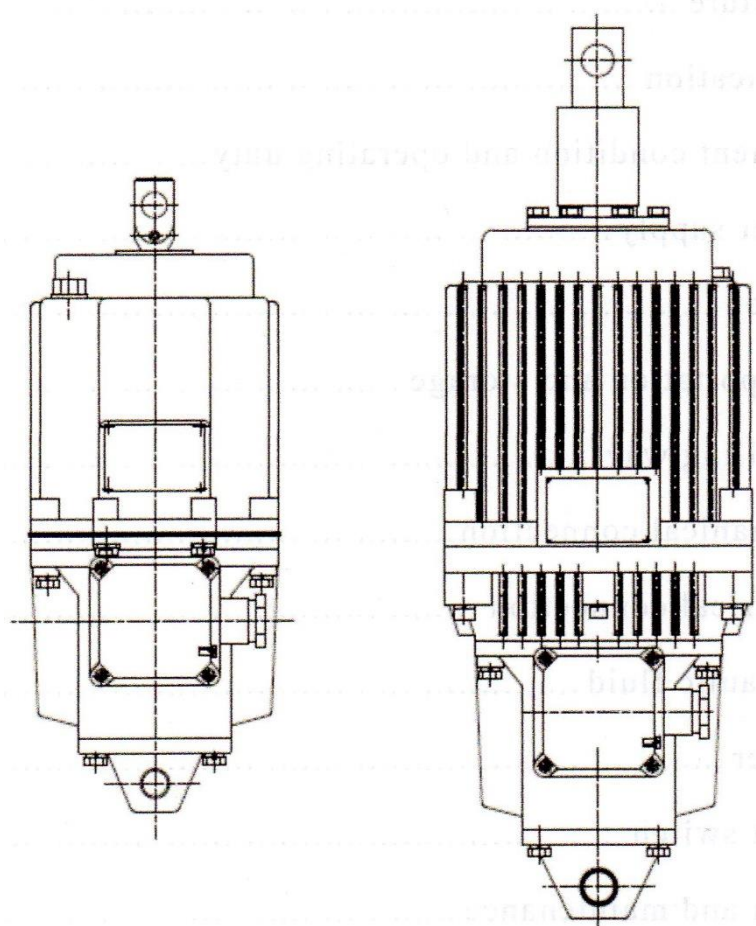


Furka® eFD Series Thruster

acc. to DIN15430



The Furka® eFD thruster is a very compact dive control system that integrates electrical motor, centrifugal pump and oil cylinder. It is used as drive mechanism working as a brake thruster, e.g. in drum and disk brakes, drive control of industrial valves, steering mechanism or boom latch thruster.

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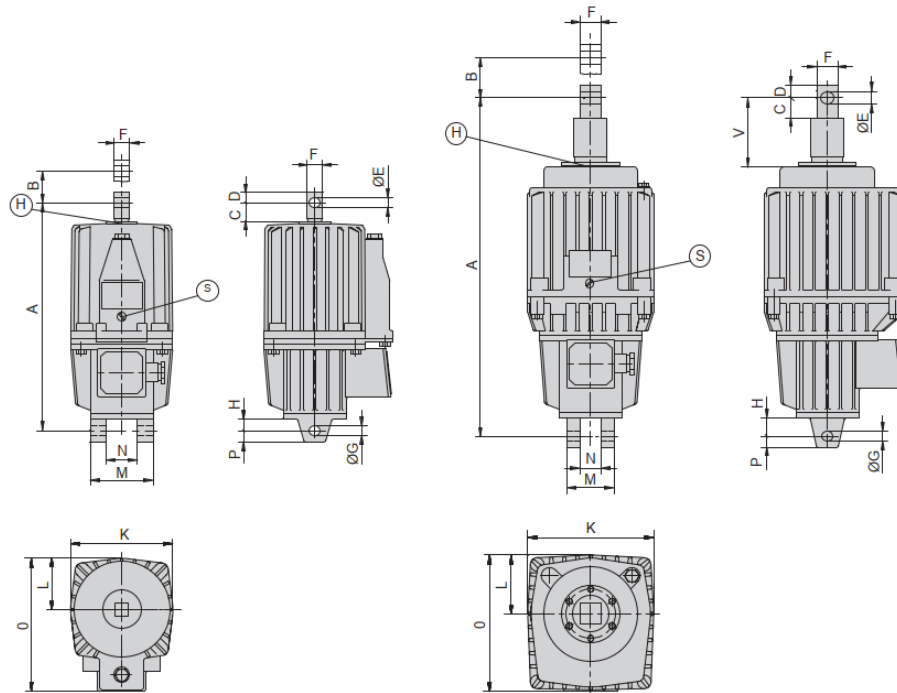


