

SERVICE MANUAL

PRINT No. 9-88551

TX130
TX140
TX170

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Service manual
TX130 – TX140 – TX170
TELESCOPIC HANDLERS

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COMPANY POLICY

Company policy, which is one of continuous improvement, reserves the right to make changes in design and specification, without notice and without obligation to modify units previously built.

All data given in this book is subject to production variations. Dimensions and weights are approximate only and the illustrations do not necessarily show machines in standard condition. For exact information about any particular machine please consult your dealer.

PARTS AND ACCESSORIES

Genuine parts and accessories have been specifically designed for these machines.

We would like to point out that “non-genuine” parts and accessories have not been examined and released by Builder. The installation or use of such products could have negative effects upon the design characteristics of your machine, and thereby affect its safety. The Builder is not liable for any damage caused by the use of “non-genuine” parts and accessories.

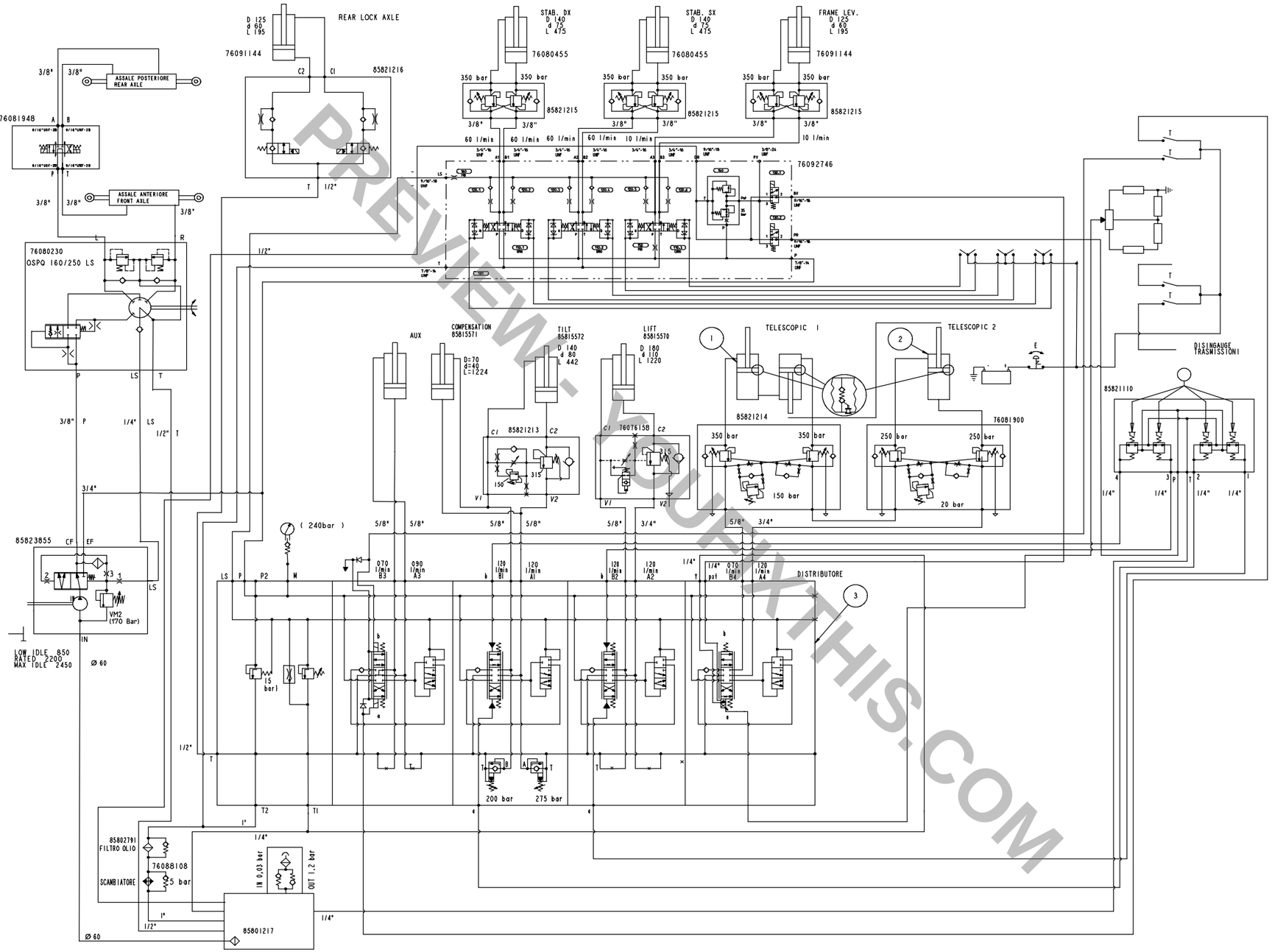
MODEL CODES

The complete range of telescopic handlers (Telehandler) described in this manual is identified in the text by reference to the maximum extension of the telescopic arm.

The vehicles listed below may not be available in all countries or markets, therefore for the latest information consult your authorised dealer.

