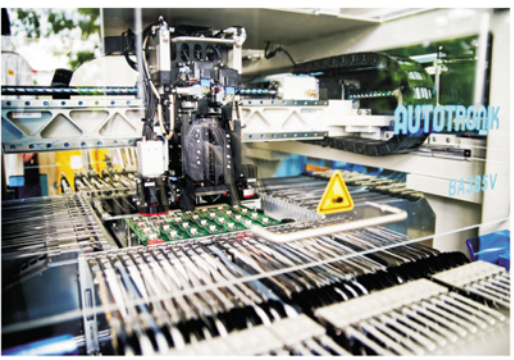
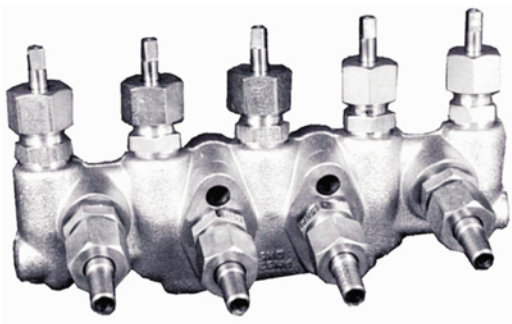
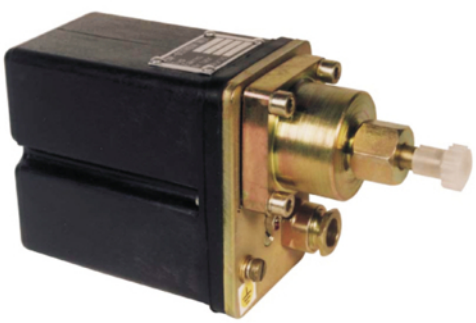
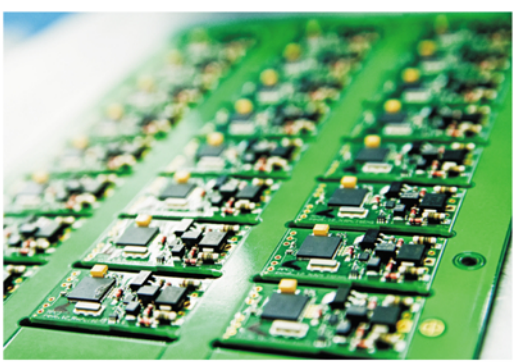
APLISENS

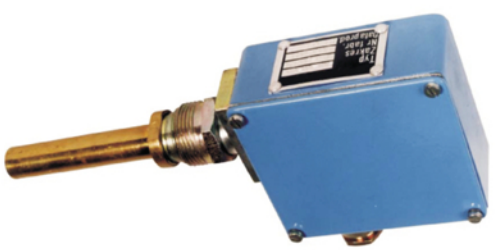
Product Catalogue 2014/2015
Controlmatica products

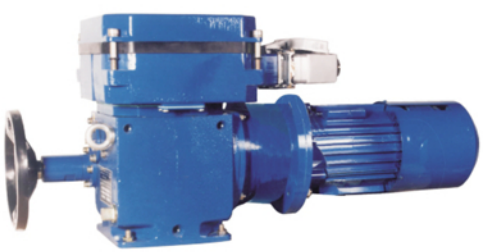


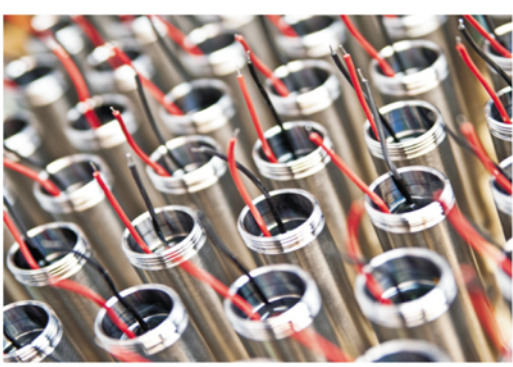












CONTROLMATICA®
ZAP PNEFAL

Chapters

I	Positioners
II	Manifolds
III	MAS type vessels
IV	Electric actuators
V	Switches
VI	Pneumatics
VII	Angular encoders

Chapter I

Positioners

A703.....I/2
A705.....I/4
A781.....I/6

PNEUMATIC POSITIONER type A703

THE PNEUMATIC POSITIONER type A703 IS DESIGNED FOR COOPERATION WITH MEMBRANE AND SPRING PNEUMATIC ACTUATORS. IT ASSURES QUICK AND PRECISE ACTUATOR MANDREL POSITION DETERMINING, AS WELL AS ACTUATOR USEFUL FORCE. THE MECHANICAL FEEDBACK ASSURES THE UNEQUIVOCAL ACTUATOR MANDREL POSITIONS, WHICH CORRESPOND THE PRESENT REGULATOR OUTPUT SIGNAL.

THE POSITIONER STRUCTURE ALLOWS USER FOR EASY OPERATION TYPE SELECTION: FORWARD OR REVERSE ACTION: DIRECT OR REVERSED ACTION (THE INPUT SIGNAL GROWTH CORRESPONDS TO OUTPUT SIGNAL GROWTH OR DECREASE).

POSITIONER HAS EQUIPMENT ALLOWS FOR:
*** ACHIEVING THE FULL RANGE OF OUTPUT SIGNAL AT THE HALF OF RANGE OF INPUT SIGNAL.**
*** CHANGING THE CONTROL SIGNAL CHARACTERISTIC IN INPUT SIGNAL FUNCTION**
*** REMOVING POSITIONER WITHOUT THE CONTROL VALVE OPERATION INTERRUPTION.**

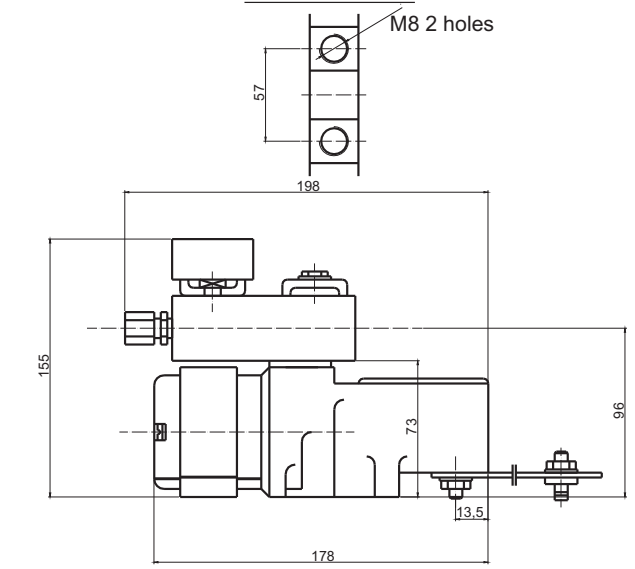
- reliable and simple in installation
- suitable for actuators Polna S.A., Masoneilan and others
- linear, accelerating and decelerating characteristics
- input signals dividing possibility

TECHNICAL DATA

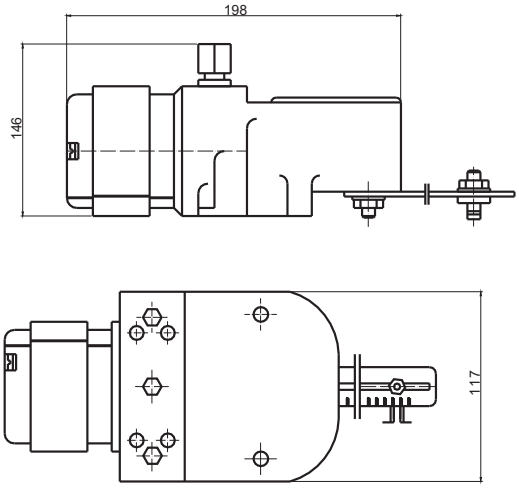
- input (control) signal	20…100 kPa; 20...60 kPa; 60...100 kPa
- supply pressure	140...600 kPa
- pneumatic output signal	0…100% of supply pressure
- cooperating actuator stroke	10…101,6 mm
- nonlinearity	<1,5% of input signal width
- hysteresis	<1% of input signal width
- sensitivity	<0,06% of input signal width
- operation characteristic	linear, accelerating, decelerating
- output delivery	min. 15...36 kg/h at supply pressure 140...600 kPa and input signal 60 kPa
- air own consumption	0.26...0.68 kg/h at supply pressure 140...600 kPa
- acceptable ambient temperature	-25°C...+70°C
- additional errors:	
from supply pressure changes of 10%	0,3% of input signal width
from temperature changes	0.5% /10°C
- humidity	5...100%
- cover protection rating	IP54
- pneumatic terminals	screwed holes 1/4” NPT or copper or polyethylene pipes ø6 or ø8 mm connectors
- operational position	arbitrary
- weight	1.8...3.8 kg, depending on version

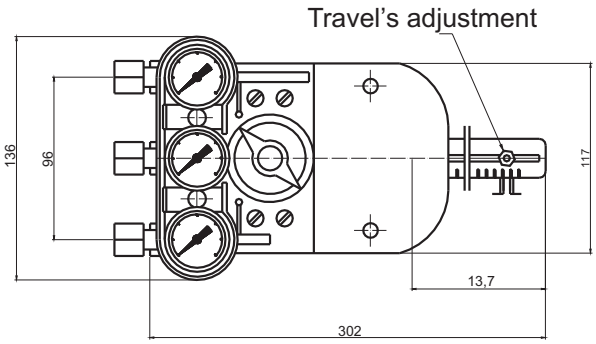
DIMENSIONAL DRAWINGS

POSITIONER WITH MANOMETERS AND SWITCH



POSITIONER WITHOUT MANOMETERS AND SWITCH





Order example:
Positioner A703, input signal 60… 100 kPa, equipped with manometers and switches, pneumatic connectors for copper pipes ø6 has a designation:
Positioner A703-A009/R971

ORDERING METHOD

A703-A	Pneumatic positioner

CODE1	VERSION
001/	input signal 20… 100 kPa, without manometers and switch
002/	input signal 20… 60 kPa, without manometers and switch
003/	input signal 60… 100 kPa, without manometers and switch
007/	input signal 20… 100 kPa, with manometers and switch
008/	input signal 20… 60 kPa, with manometers and switch
009/	input signal 60… 100 kPa, with manometers and switch

CODE2	PNEUMATIC CONNECTORS
R971	for copper pipes ø6 mm
R972	for copper pipes ø8 mm
R973	for polyethylene pipes ø6 mm

A703-A	**009**	**/ R971**	EXEMPLARY POSITIONER TYPE

1. Positioners in the basic version A703-A001…A009 are equipped with L cam (linear) and parts kit for installation on the yoke actuators, for example: type 37 or 38 from Polna S.A.
2. Positioners at accelerating and decelerating characteristic are made on special order - please agree this with Aplisens consultant.

PNEUMATIC POSITIONER type A705

THE PNEUMATIC POSITIONER type A705 IS DESIGNED FOR COOPERATION WITH PISTON PNEUMATIC ACTUATORS. IT ASSURES QUICK AND PRECISE ACTUATOR PISTON ROD POSITIONING.

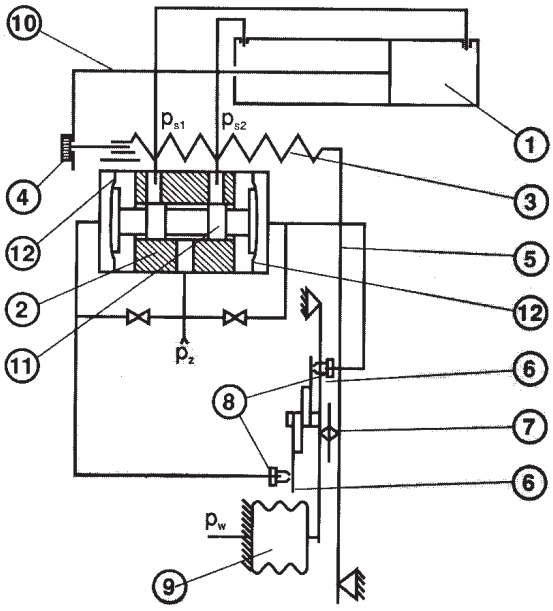
THE MECHANICAL FEEDBACK ASSURES QUICK AND ACCURATE POSITIONING THE ACTUATOR'S PISTON ROD, WHICH CORRESPONDS THE PRESENT INPUT SIGNAL.

precise actuator piston rod positioning
suitable for cooperation
with piston pneumatic actuators
maximum supply pressure up to 1 MPa

TECHNICAL DETAILS:

- input signal (control)	20...100 kPa
- supply pressure	0.25...1 MPa
- pneumatic output signal	two alternating signals of 0…100% of supply pressure
- cooperating actuator stroke	80...600 mm
- basic error	max. 1.6% of nominal actuator stroke
- sensitivity	0,4% of minimal input pressure range
- proportionality range for both control signals	1,2 ±0,5%
- additional error caused by supply pressure change of 10%	0,8% of nominal actuator stroke
- cover protection rating	IP44
- acceptable ambient temperature	-25°C...+65°C
- weight	1,7...2,2 kg, depending on version

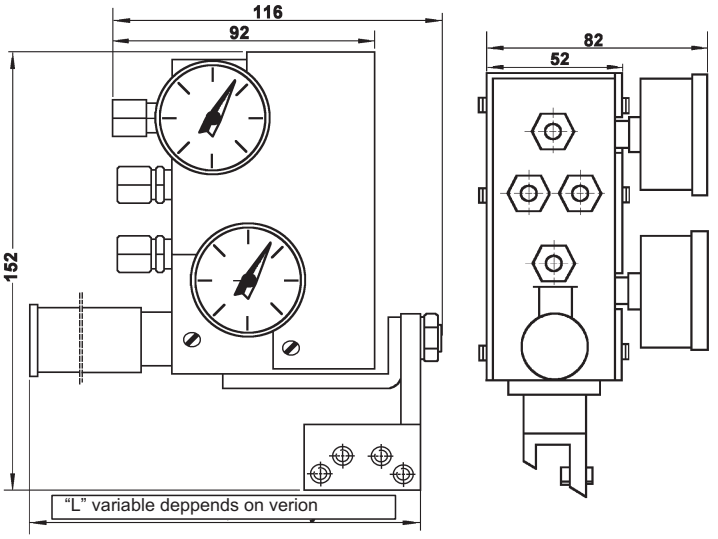
FUNCTIONAL DIAGRAM OF THE POSITIONER



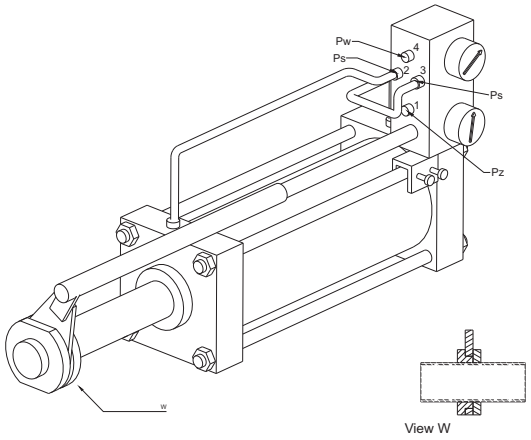
1 - actuator
2 - distributor
3 - feedback spring
4 - zeroing screw
5 - feedback lever
6 - nozzles cover group
7 - range adjustment
8 - nozzles
9 - bellows
10 - piston rod
11 - piston
12 - membrane
p_z - supply pressure
p_w - input pressure
p_{a1} i p_{a2} - control pressures

DIMENSIONED DRAWINGS

Positioner tvpe A705



Connection of pneumatic pipes



ORDERING METHOD

A705-A	Positioner for piston actuators

CODE1	VERSION
0	input signal 20...100 kPa

CODE2				ACTUATOR DIMENSIONS	
Cylinder diameter (mm)					
80	100	125	160; 200		
M20x1,5	M20x1,5	M27x2	M36x2	Thread on the piston rod end	
G 3/8"	G 1/2"	G 1/2"	G 3/4"	Connecting holes of control pressure	
-	-	41	51	80	stroke (mm)
-	22	42	52	100	
-	23	43	53	125	
04	24	44	54	150	
05	25	45	55	160	
06	26	46	56	200	
07	27	47	57	250	
08	28	48	58	300	
09	29	49	59	320	
10	30	40	60	400	
11	31	38	61	500	
12	32	39	62	600	

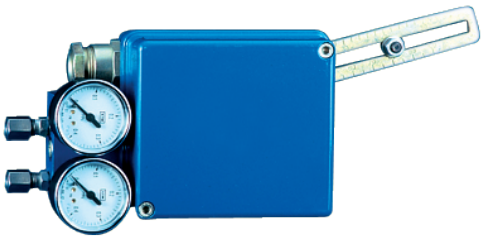
A705-A	**0**	**26**	**EXEMPLARY POSITIONER TYPE**

Specify in order: device name, type and version number, and special requirements.

Order example:
Positioner A705, actuator stroke 200 mm, cylinder diameter ø100 mm has a designation: Positioner A705-A026

We reserve the right to implement the product structural changes without the parameters deterioration.

ELECTROPNEUMATIC POSITIONER type A781



THE POSITIONER type A781 IS DESIGNED FOR COOPERATION WITH MEMBRANE PNEUMATIC AND ROTARY ONE-SIDED WORKING ACTUATORS.

IT MAKES POSSIBLY FAST AND PRECISELY CONTROL OF POSITION THE ACTUATOR'S PISTON ROD BY ANALOGUE CONTROL SIGNAL 4…20 mA.

* reliable and simple in installation
* input signals dividing possibility
* linear characteristics
* suitable for cooperation with pneumatic actuators of different manufacturers
* intrinsic-safety version made acc. to ATEX directive

TECHNICAL DATA

- input signal (control)	
full	4...20 mA, 0...20 mA
half	4...12 mA, 12...20 mA, 0...10 mA, 10...20 mA
- input resistance	≤250 Ω (control terminals shorted)
- pneumatic output signal	
(at overload >4%)	0...100% of supply pressure
- supply pressure	0,14...0,25 MPa or 0,25...0,60 MPa

IMPORTANT:
It's not allow using higher than permissible value of control pressure the cooperating actuator supply pressure

- actuator mandrel stroke or rotation	10...102 mm (1/2"...4") (if the versions table does not show another values) or 0...60°; 0...90°
- working characteristic	linear
- sensitivitythreshold	0,05% for supply pressure 0,14...0,25 MPa 0,12% for supply pressure 0,25...0,60 MPa
- nonlinearity (except the characteristic distortion in the actuator mandrel movement rexstriction point)	max. 1%
- hysteresis	max. 0,5% for supply pressure 0,14...0,25 MPa
- proportionality range:	
in relation with control signal	max. 1% for supply pressure 0,14...0,25 MPa
with range width 0,08 MPa	max. 1,2% for supply pressure 0,25...0,60 MPa
in relation with control signal	max. 2% for supply pressure 0,14...0,25 MPa
with range width 0,16 MPa	max. 2,5% for supply pressure 0,25...0,60 MPa
- output air flux:	
at p_z= 0,14 MPa	≥7,5 kg/h
at p_z= 0,25 MPa	≥15 kg/h } with maximally unscrewed choke
at p_z= 0,6 MPa	≥26 kg/h } and pipes f8x1connectors
- air flux at steady state:	

Control signal [MPa]	Supply pressure [MPa]			
	0,14	0,25	0,4	0,5
0,02	0,310 kg/h	0,380 kg/h	----	----
0,1	0,380 kg/h	0,510 kg/h	0,580 kg/h	0,710 kg/h
0,2	----	0,610 kg/h	0,710 kg/h	0,800 kg/h

Electropneumatic positioner type A781

TECHNICAL DATA cont.

- **ambient temperature** -40°C...+80°C
- **relative humidity** <100%
- **additional errors**
  - from supply pressure changes 0,14...0,25 MPa 0,5% / 10%
  - from supply pressure changes 0,25...0,60 MPa 1% / 10%
  - from ambient temperature changes 0,4% /10°C
  - from vibrations in range
    - 10...60 Hz, amplitude <0,35 mm
    - 60...500 Hz, acceleration 5g 1%
  - from the influence of constant and alternate magnetic field at strength 100 A/m, 50 Hz (acc. to PN-EN 6100-4-8:1998) max. 0,5 of allowable nonlinearity
  - from the electromagnetic field radiation perturbations at the radio frequency 10 V/m, in the frequency range from 80 Mhz to 1 GHz (acc. to PN-EN 6100-4-3:2002) max. 0,5 of allowable nonlinearity
  - from the series of quick intermediate states, caused by the voltage of peak value 2 KV (acc. to PN-EN6100-4-4:2002) max. 0,5 of allowable nonlinearity
  - from the surge at 0,5 kV (acc. to PN-EN 6100-4-5:2006) max. 1%
- **positioner operation** normal or reversed (change by the current direction switch - the current floating by coil)
- **intrinsic protection mark** Ⓔx II 2G EEx ia IIC T6/T5/T4
- **use conditions in the danger zone**

1. Positioner A781 - A2XX - ... may cooperate only with the spark protected circuit with the following parameters: U_j = 28 V dc, Ij = 100 mA, P_j = 0,7 W
2. The connection between positioner and cooperating devices must be made from the separate wires or cable, which will connect the spark protected circuits **only**. The L and C parameters of the external circuit should be the same as for the device cooperating with positioner.
3. The allowable ambient temperature, according to the temperature class:

Gases and liquid vapours temperature class	T6	T5	T4
Allowable ambient temperature (T_a)			
- version without manometers	-40°C...+50°C	-40°C...+65°C	-40°C...+80°C
- version with manometers	-25°C...+50°C	-25°C...+50°C	-25°C...+65°C

- **cover protection rating** IP54
- **operational position** arbitrary
- **pneumatic terminals** acc. to versions table (CODE4)
- **electric terminals** screw terminals for cables with diameter up to 2,5 mm
- **weight**
  - A781-AX00 and AX02...AX14-... A781-AX17- and Ax18-... without manometers 1,2 kg
  - A781-AX00 and AX02...AX14-... A781-AX17- and Ax18-... with manometers 1,5 kg
  - A781-AX01-... without manometers 1,5 kg
  - A781-AX01-... with manometers 1,8 kg

MATERIALS

- housing powder coated aluminium alloy, colour RAL5010
- pneumatic connectors nickel plated brass or stainless steel
- manometers brass, galvanized, lacquered or stainless steel
- other external parts stainless or galvanized steel

OPERATING CONDITIONS

The A781 positioner is designed to operate in the following conditions:

a) working medium:

air free from dust, oil, aggressive impurities, particulates larger than 1.5 µm, with the relative humidity allowing for the dew point temperature not lower than 10°C (10°K) from the ambient temperature (acc. to PN-EN 60654-2:1999)

b)ambient temperature:

- standard version: -40°C...+80°C
- intrinsic-safety version: please look at data on page 2, point 3 (table with temperatures)

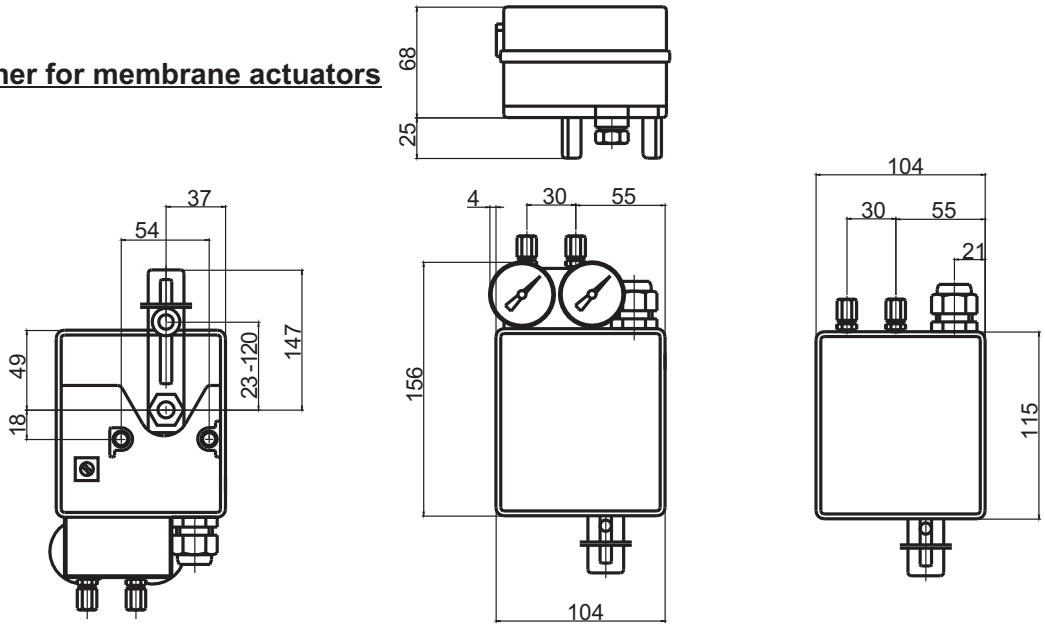
c) allowable vibrations:

10...60 Hz, amplitude <0,35 mm, 60...5000 Hz, acceleration 5g (acc. to PN-EN 60654-3:2000; class Vh6)

d) working position - arbitrary

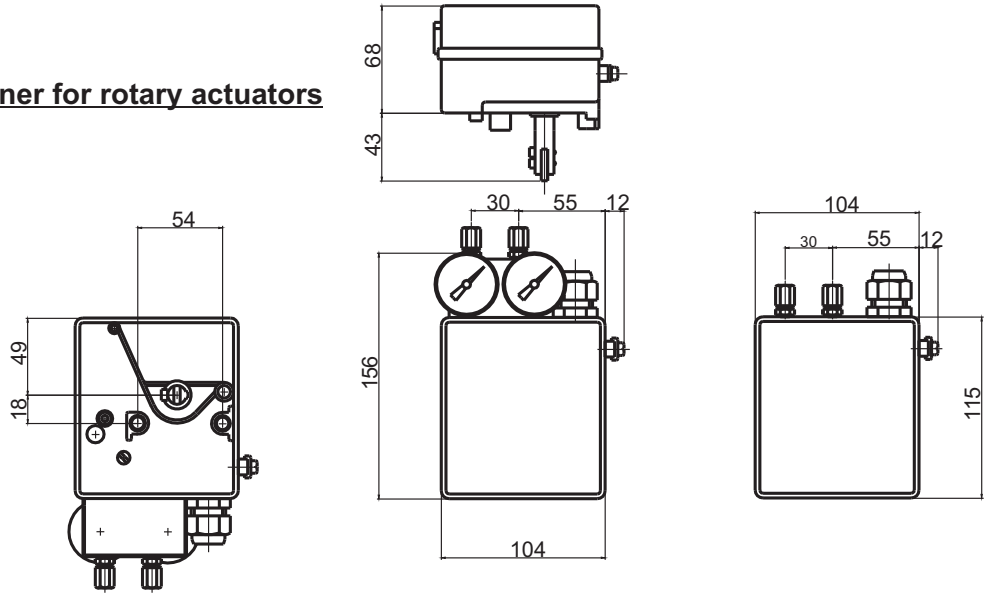
DIMENSIONED DRAWINGS

Positioner for membrane actuators



Version with manomentrs | **Version without manomenters**

Positioner for rotary actuators



Version with manometers | **Version without manometers**

Electropneumatic positioner type A781

ORDERING METHOD

A781-A	Electropneumatic positioner

CODE1	VERSION
1	normal
2	intrinsic protected with certificate KDB 04 ATEX 025X II 2G EEx ia IIC T6/T5/T4

CODE2	ELEMENTS ALLOWING FOR INSTALLATION ACTUATOR
00	membrane type 37 or 38 from POLNA S.A. made from galvanized carbon steel
01	membrane type P3 or R3 from POLNA S.A.
02	membrane type 37 or 38 from Polna S.A., made from stainless steel
03	membrane column type P or R from POLNA S.A. made from galvanized carbon steel
04	membrane column type P or R from POLNA S.A. made from stainless steel
05	actuator acc. to customer's needs
06	no fixing elements
07	membrane multispring type P1 or R1 from POLNA S.A. made from galvanized carbon steel
08	membrane multispring type P1 or R1 from POLNA S.A., made from stainless steel
09	Membrane rotary type BR99-R from POLNA S.A. made from carbon steel covered by pulverize lacquer
10	Membrane rotary type BR99-P from POLNA S.A. made from carbon steel covered by pulverize lacquer
11	rotary single-sided, consistent with EN ISO 5211, DIN 3337, VDI/VDE 38450 Namur standard (the actuator mandrel rotates left, i.e. anticlockwise), made from galvanized carbon steel, e.g.: rotary actuators from ARA PNEUMATIC series AT...S, EBRO ARMATUREN type EB-EW, EL-O-MATIC series PE and ES
12	rotary single-sided, consistent with EN ISO 5211, DIN 3337, VDI/VDE 38450 Namur standard (the actuator mandrel rotates left, i.e. anticlockwise), made from stainless steel, e.g.: rotary actuators from ARA PNEUMATIC series AT...S, EBRO ARMATUREN type EB-EW, EL-O-MATIC series PE and ES
13	with control valve with rib, acc. to PN-EN-60534-6-1:2001, made from galvanized carbon steel, e.g. actuator with valve from Samson or Arka Regler
14	with control valve with rib, acc. to PN-EN60534-6-1:2001, made from stainless steel, e.g. actuator with valve from Samson or Arka Regler
17	rotary single-sided, consistent with EN ISO 5211, DIN 3337, VDI/VDE 38450 Namur standard (the actuator mandrel rotates right, i.e. clockwise), made from galvanized carbon steel, e.g.: rotary actuators from ARA PNEUMATIC series AT...S, EBRO ARMATUREN type EB-EW, EL-O-MATIC series PE and ES
18	rotary single-sided, consistent with EN ISO 5211, DIN 3337, VDI/VDE 38450 Namur standard (the actuator mandrel rotates right, i.e. clockwise), made from stainless steel, e.g.: rotary actuators from ARA PNEUMATIC series AT...S, EBRO ARMATUREN type EB-EW, EL-O-MATIC series PE and ES

CODE3	SUPPLY PRESSURE AND PNEUMATIC AMPLIFIER
01	0.14...0.25 MPa, standard amplifier
02	0.25...0.6 MPa, standard amplifier
03	0.14...0.25 MPa, amplifier with increased dynamics
04	0.25...0.6 MPa, amplifier with increased dynamics

CODE4	PNEUMATIC CONNECTORS
L0	StB hole 1/8”
L1	copper pipes connector ø6 mm
L2	copper pipes connector ø8 mm
L3	polyethylene pipes connector ø6 mm
L4*	quick joint connector for polyethylene pipes ø6 mm (operational temp. -20°C…+80°C)

Electropneumatic positioner type A781

CODE5	EQUIPMENT
M00	without manometers
M01	with supply pressure manometer (manometer diameter 40 mm, standard materials)
M02	with output signal manometer (manometer diameter 40 mm, standard materials
M03	with supply pressure and output signal manometer (manometer diameter 40 mm, standard materials)
M04***	with supply pressure manometer (manometer diameter 50 mm, stainless steel)
M05***	with output signal manometer (manometer diameter 50 mm, stainless steel)
M06***	with supply pressure and output signal manometer (manometer diameter 50 mm, stainless steel)
M07***	with supply pressure manometer (manometer diameter 50 mm, materials: housing stainless steel, other elements standard)
M08***	with output signal manometer (manometer diameter 50 mm, materials: housing stainless steel, other elements standard)
M09***	with supply pressure and output signal manometer (manometer diameter 50 mm, materials: housing stainless steel, other elements standard)

CODE6	ELECTRIC CABLE INSERT
D1**	standard cable inlet PG 13.5 or M20x1.5 (metal from galvanized carbon steel, cable diameter 6…10 mm for standard and spark protected versions)
D2	polyamide cable inlet PG 13.5, cable diameter 8…13 mm or M20x1.5, cable diameter 7…10.5 mm (for normal versions)
D4	polyvinyl cable inlet M20x1.5, cable diameter 5…8 mm (for spark protected versions)
D5***	polyvinyl cable inlet M20x1.5, cable diameter 7…8 mm (for spark protected versions)
D6***	polyvinyl cable inlet M20x1.5, cable diameter 9…13 mm (for spark protected versions)
D7***	metal cable inlet M20x1.5 (bass covered nickel coat) cable diameter 5…8 mm - only for spark protected versions)
D8***	metal cable inlet M20x1.5 (bass covered nickel coat) cable diameter 7…10,5 mm - only for spark protected versions)
D9***	metal cable inlet M20x1.5 (bass covered nickel coat) cable diameter 9…13 mm - only for spark protected versions)

CODE7	SINUSOIDAL VIBRATIONS RESISTANCE
W0	standard (consistent with technical data)
W1	increased

A781-A	1	00	-	01,	L1,	M03,	D1,	W0	EXEMPLARY POSITIONER TYPE

* - not in spark protected version
** - not in connection with elements, allowing for installation on stainless steel actuator
*** - versions with longer realization time

ORDER EXAMPLE
Electropneumatic positioner A781 in standard version, with fixing elements for actuator type 37 from POLNA, made from galvanized carbon steel, for pressure range 0.14…0.25 MPa, pneumatic amplifier in standard version, with connector for copper pipes ø6 mm, with supply pressure and output signal manometer (manometer diameter 40 mm, standard material), universal cable inlet PG13.5, with standard sinusoidal vibrations resistance has a designation:

Electropneumatic positioner type typ A781 - A100 - 01, L1, M03, D1, W0

We reserve the right to implement the product structural changes without the parameters deterioration.

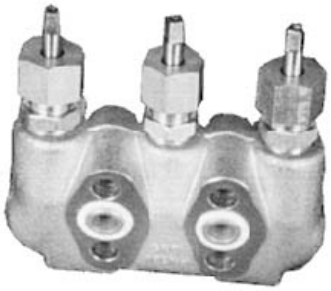
Chapter II

Manifolds

MEZ-10.....II/2
MEZ-11.....II/5
MEZ-12.....II/8
MEZ-14.....II/10
MEZ-15.....II/15
MEZ-16.....II/18
MEZ-17.....II/20

THREE-WAY BLOCK VALVES (MANIFOLDS) type MEZ-10

THE MEZ-type VALVES (MANIFOLDS) ARE DESIGNED FOR ASSEMBLING IN MEASUREMENT & CONTROL SYSTEMS. THEY ARE USED FOR SWITCHING ON THE FLOW, DIFFERENTIAL PRESSURE AND PRESSURE TRANSMITTERS FOR OPERATION, OR SWITCHING THEM OFF. THEY ENABLE ZERO AND RANGE CHECKING ON TRANSMITTERS AND BLOWING DOWN OF IMPULSE TUBES. THE VALVES ARE PROVIDED BY THE MANUFACTURER WITH SETTING KEY.

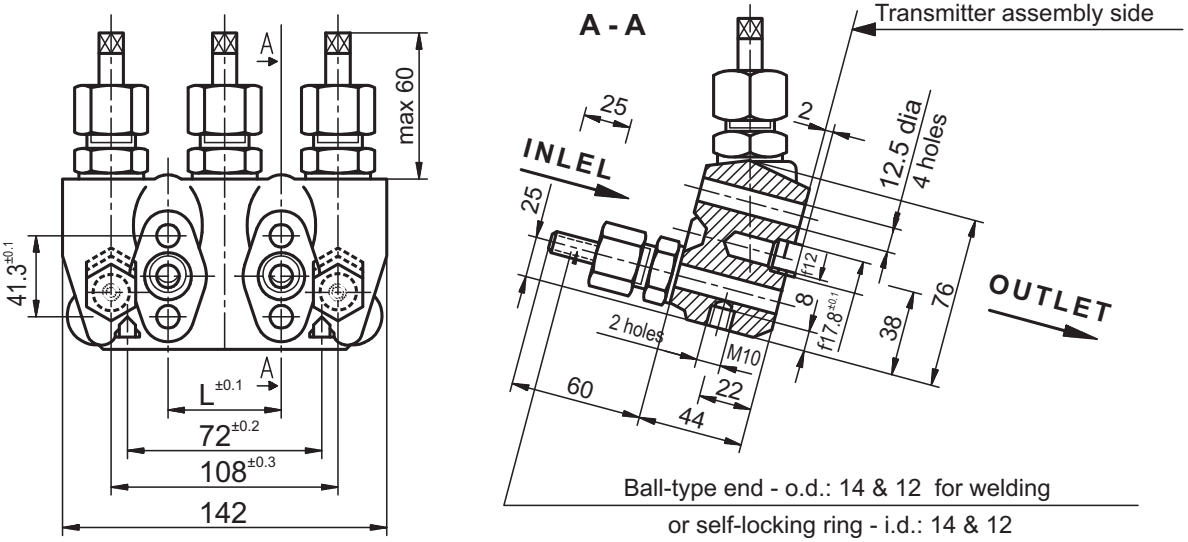


- **high reliability**
- **different material versions for water, steam, acids and oxygen**
- **body material: 15HM, 1H18N9T (321ss) or 13HMF**
- **nominal pressure up to 32 MPa**

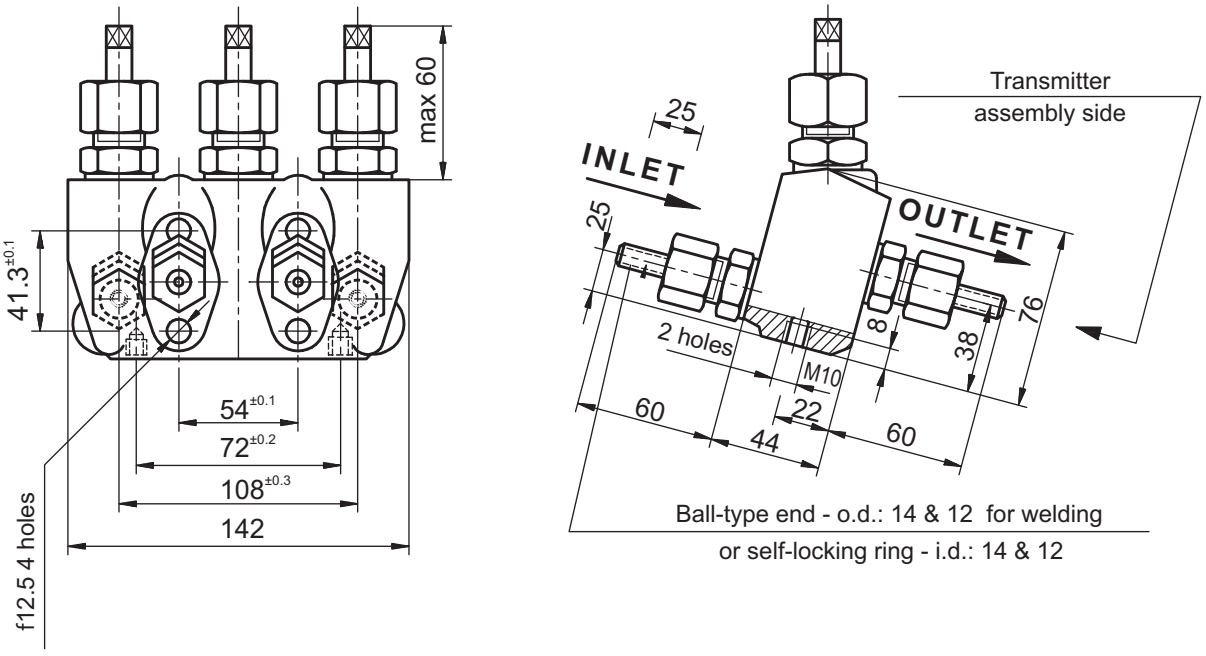
TECHNICAL DATA

Valve type	MEZ-10-00	MEZ-10-01	MEZ-10-02	MEZ-10-03
Nominal diameter [mm]:	DN 5	DN 5	DN 5	DN 5
Nominal pressure:	32 MPa	32 MPa	32 MPa	32 MPa
Highest operating temperature:	400°C	250°C	560°C	200°C
Numerical values of permissible operating pressures, in function of nominal pressure and operating temperature, acc. to PN-89/H-02650:	acc. to graph	acc. to graph	acc. to graph	acc. to graph
Valve material:	steel 15HM	steel 1H18N9T (321 ss)	steel 13HMF	steel 1H18N9T (321 ss)
Valve sealing material:	graphite	graphite	graphite	tarflen
Valve version:	standard	acid-proof	standard	for oxygen
Mass:	3.6 kg	3.6 kg	3.6 kg	3.6 kg

MEZ-10-XX/1-X-X-X DIMENSIONED DRAWING
valve body made of forging



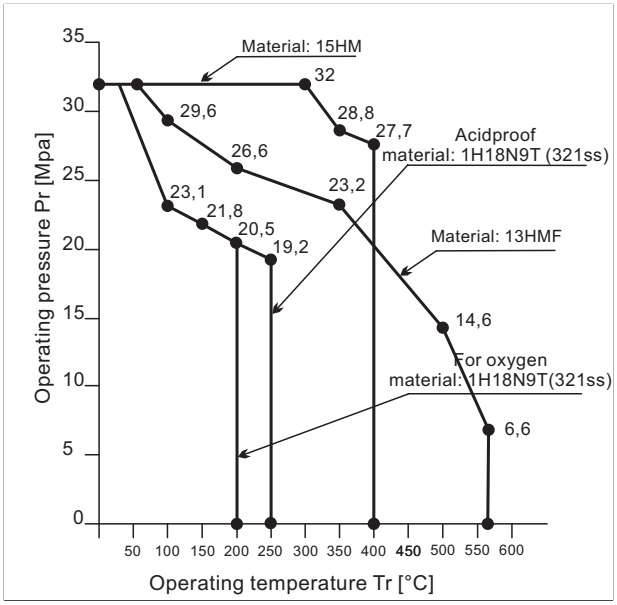
MEZ-10-XX/2-1-X-X DIMENSIONED DRAWING
valve body made of forging



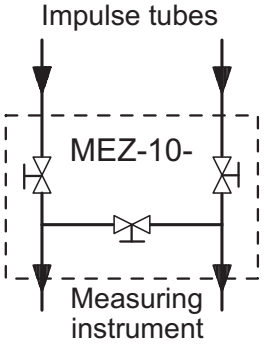
Three-way block valves (manifolds) type MEZ-10

GRAPH

Range of operating pressures versus operating temperature for valves type: MEZ-10-



BLOCK DIAGRAM



ORDERING OF VALVES (MANIFOLDS) type MEZ-10

MEZ-10-	Five-way block valve (manifold)

CODE1	VALVE BODY MATERIAL TYPE
00/*	Steel 15HM
01/*	Steel 1H18N9T (321 ss) acid-proof
02/	Steel 13HMF (only elongated gland)
03/*	Steel 1H18N9T (321 ss) for oxygen

CODE2	APPLICATION AND CONNECTING TO TRANSMITTER
1-	for direct assembly to transmitter
2-	for assembly by impulse tubes to transmitter

CODE3	IMPULSE HOLES SPACING
1-	L = 54 mm
2-	special version after agreement with manufacturer

CODE4	IMPULSE TUBE
1	f 14 for welding with ball-end
2	f 12 for welding with ball-end
3	f 14 with self-locking ring
4	f 12 with self-locking ring
5	ø14 for welding with flat end
6	ø12 for welding with flat end

CODE5	ASSEMBLY SCREWS
/S	Stadard screws 7/16”x55
/A	screws M10x55 for assembly with APLISENS transmitters

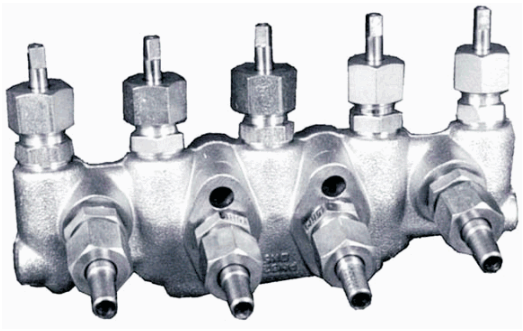
MEZ-10-00/ 2 - 1 - 3 - S VALVE TYPE

*** It is possible to make valves (namifolds) with:**
- elongated glands (it has to be denoted in the order)
- ends for connect the valve (manifold) with instalation from material different than rest of valve (manifold)
  - it has to be denoted in the order after agreement with manufacturer

The right of introducing design changes in the product, without deteriorating of its operation parameters, is reserved.

FIVE-WAY BLOCK VALVES (MANIFOLDS) type MEZ-11

THE MEZ-type VALVES (MANIFOLDS) ARE DESIGNED FOR ASSEMBLING IN MEASUREMENT & CONTROL SYSTEMS. THEY ARE USED FOR SWITCHING ON THE FLOW, DIFFERENTIAL PRESSURE AND PRESSURE TRANSMITTERS FOR OPERATION, OR SWITCHING THEM OFF. THEY ENABLE ZERO AND RANGE CHECKING ON TRANSMITTERS AND BLOWING DOWN OF IMPULSE TUBES. THE VALVES ARE PROVIDED BY THE MANUFACTURER WITH SETTING KEY.

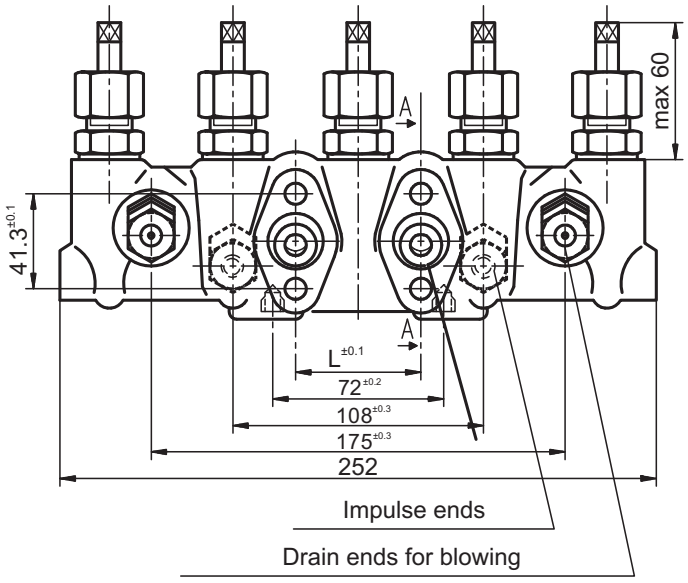


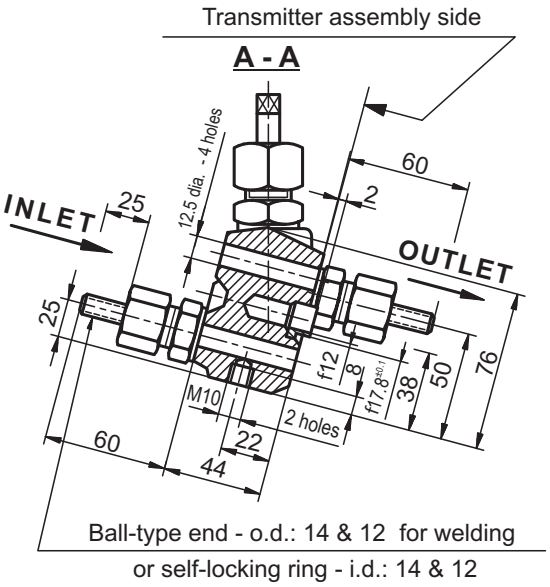
- **high reliability**
- **different material versions for water, steam, acids and oxygen**
- **body material: 15HM, 1H18N9T (321ss) or 13HMF**
- **nominal pressure up to 32 MPa**

TECHNICAL DATA

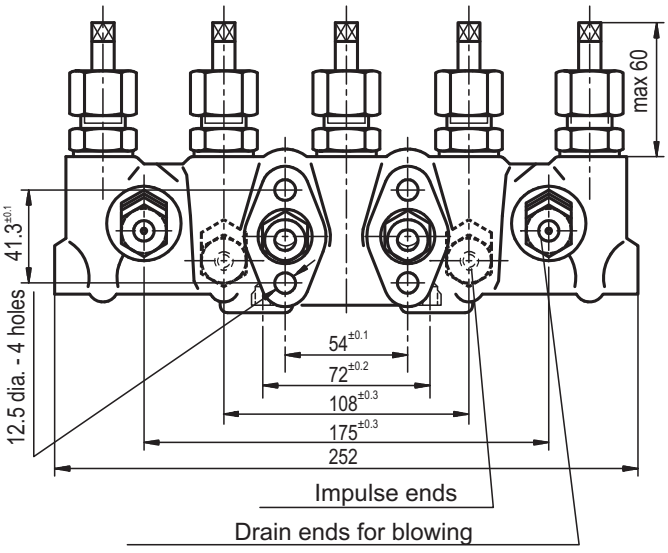
Valve type	MEZ-11-00	MEZ-11-01	MEZ-11-02	MEZ-11-03
Nominal diameter [mm]:	DN 5	DN 5	DN 5	DN 5
Nominal pressure:	32 MPa	32 MPa	32 MPa	32 MPa
Highest operating temperature:	400°C	250°C	560°C	200°C
Numerical values of permissible operating pressures, in function of nominal pressure and operating temperature, acc. to PN-89/H-02650:	acc. to graph	acc. to graph	acc. to graph	acc. to graph
Valve material:	steel 15HM	steel 1H18N9T (321 ss)	steel 13HMF	steel 1H18N9T (321 ss)
Valve sealing material:	graphite	graphite	graphite	tarflen
Valve version:	standard	acid-proof	standard	for oxygen
Mass:	5.5 kg	5.5 kg	5.5 kg	5.5 kg

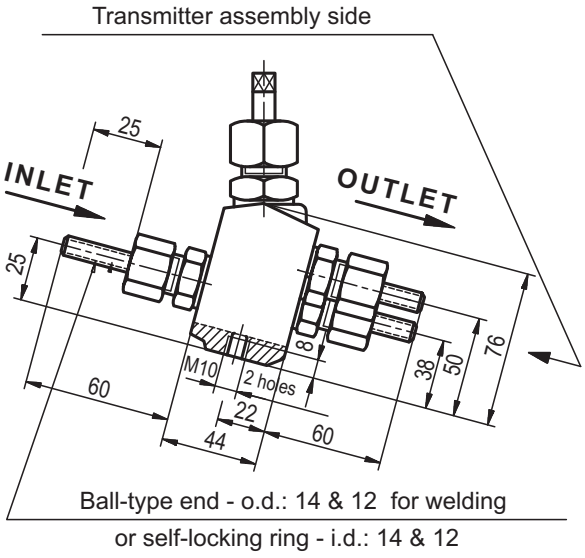
MEZ-11-XX/1-X-X-X DIMENSIONED DRAWING
valve body made of forging





MEZ-11-XX/2-1-X-X DIMENSIONED DRAWING
valve body made of forging

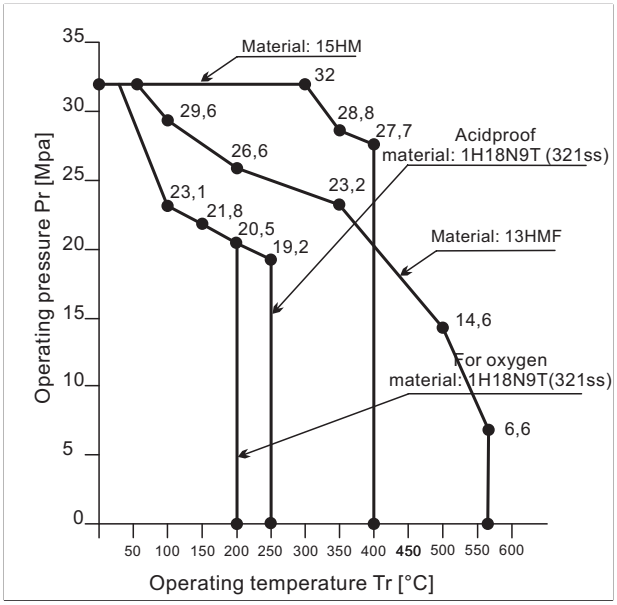




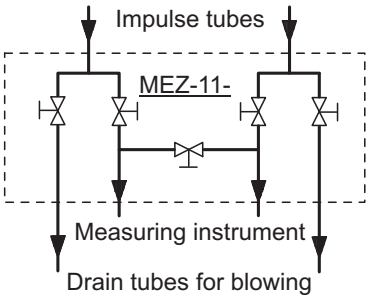
Five-way block valves (manifolds) type MEZ-11

GRAPH

Range of operating pressures versus operating temperature for valves type: MEZ-11-



BLOCK DIAGRAM



ORDERING OF VALVES (MANIFOLDS) type MEZ-11

MEZ-11-	Five-way block valve (manifold)

CODE1	VALVE BODY MATERIAL TYPE
00/*	Steel 15HM
01/*	Steel 1H18N9T (321 ss) acid-proof
02/	Steel 13HMF (only elongated gland)
03/*	Steel 1H18N9T (321 ss) for oxygen

CODE2	APPLICATION AND CONNECTING TO TRANSMITTER
1-	for direct assembly to transmitter
2-	for assembly by impulse tubes to transmitter

CODE3	IMPULSE HOLES SPACING
1-	L = 54 mm
2-	special version after agreement with manufacturer

CODE4	IMPULSE TUBE
1	f 14 for welding with ball-end
2	f 12 for welding with ball-end
3	f 14 with self-locking ring
4	f 12 with self-locking ring
5	ø14 for welding with flat end
6	ø12 for welding with flat end

CODE5	ASSEMBLY SCREWS
/S	Stadard screws 7/16”x55
/A	screws M10x55 for assembly with APLISENS transmitters

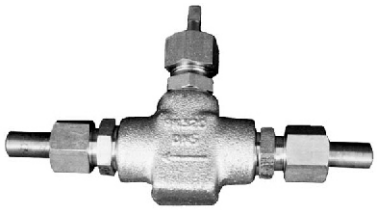
MEZ-11-00/ 2 - 1 - 3 - S VALVE TYPE

*** It is possible to make valves (namifolds) with:**
- elongated glands (it has to be denoted in the order)
- ends for connect the valve (manifold) with instalation from material different as all alve (manifold)
  - it has to be denoted in the order after agreement with manufacturer

The right of introducing design changes in the product, without deteriorating of its operation parameters, is reserved.

