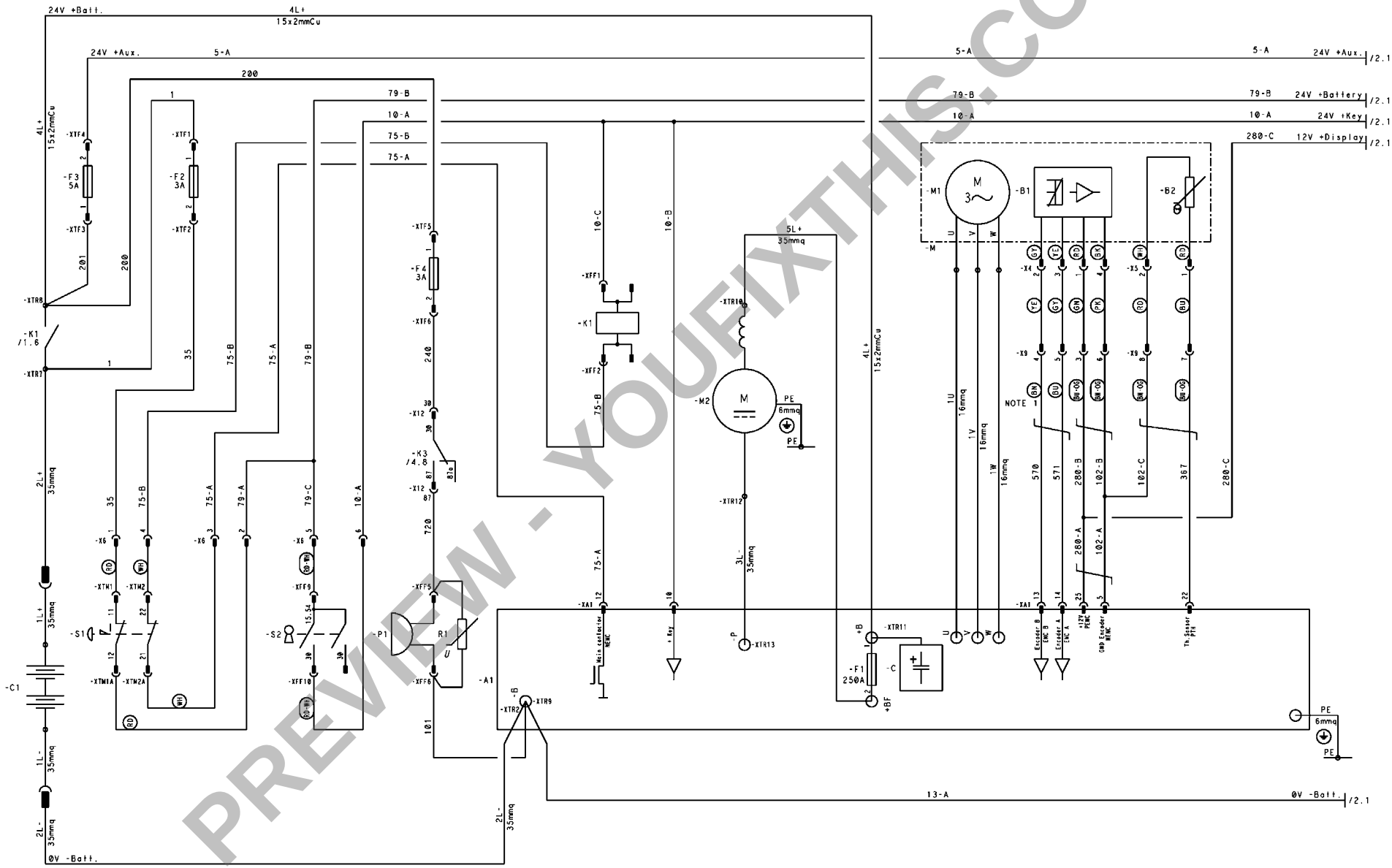
