

SRP981 Pneumatic Positioner



The SRP981 Positioner is for operation of pneumatic valve actuators with pneumatic control signals. It is used to reduce the adverse effects of valve friction, for higher thrust and shorter positioning time.

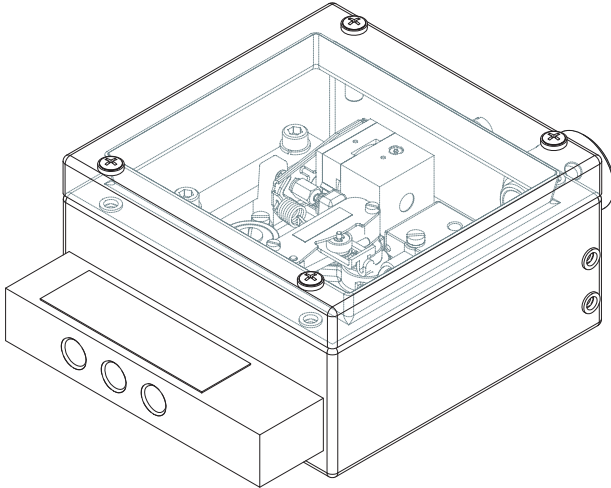
FEATURES

- Independent adjustment of stroke range and zero
- Adjustable amplification and damping
- Split range up to 4-fold possible
- Supply pressure up to 6 bar (90 psig)
- Low vibration effect in all directions
- Mounting according to IEC 534, part 6 (NAMUR)
- Rotation adapter for angles up to 120 °
- Ambient temperature –40 to 80 °C (–40 to 176 °F)
- Travel 8 to 100 mm (0.3 to 4 in)
- Angular range 30 ° to 120 °
- Modular system of additional equipment
 - Electrical limit switches
 - Electrical position transmitter
 - Booster
 - Connection manifold
- Protection class IP54 (IP 65 on request)
- Certificate No. 90/20226(E2) Lloyd's Register of Shipping for use on vessels
- Explosion protection
 - pn. basic device:
ATEX II 2 G c IIC T6 constructive design
 - el. additional built-in equipment:
ATEX II 2 G EEx ib/ia IIB/IIC T4/T6
CU TR explosion protection

SPECIAL VERSION OF SRP981

SRP981 in Stainless Steel housing

Casing	Stainless Steel 1.4404 / 316L, 1.25 mm thick
Ingress Protection	IP65; IP66 under working conditions (supplied by air supply)
Impact resistance	> 7 Joule acc. to EN 50014
Seals	VMQ (Silicone)



For dimensional drawings see page 13.

Version for mounting to linear actuators, single acting can be ordered under special version ECEP EP 0301, together with Mounting kit EBZG.

Other versions for double acting or mounting to rotary actuators on request.

TECHNICAL DATA

Input

Signal range	0.2 to 1 bar (3 to 15 psig) or split range down to Δw 0.2 bar (3 psi)
Stroke range	8 to 100 mm (0.3 to 4 in)
Angular range	
linear	30 ° to 120 °
equal percentage	90 °; from 70 ° linear

Output

Output to actuator	0 to 100 % supply air pressure
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Supply

Supply air pressure	1.4 to 6 bar (20 to 90 psig)
Air supply	according to ISO 8573-1
- Solid particle size and density . . .	class 2
- Oil rate	class 3
- Pressure dew point 10 K under ambient temperature	

For air supply, we recommend the FRS923 filter regulator.

Ambient conditions

Ambient temperature	-40 to 80 °C (-40 to 176 °F)
Relative humidity	up to 100 %
Operating conditions	
as per IEC 654-1	The device can be operated at a class D2 location
Transport and storage	
temperature	-50 to 80 °C (-58 to 176 °F)
Protection class	IP 54 (IP 65 on request)

ADDITIONAL EQUIPMENT (built-in into basic device)**Inductive Limit Switch Code T, U**
Two-wire system

Input Stroke / angle from actuator via positioner feedback lever

Output 2 inductive proximity sensors acc. to DIN 19234 or NAMUR for connection to a switching amplifier with an intrinsically safe control circuit ^{1) 2) 3)}



Current consumption

Vane clear > 3 mA

Vane interposed < 1 mA

for control circuit with the following electrical values

Supply voltage DC 8 V, R_i approx. 1 k Ω

Residual ripple < 5 %

Permissible line resistance < 100 Ω

Response characteristic ⁶⁾

Gain Continuously adjustable from 1:1 to approx. 7:1

Switching differential < 1 %

Switching point repeatability < 0.2 %

Explosion protection ^{7) 8)}

Type of protection II 2 G EEx ib/ia IIB/IIC T4/T6

Certificate of conformity PTB 02 ATEX 2153

For operation in certified intrinsically safe circuits with the following maximum values:

U_{max} 16 V

I_{max} 25 mA

P_{max} 64 mW

Internal inductance 100 μ H

Internal capacitance 30 nF

Ambient temperature

Temperature class T6 -40 to 65 °C (-4 to 149 °F)