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1. Dimensions and technical data



Type: eFD220, eFD300, eFD500, eFD800

Type: eFD1250, eFD2000, eFD3000, eFD4500

Dimensions | Abmessungen

Thruster type Luftgerät	A	B	C	D	E	F	G	H	K	L	M	N	O	P	V
eFD220-50	286	50	23	14	12	20	16	20	160	80	80	40	197	16	
eFD300-50	370	50	33	17	16	25	16	20	160	80	80	40	197	16	
eFD500-60	435	60	35	22	20	30	20	23	194	97	120	60	254	22	
eFD800-60	450	60	35	22	20	30	20	23	194	97	120	60	254	22	
eFD1250-60	645	60	37	25	25	40	25	33	240	120	90	40	268	25	130
eFD2000-60	645	60	37	25	25	40	25	33	240	120	90	40	268	25	130
eFD3000-60	645	60	37	25	25	40	25	33	240	120	90	40	268	25	130
eFD500-120	515	120	35	20	20	30	20	61	194	97	120	60	254	22	
eFD800-120	530	120	35	20	20	30	20	61	194	97	120	60	254	22	
eFD1250-120	705	120	37	25	25	40	25	43	240	120	90	40	268	25	190
eFD2000-120	705	120	37	25	25	40	25	43	240	120	90	40	268	25	190
eFD3000-120	705	120	37	25	25	40	25	43	240	120	90	40	268	25	190
eFD4500-120	850	120	48	35	30	50	30	40	290	145	110	60	325	30	190
eFD1250-80	665	80	37	25	25	40	25	33	240	120	90	40	268	25	150
eFD2000-80	665	80	37	25	25	40	25	33	240	120	90	40	268	25	150
eFD3000-80	665	80	37	25	25	40	25	33	240	120	90	40	268	25	150
eFD4500-80	810	80	48	35	30	50	30	40	290	145	110	60	325	30	150

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eFD Technical data | Technische Daten




Thruster type Typ	Rated thrust (N) Hubkraft (N)	Rated stroke (mm) Hubweg (mm)	Power consumption (W) Leistungsaufnahme (W)	Rated consumption (A) Stromaufnahme (A)	Rated voltage (V) Spannung (V)	Max. operating frequency (1/h) max. Schaltfrequenz (1/h)	Weight (kg) Gewicht (kg)
eFD220-50	220	50	120	0.38	380~400V	2000	10
eFD300-50	300	50	250	0.78	380~400V	2000	14
eFD500-60	500	60	370	1.34	380~400V	2000	23
			250	0.78			
eFD800-60	800	60	550	1.52	380~400V	2000	24
			370	1.34			
eFD1250-60	1250	60	550	1.52	380~400V	2000	39
			370	1.34			
eFD2000-60	2000	60	750	1.98	380~400V	2000	39
			550	1.52			
eFD3000-60	3000	60	900	2.21	380~400V	1500	40
			750	1.98			
eFD500-120	500	120	370	1.34	380~400V	1200	26
			250	0.78			
eFD800-120	800	120	550	1.52	380~400V	1200	27
			370	1.34			
eFD1250-120	1250	120	550	1.52	380~400V	1200	39
			750	1.98			
eFD2000-120	2000	120	550	1.52	380~400V	1200	39
			900	2.21			
eFD3000-120	3000	120	750	1.98	380~400V	900	40
eFD4500-120	4500	120	1100	2.56	380~400V	900	45
eFD1250-80	1250	80	550	1.52		1200	39
			370	1.34			
eFD2000-80	2000	80	750	1.98		1200	39
			550	1.52			
eFD3000-80	3000	80	900	2.21		900	40
			750	1.98			
eFD4500-80	4500	80	1100	2.56		900	45

2. Advice Safety regulations

2.1 General advice



The safety of your brake / brake-system depends on proper and regular inspection and maintenance. Study the manual before starting the installation. If in doubt, please don't hesitate to contact our service-department or your local retailer.

2.2 Safety and warning symbols

	Warning of personal injury	This signal indicates a threat of danger. If this danger is not avoided, this will result in death or serious injuries.
	Warning of product damages	This symbol indicates a warning which may contribute to prevent material or machine damage.
	General advice	This symbol indicates information that helps to avoid adverse results and conditions.

