TABLE OF OIL AND COOLANT QUANTITIES

RESERVOIR	KIND OF FLUID	AMBIENT TEMPERATURE	CAPACITY (ℓ)	
		–30 –20 –10 0 10 20 30 40 50°C	Specified	Refill.
Crankcase sump	OIL • API CD	SAE 10W SAE 20W-20 SAE 30 SAE 40 SAE 15W-30 SAE 15W-40	12.5	12.5
Hydraulic circuit	OIL • API CD	SAE 10W	150	74
Final drive (each)	OIL • API GL5	SAE 80W/90	0.8	0.8
Swing machinery	OIL • API GL5	SAE 80W/90	4	4
Fuel tank	FUEL	✻ ASTM D975 N. 2	125	—
Engine coolant system	WATER + ANTI-FREEZE		18	—
	WATER		18	—
	PERMANENT LIQUID		18	—

✻ ASTM D975 N. 1

ASTM: America Society of Testing and Materials
SAE: Society of Automotive Engineers
API: American Petroleum Institute
MIL: USA Military Specification
CCMC: Common Market Constructors Committe

Specified capacity: Total amount of oil including oil for components and oil in piping.
Refill capacity: Amount of oil needed to refill system during normal inspection and maintenance.

NOTE:

(1) When fuel sulphur content is less than 0.5%, change oil in the oil pan ebery periodic maintenance hours described in operation and maintenance manual.
Change oil according to the following table if fuel sulphur content is above 0.5%.

Fuel sulphur content	Oil change interval in engine oil pan
0.5 to 1.0%	1/2 of regular interval
Above 1.0%	1/4 of regular interval

(2) When starting the engine is weathers temperature below 0°C, be sure to use engine oil SAE 10W, SAE 20W-20, even if weather temperature goes up to 10°C day time.

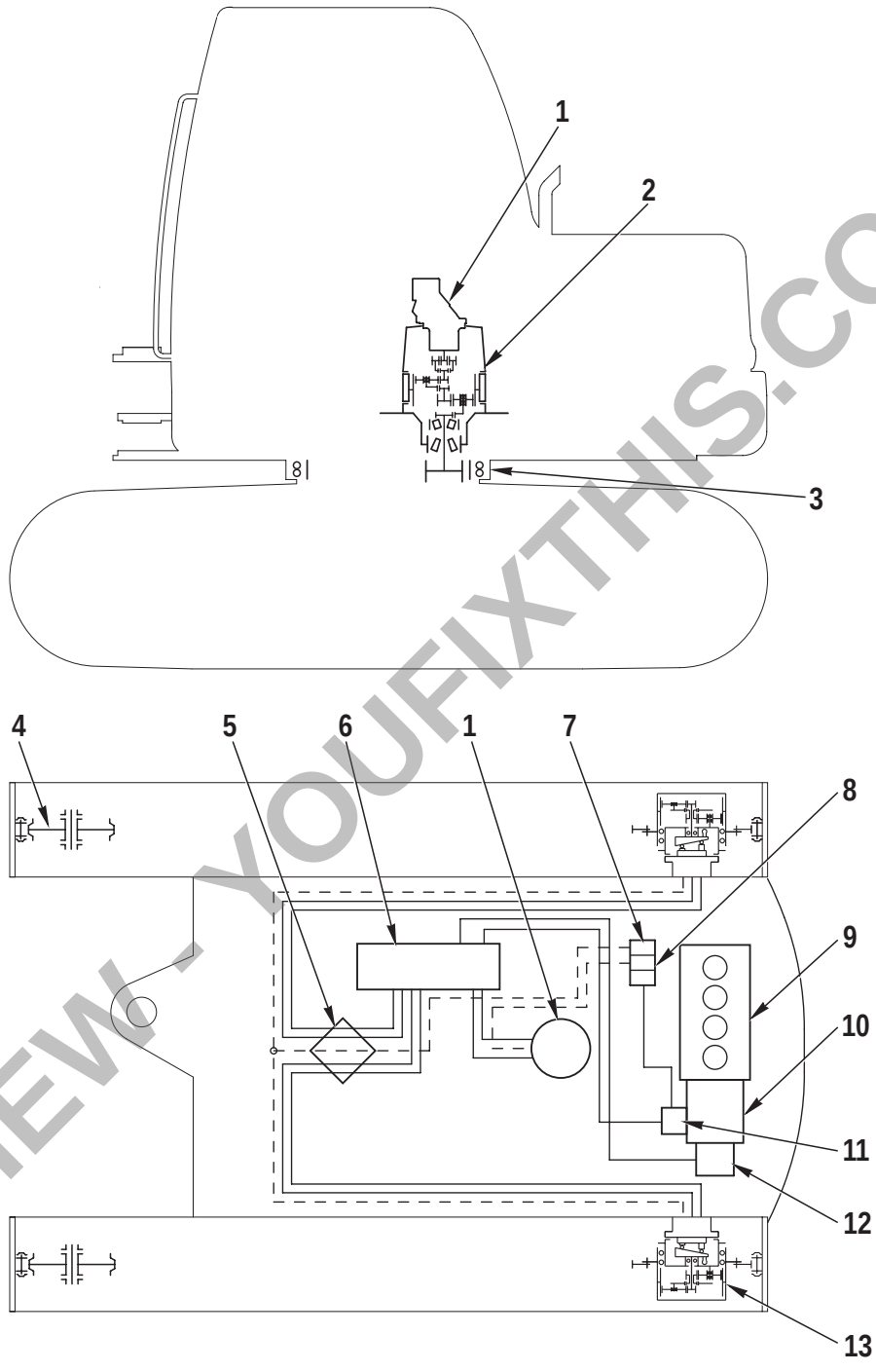
(3) Use classification CD as engine oil, if use classification CC, reduce the engine oil change interval to half.

(4) Use original products, which have characteristics specifically formulated and approved for the engine, the hydraulic circuit of equipment and for reductions.

