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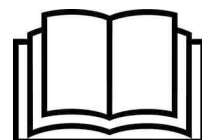
Operation & Maintenance Manual

Telescopic Handler



T40.180SLP

T40.180SLPRC S/N: B54V11001 & Above



OPERATOR SAFETY WARNINGS



- Never operate without instructions. See machine signs (decals), Operation & Maintenance Manual.
- Operator must have instructions before operating the machine. Untrained operators can cause injury or death.

SAFETY EQUIPMENT

The Bobcat machine must be equipped with safety items necessary for each job. Ask your Bobcat dealer for information on the availability and safe use of attachments and accessories.

- **SEAT BELT:** Check belt fasteners and check for damaged webbing or buckle.
- **OPERATOR CAB (ROPS AND FOPS):** It must be on the telescopic handler with all fasteners tight. Never operate without right window.
- **OPERATOR & MAINTENANCE MANUAL:** Machine Operation & Maintenance Manual must be in the cab. Man Platform Operation & Maintenance Manual must be in the man platform.
- **OPERATOR'S HANDBOOK:** Must be in the cab.
- **SAFETY SIGNS (DECALS):** Replace if damaged.
- **SAFETY TREADS:** Replace if damaged.
- **GRAB HANDLES:** Replace if damaged.
- **BOOM STOP:** Replace if damaged.
- **PARKING BRAKE:** Check for function.
- **WINDOWS AND MIRRORS:** Clean and check for broken glass or mirrors. Replace if damaged.



This check mark means: "Follow instructions for proper operations." Carefully read the message that follows.



- Always fasten seat belt snugly.
- Always keep your feet and arms inside the cab.

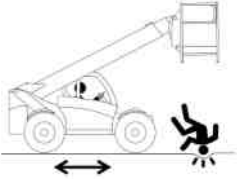


- Never use the telescopic handler without operator cab with Roll-Over Protective Structure (ROPS) and Falling-Object Protective Structure (FOPS) approval.

OPERATOR SAFETY WARNINGS



This Safety Alert Symbol means: "Attention! Be Alert! Your Safety is Involved!" Carefully read the message that follows.



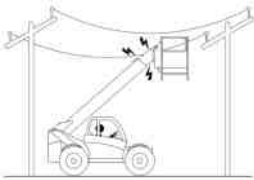
- Never carry riders.



- Do not use machine in atmosphere with explosive dust, explosive gas, or where exhaust can contact flammable material.



- Never use the machine as a working platform or an elevator unless it is equipped with a Bobcat – approved man platform.



- Check for overhead or underground power lines before operating.
- Keep boom, attachment, and load a minimum of 5 m (16 ft) away from electrical power lines beyond 50kV.



- Never exceed Rated Load Capacity.
- Read and understand the Load Capacity Charts.
- Always carry buckets or attachments as low as possible.
- Do not travel or turn with boom up.
- Load, unload, and turn on flat level ground.



- Never exit the machine with engine running or with boom raised.
- To park, put transmission in neutral, engage parking brake, put attachment flat on the ground and stop the engine.



- Never modify equipment.
- Use only attachments approved by Bobcat Company for this machine model.



Bobcat®

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EC DECLARATION OF CONFORMITY (T40.180SLPRC)

Contents of EC Declaration of Conformity					
This information is provided in the operator's manual to comply with clause 1.7.4.2(c) of Annex I of Machinery Directive 2006/42/EC. The official EC Declaration of Conformity is supplied in a separate document.					
Manufacturer  Bobcat France S.A.S. 55 Rue du Chêne Vert 44160 Pontchâteau FRANCE	Directive 2000/14/EC: Noise Emission in the Environment by Equipment For Use Outdoors Notified Body Laboratoire National de métrologie et d'Essais (LNE) France Notified Body Number: 0071 EC Certificate No. 2000-14/P205143/4				
Technical Documentation Homologation Manager Doosan Bobcat EMEA s.r.o U Kodetky 1810 263 12 Dobříš CZECH REPUBLIC	Conformity Assessment Procedure(s) 2000/14/EC, Annex VI Sound Power Levels [Lw(A)] <table> <tr> <td>Measured Sound Power</td> <td>103 dBA</td> </tr> <tr> <td>Guaranteed Sound Power</td> <td>106 dBA</td> </tr> </table>	Measured Sound Power	103 dBA	Guaranteed Sound Power	106 dBA
Measured Sound Power	103 dBA				
Guaranteed Sound Power	106 dBA				
Description of Equipment Type of Equipment: Telescopic Handler Model Name: T40.180SLPRC Model Code: B54V Engine Manufacturer: Doosan Infracore Engine Model: DM03V DM03-MFV02 Engine Power: 74.6 kW @ 2400 RPM	Equipment conforms to CE Directive(s) Listed Below 2006/42/EC: Machinery Directive 2014/30/EU: Electromagnetic Compatibility Directive				
Declaration of Conformance This equipment conforms to the requirements specified in all the EC Directives listed in this declaration.					
Effective From: 06 April 2021					

UK DECLARATION OF CONFORMITY (T40.180SLPRC)

Contents of UK Declaration of Conformity					
This information is provided in the operator's manual to comply with clause 1.7.4.2(c) of Schedule 2, Part 1 of The Supply of Machinery (Safety) Regulations 2008. The official UK Declaration of Conformity is supplied in a separate document.					
Manufacturer  Bobcat France S.A.S. 55 Rue du Chêne Vert 44160 Pontchâteau FRANCE	Noise Emission in the Environment by Equipment for Use Outdoors Regulations 2001 Approved Body AnP Certification Ltd Approved Body Number: 8500 UK Certificate No. GB/8500/0469/21				
Technical Documentation Homologation Manager Doosan Bobcat EMEA s.r.o U Kodetky 1810 263 12 Dobříš CZECH REPUBLIC	Conformity Assessment Procedure(s) Schedule 9 Procedure 1 Sound Power Levels [Lw(A)] <table> <tr> <td>Measured Sound Power</td> <td>103 dBA</td> </tr> <tr> <td>Guaranteed Sound Power</td> <td>106 dBA</td> </tr> </table>	Measured Sound Power	103 dBA	Guaranteed Sound Power	106 dBA
Measured Sound Power	103 dBA				
Guaranteed Sound Power	106 dBA				
Description of Equipment Type of Equipment: Telescopic Handler Model Name: T40.180SLPRC Model Code: B54V Engine Manufacturer: Doosan Infracore Engine Model: DM03V DM03-MFV02 Engine Power: 74.6 kW @ 2400 RPM	Equipment conforms to UK Regulations(s) Listed Below Supply of Machinery (Safety) Regulations 2008 Electromagnetic Compatibility Regulations 2016				
Declaration of Conformance This equipment conforms to the requirements specified in all the UK Regulations listed in this declaration.					
Effective From: 30 August 2022					

DECLARATION OF CONFORMITY (RADIO)

*EU Declaration of Conformity under the terms of Directive No. 2014/53/EU (RED directive)*

1. No ... (unique identification of the product)
Bobcat Radio
Hardware Version: A2C 399933
2. Name and address of the manufacturer or his authorised representative:
Continental Automotive GmbH
Heinrich-Hertz-Str. 45
78052 Villingen-Schwenningen
Germany
3. This declaration of conformity is issued under the sole responsibility of the manufacturer (or installer):
Continental Automotive GmbH declares as a manufacturer that the above-mentioned product complies with the necessary requirements of Directive 2014/53/EU (RED Directive) when used for its intended purpose.
4. Object of the declaration (identification of product allowing traceability. It may include a colour image of sufficient clarity to enable the identification of the product, where appropriate.)
Not applicable.
5. The object of the declaration described in point 4 is in conformity with the relevant Union harmonisation legislation:
Directive 2014/53/EU

Additional relevant Union harmonisation legislation:
None.
6. References to the relevant harmonised standards used, or references to the specifications in relation to which conformity is declared:
 - **EN 62368-1:2014/AC:2015/A11:2017/AC:2017**
 - **EN 62479:2010**
 - **Draft EN 301 489-1 V2.2.0**
 - **Draft EN 301 489-17 V3.2.0**
 - **EN 300 328 V2.1.1**
 - **Draft EN 303 345 v.1.1.7**
 - **EN 303 345-2 V1.1.1**
7. The notified body **CTC advanced, 0682** has performed Tests and has issued the EC approval certificate **T818837N-01-TEC**.
8. If available, a description of the accessories and the components, including the software that enables the operation of the radio system and which is covered by the EU Declaration of Conformity:
Not applicable.
9. Additional information:
None.

Signed for and on behalf of:
Continental Automotive GmbH
Heinrich-Hertz-Str. 45
78052 Villingen-Schwenningen
Germany

Place and date of issue:
Villingen-Schwenningen, 11 February 2021

Dr. Marion Grüner (Homologation)
(Name, function)



RENTWAY

EC DECLARATION OF CONFORMITY (JIB)

Declaration of Conformity for Interchangeable Equipment Directive 2006/42/EC of the European Parliament and of The Council "Machinery Directive Article 1(1)(b)"																
Manufacturer  Bobcat France S.A.S. 55 Rue du Chêne Vert 44160 Pontchâteau FRANCE		Equipment Also Compliant to Other EC Directive(s) or Standard(s) Listed Below:														
Technical Documentation Homologation Manager Doosan Bobcat EMEA s.r.o U Kodetky 1810 26312 Dobříš CZECH REPUBLIC																
Description of Equipment <table border="1"> <tr> <td>Type of Interchangeable Equipment</td> <td colspan="3">Jib</td> </tr> <tr> <td>Model Name:</td> <td rowspan="2">Jib 4.3T MT</td> <td rowspan="2">Jib 4.3T QT</td> <td rowspan="2">Long JIB 3.7M 0.7T QT</td> </tr> <tr> <td>Model Code:</td> </tr> <tr> <td>Lot Series:</td> <td>ATSR00101 & above</td> <td>B38F00101 & above</td> <td>B39J00101 & above</td> </tr> </table>				Type of Interchangeable Equipment	Jib			Model Name:	Jib 4.3T MT	Jib 4.3T QT	Long JIB 3.7M 0.7T QT	Model Code:	Lot Series:	ATSR00101 & above	B38F00101 & above	B39J00101 & above
Type of Interchangeable Equipment	Jib															
Model Name:	Jib 4.3T MT	Jib 4.3T QT	Long JIB 3.7M 0.7T QT													
Model Code:																
Lot Series:	ATSR00101 & above	B38F00101 & above	B39J00101 & above													
Declaration of Conformance This equipment conforms to the requirements of an interchangeable equipment as specified in Machinery Directive 2006/42/EC Article 1(1)(b) and any other directives listed. This declaration applies exclusively to the interchangeable equipment and does not include any hydraulic, electrical or mechanical adaptation done by the installer. Installation shall be done in accordance with instructions and specifications included in this manual.																
Authorised Signatory and Place of Declaration Date: 23 September 2022 Place: Pontchateau, France																

DECLARATION OF CONFORMITY (HYDROFLUOROCARBON)



DOOSAN BOBCAT S.A.S.
55, rue du Chêne Vert
44160 Pont-Château, France
Tel +33 (0) 2 40 00 73 50
Fax +33 (0) 2 40 00 73 60

Declaration of conformity with Article 14 of Regulation (EU) No 517/2014 of the European Parliament and of the Council

We Bobcat France S.A.S. with VAT number FR63332690908 declare under our sole responsibility that when placing on the market pre-charged equipment, which we manufacture in the Union, the hydrofluorocarbons contained in that equipment are accounted for within the quota system referred to in Chapter IV of Regulation (EU) No 517/2014 as:

☐ A. we hold authorisation(s) issued in accordance with Article 18(2) of Regulation (EU) No 517/2014 and registered in the registry referred to in Article 17 of that Regulation, at the time of release for free circulation to use the quota of a producer or importer of hydrofluorocarbons subject to Article 15 of Regulation (EU) No 517/2014 that cover(s) the quantity of hydrofluorocarbons contained in the equipment.

☐ B. *[for importers of equipment only]* the hydrofluorocarbons contained in the equipment have been placed on the market in the Union, subsequently exported and charged into the equipment outside the Union, and the undertaking that placed the hydrofluorocarbons on the market made a declaration stating that the quantity of hydrofluorocarbons has been or will be reported as placed on the market in the Union and that it has not been and will not be reported as direct supply for export in the meaning of Article 15(2)(c) of Regulation (EU) No 517/2014 pursuant to Article 19 of Regulation (EU) No 517/2014 and Section 5C of the Annex to Commission Implementing Regulation (EU) No 1191/2014 (2).

☒ C. *[for equipment manufactured in the Union only]* the hydrofluorocarbons charged into the equipment were placed on the market by a producer or importer of hydrofluorocarbons subject to Article 15 of Regulation (EU) No 517/2014.

Pavel Urban

9th June, 2021

S.A.S. au capital de 14 747 250 € - RCS Saint-Nazaire B 332 690 908 – N° Siret 332 690 908 00022
N° TVA CEE FR 63 332 690 908
Banque : J.P. Morgan n° 00609000169 09 CHASFRPPXXX – Naf 2822 Z



INTRODUCTION

This Operation & Maintenance Manual was written to give the owner / operator instructions on the safe operation and maintenance of the Bobcat machine. Read and understand this Operation & Maintenance Manual before operating your Bobcat machine. If you have any questions, see your Bobcat dealer. This manual may illustrate options and accessories not installed on your machine.

Bobcat Company Is ISO 9001 Certified



ISO 9001 is an international standard that specifies requirements for a quality management system that controls the processes and procedures that we use to design, develop, manufacture, and distribute Bobcat products.

British Standards Institute (BSI) is the Certified Registrar that Bobcat Company chose to assess the company's compliance with ISO 9001 at Bobcat's manufacturing facilities in Gwinner, North Dakota (U.S.A.), Pontchâteau (France), and the Bobcat corporate offices (Gwinner, Bismarck, and West Fargo) in North Dakota. TÜV Rheinland is the Certified Registrar that Bobcat Company chose to assess the company's compliance with ISO 9001 at Bobcat's manufacturing facility in Dobříš (Czech Republic). Only certified assessors, like BSI and TÜV Rheinland, can grant registrations.

ISO 9001 means that as a company we say what we do and do what we say. In other words, we have established procedures and policies, and we provide evidence that the procedures and policies are followed.

MANUFACTURER

France

Bobcat France S.A.S.
55 Rue du Chêne Vert
44160 Pontchâteau
FRANCE

REGULAR MAINTENANCE ITEMS

	ENGINE OIL FILTER 7343102
	FUEL FILTER, PRE-FILTER 7348032
	FUEL FILTER, MAIN 7336334
	FUEL TANK BREATHER 7373582
	ENGINE AIR FILTER, OUTER 7286652
	ENGINE AIR FILTER, INNER 7010031
	HYDRAULIC MAIN FILTER 7225338
	HYDRAULIC CHARGE FILTER 7012478
	HYDRAULIC FILL / BREATHER CAP 6727475
	BATTERY 7288629
	DEF / ADBLUE FILTER, service kit 7433127
	OPERATOR CAB AIR FILTER 7228497

NOTE: Always verify Part Numbers with your Bobcat dealer.

LUBRICANTS, FUEL, AND FLUIDS

The fluids, lubricants, and fuel described below are those used in the factory and apply to operating conditions in European temperate climate areas. Please see your Bobcat dealer for requirements in other climate areas.

Read and understand the preventive maintenance required before adding or replacing any fluids or lubricants.

ENGINE SYSTEMS				
Machine Components	Fluids And Lubricants	Temperature Range	Packaging*	Part Number
Engine	Bobcat Engine Power SAE 10W30 CK4 / ACEA E9	-25°C - +30°C	A, B, C, D	7341377**
	Bobcat Engine Power SAE 15W40 CK4 / ACEA E9	-20°C - +40°C	A, B, C, D	7395725
Cooling Circuit	Bobcat EG Coolant Concentrated that meets SAE J1034, ASTM D3306, D6210, and JIS K2234	-36°C	A, B, C, D	6987803

ENGINE SYSTEMS				
Machine Components	Fluids And Lubricants	Temperature Range	Packaging*	Part Number
	Bobcat Coolant Premixed that meets SAE J1034, ASTM D3306, D6210, and JIS K2234	-36°C	A, B, C, D	6987804**
Diesel Exhaust Fluid (DEF) / AdBlue®	DEF / AdBlue: Air1 that meets ISO 22241-1 or AUS32 that meets DIN70070 (See / System on Page 155)	-	-	**
Fuel Tank	High-quality diesel fuel that meets EN590	-	-	**

HYDRAULIC / HYDROSTATIC SYSTEMS				
Machine Components	Fluids And Lubricants	Temperature Range	Packaging*	Part Number
Hydraulic Fluid Tank	Bobcat Superior SH Hydraulic / Hydrostatic	-35°C - +50°C	A, B, C, D	6987791**

TRANSMISSION SYSTEMS				
Machine Components	Fluids And Lubricants	Temperature Range	Packaging*	Part Number
Axles Central Housing / Differential	Bobcat Axle / Transmission Oil SAE 85W90 LS / API GL-5	-20°C / +40°C	A, B, C, D	6987805
Axle End Reduction / Transfer Box	Bobcat Axle / Transmission Oil ISO 100 / API GL-4	-20°C / +40°C	A, B, C	6987794**

MECHANICAL SYSTEMS				
Machine Components	Fluids And Lubricants	Temperature Range	Packaging*	Part Number
All Mechanical Systems	Bobcat Multipurpose Grease	From 260°C	E	6987888**
	Bobcat Supreme HD Grease	From 280°C	E	6987889
	Bobcat Extreme HP Grease	From 260°C	E	6987890

* Packaging Available:

- A = 5 L Can
- B = 25 L Container
- C = 209 L Drum
- D = 1000 L Tank
- E = 400 g Tube

** Factory Filled Fluids And Lubricants

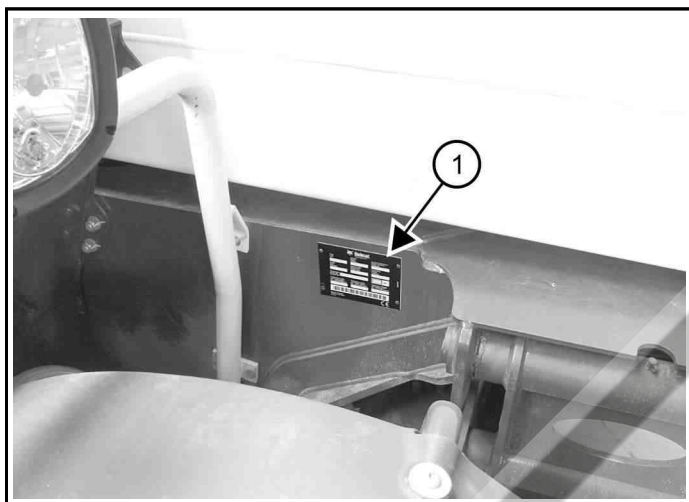
SERIAL NUMBER LOCATION

Always use the serial number of the Telescopic Handler when requesting service information or when ordering parts.

If any serial number plate is damaged, contact your Bobcat dealer.

Telescopic Handler Serial Number

Figure 1

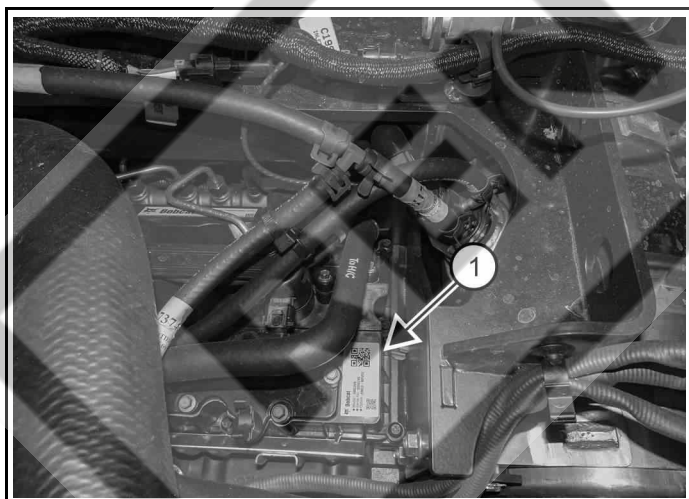


S41650b

The telescopic handler serial number plate (Item 1) [Figure 1] is located on the right side of the chassis in front.

Engine Serial Number

Figure 2



C213294a

The engine serial number can be found on the engine cylinder head cover (Item 1) [Figure 2]. Always use the full number (type + number) when ordering replacement parts.

Other Serial Numbers

Other components can also have serial numbers and an identification plate. Always use these serial numbers when ordering parts.

DELIVERY REPORT

Figure 3

Bobcat Delivery Report

Serial Number: _____ Model Number: _____ Delivery Date: _____

Dealer Address: _____ Telephone: _____
 Customer Address: _____
 Customer Email: _____ Customer Name: _____
 Machine Number: _____ Machine Category: _____
 Purchase Date: _____

WARNING

The following items are to be checked "X" as they are explained or shown to the Owner/Operator by the Dealer at time of delivery:

1. Explain delivery point (Operation & Maintenance Manual, Safety Manual and Operator's Handbook) when given to Owner/Operator.
2. Explain serial and model numbers to Owner/Operator.
3. Explain operation and maintenance of attachment and attachment carrier (as identified by Owner/Operator).
4. Review machine Safety Sign (Safety, Operation & Maintenance Manual, Operator's Handbook and Safety Manual).
5. Explain operation of steering control lever. When pulling lever forward, steering foot controls, steering will result in the direction of the lever being driven (steer wheel on back hand).
6. Show how to enter and exit machine safely, with attachment lowered and engine off. Explain function of control levers.
7. Explain use of seat belt. Explain to operate controls from operator's seat only and to keep feet and hands inside seat (if fitted).
8. Demonstrate how to start, stop, turn and park the excavator.
9. Explain function of all controls. Explain house swing control (see feature if equipped).
10. Explain STOPPED control pattern selector button (if equipped).
11. Explain use of operator's identification, which is a Bobcat Personal Protection (PPPS) under the Operator's Handbook.
12. Explain weight of capacity for the safety and stability of the excavator and attachments.
13. Explain operational loading and unloading procedures and the importance of proper fuel management practices.
14. Advise use of exclusive on slopes.
15. Advise owner to use the excavator in an environment with explosive dust and gases or with flammable material must be notified.
16. Advise Owner/Operator of all available attachments and attachments sold as dealer assembly. Serial Registration, ROPS and FOPS. Advise use of X-Change System (if equipped).
17. Review maintenance procedure with Operator and/or maintenance person as listed in Operation & Maintenance Manual.
18. Explain loading and unloading procedures into trailers and use of ramps.
19. Explain use of PTO. Explain use of back expansion function (if equipped).
20. Explain use of PTO and unloading procedures.
21. Explain "Turning Point" and limitations to Owner/Operator. Provide Owner/Operator with the correct version of the product operating manual.
22. Review Protection Plus Program (Extended Warranty, part 1) and Protection Plus Program (Extended Warranty, part 2).
23. "Must" (Serial One, Required for Delivery Report Confirmation, T-1) (Owner to purchase a Bobcat Protection Plus Extended Warranty Plan. Call purchase up to 12 months after delivery date).
24. If machine equipped with operator's remote Bobcat Telematics system, inform Owner/Operator of the system, its use and use of information (including personal identifiable information) collected in connection with the Bobcat Telematics system. If equipped, on the machine (including engine, serial number, equipment location, engine hour, and other diagnostic and performance data) and to the remote back information facility.

The above information has been explained to me, I understand the operation and maintenance of the machine. I acknowledge the warranty, conditions and limitations as outlined by the copy of the warranty document. I acknowledge the Bobcat Company and its policies. I will collect and use all information (including personal identifiable information) collected in connection with the Bobcat Telematics system. If equipped, on the machine (including engine, serial number, equipment location, engine hour, and other diagnostic and performance data) and to the remote back information facility.

Owner/Operator Signature: _____ Date: _____
 Dealer Signature: _____ Date: _____

Please scan and attach this signed, completed Delivery Report to the online form to submit retail.

NA15473

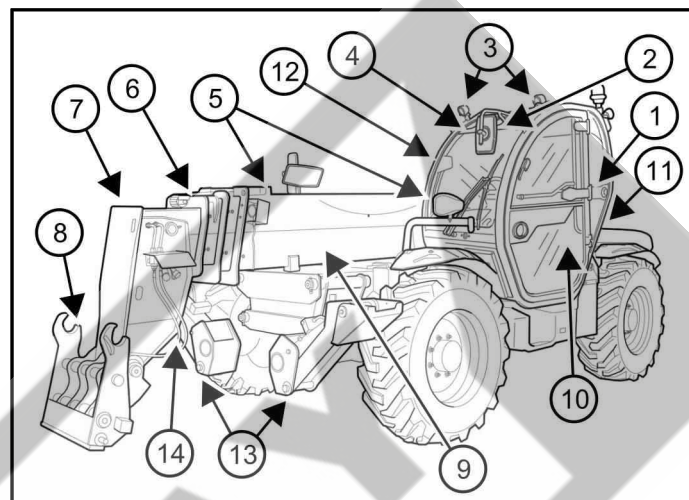
The delivery report contains a list of items that must be explained or shown to the owner or operator by the dealer when the machine is delivered.

The delivery report must be reviewed and signed by the owner or operator and the dealer.

TELESCOPIC HANDLER IDENTIFICATION

Front View

Figure 4



NA20597a

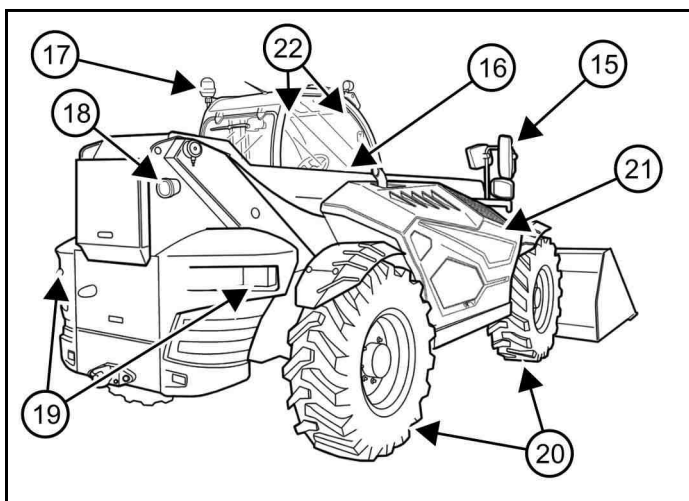
REF	DESCRIPTION
1	Operation & Maintenance Manual and Operator's Handbook
2	Mirror
3	Work Lights
4	Sight Level Gauge
5	Front Lights
6	Telescoping Booms
7	Boom Head
8	Attachment Carrier [A]
9	Boom
10	Seat Belt
11	Boom Stop
12	Operator Cab (ROPS and FOPS) [B]
13	Stabilisers
14	Lift Eye Link

[A] Attachments - Several different attachments are available for the Bobcat Telescopic Handler.

[B] ROPS, FOPS - ROPS, per ISO 3471, and FOPS per ISO 3449, Level II.

Rear View

Figure 5



NA20548a

REF	DESCRIPTION
15	Mirror
16	Load Capacity Charts
17	Rotating Beacon
18	Rear Work Light
19	Tail Lights and Directional Lights
20	Tyres [A]
21	Engine Cover
22	Front / Rear Interior Mirror

[A] TYRES - Standard tyres are shown. Several different tyre styles and sizes are available for the Bobcat Telescopic Handler.

FEATURES, ACCESSORIES AND ATTACHMENTS

Standard Items

Model T40.180SLP Bobcat Telescopic Handler is equipped with the following standard items:

- 12V power outlet
- 4 equal-size drive wheels with tyres CAMSO 400/80-24 20PR TM R4
- Adjustable steering column
- Attachment carrier
- Auxiliary hydraulic line on boom
- Back-up alarm
- Boom stop
- Cab heater
- Carrier locking bar holder
- Counterweight
- Cushion lift (up and down)
- Cushion retract
- Diesel Oxidation Catalyst (DOC), Diesel Particulate Filter (DPF) and Selective Catalytic Reduction (SCR) (DOC / SDPF / SCR)
- Cyclonic cleaner on air intake
- Display, standard, 5"
- Double mirrors on right side
- ECO mode
- Forward / Neutral / Reverse button on joystick
- Frame-levelling
- Front and rear washer / wipers
- Gear pump, 100 L/min
- Glass door
- Hydrostatic transmission, 30 km/h (18.6 mph)
- Interior mirror
- Left and right side mirrors
- Lift eye link
- Longitudinal Load Moment Controller (LLMC) system with override feature
- Manual locking of attachments
- Mudguards
- Navigation jog shuttle
- Rear document storage net
- Road lights
- Roof window wiper
- Rotating beacon
- Seat sensor
- Semi-automatic realignment of the wheels
- Sight level gauge
- Smart Handling System (SHS)

- Speed management
- Stabilisers
- Stabiliser on ground detection
- Standard proportional joystick
- Standard steering wheel
- Suspension seat
- Turbo-charged engine, 74,5 kW (100 hp)
- Turn signals
- USB plug
- Work lights on roof (2 front + 1 rear)
- Work lights on frame
- Wrench for transmission disengagement

Specifications subject to change without notice.

Options And Accessories

Below is a list of some equipment available from your Bobcat dealer as Dealer and / or Factory Installed Accessories and Factory Installed Options. See your Bobcat dealer for other available options, accessories and attachments.

- Air suspension seat
- Attachment carrier
 - ▷ J-Tach
 - ▷ Mani-tach
 - ▷ Quick-tach
- Attachment control device
- Attachment control device, without connectors
- Back-up alarm (white noise)
- Basic tow hitch
- Cab air conditioning
- Dual F-N-R
- Electric line on boom
- Extinguisher
- Fan inverter
- Flex control by hand lever
- Front window guard
- Hydraulic locking of attachments:
 - ▷ J-Tach
 - ▷ Mani-Tach
 - ▷ Quick-Tach
- Keyless start
- Lateral window wiper / washer
- License plate light
- Lockable AdBlue® cap
- Lockable fuel cap
- Lunch box
- Man platform ready
- Phone holder

- Radio ready (with radio, speakers and antenna)
- Rear flat mirror
- Rear hitch electrical plug (7-Pin)
- Rear-view camera
- Remote Control
- Road lights, left hand drive
- Road lights, left hand drive LED
- Road lights, right hand drive LED
- Roll sun visor
- Rotating beacon LED
- Smart joystick
- Solid rear document compartment
- Special colour cab
- Special colour frame, boom and rims
- Steering wheel with height adjustment
- Support for registration plate
- Tool box (outside)
- Tow devices for trailers
- Travel direction lever
- Vent compartment
- Wheel wedge
- Winch ready
- Work lights on boom
- Work lights on boom LED
- Work lights on frame LED
- Work lights on right mirror bracket LED (2)
- Work lights on roof LED (2 front + 1 rear)

Specifications subject to change without notice

Available Tyres

Standard tyres:

- CAMSO 400/80R24 20 PR TM R4

Optional tyres:

- MICHELIN 400/80R24 162A8 IND TL POWER CL

See your Bobcat dealer for more information on optional tyres and the corresponding steering angle adjustment.

Available Rims

Standard rims:

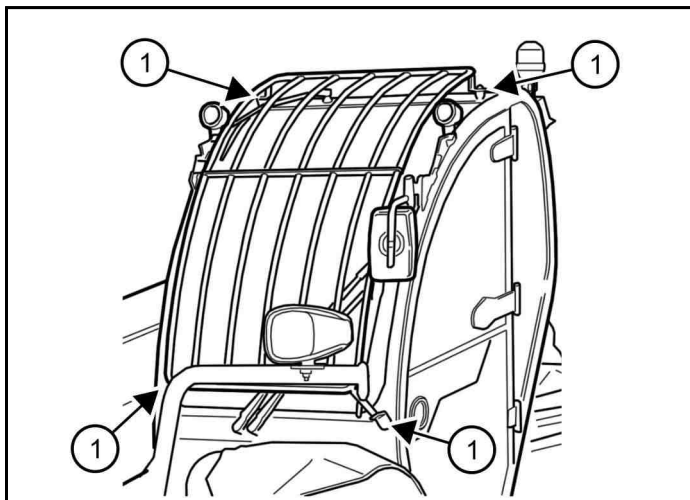
- RIM 13*24" +29

Optional rims:

- RIM 13*24" +29 + 87

Front Window Guard

Figure 6



Available for special applications to restrict material from entering cab openings [Figure 6].

The front window guard is mounted to the cab at four mounting points (Item 1) [Figure 6].

Do not use an unapproved front window guard. A front window guard not manufactured by Bobcat cannot be approved.

See your Bobcat dealer for availability.

Front Window Guard Inspection And Maintenance

The front window guard must be regularly inspected and maintained. Inspect the screen and the four mounting points (Item 1) [Figure 6] for damage. Replace parts as necessary.

Attachments

These attachments are approved for use on the Bobcat Telescopic Handler.

Do not use unapproved attachments. Attachments not manufactured by Bobcat cannot be approved.

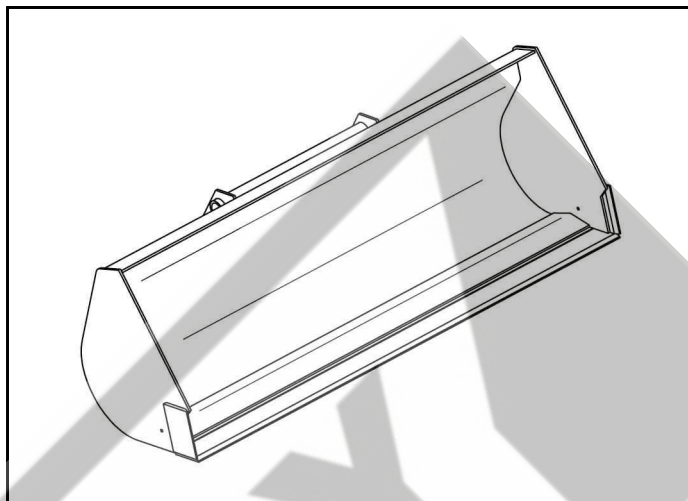
The versatile Bobcat Telescopic Handler quickly turns into a multi-job machine with a tight-fit attachment hook-up from bucket to grapple to pallet fork and a variety of other attachments.

See your Bobcat dealer for more details on these and other attachments and field accessories.

Increase the versatility of your Bobcat Telescopic Handler with a variety of bucket styles and sizes.

Digging Buckets

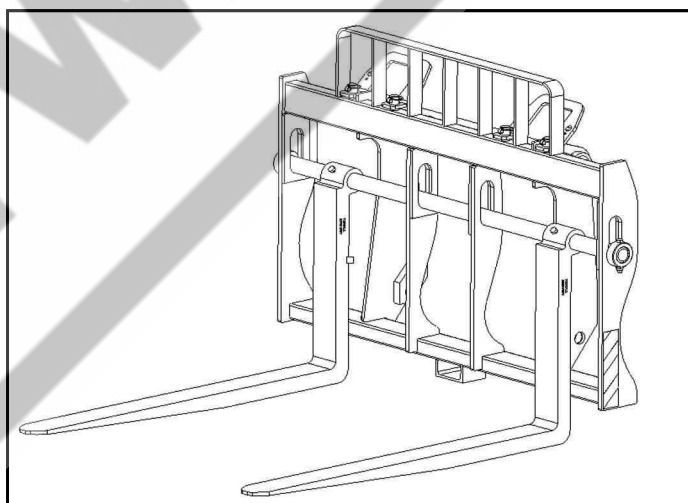
Figure 7



- 950 L (33.5 ft³) - with teeth
- 950 L (33.5 ft³) - without teeth

Pallet Forks

Figure 8

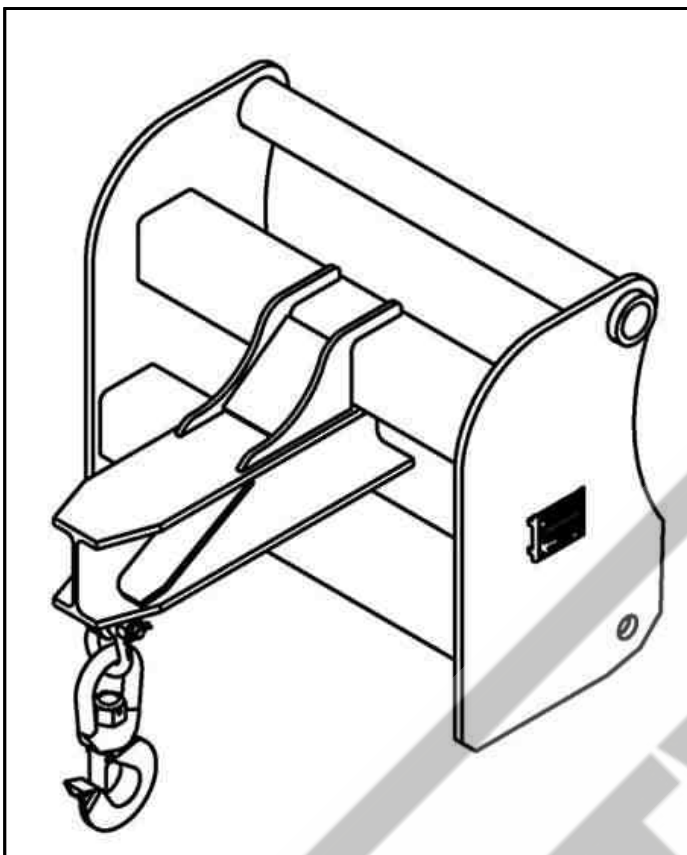


- Rigid pallet forks FEM III with guard - Quick-tach
- Rigid pallet forks FEM III - with guard - Mani-tach
- Rigid pallet forks FEM III without guard - Quick-tach
- Rigid pallet forks FEM III without guard - Mani-tach
- Floating pallet forks 1,0 m (39 in) - Quick-tach
- Floating pallet forks 1,0 m (39 in) - Mani-tach
- Floating pallet forks 1,5 m (59 in) - Quick-tach
- Floating pallet forks 1,5 m (59 in) - Mani-tach

- Floating pallet forks Q-fit - J-tach

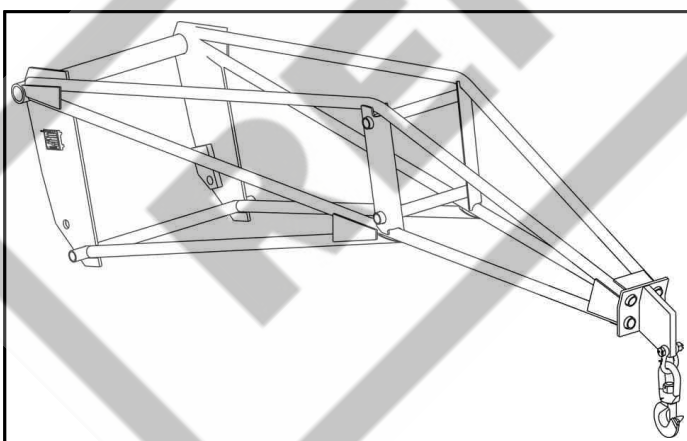
Jibs

Figure 9



- Jib 0,7 m / 4300 kg (28 in / 9480 lb) - Quick-tach
- Jib 0,7 m / 4300 kg (28 in / 9480 lb) - Mani-tach

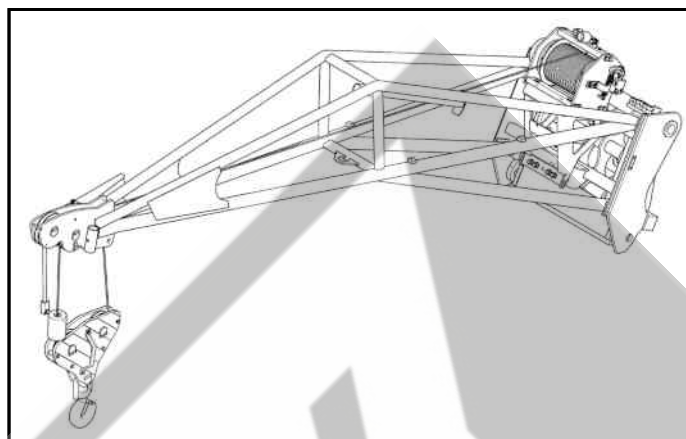
Figure 10



- Jib 3,7 m / 700 kg (12 ft / 1543 lb) - Quick-tach

Winches

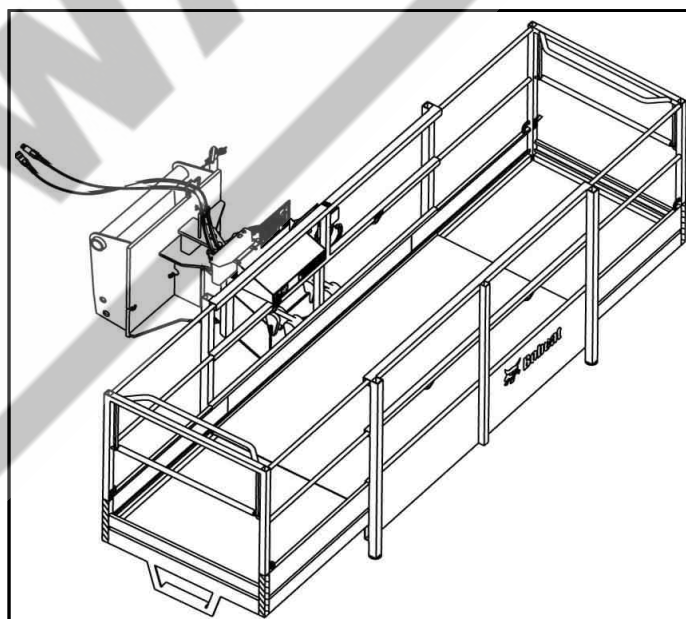
Figure 11



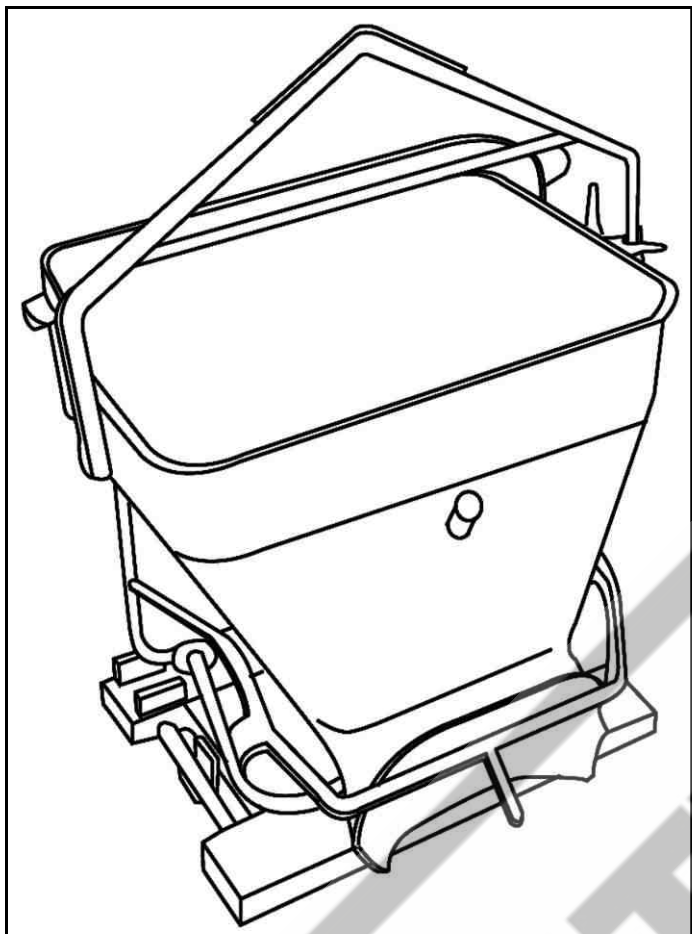
- Winch 3500 kg (7716 lb)
- Winch with jib 2 m (78.7 in), 1500 kg (3307 lb)

Man Platforms

Figure 12



- Man platform 1 m / 220 kg (3.2 ft / 485 lb)
- Man platform 2,2 m / 300 kg (7.2 ft / 661 lb)
- Man platform 4 m / 300 kg (13 ft / 661 lb)
- Man platform 4 m / 800 kg (13 ft / 1764 lb)

*Concrete Baskets***Figure 13**

EM0749

- Concrete bucket 500 L (17.6 ft³) - manual
- Concrete bucket 500 L (17.6 ft³) - hydraulic

SAFETY INSTRUCTIONS

Before Operation

WARNING

INSUFFICIENT INSTRUCTIONS HAZARD

Untrained operators or failure to follow instructions can cause serious injury or death. Operators must have adequate training and instruction before operating. ◀

W-2001

Carefully follow the operating and maintenance instructions in this manual.

The Bobcat machine is highly manoeuvrable and compact. It is rugged and useful under a wide variety of conditions. This presents an operator with hazards associated with off highway, rough terrain applications, common with Bobcat machine usage.

The Bobcat machine has an internal combustion engine with resultant heat and exhaust. All exhaust gases can kill or cause illness so use the machine with adequate ventilation.

The dealer explains the capabilities and restrictions of the Bobcat machine and attachment for each application. The dealer demonstrates the safe operation according to Bobcat instructional materials, which are also available to operators. The dealer can also identify unsafe modifications or use of unapproved attachments. Rated Operating Capacity They are designed for secure fastening to the machine. The user must check with the dealer, or Bobcat literature, to determine safe loads of materials of specified densities for the machine - attachment combination.

The following publications and training materials provide information on the safe use and maintenance of the Bobcat machine and attachments:

- The Delivery Report is used to assure that complete instructions have been given to the new owner and that the machine and attachment are in safe operating condition.
- The Operation & Maintenance Manual delivered with the machine or attachment gives operating information as well as routine maintenance and service procedures. It is a part of the machine and can be stored in a container provided on the machine. Replacement Operation & Maintenance Manuals can be ordered from your Bobcat dealer.
- Machine signs (decals) instruct on the safe operation and care of your Bobcat machine or attachment. The signs and their locations are shown in the Operation & Maintenance Manual. Replacement signs are available from your Bobcat dealer.
- An Operator's Handbook is fastened to the operator cab of the machine. Its brief instructions are convenient for the operator. See your Bobcat dealer for more information on translated versions.

The dealer and owner / operator review the recommended uses of the product when delivered. If the owner / operator will be using the machine for a different application(s) he or she must ask the dealer for recommendations on the new use.

Safe Operation Is The Operator's Responsibility

Safety Alert Symbol

This symbol with a warning statement means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.

DANGER

The signal word DANGER on machine signs and in the manuals indicates a hazardous situation which, if not avoided, will result in serious injury or death. ◀

D-1002

WARNING

The signal word WARNING on the machine and in the manuals indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death. ◀

W-2044

IMPORTANT

This notice identifies procedures which must be followed to avoid damage to the machine. ◀

I-2019

The machine and attachment must be in good operating condition before use.

Check all of the items on the Service Schedule decal (if equipped) in the Every 10 Hours section or as shown in the Operation & Maintenance Manual.

Safe Operation Needs A Qualified Operator

For an operator to be qualified, he or she must not use drugs or alcoholic drinks which impair alertness or co-ordination while working. An operator who is taking prescription drugs must get medical advice to determine if he or she can safely operate a machine.

A Qualified Operator Must Do The Following

- Understand the written instructions, rules, and regulations.
 - ▷ The written instructions from Bobcat Company include the Delivery Report, Operation & Maintenance Manual, Operator's Handbook, and machine signs (decals).
 - ▷ Check the rules and regulations at your location. The rules may include an employer's work safety requirements. For driving on public roads, the machine must be equipped as stipulated by the local regulations authorising operation on public

roads in your specific country. Regulations may identify a hazard such as a utility line.

- Have training with actual operation.
 - ▷ Operator training must consist of a demonstration and verbal instruction. This training is given by your Bobcat dealer before the product is delivered.
 - ▷ The new operator must start in an area without bystanders and use all the controls until he or she can operate the machine and attachment safely under all conditions of the work area. Always fasten seat belt before operating.
- Know the work conditions.
 - ▷ Know the weight of the materials being handled. Rated Operating Capacity Material that is very dense will be heavier than the same volume of less dense material. Reduce the size of load if handling dense material.
 - ▷ The operator must know any prohibited uses or work areas, for example, he or she needs to know about excessive slopes.
 - ▷ Know the location of any underground lines.
 - ▷ Wear tight fitting clothing. Always wear safety glasses when doing maintenance or service. Safety glasses, respiratory equipment, hearing protection, or Special Applications Kits are required for some work. See your Bobcat dealer about Bobcat safety equipment for your model.

Silica Dust Exposure



Cutting or drilling concrete containing sand or rock containing quartz may result in exposure to silica dust. Use a respirator, water spray, or other means to control dust.

Dismantling And Disposal

On the completion of its useful life, the machine and its parts shall be disposed of in an environmental friendly manner. Please contact your local dealer. Parts of the machine can be remanufactured like the engine depending on its age and condition, or recycled like metals, plastics, rubbers and glasses. Respect the environment and dispose of waste properly. Worn or damaged parts shall not be left in the environment. Oils, brake fluid, cooling refrigerants, batteries and cells shall be disposed of in a proper manner through your local dealer or recycling center.

FIRE PREVENTION



Maintenance

The machine, some attachments, and some implements have components that are at high temperatures under normal operating conditions. The primary source of high temperatures is the engine and exhaust system. The electrical system, if damaged or incorrectly maintained, can be a source of arcs or sparks.

Flammable debris (leaves, straw, etc.) must be removed regularly. If flammable debris is allowed to accumulate, it can cause a fire hazard. Clean often to avoid this accumulation. Flammable debris in the engine compartment is a potential fire hazard.

The operator's area, engine compartment, and engine cooling system must be inspected every day and cleaned if necessary to prevent fire hazards and overheating.

All fuels, most lubricants, and some coolant mixtures are flammable. Flammable fluids that are leaking or spilled onto hot surfaces or onto electrical components can cause a fire.

Operation

Do not use the machine where exhaust, arcs, sparks, or hot components can contact flammable material, explosive dust, or gases.

Electrical



P200082

Check all electrical wiring and connections for damage. Keep the battery terminals clean and tight. Repair or replace any damaged part or wires that are loose or frayed.

Battery gas can explode and cause serious injury. Use the procedure in the Operation & Maintenance Manual for connecting the battery and for jump starting. Do not jump start or charge a frozen or damaged battery. Keep any open flames or sparks away from batteries. Do not smoke in battery charging area.

Hydraulic System

Check hydraulic tubes, hoses and fittings for damage and leakage. Never use open flame or bare skin to check for leaks. Hydraulic tubes and hoses must be properly routed and have adequate support and secure clamps. Tighten or replace any parts that show leakage.

Always clean fluid spills. Do not use petrol or diesel fuel for cleaning parts. Use commercial non-flammable solvents.

Fuelling



P200084

Stop the engine and let it cool before adding fuel. No smoking! Do not refuel a machine near open flames or sparks. Fill the fuel tank outdoors.

Ultra Low Sulfur Diesel (ULSD) poses a greater static ignition hazard than earlier diesel formulations with higher sulfur content. Avoid death or serious injury from fire or explosion. Consult with your fuel or fuel system supplier to ensure the delivery system is in compliance with fuelling standards for proper earthing and bonding practices.

Starting

Do not use ether or starting fluids on any engine that has glow plugs or an air intake heater. These starting aids can cause explosion and injure you or bystanders.

Use the procedure in the Operation & Maintenance Manual for connecting the battery and for jump starting.

Welding And Grinding

Always clean the machine and attachment, disconnect the battery, and disconnect the wiring from the Bobcat controllers before welding. Cover rubber hoses, battery, and all other flammable parts. Keep a fire extinguisher near the machine when welding.

Have good ventilation when grinding or welding painted parts. Wear a dust mask when grinding painted parts. Toxic dust or gas can be produced.

Dust generated from repairing nonmetallic parts such as hoods, fenders, or covers can be flammable or explosive. Repair such components in a well-ventilated area away from open flames or sparks.

Fire Extinguishers



P200083

Know where fire extinguishers and first aid kits are located and how to use them. Inspect the fire extinguisher and service the fire extinguisher regularly. Obey the recommendations on the instructions plate.

PUBLICATIONS AND TRAINING RESOURCES

The following publications are also available for your Bobcat machine. You can order them from your Bobcat dealer.

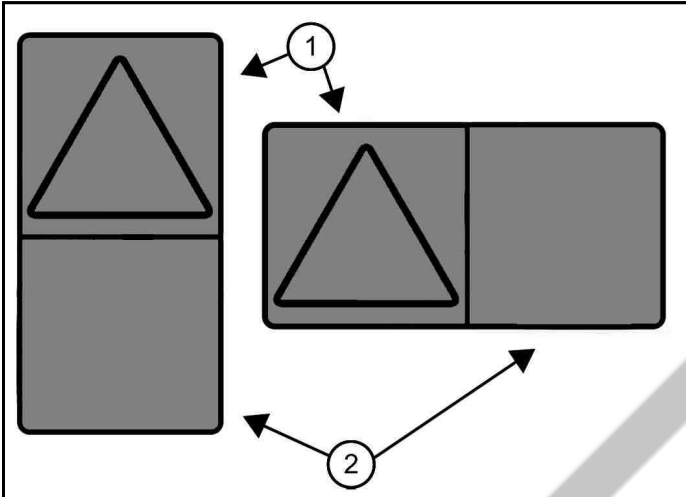
	Operation & Maintenance Manual Complete instructions on the correct operation and the routine maintenance of your Bobcat machine. 7432899
	Operator's Handbook Gives basic safety procedures and warning for your Bobcat machine. 7432867
	Service Manual Complete maintenance instructions for your Bobcat machine. 7432900

For the latest information on Bobcat products and the Bobcat Company, visit our website at Bobcat.com/training or Bobcat.com

PICTORIAL ONLY SAFETY SIGNS

Safety signs are used to alert the equipment operator or maintenance person to hazards that may be encountered in the use and maintenance of the equipment. The location and description of the safety signs are detailed in this section. Please become familiarised with all safety signs installed on the machine / attachment.

Figure 14



The format consists of the hazard panel(s) (Item 1) [Figure 14] and the avoidance panel(s) (Item 2) [Figure 14].

Hazard Panels: Depict a potential hazard enclosed in a safety alert triangle.

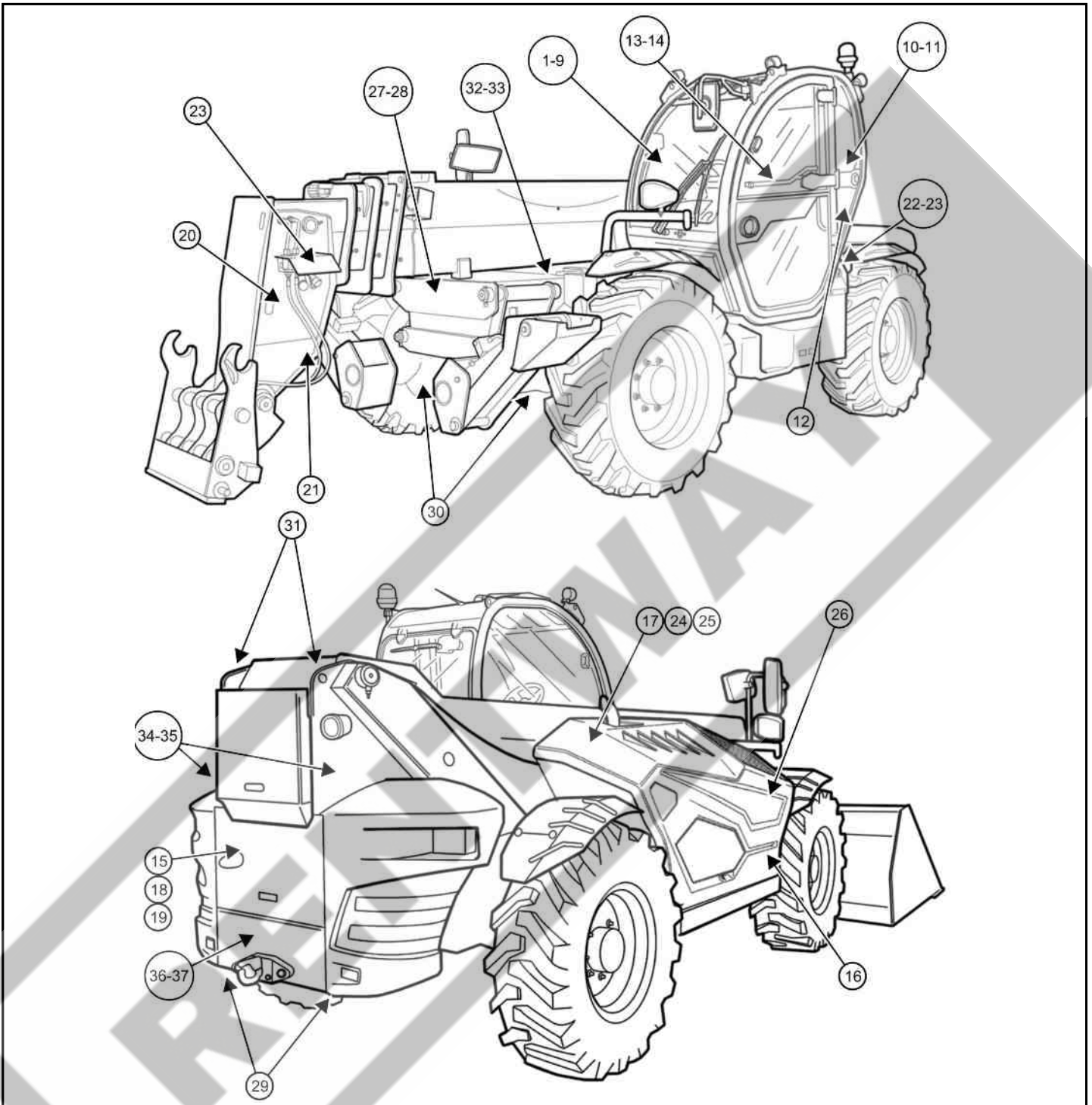
Avoidance Panels: Depict actions required to avoid the hazards.

A safety sign may contain more than one hazard panel and more than one avoidance panel.

MACHINE SIGNS (DECALS)

Follow the instructions on all the Machine Signs (Decals) that are on the Telescopic Handler. Replace any damaged machine signs and be sure they are in the correct locations. Machine signs are available from your Bobcat dealer.

Figure 15



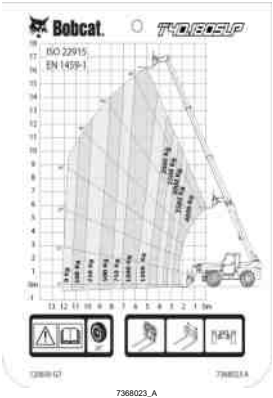
EM112646

REF	DECAL	WARNING (IF APPLICABLE)
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Load Charts

The load charts are located inside the operator cab on the right cab window.

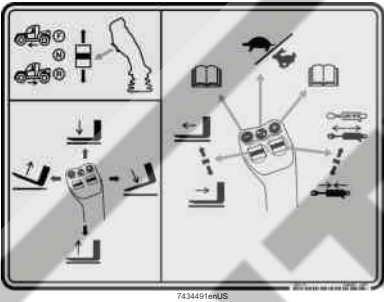
1



Simple Joystick Without F-N-R Lever (7434491)

This safety sign is located inside the operator cab on the right cab window.

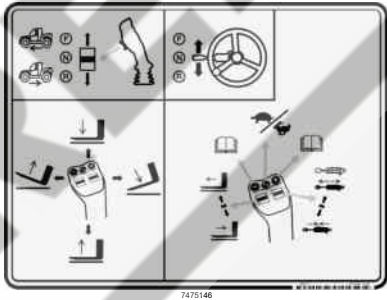
2



Simple Joystick With F-N-R Lever (7475146)
[A]

This safety sign is located inside the operator cab on the right cab window.

3

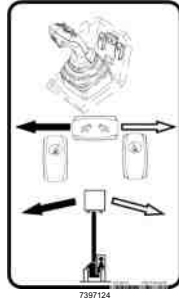


REF	DECAL	WARNING (IF APPLICABLE)
-----	-------	----------------------------

Frame Levelling (7397124)

This safety sign is located inside the operator cab on the right cab window.

4

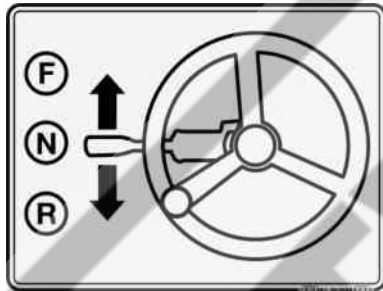


7397124

Dual F-N-R (7454542) [A]

This safety sign is located inside the operator cab on the right cab window.

5

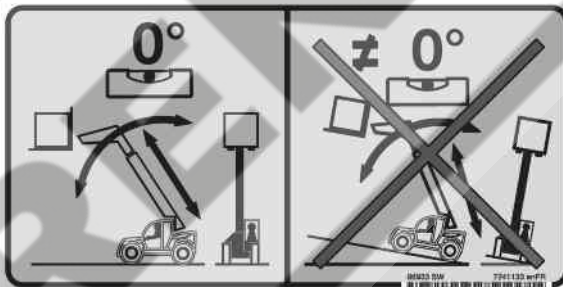


7454542

Horizontal Machine (7241133)

This safety sign is located inside the operator cab on the right cab window.

6



7241133

REF	DECAL	WARNING (IF APPLICABLE)
-----	-------	----------------------------

Four Wheel Steering (7339764)

This safety sign is located inside the operator cab on the right cab window.

7



Ignition Key (7362846)

This safety sign is located inside the operator cab on the right instrument panel.

8

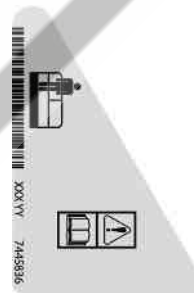


Longitudinal Load Moment Indicator (LLMI) Override Switch (7444479)

9



LLMI Override Switch (7445836)
[B]

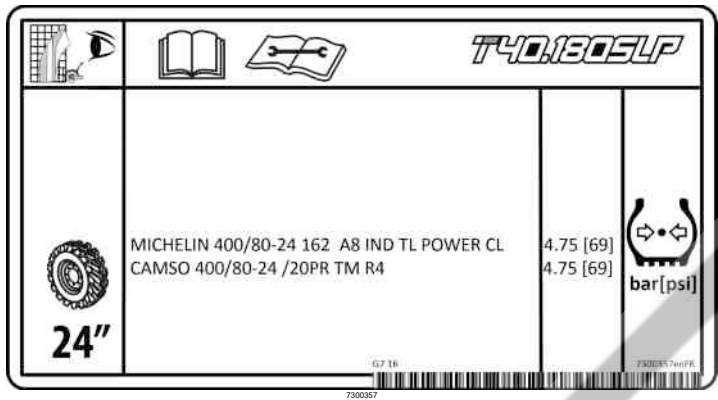


REF	DECAL	WARNING (IF APPLICABLE)
-----	-------	----------------------------

Tyres (7300357)

This safety sign is located inside the operator cab on the door.

10



Emergency Door Exit (7169014)

This safety sign is located inside the operator cab on the rear window.

11



Sound Power (7199636)

This safety sign is located on the left side of the operator cab.

12

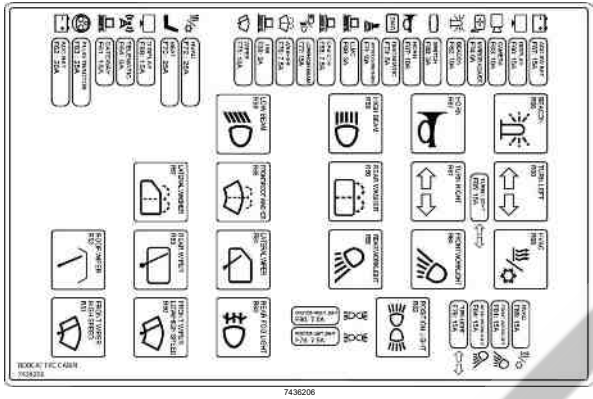


REF	DECAL	WARNING (IF APPLICABLE)
-----	-------	----------------------------

Cab Fuse And Relay Centre (7436206)

This safety sign is located inside the fuse and relay box behind the right console cover.

13



Fuse F63 (7446379)

This safety sign is located inside the fuse and relay box behind the right console cover.

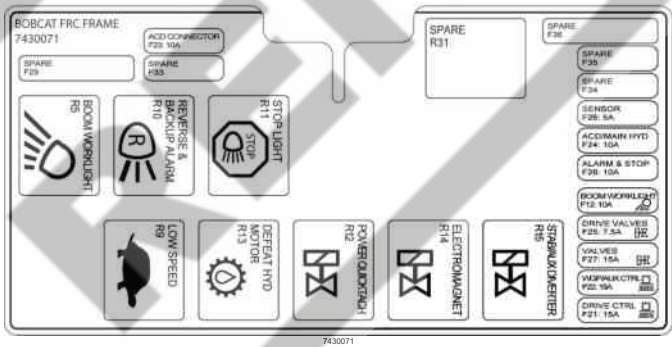
14



Frame Fuse And Relay Centre (7430071)

This safety sign is located inside the fuse and relay box in the rear of the machine.

15

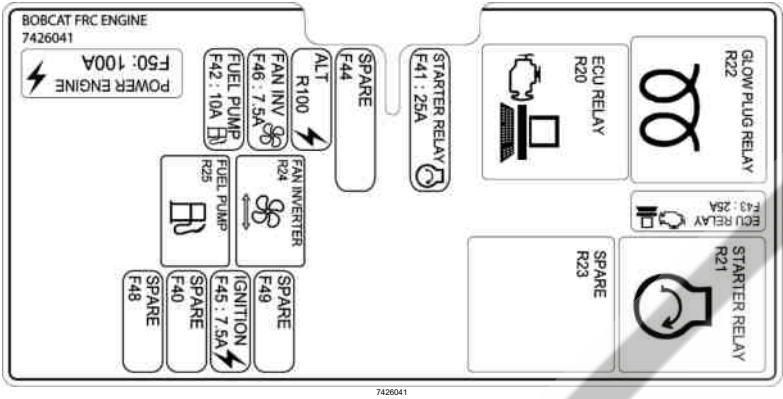


REF	DECAL	WARNING (IF APPLICABLE)
-----	-------	----------------------------

Engine Fuse And Relay Centre (7426041)

This safety sign is located in the engine compartment inside the engine fuse and relay box.

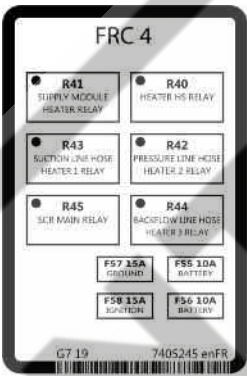
16



DEF / AdBlue® System Fuse And Relay Centre (7405245)

This safety sign is located in the engine compartment inside the DEF / AdBlue® system fuse and relay box.

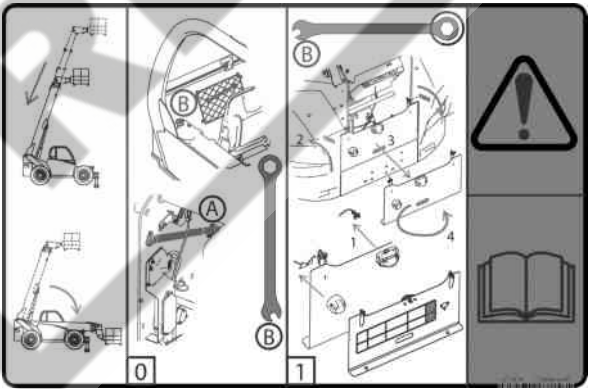
17



Rear Cover Removal (7378282)
[B]

This safety sign is located on the rear window.

18



WARNING

GENERAL HAZARD
Failure to follow the safety precautions could result in serious injury or death.
Read, understand and follow all the precautions in this manual and on safety signs (decals).¹

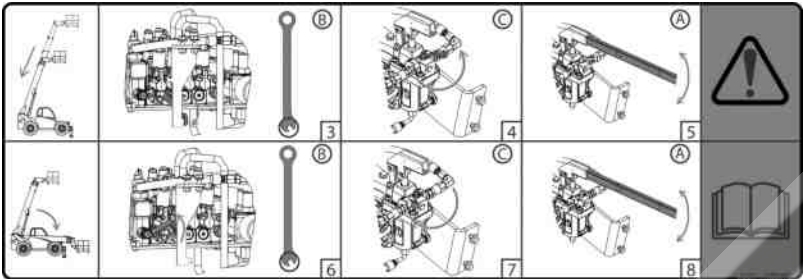
W2815

REF	DECAL	WARNING (IF APPLICABLE)
-----	-------	----------------------------

Hydraulic Safety Group Operation (7378283)
[B]

This safety sign is located on the inside of the rear cover.

19



WARNING

GENERAL HAZARD
Failure to follow the safety precautions could result in serious injury or death.
Read, understand and follow all the precautions in this manual and on safety signs (decals).¹

W-2815

Falling And Crush Hazards (7251955)

This safety sign is located on both sides of the boom head.

20



7251955



WARNING

CRUSHING HAZARD
Lowering of attachment, falling loads or falling off attachment can cause serious injury or death.
• Do not use as a manlift or work platform.
• No riders.
• Keep away from raised boom and attachment.
• Keep bystanders away.¹

W-2905

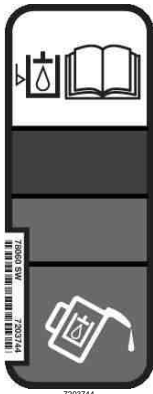
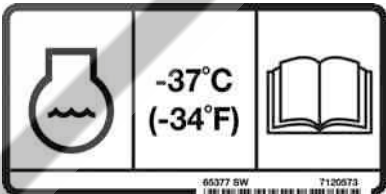
Lift Eye Link Rated Load Capacity (7274273)

This safety sign is located on the left side of the boom head.

21



7274273

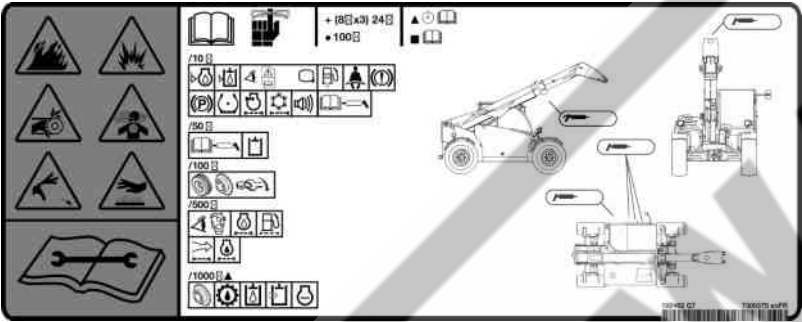
REF	DECAL	WARNING (IF APPLICABLE)
	Hydraulic Fluid Sight Gauge (7173294)	
	This safety sign is located on the hydraulic fluid tank next to the hydraulic fluid sight gauge.	
22	 7203744	
	Hot Pressurised Fluid (7185935) (2)	
	This safety sign is located on the boom head and on the hydraulic fluid tank.	
23	 7185935enUS	 WARNING BURN HAZARD Hydraulic fluid, tubes, fittings and quick couplers can get hot when running machine and attachments. Be careful when connecting and disconnecting quick couplers. † W-2220
	Hot Pressurised Fluid (7169699)	
	This safety sign is located on the engine coolant tank cap.	
24	 7169699	 WARNING BURN HAZARD Hot fluid can cause serious burns • Never open hot. • Open slowly to release pressure. † W-2755
	Engine Coolant (7120573)	
	This safety sign is located inside the engine compartment on the engine coolant tank.	
25	 65377 SW 7120573	

REF	DECAL	WARNING (IF APPLICABLE)
-----	-------	----------------------------

26

Service Checklist and Schedule (7300375)

This safety sign is located inside the engine compartment on the battery cover.



! WARNING

GENERAL HAZARD

Failure to follow instructions can cause serious injury or death.

- Keep door / cover closed except for service.
- Keep engine clean of flammable material.
- Keep body, loose objects, and clothing away from electrical contacts, moving parts, hot parts, and exhaust.
- Do not use the machine in space with explosive dusts or gases or with flammable material near exhaust.
- Never use ether or starting fluid on diesel engine with glow plugs or air intake heater. Use only starting aids as approved by engine manufacturer.
- Leaking fluids under pressure can enter skin and cause serious injury.
- Battery acid causes severe burns; wear goggles. If acid contacts eyes, skin, or clothing, flush with water. For contact with eyes, flush and get medical attention.
- Battery makes flammable and explosive gas. Keep arcs, sparks, flames, and lighted tobacco away.
- For jump start, connect negative cable to the machine engine last (never at the battery). After jump start, remove negative connection at the engine first.
- Exhaust gases can kill. Always ventilate.*

W-2782

27

Maximum Ground Pressure Below Front Tyres (7240153)

This safety sign is located on the front of the frame.



! WARNING

INSTABILITY HAZARD

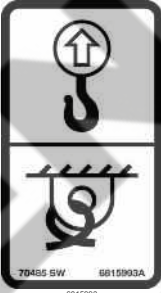
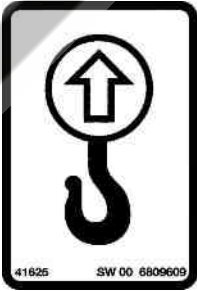
Tipping can cause serious injury or death

Make sure the ground under the machine is stable.

Do not extend the boom with a load that can cause excessive ground pressure under the stabilisers or front tyres.

Do not exceed the maximum ground pressure.*

W-2985

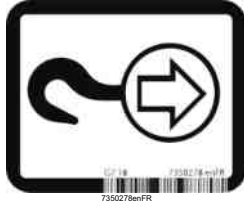
REF	DECAL	WARNING (IF APPLICABLE)
28	Maximum Ground Pressure Below Stabilisers (7240152) This safety sign is located on the front of the frame. 	 WARNING INSTABILITY HAZARD Tipping can cause serious injury or death Make sure the ground under the machine is stable. Do not extend the boom with a load that can cause excessive ground pressure under the stabilisers or front tyres. Do not exceed the maximum ground pressure. ◀ W-2985
29	Tie-Down (6595014) (2) This safety sign is located next to the rear tie-down locations. 	
30	Lift And Tie-Down (6815993) (2) This safety sign is located next to the front tie-down locations. 	
31	Hook (6809609) (2) This safety sign is located on both sides of the frame next to the lift locations. 	

REF	DECAL	WARNING (IF APPLICABLE)
-----	-------	----------------------------

Retrieval (7350278)

This safety sign is located next to the retrieval point on the front of the frame.

32



Crushing Hazard (7197650)

This safety sign is located on the front of the frame.

33



DANGER



CRUSHING HAZARD
Avoid death due to boom movement. Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or part failure can cause boom to drop. Keep out of this area when boom is raised unless supported by an approved boom stop. Replace if damaged. ◀

D-1030

Unexpected Machine Movement (7197517) (2)

This safety sign is located on each side of the rear of the frame.

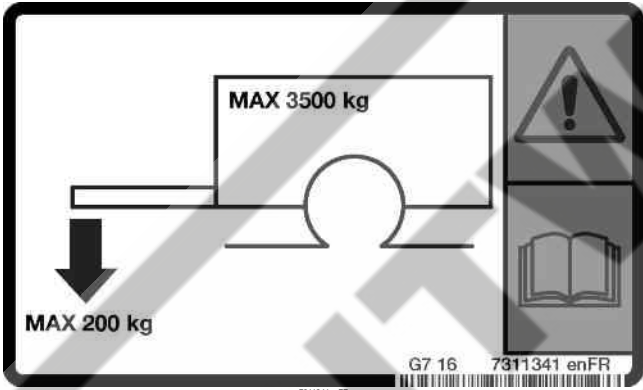
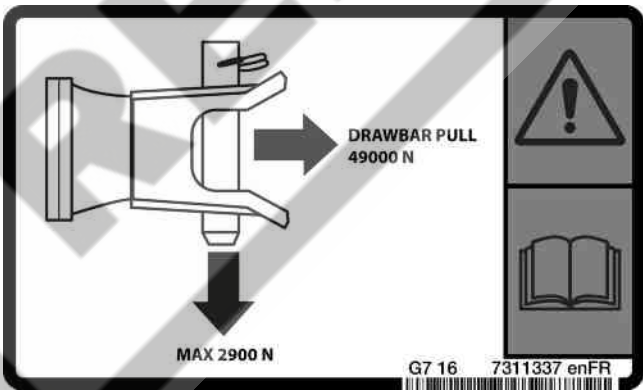
34



WARNING

UNINTENDED MOVEMENT HAZARD
Failure to follow instructions can cause serious injury or death. Start engine only from operator seat with transmission lever in neutral and parking brake engaged. Do not attempt to start the engine by shorting across the starter terminals. ◀

W-2904

REF	DECAL	WARNING (IF APPLICABLE)
35	Welding Attention (7230604) (2) This safety sign is located on each side of the rear of the frame. 	! WARNING GENERAL HAZARD Failure to follow the safety precautions could result in serious injury or death. Read, understand and follow all the precautions in this manual and on safety signs (decals).[†] W-2815
36	Trailer Hook Maximum Capacity (7311341) This safety sign is located above or on the hitch. 	! WARNING GENERAL HAZARD Failure to follow the safety precautions could result in serious injury or death. Read, understand and follow all the precautions in this manual and on safety signs (decals).[†] W-2815
37	Hook Maximum Capacity (7311337) This safety sign is located above or on the hitch. The safety sign is not available for Basic Tow Hitch. 	! WARNING GENERAL HAZARD Failure to follow the safety precautions could result in serious injury or death. Read, understand and follow all the precautions in this manual and on safety signs (decals).[†] W-2815

[A] Optional or field accessory (not standard equipment).
[B] Only for Man Platform option.

CHARTS FOR T40.180SLP MACHINE

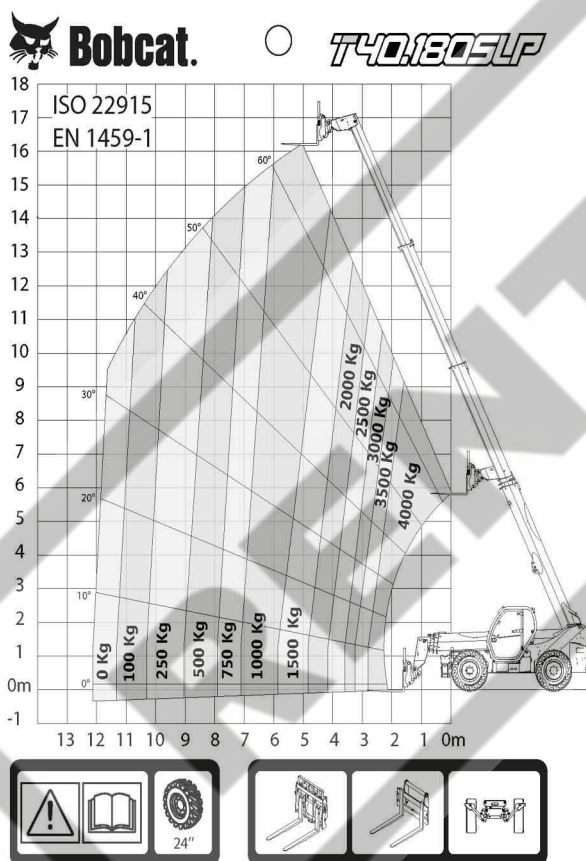
⚠ WARNING**INSTABILITY HAZARD**

Exceeding the rated load capacity can cause the machine to tip or rollover.

Always use and follow the Load Capacity Chart that is specified for each attachment and machine combination. Each attachment and machine combination will have its own chart.

Chart for the machine T40.180SLP on 24" tyres (stabilisers raised):

- CAMSO 400/80-24/20 PR TM R4
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).
 - ▷ with floating pallet forks.
- MICHELIN 400/80-24 162A8 IND TL POWER CL
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).
 - ▷ with floating pallet forks.



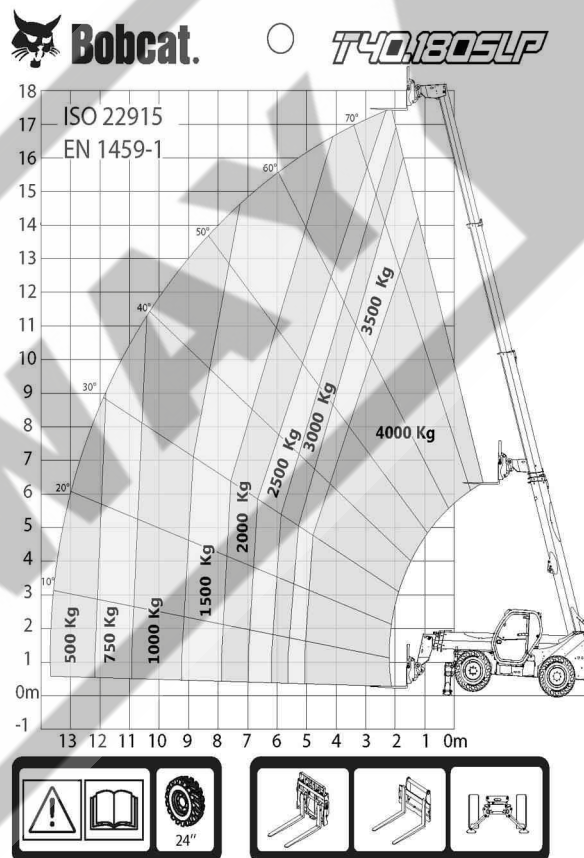
120830 G7

7368023 A

Complies with stability test EN1459-1 and the relevant parts of ISO 22915.

Chart for the machine T40.180SLP on 24" tyres (stabilisers down on firm ground):

- CAMSO 400/80-24/20 PR TM R4
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).
 - ▷ with floating pallet forks.
- MICHELIN 400/80-24 162A8 IND TL POWER CL
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).
 - ▷ with floating pallet forks.



120830 G7

7368023 A

Complies with stability test EN1459-1 and the relevant parts of ISO 22915.

INTENDED USE

This machine is classified as a Rough-Terrain Variable-Reach Truck as defined in ISO 5053-1. This machine is intended to transport loads and place them on elevated work areas and can be driven on unimproved or disturbed terrain.

This machine is primarily designed for construction application. It can also be equipped with a variety of attachments (e.g. bucket) for earthmoving application. Intensive loadings are prohibited as they will reduce the machine life and risk non-coverage of failures occurring inside the warranty period.

Additional Bobcat approved attachments allow this machine to perform other tasks described in the attachment Operation & Maintenance Manuals.

Examples of intended use include:

Digging



NA24096

Backfilling



NA24096

Levelling



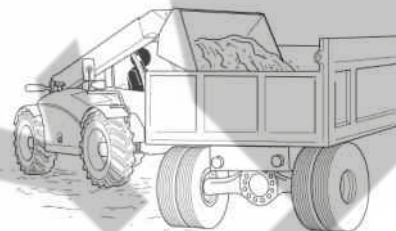
NA24097

Piling Materials



NA24098

Loading Materials



NA24099

Moving Palletised Materials



NA24100

⚠ WARNING

INSTABILITY HAZARD

Machine tipping or rollover can cause serious injury or death.

Load, unload and turn on flat level ground. DO NOT exceed Rated Operating Capacity (ROC) shown on decal in cab. ◀

W-2056

⚠ IMPORTANT

MACHINE DAMAGE HAZARD

Damage to lift arms or hydraulics can occur. Never drive forward when the hydraulic control for lift arms is in float position. ◀

I-2005

OPERATOR CONTROLS IDENTIFICATION

Operator Components

WARNING

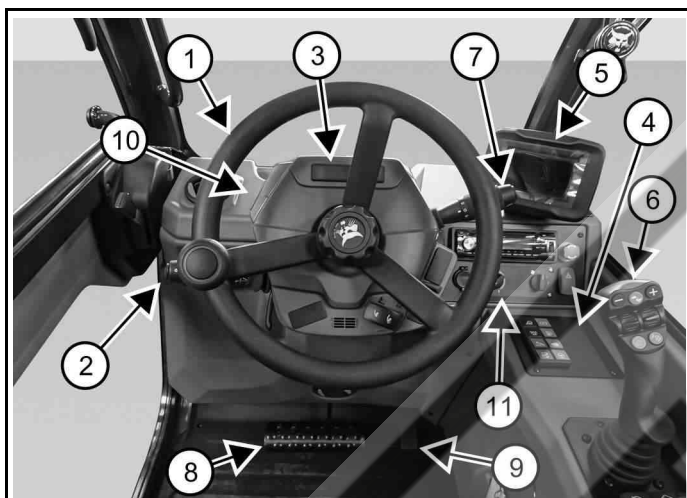
GENERAL HAZARD

Failure to follow instructions can cause serious injury or death.

- Operate only from operator's seat with seat belt securely fastened.
- Never carry riders or use attachments, other than an approved man platform, as a man lift or work platform.
- Keep bystanders away from the work area. ◀

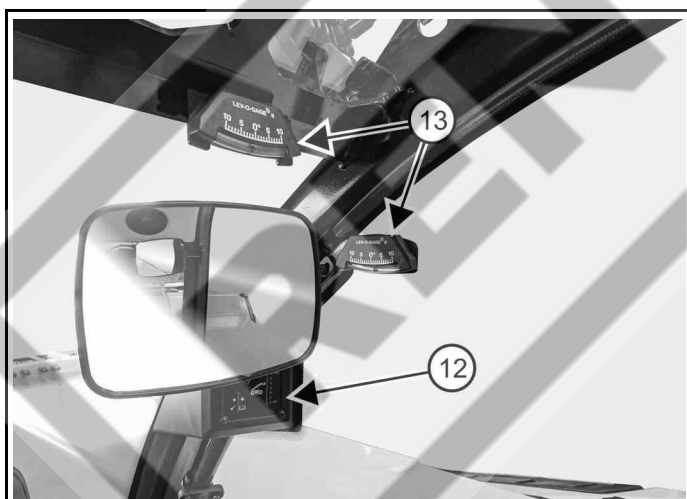
W-2979

Figure 16



C211763a

Figure 17



C212222a

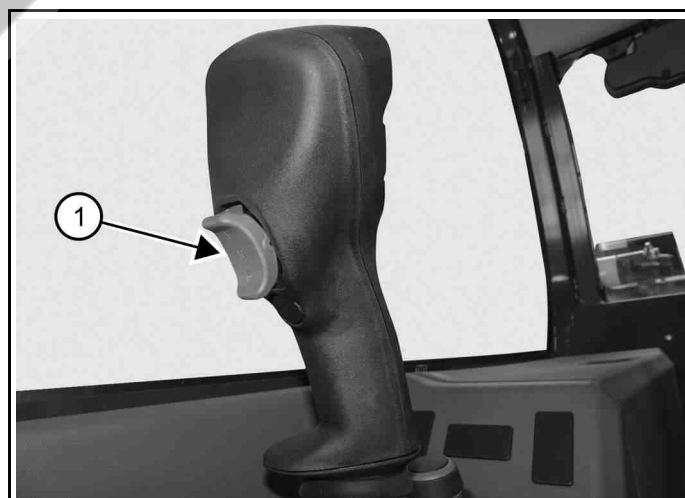
REF	DESCRIPTION	FUNCTION
1	Steering Wheel	(See Steering Wheel on Page 43)
2	Multi-function Lever	(See Multi-function Lever on Page 43)

REF	DESCRIPTION	FUNCTION
3	Center Panel and Centre Console Panel	(See Centre Panel on Page 45) and (See Centre Console Panel on Page 45)
4	Right Console Panel	(See Right Console Panel on Page 46)
5	Display	5" standard display (See Standard Display on Page 49)
6	Hydraulic Control Lever (Joystick)	(See Hydraulic Controls on Page 72)
7	Wiper Lever	(See Wiper Lever on Page 44)
8	Service Brake Pedal / Inching Control	(See Service Brake Pedal And Inching Control on Page 52)
9	Accelerator Pedal	(See Accelerator Pedal on Page 51)
10	Travel Direction Lever (If Equipped)	(See Travel Direction on Page 42)
11	Dashboard Instrument Panel	(See Operator Components on Page 42)
12	Longitudinal Load Moment Indicator (LLMI)	(See Longitudinal Load Moment Indicator (LLMI) on Page 47)
13	Sight Level Gauge	(See Sight Level Gauge on Page 52)

Travel Direction

Travel Direction Switch

Figure 18



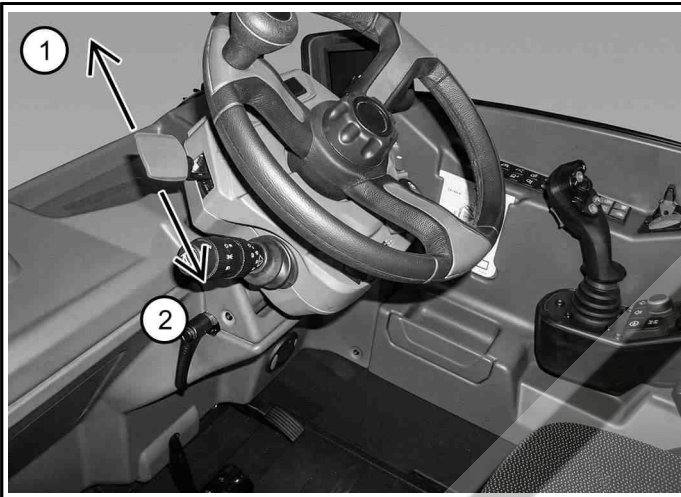
C211767a

- Press the top of the switch (Item 1) [Figure 18] for forward travel; the bottom of the switch for reverse travel. (See Dual F-N-R on Page 81) for more information. The back-up alarm will sound when the switch is in the reverse position.

Travel Direction Lever

The machine can be equipped with a travel direction lever.

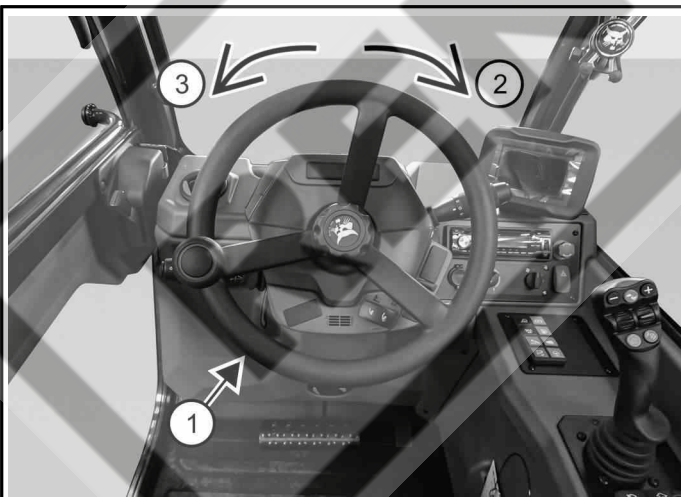
Figure 19



- Move the lever forward (Item 1) for forward travel; backward (Item 2) [Figure 19] for reverse travel. (See Dual F-N-R on Page 81) for more information. The back-up alarm will sound when the lever is in the reverse position.

Steering Wheel

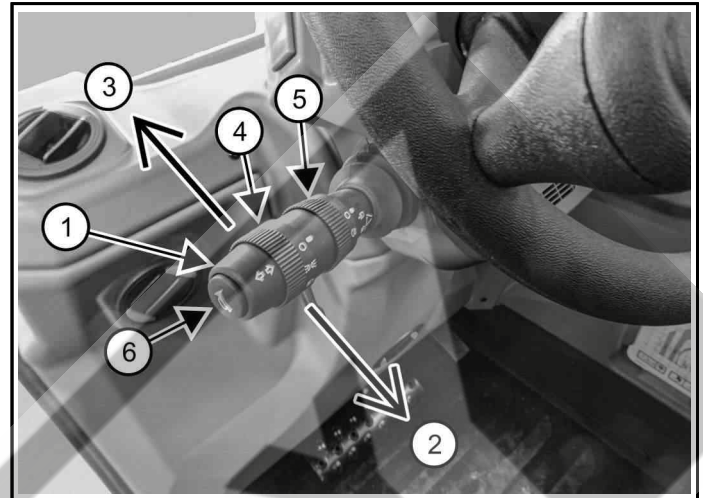
Figure 20



- Turn the steering wheel (Item 1) [Figure 20] clockwise (Item 2) to turn right; anticlockwise (Item 3) to turn left. (See Driving and Steering the Machine on Page 67)

Multi-function Lever

Figure 21



This lever (Item 1) [Figure 21] has four functions:

- Direction signal
- Parking lights and head lights
- Fog lights
- Horn

Direction Signal

- Move the lever backward (Item 2) for left direction signal; forward (Item 3) [Figure 21] for right direction signal. Be sure to turn the direction signals off after you have completed the turn.

Headlights And Rear Lights

- The lever (Item 1) also includes the lights switch (Item 4) [Figure 21] which has three positions. Rotate the lever to select front lights:
 - OFF
 - Parking lights and rear lights
 - Headlights and rear lights
- When the headlights are ON:
 - Push the lever (Item 1) [Figure 21] away from the steering wheel to change to high beam headlights. Pull the lever to come back to low beam position.
 - Pull the lever (Item 1) [Figure 21] to the steering wheel for momentary high beam headlights in addition to low beam headlights.

Fog Lights

- The lever (Item 1) also includes the fog lights switch (Item 5). Rotate the switch (Item 5) [Figure 21] and release to select fog lights. Rotate again to turn off the fog lights.

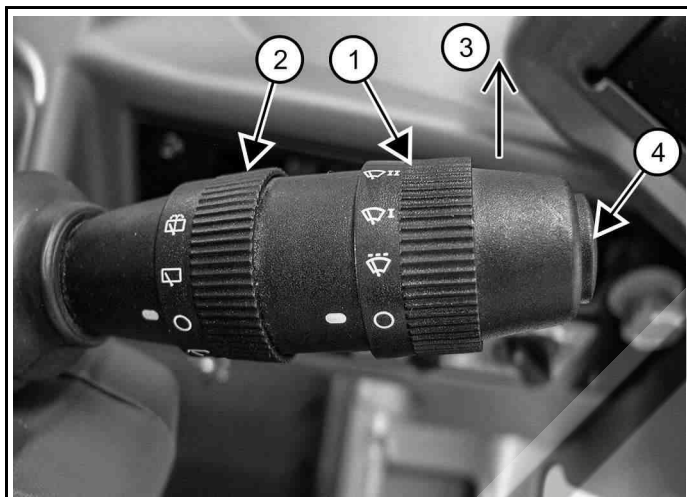
Horn

- Push the lever in (Item 6) [Figure 21] to sound the horn.

Wiper Lever

The wiper lever controls the front wiper, the rear / roof wipers, momentary front / roof washers, and a quick windshield clean function.

Figure 22



1. Rotate the ring (Item 1) [Figure 22] on the lever to select the front wiper speed:

SYMBOL	DESCRIPTION
	High speed
	Low speed
	Intermittent
O	OFF

2. Rotate the ring (Item 2) [Figure 22] on the lever to select the rear or roof wipers:

SYMBOL	DESCRIPTION
	Hold for rear wiper washer
	Rear wiper
O	OFF
	Roof wiper

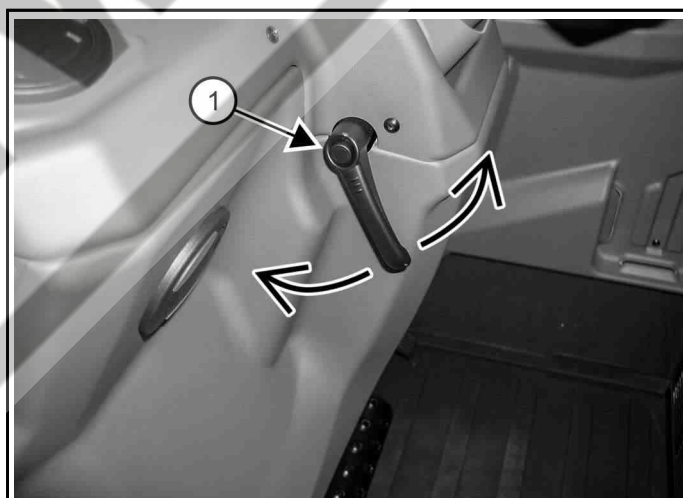
3. Raise the lever (Item 3) [Figure 22] to activate the front windshield washer and the roof washer.
4. Press the button (Item 4) momentarily to activate all wipers. Press and hold the button (Item 4) [Figure 22] to activate all wipers and washers. (Quick windshield clean)

NOTE: The rear washer will be activated when the button is released.

Adjusting The Steering Wheel

Steering Wheel Tilt Position

Figure 23



1. Turn the lever (if equipped) (Item 1) [Figure 23] anticlockwise to loosen the steering wheel tilt mechanism.
2. When the steering wheel is in the desired position, turn the lever (Item 1) [Figure 23] clockwise. Tighten firmly to lock position.

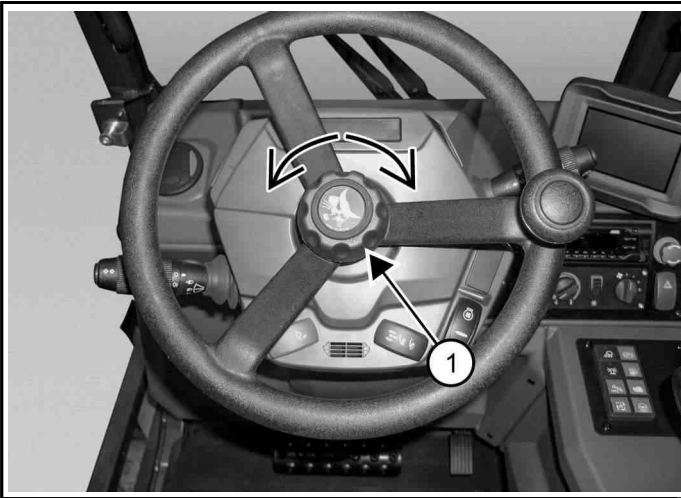
Always keep the steering wheel tilt mechanism in the lock position when operating the machine.

Steering Wheel Height

This machine may be equipped with a steering wheel

with adjustable height.

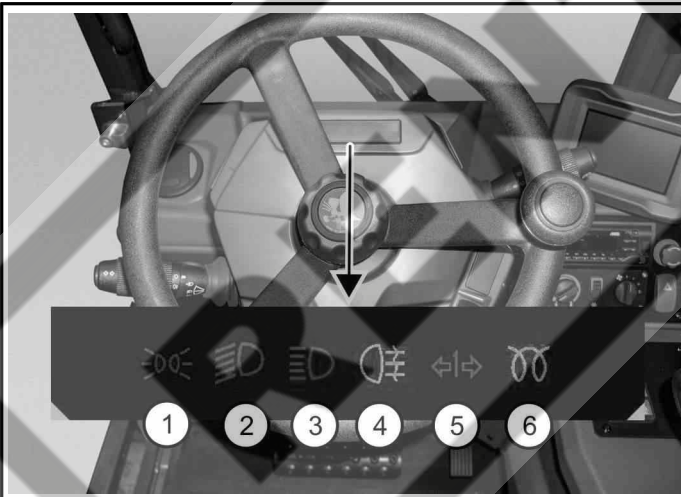
Figure 24



3. Turn the steering wheel central knob (Item 1) [Figure 24] anticlockwise to unlock the height adjustment.
4. Push down or pull up the steering wheel to adjust the height.
5. Turn the steering wheel central knob (Item 1) [Figure 24] clockwise to lock the position of the steering wheel.

Centre Panel

Figure 25

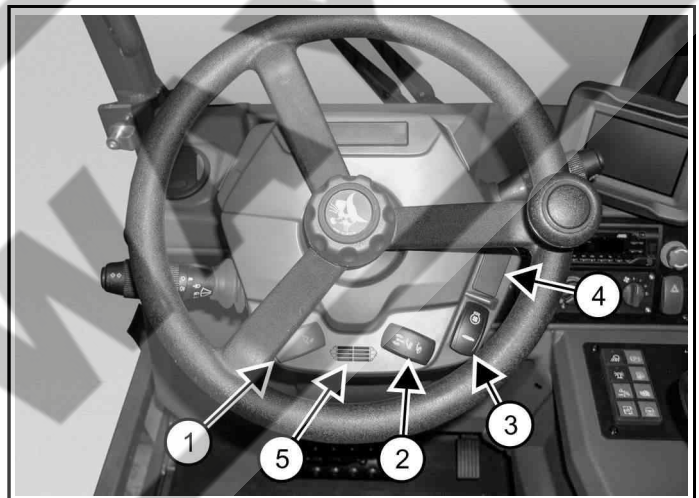


REF	DESCRIPTION	FUNCTION
1	Position Light Indicator	Light is illuminated when the position (park) lights are activated.
2	Low Beam Indicator	Light is illuminated when the low beam road lights are activated.

REF	DESCRIPTION	FUNCTION
3	High Beam Indicator	Light is illuminated when the high beam road lights are activated.
4	Rear Fog Light Indicator	Light is illuminated when the fog lights are activated.
5	Trailer Turn light Indicator (If equipped)	Light is illuminated when the directional signals are used with a trailer connected to the machine.
6	Preheating Light Indicator	Light is illuminated while the glow plugs are activated.

Centre Console Panel

Figure 26



REF	DESCRIPTION	FUNCTION
1	Hydraulic Attachment Lock Switch (If equipped)	Press and hold the bottom of the switch to unlock the hydraulic attachment lock. When released, the attachment locking pins will automatically lock at a slow speed.
2	Longitudinal Load Moment (LLM) Override Switch	(See Longitudinal Load Moment Controller (LLMC) Override Switch on Page 112)
3	Fan Inverter Switch	Press bottom of the switch once to clean debris from radiator. Fan resumes normal operation after 30 seconds. The switch is illuminated when the function is activated, either manually or automatically. (See Auto Reverse Cooling Fan on Page 80)

REF	DESCRIPTION	FUNCTION
4	—	Not used
5	Microphone (If equipped)	Not used

Right Console Panel

WARNING

GENERAL HAZARD

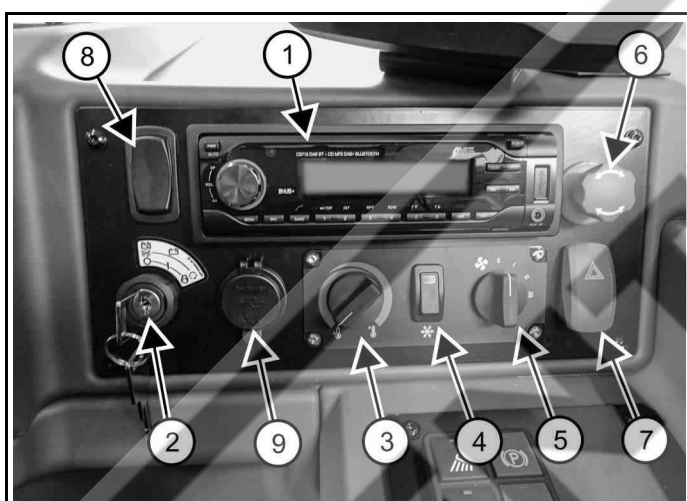
Failure to follow instructions can cause serious injury or death.

Before you leave the operator's position:

- Put the Travel Direction Control and the Joystick in neutral.
- Engage the parking brake.
- Retract and lower the boom and attachment flat on the ground.
- Stop the engine.

Right Panel Components

Figure 27

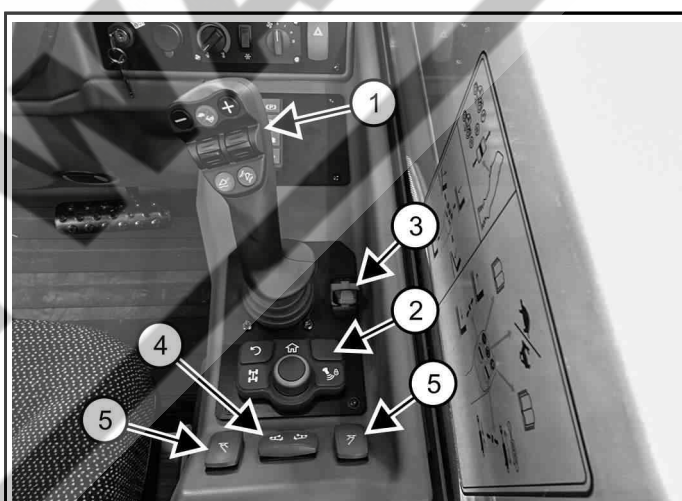


C211777a

REF	DESCRIPTION	FUNCTION
1	Radio (If equipped)	
2	Start / Stop Switch (Rotary Switch or Key Switch optional)	Used to turn the electrical system on and off, and to start and stop the engine. (See Standard Key Panel on Page 88)
3	Temperature Control	Turn clockwise to increase cab temperature; anticlockwise to decrease.
4	Air Conditioning Switch	Press the top of the switch to turn the Air Conditioning on. Press the bottom of the switch to turn off.

REF	DESCRIPTION	FUNCTION
5	Fan Switch	Turn switch clockwise to increase fan speed. "O" - Off, "I" - Low, "II" - Medium, "III" - Fast
6	Emergency Stop	Push to immediately shut down the engine and its fuel supply. The display shows "STOP". Pull to unlock from pressed position.
7	Hazard Lights	Press the bottom of the switch to turn the Hazard Lights ON; press the top to turn OFF. Switch light flashes when Hazard Lights are ON.
8	Right Hand Mirror Adjust Switch (If equipped)	Not available on this machine.
9	USB Port	(See USB Port on Page 51)

Figure 28



C212263a

REF	DESCRIPTION	FUNCTION
1	Joystick	(See Hydraulic Control Lever (Joystick) on Page 72)
2	Jog Shuttle	(See Jog Shuttle (Standard Display) on Page 47)
3	Flex Control Engine Speed Lever (If equipped)	Push the lever to increase and set the engine speed. (See Flex Drive on Page 68)
4	Frame-levelling Switch	(See Using Frame-Leveling on Page 117)
5	Left and Right Stabiliser Switch	(See Operating The Stabilizers on Page 118)

Standard Panel

The machine is equipped with standard panel below.

Figure 29

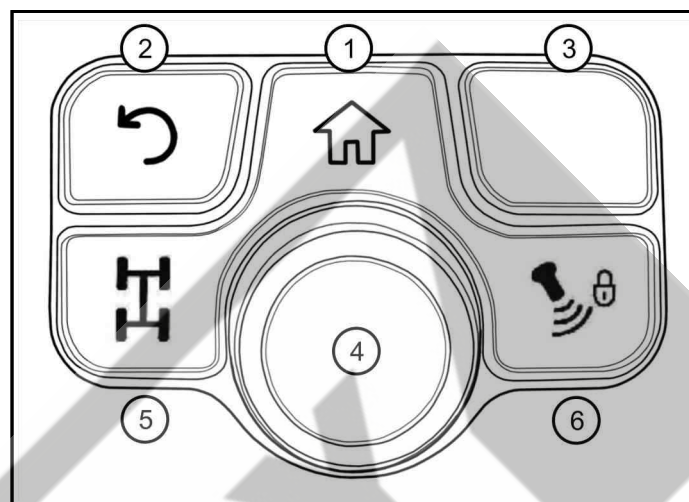


NA3974a

REF	DESCRIPTION	FUNCTION
1	Work Lights	Press the switch to turn the work lights ON; press again to turn OFF.
2	Rotating Beacon	Press the switch to turn the rotating beacon ON; press again to turn OFF.
3	Smart Handling System	Press the switch to reduce the boom movements; press again to turn OFF. (See Smart Handling System (SHS) on Page 78)
4	Auxiliary Hydraulic Flow	(See Operating The Front Auxiliary Hydraulics on Page 75)
5	Parking Brake	(See Parking Brake on Page 66)
6	ECO Mode	Press the switch to limit the engine RPM when full RPM is not needed in order to save fuel; press again to turn OFF. (See ECO Mode on Page 89)
7	Speed Management (Creep Mode)	(See Speed Management on Page 69)
8	Dynamic Drive	Press the switch to activate dynamic drive mode; press again to turn OFF. This mode increases the travel direction shift speed and accelerator pedal responsiveness.

Jog Shuttle (Standard Display)

Figure 30



NA3977a

REF	DESCRIPTION	FUNCTION
1	Home Screen (Gauges)	Press to change display view to the GAUGES screen.
2	Back	Press to return to previous screen.
3	Not Used	- - -
4	Jog Shuttle / Activate Button	Rotate to navigate between available icons on display. Press to select highlighted icon.
5	Steering Mode	Press to change display view to the STEERING MODE screen. (See Selecting The Steering Mode on Page 57)
6	Joystick Lockout	Press to disable joystick hydraulic functions. Press again to enable.

Longitudinal Load Moment Indicator (LLMI)

The LLMI warns the operator about inadequate stability in the longitudinal plane (forward direction).

The LLMI is intended to warn for tipping over in the case of:

- The machine is stationary on solid, stable and level ground
- The machine is performing load picking, carrying, loading and unloading
- The telescopic boom is not fully retracted.

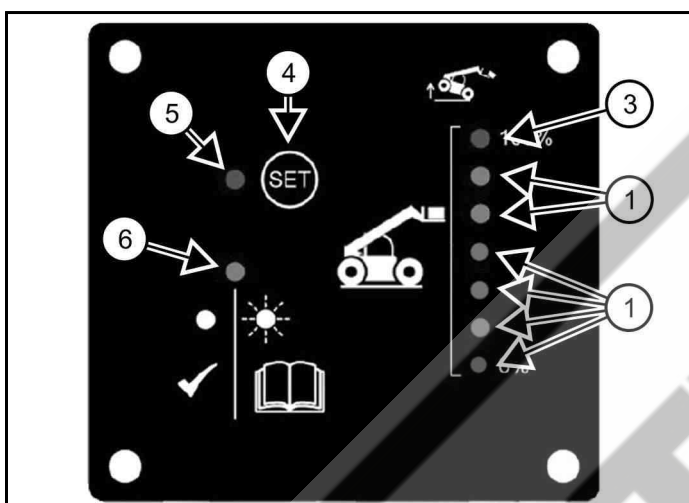
NOTE: All hydraulic movements are functional if the boom is fully retracted, regardless of the machine's stability level.

NOTE: When the longitudinal stability level reaches a critical level (Critical zone) with the boom not fully retracted and the boom angle below 5°, only hazardous movements are disabled (tilt and boom lowering are reduced in speed). It is still possible to retract and lift the boom.

The LLMI is not intended to warn for tipping over in the case of:

- A sudden overload
- Travelling with a lifted load
- Travelling on rough terrain or on grounds with obstacles and holes
- Travelling across a slope or turning on a slope
- Turning corners too fast or too sharp.

Figure 31



The indicator lights (Items 1, 2 and 3) [Figure 31] sequentially illuminate as the machine's longitudinal stability decreases. They identify three zones of the machine's longitudinal stability level:

Secure zone:

Green indicator lights (Item 1) [Figure 31] (four lights). The operator works in a secure zone.

In this zone, the following machine functions are progressively reduced in speed as the machine's longitudinal stability decreases:

- Boom lowering
- Boom extend
- Tilting of attachment
- Auxiliary hydraulic functions.

Warning zone:

Orange indicator lights (Item 2) [Figure 31] (two lights). The longitudinal stability level gets close to the critical zone.

In this zone, the following machine functions are progressively reduced in speed as the machine's longitudinal stability decreases:

- Boom lowering
- Boom extend
- Tilting of attachment
- Auxiliary hydraulic functions.

Critical Zone:

Red indicator light (Item 3) [Figure 31] (one light). The machine's longitudinal stability reaches a critical level. A warning horn is activated along with the red indicator light.

In this zone, the following machine functions are reduced in speed or disabled:

- Boom lowering (disabled with boom angle above 5°, reduced in speed when below 5°)
- Boom extend (disabled)
- Tilt (disabled with boom angle above 5°, reduced in speed when below 5°)
- Auxiliary hydraulic functions (disabled with boom angle above 5°, reduced in speed when below 5°)
- Stabilisers (disabled)
- Frame-levelling (disabled to increase frame angle)

Use the remaining active functions to bring the machine back to a safe level of stability. If necessary, activate the LLMC override mode to enable a disabled function such that the machine can be brought back to a safe level of stability.

NOTE: The LLMC override mode should only be activated when necessary and is automatically deactivated after a running period of 60 seconds.

NOTE: The warning horn cannot be deactivated.

Set Button:

The calibration set button (Item 4) [Figure 31] has two functions:

- Testing the correct functioning of the LLMI and the LLMC. (See LLMC Calibration Test on Page 148)
- Calibrating the LLMI / LLMC system. (See your Bobcat dealer for calibration.)

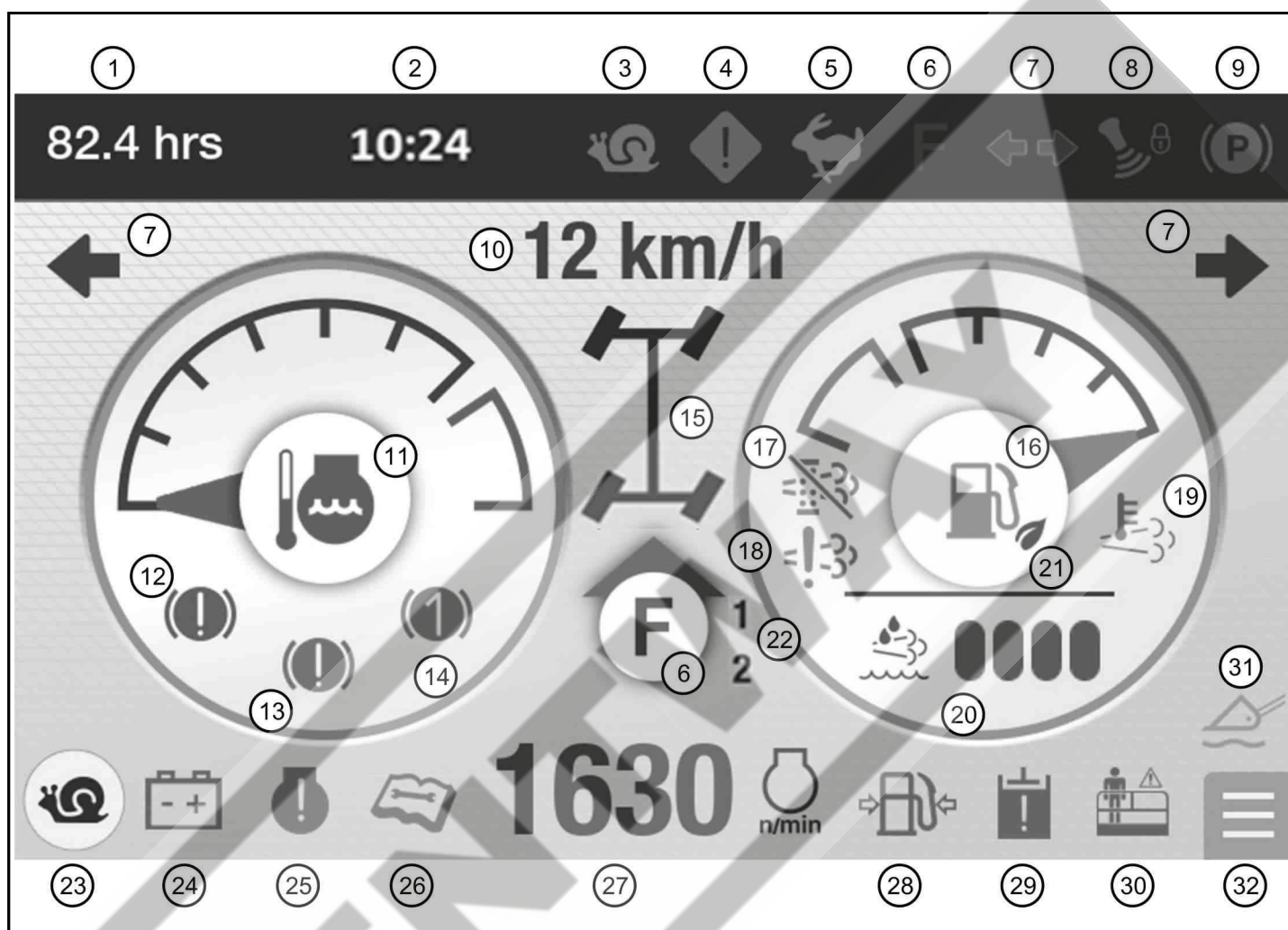
The set indicator light (RED) (Item 5) [Figure 31] is used for the test procedure and the LLMI / LLMC system calibration. The light flashes when the LLMC is in fault mode.

The control indicator light (ORANGE) (Item 6) [Figure 31] indicates that the machine is under control of the LLMC. The light flashes when the LLMC override switch is activated.

STANDARD DISPLAY

The standard display is a visual interface that provides control of certain machine settings and operating information through the use of a jog shuttle control. The standard display is scratch resistant and weather resistant.

Figure 32



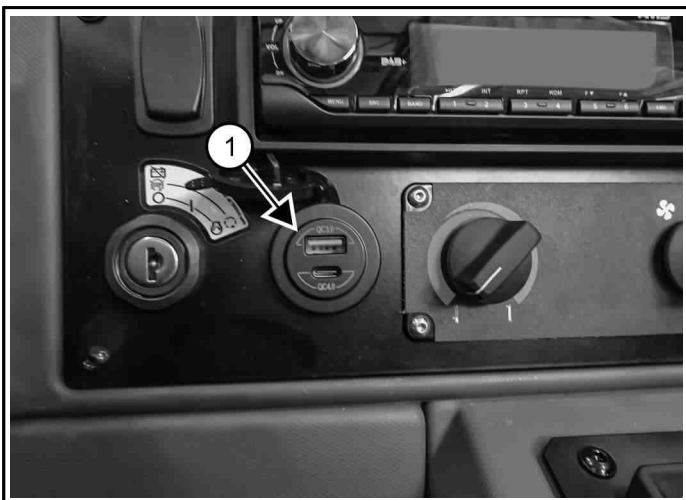
The following table shows the description and function for the icons located on the gauges (home) screen [Figure 32].

