



Bobcat®

Operation & Maintenance Manual



Telescopic Handler

(T35.105RB) S/N B4ZV11001 & Above
(T35.105LRB) S/N B51111001 & Above





RENTWAY

OPERATOR SAFETY WARNINGS



WARNING

Operator must have instructions before operating the machine. Untrained operators can cause injury or death.

W-2001-0502



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

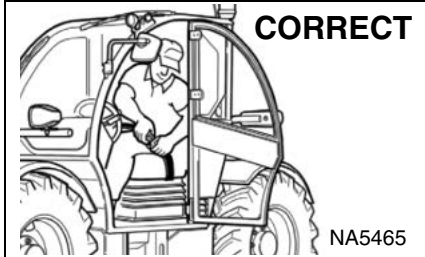
CORRECT



P-90216

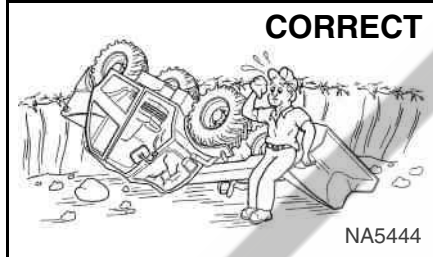


Never operate without instructions. See machine signs (decals), Operation & Maintenance Manual.



NA5465

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



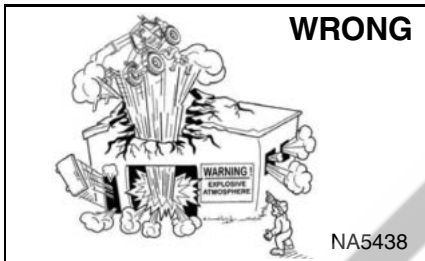
NA5444

- Never use telescopic handler without operator cab with ROPS and FOPS approval.



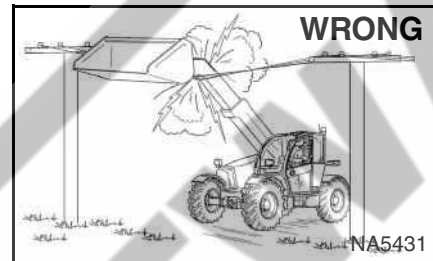
NA5435

- Never carry riders.
- Use only an approved work platform.



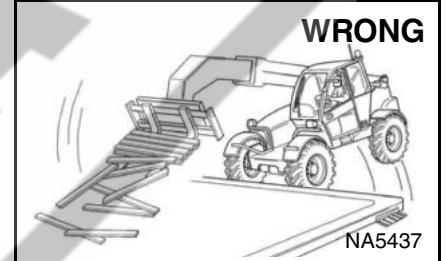
NA5438

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



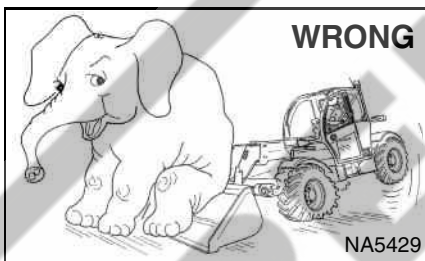
NA5431

- Check for overhead or underground power lines before operating.
- Keep boom, attachment, and load a minimum of 3m (10 ft.) away from electrical power lines.



NA5437

- Always carry bucket or attachments as low as possible.
- Do not travel or turn with boom up.
- Load, unload, and turn on flat level ground.



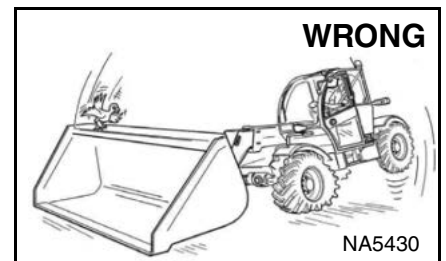
NA5429

- Never exceed Rated Load Capacity.
- Read and understand the Load Capacity Charts.



NA5426

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



NA5430

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

SAFETY EQUIPMENT

The Bobcat® telescopic handler 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.

1. SEAT BELT: Check belt fasteners and check for damaged webbing or buckle.
2. OPERATOR CAB (ROPS and FOPS): It must be on the telescopic handler with all fasteners tight. Never operate without right window.
3. OPERATOR'S HANDBOOK: Must be in the cab.
4. SAFETY SIGNS (DECALS): Replace if damaged.
5. SAFETY TREADS: Replace if damaged.
6. GRAB HANDLES: Replace if damaged.
7. BOOM STOP (if equipped): Replace if damaged.
8. PARKING BRAKE: Check for function.
9. WINDOWS AND MIRRORS: Clean and check for broken glass or mirrors. Replace if damaged.



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REFERENCE INFORMATION

Write the correct information for YOUR Bobcat telescopic handler in the spaces below. Always use these numbers when referring to your Bobcat telescopic handler.

Telescopic Handler Serial Number

Engine Serial Number

NOTES:

YOUR BOBCAT DEALER:

ADDRESS:

PHONE:



Bobcat Company
P.O. Box 128
Gwinner, ND 58040-0128
UNITED STATES OF AMERICA

Doosan Bobcat EMEA s.r.o.
U Kodetky 1810
26312 Dobris
Czech Republic



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FOREWORD

This Operation & Maintenance Manual was written to give the owner / operator instructions on the safe operation and maintenance of the Bobcat telescopic handler. **READ AND UNDERSTAND THIS OPERATION & MAINTENANCE MANUAL BEFORE OPERATING YOUR BOBCAT TELESCOPIC HANDLER.** If you have any questions, see your Bobcat dealer. This manual can illustrate options and accessories not installed on your telescopic handler.

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DECLARATION OF CONFORMITY

Model T35.105RB

Contents of EC Declaration of Conformity	
This information is provided in the operators 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 Bobcat France Route de Nantes B.P. 71 44160 Pontchateau FRANCE	Directive 2000/14/EC: Noise Emission in the Environment by Equipment For Use Outdoors Notified Body Laboratoire National d'Essais (LNE) France Notified Body Number: 0071 EC Certificate No. 2000-14/P200723/5
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)] Measured Sound Power 102 dBA Guaranteed Sound Power 104 dBA
Description of Equipment Type of Equipment: Telescopic Handler Model Name: T35.105RB Model Code: B4ZV Engine Manufacturer: Doosan Infracore Engine Model: DM03V DM03-MFV01 Engine Power: 55.3 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: 21 May 2020	

DECLARATION OF CONFORMITY (CONT'D)

Model T35.105LRB

Contents of EC Declaration of Conformity

This information is provided in the operators 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® Bobcat France Route de Nantes B.P. 71 44160 Pontchateau FRANCE	Directive 2000/14/EC: Noise Emission in the Environment by Equipment For Use Outdoors Notified Body Laboratoire National d'Essais (LNE) France Notified Body Number: 0071 EC Certificate No. 2000-14/P200723/5
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)] Measured Sound Power 102 dBA Guaranteed Sound Power 104 dBA
Description of Equipment Type of Equipment: Telescopic Handler Model Name: T35.105LRB Model Code: B511 Engine Manufacturer: Doosan Infracore Engine Model: DM03V DM03-MFV01 Engine Power: 55.3 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: 21 May 2020	

DECLARATION OF CONFORMITY (CONT'D)

All Models

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.

Patrice Caulier

P. Caulier

30th January, 2017

BOBCAT COMPANY IS ISO 9001 CERTIFIED



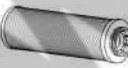
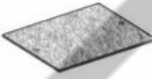
ISO 9001 is an international standard that specifies requirements for a quality management system that controls the processes and procedures which we use to design, develop, manufacture, and distribute Bobcat products.

British Standards Institute (**BSI**) is the Certified Registrar Bobcat Company chose to assess the company's compliance with the 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 Bobcat Company chose to assess the company's compliance with the ISO 9001 at Bobcat's manufacturing facility in Dobris (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.

REGULAR MAINTENANCE ITEMS

Parts

	ENGINE OIL FILTER 7343102		BATTERY 7288629
	FUEL PRE-FILTER 7348032		HYDRAULIC FILTER 7225338
	FUEL FILTER 7336334		HYDRAULIC FILL / BREATHER CAP 6727475
	FUEL TANK BREATHER 7373582		OPERATOR CAB AIR FILTER 7228497
	AIR FILTER, Outer 7286652		DIESEL OXIDATION CATALYST AND PARTICULATE FILTER 7345812
	AIR FILTER, Inner 7010031		

NOTE: Always verify Part Numbers with your Bobcat dealer.

REGULAR MAINTENANCE ITEMS (CONT'D)

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. (See PREVENTIVE MAINTENANCE on Page 143.)

ENGINE SYSTEMS				
Machine Components	Fluids And Lubricants	T° Range	Packaging**	Part Number
Engine	- Bobcat Engine Power SAE 10W30 CK4 / ACEA E6	-15°C / +30°C	A, B, C, D	7341377*
	- Bobcat Engine Power SAE 15W40 CK4 / ACEA E6	-10°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
	- Bobcat EG Coolant Premixed that meets SAE J1034, ASTM D3306, D6210, and JIS K2234	-36°C	A, B, C, D	6987804*
Fuel Tank	- High-quality diesel fuel that meets EN590 (See FUEL SYSTEM on Page 159.)	-	-	*

HYDRAULIC / HYDROSTATIC SYSTEMS				
Machine Components	Fluids And Lubricants	T° 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	T° Range	Packaging**	Part Number
Axle 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	Bobcat Axle / Transmission Oil ISO 100 / API GL-4	-20°C / +40°C	A, B, C	6987794*
Transfer Box				

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

(*) Factory-Filled Fluids And Lubricants

(**) Packaging Available:

A = 5 L Can

B = 25 L Container

C = 209 L Drum

D = 1000 L Tank

E = 400 g Tube

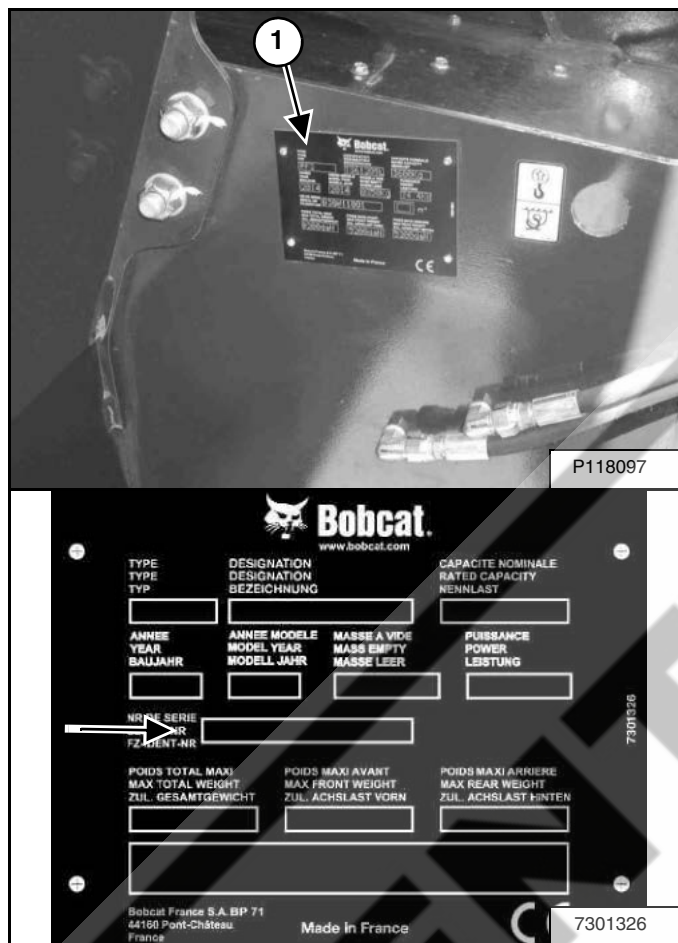
SERIAL NUMBER LOCATION

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



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

Explanation of telescopic handler serial number:

XXXX XXXXX

Module 2. - Production Sequence (Series)

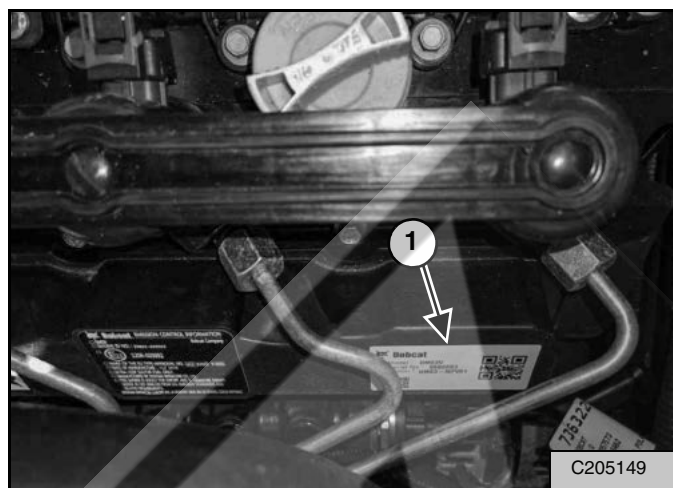
Module 1. - Model / Engine Combination

1. The four digit Model / Engine Combination Module number identifies the model number and engine combination.

2. The five digit Production Sequence Number identifies the order in which the telescopic handler is produced.

Engine Serial Number

Figure 2



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 Telescopic Handler

Dealer Number: _____ Dealer Name: _____

SALES REPRESENTATIVE NAME: _____

PERFORMANCE CHECK

1. Check fluid levels	13. Check hydraulic oil level
2. Check engine oil level	14. Check hydraulic oil level
3. Check engine oil level	15. Check hydraulic oil level
4. Check engine oil level	16. Check hydraulic oil level
5. Check engine oil level	17. Check hydraulic oil level
6. Check engine oil level	18. Check hydraulic oil level
7. Check engine oil level	19. Check hydraulic oil level
8. Check engine oil level	20. Check hydraulic oil level
9. Check engine oil level	21. Check hydraulic oil level
10. Check engine oil level	22. Check hydraulic oil level
11. Check engine oil level	23. Check hydraulic oil level
12. Check engine oil level	24. Check hydraulic oil level

TRANSMISSION TYPE (Check one): ☐ Dual-Fuel ☐ Diesel ☐ Gas ☐ Electric ☐ Other

CONTRACT NUMBER: _____ CONTRACT NAME: _____

DEALER ADDRESS: _____ CITY: _____ STATE: _____ COUNTRY: _____

DATE: _____

WARNING

1. Read and understand the operator's manual before operating the machine. 2. Read and understand the operator's manual before operating the machine. 3. Read and understand the operator's manual before operating the machine. 4. Read and understand the operator's manual before operating the machine. 5. Read and understand the operator's manual before operating the machine. 6. Read and understand the operator's manual before operating the machine. 7. Read and understand the operator's manual before operating the machine. 8. Read and understand the operator's manual before operating the machine. 9. Read and understand the operator's manual before operating the machine. 10. Read and understand the operator's manual before operating the machine. 11. Read and understand the operator's manual before operating the machine. 12. Read and understand the operator's manual before operating the machine.

Dealer Representative Signature: _____ Date: _____

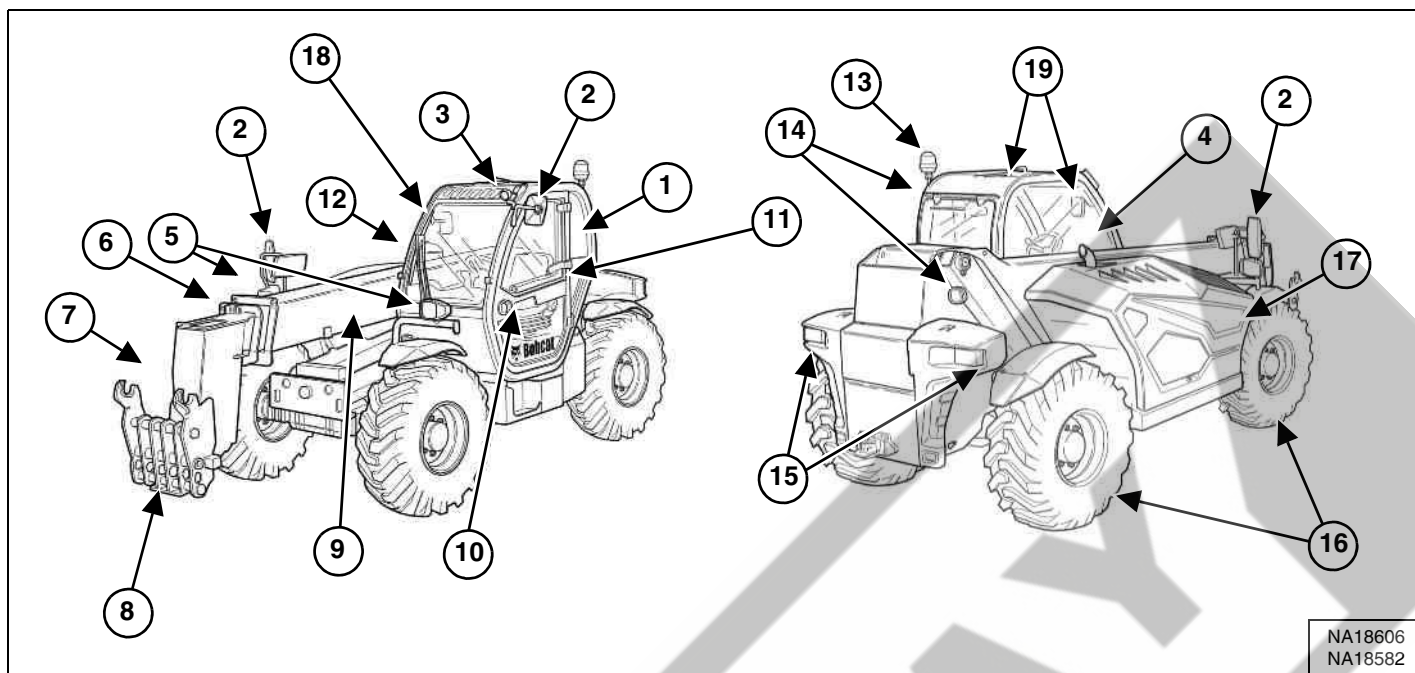
Owner/Operator Signature: _____ Date: _____

NA3106

The delivery report [Figure 3] contains a list of items that must be explained or shown to the owner or operator by the dealer when the Bobcat telescopic handler is delivered.

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

BOBCAT TELESCOPIC HANDLER IDENTIFICATION



ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Operation & Maintenance Manual and Operator's Handbook	11	Boom Stop
2	Mirrors	12	Operator Cab (ROPS and FOPS) [C]
3	Work Lights	13	Rotating Beacon
4	Load Capacity Charts	14	Rear Work Light
5	Front Lights	15	Tail Lights and Direction Signals
6	Telescoping Booms	16	Tyres [D]
7	Boom Head	17	Engine Cover
8	Attachment Carrier [B]	18	Sight Level Gauge
9	Boom	19	Rear / Front Interior Mirror
10	Seat Belt		

[A] Optional or Field Accessory. (Not Standard Equipment).

[B] Attachments - Several different attachments are available for the Bobcat telescopic handler.

[C] ROPS, FOPS - Roll-Over Protective Structure, per ISO 3471, and Falling-Object Protective Structure per ISO 3449, Level II.

[D] 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 T35.105RB and T35.105LRB Bobcat telescopic handlers are equipped with the following standard items:

- 12 V power outlet
- 4 equal-size drive wheels with tyres
- Auxiliary hydraulic line on boom
- Adjustable steering column
- Back-up alarm
- Boom stop
- Cab heater
- Cushion lift (up and down)
- Diesel Oxidation Catalyst and Particulate Filter (DOC / DPF)
- Double mirrors on right side
- Forward / Neutral / Reverse button on joystick
- Frame-Levelling (only for model T35.105LRB)
- Front and rear washer / wipers
- Gear pump
- Glass door
- Hydrostatic transmission, 24 km/h (14.9 mph)
- Interior mirror
- Left and right side mirrors
- Longitudinal Load Moment Controller (LLMC) system with override feature
- Manual locking of attachments
- Mudguards
- Quick-tach attachment carrier
- Rear document storage net
- Road lights
- Roof window wiper
- Rotating beacon
- Semi-automatic realignment of the wheels
- Speed management
- Suspension seat
- Turbo-charged engine, 55,2 kW (74 hp)
- Turn signals
- Work lights on roof (2 front + 1 rear)
- Work light on frame
- Keypad panel
- License plate light
- Lockable fuel cap
- Radio ready (with speakers and antenna)
- Rear flat mirror
- Rear hitch electrical plug (7-Pin)
- Remote control
- Roll sun visor
- Solid rear document compartment
- Special colour cab
- Special colour frame, boom and rims
- Support for registration plate
- Tow devices for trailers
- Travel direction lever
- Wheel wedge
- Work lights on boom
- 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
- Back-up alarm lynx
- Basic tow hitch
- Cab with HVAC
- Electric line on boom
- Extinguisher
- Fan inverter
- Front and roof window guard
- Hydraulic locking of attachments, J-tach
- Hydraulic locking of attachments, quick-tach
- J-tach attachment carrier
- Keyless start

FEATURES, ACCESSORIES AND ATTACHMENTS (CONT'D)

Available Tyres

Standard tyres:

- CAMSO 405/70-20 16 PR TM R4

Optional tyres:

- CAMSO 405/70-20 14 PR TM R4
- DUNLOP 405/70R20 168A2 152J MPT SPT9
- MICHELIN 400/80-24 162A8 IND TL POWER CL
- CAMSO 400/80-24 20 PR TM R4
- DUNLOP 405/70R24 168A2 152J MPT SPT9

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

Available Rims

Standard rims:

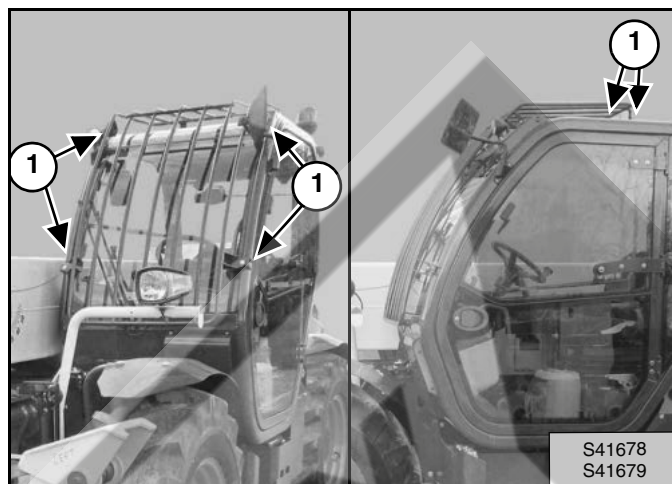
- RIM 13*20" + 29

Optional rims:

- RIM 13*24" + 29

Front And Roof Window Guard

Figure 4



Available for special applications to restrict material from entering cab openings [Figure 4].

The front and roof window guard is mounted to the cab at six mounting points (Item 1) [Figure 4].

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

See your Bobcat dealer for availability.

Front And Roof Window Guard Inspection And Maintenance

The front and roof window guard must be regularly inspected and maintained. Inspect the screen and the six mounting points (Item 1) [Figure 4] for damage. Replace parts as necessary.

FEATURES, ACCESSORIES AND ATTACHMENTS (CONT'D)

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.

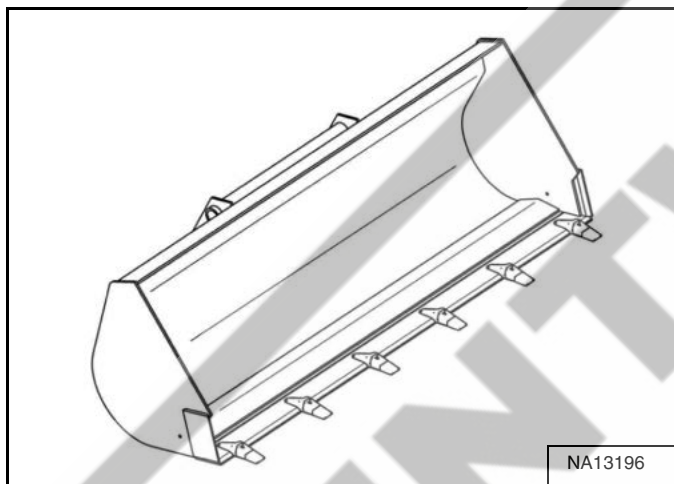
The versatile Bobcat telescopic handler quickly turns into a multi-job machine with a tight-fit attachment hook-up from bucket to grapple to pallet fork and a variety of other attachments.

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.

Buckets

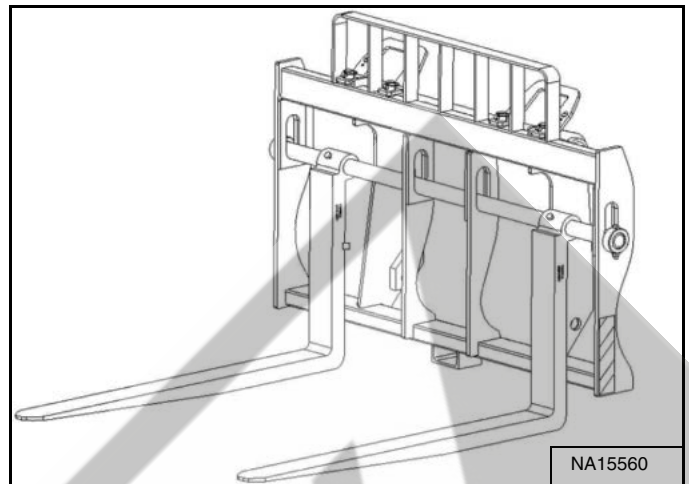
Figure 5



- 920 L (32.5 ft³) bucket - with teeth
- 920 L (32.5 ft³) bucket - without teeth

Pallet Forks

Figure 6



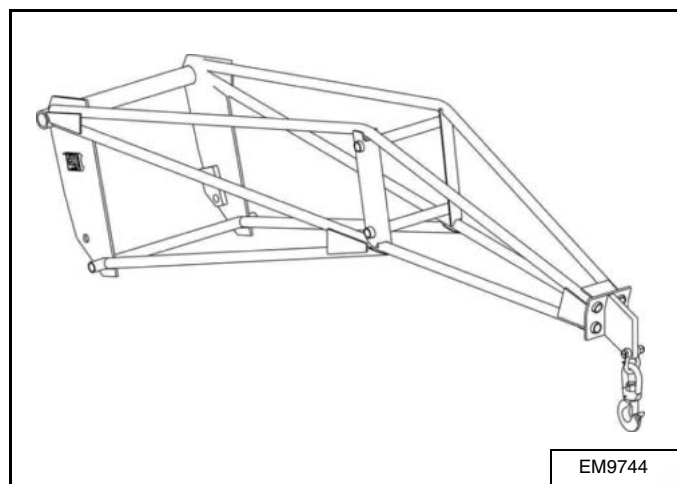
- Rigid pallet forks FEM III
- Floating pallet forks 1,0 m (39 in), quick-tach
- Floating pallet forks 1,5 m (59 in), quick-tach
- Floating pallet forks 1,0 m (39 in), Manitach
- Floating pallet forks Q-fit, J-tach

FEATURES, ACCESSORIES AND ATTACHMENTS (CONT'D)

Attachments (Cont'd)

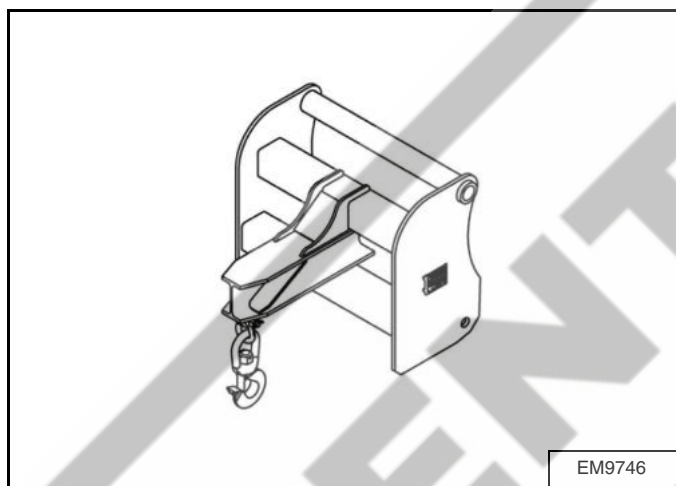
Jibs

Figure 7



- Jib 3,7 m / 700 kg (12.1 ft / 1543 lb)

Figure 8



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

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SAFETY INSTRUCTIONS

Before Operation

Carefully follow the operating and maintenance instructions in this manual.

Safety decals must be in good condition. If replacing a part with a safety decal or if a safety decal is damaged or worn it must be replaced on the machine.

The Bobcat Telescopic Handler 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 motorway, rough terrain applications, common with telescopic handler usage.

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

The dealer explains the capabilities and restrictions of the telescopic handler 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. Any modifications that affects the operator visibility or the machines specifications has to be approved by Bobcat Company. The attachments and buckets are designed for a Rated Load Capacity. They are designed for secure fastening to the telescopic handler. 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 is 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.

- Load Capacity Charts for each attachment are provided in the operator area. These charts indicate the Rated Load Capacity for each attachment at specified boom heights and extensions. Replacement or additional charts for new attachments are available from your Bobcat dealer.
- An Operator's Handbook is fastened to the operator cab of the telescopic handler. Its brief instructions are convenient to 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.

Telescopic Handler Approved Applications

The telescopic handler is designed for the following specific approved applications.

- Handling and stacking loads.
- Towing a trailer.
- Work with a bucket and other approved attachments.

Do not use the telescopic handler for applications not described in the Operation & Maintenance Manual delivered with the machine or attachment.

Any application that can cause falling objects or penetration in the operator's enclosure is prohibited.

SAFETY INSTRUCTIONS (CONT'D)

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.



WARNING

Operator must have instructions before operating the machine. Untrained operators can cause injury or death.

W-2001-0502

IMPORTANT

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

I-2019-0284



DANGER

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

D-1002-1107



WARNING

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

W-2044-1107

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

Check all of the items on the Bobcat Service Schedule Decal under the 8-10 hour column 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.
- For operating the machine, some countries require an operator license. Check the regulations at your location.

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 or structures 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. Avoid exceeding the Rated Load Capacity 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.
- The operator must know any prohibited uses or work areas, for example, he or she needs to know about excessive slopes and prohibited weather conditions like lightning weathers.
- 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 Front Window Guard are required for some work. See your Bobcat dealer about Bobcat Safety Equipment.
- Know the maximum weight capacity of the roads and working areas. Never exceed the maximum weight capacity allowed, especially when travelling on a suspended bridge or using an elevator.

SI TH EMEA-1015

SAFETY INSTRUCTIONS (CONT'D)

Safe Operation Needs A Qualified Operator (Cont'd)

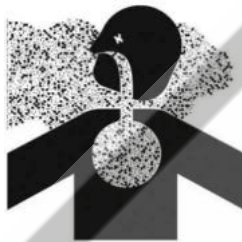
Where overhead power lines are present in the operating area, ensure sufficient clearance between the nearest of these lines and any part of the machine.

VOLTAGE	MINIMUM DISTANCE
up to 50 kV	3 m (10 ft)
beyond 50 kV	5 m (16.5 ft)

The operator must survey his / her field of vision when operating the telescopic handler. Adjust mirrors to obtain the best visibility. Clean mirrors every day and more often when necessary. Immediately replace any broken or damaged mirrors. If a suspended load or the resulting boom geometry blocks the vision of the operator alternative carrying means must be considered.

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

Avoid Silica Dust



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 centre.

FIRE PREVENTION



Maintenance

The machine and some attachments 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 coolants 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



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.

FIRE PREVENTION (CONT'D)

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



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 grounding and bonding practices.

Starting

Do not use ether or starting fluids on any engine that has glow plugs. 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 dust mask when grinding painted parts. Toxic dust or gas can be produced.

Dust generated from repairing non-metallic 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

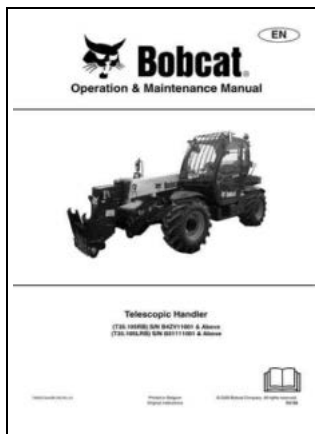


Know where fire extinguishers and first aid kits are located and how to use them. Inspect the fire extinguisher and service the fire extinguisher regularly. Obey the recommendations on the instructions plate.

PUBLICATIONS AND TRAINING RESOURCES

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

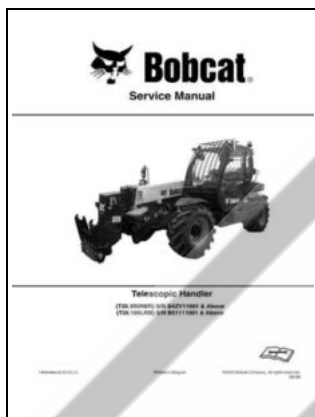
For the latest information on Bobcat products and the Bobcat Company, visit our website at **Bobcat.eu**.



T35.105RB / T35.105LRB OPERATION & MAINTENANCE MANUAL

7400375enGB

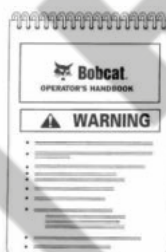
Complete instructions on the correct operation and the routine maintenance of the Bobcat telescopic handler.



T35.105RB / T35.105LRB SERVICE MANUAL

7400376enUS

Complete maintenance instructions for your Bobcat telescopic handler.



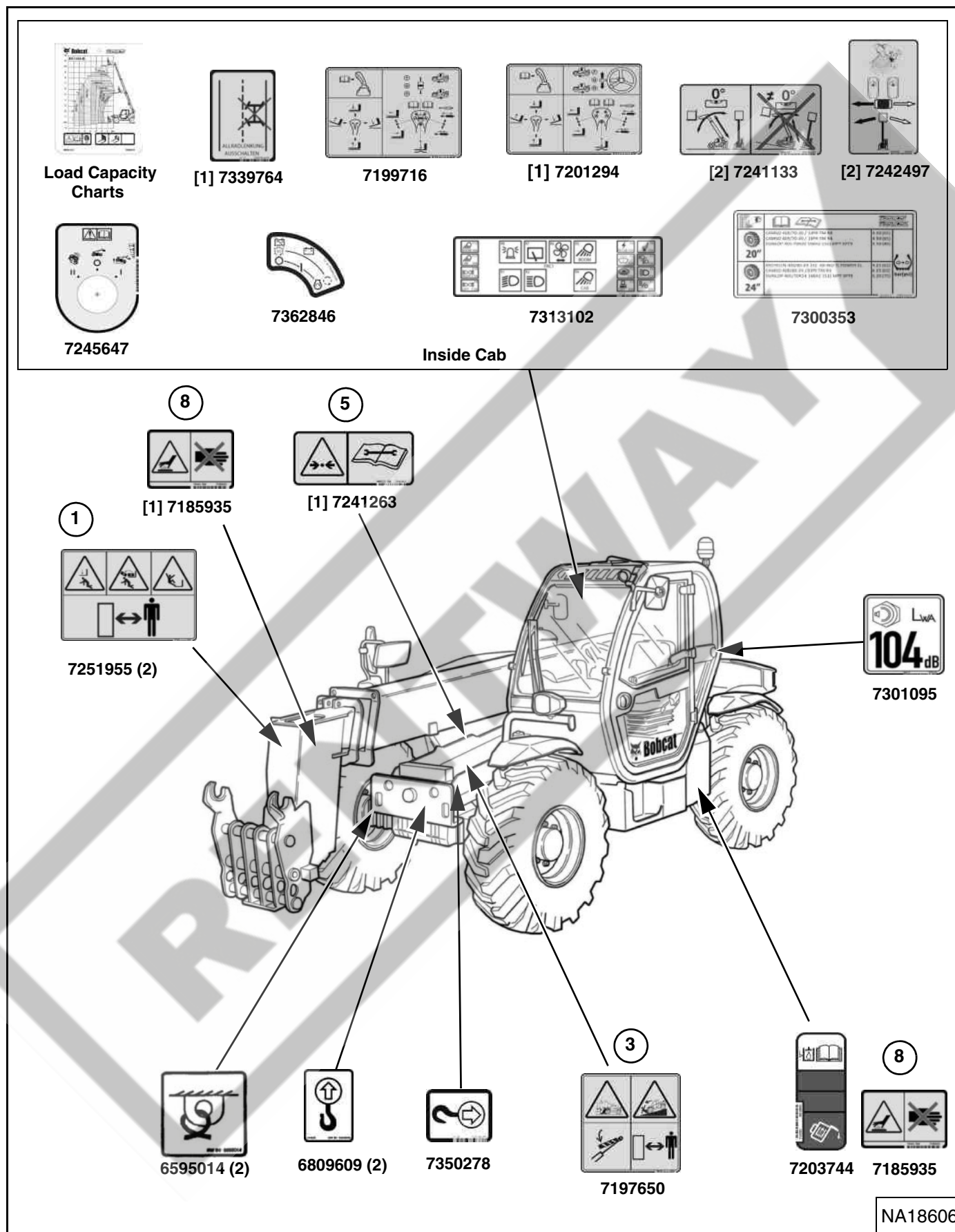
T35.105RB / T35.105LRB OPERATOR'S HANDBOOK

7400371enGB

Gives basic operation instructions and safety warnings.

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.

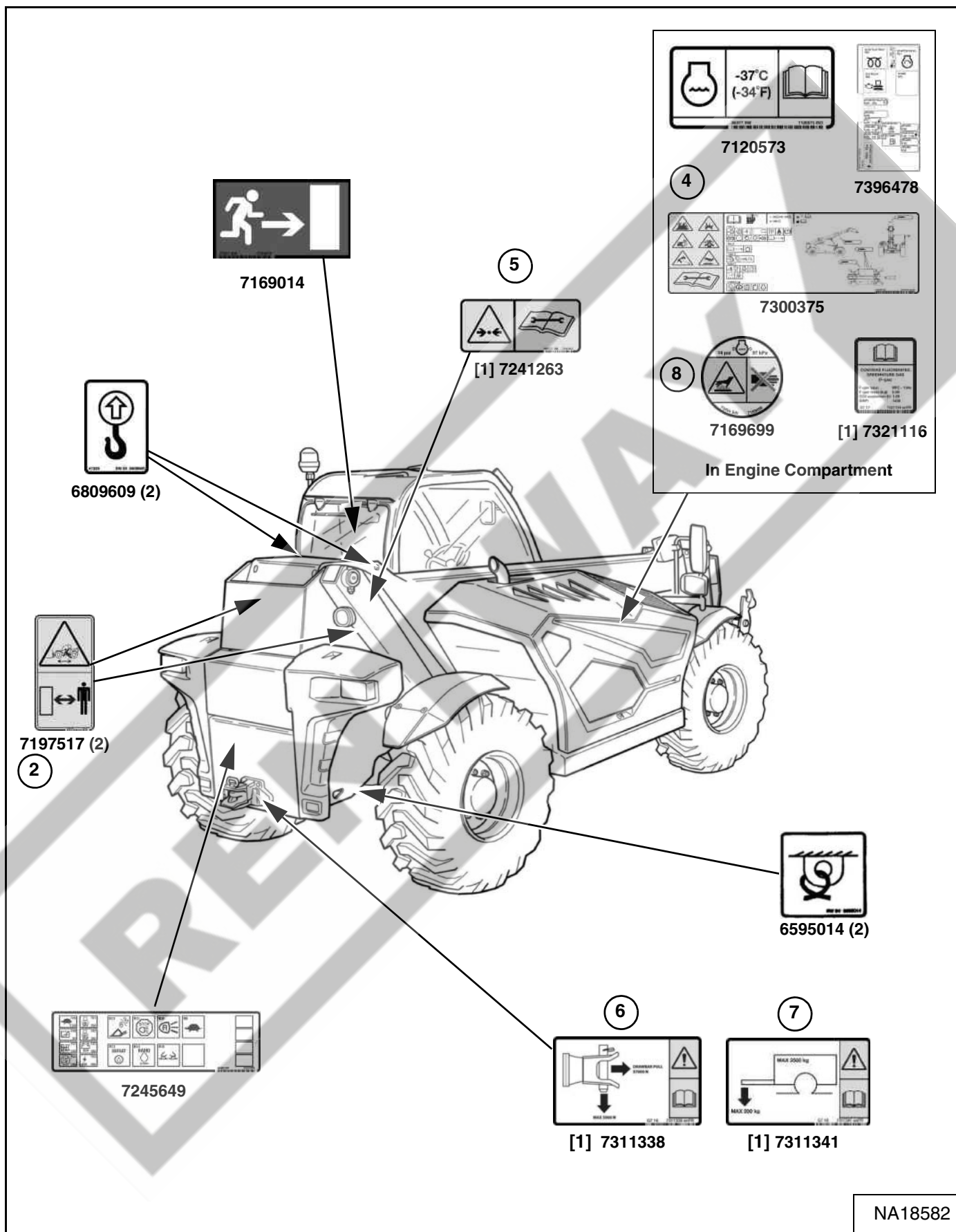


[1] Optional or Field Accessory. (Not Standard Equipment)

[2] Only for model T35.105LRB.

MACHINE SIGNS (DECALS) (CONT'D)

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.



NA18582

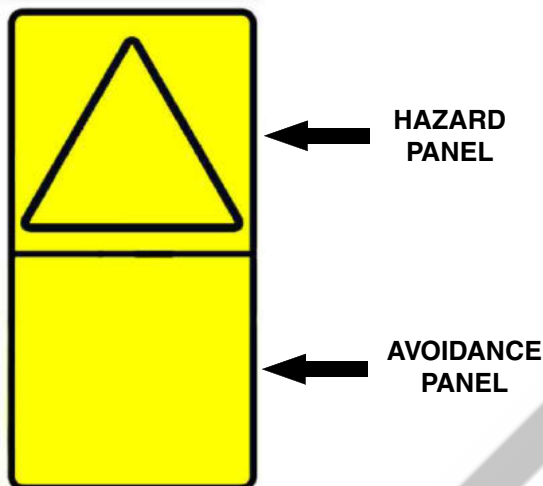
[1] Optional or Field Accessory. (Not Standard Equipment)

MACHINE SIGNS (DECALS) (CONT'D)

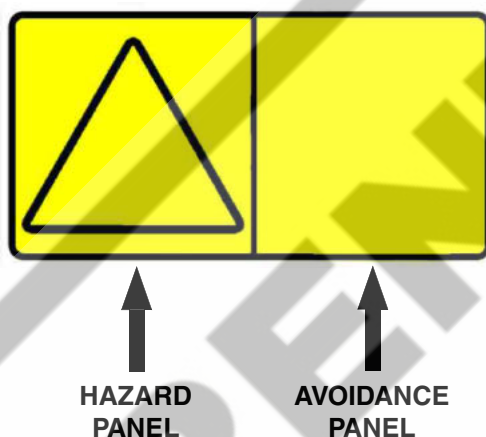
Pictorial-Only Safety Signs

Safety signs are used to alert the equipment operator or maintenance person to hazards that can 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 telescopic handler.

Vertical Configuration



Horizontal Configuration



The format consists of the hazard panel(s) and the avoidance panel(s):

Hazard panels depict a potential hazard enclosed in a safety alert triangle.

Avoidance panels depict actions required to avoid the hazards.

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

NOTE: See the overview on pages 26 and 27 for the machine location of each correspondingly numbered pictorial-only decal.

1. Falling And Crush Hazards (7198123)

The safety sign is located on each side of the boom head.



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.

W-2905-0211

2. Unexpected Machine Movement (7197517)

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



UNEXPECTED MACHINE MOVEMENT 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.

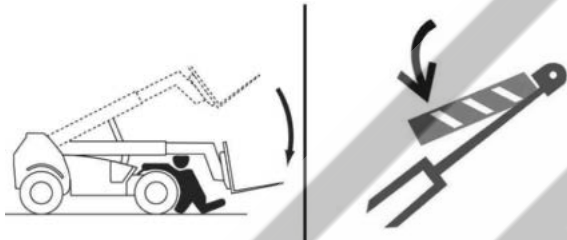
W-2904-0211

MACHINE SIGNS (DECALS) (CONT'D)

Pictorial-Only Safety Signs (Cont'd)

3. Crush Hazard (7197650)

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



P-100830

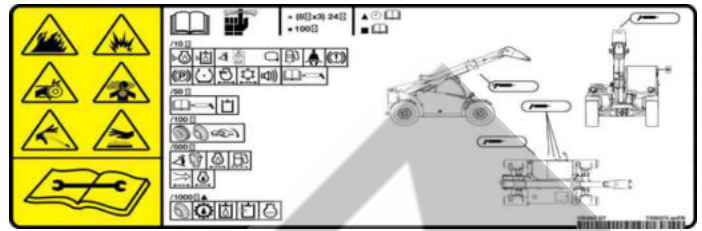
AVOID DEATH

- Disconnecting or loosening any hydraulic tubeline, hose, fitting, component or a 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-1030-1210

4. Service Checklist And Schedule (7300375)

The safety sign is located inside the engine compartment.



AVOID 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.

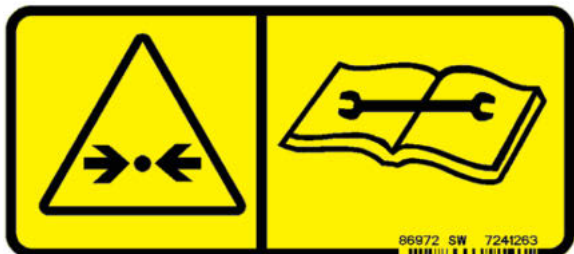
W-2782-0409

MACHINE SIGNS (DECALS) (CONT'D)

Pictorial-Only Safety Signs (Cont'd)

5. Accumulated Hydraulic Pressure (7241263)

The safety sign is located at the rear of the frame and under the front frame cover.



WARNING

**PRESSURIZED FLUID CAN CAUSE
SERIOUS INJURY OR DEATH**

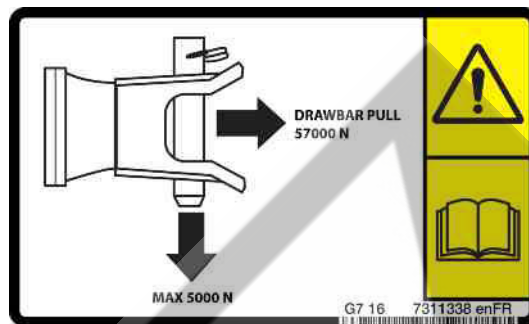
**Always release hydraulic pressure from accumulator
before service.**

W-2984-1113

6. Hook Maximum Capacity (7311338)

The safety sign is located above the hitch.

For Rotating Tow Hitch:



WARNING

AVOID INJURY OR DEATH

**Read, understand and follow all the instructions and
safety precautions in this manual and on safety
signs (decals).**

**Failure to follow the safety precautions could result
in serious injury or death.**

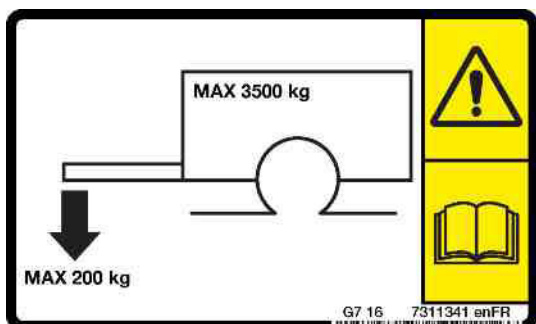
W-2815-0510

MACHINE SIGNS (DECALS) (CONT'D)

Pictorial-Only Safety Signs (Cont'd)

7. Trailer Hook Maximum Capacity (7311341)

The safety sign is located above the hitch.



AVOID INJURY OR DEATH

Read, understand and follow all the instructions and safety precautions in this manual and on safety signs (decals).

Failure to follow the safety precautions could result in serious injury or death.

W-2815-0510

8. Hot Pressurised Fluid (7169699 and 7185935)

The safety sign is located on the engine coolant tank cap.



HOT PRESSURISED FLUID CAN CAUSE SERIOUS BURNS

- Never open hot.
- OPEN SLOWLY.

W-2755-EN-0909

The safety sign is located on the boom head and on the hydraulic fluid tank.



AVOID BURNS

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

W-3032-0718



Bobcat®

LOAD CHARTS

CHARTS FOR T35.105RB MACHINE35

CHARTS FOR T35.105LRB MACHINE36



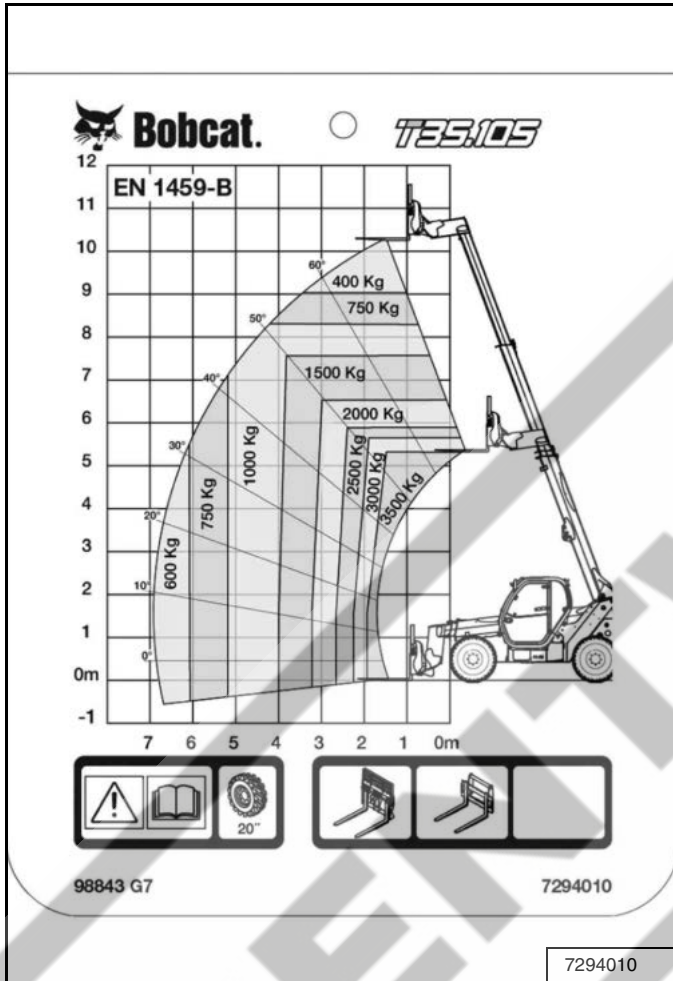


Bobcat®

CHARTS FOR T35.105RB MACHINE

Chart for the machine T35.105RB on 20" tyres:

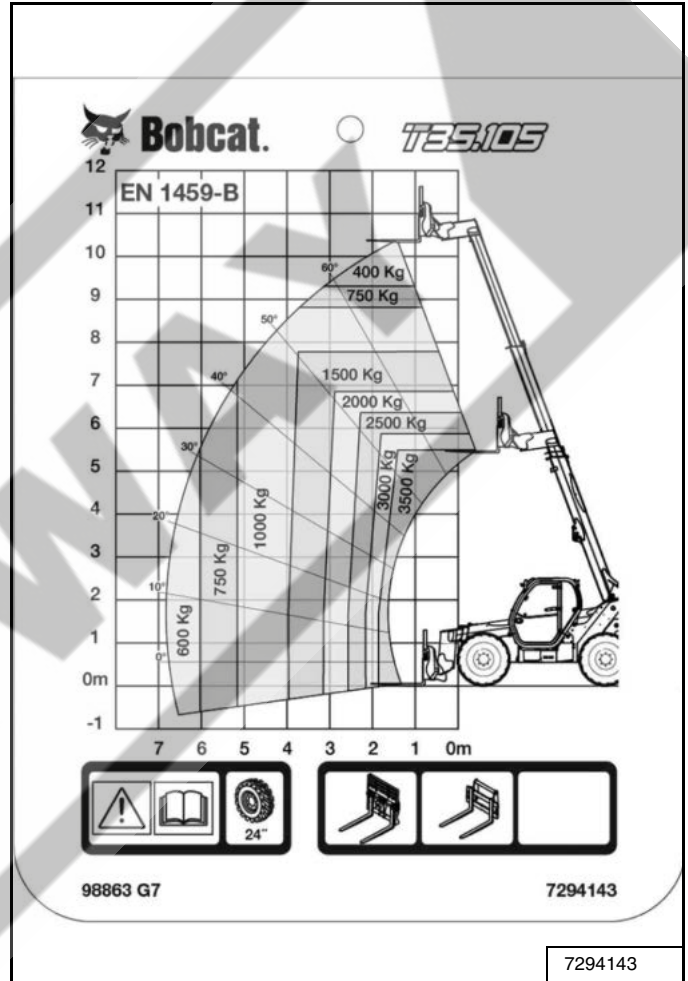
- **CAMSO 405/70-20/14 PR TM R4**
- with inflation pressure of 450 kPa (4,5 bar) (65 psi).
- with floating pallet forks.
- **CAMSO 405/70-20/16 PR TM R4**
- with inflation pressure of 450 kPa (4,5 bar) (65 psi).
- with floating pallet forks.
- **DUNLOP 405/70 R20 168A2 152J MPT SPT9**
- with inflation pressure of 550 kPa (5,5 bar) (80 psi).
- with floating pallet forks.



Complies with stability test EN1459 Annex B and the relevant parts of ISO 22915

Chart for the machine T35.105RB on 24" tyres:

- **CAMSO 400/80-24/20 PR TM R4**
- with inflation pressure of 425 kPa (4,25 bar) (62 psi).
- with floating pallet forks.
- **MICHELIN 400/80-24 162A8 IND TL POWER CL**
- with inflation pressure of 425 kPa (4,25 bar) (62 psi).
- with floating pallet forks.
- **DUNLOP 405/70R24 168A2 152J MPT SPT9**
- with inflation pressure of 520 kPa (5,20 bar) (75 psi).
- with floating pallet forks.



Complies with stability test EN1459 Annex B and the relevant parts of ISO 22915



WARNING

**TIPPING OR ROLLOVER CAN CAUSE
SERIOUS INJURY OR DEATH**

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

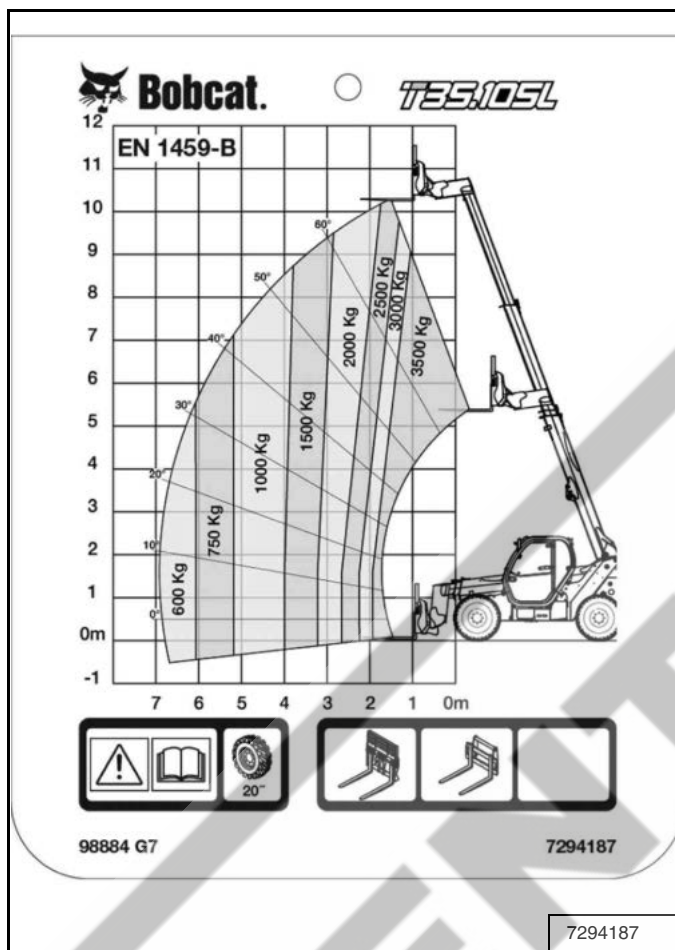
Exceeding the rated load capacity can cause the machine to tip or rollover.

W-2928-EN-1112

CHARTS FOR T35.105LRB MACHINE

Chart for the machine T35.105LRB on 20" tyres:

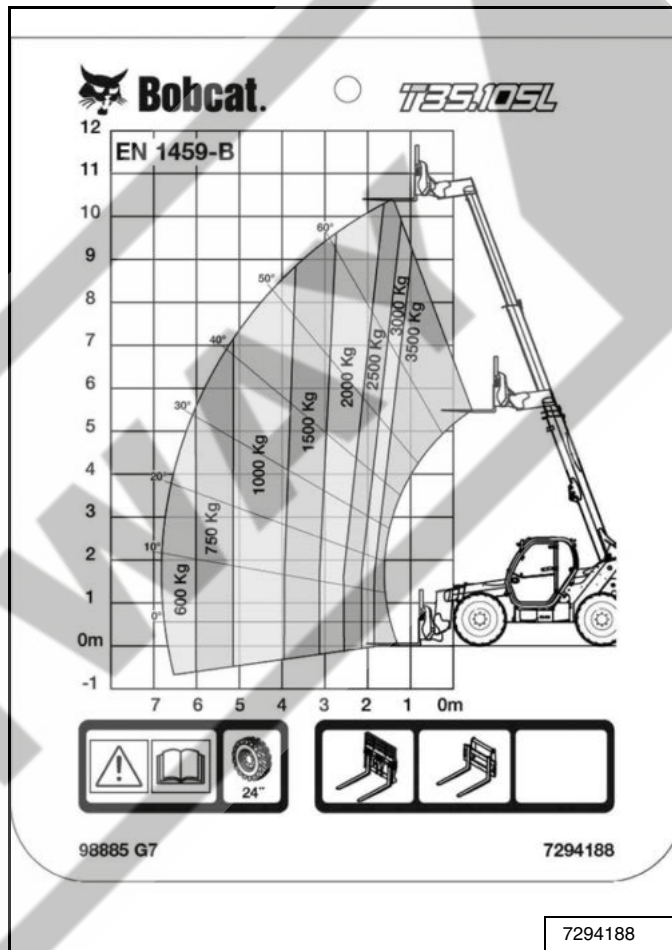
- **CAMSO 405/70-20/14 PR TM R4**
- with inflation pressure of 450 kPa (4,5 bar) (65 psi).
- with floating pallet forks.
- **CAMSO 405/70-20/16 PR TM R4**
- with inflation pressure of 450 kPa (4,5 bar) (65 psi).
- with floating pallet forks.
- **DUNLOP 405/70 R20 168A2 152J MPT SPT9**
- with inflation pressure of 550 kPa (5,5 bar) (80 psi).
- with floating pallet forks.



Complies with stability test EN1459 Annex B and the relevant parts of ISO 22915

Chart for the machine T35.105LRB on 24" tyres:

- **CAMSO 400/80-24/20 PR TM R4**
- with inflation pressure of 425 kPa (4,25 bar) (62 psi).
- with floating pallet forks.
- **MICHELIN 400/80-24 162A8 IND TL POWER CL**
- with inflation pressure of 425 kPa (4,25 bar) (62 psi).
- with floating pallet forks.
- **DUNLOP 405/70R24 168A2 152J MPT SPT9**
- with inflation pressure of 520 kPa (5,20 bar) (75 psi).
- with floating pallet forks.



Complies with stability test EN1459 Annex B and the relevant parts of ISO 22915



WARNING

**TIPPING OR ROLLOVER CAN CAUSE
SERIOUS INJURY OR DEATH**

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

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

W-2928-EN-1112

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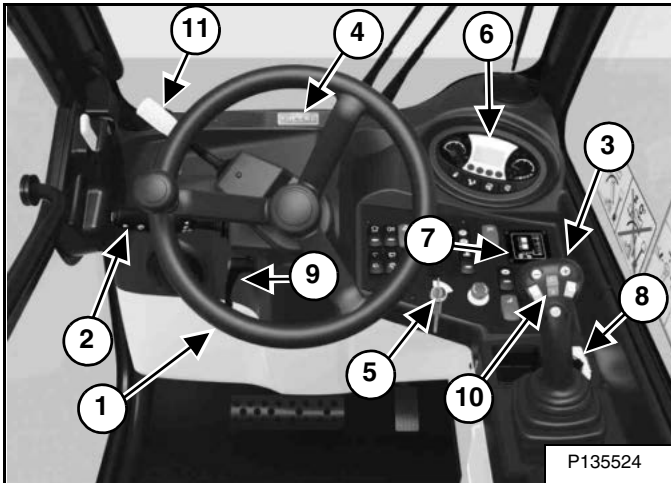


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OPERATOR CONTROLS IDENTIFICATION

Operator Components

Figure 9



Steering Wheel (Item 1) [Figure 9] (See Steering Wheel on Page 42.)

Multi-function Lever (Item 2) [Figure 9] (See Multi-function Lever on Page 43.)

Hydraulic Control Lever (Joystick) (Item 3) [Figure 9] (See HYDRAULIC CONTROLS on Page 77.)

Centre Indicator Panel (Item 4) [Figure 9] (See Centre Indicator Panel on Page 45.)

Right Instrument and Indicator Panel (Item 5) [Figure 9] (See Right Instrument And Indicator Panel on Page 44.)

Display Panel (Item 6) [Figure 9] (See Display Panel on Page 48.)

Longitudinal Load Moment Indicator (Item 7) [Figure 9] (See Longitudinal Load Moment Indicator (LLMI) on Page 46.)

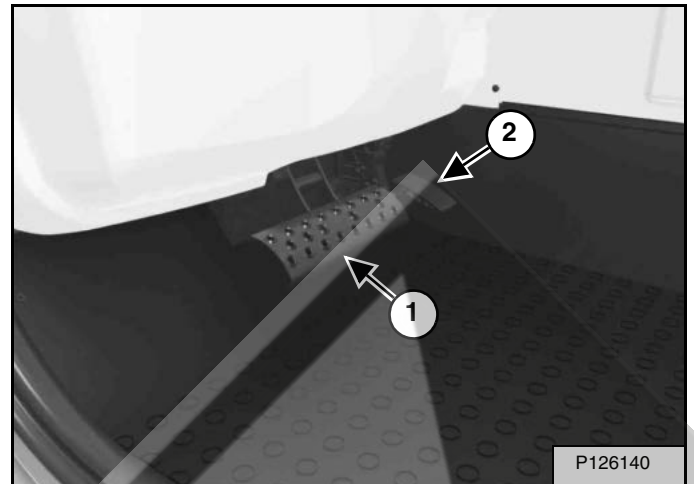
Selection Mode Switch (Item 8) [Figure 9] (See Selection Mode Switch on Page 116.)

Steering Wheel Tilt Adjustment (if equipped) (Item 9) [Figure 9] (See Steering Wheel Tilt Position on Page 43.)

Travel Direction Switch (Item 10) [Figure 9] (See Travel Direction on Page 42.)

FNR Lever (Item 11) [Figure 9] (See Travel Direction on Page 42.)

Figure 10



Brake Pedal / Inching Control (Item 1) [Figure 10] (See Brake Pedal And Inching Control on Page 52.)

Accelerator Pedal (Item 2) [Figure 10] (See Accelerator Pedal on Page 52.)



WARNING

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.

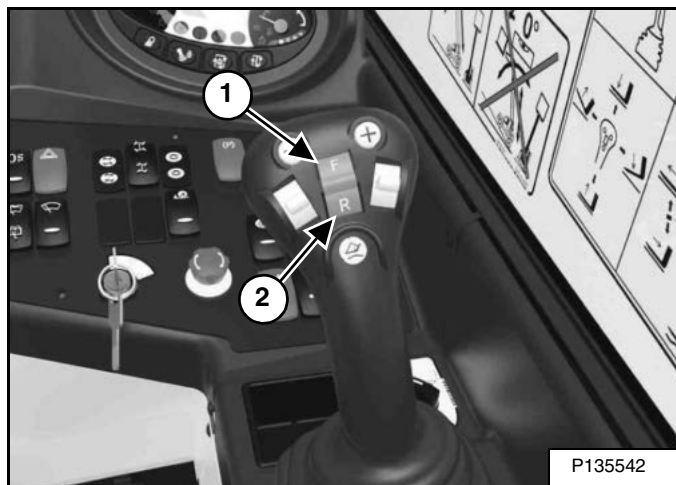
W-2979-0813

OPERATOR CONTROLS IDENTIFICATION (CONT'D)

Travel Direction

Travel Direction Switch

Figure 11

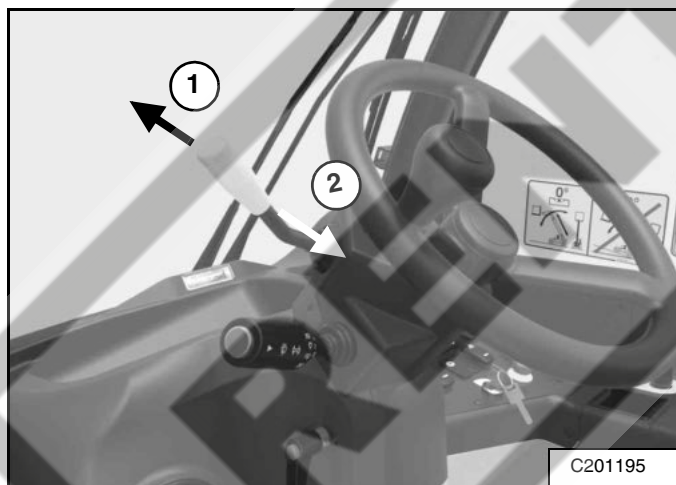


Press the top of the switch (Item 1) for forward travel; the bottom of the switch (Item 2) [Figure 11] for reverse travel.

The back-up alarm will sound when the switch is in the reverse position.

Travel Direction Lever (If Equipped)

Figure 12

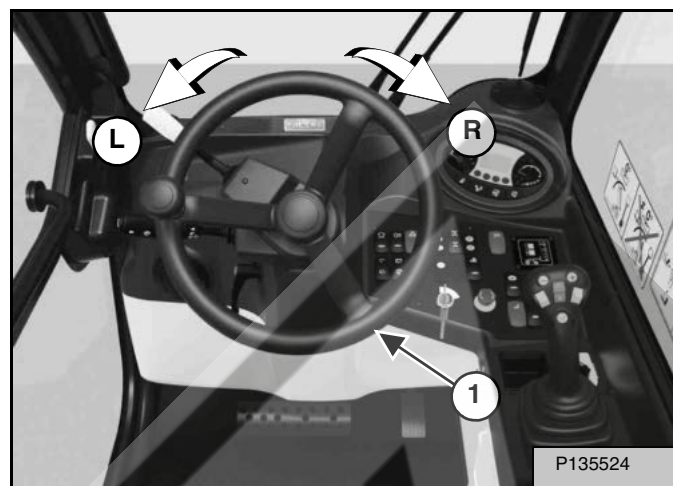


Move the lever forward (Item 1) for forward travel; backward (Item 2) [Figure 12] for reverse travel.

The back-up alarm will sound when the lever is in the reverse position.

Steering Wheel

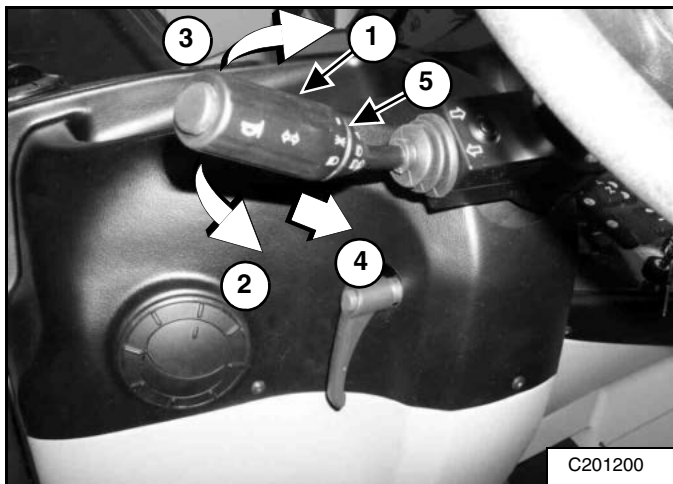
Figure 13



Turn the steering wheel (Item 1) [Figure 13] clockwise (R) to turn right; anticlockwise (L) to turn left. (See DRIVING AND STEERING THE TELESCOPIC HANDLER on Page 68.)

Multi-function Lever

Figure 14



This lever (Item 1) [Figure 14] has three functions:

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

Direction Signal

Move the lever backward (Item 2) for left direction signal; forward (Item 3) [Figure 14] for right direction signal.

NOTE: Be sure to turn the direction signals off after you have completed the turn.

Horn

Push the lever in (Item 4) [Figure 14] to sound the horn.

Headlights And Rear Lights

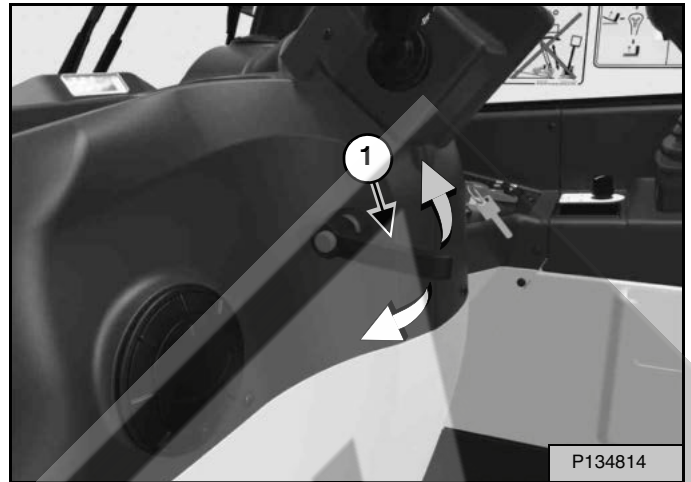
The lever also includes the lights switch (Item 5) [Figure 14] which has three positions. Rotate the lever to select front lights:

OFF
Parking lights and rear lights
Headlights and rear lights

When the headlights are ON: Push the lever away from the steering wheel and release it to change from high to low or low to high beam headlights.

Steering Wheel Tilt Position

Figure 15



Turn the lever (if equipped) (Item 1) [Figure 15] anticlockwise to loosen the steering wheel tilt mechanism.

When the steering wheel is in the desired position, turn the lever (Item 1) [Figure 15] clockwise. Tighten firmly to lock position.

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

OPERATOR CONTROLS IDENTIFICATION (CONT'D)

Right Instrument And Indicator Panel

Figure 16



Figure 17



Right Instrument And Indicator Panel [Figure 16] and [Figure 17]

1. **Rotating Beacon (Green Light)** - Press the bottom of the switch to turn the rotating beacon (if equipped) ON; press the top to turn OFF.
2. **Rear Fog Lights (Orange Light)** - Press bottom of the switch to turn rear fog lights ON; press top to turn OFF.
3. **Hazard Lights (Red Light)** - 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.
4. **Roof Wiper / Rear Wiper (Green Light)** - Press the top of the switch to turn the roof wiper ON. Press the bottom of the switch to turn the rear wiper (if equipped) ON. Move switch to the centre position to turn both wipers OFF.