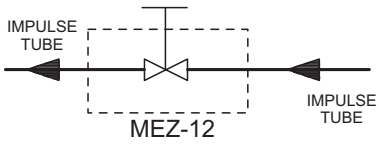
SINGLE-WAY STRAIGHT VALVES (MANIFOLDS) type MEZ-12

THE MEZ-type VALVES (MANIFOLDS) ARE DESIGNED FOR ASSEMBLING IN MEASUREMENT & CONTROL SYSTEMS. THEY ARE USED FOR SWITCHING ON THE FLOW, DIFFERENTIAL PRESSURE AND PRESSURE TRANSMITTERS FOR OPERATION, OR SWITCHING THEM OFF. THEY ENABLE ZERO AND RANGE CHECKING ON TRANSMITTERS AND BLOWING DOWN OF IMPULSE TUBES. THE VALVES ARE PROVIDED BY THE MANUFACTURER WITH SETTING KEY.



- **high reliability**
- **different material versions for water, steam, acids and oxygen**
- **body material: 15HM or 1H18N9T (321ss)**

BLOCK DIAGRAM

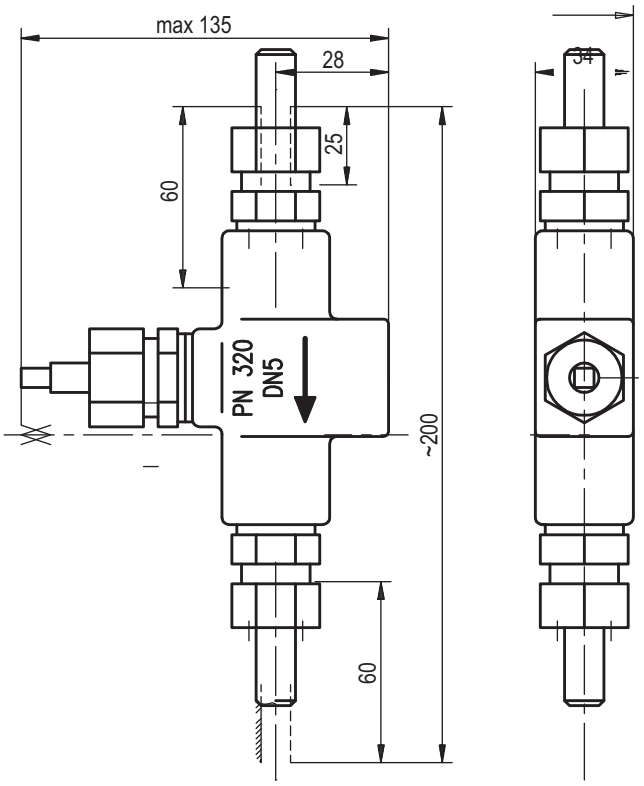


TECHNICAL DATA

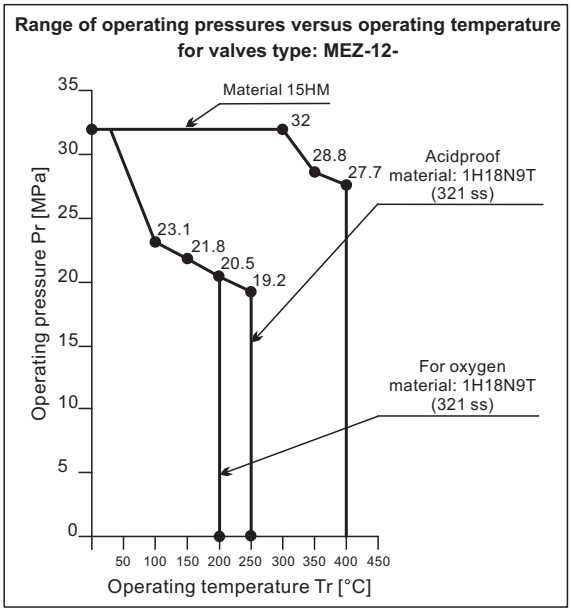
Valve type	MEZ-12-00	MEZ-12-01	MEZ-12-03
Nominal diameter [mm]:	DN 5	DN 5	DN 5
Nominal pressure:	32 MPa	32 MPa	32 MPa
Highest operating temperature:	400°C	250°C	200°C
Numerical values of permissible operating pressures, in function of nominal pressure and operating temperature, acc. to PN-89/H-02650:	acc. to graph	acc. to graph	acc. to graph
Valve material:	steel 15HM	steel 1H18N9T	steel 1H18N9T
Valve sealing material:	graphite	(321 ss) graphite	(321 ss) teflon
Valve version:	standard	acid-proof	for oxygen
Mass:	1.5 kg	1.5 kg	1.5 kg

Single-way straight valves (manifolds) type MEZ-12

MEZ-12-XX/0-0-X - DIMENSIONED DRAWING



GRAPH



ORDERING OF MEZ-12- VALVES

MEZ-12-	Single-way straight valves

CODE1	VALVE BODY MATERIAL TYPE
00/	Steel 15HM
01/	Steel 1H18N9T (321 ss) acid-proof
03/	Steel 1H18N9T (321 ss) for oxygen

CODE2	APPLICATION AND CONNECTING TO TRANSMITTER
0-	by impulse tube

CODE3	IMPULSE HOLES SPACING
0-	not concern (one hole)

CODE4	IMPULSE ENDS
1	f 14 for welding with ball-end
2	f 12 for welding with ball-end
3	f 14 with self-locking ring
4	f 12 with self-locking ring
5	ø14 for welding with flat end
6	ø12 for welding with flat end

MEZ-12-00/0-0-1 VALVE TYPE

The right of introducing design changes in the product, without deteriorating of its operation parameters, is reserved.

BLOCKED VALVES (MANIFOLDS) type MEZ-14

THE MEZ-type VALVES (MANIFOLDS) ARE DESIGNED FOR ASSEMBLING IN MEASUREMENT & CONTROL SYSTEMS. THEY ARE USED FOR SWITCHING ON THE FLOW, DIFFERENTIAL PRESSURE AND PRESSURE TRANSMITTERS FOR OPERATION, OR SWITCHING THEM OFF. THEY ENABLE ZERO AND RANGE CHECKING ON TRANSMITTERS AND BLOWING DOWN OF IMPULSE TUBES. THE VALVES ARE PROVIDED BY THE MANUFACTURER WITH SETTING KEY.

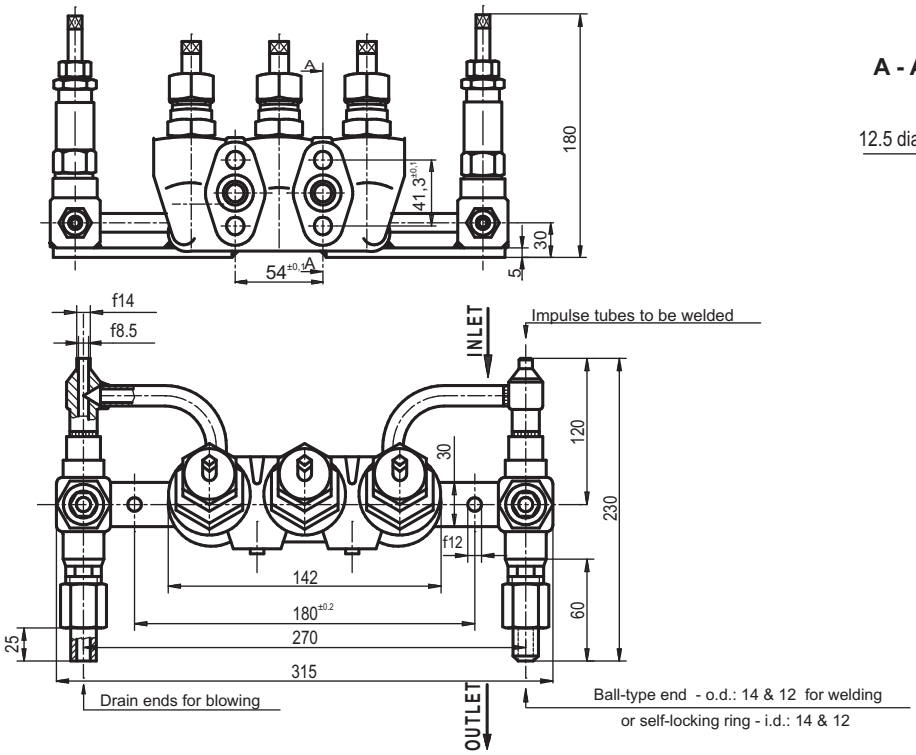
- high reliability
- different material versions for water, steam and oxygen
- body material: 15HM or 13HMF
- nominal pressure up to 32 MPa

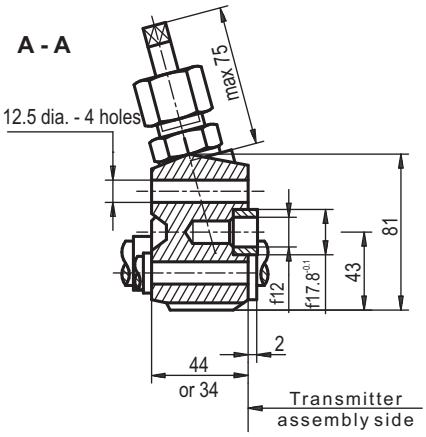
TECHNICAL DATA

Valve type	MEZ-14-00/X-X-X-1/X	MEZ-14-00/X-X-X-2/X	MEZ-14-02/X-X-X-3/X
Nominal diameter [mm]:	DN 5, DN 8	DN 5, DN 8	DN 5, DN 8
Nominal pressure:	32 Mpa	32 MPa	32 MPa
Highest operating temperature:	400°C	520°C	560°C
Numerical values of permissible operating pressures, in function of nominal pressure and operating temperature, acc. to PN-89/H-02650:	acc. to graph	acc. to graph	acc. to graph
Valve material:	steel 15HM	steel 15HM	steel 13HMF
Valve sealing material:	graphite	graphite	graphite
Valve version:	standard	standard	standard
Mass:	7 kg	8 kg	8 kg

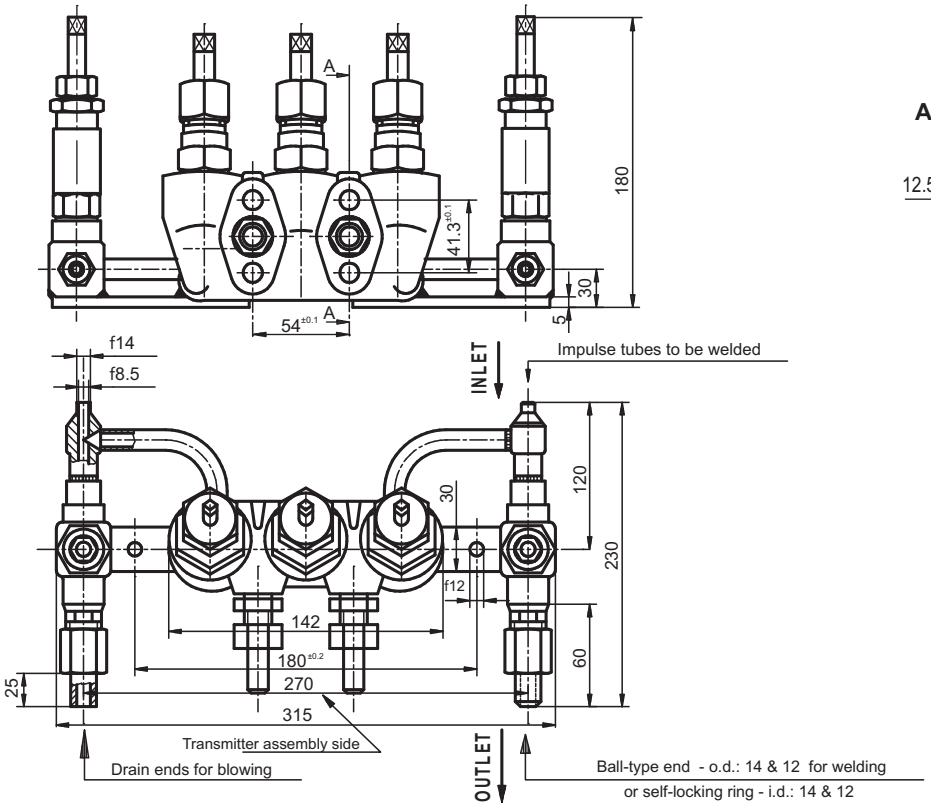
Blocked valves (manifolds) type MEZ-14

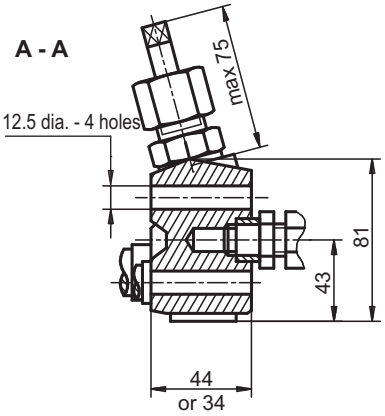
MEZ-14-00/1-X-X-1/X DIMENSIONED DRAWINGS



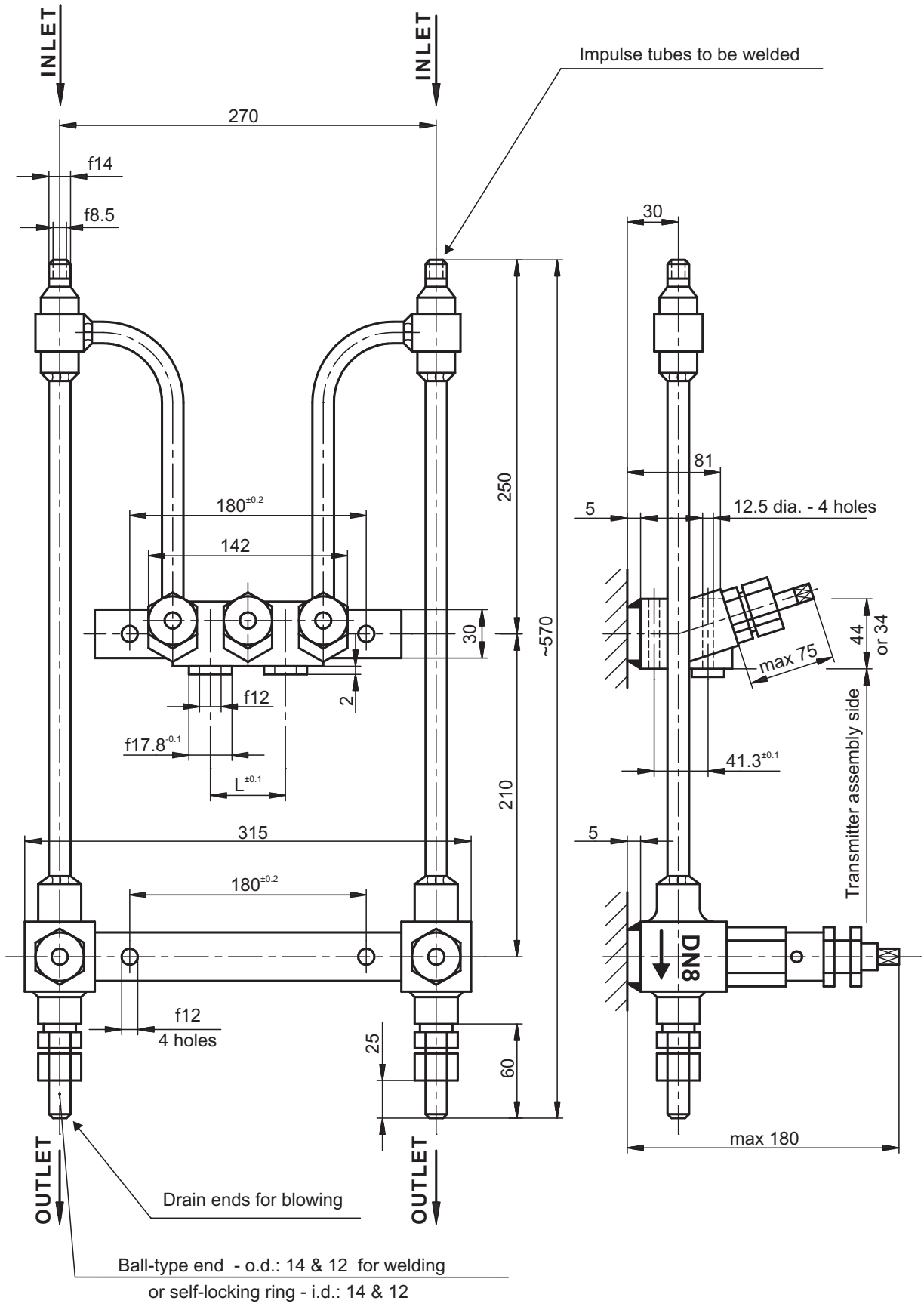


MEZ-14-00/2-1-X-1/X DIMENSIONED DRAWINGS

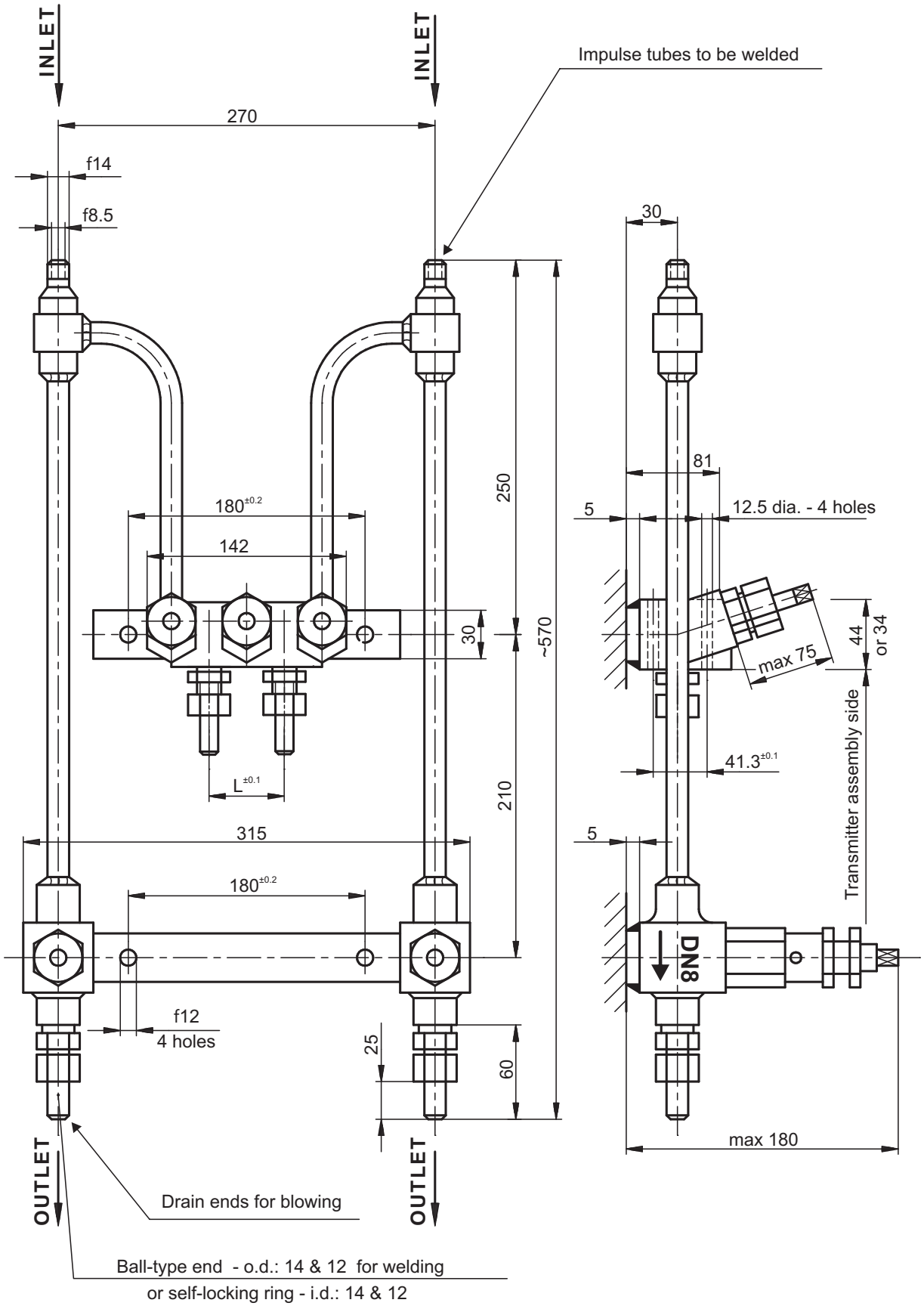




DIMENSIONED DRAWINGS OF MEZ-14-00/1-X-X-2/X and MEZ-14-02/1-X-X-3/X



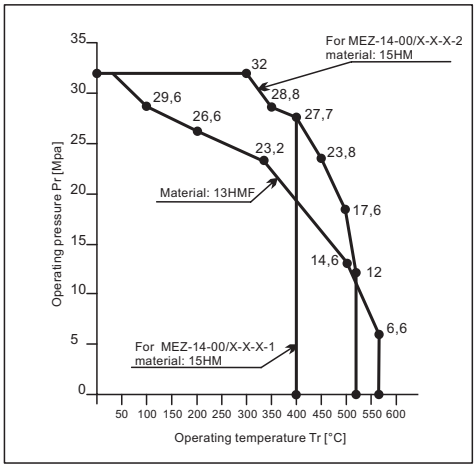
DIMENSIONED DRAWINGS OD MEZ-14-00/2-X-X-2/X and MEZ-14-02/2-X-X-3/X



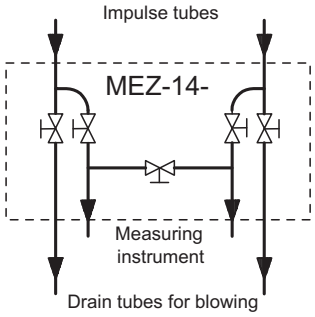
Blocked valves (manifolds) type MEZ-14

GRAPH

Range of operating pressures versus operating temperature for valves type: MEZ-14-00 and MEZ-14-02



BLOCK DIAGRAM



ORDERING OF MEZ-14- VALVES (MANIFOLDS)

MEZ-14-	Blocked valves (manifolds)

CODE1	VALVE BODY MATERIAL TYPE
00/*	Steel 15HM
02/	Steel 13HMF (elongated gland)

CODE2	APPLICATION AND CONNECTING TO TRANSMITTER
1-	for direct assembly to transmitter
2-	for assembly by impulse tubes to transmitter

CODE3	IMPULSE HOLES SPACING
1-	L = 54 mm
2-	special version after agreement with manufacturer

CODE4	IMPULSE DRAIN TUBE
1	f 14 for welding with ball-end
2	f 12 for welding with ball-end
3	f 14 with self-locking ring
4	f 12 with self-locking ring
5	ø14 for welding with flat end
6	ø12 for welding with flat end

CODE5	HIGHEST OPERATING TEMPERATURE
1	400°C
2	520°C
3	560°C

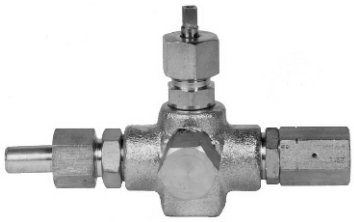
CODE6	ASSEMBLY SCREWS
/S	Stadard screws 7/16"x55
/A	screws M10x55 for assembly with APLISENS transmitters

M E Z - 1 4 - 0 0 / 1 - 1 - 3 - 1 VALVE TYPE

*** It is possible to make valves (namifolds) with:**
- elongated glands (it has to be denoted in the order)
- ends for connect the valve (manifold) with instalation from material different as all alve (manifold)
  - it has to be denoted in the order after agreement with manufacturer

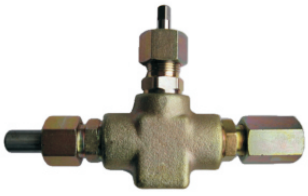
The right of introducing design changes in the product, without deteriorating of its operation parameters, is reserved.

MANOMETRIC VALVES (MANIFOLDS)
type MEZ-15 and MEZ-15.1



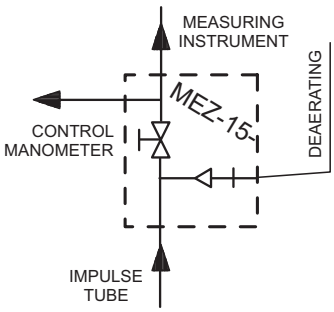
MEZ-15

- high reliability
- different material versions for water, steam, acids and oxygen
- body material: 15HM or 1H18N9T (321ss)
- nominal pressure up to 32 MPa



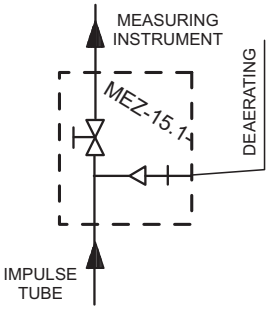
MEZ-15.1

BLOCK DIAGRAM



THE MEZ-type VALVES (MANIFOLDS) ARE DESIGNED FOR ASSEMBLING IN MEASUREMENT & CONTROL SYSTEMS. NOMINAL DIAMETER OF VALVES (MANIFOLDS) IS Dn5. THE VALVE (MANIFOLD) TYPE MEZ-15 HAS DEAERATING SCREW AND MANOMETRIC END M20X1,5, WHICH MAKES POSSIBLE TO CONNECTION CALIBRATOR TO MAKE METROLOGY CONTROL OF TRANSMITTER. THE VALVE (MANIFOLD) TYPE MEZ-15.1 IS MADE WITHOUT MANOMETRIC END. THE VALVES (MANIFOLDS) ARE PROVIDED BY THE MANUFACTURER WITH SETTING KEY.

BLOCK DIAGRAM

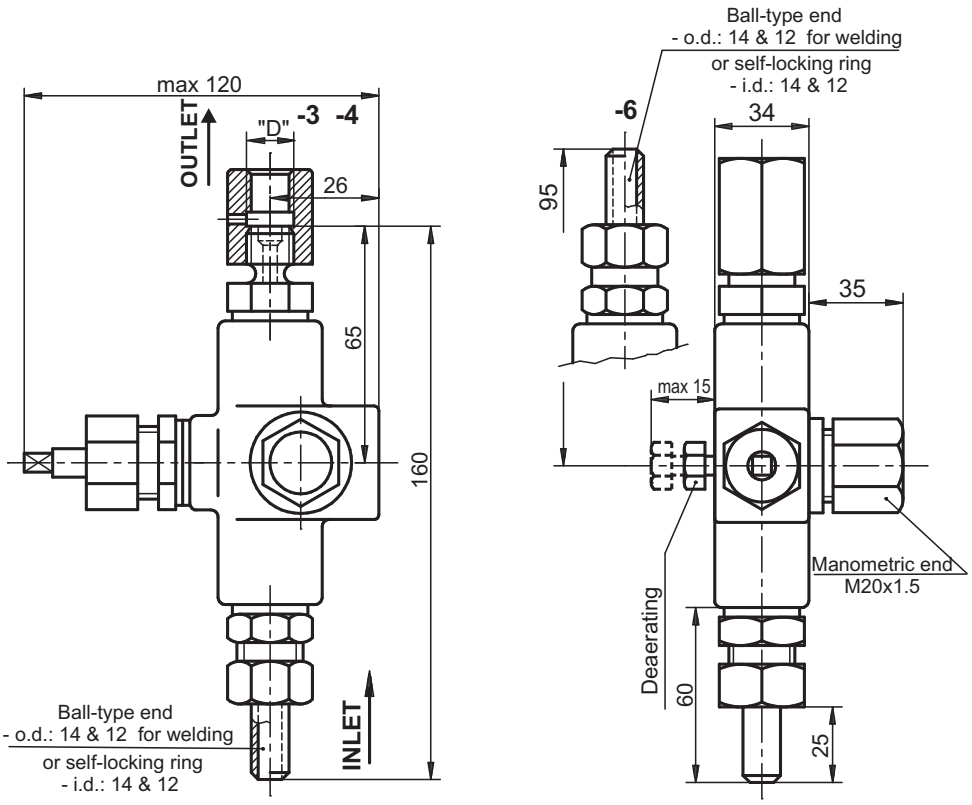


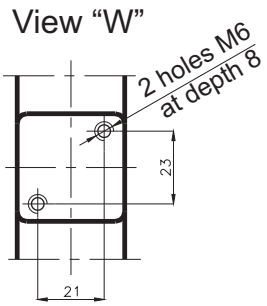
TECHNICAL DATA

Valve type	MEZ-15-00 MEZ-15.1-00	MEZ-15-01 MEZ-15.1-01	MEZ-15-03 MEZ-15.1-03
Nominal diameter [mm]:	DN 5	DN 5	DN 5
Nominal pressure:	32 MPa	32 MPa	32 MPa
Highest operating temperature:	400°C	250°C	200°C
Numerical values of permissible operating pressures, in function of nominal pressure and operating temperature, acc. to PN-89/H-02650:	acc. to graph	acc. to graph	acc. to graph
Valve material:	steel 15HM	steel 1H18N9T (321 ss)	steel 1H18N9T (321 ss)
Valve sealing material:	graphite	graphitet	tarflen
Valve version:	standard	acid-proof	for oxygen
Mass:	M.EZ-15: 1.8 kg MEZ-15.1: 1.5 kg	MEZ-15: 1.8 kg MEZ-15.1: 1.5 kg	MEZ-15: 1.8 kg MEZ-15.1: 1.5 kg

Manometric valves (manifolds) type MEZ-15 and MEZ-15.1

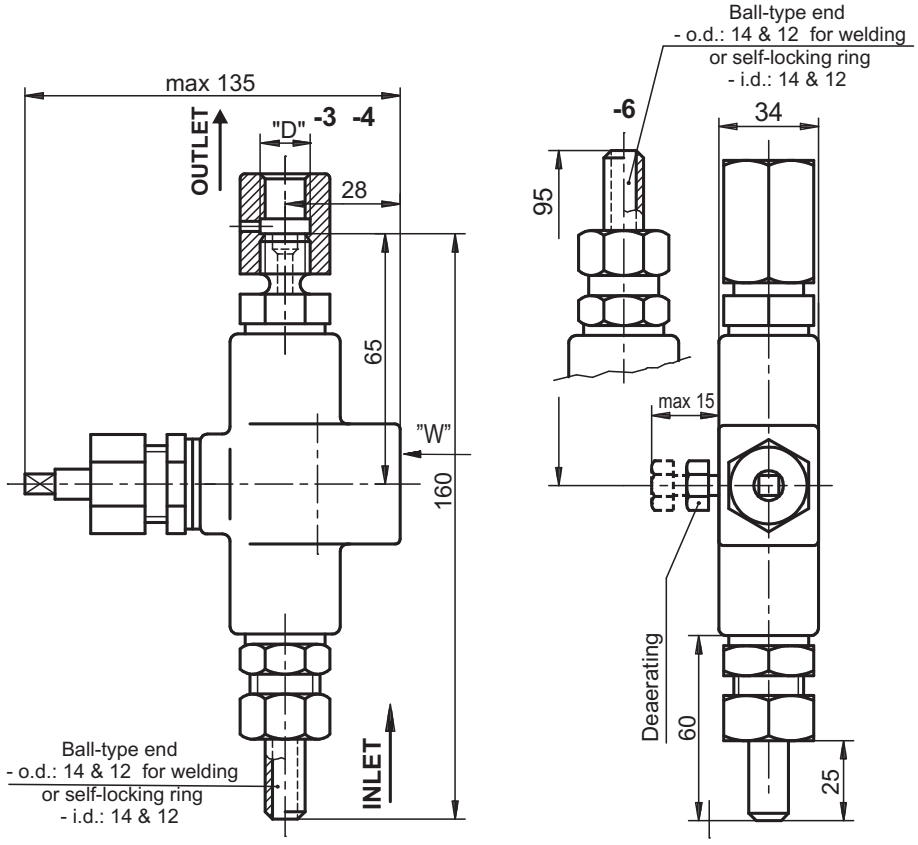
DIMENSIONED DRAWING of MEZ-15-XX/X-0-X

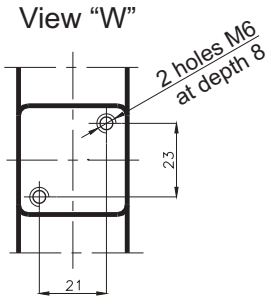




CODE 2	Dimension "D"
-3	M20 x 1.5
-4	G1/2
-6	Ball-type end or self-locking ring

DIMENSIONED DRAWING of MEZ-15.1-XX/X-0-X

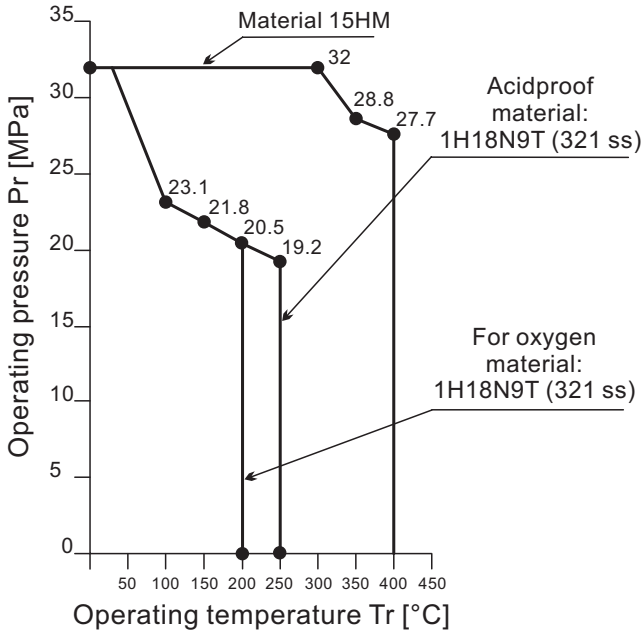




Manometric valves (manifolds) type MEZ-15 and MEZ-15.1

GRAPH

Range of operating pressures versus operating temperature for valves type: MEZ-15- and MEZ-15.1



ORDERING OF VALVES (MANIFOLDS) type MEZ-15- and MEZ-15.1

MEZ-15-	Manometric valves (manifolds) with manometric end
MEZ-15.1-	Manometric valves (manifolds) without manometric end

CODE1	VALVE BODY MATERIAL TYPE
00/	Steel 15HM
01/	Steel 1H18N9T (321 ss) acid-proof
03/	Steel 1H18N9T (321 ss) for oxygen

CODE2	APPLICATION AND CONNECTING TO TRANSMITTER TECHNIQUE
3-	for pressure transmitters and manometers with connecting end M20x1.5
4-	for pressure transmitters and manometers with connecting end G1/2
6-	for double-side installing of impulse tubes

CODE3	IMPULSE HOLES SPACING
0-	not concern (one hole)

CODE4	IMPULSE ENDS
1	f 14 for welding with ball-end
2	f 12 for welding with ball-end
3	f 14 with self-locking ring
4	f 12 with self-locking ring
5	ø14 for welding with flat end
6	ø12 for welding with flat end

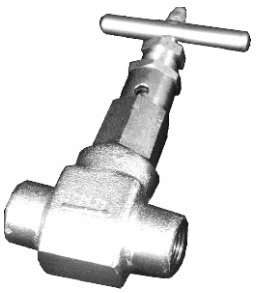
MEZ-15-00/ 4 - 0 - 3 VALVE TYPE

It is possible to make valves (namifolds) with:
- elongated glands (it has to be denoted in the order)
- ends for connect the valve (manifold) with instalation from material different as all alve (manifold)
  - it has to be denoted in the order after agreement with manufacturer

The right of introducing design changes in the product, without deteriorating of its operation parameters, is reserved.

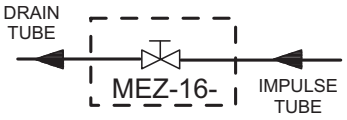
DRAIN VALVES (MANIFOLDS) type MEZ-16

THE MEZ-type VALVES ARE DESIGNED FOR ASSEMBLING IN MEASUREMENT & CONTROL SYSTEMS. THEY ARE USED FOR SWITCHING ON THE FLOW, DIFFERENTIAL PRESSURE AND PRESSURE TRANSMITTERS FOR OPERATION, OR SWITCHING THEM OFF. THEY ENABLE ZERO AND RANGE CHECKING ON TRANSMITTERS AND BLOWING DOWN OF IMPULSE TUBES. THE VALVES ARE PROVIDED BY THE MANUFACTURER WITH SETTING KEY.



- high reliability
- different material versions for water, steam and oxygen
- body material: 15HM
- nominal pressure up to 4 MPa

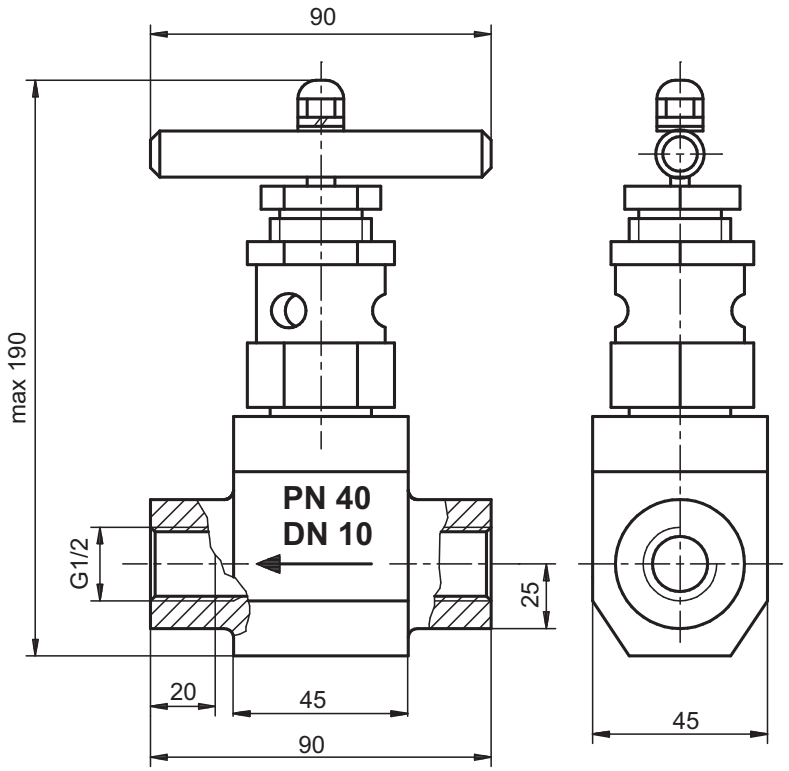
BLOCK DIAGRAM



TECHNICAL DATA

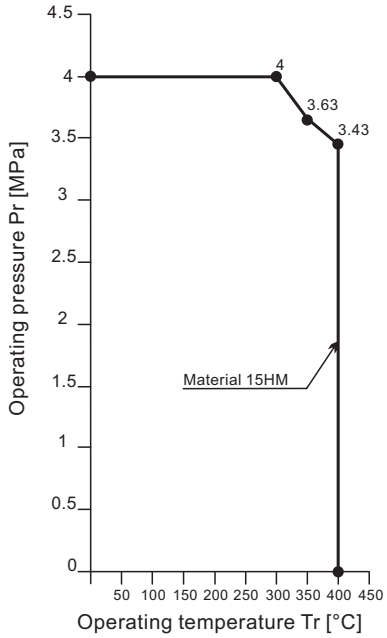
Valve type	MEZ-16-00
Nominal diameter [mm:]	DN 10
Nominal pressure:	4 MPa
Highest operating temperature:	400°C
Numerical values of permissible operating pressures, in function of nominal pressure and operating temperature, acc. to PN-89/H-02650:	acc. to graph
Valve material:	steel 15HM
Valve sealing material:	graphite
Valve version:	standard
Mass:	2.5 kg

DIMENSIONED DRAWING of MEZ-16-00/0-0-5



GRAPH

Range of operating pressures versus operating temperature for valves type: MEZ-16-00



ORDERING OF MEZ-16- VALVES (MANIFOLDS)

MEZ-16-	Drain valve (manifold)

CODE1	VALVE BODY MATERIAL TYPE
00/	Steel 15HM

CODE2	APPLICATION AND CONNECTING TO TRANSMITTER
0-	for drain valves

CODE3	IMPULSE HOLES SPACING
0-	not concern (one hole)

CODE4	IMPULSE ENDS
5	internal thread G1/2

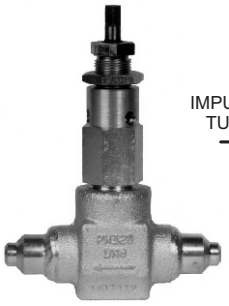
M E Z - 1 6 - 0 0 / 0 - 0 - 5 VALVE TYPE

It is possible to make valves (namifolds) with:
- ends for connect the valve (manifold) with instalation from material different as all alve (manifold)
- it has to be denoted in the order after agreement with manufacturer

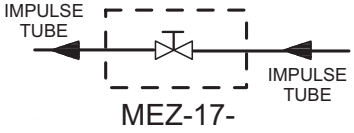
The right of introducing design changes in the product, without deteriorating of its operation parameters, is reserved.

SINGLE-WAY CUT-OFF VALVES (MANIFOLDS) type MEZ-17

THE MEZ- TYPE VALVES ARE DESIGNED FOR ASSEMBLING IN MEASUREMENT & CONTROL SYSTEMS. THEY ARE USED FOR SWITCHING ON THE FLOW, DIFFERENTIAL PRESSURE AND PRESSURE TRANSMITTERS FOR OPERATION, OR SWITCHING THEM OFF. THEY ENABLE ZERO AND RANGE CHECKING ON TRANSMITTERS AND BLOWING DOWN OF IMPULSE TUBES. THE VALVES ARE PROVIDED BY THE MANUFACTURER WITH SETTING KEY.



BLOCK DIAGRAM



MEZ-17-

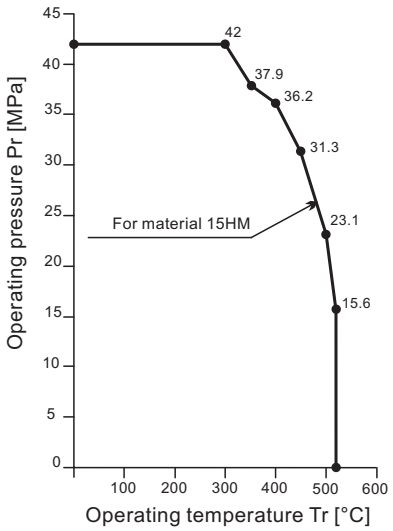
- **high reliability**
- **different material versions for water, steam, acids and oxygen**
- **body material: 15HM or 13HMF**
- **nominal pressure up to 50 MPa**

TECHNICAL DATA

Valve type	MEZ-17-00	MEZ-17-02
Nominal diameter [mm]:	DN 8	DN 8
Nominal pressure:	42 MPa	50 MPa
Highest operating temperature:	520°C	560°C
Numerical values of permissible operating pressures, in function of nominal pressure and operating temperature, acc. to PN-89/H-02650:	acc. to graph 1	acc. to graph 2
Valve material:	steel 15HM	steel 13HMF
Valve sealing material:	graphite	graphite
Valve version:	standard	standard
Mass:	2.5 kg	2.5 kg

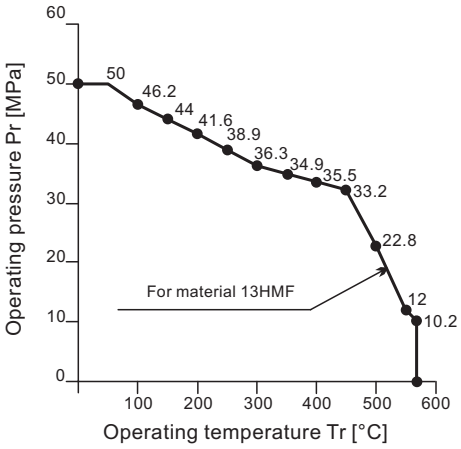
GRAPH 1

Range of operating pressures versus operating temperature for valves type: MEZ-17-00

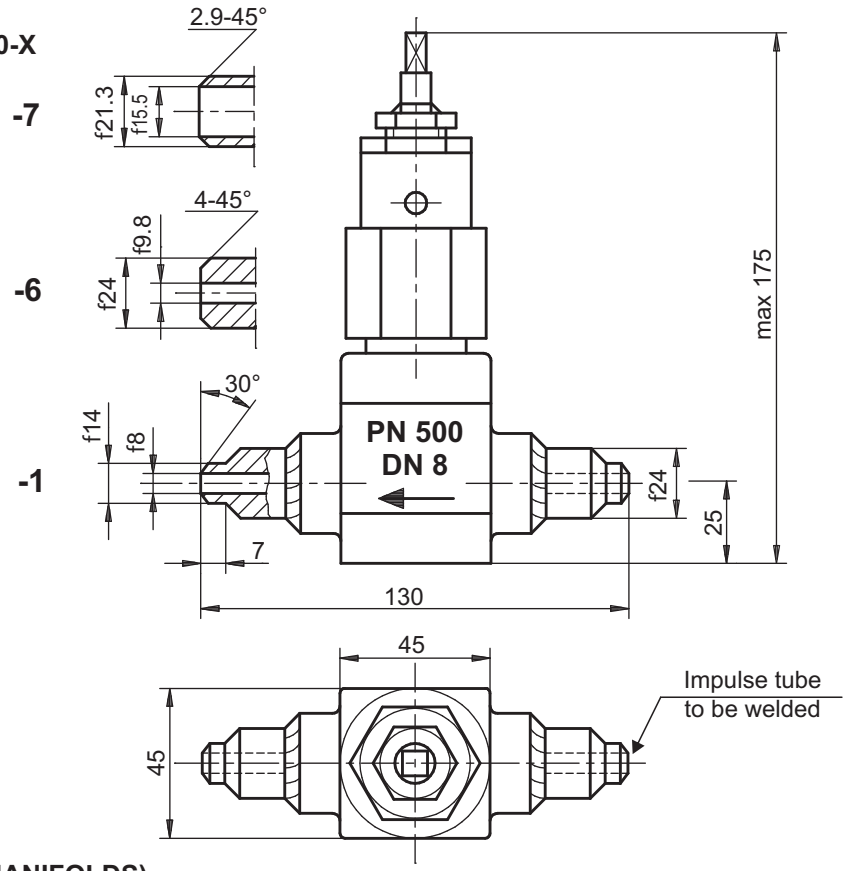


GRAPH 2

Range of operating pressures versus operating temperature for valves type: MEZ-17-02



DIMENSIONED DRAWING of MEZ-17-00/0-0-X and MEZ-17-02/0-0-X



ORDERING OF MEZ-17- VALVES (MANIFOLDS)

MEZ-17-	Single-way cut-off valves (manifolds)

CODE1	VALVE BODY MATERIAL TYPE
00/	Steel 15HM
02/	Steel 13HMF

CODE2	APPLICATION AND CONNECTING TO TRANSMITTER TECHNIQUE
0-	by impulse pipe

CODE3	IMPULSE HOLES SPACING
0-	not concern (one hole)

CODE4	IMPULSE ENDS
1	f 14 for welding (inlet-outlet)
6	f 24 for welding (inlet-outlet)
7	f 21.3 for welding (inlet-outlet)
8	f 24 inlet tube for welding, f 14 outlet tube for welding
9	f 21.3 inlet tube for welding, f 14 outlet tube for welding

M E Z - 1 7 - 0 0 / 0 - 0 - 6 VALVE TYPE

It is possible to make valves (namifolds) with:
- ends for connect the valve (manifold) with instalation from material different as all alve (manifold)
- it has to be denoted in the order after agreement with manufacturer

The right of introducing design changes in the product, without deteriorating of its operation parameters, is reserved.