Model	**TX130**			**TX140**			**TX170**	
	not stab.	small stab.	large stab.	not stab.	small stab.	large stab.	not stab.	stab.
Engine	88 kW (120 Cv) Turbo Aftercooler			88 kW (120 Cv) Turbo Aftercooler			88 kW (120 Cv) Turbo Aftercooler	
Max. lifting height (m)	12.300	12.450	12.450	13.300	13.550	13.550	16.240	16.600
Max. capacity (kg) at 500 mm from fork stop	4000	4000	4000	4000	4000	4000	4000	4000
Capacity at max. height (kg)	2600	3600	4000	2800	3000	3600	700	2500
Extension at max. height (m)	1.200	0.500	0.000	1.000	0.500	0.300	2.000	1.000
Max. longitudinal extension (m)	8.650			9.330			12.540	
Capacity at max. extension (kg)	700	1700	1800	650	1400	1500	0	450
Weight (kg)	11050			11970			12340	
Length (m)	5.850			6.070			6.135	

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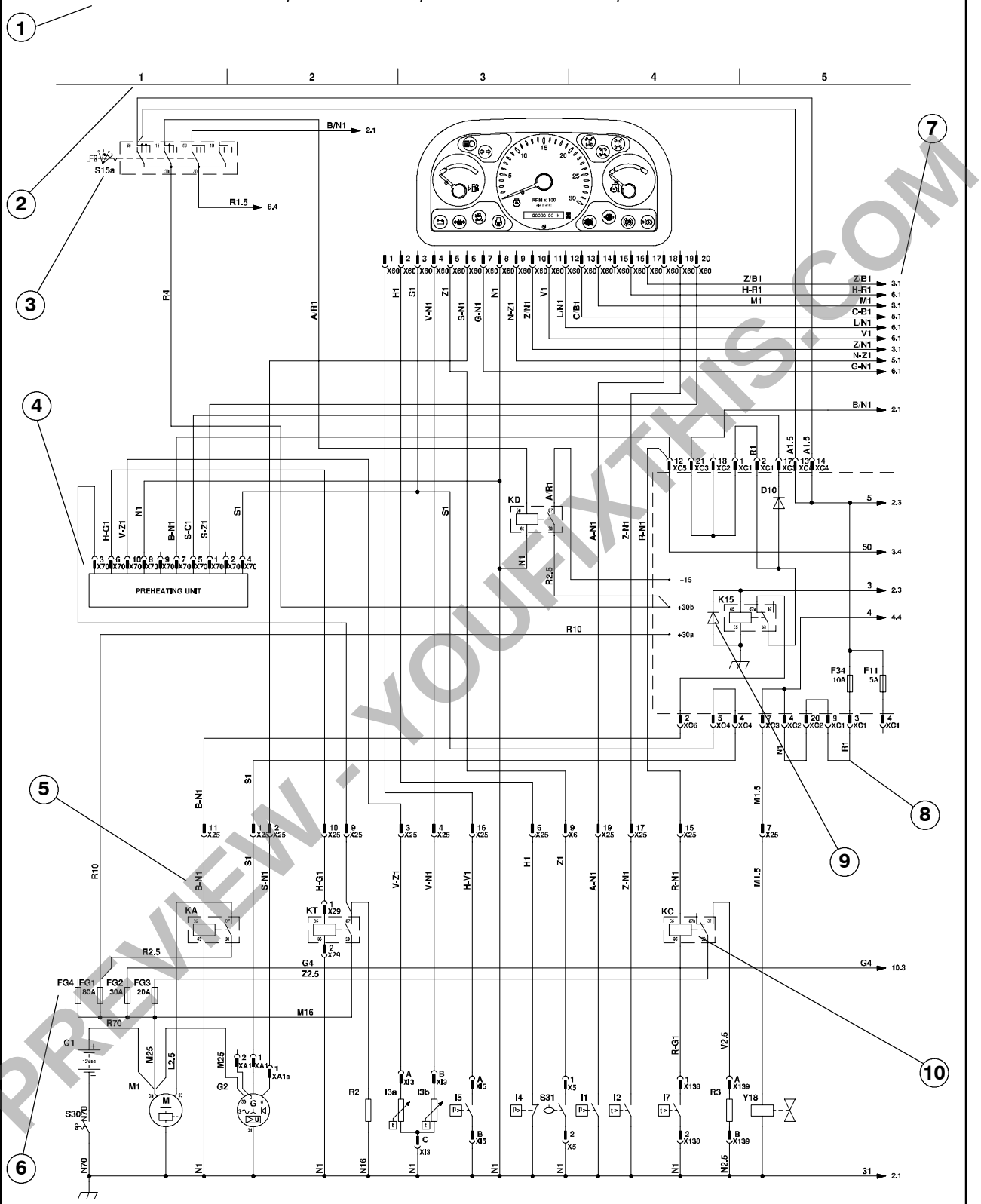