REF	DESCRIPTION	FUNCTION
1	Hourmeter	Shows machine operating hours. This will remain visible on most screens.
2	Current Time (If equipped)	Shows the time.
3	Creep Mode	This icon is ON when creep mode is activated.
4	General Warning	This icon is ON with malfunction of one or more machine functions.
5	Speed Management	Current drive speed range: low (turtle) or high (rabbit).
6	F-N-R Status	Shows the selected travel mode. The icon will flash when attempting to start the engine when the Travel Direction Control (Travel Direction Switch and / or Lever) is not in neutral position.
7	Turn Signals Status	This icon is flashing when a direction signal is activated or when the hazard lights are activated.

REF	DESCRIPTION	FUNCTION
8	Joystick Lockout	This icon is ON when the joystick functions cannot be operated.
9	Parking Brake Engaged	This icon is ON when the machine cannot be driven.
10	Speedometer	Shows the current machine speed in km/h or mph.
11	Engine Coolant Temperature Icon and Gauge	This icon turns red when engine coolant temperature is too high. The gauge shows the engine coolant temperature.
12	Brake Pressure Failure	This icon turns ON or flashes in case of a pressure failure in the brake system.
13	Brake Electrical Failure	This icon turns ON in case of an electric failure in the brake system.
14	Trailer Brake Failure	This icon turns ON in case of a failure in the trailer brake system.
15	Steering Mode	Shows the current steering mode and the status of wheel alignment.
16	Fuel Gauge	Shows the amount of fuel in the tank. The icon turns red when the fuel is low.
17	DPF	- The icon is ON: the DPF system is regenerating. The inhibit icon will display here when inhibit mode is selected. - The icon flashes slowly: perform a forced parked regeneration as soon as possible. - The icon flashes quickly: contact an authorised Bobcat service dealer to service the DPF.
18	DPF Emissions Error	This icon is ON when the DPF is malfunctioning.
19	High Exhaust System Temperature (HEST)	This icon is ON when the exhaust temperature is higher than normal operation. This indicates that there is an active regeneration ongoing.
20	DEF Level	Shows the DEF level in the tank. The icon turns red if the DEF tank level is below 25% and starts to flash if the level is below 5%.
21	ECO Mode	This icon is ON when ECO mode is activated.
22	Gear Speed	One range '1' only.
23	On-The-Fly Settings	This icon shows which setting is activated. The setting can be adjusted using the '+' and '-' buttons on the joystick.
24	Low Battery Voltage	Battery voltage is low.
25	Engine Malfunction	Engine malfunction or failure.
26	Service Due	Indicates service is due. (See Record A Service on Page 201)
27	Engine rpm	Shows engine rpm.
28	Fuel Pressure Failure	This icon is ON when fuel filter pressure is not correct.
29	Hydraulic System Malfunction	The light comes on when there is a hydraulic malfunction or failure or if the hydraulic / hydrostatic fluid temperature is high or if the hydraulic filter is plugged. The light will flash if the hydraulic / hydrostatic fluid temperature is extremely high.
30	Man Platform (shown) or Winch	Shows man platform or winch icon.
31	Boom Suspension or Boom Float (shown)	or
32	Navigation Handle	This icon is used to open the navigation bar. (See Navigation Bar on Page 199)

USB PORT

Figure 33

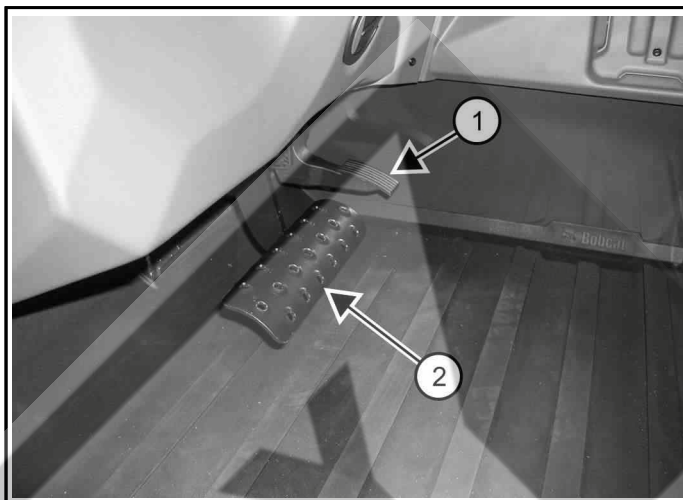


C211782a

The USB port (Item 1) [Figure 33] is a 5 V dual receptacle for accessories.

ACCELERATOR PEDAL

Figure 34



C211790a

The accelerator pedal (Item 1) [Figure 34] is at the right side of the steering console.

- Press the accelerator pedal down to increase engine speed. Release foot pressure to decrease engine speed. In Flex Drive mode (if equipped), the accelerator pedal controls only travel speed.

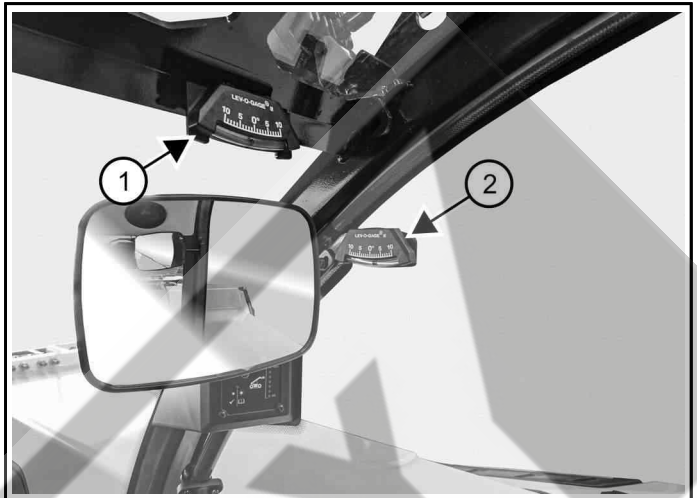
SERVICE BRAKE PEDAL AND INCHING CONTROL

The service brake pedal (Item 2) [Figure 34] is at the left of the accelerator pedal.

- Press the brake pedal a small amount to decrease travel speed and control inching (gradual travel of the machine). Approximately the first half of the total brake pedal travel is for inching control.
- Press down to stop travel of the machine.

SIGHT LEVEL GAUGE

Figure 35



The lateral and longitudinal (optional) sight level gauges (Item 1 and Item 2) [Figure 35] indicate the position of the frame to the horizontal plane.

When carrying out load handling work, carefully monitor these sight level gauges and take the necessary measures.

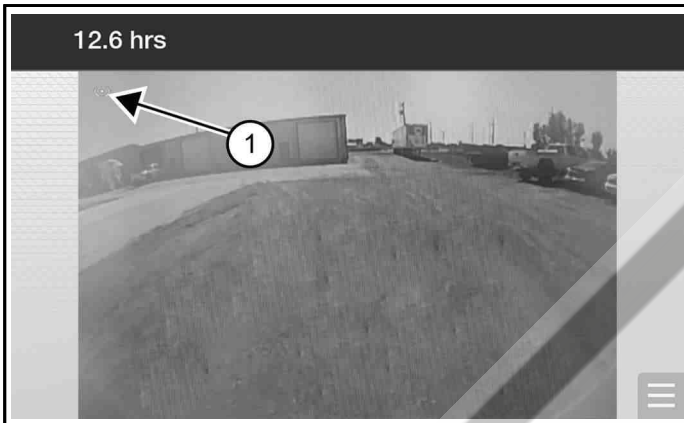
REAR VIEW CAMERA SYSTEM

Rear View Camera System Description

The machine may be equipped with a rear view camera system.

A rear view camera system is not a substitute for keeping bystanders away from the work area. Operators must remain fully aware of the surroundings using direct visibility and the rear view camera system. The operator must service and maintain the camera system to ensure proper function.

Figure 36



The camera view is shown on the display [Figure 36] by selecting **[CAMERA]** on the display.

The rotating icon (Item 1) [Figure 36] in the upper left corner of the display indicates a live broadcast from the camera.

If the icon freezes, it indicates that the camera is not supplying a live broadcast and service may be required.

The display will change to camera view automatically when the operator moves the travel direction switch or lever (if equipped) in reverse.

NOTE: Objects viewed on the camera display are closer than they appear.



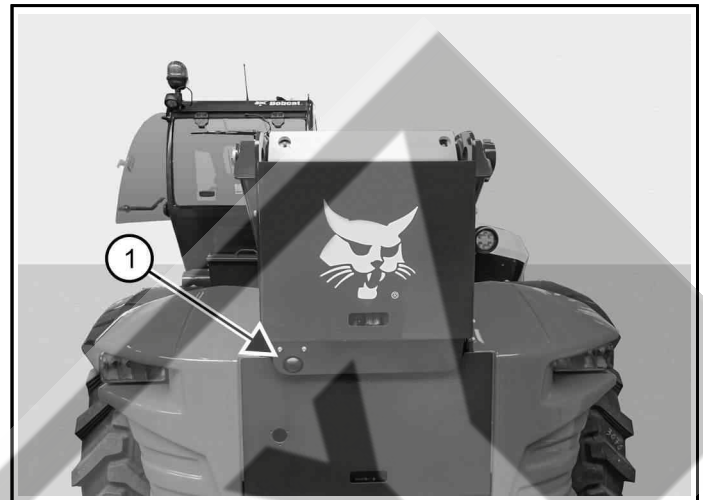
CRUSHING HAZARD

Contact with machine can cause serious injury or death.

- Always keep bystanders away from the work area and travel path.
- The operator must maintain a clear view of the direction of travel and look before and during machine movement.
- The back-up alarm must sound when operating the machine in the reverse direction. ◀

Maintaining Rear View Camera System

Figure 37



The rear view camera (Item 1) [Figure 37] is located on the rear cover.

1. Perform the following daily or as necessary:
 - Clean the lens of the camera using a soft cloth and clean water.
 - Remove mud, snow, ice, or other debris that could affect the clear view provided by the camera system.
 - Verify proper camera adjustment. Adjust camera if necessary.
 - Replace damaged rear view camera system components. See your Bobcat dealer for service and parts.

Adjusting Rear View Camera System

Perform the following steps to adjust the rear camera:

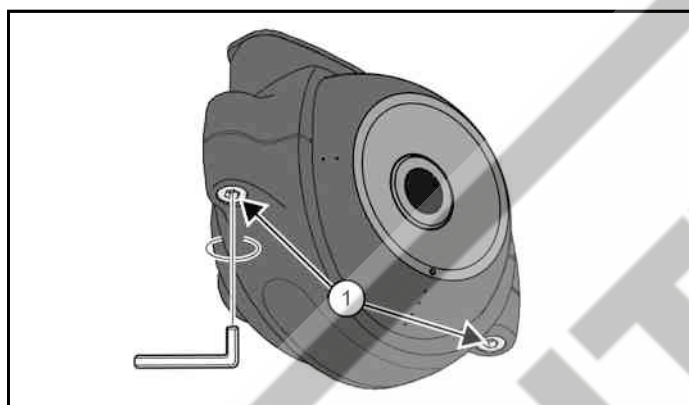
1. Make a mark on the ground 1,25 m (4 ft) behind the machine.
2. Turn the machine ON without starting the engine. Set the display for camera.

Figure 38



3. Ensure the camera is centred left and right. The mark on the ground (Item 1) [Figure 38] from step 1 should be visible on the display. Continue with procedure if necessary.

Figure 39



4. Loosen the screws (Item 1) [Figure 39] of the clamp holding the camera.
5. Adjust the camera until the mark on the ground (Item 1) [Figure 38] from step 1 is visible on the display. Ensure the camera is centred left and right.
6. Tighten the screws to 0,8 – 1,0 N•m (7 – 8.8 in-lb) torque.
7. Install the rear cover and bolts.
8. Verify proper camera adjustment [Figure 38].
9. Repeat steps 4 through 8 if necessary.
10. Turn the machine OFF.

OPERATOR CAB

Operator Cab Description

⚠ WARNING

MODIFICATION HAZARD

Changes to the cab can cause loss of operator protection from rollover and falling objects resulting in serious injury or death.

- Never modify operator cab by welding, grinding, drilling holes, or adding attachments unless instructed to do so by Bobcat.
- DO NOT operate without right window.

W-2906

The Bobcat machine has an operator cab (ROPS / FOPS) as standard equipment to protect the operator. The seat belt must be worn for ROPS / FOPS protection.

Check the ROPS / FOPS cab, mounting, and hardware for damage. Never modify the ROPS / FOPS cab. Replace the cab and hardware if damaged. See your Bobcat dealer for parts.

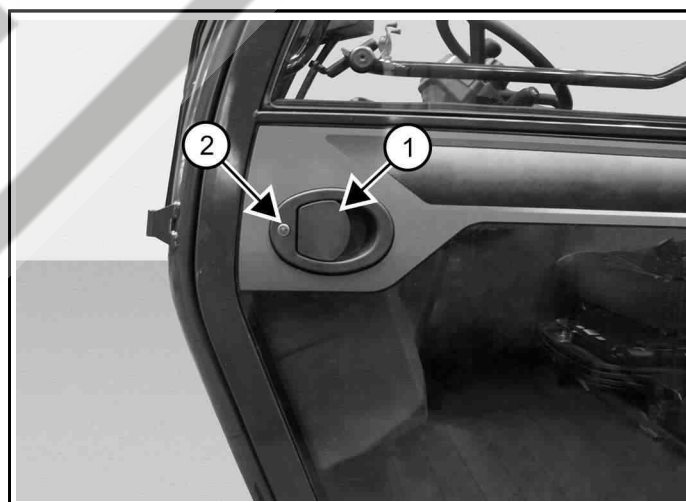
ROPS / FOPS - Roll-over Protective Structure per ISO 3471, FOPS per ISO 3449 (FOPS Level II).

Operator cab category 1 per EN 15695-1:2009.

The operator cab does not provide protection against hazardous substances. Do not use this machine under conditions requiring protection against hazardous substances.

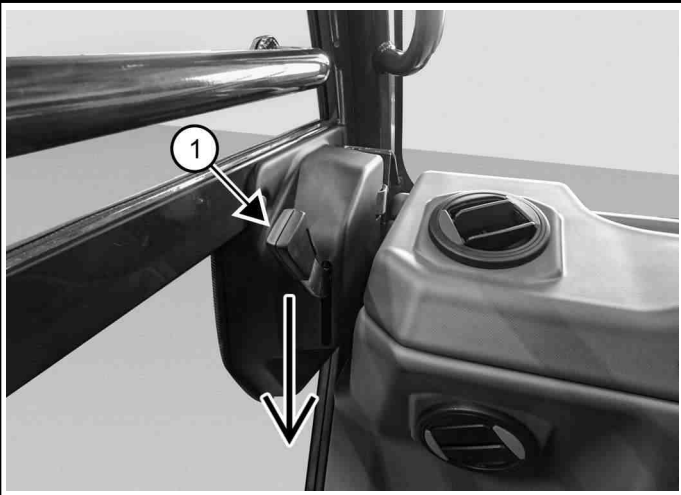
Cab Door

Figure 40



C211793a

Figure 41

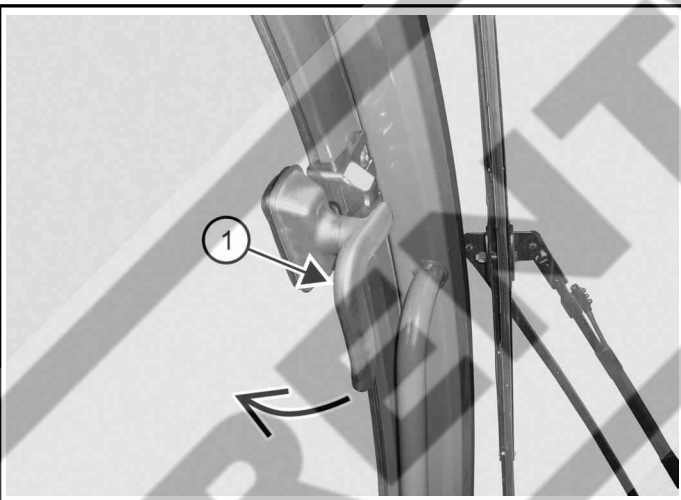


C211776a

- The cab door can be opened from the outside of the cab using the handle (Item 1) [Figure 40] and opened from the inside of the cab when you pull the lever (Item 1) [Figure 41] down.
- The cab door can be locked (Item 2) [Figure 40] with the same key as the starter switch.

Cab Door Window

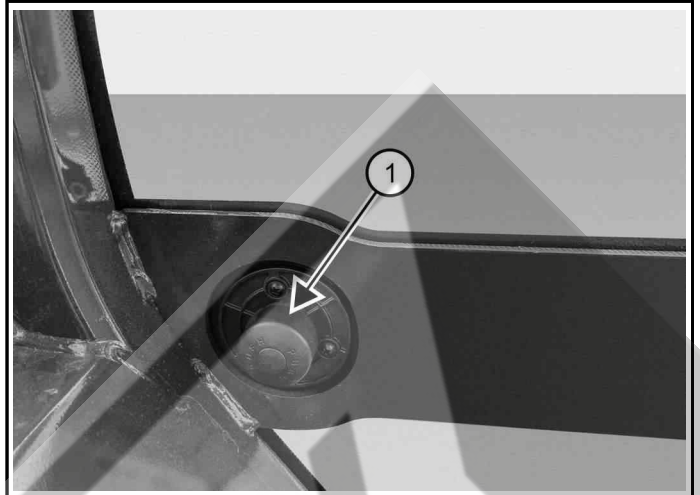
Figure 42



C209023a

1. Turn the handle (Item 1) [Figure 42] (clockwise) to unlock the window. Push the window fully open until it latches against the cab.

Figure 43

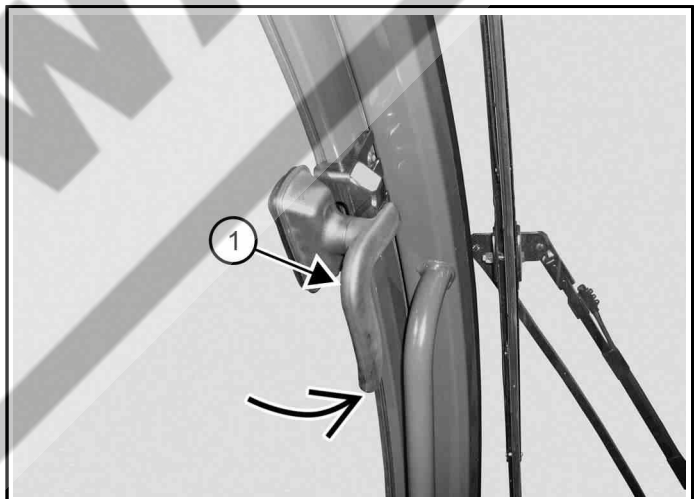


C211780a

2. Push the knob (Item 1) [Figure 43] to disengage the latch and close the window.

There is a second knob available on the outside of the cab.

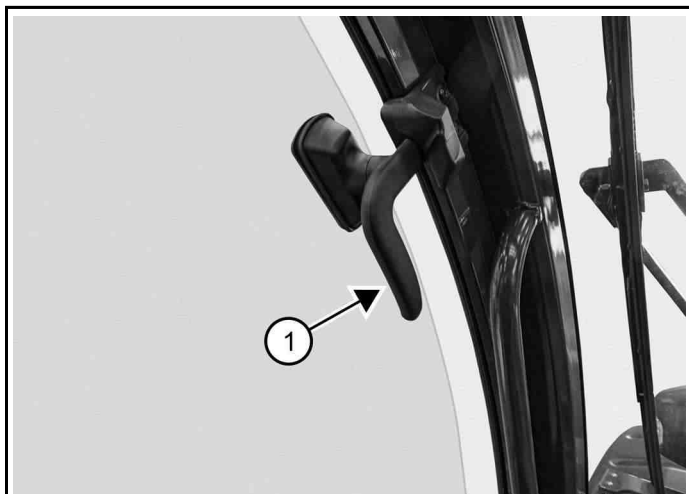
Figure 44



C209023b

3. Turn the handle (Item 1) [Figure 45] back into the original position (anticlockwise) to lock the window.

Figure 45

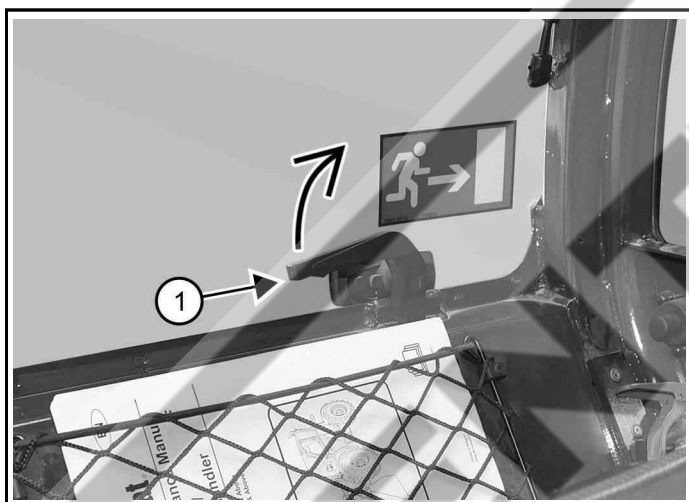


C209132a

4. The handle (Item 1) [Figure 45] can also be used to secure the window in a partly open position.

Rear Cab Window

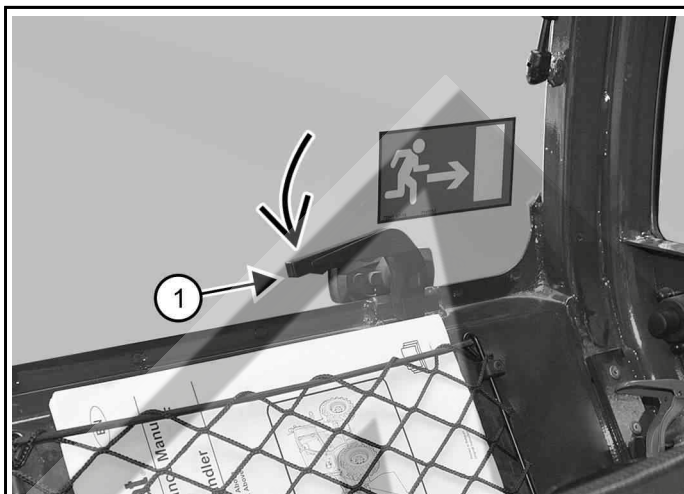
Figure 46



P118579a

1. Turn the handle (Item 1) [Figure 46] clockwise to unlock the rear window.
2. Push the rear window open until in fully open position.
3. Pull the window down to close it.

Figure 47

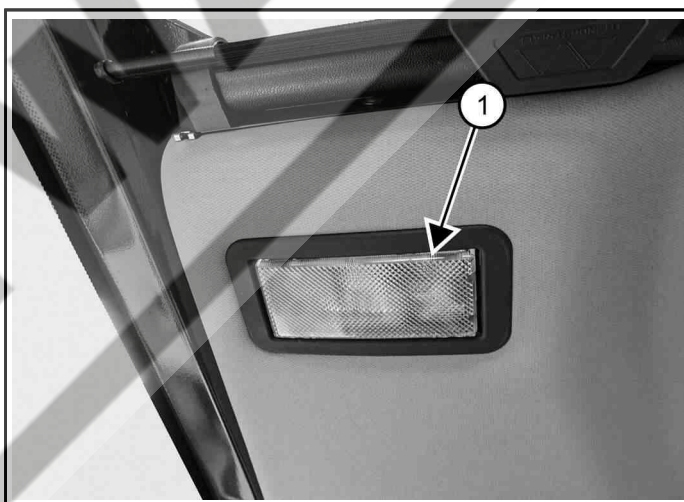


P118579b

4. Turn the handle (Item 1) [Figure 47] back into the original position (as shown) to lock the window.

Cab Light

Figure 48



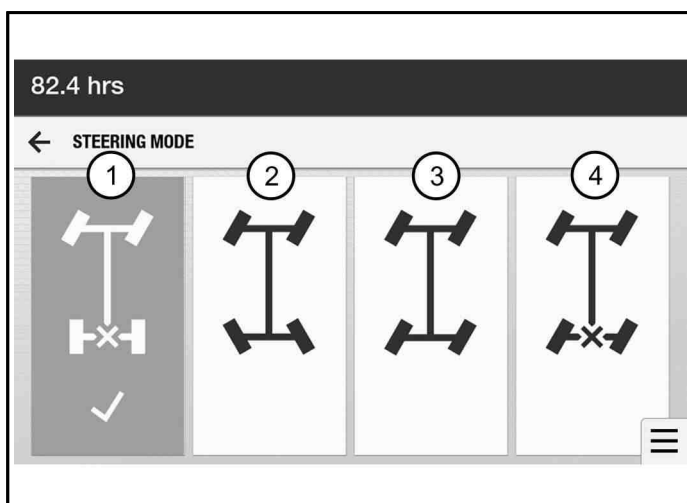
C211769a

The cab light [Figure 48] is located above the operator's head.

1. Push either side of the lens (Item 1) [Figure 48] to turn the light on.
2. Return the lens to the centre position to turn the light off.

STEERING MODE

Figure 49

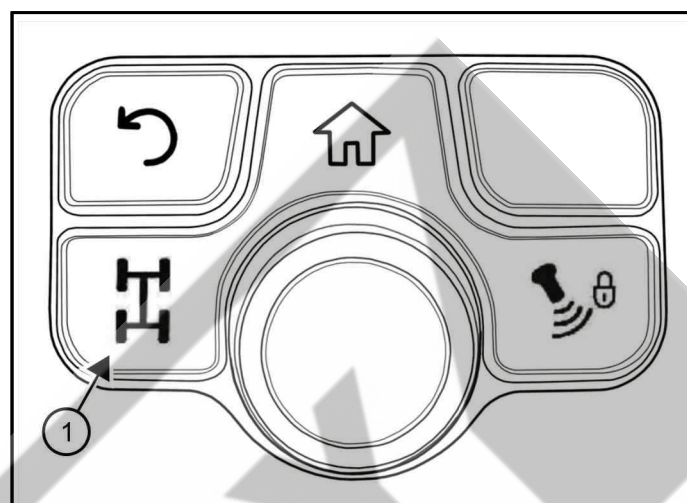


C210768a

STEERING MODES ON STEERING MODE SCREEN		
REF	DESC.	FUNCTION
1	2-Wheel Steering	The front wheels will turn the direction that the steering wheel is turned. The rear wheels remain straight ahead. Required mode when travelling on public roads.
2	4-Wheel Steering	The front wheels will turn the direction that the steering wheel is turned. The rear wheels turn the opposite direction. The machine will turn in a smaller circle. Use in most working conditions.
3	Crab Steering	Front and rear wheels turn the same direction that the steering wheel is turned. The machine moves diagonally in the direction the steering wheel is turned. Use in confined areas to move away from buildings or to reposition the machine.
4	Semi-Crab Steering (If equipped)	The rear wheels are kept in a fixed position. The front wheels will turn the direction that the steering wheel is turned. Use in confined areas to work along walls or to reposition the machine.

Selecting The Steering Mode

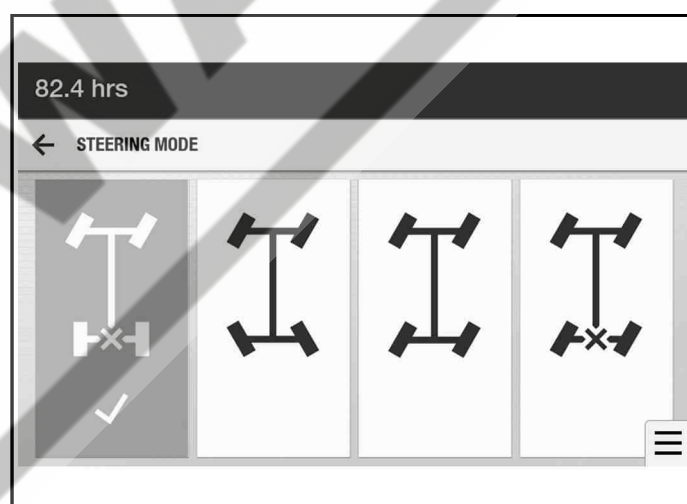
Figure 50



NA3977b

1. Press the steering mode button (Item 1) [Figure 50] to access **STEERING MODE** in the display panel.

Figure 51



C210768

2. Select the desired steering mode on the **STEERING MODE** screen [Figure 51].

As soon as the new steering mode is selected, the display returns to the **GAUGES** screen.

In manual alignment mode, the selected steering mode is immediately activated.

In semi-automatic alignment mode, the selected steering mode will be activated if the front and rear wheels are already aligned.

If the front and / or rear wheels are not aligned, the semi-automatic aligning procedure will start. (See Semi-Automatic Aligning Procedure on Page 58)

Aligning Modes

To switch between the different steering modes (See Driving and Steering the Machine on Page 67), the operator has a choice between two aligning modes:

- In manual aligning mode, the operator can apply the selected steering mode directly and regardless of the front and rear wheel aligned statuses.
- In semi-automatic aligning mode, the operator first has to choose the desired steering mode and will then receive instructions on which wheels need to be aligned. Once the wheel alignment instruction(s) (indicated by the flashing of the front or rear wheels of the icon on the **GAUGES** screen) are followed, the chosen steering mode will be automatically activated.

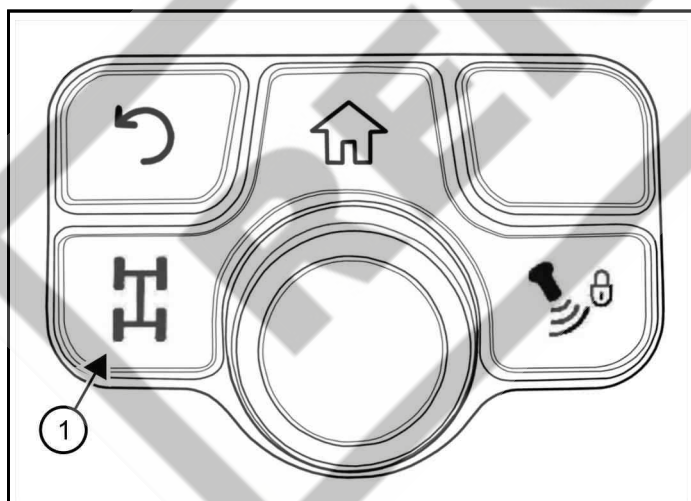
NOTE: The wheel alignment can be affected by several factors such as ground type, frequency of turns, tyre type and load handling. It is recommended to perform an alignment procedure at least on a daily basis.

Selecting Steering Aligning Modes

1. Go to **[MACHINE SETTINGS]** on the display. (See Machine Settings on Page 203)
2. Scroll to **[STEERING ALIGNMENT MODE]**.
3. The semi-automatic aligning mode is the default setting. **SEMI-AUTO** appears to the right of **[STEERING ALIGNMENT MODE]**.
4. Select **[STEERING ALIGNMENT MODE]** to switch the steering alignment mode to manual aligning mode. **MANUAL** appears to the right of **[STEERING ALIGNMENT MODE]**.

Semi-Automatic Aligning Procedure

Figure 52



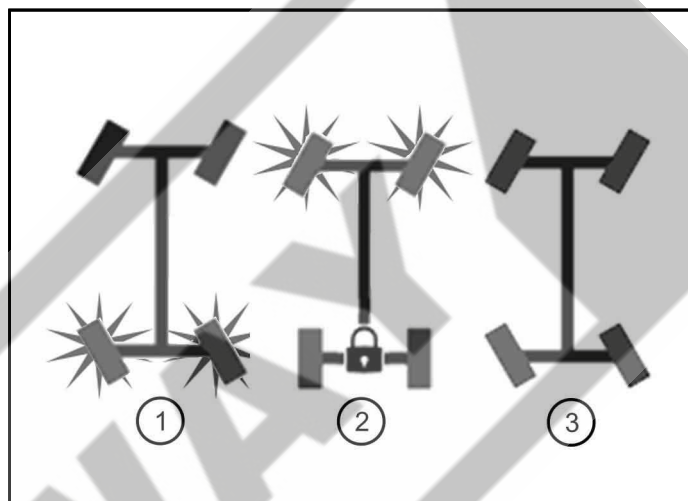
1. Press the steering mode button (Item 1) [Figure 52] to access **STEERING MODE** in the display panel.

2. Select the desired steering mode. (See Selecting The Steering Mode on Page 57)

If the front and rear wheels are straight ahead, the desired steering mode will be activated.

If the front and / or rear wheels are not straight ahead, the display returns to the **GAUGES** screen and the semi-automatic aligning procedure will start.

Figure 53



3. If the rear wheels are not straight ahead, the rear wheels of the icon (Item 1) [Figure 53] will flash green. Turn the steering wheel until the rear wheels turn to solid green. The rear wheels are straight ahead now.

If the front wheels are straight ahead, the desired steering mode is now active.

In case of leaving semi-crab steering mode to another steering mode, the semi-automatic alignment procedure will start with front wheels alignment.

4. If the front wheels are not straight ahead, the front wheels of the icon (Item 2) will flash green. Turn the steering wheel until the front wheels turn to solid green (Item 3) [Figure 53]. The front wheels are straight ahead now.

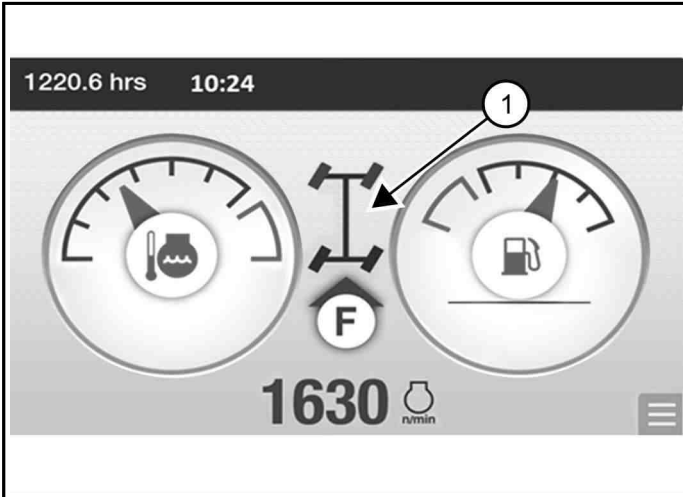
The desired steering mode is now active.

In case of leaving semi-crab steering mode to another steering mode, the semi-automatic alignment procedure will end with rear wheels alignment.

Manual Aligning Mode Procedure

The manual steering alignment mode allows the operator to apply the selected steering mode directly and regardless of the front and rear aligned statuses. It is recommended to align the wheels before driving the machine.

Figure 54



1. To align the wheels, turn the steering wheel until the four wheels of the icon (Item 1) [Figure 54] turn green.

If the wheels do not align straight ahead, use the following procedure:

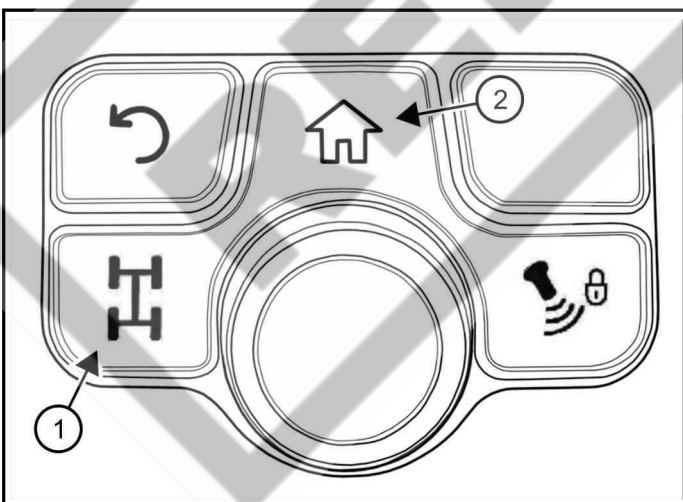
1. Select the 4-Wheel steering mode and turn the steering wheel until the rear wheels align straight ahead (icon's rear wheels turn green).
2. Select the 2-Wheel steering mode and turn the steering wheel until the front wheels align straight ahead (icon's front wheels turn green).

Now you can select the desired steering mode and the machine will steer correctly.

Quick Wheel Realignment

1. Park the machine on level ground.

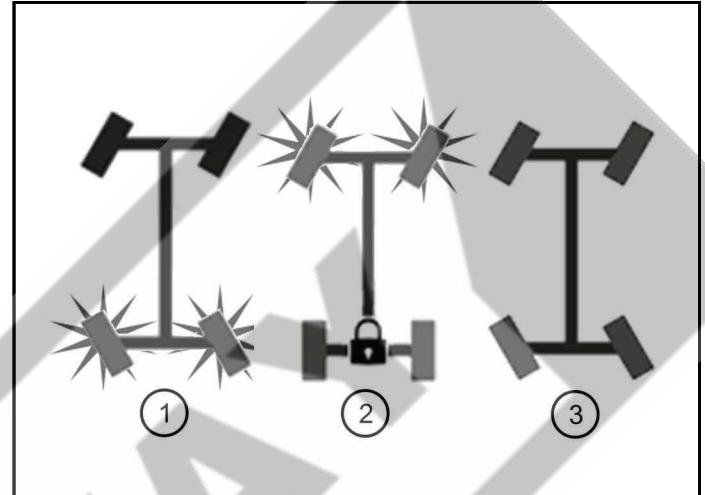
Figure 55



2. Press and hold the steering mode button (Item 1) and press the home button (Item 2) [Figure 55] to start quick wheel realignment.

The display turns to the **GAUGES** screen and the semi-automatic aligning procedure will start.

Figure 56



3. If the rear wheels are not straight ahead, the rear wheels of the icon (Item 1) [Figure 56] will flash green. Turn the steering wheel until the rear wheels turn to solid green. The rear wheels are straight ahead now and stay locked in that position until the procedure is complete.
4. If the front wheels are not straight ahead, the front wheels of the icon (Item 2) will flash green. Turn the steering wheel until the front wheels turn to solid green (Item 3) [Figure 56]. The front wheels are straight ahead now.

When the front and rear wheels are aligned, the selected steering mode will be active.

DIESEL PARTICULATE FILTER (DPF) SYSTEM

DPF Description

The engine exhaust system is equipped with a DPF.

The DPF is an emissions reduction device that removes diesel particulate matter (soot) from the exhaust gases of the diesel engine. The DPF will trap and collect the soot until it is burned off.

The process of burning off the collected soot is called regeneration. There are four types of regeneration: passive, automatic, forced parked and service regeneration. An inhibit mode is also available to the operator.

IMPORTANT

MACHINE DAMAGE HAZARD

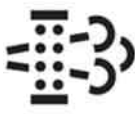
Failure to follow directions may cause damage to the DPF.

Never stop the engine during the regeneration cycle. This will by-pass the programmed cool down cycle required after a high temperature regen.

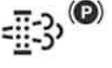
1-2392

Term	Description
Passive Regeneration	The engine provides adequate exhaust temperature during operation for regeneration.
Automatic Regeneration	The Engine Control Unit (ECU) automatically controls active regeneration. Active regeneration can occur any time the engine is operating once the soot accumulated in the DPF reaches a certain level. (See Automatic Regeneration Operation on Page 61)
Forced Parked Regeneration	The operator activates a forced parked regeneration. This selection requires confirmation after certain machine conditions are met. (See Forced Parked Regeneration Operation on Page 63)
Service Regeneration	Your Bobcat dealer uses specialised equipment to perform a service regeneration. (See DPF Service Regeneration on Page 154)
Inhibit Mode	Active regeneration will not occur. This selection requires confirmation. (See Inhibit Mode Operation on Page 64)

DPF Regeneration Status Icons

Icon	Definition
	DPF - Appears on the display during regeneration. Machine is requesting that operator activate a forced parked regeneration when flashing.
	Hot Exhaust System Temperature (HET) - Appears on the display during regeneration to indicate that exhaust and exhaust gases can be hot.
	Inhibit - Appears on the display when the operator has selected inhibit mode. Machine is indicating it would like to do regeneration when flashing.
	Emissions Error - Appears on the display to indicate a problem with the emission regulating system.

DPF Regeneration Tables

Soot Level	0 – 75%	75 – 100%	100 – 105%	105 – 110%	110 – 120%	120 – 150%	> 150%
Active Regeneration Status	Not Required	Not Required	Regenerating	Regenerating	Regenerating	Not Regenerating	Not Regenerating
Inhibit Allowed 	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Forced Parked Allowed 	No	Yes	Yes	Yes	Yes	No	No
DPF Icon 	Off	Off	On	Flashing Slowly	Flashing Slowly	Flashing Quickly	Off
HEST Icon 	Off	Off	On	On	On	Off	Off
Check Engine Icon 	Off	Off	Off	Off	On	On	On
Regeneration Type	Passive	Passive	Automatic	Automatic	Automatic	Service	None
Soot Load Bar Colour	Grey	Blue	Blue	Red	Red	Red	Red
Service Code	None	None	None	None	P2463	P24A3	P24A3
Torque Derate	None	None	None	None	Mild	Severe	Severe
Operator Action	None	None	None	Activate Forced Parked Regeneration when possible	Activate Forced Parked Regeneration when possible	Dealer Service Regeneration Required (See DPF Service Regeneration on Page 154)	Contact your Bobcat dealer to service the DPF

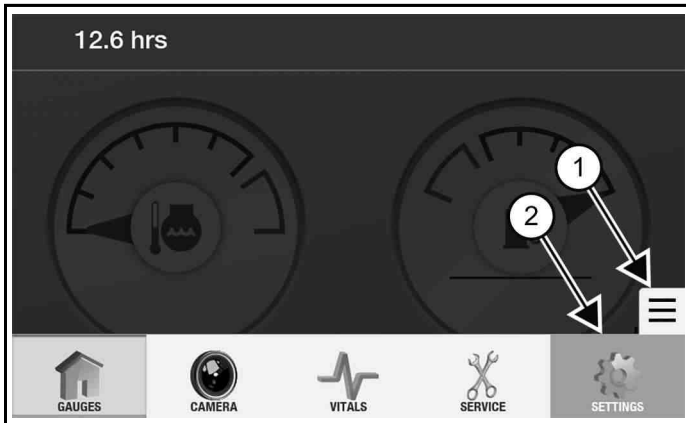
NOTE: The general warning icon on the display will also turn on to alert operator of active service codes.

Automatic Regeneration Operation

Automatic regeneration mode is selected by default every time the machine is started.

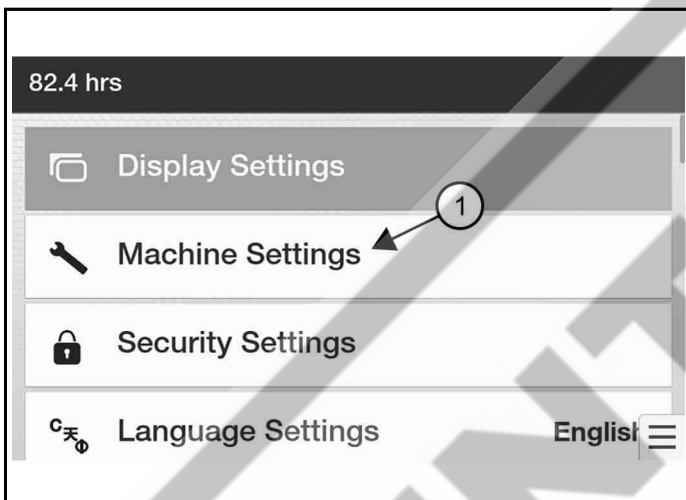
The DPF management screen is available on the display, where you can check the status of the DPF and select the required regeneration mode.

Figure 57



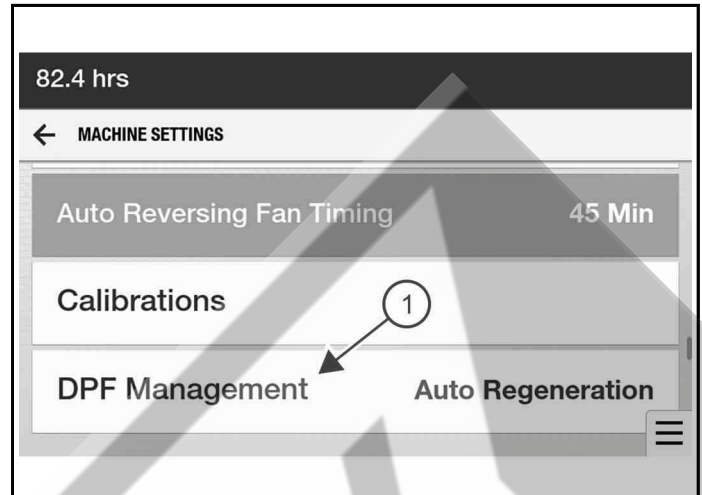
1. Select the **[NAVIGATION HANDLE]** icon (Item 1) [Figure 57].
2. Select **[SETTINGS]** (Item 2) [Figure 57].

Figure 58



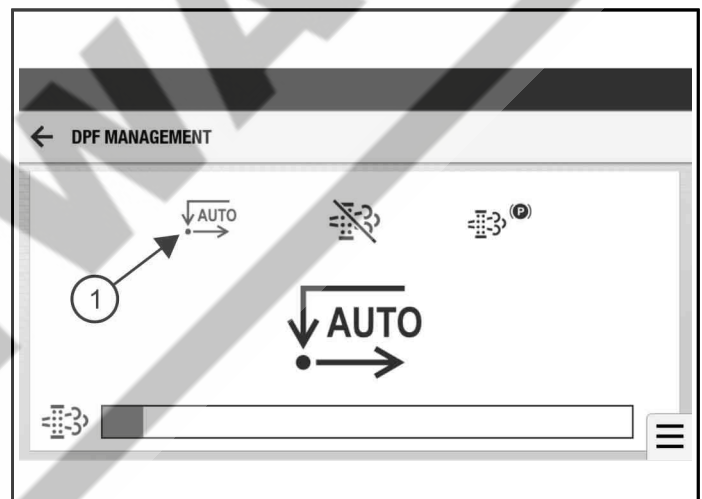
3. Select **[MACHINE SETTINGS]** (Item 1) [Figure 58].

Figure 59



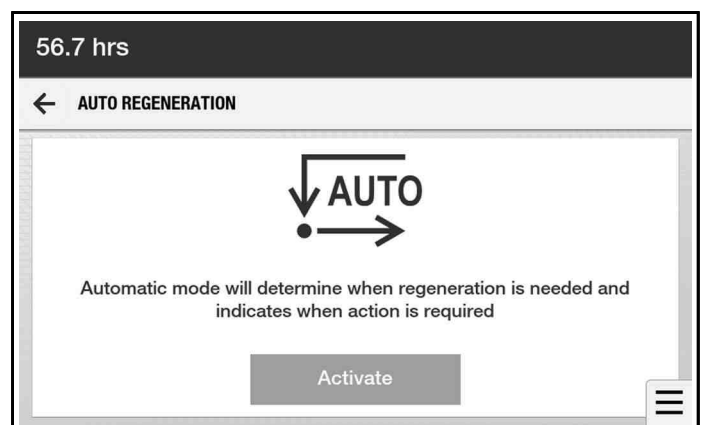
4. Scroll down and select **[DPF MANAGEMENT]** (Item 1) [Figure 59].

Figure 60



5. Select the automatic regeneration icon (Item 1) [Figure 60].

Figure 61



6. Select **[ACTIVATE]** [Figure 61] if not already active.

The ECU will monitor soot load and perform a regeneration automatically. The operator will be informed that an automatic regeneration has started by the HEST icon.

The machine should be operated during this regeneration.

NOTE: The regeneration process can last for 30 minutes or longer.

It is recommended to increase engine speed to high idle during an automatic regeneration and operate the machine under load if possible.

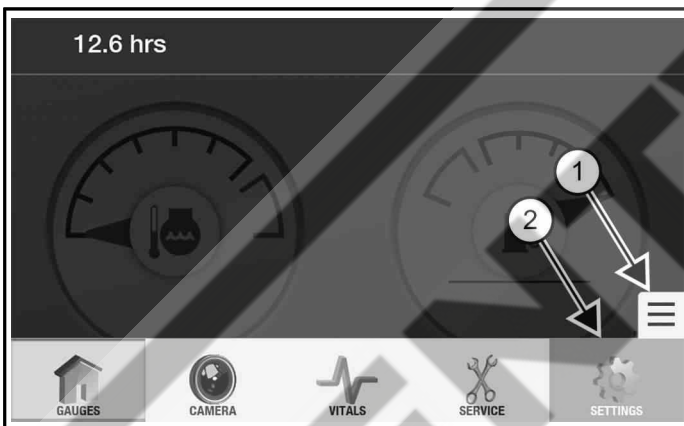
It is recommended to allow the regeneration cycle to finish before turning the machine off.

Forced Parked Regeneration Operation

A forced parked regeneration can be activated by the operator using the DPF management screen. The machine cannot be operated during this regeneration.

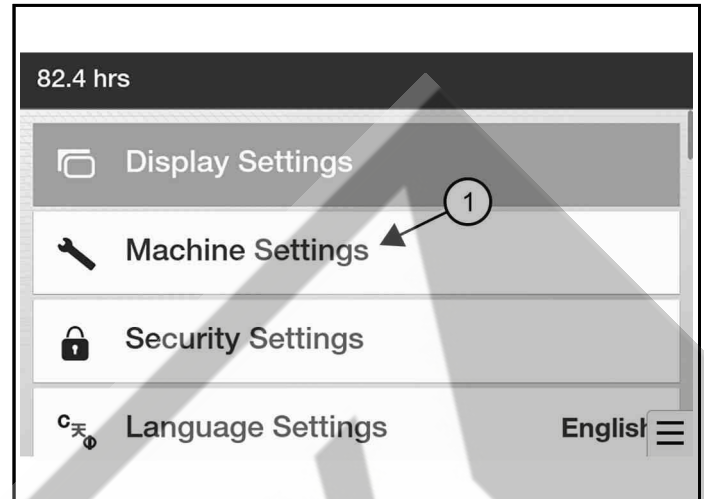
NOTE: The regeneration process can last for 40 minutes or longer.

Figure 62



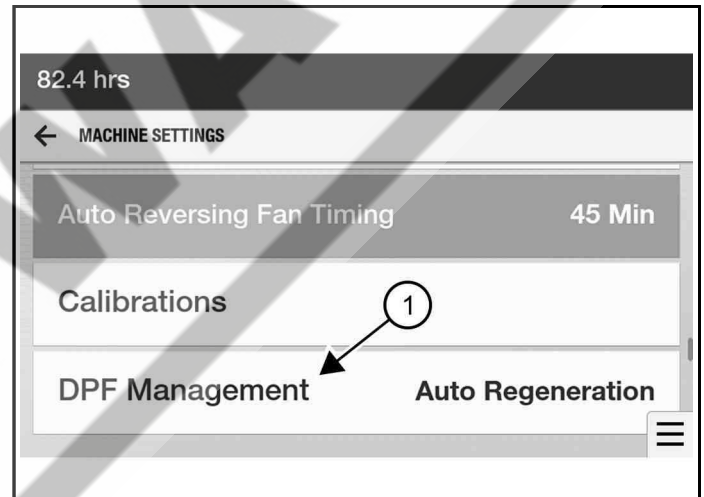
1. Select the **[NAVIGATION HANDLE]** icon (Item 1) [Figure 62].
2. Select **[SETTINGS]** (Item 2) [Figure 62].

Figure 63



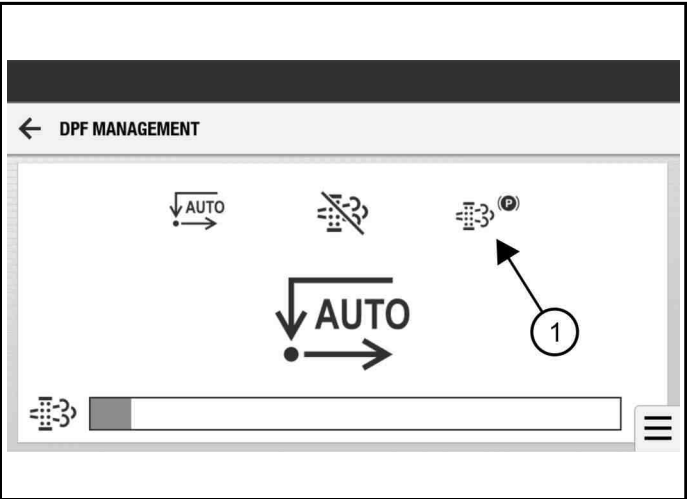
3. Select **[MACHINE SETTINGS]** (Item 1) [Figure 63].

Figure 64



4. Scroll down and select **[DPF MANAGEMENT]** (Item 1) [Figure 64].

Figure 65



5. Select the forced parked regeneration icon (Item 1) [Figure 65].

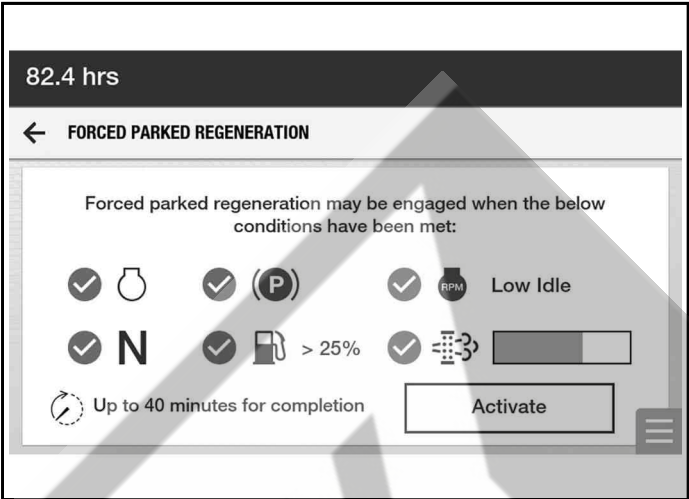
⚠ IMPORTANT

MACHINE DAMAGE HAZARD
Failure to follow directions may cause damage to the DPF.
Never stop the engine during the regeneration cycle. This will by-pass the programmed cool down cycle required after a high temperature regen. ◀

The following machine conditions must be met before forced parked regeneration is allowed:

- No active DPF related service codes
 - Engine coolant temperature higher than 40°C (104°F)
 - Soot load between 75 percent and 120 percent
 - Parking brake engaged
 - Engine speed at low idle
 - Travel Mode in Neutral
 - More than 25 percent fuel in the tank
6. Decrease engine speed to low idle.

Figure 66



7. Select [ACTIVATE] [Figure 66] to start regeneration.

The ECU will control engine speed until the regeneration cycle is finished.

Inhibit Mode Operation

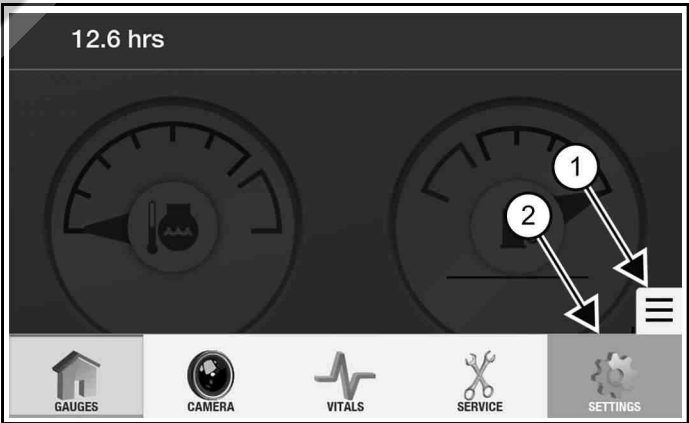
Regeneration can be prevented from occurring by selecting inhibit mode. The machine should be operated under load when inhibit mode is selected.

⚠ IMPORTANT

MACHINE DAMAGE HAZARD
Operating the machine in inhibit mode for extended periods may cause severe damage to the DPF. ◀

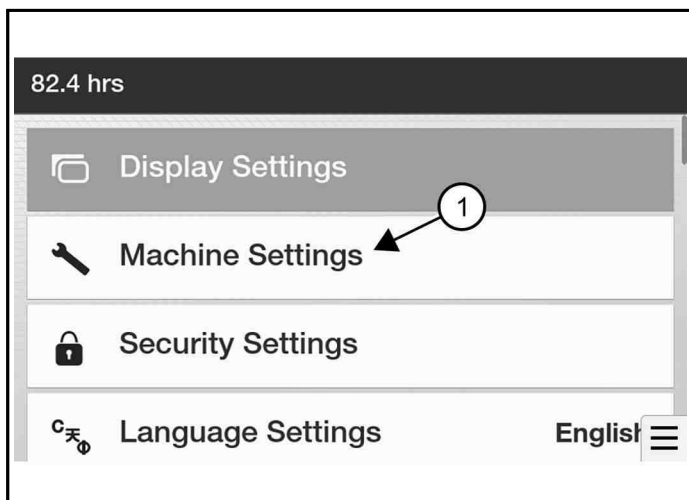
The DPF will be inhibited from actively regenerating until a regeneration mode is selected or the machine is turned OFF. The machine will revert to automatic mode the next time the machine is turned ON.

Figure 67



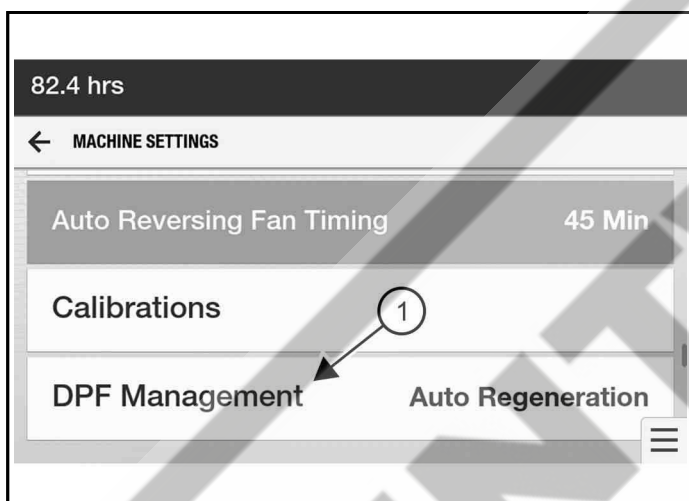
1. Select the [NAVIGATION HANDLE] icon (Item 1) [Figure 67].
2. Select [SETTINGS] (Item 2) [Figure 67].

Figure 68



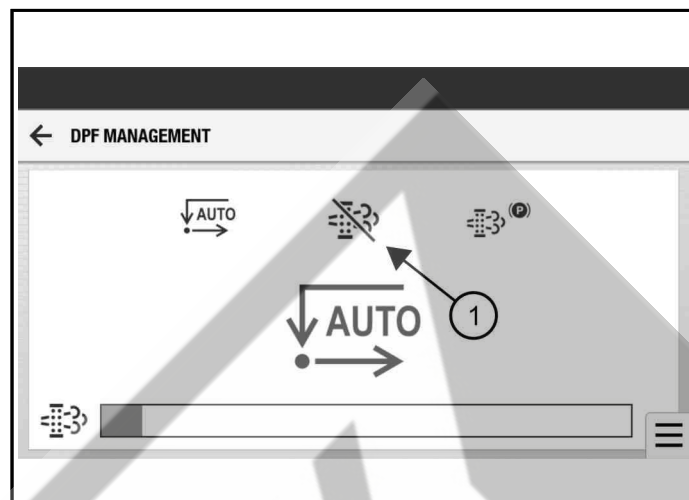
3. Select **[MACHINE SETTINGS]** (Item 1) [Figure 68].

Figure 69



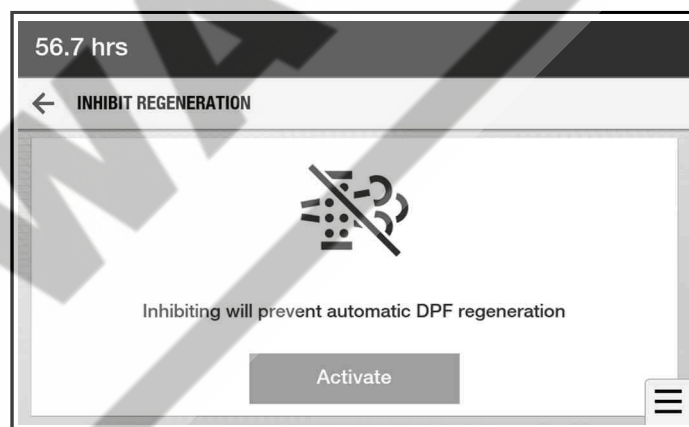
4. Scroll down and select **[DPF MANAGEMENT]** (Item 1) [Figure 69].

Figure 70



5. Select the inhibit mode icon (Item 1) [Figure 70].

Figure 71



6. Select **[ACTIVATE]** to inhibit regeneration.
7. After running the machine in inhibit mode, take one of the below actions as soon as possible:
- Place the machine in automatic regeneration mode
 - Perform a forced parked regeneration if possible (The soot load bar must be blue or red.)

PARKING BRAKE

Operating The Parking Brake

This machine is equipped with an automated parking brake system.

When the machine is stopped and the travel direction switch is set to neutral, the parking brake automatically activates.

The parking brake can also be activated or deactivated manually:

Figure 72



1. Press the button (Item 1) [Figure 72] to toggle the parking brake on or off (the LED light on the button will turn on or off).
2. If the parking brake has been engaged manually while the travel direction switch is set to Forward or Reverse, press the accelerator pedal to ensure that the machine does not move. If the machine moves while the parking brake is activated, contact your Bobcat dealer for service.

NOTE: In case of failure of the service brake, the parking brake is automatically used as an emergency brake. The parking brake will engage proportionally to the service brake pedal position.

3. To disengage the parking brake, press the button (Item 1) [Figure 72] (the LED light on the button will turn off) or switch the travel direction switch to Forward or Reverse, and press the accelerator pedal.

The parking brake display icon disappears once the parking brake is disengaged.

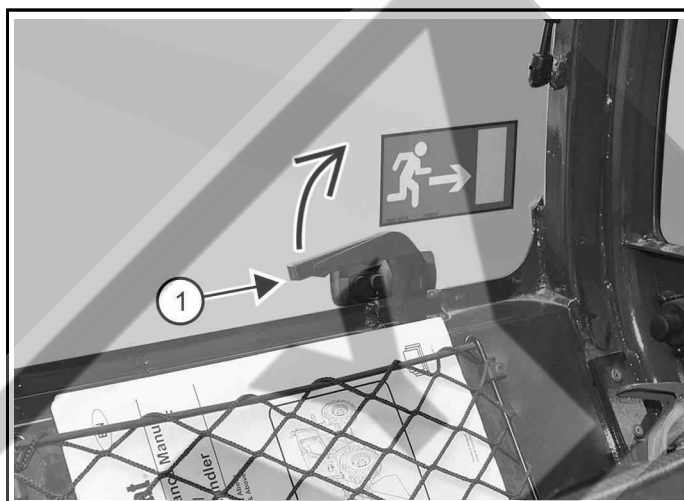
NOTE: Disengage the parking brake manually in case of towing the machine or allowing the machine to go down a slope by itself.

EMERGENCY EXIT

Rear Window

1. Open the rear window.

Figure 73



2. Turn the handle (Item 1) [Figure 73] clockwise and push the rear window fully open.

Figure 74

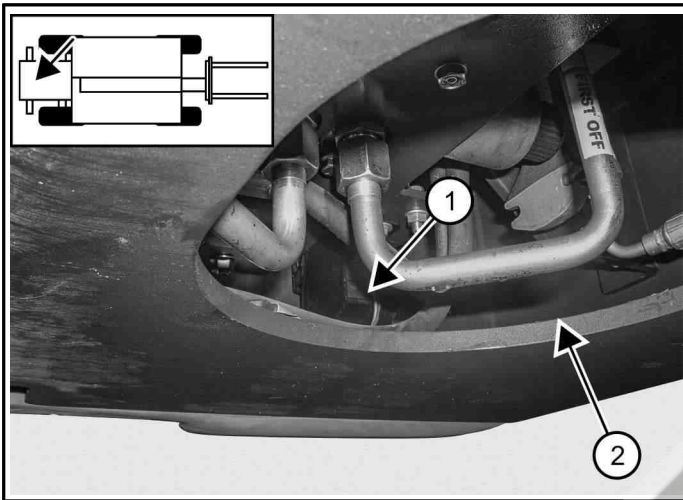


3. Exit through the rear window opening [Figure 74].

BACK-UP ALARM SYSTEM

Back-Up Alarm System Description

Figure 75



The back-up alarm (Item 1) is located at the rear of the machine and can be accessed through an opening (Item 2) [Figure 75] in the frame.

A back-up alarm is not a substitute for looking to the rear when operating the machine in reverse, or for keeping bystanders away from the work area. Operators must always look in the direction of travel, including reverse, and must also keep bystanders away from the work area, even though the machine is equipped with a back-up alarm.

Operators must be trained to **always** look in the direction of travel, **including when operating the machine in reverse** and to keep bystanders away from the work area. Other workers should be trained to **always** keep away from the operator's work area and travel path.

Back-Up Alarm System Operation

⚠ WARNING

CRUSHING HAZARD

Contact with machine can cause serious injury or death.

- Always keep bystanders away from the work area and travel path.
- The operator must maintain a clear view of the direction of travel and look before and during machine movement.
- The back-up alarm must sound when operating the machine in the reverse direction. ◀

The back-up alarm will sound when the operator prepares the machine for reverse travel. (See Travel Direction on Page 42)

If alarm does not sound, see inspection and maintenance instructions for the back-up alarm system in the preventive maintenance section of this manual.

DRIVING AND STEERING THE MACHINE

Driving And Steering The Machine Procedure

⚠ WARNING

INSTABILITY HAZARD

Tipping or roll-over can cause serious injury or death. When operating the machine:

- Operate only from operator's seat with seat belt securely fastened. ◀

⚠ WARNING

UNINTENDED MACHINE MOVEMENT HAZARD
Failure to follow instructions can cause serious injury or death.

- The direction the machine turns when moving backward is different in each steering mode.
- Know and understand the selected steering mode before operating. ◀

- Select the desired steering mode. Align the wheels if needed.

Figure 76



- Move the steering wheel smoothly. Avoid sudden starting and stopping.
- Forward Travel - Prepare the machine for forward travel. (See Travel Direction on Page 42)
- Left Turn Forward / Right Turn Forward - Slowly press the Accelerator Pedal (Item 1) and turn the steering wheel (Item 2) [Figure 76] to the right or left. Look in the direction of travel.
- Reverse Travel - Prepare the machine for reverse travel. (See Travel Direction on Page 42)
- Left Turn Backward / Right Turn Backward - Slowly press the Accelerator Pedal (Item 1) and turn the steering wheel (Item 2) [Figure 76] to the right or left. Look in the direction of travel.

- Press the accelerator pedal down to increase engine speed. Release foot pressure to decrease engine speed. In Flex Drive mode (if equipped), the accelerator pedal controls only travel speed.
- Press the brake pedal (Item 3) [Figure 76] a small amount to decrease travel speed and control inching (gradual travel of the machine).
(See Service Brake Pedal And Inching Control on Page 52)

Stopping The Machine

When the accelerator pedal is released, the hydrostatic transmission will slow the machine to a stop.

- To decrease stopping distance, press down the brake pedal (Item 3) [Figure 76].

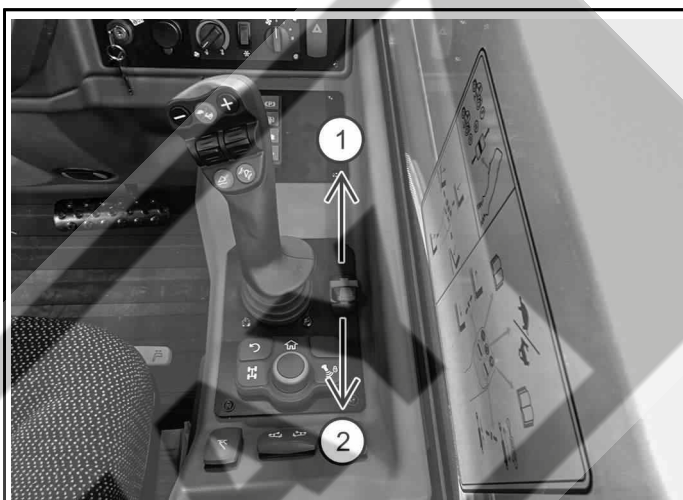
The further the brake pedal is pressed, the faster the machine will slow to a stop.

FLEX DRIVE

Setting Engine Speed In Flex Drive Mode

In flex drive mode, the engine speed is adjusted with the hand lever (if equipped) to maintain a constant hydraulic flow to the boom and attachment.

Figure 77



- Push the engine speed lever forward (Item 1) [Figure 77] to activate flex drive mode and set the engine speed.
 - With ECO mode engaged, the accelerator pedal will control only travel speed.
 - With ECO mode disengaged, the engine speed lever sets a minimum engine speed. The accelerator pedal will control only travel speed until the set engine speed is too low for the demanded travel speed. Beyond this point, the accelerator pedal will control engine speed and travel speed.
- Pull the engine speed lever fully backward (Item 2) [Figure 77] to deactivate flex drive mode.

The accelerator pedal will control engine speed and travel speed.

SPEED MANAGEMENT

Operating Speed Management

The Speed Management feature allows the machine to be manoeuvred at a slower travel speed, even during maximum engine rpm.

This feature can be useful for attachments requiring hydraulic flow, not for loading, digging, etc..

Example:

- Angle Broom: Allows the auxiliary hydraulic flow to the attachment and machine forward travel speed to be independently controlled.

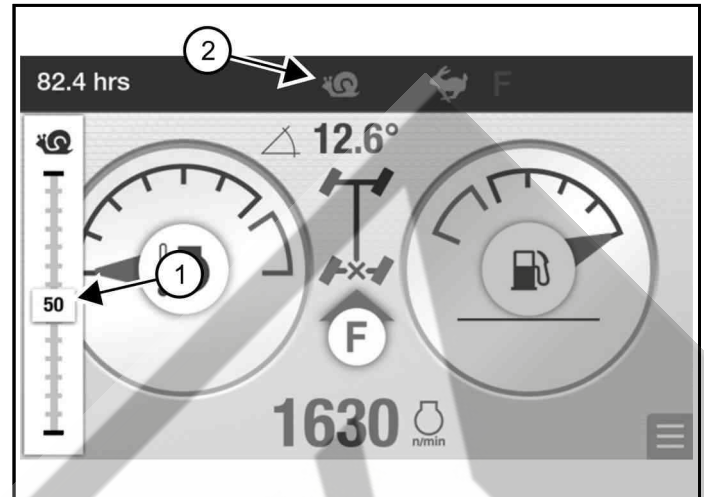
Engaging:

Figure 78



1. Press the switch (Item 1) [Figure 78] on the right console panel once to activate Speed Management. The light on the switch will turn ON.

Figure 79



The speed management icon (Item 2) [Figure 79] will appear in the display and remain on until the speed management button is pressed again or the machine is turned off.

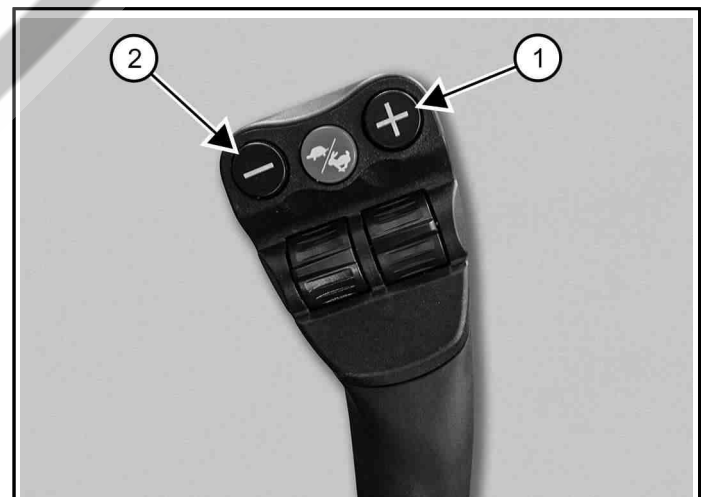
When speed management is engaged, the machine will travel at a percentage of standard travel speed. That percentage will appear briefly in the display (Item 1) [Figure 79].

NOTE: The default percentage setting can be changed by the operator.

NOTE: The factory default setting can be changed by the operator.
(See Changing Speed Management Default Setting (Standard Display) on Page 70)

Adjusting On-The-Fly:

Figure 80



2. Press the '+' adjustment button (Item 1) [Figure 80] on the joystick to increase the speed up to 100%.

The percentage graph will appear in the display (Item 1) [Figure 79] while adjusting.

3. Press the '-' adjustment button (Item 2) [Figure 80] on the joystick to decrease the speed down to 0%.

The percentage graph will appear in the display (Item 1) [Figure 79] while adjusting.

4. Press the switch (Item 1) [Figure 78] again to disengage speed management and return to standard travel speed. The speed management icon will turn off.

The system will retain the selected speed percentage as long as the machine remains ON.

EXAMPLE: You can be using the machine at 40%, then disengage speed management to reposition the machine, and then reengage Speed Management. The speed percentage will still be at 40%.

EXAMPLE: Turning the machine OFF will return the Speed Management setting to the default percentage. The next time you start the engine and engage speed management, the speed is set at the last default setting saved by the operator. (See Changing Speed Management Default Setting (Standard Display) on Page 70)

Changing Speed Management Default Setting (Standard Display)

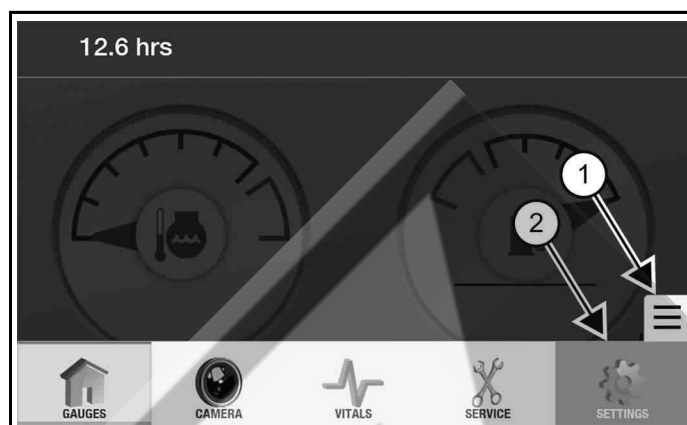
The Speed Management factory default setting can be changed by the operator to save adjustment time.

EXAMPLE: Your machine is often used for sweeping and you prefer a Speed Management setting of 30% of Standard Travel Speed for that application. The Speed Management default setting can be changed to 30% of Standard Travel Speed instead of the factory default setting of 50%. Each time you start the machine and first select Speed Management, the machine will default to 30% of Standard Travel Speed.

When Speed Management is first selected each time the machine is started, the percentage you selected will be the default setting. Speed Management can still be adjusted from 0% to 100% of Standard Travel Speed.

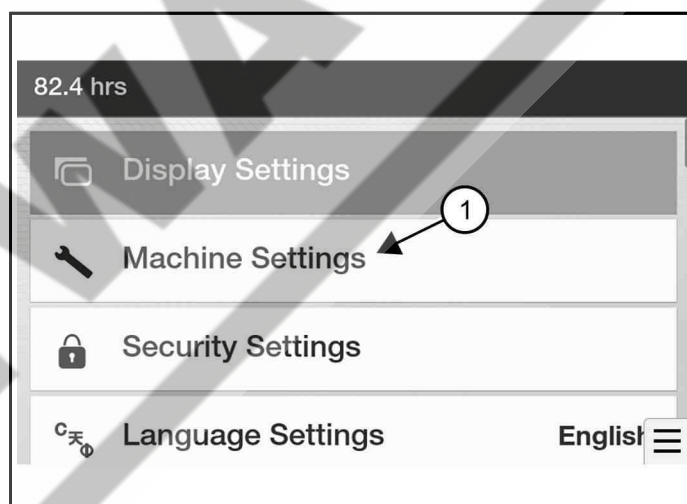
The default setting can be changed any time the operator chooses.

Figure 81



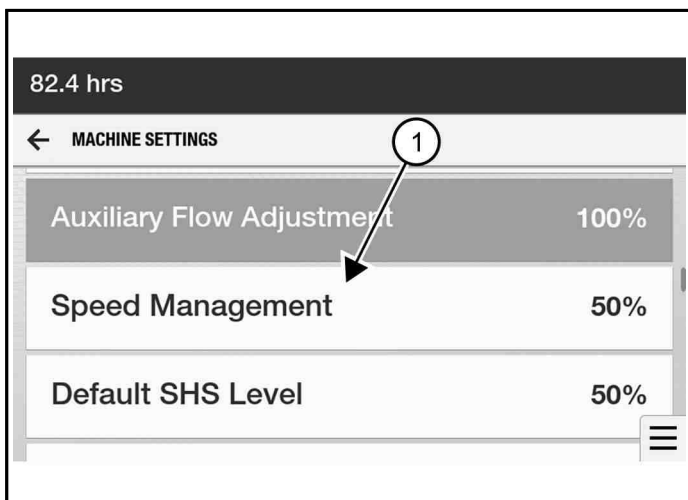
1. Select the [NAVIGATION HANDLE] icon (Item 1) [Figure 81].
2. Select [SETTINGS] (Item 2) [Figure 81].

Figure 82



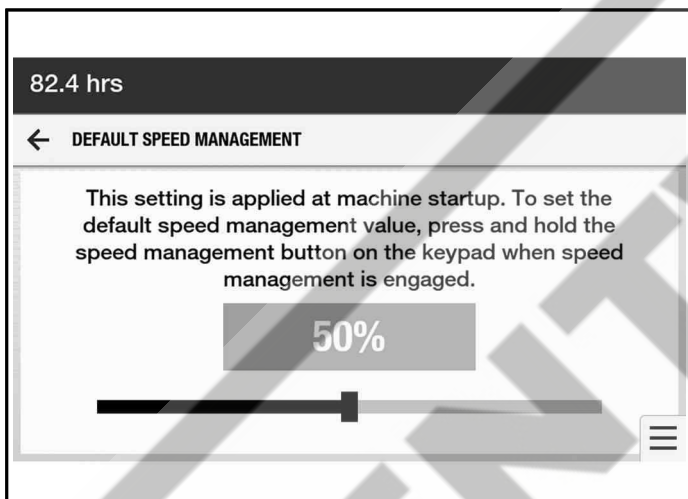
3. Select [MACHINE SETTINGS] (Item 1) [Figure 82].

Figure 83



4. Select **[SPEED MANAGEMENT]** (Item 1) [Figure 83].

Figure 84



5. Use the slider bar [Figure 84] to adjust to desired default setting.

Figure 85



6. To save the default setting, either press the jog shuttle or press and hold the button (Item 1) [Figure 85] on right console panel for several seconds.

When speed management is first engaged the next time the machine is started, the percentage you saved is the new default setting. Speed management can still be adjusted from 0% to 100% of standard travel speed.

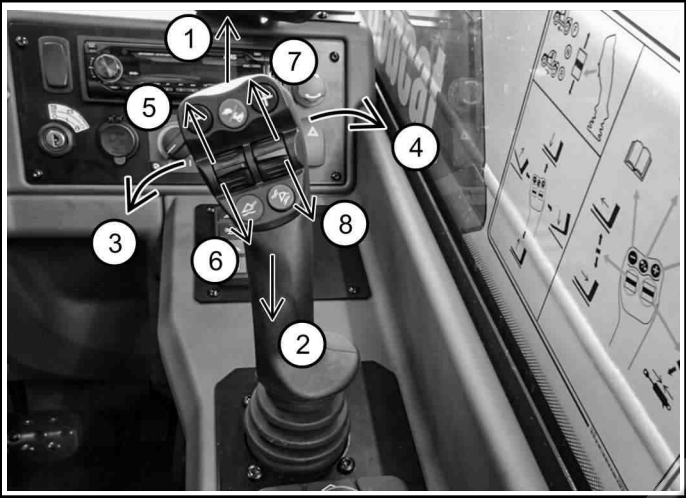
The default setting can be changed any time the operator chooses and is saved for each operator.

7. Press the button (Item 1) [Figure 85] on the right console panel or turn the machine off to disengage speed management and return the machine to standard travel speed.

HYDRAULIC CONTROLS

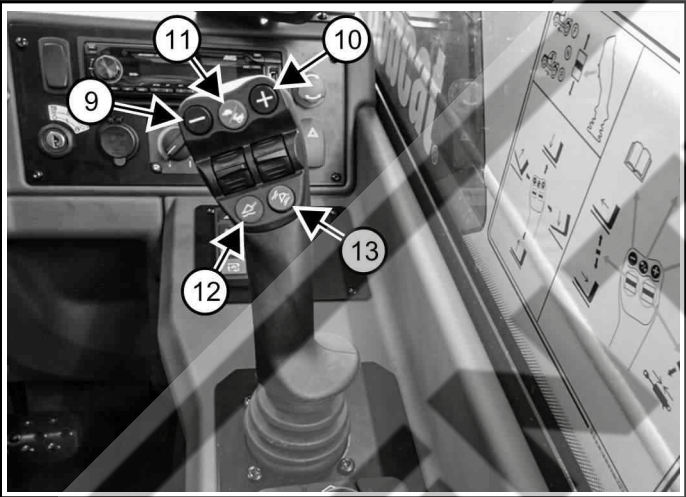
Hydraulic Control Lever (Joystick)

Figure 86



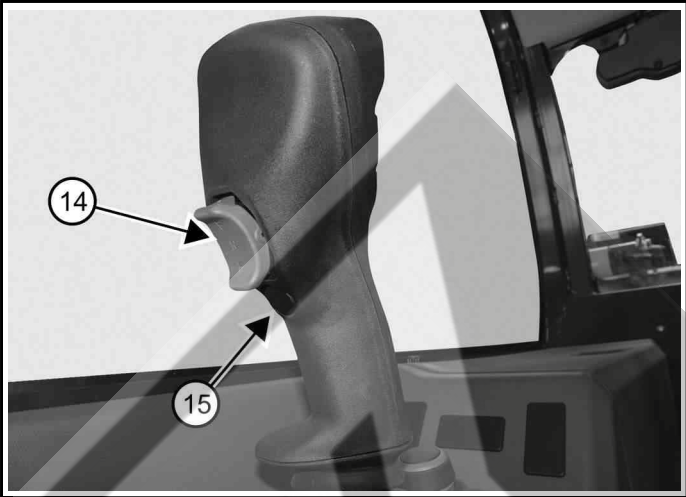
C211761a

Figure 87



C211761b

Figure 88



C211767b

The joystick controls the movement of the boom and attachment [Figure 86], [Figure 87] and [Figure 88].

REF	DESC.	FUNCTION
1	Lower boom	
2	Raise boom	
3	Tilt attachment backward	
4	Tilt Attachment forward	
5	Extend telescopic boom	
6	Retract telescopic boom	
7	Front Auxiliary Hydraulics (Flow)	Controls the function of the Front Auxiliary Hydraulics (Example: close grapple teeth). Rotate the roller all the way up through the detent for continuous flow auxiliary hydraulics. (See Operating The Front Auxiliary Hydraulics on Page 75)

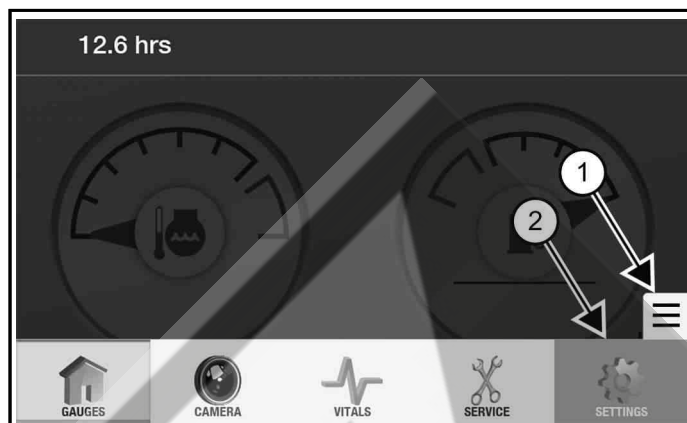
REF	DESC.	FUNCTION
8	Front Auxiliary Hydraulics (Reverse Flow)	Controls the function of the Front Auxiliary Hydraulics (Example: open grapple teeth). Rotate the roller all the way down through the detent for reverse continuous flow auxiliary hydraulics. (See Operating The Front Auxiliary Hydraulics on Page 75)
9	Adjustment '-'	Decreases the value when setting a function
10	Adjustment '+'	Increases the value when setting a function
11	Low / high speed	Press the button to toggle between low and high speed.
12	Boom float (If equipped)	Not used on this machine
13	Bucket shake (If equipped)	
14	Travel direction switch (F-N-R)	(See Travel Direction Switch on Page 42)
15	White work lights (If equipped with blue work lights)	Not used on this machine

The above joystick functions (Items 1 - 8) are proportional. The farther you move the control, the faster the hydraulic function operates.

Changing The Maximum Auxiliary Flow (Standard Display)

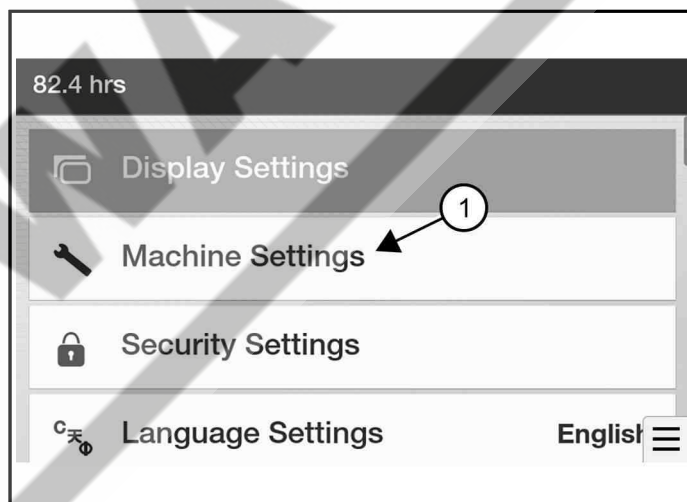
The maximum available auxiliary flow setting can be adjusted by the operator to improve control of the auxiliary hydraulics.

Figure 89



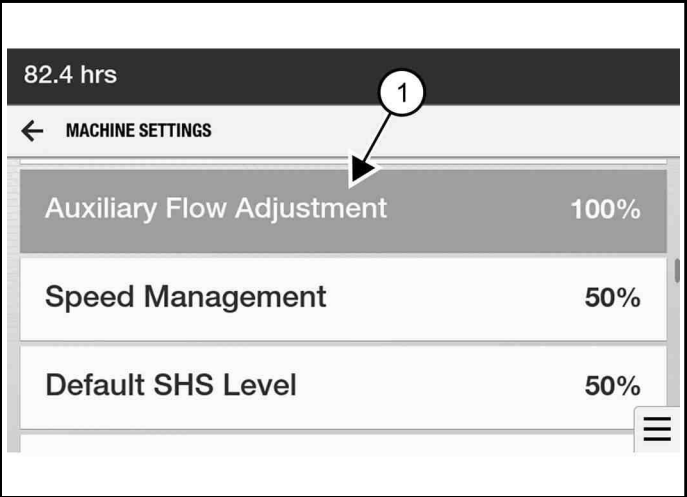
1. Select the **[NAVIGATION HANDLE]** icon (Item 1) [Figure 89].
2. Select **[SETTINGS]** (Item 2) [Figure 89].

Figure 90



3. Select **[MACHINE SETTINGS]** (Item 1) [Figure 90].

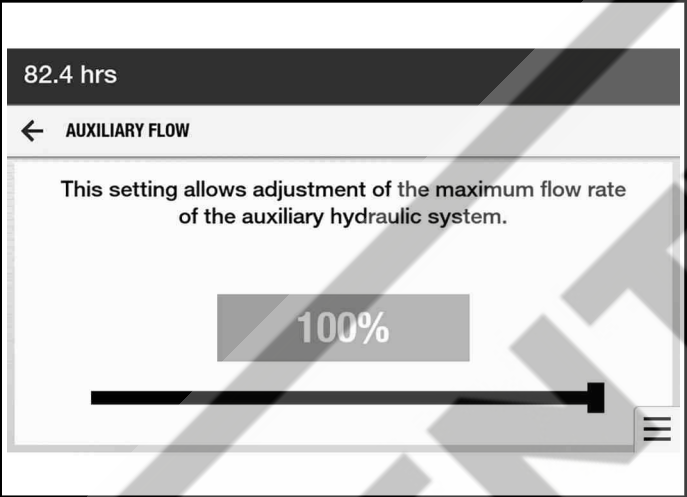
Figure 91



C210742b

4. Select **[AUXILIARY FLOW ADJUSTMENT]** (Item 1) [Figure 91].

Figure 92



C210716

5. Use the slider bar [Figure 92] to adjust to desired default setting.

Auxiliary Hydraulics At Startup

The operator can choose whether the Auxiliary Hydraulics are enabled or disabled at startup.

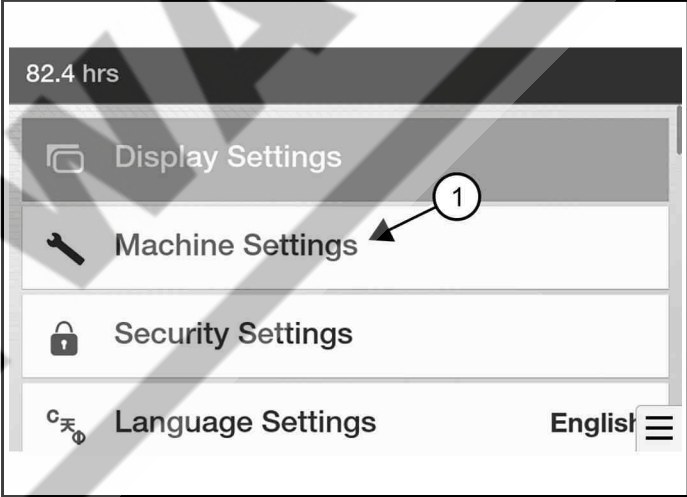
Figure 93



NA3659A

1. Select the **[NAVIGATION HANDLE]** icon (Item 1) [Figure 93].
2. Select **[SETTINGS]** (Item 2) [Figure 93].

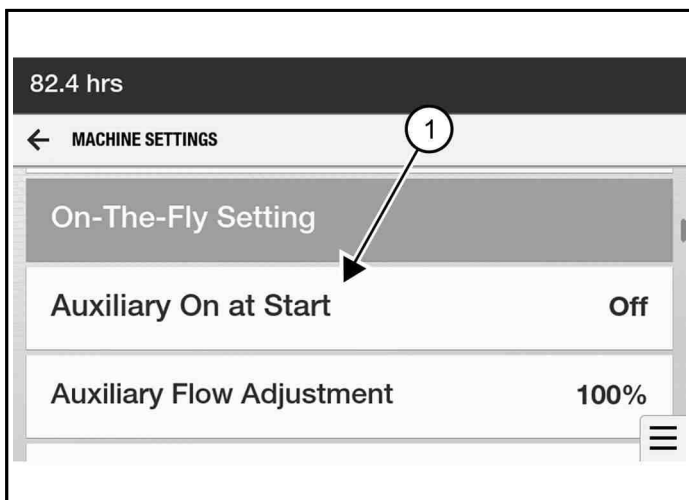
Figure 94



C210761a

3. Select **[MACHINE SETTINGS]** (Item 1) [Figure 94].

Figure 95



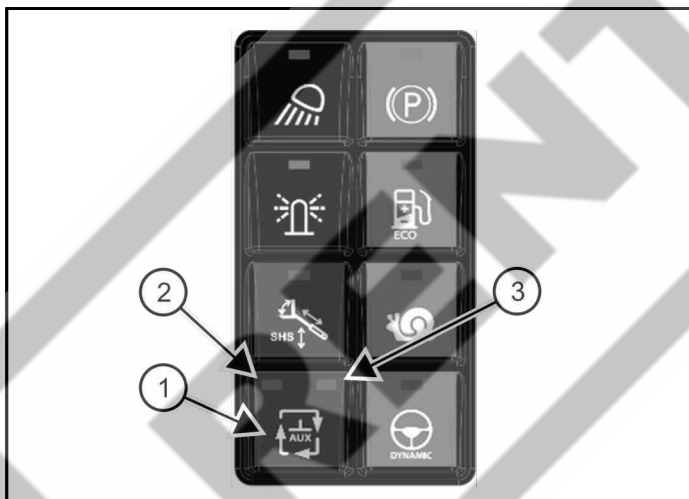
4. Select **[AUXILIARY ON AT START]** (Item 1) [Figure 95] to toggle between **ON** or **OFF**.

Operating The Front Auxiliary Hydraulics

Reverse flow can cause damage to some attachments. Use reverse flow with your attachment only if approved. See your attachment Operation & Maintenance Manual for detailed information.

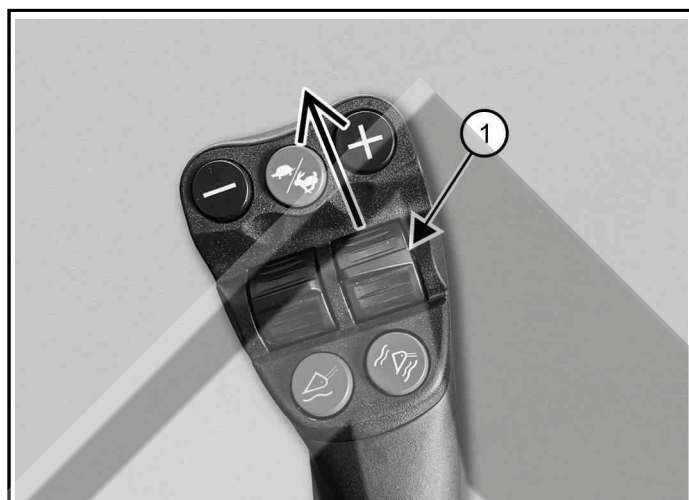
Continuous auxiliary hydraulic flow (female coupler is pressurised):

Figure 96



1. Press the switch (Item 1) to activate the auxiliary hydraulics. The left LED (Item 2) [Figure 96] will be illuminated.
2. Press the switch (Item 1) a second time to enable continuous auxiliary hydraulic flow. The right LED (Item 3) [Figure 96] will be illuminated.

Figure 97



3. Overpress the thumbwheel (Item 1) [Figure 97] upwards to activate continuous flow auxiliary hydraulics. The right LED (Item 3) [Figure 96] will flash. This function allows constant auxiliary hydraulic fluid flow to the front female coupler (female coupler is pressurised). (Example: Operate an angle broom.)
4. To stop continuous auxiliary fluid flow, overpress the thumbwheel (Item 1) [Figure 97] a second time, press the auxiliary flow button or press the joystick lockout button.

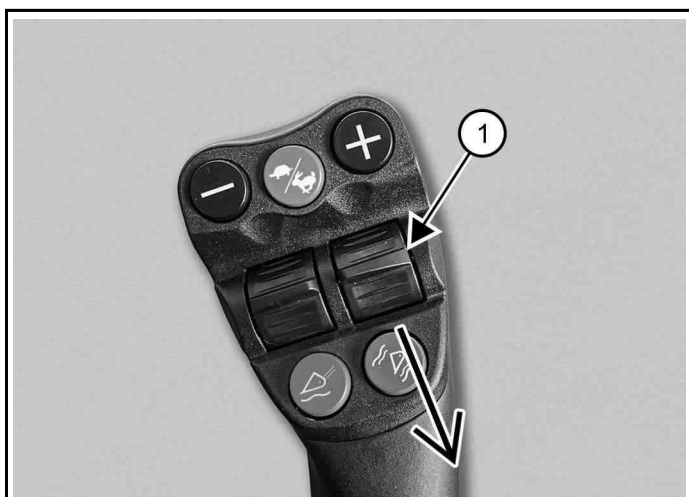
Reverse continuous auxiliary hydraulic flow (male coupler is pressurised):

Figure 98



5. Press the switch (Item 1) to activate the auxiliary hydraulics. The left LED (Item 2) [Figure 98] will be illuminated.
6. Press the switch (Item 1) a second time to enable continuous auxiliary hydraulic flow. The right LED (Item 3) [Figure 98] will be illuminated.

Figure 99

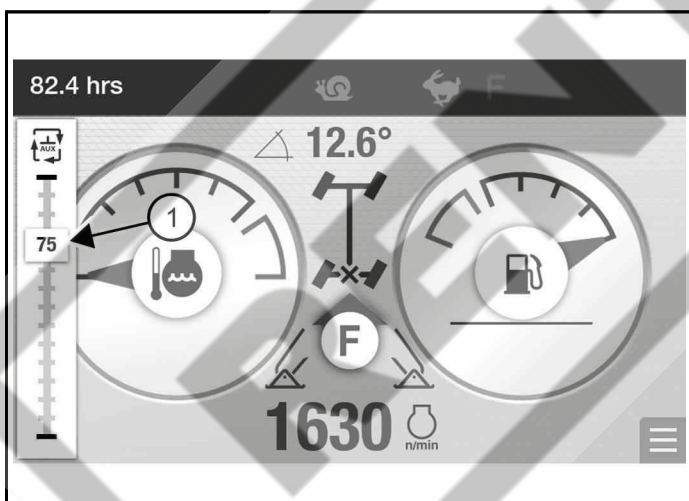


C21077c

7. Overpress the thumbwheel (Item 1) [Figure 99] downwards to activate reverse continuous flow auxiliary hydraulics. The right LED (Item 3) [Figure 96] will flash. This function allows constant auxiliary hydraulic fluid flow to the front male coupler (male coupler is pressurised). (Example: Operate an angle broom.)
8. To stop reverse continuous auxiliary fluid flow, overpress the thumbwheel (Item 1) [Figure 99] a second time, press the auxiliary flow button or press the joystick lockout button.

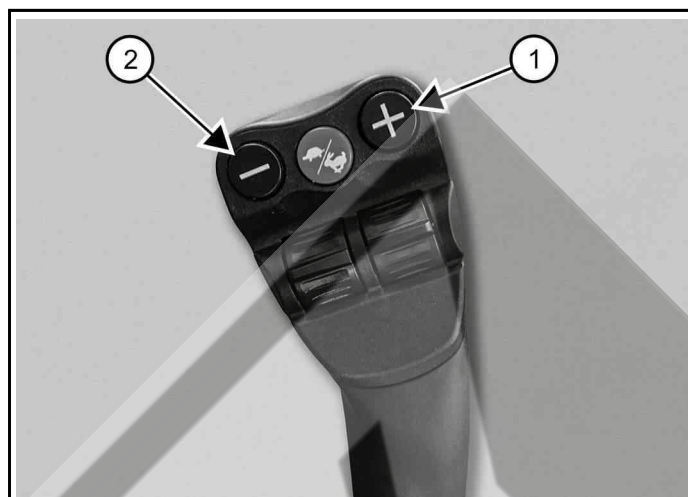
Adjusting On-The-Fly:

Figure 100



C211598a

Figure 101



C210778a

9. Press the '+' adjustment button (Item 1) [Figure 100] on the joystick to increase the maximum auxiliary hydraulic flow up to 100%.

The percentage graph will appear in the display (Item 1) [Figure 100] while adjusting.
10. Press the '-' adjustment button (Item 2) [Figure 100] on the joystick to decrease the maximum auxiliary hydraulic flow down to 0%.

The percentage graph will appear in the display (Item 1) [Figure 100] while adjusting.
11. Press and hold the auxiliary hydraulics switch (Item 1) [Figure 98] to store the value as the default maximum auxiliary hydraulic flow.

The setting is automatically saved in memory every time the machine is turned off.

Quick Couplers

⚠ WARNING

BURN HAZARD

Hydraulic fluid, tubes, fittings and quick couplers can get hot when running machine and attachments. Be careful when connecting and disconnecting quick couplers. ◀

W-2220

⚠ WARNING

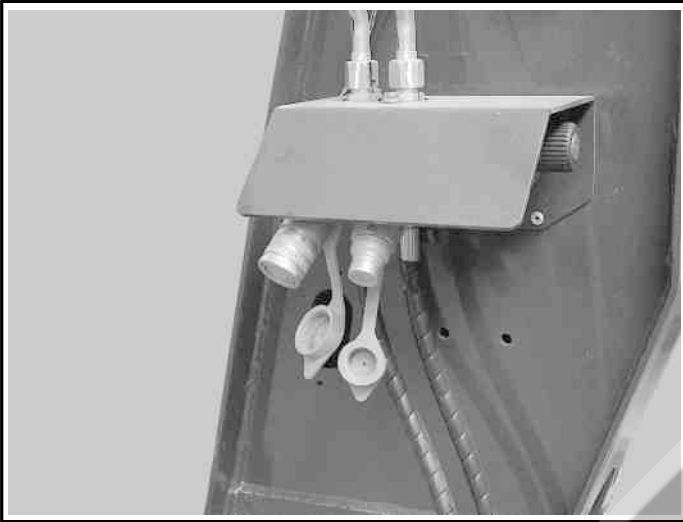
INJECTION HAZARD

Pressurised diesel fuel or hydraulic fluid can penetrate skin and eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. DO NOT use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical attention from a doctor familiar with this injury. ◀

W-2072

- Remove dirt or debris from the surface of both the male and female couplers, and from the outside diameter of the male coupler.

Figure 102



S41642

- Visually check the couplers for corroding, cracking, damage or excessive wear. If any of these conditions exist, the coupler(s) [Figure 102] must be replaced.

- To Connect: Install the male couplers into the female couplers. Full connection is made when the ball release sleeve slides forward on the female coupler.

Some attachments may have a case drain that needs to be connected to the small quick coupler (Item 1) [Figure 102].

- To Disconnect: Hold the male coupler. Retract the sleeve on the female coupler until the couplers disconnect.

Auxiliary Hydraulic Release

⚠ WARNING

BURN HAZARD

Hydraulic fluid, tubes, fittings and quick couplers can get hot when running machine and attachments. Be careful when connecting and disconnecting quick couplers. ◀

W-2220

⚠ WARNING

INJECTION HAZARD

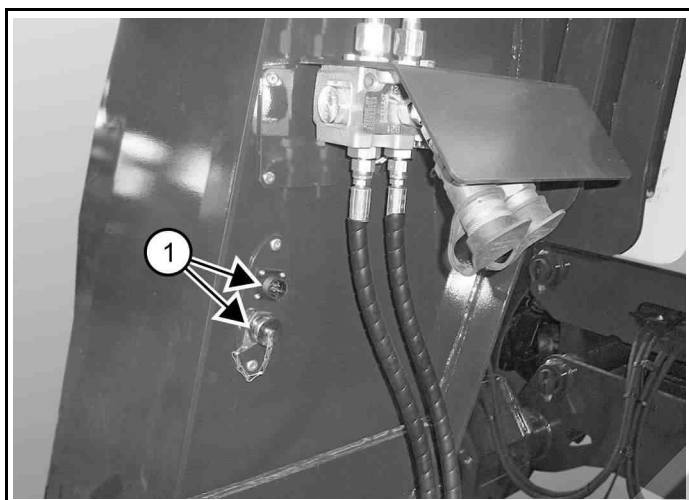
Pressurised diesel fuel or hydraulic fluid can penetrate skin and eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. DO NOT use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical attention from a doctor familiar with this injury. ◀

W-2072

ATTACHMENT CONTROL DEVICE

This machine may be equipped with an Attachment Control Device.

Figure 103



S41672a

Connect the attachments electrical harness to the attachment control device (Item 1) [Figure 103].

The joystick is used to control some attachment functions through the attachment control device.

See the appropriate attachment Operation & Maintenance Manual for control details.

SMART HANDLING SYSTEM (SHS)

The maximum speed of the boom movements can be adjusted by the operator to improve control of the boom functions.

Smart Handling System (SHS) Operation

Engaging:

Figure 104

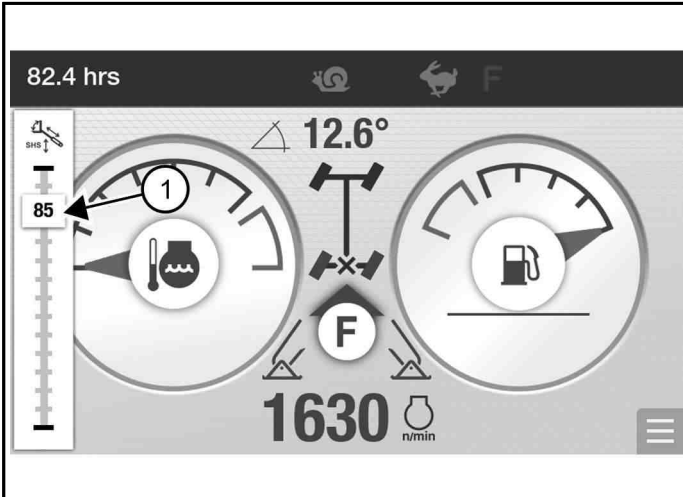


NA3974c

1. Press the SHS switch (Item 1) [Figure 104] on the right console panel to turn on.

The software will use the last saved settings selected by the operator to adjust the maximum hydraulic flow on the boom movements.

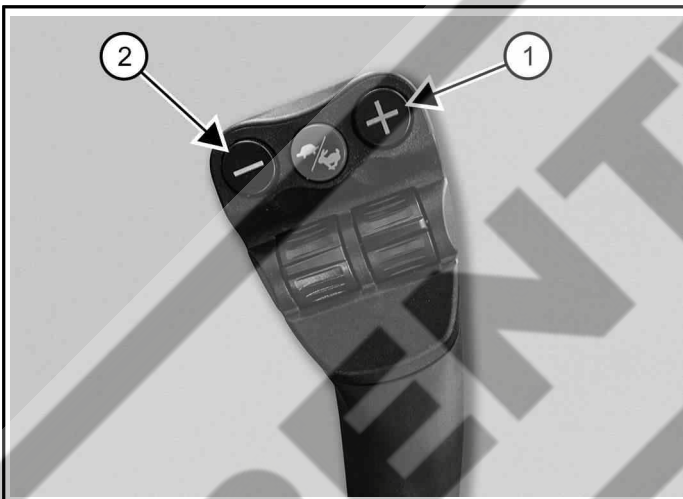
The switch activation has no effect until the joystick goes back to neutral (for all boom movements).

Figure 105

C211802a

When SHS is engaged, The software will use the last saved settings selected by the operator to adjust the maximum hydraulic flow on the boom movements. That percentage will appear briefly in the display (Item 1) [Figure 105].

Adjusting On-The-Fly:

Figure 106

C210778a

2. Press the '+' adjustment button (Item 1) on the joystick to increase the SHS level up to 100%.

The percentage graph will appear in the display (Item 1) [Figure 105] while adjusting.

3. Press the '-' adjustment button (Item 2) on the joystick to decrease the SHS level down to 0%.

The percentage graph will appear in the display (Item 1) [Figure 105] while adjusting.

4. Press and hold the SHS switch (Item 1) [Figure 104] to store the value as the default SHS level.

The setting is automatically saved in memory every time the machine is turned off.

When the switch is in the OFF position the software will allow the maximum speed of every boom movement.

AUTO REVERSE COOLING FAN

This machine may be equipped with an Auto Reverse Cooling Fan.

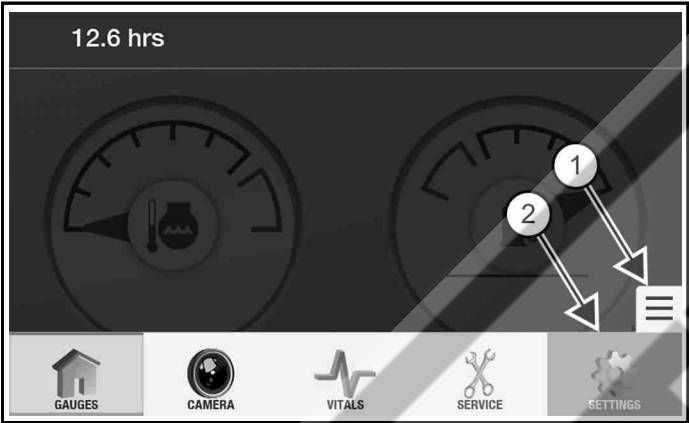
The auto reverse cooling fan interval times are 5, 15, 30, 45, 60 and 90 minutes.

NOTE: When 5 minute auto reverse cooling fan interval time is selected, cooling performances could be decreased.

The setting is automatically saved in memory every time the machine is turned off.

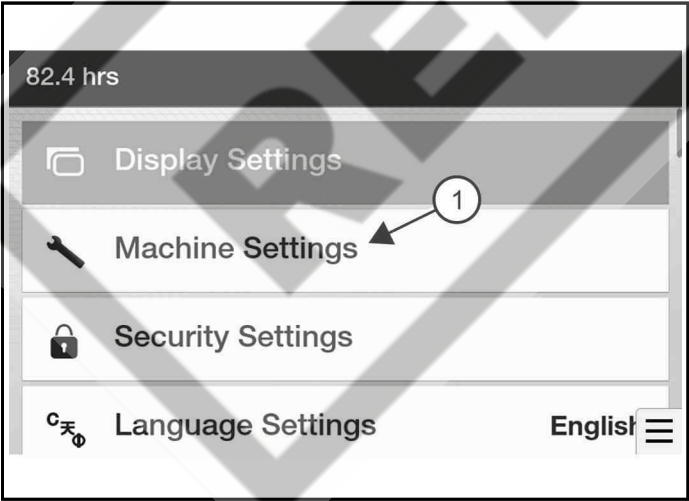
The manual reverse cooling fan can be launched by pressing the Reverse Cooling Fan switch regardless of the auto reverse cooling fan status.
(See Centre Console Panel on Page 45)

Figure 107



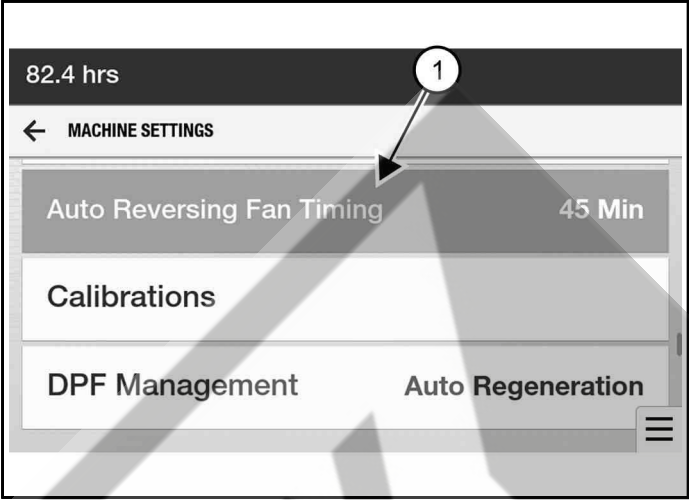
1. Select the **[NAVIGATION HANDLE]** icon (Item 1) [Figure 107].
2. Select **[SETTINGS]** (Item 2) [Figure 107].

Figure 108



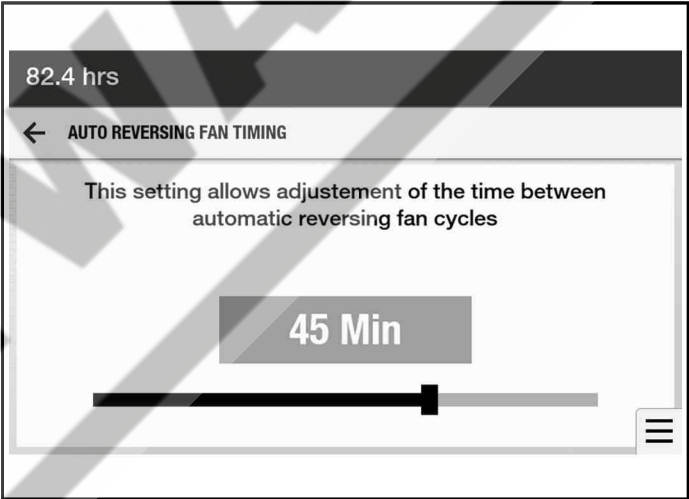
3. Select **[MACHINE SETTINGS]** (Item 1) [Figure 108].

Figure 109



4. Select **[AUTO REVERSE FAN TIMING]** (Item 1) [Figure 109].

Figure 110



5. Use the slider bar [Figure 110] to adjust to desired default setting.

DUAL F-N-R

Dual F-N-R Operation

The machine can be equipped with a joystick with Travel Direction Switch and a Travel Direction Lever at the same time. The operator can choose between the Travel Direction Switch on the joystick and the Travel Direction Lever.

Engine Cranking Condition

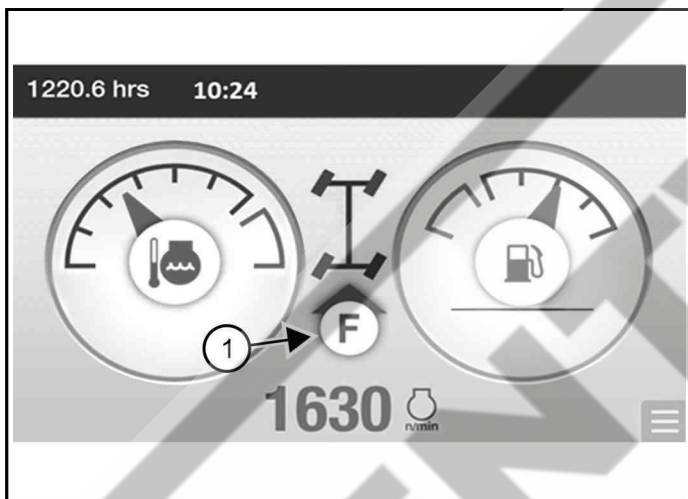
Both the Travel Direction Lever and the Travel Direction Switch on the joystick have to be in NEUTRAL to allow engine cranking.

Travel Direction Control

When the engine is running, the first command that goes out of NEUTRAL becomes the active control (FORWARD or REVERSE).

Switching Between The Travel Direction Switch and The Travel Direction Lever

Figure 111



Both the Travel Direction Lever and the Travel Direction Switch on the joystick have to be in NEUTRAL to allow switching controls.

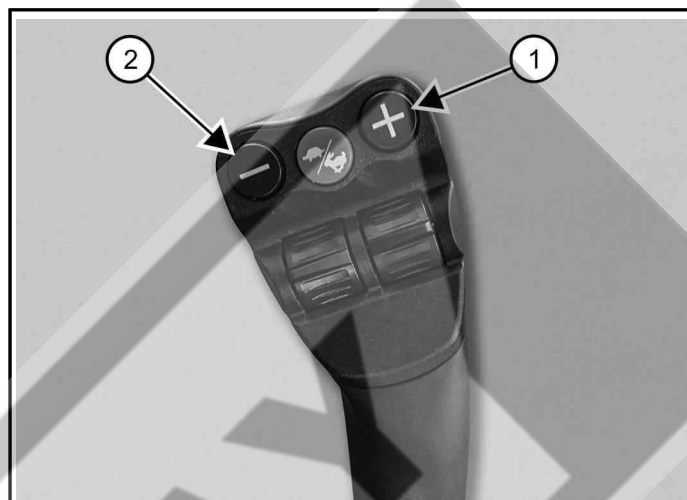
When both F-N-R controls are out of NEUTRAL the display will show **FNR NOT IN NEUTRAL** and three short beeps will sound in the cab.

The transmission will remain disabled until both the Travel Direction Switch and the Travel Direction Lever are set to NEUTRAL.

