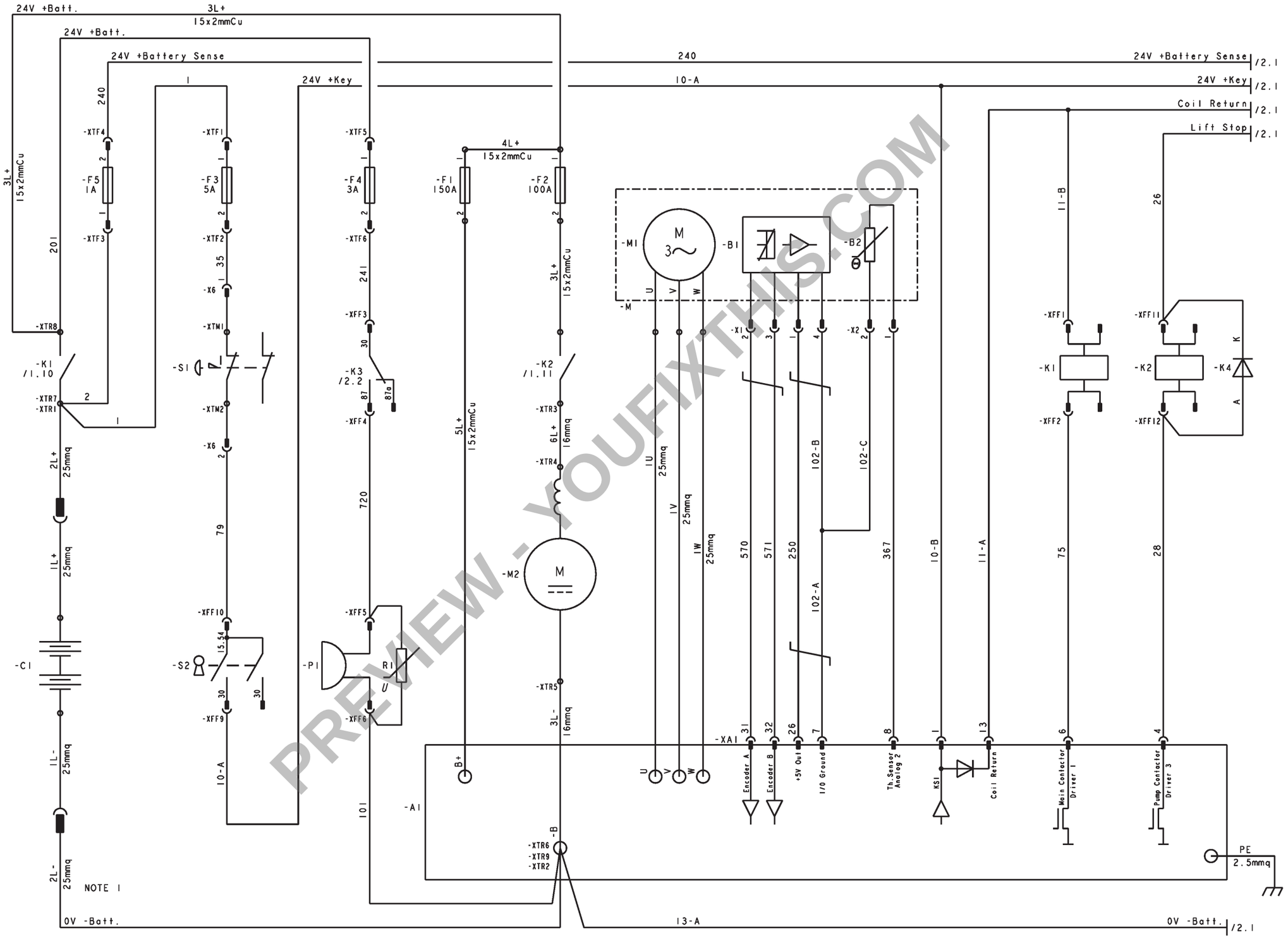


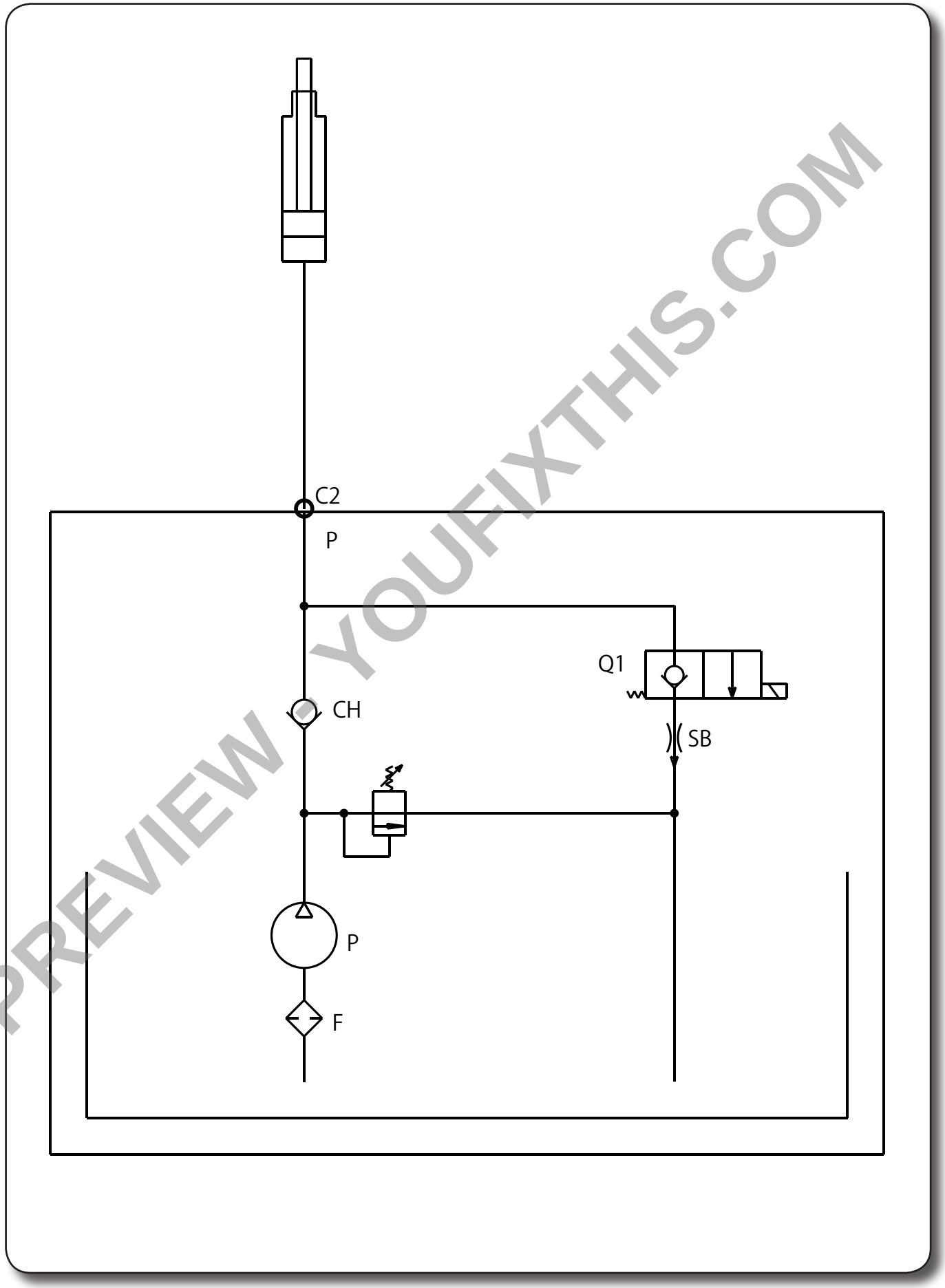
NOTES

(1) mmq equals mm^2

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MAIN HYDRAULIC DIAGRAM



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TORQUE SETTINGS FOR SCREWS, NUTS AND FITTINGS

Before disassembling the various parts and nuts and bolts, read the following carefully.

To make the threaded matings secure, *LOCTITE 270* is used for tightening the screws.

If it is not possible to unscrew the bolts because this product has been used, avoid applying extensions to the tools, instead slightly heat the area (at most 50°C) so as to eliminate the *LOCTITE 270* effect.