T1 to T5 -40 to 80 °C (-4 to 176 °F)

Parts set for later installation

Code T EW 419 510 334

Code U EW 419 510 352

Inductive Limit Switch Code R
Three-wire system

Input Stroke / angle from actuator via positioner feedback lever

Output 2 inductive proximity sensors, three-wire system, LED-indication, contact, pnp ^{2) 4)}

Supply voltage U_s DC 10 to 30 V

Residual ripple \pm 10 %, U_s = 30 V

Switching frequency 2 kHz

Constant current 100 mA

Response characteristic ⁶⁾

Gain Continuously adjustable from 1:1 to approx. 7:1

Switching differential < 1 %

Switching point repeatability < 0.2 %

Parts set for later installation

Code R EW 419 510 291

Limit Switch Assembly with Micro switches Code V

Input Stroke / angle from actuator via positioner feedback lever

Output 2 micro-switches ^{2) 5)}

Connected load

Alternating current

Switching capacity max. 250 VA

Switching voltage max. 50 V

Switching current with ohmic resistance max. 5 A

inductive resistance max. 2 A

Bulb, metal filament max. 0.5 A

Direct current

Switching voltage, max.	Ohmic load	Inductive load
30 V	5 A	3 A
50 V	1 A	1 A

Response characteristic ⁶⁾

Gain Continuously adjustable from 1:1 to approx. 7:1

Switching differential < 2.5 %

Switching point repeatability < 0.2 %

Parts set for later installation

Code V EW 420 421 017

- 1) For the standard version code T one switching amplifier is required eg Pepperl & Fuchs type WE 77/Ex2
For the security version code U a fail-safe switching amplifier for each inductive proximity sensor is required eg Pepperl & Fuchs type WE 77/Ex-SH-03
- 2) Operating mode min. (= low) / max. (= high) selectable by adjustment of switch vanes
- 3) Operating mode normally closed circuit / normally open circuit selectable at switch amplifier output
- 4) Contact closed within the positive range
- 5) Contact open within the positive range
- 6) For feedback lever effective length of 117.5 mm (4.63 in), stroke 30 mm (1.28 in) and maximum gain
- 7) National installation regulations must be observed
- 8) For retrofitting in positioner version -B and -C, the product must be tested by a qualified inspector as a special version in accordance with ElexV.

Electrical Position Transmitter Code W

Input Stroke / angle from actuator via positioner feedback lever

Sensor resistive precision conductive plastic element

Stroke range 15 to 80 mm (0.6 to 3.15 in) < 15 mm (0.6 in) on request

Angular range 60 to 120 °

Output Two-wire system
 Signal range 4-20 mA
 Permitted load $R_{B\max} = (U_S - 12\text{ V}) / 0.02\text{ A}$
 ($U_S =$ supply voltage)

Power supply
 Supply voltage DC 12 to 36 V
 Permitted ripple < 10 % p.p.
 Supply voltage dependency < 0.2 %

Response characteristic¹⁾
 Non-linearity with terminal based setting. < 1.0 % F.S.
 Hysteresis < 0.5 % F.S.
 External resistance dependency < 0.2 % / $\Delta R_{B\max}$
 Temperature effect < 0.3 % / 10 K

Explosion protection ^{2) 3)}

Type of protection II 2 G EEx ib/ia IIB/IIC T4/T6

Certificate of conformity PTB 02 ATEX 2153

For operation in certified intrinsically safe circuits with the following maximum values:

U_{\max} T4: 30 V T6: 22 V
 I_{\max} T4: 130 mA T6: 66 mA
 P_{\max} T4: 0,9 W T6: 0,5 W
 Internal inductance 9 μ H
 Internal capacitance to earth 10 nF or 6 nF differential

Ambient temperature
 Temperature class T6 -40 to 40 °C (-40 to 104 °F)
 T5 -40 to 55 °C (-40 to 131 °F)
 T4 -40 to 80 °C (-40 to 176 °F)

Parts set for later installation
 Code W EW 420 661 115



Common Data ⁴⁾

Ambient conditions
 Ambient temperature ^{5) 6)} -25 to 80 °C (-13 to 176 °F)
 -40 to 80 °C (-40 to 176 °F)

Relative humidity up to 100 %

Operating conditions
 as per IEC 654-1 The device can be operated at a class D2 location

Transport and storage
 temperature -40 to 80 °C (-40 to 176 °F)
 Protection class IP 54 (IP 65 on request)

Electrical connection
 Line entry 1 or 2 cable glands M20x1.5 (others with Adapter AD-...)
 Cable diameter 6 to 12 mm (0.24 to 0.47 in)
 Screw terminals Screw terminals for wires up to 2.5 mm² (AWG 14)

Materials
 Base plate Galvanized steel
 Control vane Aluminum
 Setting mechanism Fibre glass-reinforced polyamid

Electromagnetic compatibility EMC
 Operating conditions industrial environment
 Immunity according to
 - NAMUR recommendation NE21 fulfilled
 - EN 61 326 fulfilled
 - EN 61 000-6-2 fulfilled
 Emission according to
 - EN 55 011, Group 1, Class A fulfilled
 - EN 61 000-6-2 fulfilled

CE marking
 Electromagnetic compatibility 2004/108/EG
 Low voltage regulations w/o Ex: 73/23/EWG fulfilled (with Ex: not applicable)

Safety
 as per DIN EN 61010-1 (DIN IEC 61010-1) (VDE 0411 part 1). safety class III
 overvoltage category 1
 internal fuses none
 external fuses Limitation of power supplies for fire protection has to be observed due to EN 61010-1 9.3. ff.