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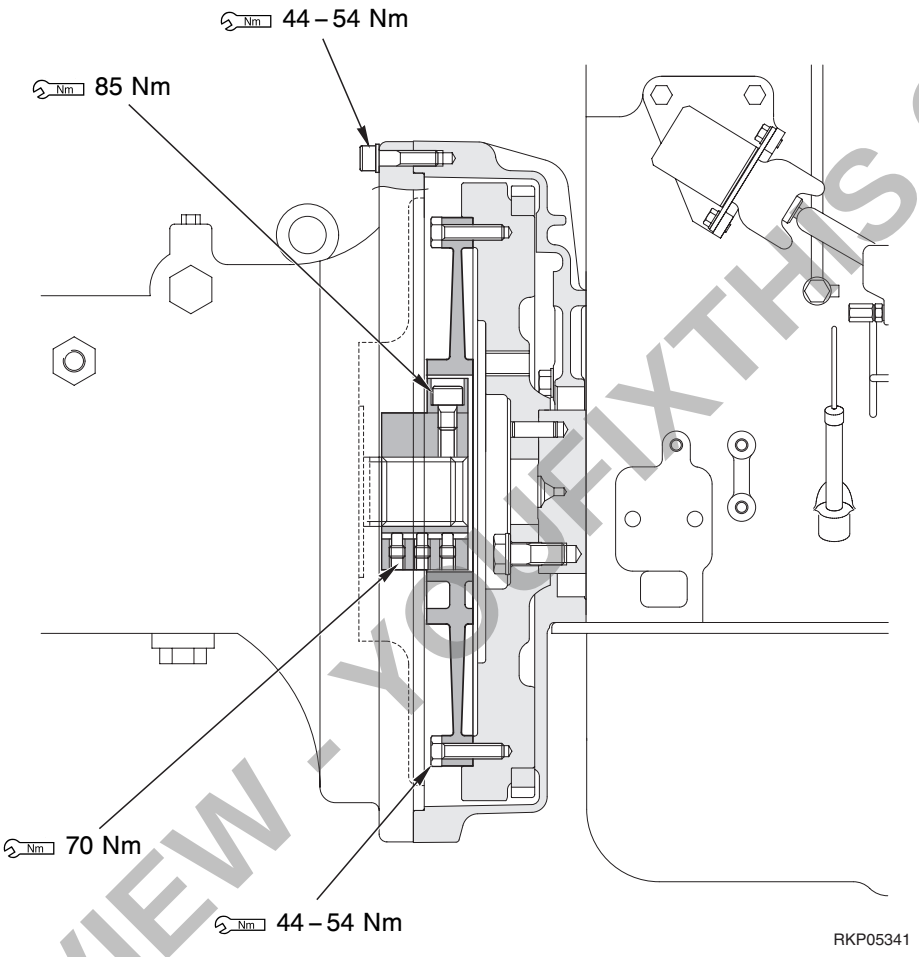
POWER TRAIN



1. Swing motor
2. Swing machinery
3. Swing circle
4. Idler
5. Center swivel joint
6. Control valve
7. Travel acceleration solenoid valve
8. Brake swing solenoid valve
9. Engine
10. Main hydraulic pump
11. Servocontrol feed unit
12. Gear pump
13. Travel motor

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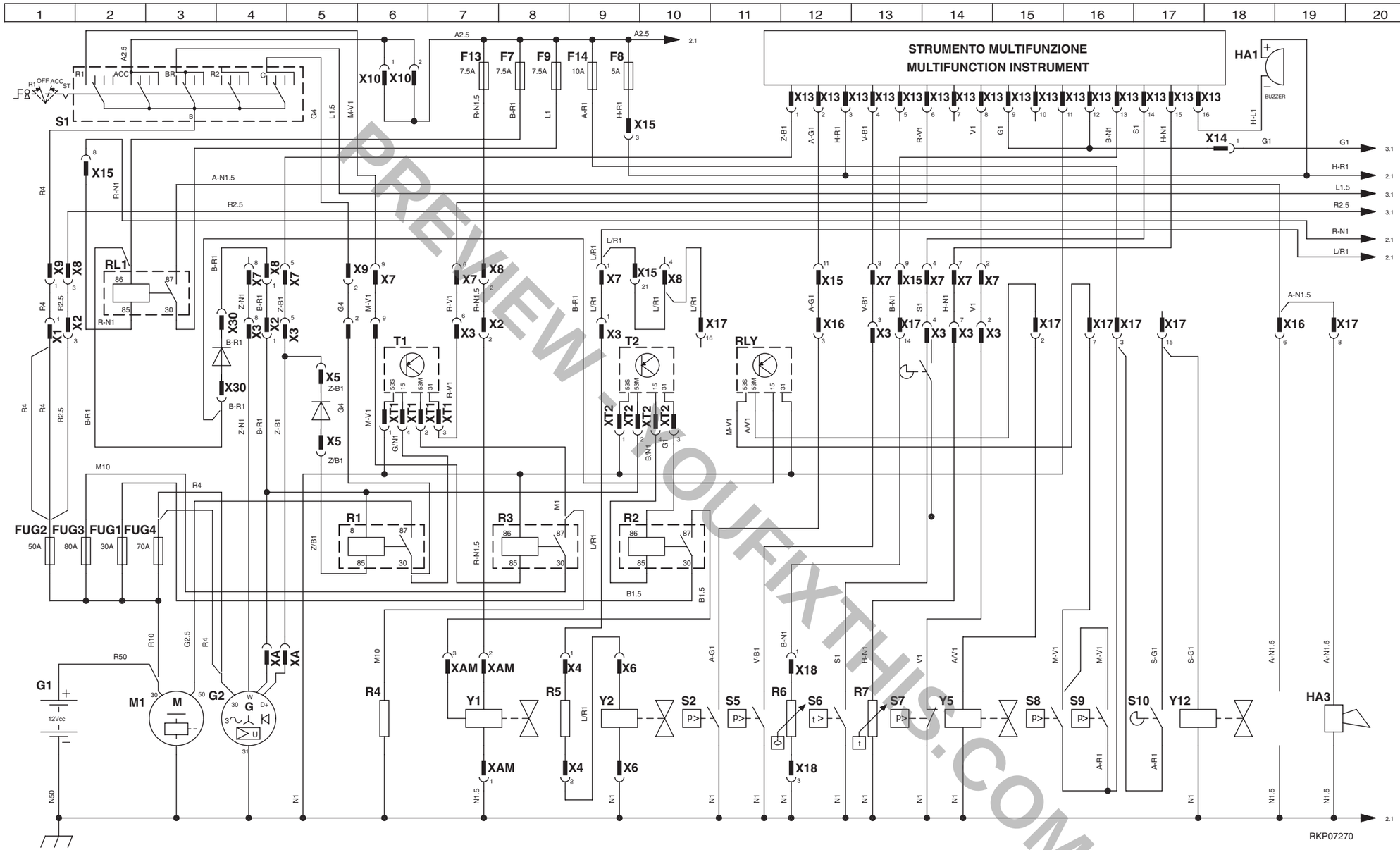
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ELECTRICAL CIRCUIT DIAGRAM (1/3)



