FLUIDOTEHNIC

ELECTROHYDRAULIC THRUSTERS

CATALOG OF DEVICES

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FLUIDOTEHNIC

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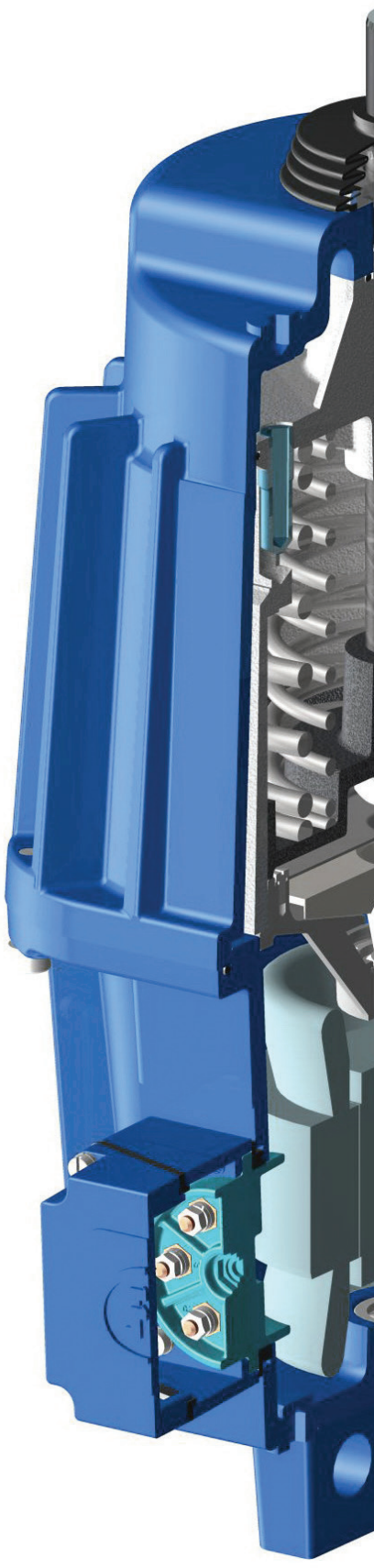
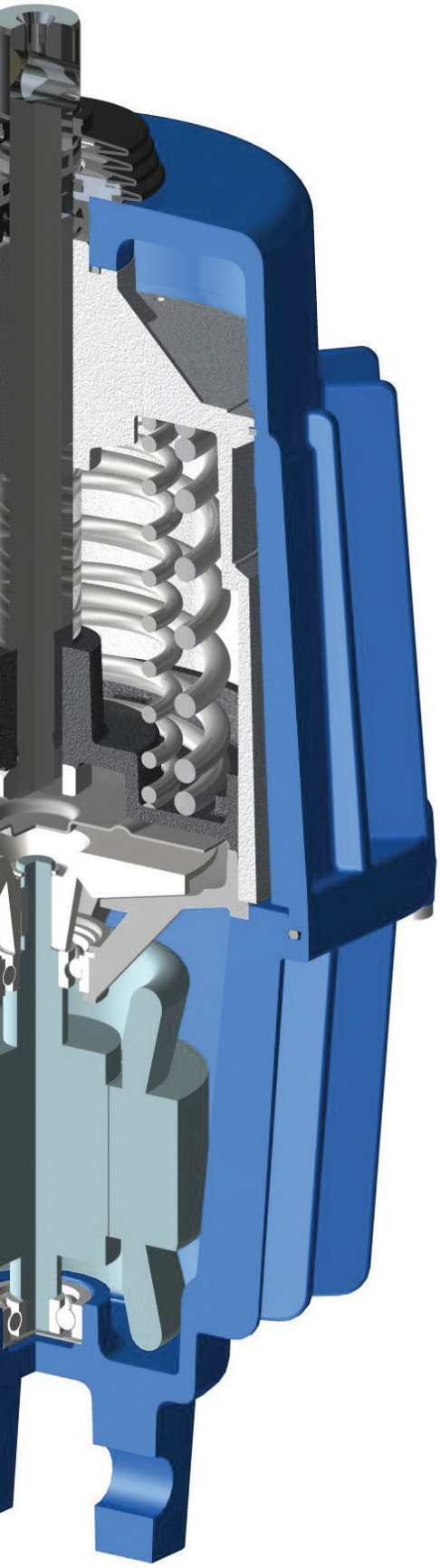


SERIES “ESM”



- Easy installation and deinstallation
- Short actuating times
- High operational safety
- Ability to work from -45°C to +70°C
- Standard version 2000c/h or ED100% (S1)

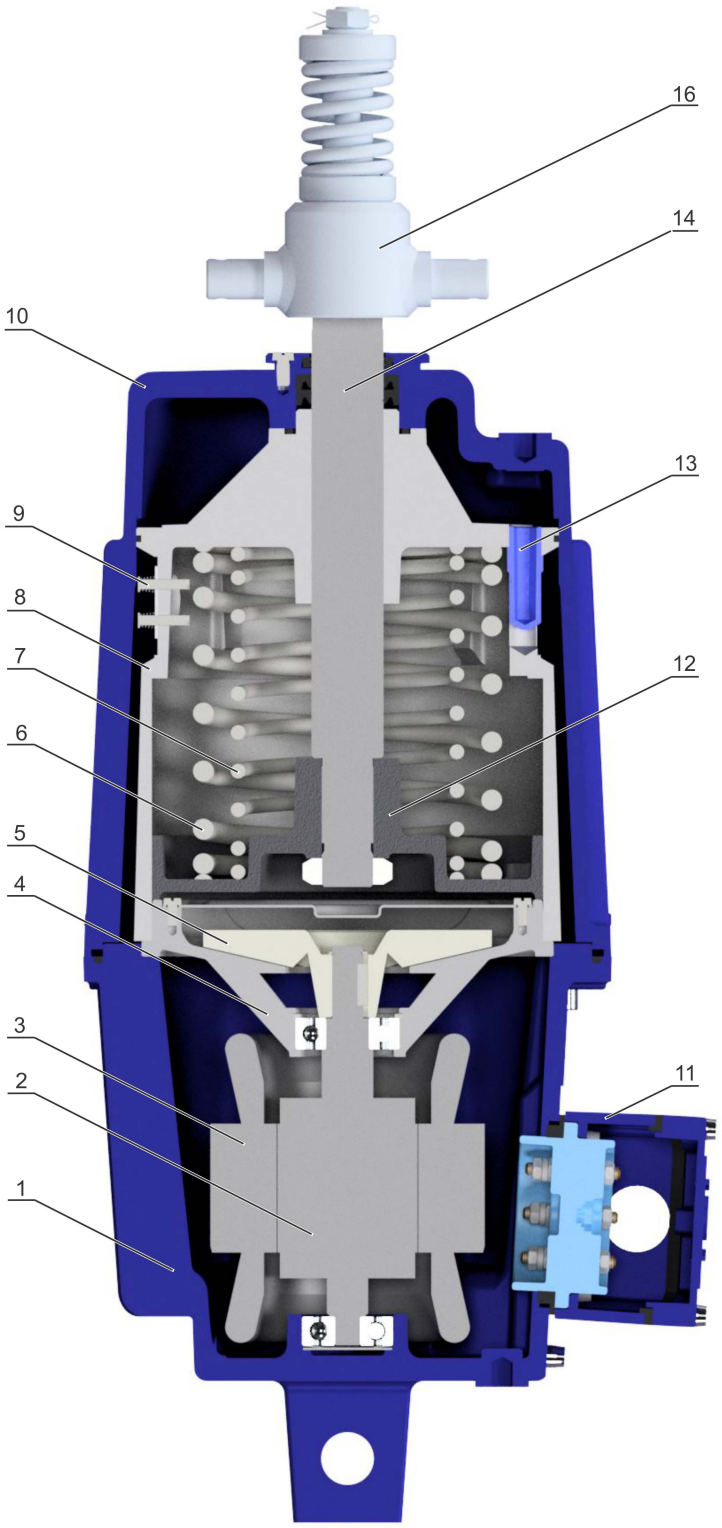
- Different voltages and frequencies of elecrtic power
- Standard mechanical protection IP66
- Resistance to heavy duty
- External controllers of device
- Internal controllers of device

TECHNICAL DESCRIPTION OF THE DEVICE

Housing of the motor **(1)** is constructed with eyelet connection and can be fixed on fundament by a bolt. There is also oil drain plug on the housing. Driving motor stator **(3)** (squirrel cage asynchronous motor) is fitted in the housing. Connecting box for electrical supply **(11)** is fixed on the housing hermetically separated from the inside of the housing. The rotor **(2)** is fixed in the housing by its downside, and upside fitted in the turbine bearing **(4)**. The turbine wheel **(5)** is mounted on the rotor shaft. The guide cylinder **(8)** with piston **(12)** and rod **(14)** is located upper the turbine.

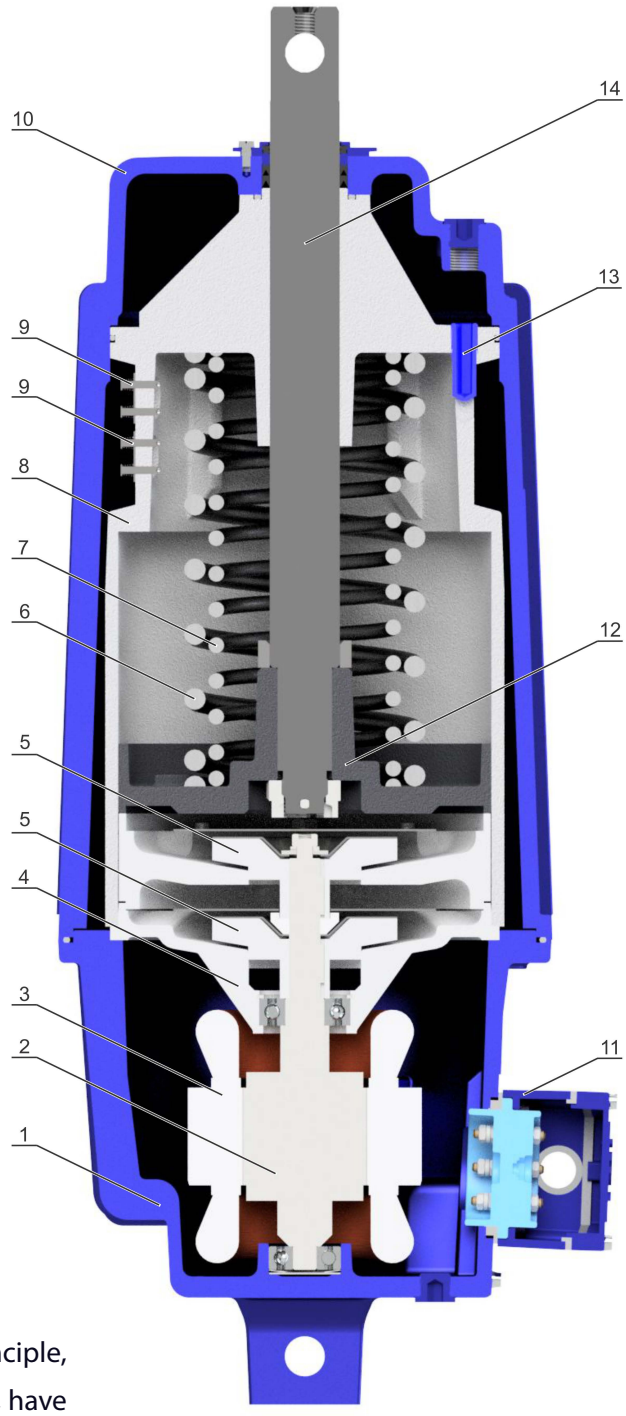
In the guide cylinder is also screw **(13)** for adjusting speed of the rod. On the upper side the guide cylinder is covered by upper housing **(10)**, which with the motor housing forms a functional entirety.

The transformer oil fills interior of the device. The electric motor drives the turbine, which produce oil pressure downside of the piston. The piston and the rod are forced to move upward. The oil from upside of the piston returns through the holes to the turbine inlet. Hydraulic force is completely independent of the piston position, it depends only of the speed of turbine (current frequency), turbine size, and of the piston diameter. When lifting, motion is uniformly in the range of nominal force, independent of the load.



Pushing force gradually increase during 0.1 – 0.15 s, which provide very soft start of the rod. Electric motor has excellent cooling since transformer oil transfers heat to device housing and over the fins is transferred to the environment.

This device construction provides a constant output force, regardless of the position of the piston rod and the possibility of continuous operation without overloading. Switching off the electric motor, outside load caused the backward movement. Oil under the piston is suppressed back through the circuit of the turbine and through the corresponding holes exceeds into the zone above the piston. Oil level in device should be on the down blade of the filling port on upper housing **(10)** (device is in the vertical position). In the case of recharge, previously removed regulating screw **(13)**.



Any position of the rod could be chosen for the output position. This is very important for brake releasing application, because thus compensate for brake linings wear. It is recommended that the brake should be adjusted (when it is completely closed) for 1/3 stroke of the rod.

Constructive, all sizes based on the same principle, except ESM-320, which, due required pushing force, have twostage turbine circuit. Thus was obtained the required pushing force from the device which has the same external dimensions like ESM-250.

According to the customer request, several versions also available:

Device with return springs C (6,7)

One or two springs are mounted upper the piston. The piston forced back to the start position by the spring, after the motor switching off. There are three versions of the device, depends of the spring force: internal, external and both of them. It should be considered that the spring force reduces the nominal output force. The nominal return spring force is given according to the piston position on the 1/3 stroke. In full extract position of the rod, real return force exceeds nominal value for approximately 20%, in full retract position, pushing force is reduced for 10%.

Device with shock absorber R (16)

The shock absorber, fixed on the rod, prevents starting and stopping shocks and enables swiveling of the brake mechanism around the rod axe and around the perpendicular axe. This provides gradual increasing of the braking force up to a maximum.

Device with speed control valve (9)

The speed control valve is build on the cylinder holes and, depends of the type, prevent the one of the flow directions.
There are few types of speed controls valves:

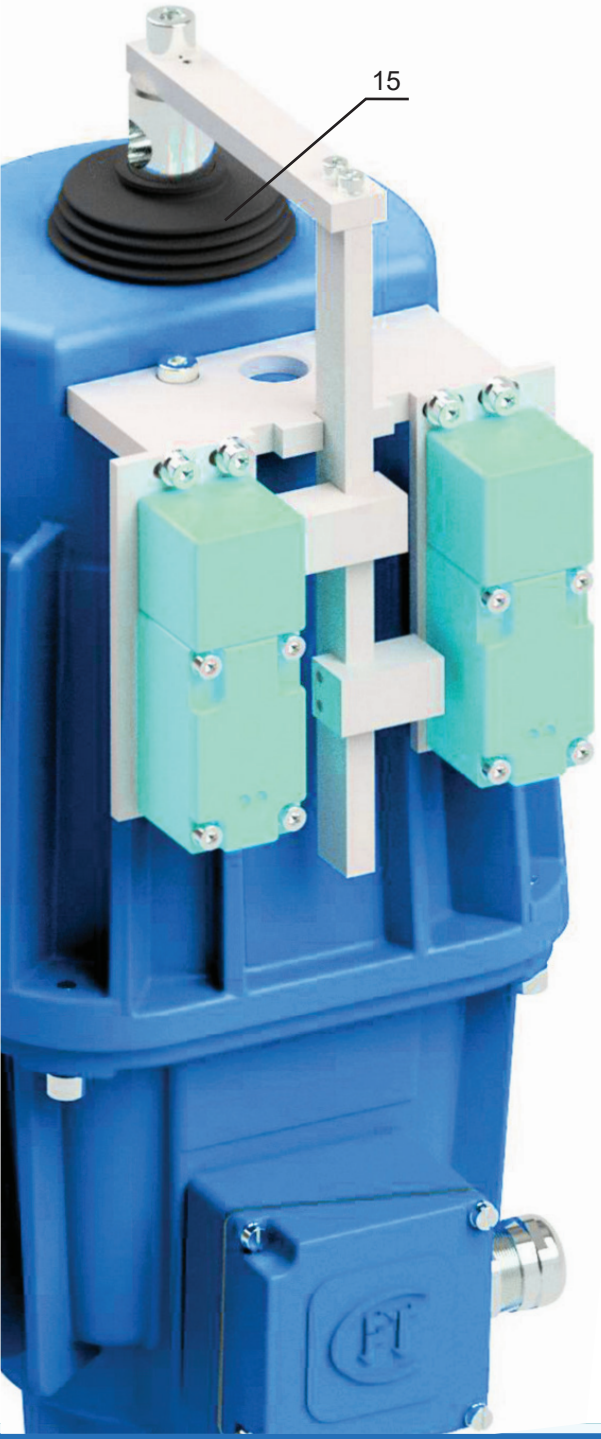
Check valve for the lifting speed control - H.

In case of the piston movement to the upper position, check valve is closed so the flow is enabling only through the port beside the adjustment screw **(13)**. Then the speed is determined by the screw position. When the piston moves down, the check valve is opened and speed is maximal. Turning the adjustment screw in clockwise direction produces lower, counter clockwise higher speed. Before the adjusting it is necessary to remove the socket screw for filling.

Check valve for the lowering speed control - S.
The function of the valve is opposite as already described, the downward speed is determined by the screw position.

Throttle valve for the speed control in the both directions - D.
The flow is restricted in the both of the directions and it always depends of the adjustment screw position.

It should be considered that these valves reduce speed of the device. If the maximum speed is necessary, the valves should not be used!



Device with cover protection (15)
The cover protects the rod and seal set from dust penetration. It allows long life of the device in heavy operating conditions (surface minings and cement industry).

Working signalisation of the device

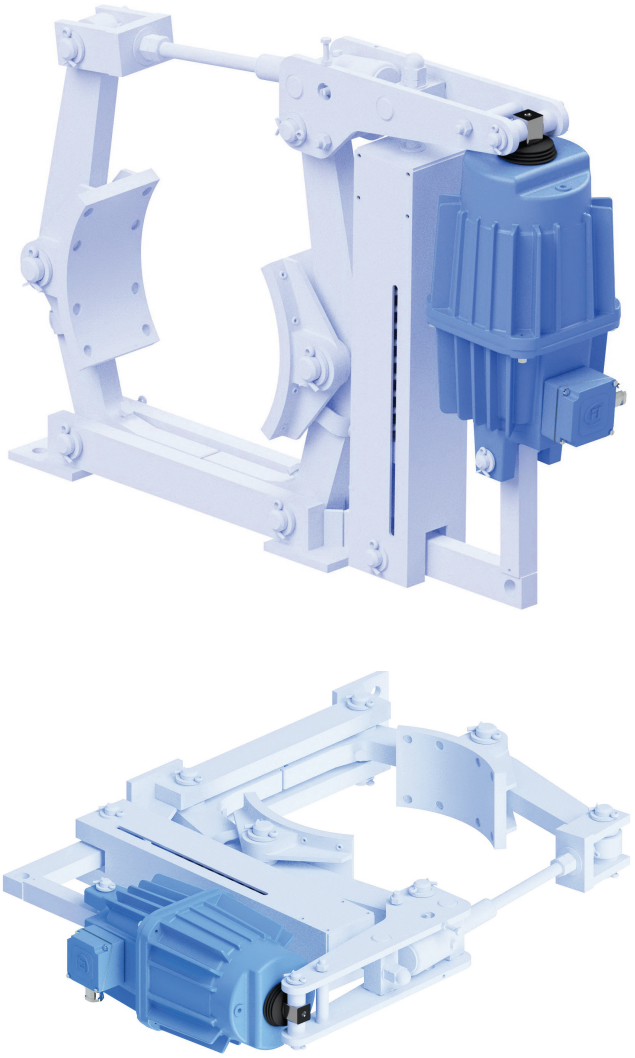
- Device with external mechanical switch **Im** and **Im1** (brake open, linings worn)
- Device with inside mechanical switch **MP** (brake open)
- Device with external inductive switch **In** and **In1** (brake open, linings worn)
- Device with inside magnet-inductive switch **Lk2** and **Lk4** (brake open, linings worn)

We meet the special customer requests for voltage and frequency. For extremely hard operation conditions, such as permanent operation under tropic temperature, or for the periodical operation under extremely low temperature, we used special seals, electric motors and adequate synthetically oils. To choice the best solution, we recommend to contact our experts.

VARIANTS OF INSTALLATION

The devices is possible to use in vertical, horizontal (lifting rod in horizontal position ±30°) or inverted position. In the vertical position, installation and operation are easiest. In the horizontal and inverted positions, the device may be installed so that the terminal box will be located at the side, provided the symbol **„ II "** was added after the type designation in the order. If in the horizontal service position space considerations require to mount the terminal box either on top or on the bottom, a modification of the device is required and has to be carried out by a specialist. When ordering this version, the symbol **„ I "** must be added after the type designation. If the devices are to be used in an inverted position (lifting rod vertically downwards ±60°), consultation with manufacturer is necessary.

VARIANT "II"

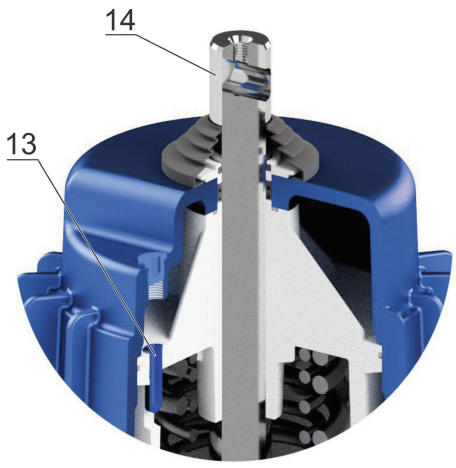


EXAMPLES FOR VARIANT "II"

VARIANT "I"

EXAMPLE FOR VARIANT "I"

The point is that, when installing the device in a horizontal position, the plane in which the piston rod **(14)** and the control bolt **(13)** are located are horizontal. In this way, the device will work properly and have adequate technical characteristics.



The delivered device is filled with oil and prepared for installation. Device is fixed using a bolt that goes through eyelets of the lower housing and another bolt through rod. If the shock absorber is built on the device, there is the fork for the upper connection. Design of a mechanism to which is connected the device should be such that prevent rod load with lateral forces during operation. Since the turbine is symmetrical, the direction of rotation of electric motors is not important for device function.