In the cases described, reapply *LOCTITE 270* during installation in a moderate quantity (30% of the mating surface).

The torque setting used for tightening the threaded couplings is extremely important to make the coupling secure and the machine safe.

The tables on this page give the classes of bolts normally used with the relevant torque settings.

Nominal diameter	TORQUE SETTING Nm	
	Class 8	Class 10
M3	4	5.2
M4	7	9.15
M5	12.14	14.8
M6	17.2	20.9
M8	31.8	38.1
M10	50.5	60.3
M12	74.2	88.5
M14	101.2	120.8
M16	138.2	164.9
M18	176.6	203.5
M20	225.4	259.7
M22	278.8	321.2
M24	324.8	374.2
M27	422.3	486.5
M30	516.1	594.7

				Pre-load N	TORQUE SETTING Nm					
					Class 5.8		Class 8.8		Class 10.9	
M4	0.7	7	3	2400	1.92	1.44	3.07	2.3	4.17	3.13
M5	0.8	8	4	3880	3.88	2.91	6.2	4.65	8.43	6.33
M6	1	10	5	5490	6.58	4.94	10.5	7.9	14.3	10.8
M8	1.25	13	6	9990	16	12	25.6	19.2	34.8	26.1
M8	1	13	6	10700	17.1	12.8	27.4	20.5	37.3	27.9
M10	1.5	16	8	15825	31.7	23.8	51	38	69	52
M10	1.25	16	8	16700	33.4	25.1	53	40.1	73	55
M12	1.75	18	10	23025	55	41.4	88	66	120	90
M12	1.25	18	10	25150	60	45.3	96	72	130	98
M14	2	21	12	31400	88	66	140	105	190	145
M14	1.5	21	12	34125	96	72	155	115	210	155
M16	2	24	14	42850	135	105	220	165	300	225
M16	1.5	24	14	45600	145	110	235	175	320	240
M20	2.5	30	17	66875	270	200	430	320	580	435
M20	1.5	30	17	74250	295	225	475	355	650	485

= with lubricant

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TROUBLESHOOTING: MODULE DIAGNOSIS SYSTEM

The module is equipped with two LEDs (one red, one yellow) which, in the event of a fault, will flash the corresponding error code. The red LED flashes once to indicate that the system is about to signal first digit of the error code, then the yellow LED will emit the number of flashes corresponding to this first digit. The red LED now flashes twice to indicate that the system is about to signal second digit of the error code, then the yellow LED will emit the number of flashes corresponding to this second digit.
The two LEDs have four operating modes which are used to signal different type of information.

RED LED	YELLOW LED	STATUS
Off	Off	The controller is switched off or the truck battery is completely discharged.
Off	Flashing	The controller is in operation.
On	On	The controller is in Flash Program mode.
On	Off	Watchdog error or software not installed. Turn off and restart the truck or install the software.
Flashing	Flashing	The controller has detected an error. The two digit code is signalled by the flashing of the two LEDs in a cyclical sequence.

ALARMS

ALARM	troubleshooting
12 - "Controller Overcurrent"	• Turn off and restart the truck. • Check the wiring and for a short-circuit or low impedance on the phases U, V and W. • Check the motor parameters are correct. • If no fault is found in the wiring or the parameters but the alarm persists, then the problem lies in the module.
Possible causes: - External shortcircuit on connections of phases U, V or W to the motor - Motor parameters incorrect - Controller fault - Encoder problem	
Effects: - Main contactor open - All truck functions disabled - Electromagnetic brake activated	
13 - "Current Sensor Fault"	• Turn off and restart the truck. • Check motor insulation • If no fault is found and the alarm persists, then the problem lies in the module.
Possible causes: - Dispersion of current from phases U, V or W to the truck chassis (short circuit of motor stator) - Controller fault	
Effects: - Main contactor open - All truck functions disabled - Electromagnetic brake activated	