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COMPONENTS

G1 - BATTERY
G2 - ALTERNATOR
HA1 - BUZZER
HA3 - HORN LIGHT
M1 - STARTING MOTOR
R1 - STARTING RELAY
R2 - STOP MOTOR RELAY
R3 - PRE-HEATER START RELAY
R4 - PRE-HEATER START
R5 - RESISTOR
R6 - FUEL LEVEL INDICATOR
R7 - WATER TEMPERATURE SENDER
RL1 - HORN RELAY
RLY - TIMER SWING
S1 - SWITCH PANEL
S2 - BRAKE PRESSURE SWITCH
S5 - CLOGGING FILTER PRESSURE SWITCH
S6 - HIGH TEMPERATURE WATER THERMOSTAT
S7 - LOW PRESSURE MOTOR OIL SWITCH
S8 - 2ND SWING PRESSURE SWITCH
S9 - 1ST SWING PRESSURE SWITCH
S10 - ARM MICRO SWITCH
T1 - PRE-HEATER TIMER
T2 - STOP MOTOR TIMER
Y1 - STOP MOTOR SOLENOID VALVE
Y2 - MODE SYSTEM SOLENOID VALVE
Y5 - SWING BRAKE SOLENOID VALVE

CONNECTORS

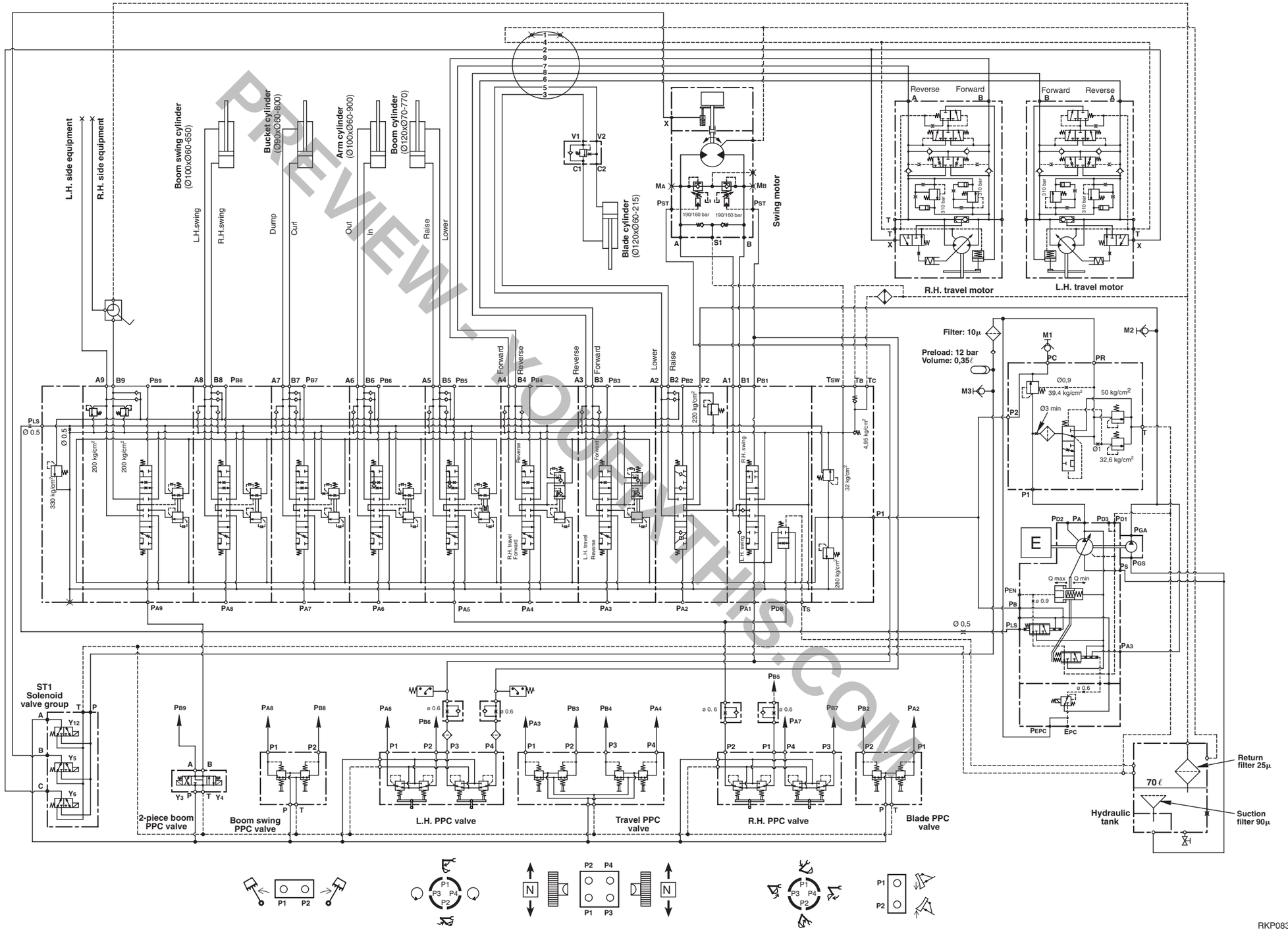
X1 - POWER 3-WAY CONNECTOR
X2 - ENGINE LINE 4-WAY CONNECTOR
X3 - ENGINE LINE 9-WAY CONNECTOR MARK
X4 - ENGINE LINE 2-WAY CONNECTOR
X5 - DIODE 2-WAY CONNECTOR
X6 - MODE SYSTEM SOLENOID VALVE 2-WAY CONNECTOR
X7 - R.H. LATERAL DASHBOARD LINE 9-WAY CONNECTOR MARK
X8 - UNIT LINE 4-WAY CONNECTOR
X9 - POWER 3-WAY CONNECTOR
X10 - POWER 2-WAY CONNECTOR
X12 - SWITCHES PANEL 12-WAY CONNECTOR
X14 - 1-WAY CONNECTOR
X15 - R.H. LATERAL DASHBOARD LINE 21-WAY CONNECTOR MARK
X16 - LEFT FRONT LIGHT 11-WAY CONNECTOR
X17 - VALVES AND RIGHT FRONT LIGHT LINE 17-WAY CONNECTOR
X18 - FUEL LEVEL SENDER 3-WAY CONNECTOR
X30 - 2-WAY CONNECTOR
XA - ALTERNATOR LINE 2-WAY CONNECTOR
XAM - STOP MOTOR 3-WAY CONNECTOR
XT1 - TIMER PRE-HEATER 4-WAY CONNECTOR
XT2 - TIMER STOP MOTOR 4-WAY CONNECTOR

FUSES

F7 - TIMER, ALTERNATOR FUSE 5 SEC. 7.5A
F8 - MULTIFUNCTION INSTRUMENT POWER FUSE 5A
F9 - HORN FUSE 7.5A
F13 - ELETTROSTOP FUSE 7.5A
F14 - SERVOCONTROL SOLENOID VALVE FUSE 10A
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FUG2 - GENERAL FUSE 50A
FUG3 - PRE-HEATHER FUSE 80A
FUG4 - ALTERNATOR FUSE 70A