ON-THE-FLY SETTINGS

On-The-Fly Settings Description

Figure 112

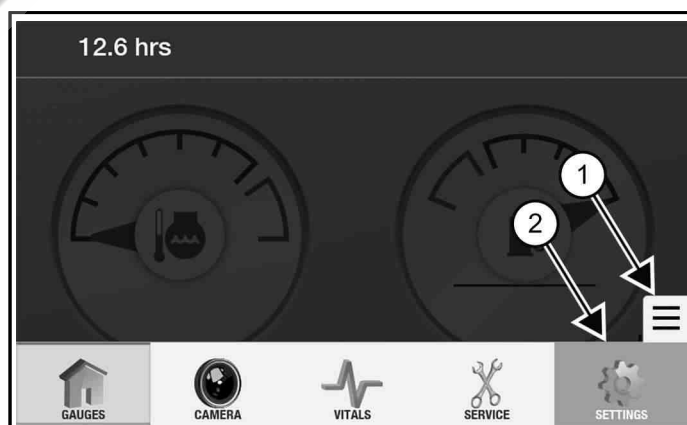


The operator can choose one function to be adjusted 'on-the-fly' by using the '+' (Item 1) and '-' (Item 2) [Figure 112] adjustment buttons on the joystick. Three functions are available for 'on-the-fly' operation:

- Speed Management (Creep Mode): adjusting the travel speed. (See Speed Management on Page 69)
- Auxiliary Flow: adjusting the maximum auxiliary hydraulic flow. (See Operating The Front Auxiliary Hydraulics on Page 75)
- SHS: adjusting SHS level. (See Smart Handling System (SHS) on Page 78)

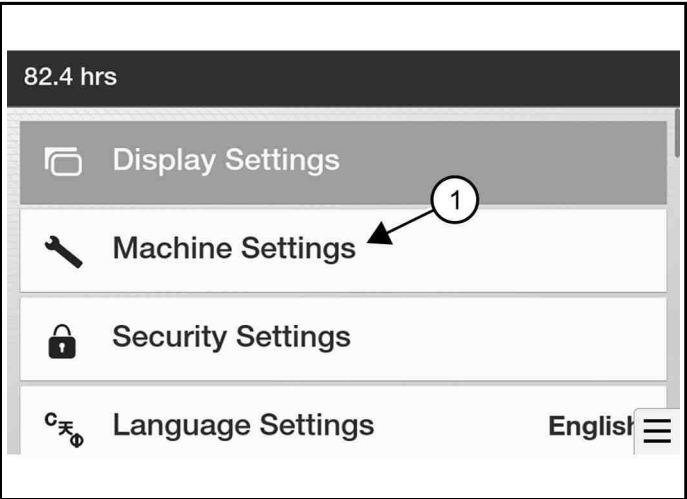
Selecting On-The-Fly Settings (Standard Display)

Figure 113



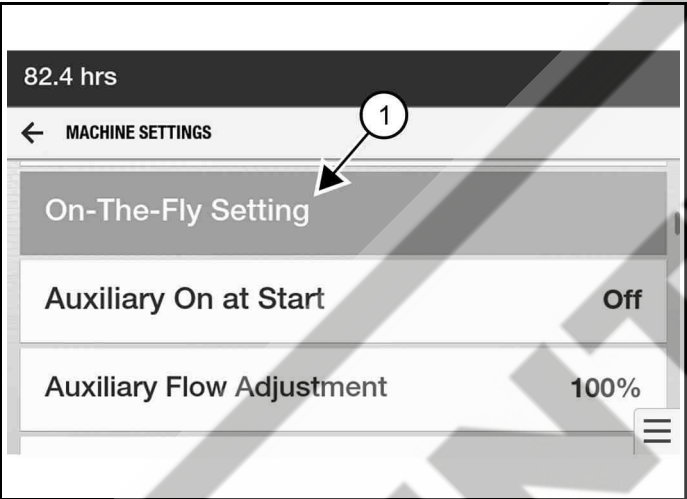
1. Select the **[NAVIGATION HANDLE]** icon (Item 1) [Figure 113].
2. Select **[SETTINGS]** (Item 2) [Figure 113].

Figure 114



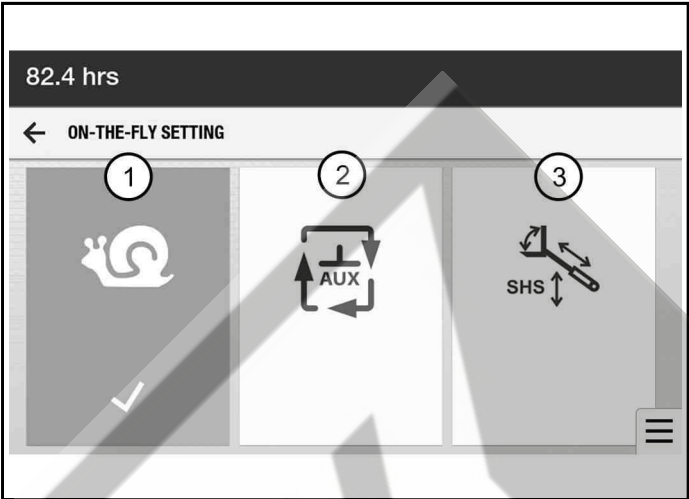
3. Select **[MACHINE SETTINGS]** (Item 1) [Figure 114].

Figure 115



4. Scroll down and select **[ON-THE-FLY SETTING]** (Item 1) [Figure 115].

Figure 116



5. Select one of the following functions [Figure 116]:

REF.	FUNCTION
1	Speed Management (Creep Mode)
2	Auxiliary Flow
3	SHS

DAILY INSPECTION

Daily Inspection And Maintenance

WARNING

INSUFFICIENT INSTRUCTIONS HAZARD
Untrained operators or failure to follow instructions can cause serious injury or death. Operators must have adequate training and instruction before operating. ◀

W-2001

IMPORTANT

MACHINE DAMAGE HAZARD
Improper pressure washing may lead to damage of the decal.

- Direct the stream at a 90 degree angle and at least 300 mm (12 in) from the decal.
- Wash from the centre of the decal toward the edges. ◀

I-2226

IMPORTANT

MACHINE DAMAGE HAZARD
Water in the fuel system can cause serious engine damage.
Remove water from the main fuel filter daily. ◀

I-2354

WARNING

FIRE AND EXPLOSION HAZARDS
Engines can have hot parts and hot exhaust gas that can cause serious injury or death.

- Keep flammable material away.
- DO NOT use machines in an atmosphere containing explosive dust or gases. ◀

W-2051

WARNING

INHALATION HAZARD
Exhaust fumes contain odorless, invisible gases that can kill without warning.
Fresh air must be added to avoid concentration of exhaust fumes when an engine is running in an enclosed area. If the engine is stationary, vent the exhaust outside. ◀

W-2050

WARNING

EXPLOSION HAZARD
Failure to follow instructions can cause serious injury, death, or severe engine damage.
DO NOT use ether with preheat systems ◀

W-2391

Maintenance work must be done at regular intervals. Failure to do so will result in excessive wear and early failures. The Service Schedule is a guide for correct maintenance of the Bobcat Telescopic Handler.
(See Service Schedule on Page 141)

1. Check the following items before each day of operation:
 - Engine Oil Level
 - Hydraulic / Hydrostatic Fluid Level
 - Brakes - Check Function
 - Tilt Cylinder - Lubricate with multipurpose lithium based grease
 - Attachment Carrier Pins - Lubricate with multipurpose lithium based grease
 - Engine Air System - Check Air System for Damage or Leaks
 - Engine Coolant Level - Check Engine Cooling System - Check System for Damage or Leaks
 - Operator Cab and Cab Mounting Hardware - DO NOT operate without right cab window
 - Seat Belt
 - Tyres - Check for Wear, Damage, Correct Air Pressure; Use only approved tyres with correct pressure
 - Loose or Broken Parts - Repair or replace as necessary
 - Safety Treads and Safety Signs (Decals) - Replace as necessary
 - Check and Clean Mirrors and Windows - Replace as necessary
 - Fuel Filter - Remove trapped water through the drain valve on the bottom of the filter. (See Fuel Filter on Page 158)
 - Back-up Alarm - Check function, replace as necessary
 - Gauges and Horn - Check function, replace as necessary
 - Engine Cooling System - Check system for damage or leaks

NOTE: Fluids such as engine oil, hydraulic fluid, coolant, etc. must be disposed of in an environmentally safe manner. Some regulations require that certain spills and leaks on the ground must be cleaned in a specific manner. See local regulations for correct disposal.
2. Allow the engine and hydraulic fluid to warm completely before beginning operation
3. Use the joystick to check for smooth operation of the following hydraulic functions:

- Raise and lower the boom
- Extend and retract the boom
- Tilt the attachment device forward and backward

4. Check forward and reverse travel
5. Check operation of the accelerator and brake
6. Check operation of the steering. Cycle the steering mode regularly to ensure correct wheel alignment

If any of the functions do not operate correctly, have it repaired immediately before continuing.

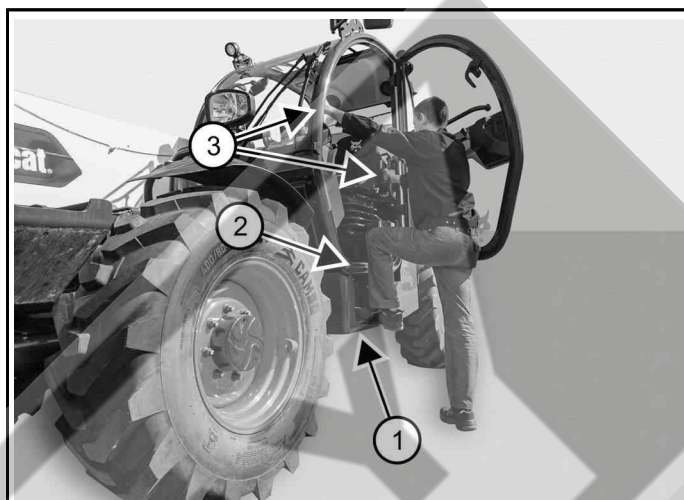
Cleaning The Operator Cab

- Clean soft upholstery in the cab with a cloth that has been dipped in a solution composed of water and detergent and then thoroughly wrung out.
- Clean the operator's seat and the floor with a vacuum cleaner and / or a stiff brush. If necessary, use a damp cloth to remove any stubborn stains.
- Fabric-covered seats should be cleaned with a stiff brush or vacuum cleaner. Plastic-covered seats should be cleaned with a damp cloth.
- Clean the seat-belts with a sponge dipped in hot soapy water and simply leave them to dry.

PRE-STARTING PROCEDURE

Entering The Machine

Figure 117



- Use step (Item 1), safety tread (Item 2) and grab handles (Item 3) [Figure 117] when entering the machine.

DO NOT JUMP.

Safety treads are installed on the machine to provide a slip resistant surface for getting on and off the machine.

Keep safety treads clean and replace when damaged. Replacement treads are available from your Bobcat dealer.

Operation & Maintenance Manual And Operator's Handbook Locations

⚠ WARNING

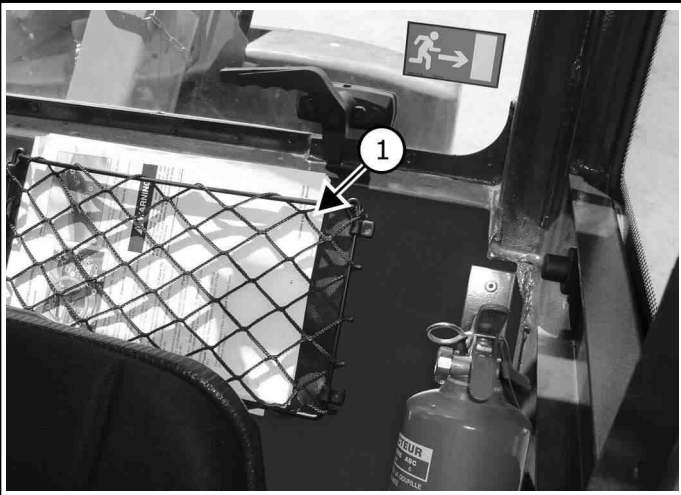
INSUFFICIENT INSTRUCTIONS HAZARD

Untrained operators or failure to follow instructions can cause serious injury or death.

- Read and understand the Operation & Maintenance Manual, Operator's Handbook and decals on machine.
- Follow warnings and instructions in the manuals when making repairs, adjustments or servicing.
- Check for correct function after adjustments, repairs or service. †

W-2003

Figure 118



P118186a

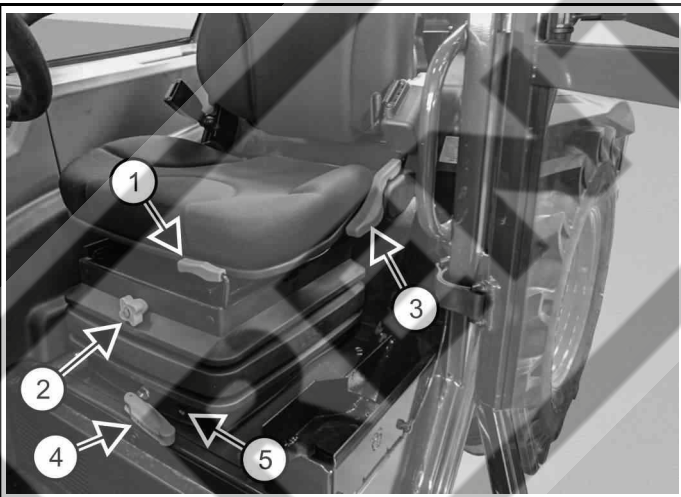
- Read and understand the Operator's Handbook and the Operation & Maintenance Manual (Item 1) [Figure 118] before operating the machine.
- Perform the daily inspection.
(See Daily Inspection on Page 83)

Adjusting The Seat

- Adjust the seat for comfortable operation.

Standard Seat

Figure 119



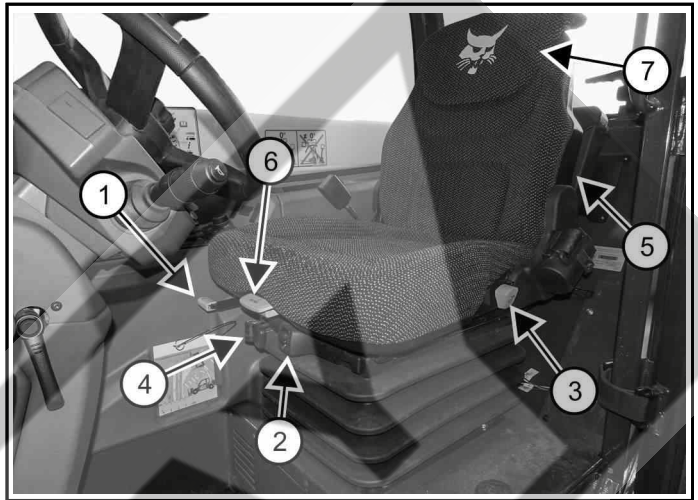
C211765a

- Pull the lever (Item 1) [Figure 119] to adjust the seat distance from the steering wheel and pedals.
- Turn the knob (Item 2) [Figure 119] to adjust the height of the seat.
- Release the lever (Item 3) [Figure 119] to adjust the angle of the seat back.
- Turn the lever (Item 4) [Figure 119] to adjust the seat cushion for weight of the operator.

The gauge (Item 5) [Figure 119] indicates the chosen value in kilograms.

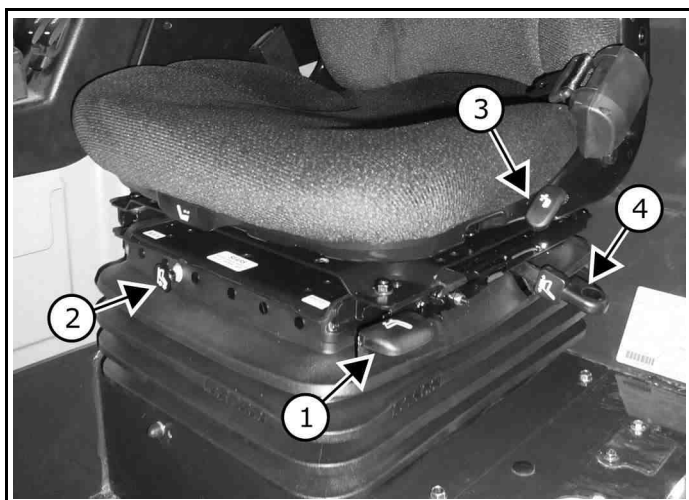
Air Suspension Seat

Figure 120



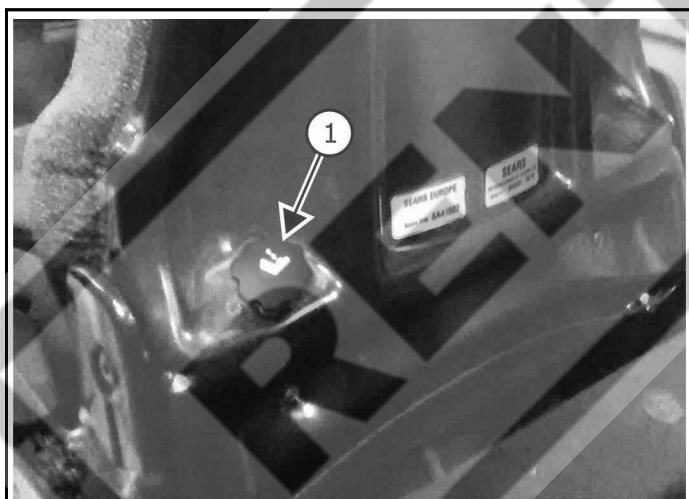
C215914a

- Pull the lever (Item 1) [Figure 120] to adjust the seat distance from the steering wheel and pedals.
- Push the knob (Item 2) [Figure 120] up or down to adjust the height of the seat.
- Release the lever (Item 3) [Figure 120] to adjust the angle of the seat back.
- Turn the lever (Item 4) [Figure 120] fully clockwise to engage the horizontal suspension. The horizontal suspension dampens forward and backward movements.
- Turn the knob (Item 5) [Figure 120] on the back of the seat to adjust the lumbar setting.
- Pull the lever (Item 6) [Figure 120] to adjust the seat cushion depth.
- Pull upwards or push down on the headrest (Item 7) [Figure 120] to adjust its height.

*Premium Seat***Figure 121**

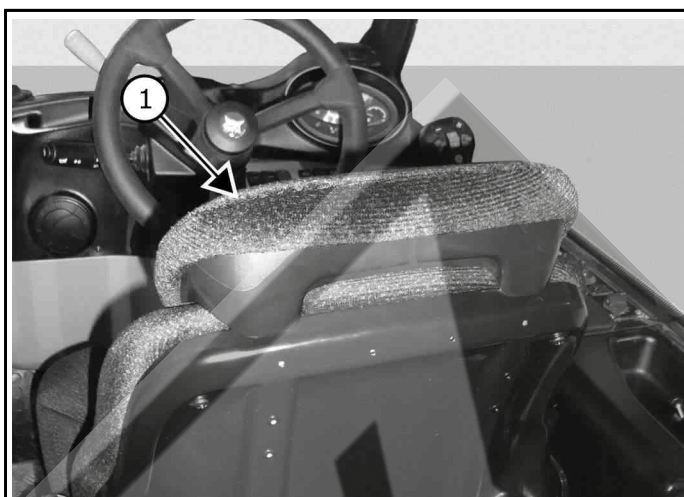
P128346a

- Pull the lever (Item 1) [Figure 121] to adjust the seat distance from the steering wheel and pedals.
- Turn the knob (Item 2) [Figure 121] to adjust the height of the seat.
- Release the lever (Item 3) [Figure 121] to adjust the angle of the seat back.
- Pull the lever (Item 4) [Figure 121] to engage the horizontal suspension. The horizontal suspension dampens forward and backward movement..

Figure 122

P128430a

- Turn the knob (Item 1) [Figure 122] to adjust the lumbar setting.

Figure 123

P128347a

- Pull upwards or push down on the headrest (Item 1) [Figure 123] to adjust its height.

Adjusting The Seat Belt**Figure 124**

C211782a

1. Fasten the seat belt (Item 1) [Figure 124].
2. Make sure that the seat belt is snug around the lower part of your hips.

Adjusting And Cleaning The Mirrors

- Adjust and clean the mirrors to obtain the best visibility.

Cleaning The Mirrors

Do not use abrasive or highly alkaline cleaners.

Do not clean with brushes.

Clean mirrors every day and more often when necessary:

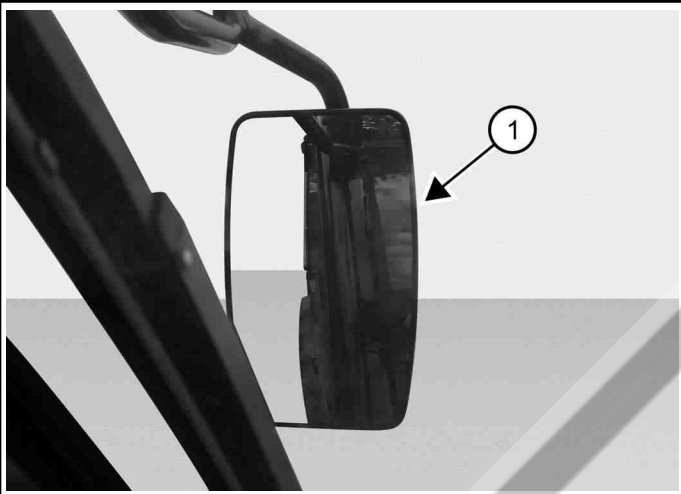
1. Pre-rinse with water to remove dirt and bird soiling.

2. Wash with a mild household detergent and warm water. Use a sponge or a soft cloth.
3. Rinse with water and dry with a clean soft cloth.

Adjusting The Mirrors

For more information on visibility,
(See Visibility Diagrams on Page 322) .

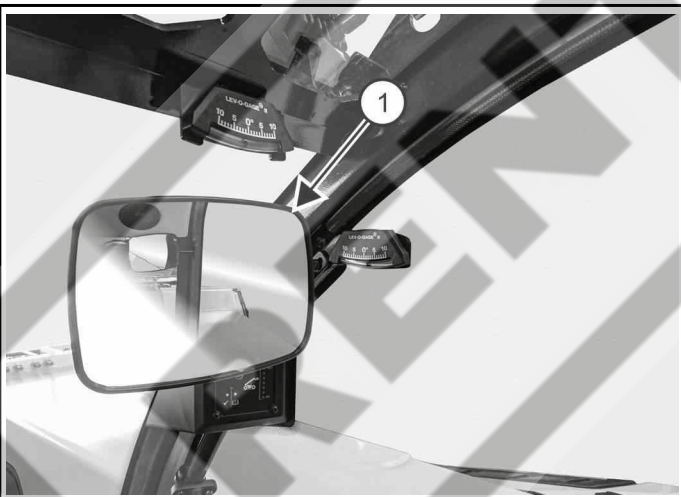
Figure 125



C211789a

- Adjust the left side mirror (Item 1) until the left side of the Telescopic Handler is visible from the operator's point of view.

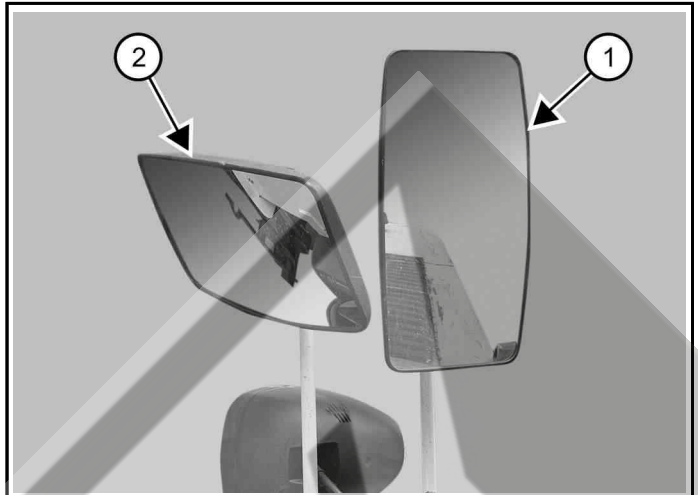
Figure 126



C212222b

- Adjust the front interior mirror (Item 1) [Figure 126] until the rear side of the telescopic handler is visible from the operator's point of view.

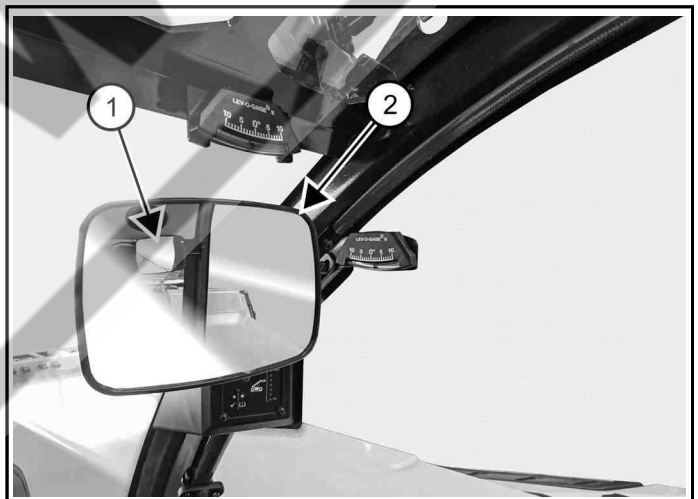
Figure 127



S41659b

- Adjust the right side flat mirror (Item 1) [Figure 127] until the right side of the Telescopic Handler is visible from the operator's point of view.
- Adjust the right side concave mirror (Item 2) [Figure 127] until the attachment carrier (boom retracted) is visible from the operator's point of view.

Figure 128



C212222c

- Adjust the rear interior mirror (if equipped) (Item 1) until the right side of the Telescopic Handler is visible via the front interior mirror (Item 2) [Figure 128] from the operator's point of view.

STARTING THE ENGINE

Standard Key Panel

⚠ IMPORTANT

MACHINE DAMAGE HAZARD

Engaging the starter for longer than 30 seconds can cause overheating which can damage the starter. Cool the starter for one minute between uses. ◀

W-2209

⚠ WARNING

FIRE AND EXPLOSION HAZARDS

Engines can have hot parts and hot exhaust gas that can cause serious injury or death.

- Keep flammable material away.
- DO NOT use machines in an atmosphere containing explosive dust or gases. ◀

W-2051

⚠ WARNING

INHALATION HAZARD

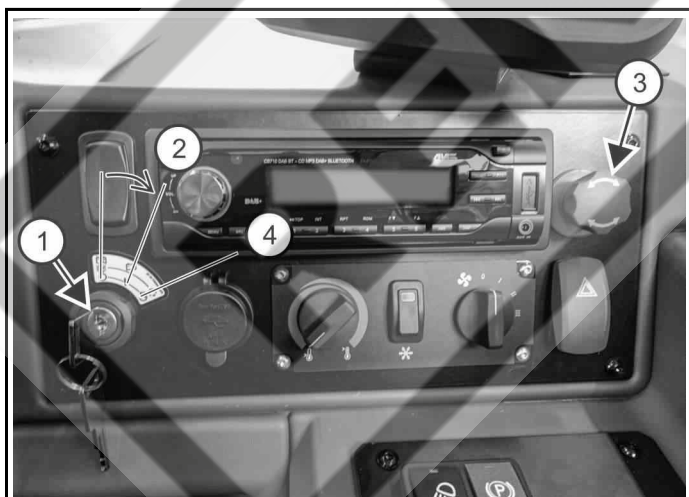
Exhaust fumes contain odorless, invisible gases that can kill without warning.

Fresh air must be added to avoid concentration of exhaust fumes when an engine is running in an enclosed area. If the engine is stationary, vent the exhaust outside. ◀

W-2050

1. Perform the pre-starting procedure.
(See Standard Key Panel on Page 88)
(See Pre-starting Procedure on Page 84)
(See Daily Inspection on Page 83)
2. The Travel Direction Control and all other controls must be in neutral position before starting the engine.

Figure 129

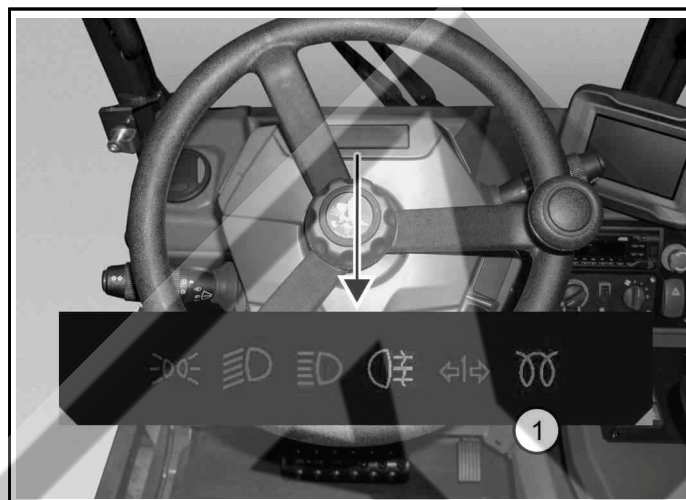


C211777b

3. Turn the key switch (Item 1) to RUN (Item 2) [Figure 129].

Check if the emergency stop (Item 3) [Figure 129] is not in the pressed position.

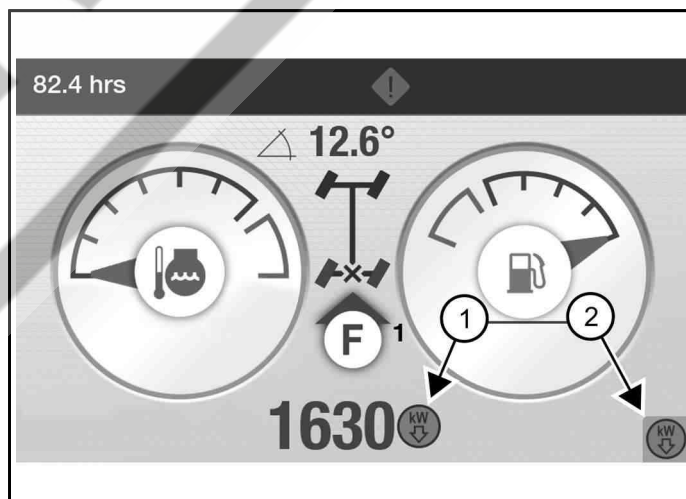
Figure 130



C212262d

4. Keep the key in RUN position for engine preheat while the engine pre-heat icon (Item 1) [Figure 130] is ON on the centre indicator panel.
5. When the engine preheat icon (Item 1) [Figure 130] goes OFF, turn the key switch to START (Item 4) [Figure 129]. Release the key when the engine starts and allow it to return to the RUN (Item 2) [Figure 129] position.

Figure 131



C212260a

If the engine oil temperature is below 10°C (50°F) after starting the engine, the machine performance icon (Item 1) [Figure 131] is shown close to the engine speed on the display and the engine speed is limited to 1260 rpm.

Select the machine performance icon (Item 2) [Figure 131] to open the **MACHINE PERFORMANCE** screen. The message "Throttle: Control Not Allowed" is shown on the screen.

Cold Temperature Starting

⚠ WARNING

EXPLOSION HAZARD

Failure to follow instructions can cause serious injury, death or severe engine damage. **DO NOT** use ether or starting fluid with glow plug or air intake heater systems.*

W-2071

If the temperature is below freezing, perform the following procedures to make starting the engine easier:

- Replace the engine oil with the correct type and viscosity for the anticipated starting temperature.
- Make sure the battery is fully charged.

Warming The Hydraulic / Hydrostatic System

- Let the engine operate for a minimum of 5 minutes to warm the engine and hydrostatic transmission fluid before operating the machine.

NOTE: The full range of the engine speed control and the full range of travel speeds will not be available until the engine controller determines the machine is adequately warmed.
(See Cold Temperature Starting on Page 89)

⚠ IMPORTANT

MACHINE DAMAGE HAZARD

Failure to follow directions can result in machine damage. **Starting the engine when the temperature of the hydraulic fluid is less than -29°C (-20°F) will result in significant damage to the hydraulic system and components.**

Park the machine in a heated location or provide some means of warming the hydraulic fluid prior to starting the engine if the ambient temperature at startup is expected to be -29°C (-20°F) or below.*

1-2403

ECO MODE

The ECO Mode switch enables the operator to save fuel by limiting the engine revolutions per minute (rpm) when full rpm is not needed.

ECO Mode Operation

Figure 132



NA3974e

1. Press the ECO Mode switch (Item 1) [Figure 132] to activate the ECO Mode.

The activation of the ECO mode is only possible at low idle rpm (900 rpm).

2. Press the ECO Mode switch (Item 1) [Figure 132] again to turn OFF.

Deactivation of this mode is allowed independently of rpm.

If continuous flow is still activated when turning OFF the ECO mode, the ECO mode light (Item 2) and the AUX mode light (Item 3) [Figure 132] will blink three times and deactivation will fail.

ECO Mode will be disabled at Key ON.

MONITORING THE STANDARD DISPLAY DURING OPERATION

Figure 133

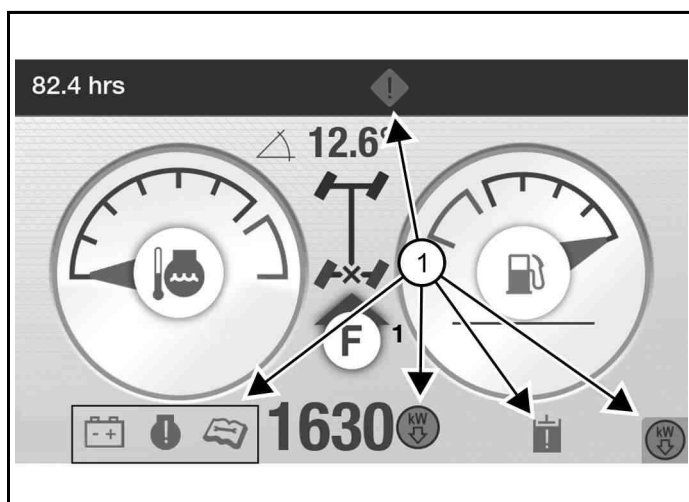
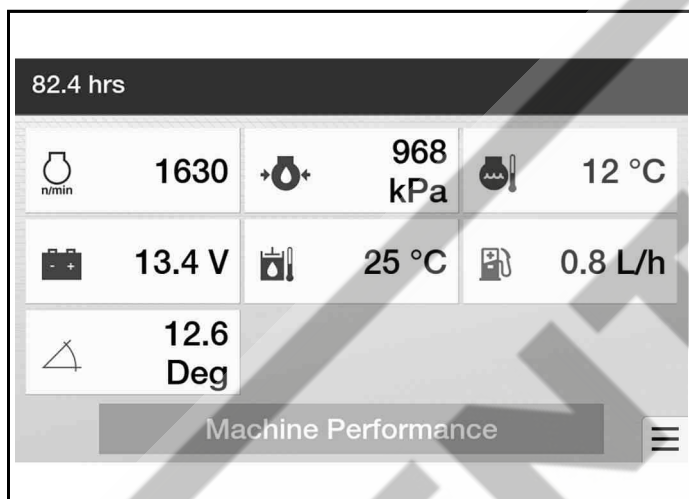
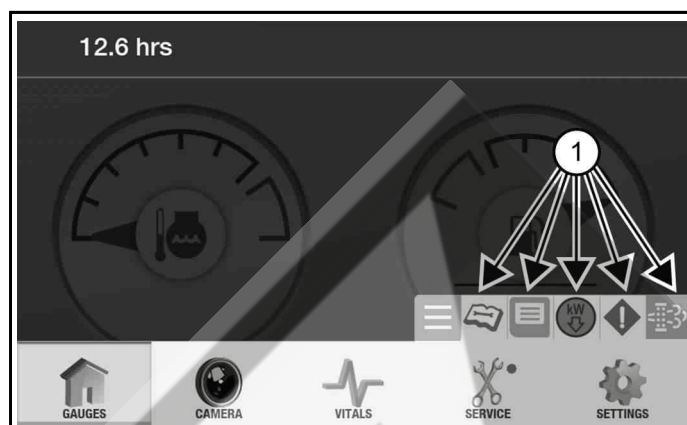


Figure 134



- Frequently monitor the **GAUGES** or **VITALS** screens [Figure 133] and [Figure 134].
- These icons (Item 1) [Figure 133] indicate machine conditions that may require service.
- Selecting **[MACHINE PERFORMANCE]** on the vitals screen can also provide details on machine condition.
(See Vital Detail And Machine Performance on Page 200)

Figure 135



- Active shortcuts (Item 1) [Figure 135] can appear in place of, or next to, the navigation handle that also indicate a need for service.
(See Viewing Active Shortcuts on Page 199)
- A red dot next to **[SERVICE]** indicates an active service code.
(See View Service Codes on Page 201)

Derate And Shutdown Conditions

Certain machine conditions can result in a derate condition until the fault is corrected. These derates are designed to protect the machine systems from damage while a fault condition exists.

An engine shutdown can occur during certain system malfunctions. The engine can be restarted to move the machine.

STOPPING THE ENGINE AND LEAVING THE MACHINE

Stopping The Engine And Leaving the Machine Procedure

WARNING

GENERAL HAZARD

Failure to follow instructions can cause serious injury or death.

Before you leave the operator's position:

- Put the Travel Direction Control and the Joystick in neutral.
- Engage the parking brake.
- Retract and lower the boom and attachment flat on the ground.
- Stop the engine.

W-2907

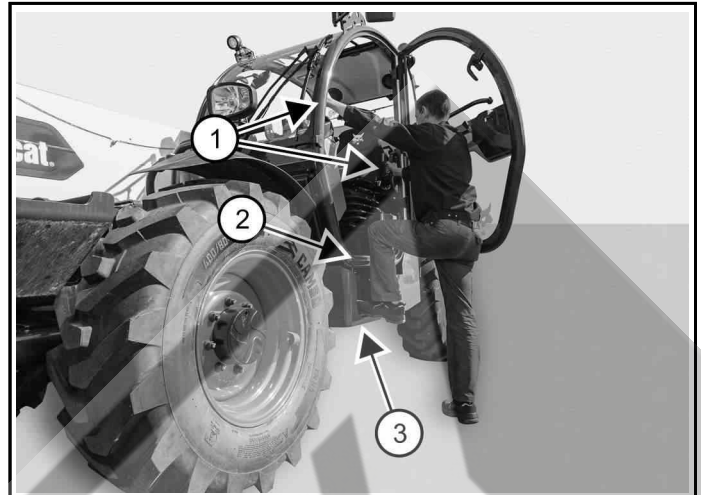
Figure 136



C212218

1. Stop the machine on solid, flat and level ground. Ensure the machine is parked safely, taking into consideration the surrounding traffic.
2. Put the Travel Direction Control in neutral. (See Travel Direction on Page 42)
3. Ensure the parking brake is engaged. (See Parking Brake on Page 66)
4. Retract and lower the boom and attachment flat on the ground [Figure 136].
5. Turn the key switch (if equipped) or start switch (if equipped) to the STOP position to stop the engine and turn the machine's electrical system OFF.
6. Unfasten the seat belt.
7. (Standard Key Panel) Remove the key from the switch to prevent operation of the machine by unauthorised personnel.

Figure 137



C212238b

8. Exit the machine using the grab handles (Item 1), safety tread (Item 2) and steps (Item 3) [Figure 137] (maintaining a three-point contact).

OBJECT HANDLING (WITH LIFT EYE LINK)

Object Handling (with Lift Eye Link) Procedure

Figure 138

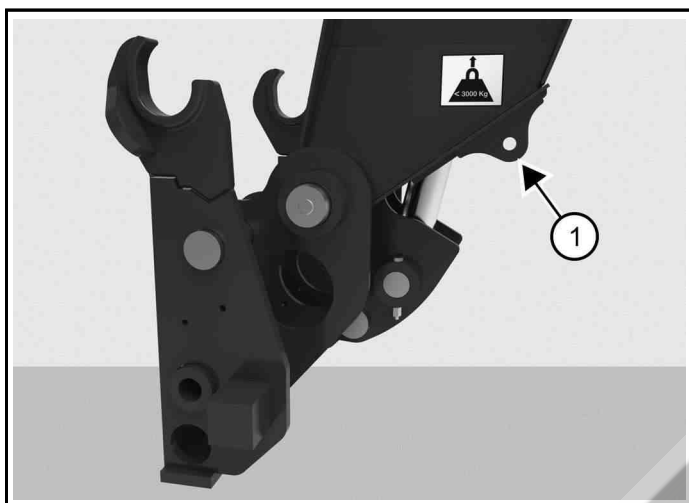


Figure 139

The telescopic handler must be equipped with the lift eye link (Item 1) [Figure 138] to handle load from the boom head without using attachment.

The maximum load to be carried when using the lift eye link (Item 1) [Figure 138] is the maximum rated capacity described on the Load Capacity Chart.

Suspended Loads

Suspended loads have a dynamic and therefore unpredictable effect on the machine's stability. External working conditions such as the wind speed increase the dynamic and unpredictable effect. Follow the procedure below when operating a suspended load.

- The lifting device is intended to handle vertical pull loads. With the jib, do not carry out horizontal pull and side-pull.

- Carry or place special loads with the lifting device or attachment intended for this type of use.

If the suspended load or the resulting boom geometry block the visibility, alternative carrying means must be considered.

- The operator must know the wind speed. Do not use the machine with wind speeds over 12,5 m/s (28 mph).
- Contact your Bobcat dealer for details on applications.

Static Test

A static strength test has been successfully performed on the jib using a load coefficient of 1,5.

Lift Eye Link Inspection Before Use

In addition to the daily inspection of the machine:

- Check if safety decals are in good condition.
 - Replace if damaged.
- Check if the lifting shackle rotates freely.
 - Lubricate as needed.
- Check if lifting hook safety tab is intact and positions itself correctly.
- Inspect the condition of the lifting hook.
 - Replace if worn or damaged.
- Inspect the lift eye link frame for cracks or deformation.
 - See your Bobcat dealer for a replacement lift eye link.

Secondary Lifting Devices

The machine is not equipped with a secondary lifting device.

Identify the lifting device based on the type of load and intended use. Identify the adequate strength needed for the object being lifted.

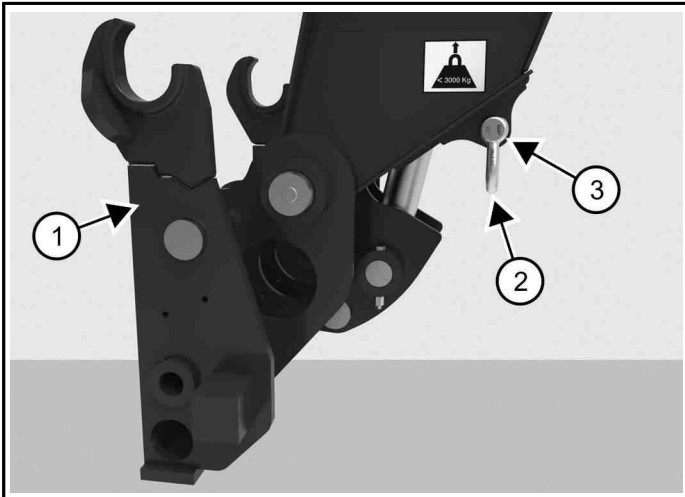
Refer to a competent person to determine the most appropriate equipment and method to properly secure the load. The operator can be assisted by a second person who needs to keep a safe distance of minimum 3 m (10 ft) away from the load and stay clear from the operator's line of sight.

Make sure the secondary lifting system (chain and clevis) is of sufficient strength to lift the object and is superior to the maximum rated load capacity of the machine. (See Performance on Page 317)

Follow the steps below to install a secondary lifting system:

- Retract and fully lower the boom.

Figure 140



P122533a

2. Tilt the attachment carrier (Item 1) [Figure 140] fully backward so that during installation, the secondary lifting device is free to move without damaging the attachment carrier.
3. Install the clevis (Item 2) through the lift eye (Item 3) [Figure 140] allowing to secure the secondary lifting device.

Secondary Lifting Devices (for Travel)

The movements of the load during travel can be reduced by the use of an additional lifting device between the load and the machine frame.

- When applicable, secure the load to the machine lifting points (See Lifting the Machine on Page 135) or towing points (See Towing And Retrieving The Machine on Page 134) with additional lifting devices (ropes, chains).

This will avoid movement of the load during travel.

NOTE: Make sure to install the secondary lifting device in a way it does not damage the components of the machine during operation.

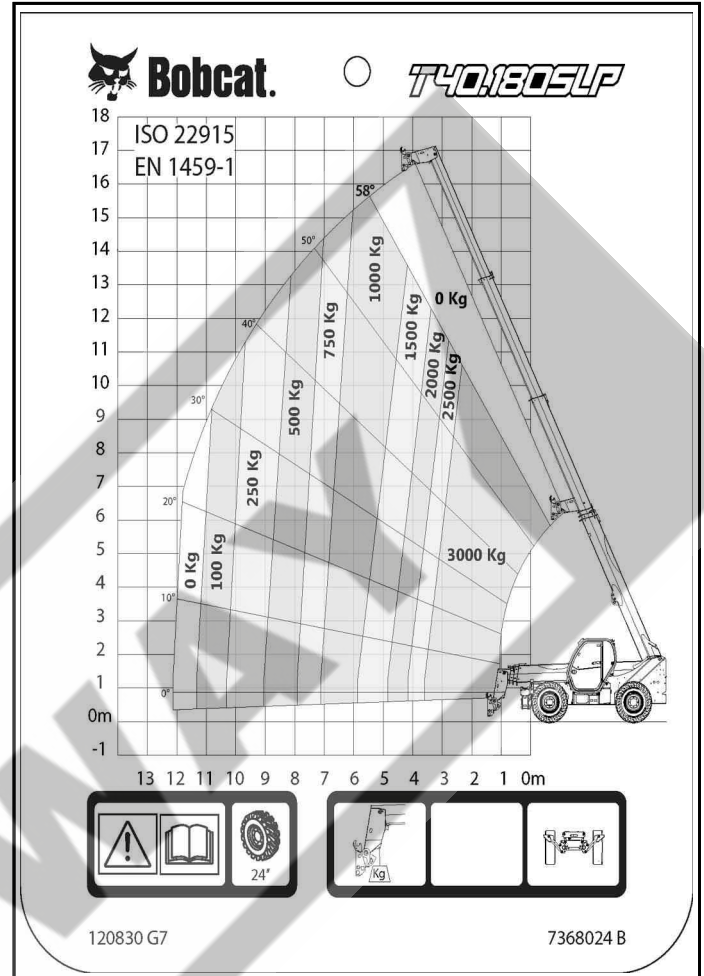
NOTE: Do not use any controls to reposition the load when the load is secured to the machine lifting or towing points. Remove the secondary lifting device between the load and the machine frame prior to repositioning the load.

Lift Eye Link Load Charts

Chart for the machine T40.180SLP on tyres (with stabilisers raised):

- CAMSO 400/80-24/20PR TM R4
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).
- MICHELIN 400/80-24 162A8 IND TL POWER CL
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).

Figure 141

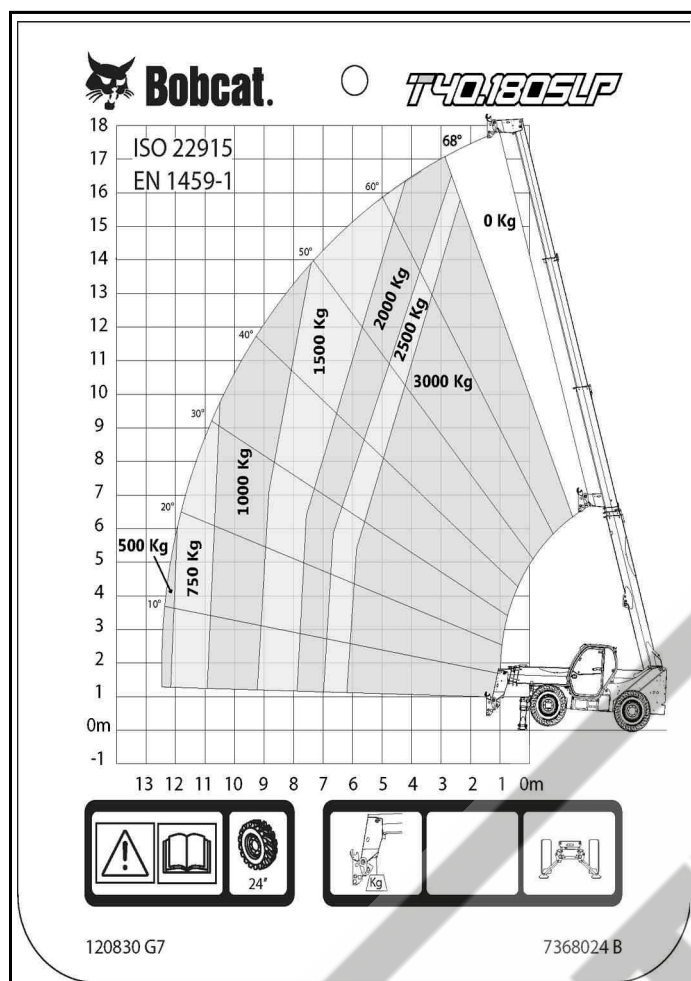


Complies with stability test EN 1459-1 and the relevant parts of ISO 22915.

Chart for the machine T40.180SLP (stabilisers down on firm ground):

- CAMSO 400/80-24/20PR TM R4
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).
- MICHELIN 400/80-24 162A8 IND TL POWER CL
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).

Figure 142



Complies with stability test EN 1459-1 and the relevant parts of ISO 22915.

Load Handling

WARNING

INSTABILITY HAZARD

Machine tipping or rollover can cause serious injury or death.

- Do not overload the machine.
- DO NOT exceed ROC see decal in cab.
- Always use and follow the ROC chart provided. Each machine has its own chart.

When using telescopic handler with a load suspended from the lift eye link:

- Identify and install adequate secondary lifting devices (See Secondary Lifting Devices on Page 92) such that unintentional unhooking or displacement of the load or sling is avoided.
- Keep the attachment carrier fully tilt backward (Item 1) [Figure 140] so that the secondary lifting device and the load are not in contact with the attachment carrier.

- Do not operate the machine while people are under the suspended load.
- Operate on firm ground.
- Keep lifting hook vertically aligned above the gravity centre of the load.
- Move the lift eye link and machine slowly. During picking, loading and unloading, avoid jerky movements and load oscillations.
- Never shock or abruptly place loads.
- Do not use the machine's levelling frame to compensate for a swinging load.
- When stationary, always keep the machine frame leveled. The lateral attitude must not exceed 1% and the longitudinal attitude must not exceed 5%.
- Do not carry or place roof trusses with the lift eye link.
- Do not carry hot or corrosive products.

During Travelling

- Identify and install adequate secondary lifting devices (See Secondary Lifting Devices (for Travel) on Page 93) such that unintentional unhooking or displacement of the load or sling is avoided.
- Move the machine with boom fully retracted and load as close as possible to the ground (transport position). The load should not be suspended higher than 500 mm (20 in) above the ground when travelling.
- The machine should travel at speeds appropriate to the ground and load conditions, or not greater than 0,4 m/s (0.9 mph) when carrying suspended loads.
- Do not use any controls to reposition the load. Come to a gradual and complete stop before attempting to reposition the load.
- Avoid crossing, climbing or descending inclines when travelling with a suspended load.
- During starting, travelling, turning and stopping, avoid jerky movements and load oscillations.
- When travelling, the lateral and longitudinal attitude must be horizontal.

Picking Up a Load from the Ground

1. Fully retract and lower the boom and move the machine as close as possible to the load.
2. Position the lift eye link vertically aligned above the load and lower it slowly as close as possible to the lifting point of the load.
3. Put the Travel Direction Control into neutral and make sure the parking brake is engaged.

4. Turn off the engine and remove the ignition key. Exit the cab. Install the lifting hook to the lifting point of the load or install a chain (or other type of the lifting device) through the shackle and connect to the load. Check that the lifting gear is hanging freely and is not twisted or knotted. Always turn off the engine to avoid involuntary hazardous movements, mainly when a second operator is present to install the load.
5. Go back to operating position in the cab and start the engine.
6. Slightly lift the load from the ground by raising the boom. The machine is then in the transport position.
7. In case of travelling with the suspended load, turn off the engine and remove the ignition key (if applicable). Exit the cab. Install the additional lifting device (rope or cable) to secure the load to the machine lifting or towing points. It will reduce the load movement during the travel.
(See Secondary Lifting Devices (for Travel) on Page 93)
3. Stabilise and level the machine.
4. Raise and extend the boom to position the lifting hook vertically aligned above the load and lower it slowly as close as possible to the lifting point of the load.
5. Turn off the engine and remove the ignition key. Exit the cab. Install the lifting hook to the lifting point of the load or install the chain (or other type of lifting device) through the shackle and connect to the load. Check that the lifting gear is hanging freely and is not twisted or knotted. Always turn off the engine to avoid involuntary hazardous movements, mainly when a second operator is present to install the load.
6. Slightly lift the load by raising the boom.
7. Bring the load to transport position by fully retracting the boom and lowering the load as close as possible to the ground.

Placing a Raised Load

1. With the machine in transport position, move the machine as close as possible to the base of the area where to place the load.
2. Put the Travel Direction Control into neutral and make sure the parking brake is engaged.
3. Stabilise and level the machine.
4. In case of travelling with the suspended load:
 - a. Turn off the engine and remove the ignition key. Exit the cab. Remove the additional lifting device (wire, cable) to secure the load to the machine lifting or towing points.
 - b. Go back to operating position in the cab and start the engine.
5. Raise and extend the boom to move the load above the area where to place the load.
6. Position the load horizontally and place it on the area by lowering and retracting the boom.
7. Turn off the engine and remove the ignition key. Exit the cab. Remove the lifting hook from the lifting point of the load or disconnect the load and remove the chain (or other type of lifting device) from the shackle. Always turn off the engine to avoid involuntary hazardous movements, mainly when a second operator is present to remove the load.
8. Return the boom to the transport position by raising, retracting and lowering it.

Picking Up a Raised Load

1. Fully retract and lower the boom. Move the machine as close as possible to the load.
2. Put the Travel Direction Control into neutral and make sure the parking brake is engaged.

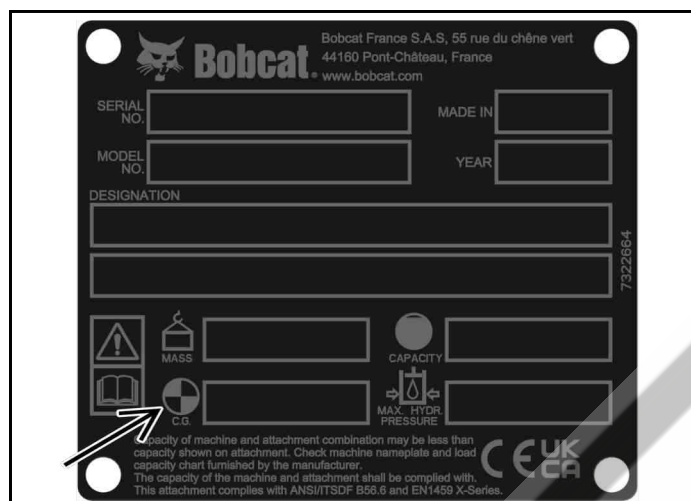
ATTACHMENTS

Serial Plate

Always use the serial number of the attachment when requesting service information or when ordering parts.

If any serial number plate is damaged, contact your Bobcat dealer.

Figure 143



An attachment serial number plate can be found on each attachment [Figure 143].

The centre of gravity (C.G.) indicates the horizontal distance between the attachment's centre of gravity and the attachment hook-up.

Attachment Operation & Maintenance Manual

Depending on the design of your Bobcat attachment, the operation and maintenance procedures are described in your Bobcat Telescopic Handler Operation & Maintenance Manual or in specific Bobcat attachment Operation & Maintenance Manual.

The operation and maintenance procedures for the attachments listed below are covered by your Bobcat Telescopic Handler Operation & Maintenance Manual:

- Pallet Fork
- Buckets
- Jibs

The operation and maintenance procedures for the attachments listed below are described in a specific Bobcat attachment Operation & Maintenance Manual:

- Winches
- Concrete Basket
- Man Platform

Contact your Bobcat Dealer to get additional copy of the specific attachment Operation & Maintenance Manual.

Attachment Declaration Of Conformity

Depending on the design of your Bobcat attachment, the homologation can be covered by your Bobcat Telescopic Handler Declaration of Conformity or requires a specific Bobcat attachment Declaration of Conformity.

When required, the attachment Declaration of Conformity specific for your region is available in the Operation & Maintenance Manual describing the operation and maintenance procedures of your Bobcat attachment.

The homologation of the attachments listed below is covered by your Bobcat Telescopic Handler Declaration of Conformity:

- Pallet fork
- Buckets

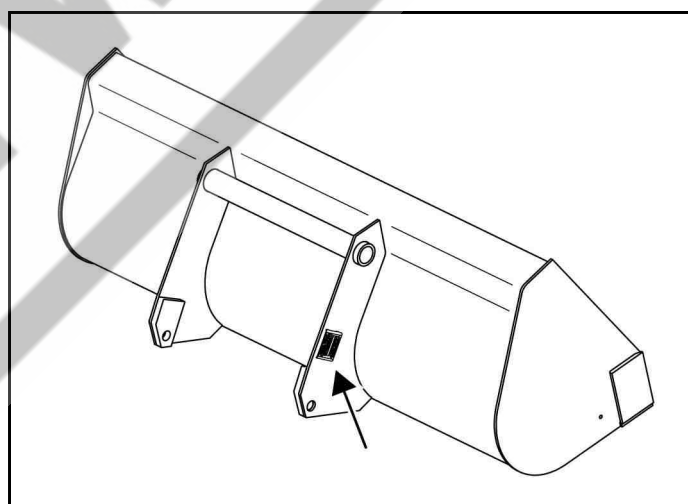
The homologation of the attachments listed below is covered by a specific Bobcat attachment Declaration of Conformity:

- Jibs
- Winches
- Concrete Basket
- Man Platform

Buckets

Bucket Serial Plate Location

Figure 144



Digging bucket [Figure 144].

Choosing The Correct Bucket

⚠ WARNING

MODIFICATION HAZARD

Unapproved attachments can cause serious injury or death.

Buckets and attachments for safe loads of specified densities are approved for each model. Never use attachments or buckets that are not approved by Bobcat Company. ◀

W-2052

⚠ WARNING

INSTABILITY HAZARD

Excessive loads can cause tipping or loss of control
Do not exceed Rated Load Capacity. ◀

W-2393

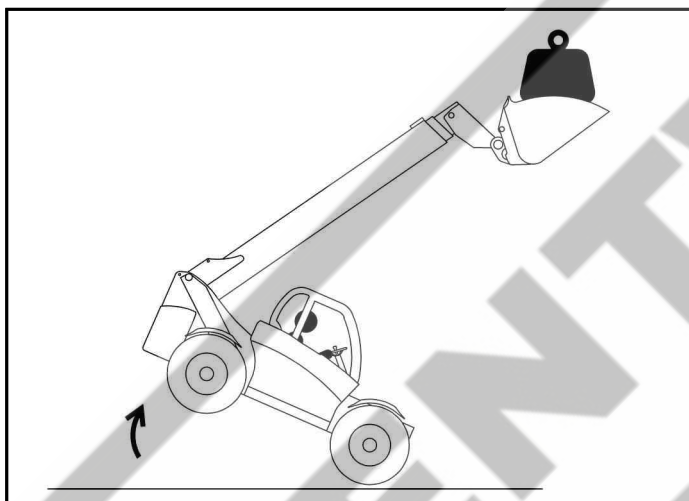
Warranty is void if non-approved attachments are used on the Bobcat Telescopic Handler.

The dealer can identify, for each model Telescopic Handler, the attachments and buckets approved by Bobcat. The buckets and attachments are approved for Rated Load Capacity (RLC) and for secure fastening.

The RLC is determined by using a bucket and material of normal density, such as dirt or dry gravel. If longer buckets are used, the load centre moves forward and reduces the RLC. If very dense material is loaded, the volume must be reduced to prevent overloading.

Use the correct bucket size for the type and density of material being handled. For safe handling of materials and avoiding machine damage, the attachment (or bucket) should handle a full load without going over the RLC for the machine.

Figure 145



NA20182a

Exceeding the RLC can cause the following problems:

- Steering the machine can be difficult.
- Tyres will wear faster.
- There will be a loss of stability.
- The life of the machine will be reduced.

Know the weight of the materials being handled. Avoid exceeding the RLC of the machine (as indicated on the Load Capacity Charts). Material which is very dense will be heavier than the same volume of less dense material. Reduce the size of load if handling dense material. Maximum material density is 3500 kg/m³ (218.5 lb/ft³) for digging buckets and 1200 kg/m³ (74.9 lb/ft³) for light material buckets.

Bucket Load Chart

⚠ WARNING

INSTABILITY HAZARD

Exceeding the rated load capacity can cause the machine to tip or rollover.
Always use and follow the Load Capacity Chart that is specified for each attachment and machine combination. Each attachment and machine combination will have its own chart. ◀

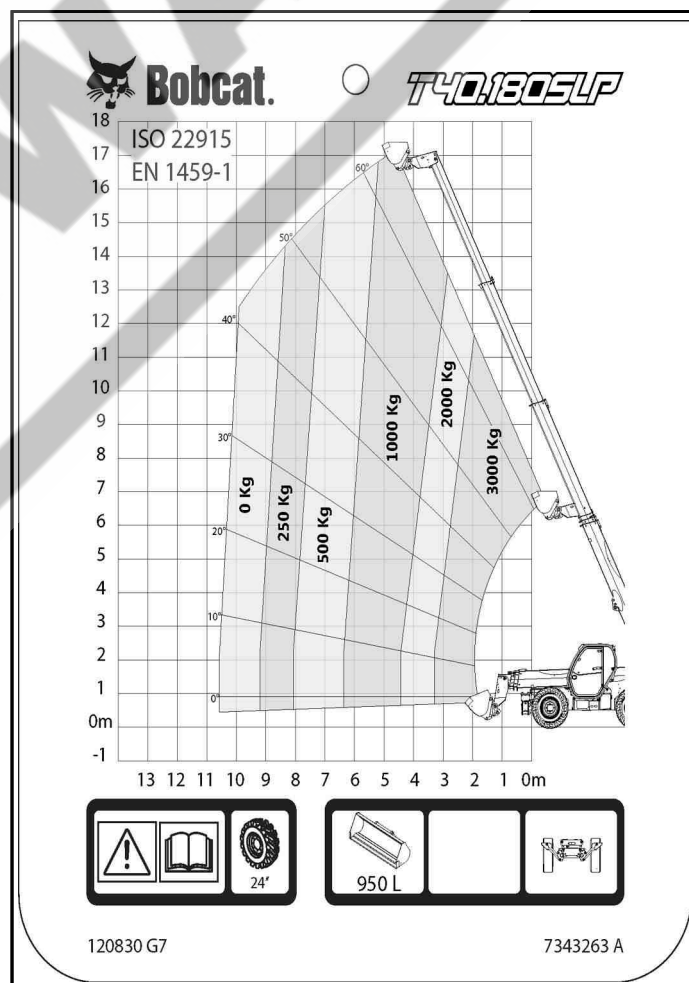
W-2528

NOTE: The maximum load of an attachment can exceed the RLC of the machine.

Chart for the machine T40.180SLP equipped with 950 L (33.5 ft³) bucket on tyres (with stabilisers raised):

- CAMSO 400/80-24/20PR TM R4
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).
- MICHELIN 400/80-24 162A8 IND TL POWER CL
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).

Figure 146

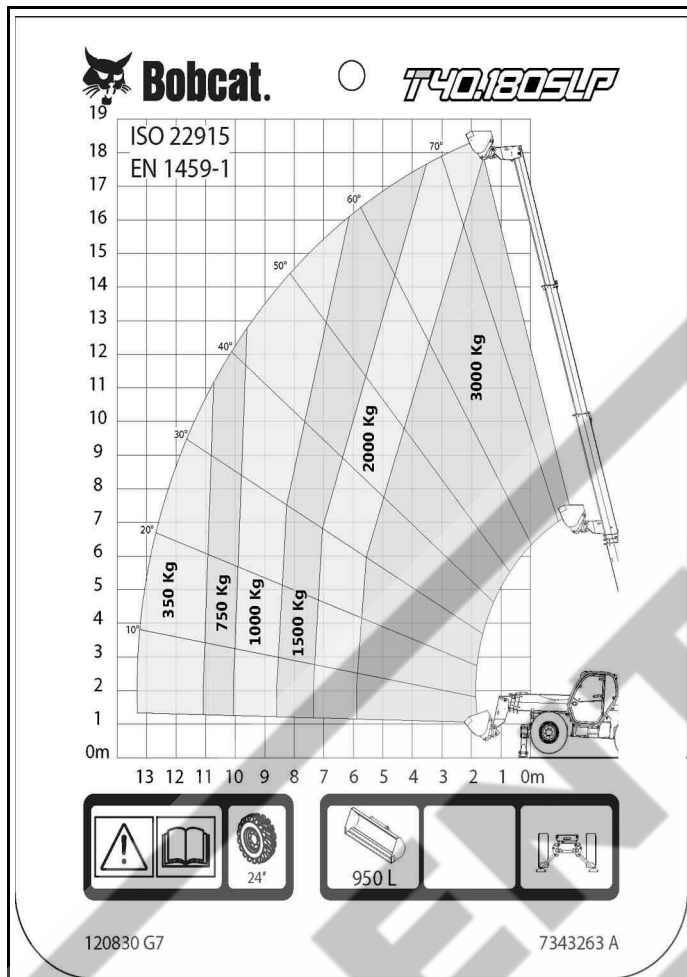


Complies with stability tests of the relevant parts of ISO 22915.

Chart for the machine T40.180SLP equipped with 950 L (33.5 ft³) bucket (stabilisers down on firm ground):

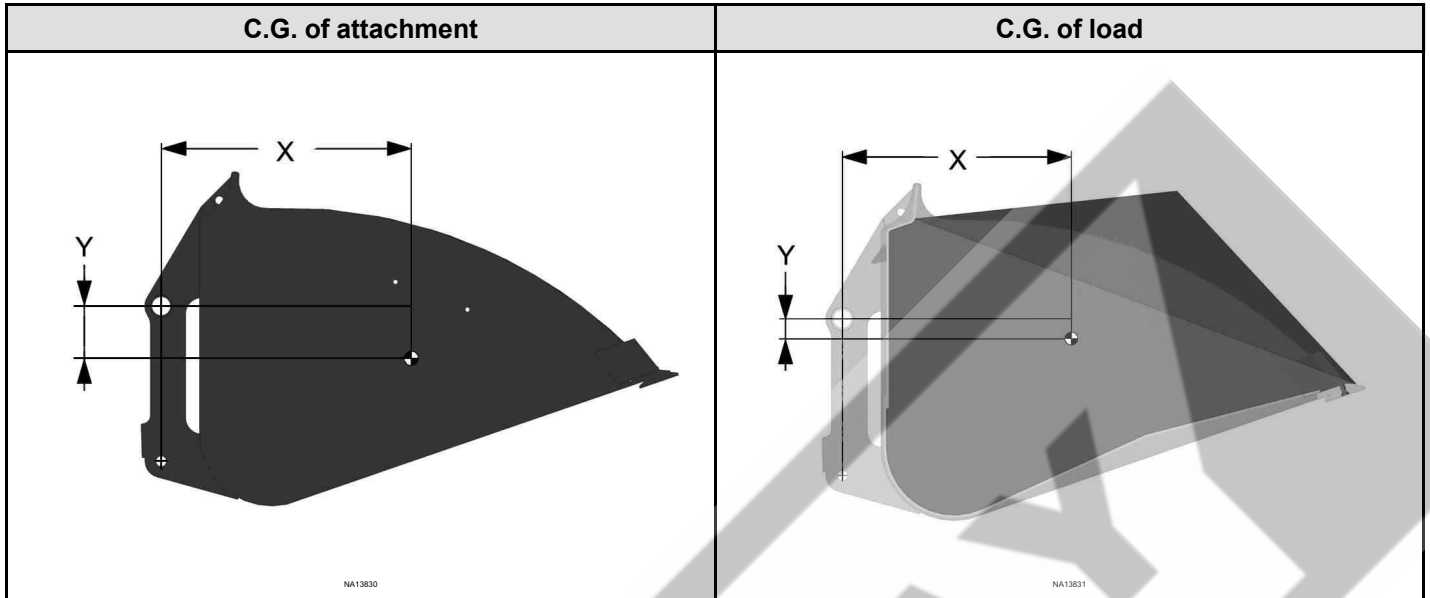
- CAMSO 400/80-24/20PR TM R4
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).
- MICHELIN 400/80-24 162A8 IND TL POWER CL
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).

Figure 147



Complies with stability tests of the relevant parts of ISO 22915.

Bucket Mass Properties

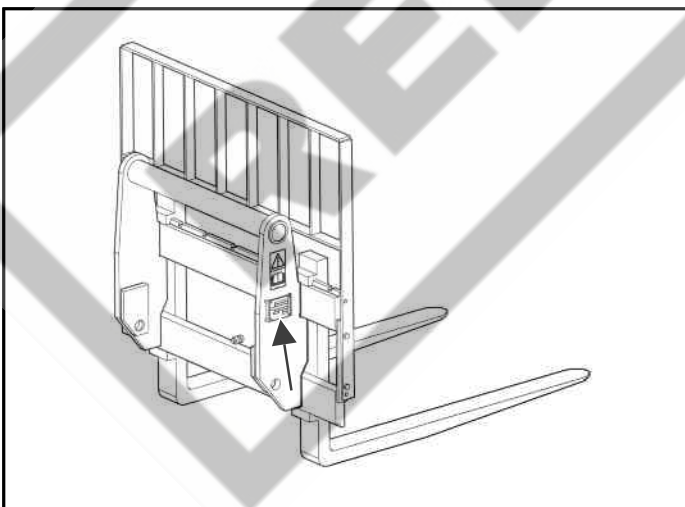


ATTACHMENT	MASS	CENTRE OF GRAVITY OF ATTACHMENT			CENTRE OF GRAVITY OF LOAD		
		X	Y	Z	X	Y	Z
Digging Bucket 950 L (33.5 ft³), without teeth	456 kg (1005 lb)	322 mm (12.7 in)	-288 mm (-11.3 in)	0 mm (0 in)	371 mm (14.6 in)	-197 mm (-7.8 in)	0 mm (0 in)
Digging Bucket 950 L (33.5 ft³), with teeth	469 kg (1034 lb)	338 mm (13.3 in)	-288 mm (-11.3 in)	0 mm (0 in)	371 mm (14.6 in)	-197 mm (-7.8 in)	0 mm (0 in)

Pallet Fork

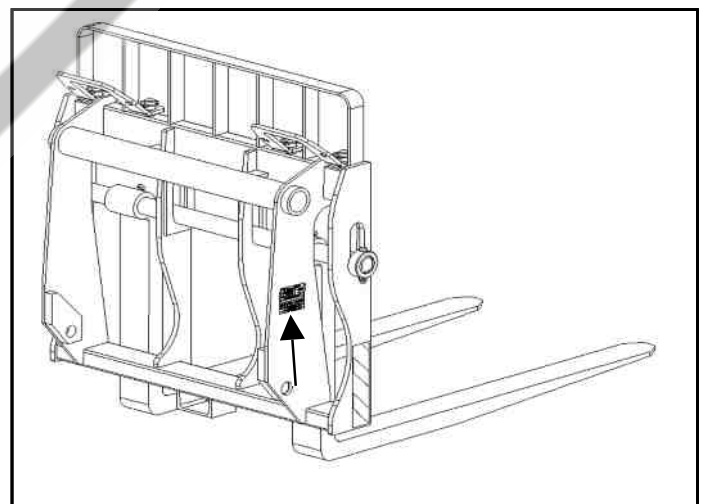
Pallet Fork Serial Plate Location

Figure 148



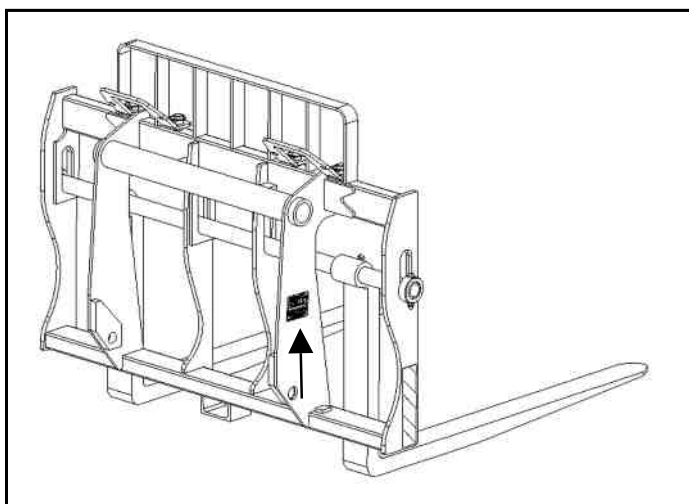
Rigid pallet fork FEM III [Figure 148].

Figure 149



Floating pallet fork 1,0 m (39 in) [Figure 149].

Figure 150



NA1559a

Floating pallet fork 1,5 m (59 in) [Figure 150].

Pallet Fork Inspection Before Use

The maximum load to be carried when using a Pallet Fork is shown on a decal located on the attachment serial number plate.

If an attachment is composed of several parts which are equipped with a serial number plate, the maximum load of the attachment will be the lowest one displayed on the serial number plates.

See your Bobcat dealer for more information about Pallet Fork inspection, maintenance and replacement. See your Bobcat dealer for RLC when using a Pallet Fork and for other available attachments.

Pallet Fork Load Charts

⚠ WARNING

INSTABILITY HAZARD

Exceeding the rated load capacity can cause the machine to tip or rollover.

Always use and follow the Load Capacity Chart that is specified for each attachment and machine combination. Each attachment and machine combination will have its own chart. ◀

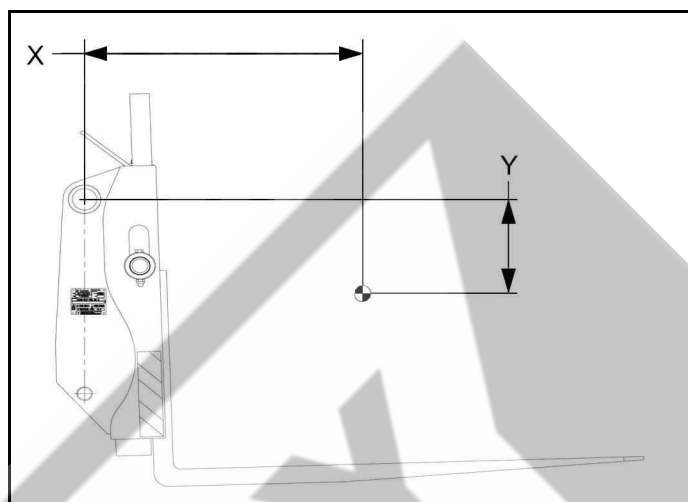
W252a

(See Load Charts on Page 40) for more information on the RLC of the machine equipped with a rigid or floating pallet fork.

NOTE: The maximum load of an attachment can exceed the RLC of the machine.

Pallet Fork Mass Properties

Figure 151



NA15582

ATTACHMENT	MASS	CENTRE OF GRAVITY OF ATTACHMENT			CENTRE OF GRAVITY OF LOAD		
		X	Y	Z	X	Y	Z
Floating Pallet Fork, 1,0 m (39 in), Quick-Tach	254 kg (560 lb)	286 mm (11.3 in)	-434 mm (-17.1 in)	0 mm (0 in)	711 mm (28 in)	-276 mm (-10.9 in)	0 mm (0 in)
Floating Pallet Fork, 1,5 m (59 in), Quick-Tach	272 kg (600 lb)	277 mm (10.9 in)	-423 mm (-16.7 in)	0 mm (0 in)	711 mm (28 in)	-276 mm (-10.9 in)	0 mm (0 in)
Rigid Pallet Fork, without guard, Quick-Tach	300 kg (661 lb)	247 mm (9.7 in)	-522 mm (-20.6 in)	3 mm (0.1 in)	700 mm (27.6 in)	-344 mm (-13.5 in)	0 mm (0 in)
Rigid Pallet Fork, with guard, Quick-Tach	325 kg (717 lb)	239 mm (9.4 in)	-476 mm (-18.7 in)	0 mm (0 in)	700 mm (27.6 in)	-344 mm (-13.5 in)	0 mm (0 in)
Floating Pallet Fork, 1,0 m (39 in), Mani-Tach	248 kg (546 lb)	199 mm (7.8 in)	-373 mm (-14.7 in)	0 mm (0 in)	647 mm (25.5 in)	-339 mm (-13.4 in)	0 mm (0 in)
Floating Pallet Fork, 1,5 m (59 in), Mani-Tach	268 kg (591 lb)	192 mm (7.5 in)	-357 mm (-14.1 in)	0 mm (0 in)	647 mm (25.5 in)	-339 mm (-13.4 in)	0 mm (0 in)
Rigid Pallet Fork, without guard, Mani-Tach	271 kg (579 lb)	159 mm (6.3 in)	-465 mm (-18.3 in)	3 mm (0.1 in)	713 mm (28.1 in)	-210 mm (-8.2 in)	0 mm (0 in)
Rigid Pallet Fork, with guard, Mani-Tach	296 kg (653 lb)	165 mm (6.5 in)	-411 mm (-16.2 in)	3 mm (0.1 in)	713 mm (28.1 in)	-210 mm (-8.2 in)	0 mm (0 in)

Winch

Operation & Maintenance Manual

WARNING

INSTABILITY HAZARD

Exceeding the rated load capacity can cause the machine to tip or rollover.

Always use and follow the Load Capacity Chart that is specified for each attachment and machine combination. Each attachment and machine combination will have its own chart. ◀

W-2928

NOTE: The maximum load of an attachment can exceed the RLC of the machine.

This Bobcat attachment requires a specific Operation & Maintenance Manual. It is a part of your product and can be stored in a container provided on the attachment or in the Bobcat product.

The Operation & Maintenance Manual delivered with the attachment gives operating information as well as routine maintenance and service procedures. Refer to the Attachment Operation & Maintenance Manual before use.

The appropriate load charts for the approved combination machine / attachment are available in the Operation & Maintenance Manual.

Concrete Basket

Operation & Maintenance Manual

WARNING

INSTABILITY HAZARD

Exceeding the rated load capacity can cause the machine to tip or rollover.

Always use and follow the Load Capacity Chart that is specified for each attachment and machine combination. Each attachment and machine combination will have its own chart. ◀

W-2928

NOTE: The maximum load of an attachment can exceed the RLC of the machine.

This Bobcat attachment requires a specific Operation & Maintenance Manual. It is a part of your product and can be stored in a container provided on the attachment or in the Bobcat product.

The Operation & Maintenance Manual delivered with the attachment gives operating information as well as routine maintenance and service procedures. Refer to the Attachment Operation & Maintenance Manual before use.

The appropriate load charts for the approved combination machine / attachment are available in the Operation & Maintenance Manual.

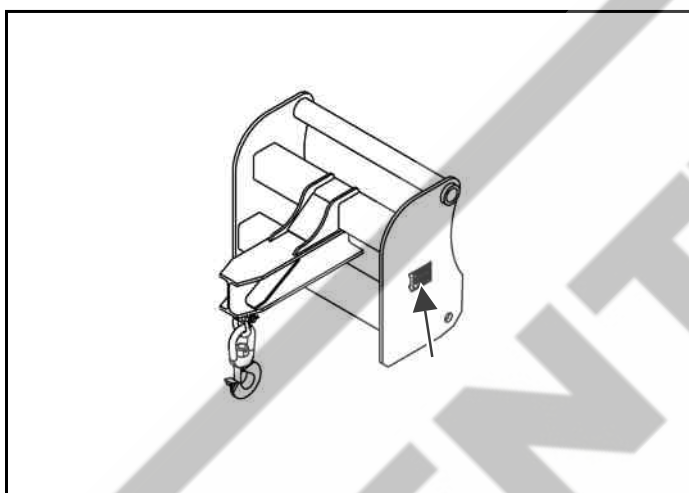
Jib

EC Declaration Of Conformity

(See EC Declaration Of Conformity (Jib) on Page 11)

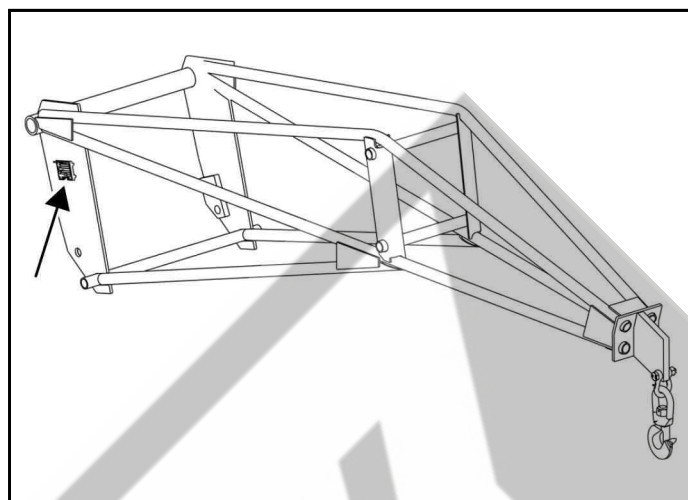
Jib Serial Plate Location

Figure 152



Jib 0,7 m / 4300 kg (28 in / 9480 lb) .

Figure 153



Jib 3,7 m / 700 kg (12 ft / 1543 lb) [Figure 153].

The maximum load to be carried when using a Jib is shown on a decal located on the attachment serial number plate.

Never carry hot or corrosive products with a jib.

If an attachment is composed of several parts which are equipped with a serial number plate, the maximum load of the attachment will be the lowest one displayed on the serial number plates.

Static Test

A static strength test has been successfully performed on the jib using a load coefficient of 1,5.

Jib Inspection Before Use

In addition to the daily inspection of the machine:

- Check if safety decals are in good condition.
 - ▷ Replace if damaged.
- Check the installation of the cotter pins.
 - ▷ Replace if damaged.
- Check if the lifting hook rotates freely.
 - ▷ Lubricate as needed.
- Check if lifting hook safety tab is intact and positions itself correctly.
- Inspect the condition of the lifting hook and shackle.
 - ▷ Replace if worn or damaged.
- Inspect the jib frame for cracks or deformation.
 - ▷ Replace complete jib if damaged.

Jib Load Charts

⚠ WARNING

INSTABILITY HAZARD

Exceeding the rated load capacity can cause the machine to tip or rollover.

Always use and follow the Load Capacity Chart that is specified for each attachment and machine combination. Each attachment and machine combination will have its own chart.

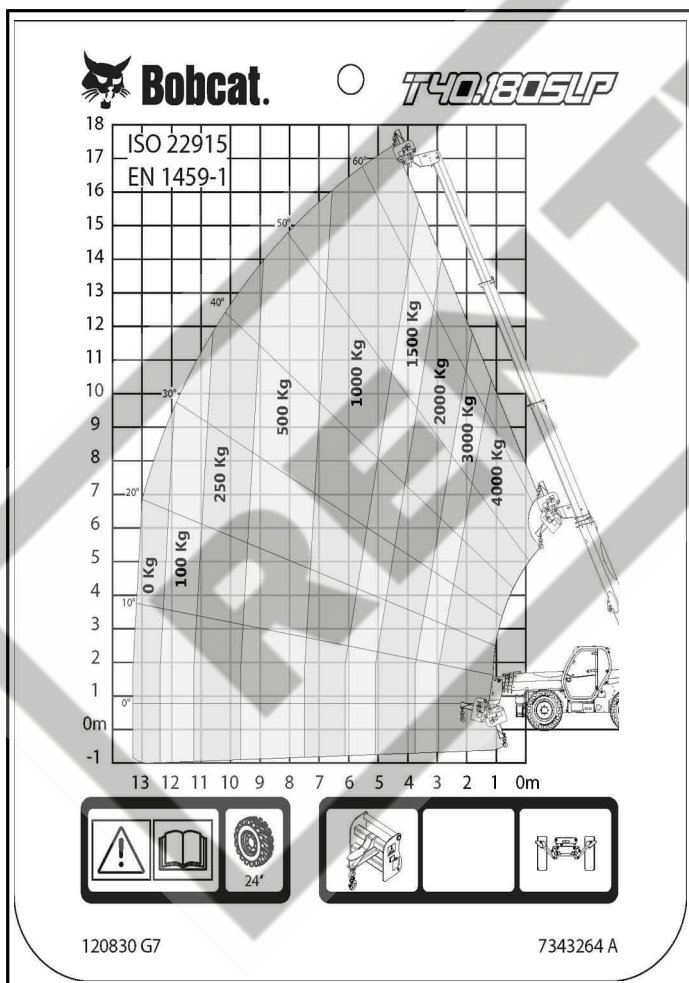
NOTE: The maximum load of an attachment can exceed the RLC of the machine.

Jib 0,7 m / 4300 kg (2.3 ft / 9480 lb)

Chart for the machine T40.180SLP on tyres (stabilisers raised):

- CAMSO 400/80-24/20PR TM R4
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).
- MICHELIN 400/80-24 162A8 IND TL POWER CL
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).

Figure 154

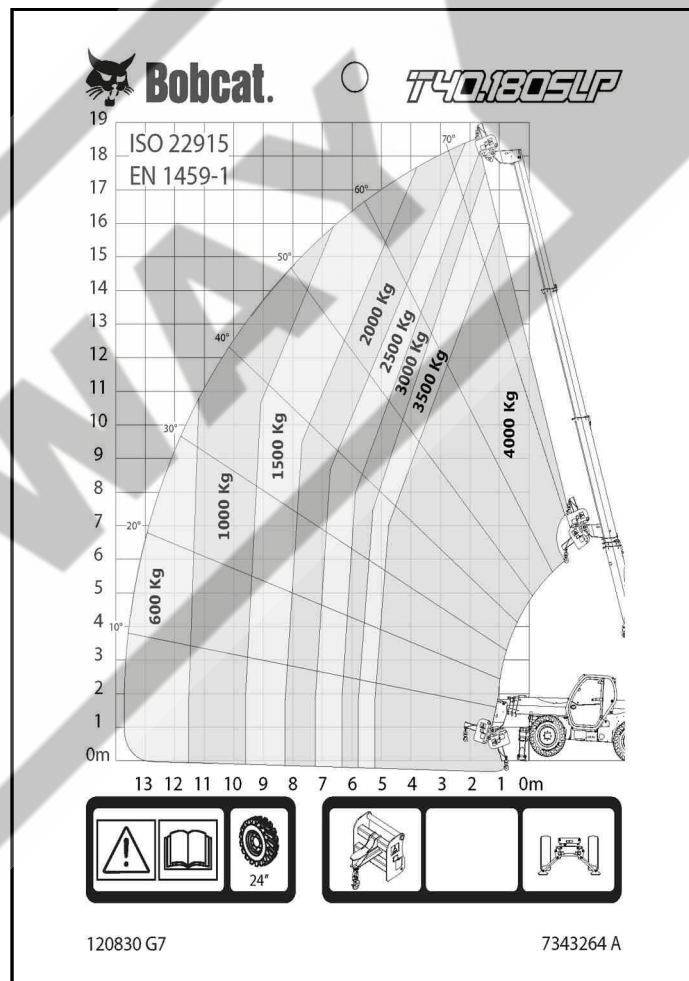


Complies with stability tests of the relevant parts of ISO 22915.

Chart for the machine T40.180SLP (stabilisers down on firm ground):

- CAMSO 400/80-24/20PR TM R4
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).
- MICHELIN 400/80-24 162A8 IND TL POWER CL
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).

Figure 155



Complies with stability tests of the relevant parts of ISO 22915.

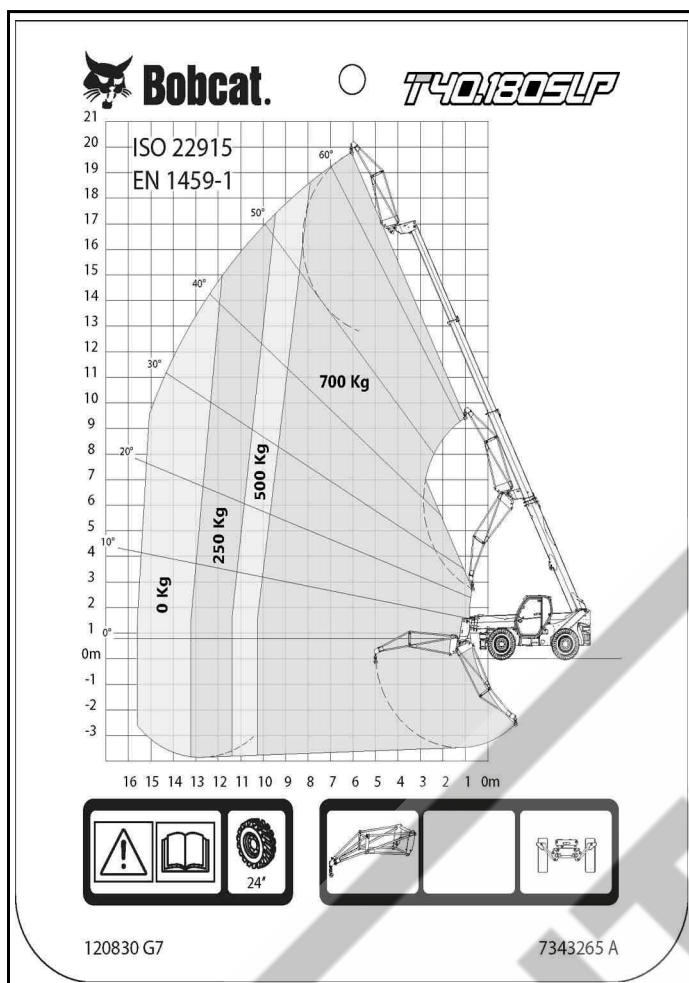
Jib 3,7 m / 700 kg (12 ft / 1543 lb)

Chart for the machine T40.180SLP on tyres (stabilisers raised):

- CAMSO 400/80-24/20PR TM R4
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).
- MICHELIN 400/80-24 162A8 IND TL POWER CL

- ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).

Figure 156

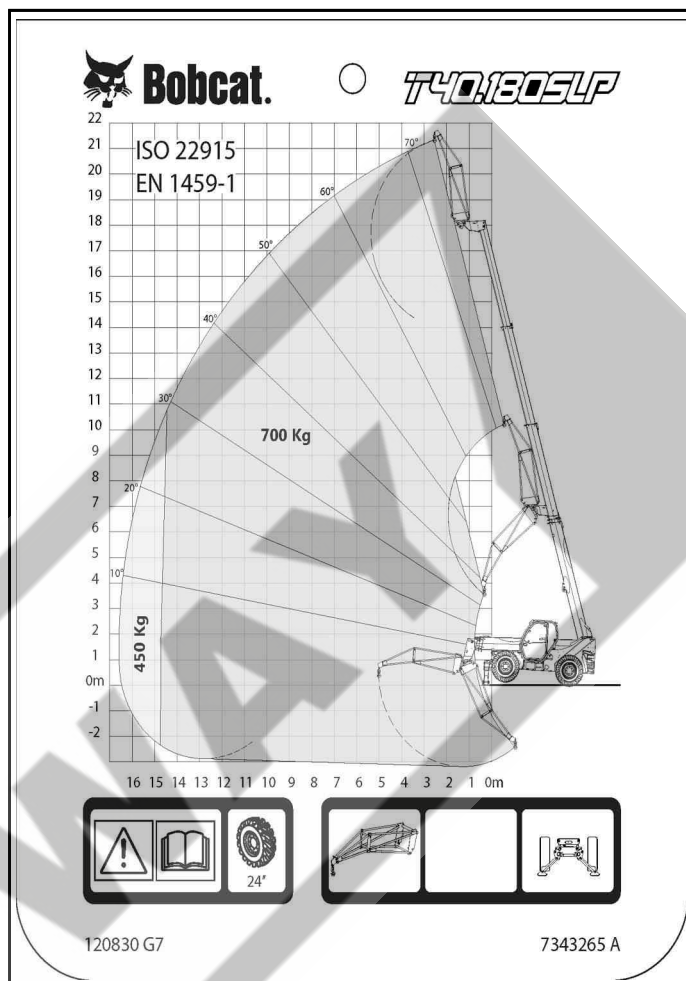


Complies with stability tests of the relevant parts of ISO 22915.

Chart for the machine T40.180SLP (stabilisers down on firm ground):

- CAMSO 400/80-24/20PR TM R4
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).
- MICHELIN 400/80-24 162A8 IND TL POWER CL
 - ▷ with inflation pressure of 475 kPa (4,75 bar) (69 psi).

Figure 157

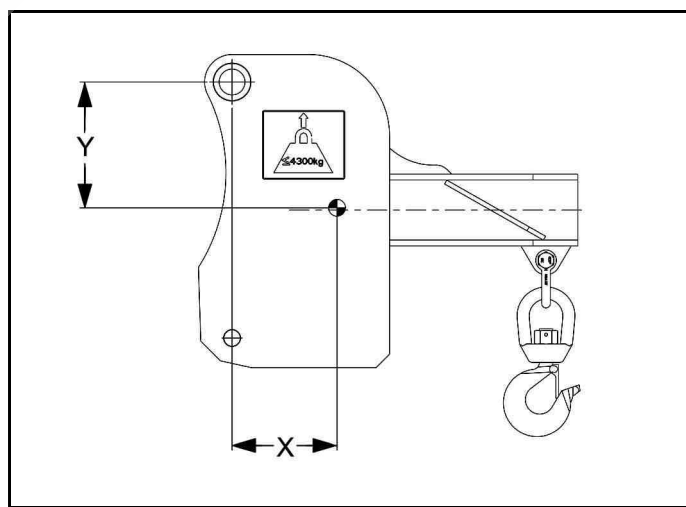


Complies with stability tests of the relevant parts of ISO 22915.

Jib Mass Properties

Jib 0,7 m / 4300 kg (2.3 ft / 9480 lb)

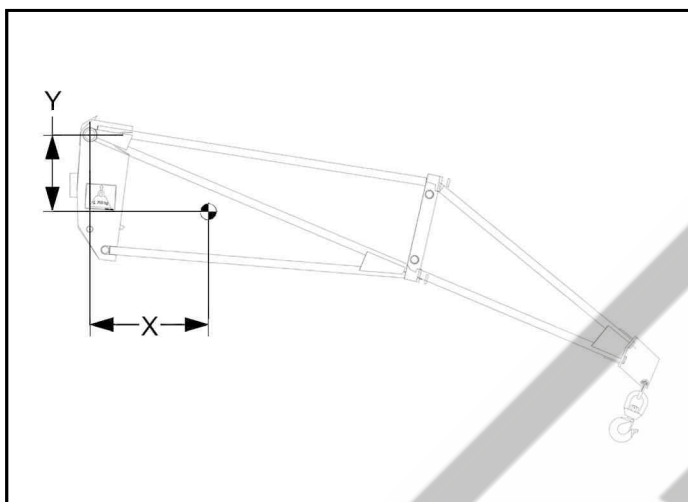
Figure 158



ATTACHMENT	MASS	CENTER OF GRAVITY OF ATTACHMENT			CENTER OF GRAVITY OF LOAD		
		X	Y	Z	X	Y	Z
Jib 0,7 m (28 in), Quick-Tach	177 kg (390 lb)	234 mm (9.2 in)	-280 mm (-11 in)	0 mm (0 in)	686 mm (27.0 in)	-707 mm (27.8 in)	0 mm (0 in)
Jib 0,7 m (28 in), Mani-Tach	153 kg (337 lb)	261 mm (10.3 in)	-135 mm (-5.3 in)	0 mm (0 in)	686 mm (27.0 in)	-554 mm (21.8 in)	0 mm (0 in)

Jib 3,7 m / 700 kg (12 ft / 1543 lb)

Figure 159



ATTACHMENT	MASS	CENTER OF GRAVITY OF ATTACHMENT			CENTER OF GRAVITY OF LOAD		
		X	Y	Z	X	Y	Z
Jib 3,7 m (12 ft), Quick-Tach	204 kg (450 lb)	1300 mm (51.2 in)	-584 mm (-23 in)	0 mm (0 in)	3355 mm (132.1 in)	-1490 mm (58.7 in)	0 mm (0 in)

Suspended Loads

Suspended loads have a dynamic and therefore unpredictable effect on the machine's stability. External working conditions such as the wind speed increase the dynamic and unpredictable effect. Follow the procedure below when operating a suspended load.

The lifting device is intended to handle vertical pull loads. With the jib, do not carry out horizontal pull and side-pull.

Carry or place special loads with the lifting device or attachment intended for this type of use.

If the suspended load or the resulting boom geometry block the visibility, alternative carrying means must be considered.

The operator must know the wind speed. Do not use the machine with wind speeds over 12,5 m/s (28 mph).

Contact your Bobcat dealer for details on applications.

Load Handling

⚠ WARNING

INSTABILITY HAZARD

Machine tipping or rollover can cause serious injury or death.

Load, unload and turn on flat level ground. DO NOT exceed Rated Load Capacity (RLC) shown on load charts in cab.*

W-3176

Do not carry or place roof trusses with the jib.

Do not carry hot or corrosive products.

When using a jib with a load suspended from the hook:

- Check that the jib is properly attached and locked to the attachment carrier.
- Do not operate the machine while people are under the suspended load.
- Operate on firm ground.

- Always keep lifting hook vertically aligned above the gravity centre of the load.
- Move the lifting hook and machine slowly. During picking, loading and unloading, avoid jerky movements and load oscillations.
- Move the machine with boom fully retracted and load as close as possible to the ground (transport position).
- Never shock or abruptly place loads.
- When stationary, ensure that the machine is level.

During Travelling

- Move the machine with boom fully retracted and load as close as possible to the ground (transport position). The load should not be suspended higher than 500 mm (20 in) above the ground when travelling.
- The machine should travel at speeds appropriate to the ground and load conditions, or not greater than 0,4 m/s (0.9 mph) when carrying suspended loads.
- Do not use any controls to reposition the load. Come to a gradual and complete stop before attempting to reposition the load.
- Avoid crossing, climbing or descending inclines when travelling with a suspended load.
- During starting, travelling, turning and stopping, avoid jerky movements and load oscillations.
- When travelling, the lateral and longitudinal attitude must be horizontal.

Picking Up A Load From The Ground

1. Fully retract and lower the boom and move the machine as close as possible to the load.
2. Position the lifting hook vertically aligned above the load and lower it slowly as close as possible to the lifting point of the load.
3. Put the Travel Direction Control into neutral and make sure the parking brake is engaged.
4. Turn off the engine and remove the ignition key. Exit the cab. Install the lifting hook to the lifting point of the load. Check that the lifting gear is hanging freely and is not twisted or knotted. Always turn off the engine to avoid involuntary hazardous movements, mainly when a second operator is present to install the load.
5. Go back to operating position in the cab and start the engine.
6. Slightly lift the load from the ground by raising the boom. The machine is then in the transport position.

In case of travelling with the suspended load:

- If applicable, turn off the engine and remove the ignition key. Exit the cab.

- Install the additional lifting device (rope, cable) to secure the load to the machine lifting or towing points. It will reduce the load movement during the travel.

Placing A Raised Load

1. With the machine in transport position, move the machine as close as possible to the base of the area where to place the load.
2. Put the Travel Direction Control into neutral and make sure the parking brake is engaged.
3. Stabilise and level the machine.
4. In case of travelling with the suspended load:
 - Turn off the engine and remove the ignition key. Exit the cab.
 - Remove the additional lifting device (wire, cable) to secure the load to the machine lifting or towing points.
 - Go back to operating position in the cab and start the engine.
5. Raise and extend the boom to move the load above the area where to place the load.
6. Position the load horizontally and place it on the area by lowering and retracting the boom.
7. Turn off the engine and remove the ignition key. Exit the cab.
8. Remove the lifting hook from the lifting point of the load. Always turn off the engine to avoid involuntary hazardous movements; mainly when a second operator is present to install the lifting hook to the lifting point of the load.
9. Return the boom to the transport position by raising, retracting and lowering it.

Picking Up A Raised Load

NOTE: Do not carry hot or corrosive products.

1. Fully retracted and lower the boom. Move the machine as close as possible to the load.
2. Put the Travel Direction Control into neutral and make sure the parking brake is engaged.
3. Stabilise and level the machine.
4. Raise and extend the boom to position the lifting hook vertically aligned above the load and lower it slowly as close as possible to the lifting point of the load.
5. Turn off the engine and remove the ignition key. Exit the cab.
6. Install the lifting hook to the lifting point of the load. Check that the lifting gear is hanging freely and is not twisted or knotted. Always turn off the engine to

avoid involuntary hazardous movements, mainly when a second operator is present to install the load.

7. Slightly lift the load by raising the boom.
8. Bring the load to transport position by fully retracting the boom and lowering the load as close as possible to the ground.

Installing And Removing The Attachment (Manual Lock)

WARNING

MODIFICATION HAZARD

Unapproved attachments can cause serious injury or death.

Never use attachments or buckets which are not approved by Bobcat. Buckets and attachments for safe loads of specified densities are approved for each model. Read and understand the Load Capacity Charts for the attachment you are using.†

W-2392

Warranty is void if non-approved attachments are used on the Telescopic Handler.

The dealer can identify, for each model Telescopic Handler, the attachments and buckets approved by Bobcat. The buckets and attachments are approved for Rated Load Capacity and for secure fastening to the Telescopic Handler. Contact your Bobcat dealer for more information if your attachment is not illustrated in your machine's Load Capacity Charts.

Installing the Attachment (Manual Lock)

WARNING

GENERAL HAZARD

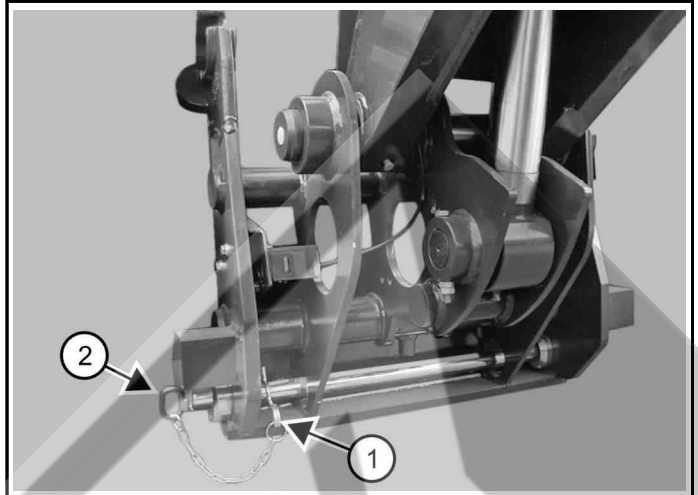
Failure to follow instructions can cause serious injury or death.

Before you leave the operator's position:

- Put the Travel Direction Control and the Joystick in neutral.
- Engage the parking brake.
- Retract and lower the boom and attachment flat on the ground.
- Stop the engine.†

W-2397

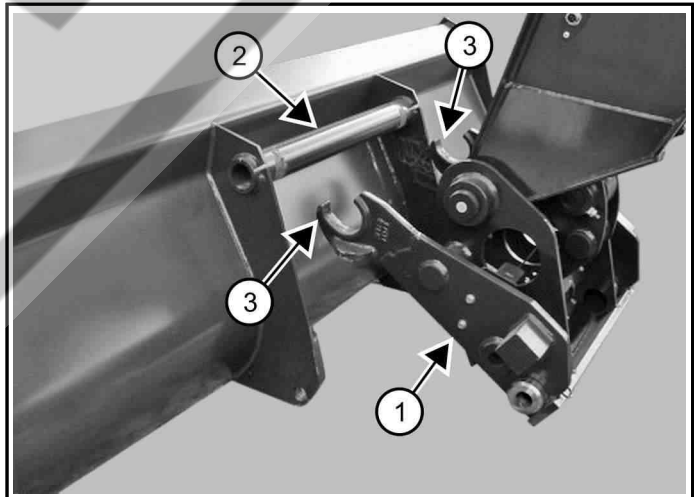
Figure 160



S41931a

1. Remove the locking bar safety pin (Item 1), and remove the locking bar (Item 2) [Figure 160] from the attachment carrier.
2. Enter the machine and perform the pre-starting procedure. (See Pre-starting Procedure on Page 84)
3. Start the engine. (See Starting the Engine on Page 88)
4. Lower and retract the boom.

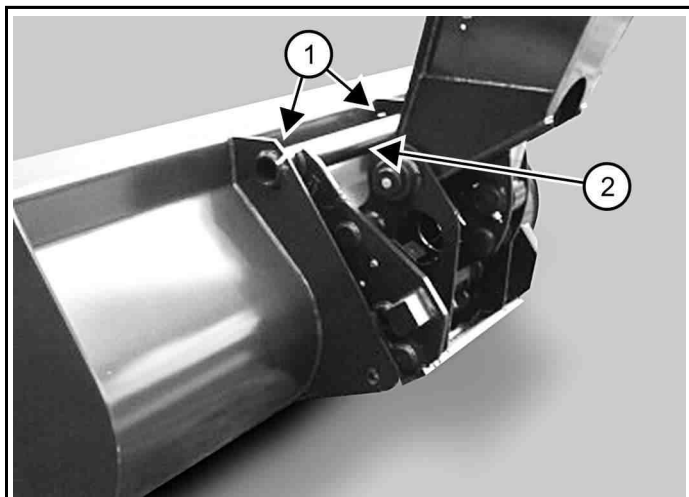
Figure 161



S41932a

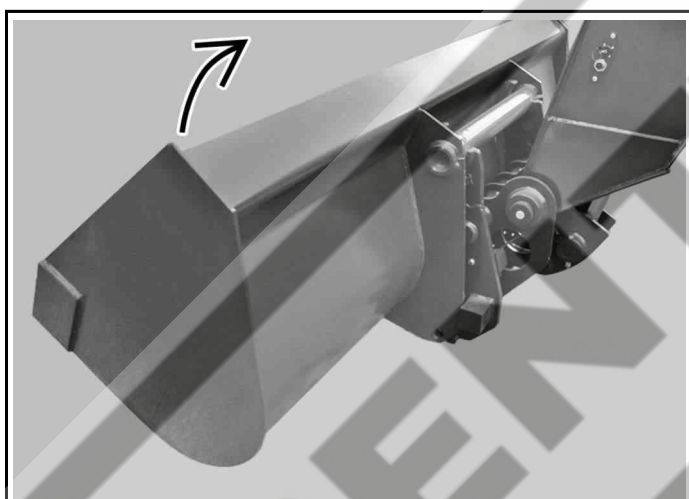
5. Position the machine so that the attachment carrier (Item 1) is parallel to the attachment tube (Item 2) [Figure 161]. Drive the machine forward until the attachment carrier is at a distance of about 1 m (3 ft) from the attachment.
6. Tilt the attachment carrier (Item 1) forward until the two hooks (Item 3) are lower than the attachment tube (Item 2) [Figure 161].

Figure 162



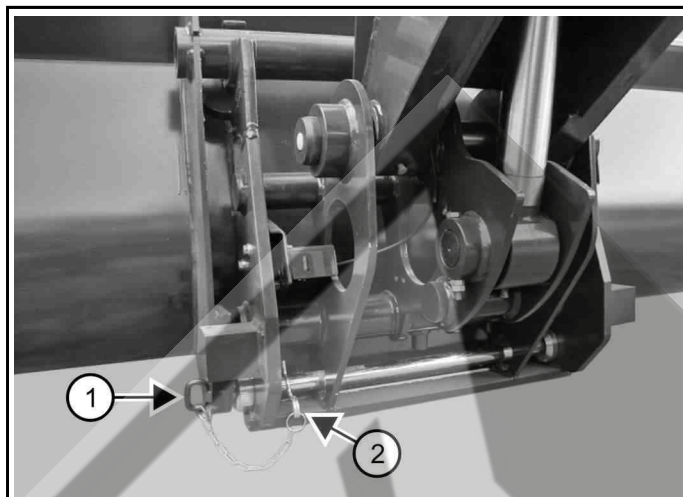
7. Drive forward until the two hooks (Item 1) are right below the attachment tube (Item 2) [Figure 162].
8. Engage the attachment tube (Item 2) in the two hooks (Item 1) [Figure 162] by raising the boom; tilt the attachment carrier backward if necessary.

Figure 163



9. When the attachment tube is properly engaged in the two hooks and the attachment is no longer touching the ground, tilt the attachment carrier fully backward [Figure 163].
10. Put the Travel Direction Control in NEUTRAL. (See Travel Direction on Page 42)
11. Make sure the parking brake is engaged. (See Parking Brake on Page 66)
12. Stop the engine and exit the machine. (See Stopping The Engine And Leaving The Machine on Page 91)

Figure 164



13. Fully insert the locking bar (Item 1) through the holes in the attachment and the attachment carrier. Install the safety pin (Item 2) [Figure 164] into the locking bar.
14. Make sure the locking bar (Item 1) [Figure 164] extends through the holes on both sides of the attachment and the attachment carrier. Make sure the attachment is securely fastened.
15. Install attachment electrical harness and hydraulic lines, if applicable, on the machine and the attachment carrier.

Removing the Attachment (Manual Lock)

⚠ WARNING

GENERAL HAZARD

Failure to follow instructions can cause serious injury or death.

Before you leave the operator's position:

- Put the Travel Direction Control and the Joystick in neutral.
- Engage the parking brake.
- Retract and lower the boom and attachment flat on the ground.
- Stop the engine.

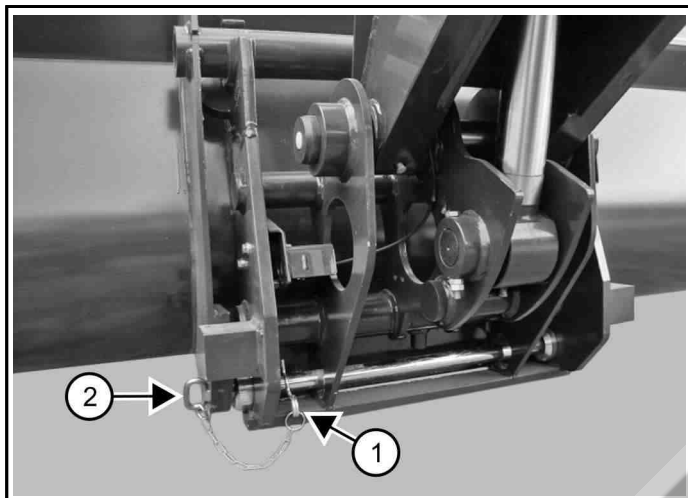
1. Lower the boom and put the attachment flat on the ground.

In muddy conditions or to prevent the attachment from freezing to the ground, put the attachment on planks or blocks before removing it from the machine.

2. Put the Travel Direction Control in NEUTRAL. (See Travel Direction on Page 42)
3. Make sure the parking brake is engaged. (See Parking Brake on Page 66)

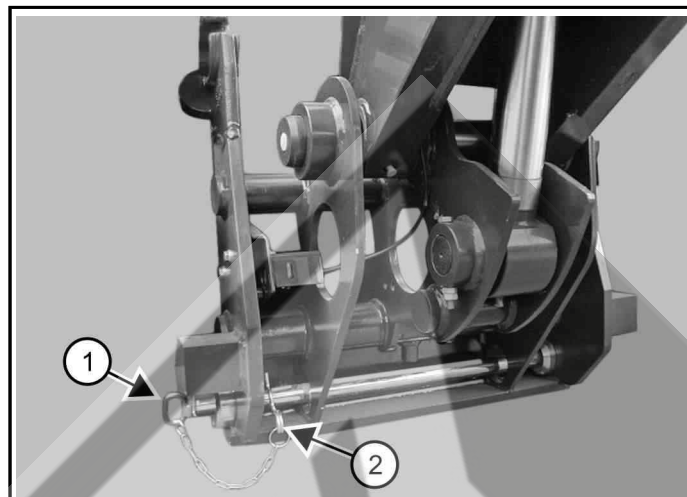
4. Stop the engine and exit the machine.
(See Stopping The Engine And Leaving The Machine on Page 91)

Figure 165



5. Disconnect attachment electrical harness and hydraulic lines, if applicable, from the machine. Remove the safety pin (Item 1), and remove the locking bar (Item 2) [Figure 165].
6. Enter the machine and perform the pre-starting procedure. (See Pre-starting Procedure on Page 84)
7. Start the engine.
(See Starting the Engine on Page 88)
8. Tilt the attachment carrier forward until the attachment tube is disengaged. Move the machine backward away from the attachment.
9. Put the Travel Direction Control in NEUTRAL.
(See Travel Direction on Page 42)
10. Make sure the parking brake is engaged.
(See Parking Brake on Page 66)
11. Stop the engine and exit the machine.
(See Stopping The Engine And Leaving The Machine on Page 91)

Figure 166



12. Fully insert the locking bar (Item 1) into the holes in the attachment carrier. Install the safety pin (Item 2) [Figure 166] into the locking bar.

Installing And Removing The Attachment (Hydraulic Lock)

⚠ WARNING

MODIFICATION HAZARD

Unapproved attachments can cause serious injury or death.

Never use attachments or buckets which are not approved by Bobcat. Buckets and attachments for safe loads of specified densities are approved for each model. Read and understand the Load Capacity Charts for the attachment you are using.

W-2392

Follow the procedure below if this machine is equipped with the option for hydraulic locking of attachments.

Warranty is void if non-approved attachments are used on the .

The dealer can identify, for each model , the attachments and buckets approved by Bobcat. The buckets and attachments are approved for Rated Load Capacity and for secure fastening to the . Contact your Bobcat dealer for more information if your attachment is not illustrated on your machine's Load Capacity Charts.

Installing the Attachment (Hydraulic Lock)

⚠ WARNING

GENERAL HAZARD

Failure to follow instructions can cause serious injury or death.

Before you leave the operator's position:

- Put the Travel Direction Control and the Joystick in neutral.
- Engage the parking brake.
- Retract and lower the boom and attachment flat on the ground.
- Stop the engine. ◀

W-2907

⚠ WARNING

CRUSHING HAZARD

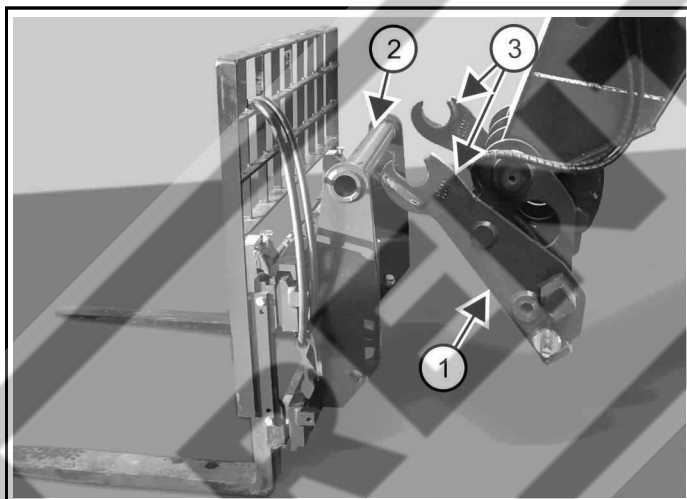
Failure to fully engage locking pins can allow attachment to come off and cause serious injury or death.

Locking pins must extend through the attachment mounting frame holes. ◀

W-2913

1. Enter the machine and perform the pre-starting procedure. (See Pre-starting Procedure on Page 84)
2. Start the engine. (See Starting the Engine on Page 88)
3. Lower and retract the boom.

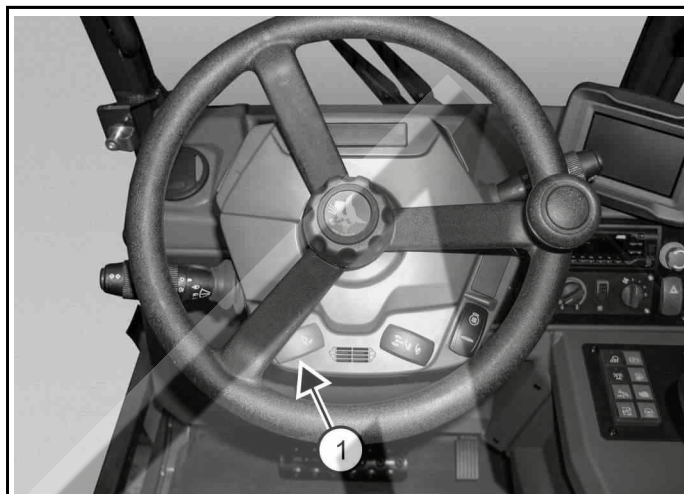
Figure 167



S41792a

4. Position the machine so that the attachment carrier (Item 1) is parallel to the attachment tube (Item 2) [Figure 167]. Drive the machine forward until the attachment carrier is at a distance of about 1 m (3 ft) from the attachment.
5. Tilt the attachment carrier (Item 1) forward until the two hooks (Item 3) are lower than the attachment tube (Item 2) [Figure 167].

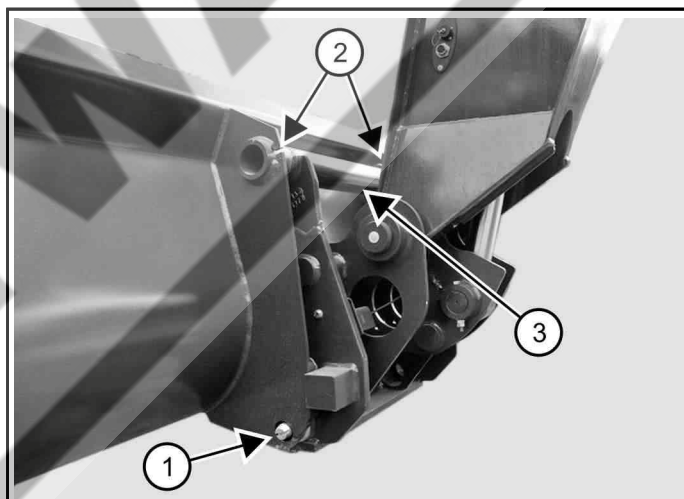
Figure 168



C212262a

6. Push and hold the bottom of the hydraulic attachment lock switch (Item 1) [Figure 168] to retract the locking pins (Item 1) [Figure 169] on the attachment carrier.

Figure 169



S41943a

7. Drive forward until the two hooks (Item 2) are right below the attachment tube (Item 3) [Figure 169].
8. Engage the attachment tube (Item 3) in the two hooks (Item 2) [Figure 169] by raising the boom; tilt the attachment carrier backward if necessary.
9. When the attachment tube (Item 3) is properly engaged in the two hooks (Item 2) [Figure 169] and the attachment is no longer touching the ground, tilt the attachment carrier fully backward.
10. Release the switch (Item 1) [Figure 168], the locking pins (Item 1) [Figure 169] will extend automatically.
11. Put the Travel Direction Control in NEUTRAL. (See Travel Direction on Page 42)

12. Make sure the parking brake is engaged.
(See Parking Brake on Page 66)
13. Stop the engine and exit the machine.
(See Stopping The Engine And Leaving The Machine on Page 91)
14. Make sure the locking pins (Item 1) [Figure 169] extend through the holes of the attachment carrier.
15. Make sure that the attachment is securely fastened.
16. Install attachment electrical harness and hydraulic lines (if equipped) on the machine and the attachment carrier.