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UNLOADING THE TRUCK

Equipment and tools



fork lift truck
load capacity
3000 kg



bridge crane
load capacity
2000 kg



double arm lift belt
load capacity
2800 kg

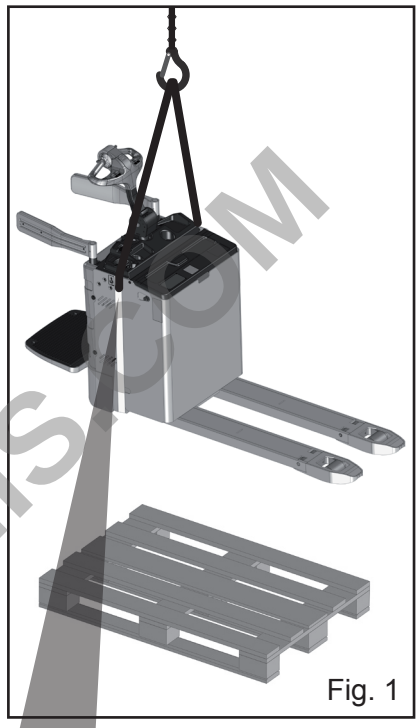


Fig. 1

Procedure

Before starting work, ensure that you are wearing suitable protective clothing.



Phase 1

FORKLIFT TRUCK

Pick up the pallet using the lift truck, raise it and carry it to a safe place, away from the transit areas of other vehicles and pedestrians.

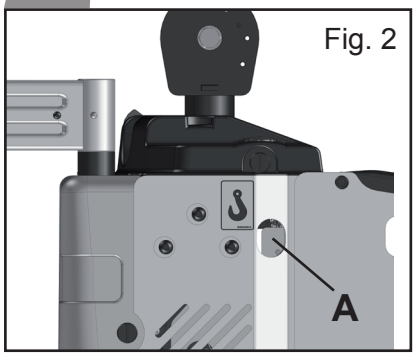


Fig. 2

Phase 2

BRIDGE CRANE - 2 LIFTING SLINGS

Remove the packaging.
Hook the double arm lift belt to the bridge crane.
Hook the two hooks of the lift belt to the two side holes of the truck base made for lifting **(ref.A fig.2)**.

Ensure that the bridge crane is positioned vertically above the truck to be lifted.

Slowly raise and carefully position the truck on the ground.

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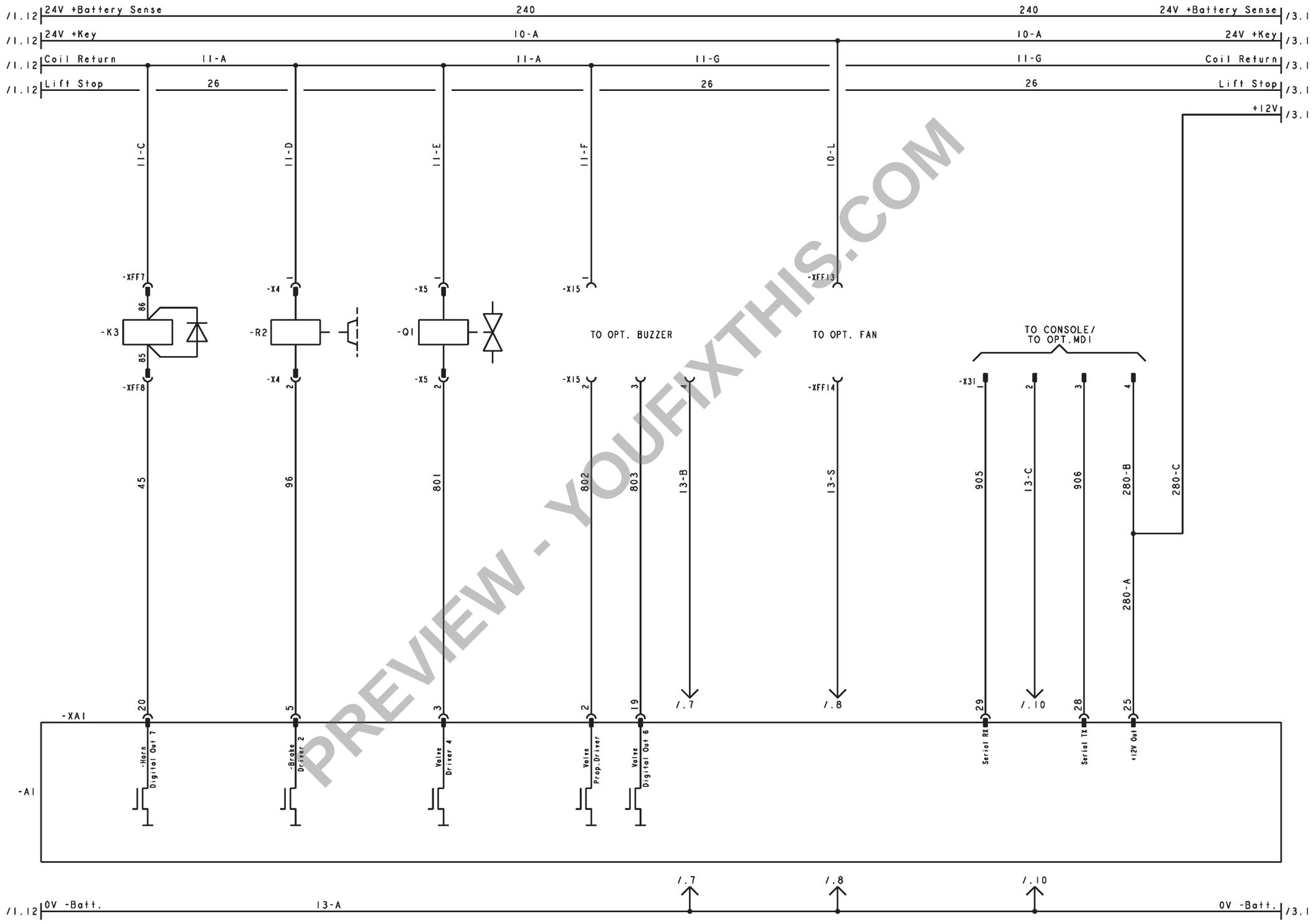
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SCHEDULED MAINTENANCE