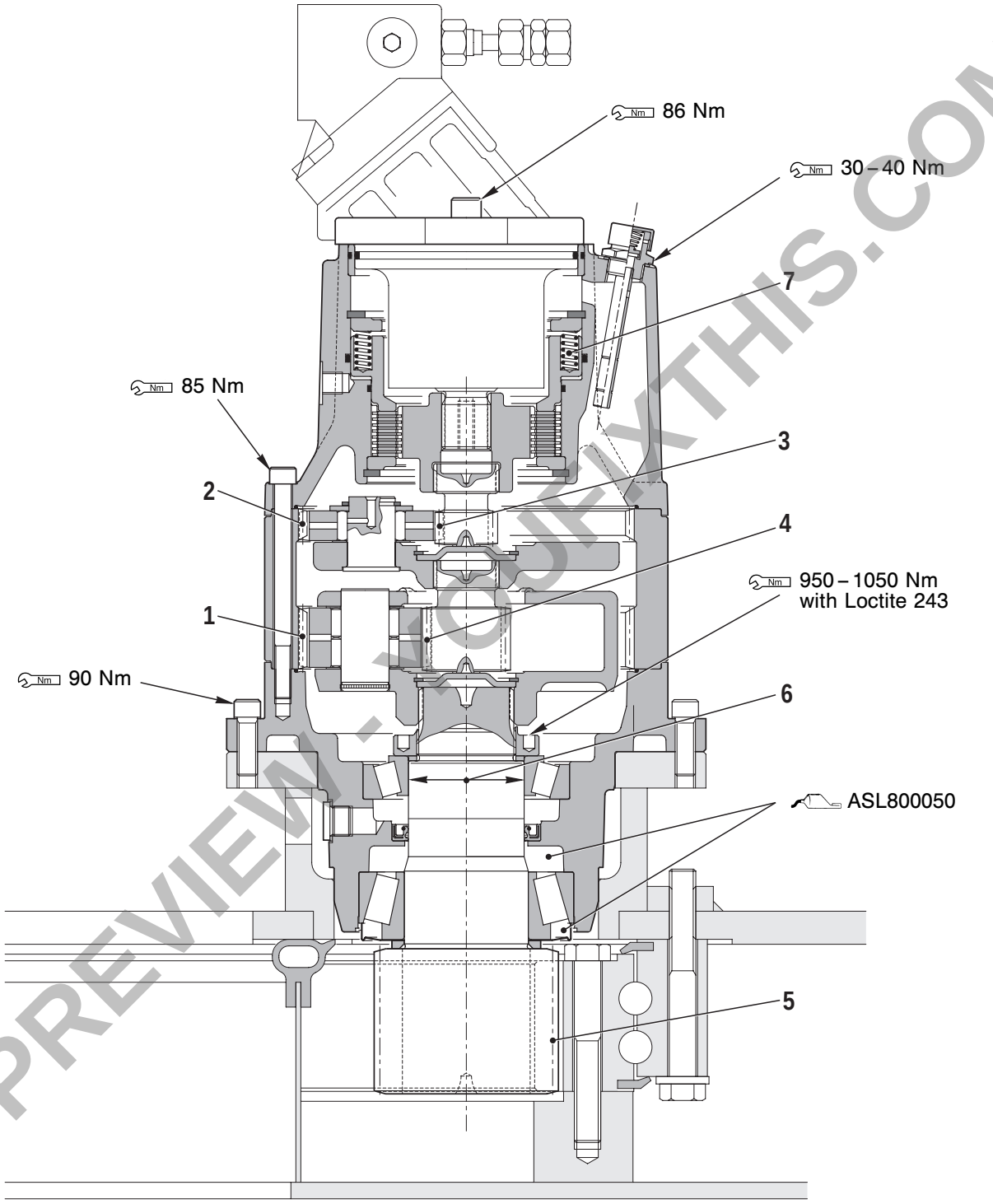
HYDRAULIC DIAGRAM

STANDARD



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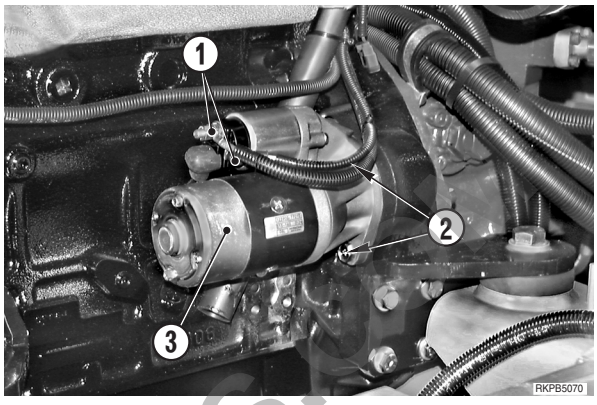
REMOVAL OF STARTER MOTOR

⚠ Disconnect the cable from accumulator negative terminal (–).

1 - Remove lower guard.

2 - Disconnect electrical cable (1).

3 - Remove screw (2) and starter motor (3). ※1



INSTALLATION OF STARTER MOTOR

- To install, reverse the removal procedure.