1) For feedback lever effective length of 117.5 mm (4.63 in) and stroke 30 mm (1.28 in)
 2) National installation regulations must be observed
 3) For retrofitting in positioner version -B and -C, the product must be tested by a qualified inspector as a special version in accordance with ElexV
 4) Except manifold with gauges
 5) Without explosion protection
 6) -40 to 80 °C (-40 to 176 °F) for the fail-safe version of inductive limit switch code U

MODEL CODES SRP981

Pneumatic Positioner	SRP981									080715
Version										
Single Acting	-B									
Double Acting	-C									
Input										
Signal Range 0.2 to 1 bar/3 to 15 psi/ 20 - 100 kPa; Split-Range Up To 4-Fold Possible, Must Be Specified	-I									
Mode of Action										
Increasing Input Increases Output	D									
Increasing Input Decreases Output	R									
Gauges										
Without Gauges	L									
Two Built-In Gauges (bar/psi) (a)	M									
Built-In Limit Switch/Position Transmitter										
Without	S									
Inductive Limit Switch Three-Wire Technique, Without Explosion Protection . (b)	R									
Inductive Limit Switch (Standard Version) w. Expl. Prot. II 2 G EEx ia IIC T6 acc. to ATEX (b)	T									
Inductive Limit Switch (Security Version) w. Expl. Prot. II 2 G EEx ia IIC T6 acc. to ATEX (b)	U									
Two Micro Switches, Without Explosion Protection . . (b)	V									
Position Transmitter 4-20 mA, with Expl. Prot. II 2 G EEx ia IIC T6 acc. to ATEX . (b)	W									
Cable Entry										
Without Cable Gland	1									
M20 x 1.5 With One Plastic Cable Gland, Color Gray . (c)	7									
Attachment Kit										
Order as Auxiliary	N									
Manifold										
Order as Auxiliary	A									
Options										
Amplifier Free Of Nonferrous Metals (a)(d)	-C									
Manual Bypass Switch (a)	-T									
EAC approved for intrinsic safety	-R									
Protection Class IP65 (b)	-FA									
Assembled Free Of Oil And Grease / Designed for Aux. Energy Oxygen	-S									
Lloyd's Register of Shipping	-X									
Certificate EN 10204-2.1 - Certificate of compliance with the order	-1									
Tag No. Labeling										
Stamped With Weather Resistant Color	-G									
Stainless Steel Label Fixed With Wire	-L									

Example Model Code: SRP981 -B I D L S 1 N A -L

- (a) Only available with Version -B
- (b) Not available with Gauge Code M or N
- (c) Not available with Built-In Limit Switch / Position Transmitter Code S
- (d) Not with Gauges M

MODEL CODES Accessories

Couple lever / cam		EBZG
Standard (a = 72 mm) (for SRP981 , SRI983, SRI986, SMP981, SMI983, SGE985)	-AN	
Extended (a = 91 mm) (for SRP981 , SRI983, SRI986, SMP981, SMI983, SGE985)	-BN	
Inverse equal percentage cam for rotary actuators (for SRP981 , SRI983, SRI986)	-CN	
Spring set		FESG
Range-Springs (4 pc.) (for SRP981 , SRI983, SRI986)	-FN	
(continued on next page)		

MODEL CODES Accessories (continued)