5. **Washer** - Press and hold the top of the switch to turn the front washer and the top washer ON; press and hold the bottom to turn the rear washer ON.
6. **Front Wiper (Green Light)** - Press the bottom of the switch to turn the front wiper ON; press the top to turn OFF.
7. **Steering Mode Indicator (Orange Light)** - Indicates the active steering mode.
8. **Steering Mode Switch** - To change steering modes (4-Wheel, 2-Wheel, Crab). (See STEERING MODE SELECTION on Page 56.)
9. **Brake Pressure Indicator (Red / Orange Light) (If Equipped)** - Red light comes ON when brake pressure is too low. Orange light comes ON when there is a braking system malfunction.
10. **NOT USED**
11. **NOT USED**
12. **Speed Management (Yellow Light)** - (See SPEED MANAGEMENT on Page 74.)
13. **Parking Brake** - Press the bottom of the switch to engage or disengage the Parking Brake. (See PARKING BRAKE on Page 65.)
14. **Auto Reverse Cooling Fan Switch (White Light) (If Equipped)** - Press bottom of the switch once to clean debris from radiator. Fan resumes normal operation after 80 seconds.
15. **ECO Mode** - Press the bottom of 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 91.)
16. **DPF Regen / Inhibit Switch** - If requested, press the top of the switch for 3s to force DPF regeneration. If DPF regeneration is not requested, pressing the top of the switch will display the soot load in percent (%) until released. Press the bottom of the switch to inhibit DPF regeneration. (See DIESEL PARTICULATE FILTER (DPF) SYSTEM on Page 61.)
17. **NOT USED**
18. **Hydraulic Quick-Tach Switch (If Equipped)** - Press and hold the top of the switch to unlock the quick-tach. When released, the quick-tach pins will automatically lock at a slow speed. Press and hold the bottom of the switch to speed up locking of the quick-tach.
19. **NOT USED**
20. **NOT USED**
21. **NOT USED**

OPERATOR CONTROLS IDENTIFICATION (CONT'D)

Right Instrument And Indicator Panel (Cont'd)

22. **Longitudinal Load Moment Indicator** - (See Longitudinal Load Moment Indicator (LLMI) on Page 46.) Indicates the successive levels of machine longitudinal stability. (See Longitudinal Load Moment Controller (LLMC) on Page 116.)
23. **Emergency Stop** - Push to immediately shut down the engine and its fuel supply. The display screen shows [STOP]. Pull to unlock from pressed position.
24. **Key Switch (If Equipped)** - Used to turn the electrical system on and off, and to start and stop the engine. (See Standard Key Panel on Page 88.)
25. **Start Switch (Keyless) (If Equipped)** - Used to turn the electrical system on and off, and to start and stop the engine. (See Keypad Panel (If Equipped) on Page 89.)
26. **Keypad (Keys 0 through 9) (If Equipped)** - Used to enter a number code (password) to allow starting the engine. An asterisk will show in the display screen for each key press.
27. **LOCK Key (If Equipped)** - Used to lock keypad. The lock key will display a red light to indicate a password is required to start the telescopic handler. (See Password Lockout Feature on Page 251.)
28. **UNLOCK Key (If Equipped)** - Used to unlock keypad. The unlock key will display a green light to indicate the telescopic handler can be started without a password. (See Password Lockout Feature on Page 251.)



WARNING

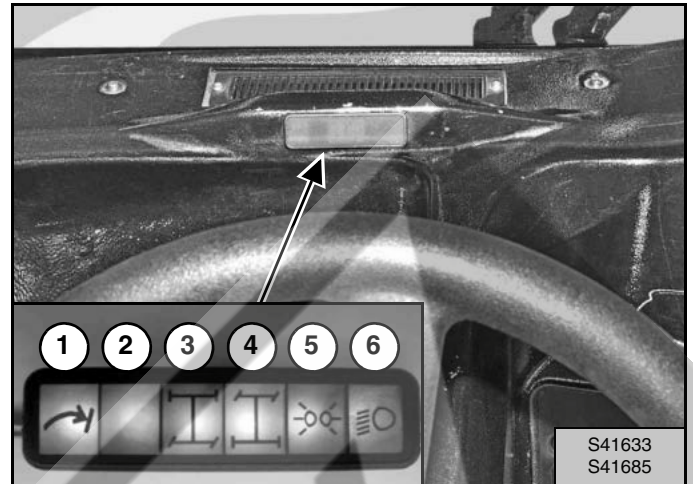
Before you exit the operator's position:

- 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.

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Centre Indicator Panel

Figure 18



Centre Indicator Panel [Figure 18]

1. **Frame-Levelling Angle Indicator** - The light comes ON when frame-levelling angle limit (left or right) is reached. (See Using Frame-Levelling (If Equipped) on Page 122.)
2. **NOT USED**
3. **Front Wheel Alignment Indicator (Orange Light).**
4. **Rear Wheel Alignment Indicator (Orange Light).**
5. **Parking Light Indicator (Green Light).**
6. **Low Beam Headlights Indicator (Green Light).**

OPERATOR CONTROLS IDENTIFICATION (CONT'D)

Longitudinal Load Moment Indicator (LLMI)

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

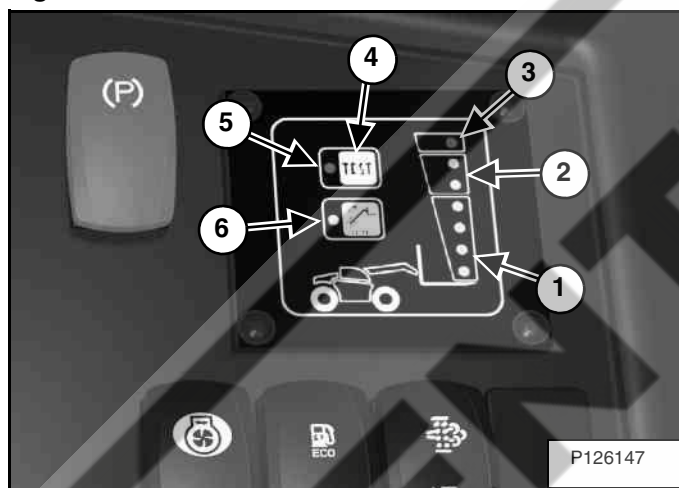
The LLMI is intended to warn for tipping over in the case of:

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

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 19



The indicator lights (Items 1, 2 and 3) [Figure 19] sequentially illuminate as the machine's longitudinal stability decreases. They identify three zones of the machine's longitudinal stability level:

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.

NOTE: Regardless the longitudinal stability level some boom functions can be disabled depending on the frame angle status (if equipped). (See Using Frame-Levelling (If Equipped) on Page 122.)

Secure Zone:

Green indicator lights (Item 1) [Figure 19] (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 19] (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.

OPERATOR CONTROLS IDENTIFICATION (CONT'D)

Longitudinal Load Moment Indicator (LLMI) (Cont'd)

Critical Zone:

Red indicator light (Item 3) **[Figure 19]** (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 (reduced in speed)
- Auxiliary hydraulic functions (reduced in speed)
- Frame-levelling (if equipped) (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. (See Selection Mode Switch on Page 116.)

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.

Test Button:

The test button (Item 4) **[Figure 19]** has two functions:

- Testing the correct functioning of the LLMI and LLMC. (See LLMC CALIBRATION TEST on Page 151.)
- Calibrating the LLMC (See your Bobcat dealer for calibration).

The test indicator light (RED) (Item 5) **[Figure 19]** 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 19]** indicates that the machine is under control of the LLMC. The light flashes when the LLMC override mode is activated. (See Selection Mode Switch on Page 116.)

OPERATOR CONTROLS IDENTIFICATION (CONT'D)

Display Panel

Figure 20



1. **Direction Signal (Green Light)** - The light will flash when a direction signal is activated or when the hazard lights are activated.
2. **General Warning (Red Light)** - The light comes on when a general error is present. (See Service Codes* and "MONITORING THE DISPLAY PANEL" on page 92.)
3. **Low Speed (Yellow Light)** - The light comes on when low speed is activated.
4. **Engine Coolant Temperature (Red Light)** - The light comes on if the engine coolant temperature is high. The light will flash if the engine coolant temperature is extremely high.
5. **Engine Malfunction (Red Light)** - The light comes on when there is an engine malfunction or failure. (See Service Codes* and "MONITORING THE DISPLAY PANEL" on page 92.)
6. **Engine Temperature Gauge** - Shows the engine coolant temperature.
7. **Display Screen** - Displays information. (See Display Screen on Page 50.)
8. **Seat Belt (Red Light)** - Instructs operator to fasten seat belt. Remains lit for 45 seconds.
9. **Forward - Neutral - Reverse - F-N-R (Yellow Light)** - The light will flash when attempting to start the engine when the Travel Direction Control (Travel Direction Switch and / or Lever) is not in NEUTRAL position. (See Travel Direction on Page 42.)
10. **Joystick Lockout (Red Light)** - The light comes on when the joystick lockout is activated. The light will flash when there is a joystick malfunction or failure. (See Service Codes*.)
11. **Parking Brake And Operator Position (Red Light)** - The light comes on when the parking brake is engaged. (See PARKING BRAKE on Page 65.) The light will flash and a warning horn is activated when the parking brake pressure is too low OR when the operator leaves the operator seat while the parking brake is not engaged.
12. **Headlights High Beam (Blue Light)** - The light comes on when high beam is activated. (See Multi-function Lever on Page 43.)
13. **NOT USED**
14. **Fuel Level (Red Light)** - The light comes on when the fuel level is low.

* See SYSTEM SETUP AND ANALYSIS for Service Code description. (See DIAGNOSTIC SERVICE CODES on Page 203.)

OPERATOR CONTROLS IDENTIFICATION (CONT'D)

Display Panel (Cont'd)

15. **Hydraulic System Malfunction (Red Light)** - 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. (See Service Codes*.)
 16. **Fuel Level Gauge** - Shows the amount of fuel in the tank.
 17. **Hot Exhaust System Temperature (Yellow Light)** - The light comes on when the exhaust reaches high temperatures suitable for active Diesel Particulate Filter (DPF) regeneration. (See DPF Icons on Page 61.)
 18. **DPF Soot Load Level** - Shows the amount of soot in the Diesel Particulate Filter (DPF). (See DPF Icons on Page 61.)
 19. **Work Lights** - Press once to turn front and rear work lights ON (left green LED will be on). Press a second time to turn work lights OFF (left green LED will be off).
- NOTE: Work Lights can only be activated when parking lights are ON. (See Multi-function Lever on Page 43.)**
20. **Hydraulic Control Lockout** - Press once to deactivate all hydraulic functions of the boom. Press a second time to enable the hydraulic functions. Use to deactivate all functions of the Hydraulic Control Lever (Joystick) when travelling on a road.
 21. **Continuous Flow Auxiliary Hydraulics** - For continuous operation of the auxiliary hydraulics, press this button once to activate the continuous auxiliary hydraulics system (left green LED will light) and then press the joystick front button (Item 9) [Figure 70 on Page 77]. Press a second time to deactivate the system.
- Auxiliary Hydraulics At Startup** - For auxiliary hydraulics at startup, press this button for three seconds to show the auxiliary hydraulics default mode at startup. (See Auxiliary Hydraulics At Startup on Page 78.)
22. **Information** - Press to cycle through the display screen menus. (See Display Screen on Page 50.)
- * See SYSTEM SETUP AND ANALYSIS for Service Code description. (See DIAGNOSTIC SERVICE CODES on Page 203.)

IMPORTANT

AVOID ENGINE DAMAGE

Continuing to operate the machine when a service code has been recorded can cause serious engine damage. A service code will not cause the engine to shut down automatically.

If a service code is observed:

- Park the machine in a safe location.
- Stop the engine immediately.
- Maintain or repair the machine as required.

I-2353-0112

OPERATOR CONTROLS IDENTIFICATION (CONT'D)

Display Screen

Figure 21

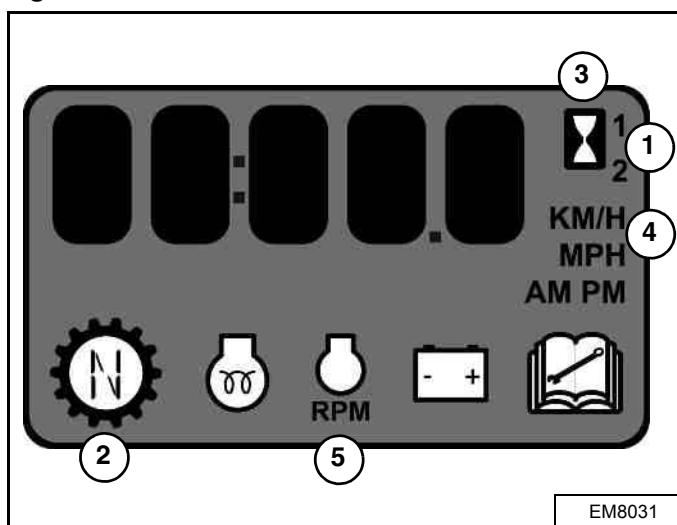


Figure 22



The display screen [Figure 21] is located on the display panel. (See Display Panel on Page 48.)

The following icons are always displayed:

- The displayed numbers (Item 1) [Figure 21] are not used.
- **FORWARD - NEUTRAL - REVERSE (F-N-R)** - The displayed character (Item 2) [Figure 21] indicates the selected travel mode. (See Travel Direction on Page 42.)

The display screen can display the following information:

- **Engine Hours** - Shows total time the engine ever ran (hours). When this menu is activated, the hourglass icon (Item 3) [Figure 21] will light. The Engine Hours menu will show by default upon startup.
- **Machine Speed** - NOT USED (Item 4) [Figure 21]
- **Engine Speed** - Shows the actual engine revolutions per minute (rpm). When this menu is activated, the rpm icon (Item 5) [Figure 21] will light.
- **Job Hours** - Shows the total time the engine ran during the job (hours). When this menu is activated, the hourglass icon (Item 3) [Figure 21] will light. Press the information button (Item 1) [Figure 22] for 3 seconds to reset the job hours.
- **Maintenance Clock** - Shows when the next service interval is due (if enabled). When this menu is activated, the hourglass icon (Item 3) [Figure 21] and Service icon (Item 4) [Figure 23] will light. (See MAINTENANCE CLOCK on Page 252.)
- **Boom Angle** - Shows the inclination angle of the telescopic boom (degrees). When this menu is activated, the degree symbol (°) will be displayed on the right side of the display screen.
- **Speed Management (Creep)** - Shows the Speed Management value (%). When this menu is activated, 'C' followed by the Speed Management value will be displayed on the left side of the display screen if the Speed Management is enabled, [C OFF] if the Speed Management is disabled. (See SPEED MANAGEMENT on Page 74.)
- **Auxiliary Hydraulics** - Shows which percentage (%) of the auxiliary hydraulics flow is available. When this menu is activated, 'A' followed by the maximum available percentage will be displayed on the left side of the display screen. (See Changing The Maximum Auxiliary Flow on Page 78.)
- **Frame-Levelling Angle** - Shows the frame level angle (degrees). When this menu is activated, the degree symbol (°) will be displayed on the right side of the display screen. (See Using Frame-Levelling (If Equipped) on Page 122.)
- **Auto Reverse Cooling Fan (If Equipped)** - Shows the auto reverse cooling fan interval (minutes). When this menu is activated, 'I' followed by the reverse cooling fan interval will be displayed on the left side of the display screen. (See AUTO REVERSE COOLING FAN on Page 80.)

Use the information button (Item 1) [Figure 22] to cycle through the different information.

OPERATOR CONTROLS IDENTIFICATION (CONT'D)

Display Screen (Cont'd)

Figure 23

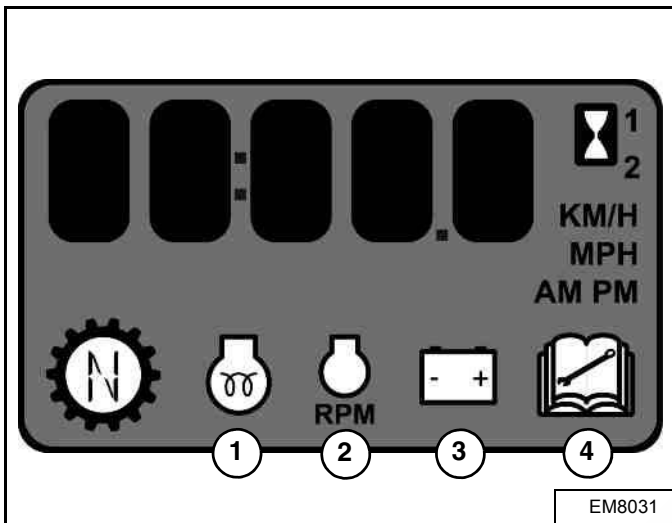


Figure 24

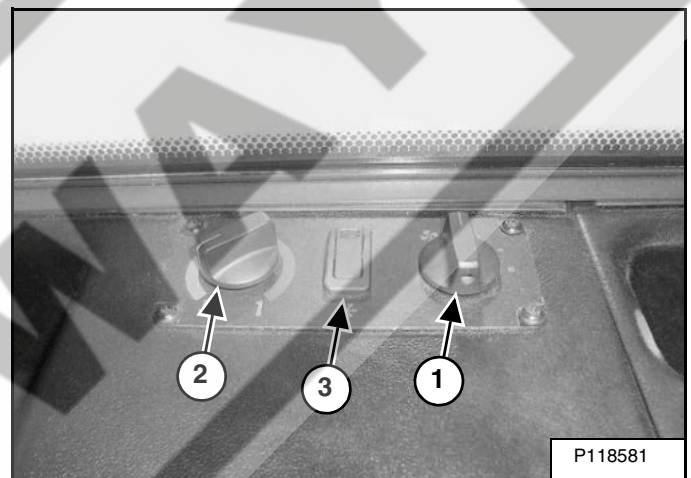


The following information can be displayed on the display screen [Figure 23]:

- **Engine Preheat** - [WAIT] is displayed automatically during the preheating of the engine (See STARTING THE ENGINE on Page 88.) When this menu is activated, the engine preheat icon (Item 1) [Figure 23] will light.
- **Steering Mode Change Management** - Shows the active steering mode change management. (See Steering Mode Management on Page 57.) When this menu is activated, the rpm icon (Item 2) [Figure 23] will light.
- **Battery / Charging Voltage** - Shows the battery voltage. To activate this menu, press the work lights button (Item 1) [Figure 24] for three seconds while in the engine hours menu. When the battery voltage menu is activated, the battery voltage icon (Item 3) [Figure 23] will light. Press the information button (Item 2) [Figure 24] once to return to the engine hour menu. In combination with general warning icon (see Item 2 "Display Panel" on page 48) it shows a battery voltage error.
- **Service Codes** - Shows the active Service Codes. (See Viewing Service Codes on Page 203.) When this menu is activated, the Service icon (Item 4) [Figure 23] will light.

Temperature Control Panel

Figure 25



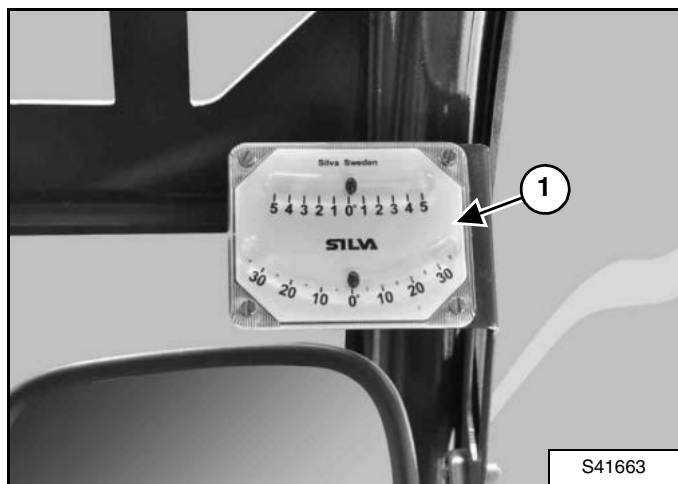
Right Rear Console [Figure 25]

1. **Fan Switch** - Turn switch clockwise to increase fan speed. "O" - Off, "I" - Low, "II" - Medium, "III" - Fast
2. **Temperature Control** - Turn clockwise to increase cab temperature; anticlockwise to decrease.
3. **Air Conditioning Switch (If Equipped)** - Press the top of the switch to turn the Air Conditioning ON - Press the bottom of the switch to turn the Air Conditioning OFF.

OPERATOR CONTROLS IDENTIFICATION (CONT'D)

Sight Level Gauge

Figure 26

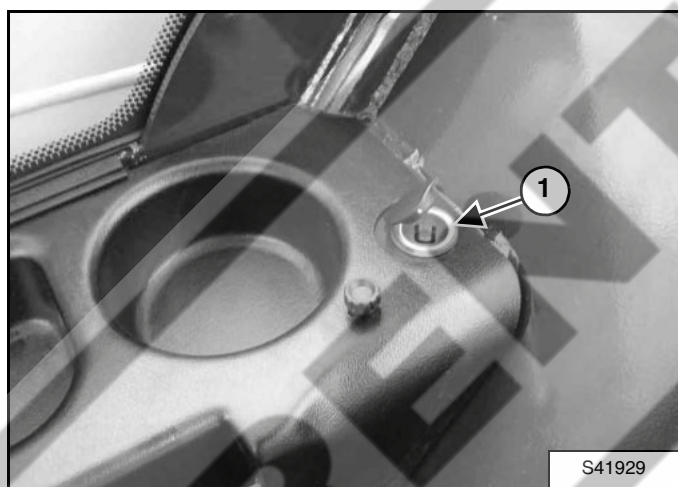


The sight level gauge (Item 1) [Figure 26] indicates position of the frame to the horizontal plane.

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

Auxiliary Power Outlet

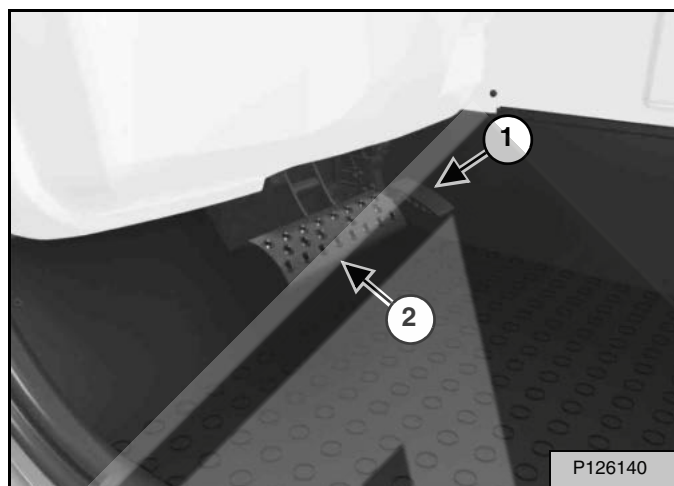
Figure 27



The Auxiliary Power Outlet (Item 1) [Figure 27] is a 12 volt receptacle for accessories.

Accelerator Pedal

Figure 28



The accelerator pedal (Item 1) [Figure 28] 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.

Brake Pedal And Inching Control

The brake pedal (Item 2) [Figure 28] is at the left of the accelerator pedal.

Press the brake a small amount to decrease travel speed and control inching (gradual travel of the machine). Press down to stop travel of the machine.

NOTE: Approximately the first half of the total brake pedal travel is for INCHING CONTROL.

OPERATOR CAB

Description

The Bobcat telescopic handler 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, Falling-Object Protective Structure per ISO 3449 (FOPS Level II) and OECD code 4, code 9 and code 10.

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.

WARNING

Never modify operator cab by welding, grinding, drilling holes or adding attachments unless instructed to do so by Bobcat Company. Do not operate without right window. Changes to the cab can cause loss of operator protection from rollover and falling objects, and result in serious injury or death.

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Cab Door

Figure 29

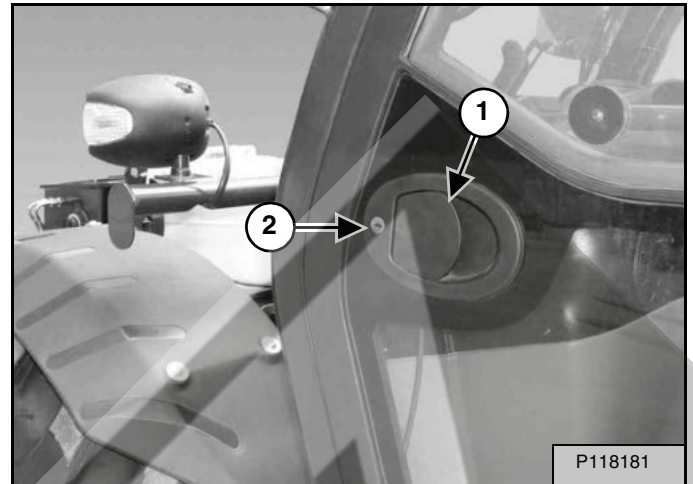
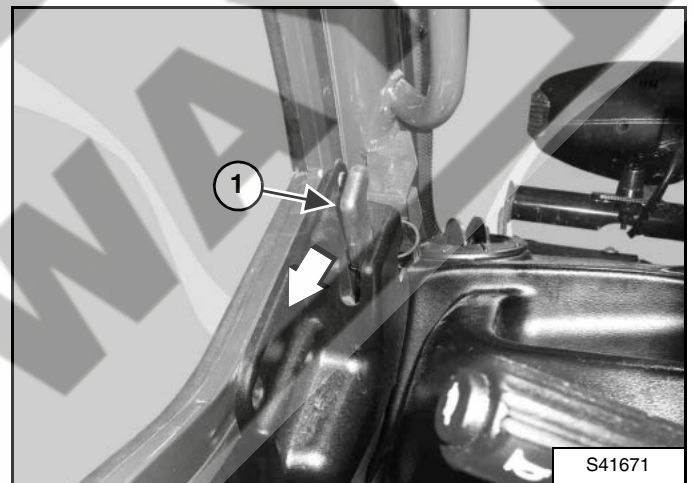


Figure 30



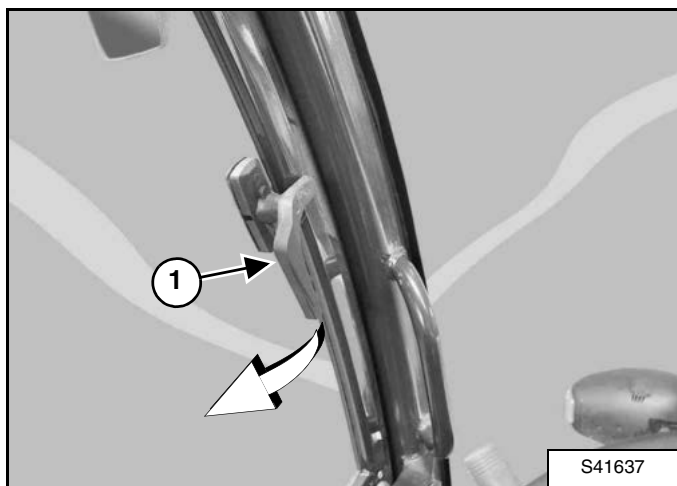
The cab door can be opened from the outside of the cab using the latch (Item 1) [Figure 29] and opened from the inside of the cab when you pull the lever (Item 1) [Figure 30] back (as shown).

The cab door can be locked (Item 2) [Figure 29] with the same key as the starter switch.

OPERATOR CAB (CONT'D)

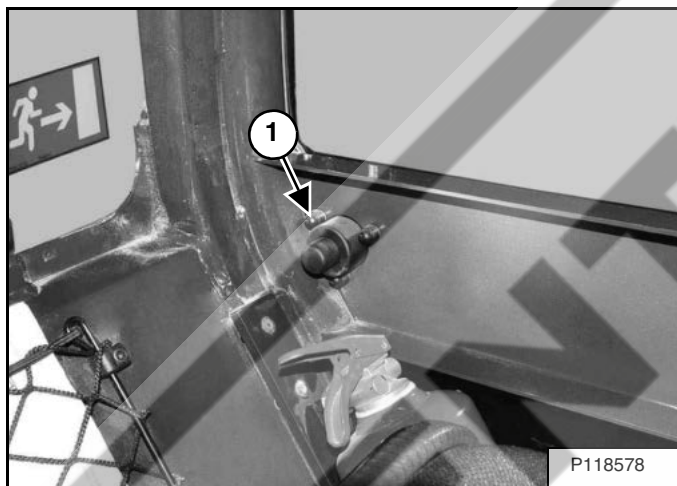
Cab Door Window

Figure 31



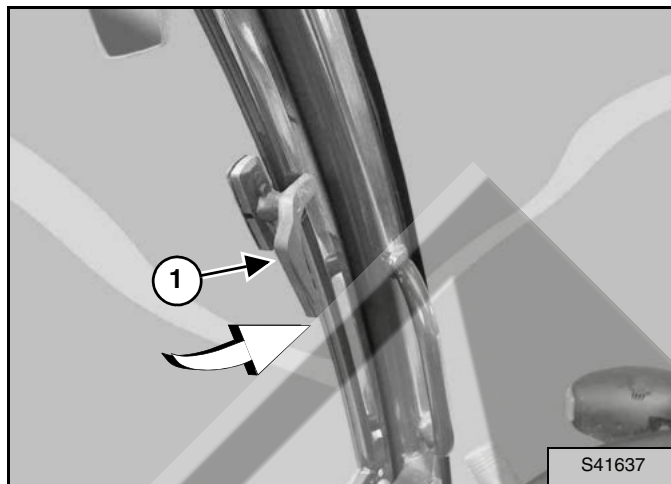
Turn the handle (Item 1) [Figure 31] (as shown) to unlock the window. Push the window fully open until it latches against the cab.

Figure 32



Push the knob (Item 1) [Figure 32] inside the cab to disengage the latch and close the window.

Figure 33

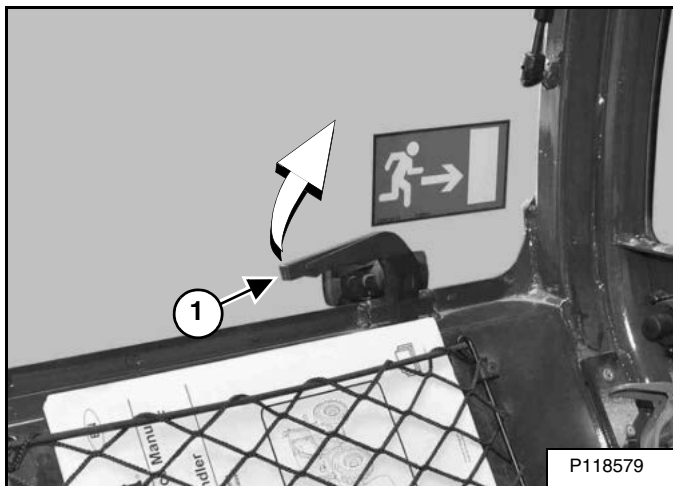


Turn the handle (Item 1) [Figure 33] back into the original position (as shown) to lock the window.

OPERATOR CAB (CONT'D)

Rear Cab Window

Figure 34

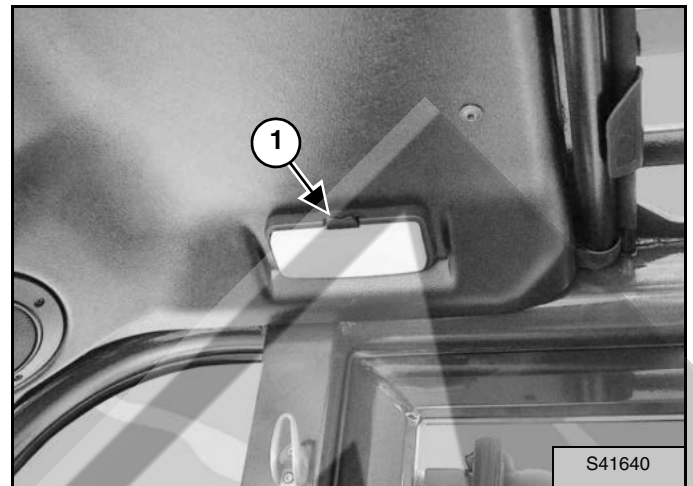


Turn the handle (Item 1) [Figure 34] (as shown) to unlock the rear window.

Push the rear window open until in fully open position.

Cab Light

Figure 35



The cab light [Figure 35] is located above the operator's left shoulder.

Move the switch (Item 1) [Figure 35] to the left or the right to turn the light ON. Move the switch to the centre position to turn the light OFF.

STEERING MODE SELECTION

Aligning Modes

To switch between the different steering modes (See DRIVING AND STEERING THE TELESCOPIC HANDLER on Page 68.) the operator has a choice between two aligning modes:

- In manual aligning mode, the operator has to make sure the front and rear wheels are straightened before selecting the desired steering mode.
- 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 Wheel Straight indicator light) are followed, the chosen steering mode will be automatically activated.

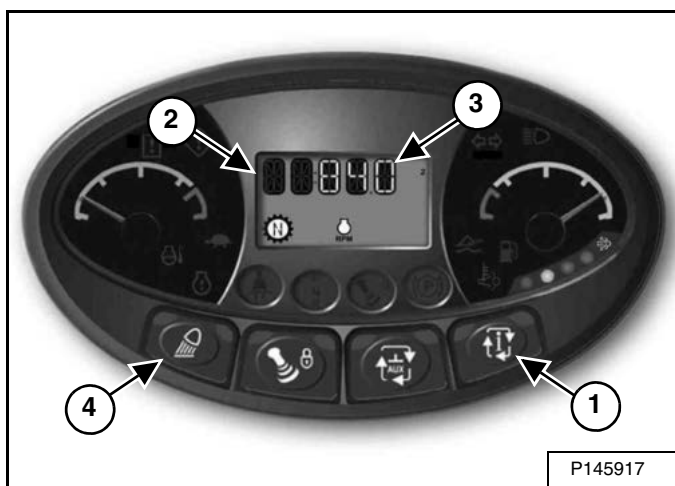
NOTE: It is recommended to perform the semi-automatic alignment procedure on a daily basis. Depending on the application, this interval may be reduced.

RENTWAY

STEERING MODE SELECTION (CONT'D)

Steering Mode Management

Figure 36



Press the information button (Item 1) to cycle the display screen (Item 2) until the engine speed menu (Item 3) [Figure 36] is displayed. (See Display Screen on Page 50.)

Press the work lights button (Item 4) [Figure 36] for 3 seconds until the aligning mode appears on the display screen.

Figure 37



The semi-automatic aligning mode is the default setting. [AUTO] [Figure 37] appears on the display screen.

Figure 38



Press the work lights button (Item 4) [Figure 36] once to switch to the manual aligning mode. [MANU] [Figure 38] will appear on the display screen. Pressing the work lights button again will switch back the aligning mode to semi-automatic.

Figure 39



Press the work lights button (Item 4) [Figure 36] for 3 seconds until [STORE] [Figure 39] appears on the display screen. The selected aligning mode has been saved now and will become active.

Press the information button (Item 1) [Figure 36] once to return to the engine hour menu.

STEERING MODE SELECTION (CONT'D)

Semi-Automatic Aligning Mode Procedure

Figure 40

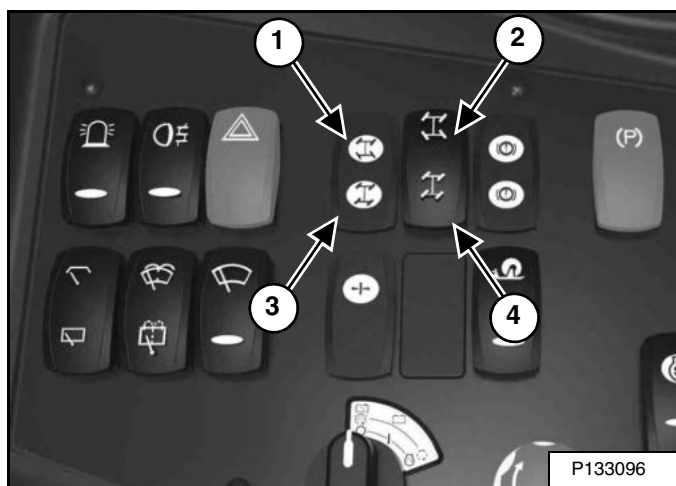
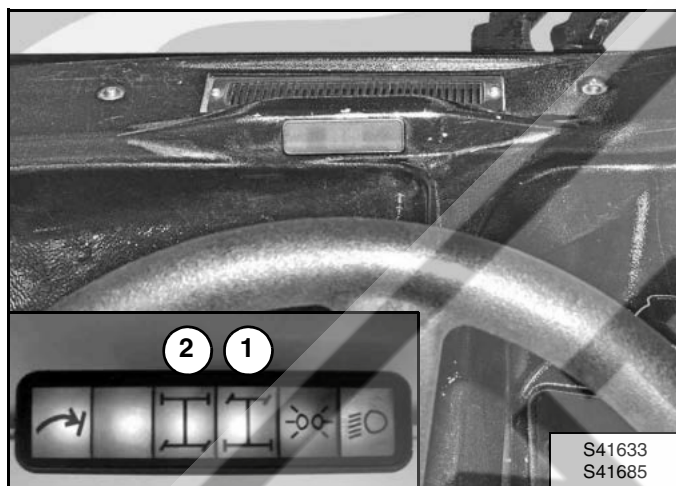


Figure 41



4-Wheel Steering (Top Switch Position)

The front wheels will turn the direction that the steering wheel is turned. The rear wheels turn the opposite direction. Indicator light (Item 1) [Figure 40] will be ON. Use in most working conditions. (See 4-Wheel Steering Mode on Page 68.)

Perform the following procedure to activate the 4-wheel steering mode:

Press top of the switch (Item 2) [Figure 40]. If the front and rear wheels are straight ahead, the 4-wheel steering mode will be activated.

If the front and / or rear wheels are not straight ahead, the semi-automatic aligning procedure will start:

1. If the rear wheels are not straight ahead, the Rear Wheels Straight indicator light (Item 1) [Figure 41] will flash. Turn the steering wheel until the light stays ON. The rear wheels are straight ahead now.
2. If the front wheels are straight ahead, the 4-wheel steering mode is active now.
3. If the front wheels are not straight ahead, the Front Wheels Straight indicator light (Item 2) [Figure 41] will flash. Turn the steering wheel until the light stays ON. The front wheels are straight ahead now.
4. The 4-wheel steering mode is active now.

STEERING MODE SELECTION (CONT'D)

Semi-Automatic Aligning Mode Procedure (Cont'd)

2-Wheel Steering (Centre Switch Position)

The front wheels will turn the direction that the steering wheel is turned. The rear wheels remain straight ahead. Use when travelling on roads at higher speeds. (No indicator light is on when in 2-wheel steering mode.) (See 2-Wheel Steering Mode on Page 70.)

Perform the following procedure to activate the 2-wheel steering mode:

Move the switch (Item 2) **[Figure 40]** to the centre position. If the rear wheels align straight ahead, the 2-wheel steering mode will be activated.

If the rear wheels do not align straight ahead, the semi-automatic aligning procedure will start:

1. The Rear Wheels Straight indicator light (Item 1) **[Figure 41]** will flash. Turn the steering wheel until the light stays ON. The rear wheels align straight ahead now.
2. The 2-wheel steering mode is activated now.

Crab Steering (Bottom Switch Position)

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. Indicator light (Item 3) **[Figure 40]** will be ON. Use in confined areas to move away from buildings or to reposition the machine. (See Crab Steering Mode on Page 72.)

Perform the following procedure to activate the crab steering mode:

Press the bottom of the switch (Item 4) **[Figure 40]**. If the front and rear wheels align straight ahead, the crab steering mode will be activated.

If the front and / or rear wheels do not align straight ahead, the semi-automatic aligning procedure will start:

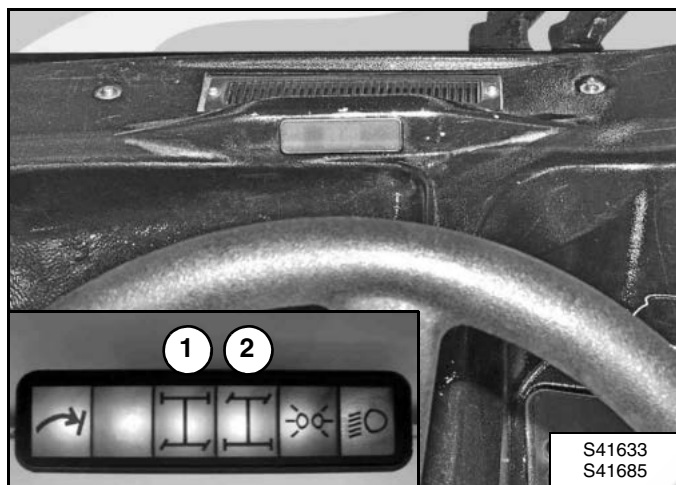
1. If the rear wheels are not straight ahead, the Rear Wheels Straight indicator light (Item 1) **[Figure 41]** will flash. Turn the steering wheel until the light stays ON. The rear wheels align straight ahead now.
2. If the front wheels align straight ahead, the crab steering mode is active now.
3. If the front wheels do not align straight ahead, the Front Wheels Straight indicator light (Item 2) **[Figure 41]** will flash. Turn the steering wheel until the light stays ON. The front wheels align straight ahead now.
4. The crab steering mode is activated now.

STEERING MODE SELECTION (CONT'D)

Manual Aligning Mode Procedure

Before changing the steering mode, all four wheels must be straight ahead.

Figure 42



Front Wheels Straight indicator light (Item 1) and Rear Wheels Straight indicator light (Item 2) [Figure 42] must be ON.

Turn the steering wheel until both lights are ON.

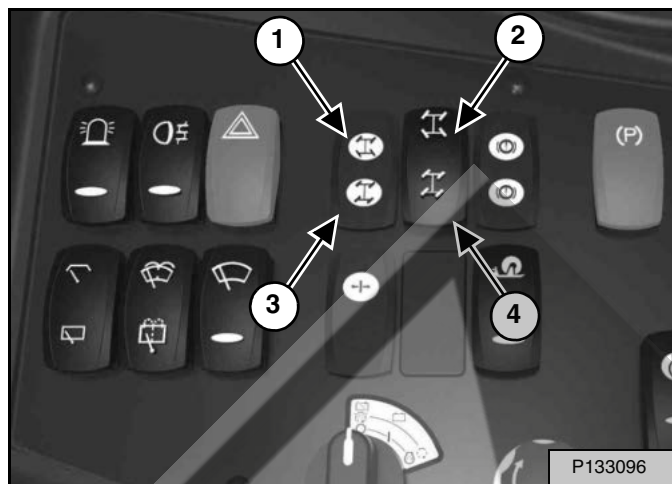
NOTE: If the wheels do not align straight ahead, use the following procedure:

1. Put the Steering Mode Switch in 4-Wheel Steering and turn the steering wheel until the rear wheels align straight ahead.

2. Put the Steering Mode Switch in 2-Wheel Steering and turn the steering wheel until the front wheels align straight ahead.

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

Figure 43



4-Wheel Steering (Top Switch Position)

Press the top of the switch (Item 2). The front wheels will turn the direction that the steering wheel is turned. The rear wheels turn the opposite direction. Indicator light (Item 1) [Figure 43] will be ON. Use in most working conditions. (See 4-Wheel Steering Mode on Page 68.)

2-Wheel (Front) Steering (Centre Switch Position)

Move the switch (Item 2) [Figure 43] to the centre position. The front wheels will turn the direction that the steering wheel is turned. The rear wheels remain straight ahead. Use when travelling on roads at higher speeds. (No indicator light is on when in 2-wheel steering mode.) (See 2-Wheel Steering Mode on Page 70.)

Crab Steering (Bottom Switch Position)

Press the bottom of the switch (Item 4). 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. Indicator light (Item 3) [Figure 43] will be ON. Use in confined areas to move away from buildings or to reposition the machine. (See Crab Steering Mode on Page 72.)

DIESEL PARTICULATE FILTER (DPF) SYSTEM

Description

The engine exhaust system is equipped with a diesel particulate filter (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 three types of regeneration: passive, active and forced parked. An inhibit mode is also available to the operator.

Passive Regeneration - The engine provides adequate exhaust temperature during operation for regeneration.

Active 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 Active Regeneration Operation on Page 63.)

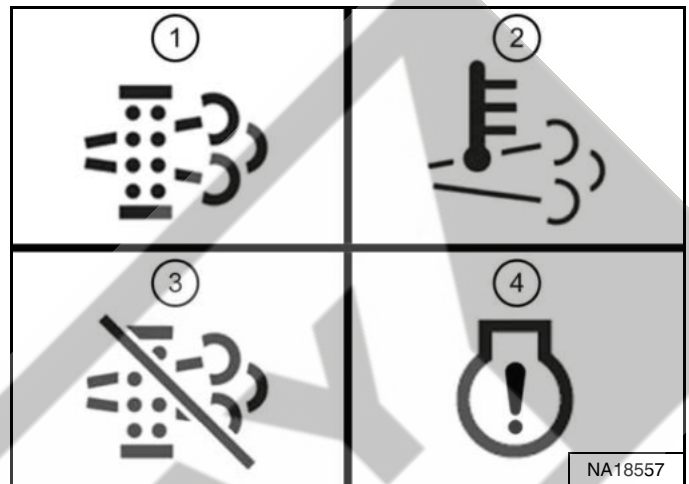
Forced Parked Regeneration - The operator activates a forced parked regeneration. This selection requires confirmation after certain machine conditions are met. (See Forced Parked Regeneration Operation on Page 64.)

Inhibit Mode - Active regeneration will not occur. This selection requires confirmation. (See Inhibit Mode Operation on Page 65.)

DPF Icons

The following icons located on the instrument panel communicate regeneration status:

Figure 44



1. **DPF Regen** - Icon is lit on the DPF Regen / Inhibit Switch during regeneration. Machine is requesting that operator activate a forced parked regeneration when flashing.
2. **Hot Exhaust System Temperature (HEST)** - Icon is lit on the display panel during regeneration to indicate that exhaust and exhaust gases can be hot.
3. **DPF Inhibit** - Icon is lit on the DPF Regen / Inhibit Switch when the operator has selected inhibit mode.
4. **Engine Failure** - Engine Failure Icon is lit on the display panel to indicate a problem with the DPF system.

DIESEL PARTICULATE FILTER (DPF) SYSTEM (CONT'D)

DPF Regeneration Tables

SOOT LOAD	ACTIVE REGENERATION STATUS	INHIBIT ALLOWED	FORCED PARKED ALLOWED	DPF ICON [A]	HEST ICON [A]	CHECK ENGINE ICON [B]
0 - 75%	Not Required	Yes	No	Off	Off	Off
75 - 100%	Not Required	Yes	Yes	Off	Off	Off
100 - 105%	Regenerating	Yes	Yes	On	On	Off
105 - 110%	Regenerating	Yes	Yes	Flashing Slowly	On	Off
110 - 120%	Regenerating	Yes	Yes	Flashing Slowly	On	On
120 - 150%	Not Regenerating	Yes	No	Flashing Quickly	Off	On
> 150%	Not Regenerating	Yes	No	Off	Off	On

SOOT LOAD	REGENERATION TYPE	SOOT LOAD BAR	SERVICE CODE	TORQUE DERATE	OPERATOR ACTION REQUIRED
0 - 25%	Passive	Four Green Lights	None	None	None
25 - 50%	Passive	Three Green Lights	None	None	None
50 - 75%	Passive	Two Green Lights	None	None	None
75 - 100%	Passive	One Green Light	None	None	None
100 - 105%	Active	One Yellow Light	None	None	None
105 - 110%	Active	One Red Light	None	None	Activate Forced Parked Regeneration when possible
110 - 120%	Active	One Red Light Flashing	P2463	Mild	Activate Forced Parked Regeneration when possible
> 120%	None	One Red Light Flashing	P24A3	Severe	Contact your Bobcat dealer to service the DPF

[A] The DPF icon is located on the DPF Regen / Inhibit switch. The HEST icon is located on the display panel. (See Display Panel on Page 48.)

[B] The Check Engine icon is located on the display panel. (See Display Panel on Page 48.)

DIESEL PARTICULATE FILTER (DPF) SYSTEM (CONT'D)

Passive Regeneration Operation

Passive regeneration can occur any time the machine is operated under load.

This self-regeneration is performed while the soot level is below 100% to reduce the soot level in the DPF under normal operation.

Figure 45



Press the top of the DPF Regen / Inhibit switch (Item 1) [Figure 45] to show the soot load percentage on the display panel or monitor the soot load level on the soot load bar (LEDs).

Active Regeneration Operation

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

The active regeneration is performed when the soot level is between 100 and 120% and the exhaust temperature becomes higher than 560°C (1040°F). At this point the machine is used intensely and should maintain this high operation to ensure efficient DPF regeneration.

Figure 46



The Hot Exhaust System Temperature (HEST) light (Item 1) [Figure 46] is ON when the DPF regeneration is ongoing.

The soot level reduction can be monitored on the soot load bar (LEDs). (See DPF Regeneration Tables on Page 62.)

DIESEL PARTICULATE FILTER (DPF) SYSTEM (CONT'D)

Forced Parked Regeneration Operation

A forced parked regeneration can be activated by the operator if the soot load level is over 75%. The machine cannot be operated during this regeneration.

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

When the DPF system requests a forced parked regeneration the following signs are shown on the instrument panel:

Between 105% and 110% :

- Soot load bar displays one red light
- DPF icon flashes slowly
- HEST light is ON
- Every hour **[REGEN]** flashes for 10s and alarm sounds

Between 110% and 120% :

- Soot load bar displays one red light
- DPF icon flashes slowly
- HEST light is ON
- CHECK ENGINE light is ON
- Every hour **[REGEN]** flashes for 10s and alarm sounds

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
- Travel direction lever in NEUTRAL
- Parking brake engaged
- Throttle pedal released
- Engine speed at low idle
- Hydraulic functions disabled
- More than 25 percent fuel in the tank

Figure 47



Press the top of the DPF Regen / Inhibit switch (Item 1) **[Figure 47]** for 3s to start DPF regeneration. Either **[FUEL]**, **[PARK]**, **[FNR]**, **[ECU]** or **[IDLE]** will be shown on the display screen if a condition is missing.

The following actions are performed during forced parked regeneration:

- Engine maximum idle speed is applied (Drive and Workgroup are disabled)
- Exhaust temperature increases up to 600°C (HEST light is turned ON)
- Regen light on the DPF Regen / Inhibit switch is turned ON
- The display screen shows **[REGEN]** alternating with soot load percentage (%)

The forced parked regeneration can be stopped by the following actions:

- Park brake is released (only by failure)
- DPF Regen / Inhibit switch is pressed
- Key switch is turned off
- Emergency Stop switch is pressed
- Accelerator pedal is pressed

The soot level reduction can be monitored on the soot load bar (LEDs). (See DPF Regeneration Tables on Page 62.)

DIESEL PARTICULATE FILTER (DPF) SYSTEM (CONT'D)

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.

I-2409-1219

The DPF will be inhibited from actively regenerating until the machine is turned OFF. The machine will revert to active DPF regeneration the next time the machine is turned ON.

Figure 48



Press the bottom of the DPF Regen / Inhibit switch (Item 1) [Figure 48] to disable active DPF regeneration.

When DPF regeneration is inhibited, only passive regeneration remains.

After running the machine in inhibit mode, take one of the below actions as soon as possible:

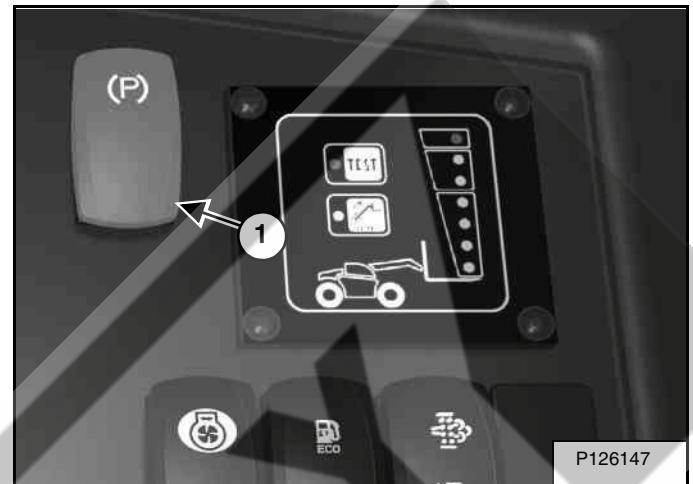
- Place the machine in active regeneration mode by cycling the key switch or by operating the machine intensely until the conditions for active regeneration are met. (See Active Regeneration Operation on Page 63.)
- Perform a forced parked regeneration if possible. The soot load bar must be yellow or red. (See Forced Parked Regeneration Operation on Page 64.)

PARKING BRAKE

Operation

Parking Brake Switch

Figure 49



NOTE: In case of failure of the service brake, the parking brake can be used as emergency brake.

Parking Brake Activation:

Press the bottom of the parking brake switch (Item 1) [Figure 49] to engage the parking brake. The light will turn on.

The parking brake will engage automatically when:

- the engine is OFF;
- the engine is ON with engine rpm at low idle AND the travel direction control is in NEUTRAL.

Parking Brake Deactivation:

Press the bottom of the parking brake switch (Item 1) [Figure 49] to release the parking brake. The light will turn off.

The parking brake will release automatically when:

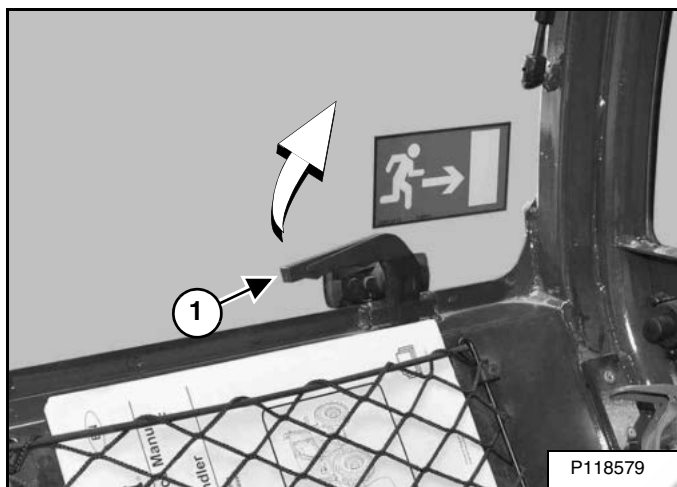
- the engine is ON with the engine rpm higher than low idle AND the travel direction control is out of NEUTRAL

EMERGENCY EXIT

Rear Window

Open the rear window. (See Rear Cab Window on Page 55.)

Figure 50



Turn the handle (Item 1) **[Figure 50]** clockwise (as shown) and push the rear window fully open.

Figure 51

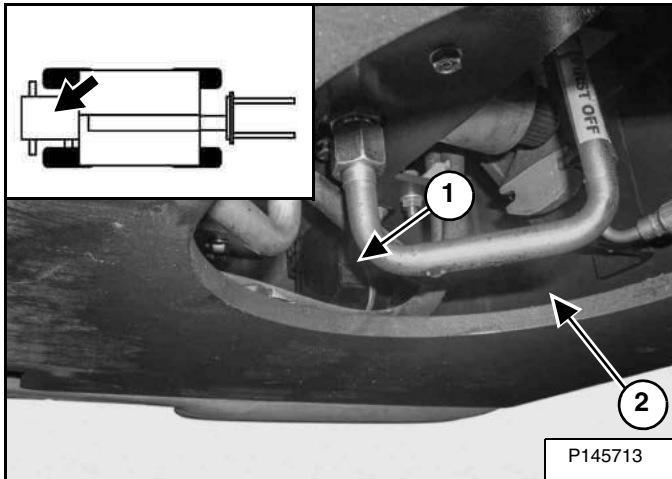


Exit through the rear window opening **[Figure 51]**.

BACK-UP ALARM SYSTEM

Description

Figure 52



The back-up alarm (Item 1) is located at the rear of the machine and can be accessed through an opening (Item 2) [Figure 52] in the frame.

A back-up alarm is not a substitute for looking to the rear when operating the telescopic handler 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 telescopic handler is equipped with a back-up alarm.

Operators must be trained to **always** look in the direction of travel, **including when operating the telescopic handler 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.

Operation

! WARNING

AVOID 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.

W-2783-0118

The back-up alarm will sound when the operator prepares the telescopic handler 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. (See BACK-UP ALARM SYSTEM on Page 154.)

DRIVING AND STEERING THE TELESCOPIC HANDLER

4-Wheel Steering Mode

WARNING

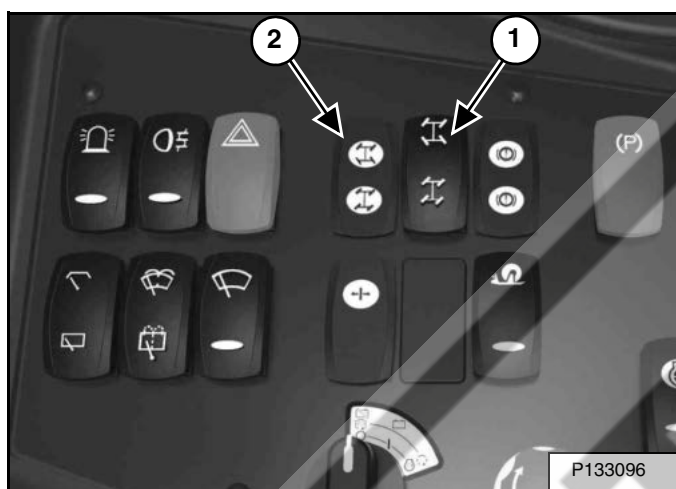
AVOID INJURY OR DEATH

When operating the machine, operate only from the operator's seat with the seat belt securely fastened.

W-2811-EN-0614

4-wheel steer allows the machine to turn in a smaller circle. In 4-wheel steer, the rear wheels follow the same path as the front wheels.

Figure 53



NOTE: Make sure all four wheels are straight ahead before changing steering mode. See Steering Mode Selection for wheel alignment procedure if front or rear wheels are not aligned. (See STEERING MODE SELECTION on Page 56.)

Press the top of the switch (Item 1) [Figure 53] to enable 4-wheel steering.

The 4-wheel steering icon (Item 2) [Figure 53] will be illuminated.

WARNING

ACCIDENTAL TELESCOPIC HANDLER MOVEMENT CAN CAUSE INJURY OR DEATH

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

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DRIVING AND STEERING THE TELESCOPIC HANDLER (CONT'D)

4-Wheel Steering Mode (Cont'd)

Figure 54

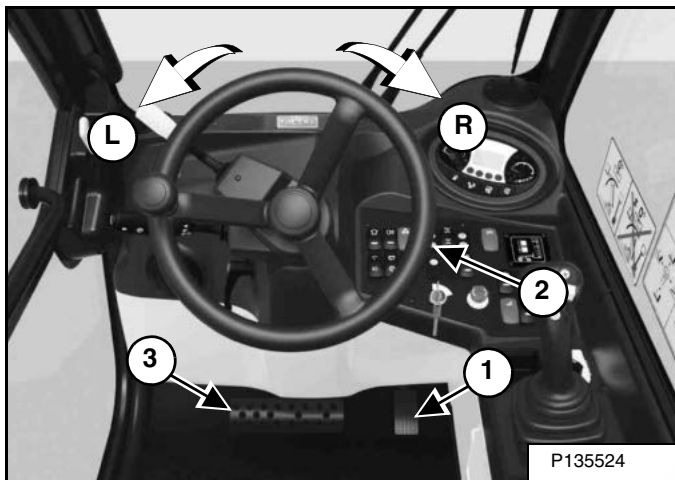
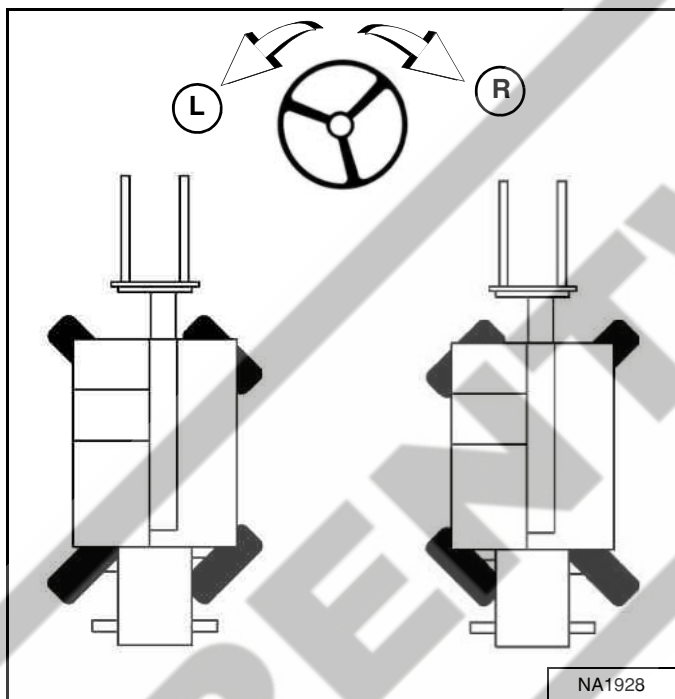


Figure 55



Move the steering wheel smoothly. Avoid sudden starting and stopping.

Forward Travel - Prepare the telescopic handler 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 54] to the right or left. Look in the direction of travel.

Reverse Travel - Prepare the telescopic handler 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 54] 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.

Press the brake pedal (Item 3) [Figure 54] a small amount to decrease travel speed and control inching (gradual travel of the machine). (See Brake Pedal And Inching Control on Page 52.)

Stopping The Telescopic Handler (4-Wheel Steering Mode)

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

DRIVING AND STEERING THE TELESCOPIC HANDLER (CONT'D)

2-Wheel Steering Mode

WARNING

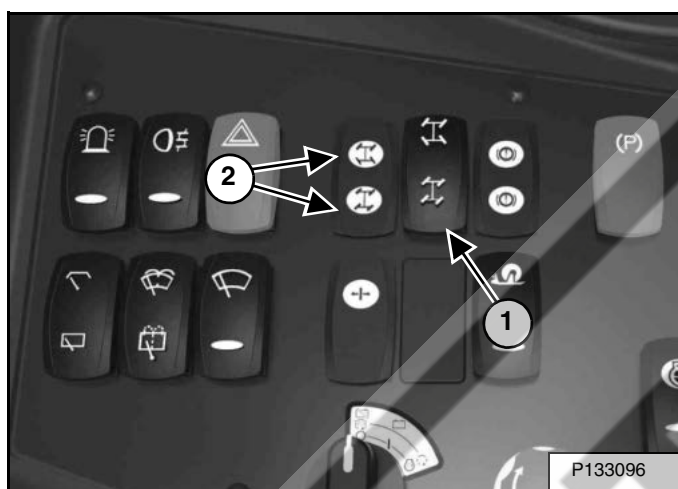
AVOID INJURY OR DEATH

When operating the machine, operate only from the operator's seat with the seat belt securely fastened.

W-2811-EN-0614

Only the front wheels turn when in 2-wheel steering mode. Use 2-wheel steering when operating on public roads.

Figure 56



NOTE: Make sure all four wheels are straight ahead before changing steering mode. See Steering Mode Selection for wheel alignment procedure if front or rear wheels are not aligned. (See STEERING MODE SELECTION on Page 56.)

Press the switch (Item 1) [Figure 56] to the centre position to enable 2-wheel steering.

The icons (Item 2) [Figure 56] will NOT be illuminated when in 2-wheel steering mode.

WARNING

ACCIDENTAL TELESCOPIC HANDLER MOVEMENT CAN CAUSE INJURY OR DEATH

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

W-2812-EN-1109

DRIVING AND STEERING THE TELESCOPIC HANDLER (CONT'D)

2-Wheel Steering Mode (Cont'd)

Figure 57

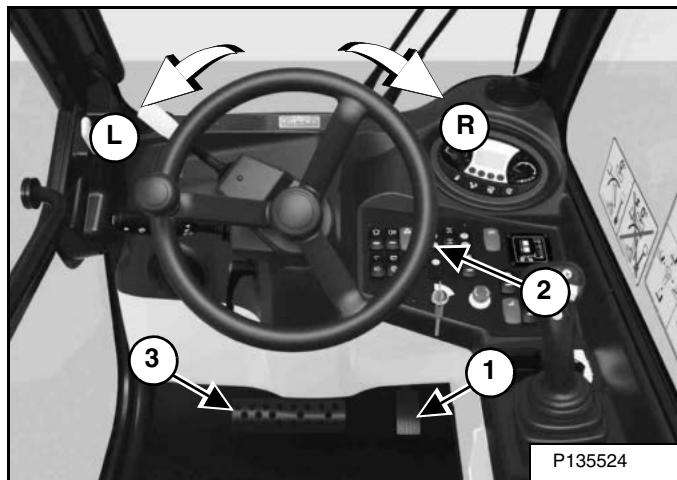
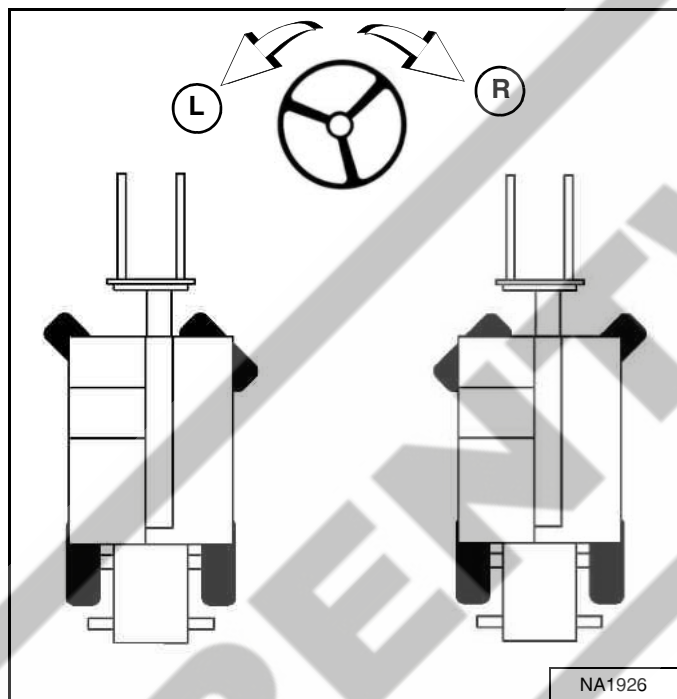


Figure 58



Move the steering wheel smoothly. Avoid sudden starting and stopping.

Forward Travel - Prepare the telescopic handler 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 57] to the right or left. Look in the direction of travel.

Reverse Travel - Prepare the telescopic handler 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 57] 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.

Press the brake pedal (Item 3) [Figure 57] a small amount to decrease travel speed and control inching (gradual travel of the machine). (See Brake Pedal And Inching Control on Page 52.)

Stopping The Telescopic Handler (2-Wheel Steering Mode)

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

Crab Steering Mode

! WARNING

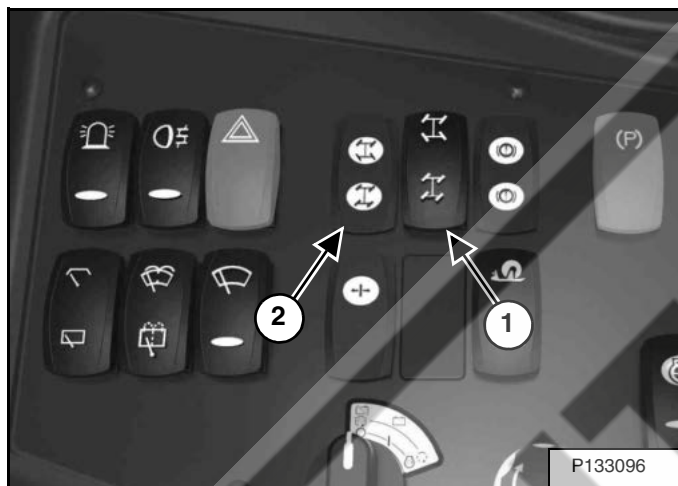
AVOID INJURY OR DEATH

When operating the machine, operate only from the operator's seat with the seat belt securely fastened.

W-2811-EN-0614

Crab steering mode allows both the front and rear wheels to 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.

Figure 59



NOTE: Make sure all four wheels are straight ahead before changing steering mode. See Steering Mode Selection for wheel alignment procedure if front or rear wheels are not aligned. (See STEERING MODE SELECTION on Page 56.)

Press the bottom of the switch (Item 1) [Figure 59] to enable crab steering.

The crab steering icon (Item 2) [Figure 59] will be illuminated.

! WARNING

ACCIDENTAL TELESCOPIC HANDLER MOVEMENT CAN CAUSE INJURY OR DEATH

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

W-2812-EN-1109

DRIVING AND STEERING THE TELESCOPIC HANDLER (CONT'D)

Crab Steering Mode (Cont'd)

Figure 60

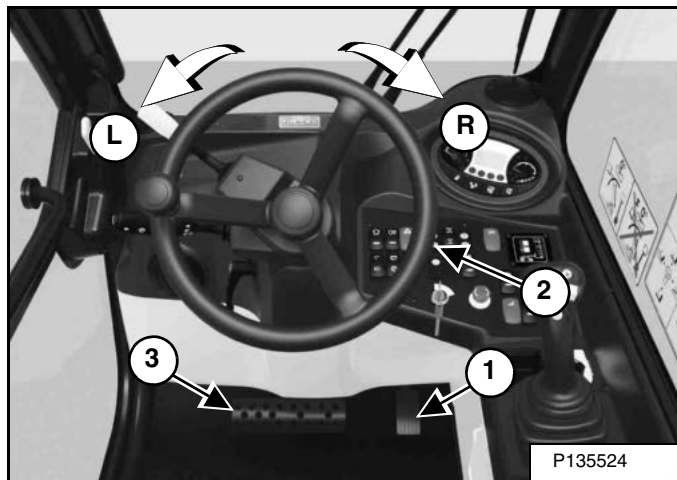
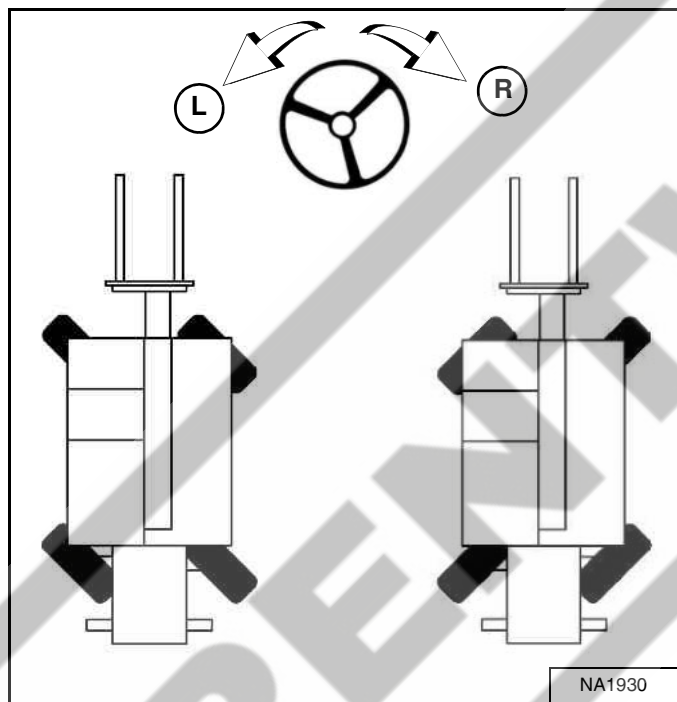


Figure 61



Move the steering wheel smoothly. Avoid sudden starting and stopping.

Forward Travel - Prepare the telescopic handler 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 60] to the right or left. Look in the direction of travel.

Reverse Travel - Prepare the telescopic handler 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 60] 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.

Press the brake pedal (Item 3) [Figure 60] a small amount to decrease travel speed and control inching (gradual travel of the machine). (See Brake Pedal And Inching Control on Page 52.)

Stopping The Telescopic Handler (Crab Steering Mode)

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

SPEED MANAGEMENT

Operation

The Speed Management feature allows the telescopic handler to be maneuvered 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.

Examples:

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

Figure 62



Press the bottom of the switch (Item 1) [Figure 62] on the Right Instrument Panel once to activate Speed Management. The light on the switch will turn ON.

Figure 63



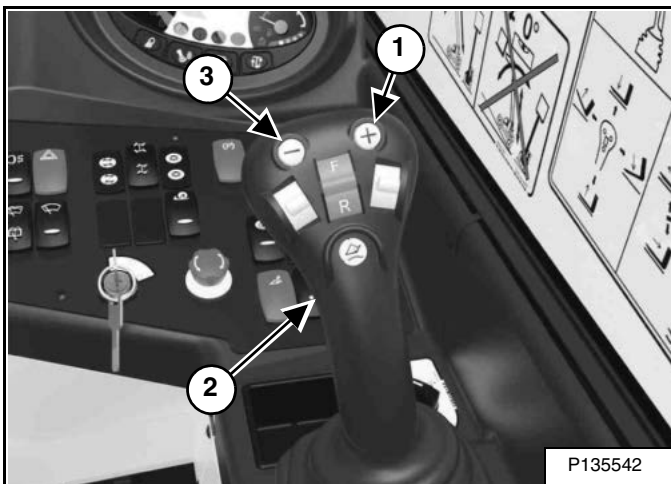
When Speed Management is activated, the machine will travel at the factory default setting of 50% of Standard Travel Speed and the percentage [C 50] will appear on the display screen (Item 1) [Figure 63].

NOTE: The factory default setting can be changed by the operator. (See Changing The Factory Default Setting on Page 76.)