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Telescopic boom circuit

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DIAGRAM 1 – STARTING/RECHARGE/WARNING LAMPS/INDICATORS

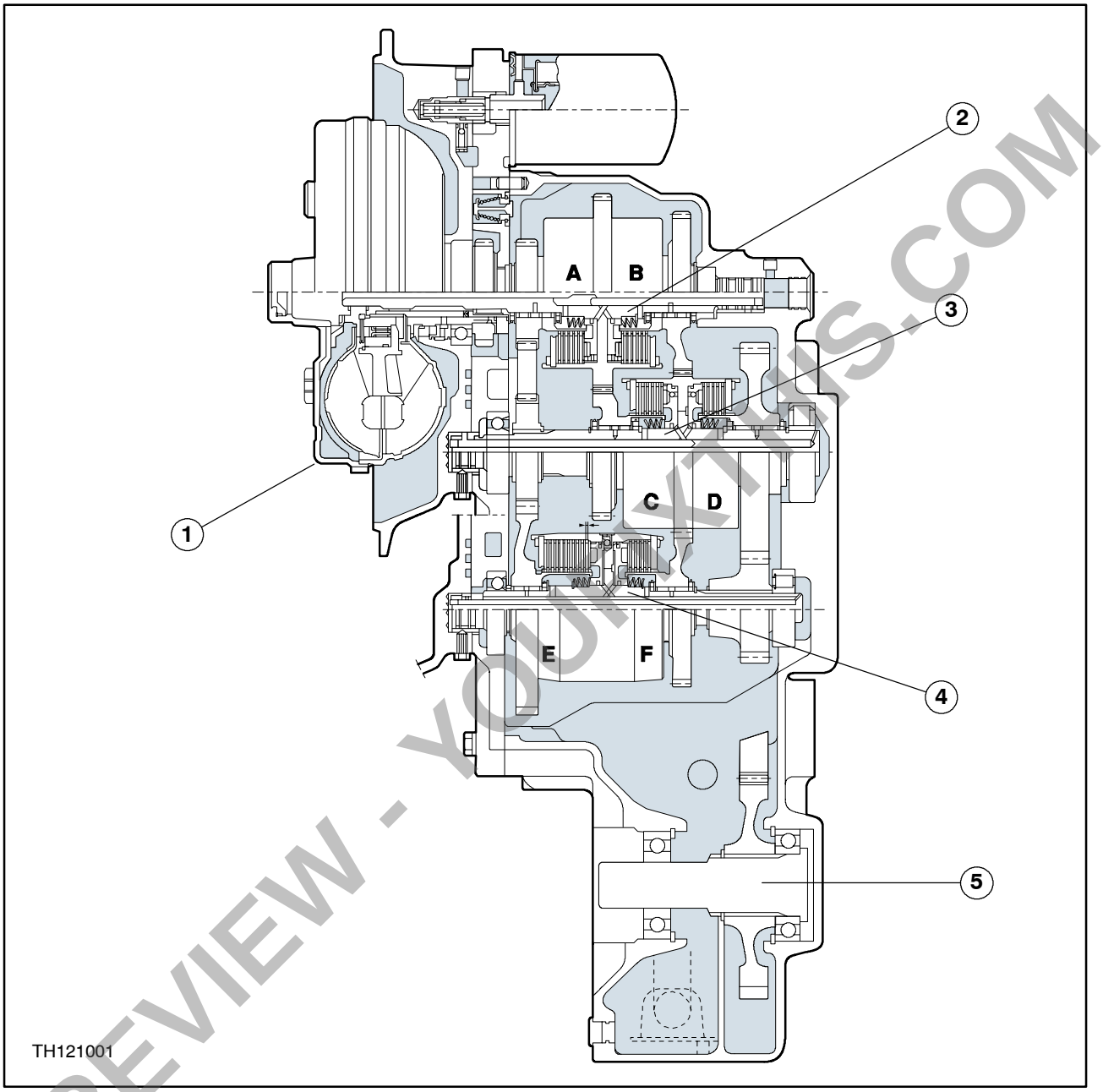


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GEARBOX ASSEMBLY

The gearbox comprises five main assemblies



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1. The converter
2. The input shaft and directional clutches:
   A – Reverse
   B – Forward
3. The output shaft with C (4th speed) and D (3rd speed) clutch assemblies
4. The lower shaft with E (1st speed) and F (2nd speed) clutch assemblies
5. The output shaft to the idler gear case

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TROUBLESHOOTING

The engine fails to start

Cause	Remedy
1. Batteries partially exhausted.	1. Check; recharge batteries and replace, if required.
2. Battery terminal connections corroded or loosen.	2. Clean; check, tighten nuts and, if required, replace excessively corroded terminals and nuts
3. Wrong timing of injection pump on the engine.	3. Set correct timing of injection pump on engine.
4. Accumulation of dirt or water in fuel lines.	4. Disconnect lines and injection pump and clean accurately. If necessary, clean and dry fuel tank.
5. Empty fuel tank.	5. Refuel.
6. Presence of air in fuel lines.	6. Check fuel pump and replace if required.
7. No fuel supply to injection pump.	7. Check lines, connections, fuel pump, filters and injection pump to ascertain presence of air, the bleed the system.
8. Starter motor damaged.	8. Repair or replace starter motor.
9. Cold starting system inefficient.	9. Check or replace cold starter.

The engine stalls

Cause	Rimedio
1. Low idle too low.	1. Adjust low idle.
2. Irregular deliveries by injection pump.	2. Check calibration of deliveries on bench.
3. Accumulation of dirt and water in fuel lines.	3. Disconnect lines and injection pump and clean accurately. If necessary, clean and dry fuel tank.
4. Clogged fuel filters.	4. Replace filter integral cartridges.
5. Abnormal valve clearance.	5. Adjust valve clearance.
6. Burnt or cracked valves.	6. Replace valves.
7. Presence of air in fuel lines.	7. Check lines, connections, fuel pump, filters and injection pump to ascertain presence of air, the bleed the system.
8. Injection pump drive damaged.	8. Replace damaged parts.