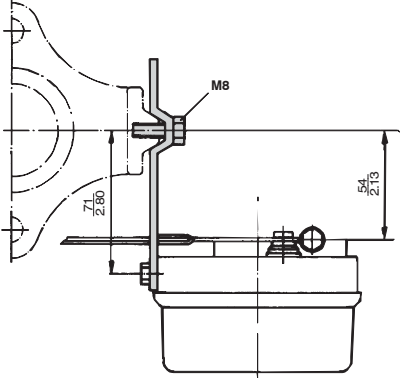
Attachment kit	EBZG
For diaphragm actuators with casting yoke acc. NAMUR. (incl. standard Couple Lever) (for SRP981 , SRI983, SMP981, SMI983, SGE985)	-GN
For diaphragm actuators with pillar yoke acc. NAMUR. (incl. standard Couple lever) (for SRP981 , SRI983, SMP981, SMI983, SGE985)	-FN
For rotary actuators, without flange, 3 drill holes 6.5 mm (for SRP981 , SRI983, SRI986, SMP981, SMI983, SGE985)	-PN
For rotary actuators, without flange, 4 threads M6 (e.g for Petras actuators) (for SRP981 , SRI983, SRI986, SMP981, SMI983, SGE985).	-NN
For rotary actuators, with flange (for SRP981 , SRI983, SRI986, SMP981, SMI983, SGE985)	-JN
For rotary actuators acc. to VDI/VDE 3845, with shaft (for SRP981 , SRI983, SRI986, SMP981, SMI983, SGE985).	-ZN
For Masoneilan type Camflex II (for SRP981 , SRI983, SRI986, SMP981, SMI983, SGE985).	-RN
For Masoneilan type Sigma F (for SRI986, SRP981 , SRI983)	-SN
For Masoneilan type 37/38, Fisher Elliott type 656, 667 (for SRP981 , SRI983, SGE985, SMI983, SMP981)	-TN
For Gulde type P (for SRP981 , SRI983)	-UN
For Masoneilan type 87/88 (for SRP981 , SRI983, SMP981, SMI983, SGE985)	-EN
For Masoneilan VariPak (for SRP981 , SRI983, SGE985, SMI983, SMP981).	-MN
For IAL actuators (for SRP981 , SRI983, SGE985, SMI983, SMP981)	-VN
Brackets VDI/VDE 3845 (A = 130 mm/5.12 in; B = 50 mm/1.97 in) (SRP981 , SRI983, SRI986, SGE985, SMI983, SMP981)	-C3
Brackets VDI/VDE 3845 (A = 80 mm/3.15 in; B = 30 mm/1.18 in) (SRP981 , SRI983, SRI986, SGE985, SMI983, SMP981).	-C2
Brackets VDI/VDE 3845 (A = 80 mm/3.15 in; B = 20 mm/0.79 in) (SRP981 , SRI983, SRI986, SGE985, SMI983, SMP981).	-C1
Manifold (Connection 1/4-18NPT)	LEXG
Staggered connections (for SRP981, SRI986)	-BN
Connections same level (for SRP981, SRI986)	-CN
Staggered connections for 1/4"-thread pneum. tube-conn. (e.g. tube-diameter: 8 mm / 0.3 in) (for SRP981, SRI986)	-DN
With gauges for supply air, y, for version single acting (for SRP981, SRI986).	-JN
With gauges for supply air, w, for version single acting (for SRP981)	-KN
With gauges for supply air, w, y, for version single acting (for SRP981).	-LN
With gauges for supply air, y1, y2, for version double acting (for SRP981, SRI986)	-MN
With gauges for w, y1, y2, for version double acting (for SRP981)	-NN
Gauge manifold without gauge (for SRP981, SRI986)	-RN
Gauge manifold without gauge, for supply air, y1, y2, for version double acting (for SRP981, SRI986)	-SN
Gauge manifold without gauge, for w, y1, y2, for version double acting (for SRP981) (b)	-TN
Booster (Connection 1/4-18NPT)	VKXG
For version single acting (for SRP981, SRI986)	-FN
For version double acting (for SRP981, SRI986).	-GN
For version single acting with doubled output capacity (for SRP981, SRI986)	-HN

MODEL CODES Accessories (continued)

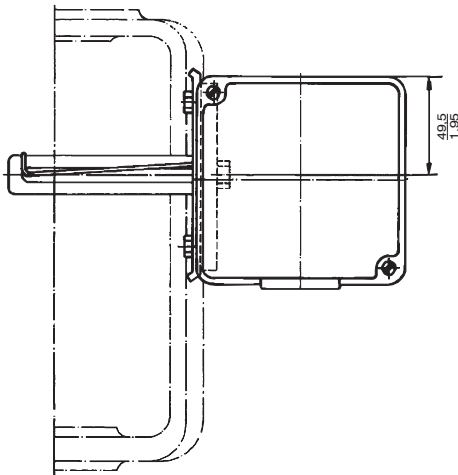
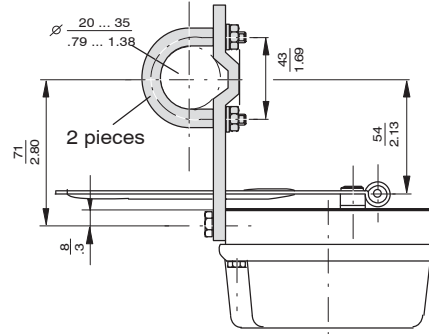
Adapter	AD
Adapter 1/2" NPT to 3/4" NPT (stainless steel)	-A3
Adapter M20 x 1.5 to G1/2" (internal thread) (stainless steel)	-A8
Adapter M20 x 1.5 to 1/2" - 14 NPT (internal thread) (brass with nickel coating)	-A5
Adapter M20 x 1.5 to 1/2" - 14 NPT (internal thread) (stainless steel)	-A6
Adapter (plastic) M20 x 1.5 to PG13.5 (internal thread)	-A9
Cable gland	BUSG
M20 x 1.5 plastics, color blue	-K7
M20 x 1.5 plastics, color white	-K9
M20 x 1.5 stainless steel	-S6
M20 x 1.5 plastics, color gray	-K6
M20 x 1.5 stainless steel EEx d	-S7
M20 x 1.5 brass zink plated EEx d	-S8
1/2-14 NPT cable gland 6...12 mm, Stainless steel, EEx d	-N1
1/2-14 NPT cable gland 6...12 mm, Steel zink plated, EEx d	-N2
1/2-14 NPT, brass zink plated, EEx d	-N3
M20 x 1.5 plug, plastic	-V3
M20 x 1.5 plug, Stainless steel, EEx d	-V4
1/2-14 NPT plug, Stainless Steel, EEx d	-V5
M20 x 1.5 plug, brass zink plated, EEx d	-V6
1/2-14 NPT plug, brass zink plated, EEx d	-V7