SPEED MANAGEMENT (CONT'D)

Operation (Cont'd)

Figure 64



While Speed Management is activated, press the right button (Item 1) on the joystick (Item 2) to increase the speed up to 100% [C 100] or the left button (Item 3) [Figure 64] to decrease the speed down to 0% [C OFF]. The percentages will appear on the display screen.

Figure 65



Press button (Item 1) [Figure 65] again to deactivate Speed Management. The light of the switch will turn OFF.

The system will retain the speed percentage as long as the telescopic handler remains ON.

EXAMPLE: You can be using the machine at 40% and then deactivate Speed Management to reposition the telescopic handler, then re-activate Speed Management. The speed percentage will still be at 40%.

EXAMPLE: Turning the engine OFF will return the Speed Management setting to default. The next time you start the engine and activate Speed Management, the speed will be at 50% (factory default setting) or the last default setting saved by the operator. (See Changing The Factory Default Setting on Page 76.)

SPEED MANAGEMENT (CONT'D)

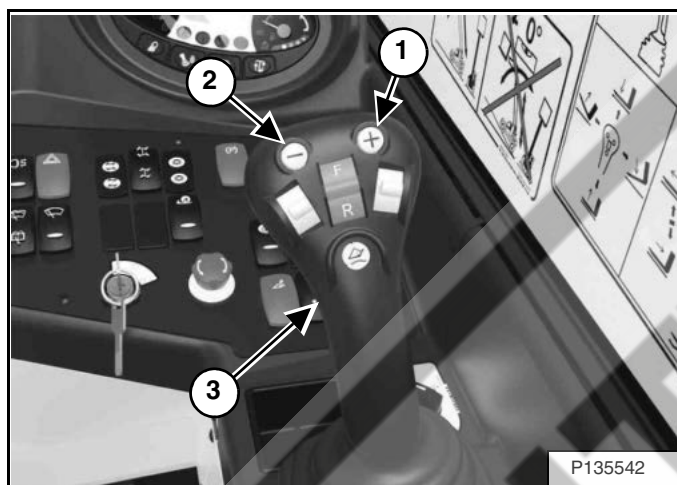
Changing The Factory Default Setting

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.

Engage Speed Management. (See Operation on Page 74.)

Figure 66



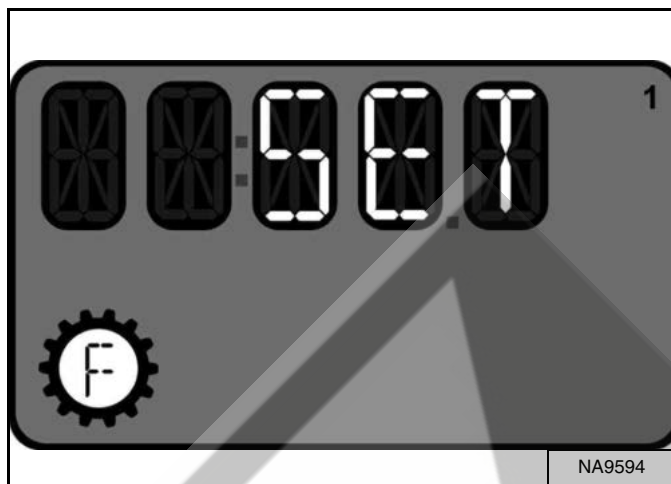
Adjust the speed percentage higher (Item 1) or lower (Item 2) by pressing the buttons on the joystick (Item 3) [Figure 66] until the desired default setting is displayed.

Figure 67



Press and hold the button (Item 1) [Figure 67] to save the default setting.

Figure 68



The alarm will beep once, the display screen will show [SET] [Figure 68] (example) and the Speed Management will remain active.

Pressing the button (Item 1) [Figure 67] or turning the machine off will disengage Speed Management and return the telescopic handler to 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.

HYDRAULIC CONTROLS

Hydraulic Control Lever (Joystick)

Figure 69

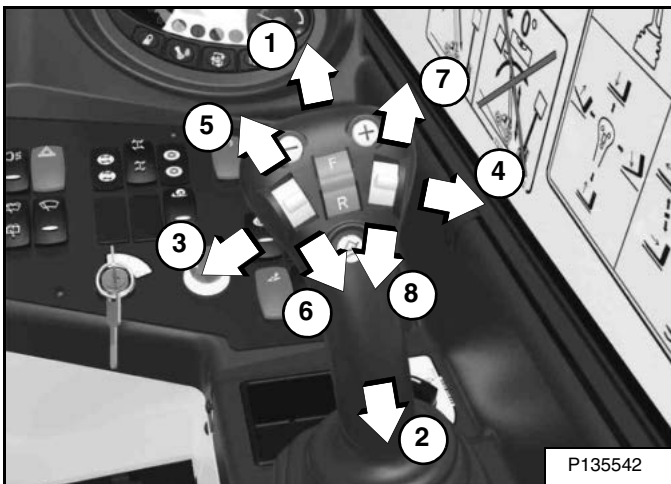
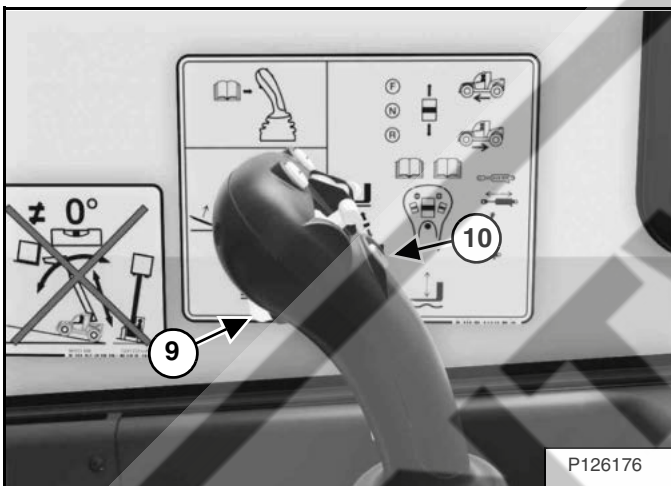


Figure 70



The joystick controls the movement of the boom and attachment [Figure 69] and [Figure 70].

1. Lower Boom
2. Raise Boom
3. Tilt Attachment Backward
4. Tilt Attachment Forward
5. Extend Telescopic Boom
6. Retract Telescopic Boom
7. Controls the function of the Front Auxiliary Hydraulics (Example: close grapple teeth).
8. Controls the function of the Front Auxiliary Hydraulics (Example: open grapple teeth).

9. Continuous Flow Auxiliary Hydraulics - After activating the auxiliary hydraulics, press the Continuous Flow Control switch (Item 9) [Figure 70] to allow constant auxiliary hydraulic fluid flow to the front female coupler (female coupler is pressurised). (Example: Operate a broom.) To stop continuous auxiliary fluid flow, press the Continuous Flow Control switch (Item 9) a second time.

10. NOT USED

The above joystick functions (Items 1 thru 8) are proportional; The farther you move the control, the faster the hydraulic function operate. Joystick functions (Item 7 and 8) are also used to operate the hydraulic locking device for attachments. (See ATTACHMENTS on Page 94.)

Front Auxiliary Hydraulics Operation (Reverse Continuous Flow)

To allow constant auxiliary hydraulic fluid flow to the front male coupler (male coupler is pressurised):

1. Activate the auxiliary hydraulics.
2. Move the Front Auxiliary Hydraulic switch down (Item 8) [Figure 69] and hold it there.
3. Press the Continuous Flow Control switch (Item 9) [Figure 69].
4. Release the Front Auxiliary Hydraulic switch (Item 8) [Figure 69].

NOTE: 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.

To stop reverse continuous auxiliary hydraulic fluid flow, press the Continuous Flow Control switch (Item 9) [Figure 70] a second time.

HYDRAULIC CONTROLS (CONT'D)

Changing The Maximum Auxiliary Flow

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

Select the Auxiliary Hydraulics menu on the display screen. (See Display Screen on Page 50.)

Figure 71

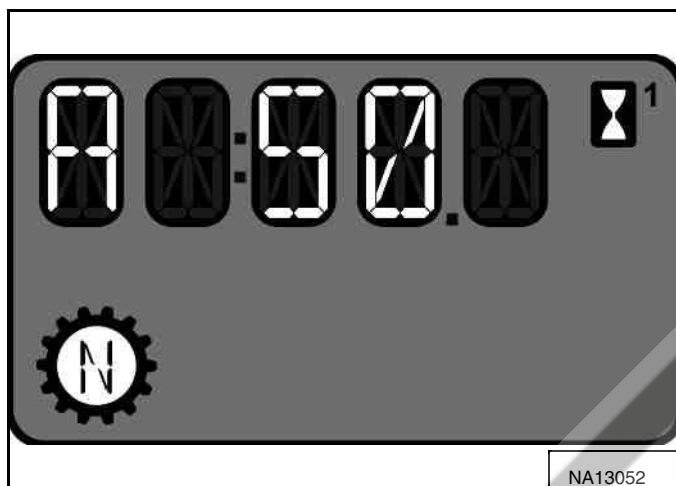
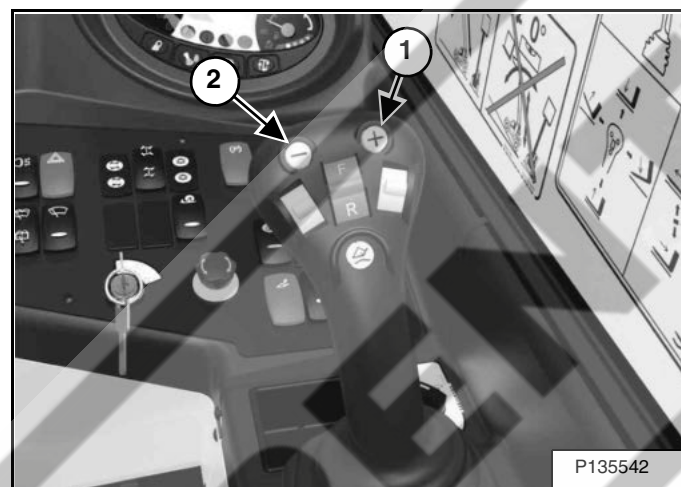


Figure 72



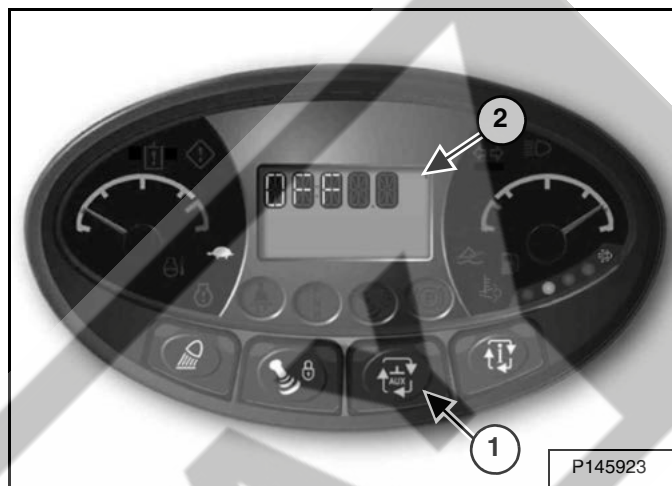
Adjust the maximum available percentage higher (Item 1) or lower (Item 2) [Figure 72] by pressing the buttons on the joystick until the desired setting is displayed [Figure 71].

Auxiliary Hydraulics At Startup

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

Select the Auxiliary Hydraulics menu on the display screen. (See Display Screen on Page 50.)

Figure 73



Press the Aux button (Item 1) for three seconds to show the Auxiliary Hydraulics default mode at startup (Item 2) [Figure 73].

Press the Aux button (Item 1) [Figure 73] again to toggle between [ON] and [OFF].

Figure 74



Press the Aux button (Item 1) [Figure 73] for 3 seconds until [STORE] [Figure 74] appears on the display screen. The selected Auxiliary Hydraulics default mode has been saved now.

Quick Couplers

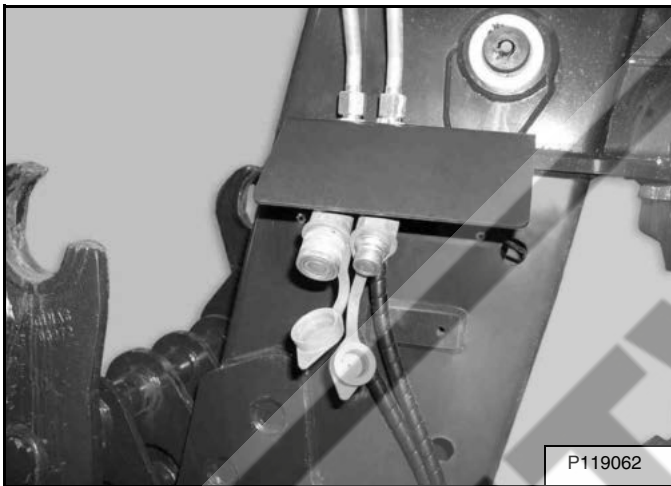
! WARNING

AVOID INJURY OR DEATH

Diesel fuel or hydraulic fluid under pressure can penetrate skin or 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-EN-0909

Figure 75



To Connect: Remove dirt or debris from the surface of both the male and female couplers, and from the outside diameter of the male coupler. Visually check the couplers for corroding, cracking, damage or excessive wear. If any of these conditions exist, the coupler(s) [Figure 75] must be replaced.

Install the male coupler into the female coupler. Full connection is made when the ball release sleeve slides forward on the female coupler.

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

! WARNING

AVOID BURNS

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

W-2220-0396

Auxiliary Hydraulic Release

! WARNING

AVOID BURNS

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

W-2220-0396

! WARNING

AVOID INJURY OR DEATH

Diesel fuel or hydraulic fluid under pressure can penetrate skin or 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-EN-0909

When Connecting: Push the quick couplers tightly together and hold for five seconds; the pressure is automatically relieved as the couplers are installed.

When Disconnecting: Push the quick couplers tightly together and hold for five seconds; then retract the sleeve until the couplers disconnect.

AUTO REVERSE COOLING FAN

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

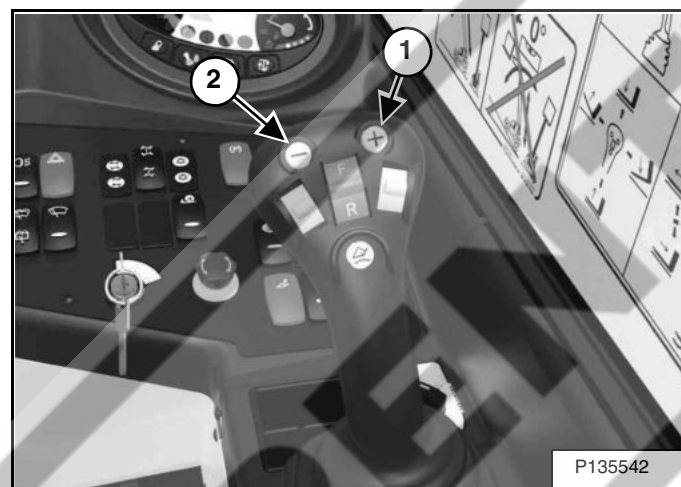
Select the Auto Reverse Cooling Fan menu on the display screen. (See Display Screen on Page 50.)

Figure 76



The default value of the Auto Reverse Cooling Fan menu is **[I OFF]** (disabled) (Item 1) [Figure 76].

Figure 77



Adjust the reverse cooling fan interval higher (Item 1) or lower (Item 2) [Figure 77] by pressing the buttons on the joystick until the desired setting is displayed. The reverse cooling fan interval shows as **[I XX M]** on the display screen. The auto reverse cooling fan interval times are 30, 45, 60 and 90 minutes.

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

NOTE: The manual reverse cooling fan can be launched by pressing the Reverse Cooling Fan switch regardless of the auto reverse cooling fan status. (See Right Instrument And Indicator Panel on Page 44.)

DAILY INSPECTION

Daily Inspection And Maintenance

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 147.)



WARNING

Operator must have instructions before operating the machine. Untrained operators can cause injury or death.

W-2001-0502

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 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 162.)

- 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.
- Frame-Levelling (if equipped) - Check frame-levelling cylinder for damage or leaks.
- Frame-Levelling Pins (if equipped) - Lubricate with multipurpose lithium based grease.

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.

IMPORTANT

PRESSURE WASHING DECALS

- **Never direct the stream at a low angle toward the decal that could damage the decal causing it to peel from the surface.**
- **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-EN-0910

IMPORTANT

AVOID ENGINE DAMAGE

Water in the fuel system can cause serious engine damage. Remove water from the primary fuel filter daily.

I-2354-0112

DAILY INSPECTION (CONT'D)

Daily Inspection And Maintenance (Cont'd)

Allow the engine and hydraulic fluid to warm completely before beginning operation.

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.
- Check frame-levelling (if equipped) left and right operation.

Check forward and reverse travel.

Check operation of the accelerator and brake.

Check operation of the steering.

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

WARNING

AVOID SERIOUS INJURY OR DEATH

- Engines can have hot parts and hot exhaust gas. Keep flammable material away.
- Do not use machines in atmosphere containing explosive dust or gases.

W-2051-0212

WARNING

AVOID INJURY OR DEATH

When an engine is running in an enclosed area, fresh air must be added to avoid concentration of exhaust fumes. If the engine is stationary, vent the exhaust outside. Exhaust fumes contain odorless, invisible gases which can kill without warning.

W-2050-0807

WARNING

Do not use ether with preheat systems. Explosion can result which can cause injury or death.

W-2391-0301

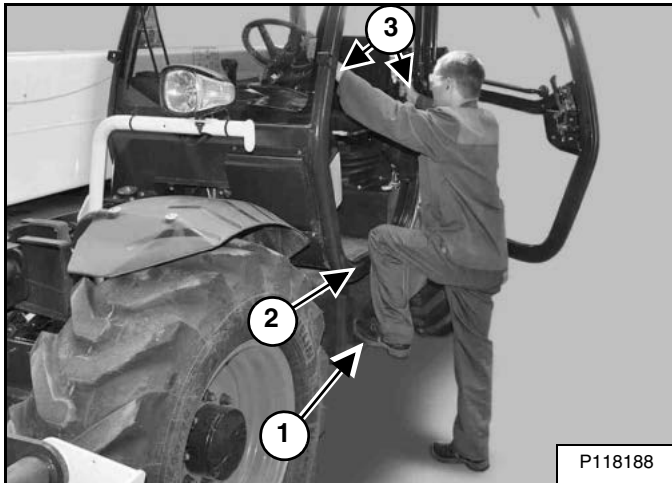
Cleaning The Operator Cab

- 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.
- The operator's seat and the floor should be cleaned with a vacuum cleaner and / or a stiff brush. If necessary, use a damp cloth to remove any stubborn stains.
- Clean the seat-belts with a sponge dipped in hot soapy water and simply leave them to dry.
- Fabric-covered seats should be cleaned with a stiff brush or vacuum cleaner. Plastic-covered seats should be cleaned with a damp cloth.

PRE-STARTING PROCEDURE

Entering The Telescopic Handler

Figure 78



Use step (Item 1), safety tread (Item 2) and grab handles (Item 3) [Figure 78] when entering the telescopic handler.

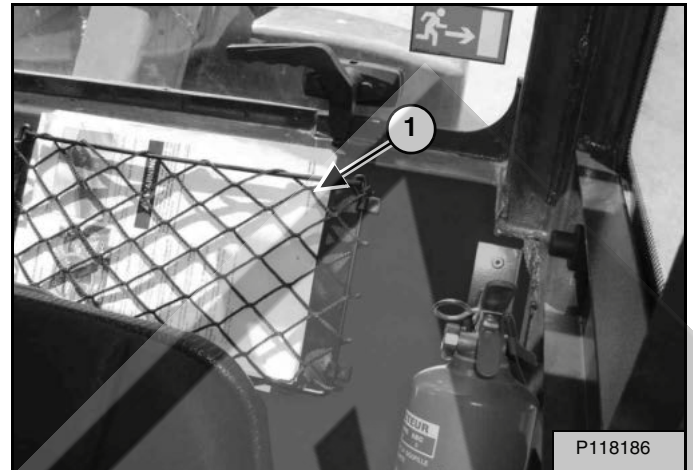
DO NOT JUMP.

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

Figure 79



Read and understand the Operator's Handbook and the Operation & Maintenance Manual (Item 1) [Figure 79] before operating the telescopic handler.

Perform the DAILY INSPECTION. (See DAILY INSPECTION on Page 81.)



WARNING

AVOID INJURY OR DEATH

Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Operator's Handbook and signs (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. Untrained operators and failure to follow instructions can cause injury or death.

W-2003-0807

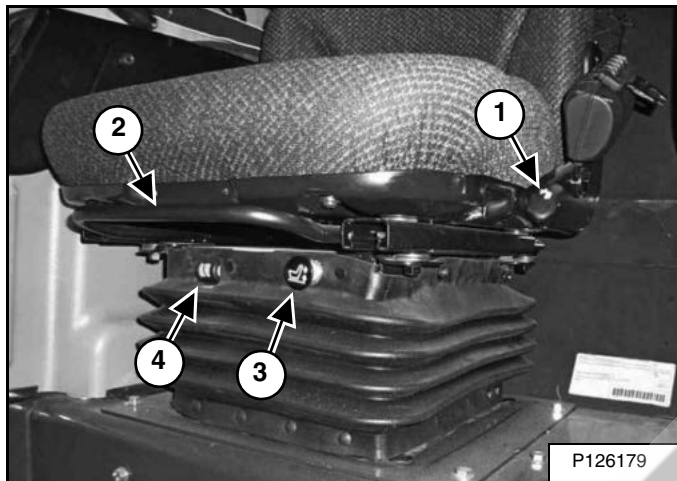
PRE-STARTING PROCEDURE (CONT'D)

Seat Adjustment

Adjust the seat for comfortable operation.

Air Suspension Seat

Figure 80



Pull the lever (Item 1) **[Figure 80]** up to adjust the angle of the seat back.

Pull the bar (Item 2) **[Figure 80]** up, and move the seat forward or backward to adjust the seat distance from the steering wheel and pedals.

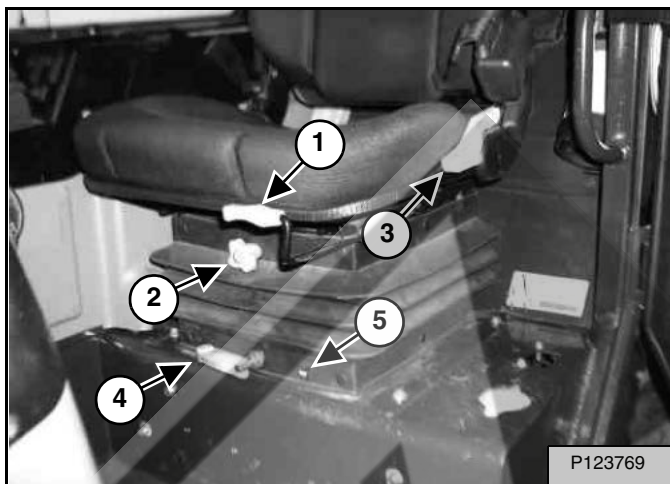
Pull the button (Item 3) **[Figure 80]** to lower the height of the seat.

Push the button (Item 3) **[Figure 80]** inward to raise the height of the seat.

The gauge (Item 4) **[Figure 80]** compares the current height of the seat with the maximum and minimum height.

Suspension Seat

Figure 81



Pull the lever (Item 1) **[Figure 81]** to adjust the seat distance from the steering wheel and pedals.

Turn the knob (Item 2) **[Figure 81]** to adjust the height of the seat.

Release the lever (Item 3) **[Figure 81]** to adjust the angle of the seat back.

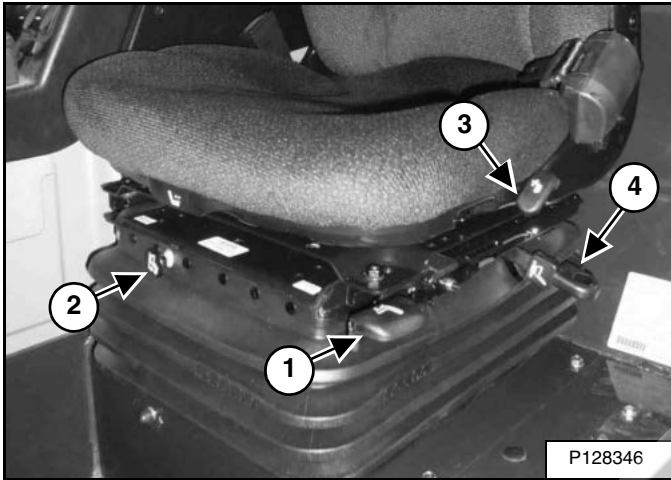
Turn the lever (Item 4) to adjust the seat cushion for weight of the operator. The gauge (Item 5) **[Figure 81]** indicates the chosen value in kilograms.

PRE-STARTING PROCEDURE (CONT'D)

Seat Adjustment (Cont'd)

Premium Seat

Figure 82



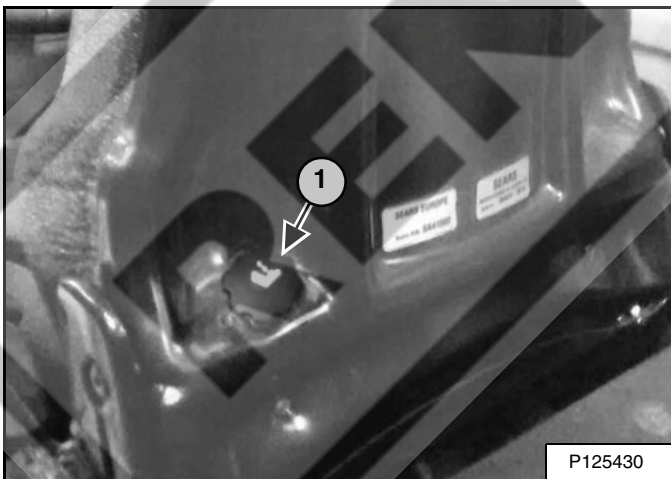
Pull the lever (Item 1) **[Figure 82]** to adjust the seat distance from the steering wheel and pedals.

Turn the knob (Item 2) **[Figure 82]** to adjust the height of the seat.

Release the lever (Item 3) **[Figure 82]** to adjust the angle of the seat back.

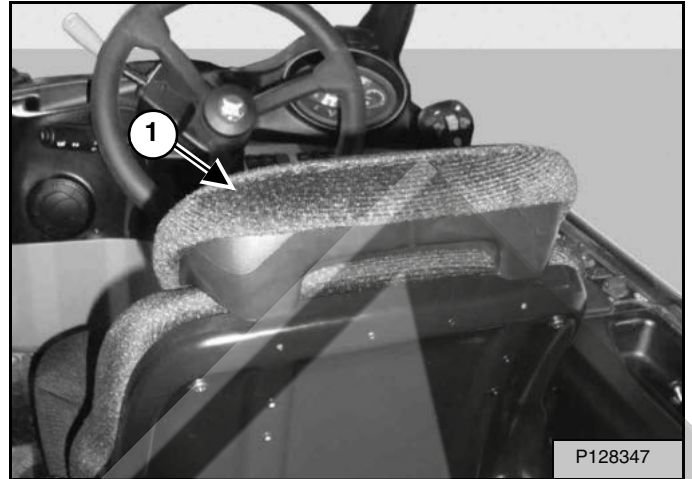
Pull the lever (Item 4) **[Figure 82]** to engage the horizontal suspension. The horizontal suspension dampens forward and backward movements.

Figure 83



Turn the knob (Item 1) **[Figure 83]** to adjust the lumbar setting.

Figure 84

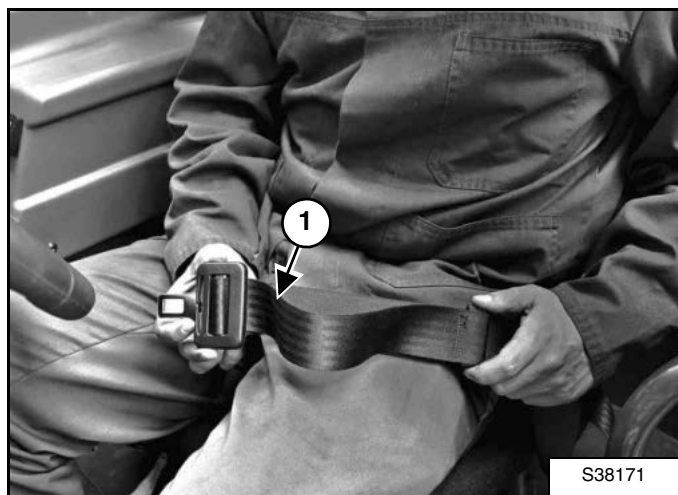


Pull upwards or push down on the headrest (Item 1) **[Figure 84]** to adjust its height.

PRE-STARTING PROCEDURE (CONT'D)

Seat Belt Adjustment

Figure 85



Fasten the seat belt (Item 1) [Figure 85].

Adjust the seat belt so that it is snug around the lower part of your hips.

Mirrors Adjustment And Cleaning

Adjust and clean the mirrors to obtain the best visibility.

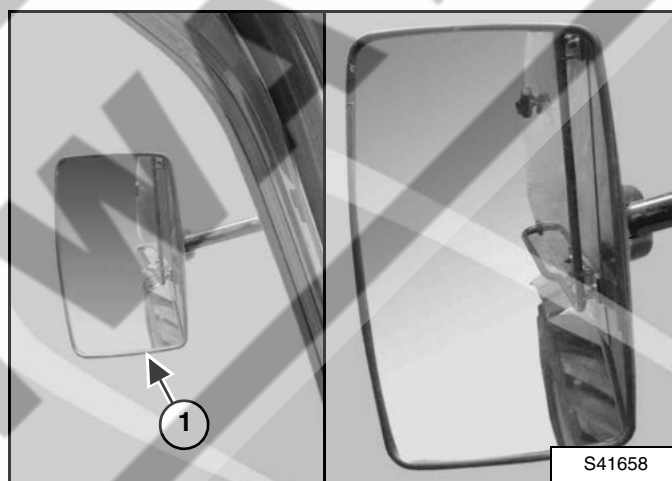
Cleaning

Clean mirrors every day and more often when necessary:

- Pre-rinse with water to remove dirt and bird soiling.
- Wash with a mild household detergent and warm water.
- Use a sponge or a soft cloth. Rinse with water and dry with a clean soft cloth.
- Do not use abrasive or highly alkaline cleaners.
- Do not clean with brushes.

Adjusting

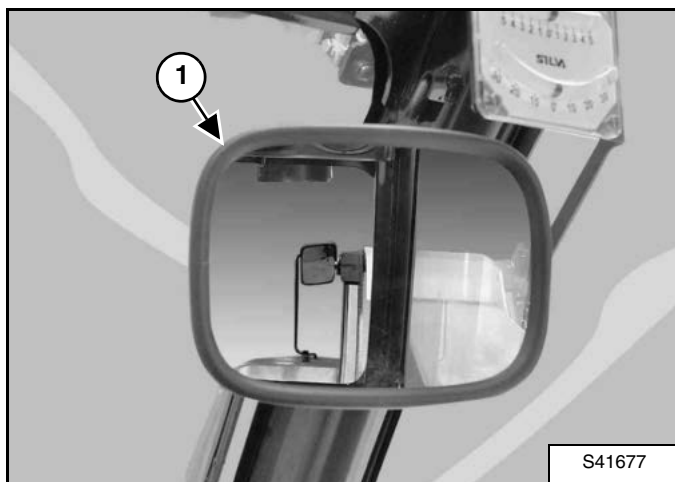
Figure 86



Adjust the left side mirror (Item 1) [Figure 86] until the left side of the telescopic handler is visible from the operator's point of view.

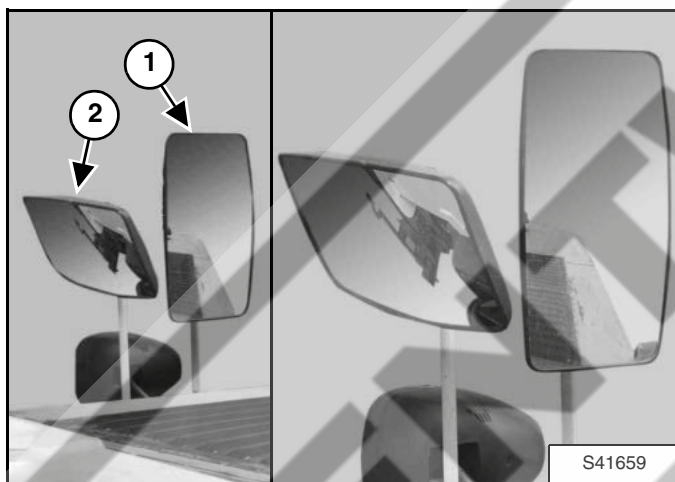
PRE-STARTING PROCEDURE (CONT'D)
Mirrors Adjustment And Cleaning (Cont'd)

Figure 87



Adjust the front interior mirror (Item 1) [Figure 87] until the rear side of the telescopic handler is visible from the operator's point of view.

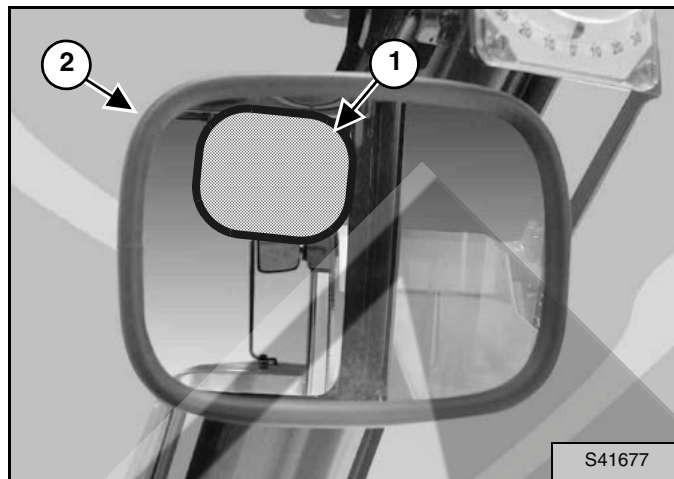
Figure 88



Adjust the right side mirror (Item 1) [Figure 88] until the right side of the telescopic handler is visible from the operator's point of view.

Adjust the right side mirror (Item 2) [Figure 88] until the right hand side of the attachment (behind the telescopic boom) is visible from the operator's point of view.

Figure 89



Adjust the rear interior mirror (Item 1) until the right side of the telescopic handler is visible via the front interior mirror (Item 2) [Figure 89] from the operator's point of view.

For more information on visibility, (See Models T35.105RB And T35.105LRB - 20" Wheels on Page 262.).

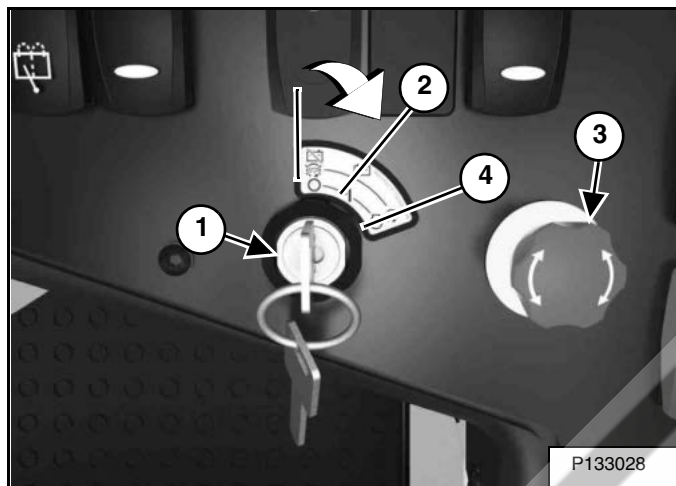
STARTING THE ENGINE

Standard Key Panel

Perform the *PRE-STARTING PROCEDURE*. (See PRE-STARTING PROCEDURE on Page 83.) (See DAILY INSPECTION on Page 81.)

The Travel Direction Control and all other controls must be in NEUTRAL POSITION before starting the engine.

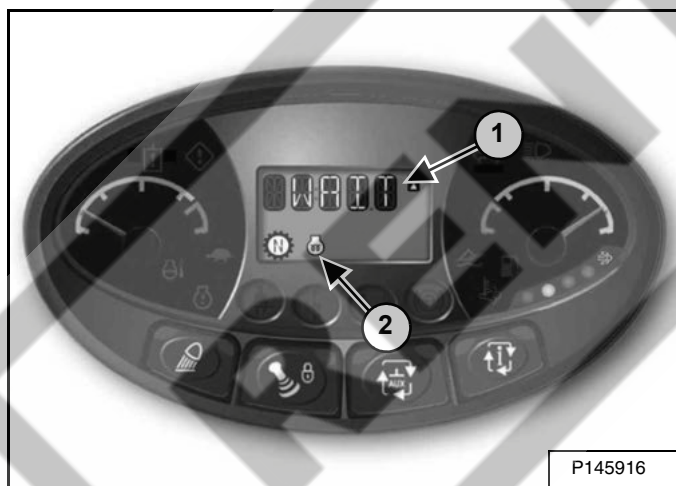
Figure 90



Turn the key switch (Item 1) to RUN (Item 2) [Figure 90].

NOTE: Check if the emergency stop (Item 3) [Figure 90] is not in the pressed position.

Figure 91



Keep the key in RUN position for engine preheat while [WAIT] is displayed on the display screen (Item 1) [Figure 91].

When the engine preheat icon (Item 2) [Figure 91] goes OFF, turn the key switch to START (Item 4) [Figure 90]. Release the key when the engine starts and allow it to return to the RUN (Item 2) [Figure 90] position.

NOTE: If the engine oil temperature is below 10°C (50°F) after starting the engine, COLD is displayed on the display screen and the engine speed is limited to 1260 rpm.

IMPORTANT

Do not engage the starter for longer than 30 seconds at a time. Longer use can damage the starter by overheating. Cool the starter for one minute between uses.

I-2209-0301

! WARNING

AVOID SERIOUS INJURY OR DEATH

- Engines can have hot parts and hot exhaust gas. Keep flammable material away.
- Do not use machines in atmosphere containing explosive dust or gases.

W-2051-0212

! WARNING

AVOID INJURY OR DEATH

When an engine is running in an enclosed area, fresh air must be added to avoid concentration of exhaust fumes. If the engine is stationary, vent the exhaust outside. Exhaust fumes contain odorless, invisible gases which can kill without warning.

W-2050-0807

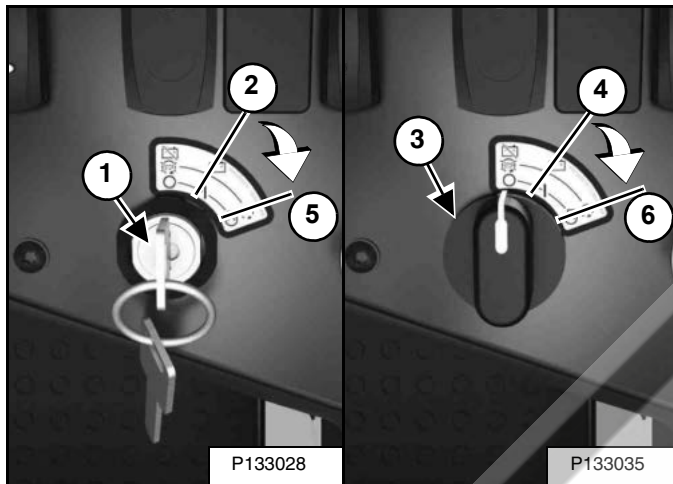
STARTING THE ENGINE (CONT'D)

Keypad Panel (If Equipped)

Perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 83.) (See DAILY INSPECTION on Page 81.)

The Travel Direction Control and all other controls must be in NEUTRAL POSITION before starting the engine.

Figure 92



Turn the key switch (Item 1) (if equipped) to RUN (Item 2) [Figure 92].

Turn the start switch (Item 3) (if equipped) to RUN (Item 4) [Figure 92].

The message **[CODE]** will appear on the display screen if the keypad panel is locked. Also when locked, the red LED (Item 2) [Figure 93] on the locked button will be flashing. (If the keypad is not locked, the unlocked green LED (Item 3) [Figure 93] will be ON. Use the start switch without a password to start the engine.) (See Password Lockout Feature on Page 251.)

Figure 93



Use the keypad (Item 1) [Figure 93] to enter the password. If the code is correct, the machine will start.

If an incorrect password is entered, **[ERROR]** will appear on the display panel.

STARTING THE ENGINE (CONT'D)

Keypad Panel (If Equipped) (Cont'd)

Figure 94



Keep the key switch (if equipped) or the start switch (if equipped) in RUN position for engine preheat while **[WAIT]** is displayed on the display screen (Item 1) **[Figure 94]**.

Press the brake pedal and keep it pressed during the engine cranking until the engine reaches the low idle speed. (See Brake Pedal And Inching Control on Page 52.)

When the engine preheat icon (Item 2) **[Figure 94]** goes OFF, turn the key switch (Item 1) (if equipped) or start switch (if equipped) (Item 3) to START (Item 5 or 6) **[Figure 92]**. Release the key switch (if equipped) or start switch (if equipped) when the engine starts and allow it to return to the RUN (Item 2 or 4) **[Figure 92]** position.

IMPORTANT

Do not engage the starter for longer than 30 seconds at a time. Longer use can damage the starter by overheating. Cool the starter for one minute between uses.

I-2209-0301

! WARNING

AVOID SERIOUS INJURY OR DEATH

- Engines can have hot parts and hot exhaust gas. Keep flammable material away.
- Do not use machines in atmosphere containing explosive dust or gases.

W-2051-0212

! WARNING

AVOID INJURY OR DEATH

When an engine is running in an enclosed area, fresh air must be added to avoid concentration of exhaust fumes. If the engine is stationary, vent the exhaust outside. Exhaust fumes contain odorless, invisible gases which can kill without warning.

W-2050-0807

! WARNING

Do not use ether with preheat systems. Explosion can result which can cause injury or death.

W-2391-0301

Turn the key switch (Item 1) (if equipped) or start switch (Item 3) **[Figure 92]** (if equipped) to the STOP position to stop the engine.

STARTING THE ENGINE (CONT'D)

Cold Temperature Starting

! WARNING

EXPLOSION 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-2071-0415

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. (See Engine Oil Chart on Page 165.)
- Make sure the battery is fully charged.

Warming The Hydraulic / Hydrostatic System

IMPORTANT

When the temperature is below -30°C (-20°F), hydrostatic oil must be warmed before starting. The hydrostatic system will not get enough oil at low temperatures and will be damaged. Park the machine in an area where the temperature will be above -18°C (0°F) if possible.

I-2007-0910

Let the engine run for a minimum of five minutes to warm the engine and hydrostatic transmission fluid before operating the telescopic handler.

When temperature is below -15°C (5°F), let the engine run for a minimum of fifteen minutes before operating the telescopic handler.

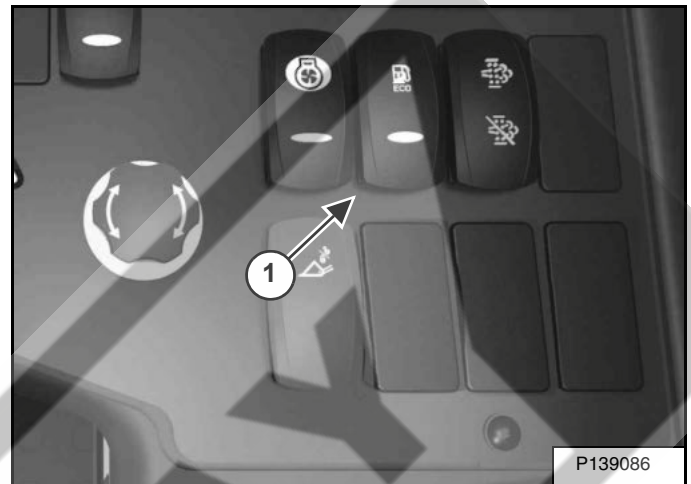
Until hydrostatic fluid reaches the optimal operating temperature, boom movement speed can be reduced.

ECO MODE

The ECO Mode switch enables the operator to save fuel by limiting the engine RPM when full RPM is not needed.

Operation

Figure 95



Press the bottom of the ECO Mode switch (Item 1) [Figure 95] to activate the ECO Mode.

NOTE: The activation of this mode is only possible at low idle RPM (900 RPM).

Press the bottom of the ECO Mode switch (Item 1) [Figure 95] to turn OFF.

Figure 96



NOTE: Deactivation of this mode is allowed independently of RPM.

NOTE: If continuous flow is still activated when turning OFF the ECO mode, the light (Item 1) [Figure 96] will blink three times and deactivation will fail.

NOTE: ECO Mode will be disabled at Key ON.

MONITORING THE DISPLAY PANEL

Figure 97



Frequently monitor the temperature (Item 1) and fuel (Item 2) gauges [Figure 97].

After the engine is running, frequently monitor display panel [Figure 97] for machine condition.

If there is an error condition, an icon light associated with the error will be ON.

EXAMPLE: Engine coolant temperature is high.

The Engine coolant temperature icon (Item 3) [Figure 97] will light.

Press the information button (Item 4) [Figure 97] to cycle the display screen until the engine hour information is displayed. (See Display Screen on Page 50.)

Press the information button (Item 4) [Figure 97] for 3 seconds until the Service Codes appear on the display screen.

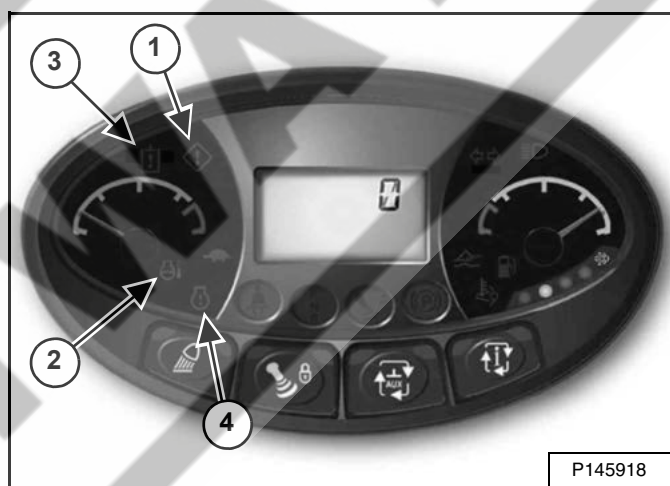
- **E000110-00** - Engine coolant temperature high

Identify the Service Code (See DIAGNOSTIC SERVICE CODES on Page 203.) and contact your Bobcat dealer for service if needed.

Warning And Shutdown

- When a WARNING condition exists, an icon light associated with the warning will come ON and there will be three beeps from the alarm. If this condition is allowed to continue, there can be damage to the engine or telescopic handler hydraulic systems.
- When a SHUTDOWN condition exists, an icon light associated with the shutdown will flash and there will be a continuous beep from the alarm. If the SHUTDOWN condition is monitored by the engine controller, **[STOP]** will be also displayed on the display screen during 15 seconds. Depending on the malfunction, the monitoring system can automatically stop the engine. The engine can be restarted only to reposition or move the telescopic handler in a safe location. If engine does not automatically stop, immediately park the machine in a safe location and STOP the engine.

Figure 98



There are three icon lights which can be associated with a SHUTDOWN condition [Figure 98]:

1. **General Warning**
2. **Engine Coolant Temperature**
3. **Hydraulic System Malfunction**
4. **Engine Malfunction**

STOPPING THE ENGINE AND LEAVING THE TELESCOPIC HANDLER

Procedure

- Stop the telescopic handler on solid, flat and level ground.

NOTE: Ensure the machine is parked safely, taking into consideration the surrounding traffic.

- 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 65.)

Figure 99



- Retract and lower the boom and attachment flat on the ground [Figure 99].
- Turn the key switch (if equipped) or start switch (if equipped) to STOP.
- Unfasten the seat belt.
- **(Standard Key Panel)** Remove the key from the switch to prevent operation of the telescopic handler by unauthorised personnel.
- Use grab handles, safety tread and steps when getting off.

DO NOT JUMP.



WARNING

Before you exit 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-2907-0211

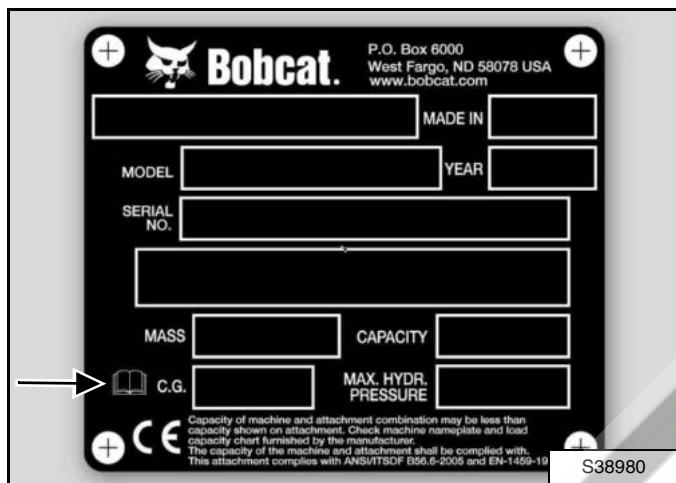
ATTACHMENTS

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 100



An attachment serial number plate can be found on each attachment [Figure 100].

NOTE: 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 forks,
- Buckets,
- Jibs.

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

Attachment EC Declaration Of Conformity

Depending on the design of your Bobcat attachment, the EC homologation can be covered by your Bobcat telescopic handler EC Declaration of Conformity or required a specific Bobcat attachment EC Declaration of Conformity.

When required, the attachment EC Declaration of Conformity 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 EC Declaration of Conformity:

- Pallet forks,
- Buckets.

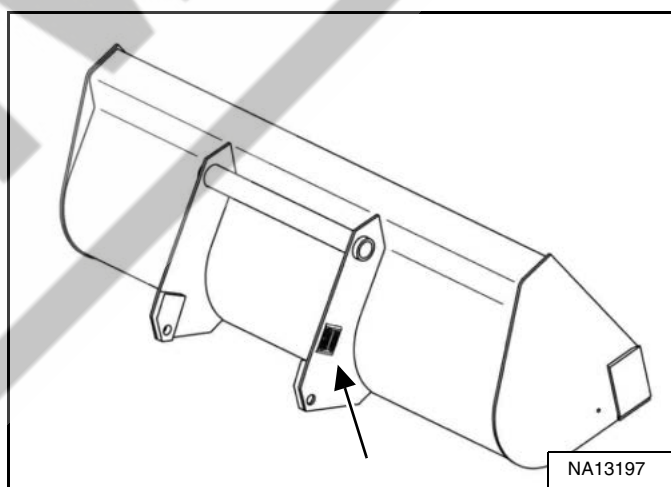
The homologation of the attachments listed below is covered by a specific Bobcat attachment EC Declaration of Conformity:

- Jibs

Buckets

Serial Plate Location

Figure 101



Bucket [Figure 101].

ATTACHMENTS (CONT'D)

Buckets (Cont'd)

Choosing The Correct Bucket

WARNING

AVOID INJURY OR DEATH

Never use attachments or buckets which are not approved by Bobcat Company. Buckets and attachments for safe loads of specified densities are approved for each model. Unapproved attachments can cause injury or death.

W-2052-0907

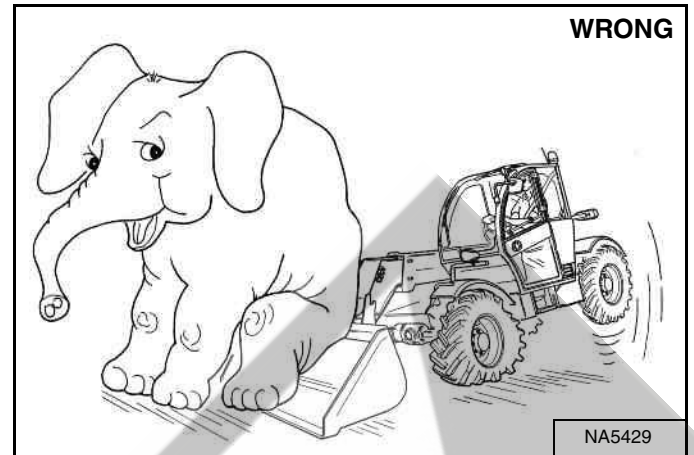
NOTE: Warranty is void if non-approved attachments are used on the Bobcat telescopic handler.

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 telescopic handler.

Figure 102



Exceeding the RLC [Figure 102] can cause the following problems:

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

WARNING

AVOID INJURY OR DEATH

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

W-2393-0301

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.

ATTACHMENTS (CONT'D)

Buckets (Cont'd)

Load Charts

! WARNING

TIPPING OR ROLLOVER CAN CAUSE SERIOUS INJURY OR DEATH

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

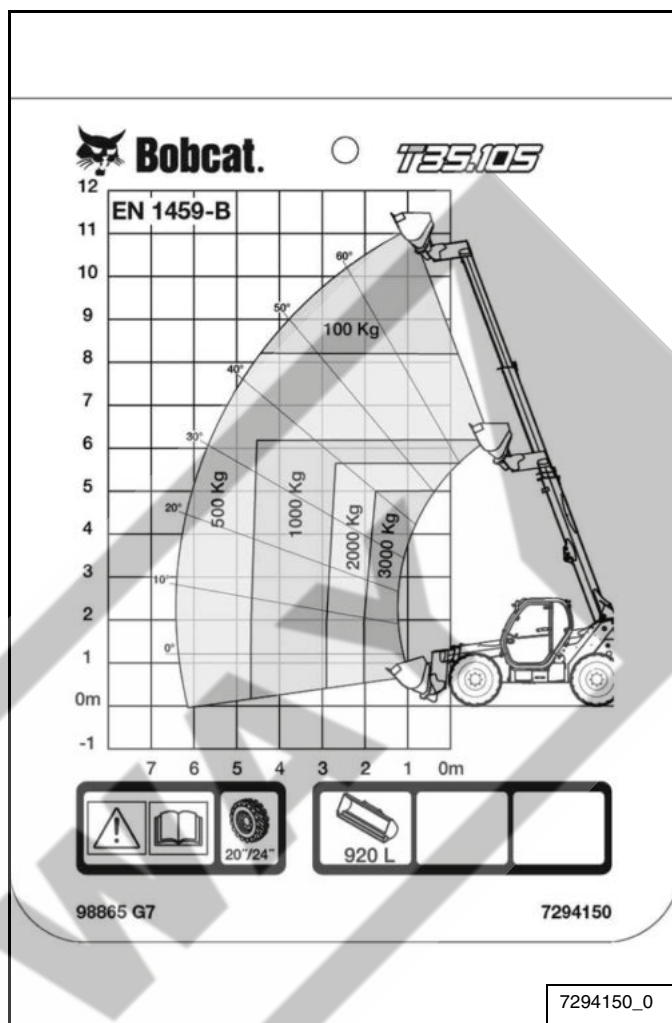
Exceeding the rated load capacity can cause the machine to tip or rollover.

W-2928-EN-1112

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

Chart for the machine T35.105RB equipped with 920 L (32.5 ft³) bucket:

- **CAMSO 405/70-20/14 PR TM R4**
 - with inflation pressure of 450 kPa (4,5 bar) (65 psi).
 - with floating pallet forks.
- **CAMSO 405/70-20/16 PR TM R4**
 - with inflation pressure of 450 kPa (4,5 bar) (65 psi).
 - with floating pallet forks.
- **DUNLOP 405/70 R20 168A2 152J MPT SPT9**
 - with inflation pressure of 550 kPa (5,5 bar) (80 psi).
 - with floating pallet forks.
- **CAMSO 400/80-24/20 PR TM R4**
 - with inflation pressure of 425 kPa (4,25 bar) (62 psi).
 - with floating pallet forks.
- **MICHELIN 400/80-24 162A8 IND TL POWER CL**
 - with inflation pressure of 425 kPa (4,25 bar) (62 psi).
 - with floating pallet forks.
- **DUNLOP 405/70R24 168A2 152J MPT SPT9**
 - with inflation pressure of 520 kPa (5,20 bar) (75 psi).
 - with floating pallet forks.



Complies with stability tests EN1459 Annex B and the relevant parts of ISO 22915.

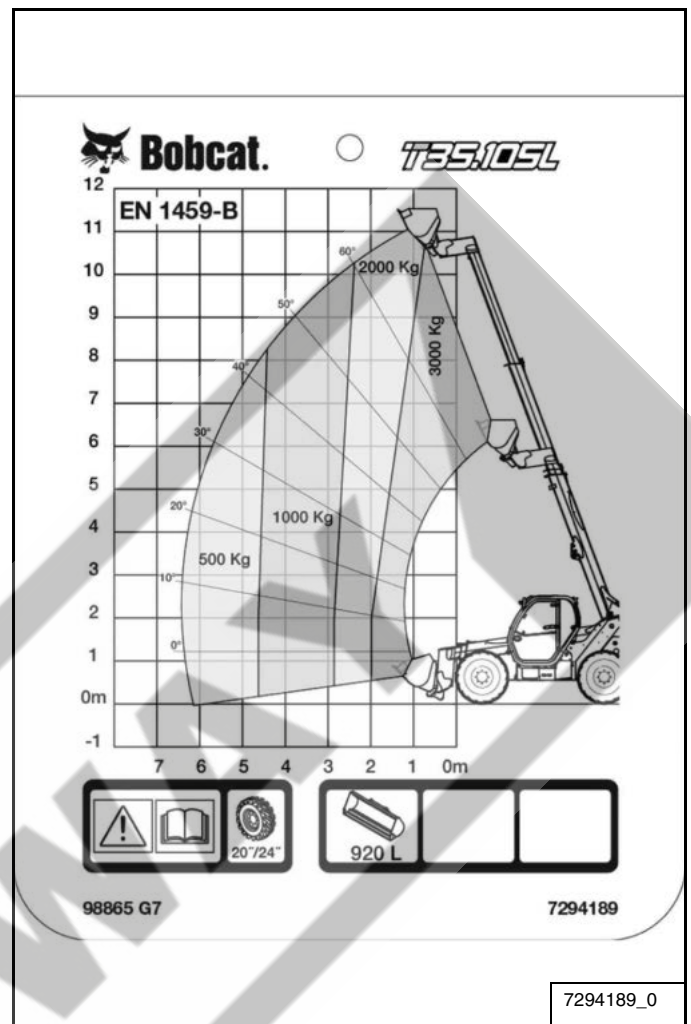
ATTACHMENTS (CONT'D)

Buckets (Cont'd)

Load Charts (Cont'd)

Chart for the machine T35.105LRB equipped with 920 L (32.5 ft³) bucket:

- **CAMSO 405/70-20/14 PR TM R4**
 - with inflation pressure of 450 kPa (4,5 bar) (65 psi).
 - with floating pallet forks.
- **CAMSO 405/70-20/16 PR TM R4**
 - with inflation pressure of 450 kPa (4,5 bar) (65 psi).
 - with floating pallet forks.
- **DUNLOP 405/70 R20 168A2 152J MPT SPT9**
 - with inflation pressure of 550 kPa (5,5 bar) (80 psi).
 - with floating pallet forks.
- **CAMSO 400/80-24/20 PR TM R4**
 - with inflation pressure of 425 kPa (4,25 bar) (62 psi).
 - with floating pallet forks.
- **MICHELIN 400/80-24 162A8 IND TL POWER CL**
 - with inflation pressure of 425 kPa (4,25 bar) (62 psi).
 - with floating pallet forks.
- **DUNLOP 405/70R24 168A2 152J MPT SPT9**
 - with inflation pressure of 520 kPa (5,20 bar) (75 psi).
 - with floating pallet forks.



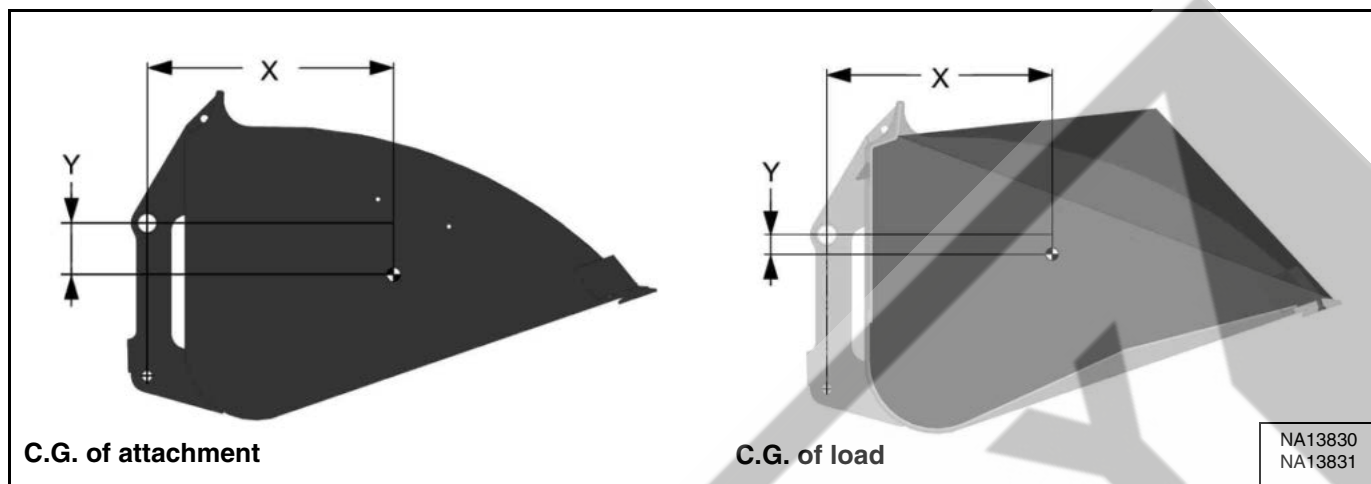
Complies with stability tests EN1459 Annex B and the relevant parts of ISO 22915.

ATTACHMENTS (CONT'D)

Buckets (Cont'd)

Mass Properties

Figure 103



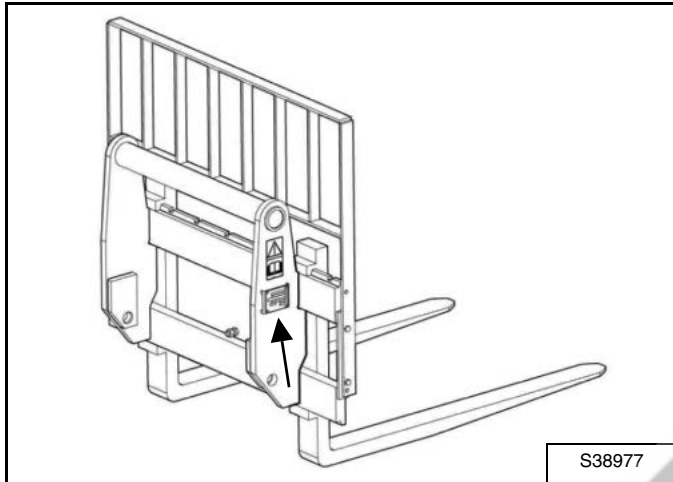
BUCKET	MASS	CENTRE OF GRAVITY OF ATTACHMENT			CENTRE OF GRAVITY OF LOAD		
		X	Y	Z	X	Y	Z
Digging Bucket 920 L (32.5 ft³), without teeth	442 kg (974 lb)	332 mm (13.1 in)	-288 mm (-11.3 in)	0 mm (0 in)	371 mm (14.6 in)	-197 mm (-7.8 in)	0 mm (0 in)
Digging Bucket 920 L (32.5 ft³), with teeth	455 kg (1003 lb)	321 mm (12.6 in)	-311 mm (-12.2 in)	0 mm (0 in)	371 mm (14.6 in)	-197 mm (-7.8 in)	0 mm (0 in)

ATTACHMENTS (CONT'D)

Pallet Forks

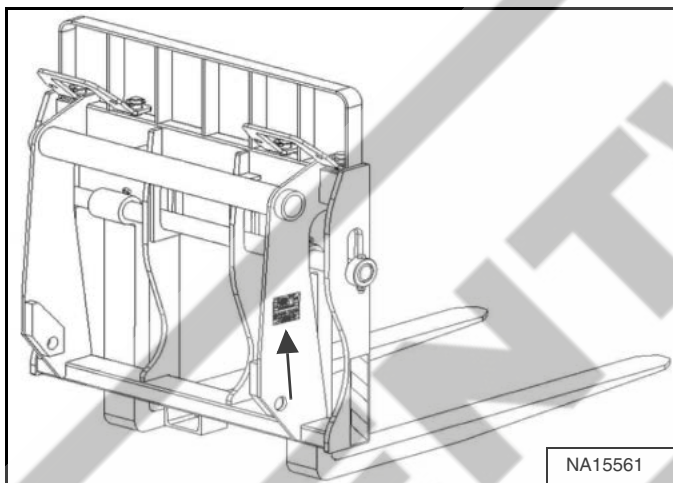
Serial Plate Location

Figure 104



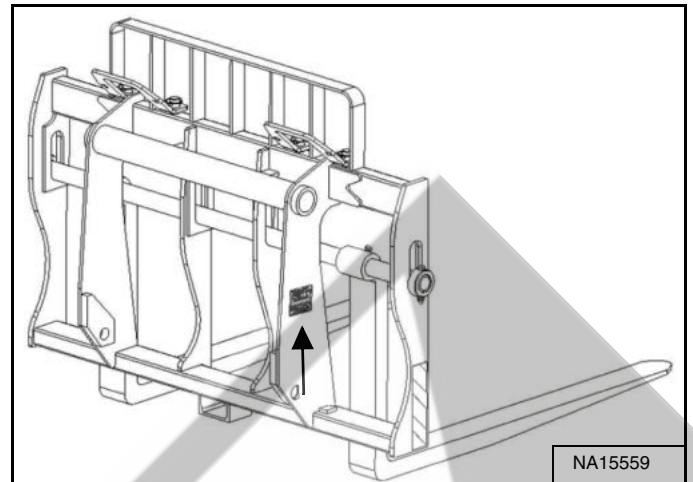
Rigid pallet forks FEM III [Figure 104].

Figure 105



Floating pallet forks 1,0 m (39 in) [Figure 105].

Figure 106



Floating pallet forks 1,5 m (59 in) [Figure 106].

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.

NOTE: 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.

Load Charts

(See LOAD CHARTS on Page 33.) for more information on the RLC of the telescopic handler equipped with a pallet fork.

WARNING

TIPPING OR ROLLOVER CAN CAUSE SERIOUS INJURY OR DEATH

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

W-2928-EN-1112

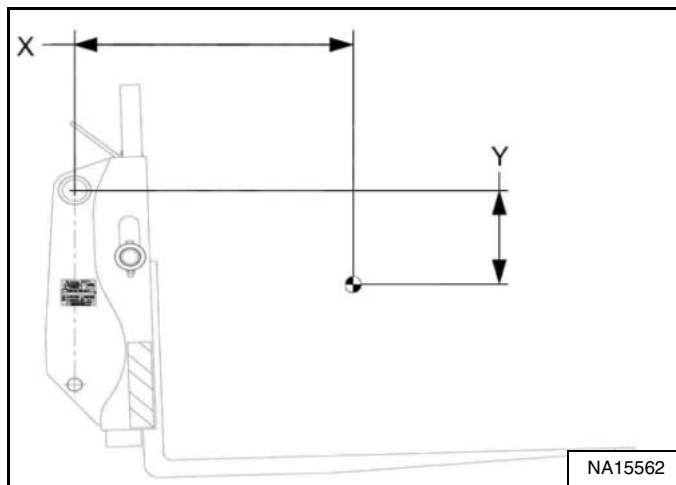
NOTE: The maximum load of an attachment can exceed the RLC of the telescopic handler.

ATTACHMENTS (CONT'D)

Pallet Forks (Cont'd)

Mass Properties

Figure 107



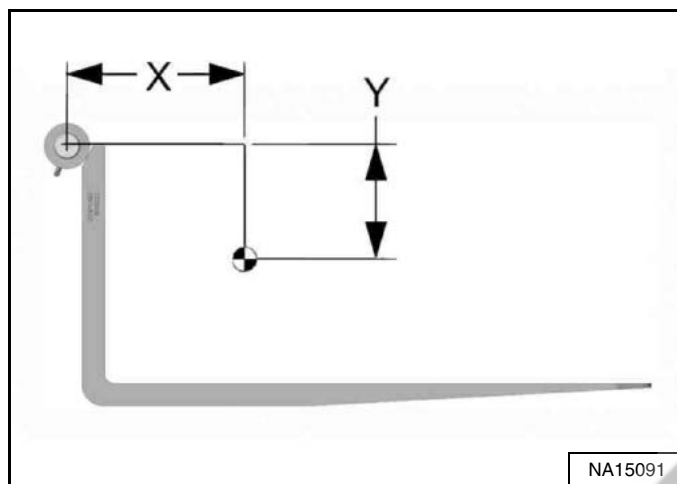
ATTACHMENT	MASS	CENTRE OF GRAVITY OF ATTACHMENT			CENTRE OF GRAVITY OF LOAD		
		X	Y	Z	X	Y	Z
Floating Pallet Forks, 1,0 m (39 in), Quick-tach	254 kg (560 lb)	286 mm (11.3 in)	-434 mm (-17.1 in)	0 mm (0 in)	711 mm (28 in)	-276 mm (-10.9 in)	0 mm (0 in)
Floating Pallet Forks, 1,5 m (59 in), Quick-tach	272 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 Forks, without guard, Quick-tach	300 kg (661 lb)	247 mm (9.7 in)	-522 mm (-20.6 in)	3 mm (0 in)	700 mm (27.6 in)	-344 mm (-13.5 in)	0 mm (0 in)
Rigid Pallet Forks, 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 Forks, 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 Forks, 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 Forks, without guard, Mani-tach	271 kg (579 lb)	159 mm (6.3 in)	-465 mm (-18.3 in)	3 mm (0 in)	713 mm (28.1 in)	-210 mm (-8.2 in)	0 mm (0 in)
Rigid Pallet Forks, with guard, Mani-tach	296 kg (653 lb)	165 mm (6.5 in)	-411 mm (-16.2 in)	3 mm (0 in)	713 mm (28.1 in)	-210 mm (-8.2 in)	0 mm (0 in)

ATTACHMENTS (CONT'D)

Pallet Forks (Cont'd)

Mass Properties (Cont'd)

Figure 108



ATTACHMENT	MASS	CENTRE OF GRAVITY OF ATTACHMENT			CENTRE OF GRAVITY OF LOAD		
		X	Y	Z	X	Y	Z
Floating Pallet Forks, J-tach, load at 500 mm (19.7 in)	150 kg (331 lb)	281 mm (11.1 in)	-337 mm (-13.3 in)	0 mm (0 in)	583 mm (23 in)	-20 mm (-0.8 in)	0 mm (0 in)

Jibs

Declaration of Conformity
for Interchangeable Equipment
Directive 2006/42/EC of the European Parliament and of The Council
"Machinery Directive Article 1(1)(b)"

Bobcat France
Route de Nantes
B.P. 71
44160 Pontchateau
FRANCE

Homologation Manager
Doosan Bobcat EMEA s.r.o.
U Kodetky 1810
26312 Dobříš
Czech Republic

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

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.

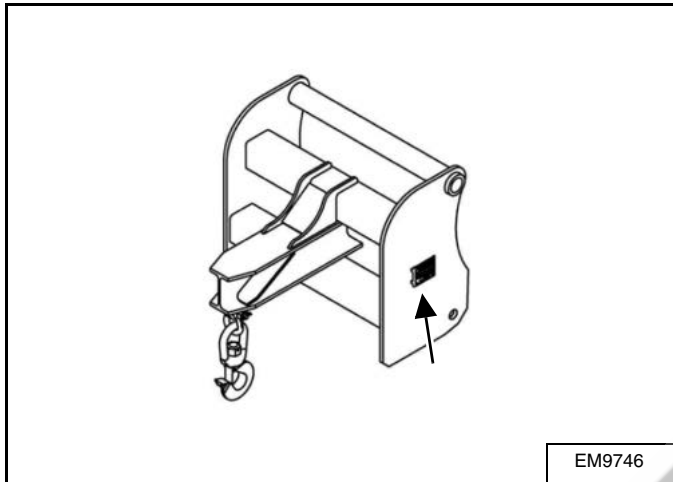
Date: 1 July 2018
Place: Pontchateau, France

ATTACHMENTS (CONT'D)

Jibs (Cont'd)

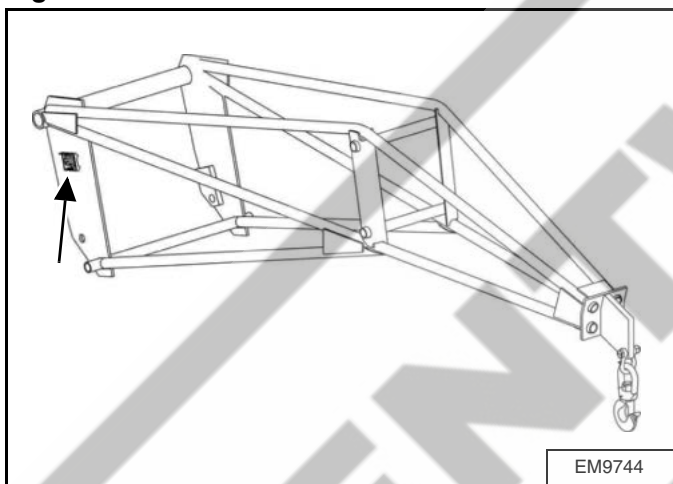
Serial Plate Location

Figure 109



Jib 0,7 m / 4300 kg (2.3 ft / 9480 lb) [Figure 109].