Removing the Attachment (Hydraulic Lock)

⚠ WARNING

GENERAL HAZARD

Failure to follow instructions can cause serious injury or death.

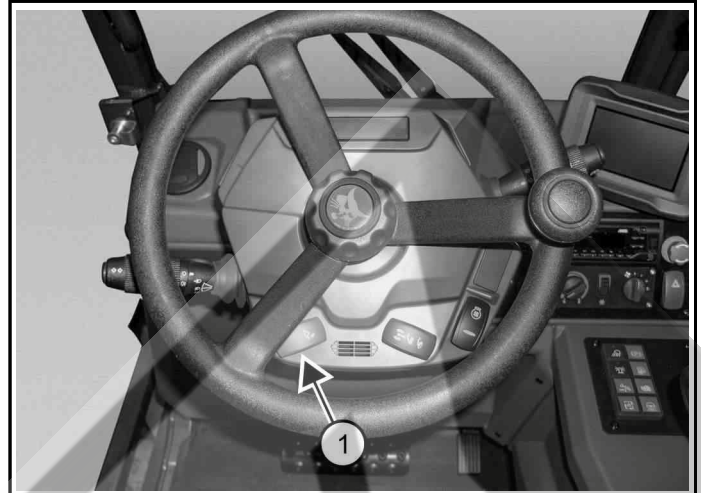
Before you leave the operator's position:

- **Put the Travel Direction Control and the Joystick in neutral.**
- **Engage the parking brake.**
- **Retract and lower the boom and attachment flat on the ground.**
- **Stop the engine.**

1. Lower the boom and put the attachment flat on the ground.

In muddy conditions or to prevent the attachment from freezing to the ground, put the attachment on planks or blocks before removing it from the machine.
2. Put the Travel Direction Control in NEUTRAL.
(See Travel Direction on Page 42)
3. Make sure the parking brake is engaged.
(See Parking Brake on Page 66)
4. Stop the engine and exit the machine.
(See Stopping The Engine And Leaving The Machine on Page 91)
5. Disconnect attachment electrical harness and hydraulic lines, if applicable, from the machine.
6. Enter the machine and perform the pre-starting procedure. (See Pre-starting Procedure on Page 84)
7. Start the engine.
(See Starting the Engine on Page 88)

Figure 170



8. Push and hold the hydraulic attachment lock switch (Item 1) [Figure 170] to retract the locking pins on the attachment carrier.
9. Tilt the attachment carrier forward until the attachment tube is disengaged. Move the machine backward away from the attachment.
10. Release the hydraulic attachment lock switch (Item 1) [Figure 170] to extend the locking pins.

OPERATING PROCEDURE

Longitudinal Load Moment Controller (LLMC)

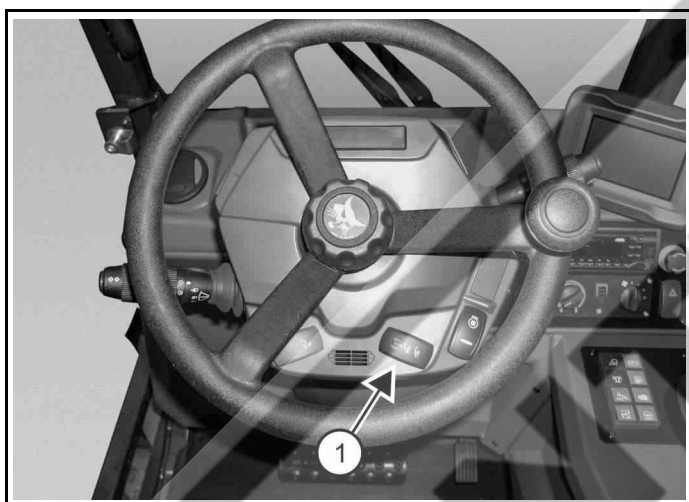
The LLMC limits the following movements when the machine stability level is critical:

- Lowering of the boom
- Extending the telescopic boom
- Forward tilt of attachment
- Backward tilt of attachment
- Auxiliary hydraulic functions.

Longitudinal Load Moment Controller (LLMC) Override Switch

The LLMC override switch should only be enabled when necessary and is automatically disabled after a running period of 60 seconds.

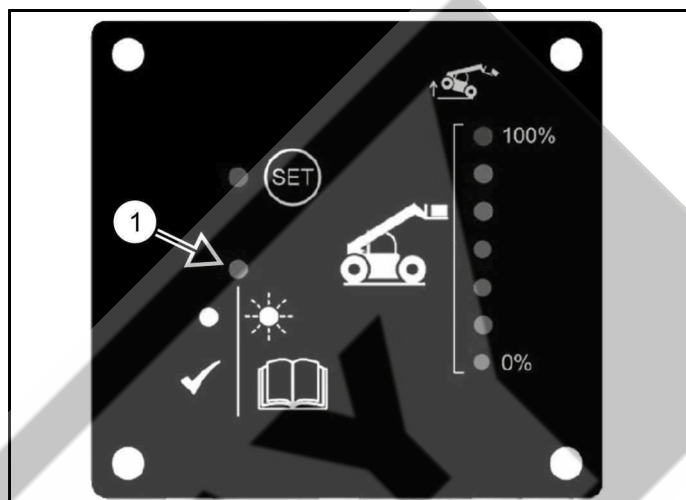
Figure 171



- Press the bottom of the LLMC override switch (Item 1) [Figure 171] to override the LLMC.

The control indicator light (ORANGE) (Item 1) [Figure 172] flashes when the LLMC override mode is activated.

Figure 172



The switch returns to the original position as soon as the switch is released. The LLMC will become active again.

Activating Cab Control Mode

- Move the LLMC override switch (Item 1) [Figure 171] to the middle position to select cab control mode for normal machine operation.

When the cab control mode is activated, the remote control (if equipped) is automatically deactivated.

Activating Remote Control Mode

- Press the top of the LLMC override switch (Item 1) [Figure 171] to select remote control mode and operate the machine with remote control (if equipped).

NOTE: The engine, if running, will stop.

Inspecting The Work Area

Before beginning operation, inspect the work area for unsafe conditions.

- Look for sharp drop-offs or rough terrain. Have underground utility lines (gas, electrical, water, sewer, irrigation, etc.) located and marked. Work slowly in areas of underground utilities.
- Remove objects or other construction material that could damage the machine or cause personal injury.
- Always check ground conditions before starting your work:

- Look for signs of instability such as cracks or settlement.
- Be aware of weather conditions that can affect ground stability.
- Check for adequate traction if working on a slope.
- Know and do not exceed the maximum weight capacity of the work areas and routes, especially when crossing or working on bridges.

Basic Operating Instructions

⚠ IMPORTANT

MACHINE DAMAGE

Machines warmed up with moderate engine speed and light load have longer life.†

†-2015

When operating on a public road or motorway, always follow local regulations. For example: A slow moving vehicle (SMV) sign, or direction signals may be required.

Run the engine at low idle speed to warm the engine and hydraulic system before operating the Telescopic Handler.

Noise at the operator position can be reduced by running the engine at low idle and closing the windows.

New operators must operate the Telescopic Handler in an open area without bystanders. Operate the controls until the Telescopic Handler can be handled at an efficient and safe rate for all conditions of the work area.

Solid tyres and water filled tyres are not authorised on these machines. Only tyres recommended in this Operation & Maintenance Manual are approved. Use of non approved tyres will void the warranty.

Visibility During Operation

The operator has to operate the machine according to the visibility diagram (See Visibility Diagrams on Page 322) provided in the Operator & Maintenance Manual. In case a suspended load or the boom prevents any visibility and creates a substantial blockage, the operator has to consider alternative carrying means.

Operating Near An Edge Or Water

Keep the machine as far back from the edge as possible and the wheels perpendicular to the edge so that if the edge collapses, the machine can be moved back.

Always move the machine back at any indication the edge can be unstable.

Operating On Slopes

⚠ WARNING

INSTABILITY HAZARD

Tipping or rollover can cause serious injury or death.

- Do not drive across or up slopes that are over 10 degrees to the side, or 25 degrees to the front.
- Do not drive down or back up slopes that exceed 25 degrees.
- Keep boom as low as possible when driving on slopes or in rough conditions.†

†W-2908

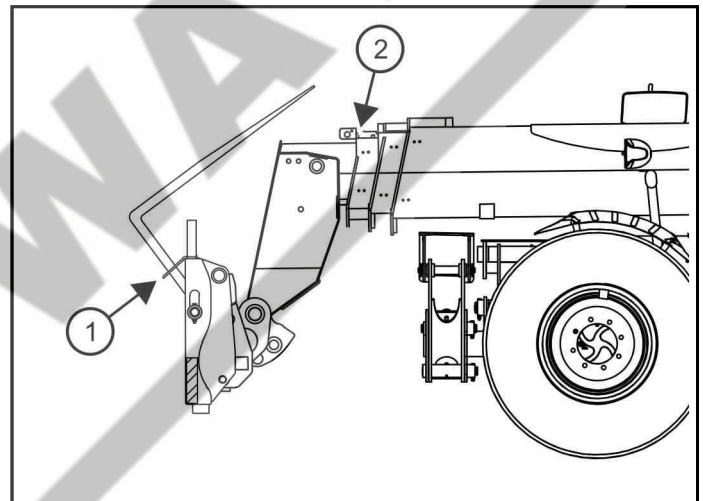
Drive slowly and do not travel on excessive slopes.

The above list of overturning hazards is not exhaustive.

Road Position

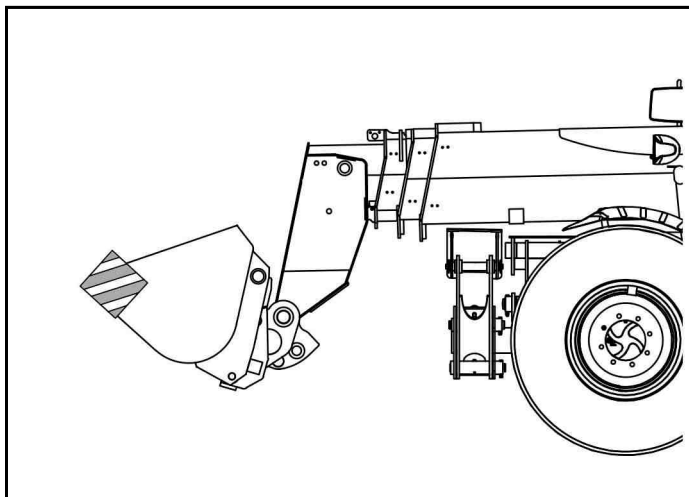
When travelling on the road, observe the recommended road position for the following attachments:

Figure 173



1. Floating pallet fork: put the attachment carrier in vertical position and tilt the forks back to avoid sharp edges in travel direction. Secure the forks to the guard with road lock brackets (Item 1). Tilt back the carrier and stop just before the forks contact the boom collar (Item 2) [Figure 173].

Figure 174



NA15040

2. 950 L (33.5 ft³) digging bucket: install bucket teeth protection [Figure 174].

Operating With A Full Bucket

⚠ WARNING

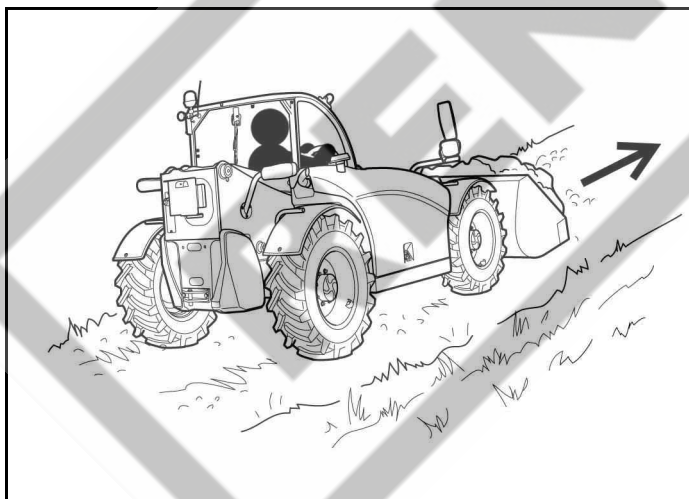
INSTABILITY HAZARD

Failure to obey warnings can cause the machine to tip or rollover and cause serious injury or death.

- Do not overload the machine.
- Keep the boom as low as possible.
- Do not travel or turn with the boom up.
- Turn on level ground and slow down when turning.
- Go up and down slopes, not across them.
- Keep the heavy end of the machine uphill. ◀

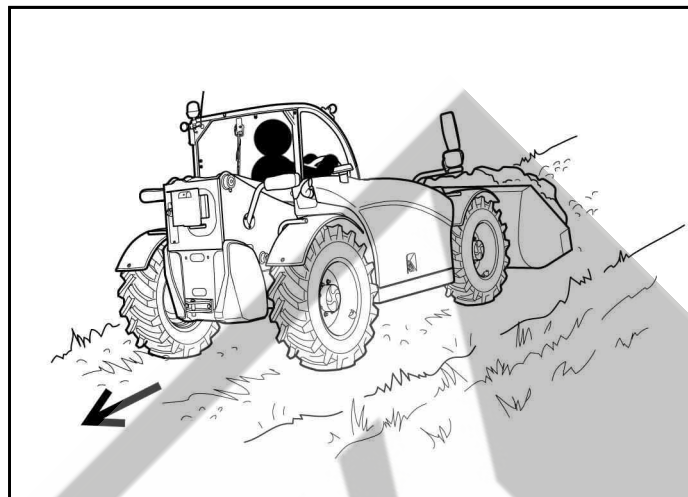
W-2650

Figure 175



NA24153

Figure 176

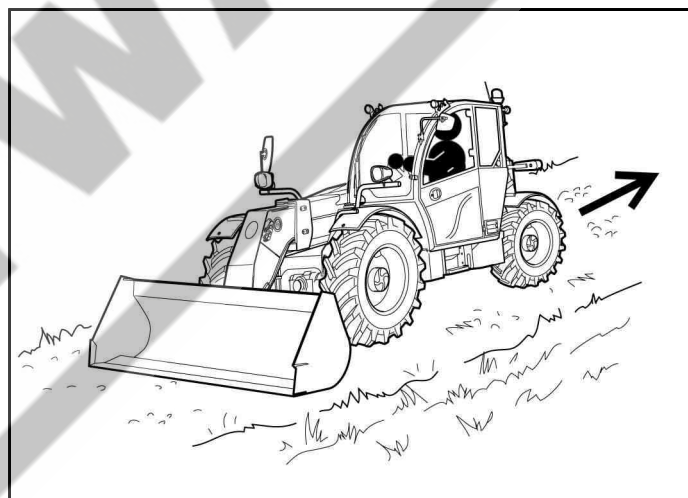


NA24154

- With a full bucket, go up or down the slope with the heavy end toward the top of the slope [Figure 175] and [Figure 176].

Operating With An Empty Bucket

Figure 177



NA24155

Figure 178



- With an empty bucket, go up or down the slope with the heavy end toward the top of the slope [Figure 177] and [Figure 178].

Filling And Emptying The Bucket

⚠ WARNING

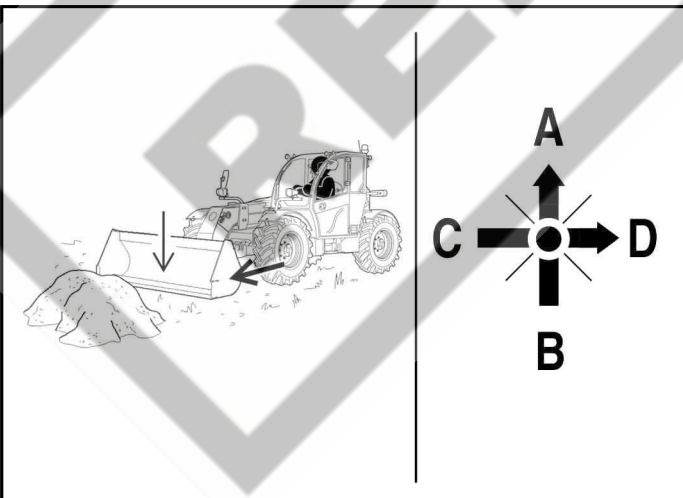
INSTABILITY AND CRUSHING HAZARD
Machine tip or rollover and falling objects can cause serious injury or death.

- Do not overfill the bucket.
- Do not exceed the rated load capacity shown on the Load Charts in the cab.
- Load, unload, and turn on flat level ground. ◀

Filling the Bucket

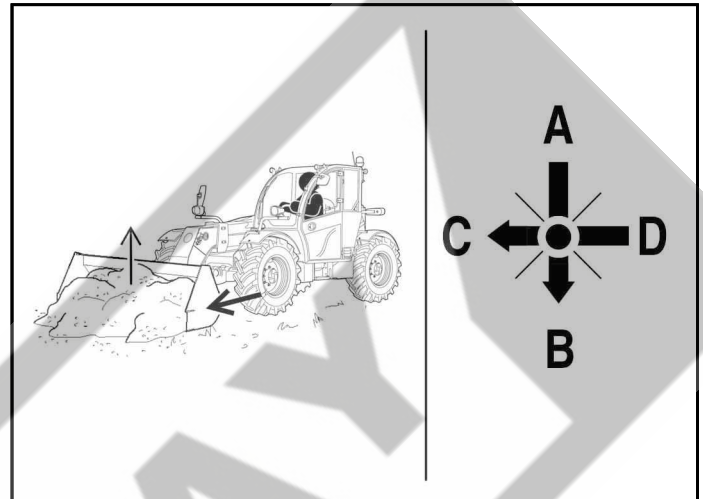
Always fully retract the boom during filling. To fill the bucket, the machine must be pushing with the centre of the bucket.

Figure 179



1. Lower the bucket (A) [Figure 179] until it slightly touches the ground.
2. Tilt the bucket forward (D) [Figure 179] until the cutting edge of the bucket is on the ground.

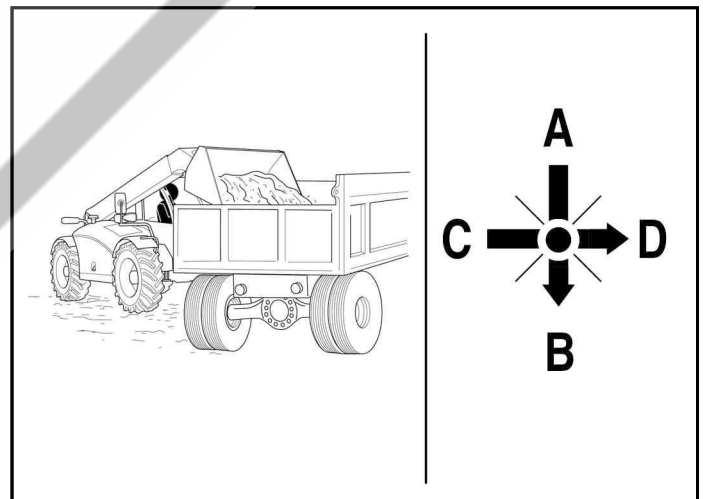
Figure 180



3. Drive slowly forward into the material.
4. Lift the boom (B) and tilt the bucket backward (C) [Figure 180] all the way when the bucket is full.
5. Drive backward away from the material.

Emptying the Bucket

Figure 181



1. Keep the bucket low and the boom retracted when moving to the area where you want to empty the bucket.
2. Raise the boom (B). If necessary, level the bucket (D) [Figure 181] while raising the boom to help prevent material from falling off the bucket.

3. Drive forward slowly until the bucket is over the top of the truck box or bin.
4. Tilt the bucket all the way forward (D) [Figure 181] to empty the bucket.

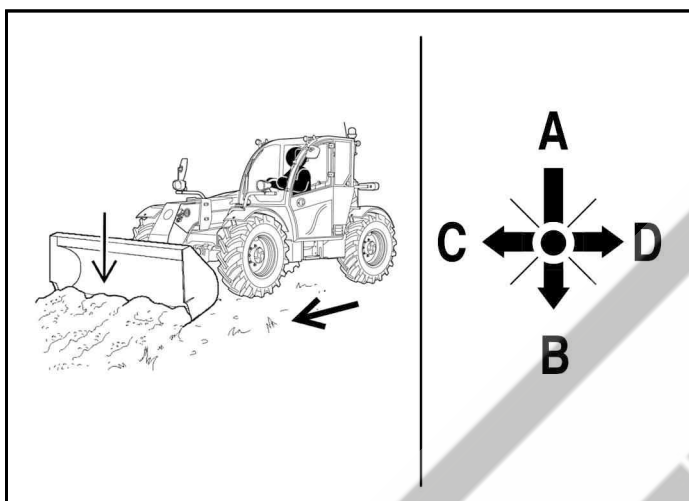
If all the material is near the side of the truck or bin, use the bucket tilt to move it to the other side.

Digging And Filling A Hole

Digging a Hole

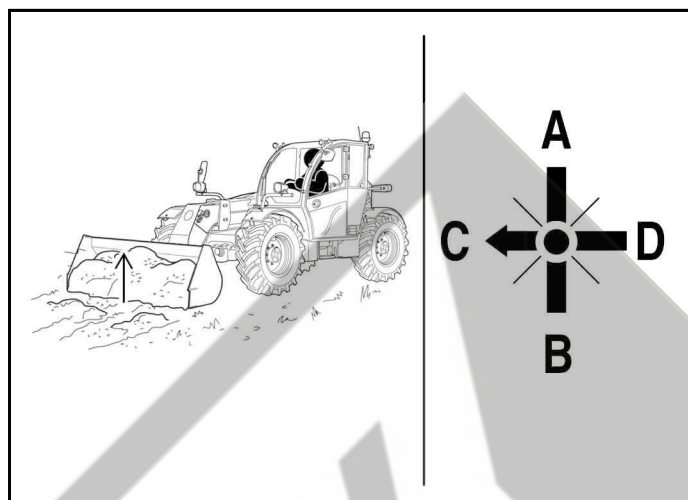
Always fully retract the boom during digging.

Figure 182



1. Lower the bucket until it slightly touches the ground (A). Put the cutting edge of the bucket on the ground (D) [Figure 182].
2. Drive forward slowly and continue to tilt the bucket down (D) [Figure 182] until it enters the ground.
3. Raise the cutting edge a small amount (C) [Figure 182] to increase traction and keep an even digging depth.
4. Continue to drive forward until the bucket is full. When the ground is hard, raise and lower the cutting edge of the bucket (D) [Figure 182] while driving forward slowly.

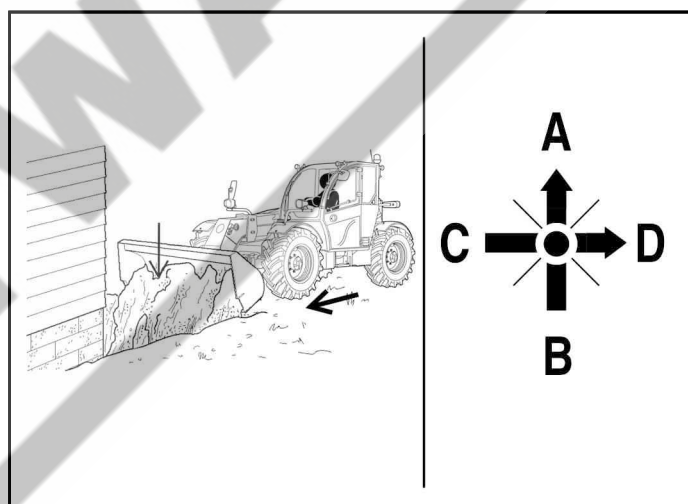
Figure 183



5. Tilt the bucket backward (C) [Figure 183] as far as it will go when the bucket is full.

Filling a Hole

Figure 184



1. Lower the boom (A) and put the cutting edge of the bucket on the ground (D) [Figure 184]. Drive forward to the edge of the hole to push the material into the hole.
2. Tilt the bucket forward (D) [Figure 184] as soon as it is past the edge of the hole.
3. If necessary, raise the boom to empty the bucket.

Using Frame-Leveling

WARNING

INSTABILITY HAZARD

Rapid starting and stopping of frame motion with a raised load can cause the machine to tip leading to serious injury or death.

- Level the frame before the load is raised. Use the sight level gauge to determine when the frame is level.
- **DO NOT** use the frame levelling function when the load is raised. ◀

W-2493

Frame-leveling feature allows to adjust the frame level to a flat angle when the telescopic handler is on a slope.

Figure 185



C212221a

The switch is located behind the joystick. Press the switch to the left (Item 1) to tilt the frame to the left; press the switch to the right (Item 2) [Figure 185] to tilt right.

The stabilizers can be used in addition to the frame-leveling feature in order to adjust the frame angle close to 0 degrees, so to an horizontal working plan.

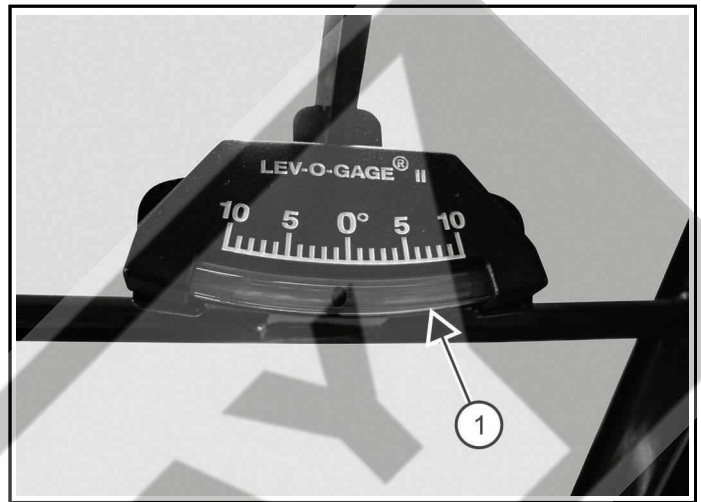
NOTE: Depending on the longitudinal stability level the frame-leveling function can be disabled.
(See Longitudinal Load Moment Indicator (LLMI) on Page 47)

Regardless the longitudinal stability level the frame-leveling (right or left) can be disabled depending on the frame and boom angles:

- With the boom angle below 5 degrees, frame leveling can be used at fast speed.
- With the boom angle between 5 degrees to 50 degrees, the frame angle can be adjusted between 4 degrees left to 4 degrees right at safety speed.
- With the boom angle over 50 degrees, the frame angle can be adjusted between 2 degrees left to 2 degrees right.

Besides the conditions listed above, the frame-leveling feature and any function that could result to get out them are independently disabled (e.g. frame-leveling left or right functions can be independently disabled...)

Figure 186



C209026a

There is a sight level gauge (Item 1) [Figure 186] in the upper right corner of the front of the cab to see the frame angle.

Using Stabilisers

WARNING

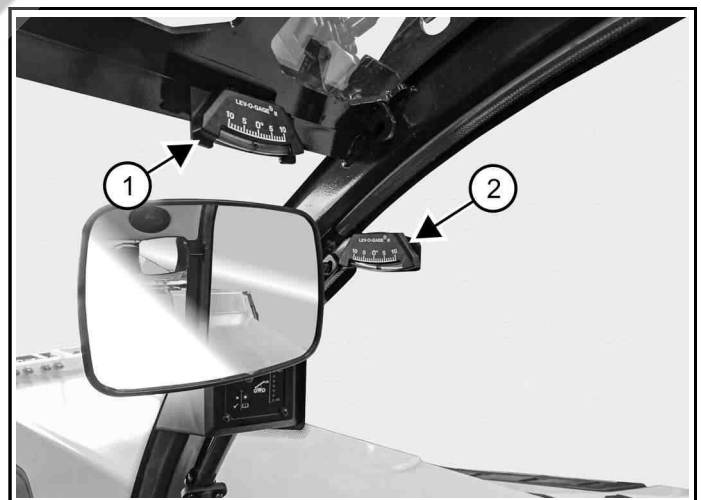
INSTABILITY HAZARD

Rapid starting and stopping of frame motion with a raised load can cause the machine to tip leading to serious injury or death.

- Level the frame before the load is lifted. Watch the sight gauge to determine when the frame is level.
- **DO NOT** use the stabilisers when the load is raised. ◀

W-2529

Figure 187



C212222a

Fully retract and lower the boom before using the stabilisers.

The frame-levelling feature can be used in addition to the stabilisers in order to adjust the frame angle (Item 1) [Figure 187] close to 0 degrees, so to an horizontal working plan.

For machines equipped with the man platform option, there is a second sight level gauge (Item 2) [Figure 187] in the upper right corner of the front of the cab to see the longitudinal frame angle.

NOTE: Depending on the frame levelling angle (See Using Frame-Leveling on Page 117) and the longitudinal stability level the stabiliser function can be disabled. (See Longitudinal Load Moment Indicator (LLMI) on Page 47)

Regardless the longitudinal stability level the stabiliser right or left can be disabled depending on frame angle, boom angle and boom extension.

When stabilisers are not used, the boom can be raised to a maximum of 64 degrees.

Boom Fully Retracted

The stabiliser feature is fully enabled and the stabilisers can be raised and lowered.

Boom Extended

- With the boom angle at 5 degrees or less the stabiliser feature is fully enabled and the stabilisers can be raised and lowered.
- With the boom angle between 5 degrees to 15 degrees the stabiliser feature is partially disabled and the stabilisers can only be lowered.
- With the boom angle above 15 degrees the stabiliser feature is disabled.

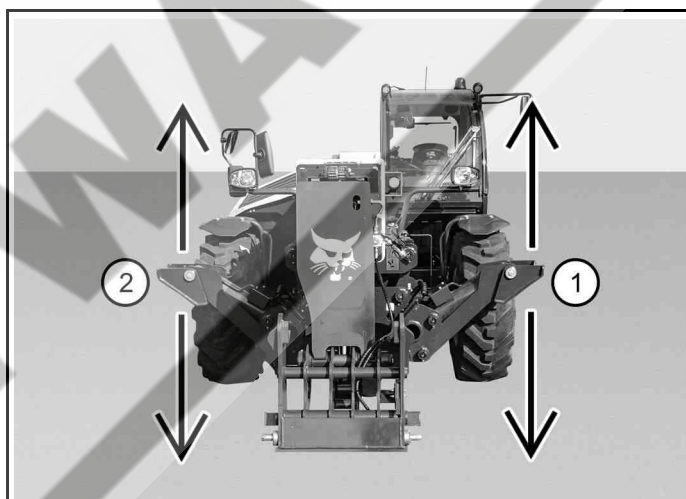
Besides the conditions listed above, the stabiliser feature and any function that could result to get out them are independently disabled.

Operating The Stabilizers

Figure 188



Figure 189



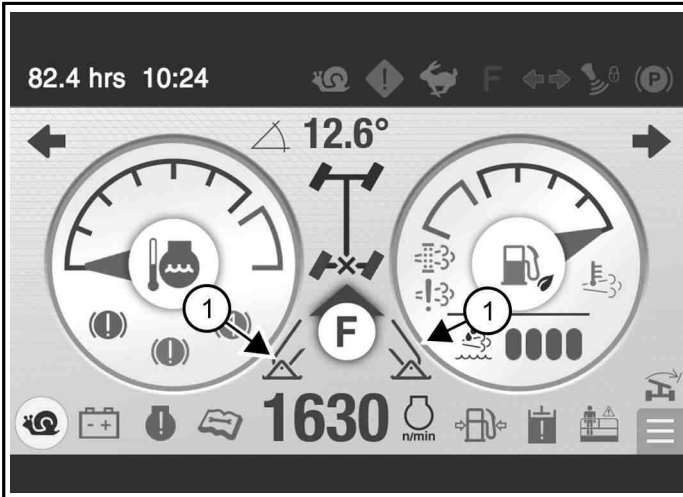
Left Stabilizer (Item 1) [Figure 189]

- Press the bottom of the left stabilizer switch (Item 1) [Figure 188] to lower the left stabilizer.
- Press the top of the left stabilizer switch (Item 1) [Figure 188] to raise the left stabilizer.

Right Stabilizer (Item 2) [Figure 189]

- Press the bottom of the right stabilizer switch (Item 1) [Figure 188] to lower the right stabilizer.
- Press the top of the right stabilizer switch (Item 1) [Figure 188] to raise the right stabilizer.

Figure 190



Left and / or right stabilizer down icons (Item 1) [Figure 190] will show on the display when the left and / or right stabilizers are on the ground.

Raising A Load And Extending The Boom

⚠ WARNING

CRUSHING HAZARD

Falling load can cause serious injury or death.

- Never go under or reach under raised load.
- Never move a load over other personnel. ◀

W-2851

⚠ DANGER

EXPLOSION AND ELECTROCUTION HAZARDS

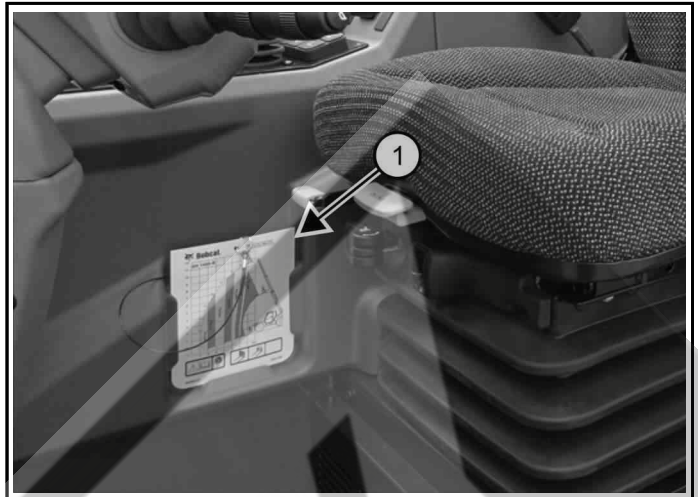
Contact with high voltage electricity will cause death, serious injury, or property damage.

- Check the work area for overhead or exposed electrical power lines.
- Keep a safe distance from energised electrical power lines. Maintain at least 3m (10 ft) from high voltage electrical sources. Great distances may be required depending on voltage levels or environmental conditions.
- Follow all local rules and regulations regarding working near energised electrical power lines. ◀

D-1051

1. Perform the pre-starting procedure before using the machine. (See Pre-starting Procedure on Page 84)

Figure 191



2. Read and understand the load capacity charts (Item 1) [Figure 191] to learn the rated load capacity at different extension and heights of the telescoping boom.

Use only attachments that are approved for this machine. All approved attachments must be shown in the load capacity charts. Contact your dealer if an approved attachment is not illustrated in the charts.

Use only approved tyres at correct pressure for this machine. All four tyres must be the same type.

3. Move the machine to the load to be lifted.
4. Make sure that the machine is on level ground. (See Sight Level Gauge on Page 52)
5. Be sure the load is centred on the attachment. Fasten the load to the attachment if load can shift.
6. Raise the boom slightly to clear the ground and tilt the attachment back.
7. Start slowly and drive the machine with the load as low as possible.
8. Stop the machine on flat, solid and level ground. Put the Travel Direction Control in NEUTRAL and make sure the parking brake is engaged before raising or extending the boom.
9. Slowly raise and extend the boom to put the load in the desired location. DO NOT DRIVE THE MACHINE WITH THE LOAD RAISED.
10. Place the load, then retract and lower the boom.
11. Slowly move the machine backward.

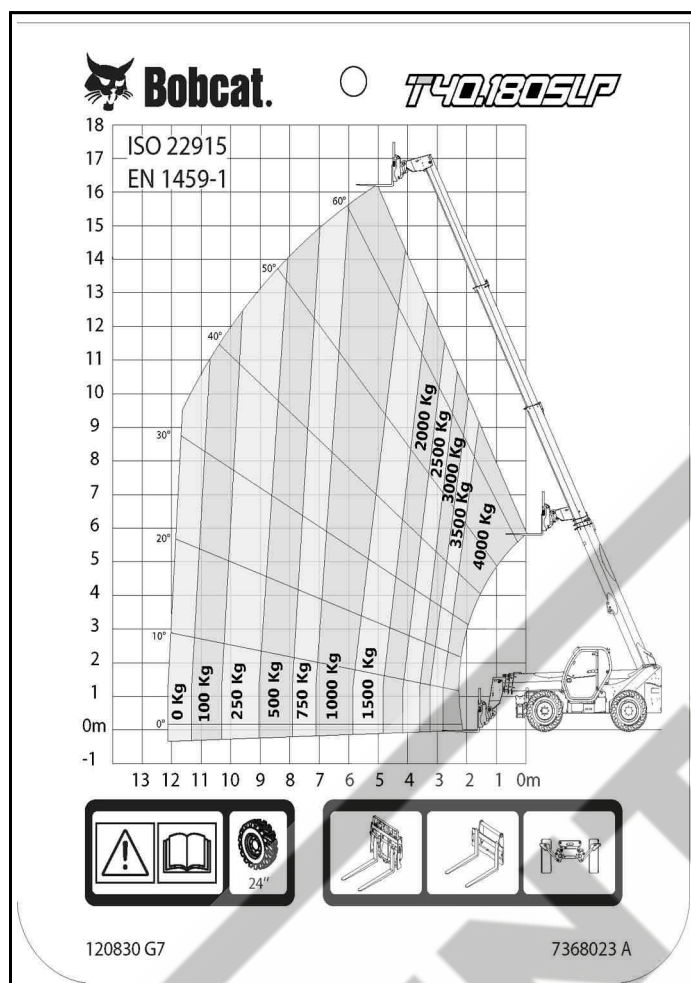
Load Capacity Charts

The load capacity charts are designed with the machine on flat, level ground. If the machine is positioned up or down a slope, the values of the load capacity chart will no

longer be accurate. Always lift and extend the boom when the machine is on flat, level and solid ground.

NOTE: When the boom is fully retracted, the machine will lift more weight than when extended.

Figure 192

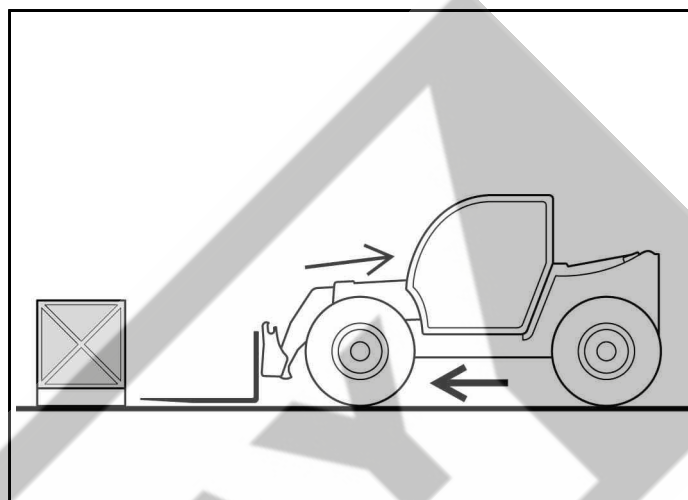


1. Always lift the load first; then extend the boom as needed, staying within the Rated Load Capacity for the height and extension.
2. Place the load, then retract and lower the boom.

Handling Loads With Pallet Fork

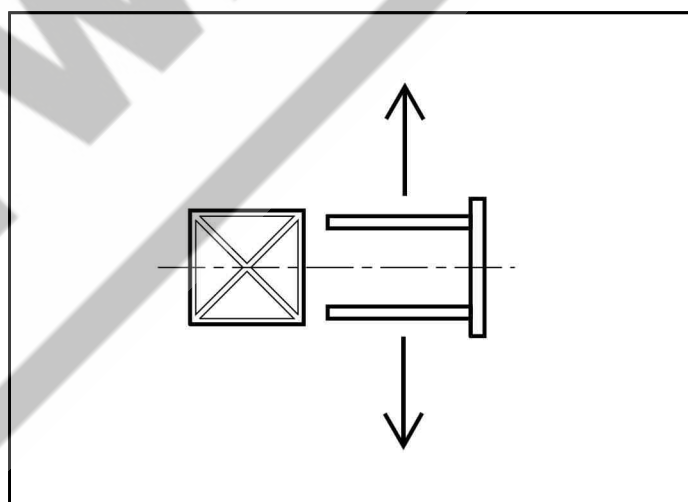
Picking Up A Load From The Ground With Pallet Fork

Figure 193



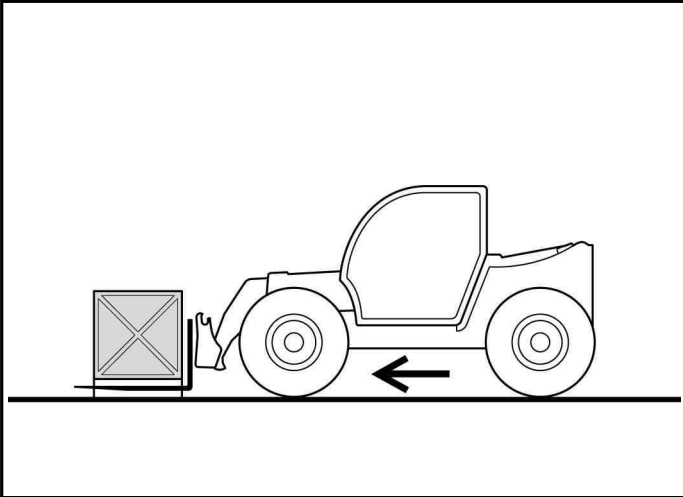
1. Move the machine perpendicular to the load with the boom fully retracted and the pallet fork parallel to the ground [Figure 193].

Figure 194



2. Adjust the pallet fork clearance and their centering in relation to the load [Figure 194].
3. Adjust the height of the pallet fork so that they can slide under the load [Figure 195].

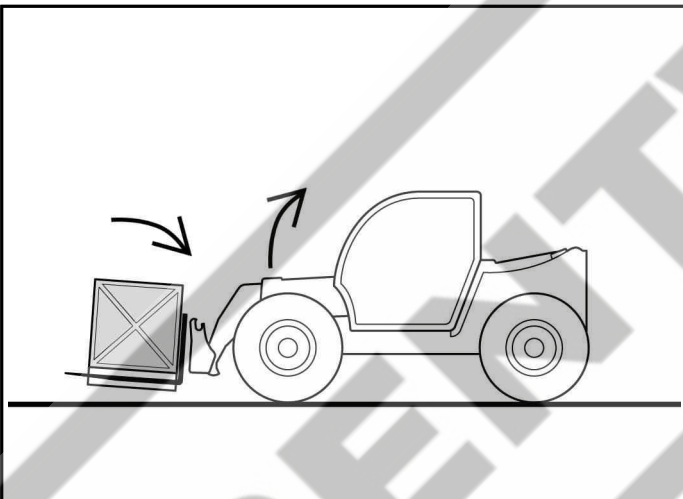
Figure 195



EMB013

4. Move the machine forward or extend the boom to bring the heel of the pallet fork in contact with the load .
5. Put the Travel Direction Control in NEUTRAL and make sure the parking brake is engaged.

Figure 196

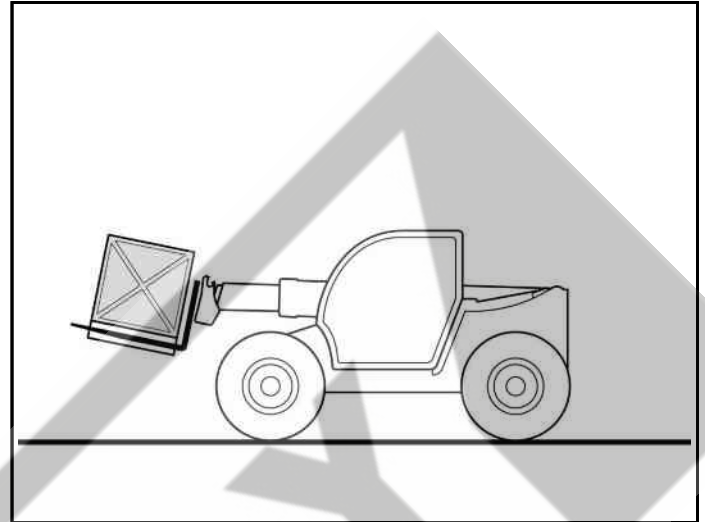


EMB014

6. Raise the boom so that the ground clearance under the pallet fork is approximately 300 mm (12 in), tilt the forks fully backward and retract the boom fully. The machine is now in transport position [Figure 196].

Placing A Load On The Ground With Pallet Fork

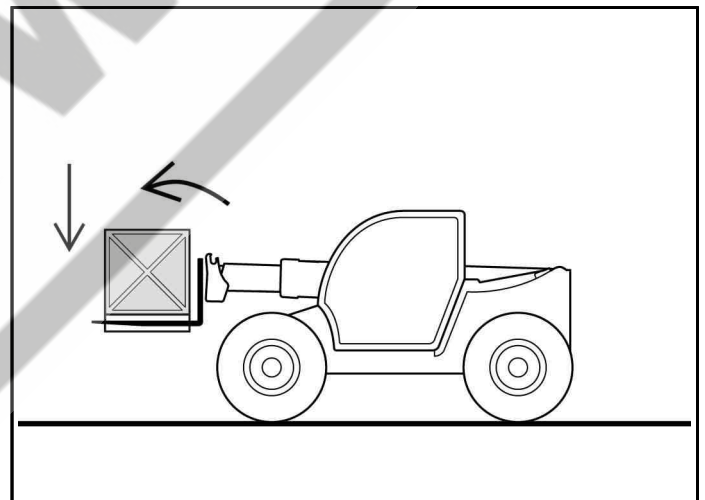
Figure 197



EMB019

1. Move the load into the position where it is to be placed [Figure 197].
2. Tilt the pallet fork into a position parallel to the ground [Figure 198].

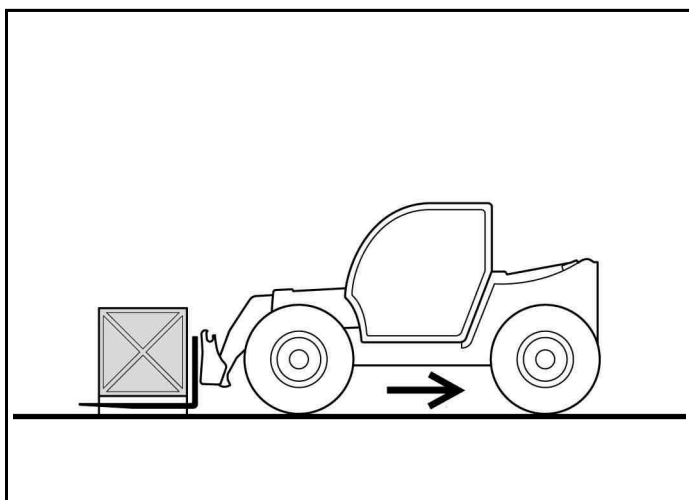
Figure 198



EMB020

3. Lower the load until it is resting on the ground and the pallet fork are no longer in contact with the load [Figure 198].

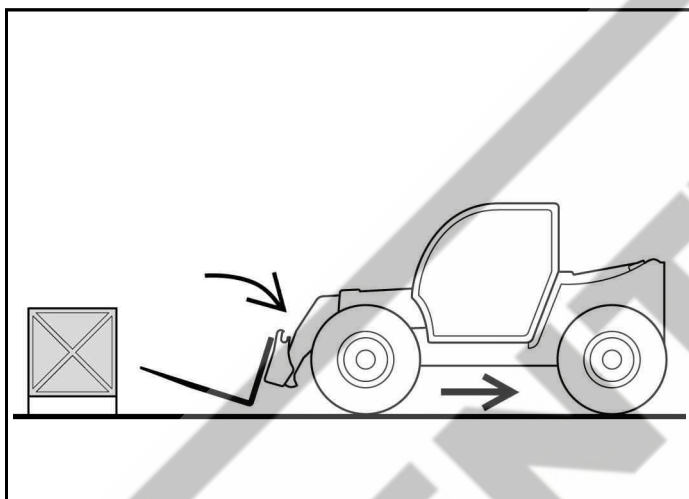
Figure 199



EM8021

4. Move the machine back in order to release the pallet fork from the load completely [Figure 199].

Figure 200



EM8022

5. Return the boom and the pallet fork to the transport position [Figure 200].

Picking Up A Raised Load With Pallet Fork

WARNING

CRUSHING HAZARD

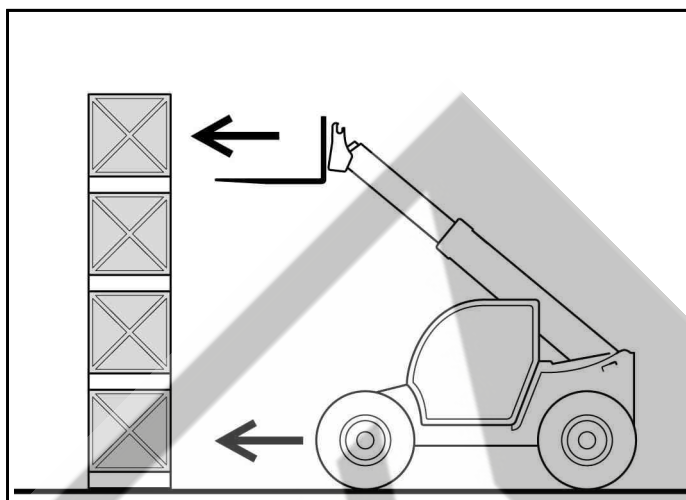
Falling load can cause serious injury or death.

- **Never go under or reach under raised load.**
- **Never move a load over other personnel.**

W-2851

1. Before starting this manoeuvre, make sure that the pallet fork can easily slide under the load and that their clearance and centering in relation to the load is correct.

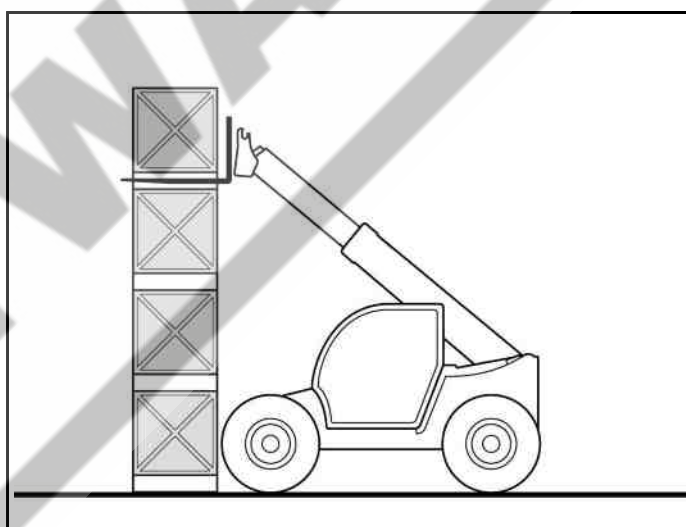
Figure 201



EM8015

2. Move the machine perpendicular to the load with the pallet fork horizontal at the height of the load [Figure 201].

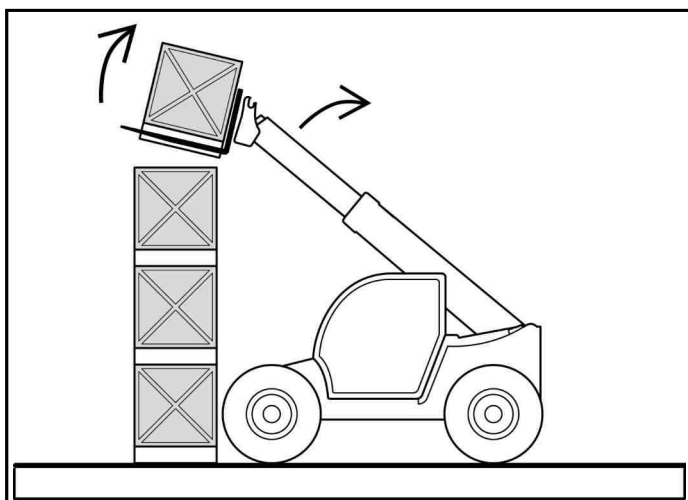
Figure 202



EM8016

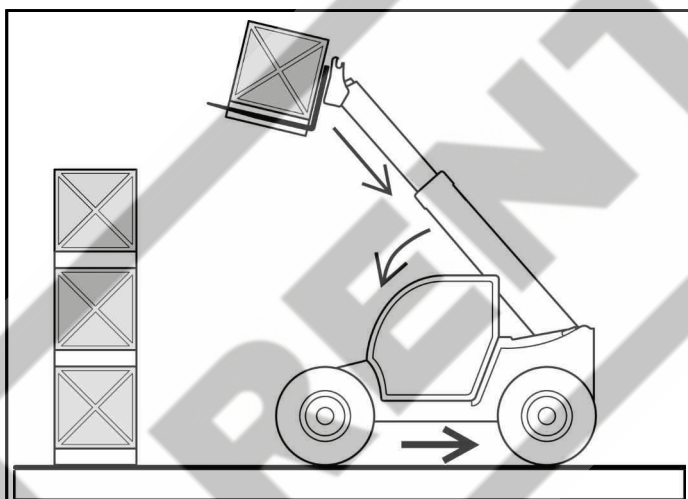
3. Move the machine forward as slowly as possible until the heel of the pallet fork is in contact with the load [Figure 202].
4. Put the Travel Direction Control into NEUTRAL and make sure the parking brake is engaged.

Figure 203



5. Raise the boom slightly and tilt the pallet fork partially backward to stabilise the load [Figure 203].
6. Put the Travel Direction Control in REVERSE and release the parking brake.
7. Move the machine back as slowly as possible so as to release the load on top of the stack, in such a way that the boom can be lowered without the load touching the pile [Figure 204].
8. Retract the boom fully. (See on Page 123)

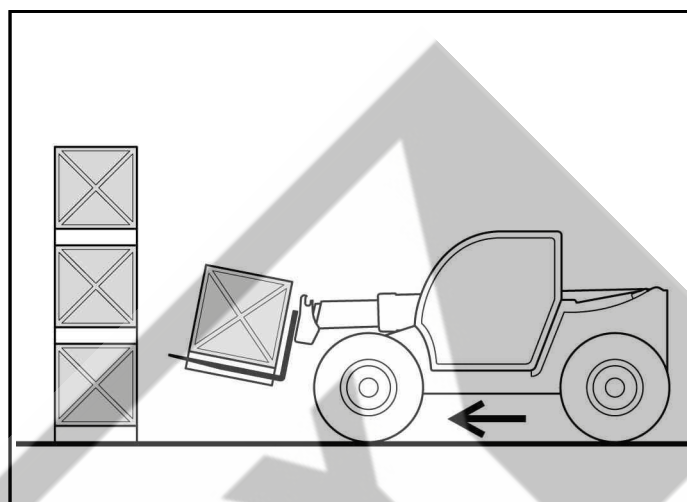
Figure 204



9. Lower the boom until the ground clearance under the pallet fork is approximately 300 mm (12 in), then tilt the fork fully backward. The machine is now in transport position [Figure 204].

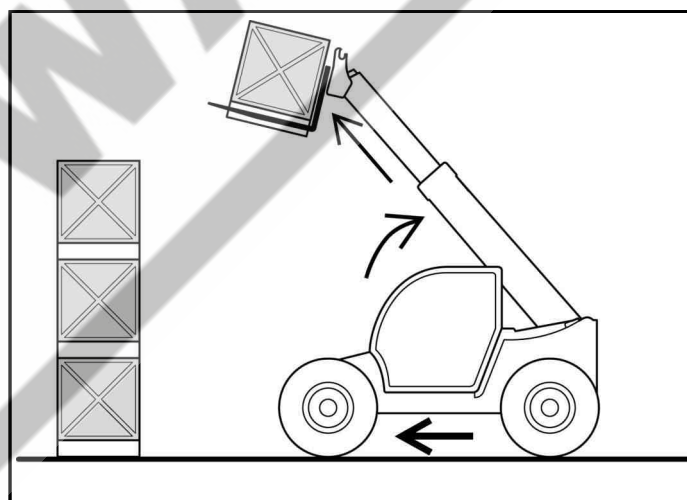
Placing A Raised Load With Pallet Fork

Figure 205



1. With the machine in transport position, move the load closer to the stack and into the position where it is to be placed [Figure 205].

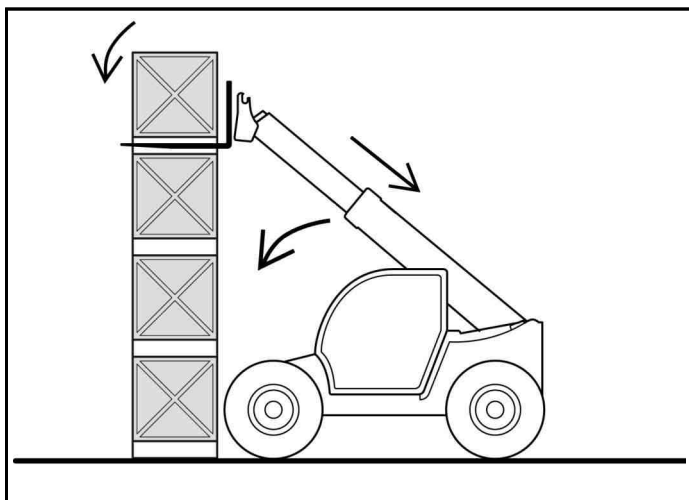
Figure 206



2. Raise the boom, then extend it to place the load above the stack. If necessary, move the machine forward [Figure 206].
3. Put the Travel Direction Control into NEUTRAL and make sure the parking brake is engaged.
4. Tilt the load into a horizontal position [Figure 207].
5. Place the load down on the stack by lowering and retracting the boom [Figure 207].
6. Once the load has been placed down, release the pallet fork so that they are no longer in contact with the load using short, successive boom lowering and retracting manoeuvres.

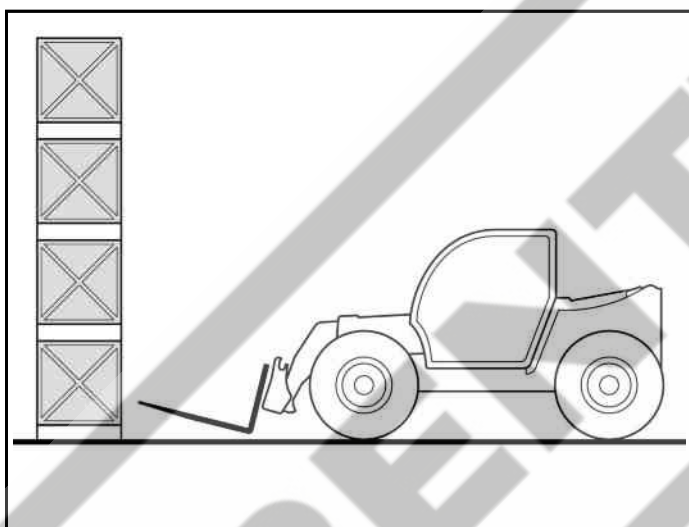
7. Put the Travel Direction Control in REVERSE and release the parking brake.

Figure 207



8. Move the machine back as slowly as possible so as to release the pallet fork from the load completely [Figure 207].

Figure 208

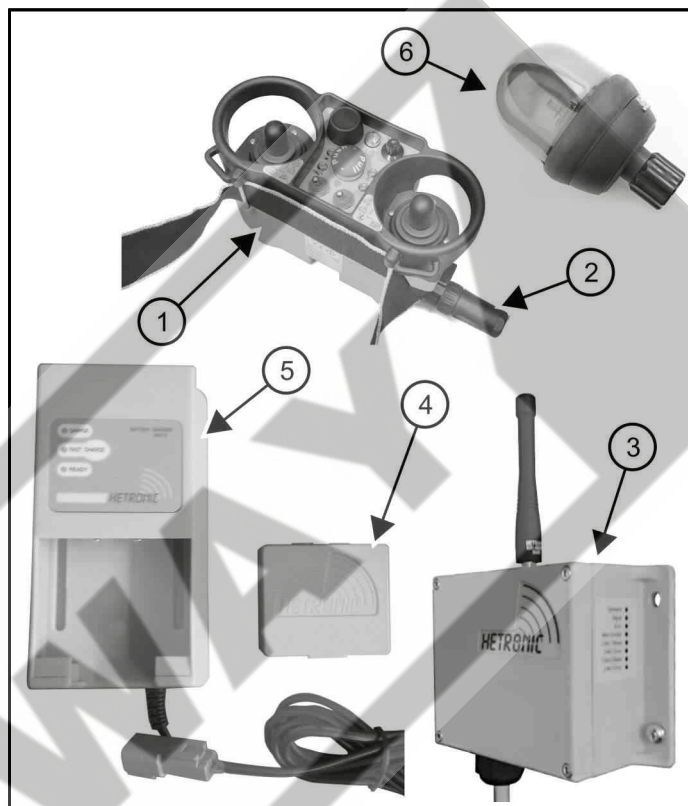


9. Return the boom and fork to transport position [Figure 208].

Remote Control

Remote Control Components

Figure 209

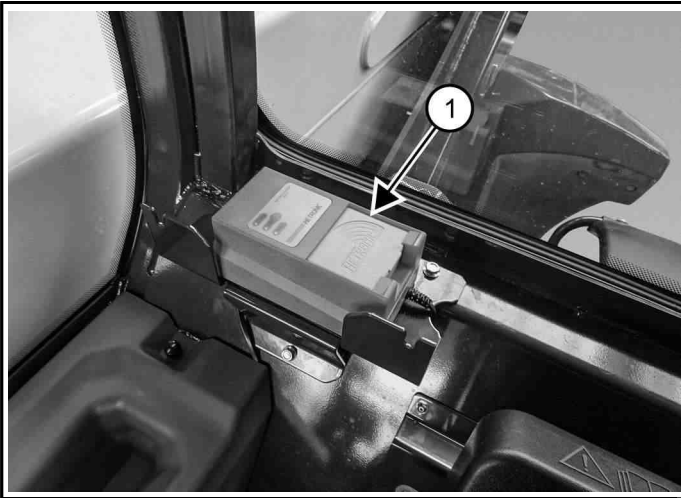


The remote control installation (if equipped) consists of the following components [Figure 209]:

- Remote control transmitter (Item 1);
- Remote shunt (Item 2);
- Remote control receiver (Item 3);
- Battery (Item 4);
- Battery charger (Item 5);
- Rotating beacon (Item 6).

Battery Charger

Figure 210

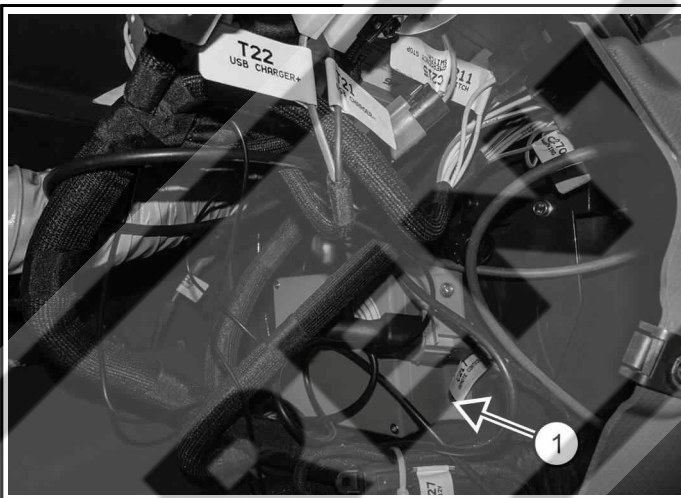


The battery charger (Item 1) [Figure 210] is located in the cab of the telescopic handler and can recharge one of the transmitter's two batteries while the other one is in use.

NOTE: Use only approved batteries. DO NOT modify the connection of the batteries.

Remote Control Receiver

Figure 211



The remote control receiver (Item 1) [Figure 211] is located in the cab of the telescopic handler, under the dashboard. An aerial is incorporated into the interior of the box.

NOTE: DO NOT modify the position or the electrical connections of the aerial.

Rotating Beacon

The rotating beacon is located on top of the operator cab.

Remote Control Daily Inspection

- Check rotating beacon for proper operation.
- Install fully charged battery in the remote control transmitter.
- Check second battery is placed in battery charger.
- Check remote control transmitter and receiver are in good condition.
- Check remote control for proper operation.

Operating the Machine with Remote Control

⚠ WARNING

CRUSHING HAZARD

Lowering of attachment, falling loads or falling off attachment can cause serious injury or death.

- Do not use as a manlift or work platform.
- No riders.
- Keep away from raised boom and attachment.
- Keep bystanders away.

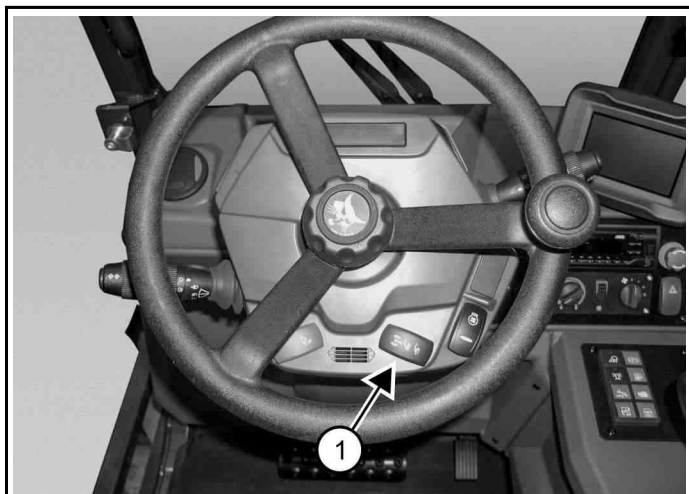
When operating the machine with the remote control:

- Activate rotating beacon.
- Keep direct visibility of the boom and load.
- Operate at a maximum distance of 100 m (328 ft) from the machine.
- Use fully charged battery.
- A fast beep at the transmitter indicates that the battery is low.
- LLMC override mode is disabled.
- Transmission and stabiliser features are disabled.
- Frame-leveling, boom and carrier features can only be operated from the remote control (joystick features from the cab disabled).

Connecting The Remote Control

1. Put the Travel Direction Control in neutral. (See Travel Direction on Page 42) Make sure the parking brake is engaged. (See Parking Brake on Page 66)
2. Stop the engine. (See Stopping The Engine And Leaving The Machine on Page 91)

Figure 212

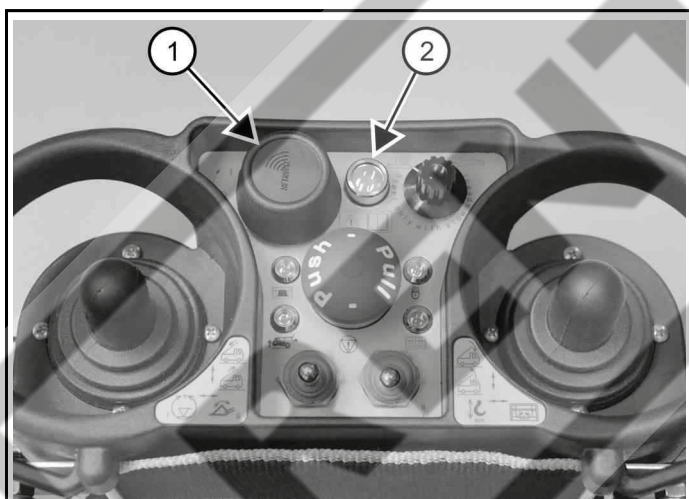


3. Press the top of the LLMC override switch (Item 1) [Figure 212] to select remote control mode and operate the machine with remote control.

NOTE: The engine, if running, will stop.

4. Exit the machine.
(See Stopping The Engine And Leaving The Machine on Page 91)
5. Plug the remote shunt (Item 2) [Figure 209] into the 7- pins connector at the right side of the transmitter.

Figure 213

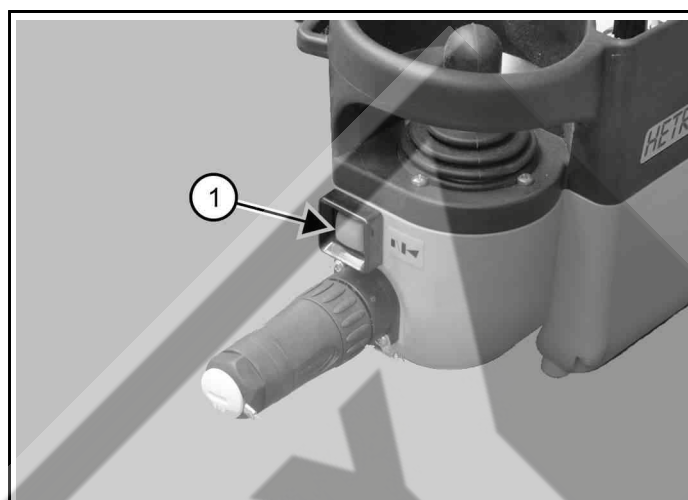


6. Turn the transmitter ON/OFF switch (Item 1) [Figure 213] clockwise to turn the transmitter on. This will also power on the machine (only if the cab key switch is in OFF position).

The indicator light (Item 2) [Figure 213] will flash when the remote control is ready to be connected with the receiver. The light will flash fast when the Emergency Stop switch is pressed.

Activating Remote Control

Figure 214



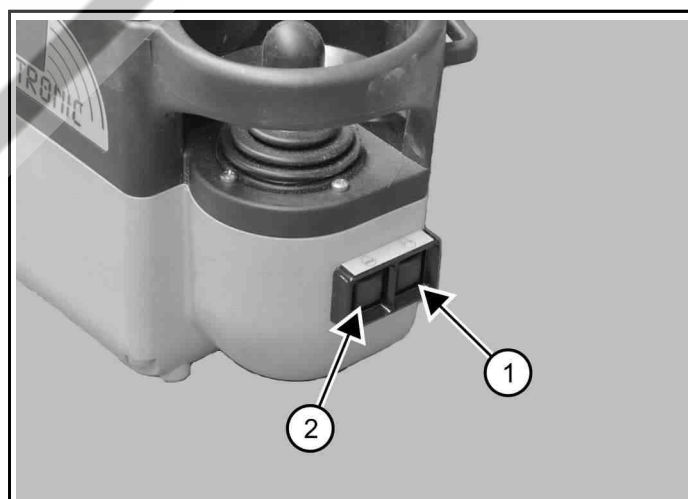
7. Press the green horn button (Item 1) [Figure 214] at the right side of the transmitter, to activate the control of the telescopic handler by the remote control.
8. Press the green horn button (Item 1) [Figure 214] for one full second in order to allow for engine cranking with the remote control within the next 60 seconds.

The machine alarm sounds for as long as the green horn button (Item 1)[Figure 214] is pressed.

Starting and Stopping The Engine With The Remote Control

9. Before starting the engine with the remote control, activate the remote control

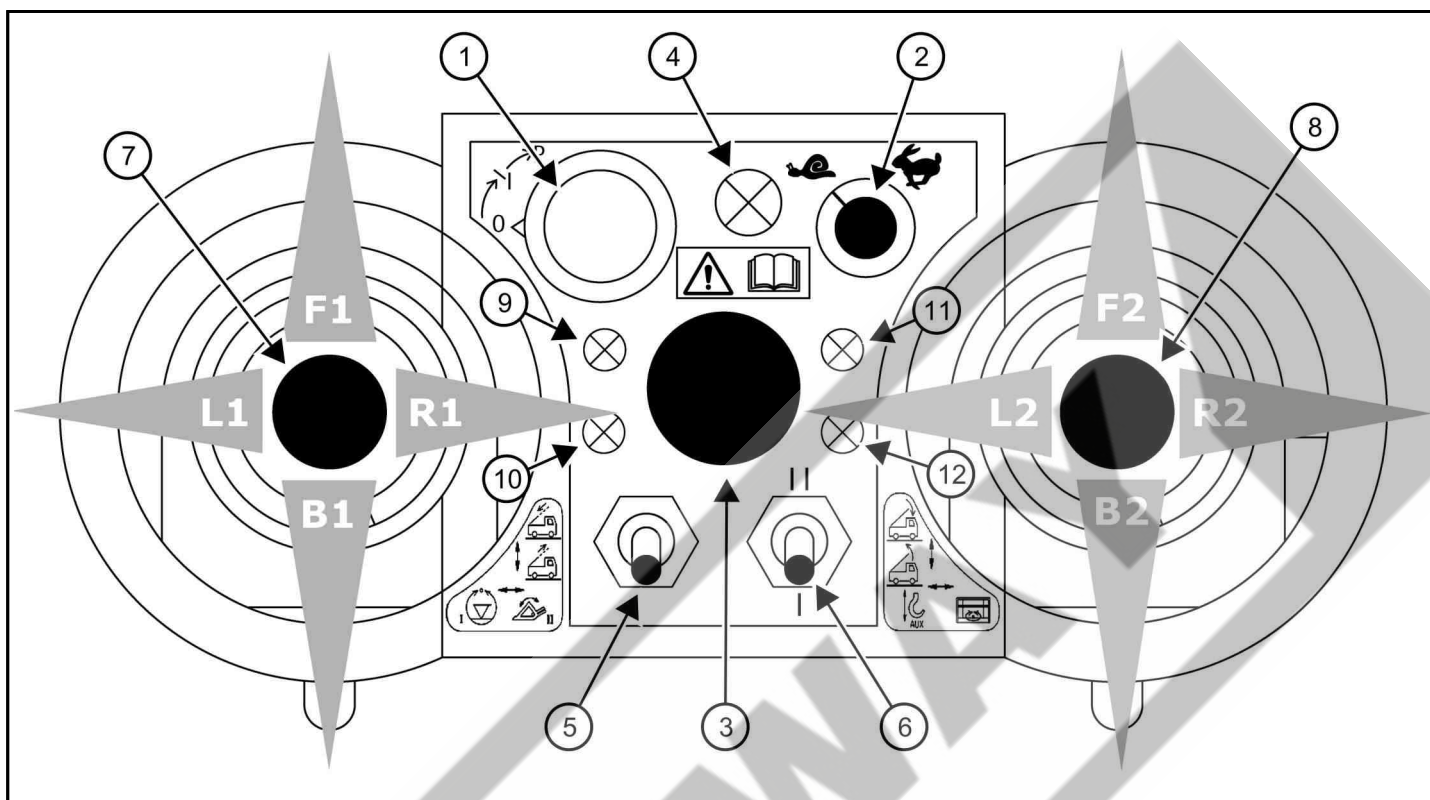
Figure 215



10. Press the engine start button (Item 1) [Figure 215] at the left side of the transmitter, to start the engine.
11. Press the engine stop button (Item 2) [Figure 215] at the left side of the transmitter, to stop the engine.

Remote Control Identification

Figure 216



S41697b

REF.	DESCRIPTION	FUNCTION
1	ON / OFF Switch	This is a rotary key switch. There are two fixed positions: • Turned counterclockwise: position '0': transmitter switched OFF and engine stopped. • Turned clockwise: position '1': transmitter switched ON and machine power ON. Pull to remove the key if needed.
2	Speed Switch	To select boom movement speed: • Snail: Slow Speed • Rabbit: Fast Speed
3	Emergency stop switch	Push in case of emergency. This switch has two fixed positions: • Pushed downwards: emergency stop is activated, i.e. the engine is stopped, the transmitter is switched off and the remote connection is interrupted. • Pulled upwards: normal transmitter operation. After the emergency stop has been activated, the start-up procedure must be redone.

REF.	DESCRIPTION	FUNCTION
4	Indicator light (Green Light)	Indicates the connection status: - The light is flashing: remote control is ready to be connected to the receiver. - The light is not flashing: not connected to the receiver. This light is flashing fast in case the emergency stop switch is activated.
5	LLMC override switch	Not used
6	I / II switch (function selection)	This switch allows the operator to select which movement is controlled by the Left Lever (L1 / R1): I: Frame Levelling II: Carrier Tilting
7	Left lever	This lever is bi-directional and returns to neutral when released. The movements are proportionally controlled: - Pushed forward (F1): retracts the boom. - Pushed backward (B1): extends the boom. - Pushed to the left (L1): control frame levelling (toward the right) OR tilting backward, depending on position of the function selection switch. - Pushed to the right (R1): control frame levelling (toward the left) OR tilting forward, depending on position of the function selection switch. When this lever is in use, engine speed increases to 1200 revolutions per minute (rpm).
8	Right lever	This lever is bi-directional and returns to neutral when released. The movements are proportionally controlled: - Pushed forward (F2): lowers the boom. - Pushed backward (B2): raises the boom. - Pushed to the left (L2): controls the function of the Front Auxiliary Hydraulics. - Pushed to the right (R2): controls the function of the Front Auxiliary Hydraulics. When this lever is in use, engine speed increases to 1200 rpm.
9	Man Platform Overload LED (Red Light)	Not used.
10	LLMC status LED (Red Light)	- Flashing light and internal warning horn: the LLMC warning zone is reached. - Continuous light and internal warning horn: the LLMC critical zone is reached. For more information (See Longitudinal Load Moment Indicator (LLMI) on Page 47)
11	Interlocking Pin status LED (Red Light)	Not used.
12	Man Platform Mode LED (Orange Light)	Will flash slowly when there is a "Remote Mode Error". (See Service Codes List - Workgroup Controller on Page 300)

Hydraulic Safety Group

Hydraulic Safety Group Description

Each machine with optional man platform is equipped with a hydraulic safety group.

In case of engine or hydraulic power failure, the hydraulic safety group allows the boom to be retracted and lowered by a person on the ground.

Hydraulic Safety Group Components

Figure 217

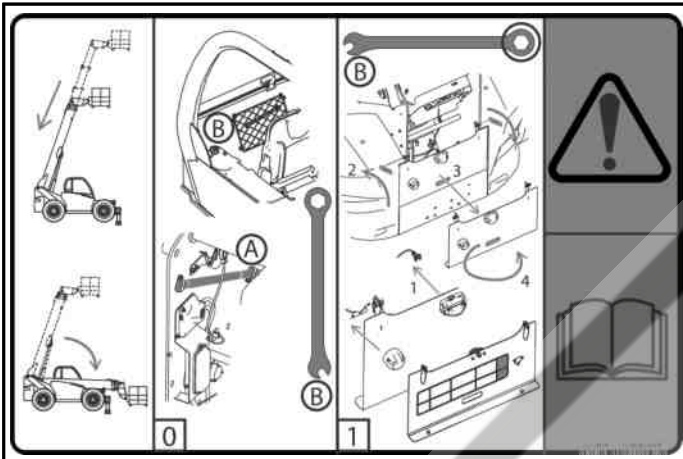
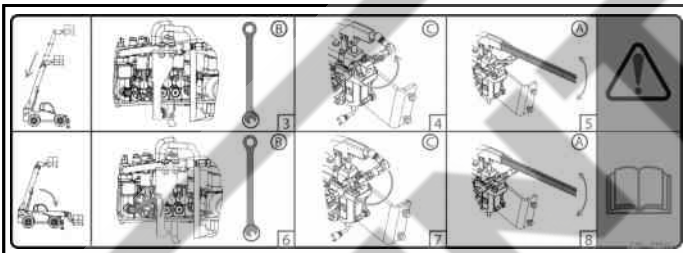


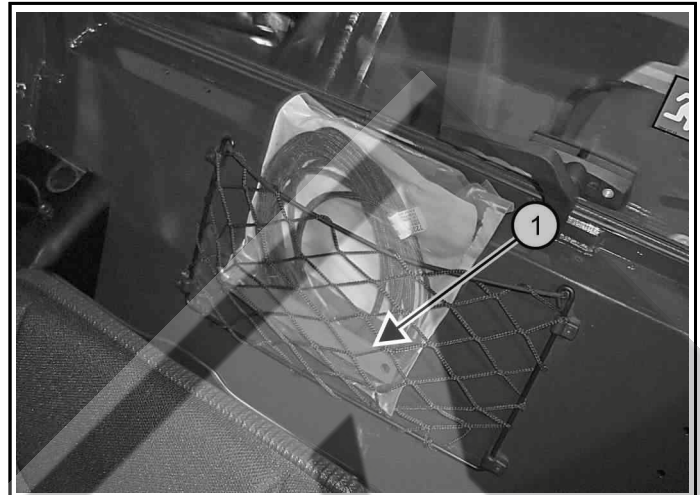
Figure 218



On the machine, the safety group components and procedure are described by means of two no-text decals:

- The hydraulic safety group decal (Item 1) [Figure 217] is located at the back of the operator cab.
- The hydraulic safety group operation decal (Item 2) with further instructions, is located at the inside of the rear cover. [Figure 218]

Figure 219



The wrench (Item 1) [Figure 219] is located in the storage area behind the operator seat.

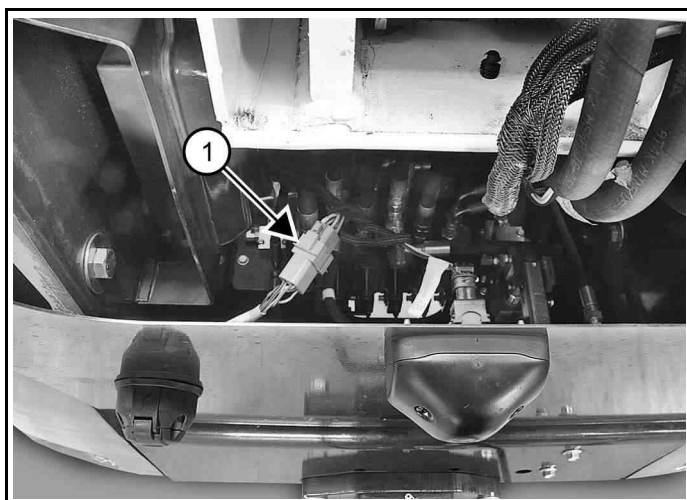
Figure 220



The lever (Item 1) [Figure 220] is located at the back of the machine.

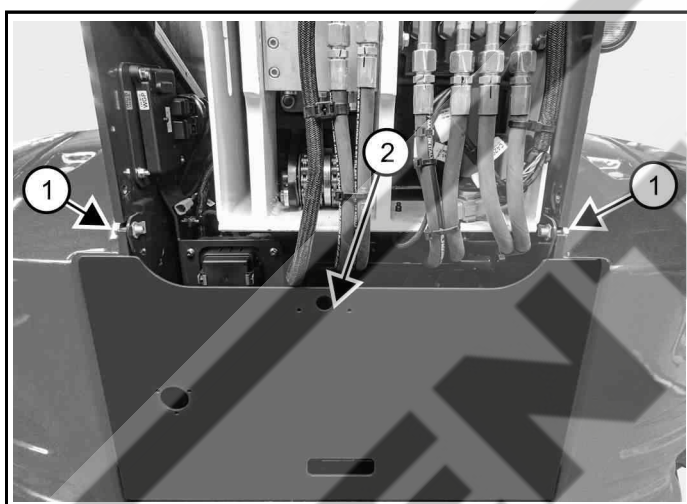
Operating The Hydraulic Safety Group

Figure 221



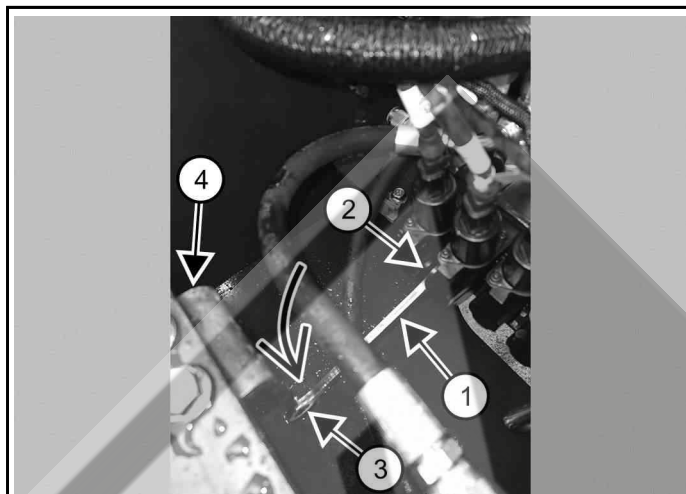
1. Disconnect the serial plate light connectors (Item 1) (if equipped) [Figure 221].

Figure 222



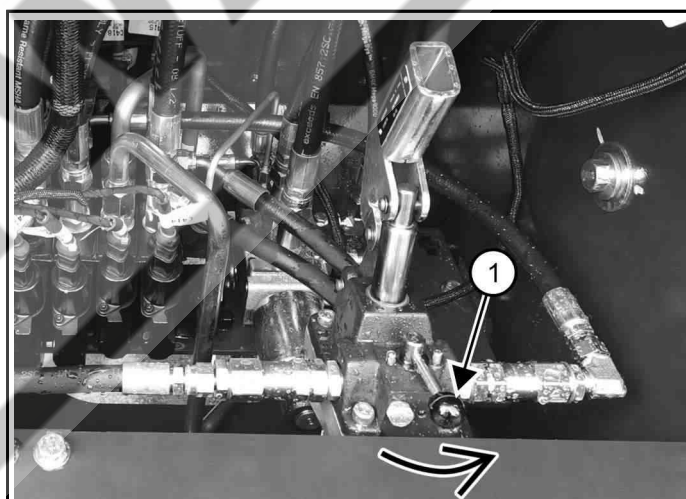
2. Use the wrench to loosen the two bolts (Item 1) and remove the rear cover (Item 2) [Figure 222].

Figure 223



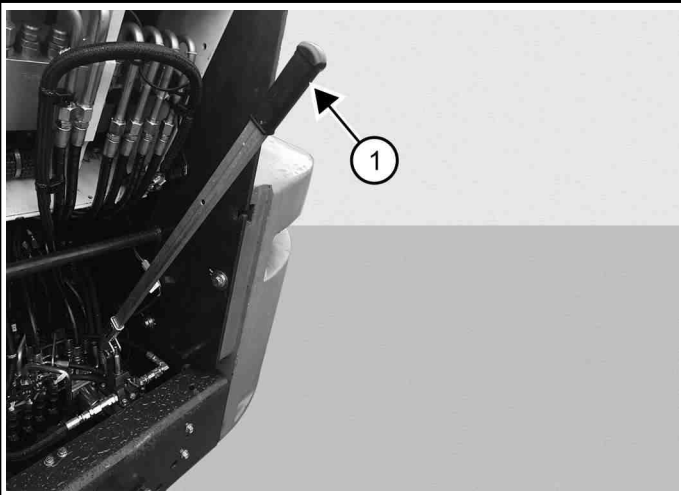
3. Install the wrench (Item 1) on the hexagonal shaft (Item 2) [Figure 223] of the telescope valve section (second from the left).
4. Lower the wrench (Item 1) until it locks in the notch (Item 3) of the support (Item 4) [Figure 223].

Figure 224



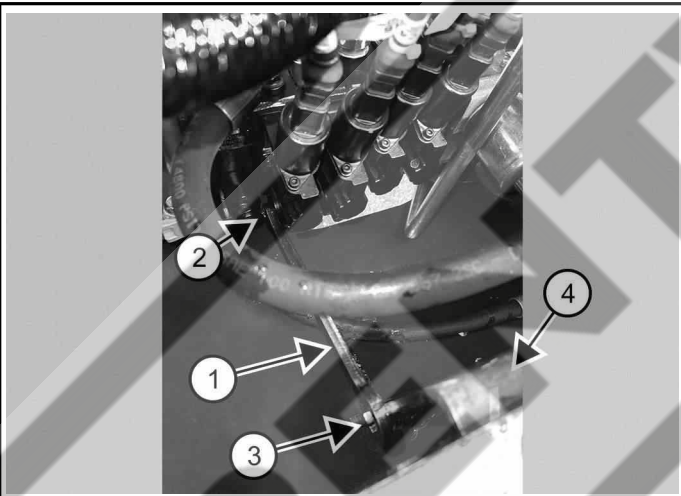
5. Rotate the valve lever (Item 1) [Figure 224] on the emergency pump housing to the right position (boom retraction position).

Figure 225



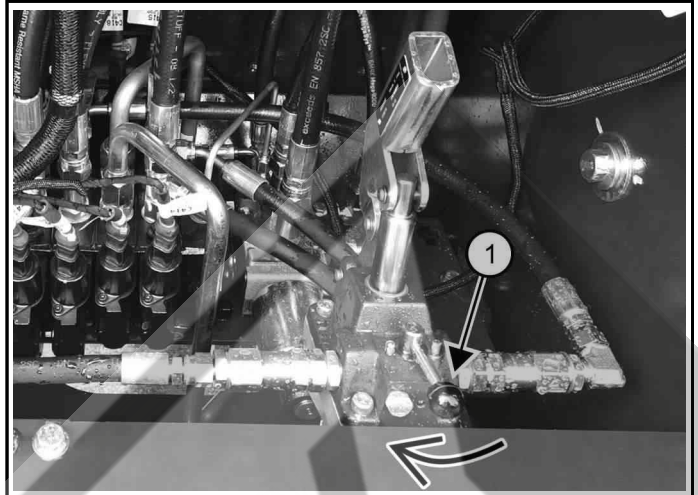
6. Install the lever (Item 1) [Figure 225] on the emergency pump.
7. Move the lever (Item 1) [Figure 225] up and down until the boom is fully retracted.
8. Remove the lever (Item 1) [Figure 225].

Figure 226



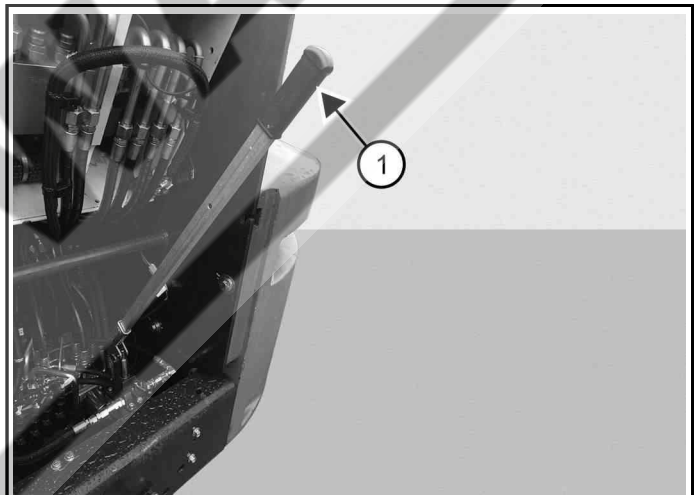
9. Install the wrench (Item 1) on the hexagonal shaft (Item 2) [Figure 226] of the lifting valve section (first from the left).
10. Raise the wrench (Item 1) until it locks in the notch (Item 3) of the support (Item 4) [Figure 226].

Figure 227



11. Rotate the valve lever (Item 1) [Figure 227] on the emergency pump housing to the left position (boom lowering position).

Figure 228



12. Install the lever (Item 1) [Figure 228] on the emergency pump.
13. Move the lever (Item 1) [Figure 228] up and down until the boom is fully lowered.
14. Remove the lever (Item 1) [Figure 228].
15. Remove the wrench (Item 1) [Figure 226].
16. Install the rear cover (Item 2) [Figure 222] using the wrench.
17. Connect the serial plate light connectors (Item 1) [Figure 221] (if equipped).
18. Put the wrench and lever back in their storage position.

Emergency Manoeuvres (with Man Platform Installed)

When an emergency situation takes place while operating the man platform (See man platform Operation & Maintenance Manual), manoeuvres described below must be carried out by personnel remaining on the ground.

1. Before operating the man platform (See man platform Operation & Maintenance Manual), ensure that personnel remaining on the ground:
 - a. Have a full set of keys of the machine.
 - b. Are trained to operate the machine and perform the emergency manoeuvres.
 - c. Pay attention to the operator on the man platform.

In The Event Of Physical Incapacity Of Personnel On The Man Platform

2. If the operator(s) on the man platform is (are) physically incapable of carrying out man platform manoeuvres, one person only (remaining on the ground) must immediately carry out the following operations:
 - a. Unlock the cab door, enter the cab and fasten the seat belt.
 - b. Select the cab control mode.
(See Activating Cab Control Mode on Page 112)
 - c. Start the engine.
(See Starting the Engine on Page 88)
 - d. Select the LLMC override mode (if necessary).
(See Longitudinal Load Moment Controller (LLMC) Override Switch on Page 112)
 - e. Fully retract the boom.
 - f. Fully lower the boom until the man platform reaches the ground.
 - g. Stop the engine, unfasten the seat belt and exit the cab.
 - h. Help the operator(s) on the man platform.

In The Event Of A Power Failure

3. The operator(s) on the man platform must inform personnel remaining on the ground. One person only must immediately carry out the hydraulic safety group procedure to lower the man platform on the ground.
(See Operating The Hydraulic Safety Group on Page 130)
4. Identify the cause of the failure and repair the machine.

In The Event Of Remote Control Failure

5. Proceed according to the steps above .

Towing the Machine

Towing The Machine Procedure

WARNING

UNINTENDED MACHINE MOVEMENT HAZARD
Failure to follow instructions can cause serious injury or death.

- **Block wheels to prevent roll away before adjusting screws to bypass the parking brake system.**
- **Return adjustment screws to the operating position before operating the machine.***

W-2808

The machine can be towed a short distance such as removing it from mud or loading onto a transport vehicle.

The towing procedure must be executed in two steps:

1. Disengaging the parking brake pads.
(See Disengaging The Parking Brake Pads on Page 132)
2. Disengaging the transmission.
(See Disengaging The Transmission on Page 133)

Both steps are mandatory before any towing is authorised.

- Tow the machine at a slow speed, not exceeding 5 km/h (3 mph). Do not tow the machine for more than 3 minutes.
- Block the wheels to prevent the machine from rolling.

Disengaging The Parking Brake Pads

Use a 14 mm and 19 mm wrench to perform this procedure. Depending on your local regulation this tool can be available in the net or container behind the seat.

The parking brake is engaged by spring pressure and released by hydraulic pressure. The parking brake must be released manually before towing.

Figure 229

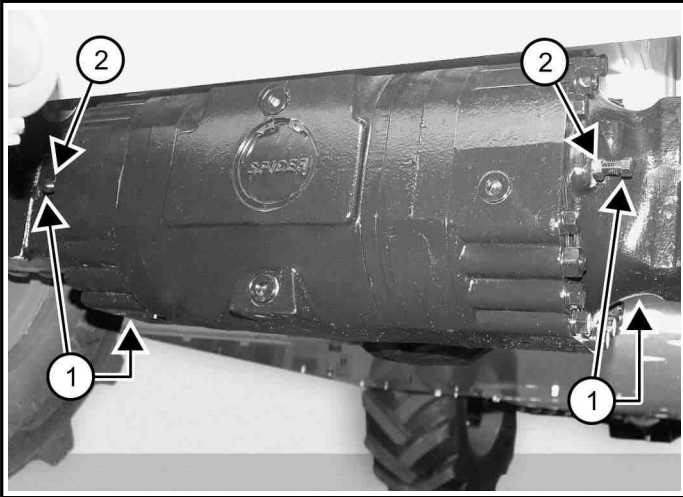
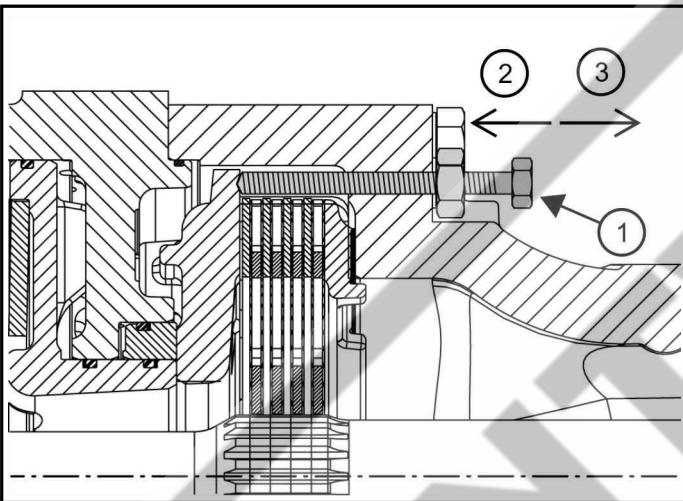


Figure 230



At each end of the central part of the front axle are two bolts (Item 1) [Figure 229] and (Item 1) [Figure 230]. When screwed in, these bolts will remove the spring pressure that engages the brake discs.

Screwing in the bolts disengages the parking brake (Item 1). Screwing out the bolts engages the parking brake (Item 2) [Figure 230].

The following procedure describes how to disengage the parking brake pads:

1. Release the parking brake.
2. Loosen the locking nuts (Item 2) [Figure 229] of the bolts and create some clearance for the bolts.
3. Using the parking brake wrench, turn the two bolts (Item 1) [Figure 229] IN, 90° at a time, alternating between the two bolts until the bolts are firmly seated.

4. Repeat steps Step 2 (See Page 133) and Step 3 (See Page 133) on the two opposite side bolts on the front axle.

The brakes are now released for towing the machine.

NOTE: The parking brake will not work until the adjustment screw is returned to the original position.

Disengaging The Transmission

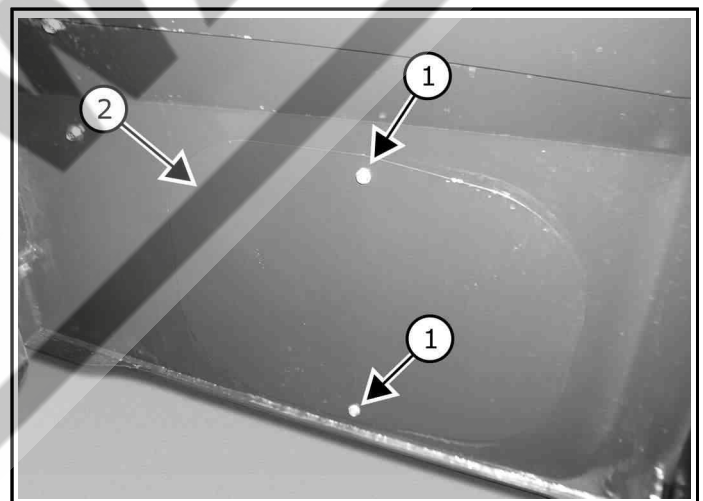
Use a 10 mm and 22 mm wrench to perform this procedure. Depending on your local regulation these tools can be available in the net or container behind the seat.

⚠ WARNING

UNINTENDED MACHINE MOVEMENT HAZARD
Failure to follow instructions can cause serious injury or death.

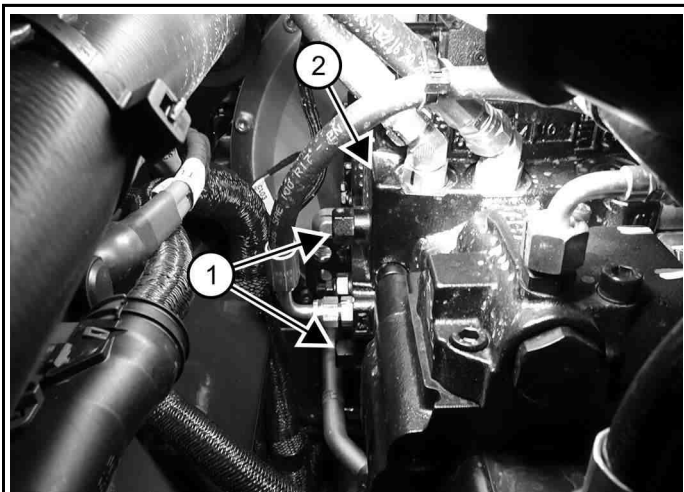
- Block wheels to prevent roll away before adjusting screws to bypass the parking brake system.
- Return adjustment screws to the operating position before operating the machine.

Figure 231



1. Loosen the two bolts (Item 1) and remove the cover (Item 2) [Figure 231] from the front side of the engine bay assembly.

Figure 232



2. Locate the two identical multi-function valves (Item 1) [Figure 232] on the hydrostatic transmission pump.
3. Loosen the valves (Item 1) [Figure 232] by turning them three full turns counterclockwise.

Do not turn more than three full turns. This can result in leakage.

This action will bypass the hydraulic fluid flow of the hydrostatic transmission.

4. Tow the machine at a slow speed, not exceeding 5 km/h (3 mph). Do not tow the machine for more than three minutes.

Engaging The Transmission

1. After towing is completed, block the wheels to prevent the machine from rolling.
2. Loosen the two bolts (Item 1) and remove the cover (Item 2) [Figure 231] from the front side of the engine bay assembly.
3. Tighten the valves (Item 1) [Figure 232] to 70 N•m (52 ft-lb) torque to re-engage the hydrostatic transmission.
4. Engage the park brake pads. (See Engaging The Parking Brake Pads on Page 134)

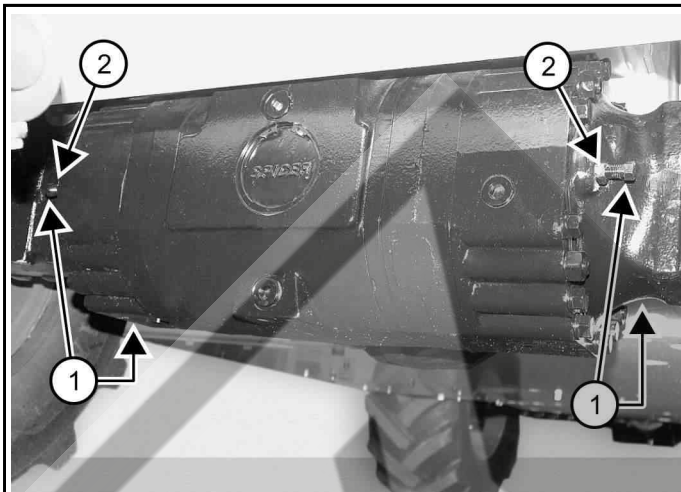
Engaging The Parking Brake Pads

Use service wrench 14 and 19 to perform this procedure. Depending on your local regulation this tool can be available in the net or container behind the seat.

Block the wheels to prevent the machine from rolling.

Before re-engaging the parking brake pads, make sure the parking brake is released.

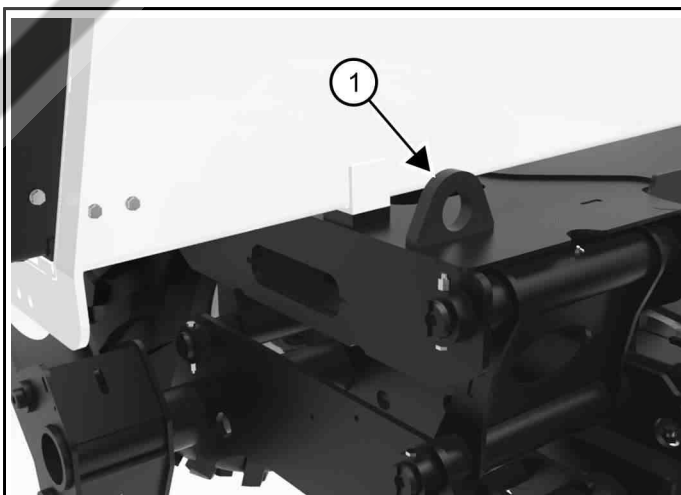
Figure 233



1. To reactivate the parking brake, release the four bolts (Item 1) [Figure 233] on the front axle to their original position: turn the two bolts out, 90° at a time, until no resistance can be felt. Repeat this procedure for the two bolts on the opposite side.
2. Make sure that all four bolts have been turned out until they can easily be loosened by hand.
3. Tighten the locking nuts (Item 2) [Figure 233].
This will allow the parking brake piston to be active again.
4. Engage the parking brake (See Parking Brake on Page 66) and make sure it functions correctly.

Towing And Retrieving The Machine

Figure 234



- Use the retrieval point (Item 1) [Figure 234] for towing and for retrieving the machine out of a hole or ditch.

The retrieval point is rated for 1,5 times mass of the machine.

Keep traction within an angle of 20° with the longitudinal axis.

Lifting the Machine

Lifting The Machine Procedure

WARNING

CRUSHING HAZARD

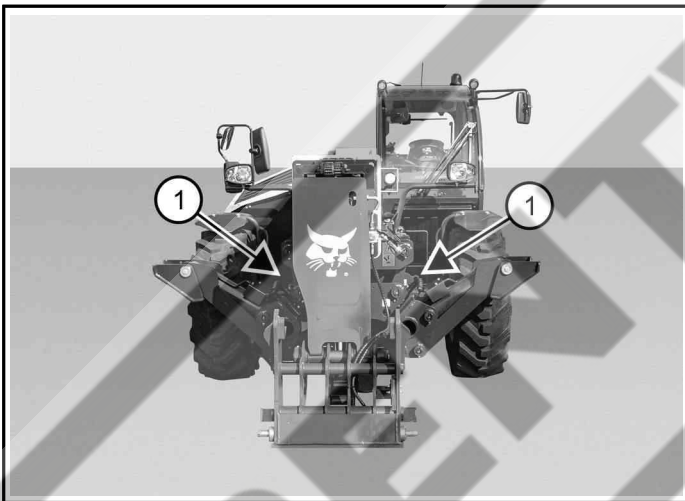
Falling machine can cause serious injury or death.

- Before lifting, check fasteners on four point lift.
- Never allow riders in the cab or bystanders within 5 m (15 ft) while lifting the machine.

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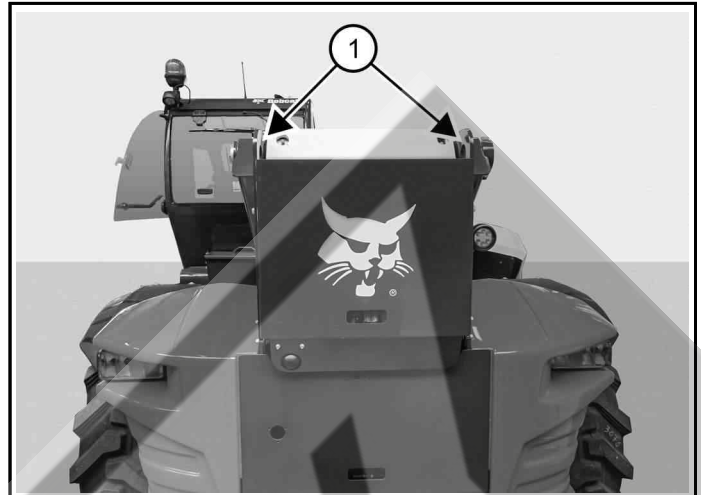
1. Before lifting: Remove all attachments, lower boom fully, position wheels straight forward and stop the machine.
2. Inspect visually the lifting points. If there are signs of damage or overloading, do not transport the machine.
3. Remove the wheel wedge.

Figure 235



C212220b

Figure 236



C212224b

4. Attach the lift hooks to the following lifting points (Items 1) [Figure 235] and [Figure 236]:

Be sure to attach the lift hooks to the lifting points on the frame, not the boom.

5. Take into account the position of the machine's centre of gravity. (See Lifting on Page 324)

Transporting the Machine On a Trailer

Loading And Unloading

WARNING

INSTABILITY HAZARD

Wood ramps can break and cause personal injury. Use adequately designed ramps of sufficient strength to support the weight of the machine loading onto a transport vehicle.

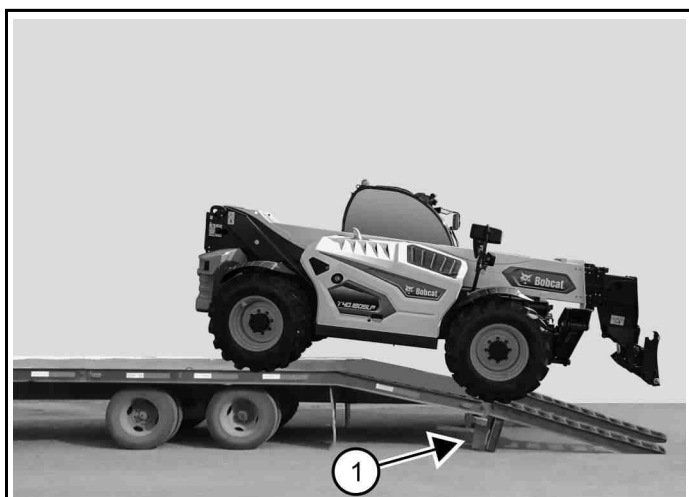
W-2058

Be sure the transport and towing vehicles are of adequate size and capacity for the weight of the machine. (See Weights on Page 317)

Be sure that the contact areas with machine tyres are clean and free from ice, snow, and other slippery materials.

1. Inspect visually the tie-down points. If there are signs of damage or overloading, do not transport the machine.

Figure 237

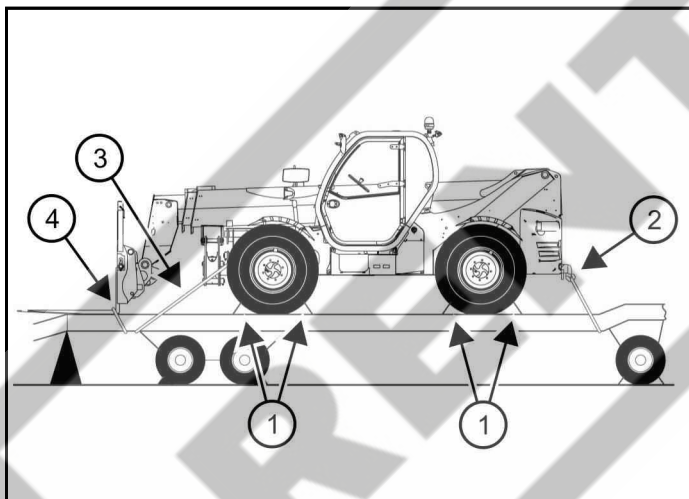


2. Block or support the rear of the trailer (Item 1) [Figure 237] when loading or unloading the machine to prevent the front end of the trailer from raising up.
3. Load the machine backward on the trailer.

Fastening

Fasten the machine to the transport vehicle to prevent it from moving during sudden stops or when going up or down slopes.

Figure 238



1. Block the wheels (Item 1) [Figure 238].
2. Use chains to fasten the machine frame to the transport vehicle (Items 2 and 3) [Figure 238]. Use chain binders to tighten the chains. (See Tie Down on Page 325)
3. Attach the fork or bucket attachment to the transport vehicle (Item 4) [Figure 238].

Towing a Trailer with the Machine

This machine can be equipped with a rear hitch or hydraulic hook for towing.

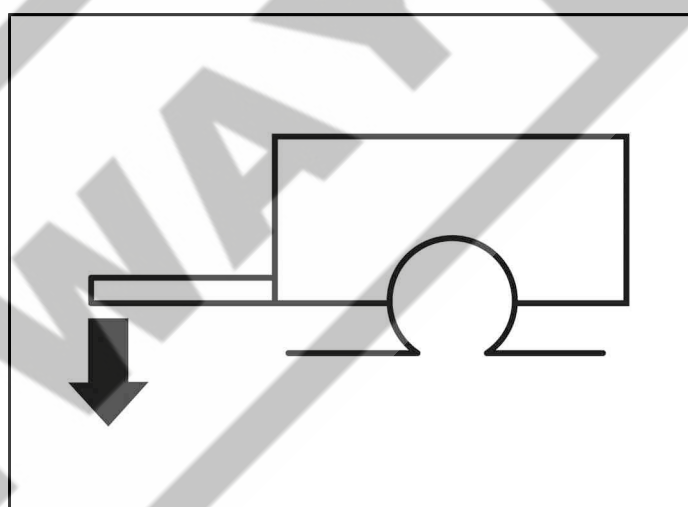
Make sure the machine and rear hitch or hydraulic hook have sufficient towing capabilities. (See Performance on Page 317)

Rear Hitch Applications And Capacities

The hitches listed below are designed to meet the directive 2009/144/EC for use on all approved applications described in the Operation & Maintenance manual of your machine.

Bobcat trailer coupling is approved to be used at the maximum speed reached by your machine. (See Performance on Page 317)

Figure 239



MODEL	EC TYPE-APPROVAL	MAXIMUM PERMITTED VERTICAL LOAD @ max speed (kg / lb)	MAXIMUM PERMITTED TRAILER MASS for machine with trailer brake (kg / lb)	MAXIMUM PERMITTED TRAILER MASS for machine without trailer brake (kg / lb)
Basic Tow Hitch	e1*2009/144*2013/15*0656*00	200 / 440	3500 / 7710	3500 / 7710
Rotating Tow Hitch	e1*2015/208*2018/829ND*00395*01	290 / 630	3500 / 7710	3500 / 7710

Rear Hitch Installation

The rear hitch can only be installed at standard available fixation points of your machine.

Contact your Bobcat Dealer for installation of a rear hitch on your machine.

Rear Hitch Inspection Before Use

In addition to the daily inspection of the machine:

- Check safety decals are in good condition. Replace if damaged.
- Inspect cotter pin installation. Replace if damaged.
- Check that the pins rotate freely. Lubricate as needed.
- Inspect the draw bar condition. Replace if damaged.
- Inspect the trailer and trailer draw bar condition. Replace if worn or damaged.

Rear Hitch

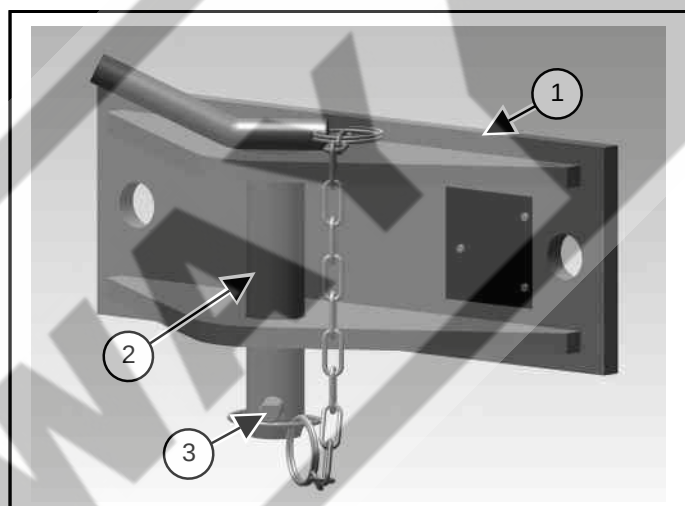
For towing always use a drawbar eyes that meets the following certifications:

MODEL	RECOMMENDED TRAILER COUPLING
Basic tow hitch	ISO 5692-3 shape X
Rotating tow hitch (Drawbar coupler tow hitch)	ISO 5692-2 ISO 8755 ISO 1102

In horizontal position of tractor and trailer, the connecting system (e.g. towing hook / drawbar eye) must be level to the roadway (angle deviation compared to the horizontal towards the top and below may not exceed 3 degrees) to ensure that the customary swinging draw bar angle between the connecting system is not impeded.

Basic Tow Hitch Description

Figure 240



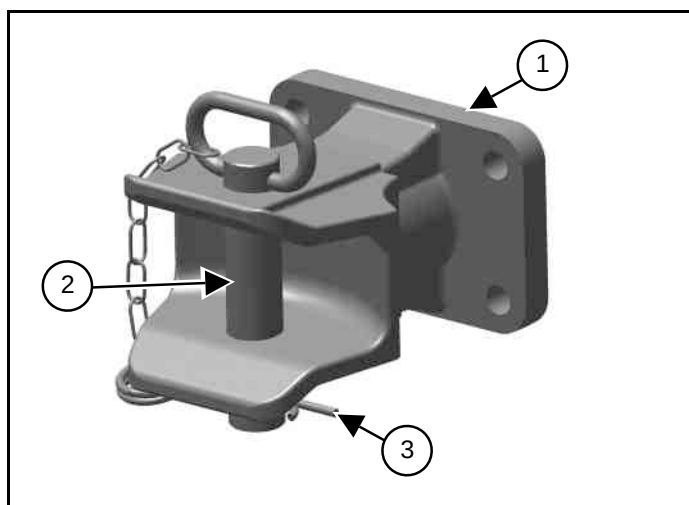
REF	DESCRIPTION
1	BASIC TOW HITCH
2	HITCH PIN
3	COTTER PIN

Basic Tow Hitch Operation

1. Remove the cotter pin (Item 3) from the hitch pin (Item 2) [Figure 240].
2. Remove the hitch pin (Item 2) from the hitch (Item 1) [Figure 240].
3. Install the drawbar eye in the hitch (Item 1) [Figure 240].
Only use self-rotating drawbar eyes.
4. Install the hitch pin (Item 2) and secure with the cotter pin (Item 3) [Figure 240].

Rotating Tow Hitch Description

Figure 241



P122578a

REF	DESCRIPTION
1	ROTATING TOW HITCH
2	PIN
3	COTTER PIN

Rotating Tow Hitch Operation

WARNING

CRUSHING HAZARD

Failure to follow instructions can cause serious injury or death.

Never enter the area between the telescopic handler and the trail vehicle when operating the machine. Before entering the area between the telescopic handler and the trail vehicle:

- Put the Travel Direction Control and the Joystick in neutral.
- Engage the parking brake.
- Retract and lower the boom and attachment flat on the ground.
- Stop the engine. ◀

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1. Remove the cotter pin (Item 3) from the hitch pin (Item 2) .
2. Remove the hitch pin (Item 2) from the hitch (Item 1) .
3. Install the towing hook or drawbar eye in the hitch (Item 1) .
4. Install the hitch pin (Item 2) and secure with the cotter pin (Item 3) .

Rear Hitch Maintenance

- Lubricate the contact areas of the hitch pin and hitch.

- Check the torque value of the mounting bolts. Torque value should be 390 N•m (288 ft-lb).
- Replace the hitch pin if damaged or exceeding the abrasion limit (diameter < 26,5 mm [1.04 in]).

