Hydraulic Power Unit HAO 5

1. Description

Hydraulic power unit of HAO 5 series serves for driving two single acting hydraulic cylinders of a dock leveller, i.e. hydraulic cylinder for lifting of the run-on plate and hydraulic cylinder for lifting of the tilting slat.
The power unit consists of a pump driven by an electromotor 1 (fig.1), both submerged in a reservoir under the oil level, filter 2 in the pump suction line, pressure relief valve 3, check valves 4, electromagnetic two-position two-way poppet directional control valve 5, electromagnetic two-position three-way directional control valve 6 and throttling orifices 9. The power unit is also fitted with an air-breath filter located in the reservoir filling cup. Thanks to the submerged electromotor the power unit is quiet, compact and has small installing dimensions.

The power unit has three ports:

- port I – for connecting the cylinder 7 – lifting of the run-on plate
- port II for connecting the cylinder 8 – lifting of the tilting slat
- closed port M usable for output pressure measurement

2. Function

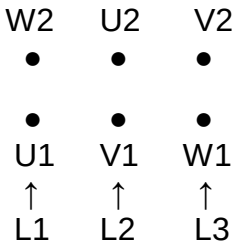
After switching on the electromoto, the pump 1 delivers fluid through port I to the hydraulic cylinder 7. Directional control valve 5 which controls the run-on plate lowering, is connected in parallel to this line. When the control valve 5 is without voltage signal, the valve is closed. When the voltage signal is put on the electromagnet, the control valve 5 is shifted and then the cylinder 7 is connected with the reservoir. Directional control valve 6 controls the cylinder 8, i.e. lifting and lowering of the tilting slat. When the control valve 6 is without voltage signal, ports A and P as well as cylinder 8 and output of pump 1 are connected (tilting slat lifts). After introducing voltage signal on the electromagnet, the ports A and T as well as cylinder 8 and reservoir are connected (tilting slat is lowering).
The check valves 4 hold the position of cylinder 7 (plate) when the electromotor and directional control valve 5 are switched off. The position of cylinder 8 is held by check valves 4 when the electromotor and control valve 6 are switched off.
Pressure relief valve 3 protects the system against overpressure. The lowering rate is controlled with orifices 9.

3. Technical data

Operating pressure		90 bar
Pressure relief valve setting pressure		100-^{5} bar
Pump displacement		3.6 cm^3
Flow at the operating pressure		4.9 $dm^3\,min^{-1}$
Filling volume of the reservoir		9 dm^3
Fluid	mineral hydraulic oils ISO 6743/4 type HM, class ISO VG 32, 46	
Viscosity	recommended range	(20 to 70).10^{-6} $m^2\,s^{-1}$
	maximum range	(7 to 400).10^{-6} $m^2\,s^{-1}$
Class of fluid purity according to ISO 4406		16/13

Electrical installation:	
Electromotor	3-phase AC
Voltage	400 V / 50 Hz
Power	1.1 kW
Duty S3	20 % ED
Enclosure type of electromotor	IP 54

