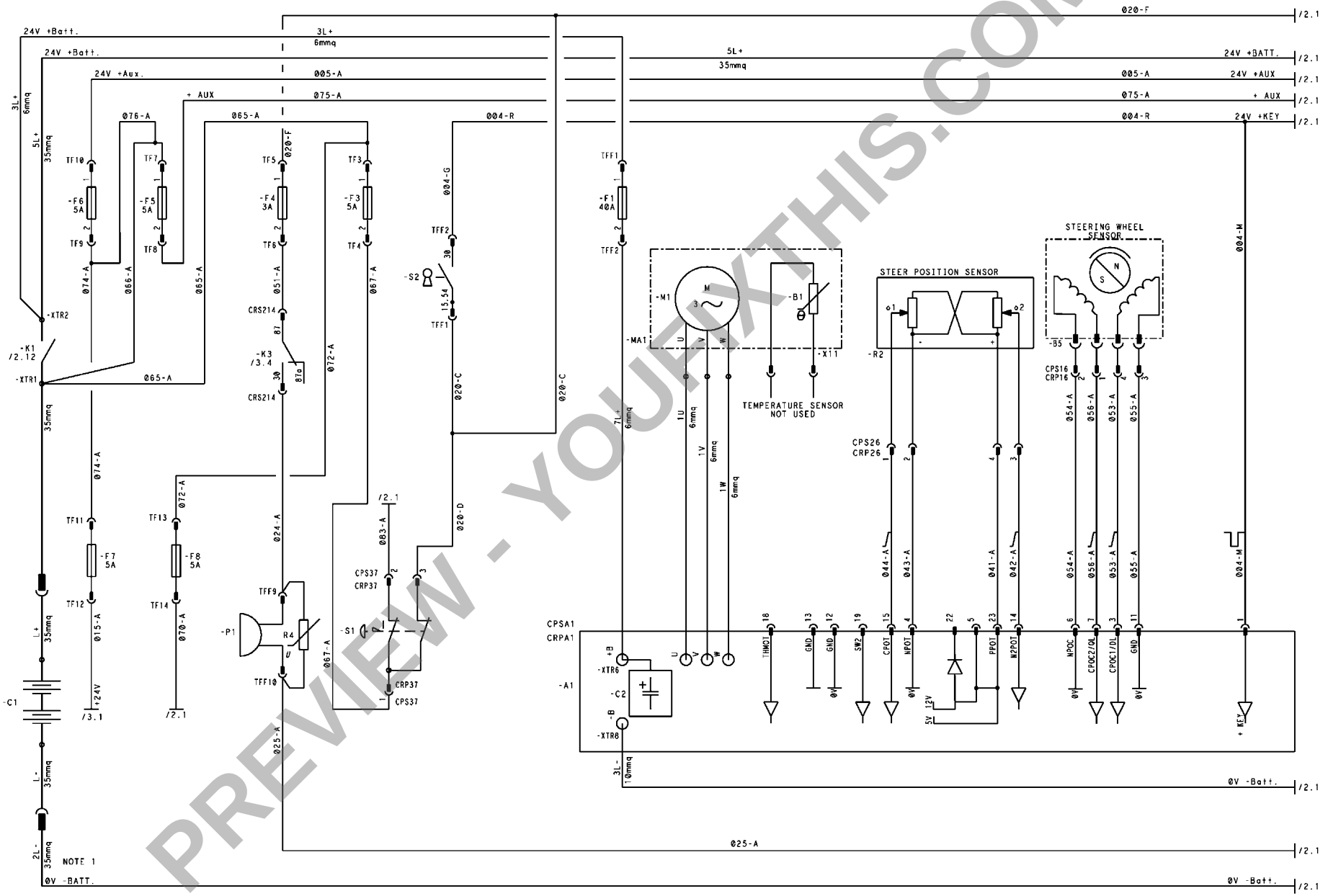
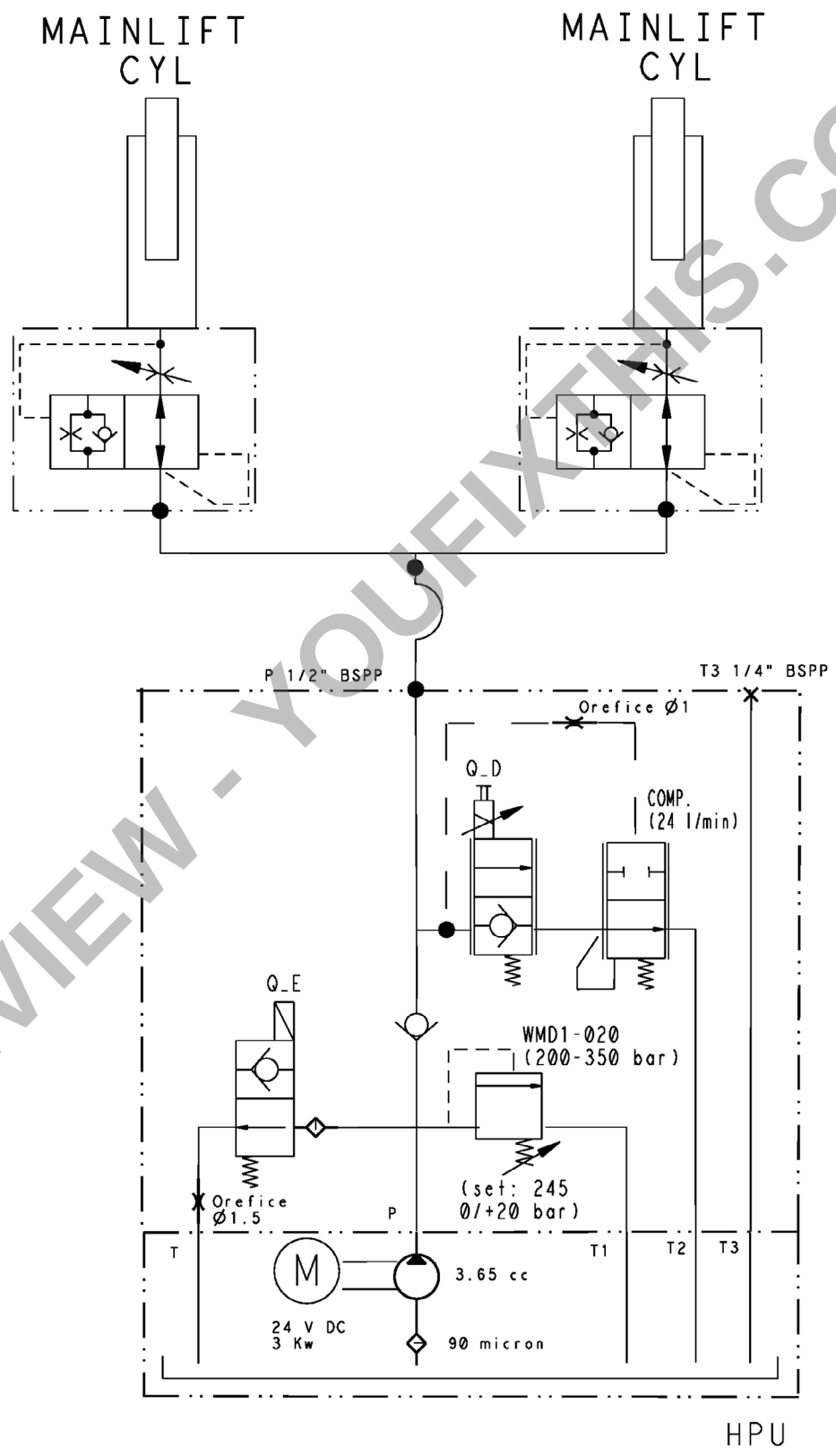