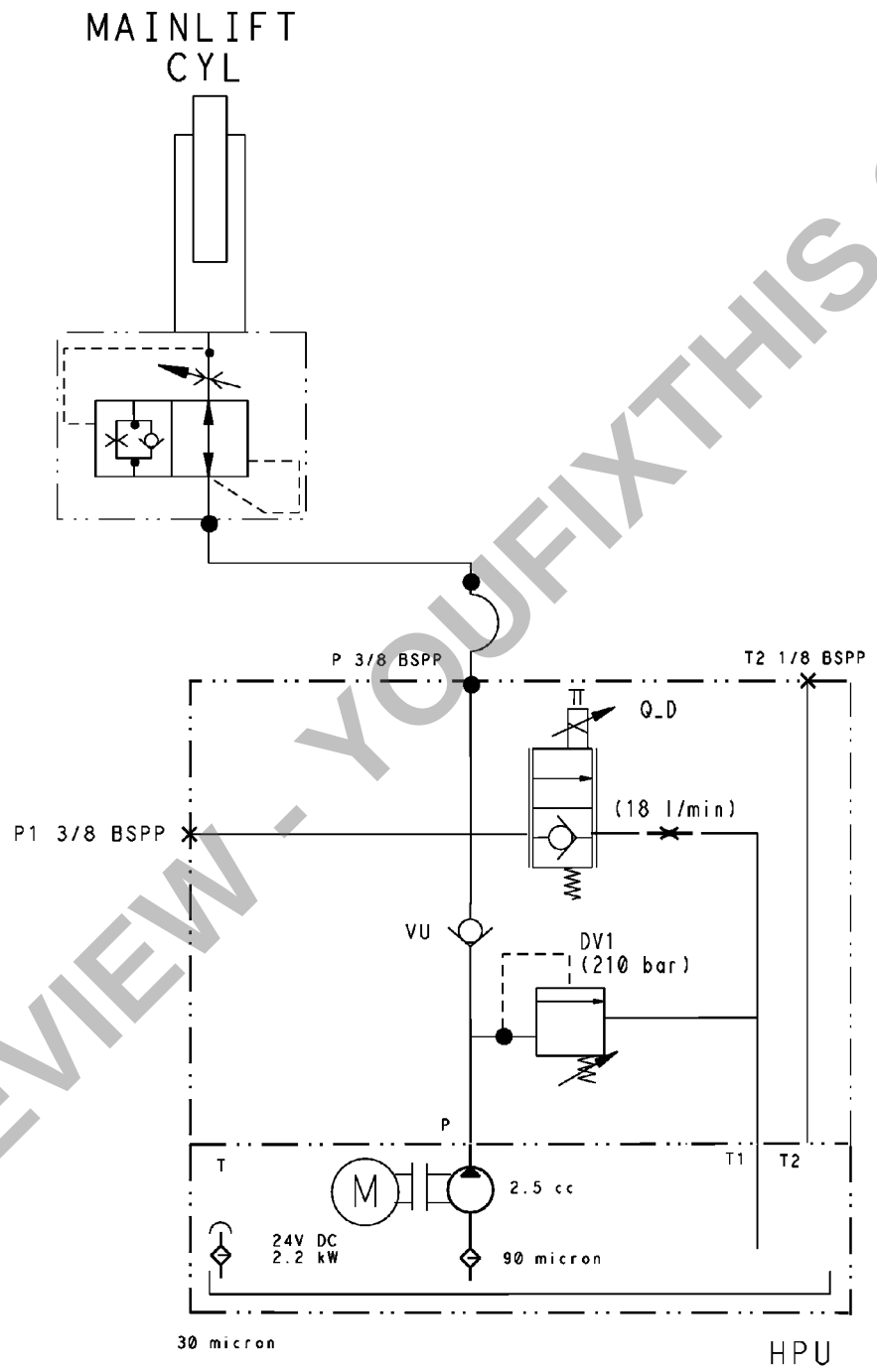


PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

OVERALL HYDRAULIC DIAGRAM

SINGLE STAGE FFL MAST / TWO STAGE NFL MAST



PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

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.

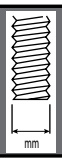
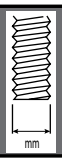
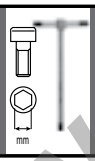
If it is not possible to unscrew the bolts because this product has been used, avoid applying extensions to the tools, instead slightly heat the area (at most 50°C) so as to eliminate the *LOCTITE 270* effect.

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

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

TROUBLESHOOTING: COMBI MODULE DIAGNOSIS SYSTEM

The diagnosis system is divided into two main groups:

ALARMS
When an alarm is detected, the current to the motors of the modules involved is cut off. The remote-control switch opens and the electromagnetic brake is activated.
These alarms are connected to:
• breakdowns in the motors/modules, the power system is no longer able to supply current to the motors.
• breakdowns connected with safety.

WARNINGS
When a warning takes place, the module is working properly but it has detected conditions that lead it to reduce performance or stock the truck, without affecting the power systems.
These warnings are connected to:
• incorrect starting sequences by the operator.
• conditions that require a reduction of performance (for example high temperatures, ...

The Combi module is equipped with two microcontrollers; each microcontroller is identified by a number (node).

Microcontoller	Node
Master	2
Slave	5

The alarms are shown on the display with the following format xxxAyy, where xxx is the MDI code, and yy is the node. For example 79A02 is the Incorrect Start alarm on the Master microcontroller.

COMBI MODULE NODE 2 MASTER

Alarm	Code MDI	Troubleshooting
WATCHDOG	**8**	This is a failure inside the module, it needs to be replaced.
Cause: The system is provided with a self-diagnosis circuit. A microchip tests the self-testing circuit to verify its correct operation. This circuit's output changes state if the microchip does not perform the test correctly. In this case the general remote-control switch K1 is disabled together with the power section. The electromagnetic brake is activated. The alarm appears when: • the circuit output does not correspond to the input during the initial test on the self-testing circuit (start up diagnosis - START-UP). • the circuit's output changes during the stand-by or during the hydraulic functions (STANDBY AND MOTOR RUNNING diagnosis).		

LOGIC FAILURE #3	17	This type of failure is not connected to external components, so when it manifests itself the module needs replacing.
Cause: A hardware problem pertaining to the logic card as a protection against high current values (overload).		

LOGIC FAILURE #2	18	This type of failure is not connected to external components, so when it manifests itself the module needs replacing.
Cause: A fault in the hardware section of the logic card that oversees the retroaction of the phase voltage.		

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

UNLOADING THE TRUCK

Equipment and tools



forklift truck load capacity 1600 kg



bridge crane load capacity 1600 kg



no.1 lift belt load capacity 1600 kg



no. 2 eyebolts

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.

TRUCK WITH MAST UNIT LIFTING

Phase 2

NO.2 EYEBOLTS - BRIDGE CRANE - NO.1 LIFT BELT

Remove the packaging.
Attach the truck using the two lifting slings using the specific eyebolts to insert on the mast **(ref. A fig.1)**.

Attach the lifting slings directly to the bridge crane, lift the truck off the pallet and slowly lower it to the ground

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

To attach the truck, it is necessary to fit two M16 eyebolts not included in the machine equipment.

To load and unload the truck, if there is no pallet, go directly to step 2, or use a lifting platform with a suitable capacity if it is possible to start-up the truck.