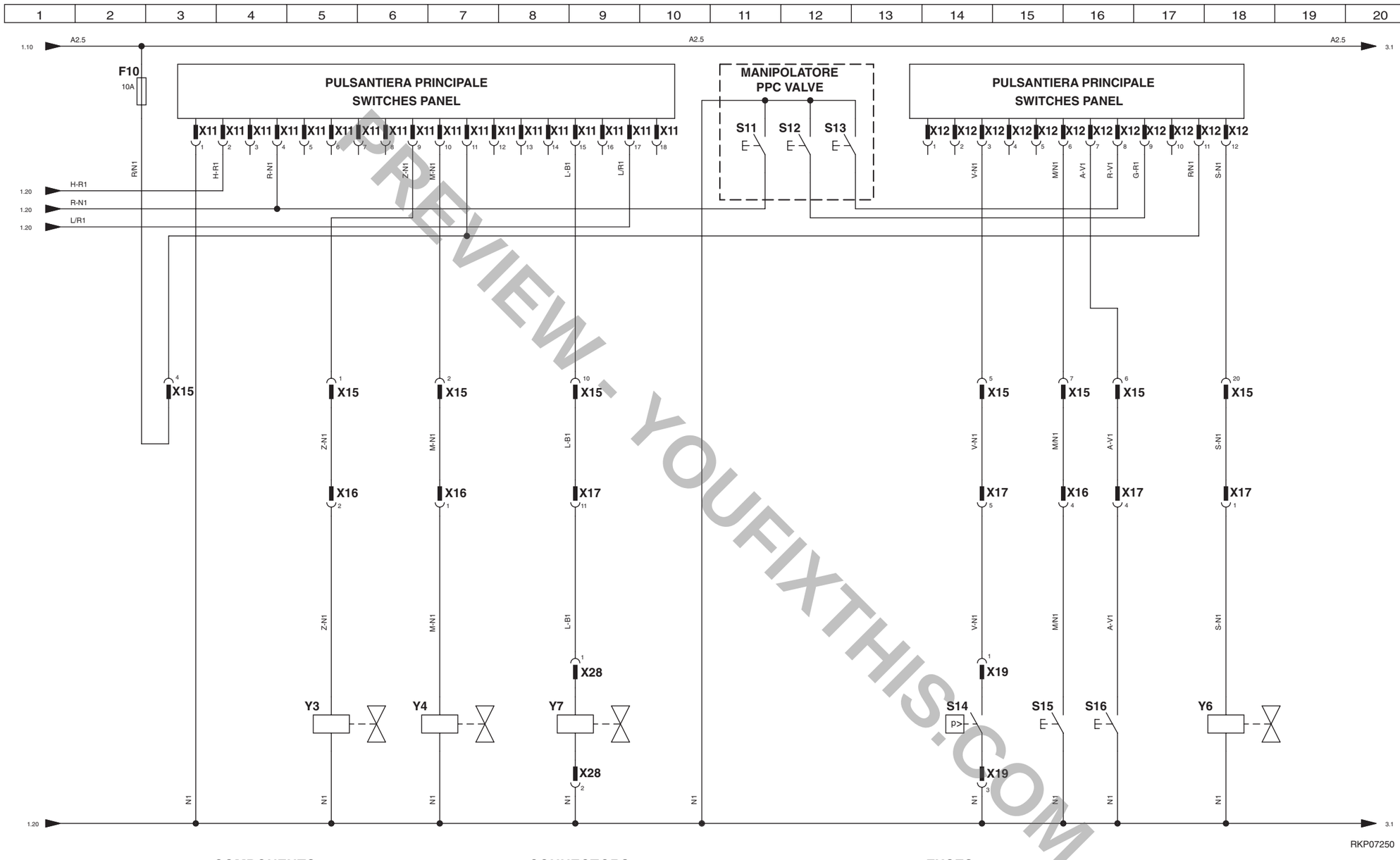
※1

Nm Screw: 78.4 – 98 Nm

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ELECTRICAL CIRCUIT DIAGRAM (2/3)



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COMPONENTS

S11 - HORN SWITCH
S12 - BUCKET SWITCH
S13 - HAMMER SWITCH
S14 - ANTI OVERTURNING PRESSURE SWITCH
S15 - HAMMER PEDAL SWITCH
S16 - PLIERS BUTTON
Y3 - BITING CRAB SOLENOID VALVE
Y4 - HAMMER SOLENOID VALVE
Y6 - ACCELERATION SOLENOID VALVE
Y7 - PLIERS SOLENOID VALVE

CONNECTORS

X11 - SWITCH PANEL 8-WAY CONNECTOR
X12 - SWICTH PANEL 12-WAY CONNECTOR
X15 - R.H. LATERAL DASHBOARD LINE 21-WAY CONNECTOR MARK
X16 - LEFT FRONT LIGHT 11-WAY CONNECTOR
X17 - VALVES AND RIGHT FRONT LIGHT LINE 17-WAY CONNECTOR
X19 - ANTI OVERTURNING PRESSURE SWICTH 4-WAY CONNECTOR
X28 - PLIERS SOLENOID VALVE 2-WAY CONNECTOR