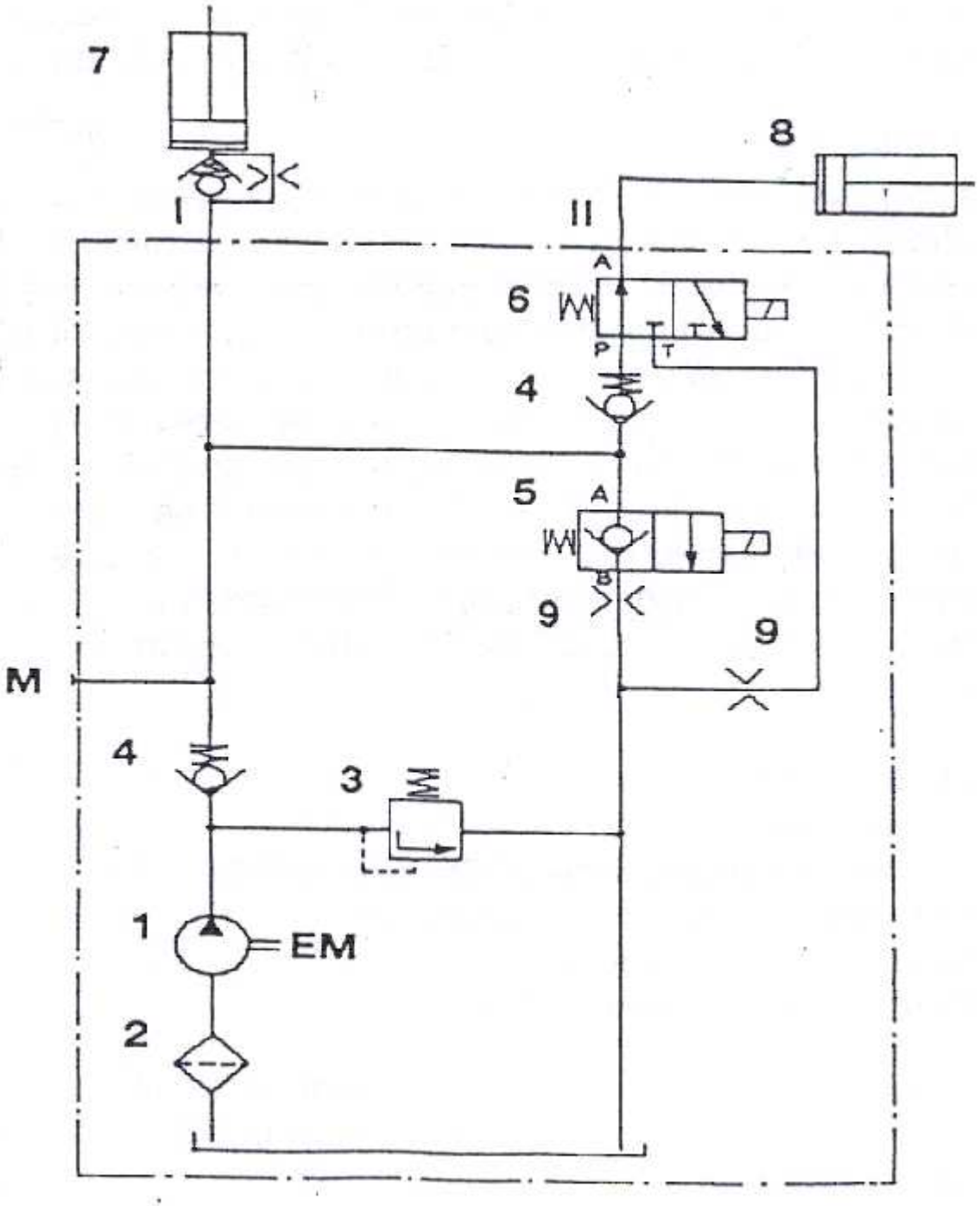
Phases connection for the correct direction of rotation