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OVERALL HYDRAULIC DIAGRAM

TWO STAGE NFL MAST



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TROUBLESHOOTING DIAGNOSIS SYSTEM FOR COMBI MODULE

The diagnosis system is divided into two main groups:

WARNINGS
When a warning occurs, the module is operating properly but it is found conditions to reduce performance, or to stop the truck, without affecting the power devices.
These warnings are connected to:

- incorrect starting sequences by the operator.
- conditions that require a reduction of performance (as for example high temperatures, ...

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.

COMBI AC1 MODULE TRACTION - WARNINGS

Warning	Code MDI	Troubleshooting
PUMP WARNING	**0**	COMBI AC1 PUMP module troubleshooting
Cause: There's a problem with the hydraulic pump.		
BATTERY LOW	**0**	Recharge the battery. If it doesn't work, measure the battery voltage using a multimeter and compare it with the COMBI AC1 TRACTION / tester menu/ battery voltage parameter. If they are different, carry out the battery voltage setting procedure (see "SETTING BATTERY VOLTAGE in the "INSTALLATION AND SETTINGS" section").
Cause: It appears when the battery charge is calculated beneath 20% of full charge.		
WAITING FOR NODE	**0**	The COMBI module cannot be activated, but it has to wait until the other module exits from the error condition.
Cause: The module receives the message from the CAN that another network module is in a breakdown condition.		
CHECK UP NEEDED	**0**	After having carried out the maintenance, set the COMBI AC1 TRACTION / adjustment menu / check up done parameter to ON.
Cause: This message is only a warning that the time has come to carry out the maintenance program.		
DATA ACQUISITION	**0**	The alarm disappears when the acquisition is completed.
Cause: Acquisition of current gains.		