TECHNICAL CHARACTERISTICS OF DEVICES

Size	Type	Nom. stroke	Nominal pushing force	Nominal return force	Power	Current	Mass witout oil	Oil's mass	Lifting time	Lowering time
		mm	N	N	W	A	kg	kg	s	s
0	ESM 12/50 ESM 12/50 C12 ESM 12/50 C18 ESM 12/50 C22	50	220	0 120 180 220	200	0.35	11.6	1.4	0.45	0.4
1	ESM 20/50 ESM 20/50 C12 ESM 20/50 C20	50	300	0 120 200	150	0.5	9.5	1.8	0.4	0.45
2	ESM 50/50 ESM 50/50 C18 ESM 50/50 C32 ESM 50/50 C50	50	500	0 180 320 500	200	0.55	12.5	2.6	0.4	0.45
2	ESM 50/60 ESM 50/60 C18 ESM 50/60 C32 ESM 50/60 C50	60	500	0 180 320 500	200	0.55	12.5	2.6	0.4	0.45
2.1	ESM 50/100 ESM 50/100 C18 ESM 50/100 C32 ESM 50/100 C50	100	500	0 130 290 420	200	0.55	14	3.2	0.8	0.7
3	ESM 80/60 ESM 80/60 C45 ESM 80/60 C80	60	800	0 450 800	350	0.6	19.7	4.3	0.45	0.5
3.1	ESM 80/160 ESM 80/160 C45 ESM 80/160 C80	160	800	0 300 520	350	0.6	22	6	1.0	0.9
3	ESM 125/60 ESM 125/60 C45 ESM 125/60 C80 ESM 125/60 C125	60	1250	0 450 800 1250	400	0.65	19.7	4.3	0.6	0.4
3.1	ESM 125/160 ESM 125/160 C45 ESM 125/160 C80 ESM 125/160 C125	160	1250	0 300 520 820	400	0.65	22	6	1.2	0.9
3	ESM 150/60 ESM 150/60 C45 ESM 150/60 C80 ESM 150/60 C125	60	1500	0 450 800 1250	450	0.7	19.7	4.3	0.7	0.4
3.1	ESM 150/160 ESM 150/160 C45 ESM 150/160 C80 ESM 150/160 C125	160	1500	0 300 520 820	450	0.7	22	6	1.2	0.8
4	ESM 250/60 ESM 250/60 C70 ESM 250/60 C130 ESM 250/60 C200	60	2500	0 700 1300 2000	500	0.7	31.5	9	0.65	0.45
5	ESM 250/160 ESM 250/160 C70 ESM 250/160 C130 ESM 250/160 C200	160	2500	0 510 850 1360	500	0.7	37.5	10.5	1.5	0.95
5	ESM 320/100 ESM 320/100 C70 ESM 320/100 C250* ESM 320/100 C320*	100	3200	0 580 2300 2950	600	0.9	39.5	9.5	1.1	0.7

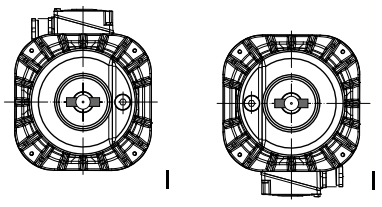
* *For the devices ESM 320/100 C250 and ESM 320/100 C320 nominal stroke of piston rod is limited to 60mm.*

			Standard variant	For high temperatures			For low temperatures
	Symbol		-	T	TW06	TW07	L
Environment temperature	maximum		+40ºC	+45ºC	+60ºC	+70ºC	+40ºC
	minimum		-25ºC	-25ºC	-10ºC	-10ºC	-45ºC
Hydraulic fluid - oil type			Insulation oil NYNAS NYTRO 4000X				AEROSHELL FLUID 41
Voltage and motor frequency			3 x 400V 50Hz				
Duty of device			2.000 cycles/h or ED 100% (S1)		350 cycles/h or ED 35% (S3)	250 cycles/h or ED 25% (S3)	2.000 cycles/h or ED 100% (S1)
Mechanical protection			IP 66				
Variant on customer request	Voltage of electromotor		od 200V do 660V				
	Frequency		od 42Hz do 60Hz				
	Work control	Mechanical switch	Im	External mechanical control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 2,5A; external IP65: The guaranteed activation point is max. 0,3mm from the maximum position of the activated thruster
			Im1	External mechanical control sensor signals that the brake is raised (open) and brake lining are worn			
			MP	Internal mechanical control sensor signals that the brake is raised (open)			
		Inductive switch	In	External inductive control sensor signals that the brake is raised (open)			Voltage 15...250V AC 500 mA 45...65 Hz NO/NC
			In1	External inductive control sensor signals that the brake is raised (open) and brake lining are worn			
		Magnetic-inductive switch	Lk2	Internal control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 0,5A; The guaranteed activation point is max. 5mm from the maximum position of the activated thruster
			Lk4	Internal control sensor signals that the brake is raised (open) and brake lining are worn			

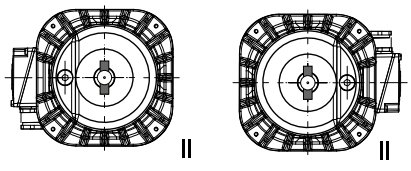
NOTES:

- Nominal pushing force for the device without a spring, is a declared force on the piston rod in the output direction. Maximum pushing force is ~ 50% higher. In devices with spring it is reduced by force springs.
- Nominal return force is a force of the spring for returning the piston rod and this information related to the 1/3 piston rod stroke. Tolerance is ±10%.
- The weight of the device and oil are approximate (depending on additional equipment).
- Time of lifting and lowering is related to a variant of the device without irreversible valve with built-in springs, i.e. with the corresponding external load. Tolerance is ±10%. In devices with built-in non return valve min. lifting and lowering time is greater for ~ 25%, while by the wring screw (13) can be continuously adjusted up to a maximum of 3- 5s for a stroke rate 50-60mm, 8-12s for the stroke rate 100 mm and 10-15s for the stroke rate 160mm.
- Nominal power and current refer to temperature of the device 20°C. Lowering temperature causes an increase in oil viscosity, in which case the nominal value of the power and current are growing and can be up to 50% higher.

POSITION OF TERMINAL BOX WHEN THE DEVICE WORKS IN A HORIZONTAL POSITION



Foot bolt horizontal

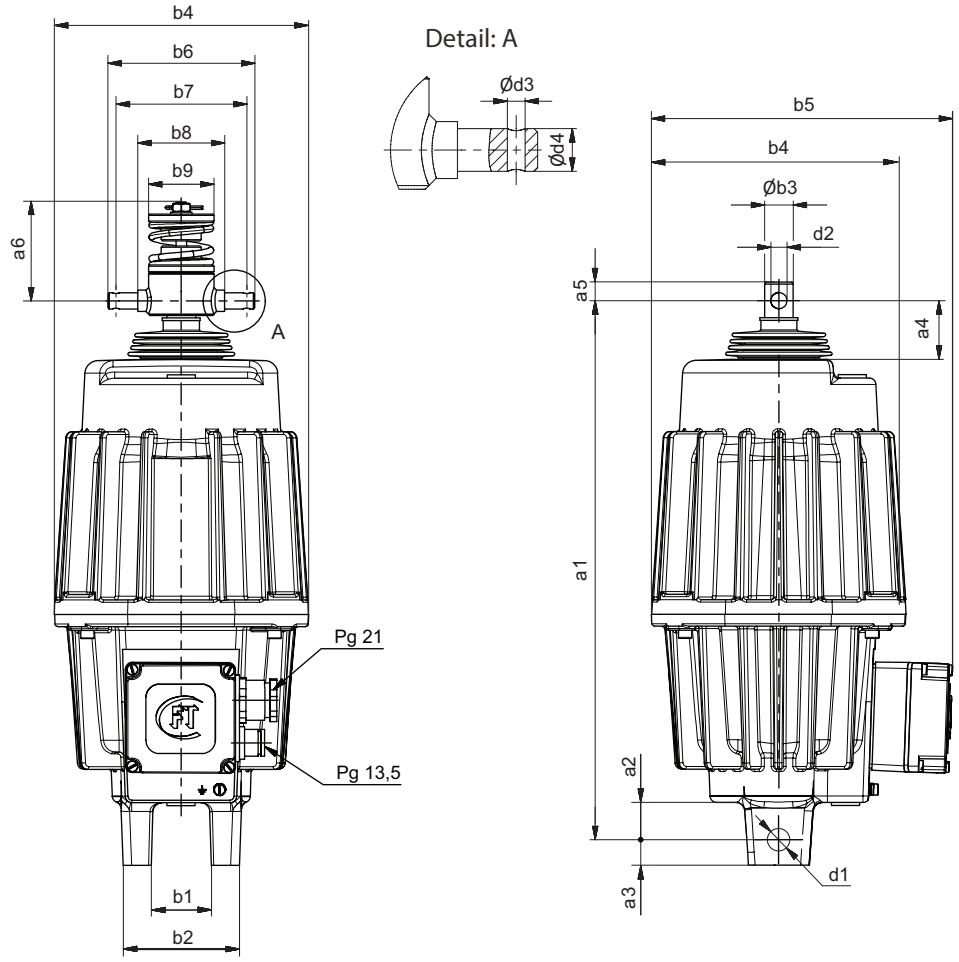


Foot bolt vertical

INSTALLATION DRAWING

VARIANT WITH SHOCK ABSORBER - R

VARIANT WITHOUT SHOCK ABSORBER - R

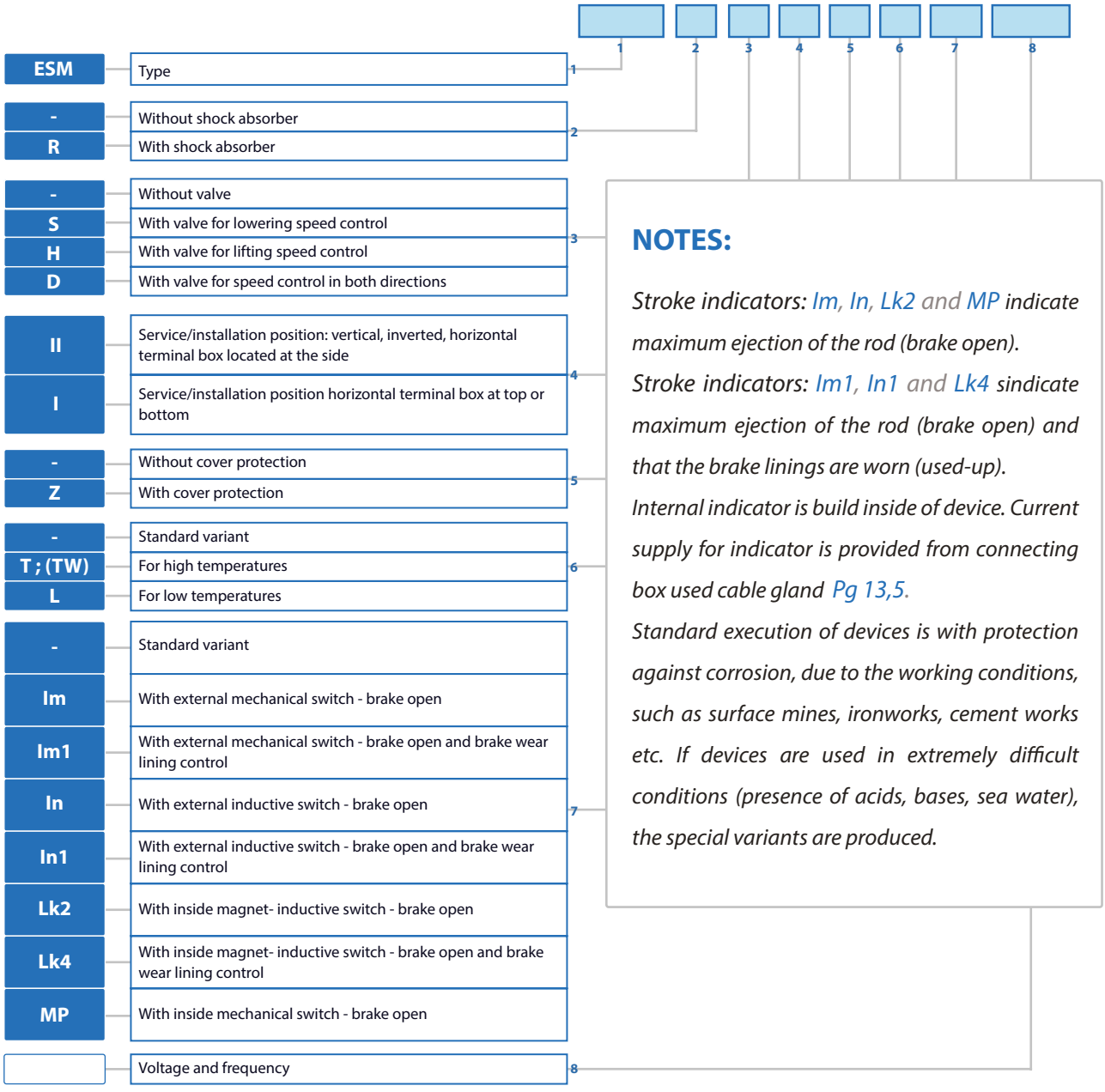


The devices are homologated by INSTITUTE FOR QUALITY 1. MAJ – Nis, registered number is 03-3322/2 from 25.12.1996. and they are produced in accordance with the EC-safety requirements. The CERTIFICATE OF SAFETY and CERTIFICATE OF TESTING are available for each device.

INSTALLATION DIMENSIONS:

DIMENSIONS SIZE	a1$^{\pm1}$	a2	a3^{+1}	a4$^{\pm1}$	a5	a6	b1^{+2}	b2^{+1}	b3^{e8}	b4	b5	b6	b7$^{+0,5}$	b8$^{\pm0,5}$	b9	d1$^{+0,1}$	d2^{F9}	d3	d4^{e8}
0	286	18	15	26	12	106	40	80	20	140	209	110	98	65	49	16.1	12	5	12
1	380	30	20	30	17	106	40	80	21.5	150	200	110	98	65	49	20.2	12	5	12
2	400	30	20	32	17	106	40	90	21.5	180	220	110	98	65	49	20.2	12	5	12
2.1	452	30	20	32	17	106	40	90	21.5	180	220	110	98	65	49	20.2	12	5	12
3	458	30	25	36	21	140	40	90	27.5	208	232	110	98	65	49	20.2	16	5	16
3.1	573	30	25	36	21	140	40	90	27.5	208	232	110	98	65	49	20.2	16	5	16
4	549	30	25	36	25	189	40	90	35.5	250	265	120	105	70	58	20.2	20	5	20
5	660	30	25	36	25	189	40	90	35.5	250	265	120	105	70	58	20.2	20	5	20

ORDER INSTRUCTION



EXAMPLES

Electrohydraulic thruster with pushing force 1250N, stroke 60mm, with return spring 800N, shock absorber and valve for lowering speed control, voltage 400V 50Hz is marked:

ESM 125/60 C80 R S 400V 50Hz

Electrohydraulic thruster with pushing force 500N, stroke 50 mm, with return spring 500N, valve for lowering speed control, cover protection, for high temperatures, with inside sensor for control device check voltage 500V 50Hz is marked:

ESM 50/50 C50 S Z T MP 500V 50Hz

Electrohydraulic thruster with pushing force 2500N, stroke 160mm, without return spring, with valve for lifting speed control, for low temperature, voltage 400V 50Hz is marked:

ESM 250/160 H L 400V 50Hz

ELECTROHYDRAULIC THRUSTERS SERIES ESM DIN 15430

TECHNICAL CHARACTERISTICS OF DEVICES

Size	Type	Nom. stroke	Nominal pushing force	Nominal return force	Power	Current	Mass without oil	Oil's mass	Lifting time	Lowering time
		mm	N	N	W	A	kg	kg	s	s
0	ESM 120-40 ESM 120-40 C60 ESM 120-40 C120	40	120	0 60 120	200	0.35	11.6	1.4	0.25	0.25
0	ESM 220-50 ESM 220-50 C120 ESM 220-50 C180 ESM 220-50 C220	50	220	0 120 180 220	200	0.35	11.6	1.4	0.45	0.40
1	ESM 300-50 ESM 300-50 C120 ESM 300-50 C200 ESM 300-50 C270	50	300	0 120 200 270	150	0.5	9.5	1.8	0.45	0.4
2	ESM 500-60 ESM 500-60 C180 ESM 500-60 C320 ESM 500-60 C500	60	500	0 180 320 500	200	0.55	12.5	2.6	0.45	0.4
2.1	ESM 500-120 ESM 500-120 C180 ESM 500-120 C320 ESM 500-120 C500	120	500	0 132 300 432	200	0.55	14	3.2	0.80	0.60
3	ESM 800-60 ESM 800-60 C450 ESM 800-60 C800	60	800	0 450 800	350	0.6	19.7	4.3	0.45	0.50
3.1	ESM 800-120 ESM 800-120 C450 ESM 800-120 C800	120	800	0 300 520	350	0.6	22	6	0.75	0.6
3.2	ESM 1250-60 ESM 1250-60 C450 ESM 1250-60 C800 ESM 1250-60 C1250	60	1250	0 450 800 1250	400	0.65	19.7	4.3	0.55	0.4
3.3	ESM 1250-120 ESM 1250-120 C450 ESM 1250-120 C800 ESM 1250-120 C1250	120	1250	0 300 520 820	400	0.65	22	6	1	0.6
4	ESM 2000-60 ESM 2000-60 C700 ESM 2000-60 C1300 ESM 2000-60 C2000	60	2000	0 700 1300 2000	500	0.7	31.5	9	0.6	0.4
5.1	ESM 2000-120 ESM 2000-120 C700 ESM 2000-120 C1300 ESM 2000-120 C2000	120	2000	0 510 850 1360	500	0.7	37.5	10.5	1.20	0.60
5.1	ESM 2500-160 ESM 2500-160 C700 ESM 2500-160 C1300 ESM 2500-160 C2000	160	2500	0 510 850 1360	500	0.7	37.5	10.5	1.50	0.65
5	ESM 3000-60 ESM 3000-60 C700 ESM 3000-60 C2500 ESM 3000-60 C3200	60	3000	0 700 2300 2950	600	0.9	39.5	9.5	0.65	0.45
5.1	ESM 3000-120	120	3000	0	600	0.9	39.5	9.5	1.20	0.70
5.1	ESM 3200-100 ESM 3200-100 C700 ESM 3200-100 C2500* ESM 3200-100 C3200*	100	3200	0 680 2300 2950	600	0.9	39.5	9.5	1,10	0,60

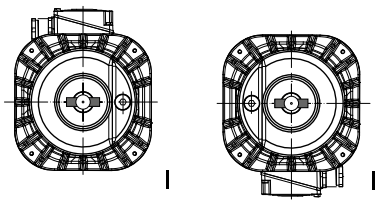
* *For the devices ESM 3200/100 C2500 and ESM 3200/100 C3200 nominal stroke of piston rod is limited to 60mm.*

			Standard variant	For high temperatures			For low temperatures
	Symbol		-	T	TW06	TW07	L
Environment temperature	maximum		+40ºC	+45ºC	+60ºC	+70ºC	+40ºC
	minimum		-25ºC	-25ºC	-10ºC	-10ºC	-45ºC
Hydraulic fluid - oil type			Insulation oil NYNAS NYTRO 4000X				AEROSHELL FLUID 41
Voltage and motor frequency			3 x 400V 50Hz				
Duty of device			2.000 cycles/h or ED 100% (S1)		350 cycles/h or ED 35% (S3)	250 cycles/h or ED 25% (S3)	2.000 cycles/h or ED 100% (S1)
Mechanical protection			IP 66				
Variant on customer request	Voltage of electromotor		od 200V do 660V				
	Frequency		od 42Hz do 60Hz				
	Work control	Mechanical switch	Im	External mechanical control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 2,5A; external IP65: The guaranteed activation point is max. 0,3mm from the maximum position of the activated thruster
			Im1	External mechanical control sensor signals that the brake is raised (open) and brake lining are worn			
			MP	Internal mechanical control sensor signals that the brake is raised (open)			
		Inductive switch	In	External inductive control sensor signals that the brake is raised (open)			Voltage 15...250V AC 500 mA 45...65 Hz NO/NC
			In1	External inductive control sensor signals that the brake is raised (open) and brake lining are worn			
		Magnetic-inductive switch	Lk2	Internal control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 0,5A; The guaranteed activation point is max. 5mm from the maximum position of the activated thruster
			Lk4	Internal control sensor signals that the brake is raised (open) and brake lining are worn			

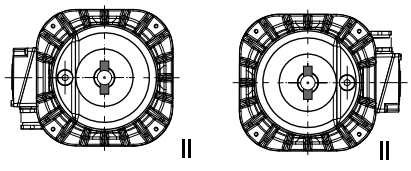
NOTES:

- Nominal pushing force for the device without a spring, is a declared force on the piston rod in the output direction. Maximum pushing force is ~ 50% higher. In devices with spring it is reduced by force springs.
- Nominal return force is a force of the spring for returning the piston rod and this information related to the 1/3 piston rod stroke. Tolerance is ±10%.
- The weight of the device and oil are approximate (depending on additional equipment).
- Time of lifting and lowering is related to a variant of the device without irreversible valve with built-in springs, i.e. with the corresponding external load. Tolerance is ±10%. In devices with built-in non return valve min. lifting and lowering time is greater for ~ 25%, while by the wring screw (13) can be continuously adjusted up to a maximum of 3- 5s for a stroke rate 50-60mm, 8-12s for the stroke rate 100 mm and 10-15s for the stroke rate 160mm.
- Nominal power and current refer to temperature of the device 20°C. Lowering temperature causes an increase in oil viscosity, in which case the nominal value of the power and current are growing and can be up to 50% higher.

POSITION OF TERMINAL BOX WHEN THE DEVICE WORKS IN A HORIZONTAL POSITION



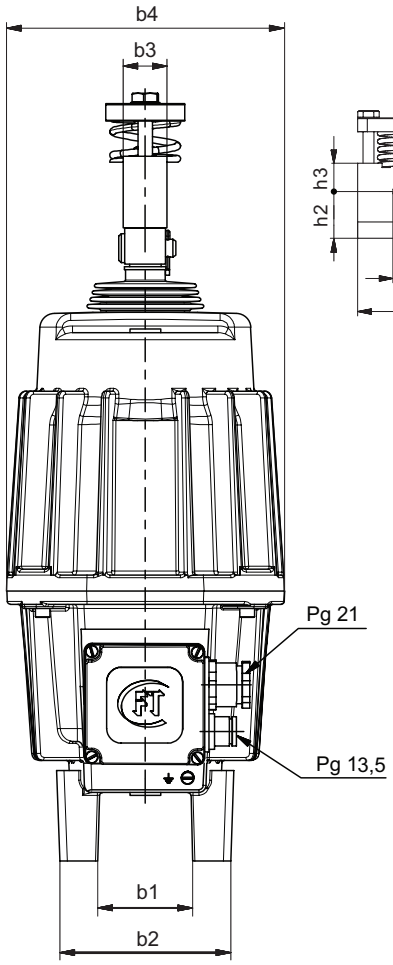
Foot bolt horizontal



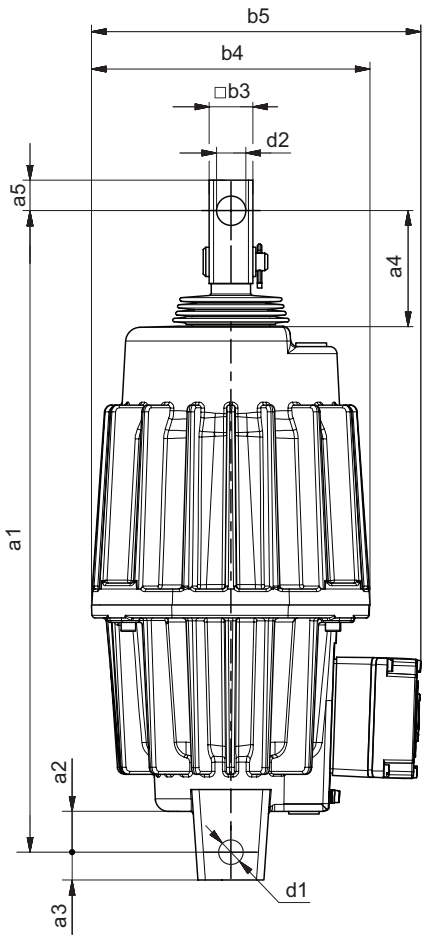
Foot bolt vertical

INSTALLATION DRAWING

VARIANT WITH SHOCK ABSORBER - R



VARIANT WITHOUT SHOCK ABSORBER - R

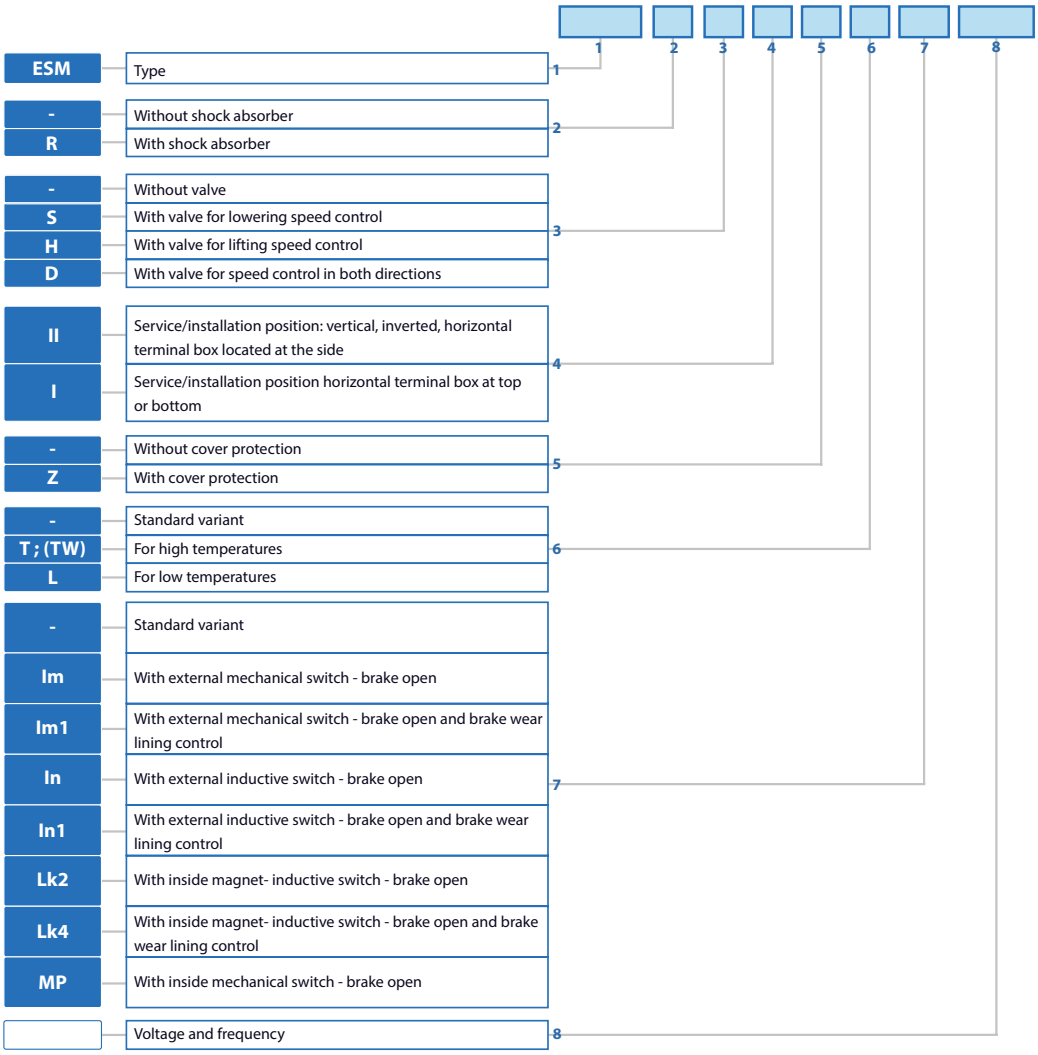


The devices are homologated by INSTITUTE FOR QUALITY 1. MAJ – Nis, registered number is 03-3322/2 from 25.12.1996. and they are produced in accordance with the EC-safety requirements.
The CERTIFICATE OF SAFETY and CERTIFICATE OF TESTING are available for each device.