ATTACHMENT KIT FOR DIAPHRAGM ACTUATORS

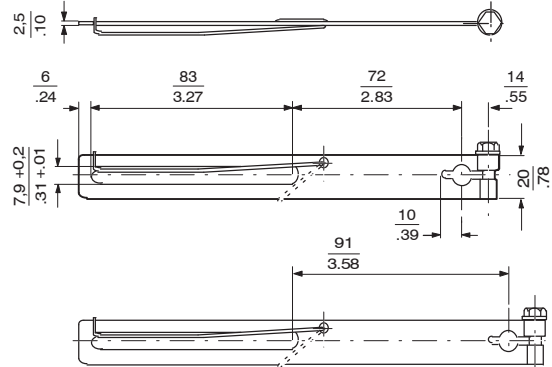
Attachment to casting yoke
according to IEC 534-6 (NAMUR)
Code EBZG-GN



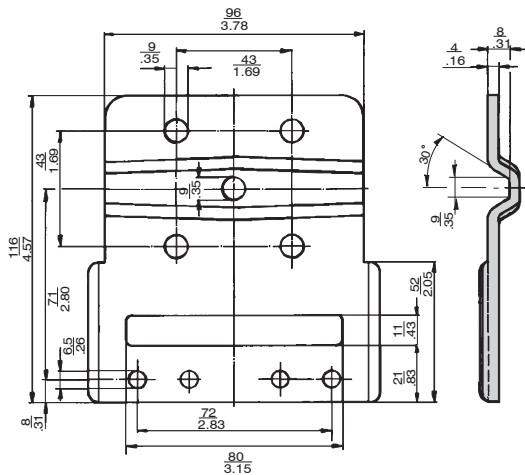
Attachment to pillar yoke
according to IEC 534-6 (NAMUR)
Code EBZG-FN



Feedback lever
Code EBZG-AN, -FN, -GN
Code EBZG-BN (extended version)

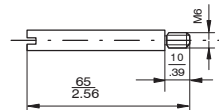


Mounting bracket
according to IEC 534-6 (NAMUR)
for Code EBZG-GN, FN



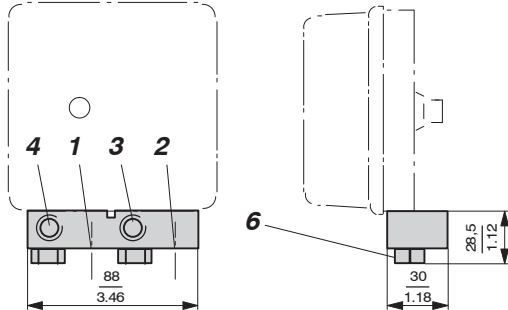
mm
in

Carrier bolt
for attachment to valve stem

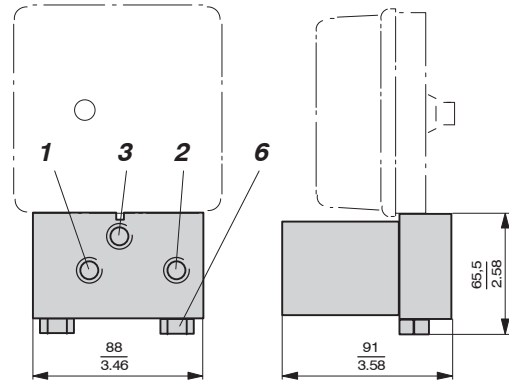


DIMENSIONS Additional equipment

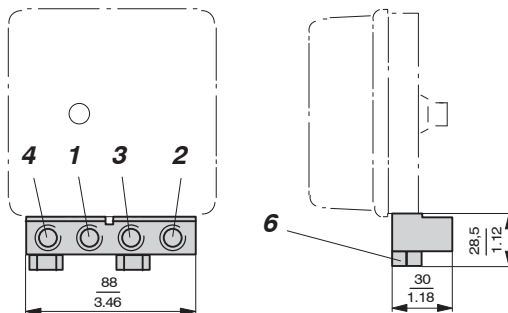
**Connection manifold, staggered connections
Code LEXG-BN**