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TRUCK UNLOADING

Equipment and tools



forklift truck load capacity 2000 kg



bridge crane load capacity 2000 kg



3 lift belt load capacity 2000 kg

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.

Phase 2

BRIDGE CRANE - 2 LIFTING SLINGS

Remove the packaging.
Attach the truck using the two lifting slings to the lifting attachments on the truck base **(ref. A fig.1)**.

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

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

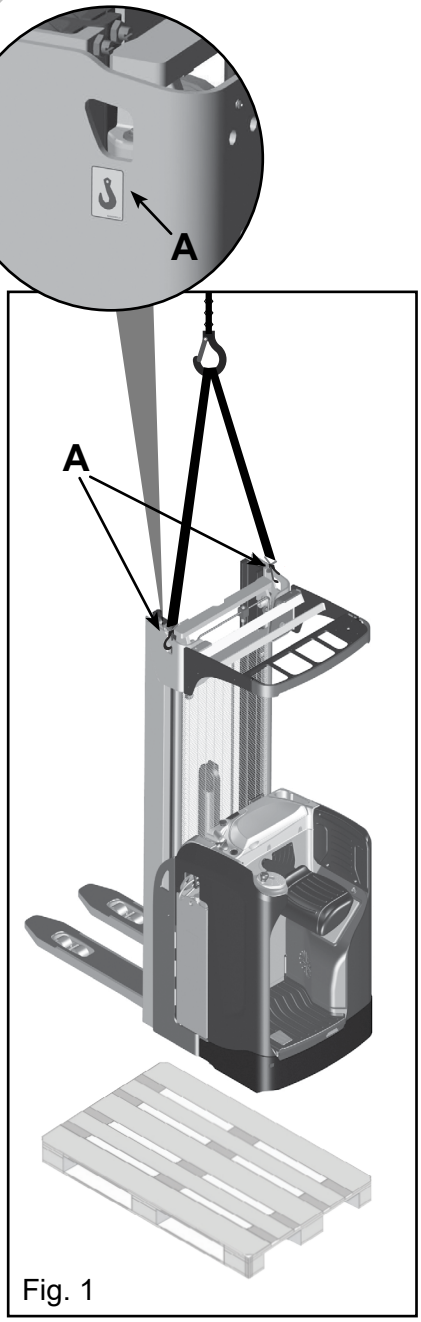


Fig. 1

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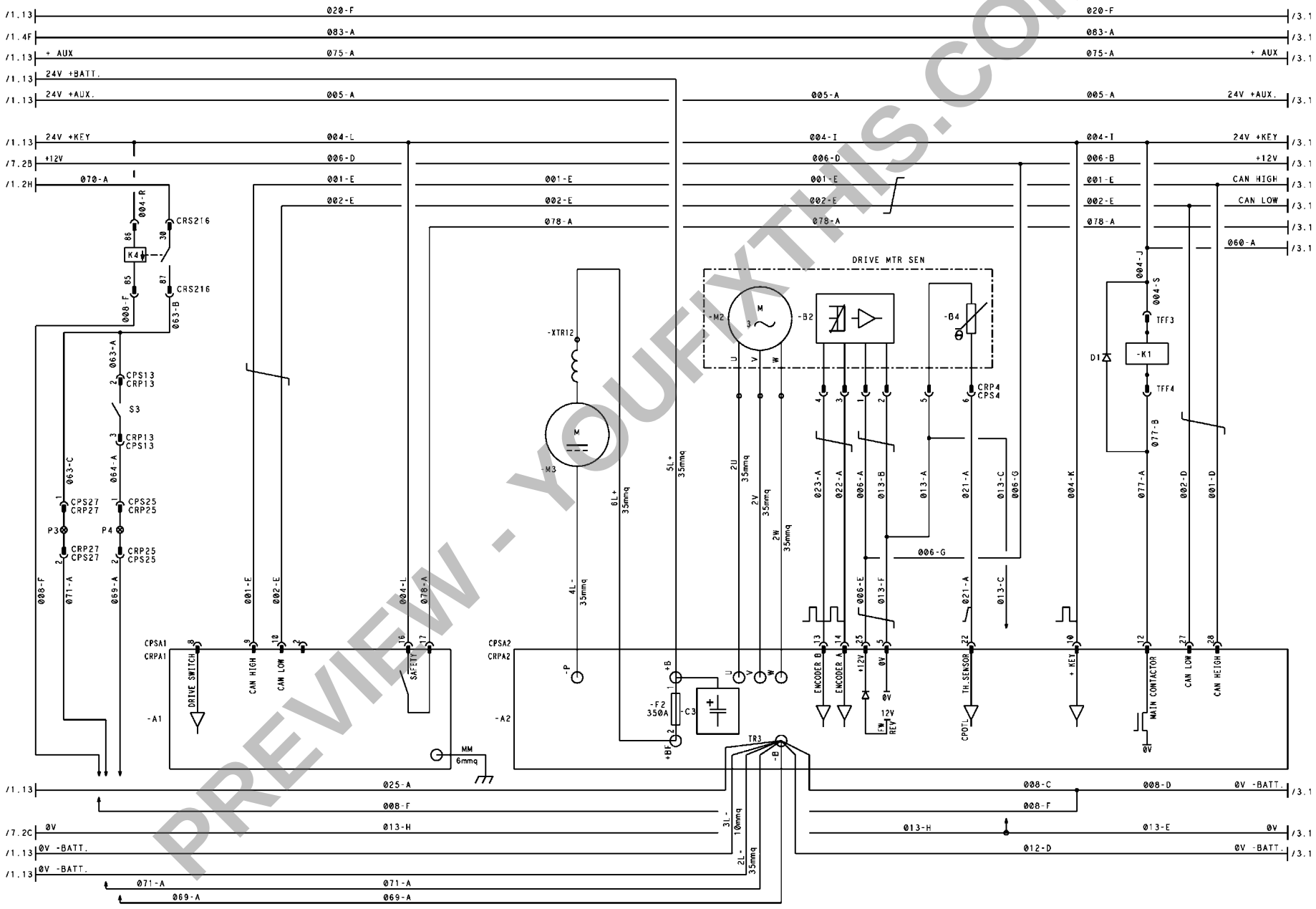
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SCHEDULED MAINTENANCE

	● = 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
FRAME	Screws and bolts check		●		
	Main welds visual check				●
	General cleaning		●		
BRAKING SYSTEM	Check the braking action (reverse)	■	●		
	Check the dynamic braking action	■	●		
	Check the emergency braking action	■	●		
	Check the electromagnetic parking brake coil efficiency		●		
	Check the electromagnetic parking brake gaskets wear		●		
	General cleaning		●		
HYDRAULIC SYSTEM	Check that there are no oil leaks	■	●		
	Check the correct operation of the valves	■	●		
	Check the oil level in the tank		●		
	Check the condition and tension of the hoses			●	
	Change the oil in the tank				x
	Oil filter cleaning				x