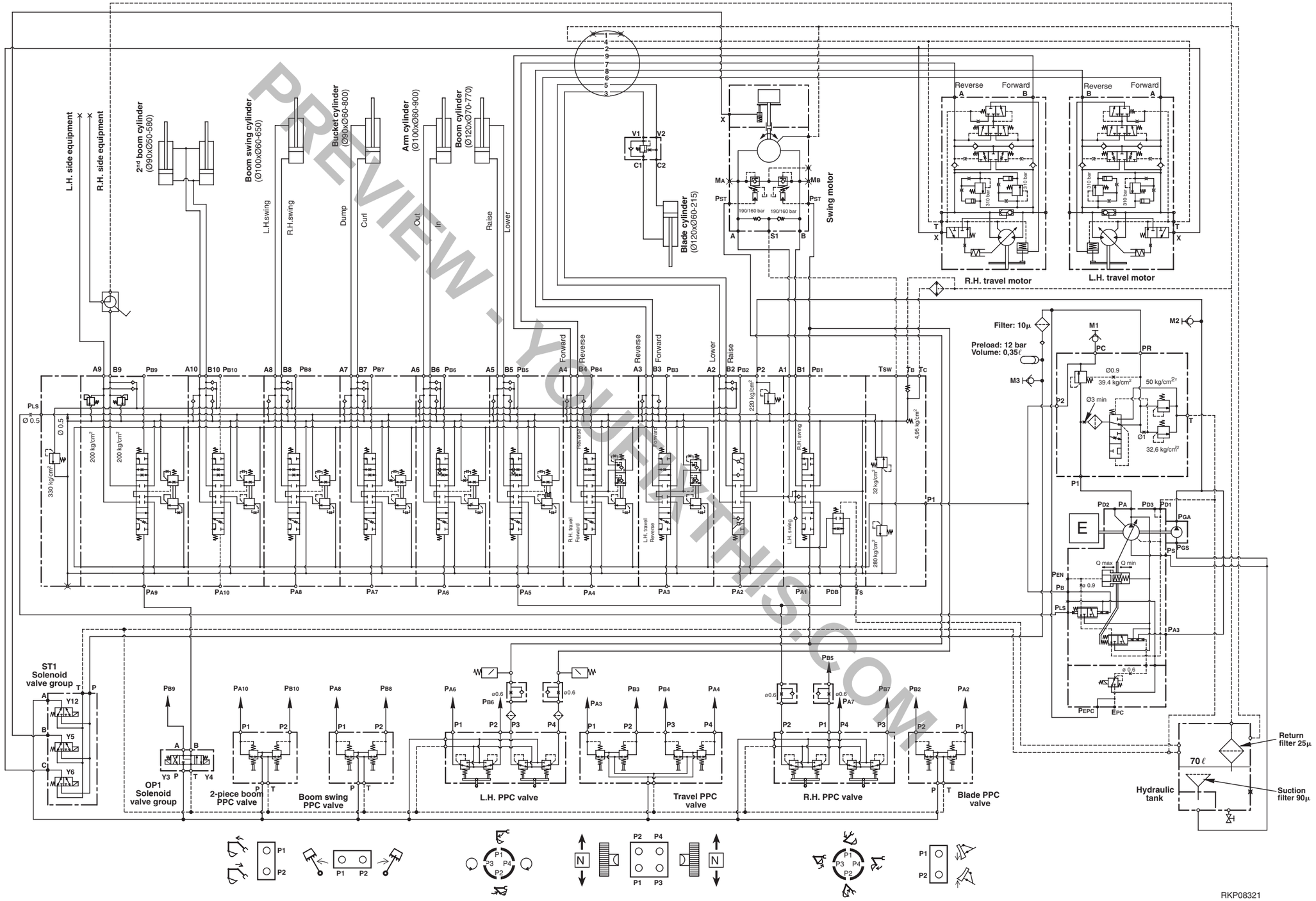
FUSES

F10 - SWICTH PANEL RELAY FUSE 10A

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HYDRAULIC DIAGRAM

WITH 2 - PIECE BOOM



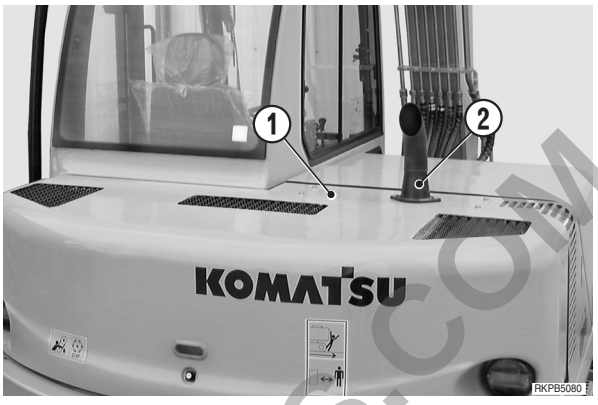
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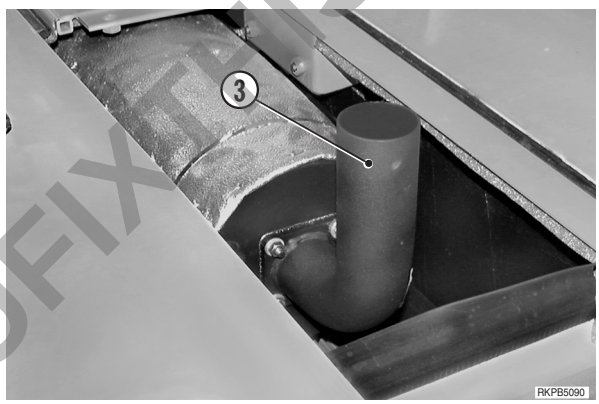
REMOVAL OF ALTERNATOR

⚠ Disconnect the cable from accumulator negative terminal (–).

1 - Remove upper cover (1) (No. 5 screws) with exhaust pipe (2).



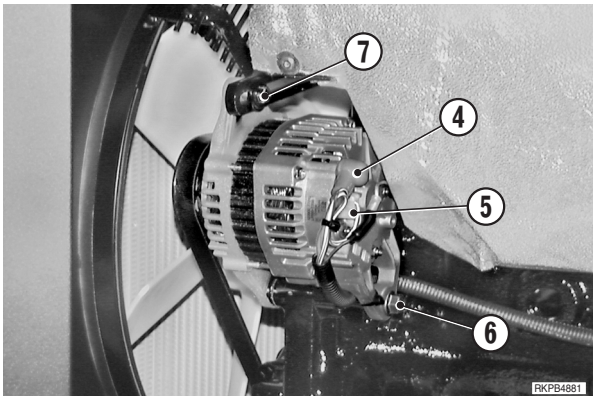
2 - Remove union (3) of the exhaust pipe. ※1



3 - Disconnect cable (4) and connector (5).

4 - Loosen bolts (6), (7) and (8) sufficiently to allow the alternator (9) to rotate.

5 - Free the pulley from the fan-belt (10) and remove alternator (9). ※2



INSTALLATION OF ALTERNATOR

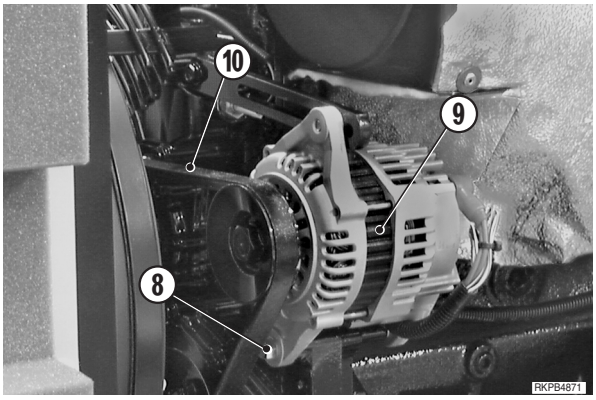
- To install, reverse the removal procedure.

※1

★ Check the union gasket of exhaust pipe.