Connecting The Electrics

WARNING

CRUSHING HAZARD

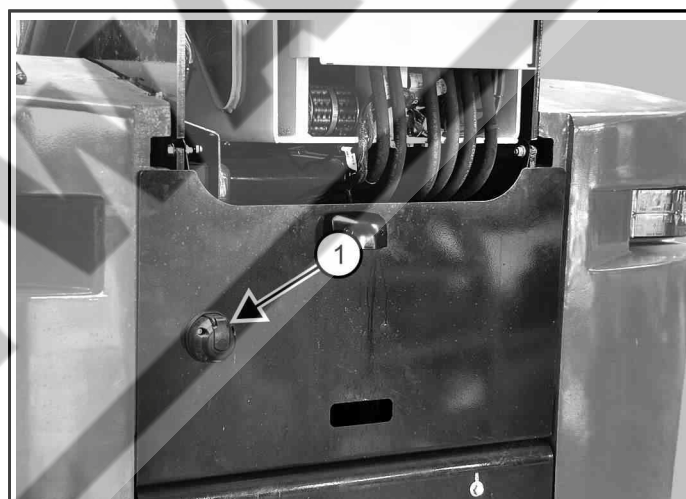
Failure to follow instructions can cause serious injury or death.

Never enter the area between the telescopic handler and the trail vehicle when operating the machine. Before entering the area between the telescopic handler and the trail vehicle:

- Put the Travel Direction Control and the Joystick in neutral.
- Engage the parking brake.
- Retract and lower the boom and attachment flat on the ground.
- Stop the engine. ◀

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Figure 242



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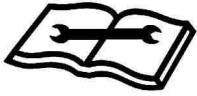
- Connect the electrical cable (if equipped) from the trailer to the 7-pin electrical plug (Item 1) [Figure 242] on the machine.

If the electrical cable is not connected to the machine, the trailer brake lights will not function.

- Connect the rear trailer brake electrical cable (if equipped) from the trailer to the electrical plug (Item 2) [Figure 242] on the machine.

If the electrical cable is not connected to the machine, the rear trailer brake will not function.

MAINTENANCE SAFETY WARNINGS



- Never service the Bobcat machine without instructions. Read and understand the Operation & Maintenance Manual, Operator's Handbook and signs (decals) on machine.
- Follow warnings and instructions in manuals when making repairs, adjustments or servicing. Check for correct function after adjustments, repairs or service. Untrained operators and failure to follow instructions can cause injury or death.

Maintenance procedures which are given in the Operation & Maintenance Manual can be performed by the owner/operator without any specific technical training. Maintenance procedures which are not in the Operation & Maintenance Manual must be performed **ONLY BY QUALIFIED SERVICE PERSONNEL**. Always use genuine Bobcat replacement parts. The Service Safety Training Course is available from your Bobcat dealer.



This check mark means: "Follow instructions for proper operations." Carefully read the message that follows.

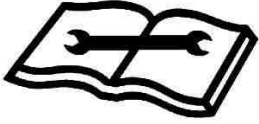


- Have good ventilation when welding or grinding painted parts.
- Wear dust mask when grinding painted parts. Toxic dust and gas can be produced.

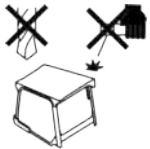
MAINTENANCE SAFETY WARNINGS



This Safety Alert Symbol means: "Attention! Be Alert! Your Safety is Involved!" Carefully read the message that follows.



- Cleaning and maintenance are required daily.



- Never modify equipment.
- Use only attachments approved by Bobcat Company for this machine model.



- Vent exhaust to outside when engine must be run for service.
- Exhaust system components and connections must be tightly sealed. Exhaust fumes can kill without warning.



- Use the correct procedure to lift and support the machine.
- Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a part failure can cause boom to drop. Do not go under boom when raised unless supported by an approved boom stop. Replace if damaged.



- Keep body, jewelry, and clothing away from moving parts, electrical contact, hot parts, and exhaust.
- Wear eye protection to guard from battery acid, compressed springs, fluids under pressure, and flying debris when engines are running or tools are used. Use eye protections approved for type of welding.



- Stop, cool, and clean engine of flammable materials before checking fluids.
- Never service or adjust machine with the engine running unless instructed to do so in the manual.
- Avoid contact with leaking hydraulic fluid or diesel fuel under pressure. It can penetrate the skin or eyes.
- Never fill fuel tank with engine running, while smoking, or when near open flame.



- Lead-acid batteries produce flammable and explosive gases.
- Keep arcs, sparks, flames, and lighted tobacco away from batteries.
- Batteries contain acid that burns eyes or skin on contact.
- Wear protective clothing. If acid contacts body, flush well with water. For eye contact, flush well and get immediate medical attention.

SERVICE SCHEDULE

Maintenance Intervals

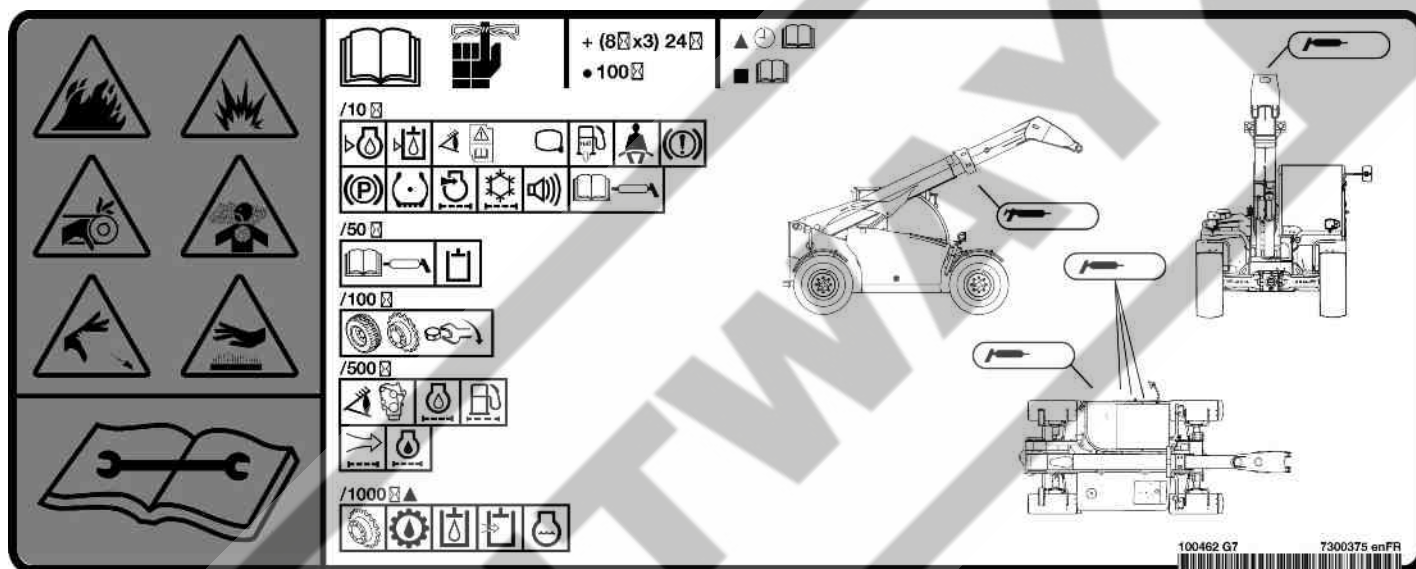
Maintenance work must be done at regular intervals. Failure to do so will result in excessive wear and early failures.

The maintenance items listed under the maintenance intervals on the following pages are the required tasks to be performed. Those items provide additional details and include maintenance that is not shown on the decal.

All maintenance intervals are for machines operating in general environmental conditions. Keep in mind that filter and oil life can be reduced:

- When machines are operating in high dust environments or extreme temperature applications,
- When fuel is taken from uncontrolled storage tanks,
- When other non-standard conditions exist.

For more details, contact your Bobcat dealer.



⚠ WARNING

INSUFFICIENT INSTRUCTIONS HAZARD

Untrained operators or failure to follow instructions can cause serious injury or death.

- Read and understand the Operation & Maintenance Manual, Operator's Handbook and decals on machine.
- Follow warnings and instructions in the manuals when making repairs, adjustments or servicing.
- Check for correct function after adjustments, repairs or service.

Service Schedule

Explanation of the service intervals:

- **10:** Every 10 hours or daily (before starting the machine).
- **50:** Every 50 hours.
- **100:** Every 100 hours.
- **250:** Every 250 hours.
- **500:** Every 500 hours or every 12 months, whichever comes first.
- **1000:** Every 1000 hours or every 12 months, whichever comes first.
- **2000:** Every 2000 hours or every 24 months, whichever comes first.

- **3000:** Every 3000 hours or every 36 months, whichever comes first.

Service Schedule											
O	Check condition / proper operation. Adjust or replace as needed.			V	Refill as needed						
D	Check the display. Service only when required.			C	Clean						
W	Drain water			R	Replace						
F	First time only.			G	Grease						
Item		Service Required	Service Interval (hours)								
			10	50	100	250	500	1000	2000	3000	
Tyres		Condition and pressure. Use only approved tyres. (See Tyre Maintenance on Page 185)	O								
Engine Oil		(See Engine Lubrication System on Page 161) • Engine Oil 10W30 (7341377) • Engine Oil 15W40 (7395725)	VD					R			
Engine Oil Filter		(See Engine Lubrication System on Page 161) • Engine Oil Filter (7343102)						R			
Exhaust system		Check exhaust system and exhaust aftertreatment components for leaks.	CO								
Cooling System		Oil, charge air coolers and air conditioning condenser (if equipped). Keep cooling system free from debris. (See Cooling System on Page 163) Clean debris from radiator, air cooler, hydraulic fluid cooler, air conditioning condenser (if equipped), and grid.	VC-O								
		Coolant (See Cooling System on Page 163) • EG Coolant, concentrate (6987803) • EG Coolant, premixed (6987804)							R		
		Check coolant concentration (with a refractometer). Replace as needed.						O			
		Coolant level (check cold). (See Cooling System on Page 163) • EG Coolant, concentrate (6987803) • EG Coolant, premixed (6987804)	V								

Service Schedule									
O	Check condition / proper operation. Adjust or replace as needed.	V	Refill as needed						
D	Check the display. Service only when required.	C	Clean						
W	Drain water	R	Replace						
F	First time only.	G	Grease						
Item	Service Required	Service Interval (hours)							
		10	50	100	250	500	1000	2000	3000
Heater Coil and Air Conditioning Evaporator 	Contact your Bobcat dealer.						C		
Grease Fittings 	Tilt cylinder rod end. (See Lubricating the Machine on Page 187)	G							
	Articulation pins, axle oscillation (rear), boom pivot, boom cylinder, self levelling (compensation) cylinder, frame levelling pivots, frame-levelling cylinder, stabiliser cylinders, chain pulley pivots (front / rear). (See Lubricating the Machine on Page 187)		G						
Telescopic Boom Wear Pads 	(See Lubricating the Machine on Page 187)		G			O			
Attachment Carrier Pins	(See Lubricating the Machine on Page 187)	G							
Chains	Check and apply chain lubricant as needed. Check chain tension and wear. Adjust or replace as necessary. (See Chain Checking And Adjusting on Page 195)				GO				
LLMC System	Test the LLMC calibration. (See LLMC Calibration Test on Page 148)			FO	O				

Service Schedule

O	Check condition / proper operation. Adjust or replace as needed.	V	Refill as needed							
D	Check the display. Service only when required.	C	Clean							
W	Drain water	R	Replace							
F	First time only.	G	Grease							
Item	Service Required	Service Interval (hours)								
		10	50	100	250	500	1000	2000	3000	
Engine Air System and Air Filters 	Service when [AIR FILTER PLUGGED] is shown on display screen. Check for leaks and damaged components. (See Air Cleaner Service on Page 153) Empty dust extractor. (See Cleaning The Dust Extractor on Page 154) • Outer Air Filter (7286652) • Inner Air Filter (7010031)	D				O				
	Replace the outer filter element. (See Replacing The Outer Filter on Page 153) • Outer Air Filter (7286652)						R			
	Replace the inner filter element. (See Replacing The Inner Filter on Page 153) • Inner Air Filter (7010031)							R		
Fuel Filter  	(See Fuel Filter on Page 158) • Main Fuel Filter (7336334)	DW				R				
	(See Fuel System on Page 156) • Fuel Pre-Filter (7348032) • Fuel Tank Breather (7373582)						R			
Back-up Alarm and Horn 	Check for proper function. (See Multi-function Lever on Page 43) and (See Back-up Alarm System on Page 67)	O								
Seat Belt 	Check condition. Clean or replace seat belt retractors as needed. Clean dirt and debris from moving parts. (See Seat Belt on Page 147)	OC								

Service Schedule									
O	Check condition / proper operation. Adjust or replace as needed.			V	Refill as needed				
D	Check the display. Service only when required.			C	Clean				
W	Drain water			R	Replace				
F	First time only.			G	Grease				
Item	Service Required	Service Interval (hours)							
		10	50	100	250	500	1000	2000	3000
Hydraulic / Hydrostatic Fluid and Filter 	(See Removing And Replacing Hydraulic / Hydrostatic Filter on Page 176) • Hydraulic Filter (7012477)			FR		R			
	 (See Hydraulic / Hydrostatic System on Page 174) • Hydraulic Fluid (6987791B)	V					R		
	 (See Removing And Installing The Fill / Breather Cap on Page 178) • Hydraulic Fill / Breather Cap (6727475)					R			
Hydraulic Hoses and Tubelines	 Contact your Bobcat dealer to replace any damaged hoses or tubelines.		O						
Parking Brake / Service Brake	 Check For Proper Function. (See Parking Brake on Page 66) and (See Service Brake Pedal And Inching Control on Page 52)	O							
Safety Signs, Treads And Mirrors	 Check for damaged signs (decals), safety treads and mirrors. Replace any signs, safety treads or mirrors that are damaged or worn. (See Machine Signs (Decals) on Page 26) 	O							
Articulated Steering Links	Rubber protection. Contact your Bobcat dealer if damaged.		O						
Wheel Nut Torque	(See Wheel Nuts on Page 185)  	FO		O					
Front Axle Mounting Bolts Torque	 (See Front Axle Mounting Bolts on Page 197)					O			

Service Schedule									
O	Check condition / proper operation. Adjust or replace as needed.			V	Refill as needed				
D	Check the display. Service only when required.			C	Clean				
W	Drain water			R	Replace				
F	First time only.			G	Grease				
Item		Service Required	Service Interval (hours)						
			10	50	100	250	500	1000	2000
Alternator		Belt. (See Alternator Belt on Page 183) .				O			R
Air-Conditioning (if equipped)		Belt. (See Air Conditioning Belt on Page 184)					O		R
Axle Central Housing and Differential		(See Axles (Front and Rear) on Page 179) • Axle Oil (6987805)							
Planetary Carriers / Reduction Box		(See Axles (Front and Rear) on Page 179) • Axle Oil (6987794)			FR	V		R [A]	
Cab Air Filter		(See Heating, Ventilation and Air Conditioning System (HVAC) on Page 151) • Fresh Air Filter(7228497)		C			OC		
Battery		Cables and electrical connections. • Battery (7288629)					O		
Engine Mounts							O		
Fastenings, Hose Unions and Clips							O		
DEF / Adblue® Filter		Contact your Bobcat dealer.							R

[A]

Half fluid change intervals must be applied in at least one of these use cases:

- more than 1000H/12 months
- cooperatives of multiple owners
- recycling application
- biogas application
- forestry application

Inspection Checkbook

Maintenance work must be done at regular intervals. Failure to do so will result in excessive wear and early failures.

The service schedule is a guide for correct maintenance of the Bobcat Telescopic Handler.

The Inspection Checkbook contains the following information:

- Doosan Bobcat EMEA s.r.o. Warranty Policy
- Doosan Bobcat EMEA s.r.o. Extended Warranty Policy

The Inspection Checkbook has to be filled in by the Dealer for any maintenance and service work of your Bobcat machine. This book may be required anytime by an authorised dealer or by Bobcat Europe, should a breakdown occur on the Bobcat equipment. Your local dealer can order the Inspection Checkbook.

Part number: 7296478

SEAT BELT

Inspection And Maintenance

RENTWAY

LLMC CALIBRATION TEST

LLMC Calibration Test Procedure

WARNING

INSTABILITY HAZARD

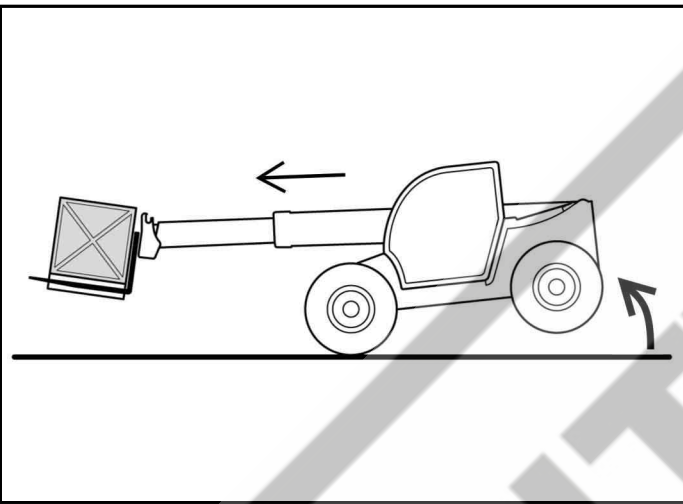
Tipping can cause serious injury or death. Keep the boom low, only raise the load 500 mm (20 in) when testing or calibrating the LLMI / LLMC system.*

W-2829

The LLMC system calibration can be tested by performing the following procedure:

1. Pick up a load and park the machine on flat level ground and align the front and rear wheels straight ahead.

Figure 243



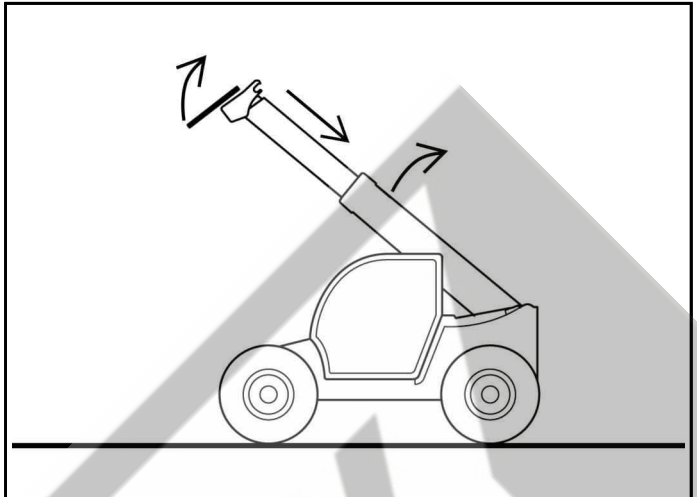
839203

2. Using the LLMC override switch, decrease the rear axle load pressure by extending the boom until the machine's rear wheels lift off the ground slightly [Figure 243].

Do not move or reposition the machine after decreasing the rear axle load pressure.

3. Retract the boom and place the load on the ground.

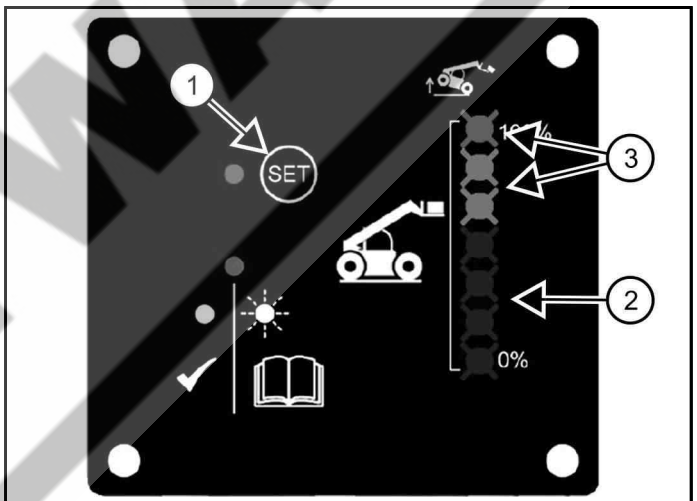
Figure 244



EM9526a

4. Without attachment and with the attachment carrier fully tilted up, fully retract and raise the boom [Figure 244].

Figure 245



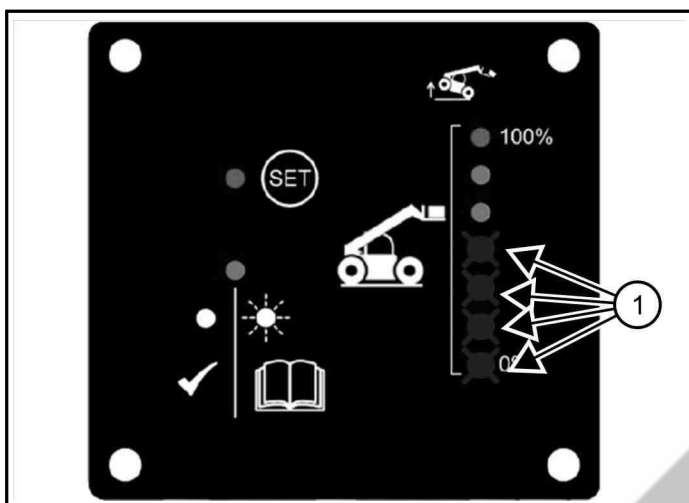
C210375a

5. Push and hold the **[SET]** button (Item 1) [Figure 245] during the complete procedure. Keep holding the test button for default test result confirmation.

All the LEDs (Item 2 and 3) light up, and the buzzer sounds discontinuously during 3 seconds.

Two test results are possible:

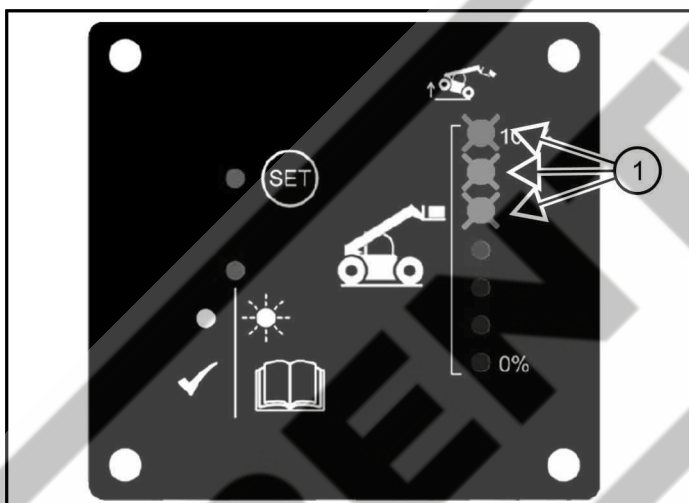
Figure 246



C210373a

- If the four green LEDs (Item 1) [Figure 246] light up, calibration is OK.

Figure 247



C210374a

- If the orange and red LEDs (Item 1) [Figure 247] light up, calibration is out of range. Please redo calibration of the LLMI / LLMC system. (See your Bobcat dealer for calibration).

6. Release the **[SET]** button (Item 1) [Figure 245].

The calibration test is finished.

After pressing the **[SET]** button (Item 1) [Figure 245] longer than 60 seconds, the procedure will automatically end and the system will return to normal mode.

The system always returns to normal mode when the **[SET]** button (Item 1) [Figure 245] is released during the procedure.

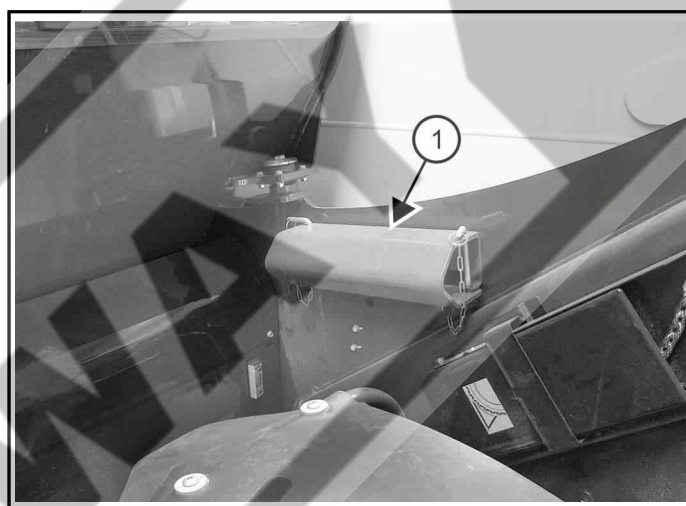
APPROVED BOOM STOP

If the boom is raised for service or maintenance, use the following procedure to install and remove the approved boom stop.

Installing The Approved Boom Stop

1. Park the machine on a flat, solid and level surface.
2. With the operator in the seat, the seat belt fastened, travel direction switch / control lever (optional) in neutral and the parking brake engaged, start the engine, raise the boom and stop the engine.

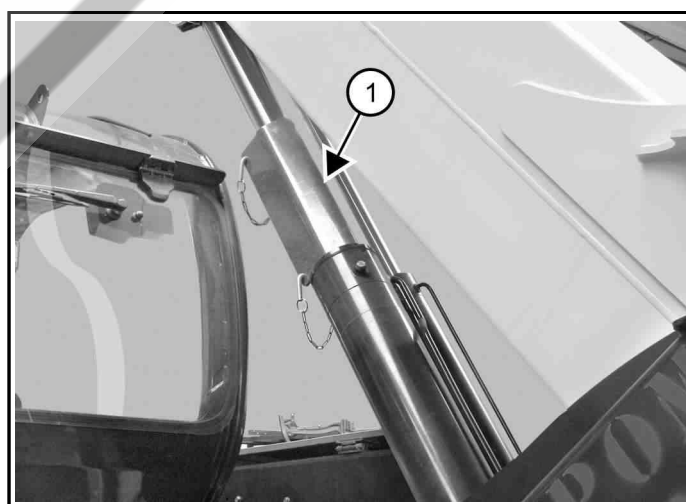
Figure 248



S41616a

3. Remove the approved boom stop (Item 1) [Figure 248] from the storage position.

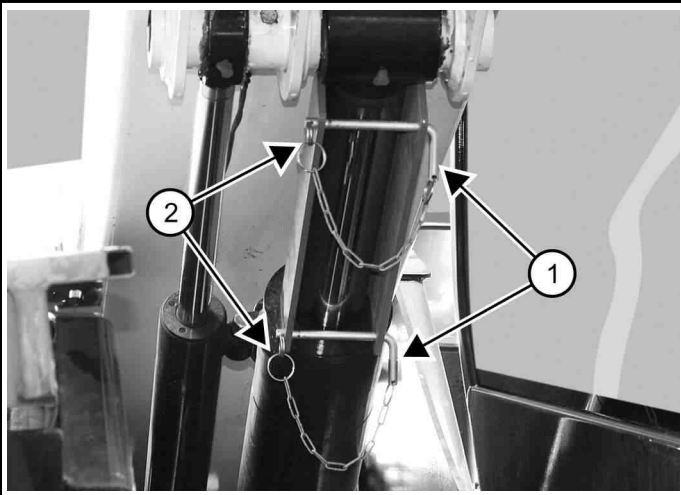
Figure 249



S41617a

4. Operating from the left back side of the machine, install the approved boom stop (Item 1) [Figure 249] over the boom cylinder rod.

Figure 250



5. Install the pins (Item 1) and secure with retainer pins (Item 2) [Figure 250].
6. Start the engine and lower the boom slowly until the approved boom stop is held securely.

Removing The Approved Boom Stop

⚠ WARNING

INSTABILITY HAZARD

Failure to use an approved boom stop can allow the boom to drop and cause injury or death. Using a damaged boom stop or with missing parts can cause boom to drop causing injury or death. Never work on a machine with the boom up unless the boom is held by an approved boom stop. Service boom stop if damaged or if parts are missing.

1. Start the engine and raise the boom. Stop the engine.
2. Operating from the left back side of the machine, remove the retainer pins (Item 2), pins (Item 1) [Figure 250] and approved boom stop (Item 1) [Figure 249].
3. Reinstall the approved boom stop in the storage position (Item 1) [Figure 248].

BACK-UP ALARM SYSTEM

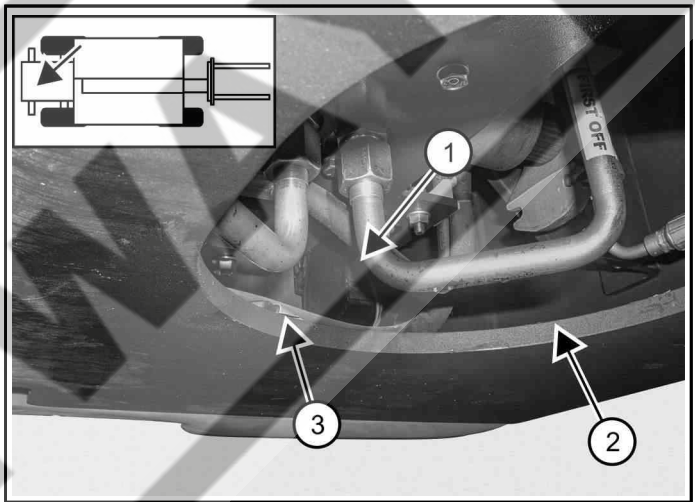
Back-up Alarm System Description

The back-up alarm will sound when the operator moves the travel direction control into the reverse position AND the engine is running.

Inspecting The Back-up Alarm System

1. Sit in the seat and fasten the seat belt. Start the engine and disengage the parking brake.
2. Move the travel direction switch / control lever (optional) into the reverse position. The back-up alarm must sound.
3. Turn the switch to the OFF position and make sure the parking brake is engaged.

Figure 251



4. The back-up alarm (Item 1) is located at the rear of the machine and can be accessed through an opening (Item 2) [Figure 251] in the frame.
5. Inspect the back-up alarm electrical connection (Item 3) [Figure 251] and the wire harness for tightness and damage. Repair or replace any damaged components.

ENGINE COVER

Opening And Closing The Engine Cover

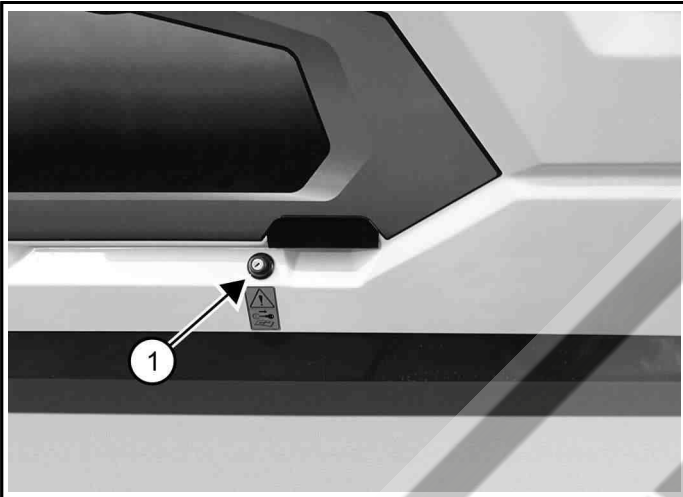
⚠ IMPORTANT

MACHINE DAMAGE HAZARD

Running the engine with the engine cover open can cause damage to the engine cover. Keep the engine cover closed when the engine is running. ◀

1-2432

Figure 252



C209117a

- Turn the key switch (Item 1) [Figure 252] clockwise to unlock. Remove the key and push the key switch. Raise the engine cover to provide access to the engine compartment for maintenance.

HEATING, VENTILATION AND AIR CONDITIONING SYSTEM (HVAC)

This machine may be equipped with a heating, ventilation and air conditioning system.

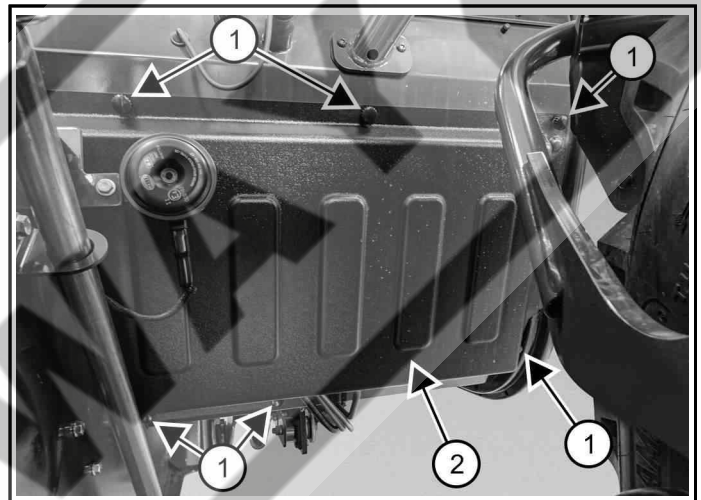
Cleaning And Maintenance

The HVAC system requires regular inspection and maintenance. (See Service Schedule on Page 141)

Cab Filter

The fresh air filter is located on the front of the operator cab.

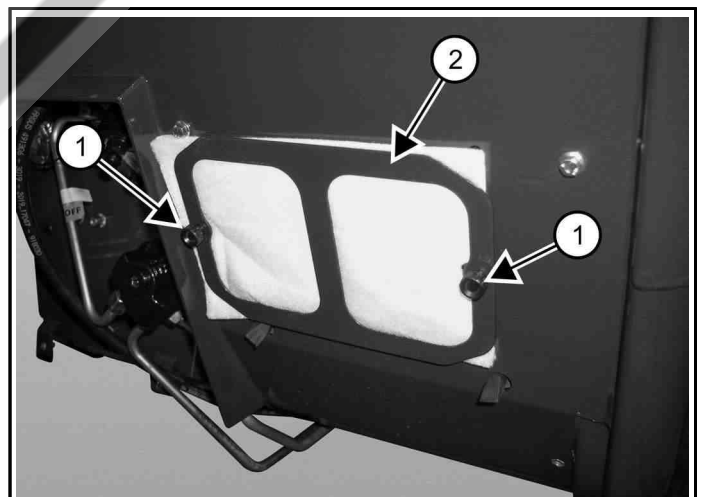
Figure 253



C211775a

1. Remove the six screws (Item 1) and filter housing (Item 2) [Figure 253].

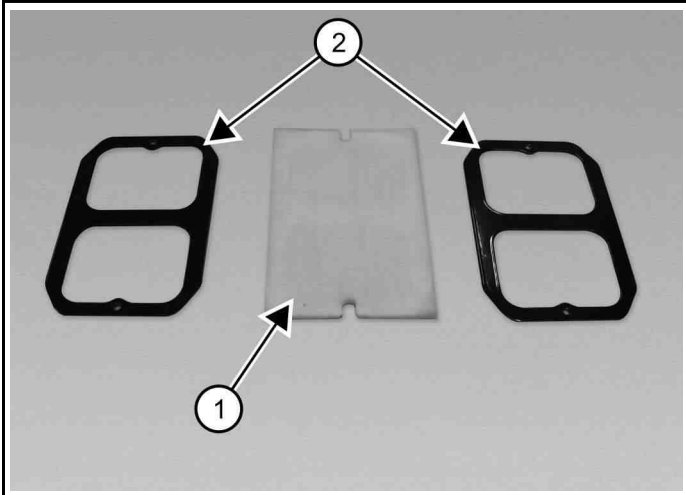
Figure 254



C211795a

2. Remove the two screws (Item 1) and the filter assembly (Item 2) [Figure 254].

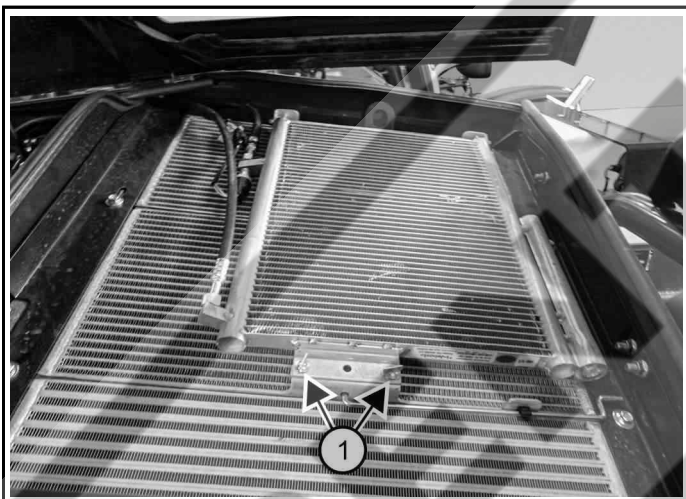
Figure 255



3. Remove the filter (Item 1) from in between the filter holders (Item 2) [Figure 255].
4. Clean or replace the filter as necessary.

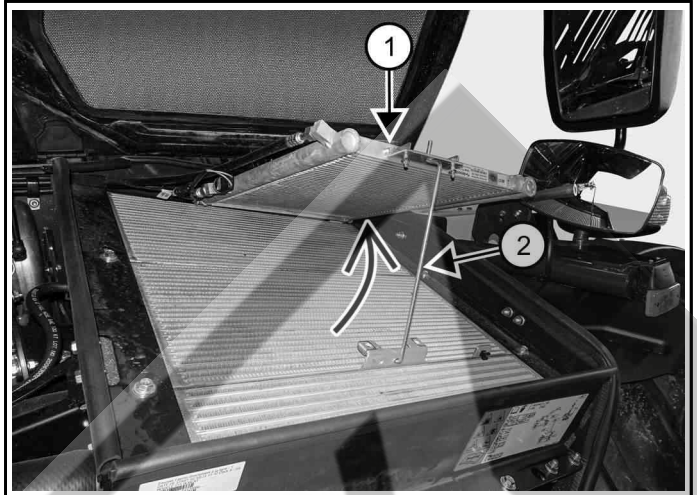
Cleaning The Condenser

Figure 256



1. Loosen the two screws (Item 1) [Figure 256].

Figure 257



2. Raise the condenser (Item 1) and keep in position by installing the rod (Item 2) [Figure 257] in the condenser mount.
3. Use low pressure air to clean the condenser (Item 1) [Figure 257]. Be careful not to damage fins.
4. Remove the rod (Item 2) [Figure 257], lower the condenser and tighten the two screws (Item 1) [Figure 256].

Air Conditioning Lubrication

- Run the air conditioning for about five minutes every week to lubricate the internal components.

Air Conditioning Troubleshooting

- If the fan does not run, or the air conditioning does not turn on, check the fuse. (See Fuses And Relays Location / Identification on Page 165)
- If the air conditioning system circulates warm air, the refrigerant may need to be recharged. Contact your Bobcat dealer for recharging the air conditioning system.

AIR CLEANER SERVICE

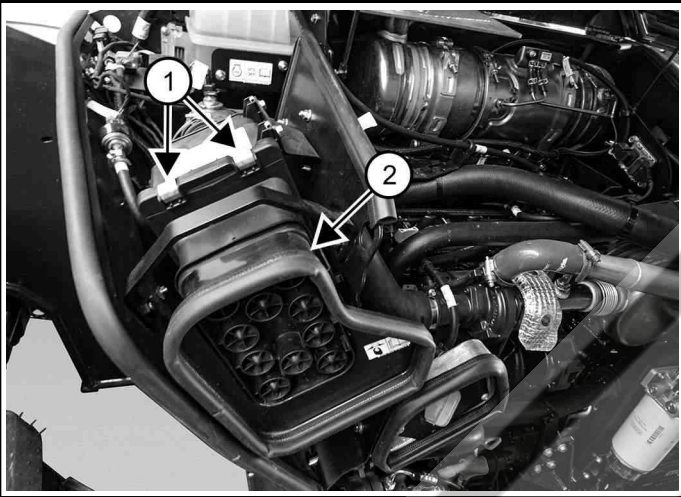
Replacing Filter Elements

Replacing The Outer Filter

Replace the inner filter every second time the outer filter is replaced or as indicated.
(See Service Schedule on Page 141)

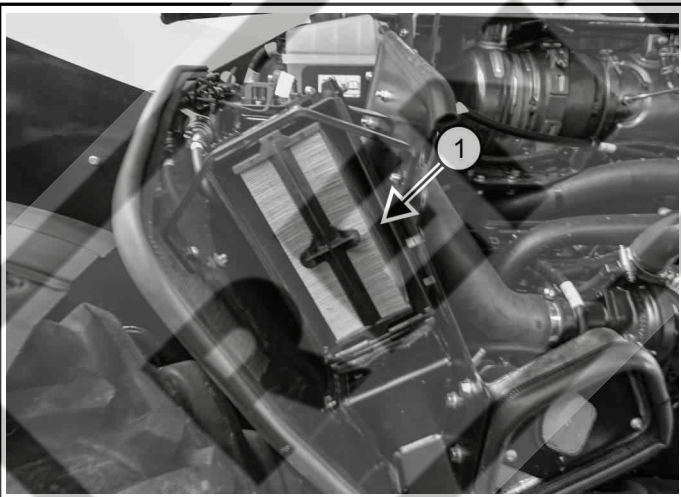
1. Stop the engine and open the engine cover.

Figure 258



2. Open the latches (Item 1) and remove the cover (Item 2) [Figure 258].

Figure 259



3. Pull the outer filter element (Item 1) [Figure 259] out and discard.
4. Make sure the filter housing is free of dirt and debris. Verify that sealing surfaces are clean. Clean the surfaces with a clean damp cloth. DO NOT use compressed air.

5. Install new outer filter. Push in until the filter contacts the base of the housing.
6. Install the cover (Item 2) and secure the latches (Item 1) [Figure 258].

NOTE: The rubber boot attached to the air cleaner cover is an important part of the engine performance and must remain correctly installed on the air cleaner cover.

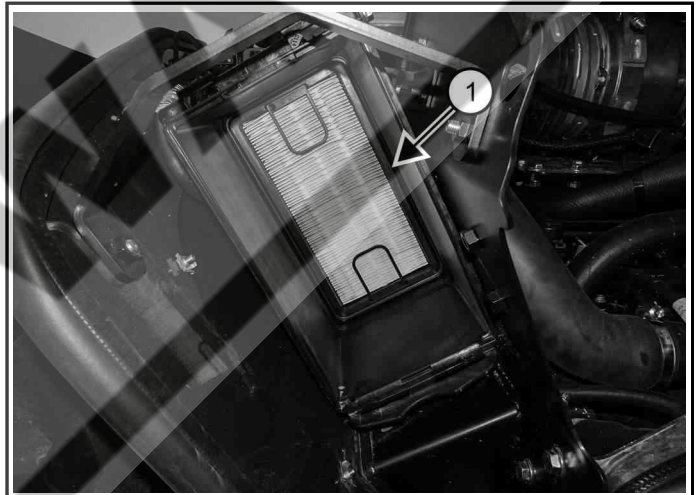
7. Close the engine cover.

Replacing The Inner Filter

Replace the inner filter element every second time the outer filter is replaced or as indicated.
(See Service Schedule on Page 141)

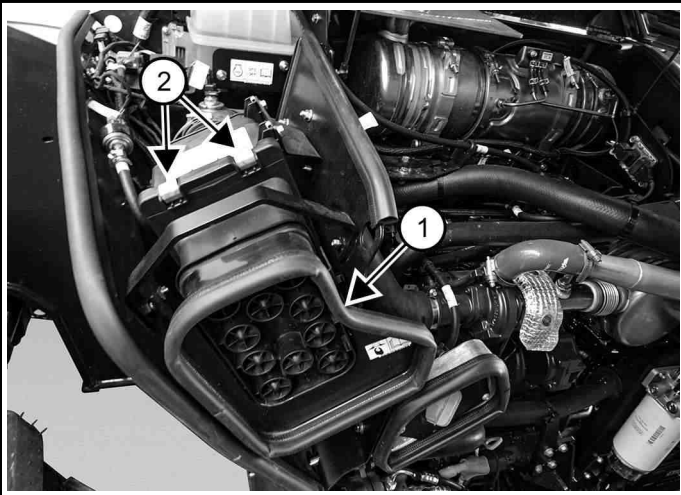
1. Stop the engine and open the engine cover.
2. Remove the cover (Item 2) [Figure 258] and the outer filter (Item 1) [Figure 259].

Figure 260



3. Remove the inner filter (Item 1) [Figure 260].
4. Make sure the filter housing is free of dirt and debris. Verify that sealing surfaces are clean. Clean the surfaces with a clean damp cloth. DO NOT use compressed air.
5. Install new inner filter. Push in until the filter contacts the base of the housing.
6. Install the outer filter (Item 1) [Figure 259].

Figure 261



7. Install the cover (Item 1) and secure the latches (Item 2) [Figure 261].

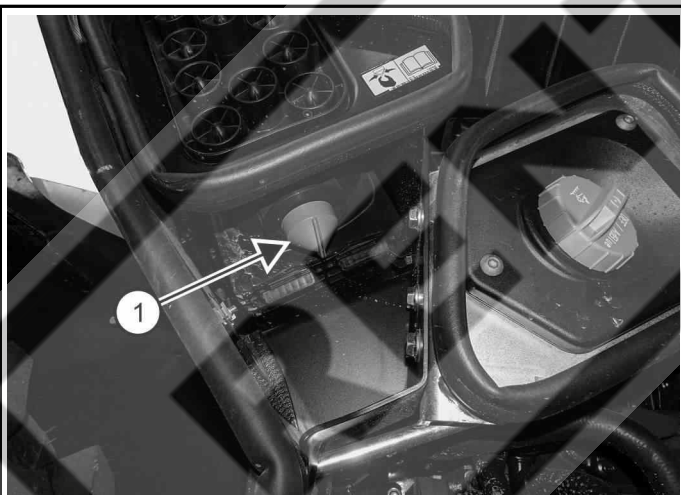
NOTE: The rubber boot attached to the air cleaner cover is an important part of the engine performance and must remain correctly installed on the air cleaner cover.

8. Close the engine cover.

Cleaning The Dust Extractor

1. Stop the engine and open the engine cover.

Figure 262



2. Clean the dust extractor (Item 1) [Figure 262] underneath the air filter housing. If needed, remove the dust extractor for complete cleaning.
3. Close the engine cover.

DIESEL PARTICULATE FILTER (DPF) SYSTEM

DPF Service Description

The engine exhaust system is equipped with a DPF. The DPF is an emissions reduction device that removes diesel particulate matter (soot) from the exhaust gases of the diesel engine. The DPF will trap and collect the soot until it is burned off. The process of burning off the collected soot is called regeneration.

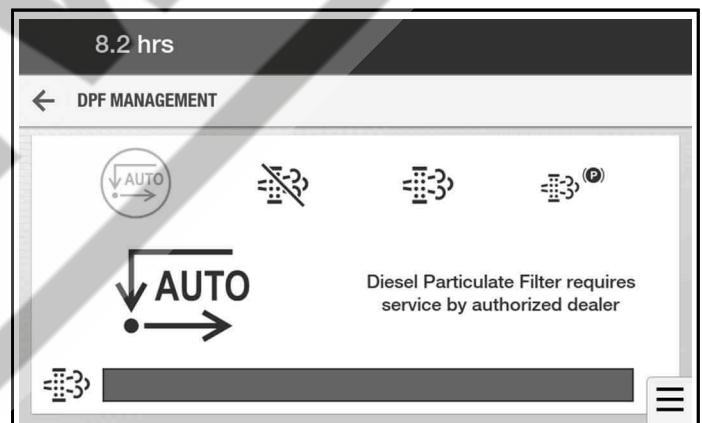
A service regeneration cycle may be required if too much soot is allowed to accumulate in the DPF. This can occur in the following situations:

- The machine is often operated for brief periods (less than 30 minutes) that do not allow sufficient time for the DPF to complete an automatic or operator activated forced regeneration cycle.
- The inhibit mode is used for an extended period of time. This will inhibit the DPF from actively regenerating and burning off the collected soot.

Ash residue will remain after the regeneration process is complete. The ash must be removed from the DPF every 5000 hours or earlier if the display shows service code "P242F".

DPF Service Regeneration

Figure 263



The machine will alert the operator when DPF service is required [Figure 263].

Service code "P24A3" "Very High DPF Soot Mass - Service Regen Required" will be accompanied by a severe torque reduction.

Service regeneration requires the use of specialised equipment. See your Bobcat dealer for service regeneration.

DPF Cleaning

Contact your Bobcat dealer to arrange the cleaning of the DPF when indicated.

Service code "P242F" "High DPF Ash Content - Ash Cleaning Needed" will show in the display screen when DPF cleaning is necessary.

The DPF is a critical component of the engine exhaust system and must be properly maintained. Specialised equipment is required to clean the ash from the DPF. See your Bobcat dealer for DPF cleaning.

DEF / ADBLUE SYSTEM

DEF/ AdBlue System Description

The engine exhaust system is equipped with a combined DPF and SCR system. The SCR is an emissions reduction system that removes nitrogen oxides from the exhaust gases.

The DPF / SCR system requires DEF / AdBlue to function correctly.

NOTE: DEF and AdBlue are different names for the same fluid. See your Bobcat dealer for more information.

The DPF / SCR system will use one tankful of DEF / AdBlue for approximately two tankfuls of diesel fuel. The DEF / AdBlue level indicator is located on the display. (See Standard Display on Page 49)

Avoiding Urea Crystallization In The SCR System

At low exhaust temperatures and low exhaust gas flow rates, there is a risk of urea deposit formation in the exhaust system and catalyst.

To reduce the risk of urea crystallization:

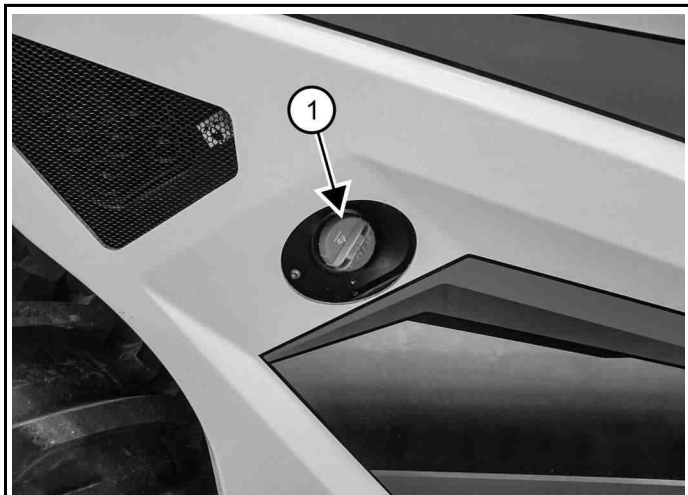
- Avoid long-time storage of used machines without proper cleaning / purging of the urea system and components. (See Machine Storage and Return to Service on Page 198)
- Avoid often starts and stops (especially in low ambient temperatures).
- Avoid low idle running machines.
- Use high quality DEF / AdBlue. (See Lubricants, Fuel, And Fluids on Page 14)

Filling The DEF / AdBlue Tank

1. Stop the engine.

The engine must be stopped with the key switch in the STOP position when filling the DEF / AdBlue tank.

Figure 264



2. Remove the fill cap (Item 1) [Figure 264].

The DEF / AdBlue fill cap is located on the right side of the machine.

3. Add only clean, unused DEF / AdBlue.
4. Install and tighten the fill cap (Item 1) [Figure 264].

The DEF / AdBlue fill cap must be tightened until the cap clicks.

FUEL SYSTEM

Fuel Specifications

NOTE: Contact your local fuel supplier to receive recommendations for your region.

U.S. Standard (ASTM D975)

Use only clean, high quality diesel fuel, grade number 2-D or grade number 1-D.

Ultra-low sulfur diesel fuel must be used in this machine. Ultra-low sulfur is defined as 15 mg/kg (15 ppm) sulfur maximum.

The following is one suggested blending guideline that should prevent fuel gelling during cold temperatures:

TEMPERATURE	GRADE 1-D	GRADE 2-D
Above -9°C (+15°F)	0%	100%
Down to -21°C (-5°F)	50%	50%
Below -21°C (-5°F)	100%	0%

NOTE: Biodiesel blend fuel may also be used in this machine. Biodiesel blend fuel must contain no more than 5% biodiesel mixed with ultra-low sulfur petroleum based diesel. This biodiesel blend fuel is commonly marketed as B5 blended diesel fuel. B5 blended diesel fuel must meet ASTM specifications.

E.U. Standard (EN590)

Use only clean (according to ISO 4406), high quality diesel fuel that meets the EN590 specifications listed below:

- Sulfur-free diesel fuel defined as 10 mg/kg (10 ppm) sulfur maximum.
- Diesel fuel with cetane number of 51.0 and above.

NOTE: Biodiesel blend fuel may also be used in this machine. Biodiesel blend fuel must contain no more than 5% biodiesel mixed with sulfur-free petroleum based diesel. This biodiesel blend fuel is commonly marketed as B7 blended diesel fuel. B7 blended diesel fuel must meet EN590 specifications.

Biodiesel Blend Fuel

Biodiesel blend fuel has unique qualities that should be considered before using in this machine:

- Cold weather conditions can lead to plugged fuel system components and hard starting.
- Biodiesel blend fuel is an excellent medium for microbial growth and contamination, which can cause corrosion and plugging of fuel system components.

- Use of biodiesel blend fuel may result in premature failure of fuel system components, such as plugged fuel filters and deteriorated fuel lines.
- Shorter maintenance intervals may be required, such as cleaning the fuel system and replacing fuel filters and fuel lines.
- Using biodiesel blended fuels containing more than the recommended amount of biodiesel can affect engine life and cause deterioration of hoses, tubelines, injectors, injector pump, and seals. (See Fuel Specifications on Page 156)

Apply the following guidelines if biodiesel blend fuel is used:

- Ensure the fuel tank is as full as possible at all times to prevent moisture from collecting in the fuel tank.
- Ensure that the fuel tank cap is securely tightened.
- Biodiesel blend fuel can damage painted surfaces. Remove all spilled fuel from painted surfaces immediately.
- Drain all water from the fuel filter daily before operating the machine.
- Do not exceed engine oil change interval. Extending oil change intervals can cause engine damage.
- Before vehicle storage, drain the fuel tank, refill with 100% petroleum diesel fuel, add fuel stabiliser, and run the engine for at least 30 minutes.

NOTE: Biodiesel blend fuel does not have long-term stability and should not be stored for more than three months.

Filling The Fuel Tank

WARNING

FIRE AND EXPLOSION HAZARD

Failure to follow instructions can cause serious injury or death. Stop the engine and allow it to cool before adding fuel. NO SMOKING! ◀

W-2063

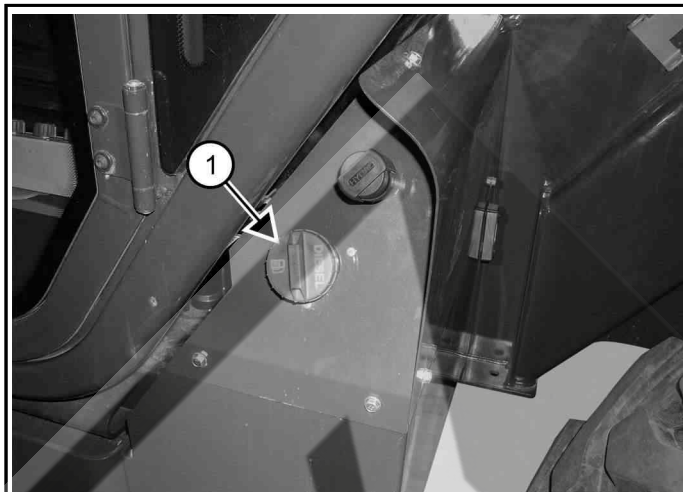
WARNING

FIRE AND EXPLOSION HAZARD

Failure to use care around combustibles can cause serious injury or death. Always clean up spilled flammable fluids or oil. Keep heat, flames, sparks or lighted tobacco away from flammable fluids and oil. ◀

W-2103

Figure 265



C202367a

1. Remove the fuel fill cap (Item 1) [Figure 265].
2. Use a clean, approved safety container to add fuel of the correct specifications.

Add fuel only in an area that has free movement of air and no open flames or sparks. NO SMOKING!

3. Install and tighten the fuel fill cap (Item 1) [Figure 265].

Replacing The Fuel Tank Breather

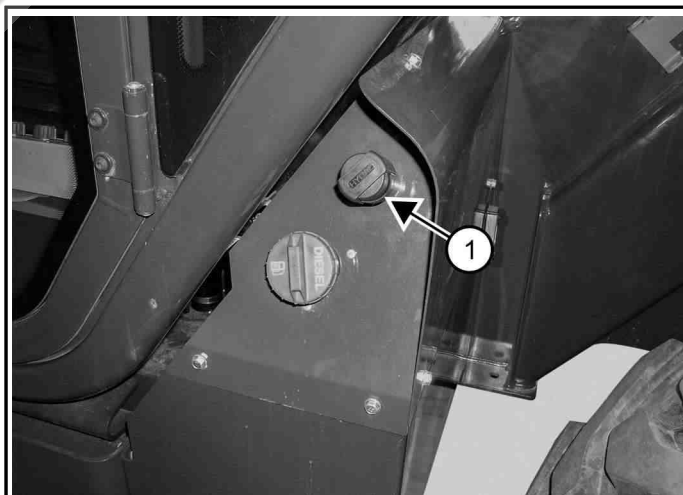
WARNING

FIRE AND EXPLOSION HAZARD

Failure to use care around combustibles can cause serious injury or death. Always clean up spilled flammable fluids or oil. Keep heat, flames, sparks or lighted tobacco away from flammable fluids and oil. ◀

W-2103

Figure 266



C202367b

1. Remove and discard the fuel tank breather (Item 1) [Figure 266].
2. Install a new fuel tank breather and tighten to 10 N·m (88 in-lb) torque.

Fuel Pre-Filter

WARNING

INJECTION HAZARD

Pressurised diesel fuel or hydraulic fluid can penetrate skin and eyes, causing serious injury or death.

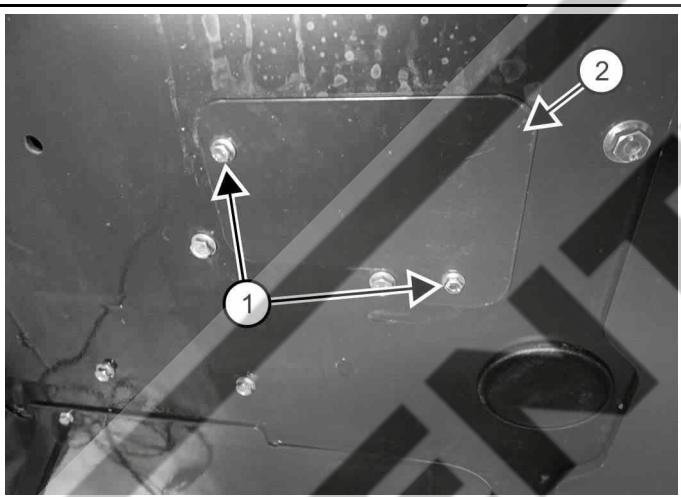
Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. **DO NOT** use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical attention from a doctor familiar with this injury. ◀

W-2072

See the service schedule for the service interval when to replace the fuel pre-filter.
(See Service Schedule on Page 141)

1. Stop the engine.

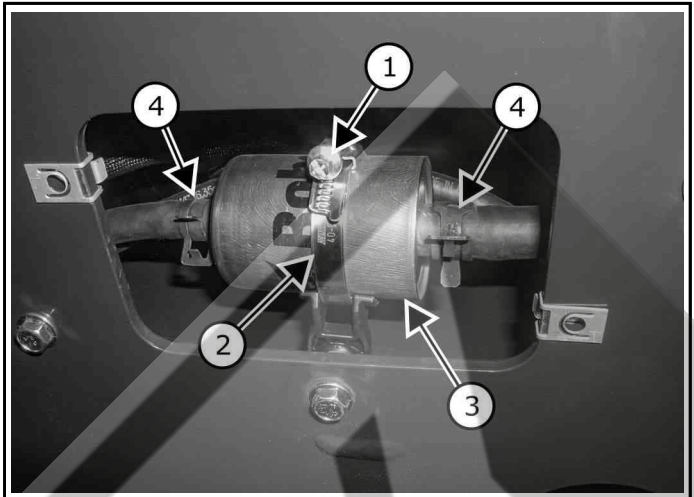
Figure 267



C209120a

2. Loosen the two bolts (Item 1) and remove the small cover (Item 2) [Figure 267] underneath the engine.
3. Place a suitable container under the filter in order to catch any fuel that might spill.
4. Clean up any spilled fuel.

Figure 268



P145711a

5. Loosen the clamp (Item 1) and remove the collar (Item 2) from the fuel pre-filter (Item 3) [Figure 268].
6. Loosen the clamps (Item 4) [Figure 268] on both sides of the fuel pre-filter.
7. Replace the fuel pre-filter and install the clamps.
8. Install the collar (Item 2) and tighten the clamp (Item 1) [Figure 268].
9. Dispose of drained fluid in an environmentally safe manner.
10. Remove air from the fuel system.
(See Removing Air From The Fuel System on Page 160)
11. Start the engine and allow to operate for one minute.
12. Stop the engine and check for leaks at the pre-filter.
13. Install the cover (Item 2) with the two bolts (Item 1) [Figure 267].

Fuel Filter

See the service schedule for the service interval when to replace the fuel filter.
(See Service Schedule on Page 141)

Removing Water

IMPORTANT

MACHINE DAMAGE HAZARD

Water in the fuel system can cause serious engine damage.

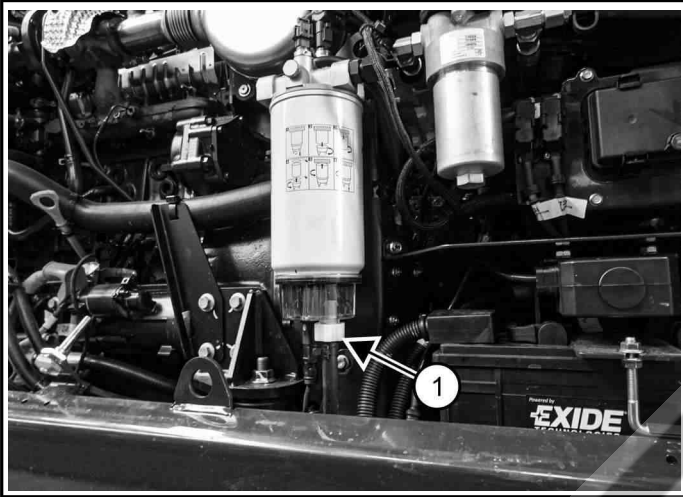
Remove water from the main fuel filter daily. ◀

I-2354

Presence of water in the fuel system is displayed on the display screen with an error code.
(See Monitoring The Standard Display During Operation on Page 90)

1. Stop the engine and open the engine cover.
2. Place a suitable container under the filter in order to catch any fuel that might spill. Clean up any spilled fuel.

Figure 269



3. Loosen the drain valve (Item 1) [Figure 269] at the bottom of the filter to remove trapped water from the filter.
4. When clean fuel drains from the filter, hand tighten the drain valve (Item 1) [Figure 269].
5. Dispose of drained fluid in an environmentally safe manner.
6. Close the engine cover.

Replacing Element

WARNING

INJECTION HAZARD

Pressurised diesel fuel or hydraulic fluid can penetrate skin and eyes, causing serious injury or death.

Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. DO NOT use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical attention from a doctor familiar with this injury.

W-2072

WARNING

FIRE AND EXPLOSION HAZARD

Failure to use care around combustibles can cause serious injury or death.

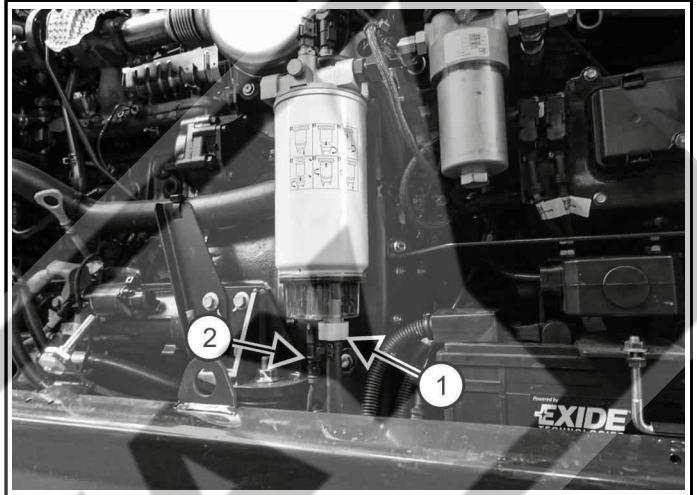
Always clean up spilled flammable fluids or oil. Keep heat, flames, sparks or lighted tobacco away from flammable fluids and oil.

W-2100

1. Stop the engine and open the engine cover.

2. Place a suitable container under the filter in order to catch any fuel that might spill.
3. Clean up any spilled fuel.
4. Clean the outside of the filter.

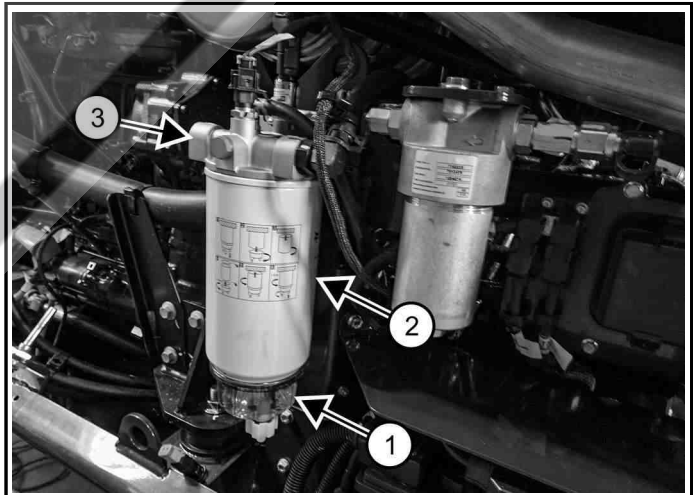
Figure 270



C209013b

5. Loosen the drain valve (Item 1) [Figure 270] and allow the fluid to drain into the container. Dispose of drained fluid in an environmentally safe manner.
6. When fuel stops draining from the filter, disconnect the electrical connector (Item 2) [Figure 270].

Figure 271



C209121a

7. Remove the fuel filter cap (Item 1) from the fuel filter element (Item 2) [Figure 271].
8. Remove the fuel filter element (Item 2) from the fuel filter head (Item 3) [Figure 271]. Do NOT remove the hoses from the fuel filter head.

Do NOT fill the new fuel filter element with fuel at this time.

9. Put clean oil on the two new fuel filter element O-rings, install the element, and tighten to 14 N•m (10 ft-lb) torque.
10. Install the fuel filter cap on the fuel filter element.
11. Connect the electrical connector (Item 2) [Figure 270].
12. Remove air from the fuel system.
(See Removing Air From The Fuel System on Page 160)
13. Close the engine cover.
14. Start the engine and allow to operate for one minute.
15. Stop the engine and check for leaks at the filter.
16. Close the engine cover.
2. Turn the key switch (Item 1) to RUN (Item 2) [Figure 272] (this will activate the electrical fuel pump relay).
3. Leave the ignition key in the Run position (Item 2) [Figure 272] for three minutes.
4. Crank the engine with the accelerator pedal released (low idle position) until the engine starts.
5. Run the engine at low idle for approximately five seconds then cycle the accelerator pedal from the low idle position to the high idle position three times. The time to cycle the accelerator pedal should take five to ten seconds. This will assist in displacing any residual trapped air in the fuel injection pump.
6. Check for fuel leaks in the fuel system.

Removing Air From The Fuel System

WARNING

INJECTION HAZARD

Pressurised diesel fuel or hydraulic fluid can penetrate skin and eyes, causing serious injury or death.

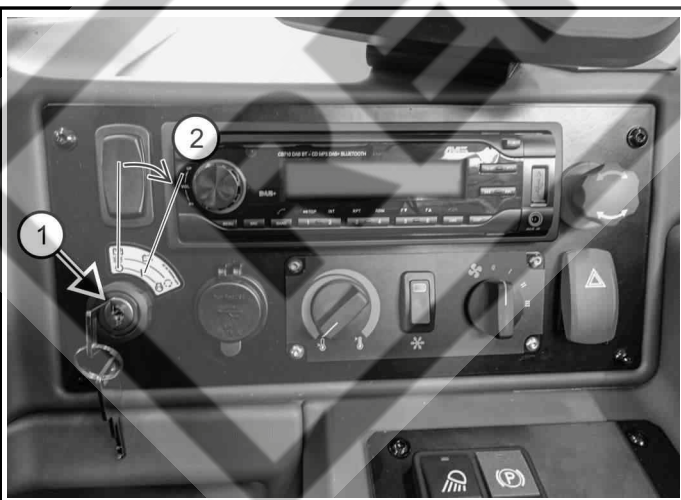
Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. **DO NOT** use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical attention from a doctor familiar with this injury.

W-2072

Perform the following procedure before starting the engine when air is found in the system and always after any fuel component replacement and repair, including the fuel filter and when the fuel tank has run out of fuel.

1. Ensure all low-pressure and high-pressure fuel connections are installed correctly.

Figure 272



C211777c

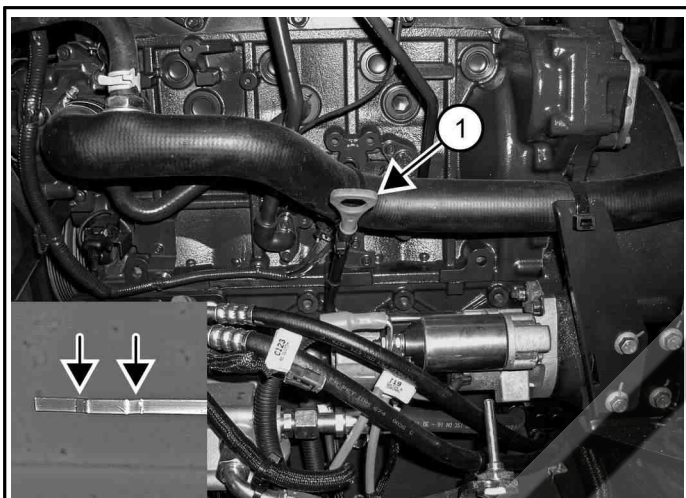
ENGINE LUBRICATION SYSTEM

Checking And Adding Engine Oil

Check the engine oil level every day before starting the engine for the work shift.

1. Stop the engine.

Figure 273



2. Open the engine cover and remove the dipstick (Item 1) [Figure 273].
3. Keep the oil level between the marks on the dipstick (Inset) [Figure 273]. Do not overfill.

Engine Oil Chart

ENGINE CRANKCASE OIL	
Recommended SAE Viscosity Number	
Refer to the temperature range anticipated before next oil change.	
Must use API Category CK-4 or better or ACEA E9 or better.	
Do not use API category FA-4 engine oil.	
[1] SAE 10W-30	
[2] SAE 15W-40	

Bobcat engine oils are recommended for use in this machine. If Bobcat engine oil is not available, use a good quality engine oil that meets API Service Category of CK-4 or better, or ACEA E9 or better.

⚠ IMPORTANT

MACHINE DAMAGE HAZARD

Failure to follow directions may result in severe engine damage.

Use of API Service Category FA-4 engine oil is not approved and may cause irreversible damage to the engine. ◀

I-2384

Removing And Replacing Oil And Filter

⚠ WARNING

IMPACT AND INJECTION HAZARDS

Flying debris or pressurised fluids can cause serious injury or death.

Wear safety glasses to prevent eye injury when any of the following conditions exist:

- When fluids are under pressure.
- Flying debris or loose material.
- Engine is running.
- Tools are being used. ◀

W-2019

⚠ WARNING

FIRE AND EXPLOSION HAZARD

Failure to use care around combustibles can cause serious injury or death.

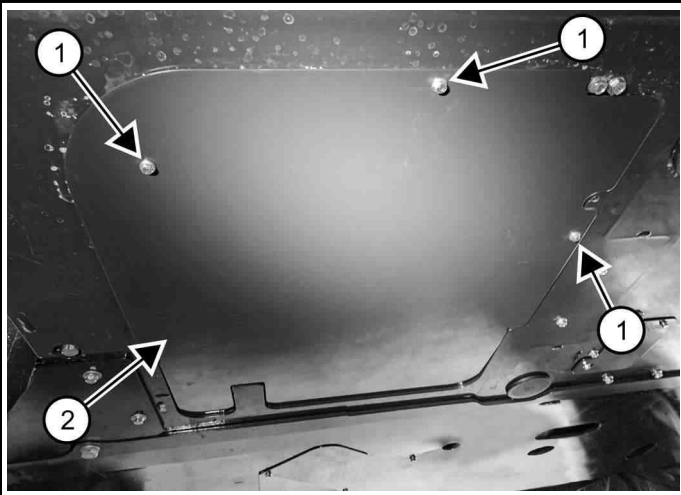
Always clean up spilled flammable fluids or oil. Keep heat, flames, sparks or lighted tobacco away from flammable fluids and oil. ◀

W-2103

See the service schedule for correct service interval for replacing the engine oil and filter.
(See Service Schedule on Page 141)

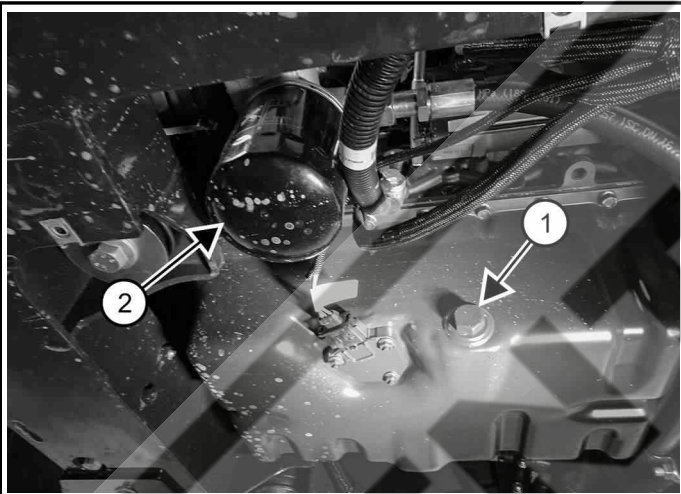
1. Run the engine until it is at operating temperature. Stop the engine.
2. Open the engine cover.

Figure 274



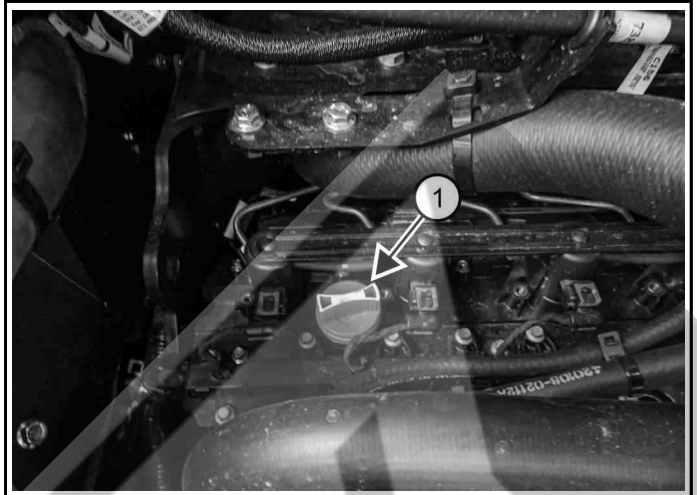
3. Remove the three bolts (Item 1) and the cover (Item 2) [Figure 274] at the bottom of the frame.

Figure 275



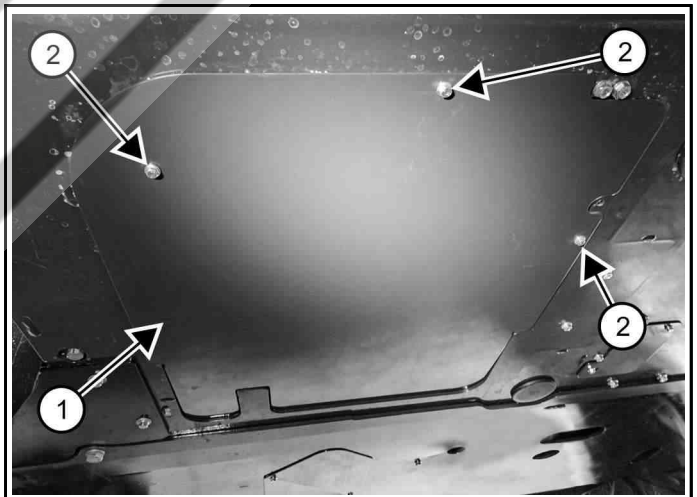
4. Remove the oil drain plug (Item 1) [Figure 275] from the oil drain fitting and drain the oil into a container. Recycle or dispose of used oil in an environmentally safe manner.
5. Fit a new sealing ring to the oil drain plug.
6. Install the oil drain plug.
7. Place a suitable container under the oil filter (Item 2) [Figure 275] in order to catch any oil that might spill. Clean up any spilled oil.
8. Remove the oil filter (Item 2) [Figure 275] and clean the filter base.
9. Put clean oil on the new filter gasket, install the new filter and hand tighten. Use genuine Bobcat filter only.

Figure 276



10. Clean the area around the oil fill cap (Item 1) [Figure 276].
11. Remove the oil fill cap (Item 1) [Figure 276].
12. Put oil in the engine. For capacity, For type,
13. Install oil fill cap (Item 1) [Figure 276], start the engine and let it run for several minutes.
14. Stop the engine and check for leaks at the oil filter.
15. Add oil as needed, if it is not between the marks on the dipstick.
(See Checking And Adding Engine Oil on Page 161)

Figure 277



16. Install the cover (Item 1) at the bottom of the frame using the three bolts (Item 2) [Figure 277].

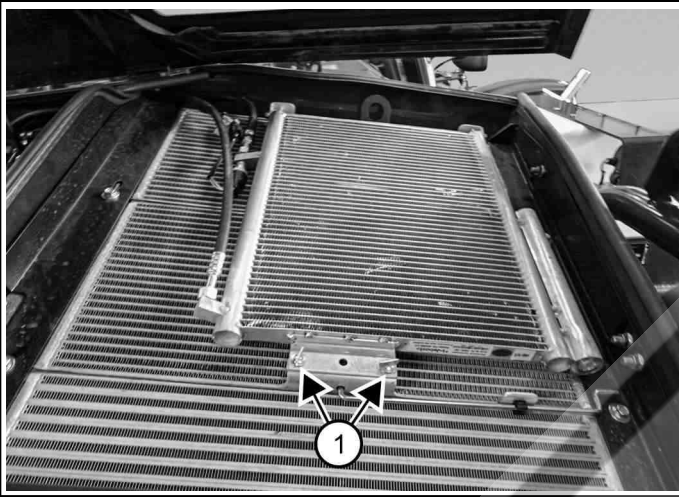
COOLING SYSTEM

- Check the cooling system every day to prevent overheating, loss of performance or engine damage.

Cleaning The Cooling System

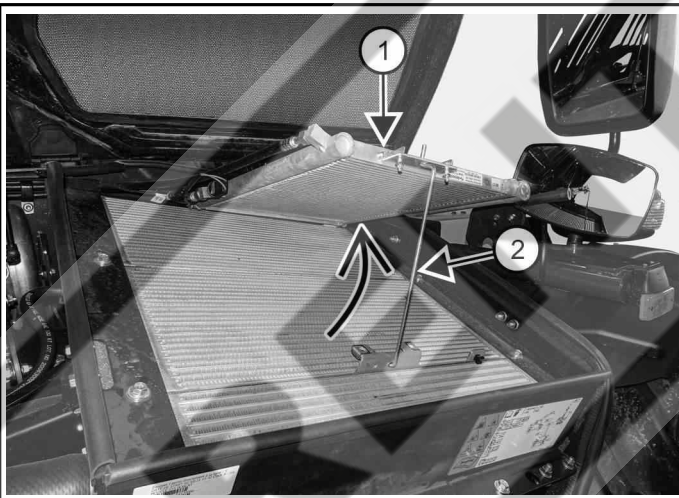
1. Stop the engine and open the engine cover.

Figure 278



2. Loosen the two screws (Item 1) [Figure 278].

Figure 279



3. Raise the condenser (Item 1) and keep in position by installing the rod (Item 2) [Figure 279] in the condenser mount.
4. Use low pressure air to clean the top and bottom of the cooler. Be careful not to damage fins.
5. Remove the rod (Item 2) [Figure 279], lower the condenser and tighten the two screws (Item 1) [Figure 278].

Checking Coolant Level

⚠ IMPORTANT

MACHINE DAMAGE HAZARD

The incorrect ratio of water to coolant will reduce cooling system efficiency and may lead to premature engine failure.

- Always use the correct ratio of water to coolant.
- Always add a premixed solution.†

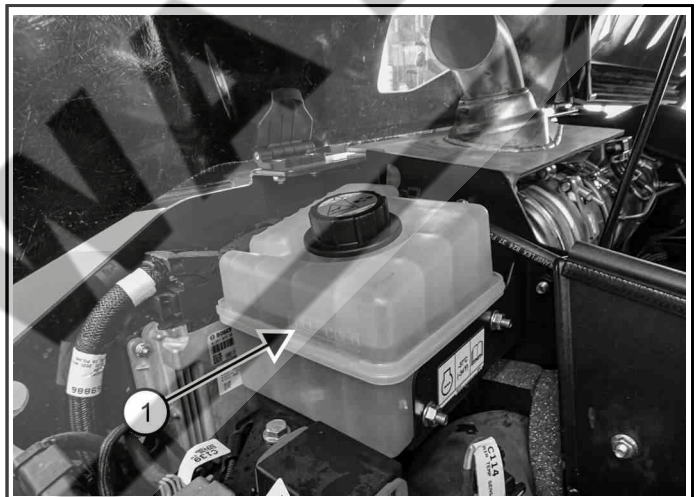
I-2124

Always check coolant level before operating the machine. Lack of engine coolant will result in engine damage.

The cooling system is factory filled with ethylene glycol (EG) coolant. DO NOT mix ethylene glycol with propylene glycol.

1. Stop the engine and allow the engine to cool. Open the engine cover.

Figure 280



2. Check coolant level using the level markers (Item 1) [Figure 280] on the tank. Coolant must be between MIN and MAX level markers when the engine is cold.
3. Use a refractometer to check the condition of ethylene glycol in your cooling system.
4. Add premixed coolant to the tank if the coolant level is low.
5. Close the engine cover.

Removing And Replacing The Coolant

⚠ IMPORTANT

MACHINE DAMAGE HAZARD

The incorrect ratio of water to coolant will reduce cooling system efficiency and may lead to premature engine failure.

- Always use the correct ratio of water to coolant.
- Always add a premixed solution.†

I-2124

⚠ WARNING

IMPACT AND INJECTION HAZARDS

Flying debris or pressurised fluids can cause serious injury or death.

Wear safety glasses to prevent eye injury when any of the following conditions exist:

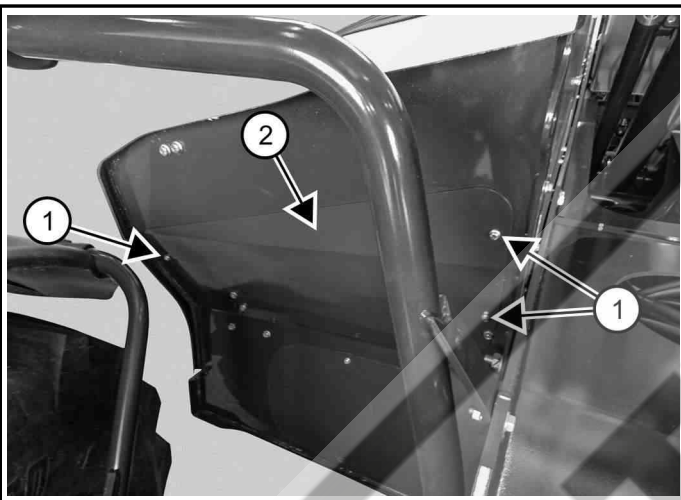
- When fluids are under pressure.
- Flying debris or loose material.
- Engine is running.
- Tools are being used.

W-2019

See the service schedule for correct service intervals.
(See Service Schedule on Page 141)

1. Stop the engine. Open the engine cover.

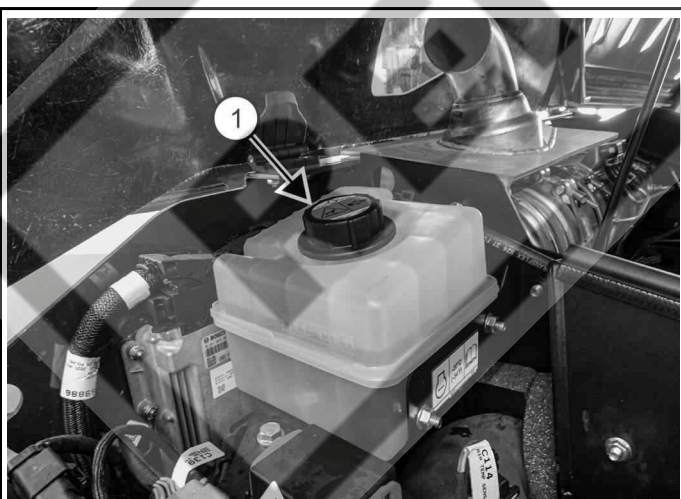
Figure 281



C21225a

2. Remove the three bolts (Item 1) and the cover (Item 2) [Figure 281].

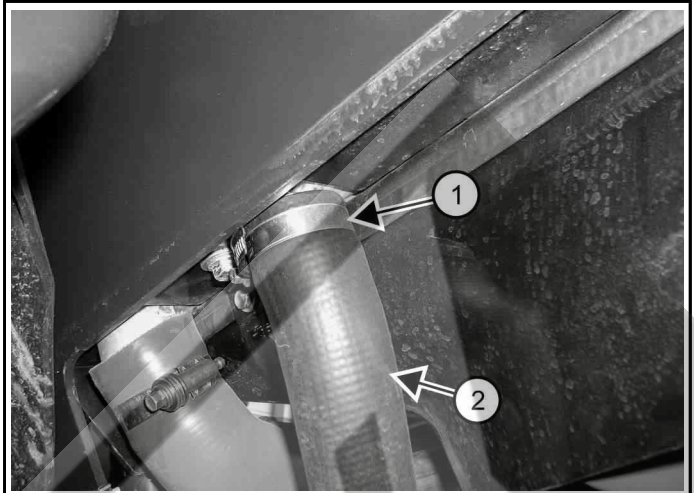
Figure 282



C209125b

3. When the engine is cool, remove the coolant fill cap (Item 1) [Figure 282].

Figure 283



C202370b

4. Loosen the clamp (Item 1) and remove the hose (Item 2) [Figure 283] from the radiator. Drain all of the coolant into a container. Recycle or dispose of used coolant in an environmentally safe manner.

When installing, tighten the clamp (Item 1) [Figure 283] to 3 - 4 N·m (25 - 35 in-lb) torque.

5. Add premixed coolant to the coolant tank until the coolant level reaches the MIN marker on the tank. Install the coolant fill cap (Item 1) [Figure 282]. For the correct coolant:
(See Lubricants, Fuel, And Fluids on Page 14)
6. Follow these steps when using concentrated coolant instead of a ready-to-use premix:
 - a. Use a separate container to mix the coolant.
 - b. The correct mixture proportions of coolant to provide a -37°C (-34°F) freeze protection are 50% demineralised water and 50% ethylene glycol. For instance, to get 8 L OR 2 U.S. gal of mixture, mix 4 L ethylene glycol with 4 L of water OR 1 U.S. gal ethylene glycol with 1 U.S. gal of water.
 - c. Add premixed coolant to the coolant tank until the coolant level reaches the lower marker on the tank (Item 1).
(See Checking Coolant Level on Page 163)
7. Install the coolant fill cap (Item 1) [Figure 282]. Tighten the coolant fill cap until the cap clicks.
8. Close the engine cover.
9. Run the engine until coolant reaches normal operating temperature. Stop the engine.
10. Check the coolant level when cool. Add coolant as needed. (See Checking Coolant Level on Page 163)

ELECTRICAL SYSTEM

Electrical System Description

The telescopic handler has a 12volt (V), negative ground alternator charging system. The electrical system is protected against an electrical overload by fuses.

The cause of an overload must be found before starting the engine again.

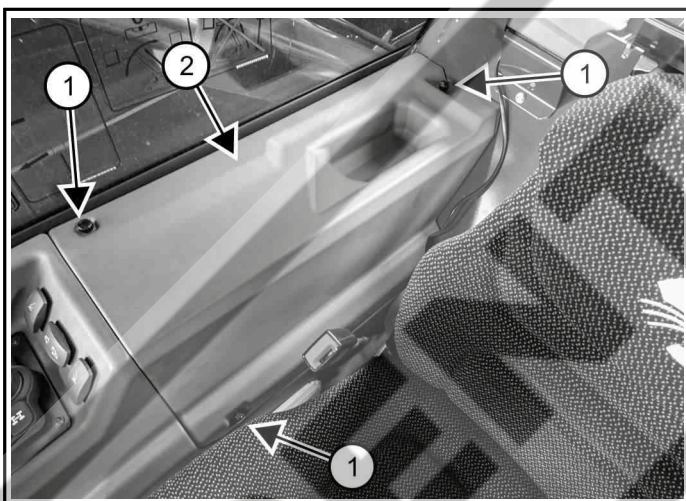
Fuses And Relays Location / Identification

The electrical system is protected by fuses and relays in four locations:

- In the cab.
(See Operator Cab Fuse Panel on Page 165)
- On the rear frame.
(See Mainframe Fuse Panel on Page 167)
- In the front right corner of the engine compartment.
(See Engine Fuse Panel on Page 168) and
- In the rear of the engine compartment.

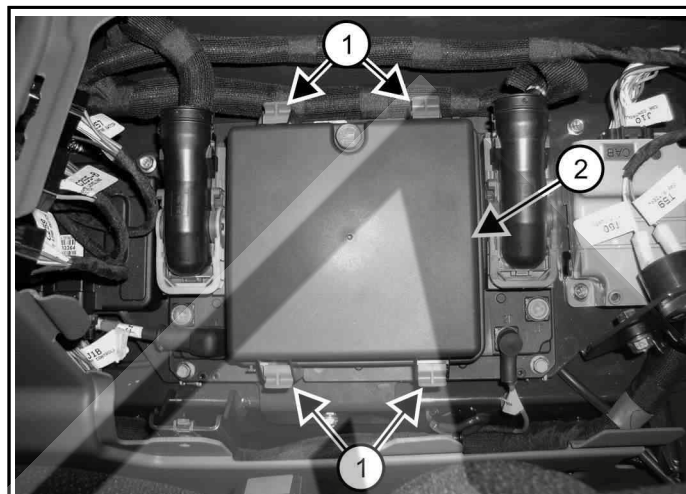
Operator Cab Fuse Panel

Figure 284



1. Loosen the retainer screws (Item 1) and remove the console cover (Item 2) [Figure 284].

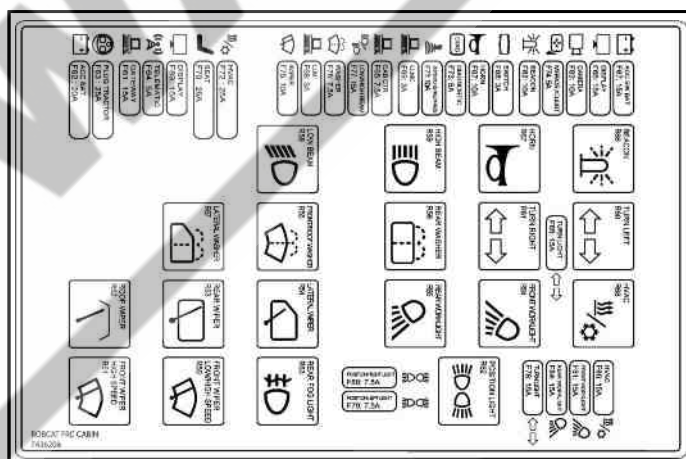
Figure 285



2. Loosen the latches (Item 1) and remove the cover (Item 2) [Figure 285] to check or replace fuses or relays.

Operator Cab Fuses And Relays

Figure 286

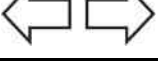


Fuse location and amperage ratings are shown in the table below and on the decal [Figure 286]. Relays are identified by the letter "R" in the AMP column.

REF	ICON	DESCRIPTION	AMP
F61		Gateway Controller	15
F62		Accessories	20
F63		Plug Tractor	15

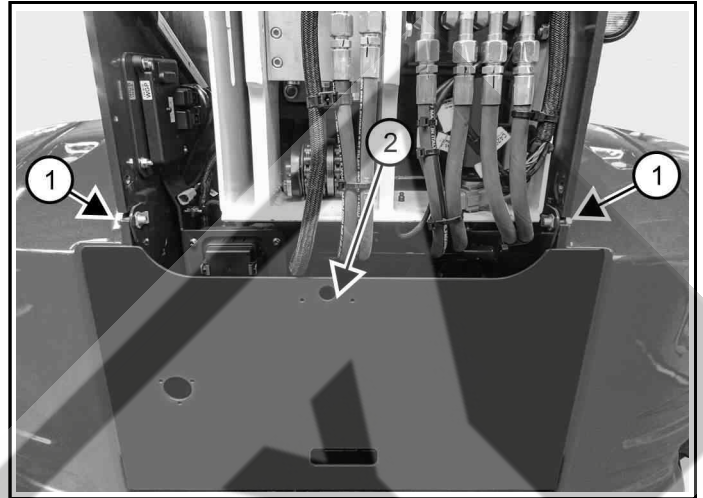
REF	ICON	DESCRIPTION	AMP
F64		Telematics (Bobcat® Machine IQ wireless communications)	5
F65		Cab Controller	7,5
F66		Display	15
F67		Accessories / Switches	15
F68		LLMI	3
F69		LLMC	3
F70		Seat	25
F71		Joysticks / Keypads	10
F72		Heater / HVAC	25
F73		Diagnostic	5
F74		Mirror Adjustment	5
F75		Wiper	10
F76		Washer	7,5
F77		Low / High Beam	15
F78		Turn Light	15

REF	ICON	DESCRIPTION	AMP
F79		Position Left Light	7,5
F80		Position Right Light	7,5
F81		Front Work Light	15
F82		Beacon	10
F83		Camera	10
F84		Rear Work Light	15
F85		Turn Light	15
F86		Heater / HVAC	15
F87		Horn	10
F88		Switches	3
F89		Display	15
R50		Front Wiper Low / High Speed	R
R51		Front Wiper High Speed	R
R52		Roof Wiper	R
R53		Rear Wiper	R

REF	ICON	DESCRIPTION	AMP
R54		Lateral Wiper	R
R55		Front / Roof Washer	R
R56		Rear Washer	R
R57		Lateral Washer	R
R58		Low Beam	R
R59		High Beam	R
R60		Turn Left	R
R61		Turn Right	R
R62		Position Light	R
R63	 NA20330	Rear Fog Light	R
R64		Front Work Light	R
R65		Rear Work Light	R
R66		Beacon	R
R67		Front Horn	R
R68		Heater / HVAC	R

Mainframe Fuse Panel

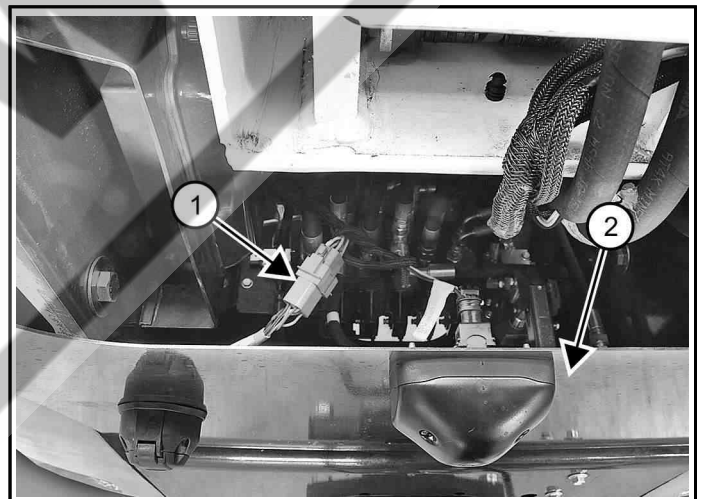
Figure 287



1. Loosen the two bolts (Item 1) and tilt the cover (Item 2) [Figure 287] back.

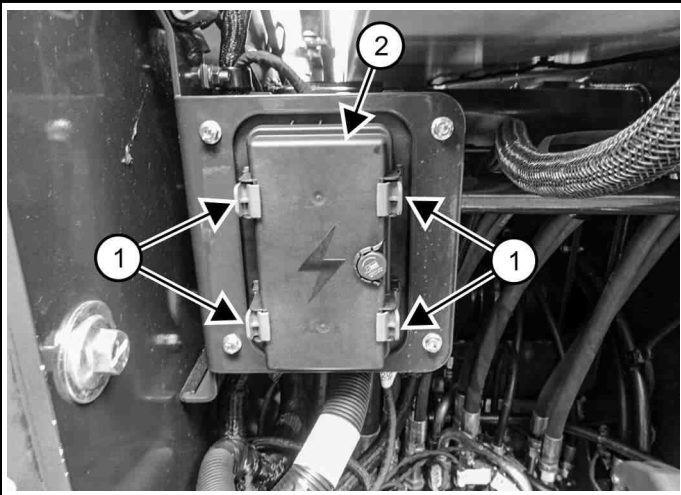
When installing, tighten the bolts (Item 1) [Figure 287] to maximum 16 N·m (12 ft-lb) torque.

Figure 288



2. Disconnect the connectors (if equipped) (Item 1) and remove the cover (Item 2) [Figure 288].

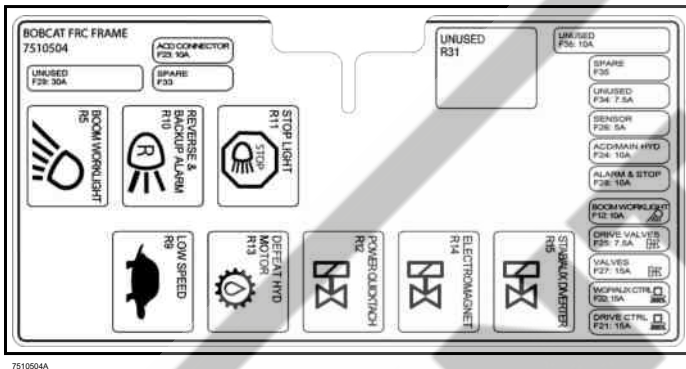
Figure 289



3. Open the four latches (Item 1) and remove the cover (Item 2) [Figure 289] to check or replace fuses or relays.

Mainframe Fuses And Relays

Figure 290



Fuse location and amperage ratings are shown in the table below and on the decal [Figure 290]. Relays are identified by the letter "R" in the AMP column.

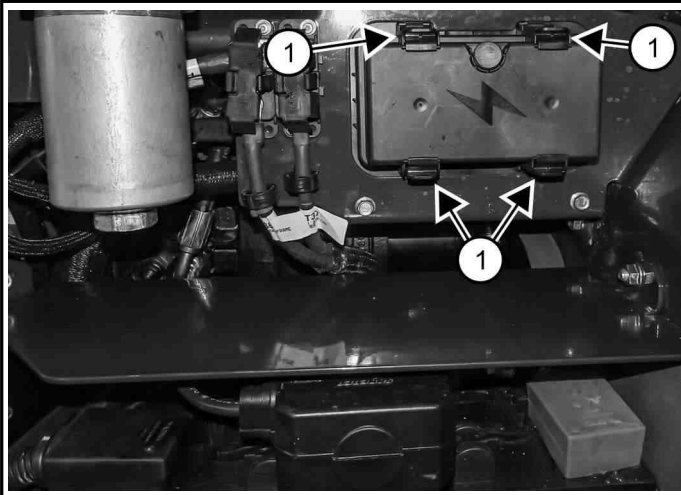
REF.	ICON	DESCRIPTION	AMP
F12		Boom Worklight	10
F21		Drive Controller	15
F22		Workgroup / Auxiliary Controller	15
F23		Attachment Control Device (ACD) Connector	10
F24		ACD / Main Hyd	10

REF.	ICON	DESCRIPTION	AMP
F25		Drive Valves	7,5
F26		Sensor	5
F27		Valves	15
F28		Alarm and Stop	10
F29		Not used	—
F33		Not used	—
F34		Not used	—
F35		Not used	—
F36		Not used	—
R5		Boom Work Light	R
R9		Low Speed	R
R10		Reverse And Backup Alarm	R
R11		Stop Light	R
R12		Power Quick-tach	R
R13		Defeat Hyd Motor	R
R14		Electromagnet	R
R15		Stabilisers / Auxiliary Diverter	R
R31		Not used	—

Engine Fuse Panel

1. Open the engine cover.

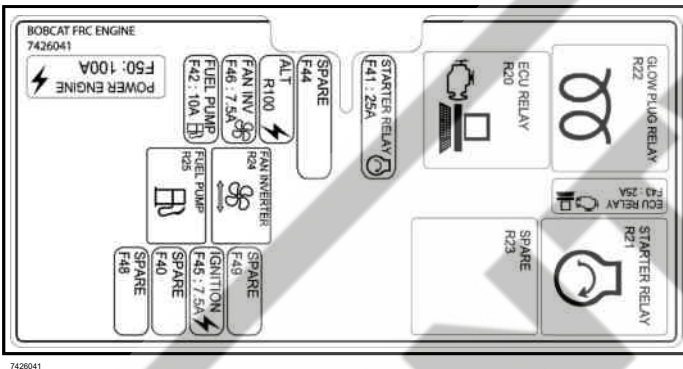
Figure 291



2. Open the four latches (Item 1) and remove the cover (Item 2) [Figure 291] to check or replace fuses or relays.

Engine Fuses And Relays

Figure 292



Fuse location and amperage ratings are shown in the table below and on the decal [Figure 292]. Relays are identified by the letter "R" in the AMP column.

REF.	ICON	DESCRIPTION	AMP
F40		Not used	—
F41		Starter	25
F42		Fuel Pump	10
F43		ECU	25
F44		Not used	—

REF.	ICON	DESCRIPTION	AMP
F45		Ignition	7,5
F46		Fan Inverter	7,5
F48		Not used	—
F49		Not used	—
F50		Engine Power	100
R20		ECU Relay	R
R21		Starter Relay	R
R22		Glow Plug Relay	R
R23		Not used	—
R24		Fan Inverter	R
R25		Fuel Pump	R
R10-0		Alternator	100 ohm

Master Fuse Panel

Figure 293

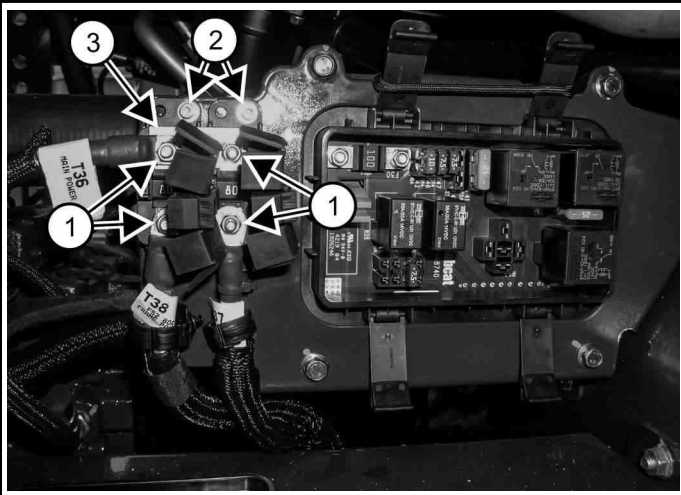
The master fuses (Item 1) [Figure 293] are located inside the engine bay above the battery.

Fuse location and amperage ratings are shown in the table below.

REF.	FUSE	DESCRIPTION	AMP
1	F51	Cab Power	80
2	F52	Frame Power	80

Follow the procedure below to replace the master fuses:

Figure 294

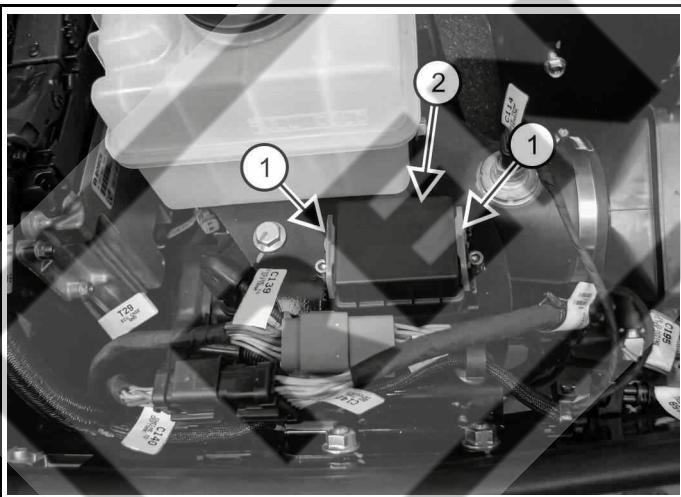


1. Remove the four nuts and washers (Item 1) [Figure 294].
 2. Remove the four bolts and nuts (Item 2) [Figure 294] to remove the master fuse modules.
- When installing, apply Loctite® #242 to the threads of the bolts.
3. If needed, replace the buss bar (Item 3) [Figure 294].

DEF Tank Fuse Panel

1. Open the engine cover.
(See Engine Cover on Page 151)

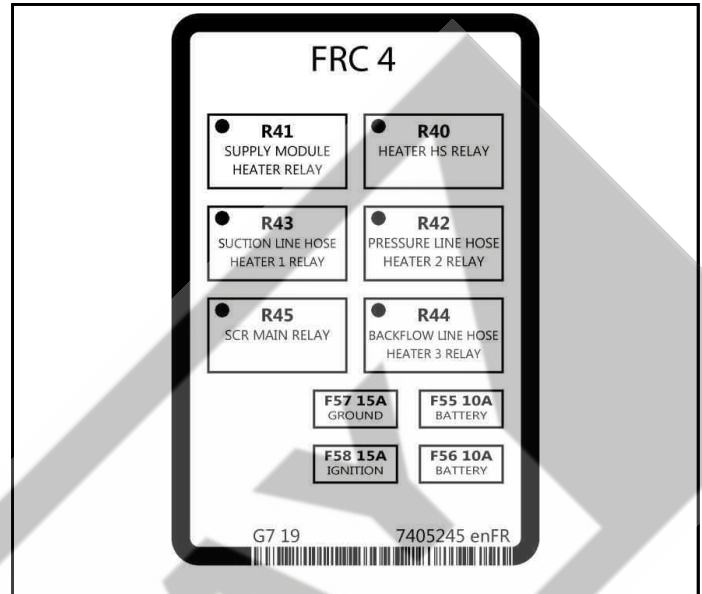
Figure 295



2. Pull out the two latches (Item 1) and remove the cover (Item 2) [Figure 295] to check or replace fuses or relays.

DEF Tank Fuses And Relays

Figure 296



Fuse location and amperage ratings are shown in the table below and on the decal [Figure 296]. Relays are identified by the letter "R" in the AMP column.

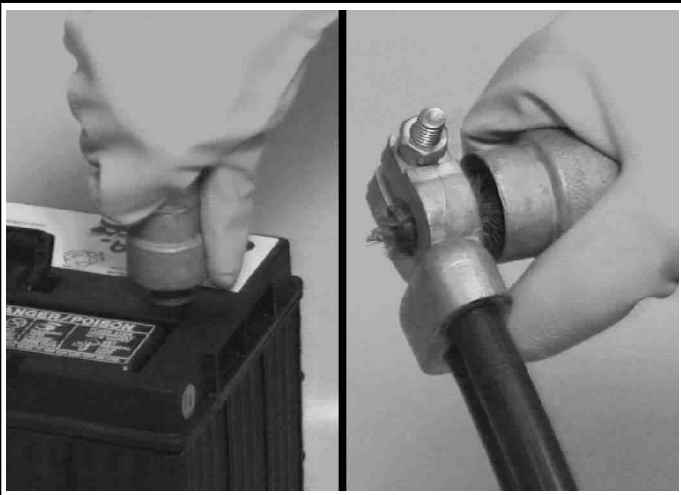
REF.	DESCRIPTION	AMP
F55, F56	Battery	10
F57	Ground	15
F58	Ignition	15
R40	Heater High Side Relay	R
R41	Supply Module Heater Relay	R
R42	Pressure Line Hose Heater 2 Relay	R
R43	Suction Line Hose Heater 1 Relay	R
R44	Backflow Line Hose Heater 3 Relay	R
R45	SCR Main Relay	R

Battery Maintenance

See the Service Schedule for the correct service interval.

The Bobcat brand battery supplied with your machine is sealed and does not require watering. Proper charging and storage are important to maximise the life of all batteries.

Figure 297



P200188

Simple steps for reliability and long battery life:

- Keep battery posts and terminals clean [Figure 297].
- Keep terminals tight.
- Remove corrosion from battery and terminals with sodium bicarbonate (baking soda) and water solution.
- Put Bobcat Battery Saver or grease on the battery terminals and cable ends to prevent corrosion.
- Operate the machine for at least 15 minutes to recover from the battery drain caused by engine start up whenever practical.
- Maintain the battery charge level. This is a key factor for long battery life.
- Charge a severely discharged battery with a battery charger instead of relying on the machine charging system.
- Check the battery state of charge every 30 days on machines that are not frequently used.

⚠ WARNING

CHEMICAL HAZARD

Contact with or ingestion of battery acid can cause serious injury or death.

- Batteries contain acid that burns eyes and skin on contact. Wear safety goggles, protective clothing, and rubber gloves to keep acid off body.
- In case of acid contact, wash immediately with water. In case of eye contact, get prompt medical attention and wash eye with clean, cool water for at least 5 minutes.
- If electrolyte is ingested, drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention. ◀

W-2065

Using A Booster Battery (Jump Starting)

⚠ WARNING

EXPLOSION HAZARD

Battery gas can explode and cause serious injury or death.

- Keep arcs, sparks, flames and lighted tobacco away from batteries. When jumping from booster battery make final connection (negative) at machine frame.
- Do not jump start or charge a frozen or damaged battery. Warm battery to 16°C (60°F) before connecting to a charger. Unplug charger before connecting or disconnecting cables to a battery. Never lean over battery while boosting, testing or charging. ◀

W-2066

⚠ IMPORTANT

MACHINE DAMAGE HAZARD

Damage to the alternator can occur

Do not operate machine if:

- Engine is operated with battery cables disconnected.
- Battery cables are connected when using a fast charger or when welding on the machine. Remove both cables from the battery.
- Extra battery cables (booster cables) are connected wrong. ◀

I-2023

⚠ IMPORTANT

MACHINE DAMAGE HAZARD

Running the engine with the engine cover open can cause damage to the engine cover.

Keep the engine cover closed when the engine is running. ◀

I-2432

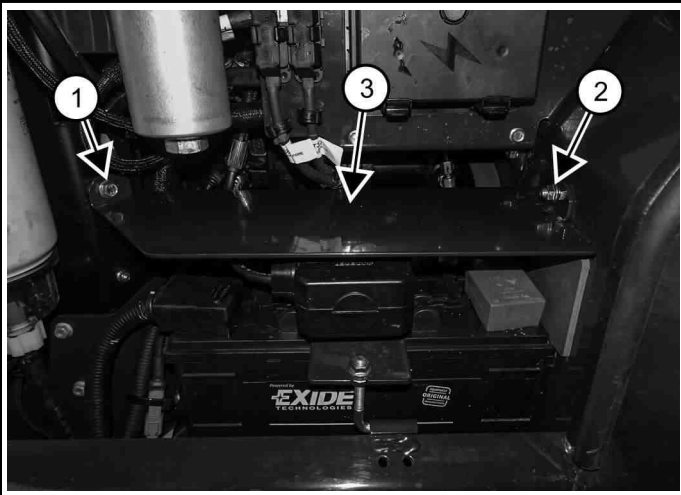
If it is necessary to use a booster battery to start the engine, BE CAREFUL! There must be one person in the operator's seat and one person to connect and disconnect the battery cables.

The key switch (if equipped) or start switch (if equipped) must be OFF. The booster battery must be 12V.

Engine cover must be closed after engine is started.

1. Open the engine cover.

Figure 298

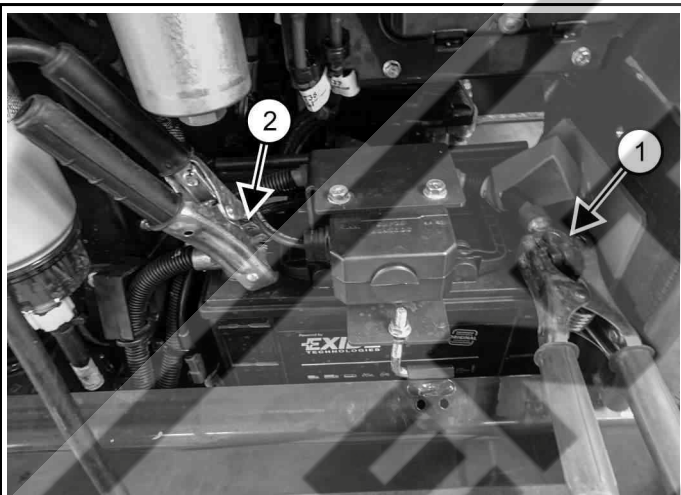


C210363a

2. Remove the bolt (Item 1) and nut (Item 2). Remove the battery cover (Item 3) [Figure 298].

Before installing, apply Loctite #242 to the threads of the bolts.

Figure 299



C210368a

3. Connect the end of the first cable to the positive (+) terminal of the booster battery. Connect the other end of the same cable to the positive (+) terminal (Item 1) [Figure 299] of the machine battery.
4. Connect the end of the second cable to the earth (-) terminal of the booster battery. Connect the other end of the same cable to the earth (-) terminal (Item 2) [Figure 299] on the machine starter.
5. Keep cables away from moving parts. Start the engine.
6. After the engine has started, remove the earth (-) cable (Item 2) [Figure 299] first.
7. Remove the cable from the positive (+) terminal (Item 1) [Figure 299].

8. Install the battery cover (Item 3) with bolt (Item 1) and nut (Item 2) [Figure 298].
9. Close the engine cover immediately after battery cover is installed.

Removing And Installing The Battery

⚠ WARNING

CHEMICAL HAZARD

Contact with or ingestion of battery acid can cause serious injury or death.

- Batteries contain acid that burns eyes and skin on contact. Wear safety goggles, protective clothing, and rubber gloves to keep acid off body.
- In case of acid contact, wash immediately with water. In case of eye contact, get prompt medical attention and wash eye with clean, cool water for at least 5 minutes.
- If electrolyte is ingested, drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention.†

W-2065

⚠ WARNING

EXPLOSION HAZARD

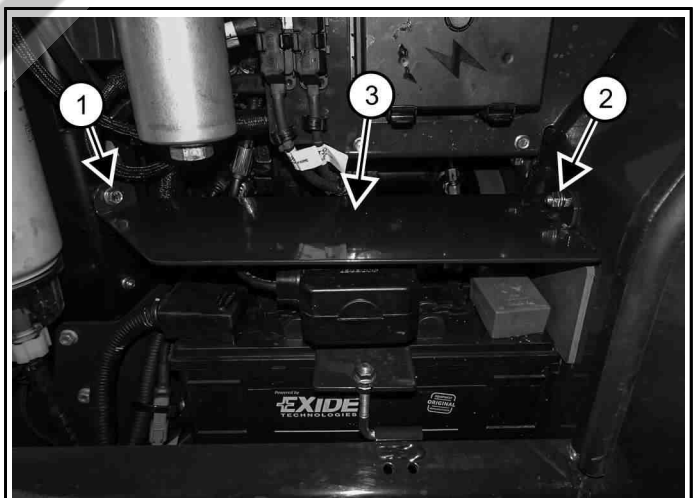
Battery gas can explode and cause serious injury or death.

- Keep arcs, sparks, flames and lighted tobacco away from batteries. When jumping from booster battery make final connection (negative) at machine frame.
- Do not jump start or charge a frozen or damaged battery. Warm battery to 16°C (60°F) before connecting to a charger. Unplug charger before connecting or disconnecting cables to a battery. Never lean over battery while boosting, testing or charging.†

W-2066

1. Open the engine cover.

Figure 300

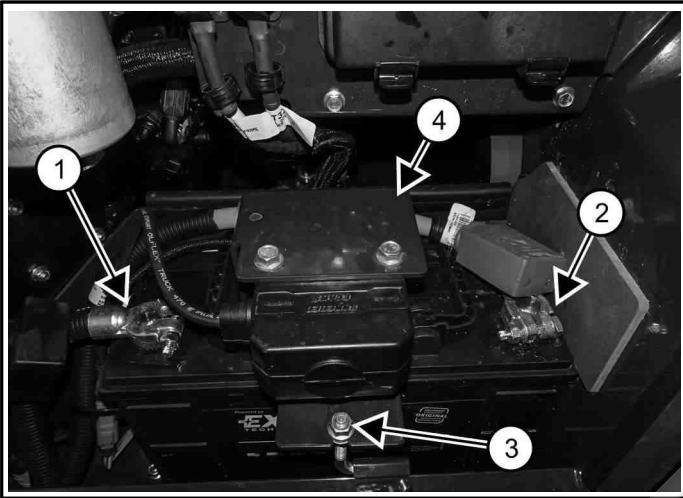


C210363a

2. Remove the bolt (Item 1) and nut (Item 2). Remove the battery cover (Item 3) [Figure 300].

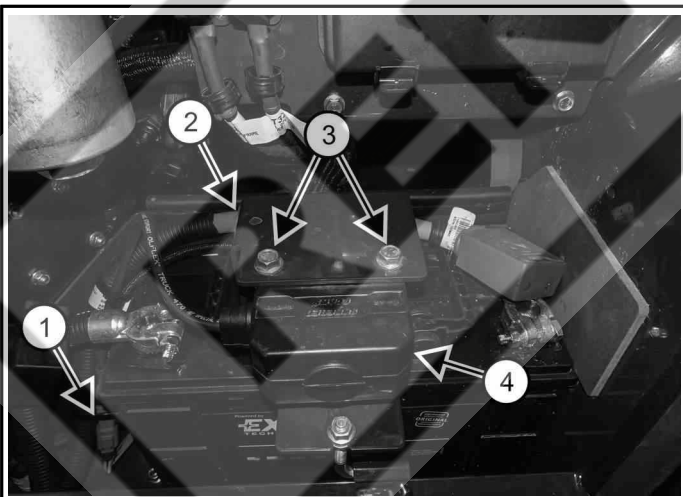
When installing, apply Loctite #242 to the threads of the bolts.