	General cleaning		●		
REDUCTION UNIT	Check that there are no oil leaks	■	●		
	Change the oil in the gearbox				
	Check the wear of reduction unit outer gears (gear wheel and steering pinion)		●		
	Check the gearbox noise		●		
	General cleaning		●		
MOTORS	Check the motor insulation		●		
	Check the cable connections		●		
	Check the fastening nuts condition		●		
	Check the bearings noise		●		
	General cleaning		●		
WHEELS AND TYRES	Check the condition and wear of the driving wheel (1)	■	●		
	Check the condition and wear of the loading wheels (1)	■	●		
	Check the condition and wear of the castor wheel (1)	■	●		
	Check the condition of the castor wheels support bearings (1)	■	●		
	Check the condition of the castor wheels bearings (1)		●		
	Check the condition of the loading wheels bearings (1)		●		
	Check the fastening nuts of the driving wheel		●		
	Check the nuts fastening the castor wheel support to the chassis articulation		●		
MAST AND FORKS	Screws and bolts check		●		
	Check the chain tensioner condition (1)		●		
	Check the lifting chain for elongation (yield) (1)		●		
	Check the wear on links and pins of lift chains		●		
	Check the condition of the chain pulleys in the pipes (1)		●		
	Check the conditions of the bearings slide guides		●		
	Check the bearings slide guides		●		
	Check the conditions of the forks and mast support bearings (1)		●		
	Check the forks conditions (1)	■			●
	Check the mast adjuster dowels clearance		●		