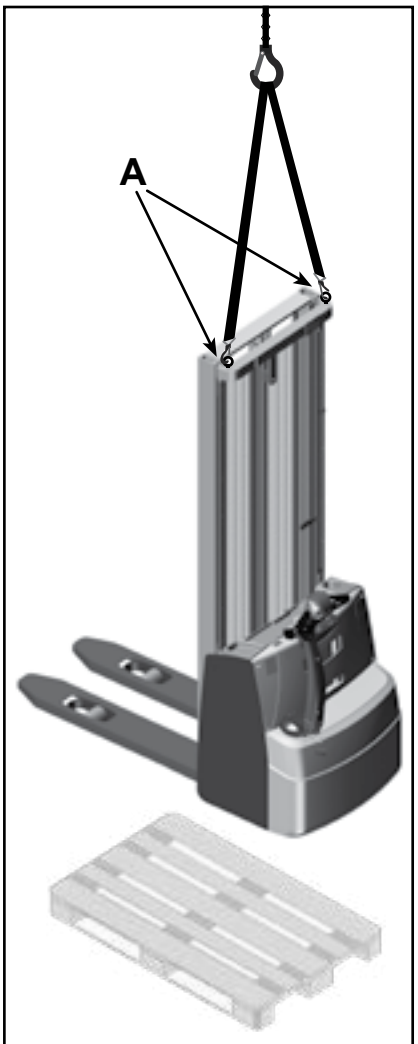


Fig.1

PREVIEW - YOUFIXTHIS.COM

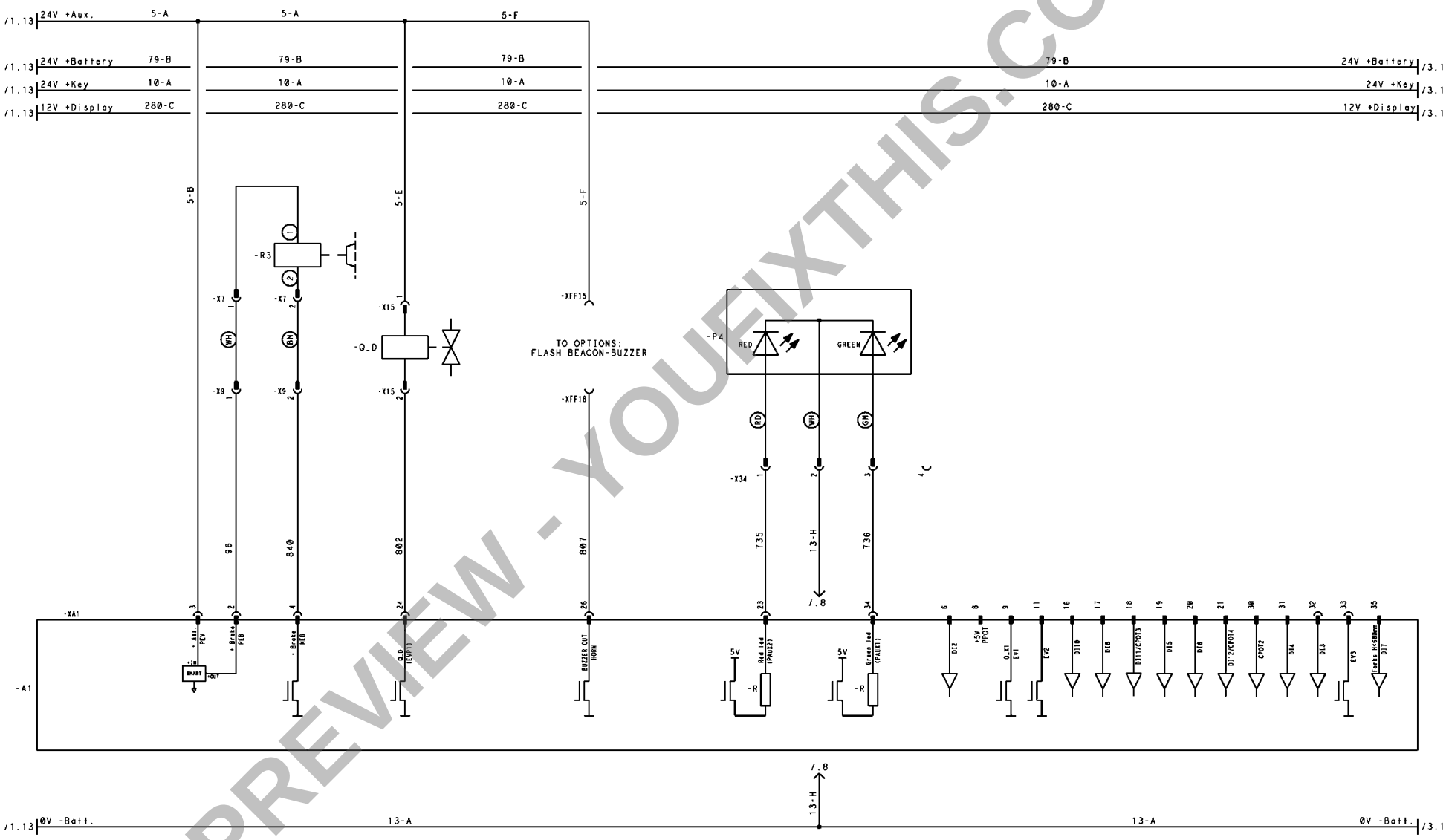
Download full manual at youfixthis.com

SCHEDULED MAINTENANCE

	● = check and maintenance ■ = 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
CHASSIS	Check the screws and bolts		●		
	Visual check of main welds				●
	General cleaning		●		
BRAKING SYSTEM	Check the service brakes action	■	●		
	Check the braking on reversal direction action	■	●		
	Check the emergency braking action	■	●		
	Check the release braking action	■	●		
	Electromagnetic parking brake coil efficiency check		●		
	Electromagnetic parking brake liner wear check (1)		●		
	General cleaning		●		
HYDRAULIC SYSTEM	Oil leak check	■	●		
	Valve operation check	■	●		
	Oil level in tank check		●		
	Check the condition and tension of the hoses (2)			●	
	Tank oil change				x
	Oil filter cleaning (1)				●
	General cleaning		●		
REDUCER	Oil leak check	■	●		
	Change oil in reduction unit (3)				
	Reduction unit noise check		●		
	General cleaning		●		
MOTORS	Motor insulation check		●		
	Cables connection check		●		
	Fixing nuts condition check		●		
	Bearing noise check		●		
	General cleaning		●		
WHEELS & TYRES	Check condition and wear of drive wheel (1)	■	●		
	Check condition and wear of load wheels (1)	■	●		
	Check condition and wear of castor wheel (1)	■	●		
	Check condition of castor wheel support bearing (1)	■	●		
	Check condition of swivel castor wheels bearings (1)		●		
	Check condition of load wheel bearings (1)		●		
	Check drive wheel fixing nuts		●		
	Check castor wheel-chassis swivel support fixing nuts		●		
MAST AND FORKS	Check the screws and bolts		●		
	Check conditions of chain tensioner (1) (4)		●		
	Check wear on links and pins of lift chains (1) (4)		●		
	Check elongation of lift chains (4)		●		
	Check the condition of the chain pulleys and pipes (1) (4)		●		
	Check the conditions of fork and mast support device bearings slide guides		●		
	Check the bearings slide guides (		●		
	Check conditions of fork and mast support bearings (1)		●		
	Check conditions of forks (1)	■			●
	Check adjustment dowels clearance		●		