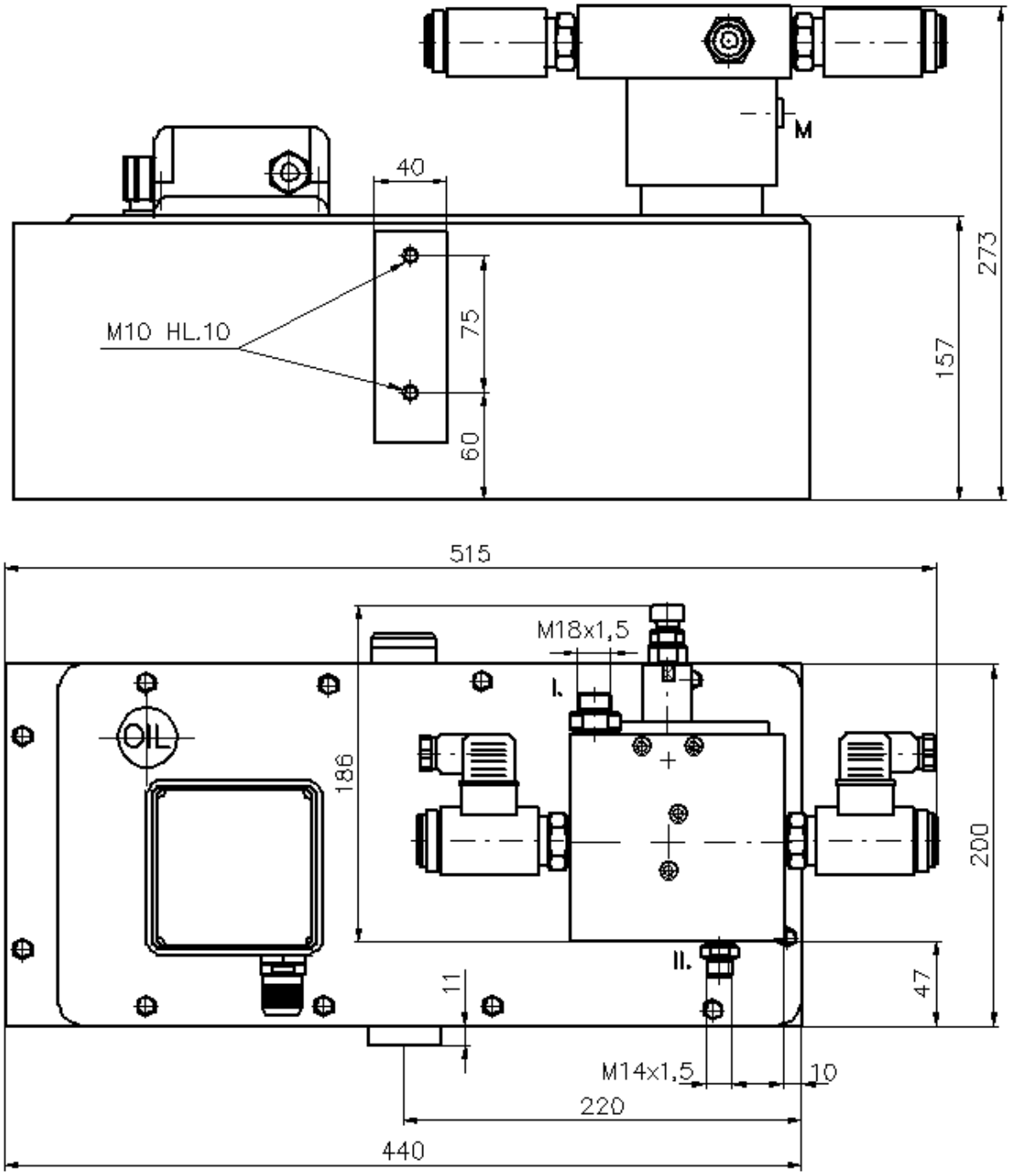
Electromagnetic directional control valves	
Voltage	230 V / 50 Hz
Current	0.17 A
Duty	100 % ED
Enclosure type	IP 65

4. Hydraulic diagram

I – output to cylinder 7
II – output to cylinder 8
EM - electromotor



5. Dimensions



6. Quality guarantee

Power unit is produced, tested and delivered according to theTechnical conditions TPG 0320-1099.
Power unit has been designed in correspondence with following standards:
CSN EN 982 “Safety of machinery equipment – safety requirements for fluid devices and its components”
CSN EN 1398 “Dock levellers”
Glentor is the certified company according to ISO EN 9001:2001 Standard

7. Working conditions

Temperature:	working fluid	-20 ℃ up to + 60 ℃
	ambient	-20 ℃ up to + 60 ℃
Fluid	mineral hydraulic oils:	
	ISO 6743/4 type HM	class ISO VG 32, 46
	ISO 6743/4 type HV	class ISO VG 32, 46
Viscosity:	recommended range	(20 to 70) $.10^{-6}$ m^2 s^{-1}
	maximum range	(7 to 400) $.10^{-6}$ m^2 s^{-1}

Class of fluid purity according to ISO 4406 16/13

The unit operating position is horizontal.
Exchanging the fluid in the reservoir depends on operating intensity; the minimum interval is once in three years. It is recommended to use fresh fluid and fill it into the reservoir through the filter with filtration rating 10 μm.
The units do not require special maintenance during operation.

7. Delivery conditions

Each product is delivered with *Certificate of quality and completeness* and - if required - also with *Statement of conformity.* Spare parts are not delivered with the product. Service and repairs are carried out by the manufacturer or an authorized repair shops.

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