Figure 110



Long jib 3,7 m / 700 kg (12 ft / 1543 lb) [Figure 110].

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.

NOTE: 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.

Inspection Before Use

In addition to the daily inspection of the telescopic handler:

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

ATTACHMENTS (CONT'D)

Jibs (Cont'd)

Load Charts

! WARNING

TIPPING OR ROLLOVER CAN CAUSE SERIOUS INJURY OR DEATH

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

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

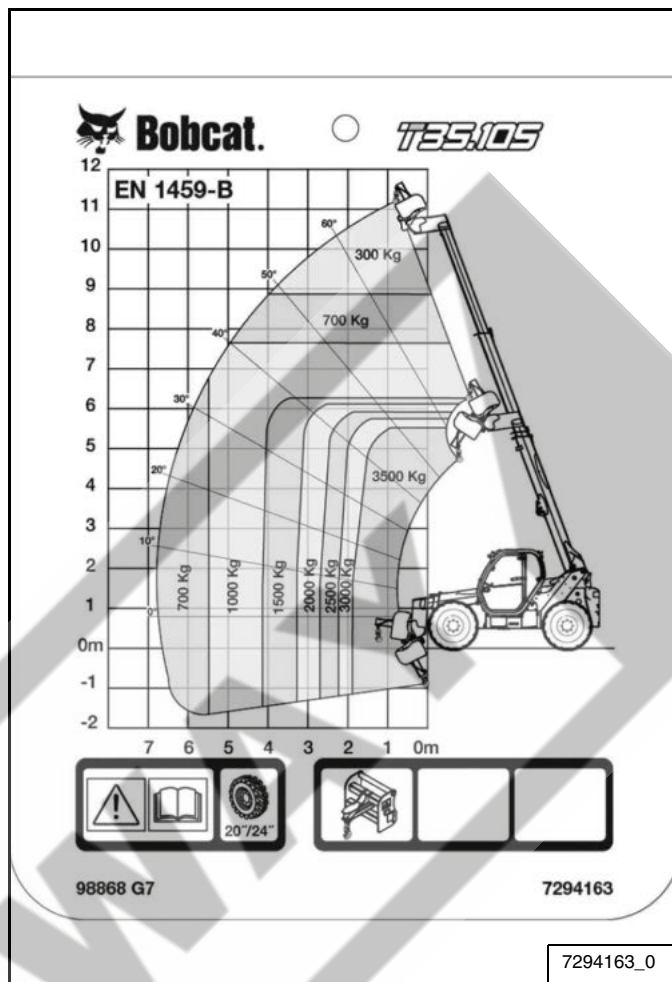
W-2928-EN-1112

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

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

Chart for the machine T35.105RB:

- **CAMSO 405/70-20/14 PR TM R4**
 - with inflation pressure of 450 kPa (4,5 bar) (65 psi).
 - with floating pallet forks.
- **CAMSO 405/70-20/16 PR TM R4**
 - with inflation pressure of 450 kPa (4,5 bar) (65 psi).
 - with floating pallet forks.
- **DUNLOP 405/70 R20 168A2 152J MPT SPT9**
 - with inflation pressure of 550 kPa (5,5 bar) (80 psi).
 - with floating pallet forks.
- **CAMSO 400/80-24/20 PR TM R4**
 - with inflation pressure of 425 kPa (4,25 bar) (62 psi).
 - with floating pallet forks.
- **MICHELIN 400/80-24 162A8 IND TL POWER CL**
 - with inflation pressure of 425 kPa (4,25 bar) (62 psi).
 - with floating pallet forks.
- **DUNLOP 405/70R24 168A2 152J MPT SPT9**
 - with inflation pressure of 520 kPa (5,20 bar) (75 psi).
 - with floating pallet forks.



Complies with stability tests EN1459 Annex B and the relevant parts of ISO 22915.

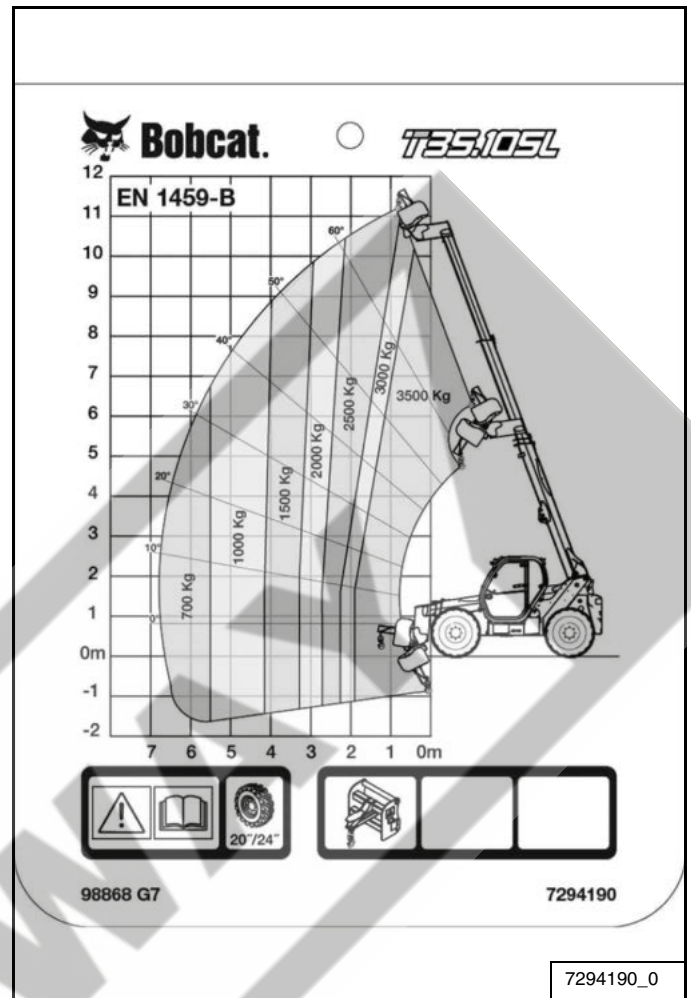
ATTACHMENTS (CONT'D)

Jibs (Cont'd)

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

Chart for the machine T35.105LRB:

- **CAMSO 405/70-20/14 PR TM R4**
 - with inflation pressure of 450 kPa (4,5 bar) (65 psi).
 - with floating pallet forks.
- **CAMSO 405/70-20/16 PR TM R4**
 - with inflation pressure of 450 kPa (4,5 bar) (65 psi).
 - with floating pallet forks.
- **DUNLOP 405/70 R20 168A2 152J MPT SPT9**
 - with inflation pressure of 550 kPa (5,5 bar) (80 psi).
 - with floating pallet forks.
- **CAMSO 400/80-24/20 PR TM R4**
 - with inflation pressure of 425 kPa (4,25 bar) (62 psi).
 - with floating pallet forks.
- **MICHELIN 400/80-24 162A8 IND TL POWER CL**
 - with inflation pressure of 425 kPa (4,25 bar) (62 psi).
 - with floating pallet forks.
- **DUNLOP 405/70R24 168A2 152J MPT SPT9**
 - with inflation pressure of 520 kPa (5,20 bar) (75 psi).
 - with floating pallet forks.



Complies with stability tests EN1459 Annex B and the relevant parts of ISO 22915.

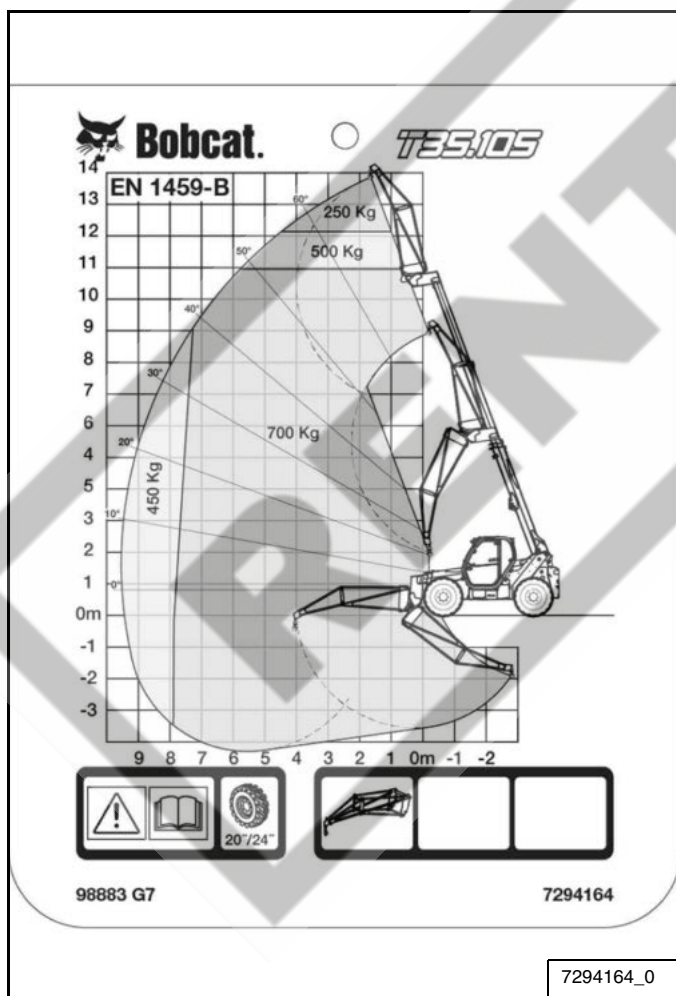
ATTACHMENTS (CONT'D)

Jibs (Cont'd)

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

Chart for the machine T35.105RB:

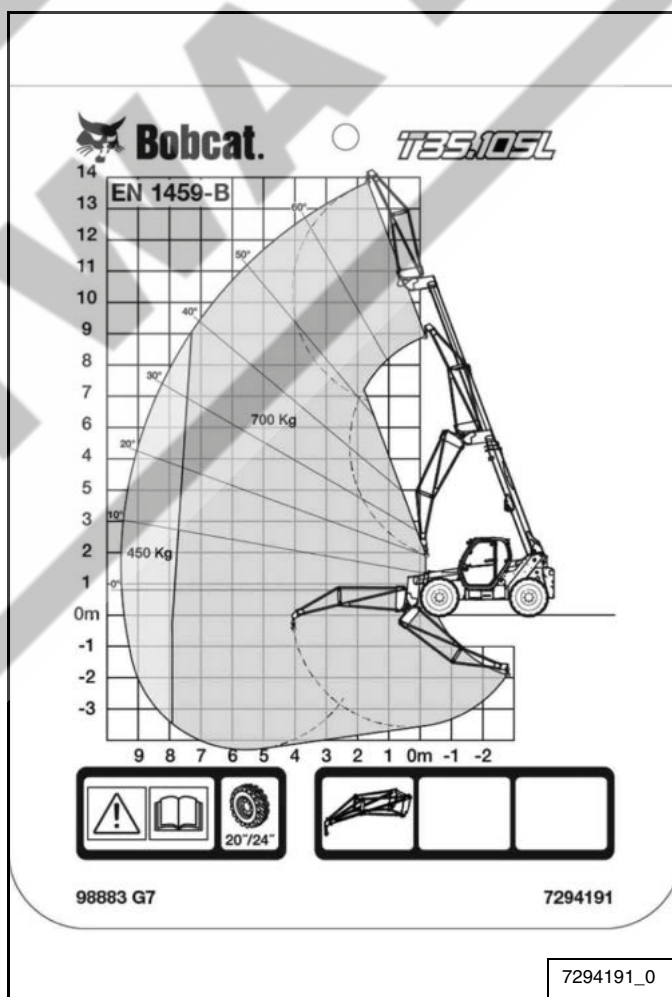
- **CAMSO 405/70-20/14 PR TM R4**
• with inflation pressure of 450 kPa (4,5 bar) (65 psi).
• with floating pallet forks.
- **CAMSO 405/70-20/16 PR TM R4**
• with inflation pressure of 450 kPa (4,5 bar) (65 psi).
• with floating pallet forks.
- **DUNLOP 405/70 R20 168A2 152J MPT SPT9**
• with inflation pressure of 550 kPa (5,5 bar) (80 psi).
• with floating pallet forks.
- **CAMSO 400/80-24/20 PR TM R4**
• with inflation pressure of 425 kPa (4,25 bar) (62 psi).
• with floating pallet forks.
- **MICHELIN 400/80-24 162A8 IND TL POWER CL**
• with inflation pressure of 425 kPa (4,25 bar) (62 psi).
• with floating pallet forks.
- **DUNLOP 405/70R24 168A2 152J MPT SPT9**
• with inflation pressure of 520 kPa (5,20 bar) (75 psi).
• with floating pallet forks.



Complies with stability tests EN1459 Annex B and the relevant parts of ISO 22915.

Chart for the machine T35.105LRB:

- **CAMSO 405/70-20/14 PR TM R4**
• with inflation pressure of 450 kPa (4,5 bar) (65 psi).
• with floating pallet forks.
- **CAMSO 405/70-20/16 PR TM R4**
• with inflation pressure of 450 kPa (4,5 bar) (65 psi).
• with floating pallet forks.
- **DUNLOP 405/70 R20 168A2 152J MPT SPT9**
• with inflation pressure of 550 kPa (5,5 bar) (80 psi).
• with floating pallet forks.
- **CAMSO 400/80-24/20 PR TM R4**
• with inflation pressure of 425 kPa (4,25 bar) (62 psi).
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• with inflation pressure of 425 kPa (4,25 bar) (62 psi).
• with floating pallet forks.
- **DUNLOP 405/70R24 168A2 152J MPT SPT9**
• with inflation pressure of 520 kPa (5,20 bar) (75 psi).
• with floating pallet forks.



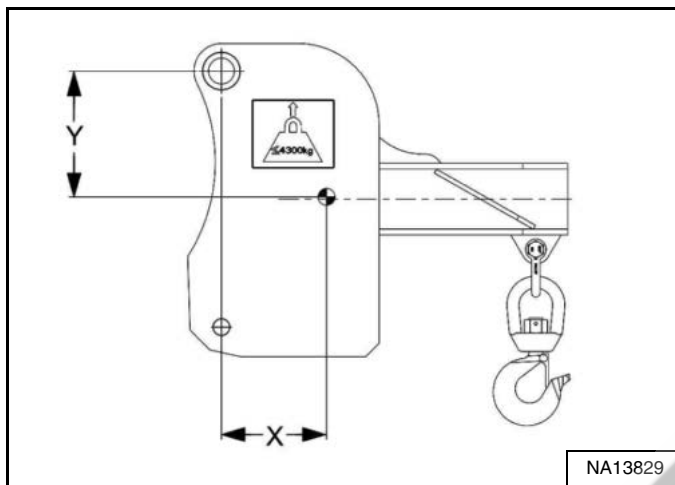
Complies with stability tests EN1459 Annex B and the relevant parts of ISO 22915.

ATTACHMENTS (CONT'D)

Jibs (Cont'd)

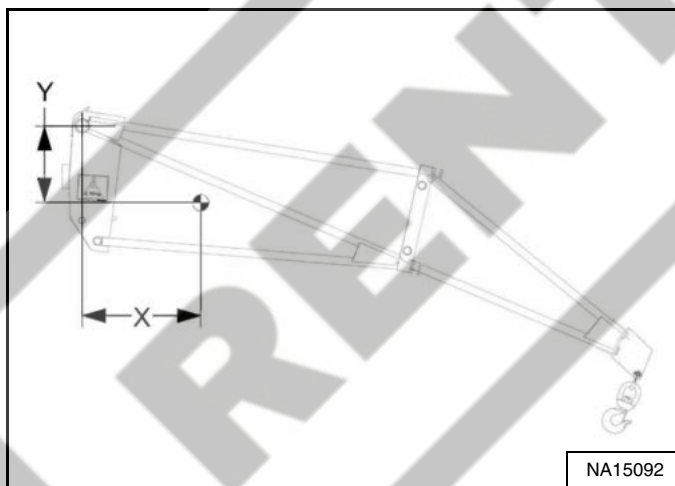
Mass Properties

Figure 111



ATTACHMENT	MASS	CENTRE OF GRAVITY OF ATTACHMENT			CENTRE OF GRAVITY OF LOAD		
		X	Y	Z	X	Y	Z
Jib 0,7 m (28 in), Quicktach	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), Manitach	153 kg (337 lb)	261 mm (10.3 in)	-135 mm (-5.3 in)	0 mm (0 in)	700 mm (27.6 in)	-554 mm (-21.8 in)	0 mm (0 in)

Figure 112



ATTACHMENT	MASS	CENTRE OF GRAVITY OF ATTACHMENT			CENTRE 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)

ATTACHMENTS (CONT'D)

Jibs (Cont'd)

Procedure

Suspended loads have a dynamic and therefore unpredictable effect on the telescopic handler'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 telescopic handler with wind speeds over 12,5 m/s (28 mph).

Contact your Bobcat dealer for details on applications.

Load Handling

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, always keep the machine frame levelled. The lateral attitude must not exceed 1% and the longitudinal attitude must not exceed 5%.

NOTE: Do not carry or place roof trusses with the jib.

NOTE: Do not carry hot or corrosive products.



WARNING

OVERLOAD CAN CAUSE TIPPING OR ROLLOVER AND SERIOUS INJURY OR DEATH

- **Always use and follow the Rated Load Capacity chart provided. Each machine has its own chart.**
- **DO NOT exceed the Rated Load Capacity.**

W-2995-1215

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 telescopic handler 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.

ATTACHMENTS (CONT'D)

Jibs (Cont'd)

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. Engage the parking brake and put the gear lever into NEUTRAL.
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 lifting hook to the lifting point of 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 (wire, 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. Park the machine on level ground.
3. Put the Travel Direction Control into NEUTRAL and make sure the parking brake is engaged.

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.
4. Raise and extend the boom to move the load above the area where to place the load.
 5. Position the load horizontally and place it on the area by lowering and retracting the boom.

6. Turn off the engine and remove the ignition key. Exit the cab. 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.
7. Return the boom to the transport position by raising, retracting and lowering it.

Picking Up A Raised Load

1. Fully retracted and lower the boom. Move the machine as close as possible to the load.
2. Park the machine on level ground.
3. Put the Travel Direction Control into NEUTRAL and make sure the parking brake is engaged.
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. 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.

NOTE: Do not carry hot or corrosive products.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Manual Lock)

! WARNING

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. Unapproved attachments can cause serious injury or death.

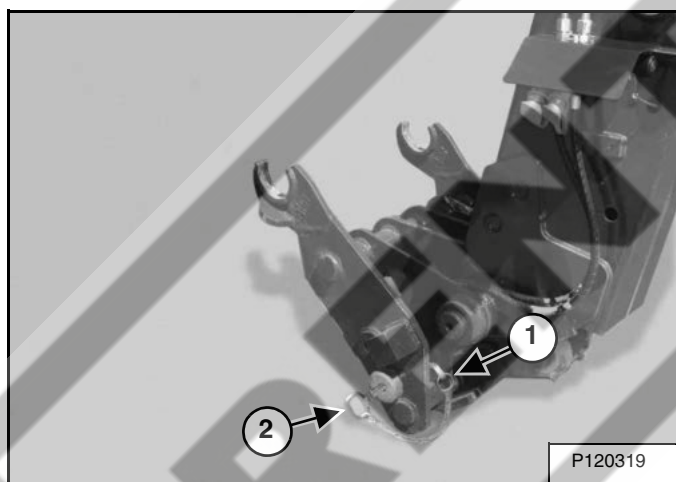
W-2392-0301

NOTE: 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

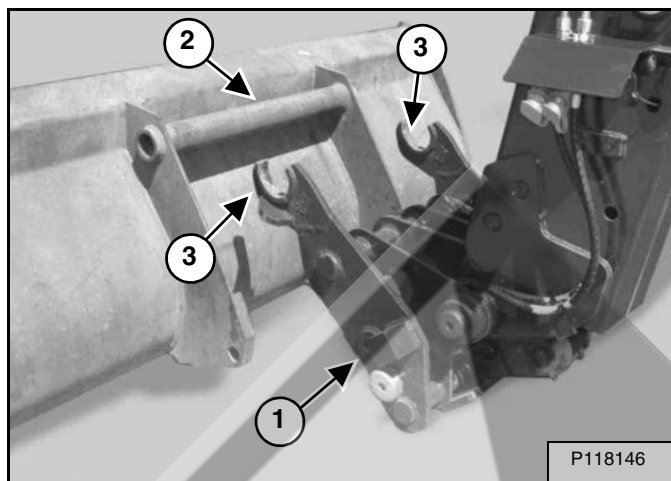
Figure 113



Remove the locking bar safety pin (Item 1), and remove the locking bar (Item 2) [Figure 113] from the attachment carrier.

Enter the telescopic handler and perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 83.) Start the engine. (See STARTING THE ENGINE on Page 88.) Lower and retract the boom.

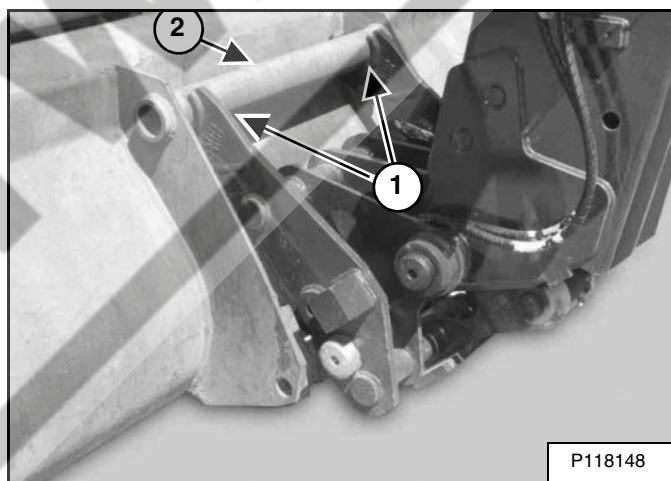
Figure 114



Position the telescopic handler so that the attachment carrier (Item 1) is parallel to the attachment tube (Item 2) [Figure 114]. Drive the telescopic handler forward until the attachment carrier is at a distance of about 1 m (3 ft) from the attachment.

Tilt the attachment carrier (Item 1) forward until the two hooks (Item 3) are lower than the attachment tube (Item 2) [Figure 114].

Figure 115



Drive forward until the two hooks (Item 1) are right below the attachment tube (Item 2) [Figure 115].

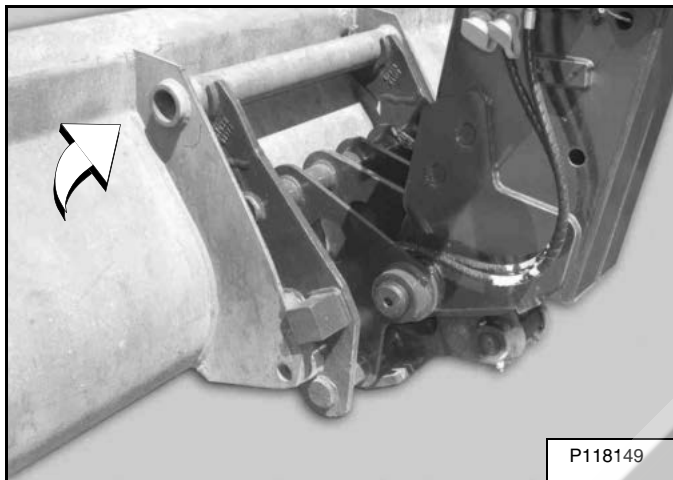
Engage the attachment tube (Item 2) in the two hooks (Item 1) [Figure 115] by raising the boom; tilt the attachment carrier backward if necessary.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Manual Lock) (Cont'd)

Installing (Cont'd)

Figure 116



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 116]**.

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 65.) Stop the engine and exit the telescopic handler. (See STOPPING THE ENGINE AND LEAVING THE TELESCOPIC HANDLER on Page 93.)



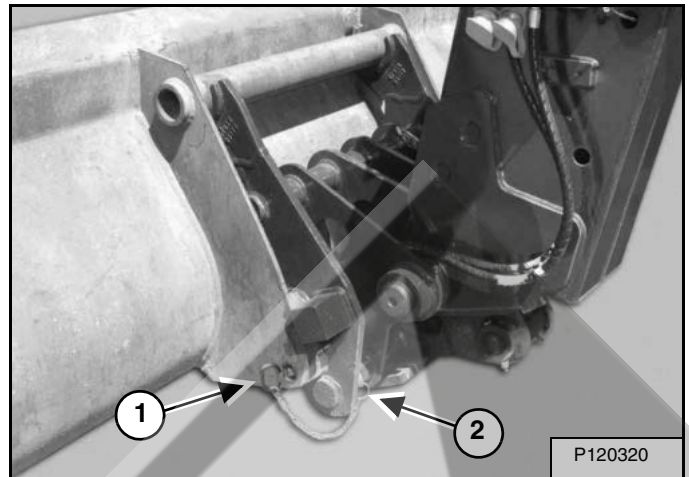
WARNING

Before you exit 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-2907-0211

Figure 117



Fully insert the locking bar (Item 1) through the holes in the attachment and the attachment carrier. Install the safety pin (Item 2) **[Figure 117]** into the locking bar.

Make sure the locking bar (Item 1) **[Figure 117]** extends through the holes on both sides of the attachment and the attachment carrier. Make sure the attachment is securely fastened.

Install attachment electrical harness and hydraulic lines, if applicable, on the telescopic handler and the attachment carrier.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Manual Lock) (Cont'd)

Removing

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

NOTE: 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.

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 65.) Stop the engine and exit the telescopic handler. (See STOPPING THE ENGINE AND LEAVING THE TELESCOPIC HANDLER on Page 93.)

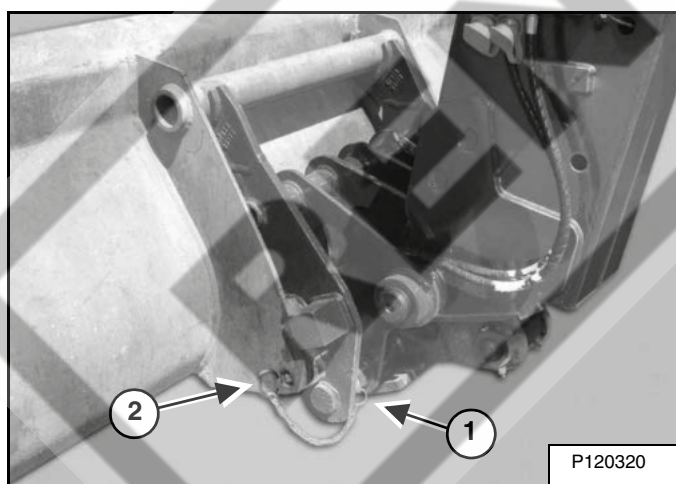
! WARNING

Before you exit 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-2907-0211

Figure 118



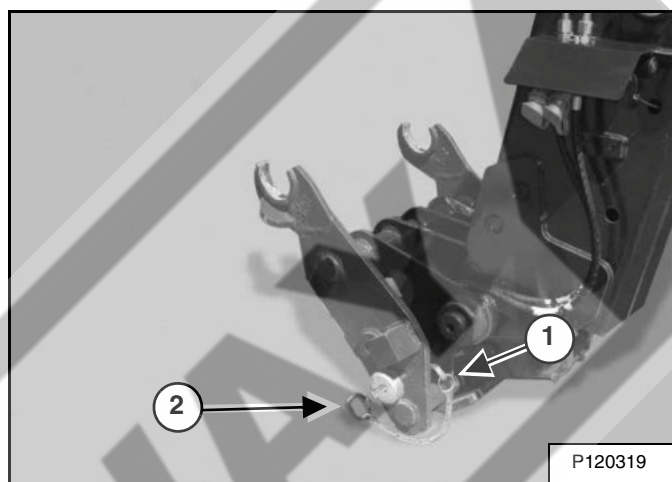
Disconnect attachment electrical harness and hydraulic lines, if applicable, from the telescopic handler. Remove the safety pin (Item 1), and remove the locking bar (Item 2) [Figure 118].

Enter the telescopic handler and perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 83.) Start the engine. (See STARTING THE ENGINE on Page 88.)

Tilt the attachment carrier forward until the attachment tube is disengaged. Move the telescopic handler backward away from the attachment.

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 65.) Stop the engine and exit the telescopic handler. (See STOPPING THE ENGINE AND LEAVING THE TELESCOPIC HANDLER on Page 93.)

Figure 119



Fully insert the locking bar (Item 2) into the holes in the attachment carrier. Install the safety pin (Item 1) [Figure 119] into the locking bar.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Hydraulic Lock)

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

WARNING

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. Unapproved attachments can cause serious injury or death.

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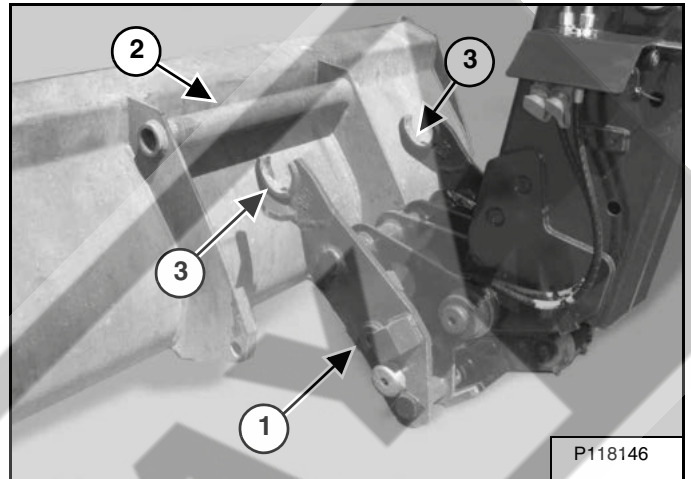
NOTE: Warranty is void if non-approved attachments are used on the telescopic handler.

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 on your machine's Load Capacity Charts.

Installing

Enter the telescopic handler and perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 83.) Start the engine. (See STARTING THE ENGINE on Page 88.) Lower and retract the boom.

Figure 120



Position the telescopic handler so that the attachment carrier (Item 1) is parallel to the attachment tube (Item 2) [Figure 120]. Drive the telescopic handler forward until the attachment carrier is at a distance of about 1 m (3 ft) from the attachment.

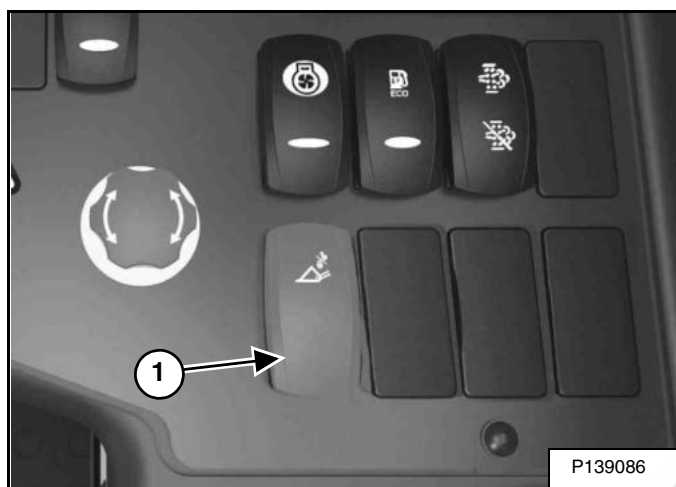
Tilt the attachment carrier (Item 1) forward until the two hooks (Item 3) are lower than the attachment tube (Item 2) [Figure 120].

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Hydraulic Lock) (Cont'd)

Installing (Cont'd)

Figure 121



Push and hold the top of the Hydraulic Quick-tach switch (Item 1) [Figure 121] to retract the locking pins (Item 1) [Figure 122] on the attachment carrier.

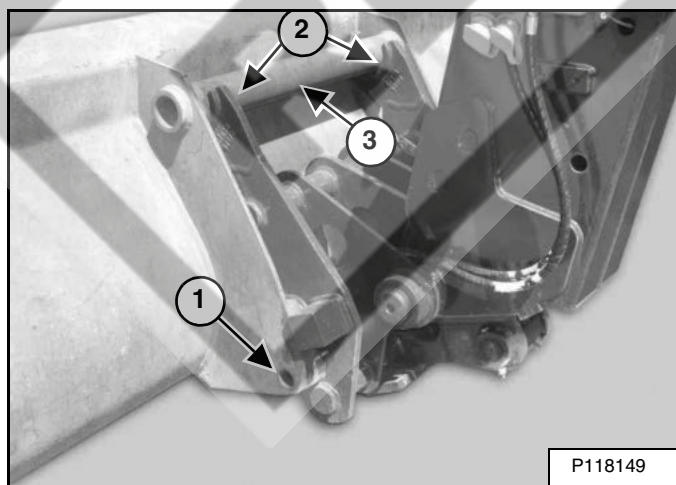
WARNING

Before you exit 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-2907-0211

Figure 122



Drive forward until the two hooks (Item 2) are right below the attachment tube (Item 3) [Figure 122].

Engage the attachment tube (Item 3) in the two hooks (Item 2) [Figure 122] by raising the boom; tilt the attachment carrier backward if necessary.

When the attachment tube (Item 3) is properly engaged in the two hooks (Item 2) [Figure 122] and the attachment is no longer touching the ground, tilt the attachment carrier fully backward.

Release the switch (Item 1) [Figure 121], the locking pins (Item 1) [Figure 122] will extend automatically.

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 65.) Stop the engine and exit the telescopic handler. (See STOPPING THE ENGINE AND LEAVING THE TELESCOPIC HANDLER on Page 93.)

Make sure the locking pins (Item 1) [Figure 122] extend through the holes of the attachment carrier.

Make sure that the attachment is securely fastened.

WARNING

FAILURE TO FULLY ENGAGE LOCKING PINS CAN CAUSE SERIOUS INJURY OR DEATH

Locking pins must extend through the holes in the attachment mounting frame. Failure to engage locking pins can allow attachment to come off.

W-2913-0211

Install attachment electrical harness and hydraulic lines. (if equipped) on the telescopic handler and the attachment carrier.

ATTACHMENTS (CONT'D)

Installing And Removing The Attachment (Hydraulic Lock) (Cont'd)

Removing

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

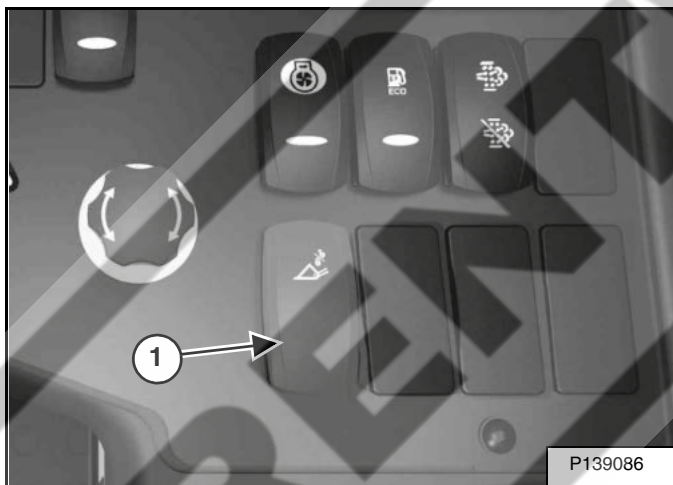
NOTE: In muddy conditions or to prevent the attachment from freezing to the ground, put the attachment on planks or blocks before removing it from the machine.

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 65.) Stop the engine and exit the telescopic handler. (See STOPPING THE ENGINE AND LEAVING THE TELESCOPIC HANDLER on Page 93.)

Disconnect attachment electrical harness and hydraulic lines, if applicable, from the telescopic handler.

Enter the telescopic handler and perform the PRE-STARTING PROCEDURE. (See PRE-STARTING PROCEDURE on Page 83.) Start the engine. (See STARTING THE ENGINE on Page 88.)

Figure 123



Push and hold the Hydraulic Quick-tach switch (Item 1) [Figure 123] to retract the locking pins on the attachment carrier.

Tilt the attachment carrier forward until the attachment tube is disengaged. Move the telescopic handler backward away from the attachment.

Release the Hydraulic Quick-tach switch (Item 1) [Figure 123] to extend the locking pins.

WARNING

Before you exit 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-2907-0211

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.

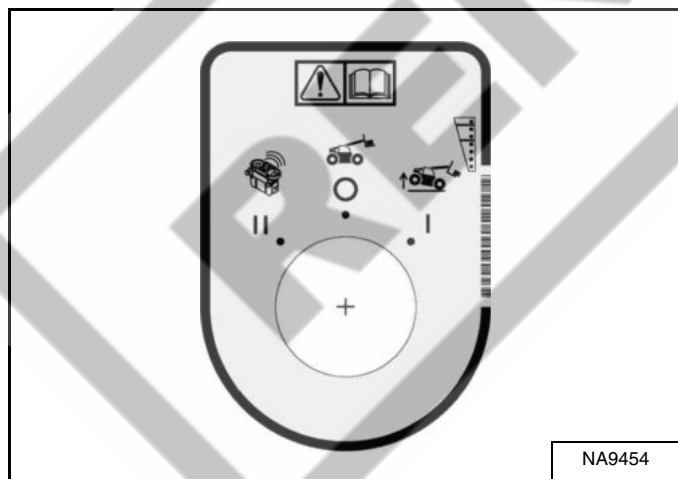
Selection Mode Switch

Figure 124



The selection mode switch (Item 1) [Figure 124] located in front of the joystick allows to select the operating mode of the machine.

Figure 125



Cab Control Mode

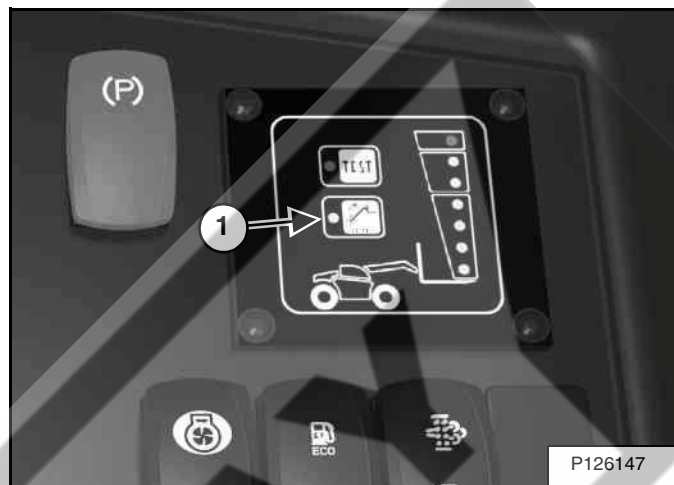
Select cab control mode (position '0') using the Selection Mode Switch [Figure 125] for normal machine operation.

When the cab control mode is activated, the remote control is automatically deactivated.

Longitudinal Load Moment Controller (LLMC) Override Mode

Turn the Selection Mode Switch (Item 1) [Figure 124] clockwise into LLMC override mode (position 'I') to override the LLMC.

Figure 126



The control indicator light (ORANGE) (Item 1) [Figure 126] flashes when the LLMC override mode is activated.

The switch returns to the original position as soon as the switch is released and the LLMC becomes active again.

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

Remote Control Mode (If Equipped)

Select remote control mode (position 'II') using the Selection Mode Switch [Figure 125] to operate the machine with remote control.

NOTE: The engine, if running, will stop.

OPERATING PROCEDURE (CONT'D)

Inspect 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 telescopic handler 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.

Basic Operating Instructions

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

IMPORTANT

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

I-2015-0284

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.

NOTE: 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 telescopic handler according to the visibility diagram (See Models T35.105RB And T35.105LRB - 20" Wheels on Page 262.) 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 telescopic handler as far back from the edge as possible and the telescopic handler wheels perpendicular to the edge so that if the edge collapses, the telescopic handler can be moved back.

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

Operating On Slopes

Drive slowly and do not travel on excessive slopes.



WARNING

TIPPING OR ROLLOVER CAN CAUSE SERIOUS INJURY OR DEATH

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

W-2908-EN-1112

The above list of overturning hazards is not exhaustive.

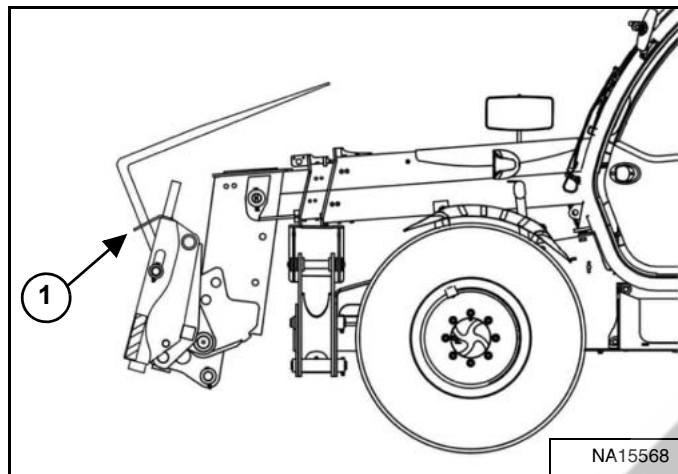
OPERATING PROCEDURE (CONT'D)

Basic Operating Instructions (Cont'd)

Road Position

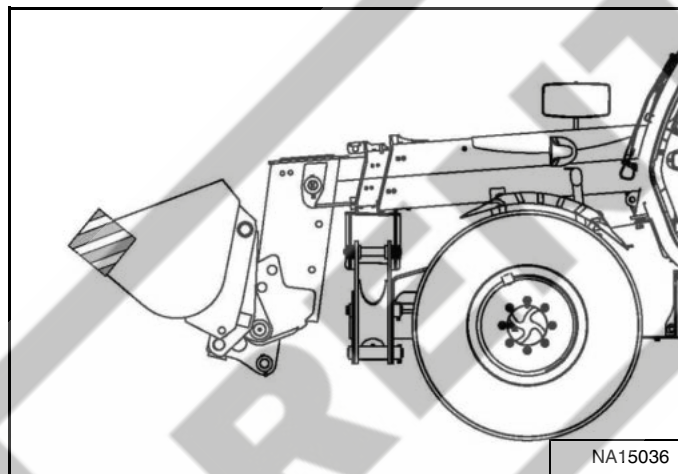
When travelling on the road, observe the recommended road position for the following attachments:

Figure 127



1. 1,5 m (59 in) floating pallets forks: put the attachment carrier in vertical position and tilt the forks back to avoid sharp edges travel direction. Secure the forks to the guard with road lock brackets (Item 1) [Figure 127]. Then tilt back the carrier.

Figure 128



2. 920 L (32.5 ft³) digging bucket: install bucket teeth protection (Item 1) [Figure 128].

OPERATING PROCEDURE (CONT'D)

Operating With A Full Bucket

Figure 129

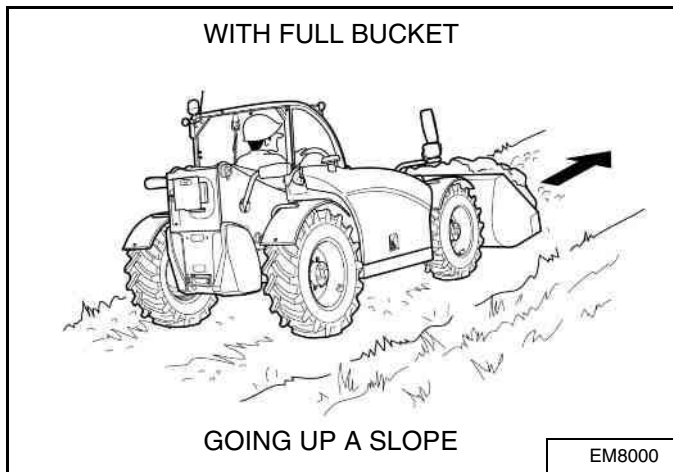
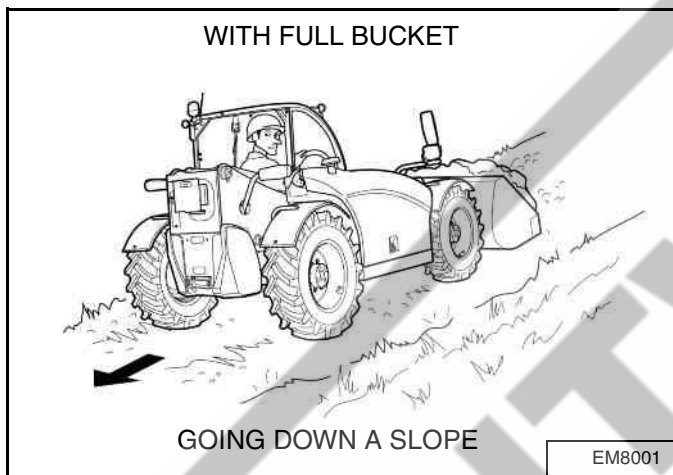


Figure 130



With a full bucket, go up or down the slope with the heavy end toward the top of the slope [Figure 129] and [Figure 130].

Operating With An Empty Bucket

Figure 131

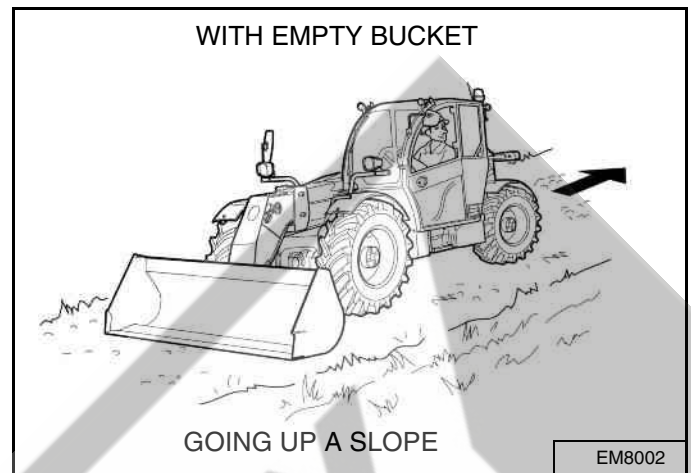
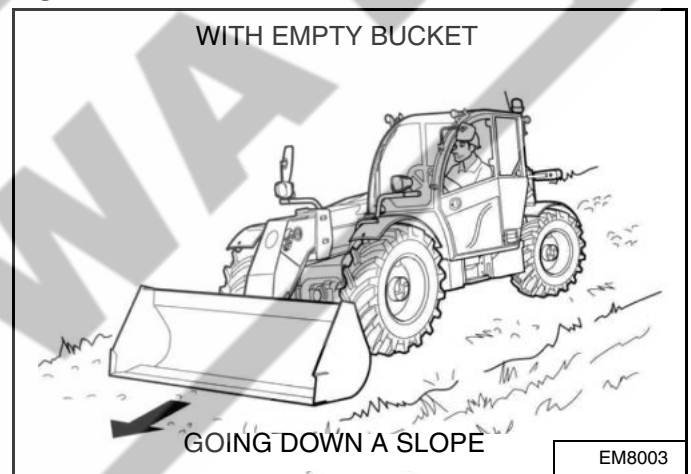


Figure 132



With an empty bucket, go up or down the slope with the heavy end toward the top of the slope [Figure 131] and [Figure 132].



WARNING

AVOID INJURY OR DEATH

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

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

W-2650-1112

OPERATING PROCEDURE (CONT'D)

Filling And Emptying The Bucket

! WARNING

AVOID INJURY OR DEATH

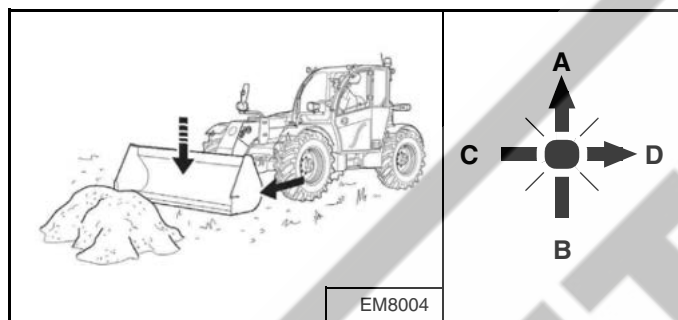
Load, unload and turn on flat level ground. Do not exceed the rated load capacity shown on the Load Charts in the cab. Do not overfill the bucket to avoid the risk of falling objects. Failure to obey warnings can cause the machine to tip or rollover and cause injury or death.

W-2651-0313

Filling

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

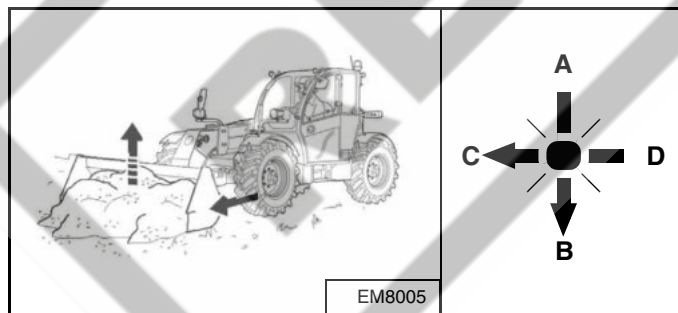
Figure 133



Lower the bucket until it slightly touches the ground (A).

Tilt the bucket forward (D) until the cutting edge of the bucket is on the ground.

Figure 134



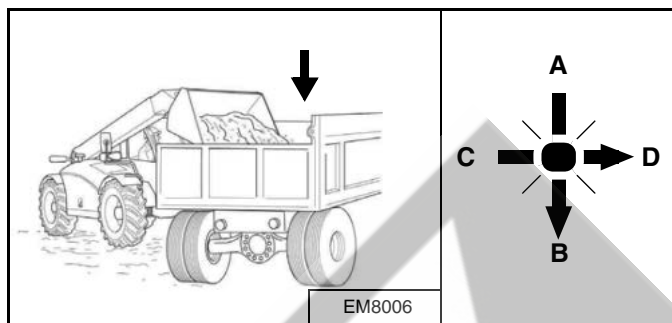
Drive slowly forward into the material.

Lift the boom (B) and tilt the bucket backward (C) all the way when the bucket is full.

Drive backward away from the material.

Emptying

Figure 135



Keep the bucket low and the boom retracted when moving to the area where you want to empty the bucket.

Raise the boom (B). If necessary, level the bucket (D) while raising the boom to help prevent material from falling off the bucket.

Drive forward slowly until the bucket is over the top of the truck box or bin.

Tilt the bucket all the way forward (D) 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.

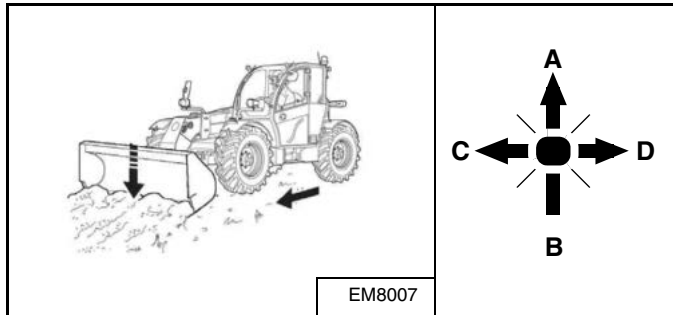
OPERATING PROCEDURE (CONT'D)

Digging And Filling A Hole

Digging

NOTE: Always fully retract the boom during digging.

Figure 136



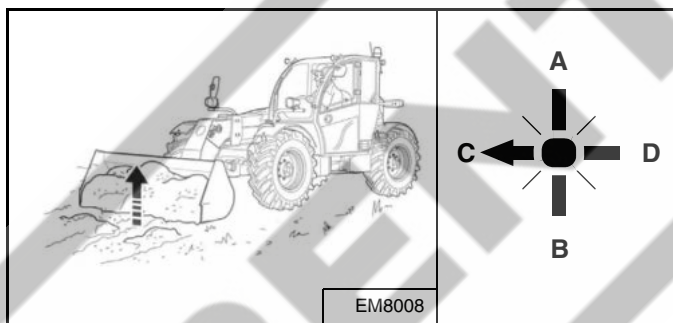
Lower the bucket until it slightly touches the ground (A). Put the cutting edge of the bucket on the ground (D).

Drive forward slowly and continue to tilt the bucket down (D) until it enters the ground.

Raise the cutting edge a small amount (C) to increase traction and keep an even digging depth.

Continue to drive forward until the bucket is full. When the ground is hard, raise and lower the cutting edge of the bucket (D) while driving forward slowly.

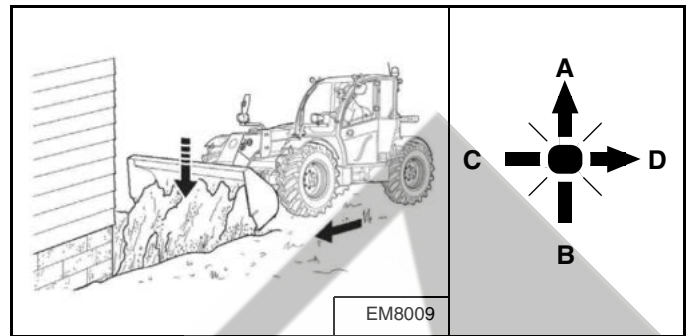
Figure 137



Tilt the bucket backward (C) as far as it will go when the bucket is full.

Filling

Figure 138



Lower the boom (A) and put the cutting edge of the bucket on the ground (D). Drive forward to the edge of the hole to push the material into the hole.

Tilt the bucket forward (D) as soon as it is past the edge of the hole.

If necessary, raise the boom to empty the bucket.

OPERATING PROCEDURE (CONT'D)

Using Frame-Levelling (If Equipped)

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

Figure 139



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 139] to tilt right.

NOTE: Depending on the longitudinal stability level the frame-levelling function can be disabled. (See Longitudinal Load Moment Indicator (LLMI) on Page 46.)

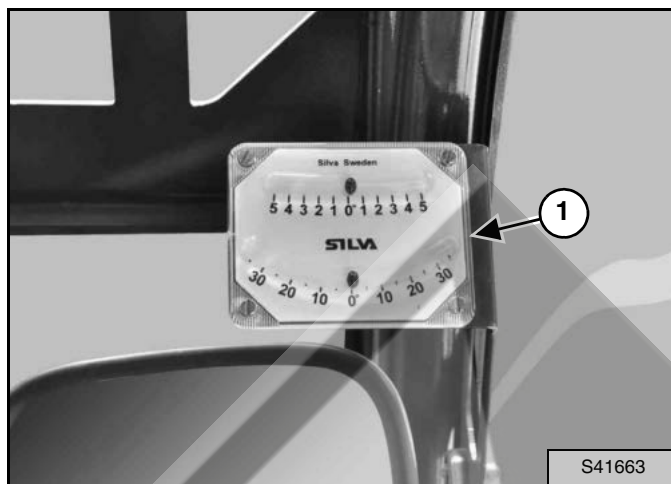
Regardless the longitudinal stability level the frame-levelling (right or left) can be reduced in speed and disabled depending on the frame and boom angles:

- With the boom angle below 5 degrees, frame levelling can be used at fast speed.
- With the boom angle between 5 degrees to 50 degrees, the frame angle can be adjusted between 6 degrees left to 6 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-levelling feature and any function that could result to get out them are independently disabled (e.g. frame-levelling left or right functions can be independently disabled...)

When operating the frame-levelling function the frame level angle is displayed on the display screen. (See Display Screen on Page 50.)

Figure 140



There is also a sight level gauge (Item 1) [Figure 140] in the upper right corner of the front of the cab to see the frame angle.



WARNING

TIPPING CAN CAUSE SERIOUS INJURY OR DEATH

Rapid starting and stopping of frame motion with a raised load can cause the telescopic handler to tip.

- 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.

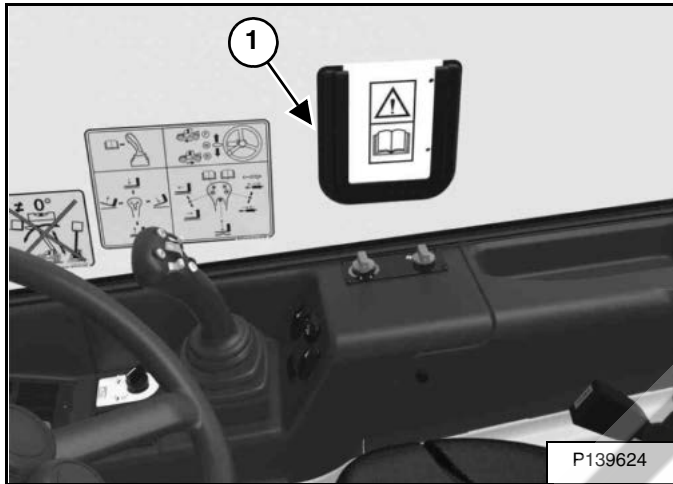
W-2493-EN-0511

OPERATING PROCEDURE (CONT'D)

Raising A Load And Extending The Boom

Perform the pre-starting procedure before using the telescopic handler. (See PRE-STARTING PROCEDURE on Page 83.)

Figure 141



Read and understand the load capacity charts (Item 1) [Figure 141] to learn the Rated Load Capacity at different extension and heights of the telescoping boom.

NOTE: 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.

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

Move the telescopic handler to the load to be lifted.

Be sure the load is centred on the attachment. Fasten the load to the attachment if load can shift.

Raise the boom slightly to clear the ground and tilt the attachment back.

Start slowly and drive the telescopic handler with the load as low as possible.

Stop the telescopic handler on flat, solid and level ground. Put the Travel Direction Control in NEUTRAL and engage the parking brake before raising or extending the boom.

Slowly raise and extend the boom to put the load in the desired location. **DO NOT DRIVE FORWARD WITH THE LOAD RAISED.**

Place the load, then retract and lower the boom.

Slowly move the machine backward.

WARNING

CRUSH HAZARD CAN CAUSE SERIOUS INJURY OR DEATH

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

W-2851-0410

WARNING

AVOID INJURY OR DEATH

Check area to be excavated for overhead or underground electrical power lines. Keep a safe distance from electrical power lines.

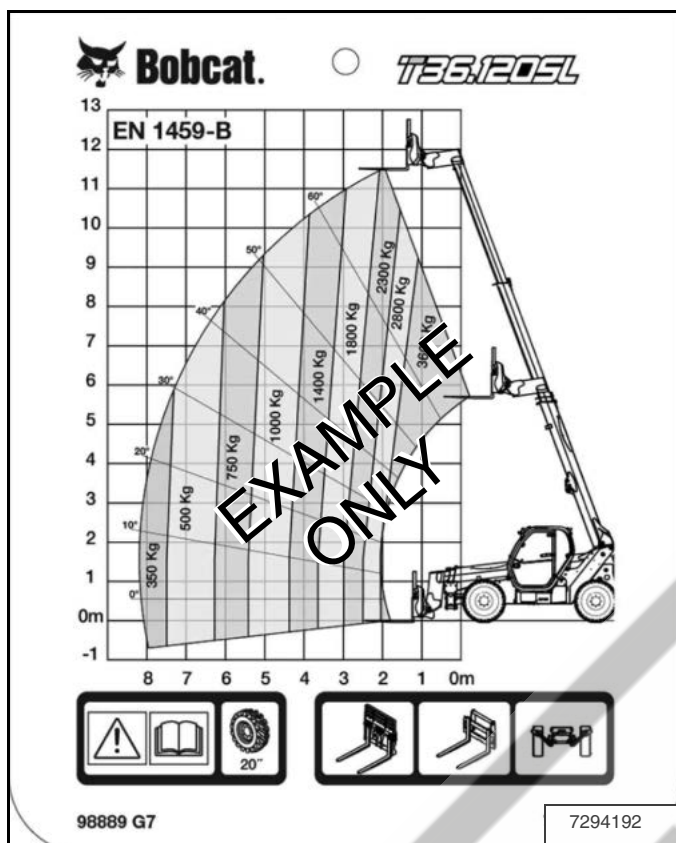
VOLTAGE	MINIMUM DISTANCE
up to 50 kV	3 m (10 ft)
beyond 50 kV	5 m (17 ft)

W-2757-EN-0513

OPERATING PROCEDURE (CONT'D)

Load Capacity Charts

Figure 142



Note that, when the boom is fully retracted, the telescopic handler will lift more weight than when extended.

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

Place the load, then retract and lower the boom.

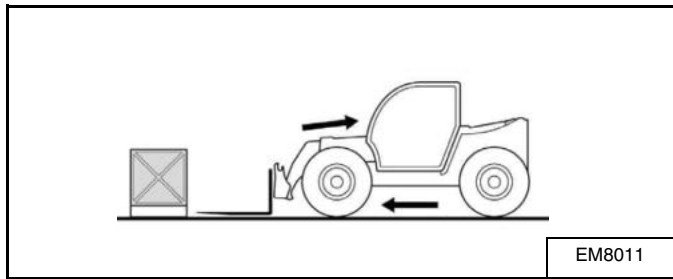
The load capacity charts are designed with the machine on flat, level ground. If the machine is positioned up or down a slope, the values of the load chart will no longer be accurate. Always lift and extend the boom when the machine is on flat, level and solid ground.

OPERATING PROCEDURE (CONT'D)

Handling Loads With Pallet Forks

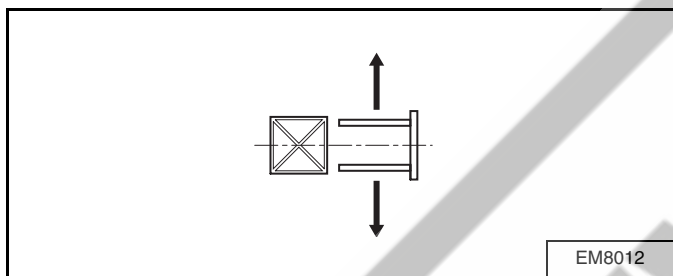
Picking Up A Load From The Ground With Pallet Forks

Figure 143



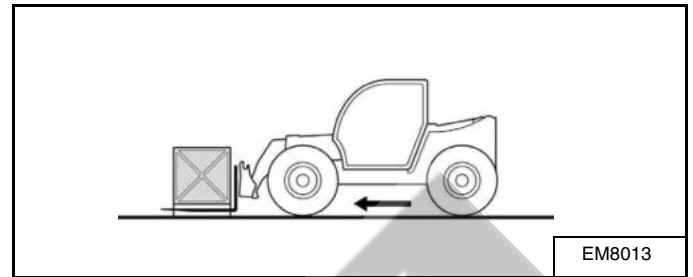
1. Move the machine perpendicular to the load with the boom fully retracted and the pallet forks parallel to the ground **[Figure 143]**.

Figure 144



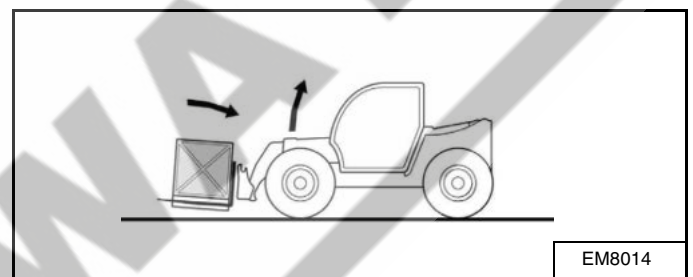
2. Adjust the pallet fork clearance and their centring in relation to the load **[Figure 144]**.

Figure 145



3. Adjust the height of the pallet forks so that they can slide under the load **[Figure 145]**.
4. Move the machine forward or extend the boom to bring the heel of the pallet forks in contact with the load **[Figure 145]**.
5. Put the Travel Direction Control in NEUTRAL and engage the parking brake.

Figure 146



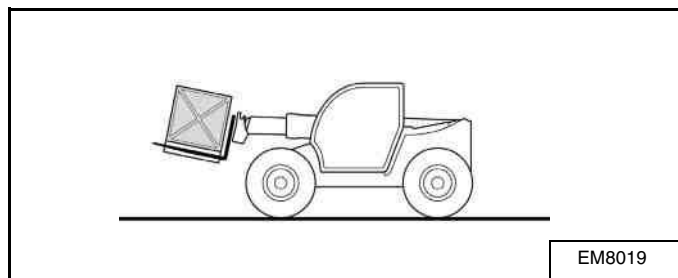
6. Raise the boom so that the ground clearance under the pallet forks is approximately 300 mm (12 in), tilt the forks fully backward and retract the boom fully. The machine is now in transport position **[Figure 146]**.

OPERATING PROCEDURE (CONT'D)

Handling Loads With Pallet Forks (Cont'd)

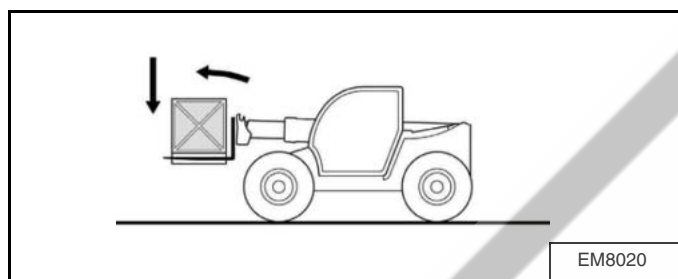
Placing A Load On The Ground With Pallet Forks

Figure 147



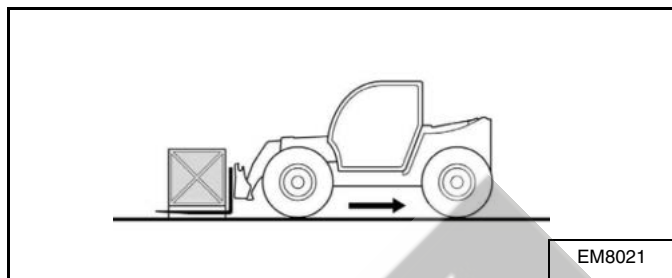
1. Move the load into the position where it is to be placed **[Figure 147]**.

Figure 148



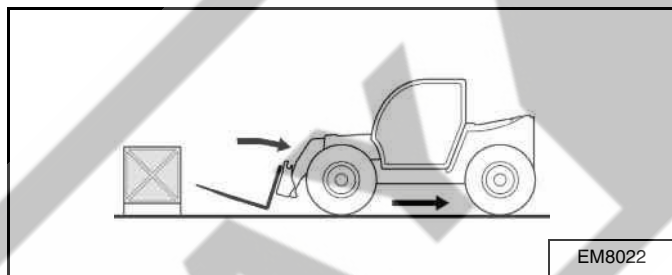
2. Tilt the pallet forks into a position parallel to the ground **[Figure 148]**.
3. Lower the load until it is resting on the ground and the pallet forks are no longer in contact with the load **[Figure 148]**.

Figure 149



4. Move the machine back in order to release the pallet forks from the load completely **[Figure 149]**.

Figure 150



5. Return the boom and the pallet forks to the transport position **[Figure 150]**.

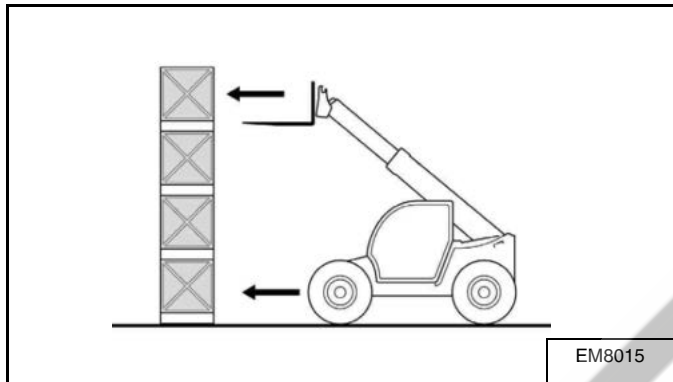
OPERATING PROCEDURE (CONT'D)

Handling Loads With Pallet Forks (Cont'd)

Picking Up A Raised Load With Pallet Forks

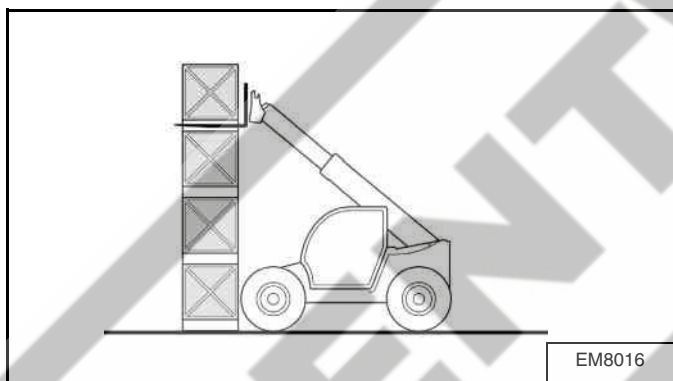
1. Before starting this maneuver, make sure that the pallet forks can easily slide under the load and that their clearance and centring in relation to the load is correct.

Figure 151



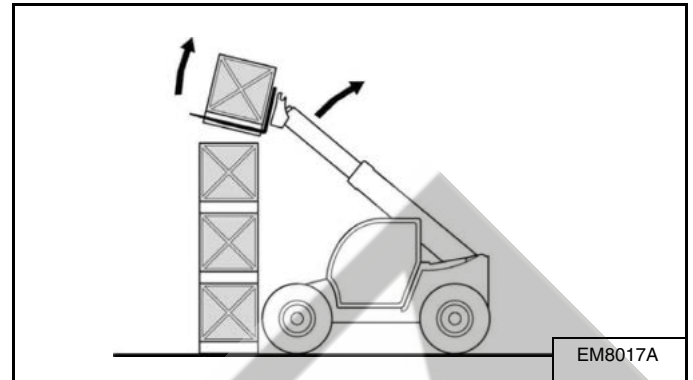
2. Move the machine perpendicular to the load with the pallet forks horizontal at the height of the load [Figure 151].

Figure 152



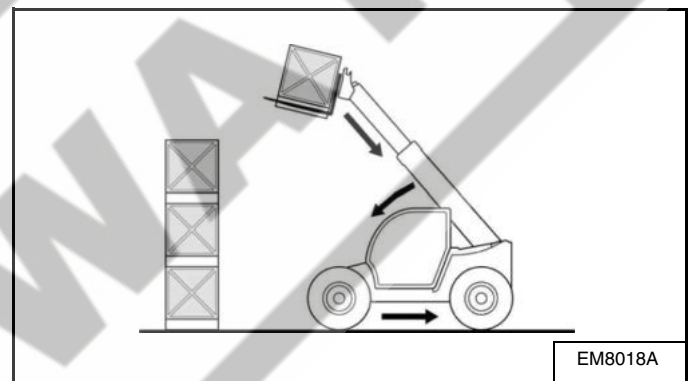
3. Move the machine forward as slowly as possible until the heel of the pallet forks is in contact with the load [Figure 152].
4. Put the Travel Direction Control in NEUTRAL and engage the parking brake.

Figure 153



5. Raise the boom slightly and tilt the pallet forks partially backward to stabilise the load [Figure 153].
6. Put the Travel Direction Control in REVERSE and release the parking brake.

Figure 154



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 154].
8. Retract the boom fully [Figure 154].
9. Lower the boom until the ground clearance under the pallet forks is approximately 300 mm (12 in), then tilt the forks fully backward. The machine is now in transport position [Figure 154].