		● = check and maintenance by specialist technician ● = operator check x = replacement	Maintenance intervals			
		Operation description	Every 8 hours 1 day	Every 1000 hours 12 months	Every 2000 hours 24 months	Every 3000 hours 36 months
TRUCK BASE		Welding check				●
		General cleaning				●
	BRAKING SYSTEM	Dynamic braking action check	●	●		
		Reverse braking action check	●	●		
		Normal braking action check	●	●		
		Emergency braking action check	●	●		
		Electromagnetic brake and coil efficiency check	●	●		
		Brake lining check (1)		●		
		General cleaning		●		
HYDRAULIC SYSTEM		Oil leak check	●	●		
		Valve operation check	●	●		
		Tank oil level check		■		
		General cleaning		●		
		Flexible pipe check (2)			●	
		Tank oil change				x
		Oil filter change				x
MOTORS		Motor insulation check		●		
		Cable connection check		●		
		Fixing nut condition check		●		
		Bearing noise check		●		
		General cleaning		●		
REDUCTION UNIT		Oil leak check	●	●		
		Check general condition of reducer		●		
		General cleaning		●		
		Reducer oil change			x	
FORKS	WHEELS & TYRES	Check condition and wear of drive wheel (1)	●	●		
		Check condition and wear of load wheels (1)	●	●		
		Check condition and wear of castor wheels (1)	●	●		
		Check condition of castor wheel swinging support bearings (1)	●	●		
		Check drive wheel fixing nut tightness		●		
		Load wheel bearing check (1		●		
		Check the castor wheel fixing nut tightening		●		
		Check the drive wheel-tiller alignment				●
		Check fork condition	●			●
		General cleaning				●
CAB		Check the side guard conditions and operation	■			
		Check the platform conditions and operation	■			
		Check the platform suspension spring efficiency				●
TILLER		Check the tiller conditions and operation	■			
		Check the gas tank efficiency	■			
		Check the tiller screw tightening		●		
		Check the tiller head screw tightening		●		
		Steering thrust bearing check (1		●		

