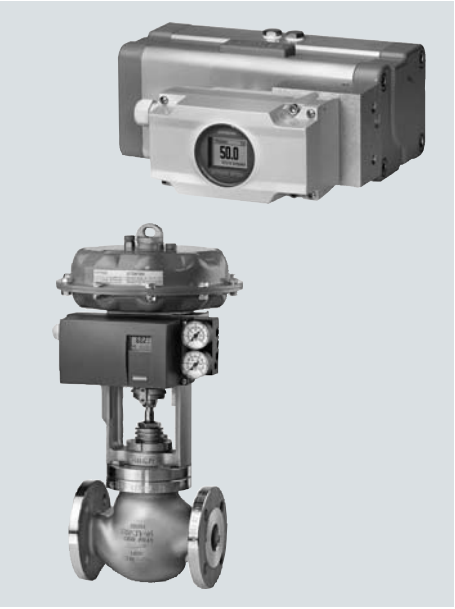
Positioners



You can download all instructions, catalogs and certificates for SIPART PS2 free of charge at the following Internet address:
www.siemens.com/positioners

Overview

	Application	Description	Catalog page	Software for parameterization
Positioners				
	Position control of pneumatic linear or part-turn actuators, also for intrinsically safe operation	**SITRANS VP300** • Connection: 4 to 20 mA/HART • Plain text available in a range of languages • Local manual operation • Non-contacting position detection • OPOS Interface® • Robust enclosure • Diagnostic function • Partial stroke test (PST) • Supports the replacement of devices with the equipment running	6/3	SIMATIC PDM
	Position control of pneumatic linear or part-turn actuators, also for intrinsically safe operation	**SIPART PS2** Universal device for positioning pneumatic actuators • Connection: 4 to 20 mA • HART; PROFIBUS PA or FOUNDATION Fieldbus • Local manual operation • Binary inputs and outputs • Diagnostic function • Blocking function • Automatic startup	6/12	SIMATIC PDM
	As above, but in flameproof enclosure for explosion-proof application	**SIPART PS2** As above, but in flameproof aluminum enclosure	6/12	SIMATIC PDM

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Overview

The SITRANS VP300 intelligent positioner is used for the continuous control of process valves with single or double-acting, pneumatic actuators. HART communication, an alarm module with digital inputs and outputs, and a position feedback module are available as options.

The device can also be supplied with types of protection Ex ia and Ex n.

As a further option the SITRANS VP300 is available as a SIL device.

Benefits

The SITRANS VP300 positioner is characterized by the following features:

- OPOS Interface® (mechanical and pneumatic interface according to VDI/VDE 3847) for particularly simple installation with two screws and and integral piping
- Mounting kits for conversion of existing actuators (e.g. according to IEC 60534-6-1 or VDI/VDE 3845) to OPOS Interface®
- Non-contacting position detection with practice-proven and robust GMR (giant magnetoresistance) principle saves having to install levers and makes the device less sensitive to vibrations
- User interface on-site contains plain text, graphics and different languages that can be selected (English, German, Spanish, French, Italian and Chinese).
- Parameterization and activation of functions (e.g. tight closing, characteristic curves, partial stroke test) either on the device or using SIMATIC PDM (on HART device)
- Can be used as standard in the temperature range from -40 °C to +85 °C (-40 °F to +185 °F)
- One device for linear and part-turn actuators, either single-acting or double-acting
- Extensive diagnostic functions (stiction, deadband, move lower endstop, etc.) included as standard in every device
- Partial stroke test for testing SIL 2 applications
- SIL 2 for safe venting
- High degree of protection IP66

Application

Overview

The intelligent electropneumatic positioner is used, for example, in the following industries:

- Chemical industry
- Oil and gas
- Energy production
- Food and beverage industry
- Pulp and paper
- Water, waste water
- Pharmaceutical industry
- Mining and aggregates

The positioner is used for the continuous control of process valves with single or double-acting, pneumatic actuators. The positioner can be installed on a wide range of linear and part-turn actuators.