Figure 301



3. Always disconnect the ground (-) cable (Item 1) [Figure 301] first to prevent sparks.
 4. Remove the positive (+) battery cable (Item 2) [Figure 301].
- When installing, tighten the bolts to 5 - 10 N•m (44 - 88 in-lb) torque.
5. Remove the nut (Item 3) [Figure 301].
 6. Reposition the hold-down plate (Item 4) [Figure 301] including the battery disconnect switch.
 7. Remove the battery.

Figure 302



8. If needed, disconnect the connector (Item 1) and remove the cables from the battery disconnect switch terminals (Item 2) [Figure 302].

When installing, tighten the nuts (Item 2) [Figure 302] to 11 - 17 N•m (8 - 12 ft-lb) torque.

9. Remove the two bolts (Item 3) and remove the battery disconnect switch (Item 4) [Figure 302] from the hold-down plate.

When installing, tighten the bolts to 9 - 11 N•m (80 - 97 in-lb) torque.

Figure 303



10. Always clean the battery terminals and cable ends when installing a new or used battery [Figure 303].
11. When installing the battery, do not touch any metal parts with the battery terminals.
12. Connect and tighten the battery cables. Connect the ground (-) cable last to prevent sparks.

HYDRAULIC / HYDROSTATIC SYSTEM

Checking And Adding Fluid

WARNING

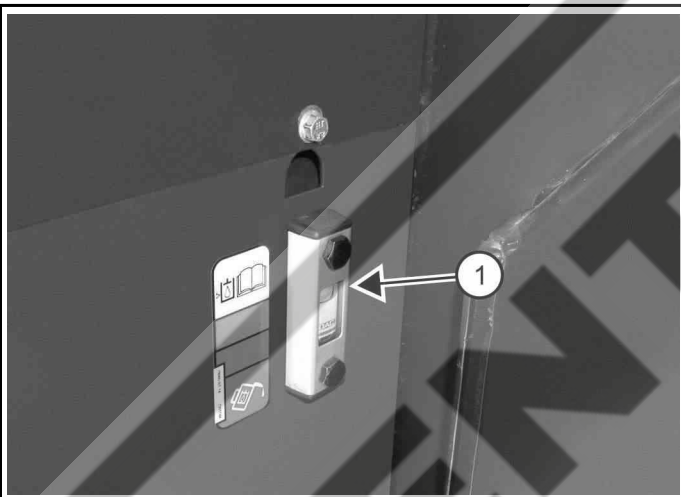
FIRE AND EXPLOSION HAZARD

Failure to use care around combustibles can cause serious injury or death. Always clean up spilled flammable fluids or oil. Keep heat, flames, sparks or lighted tobacco away from flammable fluids and oil.

Use only recommended fluid in the hydraulic system. (See Lubricants, Fuel, And Fluids on Page 14)

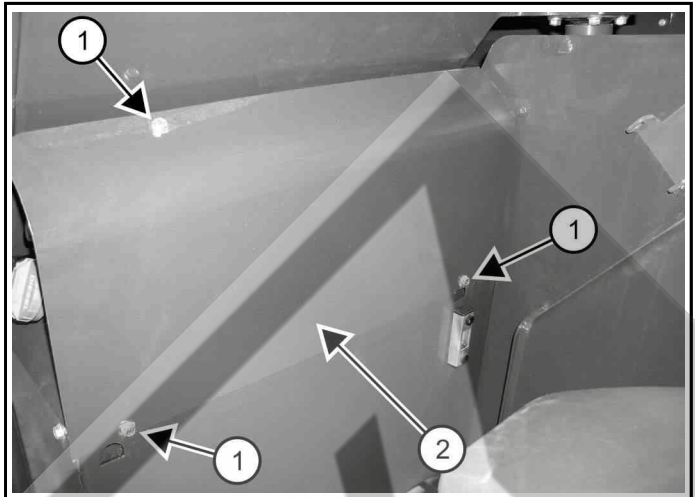
1. Completely retract and lower the boom. Tilt the attachment carrier forward.
2. Stop the machine on a level surface.
3. Stop the engine.
4. Hydraulic fluid must be at ambient temperature for this procedure.

Figure 304



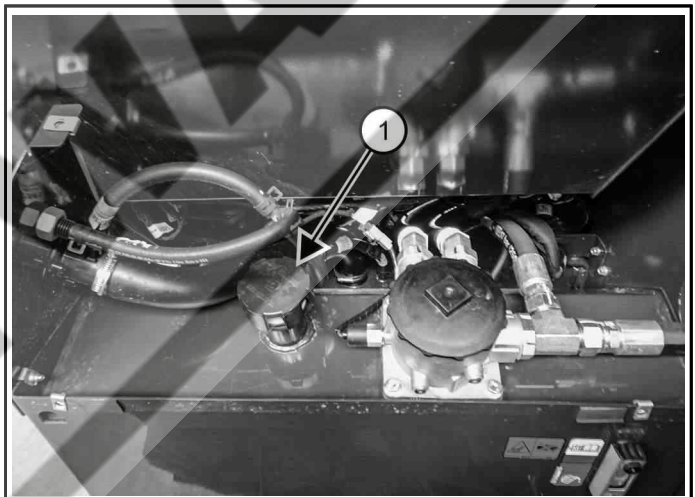
5. Check the fluid level at the sight gauge (Item 1) [Figure 304].

Figure 305



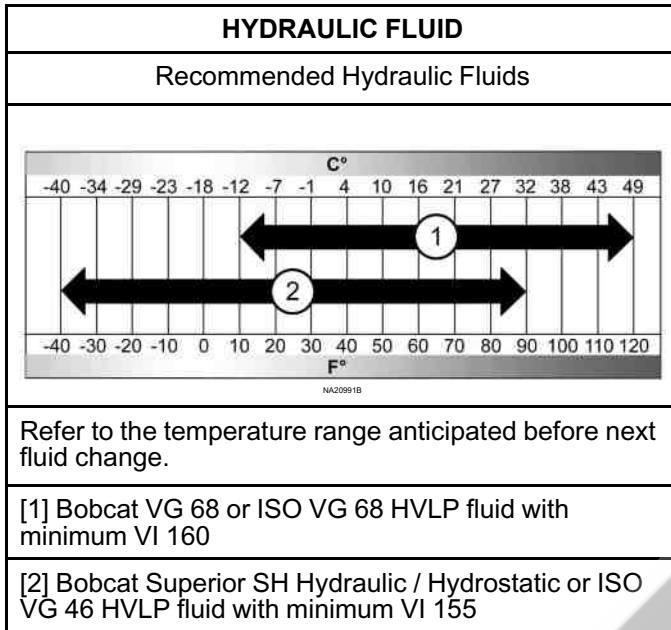
6. Remove the three bolts (Item 1) and the cover (Item 2) [Figure 305].

Figure 306



7. Remove the fill / breather cap (Item 1) [Figure 306].
8. Add fluid until it is at the centre of the sight gauge (Item 1) [Figure 304].
9. Install the fill / breather cap (Item 1) [Figure 306].
10. Install the cover (Item 2) with the three bolts (Item 1) [Figure 305]. Tighten the bolts to maximum 16 N•m (12 ft-lb) torque.

Hydraulic Fluid Chart



⚠ IMPORTANT

MACHINE DAMAGE HAZARD

Failure to follow directions can result in machine damage.

Starting the engine when the temperature of the hydraulic fluid is less than -29°C (-20°F) will result in significant damage to the hydraulic system and components.

Park the machine in a heated location or provide some means of warming the hydraulic fluid prior to starting the engine if the ambient temperature at startup is expected to be -29°C (-20°F) or below.

Removing And Replacing Hydraulic Fluid

⚠ WARNING

INJECTION HAZARD

Pressurised diesel fuel or hydraulic fluid can penetrate skin and eyes, causing serious injury or death.

Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. DO NOT use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical attention from a doctor familiar with this injury.

See the service schedule for the correct service intervals. (See Service Schedule on Page 141)

Replace the fluid if it becomes contaminated or after major repair.

Use only recommended fluid in the hydraulic system. (See Lubricants, Fuel, And Fluids on Page 14)

Always replace the hydraulic / hydrostatic filter whenever the hydraulic fluid is replaced.

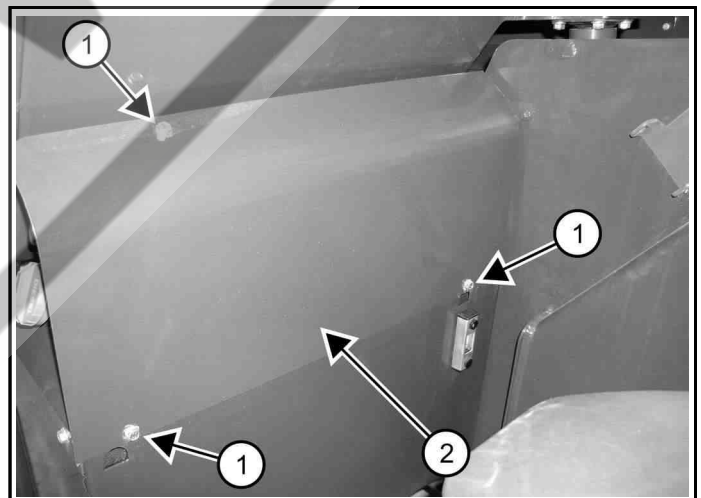
(See Removing And Replacing Hydraulic / Hydrostatic Filter on Page 176)

Figure 307



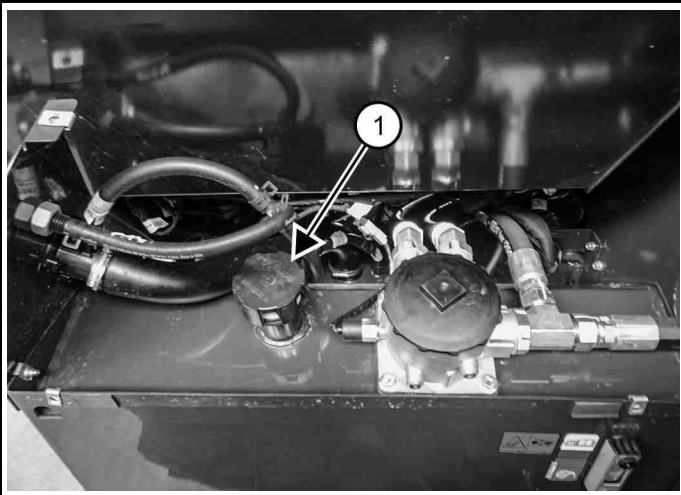
1. Remove the hydraulic fluid tank drain plug (Item 1) [Figure 307] behind the left front wheel and drain the fluid into a container. Recycle or dispose of the fluid in an environmentally safe manner.
2. Put a new seal on the drain plug. Install the drain plug (Item 1) [Figure 307] and tighten.

Figure 308



3. Remove the three bolts (Item 1) and the cover (Item 2) [Figure 308].

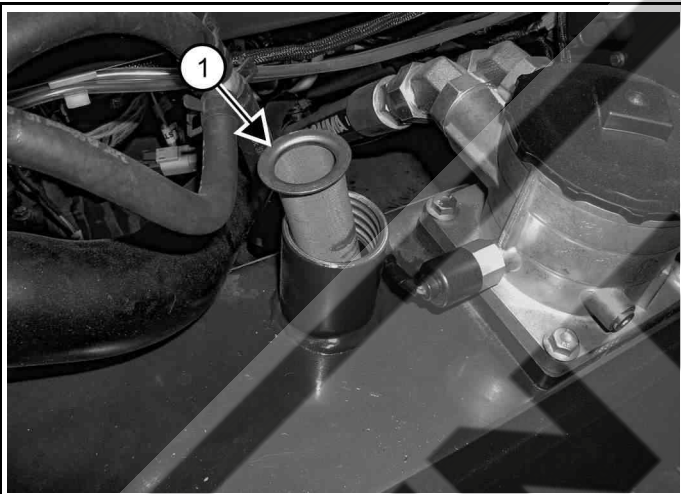
Figure 309



C212231b

4. Remove the fill / breather cap (Item 1) [Figure 309].

Figure 310



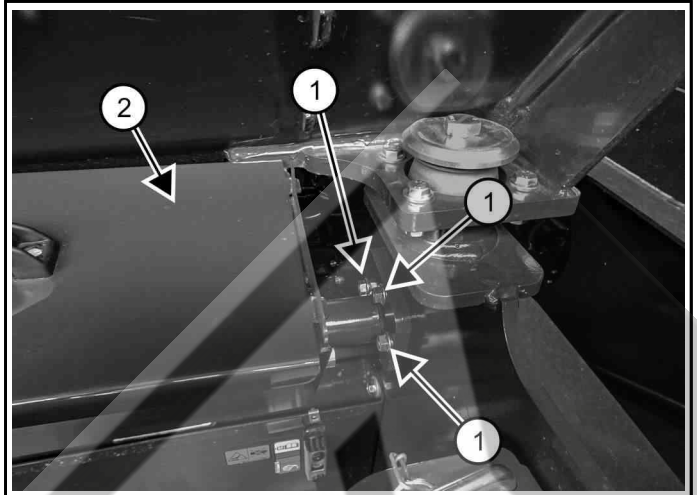
P143981a

5. Remove and clean the hydraulic fill screen (Item 1) [Figure 310]. Use low pressure air to dry the screen.
6. Install hydraulic fill screen and add fluid until it is at the centre of the sight gauge (Item 1) [Figure 304].
7. Install the fill / breather cap (Item 1) [Figure 309].
8. Install the cover (Item 2) with the three bolts (Item 1) [Figure 308]. Tighten the bolts to maximum 16 N•m (12 ft-lb) torque.

Removing And Replacing Hydraulic / Hydrostatic Filter

See the service schedule for the correct service interval.
(See Service Schedule on Page 141)

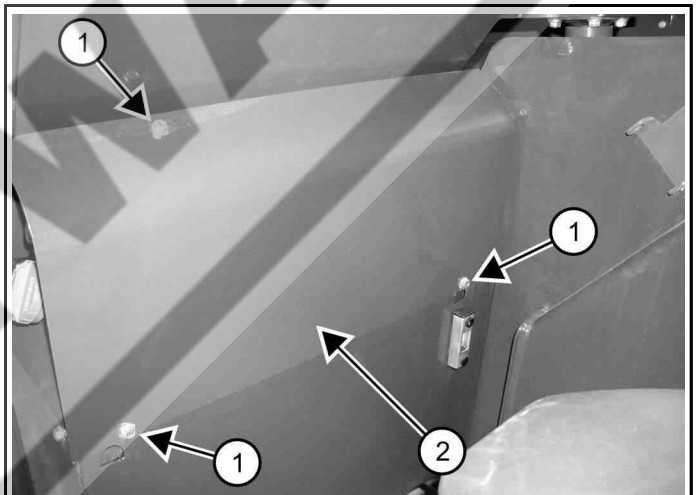
Figure 311



C212230a

1. If equipped with the toolbox, remove the three bolts (Item 1) and remove the toolbox (Item 2) [Figure 311].

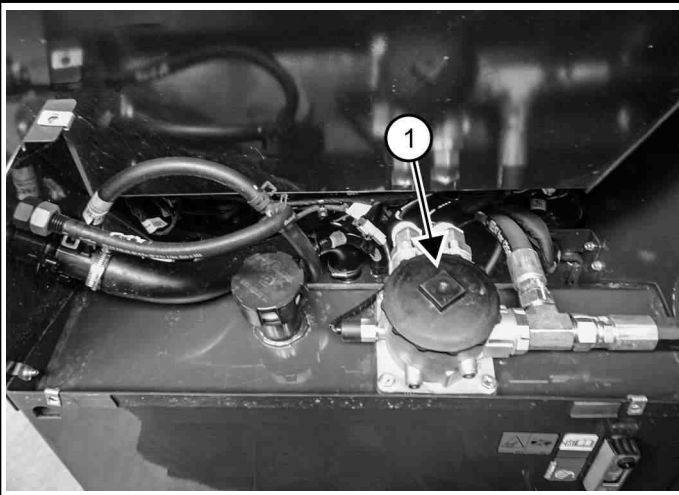
Figure 312



C202368a

2. Remove the three bolts (Item 1) and the cover (Item 2) [Figure 312].

Figure 313



C212231a

3. Remove the cap (Item 1) [Figure 313].

Figure 314



C212232a

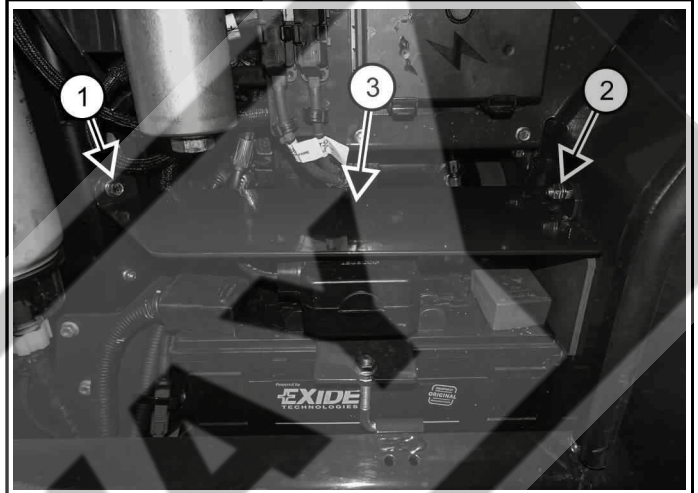
4. Remove the filter element (Item 1) [Figure 314] and discard.
5. Install a new filter element ensuring that the element is fully seated in the filter base.
6. Install the cap and hand tighten.
7. Start the engine and let the engine run for one minute (low idle) before operating the boom hydraulics.
8. Stop the engine and check for leaks at the filter.
9. Check the fluid level in the hydraulic fluid tank and add as needed.
(See Checking And Adding Fluid on Page 174)
10. Install the cover (Item 2) with the three bolts (Item 1) [Figure 312]. Tighten the bolts to maximum 16 N•m (12 ft-lb) torque.

Removing And Replacing Hydraulic Charge Filter

See the service schedule for the correct service intervals.
(See Service Schedule on Page 141)

1. Shut down the engine and wait for five minutes.

Figure 315

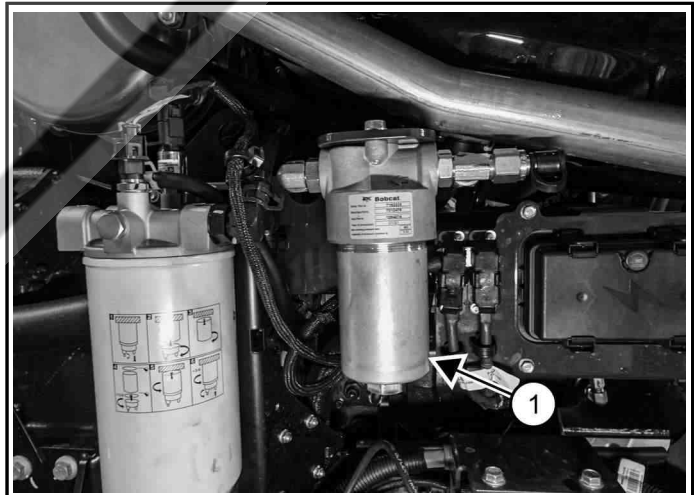


C210363a

2. Remove the bolt (Item 1) and nut (Item 2). Remove the battery cover (Item 3) [Figure 315].

When installing, apply Loctite #242 to the threads of the bolts.

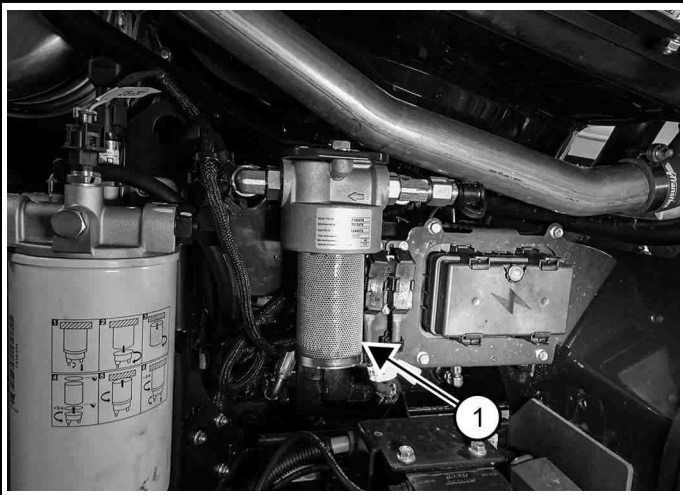
Figure 316



C210359a

3. Place a suitable container below the filter housing and remove the filter housing (Item 1) [Figure 316] completely using a socket wrench.

Figure 317



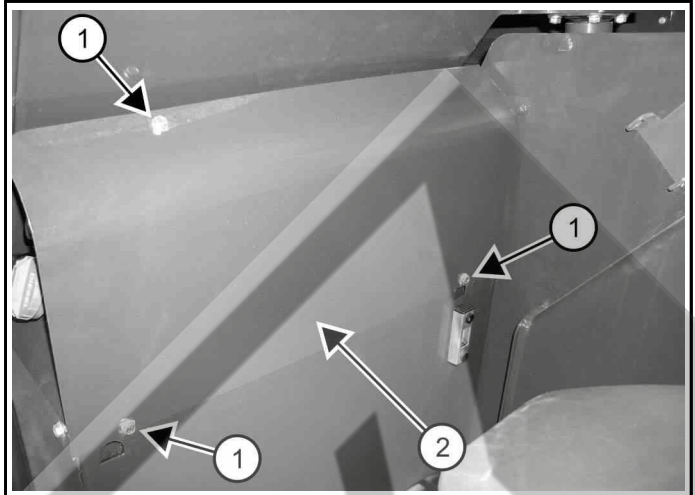
C209130a

4. Remove the filter element (Item 1) [Figure 317] and discard.
5. Install new filter element ensuring that element is fully seated in the filter base.
6. Apply aluminum paste P/N 7401526 to the threads of the filter housing (Item 1) [Figure 316] to avoid seizing.
7. Install the filter housing (Item 1) [Figure 316] to the end of the thread, then unscrew 1/4 turn.
8. Start the engine and let the engine run for one minute (low idle) before operating the boom hydraulics.
9. Stop the engine and check for leaks at the filter. Check the fluid level in the hydraulic fluid tank and add as needed. (See Checking And Adding Fluid on Page 174)

Removing And Installing The Fill / Breather Cap

See the service schedule for the correct replacement interval. (See Service Schedule on Page 141)

Figure 318



C202368a

1. Remove the three bolts (Item 1) and the cover (Item 2) [Figure 318].

Figure 319



C212231b

2. Remove the fill / breather cap (Item 1) [Figure 319].
3. Install the new fill / breather cap (Item 1) [Figure 319].
4. Install the cover (Item 2) with the three bolts (Item 1) [Figure 318]. Tighten the bolts to maximum 16 N•m (12 ft-lb) torque.

AXLES (FRONT AND REAR)

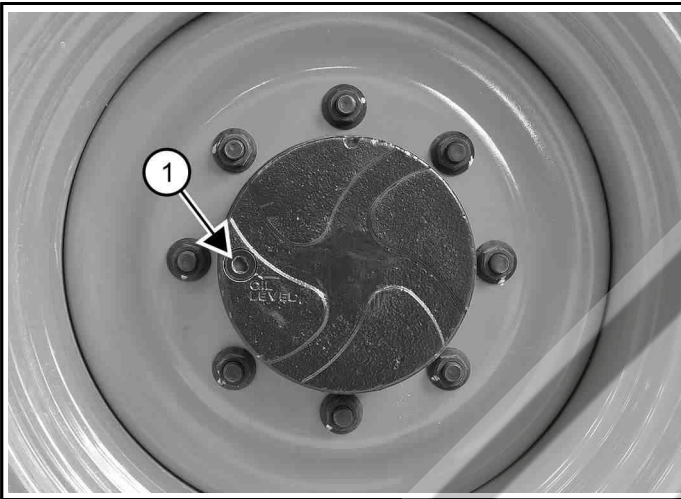
Checking And Adding Oil (Planetary Carrier)

See the service schedule for the correct service interval.
(See Service Schedule on Page 141)

For oil capacity.

For oil type.
(See Lubricants, Fuel, And Fluids on Page 14)

Figure 320



1. Park the machine on a level surface with the plug (Item 1) [Figure 320] positioned as shown.
2. Clean the plug (Item 1) [Figure 320] and the surrounding surface.
3. Remove the plug (Item 1) [Figure 320]. The oil level should be at the bottom edge of the plug hole.
4. Add oil through the hole if the oil level is below the hole.
5. Install and tighten the plug to 35 - 50 N•m (26 - 37 ft-lb) torque.
6. Repeat the procedure for the other three planetary carriers.

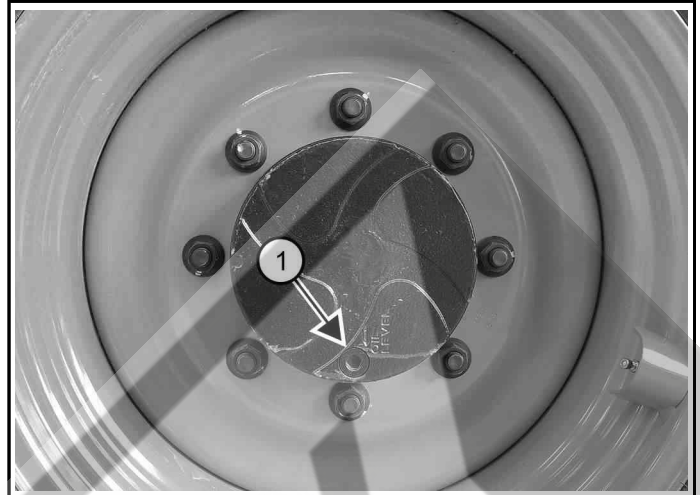
Removing And Replacing Oil (Planetary Carrier)

See the service schedule for the correct service interval.
(See Service Schedule on Page 141)

For oil capacity.

For oil type.
(See Lubricants, Fuel, And Fluids on Page 14)

Figure 321



1. Park the machine on a level surface with the plug (Item 1) [Figure 321] positioned as indicated by the arrow.
2. Clean the plug (Item 1) [Figure 321] and the surrounding surface.
3. Remove the plug (Item 1) [Figure 321] and drain oil into a container. Recycle or dispose of the used lubricant in an environmentally safe manner.
4. Reposition the plug hole as shown in (See Checking And Adding Oil (Planetary Carrier) on Page 179) and add gear lube until the lube level is at the bottom edge of the plug hole (Item 1) [Figure 320].
5. Install and tighten the plug to 35 - 50 N•m (26 - 37 ft-lb) torque.
6. Repeat the procedure for the other planetary carriers.

Checking And Adding Oil (Rear Differential)

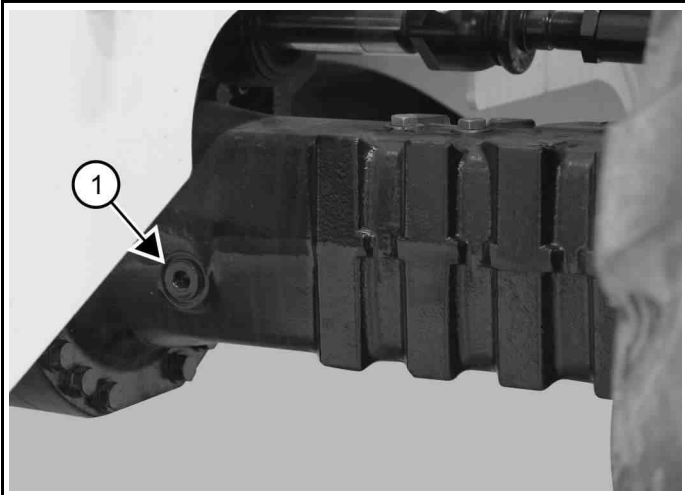
See the service schedule for the correct service interval.
(See Service Schedule on Page 141)

For oil capacity.

For oil type.
(See Lubricants, Fuel, And Fluids on Page 14)

1. Park the machine on a level surface.

Figure 322



S1841a

2. Clean the plug (Item 1) [Figure 322] and the surrounding surface.
3. Remove the plug (Item 1) [Figure 322]. The oil level should be at the bottom edge of the plug hole.
4. Add oil through the hole if the oil level is below the hole.
5. Install and tighten the plug to 35 - 50 N•m (26 - 37 ft-lb) torque.

Removing And Replacing Oil (Rear Differential)

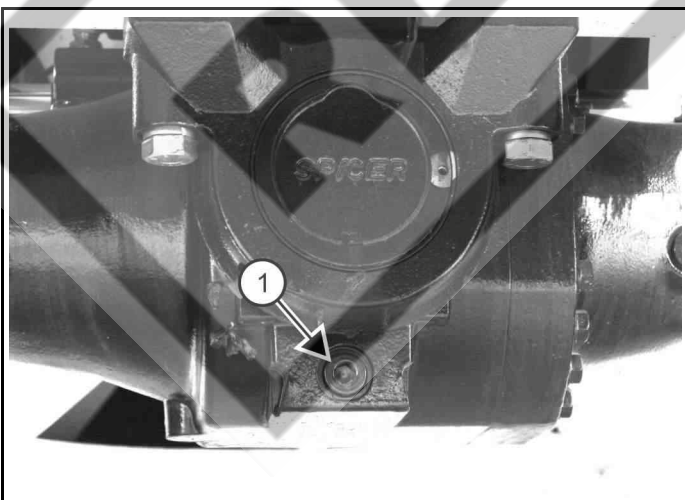
See the service schedule for the correct service interval.
(See Service Schedule on Page 141)

For oil capacity.

For oil type.
(See Lubricants, Fuel, And Fluids on Page 14)

1. Park the machine on a level surface.

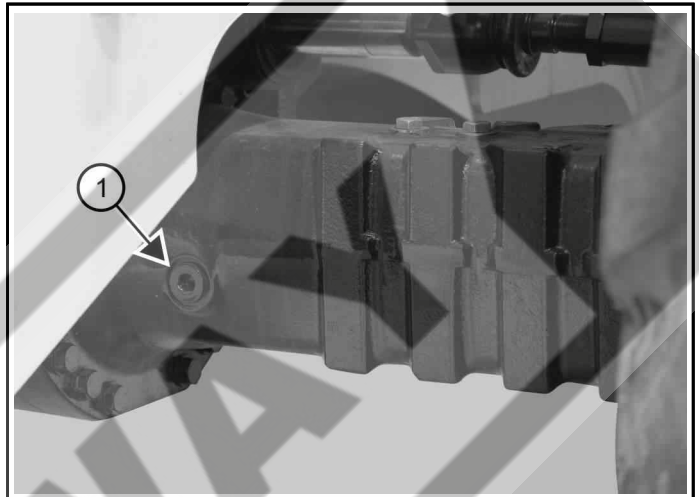
Figure 323



S1842a

2. Clean the plug (Item 1) [Figure 323] and the surrounding surface.
3. Remove the plug (Item 1) [Figure 323] and drain oil into a container. Recycle or dispose of the used lubricant in an environmentally safe manner.
4. Install and tighten the plug (Item 1) [Figure 323] to 35 - 50 N•m (26 - 37 ft-lb) torque.

Figure 324



S1841a

5. Add oil through the hole (Item 1) [Figure 324] until it is to the bottom of the plug hole.
6. Install and tighten the plug to 35 - 50 N•m (26 - 37 ft-lb) torque.

Checking And Adding Oil (Front Differential)

See the service schedule for the correct service interval.
(See Service Schedule on Page 141)

For oil type,
(See Lubricants, Fuel, And Fluids on Page 14)

1. Park the machine on a level surface.

Figure 325

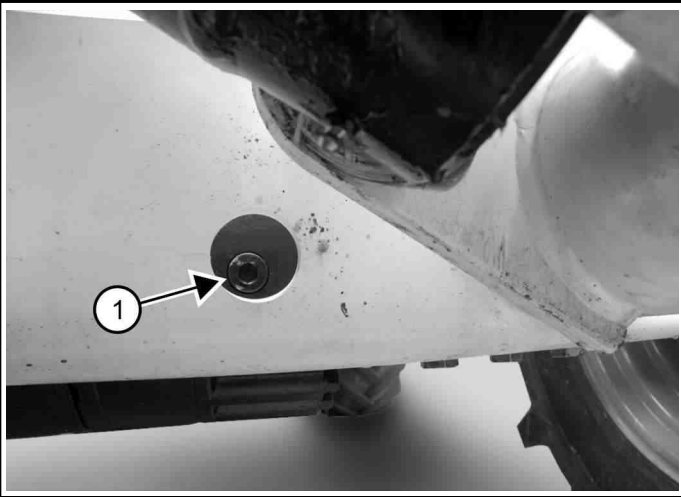
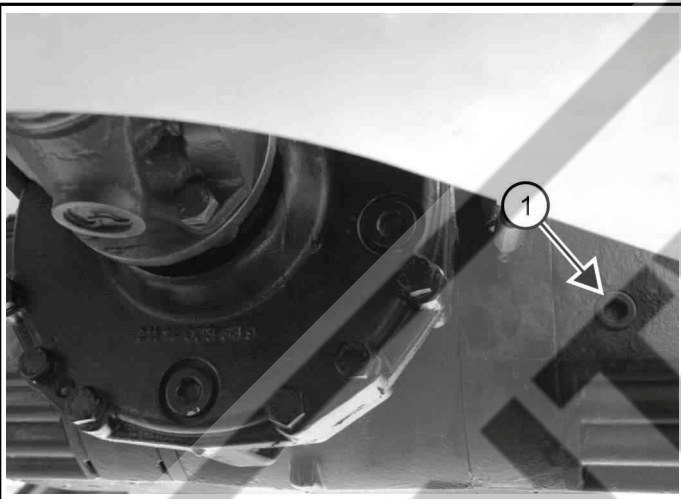


Figure 326



2. Clean the plugs (Item 1) [Figure 325] and [Figure 326] and the surrounding surface.
3. Remove the plugs (Item 1) [Figure 325] and [Figure 326]. The oil level should be at the bottom edge of the plug hole.
4. Add oil through the hole if the oil level is below the hole.
5. Install and tighten the plugs to 35 - 50 N•m (26 - 37 ft-lb) torque.

Removing And Replacing Oil (Front Differential)

See the SERVICE SCHEDULE for the correct service interval. (See Service Schedule on Page 141)

For oil capacity, For oil type,
(See Lubricants, Fuel, And Fluids on Page 14)

- Park the machine on a level surface.

Figure 327

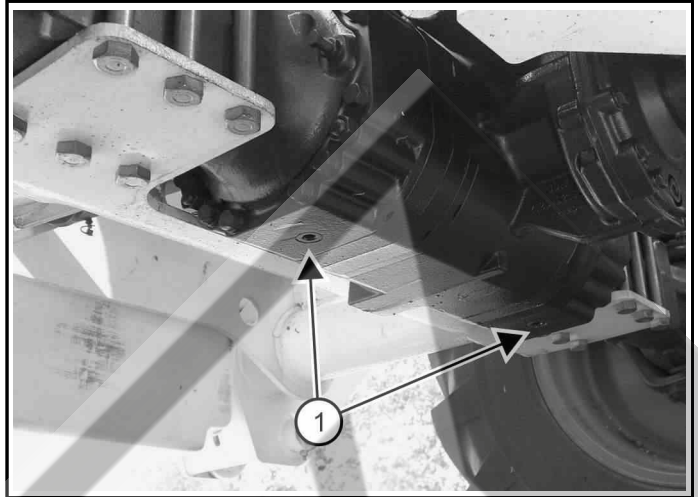
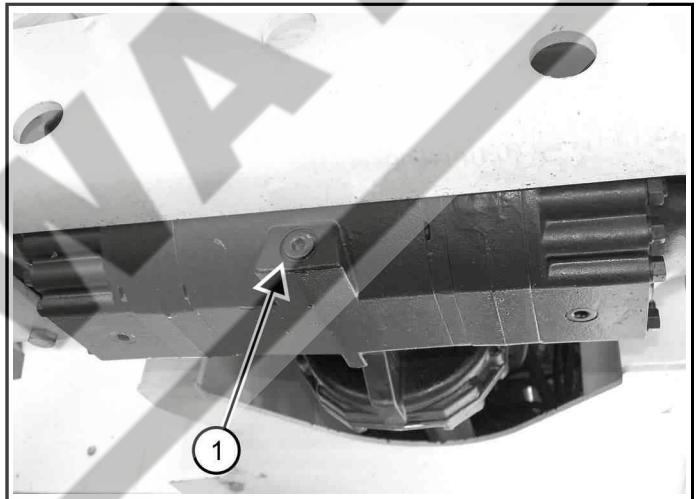


Figure 328



- Clean the plugs (Item 1) [Figure 327] and [Figure 328] and the surrounding surface.
- Remove the plugs (Item 1) [Figure 327] and [Figure 328] and drain oil into a container. Recycle or dispose of the used lubricant in an environmentally safe manner.
- Install and tighten the plugs (Item 1) [Figure 327] and [Figure 328] to 35 - 50 N•m (26 - 37 ft-lb) torque.
- Clean the plugs (Item 1) [Figure 325] and [Figure 326] and the surrounding surface.
- Remove the plugs (Item 1) [Figure 325] and [Figure 326] and add oil through the holes until it is to the bottom of the plug holes.
- Install and tighten the plugs to 35 - 50 N•m (26 - 37 ft-lb) torque.

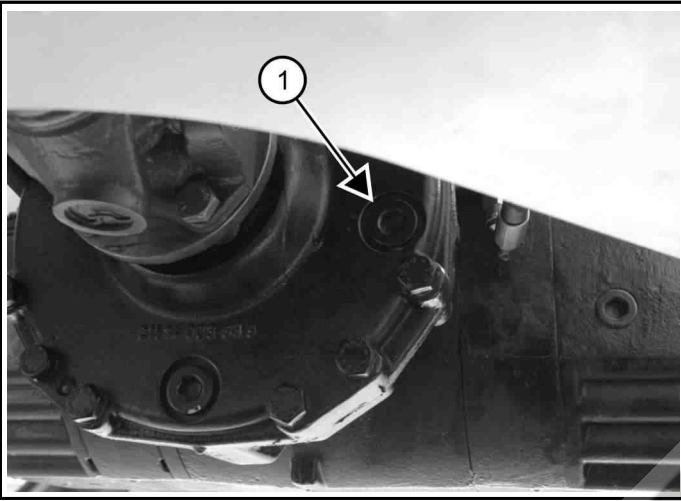
Checking And Adding Oil (Reduction Box)

For oil capacity.

For oil type.
(See Lubricants, Fuel, And Fluids on Page 14)

1. Park the machine on a level surface.

Figure 329



2. Clean the plug (Item 1) [Figure 329] and the surrounding surface.
3. Remove the plug (Item 1) [Figure 329]. The oil level should be at the bottom edge of the plug hole.
4. Add oil through the hole if the oil level is below the hole.
5. Install and tighten the plug.

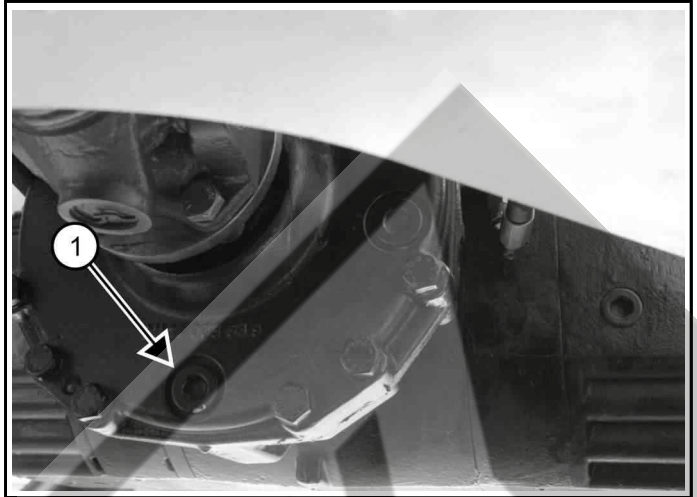
Removing And Replacing Oil (Reduction Box)

For oil capacity.

For oil type.
(See Lubricants, Fuel, And Fluids on Page 14)

1. Park the machine on a level surface.

Figure 330



2. Clean the plug (Item 1) [Figure 330] and the surrounding surface.
3. Remove the plug (Item 1) [Figure 330] and drain oil into a container. Recycle or dispose of the used lubricant in an environmentally safe manner.
4. Install and tighten the plug (Item 1) [Figure 330].
5. Remove the plug (Item 1) [Figure 329] and add oil through the hole until it is to the bottom of the plug hole.
6. Install and tighten the plug (Item 1) [Figure 329].

ALTERNATOR BELT

Adjusting The Alternator Belt

See the service schedule for the correct service interval (See Service Schedule on Page 141) and contact your Bobcat dealer for replacement parts.

Checking The Alternator Belt

⚠ IMPORTANT

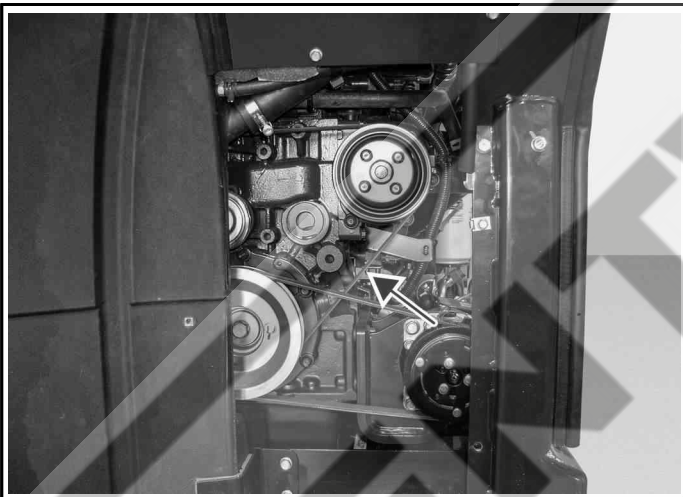
MACHINE DAMAGE HAZARD

Running the engine with the engine cover open can cause damage to the engine cover. Keep the engine cover closed when the engine is running. ◀

I-2432

1. Run the engine for more than five minutes.
2. Stop the engine.
3. Check the whole belt drive visually for damage. Replace damaged parts.

Figure 331



C209141a

4. Check the belt tension with a tension meter in the middle of the span between the crankshaft pulley and the water pump pulley [Figure 331].

Use the following data for the tension meter:

Unit Weight	13,7 g/rib.m or 82,2 g/m (0.15 oz/rib.ft or 0.88 oz/ft)
Number of Ribs	6 (belt pk, construction MT610)
Span Length	276,5 mm (10.9 in)

5. If the belt tension is out of the suggested range for belts, replace the belt.

	FREQUENCY	TENSION
Suggested range	110 - 130 Hz	305 - 425 N (69 - 96 lbf)

Replacing The Alternator Belt

⚠ IMPORTANT

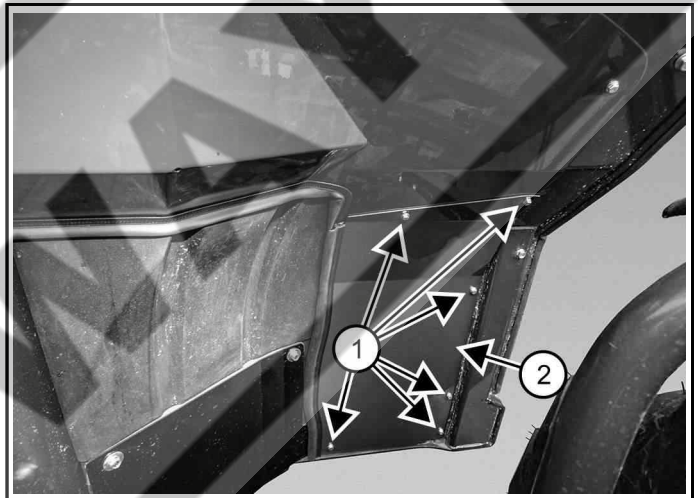
MACHINE DAMAGE HAZARD

Running the engine with the engine cover open can cause damage to the engine cover. Keep the engine cover closed when the engine is running. ◀

I-2432

1. Stop the engine and open the engine cover.

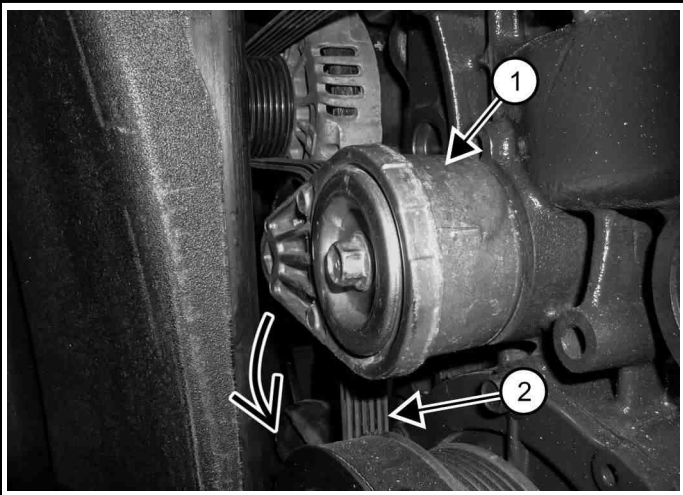
Figure 332



C209123a

2. Remove the six bolts (Item 1) and cover (Item 2) [Figure 332].
3. Remove the air conditioning belt. (See Replacing The Air Conditioning Belt on Page 184)

Figure 333



C210371a

4. Rotate the pulley (Item 1) anticlockwise to loosen the tension from the alternator belt (Item 2) [Figure 333]. Lock the pulley with a pin dia. 4 mm (0.16 in).
5. Remove the belt from the pulleys.
6. Inspect the pulleys for wear.
7. Install new belt.
8. Close the engine cover.
9. After belt replacement let the engine run for five minutes and check the alternator belt.

AIR CONDITIONING BELT

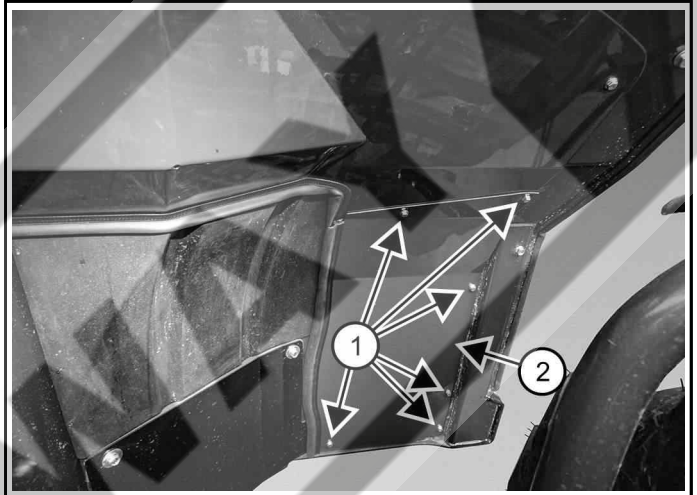
Adjusting The Air Conditioning Belt

The air conditioning belt is a special maintenance free type that is pretensioned over the pulleys. This belt eliminates the need for a tensioning device and does not require periodic adjustment. Contact your Bobcat dealer for replacement parts.

Replacing The Air Conditioning Belt

1. Stop the engine and open the engine cover.

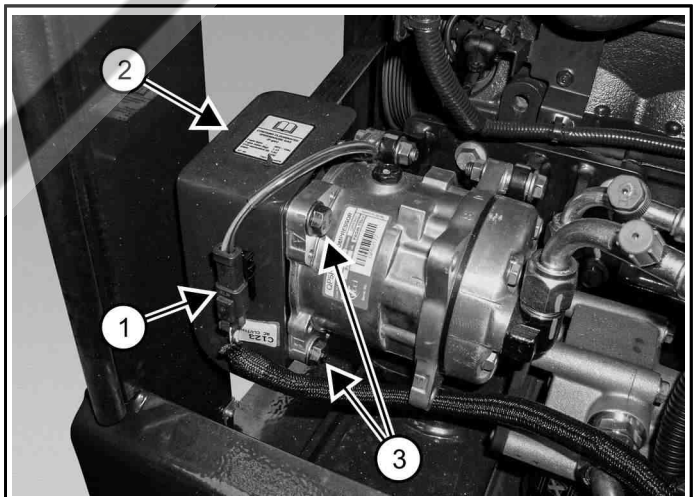
Figure 334



C209123a

2. Remove the six bolts (Item 1) and cover (Item 2) [Figure 334].

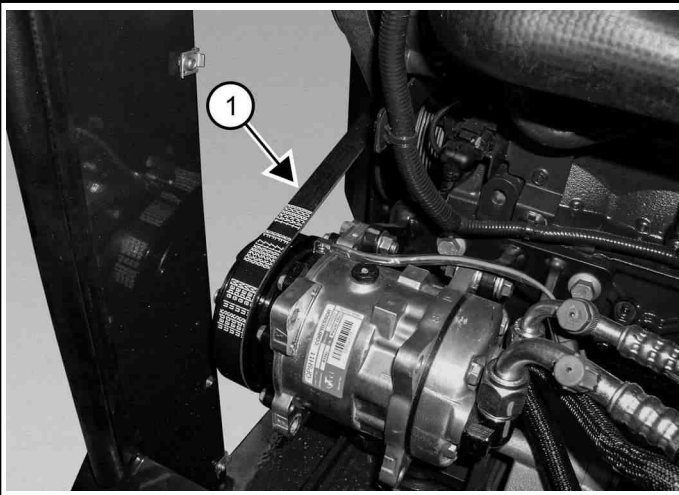
Figure 335



C209142a

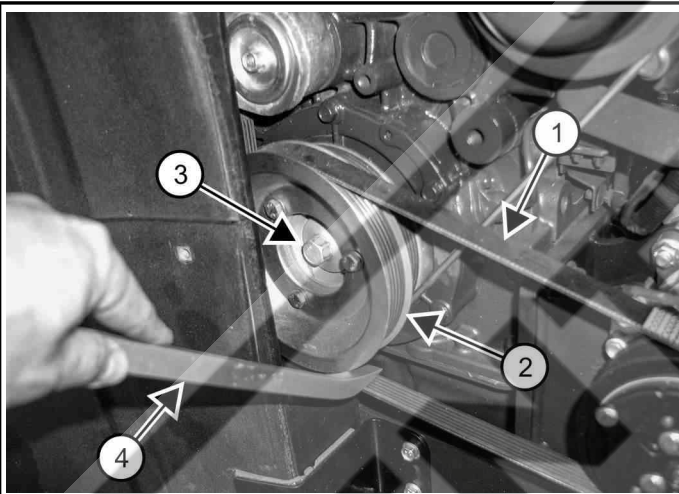
3. Remove the connector (Item 1) from the belt cover (Item 2) [Figure 335].
4. Remove the two bolts (Item 3) and belt cover (Item 2) [Figure 335].

Figure 336



5. Cut the old belt (Item 1) [Figure 336] and remove the belt from the pulleys. Inspect the pulleys for wear.

Figure 337



6. Install the belt on the air conditioning compressor pulley and position the belt (Item 1) on the bottom side of the crank shaft pulley (Item 2) [Figure 337].
7. Rotate the engine clockwise using the large crankshaft pulley bolt (Item 3) and guide the belt on the pulley with a pry bar (Item 4) [Figure 337].

Do NOT use the alternator pulley nut, the water pump pulley bolts, or the smaller crankshaft pulley bolts. Ensure that the belt is fully installed on both pulleys.

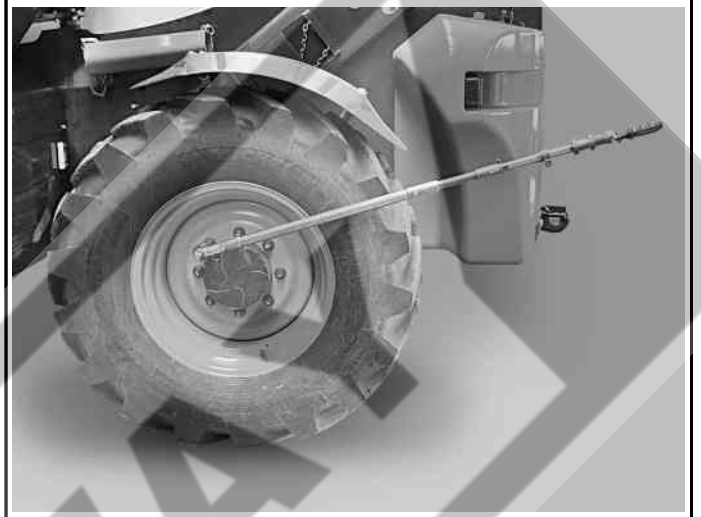
8. Install the air conditioning belt cover (Item 2) and tighten the bolts (Item 3) [Figure 335].
9. Install cover (Item 2) and tighten the bolts (Item 1) [Figure 334].
10. Close the engine cover.

TYRE MAINTENANCE

Wheel Nuts

See the service schedule for the service interval to check the wheel nuts. (See Service Schedule on Page 141)

Figure 338



- Check the tightening torque on the wheel nuts. The correct wheel nut tightening torque is 360 N•m (266 ft-lb) [Figure 338].

Rotating

Check the tyres regularly for wear, damage and pressure. For the correct tyre pressure, (See Traction on Page 319)

Rear tyres usually wear faster than front tyres. To keep the wear even, move the front wheels to the rear and rear wheels to the front.

It is important to keep the same size tyres on each side of the machine. If different sizes are used, each tyre will be turning at a different rate and cause excessive wear. The tread bars of all the tyres must face the same direction.

Recommended tyre pressure must be maintained to avoid excessive tyre wear and loss of stability and handling capacity. Check for the correct pressure before operating the machine.

Replacing The Wheels

WARNING

INSTABILITY AND UNINTENDED MOVEMENT HAZARD

Failure to use jackstands can allow the machine to tip or move causing serious injury or death. Place jackstands under the front and rear of the machine before running engine for service.

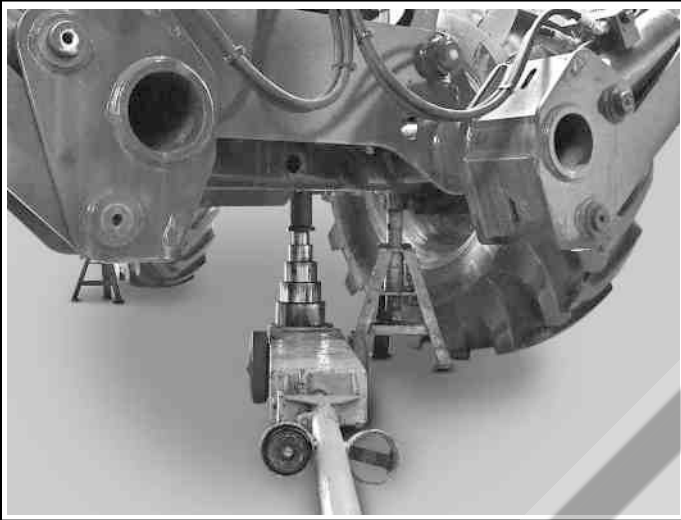
W-2719

NOTE: When replacing the wheels, the four wheels must be identical. To change the wheel size, contact your Bobcat dealer.

- Always park the machine on a level surface.
- Retract and lower the boom fully.
- STOP the engine.

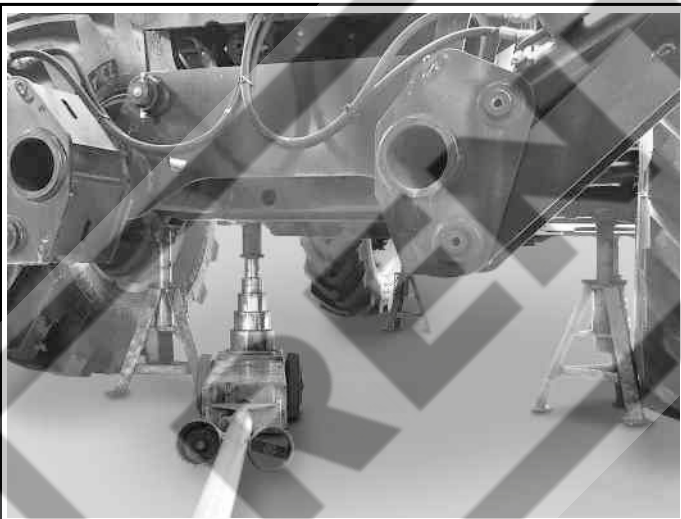
Replacing The Front Wheels

Figure 339



1. Put the floor jack under the left side of the front axle. Lift the machine and install the first jackstand [Figure 339].

Figure 340



2. Put the floor jack under the right side of the front axle. Lift the machine and install the second jackstand [Figure 340].
3. Remove the eight wheel nuts and replace the wheel. Install the wheel nuts and tighten using a crisscross pattern to 360 N•m (266 ft-lb) torque.

Replacing The Rear Wheels

Figure 341



1. Put the floor jack under the centre of the counterweight. Lift the machine and install jackstands [Figure 341].
2. Remove the eight wheel nuts and replace the wheel. Install the wheel nuts and tighten using a crisscross pattern to 360 N•m (266 ft-lb) torque.

Mounting

To change the size of the tyres, contact your Bobcat dealer.

Tyres are to be repaired only by an authorised person using the correct procedures and type of equipment.

Tyres and rims must always be checked for correct size before mounting. Check rim and tyre bead for damage. The rim flange must be cleaned and free of rust. The tyre bead and rim flange must be lubricated with a rubber lubricant before mounting the tyre.

Avoid excessive pressure which can rupture the tyre and cause serious injury or death.

During inflation of the tyre, check the tyre pressure frequently to avoid over inflation.

Tyre Pressure

⚠ WARNING

EXPLOSION HAZARD

**Failure to use correct tyre mounting procedure can cause serious injury or death.
Do not inflate tyres above specified pressure. †**

W-2078

⚠ IMPORTANT**MACHINE DAMAGE HAZARD**

Mixing tyre brands and sizes and improper tyre inflation pressure can cause transmission or tyre damage.

Never exceed the **MAXIMUM** pressure shown on the sidewall of the tyre.

Use only tyres of the same size and similar wear condition on the same machine.

DO NOT mix brands of tyres used on the same machine. *

For correct inflation, (See Traction on Page 319)

LUBRICATING THE MACHINE**Lubrication Locations (Standard)**

Lubricate as specified in the **SERVICE SCHEDULE** for the best performance of the machine.
(See Service Schedule on Page 141)

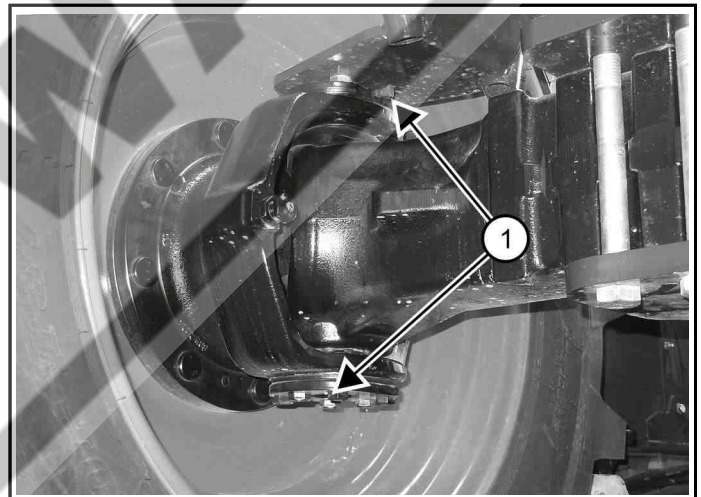
Record the operating hours each time you lubricate so that it is performed at the correct interval.

Always use a good quality lithium based multipurpose grease. (Bobcat Multi Purpose Grease P/N 6987888, Bobcat Supreme HD Grease P/N 6987889 or Bobcat Extreme HD P/N 69878790 depending on the severity of the condition of use). Apply lubricant until extra grease shows.

Remove the attachment from the machine before lubricating.
(See Installing And Removing The Attachment (Manual Lock) on Page 107)
(See Installing And Removing The Attachment (Hydraulic Lock) on Page 109)

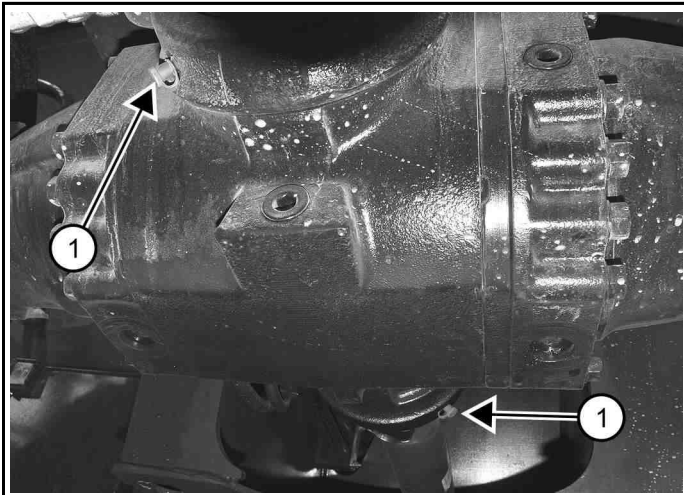
Lubricate the following locations on the machine:

Figure 342



- Axle pivots - top and bottom (Item 1) [Figure 342] all four wheels.

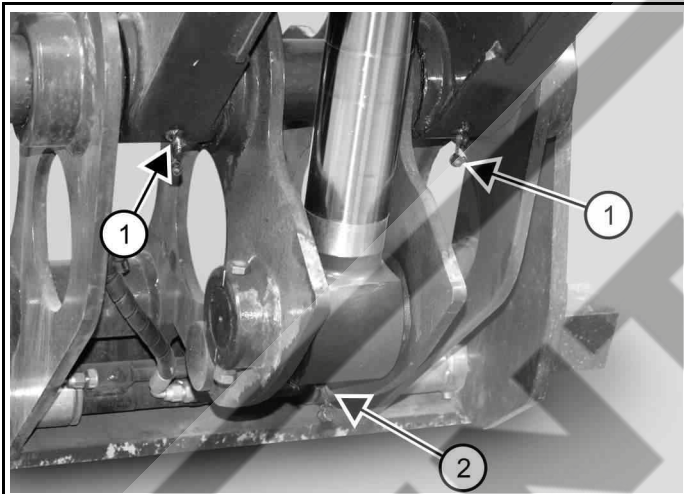
Figure 343



S38063a

- Axle oscillation - rear axle (Item 1) [Figure 343].

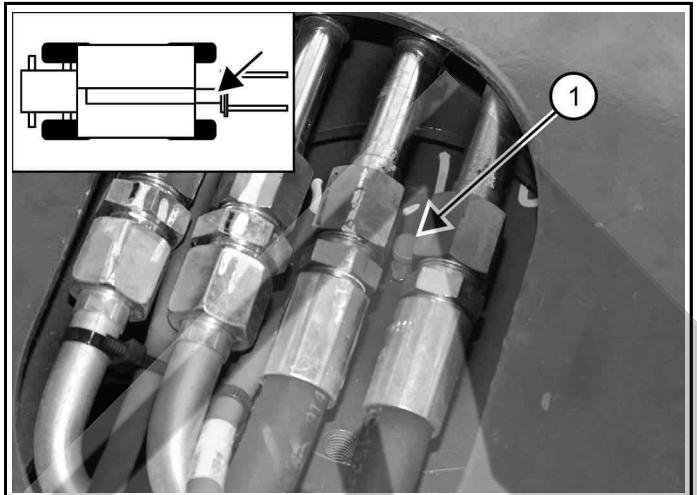
Figure 344



S41611a

- Attachment carrier pivot (Item 1) [Figure 344] (both sides).
- Tilt cylinder rod end (Item 2) [Figure 344].
- Remove the front cover from the boom end.

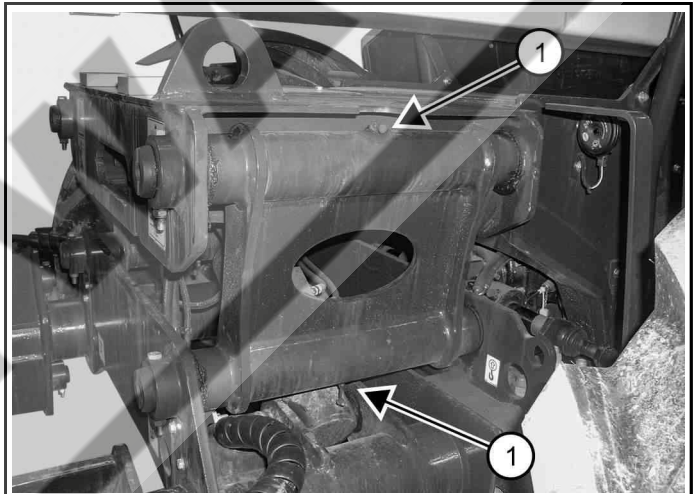
Figure 345



C212366a

- Tilt cylinder base end (Item 1) [Figure 345].

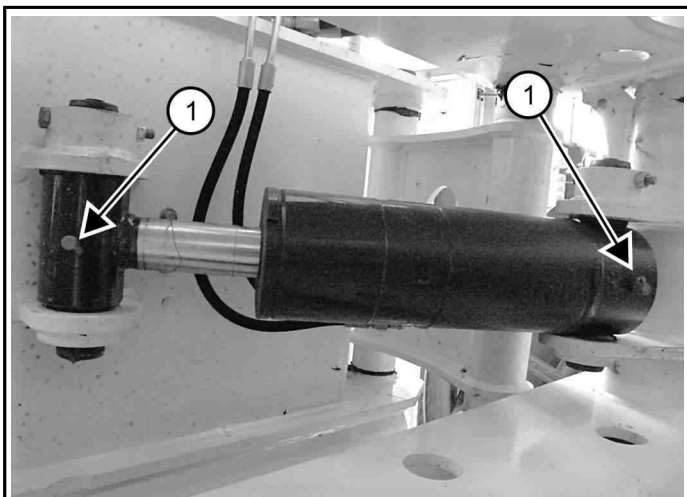
Figure 346



P143992a

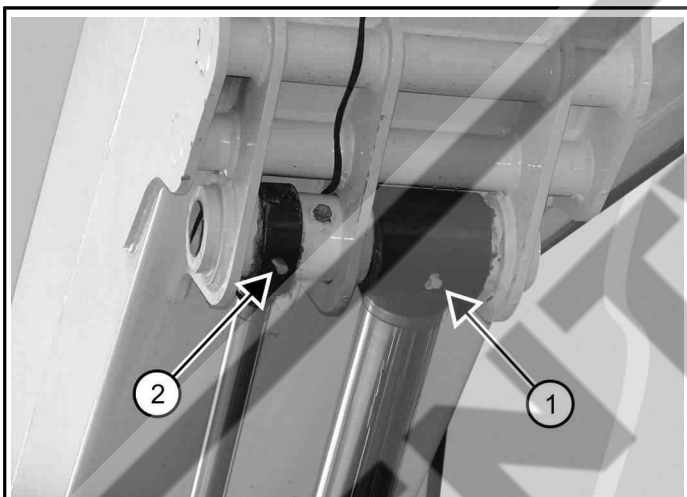
- Frame-levelling pivots - both sides (Item 1) [Figure 347].

Figure 347



- Frame-levelling cylinder - rod and base end (Item 1) [Figure 347].

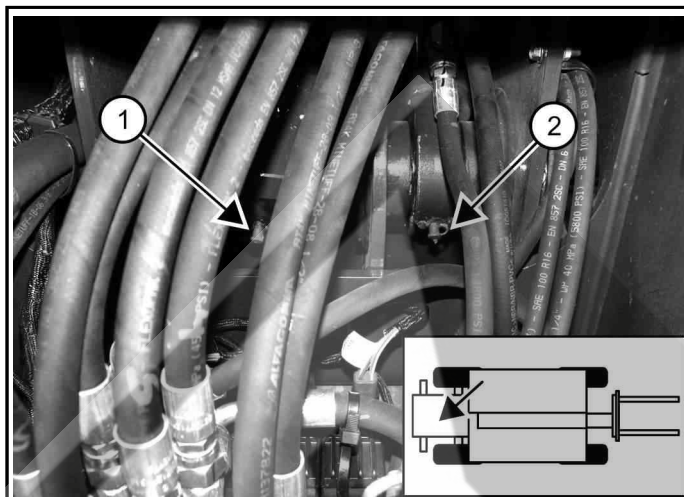
Figure 348



- Boom cylinder rod end (Item 1) and self-levelling cylinder rod end (Item 2) [Figure 348].

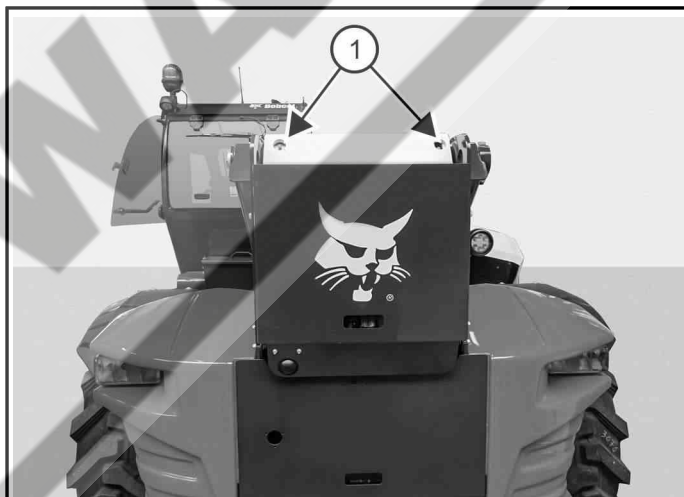
NOTE: Raise the boom and install the approved boom stop before lubricating the boom cylinder and self-levelling cylinder. (See Installing The Approved Boom Stop on Page 149)

Figure 349



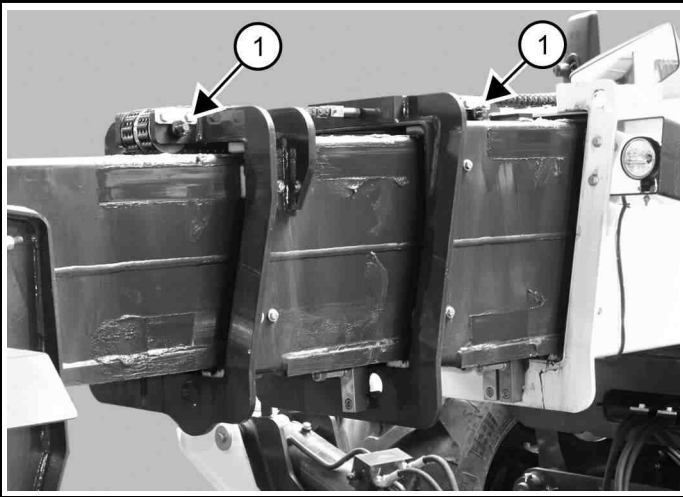
- Boom cylinder base end (Item 1) and self-levelling cylinder base end (Item 2) [Figure 349].

Figure 350



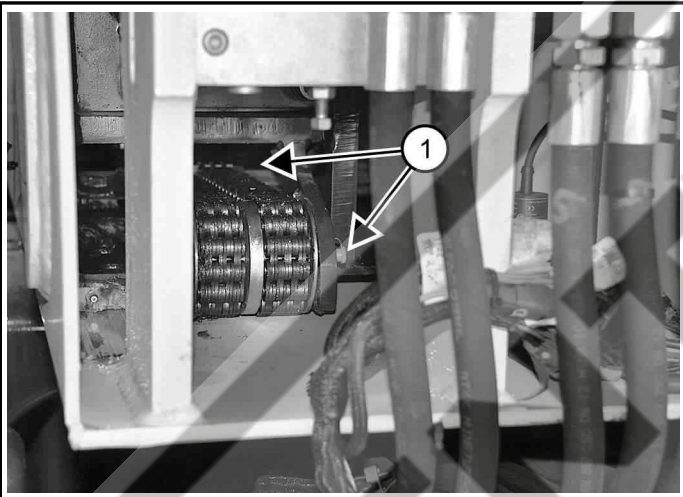
- Boom pivot (Item 1) [Figure 350].

Figure 351



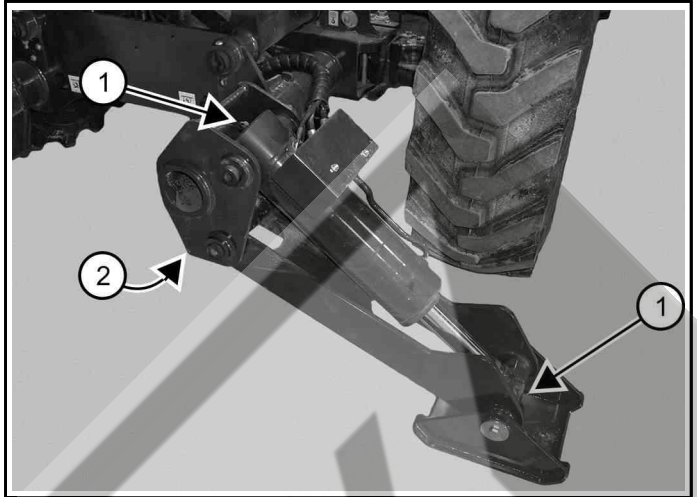
- Front chain pulley pivots (Item 1) [Figure 351] – both sides.

Figure 352



- Rear chain pulley pivots (Item 1) [Figure 352].

Figure 353



- Stabiliser cylinder - rod and base end (Item 1) [Figure 353] (both sides).
- Stabiliser pivot (Item 2) [Figure 353] (both sides).

Lubrication Locations (With Easy Greasing)

Lubricate as specified in the SERVICE SCHEDULE for the best performance of the machine. (See Service Schedule on Page 141)

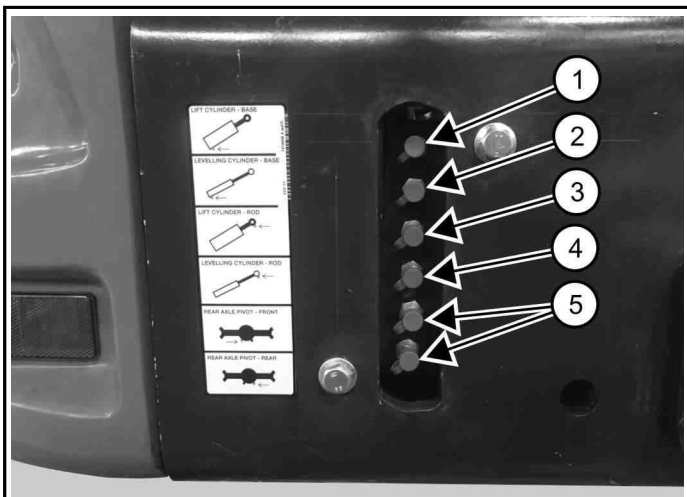
Record the operating hours each time you lubricate so that it is performed at the correct interval.

Always use a good quality lithium based multipurpose grease. (Bobcat Multi Purpose Grease P/N 6987888, Bobcat Supreme HD Grease P/N 6987889 or Bobcat Extreme HD P/N 69878790 depending on the severity of the condition of use). Apply lubricant until extra grease shows.

Remove the attachment from the machine before lubricating.
(See Installing And Removing The Attachment (Manual Lock) on Page 107)
(See Installing And Removing The Attachment (Hydraulic Lock) on Page 109)

Lubricate the following locations on the machine:

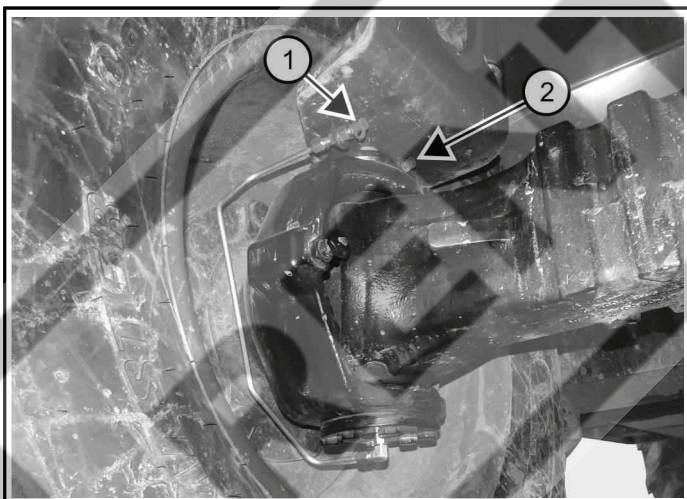
Figure 354



C21730b

- Central lubrication points [Figure 354] for the following locations:
 1. Boom Cylinder base end.
 2. Self-Levelling Cylinder base end.
 3. Boom Cylinder rod end.
 4. Self-Levelling Cylinder rod end.
 5. Rear Axle Oscillation (two locations).

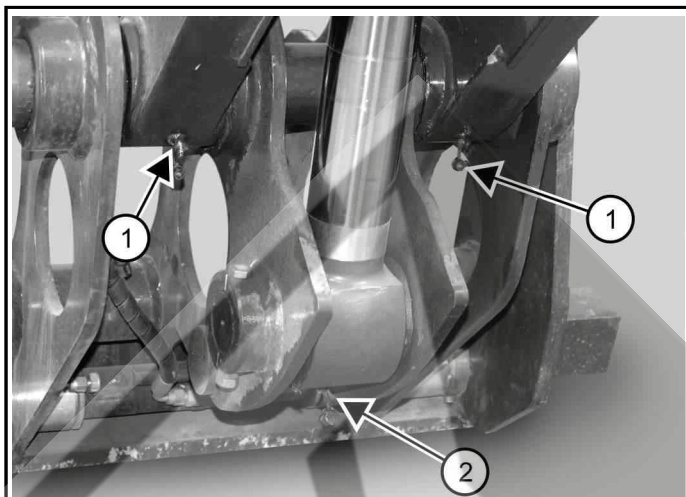
Figure 355



C222756a

- Axle pivots — bottom (Item 1) and top (Item 2) [Figure 355] (all four wheels).

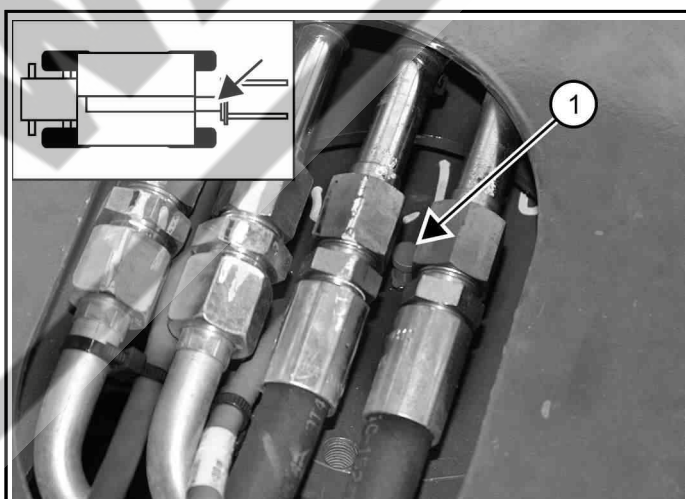
Figure 356



S41611a

- Attachment carrier pivot (Item 1) [Figure 356] (both sides).
- Tilt cylinder rod end (Item 2) [Figure 356].
- Remove the front cover from the boom end.

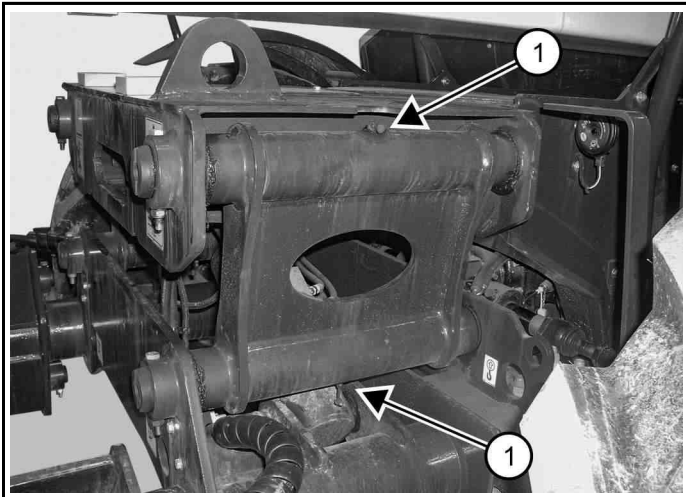
Figure 357



C212356a

- Tilt cylinder base end (Item 1) [Figure 357].

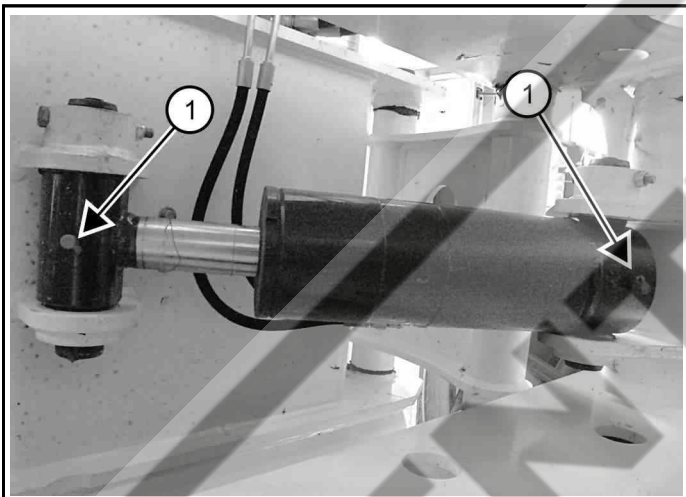
Figure 358



P143992a

- Frame-levelling pivots - both sides (Item 1) [Figure 359].

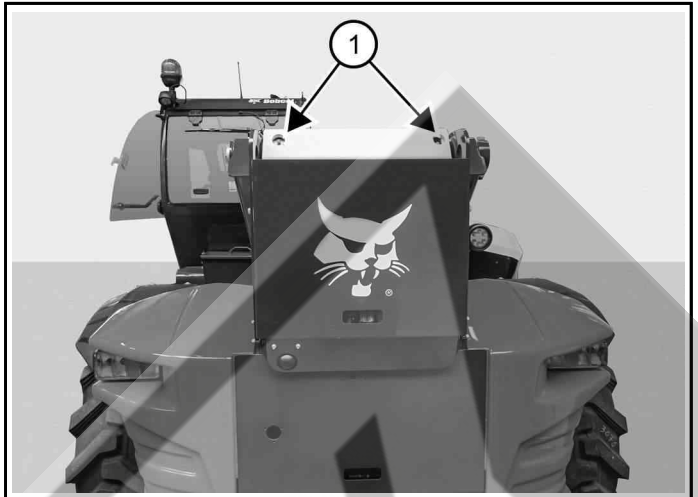
Figure 359



S4512a

- Frame-levelling cylinder - rod and base end (Item 1) [Figure 359].

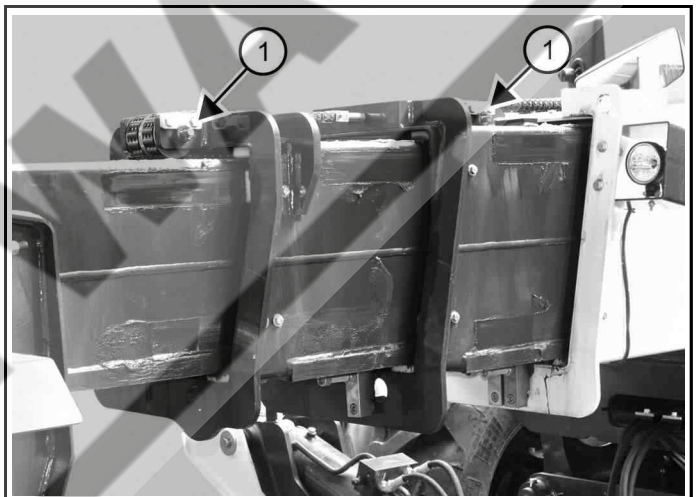
Figure 360



C212284c

- Boom pivot (Item 1) [Figure 360].

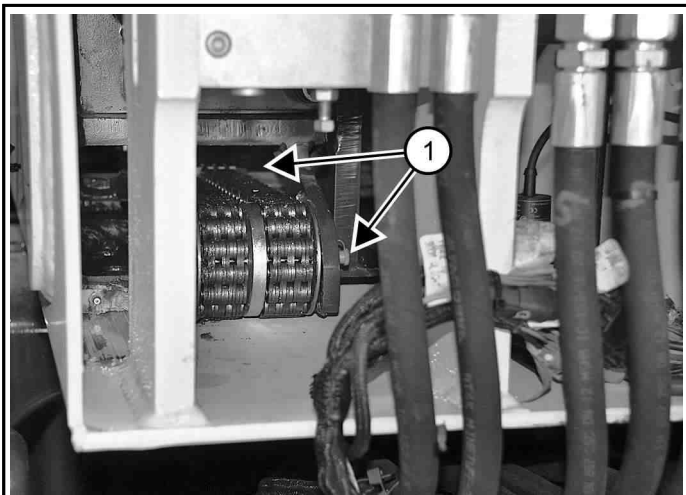
Figure 361



S41615a

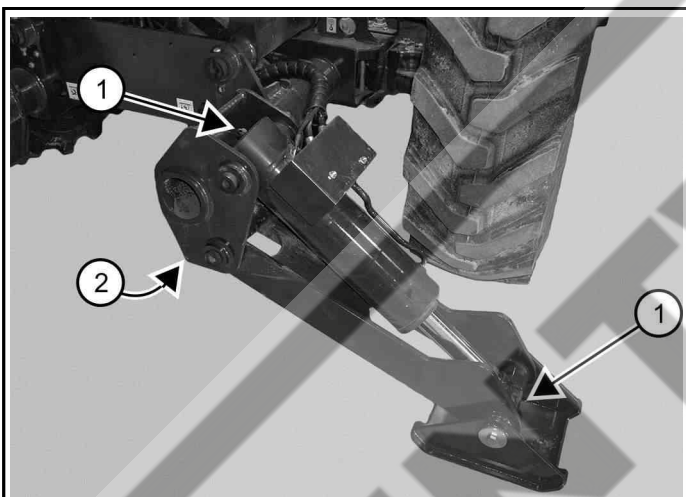
- Front chain pulley pivots (Item 1) [Figure 361] – both sides.

Figure 362



- Rear chain pulley pivots (Item 1) [Figure 362].

Figure 363



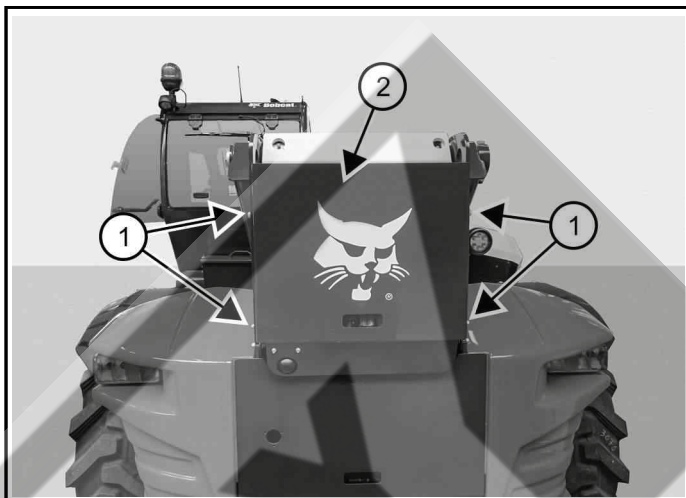
- Stabiliser cylinder - rod and base end (Item 1) [Figure 363] (both sides).
- Stabiliser pivot (Item 2) [Figure 363] (both sides).

Lubricating The Front Wear Pads

1. Fully extend and lower the boom.
2. Put the Travel Direction Control in neutral. (See Travel Direction on Page 42)
3. Ensure that the parking brake is engaged. (See Parking Brake on Page 66)
4. Stop the engine and exit the machine. (See Stopping The Engine And Leaving The Machine on Page 91)
5. Use a brush to lubricate the outside of the inner booms.

Lubricating The Rear Wear Pads

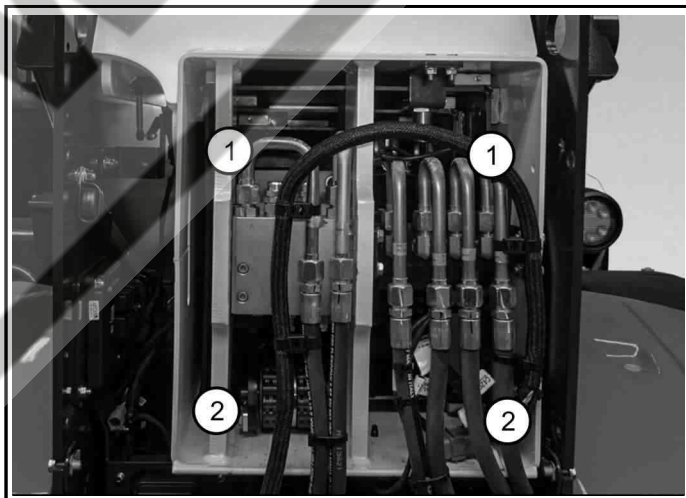
Figure 364



1. Loosen the four bolts (Item 1) and remove the rear cover (Item 2) [Figure 364] from the back of the boom.

When installing, tighten the bolts (Item 1) [Figure 364] to maximum 16 N·m (12 ft-lb) torque.

Figure 365



2. Lubricate the top rear pads (Item 1) (six locations) [Figure 365] by using a greaser.
3. To lubricate the bottom rear pads (Item 2) (six locations) [Figure 365] that are not accessible in the above step:
 - a. Partially extend and fully lower the boom.
 - b. Put the Travel Direction Control in neutral. (See Travel Direction on Page 42) Ensure that the parking brake is engaged. (See Parking Brake on Page 66) Stop the engine and exit the machine.

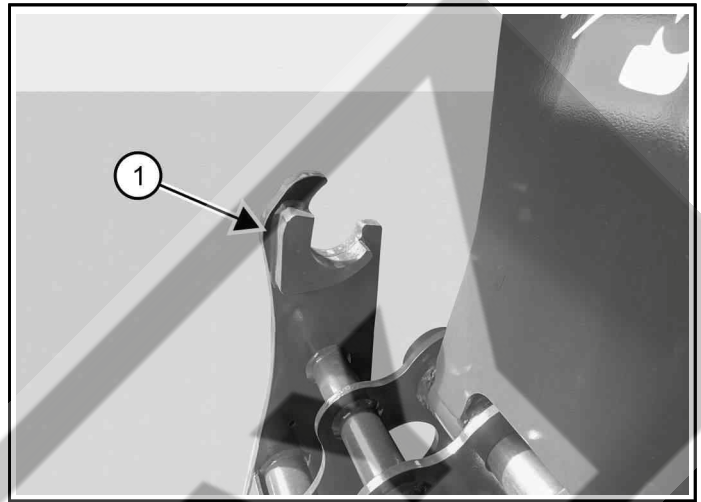
(See Stopping The Engine And Leaving The Machine on Page 91)

- c. Use a brush to lubricate the inside of the booms.

ATTACHMENT CARRIER

Inspection And Maintenance

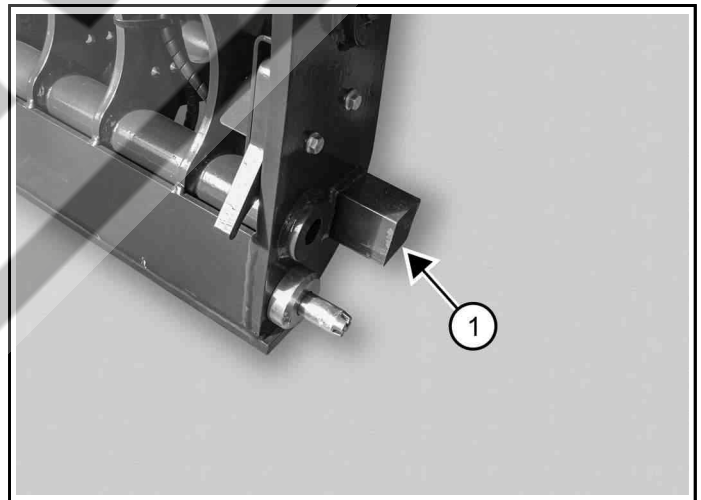
Figure 366



C212234a

- The attachment carrier mounting hooks (Item 1) [Figure 366] (both sides) must not be damaged or worn.
 - ▷ Inspect attachment carrier condition.
 - ▷ Replace as needed.

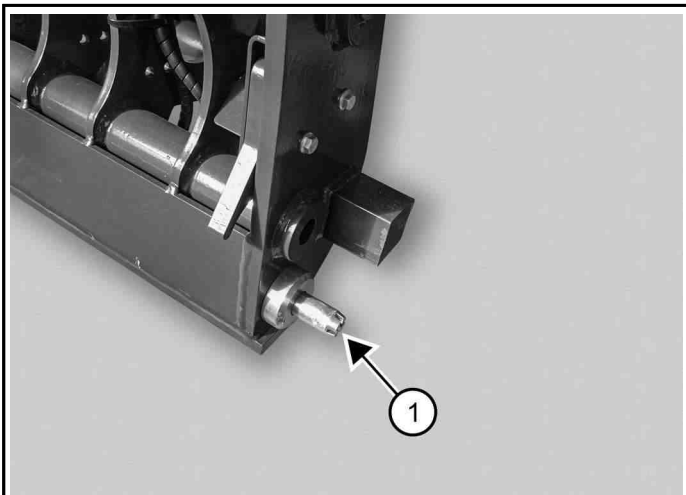
Figure 367



C212235a

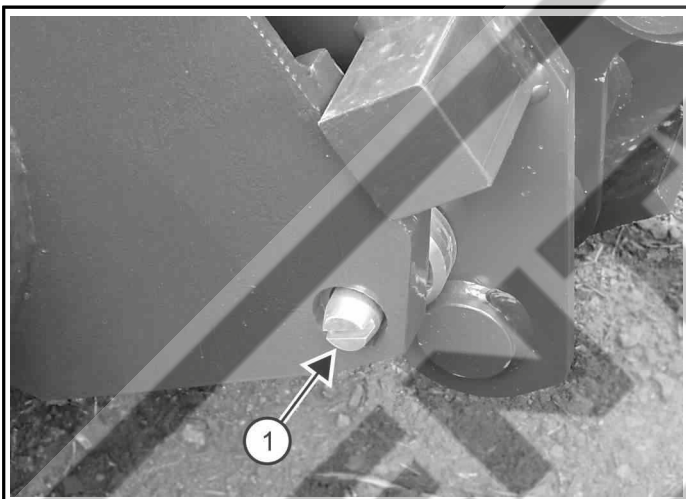
- The stop block (Item 1) [Figure 367] (both sides) must not be damaged or worn.
 - ▷ Inspect stop block condition.
 - ▷ Replace as needed.

Figure 368



- The attachment carrier hydraulic locking pins (if equipped) (Item 1) [Figure 368] (both sides) must move freely. The pins must not be bent or the ends deformed.

Figure 369



- The pins (if equipped) (Item 1) [Figure 369] (both sides) must extend through the holes in the attachment mounting frame.
- Lubricate the attachment carrier.

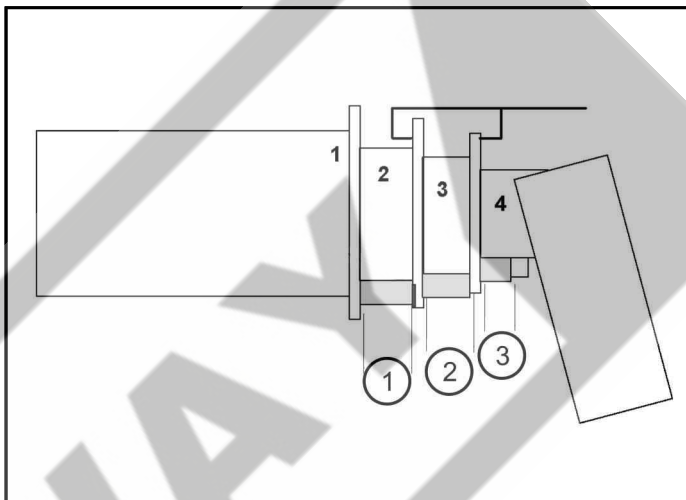
CHAIN CHECKING AND ADJUSTING

Checking And Adjusting Procedure

One (wooden) block of 280 mm (11.8 in) and two (wooden) blocks of 190 mm (7.5 in) will be needed.

Preparation

Figure 370

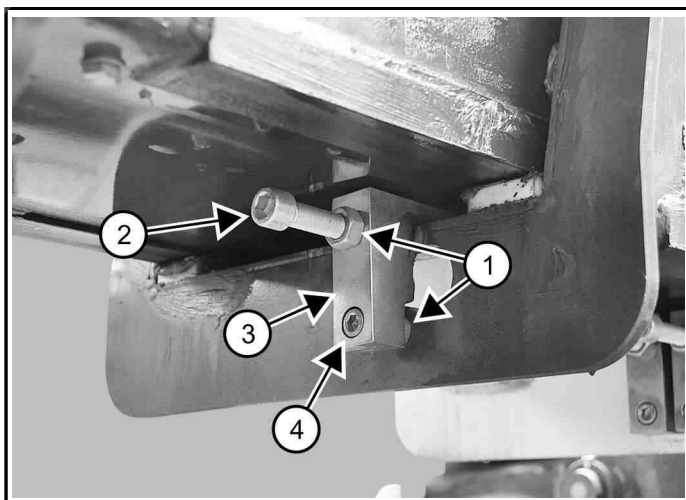


- Retract the boom while inserting the blocks as shown in [Figure 370] and use clamps to prevent the boom sections from extending.

REF.	LENGTH
1	280 mm (11 in)
2	190 mm (7.5 in)
3	190 mm (7.5 in)

Retraction Chains Tightness

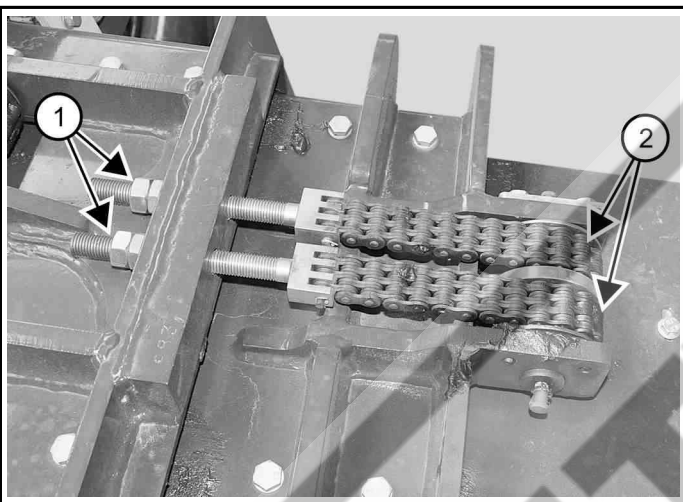
Figure 371



2. Loosen the lock nuts (Item 1) [Figure 371].
3. Check the tightness of the adjustment screw (Item 2) [Figure 371]. The correct torque value is 30 N•m (22 ft-lb).
4. Tighten the adjustment screws as required. The chain anchor (Item 3) must stay perpendicular to the bottom of the intermediate boom section. Re-position the chain anchor as required using the screw (Item 4) [Figure 371] and lock nut to position the anchor correctly.
5. Re-tighten the lock nuts.
6. Repeat this for the other retraction chain(s).

Extension Chains Tightness

Figure 372

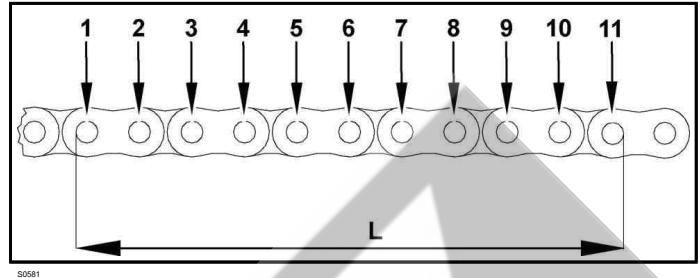


7. Loosen the two lock nuts (Item 1) [Figure 372].
8. Check the tightness of the adjustment nuts (located behind the lock nuts). The correct torque value is 22 N•m (16 ft-lb).
9. Tighten the adjustment nuts as required.
Tighten the adjustment nuts alternately and evenly as required to achieve the desired torque value. DO NOT tighten one chain (Item 2) [Figure 372] more than the other.
10. Re-tighten the lock nuts.
11. Repeat this for the other extension chain(s).
12. Start the engine and operate the extend/retract function through several cycles to check for proper operation. Repair as required.

Checking Wear on the Extension and Retraction Chains

1. Start the engine. Extend the boom completely in the horizontal position. Shut off the engine.

Figure 373



2. As shown in [Figure 373], use a Vernier caliper to measure the length "L" of 11 links of the extension chain. Measure from the outside edge of link pin 1 to outside edge of link pin 11.

The wear is considered normal as long as "L" is less than 169,50 mm (6.68 in).

If "L" is equal to or longer than 169,50 mm (6.68 in), the chains, pins, rollers, tension rods and attachment screws must be replaced.

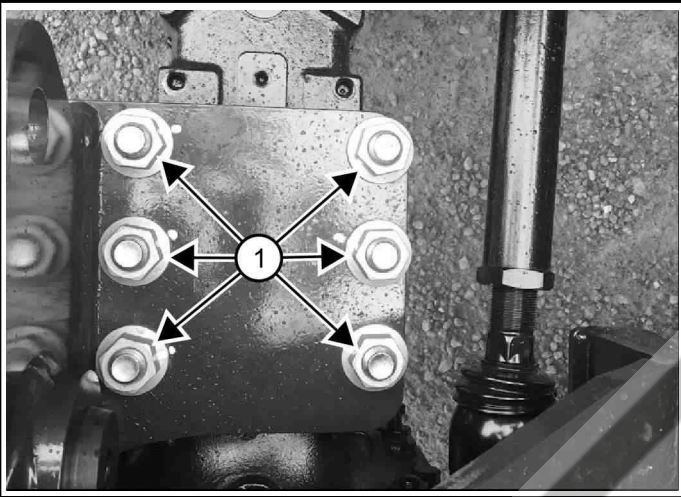
Each time the chain wear is checked, record the date, machines hours and measurement "L" for future reference.

FRONT AXLE MOUNTING BOLTS

Checking The Tightening Torque

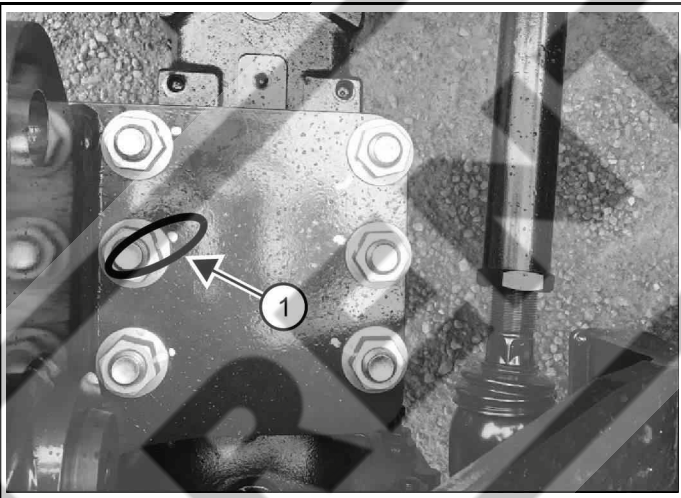
See the service schedule for the service interval to check the tightening torque of the front axle mounting bolts and nuts. (See Service Schedule on Page 141)

Figure 374



When operating in heavy applications, the front axle mounting bolts and nuts (Item 1) [Figure 374] might get loose.

Figure 375



1. Visually check the mounting bolts and nuts. Check that the marks (Item 1) [Figure 375] (made in the factory during initial tightening) are still aligned.
2. Manually check if the bolts / nuts have moved. Try to turn it by hand.

If the marks are still aligned and clearly visible and there is no sign of bolts / nuts moving, no action is required.

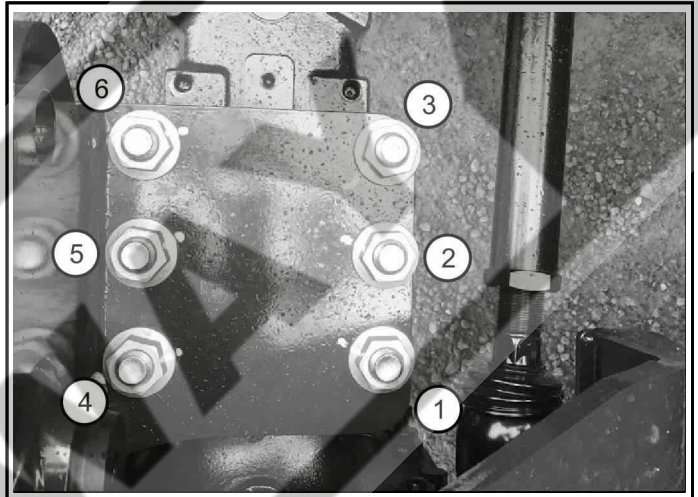
NOTE: If the marks have disappeared, make new ones for the next maintenance.

If the marks are misaligned or the bolts / nuts turn or there is any sign of bolt / nut movement, tighten all mounting bolts and nuts.
(See Tightening The Front Axle Mounting Bolts on Page 197)

Tightening The Front Axle Mounting Bolts

1. Remove and clean all front axle mounting bolts and nuts.
2. Apply Loctite #242 to the threads of the mounting bolts.

Figure 376



3. Install and tighten the mounting bolts and nuts following the sequence 1 through 6 shown in [Figure 376]

Tighten the mounting bolts and nuts to 520 N•m (383.5 ft-lb) torque.

4. Repeat the tightening procedure for a second time.

MACHINE STORAGE AND RETURN TO SERVICE

Storage

Sometimes it can be necessary to store your Bobcat machine for an extend period of time. Below is a list of items to perform before storage.

- Thoroughly clean the machine including the engine compartment.
- Store the attachments in a dry protected shelter.
- Lubricate the machine.
- Replace worn or damaged parts.
- Park the machine in a dry protected shelter.
- Lower the boom all the way and put the attachment (if equipped) flat on the ground.
- Check tyre inflation and put blocks under the frame to remove weight from the tyres.
- Put grease on any exposed cylinder rods.
- Put fuel stabiliser in the fuel tank and run the engine a few minutes to circulate the stabiliser to the pump and fuel injectors.

If biodiesel blend fuel has been used, perform the following:

Drain the fuel tank, refill with 100% petroleum diesel fuel, add fuel stabiliser and run the engine for at least 30 minutes.

- Drain and flush the cooling system. Refill with premixed coolant.
- Fill the DEF / AdBlue tank. The maximum DEF / AdBlue storage limit is two months in ambient temperatures of $-40 - +40^{\circ}\text{C}$ ($-40 - +104^{\circ}\text{F}$) or four months in $-40^{\circ}\text{C} - +25^{\circ}\text{C}$ ($-40^{\circ}\text{F} - +77^{\circ}\text{F}$).
- Replace all fluids and filters (engine, hydraulic / hydrostatic).
- Replace air cleaner, heater and air conditioning filters.
- Put all controls in neutral position.
- Remove the battery. Be sure the electrolyte level is correct then charge the battery. Store it in a cool dry place above freezing temperatures and charge it periodically during storage.
- Cover the exhaust pipe opening.
- Tag the machine to indicate that it is in storage condition.

Return To Service

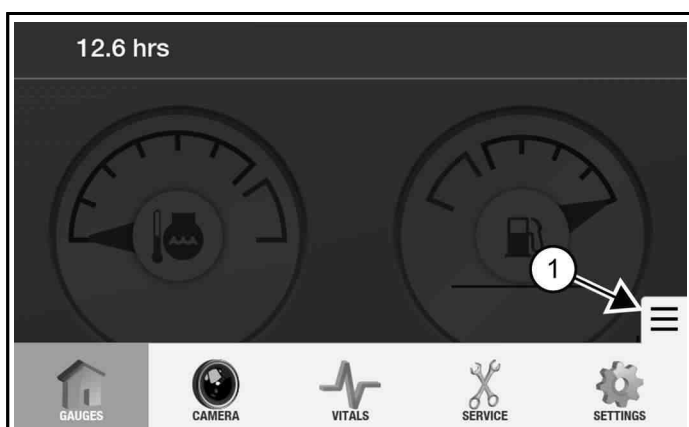
After the Bobcat machine has been in storage, it is necessary to follow a list of items to return the machine to service.

- Check the engine and hydraulic fluid levels; check coolant level.
- Install a fully charged battery.
- Remove grease from exposed cylinder rods.
- Check all belt tensions.
- Be sure all shields and guards are in place.
- Lubricate the machine.
- Check tyre inflation and remove blocks from under frame.
- Remove cover from exhaust pipe opening.
- Perform the following steps if the DEF / AdBlue storage limit has been exceeded:
 1. Remove the fluid from the DEF / AdBlue tank and refill with new fluid.
 2. Replace the DEF / AdBlue filter if the machine was stored for more than nine months.
 3. See your Bobcat dealer for service if the machine displays any codes related to the DPF / SCR system that do not clear within 15 minutes of engine run time.
- Perform the 'Long Storage Action' in the Bobcat Engine Analyzer.
- Start the engine and let run for a few minutes while observing the instrument panels and systems for correct operation.
- Operate machine, check for correct function.
- Stop the engine and check for leaks. Repair as needed.

NAVIGATION (STANDARD DISPLAY)

Navigation Bar

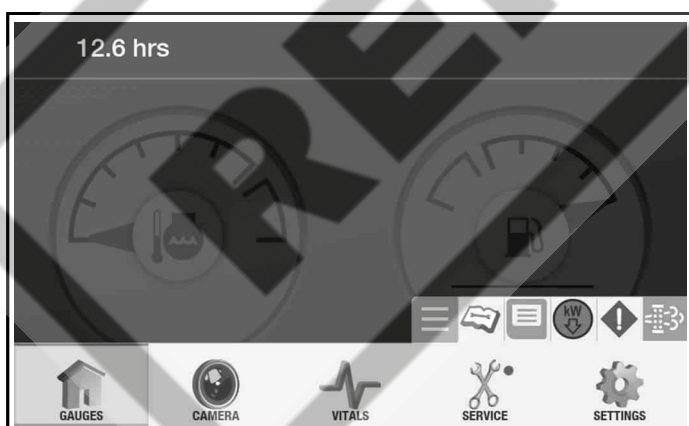
Figure 377



1. Select the **[NAVIGATION HANDLE]** icon (Item 1) [Figure 377] to open the navigation bar.
2. The navigation bar contains icons that are used to take you to the following screens:
 - **GAUGES** - Home screen
 - **CAMERA** - Rear-view camera screen
 - **VITALS** - (See Vitals (Standard Display) on Page 200)
 - **SERVICE** - (See Service (Standard Display) on Page 201)
 - **SETTINGS** - (See Settings (Standard Display) on Page 202)

Viewing Active Shortcuts

Figure 378



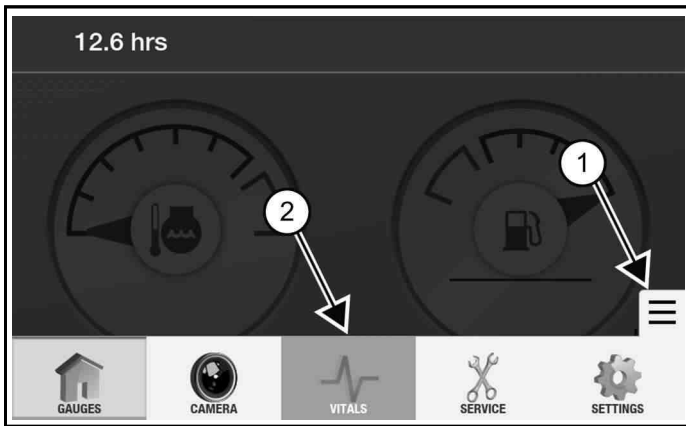
- The following icons can appear in the navigation handle position [Figure 378]. Selecting the icon will take you directly to the indicated screen.

ICON	DESCRIPTION	FUNCTION
	Navigation Handle	Opens and closes the navigation bar (See Navigation Bar on Page 199)
	Service Due	Opens the service screen (See Record A Service on Page 201)
	Software Update	Opens the software screen (See Software on Page 207)
	Machine Derate	Opens the machine performance screen (See Vital Detail And Machine Performance on Page 200)
	Warning	Opens the service codes screen (See View Service Codes on Page 201)
	Diesel Particulate Filter	Opens the DPF management screen (See DPF Description on Page 60)

VITALS (STANDARD DISPLAY)

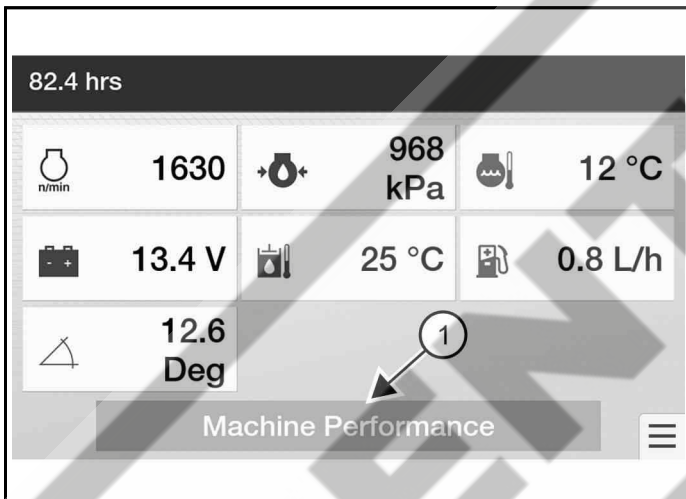
Vital Detail And Machine Performance

Figure 379



1. Select the **[NAVIGATION HANDLE]** icon (Item 1) [Figure 379].
2. Select **[VITALS]** (Item 2) [Figure 379].

Figure 380



3. The following vitals can be viewed in a digital format [Figure 380]:
 - Engine Speed (rpm)
 - Engine Oil Pressure
 - Engine Coolant Temperature
 - System Voltage
 - Hydraulic Fluid Temperature
 - Fuel Usage Per Hour
 - Boom Angle Value
4. Select **[MACHINE PERFORMANCE]** (Item 1) [Figure 380] to view limitations or restrictions that prevent machine damage.

Figure 381

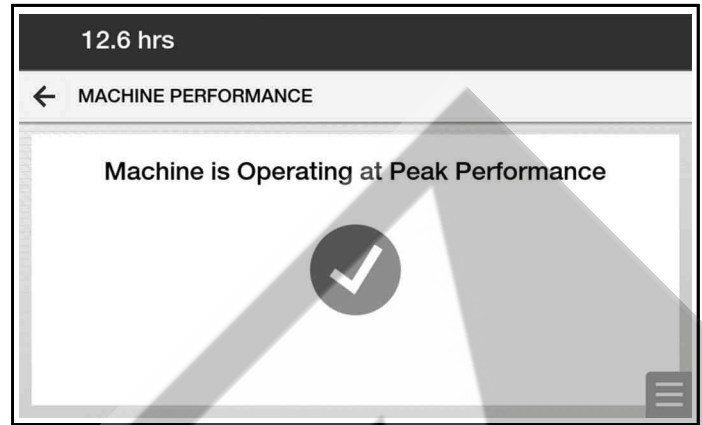
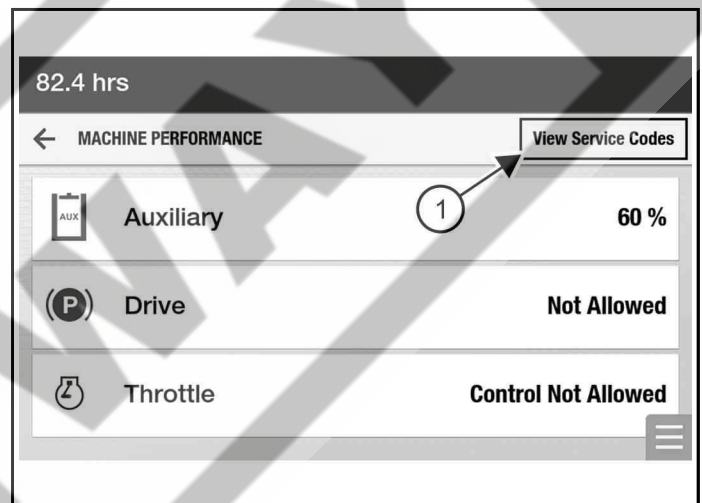


Figure 382



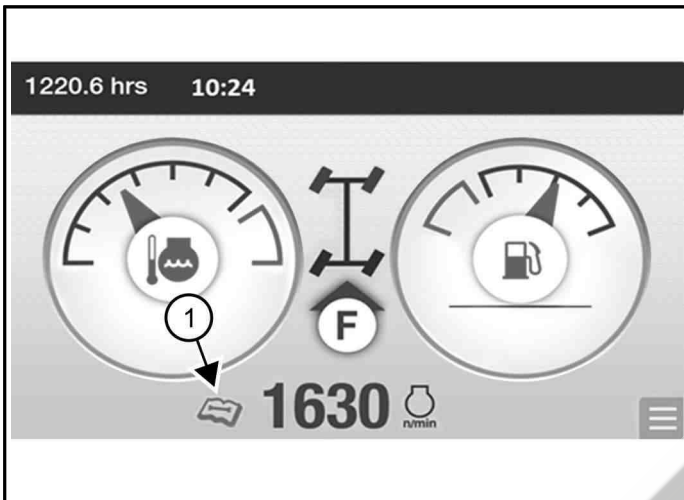
Examples of **MACHINE PERFORMANCE** screens are shown in [Figure 381] and [Figure 382]. Associated service codes may also be listed.