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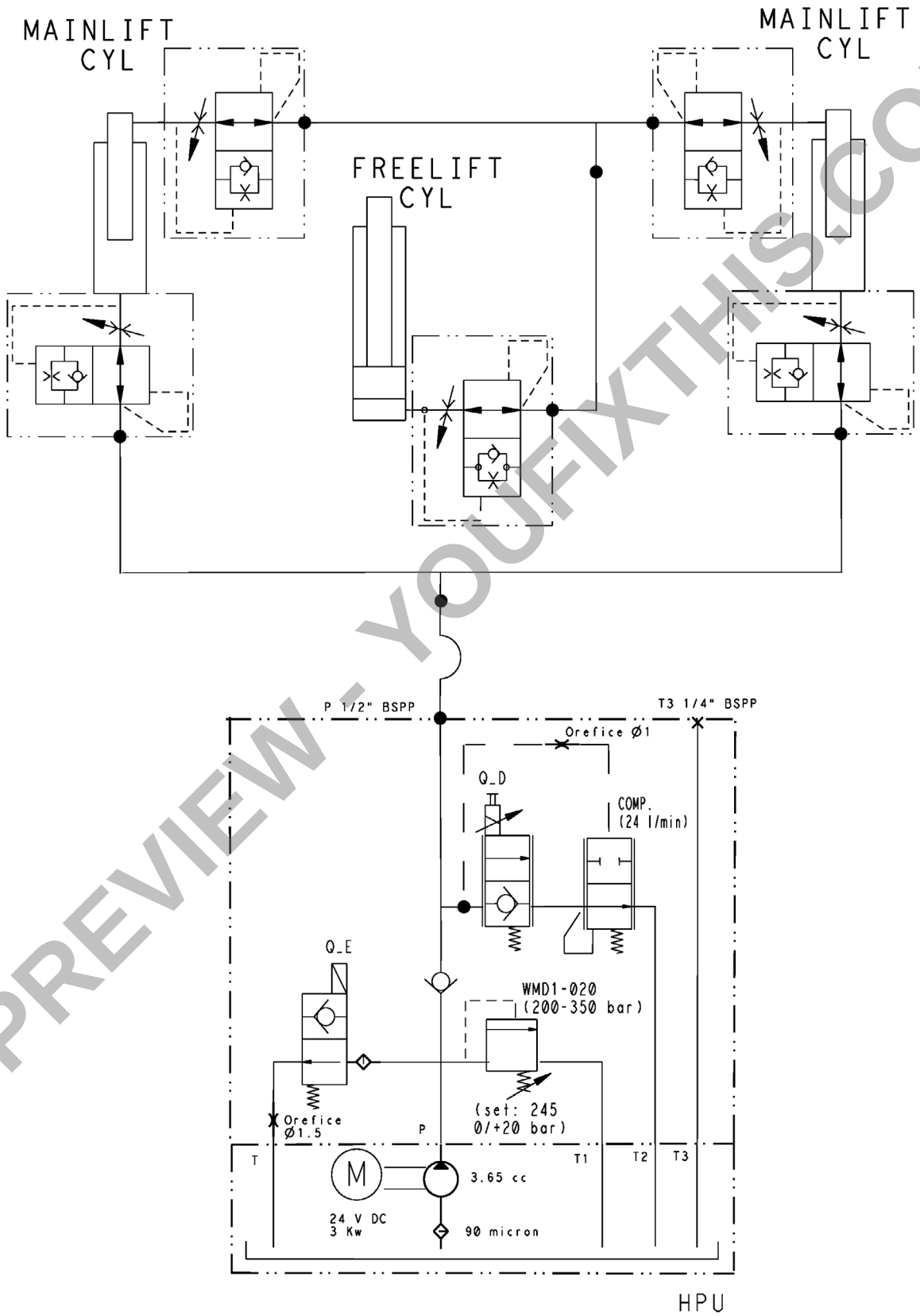
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COMBI AC1 MODULE TRACTION - ALARMS

Alarm	Code MDI	Troubleshooting
DEADMAN SHORTED	**7**	Check that the operator presence pedal works properly.
Cause: The CRPA 2-20 input (operator presence pedal) is active for a time greater than the TIMEOUT DEADMAN (40 seconds) without no function being operated.		

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 output changes during the stand-by or during the hydraulic functions (STANDBY AND MOTOR RUNNING diagnosis).		

EEPROM KO	**13**	Carry out the CLEAR EEPROM operation. Turn the machine off then on again to verify the result. If the alarm remains on permanently the module must be replaced. If the alarm goes off, the parameters previously memorized are replaced by default parameters.
Cause: The general check operation fails owing to a fault with the hardware of the permanent memory software that acts as a support for the module parameters. This alarm does not prevent the machine from carrying out operations, but the truck will work with default values.		