Setpoints and electrical power supply for the positioner are fed through a 4 to 20 mA setpoint signal. As an option, HART communication and an alarm module with digital inputs and outputs are also available. Also available as an option is a module for position feedback, which outputs the valve position using a 4 to 20 mA signal.

Explosion-proof device versions

In addition to a device version for non-hazardous applications, the device is also available as an intrinsically safe design with types of protection Ex ia and Ex n.

SIL

As a further option the SITRANS VP300 is available as a SIL device. In that case, the following applies:

Safe shutdown function with SIL 2. On request using digital input DI 3 or in the case of failure of the electrical or pneumatic supply, ventilation is carried with actuating pressure Y1. A connected single-acting actuator moves the valve into the safe final position.

The SIL device is certified in order to test partial strokes in applications up to SIL 2. The result of this so-called partial stroke test is then reported with digital output DO 1 (fail-safe). Optionally, the result can also be reported through HART communication.

Device versions

The positioners can be supplied:

- For single and double-acting actuators
- For non-hazardous applications
- For use as an intrinsically safe device Ex ia or Ex n
- With HART communication through the 4 to 20 mA control pulse

Design

Introduction

The electropneumatic positioner is made up of the following components:

- Enclosure and cover
- Display assembly with connecting terminals
- Control assembly
- Sensors for non-contacting position detection
- Pneumatic valve block

Technical description

The valve block is located in the enclosure. Both the pneumatic interface and the mechanical interface of the SITRANS VP300 are provided by the innovative OPOS Interface. Behind this name stands the directive VDI/VDE 3847, with additional functionality and greater customer benefit. The positioner is mounted on the front with only two screws and is ready for operation without any external piping. If the interface of the actuator does not correspond with the VDI/VDE 3847 directive, the positioner is mounted using the adapter block of the corresponding mounting kit.

With the SITRANS VP300, position detection is carried out on a non-contacting basis using a magnet and sensors in the positioner. The magnet for position detection on a non-contacting basis is in the magnet holder. In the case of linear actuators, the magnet holder is attached to the drive spindle and moves up and down on the back of the positioner. In the case of part-turn actuators, the magnet holder is attached to the shaft butt and turns underneath the positioner. The valve position is detected by the robust GMR principle, which identifies the direction of the magnetic field lines. GMR stands for "giant magnetoresistance".

Gauges for displaying pressure can be fastened to the adapter block as an accessory, and you can connect a safety solenoid valve. A shutdown tap for the compressed air connections, which is useful when replacing the device without having to shut down the equipment, can also be connected. The positioner regulates e.g. valves:

- With a linear actuator or an integrated linear actuator with an interface according to VDI/VDE 3847. The linear actuator with an interface according to VDU/VDE 3847 requires only a magnet holder for position detection and no additional mounting kit.
- With a part-turn actuator or an integrated part-turn actuator with an interface according to VDI/VDE 3847. The part-turn actuator with an interface according to VDU/VDE 3847 requires only a magnet holder for position detection and no additional mounting kit.

Digital inputs

In its standard form, the electropneumatic positioner has two digital inputs DI 1 and DI 3.

Digital input DI 1 can be parameterized and performs e.g. the following tasks:

- Blocking the actuator
- Moving the actuator

Digital input DI 3 is only used to move the actuator into a safety position.

Option modules

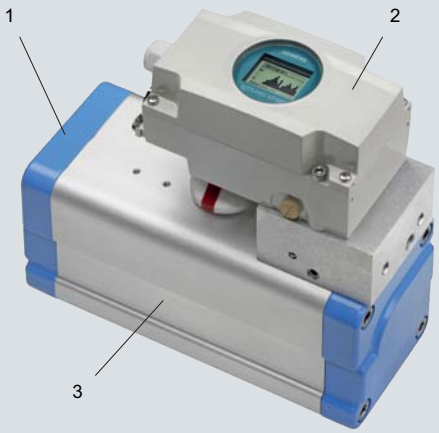
The device provides slots for option modules, which can be used for retrofitting the following functions or ordering them directly from the factory:

- Position feedback module
  Position feedback is provided as a 4 to 20 mA signal.
- Alarm module
  - 3 freely parameterizable digital outputs
  - 1 freely parameterizable digital input

Design of a control valve

1 Pneumatic linear actuator
2 Positioner
3 Process valve
4 Electrical connection

Positioner, attached to linear actuator



1 Pneumatic part-turn actuator
2 Positioner
3 Mounting block with integrated air duct

Positioner, attached to part-turn actuator

Function

The positioner is a field device with a microcontroller. It is used to adjust and control pneumatic actuators on an electropneumatic basis.

The setpoint and actual value of the actuator position are electronically compared in a microcontroller. If the microcontroller detects a deviation, it uses a control algorithm to actuate the pneumatic block inside the positioner.

Air is blown into the chamber or chambers of the pneumatic actuator, or removed in the opposite direction. The pneumatic block doses this air flow.

The linear or part-turn movements are detected by non-contacting sensors.

Local operation

Using the four buttons you can parameterize and operate the positioner as well as switch between automatic and manual mode. The positioner's settings and feedback can be followed on the display. Actuator adjustments over the entire range are possible in manual mode.

Commissioning

Using the "Quick Start" menu, the electropneumatic positioner can be quickly adapted to the valve and adjusted by means of an automatic startup function. The microcontroller optimizes the control by determining the following data (among others) during the initialization process:

- Zero point
- Full-scale value
- Direction of action
- Positioning speed of shifting
- Dynamic positioning

Monitoring functions

The electropneumatic positioner has different monitoring functions. They detect changes to the actuator and valve and compare them with the defined limits. If a limit is exceeded, the display shows the corresponding diagnostic message. This information may be important for diagnosis of the actuator or valve. The following measuring data, some with adjustable limits, are determined and monitored:

- Travel integral
- Number of changes in direction
- Alarm counter
- Deadband
- Valve end limit position (e.g. for detection of valve seat wear or deposits)
- Operating hours (also according to temperature and travel ranges) as well as min./max. temperature
- Valve positioning time

Status monitoring with 3-stage alarm concept

The intelligent electropneumatic positioner is equipped with additional monitoring functions. The status indications derived from these monitoring functions signal active faults of the unit. The severity of these faults is graded using "traffic light signaling", symbolized by a wrench in the colors green, yellow and red (in SIMATIC PDM and Maintenance Station). Presentation in SIMATIC PDM and the Maintenance Station is as follows:

- Need for maintenance - indicated by a green wrench
- Urgent need for maintenance - indicated by a yellow wrench
- Imminent danger of unit failure - indicated by a red wrench

This allows users to put early measures into action before a serious valve or actuator fault occurs which could result in a system shutdown. An alarm is signaled in good time. With suitable maintenance strategies in place the user can ensure plant availability. An alarm is triggered for example by the progressive sluggishness of a unit. This three-stage alarm hierarchy also allows early detection and signaling of static friction on a packing box, signs of wear on a valve plug or valve seat, and valve sedimentation or incrustation.

The alarms are issued through the digital outputs of the positioner and through HART communication.