5. Select **[VIEW SERVICE CODES]** (Item 1) [Figure 382] to take you directly to the **SERVICE CODES** screen.

SERVICE (STANDARD DISPLAY)

Record A Service

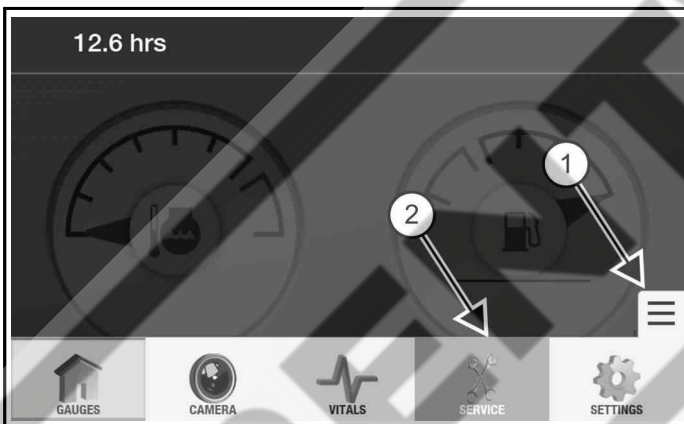
Figure 383



C211162a

The service schedule information is based off the machine service schedule. The display will notify the operator 10 hours prior to the next service due and continue until the service is completed (Item 1) [Figure 383].

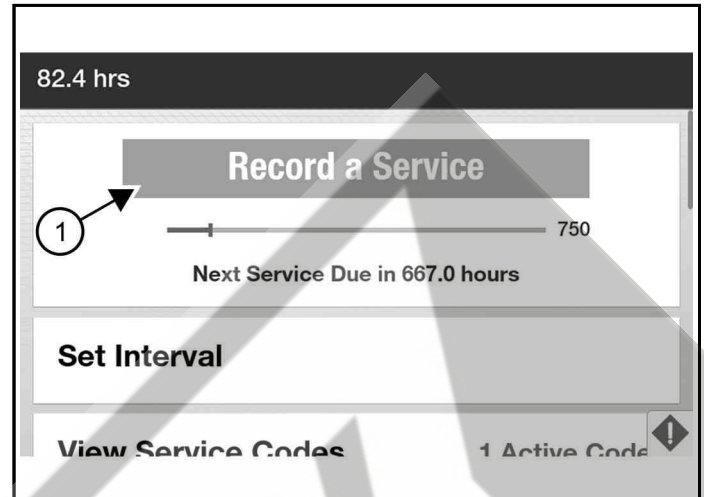
Figure 384



NA3700A

1. Select the **[NAVIGATION HANDLE]** icon (Item 1) [Figure 384].
2. Select **[SERVICE]** (Item 2) [Figure 384].

Figure 385

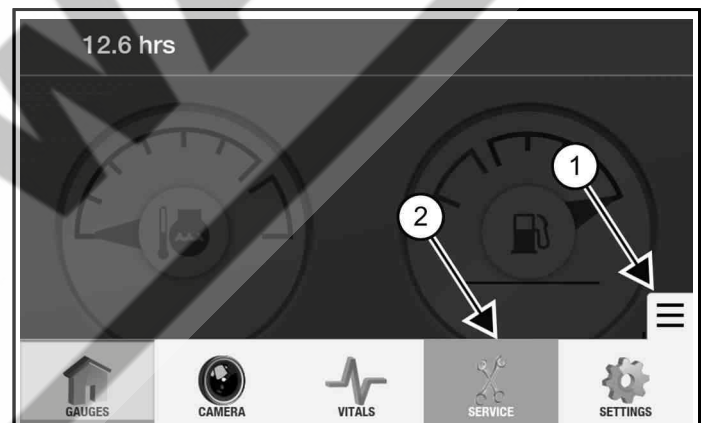


C210759a

3. Select **[RECORD A SERVICE]** (Item 1) [Figure 385] to record the service as completed.

View Service Codes

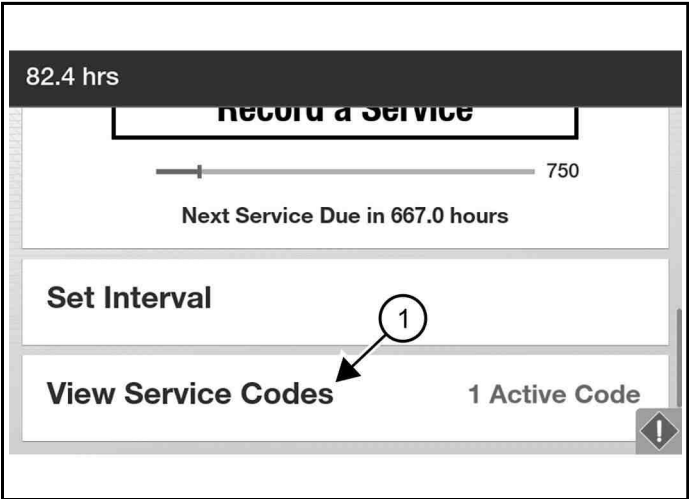
Figure 386



NA3700A

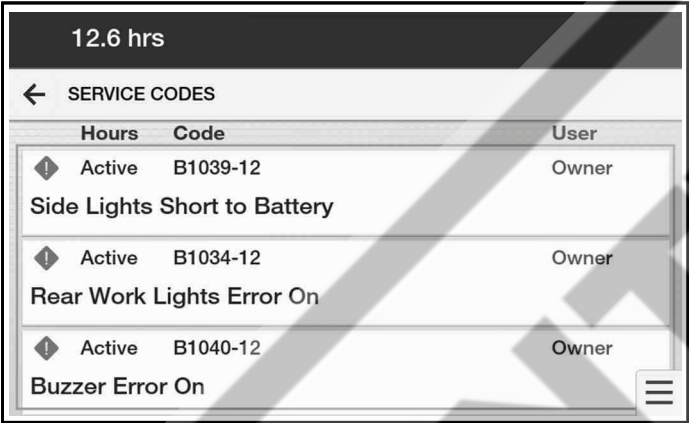
1. Select the **[NAVIGATION HANDLE]** icon (Item 1) [Figure 386].
2. Select **[SERVICE]** (Item 2) [Figure 386].

Figure 387



3. Select **[VIEW SERVICE CODES]** (Item 1) [Figure 387].

Figure 388

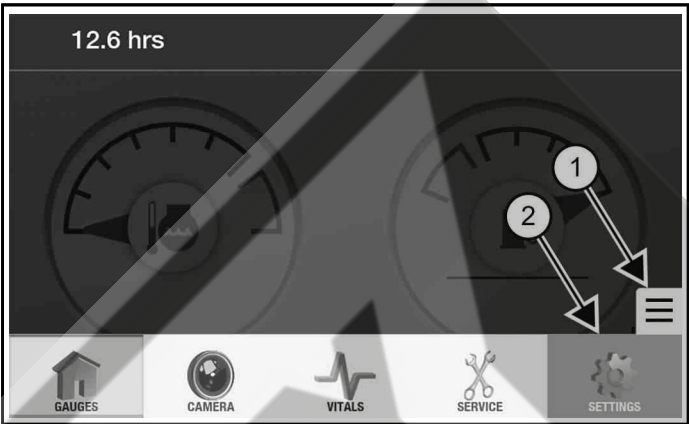


4. Scroll down if necessary to see all service codes [Figure 388].

SETTINGS (STANDARD DISPLAY)

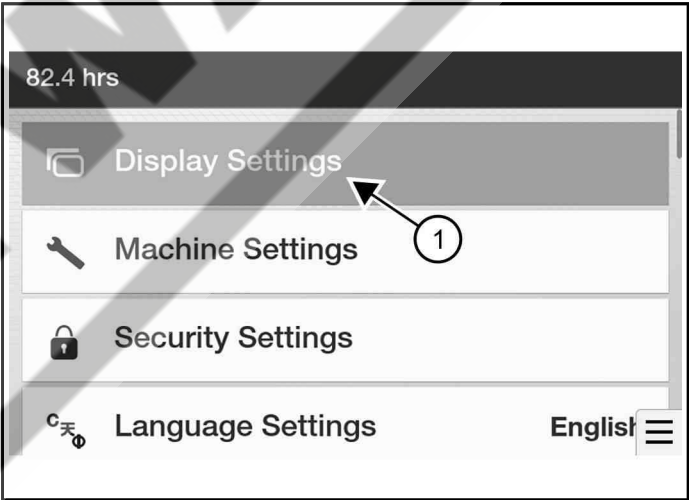
Display Settings

Figure 389



1. Select the **[NAVIGATION HANDLE]** icon (Item 1) [Figure 389].
2. Select **[SETTINGS]** (Item 2) [Figure 389].

Figure 390



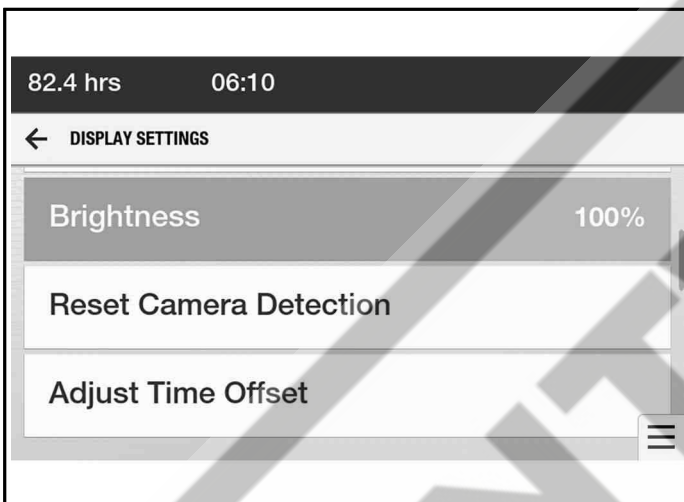
3. Select **[DISPLAY SETTINGS]** (Item 1) [Figure 390].

Figure 391



C210718

Figure 392

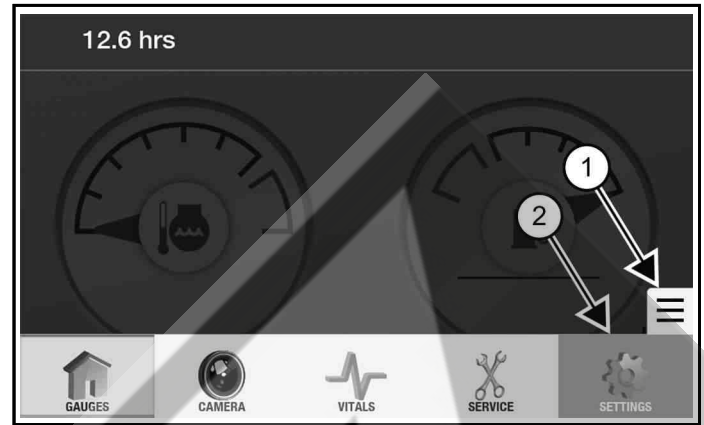


C210720

4. The following display settings are available [Figure 391] and [Figure 392]:
 - Auto brightness on or off
 - Screen brightness adjustment
 - Reset Camera Detection
 - Adjust Time Offset
 - Time Format

Machine Settings

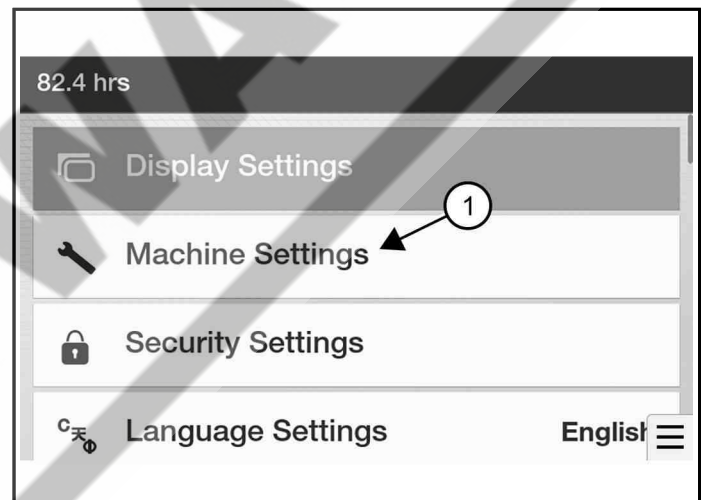
Figure 393



NA3665A

1. Select the **[NAVIGATION HANDLE]** icon (Item 1) [Figure 393].
2. Select **[SETTINGS]** (Item 2) [Figure 393].

Figure 394



C210781a

3. Select **[MACHINE SETTINGS]** (Item 1) [Figure 394].

Figure 395

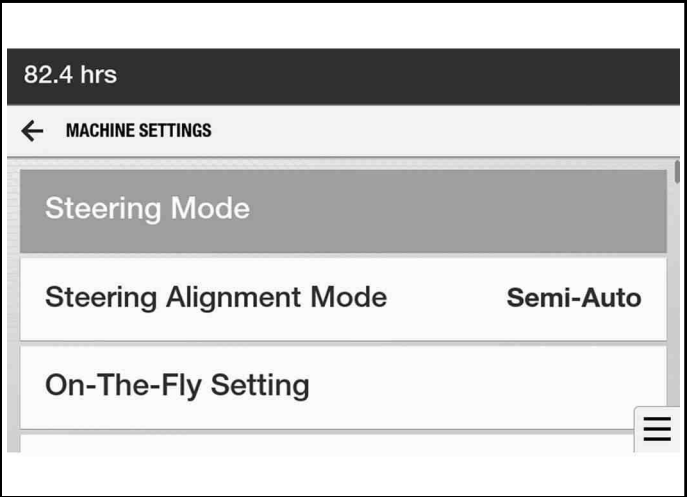


Figure 396

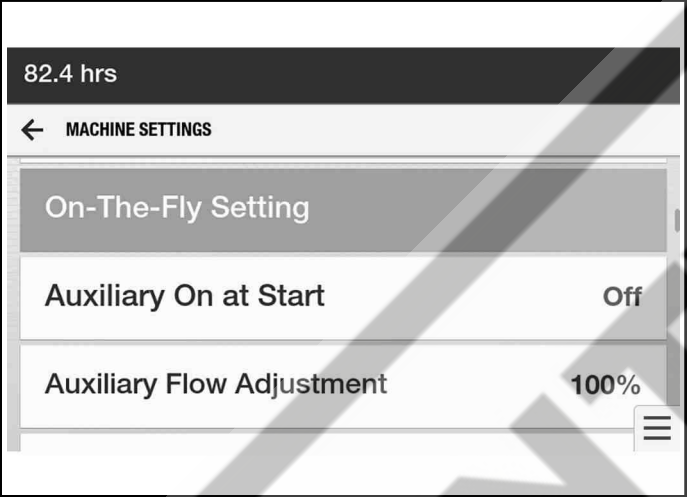


Figure 397

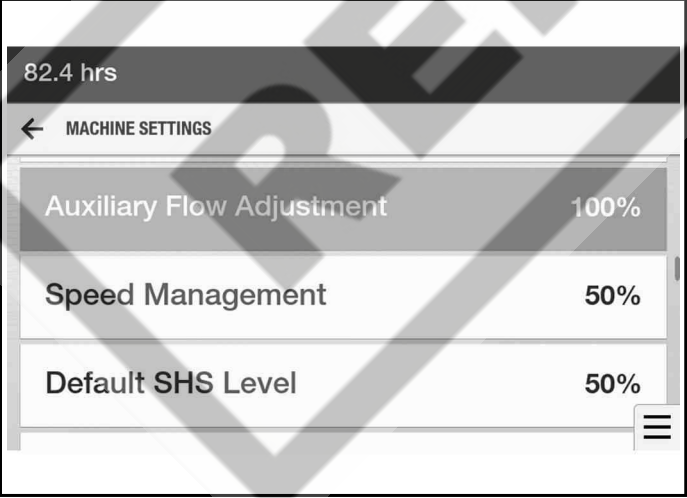
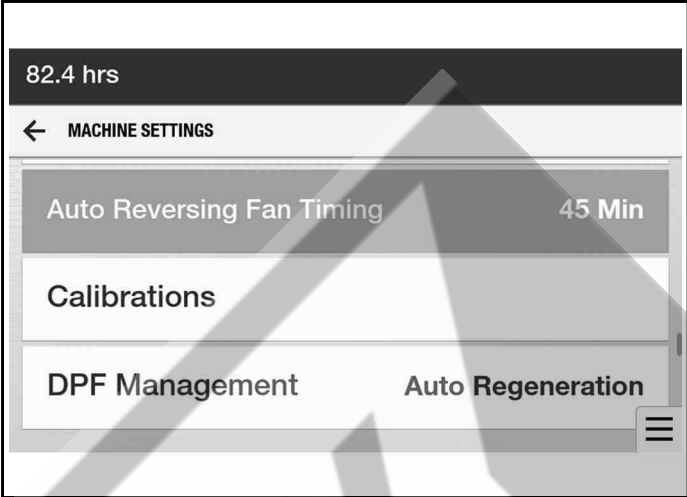


Figure 398



4. The following machine settings may be available depending on machine configuration [Figure 395], [Figure 396], [Figure 397] and [Figure 398]:
- Steering Mode
 - Steering Alignment Mode
 - On-the-Fly Setting
 - Auxiliary on at Start
 - Auxiliary Flow Adjustment
 - Speed Management
 - Default SHS Level
 - Auto Reverse Fan Timing
 - Calibrations
 - DPF Management

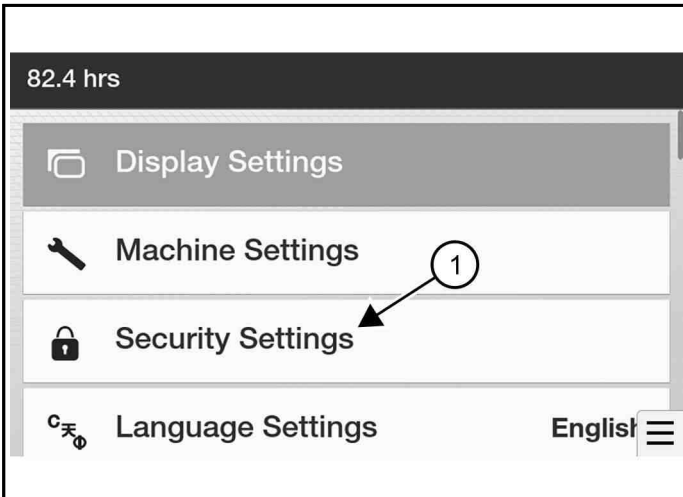
Security Settings

Figure 399



1. Select the **[NAVIGATION HANDLE]** icon (Item 1) [Figure 399].
2. Select **[SETTINGS]** (Item 2) [Figure 399].

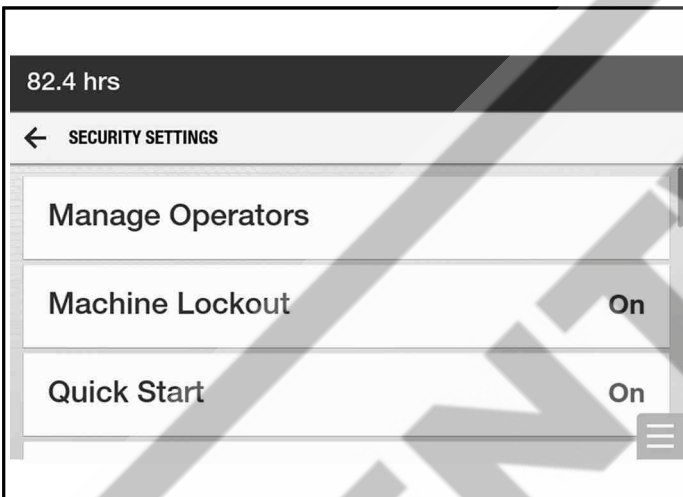
Figure 400



C210761c

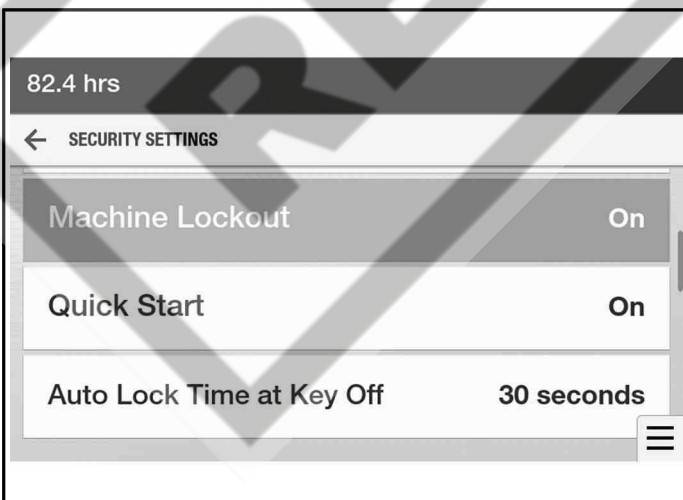
3. Select **[SECURITY SETTINGS]** (Item 1) [Figure 400].

Figure 401



C210758

Figure 402



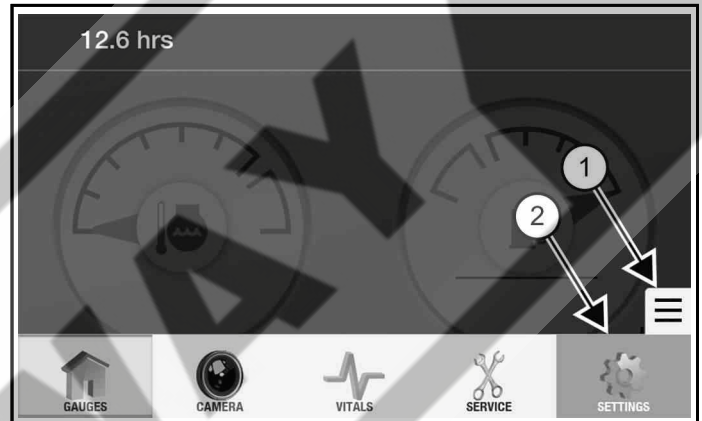
C210757

4. The following security settings are available [Figure 401] and [Figure 402]:

- Manage Operators (See Security Settings (Manage Operators) on Page 205)
- Machine Lockout - When on, requires password to use machine
- Quick Start
- Auto Lock Time at Key Off

Security Settings (Manage Operators)

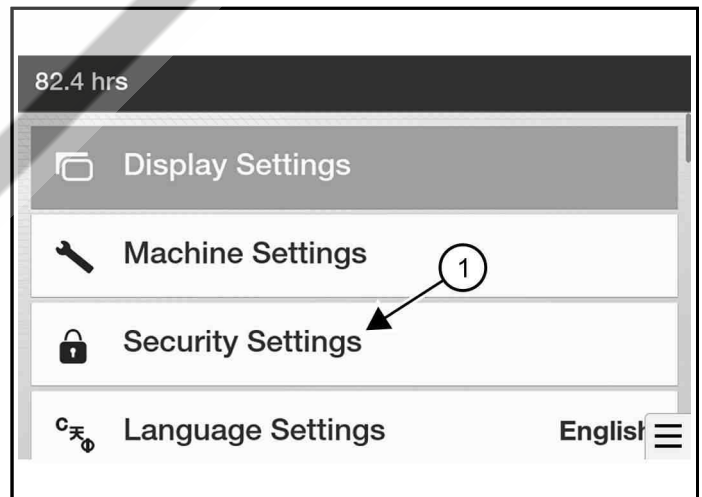
Figure 403



NA3665A

1. Select the **[NAVIGATION HANDLE]** icon (Item 1) [Figure 403].
2. Select **[SETTINGS]** (Item 2) [Figure 403].

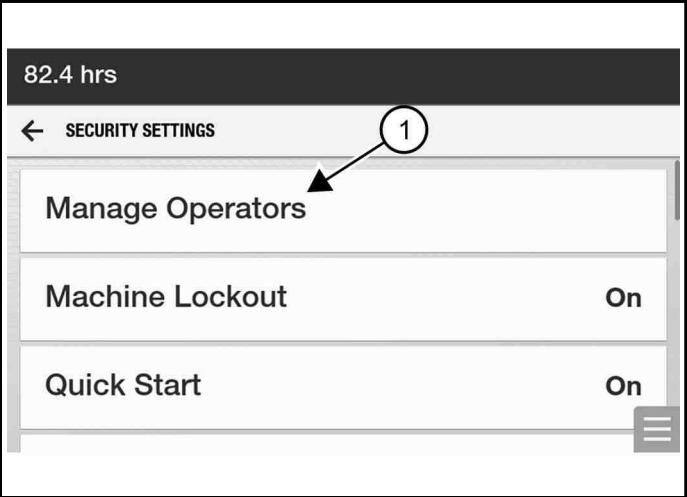
Figure 404



C210761c

3. Select **[SECURITY SETTINGS]** (Item 1) [Figure 404].

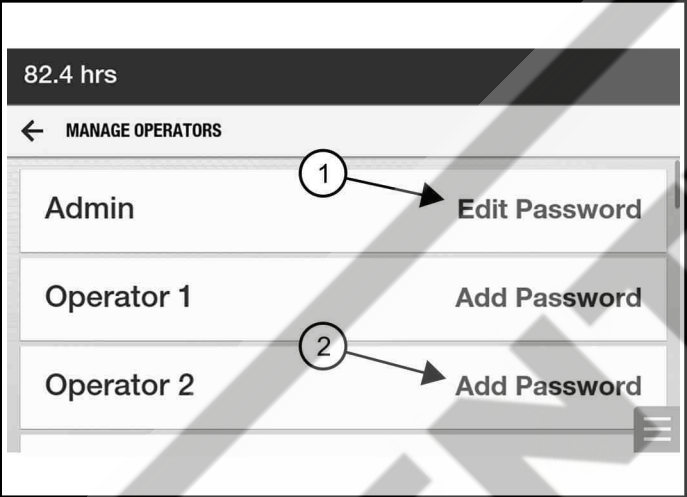
Figure 405



C210756a

4. Select **[MANAGE OPERATORS]** (Item 1) [Figure 405].

Figure 406

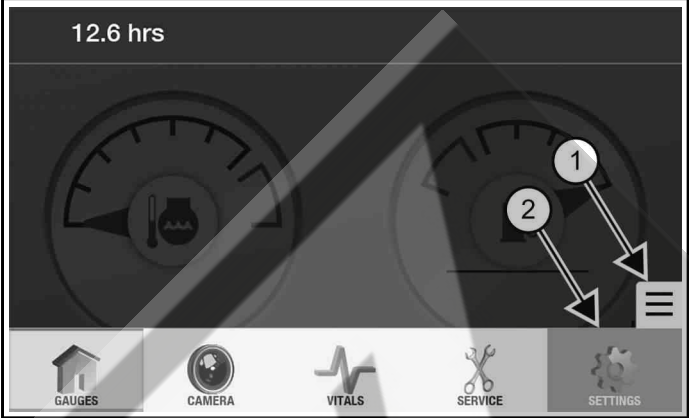


C210750a

5. Select **[ADD PASSWORD]** (Item 2) [Figure 406] to enter a new operator.
A maximum of four operators can be assigned.
6. Select **[EDIT PASSWORD]** (Item 1) [Figure 406] to change a password.

Language Settings

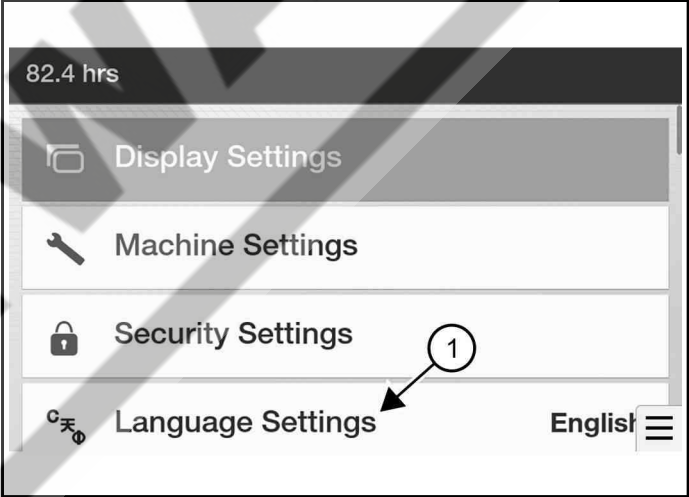
Figure 407



NA3659A

1. Select the **[NAVIGATION HANDLE]** icon (Item 1) [Figure 407].
2. Select **[SETTINGS]** (Item 2) [Figure 407].

Figure 408



C210761d

3. Select **[LANGUAGE SETTINGS]** (Item 1) [Figure 408].

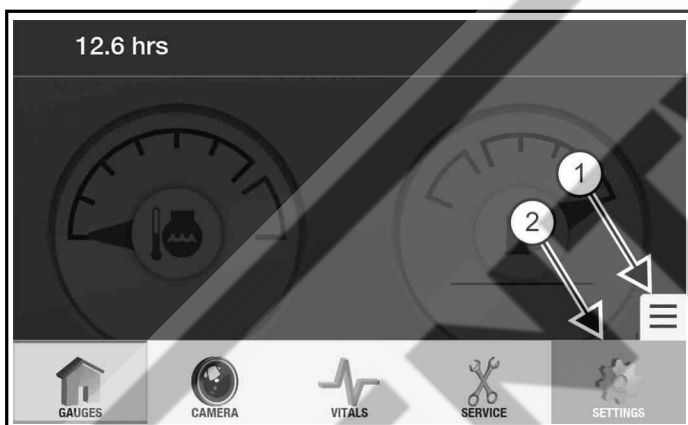
Figure 409



4. Scroll up or down and select the desired language [Figure 409]. The selected language will take effect immediately.

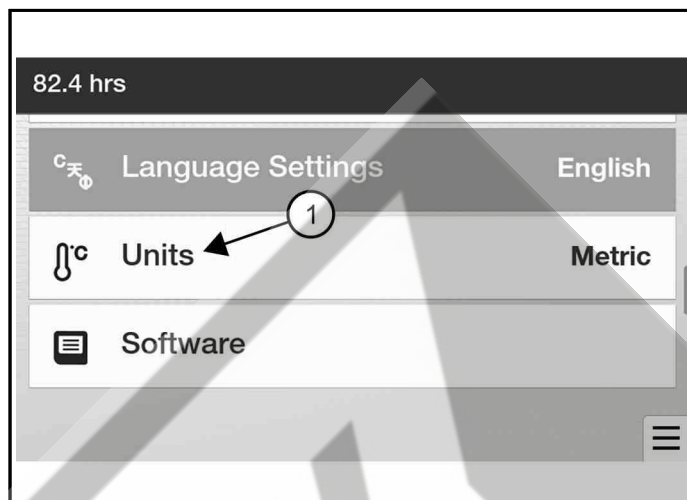
Units

Figure 410



1. Select the **[NAVIGATION HANDLE]** icon (Item 1) [Figure 410].
2. Select **[SETTINGS]** (Item 2) [Figure 410].

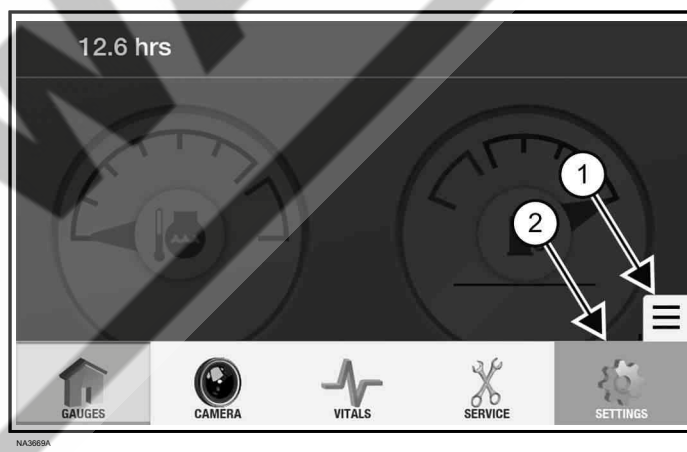
Figure 411



3. Scroll down and select **[UNITS]** (Item 1) [Figure 411] to toggle between English and Metric.

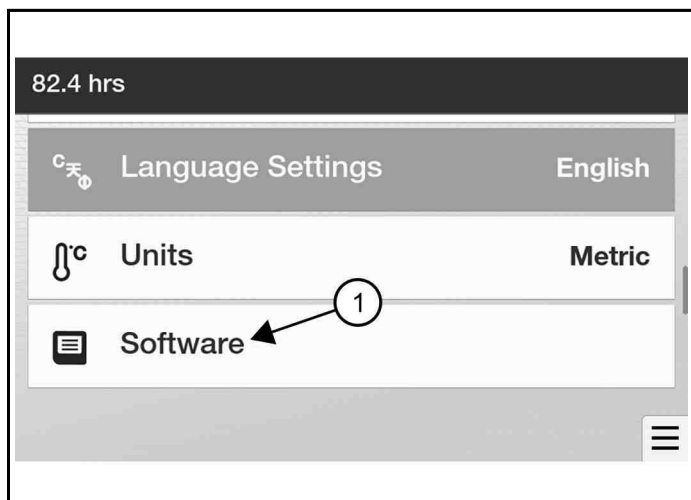
Software

Figure 412



1. Select the **[NAVIGATION HANDLE]** icon (Item 1) [Figure 412].
2. Select **[SETTINGS]** (Item 2) [Figure 412].

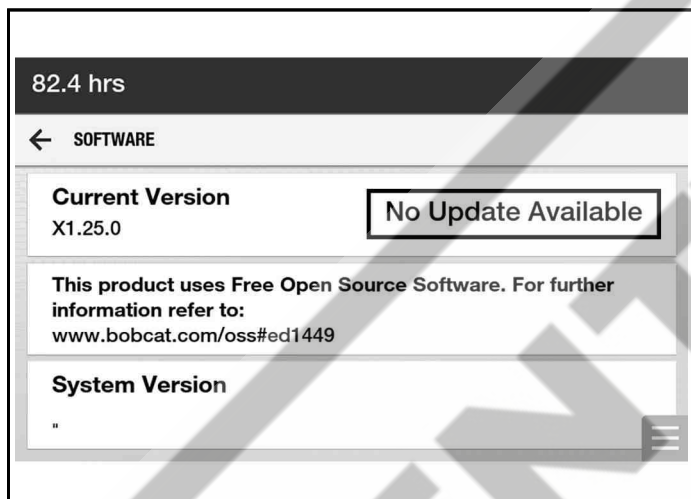
Figure 413



C210762b

3. Scroll down and select **[SOFTWARE]** (Item 1) [Figure 413].

Figure 414



C210766

4. Your machine's current software version is shown [Figure 414]. Software updates can only be performed by your dealer.

DIAGNOSTIC SERVICE CODES

Service Codes List - Engine Controller

The engine controller is located in the back of the engine compartment.

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00000019	"U0607"	CAN frame has a time out for the number of cycles (4).	Engine torque reduction Level 1 (Mid)	1. Electric problem (VCU, abnormal network) 2. Electric problem (CAN wiring harness insulation, resistance)
E00002700	"P042E"	If the position difference between demanded EGR position and feedback EGR position is over the threshold.	Engine Torque Reduction Variable	1. Actuator problem (Faulty EGR valve motor, EGR valve sticking, carbon or foreign material, Faulty EGR position sensor) 2. Electric problem (Wiring harness EGR to ECU)
E00002701	"P042F"	If the position difference between demanded EGR position and feedback EGR position is over the threshold.	Engine Torque Reduction Variable	1. Actuator problem (Faulty EGR valve motor, EGR valve sticking, carbon or foreign material, faulty EGR position sensor) 2. Electric problem (Wiring harness EGR to ECU)
E00002703	"P0406"	EGR Feedback Position value is more than maximum operation range (4.55 V).	Engine Torque Reduction Variable	1. Electric problem (Faulty EGR valve, EGR valve connector, wiring harness EGR to ECU) 2. Electric problem (Faulty ECU, ECU connector)
E00002704	"P0407"	EGR Feedback Position value is less than minimum operation range (0.4 V).	Engine Torque Reduction Variable	1. Electric problem (Faulty EGR valve, EGR valve connector, wiring harness EGR to ECU) 2. Electric problem (Faulty ECU, ECU connector)
E00002720	"P0C17"	If the average voltage value of the feedback position that is calculated in the closed stop is not within the limits (3.4 ~ 4.35 V).	Engine Torque Reduction Variable	1. Actuator problem (Valve sticking, foreign material, deep carbon) 2. Electric problem (Faulty EGR valve) 3. Electric problem (EGR valve connector, wiring harness, Faulty ECU, ECU connector)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00002722	"P0C18"	The absolute value of the difference of the learned voltage values in the mechanical end stops and the first learned voltage values is greater than 0.7 V for long time.	Engine Torque Reduction Variable	1. Actuator problem (Valve sticking, foreign material, deep carbon) 2. Electric problem (Faulty EGR valve) 3. Electric problem (EGR valve connector, wiring harness, faulty ECU, ECU connector)
E00002723	"P0C19"	The absolute value of the difference of the learned voltage values in the mechanical end stops and the last learned voltage values is greater than 0.7 V for short time.	Engine Torque Reduction Variable	1. Actuator problem (Valve sticking, foreign material, deep carbon) 2. Electric problem (Faulty EGR Valve) 3. Electric problem (EGR valve connector, wiring harness, faulty ECU, ECU connector)
E00002915	"P0221"	The hand pedal position track2 sensor signal is higher than maximum threshold (5 V).	Engine torque reduction Level 1 (Mid)	1. Electric problem (Faulty pedal track2 sensor, pedal sensor connector) 2. Electric problem (Wiring harness pedal to ECU) 3. Electric problem (ECU connector, faulty ECU)
E00002904	"P0222"	The accel pedal position track2 sensor signal is lower than minimum threshold (0 V).	Engine torque reduction Level 1 (Mid)	1. Electric problem (Faulty pedal track2 sensor, pedal sensor connector) 2. Electric problem (Wiring harness pedal to ECU) 3. Electric problem (ECU connector, faulty ECU)
E00002903	"P0223"	The accel pedal position track2 sensor signal is higher than maximum threshold (5 V).	Engine torque reduction Level 1 (Mid)	1. Electric problem (Faulty pedal track2 sensor, pedal sensor connector) 2. Electric problem (Wiring harness pedal to ECU) 3. Electric problem (ECU connector, faulty ECU)
E00002917	"P0224"	The hand pedal position track2 sensor signal is lower than minimum threshold (0 V).	Engine torque reduction Level 1 (Mid)	1. Electric problem (Faulty pedal track2 sensor, pedal sensor connector) 2. Electric problem (Wiring harness pedal to ECU) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00005100	"P02E4"	If the position difference between demanded Throttle valve position and feedback Throttle valve position is over the threshold.		1. Actuator problem (Faulty throttle valve motor, throttle valve sticking, carbon or foreign material, faulty throttle valve position sensor) 2. Electric problem (Wiring harness throttle valve to ECU)
E00005101	"P02E5"	If the position difference between demanded Throttle valve position and feedback Throttle valve position is over the threshold.		1. Actuator problem (Faulty throttle valve motor, throttle valve sticking, carbon or foreign material, faulty throttle valve position sensor) 2. Electric problem (Wiring harness throttle valve to ECU)
E00005130	"P02E7"	If the average voltage value of the feedback position that is calculated in the closed stop is not within the limits (4.3 ~ 4.55 V).		1. Actuator problem (Valve sticking, foreign material) 2. Electric problem (Faulty throttle valve) 3. Electric problem (Throttle valve connector, wiring harness, faulty ECU, ECU connector)
E00005104	"P02E8"	Throttle valve Feedback Position value is less than minimum operation range(0.25 V).		1. Electric problem (Faulty throttle valve, throttle valve connector, wiring harness throttle valve to ECU) 2. Electric problem (Faulty ECU, ECU connector)
E00005103	"P02E9"	Throttle valve Feedback Position value is more than maximum operation range(4.75 V).		1. Electric problem (Faulty throttle valve, throttle valve connector, wiring harness throttle valve to ECU) 2. Electric problem (Faulty ECU, ECU connector)
E00005122	"P02EA"	The absolute value of the difference of the learned voltage values in the mechanical end stops and the first learned voltage value is greater than 0.3 V for long time.		1. Actuator problem (Valve sticking, foreign material) 2. Electric problem (Faulty throttle valve) 3. Electric problem (Throttle valve connector, wiring harness, faulty ECU, ECU connector)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00005123	"P02EB"	The absolute value of the difference of the learned voltage values in the mechanical end stops and the first learned voltage value is greater than 0.3 V for short time.		1. Actuator problem (Valve sticking, foreign material) 2. Electric problem (Faulty throttle valve) 3. Electric problem (Throttle valve connector, wiring harness, faulty ECU, ECU connector)
E00009115	"P0121"	The hand pedal position track1 sensor signal is higher than maximum threshold (5 V).	Engine torque reduction Level 1 (Mid)	1. Electric problem (Faulty pedal track1 sensor, pedal sensor connector) 2. Electric problem (Wiring harness pedal to ECU) 3. Electric problem (ECU connector, faulty ECU)
E00009104	"P0122"	The accel pedal position track1 sensor signal is lower than minimum threshold (0 V).	Engine torque reduction Level 1 (Mid)	1. Electric problem (Faulty pedal track1 sensor, pedal sensor connector) 2. Electric problem (Wiring harness pedal to ECU) 3. Electric problem (ECU connector, faulty ECU)
E00009103	"P0123"	The accel pedal position track1 sensor signal is higher than maximum threshold (5 V).	Engine torque reduction Level 1 (Mid)	1. Electric problem (Faulty pedal track1 sensor, pedal sensor connector) 2. Electric problem (Wiring harness pedal to ECU) 3. Electric problem (ECU connector, faulty ECU)
E00009117	"P0124"	The hand pedal position track1 sensor signal is lower than minimum threshold (0 V).	Engine torque reduction Level 1 (Mid)	1. Electric problem (Faulty pedal track1 sensor, pedal sensor connector) 2. Electric problem (Wiring harness pedal to ECU) 3. Electric problem (ECU connector, faulty ECU)
E00009111	"P2135"	The difference between values of dual track pedals are bigger than maximum threshold (Normally 9%).	Engine torque reduction Level 1 (Mid)	1. Electric problem (Faulty pedal sensor, pedal sensor connector) 2. Electric problem (Wiring harness pedal to ECU) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00009112	"P2136"	The difference between values of dual track pedals are bigger than maximum threshold (Normally 9%).	Engine torque reduction Level 1 (Mid)	1. Electric problem (Faulty pedal sensor, pedal sensor connector) 2. Electric problem (Wiring harness pedal to ECU) 3. Electric problem (ECU connector, faulty ECU)
E00009119	"U0606"	CAN frame has a time out for the number of cycles (4).	Engine torque reduction Level 1 (Mid)	1. Electric problem (VCU, abnormal network) 2. Electric problem (CAN wiring harness insulation, Resistance)
E00009723	"P2265"	Water in Fuel sensor raw value is within the threshold to detect water (<2.90 V). And 20 minutes have elapsed since the error was detected.	Engine torque reduction Level 2 (Severe)	1. Water in fuel problem (Water is detected in the fuel filter after 20 minutes). 2. Electric problem (WIF sensor connector, wiring harness WIF to ECU, faulty WIF sensor, faulty ECU, ECU connector).
E00009704	"P2266"	Water in Fuel Feedback raw signal value is less than minimum threshold (0.2 V).	Engine torque reduction Level 2 (Severe)	1. Electric problem (WIF sensor connector) 2. Electric problem (Wiring harness WIF to ECU, Faulty WIF sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00009703	"P2267"	Water in Fuel Feedback raw signal value is more than maximum threshold (4.83 V).	Engine torque reduction Level 2 (Severe)	1. Electric problem (WIF sensor connector) 2. Electric problem (Wiring harness WIF to ECU, faulty WIF sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00009714	"P2269"	Water in Fuel sensor raw value is within the threshold to detect water (<2.90 V).		1. Water in fuel problem (Water is detected in the fuel filter) 2. Electric problem (WIF sensor connector, wiring harness WIF to ECU, faulty WIF sensor, faulty ECU, ECU connector)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00009805	"P250A"	The oil combination sensor hardware detects an open or short circuit error at sensor itself.		1. Electric problem (Oil combination sensor) 2. Electric problem (Wiring harness ECU to Oil combination sensor, oil combination sensor connector) 3. Electric problem (Faulty ECU, ECU connector)
E00009804	"P250C"	The oil combination sensor signal is shorted circuit to ground error.		1. Electric problem (Oil combination sensor) 2. Electric problem (Wiring harness ECU to Oil combination sensor, oil combination sensor connector) 3. Electric problem (Faulty ECU, ECU connector)
E00009803	"P250D"	The oil combination sensor signal is shorted circuit to battery error.		1. Electric problem (Oil combination sensor). 2. Electric problem (Wiring harness ECU to Oil combination sensor, oil combination sensor connector). 3. Electric problem (Faulty ECU, ECU connector).
E00009818	"P250F"	The oil level height be lower than minimum level step3. In the incline condition, the engine oil level can be recognized at a lower or higher depending on the tilt angle. If the equipment was on incline condition, check the oil level on the flat ground condition.		1. The oil level height be lower than minimum level step3. 2. In the incline condition, the engine oil level can be recognized at a lower or higher depending on the tilt angle 3. Electric problem (Oil combination sensor)
E00009822	"P350D"	The oil combination sensor signal response time is exceeded the threshold.		1. Electric problem (Oil combination sensor) 2. Electric problem (Wiring harness ECU to oil combination sensor, oil combination sensor connector) 3. Electric problem (Faulty ECU, ECU connector)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00009823	"P350E"	The oil combination sensor hardware detects a voltage out of range error at sensor itself.		1. Electric problem (Oil combination sensor) 2. Electric problem (Wiring harness ECU to oil combination sensor, oil combination sensor connector) 3. Electric problem (Faulty ECU, ECU connector)
E00009824	"P350F"	The oil level height be lower than minimum level step2. In the incline condition, the engine oil level can be recognized at a lower or higher depending on the tilt angle. If the equipment was on incline condition, check the oil level on the flat ground condition.		1. The oil level height be lower than minimum level step2 2. In the incline condition, the engine oil level can be recognized at a lower or higher depending on the tilt angle 3. Electric problem (Oil combination sensor)
E00010001	"P1522"	Engine oil pressure sensor value is below the threshold (170 kPa ~ 250 kPa, depend on engine speed) value at engine running condition.	Engine torque reduction Level 2 (Severe). Engine speed reduced to 1200 rpm.	1. Oil level low problem (Oil change period, oil leakage) 2. Oil path problem (Oil filter or oil suction pipe clogging) 3. Oil path problem (Oil filter or oil pump broken) 4. Electric problem (Oil pressure sensor connector, oil pressure sensor, wiring harness sensor to ECU, faulty ECU, ECU connector)
E00010003	"P0523"	Engine oil pressure sensor value is more than maximum threshold (4.7 V).	Engine torque reduction Level 2 (Severe). Engine speed reduced to 1200 rpm.	1. Electric problem (Oil pressure sensor connector) 2. Electric problem (Wiring harness oil pressure sensor to ECU, faulty oil pressure sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00010004	"P0522"	Engine oil pressure sensor value is less than minimum threshold (0.27 V).	Engine torque reduction Level 2 (Severe). Engine speed reduced to 1200 rpm.	1. Electric problem (Oil pressure sensor connector) 2. Electric problem (Wiring harness oil pressure sensor to ECU, faulty oil pressure sensor) 3. Electric problem (Faulty ECU, ECU connector)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00010203	"P0108"	Intake manifold pressure sensor value is more than maximum threshold (4.75 V).	Engine Torque Reduction Variable	1. Electric problem (Intake manifold pressure sensor connector) 2. Electric problem (Wiring harness intake manifold pressure sensor to ECU, faulty intake manifold pressure sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00010204	"P0107"	Intake manifold pressure sensor value is less than minimum threshold (0.25 V).	Engine Torque Reduction Variable	1. Electric problem (Intake manifold pressure sensor connector) 2. Electric problem (Wiring harness intake manifold pressure sensor to ECU, faulty intake manifold pressure sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00010503	"P00AD"	Intake manifold temperature sensor value is more than maximum threshold (4.92 V).	Engine Torque Reduction Variable	1. Electric problem (Intake manifold temperature sensor connector) 2. Electric problem (Wiring harness intake manifold temperature sensor to ECU, faulty intake manifold temperature sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00010504	"P00AC"	Intake manifold temperature sensor value is less than minimum threshold (0.15 V).	Engine Torque Reduction Variable	1. Electric problem (Intake manifold temperature sensor connector) 2. Electric problem (Wiring harness intake manifold temperature sensor to ECU, faulty intake manifold temperature sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00010516	"P10AD"	Intake manifold temperature is increased more than normal operation threshold (128°C (262.4°F)).		1. Intake manifold temperature is exceeded than engine limit 2. Electric problem (Intake manifold temperature sensor connector, wiring harness ECU to intake manifold temperature sensor, intake manifold temperature sensor) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00010803	"P2229"	Atmospheric Pressure value is more than Maximum operation pressure (>115 kPa).		1. Electric problem (Faulty atmospheric pressure sensor in ECU) 2. Atmospheric problem (Too high atmospheric pressure > 1150hPa, almost underground mine condition (< -1500m))
E00010804	"P2228"	Atmospheric Pressure value is less than minimum operation pressure (< 50 kPa).		1. Electric problem (Faulty atmospheric pressure sensor in ECU) 2. Atmospheric problem (Too low atmospheric pressure < 500hPa, high altitude condition > 5000m)
E00011000	"P1118"	If the coolant temperature is increased more than the threshold, fault code is raised (110° C (230°F)).		1. Cooling problem (Low coolant, thermostat broken - fully closed) 2. Electric problem (Faulty coolant temperature sensor) 3. Cooling problem (Faulty of water pump)
E00011003	"P0118"	Coolant temperature signal voltage is more than 4.94 V.	Engine Torque Reduction Variable	1. Electric problem (Coolant temperature sensor connector) 2. Electric problem (Wiring harness coolant temperature sensor to ECU, faulty coolant temperature sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00011004	"P0117"	Coolant temperature signal voltage is almost 0 V (123 mV).	Engine Torque Reduction Variable	1. Electric problem (Coolant temperature sensor connector) 2. Electric problem (Wiring harness coolant temperature sensor to ECU, faulty coolant temperature sensor) 3. Electric problem (Faulty ECU, ECU connector)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00011010	"P011E"	If the coolant temperature is not increased more than the threshold during restricted condition, fault code is raised.	Engine torque reduction Level 1 (Mid)	1. Thermostat problem (Broken or normally open) 2. Electric problem (Coolant temperature sensor connector, wiring harness coolant temperature sensor to ECU, faulty coolant temperature sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00013201	"P00BC"	The intake manifold pressure is lower than estimated target minimum threshold.	Engine torque reduction Level 2 (Severe)	1. Air Path problem (Leakage of compressor outlet to intake manifold (hose, CAC)) 2. Air Path problem (Leakage of exhaust manifold to EGR path (EGR, cooler, pipe)) 3. Electric problem (Faulty intake manifold pressure sensor, faulty intake manifold temperature sensor, faulty air mass flow sensor)
E00013203	"P0103"	Air mass flow signal is higher than maximum operation frequency (1000 us).	Engine Torque Reduction Variable	1. Electric problem (Air mass flow sensor connector) 2. Electric problem (Wiring harness air mass flow sensor to ECU, faulty air mass flow sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00013204	"P0102"	Air mass flow signal is less than minimum operation frequency (70 us).	Engine Torque Reduction Variable	1. Electric problem (Air mass flow sensor connector) 2. Electric problem (Wiring harness air mass flow sensor to ECU, faulty air mass flow sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00013205	"P0101"	The supply voltage exceeds the thresholds (16 V).		1. Electric problem (Battery voltage too high / low) 2. Electric problem (Alternator, alternator wiring harness)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00013219	"P0100"	If there is short circuit to battery OR open load on the signal line.	Engine Torque Reduction Variable	1. Electric problem (Air mass flow sensor connector) 2. Electric problem (Wiring harness air mass flow sensor to ECU, faulty air mass flow sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00013221	"P00BE"	Air mass difference between air flow meter and calculated air flow into the cylinder is out of the threshold, fault code is raised.	Engine Torque Reduction Variable	1. Air path problem (Leakage of air cleaner to compressor inlet) 2. Installation problem (reverse installation of the air mass flow sensor) 3. Electric problem (Faulty intake manifold pressure sensor, faulty intake manifold temperature sensor, faulty air mass flow sensor)
E00015710	"P0087"	If the high pressure pump delivery quantity exceeds the plausibility limit of the volume flow balance (evaluated over the product life and supplemented to include tolerances), an error will be detected.	Engine torque reduction Level 1 (Mid)	1. Fuel LPC problem (No fuel in tank, fuel leakage before HP pump, fuel filter plugged, fuel return line clogging) 2. Fuel HPC problem (Injector close stuck, faulty HP pump, metering unit sticking, leaking) 3. Electric problem (Metering unit connector, wiring harness metering unit to ECU) * LPC (Low pressure circuit) / HPC (High pressure circuit)
E00015711	"P0002"	If the rail pressure governor deviation exceeds the limiting value (Normally 70~150 bar) based on the engine speed and the set value of the Fuel Metering unit volume is greater than the upper limit, an error will be detected.	Engine torque reduction Level 1 (Mid)	1. Fuel LPC problem (No fuel in tank, fuel leakage before HP pump, fuel filter plugged, fuel return line clogging) 2. Fuel HPC problem (Injector close stuck, faulty HP pump, metering unit sticking, leaking) 3. Electric problem (Metering unit connector, wiring harness metering unit to ECU) * LPC (Low pressure circuit) / HPC (High pressure circuit)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00015726	"P190C"	If the rail pressure falls below the limiting value (Normally 120 bar) based on the engine speed, an error will be detected.	Engine torque reduction Level 1 (Mid)	1. Fuel LPC problem (No fuel in tank, fuel leakage before HP pump, fuel filter plugged, fuel return line clogging) 2. Fuel HPC problem (Injector close stuck, faulty HP pump, metering unit sticking, leaking) 3. Electric problem (Metering unit connector, wiring harness metering unit to ECU) * LPC (Low pressure circuit) / HPC (High pressure circuit)
E00015727	"P190B"	If the rail pressure exceeds the limiting value (Normally 1950 bar), an error will be detected.	Engine torque reduction Level 1 (Mid)	1. Fuel LPC problem (No fuel in tank, fuel leakage before HP pump, fuel filter plugged, fuel return line clogging) 2. Fuel HPC problem (Injector close stuck, faulty HP pump, metering unit sticking, leaking) 3. Electric problem (Metering unit connector, wiring harness metering unit to ECU) * LPC (Low pressure circuit) / HPC (High pressure circuit)
E00015728	"P1934"	The fault is occurred when If PRV (Pressure relief valve) open fault (P000F) occurs but rail pressure does not decrease. There can be a problem with PRV itself.	Engine torque reduction Level 2 (Severe); Engine shutdown	1. Common rail pressure relief valve (PRV) is not opened at overpressure condition. (PRV failure)
E00017100	"P1073"	The sensed value of environment temperature sensor is greater than a threshold (129.96°C (265.93°F)).		1. Electric problem (Environment temperature sensor connector) 2. Electric problem (Wiring harness ECU to environment temperature sensor, environment temperature sensor, ECU connector, faulty ECU)
E00017103	"P0073"	The raw voltage value of environment temperature sensor is above a threshold (4.84 V).		1. Electric problem (Environment temperature sensor connector) 2. Electric problem (Wiring harness ECU to environment temperature sensor, environment temperature sensor, ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00017104	"P0072"	The raw voltage value of environment temperature sensor is below a threshold (0.56 V).		1. Electric problem (Environment temperature sensor connector) 2. Electric problem (Wiring harness ECU to environment temperature sensor, environment temperature sensor, ECU connector, faulty ECU)
E00017200	"P107D"	Inlet air temperature is increased more than normal operation threshold (125°C (257° F)).		1. Inlet air temperature is exceeded than engine limit 2. Electric problem (Inlet air temperature sensor connector, wiring harness ECU to inlet air temperature sensor, inlet air temperature sensor, ECU connector, faulty ECU)
E00017203	"P007D"	Inlet air temperature raw signal value is more than maximum operation threshold (4.91 V).		1. Electric problem (Inlet air temperature sensor connector) 2. Electric problem (Wiring harness inlet air temperature sensor to ECU, faulty inlet air temperature sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00017204	"P007C"	Inlet air temperature raw signal value is less than minimum operation threshold (0.06 V).		1. Electric problem (Inlet air temperature sensor connector) 2. Electric problem (Wiring harness inlet air temperature sensor to ECU, faulty inlet air temperature sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00017301	"P0421"	If calculated DOC efficiency is lower than threshold at DPF regeneration.		1. Electric problem (Faulty DPF (SCRf) in temperature sensor) 2. Air path problem (Leakage of turbine out to DOC in) 3. Hardware problem (DOC was poisoned by sulfur) 4. Injector problem (Injector close stuck, not controlled well) 5. Hardware problem (Faulty DOC)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00017400	"P1183"	Fuel temperature is increased more than normal operation threshold (80°C (176° F)).		1. Fuel temperature is exceeded than engine limit 2. Electric problem (Fuel temperature sensor connector, wiring harness ECU to fuel temperature sensor, fuel temperature sensor, ECU connector, faulty ECU)
E00017403	"P0183"	Fuel temperature raw signal value is more than maximum operation threshold (4.95 V).		1. Electric problem (Fuel temperature sensor connector) 2. Electric problem (Wiring harness fuel temperature sensor to ECU, faulty fuel temperature sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00017404	"P0182"	Fuel temperature raw signal value is less than minimum operation threshold (0.11 V).		1. Electric problem (Fuel temperature sensor connector) 2. Electric problem (Wiring harness fuel temperature sensor to ECU, faulty fuel temperature sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00017511	"P0196"	The oil combination sensor hardware detects a temperature out of range error at sensor itself.		1. Electrical problem (Oil combination sensor) 2. Electrical problem (Wiring harness ECU to oil combination sensor, oil combination sensor connector) 3. Electrical problem (Faulty ECU, ECU connector)
E00017715	"P273F"	Transmission oil temperature is above the operation range.	Engine torque reduction Level 1 (Mid)	1. Cooling problem (Transmission oil over heating) 2. Electric problem (Connector, wiring harness, switch)
E00017716	"P274F"	Transmission oil temperature is above the operation range.	Engine torque reduction Level 1 (Mid)	1. Cooling problem (Transmission oil over heating) 2. Electric problem (Connector, wiring harness, switch)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00019000	"P0219"	Engine speed is too higher than threshold.		1. Electric problem (Crank sensor connector) 2. Electric problem (Wiring harness crank sensor to ECU, Faulty crank sensor) 3. Electric problem (Faulty ECU, ECU connector) 4. Hardware problem (Faulty trigger wheel)
E00044400	"P1563"	Battery voltage is more than maximum warning operation voltage (15 V).		1. Electric problem (Alternator, alternator wiring harness) 2. Electric problem (Battery, wiring harness, battery terminal, connector) 3. Electric problem (External battery charger)
E00044401	"P1562"	Battery voltage is less than minimum warning operation voltage (10 V).		1. Electric problem (Alternator, alternator wiring harness) 2. Electric problem (Battery, wiring harness, battery terminal, connector) 3. Electric problem (External battery charger)
E00044402	"P1565"	Power stage diagnosis disabled error due to battery voltage is less than minimum power stage operation voltage (6.5 V). * Power stage operation range refers to the area where the ECU can control external actuators such as EGR and throttle valve.		1. Electric problem (Alternator, alternator wiring harness) 2. Electric problem (Battery, wiring harness, battery terminal, connector) 3. Electric problem (External battery charger)
E00044403	"P0563"	Battery voltage is more than maximum operation voltage (16 V).	Engine torque reduction Level 1 (Mid)	1. Electric problem (Alternator, alternator wiring harness) 2. Electric problem (Battery, wiring harness, battery terminal, connector) 3. Electric problem (External battery charger)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00044404	"P0562"	Battery voltage is less than minimum operation voltage (6 V).	Engine torque reduction Level 1 (Mid)	1. Electric problem (Alternator, alternator wiring harness) 2. Electric problem (Battery, wiring harness, battery terminal, connector) 3. Electric problem (External battery charger)
E00044412	"P1564"	Power stage diagnosis disabled error due to battery voltage is more than maximum operation voltage (16 V). * Power stage operation range refers to the area where the ECU can control external actuators such as EGR and throttle valve.		1. Electric problem (Alternator, alternator wiring harness) 2. Electric problem (Battery, wiring harness, battery terminal, connector) 3. Electric problem (External battery charger)
E00062612	"P0512"	The activated time of starter switch is longer than threshold (60 sec). If the cranking request time is too long, the switch can be considered to stuck.		1. Electric problem (Starter switch connector) 2. Electric problem (Wiring harness ECU to starter switch, starter switch) 3. Electric problem (ECU connector, faulty ECU)
E00063602	"P0372"	If the crank shaft signal is disturbed one or more of the reasons.	Engine torque reduction Level 2 (Severe). Engine speed reduced to 1200 rpm.	1. Electric problem (Crank sensor connector) 2. Electric problem (Wiring harness crank sensor to ECU, faulty crank sensor) 3. Electric problem (Faulty ECU, ECU connector) 4. Hardware problem (Faulty trigger wheel)
E00063608	"P0374"	The engine is rotating but there is no crankshaft signal detectable.	Engine torque reduction Level 2 (Severe). Engine speed reduced to 1200 rpm.	1. Electric problem (Crank sensor connector) 2. Electric problem (Wiring harness crank sensor to ECU, faulty crank sensor) 3. Electric problem (Faulty ECU, ECU connector) 4. Hardware problem (Faulty trigger wheel)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00063702	"P0344"	In between of several camshaft revolutions there are too many or too less camshaft edges present or the distance or the series of the camshaft edges is implausible.		1. Electric problem (CAM sensor connector) 2. Electric problem (Wiring harness CAM sensor to ECU, faulty CAM sensor) 3. Electric problem (Faulty ECU, ECU connector) 4. Hardware problem (Faulty CAM shaft)
E00063708	"P0342"	In between of several crankshaft revolutions there is not any camshaft edge present.		1. Electric problem (CAM sensor connector) 2. Electric problem (Wiring harness CAM sensor to ECU, faulty CAM sensor) 3. Electric problem (Faulty ECU, ECU connector) 4. Hardware problem (Faulty CAM shaft)
E00063730	"P0340"	Cam signal drift higher than threshold.		1. Electric problem (CAM sensor connector) 2. Electric problem (Wiring harness CAM sensor to ECU, faulty CAM sensor) 3. Electric problem (Faulty ECU, ECU connector) 4. Hardware problem (Faulty CAM shaft)
E00063902	"U0029"	CAN communication error.	Engine torque reduction Level 1 (Mid)	1. Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out (<6 V)) 2. After ECU reflash 3. Electric problem (CAN wiring harness-insulation, resistance) 4. Electric problem (ECU connector, faulty VCU, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00063919	"U0028"	CAN Bus OFF.	Engine torque reduction Level 1 (Mid)	1. Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out (<6 V)) 2. After ECU reflash 3. Electric problem (CAN wiring harness-insulation, resistance) 4. Electric problem (ECU connector, faulty VCU, faulty ECU)
E00065102	"P268C"	If the monitoring for missing or faulty programming of the injector adjustment values, the fault is active.		1. Coding problem (The injector code (IQA) is not updated at fresh ECU or after ECU reset.) 2. Electric problem (Faulty ECU)
E00065104	"P02EE"	The injector of cylinder #1 is shorted.		1. Electric problem (Injector connector) 2. Electric problem (Wiring harness injector to ECU, faulty injector) 3. Electric problem (Faulty ECU, ECU connector)
E00065105	"P0201"	The injector of cylinder #1 is opened.		1. Electric problem (Injector connector) 2. Electric problem (Wiring harness injector to ECU, faulty injector) 3. Electric problem (Faulty ECU, ECU connector)
E00065122	"P32EE"	The injector of cylinder #1 is shorted between high-side to low-side in the injector.		1. Electric problem (Injector connector) 2. Electric problem (Wiring harness injector to ECU, faulty injector) 3. Electric problem (Faulty ECU, ECU connector)
E00065202	"P268D"	If the monitoring for missing or faulty programming of the injector adjustment values, the fault is active.		1. Coding problem (The injector code (IQA) is not updated at fresh ECU or after ECU reset.) 2. Electric problem (Faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00065204	"P02EF"	The injector of cylinder #2 is shorted.		1. Electric problem (Injector connector) 2. Electric problem (Wiring harness injector to ECU, faulty injector) 3. Electric problem (Faulty ECU, ECU connector)
E00065205	"P0202"	The injector of cylinder #2 is opened.		1. Electric problem (Injector connector) 2. Electric problem (Wiring harness injector to ECU, faulty injector) 3. Electric problem (Faulty ECU, ECU connector)
E00065222	"P32EF"	The injector of cylinder #2 is shorted between high-side to low-side in the injector.		1. Electric problem (Injector connector) 2. Electric problem (Wiring harness injector to ECU, faulty injector) 3. Electric problem (Faulty ECU, ECU connector)
E00065302	"P268E"	If the monitoring for missing or faulty programming of the injector adjustment values, the fault is active.		1. Coding problem (The injector code (IQA) is not updated at fresh ECU or after ECU reset.) 2. Electric problem (Faulty ECU)
E00065304	"P02F0"	The injector of cylinder #3 is shorted.		1. Electric problem (Injector connector) 2. Electric problem (Faulty ECU, ECU connector)
E00065305	"P0203"	The injector of cylinder #3 is opened.		1. Electric problem (Injector connector) 2. Electric problem (Faulty ECU, ECU connector)
E00065322	"P32F0"	The injector of cylinder #3 is shorted between high-side to low-side in the injector.		1. Electric problem (Injector connector) 2. Electric problem (Faulty ECU, ECU connector)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00065402	"P268F"	If the monitoring for missing or faulty programming of the injector adjustment values, the fault is active.		1. Coding problem (The injector code (IQA) is not updated at fresh ECU or after ECU reset.) 2. Electric problem (Faulty ECU)
E00065404	"P02F1"	The injector of cylinder #4 is shorted.		1. Electric problem (Injector connector) 2. Electric problem (Wiring harness injector to ECU, faulty injector)
E00065405	"P0204"	The injector of cylinder #4 is opened.		1. Electric problem (Injector connector) 2. Electric problem (Wiring harness injector to ECU, faulty injector)
E00065422	"P32F1"	The injector of cylinder #4 is shorted between high-side to low-side in the injector.		1. Electric problem (Injector connector) 2. Electric problem (Wiring harness injector to ECU, faulty injector)
E00067603	"P0384"	Glow plug relay is connected to battery (Short to Battery).		1. Electric problem (Relay, wiring harness, connector)
E00067604	"P0383"	Glow plug relay is connected to ground (Short to Ground).		1. Electric problem (Relay, wiring harness, connector)
E00067605	"P0380"	Glow plug relay is not connected (open).		1. Electric problem (Relay, wiring harness, connector)
E00072907	"P0640"	The battery voltage drop is insufficient even though the glow plug is in operation (0.2 V).		1. Electric problem (Relay, wiring harness, connector)
E00097012	"U1003"	External shut off request by Electronic Brake Controller 1 message. This item is not a fault and indicates that the VCU has issued an emergency stop request.		1. External shut off request by Electronic Brake Controller 1 message.
E00097022	"P0215"	Engine shut off request by hardwire.		1. Engine shut off request by hardwire switch

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00097503	"P028E"	The hardware detects a short circuit to battery error on the PWM output power stage for the Fan actuator.		1. Electric problem (FAN controller connector) 2. Electric problem (Wiring harness ECU to FAN controller, FAN controller) 3. Electric problem (Faulty ECU, ECU connector)
E00097504	"P028D"	The hardware detects a short circuit to ground error PWM output power stage for the Fan actuator.		1. Electric problem (FAN controller connector) 2. Electric problem (Wiring harness ECU to FAN controller, FAN controller) 3. Electric problem (Faulty ECU, ECU connector)
E00097505	"P028A"	The hardware detects an open load error on the PWM output power stage for the Fan actuator.		1. Electric problem (FAN controller connector) 2. Electric problem (Wiring harness ECU to FAN controller, FAN controller) 3. Electric problem (Faulty ECU, ECU connector)
E00098703	"P1931"	Lamp wiring is shorted to battery.	Engine shutdown	1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness Lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)
E00098704	"P192F"	Lamp wiring is shorted to ground.	Engine shutdown	1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness Lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)
E00098705	"P192E"	Lamp wiring is opened.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness Lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00107603	"P0004"	If the high pressure pump delivery quantity exceeds the threshold based on the pressure at overrun mode, an error will be detected.	Engine torque reduction Level 1 (Mid); Engine speed reduced to 1200 rpm	1. Fuel LPC problem (No fuel in tank, fuel leakage before HP pump, fuel filter plugged, fuel return line clogging) 2. Fuel HPC problem (Injector close stuck, faulty HP pump, metering unit sticking, leaking) 3. Electric problem (Metering unit connector, wiring harness metering unit to ECU) * LPC (Low pressure circuit) / HPC (High pressure circuit)
E00107604	"P0003"	If the high pressure pump delivery quantity exceeds the threshold based on the pressure at idle mode, an error will be detected.	Engine torque reduction Level 1 (Mid); Engine speed reduced to 1200 rpm	1. Fuel LPC problem (No fuel in tank, fuel leakage before HP pump, fuel filter plugged, fuel return line clogging) 2. Fuel HPC problem (Injector close stuck, faulty HP pump, metering unit sticking, leaking) 3. Electric problem (Metering unit connector, wiring harness metering unit to ECU) * LPC (Low pressure circuit) / HPC (High pressure circuit)
E00107616	"P0254"	If the rail pressure governor deviation falls below the limiting value (Normally -200 ~ -117 bar) and the high pressure pump delivery quantity falls to the threshold, an error will be detected.	Engine torque reduction Level 1 (Mid); Engine speed reduced to 1200 rpm	1. Fuel LPC problem (No fuel in tank, fuel leakage before HP pump, fuel filter plugged, fuel return line clogging) 2. Fuel HPC problem (Injector close stuck, faulty HP pump, metering unit sticking, leaking) 3. Electric problem (Metering unit connector, wiring harness metering unit to ECU) * LPC (Low pressure circuit) / HPC (High pressure circuit)
E00107620	"P0252"	The rail pressure falls below the minimum threshold for injection (100 bar).		1. Fuel LPC problem (No fuel in tank, fuel leakage before HP pump, fuel filter plugged, fuel return line clogging) 2. Fuel HPC problem (Injector close stuck, faulty HP pump, metering unit sticking, leaking) 3. Electric problem (Metering unit connector, wiring harness metering unit to ECU) * LPC (Low pressure circuit) / HPC (High pressure circuit)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00108103	"P2381"	Lamp wiring is shorted to battery.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness Lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)
E00108104	"P1904"	Lamp wiring is shorted to ground.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness Lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)
E00108105	"P0381"	Lamp wiring is opened.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness Lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)
E00120700	"P0669"	ECU temperature is increased more than normal operation threshold (175°C (347° F)).		1. ECU temperature is exceeded than engine limit 2. Electric problem (Faulty ECU)
E00120703	"P06AE"	ECU temperature sensor is shorted to battery.		1. Electric problem (ECU temperature sensor - inner part of ECU, faulty ECU)
E00120704	"P06AD"	ECU temperature sensor is shorted to ground.		1. Electric problem (ECU temperature sensor - inner part of ECU, faulty ECU)
E00138200	"P018D"	Fuel filter pressure is higher than the maximum threshold (>200 kPa).	Engine torque reduction Level 1 (Mid)	1. LPC problem (Overflow valve failure) 2. Electrical problem (Fuel filter pressure sensor connector, wiring harness from fuel filter pressure sensor to ECU, faulty fuel filter pressure sensor) 3. Electrical problem (Faulty ECU, ECU connector)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00138201	"P018C"	Fuel filter pressure is lower than the minimum threshold (<50 kPa).	Engine torque reduction Level 2 (Severe)	1. LPC problem (Fuel filter plugged, faulty fuel tank cap, fuel line clogging, fuel waxing at cold condition, no fuel, fuel electric feed pump failure) 2. Electrical problem (Electric fuel feed pump connector, wiring harness from electric fuel feed pump or ECU, faulty electric fuel feed pump) 3. Electrical problem (Fuel filter pressure sensor connector, wiring harness from Fuel filter pressure sensor to ECU, faulty fuel filter pressure sensor) 4. Electrical problem (Faulty ECU, ECU connector)
E00138203	"P01C3"	Fuel filter pressure raw signal value is above than maximum threshold (4.75 V).		1. Electric problem (Fuel filter pressure sensor connector) 2. Electric problem (Wiring harness fuel filter pressure sensor to ECU, faulty fuel filter pressure sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00138204	"P01C2"	Fuel filter pressure raw signal value is less than minimum threshold (0.25 V).		1. Electric problem (Fuel filter pressure sensor connector) 2. Electric problem (Wiring harness fuel filter pressure sensor to ECU, faulty fuel filter pressure sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00138207	"P01C4"	Fuel filter pressure is below than warning threshold.		1. LPC problem (Fuel filter plugged, faulty fuel tank cap, fuel line clogging, fuel waxing at cold condition, no fuel) 2. Electric problem (Faulty fuel filter pressure sensor, faulty ECU, ECU connector)
E00138213	"P01C5"	Fuel filter pressure is below than torque reduction threshold.	Engine torque reduction Level 1 (Mid)	1. LPC problem (Fuel filter plugged, faulty fuel tank cap, fuel line clogging, fuel waxing at cold condition, no fuel) 2. Electric problem (Faulty fuel filter pressure sensor, faulty ECU, ECU connector)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00148507	"P0685"	The fault is detected, if main relay was not opened by time (150ms) after commanding to open main relay during shutdown.		1. Electric problem (Faulty main relay, wiring harness ECU power supply and ground) 2. Electric problem (Faulty ECU)
E00148511	"P068A"	The fault is detected when the main relay has been opened without any request.		1. Electric problem (Abnormal engine power shut down) 2. Electric problem (Faulty main relay, wiring harness ECU power supply and ground) 3. Electric problem (Faulty ECU)
E00156803	"P2547"	The multi-torque switch raw value is higher than threshold.		1. Electric problem (Multi-torque switch) 2. Electric problem (Wiring harness multi-torque switch t to ECU, faulty multi-torque switch) 3. Electric problem (Faulty ECU, ECU connection)
E00156804	"P2546"	The multi-torque switch raw value is less than threshold.		1. Electric problem (Multi-torque switch) 2. Electric problem (Wiring harness multi-torque switch to ECU, faulty multi-torque switch) 3. Electric problem (Faulty ECU, ECU connection)
E00161203	"P062D"	The 1st injector bank is short circuit. #1 & #4 injector		1. Electric problem (Faulty injector insulation, water ingress, injector bank short to battery or ground) 2. Electric problem (Wiring harness injector to ECU) 3. Electric problem (Faulty ECU)
E00161212	"P062E"	The 2nd injector bank is short circuit. #2 & #3 injector		1. Electric problem (Faulty injector insulation, water ingress, injector bank short to battery or ground) 2. Electric problem (Wiring harness injector to ECU) 3. Electric problem (Faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00163903	"P0528"	The FAN speed is higher than the maximum threshold.		1. Electric problem (FAN controller connector) 2. Electric problem (Wiring harness ECU to FAN controller, FAN controller) 3. Electric problem (Faulty ECU, ECU connector)
E00163904	"P0529"	The FAN speed is lower than the minimum threshold.		1. Electric problem (FAN controller connector) 2. Electric problem (Wiring harness ECU to FAN controller, FAN controller) 3. Electric problem (Faulty ECU, ECU connector)
E00163911	"P0527"	A long period error is detected when the signal period is greater than the maximum measurement limit of the timer.		1. Electric problem (FAN controller connector) 2. Electric problem (Wiring harness ECU to FAN controller, FAN controller) 3. Electric problem (Faulty ECU, ECU connector)
E00186701	"P2505"	The ECU temperature is higher than threshold for SCR system monitoring (105°C (221°F)).		1. Engine room cooling problem (The ECU temperature is too high.) 2. Electric problem (Faulty ECU)
E00186703	"P2508"	The fault is detected when ABE is active due to overvoltage detection.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E00186704	"P2507"	The fault is detected when ABE is active due to undervoltage detection.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00186711	"P2511"	The fault is detected when WDA/ABE is active due to unknown reason.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E00186719	"P2509"	The fault is detected when WDA is active due to in query-response communication.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E00186722	"P2506"	The reset system provides an mechanism to transfer the ECU from an faulty state into a safety state. This is done by resetting the controller, this fault is set for alarm purpose. Check the other faults that have occurred together to determine why the ECU was reset.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E00186723	"P3506"	The reset system provides an mechanism to transfer the ECU from an faulty state into a safety state. This is done by resetting the controller, this fault is set for alarm purpose. Check the other faults that have occurred together to determine why the ECU was reset.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E00278900	"P1546"	Turbine inlet temperature is increased more than normal operation threshold (830°C (1526°F)).	Engine torque reduction Level 1 (Mid)	1. Turbine inlet temperature is exceeded than engine limit 2. Electric problem (Turbine inlet temperature sensor connector, wiring harness ECU to turbine inlet temperature sensor, turbine inlet temperature sensor) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00278903	"P0546"	Turbine inlet temperature sensor value is more than maximum threshold (3.45 V).	Engine Torque Reduction Variable	1. Electric problem (Turbine inlet temperature sensor connector) 2. Electric problem (Wiring harness turbine inlet temperature sensor to ECU, faulty turbine inlet temperature sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00278904	"P0545"	Turbine inlet temperature sensor value is less than minimum threshold (0.27 V).	Engine Torque Reduction Variable	1. Electric problem (Turbine inlet temperature sensor connector) 2. Electric problem (Wiring harness turbine inlet temperature sensor to ECU, faulty turbine inlet temperature sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00278911	"P0544"	If the Turbine in temperature is out of the threshold during restricted condition, fault code is raised ($\pm 300^{\circ}\text{C}$ (572°F)).		1. Air path problem (Exhaust leakage (exhaust manifold, EGR path)) 2. Air path problem (Faulty turbocharger) 3. Air path problem (Intake air restriction too high (Air filter plugged)) 4. Injector problem (Injector open stuck) 5. Electric problem (Faulty turbine inlet temperature sensor) 6. Electric problem (Faulty ECU, ECU connector)
E00279103	"P2145"	If the pins of EGR H-bridge have been shorted to battery or H-Bridge circuit included EGR valve is damaged.	Engine Torque Reduction Variable	1. Electric problem (EGR valve connector, faulty ECU valve motor) 2. Electric problem (Wiring harness EGR to ECU) 3. Electric problem (Faulty ECU)
E00279104	"P2144"	If the pins of EGR H-bridge have been shorted to ground or H-Bridge circuit included EGR valve is damaged.	Engine Torque Reduction Variable	1. Electric problem (EGR valve connector, faulty ECU valve motor) 2. Electric problem (Wiring harness EGR to ECU) 3. Electric problem (Faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00279105	"P2143"	If the pins of EGR H-bridge have been opened or H-Bridge circuit included EGR valve is damaged.	Engine Torque Reduction Variable	1. Electric problem (EGR valve connector, faulty ECU valve motor) 2. Electric problem (Wiring harness EGR to ECU) 3. Electric problem (Faulty ECU)
E00303114	"P205E"	The DEF tank temperature is more than threshold (70°). * DEF temperature is really high due to high ambient temperature and continuous high load operation. Therefore, in case of this fault, only the alarm is done. However, if the fault occurs even though the machine is not working continuously and the ambient temperature are not high, a cooling line check is required. In general, the fault had not been occurred during 1~2hrs consecutive machine operating in hot ambient conditions (>40° C (104°F)).		1. DEF temperature is really high due to high ambient temperature and continuous high load operation 2. Electric problem (DEF tank coolant valve connector, Wiring harness ECU to DEF tank coolant valve, DEF Coolant valve) 3. Electric problem (ECU connector, Faulty ECU)
E00303116	"P1045"	The difference between DEF Tank temperature sensor and Environment temperature sensor is higher than threshold (35°C (63°F)). This fault is used to determine if the DEF Tank temperature sensor was drift (offset).		1. Electric problem (DEF temperature sensor, wiring harness in the DEF module) 2. Electric problem (CAN wiring harness-insulation, resistance)
E00303118	"P1044"	The difference between DEF Tank temperature sensor and Environment temperature sensor is lower than threshold (-55°C (-99°F)). This fault is used to determine if the DEF Tank temperature sensor was drift (offset).		1. Electric problem (DEF temperature sensor, wiring harness in the DEF module) 2. Electric problem (CAN wiring harness-insulation, resistance)
E00321603	"P2395"	NOx signal is higher than maximum threshold (3000 ppm).		1. Electric problem (NOx sensor connector, wiring harness NOx sensor controller to sensing part, NOx sensor) 2. Electric problem (CAN wiring harness-insulation, resistance)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00321604	"P2397"	NOx signal is less than minimum threshold (-100 ppm).		1. Electric problem (NOx sensor connector, wiring harness NOx sensor controller to sensing part, NOx sensor) 2. Electric problem (CAN wiring harness-insulation, resistance)
E00321703	"P23A7"	Lambda signal is higher than maximum threshold (3.1).		1. Electric problem (NOx sensor connector, wiring harness NOx sensor controller to sensing part, NOx sensor) 2. Electric problem (CAN wiring harness-insulation, resistance)
E00321907	"U030D"	A fault is detected if the heater won't stay heated up after dew point release (600 sec).	Engine Torque Reduction Variable	1. Electric problem (NOx sensor) 2. Electric problem (NOx sensor connector, wiring harness NOx sensor controller to sensing part, CAN wiring harness-insulation, resistance)
E00322405	"P2203"	NOx sensor control unit detects an open circuit.	Engine Torque Reduction Variable	1. Electric problem (NOx sensor connector, wiring harness NOx sensor controller to sensing part, NOx sensor) 2. Electric problem (CAN wiring harness-insulation, resistance)
E00322406	"P2202"	NOx sensor control unit detects a short circuit.	Engine Torque Reduction Variable	1. Electric problem (NOx sensor connector, wiring harness NOx sensor controller to sensing part, NOx sensor) 2. Electric problem (CAN wiring harness-insulation, resistance)
E00322603	"P2396"	NOx signal is higher than maximum threshold (3000 ppm).		1. Electric problem (NOx sensor connector, wiring harness NOx sensor controller to sensing part, NOx sensor) 2. Electric problem (CAN wiring harness-insulation, resistance)
E00322604	"P2398"	NOx signal is less than minimum threshold (-100 ppm).		1. Electric problem (NOx sensor connector, wiring harness NOx sensor controller to sensing part, NOx sensor) 2. Electric problem (CAN wiring harness-insulation, resistance)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00322703	"P23A8"	Lambda signal is higher than maximum threshold (3.1).		1. Electric problem (NOx sensor connector, wiring harness NOx sensor controller to sensing part, NOx sensor) 2. Electric problem (CAN wiring harness-insulation, resistance)
E00322907	"U030E"	A fault is detected if the heater won't stay heated up after dew point release (600 sec).	Engine Torque Reduction Variable	1. Electric problem (NOx sensor) 2. Electric problem (NOx sensor connector, wiring harness NOx sensor controller to sensing part, CAN wiring harness-insulation, resistance)
E00323405	"P2216"	NOx sensor control unit detects an open circuit.	Engine Torque Reduction Variable	1. Electric problem (NOx sensor connector, wiring harness NOx sensor controller to sensing part, NOx sensor) 2. Electric problem (CAN wiring harness-insulation, resistance)
E00323406	"P2215"	NOx sensor control unit detects a short circuit.	Engine Torque Reduction Variable	1. Electric problem (NOx sensor connector, wiring harness NOx sensor controller to sensing part, NOx sensor) 2. Electric problem (CAN wiring harness-insulation, resistance)
E00323600	"P049B"	The EGR rate positive response is too slow than threshold time.	Engine Torque Reduction Variable	1. Air path problem (EGR cooler plugged, tampering by user) 2. Air path problem (EGR path leakage, intake air path leakage) 3. Electrical problem (Faulty air mass flow sensor, faulty MAP sensor)
E00323616	"P0408"	The limit for the maximum permissible positive closed-loop EGR rate control deviation of the exhaust gas recirculation control has been exceeded over than 10 sec.	Engine Torque Reduction Variable	1. Air path problem (EGR cooler plugged, tampering by user) 2. Air path problem (EGR path leakage, intake air path leakage) 3. Electrical problem (Faulty air mass flow sensor, faulty MAP sensor)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00324200	"P1033"	DPF(SCRf) inlet temperature is increased more than normal operation threshold (830°C (1526°F)).		1. DPF(SCRf) inlet temperature is exceeded than engine limit 2. Electric problem (DPF(SCRf) inlet temperature sensor connector, Wiring harness ECU to DPF(SCRf) inlet temperature sensor, DPF(SCRf) inlet temperature sensor) 3. Electric problem (ECU connector, Faulty ECU)
E00324203	"P2033"	DPF(SCRf) inlet temperature sensor value is more than maximum threshold (3.54 V).	Engine Torque Reduction Variable	1. Electric problem (DPF(SCRf) inlet temperature sensor connector) 2. Electric problem (Wiring harness DPF(SCRf) inlet temperature sensor to ECU, faulty DPF(SCRf) inlet temperature sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00324204	"P2032"	DPF(SCRf) inlet temperature sensor value is less than minimum threshold (0.33 V).	Engine Torque Reduction Variable	1. Electric problem (DPF(SCRf) inlet temperature sensor connector) 2. Electric problem (Wiring harness DPF(SCRf) inlet temperature sensor to ECU, faulty DPF(SCRf) inlet temperature sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00324211	"P2034"	If the DPF(SCRf) in temperature is out of the threshold during restricted condition, fault code is raised ($\pm 200^{\circ}\text{C}$ (392°F)).	Engine Torque Reduction Variable	1. Electric problem (DPF(SCRf) in temperature sensor connector) 2. Tampering (DPF(SCRf) in temperature sensor is not installed well for tampering, reduced DEF consumption) 3. Electric problem (Faulty DPF(SCRf) in temperature sensor) 4. Air path problem (Exhaust gas leakage)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00325103	"P2455"	The DPF differential pressure sensor signal is more than maximum threshold (4.67 V).	Engine Torque Reduction Variable	1. Electric problem (Differential pressure sensor connector) 2. Electric problem (Wiring harness ECU to differential pressure sensor, faulty differential pressure sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00325104	"P2454"	The DPF differential pressure sensor signal is less than minimum threshold (0.27 V).	Engine Torque Reduction Variable	1. Electric problem (Differential pressure sensor connector) 2. Electric problem (Wiring harness ECU to differential pressure sensor, faulty differential pressure sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00325113	"P3052"	The DPF differential pressure sensor was drift than threshold at drift check condition.		1. DPF differential pressure sensor drift 2. Electric problem (Differential pressure sensor connector, wiring harness ECU to differential pressure sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00325118	"P1454"	The DPF differential pressure is less than minimum pressure dependent on exhaust gas flow (Ref : <1 kPa).	Engine Torque Reduction Variable	1. DPF differential pressure sensor hose open or leakage 2. Electric problem (Differential pressure sensor connector, wiring harness ECU to differential pressure sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00336014	"P263D"	The DEF pressure line heating is needed, but it cannot be heated due to some fault or hardware issue. In this case, the SCR system should be shut off for protecting. ("Afterrun" is performed.)	Engine Torque Reduction Variable	1. Electric problem (DEF pressure line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF pressure line heater) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00336103	"P2047"	The Dosing valve actuator power stage is shorted to battery.	Engine Torque Reduction Variable	1. Electric problem (Dosing valve connector) 2. Electric problem (Wiring harness dosing valve to ECU, faulty dosing valve) 3. Electric problem (ECU connector, faulty ECU)
E00336104	"P2048"	The Dosing valve actuator power stage is shorted to ground.	Engine Torque Reduction Variable	1. Electric problem (Dosing valve connector) 2. Electric problem (Wiring harness dosing valve to ECU, faulty dosing valve) 3. Electric problem (ECU connector, faulty ECU)
E00336105	"P2049"	The Dosing valve actuator power stage output is opened.	Engine Torque Reduction Variable	1. Electric problem (Dosing valve connector) 2. Electric problem (Wiring harness dosing valve to ECU, faulty dosing valve) 3. Electric problem (ECU connector, faulty ECU)
E00336113	"P202E"	The Dosing valve actuator power stage is over temperature.	Engine Torque Reduction Variable	1. Electric problem (Dosing valve connector) 2. Electric problem (Wiring harness dosing valve to ECU, faulty dosing valve) 3. Electric problem (ECU connector, faulty ECU)
E00336114	"P2C11"	The dosing valve is detected as blocked if no opening signal is detected by the dosing valve driver.	Engine Torque Reduction Variable	1. The dosing valve nozzle tip is clogged due to DEF crystallization (deposit). 2. The DEF hose line is clogged. 3. Electric problem (Dosing valve connector, wiring harness ECU to dosing valve, dosing valve) 4. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00336122	"P2050"	The Dosing valve actuator HS (High side) power stage is shorted to battery.	Engine Torque Reduction Variable	1. Electric problem (Dosing valve connector) 2. Electric problem (Wiring harness dosing valve to ECU, faulty dosing valve) 3. Electric problem (ECU connector, faulty ECU)
E00336123	"P2051"	The Dosing valve actuator HS (High side) power stage is shorted to ground.	Engine Torque Reduction Variable	1. Electric problem (Dosing valve connector) 2. Electric problem (Wiring harness dosing valve to ECU, faulty dosing valve) 3. Electric problem (ECU connector, faulty ECU)
E00336127	"P208E"	The dosing valve will be blocked if no opening process is detected by the dosing valve driver and the operating conditions are within the evaluation range. It is a similar fault to judge the clogging of the dosing valve as P204A (DEF pressure check error at DETECTIONMODE). However, the diagnosis condition is different. The P204A diagnoses at DETECTIONMODE, P208E diagnoses at "METERINGCONTROL" state	Engine Torque Reduction Variable	1. DEF line problem (DEF hose line or dosing valve is clogged) 2. Electric problem (Supply module connector, wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00336303	"P20B4"	The DEF Tank heating coolant valve output is shorted to battery.	Engine Torque Reduction Variable	1. Electric problem (DEF tank heating coolant valve connector) 2. Electric problem (Heater relay, wiring harness related DEF tank heating coolant valve) 3. Electric problem (ECU connector, faulty ECU)
E00336304	"P20B3"	The DEF Tank heating coolant valve output is shorted to ground.	Engine Torque Reduction Variable	1. Electric problem (DEF tank heating coolant valve connector) 2. Electric problem (Heater relay, wiring harness related DEF tank heating coolant valve) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00336305	"P20B1"	The DEF Tank heating coolant valve output is opened.	Engine Torque Reduction Variable	1. Electric problem (DEF tank heating coolant valve connector) 2. Electric problem (Heater relay, wiring harness related DEF tank heating coolant valve) 3. Electric problem (ECU connector, faulty ECU)
E00336307	"P30B1"	The DEF Tank heating coolant valve output is over temperature.	Engine Torque Reduction Variable	1. Electric problem (DEF tank heating coolant valve connector) 2. Electric problem (Heater relay, wiring harness related DEF tank heating coolant valve) 3. Electric problem (ECU connector, faulty ECU)
E00350903	"P0659"	The ECU sensor supply1 voltage is higher than maximum threshold (5.2 V).	Engine torque reduction Level 1 (Mid)	1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Sensor or actuator failure used by ECU 5 V supply) 3. Electric problem (Wiring harness related ECU 5 V supply) 4. Electric problem (Faulty ECU)
E00350904	"P0658"	The ECU sensor supply1 voltage is lower than minimum threshold (4.8 V).	Engine torque reduction Level 1 (Mid)	1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Sensor or actuator failure used by ECU 5 V supply) 3. Electric problem (Wiring harness related ECU 5 V supply) 4. Electric problem (Faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00350905	"P1657"	The ECU sensor supply1 voltage lies outside of the threshold.	Engine torque reduction Level 1 (Mid)	1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Sensor or actuator failure used by ECU 5 V supply) 3. Electric problem (Wiring harness related ECU 5 V supply) 4. Electric problem (Faulty ECU)
E00350906	"P0657"	The ECU sensor supply1 voltage is shorted to ground.	Engine torque reduction Level 1 (Mid)	1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Sensor or actuator failure used by ECU 5 V supply) 3. Electric problem (Wiring harness related ECU 5 V supply) 4. Electric problem (Faulty ECU)
E00350911	"P0641"	The sensor supply voltage is higher than monitoring threshold.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Fault sensor or actuator used by ECU 5 V supply) 3. Electric problem (Faulty wiring harness)
E00351003	"P2671"	The ECU sensor supply2 voltage is higher than maximum threshold (5.2 V).	Engine torque reduction Level 1 (Mid)	1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Sensor or actuator failure used by ECU 5 V supply) 3. Electric problem (Wiring harness related ECU 5 V supply) 4. Electric problem (Faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00351004	"P2670"	The ECU sensor supply2 voltage is lower than minimum threshold (4.8 V).	Engine torque reduction Level 1 (Mid)	1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Sensor or actuator failure used by ECU 5 V supply) 3. Electric problem (Wiring harness related ECU 5 V supply) 4. Electric problem (Faulty ECU)
E00351005	"P1669"	The ECU sensor supply2 voltage lies outside of the threshold.	Engine torque reduction Level 1 (Mid)	1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Sensor or actuator failure used by ECU 5 V supply) 3. Electric problem (Wiring harness related ECU 5 V supply) 4. Electric problem (Faulty ECU)
E00351006	"P2669"	The ECU sensor supply2 voltage is shorted to ground.	Engine torque reduction Level 1 (Mid)	1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Sensor or actuator failure used by ECU 5 V supply) 3. Electric problem (Wiring harness related ECU 5 V supply) 4. Electric problem (Faulty ECU)
E00351011	"P0642"	The sensor supply voltage is lower than monitoring threshold.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Fault sensor or actuator used by ECU 5 V supply) 3. Electric problem (Faulty wiring harness)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00351103	"P2686"	The ECU sensor supply3 voltage is higher than maximum threshold (5.2 V).	Engine torque reduction Level 1 (Mid)	1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Sensor or actuator failure used by ECU 5 V supply) 3. Electric problem (Wiring harness related ECU 5 V supply) 4. Electric problem (Faulty ECU)
E00351104	"P2685"	The ECU sensor supply3 voltage is lower than minimum threshold (4.8 V).	Engine torque reduction Level 1 (Mid)	1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Sensor or actuator failure used by ECU 5 V supply) 3. Electric problem (Wiring harness related ECU 5 V supply) 4. Electric problem (Faulty ECU)
E00351105	"P1684"	The ECU sensor supply3 voltage lies outside of the threshold.	Engine torque reduction Level 1 (Mid)	1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Sensor or actuator failure used by ECU 5 V supply) 3. Electric problem (Wiring harness related ECU 5 V supply) 4. Electric problem (Faulty ECU)
E00351106	"P2684"	The ECU sensor supply3 voltage is shorted to ground.	Engine torque reduction Level 1 (Mid)	1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Sensor or actuator failure used by ECU 5 V supply) 3. Electric problem (Wiring harness related ECU 5 V supply) 4. Electric problem (Faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00351600	"P106D"	The DEF quality signal exceeds the maximum threshold (Normally 45%, dependent on Emission). * This fault can also occur if there is air bubble and foreign material around the DEF quality sensor.	Engine Torque Reduction Variable	1. Detecting problem (The sensor raw value is distorted by air bubble or foreign material) 2. Electric problem (DEF quality sensor, wiring harness in the DEF module) 3. Bad DEF (But high DEF quality is very unlikely case) 4. Electric problem (CAN wiring harness-insulation, resistance)
E00351601	"P106C"	The DEF quality signal is lower the minimum threshold (Normally 27.5%, dependent on Emission). * This fault can also occur if there is air bubble and foreign material around the DEF quality sensor.	Engine Torque Reduction Variable	1. Detecting problem (The sensor raw value is distorted by air bubble or foreign material) 2. Electric problem (DEF quality sensor, wiring harness in the DEF module) 3. Bad DEF (Customer dilutes it for reducing the DEF consumption rate) 4. Electric problem (CAN wiring harness-insulation, resistance)
E00351612	"P106E"	DEF quality Diagnosis is considered as tampering if the signal used to prevent mis diagnosis due to temporary air bubble is kept too long.		1. Detection problem (Distorted by air bubble time is too long.) 2. Tampering (DEF quality signal is tampered) 3. Bad DEF
E00351718	"P203F"	If the remaining DEF is less than the empty threshold (Normally 2.5%).	Engine Torque Reduction Variable	1. Refill problem (DEF level is low <2.5%) 2. Electric problem (DEF level sensor, wiring harness in the DEF module) 3. Electric problem (CAN wiring harness-insulation, resistance)
E00352003	"U1028"	The error is reported if its FMI is equal 3 (Open circuit).	Engine Torque Reduction Variable	1. Electric problem (DEF quality sensor, wiring harness in the DEF module) 2. Electric problem (CAN wiring harness-insulation, resistance)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00352004	"U1030"	The error is reported if its FMI is equal 4 (Short circuit).	Engine Torque Reduction Variable	1. Electric problem (DEF quality sensor, wiring harness in the DEF module) 2. Electric problem (CAN wiring harness-insulation, resistance)
E00353203	"P203A"	The error is reported if its FMI is equal 3 (Open circuit).	Engine Torque Reduction Variable	1. Electric problem (DEF quality sensor, wiring harness in the DEF module) 2. Electric problem (CAN wiring harness-insulation, resistance)
E00353204	"P2041"	The error is reported if its FMI is equal 4 (Short circuit).	Engine Torque Reduction Variable	1. Electric problem (DEF quality sensor, wiring harness in the DEF module) 2. Electric problem (CAN wiring harness-insulation, resistance)
E00369503	"P25BC"	If DPF regeneration inhibit switch is shorted to battery. The switch is connected directly to ECU.		1. Electric problem (DPF regeneration switch connector) 2. Electric problem (Wiring harness DPF regeneration switch to ECU, faulty DPF regeneration switch) 3. Electric problem (Faulty ECU, ECU connector)
E00369603	"P25BB"	If DPF regeneration enable switch is shorted to battery. The switch is connected directly to ECU.		1. Electric problem (DPF regeneration switch connector) 2. Electric problem (Wiring harness DPF regeneration switch to ECU, faulty DPF regeneration switch) 3. Electric problem (Faulty ECU, ECU connector)
E00369611	"P25BA"	If DPF regeneration inhibit switch is active and DPF regeneration enable switch is also activated. The switch signal is connected directly to ECU.		1. Electric problem (DPF regeneration switch connector) 2. Electric problem (Wiring harness DPF regeneration switch to ECU, faulty DPF regeneration switch) 3. Electric problem (Faulty ECU, ECU connector)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00369703	"P2611"	Lamp wiring is shorted to battery.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)
E00369704	"P260F"	Lamp wiring is shorted to ground.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)
E00369705	"P260E"	Lamp wiring is opened.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)
E00371514	"P246B"	The DPF regeneration counter exceeds the threshold.		1. This fault is an indicator that DPF regeneration is not performed well during machine operation mode.
E00372016	"P242F"	DPF ash loading is more than maximum threshold. Ash cleaning is needed, and ash cleaning interval is dependent on After-treatment system size.		1. DPF ash cleaning is needed
E00408203	"P025D"	If the fuel metering unit signal is short circuit to battery, fault code is raised.	Engine torque reduction Level 1 (Mid)	1. Electric problem (Metering unit connector) 2. Electric problem (Wiring harness metering unit to ECU, faulty metering unit) 3. Electric problem (Faulty ECU, ECU connection)
E00408204	"P025C"	If the fuel metering unit signal is short circuit to ground, fault code is raised.	Engine torque reduction Level 1 (Mid)	1. Electric problem (Metering unit connector) 2. Electric problem (Wiring harness metering unit to ECU, faulty metering unit) 3. Electric problem (Faulty ECU, ECU connection)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00408205	"P025A"	If the fuel metering unit signal is opened, fault code is raised.	Engine torque reduction Level 1 (Mid)	1. Electric problem (Metering unit connector) 2. Electric problem (Wiring harness metering unit to ECU, faulty metering unit) 3. Electric problem (Faulty ECU, ECU connection)
E00408207	"P025B"	If the fuel metering unit signal is over temperature, fault code is raised.	Engine torque reduction Level 1 (Mid)	1. Electric problem (Metering unit connector) 2. Electric problem (Wiring harness metering unit to ECU, faulty metering unit) 3. Electric problem (Faulty ECU, ECU connection)
E00433500	"P1450"	If DEF pressure exceeds the maximum threshold (10.5 bar) for longer than 10 sec, an error will be set at "METERINGCONTROL" state.	Engine Torque Reduction Variable	1. DEF line problem (DEF hose line or dosing valve is clogged) 2. Electric problem (Supply module connector, wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00433501	"P1451"	If DEF pressure falls below the first minimum pressure threshold (4 bar) for longer than 10 sec, or the second minimum pressure threshold (3 bar) for longer than 0.5 sec, an error will be set at "METERINGCONTROL" state.	Engine Torque Reduction Variable	1. Low DEF level 2. DEF line problem (DEF hose line or dosing valve is clogged, supply module filter is clogged, hose line are swapped) 3. Electric problem (Supply module connector, wiring harness ECU to supply module, supply module) 4. Electric problem (ECU connector, faulty ECU)
E00433502	"P1457"	When system attempts to build up the pressure in the dosing line, if this pressure threshold (6.5 bar) cannot be reached within 25 s for longer than maximum number of attempts (3), fault will be set.	Engine Torque Reduction Variable	1. Low DEF level 2. DEF line problem (DEF hose line or dosing valve is opened, hose line are swapped.) 3. Electric problem (Supply module connector, wiring harness ECU to supply module, supply module) 4. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00433512	"P1452"	The DEF pressure is higher than threshold (12.5 bar) for longer than 10 sec, fault will be set except below condition. 1) when the supply module is defrosting. 2) when the DEF Reverting valve is actuated for pressure reduction in the "DETECTIONMODE" state.	Engine Torque Reduction Variable	1. DEF line problem (DEF hose line or dosing valve is clogged) 2. Electric problem (Supply module connector, wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00433515	"P1459"	The desired DEF pressure reduction (<0.5 bar) could not be achieved within 40 sec.	Engine Torque Reduction Variable	1. The DEF backflow hose line is clogged. 2. Electric problem (Supply module connector, wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00433516	"P1460"	The DEF pressure is below the minimum pressure threshold at "AFTERRUN PRESSURECOMPENSATION" state.	Engine Torque Reduction Variable	1. The DEF backflow hose line is clogged. 2. Electric problem (Supply module connector, wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00433518	"P1458"	When system attempts to build up the pressure in the dosing line, if this pressure threshold (6.5 bar) cannot be reached within 25 s for longer than maximum number of attempts (3), fault will be set. This fault is occurred after P1458 (DEF pressure build up error at PRESSUREBUILDUP).	Engine Torque Reduction Variable	1. Low DEF level 2. DEF line problem (DEF hose line or dosing valve is opened, hose line are swapped) 3. Electric problem (Supply module connector, wiring harness ECU to supply module, supply module) 4. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00434402	"P1893"	If the backflow line is blocked, the pressure will not drop below the threshold by actuation of the backflow pump within the time threshold. If a blockage is detected in backflow line, the state is left with an error and the counter is incremented. If the counter exceeds the maximum acceptable number of repetitions the fault is set.	Engine Torque Reduction Variable	1. The DEF backflow hose line is clogged. 2. Electric problem (Supply module connector, wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00435405	"P221D"	The DEF pressure line heater circuit is opened.		1. Electric problem (DEF pressure line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF pressure line heater) 3. Electric problem (ECU connector, faulty ECU)
E00435406	"P221C"	The DEF pressure line heater circuit is opened or shorted to ground.		1. Electric problem (DEF pressure line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF pressure line heater) 3. Electric problem (ECU connector, faulty ECU)
E00435505	"P221F"	The DEF Backflow line heater circuit is opened.		1. Electric problem (DEF backflow line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF backflow line heater) 3. Electric problem (ECU connector, faulty ECU)
E00435506	"P221E"	The DEF Backflow line heater circuit is opened or shorted to ground.		1. Electric problem (DEF backflow line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF backflow line heater) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00435605	"P215F"	The DEF Suction line heater circuit is opened.		1. Electric problem (DEF suction line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF suction line heater) 3. Electric problem (ECU connector, faulty ECU)
E00435606	"P215E"	The DEF Suction line heater circuit is opened or shorted to ground.		1. Electric problem (DEF suction line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF suction line heater) 3. Electric problem (ECU connector, faulty ECU)
E00436414	"P20EE"	The SCR average efficiency is below the eta threshold. It is used to monitor NOx conversion efficiency by using NOx sensor before and after SCR. Diagnoses when the NOx reduction efficiency drops below about 30%. Calculate the calculated average efficiency during NOx 10 g accumulation (time varies according to mode, normally over 30 minutes). And if this value falls below 6th consecutive the diagnosis threshold, the fault is occurred. If the efficiency is higher than the threshold even once in the middle, it heals immediately.	Engine torque reduction Level 1 (Mid)	1. Electric problem (When the upstream and downstream NOx sensors are conversely connected) 2. Electric problem (NOx sensor failure, sensor drift) 3. Bad DEF (Check if DEF concentration fault is occurred at same time) 4. SCR failure (not common, please perform DPF regeneration and data monitor before change SCR system)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
		* Do not clear fault only, re-update MAP or change the ECU first without operating test. The diagnostic criterion must be operated under stable temperature conditions for a certain period of time, which may take a long time to diagnose. Therefore, when exchanging ECU, the values are reset and appear to have improved, but if the root cause is not improved, the fault will be reoccurred.		
E00436504	"P2046"	The error is reported if its FMI is equal 4 (Short circuit).	Engine Torque Reduction Variable	1. Electric problem (DEF temperature sensor, wiring harness in the DEF module) 2. Electric problem (CAN wiring harness-insulation, resistance)
E00436514	"P1227"	The DEF tank temperature has not risen by the threshold (3°C (5.4°F)) and within 3600 sec. The DEF tank temperature is not risen as expected. This monitoring will run only under the following condition: • DEF Tank heater (Coolant valve) is activated. • The remaining urea tank level is higher than threshold (20%). • DEF Tank temperature is lower than (-16°C (3.2°F)) or higher than (-8°C (17.6°F)) • DEF Tank temperature is lower than (20°C (68°F)). • The engine coolant temperature is greater than (49.96°C (121.9°F))	Engine Torque Reduction Variable	1. Electric problem (DEF tank temperature sensor, wiring harness in the DEF tank module) 2. Electric problem (DEF tank coolant valve connector, wiring harness ECU to DEF tank coolant valve) 3. Electric problem (CAN wiring harness-insulation, resistance)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00437403	"P208D"	The DEF Supply pump motor signal output is shorted to battery.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00437404	"P208C"	The DEF Supply pump motor signal output is shorted to ground.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00437405	"P208A"	The DEF Supply pump motor signal output is opened.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00437407	"P208B"	The DEF Supply pump motor signal output is over temperature.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00437408	"P108A"	The fault is detected when the actual pump motor speed deviates from the set pump motor speed for more than five seconds. The pump speed is calculated by internal electronics.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00437409	"P108B"	The fault is detected when the actual pump motor speed deviates from the set pump motor speed for more than five seconds. The pump speed is calculated by internal electronics. If the DEF Supply Pump Motor Speed Deviation Fault has been occurred more than 5 times in the same driving cycle, it is considered to permanent fault.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00437412	"P108C"	The DEF Supply pump motor does not switch to pump actuation mode.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00478115	"P24A3"	The DPF soot loading is exceed 120%. There is no chance to heat up or burn soot within very short time driving, physically. So it should be needed the manual regeneration by DPF switch.	Engine Torque Reduction Level 2 (Severe)	1. DPF soot loading is exceed 120%
E00478116	"P2463"	The DPF soot loading is exceed 110%. There is no chance to heat up or burn soot within very short time driving, physically. So it should be needed the manual regeneration by DPF switch. If the ECU DPF regeneration memory is reset, the DPF regeneration is induced for safety.	Engine torque reduction Level 1 (Mid)	1. DPF soot loading is exceed 110% 2. ECU DPF regeneration memory is reset. If the ECU memory is reset, the DPF regeneration is induced for safety
E00506703	"P0593"	Lamp wiring is shorted to battery.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00506704	"P0592"	Lamp wiring is shorted to ground.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)
E00506705	"P0591"	Lamp wiring is opened.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)
E00509903	"P055D"	Lamp wiring is shorted to battery.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)
E00509904	"P055C"	Lamp wiring is shorted to ground.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)
E00509905	"P055B"	Lamp wiring is opened.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)
E00531303	"P0193"	The rail pressure sensor raw signal is more than maximum threshold (4.83 V).	Engine torque reduction Level 1 (Mid); Engine speed reduced to 1200 rpm	1. Electric problem (Rail pressure sensor connector) 2. Electric problem (Wiring harness rail pressure sensor to ECU, rail pressure sensor) 3. Electric problem (Faulty ECU, ECU connector)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00531304	"P0192"	The rail pressure sensor raw signal is less than minimum threshold (0.36 V).	Engine torque reduction Level 1 (Mid); Engine speed reduced to 1200 rpm	1. Electric problem (Rail pressure sensor connector) 2. Electric problem (Wiring harness rail pressure sensor to ECU, rail pressure sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00541904	"P02E2"	If the pins of Throttle valve H-bridge have been shorted to ground or H-Bridge circuit included Throttle valve is damaged.		1. Electric problem (Throttle valve connector, faulty throttle valve motor) 2. Electric problem (Wiring harness throttle valve to ECU) 3. Electric problem (Faulty ECU)
E00541903	"P02E3"	If the pins of Throttle valve H-bridge have been shorted to battery or H-Bridge circuit included Throttle valve is damaged.		1. Electric problem (Throttle valve connector, faulty throttle valve motor) 2. Electric problem (Wiring harness throttle valve to ECU) 3. Electric problem (Faulty ECU)
E00541905	"P02E0"	If the pins of Throttle valve H-bridge have been opened or H-Bridge circuit included Throttle valve is damaged.		1. Electric problem (Throttle valve connector, faulty throttle valve motor) 2. Electric problem (Wiring harness throttle valve to ECU) 3. Electric problem (Faulty ECU)
E00543510	"P1453"	If the DEF pressure is not within the admissible limits (± 0.5 bar) for longer than 50 sec.	Engine Torque Reduction Variable	1. DEF line problem (DEF hose line or dosing valve is clogged) 2. Electric problem (Supply module connector, wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00543512	"P204A"	The ECU checks whether the dosing valve is physically blocked by checking whether the pressure drops normally by opening the dosing valve with the pressure in the pressure line at 9 bar. If the DEF pressure is not dropped below threshold (7.5 bar) within 15 sec, the dosing valve is considered to blockage. If a blockage is detected, the state is left with error and the counter is incremented. If the counter exceeds the maximum acceptable number of repetitions the fault is set.	Engine Torque Reduction Variable	1. DEF line problem (DEF hose line or dosing valve is clogged) 2. Electric problem (Supply module connector, wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00543603	"P20A3"	The DEF Reverting valve signal output is shorted to battery.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00543604	"P20A2"	The DEF Reverting valve signal output is shorted to ground.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00543605	"P20A0"	The DEF Reverting valve signal output is opened.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00543607	"P20A1"	The DEF Reverting valve signal output is over temperature.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00543611	"P20A5"	The DEF pump pressure is not dropped less than 0.9 bar in 15 sec at pressure reduction control mode.	Engine Torque Reduction Variable	1. The DEF backflow hose line is clogged. 2. Electric problem (Supply module connector, wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00543614	"P1461"	The DEF pressure difference is lower than threshold (3 bar) at "PRESSUREREDUCTION" state. It is a similar fault to judge the clogging back flow line as P1459 (DEF Pressure reduction error at PRESSUREREDUCTION). However, this fault is especially focused on judge of the DEF Reverting valve operation.	Engine Torque Reduction Variable	1. The DEF backflow hose line is clogged. 2. Electric problem (Supply module connector, wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00549103	"P20C0"	The DEF Pressure line heater relay output is shorted to battery.	Engine Torque Reduction Variable	1. Electric problem (DEF pressure line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF pressure line heater) 3. Electric problem (ECU connector, faulty ECU)
E00549104	"P20BF"	The DEF Pressure line heater relay output is shorted to ground.	Engine Torque Reduction Variable	1. Electric problem (DEF pressure line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF pressure line heater) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00549105	"P20BD"	The DEF Pressure line heater relay output is opened.	Engine Torque Reduction Variable	1. Electric problem (DEF pressure line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF pressure line heater) 3. Electric problem (ECU connector, faulty ECU)
E00549107	"P30BD"	The DEF Pressure line heater relay output is over temperature.	Engine Torque Reduction Variable	1. Electric problem (DEF pressure line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF pressure line heater) 3. Electric problem (ECU connector, faulty ECU)
E00549112	"P20BE"	The Pressure line heater feedback voltage is between Low threshold and High threshold (2000 mV and 4750 mV). 2 to 4.75 V is the value measured by the ECU internal resistance when the current has not flowed normally in the feedback line. The hose heater plausibility fault is diagnosed when the current does not flow normally to the hose heating line even though the hose heater relay is operated. Therefore, it is used to check if the actual heater is working when the relay operates.	Engine Torque Reduction Variable	1. Electric problem (Battery supply into the main relay, DEF pressure line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF pressure line heater, DEF pressure line heater) 3. Electric problem (ECU connector, faulty ECU)
E00557122	"P009B"	Common rail pressure relief valve (PRV) open counter is exceeded than guideline (50). The PRV open occurs when the rail pressure rises above 1850 bar, so if the fault recurs within a short time, a low pressure circuit (LPC) check is required. * LPC : Whole system from Fuel tank to Fuel high pressure pump.		1. Common rail pressure relief valve (PRV) open counter is exceeded than guideline.