The engine is overheating

Cause	Remedy
1. Inefficient cooling system pump.	1. Overhaul pump and replace, if necessary.
2. Inefficient thermostat	2. Replace thermostat.
3. Radiator partially inefficient.	3. Eliminate possible scaling by flushing, check and repair possible leakages from pipes.
4. Scaling in the coolant passages in cylinder head and cylinder block.	4. Flush accurately

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ENGINE OVERHAUL ON BENCH

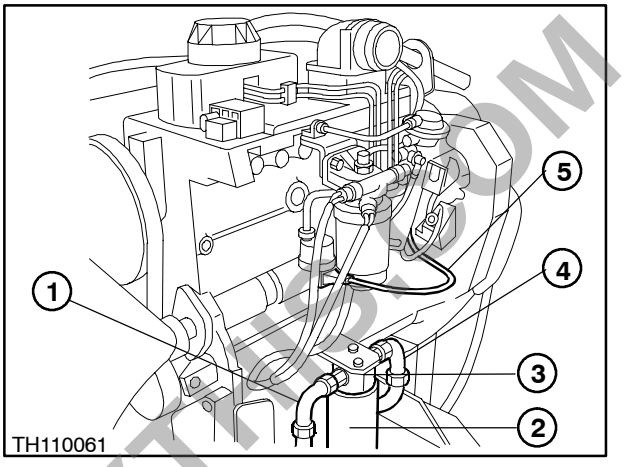
Engine disassembly

Drain the engine oil by removing the sump plug and the filler cap on the cylinder head cover.

Remove the fan group from the fan pulley.

To install bracket 380000661 to the engine to secure it on the engine overhaul stand proceed on the left side of the engine:

- remove oil filter (2) from support (3) using tool 380000670;
- remove oil pipes (1) and (4) of filter support (3);
- remove support (3);
- remove electric harness (5).



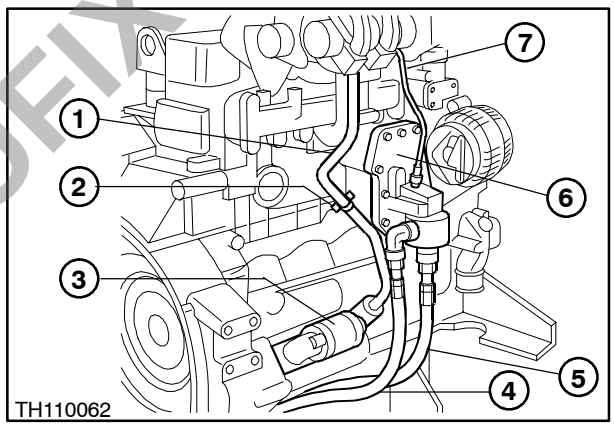
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To install bracket 380000661 on the right side of the engine, remove:

- starter motor (3);
- oil return (1) securing bracket (2);
- oil return pipe (1) relative to the turbine;
- remove oil pipes (4) and (5) from heat exchanger group (6).

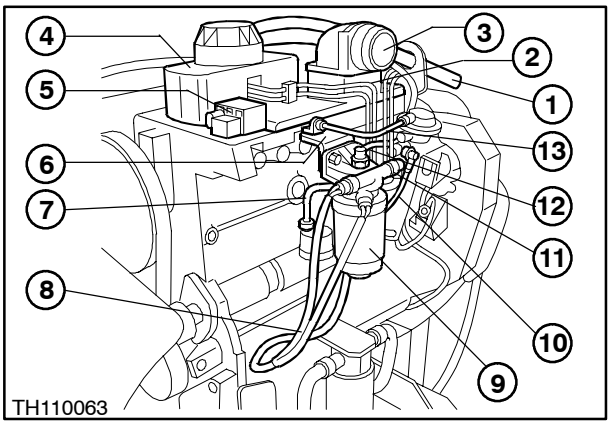
Secure the engine to rotary stand 380000301

- disconnect turbine lubrication delivery pipe (7)



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- disconnect the engine oil fumes recovery pipe from blow-by (1);
- remove rocker arm cover (4);
- remove electric harness (8);
- remove fuel filter (9);
- remove intake manifold (3);
- remove heater (2);
- remove heater (5) controller;
- remove LDA system pipe (13);
- remove quick release pipes (7), (10), (11) and (12) following the notices provided in figure 51;
- remove fuel filter support (6).



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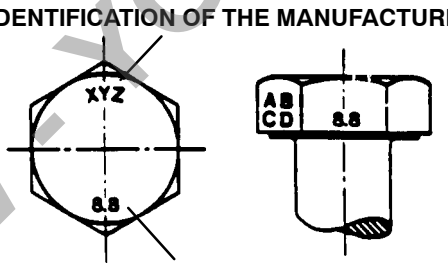
MINIMUM TIGTENING TORQUES FOR FASTENERS

IN NEWTON-METRES (Nm)
FOR NORMAL INSTALLATION APPLICATIONS

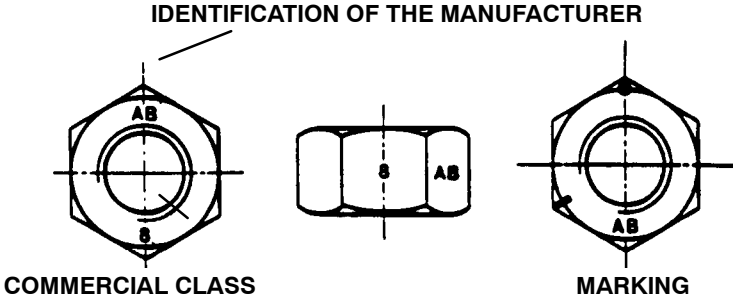
METRIC BOLTS AND LOCK NUTS

NOMINAL DIMENSION	CLASS 5.8		CLASS 8.8		CLASS 10.9		LOCK NUT CL 8 with BOLT CL 8.8
	NOT PLATED	PLATED Zn/Cr	NOT PLATED	PLATED Zn/Cr	NOT PLATED	PLATED Zn/Cr	
M4	1.7	2.2	2.6	3.4	3.7	4.8	1.8
M6	5.8	7.6	8.9	12	13	17	6.3
M8	14	18	22	28	31	40	15
M10	28	36	43	56	61	79	30
M12	49	63	75	97	107	138	53
M16	121	158	186	240	266	344	131
M20	237	307	375	485	519	671	265
M24	411	531	648	839	897	1160	458