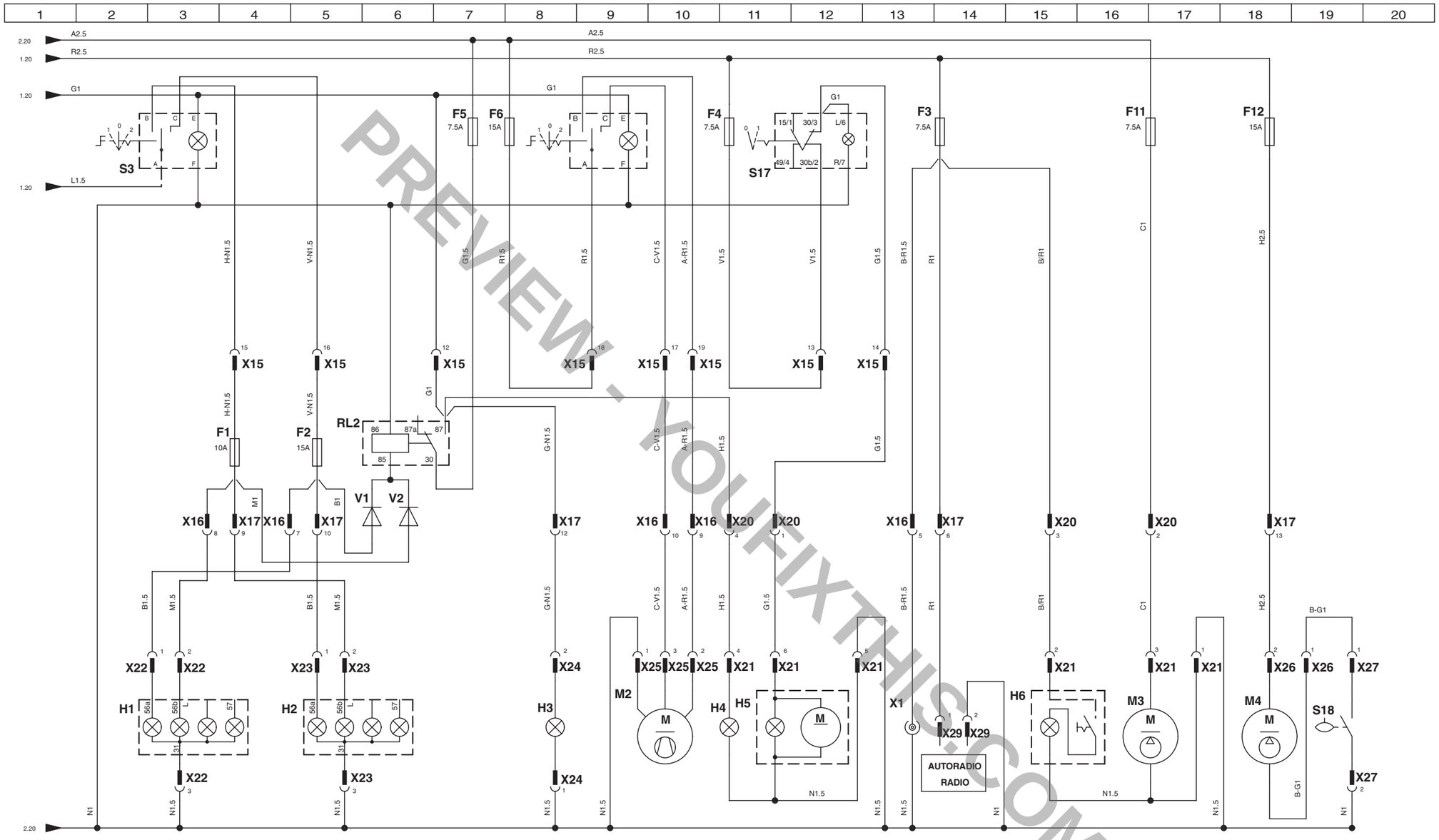
※2

★ Adjusting of the fan-belt (For details, see «20. TESTING AND ADJUSTMENTS»).



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ELECTRICAL CIRCUIT DIAGRAM (3/3)



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COMPONENTS

H1 - FRONT LEFT LIGHT
H2 - FRONT RIGHT LIGHT
H3 - WORKING LIGHT
H4 - WORKING LIGHT
H5 - BEACON LAMP
H6 - CABIN LAMP
M2 - HEATING
M3 - WASHER PUMP
M4 - TRANSFER PUMP
RL2 - ARM WORKING LIGHT RELAY
S3 - LAMP SWITCH
S17 - ROTATING LAMP SWICTH
S18 - TRANSFER PUMP SENDER
V1 - DIODE
V2 - DIODE

CONNECTORS

X1 - POWER 3-WAY CONNECTOR
X15 - R.H. LATERAL DASHBOARD LINE 21-WAY CONNECTOR MARK
X16 - LEFT FRONT LIGHT 11-WAY CONNECTOR
X17 - VALVES AND RIGHT FRONT LIGHT LINE 17-WAY CONNECTOR
X20 - LEFT FRONT LIGHT LINE 5-WAY CONNECTOR
X21 - CABIN LINE 7-WAY CONNECTOR MARK
X22 - LEFT FRONT LIGHT 3-WAY CONNECTOR
X23 - RIGHT FRONT LIGHT 3-WAY CONNECTOR
X24 - WORKING LIGHT LINE 2-WAY CONNECTOR
X25 - LEFT LIGHT 4-WAY CONNECTOR
X26 - TRANSFER PUMP 2-WAY CONNECTOR
X27 - TRANSFER PUMP SENDER 4-WAY CONNECTOR
X29 - RADIO POWER LINE 2-WAY CONNECTOR

FUSES

F1 - LOW BEAM FUSE 10A
F2 - MAIN BEAM FUSE 15A
F3 - SOCKET, RADIO AND CABIN LAMP FUSE 7.5A
F4 - ROTATING BEAM FUSE 7.5A
F5 - WORKING BEAM FUSE 7.5A
F6 - HEATING FUSE 15A
F11 - POWER +15 CABIN FUSE 7.5A
F12 - TRANSFER PUMP FUSE 15A

IMPORTANT SAFETY NOTICE

Proper service and repair is extremely important for the safe operation of your machine.
The service and repair techniques recommended by Komatsu Utility and describe in this manual are both effective and safe methods of operation. Some of these operations require the use of tools specially designed by Komatsu Utility for the purpose.

To prevent injury to workers, the symbols ⚠ and ⚠ are used to mark safety precautions in this manual. The cautions accompanying these symbols should always be carefully followed. If any danger arises or may possibly arise, first consider safety, and take necessary steps to face.

SAFETY

GENERAL PRECAUTIONS

Mistakes in operation extremely dangerous.
Read all the Operation and Maintenance Manual carefully BEFORE operating the machine.

1. Before carrying out any greasing or repairs, read all the precautions written on the decals which are suck on the machine.
2. When carrying out any operation, always wear safety shoes and helmet. Do not wear loose work clothes, or clothes with buttons missing.
   - Always wear safety glasses when hitting parts with a hammer.
   - Always wear safety glasses when grinding parts with a grinder, etc.
3. If welding repairs are needed, always have a trained, experienced welder carry out the work. When carrying out welding work, always wear welding gloves, apron, glasses, cap and other clothes suited for welding work.
4. When carrying out any operation with two or more workers, always agree on the operating procedure before starting. Always inform your fellow workers before starting any step of the operation. Before starting work, hang UNDER REPAIR signs on the controls in the operator's compartment.
5. Keep all tools in good condition and learn the correct way to use them.
6. Decide a place in the repair workshop to keep tools and removed parts. Always keep the tools and parts in their correct places. Always keep the work area clean and make sure that there is no dirt or oil on the floor.
   Smoke only in the areas provided for smoking. Never smoke while working.

PREPARATIONS FOR WORK

7. Before adding or making any repairs, park the machine on hard, level ground, and block the tracks to prevent the machine from moving.
8. Before starting work, lower blade, bucket or any other work equipment to the ground. If this is not possible, use blocks to prevent the work equipment from falling down. In addition, be sure to lock all the control levers and hang warning sign on them.
9. When disassembling or assembling, support the machine with blocks, jacks or stands before starting work.
10. Remove all mud and oil from the steps or other places used to get on and off the machine. Always use the handrails, ladders or steps when getting on or off the machine.
    Never jump on or off the machine.
    If it is impossible to use the handrails, ladders or steps, use a stand to provide safe footing.

