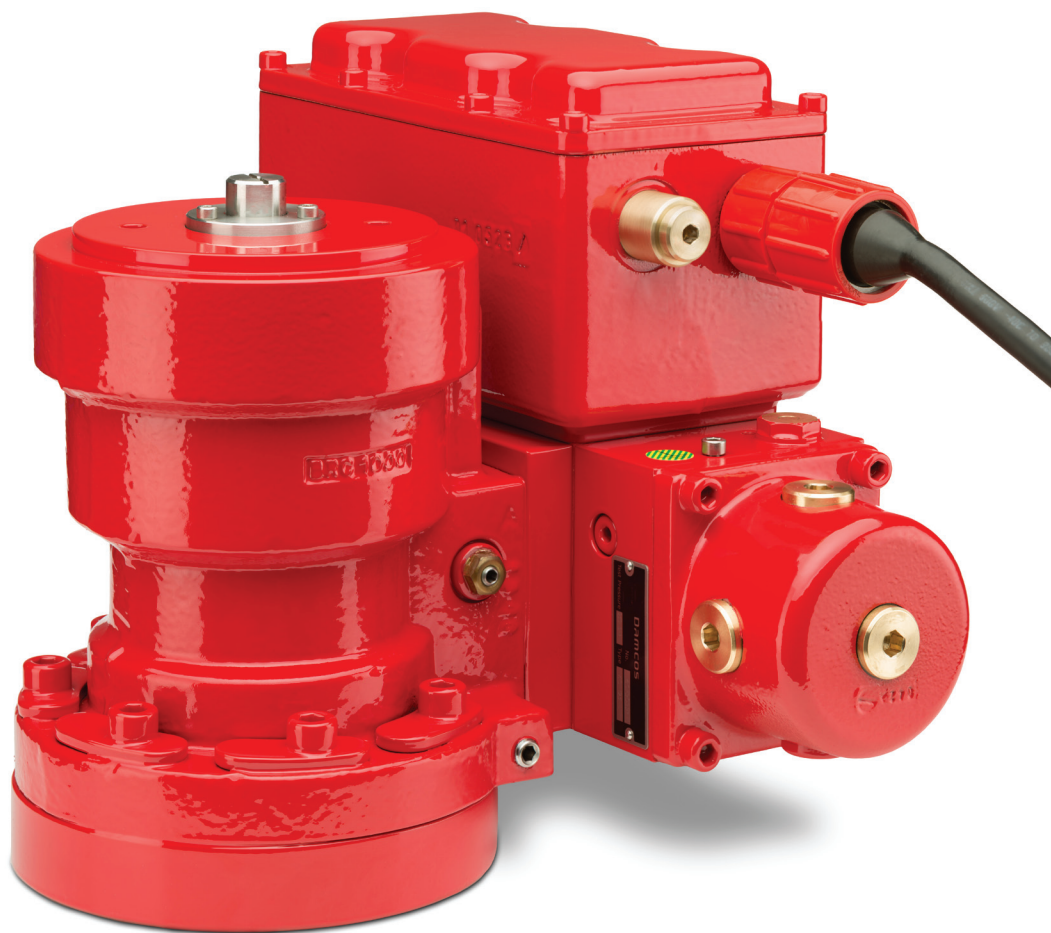


Damcos™ LPU F

General



Description

The LPU - (Local Power Unit) - is an integrated electro-hydraulic system for remote control of valves and actuators.

The LPU is especially developed for mounting direct on valve actuators, primarily on board ships. The F version allows the LPU to be installed in areas where flooding is at risk. The LPU F can withstand flooding down to 70 meters for 7 days (IP68).

The LPU consists of a hydraulic pump which is driven by an asynchronous capacitor motor and several valve functions.

The LPU F offers installation of two basic versions:

- LPU-S F (fail safe) for single acting actuator
- LPU-D F (fail set) for double acting actuator

The above two main types can be delivered with Plug connection or Cable connection.

Features

The LPU F version 2:

- IP68 7 bar for 7 days
- matches Damcos actuators, see page 4
- has no external indication cable
- easier de-airing and oil filling
- plugs for oil checking
- adjustable flow 250 - 1000 ml/min.
- one size for all actuators
- low energy consumption by means of automatic pump reduce "patented"

Note!

If LPU is to be mounted on BRC 125 or BRCF 125, the LPU has to be bulkhead mounted or supported otherwise, because of the size differences of the LPU and the actuator.