WARNING

CRUSH HAZARD CAN CAUSE SERIOUS INJURY OR DEATH

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

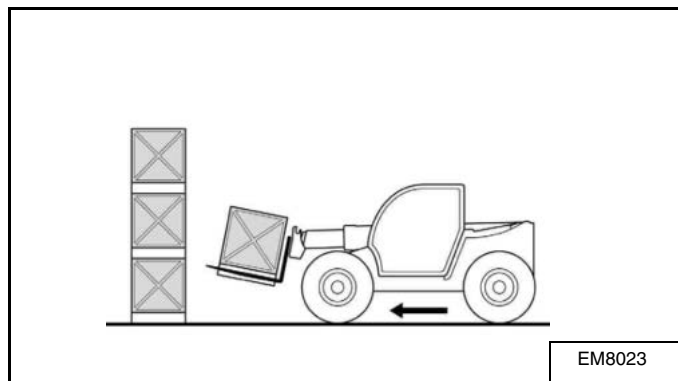
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OPERATING PROCEDURE (CONT'D)

Handling Loads With Pallet Forks (Cont'd)

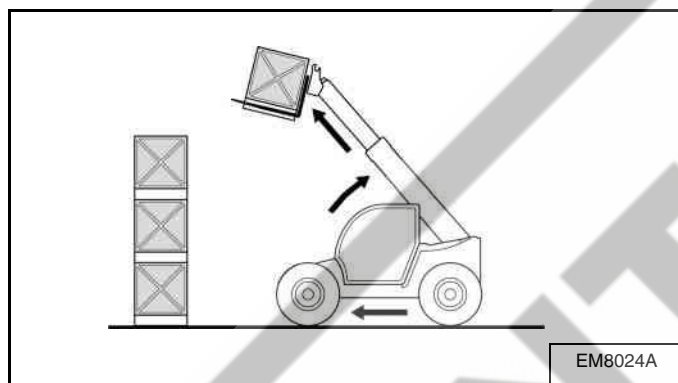
Placing A Raised Load With Pallet Forks

Figure 155



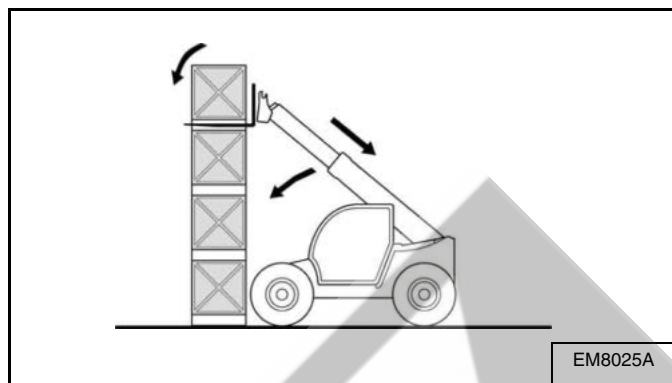
1. With the machine in transport position, move the load closer to the stack and into the position where it is to be placed [Figure 155].

Figure 156



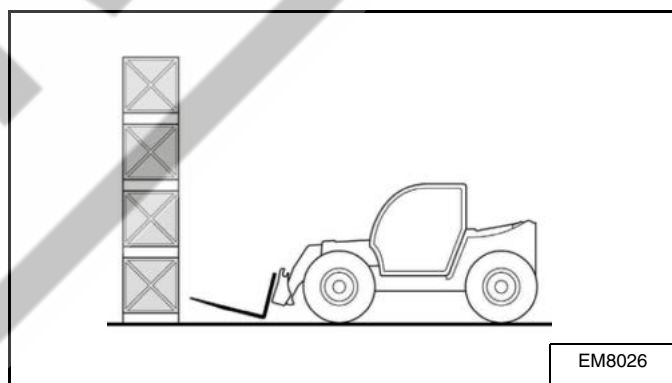
2. Raise the boom, then extend it to place the load above the stack. If necessary, move the machine forward [Figure 156].
3. Put the Travel Direction Control in NEUTRAL and engage the parking brake.

Figure 157



4. Tilt the load into a horizontal position [Figure 157].
5. Place the load down on the stack by lowering and retracting the boom [Figure 157].
6. Once the load has been placed down, release the pallet forks so that they are no longer in contact with the load using short, successive boom lowering and retracting maneuvers.
7. Put the Travel Direction Control in REVERSE and release the parking brake.
8. Move the machine back as slowly as possible so as to release the pallet forks from the load completely [Figure 157].

Figure 158

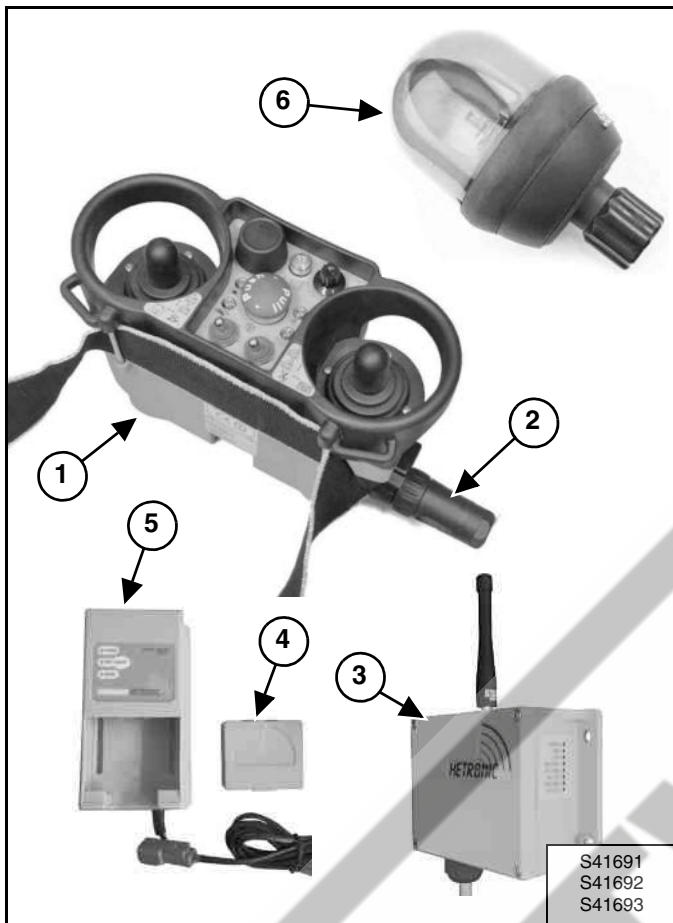


9. Return the boom and forks to transport position [Figure 158].

REMOTE CONTROL OPERATION

Components

Figure 159

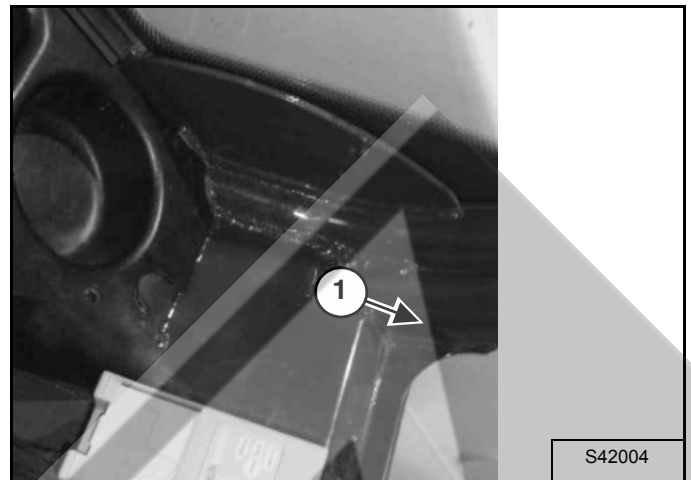


The remote control installation (if equipped) consists of the following components [Figure 159]:

- 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 160

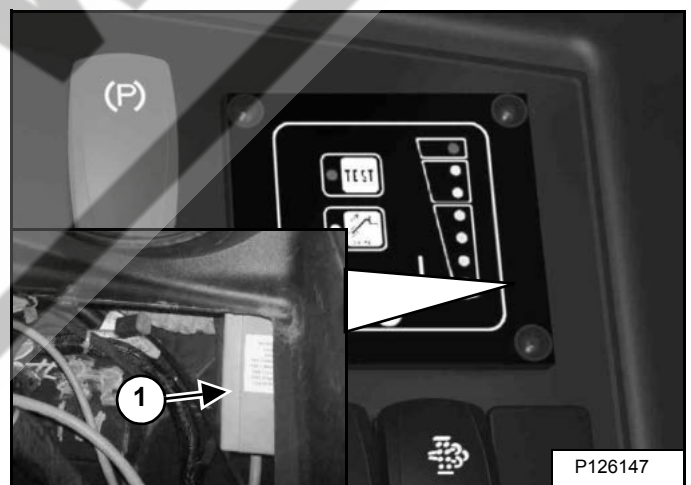


The battery charger (Item 1) [Figure 160] is located in the cab of the telescopic handler and can recharge one of the transmitter's two batteries while the other one is in use.

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

Remote Control Receiver

Figure 161



The remote control receiver (Item 1) [Figure 161] is located in the cab of the telescopic handler, under the right instrument and indicator panel. 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 OPERATION (CONT'D)

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.

Operation

When operating the telescopic handler with the remote control:

- Activate rotating beacon.
- Keep direct visibility of the boom and load.
- Operate at a maximum distance of 100m (328 ft) from the telescopic handler.
- Use fully charged battery.
- A fast beep at the transmitter indicates that the battery is low.
- LLMC override mode is disabled.
- Transmission features are disabled.
- Frame-levelling (if equipped), boom and carrier features can only be operated from the remote control (joystick features from the cab disabled).

WARNING

LOWERING OF ATTACHMENT, FALLING LOADS OR FALLING OFF ATTACHMENT CAN CAUSE SERIOUS INJURY OR DEATH

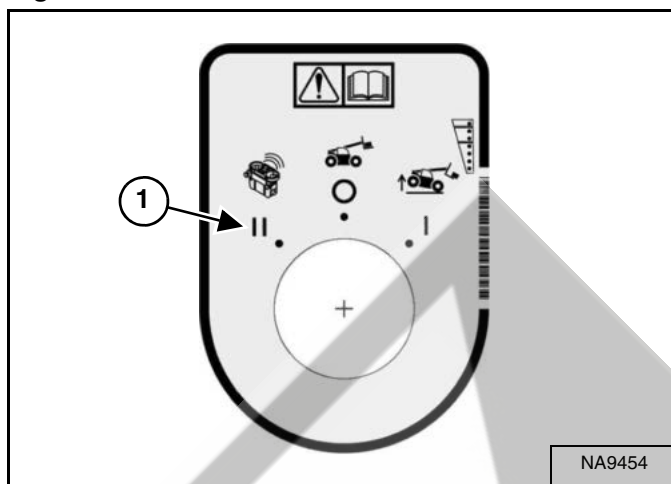
- **Do not use as a manlift or work platform.**
- **No riders.**
- **Keep away from raised boom and attachment.**
- **Keep bystanders away.**

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Remote Control Connection

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 65.) Stop the engine. (See STOPPING THE ENGINE AND LEAVING THE TELESCOPIC HANDLER on Page 93.)

Figure 162

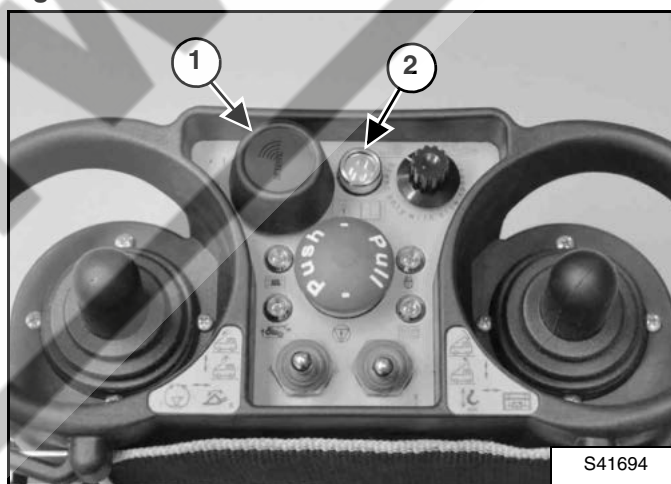


Select remote control mode (position II) using the Selection Mode Switch (Item 1) [Figure 162], located in the cab in front of the joystick.

Exit the telescopic handler. (See STOPPING THE ENGINE AND LEAVING THE TELESCOPIC HANDLER on Page 93.)

Plug the remote shunt (Item 2) [Figure 159] into the 7-pins connector at the right side of the transmitter.

Figure 163



Turn the transmitter ON / OFF switch (Item 1) [Figure 163] clockwise to turn the transmitter on. This will also power on the machine (only if the cab key switch is in OFF position).

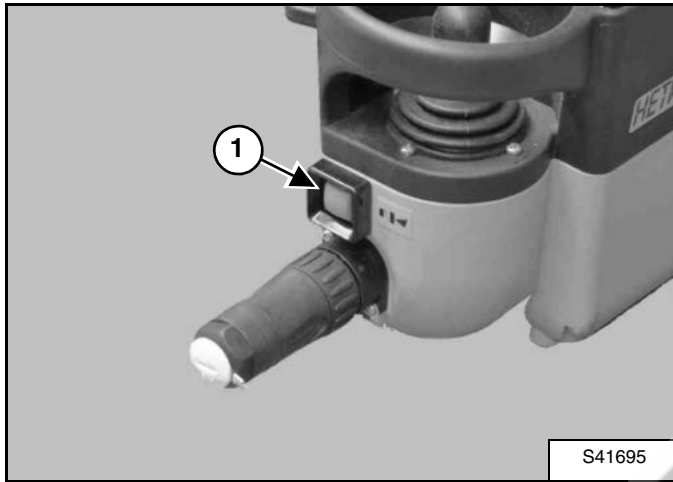
The indicator light (Item 2) [Figure 163] will flash when the remote control is ready to be connected with the receiver. The light will flash fast when the Emergency Stop switch is pressed.

REMOTE CONTROL OPERATION (CONT'D)

Operation (Cont'd)

Remote Control Activation

Figure 164



Press the green horn button (Item 1) **[Figure 164]** at the right side of the transmitter, to activate the control of the telescopic handler by the remote control.

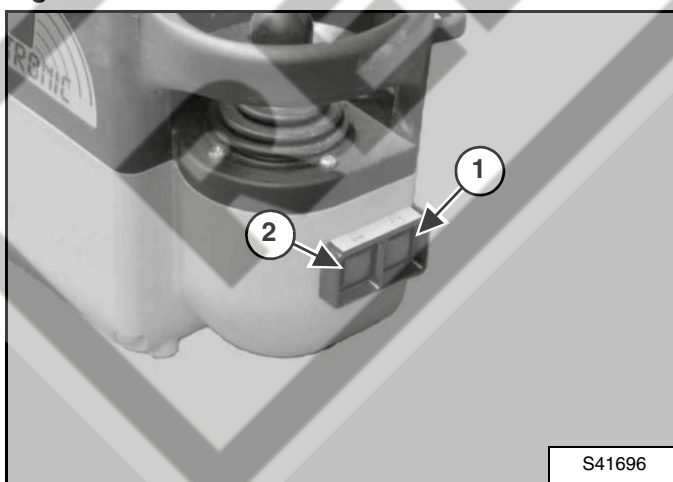
Press the green horn button (Item 1) **[Figure 164]** for one full second in order to allow for engine cranking with the remote control within the next 60 seconds.

The telescopic handler alarm sounds for as long as the green horn button (Item 1) **[Figure 164]** is pressed.

Start and Stop The Engine With The Remote Control

Before starting the engine with the remote control, activate the remote control (See Remote Control Activation on Page 131.).

Figure 165



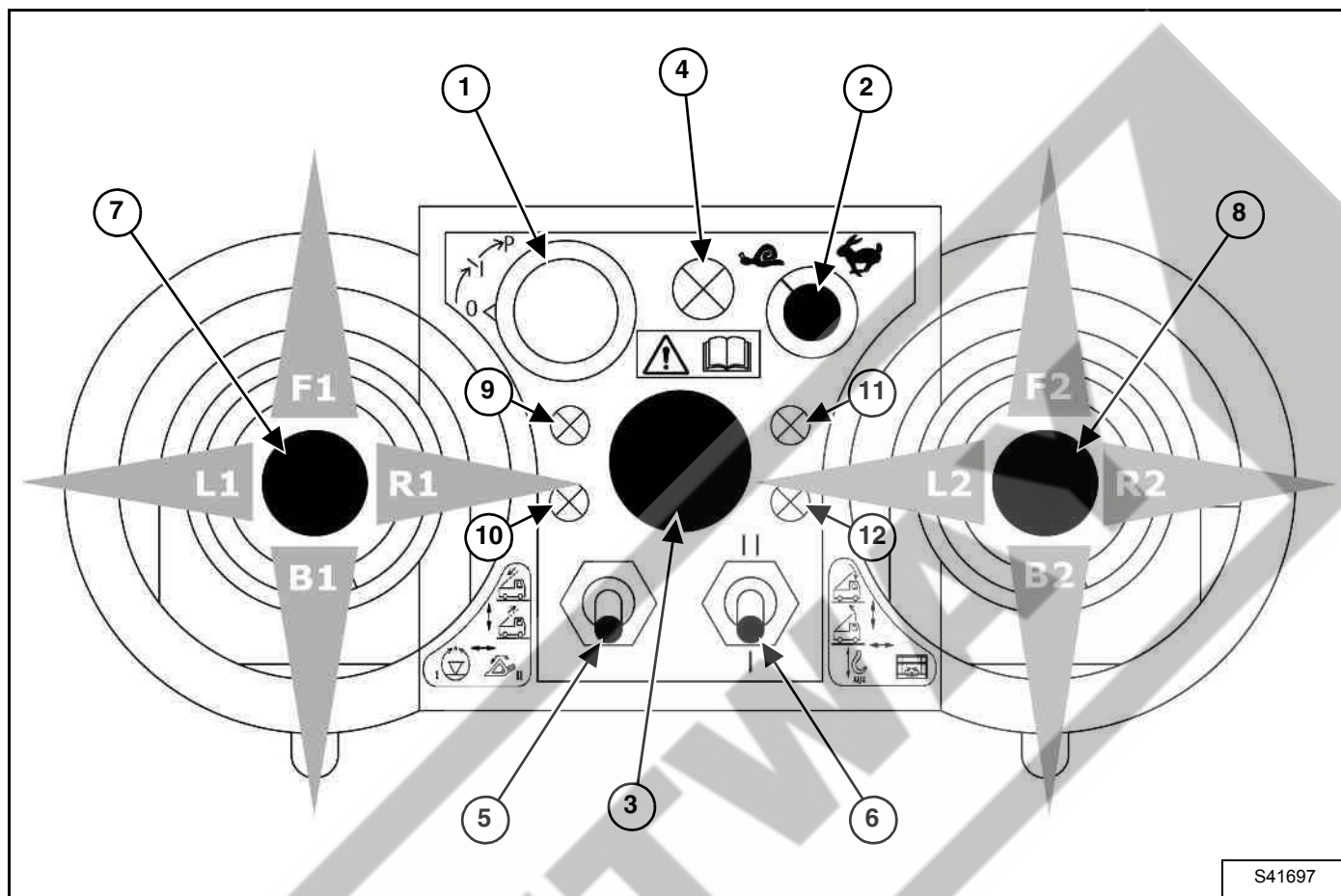
Press the engine start button (Item 1) **[Figure 165]** at the left side of the transmitter, to start the engine.

Press the engine stop button (Item 2) **[Figure 165]** at the left side of the transmitter, to stop the engine.

REMOTE CONTROL OPERATION (CONT'D)

Identification

Figure 166



S41697

REF.	DESCRIPTION	FUNCTION
1	ON / OFF Switch	This is a rotary key switch. There are two fixed positions: - Turned anticlockwise: 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.
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

REMOTE CONTROL OPERATION (CONT'D)

Identification (Cont'd)

REF.	DESCRIPTION	FUNCTION
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 (if equipped) - 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) (if equipped) OR tilting backward, depending on position of the function selection switch. - Pushed to the right (R1): control frame levelling (toward the left) (if equipped) OR tilting forward, depending on position of the function selection switch. When this lever is in use, engine speed increases to 1200 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 Basket 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 info (See Longitudinal Load Moment Indicator (LLMI) on Page 46.)
11	Interlocking Pin status LED (Red Light)	Not used.
12	Man Basket Mode LED (Orange Light)	Will flash slowly when there is a "Remote Mode Error". (See Service Codes List - Workgroup Controller on Page 245.)

TOWING THE TELESCOPIC HANDLER

Procedure

The telescopic handler 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:

- Disengaging the parking brake pads (See Disengaging The Parking Brake Pads on Page 134.)
- Disengaging the transmission (See Disengaging The Transmission on Page 135.)

Both steps are mandatory before any towing is authorized.

Tow the telescopic handler at a slow speed, not exceeding 5 km/h (3 mph). Do not tow the machine for more than 3 minutes.

WARNING

UNEXPECTED MACHINE MOVEMENT CAN CAUSE SERIOUS INJURY OR DEATH

- Block wheels to prevent roll away before adjusting screws to bypass the park brake system.
- Return adjustment screws to the operating position before operating the machine.

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Block the wheels to prevent the machine from rolling.

Disengaging The Parking Brake Pads

NOTE: Use service wrench 14 and 19 to perform this procedure. Depending on your local regulation these tools can be available in the net or container behind the seat.

The brakes are engaged by spring pressure and released by hydraulic pressure. The parking brake must be released manually before towing. Only the front axle has brakes.

The following procedure describes how to release the brakes:

Release the parking brake. (See Operation on Page 65.)

Figure 167

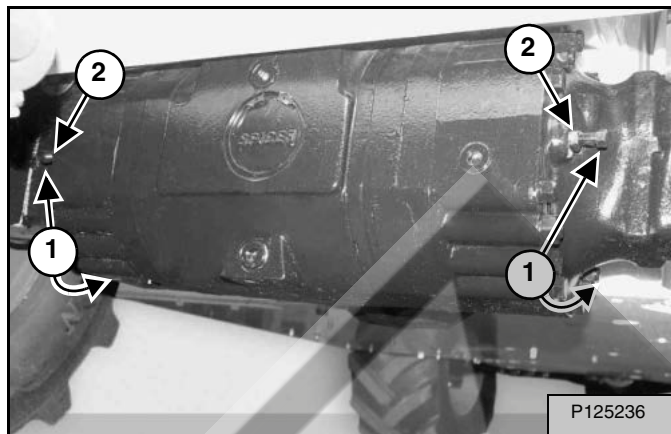
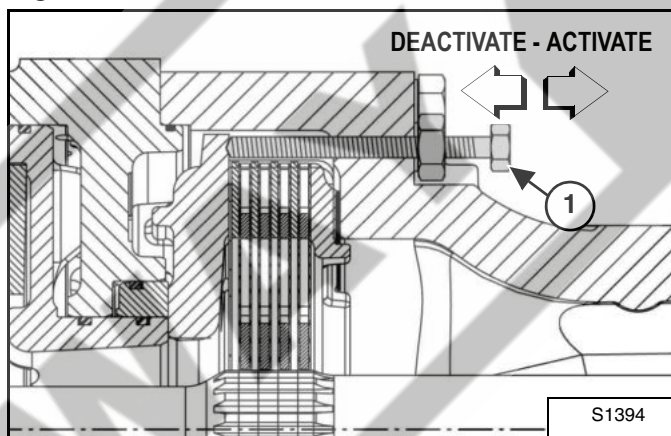


Figure 168



At each end of the central part of the front axle are two bolts (Item 1) [Figure 167] and (Item 1) [Figure 168]. When screwed in, these bolts will remove the spring pressure that engages the brake discs [Figure 168] shows the function of such a bolt inside the axle.

The work will first be carried out on the two bolts on one side of the front axle then the two bolts on the other side:

Loosen the locking nuts (Item 2) [Figure 167] of the bolts and create some clearance for the bolts.

Using the parking brake wrench, turn the two bolts (Item 1) [Figure 167] IN, 90° at a time, alternating between the two bolts until the bolts are firmly seated.

Repeat this 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.

TOWING THE TELESCOPIC HANDLER (CONT'D)

Procedure (Cont'd)

Disengaging The Transmission

NOTE: Use service wrench 10 and 22 to perform this procedure. Depending on your local regulation these tools can be available in the net or container behind the seat.

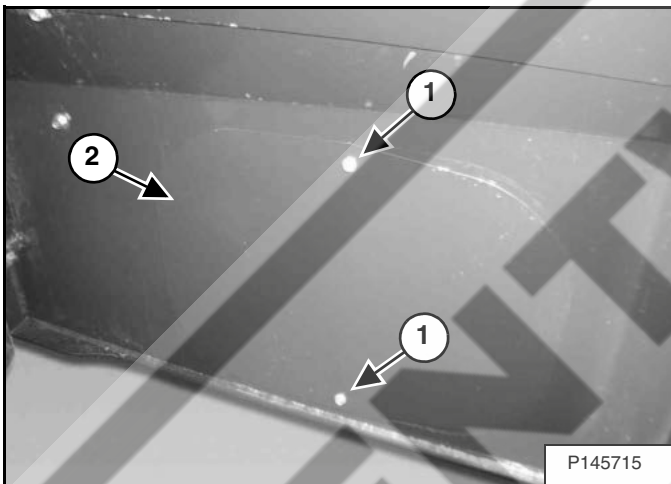
WARNING

UNEXPECTED MACHINE MOVEMENT CAN CAUSE SERIOUS INJURY OR DEATH

- **Block wheels to prevent roll away before adjusting screws to bypass the park brake system.**
- **Return adjustment screws to the operating position before operating the machine.**

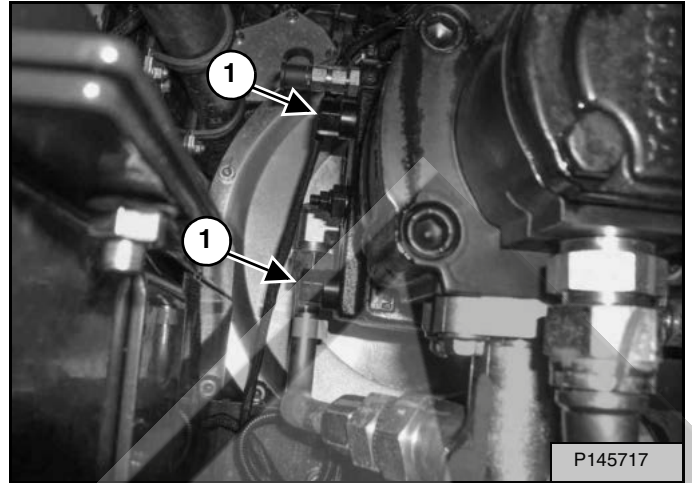
W-2808-0909

Figure 169



Loosen the two bolts (Item 1) and remove the cover (Item 2) [Figure 169] from the front side of the engine bay assembly.

Figure 170



Locate the two identical multi-function valves (Item 1) [Figure 170] on the hydrostatic transmission pump.

Loosen the valves (Item 1) [Figure 170] by turning them three times anticlockwise.

NOTE: Do not turn more than three times. This can result in leakage.

This action will bypass the hydraulic fluid flow of the hydrostatic transmission.

Tow the telescopic handler at a slow speed, not exceeding 5 km/h (3 mph). Do not tow the machine for more than three minutes.

Engaging The Transmission

After towing is completed, block the wheels to prevent the machine from rolling.

Raise the engine cover.

Loosen the two bolts (Item 1) and remove the cover (Item 2) [Figure 169] from the front side of the engine bay assembly.

Tighten the valves (Item 1) [Figure 170] to 70 N•m (52 ft-lb) torque to re-engage the hydrostatic transmission.

Engage the parking brake. (See Engaging The Parking Brake Pads on Page 136.)

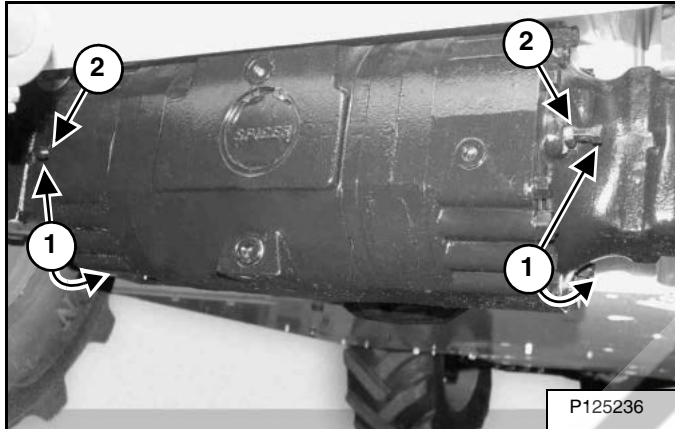
TOWING THE TELESCOPIC HANDLER (CONT'D)

Procedure (Cont'd)

Engaging The Parking Brake Pads

NOTE: Use service wrench 14 and 19 to perform this procedure. Depending on your local regulation these tools can be available in the net or container behind the seat.

Figure 171



To reactivate the parking brake, release the four bolts (see (Item 1) [Figure 171] 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).

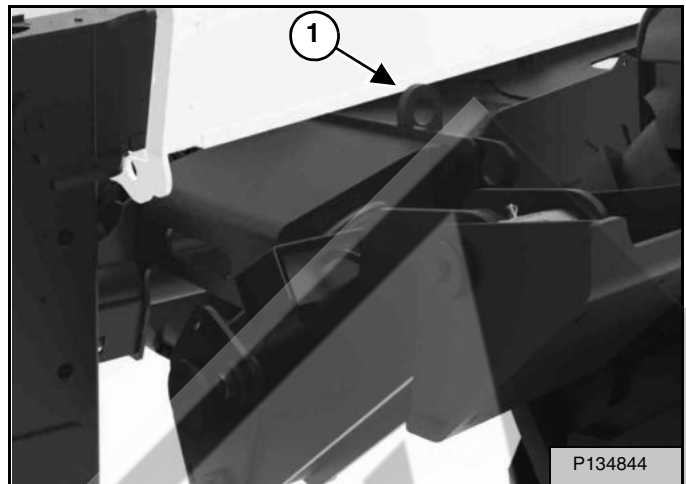
Make sure that all four bolts have been turned out until they can easily be loosened by hand. Tighten the locking nuts (Item 2) [Figure 171].

This will allow the parking brake piston to be active again.

Engage the parking brake (See PARKING BRAKE on Page 65.) and make sure it functions correctly.

Towing And Retrieving The Machine

Figure 172



Use the retrieval point (Item 1) [Figure 172] for towing and for retrieving the machine out of a hole or ditch.

NOTE: The retrieval point is rated for 1,5 times mass of the machine.

NOTE: Keep traction within an angle of 20° with the longitudinal axis.

LIFTING THE TELESCOPIC HANDLER

Procedure

Take into account the position of the machine's centre of gravity. (See Lifting on Page 264.)

! WARNING

AVOID 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.

W-2160-0910

Before lifting: Remove all attachments, lower boom fully, position wheels straight forward and stop the machine.

Inspect visually the lifting points. If there are signs of damage or overloading, do not transport the machine.

Attach the lift hooks to the following lifting points (Items 1) [Figure 173] and [Figure 174]:

Figure 173

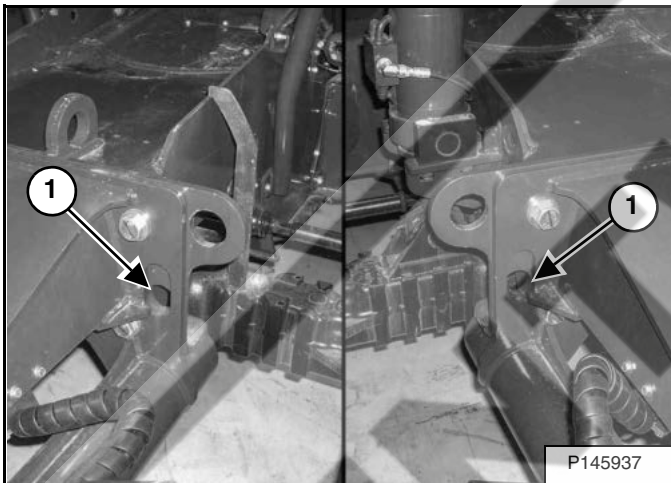
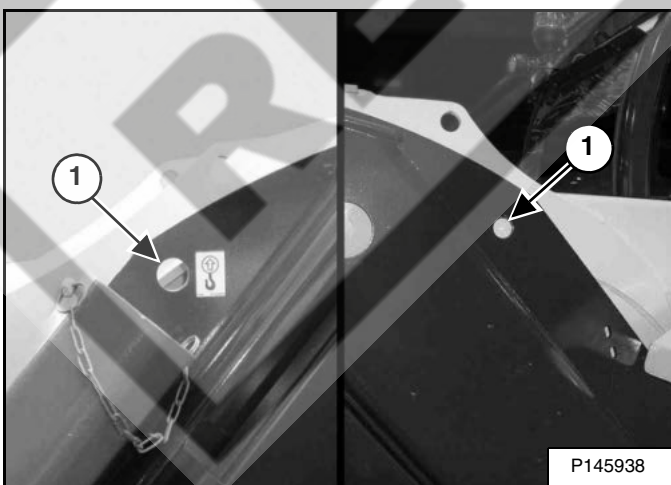


Figure 174

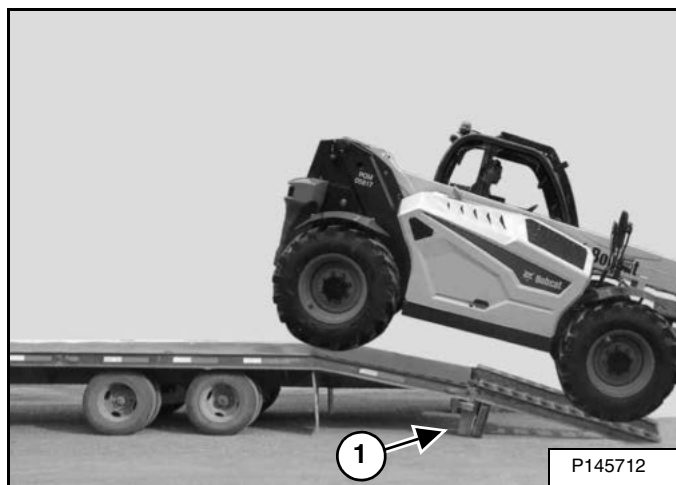


NOTE: Be sure to attach the Lift hooks to the Lifting points on the frame, not the boom.

TRANSPORTING THE TELESCOPIC HANDLER ON A TRAILER

Loading And Unloading

Figure 175



The telescopic handler must be loaded backward on the trailer.

The rear of the trailer must be blocked or supported (Item 1) **[Figure 175]** when loading or unloading the telescopic handler to prevent the front end of the trailer from raising up.

Be sure the transport and towing vehicles are of adequate size and capacity. For the weight of the T35.105RB telescopic handler, (See Weights on Page 256.).

Be sure that the contact areas with machine tyres are clean and free from ice, snow, and other slippery materials.

Inspect visually the tie-down points. If there are signs of damage or overloading, do not transport the machine.

WARNING

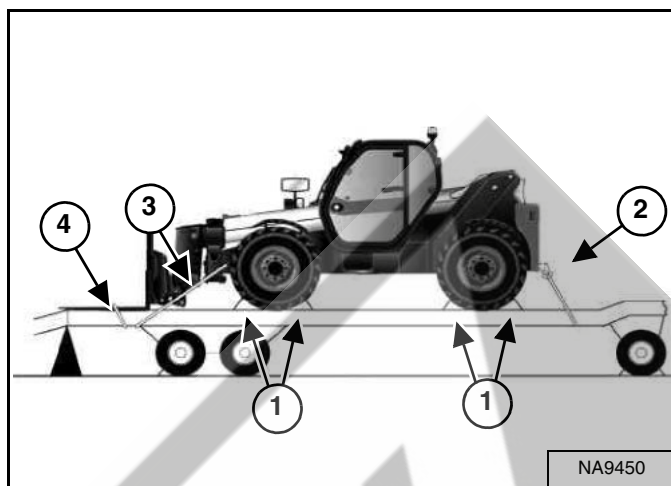
AVOID SERIOUS INJURY OR DEATH

Adequately designed ramps of sufficient strength are needed to support the weight of the machine when loading onto a transport vehicle. Wood ramps can break and cause personal injury.

W-2058-0807

Fastening

Figure 176



Fasten the telescopic handler to the transport vehicle to prevent it from moving during sudden stops or when going up or down slopes.

- Block the wheels (Item 1) **[Figure 176]**.
- Use chains to fasten the machine frame to the transport vehicle (Items 2 and 3) **[Figure 176]**. Use chain binders to tighten the chains. (See Tie Down on Page 265.)
- Attach the forks or bucket attachment to the transport vehicle (Item 4) **[Figure 176]**.

TOWING A TRAILER WITH THE TELESCOPIC HANDLER

This machine can be equipped with a rear hitch for towing.

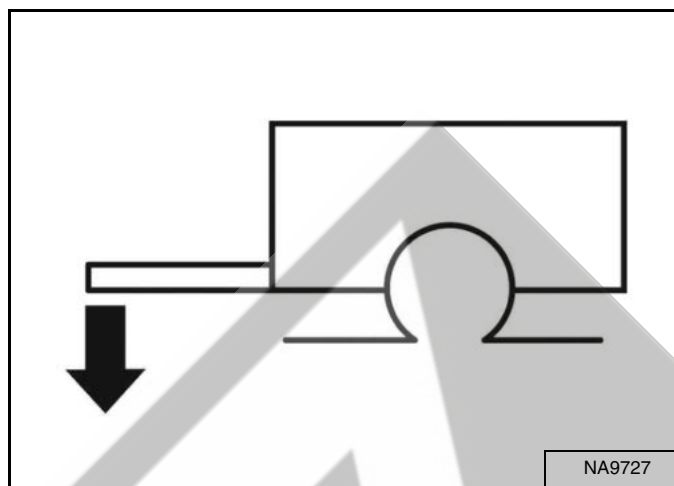
NOTE: Make sure the telescopic handler and rear hitch have sufficient towing capabilities. (See Performance on Page 256.).

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 Bobcat telescopic handler.

Bobcat trailer coupling is approved to be used at the maximum speed reached by your telescopic handler machine. (See Performance on Page 256.).

Figure 177



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	204 / 450	3500 / 7726	3500 / 7726
Rotating tow hitch	e1*2015/208*2015/208ND*00427*00	765 / 1688	17000 / 37528	3500 / 7726

Rear Hitch Installation

The rear hitch can only be installed at standard available fixation points of your telescopic handler.

Contact your Bobcat Dealer for installation of a rear hitch on your Bobcat telescopic handler.

Rear Hitch Inspection Before Use

In addition to the daily inspection of the telescopic handler:

- Check if safety decals are in good condition. Replace if damaged.
- Inspect cotter pins. Replace if damaged.
- Check if the pins rotate freely. Lubricate as needed.
- Inspect towing hook condition. Replace if worn or damaged.
- Inspect the draw bar condition. Replace if damaged.

TOWING A TRAILER WITH THE TELESCOPIC HANDLER (CONT'D)

Rear Hitch Description And Operation

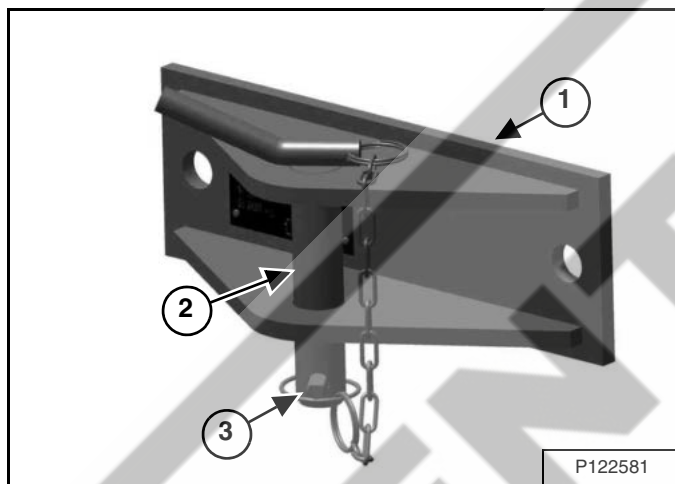
For towing always use a drawbar eyes that meets the following certifications:

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

Figure 178



ITEM	DESCRIPTION
1	BASIC TOW HITCH
2	HITCH PIN
3	COTTER PIN

Operation

Remove the cotter pin (Item 3) from the hitch pin (Item 2) [Figure 178].

Remove the hitch pin (Item 2) from the hitch (Item 1) [Figure 178].

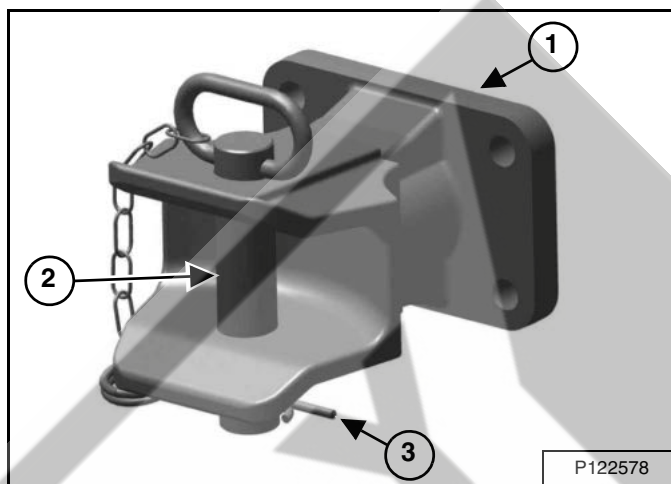
Install the drawbar eye in the hitch (Item 1) [Figure 178].

NOTE: Only use self-rotating drawbar eyes.

Install the hitch pin (Item 2) and secure with the cotter pin (Item 3) [Figure 178].

Rotating Tow Hitch

Figure 179



ITEM	DESCRIPTION
1	ROTATING TOW HITCH
2	PIN
3	COTTER PIN

Operation

Remove the cotter pin (Item 3) from the hitch pin (Item 2) [Figure 179].

Remove the hitch pin (Item 2) from the hitch (Item 1) [Figure 179].

Install the towing hook or drawbar eye in the hitch (Item 1) [Figure 179].

Install the hitch pin (Item 2) and secure with the cotter pin (Item 3) [Figure 179].

! WARNING

AVOID 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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TOWING A TRAILER WITH THE TELESCOPIC HANDLER (CONT'D)

Rear Hitch Maintenance

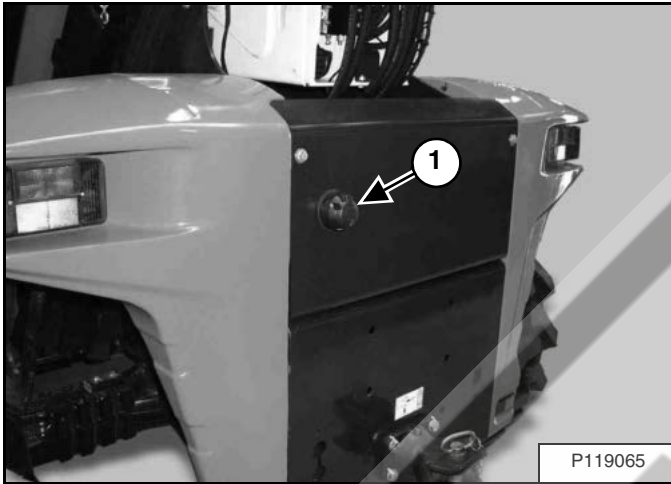
Lubricate the contact areas of the hitch pin and hitch.

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

Figure 180



Connect the electrical cable (if equipped) from the trailer to the 7-pin electrical plug (Item 1) [Figure 180] on the telescopic handler.

NOTE: If the electrical cable is not connected to the telescopic handler, the trailer brake lights will not function.



WARNING

AVOID 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.

W-2960-0313



Bobcat®

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MAINTENANCE SAFETY



WARNING

Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual, Operator's Handbook and signs (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. Untrained operators and failure to follow instructions can cause injury or death.

W-2003-0807

CORRECT



P-90216

- ⚠ Never service the Bobcat telescopic handler without instructions.



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

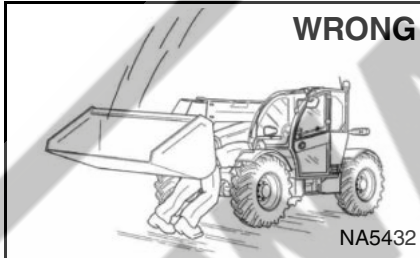
CORRECT



NA5428

- ⚠ Cleaning and maintenance are required daily.

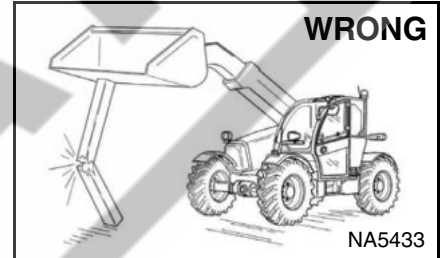
WRONG



NA5432

- ⚠ 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.

WRONG



NA5433

- ⚠ Never work on telescopic handler with boom up unless boom is held by an approved boom stop. Replace if damaged.
- ⚠ Never modify equipment or add attachments not approved by Bobcat Company.

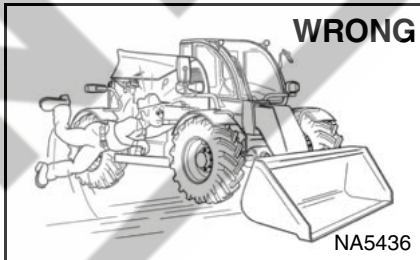
WRONG



NA5434

- ⚠ Have good ventilation when welding or grinding painted parts.
- ⚠ Wear dust mask when grinding painted parts. Toxic dust and gas can be produced.
- ⚠ Avoid exhaust fume leaks which can kill without warning. Exhaust system must be tightly sealed.

WRONG



NA5436

- ⚠ 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 protection approved for type of welding.

WRONG



B-6589

- ⚠ Lead-acid batteries produce flammable and explosive gases.
- ⚠ Keep arcs, sparks, flames and lighted tobacco away from batteries.
- ⚠ Batteries contain acid which 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.

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 BOBCAT SERVICE PERSONNEL**. Always use genuine Bobcat replacement parts.

MSW43-EN-0211



Bobcat®

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 service schedule is a guide for correct maintenance of the Bobcat telescopic handler.

During service, record:

- The machine operating hours.
- Maintenance procedures that are performed.

Every 10 Hours (Before Starting The Telescopic Handler)

- **Engine Oil** - Check level and add as needed. Do not overfill. Check engine for oil leaks. (See page 165.)
- **Engine Air Filters and Air System** - Service when [AIR F] is shown on display screen. Check for leaks and damaged components. (See page 157.) Empty dust extractor. (See page 158.)
- **Cooling System** - Check oil, coolant, charge air coolers and AC condenser. Clean if needed. Check coolant level cold in coolant tank. Add premixed coolant as necessary. (See page 168.) Check cooling system for leaks. Keep cooling system free from debris.
- **Exhaust System** - Check exhaust system and exhaust aftertreatment components for leaks.
- **Hydraulic Fluid** - Check fluid level and add as needed. (See page 178.)
- **Fuel Filter** - Check display panel. If needed, remove the trapped water if needed. (See page 162.)
- **Seat Belt** - Check the condition of seat belt. Clean or replace seat belt retractors as needed. Clean dirt and debris from moving parts. (See page 86.) and (See page 150.)
- **Back-up Alarm** - Check for proper function. Service as necessary. (See page 67 and page 154.)
- **Service Brakes** - Check for function. Service as necessary.
- **Parking Brakes** - Check for function. Adjust or service as necessary.
- **Tyres** - Check for wear or damage. Inflate to correct pressure. Be sure all tyres are inflated to the same pressure. Use only approved tyres. (See page 189.)
- **Wheel Nuts** - Perform every 8 hours or daily for the first week, then as scheduled. Check for loose wheel nuts and tighten to correct torque. (See page 189.)
- **Safety Signs and Safety 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 page 26.)
- **Tilt Cylinder Rod End** - Lubricate with multipurpose lithium based grease. (See page 191.)
- **Attachment Carrier Pins** - Lubricate with multipurpose lithium based grease. (See page 191.)

Every 50 Hours

- **Cooling System** - Clean debris from radiator, air cooler, hydraulic fluid cooler, air conditioning condenser (if equipped), and grid. (See page 168.)
- **Articulation Pins, Axle Oscillation (Front / Rear), Boom Pivot, Boom Cylinder, Self Levelling Cylinder, Frame-Levelling Cylinder (if equipped), Chain Pulley Pivots (Front / Rear)** - Lubricate with multipurpose lithium based grease. (See page 191.)
- **Telescopic Boom Wear Pads** - Lubricate with multipurpose lithium based grease. (See page 191.)
- **Hydraulic Hoses, Tubelines and Connections** - Check for leaks. Repair or replace as needed.
- **Harnesses** - Check condition. Repair or replace as needed.
- **Articulated Steering Links** - Check for any damage or cuts on the rubber protection. Replace as needed.



WARNING

AVOID INJURY OR DEATH

Instructions are necessary before operating or servicing machine. Read and understand the **Operation & Maintenance Manual, Operator's Handbook** and signs (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. Untrained operators and failure to follow instructions can cause injury or death.

W-2003-0807

SERVICE SCHEDULE (CONT'D)

Maintenance Intervals (Cont'd)

Every 100 Hours

- **LLMC System** - Test the LLMC calibration the first time, then as scheduled. (See page 151.)
- **Wheel Nuts** - Check for loose wheel nuts and tighten to correct torque. (See page 189.)
- **Hydraulic / Hydrostatic Fluid Filter** - Replace the filter element the first time, then as scheduled. Use a genuine Bobcat filter. (See page 180.)
- **Planetary Carriers** - Replace the fluid the first time, then as scheduled. (See page 182.)
- **Axle and Differential Fluid** - Replace the fluid the first time, then as scheduled. (See page 183 and page 184.)
- **Reduction Box Fluid** - Replace the fluid the first time, then as scheduled. (See page 185.)

Every 250 Hours Or Every 12 Months

- **LLMC System** - Test the LLMC calibration (See page 151.)
- **Planetary Carriers** - Check level. (See page 182.)
- **Axle and Differential Fluid** - Check level. (See page 183 and page 184.)
- **Reduction Box Fluid** - Check level. (See page 185.)
- **Alternator Belt** - Check belt tension. (See page 186.)
- **Chains** - Check and apply chain lubricant as needed. Check chain tension and wear. Adjust or replace as necessary. (See page 197.)

Every 500 Hours Or Every 12 Months

- **Engine Air Filters and Air System** - Service only when required. Check for leaks and damaged components. (See page 157.)
- **Engine Oil and Filter** - Replace oil and filter. (See page 166.)
- **Cooling System** - Check coolant concentration (with a refractometer). Replace as needed. (See page 168.)
- **Air Conditioning Belt (if equipped)** - Check condition. Replace as needed. (See page 187.)
- **Hydraulic / Hydrostatic Fluid Filter** - Replace the filter element. Use a genuine Bobcat filter. (See page 180.)
- **Hydraulic Fluid Tank Breather** - Replace the hydraulic fluid tank breather. (See page 181.)
- **Telescopic Boom Wear Pads** - Check for wear. Replace as necessary.
- **Service Brake Pedal Spring** - Lubricate with multipurpose lithium based grease. (See page 191.)
- **Cab Air Filter** - Check filter condition. Check for damage. Clean or replace as necessary. (See page 155.)
- **A/C System Water Condensate Rubber Valves** - Clean the rubber valves. (See page 155.)

Every 1000 Hours Or Every 12 Months

- **Planetary Carriers** - Replace the fluid. In case of severe duty, half fluid change intervals must be applied. (See page 182.)
- **Axle and Differential Fluid** - Replace the fluid. In case of severe duty, half fluid change intervals must be applied. (See page 183 and page 184.)
- **Reduction Box Fluid** - Replace the fluid. In case of severe duty, half fluid change intervals must be applied. (See page 185.)
- **Coolant** - Replace the coolant. (See page 169.)
- **Engine Air Filter** - Replace the outer filter element. (See page 157.)
- **Fuel Pre-Filter** - Replace fuel pre-filter. (See page 161.)
- **Fuel Filter** - Replace fuel filter element (See page 162.) or earlier if required by service codes. (See page 203.)
- **Fuel Tank Breather** - Replace fuel tank breather element. (See page 160.)
- **Battery and Cable Connectors** - Check voltage. Check terminals for good contact and presence of protective grease. (See page 174.)
- **Engine Mounts** - Tighten. Replace if damaged.
- **Charge Air Cooler** - Check entry area.
- **Alternator Belt** - Check condition. Replace as needed. (See page 186.)
- **Hydraulic Fluid** - Replace the fluid. (See page 179.)
- **Fastenings, Hose Unions and Clips** - Replace if damaged.

Every 3000 Hours Or Every 36 Months

- **Air Conditioning Belt (if equipped)** - Replace the belt. (See page 187.)
- **Alternator Belt** - Replace the belt. (See page 186.)

SERVICE SCHEDULE (CONT'D)

When Required Or Maximum Every 5000 Hours

- **Diesel Particulate Filter (DPF)** - Service the DPF.

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 authorized dealer or by Bobcat Europe, should a breakdown occur on the Bobcat equipment. Your local dealer can order the Inspection Checkbook.

Part number: 7296478

RENTWAY

SEAT BELT

Inspection And Maintenance

! WARNING

Failure to properly inspect and maintain the seat belt can cause lack of operator restraint resulting in serious injury or death.

W-2466-0703

Check the seat belt daily for correct function.

Inspect the seat belt system thoroughly at least once each year or more often if the machine is exposed to severe environmental conditions or applications.

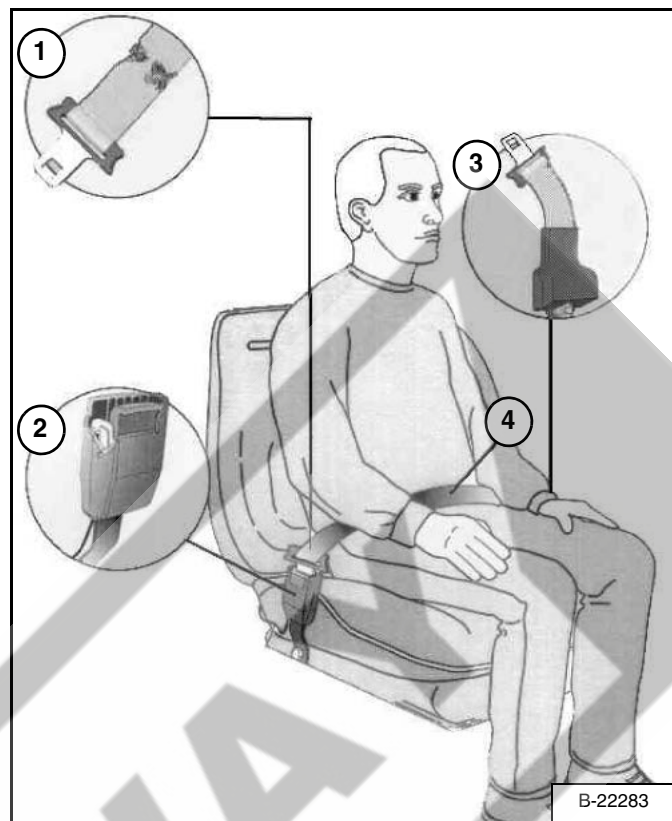
Any seat belt system that shows cuts, fraying, extreme or unusual wear, significant discolourations due to ultraviolet UV exposure, dusty / dirty conditions, abrasion to the seat belt webbing, or damage to the buckle, latch plate, retractor (if equipped), hardware or any other obvious problem should be replaced immediately.

The items below are referenced in [Figure 181].

1. Check the webbing. If the system is equipped with a retractor, pull the webbing completely out and inspect the full length of the webbing. Look for cuts, wear, fraying, dirt and stiffness.
2. Check the buckle and latch for correct operation. Make sure latch plate is not excessively worn, deformed or buckle is not damaged or casing broken.
3. Check the retractor web storage device (if equipped) by extending webbing to determine if it looks correct and that it spools out and retracts webbing correctly.
4. Check webbing in areas exposed to ultraviolet (UV) rays from the sun or extreme dust or dirt. If the original colour of the webbing in these areas is extremely faded and / or the webbing is packed with dirt, the webbing strength can have deteriorated.

See your Bobcat dealer for seat belt system replacement parts for your machine.

Figure 181



LLMC CALIBRATION TEST

Procedure

The Longitudinal Load Moment Control (LLMC) system calibration can be tested by performing the following procedure:

Park the machine on flat level ground and align the front and rear wheels straight ahead.

NOTE: A load will be needed to topple the machine.

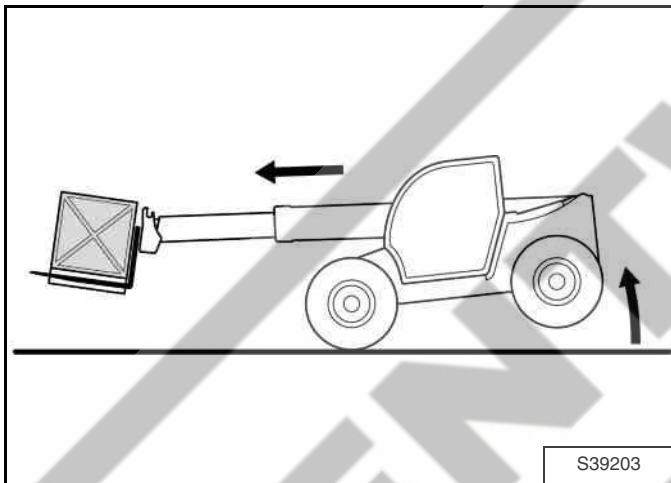
WARNING

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-2929-1012

Figure 182

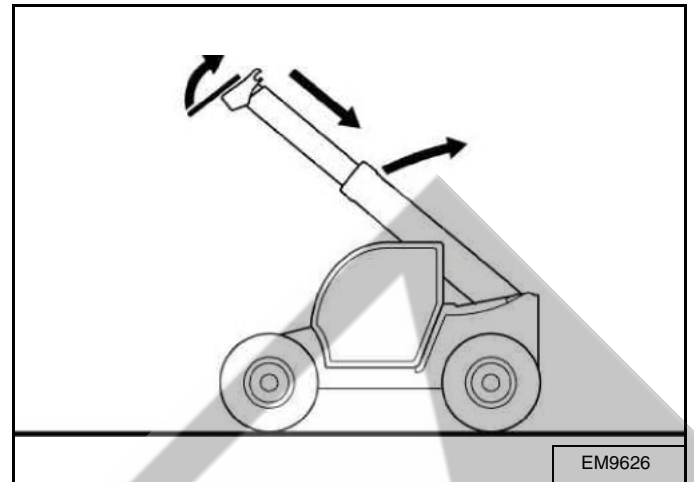


Using the LLMC override mode, decrease the rear axle load pressure by picking up a load and extending the boom until the machine topples over (rear wheels off the ground) [Figure 182].

NOTE: Do not move or reposition the machine after decreasing the rear axle load pressure.

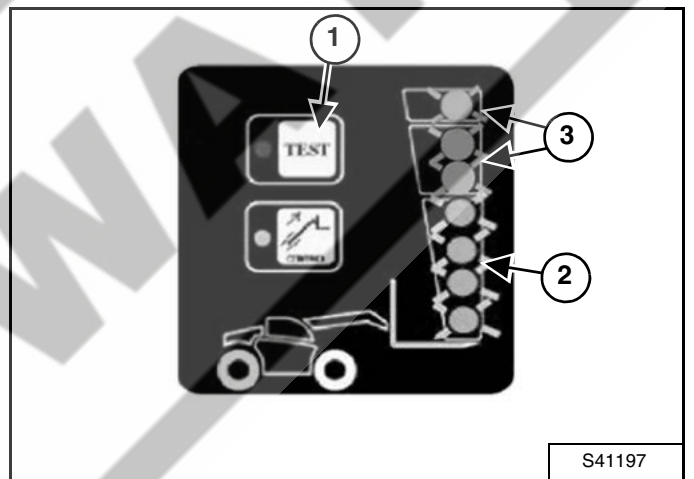
Retract the boom and place the load on the ground.

Figure 183



Without attachment and with the attachment carrier fully tilted up, fully retract and raise the boom [Figure 183].

Figure 184



Push and hold the TEST button (Item 1) [Figure 184] during the complete procedure. All the LEDs (Item 2 and 3) light up, and the buzzer sounds discontinuously during 3 seconds.

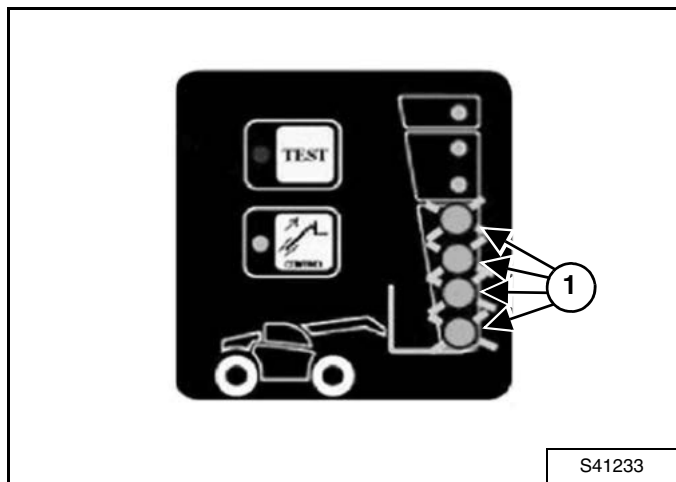
NOTE: Keep holding the test button for default test result confirmation.

LLMC CALIBRATION TEST (CONT'D)

Procedure (Cont'd)

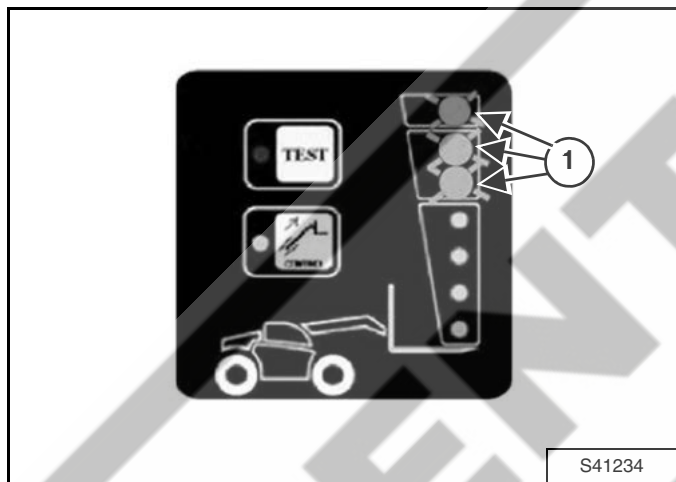
Two test results are possible:

Figure 185



- The four green LEDs (Item 1) [Figure 185] light up, calibration is OK;

Figure 186



- The orange and red LEDs (Item 1) [Figure 186] light up, calibration is out of range. Please redo calibration of the LLMI / LLMC system. (See your Bobcat dealer for calibration).

Release the TEST button (Item 1) [Figure 184].

The calibration test is finished.

NOTE: After pressing the TEST button (Item 1) (See Figure 184 on Page 151.) longer than 60 seconds, the procedure will automatically end and the system will return to normal mode.

NOTE: The system always returns to normal mode when the TEST button (Item 1) (See Figure 184 on Page 151.) is released during the procedure.

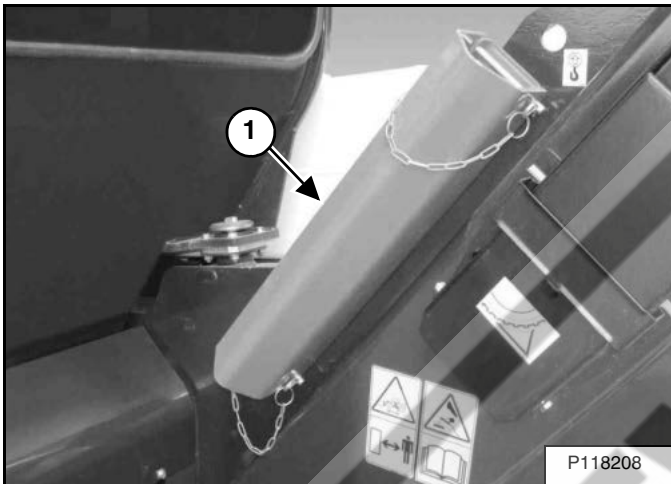
APPROVED BOOM STOP

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

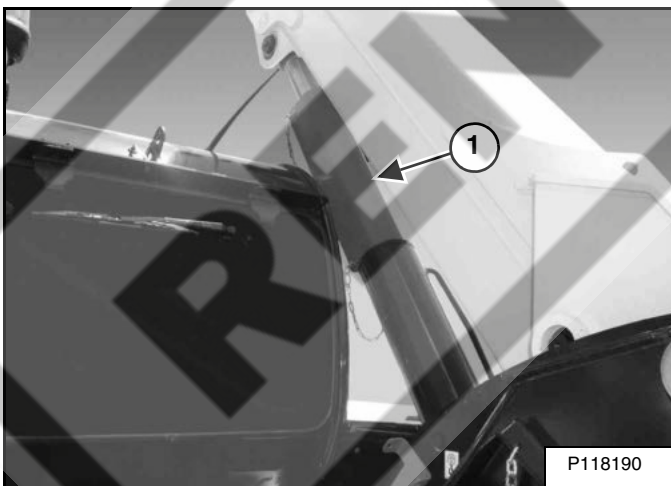
- Put the telescopic handler on a flat, solid and level surface.
- With the operator in the seat, the seat belt fastened, travel direction switch / control lever (optional) in NEUTRAL and the parking brake engaged, start the engine, raise the boom and stop the engine.

Figure 187



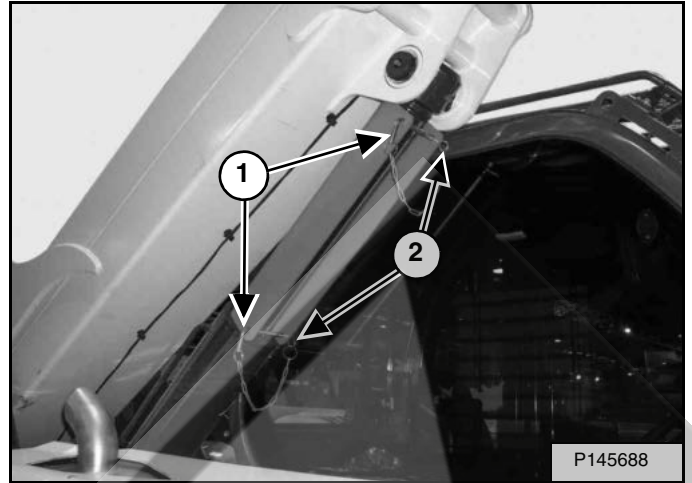
- Remove the approved boom stop (Item 1) [Figure 187] from the storage position.

Figure 188



- Install the approved boom stop (Item 1) [Figure 188] operating from the left back side of the machine.

Figure 189



- Install the pins (Item 1) and secure with retainer pins (Item 2) [Figure 189].
- Start the engine and lower the boom slowly [Figure 189] so that the approved boom stop is held securely.

Removing The Approved Boom Stop

- Start the engine and raise the boom. Stop the engine.
- Operating from the left back side of the machine, remove the retainer pins, pins and approved boom stop (Item 1) [Figure 188].
- Reinstall the approved boom stop in the storage position (Item 1) [Figure 187].

WARNING

AVOID INJURY OR DEATH

Never work on a machine with the boom up unless the boom is held by an approved boom stop. Failure to use an approved boom stop can allow the boom to drop and cause injury or death.

Service boom stop if damaged or if parts are missing. Using a damaged boom stop or with missing parts can cause boom to drop causing injury or death.

W-2899-1210

BACK-UP ALARM SYSTEM

Description

The back-up alarm will sound when the operator moves the travel direction switch / control lever (optional) into the REVERSE position AND the engine is running.

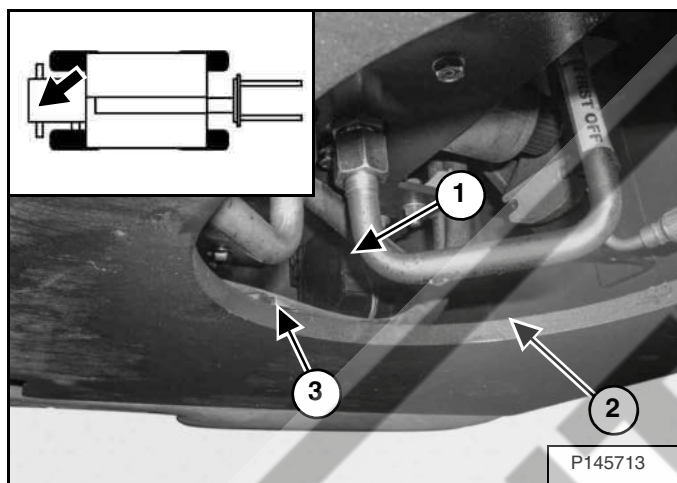
Inspecting

Sit in the seat and fasten the seat belt. Start the engine and disengage the parking brake.

Move the travel direction switch / control lever (optional) into the REVERSE position. The back-up alarm must sound.

Turn the switch to the OFF position and make sure the parking brake is engaged.

Figure 190



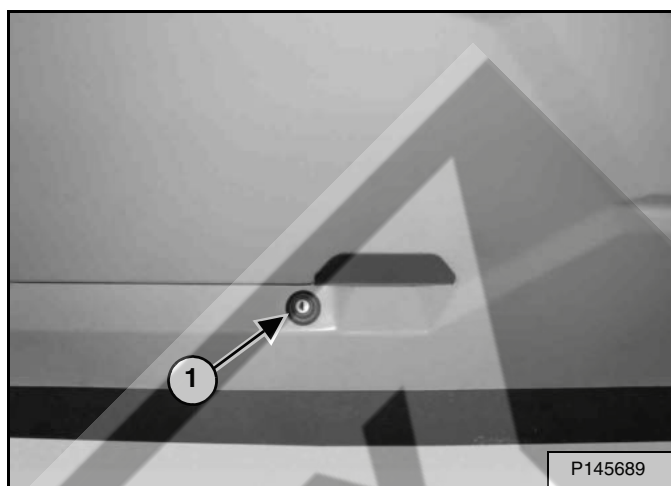
The back-up alarm (Item 1) is located at the rear of the machine and can be accessed through an opening (Item 2) [Figure 190] in the frame.

Inspect the back-up alarm electrical connection (Item 3) [Figure 190] and the wire harness for tightness and damage. Repair or replace any damaged components.

ENGINE COVER

Opening And Closing

Figure 191



Turn the key switch (Item 1) [Figure 191] clockwise to unlock. Remove the key and push the key switch. Raise the engine cover to provide access to the engine compartment for maintenance.

NOTE: The engine cover locks automatically when closed.

HEATING, VENTILATION AND AIR CONDITIONING SYSTEM (HVAC)

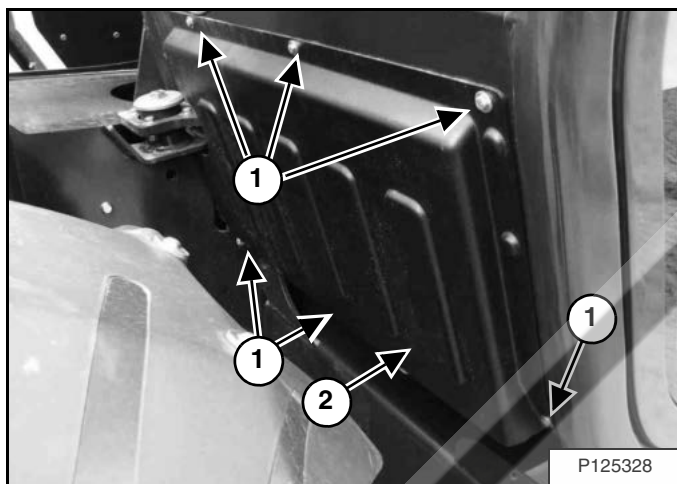
This machine may be equipped with a heating, ventilation and air conditioning system.

Cleaning And Maintenance

The HVAC system requires regular inspection and maintenance. (See SERVICE SCHEDULE on Page 147.)