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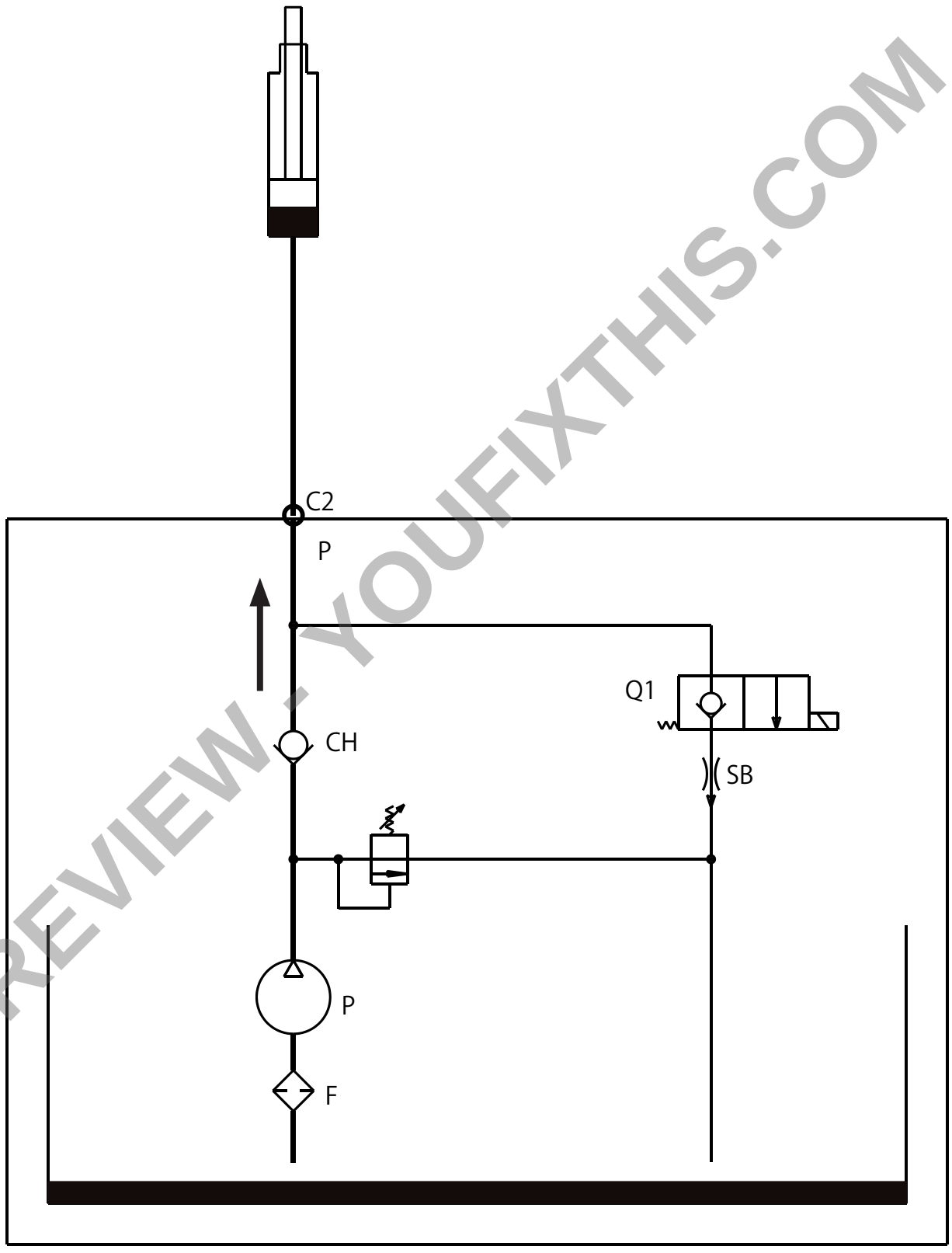
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HYDRAULIC DIAGRAM FOR LIFTING



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CORRECT METHOD FOR APPLYING FEMALE FITTINGS

To assure a reliable seal between female fittings and the adapters in this manual, it is necessary to observe the following procedure, which differs from the one for assembling rigid pipes.

Female fittings without a gasket (metal/metal joint)

Screw on the nut by hand and then, with the aid of a wrench, tighten by another quarter turn.

Female fittings with O-ring

Screw on the nut by hand and then, with the aid of a wrench, tighten by another half turn.

In every case make sure that the pipe is properly aligned before tightening the nut on the adapter.