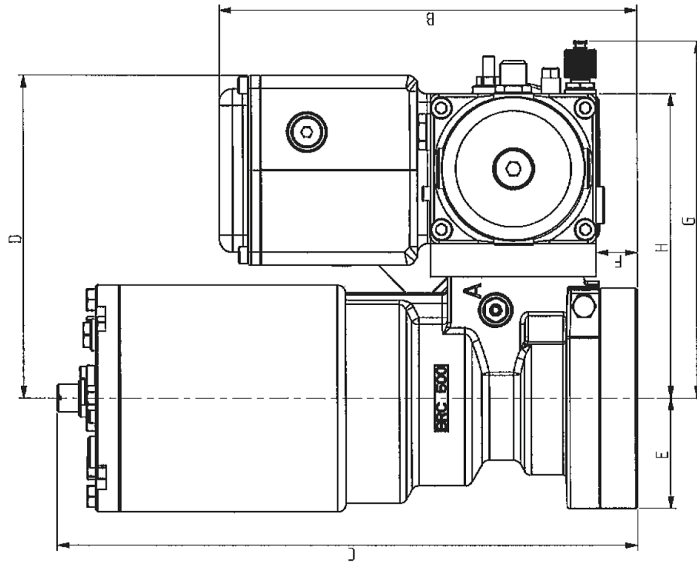
It can be necessary to use extension tanks, if pipe has to be used, because of handpump or bulkmounting. Please contact Emerson for further information.

Controls

The LPU F is designed to be controlled by Power Control PCB only.

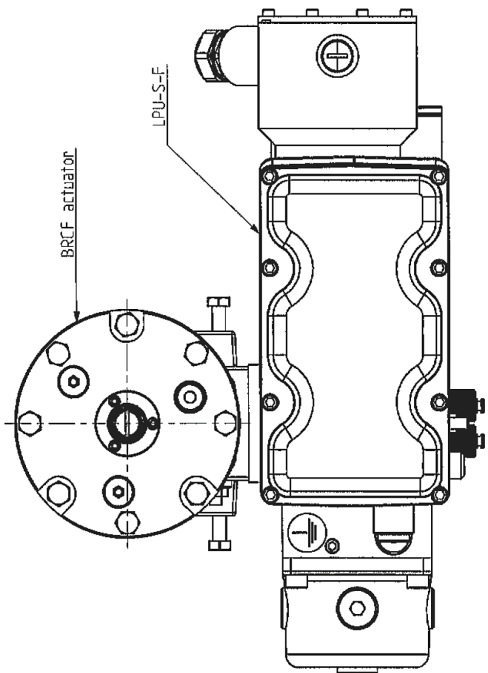
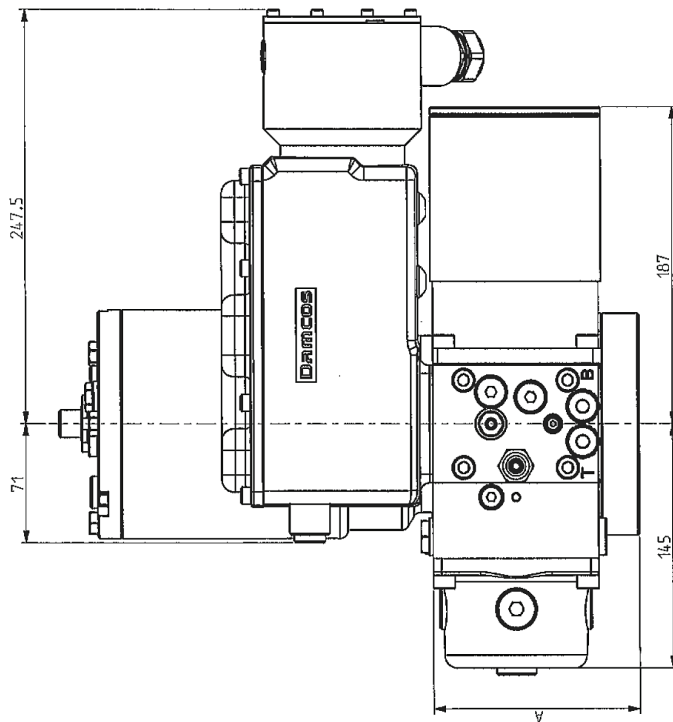
For further information about the control please see separate data sheet.