Cab Filter

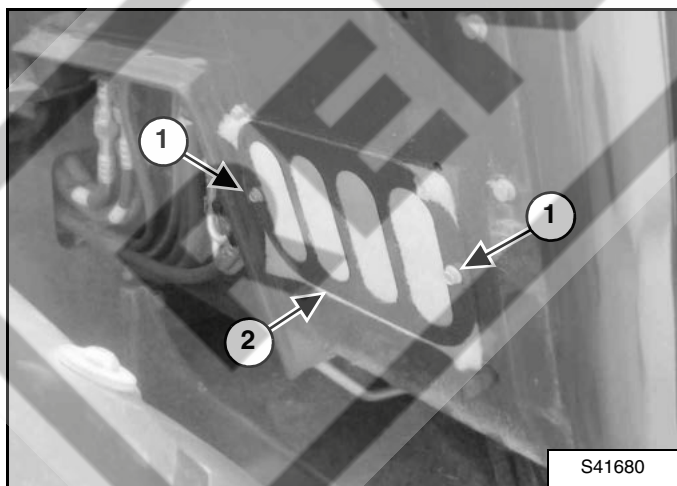
Figure 192



The fresh air filter is located on the front of the operator cab. Remove the six bolts (Item 1) and filter housing (Item 2) [Figure 192].

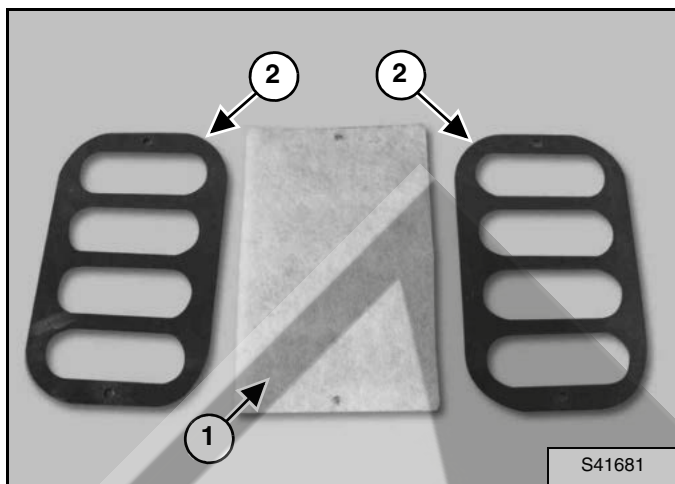
Installation: Tighten the bolts (Item 1) [Figure 192] to maximum 10 - 11 N•m (84 - 93 in-lb) torque.

Figure 193



Remove the two screws (Item 1) and the filter assembly (Item 2) [Figure 193].

Figure 194

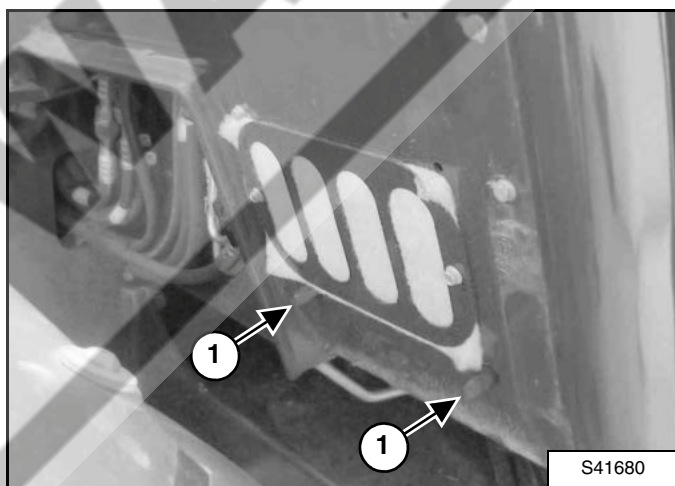


Remove the filter (Item 1) from in between the filter holders (Item 2) [Figure 194].

Clean or replace the filter as necessary.

A/C System Water Condensate Rubber Valves

Figure 195

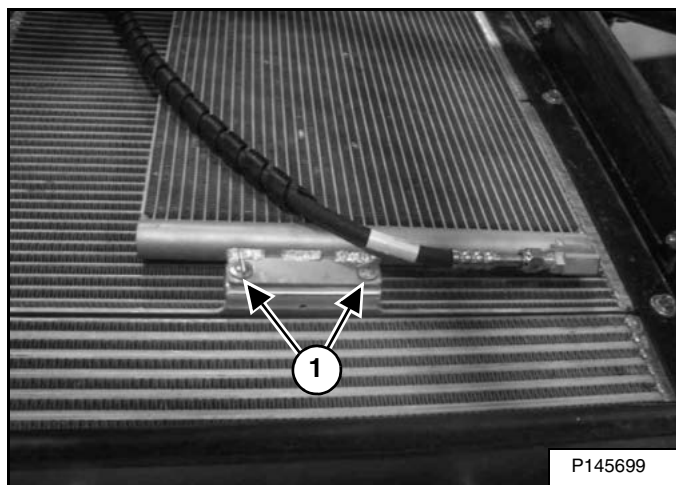


The A/C system water condensate rubber valves (Item 1) [Figure 195] are located on the front of the operator cab, under the cab filter. Remove any dust to allow proper evacuation of A/C water condensates.

HEATING, VENTILATION AND AIR CONDITIONING SYSTEM (HVAC) (CONT'D)

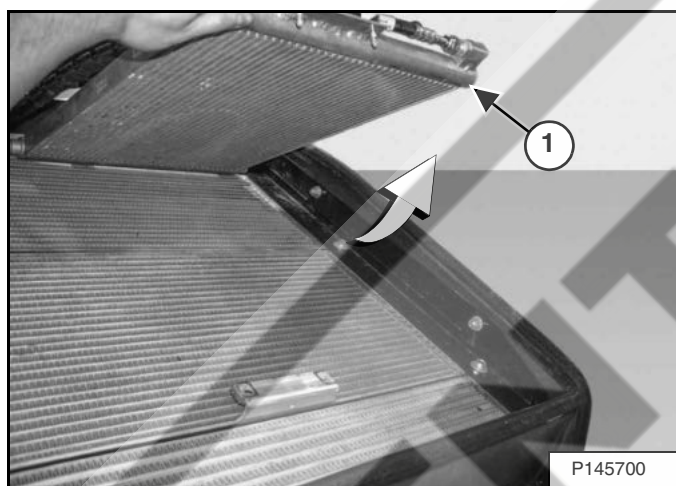
Condenser

Figure 196



Loosen the two screws (Item 1) [Figure 196].

Figure 197



Raise the condenser (Item 1) [Figure 197].

Use low air pressure to clean the condenser (Item 1) [Figure 197]. Be careful not to damage fins.

Lower the condenser and tighten the two screws (Item 1) [Figure 196].

Air Conditioning Lubrication

Run the air conditioning for about five minutes every week to lubricate the internal components.

Troubleshooting

If the fan does not run, or the air conditioning does not turn on, check the fuse. (See Fuses And Relay Location / Identification on Page 171.)

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

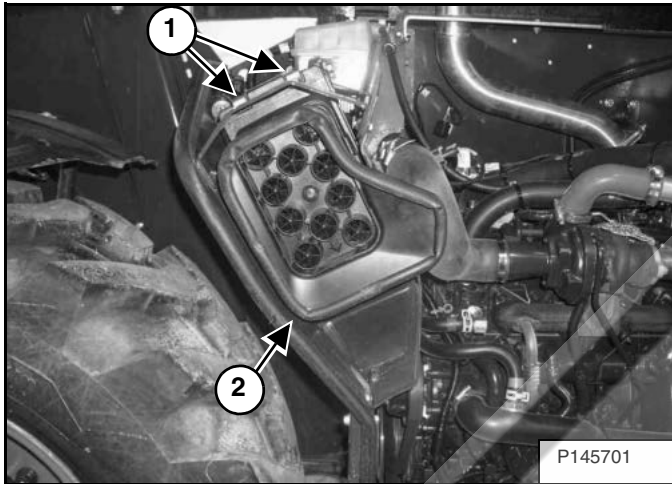
Replacing Filter Elements

Replace the inner filter every second time the outer filter is replaced or as indicated. (See SERVICE SCHEDULE on Page 147.)

Outer Filter

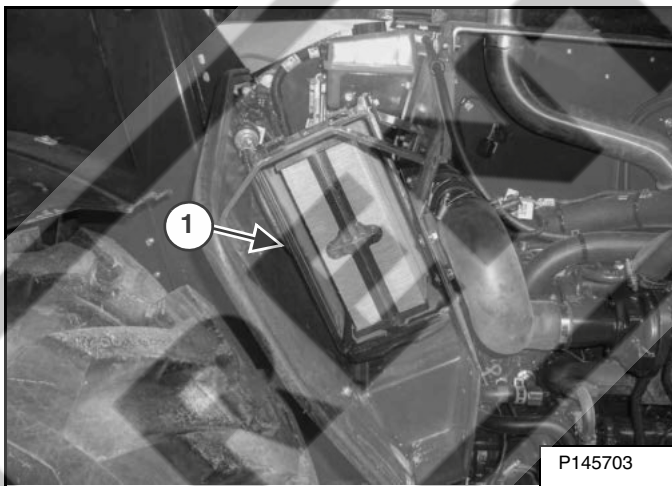
Stop the engine and open the engine cover.

Figure 198



Open the latches (Item 1) and remove the cover (Item 2) [Figure 198].

Figure 199



Pull the outer filter element (Item 1) [Figure 199] out and discard.

NOTE: 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.

Install new outer filter. Push in until the filter contacts the base of the housing.

Install the cover (Item 2) and secure the latches (Item 1) [Figure 198].

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.

Close the engine cover.

AIR CLEANER SERVICE (CONT'D)

Replacing Filter Elements (Cont'd)

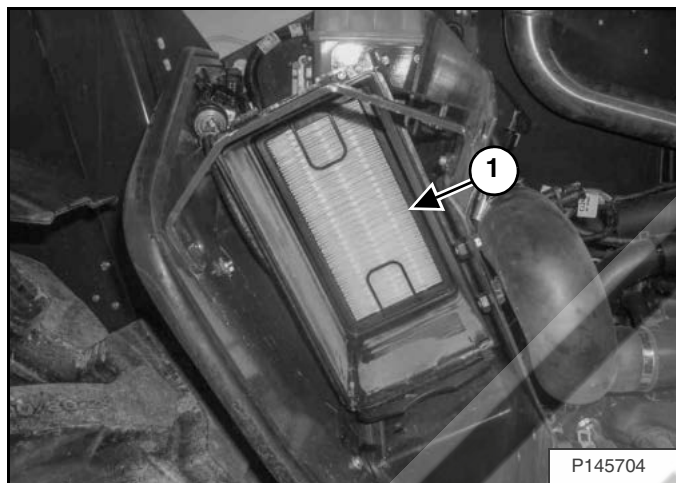
Inner Filter

Replace the inner filter element every *second* time the outer filter is replaced or as indicated. (See SERVICE SCHEDULE on Page 147.)

Stop the engine and open the engine cover.

Remove the cover (Item 2) [Figure 198] and the outer filter (Item 1) [Figure 199].

Figure 200



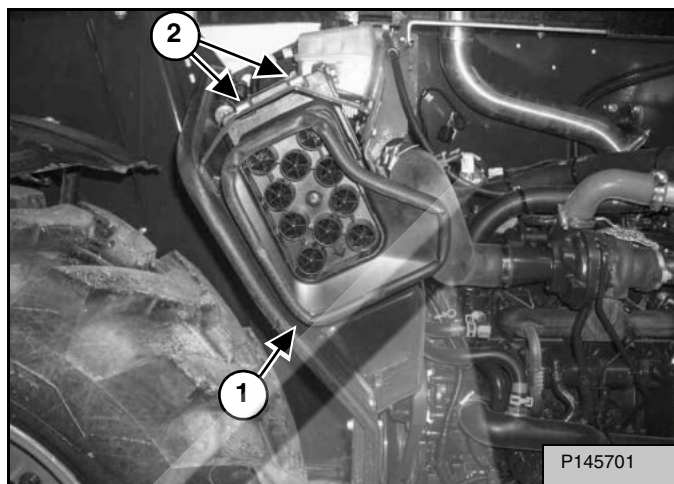
Remove the inner filter (Item 1) [Figure 200].

NOTE: 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.

Install new inner filter. Push in until the filter contacts the base of the housing.

Install the outer filter (Item 1) [Figure 199].

Figure 201



Install the cover (Item 1) and secure the latches (Item 2) [Figure 201].

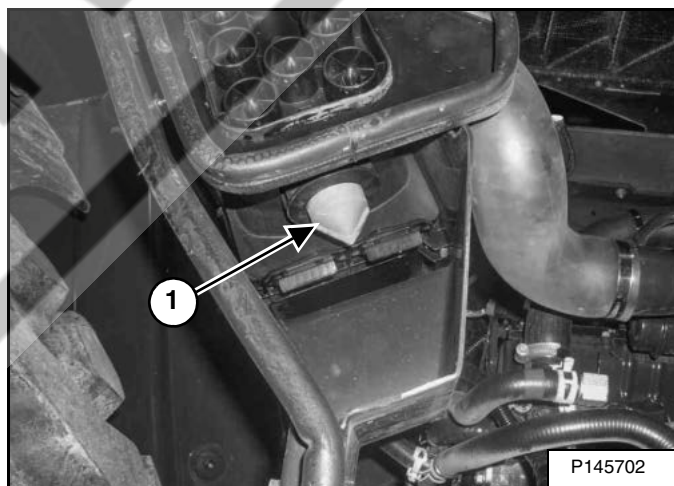
NOTE: The rubber boot attached to the air cleaner cover is an important part of the engine performance and must remain correctly installed on the air cleaner cover.

Close the engine cover.

Cleaning The Dust Extractor

Stop the engine and open the engine cover.

Figure 202



Clean the dust extractor (Item 1) [Figure 202] underneath the air filter housing. If needed, remove the dust extractor for complete cleaning.

Close the engine cover.

FUEL SYSTEM

Fuel Specifications

NOTE: Contact your local fuel supplier to receive recommendations for your region.

The machine has to be used with fuel fulfilling all requirements of at least one of the following standards.

- EN590: 2013/AC:2014
- ASTM D975C-15 Grades 1D or 2D, with the restrictions regarding paraffinic fuels and FAAE as indicated below
- JIS K2204:2007 with a lubricity (HFRR test, per test method ISO12156-1) smaller or equal to 520µm and according to the Japanese legal regulations with the restrictions regarding paraffinic fuels as indicated below. This includes up to 5% of FAME according to JIS K2390:2008.
- GB252:2015 and GB19147:2013
- IS1460 2005 Amm. 10 BSIII or BSIV
- ANP69/2014
- GOST R32511-2013 except its arctic classes 3 & 4

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 can result in premature failure of fuel system components, such as plugged fuel filters and deteriorated fuel lines.
- Shorter maintenance intervals can be required, such as cleaning the fuel system and replacing fuel filters and fuel lines.
- Using biodiesel blend fuel not compliant with the fuel specifications and standard for approved fuels described in this manual can affect engine life and cause deterioration of hoses, tubelines, injectors, injector pump and seals.

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. Extended oil change intervals can cause engine damage.
- Before machine storage; drain the fuel tank, refill with 100% petroleum based 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.

Paraffinic Fuels

Paraffinic material (synthetically produced hydrocarbons, hydro-treated vegetable oils and fats) hold promise as a blend component in conventional diesel fuel. The use of paraffinic blended fuel is covered by this data sheet, provided that the final fuel fulfills an allowed fuel standard as indicated by this data sheet.

NOTE: ASTM D975 and JIS K2204 specifications do not exclude pure paraffinic fuels. Neat paraffinic material characteristics can differ substantially from fuels described in this data sheet and therefore additional validation for such material is necessary.

Fatty Acid Alkyl Ester (FAAE) As Blend Component

Due to market availability, validation of such blend components has only been done with fatty acid methyl esters (FAME). Fuels according to ASTM D975 could contain other nonvalidated FAAEs according to ASTM D6751.

Specification Gaps In The Fuel Standards

Fuel standards are not comprehensive technical specifications. Consequently, fuels which comply with a standard, yet are placed in service under boundary conditions unintended or unanticipated by the standard (or application or market) may incur additional uncertainty regarding the fuel fitness for use. Examples are metal contaminations, high-molecular biogenic components (filter blocking), additive incompatibilities or process chemicals from fuel production.

Aftermarket Admixtures And Additives

Use of fuels with aftermarket admixtures and/or additives (e.g. usage of fuel borne catalyst) are not included fuels. Under special boundary conditions (e.g. usage of additives to support the diesel particulate filter) the usage of such additives can be tolerated. In the event supplementary aftermarket admixtures and/or additives are used, consequential FIE damage from such usage are the exclusive responsibility of those marketing and/or using it.

FUEL SYSTEM (CONT'D)

Filling The Fuel Tank

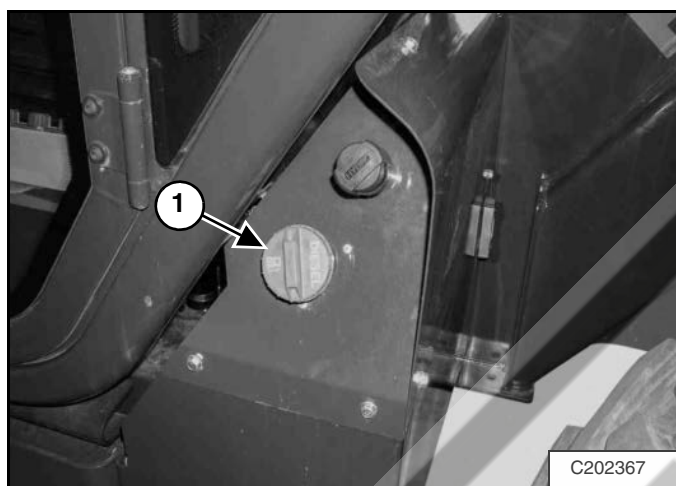
! WARNING

AVOID INJURY OR DEATH

Stop and cool the engine before adding fuel. **NO SMOKING!** Failure to obey warnings can cause an explosion or fire.

W-2063-0807

Figure 203



Remove the fuel fill cap (Item 1) [Figure 203].

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!**

Install and tighten the fuel fill cap (Item 1) [Figure 203].

! WARNING

AVOID INJURY OR DEATH

Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire.

W-2103-0508

Replacing The Fuel Tank Breather

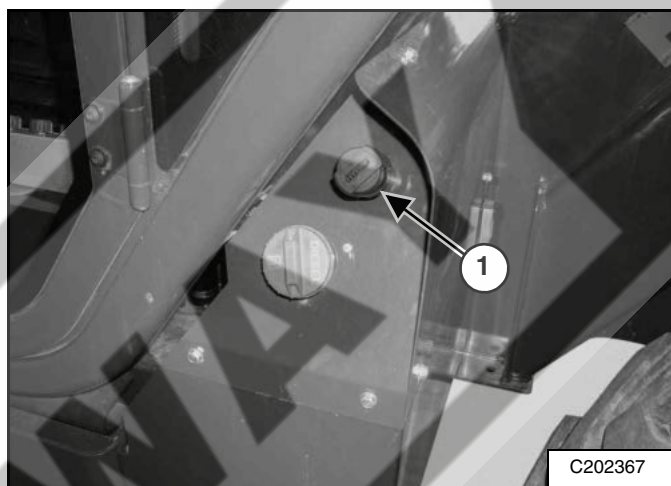
! WARNING

AVOID INJURY OR DEATH

Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire.

W-2103-0508

Figure 204



Remove and discard the fuel tank breather (Item 1) [Figure 204].

Install a new fuel tank breather and tighten to 10 N•m (88 in-lb) torque.

Fuel Pre-Filter

 WARNING**AVOID INJURY OR DEATH**

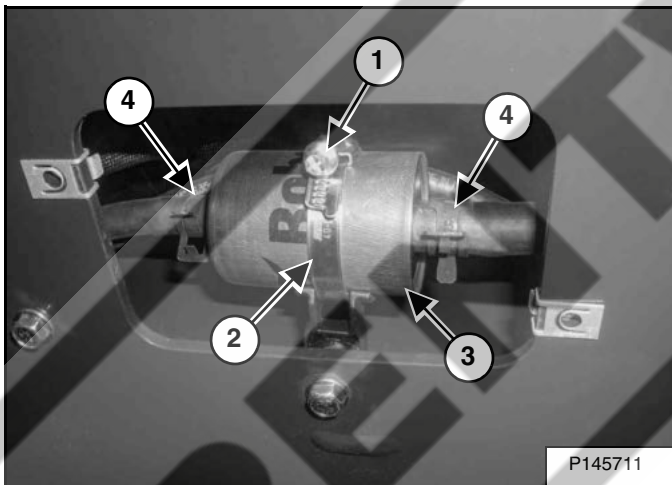
Diesel fuel or hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. Do not use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical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

W-2072-0807

See the *SERVICE SCHEDULE* for the service interval when to replace the fuel pre-filter. (See *SERVICE SCHEDULE* on Page 147.)

Stop the engine. Remove the small cover underneath the engine.

Place a suitable container under the filter in order to catch any fuel that might spill. Clean up any spilled fuel.

Figure 205

Loosen the bolt (Item 1) and remove the collar (Item 2) from the fuel pre-filter (Item 3). Loosen the clamps (Item 4) [Figure 205] on both sides of the fuel pre-filter.

Replace the fuel pre-filter and install the clamps.

Install the collar (Item 2) and tighten the bolt (Item 1) [Figure 205].

Dispose of drained fluid in an environmentally safe manner.

Remove air from the fuel system. (See Removing Air From The Fuel System on Page 164.)

Start the engine and allow to operate for one minute.

FUEL SYSTEM (CONT'D)

Fuel Filter

See the SERVICE SCHEDULE for the service interval when to replace the fuel filter. (See SERVICE SCHEDULE on Page 147.)

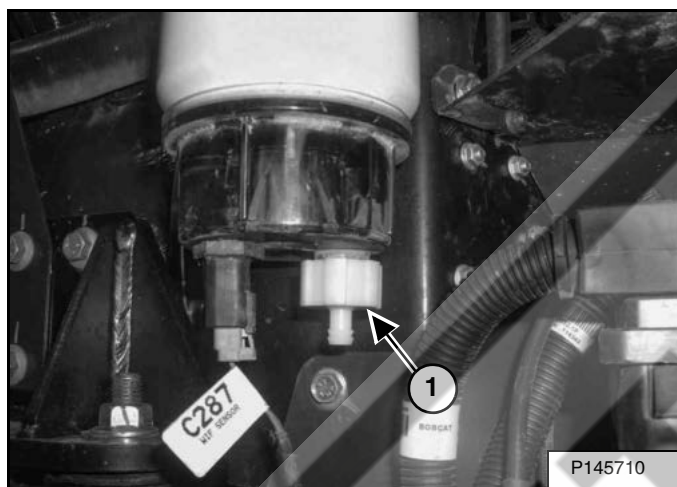
Removing Water

Presence of water in the fuel system is displayed on the display screen with an error code. (See MONITORING THE DISPLAY PANEL on Page 92.)

Stop the engine and open the engine cover.

Place a suitable container under the filter in order to catch any fuel that might spill. Clean up any spilled fuel.

Figure 206



Loosen the drain valve (Item 1) [Figure 206] at the bottom of the filter to remove trapped water from the filter.

When clean fuel drains from the filter, hand tighten the drain valve (Item 1) [Figure 206].

Dispose of drained fluid in an environmentally safe manner.

IMPORTANT

AVOID ENGINE DAMAGE

Water in the fuel system can cause serious engine damage. Remove water from the primary fuel filter daily.

I-2354-0112

Close the engine cover.

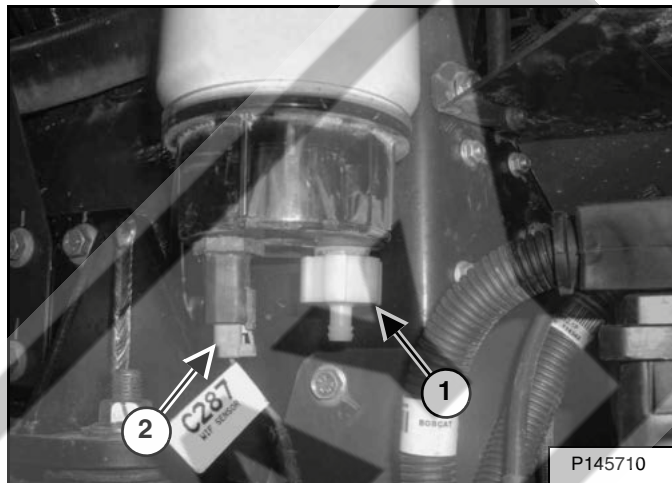
Replacing Element

Stop the engine and open the engine cover.

Place a suitable container under the filter in order to catch any fuel that might spill. Clean up any spilled fuel.

Clean the outside of the filter.

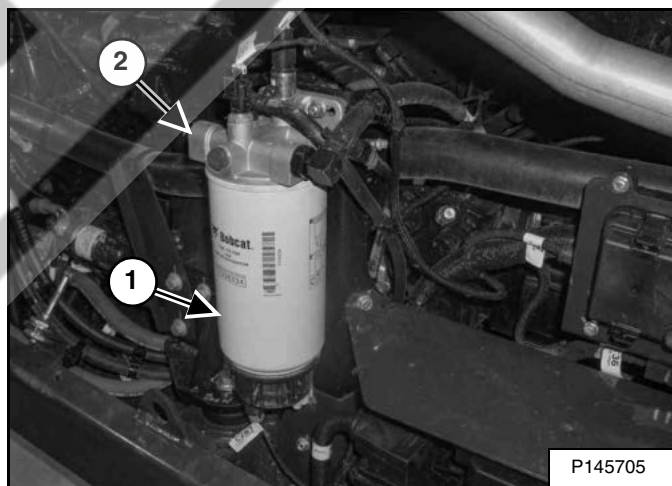
Figure 207



Loosen the drain valve (Item 1) [Figure 207] and allow the fluid to drain into the container. Dispose of drained fluid in an environmentally safe manner.

When fuel stops draining from the filter, disconnect the electrical connector (Item 2) [Figure 207].

Figure 208



Remove the fuel filter element (Item 1) from the fuel filter head (Item 2) [Figure 208]. Do NOT remove the hoses from the fuel filter head.

NOTE: Do NOT fill the new fuel filter element with fuel at this time.

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.

FUEL SYSTEM (CONT'D)

Fuel Filter (Cont'd)

Install the fuel filter assembly into the clamps and tighten.
Connect the electrical connector (Item 2) [Figure 208].

Remove air from the fuel system. (See Removing Air From The Fuel System on Page 164.)

WARNING

AVOID INJURY OR DEATH

Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire.

W-2103-0508

Close the engine cover.

Start the engine and allow to operate for one minute.

WARNING

AVOID INJURY OR DEATH

Diesel fuel or hydraulic fluid under pressure can penetrate skin or 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 physician familiar with this injury.

W-2072-0807

Stop the engine and check for leaks at the filter.

Removing Air From The Fuel System

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.

WARNING

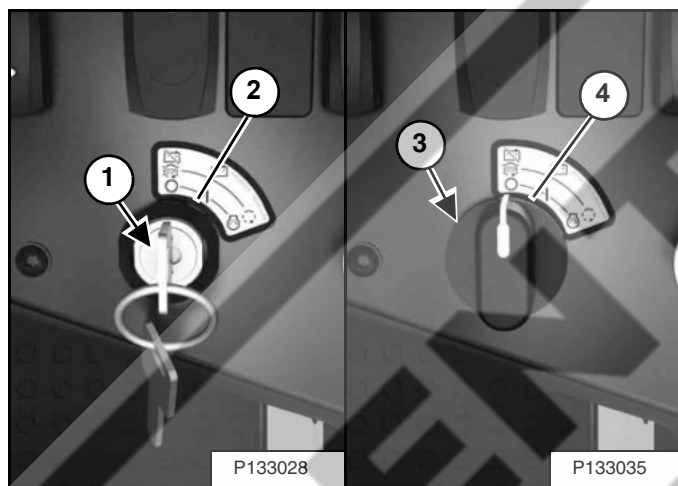
AVOID INJURY OR DEATH

Diesel fuel or hydraulic fluid under pressure can penetrate skin or 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-EN-0909

Ensure all low-pressure and high-pressure fuel connections are installed correctly.

Figure 209



Turn the key switch (Item 1) or start switch (Item 3) to RUN (Item 2) [Figure 209] (this will activate the electrical pump relay).

Leave the ignition key (if equipped) or starter switch (if equipped) in the Run position (Item 2) [Figure 209] for three minutes.

Crank the engine with the accelerator pedal released (low idle position) until the engine starts.

Run the engine at low idle for approximately five seconds then cycle the accelerator pedal rapidly from the low idle position to the high idle position three times. The time taken to cycle the accelerator pedal to be typically one to three seconds. This will assist in displacing any residual trapped air in the fuel injection pump.

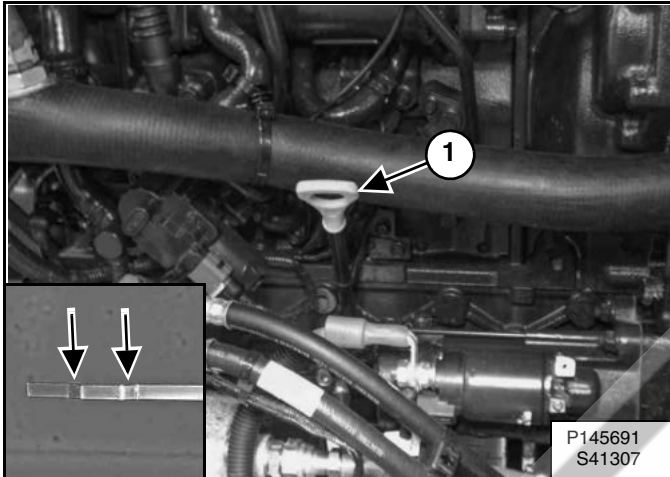
ENGINE LUBRICATION SYSTEM

Checking And Adding Engine Oil

Check the engine oil level every day before starting the engine for the work shift.

Stop the engine.

Figure 210

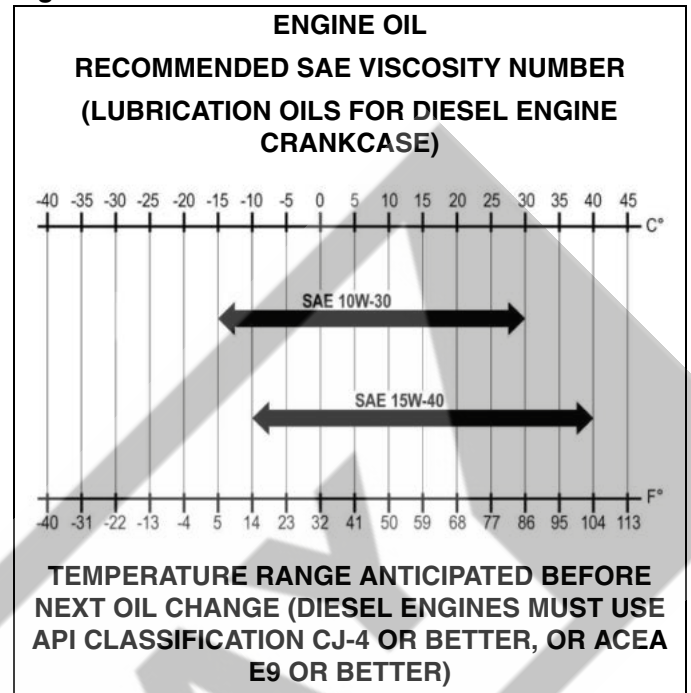


Open the engine cover and remove the dipstick (Item 1) [Figure 210].

Keep the oil level between the marks on the dipstick (Inset) [Figure 210]. Do not overfill.

Engine Oil Chart

Figure 211



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 Classification of CJ-4 or better, or ACEA E9 or better [Figure 211]. See Lubricants, Fuel And Fluids on page 11 for approved oils.



WARNING

AVOID INJURY OR DEATH

Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire.

W-2103-0508



WARNING

AVOID 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 is present.
- Engine is running.
- Tools are being used.

W-2019-0907

ENGINE LUBRICATION SYSTEM (CONT'D)

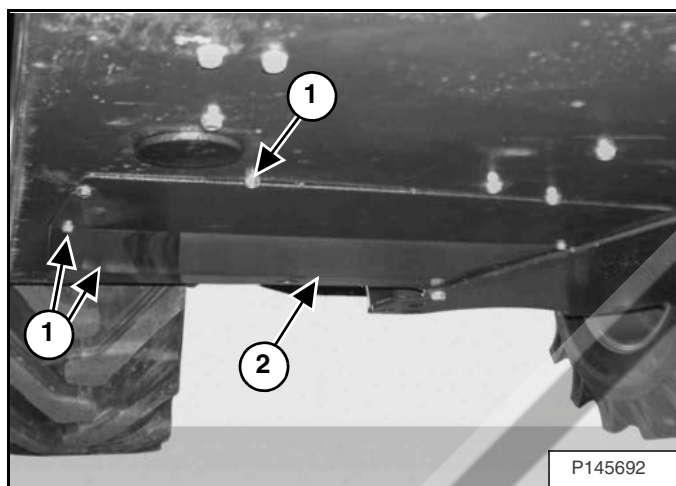
Removing And Replacing Oil And Filter

See the SERVICE SCHEDULE for correct service interval for replacing the engine oil and filter. (See SERVICE SCHEDULE on Page 147.)

Run the engine until it is at operating temperature. Stop the engine.

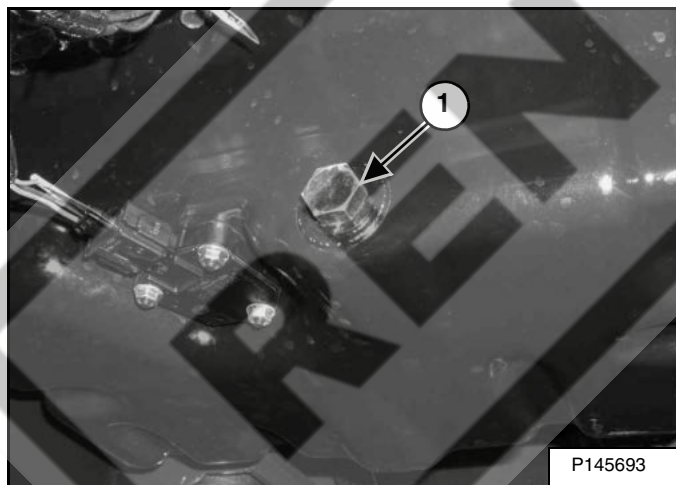
Open the engine cover. (See Opening And Closing on Page 154.)

Figure 212



Remove the three bolts (Item 1) and the cover (Item 2) [Figure 212] at the bottom of the frame.

Figure 213

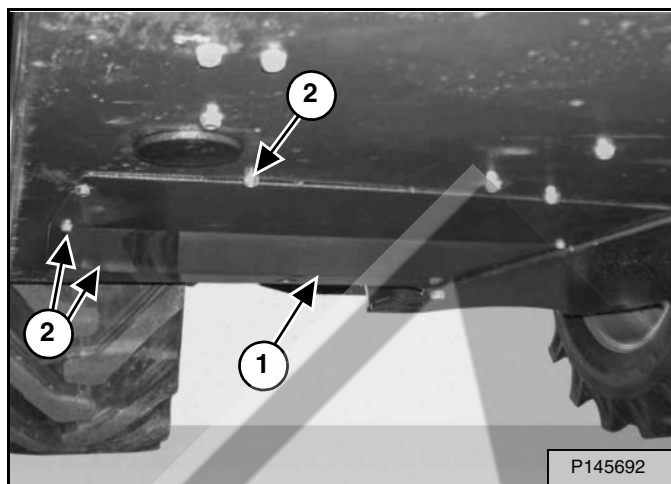


Remove the oil drain plug (Item 1) [Figure 213] from the oil drain fitting and drain the oil into a container. Recycle or dispose of used oil in an environmentally safe manner.

Fit a new sealing ring to the oil drain plug.

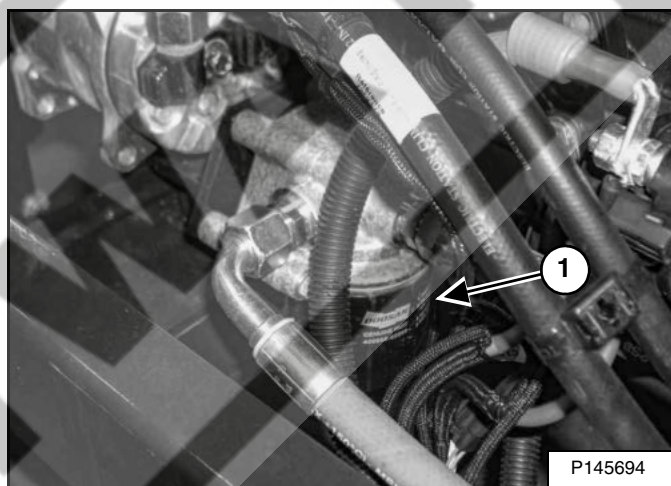
Install the oil drain plug.

Figure 214



Install the cover (Item 1) at the bottom of the frame using the three bolts (Item 2) [Figure 214].

Figure 215



Place a suitable container under the oil filter (Item 1) [Figure 215] in order to catch any oil that might spill. Clean up any spilled oil.

Remove the oil filter (Item 1) [Figure 215] and clean the filter base.

Put clean oil on the new filter gasket, install the new filter and hand tighten. Use genuine Bobcat filter only.

WARNING

AVOID INJURY OR DEATH

Wear safety glasses to prevent eye injury when any of the following conditions exist:

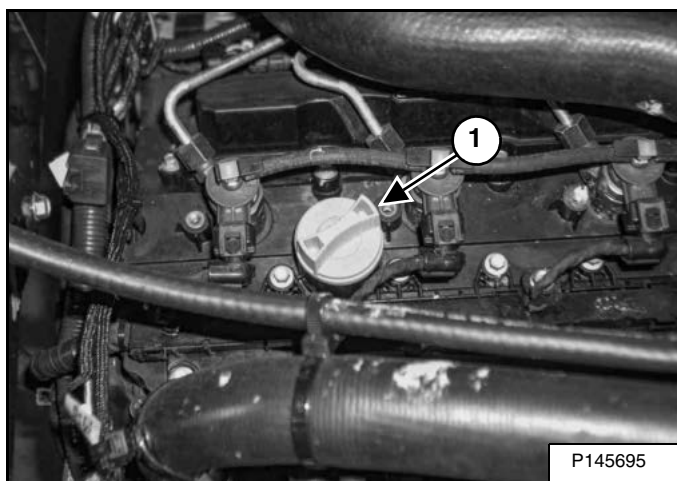
- When fluids are under pressure.
- Flying debris or loose material is present.
- Engine is running.
- Tools are being used.

W-2019-0907

ENGINE LUBRICATION SYSTEM (CONT'D)

Removing And Replacing Oil And Filter (Cont'd)

Figure 216



Remove the oil fill cap (Item 1) [Figure 216].

Put oil in the engine. For capacity, (See Fluid Capacities on Page 259.). For type, (See Engine Oil Chart on Page 165.).

Install oil fill cap (Item 1) [Figure 216], start the engine and let it run for several minutes.

Stop the engine, and check for leaks at the oil filter.

Add oil as needed if it is not at the top mark on the dipstick. (See Checking And Adding Engine Oil on Page 165.)



WARNING

AVOID INJURY OR DEATH

Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire.

W-2103-0508

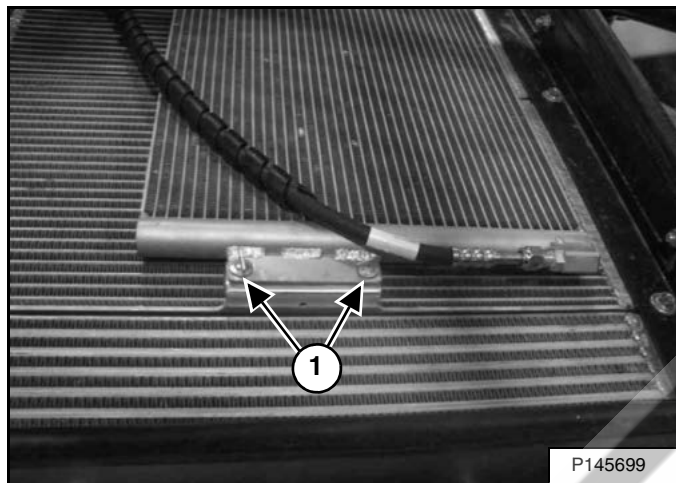
COOLING SYSTEM

Check the cooling system every day to prevent overheating, loss of performance or engine damage.

Cleaning

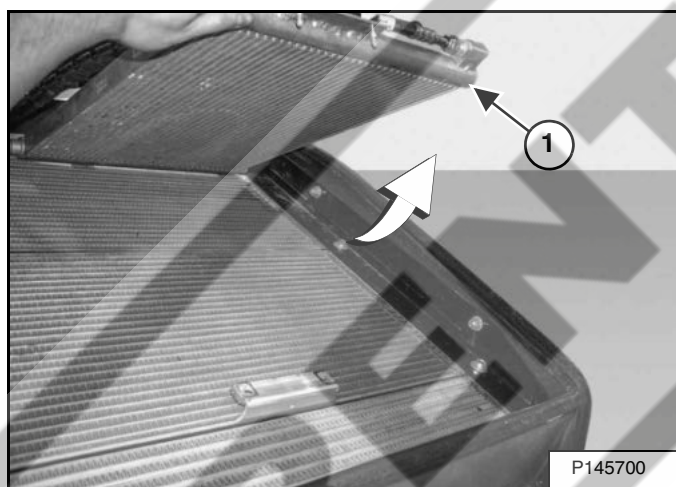
Stop the engine and open the engine cover. (See Opening And Closing on Page 154.)

Figure 217



Loosen the two screws (Item 1) [Figure 196].

Figure 218



Raise the condenser (Item 1) [Figure 197].

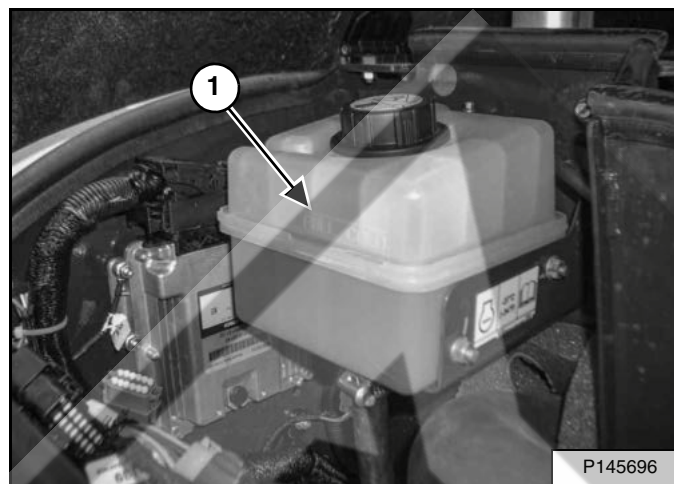
Use low air pressure to clean the top and bottom of the cooler. Be careful not to damage fins.

Lower the condenser and tighten the two screws (Item 1) [Figure 218].

Checking Level

Stop the engine and allow the engine to cool. Open the engine cover. (See Opening And Closing on Page 154.)

Figure 219



Check coolant level using the level markers (Item 1) [Figure 219] on the tank. Coolant must be between MIN and MAX level markers when the engine is cold.

NOTE: Always check coolant level before operating the machine. Lack of engine coolant will result in engine damage.

NOTE: The cooling system is factory filled with ethylene glycol (EG) coolant. DO NOT mix ethylene glycol with propylene glycol.

Use a refractometer to check the condition of ethylene glycol in your cooling system.

Add premixed coolant to the tank if the coolant level is low. (See Lubricants, Fuel And Fluids on Page 11.)

Close the engine cover.

IMPORTANT

AVOID ENGINE DAMAGE

Always use the correct ratio of water to antifreeze.

Too much antifreeze reduces cooling system efficiency and may cause serious premature engine damage.

Too little antifreeze reduces the additives which protect the internal engine components; reduces the boiling point and freeze protection of the system.

Always add a premixed solution. Adding full strength concentrated coolant can cause serious premature engine damage.

I-2124-0497

COOLING SYSTEM (CONT'D)

Removing And Replacing The Coolant

IMPORTANT

AVOID ENGINE DAMAGE

Always use the correct ratio of water to antifreeze.

Too much antifreeze reduces cooling system efficiency and may cause serious premature engine damage.

Too little antifreeze reduces the additives which protect the internal engine components; reduces the boiling point and freeze protection of the system.

Always add a premixed solution. Adding full strength concentrated coolant can cause serious premature engine damage.

I-2124-0497

! WARNING

AVOID INJURY OR DEATH

Wear safety glasses to prevent eye injury when any of the following conditions exist:

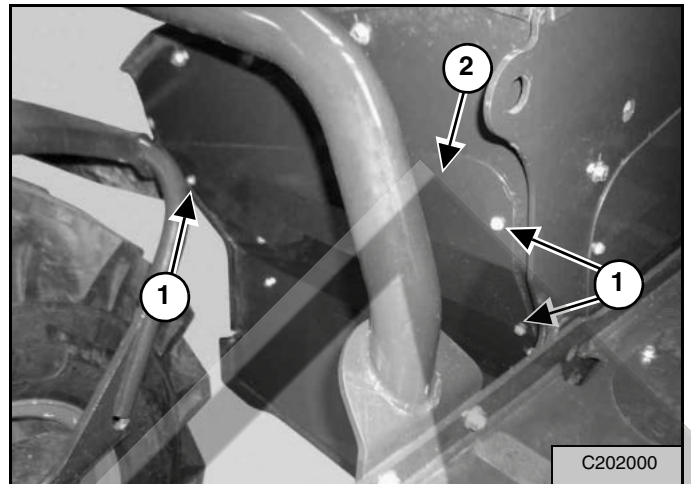
- When fluids are under pressure.
- Flying debris or loose material is present.
- Engine is running.
- Tools are being used.

W-2019-0907

See the SERVICE SCHEDULE for correct service intervals. (See SERVICE SCHEDULE on Page 147.)

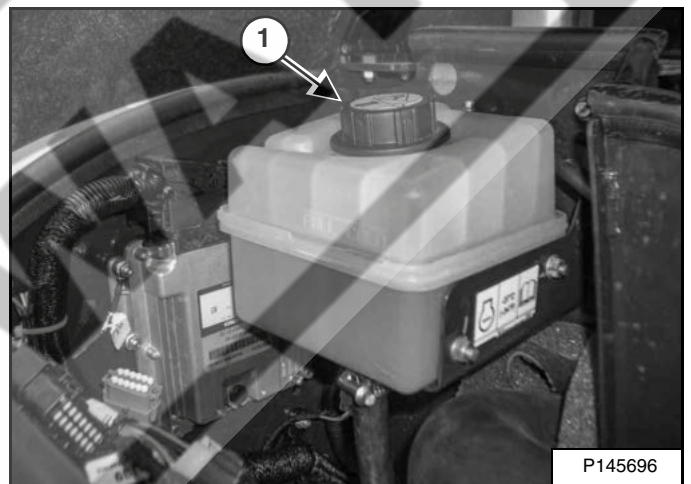
Stop the engine. Open the engine cover. (See Opening And Closing on Page 154.)

Figure 220



Remove the three bolts (Item 1) and the cover (Item 2) [Figure 221].

Figure 221

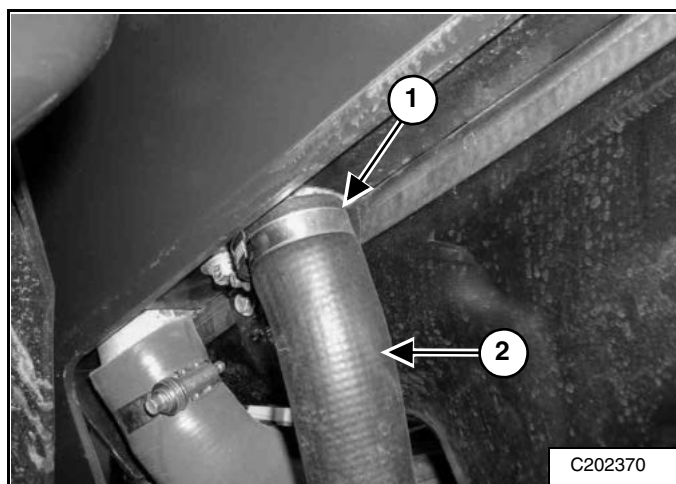


When the engine is cool, remove the coolant fill cap (Item 1) [Figure 221].

COOLING SYSTEM (CONT'D)

Removing And Replacing The Coolant (Cont'd)

Figure 222



Loosen the clamp (Item 1) and remove the hose (Item 2) [Figure 222] from the radiator. Drain all of the coolant into a container. Recycle or dispose of used coolant in an environmentally safe manner.

Installation: Tighten the clamp (Item 1) [Figure 222] to 3 - 4 N•m (25 - 35 in-lb) torque.

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 221]. For the correct coolant, (See Lubricants, Fuel And Fluids on Page 11.).

Follow these steps when using concentrated coolant instead of a ready-to-use premix:

- Use a separate container to mix the coolant.
- 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.
- Add premixed coolant to the coolant tank until the coolant level reaches the lower marker on the tank (Item 1) [Figure 219].

Install the coolant fill cap (Item 1) [Figure 221].

NOTE: The coolant fill cap must be tightened until the cap clicks.

Close the engine cover.

Run the engine until coolant reaches normal operating temperature. Stop the engine.

Check the coolant level when cool. Add coolant as needed. (See Checking Level on Page 168.)

ELECTRICAL SYSTEM

Description

The telescopic handler has a 12 volt, negative earth alternator charging system. The electrical system is protected against an electrical overload by fuses in three locations.

The cause of an overload must be found before starting the engine again.

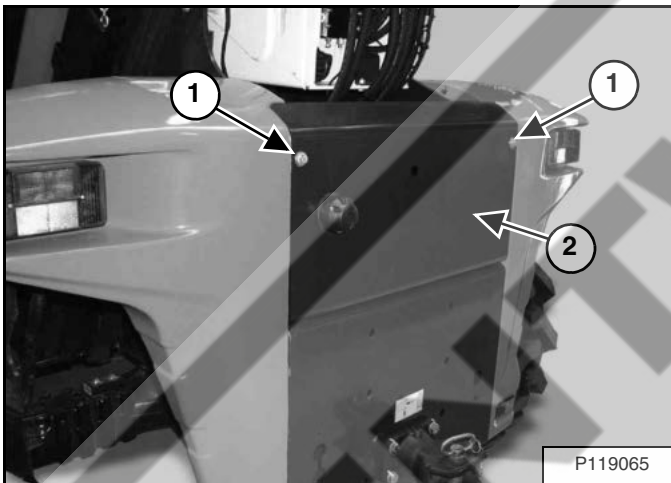
Fuses And Relay Location / Identification

The electrical system is protected by fuses and relays in three locations:

- in the cab. (See Cab on Page 172.)
- on the rear frame. (See Frame on Page 171.)
- in the front right corner of the engine compartment. (See Engine Compartment on Page 173.)

Frame

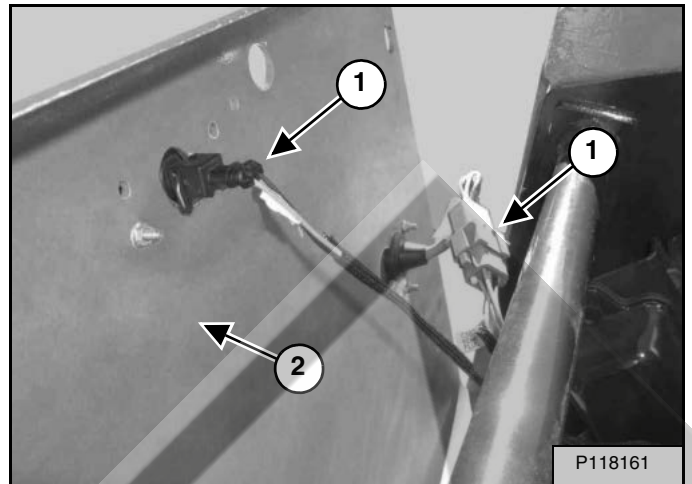
Figure 223



Loosen the two bolts (Item 1) and tilt the cover (Item 2) [Figure 223] back.

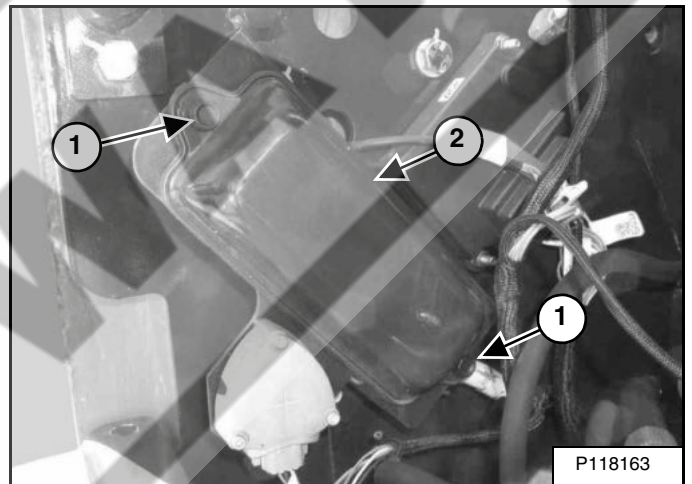
Installation: Tighten the bolts (Item 1) [Figure 223] to maximum 16 N•m (12 ft-lb) torque.

Figure 224



Disconnect the connectors (if equipped) (Item 1) and remove the cover (Item 2) [Figure 224].

Figure 225



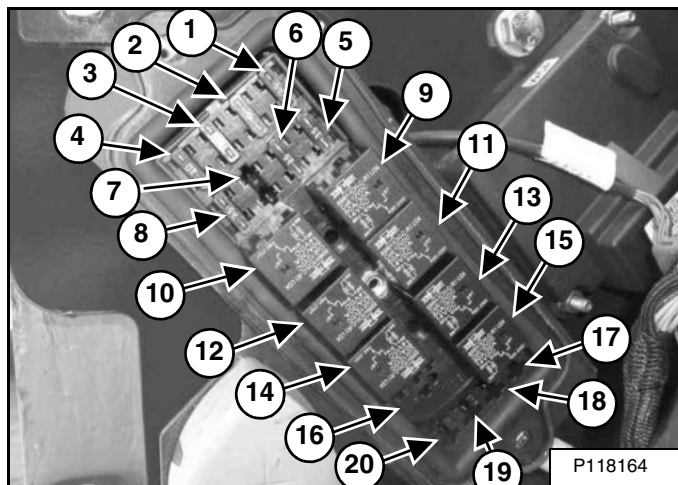
Remove the two retainer screws (Item 1) (both sides) and remove the cover (Item 2) [Figure 225] to check or replace fuses or relays.

ELECTRICAL SYSTEM (CONT'D)

Fuses And Relay Location / Identification (Cont'd)

Frame (Cont'd)

Figure 226



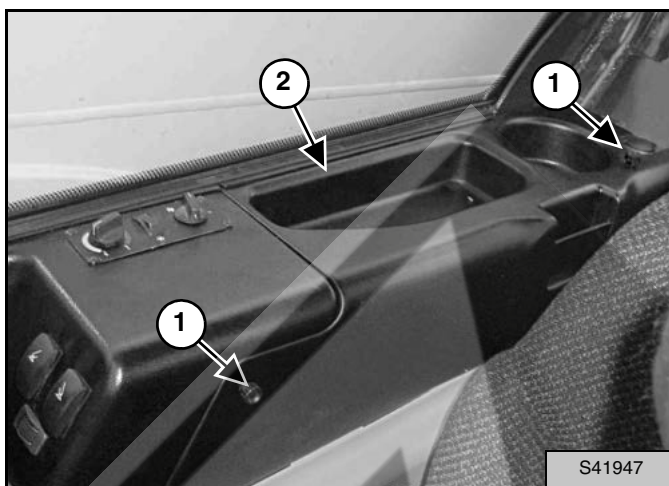
The location and description are shown below and in [Figure 226].

REF	DESCRIPTION	AMP	REF	DESCRIPTION	AMP
1	Low Speed	7.5	11	Brake Lights	R
2	Wheels Alignment / Retract Switch / External buzzer / Inclinator	5	12	Remote (Radio) Throttle Control	R
3	Hydraulic Quick-Tach	7.5	13	Reverse Light / Backup Alarm	R
4	Stop Lights / Reverse Light / Back Up Alarm	10	14	Not Used	—
5	Drive Controller	15	15	Low Speed	R
6	Work Group Controller	15	16	Not Used	—
7	Not Used	10	17	Not Used	—
8	Hydraulic Control Valve	7.5	18	Not Used	—
9	Hydraulic Quick-Tach	R	19	Not Used	—
10	Disable Hydrostatic Brake	R	20	Not Used	—

R - Relay

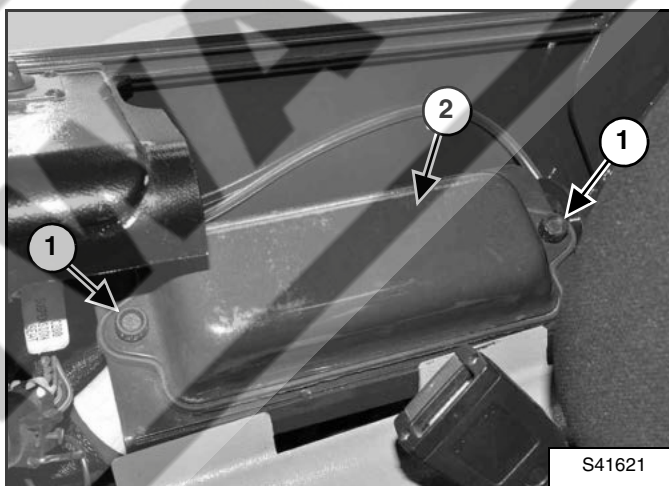
Cab

Figure 227



Loosen the retainer screws (Item 1) and remove the console cover (Item 2) [Figure 227].

Figure 228



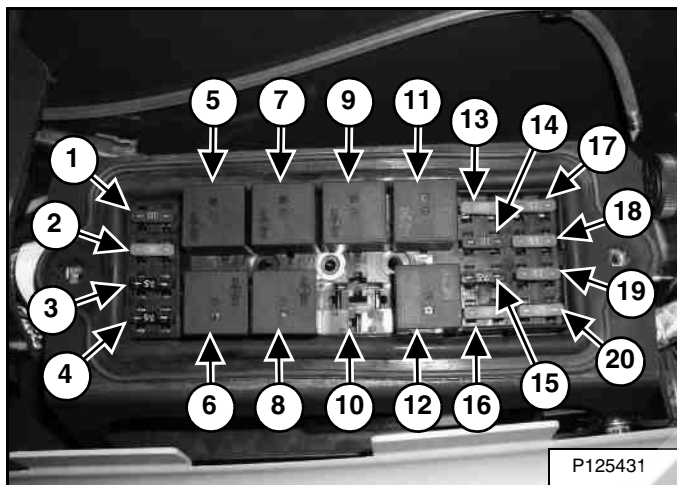
Remove retainer screws (Item 1) and remove the cover (Item 2) [Figure 228] to check or replace fuses or relays.

ELECTRICAL SYSTEM (CONT'D)

Fuses And Relay Location / Identification (Cont'd)

Cab (Cont'd)

Figure 229



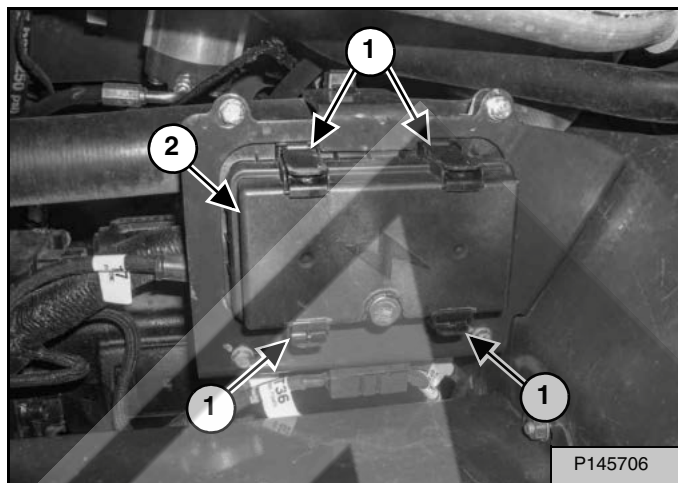
The location and description are shown below and in [Figure 229].

REF	DESCRIPTION	AMP	REF	DESCRIPTION	AMP
1	Boom Work Light	10	11	Boom Work Light	R
2	Cab Work Lights	20	12	Cab Work Lights	R
3	Park Lights Right	7.5	13	Rear and Roof Wiper / LLMC / Radio (Ignition) / Dome Light / Beacon	15
4	Park Lights Left / Fog Light	7.5	14	Front Wiper / Washers / Travel Direction Lever	10
5	Rotating Beacon	R	15	Display Panel / LMMI / Diagnostic Connector / Joystick / Switches	7.5
6	Low Beam	R	16	Gateway Controller / Starter Switch / Diagnostic Connector / Remote Control / Warning Lights	20
7	Rear Wiper	R	17	Auxiliary Power Outlet / Suspension Seat (If equipped)	15
8	High Beam	R	18	Low/High Beam	15
9	Fan Inverter	R	19	Headlights / Direction Lights / Horn	15
10	Not Used	—	20	A/C and Heater / Fan inverter	25

R - Relay

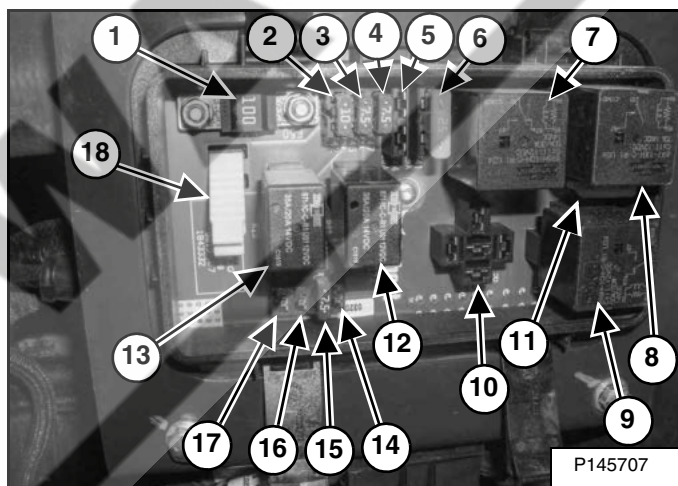
Engine Compartment

Figure 230



Open the four latches (Item 1) to remove the cover (Item 2) [Figure 230].

Figure 231



The location and description are shown below and in [Figure 231].

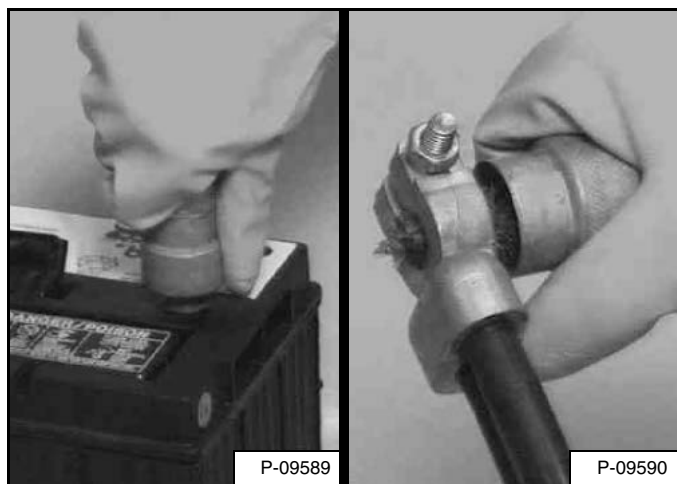
REF	DESCRIPTION	AMP	REF	DESCRIPTION	AMP
1	Master Fuse, Air Heater	100	10	Not Used	—
2	Fuel Pump	10	11	ECU	25
3	Fan Inverter	7.5	12	Fan Inverter	R
4	Alternator	7.5	13	Fuel Pump	R
5	Not used	R	14	Not Used	—
6	Starter	25	15	Ignition	7.5
7	ECU Relay	R	16	Not Used	—
8	Glow Plug Relay	R	17	Not Used	—
9	Starter Relay	R	18	Switch	—

R - Relay

ELECTRICAL SYSTEM (CONT'D)

Battery Maintenance

Figure 232



The battery cables must be clean and tight [Figure 232]. Check electrolyte level in the battery. Add distilled water as needed. Remove acid or corrosion from battery and cables with sodium bicarbonate (baking soda) and water solution.

Put Bobcat Battery Saver or grease on the battery terminals and cable ends to prevent corrosion.



WARNING

AVOID INJURY OR DEATH

Batteries contain acid which burns eyes and skin on contact. Wear 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 15 minutes.

If electrolyte is taken internally drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention.

W-2065-0807

ELECTRICAL SYSTEM (CONT'D)

Using A Booster Battery (Jump Starting)

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 12 volt.

WARNING

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 battery. Never lean over battery while boosting, testing or charging.

W-2066-0910

IMPORTANT

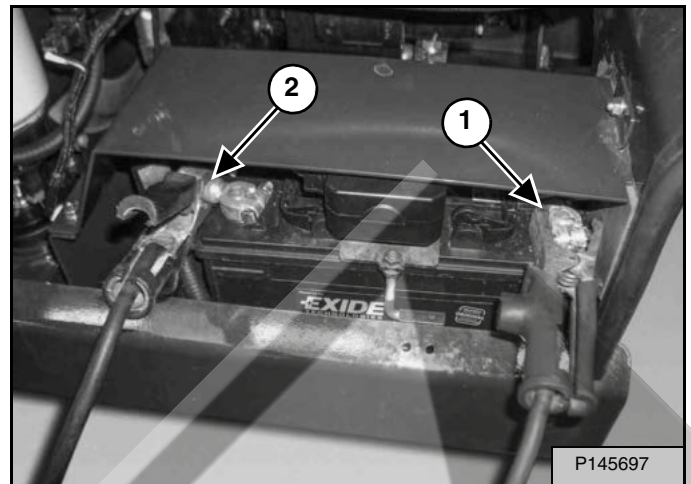
Damage to the alternator can occur if:

- Engine is operated with battery cables disconnected.
- Battery cables are connected when using a fast charger or when welding on the Telescopic Handler. (Remove both cables from the battery.)
- Extra battery cables (booster cables) are connected wrong.

I-2345-0311

Open the engine cover.

Figure 233



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 233] of the telescopic handler battery.

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 233] on the telescopic handler starter.

Keep cables away from moving parts. Start the engine.

After the engine has started, remove the earth (-) cable (Item 1) [Figure 233] first.

Remove the cable from the positive (+) terminal (Item 1) [Figure 233].

ELECTRICAL SYSTEM (CONT'D)

Removing And Installing The Battery

! WARNING

AVOID INJURY OR DEATH

Batteries contain acid which burns eyes and skin on contact. Wear goggles, protective clothing and rubber gloves to keep acid off body.

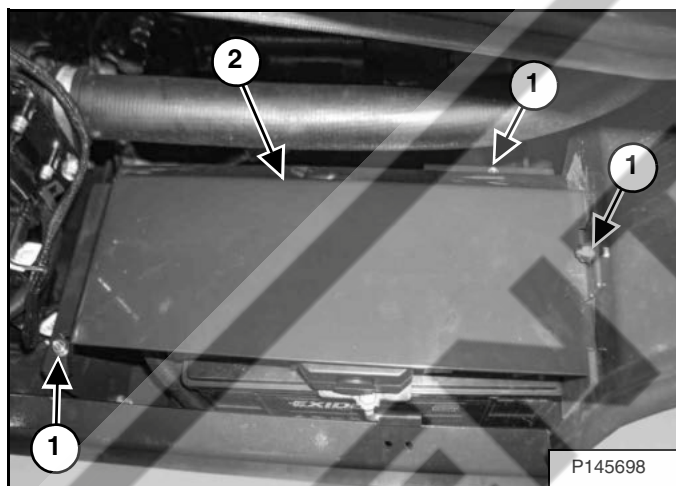
In case of acid contact, wash immediately with water. In case of eye contact get prompt medical attention and wash eye with clean, cool water for at least 15 minutes.

If electrolyte is taken internally drink large quantities of water or milk! DO NOT induce vomiting. Get prompt medical attention.

W-2065-0807

Open the engine cover.

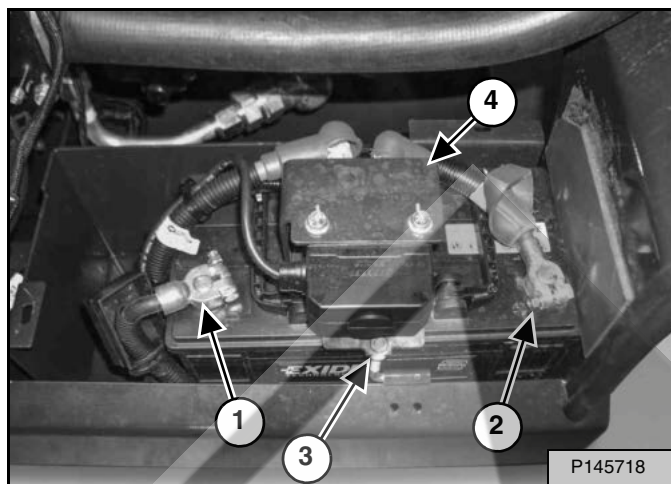
Figure 234



Remove the three bolts (Item 1) and remove the battery cover (Item 2) [Figure 234].

Installation: Apply Loctite® # 242 to the threads of the bolts (Item 1) [Figure 234] before installation.

Figure 235



Always disconnect the earth (-) cable (Item 1) [Figure 235] first to prevent sparks.

Remove the positive (+) battery cable (Item 2) [Figure 235].

Installation: Tighten the bolts to 5 - 10 N•m (44 - 88 in-lb) torque.

Remove the nut (Item 3) [Figure 235].

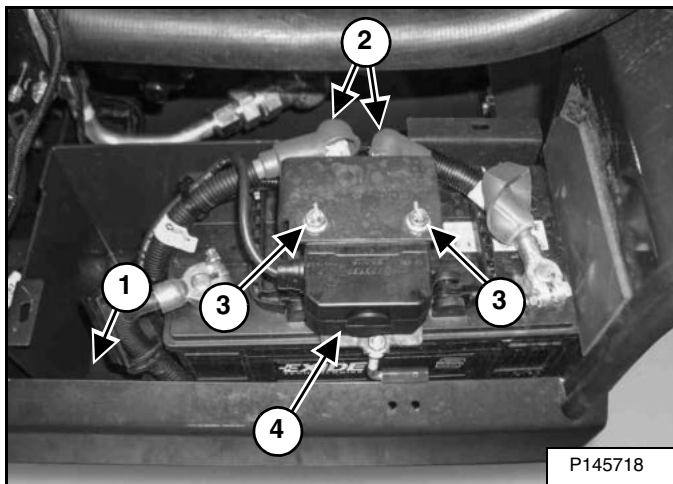
Reposition the hold-down plate (Item 4) [Figure 235] including the battery disconnect switch.

Remove the battery.

ELECTRICAL SYSTEM (CONT'D)

Removing And Installing The Battery (Cont'd)

Figure 236



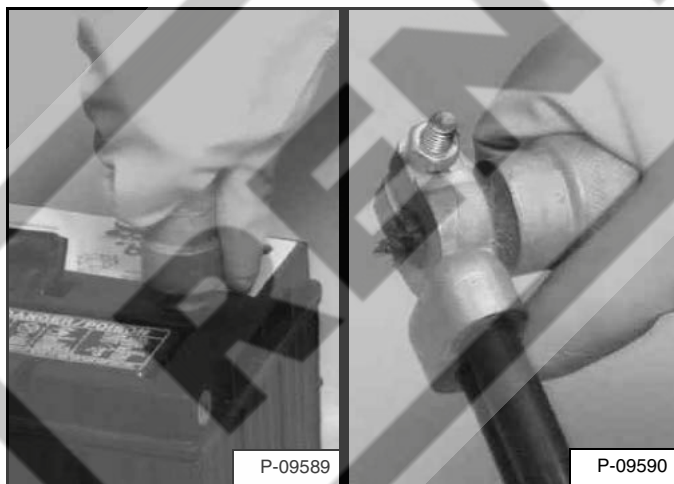
If needed, disconnect the connector (Item 1) and remove the cables from the battery disconnect switch terminals (Item 2) [Figure 236].

Installation: Tighten the nuts (Item 2) [Figure 236] to 11 - 17 N•m (8 - 12 ft-lb) torque.

Remove the two bolts (Item 3) and remove the battery disconnect switch (Item 4) [Figure 236] from the hold-down plate.