PRECAUTIONS DURING WORK

11. When removing the oil filler cap, drain plug or hydraulic pressure measuring plugs, loosen them slowly to prevent the oil from spurting out.
    Before disconnecting or removing components of the hydraulic circuit and engine cooling circuit, first remove the pressure completely from the circuit.
12. The water and oil in the circuits are not hot when the engine in stopped, so be careful not to get burned.
    Wait for the oil water to cool before carrying out any work on the cooling water circuits.

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20 TESTING AND ADJUSTMENTS

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⚠ When carrying out controls, adjustments or analyses for troubleshooting, park the machine on firm, level ground. Apply all the machine safety devices and use blocks to prevent any machine movement.

⚠ When more than one person is engaged in the work, use the prescribed notices that indicate that the machine is undergoing maintenance. Do not allow any unauthorised persons to remain in the vicinity.

⚠ When checking the level of the cooling liquid, wait until this liquid has cooled. If the radiator cap is removed while the liquid is still hot and under pressure, it may cause severe burns.

⚠ Take great care not to get entangled in moving parts (fan, alternator belt or any of the rotating elements).

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Nature of work	Symbol		Code	Description	Q.ty	Notes
Disassembly/Assembly of swing machinery	G	1	ATR500860	Wrench	1	To remove and mount lock-nut
		2	ATR500870	Plunger	3	To remove inside ring from pinion bearing
		3	ATR500880	Plunger	1	To assemble inside bearing ring
		4	ATR500590	Plunger	1	To mount outside bearing ring
		5	ATR200380	Circuit sectioning tool	1	To test brake release seal
		6	ATR800140	Pressure gauge	1	Full scale 400 bar
Disassembly/Assembly the swing bracket	H	1	ATR201370	Raising equipment	1	—

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INSTALLATION OF R.H. PPC VALVE (BOOM-BUCKET)

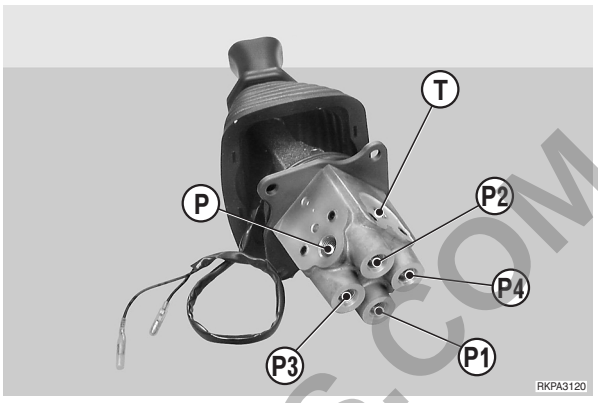
- To install, reverse the removal procedure.

※1

★ Check the positions carefully when reconnecting the tubes.

P - Pressure
T - Unload
P1 - Arm opening
P4 - R.H. swing
P2 - Arm closing
P3 - L.H. swing

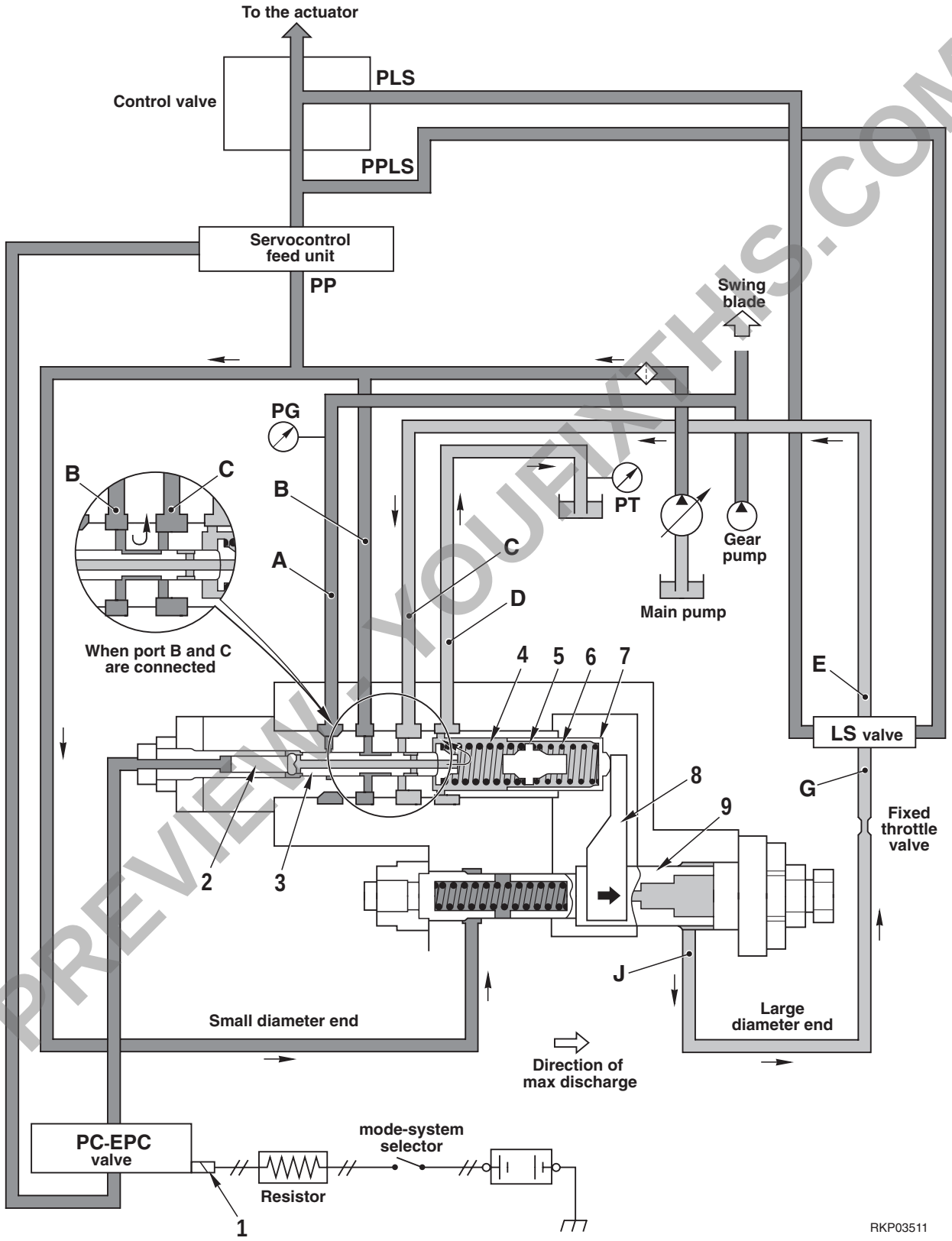
1 - Start the engine to circulate the oil and check the seals.



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b) Function of the spring



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