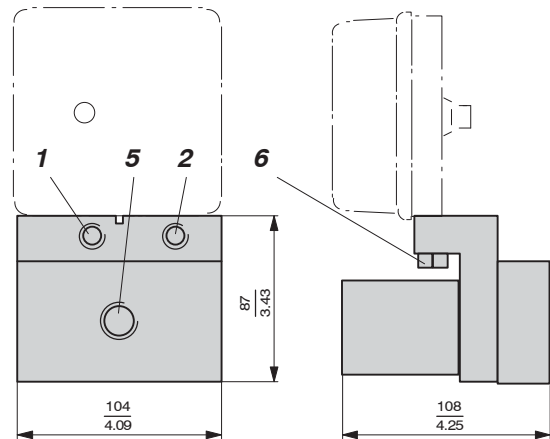
**Booster single acting
Code VKXG-FN**



**Connection manifold, connections same level
Code LEXG-CN**

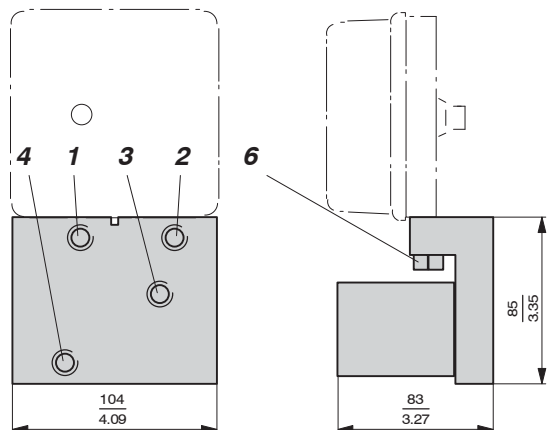


**Booster single acting with doubled output capacity
Code VKXG-HN**



mm
in

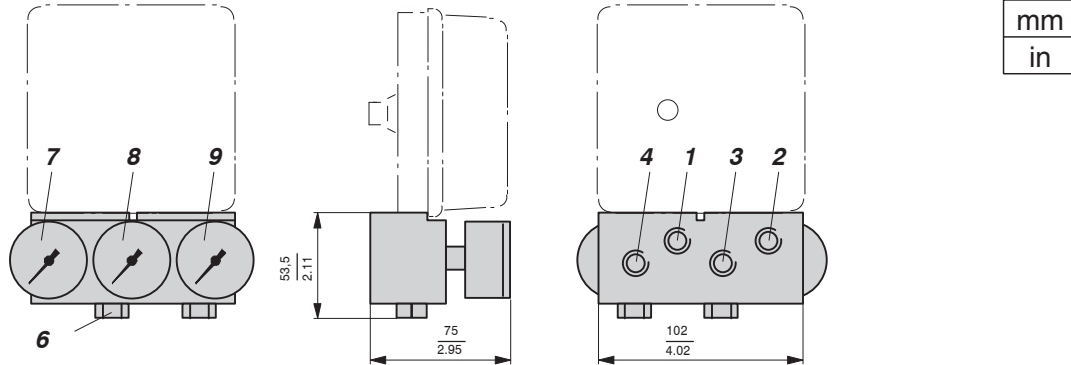
**Booster double acting
Code VKXG-GN**



- 1 Female thread 1/4-18 NPT for supply air
- 2 Female thread 1/4-18 NPT for input (w)
- 3 Female thread 1/4-18 NPT for output I (y1)
- 4 Female thread 1/4-18 NPT for output II (y2)
- 5 Female thread 1/2-14 NPT for output I (y1)
- 6 Fixing screws 17 mm A/F

DIMENSIONS Additional equipment

Connection manifold with gauges Code LEXG-JN, -KN, -LN, -MN, -NN
 Connection manifold for gauges Code LEXG-RN, -TN, -SN



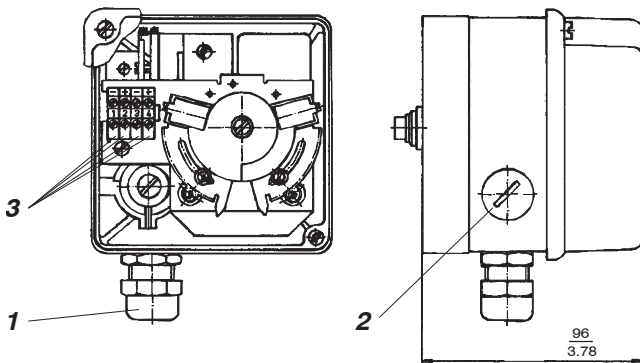
Manifold Code LEXG	7 Gauge for	8 Gauge for	9 Gauge for	Version Action
-JN (-RN*)	without	output (y)	supply air	single
-KN (-RN*)	input (w)	without	supply air	single
-LN (-RN*)	input (w)	output (y)	supply air	single
-MN (-SN*)	supply air	output I (y1)	output II (y2)	double
-NN (-TN*)	input (w)	output I (y1)	output II (y2)	double