Installation: Tighten the bolts to 9 - 11 N•m (80 - 97 in-lb) torque.

Figure 237



Always clean the battery terminals and cable ends when installing a new or used battery [Figure 237].

When installing the battery, do not touch any metal parts with the battery terminals.

Connect and tighten the battery cables. Connect the earth (-) cable last to prevent sparks.

WARNING

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 battery. Never lean over battery while boosting, testing or charging.

W-2066-0910

HYDRAULIC / HYDROSTATIC SYSTEM

Checking And Adding Fluid

Use only recommended fluid in the hydraulic system.
(See Lubricants, Fuel And Fluids on Page 11.)

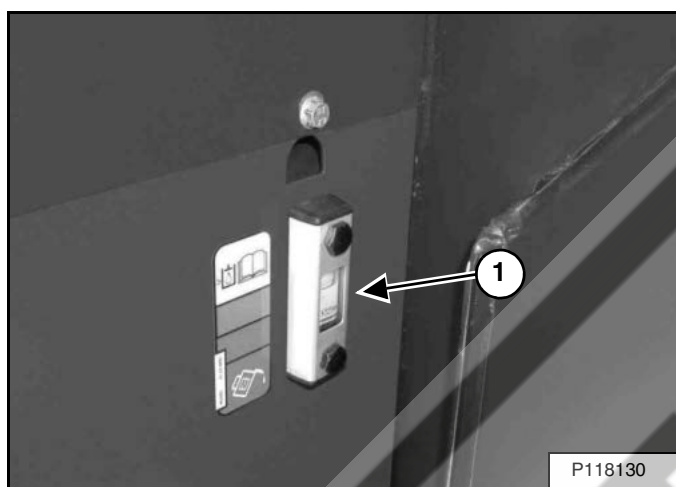
Completely retract and lower the boom. Tilt the attachment carrier forward.

Stop the machine on a level surface.

Stop the engine.

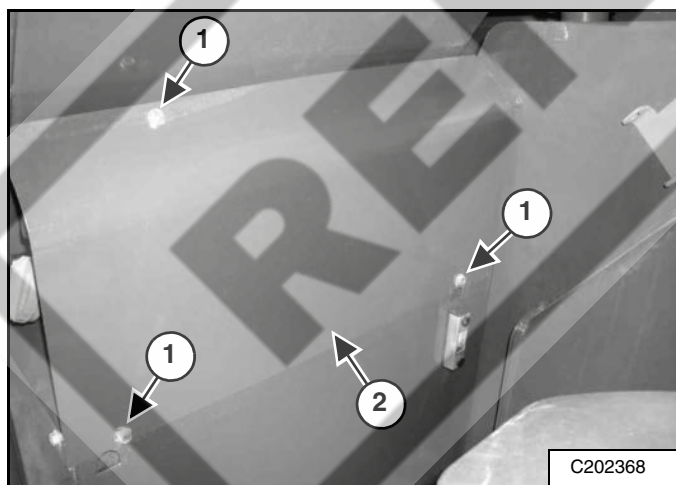
Hydraulic fluid must be at ambient temperature for this procedure.

Figure 238



Check the fluid level at the sight gauge (Item 1) [Figure 238].

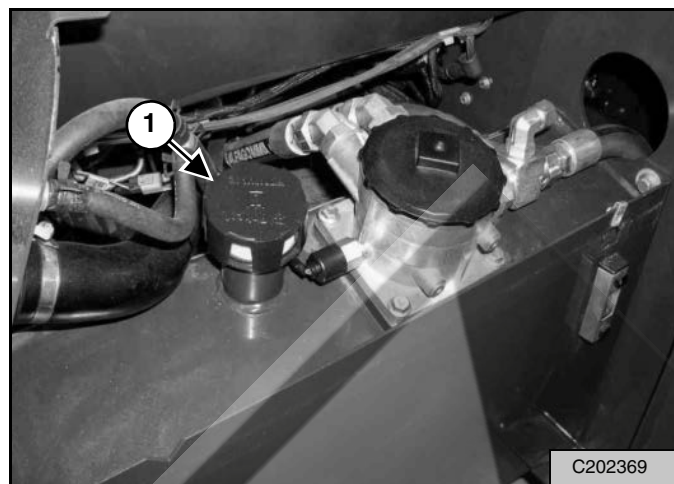
Figure 239



Remove the three bolts (Item 1) and the cover (Item 2) [Figure 239].

Installation: Tighten the bolts (Item 1) [Figure 239] to maximum 16 N•m (12 ft-lb) torque.

Figure 240



Remove the fill / breather cap (Item 1) [Figure 240].

Add fluid until it is at the centre of the sight gauge (Item 1) [Figure 238].

Install the fill / breather cap (Item 1) [Figure 240].

Install the cover (Item 2) with the three bolts (Item 1) [Figure 239].



WARNING

AVOID INJURY OR DEATH

Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire.

W-2103-0508

HYDRAULIC / HYDROSTATIC SYSTEM (CONT'D)

Removing And Replacing Hydraulic Fluid

See the SERVICE SCHEDULE for the correct service intervals. (See SERVICE SCHEDULE on Page 147.)

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 11.)

Always replace the hydraulic / hydrostatic filter whenever the hydraulic fluid is replaced. (See Removing And Replacing Hydraulic / Hydrostatic Filter on Page 180.)

WARNING

AVOID INJURY OR DEATH

Diesel fuel or hydraulic fluid under pressure can penetrate skin or 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-EN-0909

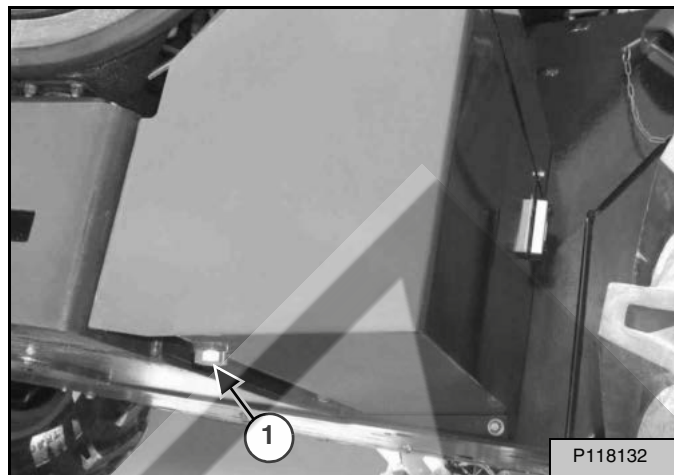
WARNING

AVOID INJURY OR DEATH

Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire.

W-2103-0508

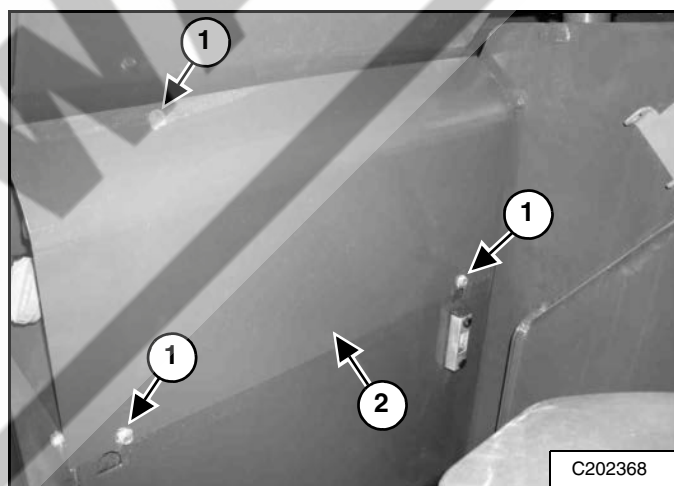
Figure 241



Remove the hydraulic fluid tank drain plug (Item 1) [Figure 241] behind the right front wheel and drain the fluid into a container. Recycle or dispose of the fluid in an environmentally safe manner.

Put a new seal on the drain plug. Install the drain plug (Item 1) [Figure 241] and tighten.

Figure 242



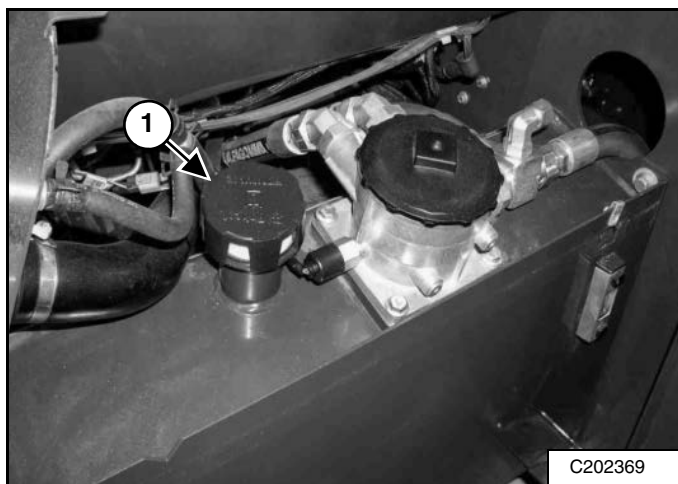
Remove the three bolts (Item 1) and the cover (Item 2) [Figure 242].

Installation: Tighten the bolts (Item 1) [Figure 242] to maximum 16 N•m (12 ft-lb) torque.

HYDRAULIC / HYDROSTATIC SYSTEM (CONT'D)

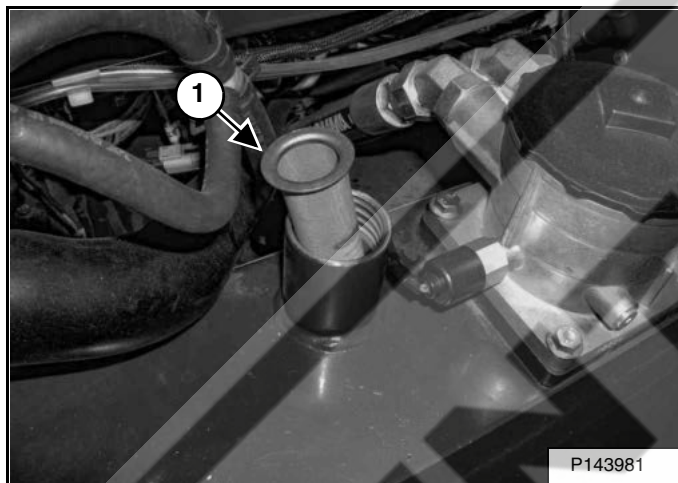
Removing And Replacing Hydraulic Fluid (Cont'd)

Figure 243



Remove the fill / breather cap (Item 1) [Figure 243].

Figure 244



Remove and clean the hydraulic fill screen (Item 1) [Figure 244]. Use low air pressure to dry the screen.

Install hydraulic fill screen and add fluid until it is at the center of the sight gauge (Item 2) [Figure 238].

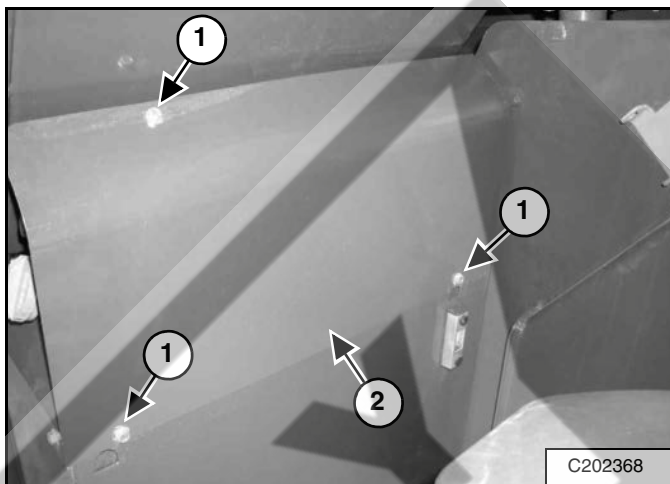
Install the fill / breather cap (Item 1) [Figure 243].

Install the cover (Item 2) with the three bolts (Item 1) [Figure 242].

Removing And Replacing Hydraulic / Hydrostatic Filter

See the SERVICE SCHEDULE for the correct service intervals. (See SERVICE SCHEDULE on Page 147.)

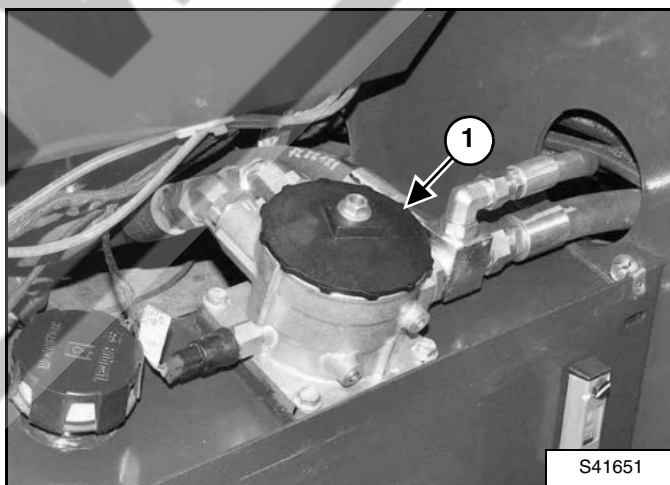
Figure 245



Remove the three bolts (Item 1) and the cover (Item 2) [Figure 245].

Installation: Tighten the bolts (Item 1) [Figure 245] to maximum 16 N•m (12 ft-lb) torque.

Figure 246

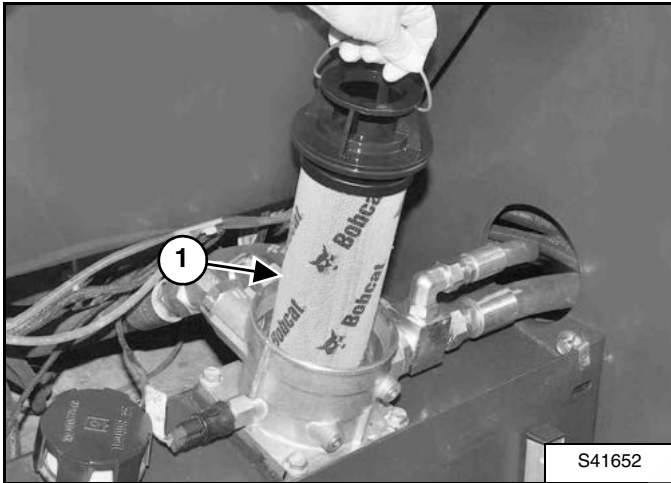


Remove the cap (Item 1) [Figure 246].

HYDRAULIC / HYDROSTATIC SYSTEM (CONT'D)

Removing And Replacing Hydraulic / Hydrostatic Filter (Cont'd)

Figure 247



Remove the filter element (Item 1) [Figure 247] and discard.

Install a new filter element ensuring that the element is fully seated in the filter base.

Install the cap and hand tighten.

Start the engine and let the engine run for one minute (low idle) before operating the boom hydraulics.

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 178.)

Install the cover.

WARNING

AVOID INJURY OR DEATH

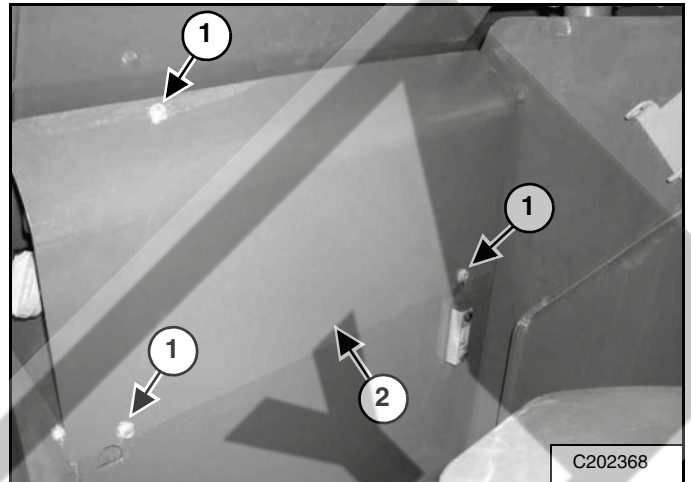
Always clean up spilled fuel or oil. Keep heat, flames, sparks or lighted tobacco away from fuel and oil. Failure to use care around combustibles can cause explosion or fire.

W-2103-0508

Fill / Breather Cap

See the SERVICE SCHEDULE for the correct replacement interval. (See SERVICE SCHEDULE on Page 147.)

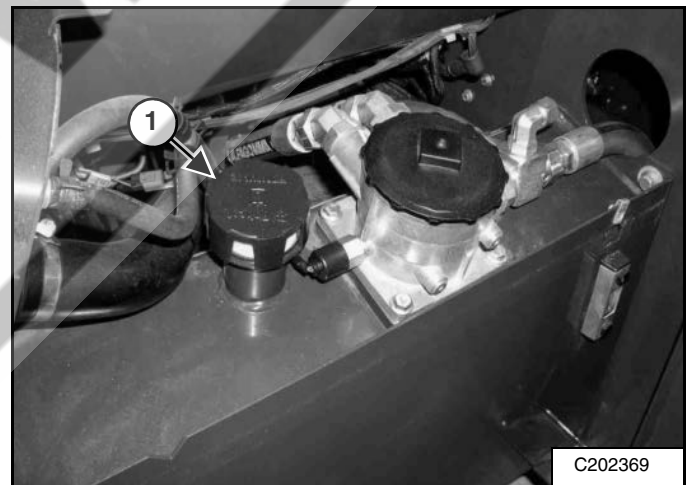
Figure 248



Remove the three bolts (Item 1) and the cover (Item 2) [Figure 248].

Installation: Tighten the bolts (Item 1) [Figure 248] to maximum 16 N•m (12 ft-lb) torque.

Figure 249



Remove the fill / breather cap (Item 1) [Figure 249].

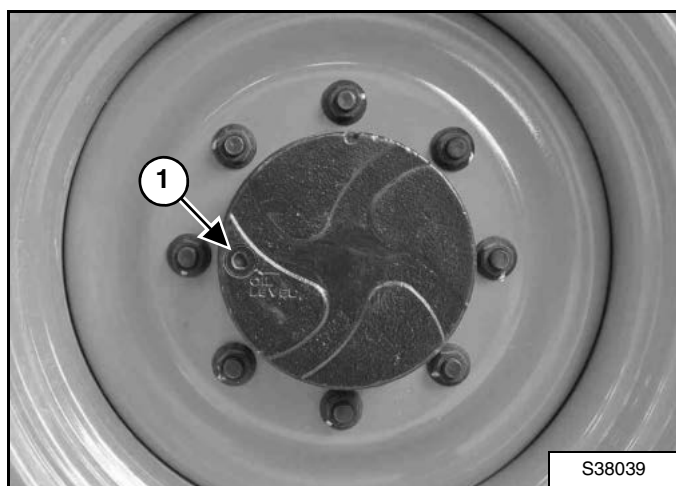
Install the new fill / breather cap (Item 1) [Figure 249].

Install the cover (Item 2) with the three bolts (Item 1) [Figure 248].

AXLES (FRONT AND REAR)

Checking And Adding Oil (Planetary Carrier)

Figure 250



Put the machine on a level surface with the plug (Item 1) [Figure 250] positioned as shown.

Clean the plug (Item 1) [Figure 250] and the surrounding surface.

Remove the plug (Item 1) [Figure 250]. The oil level should be at the bottom edge of the plug hole.

Add oil through the hole if the oil level is below the hole.

For oil capacity, (See Fluid Capacities on Page 259.). For oil type, (See Lubricants, Fuel And Fluids on Page 11.)

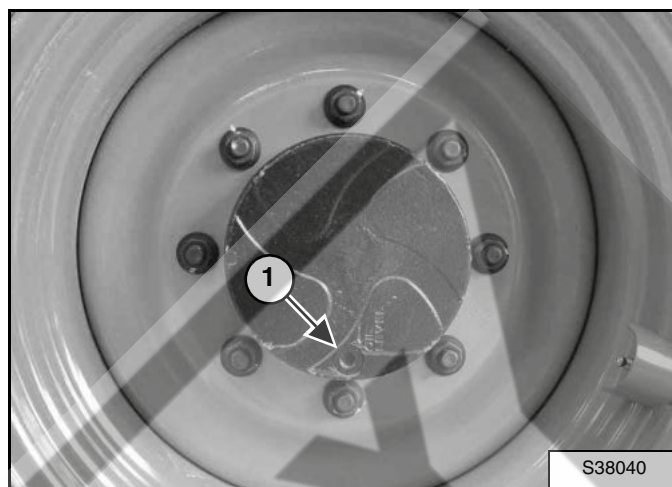
Install and tighten the plug to 35 - 50 N•m (26 - 37 ft-lb) torque.

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 147.)

Figure 251



Put the machine on a level surface with the plug (Item 1) [Figure 251] positioned as shown.

Clean the plug (Item 1) [Figure 251] and the surrounding surface.

Remove the plug (Item 1) [Figure 251] and drain oil into a container. Recycle or dispose of the used lubricant in an environmentally safe manner.

Reposition the plug hole as shown in [Figure 250] and add gear lube until the lube level is at the bottom edge of the plug hole (Item 1) [Figure 250].

For oil capacity, (See Fluid Capacities on Page 259.). For oil type, (See Lubricants, Fuel And Fluids on Page 11.)

Install and tighten the plug to 35 - 50 N•m (26 - 37 ft-lb) torque.

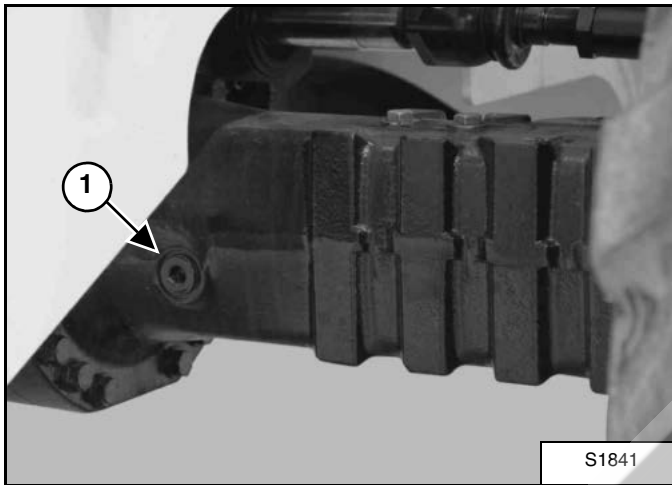
Repeat the procedure for the other planetary carriers.

AXLES (FRONT AND REAR) (CONT'D)

Checking And Adding Oil (Rear Differential)

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 147.)

Figure 252



Put the machine on a level surface.

Clean the plug (Item 1) [Figure 252] and the surrounding surface.

Remove the plug (Item 1) [Figure 252]. The oil level should be at the bottom edge of the plug hole.

Add oil through the hole if the oil level is below the hole.

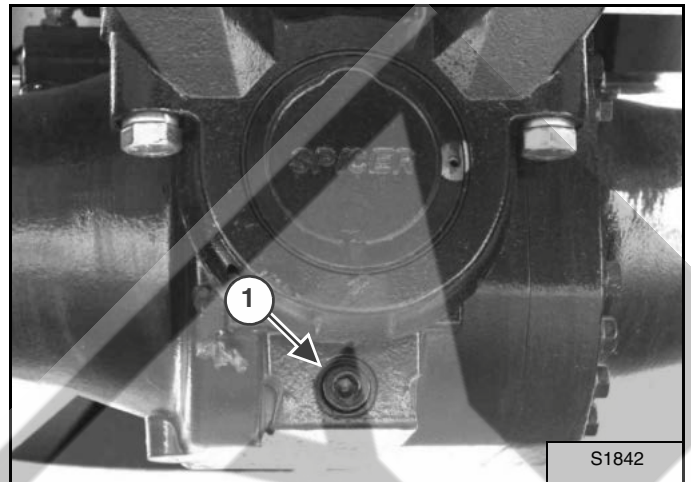
For oil type, (See Lubricants, Fuel And Fluids on Page 11.)

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 147.)

Figure 253



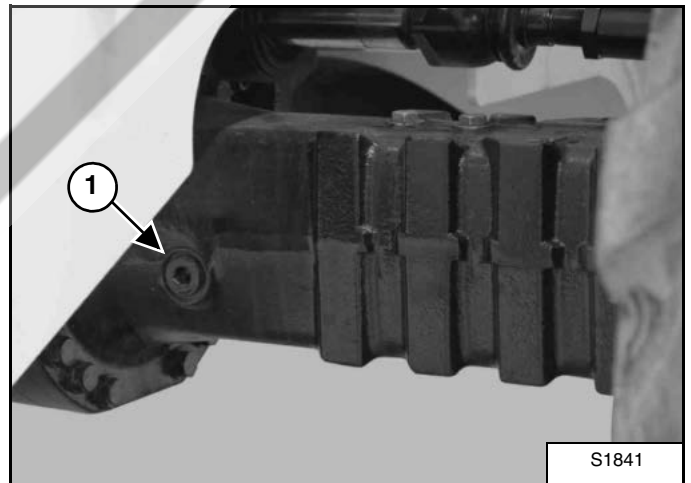
Put the machine on a level surface.

Clean the plug (Item 1) [Figure 253] and the surrounding surface.

Remove the plug (Item 1) [Figure 253] and drain oil into a container. Recycle or dispose of the used lubricant in an environmentally safe manner.

Install and tighten the plug (Item 1) [Figure 253] to 35 - 50 N•m (26 - 37 ft-lb) torque.

Figure 254



Remove the plug (Item 1) [Figure 254] and add oil through the hole until it is to the bottom of the plug hole.

For oil capacity, (See Fluid Capacities on Page 259.).
For oil type, (See Lubricants, Fuel And Fluids on Page 11.)

Install and tighten the plug (Item 1) [Figure 254] to 35 - 50 N•m (26 - 37 ft-lb) torque.

AXLES (FRONT AND REAR) (CONT'D)

Checking And Adding Oil (Front Differential)

See the SERVICE SCHEDULE for the correct service interval. (See SERVICE SCHEDULE on Page 147.)

Figure 255

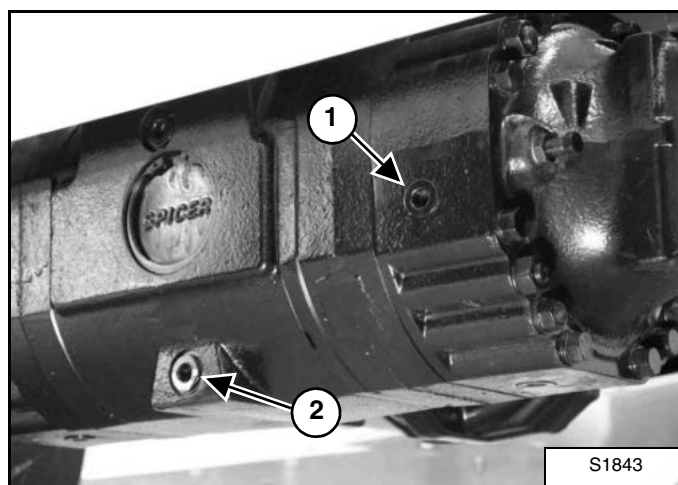
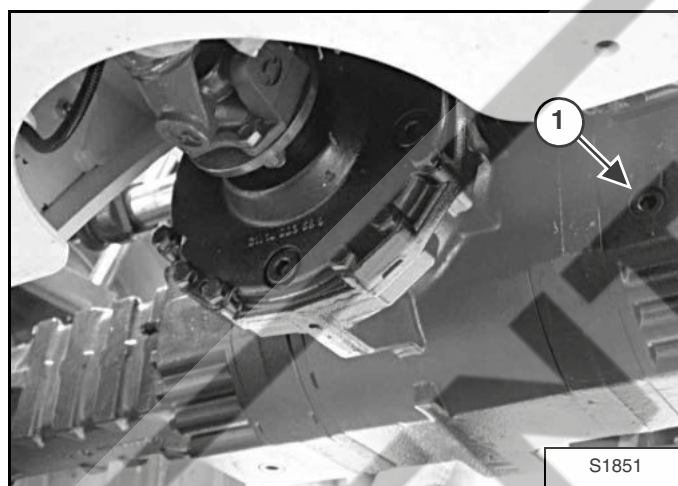


Figure 256



Put the machine on a level surface.

Clean the plugs (Item 1) [Figure 255] and [Figure 256] and the surrounding surface.

Remove the plugs (Item 1) [Figure 255] and [Figure 256]. The oil level should be at the bottom edge of the plug hole.

Add oil through the hole if the oil level is below the hole.

For oil type, (See Lubricants, Fuel And Fluids on Page 11.)

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 147.)

Figure 257

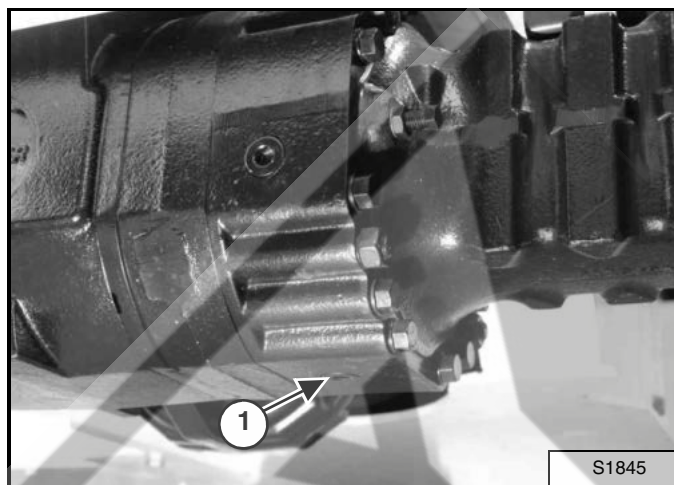
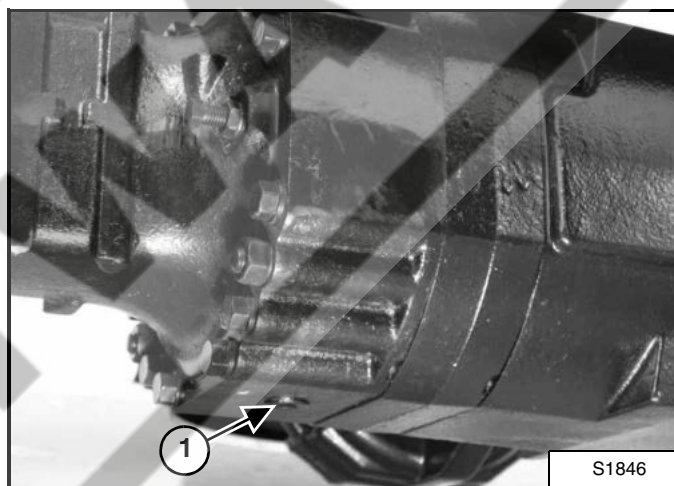


Figure 258



Put the machine on a level surface.

Remove the plug(s) (Item 1) [Figure 257], [Figure 258] and (Item 2) [Figure 255] 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 257], [Figure 258] and (Item 2) [Figure 255] to 35 - 50 N•m (26 - 37 ft-lb) torque.

Remove the plugs (Item 1) [Figure 255] and [Figure 256] and add oil through the holes until it is to the bottom of the plug holes.

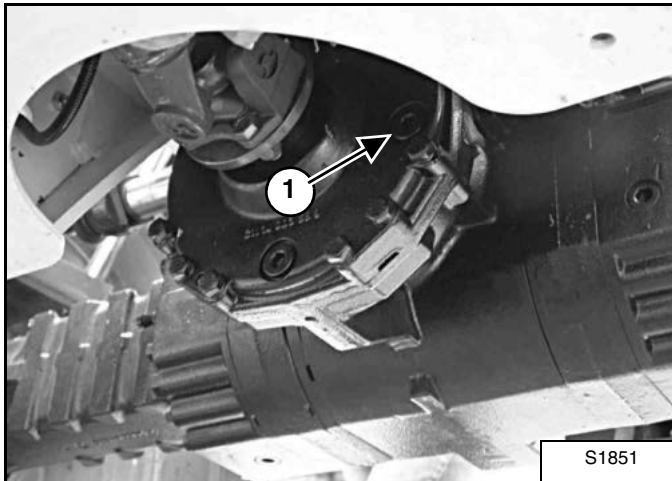
For oil capacity, (See Fluid Capacities on Page 259.).
For oil type, (See Lubricants, Fuel And Fluids on Page 11.)

Install and tighten the plugs to 35 - 50 N•m (26 - 37 ft-lb) torque.

AXLES (FRONT AND REAR) (CONT'D)

Checking And Adding Oil (Reduction Box)

Figure 259



Put the machine on a level surface.

Clean the plug (Item 1) [Figure 259] and the surrounding surface.

Remove the plug (Item 1) [Figure 259]. The oil level should be at the bottom edge of the plug hole.

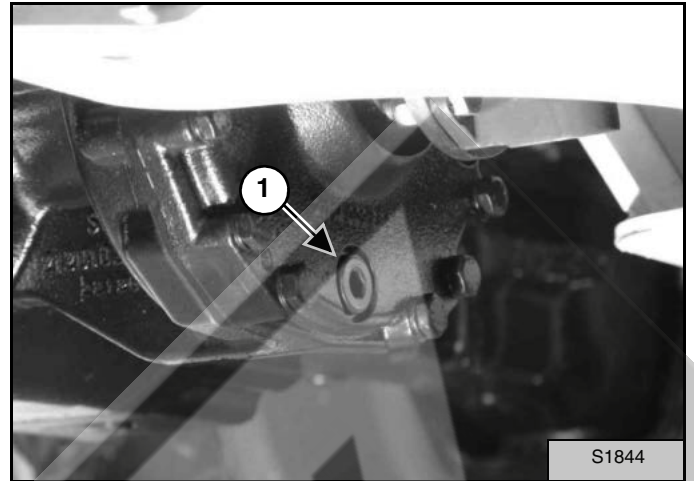
Add oil through the hole if the oil level is below the hole.

For oil capacity, (See Fluid Capacities on Page 259.).
For oil type, (See Lubricants, Fuel And Fluids on Page 11.)

Install and tighten the plug (Item 1) [Figure 259].

Removing And Replacing Oil (Reduction Box)

Figure 260



Put the machine on a level surface.

Clean the plug (Item 1) [Figure 260] and the surrounding surface.

Remove the plug (Item 1) [Figure 260] and drain oil into a container. Recycle or dispose of the used lubricant in an environmentally safe manner.

Install and tighten the plug (Item 1) [Figure 260].

Remove the plug (Item 1) [Figure 259] and add oil through the hole until it is at the bottom of the plug hole.

For oil capacity, (See Fluid Capacities on Page 259.).
For oil type, (See Lubricants, Fuel And Fluids on Page 11.)

Install and tighten the plug (Item 1) [Figure 259].

ALTERNATOR BELT

Belt Adjustment

See the service schedule for the correct service interval (See SERVICE SCHEDULE on Page 147.) and contact your Bobcat dealer for replacement parts.

Belt Checking

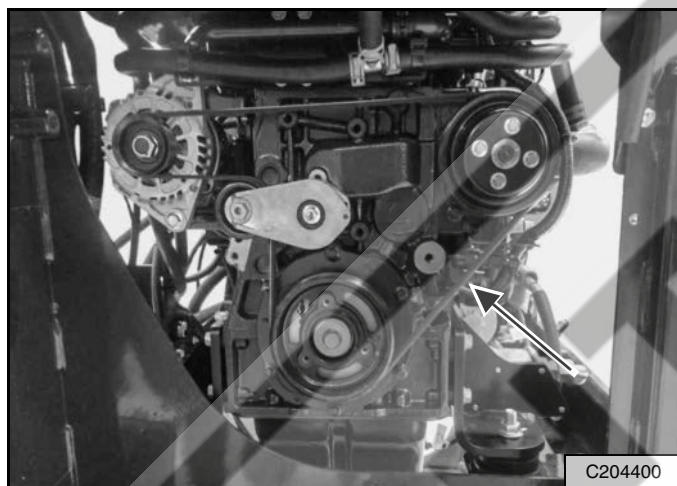
Run the engine for more than five minutes.

Check the whole belt drive visually for damage. Replace damaged parts. (See Belt Replacement on Page 186.)

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)

Figure 261



Check the belt tension with a tension meter in the middle of the span between the crankshaft pulley and the water pump pulley [Figure 261].

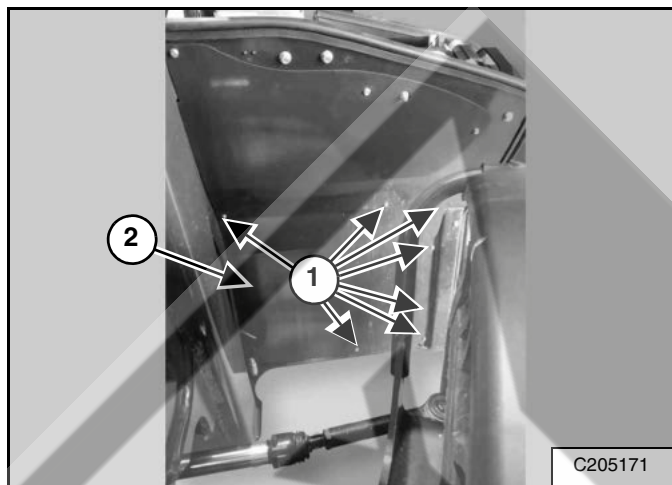
If the belt tension is out of the suggested range for belts, replace the belt. (See Belt Replacement on Page 186.)

	FREQUENCY	TENSION
Suggested range	110 - 130 Hz	305 - 425 N (69 - 96 lbf)

Belt Replacement

Stop the engine and open the engine cover. (See Opening And Closing on Page 154.)

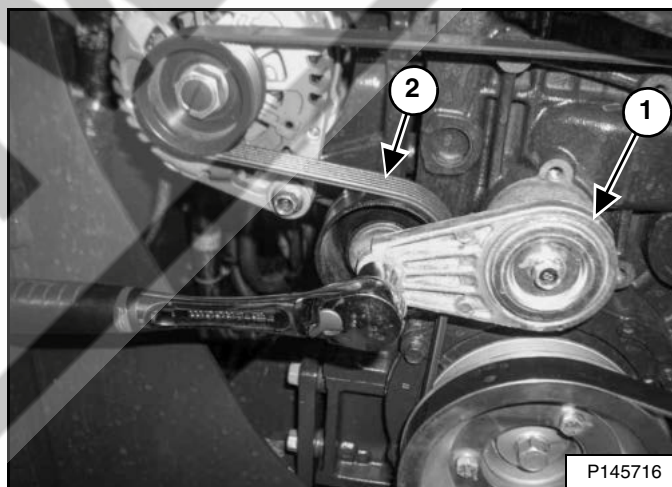
Figure 262



Remove the seven bolts (Item 1) and cover (Item 2) [Figure 262].

Remove the air conditioning belt (if equipped). (See Belt Replacement on Page 187.)

Figure 263



Rotate the pulley (Item 1) anticlockwise to loosen the tension from the alternator belt (Item 2) [Figure 263]. Lock the pulley with a pin dia. 4 mm (0.16 in).

Remove the belt from the pulleys.

Inspect the pulleys for wear.

Install new belt.

After belt replacement let the engine run for five minutes and check the alternator belt. (See Belt Checking on Page 186.)

AIR CONDITIONING BELT

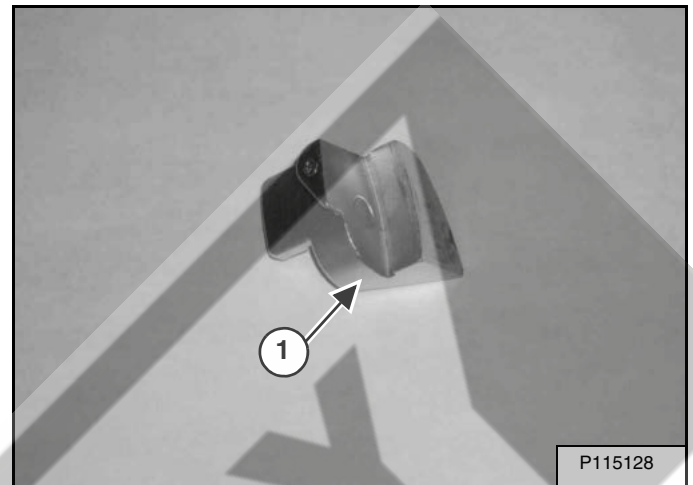
Belt Adjustment

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.

Belt Replacement

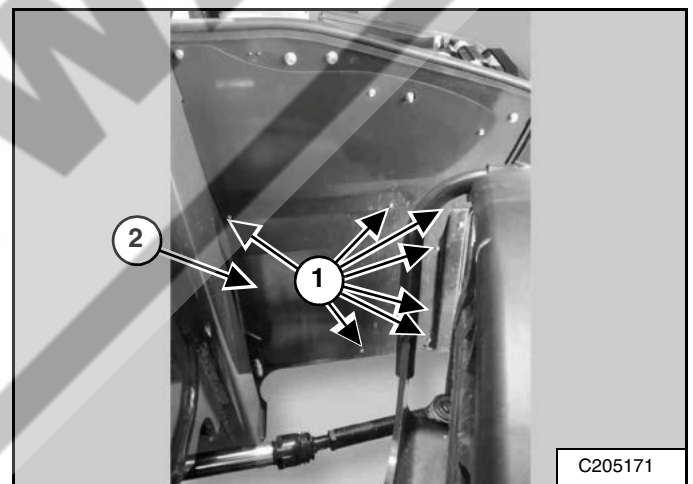
Stop the engine and open the engine cover. (See Opening And Closing on Page 154.)

Figure 264



A belt tool (Item 1) [Figure 264] is required to install the new air conditioning belt. The belt tool is available in local aftermarket stores.

Figure 265

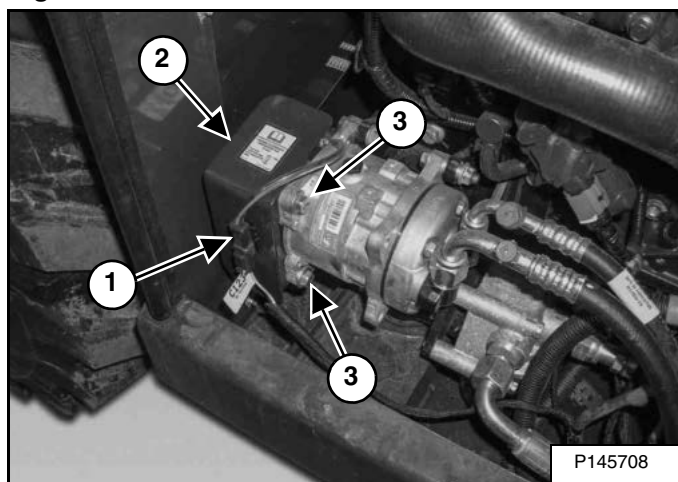


Remove the seven bolts (Item 1) and cover (Item 2) [Figure 265].

AIR CONDITIONING BELT (CONT'D)

Belt Replacement (Cont'd)

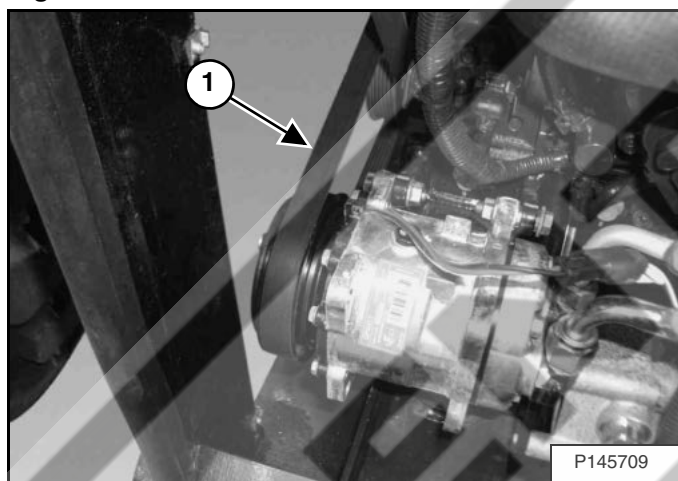
Figure 266



Remove the connector (Item 1) from the belt cover (Item 2) [Figure 266].

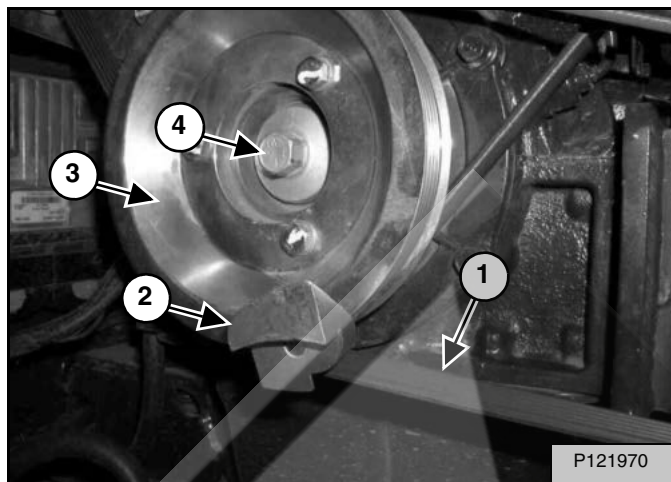
Remove the two bolts (Item 3) and belt cover (Item 2) [Figure 266].

Figure 267



Cut the old belt (Item 1) [Figure 267] and remove the belt from the pulleys. Inspect the pulleys for wear.

Figure 268



Install the belt on the air conditioning compressor pulley and position the belt (Item 1) and belt tool (Item 2) on the bottom side of the crank shaft pulley (Item 3) [Figure 268].

Rotate the engine clockwise using the large crankshaft pulley bolt (Item 4) [Figure 268]. 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. Repeat the procedure if necessary.

Remove the belt tool. Install the air conditioning belt cover (Item 2) and tighten the bolts (Item 1) [Figure 266].

Install cover (Item 2) and tighten the bolts (Item 1) [Figure 265].

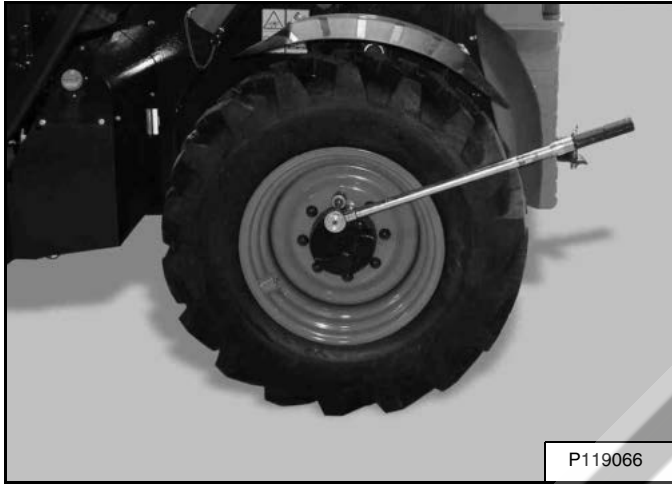
Close the engine cover.

TYRE MAINTENANCE

Wheel Nuts

See the SERVICE SCHEDULE for the service interval to check the wheel nuts. (See SERVICE SCHEDULE on Page 147.)

Figure 269



The correct wheel nut tightening torque is 360 N•m (266 ft-lb) [Figure 269].

Rotating

Check the tyres regularly for wear, damage and pressure. For the correct tyre pressure, (See Traction on Page 258.).

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 telescopic handler. 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 telescopic handler.

Wheel Replacement

Always park the machine on a level surface. STOP the engine.

! WARNING

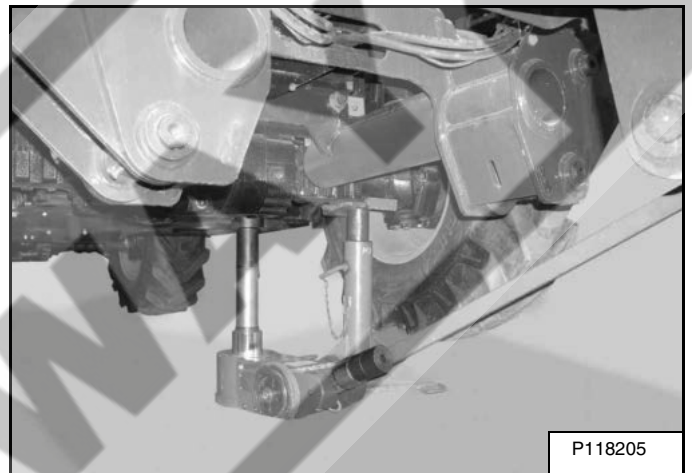
**MACHINE FALLING OR MOVING CAN CAUSE
SERIOUS INJURY OR DEATH**

Put jackstands under the front and rear of the machine before running engine for service.

W-2718-0208

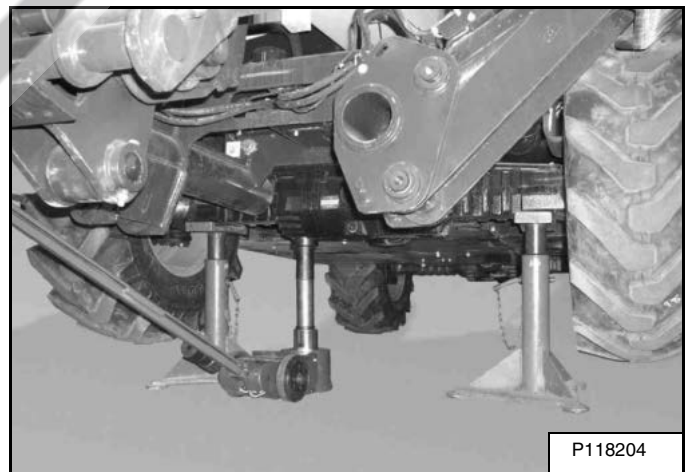
Front Wheels

Figure 270



Put the floor jack under the left side of the front axle. Lift the telescopic handler and install the first jackstand [Figure 270].

Figure 271



Put the floor jack under the right side of the front axle. Lift the telescopic handler and install the second jackstand [Figure 271].

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.

TYRE MAINTENANCE (CONT'D)

Wheel Replacement (Cont'd)

Rear Wheels

Figure 272



Put the floor jack under the centre of the rear weight. Lift the telescopic handler and install jackstands [Figure 272].

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.

Pressure

For correct inflation, (See Traction on Page 258.).



WARNING

AVOID INJURY OR DEATH

Do not inflate tyres above specified pressure. Failure to use correct tyre mounting procedure can cause an explosion which can result in injury or death.

W-2078-EN-0909

IMPORTANT

Inflate tyres to the MAXIMUM pressure shown on the sidewall of the tyre. DO NOT mix brands of tyres used on the same machine.

I-2057-EN-1010

LUBRICATING THE TELESCOPIC HANDLER

Lubrication Locations

Lubricate as specified in the SERVICE SCHEDULE for the best performance of the machine. (See SERVICE SCHEDULE on Page 147.)

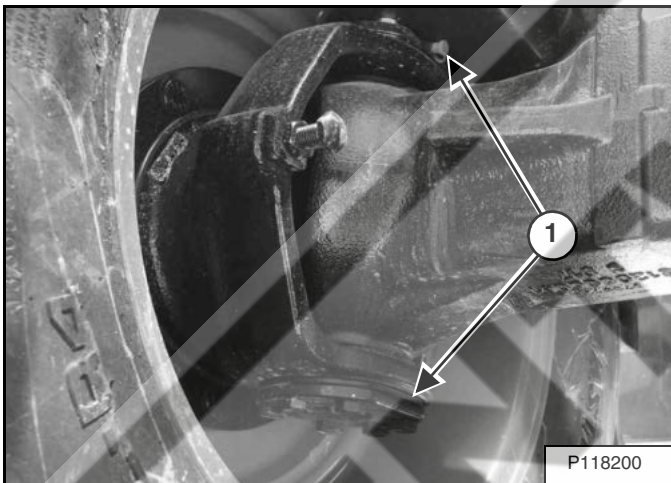
Record the operating hours each time you lubricate so that it is performed at the correct interval.

Always use a good quality lithium based multipurpose grease. (See Lubricants, Fuel And Fluids on Page 11.) Apply lubricant until extra grease shows.

Remove the attachment from the telescopic handler before lubricating. (See Installing And Removing The Attachment (Manual Lock) on Page 110.) (See Installing And Removing The Attachment (Hydraulic Lock) on Page 113.)

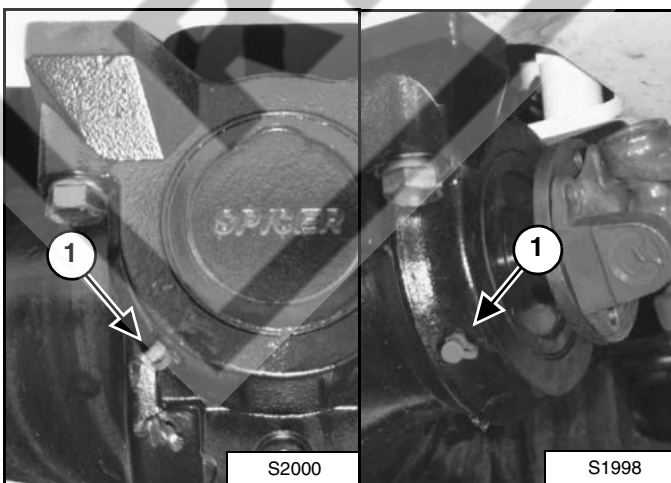
Lubricate the following locations on the telescopic handler:

Figure 273



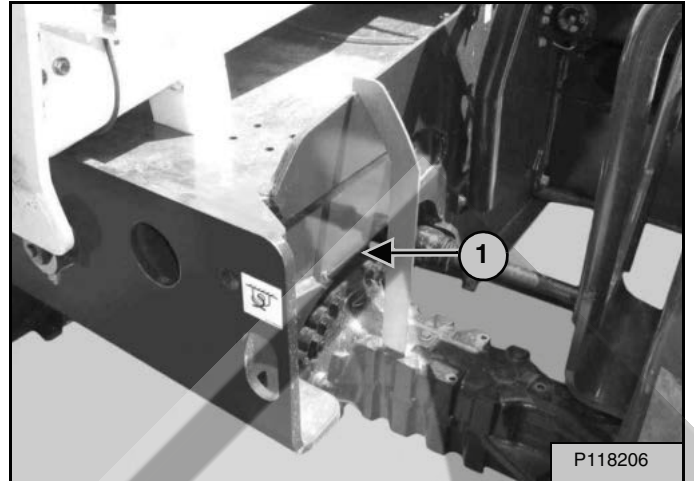
Axle Pivots - Top and bottom (Item 1) [Figure 273] all four wheels.

Figure 274



Axle Oscillation - Rear Axle (Item 1) [Figure 274].

Figure 275



Axle Oscillation - Front Axle (Item 1) [Figure 275].

Figure 276

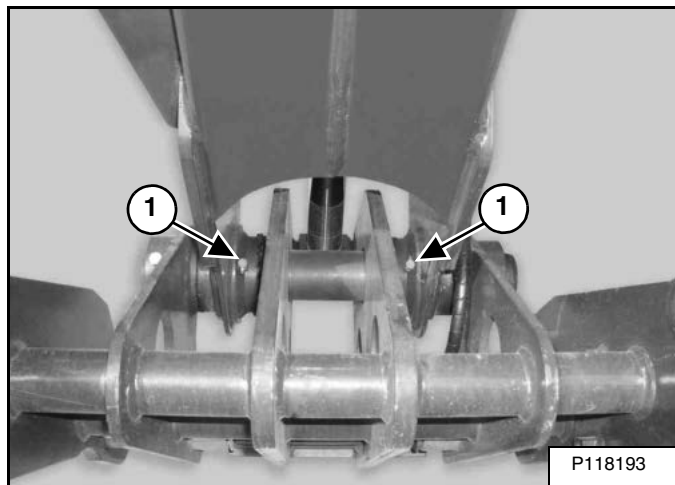


Frame-Levelling Cylinder (if equipped) - Rod End (Item 1) [Figure 276].

LUBRICATING THE TELESCOPIC HANDLER (CONT'D)

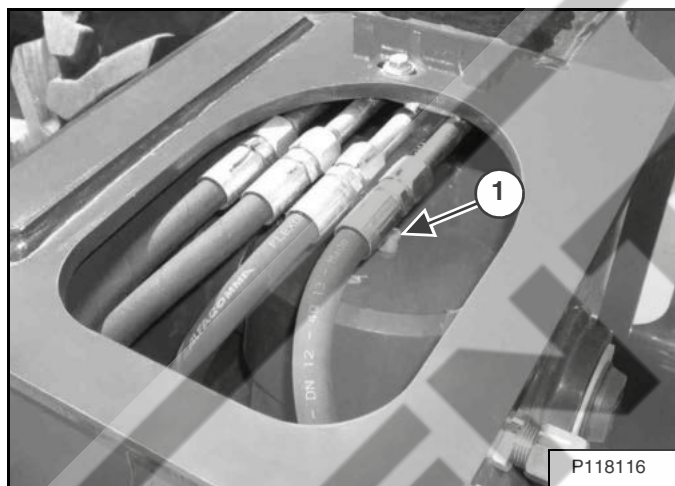
Lubrication Locations (Cont'd)

Figure 277



Attachment Carrier Pivot (Item 1) [Figure 277] (Both Sides).

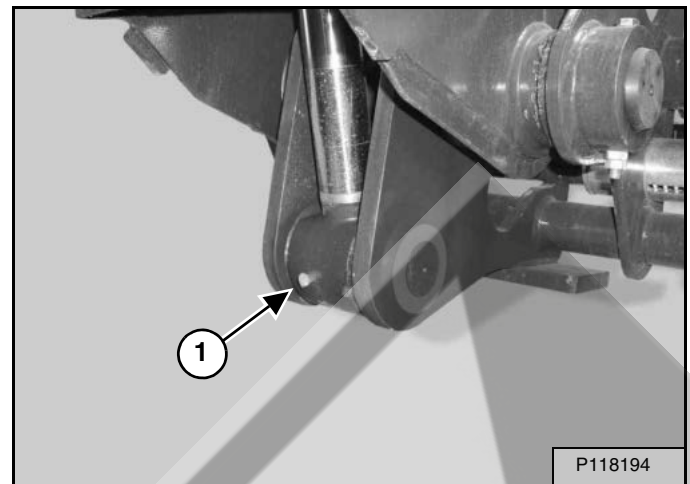
Figure 278



Remove the cover.

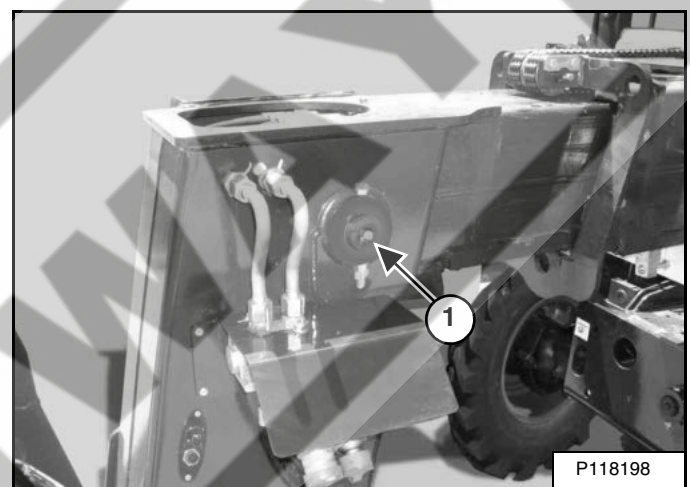
Tilt Cylinder Base End (Item 1) [Figure 278].

Figure 279



Tilt Cylinder Rod End (Item 1) [Figure 279].

Figure 280

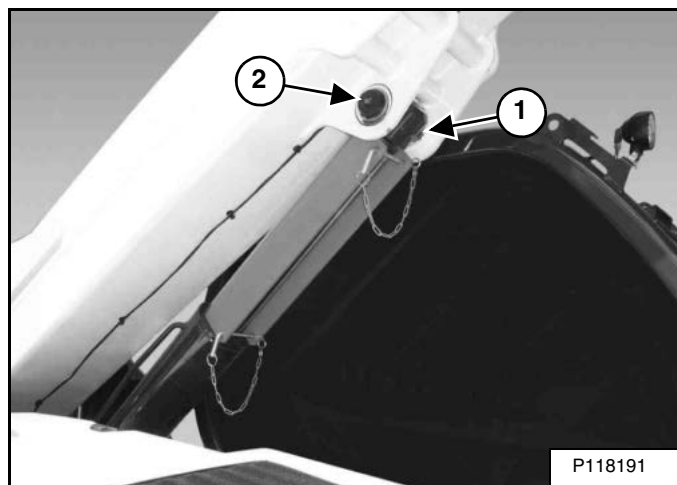


Tilt Cylinder pivot (Item 1) [Figure 280] (both sides).

LUBRICATING THE TELESCOPIC HANDLER (CONT'D)

Lubrication Locations (Cont'd)

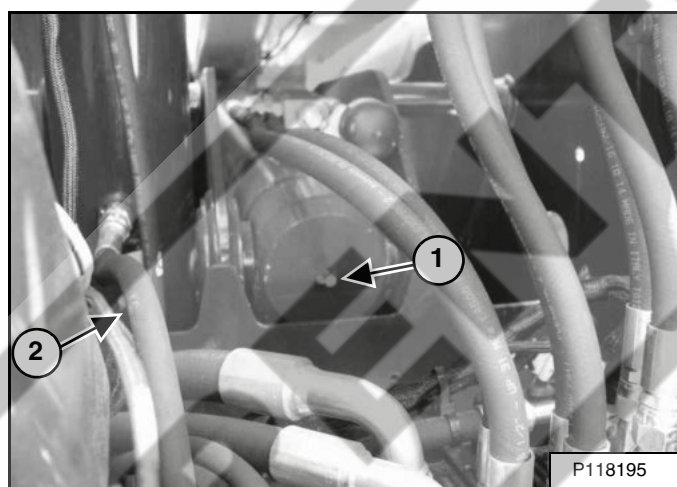
Figure 281



NOTE: Raise the boom and install the approved Boom Stop before lubricating the Boom and Self-levelling Cylinders. (See Installing The Approved Boom Stop on Page 153.)

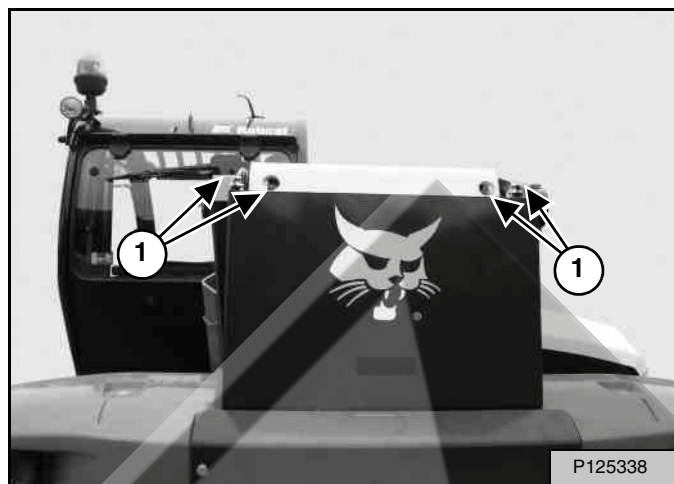
Boom Cylinder Rod End (Item 1) and Pivot (Item 2) [Figure 281].

Figure 282



Boom Cylinder Base End (Item 1), Self-levelling Cylinder Base End (Item 2) [Figure 282].

Figure 283



Boom Pivot (Item 1) [Figure 283] (Four Places).

Figure 284

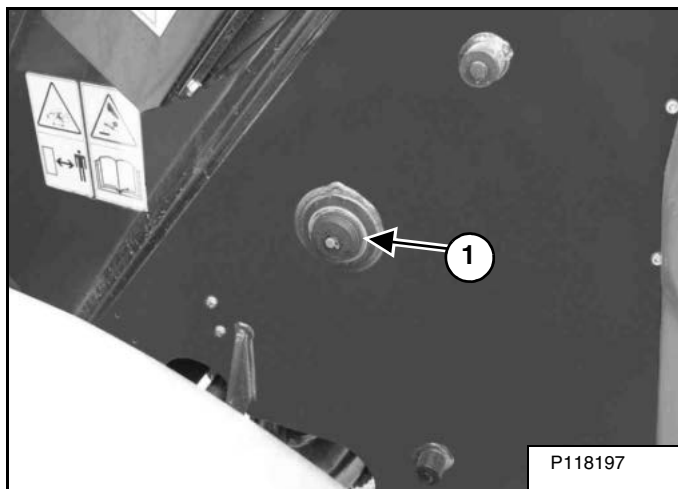


Self-levelling cylinder rod end (Item 1) [Figure 284].

LUBRICATING THE TELESCOPIC HANDLER (CONT'D)

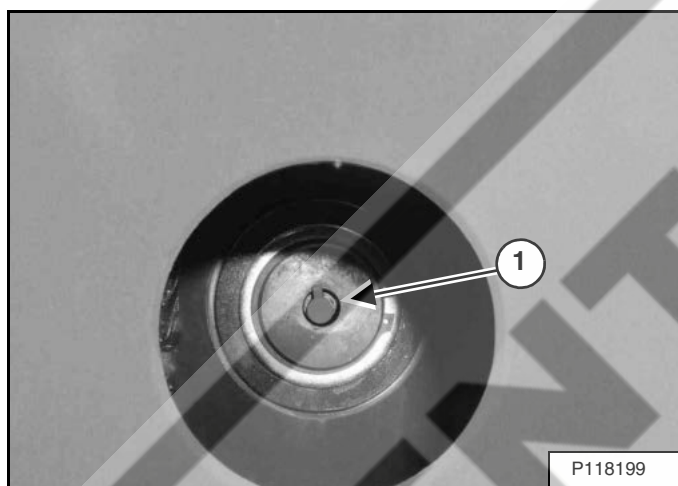
Lubrication Locations (Cont'd)

Figure 285



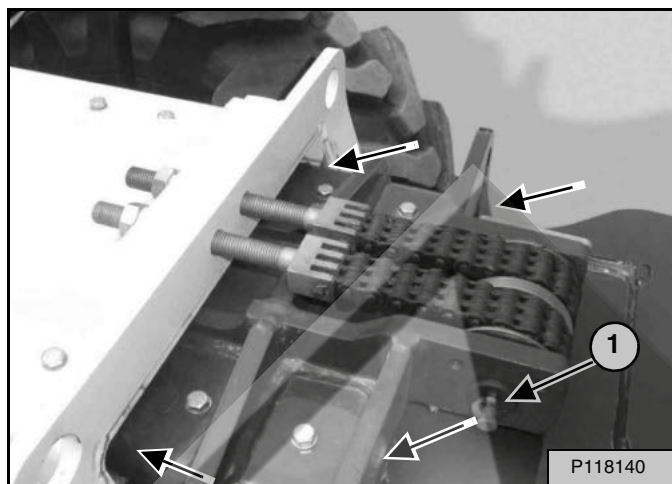
Self-levelling cylinder pivot pin (Item 1) [Figure 285].

Figure 286



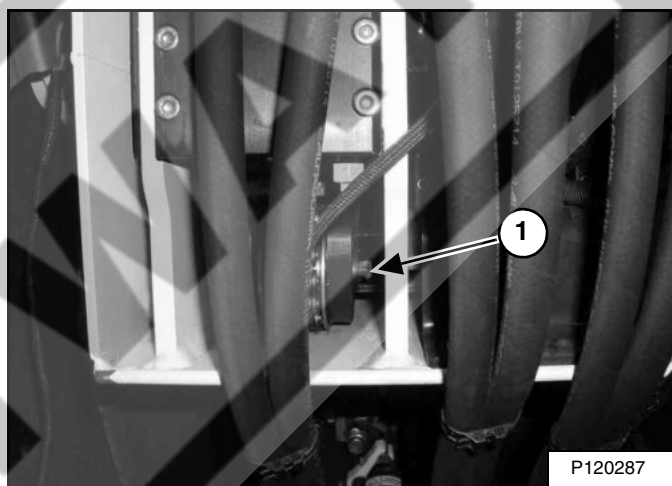
Boom cylinder pivot pin (Item 1) [Figure 286] located on the frame by the right rear wheel.

Figure 287



Boom Slide (Eight Places), Front Chain Pulley Pivot (Item 1) [Figure 287].

Figure 288



Rear Chain Pulley Pivot (Item 1) [Figure 288].

LUBRICATING THE TELESCOPIC HANDLER (CONT'D)

Lubrication Locations (Cont'd)

Front Pads Lubrication

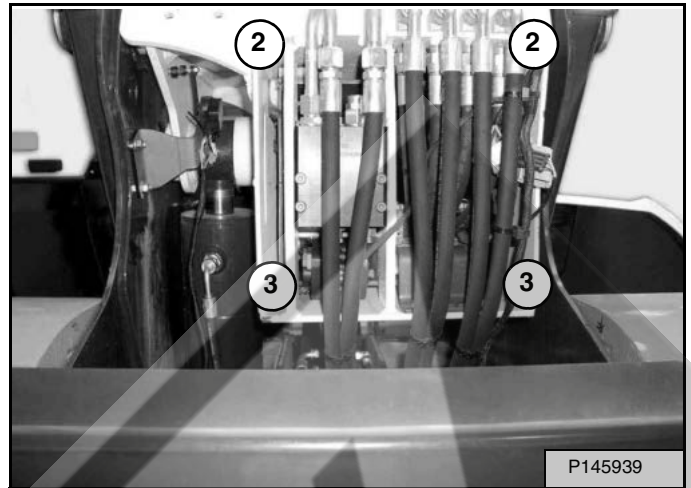
Fully extend and lower the boom.

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 65.) Stop the engine and exit the telescopic handler. (See STOPPING THE ENGINE AND LEAVING THE TELESCOPIC HANDLER on Page 93.)

Use a brush to lubricate the outside of the inner booms.

Rear Pads Lubrication

Figure 289



Top rear pads (Item 2) (four locations) [Figure 289] can be greased by using a greaser.

To lubricate the bottom rear pads (Item 3) (four locations) [Figure 289] that are not accessible in the above step:

Partially extend and fully lower boom.

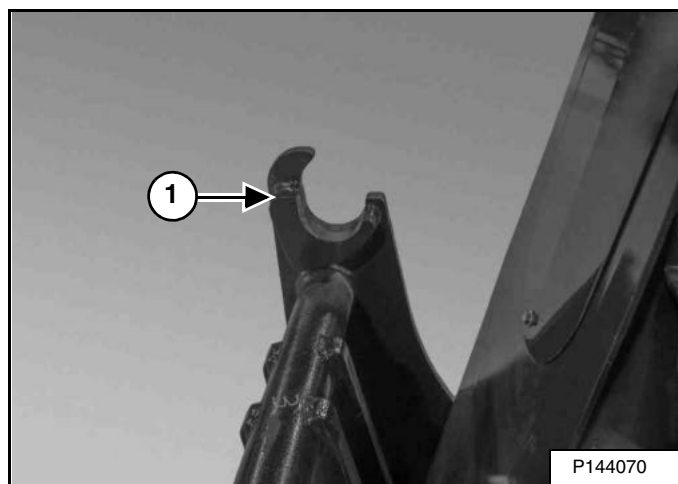
Put the Travel Direction Control in NEUTRAL. (See Travel Direction on Page 42.) Make sure the parking brake is engaged. (See PARKING BRAKE on Page 65.) Stop the engine and exit the telescopic handler. (See STOPPING THE ENGINE AND LEAVING THE TELESCOPIC HANDLER on Page 93.)

Use a brush to lubricate the inside of the booms.