IDENTIFICATION
HEX SCREWS (WITHOUT NUT) AND ROUND HEAD BOLTS
CLASS 5.6 AND HIGHER



HEX NUTS AND TIGHTENING NUTS
CLASS 05 AND HIGHER



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TELEHANDLER TELESCOPIC LIFTER

LUBRICANTS AND COOLANTS

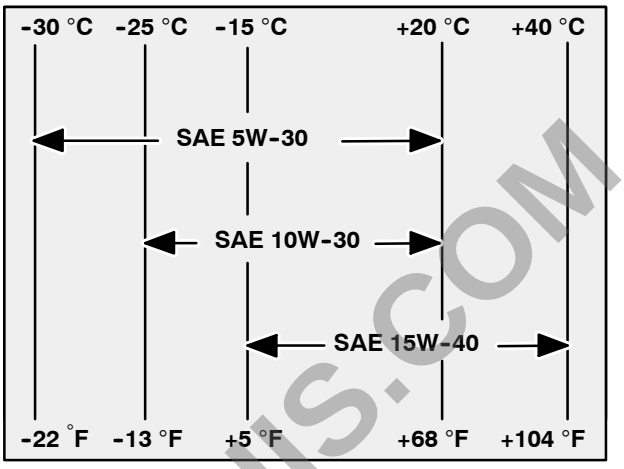
Engine oil correct viscosity grade depends on ambient temperature. Refer to the table on the right for selecting engine oil for your machine.

NOTE: *In areas with long periods of extreme temperature, local lubrication procedures are admissible, such as using SAE 5W30 where there are extremely low temperatures or SAE 50 where there are extremely high temperatures.*

Sulphur contents in fuel.

Engine oil replacement interval is shown in Section 3. Local fuel can however have a high sulphur content: in this case engine oil replacement interval must be changed as follows:

Sulphur contents in %	***Oil replacement interval***
Below 0.5	*Normal*
05.5 to 1.0	*Half the normal*
Over 1.0	*One fourth the normal*



NOTE: *It is advised to use fuel with sulphur contents below 1.3%*

SUGGESTED FLUIDS AND THEIR APPLICATION	International Specification	Quantity	Ambient Temperature (°C)
Oil – ENGINE CASE Nº 1 15W40 CASE Nº 1 10W30	ACEA E5 API CH-4, CG-4/SL	7,6 litres (including engine oil filter)	From –10 to +50
Oil – POWERSHIFT TRANSMISSION TCH	ATF Type A Suffix A ALLISON C4	12,9 + 4 litres (lines and radiator)	
Oil – FRONT AND REAR AXLE FUCHS TITAN GEAR LS 90 85W90	API GL5 e API GL5 LS GO 90 LS ZF TE-ML 05	7 litres	From -20 to +50
Oil – DROP BOX 135H EP 80W90	API GL5	0,75 litres	
OIL – FRONT/REAR AXLE HUB 135H EP 80W90	API GL5	0,65 litres	
OIL – FRONT LOADER HYDRAULIC SYSTEM Hydraulic Fluid	ISO VG 46 DIN 51524	180 litres	
ENGINE RADIATOR Water Premium Antifreeze	H_2O	12 litres 12 litres	
BRAKE CONTROL CIRCUIT – OIL LHM Fluid	M6C 59-A	1 litre	
CRANE ARM SHOES – GREASE 251H EP	NLGI 2	As required	
GENERAL – GREASE 251H EP	NLGI 2	As required	From -40 to +50
CONDITIONER COMPRESSOR Freon R134a			
FUEL Diesel Fuel		135 litres	

NOTE: *Fluid and lubricant quantities are meant as overall. Drained fluid or lubricant quantities might not correspond to those stated because part of the oil or fluid could be trapped by some machine components.*

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4. SETTING OF POINT 0% (conditions):
   - boom fully retracted
   - forks lowered (just raised from the ground)
   - no load applied
   - press the test button once only; the buzzer gives a short sound signal indicating that the setting of point 0% has occurred
   - the red and yellow leds on the display come ON the buzzer starts sounding again intermittently (the system is ready for the setting of point 100%)

5. SETTING OF POINT 100% (conditions):
   - load a 2000 kg weight (with boom fully retracted)
   - extract the boom in an horizontal position until the rear wheels start to raise (unstable equilibrium)
   - retract the boom 600 mm (condition of 100% safety)
   - press the test button once only, the buzzer gives a short sound signal indicating that the setting of point 100% has occurred

PROCEDURE OF CALIBRATION ACCOMPLISHED

NOTE: if the buzzer sounds in a prolonged manner, it indicates that an error occurred during the calibration procedure, thus the procedure must be repeated. The system provides 5 minutes to perform a complete calibration procedure. Should this time be exceeded, the system is zeroed and returns to the initial condition.
The calibration must be performed without sharp movements and jumps on the rear axle.