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2.3 General hazard warnings

	The lifting rod must be protected while handling the thruster. It must be neither damaged nor be subjected to shearing forces. It should be kept clean. Colour residues and (welding) splashes should be avoided.
	A sudden start-up of the installation endangers the life of the maintenance personnel! Secure the drive and the installation against any accidental movement before starting any work! Reading the operating instructions is indispensable.

- The following applies to all work and operations with the thruster: **Safety first**
- Don't use any mechanical devices to block the brake.
- Ensure, that **the drive** is disconnected from the electrical power supply.
- Ensure, that **the brake (thruster)** is disconnected from the electrical power supply.
- Any electrical work is only to be done by a trained electrician.
- Only use original Furka® spare parts
- The thruster must not be disassembled.

Never open the thruster or the screw plug when it is hot! Escaping hot oil may cause burns!

Before repair or refilling, let the unit cool down to room temperature!

Furka® thrusters are fully factory tested prior to delivery and are supplied in a perfect condition.

2.4 Warranty

The warranty and its duration depends on the contract. For details on the supplier's warranty please refer to the terms of the contract. Any warranty- or liability claims are excluded in case they occur because of one or more of the following conditions:

- Non-designated use of the thruster.
- Improper handling, setup, operation and maintenance of the thruster by the operating company.
- Neglect of the regulations and notes in this manual concerning transport, setting up, operation and maintenance of the thruster.
- Improper maintenance and repairs of the thruster.
- Improper monitoring of components, which are prone to wear.
- Catastrophes, external objects and forces and force majeure.
- Changes at the thruster without approval of Furka®.
- The information in this manual has been checked thoroughly. Nevertheless we can't accept liability for errors.

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2.5 Description and designated use

This manual describes the operation of an eFD thruster with a Furka® lever disc or drum brake. The eFD thruster is designed exclusively as per the specifications in your order. It serves to electro-hydraulically release a brake. This version of the thruster is not suitable for use in areas with explosion hazards.

The thruster may be only used in accordance with the technical data (see 1.??). Unauthorised modifications of the thruster are not admissible. Ignoring the regulations for the designated use and /or the instructions for setup and maintenance endangers life and leads to the loss of any warranty by the manufacturer!

The eFD thruster may be equipped with a heater, that can either be used as an oil heater or a stand-still-heater. To control the thruster a limit switch may be mounted.

3. Storage transport and packaging



Note!

Depending on the type, the eFD thruster has a weight of up to 45kg.
Always use a proper lifting device to transport the thruster! Danger of injury.

The thruster is shipped ready to mount.

- Thrusters are shipped ready to use complete with hydraulic fluid. Refer to table 2 (chapter 6) for oil type.
- Units are factory-set in star (Y) position.
- Never open the filler or overflow plugs without authorization as loss of oil will change the technical values or disable some functions..
- Store and transport the thruster dust- and waterproof.
- Protect the thruster during the whole storage- and transport time against damage.

In case of additional painting, do NOT contaminate:

- Rod of the thruster
- Electrical components
- Signs and plates

If the thruster isn't installed directly after delivery heed the following instructions:

- Store and / or transport the thrusters dust- and waterproof with drying agent until installation.
- Protect the brake against external damages during the complete storage- / transport-period.

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4. Furka® eFD electro-hydraulic thruster acc. to DIN 15430

The electrohydraulic thruster (eFD) described in figure corresponds to DIN15430 with regards to release force, stroke, fastening and general dimensions.