SAFETY STEER	**15**	• Check the alarms on EPS AC0 and follow the corresponding troubleshooting. • If there are no alarms on the EPS, check the cable that connects the EPS AC0 output to the COMBI AC1 module input. • If there are no alarms on the EPS,check with a multimeter the safety signal output status on the EPS AC0. If the signal is low (-BATTE), the safety relay is probably damaged, replace the module. • If there are no alarms on the EPS, check the COMBI AC1 module input status using a multimeter. If it is high (VBATT), the module's input circuit is most probably damaged and the module should be replaced.
Cause: The EPS AC0 safety relay output is connected to the COMBI AC1 module. This error message informs that the detected signal is low and that the EPS AC0 module is in alarm.		

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.		

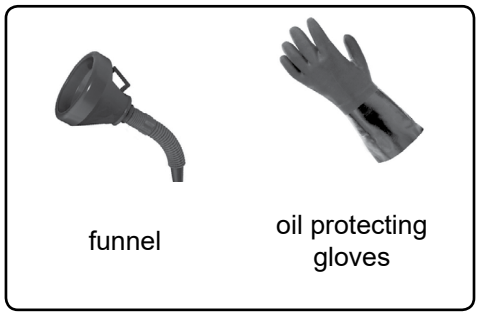
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TOPPING UP THE OIL RESERVOIR

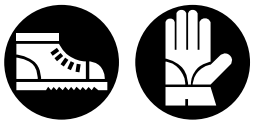
If required top up the oil in the hydraulic oil reservoir. Before proceeding, make sure that the forks are fully lowered.

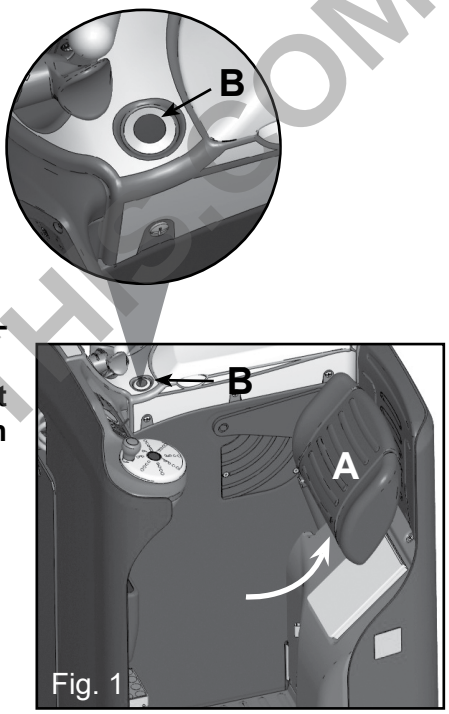
Equipment and tools



Procedure

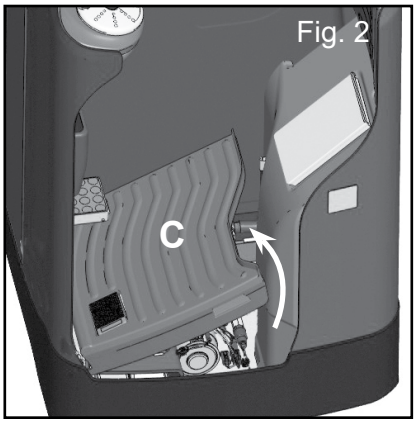
Before starting work, ensure that you are wearing suitable protective clothing.
Move the truck to a safe place, away from areas of transit of other vehicles and all pedestrians. Set the key switch to OFF and disconnect the battery.





Phase 1

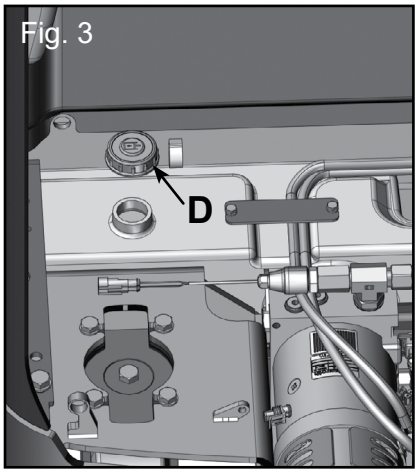
Fully rotate the seat **(ref.A fig.1)** pressing the appropriate button **(ref.B fig.1)** and bring it into the vertical position.
Then lift the platform **(ref. C fig.2)**.



Phase 2

OIL PROTECTING GLOVES - FUNNEL

Unscrew the oil sump cap **(ref. D fig. 3)**, place the funnel in the filler hole and top up the oil level.
Take the oil level in the tank to between the MIN and MAX values.
At the end of the operation screw the tank cap back on.