Main Dimensions for LPU-S F (cable connection sample)

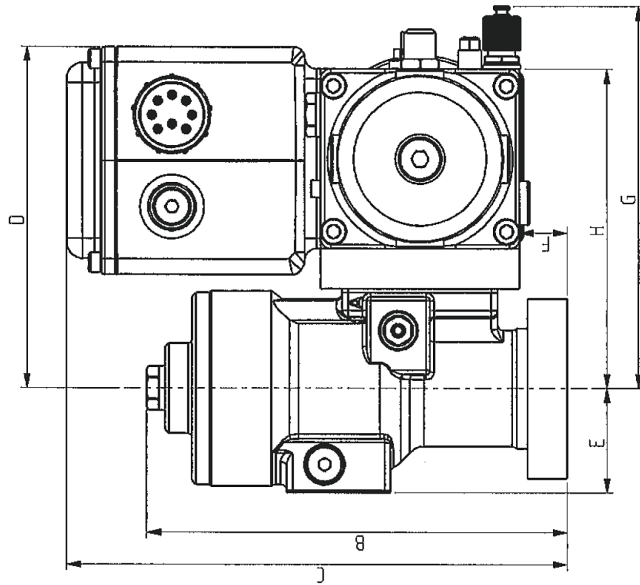


	A	B	C	D	E	F	G	H
BRCF 125	116.5	239	251.5	149	48	16.5	189.5	163
BRCF 250	121	279	256	156	59	21	201.5	170
BRCF 500	124.5	348	259.5	169	66	24.5	214.5	183
BRCF 1000	133	408	268	181	80	33	226.5	175
BRCF 2000	144	485	279	193	96	44	238.5	187
BRCF 4000	153	613	288	221	150	53	266.5	215

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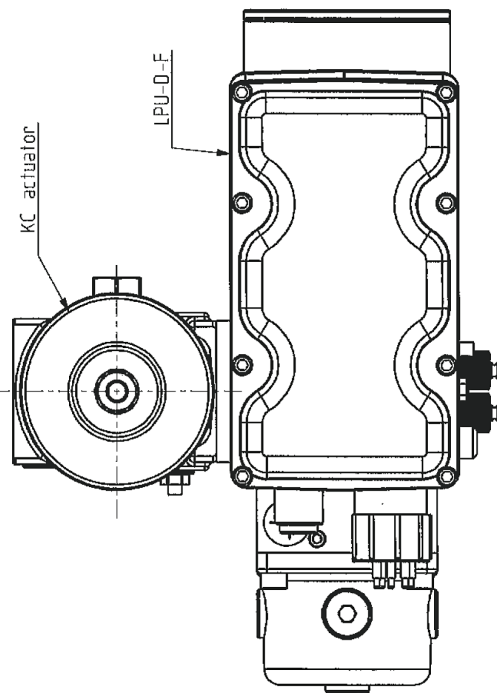
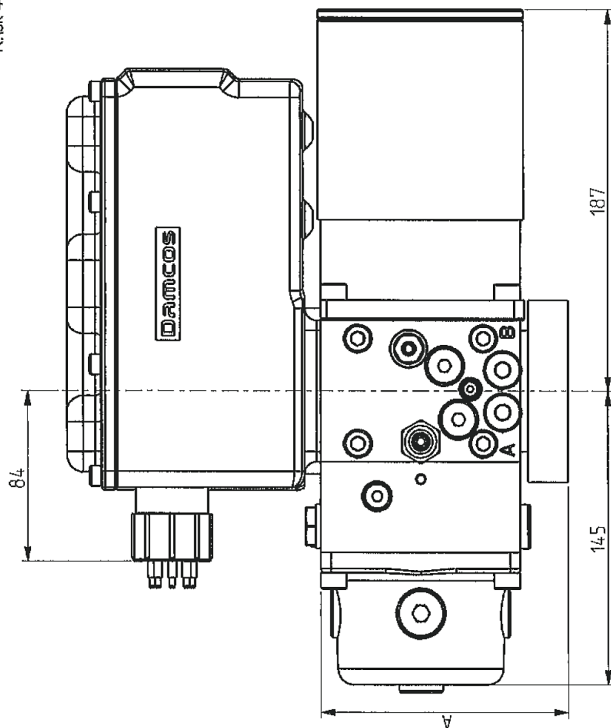