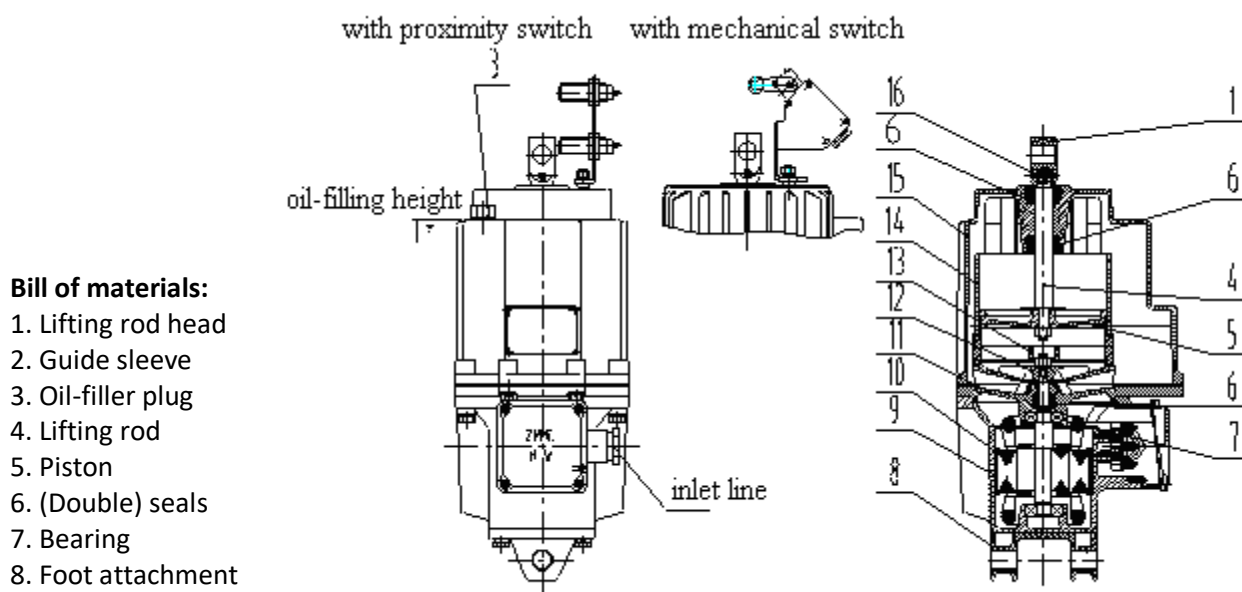


Fig. 1a: eFD 220-880

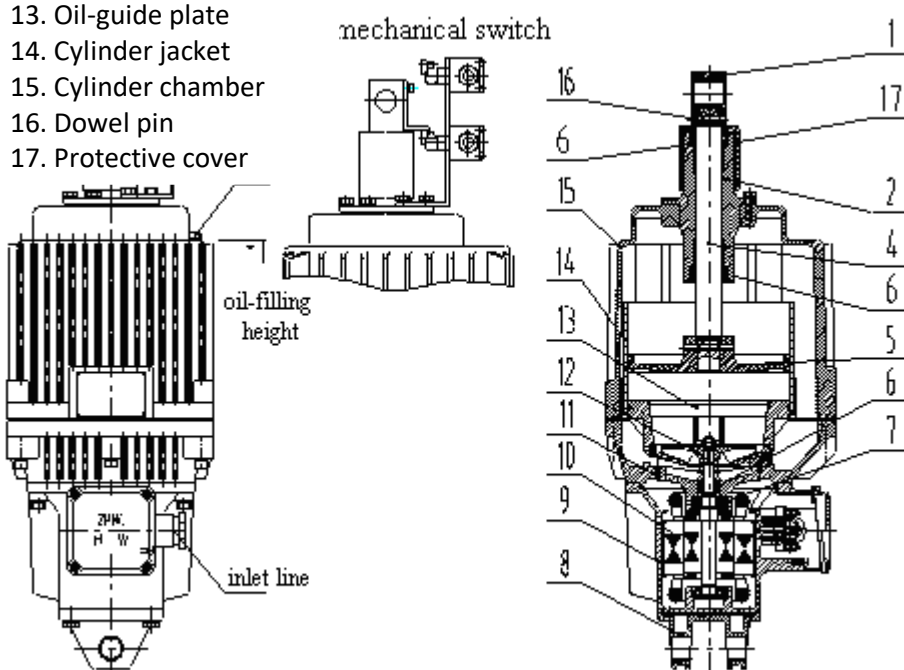


Fig. 1 (b) Ed (YTD) 1250~3000 (Figure 1b: eFD 1250-3000)

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4.1 Functional description

The eFD thruster is a compact hydraulic machine: Three-phase asynchronous motor - hydraulic pump - cylinder with piston and lifting rod. It is designed to generate a constant lifting force for a given stroke. The hydraulic force is almost independent of the position of the piston.

When the motor is switched on, the impeller rotates and generates a hydrodynamic pressure that is acting against the piston crown. The lifting rod is moving upwards until it is in its end position (brake released). As soon as the motor is switched off the impeller stops rotating. The lifting rod is moving back in the original position (brake closed).

4.2 Installation

eFD thrusters can be installed in a vertical or a 15° offset position as shown in fig.2. A horizontal installation position is possible as well. In that case the air compensation reservoir must be positioned in the upper position as shown in figure 2.