TORQUE SETTINGS

METRIC REVOLVING FEMALE

UNF thread	Outside diameter of the pipe	Torque setting Nm	
		Nominal torque	min / max
M 12x1.5	6	20	15 -25
M 14x1.5	8	38	30 - 45
M 16x1.5	8	45	38 - 52
	10		
M 18x1.5	10	51	43 - 85
	12		
M 20x1.5	12	58	50 - 65
M 22x1.5	14	74	60 - 88
	15		
M 24x1.5	16	74	60 - 88
M 26x1.5	18	105	85 - 125
M 30x2	20	135	115 - 155
	22		
M 36x2	25	166	140 - 192
	28		
M 42x2	30	240	210 - 270
M 45x2	35	290	255 - 325
M 52x2	38	330	280 - 380
	42		

REVOLVING FEMALE jic 37°

UNF thread	Size	Torque setting Nm	
		Nominal torque	min / max
7/16-20	-4	15	9 - 21
1/2-20	-5	20	13 - 27
9/16-18	-6	30	18 - 42
3/4-16	-8	50	30 - 70
7/8-14	-10	69	44 - 94
1.1/16-12	-12	98	63 - 133
1.3/16-12	-14	118	73 - 163
1.5/16-12	-16	140	90 - 190
1.5/8-12	-20	210	135 - 285
1.7/8-12	-24	290	200 - 380
2.1/2-12	-32	450	300 - 600

REMOVING FEMALE BSP

UNF thread	Torque setting Nm	
	Nominal torque	max
G1/4	20	15 - 25
G3/8	34	27 - 41
G1/2	60	42 - 76
G5/8	69	44 - 94
G3/4	115	95 - 135
G1	140	115 - 165
G1.1/4	210	140 - 280
G1.1/2	290	215 - 365
G2	400	300 - 500

REVOLVING FEMALE ORFS

UNF thread	Size	Torque setting Nm	
		Nominal torque	max.
9/16-18	-4	14	16
11/16-16	-6	24	27
13/16-16	-8	43	47
1-14	-10	60	68
1.3/16-12	-12	90	95
1.3/16-12	-14	90	95
1.7/16-12	-16	125	135
1.11/16-12	-20	170	190
2-12	-24	200	225
2-1/2-20	-32	460	490

The values given in the tables refer to galvanized steel fittings. Fittings of other materials have other values.

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ALARM	troubleshooting
14 - "Precharge failed"	
Possible causes: - External load on capacitor bank (connected to B+) preventing capacitors from charging	• Release all the tiller controls. • Check value of the parameter MAIN MENU MONITOR / Battery / **Capacitor Voltage.** • If no fault is found and the alarm persists, then the problem lies in the module.
Effects: - Main contactor open - All truck functions disabled - Electromagnetic brake activated	
15 - "Controller Severe Undertemp"	
Possible causes: - The controller is operating in too low temperature conditions (below -40°C)	• Check the value of the parameter MAIN MENU MONITOR / Controller / **Temperature** • Bring the temperature to above the lower limit of -40°C, release all tiller controls, turn off and restart the truck. • If no fault is found and the alarm persists, then the problem lies in the module.
Effects: - Main contactor open - All truck functions disabled - Electromagnetic brake activated	
16 - "Controller Severe Overtemp"	
Possible causes: - The controller is operating in too high temperature conditions (above 95°C) - Truck overloaded - Controller incorrectly installed	• Check the value of the parameter MAIN MENU MONITOR / Controller / **Temperature** • Return the temperature to below the maximum limit of 95°C, release all the tiller controls, remove all loads from the truck, turn off and restart the truck. • Check that the module is installed correctly. • If no fault is found and the alarm persists, then the problem lies in the module.
Effects: - Main contactor open - All truck functions disabled - Electromagnetic brake activated	
17 - "Severe Undervoltage"	
Possible causes: - Incorrect battery parameters - Battery resistance too high - Battery disconnected during truck operation - Loss of capacitor charge to below critical limit - Fuse on positive feed to key switch disconnected or blown - The main contactor did not close	• Check value of the parameter MAIN MENU MONITOR / Battery / **Capacitor Voltage.** • Return the capacitor voltage to above the minimum critical value. • Check the battery parameters. • Check the battery wiring. • Check the fuses • Check the status of the main contactor. • If no fault is found and the alarm persists, then the problem lies in the module.
Effects: - Drive reduced	

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TOPPING UP THE OIL RESERVOIR

Before topping up the oil in the hydraulic oil reservoir make sure that the forks are fully lowered.