Main Dimensions for LPU-D F (plug w/cable sample)



	A	B	C	D	E	F	G	H
KC 65	116	157	251	143.5	-	16	169	137.5
KC 125	124	202	259	146	52	24	171.5	140
KC 250	152.5	343	287.5	172.5	77	52.5	198	166.5
KC 315	177	468	312	200	-	77	225	193.5
KC 400	196	520	331	200	-	96	225	193.5

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SK-4669

Hydraulic specification

Operating speed

The operating duration can be calculated from the oil displacement of the actuator. The LPU can deliver a flow, smoothly manually adjusted from 250 to 1000 ml/min at 50 Hz.

Example

A BRC 250 can be opened in:

min. 50 ml / 1000 ml x 60 sec. = 3.0 sec.,

max. 50 ml / 250 ml x 60 sec. = 12.0 sec.

For adjustment please refer to instruction.

Actuator type:	Oil displacement:	Min. operating time (sec.) open/close for LPU-D:		
		50 Hz	60 Hz	
BRC 125*	26	1.6	1.3	
BRC 250	50	3.0	2.5	
BRC 500	102	6.1	5.1	
BRC 1000	209	13	10	
BRC 2000	400	24	20	
BRC 4000	800	48	40	
BRC 8000	1600	96	80	
BRC 16000	3100	186	154	
KC 65	21	1,35	1,1	
KC 125	82	4,9	4,1	
KC 250	428	25,6	21,2	
KC 325	793	48	40	
KC 400	1700	102	85	
BRCF 125*	26	Min. operating time (sec.) open for LPU-S:		Min. closing time
		50 Hz	60 Hz	
BRCF 250	50	4	3	N/A
BRCF 500	102	8	6	1
BRCF 1000	209	15	13	2
BRCF 2000	400	31	26	4
BRCF 4000	800	60	50	8
BRCF 8000	1600	120	100	16
BRCF 16000	3100	240	200	32
BRCF 16000	3100	465	388	64
KF 65	21	1,2	1,1	124
KF/KFR 125	82	4,9	4,1	1
KF/KFR 250/150	265	15,9	13,2	3
KF/KFR 250	428	25,6	21,2	10
				17

* Only bulkhead mounted on LPU. Please note that min. time is calculated value. BRCF spring and value difference can change the actual time.

Working pressure:	135 bar
Relief valve cracking pressure:	150 bar
Safety valve pressure:	210 ± 40 bar
Max. running time:	Up to 10 min. dependent on ambient temp. (max. 25% duty cycle)
Enclosure rating:	IP68, (7 bar in 7 days)
Test pressure:	225 bar
Ambient temperature:	-5°C to 70°C (-25°C to 70°C on request)
Tank volume/ utility volume:	approx. 300 ml. / 120 ml.
Weight:	23 kg (plugged) or 26 kg (cable entry version)

Electrical specification

	230 V AC
Power supply:	230 V AC 50 or 60 Hz \pm 20%
Starting current:	4 A at 20°C
Running current max.:	1,85A at 50 Hz / 2A at 60 Hz
Running current at 20°C (220 V 50 Hz):	1.2 A
The solenoid valve in: LPU-S F consumes approx.: LPU-D F consumes approx.:	12 W corresponding to 0.07A 9 W corresponding to 0.09 A

Motor is protected against overheating with internal bimetal switch.

Materials

Electrical housing and tank:	Cast iron
Slides, etc.:	Steel
Screws, sign plate, rivets and bracket:	Stainless steel
Seals:	NBR/PTFE
Cable glands:	Brass/nickel
Hydraulic blocks:	Nodular cast iron

Placement and tests

The LPU can be placed according to ABS:

Mounting direction:	Any. (If bulk head mounted: with motor pointing downwards)
Cold test:	Function test at -30°C
Dry test:	70°C
Humidity test:	Static and cyclic for 6 days and nights.
IP-enclosure:	IP68, (7 bar in 7 days)
Vibration test:	5-25 Hz/ \pm 1,6 mm and 25-200Hz \pm 4.0 g in three directions
Mechanical shock:	80g for 6 msec.
Salt spray test:	Acc. to class requirement for mounting on deck
EMC test acc. to IACS E10 (1999)	

Cable Connection

Application	Number	Cable min. Ø	Cable max Ø			
Power Control						
Plug connection version	1					
Cable entry version	1	12.5	20.5			

Approvals

The LPU is type approved by:

- ABS

Mounting and Reinstallation Requirements

At commissioning and after repair of LPU F or actuator a special test must be done to ensure water proofness.