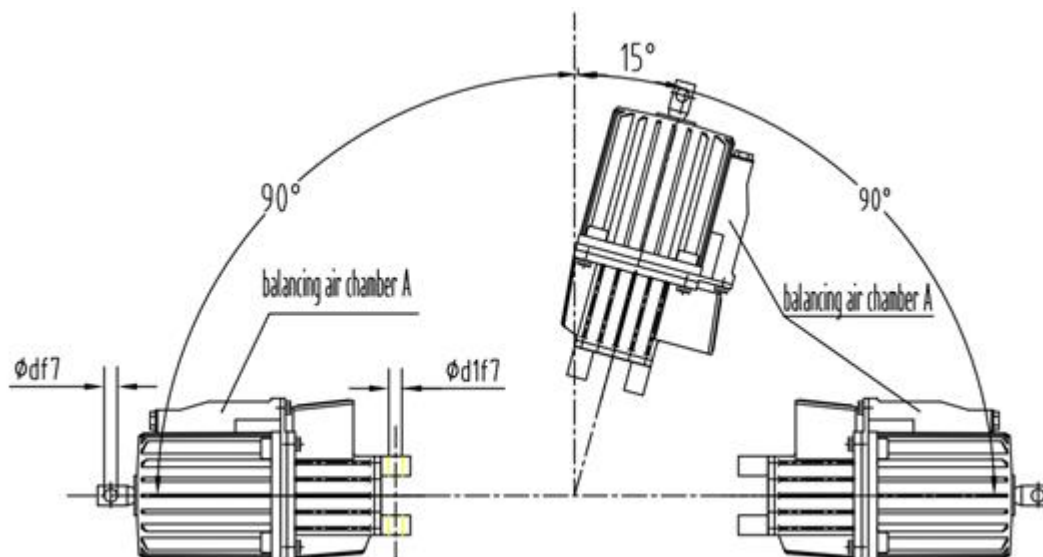


Fig. 2: Mounting options

The foot attachment can be turned 90° to the right or left (must be specified in the order).

The lifting rod can be rotated in any direction.

No lateral forces may act on the piston rod!

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4.3 Ambient conditions and operating mode

- Ambient temperature : -25°C~+50°C (Please advise when the temperature is lower than -25°C, then the thruster should use low temperature oil and/or additionally install a heater) .
- Relative humidity : ≤90%; the highest average relative humidity in the wettest month in mounting place should not exceed 90%, meanwhile the average temperature of this month should not be higher than +25°C, condensation is allowable on products' surface due to the temperature change;
- Operating duty: intermittent cycle operating duty (S3) and continuous operating duty (S1) , load continuity is not bigger than 60% when operating duty is the intermittent cycle operating duty;
- Altitude: <2000m

5. Electrical connection

The eFD thruster is powered by a 3-phase AC motor, rated voltage is subject to the data given on the nameplate. Protection class is IP65.

5.1 Operating voltage

Standard voltages and frequencies are:

- AC 220~230V/50Hz
- AC 380~415V/50Hz
- AC 440~460V/60Hz

- Heater: 110/220V AC 50/60Hz

Voltage fluctuations should not exceed ±10% of the rated voltage.

It is not permissible to operate the thruster with a supply voltage and frequency other than those specified on the nameplate.

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5.2 Electrical connection



Danger!

The applied electrical voltages are dangerous to life! The electrical connection and all other electrical tasks must only be done by a **trained electrician**!

If the unit is protected by a **protective motor switch**, insure that the thermal value which triggers the switch is set as per the below table (refer to nameplate)!

Thruster type	380V, 50Hz			460V, 60Hz		
	Rated current [A]	Circuit breaker QF1 rated current [A]	Heat relay FR1 operating current [A]	Rated current [A]	Circuit breaker QF1 rated current [A]	Heat relay FR1 operating current [A]
eFD220-50	0.38	2	0.38	0.39	2	0.39
eFD300-50	0.78	4	0.78	0.80	4	0.80
eFD500-60	1.34	6	1.34	1.37	6	1.37
eFD500-120	1.34	6	1.34	1.37	6	1.37
eFD800-60	1.52	6	1.52	1.55	6	1.55
eFD800-120	1.52	6	1.52	1.55	6	1.55
eFD1250-60	1.52	6	1.52	1.55	6	1.55
eFD1250-80	1.52	6	1.52	1.55	6	1.55
eFD1250-120	1.52	6	1.52	1.55	6	1.55
eFD2000-60	1.98	10	1.98	2.02	10	2.02
eFD2000-80	1.98	10	1.98	2.02	10	2.02
eFD2000-120	1.98	10	1.98	2.02	10	2.02
eFD3000-60	2.21	10	2.21	2.25	10	2.25
eFD3000-80	2.21	10	2.21	2.25	10	2.25
eFD3000-120	2.21	10	2.21	2.25	10	2.25
eFD4500-80	2.56	16	2.56	2.56	16	2.56
eFD4500-120	2.56	16	2.56	2.56	16	2.56