Chapter III

Electric actuators

MAS.....III/2

MAS- TYPE VESSELS

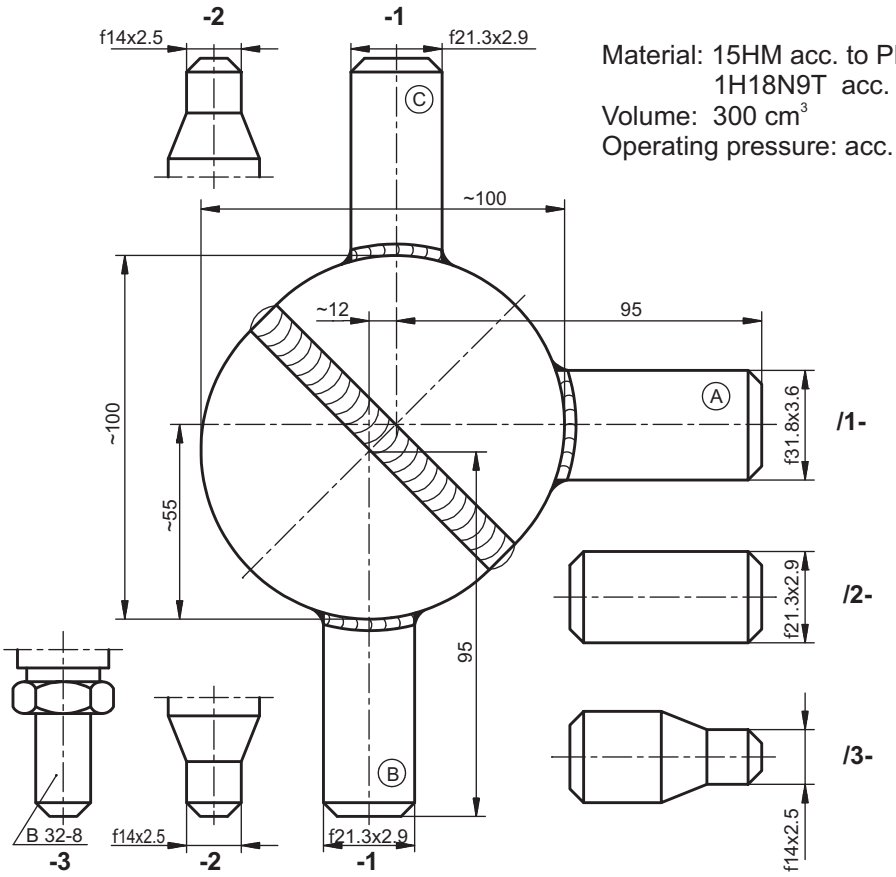
VESSELS MAS-type ARE DESIGNED FOR VENTING AND BLOW-OFF OF MEASURING CIRCUITS AS WELL AS SEPARATING OF HIGH-PARAMETER MEDIA FROM MEASURING INSTRUMENTATION. THE VESSELS MAS-type MIGHT BE USED FOR UP-KEEPING CONSTANT INTERMEDIATE LIQUID LEVEL (CONDENSATE) BETWEEN VESSEL AND DIFFERENT PRESSURE TRANSMITTER AT THE MEASURING THE INTENSITY OF OVERHEATED STEAM FLOW.

- **maximum pressure 10 and 42MPa**
- **maximum temperature 250°C; 520°C; 560°C**
- **different construction versions**
- **certificate for material and make - each product is tested RTG**

TECHNICAL DATA

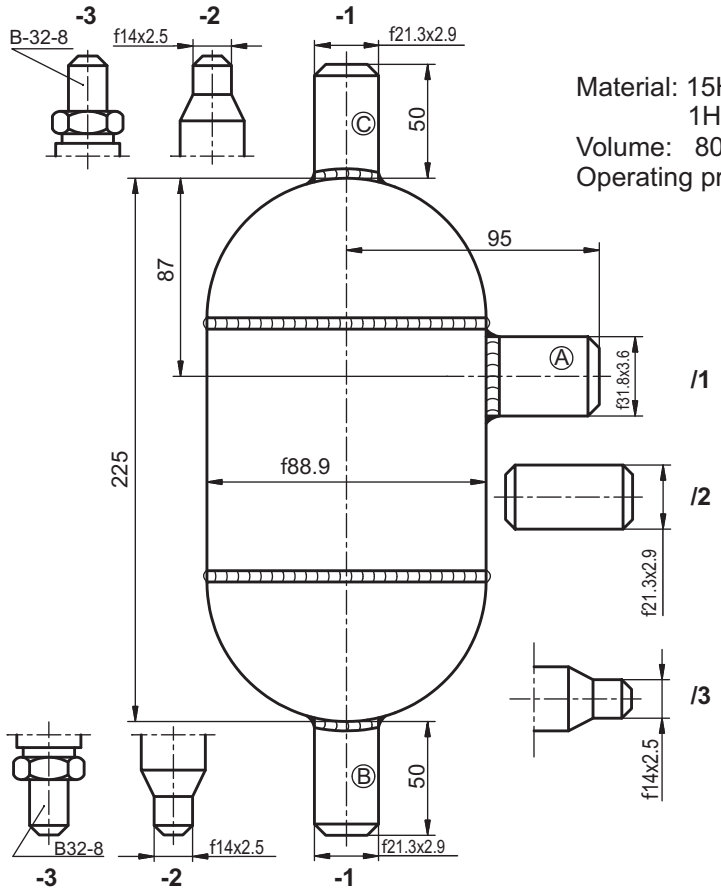
VESSEL TYPE	MAS-01-00	MAS-01-02	MAS-02-00	MAS-02-02	MAS-03-00	MAS-03-01
Volume:	300 cm^3	300 cm^3	800 cm^3	800 cm^3	180 cm^3	180 cm^3
Nominal pressure:	10MPa	10MPa	10MPa	10MPa	42MPa	42MPa
Test pressure:	15MPa	15MPa	15MPa	15MPa	56MPa	56MPa
The highest application temperature:	520°C	250°C	520°C	250°C	520°C	560°C
Vessel's material:	15HM	1H18N9T	15HM	1H18N9T	15HM	13HMF
Passage diameter:	8; 15; 24.5mm	8; 15; 24.5mm	8; 15; 24.5mm	8; 15; 24.5mm	8; 10; 14mm	8; 10; 14mm
Mass:	1.9kg	1.9kg	4.3kg	4.3kg	3.7kg	3.7kg

DIMENSIONED DRAWING OF MAS-01- VESSEL



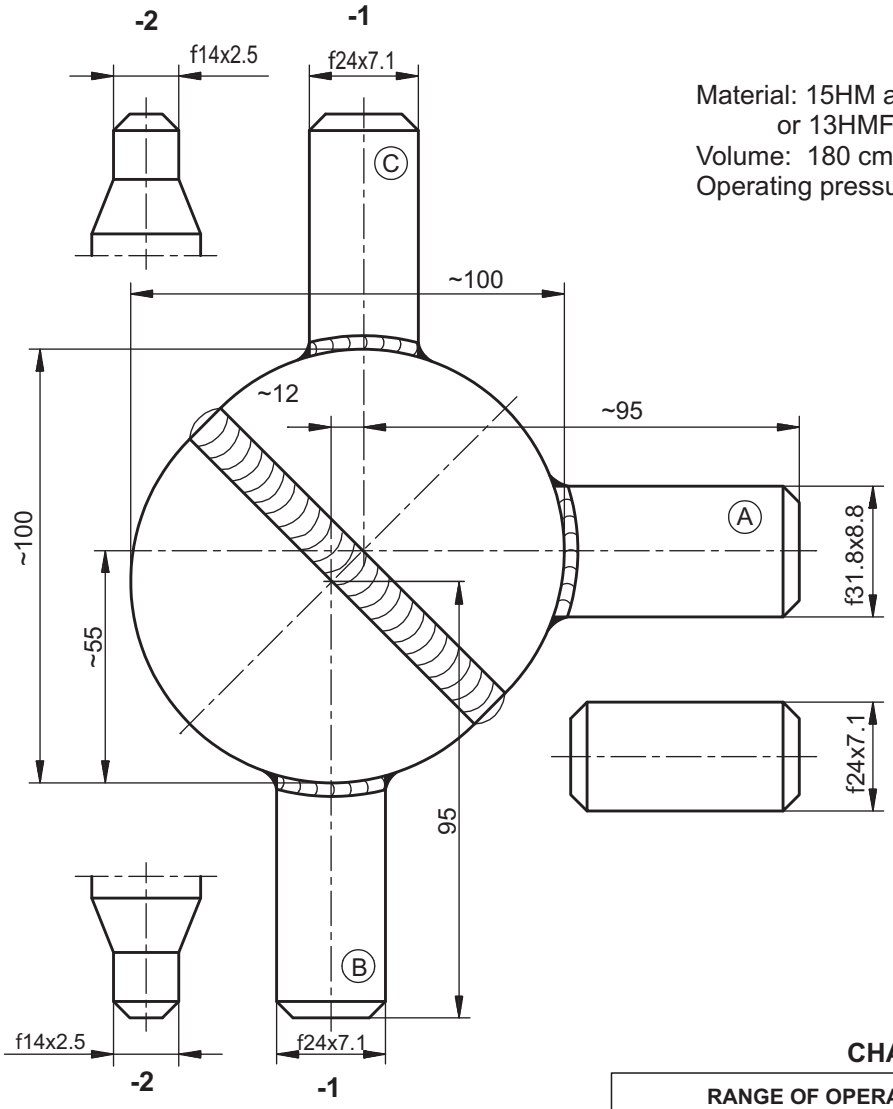
Material: 15HM acc. to PN-75/H-84024
1H18N9T acc. to PN-71/H-86020
Volume: 300 cm^3
Operating pressure: acc. to chart no.1

DIMENSIONED DRAWING OF MAS-02- VESSEL



Material: 15HM acc. to PN-75/H-84024
1H18N9T acc. to PN-71/H-86020
Volume: 800 cm^3
Operating pressure: acc. to Chart no. 1

DIMENSIONED DRAWING OF MAS-03- VESSEL



Material: 15HM acc. to PN-75/H-84024
or 13HMF acc. to PN-75/H-84024
Volume: 180 cm^3
Operating pressure: acc. to Charts no. 2 and 3

CHART NO. 1

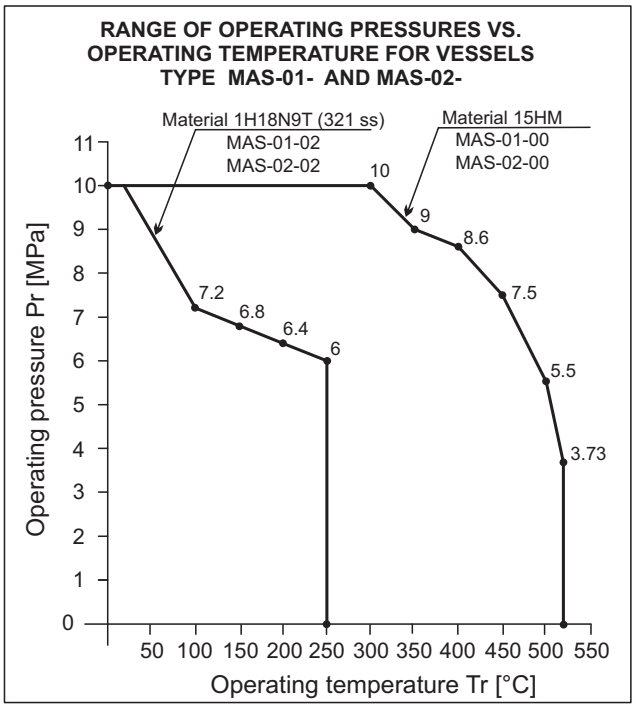


CHART NO. 2

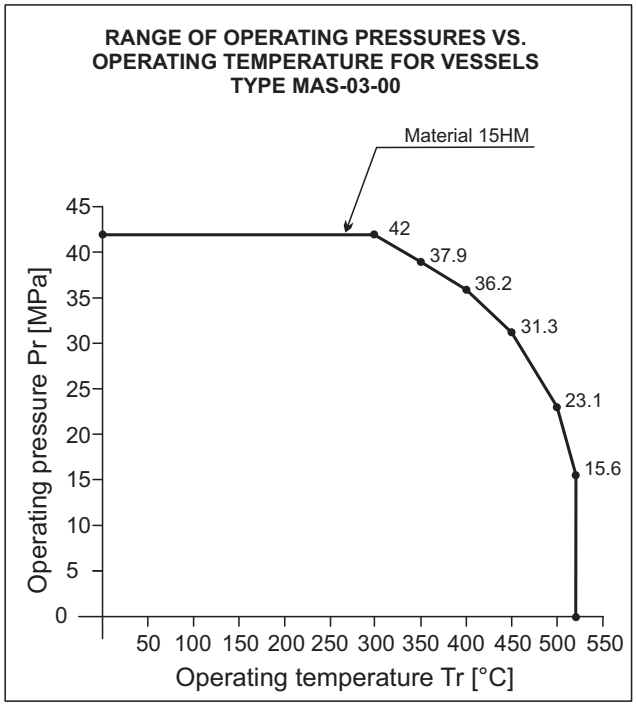
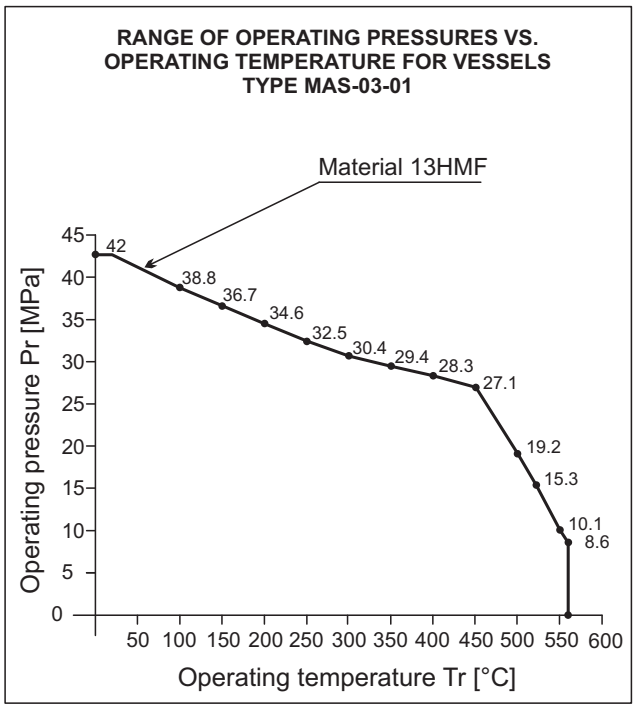


CHART NO. 3



Making

MAS-type vessels perform requirements of pressure directive PED no. 97/23/WE. As pressure units which parameters are not higher than limiting in par. 1.1, 1.2, 1.3 and 2 of mentioned directive they are designed and making with acknowledged engineering practice and they are not need CE marking.

ORDERING OF MAS-01- VESSEL

MAS-01-	VESSEL

CODE1	MATERIAL TYPE
00	15HM
02	1H18N9T (321ss)

CODE2	STUB PIPE TYPE (A)*
/1	31.8 dia. x 3.6
/2	21.3 dia. x 2.9
/3	14 dia. x 2.5

CODE3	STUB PIPE TYPE (B)*
-1	21.3 dia. x 2.9
-2	14 dia. x 2.5
-3	ball - type end B32-8

CODE4	STUB PIPE TYPE (C)*
-0	no stub pipe
-1	21.3 dia. x 2.9
-2	14 dia. x 2.5

MAS-01-00/1-1-1 Vessel

*** Other stub pipe versions available after agreement with manufacturer**

ORDERING OF MAS-02- VESSEL

MAS-02-	VESSEL

CODE1	MATERIAL TYPE
00	15HM
02	1H18N9T

CODE2	STUB PIPE TYPE (A)*
/1	31.8 dia. x 3.6
/2	21.3 dia. x 2.9
/3	14 dia. x 2.5

CODE3	STUB PIPE TYPE (B)*
-1	21.3 dia. x 2.9
-2	14 dia. x 2.5
-3	ball - type end B32-8

CODE4	STUB PIPE TYPE (C)*
-0	without stub pipe
-1	21.3 dia. x 2.9
-2	14 dia. x 2.5
-3	ball - type end B32-8

MAS-02-00 / 1 - 1 - 1 Vessel

*** Other stub pipe versions available after agreement with manufacturer**

ORDERING OF MAS-03- VESSEL

MAS-03-	VESSEL

CODE1	MATERIAL TYPE
00	15HM
01	13HMF
03	10H2M

CODE2	STUB PIPE TYPE (A)*
/1	31.8 dia. x 8.8
/2	24 dia. x 7.1

CODE3	STUB PIPE TYPE (B)*
-1	24 dia. x 7.1
-2	14 dia. x 2.5

CODE4	STUB PIPE TYPE (C)*
-0	without stub pipe
-1	21.3 dia. x 2.9
-2	14 dia. x 2.5

MAS-03-00 / 1 - 1 - 1 Vessel

*** Other stub pipe versions available after agreement with manufacturer**

The right of introducing design changes in the product, without deteriorating of its operation parameters, is reserved.

Chapter IV

Electric actuators

ESL-03.....IV/2
ESL-13.....IV/13
ESL-14.....IV/18
ESO-07.....IV/28
ESW-07.....IV/33
ESW-25.....IV/38
ESW-26.....IV/44
ESW-30.....IV/49

ELECTRIC LINEAR ACTUATORS ESL-03-

for heat engineering and air conditioning systems
requirements acc. to standard PN-92/M-42011
control type

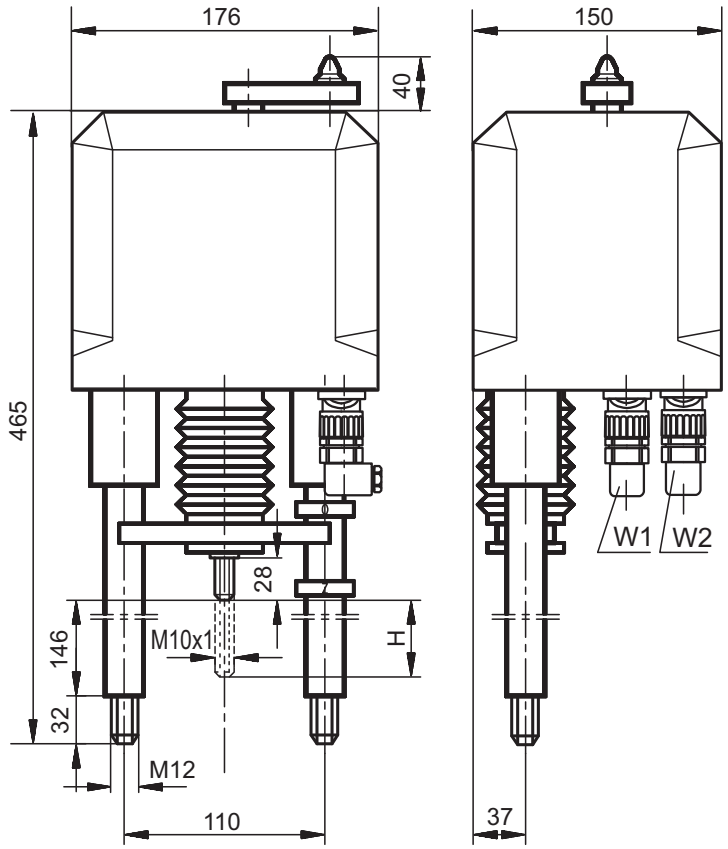
THE ELECTRIC LINEAR ACTUATORS TYPE ESL-03- (CONSTANT SPEED) ARE DESIGNED FOR DRIVING OF CONTROL CLOSING COMPONENTS AND OTHER DEVICES IN CONTROL SYSTEM IN AIR CONDITIONING AND HEAT ENGINEERING.

TECHNICAL DATA

- power supply	230V +10%, -15%, f=50Hz
- rated force	2…8kN
- linear velocity (positioning speed)	16; 25 or 40mm/min
- travel	20; 25 or 40mm
- ambient temperature during operation	-25°C…+55°C
- protection degree	IP54 acc. to PN-EN60259 : 2002(U)
- duty type	S2 - 15min and S4 - 25%, 630c/h acc. to PN-92/M-42011
- mass	~8kg

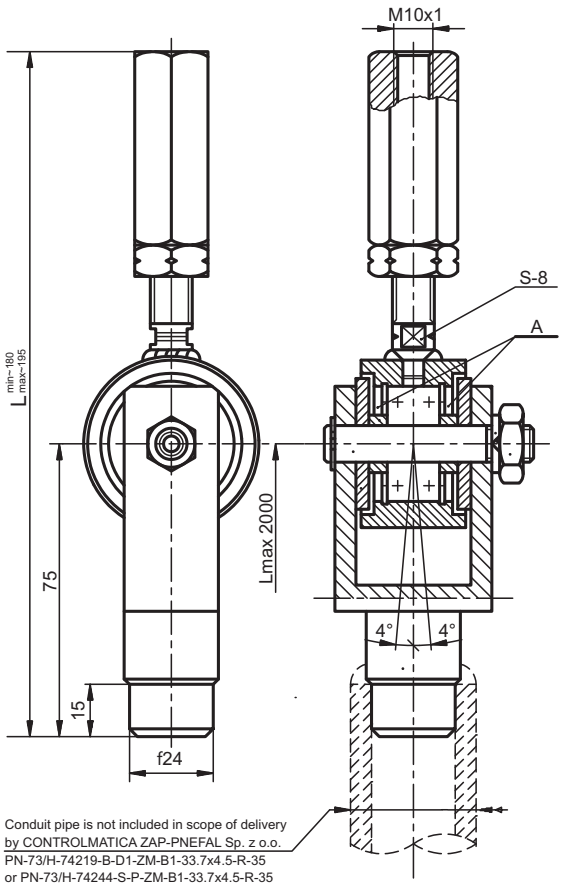
MICROSWITCHES:	Type: 83.133. 54ER14.1
- rated power supply	250V, 50…60Hz or 30V DC
- rated switching current	2.5A
- rated thermal current	11A
- minimal switching voltage	10V
- minimal switching current	20mA

DIMENSIONED DRAWING



CODE5	Drawing no.	Connector
-06	ES3-0815	Ball-and-socket joint

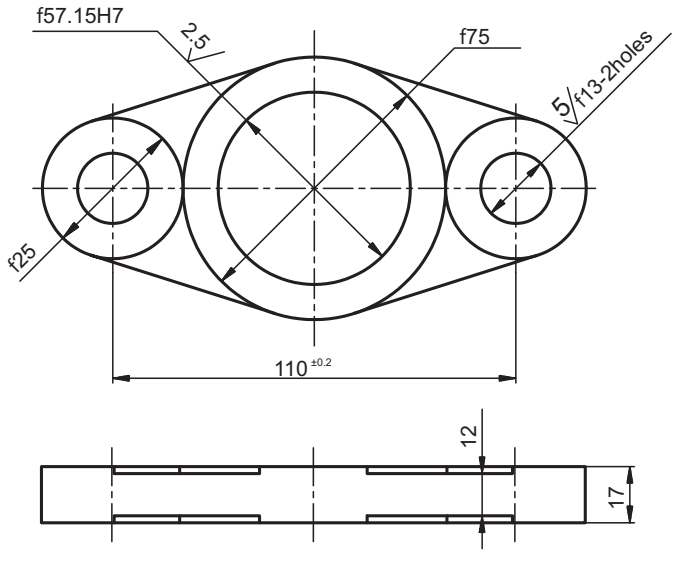
BALL-AND-SOCKET JOINT FOR ESL-03- ACTUATORS



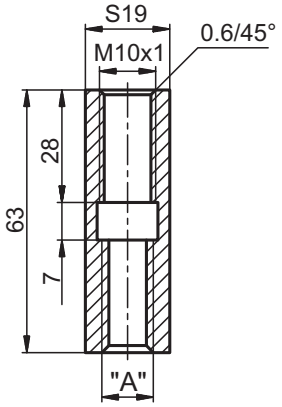
Conduit pipe is not included in scope of delivery
by CONTROLMATICA ZAP-PNEFAL Sp. z o.o.
PN-73/H-74219-B-D1-ZM-B1-33.7x4.5-R-35
or PN-73/H-74244-S-P-ZM-B1-33.7x4.5-R-35

CONNECTORS FOR ESL-03- ACTUATORS

CONNECTING PLATE

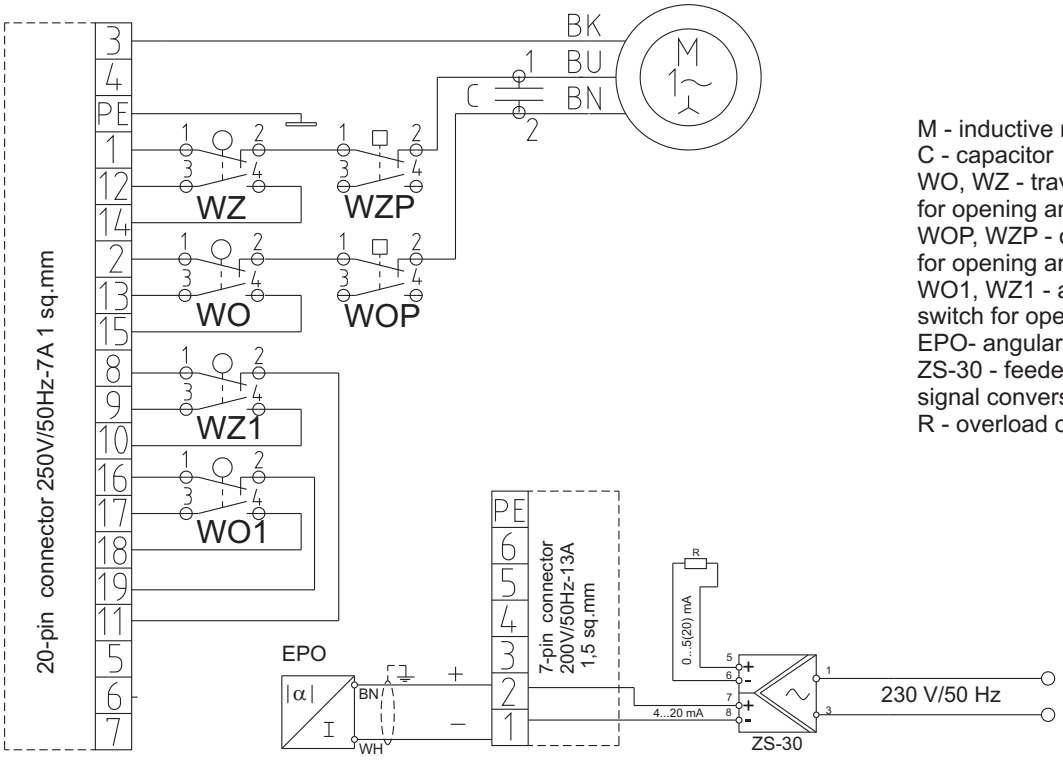


THREADED CONNECTOR



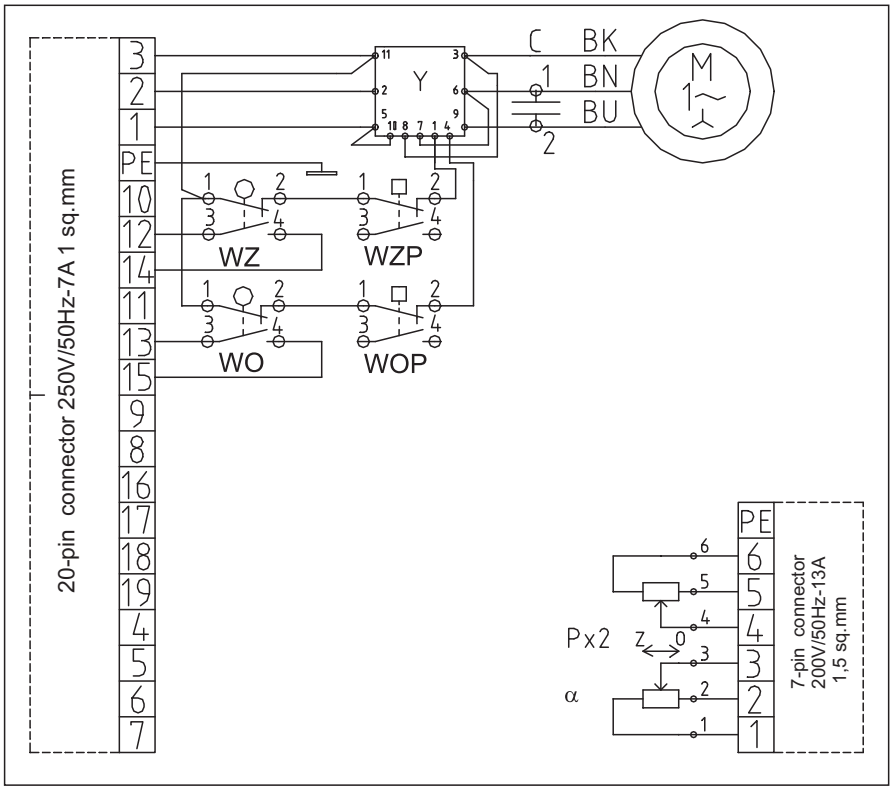
Drawing no.	CODE5	Ver-sion	"A" mm
ES1-0786-1	-03	-1	5/16" 24UNF3A
ES1-0786-2	-04	-2	3/8" 24UNF3A
ES1-0786-3	-05	-3	1/2" 20UNF3A
ES1-0786-4	-13	-4	M12 x1.25

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH DOUBLE TRAVEL SWITCHES AND ANGULAR ENCODER



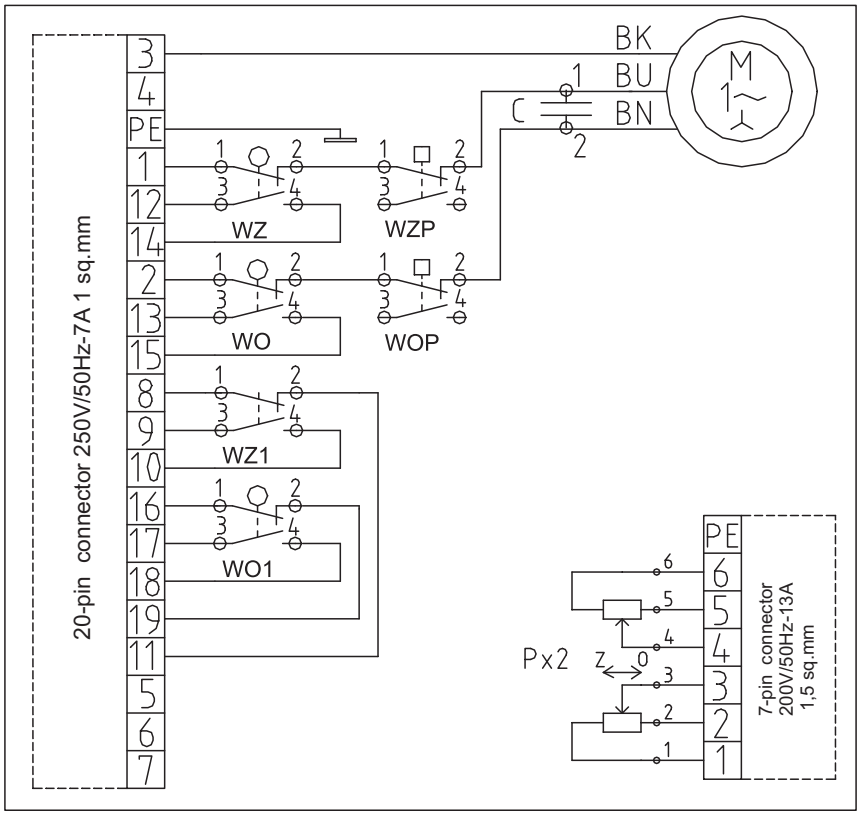
M - inductive motor
C - capacitor
WO, WZ - travel switch for opening and closing
WOP, WZP - overload switch for opening and closing
WO1, WZ1 - additional travel switch for opening and closing
EPO- angular encoder
ZS-30 - feeder 230V AC with signal conversion
R - overload output resistance

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH DOUBLE TRAVEL SWITCHES R15 RELAY AND POSITION TRANSMITTER - DOUBLE POTENTIOMETER



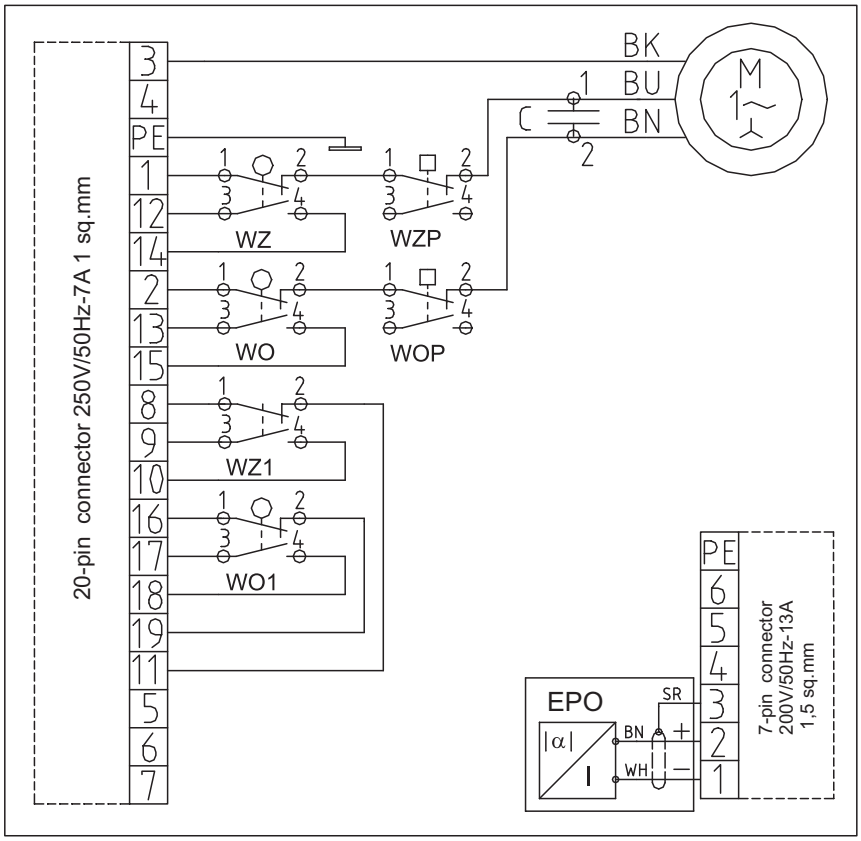
M - inductive motor
C - capacitor
WO, WZ - travel switches for opening and closing
WOP, WZP - overload switches for opening and closing
Y - R15 type relay
Px2 - double potentiometer

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH DOUBLE TRAVEL SWITCHES AND POSITION TRANSMITTER - DOUBLE POTENTIOMETER



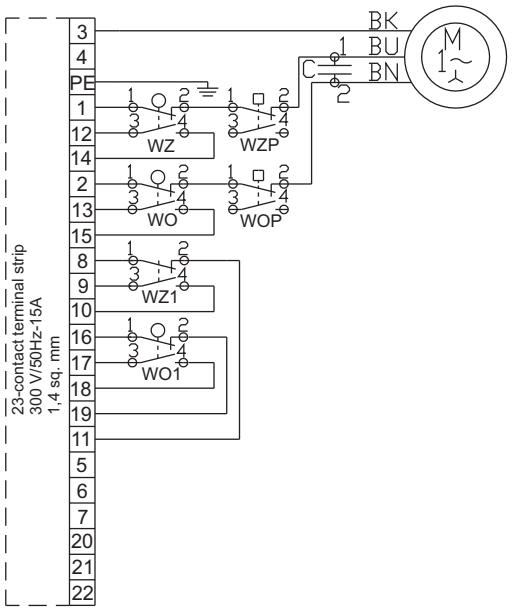
M - inductive motor
C - capacitor
WO, WZ - travel switches for opening and closing
WOP, WZP - overload switches for opening and closing
Px2 - double potentiometer
WO1, WZ1 - additional travel switches for opening and closing

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH DOUBLE TRAVEL SWITCHES AND 2-WIRE ANGULAR ENCODER



M - inductive motor
C - capacitor
WO, WZ - travel switch for opening and closing
WOP, WZP - overload switch for opening and closing
WO1, WZ1 - additional travel switch for opening and closing
EPO - angular encoder

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH TERMINAL STRIP



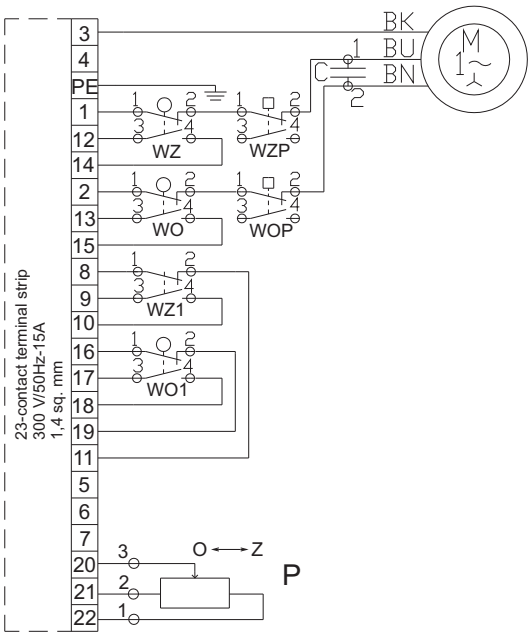
M-inductive motor
C-condenser

WO,WZ-travel switches for opening and closing
WOP,WZP-overload switches for opening closing
WO1,WZ1-additional travel switches

ATTENTION:

1. Power 230 V, 50 Hz of clamps no. 3 and 2 makes working of actuator for opening
2. Power 230 V, 50 Hz of clamps no. 3 and 1 makes working of actuator for closing
3. Back-electrocution protection is made by joining of protection strip PE for outside back-electrocution protection system.

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH TERMINAL STRIP POTENTIOMER



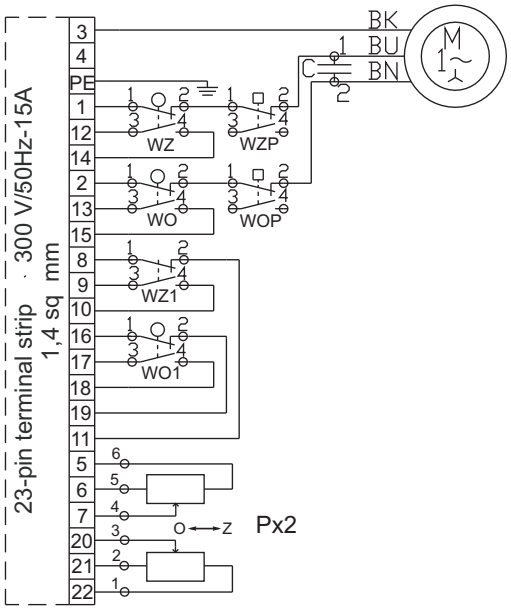
M-inductive motor
C-condenser
P - potentiometer

WO,WZ-travel switches for opening and closing
WOP,WZP-overload switches for opening closing
WO1,WZ1-additional travel switches

ATTENTION:

1. Power 230 V, 50 Hz of clamps no. 3 and 2 makes working of actuator for opening
2. Power 230 V, 50 Hz of clamps no. 3 and 1 makes working of actuator for closing
3. Back-electrocution protection is made by joining of protection strip PE for outside back-electrocution protection system.
4. Potentiometer P is used to position mapping of output actuator component.

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH TERMINAL STRIP AND TWO POTENTIOMETERS



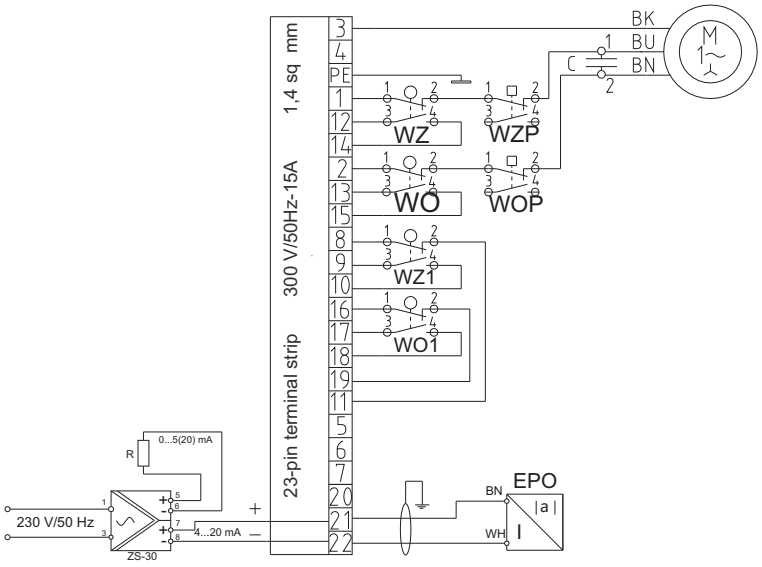
M-inductive motor
C-condenser
Px2 - double potentiometer

WO,WZ-travel switches for opening and closing
WOP,WZP-overload switches for opening closing
WO1,WZ1-additional travel switches

ATTENTION:

1.Power 230V, 50Hz of clamps no. 3 and 2 makes working of actuator for opening.
2.Power 230V, 50Hz of clamps no. 3 and 1 makes working of actuator for closing.
3.Back-electrocution protection is made by joining of protection strip PE for outside back-electrocution protection system.
4.Potentiometer Px2 is used to position mapping of output actuator component.

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH TERMINAL STRIP AND 4-WIRE ANGULAR ENCODER



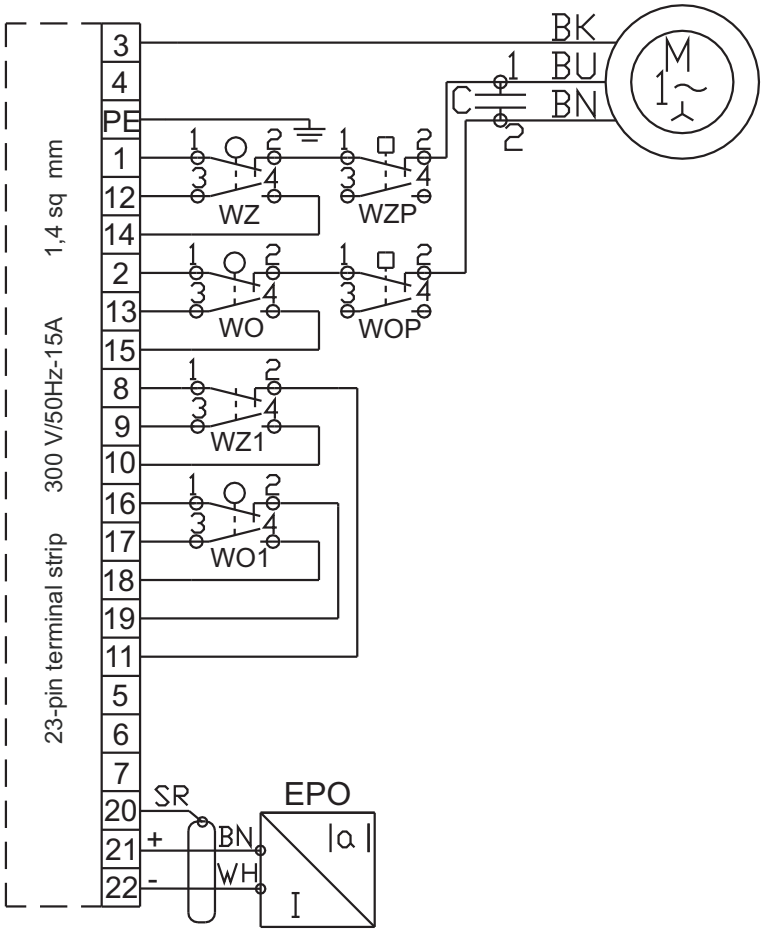
M-inductive motor
C-condenser
EPO- angular encoder

WO,WZ-travel switches for opening and closing
WOP,WZP-overload switches for opening closing
WO1,WZ1-additional travel switches
ZS-30 - feeder 230V AC with signal conversion

ATTENTION:

1.Power 230V, 50Hz of clamps no. 3 and 2 makes working of actuator for opening.
2.Power 230V, 50Hz of clamps no. 3 and 1 makes working of actuator for closing.
3.Back-electrocution protection is made by joining of protection strip PE for outside back-electrocution protection system.
4.Angular encoder EPO is used to position mapping of output actuator component.

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH TERMINAL STRIP
AND 2-WIRE ANGULAR ENCODER

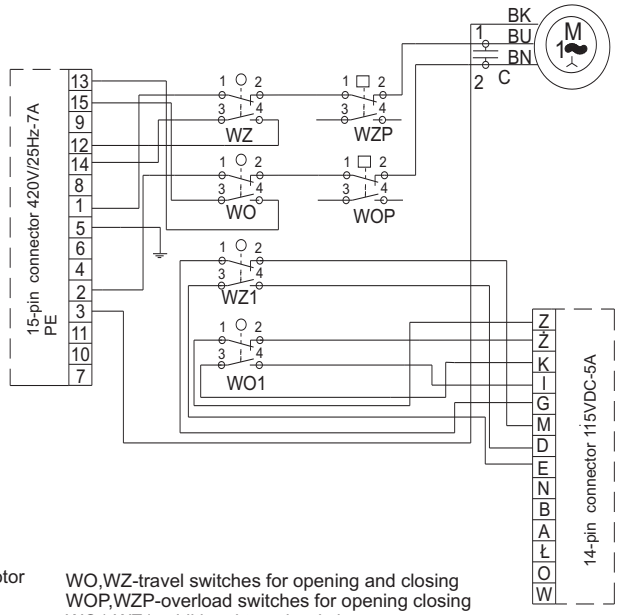


M - inductive motor
C - capacitor
WO, WZ - travel switch for opening and closing
WO1, WZ1 - additional travel switch for opening and closing
WOP, WZP - overload switch for opening and closing
EPO - angular encoder

ATTENTION:

1.Power 230V, 50Hz of clamps no. 3 and 2 makes working of actuator for opening.
2.Power 230V, 50Hz of clamps no. 3 and 1 makes working of actuator for closing.
3.Back-electrocution protection is made by joining of protection strip PE
for outside back-electrocution protection system.
4.Angular encoder EPO is used to position mapping of output actuator component.

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH MULTI-CONTACT CONNECTOR TYPE SSz

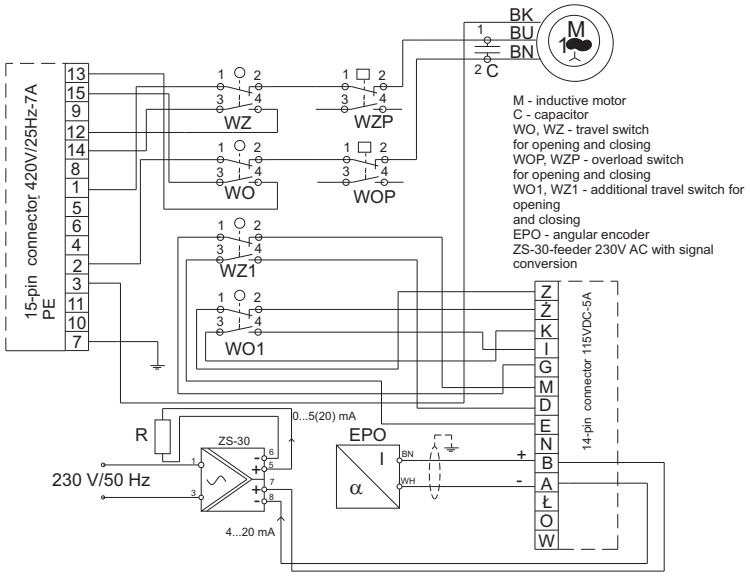


M-inductive motor
C-condenser

WO,WZ-travel switches for opening and closing
WOP,WZP-overload switches for opening closing
WO1,WZ1-additional travel switches

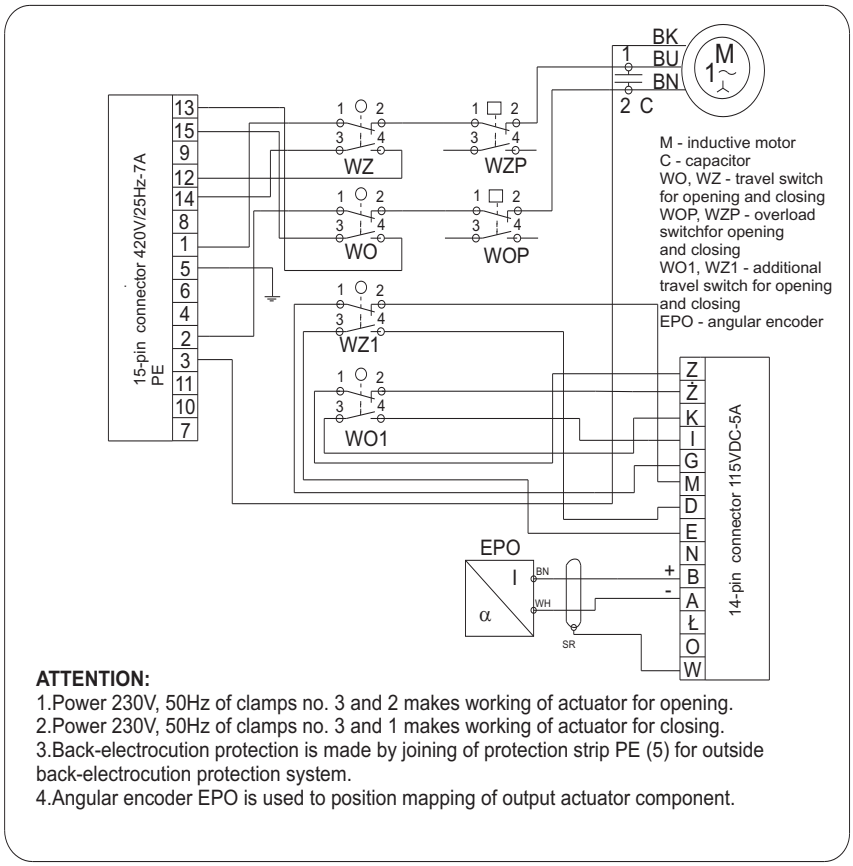
ATTENTION:
1.Power 230V, 50Hz of clamps no. 3 and 2 makes working of actuator for opening.
2.Power 230V, 50Hz of clamps no. 3 and 1 makes working of actuator for closing.
3.Back-electrocution protection is made by joining of protection strip (5) PE
for outside back-electrocution protection system.

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH DOUBLE MICROWITCHES, 4-WIRE ANGULAR ENCODER AND MULTI-CONTACT CONNECTOR TYPE SSZ



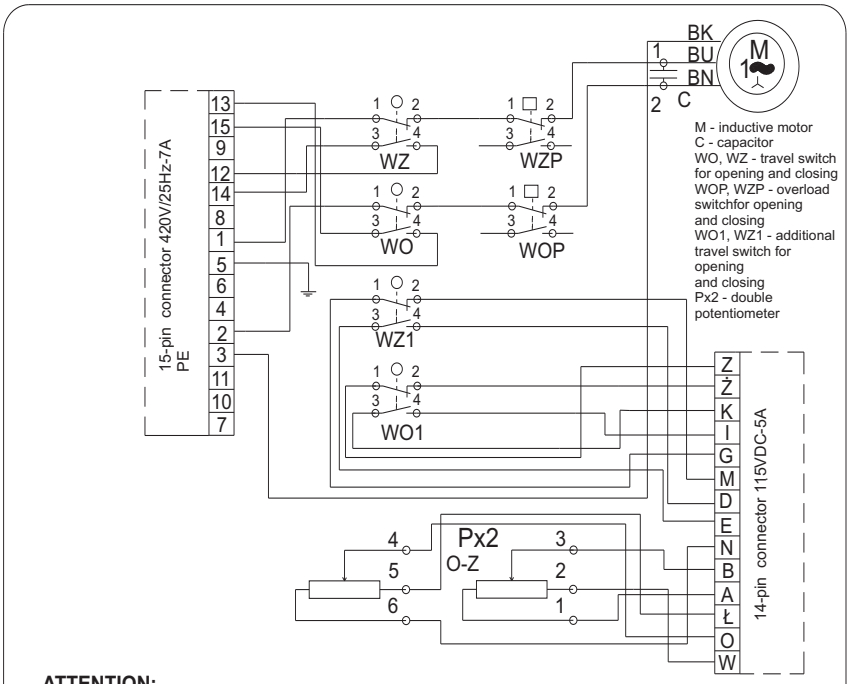
ATTENTION:
1.Power 230V, 50Hz of clamps no. 3 and 2..6 makes working of actuator for opening.
2.Power 230V, 50Hz of clamps no. 3 and 1…6 makes working of actuator for closing.
3.Back-electrocution protection is made by joining of protection strip PE (7) for outside back-electrocution protection system.
4.Angular encoder EPO is used to position mapping of output actuator component.

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH DOUBLE MICROSWITCHES AND 2-WIRE ANGULAR ENCODER WITH MULTI-CONTACT CONNECTOR TYPE Ssz



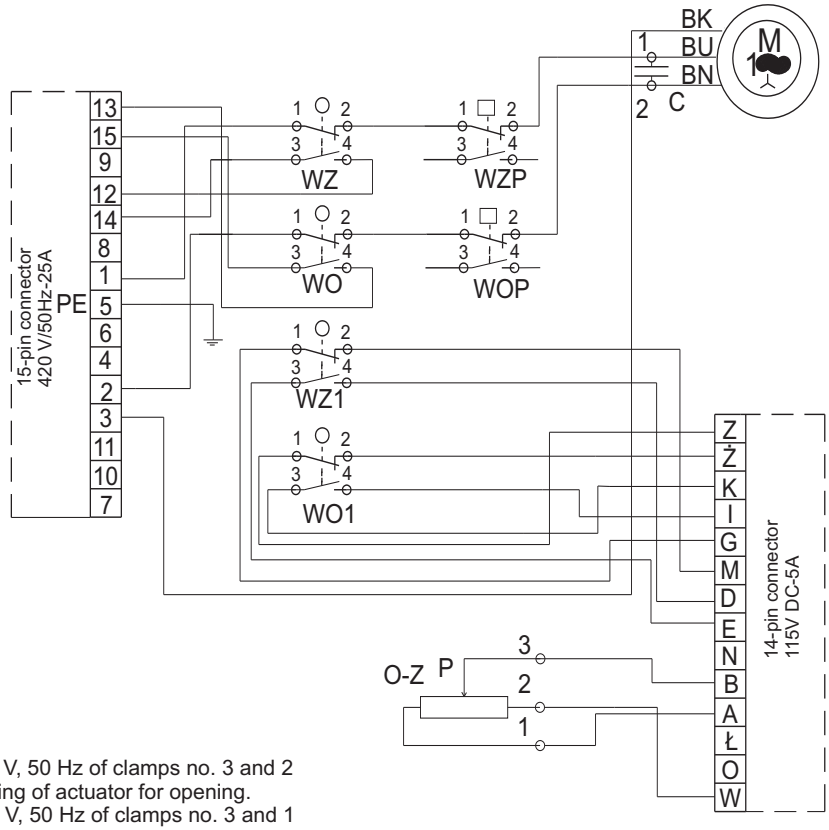
ATTENTION:
1.Power 230V, 50Hz of clamps no. 3 and 2 makes working of actuator for opening.
2.Power 230V, 50Hz of clamps no. 3 and 1 makes working of actuator for closing.
3.Back-electrocution protection is made by joining of protection strip PE (5) for outside back-electrocution protection system.
4.Angular encoder EPO is used to position mapping of output actuator component.

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH DOUBLE MICROSWITCHES AND DOUBLE POTENTIOMETER WITH MULTI-CONTACT CONNECTOR TYPE Ssz



ATTENTION:
1.Power 230V, 50Hz of clamps no. 3 and 2 makes working of actuator for opening.
2.Power 230V, 50Hz of clamps no. 3 and 1 makes working of actuator for closing.
3.Back-electrocution protection is made by joining of protection strip PE (5) for outside back-electrocution protection system.
4.Double potentiometer Px2 is used to position mapping of output actuator component.

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH DOUBLE MICROSWITCHES AND POTENTIOMETER WITH MULTI-CONTACT CONNECTOR TYPE Ssz



ATTENTION:

1.Power 230 V, 50 Hz of clamps no. 3 and 2 makes working of actuator for opening.
2.Power 230 V, 50 Hz of clamps no. 3 and 1 makes working of actuator for closing.
3.Back-electrocution protection is made by joining of protection strip (5) PE for outside back-electrocution protection system.

M-inductive motor
C-condenser
WO,WZ-travel switches for opening and closing
WOP,WZP-overload switches for opening and closing
WO1,WZ1-additional travel switches
P-potentiometer

ORDERING

TYPE	Force	Linear positioning speed	Travel "H"
ESL-03-00	4kN	25mm/min	25mm
ESL-03-01	4kN	25mm/min	40mm
ESL-03-02	2kN	25mm/min	25mm
ESL-03-03	2kN	40mm/min	40mm
ESL-03-04	3.2kN	40mm/min	40mm
ESL-03-05	6.3kN	16mm/min	20mm
ESL-03-06	6.3kN	16mm/min	25mm
ESL-03-07	6.3kN	16mm/min	40mm
ESL-03-08	6.3kN	25mm/min	20mm
ESL-03-09	6.3kN	25mm/min	25mm
ESL-03-10	6.3kN	25mm/min	40mm
ESL-03-11	8kN	16mm/min	20mm
ESL-03-12	8kN	16mm/min	25mm
ESL-03-13	8kN	16mm/min	40mm
ESL-03-14	8kN	25mm/min	20mm
ESL-03-15	8kN	25mm/min	25mm
ESL-03-16	8kN	25mm/min	40mm

Meaning of symbols:

ESL -03-00 - small-sized electric linear actuator of rated lifting force F=4kN, travel h=25mm, linear positioning speed V=25 mm/min
-00 - standard version
-01 - climatic version - for moderate climate
-5 - with 100W potentiometric transmitter
-1 - with single travel switches
-09 - with connector including: plate + connector
- 1 - with amphenol connector

CODE1	PROTECTION TYPE
- 00	standard version

CODE2	CLIMATIC VERSION
-01	version N/2 acc. to PN-68/H-04650 (for moderate climate zone, on land, for outdoor under roof operation)

CODE3	EQUIPMENT
-0	Angular encoder 4…20Ma digital potentiometric (2-wire)
-1	Without angular encoder
-2	Angular encoder 0…5Ma analog potentiometric (4-wire)*
-3	Angular encoder 0…20Ma analog potentiometric (4-wire)*
-4	Angular encoder 4…20Ma analog potentiometric (4-wire)*
-5	Potentiometer 100Ù
-6	Relay type R15
-7	Potentiometer 100Ù, Relay type R15
-8	Potentiometer 2x100Ù, Relay type R15
-9	Potentiometer 2x100Ù
-10	Angular encoder 4…20mA digital un-contacting (2-wire)
-11	Angular encoder 4…20mA analog potentiometric (2-wire)

CODE4	TRAVEL ADJUSTMENT
-1	single travel-dependent switches
-2	double travel-dependent switches (version - recommended)**

CODE5	CONNECTORS
-00	without connecting elements
-02	plate R 110 mm
-03	threaded connector 5/16" - 24UNF3A
-04	threaded connector 3/8" - 24UNF3A
-05	threaded connector 1/2" - 20UNF3A
-06	ball-and-socket joint
-07	plate + threaded connector 5/16" - 24UNF3A
-08	plate + threaded connector 3/8" - 24UNF3A
-09	plate + threaded connector 1/2" - 20UNF3A
-10	plate + threaded connector 5/16"-24UNF3A+ball-and-socket joint
-11	plate + threaded connector 3/8"-24UNF3A+ball-and-socket joint
-12	plate + threaded connector 1/2"-20UNF3A+ball-and-socket joint
-13	M12 x 1.25 connector
-14	M12 x 1.25 connector + plate R 110 mm

CODE6	ELECTRIC CONNECTORS
-1	Amphenol connector
-2	Terminal strip
-3	Multi-contact

ESL-03- 00 - 00 - 01 - 5 - 1 - 09 - 1 EXAMPLE OF ACTUATOR TYPE DENOTATION

** 2-wire angular encoder + feeder with signal conversion; the feeder - the feeder type ZS-30 or other similar for assembly outside the actuator*
*** - for double travel switches one can use the position transmitters having type symbol from "-0" to "-5" as well as "-9" and "-11" (CODE 3)*

The right of introducing design changes in the product, without deteriorating of its operation parameters, is reserved.

ELECTRIC LINEAR ACTUATORS ESL-13-

- for heat engineering and air conditioning
- requirements acc. to standard PN-92/M-42011
- motor provided with brake
- regulating type

THE ELECTRIC LINEAR (CONSTANT-SPEED) ACTUATORS TYPE ESL-13- ARE DESIGNED FOR DRIVING OF CONTROL CLOSING COMPONENTS AND OTHER DEVICES IN CONTROL IN CONTROL AND REGULATION SYSTEMS IN AIR CONDITIONING, HEAT ENGINEERING AND POWER ENGINEERING.

TECHNICAL DATA

- power supply	230V +10%, -15%, f=50Hz
- rated force	8, 12, 16, 20kN
- linear velocity (positioning speed)	16; 32 or 50mm/min
- stroke / travel	25; 40 or 63mm
- ambient temperature during operation	-25°C…+55°C
- protection degree	IP44, acc. to PN-EN60259..2002(U)
- duty type	S2 - 15 min, S4 - 25%, 630c/h acc. to PN-92/M-42011
- mass	~30kg

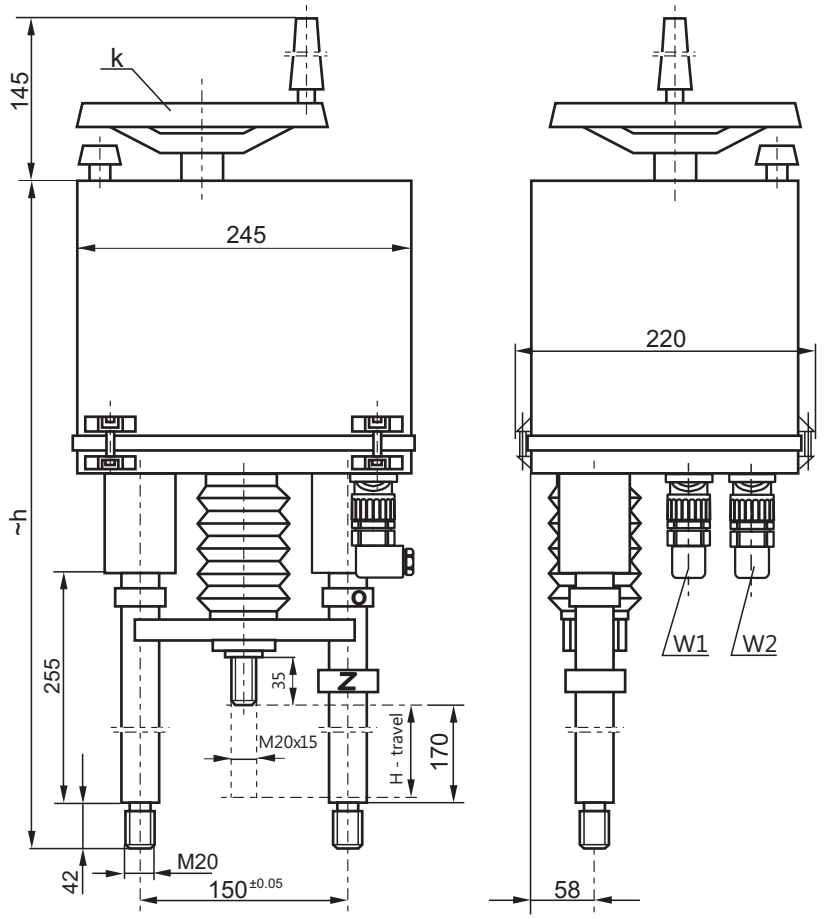
INDUCTIVE TWO-WIRE SENSOR:

- power supply	12…36V DC (recommended 24V DC)
- output signal	4…20mA
- range setting	50…100%
- maximum load resistance	for power supply 24V DC - 500W

MICROSWITCHES: Type: 83.133; 54ER14

- rated power supply	250V, 50…60Hz or 30V DC
- rated switching current	2.5A
- rated thermal current	11A
- minimal switching voltage	10V
- minimal switching current	20mA

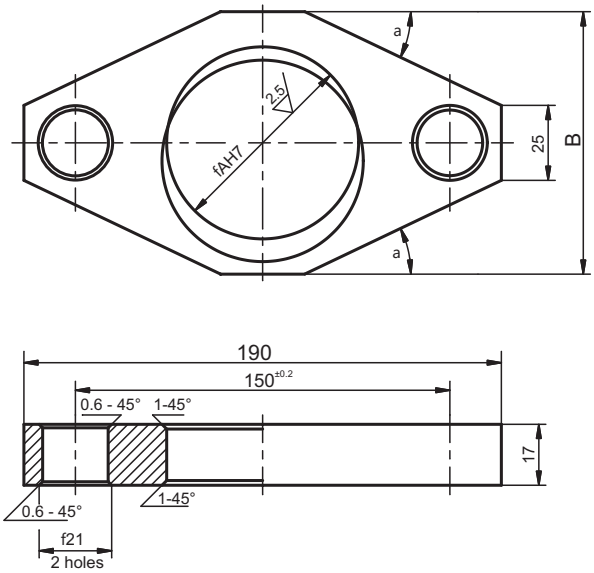
DIMENSIONED DRAWING



W1; W2 – plug-in connectors
K – manual drive wheel

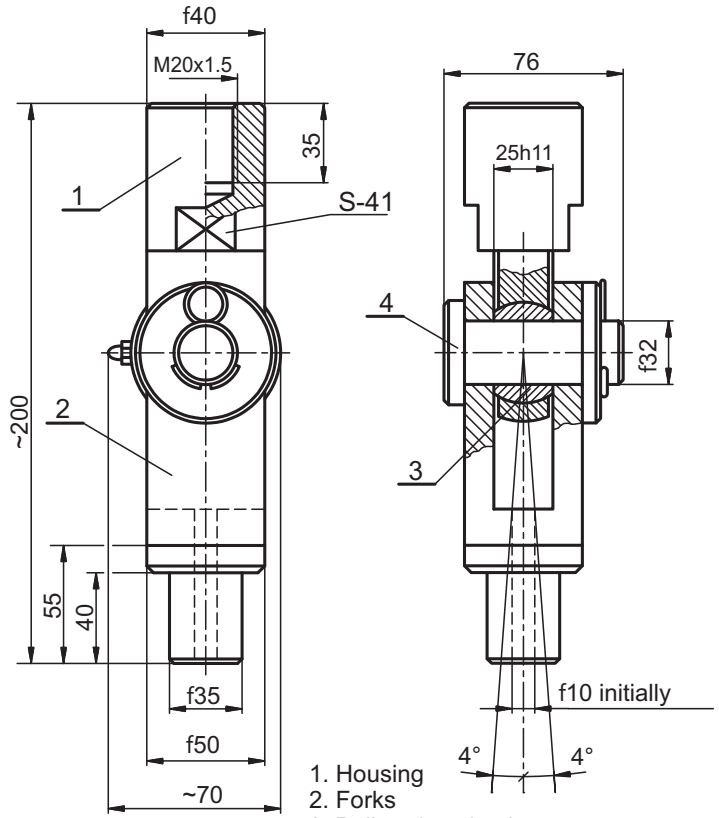
H [mm]	h [mm]
25 40 63	~640
100	~680

PLATE FOR ESL-13- ACTUATOR



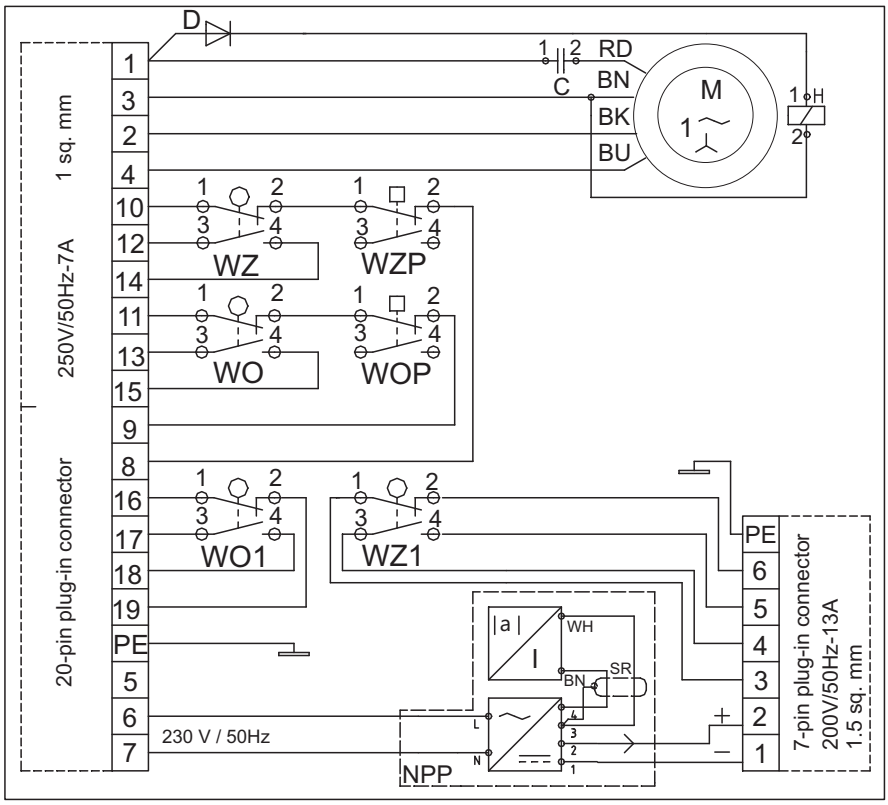
Version	fAH7	B (mm)	a°
1	57.15	85	25°
2	84.2	116	35°
3	95.3	116	35°

BALL-AND-SOCKET JOINT FOR ESL-13- ACTUATORS



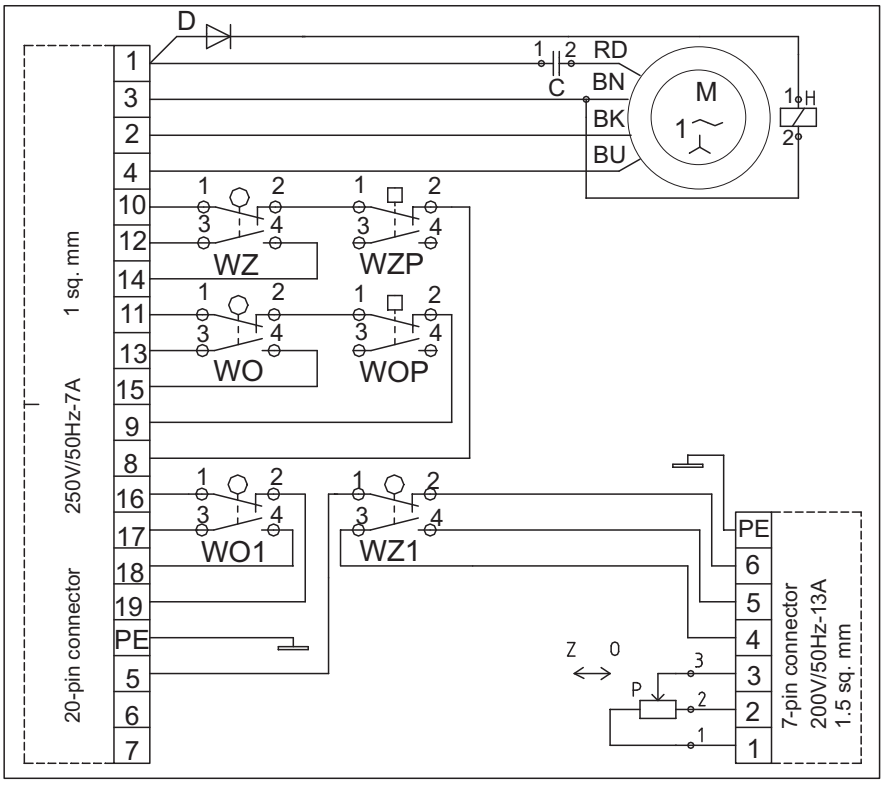
1. Housing
2. Forks
3. Ball-and-socket insert
4. Bolt

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH CURRENT-TYPE FOUR-WIRE POSITION TRANSMITTER



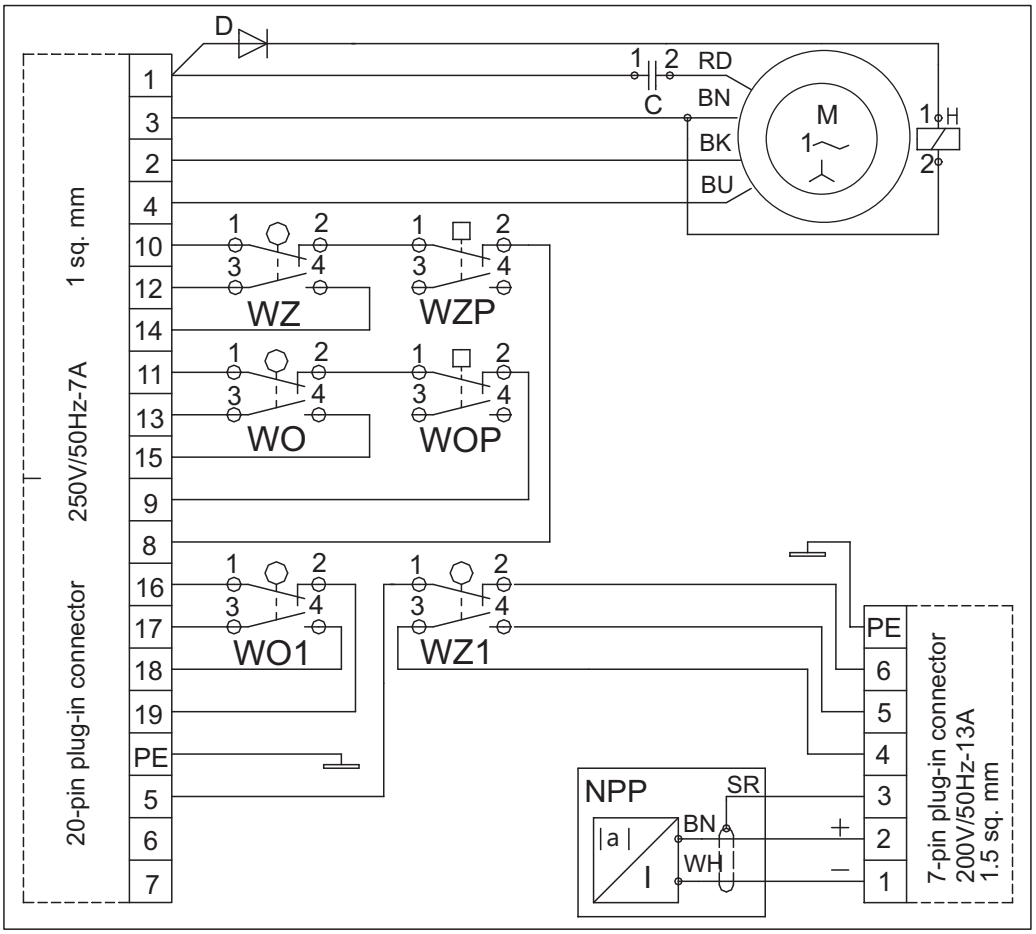
M - inductive motor
C - capacitor
WO, WZ - travel switches for opening and closing
WOP, WZP - overload switches for opening and closing
H - brake
NPP - current-type 4-wire position transmitter
WO1, WZ1 - additional travel switches for opening and closing

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH POSITION TRANSMITTER - POTENTIOMETER



M - inductive motor
C - capacitor
WO, WZ - travel switches for opening and closing
WOP, WZP - overload switches for opening and closing
H - brake
WO1, WZ1 - additional travel switches for opening and closing
P - potentiometer

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR
WITH CURRENT-TYPE TWO-WIRE POSITION TRANSMITTER



M - inductive motor
C - capacitor
WO,WZ - travel switches for opening and closing
WOP,WZP - overload switches for opening and closing
H - brake
NPP - current-type four-wire position transmitter
WO1, WZ1 - additional travel switches
for opening and closing

ORDERING

TYPE	Force kN	Linear positioning speed mm/min	Travel mm
ESL-13-00	8	50	25
ESL-13-01	8	32	25
ESL-13-02	8	16	25
ESL-13-03	8	50	40
ESL-13-04	8	32	40
ESL-13-05	8	16	40
ESL-13-06	8	50	63
ESL-13-07	8	32	63
ESL-13-08	8	16	63
ESL-13-09	8	50	100
ESL-13-10	8	32	100
ESL-13-11	8	16	100
ESL-13-13	12	32	25
ESL-13-14	12	16	25
ESL-13-16	12	32	40
ESL-13-17	12	16	40
ESL-13-19	12	32	63
ESL-13-20	12	16	63
ESL-13-22	12	30	100
ESL-13-23	12	16	100
ESL-13-25	16	32	25
ESL-13-26	16	16	25
ESL-13-28	16	32	40
ESL-13-29	16	16	40
ESL-13-31	16	32	63
ESL-13-32	16	16	63
ESL-13-34	16	32	100
ESL-13-35	16	16	100
ESL-13-38	20	16	25
ESL-13-41	20	16	40
ESL-13-44	20	16	63

Meaning of symbols:

ESL-13-08 - small-sized electric linear actuator of rated lifting force F=8,000N (8kN), travel h=63mm, linear positioning speed V=16 mm/min
-00 - protection type - standard version
-01 - climatic version - for moderate climate
-1 - with single travel switches
-1 - without position transmitter
-00 - without connecting elements

CODE1	PROTECTION TYPE
-00	standard version

CODE2	CLIMATIC VERSION
-01	version N/2 acc. to PN-68/H-04650 (for moderate climate zone, outdoor under roof operation on land)

CODE3	EQUIPMENT
-0	with current transmitter, signal of 4…20mA, two-wire type PPI-01-B measuring element - resolver
-1	without transmitter
-2	with current transmitter, signal of 0…5mA *
-3	with current transmitter, signal of 0…20mA *
-4	with current transmitter, signal of 4…20mA *
-5	with 100-ohm potentiometric transmitter
-6	with current transmitter, signal of 4...20mA, intelligent two-wire

CODE4	TRAVEL ADJUSTMENT
-1	single travel-dependent switches
-2	double travel-dependent switches (version - recommended)

CODE5	CONNECTORS
-00	without connecting elements
-01	ball-and-socket joint
-02	M12 x 1.25 connector
-03	plate 57.15 dia. + threaded connector 5/8" - 18UNF3A
-04	plate 84.20 dia. + threaded connector 3/4" - 16UNF3A
-05	plate 84.20 dia. + threaded connector 5/8" - 18UNF3A
-06	plate 57.15 dia.+ threaded connector 1/2" - 20UNF3A
-07	plate 95.30 dia. + threaded connector 3/4" - 16UNF3A
-08	plate 84.20 dia. + M16 x 1.5 connector
-09	plate 57.15 dia. + M16 x 1.25 connector (draw. ES1-3182-1)**
-10	plate 57.15 dia. + M16 x 1.5 connector (draw. ES1-3182-2)**
-11	plate 84.20 dia. + M20 x 1.5 connector (draw. ES1-3182-3)**
-12	plate 95.30 dia. + M24 x 1.5 connector (draw. ES1-3182-4)**

ESL-13-08 - 00 - 01 - 1 - 1 - 00 EXAMPLE OF ACTUATOR TYPE DENOTATION

** - with two-wire transmitter PPI-01-B + power supply unit (PSU) with signal conversion; PSU for mounting outside the actuator*
*** - for valves POLNA S.A. Z1*

The right of introducing design changes in the product, without deteriorating of its operation parameters, is reserved.

ELECTRIC LINEAR ACTUATORS ESL-14-

for heat engineering and air conditioning
requirements acc. to standard PN-92/M-42011
regulating type
motor provided with brake

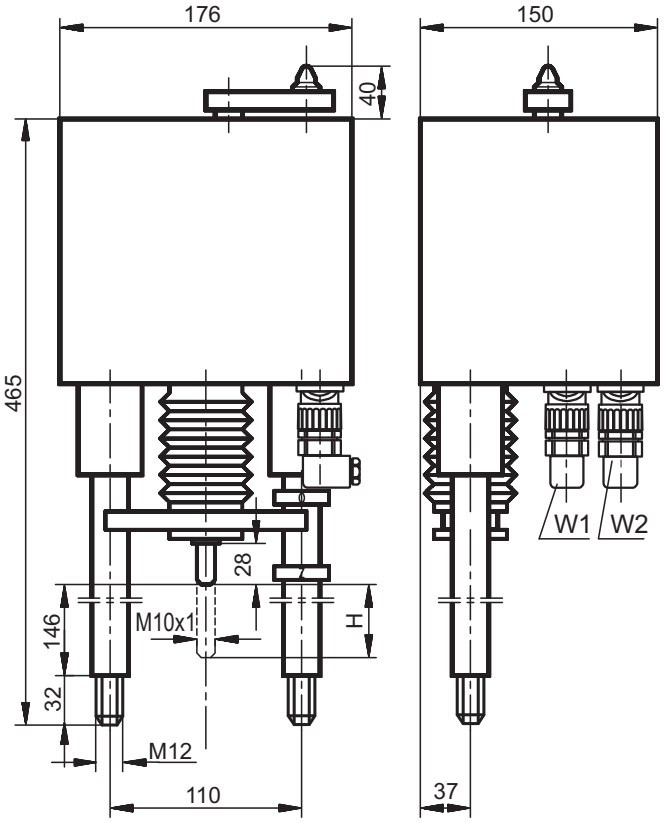
THE ELECTRIC LINEAR ACTUATORS TYPE ESL-14- (CONSTANT-SPEED) ARE DESIGNED FOR DRIVING OF CONTROL CLOSING COMPONENTS AND OTHER DEVICES IN CONTROL AND REGULATION SYSTEMS IN AIR CONDITIONING, HEAT ENGINEERING.

TECHNICAL DATA

- power supply	230V +10%, -15%, f=50Hz
- rated force	2…8kN
- linear velocity (positioning speed)	16; 25 or 40mm/min
- stroke / travel	20; 25 or 40mm
- ambient temperature during operation	-25°C…+55°C
- protection degree	IP54 acc. to standard PN-EN60259..2002(U)
- duty type	S2 - 15min. and S4 - 25%, 1200 c/h acc. to standard PN-92/M-42011
- mass	~8kg

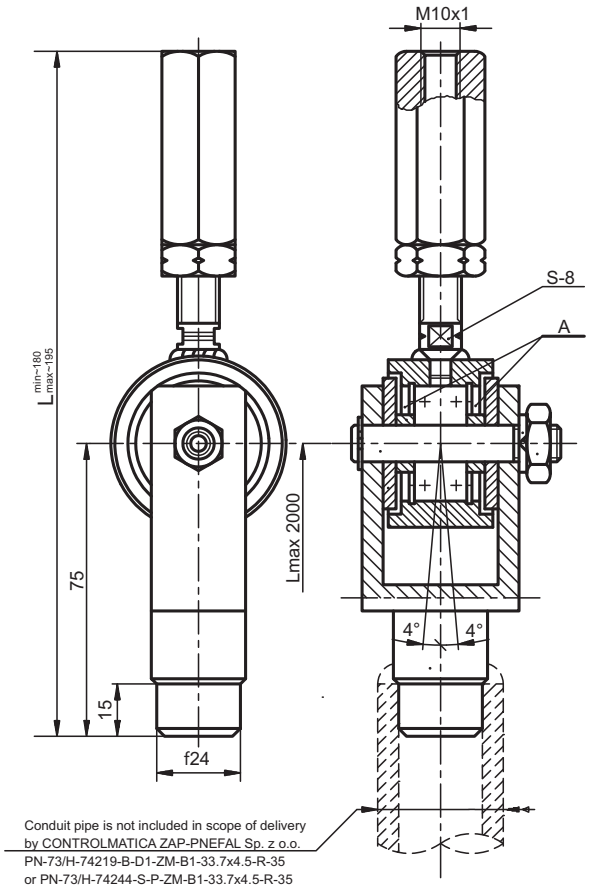
MICROSWITCHES:	Type: 83.132, 54ER14.1
- rated power supply	250V, 50…60Hz or 30V DC
- rated switching current	2.5A
- rated thermal current	11A
- minimal switching voltage	10V
- minimal switching current	20mA

DIMENSIONED DRAWING



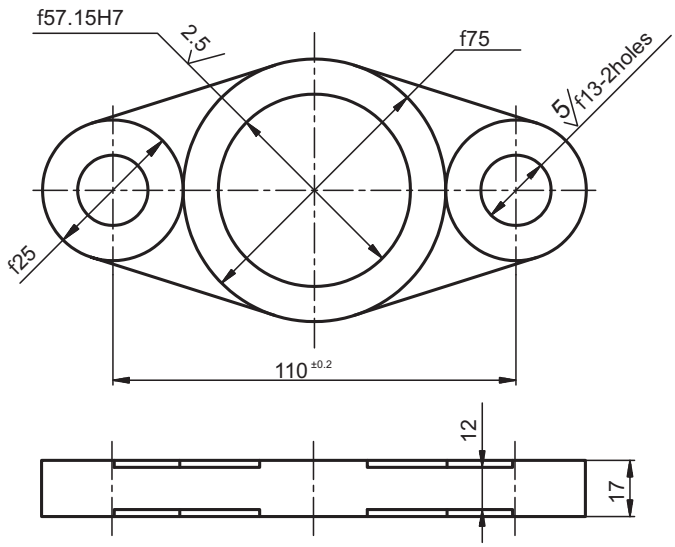
CODE5	Drawing no.	Connector
-06	ES3-0815	Ball-and-socket joint

BALL-AND-SOCKET JOINT FOR ESL-14- ACTUATORS

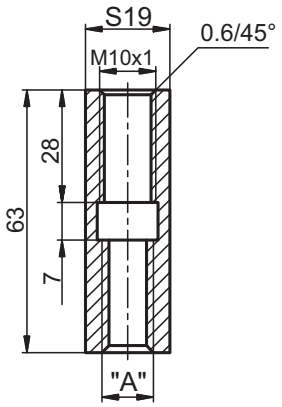


CONNECTORS FOR ESL-14- ACTUATORS

CONNECTING PLATE

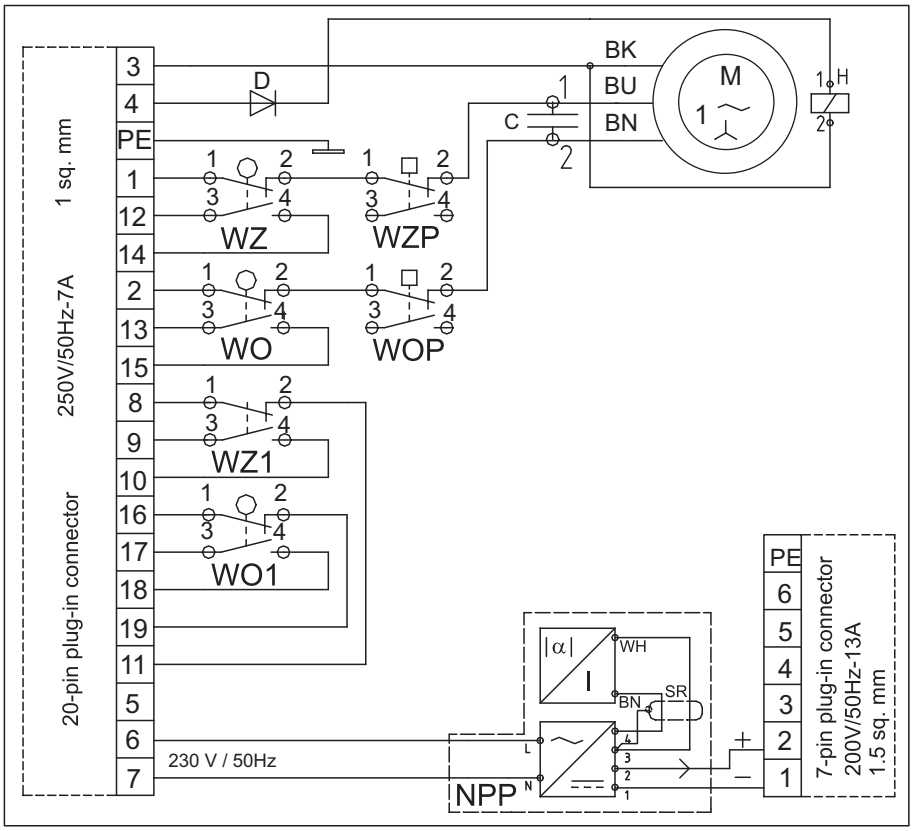


THREADED CONNECTOR



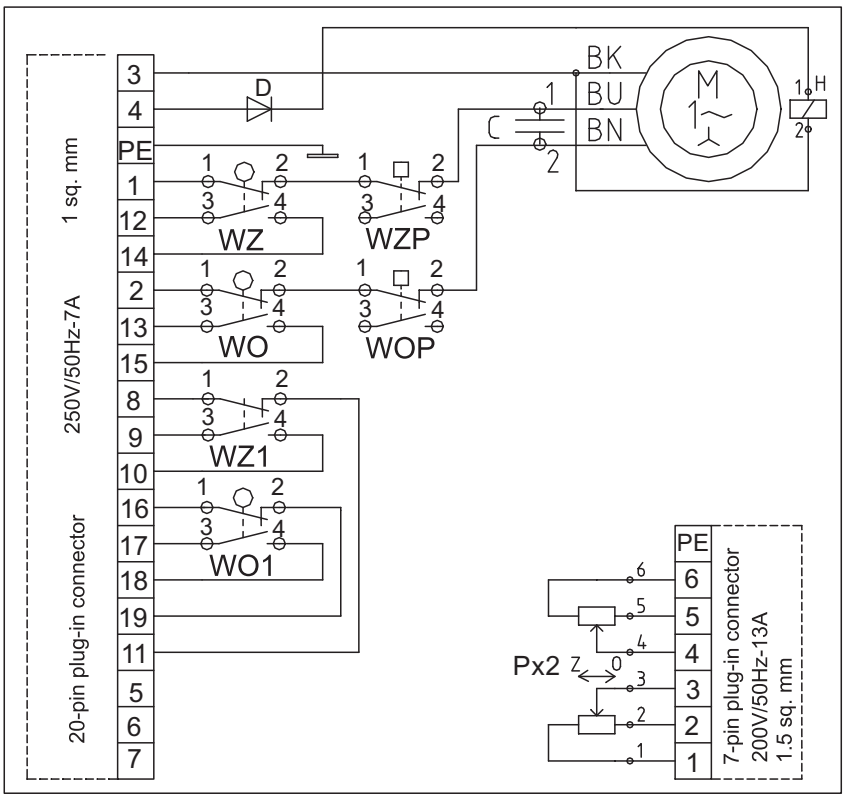
Drawing no.	CODE5	Ver-sion	"A" mm
ES1-0786-1	-03	-1	5/16" 24UNF3A
ES1-0786-2	-04	-2	3/8" 24UNF3A
ES1-0786-3	-05	-3	1/2" 20UNF3A
ES1-0786-4	-13	-4	M12 x1.25

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH DOUBLE TRAVEL SWITCHES AND ANGULAR ENCODER



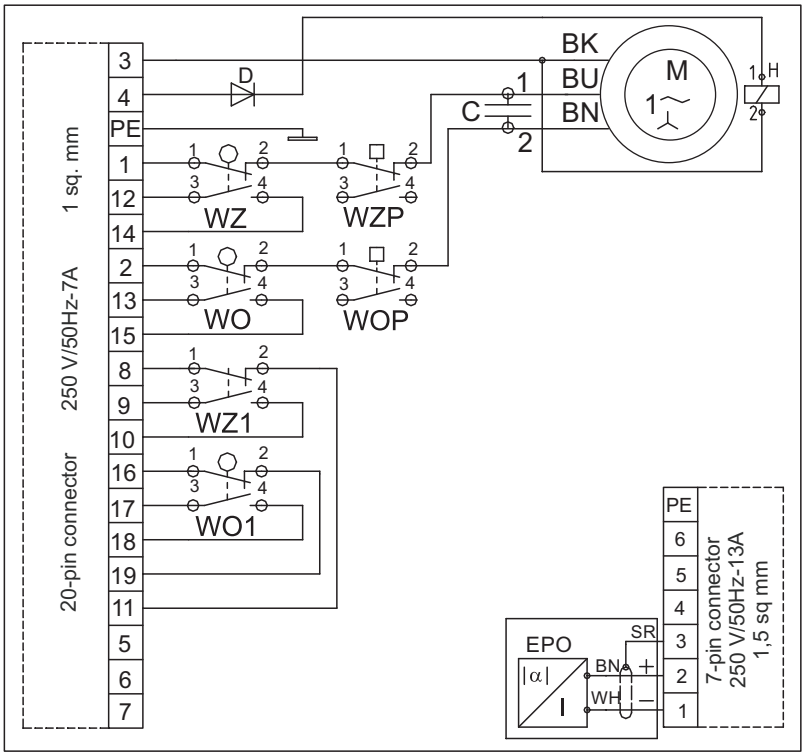
M - inductive motor
C - capacitor
WO, WZ - travel switch for opening and closing
WOP, WZP - overload switch for opening and closing
WO1, WZ1 - additional travel switch for opening and closing
EPO angular encoder
ZS-30-feeder 230V AC with signal conversion
R overload output resistance

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH DOUBLE TRAVEL SWITCHES AND DOUBLE POTENTIOMETER



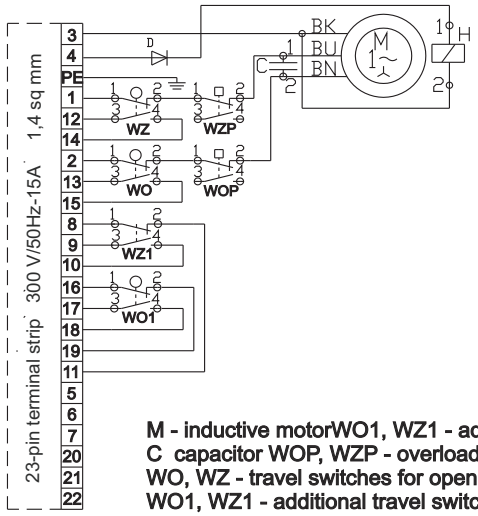
M - inductive motor
C - capacitor
WO, WZ - travel switch for opening and closing
WOP, WZP - overload switch for opening and closing
WO1, WZ1 - additional travel switch for opening and closing
H brake
Px2 double potentiometer

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH DOUBLE TRAVEL SWITCHES AND TWO-WIRE ANGULAR ENCODER



M - inductive motor
C - capacitor
WO, WZ - travel switches for opening and closing
WOP, WZP - overload switches for opening and closing
WO1, WZ1 - additional travel switches
EPO - angular encoder
H - brake

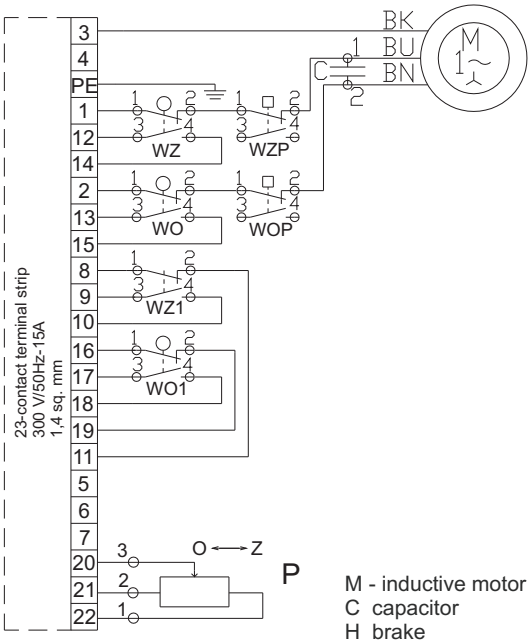
ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH TERMINAL STRIP



M - inductive motorWO1, WZ1 - additional travel switches
C capacitor WOP, WZP - overload switches for opening and closing
WO, WZ - travel switches for opening and closing
WO1, WZ1 - additional travel switches
WOP, WZP - overload switches for opening and closing
H brake

ATTENTION:
1.Power 230V, 50Hz of clamps no. 3 and 2…4 makes working of actuator for opening.
2.Power 230V, 50Hz of clamps no. 3 and 1…4 makes working of actuator for closing.
3.Back-electrocution protection is made by joining of protection strip PE for outside back-electrocution protection system.

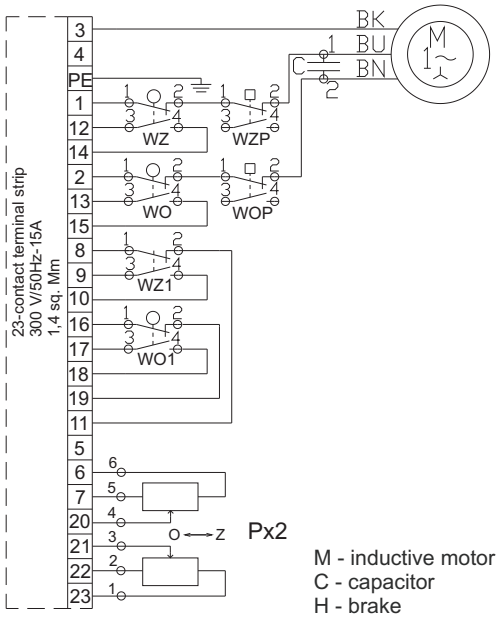
ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH TERMINAL STRIP AND POTENTIOMER



M - inductive motor
C capacitor
H brake
P - potentiometer
WO1, WZ1 - additional travel switches
WOP, WZP - overload switches for opening and closing
WO, WZ - travel switches for opening and closing

ATTENTION:
1.Power 230V, 50Hz of clamps no. 3 and 2 makes working of actuator for opening.
2.Power 230V, 50Hz of clamps no. 3 and 1 makes working of actuator for closing.
3.Back-electrocution protection is made by joining of protection strip PE for outside back-electrocution protection system.
4.Potentiometer P is used to position mapping of output actuator component.