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00557123	"P009C"	If there is any malfunction related to FIE system. the PRV (pressure relief valve) is forced to open for protection FIE system and driver by performing of rail pressure increment.	Engine torque reduction Level 1 (Mid); Engine speed reduced to 1200 rpm	1. If there is any malfunction related to FIE system. the PRV (pressure relief valve) is forced to open for protection FIE system and driver by performing of rail pressure increment.
E00557124	"P009D"	If there is any malfunction related to FIE system. the PRV (pressure relief valve) is forced to open for protection FIE system and driver by performing of rail pressure and injection quantity increment.	Engine torque reduction Level 1 (Mid); Engine speed reduced to 1200 rpm	1. If there is any malfunction related to FIE system. the PRV (pressure relief valve) is forced to open for protection FIE system and driver by performing of rail pressure and injection quantity increment.
E00557125	"P000F"	Common rail pressure relief valve (PRV) is open. The PRV open occurs when the rail pressure rises above 1850 bar, so the Fuel system (LPC & HPC) check is required.	Engine torque reduction Level 1 (Mid); Engine speed reduced to 1200 rpm	1. Fuel LPC problem (No fuel in tank, fuel leakage before HP pump, fuel filter plugged, fuel return line clogging) 2. Fuel HPC problem (Injector close stuck, faulty HP pump, metering unit sticking, leaking) 3. Electric problem (Metering unit connector, wiring harness metering unit to ECU) * LPC (Low pressure circuit) / HPC (High pressure circuit)
E00557127	"P009F"	The averaged rail pressure is outside the expected tolerance range for detection of the opened pressure relief valve.		1. Fuel LPC problem (No fuel in tank, fuel leakage before HP pump, fuel filter plugged, fuel return line clogging) 2. Fuel HPC problem (Injector close stuck, faulty HP pump, metering unit sticking, leaking) 3. Electric problem (Metering unit connector, wiring harness metering unit to ECU) * LPC (Low pressure circuit) / HPC (High pressure circuit)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00557128	"P018F"	Common rail pressure relief valve (PRV) open accumulated time is exceeded than guideline (300 minutes). The PRV open occurs when the rail pressure rises above 1950 bar, so if the fault recurs within a short time, a low pressure circuit (LPC) and high pressure circuit (HPC) check is required. * LPC: Whole system from Fuel tank to Fuel high pressure pump. * HPC: Whole system from high pressure pump to Injector.	Engine torque reduction Level 1 (Mid); Engine speed reduced to 1200 rpm	1. Common rail pressure relief valve (PRV) open accumulated time is exceeded than guideline.
E00562914	"P246C"	The DPF differential pressure is more than maximum pressure dependent on exhaust gas flow. This fault occurs when the soot in the DPF is overloaded. Therefore, if this fault continues to recur in a short time, it is necessary to improve the phenomenon that soot accumulates excessively. For example, air leak of Intake system, Injector failure etc.	Engine torque reduction Level 1 (Mid)	1. DPF fully clogging 2. Electric problem (Differential pressure sensor connector, wiring harness ECU to differential pressure sensor) 3. Electric problem (Faulty ECU, ECU connector)
E00570605	"P214F"	The DEF Supply module heater circuit is opened.		1. Electric problem (DEF Supply module heater connector) 2. Electric problem (Heater relay, wiring harness related DEF supply module heater) 3. Electric problem (ECU connector, faulty ECU)
E00570606	"P21DD"	The DEF Supply module heater circuit is opened or shorted to ground.		1. Electric problem (DEF Supply module heater connector) 2. Electric problem (Heater relay, wiring harness related DEF supply module heater) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00570612	"P23B3"	After defrosting of the supply module the temperature of the supply module heater has not risen by the value (3°C (5.4°F)) but the temperature of the supply module has risen.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00570614	"P23B4"	The difference between the sensed value of supply module heater temperature and the ambient air temperature is greater than a threshold (15°C (27°F)). It means that check the sensor drift when the machine is at cold soaking condition.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00570622	"P23B2"	After defrosting of the supply module the temperature of the supply module heater has not risen by the threshold (3°C (5.4°F)) and the temperature of the supply module has not risen by the threshold (3°C (5.4°F)).	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00574603	"P21C4"	The DEF Main heater relay output is shorted to battery.	Engine Torque Reduction Variable	1. Electric problem (Battery supply into the main relay) 2. Electric problem (Heater relay, wiring harness related DEF main heater relay) 3. Electric problem (ECU connector, faulty ECU)
E00574604	"P21C3"	The DEF Main heater relay output is shorted to ground.	Engine Torque Reduction Variable	1. Electric problem (Battery supply into the main relay) 2. Electric problem (Heater relay, wiring harness related DEF main heater relay) 3. Electric problem (ECU connector, faulty ECU)
E00574605	"P21C2"	The DEF Main heater relay output is opened.	Engine Torque Reduction Variable	1. Electric problem (Battery supply into the main relay) 2. Electric problem (Heater relay, wiring harness related DEF main heater relay) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00574606	"P05ED"	At least one DEF line heater circuit is shorted to battery.		1. Electric problem (DEF line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF line heater) 3. Electric problem (ECU connector, faulty ECU)
E00574607	"P31C5"	The DEF Main heater relay output is over temperature.	Engine Torque Reduction Variable	1. Electric problem (Battery supply into the main relay) 2. Electric problem (Heater relay, wiring harness related DEF main heater relay) 3. Electric problem (ECU connector, faulty ECU)
E00596503	"P21C9"	The relay control output is shorted to battery.	Engine Torque Reduction Variable	1. Electric problem (Battery supply into the SCR main relay) 2. Electric problem (Faulty SCR main relay, wiring harness related SCR main relay) 3. Electric problem (ECU connector, faulty ECU)
E00596504	"P21C8"	The relay control output is shorted to ground.	Engine Torque Reduction Variable	1. Electric problem (Battery supply into the SCR main relay) 2. Electric problem (Faulty SCR main relay, wiring harness related SCR main relay) 3. Electric problem (ECU connector, faulty ECU)
E00596505	"P21C7"	The relay control output is opened.	Engine Torque Reduction Variable	1. Electric problem (Battery supply into the SCR main relay) 2. Electric problem (Faulty SCR main relay, wiring harness related SCR main relay) 3. Electric problem (ECU connector, faulty ECU)
E00632303	"P2634"	The relay control output is shorted to battery.	Engine Torque Reduction Level 2 (Severe)	1. Electric problem (Electric fuel feed pump connector) 2. Electric problem (Wiring harness ECU to electric fuel feed pump, electric fuel feed pump) 3. Electric problem (Faulty ECU, ECU connector)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00632304	"P2633"	The relay control output is shorted to ground.	Engine Torque Reduction Level 2 (Severe)	1. Electric problem (Electric fuel feed pump connector) 2. Electric problem (Wiring harness ECU to electric fuel feed pump, electric fuel feed pump) 3. Electric problem (Faulty ECU, ECU connector)
E00632305	"P2632"	The relay control output is opened.	Engine Torque Reduction Level 2 (Severe)	1. Electric problem (Electric fuel feed pump connector) 2. Electric problem (Wiring harness ECU to electric fuel feed pump, electric fuel feed pump) 3. Electric problem (Faulty ECU, ECU connector)
E00632313	"P2635"	The fuel filter absolute pressure is below the diagnosis threshold at ignition OFF condition. If the electric fuel feed pump does not operate under the ignition off condition, the fuel filter pressure value will not rise above the threshold (105 kPa(abs)).		1. Fuel LPC problem (No fuel in tank, fuel leakage before HP pump, fuel filter plugged, fuel return line clogging) 2. Fuel HPC problem (Injector close stuck, faulty HP pump, metering unit sticking, leaking) 3. Electric problem (Electric fuel feed pump connector) 4. Electric problem (Wiring harness ECU to electric fuel feed pump, electric fuel feed pump) 5. Electric problem (Faulty ECU, ECU connector) * LPC (Low pressure circuit) / HPC (High pressure circuit)
E00638519	"U1033"	CAN frame has a time out for the number of cycles (4).		1. Electric problem (VCU, abnormal network) 2. Electric problem (CAN wiring harness insulation, resistance)
E00687503	"P204D"	The DEF Supply pump pressure sensor value is more than maximum threshold (0.258 V).	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00687504	"P204C"	The DEF Supply pump pressure sensor value is less than minimum threshold (3.30 V).	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00687516	"P304D"	The difference between DEF Supply pump pressure sensor and atmospheric pressure sensor is higher than threshold (0.5 bar). This fault is used to determine if the DEF supply pump pressure sensor was drift (offset).	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00687518	"P304C"	The difference between DEF Supply pump pressure sensor and atmospheric pressure sensor is lower than threshold (-0.5 bar). This fault is used to determine if the DEF supply pump pressure sensor was drift (offset).	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00691503	"P3611"	Lamp wiring is shorted to battery.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)
E00691504	"P360F"	Lamp wiring is shorted to ground.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)
E00691505	"P360E"	Lamp wiring is opened.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00691603	"P1908"	Lamp wiring is shorted to battery.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)
E00691604	"P1907"	Lamp wiring is shorted to ground.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)
E00691605	"P1906"	Lamp wiring is opened.		1. Electric problem (Lamp connector) 2. Electric problem (Wiring harness lamp to ECU, faulty lamp) 3. Electric problem (Faulty ECU, ECU connector)
E00706903	"P20C4"	The DEF Backflow line heater relay output is shorted to battery.	Engine Torque Reduction Variable	1. Electric problem (DEF backflow line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF backflow line heater) 3. Electric problem (ECU connector, faulty ECU)
E00706904	"P20C3"	The DEF Backflow line heater relay output is shorted to ground.	Engine Torque Reduction Variable	1. Electric problem (DEF backflow line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF backflow line heater) 3. Electric problem (ECU connector, faulty ECU)
E00706905	"P20C1"	The DEF Backflow line heater relay output is opened.	Engine Torque Reduction Variable	1. Electric problem (DEF backflow line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF backflow line heater) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00706907	"P30C1"	The DEF Backflow line heater relay output is over temperature.	Engine Torque Reduction Variable	1. Electric problem (DEF backflow line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF backflow line heater) 3. Electric problem (ECU connector, faulty ECU)
E00706912	"P20C2"	The Backflow line heater feedback voltage is between Low threshold and High threshold (2000 mV and 4750 mV). 2 to 4.75 V is the value measured by the ECU internal resistance when the current has not flowed normally in the feedback line. The hose heater plausibility fault is diagnosed when the current does not flow normally to the hose heating line even though the hose heater relay is operated. Therefore, it is used to check if the actual heater is working when the relay operates.	Engine Torque Reduction Variable	1. Electric problem (Battery supply into the main relay, DEF backflow line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF backflow line heater, DEF backflow line heater) 3. Electric problem (ECU connector, faulty ECU)
E00710712	"P23B5"	After defrosting of the supply module the temperature of the supply module has not risen by the value (3°C (5.4°F)) but the temperature of the supply module heater has risen.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00710714	"P23B6"	The difference between the sensed value of supply module temperature and the ambient air temperature is greater than a threshold (15°C (27°F)). It means that check the sensor drift when the machine is at cold soaking condition.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00741603	"P20BC"	The DEF Supply module heater relay output is shorted to battery.	Engine Torque Reduction Variable	1. Electric problem (DEF supply module connector) 2. Electric problem (Heater relay, wiring harness related DEF supply module) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00741604	"P20BB"	The DEF Supply module heater relay output is shorted to ground.	Engine Torque Reduction Variable	1. Electric problem (DEF supply module connector) 2. Electric problem (Heater relay, wiring harness related DEF supply module) 3. Electric problem (ECU connector, faulty ECU)
E00741605	"P20B9"	The DEF Supply module heater relay output is opened.	Engine Torque Reduction Variable	1. Electric problem (DEF supply module connector) 2. Electric problem (Heater relay, wiring harness related DEF supply module) 3. Electric problem (ECU connector, faulty ECU)
E00741607	"P30B9"	The DEF Supply module heater relay output is over temperature.	Engine Torque Reduction Variable	1. Electric problem (DEF supply module connector) 2. Electric problem (Heater relay, wiring harness related DEF supply module) 3. Electric problem (ECU connector, faulty ECU)
E00741612	"P20BA"	The Supply module heater feedback voltage is between Low threshold and High threshold (2000 mV and 4750 mV). 2 to 4.75 V is the value measured by the ECU internal resistance when the current has not flowed normally in the feedback line. The hose heater plausibility fault is diagnosed when the current does not flow normally to the hose heating line even though the hose heater relay is operated. Therefore, it is used to check if the actual heater is working when the relay operates.	Engine Torque Reduction Variable	1. Electric problem (Battery supply into the main relay, DEF supply module heater connector) 2. Electric problem (Heater relay, wiring harness related DEF supply module heater, DEF supply module heater) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00753812	"P06F0"	The received DEF supply module temperature duty cycle is in the failure range (90~95%).	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00753813	"P06F1"	received DEF supply module temperature duty cycle is in the invalid range. 1) DEF supply module temperature duty cycle < 15% or; 2) DEF supply module temperature duty cycle (85~90%) or; 3) DEF supply module temperature duty cycle > 95%.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00753822	"P20AC"	The received DEF supply module heater temperature duty cycle is in the failure range (90~95%).	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00753823	"P20AD"	The received DEF supply module heater temperature duty cycle is in the invalid range. 1) DEF supply module heater temperature duty cycle < 15% or; 2) DEF supply module heater temperature duty cycle (85~90%) or; 3) DEF supply module heater temperature duty cycle > 95%.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00753824	"P20B0"	When temperature measurement is not enabled even after sending start sequence for maximum number of times.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00753825	"P20FF"	The time period of the received DEF supply module PWM signal is out of the specified range of 150 ms to 250 ms.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00753826	"P056D"	When valid Sync is not received OR When two Sync signals or two temperature information signals are received consecutively OR valid sync and temperature signal for only one information is received consecutively.	Engine Torque Reduction Variable	1. Electric problem (Supply module connector) 2. Electric problem (Wiring harness ECU to supply module, supply module) 3. Electric problem (ECU connector, faulty ECU)
E00754003	"P20C8"	The DEF Suction line heater relay output is shorted to battery.	Engine Torque Reduction Variable	1. Electric problem (DEF Suction line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF suction line heater) 3. Electric problem (ECU connector, faulty ECU)
E00754004	"P20C7"	The DEF Suction line heater relay output is shorted to ground.	Engine Torque Reduction Variable	1. Electric problem (DEF Suction line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF suction line heater) 3. Electric problem (ECU connector, faulty ECU)
E00754005	"P20C5"	The DEF Suction line heater relay output is opened.	Engine Torque Reduction Variable	1. Electric problem (DEF Suction line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF suction line heater) 3. Electric problem (ECU connector, faulty ECU)
E00754007	"P30C5"	The DEF Suction line heater relay output is over temperature.	Engine Torque Reduction Variable	1. Electric problem (DEF Suction line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF suction line heater) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00754012	"P20C6"	The Suction line heater feedback voltage is between Low threshold and High threshold (2000 mV and 4750 mV). 2 to 4.75 V is the value measured by the ECU internal resistance when the current has not flowed normally in the feedback line. The hose heater plausibility fault is diagnosed when the current does not flow normally to the hose heating line even though the hose heater relay is operated. Therefore, it is used to check if the actual heater is working when the relay operates.	Engine Torque Reduction Variable	1. Electric problem (Battery supply into the main relay, DEF suction line heater connector) 2. Electric problem (Heater relay, wiring harness related DEF suction line heater, DEF suction line heater) 3. Electric problem (ECU connector, faulty ECU)
E00774803	"P0617"	The starter relay HS/LS power stage output is opened or the starter relay LS power stage output is shorted to battery. *HS = High side, LS = Low side		1. Electric problem (Starter connector) 2. Electric problem (Wiring harness ECU to starter, starter) 3. Electric problem (ECU connector, faulty ECU)
E00774804	"P0616"	The starter relay HS power stage output is shorted to ground. *HS = High side, LS = Low side		1. Electric problem (Starter connector) 2. Electric problem (Wiring harness ECU to starter, starter) 3. Electric problem (ECU connector, faulty ECU)
E00774805	"P0615"	The starter relay HS/LS power stage output is opened. *HS = High side, LS = Low side		1. Electric problem (Starter connector) 2. Electric problem (Wiring harness ECU to starter, starter) 3. Electric problem (ECU connector, faulty ECU)
E00774903	"P26E6"	The starter relay HS power stage output is shorted to battery.		1. Electric problem (Starter connector) 2. Electric problem (Wiring harness ECU to starter, starter) 3. Electric problem (ECU connector, faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00774904	"P26E5"	The starter relay LS power stage output is shorted to ground.		1. Electric problem (Starter connector) 2. Electric problem (Wiring harness ECU to starter, starter) 3. Electric problem (ECU connector, faulty ECU)
E00774905	"P26E4"	The starter relay LS power stage output is opened.		1. Electric problem (Starter connector) 2. Electric problem (Wiring harness ECU to starter, starter) 3. Electric problem (ECU connector, faulty ECU)
E00861412	"P213E"	Injection cut-off request by ECU internal calculation for safety based on malfunction of accel pedal, injection control, etc.	Engine Torque Reduction Level 2 (Severe); Engine shutdown	1. Injection cut-off request by ECU internal calculation for safety based on malfunction of accel pedal, injection control, etc.. 2. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 3. Electric problem (ECU)
E05529612	"P062F"	Fault is set when data for when the number of blocks that could not be read from memory media is greater or equal to threshold.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E05555212	"P0630"	If a block cannot be written more than 3 times, an error will be registered.	Engine shutdown	1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E05734419	"U01B7"	CAN frame has a time out for the number of cycles (4).		1. Electric problem (VCU, abnormal network) 2. Electric problem (CAN wiring harness insulation, resistance)
E06144119	"U01B9"	CAN frame has a time out for the number of cycles (4).		1. Electric problem (VCU, abnormal network) 2. Electric problem (CAN wiring harness insulation, resistance)
E06145419	"U029D"	CAN frame has a time out for the number of cycles (4).	Engine Torque Reduction Variable	1. Electric problem (Upstream NOx sensor connector, upstream NOx sensor power, upstream NOx sensor, abnormal network) 2. Electric problem (CAN wiring harness insulation, resistance)
E06145519	"U029E"	CAN frame has a time out for the number of cycles (4).	Engine Torque Reduction Variable	1. Electric problem (Downstream NOx sensor connector, downstream NOx sensor power, downstream NOx sensor, abnormal network) 2. Electric problem (CAN wiring harness insulation, resistance)
E06492319	"U02A2"	CAN frame has a time out for the number of cycles (4).	Engine Torque Reduction Variable	1. Electric problem (DEF tank module connector, DEF tank module, abnormal network) 2. Electric problem (CAN wiring harness insulation, resistance)
E06511019	"U0619"	CAN frame has a time out for the number of cycles (4).	Engine Torque Reduction Variable	1. Electric problem (DEF tank module connector, DEF tank module, abnormal network) 2. Electric problem (CAN wiring harness insulation, resistance)
E06516419	"U1001"	CAN frame has a time out for the number of cycles (4).		1. Electric problem (VCU, abnormal network) 2. Electric problem (CAN wiring harness insulation, resistance)
E06524119	"U1031"	Fault is detected if a timeout of the AUXIO1 frame has occurred. (status of vehicle cut off [Safety bar]).		1. Electric problem (VCU, abnormal network) 2. Electric problem (CAN wiring harness insulation, resistance)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E06526519	"U1032"	CAN frame has a time out for the number of cycles (4).		1. Electric problem (VCU, abnormal network) 2. Electric problem (CAN wiring harness insulation, resistance)
E06527219	"P0218"	CAN frame has a time out for the number of cycles (4).		1. Electric problem (VCU, abnormal network) 2. Electric problem (CAN wiring harness insulation, resistance)
E06532019	"U0632"	CAN frame has a time out for the number of cycles (4).		1. Electric problem (VCU, abnormal network) 2. Electric problem (CAN wiring harness insulation, resistance)
E06532031	"U1039"	FAN control error is occurred.		1. Electric problem (FAN module & wiring harness of FAN module)
E06540019	"U0608"	CAN frame has a time out for the number of cycles (4).	Engine torque reduction Level 1 (Mid)	1. Electric problem (VCU, abnormal network) 2. Electric problem (CAN wiring harness insulation, resistance)
E06540022	"U013C"	CAN frame has a time out for the number of cycles (4).	Engine torque reduction Level 1 (Mid)	1. Electric problem (VCU, abnormal network) 2. Electric problem (CAN wiring harness insulation, resistance)
E06540023	"U043D"	The error is reported when the Rolling Counter of the CAN frame received is not equal.	Engine torque reduction Level 1 (Mid)	1. Electric problem (VCU, abnormal network) 2. Electric problem (CAN wiring harness insulation, resistance)
E06540119	"U010F"	CAN frame has a time out for the number of cycles (4).		1. Electric problem (VCU, abnormal network) 2. Electric problem (CAN wiring harness insulation, resistance)
E06540219	"U01B8"	CAN frame has a time out for the number of cycles (4).		1. Electric problem (VCU, abnormal network) 2. Electric problem (CAN wiring harness insulation, resistance)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E10433209	"P2383"	If the O2 concentration is above the defined threshold (Sensor is probably not mounted correctly).	Engine Torque Reduction Variable	1. Tampering (NOx sensor tampering like to mount outside for reducing of DEF consumption) 2. Electric problem (NOx sensor connector, wiring harness NOx sensor controller too sensing part, NOx sensor) 3. Electric problem (CAN wiring harness-insulation, resistance)
E10438509	"P2384"	If the O2 concentration is above the defined threshold (Sensor is probably not mounted correctly).	Engine Torque Reduction Variable	1. Tampering (NOx sensor tampering like to mount outside for reducing of DEF consumption) 2. Electric problem (NOx sensor connector, wiring harness NOx sensor controller too sensing part, NOx sensor) 3. Electric problem (CAN wiring harness-insulation, resistance)
E52060112	"P160B"	The SPI-communication is monitored by the CY327 driver. A fault is detected if the received data has incorrect check -bytes or a data transfer is not possible.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52061812	"P060B"	If the value converted by the ADC channel is greater than the applicable threshold (166 mV), after the debounce counter has reached the final value (8).		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52064112	"P160F"	Multiple errors are detected while testing the complete ROM memory.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E52064212	"P1610"	This fault is detected when the MM (Monitoring Module) does not receive the whole response from CPU during shut-off path test.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52064312	"P101A"	The current energizing time is greater than the maximum permitted energizing time after overrun demand by the driver.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52069612	"P160C"	If the value converted by the ADC, does not lie between minimum(4.70 V) and maximum (4.8 V) after the debounce counter has reached the final value (255).		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52069712	"P160D"	If the ratio correction value converted by the ADC, does not lie between minimum (0.95) and maximum (1.05) after the debounce counter has reached the final value (8).		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52069812	"P060C"	If the ECU query response is late 5 times.	Engine torque reduction Level 2 (Severe); Engine shutdown	1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E52069912	"P160E"	If the ECU SPI response is late 5 times.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52070012	"P1611"	This fault is detected when the any error found during the execution of the shut-off path test.	Engine torque reduction Level 2 (Severe); Engine shutdown	1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52070112	"P1612"	This fault is detected when the wrong set MM Response time during shut-off path test.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52070212	"P1613"	This fault is detected when the errors detected in the SPI communication during shut-off path test.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52070312	"P1615"	The WDA is not working correct during shut-off path test.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E52070412	"P1616"	The OS timeout error during shut-off path test.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52070512	"P1617"	The positive test failure error during shut-off path test.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52070612	"P1618"	The shut-off path test time is longer than threshold.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52070703	"P1619"	The overvoltage is detected during shut-off path test.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52070704	"P1614"	When the under voltage is detected during shut-off path test.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E52072312	"P12E5"	The inducement Level 1 is activated by EGR valve blocked group fault and the fault is currently present. This fault is only intended to inform about the SCR inducement status. Check the other faults that have occurred together to determine why the SCR inducement was active.		1. SCR Inducement Fault Level1 (Group1 – EGR Block)
E52072412	"P12E6"	The inducement Level 2 is activated by EGR valve blocked group fault and the fault is currently present. This fault is only intended to inform about the SCR inducement status. Check the other faults that have occurred together to determine why the SCR inducement was active.		1. SCR Inducement Fault Level2 (Group1 – EGR Block)
E52072512	"P12E7"	The inducement Level 3 is activated by EGR valve blocked group fault and the fault is currently present. This fault is only intended to inform about the SCR inducement status. Check the other faults that have occurred together to determine why the SCR inducement was active.		1. SCR Inducement Fault Level3 (Group1 – EGR Block)
E52072612	"P12E8"	The inducement Warning is activated by EGR valve blocked group fault and the fault is currently present. This fault is only intended to inform about the SCR inducement status. Check the other faults that have occurred together to determine why the SCR inducement was active.		1. SCR Inducement Fault Warning (Group1 – EGR Block)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E52072712	"P12E9"	The inducement Level 1 is activated by Dosing interrupt group fault and the fault is currently present. This fault is only intended to inform about the SCR inducement status. Check the other faults that have occurred together to determine why the SCR inducement was active.		1. SCR Inducement Fault Level1 (Group2 – Dosing Interrupt)
E52072812	"P12EA"	The inducement Level 2 is activated by Dosing interrupt group fault and the fault is currently present. This fault is only intended to inform about the SCR inducement status. Check the other faults that have occurred together to determine why the SCR inducement was active.		1. SCR Inducement Fault Level2 (Group2 – Dosing Interrupt)
E52072912	"P12EB"	The inducement Level 3 is activated by Dosing interrupt group fault and the fault is currently present. This fault is only intended to inform about the SCR inducement status. Check the other faults that have occurred together to determine why the SCR inducement was active.		1. SCR Inducement Fault Level3 (Group2 – Dosing Interrupt)
E52073012	"P12EC"	The inducement Warning is activated by Dosing interrupt group fault and the fault is currently present. This fault is only intended to inform about the SCR inducement status. Check the other faults that have occurred together to determine why the SCR inducement was active.		1. SCR Inducement Fault Warning (Group2 – Dosing Interrupt)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E52073612	"P12F2"	The inducement Level 1 is activated by DEF quality group fault and the fault is currently present. This fault is only intended to inform about the SCR inducement status. Check the other faults that have occurred together to determine why the SCR inducement was active.		1. SCR Inducement Fault Level1 (Group4 – DEF Quality)
E52073712	"P12F3"	The inducement Level 2 is activated by DEF quality group fault and the fault is currently present. This fault is only intended to inform about the SCR inducement status. Check the other faults that have occurred together to determine why the SCR inducement was active.		1. SCR Inducement Fault Level2 (Group4 – DEF Quality)
E52073812	"P12F4"	The inducement Level 3 is activated by DEF quality group fault and the fault is currently present. This fault is only intended to inform about the SCR inducement status. Check the other faults that have occurred together to determine why the SCR inducement was active.		1. SCR Inducement Fault Level3 (Group4 – DEF Quality)
E52073912	"P12F5"	The inducement Warning is activated by DEF quality group fault and the fault is currently present. This fault is only intended to inform about the SCR inducement status. Check the other faults that have occurred together to determine why the SCR inducement was active.		1. SCR Inducement Fault Warning (Group4 – DEF Quality)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E52074012	"P12F6"	The inducement Level 1 is activated by Tampering group fault and the fault is currently present. This fault is only intended to inform about the SCR inducement status. Check the other faults that have occurred together to determine why the SCR inducement was active.		1. SCR Inducement Fault Level1 (Group5 – Tampering)
E52074112	"P12F7"	The inducement Level 2 is activated by Tampering group fault and the fault is currently present. This fault is only intended to inform about the SCR inducement status. Check the other faults that have occurred together to determine why the SCR inducement was active.		1. SCR Inducement Fault Level2 (Group5 – Tampering)
E52074212	"P12F8"	The inducement Level 3 is activated by Tampering group fault and the fault is currently present. This fault is only intended to inform about the SCR inducement status. Check the other faults that have occurred together to determine why the SCR inducement was active.		1. SCR Inducement Fault Level3 (Group5 – Tampering)
E52074312	"P12F9"	The inducement Warning is activated by Tampering group fault and the fault is currently present. This fault is only intended to inform about the SCR inducement status. Check the other faults that have occurred together to determine why the SCR inducement was active.		1. SCR Inducement Fault Warning (Group5 – Tampering)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E52079012	"P1303"	The inducement Level1 is activated by Repeat offense condition. For discourage repeat tampering and repeat use of poor DEF, The SCR inducement fault is monitored during 40 hrs after healing the SCR inducement fault. If the SCR inducement fault is occurred within 40 hrs, the time of engine speed and torque de-rate process is shorten than normal SCR inducement process.		1. SCR inducement repeat offense level1
E52079112	"P1304"	The inducement Level2 is activated by Repeat offense condition. For discourage repeat tampering and repeat use of poor DEF, The SCR inducement fault is monitored during 40 hrs after healing the SCR inducement fault. If the SCR inducement fault is occurred within 40 hrs, the time of engine speed and torque de-rate process is shorten than normal SCR inducement process.		1. SCR inducement repeat offense level2
E52079212	"P1305"	The inducement Level3 is activated by Repeat offense condition. For discourage repeat tampering and repeat use of poor DEF, The SCR inducement fault is monitored during 40 hrs after healing the SCR inducement fault. If the SCR inducement fault is occurred within 40 hrs, the time of engine speed and torque de-rate process is shorten than normal SCR inducement process.		1. SCR inducement repeat offense level3

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E52079612	"P1012"	Implausible accelerator pedal voltage.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Faulty pedal sensor, pedal sensor connector) 3. Electric problem (Wiring harness related ECU power and ground, ECU connector) 4. Electric problem (Faulty ECU)
E52079712	"P1013"	Implausible engine speed.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52080012	"P1016"	Implausible Injector ZFC (zero fuel quantity calibration).		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52080212	"P1018"	Implausible Post2 injection shut off error.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E52080312	"P1019"	Implausible Post3 injection (Pol3) efficiencies.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52080412	"P101B"	Implausible injection wave correction of the injection quantity correction.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52080512	"P101C"	Implausible rail pressure.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
E52080612	"P101D"	Error in the torque comparison between the permissible engine torque and the current plausible actual torque.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E52080812	"P1021"	Implausible hand pedal voltage.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Faulty pedal sensor, pedal sensor connector) 3. Electric problem (Wiring harness related ECU power and ground, ECU connector) 4. Electric problem (Faulty ECU)
E52080912	"P1022"	Implausible starter control.		1. Electric problem (Abnormal engine shut down (The battery is removed at engine running or ignition on condition, battery out <6 V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)

Service Codes List - Gateway Controller

The gateway controller is located in the cab, below the right console cover.

CODE	DESCRIPTION	RESULTS
"M0116"	Air filter switch not connected	All functions allowed
"M0117"	Air filter plugged	[air f] is displayed in error code menu
"M0144"	Air filter de-rate level 1	[air f] is displayed in error code menu; engine torque/speed reduced by 25%
"M0145"	Air filter de-rate level 2	[air f] is displayed in error code menu; engine torque/speed reduced by 60%
"M0309"	Battery voltage low	All functions allowed
"M0310"	Battery voltage high	All functions allowed
"M0311"	Battery voltage extremely high	All functions allowed
"M0314"	Battery voltage extremely low	All functions allowed
"M0322"	Battery voltage out of range low	All functions allowed
"M0414"	Engine oil pressure extremely low	All functions allowed
"M0610"	Engine speed high	All functions allowed
"M0611"	Engine speed extremely high	All functions allowed
"M0613"	Engine speed no signal	Drive disabled
"M0615"	Engine speed shutdown	Engine shutdown

CODE	DESCRIPTION	RESULTS
"M0618"	Engine speed out of range	All functions allowed
"M0710"	Hydraulic fluid temperature high	All functions allowed
"M0711"	Hydraulic fluid temperature extremely high	Drive reduced
"M0715"	Hydraulic fluid temperature shutdown	Drive reduced
"M0810"	Engine coolant temperature high	Engine torque limited
"M0811"	Engine coolant temperature extremely high	Engine torque limited
"M0815"	Engine coolant temperature shutdown	Engine shutdown
"M0826"	Engine coolant temperature pre shutdown	All functions allowed. Not displayed on display screen
"M0909"	Fuel level low	All functions allowed
"M0921"	Fuel level out of range high	All functions allowed
"M0922"	Fuel level out of range low	All functions allowed
"M1009"	Fuel filter pressure low	Engine torque / speed reduced by 25%
"M1014"	Fuel filter pressure extremely low	Engine torque / speed reduced by 60%
"M1021"	Fuel filter pressure out of range high	No engine cranking (starter not controlled)
"M1022"	Fuel filter pressure out of range low	No engine cranking (starter not controlled)
"M1117"	Fuel filter plugged	All functions allowed
"M1119"	Fuel filter extremely plugged	Engine torque / speed reduced by 60%
"M1144"	Fuel filter de-rate level 1	Engine torque / speed reduced by 25%
"M1145"	Fuel filter de-rate level 2	Engine torque / speed reduced by 60%
"M1302"	Fuel pump output error ON	Not allowed to crank the engine until next key cycle
"M1303"	Fuel pump output error OFF	Engine shutdown
"M1402"	Fuel solenoid output error ON	Not allowed to crank the engine until next key cycle
"M1403"	Fuel solenoid output error OFF	Engine shutdown
"M1428"	Fuel solenoid output internal failure	Engine shutdown
"M1502"	Fuel solenoid relay error ON	Not allowed to crank the engine until next key cycle
"M1503"	Fuel solenoid relay error OFF	Engine shutdown
"M1821"	Frame leveling pot out of range high	Frame leveling movement disabled
"M1822"	Frame leveling pot out of range low	Frame leveling movement disabled
"M2101"	Glow plug output error ON	All functions allowed if STB : Glow plugs are always active
"M2103"	Glow plug output error OFF	Glow plug function disabled
"M2202"	Starter output error ON	On ignition, starter is active but engine does not crank
"M2203"	Starter output error OFF	Engine does not crank
"M2207"	Starter output error open circuit	Engine does not crank
"M2405"	Crab valve output short to battery	Drive reduced

CODE	DESCRIPTION	RESULTS
"M2406"	Crab valve output short to ground	All functions allowed excepted crab function
"M2407"	Crab valve output open circuit	All functions allowed excepted crab function
"M2505"	4 wheels valve short to battery	Drive reduced
"M2506"	4 wheels valve short to ground	4 wheels steer mode not available
"M2507"	4 wheels valve open circuit	4 wheels steer mode not available
"M2702"	Fan inverter output error ON	Fan inverter is active
"M2703"	Fan inverter output error OFF	Fan inverter not available
"M2707"	Fan inverter output open circuit	Fan inverter not available
"M2805"	Fan PWM output short to battery	Fan inverter not available
"M2806"	Fan PWM output short to ground	Fan inverter not available
"M2807"	Fan PWM output open circuit	Fan inverter not available
"M2832"	Fan PWM output overcurrent	Fan inverter not available
"M2910"	Engine exhaust gas temperature high	Engine exhaust gas temperature > 750°C (1382°F). Engine torque limited by ECU engine controller from 800°C (1472°F).
"M3128"	Interrupted power failure	Engine shutdown
"M3204"	Workgroup controller no communication	Workgroup functions disabled
"M3404"	Display controller no communication	No information displayed
"M3504"	DCU controller no communication	SCR system disabled. Engine torque limited by ECU engine controller
"M3604"	Engine controller no communication	Engine speed error, drive disabled, engine shutdown if engine controller in failure
"M3704"	Drive controller no communication	Drive functions & Aux functions disabled
"M3905"	Cab buzzer short to battery	Cab buzzer disabled
"M4028"	Wrong mapping of ECU controller detected: engine horse power mismatch	Engine torque limited
"M4109"	Alternator voltage low	All functions allowed
"M4110"	Alternator voltage high	All functions allowed
"M4228"	Wrong mapping of DCU controller detected: horse power mismatch	Engine torque limited
"M4605"	Wait to start lamp output short to battery	Wait to start lamp (orange) disabled
"M4721"	Sensor supply out of range high	Impact on inching function
"M4722"	Sensor supply out of range low	Impact on inching function
"M5005"	Front worklights output short to battery	Front worklights permanently lighted on.
"M5006"	Front worklights output short to ground	Front worklights not available.
"M5007"	Front worklights output open circuit	Front worklights not available.
"M5102"	Rear worklights short to battery or open circuit	If open circuit: rear worklights not available. If stb: rear worklights permanently lighted on.

CODE	DESCRIPTION	RESULTS
"M5103"	Rear worklights output short to ground	Rear worklights not available.
"M5205"	Electronic battery disconnect output open circuit or short to battery	If open circuit: no power supply If STB: electronic battery disconnect always closed: all functions allowed but it could stay closed when the key switch is off.
"M5206"	Electronic battery disconnect output short to ground	No power supply on the machine
"M5207"	Electronic battery disconnect output open circuit	No power supply on the machine
"M5302"	Electronic battery disconnect stuck	Machine always supplied although key switch off
"M5303"	Electronic battery disconnect open error (unstuck)	No power supply on the machine
"M5421"	Hand throttle: analog signal out of range high	Hand throttle disabled
"M5422"	Hand throttle: analog signal out of range low	Hand throttle disabled
"M5428"	Hand throttle in error (redundancy error)	Hand throttle disabled
"M5810"	Fuel temperature high	Fuel temperature is higher than 86°C (187°F) Engine Torque limited by ECU from Fuel temperature > 90°C
"M5811"	Fuel temperature extremely high	Fuel temperature is higher than 88°C (190°F) Engine Torque limited by ECU from Fuel temperature > 90°C
"M5815"	Fuel temperature in shutdown	Fuel temperature is higher than 90°C (194°F). Engine shutdown.
"M6004"	Cab controller no communication	Cab functions disabled
"M6105"	Safety valve short to battery	Workgroup functions disabled
"M6106"	Safety valve short to ground	Workgroup functions disabled
"M6107"	Safety valve open circuit	Workgroup functions disabled
"M6132"	Safety valve overcurrent	Workgroup functions disabled
"M7748"	Multiple key on active (service tool and keyswitch)	Not allowed to crank the engine
"M7815"	Emergency Stop Switch In Shutdown	Not allowed to crank the engine
"M8021"	Throttle pedal analog signal out of range high	Engine speed is set to 1200 rpm (limp home)
"M8022"	Throttle pedal analog signal out of range low	Engine speed is set to 1200 rpm (limp home)
"M8028"	Throttle pedal in error (redundancy error)	Engine speed is set to 1200 rpm (limp home)
"M8450"	REGEN requested but inhibited	
"M8602"	Receiver input error ON	
"M8703"	Attachment run input error OFF	
"M8848"	Selection mode switch multiple	
"M9504"	ACD Keypad No Communication	Keypad functions disabled
"M9604"	Single keypad no communication	Keypad functions disabled
"M9704"	Primary keypad no communication	Primary keypad functions disabled

CODE	DESCRIPTION	RESULTS
"M9804"	Secondary keypad no communication	Keypad functions disabled
"M9999"	Bad constant data table	Gateway function disabled Not able to crank the engine

Service Codes List - Drive Controller

The drive controller is mounted on the inside of the main frame.

CODE	DESCRIPTION	RESULTS
"D0217"	Hydraulic filter plugged	All functions allowed
"D0321"	Battery voltage out of range high	All functions disabled
"D0322"	Battery voltage out of range low	All functions disabled
"D0421"	Inching pedal out of range high	Drive reduced to 20% inching
"D0422"	Inching pedal out of range low	Drive reduced to 20% inching
"D0428"	Inching pedal in error	Drive reduced to 30% inching
"D0605"	Vehicle speed short to battery	No vehicle speed available, gear shift allowed only at neutral
"D0606"	Vehicle speed short to ground	No vehicle speed available, gear shift allowed only at neutral
"D0607"	Vehicle speed open circuit	No vehicle speed available, gear shift allowed only at neutral
"D0611"	Vehicle speed extremely high	Drive disabled then engine shutdown after 10 s
"D0613"	Vehicle speed no signal	No vehicle speed available, gear shift allowed only at neutral
"D0645"	Vehicle speed sensor disagree	Drive reduced
"D0721"	Hydraulic fluid temperature out of range high	All functions allowed
"D0722"	Hydraulic fluid temperature out of range low	All functions allowed
"D0821"	Frame levelling pressure sensor out of range high	All functions allowed
"D0822"	Frame levelling pressure sensor out of range low	All functions allowed
"D0909"	Park brake pressure low	Drive disabled (parking brake is detected applied)
"D0910"	Park brake pressure high	All functions allowed
"D0911"	Park brake pressure extremely high	All functions allowed
"D0921"	Park brake pressure out of range high	All functions allowed
"D0922"	Park brake pressure out of range low	All functions allowed
"D1005"	Passive brake output short to battery	Drive reduced to 30% inching
"D1006"	Passive brake output short to ground	Park brake is applied
"D1007"	Passive brake output open circuit	Park brake is applied
"D1032"	Passive brake output overcurrent	Park brake is applied
"D1128"	Park brake dashboard switch in error	Activation / deactivation of park brake with switch not possible

CODE	DESCRIPTION	RESULTS
"D1145"	Park brake dashboard switch disagree	Activation / deactivation of park brake with switch not possible
"D1207"	Vehicle speed sensor 1 open circuit	Drive reduced
"D1221"	Vehicle speed sensor 1 out of range high	Drive reduced
"D1222"	Vehicle speed sensor 1 out of range low	Drive reduced
"D1307"	Vehicle speed sensor 2 open circuit	Drive reduced
"D1321"	Vehicle speed sensor 2 out of range high	Drive reduced
"D1322"	Vehicle speed sensor 2 out of range low	Drive reduced
"D1402"	Brake light output error on	All functions allowed
"D1403"	Brake light output error off	All functions allowed
"D1407"	Brake light output open circuit	All functions allowed
"D1433"	Brake light output internal failure	All functions allowed
"D1502"	Brake light relay error on	All functions allowed
"D1503"	Brake light relay error off	All functions allowed
"D1605"	Drive pump forward coil short to battery	Drive disabled
"D1606"	Drive pump forward coil short to ground	Forward disabled
"D1607"	Drive pump forward coil open circuit	Forward disabled
"D1632"	Drive pump forward coil overcurrent	Drive disabled
"D1705"	Drive pump reverse coil short to battery	Drive disabled
"D1706"	Drive pump reverse coil short to ground	Reverse disabled
"D1707"	Drive pump reverse coil open circuit	Reverse disabled
"D1732"	Drive pump reverse coil overcurrent	Drive disabled
"D2002"	Low speed output (hydraulic motor) error on	Drive reduced to 30% inching
"D2003"	Low speed output (hydraulic motor) error off	Drive reduced to 30% inching
"D2007"	Low speed output (hydraulic motor) open circuit	Drive reduced to 30% inching
"D2033"	Low speed output (hydraulic motor) controller internal failure	Drive reduced to 30% inching
"D2102"	Low speed relay error on	Drive reduced to 30% inching
"D2103"	Low speed relay error off	Drive reduced to 30% inching
"D2202"	Defeat valve output (hydraulic motor) error on	All functions allowed
"D2203"	Defeat valve output (hydraulic motor) error off	All functions allowed
"D2207"	Defeat valve output (hydraulic motor) open circuit	All functions allowed
"D2233"	Defeat valve output controller internal failure	All functions allowed
"D2302"	Defeat valve relay error on	All functions allowed
"D2303"	Defeat valve relay error off	All functions allowed

CODE	DESCRIPTION	RESULTS
"D2405"	Drive motor solenoid short to battery	Drive reduced
"D2406"	Drive motor solenoid short to ground	Drive reduced
"D2407"	Drive motor solenoid open circuit	Drive reduced
"D2432"	Drive motor solenoid overcurrent	Drive reduced
"D2502"	Left stabiliser on the floor error ON	All functions allowed
"D2503"	Left stabiliser on the floor error OFF	All functions allowed
"D2609"	Hydraulic steering pressure low	All functions allowed
"D2621"	Hydraulic steering pressure out of range high	All functions allowed
"D2702"	Right stabiliser on the floor error ON	All functions allowed
"D2703"	Right stabiliser on the floor error OFF	All functions allowed
"D2821"	Left stabiliser pressure sensor out of range high	All functions allowed
"D2822"	Left stabiliser pressure sensor out of range low	All functions allowed
"D2921"	Right stabiliser pressure sensor out of range high	All functions allowed
"D2922"	Right stabiliser pressure sensor out of range low	All functions allowed
"D3005"	Stabilisers right output short to battery	Auxiliary / Power quick-tach / Stabilisers / Frame Levelling disable
"D3006"	Stabilisers right output short to ground	All functions allowed
"D3007"	Stabilisers right output open circuit	All functions allowed
"D3024"	Stabilisers right output not in neutral	Auxiliary / Power quick-tach / Stabilisers / Frame Levelling disable
"D3105"	Stabilisers left output short to battery	Auxiliary / Power quick-tach / Stabilisers / Frame Levelling disable
"D3106"	Stabilisers left output short to ground	All functions allowed
"D3107"	Stabilisers left output open circuit	All functions allowed
"D3124"	Stabilisers left output not in neutral	Auxiliary / Power quick-tach / Stabilisers / Frame Levelling disable
"D3204"	Workgroup controller no communication	Aux disabled
"D3304"	Gateway controller no communication	All functions disabled
"D3404"	Display controller no communication	All functions disabled
"D3604"	Engine controller no communication	Drive disabled
"D3723"	Programming or constant data invalid	Drive disabled
"D3728"	Controller failure	Drive disabled
"D3796"	Interrupted power	All functions allowed
"D3797"	Controller programmed	All functions allowed
"D3821"	Drive forward pressure out of range high	Drive reduced
"D3822"	Drive forward pressure out of range low	Drive reduced

CODE	DESCRIPTION	RESULTS
"D3828"	Drive forward pressure in error	Drive reduced
"D3899"	Drive pressure sensor calibration needed	Drive reduced
"D3921"	Drive reverse pressure out of range high	Drive reduced
"D3922"	Drive reverse pressure out of range low	Drive reduced
"D3928"	Drive reverse pressure in error	Drive reduced
"D4004"	Joystick no communication	Drive disabled / boom movement disabled
"D4011"	Joystick right roller out of NEUTRAL (auxiliary)	Aux disabled
"D4028"	Joystick grip fault	Drive disabled / boom movement disabled
"D4113"	FNR lever no signal	Drive disabled
"D4128"	FNR multiple inputs active	Drive disabled
"D4228"	Boom Suspension/Float Switch On	Boom Suspension and Float disabled
"D4402"	Power Quicktach output Error On	Power Quicktach function not available
"D4403"	Power Quicktach output Error Off	Power Quicktach function not available
"D4407"	Power Quicktach Output Open circuit	Power Quicktach disabled
"D4502"	Power Quicktach Relay feedback Error On	Quicktach disabled
"D4503"	Power Quicktach Relay feedback Error On	Quicktach disabled
"D4528"	Power Quicktach Switch in error	Quicktach disabled
"D4621"	Voltage sensor 5 V out of range high	All functions disabled
"D4622"	Voltage sensor 5 V out of range low	All functions disabled
"D4705"	Frame levelling output short to battery	Auxiliary / Power quick-tach / Stabilisers / Frame Levelling disable
"D4706"	Frame levelling output short to ground	All functions allowed
"D4707"	Frame levelling output open circuit	All functions allowed
"D4724"	Frame levelling output not in neutral	Auxiliary / Power quick-tach / Stabilisers / Frame Levelling disable
"D4802"	Park brake reserve pressure valve output error on	All functions allowed
"D4803"	Park brake reserve pressure valve output error off	All functions allowed
"D4807"	Park brake reserve pressure valve output open circuit	All functions allowed
"D4902"	Park brake reserve pressure valve relay feedback error on	All functions allowed
"D4903"	Park brake reserve pressure valve relay feedback error off	All functions allowed
"D5002"	Redundancy park brake output error on	Park brake cannot be applied if it has been released
"D5003"	Redundancy park brake output error off	All functions allowed
"D5007"	Redundancy park brake output open circuit	All functions allowed
"D5033"	Redundancy park brake output internal failure	All functions allowed

CODE	DESCRIPTION	RESULTS
"D5102"	Redundancy park brake relay error on	Park brake cannot be applied if it has been released
"D5103"	Redundancy park brake relay error off	All functions allowed
"D5421"	Auxiliary spool sensor out of range high	Auxiliary / Power Quick-tach / Stabilisers / Frame levelling disable
"D5422"	Auxiliary spool sensor out of range low	Auxiliary / Power Quick-tach / Stabilisers / Frame levelling disable
"D5424"	Auxiliary spool sensor not in neutral	Auxiliary / Power Quick-tach / Stabilisers / Frame levelling disable
"D5425"	Auxiliary spool sensor unresponsive	Auxiliary / Power Quick-tach / Stabilisers / Frame levelling disable
"D5521"	Swash plate sensor1 out of range high	Drive reduced
"D5522"	Swash plate sensor1 out of range low	Drive reduced
"D5621"	Swash plate sensor2 out of range high	Drive reduced
"D5622"	Swash plate sensor2 out of range low	Drive reduced
"D5715"	Swash plate shutdown	Engine shutdown
"D5724"	Swash plate not in neutral	Engine cranking disabled
"D5725"	Swash plate unresponsive	Drive disabled
"D5726"	Swash plate commanded position not reachable	Drive disabled
"D5744"	Swash plate dual fault	Drive reduced
"D5745"	Swash plate disagree	Drive reduced
"D5746"	Swash plate unresponsive	Drive disabled
"D5786"	Swash plate safe stop failure	Electrical park brake is applied automatically to stop the machine.
"D5815"	Safe start shutdown	Engine shutdown
"D5824"	Safe start swash out of neutral	Drive disabled
"D6202"	Creep light error on	All functions allowed
"D6203"	Creep light error off	All functions allowed
"D6302"	Creep switch error on	All functions allowed
"D6421"	Voltage sensor 10V out of range high	All functions disabled
"D6422"	Voltage sensor 10V out of range low	All functions disabled
"D6505"	Gear 1 (gearbox) short to battery	Drive disabled
"D6506"	Gear 1 (gearbox) short to ground	Drive disabled
"D6507"	Gear 1 (gearbox) open circuit	Drive disabled
"D6605"	Gear 2 (gearbox) short to battery	Drive disabled
"D6606"	Gear 2 (gearbox) short to ground	Drive disabled
"D6607"	Gear 2 (gearbox) open circuit	Drive disabled
"D6702"	Gearshift sensor error on	All functions allowed

CODE	DESCRIPTION	RESULTS
"D6760"	Gearshift sensor - shift didn't start / no shift	Autoshift disabled
"D6761"	Gearshift sensor - shift too long / locked	Drive disabled
"D6824"	Frame levelling switch not in neutral	Frame levelling and stabilisers disabled
"D6902"	Gear switch 1/2 error on (dashboard)	All functions allowed
"D7002"	High/low speed switch error on (left lever)	All functions allowed
"D7209"	Service brake pressure low	Emergency brake enabled
"D7210"	Service brake pressure high	All functions allowed
"D7214"	Service brake pressure extremely low	All functions allowed
"D7221"	Service brake pressure out of range high	All functions allowed
"D7222"	Service brake pressure out of range low	All functions allowed
"D7309"	Service brake reserve pressure low	All functions allowed
"D7310"	Service brake reserve pressure high	All functions allowed
"D7321"	Service brake reserve pressure out of range high	All functions allowed
"D7322"	Service brake reserve pressure out of range low	All functions allowed
"D7428"	Boom Suspension Error	Boom Suspension disabled
"D7509"	Park brake reserve pressure low	All functions allowed
"D7605"	Aux female output short to battery	Auxiliary disabled
"D7606"	Aux female output short to ground	Auxiliary disabled
"D7607"	Aux female output open circuit	Auxiliary disabled
"D7632"	Aux female output overcurrent	Auxiliary disabled
"D7705"	Aux male output short to battery	Auxiliary disabled
"D7706"	Aux male output short to ground	Auxiliary disabled
"D7707"	Aux male output open circuit	Auxiliary disabled
"D7732"	Aux male output overcurrent	Auxiliary disabled
"D7802"	DEF tank elec fan relay error ON	
"D7803"	SCR elec fan relay error OFF	
"D7902"	ACD switches error ON	Aux disabled
"D8110"	LS pump pressure high	All functions allowed
"D8121"	LS pump pressure out of range high	All main valve movements allowed at reduced speed.
"D8122"	LS pump pressure out of range low	All main valve movements allowed at reduced speed.
"D8202"	Boom suspension valve error ON	All boom movements disabled
"D8203"	Boom suspension valve error OFF	Boom suspension disabled

CODE	DESCRIPTION	RESULTS
"D8205"	Boom Suspension Output Short To Battery	All Boom movements disabled Boom Suspension disabled
"D8206"	Boom Suspension Output Short To Ground	Boom Suspension disabled
"D8207"	Boom suspension open circuit	Boom suspension disabled
"D8232"	Boom suspension overcurrent	Boom suspension disabled
"D8302"	Stabilisers ON/OFF output valve error ON	All functions allowed
"D8303"	Stabilisers ON/OFF output valve error OFF	Stabilisers control not available
"D8307"	Stabilisers ON/OFF output open circuit	Stabilisers control not available
"D8402"	Stabilisers ON/OFF relay feedback error ON	All functions allowed
"D8403"	Stabilisers ON/OFF relay feedback error OFF	Stabilisers control not available
"D8505"	Stabilisers left UP output short to battery	Stabilisers control not available
"D8506"	Stabilisers left UP output short to ground	Stabilisers control not available
"D8507"	Stabilisers left UP output open circuit	Stabilisers control not available
"D8605"	Stabilisers left DOWN output short to battery	Stabilisers control not available
"D8606"	Stabilisers left DOWN output short to ground	Stabilisers control not available
"D8607"	Stabilisers left DOWN output open circuit	Stabilisers control not available
"D8705"	Stabilisers right UP output short to battery	Stabilisers control not available
"D8706"	Stabilisers right UP output short to ground	Stabilisers control not available
"D8707"	Stabilisers right UP output open circuit	Stabilisers control not available
"D8805"	Stabilisers right DOWN output short to battery	Stabilisers control not available
"D8806"	Stabilisers right DOWN output short to ground	Stabilisers control not available
"D8807"	Stabilisers right DOWN output open circuit	Stabilisers control not available
"D8902"	Stabilisers active switch error ON	Stabilisers control not available
"D9099"	Drive calibration required, minimum current + swash plate calibration	All functions allowed
"D9199"	Swash plate neutral range calibration required (drive pump)	All functions allowed
"D9299"	Swash plate maximal range calibration required (drive pump)	All functions allowed
"D9302"	Trailer brake supplementary line output error on	Trailer park brake is released and corresponding coupler cannot be unplugged
"D9303"	Trailer brake supplementary line output error off	Trailer park brake is applied
"D9307"	Trailer brake supplementary line output open circuit	Trailer park brake is applied
"D9333"	Trailer brake supplementary line output internal failure	Trailer park brake is derate
"D9402"	Trailer brake supplementary line relay error on	Trailer park brake is released and corresponding coupler cannot be unplugged

CODE	DESCRIPTION	RESULTS
"D9403"	Trailer brake supplementary line relay error off	Trailer park brake is applied
"D9509"	Trailer brake reserve pressure low	All functions allowed
"D9605"	Redundancy park brake output, short to battery	Park brake cannot be applied if it has been released
"D9606"	Redundancy park brake output, short to ground	All functions allowed
"D9607"	Redundancy park brake output open circuit	All functions allowed
"D9702"	Boom Drain Output Error ON	Workgroup disabled Boom Suspension & Float disabled
"D9703"	Boom Drain Output Error OFF	Boom Suspension & Float disabled
"D9707"	Boom Drain Output Error Open Circuit	Boom Suspension & Float disabled
"D9733"	Boom Drain Output Internal Failure	Boom Suspension & Float disabled
"D9802"	Boom Drain Relay Feedback Output Error ON	Workgroup disabled Boom Suspension & Float disabled
"D9803"	Boom Drain Relay Feedback Output Error OFF	Boom Suspension & Float disabled
"D9999"	Bad constant data table	Not applicable

Service Codes List - Workgroup Controller

The workgroup controller is located in the rear frame, left of the boom.

CODE	DESCRIPTION	RESULTS
"W0321"	Battery voltage out of range high	Workgroup disabled
"W0322"	Battery voltage out of range low	Workgroup disabled
"W0721"	Hydraulic fluid temperature out of range high	All functions allowed
"W0722"	Hydraulic fluid temperature out of range low	All functions allowed
"W1005"	PVG32 Lift Up/Down valve short to battery	Boom lifting and lowering disabled
"W1006"	PVG32 Lift Up/Down valve short to ground	Boom lifting and lowering disabled
"W1007"	PVG32 Lift Up/Down valve open circuit	Boom lifting and lowering disabled
"W1028"	PVG32 Lift Up/Down valve in error, from main valve diagnostic	Boom lifting and lowering disabled
"W1105"	PVG32 Tilt valve short to battery	Tilt disabled
"W1106"	PVG32 Tilt valve short to ground	Tilt disabled
"W1107"	PVG32 Tilt valve open circuit	Tilt disabled
"W1128"	PVG32 Tilt valve in error, from main valve diagnostic	Tilt disabled
"W1205"	PVG32 Extend/Retract valve short to battery	Boom extend and retract disabled
"W1206"	PVG32 Extend/Retract valve short to ground	Boom extend and retract disabled
"W1207"	PVG32 Extend/Retract valve open circuit	Boom extend and retract disabled

CODE	DESCRIPTION	RESULTS
"W1228"	PVG32 Extend/Retract valve in error, from main valve diagnostic	Boom extend and retract disabled
"W1305"	PVG32 Auxiliary valve short to battery	Auxiliary disabled
"W1306"	PVG32 Auxiliary valve short to ground	Auxiliary disabled
"W1307"	PVG32 Auxiliary valve open circuit	Auxiliary disabled
"W1328"	PVG32 Auxiliary valve in error, from main valve diagnostic	Auxiliary disabled
"W1405"	PVG32 Frame Levelling valve short to battery	Frame levelling movement disabled
"W1406"	PVG32 Frame Levelling valve short to ground	Frame levelling movement disabled
"W1407"	PVG32 Frame Levelling valve open circuit	Frame levelling movement disabled
"W1428"	PVG32 Frame Levelling valve in error, from main valve diagnostic	Frame levelling movement disabled
"W1824"	Frame Levelling potentiometer out of neutral	Frame levelling movement disabled
"W2205"	Lift up output short to battery	Lift Up disabled
"W2206"	Lift up output short to ground	Lift Up disabled
"W2207"	Lift up output open circuit	Lift Up disabled
"W2232"	Lift up output overcurrent	Lift Up disabled
"W2299"	Lift Up Coil Calibration required	All functions allowed
"W2305"	Lift down output short to battery	Lift Down disabled
"W2306"	Lift down output short to ground	Lift Down disabled
"W2307"	Lift down output open circuit	Lift Down disabled
"W2332"	Lift down output overcurrent	Lift Down disabled
"W2399"	Lift Down Coil Calibration required	All functions allowed
"W2405"	Tilt out output short to battery	Tilt out disabled
"W2406"	Tilt out output short to ground	Tilt out disabled
"W2407"	Tilt out output open circuit	Tilt out disabled
"W2432"	Tilt out output overcurrent	Tilt out disabled
"W2505"	Tilt back output short to battery	Tilt back disabled
"W2506"	Tilt back output short to ground	Tilt back disabled
"W2507"	Tilt back output open circuit	Tilt back disabled
"W2532"	Tilt back output overcurrent	Tilt back disabled
"W2605"	Extend output short to battery	Extend disabled
"W2606"	Extend output short to ground	Extend disabled
"W2607"	Extend output open circuit	Extend disabled
"W2632"	Extend output overcurrent	Extend disabled

CODE	DESCRIPTION	RESULTS
"W2705"	Retract output short to battery	Retract disabled
"W2706"	Retract output short to ground	Retract disabled
"W2707"	Retract output open circuit	Retract disabled
"W2732"	Retract output overcurrent	Retract disabled
"W2821"	Extend Sensor Out Of Range High	Extend and Retract disabled
"W2822"	Extend Sensor Out Of Range Low	Extend and Retract disabled
"W2824"	Extend Sensor Not in Neutral	Extend and Retract disabled
"W2825"	Extend Sensor Unresponsive	All functions allowed
"W2921"	Tilt Pressure Sensor Out Of Range High	Power Bobtach Unlock function disabled
"W2922"	Tilt Pressure Sensor Out Of Range Low	Power Bobtach Unlock function disabled
"W2928"	Tilt Pressure Sensor In Error	Power Bobtach Unlock function disabled
"W3223"	Programming or constant data invalid	Workgroup disabled
"W3228"	Controller failure	Workgroup disabled
"W3296"	Interrupted power	All functions allowed
"W3297"	Controller programmed	All functions allowed
"W3304"	Gateway controller no communication	Workgroup disabled
"W3404"	Display controller no communication	Workgroup disabled
"W3604"	Engine controller no communication	All functions allowed
"W3704"	Drive controller no communication	Auxiliary disabled
"W3804"	LLMC no communication	Workgroup reduced
"W3818"	LLMC out of range	Workgroup reduced
"W3844"	LLMC not matching	Workgroup reduced
"W3845"	LLMC not matching level 2	Aggravating movements disabled
"W3904"	LLMI no communication	Workgroup reduced
"W3918"	LLMI out of range	Workgroup reduced
"W4004"	Joystick no communication	Workgroup disabled
"W4005"	Joystick X axis out of NEUTRAL (tilt)	Tilt disabled
"W4007"	Joystick Y axis out of NEUTRAL (lift)	Lift disabled
"W4010"	Joystick left roller out of NEUTRAL (extend retract)	Extend and retract disabled
"W4028"	Joystick grip fault	Extend and retract disabled
"W4204"	Receiver No Communication	Manbasket mode error Orange LED on transmitter will flash fast. 3 beeps every 10 seconds at transmitter.
"W4205"	Remote Left Joystick X Axis OON	Manbasket mode error Orange LED on transmitter will flash fast. 3 beeps every 10 seconds at transmitter.

CODE	DESCRIPTION	RESULTS
"W4206"	Remote Right Joystick X Axis OON	Manbasket mode error Orange LED on transmitter will flash fast. 3 beeps every 10 seconds at transmitter.
"W4207"	Remote Left Joystick Y Axis OON	Manbasket mode error Orange LED on transmitter will flash fast. 3 beeps every 10 seconds at transmitter.
"W4208"	Remote Right Joystick Y Axis OON	Manbasket mode error Orange LED on transmitter will flash fast. 3 beeps every 10 seconds at transmitter.
"W4215"	Remote Left Joystick X axis in error	Manbasket mode error Orange LED on transmitter will flash fast. 3 beeps every 10 seconds at transmitter.
"W4216"	Remote Right Joystick X axis in error	Manbasket mode error Orange LED on transmitter will flash fast. 3 beeps every 10 seconds at transmitter.
"W4217"	Remote Left Joystick Y axis in error	Manbasket mode error Orange LED on transmitter will flash fast. 3 beeps every 10 seconds at transmitter.
"W4218"	Remote Right Joystick Y axis in error	Manbasket mode error Orange LED on transmitter will flash fast. 3 beeps every 10 seconds at transmitter.
"W4320"	Manbasket mode : Remote control not connected to manbasket harness (from receiver CAN bus signal)	Manbasket mode error Orange LED on transmitter will flash fast. 3 beeps every 10 seconds at transmitter. With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4321"	Manbasket mode : Remote control not connected to Manbasket harness (from GACD controller status)	Manbasket mode error Orange LED on transmitter will flash fast. 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4325"	Manbasket mode : Manbasket detection in error	Manbasket mode error Orange LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4326"	Manbasket mode : Manbasket not detected on carriage	Manbasket mode error Orange LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4327"	Manbasket mode : Manbasket not detected on carriage with GACD on or Remote control active	Manbasket mode error Orange LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor

CODE	DESCRIPTION	RESULTS
"W4330"	Manbasket mode : Manbasket Retract switch in error	Manbasket mode error Orange LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4331"	Manbasket mode : No boom extension when expected (boom retract switch ON)	Manbasket mode error Orange LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4335"	Manbasket mode : Stabilisers in error	Manbasket mode error Orange LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4336"	Manbasket mode : Stabilisers not on the ground	Manbasket mode error Orange LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4340"	Manbasket mode : Boom angle in error	Manbasket mode error Orange LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4341"	Manbasket mode : Boom lift movement when not expected	All workgroup movements disabled. Safety valve turned off. Manbasket mode error orange LED on transmitter will flash slowly 3 beeps every 10 seconds at transmitter.
"W4342"	Manbasket mode : No Boom lift movement when expected	Manbasket mode error Orange LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4343"	Manbasket mode : Boom angle limit exceeded	Manbasket mode error Orange LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter
"W4345"	Manbasket mode : LLM in error	LLM Red LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4346"	Manbasket mode : LLM in reduced zone	LLM Red LED on transmitter will flash slowly 3 beeps every 10 seconds at transmitter Max speed of aggravating movements is reduced.

CODE	DESCRIPTION	RESULTS
"W4347"	Manbasket mode : Longitudinal stability : Max allowed value reached.	LLM Red LED on transmitter will be steady on. Continuous beep at transmitter All aggravating movements are stopped
"W4350"	Manbasket mode : Frame Levelling in error	Manbasket mode error Orange LED on transmitter will flash slowly 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4351"	Manbasket mode : Frame Levelling angle exceeded (out of the range $[-2^\circ; +2^\circ]$)	Manbasket mode error Orange LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter Error code W4351 is displayed at Cab display LCD screen General warning icon is steady on at Cab display Recoverable when all transmitter joysticks are at neutral. Boom lifting = not allowed Boom extend = not allowed Frame levelling = not allowed on aggravating side
"W4355"	Manbasket mode : Interlocking pin in error	Locking Red LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4356"	Manbasket mode : Interlocking pin unlocked	Locking Red LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4360"	Manbasket mode : Manbasket Overload in error	Manbasket mode error LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4361"	Manbasket mode : Manbasket Overload	Manbasket Overload LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter All Workgroup movements are disabled
"W4362"	Manbasket mode : Manbasket Overload in error Level 2	Manbasket mode error LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter
"W4365"	Manbasket mode : Tilt angle in error	Manbasket mode error Orange LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4366"	Manbasket mode : Tilt angle limit exceeded (out of the range $[-4^\circ ; +4^\circ]$)	Manbasket mode error Orange LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter All movements disabled excepted : Tilt in (when boom lifting or lowering request) if tilt angle $> +4^\circ$ Tilt out (when boom lifting or lowering request) if tilt angle $< -4^\circ$

CODE	DESCRIPTION	RESULTS
"W4370"	Manbasket mode : FNR in error	Manbasket mode error Orange LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4371"	Manbasket mode : Park brake in error	Manbasket mode error Orange LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4372"	Manbasket mode : Swash plate position in error	Manbasket mode error Orange LED on transmitter will flash slowly. 3 beeps every 10 seconds at transmitter With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4404"	Manbasket mode : GACD controller no communication on CAN Bus	Manbasket mode error Orange LED on transmitter will flash fast. 3 beeps every 10 seconds at transmitter. With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W4621"	Vsensor 5 V supply out of range high	Workgroup disabled
"W4622"	Vsensor 5 V supply out of range low	Workgroup disabled
"W4902"	Blue lights output short to battery or open circuit	If STB: Blue Lights permanently lighted on if OC: Blue Lights disabled
"W4903"	Blue lights output short to ground	Blue lights not available
"W5005"	Rear diverter 1 output short to battery	Auxiliary disabled
"W5006"	Rear diverter 1 output short to ground	Auxiliary disabled
"W5007"	Rear diverter 1 output open circuit	Auxiliary disabled
"W5102"	Rear diverter 2 output Error ON	Auxiliary disabled
"W5103"	Rear diverter 2 output Error OFF	Auxiliary disabled
"W5107"	Rear diverter 2 output Open Circuit	Auxiliary disabled
"W5202"	Rear diverter 2 output Relay Feedback Error ON	Auxiliary disabled
"W5203"	Rear diverter 2 output Relay Feedback Error OFF	Auxiliary disabled
"W5302"	Front / Rear diverter sensor Error ON	Auxiliary disabled
"W5302"	Front / Rear diverter sensor Error ON	Auxiliary disabled
"W5303"	Front / Rear diverter sensor Error OFF	Auxiliary disabled
"W5303"	Front / Rear diverter sensor Error OFF	Auxiliary disabled
"W5402"	Boom worklights output short to battery or open circuit	If STB: Boom Worklights permanently lighted on if OC: Boom Worklights disabled

CODE	DESCRIPTION	RESULTS
"W5403"	Boom worklights output short to ground	Boom Worklights not available
"W5502"	Mirror worklights output short to battery or open circuit	If STB: Mirror Worklights permanently lighted on if OC: Mirror Worklights disabled
"W5503"	Mirror worklights output short to ground	Mirror Worklights not available
"W5602"	Mirror defrost output short to battery or open circuit	If STB: Mirror Defrost permanently lighted on if OC: Mirror Defrost disabled
"W5603"	Mirror defrost output short to ground	Mirror Defrost not available
"W6021"	Inclinometer sensor input Out of Range High	All functions allowed
"W6022"	Inclinometer sensor input Out of Range Low	All functions allowed
"W6098"	Calibration performed	All functions allowed
"W6099"	Inclinometer Calibration required	All functions allowed
"W6102"	Inclinometer lamp error ON	All functions allowed
"W6103"	Inclinometer lamp error OFF	All functions allowed
"W6521"	Boom angle 1 out of range high	All functions allowed
"W6522"	Boom angle 1 out of range low	All functions allowed
"W6621"	Boom angle 2 out of range high	All functions allowed
"W6622"	Boom angle 2 out of range low	All functions allowed
"W6744"	Boom angle in error	All functions allowed
"W6798"	Boom angle calibration performed	All functions allowed
"W6799"	Boom angle calibration required	All functions allowed
"W6802"	Boom retract switch short to battery	All functions allowed
"W6803"	Boom retract switch short to ground or open circuit	All functions allowed
"W6902"	Boom retract switch 2 Short to Battery	Cushion retract disabled
"W6903"	Boom retract switch 2 Short to Ground or Open Circuit	Cushion retract disabled
"W6928"	Boom retract switch 2 In Error	Cushion retract disabled
"W7002"	Boom drain output error ON	Workgroup disabled. Boom suspension disabled.
"W7003"	Boom drain output error OFF	Boom suspension disabled
"W7007"	Boom drain output error open circuit	Boom suspension disabled
"W7033"	Boom drain output internal failure	Boom suspension disabled
"W7102"	Boom drain relay feedback output error ON	Workgroup disabled Boom suspension disabled
"W7103"	Boom drain relay feedback output error OFF	Boom suspension disabled
"W7428"	Boom suspension error	Boom suspension disabled
"W7528"	Boom suspension/float switch ON	Boom suspension or boom float disabled
"W7602"	Boom suspension icon error ON	All functions allowed
"W7603"	Boom suspension icon error OFF	All functions allowed

CODE	DESCRIPTION	RESULTS
"W7705"	Boom float output short o battery	Boom float disabled
"W7706"	Boom float output short to ground	Boom float disabled
"W7707"	Boom float output open circuit	Boom float disabled
"W8002"	Power Quicktach output error ON	Power Quicktach function not available
"W8003"	Power Quicktach output error OFF	Power Quicktach function not available
"W8005"	Power Quicktach output short to battery	Power Quicktach disabled
"W8006"	Power Quicktach output short to ground	Power Quicktach disabled
"W8007"	Power Quicktach output open circuit	Power Quicktach disabled
"W8128"	Power Quicktach switch in error	Quicktach disabled
"W8202"	Power Quicktach Relay feedback error ON	Quicktach disabled
"W8203"	Power Quicktach relay feedback error OFF	Quicktach disabled
"W8302"	Electromagnet output error ON	RC Engine Speed control function not available
"W8303"	Electromagnet output error OFF	RC Engine Speed control function not available
"W8307"	Electromagnet output open circuit	RC Engine Speed control function not available
"W8402"	Electromagnet relay feedback error ON	RC Engine Speed control function not available
"W8403"	Electromagnet relay feedback error OFF	RC Engine Speed control function not available
"W8502"	Manplatform detection switch short to battery	Manbasket mode error Orange LED on transmitter will flash slowly 3 beeps every 10 seconds at transmitter Error code displayed at Cab LCD screen With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W8503"	Manplatform detection switch short to ground or open circuit	Manbasket mode error Orange LED on transmitter will flash slowly 3 beeps every 10 seconds at transmitter Error code displayed at Cab LCD screen With Boom Angle $\leq 0^\circ$: No possibility to crank the engine from Manplatform With Boom Angle $> 0^\circ$ with MB mode active : Allowed movements are those that will help the operator to reach the floor
"W8611"	Winch overloaded	Winch flashing on the LCD screen for 5s Boom Up, Extend, Tilt In and Aux- (hook up) are disabled
"W8628"	Winch inputs in error	Winch considered overloaded
"W8702"	Power Quicktach boom output error ON	Quicktach disabled
"W8703"	Power Quicktach boom output error OFF	Quicktach disabled
"W8707"	Power Quicktach boom output open circuit	Quicktach disabled
"W8802"	Power Quicktach boom relay feedback error ON	Quicktach disabled
"W8803"	Power Quicktach boom relay feedback error OFF	Quicktach disabled
"W8902"	Power lift output error ON	Boom lifting and lowering reduced
"W8903"	Power lift output error OFF	Boom lifting and lowering reduced

CODE	DESCRIPTION	RESULTS
"W8907"	Power lift output error open circuit	Boom lifting and lowering reduced
"W9002"	Power lift relay error OFF	Boom lifting and lowering reduced
"W9003"	Workgroup controller bad table	Not applicable
"W9999"	Power Quicktach output error OFF	Power Quicktach function not available

Service Codes List - Auxiliary Controller

CODE	DESCRIPTION	RESULTS
"H0321"	Battery voltage out of range high	Auxiliary disabled
"H0322"	Battery voltage out of range low	Auxiliary disabled
"H1005"	Rear diverter 1 output short to battery	Auxiliary disabled
"H1006"	Rear diverter 1 output short to ground	Auxiliary disabled
"H1007"	Rear diverter 1 output open circuit	Auxiliary disabled
"H1102"	Rear diverter 2 output error on	Auxiliary disabled
"H1103"	Rear diverter 2 output error off	Auxiliary disabled
"H1107"	Rear diverter 2 output open circuit	Auxiliary disabled
"H1202"	Rear diverter 2 output relay feedback error on	Auxiliary disabled
"H1203"	Rear diverter 2 output relay feedback error off	Auxiliary disabled
"H1302"	Front / rear diverter sensor error on	Auxiliary disabled
"H1303"	Front / rear diverter sensor error off	Auxiliary disabled
"H2005"	Rear auxiliary / hook UP valve short to battery	Rear auxiliary / hook function disabled
"H2006"	Rear auxiliary / hook UP valve short to ground	Rear auxiliary / hook function disabled
"H2007"	Rear auxiliary / hook UP valve open circuit	Rear auxiliary / hook function disabled
"H2105"	Rear auxiliary / hook DOWN valve short to battery	Rear auxiliary / hook function disabled
"H2106"	Rear auxiliary / hook DOWN valve short to ground	Rear auxiliary / hook function disabled
"H2107"	Rear auxiliary / hook DOWN valve open circuit	Rear auxiliary / hook function disabled
"H2205"	Rear auxiliary / hook ACTIVATION valve short to battery	Rear auxiliary / hook function disabled
"H2206"	Rear auxiliary / hook ACTIVATION valve short to ground	Rear auxiliary / hook function disabled
"H2207"	Rear auxiliary / hook ACTIVATION valve open circuit	Rear auxiliary / hook function disabled
"H2232"	Rear auxiliary / hook ACTIVATION valve overcurrent	Rear auxiliary / hook function disabled
"H2328"	Rear auxiliary / hook dashboard switch in error	Rear auxiliary / hook function disabled
"H3204"	Workgroup controller no communication	Boom float and boom suspension disabled
"H3304"	Gateway controller no communication	All functions disabled

CODE	DESCRIPTION	RESULTS
"H3404"	Display controller no communication	All functions disabled
"H3523"	Programming or constant data invalid	Workgroup disabled
"H3528"	Controller failure	Workgroup disabled
"H3596"	Interrupted power	All functions allowed
"H3597"	Controller programmed	All functions allowed
"H3604"	Engine controller no communication	All functions allowed
"H3704"	Drive controller no communication	Auxiliary disabled
"H4004"	Joystick no communication	Workgroup disabled
"H4621"	Voltage sensor 5 V supply out of range high	Workgroup disabled
"H4622"	Voltage sensor 5 V supply out of range low	Workgroup disabled
"H7002"	Boom drain output error ON	Workgroup and boom suspension disabled
"H7003"	Boom drain output error OFF	Boom suspension disabled
"H7007"	Boom drain output error open circuit	Boom suspension disabled
"H7033"	Boom drain output internal failure	Boom suspension disabled
"H7102"	Boom drain relay feedback output error ON	Workgroup and boom suspension disabled
"H7103"	Boom drain relay feedback output error OFF	Boom suspension disabled
"H7205"	Boom suspension output short to battery	All boom movements and boom suspension disabled
"H7206"	Boom suspension output short to ground	Boom suspension disabled
"H7207"	Boom suspension output open circuit	Boom suspension disabled
"H7232"	Boom suspension output overcurrent	Boom suspension disabled
"H7233"	Boom suspension output internal failure	Boom suspension disabled
"H7428"	Boom suspension error	Boom suspension disabled
"H7528"	Boom suspension switch ON	Boom suspension disabled
"H7602"	Boom suspension icon error ON	All functions allowed
"H7603"	Boom suspension icon error OFF	All functions allowed
"H7705"	Boom float output short to battery	Boom float and boom suspension disabled
"H7706"	Boom float output short to ground	Boom float disabled
"H7707"	Boom float open circuit	Boom float disabled
"H7732"	Boom float overcurrent	Boom float disabled
"H9999"	Auxiliary controller bad table	Not applicable

Service Codes List - LLMI controller

CODE	DESCRIPTION	RESULTS
"I0000"	Last Calibration Successfully Performed	Only stored (not displayed)
"I0100"	Calibration Test: Zero Calibration Valid	Only stored (not displayed)

CODE	DESCRIPTION	RESULTS
"I0101"	Calibration Test: Button Fault	Only stored (not displayed)
"I0102"	Calibration Test: LLMI Zero Calibration Deviation Fault	Only stored (not displayed)
"I0103"	Calibration Test: LLMI Zero Calibration Deviation Fault AND Button Fault	Only stored (not displayed)
"I0104"	Calibration Test: LLMC Zero Calibration Deviation Fault	Only stored (not displayed)
"I0105"	Calibration Test: LLMC Zero Calibration Deviation Fault AND Button Fault	Only stored (not displayed)
"I0106"	Calibration Test: LLMI AND LLMC Zero Calibration Deviation Fault	Only stored (not displayed)
"I0107"	Calibration Test: LLMI AND LLMC Zero Calibration Deviation Fault AND Button Fault	Only stored (not displayed)
"I0314"	LLMI undervoltage	No LLMI display - Workgroup functions reduced; Battery Voltage < 9 V
"I0315"	LLMI overvoltage	No LLMI display - Workgroup functions reduced; Battery Voltage > 16 V
"I3001"	LLMI Sensor in Error: Sensor Not Calibrated or Calibration Corrupted	
"I3003"	LLMI Sensor in Error: Sensor Power Fault	
"I3004"	LLMI Sensor in Error: Sensor Strain Gauge Power Fault	
"I3005"	LLMI Sensor in Error: Sensor Watchdog Fault	
"I3006"	LLMI Sensor in Error: Sensor RAM Corrupted	
"I3007"	LLMI Sensor in Error: Sensor Program Memory Corrupted	
"I3012"	LLMI Sensor in Error: Sensor Gauge Fault	
"I3014"	LLMI sensor offset	No LLMI display - Workgroup functions reduced; Calibrate the system
"I3015"	LLMI sensor out of range	No LLMI display - Workgroup functions reduced; Calibrate the system
"I3016"	LLMI sensor default	No LLMI display - Workgroup functions reduced
"I3017"	LLMI sensor ID error	No LLMI display - Workgroup functions reduced; Calibrate the system
"I3018"	LLMI sensor RX out of delay	No LLMI display - Workgroup functions reduced
"I3113"	LLMI calibration values out of range	No LLMI display - Workgroup functions reduced; Redo the calibration correctly
"I3121"	LLMI calibration values inverted	No LLMI display - Workgroup functions reduced; Redo the calibration correctly
"I3122"	LLMI calibration values too close	No LLMI display - Workgroup functions reduced; Redo the calibration correctly
"I3123"	LLMI calibration timeout	No LLMI display - Workgroup functions reduced; Redo the calibration in less than 5 minutes
"I3901"	LLMI EEPROM failure	No LLMI display - Workgroup functions reduced

CODE	DESCRIPTION	RESULTS
"I3903"	LLMI external watchdog default	No LLMI display - Workgroup functions reduced
"I3904"	LLMI wrong RAM test	No LLMI display - Workgroup functions reduced
"I3905"	LLMI wrong program checksum	No LLMI display - Workgroup functions reduced
"I3909"	LLMI test button error	No test available

Service Codes List - LLMC Controller

CODE	DESCRIPTION	RESULTS
"C0314"	LLMC undervoltage	Workgroup functions reduced
"C0315"	LLMC overvoltage	Workgroup functions reduced
"C3001"	LLMC Sensor in Error: Sensor Not Calibrated or Calibration Corrupted	
"C3003"	LLMC Sensor in Error: Sensor Power Fault	
"C3004"	LLMC Sensor in Error: Sensor Strain Gauge Power Fault	
"C3005"	LLMC Sensor in Error: Sensor Watchdog Fault	
"C3006"	LLMC Sensor in Error: Sensor RAM Corrupted	
"C3007"	LLMC Sensor in Error: Sensor Program Memory Corrupted	
"C3012"	LLMC Sensor in Error: Sensor Gauge Fault	
"C3014"	LLMC sensor offset	Workgroup functions reduced
"C3015"	LLMC sensor out of range	Workgroup functions reduced
"C3016"	LLMC sensor default	Workgroup functions reduced
"C3017"	LLMC sensor ID error	Workgroup functions reduced
"C3018"	LLMC sensor Rx out of delay	Workgroup functions reduced
"C3022"	LLMC Sensor in Error: Sensor Notch Fault	
"C3042"	LLMC Sensor in Error: Sensor Temperature Fault	
"C3113"	LLMC calibration values out of range	Workgroup functions reduced
"C3121"	LLMC calibration values Inverted	Workgroup functions reduced
"C3122"	LLMC calibration values too close	Workgroup functions reduced
"C3123"	LLMC calibration time-out	Workgroup functions reduced
"C3801"	LLMC EEPROM failure	Workgroup functions reduced
"C3803"	LLMC external watchdog default	Workgroup functions reduced
"C3804"	LLMC wrong RAM test	Workgroup functions reduced
"C3805"	LLMC wrong program checksum	Workgroup functions reduced

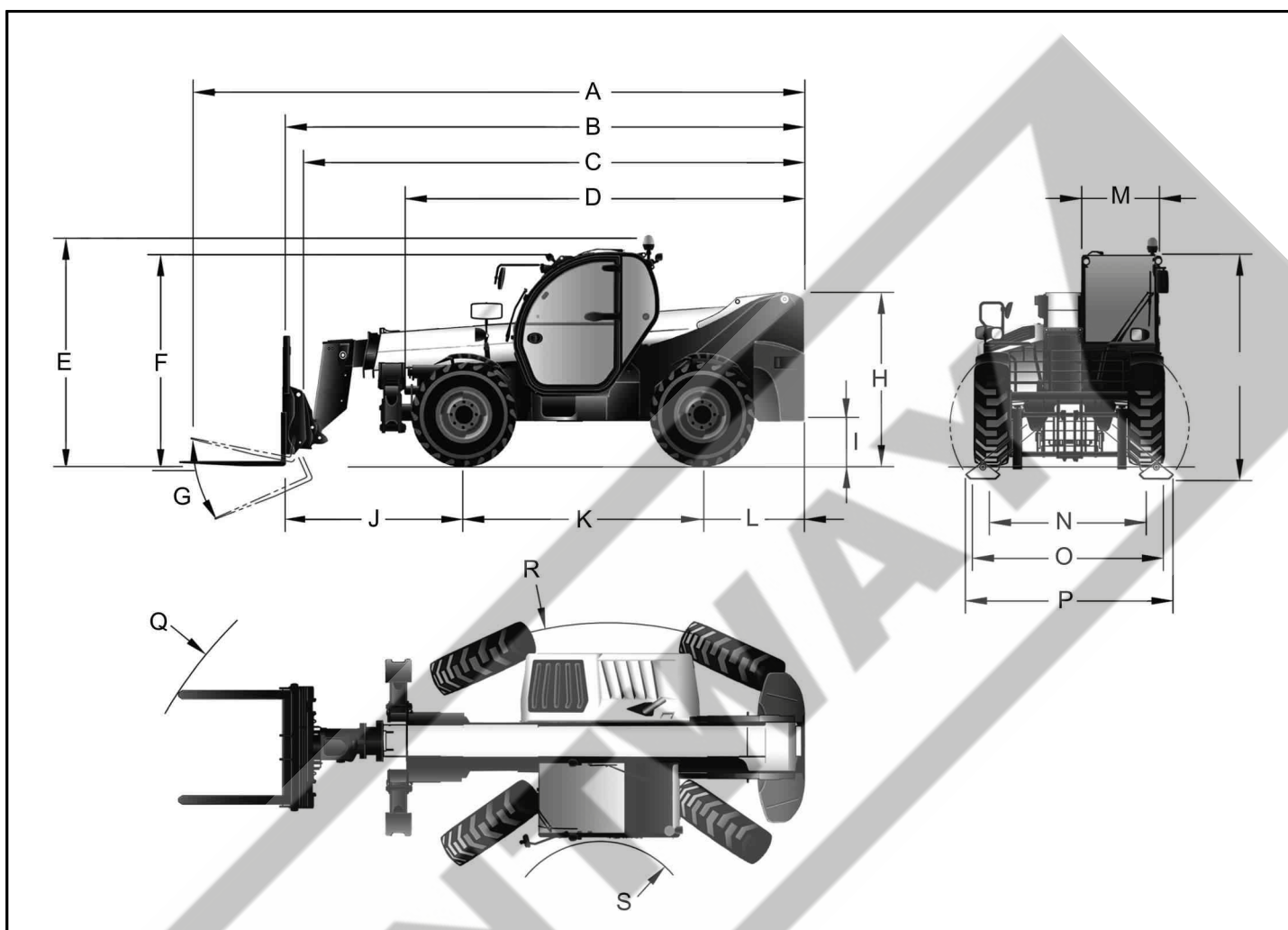
Service Codes List - Cab Controller

CODE	DESCRIPTION	RESULTS
"K1005"	Position Lights Output Short To Battery	Position Lights permanently lighted on
"K1006"	Position Lights Output Short To Earth	Position Lights disabled
"K1007"	Position Lights Output Open Circuit	Position Lights disabled
"K1102"	Position Lights Status Error ON	Position Lights permanently lighted on
"K1103"	Position Lights Status Error OFF	Position Lights disabled
"K1205"	Low Beam Output Short To Battery	Low Beam permanently lighted on → High Beam disable → <i>Feux de route inactifs</i>
"K1206"	Low Beam Output Short To Earth	Low Beam disabled
"K1207"	Low Beam Output Open Circuit	Low Beam disabled
"K1305"	High Beam Output Short To Battery	High Beam permanently lighted on → Low Beam disabled
"K1306"	High Beam Output Short To Earth	High Beam disabled
"K1307"	High Beam Output Open Circuit	High Beam disabled
"K1402"	Fog Light Output Error ON	
"K1403"	Fog Light Output Error OFF	
"K1505"	Left Turn Signal Output Short To Battery	Left Turn Signal permanently turned on
"K1506"	Left Turn Signal Output Short To Earth	Left Turn Signal disabled
"K1507"	Left Turn Signal Output Open Circuit	Left Turn Signal disabled
"K1602"	Left Turn Signal Status Error ON	Left Turn Signal permanently turned on
"K1603"	Left Turn Signal Status Error OFF	Left Turn Signal disabled
"K1705"	Right Turn Signal Output Short To Battery	Right Turn Signal permanently turned on
"K1706"	Right Turn Signal Output Short To Earth	Right Turn Signal disabled
"K1707"	Right Turn Signal Output Open Circuit	Rights Turn Signal disabled
"K1802"	Right Turn Signal Status Error ON	Rights Turn Signal permanently turned on
"K1803"	Right Turn Signal Status Error OFF	Rights Turn Signal disabled
"K2002"	Front Wiper Output Error ON	
"K2003"	Front Wiper Output Error OFF	
"K2102"	Front Wiper (High Speed) Output Error ON	
"K2103"	Front Wiper (High Speed) Output Error OFF	
"K2202"	Front/Roof Washer Output Error ON	
"K2203"	Front/Roof Washer Output Error OFF	
"K2305"	Roof Wiper Output Short To Battery	Roof Wiper permanently turned on
"K2306"	Roof Wiper Output Short To Earth	Roof Wiper disabled
"K2307"	Roof Wiper Output Open Circuit	Roof Wiper disabled

CODE	DESCRIPTION	RESULTS
"K2405"	Rear Wiper Output Short To Battery	Rear Wiper permanently turned on
"K2406"	Rear Wiper Output Short To Earth	Rear Wiper disabled
"K2407"	Rear Wiper Output Open Circuit	Rear Wiper disabled
"K2502"	Rear Washer Output Error ON	
"K2503"	Rear Washer Output Error OFF	
"K2605"	Lateral Wiper Output Short To Battery	Lateral Wiper permanently turned on
"K2606"	Lateral Wiper Output Short To Earth	Lateral Wiper disabled
"K2607"	Rear Wiper Output Open Circuit	Lateral Wiper disabled
"K2702"	Lateral Washer Output Error ON	
"K2703"	Lateral Washer Output Error OFF	
"K4204"	Left Lever No Communication	Road Lights functions disabled
"K4304"	Right Lever No Communication	Wipers/Washers functions disabled
"K4404"	Right Lever No Communication	Road Lights & functions Wipers/Washers disabled

MACHINE DIMENSIONS

Figure 415



NA20569a

REF.	DESCRIPTION	WITH STANDARD TYRES
A	Overall Length (to fork tips)	7425 mm (292 in)
B	Overall Length (to forks face)	6220 mm (244 in)
C	Overall Length (to carrier pin)	5821 mm (229 in)
D	Overall Length (to front tires)	4950 mm (194 in)
E	Overall Height (with rotating beacon)	2673 mm (105 in)
F	Overall Height (with roof window wiper)	2520 mm (99 in)
G	Carriage Rotation Angle	124°
H	Height To Back Of Machine	1956 mm (77 in)
I	Ground Clearance	509 mm (20 in)
J	Length – Front Axle To Forks Face	2263 mm (89 in)
K	Wheelbase	2850 mm (112 in)

REF.	DESCRIPTION	WITH STANDARD TYRES
L	Length – Rear Axle To Machine Rear	1107 mm (43 in)
M	Operator Cab Outside Width	930 mm (36 in)
Mi	Operator Cab Inside Width	857 mm (33 in)
N	Track Width (front & rear)	1992 mm (78 in)
O	Width Over Standard Tires	2418 mm (95 in)
P	Width With Stabilisers Down	2619 mm (103 in)
Q1	External Turning Radius (with forks spaced 1040 mm ext.)	5840 mm (229 in)
Q2	External Turning Radius (with forks spaced 1360 mm ext.)	6051 mm (238 in)
R	External Turning Radius (at tires)	4150 mm (163 in)
S	Internal Turning Radius (cab)	1519 mm (59 in)

TELESCOPIC HANDLER SPECIFICATIONS

Certain specification(s) are based on engineering calculations and are not actual measurements. Specification(s) are provided for comparison purposes only and are subject to change without notice. Specification(s) for your individual Bobcat equipment will vary based on normal variations in design, manufacturing, operating conditions, and other factors

Performance

Tilt Breakout Force - ISO 8313	12300 daN (27651 lbf)
Lift Breakout Force - ISO 8313	4900 daN (11015 lbf)
Drawbar Pull	4900 daN (11015 lbf)
Ground Pressure On Tyres	max. 13 kg/cm ² (185 psi)
Ground Pressure On Stabilisers	max. 13 kg/cm ² (185 psi)
Rated Load Capacity*	4000 kg (8818 lb)
Capacity (At Max. Height) - Tyres	1000 kg (2204 lb)
Capacity (At Max. Height) - Stabilisers	2500 kg (5511 lb)
Capacity (At Max. Reach) - Tyres	0 kg (lb)
Capacity (At Max. Reach) - Stabilisers	500 kg (1102 lb)
Tipping Load At Maximum Reach (On Stabilisers)	590 kg (1300 lb)
Tipping Load At Maximum Reach (On Stabilisers With Man Platform Option)	700 kg (1543 lb)
Lifting Height - Tyres	16200 mm (637 in)
Lifting Height - Stabilisers	17466 mm (687 in)
Max. Reach - Tyres	12130 mm (477 in)
Max. Reach - Stabilisers	13680 mm (538 in)
Reach @ Max Height - Tyres	5035 mm (198 in)
Travel Speed	
Low Range	0 - 8,5 km/h (0 - 5.3 mph)
High Range	0 - 30 km/h (0 - 18.6 mph)

* Static And Dynamic Tests Have Been Carried Out And Passed According To EN1459-1 And ISO 22915

Weights

Weights Without Man Platform Option

Weight (unladen)	10590 kg (23346 lb)
Front Axle Weight (unladen)	4285 kg (9446 lb)
Rear Axle Weight (unladen)	6305 kg (13900 lb)
Weight With Pallet Frame And Forks	10900 kg (24030 lb)
Front Axle Weight With Pallet Frame And Forks	4855 kg (10703 lb)
Rear Axle Weight With Pallet Frame And Forks	6045 kg (13326 lb)
Weight With Pallet Frame, Forks and Rated Load	14900 kg (32848 lb)

Front Axle Weight With Pallet Frame, Forks and Rated Load	12805 kg (28230 lb)
Rear Axle Weight With Pallet Frame, Forks and Rated Load	2095 kg (4618 lb)

Weights With Man Platform Option

Weight (unladen)	10890 kg (24008 lb)
Front Axle Weight (unladen)	4200 kg (9259 lb)
Rear Axle Weight (unladen)	6690 kg (14749 lb)
Weight With Pallet Frame And Forks	11200 kg (24692 lb)
Front Axle Weight With Pallet Frame And Forks	4770 kg (10516 lb)
Rear Axle Weight With Pallet Frame And Forks	6430 kg (14176 lb)
Weight With Pallet Frame, Forks and Rated Load	15200 kg (33510 lb)
Front Axle Weight With Pallet Frame, Forks and Rated Load	12720 kg (28043 lb)
Rear Axle Weight With Pallet Frame, Forks and Rated Load	2480 kg (5467 lb)

Engine

Make / Model	Bobcat D34
Fuel / Cooling	Diesel / Coolant
Rated Power (ISO 14396)	74 kW
Rated Speed	2400 rpm
Low Idle Speed	900 rpm
Maximum Torque at 1400 rpm	430 N·m (317 ft-lb)
Number of Cylinders	4
Displacement	3,4 L (207 in ³)
Bore / Stroke	98 mm (3.8 in) / 113 mm (4.4 in)
Fuel Consumption (average loading)	5,5 L/h (1.4 U.S. gal/h)
Urea Consumption (average loading)	0,5 L/h (0.1 U.S. gal/h)
Lubrication	Gear Pump Pressure
Crankshaft Ventilation	Close Breathing
Air Filter	Dry Replaceable Cartridge With Safety Element
Ignition	Diesel Compression
Cycle Type	4 Strokes
Air Induction	Turbocharged
Engine Coolant	Ethylene Glycol Mix -37°C (-34.6°F)
Starting Aid	Air intake heater automatically activated as needed in RUN position

Controls

Engine	Electronic Engine Speed Governor
Starting	Key-type Starter Switch and Shutdown
Front Auxiliary	Variable Thumbwheel On Joystick
Hydraulics Lift And Tilt	Joystick Electronic
Hydraulics Telescope In and Telescope Out	Variable Thumbwheel On Joystick
Service Brake	Pedal-activated Wet Multi-disk on Front Axle
Secondary Brake	Passive Brake
Parking Brake	Passive Brake
Steering	Proportional Hydraulic Steering VIA a Conventional Steering Wheel
Speed Range and Reverse Selection	Switch For Hydrostatic Motor and Switch On Joystick Or Lever for F-N-R
4WD / 2WD / Parallel Drive Selection	Button and Screen for Selection
Auxiliary Pressure Release	Standard Coupler + Pressure Release On Control Valve Spool

Drive System

Transmission	Hydrostatic With Electronic Regulation
Main Drive	Hydrostatic Motor
Transmission Oil	ELF SF3 / TOTAL DYNATRANS FR

Traction

Standard Tyres	CAMSO 400/80-24 / 20PR TM R4
Optional Tyres	MICHELIN 400/80-24 162A8 IND TL POWER CL

Steering

Steering Pump	Priority Valve on Pump
Steering Mode	2WS / 4WS / CRAB

Brakes

Engine Braking	Hydrostatic
Parking and Emergency Brake	Passive Brake
Service Brake	Oil Immersed Discs

Fluid Capacities

Front Axle Differential	6,7 L (1.77 U.S. gal)
Rear Axle Differential	7,7 L (2.0 U.S. gal)
Wheel Hub (Per Wheel)	0,8 L (0.2 U.S. gal)

Reduction Box	0,8 L (0.2 U.S. gal)
Cooling System With Heater	14,5 L (3.8 U.S. gal)
Engine Oil With Filter	12,6 L (3.3 U.S. gal)
Fuel Tank	145 L (38.3 U.S. gal)
DEF / AdBlue Tank	22,4 L (5.9 U.S. gal)
Hydraulic Fluid Tank	76 L (20 U.S. gal)
Hydraulic System Plus Tank	173 L (45.7 U.S. gal)

Hydraulic System

Pump Type	Gear Pump with LS Valve
Pump Capacity @ maximum rpm	100 L/min (26.4 U.S. gpm)
Relief Valve Pressure Setting	250 bar (3625 psi)
Control Valve Type	Open Centre With Flow Sharing & Flow Compensators Technology
Hydraulic Filter Specification	Full Flow Filtration
Front Auxiliary Flow @ Maximum rpm	65 L/min (17.1 U.S. gpm)
Hydraulic Fluid	Petronas

Electrical System

Alternator	140 A
Battery	110 Ah
Starter	2.7 kW (3.6 hp)

Temperature Range

Operation And Storage	-15 – +45°C (+5 – +113°F)
-----------------------	---------------------------

Environmental

Declared Noise Emission Values

	Value	Uncertainty
Bystander noise Level per Directive 2000/14/EC - LwA	106 dB(A)	N/A
Operator noise level per EN 12053 - LpA	75 dB(A)	4 dB(A)

Declared Vibration Emission Values

	Value	Uncertainty
Whole-body vibration per EN 13059	1,0 m/s ²	0,3 m/s ²
	3.28 ft/s ²	0.98 ft/s ²
Hand-arm vibration	N/A[A]	N/A

[A] N/A - Not applicable for telescopic handler.

Fluorinated Greenhouse Gas (F-gas) (If equipped with HVAC)

	Value
F-gas Type	HFC-134a
F-gas Mass	0,77 kg (1.70 lb)
CO Equivalent	1,1 t (1.21 tn)
Global Warming Potential (GWP)	1430

Altitude

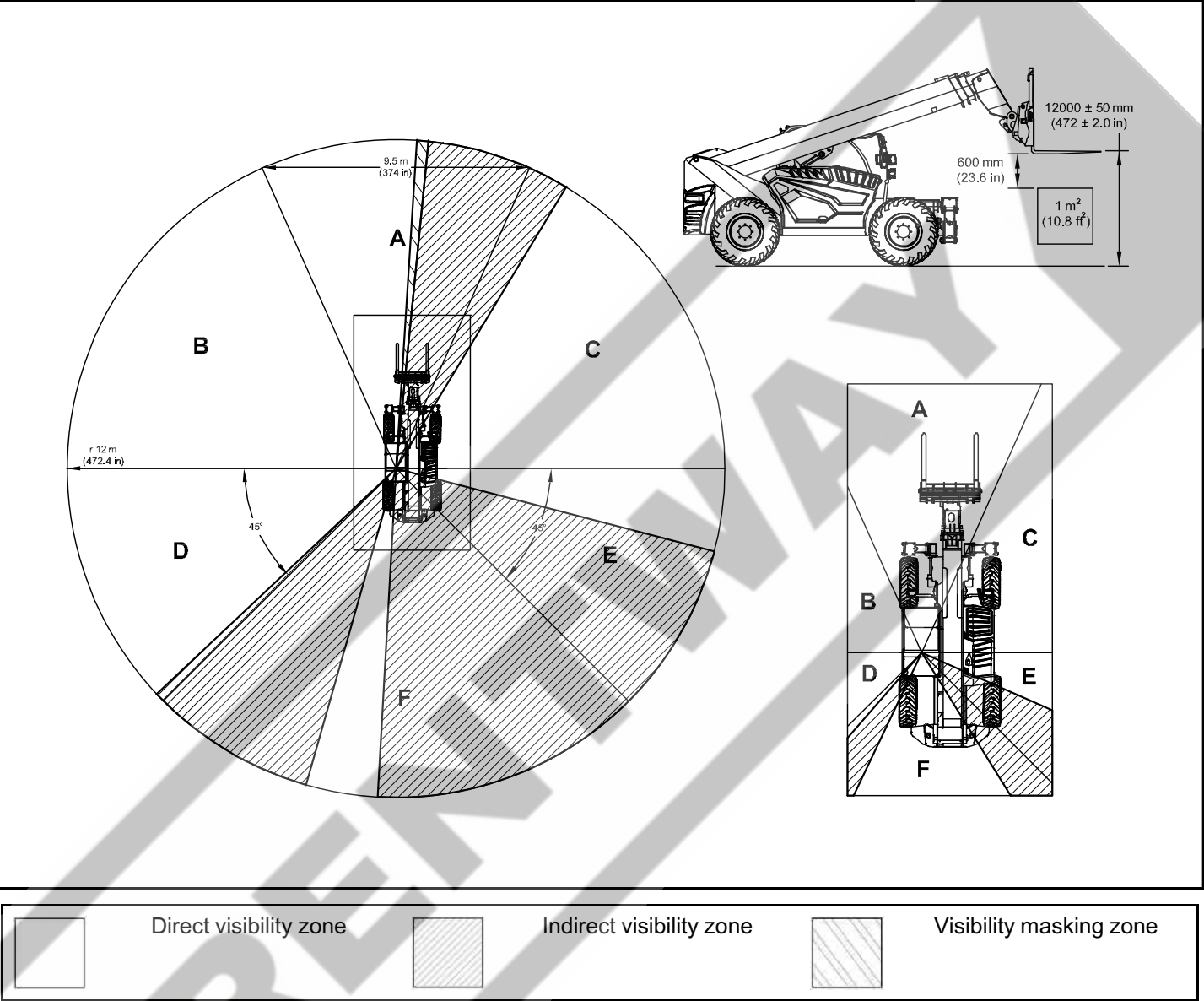
Maximum Altitude	2000 m (6500 ft)
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Visibility Diagrams

For Model T40.180SLP

Handling Suspended Loads

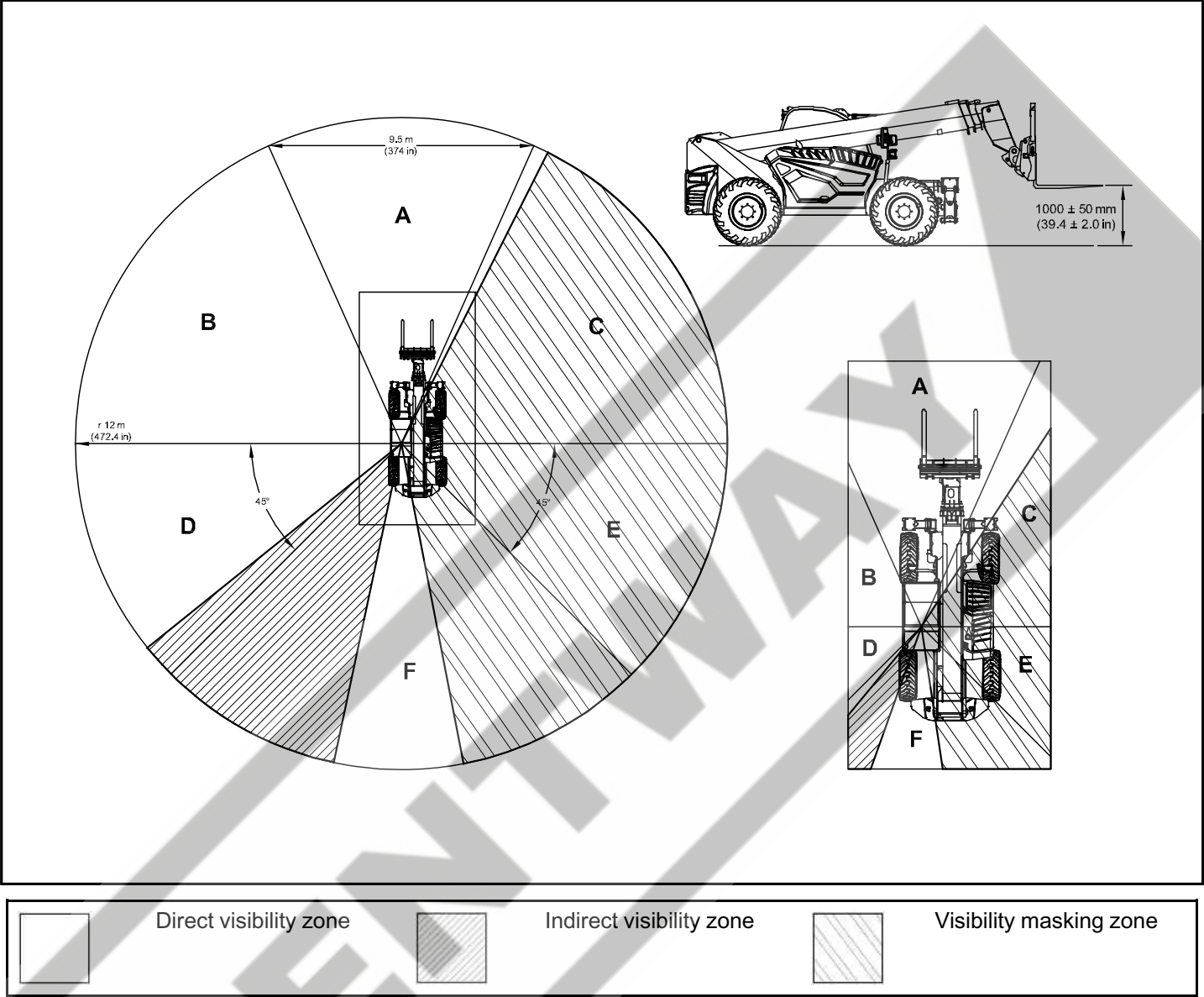
Figure 416



NA20470

Loading The Trailer

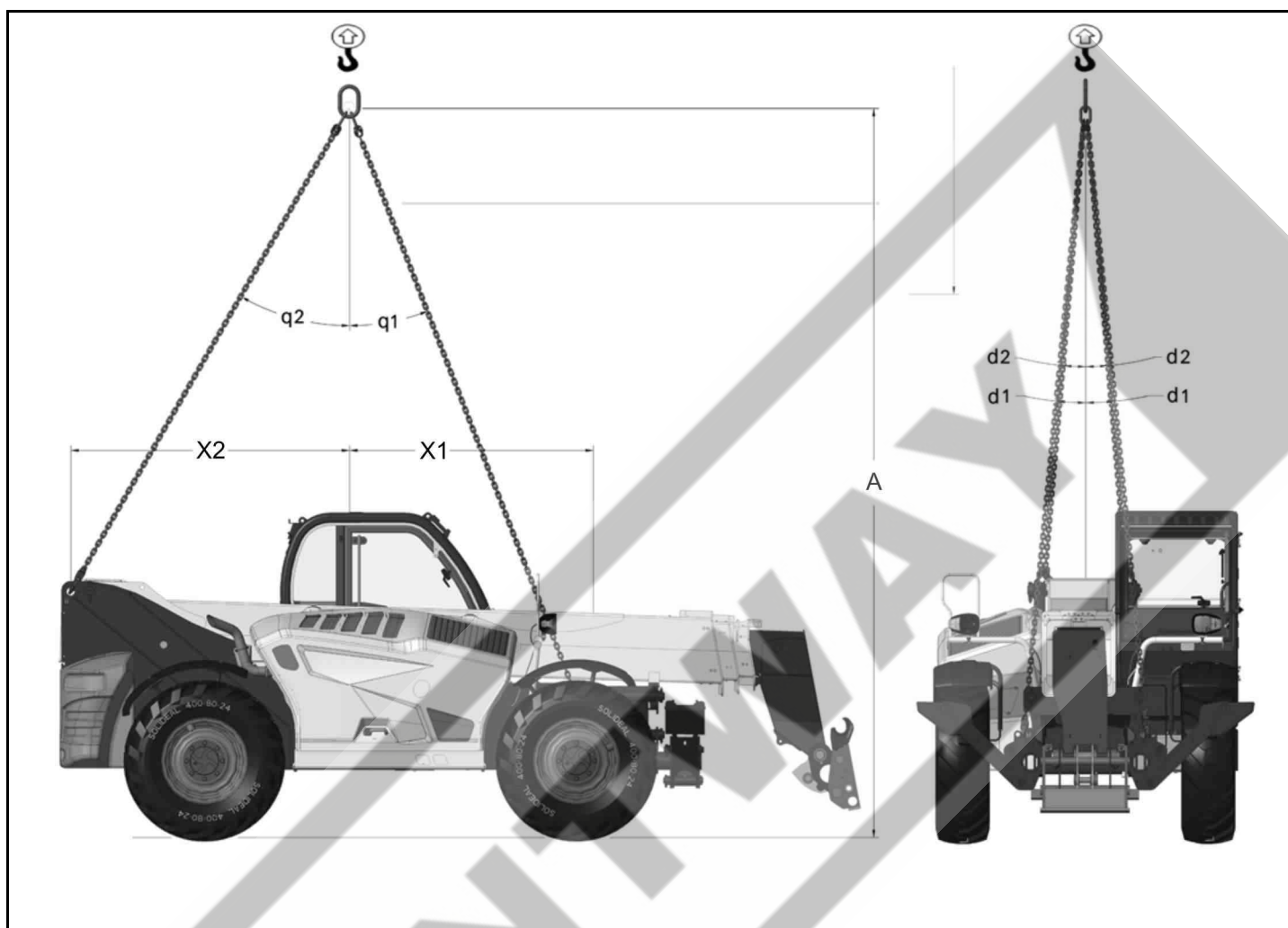
Figure 417



NA20471

Lifting

Figure 418

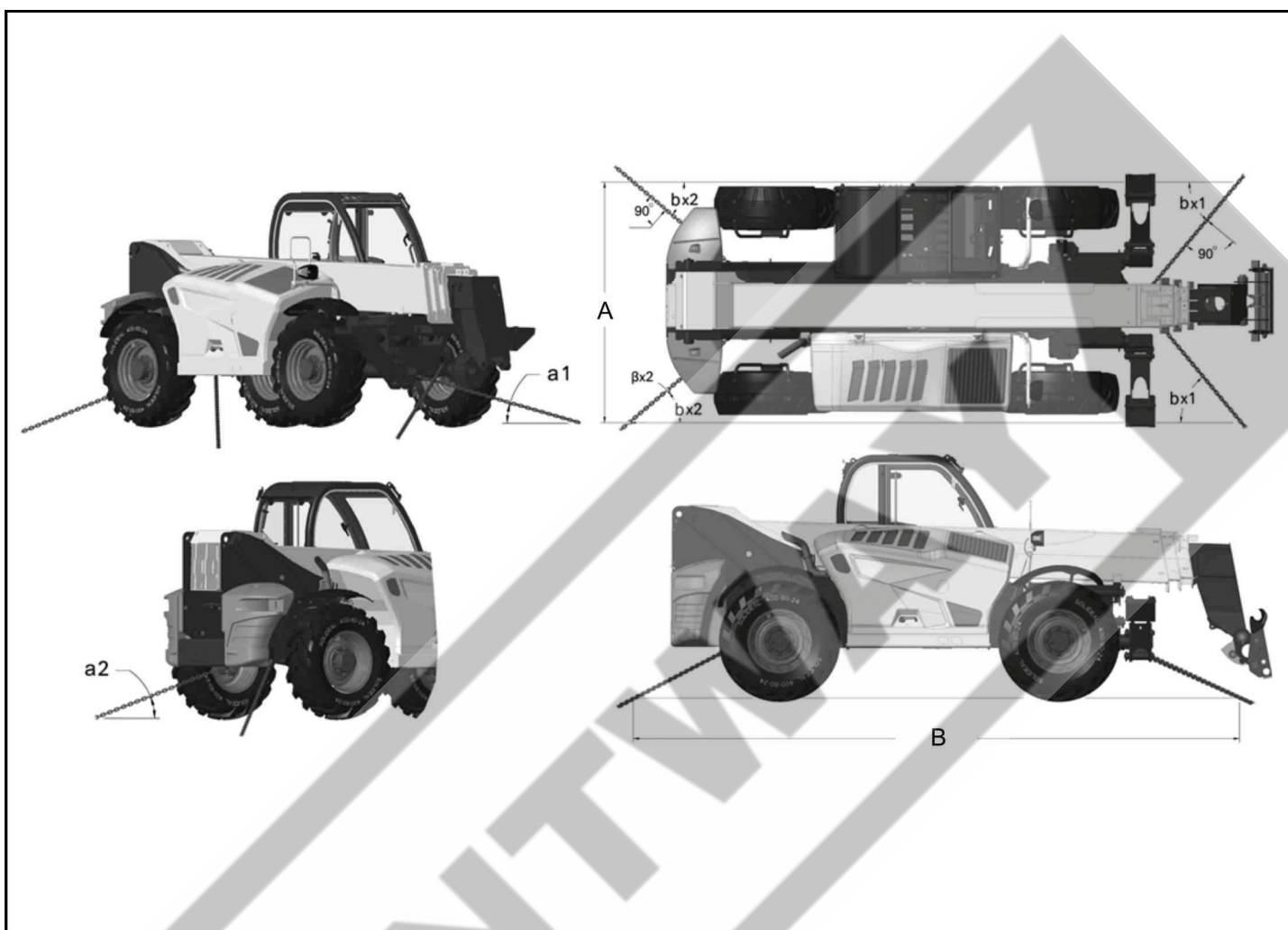


NA20557a

CG Location	(X1) Front	1863 mm (73.3 in)
	(X2) Rear	2116 mm (83.3 in)
Longitudinal Angle	(q1) Front	21°
	(q2) Rear	30°
Lateral Angle	(d1) Front	6°
	(d2) Rear	5°
Sling Length	Front	5190 mm (204.3 in)
	Rear	4270 mm (168.1 in)
Single Sling Force	Front	69260 N (15570 lbf)
	Rear	50130 N (11270 lbf)
(A) Lifting Hook height minimum		5575 mm (219.5 in)
Operating mass		10790 kg (23788 lb)

Tie Down

Figure 419



NA20558a

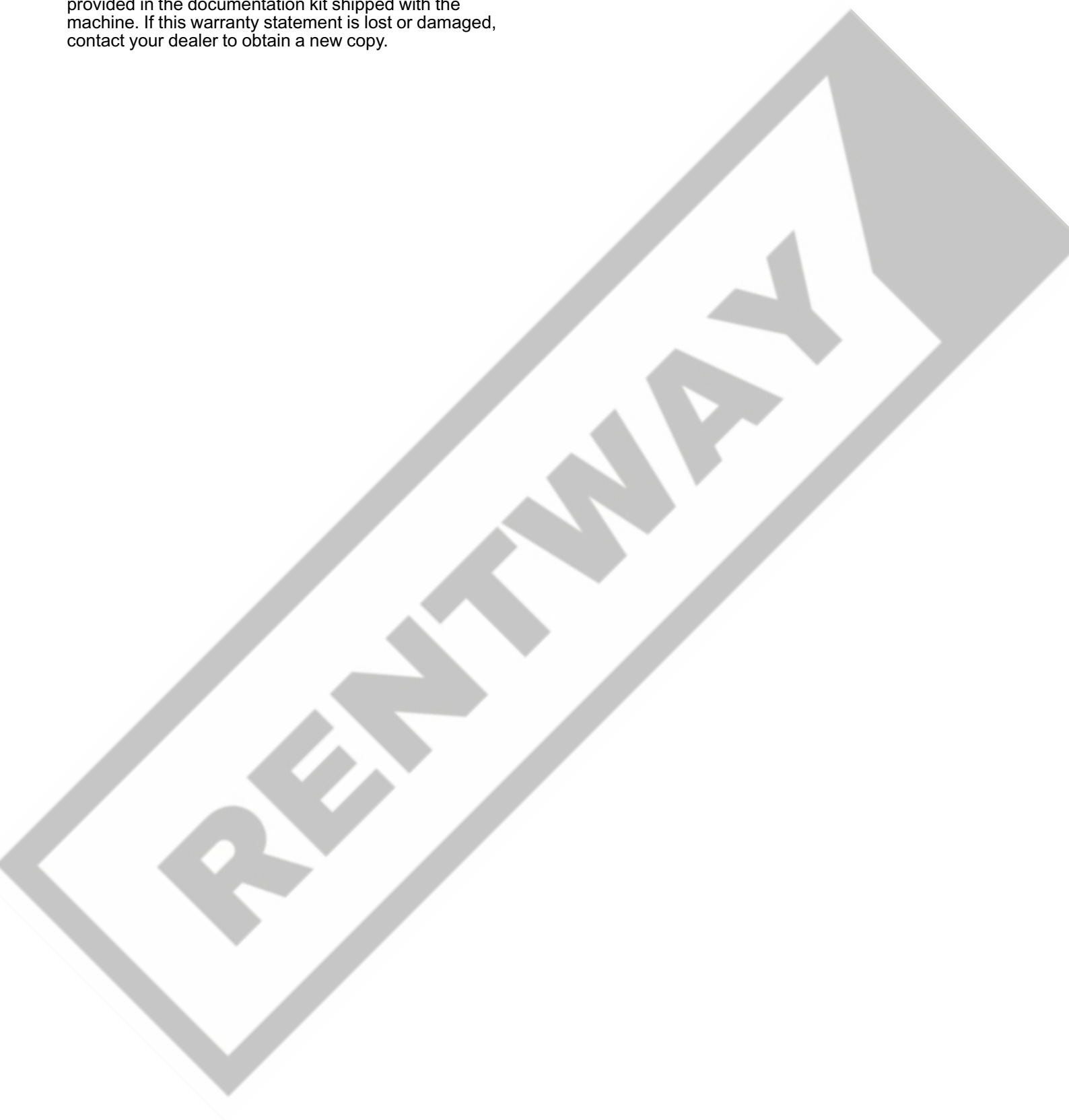
(A) Lateral distance attachment points		2450 mm (96.5 in)
(B) Longitudinal distance attachment points		6177 mm (243.2 in) - 7549 mm (297.2 in)
Operating mass		10790 kg (23788 lb)
Most compact angle		
Vertical Angle	(a1) Front	16°
	(a2) Rear	22°
Horizontal Angle	(bx1) Front	50°
	(bx2) Rear	40°
Sling Length	Front	2060 mm (81.1 in)
	Rear	1550 mm (61.0 in)
Single Sling Force	Front	47880 N (10764 lbf)
	Rear	41050 N (9228 lbf)

	Angle for < 4000 daN (8992 lbf) sling forces	
Vertical Angle	(a1) Front	11°
	(a2) Rear	21°
Horizontal Angle	(bx1) Front	31°
	(bx2) Rear	37°
Sling Length	Front	3000 mm (118.1 in)
	Rear	1640 mm (64.6 in)

RENTWAY

MACHINE WARRANTY

A statement explaining the terms and conditions of the warranty coverage that applies to your machine was provided in the documentation kit shipped with the machine. If this warranty statement is lost or damaged, contact your dealer to obtain a new copy.



RENTWAY

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Reference Information

Product Serial Number:

Engine Serial Number:

Dealer Information:

