Note to the Owner

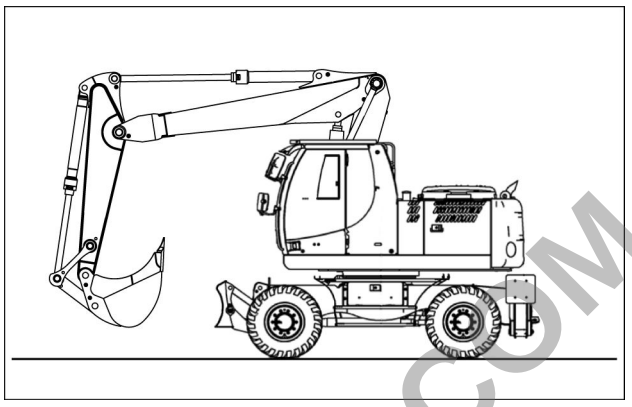
The wheeled excavators are operation hydraulic machines.

They essentially consist in a wheeled undercarriage on which a slewing bearing is mounted, which is coupled to the upper frame.

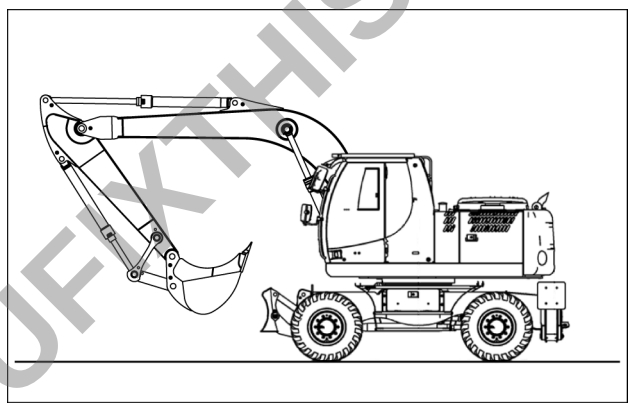
The upper frame supports the front attachment, the engine, the hydraulic components, the cab, the fuel tank and the counterweight.

When the operator activates the controls (hydraulic control levers and pedals), the hydraulic pumps rotated by the engine suck oil from the tank and convey it to the control valve, the control valve, in turn, sends it to the relevant users.

A cooling system keeps the hydraulic fluid at a normal operating temperature.



SMIL12WEX0181AA 1



SMIL12WEX0182AA 2

Designated use

The machine has been built in accordance with state-of-the-art standards and the recognized safety rules. The machine must be used in accordance with its designated use, by observing the safety and precautionary rules and by strictly following the operating instructions. Any functional disorders, especially those affecting the safety of the machine, should therefore be rectified immediately.

The Excavator is intended to be used in digging and loading operation (with bucket or grab or clamshell bucket), ground levelling (with blade when installed) and use of hydraulic hammer to break concrete or other solid material.

Notice

A different use of the excavator or of its working equipment:

- For lifting or transporting persons.
- As a working platform.
- For lifting loads without the attachment being approved for this purpose.
- For pulling slung loads.
- For driving in posts, supports, sheet-piles, without the attachment being approved for this purpose.

Is considered contrary to the designated use.

Improper use may cause injury or life-threatening risks for the operator and for other persons.

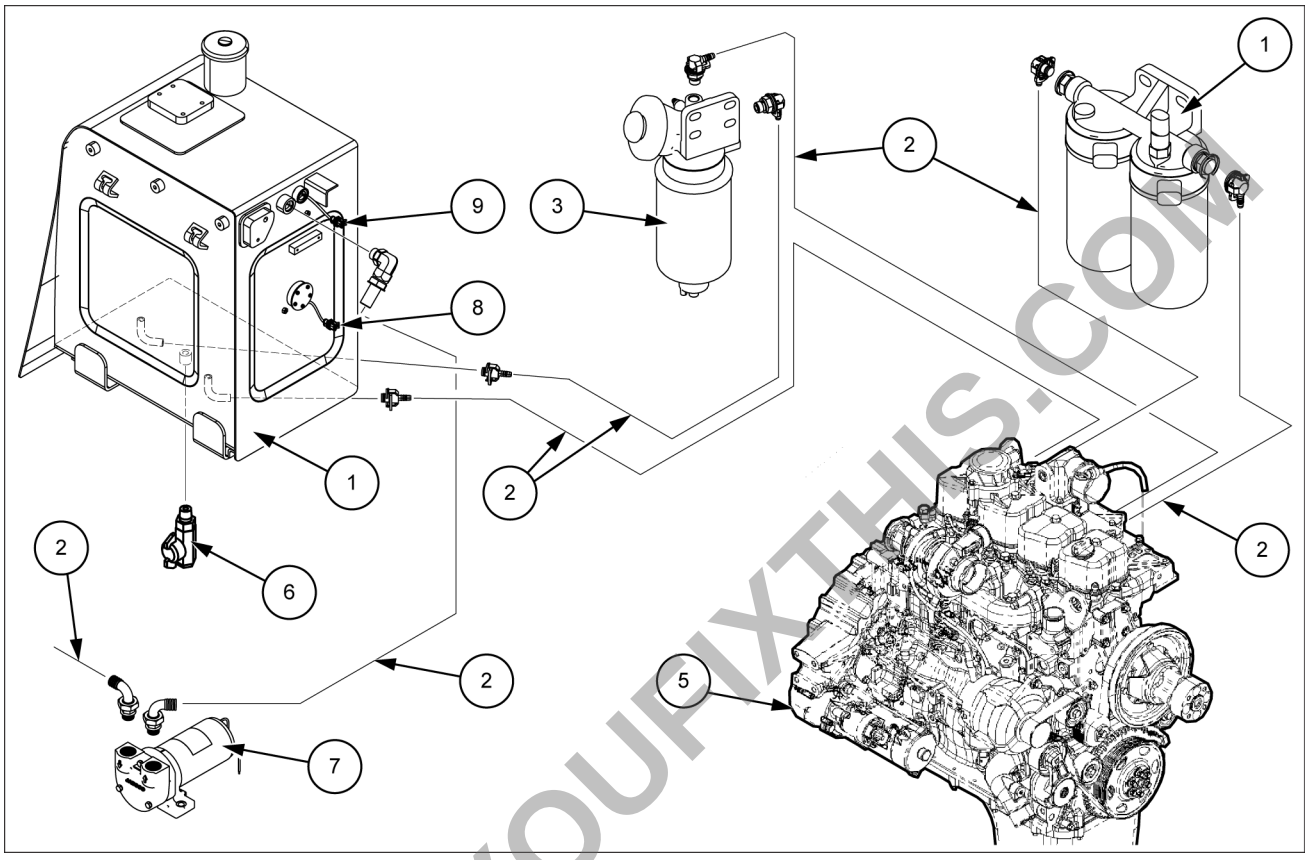
The manufacturer/supplier cannot be held responsible for any damage resulting from other than the designated use. The risk involved in such misuse lies entirely with the user.

NOTICE: *For clarity purposes, some figures in this Manual show the machine with protection panels or covers removed. Never operate the machine with any protection panels or covers removed.*

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Engine - Exploded view – Fuel system

The fuel tank contains the fuel for the engine.



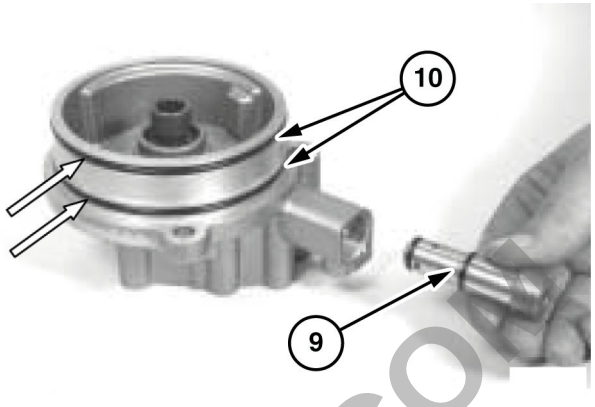
SMIL12WEX0103FB 1

1. Fuel tank
2. Flexible hose
3. Water separator
4. Fuel filters
5. Diesel engine
6. Drain cock
7. Refuelling pump
8. Fuel level sensor
9. Refuelling pump sensor

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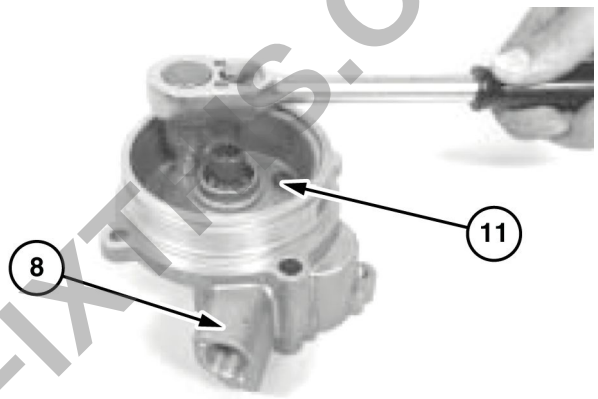
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Remove the pressure valve **(9)** and both O-rings **(10)** (see the arrows in figure).
Discard both O-rings.



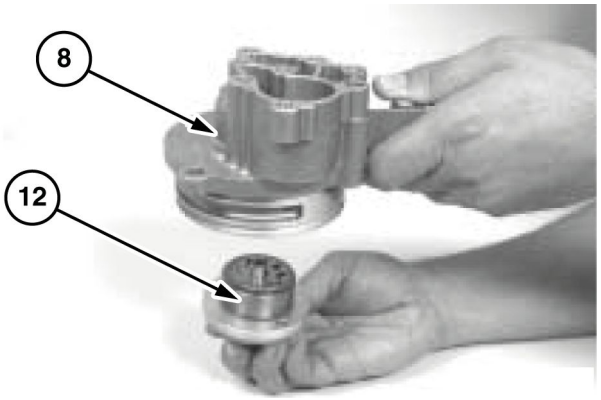
TUPH12WEX3309AB 5

Remove the screws **(11)** that fix the pump on the housing **(8)**.



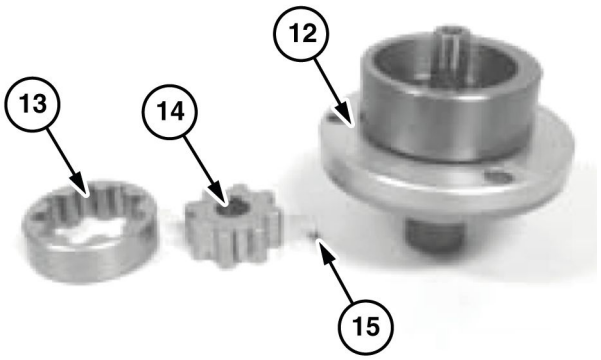
TUPH12WEX3310AB 6

Keep pump in contact with the housing **(8)** and rotate it (180°), then remove the pump **(12)**. Pay attention to possible release of balls and compression springs.



TUPH12WEX3311AB 7

Remove the inner parts of the pump **(12)**: Outer rotor **(13)**, internal rotor **(14)** and ball **(15)**.



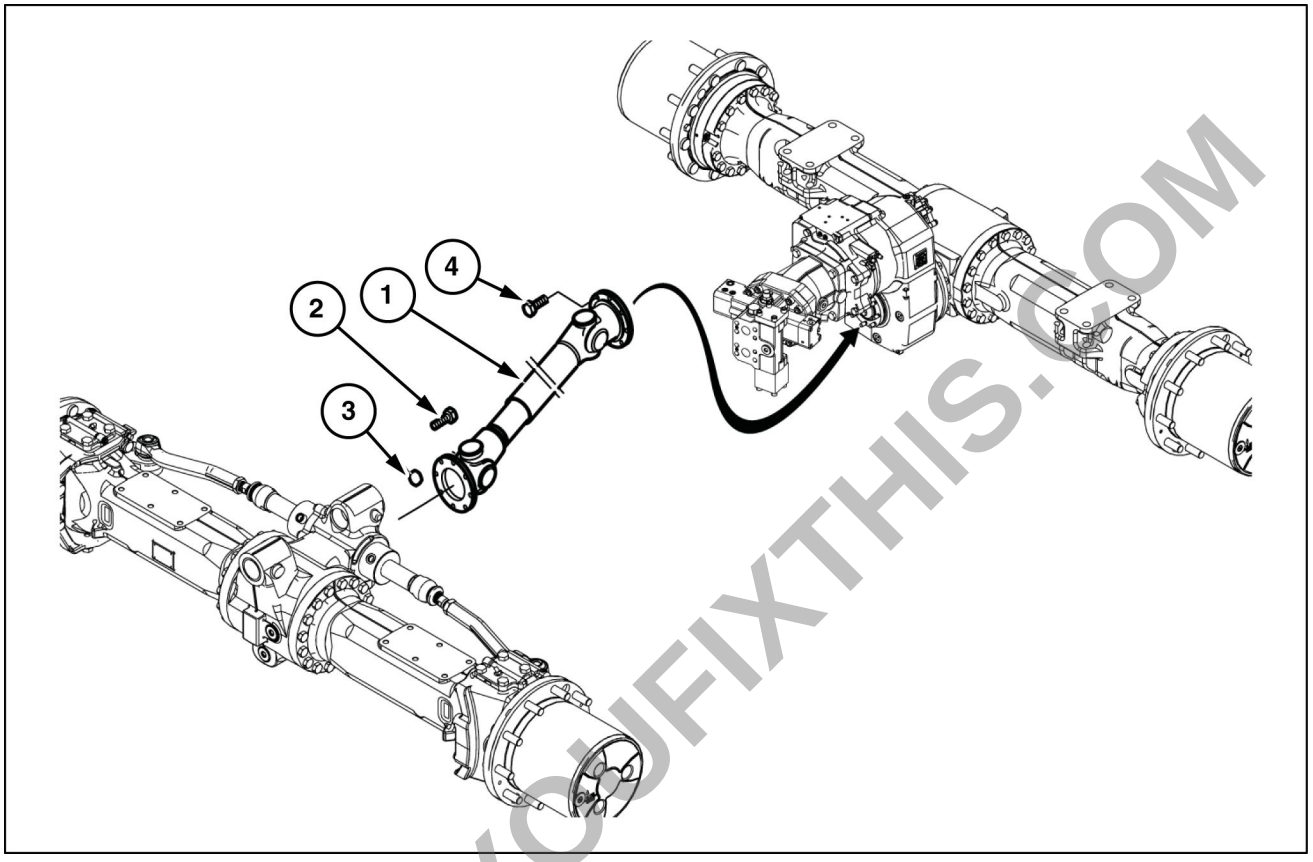
TUPH12WEX3312AB 8

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Drive shaft - Exploded view – Single cardan shaft

(Version 20 km/h (12.43 mph))



TULI12WEX3224FB 1

1. Cardan shaft
2. Screw
3. Nut
4. Screw

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Parking brake disengagement in emergency

If the transmission is locked due to a failure or a pressure drop that does not let to disengage the parking brake, act manually on parking brake emergency release valve to tow the machine and repair the failure.

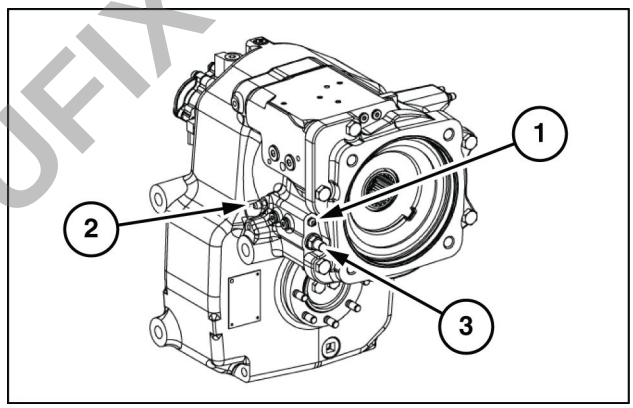
⚠ WARNING

Loss of control hazard!
DO NOT exceed maximum road speed when towing the machine. See machine decal for maximum road speed. Use caution when making turns.
Failure to comply could result in death or serious injury.

W0105A

NOTE: *Refer to* ***Parking lock relief valve - Disassemble – Parking brake emergency release valve (33.110)*** *and* ***Parking lock relief valve - Assemble – Parking brake emergency release valve (33.110)*** *for the removal and installation of the parking brake emergency release valve and to* ***Hydraulic systems - Static description (35.000)*** *for the transmission operation.*

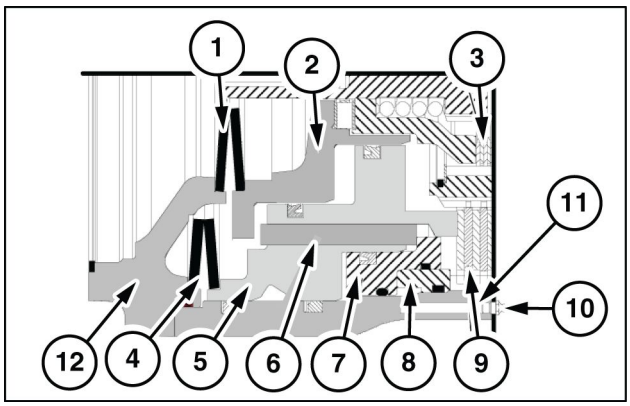
In emergency, pump grease into the nipple **(1)** until it comes visible out of the pressure relief valve **(3)**. To deactivate the emergency actuation, open the bleeder valve **(2)** and shift into the road speed (apply a control pressure of **30 - 35 bar** (**435 - 508 psi**) at the connection of the brake).



TULI12WEX2426AB 3

The figures that follow shown the transmission with emergency actuation deactivated and with emergency actuation activated.

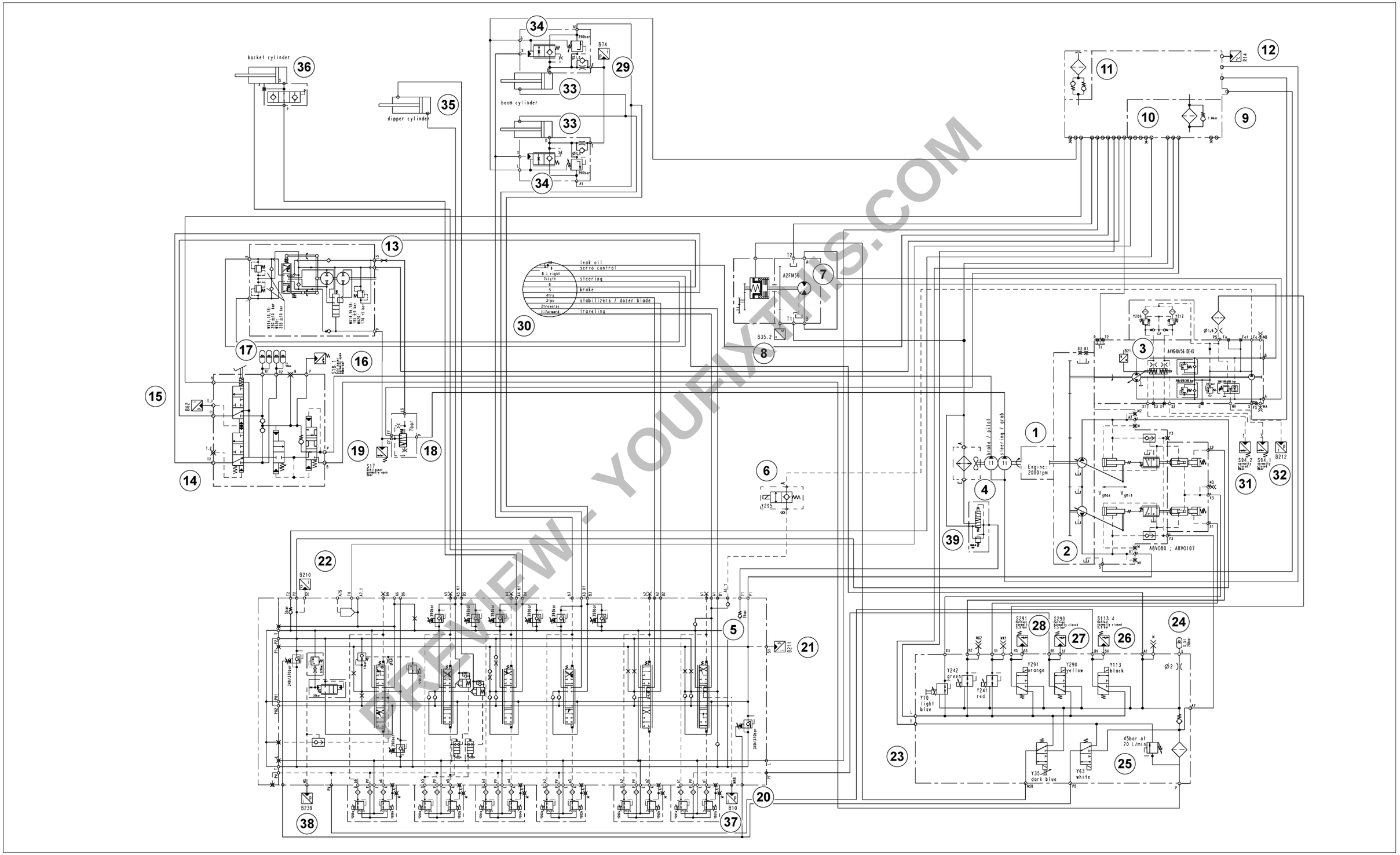
1. Clutch cup springs
2. Clutch piston
3. Clutch discs set
4. Brake cup springs
5. Brake piston
6. Pin
7. Pressure ring for the emergency actuation
8. Ring for the emergency actuation
9. Brake discs set
10. Grease
11. Grease nipple
12. Transmission housing



TULI12WEX2427AB 4

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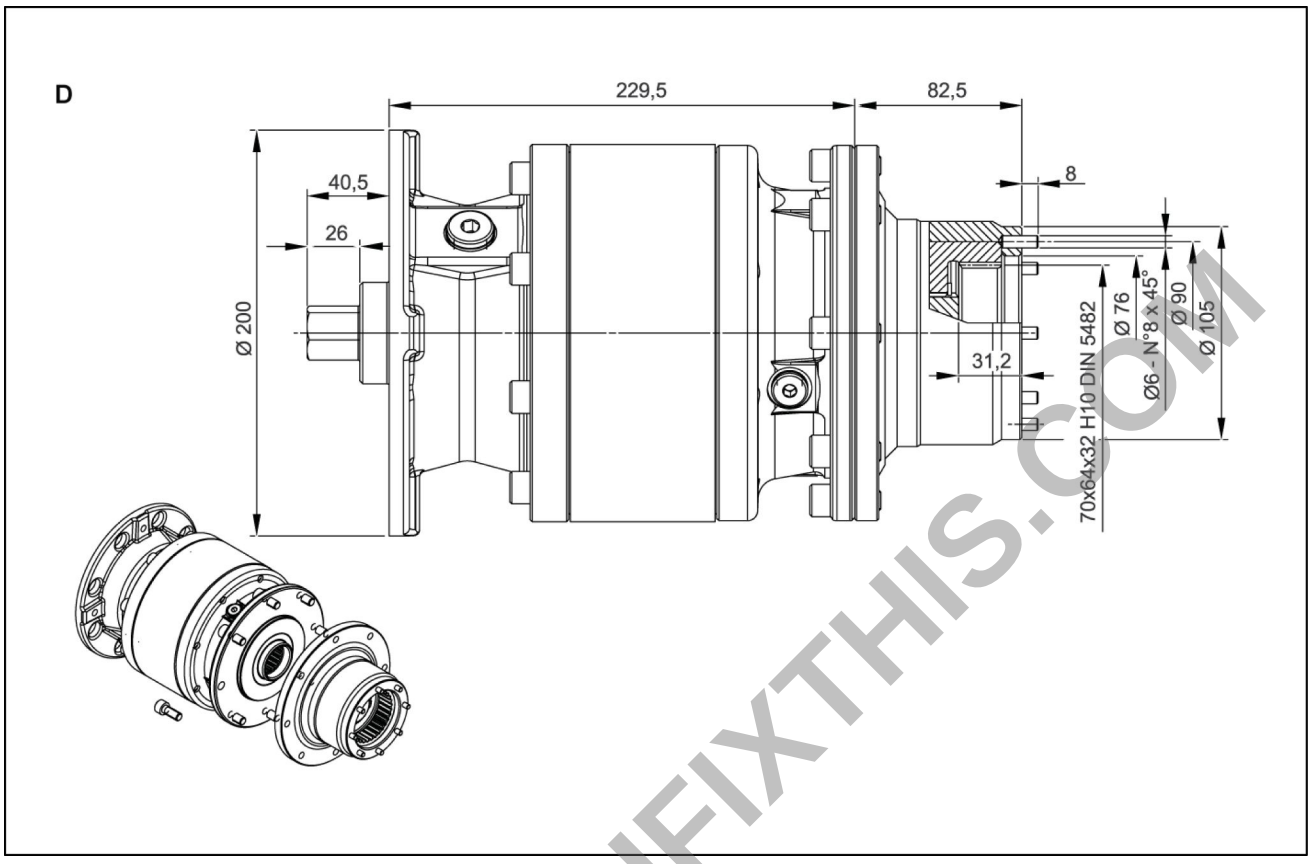
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TULI12WEX3081FA 4

Hydraulic swing system - General specification – Slewing gearbox

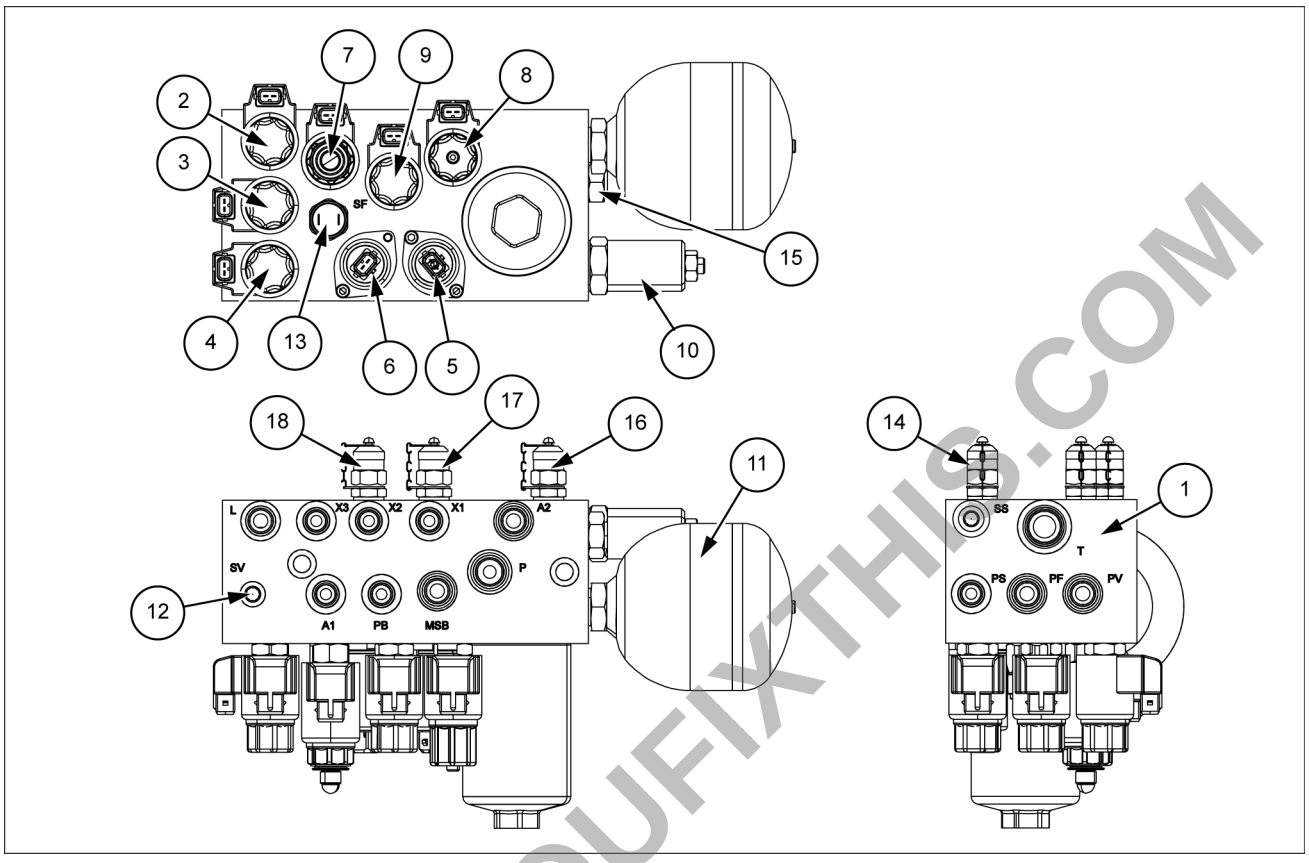
Data

Model	705T2F/20, 70
Total displacement	**1159.2 cm³/rev** (**70.7 in³/rev**)
Motor displacement	**56 cm³/rev** (**3.42 in³/rev**)
Total reduction ratio	20.7
Maximum oil delivery	**74 l/min** (**19.5 US gpm**)
Maximum differential pressure of the hydraulic motor	**320 bar** (**4640.0 psi**)
Max. input speed	**1321 RPM**
Output torque	**5904 N·m** (**4354.6 lb ft**)
Gearbox output speed	**63.8 RPM**
Oil capacity	**3.5 l +/- 10%** (**0.92 US gal**)
Dry weight	**120 kg +/- 10%** (**264.55 lb**)
Braking torque	**548 N·m +/- 10%** (**404.2 lb ft**)
Complete opening pressure	**13 bar** (**188.5 psi**)
Max operating pressure	**50 bar** (**725 psi**)
Number of internally toothed steel discs	4
Number of sintered bronze discs with external teeth	5
Pinion length	**115.5 mm** (**4.55 in**)

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Pilot system - Static description – Pilot control assy.



SMIL12WEX0324FA 1

1. Pilot control assy.
2. Electro-valve **Y113** - pilot control pressure
3. Electro-valve **Y290** - travel pilot control pressure
4. Electro-valve **Y291** - slewing pilot control pressure
5. Proportional electro-valve **Y241** - pump **P1** regulator control
6. Proportional electro-valve **Y242** - pump **P2** regulator control
7. Proportional electro-valve **Y10** - load limit adjustment
8. Electro-valve **Y35** - slewing brake control
9. Electro-valve **Y63** - power boost control
10. Pressure relief valve
11. Accumulator
12. Pressure sensor **S113.4** - pilot control activation
13. Pressure sensor **S290** - travel pilot control
14. Pressure sensor **S291** - slewing pilot control
15. Check valve
16. Pressure port - Piloting
17. Flow demand pump **P1** (**MX1**)
18. Flow demand pump **P2** (**MX2**)

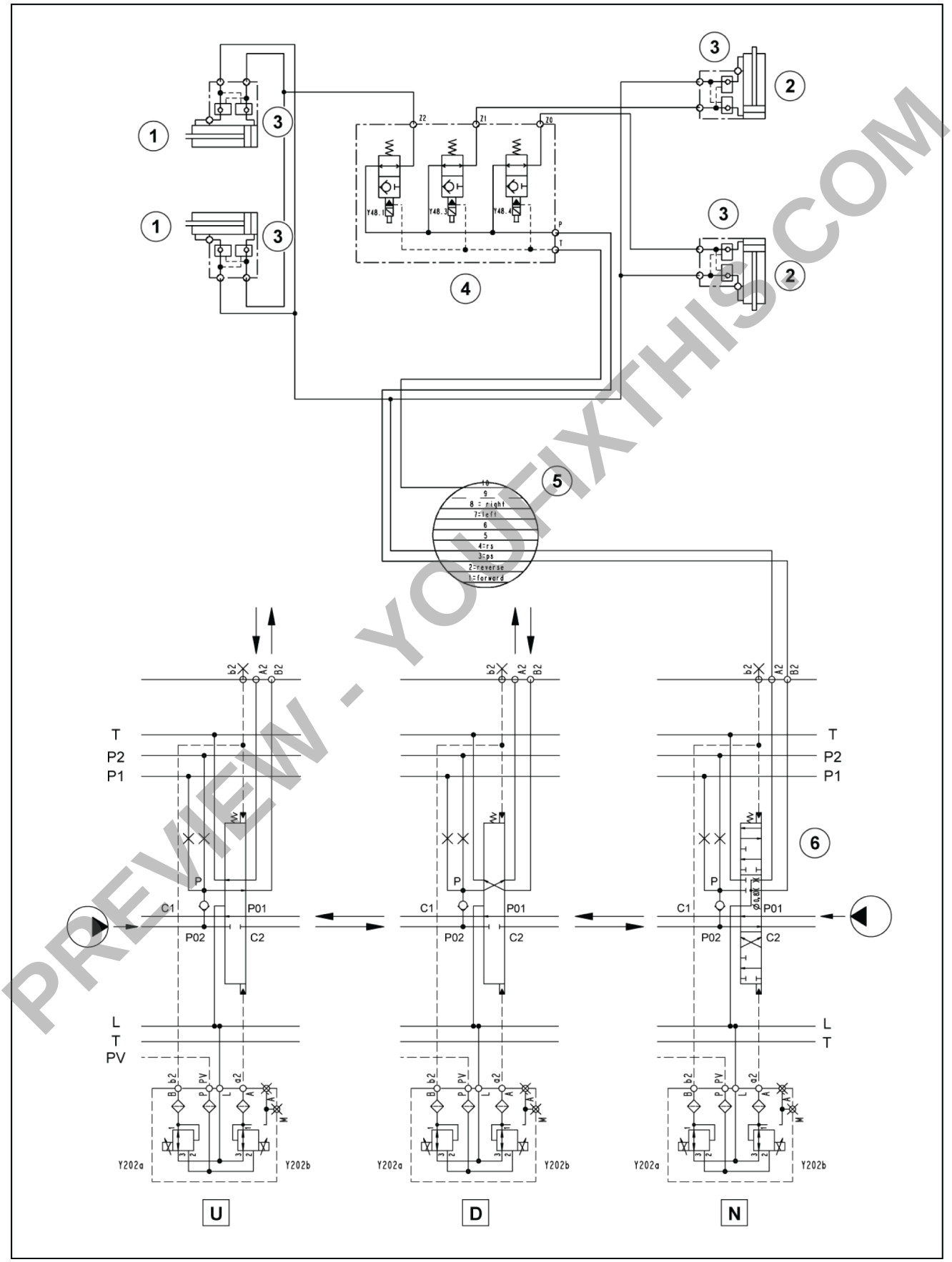
NOTE: *Refer to upper structure and undercarriage hydraulic schemes shown in this section to observe the hydraulic connections of pilot control assy.*

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Stabilizer hydraulic system - Hydraulic schema

Version with front blade and rear stabilizers

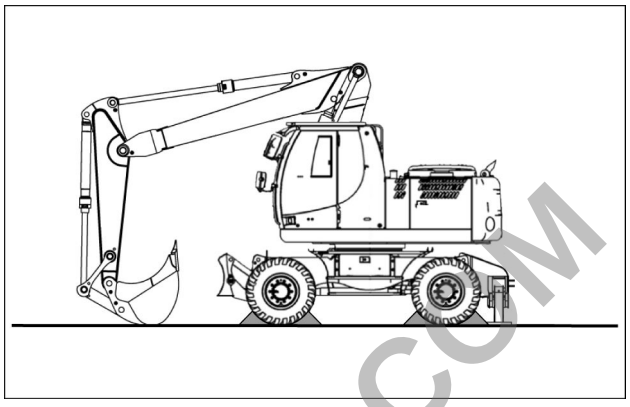


TULI12WEX2774HA 1

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Swing ring assembly - Remove – Slewing bearing

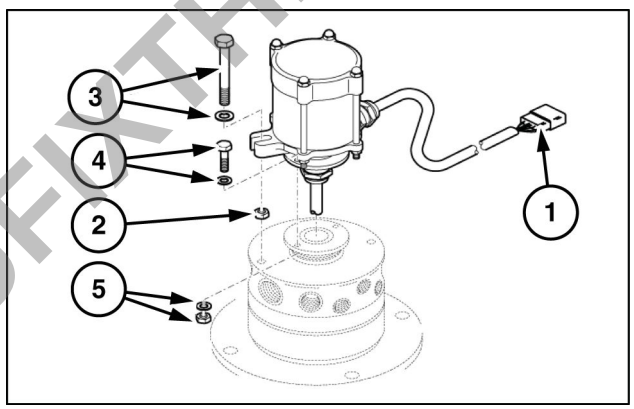
Park the machine on a level and firm surface.
Lower the attachment to the ground.
Lower the blade and the stabilizers to the ground.
Engage the parking brake.
Lock the upper structure.
Stop the engine.
Place some wedges under the wheels so as to prevent the machine from moving.
Move both hydraulic control levers in all directions, to release possible residual pressure inside the hydraulic system.
For slewing bearing disassembly, it is necessary to remove the upper structure.



SMIL12WEX0021AA 1

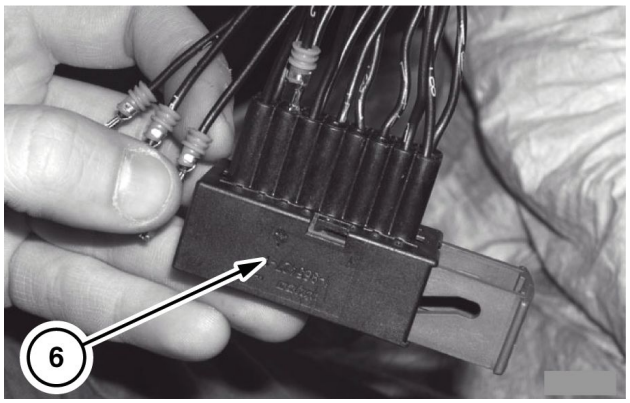
NOTE: *If the machine is provided with optionals such as* ***80 l*** *low flow system, it is necessary to disassemble the lines preventing easy access to the electric rotor and to the swivel joint.*

Disconnect electric connection **(1)** from the electric rotor.
Unscrew the nut **(2)**, the screw and washer **(3)**.
Unscrew the two screws and two washers **(4)** with nuts and washers **(5)**.



TULI12WEX2061AB 2

From undercarriage disconnect the second connection **(6)** of electric rotor.
Extract the pins from the connector.

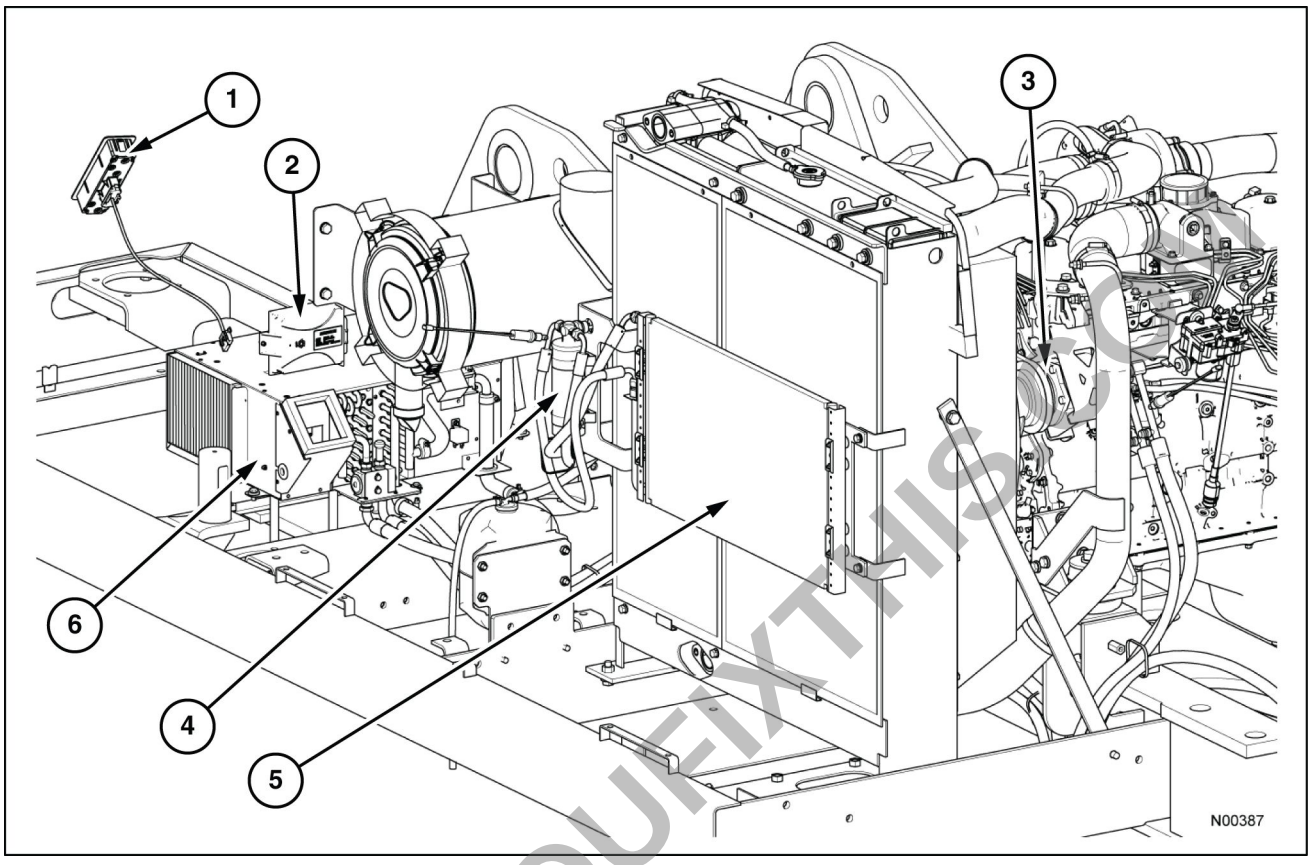


TUPH12WEX2062AB 3

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Air conditioning - General specification



TULI12WEX2113FB 1

1. Air-conditioning control panel
2. Control unit
3. Compressor
4. Dryer
5. Condenser
6. Box climate unit ATC

Quantity of **R134A** gas: **820 g** (**28.92 oz**).

Air-conditioning system consists of a control panel located in cabin **(1)**, a conditioning control module **(2)**, a compressor **(3)** located near the engine, a dryer **(4)** and a condenser **(5)** installed close to the radiator assy.

Refer to Operator's Manual for operation of air-conditioning system.

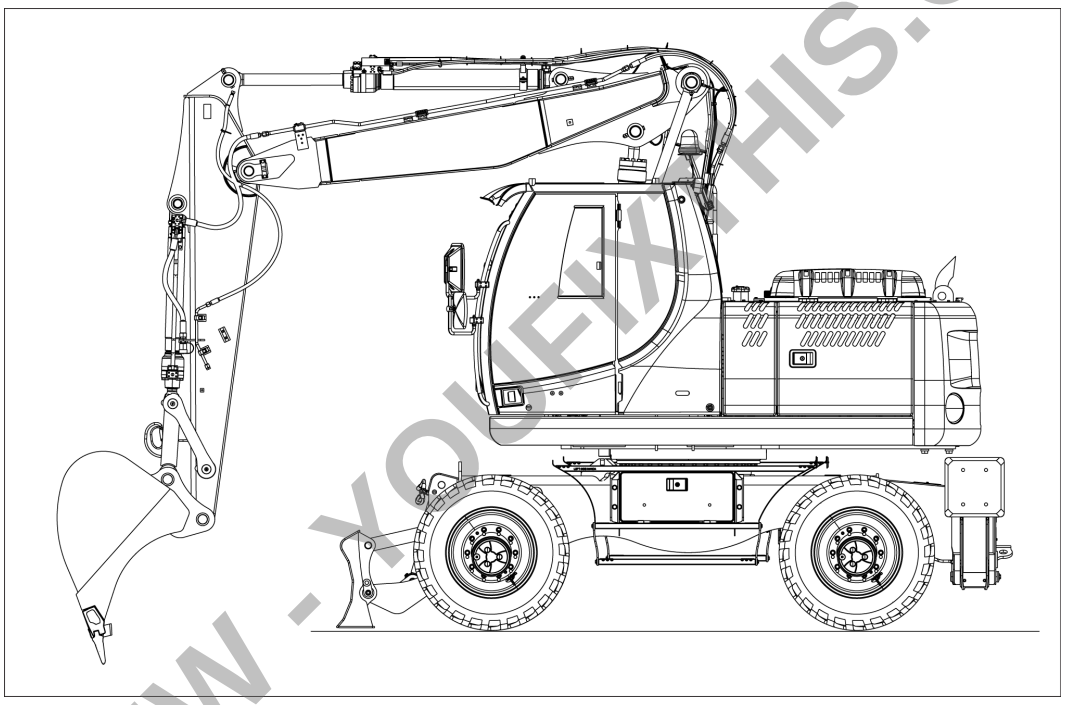
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NEW HOLLAND CONSTRUCTION

SERVICE MANUAL

Electrical systems



WE150B

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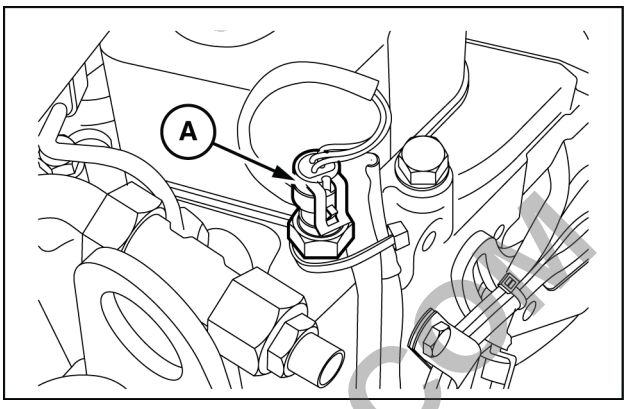
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Engine coolant temperature sensor - Static description

Sensor **(A)** is installed on cylinder head and detect the temperature of engine coolant.

Sensor is a transmitter: it reduces its electrical resistance with increasing temperature.

Temperature	Resistance
0 °C (32 °F)	**5466 - 5896 Ω**
10 °C (50 °F)	**3542 - 3792 Ω**
20 °C (68 °F)	**2351 - 2500 Ω**
25 °C (77 °F)	**1941 - 2057 Ω**
30 °C (86 °F)	**1615 - 1707 Ω**
40 °C (104 °F)	**1118 - 1175 Ω**
50 °C (122 °F)	**798 - 834 Ω**
60 °C (140 °F)	**573 - 596 Ω**
70 °C (158 °F)	**421 - 435 Ω**
80 °C (176 °F)	**313 - 323 Ω**
90 °C (194 °F)	**237 - 243 Ω**
100 °C (212 °F)	**182 - 186 Ω**
110 °C (230 °F)	**140 - 144 Ω**
120 °C (248 °F)	**109 - 113 Ω**



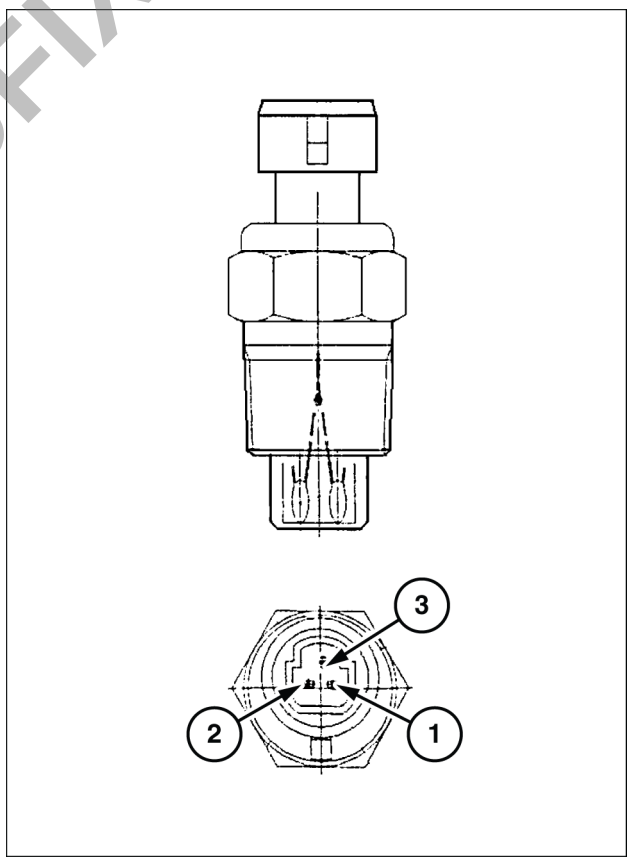
TULI12WEX2666AB 1

Sensor **(A)** connector pinout:

PIN **(1)**: NTC Signal

PIN **(2)**: GND

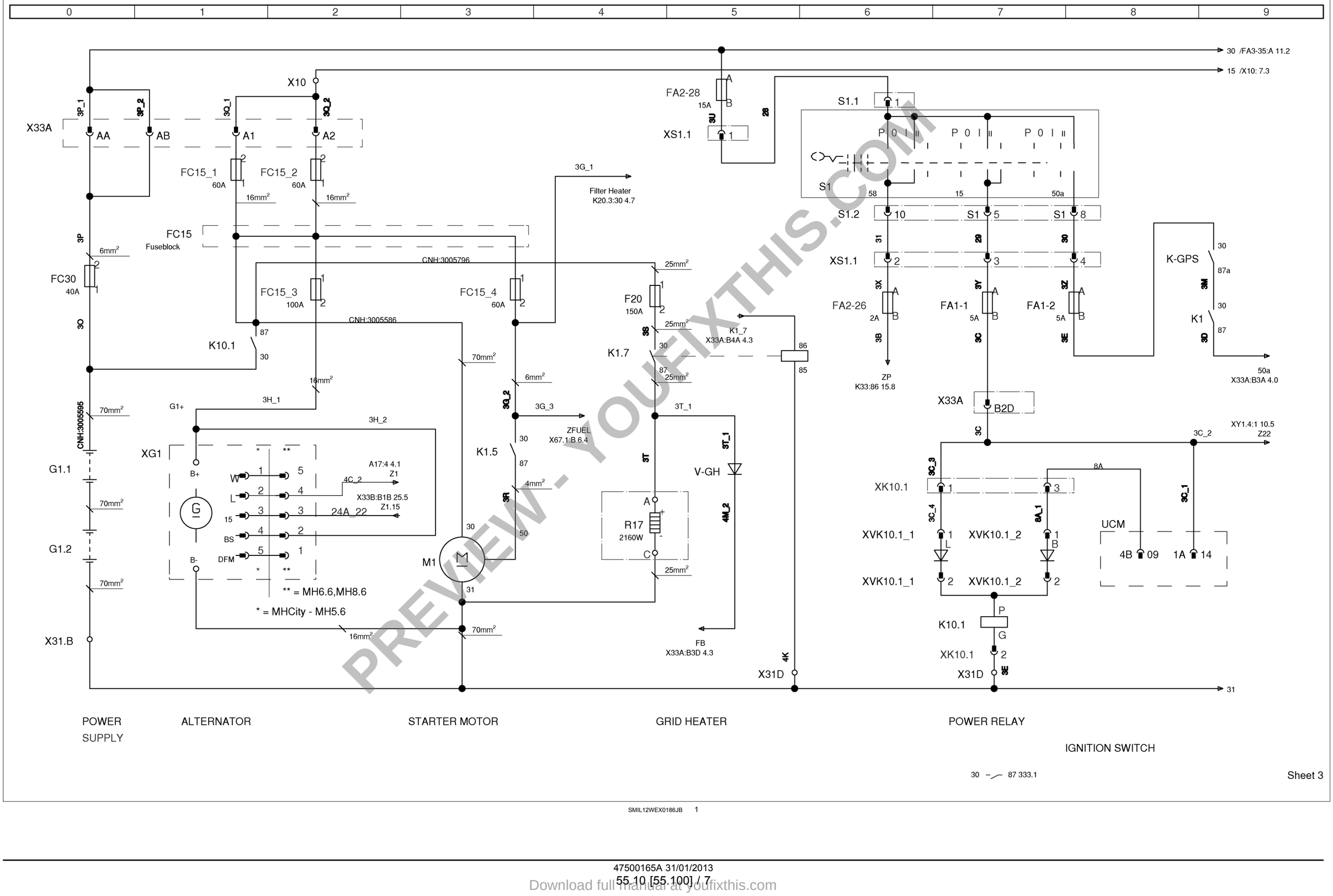
PIN **(3)**: RIN_1 (Coolant temperature)