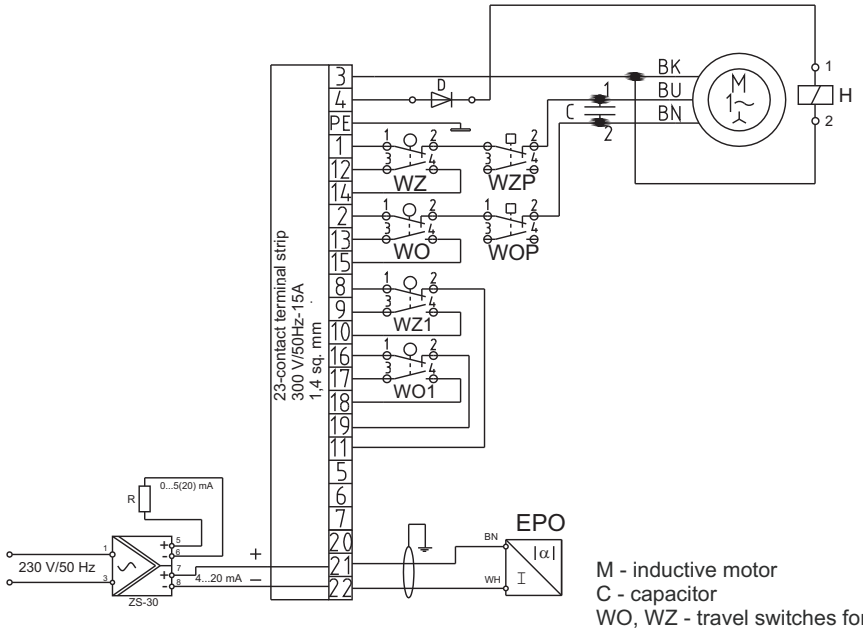
ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH TERMINAL STRIP AND TWO POTENTIOMETERS



M - inductive motor
C - capacitor
H - brake
Px2 - double potentiometer
WO1, WZ1 - additional travel switches
WOP, WZP - overload switches for opening and closing
WO, WZ - travel switches for opening and closing

ATTENTION:
1.Power 230V, 50Hz of clamps no. 3 and 2…4 makes working of actuator for opening.
2.Power 230V, 50Hz of clamps no. 3 and 1…4 makes working of actuator for closing.
3.Back-electrocution protection is made by joining of protection strip PE for outside back-electrocution protection system.
4.Potentiometer Px2 is used to position mapping of output actuator component.

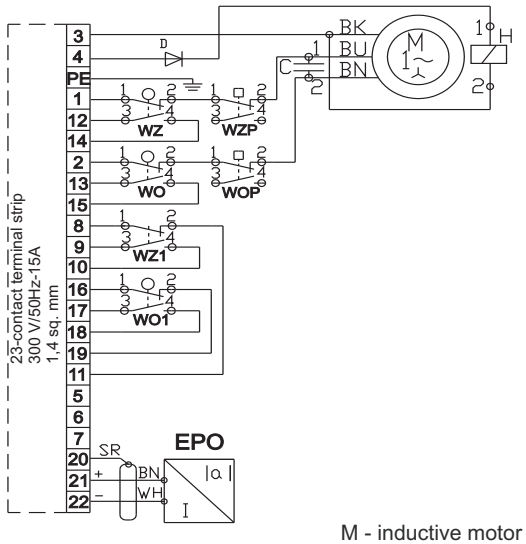
ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH TERMINAL STRIP AND 4-WIRE ANGULAR ENCODER



M - inductive motor
C - capacitor
WO, WZ - travel switches for opening and closing
WOP, WZP - overload switches for opening and closing
WO1, WZ1 - additional travel switches
EPO - angular encoder
H - brake
ZS-30 - feeder 230V AC with signal conversion

ATTENTION:
1.Power 230V, 50Hz of clamps no. 3 and 2 makes working of actuator for opening.
2.Power 230V, 50Hz of clamps no. 3 and 1 makes working of actuator for closing.
3.Back-electrocution protection is made by joining of protection strip PE for outside back-electrocution protection system.
4.Angular encoder EPO is used to position mapping of output actuator component.

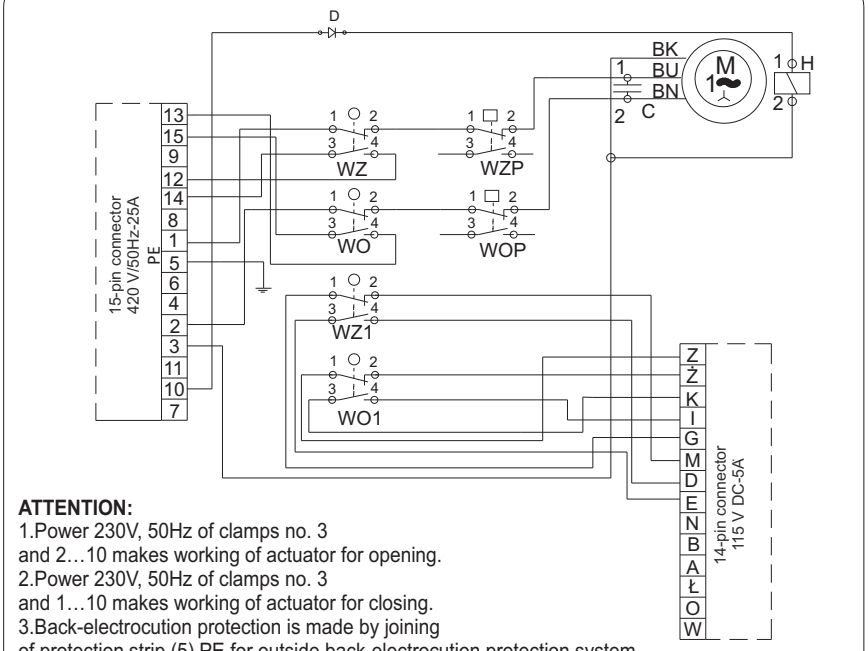
ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH TERMINAL STRIP AND 2-WIRE ANGULAR ENCODER



M - inductive motor
C - capacitor
WO, WZ - travel switches for opening and closing
WOP, WZP - overload switches for opening and closing
WO1, WZ1 - additional travel switches
EPO - angular encoder
H - brake

ATTENTION:
1.Power 230V, 50Hz of clamps no. 3 and 2…4 makes working of actuator for opening.
2.Power 230V, 50Hz of clamps no. 3 and 1…4 makes working of actuator for closing.
3.Back-electrocution protection is made by joining of protection strip PE for outside back-electrocution protection system.
4.Angular encoder EPO is used to position mapping of output actuator component.

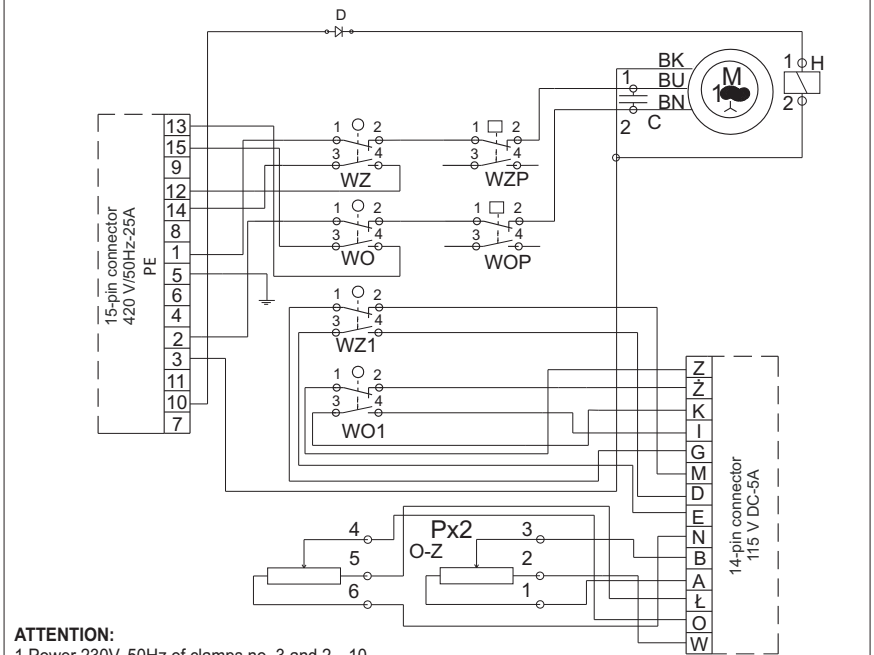
ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH MULTI-CONTACT CONNECOTR TYPE Ssz



ATTENTION:
1.Power 230V, 50Hz of clamps no. 3
and 2…10 makes working of actuator for opening.
2.Power 230V, 50Hz of clamps no. 3
and 1…10 makes working of actuator for closing.
3.Back-electrocution protection is made by joining
of protection strip (5) PE for outside back-electrocution protection system.

M - inductive motor
C - capacitor
WO, WZ - travel switch for opening and closing
WOP, WZP - overload switch for opening and closing
WO1, WZ1 - additional travel switch
H - brake

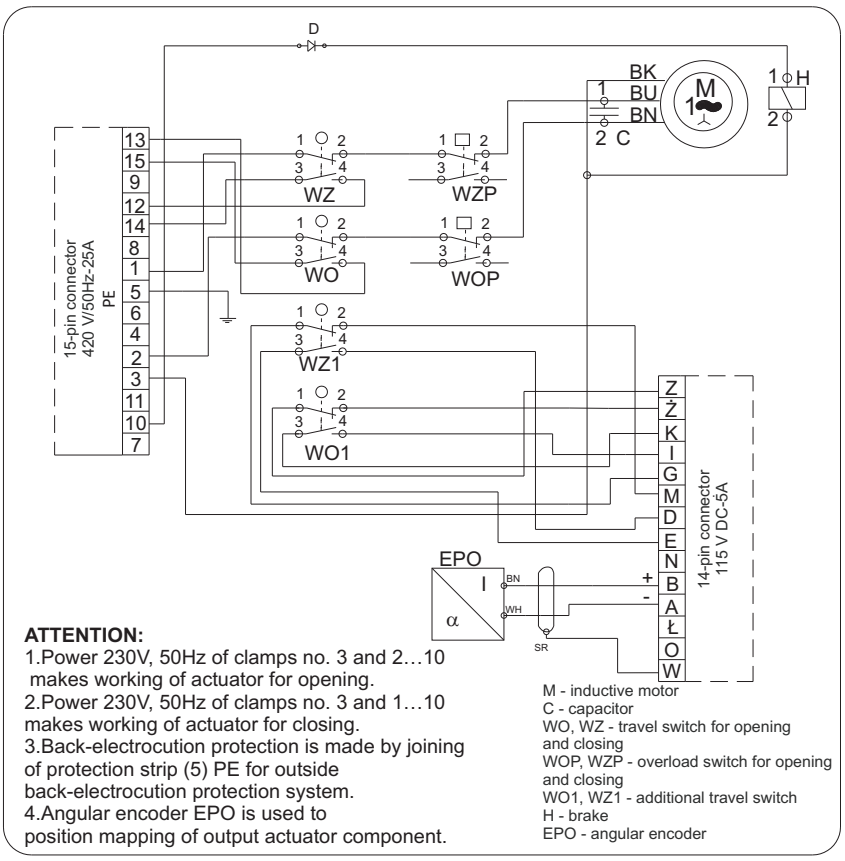
ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH DOUBLE MICROSWITCHES AND DOUBLE POTENTIOMETER WITH MULTI-CONTACT CONNECOTR TYPE Ssz



ATTENTION:
1.Power 230V, 50Hz of clamps no. 3 and 2…10
makes working of actuator for opening.
2.Power 230V, 50Hz of clamps no. 3 and 1…10
makes working of actuator for closing.
3.Back-electrocution protection is made by joining
of protection strip (5) PE for outside back-electrocution
protection system.
4.Potentiometer Px2 is used to position mapping
of output actuator component.

M - inductive motor
C - capacitor
WO, WZ - travel switch for opening and closing
WOP, WZP - overload switch for opening
and closing
WO1, WZ1 - additional travel switch
H brake
Px2 double potentiometer

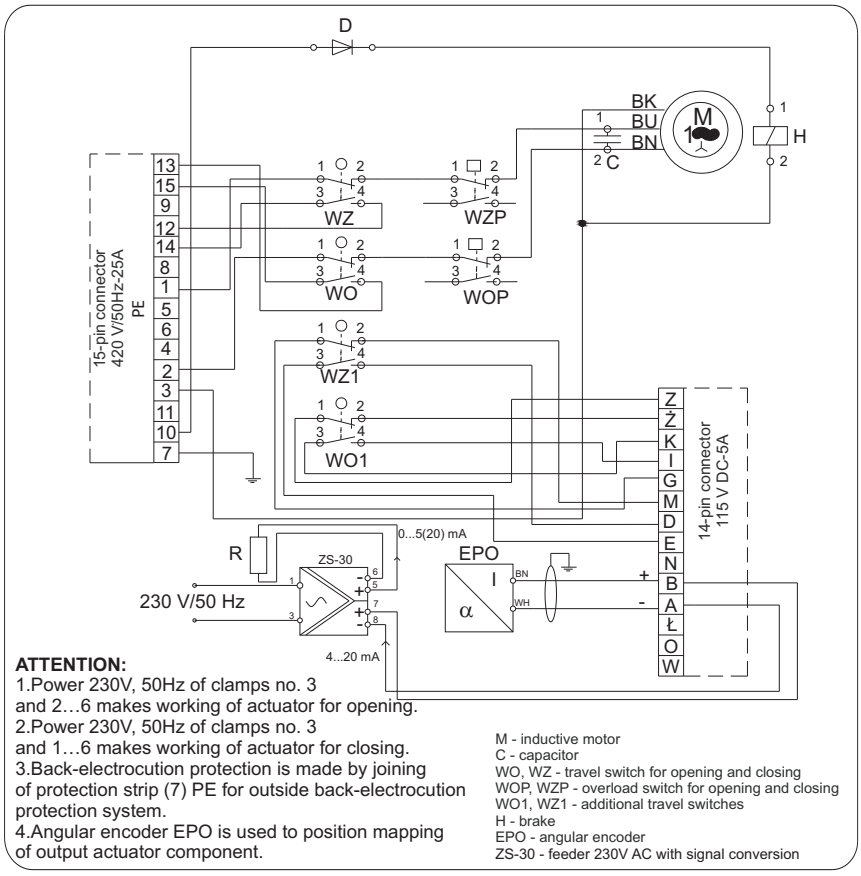
ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH DOUBLE MICROSWITCHES AND 2-WIRE ANGULAR ENCODER WITH MULTI-CONTACT CONNECTOR TYPE SSz



ATTENTION:
1.Power 230V, 50Hz of clamps no. 3 and 2…10 makes working of actuator for opening.
2.Power 230V, 50Hz of clamps no. 3 and 1…10 makes working of actuator for closing.
3.Back-electrocution protection is made by joining of protection strip (5) PE for outside back-electrocution protection system.
4.Angular encoder EPO is used to position mapping of output actuator component.

M - inductive motor
C - capacitor
WO, WZ - travel switch for opening and closing
WOP, WZP - overload switch for opening and closing
WO1, WZ1 - additional travel switch
H - brake
EPO - angular encoder

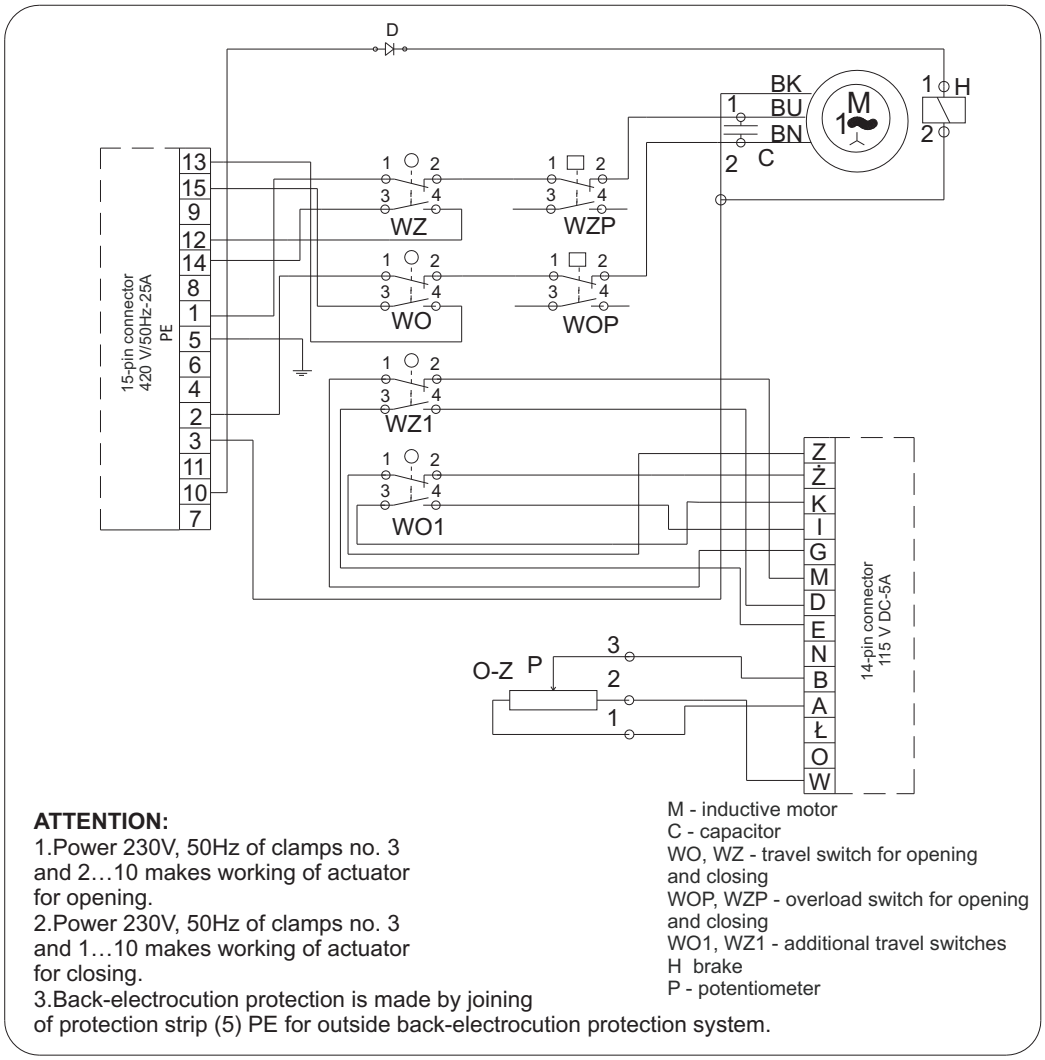
ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH DOUBLE MICROSWITCHES AND 4-WIRE ANGULAR ENCODER WITH MULTI-CONTACT CONNECOTR TYPE SSz



ATTENTION:
1.Power 230V, 50Hz of clamps no. 3 and 2…6 makes working of actuator for opening.
2.Power 230V, 50Hz of clamps no. 3 and 1…6 makes working of actuator for closing.
3.Back-electrocution protection is made by joining of protection strip (7) PE for outside back-electrocution protection system.
4.Angular encoder EPO is used to position mapping of output actuator component.

M - inductive motor
C - capacitor
WO, WZ - travel switch for opening and closing
WOP, WZP - overload switch for opening and closing
WO1, WZ1 - additional travel switches
H - brake
EPO - angular encoder
ZS-30 - feeder 230V AC with signal conversion

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH DOUBLE MICROSWITCHES AND POTENTIOMETER
WITH MULTI-CONTACT CONNECOTR TYPE SSz



ATTENTION:
1.Power 230V, 50Hz of clamps no. 3 and 2…10 makes working of actuator for opening.
2.Power 230V, 50Hz of clamps no. 3 and 1…10 makes working of actuator for closing.
3.Back-electrocution protection is made by joining of protection strip (5) PE for outside back-electrocution protection system.

M - inductive motor
C - capacitor
WO, WZ - travel switch for opening and closing
WOP, WZP - overload switch for opening and closing
WO1, WZ1 - additional travel switches
H brake
P - potentiometer

ORDERING

	TYPE	Force	Linear positioning speed	Travel "H"
	ESL-14-00	4kN	25mm/min	25mm
	ESL-14-01	4kN	25mm/min	40mm
	ESL-14-02	2kN	25mm/min	25mm
	ESL-14-03	2kN	40mm/min	40mm
	ESL-14-04	3.2kN	40mm/min	40mm
	ESL-14-05	6.3kN	16mm/min	20mm
	ESL-14-06	6.3kN	16mm/min	25mm
*	ESL-14-07	6.3kN	16mm/min	40mm
	ESL-14-08	6.3kN	25mm/min	20mm
	ESL-14-09	6.3kN	25mm/min	25mm
	ESL-14-10	6.3kN	25mm/min	40mm
	ESL-14-11	8kN	16mm/min	20mm
	ESL-14-12	8kN	16mm/min	25mm
*	ESL-14-13	8kN	16mm/min	40mm
	ESL-14-14	8kN	25mm/min	20mm
	ESL-14-15	8kN	25mm/min	25mm
	ESL-14-16	8kN	25mm/min	40mm

Meaning of symbols ESL-14-00-00-01-5-1-09-1:
ESL-14-00 small-size electric linear actuator
of rated force F=4kN, travel h=25mm,
linear positioning speed V=25mm/min
-00 standard version
-01 version for moderate climate
-5 with 100Ω potentiometer
-1 single travel switches
-09 with connector: plate and connector
-1 with Amphenol

CODE1	PROTECTION TYPE
-00	standard version

CODE2	CLIMATIC VERSION
-01	version N/2 acc. to PN-68/H-04650 (for moderate climate zone, outdoor under roof operation on land)

CODE3	EQUIPMENT
-0	Angular encoder 4…20Ma digital potentiometric (2-wire)
-1	Without angular encoder
-2	Angular encoder 0…5Ma analog potentiometric (4-wire)**
-3	Angular encoder 0…20Ma analog potentiometric (4-wire)**
-4	Angular encoder 4…20Ma analog potentiometric (4-wire)**
-5	Potentiometer 100Ù
-6	Potentiometer 2x100Ù
-10	Angular encoder 4…20mA digital un-contacting (2-wire)
-11	Angular encoder 4…20Ma analog potentiometric (2-wire)

CODE4	TRAVEL ADJUSTMENT
-1	single travel-dependent switches
-2	double travel-dependent switches (version - recommended)

CODE5	CONNECTORS
-00	without connecting elements
-02	plate R 110mm
-03	threaded connector 5/16" - 24UNF3A
-04	threaded connector 3/8" - 24UNF3A
-05	threaded connector 1/2" - 20UNF3A
-06	ball-and-socket joint
-07	plate + threaded connector 5/16" - 24UNF3A
-08	plate + threaded connector 3/8" - 24UNF3A
-09	plate + threaded connector 1/2" - 20UNF3A
-10	plate + threaded connector 5/16" - 24UNF3A + ball-and-socket joint
-11	plate + threaded connector 3/8" - 24UNF3A + ball-and-socket joint
-12	plate + threaded connector 1/2" - 20UNF3A + ball-and-socket joint
-13	M12 x 1.25 connector
-14	M12 x 1.25 connector + plate R 110mm

CODE6	ELECTRIC CONNECTORS
-1	Amphenol connector
-2	Terminal strip
-3	Multi-contact connector type Ssz

ESL-14- 00 - 00 - 01 - 5 - 1 - 09 - 1 **EXAMPLE OF ACTUATOR TYPE DENOTATION**

**actuators type ESL-14-07 and ESL-14-13 with terminal strip aren't available in versions with equipment of -0 and -10 in CODE3*
***angular encoder + feeder with signal conversion; unit feeder separator type ZS-30 or other similar for mounting outside the actuator*

The right of introducing design changes in the product, without deteriorating of its operation parameters, is reserved.

ELECTRIC ROTATIONAL ACTUATOR TYPE ESO-07

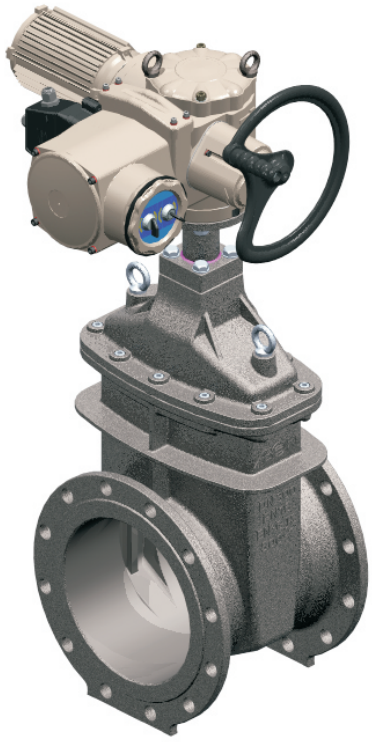
Applied for drive of the gate valves and channel non-return gates

Fixing connector, according to the ISO 5210 standard (connectors F14 or F16)

Compact design and modular construction

Protection degree IP65 or IP 67

Possibility of mounting on the fittings made by various manufacturers



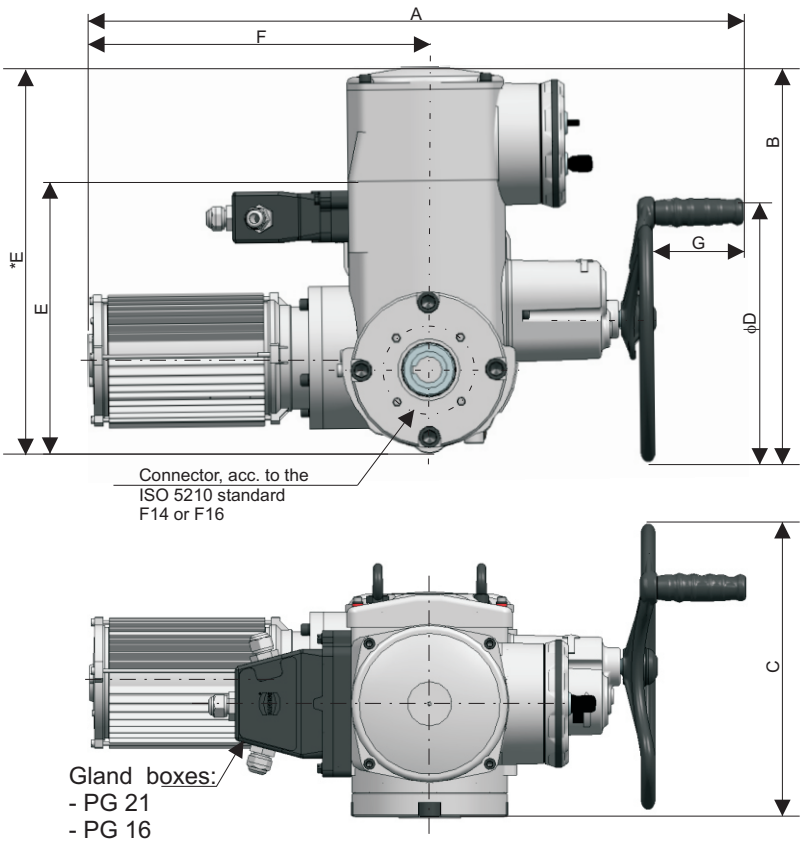
Application

The Electric Rotational Actuator type ESO-07 designed for driving of control closing components (gate valves, channel non-return gates) and other devices in the control and adjustment systems. Actuator can be equipped with the position indication system (recommended transmitters EPO-02 or EPO-03), or with Controller ESA-01 for control by means of three-term signal or continuous signal of 4…20 mA.

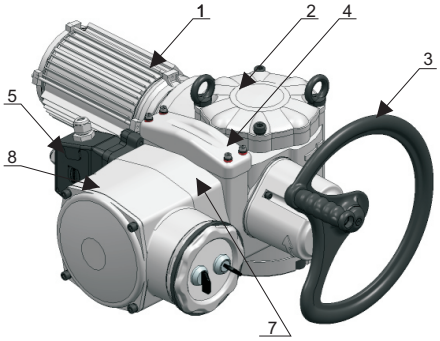
Technical Data

Power supply	3x400 V AC $^{10\%}_{-15\%}$, 50 Hz
Rated torque	125 Nm; 160 Nm; 250 Nm; 400 Nm; 800 Nm; 1000 Nm
Rotational speed	10 rpm; 25 rpm; 40 rpm; 63 rpm
Number of rotations	from 3 to 240 rpm
Duty type	S2-30 minutes S4-25% maximum 1200 cycles/h
Control signal	without controller; changing of motor power supply phases with controller: analogue continuous signal 4…20 mA or three-term control signals 24 V DC / 12 mA
Position indication signal	4…20 mA
Protection degree	IP65 Standard IP67
Working temperature	od -25°C...+70°C (Normal) od -40°C...+55°C (Low temperatures)
Working position	Unrestricted
Vibration frequency	<7,1 mm/s
Relative humidity	up 95%, with short-term condensation
Lubrication	Gadus S2 V220, producer: Shell
Mass	approx. 45 kg
Microswitches	type 83.133 54ER14.1
- usage category AC-15	2,5 A - przy Ue = 230 V 50 do 60 Hz
- usage category AC-13	0,3 A - przy Ue = 230 V DC Minimum voltage and switching current: 10 V, 20 mA

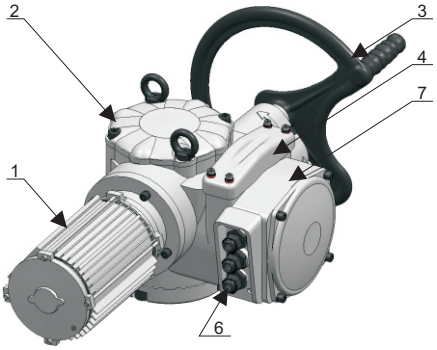
Overall dimensions



Actuator with controller



Actuator without controller

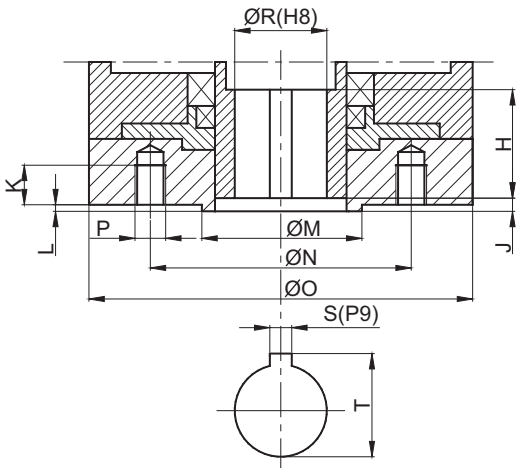


1 - Three-phase motor
2 - Main reduction gear
3 - Manual drive
4 - Terminal strip
5 - Multipin connector, type Harting
6 - Gland box
7 - Control unit
8 - Microprocessor controller with control station (option)

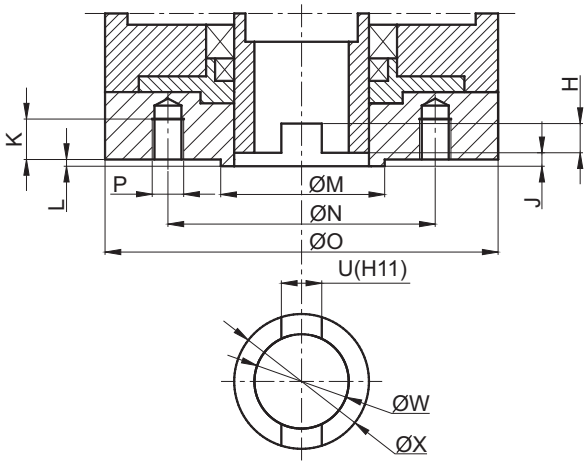
TYPE	TORQUE	ROTATIONAL SPEED	A	B	C	D	E(*E)	F	G
	Nm	Rpm	mm	mm	mm	mm	mm	mm	mm
ESO-07-11	125	10	660	446	332	300	350 (435)	304	100
ESO-07-21	160		717					361	
ESO-07-31	250		717					361	
ESO-07-41	400		740					383	
ESO-07-12	125	25	684					328	
ESO-07-22	160		709					353	
ESO-07-32	250		709					353	
ESO-07-13	125	40	709					353	
ESO-07-23	160		854					498	
ESO-07-14	125	63	854					498	

Connectors

Type A

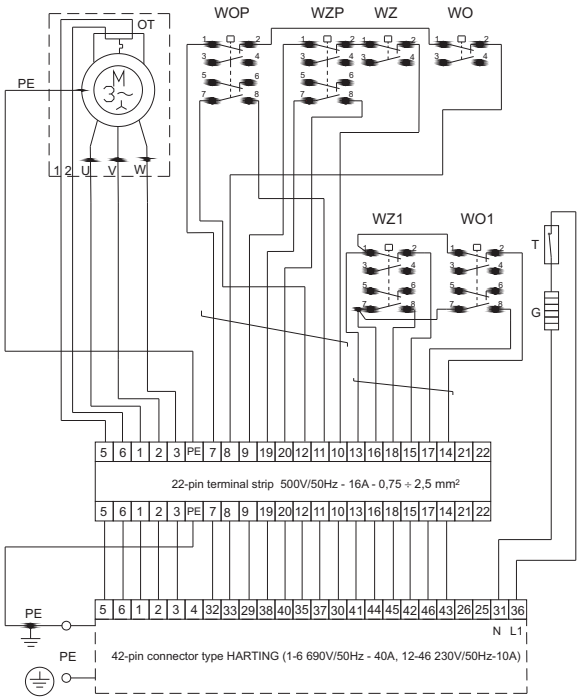


Type B



Torque	Connector	H	J	K	L	oM	oN	oO	P	oR	S	T	oU	oW	oX
125	A1	65	3	28	1,5	100	140	175	M16	20	6	23,3	-	-	-
160	A2	65	3	28	1,5	100	140	175	M16	30	8	33,3	-	-	-
250	A2	65	3	28	1,5	100	140	175	M16	30	8	33,3	-	-	-
	B1	9	3	28	1,5	100	140	175	M16	-	-	-	20	40	60
400	A3	65	3	28	1,5	100	140	175	M16	40	12	43,3	-	-	-
						130	165	210	M20	40	12	43,3	-	-	-
	B1	9	3	28	1,5	130	165	210	M20	-	-	-	20	40	60

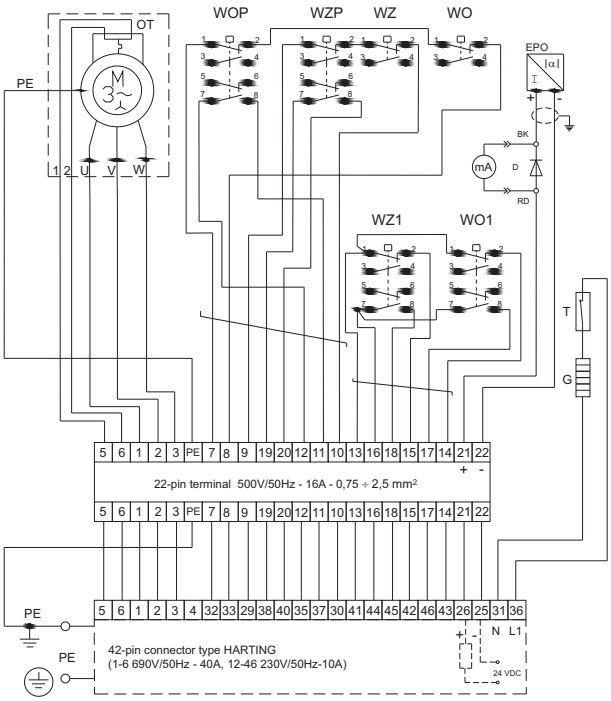
Electric circuit diagram of actuator ESO-07 without equipment



PE - protective grounding terminal
M - induction motor with temerature OT
G - heater
T - thermal circuit breaker of heater

WOP, WZP - double overload switches
WO, WZ - main travel switches
WO1, WZ1 - additional double travel switches
EPO - Electronic position transmitter

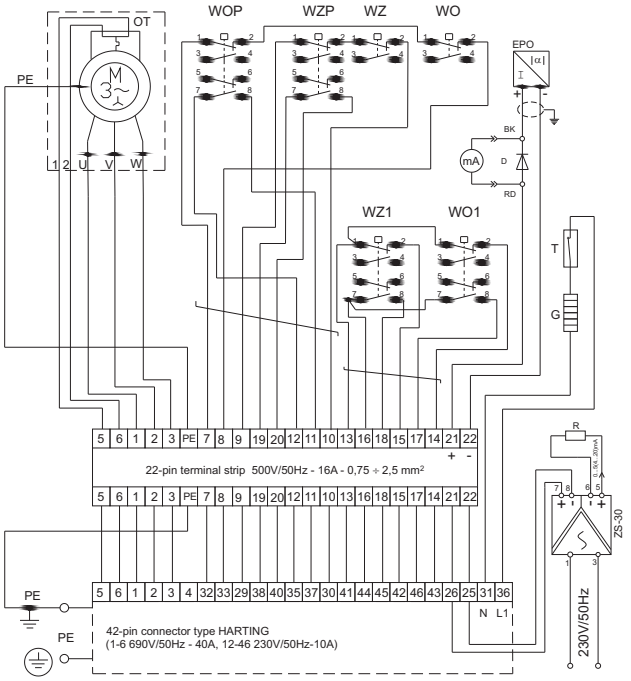
Electric circuit diagram of actuator ESO-07 with position transmitter EPO



PE - protective grounding terminal
M - induction motor with temerature limiter OT
G - heater
T - thermal circuit breaker of heater

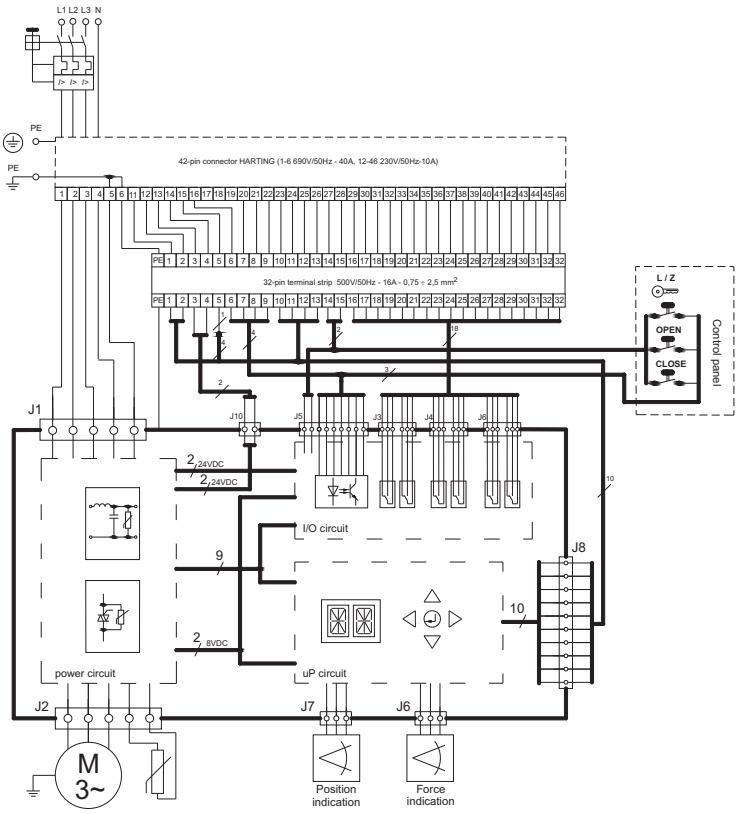
WOP, WZP - double overload switches
WO, WZ - main travel switches
WO1, WZ1 - additional double travel switches
EPO - Electronic position transmitter
D - Diode

Electric circuit diagram of actuator ESO-07 with position transmitter and power supply unit



PE - protective grounding terminal
M - induction motor with temerature limiter OT
G - heater
T - thermal circuit breaker of heater
WOP, WZP - double overload switches
WO, WZ - main travel switches
WO1, WZ1 - additional double travel switches
EPO - Electronic position transmitter
ZS-30 - 230 V AC power supply unit with signal conversion
R - output load resistance
D - Diode

Electric circuit diagram of actuator ESO-07 with Controller ESA-01



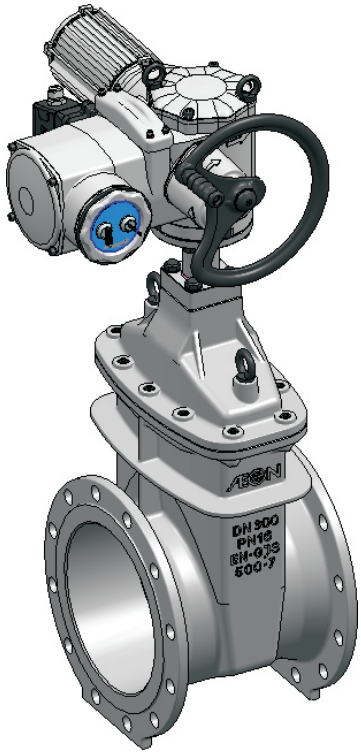
Flow control system: gate valve + actuator

Application

Flow control systems are designed for changing the flow rate of a medium, keeping the required flow characteristics.

Design

The basic components of the flow control system are the gate valves used in order to change the resistance for a flowing medium and actuators designed for supply of mechanical energy necessary for its shifting.



Selection of gate valve

Designing of the flow control system should be begun from selecting the gate valve. In order to correctly choose a gate valve, one should determine the following parameters:

Parameters of gate valve selection
Pipeline diameter
Working pressure
Length of built-in section
Type of connector

Technical parameters of gate valves	
Rated diameters	DN 40...300
Rated pressures	PN 10...16
Flow connectors	BS 5163
Temperature of the medium	TN maximum 70°C
Flange type	Wg EN 1092-2

After a gate valve is selected, depending on necessary torque and number of rotations, one chooses the actuator. The equipment and mechanical plus electric connectors can be a subject of separate agreements.

Ordering

The gate valve and actuator are to be ordered separately. The actuator is to be specified according to the Ordering Table. The gate valve can assigned by the customer, or chosen on the basis of determined parameters.
When ordering the gate valve and actuator, we make the actuator connections and settings, which guarantees a correct and reliable operation of the system.

Ordering table

Electric rotational actuator type	E	S	O	-	0	7	-	X	X	-	R	X	-	X	X	-	X	-	X	X	X	X	-	X

TORQUE	ROTATIONAL SPEED		
125 Nm	10 rpm	1	1
160 Nm		2	1
250 Nm		3	1
400 Nm		4	1
125 Nm	25 rpm	1	2
160 Nm		2	2
250 Nm		3	2
125 Nm	40 rpm	1	3
160 Nm		2	3
125 Nm	60 rpm	1	4

NUMBER OF ROTATIONS		
acc. to client's order (in the range of 3...240 rpm) - after agreement	R	0
10 rpm (with possibility of setting 3 rpm)	R	1
40 rpm (with possibility of setting 11 rpm)	R	2
100 rpm (with possibility of setting 27 rpm)	R	3
240 rpm (with possibility of setting 67 rpm)	R	4

	CLIMATIC VERSION	
	Normal version -25°C...70°C	1
*	Low temperatures -40°C...55°C	2

EQUIPMENT	
No equipment	A
Position transmitter EPO-01 (analogue potentiometric 4...20 mA, two-wire)	B
Position transmitter EPO-02 (bezstykowy cyfrowy 4...20 mA two-wire)	C
Position transmitter EPO-03 (bezstykowy cyfrowy 4...20 mA two-wire with display)	D
Analogue transmitter ESA-01, with local control station	E

ELECTRIC CONNECTORS	
Multipin connector, type Harting (for actuator with protection degree IP67)	1
Multipin connector, type Harting + terminal strip (for actuator with protection degree IP67)	2
Multipin connector, type Harting (for actuator with protection degree IP65)	3
Multipin connector, type Harting + terminal strip (for actuator with protection degree IP65)	4
Glands + terminal strip (for actuator with protection degree IP67)	5

MECHANICAL CONNECTORS					
Acc. to client's order after agreement		X	X	X	X
Flange connector F14 acc. to ISO 5210 Standard	For torques 125 Nm, output shaft acc. to drawing A1	1	4	A	1
	For torques 160 Nm, 250 Nm, output shaft acc. to drawing A2	1	4	A	2
	For torques 400 Nm, output shaft acc. to drawing A3	1	4	A	3
	For torques 250 Nm, 400 Nm, output shaft acc. to drawing B1	1	4	B	1
Flange connector F14, acc. to ISO 5210 Standard	For torques 400 Nm, output shaft acc. to drawing A3	1	6	A	3
	For torques 400 Nm, output shaft acc. to drawing B1	1	6	B	1

ADDITIONAL EQUIPMENT	
Without additional equipment	0
Power supply unit with signal conversion (switched mode, four-wire) for building on the actuator exterior	1

** - For low temperatures -40°C...55°C - one can use the equipment with symbol from A, B and C*

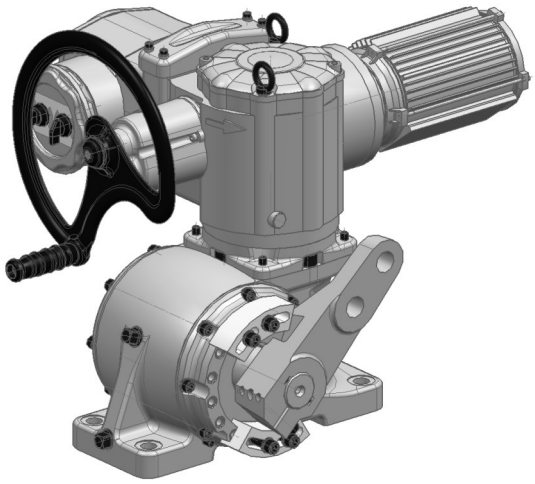
Example: Electric Rotational Actuator type ESO-07 with torque of 250 Nm, rotational speed 25 rpm, maximum no. of rotations 100 rpm, normal climatic version with position transmitter EPO-03, multipin connector, type Harting IP67, with flange connector F14, shape of output shaft - acc. to drawing B1, without additional equipment.

ESO-07-32-R3-1D-1-14B1-0

Electric swinging actuator type ESW-07

May be utilized to drive globe valves, dampers (F12, F14, F16), trapdoors, blinds, and other closing components
Compact design and module-based structure
Protection rating: IP65 or Ip67

The device may also come with ESA-01 controller (optional)



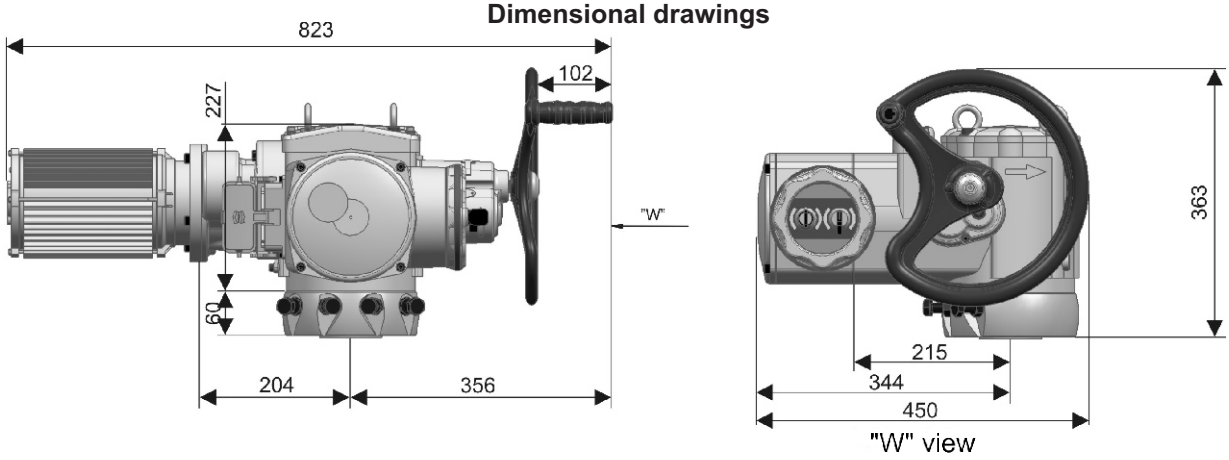
Recommended range of applications

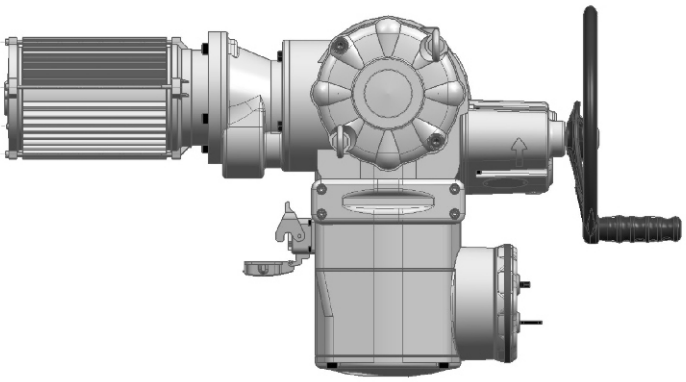
The ESW-01 electric swinging actuator shall be used to drive closing components, which require a significant amount of torque to work properly. The actuator is designed in such a way that it can be directly connected to globe valves, dampers and gate valves, as well as to control trapdoors and blinds by means of knuckles and strands. The actuator may also incorporate additional components, such as position adjustment module and ESA-01 controller. The latter may be used to control both binary and continuous signals. The ESW-07 actuator may be utilized as a replacement of such actuators as: ESW-16, ESW-26 (available on demand only), ESW-19, and ESW-20.