Please see Installation/Maintenance Manual for more information.

Mounting on actuators

- Direct mounting on BRC 250 - 16000, BRCF 250 - 16000, KC 65 - 400 and KF 65-250.
- Mounting on BRC 125 and BRCF 125 has to be bulkhead mounted or supported otherwise.

Be aware of the pipe dimensions too.

- LPU may be bulk-head mounted via a standard B-block. - It is possible to use a B-block with integrated VPI, (please see illustration). No external indication cable.

Note!

If bulk-head mounted:

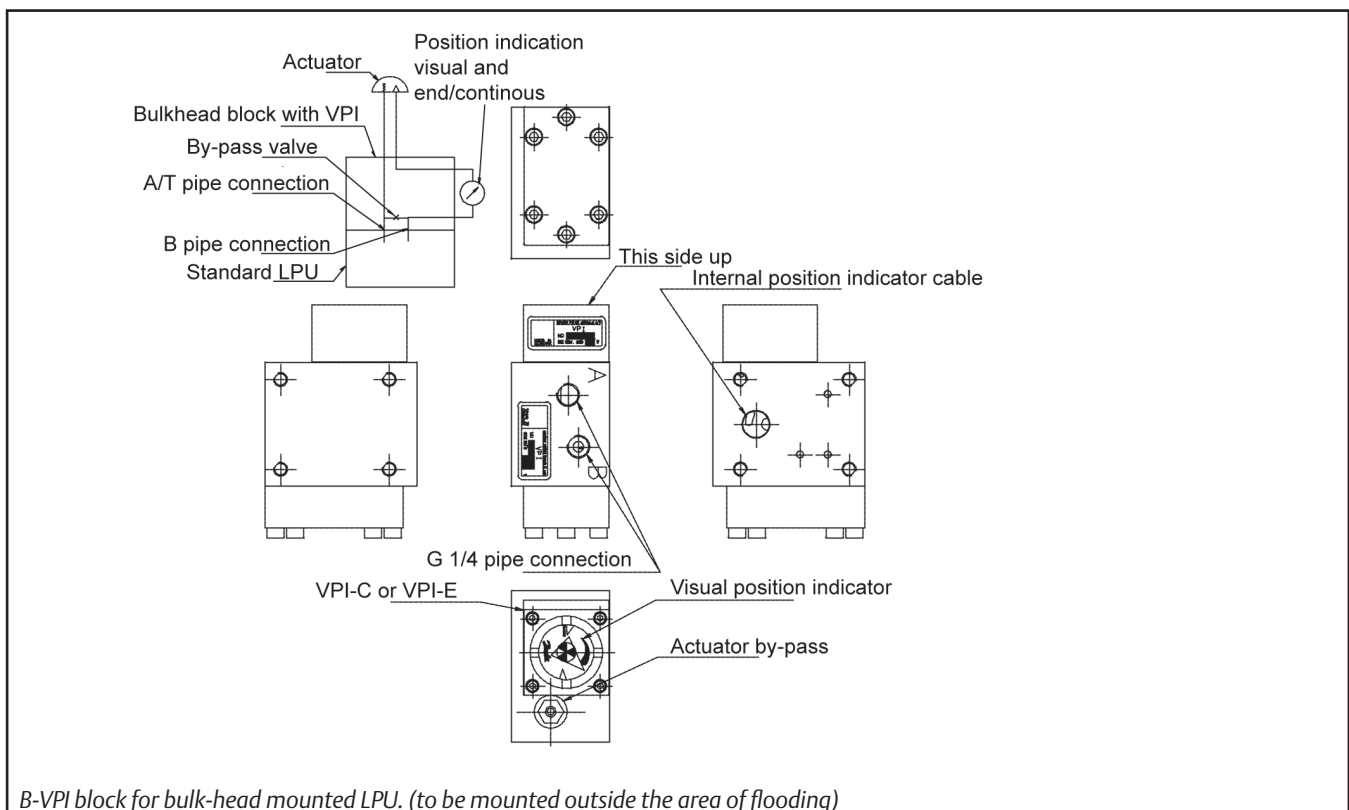
LPU bulk-head mounted with integrated VPI has to be mounted outside the area of flooding.