PREVIEW - YOUFIXTHIS.COM

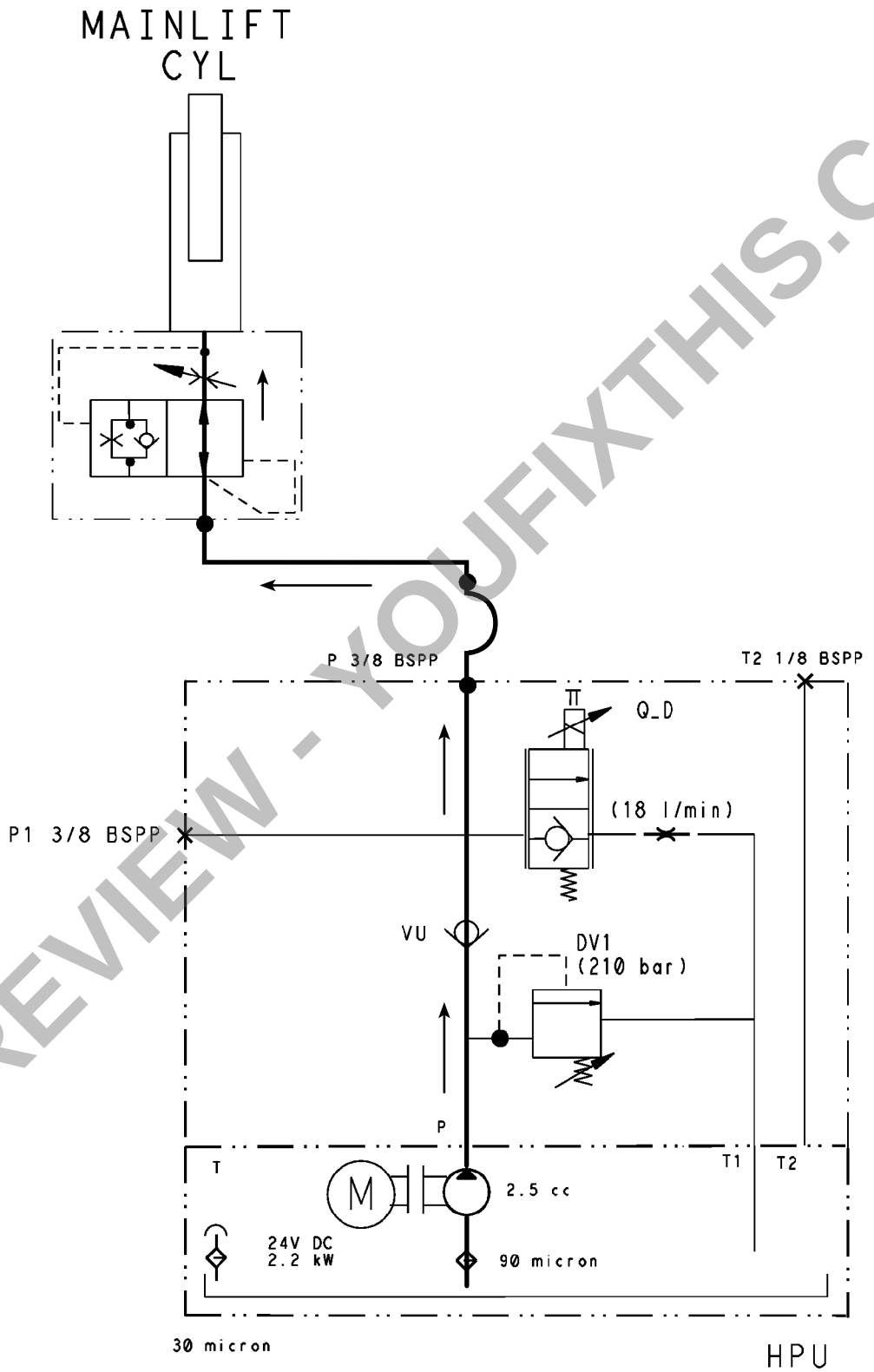
Download full manual at youfixthis.com



PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

HYDRAULIC DIAGRAM FOR SINGLE STAGE FFL / TWO STAGE NFL FORKS LIFTING



PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

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

BSP REVOLVING FEMALE		
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

ORFS REVOLVING FEMALE			
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.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Alarm	Code MDI	Troubleshooting
LOGIC FAILURE #1	**19**	• If the alarm appears on start up or in standby, it is very likely that the problem is due to a voltage drop. In this case the following controls are recommended: Diminishing pulsations of the key input signal (beneath the undervoltage level) due to an external load, such as the start up of a DC/DC converter, start up of a relay or of a contactor, charging/discharging of coils. • If no change in the voltage is detected on the power supply line and the alarm is present every time the key is placed on ON, then the fault probably lies with the module hardware. In this case the module needs to be replaced. • If the fault appears while in motion, then it could be due to over or undervoltage. • If the alarm appears during acceleration while in traction, it is most likely due to undervoltage; check the battery charge and the cabling to the power supply. If the alarm appears when the brake is released, in all probability it is due to undervoltage: check the remote-control switch contacts and the cabling to the power supply.
Cause: This alarm appears when the module detects over or under voltage conditions. The overvoltage limit is 35V, the limit for undervoltage is 9,5V.		
PUMP VMN LOW	**28**	If the alarm appears on start up (the remote-control switch doesn't close at all), check: • the internal motor connections (ohm continuity); • the power cable connections; • If the motor connections are okay, then the problem rests with the module. If the alarm appears after having closed the remote-control switch (the remote-control switch closes and opens immediately after), check: • the motor connections • if the coil-winding/cables of the motor phases show losses towards the truck bodywork. If the alarm occurs while the motor is operating, check: • the motor connections; • if the coil-winding/cables of the motor phases show losses towards the truck bodywork; • If the remote-control switch closes correctly. If no problem connected with the motors is detected, then the problem is inside the module.