Technical specification:

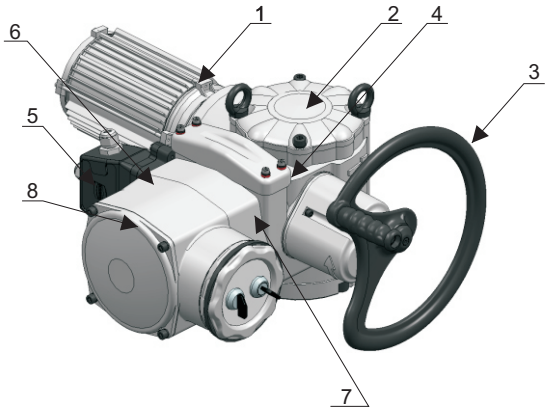
Power supply:	3x400 V AC$^{10\%}_{-15\%}$, 50 Hz
Torque:	500 Nm; 630 Nm; 1000 Nm; 1500 Nm; 2000 Nm; 4000 Nm
Rotating speed:	90° /min.; 180° /min.
Rotation angle:	90°, 120°, 30° ÷ 180° (depending on ordered version)
Operation type:	S2-30 min. S4-25% max. 1200 c/h
Control signal	No external controller: change of order of engine feeding phases External controller: analog continuous signal 4…20 mA or binary signal 24 V DC/12 mA
Position adjustment signal:	4…20 mA
Protection rating:	IP65 or IP67
Operation temperature:	od -25°C...+70°C (normal operation) od -40°C...+55°C (operation in low temperatures)
Working position:	Unrestricted
Vibration level:	<7,1 mm/s
Relative humidity:	up to 95%, including temporal condensation
Recommended grease:	Gadus S2V220 0 prod. Shell
Weight:	approx. 37 ÷ 100 kg
Microswitches:	type 83.133
- AC-15 category:	2,5 A - for Ue = 230 V 50 do 60 Hz
- AC-13 category:	0,3 A - for Ue = 230 V DC Min. voltage and current: 10 V, 20 mA

Dimensional drawings



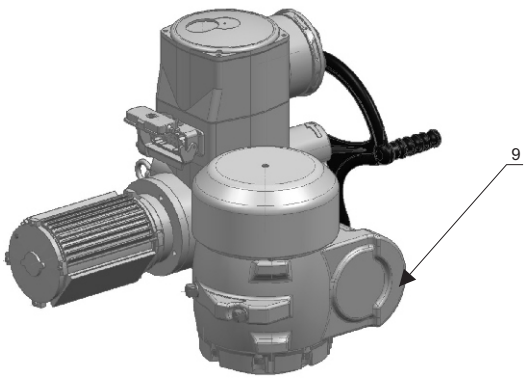


Actuator connected directly to the controller

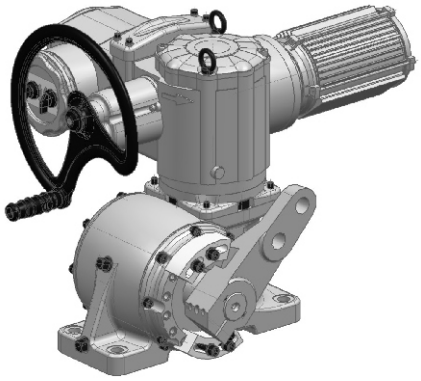


1 -Three-phase engine
2 - Main reducer
3 - Manual drive
4 - Terminal strip
5 - Harting multicross relay
6 - Harting multicross relay socket
7 - Steering unit
8 - Microprocessor-based controller with ignition switch (optional)
9 - Worm gear

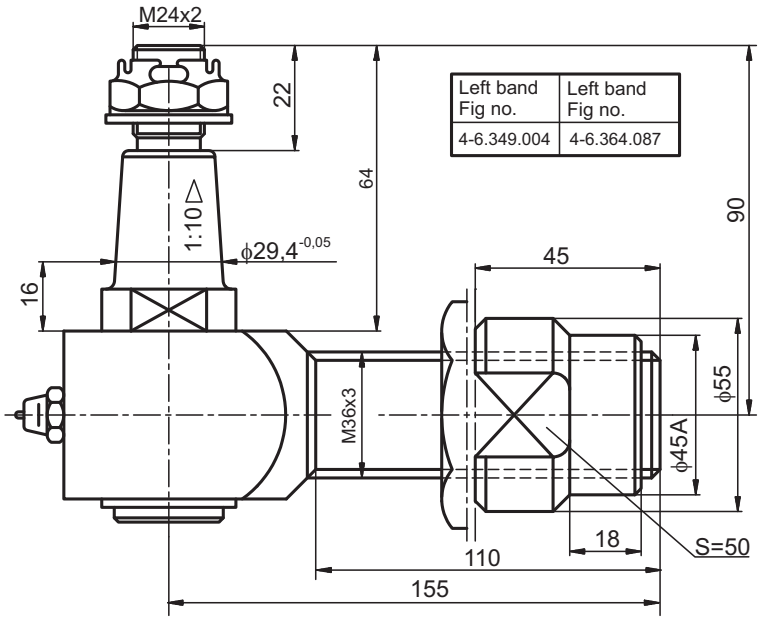
Actuator connected directly to the controller and worm gear



Actuator with controller and crank

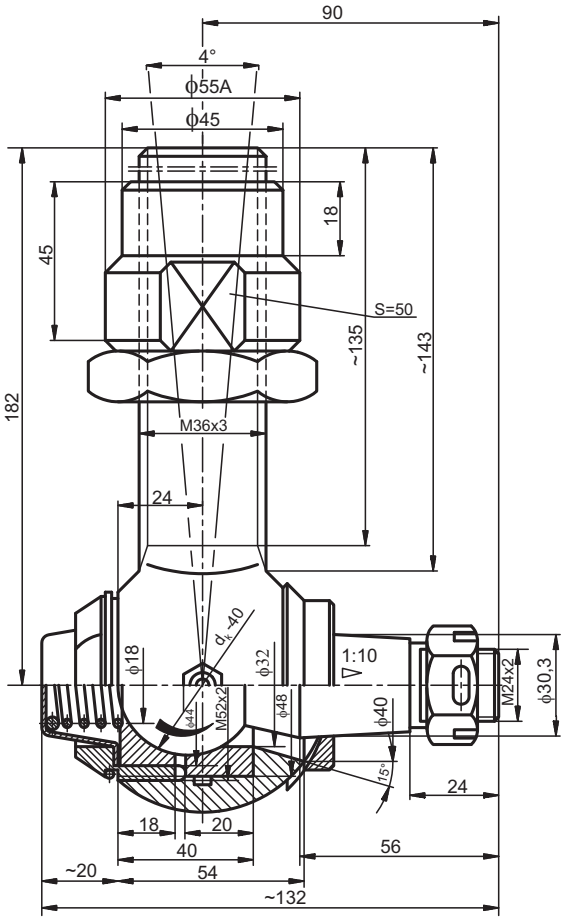


TYPICAL BAND



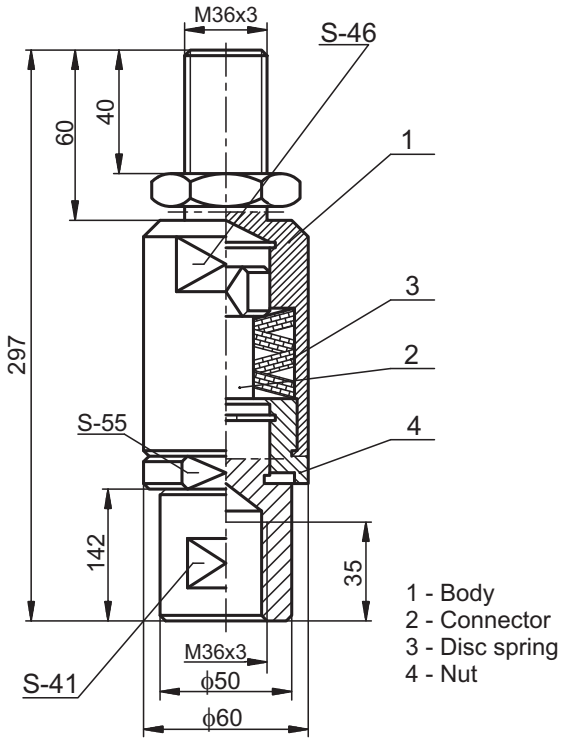
Left band Fig no.	Left band Fig no.
4-6.349.004	4-6.364.087

KNUCKLE BAND



Left band	Right band
ES2-1432	ES2-1433

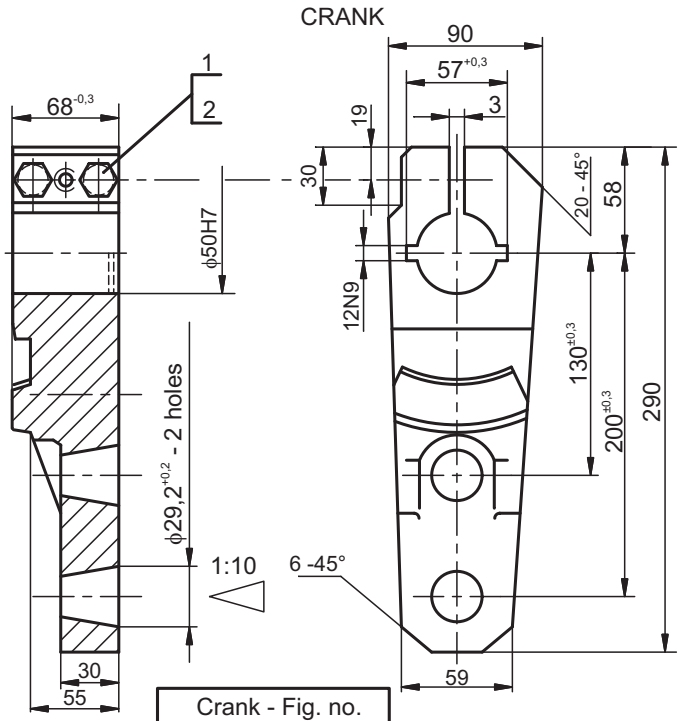
ABSORBER



1 - Body
2 - Connector
3 - Disc spring
4 - Nut

Absorber - Fig no.
3-6.279.082-3

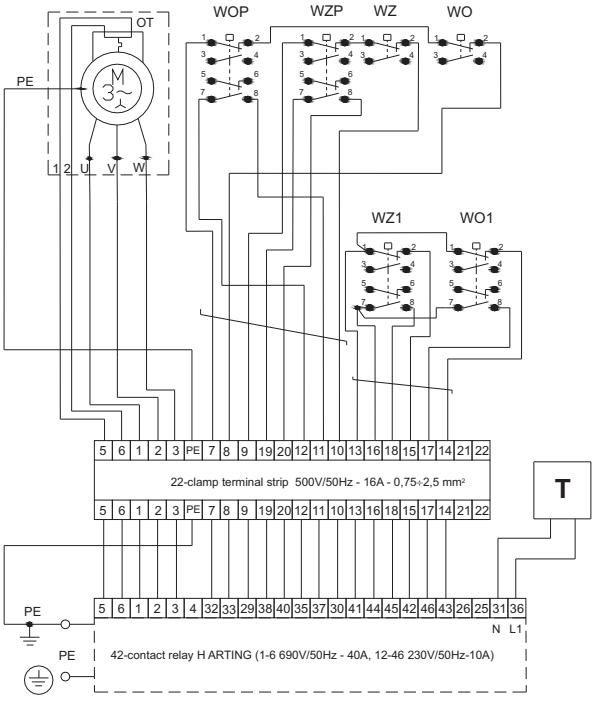
CRANK



Crank - Fig. no.
ES2-0682

Position 1 spring washer ϕ 12.2, in accordance with PN-77/M-82008
Position 2 M12x70 screw, in accordance with PN-85/M.-82105

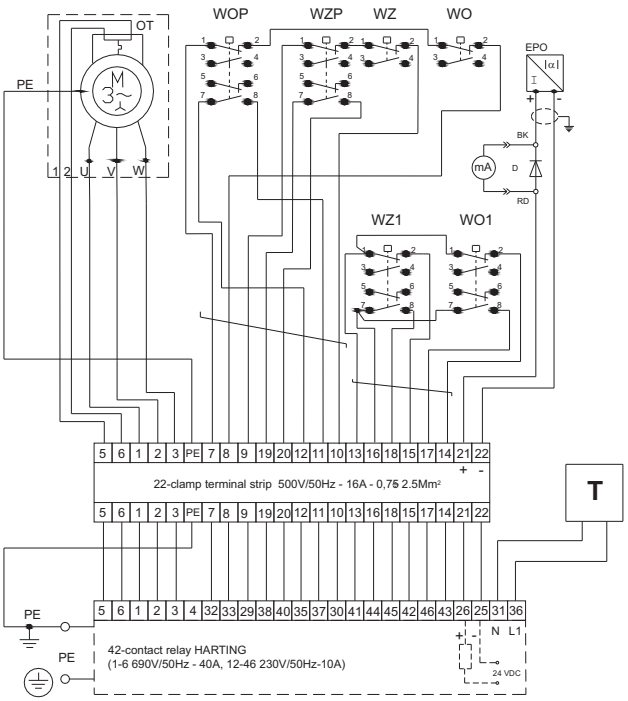
ESW-07-XX-XX-XA-Y-XXX-0 actuator (HARTING design + terminal strip) No additional equipment



PE - safety clamp
M - induction motor with OT temperature limiter
T - heater thermoswitch

WOP, WZP - double load off switch
WO, WZ - scope of operation off switch
WO1, WZ1 - scope of operation dual off switch
EPO - Electronic position adjuster

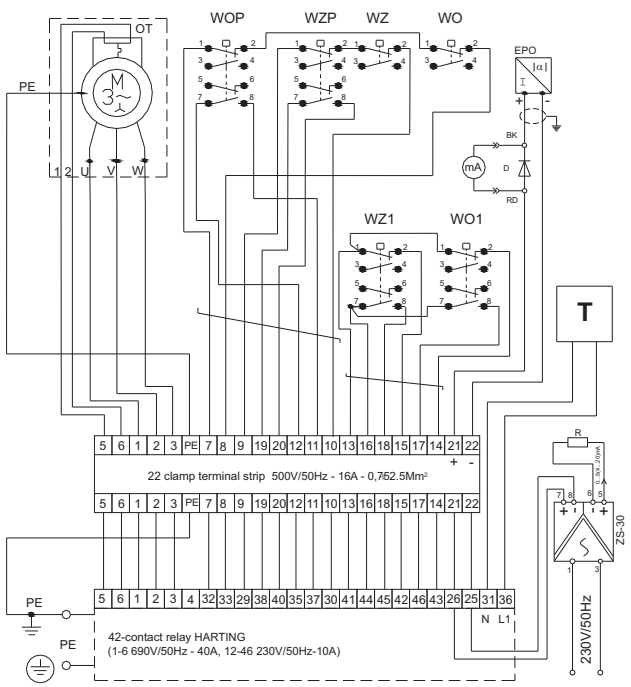
ESW-07-XX-XX-XZ-Y-XXX-0 actuator (HARTING design + terminal strip) With EPO position adjuster



PE - safety clamp
M - induction motor with OT temperature limiter
T - heater thermoswitch

WOP, WZP - double load off switch
WO, WZ - scope of operation off switch
WO1, WZ1 - scope of operation dual off switch
EPO - Electronic position adjuster
D - diode

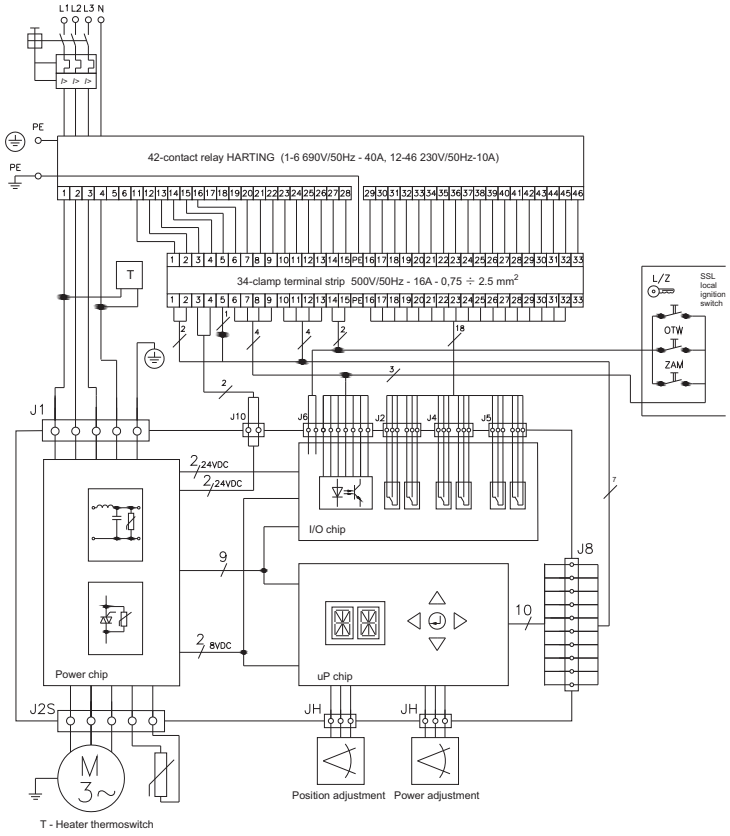
ESW-07-XX-XX-XZ-Y-XXX-1 actuator (HARTING design + terminal strip) With position adjuster and feeder



PE - safety clamp
M - induction motor with OT temperature limiter
T - heater thermoswitch

WOP, WZP - double load off switch
WO, WZ - scope of operation off switch
WO1, WZ1 - scope of operation dual off switch
EPO - Electronic position adjuster
ZS - 30 - 230V AC feeder with signal processing
R - output load resistance
D - diode

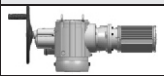
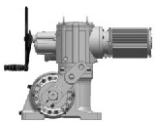
ESW-07-XX-XX-XE-Y-XXX-0 actuator (HARTING design + terminal strip) With ESA-01 controller



T - Heater thermoswitch

Y - actuator specification in accordance with code no.5
Z - actuator specification in accordance with code no.4
NOTE: Other diagrams are in DTR

Electric swinging actuator, type ESW	E	S	W	-	0	7	-	X	X	-	A	X	-	X	X	-	X	-	X	X	X	-	X

CODE 1	TORQUE	DESIGN	ROTATION SPEED		
	500Nm		90^{O}/min	1	1
	630Nm			2	1
	1000Nm			3	1
	1500Nm			4	1
	2000Nm			5	1
	4000Nm			6	1
	1500Nm		180^{O}/min	4	2

CODE 2	ROTATION ANGLE		
	90^{O}	A	0
	120^{O}	A	1
	150^{O}	A	2
	Customized (within the range of 30^{O}…180^{O}) - after prior clarification	A	X

CODE 3	TEMPERATURE RANGE	
	Normal -25^{O}C…70^{O}C	1
*	Low temperatures -40^{O}C…55^{O}C - after prior clarification	2

CODE 4	EQUIPMENT	
	No equipment	A
	EPO-01 position adjuster (analog, potentiometric, 4…20mA, paired cable)	B
	EPO-02 position adjuster (digital, connectionless, 4…20mA, paired cable)	C
	EPO-03 position adjuster (digital, connectionless, 4…20mA, paired cable with display)	D
	ESA-01 analog controller with ignition switch	E

CODE 5	ELECTRICAL CONNECTIONS	
	Harting multicross relay (for the IP67 protection rating actuator)	1
	Harting multicross relay + terminal strip (for the IP67 protection rating actuator)	2
	Harting multicross relay (for the IP65 protection rating actuator)	3
	Harting multicross relay + terminal strip (for the IP65 protection rating actuator)	4
	ESA-01 analog controller with ignition switch	5

CODE 6	MECHANICAL CONNECTIONS			
	Customized - after prior clarificationtor)	X	X	X
	Crank	K	0	0
	Crank + typical band	K	0	1
	Crank + knuckle band	K	0	2
	Crank + absorber	K	0	3
	Crank + typical band + absorber	K	0	4
	Crank + knuckle band + absorber	K	0	5
	Crank + typical band x 2	K	0	6
	Crank + knuckle band x 2	K	0	7
	Crank + typical band x 2 + absorber	K	0	8
	Crank + knuckle band x 2 + absorber	K	0	9

CODE 7	ADDITIONAL EQUIPMENT	
	No additional equipment	0
	Feeder with signal processing function (four-wire) external applications only	1

* - In the case of low temperature applications (-40ºC...55ºC), the devices with A, B, and C symbols may be used

Example: Electric swinging actuator, type ESW-07, with torque equal to 1000 Nm, rotation speed of 90 rotations/minute, rotation angle of 90º, with EPO-02 position adjuster, Harting multicross relay type IP67, with a crank and without additional equipment will be in short referred to as:

ESW-07-31-A0-1-C1-K00-0

Electronic three-phase actuator controller, type ESA-01

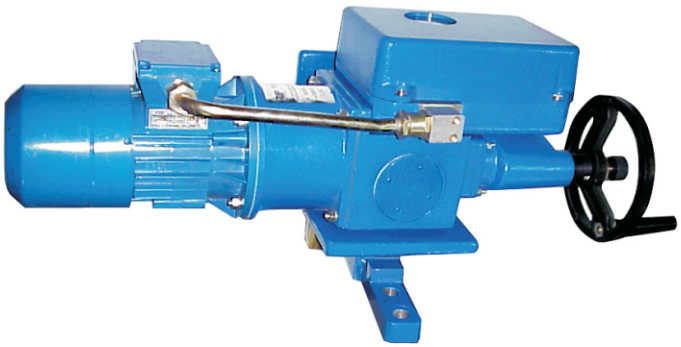
Engine powered by means of triacs (softstart)
Automatic engine rotation pace decrement by means of backward current
Signals: steering 4…20 mA, binary- 24 V DC/12 mA
Contactless scope and power measurement (hall effect sensor)
Max. power of the controlled engine up to 3 kW

Recommended range of applications

ESA-01 type electronic three -phase actuator controllers may be utilized in order to control such actuators as **ESW-07** (p. XIII.9), **ESO-07** (p. XIII.14), and **ESL-07** (p. XIII.19), which are equipped with three -phase 3x400 V A C engines and are controlled via 4…20 mA signal. The controller, being connected to the actuator, may be utilized in continuous technical processes, as well as industrial automatic systems controlling modules.

Technical specification	
External power supply	Main supply: 400 V AC + 10% / - 15 % ; Emergency supply: 24 V DC + 20 % / - 15 % Power consumption: 250 mA (on average)
Nominal power	Provided on the plate adjusted to the engine power
Switchgear	Contactless engine powering and rotation pace decreasing by means of triacs. Power circuit of the actuator connected to the ESA-01 controller should be additionally protected by means of the Legrand C4 safety catch. Performance level of the safety catch should be adjusted to the performance of utilized engine.
Steering signals	• **Positioner** - Power supply control input ➔ I_{STER} = (4…20)mA, • **Steering inputs** binary: 6 inputs (2x3); voltage 24V DC inputs➔(CONFIRMATION OPEN CLOSE the inputs are insulated by means of the optoelectronic battery; power consumption=10mA
Output signals	**Analog** - 2 insulated and galvanized power inputs I_{WY} (4…20) mA; R_{LOAD} = 500 Ω •Actuator position adjustment •Actuator mechanical load adjustment **Binary** 6 programmable gold-plated relays • 5 dry contact relays; NO/NC type relays; 250 V AC; operation type AC1 1A; Signalling by means of powering the ON relay. Signalling: WZ and WO peripheral positions. Two intermediate positions (PO and PZ). Indication of local steering system utilization ➔ **LOCALLY** • 1 alarm dry contact relay; NO/NC type relays; 250 V AC; operation type AC1 1A; In the case of lack of malfunctions, the relay is in the ON position; the OFF position signalizes: no power supply, engine overheating, improper steering signal I_{STER} ➔ (4…20) mA, insufficient scope of operation, actuator's pin off limits, max. positioning time exceeded, ZAM or OTW overload
Additional input voltage	Basic: 24 V DC, max. current efficiency = 100 mA insulated from the electronic modules of the controller by means of galvanized elements. **NOTE!** In the case of utilization of 400 V AC power source, the additional voltage will not be generated
Local ignition switch	Basic: • LOCAL/REMOTE CONTROL switch (with a key involuntary switching prevention) • OPEN STOP CLOSE CONTROL switch
Available functions	
Functions accessible during configuration	• Programmable phase-switching procedure • Actuator's scope of operation configuration by means of local ignition switch • Position adjustment for the configured actuator's scope of operation • Mechanical load indication may be taken advantage of during configuration of the actuator's scope of operation • In the case of scope limitation by means of mechanical load, the position of the limit switch is adjusted • Programmable actuator stopping method: depending on position of the moved element in relation with WZ and WO peripheral positions or depending on the amount of mechanical load • Programmable reaction of actuator in the case of reception of inappropriate signal: **STOP or PERIPHERAL POSITION CLOSED or PERIPHERAL POSITION OPEN** • Two freely programmable intermediate position transmitters: programmable range = (0…100%) of actuator's scope of operation • Available position-related options: Normal/ Inverted • 7 levels of display's brightness
Steering-related functions	• Engine phases control • Engine temperature control • Signal accurateness control • Minimal scope of operation control • Actuator's pin off set limits control • Control of any excessive mechanical load occurring within the scope of operation of the actuator • Maximal stabilization time of the actuator's pin control
Actuator protection -related functions	• Protection against exceeding the S4 1200 cycles/hour working pace • Engine overheating protection • Actuator's pin overloading protection

ELECTRIC PART-TURN ACTUATORS type ESW-25-00



- for ball-type valves
- requirements acc. to standard PN-92/M-42011

THE ELECTRIC PART-TURN ACTUATORS type ESW-25- (CONSTANT-SPEED) ARE DESIGNED FOR DRIVING OF CONTROL CLOSING COMPONENTS, BALL VALVES AND OTHER DEVICES WHEREIN LARGE FORCES AND DISPLACEMENTS ARE REQUIRED.

TECHNICAL DATA

- power supply	230/400V +10%, -15%, f=50Hz
- rated torque	250Nm
- angular velocity (positioning speed)	0.24 rpm
- rotation angle	90°
- ambient temperature during operation	-25°C…+55°C -25°C…+70°C in version with intelligent controller
- protection degree	IP54, acc. to PN-EN60259..2002(U)
- duty type	S2 - 15min and S4 - 25%, 630 c/h , acc. to PN-92/M-42011
- lubrication	semi-liquid grease Shell Gadus S2, Shell make
- relative humidity	up to 95%
- vibrations	V2, acc. to PN-91/M-42020
- mass	~30kg

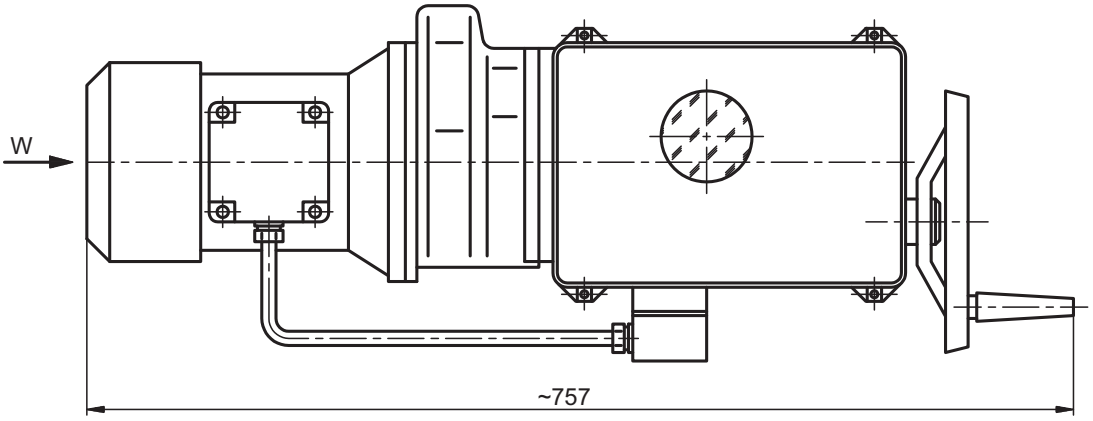
2-WIRE ANGULAR ENCODER:

- power supply	12…36V DC (recommended 24V DC)
- output signal	4…20mA
- range setting	50 ...100% (for analog angular encoder) 20...100% (for digital angular encoder)
- maximum load resistance	for supply 24V DC - 500 W

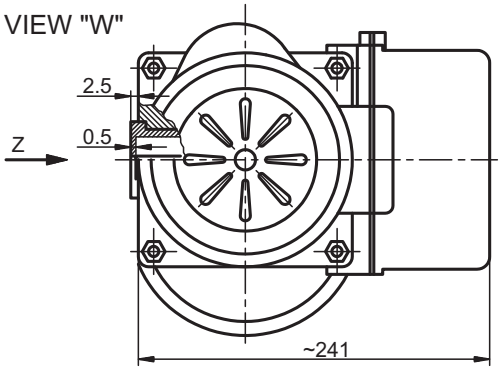
MICROSWITCHES: Type: 83.132, 83.133

- rated power supply	250V, 50…60Hz or 30V DC
- rated switching current	2.5A
- rated thermal current	11A
- minimal switching voltage	10V
- minimal switching current	20mA

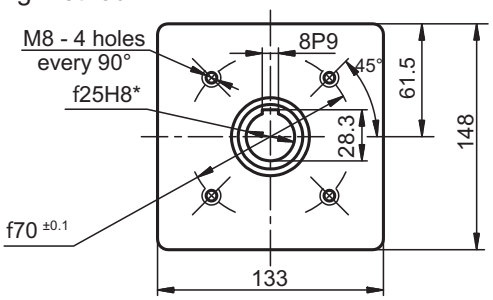
DIMENSIONED DRAWING OF ACTUATOR type ESW-25-00-0001-…-02



VIEW "W"

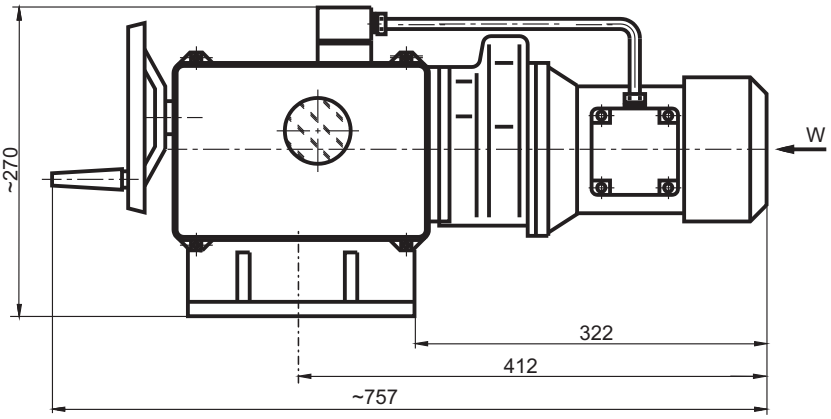


VIEW "Z"
fixing method

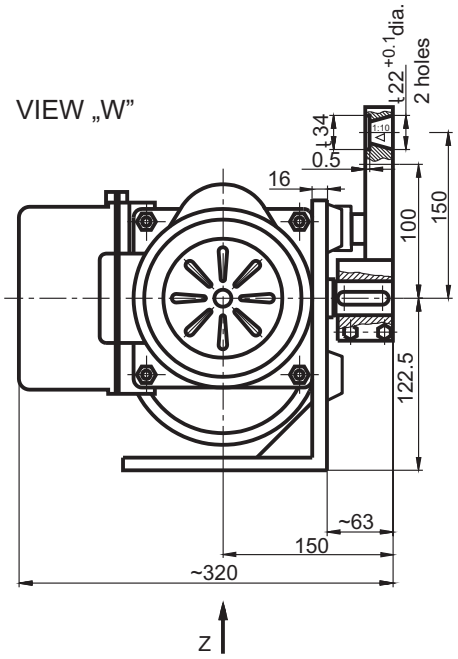


* - other connector to be agreed with the manufacturer

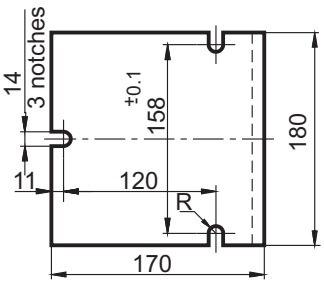
DIMENSIONED DRAWING OF ACTUATOR type ESW-25-00-0001-…-01



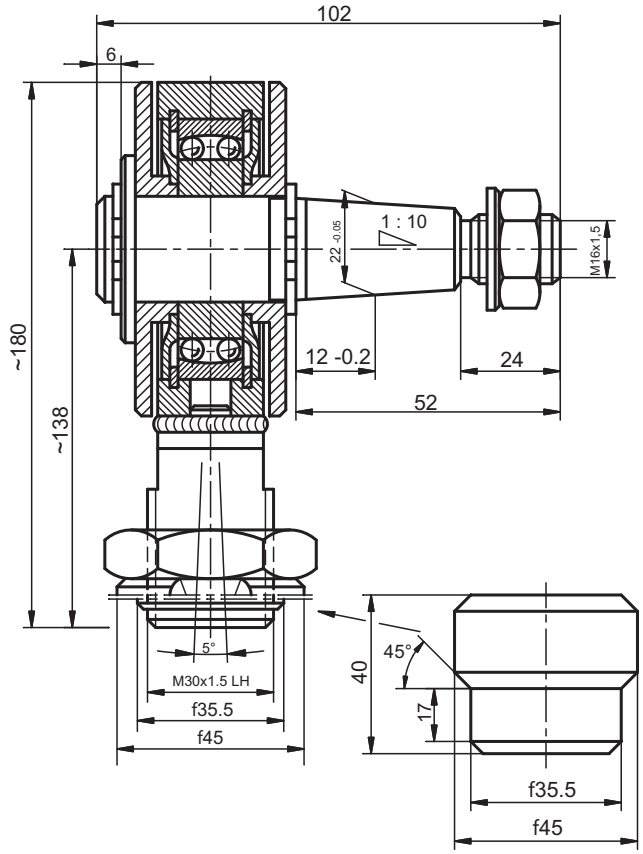
VIEW „W”



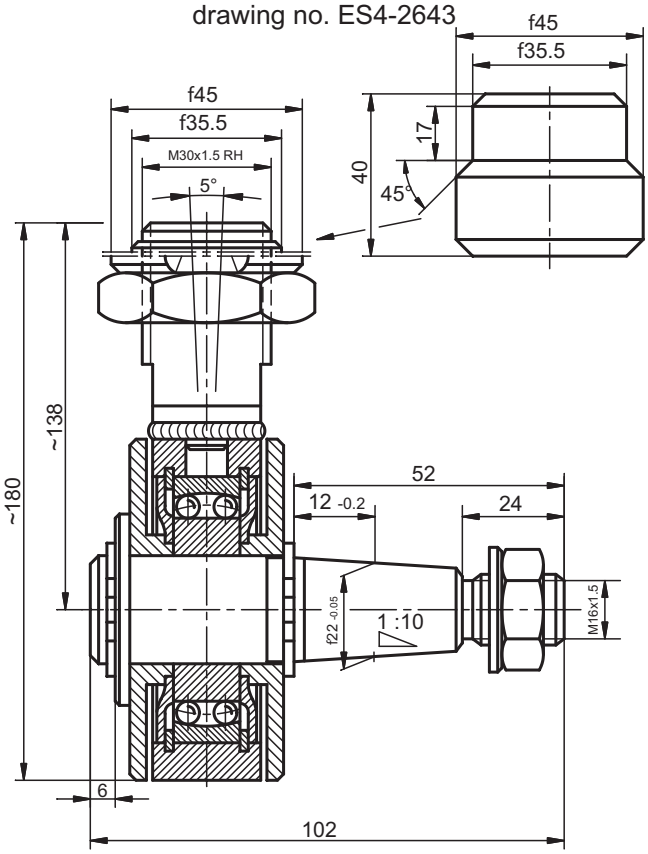
VIEW "Z"
fixing method



LEFT JOINED EXTENSION ROD FOR ACTUATORS type ESW-25-
drawing no. ES4-2306

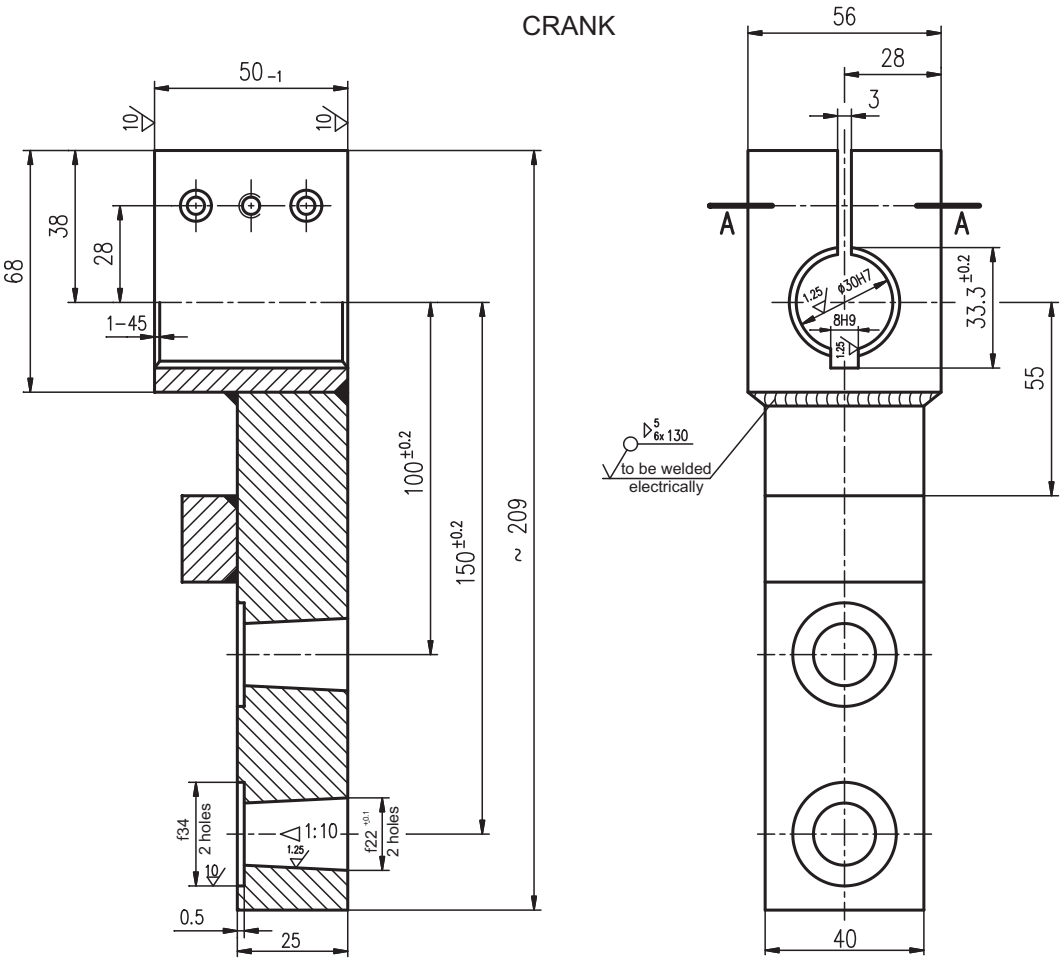


RIGHT JOINED EXTENSION ROD FOR ACTUATORS type ESW-25-
drawing no. ES4-2643

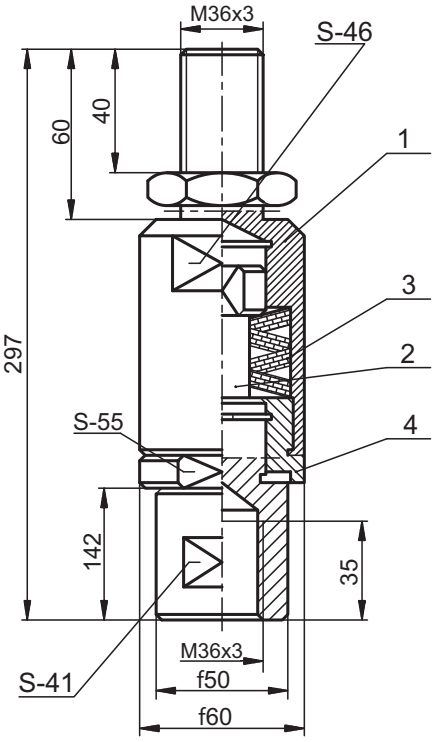


ELECTRIC PART-TURN ACTUATORS type ESW-25-00

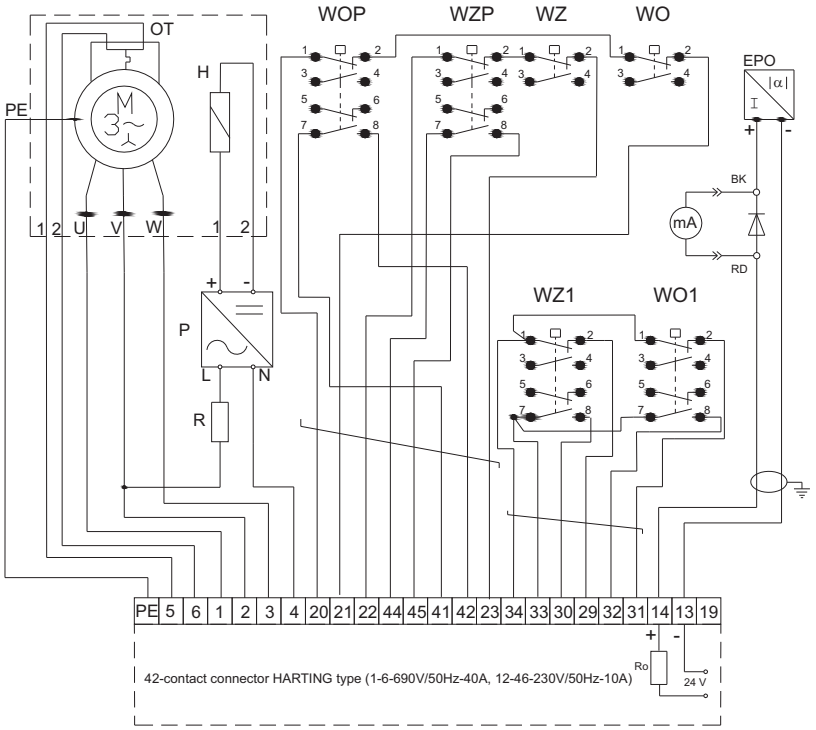
CRANK



SHOCK ABSORBER FOR ACTUATORS type ESW-25-
no. 3-6.279.082-2



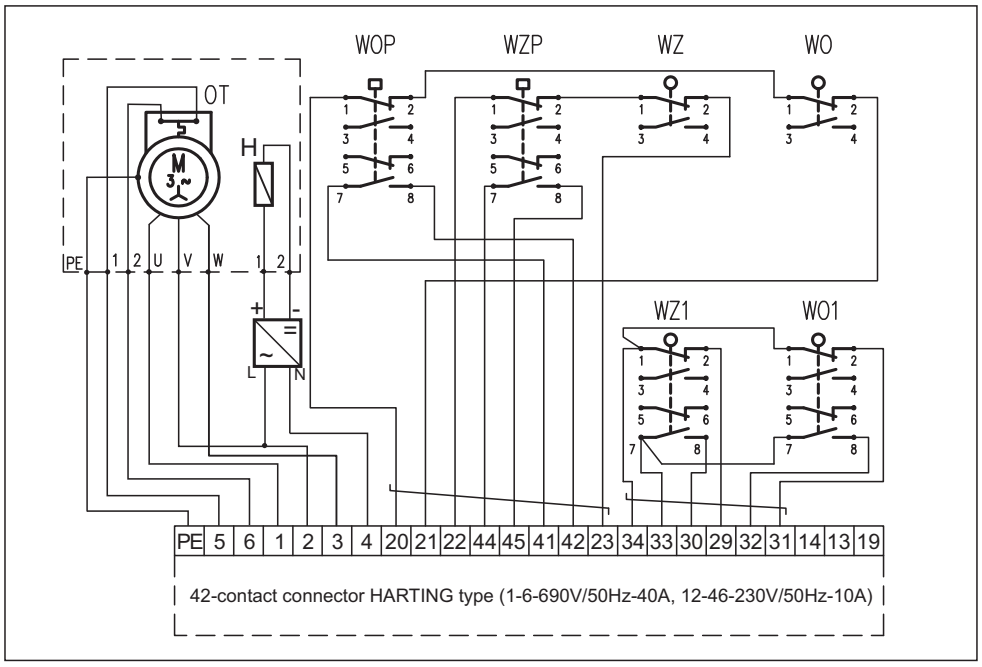
ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR type ESW-25 WITH 2-WIRE ANGULAR ENCODER



PE - protecting terminal
M - inductive motor with brake release H and temperature limiter OT
P - rectifier PCB (printed circuit board)
R - additional resistance for 500V AC

WOP, WZP- double overload switches
WO, WZ - main travel switches
WO1, WZ1 - additional double travel switches
EPO - angular encoder
Ro - load resistance (external) Ro=(0..600)Ω

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR type ESW-25 WITHOUT ANGULAR ENCODER



PE - protecting terminal
M - inductive motor with brake release H and temperature limiter OT
P - rectifier PCB (printed circuit board)

WOP, WZP- double overload switches
WO, WZ - main travel switches
WO1, WZ1 - additional double travel switches

ORDERING METHOD

TYPE	Drive	Rated torque	Rotation angle	Angular velocity
		Nm	°∢	rpm
ESW-25-00	asynchronous 3-phase motor, type Skg71-8B 0.12kW; 690rpm, 230/400V, 50Hz	250	90°	0.24

CODE1	PROTECTION TYPE
-00	standard version

CODE2	CLIMATIC VERSION
-01	version N2, acc. to PN-68/H-04650 (for temperate climate zone, outdoor under roof operation on land)

CODE3	EQUIPMENT
-1	without angular encoder*
-2	angular encoder type EPO-02; 4…20mA digital un-contacting (2-wire)*
-3	angular encoder type EPO-03; 4…20mA digital un-contacting (2-wire)*
-7	angular encoder type EPO-01; 4…20mA analog potentiometric (2-wire)

CODE4	TRAVEL ADJUSTMENT
-2	double travel-switches

CODE5	CONNECTORS
-01	with crank
-02	without crank, with clutch - acc. to drg. no. 1
-03	with crank and ball-and-socket joints
-04	with crank, ball-and-socket joints and shock absorber

ESW-25-00 - 00 - 01 - 2 - 2 - 01 EXAMPLE OF ACTUATOR TYPE DENOTATION

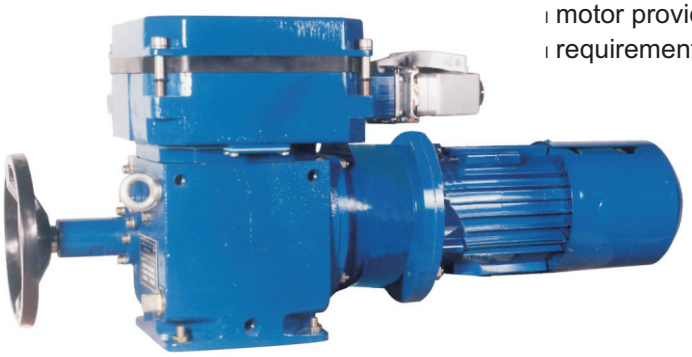
**- if client doesn't determine output connector in the order, manufacturer will make actuator with 42-pin HARTING connector (housing of plug has 2 glands: 1xPG21 and 1xPG 13,5); AMPHENOL connector should be mentioned in order.*

Meaning symbols of ESW-25-00-00-01-2-2-01:

ESW-25-00- - electric part-turn actuator of rated torque 250Nm, angular positioning speed - 0.25 rpm and rated rotation angle 90°
-00 - standard version
-01 - temperate climate version
-2 - with angular encoder type EPO-02; 4…20mA digital un-contacting (2-wire)
-2 - with double travel switches
-01 - with crank

The right of introducing design changes in the product, without deteriorating of its operation parameters, is reserved.

ELECTRIC PART-TURN ACTUATORS type ESW-26-00



- for ball-type valves
- for power engineering
- motor provided with brake
- requirements acc. to standard PN-92/M-42011

THE ELECTRIC PART-TURN ACTUATORS (CONSTANT-SPEED) type ESW-25- ARE DESIGNED FOR DRIVING OF CONTROL DEVICES, ADAPTED FOR LEVER-TYPE DRIVE SUCH AS VALVES, GATE VALVES, FLAP VALVES AND SO LIKE, IN REGULATING AND CONTROL SYSTEMS. ACTUATORS ARE ALSO DESIGNED FOR DRIVING OF BALL VALVES AND DIRECT ASSEMBLING ON THEM.