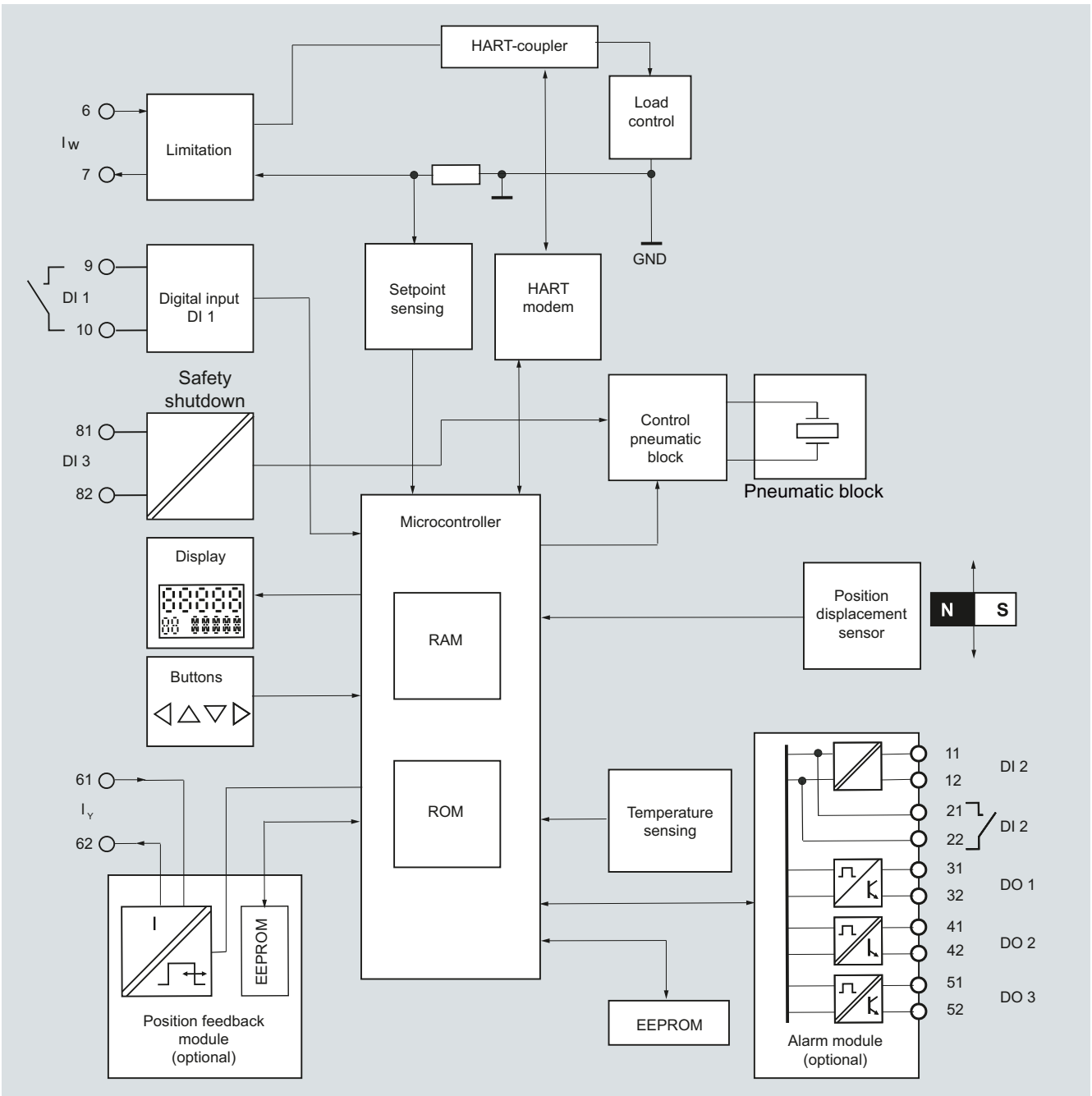
Three digital outputs are available. HART communication supplies the following information about the unit:

- differentiation between the various alarms
- presentation of one position control circuit parameter in a trend graph
- Histogram in the form of a bar graph of all the control circuit's parameters.

The graded maintenance requirements, complete with identification of the source of the fault, are also indicated in the device display.