ATTACHMENT CARRIER

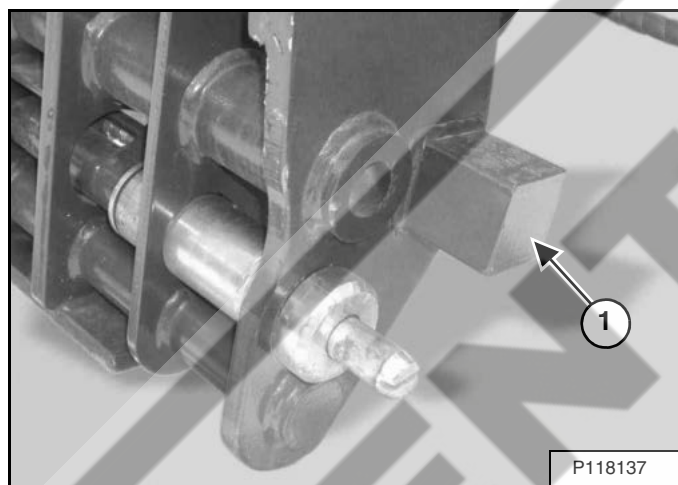
Inspection And Maintenance

Figure 290



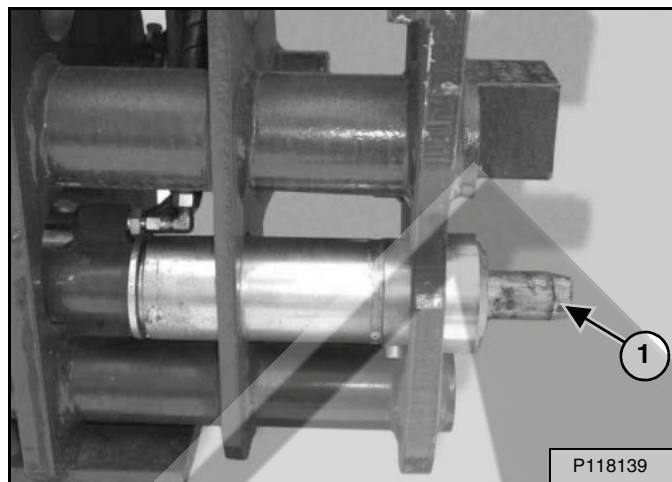
The attachment carrier mounting hooks (Item 1) [Figure 290] (both sides) must not be damaged or worn. Inspect attachment carrier condition. Replace as needed.

Figure 291



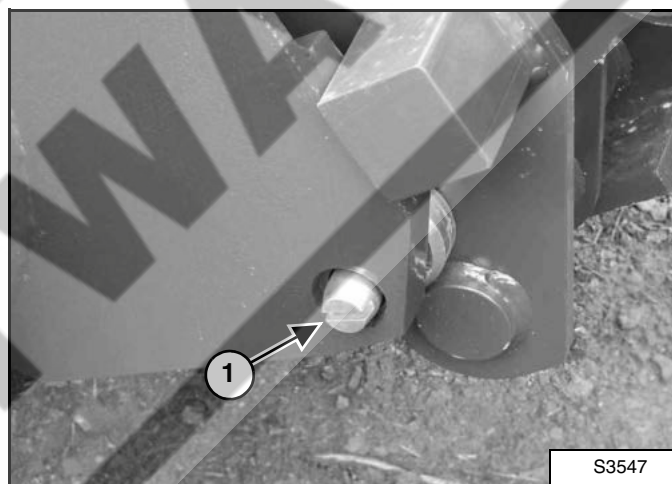
The stop block (Item 1) [Figure 291] (both sides) must not be damaged or worn. Inspect stop plate condition. Replace as needed.

Figure 292



The telescopic handler attachment hydraulic locking pins (if equipped) (Item 1) [Figure 292] (both sides) must move freely. The pins must not be bent or the ends deformed.

Figure 293



The pins (if equipped) (Item 1) [Figure 293] (both sides) must extend through the holes in the attachment mounting frame.

Lubricate the attachment carrier. (See SERVICE SCHEDULE on Page 147.) (See LUBRICATING THE TELESCOPIC HANDLER on Page 191.)

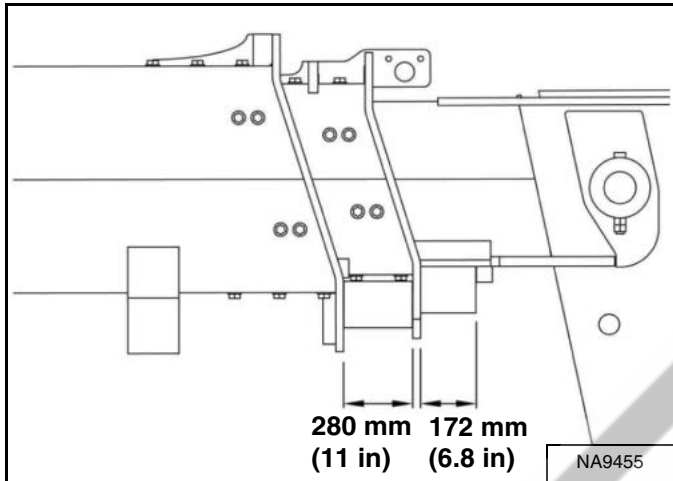
CHAIN CHECKING AND ADJUSTING PROCEDURE

Checking / Adjustment Procedure

Preparation

Two (wooden) blocks will be needed of the following dimensions: 280 mm and 172 mm (11 in and 6.8 in).

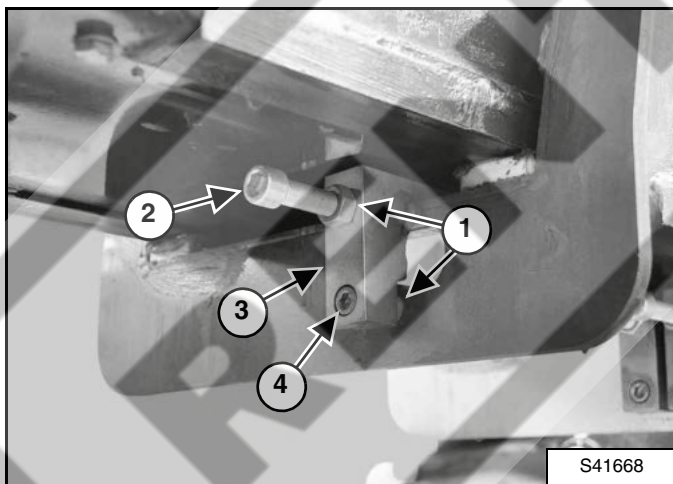
Figure 294



Retract the boom while inserting the blocks as shown in **[Figure 294]** and use clamps to prevent the boom sections from extending.

Retraction Chains Tightness

Figure 295



Loosen the lock nuts (Item 1) **[Figure 295]**.

Check the tightness of the adjustment screw (Item 2) **[Figure 295]**. The correct torque value is 30 N•m (22 ft-lb).

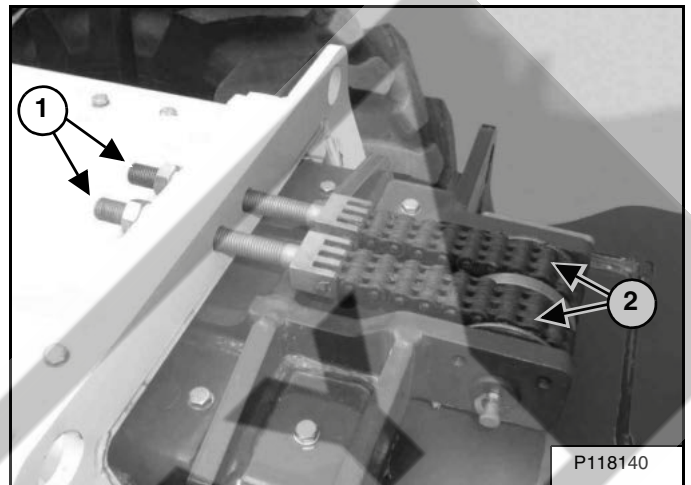
Tighten the adjustment screws as required. The chain anchor (Item 3) must stay perpendicular to the bottom of the intermediate boom section. Re-position the chain anchor as required using the screw (Item 4) **[Figure 295]** and lock nut to position the anchor correctly.

Re-tighten the lock nuts.

Repeat this for the other retraction chain(s).

Extension Chains Tightness

Figure 296



Loosen the two lock nuts (Item 1) **[Figure 296]**.

Check the tightness of the adjustment nuts (located behind the lock nuts). The correct torque value is 22 N•m (16 ft-lb).

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 296]** more than the other.

Re-tighten the lock nuts.

Repeat this for the other extension chain(s).

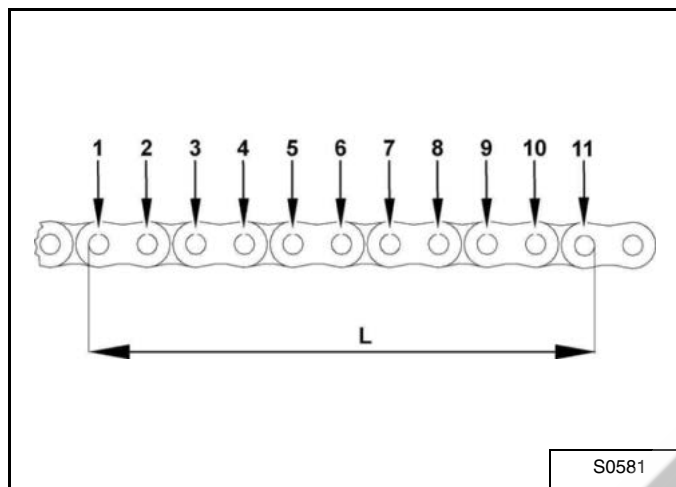
Start the engine and operate the extend/retract function through several cycles to check for proper operation. Repair as required.

CHAIN CHECKING AND ADJUSTING PROCEDURE (CONT'D)

Extension / Retraction Chain Wear Check

Start the engine. Extend the boom completely in the horizontal position. Shut off the engine.

Figure 297



As shown in **[Figure 297]**, 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.

TELESCOPIC HANDLER STORAGE AND RETURN TO SERVICE

Storage

Sometimes it can be necessary to store your Bobcat telescopic handler for an extended period of time. Below is a list of items to perform before storage.

- Thoroughly clean the telescopic handler including the engine compartment.
- Store the attachments in a dry protected shelter.
- Lubricate the telescopic handler.
- Replace worn or damaged parts.
- Park the telescopic handler 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.
- 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 telescopic handler has been in storage, it is necessary to follow a list of items to return the telescopic handler 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 telescopic handler.
- Check tyre inflation and remove blocks from under frame.
- Remove cover from exhaust pipe opening.
- 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.



Bobcat®

SYSTEM SETUP AND ANALYSIS

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Bobcat®

DIAGNOSTIC SERVICE CODES

Viewing Service Codes

Figure 298



Press the information button (Item 1) to cycle the display screen (Item 2) [Figure 298] until the engine hour menu is displayed. (See Display Screen on Page 50.)

Press and hold the information button (Item 1) [Figure 298] for three seconds until the Service Codes appear on the display screen.

If more than one Service Code is present, the codes will scroll on the display screen.

NOTE: Corrosion or loose earth can cause multiple service codes and / or abnormal symptoms. All instrument panel lights flashing, alarm sounding, headlights and rear lights flashing, could indicate a bad earth. The same symptoms could apply if the voltage is low, such as loose or corroded battery cables. If you observe these symptoms, check earth and positive leads first.

Service Codes can be either a word (Item 3) or a number (Item 4) [Figure 298]. (See Service Codes List - Gateway Controller on Page 238.)

The following letter codes may be displayed:

CODE	DESCRIPTION
AIR F	Engine air filter needs service.
CODE	The controller is asking for a password. (Keypad only.)
COLD	The engine controller has determined the engine must warm up. (Operator engine speed is limited to 1250 rpm.)
ERROR	The wrong password was entered. (Keypad only.)
FUEL	Low fuel level.
REPLY	The panel does not communicate with controllers.
SHTDN	A shutdown condition exists.
STOP	The emergency button is pressed.
WAIT	Engine preheating.

Press the information button (Item 1) [Figure 298] to return to the engine hour menu.

DIAGNOSTIC SERVICE CODES (CONT'D)

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(4.55V).	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(0.4V).	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. (3.4~4.35V)	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)
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 0.7V 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 0.7V 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. (5V)	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. (0V)	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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00002903	P0223	The accel pedal position track2 sensor signal is higher than maximum threshold. (5V)	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. (0V)	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)
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)
E00005103	P02E9	Throttle valve Feedback Position value is more than maximum operation range(4.75V).		1. Electric problem (Faulty Throttle valve, Throttle valve connector, Wiring harness Throttle valve to ECU) 2. Electric problem (Faulty ECU, ECU connector)
E00005104	P02E8	Throttle valve Feedback Position value is less than minimum operation range(0.25V).		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 0.3V 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)
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 0.3V 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)
E00005130	P02E7	If the average voltage value of the feedback position that is calculated in the closed stop is not within the limits. (4.3~4.55V)		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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00009115	P0121	The hand pedal position track1 sensor signal is higher than maximum threshold. (5V)	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. (0V)	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. (5V)	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. (0V)	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)
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 (<2.900V). 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. (0.2V)	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. (4.837V)	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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00009714	P2269	Water in Fuel sensor raw value is within the threshold to detect water (<2.900V).		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)
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 connector) 2. Electric problem (Wiring harness ECU to Oil combination sensor, Oil combination sensor) 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 connector) 2. Electric problem (Wiring harness ECU to Oil combination sensor, Oil combination sensor) 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)
E00009823	P350E	The oil combination sensor hardware detects a voltage 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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
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 (170kPa~250kPa, 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 (4.696V)	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 (0.275V)	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)
E00010203	P0108	Intake manifold pressure sensor value is more than maximum threshold (4.752V)	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 (0.249V)	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 (4.919V)	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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00010504	P00AC	Intake manifold temperature sensor value is less than minimum threshold (0.151V)	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. (128degC)		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)
E00010803	P2229	Atmospheric Pressure value is more than Maximum operation pressure (>115kPa)		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 (< 50kPa)		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. (110degC)		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 4.944V	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 0V(123mV)	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)
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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
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 (1000us)	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 (70us)	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. (16V)		1. Electric problem (Battery voltage too high / low) 2. Electric problem (Alternator, Alternator wiring harness)
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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00015711	P0002	If the rail pressure governor deviation exceeds the limiting value (Normally 70~150bar) 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)
E00015726	P190C	If the rail pressure falls below the limiting value (Normally 120bar) 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 1950bar), 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?)		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. (4.844V)		1. Electric problem (Environment temperature sensor connector) 2. Electric problem (Wiring harness ECU to environment temperature sensor, Environment temperature sensor, ECU connector, Faulty ECU)
E00017104	P0072	The raw voltage value of environment temperature sensor is below a threshold. (0.56V)		1. Electric problem (Environment temperature sensor connector) 2. Electric problem (Wiring harness ECU to environment temperature sensor, Environment temperature sensor, ECU connector, Faulty ECU)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00017200	P107D	Inlet air temperature is increased more than normal operation threshold. (125degC)		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. (4.911V)		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. (0.068V)		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(SCR) 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)
E00017400	P1183	Fuel temperature is increased more than normal operation threshold. (80degC)		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. (4.958V)		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. (0.116V)		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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
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)
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 (15V)		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 (10V)		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 (6.5V) * 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 (16V)	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)
E00044404	P0562	Battery voltage is less than minimum operation voltage (6V)	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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00044412	P1564	Power stage diagnosis disabled error due to battery voltage is more than maximum operation voltage (16V) * 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. (60sec) 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)
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 (<6V)) 2. After ECU reflash 3. Electric problem (CAN wiring harness-insulation, resistance) 2. Electric problem (ECU connector, Faulty VCU, Faulty ECU)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

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 (<6V)) 2. After ECU reflash 3. Electric problem (CAN wiring harness-insulation, resistance) 2. 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)
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. (D18#2)		1. Electric problem (Injector connector) 2. Electric problem (Wiring harness injector to ECU, Faulty injector) 3. Electric problem (Faulty ECU, ECU connector)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00065305	P0203	The injector of cylinder #3 is opened. (D18#2)		1. Electric problem (Injector connector) 2. Electric problem (Wiring harness injector to ECU, Faulty injector) 3. Electric problem (Faulty ECU, ECU connector)
E00065322	P32F0	The injector of cylinder #3 is shorted between high• side to low• side in the injector. (D18#2)		1. Electric problem (Injector connector) 2. Electric problem (Wiring harness injector to ECU, Faulty injector) 3. Electric problem (Faulty ECU, ECU connector)
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. (D18#3)		1. Electric problem (Injector connector) 2. Electric problem (Wiring harness injector to ECU, Faulty injector) 3. Electric problem (Faulty ECU, ECU connector)
E00065405	P0204	The injector of cylinder #4 is opened. (D18#3)		1. Electric problem (Injector connector) 2. Electric problem (Wiring harness injector to ECU, Faulty injector) 3. Electric problem (Faulty ECU, ECU connector)
E00065422	P32F1	The injector of cylinder #4 is shorted between high• side to low• side in the injector. (D18#3)		1. Electric problem (Injector connector) 2. Electric problem (Wiring harness injector to ECU, Faulty injector) 3. Electric problem (Faulty ECU, ECU connector)
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)
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
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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
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)
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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00107616	P0254	If the rail pressure governor deviation falls below the limiting value (Normally - 200~117bar) 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. (100bar)		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)
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. (175degC)		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. (>200kPa)	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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00138201	P018C	Fuel filter pressure is lower than the minimum threshold. (<50kPa)	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 to 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	P01C6	Fuel filter pressure raw signal value is above than maximum threshold. (4.754V)		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. (0.25V)		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)
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 to ECU, Faulty Multi-torque switch) 3. Electric problem (Faulty ECU, ECU connection)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
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 t 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)
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. (105degC)		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<6V)) 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<6V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

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<6V)) 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<6V)) 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<6V)) 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. (830degC)	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)
E00278903	P0546	Turbine inlet temperature sensor value is more than maximum threshold (3.457V)	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 (0.270V)	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. (±300degC)		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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
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)
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)
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 10sec.	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. Electric problem (Faulty Air mass flow sensor, Faulty MAP sensor)
E00324200	P1033	DPF(SCRf) inlet temperature is increased more than normal operation threshold. (830degC)		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 (3.548V)	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 (0.331V)	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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
E00324211	P2034	If the DPF(SCRf) in temperature is out of the threshold during restricted condition, fault code is raised. ($\pm 200^{\circ}\text{C}$)	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)
E00325103	P2455	The DPF differential pressure sensor signal is more than maximum threshold. (4.677V)	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. (0.274V)	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 : $<1\text{kPa}$)	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)
E00350903	P0659	The ECU sensor supply1 voltage is higher than maximum threshold. (5.2V)	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 $<6\text{V}$)) 2. Electric problem ((Sensor or actuator failure used by ECU 5V supply) 3. Electric problem (Wiring harness related ECU 5V supply) 4. Electric problem (Faulty ECU)
E00350904	P0658	The ECU sensor supply1 voltage is lower than minimum threshold. (4.8V)	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 $<6\text{V}$)) 2. Electric problem ((Sensor or actuator failure used by ECU 5V supply) 3. Electric problem (Wiring harness related ECU 5V supply) 4. Electric problem (Faulty ECU)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

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<6V)) 2. Electric problem ((Sensor or actuator failure used by ECU 5V supply) 3. Electric problem (Wiring harness related ECU 5V 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<6V)) 2. Electric problem ((Sensor or actuator failure used by ECU 5V supply) 3. Electric problem (Wiring harness related ECU 5V 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<6V)) 2. Electric problem Fault sensor or actuator used by ECU 5V supply) 3. Electric problem (Faulty wiring harness)
E00351003	P2671	The ECU sensor supply2 voltage is higher than maximum threshold. (5.2V)	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<6V)) 2. Electric problem ((Sensor or actuator failure used by ECU 5V supply) 3. Electric problem (Wiring harness related ECU 5V supply) 4. Electric problem (Faulty ECU)
E00351004	P2670	The ECU sensor supply2 voltage is lower than minimum threshold. (4.8V)	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<6V)) 2. Electric problem ((Sensor or actuator failure used by ECU 5V supply) 3. Electric problem (Wiring harness related ECU 5V 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<6V)) 2. Electric problem ((Sensor or actuator failure used by ECU 5V supply) 3. Electric problem (Wiring harness related ECU 5V supply) 4. Electric problem (Faulty ECU)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
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<6V)) 2. Electric problem ((Sensor or actuator failure used by ECU 5V supply) 3. Electric problem (Wiring harness related ECU 5V 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<6V)) 2. Electric problem Fault sensor or actuator used by ECU 5V supply) 3. Electric problem (Faulty wiring harness)
E00351103	P2686	The ECU sensor supply3 voltage is higher than maximum threshold. (5.2V)	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<6V)) 2. Electric problem ((Sensor or actuator failure used by ECU 5V supply) 3. Electric problem (Wiring harness related ECU 5V supply) 4. Electric problem (Faulty ECU)
E00351104	P2685	The ECU sensor supply3 voltage is lower than minimum threshold. (4.8V)	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<6V)) 2. Electric problem ((Sensor or actuator failure used by ECU 5V supply) 3. Electric problem (Wiring harness related ECU 5V 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<6V)) 2. Electric problem ((Sensor or actuator failure used by ECU 5V supply) 3. Electric problem (Wiring harness related ECU 5V 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<6V)) 2. Electric problem ((Sensor or actuator failure used by ECU 5V supply) 3. Electric problem (Wiring harness related ECU 5V supply) 4. Electric problem (Faulty ECU)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
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)
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	If particulate filter regeneration is disabled, i.e., if bit 0 of PFItRgn_stLck = TRUE, an error will be detected.		- DPF regeneration could not be success with max allowable time (lock up mode) - internal fault
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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
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)
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)
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)
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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
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. (4.835V)	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)
E00531304	P0192	The rail pressure sensor raw signal is less than minimum threshold. (0.365V)	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)
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)
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.
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.

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
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)
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.

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
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)
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)
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. (105kPa(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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
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)
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)
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)
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<6V)) 3. Electric problem (ECU)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
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<6V)) 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<6V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
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)
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)
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)
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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
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<6V)) 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 (166mV), 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<6V)) 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<6V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
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<6V)) 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<6V)) 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(4.702V) and maximum (4.799V) 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<6V)) 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<6V)) 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<6V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

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<6V)) 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<6V)) 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<6V)) 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<6V)) 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<6V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
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<6V)) 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<6V)) 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<6V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
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<6V)) 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<6V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)
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)

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
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)
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 40hrs after healing the SCR inducement fault. If the SCR inducement fault is occurred within 40hrs, 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 40hrs after healing the SCR inducement fault. If the SCR inducement fault is occurred within 40hrs, 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 40hrs after healing the SCR inducement fault. If the SCR inducement fault is occurred within 40hrs, the time of engine speed and torque de-rate process is shorten than normal SCR inducement process.		1. SCR Inducement Repeat offense Level3

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Engine Controller (Cont'd)

E-CODE	P-CODE	DESCRIPTION	RESULTS	CHECK
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<6V)) 2. Electric problem (Wiring harness related ECU power and ground, ECU connector) 3. Electric problem (Faulty ECU)

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DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Gateway Controller

The gateway controller is located in the cab, behind the right Instrument and Indicator Panel.

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
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 reduced
M0811	Engine coolant temperature extremely high	Engine torque reduced
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
M1602	Front Alignment Lamp output error ON	All functions allowed
M1603	Front Alignment Lamp output error OFF	All functions allowed
M1702	Rear Alignment Lamp output error ON	All functions allowed
M1703	Rear Alignment Lamp output error OFF	All functions allowed
M1821	Frame levelling pot out of range high	Frame levelling movement disabled

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Gateway Controller (Cont'd)

CODE	DESCRIPTION	RESULTS
M1822	Frame levelling pot out of range low	Frame levelling movement 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 open circuit	Engine does not crank
M2302	Starter relay error ON	On ignition, starter is active but engine does not crank
M2303	Starter relay error OFF	Engine does not crank
M2405	Crab valve output short to battery	Drive reduced
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
M2648	Steer Mode switch Multiple inputs active	All functions allowed
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 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
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 reduced
M4109	Alternator voltage low	All functions allowed
M4110	Alternator voltage high	All functions allowed
M4304	Keypad KSS no communication	Engine cranking not allowed (if previously locked)
M4405	Brake fail electric lamp short to battery	Brake fail electric lamp (orange) disabled
M4505	Brake fail pressure lamp short to battery	Brake fail pressure lamp (red) disabled
M4721	Sensor Supply out of range high	Impact on Inching function
M4722	Sensor Supply out of range low	Impact on Inching function
M4805	Worklights output error on	Worklights permanently lighted on
M4806	Worklights output error off	Worklights not available

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Gateway Controller (Cont'd)

CODE	DESCRIPTION	RESULTS
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
M5810	Fuel temperature high	Engine torque limited by ECU from fuel temperature > 86 °C (187 °F)
M5811	Fuel temperature extremely high	Engine torque limited by ECU from fuel temperature > 88 °C (190 °F)
M5815	Fuel temperature in shutdown	Engine shutdown by ECU from fuel temperature > 90 °C (194 °F)
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
M8021	Throttle pedal analog signal out or range high	If error E000091-19 is also active: ECU controller will set the engine speed to 1200 rpm
M8022	Throttle pedal analog signal out or range low	If error E000091-19 is also active: ECU controller will set the engine speed to 1200 rpm
M8028	Throttle pedal in error (redundancy error)	If error E000091-19 is also active: ECU controller will set the engine speed to 1200 rpm
M8228	Inhibit REGEN switch in failure	Inhibit REGEN function not available
M8328	Force REGEN switch in failure	Force REGEN function not available
M8450	REGEN requested but inhibited	
M8602	Receiver input error ON	
M8703	Attachment run input error OFF	
M8848	Selection mode switch multiple	
M8928	ECO mode switch in error	ECO mode is disabled
M9999	Bad Constant Data table	Gateway function disabled; Not able to crank the engine

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Drive Controller

The drive controller is located between the boom and the cab, next to the front frame fuse box.

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
D0721	Hydraulic fluid temperature Out of Range high	All functions disabled
D0722	Hydraulic fluid temperature Out of Range low	All functions disabled
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	Parking brake pressure low	Drive disabled (parking brake detected applied)
D0910	Parking brake pressure high	All functions allowed
D0911	Parking brake pressure extremely high	All functions allowed
D0921	Parking brake pressure out of range high	All functions allowed
D0922	Parking 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	Parking brake is applied
D1032	Passive brake output overcurrent	Parking brake is applied (feedback would open to protect the controller)
D1128	Parking brake dashboard switch in error	Activation / deactivation of parking brake with the switch is not possible
D1145	Parking brake dashboard switch disagree	Activation / deactivation of parking brake with the switch is not possible
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
D1802	Aux diverter output valve error ON	Auxiliary / Power quick-tech / Frame Levelling disabled
D1803	Aux diverter output valve error OFF	Auxiliary / Power quick-tech / Frame Levelling disabled
D1807	Aux diverter output open circuit	Auxiliary / Power quick-tech / Frame Levelling disabled

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Drive Controller (Cont'd)

CODE	DESCRIPTION	RESULTS
D1825	Aux diverter output unresponsive	Auxiliary / Power quick-tech / Frame Levelling disabled
D1833	Aux diverter output failure	Auxiliary / Power quick-tech / Frame Levelling disabled
D1902	Aux diverter relay feedback error ON	Auxiliary / Power quick-tech / Frame Levelling disabled
D1903	Aux diverter relay feedback error OFF	Auxiliary / Power quick-tech / Frame Levelling 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
D3204	Workgroup controller no communication	Aux disabled
D3304	Gateway controller no communication	All functions disabled
D3404	Display controller no communication	All functions disabled
D3604	Controller no communication	Drive disabled

DIAGNOSTIC SERVICE CODES (CONT'D)**Service Codes List - Drive Controller (Cont'd)**

CODE	DESCRIPTION	RESULTS
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
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
D4402	Power quick-tach output error ON	Power quick-tach function not available
D4403	Power quick-tach output error OFF	Power quick-tach function not available
D4407	Power quick-tach output open circuit	Power quick-tach disabled
D4433	Power quick-tach output failure	Power quick-tach disabled
D4502	Power quick-tach relay feedback error OFF	Power quick-tach disabled
D4503	Power quick-tach relay feedback error OFF	Power quick-tach disabled
D4528	Power quick-tach switch in error	Power quick-tach disabled
D4621	Voltage sensor 5V Out of Range high	All functions disabled
D4622	Voltage sensor 5V Out of Range low	All functions disabled
D4705	Frame levelling output short to battery	Auxiliary / Power quick-tach / Frame Levelling disabled
D4706	Frame levelling output short to ground	Frame levelling control not available
D4707	Frame levelling output open circuit	Frame levelling control not available
D4724	Frame levelling output not in neutral	Auxiliary / Power quick-tach / Frame Levelling disabled
D5421	Auxiliary spool sensor out of range high	Auxiliary / Power quick-tach / Frame Levelling disabled
D5422	Auxiliary spool sensor out of range low	Auxiliary / Power quick-tach / Frame Levelling disabled
D5424	Auxiliary spool sensor not in neutral	Auxiliary / Power quick-tach / Frame Levelling disabled
D5425	Auxiliary spool sensor unresponsive	Auxiliary / Power quick-tach / Frame Levelling disabled
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
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

DIAGNOSTIC SERVICE CODES (CONT'D)**Service Codes List - Drive Controller (Cont'd)**

CODE	DESCRIPTION	RESULTS
D5986	Overspeed failure	
D6202	Creep light error ON	All functions allowed
D6203	Creep light error OFF	All functions allowed
D6302	Creep switch error ON	All functions allowed
D6824	Frame levelling switch out of neutral	Frame levelling disabled
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 extremely low	Emergency brake enabled, Drive reduced
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
D7509	Parking brake reserve pressure low	All functions allowed
D7605	Auxiliary Female output short to battery	Auxiliary Female disabled
D7606	Auxiliary Female output short to ground	Auxiliary Female disabled
D7607	Auxiliary Female output open circuit	Auxiliary Female disabled
D7632	Auxiliary Female output overcurrent	Auxiliary Female disabled
D7705	Auxiliary Male output short to battery	Auxiliary Male disabled
D7706	Auxiliary Male output short to ground	Auxiliary Male disabled
D7707	Auxiliary Male output open circuit	Auxiliary Male disabled
D7732	Auxiliary Male output overcurrent	Auxiliary Male disabled
D9199	Swash plate neutral range calibration required (drive pump)	All functions allowed
D9299	Swash plate maximal range calibration required (drive pump)	All functions allowed
D9999	Bad constant data Table	Not applicable

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Workgroup Controller

The workgroup controller is located in the rear frame.

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
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

DIAGNOSTIC SERVICE CODES (CONT'D)**Service Codes List - Workgroup Controller (Cont'd)**

CODE	DESCRIPTION	RESULTS
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
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 spool sensor out of range high	Extend and Retract disabled
W2822	Extend spool sensor out of range low	Extend and Retract disabled
W2824	Extend spool sensor not in neutral	Extend and Retract disabled
W2825	Extend spool sensor unresponsive	All functions allowed
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 flashes fast. 3 beeps every 10 seconds at transmitter.
W4205	Remote Left Joystick X Axis Out Of Neutral	Manbasket mode error Orange LED on transmitter flashes fast. 3 beeps every 10 seconds at transmitter.

DIAGNOSTIC SERVICE CODES (CONT'D)**Service Codes List - Workgroup Controller (Cont'd)**

CODE	DESCRIPTION	RESULTS
W4206	Remote Right Joystick X Axis Out Of Neutral	Manbasket mode error Orange LED on transmitter flashes fast. 3 beeps every 10 seconds at transmitter.
W4207	Remote Left Joystick Y Axis Out Of Neutral	Manbasket mode error Orange LED on transmitter flashes fast. 3 beeps every 10 seconds at transmitter.
W4208	Remote Right Joystick Y Axis Out Of Neutral	Manbasket mode error Orange LED on transmitter flashes fast. 3 beeps every 10 seconds at transmitter.
W4215	Remote Left Joystick X axis in error	Manbasket mode error Orange LED on transmitter flashes fast. 3 beeps every 10 seconds at transmitter.
W4216	Remote Right Joystick X axis in error	Manbasket mode error Orange LED on transmitter flashes fast. 3 beeps every 10 seconds at transmitter.
W4217	Remote Left Joystick Y axis in error	Manbasket mode error Orange LED on transmitter flashes fast. 3 beeps every 10 seconds at transmitter.
W4218	Remote Right Joystick Y axis in error	Manbasket mode error Orange LED on transmitter flashes fast. 3 beeps every 10 seconds at transmitter.
W4621	Inclinometer sensor 5V supply out of range high	Workgroup disabled
W4622	Inclinometer sensor 5V supply out of range low	Workgroup disabled
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
W8611	Winch overloaded	WINCH flashing in the display screen for 5 s. Boom up, extend, tilt in and aux (hook up) are disabled.
W8628	Winch inputs in error	Winch considered overloaded
W9999	Workgroup controller bad table	Not applicable

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - Display Controller

CODE	DESCRIPTION	RESULTS
L0102	Left panel button 1 error ON	Work lights button doesn't work Cannot access to steering mode calibration menu and battery voltage
L0202	Left panel button 2 error ON	Joystick lockout button doesn't work. Cannot change the safety valve status. Cannot access to angle calibration menu
L0302	Left panel button 3 error ON	Auxiliary button doesn't work. Cannot change the permanent flow status Cannot access to drive pump menu
L0402	Left panel button 4 error ON	Information button doesn't work Cannot change the menu displayed
L7404	Main controller no communication	No data displayed / no functions allowed from Display
L7672	Left hand panel programming error	No data displayed / no functions allowed from Display

Service Codes List - LLMI controller

CODE	DESCRIPTION	RESULTS
I0314	LLMI Undervoltage	No LLMI display - Workgroup functions reduced; Battery Voltage < 9V
I0315	LLMI Overvoltage	No LLMI display - Workgroup functions reduced; Battery Voltage > 16V
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
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

DIAGNOSTIC SERVICE CODES (CONT'D)

Service Codes List - LLMC Controller

CODE	DESCRIPTION	RESULTS
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
C3017	LLMC sensor ID error	Workgroup functions reduced; Calibrate the system
C3014	LLMC sensor offset	Workgroup functions reduced; Calibrate the system
C3015	LLMC sensor out of range	Workgroup functions reduced; Calibrate the system
C3018	LLMC sensor Rx out of delay	Workgroup functions reduced
C3016	LLMC sensor default	Workgroup functions reduced
C3113	LLMC calibration values out of range	Workgroup functions reduced; Redo the calibration correctly
C3121	LLMC calibration values Inverted	Workgroup functions reduced; Redo the calibration correctly
C3122	LLMC calibration values too close	Workgroup functions reduced; Redo the calibration correctly
C3123	LLMC calibration time-out	Workgroup functions reduced; Redo the calibration in less than 5 minutes
C0314	LLMC undervoltage	Workgroup functions reduced; Battery Voltage <9V
C0315	LLMC overvoltage	Workgroup functions reduced; Battery Voltage >16V

PASSWORD SETUP (KEYPAD PANEL)

Password Description

Master Password:

A permanent, randomly selected password set at the factory that cannot be changed. This password is used for service by the Bobcat dealer if the owner password is not known or to change the owner password.

Owner Password:

Allows for full use of the telescopic handler. Must be used to change the owner password.

NOTE: By default, the owner password is the last 5 digits of the machine serial number.

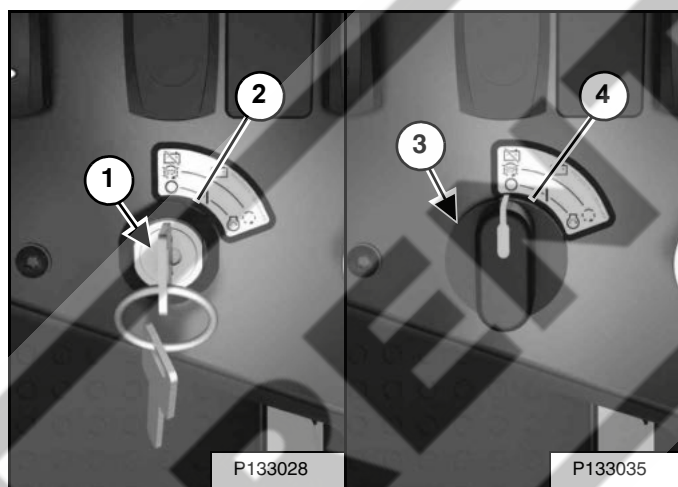
User 1 and User 2 Passwords:

By default, User 1 and User 2 Passwords are not set.

NOTE: the User 1 and User 2 passwords cannot be used to change a password or switch from Locked mode to Unlocked mode and vice versa.

Changing The Owner, User 1 And User 2 Password

Figure 299



Turn the key switch (Item 1) to the RUN (Item 2) [Figure 299] position to turn on the telescopic handlers electrical system.

OR

Turn the start switch (Item 3) to the RUN (Item 4) [Figure 299] position to turn on the telescopic handlers electrical system.

Figure 300



Press and hold the lock (Item 1) and unlock (Item 2) [Figure 300] keys for three seconds.

The display screen will show [CODE].

Enter the five digit owner or master password using the number keys (0 through 9) if locked.

The display screen will show [OWNER] for two seconds. Press the unlock key (Item 2) [Figure 300] to navigate between [OWNER], [USER 1] and [USER 2].

After two seconds, the display screen will show [ENTER].

NOTE: The lock key (Item 1) red light and the unlock key (Item 2) [Figure 300] green light will flash during the procedure.

Enter a new five digit owner, user 1 or user 2 password using the number keys (0 through 9). An asterisk will show in the display screen for each key press.

The display screen will show [AGAIN].

Enter the new five digit owner password again.

The display screen will show [STORE] if the password has been changed.

The display screen will show [ERROR] if:

- The second five digit owner user 1 or user 2 password is different from the first one.
- OR
- No number key was pressed for more than 20 seconds.
- OR
- "00000" was entered as owner user 1 or user 2 password.

NOTE: "00000" is not an acceptable owner, user 1 or user 2 password.

The system returns to its previous state. Either the lock key (Item 1) red light or the unlock key (Item 2) [Figure 300] green light will become solid.

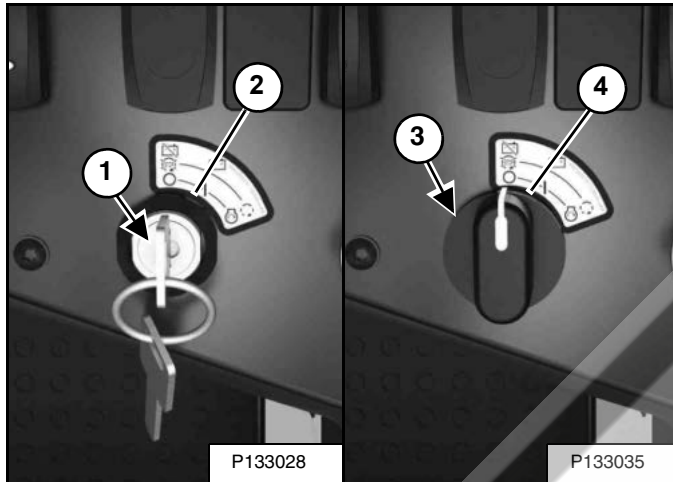
PASSWORD SETUP (KEYPAD PANEL) (CONT'D)

Password Lockout Feature

This feature allows the owner to unlock the password feature so that a password does not need to be used every time the engine is started.

NOTE: The password lockout feature does not function with a user password.

Figure 301



Turn the key switch (Item 1) to the RUN (Item 2) [Figure 301] position to turn on the telescopic handlers electrical system.

OR

Turn the start switch (Item 3) to the RUN (Item 4) [Figure 301] position to turn on the telescopic handlers electrical system.

The display screen will show [CODE].

Enter the five digit owner password using the number keys (0 through 9).

Figure 302



Press the unlock key (Item 1) [Figure 302].

The unlock key (Item 1) [Figure 302] green light will flash and the display screen will show [CODE].

Enter the five digit owner password using the number keys (0 through 9). The unlock key (Item 1) [Figure 302] green light will become solid.

The telescopic handler can now be started without using a password.

NOTE: Use the following procedure to reset the machine lock so that the telescopic handler requires a password to start the engine.

Turn the key switch (Item 1) to the RUN (Item 2) [Figure 301] position to turn on the telescopic handlers electrical system.

OR

Turn the start switch (Item 3) to the RUN (Item 4) [Figure 301] position to turn on the telescopic handlers electrical system.

Press the lock key (Item 2) [Figure 302].

The lock key (Item 2) [Figure 302] red light will flash and the display screen will show [CODE].

Enter the five digit owner password using the number keys (0 through 9). The lock key (Item 2) [Figure 302] red light will become solid.

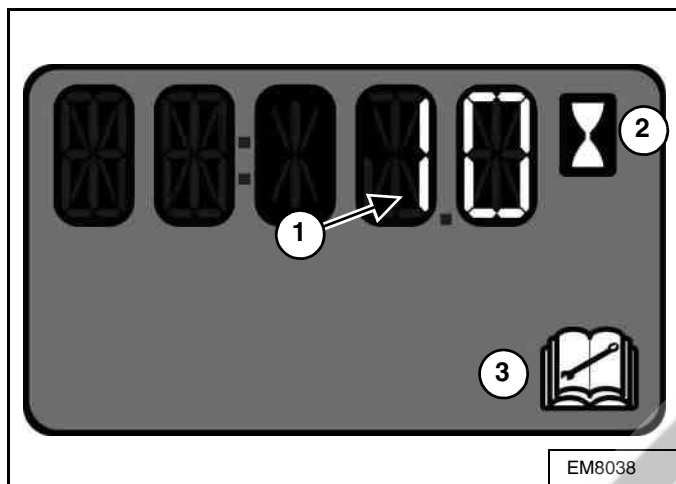
You must now enter the password every time to start the telescopic handler.

MAINTENANCE CLOCK

Description

The Maintenance Clock alerts the operator when the next service interval is due. *EXAMPLE:* The maintenance clock can be set to a 500 hour interval as a reminder for the next 500 hour planned maintenance.

Figure 303



During machine operation, a 2 beep alarm will sound when there are less than 10 hours until the next planned maintenance.

The remaining hours before maintenance is required (Item 1) will appear in the data display for 10 seconds while the service icon (Item 3) and the hourmeter icon (Item 2) [Figure 303] flash.

NOTE: The display will show negative numbers after counting down to zero.

The display will revert to the previous display and will appear for 10 seconds every time the machine is started until the maintenance clock is reset.

Setup

See your Bobcat dealer about installation of this feature.

Reset

See your Bobcat dealer to reset the maintenance clock.

SPECIFICATIONS

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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.



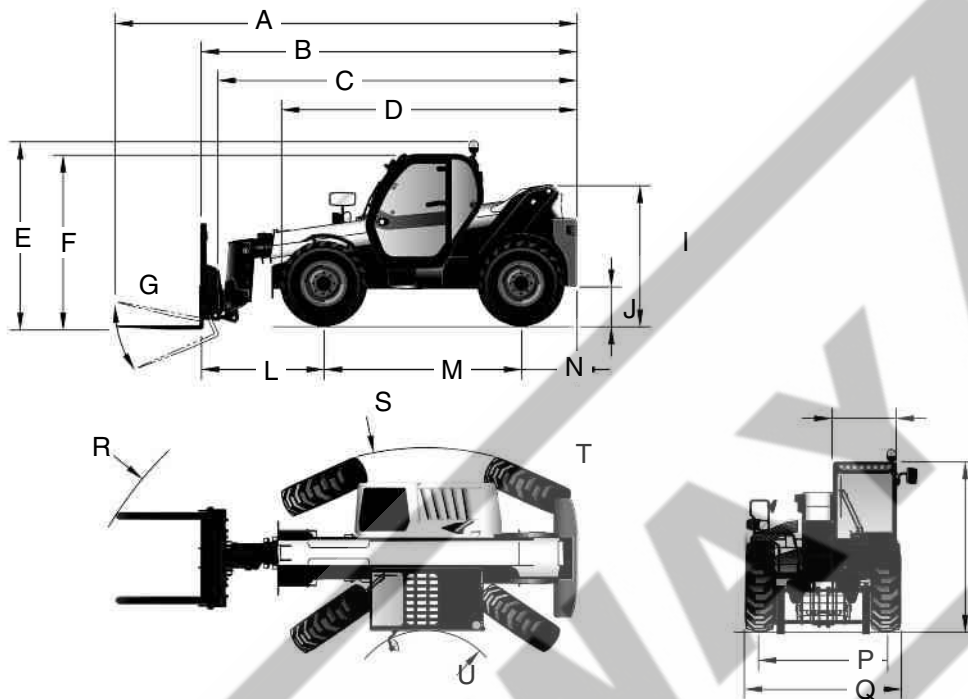
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T35.105RB / T35.105LRB TELESCOPIC HANDLER SPECIFICATIONS

Dimensions are given for machine equipped with standard tyres and can vary with other tyre types.

Where applicable, specifications conform to SAE, ASME or ISO standards and are subject to change without notice.

Machine Dimensions



(A) Overall length (with forks)	6276 mm (247.1 in)
(B) Overall length (with Quick-tach carriage)	5071 mm (199.6 in)
(C) Overall length (to carrier pin)	4936 mm (194.3 in)
(D) Overall length (to front tyres 20")	4192 mm (165.0 in)
(E) Overall height (with rotating beacon) - 20" Tyres	2584 mm (101.7 in)
(F) Overall height (with roof window wiper) - 20" Tyres	2445 mm (96.3 in)
(G) Carriage rotation angle	143°
(I) Height to back of the machine - 20" Tyres	1941 mm (76.4 in)
(J) Ground clearance - 20" Tyres	415 mm (16.3 in)
(L) Front axle to front of carriage	1422 mm (56 in)
(M) Wheelbase	2850 mm (112.2 in)
(N) Rear axle to machine rear	799 mm (31.4 in)
(O) Operator cab outside width	930 mm (36.6 in)
(P) Track width (front and rear)	1862 mm (73.3 in)
(Q) Width over standard tyres (front and rear) - 20" Tyres	2264 mm (89.1 in)
(R) External turning radius (with forks)	5116 mm (201.4 in)
(S) External turning radius (at tyres) - 20" Tyres	3765 mm (148.2 in)
(T) External turning radius (at counterweight)	-
(U) Internal turning radius	1245 mm (49.0 in)
Operator cab inside width	857 mm (33.7 in)

T35.105RB / T35.105LRB TELESCOPIC HANDLER SPECIFICATIONS (CONT'D)

Performance

Crowding force - Tilt	7800 daN (17535 lbf)
Crowding force - Lift	5100 daN (11465 lbf)
Drawbar pull (at 1km/h [0.6 mph])	5400 daN (12140 lbf) - 20" / 4500 daN (10116 lbf) - 24"
Ground pressure	max. 11 kg/cm ² (156.5 psi)
Rated load capacity*	3500 kg (7716 lb)
Capacity (at maximum height on tyres) - T35.105RB	400 kg (882 lb)
Capacity (at maximum height on tyres) - T35.105LRB	2500 kg (5512 lb)
Capacity (at maximum reach on tyres)	600 kg (1323 lb)
Tipping load (at maximum reach)	700 kg (1543 lb)
Lifting height - on 20" tyres	10,3 m (33.8 ft)
Maximum reach on 20" tyres	6,9 m (22.6 ft)
Maximum reach (at maximum height) on 20" tyres	1,5 m (4.86 ft)
Travel Speed on 20" tyres	0 - 20,5 km/h (0 - 12.7 mph)

* Frame tilt angle: 6 degrees

* Static and dynamic tests have been carried out and passed according to EN1459-1 and the relevant parts of ISO 22915.

Weights

Weight (unladen) - 20" tyres	7270 kg (16028 lb)
Front axle weight unladen	2925 kg (6449 lb)
Rear axle weight unladen	4345 kg (9579 lb)
Total weight with pallet frame and forks - 20" tyres	7580 kg (16711 lb)
Front axle weight with pallet frame and forks	3390 kg (7474 lb)
Rear axle weight with pallet frame and forks	4190 kg (9137 lb)
Total weight with pallet frame, forks and rated load - 20" tyres	11080 kg (24427 lb)
Front axle weight with pallet frame, forks and rated load	9190 kg (20260 lb)
Rear axle weight with pallet frame, forks and rated load	1890 kg (4167 lb)

T35.105RB / T35.105LRB TELESCOPIC HANDLER SPECIFICATIONS (CONT'D)

Engine

Make / Model	Bobcat Engine / 3,4L Bobcat Engine Stage 5
Fuel / Cooling	Diesel / Liquid
Horsepower (ISO 14396)	55,3 kW (74 hp) @ 2400 rpm
Torque	360 N•m (265.5 ft-lb) @ 1400 rpm
Low Idle rpm	900
High Idle rpm	2400
Number of Cylinders	4
Displacement	3,4 L (207.5 in ³)
Bore / Stroke	98 mm / 113 mm (3.85 in / 4.44 in)
Fuel Consumption (average loading)	4,9 L/h (1.3 U.S. gal/h)
Lubrication	Gear Pump Pressure System with Filter
Crankcase Ventilation	Closed Breathing
Air Cleaner	Dry replaceable paper cartridge with separate safety element
Ignition	Diesel – Compression
Air Induction	Turbo-Charged and Charged Air Cooled
Engine Coolant	Ethylene Glycol Mix -37°C (-34.6°F)
Starting Aid	Air intake heater automatically activated as needed in RUN position

Controls

Engine	Foot accelerator pedal
Starting	Key-type starter switch and shutdown
Front auxiliary	Variable thumbwheel on joystick
Hydraulics lift and tilt	Electronic joystick
Hydraulics telescope in and telescope out	Variable thumbwheel on joystick
Service brake	Pedal-activated wet multi-disc 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 ratios, and switch on joystick or lever for F-N-R
4WD / 2WD / parallel drive selection	Three-position switch on the right-hand console
Auxiliary pressure release	Bobcat coupler

T35.105RB / T35.105LRB TELESCOPIC HANDLER SPECIFICATIONS (CONT'D)

Drive System

Transmission	Hydrostatic with electronic regulation
Main drive	Two speed hydrostatic motor
Transmission oil	ELF SF3 / TOTAL DYNATRANS FR

Traction

Standard tyres	CAMSO 405/70-20 16PR (450 kPa [4,45 bar] [65 psi])
Optional tyres	CAMSO 405/70-20 14PR (450 kPa [4,45 bar] [65 psi])
Optional tyres	DUNLOP 405/70R20 168A2 152J MPT SPT9 (550 kPa [5,5 bar] [80 psi])
Optional tyres	MICHELIN 400/80-24 162A8 IND TL POWER CL (425 kPa [4,25 bar] [62 psi])
Optional tyres	DUNLOP 405/70R24 168A2 152J MPT SPT9 (520 kPa [5,2 bar] [75 psi])
Optional tyres	CAMSO 400/80-24 20PR (425 kPa [4,25 bar] [62 psi])

Steering

Steering Pump	Priority valve on hydraulic pump
Steering Mode	2WS / 4WS / CRAB

Brakes

Engine Braking	Hydrostatic
Parking and Emergency brake	Negative brake with hydraulic command
Service Brake	Oil immersed multi-disks

T35.105RB / T35.105LRB TELESCOPIC HANDLER SPECIFICATIONS (CONT'D)

Fluid Capacities

Axle front / rear	-
— Axle differential front	6,6 L (1.77 U.S. gal)
— Axle differential rear	7,4 L (1.95 U.S. gal)
— Wheel hub reduction (per wheel)	0,8 L (0.21 U.S. gal)
— Reduction box	0,8 L (0.21 U.S. gal)
Cooling system with heater	15,5 L (4.1 U.S. gal)
Engine oil with oil filter	12,6 L (3.33 U.S. gal)
Fuel tank	130 L (34.3 U.S. gal)
Hydraulic fluid tank	71 L (18.8 U.S. gal)
Hydraulic system plus tank	120 L (31.7 U.S. gal)

Hydraulic System

Pump type	Gear pump with LS valve
Pump capacity @ 2400 rpm	80 L/min (21.1 U.S. gpm)
Relief valve pressure setting	25 MPa (250 bar) (3626 psi)
Control valve type	Open centre with flow sharing and flow compensators technology
Hydraulic filter specification	Full flow filtration
Auxiliary flow @ 2400 rpm	65 L/min (17.2 U.S. gpm)
Hydraulic fluid	PETRONAS

Electrical System

Alternator	140 A
Battery	110 Ah
Starter	2,5 kW (3.4 hp)

Temperature Range

Operation and storage	-15 - +45°C (+5 - +113°F)
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Altitude

Maximum altitude	2000 m (6500 ft)
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Instrument Panel

The following functions are monitored by a combination of gauges and warning lights in the operator's line of sight. The system alerts the operator of monitored malfunctions by way of audible and visual indicators.

Gauges

- Rev counter
- Total operating hours
- Job hours
- Boom angle
- Frame-levelling angle
- Fuel gauge
- Engine coolant temperature gauge
- Soot load level

Indicators

- Front and rear wheel alignment status
- Headlight full beam
- Headlight low beam
- Position lights
- Left and right turn
- Trailer turn
- Parking brake
- Longitudinal stability level
- Windscreen wipers
- Work lights
- Flashing warning lights
- Hazard warning lights
- Hydraulic function lock
- Rear fog lights
- Heater fan

Warning lights

- Hydraulic fluid over-temperature
- Engine coolant over-temperature
- Low oil pressure
- Battery not charging
- Longitudinal stability alarm
 - Green - less than 61% of load
 - Amber - 63 to 68% of load
 - Red - over 71% of load
- Hot exhaust system temperature

Environmental

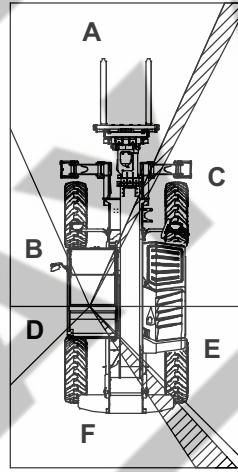
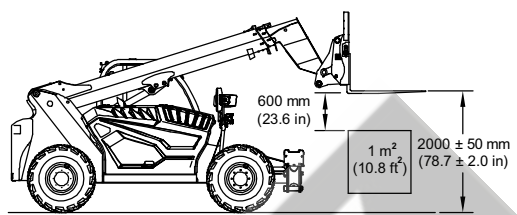
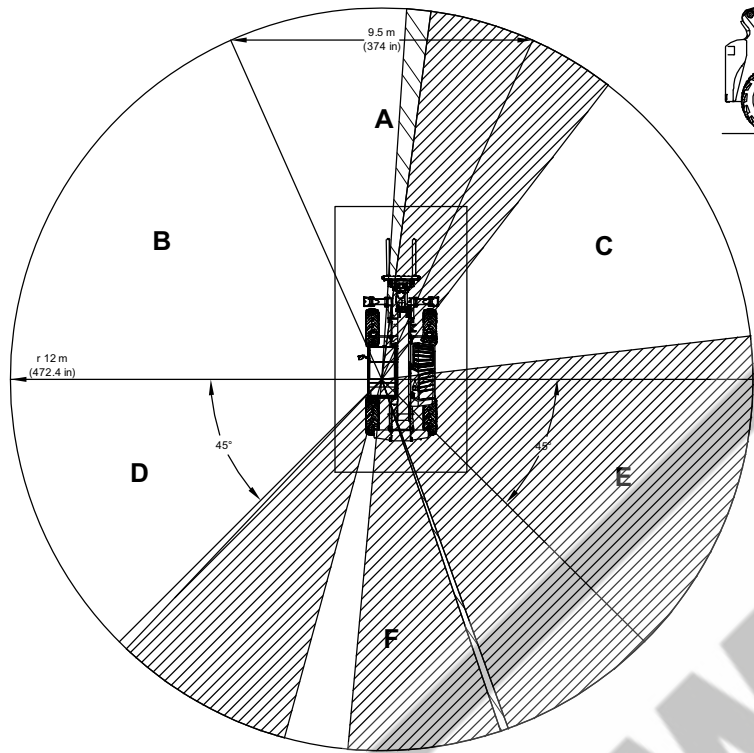
DECLARED NOISE EMISSION VALUES		
	Value	Uncertainty
Bystander noise level per Directive 2000/14/EC - LwA	104 dB(A)	N/A*
Operator noise level per EN 12053 - LpA	75 dB(A)	4 dB(A)
DECLARED VIBRATION EMISSION VALUES		
	Value	Uncertainty
Whole-body vibration per EN 13059 (24" tyres)	0,9 m/s ² (2.95 ft/s ²)	0,27 m/s ² (0.88 ft/s ²)
Hand-arm vibration	N/A*	N/A*
RMS maximum per Directive 1978/764	N/A*	N/A*
FLUORINATED GREENHOUSE GAS (F-GAS) (if equipped with HVAC)		
	Value	
F-gas Type	HFC-134a	
F-gas Mass	1,13 kg (2.5 lb)	
CO Equivalent	1,62 t (1.79 tn)	
Global Warming Potential (GWP)	1430	

* N/A - Not applicable for telescopic handler.

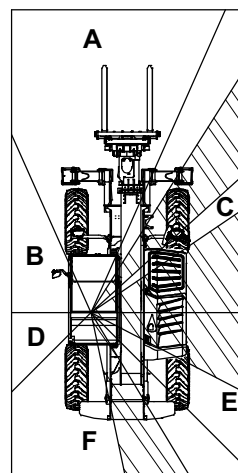
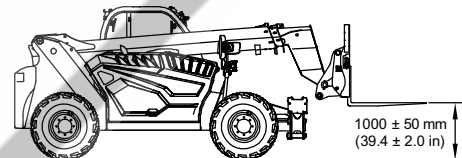
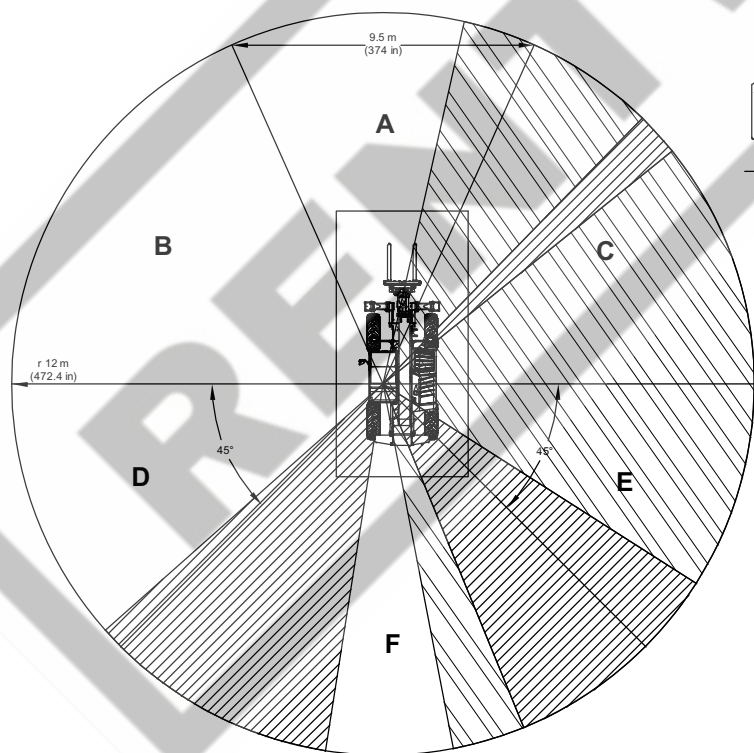
VISIBILITY DIAGRAMS

Models T35.105RB And T35.105LRB - 20" Wheels

HANDLING SUSPENDED LOADS



LOADING THE TRAILER

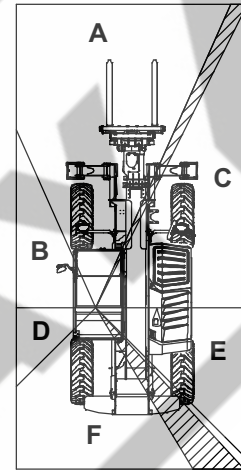
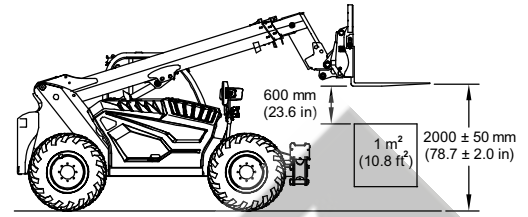
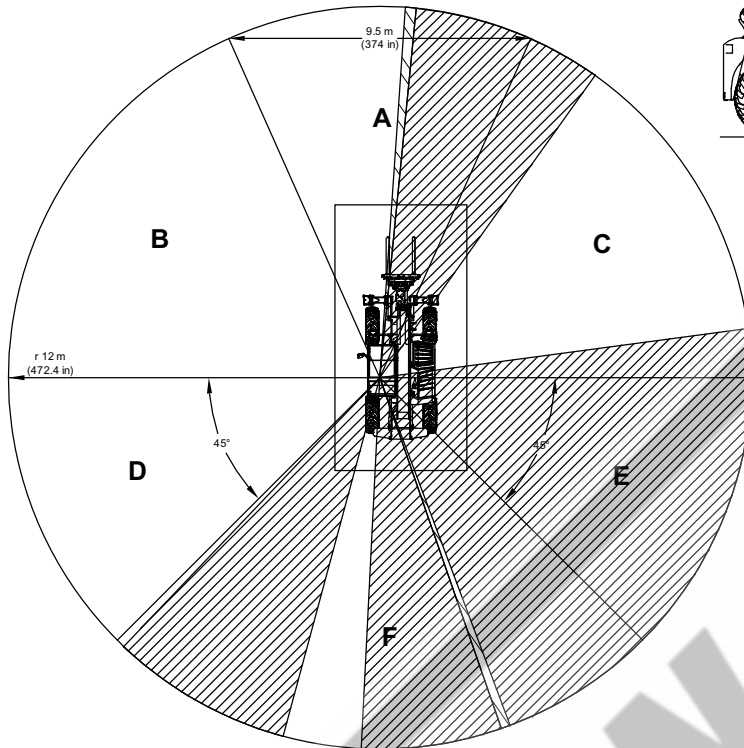


- DIRECT VISIBILITY ZONE
- INDIRECT VISIBILITY ZONE
- VISIBILITY MASKING ZONE

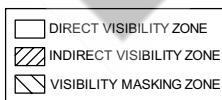
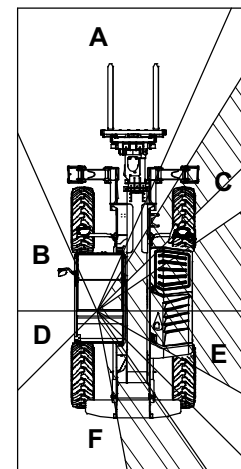
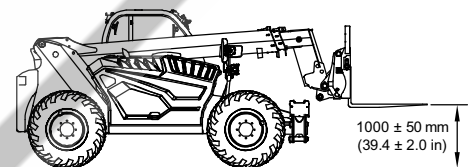
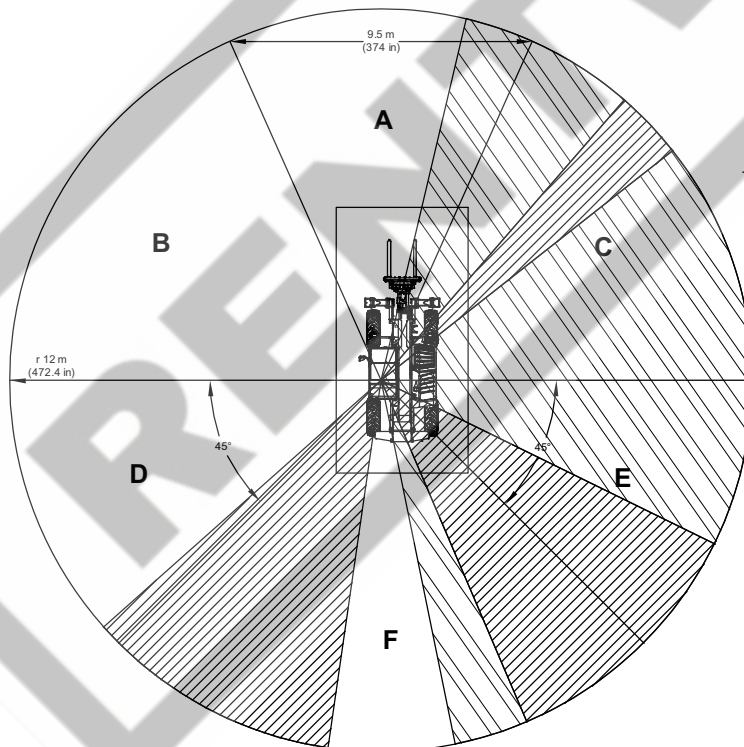
VISIBILITY DIAGRAMS (CONT'D)

Models T35.105RB And T35.105LRB - 24" Wheels

HANDLING SUSPENDED LOADS

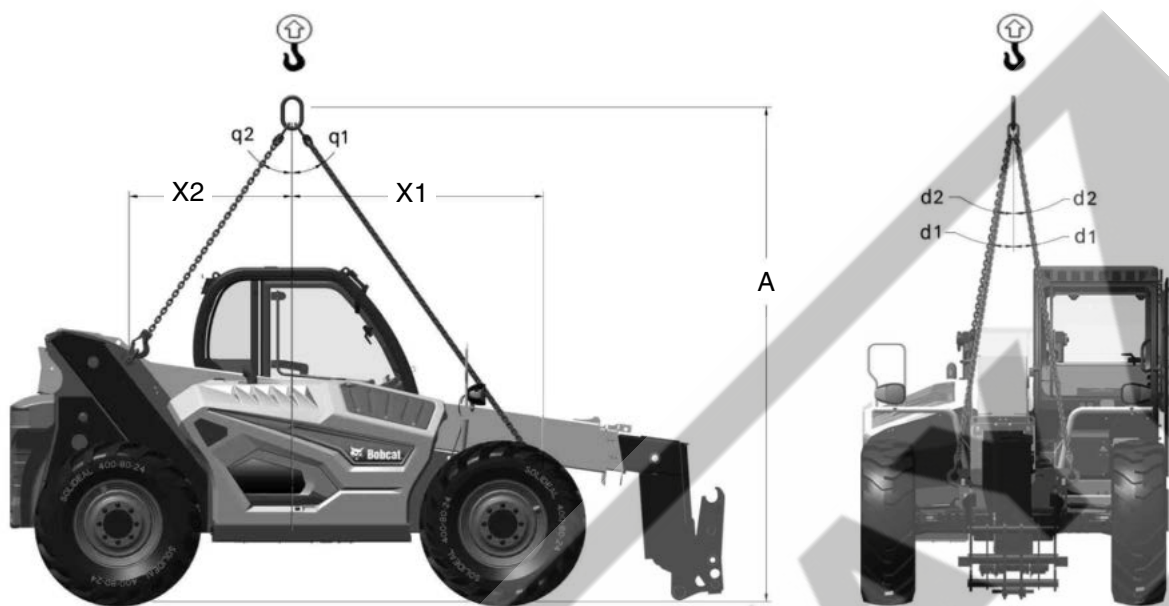


LOADING THE TRAILER



LIFTING AND TIE-DOWN SPECIFICATIONS

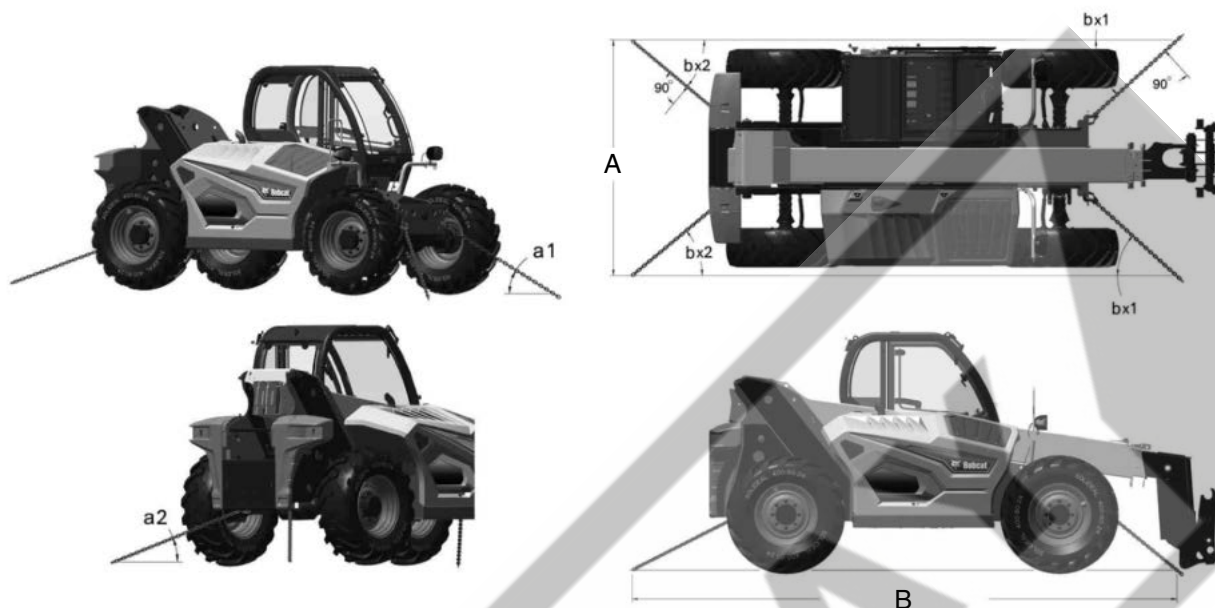
Lifting



CG location	(X1) Front	2009 mm (6.6 in)
	(X2) Rear	1081 mm (3.5 in)
Longitudinal Angle	(q1) Front	36°
	(q2) Rear	30°
Lateral Angle	(d1) Front	9°
	(d2) Rear	9°
Sling Length	Front	3440 mm (11.3 in)
	Rear	2210 mm (7.25 in)
Single Sling Force	Front	40420 N (9087 lbf)
	Rear	47980 N (10786 lbf)
(A) Lifting hook height minimum		3665 mm (144.3 in)
Operating mass		7270 kg (16028 lb)

LIFTING AND TIE-DOWN SPECIFICATIONS (CONT'D)

Tie Down



		Most compact angle	Angle for < 4000 DaN (8992 lbf) sling forces
Vertical Angle	(a1) Front	31°	24°
	(a2) Rear	22°	20°
Horizontal Angle	(bx1) Front	42°	29°
	(bx2) Rear	20°	36°
Sling Length	Front	1480 mm (58.3 in)	1910 mm (75.2 in)
	Rear	1550 mm (61.0 in)	1680 mm (66.1 in)
Single Sling Force	Front	29680 N (6672 lbf)	-
	Rear	27960 N (6286 lbf)	-
(A) Lateral distance attachment points	2450 mm (96.5 in)		
(B) Longitudinal distance attachment points	5658 mm (222.7 in) - 6415 mm (252.5 in)		
Operating mass	7270 kg (16028 lb)		



Bobcat®

WARRANTY

WARRANTY	269
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RENTWAY



Bobcat®

WARRANTY

BOBCAT® TELESCOPIC HANDLERS

Doosan Bobcat EMEA s.r.o. ("Doosan") warrants to its authorised dealers who in turn warrants to the customer that each new Bobcat Telescopic Handler will be free from defects in material and workmanship for thirty-six (36) months from the date of delivery to the customer or 3000 hours of machine usage, whichever occurs first. During the warranty period, the authorised Doosan dealer shall repair or replace, at Doosan's option, without charge for parts, labour and travel of technicians, any part of the Doosan product which fails because of defects in material or workmanship. The customer shall provide the authorised Doosan dealer with prompt written notice of the defect and allow reasonable time for replacement or repair. Doosan may, at its option, request failed parts to be returned to the factory or to any other designated location. Transportation of the Doosan product to the authorised Doosan dealer for warranty work is not the responsibility of Doosan. Service schedules must adhere to prescribed intervals and Bobcat genuine parts/lubricants must be used. The warranty does not apply to tyres, tracks or other accessories not manufactured by Doosan. For coverage on engines, consult with your Bobcat Dealer. For these non-covered items, the customer shall refer solely to the warranty, if any, of the respective manufacturers thereof, in accordance with the respective manufacturers warranty statement. Some Doosan parts are covered pro-rata depending on the expected life-time of the part. Coverage for batteries, air-conditioning refill, couplers and ignition system parts (glow plugs, fuel injection pumps, injectors) is reduced as failures generally originate from factors not under Doosan's control such as, but not limited to, prolonged storage, abuse or fuel quality. Reduced coverage is, depending on the component, limited from 50 to 500 operating hours. The warranty does not cover: (i) Oils and lubricants, coolant fluids, filter elements, brake linings, tune-up parts, bulbs, fuses, alternator fan belts, drive belts, pins, bushings and other high-wear items. (ii) Damages resulting from abuse, accidents, alterations, use of the product with any bucket or attachment not approved by Doosan, air flow obstructions, or failure to maintain or use the Doosan product according to the instructions applicable to it. (iii) Ground engaging parts such as bucket teeth and cutting edges. (iv) Fuel or hydraulic system cleaning, engine tune-up, brake inspection or adjustment. (v) Adjustments or slight defects which generally do not affect the stability or reliability of the machine.

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