INSTALLATION DIMENSIONS:

DIMENSIONS / SIZE	a1±1	a2	a3+1	a4±1	a5	b1+2	b2+1	b3-0,1	b4	b5	b6	d1+0,1	d2F9	h1	h2	h3	h4
0	286	18	15	26	12	40	80	20	140	209	68	16.1	12	15	36	20	89
1	370	18	16	32	15	40	80	25	150	200	68	16.1	16	15	30	20	75
2	435	30	20	67	18	60	120	30	180	220	68	20.1	20	20	36	20	100
2.1	515	30	20	95	18	60	120	30	180	220	68	20.1	20	20	36	20	100
3	458	23	22	42	18	60	120	30	208	232	68	20.1	20	20	36	20	100
3.1	530	23	22	39	18	60	120	30	208	232	68	20.1	20	20	36	20	100
3.2	645	30	25	108	25	40	90	40	208	232	110	25,1	25	20	38	35	175
3.3	705	30	25	168	25	40	90	40	208	232	110	25.1	25	20	38	35	175
4	645	30	25	132	25	40	90	40	250	265	110	25.1	25	20	38	35	175
5	660	30	25	36	25	40	90	40	250	265	110	25.1	25	20	38	35	175
5.1	705	30	25	81	25	40	90	40	250	265	110	25.1	25	20	38	35	175

ORDER INSTRUCTION



NOTES:

Stroke indicators: Im, In, Lk2 and MP indicate maximum ejection of the rod (brake open).

Stroke indicators: Im1, In1 i Lk4 indicate maximum ejection of the rod (brake open) and that the brake linings are worn (used-up).

Internal indicator is build inside of device. Current supply for indicator is provided from connecting box used cable gland Pg 13,5.

Standard execution of devices is with protection against corrosion, due to the working conditions, such as surface mines, ironworks, cement works etc. If devices are used in extremely difficult conditions (presence of acids, bases, sea water), the special variants are produced.

All devices are technologically produced in the basic version so that the customer can upgrade with valves (H, S, D), shock absorber (R), external indication (Im, Im1, In, In1), cover protection (Z).

PRIMERI

Electrohydraulic thruster with pushing force 1250N, stroke 60mm, with return spring 800N, shock absorber and valve for lowering speed control, voltage 400V 50Hz is marked:

ESM 1250-60 C80 R S 400V 50Hz

Electrohydraulic thruster with pushing force 500N, stroke 60 mm, with return spring 500N, valve for lowering speed control, cover protection, for high temperatures, with inside sensor for control device check voltage 500V 50Hz is marked:

ESM 500-60 C500 S Z T MP 500V 50Hz

Electrohydraulic thruster with pushing force 2000N, stroke 120mm, without return spring, with valve for lifting speed control, for low temperature, voltage 400V 50Hz is marked:

ESM 2000-120 H L 400V 50Hz

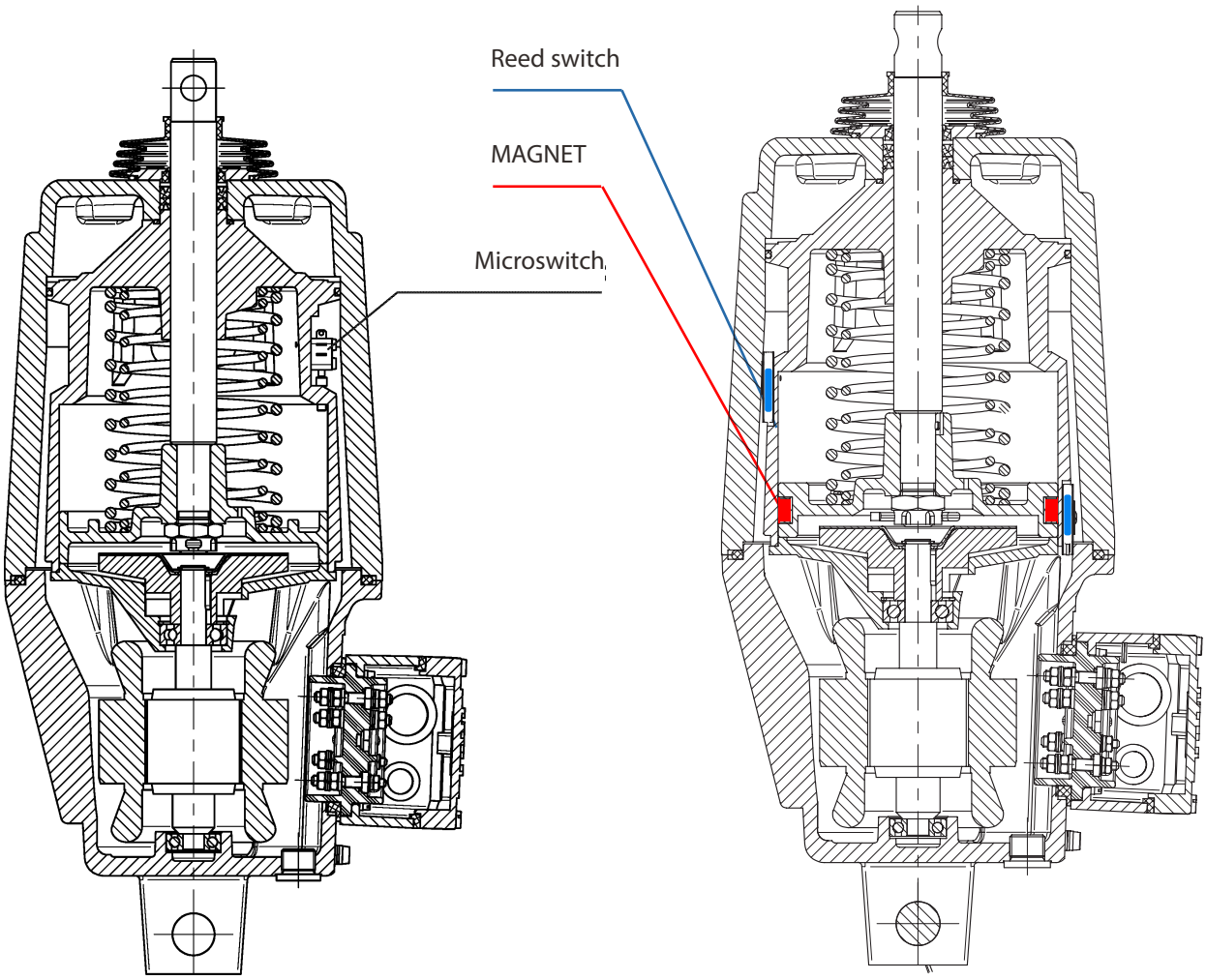
External mechanical switch
“Im“ and “Im1“

External inductive switch
“In“ and “In1“

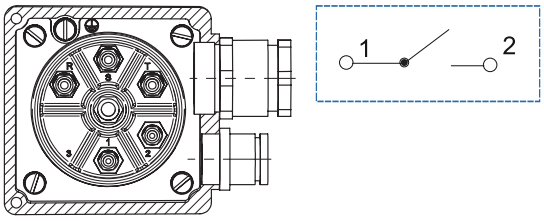
Microswitch is build on the outside of cylinder. It is activate when the piston is in the top position. In a magnetic inductive switch, switches are also built on the outside of the cylinder and activates them a permanent magnet built in the piston. The advantage of this solution is that the switches are fully protected from external influences and in this way are very reliable in the work. Linkage is done in connecting box.

Internal mechanical switch
"MP"

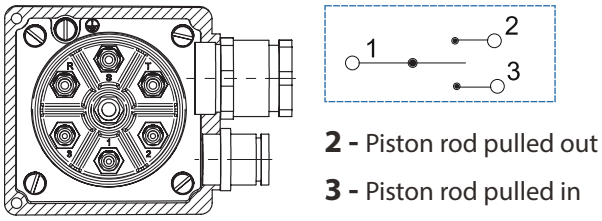
Internal magnet-inductive switch
"Lk2" and "Lk4"



Connecting box for device variant "MP" and "Lk2"



Connecting box for device variant "Lk4"



2 - Piston rod pulled out

3 - Piston rod pulled in

FLUIDOTEHNIC

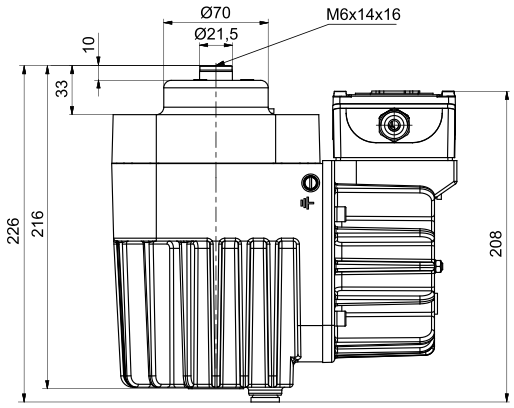
ELECTROHYDRAULIC THRUSTERS

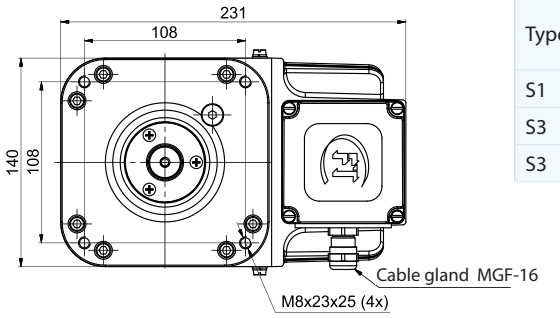
SPECIAL VARIANTS

ELECTROHYDRAULIC THRUSTERS E-SF 100-30

ELECTROHYDRAULIC THRUSTERS E-SF 100-30-U

E-SF 100-30





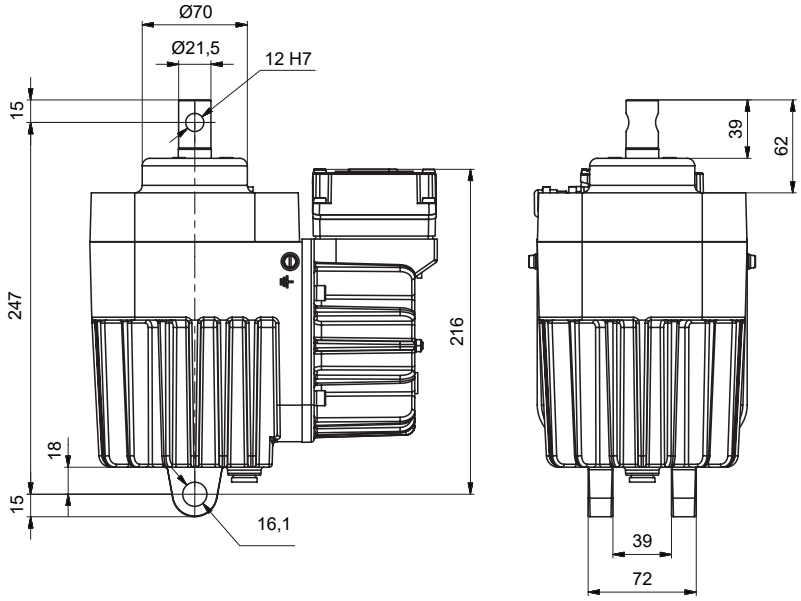
Type	E-SF 100-30; E-SF 100-30-U				
Stroke	30	mm	Motor voltage 3~	400	V
Nominal pushing force	100	daN	Frequency	50	Hz
Nominal return force	0	daN	Nominal power	200	W
Lifting time	0.75	s	Nominal current	0.4	A
Lowering time	0.3	s	Mech. protection	IP 66	
Electrical insulating oil	"NYTRO 4000X"		Insulation class	F	IEC 60034
Quantity of oil	1.2	dm³	Mass	10.2	kg
Installation position	Device is provided to operate in all positions				

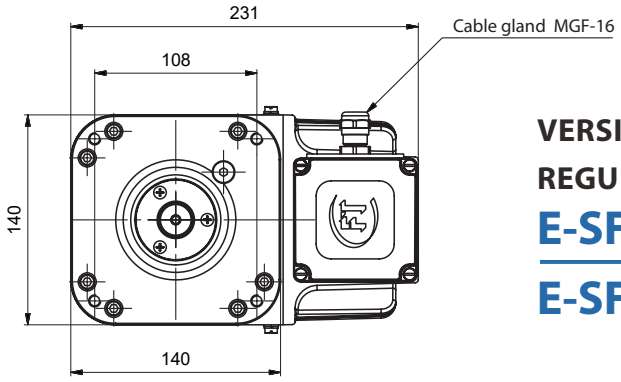
Type of duty cycles	Ambiental temperature (°C)		
	-	T	L
S1	-25 ; +40	-25 ; +50	-40 ; +35
S3 60% 600 cycle/h	-25 ; +50	-25 ; +60	-40 ; +45
S3 60% 240 cycle/h	-25 ; +60	-25 ; +70	-40 ; +55

NOTES:

- On low temperature rated current can be increased to 0,8A
- Lifting and lowering time depends on the load, it is changeable in the range of ± 10%

E-SF 100-30-U





VERSIONS WITH VALVE FOR REGULATION LOWERING SPEED

E-SF 100-30 S

E-SF 100-30-U S

ELECTROHYDRAULIC THRUSTERS F-EB

TECHNICAL CHARACTERISTICS OF DEVICES

Size	Type	Nom. stroke	Nominal pushing force	Nominal return force	Power	Current	Mass without oil	Oil's mass	Lifting time	Lowering time
		mm	N	N	W	A	kg	kg	s	s
0	F-EB 12/50 F-EB 12/50 C12 F-EB 12/50 C18 F-EB 12/50 C22	50	220	0 120 180 220	200	0.35	11.6	1.4	0.45	0.4
1	F-EB 20/50 F-EB 20/50 C12 F-EB 20/50 C20	50	300	0 120 200	150	0.5	9.5	1.8	0.4	0.45
2	F-EB 50/50 F-EB 50/50 C18 F-EB 50/50 C32 F-EB 50/50 C50	50	500	0 180 320 500	200	0.55	12.5	2.6	0.4	0.45
2	F-EB 50/60 F-EB 50/60 C18 F-EB 50/60 C32 F-EB 50/60 C50	60	500	0 180 320 500	200	0.55	12.5	2.6	0.4	0.45
2.1	F-EB 50/100 F-EB 50/100 C18 F-EB 50/100 C32 F-EB 50/100 C50	100	500	0 130 290 420	200	0.55	14	3.2	0.8	0.7
3	F-EB 80/60 F-EB 80/60 C45 F-EB 80/60 C80	60	800	0 450 800	350	0.6	19.7	4.3	0.45	0.5
3.1	F-EB 80/160 F-EB 80/160 C45 F-EB 80/160 C80	160	800	0 300 520	350	0.6	22	6	1.0	0.9
3	F-EB 125/60 F-EB 125/60 C45 F-EB 125/60 C80 F-EB 125/60 C125	60	1250	0 450 800 1250	400	0.65	19.7	4.3	0.6	0.4
3.1	F-EB 125/160 F-EB 125/160 C45 F-EB 125/160 C80 F-EB 125/160 C125	160	1250	0 300 520 820	400	0.65	22	6	1.2	0.9
3	F-EB 150/60 F-EB 150/60 C45 F-EB 150/60 C80 F-EB 150/60 C125	60	1500	0 450 800 1250	450	0.7	19.7	4.3	0.7	0.4
3.1	F-EB 150/160 F-EB 150/160 C45 F-EB 150/160 C80 F-EB 150/160 C125	160	1500	0 300 520 820	450	0.7	22	6	1.2	0.8
4	F-EB 250/60 F-EB 250/60 C70 F-EB 250/60 C130 F-EB 250/60 C200	60	2500	0 700 1300 2000	500	0.7	31.5	9	0.65	0.45
5	F-EB 250/160 F-EB 250/160 C70 F-EB 250/160 C130 F-EB 250/160 C200	160	2500	0 510 850 1360	500	0.7	37.5	10.5	1.5	0.95
5	F-EB 320/100 F-EB 320/100 C70 F-EB 320/100 C250* F-EB 320/100 C320*	100	3200	0 580 2300 2950	600	0.9	39.5	9.5	1.1	0.7

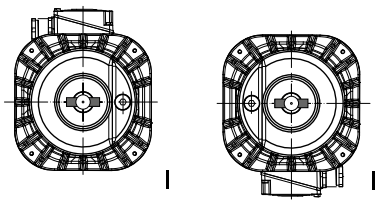
* *For the devices F-EB 320/100 C250 and F-EB 320/100 C320 nominal stroke of piston rod is limited to 60mm.*

			Standard variant	For high temperatures			For low temperatures
		Symbol	-	T	TW06	TW07	L
Environment temperature		maximum	+40ºC	+45ºC	+60ºC	+70ºC	+40ºC
		minimum	-25ºC	-25ºC	-10ºC	-10ºC	-45ºC
Hydraulic fluid - oil type			Insulation oil NYNAS NYTRO 4000X				AEROSHELL FLUID 41
Voltage and motor frequency			3 x 400V 50Hz				
Duty of device			2.000 cycles/h or ED 100% (S1)		350 cycles/h or ED 35% (S3)	250 cycles/h or ED 25% (S3)	2.000 cycles/h or ED 100% (S1)
Mechanical protection			IP 66				
Variant on customer request	Voltage of electromotor		od 200V do 660V				
	Frequency		od 42Hz do 60Hz				
	Work control	Mechanical switch	Im	External mechanical control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 2,5A; external IP65: The guaranteed activation point is max. 0,3mm from the maximum position of the activated thruster
			Im1	External mechanical control sensor signals that the brake is raised (open) and brake lining are worn			
			MP	Internal mechanical control sensor signals that the brake is raised (open)			
		Inductive switch	In	External inductive control sensor signals that the brake is raised (open)			Voltage 15...250V AC 500 mA 45...65 Hz NO/NC
			In1	External inductive control sensor signals that the brake is raised (open) and brake lining are worn			
		Magnetic-inductive switch	Lk2	Internal control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 0,5A; The guaranteed activation point is max. 5mm from the maximum position of the activated thruster
			Lk4	Internal control sensor signals that the brake is raised (open) and brake lining are worn			

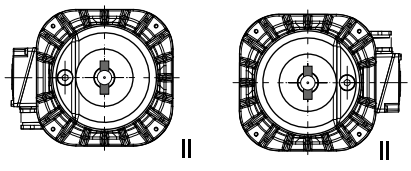
NOTES:

- Nominal pushing force for the device without a spring, is a declared force on the piston rod in the output direction. Maximum pushing force is ~ 50% higher. In devices with spring it is reduced by force springs.
- Nominal return force is a force of the spring for returning the piston rod and this information related to the 1/3 piston rod stroke. Tolerance is ±10%.
- The weight of the device and oil are approximate (depending on additional equipment).
- Time of lifting and lowering is related to a variant of the device without irreversible valve with built-in springs, i.e. with the corresponding external load. Tolerance is ±10%. In devices with built-in non return valve min. lifting and lowering time is greater for ~ 25%, while by the wring screw (13) can be continuously adjusted up to a maximum of 3- 5s for a stroke rate 50-60mm, 8-12s for the stroke rate 100 mm and 10-15s for the stroke rate 160mm.
- Nominal power and current refer to temperature of the device 20°C. Lowering temperature causes an increase in oil viscosity, in which case the nominal value of the power and current are growing and can be up to 50% higher.

POSITION OF TERMINAL BOX WHEN THE DEVICE WORKS IN A HORIZONTAL POSITION



Foot bolt horizontal

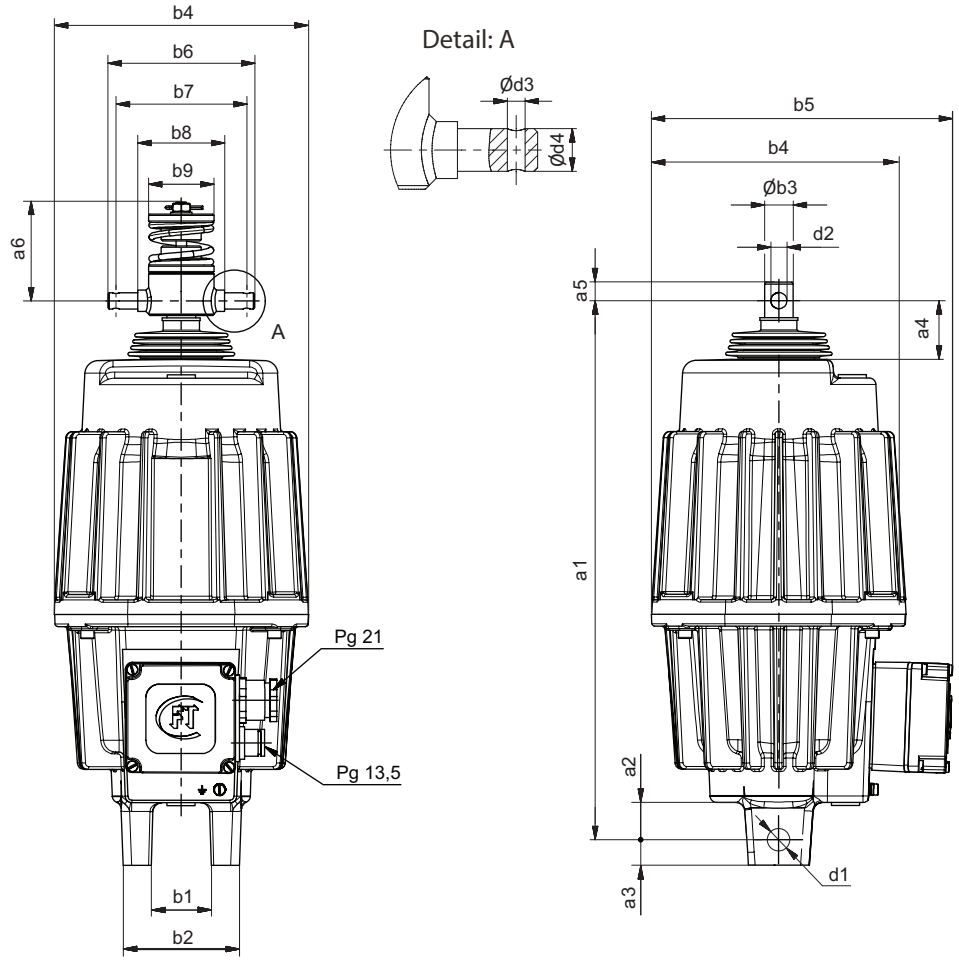


Foot bolt vertical

INSTALLATION DRAWING

VARIANT WITH SHOCK ABSORBER - R

VARIANT WITHOUT SHOCK ABSORBER - R

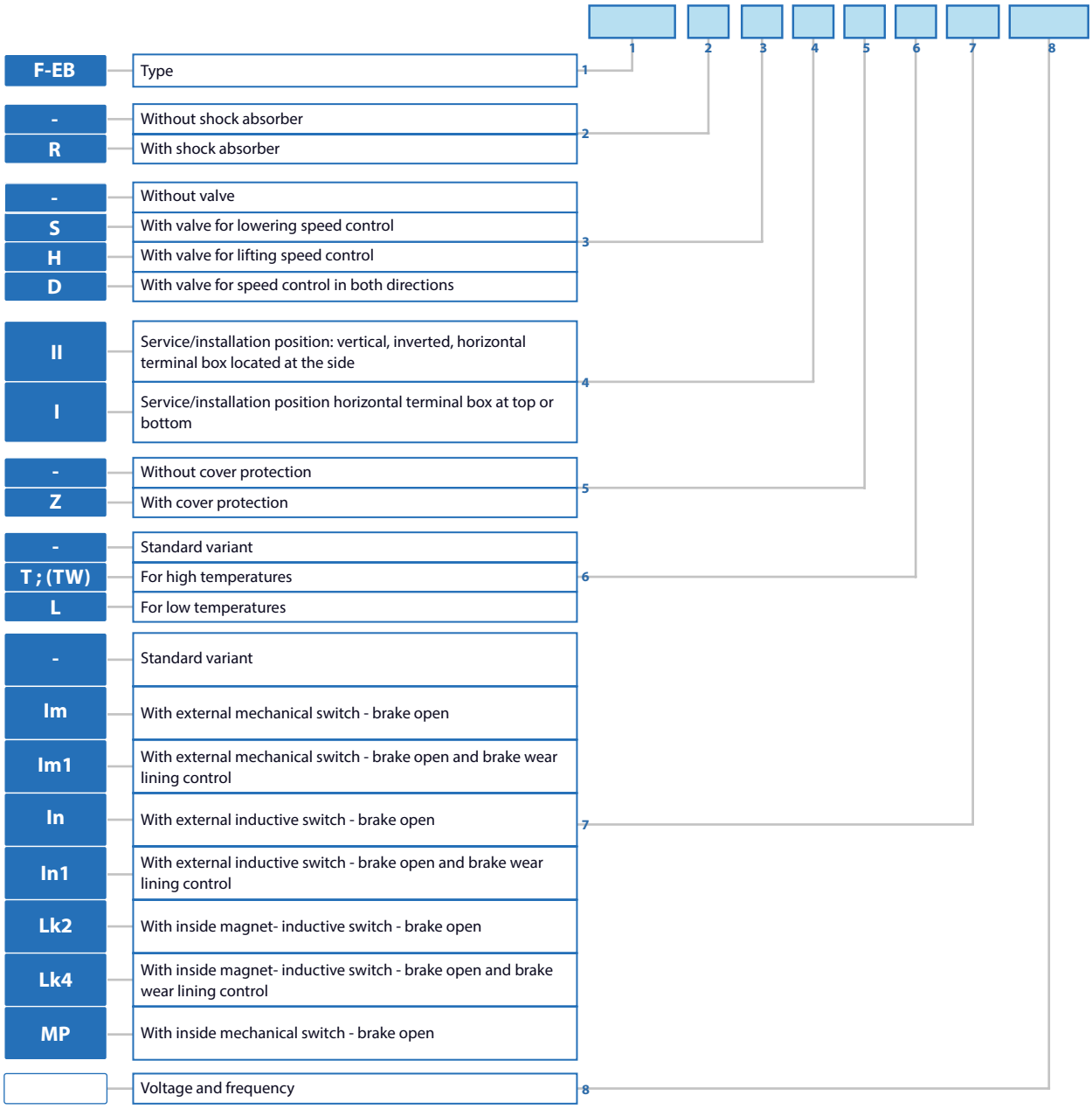


The devices are homologated by INSTITUTE FOR QUALITY 1. MAJ – Nis, registered number is 03-3322/2 from 25.12.1996. and they are produced in accordance with the EC-safety requirements. The CERTIFICATE OF SAFETY and CERTIFICATE OF TESTING are available for each device.