Technical description

Mode of operation



SITRANS VP300 electropneumatic positioner, function diagram

Technical specifications

SITRANS VP300 (all versions)

General data	
Range of stroke (linear actuators)	3 ... 60 mm (0.12 ... 2.36 inch) 3 ... 150 mm (0.12 ... 5.91 inch) for selected actuators)
Angle of rotation (part-turn actuators)	30 ... 120°
Controller unit[1]	
• Non-linearity	< 1 %
• Repeatability	< 1 %
• Hysteresis	< 1 %
• Temperature influence effect	< 0.5 %/10 K in the range of -40 ... +85 °C (-40 ... +185 °F)
• Shock influence effect and vibration influence effect	< 1 % (20 m/s^2 or 0.15 mm; 10 ... 500 Hz)
Degree of protection	IP66 to EN 60529
Material	
• Enclosure 6DR63*0 (aluminum)	EN 1706: EN AC-AISI12(Fe) or EN AC-AISI10Mg(Fe)
Vibration resistance	
• Harmonic oscillations (sine-wave) according to EN 60068-2-6/02/2008	3.5 mm (0.14 inch), 2 ... 27 Hz 3 cycles/axis 100 m/s^2 (328 ft/s^2), 27 ... 200 Hz, 3 cycles/axis
• Bumping (half-sine) to EN 60068-2-29/03.95	250 m/s^2 (820 ft/s^2), 6 ms, 1000 shocks/axis
• Noise (digitally controlled) according to EN 60068-2-64/04/2008	10 ... 200 Hz; 1 (m/s^2)^2/Hz (3.28 (ft/s^2)^2/Hz) 200 ... 500 Hz; 0.3 (m/s^2)^2/Hz (0.98 (ft/s^2)^2/Hz)
Weight	1.15 kg (2.535 lb)
Climatic class	According to EN 60721-3-4
• Storage	1K3
• Transport	2K4
• Operation [2]	4K4, but -40 ... +85 °C (-40 ... +185 °F)
Certificates and approvals	
Classification according to pressure equipment directive (PED 97/23/EC)	For gases of fluid group 1; complies with requirements of article 3, para. 3
CE marking	You can find the appropriate directives and standards, including the relevant versions, in the EC Declaration of Conformity on the Internet
Pneumatic data	
Auxiliary power (air supply)	Compressed air and nitrogen
• Pressure	1.4 ... 8 bar (20.3 ... 116 psi)
Air quality to ISO 8573-1	
• Solid particulate size and density	Class 3
• Pressure dew point	Class 3 (min. 20 K below ambient temperature)
• Oil content	Class 3
Unrestricted flow	
• Inlet air valve (depressurize actuator)	
- 2 bar (29 psi)	7.5 Nm^3/h (33 USgpm)
- 4 bar (58 psi)	10.6 Nm^3/h (46.7 USgpm)
- 6 bar (87 psi)	13 Nm^3/h (57.2 USgpm)
• Outlet air valve(depressurize actuator)	
- 2 bar (29 psi)	14.4 Nm^3/h (63.4 USgpm)
- 4 bar (58 psi)	20.4 Nm^3/h (89.8 USgpm)
- 6 bar (87 psi)	25 Nm^3/h (110.1 USgpm)
Auxiliary power consumption in the controlled state	< 9,5·10^{-2} Nm^3/h (0.26 USgpm)
Device versions	single-acting and double-acting
Gauge made of steel	
• Degree of protection	IP44
• Vibration resistance	According to EN 837-1
Communication	
HART	Version 6
Languages	
Menu languages	English, German, Spanish, French, Italian, Chinese

[1] All percentage values refer to a 20 mm stroke range or 90° angle of rotation, measured as per IEC 61514-2.

[2] At ≤ -20 °C (-4 °F) the display refresh rate of the indicator is limited. At > 70 °C, the contrast for the display is limited.