Cause: The motor pump yield is lower than expected, considering the PWM applied.		
PUMP VMN HIGH	**29**	It is recommended to check: • the motor connections; • if the cables of the motor show losses towards the truck bodywork. If there are no problems with the motors, then the problem rests with the module.
Cause The motor pump yield is higher than expected, considering the PWM applied.		
VMN LOW	**30**	If the problem appears on start up (the remote-control switch doesn't close at all), check: • the internal motor connections (ohm continuity); • the motor power cabling; • If the motor connections are correct, then the problem rests with the module. If the alarm takes place while the motor is operating, check: • the motor connections: • if the coil-winding/cables of the motor phases show losses towards the truck bodywork; • that the power contact of the remote-control switch closes correctly, with a good contact. • If no problem connected with the motors is detected, then the problem is inside the module.
Cause 1: start up testing. Before closing the remote-control switch, the software checks the power section: it turns on the Mosfets alternatively and waits until the phase voltage rises up to the condenser values. If the voltage of the phases does not increase, this alarm appears. Cause 2: test during the operation. When the motor is operating, the power bridge is ON and the motor power supply voltage is monitored; if it is below the set value, an error status is recorded.		

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

TOPPING UP THE OIL RESERVOIR

If required top up the oil in the hydraulic oil reservoir. Before proceeding, make sure that the forks are fully lowered.

Equipment and tools


funnel


oil resistant gloves


2 Allen wrenches size 5 and 4mm

Procedure

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



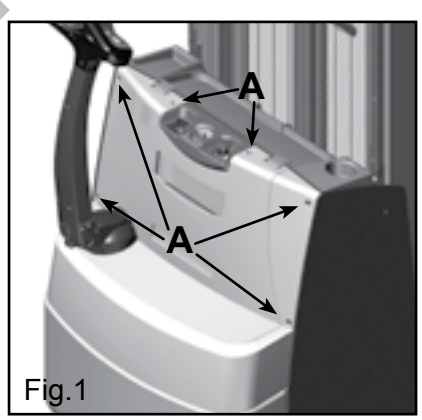
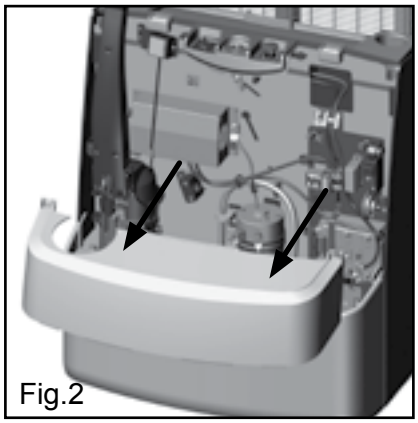


Fig.1

Phase 1

5 MM ALLEN KEY

Using the Allen wrench remove the 6 screws that secure the truck front cover **(ref.A fig.1)**. Remove the cover.