Error indications

In the event the controller monitors a malfunction of the sensor, relative to installation problems, wiring or it is unable to provide guaranteed repeatability of the measurement, the buzzer sounds constantly and all the leds of the display flash. The typology of the malfunction monitored can be read by pressing the "Test" button providing a diagnosis of the system from the operator's cab.

Normal operational errors

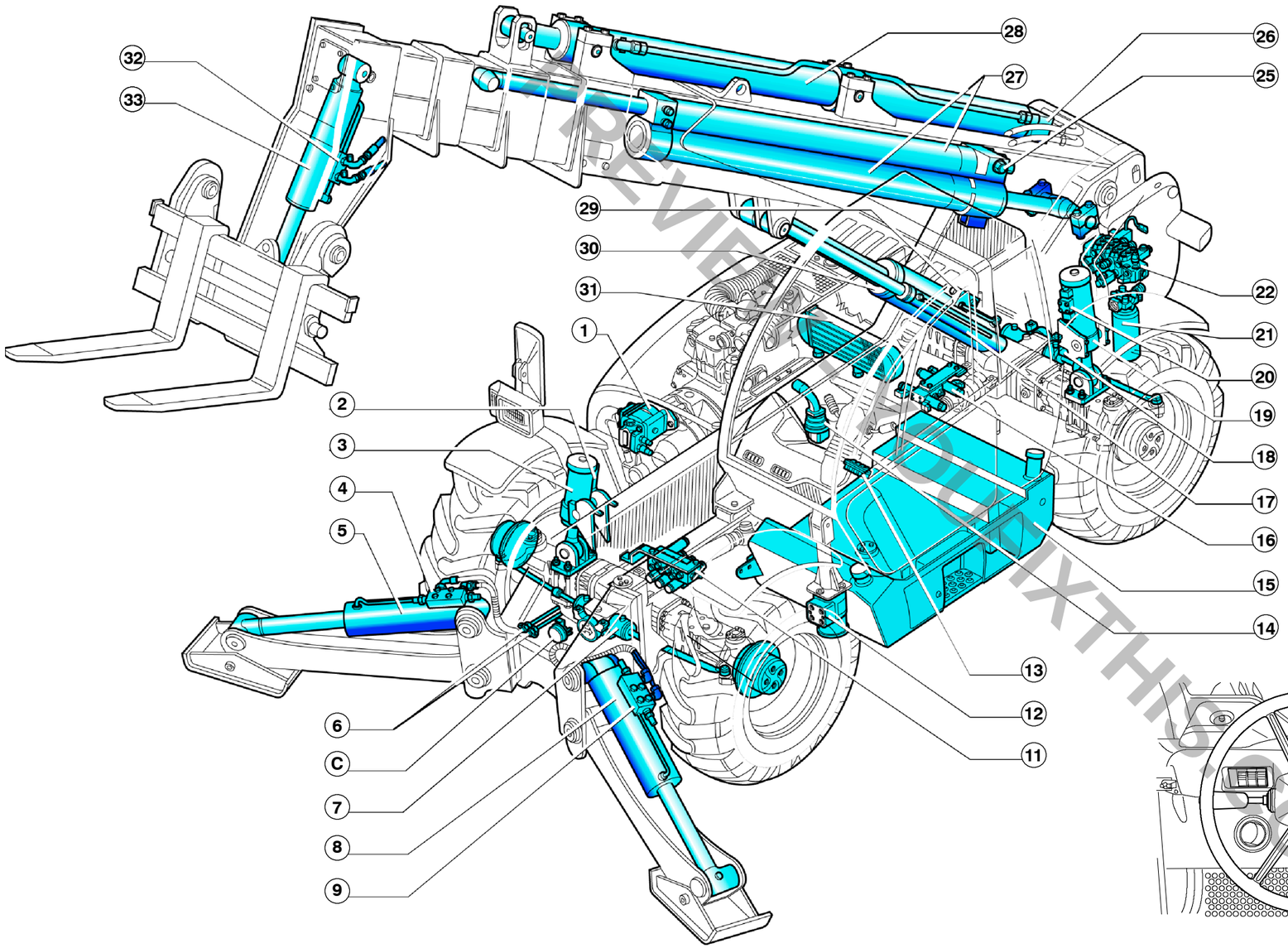
		The leds are numbered from the bottom upward						
Ref.	Error code	LED 1	LED 2	LED 3	LED 4	LED 5	LED 6	LED 7
101	Current out of scale	1	1	0	0	0	0	1
		Green	*Green*	*Green*	*Yellow*	*Yellow*	*Red*	*Red*

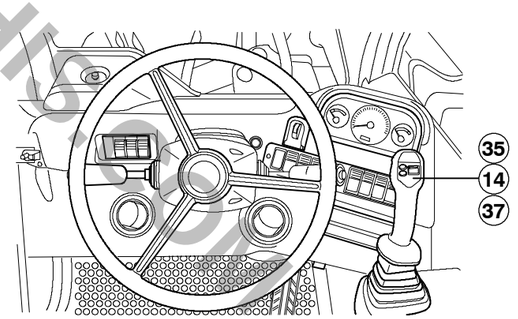
Errori di calibrazione

		The leds are numbered from the bottom upward						
Ref.	Error code	LED 1	LED 2	LED 3	LED 4	LED 5	LED 6	LED 7
102	Min >/= Max	1	1	0	1	0	1	0
103	Min + stab >/=	1	1	0	1	1	0	1
	Max							
		Green	*Green*	*Green*	*Yellow*	*Yellow*	*Red*	*Red*

The SAR signals error conditions of normal operations during the calibration procedure as well.