INSTALLATION DIMENSIONS:

DIMENSIONS / SIZE	a1$^{\pm1}$	a2	a3^{+1}	a4$^{\pm1}$	a5	a6	b1^{+2}	b2^{+1}	b3^{e8}	b4	b5	b6	b7$^{+0,5}$	b8$^{\pm0,5}$	b9	d1$^{+0,1}$	d2^{F9}	d3	d4^{e8}
0	286	18	15	26	12	106	40	80	20	140	209	110	98	65	49	16.1	12	5	12
1	380	30	20	30	17	106	40	80	21.5	150	200	110	98	65	49	20.2	12	5	12
2	400	30	20	32	17	106	40	90	21.5	180	220	110	98	65	49	20.2	12	5	12
2.1	452	30	20	32	17	106	40	90	21.5	180	220	110	98	65	49	20.2	12	5	12
3	458	30	25	36	21	140	40	90	27.5	208	232	110	98	65	49	20.2	16	5	16
3.1	573	30	25	36	21	140	40	90	27.5	208	232	110	98	65	49	20.2	16	5	16
4	549	30	25	36	25	189	40	90	35.5	250	265	120	105	70	58	20.2	20	5	20
5	660	30	25	36	25	189	40	90	35.5	250	265	120	105	70	58	20.2	20	5	20

ORDER INSTRUCTION



NOTES:

Stroke indicators: Im, In, Lk2 and MP indicate maximum ejection of the rod (brake open).

Stroke indicators: Im1, In1 and Lk4 sindicate maximum ejection of the rod (brake open) and that the brake linings are worn (used-up).

Internal indicator is build inside of device. Current supply for indicator is provided from connecting box used cable gland Pg 13,5.

Standard execution of devices is with protection against corrosion, due to the working conditions, such as surface mines, ironworks, cement works etc. If devices are used in extremely difficult conditions (presence of acids, bases, sea water), the special variants are produced.

ELECTROHYDRAULIC THRUSTERS F-EB DIN 15430

TECHNICAL CHARACTERISTICS OF DEVICES

Size	Type	Nom. stroke	Nominal pushing force	Nominal return force	Power	Current	Mass without oil	Oil's mass	Lifting time	Lowering time
		mm	N	N	W	A	kg	kg	s	s
0	F-EB 120-40 F-EB 120-40 C60 F-EB 120-40 C120	40	120	0 60 120	200	0.35	11.6	1.4	0.25	0.25
0	F-EB 220-50 F-EB 220-50 C120 F-EB 220-50 C180 F-EB 220-50 C220	50	220	0 120 180 220	200	0.35	11.6	1.4	0.45	0.40
1	F-EB 300-50 F-EB 300-50 C120 F-EB 300-50 C200 F-EB 300-50 C270	50	300	0 120 200 270	150	0.5	9.5	1.8	0.45	0.4
2	F-EB 500-60 F-EB 500-60 C180 F-EB 500-60 C320 F-EB 500-60 C500	60	500	0 180 320 500	200	0.55	12.5	2.6	0.45	0.4
2.1	F-EB 500-120 F-EB 500-120 C180 F-EB 500-120 C320 F-EB 500-120 C500	120	500	0 132 300 432	200	0.55	14	3.2	0.80	0.60
3	F-EB 800-60 F-EB 800-60 C450 F-EB 800-60 C800	60	800	0 450 800	350	0.6	19.7	4.3	0.45	0.50
3.1	F-EB 800-120 F-EB 800-120 C450 F-EB 800-120 C800	120	800	0 300 520	350	0.6	22	6	0.75	0.6
3.2	F-EB 1250-60 F-EB 1250-60 C450 F-EB 1250-60 C800 F-EB 1250-60 C1250	60	1250	0 450 800 1250	400	0.65	19.7	4.3	0.55	0.4
3.3	F-EB 1250-120 F-EB 1250-120 C450 F-EB 1250-120 C800 F-EB 1250-120 C1250	120	1250	0 300 520 820	400	0.65	22	6	1	0.6
4	F-EB 2000-60 F-EB 2000-60 C700 F-EB 2000-60 C1300 F-EB 2000-60 C2000	60	2000	0 700 1300 2000	500	0.7	31.5	9	0.6	0.4
5.1	F-EB 2000-120 F-EB 2000-120 C700 F-EB 2000-120 C1300 F-EB 2000-120 C2000	120	2000	0 510 850 1360	500	0.7	37.5	10.5	1.20	0.60
5.1	F-EB 2500-160 F-EB 2500-160 C700 F-EB 2500-160 C1300 F-EB 2500-160 C2000	160	2500	0 510 850 1360	500	0.7	37.5	10.5	1.50	0.65
5	F-EB 3000-60 F-EB 3000-60 C700 F-EB 3000-60 C2500 F-EB 3000-60 C3200	60	3000	0 700 2300 2950	600	0.9	39.5	9.5	0.65	0.45
5.1	F-EB 3000-120	120	3000	0	600	0.9	39.5	9.5	1.20	0.70
5.1	F-EB 3200-100 F-EB 3200-100 C700 F-EB 3200-100 C2500* F-EB 3200-100 C3200*	100	3200	0 680 2300 2950	600	0.9	39.5	9.5	1,10	0,60

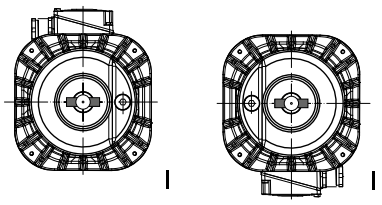
* *For the devices E-EB 3200/100 C2500 and F-EB 3200/100 C3200 nominal stroke of piston rod is limited to 60mm.*

			Standard variant	For high temperatures			For low temperatures
		Symbol	-	T	TW06	TW07	L
Environment temperature		maximum	+40ºC	+45ºC	+60ºC	+70ºC	+40ºC
		minimum	-25ºC	-25ºC	-10ºC	-10ºC	-45ºC
Hydraulic fluid - oil type			Insulation oil NYNAS NYTRO 4000X				AEROSHELL FLUID 41
Voltage and motor frequency			3 x 400V 50Hz				
Duty of device			2.000 cycles/h or ED 100% (S1)		350 cycles/h or ED 35% (S3)	250 cycles/h or ED 25% (S3)	2.000 cycles/h or ED 100% (S1)
Mechanical protection			IP 66				
Variant on customer request	Voltage of electromotor		od 200V do 660V				
	Frequency		od 42Hz do 60Hz				
	Work control	Mechanical switch	Im	External mechanical control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 2,5A; external IP65: The guaranteed activation point is max. 0,3mm from the maximum position of the activated thruster
			Im1	External mechanical control sensor signals that the brake is raised (open) and brake lining are worn			
			MP	Internal mechanical control sensor signals that the brake is raised (open)			
		Inductive switch	In	External inductive control sensor signals that the brake is raised (open)			Voltage 15...250V AC 500 mA 45...65 Hz NO/NC
			In1	External inductive control sensor signals that the brake is raised (open) and brake lining are worn			
		Magnetic-inductive switch	Lk2	Internal control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 0,5A; The guaranteed activation point is max. 5mm from the maximum position of the activated thruster
			Lk4	Internal control sensor signals that the brake is raised (open) and brake lining are worn			

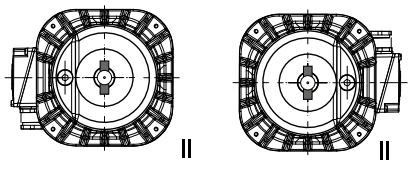
NOTES:

- Nominal pushing force for the device without a spring, is a declared force on the piston rod in the output direction. Maximum pushing force is ~ 50% higher. In devices with spring it is reduced by force springs.
- Nominal return force is a force of the spring for returning the piston rod and this information related to the 1/3 piston rod stroke. Tolerance is ±10%.
- The weight of the device and oil are approximate (depending on additional equipment).
- Time of lifting and lowering is related to a variant of the device without irreversible valve with built-in springs, i.e. with the corresponding external load. Tolerance is ±10%. In devices with built-in non return valve min. lifting and lowering time is greater for ~ 25%, while by the wring screw (13) can be continuously adjusted up to a maximum of 3- 5s for a stroke rate 50-60mm, 8-12s for the stroke rate 100 mm and 10-15s for the stroke rate 160mm.
- Nominal power and current refer to temperature of the device 20°C. Lowering temperature causes an increase in oil viscosity, in which case the nominal value of the power and current are growing and can be up to 50% higher.

POSITION OF TERMINAL BOX WHEN THE DEVICE WORKS IN A HORIZONTAL POSITION



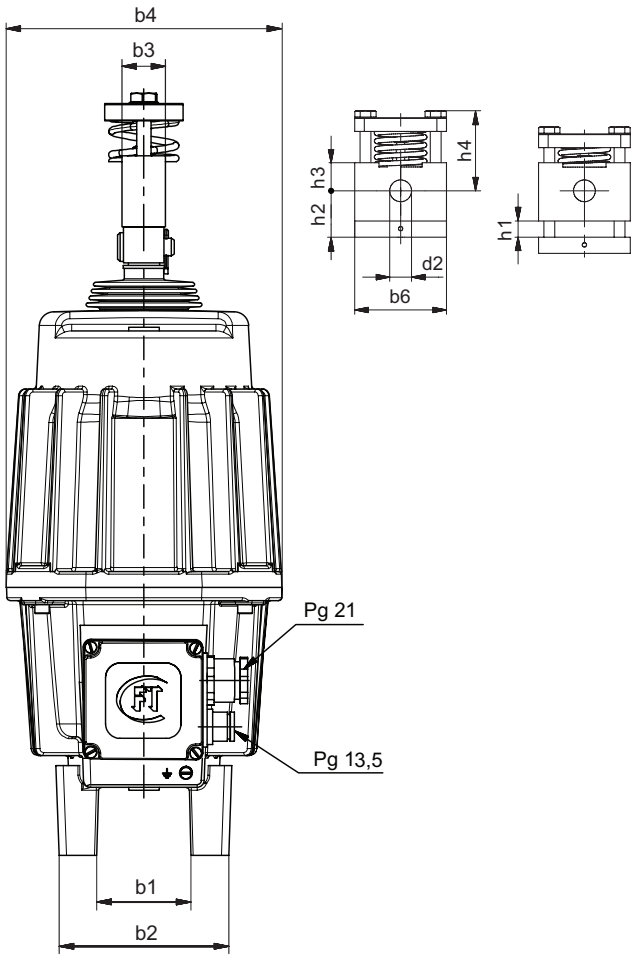
Foot bolt horizontal



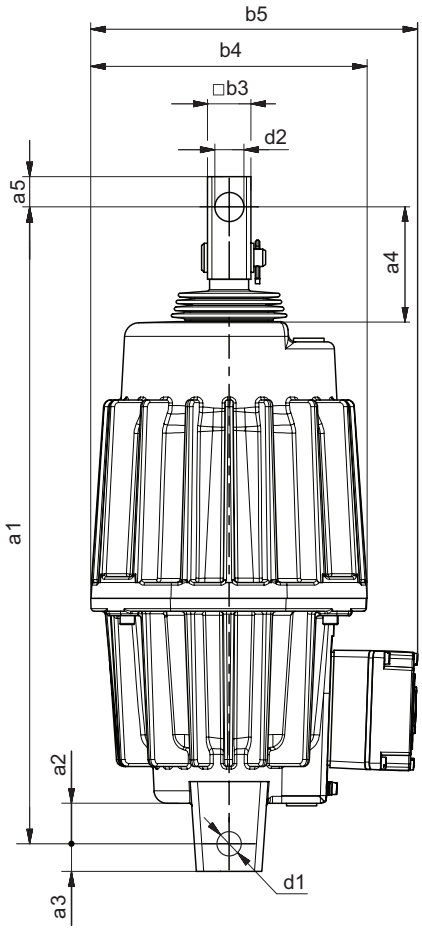
Foot bolt vertical

INSTALLATION DRAWING

VARIANT WITH SHOCK ABSORBER - R



VARIANT WITHOUT SHOCK ABSORBER - R

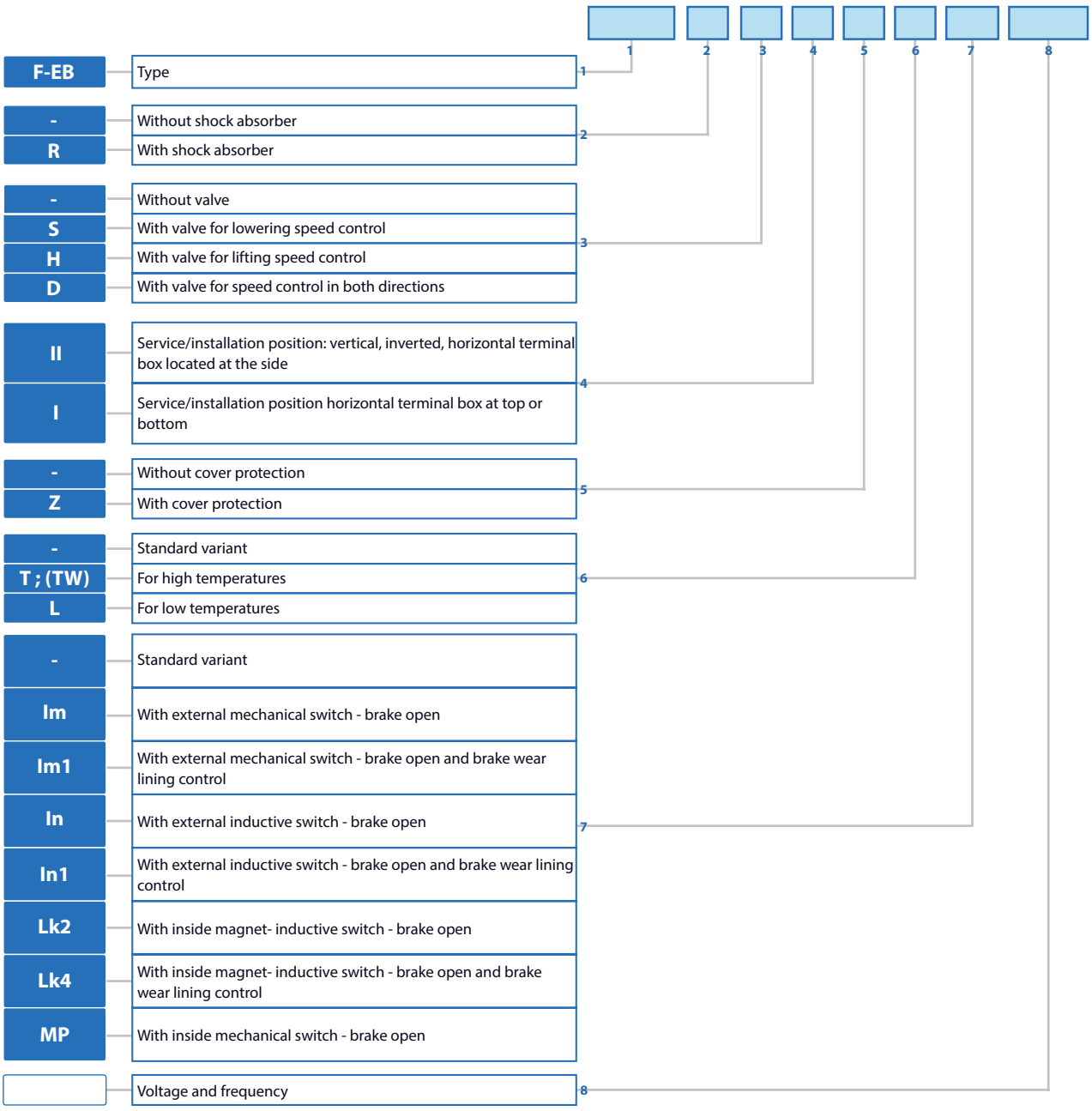


The devices are homologated by INSTITUTE FOR QUALITY 1. MAJ – Nis, registered number is 03-3322/2 from 25.12.1996. and they are produced in accordance with the EC-safety requirements.
The CERTIFICATE OF SAFETY and CERTIFICATE OF TESTING are available for each device.

INSTALLATION DIMENSIONS:

DIMENSIONS / SIZE	a1±1	a2	a3+1	a4±1	a5	b1+2	b2+1	b3-0,1	b4	b5	b6	d1+0,1	d2F9	h1	h2	h3	h4
0	286	18	15	26	12	40	80	20	140	209	68	16.1	12	15	36	20	89
1	370	18	16	32	15	40	80	25	150	200	68	16.1	16	15	30	20	75
2	435	30	20	67	18	60	120	30	180	220	68	20.1	20	20	36	20	100
2.1	515	30	20	95	18	60	120	30	180	220	68	20.1	20	20	36	20	100
3	458	23	22	42	18	60	120	30	208	232	68	20.1	20	20	36	20	100
3.1	530	23	22	39	18	60	120	30	208	232	68	20.1	20	20	36	20	100
3.2	645	30	25	108	25	40	90	40	208	232	110	25,1	25	20	38	35	175
3.3	705	30	25	168	25	40	90	40	208	232	110	25.1	25	20	38	35	175
4	645	30	25	132	25	40	90	40	250	265	110	25.1	25	20	38	35	175
5	660	30	25	36	25	40	90	40	250	265	110	25.1	25	20	38	35	175
5.1	705	30	25	81	25	40	90	40	250	265	110	25.1	25	20	38	35	175

ORDER INSTRUCTION



NOTES:

Stroke indicators: Im, In, Lk2 and MP indicate maximum ejection of the rod (brake open).

Stroke indicators: Im1, In1 and Lk4 sindicate maximum ejection of the rod (brake open) and that the brake linings are worn (used-up).

Internal indicator is build inside of device. Current supply for indicator is provided from connecting box used cable gland Pg 13,5.

Standard execution of devices is with protection against corrosion, due to the working conditions, such as surface mines, ironworks, cement works etc. If devices are used in extremely difficult conditions (presence of acids, bases, sea water), the special variants are produced.

All devices are technologically produced in the basic version so that the customer can upgrade with valves (H, S, D), shock absorber (R), external indication (Im, Im1, In, In1), cover protection (Z).

ELECTROHYDRAULIC THRUSTERS F-BL

TECHNICAL CHARACTERISTICS OF DEVICES

Size	Type	Nom. stroke	Nominal pushing force	Nominal return force	Power	Mass	Lifting time	Lowering time
		mm	N	N	W	kg	s	s
1	F-BL-12 F-BL-12 SV F-BL-12 C F-BL-12 C SV	50	200	0 0 120 120	150	11.3	0.55	0.65
1	F-BL-20 F-BL-20 SV F-BL-20 C F-BL-20 C SV	50	200	0 0 180 180	150	11.3	0.55	0.65
2	F-BL-32 F-BL-32 SV F-BL-32 C F-BL-32 C SV	50	500	0 0 330 330	200	15.1	0,55	0,65
2	F-BL-50 F-BL-50 SV F-BL-50 C F-BL-50 C SV	50	500	0 0 485 485	200	15.1	0.55	0.65
3	F-BL-80 F-BL-80 SV F-BL-80 C F-BL-80 C SV	60	1250	0 0 775 775	350	24	0.55	0.6
3.1	F-BL-80/16 F-BL-80/16 SV	160	1250	0 0	350	28	1.2	1.1
3	F-BL-125 F-BL-125 SV F-BL-125 C F-BL-125 C SV	60	1250	0 0 1290 1290	400	24	0.65	0.6
3.1	F-BL-125/16 F-BL-125/16 SV	160	1250	0 0	400	28	1.2	1.1
4	F-BL-200 F-BL-200 SV F-BL-200 C F-BL-200 C SV	60	2500	0 0 1910 1910	500	40.5	0.7	0.6
5	F-BL-200/16 F-BL-200/16 SV F-BL-250/16 F-BL-250/16 SV F-BL-320 F-BL-320 SV	160 160 160 160 100 100	2000 2000 2500 2500 3200 3200	0	500 500 500 500 600 600	48 48 48 48 49 49	1.5 1.5 1.5 1.5 1.4 1.4	1.1 1.1 1.1 1.1 0.9 0.9

SV *with valve for lowering speed control*

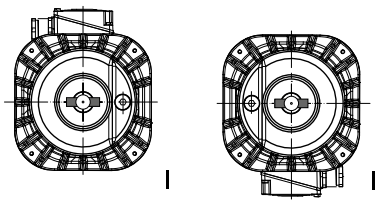
C *with return springs*

			Standard variant	For high temperatures			For low temperatures
	Symbol		-	T	TW06	TW07	L
Environment temperature	maximum		+40ºC	+45ºC	+60ºC	+70ºC	+40ºC
	minimum		-25ºC	-25ºC	-10ºC	-10ºC	-45ºC
Hydraulic fluid - oil type			Insulation oil NYNAS NYTRO 4000X				AEROSHELL FLUID 41
Voltage and motor frequency			3 x 400V 50Hz				
Duty of device			2.000 cycles/h or ED 100% (S1)		350 cycles/h or ED 35% (S3)	250 cycles/h or ED 25% (S3)	2.000 cycles/h or ED 100% (S1)
Mechanical protection			IP 66				
Variant on customer request	Voltage of electromotor		od 200V do 660V				
	Frequency		od 42Hz do 60Hz				
	Work control	Mechanical switch	Im	External mechanical control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 2,5A; external IP65: The guaranteed activation point is max. 0,3mm from the maximum position of the activated thruster
			Im1	External mechanical control sensor signals that the brake is raised (open) and brake lining are worn			
			MP	Internal mechanical control sensor signals that the brake is raised (open)			
		Inductive switch	In	External inductive control sensor signals that the brake is raised (open)			Voltage 15...250V AC 500 mA 45...65 Hz NO/NC
			In1	External inductive control sensor signals that the brake is raised (open) and brake lining are worn			
		Magnetic-inductive switch	Lk2	Internal control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 0,5A; The guaranteed activation point is max. 5mm from the maximum position of the activated thruster
			Lk4	Internal control sensor signals that the brake is raised (open) and brake lining are worn			

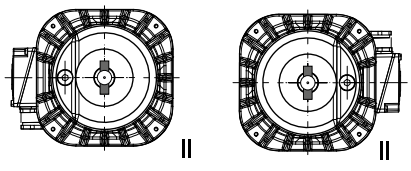
NOTES:

- Nominal pushing force for the device without a spring, is a declared force on the piston rod in the output direction. Maximum pushing force is ~ 50% higher. In devices with spring it is reduced by force springs.
- Nominal return force is a force of the spring for returning the piston rod and this information related to the 1/3 piston rod stroke. Tolerance is ±10%.
- The weight of the device and oil are approximate (depending on additional equipment).
- Time of lifting and lowering is related to a variant of the device without irreversible valve with built-in springs, i.e. with the corresponding external load. Tolerance is ±10%. In devices with built-in non return valve min. lifting and lowering time is greater for ~ 25%, while by the wring screw (13) can be continuously adjusted up to a maximum of 3- 5s for a stroke rate 50-60mm, 8-12s for the stroke rate 100 mm and 10-15s for the stroke rate 160mm.
- Nominal power and current refer to temperature of the device 20°C. Lowering temperature causes an increase in oil viscosity, in which case the nominal value of the power and current are growing and can be up to 50% higher.