- 1 Female thread 1/4-18 NPT for supply air
- 2 Female thread 1/4-18 NPT for input (w)
- 3 Female thread 1/4-18 NPT for output I (y1)
- 4 Female thread 1/4-18 NPT for output II (y2) (only on manifold Code M, N)

6 Fixing screws 17 mm A/F

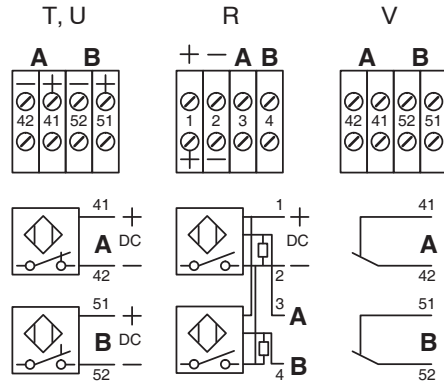
*) Connection manifold for gauges, without gauges (for customer's gauges)

Built-in limit switch Code R, T, U, V

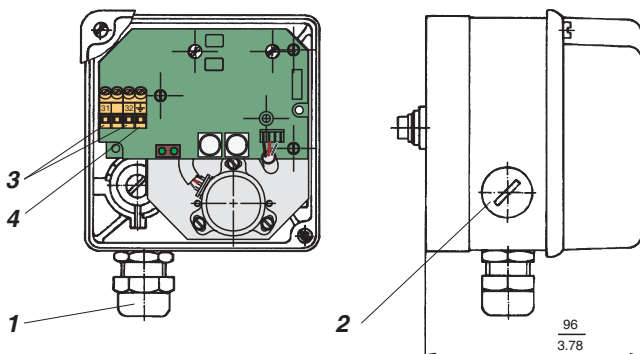


- 1 Cable gland