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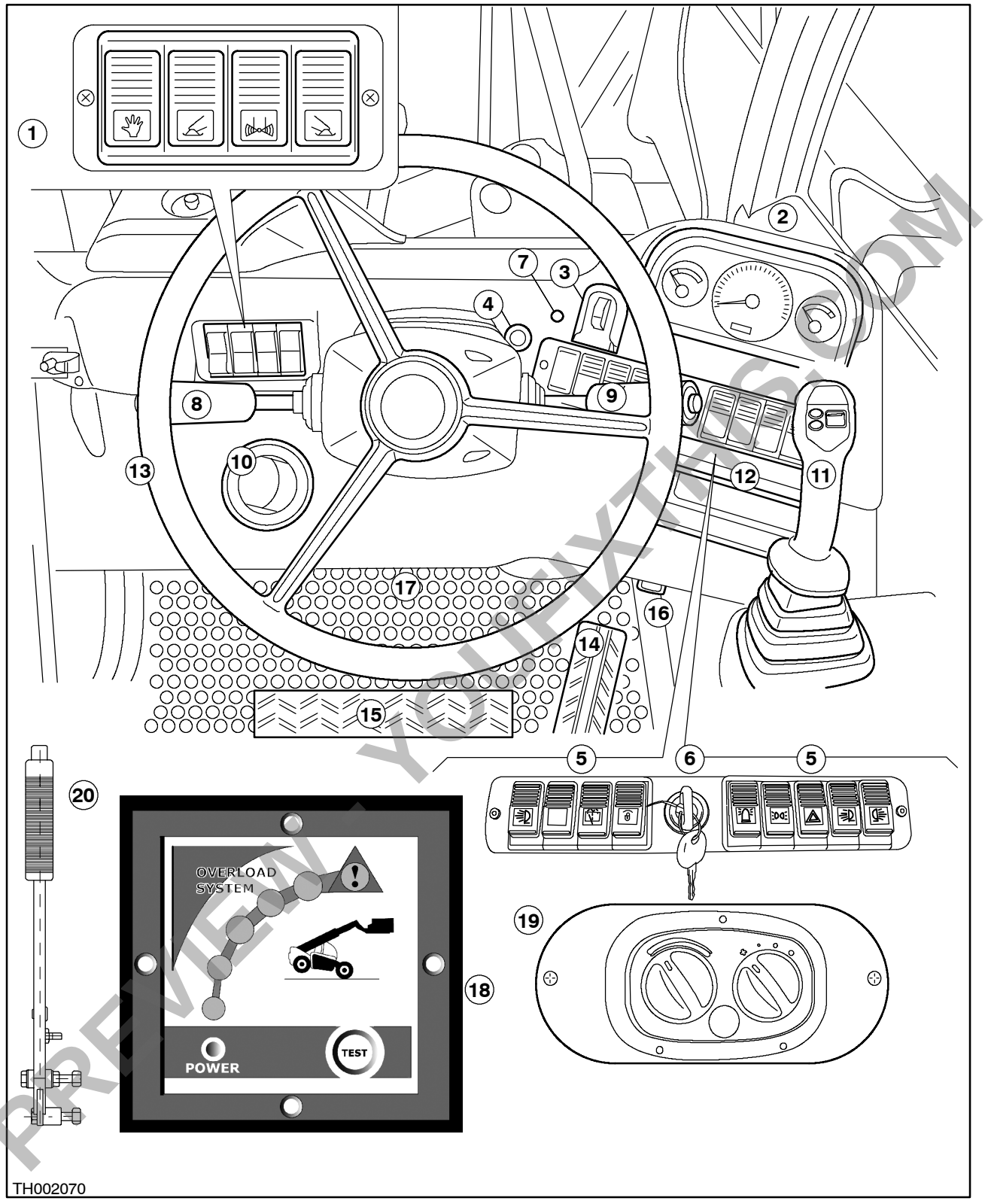




Arrangement of hydraulic system components, complete with:
- **steering**
- **telescopic boom**

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POWERSHIFT GEARBOX 4 X 3

Gearbox control

The microprocessor-controlled gearbox assembled on this machine is called Powershift.
The Powershift gearbox lever is assembled on the left side of the steering column and it enables the electronic selection of four forward gears and three reverse gears.



1

DRIVING WITH THE POWERSHIFT GEARBOX

Neutral position

Select the neutral position by shifting the gearbox level to the centre.

Selecting the forward gear

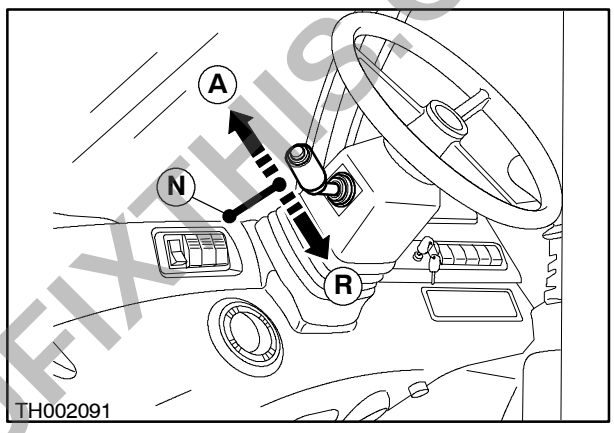
To select the forward gear, pull the lever towards the steering wheel and push it upwards.