TECHNICAL DATA

- rated rotation angle	90°
- rated torque	500Nm
- angular velocity (positioning speed)	0.25 rpm
- insulation resistance	20MW
- operating temperature	-25°…+55°C -25°…+70°C in version with intelligent controller
- protection degree	IP54, acc. to EN60259..2002(U)
- working position	arbitrary
- radio noise level	N
- vibrations	N2, acc. to PN-91/M-42020
- relative humidity	up to 95%
- duty type	S4 25% 630c/h F1, acc. to PN-92/M-42011
- lubrication	semi-liquid grease Shell Gadus S2
- mass	~40kg

INDUCTIVE TWO-WIRE SENSOR

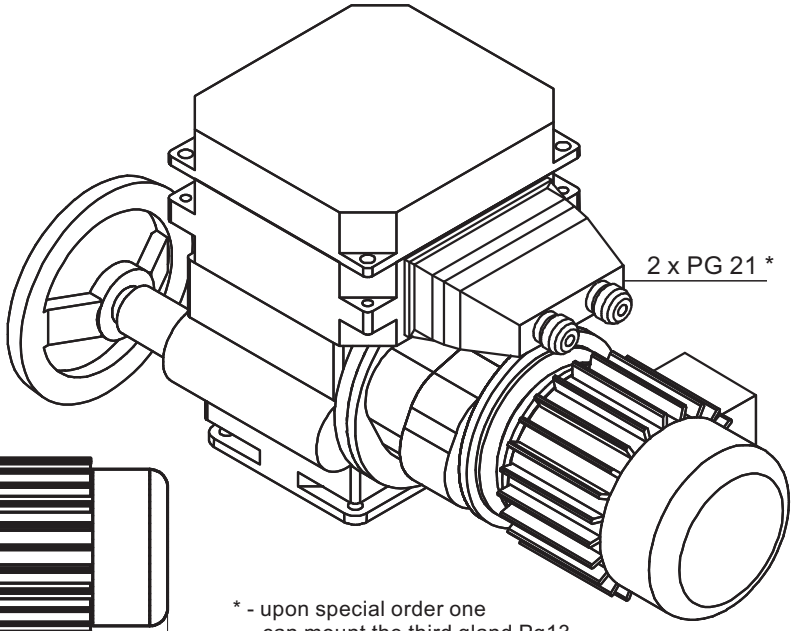
- power supply	12…36V DC (recommended 24V DC)
- output signal	4…20mA
- range setting	50 ...100% (for analog angular encoder) 20...100% (for digital angular encoder)
- maximum load resistance	for supply 24V DC - 500W

MICROSWITCHES: Type: 83.132.54ER14.1 83.133

- load capacity of contacts: 2,5 A at Ue=230V 50...60 Hz in user category AC 0,3 A at Ue=220V DC in user category DC-13	
- minimal switching voltage	10V
- minimal switching current	20mA

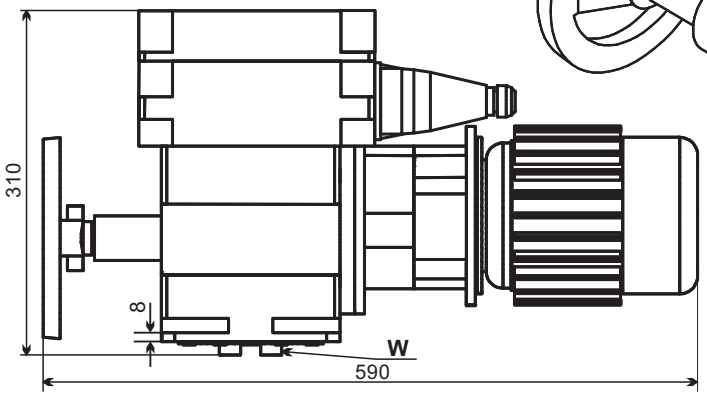
ELECTRIC PART-TURN ACTUATORS type ESW-26-00

GENERAL VIEW, PROJECTIONS AND OVERALL DIMENSIONS OF ACTUATOR

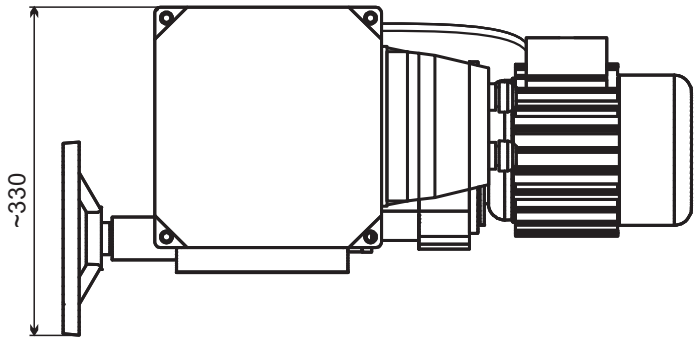


* - upon special order one can mount the third gland Pg13

SIDE VIEW

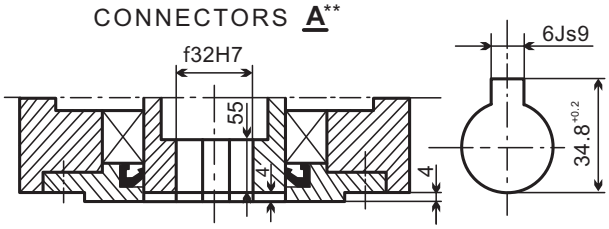


TOP VIEW

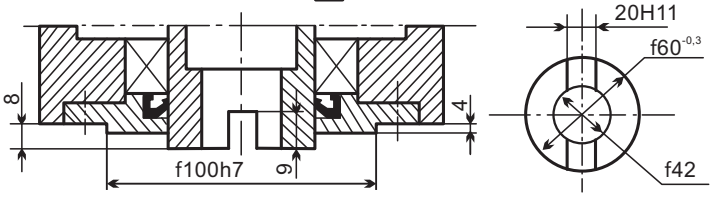


VIEW “W” :

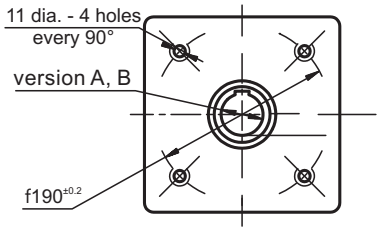
CONNECTORS **A****



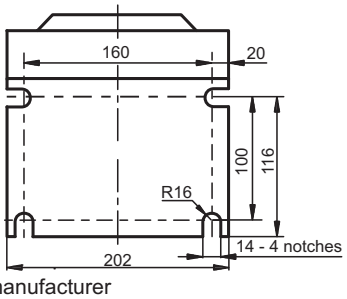
CONNECTORS **B****

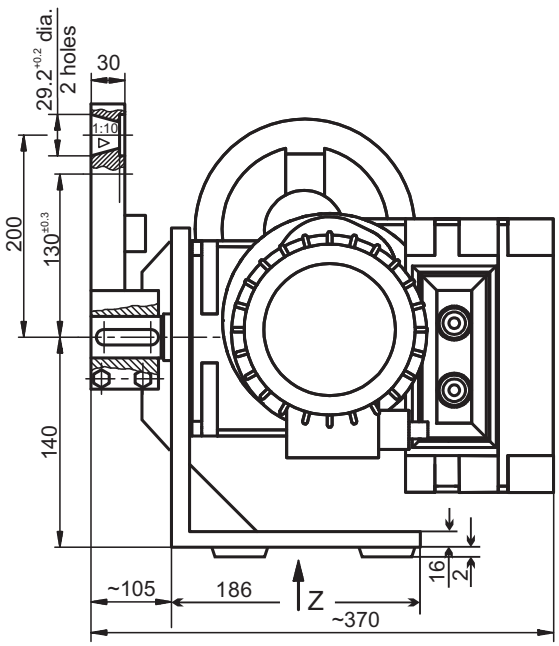


VIEW "W"



VIEW "Z"

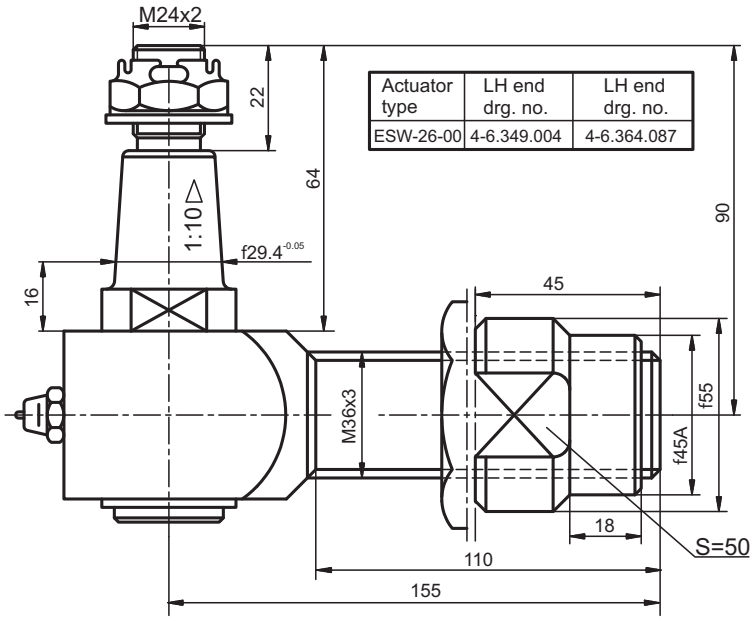




** - other connectors to be agreed with the manufacturer

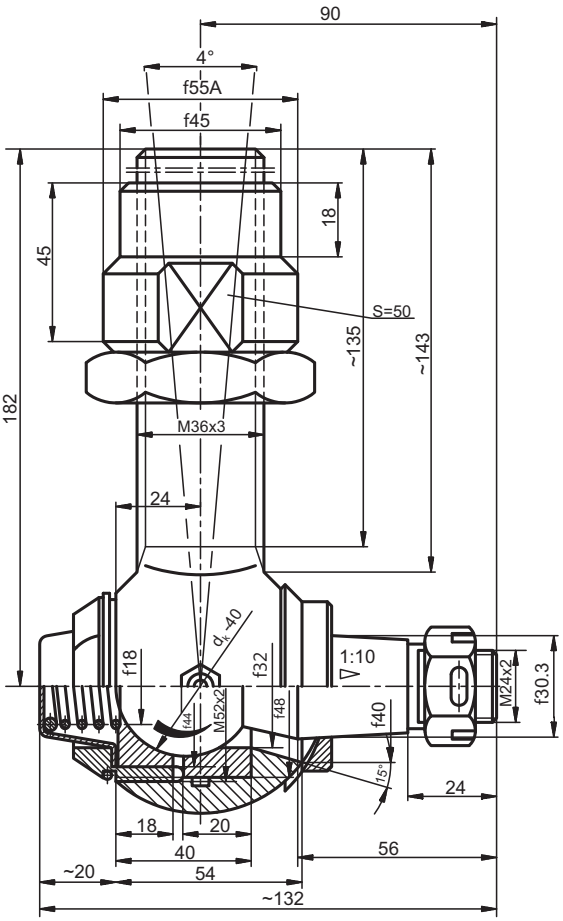
ELECTRIC PART-TURN ACTUATORS type ESW-26-00

STANDARD EXTENSION ROD for actuators type ESW-26-



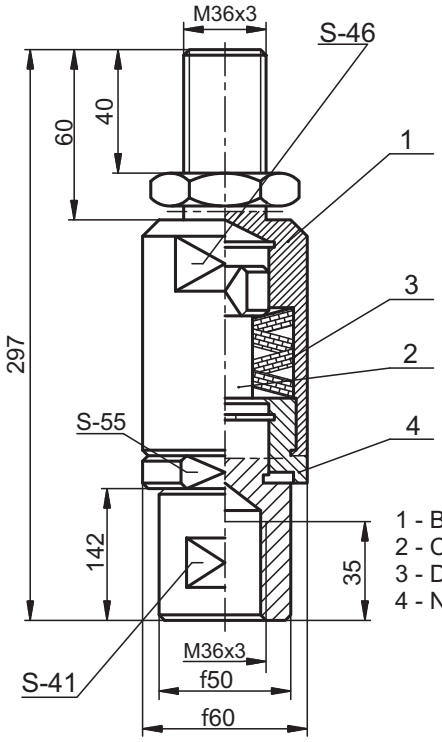
Actuator type	LH end drg. no.	LH end drg. no.
ESW-26-00	4-6.349.004	4-6.364.087

JOINED EXTENSION ROD for actuators type ESW-26-00



Actuator type	LH end drg. no.	RH end drg. no.
ESW-26-00	ES2-1432	ES2-1433

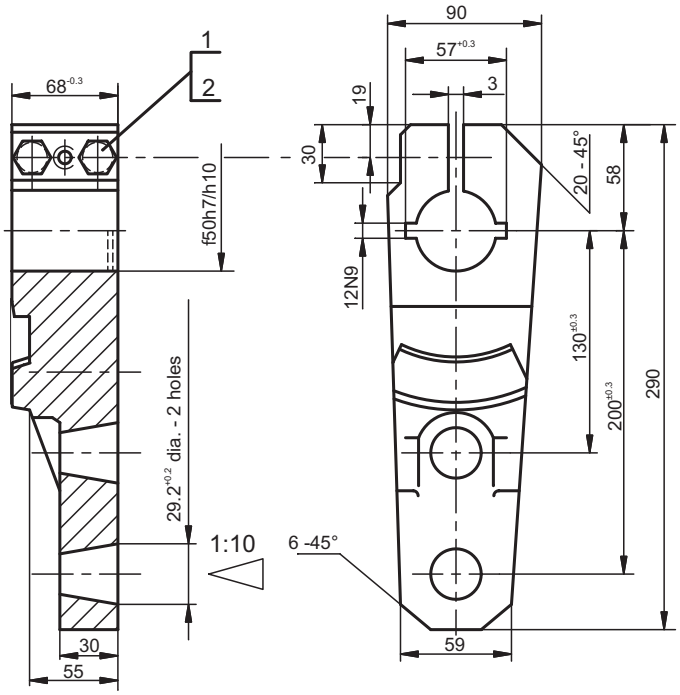
SHOCK ABSORBER for actuators type ESW-26-00



1 - Body
2 - Connector
3 - Disc spring
4 - Nut

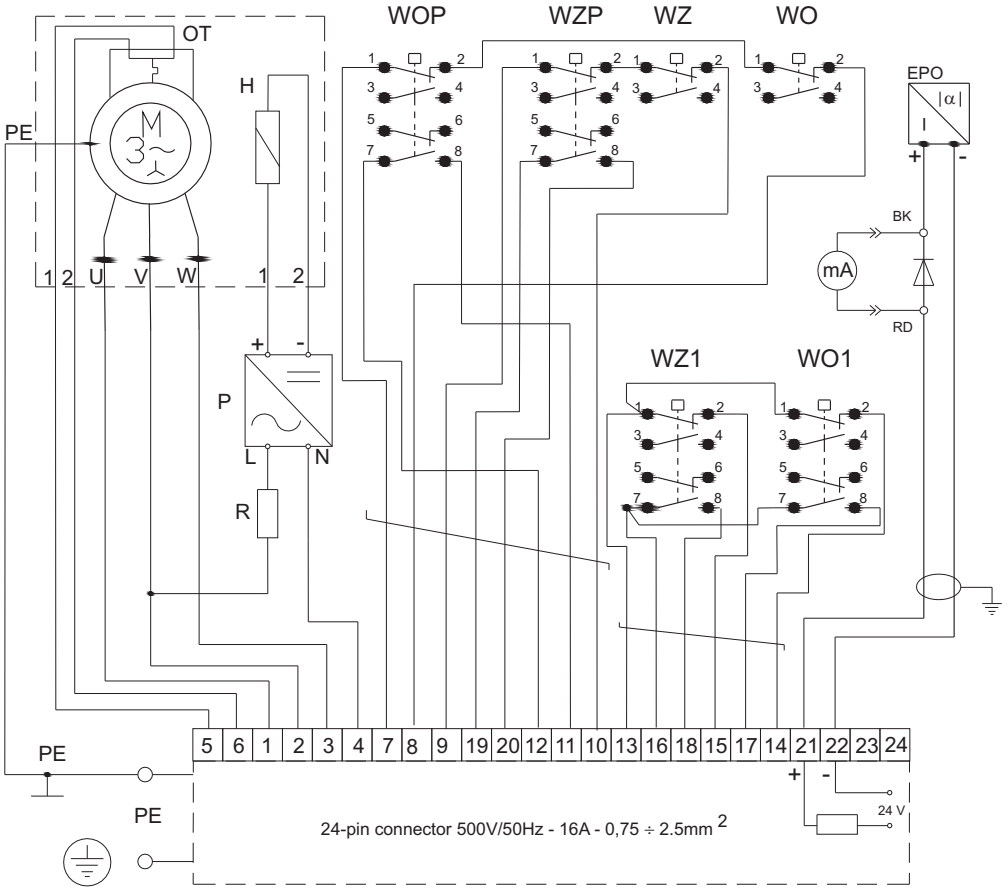
Actuator type	Shock absorber drg. no.
ESW-26-00	3-6.279.082-3

MOUNTING OF CRANK ON ACTUATOR OUTPUT SHAFT



item 1 - spring washer, 12,2 dia., acc. to PN-77/M-82008
item 2 - screw M12 x 70, acc. to PN-85/M-82105

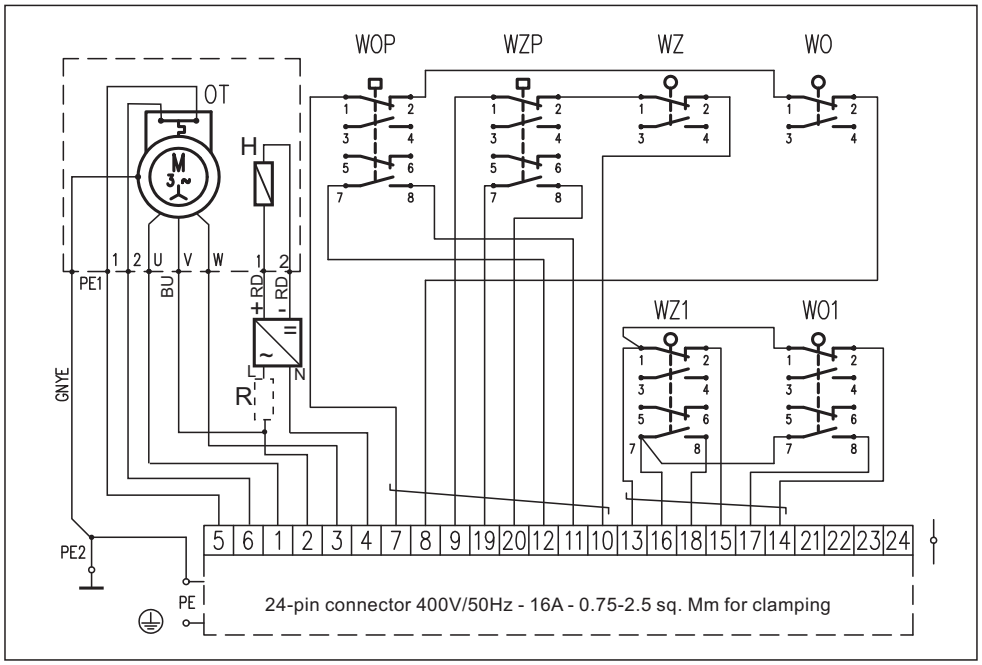
ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITH 2-WIRE ANGULAR ENCODER



PE - protecting terminal
M - inductive motor with brake release H and temperature limiter OT
P - rectifier PCB (printed circuit board)
R - additional resistance for 500V AC

WOP, WZP- double overload switches
WO, WZ - main travel switches
WO1, WZ1 - additional double travel switches
EPO - angular encoder

ELECTRIC CIRCUIT DIAGRAM OF ACTUATOR WITHOUT ANGULAR ENCODER



ORDERING METHOD:

Type	Rated torque	Rated rotation angle	Velocity...
	Nm	[°]	rpm
ESW-26-00	500	90	0.24

CODE1	PROTECTION TYPE
-00	standard version

CODE2	CLIMATIC VERSION
-01	version N2, acc. to PN-68/H-04650 (for moderate climate zone, outdoor under roof operation on land)
-02	version N2, acc. to PN-68/H-04650 (for moderate climate zone, outdoor under roof operation on land) up to temp. -40°C ...+55°C*

CODE3	EQUIPMENT
-1	Without angular encoder
-2	angular encoder type EPO-02; 4…20mA digital un-contacting (2-wire)
-3	angular encoder type EPO-03; 4…20mA digital un-contacting (2-wire)
-7	angular encoder type EPO-01; 4…20mA analog potentiometric (2-wire)

CODE4	TRAVEL ADJUSTMENT
-2	double travel-dependent switches

CODE5	CONNECTORS
-01	with crank
-02	version without crank, with clutch - acc. to B
-03	version without crank, with clutch - acc. to A
-04	version with crank, with joined extension rod LH and RH
-05	version with crank, with standard extension rod LH and RH
-06	version with crank, with joined extension rod LH and RH and shock absorber
-07	version with crank, with standard extension rod LH and RH and shock absorber

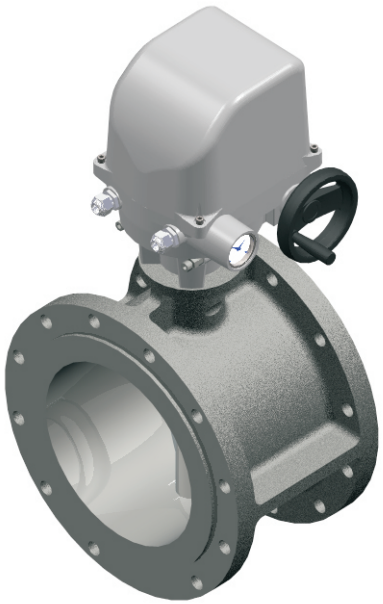
ESW-26-00 - 00 - 01 - 2 - 2 - 01 EXAMPLE OF ACTUATOR TYPE DENOTATION

** - it doesn't apply to the actuator with digital un-contacting angular encoder (CODE3 version 3) and version with controller (Code 3 version 4,5,6*

Meaning symbols of ESW-26-00-00-01-2-2-01:

ESW-26-00 - electric part-turn actuator of rated torque 500Nm, rated rotation angle 90°, velocity 0.25 rpm
-00 - standard version (non-explosionproof)
-01 - moderate climate version
-2 - with angular encoder type EPO-02 4...20Ma digital un-contacting (2-wire)
-2 - with double travel switches
-01 - version with crank

Electric butterfly valve actuator type ESW-30



- **Used for driving of the ball-type valves and throttling valves**
- **Fixing connector, according to the ISO 5211 standard (connectors F05, F07 and F10)**
- **Compact design and modular construction**

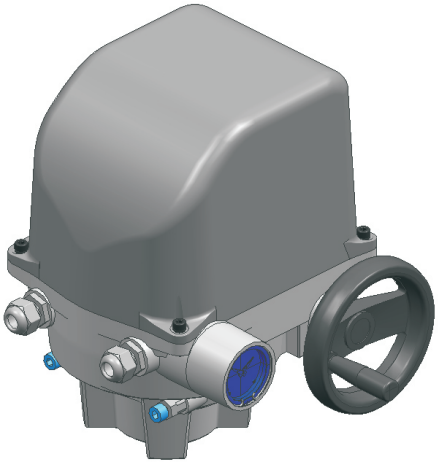
Application

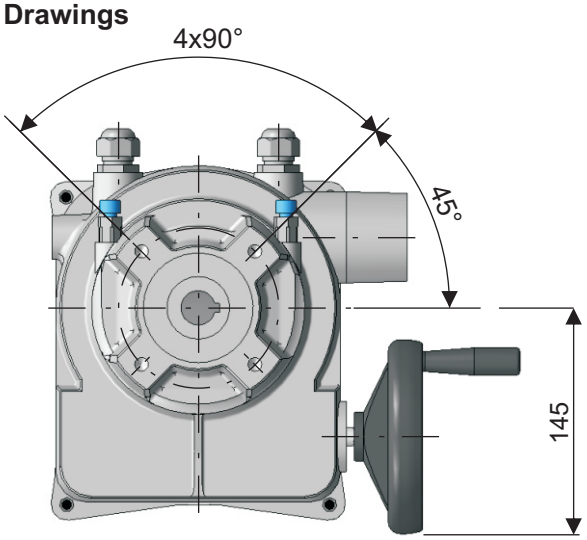
The Electric Butterfly Valve Actuator type ESW-30 is designed for driving of ball valves and throttling valves and other devices for which the rotational shift is required. The drives are adapted for direct mounting on the ball valves and throttling valves, equipped with flange connectors being in accordance with the ISO 5211 Standard (type series of connectors F05, F07 and F10).

Technical Data

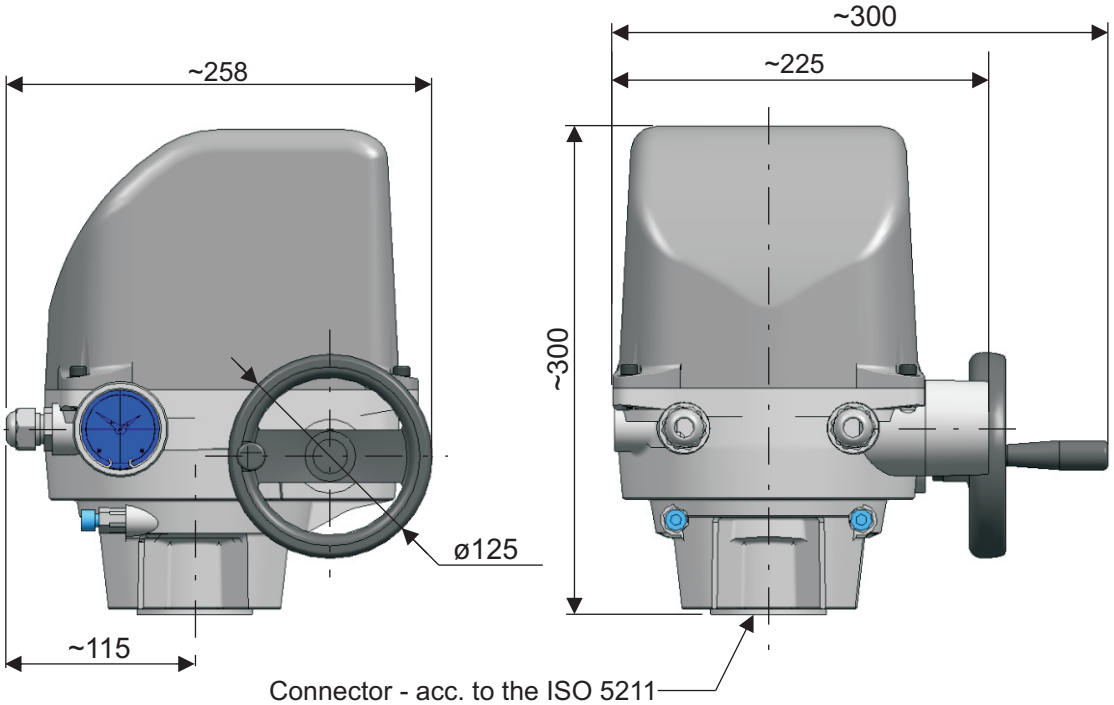
Power supply	230 V AC$^{10\%}_{-15\%}$, 50 Hz
Rated torque	125 Nm; 250 Nm
Operating time	20s/90°; 40s/90°; 60s/90°
Angle of rotation	90°; 180°
Duty type	S4-25% maximum 630c/h
Control signal	supply voltage three-term control signal
Position indication signal	4…20 mA or 100 Ω
Protection degree	IP67
Working temperature	od -25°C...+70°C (Normal) od -40°C...+55°C (Low temperatures)
Working position	arbitrary
Vibrations	<7,1mm/s
Relative humidity	up to 95%, with short-term condensation
Mass	approx. 12 kg
Microswitches	type 83.133 54ER14.1
- usage category AC-15	2,5A- with U_e=230 V 50 do 60 Hz
- usage category AC-13	0,3A- with U_e=230 V DC
	Minimum voltage and switching current; 10 V, 20 mA

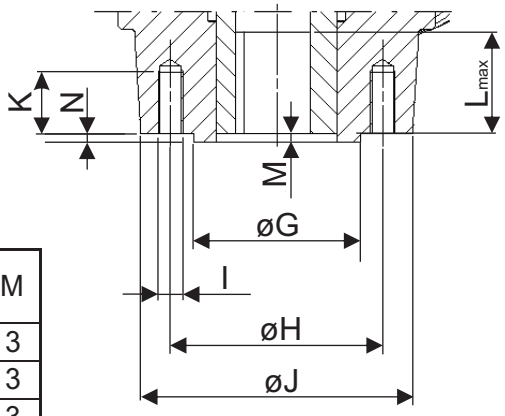
Dimensioned Drawings





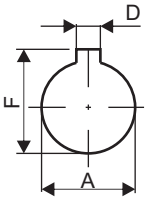
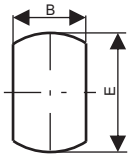
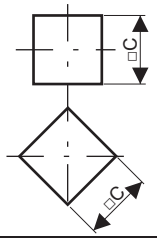
Dimensioned Drawings - continued



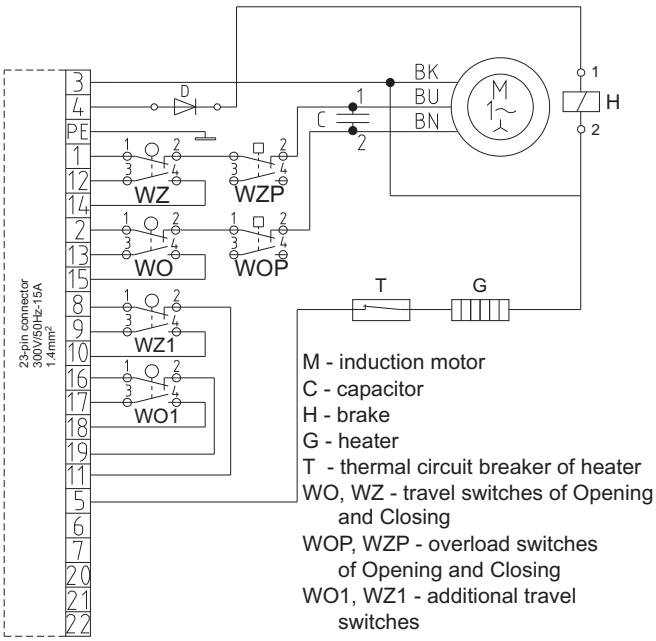


Connectors

Flange Type	G f8	H	Ix4	J	K	N	M
F05	35	50	M6	65	9	3	3
F07	55	70	M8	90	12	3	3
F10	70	102	M10	125	15	3	3

			Type A					Type B					Type C				
Connector shape																	
Actuator type	Rotation torque	Flange type	A H9					B H11					C H11				
			12	14	18	22	28	11	14	17	19	22	11	14	17	19	22
ESW-30-21 ESW-30-22 ESW-30-23	125Nm	F05	A1	A2	A4	A6	-	B0	B2	-	-	-	C0	C2	-	-	-
		F07	-	A2	A4	A6	A7	B0	B2	B3	-	-	C0	C2	C3	-	-
ESW-30-31 ESW-30-32 ESW-30-33	250Nm	F10	-	-	A4	A6	A7	-	B2	B3	B5	B6	-	C2	C3	C5	C6
L_{max}			50					40					40				
			5	5	6	8	8	14	18	22	25	28					
			DN9					E									
			14,3	16,3	20,8	25,3	31,3										
			F														

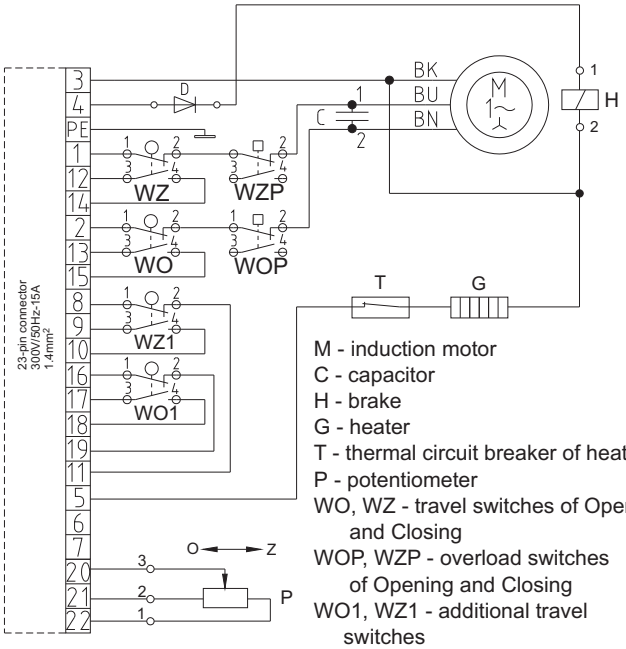
Electric circuit diagram of actuator ESW-30 without equipment



M - induction motor
C - capacitor
H - brake
G - heater
T - thermal circuit breaker of heater
WO, WZ - travel switches of Opening and Closing
WOP, WZP - overload switches of Opening and Closing
WO1, WZ1 - additional travel switches

REMARKS:
1. Power supply 230V,50Hz between the terminals 3 and (2+4) causes the actuator movement, which corresponds to “Opening”.
2. Power supply 230V,50Hz between the terminals 3 and (1+4) causes the actuator movement, which corresponds to “Closing”.
3. P..Electric shock protection is provided with connecting the protective earthing terminal (PE) to the external electric shock protection system.

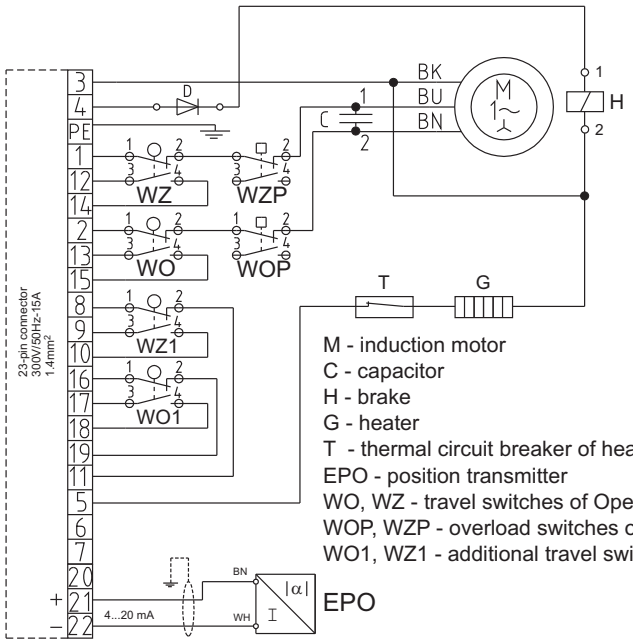
Electric circuit diagram of actuator ESW-30 with potentiometer



M - induction motor
C - capacitor
H - brake
G - heater
T - thermal circuit breaker of heater
P - potentiometer
WO, WZ - travel switches of Opening and Closing
WOP, WZP - overload switches of Opening and Closing
WO1, WZ1 - additional travel switches

REMARKS:
1. Power supply 230V,50Hz between the terminals 3 and (2+4) causes the actuator movement, which corresponds to “Opening”.
2. Power supply 230 V, 50 Hz between the terminals 3 and (1÷4) causes the actuator movement, which corresponds to „Closing”.
3. Electric shock protection is provided with connecting the protective earthing terminal (PE) to the external electric shock protection system.
4. Position indication of the actuator final control element is given by means of the potentiometer P.

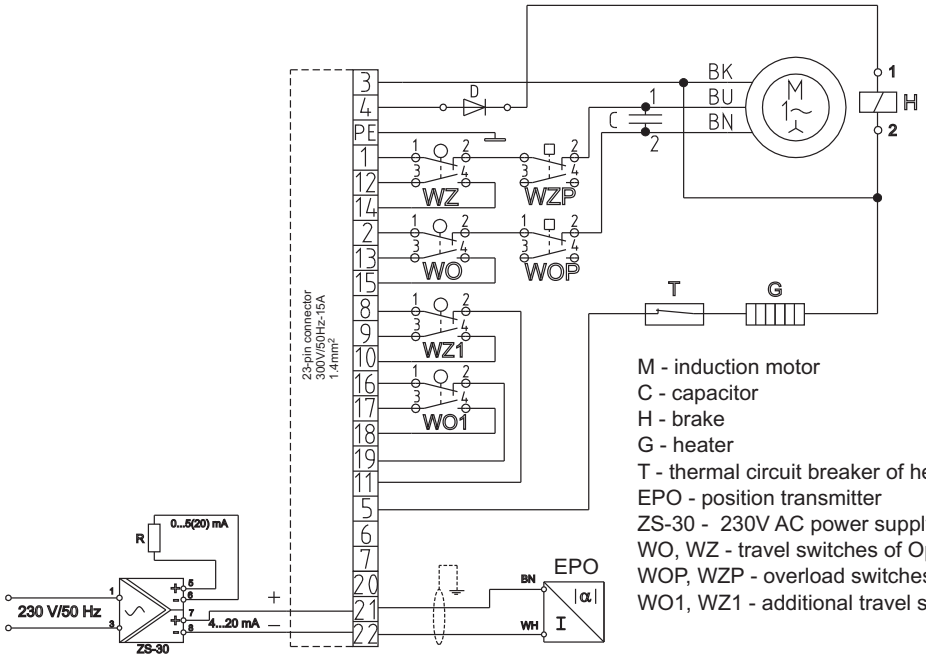
Electric circuit diagram of actuator ESW-30 with position transmitter EPO



M - induction motor
C - capacitor
H - brake
G - heater
T - thermal circuit breaker of heater
EPO - position transmitter
WO, WZ - travel switches of Opening and Closing
WOP, WZP - overload switches of Opening and Closing
WO1, WZ1 - additional travel switches

REMARKS:
1. Power supply 230 V, 50 Hz between the terminals 3 and (2÷4) causes the actuator movement, which corresponds to „Opening”.
2. Power supply 230 V, 50 Hz between the terminals 3 and (1÷4) causes the actuator movement, which corresponds to „Closing”.
3. Electric shock protection is provided with connecting the protective earthing terminal (PE) to the external electric shock protection system.
4. Position indication of the actuator output element is given by means of the position transmitter EPO.

Electric circuit diagram of actuator ESW-30 with position transmitter EPO and power supply unit



M - induction motor
C - capacitor
H - brake
G - heater
T - thermal circuit breaker of heater
EPO - position transmitter
ZS-30 - 230V AC power supply unit with signal conversion
WO, WZ - travel switches of Opening and Closing
WOP, WZP - overload switches of Opening and Closing
WO1, WZ1 - additional travel switches

REMARKS:

1. Power supply 230 V, 50 Hz between the terminals 3 and (2÷4) causes the actuator movement, which corresponds to „Opening".
2. Power supply 230 V, 50 Hz between the terminals 3 and (1÷4) causes the actuator movement, which corresponds to „Closing".
3. Electric shock protection is provided with connecting the protective earthing terminal (PE) to the external electric shock protection system.
4. Position indication of the actuator output element is given by means of the position transmitter EPO.

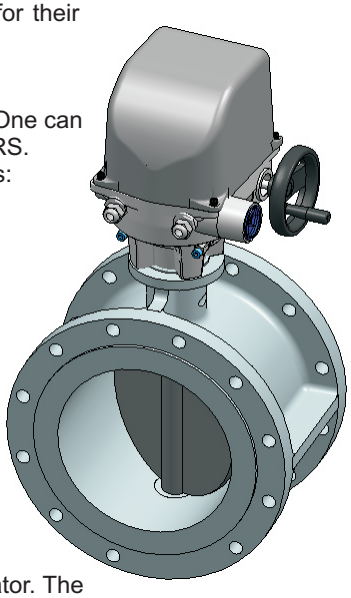
Flow control system: actuator + throttling valve

Application

Flow control systems are designed for changing the flow rate of a medium, keeping the required flow characteristics.

Design

The control system consists of the flap valve or throttling valve in order to change the resistance for a flowing medium and actuators designed for supply of mechanical energy necessary for their shifting.



Selection of throttling valve

Designing of the flow control system should be started from selecting the throttling valve.One can apply here the throttling valves produced by the "Zakład Automatyki POLNA S.A." type PRS.
In order to correctly choose a throttling valve, one should specify the following parameters:

Parameters of throttling valve selection
Nominal diameter DN
Nominal pressure PN
Temperature of the medium
Kind of the medium
Connecting flange type

According to the given temperature and kind of the medium one chooses the sealing insert.

Technical parameters of throttling valves type PRS	
Nominal diameters	DN 40...300
Nominal pressures	PN 6...20
Ambient temperature (dependent of the sealing insert material)	TN - 40°...180°C

After a throttling valve is selected, depending on necessary torque, one selects the actuator. The actuator equipment and mechanical plus electric connectors can be a subject of separate agreements.

Ordering

The throttling valve can be specified by the customer, or selected on the basis of determined parameters.
The actuator is to be specified according to the Ordering Table.
When ordering the throttling valve and actuator, we make the actuator connections and settings, which guarantees a correct and reliable operation of the system.

Ordering table

Electric butterfly valve actuator	E	S	W	-	3	0	-	X	X	-	A	X	-	X	X	-	X	-	X	X	X	X	-	X

TORQUE	OPERATING TIME		
125Nm	20s/90°	2	1
250Nm		3	1
125Nm	40s/90°	2	2
250Nm		3	2
125Nm	60s/90°	2	3
250Nm		3	3

ANGLE OF ROTATION		
90°	A	0
180°	A	1
Other angle in the range of 30° up to 180° - after agreement	A	2

CLIMATIC VERSION	
Normal version -25°C...up to 70°C	1
* Low temperatures -40°C...up to 55°C	2

EQUIPMENT	
No equipment	A
Position transmitter EPO-01 (analogue potentiometric 4…20mA, two-wire)	B
Position transmitter EPO-02 (contactless digital 4…20mA, two-wire)	C
Position transmitter EPO-03 (contactless digital 4…20mA, two-wire, with display)	D
Potentiometer 100Ω	P

ELECTRIC CONNECTORS	
Glands + terminal strip	5

MECHANICAL CONNECTORS							
Acc. to client's order - after agreement		X	X	X	X		
Flange connector F05 acc. to ISO 5211 Standard	For torques 125Nm - the output shaft acc. to drawing A1	0	5	A	1	**	
Flange connector F07 acc. to ISO 5211 Standard Recommended	For torques 125Nm, 250Nm - the output shaft acc. to drawing A2	0	7	A	2		
	For torques 125Nm, 250Nm - the output shaft acc. to drawing A4	0	7	A	4		
	For torques 125Nm, 250Nm - the output shaft acc. to drawing A6	0	7	A	6		
	For torques 125Nm, 250Nm - the output shaft acc. to drawing A7	0	7	A	7		
	For torques 125Nm, 250Nm - the output shaft acc. to drawing B0	0	7	B	0		
	For torques 125Nm, 250Nm - the output shaft acc. to drawing B2	0	7	B	2		
	For torques 125Nm, 250Nm - the output shaft acc. to drawing B3	0	7	B	3		
	For torques 125Nm, 250Nm - the output shaft acc. to drawing C0	0	7	C	0		
	For torques 125Nm, 250Nm - the output shaft acc. to drawing C2	0	7	C	2		
	For torques 125Nm, 250Nm - the output shaft acc. to drawing C3	0	7	C	3		
Flange connector F10 acc. to ISO 5211 Standard	For torques 250Nm - the output shaft acc. to drawing A4l	1	0	A	4	**	

ADDITIONAL EQUIPMENT	
Without additional equipment	0
Power supply unit with signal conversion (switched mode, four-wire). For building on the actuator exterior	1

** - For low temperatures: -40°C...55°C - one can apply the equipment with symbol from A, B, C and P*

*** - Remaining versions acc. to table connectors*

Example: Electric Butterfly Valve Actuator type ESW-30 with torque of 125 Nm, operating time 20s/90°, normal climatic version with position transmitter EPO-03, electric connector, terminal strip, and mechanical connector F05, shape of output shaft type A - dimensions: ϕ22H9 end key 8N9.

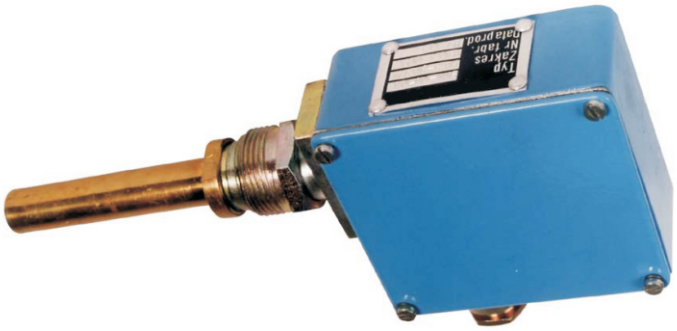
ESW-30-21-1D-5-05A6

Chapter V

Switches

ERT-01.....V/2
ERP-01.....V/4
B174.....V/6

ELECTRIC TWO-TERM TEMPERATURE SWITCHES type ERT-01



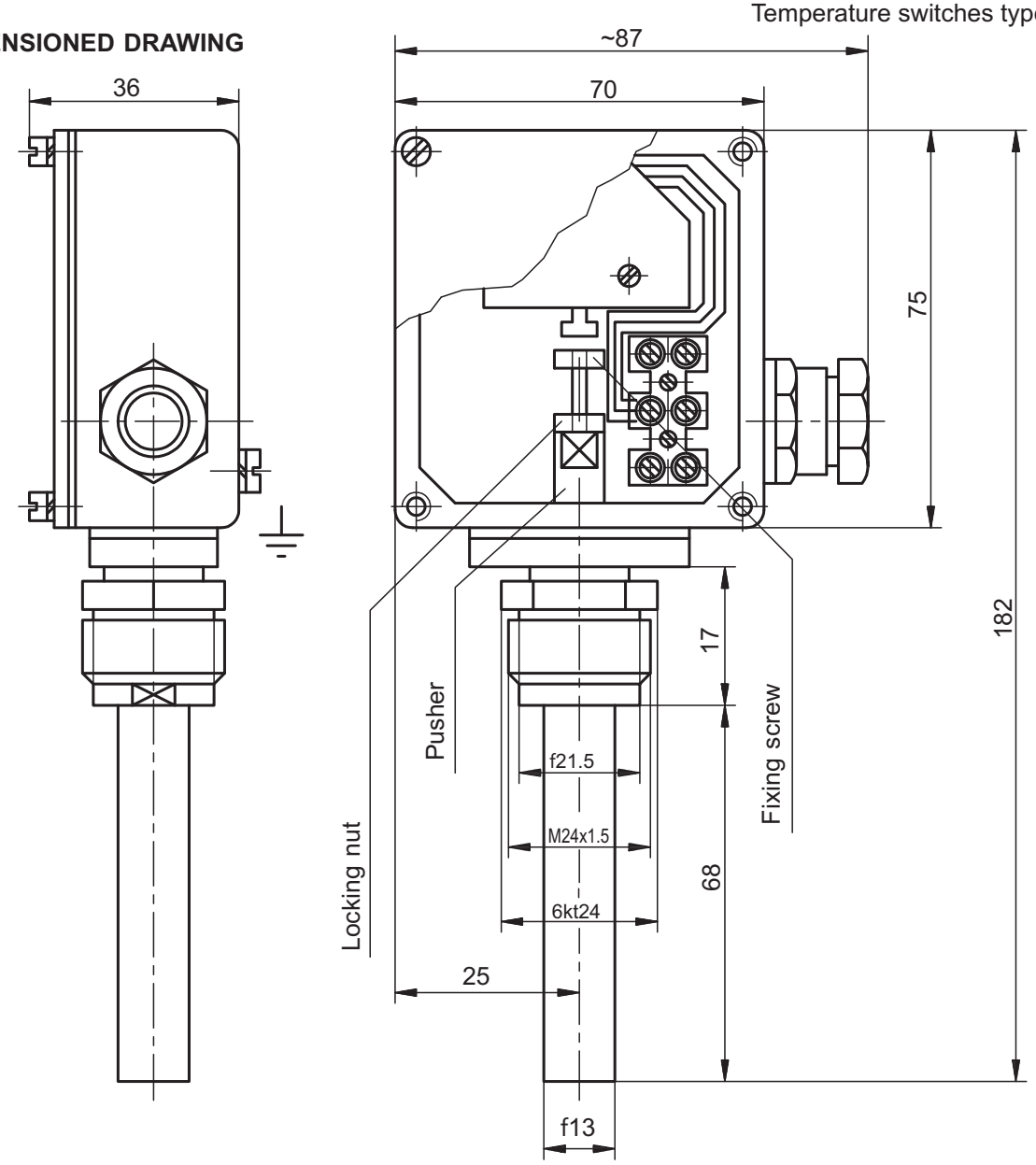
- control range of temperature from 30^0C to 100^0C
- protection degree IP55
- resistance to vibration

THE ELECTRIC TEMPERATURE SWITCHES ARE DESIGNED FOR CONTROL IN SUCH SYSTEMS WHEREIN IT IS NECESSARY TO MAINTAIN CONSTANT TEMPERATURE BY MEANS CHANGING IN THE INFLOW CONDITIONS OF ENERGY MEDIUM, FOR E. G. BY CONTROLLING THE ELECTRO-MAGNETIC VALVES, SWITCHING-ON OF HEATING ELEMENTS, PUMPS, FANS, ETC. THANKS TO RESISTANCE TO SHOCKS AND VIBRATIONS THEY CAN BE APPLIED IN THE TRACTION DIESEL AND MARINE ENGINES. MOREOVER, THE UNITS CAN BE APPLIED AS SIGNALLING ELEMENTS OF TEMPERATURE EXCEEDING OR TEMPERATURE DROP IN VARIOUS INDUSTRIAL SYSTEMS.