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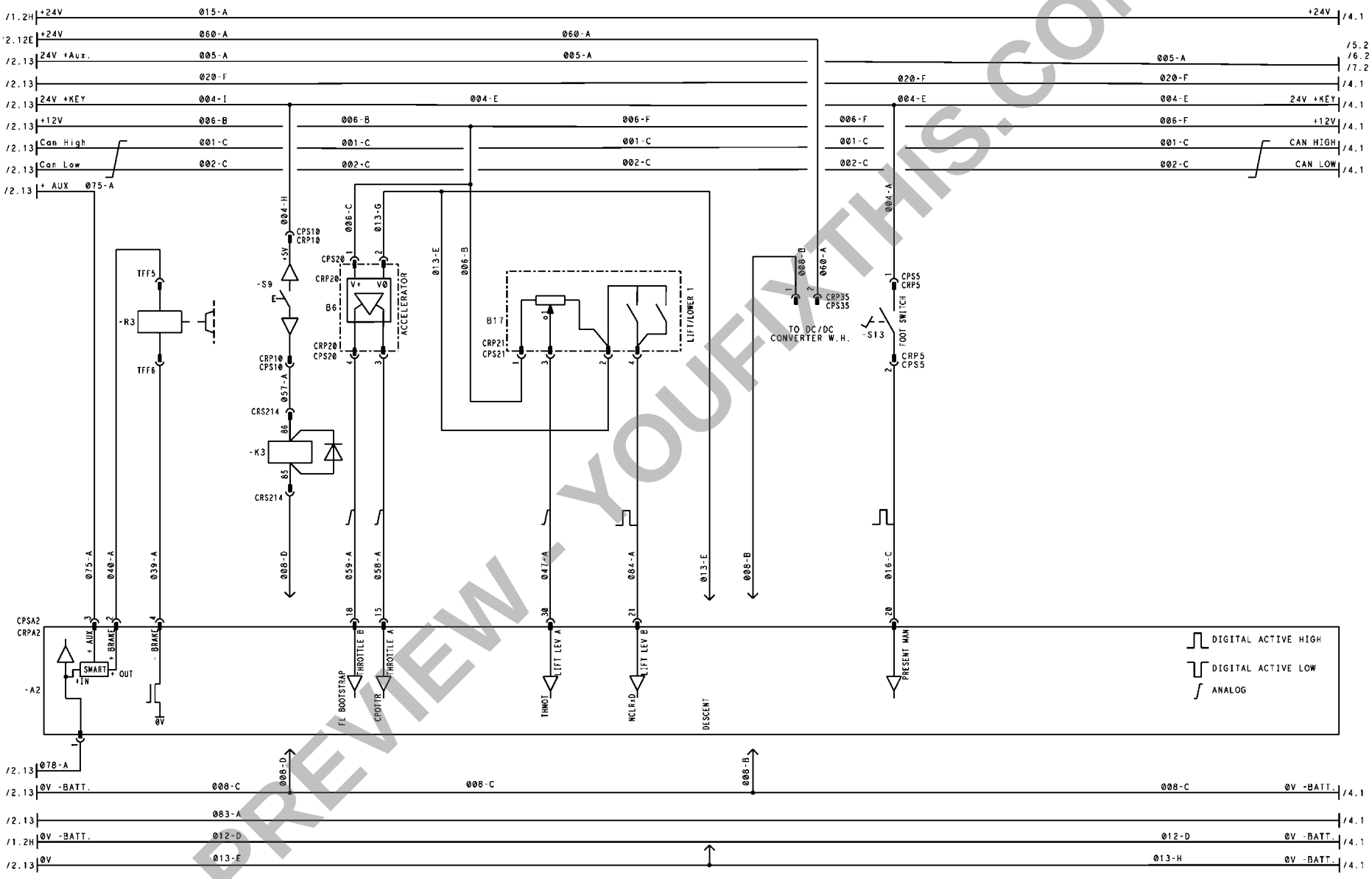
● = check and maintenance
■ = check by the operator
x = replacement

	Operation description	Maintenance intervals every 8 hours 1 day	every 1000 hours 12 months	every 2000 hours 24 months	every 3000 hours 36 months
LINKAGE, LEVERS	Check conditions of linkage (4)	■	●		
GREASING POINTS	Lifting chain lubrication		●		
	Lubrication with grease of reduction unit outer gear (crown wheel and steering pinion)		●		
	Lubrication with grease of reduction the forks support device bearings sliding guides and mast		●		
	Lubrication with grease of the levers		●		
CABIN	Check the seat wheel conditions and operation		●		
CONTROLS INSTRUMENTATION	Check the steering wheel operation	■	●		
	Check the horn button operation	■	●		
ELECTRONIC SYSTEM	Battery plug/socket integrity check	■	●		
	Check conditions of electrical power connections		●		
	Check conditions of electronic controllers auxiliary connections				●
	Electrical wiring check		●		
	Sensor operation check(4)		●		
	Battery release system operation check	■			
	Battery release system operation and wear 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 the visible warning and information plates and adhesive decals condition(1)	■			
	Warning and safety plates and adhesive decals general cleaning	■			
	Check all the visible warning and information plates and adhesive decals condition(1)		●		
	All warning and safety plates and adhesive decals cleaning		●		