TULI12WEX2667BB 2

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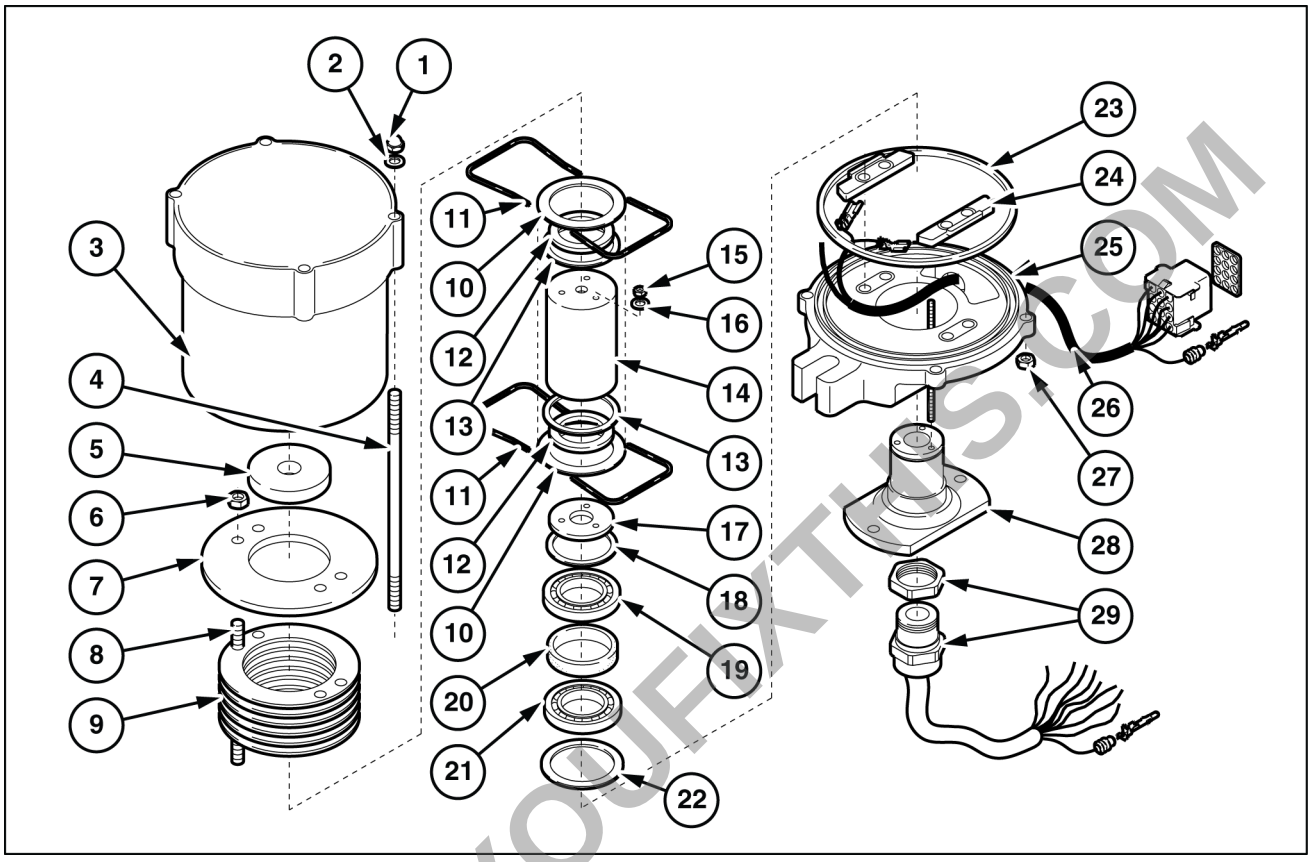
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SMIL12WEX0186JB 1

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Swivel joint - Exploded view

Electric rotor



TULI12WEX3347FB 1

1. Nut
2. Washer
3. Cover
4. Tie-rod
5. Disc
6. Nut
7. Disc
8. Tie-rod
9. Brake discs
10. Ring
11. Gasket
12. Ring
13. Ring
14. Piston
15. Nut
16. Washer
17. Disc
18. Shim
19. Bearing
20. Spacer
21. Bearing
22. Shim
23. Seal ring
24. Stopper
25. Support
26. Electric cable
27. Nut
28. Flange
29. Electric cable

NOTE: *See* ***Swing ring assembly - Remove – Slewing bearing (39.103)*** *for the removal and installation of electric rotor.*

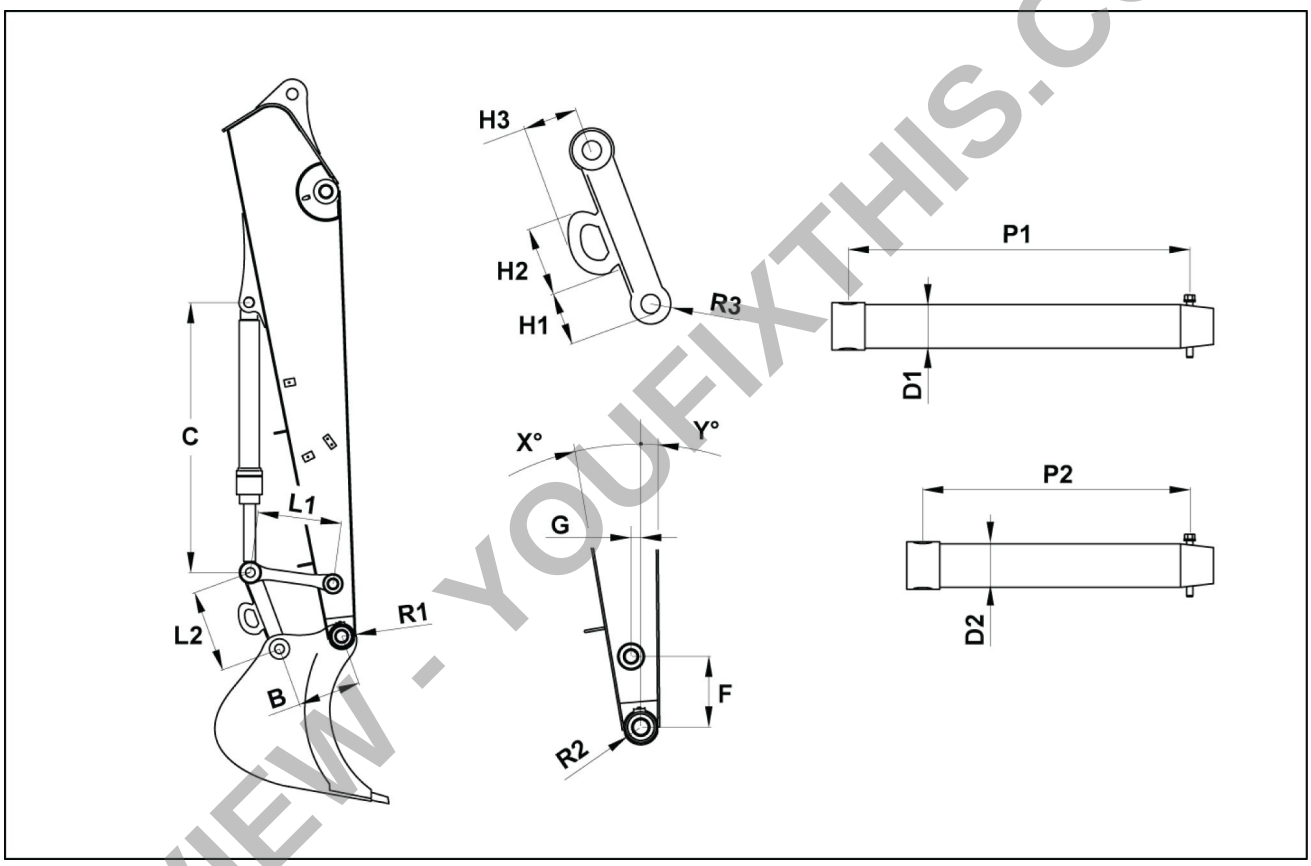
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Bucket - Dimension Buckets

Width	Weight	Heaped capacity	SAE capacity	Teeth
500 mm (19.69 in)	**315 kg (694.5 lb)**	**0.248 m³ (8.8 ft³)**	**0.280 m³ (9.9 ft³)**	3
750 mm (29.5 in)	**350 kg (771.6 lb)**	**0.357 m³ (12.6 ft³)**	**0.424 m³ (15.0 ft³)**	3
850 mm (33.5 in)	**370 kg (815.7 lb)**	**0.414 m³ (14.6 ft³)**	**0.498 m³ (17.6 ft³)**	3
900 mm (35.4 in)	**380 kg (837.8 lb)**	**0.443 m³ (15.6 ft³)**	**0.536 m³ (18.9 ft³)**	4
1000 mm (39.4 in)	**415 kg (914.9 lb)**	**0.500 m³ (17.7 ft³)**	**0.610 m³ (21.5 ft³)**	4
1100 mm (43.3 in)	**440 kg (970.0 lb)**	**0.558 m³ (19.7 ft³)**	**0.684 m³ (24.2 ft³)**	4
1200 mm (47.2 in)	**470 kg (1036.2 lb)**	**0.616 m³ (21.8 ft³)**	**0.758 m³ (26.8 ft³)**	5