Oil level must be checked before starting up the LPU.

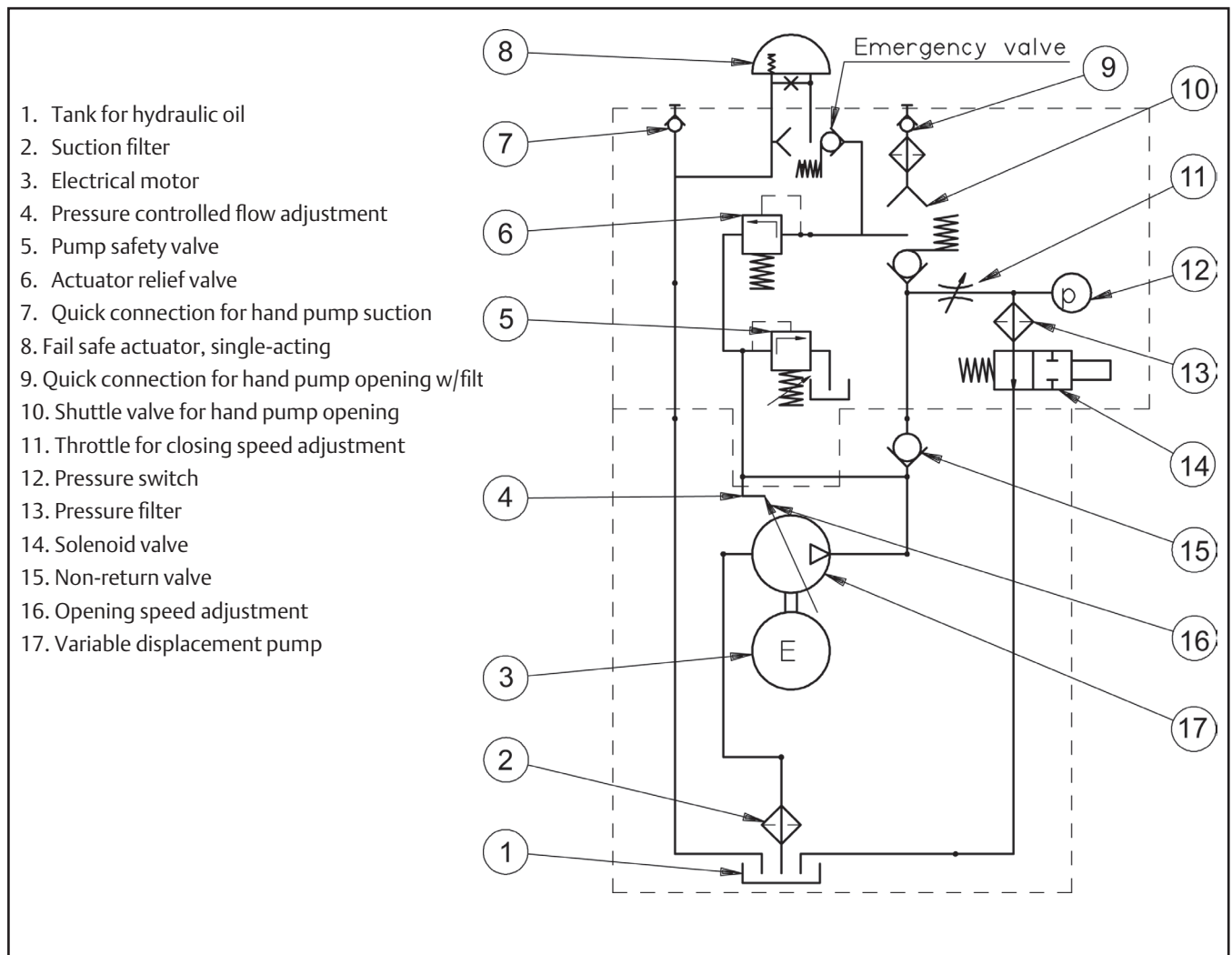
LPU must be placed with motor pointing down and breather valve on top, short suction pipe recommend.

The LPU may be emergency operated as if mounted direct on actuator.

Properly de-airing via quick connections on the LPU.