Technical specifications

SITRANS VP300 - Basic device without Ex protection and with Ex ia/ib protection

SITRANS VP300	Basic device without Ex protection	Basic device with Ex ia/ib protection
Explosion protection as per ATEX	Without	Ex ia/ib II 2 G Ex ia IIC T6/T4
Mounting location		Zone 1
Permissible ambient temperature for operation	-40 ... +85 °C (-40 ... +185 °F)	T4: -40 ... +80 °C (-40 ... +176 °F) T6: -40 ... +50 °C (-40 ... +122 °F)
Electrical specifications		
Setpoint input I_w		
2-wire connection (terminals 6/7)		
Rated signal range	4 ... 20 mA	
Current to maintain the auxiliary power supply	≥ 3.8 mA	
Required load voltage U_B (load resistance at 20 mA)		
• without HART (6DR630*) max.	≤ 6.5 V (325 Ω)	≤ 7.5 V (375 Ω)
• with HART (6DR631*)	≤ 7.5 V (375 Ω)	≤ 8.5 V (420 Ω)
Static destruction limit	30 V (internal current load approx. +50 mA) -150 mA (with poled connection)	-
Effective internal capacitance C_i	-	≤ 33 nF
Effective internal inductance L_i	-	≤ 0.19 mH
For connecting to circuits with the following peak values	-	Intrinsically safe U_i = 30 V DC I_i = 100 mA P_i = 1 W
Digital input DI 1 (terminal 9/10; galvanically connected with basic device)		
Suitable only for floating contact; max. contact load 0.1 mA with 3 V		
Connectable external capacitance C_O	-	≤ 1 µF
Connectable external inductance L_O	-	≤ 1 mH
For connecting to circuits with the following peak values	-	Intrinsically safe U_o = 5 V DC I_o = 0.5 mA P_o = 2.5 mW
Digital input DI 3 (terminal 81/82); can be activated for safety shutdown with switch		
Input resistance	> 20 kΩ	
Switch in "enable" position		
• Signal state "0" = Safety shutdown	0 ... 4.5 V or unused	
• Signal state "1" = normal operation	13 ... 30 V	
Switch in "disable" position		
• Normal control mode; safety shutdown inactive	0 ... 30 V or unused	
Internal capacitance C_i	-	Negligibly small
Internal inductance L_i	-	Negligibly small
For connecting to circuits with the following peak values	-	Intrinsically safe U_i = 30 V DC I_i = 100 mA P_i = 1 W
Ports		
• electrical	Screw terminal 2.5 AWG28-12 Cable feed (M20x1.5 or ½-14 NPT) or plug M12	
• pneumatic	OPOS Interface® (VDI/VDE 3847)	

Selection and Ordering data		Order No.
SITRANS VP300 electropneumatic positioner	D)	**6 D R 6 3 ■■ - ■■■■■ - ■ A ■ 0**
Version		
2-wire		
• without HART		**0**
• with HART		**1**
Enclosure design		
Aluminum, painted		**0**
Actuator type		
single-acting		**1**
double-acting[1]		**2**
Explosion protection		
Without		**N N**
ATEX/IECEx Ex ia, Zone 1 Ex ic, Zone 2 Ex iaD, Zone 21		**E**
FM/CSA[1] IS, Class I, Zone 1, IIC IS, Class I, Div 1, ABCD NI, Class I, Zone 2, IIC NI, Class I, Div 2, ABCD IS, Class II, III, Div 1, EFG		
ATEX/IECEx[1] Ex n, Zone 2 Ex tD, Zone 22		**G**
FM/CSA[1] NI, Class I, Zone 2, IIC NI, Class I, Div 2, ABCD NI, Class II, III, Div 2, EFG		
Approvals for explosion protection		
Without		**N**
ATEX, IECEx, FM, CSA, GOST, NEPSI, INMETRO[1]		**S**
ATEX, IECEx		**A**
FM[1]		**B**
CSA[1]		**C**
GOST[1]		**D**
NEPSI[1]		**E**
INMETRO[1]		**F**
Electric connection		
Cable gland M20x1.5		**1**
Thread adapter ½ - -14 NPT		**2**
M12 plug		**3**
Limit monitor		
Without		**0**
Alarm module, electronic[1]		**1**
Option modules		
Without		**0**
Position feedback module 4 to 20 mA[1]		**1**
OEM version		
None		**A**