NOTE: *Actual forward gear selection at this time depends upon vehicle conditions; if it is moving, the microprocessor will take into consideration speed on road and running direction before any gear shift can take place.*

Selecting the reverse gear

To select the reverse gear pull the lever towards the steering wheel and push it downwards.

NOTE: *Actual reverse gear selection at this time depends upon vehicle conditions; if it is moving, the microprocessor will take into consideration speed on road and running direction before any gear shift can take place.*



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GENERAL

NOTE: *"The Manufacturer" pursues a policy of constant improvements, thus reserves the right to modify at any moment technical and design data, without notice, and without any obligation to modify the machines previously manufactured.*

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Max. capacity (kg) at 500 mm from fork stop	4000	4000	4000	4000	4000	4000	4000	4000
Capacity at max. height (kg)	2600	3600	4000	2800	3000	3600	700	2500
Extension at max. height (m)	1.200	0.500	0.000	1.000	0.500	0.300	2.000	1.000
Max. longitudinal extension (m)	8.650			9.330			12.540	
Capacity at max. extension (kg)	700	1700	1800	650	1400	1500	0	450
Weight (kg)	11050			11970			12340	
Length (m)	5.850			6.070			6.135	

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SAFETY RULES

PAY ATTENTION TO THIS SYMBOL



This alert symbol announces important messages involving your safety.
Read carefully the safety instructions listed and follow the precautions recommended to avoid potential risks and to safeguard your health and your safety.
You will find this symbol in the text of this Manual with the following key words:



***WARNING** - Cautions intended to avoid improper repair interventions involving potential consequences for the safety of the personnel performing the repairs.*

***DANGER** - These warnings qualify specifically potential dangers for the safety of the operator or other persons directly or indirectly involved.*

AVOID ACCIDENTS

Most accidents, whether they occur in workshop, on the farm, at home or on the road, are caused by the failure of some individuals to follow simple and fundamental safety rules and precautions. For this reason MOST ACCIDENTS CAN BE PREVENTED by recognising the real cause and doing something about it before the accident occurs.

Regardless of the care used in the design and construction of any type of equipment, there are many conditions that cannot be completely safeguarded against without hindering reasonable accessibility and efficient operation.

A careful operator is the best insurance against an accident.

The complete observance of one simple rule would prevent many serious accidents.

DANGER. Never attempt to clean, lubricate or maintain a machine while it is in motion.

SAFETY RULES

SAFETY RULES

◊ Read and heed all safety rules before any intervention.

◊ Do not wear rings, wristwatches, jewellery, and loose or hanging apparels, such as ties, torn clothing, scarves, unbuttoned or unzipped jackets that can catch on moving parts. Wear proper safety equipment as recommended for the job. Examples: hard hat, heavy gloves, ear protection, safety glasses or goggles, reflector vests, respirator. Consult your employer for specific safety equipment requirements.

◊ Do not perform any service operation on the machine with a person seated in the operator's compartment, unless he is an authorised operator co-operating in the operation to be performed.

◊ Never attempt to operate the machine or its tools from any position other than seated in the operator's seat.

◊ Never perform any intervention on the machine with engine running unless this is prescribed.

◊ Cut-off the engine and make sure that all pressures in the hydraulic systems are released before removing caps, covers, valves etc.

◊ All service interventions must be performed with the utmost care and attention.

◊ Shop and/or field service platforms or ladders must be constructed and maintained in accordance with local and national regulations.

◊ Disconnect the batteries and tag all controls to signal that an intervention is in progress. Block the machine and all equipment that must be lifted.

◊ Do not check nor refill fuel tanks, as well as batteries, nor use starting fluid while smoking or near open flames since these fluids are flammable.

◊ Brakes are inactive when manually released for service interventions. Under such circumstances it is necessary to maintain the control of the machine using appropriate blocks or similar devices.

◊ The fuel-filling nozzle must be kept constantly inside the filling neck. Keep this contact from the beginning to the end of the fuelling operation to avoid the possibility that sparks due to static electricity are generated.

◊ Use only designated towing or attaching points. Use care in making attachments. Make sure pins and/or locks are secure before pulling. Stay clear of drawbars, cables or chains under load.

◊ To move a disabled machine, use a trailer or a low-boy, if available.

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SECTION 21 - POWERSHIFT GEARBOX

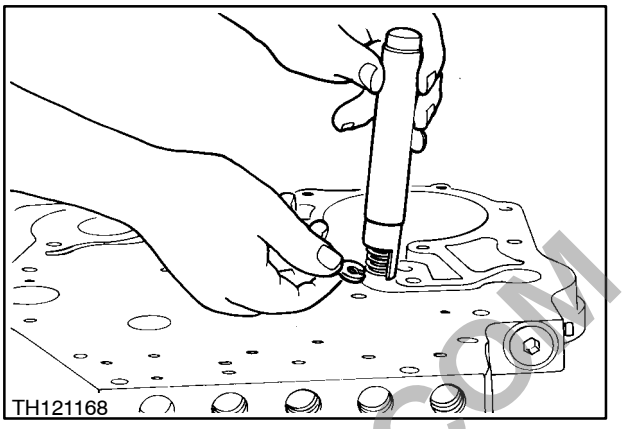
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Compress the safety valve using a suitable hand tool and remove the retaining washer. Remove the spring, and from the other side of the manifold plate, remove the poppet valve.



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Reassembly of the manifold plate

Reassemble in the reverse order of disassembly.

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