Bucket/dipper arm interface data



TULI12WEX2401FA 1

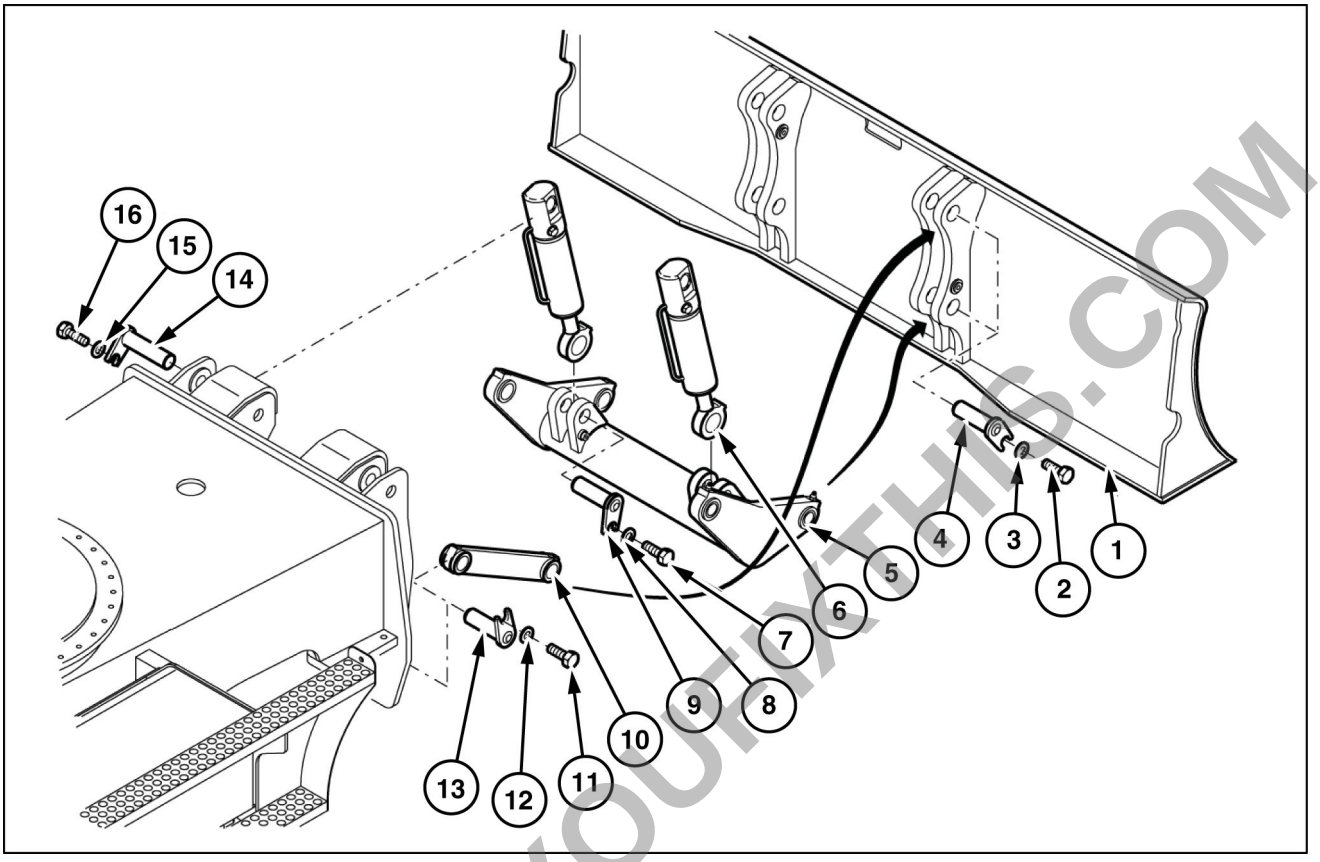
B	Bucket pin distance	**370 mm (14.6 in)**
C	Retracted cylinder length	**1390 mm (54.7 in)**
	Extended cylinder length	**2293 mm (90.3 in)**
L1	Rocker length	**514 mm (20.2 in)**
L2	Lin length	**492 mm (19.4 in)**
R1	Max radius of bucket boss	**85 mm (3.3 in)**

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Dozer blade - Exploded view

Removal



TULI12WEX2393FB 1

1. Levelling blade
2. Screw
3. Washer
4. Pin
5. Connecting rod
6. Blade cylinders
7. Screw
8. Washer
9. Pin
10. Rod
11. Screw
12. Washer
13. Pin
14. Pin
15. Washer
16. Screw

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Ladder - Static description

Upper structure access ladders

Ladders are used to gain access to the upper structure from both sides of machine.

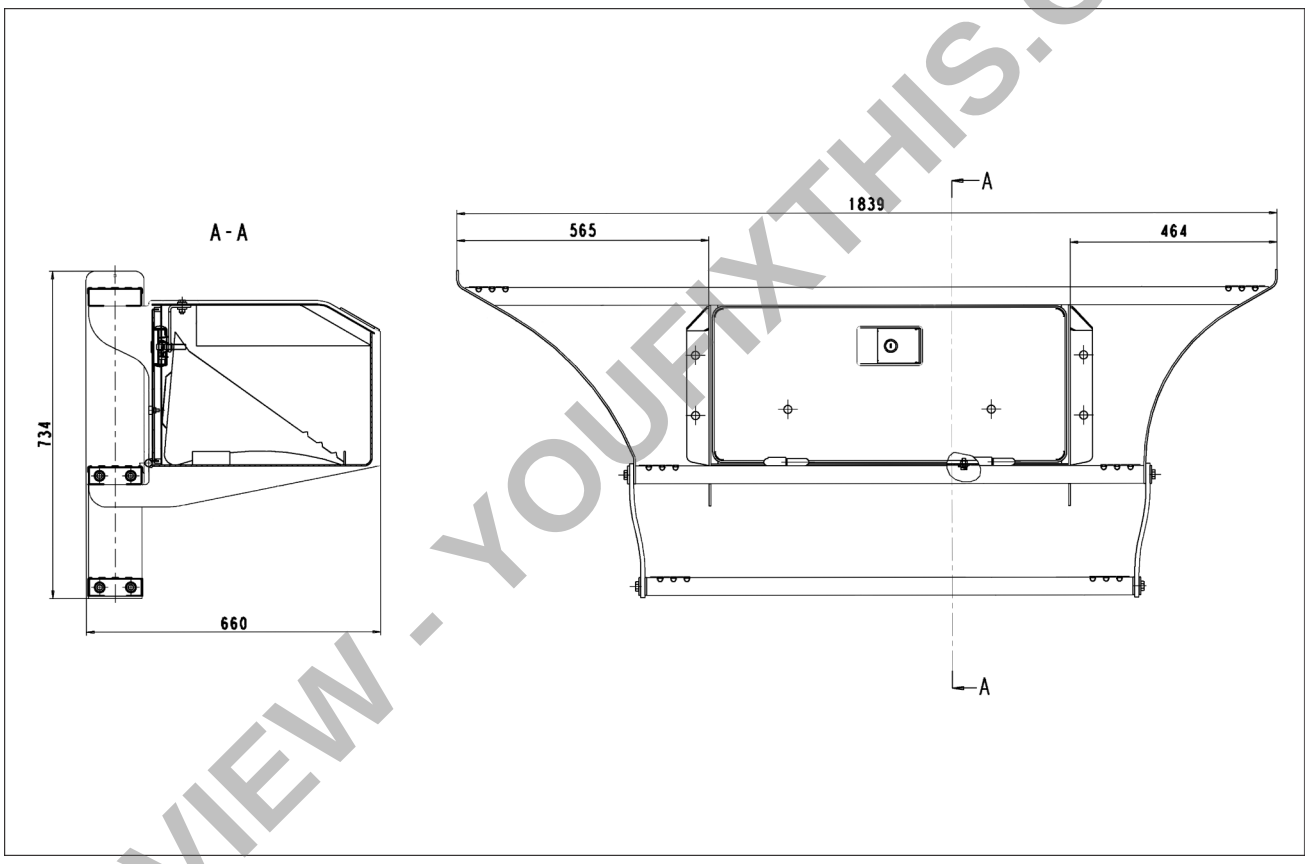
Keep them constantly clean of mud, ice, etc. in order to prevent slipping.

Ladders can be provided with a storage box, where the tools used for maintenance operations or repairs are stored.

Weight of ladder without storage box: **54 kg** (**119.0 lb**).

Weight of ladder with storage box: **75 kg** (**165.3 lb**).

Technical Specifications



SMIL12WEX0111FA 1

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[33.202] Hydraulic service brakes 33.2

Hydraulic systems 35

[35.000] Hydraulic systems 35.1

[35.102] Pump control valves 35.2

[35.106] Variable displacement pump 35.3

[35.300] Reservoir, cooler, and filters 35.4

[35.304] Combination pump units 35.5

[35.352] Hydraulic swing system 35.6

[35.353] Hydraulic travel system 35.7

[35.354] Hydraulic central joint 35.8

[35.357] Pilot system 35.9

[35.359] Main control valve 35.10

[35.360] Hammer and rotating bucket hydraulic system 35.11

[35.703] Stabilizer hydraulic system 35.12

[35.730] Positioning arm hydraulic system 35.13

[35.736] Boom hydraulic system 35.14

[35.737] Dipper hydraulic system 35.15

[35.738] Excavator and backhoe bucket hydraulic system 35.16

[35.741] Dozer blade cylinders 35.17

Frames and ballasting 39

[39.103] Swing ring assembly 39.1

[39.129] Stabilizers 39.2

[39.140] Ballasts and supports 39.3

Steering 41

[41.101] Steering control 41.1

[41.106] Tie rods 41.2

[41.200] Hydraulic control components 41.3

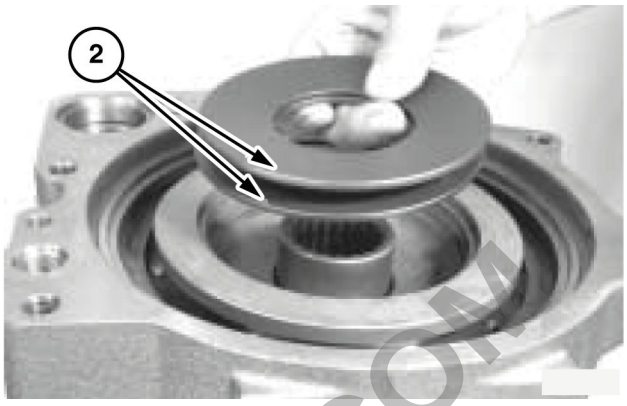
[41.216] Cylinders 41.4

Wheels 44

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Install both clutch cup springs **(2)**.



TUPH12WEX2238AB 31

Install both brake cup springs **(1)**.



TUPH12WEX2239AB 32

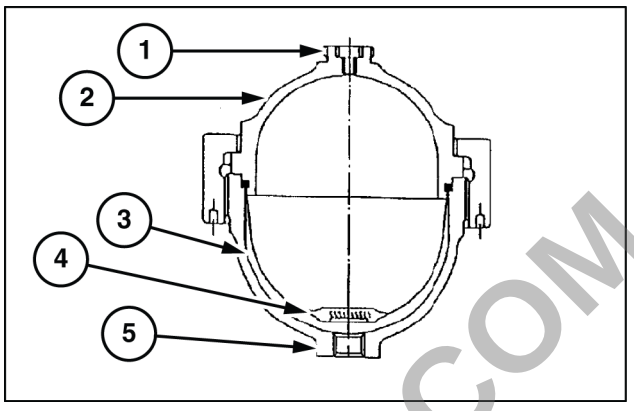
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Accumulator - Static description

The machine has different accumulators.