Hydraulic diagram for LPU-S F



Operation LPU-S F

To move the valve towards open, the motor (3) is activated. The oil is led from tank through the pump and through the non-return valve (17), directly to the actuator B port. To prevent the oil from flowing back to tank, the solenoid valve (16) must be energized. When the valve is fully open, the pressure rises to 150 bar which causes the pump safety valve (7) to open and the oil flows back to tank. The motor is de-energized. The actuator is now hydraulically locked in position by the solenoid valve.

In case of a major increase of temperature, the pressure may rise. This will not cause any problems because of the safety valve (8) which will open at approximately 225 bar.

The valve can be stopped (and hydraulically locked) in any intermediate position simply by de-energizing the motor.

If the pressure drops while valve is fully open - due to a minor leakage in the solenoid valve or due to temperature variations -, the pressure switch (14) will detect this. The motor may then be activated for some seconds in order to keep up the pressure, and prevent the valve from leaving the open position. - This may take place automatically.

To move the valve towards closed, the solenoid valve is de-energized. The springs then move the actuator, pressing the oil back from the actuator B port, through the throttle valve (13) and the solenoid valve (16) to the LPU tank.

Emergency operation LPU-S F

... with portable hand pump (BRCF)

A portable hand pump is connected to the two quick connections (9) and (11). With suction to T and pressure to B which causes the shuttle valve (12) to change over and prevents the oil from flowing to tank. When reaching the required position, the hand pump can be disconnected. If the valve must be emergency operated towards closed, the cross-over valve on the actuator is open until the required position is reached. When the valve is fully closed, the shuttle valve will reset.

...with permanently connected (bulkhead-mounted) hand pump

Opening: Hand pump is activated until the required valve position is reached.

Closing: The valve moves towards closed by opening the bypass valve in the hand pump block. When the remote control has to take over, the valve can be closed by energizing the solenoid valve and the motor for a few seconds. This will reset the shuttle valve. After emergency operation, remote control is automatically in charge.