POSITION OF TERMINAL BOX WHEN THE DEVICE WORKS IN A HORIZONTAL POSITION



Foot bolt horizontal



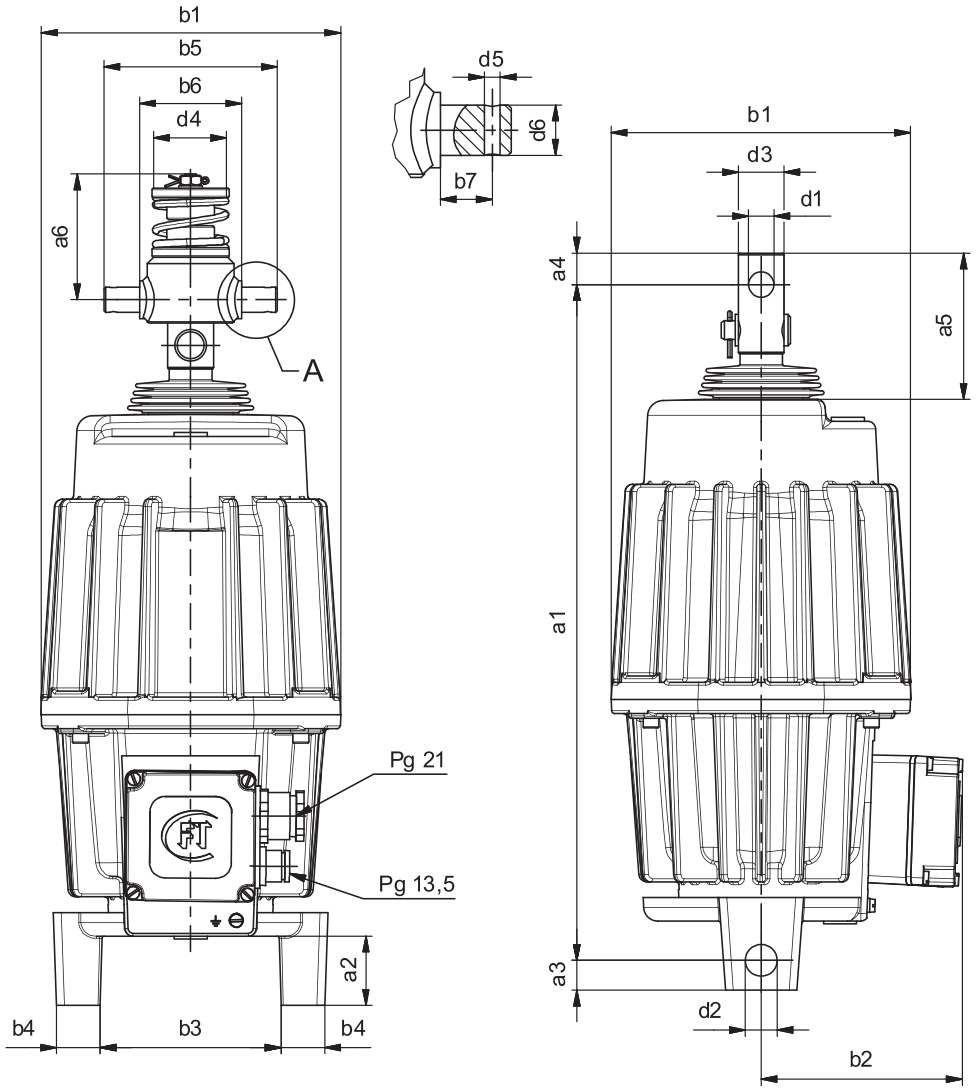
Foot bolt vertical

INSTALLATION DRAWING

VARIANT WITH SHOCK ABSORBER - R

VARIANT WITHOUT SHOCK ABSORBER - R

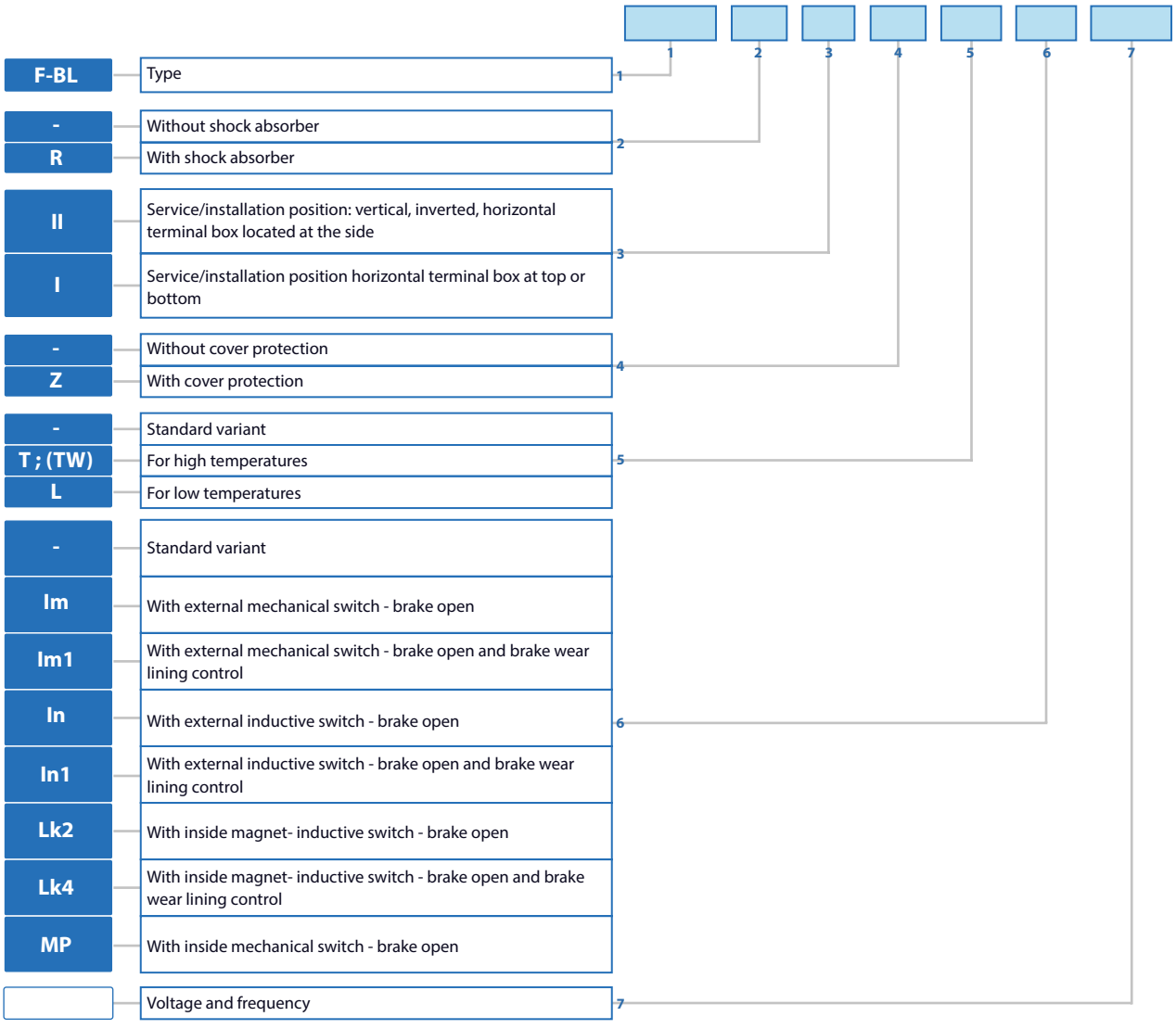
Detail: A



INSTALLATION DIMENSIONS:

DIMENSIONS / SIZE	$a1^{+1}$	$a2^{+1}$	$a3^{+1}$	$a4^{+0.2}$	a5	$a6^{+1}$	$b1^{+1}$	$b2^{+1}$	$b3^{+1}$	$b4^{+1}$	b5	$b6^{+0,2}$	$b7^{+0,2}$	$d1^{F9}$	$d2^{h11}$	d3	d4	d5	$d6^{-0.1}$
1	405	50	23	16	81	42	152	125	88	23	110	65	16,5	16	20	24	49	5	16
2	430	50	23	20	93	57	182	130	110	32	110	65	16,5	16	20	29	49	5	16
3	513	55	25	25	112	52	210	140	116	38	110	65	16,5	20	20	34	49	5	16
3.1	613	55	25	25	106	52	210	140	116	38	110	65	16,5	20	20	34	49	5	16
4	605	55	25	30	131	63	255	150	126	38	121	70	17,5	25	20	40	58	5	20
5	705	55	25	30	118	63	255	150	126	38	121	70	17,5	25	20	40	58	5	20

ORDER INSTRUCTION



ELECTROHYDRAULIC THRUSTERS F-EHT 12.5-50 to 250-60

TECHNICAL CHARACTERISTICS OF DEVICES

Size	Type	Nom. stroke	Nominal pushing force	Nominal return force	Power	Mass	Lifting time	Lowering time
		mm	N	N	W	kg	s	s
1	F-EHT 12.5-50 F-EHT 12.5-50V F-EHT 12.5-50F F-EHT 12.5-50FV	50	200	0 0 130 130	150	11.3	0.55	0.65
1	F-EHT 20-50 F-EHT 20-50V F-EHT 20-50F F-EHT 20-50FV	50	200	0 0 200 200	150	11.3	0.55	0.65
2	F-EHT 32-50 F-EHT 32-50V F-EHT 32-50F F-EHT 32-50FV	50	500	0 0 330 330	200	15.1	0.55	0.65
2	F-EHT 50-50 F-EHT 50-50V F-EHT 50-50F F-EHT 50-50FV	50	500	0 0 485 485	200	15.1	0.55	0.65
3	F-EHT 80-60 F-EHT 80-60V F-EHT 80-60F F-EHT 80-60FV	60	1250	0 0 775 775	350	24	0.55	0.6
3.1	F-EHT 125-60 F-EHT 125-60V F-EHT 125-60F F-EHT 125-60FV	60	1250	0 0 1290 1290	400	24	0.65	0.6
3.2	F-EHT 125-120 F-EHT 125-120V F-EHT 125-120F F-EHT 125-120FV	120	1250	0 0 820 820	400	28	0.65	0.6
4	F-EHT 200-60 F-EHT 200-60V F-EHT 200-60F F-EHT 200-60FV	60	2500	0 0 1910 1910	500	40.5	0.7	0.6
4	F-EHT 250-60 F-EHT 250-60V F-EHT 250-60F F-EHT 250-60FV	60	2850	0 0 2500 2500	500	40.5	0.7	0.6
4.1	F-EHT 200-120 F-EHT 200-120V F-EHT 200-120F F-EHT 200-120FV	120	2500	0 0 1360 1360	500	48	0.7	0.65

V *with valve for lowering speed control*

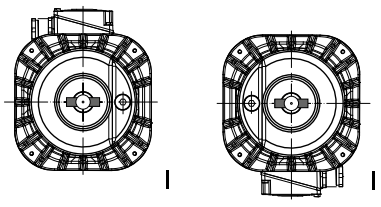
F *with return springs*

			Standard variant	For high temperatures			For low temperatures
	Symbol		-	T	TW06	TW07	L
Environment temperature	maximum		+40ºC	+45ºC	+60ºC	+70ºC	+40ºC
	minimum		-25ºC	-25ºC	-10ºC	-10ºC	-45ºC
Hydraulic fluid - oil type			Insulation oil NYNAS NYTRO 4000X				AEROSHELL FLUID 41
Voltage and motor frequency			3 x 400V 50Hz				
Duty of device			2.000 cycles/h or ED 100% (S1)		350 cycles/h or ED 35% (S3)	250 cycles/h or ED 25% (S3)	2.000 cycles/h or ED 100% (S1)
Mechanical protection			IP 66				
Variant on customer request	Voltage of electromotor		od 200V do 660V				
	Frequency		od 42Hz do 60Hz				
	Work control	Mechanical switch	Im	External mechanical control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 2,5A; external IP65: The guaranteed activation point is max. 0,3mm from the maximum position of the activated thruster
			Im1	External mechanical control sensor signals that the brake is raised (open) and brake lining are worn			
			MP	Internal mechanical control sensor signals that the brake is raised (open)			
		Inductive switch	In	External inductive control sensor signals that the brake is raised (open)			Voltage 15...250V AC 500 mA 45...65 Hz NO/NC
			In1	External inductive control sensor signals that the brake is raised (open) and brake lining are worn			
		Magnetic-inductive switch	Lk2	Internal control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 0,5A; The guaranteed activation point is max. 5mm from the maximum position of the activated thruster
			Lk4	Internal control sensor signals that the brake is raised (open) and brake lining are worn			

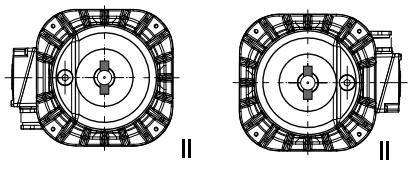
NOTES:

- Nominal pushing force for the device without a spring, is a declared force on the piston rod in the output direction. Maximum pushing force is ~ 50% higher. In devices with spring it is reduced by force springs.
- Nominal return force is a force of the spring for returning the piston rod and this information related to the 1/3 piston rod stroke. Tolerance is ±10%.
- The weight of the device and oil are approximate (depending on additional equipment).
- Time of lifting and lowering is related to a variant of the device without irreversible valve with built-in springs, i.e. with the corresponding external load. Tolerance is ±10%. In devices with built-in non return valve min. lifting and lowering time is greater for ~ 25%, while by the wring screw (13) can be continuously adjusted up to a maximum of 3- 5s for a stroke rate 50-60mm, 8-12s for the stroke rate 100 mm and 10-15s for the stroke rate 160mm.
- Nominal power and current refer to temperature of the device 20°C. Lowering temperature causes an increase in oil viscosity, in which case the nominal value of the power and current are growing and can be up to 50% higher.

POSITION OF TERMINAL BOX WHEN THE DEVICE WORKS IN A HORIZONTAL POSITION

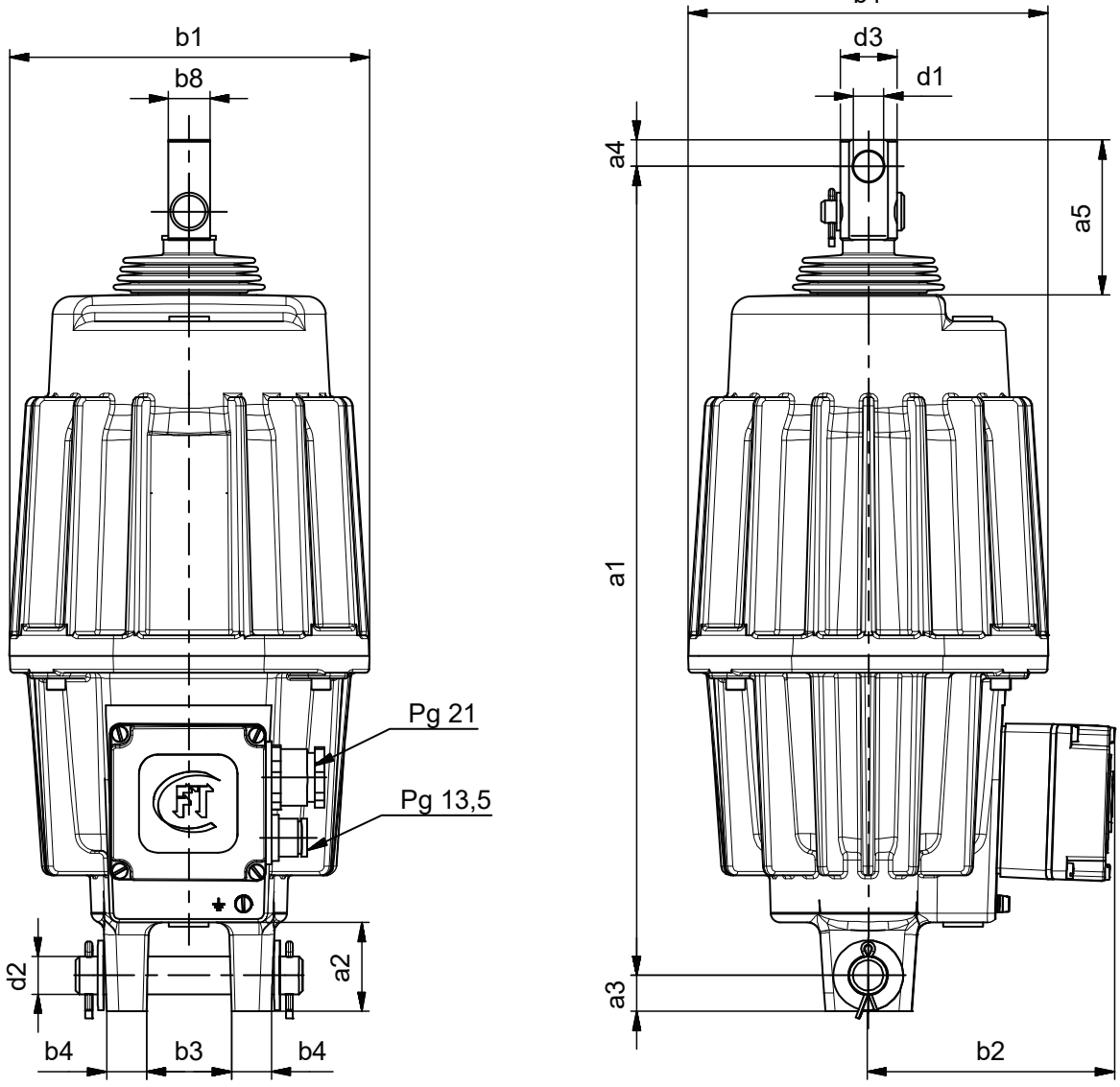


Foot bolt horizontal



Foot bolt vertical

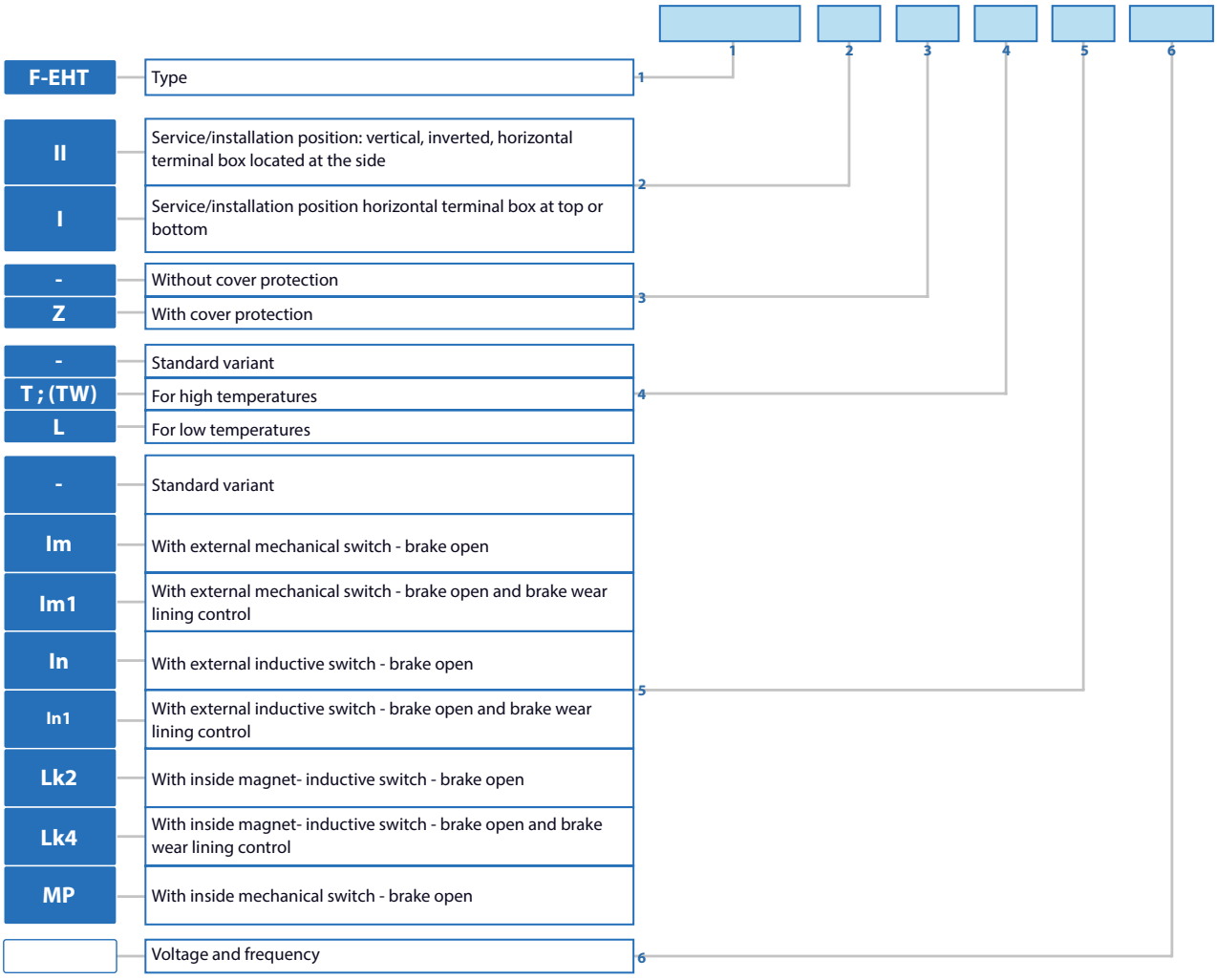
INSTALLATION DRAWING



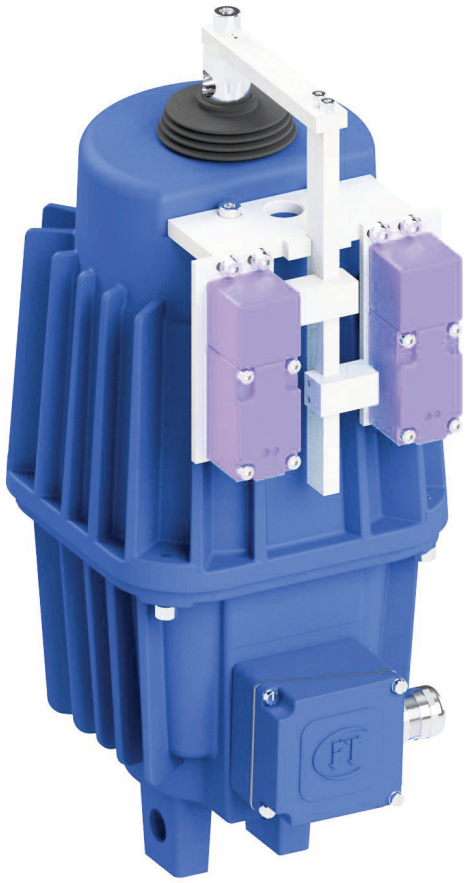
INSTALLATION DIMENSIONS:

DIMENSIONS / SIZE	$a1^{+1}$	$a2^{+1}$	$a3^{+1}$	$a4^{+0.2}$	a5	$b1^{+1}$	$b2^{+1}$	$b3^{+1}$	$b4^{+1}$	$b8^{-0.2}$	$d1^{F9}$	$d2^{h11}$	$d3^{+0.2}$
1	400	50	20	15	75	152	125	40	15	22	16	20	30
2	420	50	20	15	75	182	130	40	15	22	16	20	30
3	557	55	25	19	153	210	140	40	20	25	20	25	35
3.1	582	55	25	19	178	210	140	40	20	25	20	25	35
3.2	702	55	25	19	194	210	140	40	20	25	20	25	35
4	582	55	25	19	92	255	150	40	20	25	20	25	35
4.1	702	55	25	19	104	255	150	40	20	25	20	25	35

ORDER INSTRUCTION



ELECTROHYDRAULIC THRUSTERS F-EHT 338 to 2960



TECHNICAL CHARACTERISTICS OF DEVICES

Size	Type	Nom. stroke	Nominal pushing force	Nominal return force	Power	Mass	Lifting time	Lowering time
		mm	N	N	W	kg	s	s
3	F-EHT 338	75	450	0	350	24	0.6	0.7
3-F	F-EHT 338 F	50	450	420	350	24	0.6	0.7
3	F-EHT 375	50	750	0	350	24	0.5	0.55
3-F	F-EHT 375 F	50	750	700	350	24	0.5	0.55
3.1	F-EHT 900	120	750	0	350	24	1	0.7
4	F-EHT 1110	60	1850	0	500	40.5	0.8	0.6
4-F	F-EHT 1110-F	60	1850	1750	500	40.5	0.8	0.6
5	F-EHT 2960	160	1850	0	500	49	1.8	1.1

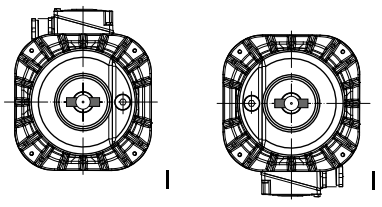
F *with return springs*

			Standard variant	For high temperatures			For low temperatures
	Symbol		-	T	TW06	TW07	L
Environment temperature	maximum		+40ºC	+45ºC	+60ºC	+70ºC	+40ºC
	minimum		-25ºC	-25ºC	-10ºC	-10ºC	-45ºC
Hydraulic fluid - oil type			Insulation oil NYNAS NYTRO 4000X				AEROSHELL FLUID 41
Voltage and motor frequency			3 x 400V 50Hz				
Duty of device			2.000 cycles/h or ED 100% (S1)		350 cycles/h or ED 35% (S3)	250 cycles/h or ED 25% (S3)	2.000 cycles/h or ED 100% (S1)
Mechanical protection			IP 66				
Variant on customer request	Voltage of electromotor		od 200V do 660V				
	Frequency		od 42Hz do 60Hz				
	Work control	Mechanical switch	Im	External mechanical control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 2,5A; external IP65: The guaranteed activation point is max. 0,3mm from the maximum position of the activated thruster
			Im1	External mechanical control sensor signals that the brake is raised (open) and brake lining are worn			
			MP	Internal mechanical control sensor signals that the brake is raised (open)			
		Inductive switch	In	External inductive control sensor signals that the brake is raised (open)			Voltage 15...250V AC 500 mA 45...65 Hz NO/NC
			In1	External inductive control sensor signals that the brake is raised (open) and brake lining are worn			
		Magnetic-inductive switch	Lk2	Internal control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 0,5A; The guaranteed activation point is max. 5mm from the maximum position of the activated thruster
			Lk4	Internal control sensor signals that the brake is raised (open) and brake lining are worn			

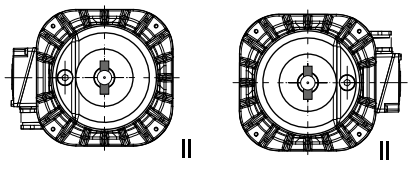
NOTES:

- Nominal pushing force for the device without a spring, is a declared force on the piston rod in the output direction. Maximum pushing force is ~ 50% higher. In devices with spring it is reduced by force springs.
- Nominal return force is a force of the spring for returning the piston rod and this information related to the 1/3 piston rod stroke. Tolerance is ±10%.
- The weight of the device and oil are approximate (depending on additional equipment).
- Time of lifting and lowering is related to a variant of the device without irreversible valve with built-in springs, i.e. with the corresponding external load. Tolerance is ±10%. In devices with built-in non return valve min. lifting and lowering time is greater for ~ 25%, while by the wring screw (13) can be continuously adjusted up to a maximum of 3- 5s for a stroke rate 50-60mm, 8-12s for the stroke rate 100 mm and 10-15s for the stroke rate 160mm.
- Nominal power and current refer to temperature of the device 20°C. Lowering temperature causes an increase in oil viscosity, in which case the nominal value of the power and current are growing and can be up to 50% higher.

POSITION OF TERMINAL BOX WHEN THE DEVICE WORKS IN A HORIZONTAL POSITION

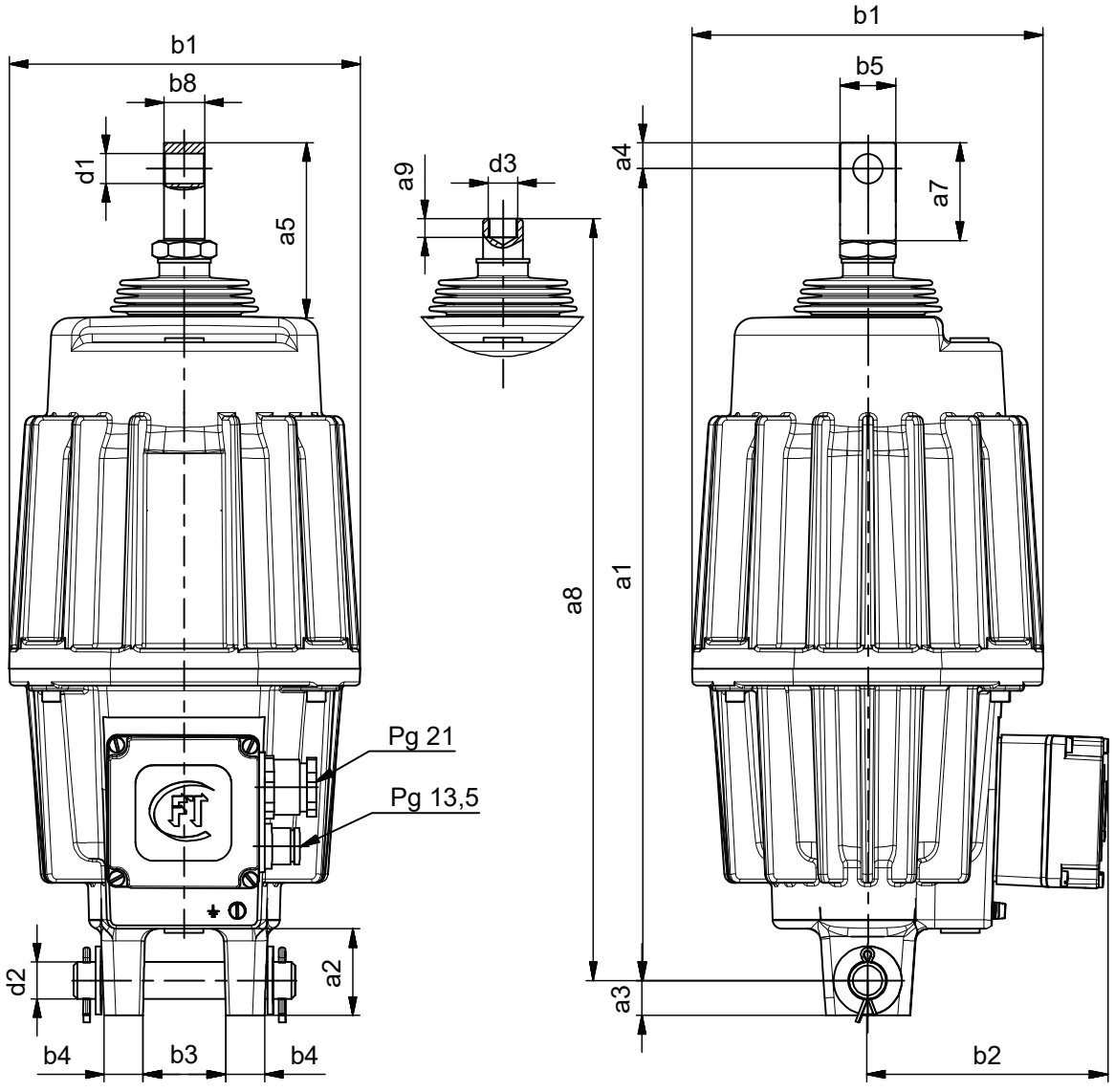


Foot bolt horizontal



Foot bolt vertical

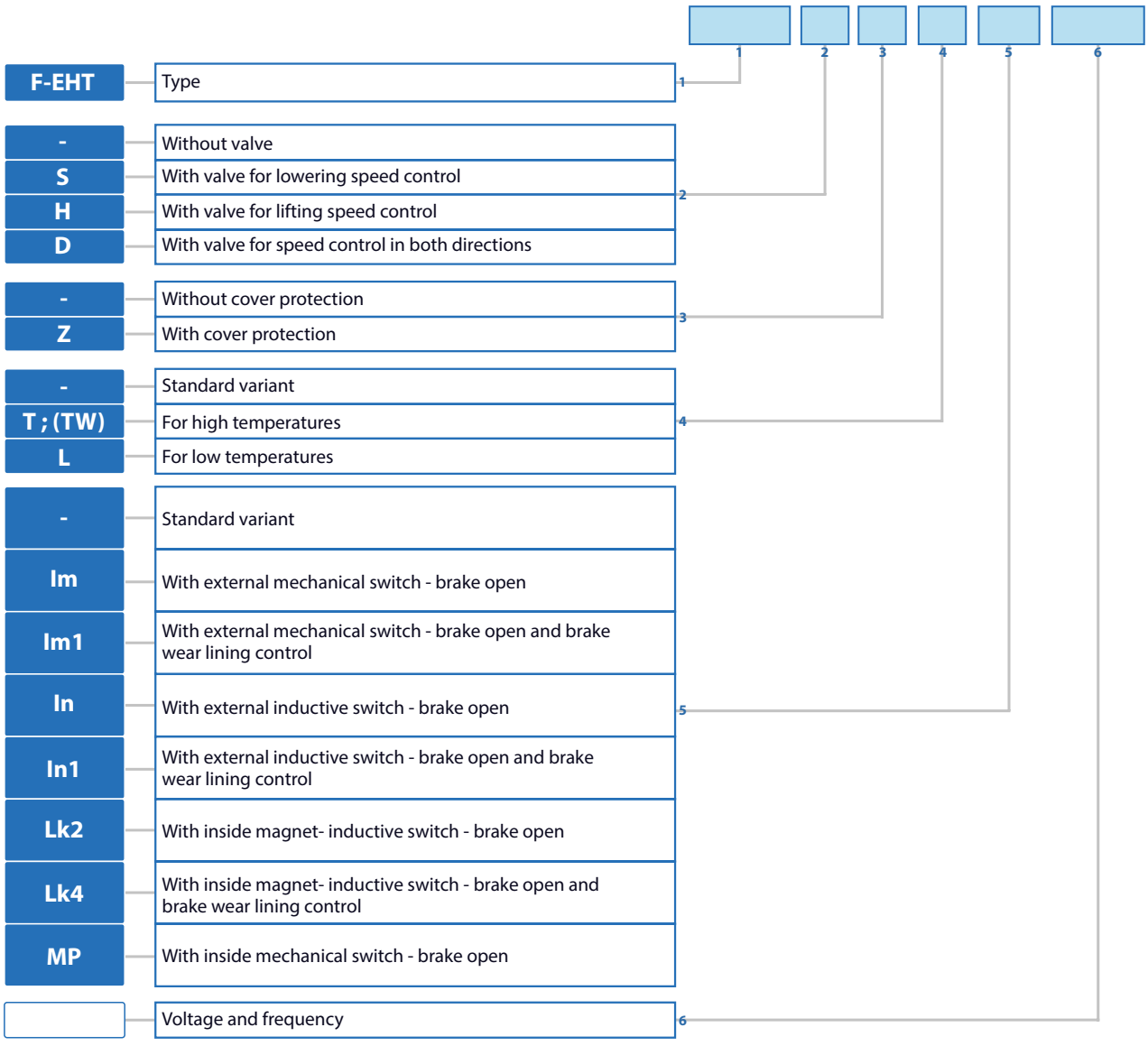
INSTALLATION DRAWING



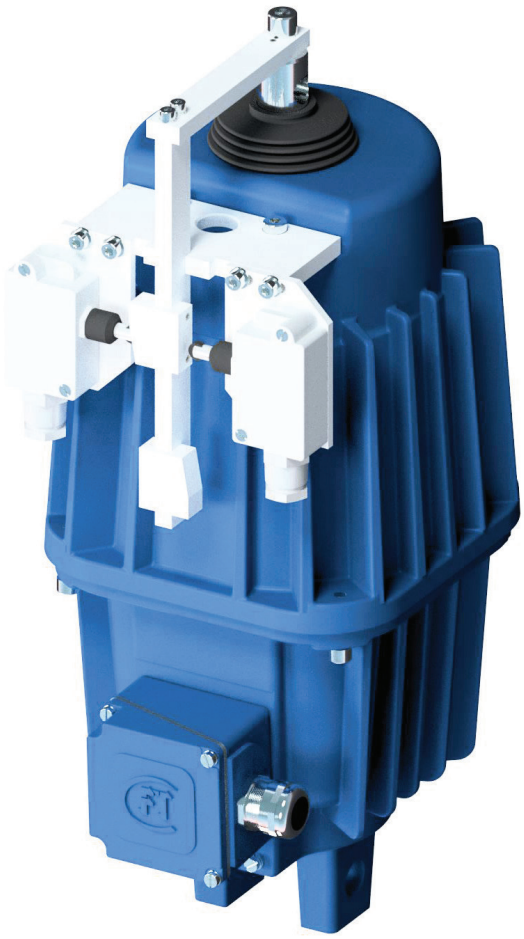
INSTALLATION DIMENSIONS:

DIMENSIONS / SIZE	a1	a2^{+1}	a3^{+1}	a4$^{+0.2}$	a5	a7$^{+0.2}$	a8^{+1}	a9$^{+0.2}$	b1^{+1}	b2^{+1}	b3^{+1}	b4^{+1}	b5$^{+0.2}$	b8$^{-0.2}$	d1^{F9}	d2^{h11}	d3
3	509	50	22	14	100	30			210	140	60	30	34	22	16	24	
3.1	609	50	22	15	96	57			210	140	60	30	34	25	16	24	
4	600	60	24	23	113	70			250	150	80	32	40	40	25	27	
5	700	60	24	23	105	70			255	150	80	32	40	40	25	27	
3-F		50	22				480	30	210	140	60	25				24	M16x1,5
4-F		60	24				568	30	255	150	80	32				27	M16x1,5

ORDER INSTRUCTION



ELECTROHYDRAULIC THRUSTERS F-SZH 45 and F-SZH 185



TECHNICAL CHARACTERISTICS OF DEVICES

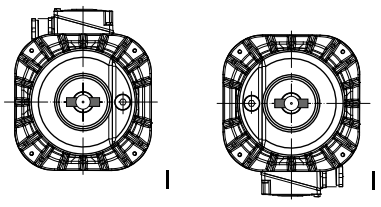
Size	Type	Nom. stroke	Nominal pushing force	Nominal return force	Power	Mass	Lifting time	Lowering time
		mm	N	N	W	kg	s	s
3	F-SZH 45/50	60	800	0	350	24	0.5	0.55
4	F-SZH 185/60	60	2500	0	500	40.5	0.7	0.6
5	F-SZH 185/120	120	2500	0	500	48	1.4	0.9

			Standard variant	For high temperatures			For low temperatures
	Symbol		-	T	TW06	TW07	L
Environment temperature	maximum		+40ºC	+45ºC	+60ºC	+70ºC	+40ºC
	minimum		-25ºC	-25ºC	-10ºC	-10ºC	-45ºC
Hydraulic fluid - oil type			Insulation oil NYNAS NYTRO 4000X				AEROSHELL FLUID 41
Voltage and motor frequency			3 x 400V 50Hz				
Duty of device			2.000 cycles/h or ED 100% (S1)		350 cycles/h or ED 35% (S3)	250 cycles/h or ED 25% (S3)	2.000 cycles/h or ED 100% (S1)
Mechanical protection			IP 66				
Variant on customer request	Voltage of electromotor		od 200V do 660V				
	Frequency		od 42Hz do 60Hz				
	Work control	Mechanical switch	Im	External mechanical control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 2,5A; external IP65: The guaranteed activation point is max. 0,3mm from the maximum position of the activated thruster
			Im1	External mechanical control sensor signals that the brake is raised (open) and brake lining are worn			
			MP	Internal mechanical control sensor signals that the brake is raised (open)			
		Inductive switch	In	External inductive control sensor signals that the brake is raised (open)			Voltage 15...250V AC 500 mA 45...65 Hz NO/NC
			In1	External inductive control sensor signals that the brake is raised (open) and brake lining are worn			
		Magnetic-inductive switch	Lk2	Internal control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 0,5A; The guaranteed activation point is max. 5mm from the maximum position of the activated thruster
			Lk4	Internal control sensor signals that the brake is raised (open) and brake lining are worn			

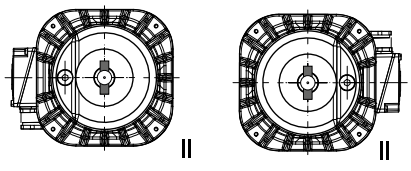
NOTES:

- Nominal pushing force for the device without a spring, is a declared force on the piston rod in the output direction. Maximum pushing force is ~ 50% higher. In devices with spring it is reduced by force springs.
- Nominal return force is a force of the spring for returning the piston rod and this information related to the 1/3 piston rod stroke. Tolerance is ±10%.
- The weight of the device and oil are approximate (depending on additional equipment).
- Time of lifting and lowering is related to a variant of the device without irreversible valve with built-in springs, i.e. with the corresponding external load. Tolerance is ±10%. In devices with built-in non return valve min. lifting and lowering time is greater for ~ 25%, while by the wring screw (13) can be continuously adjusted up to a maximum of 3- 5s for a stroke rate 50-60mm, 8-12s for the stroke rate 100 mm and 10-15s for the stroke rate 160mm.
- Nominal power and current refer to temperature of the device 20°C. Lowering temperature causes an increase in oil viscosity, in which case the nominal value of the power and current are growing and can be up to 50% higher.

POSITION OF TERMINAL BOX WHEN THE DEVICE WORKS IN A HORIZONTAL POSITION

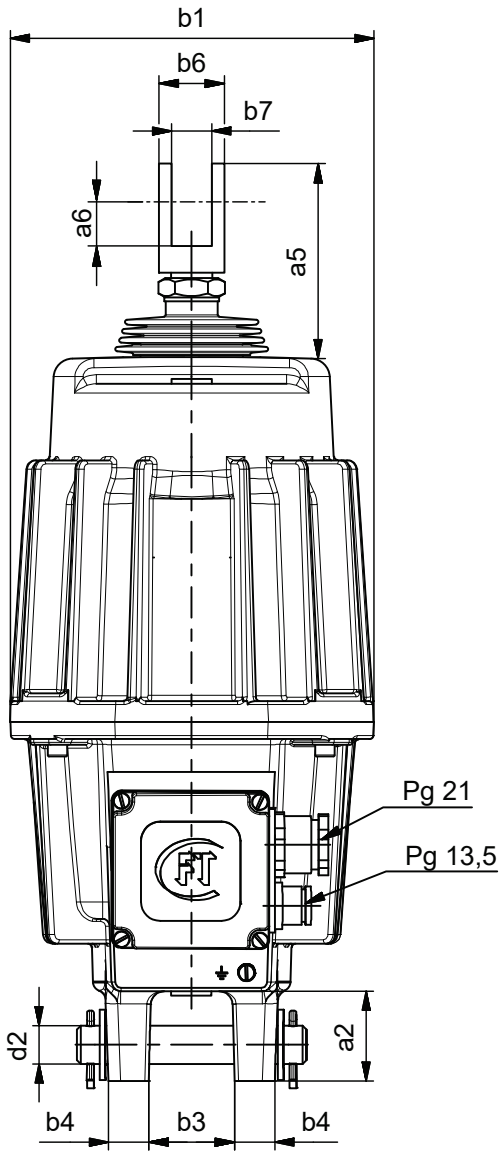


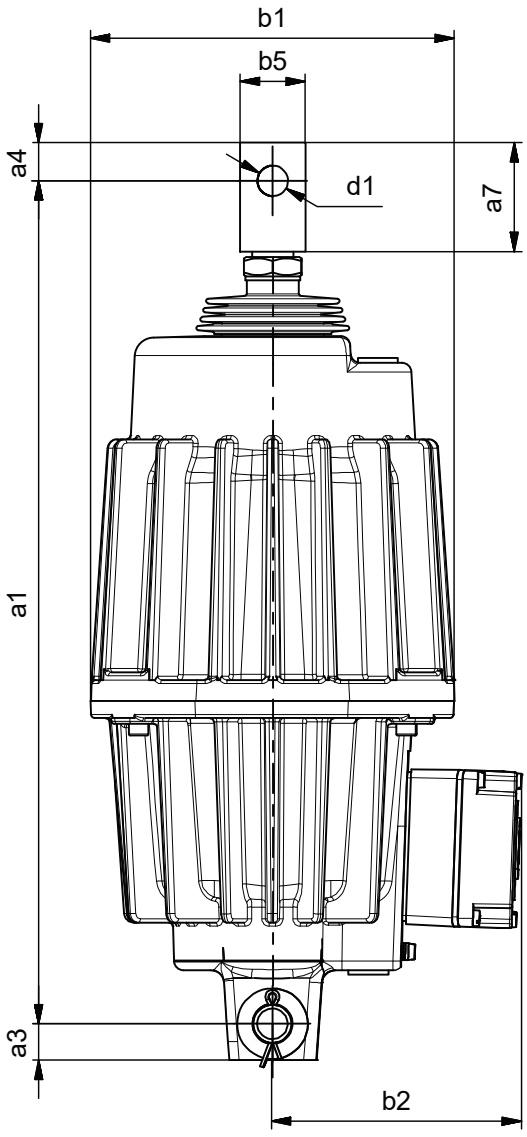
Foot bolt horizontal



Foot bolt vertical

INSTALLATION DRAWING



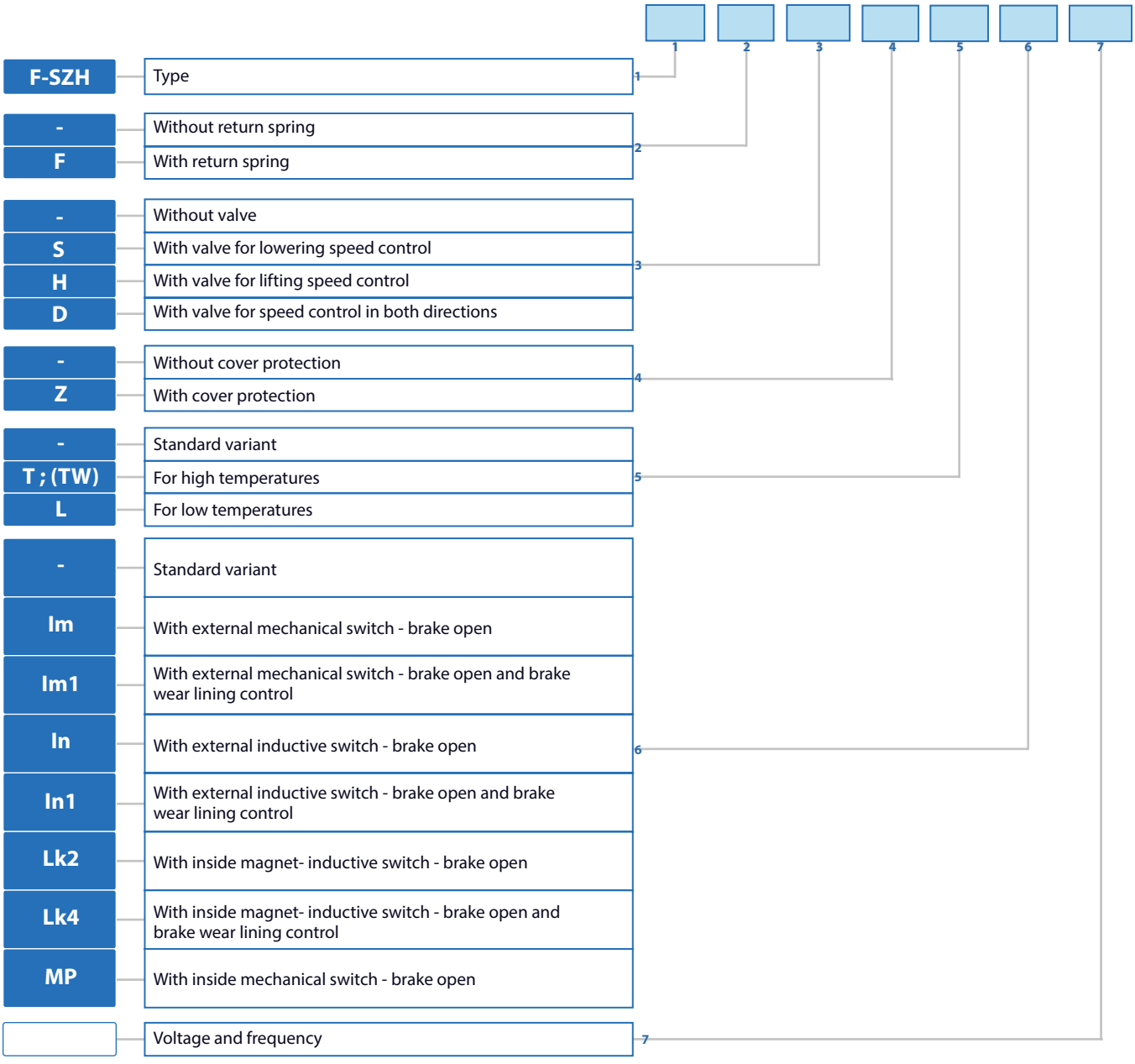


INSTALLATION DIMENSIONS:

DIMENSIONS / SIZE	a1*	a2^{+1}	a3^{+1}	a4$^{+0.2}$	a5*	a6$^{+0.2}$	a7$^{+0.2}$	b1^{+1}	b2^{+1}	b3^{+1}	b4^{+1}	b5$^{+0.2}$	b6$^{+0.2}$	b7$^{+0.2}$	d1^{F9}	d2^{h11}
3	509	50	22	15	97	32	57	210	140	60	25	34	39	21	16	24
4	757	60	24	23	358	34	70	255	150	84	31	40	60	36	22	24
5	757	60	24	23	160	34	70	255	150	84	31	40	60	36	22	24

** Adjust the range ± 10mm*

ORDER INSTRUCTION



ELECTROHYDRAULIC THRUSTERS F- TGM

TECHNICAL CHARACTERISTICS OF DEVICES

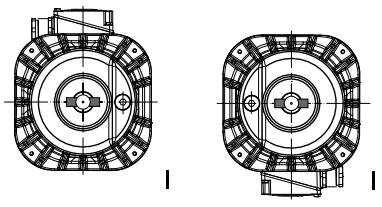
Size	Type	Nom. stroke	Nominal pushing force	Nominal return force	Power	Current	Mass	Lifting time	Lowering time
		mm	N	N	W	A	kg	s	s
1	F-TGM 25	32	300	0	150	0,50	11.3	0,35	0,45
2	F-TGM 50	50	500	0	200	0,55	15.1	0,45	0,50

			Standard variant	For high temperatures			For low temperatures
		Symbol	-	T	TW06	TW07	L
Environment temperature		maximum	+40ºC	+45ºC	+60ºC	+70ºC	+40ºC
		minimum	-25ºC	-25ºC	-10ºC	-10ºC	-45ºC
Hydraulic fluid - oil type			Insulation oil NYNAS NYTRO 4000X				AEROSHELL FLUID 41
Voltage and motor frequency			3 x 400V 50Hz				
Duty of device			2.000 cycles/h or ED 100% (S1)		350 cycles/h or ED 35% (S3)	250 cycles/h or ED 25% (S3)	2.000 cycles/h or ED 100% (S1)
Mechanical protection			IP 66				
Variant on customer request	Voltage of electromotor		od 200V do 660V				
	Frequency		od 42Hz do 60Hz				
	Work control	Mechanical switch	Im	External mechanical control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 2,5A; external IP65: The guaranteed activation point is max. 0,3mm from the maximum position of the activated thruster
			Im1	External mechanical control sensor signals that the brake is raised (open) and brake lining are worn			
			MP	Internal mechanical control sensor signals that the brake is raised (open)			
		Inductive switch	In	External inductive control sensor signals that the brake is raised (open)			Voltage 15...250V AC 500 mA 45...65 Hz NO/NC
			In1	External inductive control sensor signals that the brake is raised (open) and brake lining are worn			
		Magnetic-inductive switch	Lk2	Internal control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 0,5A; The guaranteed activation point is max. 5mm from the maximum position of the activated thruster
			Lk4	Internal control sensor signals that the brake is raised (open) and brake lining are worn			

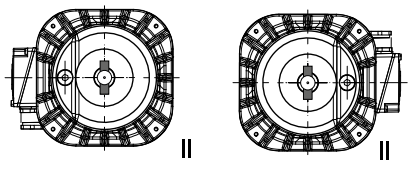
NOTES:

- Nominal pushing force for the device without a spring, is a declared force on the piston rod in the output direction. Maximum pushing force is ~ 50% higher. In devices with spring it is reduced by force springs.
- Nominal return force is a force of the spring for returning the piston rod and this information related to the 1/3 piston rod stroke. Tolerance is ±10%.
- The weight of the device and oil are approximate (depending on additional equipment).
- Time of lifting and lowering is related to a variant of the device without irreversible valve with built-in springs, i.e. with the corresponding external load. Tolerance is ±10%. In devices with built-in non return valve min. lifting and lowering time is greater for ~ 25%, while by the wring screw (13) can be continuously adjusted up to a maximum of 3- 5s for a stroke rate 50-60mm, 8-12s for the stroke rate 100 mm and 10-15s for the stroke rate 160mm.
- Nominal power and current refer to temperature of the device 20°C. Lowering temperature causes an increase in oil viscosity, in which case the nominal value of the power and current are growing and can be up to 50% higher.

POSITION OF TERMINAL BOX WHEN THE DEVICE WORKS IN A HORIZONTAL POSITION



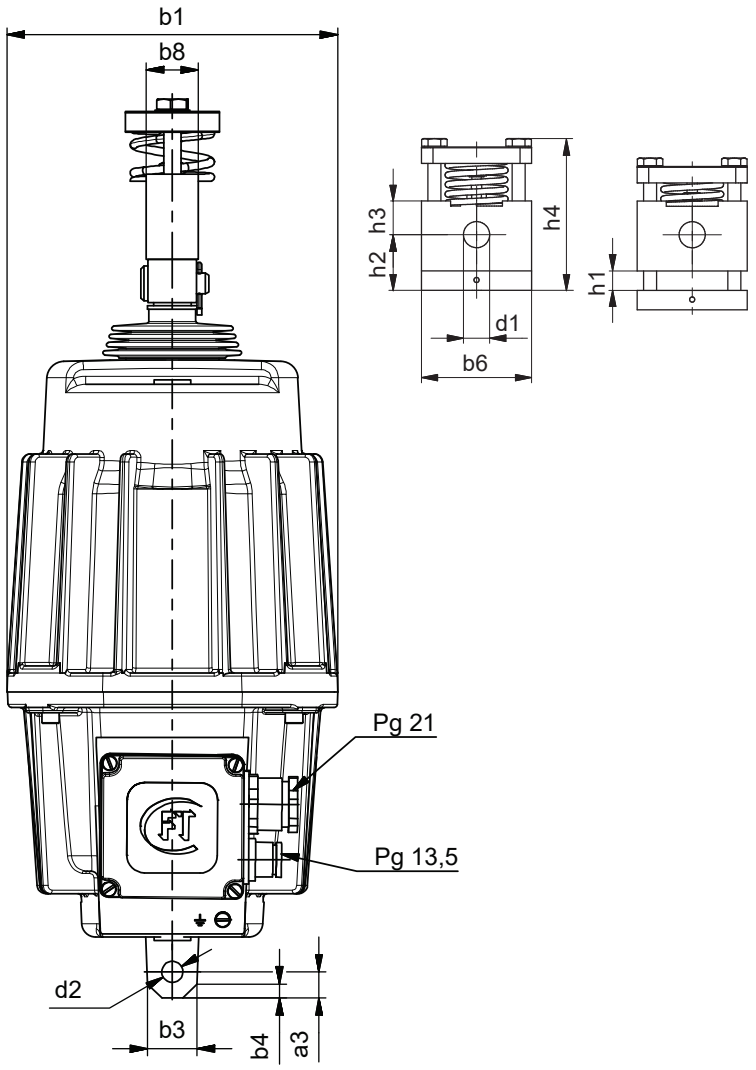
Foot bolt horizontal



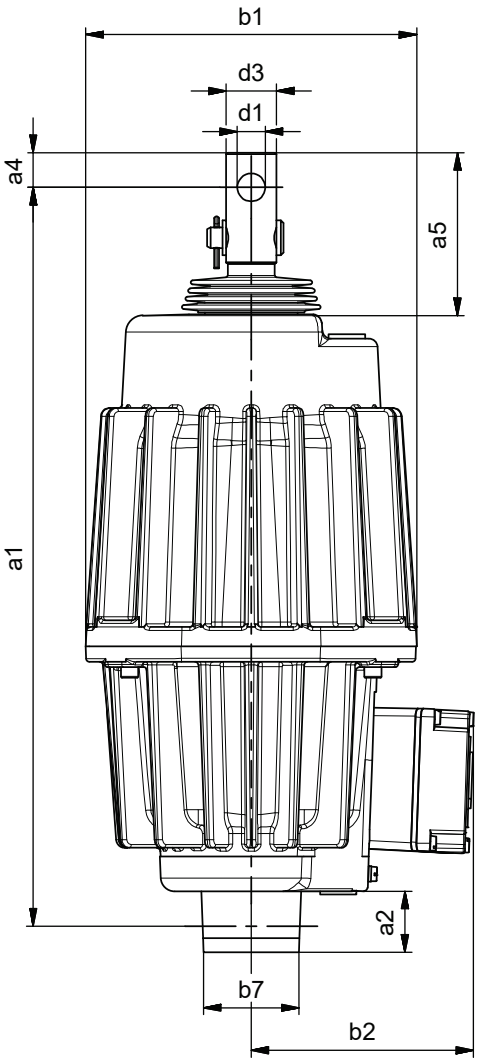
Foot bolt vertical

INSTALLATION DRAWING

VARIANT WITH SHOCK ABSORBER - R



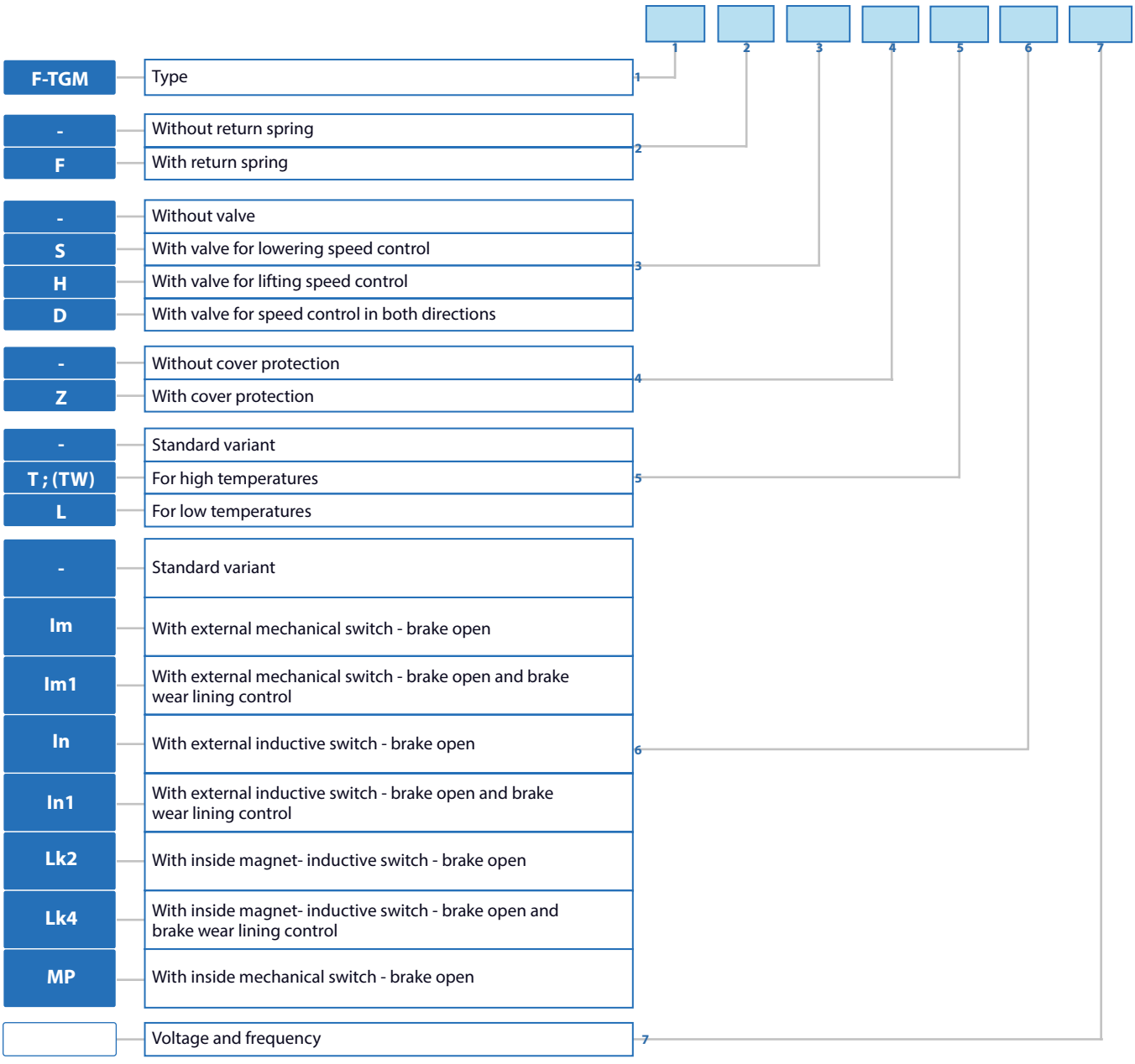
VARIANT WITHOUT SHOCK ABSORBER - R



INSTALLATION DIMENSIONS:

DIMENSIONS / SIZE	a1^{+1}	a2^{+1}	a3^{+1}	a4$^{+0,2}$	a5	b1^{+1}	b2^{+1}	b3^{+2}	b4$^{+0,5}$	b5	b6	b7	b8$^{-0,2}$	h1	h2	h3	h4	d1^{F9}	d2$^{+0,1}$	d3$^{-0,1}$
1	349	39	15	13	32	152	125	30	10			60	16					12	12,2	20
2	400	47	17	16	60	182	130	35	12	78	68	60	25	20	36	20	100	16	16,2	32

ORDER INSTRUCTION



ELECTROHYDRAULIC THRUSTERS F-REH and F-R

TECHNICAL CHARACTERISTICS OF DEVICES

Size	Type	Nom. stroke	Nominal pushing force	Nominal return force	Power	Current	Mass	Lifting time	Lowering time
		mm	N	N	W	A	kg	s	s
1	F-R 12/5 F-R 12/5 c F-R 20/5 F-R 20/5 c	50	200	0 120 0 200	150	0,50	11.3	0,55	0,65
1.1	F-REH 12/50 N5H F-REH 12/50 N5C F-REH 20/50 N5H F-REH 20/50 N5C	50	200	0 200 0 200	150	0,50	11.3	0,55	0,65
2	F-R 32/5 F-R 32/5 c F-R 50/5 F-R 50/5 c	50	500	0 330 0 485	200	0,55	15.1	0,55	0,65
2.1	F-REH 32/50 N5H F-REH 32/50 N5C F-REH 50/50 N5H F-REH 50/50 N5C	50	500	0 330 0 485	200	0,55	15.1	0,55	0,65
3	F-R 80/6 F-R 80/6 c F-R 125/6 F-R 125/6 c	60	800 800 1250 1250	0 780 0 1180	350 350 400 400	0,60	24	0,55 0,55 0,65 0,65	0,60 0,60 0,60 0,60
3.1	F-REH 80/60 N5H F-REH 80/60 N5C	60	800	0 780	350	0,60	24	0,55	0,60
3.3	F-REH 80/120 N5H	120	800	0	350	0,6	28	0,90	0,80
3.2	F-REH 125/60 N5H F-REH 125/60 N5C	60	1250	0 1180	400	0,60	24	0.65	0.6
4	F-REH 200/60 N5H F-REH 200/60 N5C	60	2500	0 2000	500	0,80	40.5	0,70	0.6
5	F-REH 320/60 N5H F-REH 320/60 N5C	60	3200	0 2800	500	0,9	49	0,75	0.65
5.1	F-REH 320/120 N5H	120	3200	0	500	0,9	49	1,1	1.05

H *without return spring*

5 *electric supply 3x400V 50Hz*

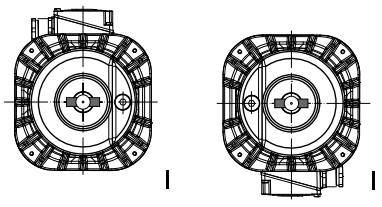
C(c) *without return spring*

			Standard variant	For high temperatures			For low temperatures
	Symbol		N	T	TW06	TW07	L
Environment temperature	maximum		+40ºC	+45ºC	+60ºC	+70ºC	+40ºC
	minimum		-25ºC	-25ºC	-10ºC	-10ºC	-45ºC
Hydraulic fluid - oil type			Insulation oil NYNAS NYTRO 4000X				AEROSHELL FLUID 41
Voltage and motor frequency			3 x 400V 50Hz				
Duty of device			2.000 cycles/h or ED 100% (S1)		350 cycles/h or ED 35% (S3)	250 cycles/h or ED 25% (S3)	2.000 cycles/h or ED 100% (S1)
Mechanical protection			IP 66				
Variant on customer request	Voltage of electromotor		od 200V do 660V				
	Frequency		od 42Hz do 60Hz				
	Work control	Mechanical switch	Im	External mechanical control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 2,5A; external IP65: The guaranteed activation point is max. 0,3mm from the maximum position of the activated thruster
			Im1	External mechanical control sensor signals that the brake is raised (open) and brake lining are worn			
			MP	Internal mechanical control sensor signals that the brake is raised (open)			
		Inductive switch	In	External inductive control sensor signals that the brake is raised (open)			Voltage 15...250V AC 500 mA 45...65 Hz NO/NC
			In1	External inductive control sensor signals that the brake is raised (open) and brake lining are worn			
		Magnetic-inductive switch	Lk2	Internal control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 0,5A; The guaranteed activation point is max. 5mm from the maximum position of the activated thruster
			Lk4	Internal control sensor signals that the brake is raised (open) and brake lining are worn			

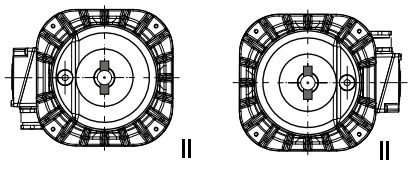
NOTES:

- Nominal pushing force for the device without a spring, is a declared force on the piston rod in the output direction. Maximum pushing force is ~ 50% higher. In devices with spring it is reduced by force springs.
- Nominal return force is a force of the spring for returning the piston rod and this information related to the 1/3 piston rod stroke. Tolerance is ±10%.
- The weight of the device and oil are approximate (depending on additional equipment).
- Time of lifting and lowering is related to a variant of the device without irreversible valve with built-in springs, i.e. with the corresponding external load. Tolerance is ±10%. In devices with built-in non return valve min. lifting and lowering time is greater for ~ 25%, while by the wring screw (13) can be continuously adjusted up to a maximum of 3- 5s for a stroke rate 50-60mm, 8-12s for the stroke rate 100 mm and 10-15s for the stroke rate 160mm.
- Nominal power and current refer to temperature of the device 20°C. Lowering temperature causes an increase in oil viscosity, in which case the nominal value of the power and current are growing and can be up to 50% higher.

POSITION OF TERMINAL BOX WHEN THE DEVICE WORKS IN A HORIZONTAL POSITION



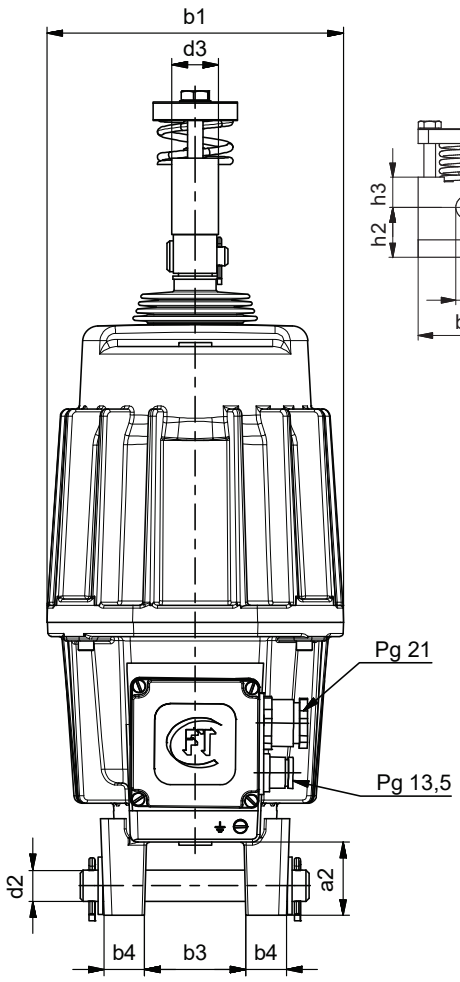
Foot bolt horizontal



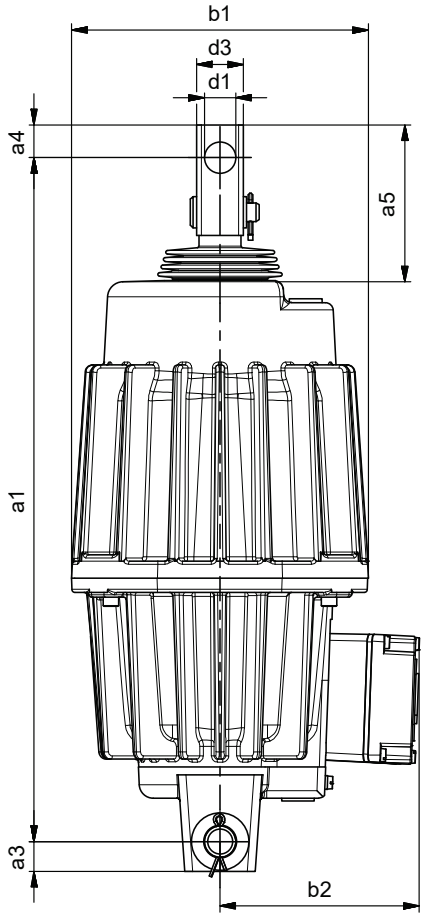
Foot bolt vertical

INSTALLATION DRAWING

VARIANT WITH SHOCK ABSORBER - R



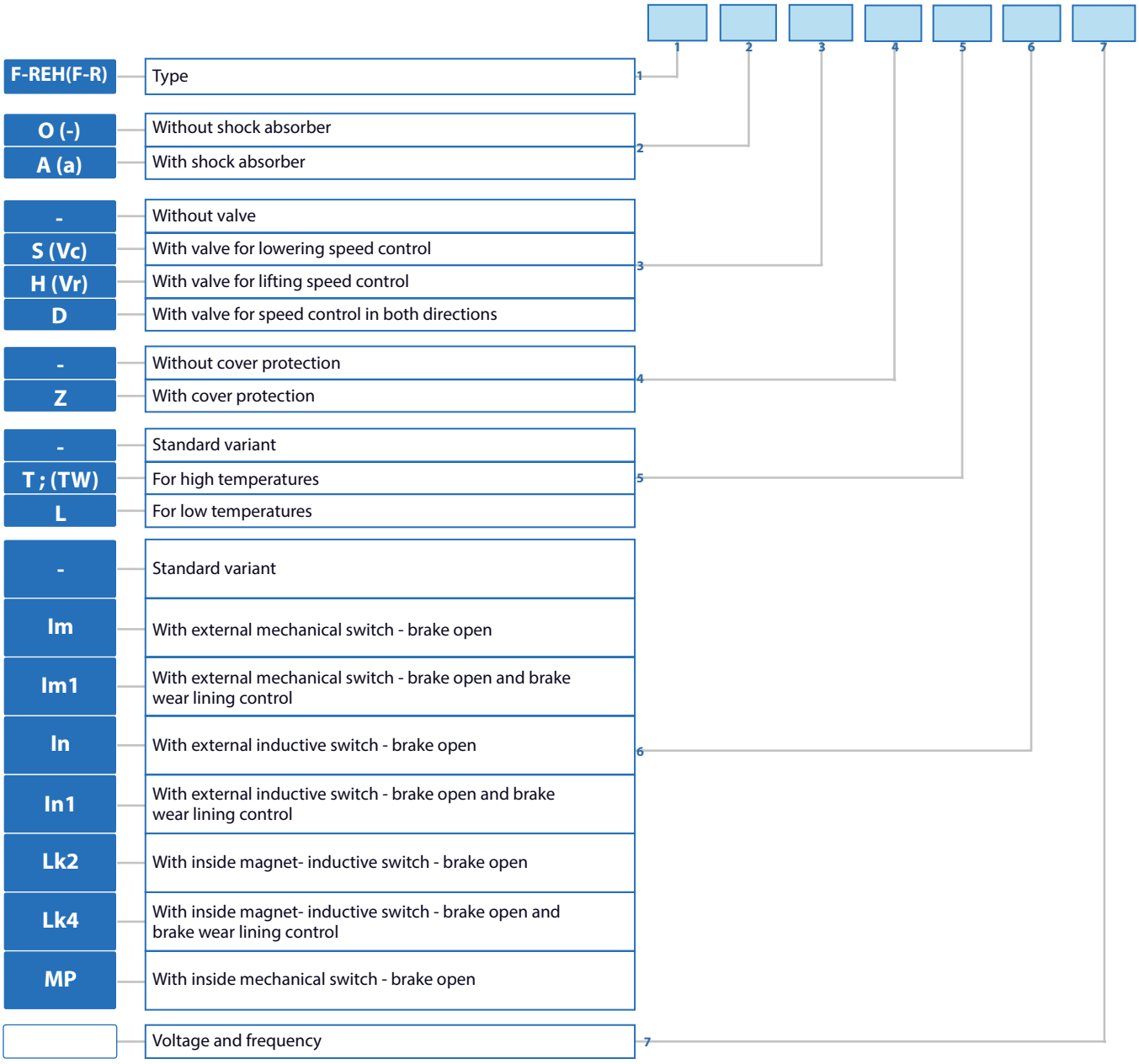
VARIANT WITHOUT SHOCK ABSORBER - R



INSTALLATION DIMENSIONS:

DIMENSIONS / SIZE	a1^{+1}	a2^{+1}	a3^{+1}	a4$^{+0.2}$	a5	b1^{+1}	b2^{+1}	b3^{+1}	b4^{+1}	b6	h1	h2	h3	h4	d1^{F9}	d2^{h11}	d3$^{+0.2}$
1	416	50	20	18	94	152	125	87	24	68	15	40	20	120	20	18	40
1.1	370	40	20	18	48	152	125	32	20	68	15	40	20	120	16	16	45
2	428	50	20	16	88	182	130	110	30	68	20	34	25	110	20	25	40
2.1	450	50	20	16	110	182	130	40	25	68	20	34	25	110	20	25	50
3	515	55	25	25	114	210	140	116	38	110	20	38	35	175	20	25	40
3.1	450	50	25	20	49	210	140	40	25	110	20	38	35	175	20	25	50
3.2	620	55	25	20	218	210	140	40	25	110	20	38	35	175	20	25	60
3.3	530	50	25	20	63	210	140	40	25	110	20	38	35	175	20	25	60
4	620	55	25	25	135	255	150	40	25	110	11	29	35	112,5	20	25	60
5	675	55	25	25	80	255	150	40	25	110	11	29	35	112,5	20	25	60
5.1	800	55	25	25	205	255	150	40	25	110	11	29	35	112,5	20	25	60

ORDER INSTRUCTION



ELECTROHYDRAULIC THRUSTERS F-Ed

TECHNICAL CHARACTERISTICS OF DEVICES

Size	Type	Nom. stroke	Nominal pushing force	Nominal return force	Power	Mass	Lifting time	Lowering time
		mm	N	N	W	kg	s	s
0	F-Ed 12/4.1	40	120	110*	200	13	0.30	0.30
0	F-Ed 23/5	50	220	180*	200	13	0.40	0.40
0	F-Ed 25/5	50	300	280*	200	13	0.40	0.40
1	F-Ed 30/5	50	300	280*	200	11.3	0.40	0.40
1.01	F-Ed 11 F-Ed 30/5.1	50	300	280*	200	11.3	0.40	0.40
2	F-Ed 50/6 F-Ed 21 F-Ed 50/6.2	60	500	485*	200	15.1	0.50	0.45
2.01	F-Ed 2 F-Ed 50/6.1	60	500	485*	200	15.1	0.50	0.45
2.1	F-Ed 50/12	120	500	0	200	17.2	0.80	0.60
3	F-Ed 80/6	60	800	780*	350	24	0.40	0.45
3.01	F-Ed 3 F-Ed 80/6.1	60	800	780*	350	24	0.40	0.45
3.1	F-Ed 80/12	120	800	0	350	28	0.65	0.50
3.1.01	F-Ed 4 F-Ed 80/12.1	120	800	0	350	28	0.65	0.50
3.2	F-Ed 125/6 F-Ed 121/6	60	1250	1200*	400	24	0.45	0.50
3.3	F-Ed 121/12	120	1250	0	400	28	0.85	0.70
3.3.01	F-Ed 125/12 F-Ed 121/12.1	120	1250	0	400	28	0.85	0.70
4	F-Ed 5 F-Ed 185/6	60	1850	1900*	500	40.5	0.55	0.40
4.1	F-Ed 6 F-Ed 185/16	160	1850	0	500	40.5	1.30	0.70
4.2	F-Ed 200/6 F-Ed 201/6	60	2500	2000*	500	40.5	0.55	0.40
4.3	F-Ed 201/12	120	2500	0	500	40.5	1.05	0.60
4.3.01	F-Ed 200/12 F-Ed 201/12.1	120	2500	0	500	40.5	1.05	0.60
5	F-Ed 301/6	60	3200	2700*	600	49	0.65	0.40
5.01	F-Ed 300/6 F-Ed 301/6.1	60	3200	2700*	600	49	0.65	0.40
5.1	F-Ed 301/12	120	3200	0	600	49	1.20	0.60
5.1.01	F-Ed 300/12 F-Ed 301/12.1	120	3200	0	600	49	1.20	0.60

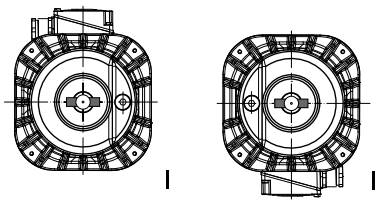
** Return force is related to the variant – "c". In the variant without spring return force is – "0"*

			Standard variant	For high temperatures			For low temperatures
		Symbol	-	T	TW06	TW07	L
Environment temperature		maximum	+40ºC	+45ºC	+60ºC	+70ºC	+40ºC
		minimum	-25ºC	-25ºC	-10ºC	-10ºC	-45ºC
Hydraulic fluid - oil type			Insulation oil NYNAS NYTRO 4000X				AEROSHELL FLUID 41
Voltage and motor frequency			3 x 400V 50Hz				
Duty of device			2.000 cycles/h or ED 100% (S1)		350 cycles/h or ED 35% (S3)	250 cycles/h or ED 25% (S3)	2.000 cycles/h or ED 100% (S1)
Mechanical protection			IP 66				
Variant on customer request	Voltage of electromotor		od 200V do 660V				
	Frequency		od 42Hz do 60Hz				
	Work control	Mechanical switch	Im	External mechanical control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 2,5A; external IP65: The guaranteed activation point is max. 0,3mm from the maximum position of the activated thruster
			Im1	External mechanical control sensor signals that the brake is raised (open) and brake lining are worn			
			MP	Internal mechanical control sensor signals that the brake is raised (open)			
		Inductive switch	In	External inductive control sensor signals that the brake is raised (open)			Voltage 15...250V AC 500 mA 45...65 Hz NO/NC
			In1	External inductive control sensor signals that the brake is raised (open) and brake lining are worn			
		Magnetic-inductive switch	Lk2	Internal control sensor signals that the brake is raised (open)			Voltage 24...250V AC/DC; current 0,5A; The guaranteed activation point is max. 5mm from the maximum position of the activated thruster
			Lk4	Internal control sensor signals that the brake is raised (open) and brake lining are worn			

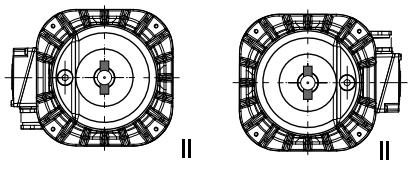
NOTES:

- Nominal pushing force for the device without a spring, is a declared force on the piston rod in the output direction. Maximum pushing force is ~ 50% higher. In devices with spring it is reduced by force springs.
- Nominal return force is a force of the spring for returning the piston rod and this information related to the 1/3 piston rod stroke. Tolerance is ±10%.
- The weight of the device and oil are approximate (depending on additional equipment).
- Time of lifting and lowering is related to a variant of the device without irreversible valve with built-in springs, i.e. with the corresponding external load. Tolerance is ±10%. In devices with built-in non return valve min. lifting and lowering time is greater for ~ 25%, while by the wring screw (13) can be continuously adjusted up to a maximum of 3- 5s for a stroke rate 50-60mm, 8-12s for the stroke rate 100 mm and 10-15s for the stroke rate 160mm.
- Nominal power and current refer to temperature of the device 20°C. Lowering temperature causes an increase in oil viscosity, in which case the nominal value of the power and current are growing and can be up to 50% higher.

POSITION OF TERMINAL BOX WHEN THE DEVICE WORKS IN A HORIZONTAL POSITION



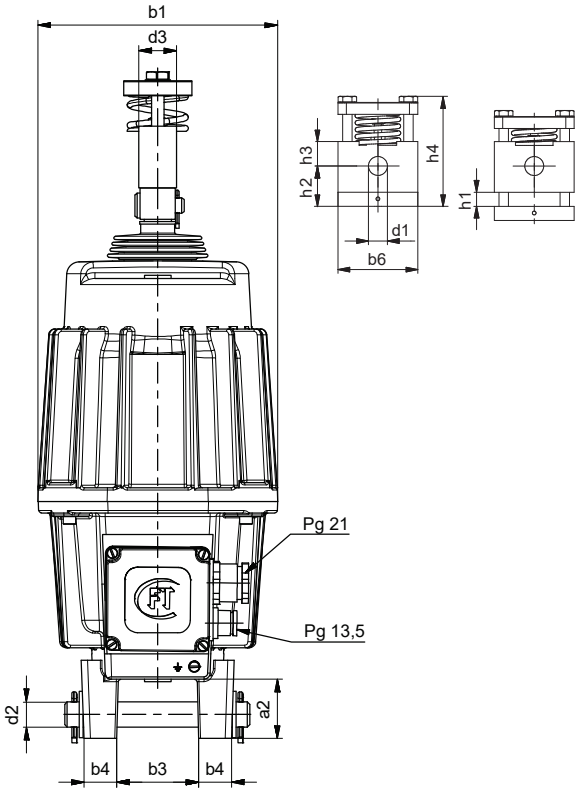
Foot bolt horizontal



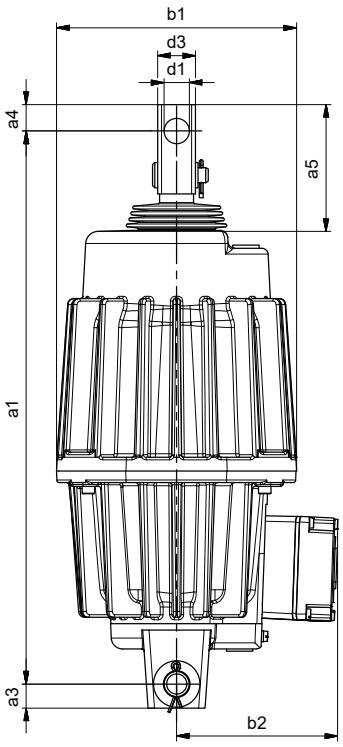
Foot bolt vertical

INSTALLATION DRAWING

VARIANT WITH SHOCK ABSORBER - R



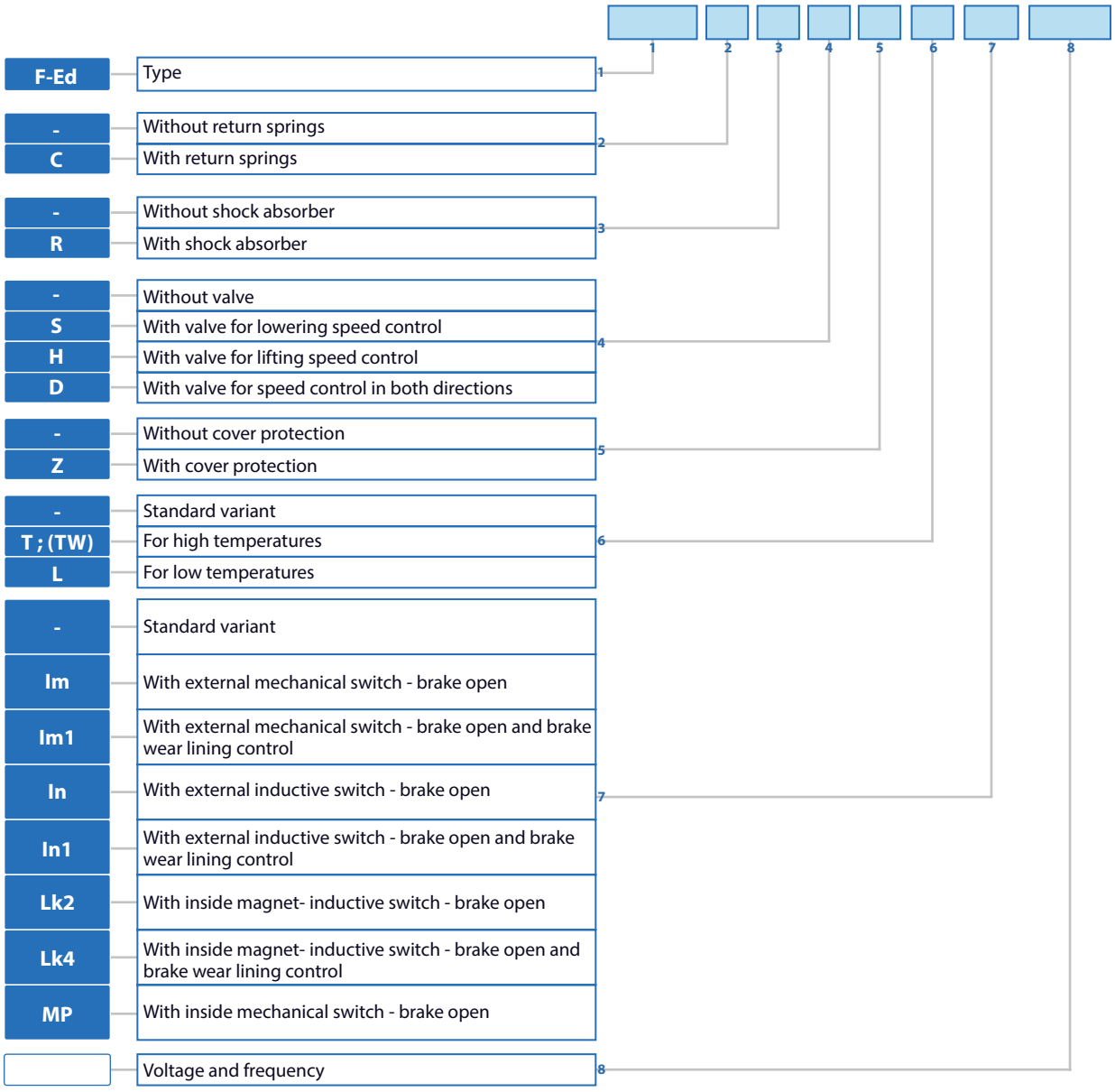
VARIANT WITHOUT SHOCK ABSORBER - R



INSTALLATION DIMENSIONS:

DIMENSIONS / SIZE	a1±1	a2+1	a3+1	a4±0,2	a5	b1±1	b2±1	b3±1	b4±1	b5	b6	h1	h2	h3	h4	d1F9	d2h11	d3±0,2
0	286	33	15	12	38	140	139	40	20	78	68	15	35	20	75	12	16	20
1	370	40	16	14	49	152	125	40	20	78	68	15	35	20	75	16	16	25
1.01	433				112													
2	435	50	20	20	93	182	130	60	30	78	68	20	35	20	100	20	20	30
2.01	511				169													
2.1	515	50	22	18	113	182	130	60	30	/	/	/	/	/	/	20	20	30
3	450	55	25	18	52	210	140	60	30	78	68	20	35	20	100	20	20	30
3.01	509				111													
3.1	530	55	25	20	25	210	140	60	30	/	/	/	/	/	/	20	20	30
3.1.01	606				101													
3.2	645	55	25	20	241	210	140	40	25	116	110	20	40	35	175	25	25	40
3.3	705	55	25	20	197	210	140	40	25	/	/	/	/	/	/	25	25	40
3.3.01	765				257													
4	600	65	25	24	120	255	150	80	40	116	110	11	29	35	112.5	25	27	40
4.1	700	65	25	24	97	255	150	80	40	/	/	/	/	/	/	25	27	40
4.2	645	55	25	24	159	250	150	40	25	116	110	11	29	35	112.5	25	25	40
4.3	705	55	25	24	122	255	150	40	25	/	/	/	/	/	/	25	25	40
4.3.01	765				182													
5	645	55	25	24	52	255	150	40	25	116	110	11	29	35	112.5	25	25	40
5.01	680				87													
5.1	705	55	25	24	112	255	150	40	25	/	/	/	/	/	/	25	25	40
5.1.01	800				207													

ORDER INSTRUCTION



FLUIDOTEHNIC
PRIVREDNO DRUŠTVO ZA PROIZVIDNJU PROMET I USLUGE D.O.O.

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Matični broj: 06568939
Šifra delatnosti: 2822
PIB: 100918689
Reg. broj: 11506568939
Br. Reg. Upisa: 1-14429-00

EC DECLARATION OF CONFORMITY / DECLARATION ON INSTALLATION

DEKLARACIJA O USAGLAŠENOSTI / DEKLARACIJA O UGRADNJI

We hereby declare that the following product

Izjavljujemo da su sledeći uređaji

ELECTROHYDRAULIC THRUSTER

ELEKTROHIDRAULIČNI PODIZAČI

ESM 12/50...ESM320/100 ; ESM 120-40...ESM 3200-100
F-EB 12/50...F-EB 320/100 ; F-EB 120-40...F-EB 3200-100
F-BL-12 . . . F-BL-320
F-EHT-12.5-50 . . . F-EHT-250-60 ; F-EHT-338 . . . F-EHT-2960
F-SZH 45/50 . . . F-SZH 185/120
F-TGM 25 . . . F-TGM 50
F-R 12/5 . . . F-REH 320/120 N5H
F-Ed 12/4.1 . . . F-Ed 301/12.1

Are designed and produced in accordance with the safety requirements according to the following regulations:

Projektovani i proizvedeni u skladu sa bezbednosnim zahtevima prema sledećim propisima:

Machinery Directive EC/2006/42
(Mašinska direktiva EC/2006/42)

Low voltage directive EC/2014/35
(Niskonaponska direktiva EC/2014/35)

in accordance with the following standards:
i u skladu sa sledećim standardima:
Safety of machinery - General principles for design
- Risk assessment and risk reduction EN ISO 12100:2010
Bezbednost mašina - Opšti principi za projektovanje
- Ocena rizika i smanjenje rizika SRPS ISO 12100:2014

Safety of machinery - Electrical equipment of machines - Part 1: EN 60204-1:2016
Bezbednost mašina - Električna oprema mašina - Deo 1: EN 60204-1:2016

Declaration on installation in the sense of EC Machinery Directive (2006/42/EC) Annex II B

Izjava o ugradnji u skladu sa EC Mašinskom direktivom (2006/42/EC) Anex II B

Electrohydraulic trusters of "FLUIDOTEHNIC" assemble into mechanical devices and equipement. Start-up is not admissible unless it has been verified that the whole equipment, meets the requirements defined in the EC machinery Directive (2006/42/EC)

Elektrohidraulični podizači "FLUIDOTEHNIC"-a se ugrađuju u drugu opremu i dodatne uređaje. Pokretanje nije dozvoljeno sve dok i relevantna oprema u koju se ugrađuju ne bude u skladu sa Mašinskom direktivom (2006/42/EC)

The manufacturer undertakes to supply the relevant information of incomplete machine on request to responsible inspector by electronic way. Technical documents of the machine is prepared in accordance with Annex VII, part B Machinery Directive (2006/42/EC)

Proizvođač se obavezuje da će elektronskim putem dostaviti odgovarajuće podatke o delimično završenoj mašini nadležnom inspektoru na njegov zahtev. Tehnička dokumentacija je izrađena u skladu sa Anexom 7, deo B Mašinske direktive.

Vrnjačka Banja, 01/02/2017 godine

Šljivić Miroslav, General Manager

The EC Declaration of Conformity is only valid in conjunction with confirmation that the device has been correctly applied, installed, inspected and maintained according to the operating instructions provided. The validity of the declaration will cease in case of any modification and/or supplement not previously approved by "FLUIDOTEHNIC".

Ova deklaracija o usaglašenosti važi samo u slučaju da je uređaj pravilno ugrađen, iskontrolisan i da se koristi i održava u skladu sa uputstvom za rukovanje i održavanje. Važenje izjave prestaje u slučaju bilo kakve modifikacije ili dodatka koji nisu prethodno odobreni od "FLUIDOTEHNIC"-a.

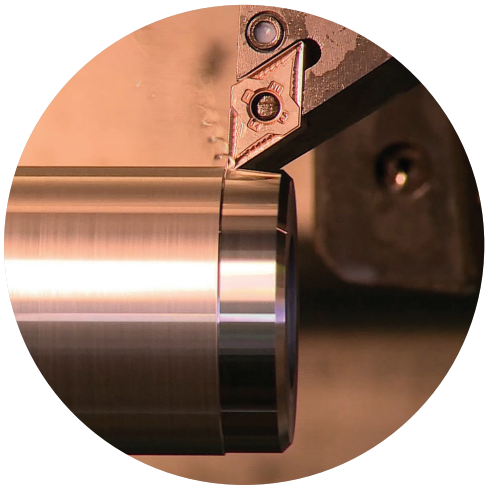
NOTES

- FLUIDOTEHNIC's production program is based on its own development. Thanks to that, all the products are the result of the engineering staff work, as well as the quality and skilled workers in manufacturing and installation. Each serial product during the conquest passes through the phase of prototype development, functional tests and check in real operating conditions. Following step is removal of all possible defects and then, based on that, test series is produced. This is how we achieve high quality of manufactured devices. In case of the individual production, after the functional testing, we deliver the product to the customer.

- Since its foundation FLUIDOTEHNIC Ltd. has been continuously investing both in the expansion of commercial building and the purchase of modern equipment for the production, control and techno-economic support. It is located in the industrial zone of Vrnjacka Banja, on a lot size ~ 2ha. It consists several buildings, connected into a functional whole area of 4000 m2. The whole complex is adjusted to the environment- we are taking good care of health, work safety and environmental protection.

- Market research, device development, technical assistance and personnel training free of charge for all our customers is the main task of this service. Many years of experience in the development tasks of hydraulics, pneumatics and lubrication techniques, as well as t the latest computer technology guarantee that our custumers will get the optimum technical solution. During the development, every device passes precisely defined procedure, starting from making the design concept, followed by manufacturing and testing prototypes and going into production.

- It consists of several facilities and departments: foundry of non-ferrous metals, mechanical drive, locksmith department, installation and technical control. All operations from the casting to the final machining are performed with the universal and software machines. Control and assembly is 100%. When the assembly is finished, each device is being tested on the test stand and on the basis of the results it gets the appropriate certificates and guarantees. On each call of the user, service teams come in as soon as possible, with spare parts and the necessary tools, regardless of whether the equipment is in warranty or out of warranty period.



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02/2018