Table 1: Current values

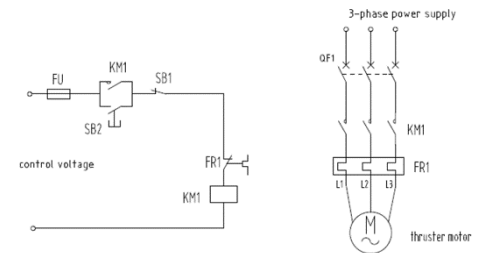


Fig. 3: 3-phase power supply

The cable gland size for the motor cable is M25x1.5 or NPT3/4" (please advise in the order). The cable gland size for the heater is M25x1.5 (stuffing box not part of Furka® supply).

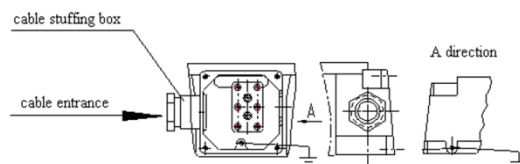


Fig. 4

The motor can be connected in star(Y) or delta(Δ) connection. Please see fig. 4 for standard thruster version and version with heater.

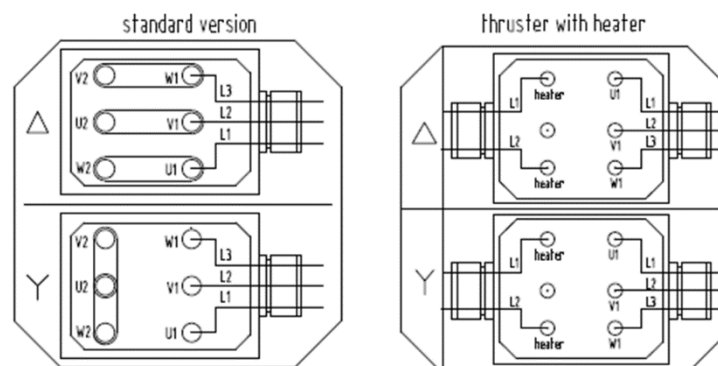


Fig. 5: Wiring

Don't switch on before the grounding cable is connected and the terminal box cover is closed.

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6. Hydraulic fluid

eFD thruster has been filled up with oil prior to delivery. The following oil types can be used for refill.

Ambient temperature	Standard	Shell electric insulation oil
-10 °C +50 °C	IEC 60296	Diala S3 ZX-I
-25 °C +50 °C		
-35 °C +50 °C		

Table 2: Oil type

7. Maintenance

Thruster maintenance is limited to regular function and oil level checks. In case of oil leakages please contact an authorized specialist.

If the oil needs to be refilled, please use the volume as given in table 3. The maximum oil level is shown in fig. 1

Thruster type	Oil volume [Litres]
eFD 220-50	≈ 1.5
eFD 300-50	≈ 2
eFD 500-60 (120)	≈ 4
eFD 800-60 (120)	≈ 5
eFD 1250-60 (80) (120)	≈ 8.5
eFD 2000-60 (80) (120)	≈ 10
eFD 3000-60 (80) (120)	≈ 10
eFD 4500-80 (120)	≈ 20

Table 3: Oil volumes

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8. Trouble Shooting

Fault	Cause of failure	Remedy
motor is not running	broken power supply cable	Check cable and cable connection
	corroded contacts	Clean contacts when necessary
	motor protection switch triggered	Check motor protection switch for blown fuses (pl. see table 1 for selecting the right fuses) – Replace thruster in case of short circuit problems
Thruster does not open	rotor has seized up in stator	Replace thruster
	too high (brake) spring force	Check brake torque setting (reduce spring force)
	Insufficient oil filling	Fill up thruster oil
Thruster opens slowly	Installation position	Check mounting acc. to fig. 2
	Lifting rod jamming	Check for lateral forces
	Air in the pump circuit	Open/close thruster a few times and fill up thruster oil
	Damaged impeller	Replace thruster (overhaul of thruster required)
Oil leakage	Worn out seals	Replace thruster (overhaul of thruster required)
Abnormal (metallic) noise during operation	Worn out bearings	Replace thruster (overhaul of thruster required)



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