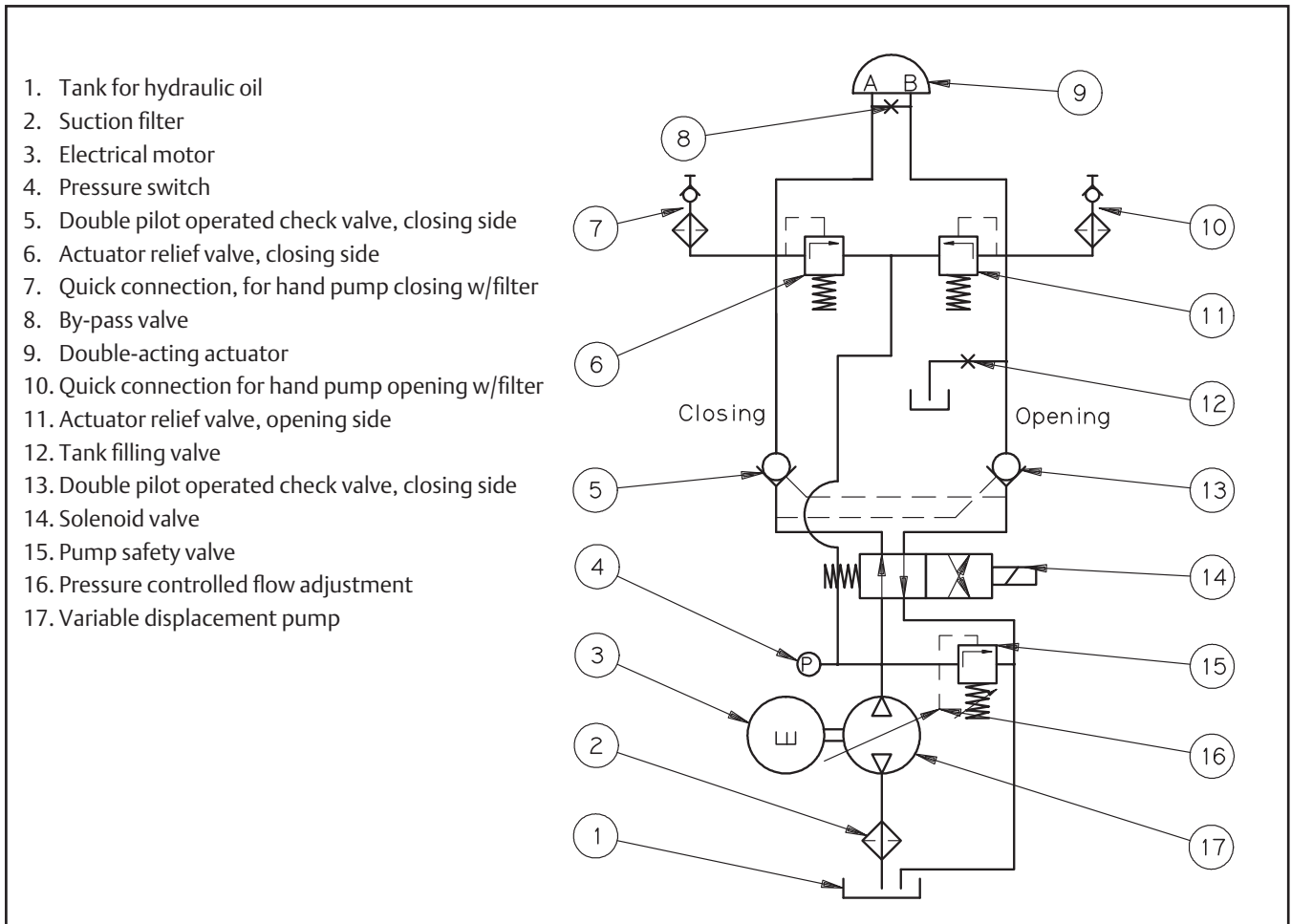
Requirements

LPU Hand pump (HP-LPU) can be placed at actuator and hence flooded as actuator and LPU-S F.

HP-S-50 placed above waterline requires LPU to be placed above waterline as well. Maximum allowed pipe length is 80 m (based on ID 8 mm).

LPU tank size depend on pipe volume.

Hydraulic diagram for LPU-D F



1. Tank for hydraulic oil
2. Suction filter
3. Electrical motor
4. Pressure switch
5. Double pilot operated check valve, closing side
6. Actuator relief valve, closing side
7. Quick connection, for hand pump closing w/filter
8. By-pass valve
9. Double-acting actuator
10. Quick connection for hand pump opening w/filter
11. Actuator relief valve, opening side
12. Tank filling valve
13. Double pilot operated check valve, closing side
14. Solenoid valve
15. Pump safety valve
16. Pressure controlled flow adjustment
17. Variable displacement pump

Operation LPU-D F

When the motor and solenoid valve are activated the oil is sucked from tank through the suction filter to the pump and pumped through the solenoid valve and the pilot operated check valve (13) to the actuator port B. This causes the actuator to open the valve. The oil from actuator port A flows back through the pilot operated check valve (5) (which is opened by the pressure in the B-line) and returns through the solenoid valve to the tank.

When the valve is fully open, the pressure rises to 150 bar, which causes the pump safety valve to open so that the oil flows back to tank. The motor and the solenoid valve are then de-energized.

The actuator is now hydraulically locked in position by the pilot operated check valves.

In case of a major rise in temperature, the pressure may rise. This will not cause any problems because of the actuator relief valve (6) and (11), which will open at approx. 225 bar.

Closing the valve follows exact the same procedure, except that the solenoid valve is not activated which causes the ports A and B to be reversed.

When the motor is running the direction of oil-flow is solely determined by the activation of the solenoid valve.

Emergency operation LPU-D F

...with portable hand pump

A portable hand pump is connected to the two quick connections (7) and (10), which are directly connected to the actuators ports A and B. The actuator can be activated in any of the two directions, until the required position is reached. If too high pressure is applied to the LPU, the relief valve let the oil flow to the tank. The hand pump is dismantled. The actuator is hydraulically locked in any position.

...with key (only possible up to BRC 500)

The cross-over valve in the actuator is opened, the key is used to turn the actuator, the cross-over valve is closed. The actuator is hydraulically locked in any position.

...with permanently connected (bulkhead-mounted) hand pump

Open or close is selected on the hand pump block lever, the hand pump is activated until the required position is reached. The actuator is hydraulically locked in any position.

Note!

After emergency operation, remote control is automatically in charge.

Requirements

LPU Hand pump (HP-LPU) can be placed at actuator and hence flooded as actuator and LPU-D F.

HP-D-50 placed above waterline requires LPU to be placed above waterline as well. Maximum allowed pipe length is 80 m (based on ID 8 mm).

LPU tank size depend on pipe volume.

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