- 2 Dummy plug can be replaced with 1
- 3 Connection terminals

Built-in limit switch Code

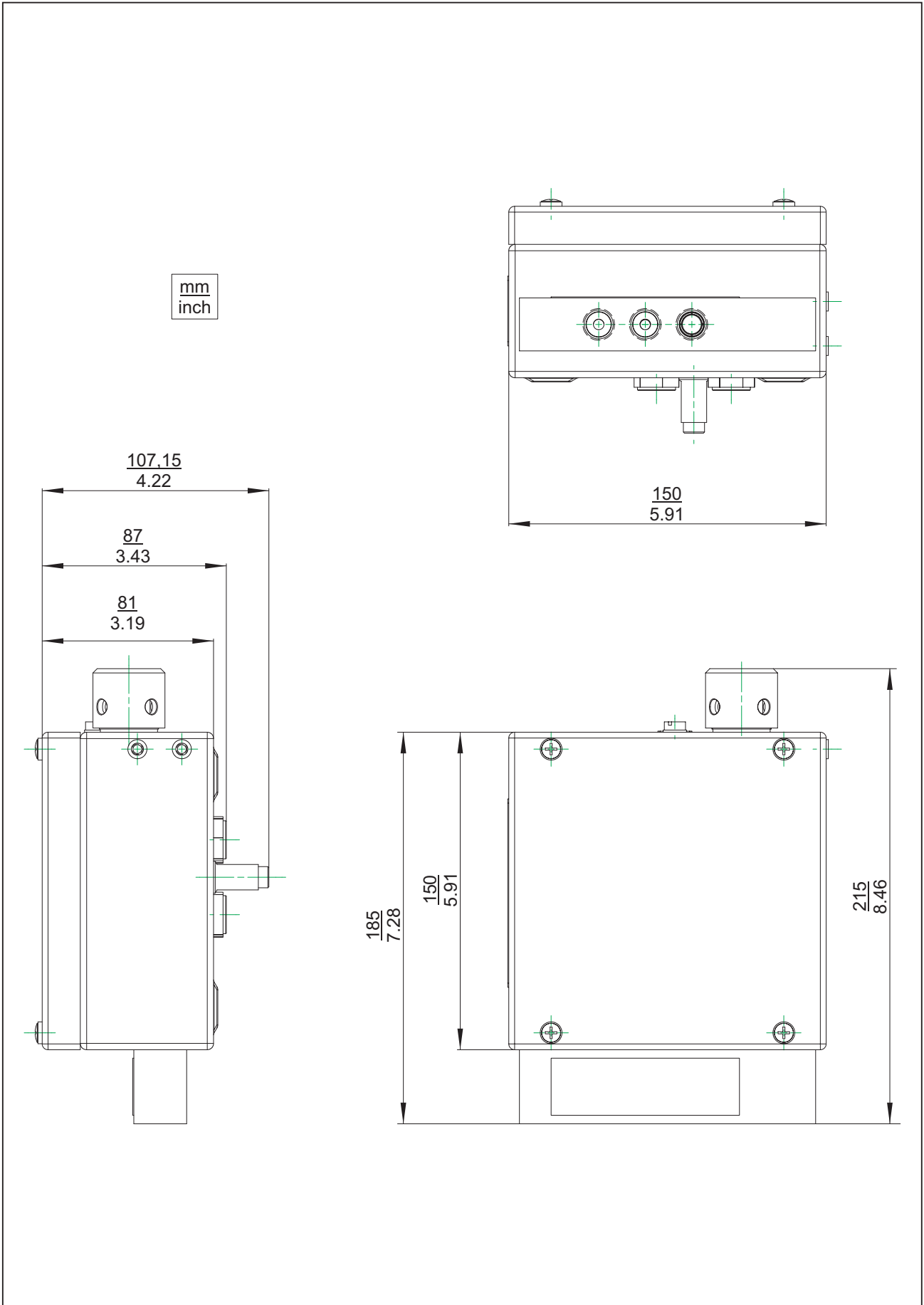


Built-in position transmitter Code W

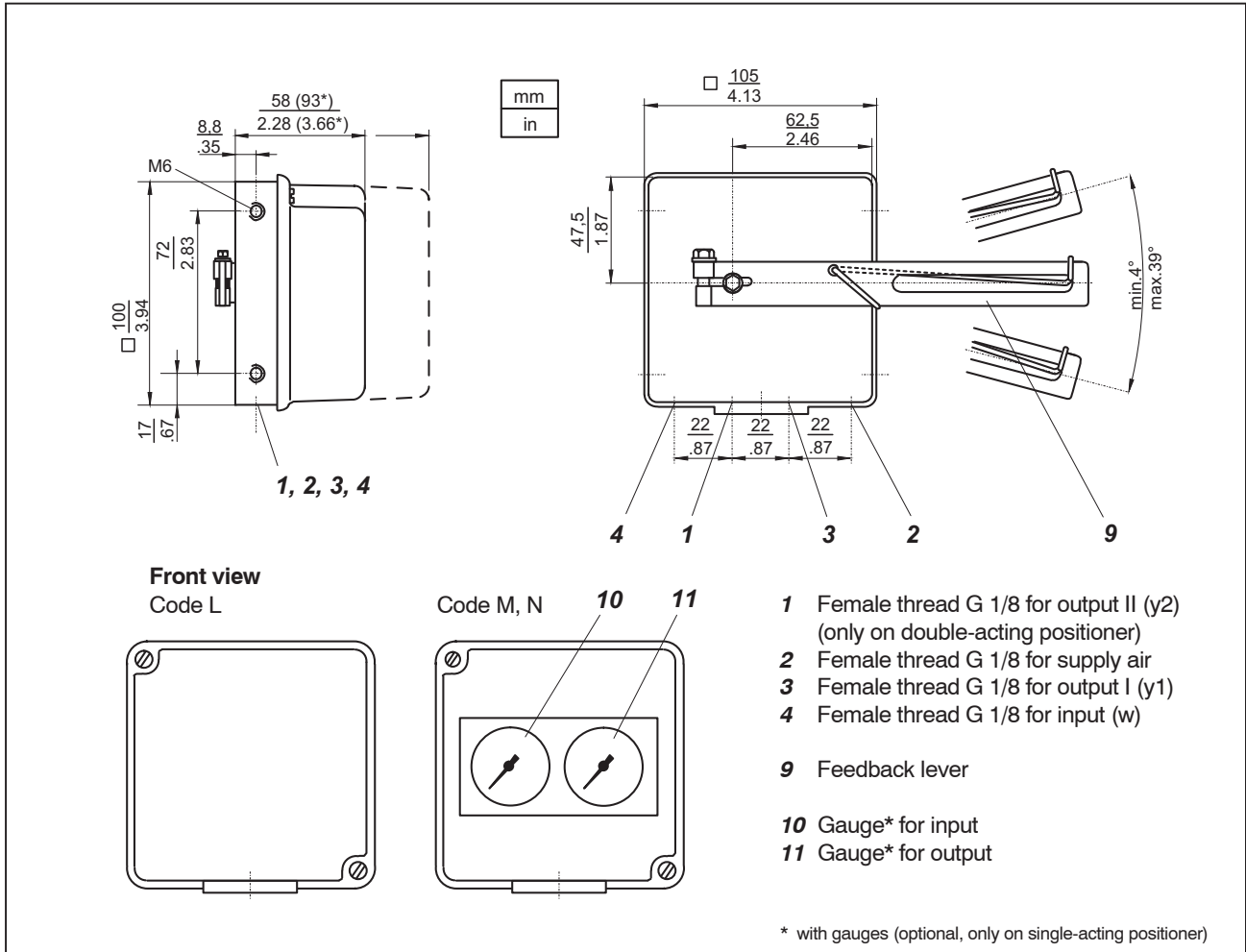


- 1 Cable gland
- 2 Dummy plug can be replaced with 1
- 3 Connection terminals (+/-)
- 4 Ground connection

DIMENSIONS SRP981 Special version in Stainless Steel Housing



DIMENSIONS, CONNECTIONS



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