(4) Solo per modelli S1.2 IL - S1.4 IL - S1.6 IL

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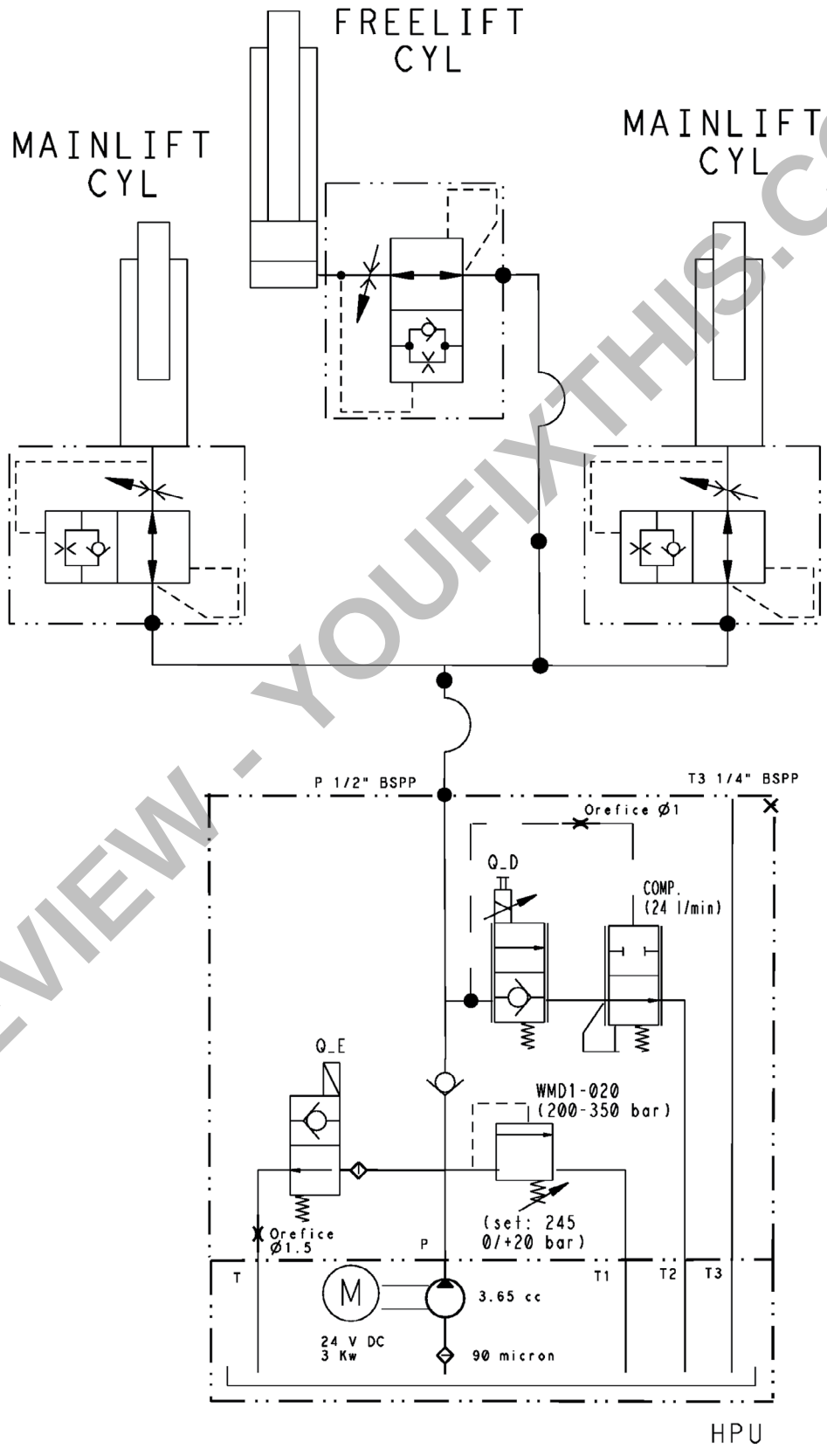
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