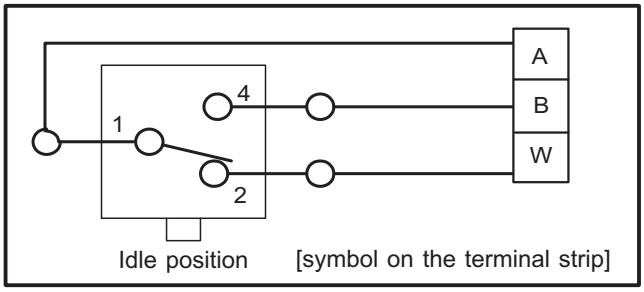
TECHNICAL DATE

Parameters	ERT-01-00	ERT-01-01
Control range	30…70°C	70…110°C
Repeatability	±1.5°C	
Sensor diameter	13 mm	
Dead zone	≤4°C	
Sensor lenght	68 mm	
Time constant	30 s	
Fixing thread	M24 x 1.5	
Switching frequency	60 connections/h	
Durability	$0,1x10^6$ functions	
Resistance to vibrations	0…70 Hz at 6 g	
Resistance to shocks	10 g	
Ambient temperature	-20°C…+80°C	
Switched current	U_e = 400V; 50…60Hz; 1A; AC15 U_e = 220V=; 0,5 A; DC13	
Mass	~0.5kg	
Overheating temperature from the setpoint	20°C	
Permissible pressure of the medium	6.3 MPa	

DIMENSIONED DRAWING



ELECTRIC CIRCUIT DIAGRAM



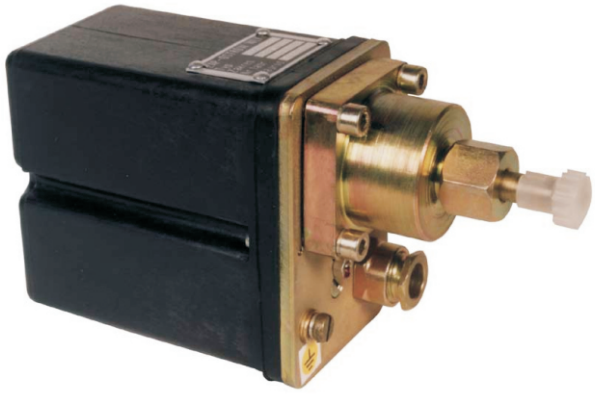
ORDERING

One should give the in the order: switch full name and type, e.g.:

Electric two-term temperature switch type ERT-01-00 (52-56°C)

The right of introducing design changes in the product, without deteriorating of its operation parameters, is reserved.

ELECTRIC TWO-TERM PRESSURE SWITCHES TYPE ERP-01



- pressure range from 0,03 to 3,2 MPa
- max temperature of medium 120°C
- arbitrary working position
- they perform requirements of directive PED 97/23/WE (art.3, par.3)

THE ELECTRIC PRESSURE SWITCHES ARE DESIGNED FOR TWO-TERM PRESSURE CONTROL OF STEAM, WATER, OIL AND AIR. THE SWITCHES MAINTAIN THE SET-POINT PRESSURE VALUE IN THE INTERVAL DETERMINED BY THE SET DIFFERENTIAL PRESSURE. MOREOVER, THE UNITS CAN BE APPLIED AS SIGNALLING ELEMENTS OF PRESSURE EXCEEDING OR PRESSURE DROP IN VARIOUS DEVICES.

ELECTRIC TWO-TERM PRESSURE SWITCHES TYPE ERP-01- PERFORM REQUIREMENTS OF DIRECTIVE PED 97/23/WE PRESSURE SYSTEMS (ART. 3 PAR.3) AND THEY ARE MADE WITH ACKNOWLEDGED ENGINEERING PRACTICE.

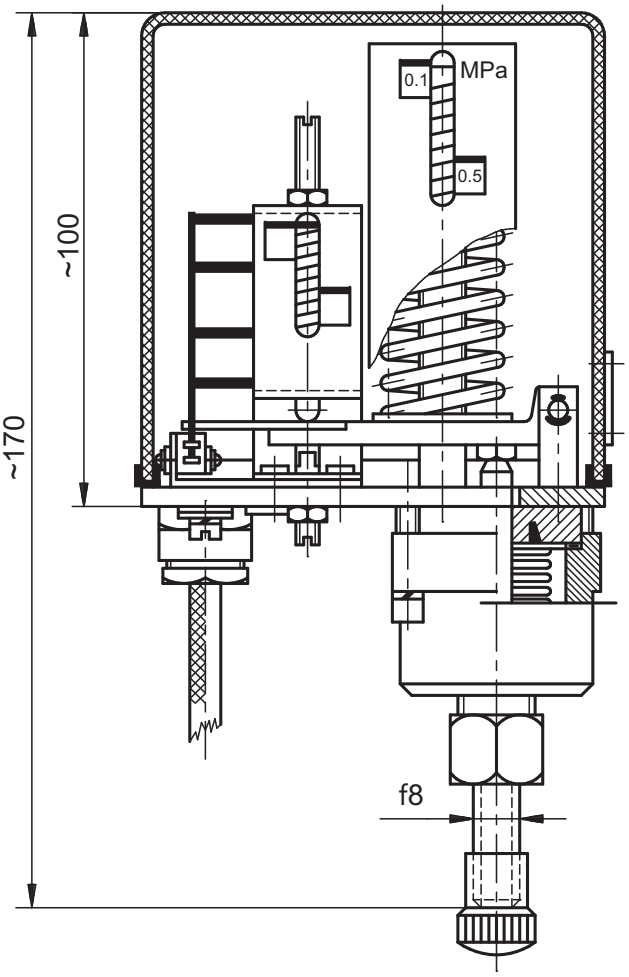
TECHNICAL DATA

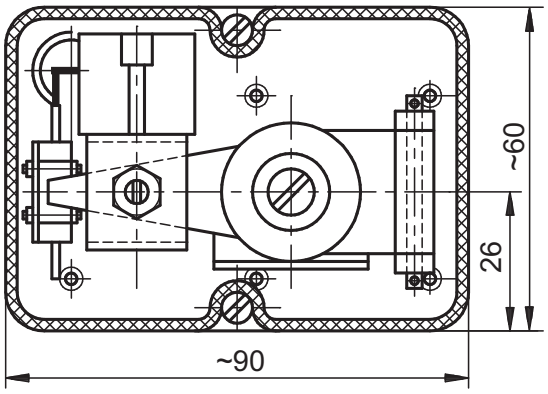
Parameters	ERP-01-00	ERP-01-01	ERP-01-02	ERP-01-03
Pressure control range	0.03…0.15 MPa	0.1…1 MPa	0.3…2 MPa	0.4…4 MPa
Differential pressure	0.03…0.1 MPa	0.1…0. 5 MPa	0.15…0.6 MPa	0.4…1.5 MPa
Static pressure of the medium	0.2 MPa	1.6 MPa	2.5 MPa	4.5 MPa
Repeatability	±2%			
Permissible temperature of the medium	120°C			
Ambient temperature	-20°C…+80°C			
Casing protection dergee	IP 55			
Mass	0.8 kg			

ELECTRIC PARAMETERS OF MICROSWITCH:

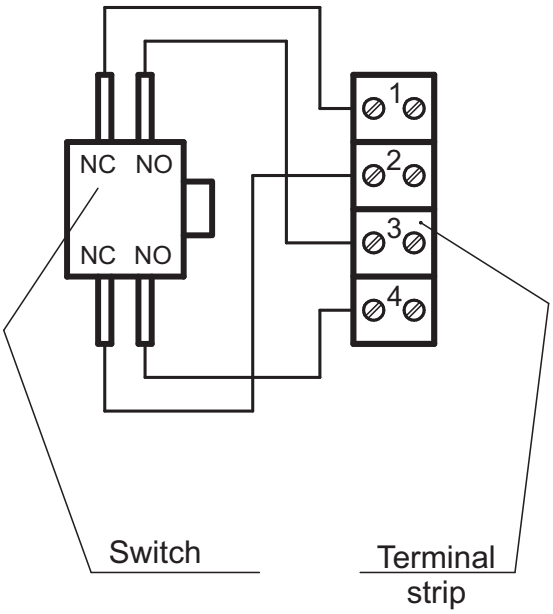
Rated switching voltage U_e
AC-15 230V; 50...60Hz
DC-13 220V=
Rated switching currents:
I_e /AC 15 U_e 230V; 50...60Hz 2,5A
I_e /DC 13 220V; 0,6A
Switching durability:
AC-15 $85x10^3$
DC-13 $30x10^3$
Minimal voltage and switching current: 10V; 20mA
Cross sections of connecting wires - for single-core wires: 1 sq. mm
- for multile-core wires: 1 sq. mm

DIMENSIONED DRAWINGS





ELECTRIC CIRCUIT DIAGRAM



ORDERING

One should give the in the order: switch full name and type, e.g.:

Electric two-term pressure switch type ERP-01-00

The right of introducing design changes in the product, without deteriorating of its operation parameters, is reserved.

PRESSURE SWITCH type B174 (protecting pumps before working “on dry”)

- switch of critical states
- protecting unit (protecting pumps before working “on dry” and decrease of water pressure)
- two-term pressure switch, strong compacted housing, max. working pressure to 1 MPa, might be used for mediums like gas and liquid
- optional working position, high long-time stability, protection degree of housing IP54 acc. to PN-EN 60529:2002
- high reliability - they are made according to EN ISO 9001:2000

PRESSURE SWITCH TYPE B174 WAS DESIGNED FOR DISCONNECTED ELECTRIC CIRCUITS AT BRAKE OF SETTING AT MEASURED PRESSURE VALUE. IT IS USED IN AUTOMATION SYSTEMS AND BUILDING OF MACHINES AND EQUIPMENT (E.G. IN PUMPS PROTECTING SYSTEMS BEFORE WORKING “ON DRY”). METAL ELASTIC BELLOWS IS THE MEASURING ELEMENT, WHICH MAKES SWITCHING CONTACTS OF MINIATURE SWITCH UNDER THE INFLUENCE OF GROW UP OF MEASURING PRESSURE.

TECHNICAL DATA

- switching off pressure:	
for versions B-174-A001 ... A004	10 - 30 kPa
for versions B-174-A005 and A006	32-40 kPa
- setting accuracy of switching off pressure:	
for versions B-174-A001 ... A004	0,8 kPa
for versions B-174-A005 and A006	1 kPa
- hysteresis zone (un-setting):	
for versions B-174-A001 ... A004	8-14 kPa
for versions B-174-A005 and A006	8-28 kPa
- max working pressure	1,0 MPa
- working position	optional
- load contacts capacity:	
for versions B-174-A001 ... A004	230VAC /2,5A
for versions B-174-A005 and A006	380VAC /6A
- acceptable vibrations	10...60 Hz / amplitude <0,3 5 mm 60...500Hz, hurrying 5g (acc. to PN-EN60654-3:2000;class VH6
- protection degree of housing	IP54 (acc. to PN-EN 60529:2002)
- additional mistake at surrounding temperature changes (at max working pressure):	
for versions B-174-A001 ... A004	0,5 kPa /10°C
for versions B-174-A005 and A006	0,8 kPa /10°C

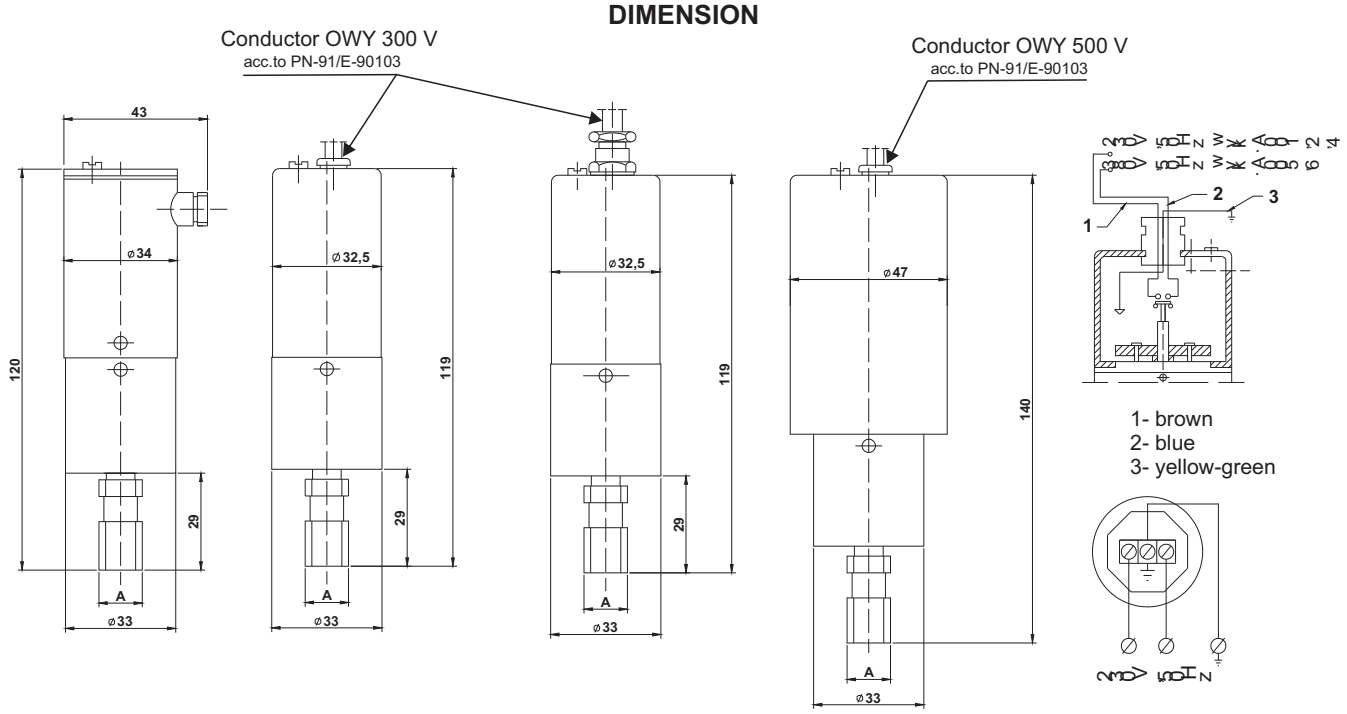
TECHNICAL DATA (continuation)

- additional mistake at vibrations in range 10...60Hz, amplitude <0,35mm 60...500Hx, hurrying 5g
  - for vertical position: for versions B-174-A001 ... A004 — 1,6 kPa /10°C
  - for versions B-174-A005 and A006 — 2,5 kPa /10°C
  - for horizontal position: for versions B-174-A001 ... A004 — 1,0 kPa /10°C
  - for versions B-174-A005 and A006 — 2,0 kPa /10°C
- relative humidity surroundings — 0...95%
- influence of changing position (deviation at vertical) — 0,4 kPa /90°
- surroundings temperature — -25°C...+70°C
- temperature of measuring medium — -25°C...+120°C
- mass:
  - for versions B-174-A001 ... A004 — 0,3 kg
  - for versions B-174-A005 and A006 — 0,5 kg

IMPORTANT:

Measuring medium gas or liquid, couldn't in chemical reaction on copper alloy

DIMENSION



Version A003 | Version A001 and A004 | Version A002 | Version A005 and A006 | 220V, 50 Hz Version A003

TABLE VERSIONS

Version	Conductor at length 600 mm	Connector's thread (dimension A)	Cable bush of conductor	Electric gland from above	Electric gland from the side
B174-A001	+	G 1/4"	+	-	-
B174-A002	+		-	+	-
B174-A003	-		-	-	+
B174-A004	+	R 1/4"	+	-	-
B174-A005	+		+	-	-
B174-A006	+	R 1/8"	+	-	-

ORDERING METHOD

Name of switch, type and special wishes have to be determined in order.

Example of ordering:
Pressure switch with conductors at length 600 mm, with connector for conduits which conclude input pressure G 1/4" inch and with electric gland from above has denotation:
Pressure switch type B174 - A002

The right of introducing design changes in the products, without deteriorating of its operation parameters, is reserved.

Chapter VI

Pneumatics

A201.....VI/2
R110.....VI/4
R372.....VI/6
R503.....VI/8

ELECTRO-PNEUMATIC INTERSYSTEM TRANSMITER type A201

ELECTRO-PNEUMATIC INTERSYSTEM TRANSMITTER type A201 IS USED FOR CONVERSION THE STANDARD ANALOGUE ELECTRIC SIGNAL ON STANDARD PNEUMATIC SIGANL AT RANGE 20...kPa OR 60..300kPa IN AUTOMATIC REGULATION SYSTEMS OR CONTROL INDUSTRY SYSTEMS.
THIS TRANSMITTER POSSESES COOPERATION THE ELECTRONIC AUTOMATION SYSTEMS WITH EXECUTIVE ELEMENTS.
THE TRANSMITTER'S WORKING IS BASED ON COMPARISON MOMENT RULE OF FORCE MADE BY COIL WHICH WAS PUT IN CONSTANT MAGNETIC FIELD PROPORTIONAL FOR INPUT SIGNAL, WITH MOMENT OF FORCE MADE BY METALIC PRESSURE CAPSULE OF FEEDBACK, WHERE THE PNEUMATIC OUTPUT SIGNAL IS SUPPLIED.
CHANGE OF DIRECT OF TRANSMITTER WORKING ("DIRECTLY" OR "INVERSELY" WORKING) MIGHT BE REALIZED BY CHANGE CURRENT FLOW DIRECTION BY COIL AND CORRECTION OF TRANSMITTER REGULATION.

*** pressure voltage 140±14 kPa**
*** protection degree IP 54**
*** spark-safety version acc. to ATEX directive**

TECHNICAL DETAILS

- input standard signal	4...20 mA; 0...20 mA
- input inversion signal	20...4 mA; 20...0 mA
- output signal	20...100 kPa; 60...300 kPa
- pressure supply	140 ±14 kPa; 400 ±40 kPa
- input resistance	≤250Ω
- basic error	0,6%
- hysteresis	0,25%
- additional errors:	
from changes of pressure supply by 10%	max 0,5%
from change of ambient temperature	max 0,8% on each 10°C
form vibrations in range:	
10 ... 60 Hz, amplitude<0,35 mm 60 ... 500 Hz, acceleration 5g	max 1%
form reaction the magnetic constant and commutative field at intensity 100 A/m, 50 Hz (acc. to PN-EN 6100-4-8:1998)	max 0,5 permissible basic error
form disturbances radiated magnetic field at radio frequency 10 V/m., at frequency in range 80 MHz do 1 GHz (acc. to PN-EN 6100-4-3:2002)	max 0,5 permissible basic error
from series of quick transient states made by voltage at peak value 2 KV (acc. To PN-EN 6100-4-4:2002)	max 0,5 permissible basic error
from surge at voltage 0,5 KV (acc. to PN-EN 6100-4-5:1998)	max 0,5 permissible basic error
- working position	optionally, subject to 0 correction in choosed position
- own air consumption	max 0,35 kg/h at p_z= 140 kPa
- max rate	7,5 kg/h at p_z= 140 kPa
- intrinsic-safety characteristic	Ex II 2 G EExi_a IICT6/T5/T4
- certificate	KDB 04 ATEX 026X
- conditions of using in explosion-risk zone:	

1. Electro-pneumatic system transmitter type A201-A2XX-XX-XX, ... may cooperate only with intrinsic-safety circuit at parameters: U_1 = 28 V DC, I_1 = 100 mA, P_1 = 0,7 W
2. Transmitter connection with cooperating devices should be made by separate conductors pair or by cable, which only spark-safety circuits will be connected. L and C parameters of external circuit should be the same like for device cooperates with transmitter.
3. Acceptable ambient temperature - depending on temperature class

Temperature class of gases and steam	T6	T5	T4
Acceptable ambient temperature(T_a)	-40°C ... +50°C	-40°C ... +65°C	-40°C ... +70°C

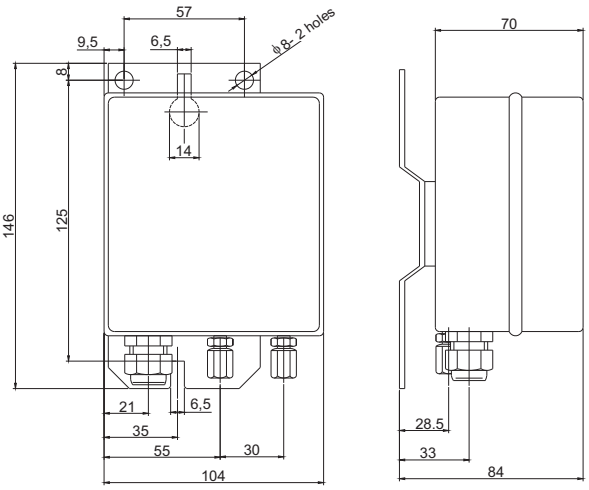
- housing protection degree	IP54 acc. to PN-EN 60529:2002
- mass	1,1 kg
- connectors:	
Electric	screw clamps for transmitter at diameter to 2,5 mm²
Pneumatic	threaded holes St. B1/8" or connectors

WORKING CONDITIONS

Electro-pneumatic system transmitter type A201 is designed for working in industry condition in little roof places, booths in the field, not heated and closed rooms or in control room base in conditions:

- ambient temperature -40°C ... +70°C
- relative humidity 100%
- sinusoidal vibrations 10 ... 60 Hz, amplitude< 0,35 mm, 60 ... 500 Hz, acceleration 5g (class VH6 acc. to PN-EN 60654:1996)
- working position optionally, subject to 0 correction in chosed position
- working medium air without dust, oil and aggressive pollution, at relative humidity when dew temperature should be lesser than ambient temperature at the value not lesser than 10°C (10°K) (PN-EN 60654-2:1999)

DIMENSION DRAWINGS



ORDERING METHOD

A201-	Electro-pneumatic intersystem transmitter

CODE1	VERSION
1	standard
2	intrinsic-safety with certificate ATEX Ex II 2 G EExi_a IICT6/T5/T4

CODE 2	INPUT SIGNAL
0	4 ... 20 mA
1	0 ... 20 mA
5	20 ...4 mA (inversion signal)
6	20 ... 0 mA (inversion signal)

CODE 3	PNEUMATIC CONECTORS
1	connectors for copper or polyethylene pipes ϕ6x1 mm

OPTIONS:

CODE 4	INPUT OF ELECTRIC CABLE
-D1	standard cable key type M20x1,5 (metallic type covered zinc coating - for standard and intrinsic-safety version
-D2	polyamide cable key type M20x1,5 (for standard version)
-D3	polyamide cable key type M20x1,5 (for spark-safety version)

CODE 5	OUTPUT SIGNAL
-W1	range from 20...100 kPa
-W2*	range from 60...300 kPa

*** it doesn't available in intrinsic-safety Ex version**

A201-A	1	0	1	-	D1	EXAMPLE OF TRANSMITTER DENOTATION

REMARK: other versions of transmitter type A201 available aftr agreement with manufacturer

Example of ordering:
Electro-pneumatic intersystem transmitter type A201 in standard version with input signal 4...20 mA, with connector for pipe ϕ6x1 mm with standard - metallic cable key and output signal from 20 ... 100 kP has denotation:
Electro-pneumatic system transmitter type A201-101 -D1-W1

The right of introducing design changes in the product, without deteriorating of its operation parameters, is reserved.

PRESSURE REDUCER type R110 WITH FILTER

PRESSURE REDUCER type R110 WITH FILTER IS DESIGNED FOR REGULATION AIR PRESSURE SUPPLIED DEICES OF PNEUMATIC SYSTEMS THE AUTOMATIC REGULATION AND FOR SIMULTANEOUS CLEANING THIS AIR FROM MECHANIC, OIL AND WATER POLLUTION.

*** pressure voltage max 1,6 MPa**
*** acid-proof versions available**

TECHNICAL DATA

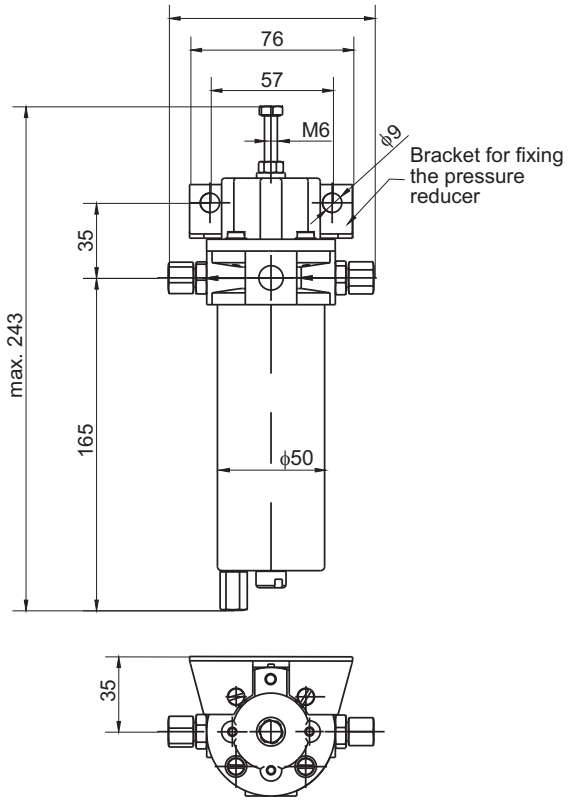
- working medium	cleaned air or gases
- pressure voltage	max 1,6MPa
- regulation range of initial pressure	from 0,01 to 0,6MPa
- flow intensity at decrease of pressure on output to 5kPa	4,6 ... 6,5 kg/h (deppending of pressure voltage)
- own air consumption	max 80g/h at voltage 0,5MPa
- working temperature:	-40^{o}C...+80^{o}C
- humidity	max 95%
- filter separation efficiency	99,99% for constant particles at dimension higher then 1,5mm
- additional mistakes:	
from change the pressure at outflow	± 0,3% from set value on 10kPa
od zmian temperatury otoczenia	± 0,5% from set value on 10^{o}C
- manometers	f40mm or f50mm, class 2,5%, range: 0 to 2,5MPa on inflow 0 to 0,6MPa on outflow
- air terminals	or connector for pipes f6mm
- fixing	on the wall or construction using the holder
- working position	vertical with negative source the valve down
- protection degree	IP54
- mass:	depending on version.

Pressure reducer type R110 with filter

DIMENSION DRAWINGS

PRESSURE REDUCER WITH FILTER

l=115-(ver.A004; A011)
l=160-(ver.A005; A007; A009; A012; A014)
l=205-(ver.A006; A008; A010; A013; A015)



ORDERING METHOD

R110 — Pressure reducer with filter

CODE1	VERSION	
A004 A005 A006 A007* A008* A009* A010*	- without manometers - with 1 manometer f40 (on output) - with 2 manometers f40 - with 1 manometer f50 (on output) - with 2 manometers f50 - with 1 manometer f50 in stainless steel housing (on output) - with 2 manometers f50 in stainless steel housing	The housing reductor material - Ak11
A011* A012* A013* A014*	- stainless steel version without manometers - stainless steel version z with 1 manometer f40 in stainless steel housing (on output) - stainless steel version with 2 manometers f40 in stainless steel housing - stainless steel version with 1 manometer f50 in stainless steel housing (on output)	The housing reductor material - stainless steel 1H18N9T

R110 - A005 EXAMPLE TYPING OF REDUCER

*** versions with longer realization time**

In the order please specify: name and type of reducer, version's No. and special requirements.

AIR TERMINALS:
The connectors with thread 1/4" StB and parts for connect copper or polyethylene pipe f6mm are delivered with reducer.

The right of introducing design changes in the product, without deteriorating of its operation parameters, is reserved.

THREE-WAY ELECTROMAGNETIC VALVE type R372

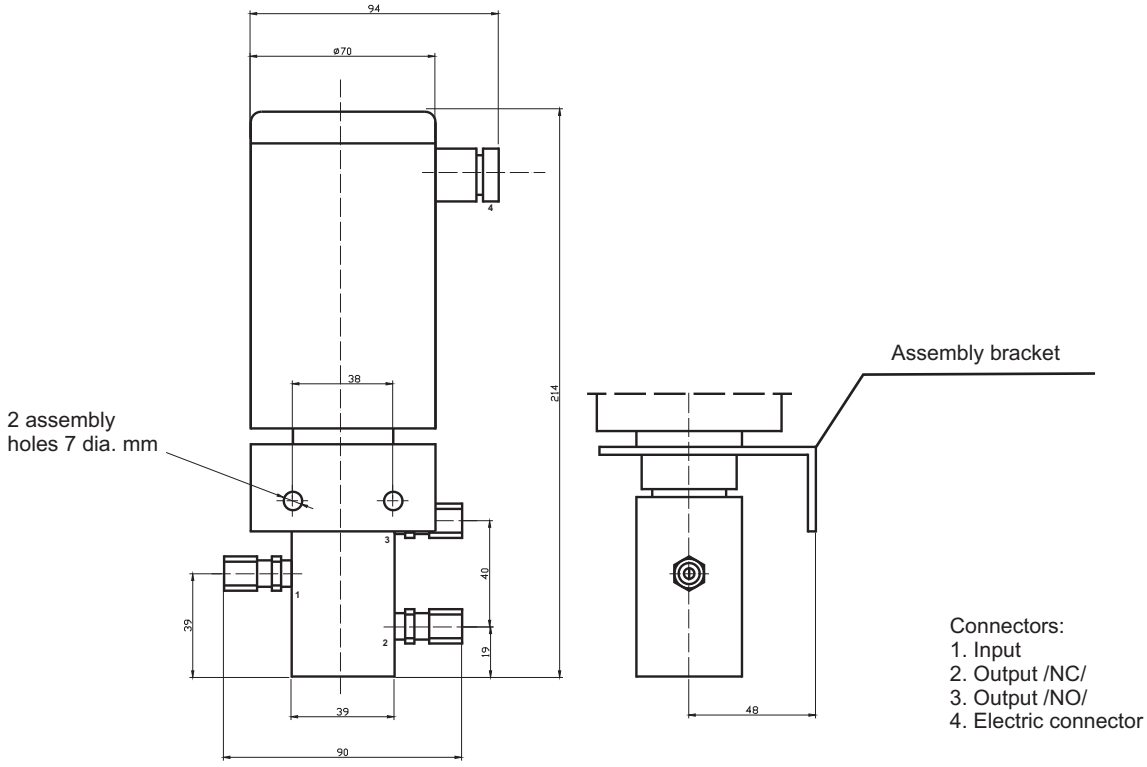
THREE-WAY ELECTROMAGNETIC VALVE type R372 IS DESIGNED FOR CONTROL ELECTRIC SWITCHING THE PNEUMATIC SIGNAL. IT CAN BE USED TOO FOR TWO-POSITION CONTROL OF PNEUMATIC ACTUATORS.

THIS TYPE OF VALVE MIGHT BE CONTROLED 230V AND 110V VARIABLE VOLTAGE OR 230V, 110V, 24V CONSTANT VOLTAGE.

TECHNICAL DATA

- working medium	cleaned air or gases without chemical influence on aluminium and copper alloys, and rubber too
- control voltage	230 V, 11 V AC or 230 V, 110 V, 24 V DC (acc. to table with versions)
- acceptable voltage changes	from -15 to +5%
- power consumption	11,5 VA or 10 W (acc. to table with versions)
- working pressure	max. 1,6 MPa
- air flow at pressure 1,6MPa and pressure decrease at 6 kPa	min 6,5 kg/h
- ambient temperature	-20^{o}C...+50^{o}C
- humidity	98%
- vibrations	permissible value of vibrations to 0,1 mm at frequency to 50 Hz
- assembly	vertical position
- housing	dust- and splash-proof
- connectors:	
electric	cable gland f6 mm
pneumatic	internal thread 1/8” NPT or connector for pipe f6 mm
- mass	3,2 kg
- materials:	
valve’s body	brass
housing	carbon steel covered by vinyl and painted lacquer RAL 5010
upper cover	plastic
seat	brass
valve head	stainless steel
pneumatic connectors	nickel brass

DIMENSION DRAWING



Three-way electromagnetic valve type R372 consists of two main sets:

- valve's body with set of seats and valve heads
- electromagnet

Valve's construction characterizes of compact structure and density of closing the seat&alve's head set.

VERSION'S TABLE

Three-way electromagnetic valve type R372, version No.		
Version	Control vlotage	Power consumption
A001	230 V, 50 Hz	11,5 VA
A002	230 V, direct current	10 W
A003	110 V, 50 Hz	11,5VA
A004	110 V, direct current	10 W
A005	24 V, direct current	10 W

SPECIAL VERSION:

Th valve posses assembly bracket made from carbon cadmium steel.
Other versions have to be determined with manufacturer.

PNEUMATIC CONNECTORS:

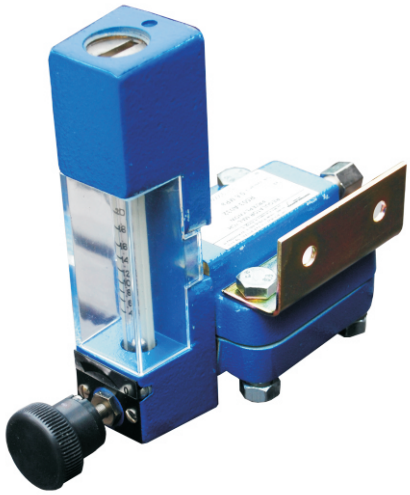
The connectors with thread 1/8" NPT with parts for connect copper or polyethylene pipe f6 mm are delivered with valve.

ORDERING METHOD

In the order please specify: name and type of valve , version's No. and special requirements.

The right of introducing design changes in the product, without deteriorating of its operation parameters, is reserved.

SMALL-FLOWS REGULATOR type R503



SMALL-FLOWS REGULATOR TYPE R503 IS USED FOR CONSTANT MAINTAIN SETTING VALUE OF AIR OR WATER FLOW NOT DEPEND FROM INPUT AND OUTPUT PRESSURE FLUCTUATION.

IT MIGHT BE USED IN MEASURING LEVEL SYSTEMS, PRESSURE DIFFERENCE AND PRESSURE OF AGGRESSIVE MEDIUMS, AS DEVICE WHICH DOSES PROTECTION FLUID FOR MEASURING CONDUCTOR.

*** acid-proof versions available**

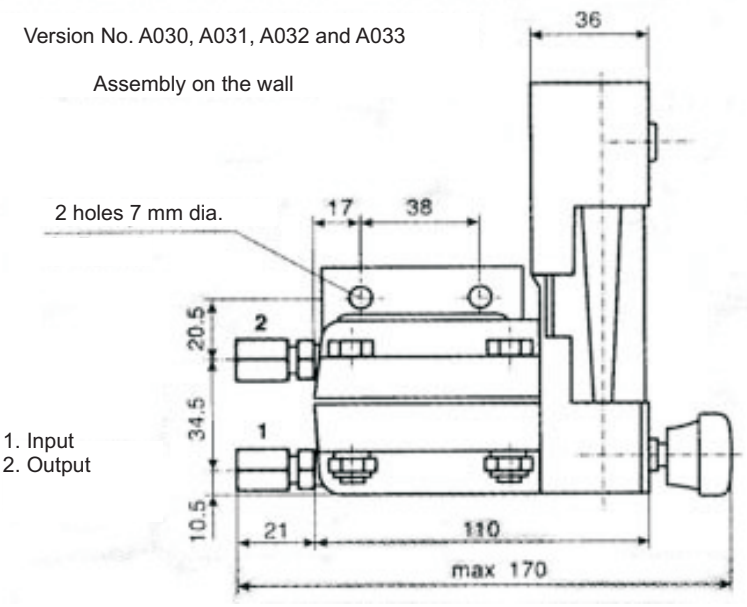
TECHNICAL DATA

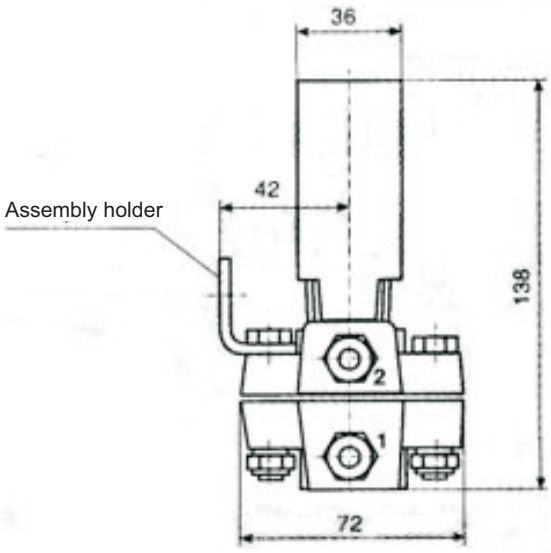
- working medium	cleaned air or water	
- working temperature	air:	-40°C...+50°C
	water:	5°C...+50°C
- supply pressure	0,6 MPa or 2,5 MPa	
when the condition 50 kPa ≤ (Pp-Po) ≤ 600 kPa is keeping		
- setting flow rangers for:		
air	4 ... 20 dm^3/h	
water	4 ... 40 dm^3/h	
- accuracy working		
change of pressure decrease on throttle valve under		
the influence of change voltage pressure or input pressure:		
for air	max 2 kPa	
for water	max 3 kPa	
- indicator	scaled rotameter acc. to specified flow range	
- acceptable pressure	up to 2,5 MPa	
- assembly	in the board or bracket construction (look at version's table)	
- assembly position	look at version's table	
- connectors	connector acc. to table	
- mass:	up to 2kg depending on version	

DIMENSION DRAWINGS

Version No. A030, A031, A032 and A033

Assembly on the wall





WORKING RULES

Regulator working is based on balance rule between the spring, which exerts determine force on membrane and pressures difference on the both sides of membrane. The constant drop on throttle valve is keeping in balance and the flow, which value depends on degree of open the throttle valve is keeping in balance, too.

ORDERING METHOD

Small-flows regulator type R503, version No.					
Input pressure MPa		Working medium		Assembly method	Using
2,5	0,6	Air	Water		
A030	A032	x	-	on the wall, vertical	pointing and regulation of the flow
A031	A033	-	x		
A040	A042	x	-	in the board, vertical	
A041	A043	-	x		
A007	A017	x	-	Unrestricted	regulation of the flow
A008	A018	-	x		

CONNECTORS	
R903	For copper pipe f 6mm

In the order please specify: name and type the regulator, version's No. and special requirements

Example of ordering:
Small-flows regulator with regulator for measuring air flow at input pressure to 2,5 MPa, pointing and setting (regulating) the flow, assembly on the wall, connectors for copper pipe f 6mm, stainless steel version has denotation:

R503-A030/K

The right of introducing design changes in the product, without deteriorating of its operation parameters, is reserved.

Chapter V

Angular encoders

EPO-02.....VII/2
EPO-03.....VII/4

ANGULAR ENCODER
EPO-02 (DIGITAL HALL EFFECT- UNCONTACTING)

- For position measurement in the automatic control, steering and measuring systems
- EPO-02 angular encoder with Hall effect sensor - uncontacting
- Independent settings of "0" and measuring range

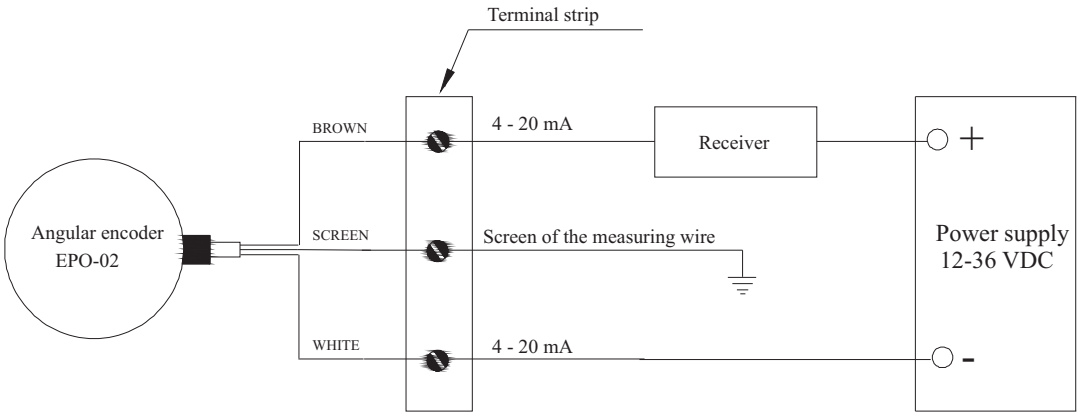
THE ANGULAR ENCODER TYPE EPO-02 ARE DESIGNED FOR POSITION MEASUREMENT IN AUTOMATIC CONTROL, STEERING AND MEASURING SYSTEMS. THEY CONVERT CHANGE OF THE TRANSDUCER AXIS ROTATION ANGLE INTO STANDARDIZED CURRENT SIGNAL 4-20 mA. MEASUREMENT OF ANGLE IS REALIZED BY MEANS OF HALL EFFECT DEVICE. THE ANGULAR ENCODER IS MADE ON THE BASIS OF CONTEMPORARY TECHNOLOGIES WHICH GUARANTEE HIGH STABILITY AND LONG-TERM LIFE OF CONVERSION CIRCUIT.

TECHNICAL DATA

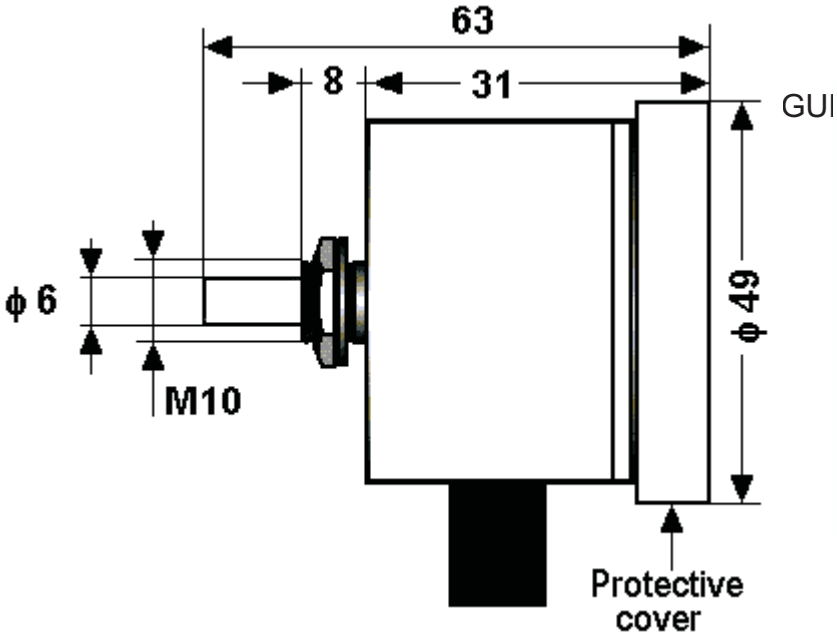
- two-wire power supply	12÷36V DC *
- power consumption	≤1 VA
- measuring range	0÷360°
- setting of range	20÷100%
- output signal	4÷20mA
- characteristics of conversion	linear, dependent of the transducer axis rotation angle
- load resistance	$0 \div R_{max} \leq 1k\Omega$ $R_{max}=(U_z-12V)/20mA$
- conversion error	≤0,3 %
- hysteresis for FSO**	≤0,2 %
- protection degree	IP65
- ambient temperature effect for FSO**	≤0,15 %/10°C
- resistance to vibrations	5G
- operating temperature	-40÷80°C
- mechanical life time	life time, practically unlimited
- mass	200g

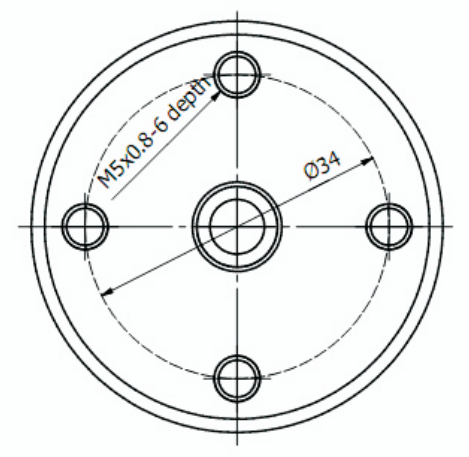
* the wires "+" and "-" have got the connection from the PE protective earthing terminal, through transils of 63 V voltage.
** FSO - maximum range

APPLICATION DIAGRAM OF THE ANGULAR ENCODER EPO-



DIMENSIONED DIAGRAM OF THE ANGULAR ENCODER EPO-02





ORDERING

TYP	NAME
EPO-02-	Angular encoder (digital, Hall effect-uncontacting)

CODE1	ANGULAR ENCODER MEASURING RANGE
01	0 ÷ 360°

CODE2	PROPERTIES OF ANGULAR ENCODER
1	life time, practically unlimited

EPO - 02 - 01 - 1	EXAMPLE OF PRODUCT DENOTATION

The Manufacturer reserves the right of introducing the product design changes, without deteriorating of its utility parameters.

ANGULAR ENCODER
EPO-03 (DIGITAL HALL EFFECT- UNCONTACTING)

- For position measurement in the automatic control, steering and measuring systems
- EPO-03 angular encoder with Hall effect sensor - uncontacting
- Independent settings of "0" and measuring range

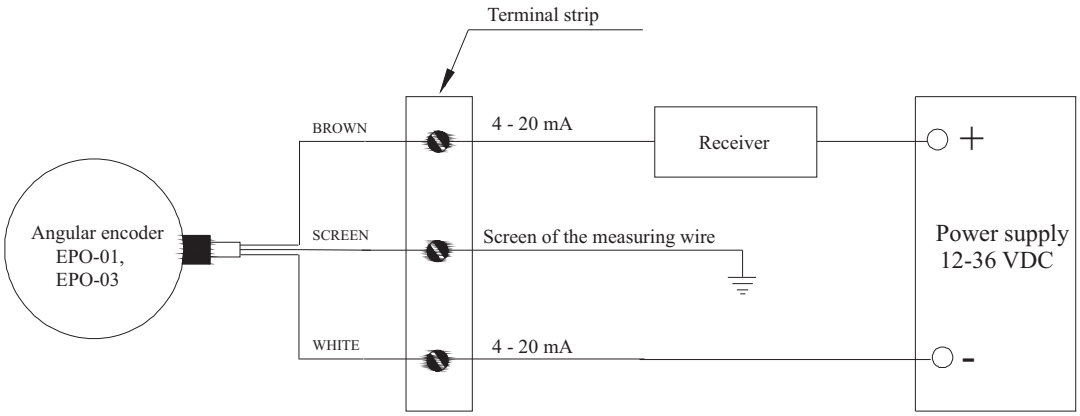
THE ANGULAR ENCODER TYPE EPO-03 ARE DESIGNED FOR POSITION MEASUREMENT IN AUTOMATIC CONTROL, STEERING AND MEASURING SYSTEMS. THEY CONVERT CHANGE OF THE TRANSDUCER AXIS ROTATION ANGLE INTO STANDARDIZED CURRENT SIGNAL 4-20 mA. MEASUREMENT OF ANGLE IS REALIZED BY MEANS OF HALL EFFECT DEVICE. THE ANGULAR ENCODER IS MADE ON THE BASIS OF CONTEMPORARY TECHNOLOGIES WHICH GUARANTEE HIGH STABILITY AND LONG-TERM LIFE OF CONVERSION CIRCUIT.

TECHNICAL DATA

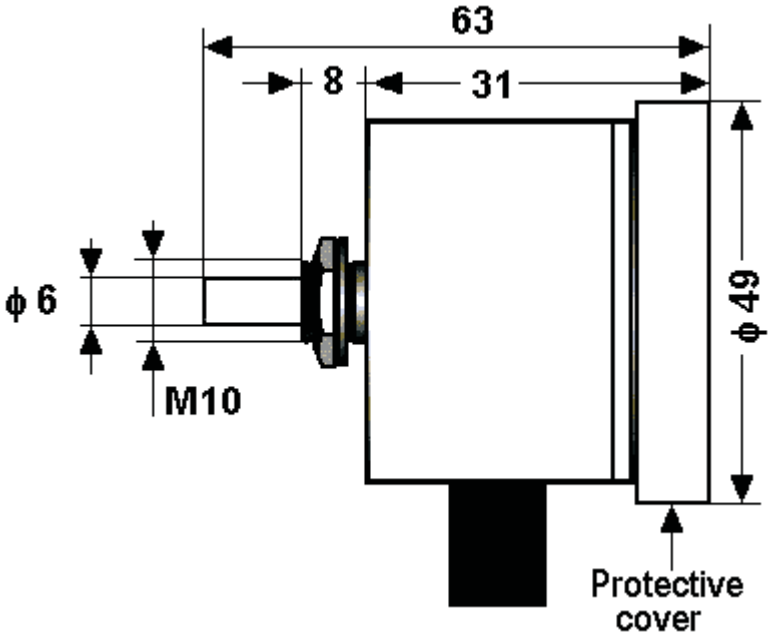
- two-wire power supply	12÷36V DC *
- power consumption	≤1 VA
- measuring range	0÷360°
- setting of range	20÷100%
- output signal	4÷20mA
- characteristics of conversion	linear, dependent of the transducer axis rotation angle
- load resistance	$0 \div R_{max} \leq 1k\Omega$ $R_{max}=(U_z-12V)/20mA$
- conversion error	≤0,3 %
- hysteresis for FSO**	≤0,2 %
- protection degree	IP65
- ambient temperature effect for FSO**	≤0,15 %/10°C
- resistance to vibrations	5G
- operating temperature	-25÷80°C
- mechanical life time	life time, practically unlimited
- display	LCD type, 4 digits + mA, %,°
- mass	200g

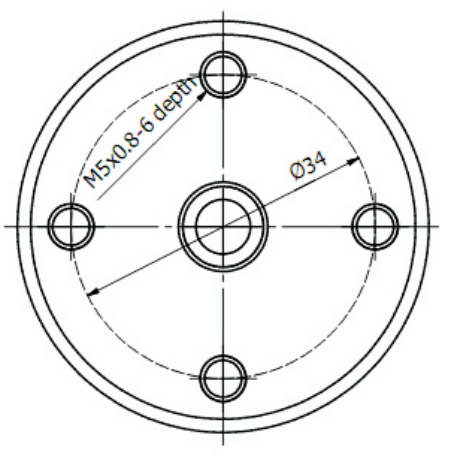
* the wires "+" and "-" have got the connection from the PE protective earthing terminal, through transils of 63 V voltage.
** FSO - maximum range

APPLICATION DIAGRAM OF THE ANGULAR ENCODER EPO-



DIMENSIONED DIAGRAM OF THE ANGULAR ENCODER EPO-03





ORDERING

TYP	NAME
EPO-03-	Angular encoder (digital, Hall effect-uncontacting)

CODE1	ANGULAR ENCODER MEASURING RANGE
01	0 ÷ 360°

CODE2	PROPERTIES OF ANGULAR ENCODER
1	life time, practically unlimited

EPO - 03 - 01 - 1	EXAMPLE OF PRODUCT DENOTATION

The Manufacturer reserves the right of introducing the product design changes, without deteriorating of its utility parameters.

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