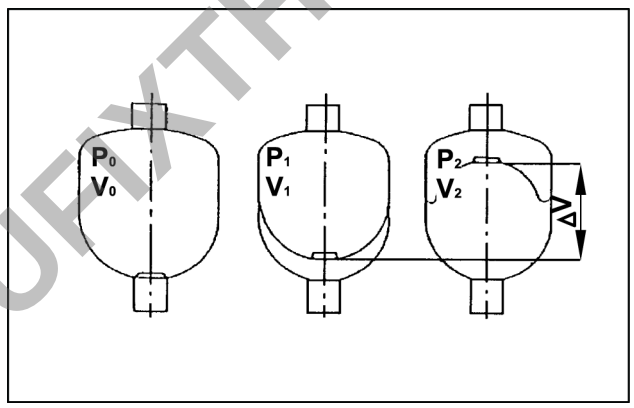
The accumulators, of a membrane-type, are functionally identical and guarantee a certain number of actuations of the users they are connected to in case of lack of hydraulic pressure. The membrane accumulator consists of a pressure-resistant steel container, inside which a membrane made of elastic material is assembled as separating element. The membrane is locked with a ring nut between the body lower and upper part. In the membrane central lower section is dived a metallic disc preventing its slipping out from fluid inlet port.



TULI12WEX2436AB 1

1. Gas valve
2. Container
3. Membrane
4. Poppet valve
5. Oil-side connection

With no hydraulic pressure, the membrane, charged on the gas-side to pre-charge pressure ($\mathbf{P}_0$), leans against the inner surface of the accumulator and the poppet stops the fluid flow. With hydraulic pressure applied, the pre-charge pressure is exceeded by compressing nitrogen, the poppet is lifted and liquid flows into the accumulator. The useful quantity of liquid results from the difference between gas volume and minimum and maximum service pressure.

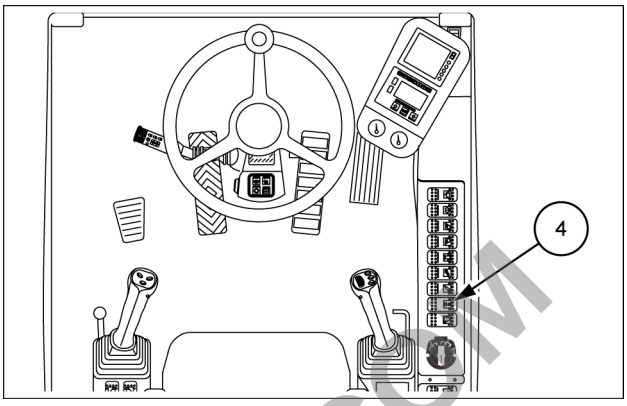


TULI12WEX2437AA 2

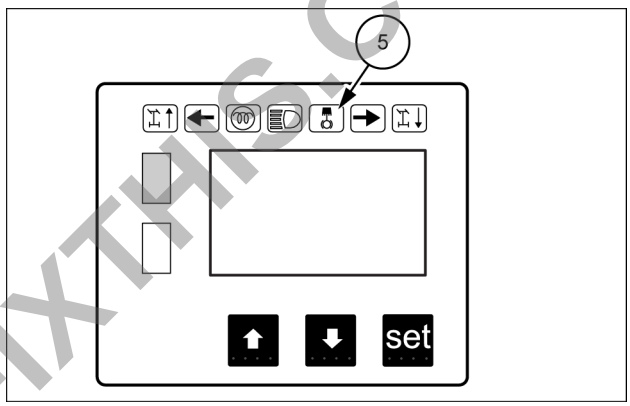
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2. Check the calibration of swing pump sensor (B213). Continue as indicated:



SMIL12WEX0307AB 13



SMIL12WEX0308AB 14

- set the engine power level knob to HEAVY (refer to **Accelerator potentiometer - Static description – Power level selection knob (55.525)**) and set the upper structure slewing brake to “FIXED-Mode” by pressing the upper structure slewing brake activation push-button (4) on the left side of cab. When the device is engaged, the light (5) is lighted;
- go to page “CONFIGURATION - ELECTRO-HYDRAULIC PARAMETERS” of EST and select “Manual Calibration”;
- deactivate the entry “Special displacement control for swing pump”;

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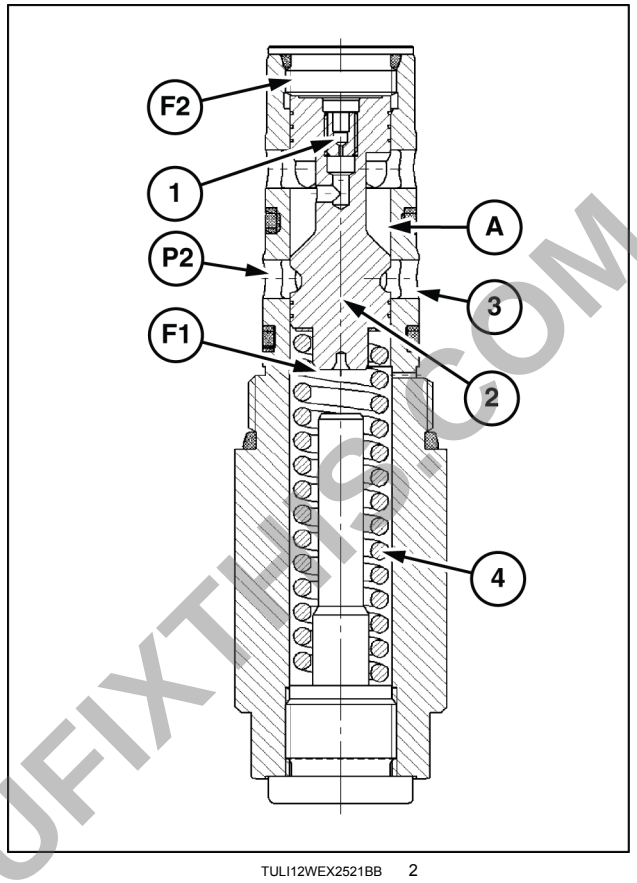
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Starting the function

Once the motor has been started, pump P2 delivers oil to the inlet channel of the pressure compensator. When starting the function, pump P2 generates a pressure > **15 bar** (**218 psi**). By means of the transverse hole and the nozzle **(1)**, pressure builds up behind the piston **(2)** The force **F2** moves the piston against the spring **(4)**, so that the check function of the piston is cancelled. The oil of pump P2 moves therefore to channel **P (3)** and to the main valve rod.

1. Nozzle
2. Control piston
3. Channel **P**
4. **15 bar** (**218 psi**) spring

A. Check valve (opened)
F1. Spring force
F2. Pressure force in channel **P**
P2. Pump **P2**



TULI12WEX2521BB 2

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Diagnostic code: 7010

Light	Description	Condition
Red	Battery charge control of alternator **G1** with engine Off	Digital input AN_28 of UCM, connector **2B**, pin **13**, checks the voltage on alternator (connector **XG1** , pin **2**). Engine should not be run at least **5 s** Error is activated if the voltage signal is high (**24 V**) for a time > **1 s**. If voltage signal is low (**0 V**) for a time > **1 s** error is erased.
Note:	Check diagnostic code **7021** with engine On	

Troubleshooting related to diagnostic code 7010

Type of error	Error caused by	Possible cause	Remedy
Mechanical	Alternator	Alternator is damaged	Replace alternator
Electrical	Wiring	Wiring **4C_1** damaged (between UCM and grid heater)	Check the continuity of wiring and the correct connection and, if necessary, replace the wiring
		Wiring **4C_2** damaged (between grid heater and alternator)	Check the continuity of wiring and the correct connection and, if necessary, replace the wiring
	24 V for a time > **1 s** between pin **AN_28** and pin GND_SIGNAL of UCM with engine Off (starting key in “ON” position)	UCM faulty	Replace the UCM

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Wire harnesses - Component localisation – Harness assy.

In the following paragraph the electrical items of harness assy. are listed.

The following table indicates the item code, the nomenclature and the reference to electrical diagrams and to the harness assy. figures shown after the table.

Code	Nomenclature	Electrical diagram reference	Harness assy.-key in figure
Y208	Flow circulation	**Harnesses and connectors - Electrical schematic frame 29 – UCM: Electrovalves (55.100)**	A
Y239.1	Flow summation	**Harnesses and connectors - Electrical schematic frame 29 – UCM: Electrovalves (55.100)**	A
Y239.2	Prop-solenoid pressure cut	**Harnesses and connectors - Electrical schematic frame 29 – UCM: Electrovalves (55.100)**	A
B239	Pressure load	**Harnesses and connectors - Electrical schematic frame 31 – UCM: Sensors (55.100)**	A
B211	Pressure pump **P1**	**Harnesses and connectors - Electrical schematic frame 31 – UCM: Sensors (55.100)**	A
B210	Pressure pump **P2**	**Harnesses and connectors - Electrical schematic frame 31 – UCM: Sensors (55.100)**	A
B10	Pressure sensor travel	**Harnesses and connectors - Electrical schematic frame 31 – UCM: Sensors (55.100)**	A
Y207A	Hammer shear negative	**Harnesses and connectors - Electrical schematic frame 26 – UCM: Main valve proportional electrovalves (55.100)** (Sheet 2 of 2)	A
Y207B	Hammer shear positive	**Harnesses and connectors - Electrical schematic frame 26 – UCM: Main valve proportional electrovalves (55.100)** (Sheet 2 of 2)	A
Y206A	Prop-solenoid positioning cylinder	**Harnesses and connectors - Electrical schematic frame 26 – UCM: Main valve proportional electrovalves (55.100)** (Sheet 2 of 2)	A
Y206B	Prop-solenoid positioning cylinder	**Harnesses and connectors - Electrical schematic frame 26 – UCM: Main valve proportional electrovalves (55.100)** (Sheet 2 of 2)	A
Y205A	Prop-solenoid stick (out)	**Harnesses and connectors - Electrical schematic frame 26 – UCM: Main valve proportional electrovalves (55.100)** (Sheet 2 of 2)	A
Y205B	Prop-solenoid stick (in)	**Harnesses and connectors - Electrical schematic frame 26 – UCM: Main valve proportional electrovalves (55.100)** (Sheet 2 of 2)	A
Y204A	Prop-solenoid bucket (open)	**Harnesses and connectors - Electrical schematic frame 26 – UCM: Main valve proportional electrovalves (55.100)** (Sheet 2 of 2)	A

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