Fig.2

Phase 2

Then remove the engine and brake cover **(fig.2)**.

Phase 3

OIL PROTECTING GLOVES - FUNNEL

Unscrew the oil sump cap **(ref. B fig. 3)**, place the funnel in the filler hole and top up the oil level.
Do not overfill the reservoir.
At the end of the operation screw the tank cap back on.

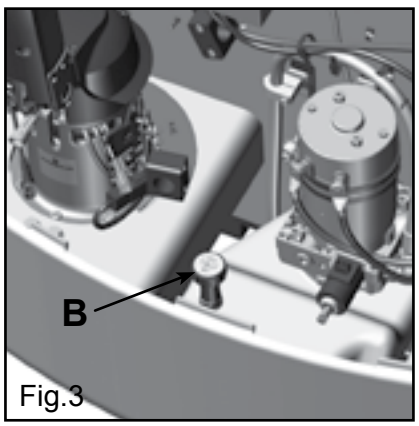


Fig.3

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

	● = check and maintenance ■ = check by the operator x = replacement	Maintenance intervals				
	Operation description	every 8 hours 1 day	every 500 hours 6 months	every 1000 hours 12 months	every 2000 hours 24 months	every 3000 hours 36 months
GREASING POINTS	Lifting chains lubrication [4]		●			
	Lubrication with grease of the forks and mast support device bearings sliding guides		●			
STEERING TILLER	Check the steering tiller operation	■	●			
	Check the steering tiller efficiency		●			
CONTROLS	Belly switch operation check (reversing button)	■	●			
	Horn button operation check	■	●			
	Snail button operation check	■	●			
ELECTRIONIC SYSTEM	Battery plug/socket integrity check	■	●			
	Electrical wiring conditions check		●			
	Check conditions of electronic controllers auxiliary connections					●
	Electrical wiring check		●			
	General cleaning of the electrical box		●			
BATTERY	Battery charge check	■	●			
	Cable connection check		●			
	Liquid leaks check	■	●			
	Battery insulation check		●			
	Electrolyte density check		●			
	Electrolyte level check		●			
	General cleaning		●			
DECALS	Check all the warning and information plates and adhesive decals condition[1]	■				
	Visible warning and information plates and decals cleaning	■				
	Check all the visible warning and information plates and decals condition[1]		●			
	All warning and information plates and adhesive decals cleaning		●			

[1] Replace if necessary

[2] Replace in the following situations:
- A shift of the connector on the pipe;
- The presence of damage, cuts or superficial abrasions;
- Hardening or stiffening of pipes, presence of burnt or cracked areas due to exposure to heat;
- Presence of cracks, damages or strong corrosion on the coupling joint;
- Presence of leaks along the pipe or at the coupling joint;
- Presence of permanent creases, compression, flattening on the pipe;
- Presence of blisters, softening or wear of the external coat.

[3] It is not necessary to replace it, very long life oil

[4] Only for models S1.0E - S1.2E

Trucks working in cold stores must be lubricated every 500 hours, or even more frequently in the case of particularly heavy use.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

PREVIEW ONLY

You're viewing 12 of 241 pages

The full manual includes:

- All 241 pages, complete
- Searchable PDF (find any keyword)
- No watermarks
- Instant download
- Print-ready quality

GET FULL MANUAL NOW

Hyster S1.0E, S1.2E, S2.4HBE Service Manual

Scan or click anywhere
youfixthis.com

Click anywhere on this page to get the full manual