Equipment and tools



Procedure

Before starting work, ensure that you are wearing suitable protective clothing.
Move the truck to a safe place, away from areas of transit of other vehicles and pedestrians. Turn the keyswitch to OFF and disconnect the battery.



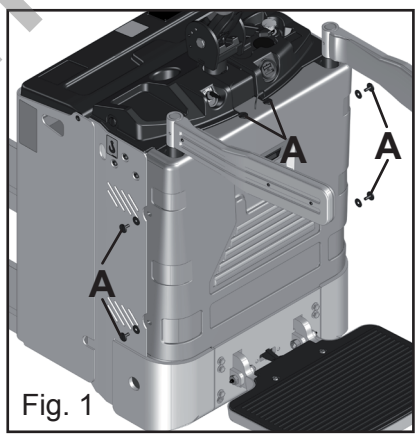


Fig. 1

Phase 1

LARGE FLAT BLADE SCREWDRIVER

Use the Philips screwdriver to unscrew and remove the fastening screws on the motor compartment cover **(ref.A fig.1)**. Recover the washers. Remove the cover.

Phase 2

OIL RESISTANT GLOVES - FUNNEL

Unscrew the oil reservoir cap **(ref.B fig.2)**, place the funnel in the filler hole and top up the oil level.
Do not overfill the reservoir.
After topping up the oil level, replace the screw on filler cap.

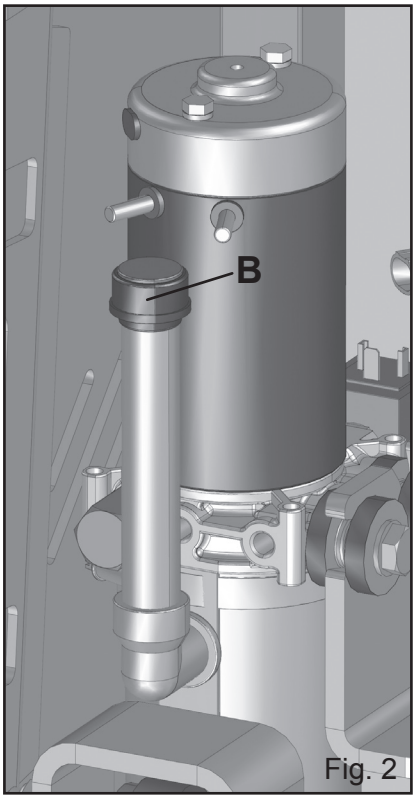


Fig. 2

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	● = check and maintenance by specialist technician ● = operator check x = replacement	Maintenance intervals			
	Operation description	Every 8 hours 1 day	Every 1000 hours 12 months	Every 2000 hours 24 months	Every 3000 hours 36 months
ELECTRICAL SYSTEM	Battery plug/socket integrity check	■			
	Electrical connection check		●		
	Fixing nut condition check		●		
	Electrical wiring check		●		
	Sensor efficiency check		●		
	General cleaning of electrical panel		●		
BATTERY	Battery charge check	■			
	Cable connection check	■			
	Liquid leaks check	■			
	Electrolyte density check	■			
	Electrolyte level check(3)	■			
	Battery insulation check		●		
	General cleaning		●		
GREASING POINTS					
	Greasing the pins and bushings		●		
	Lubrication of platform suspension springs				●
LINKAGE	Linkage check	■			
CHASSIS	Check all load bearing elements		●		
	Check the tightening of the screws and bolts		●		
CONTROLS	Check machine functions with actuating controls	■			
SAFETY DECALS	Check safety labels and decals	■			

(1)replace if necessary

(2) replace in the following situations:
• a shift of the connection on the pipe;
• the presence of damage, cuts or abrasions on the superficial layer;
• hardening or stiffness of the pipe, the presence of burns or cracks due to heat exposure;
• the presence of cracks, damages or strong corrosion on the connection;
• the presence of leaks along the pipe or at the coupling joint;
• the presence of permanent creases, compression, flattening or twists in the pipe;
• the presence of blisters, softening, wear of the external coat.

(3)fill up whenever the electrolyte levels falls to 5 - 10 mm (0.19-0.39 in) from the plate unit

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