Selection and Ordering data		Order No.
SITRANS VP300 electropneumatic positioner	D)	**6 D R 6 3 ■■ - ■■■■■ - ■ A ■ 0**
Further designs		Order code
Add "-Z" to Order No. and specify order code.		
TAG plate made of stainless steel, 3-line Text line 1: Plain text from Y17 Text line 2: Plain text from Y15 Text line 3: Plain text from Y16		**A01**
Version with stainless steel sound absorbers[1]		**A40**
Certificates		
Final check		**C11**
SIL, only for single-acting device (you must order a certificate to receive a SIL-certified device)[1]		**C20**
Measuring point description Max. 16 characters, specify in plain text **Y15:.....**		**Y15**
Measuring point text Max. 24 characters, specify in plain text **Y16:.....**		**Y16**
Measuring point number (TAG No.) Max. 8 characters, specify in plain text **Y17:.....**		**Y17**

[1] In preparation

D) Subject to export regulations AL: N, ECCN: EAR99H.

Note:

To operate the SITRANS VP300 you need a matching magnet holder (contains one magnet). You can order this magnet holder as part of the mounting kit or separately as an accessory.

Technical specifications

Selection and Ordering data — Order No.

SITRANS VP300 electropneumatic positioner, mounting kits D) — **6 D R 6 0 3 - _ _ _ _ - _ _ A _**

Material mounting kit
- Aluminum — **1**

Actuator type
- Single-acting — **1**
- Double-acting[1] — **2**

Type mounting kit

Standard linear actuators
- IEC 60 534-6-1 (NAMUR), up to 60 mm (2.36 inch) — **A A**
- IEC 60 534-6-1 (NAMUR), up to 150 mm (5.9 inch)[1] — **A B**

Standard part-turn actuators
- For existing mounting consoles according to VDI/VDE 3845 — **B A**
- For actuators according to VDI/VDE 3845 with hole pattern 30 x 80 x 20 mm (1.18 x 3.15 x 0.79 inch) — **B B**
- For actuators according to VDI/VDE 3845 with hole pattern 30 x 80 x 30 mm (1.18 x 3.15 x 0.79 inch) **or** 30 x 130 x 30 mm (1.18 x 5.12 x 0.79 inch)[1] — **B C**
- For actuators according to VDI/VDE 3845 with hole pattern 30 x 130 x 50 mm (1.18 x 5.12 x 1.97 inch)[1] — **B D**

Integrated manufacturer-specific interfaces for linear actuators
- Flowserve FlowAct 127/252/502/700[1] — **C A**
- ARCA ARCAPAQ type 812[1] — **C B**
- RTK ST 6115/6135/6160 (pneumatic connections only G ¼) — **C C 1 0**
- Fisher GX[1] — **C D**

Integrated manufacturer-specific interfaces for part-turn actuators
- Neles series EC 05 - 14 and EJ 05 - 14[1] — **D A**

Samson linear actuators
- Type 3277 for integrated mounting — **E A 0**
- Type 3277-5 for integrated mounting — **E B 0**
- Other types according to IEC 60 534-6-1, up to 60 mm (2.36 inch)[1] — **E C**
- Other types according to IEC 60 534-6-1, up to 150 mm (5.9 inch)[1] — **E D**

Other linear actuators
- Adapter for mech. interface SIPART PS2, up to 60 mm (2.36 inch) — **F A**
- Fisher type series 656 and 667 30/34/40/45/46/50/60, up to 60 mm (2.36 inch)[1] — **F B**
- Fisher type series 656 and 667 70/76/80/87/100, up to 150 mm (5.9 inch)[1] — **F C**
- RTK ST 6141, up to 60 mm (2.36 inch) (pneumatic connections only G ¼) — **F D 1**
- RTK ST 6141, up to 150 mm (5.9 inch) (pneumatic connections only G ¼[1]) — **F E 1**

Other part-turn actuators
- Masoneilan Camflex II — **G A**
- Neles BC/BJ 6 - 20[1] — **G B**

Selection and Ordering data — Order No.

SITRANS VP300 electropneumatic positioner, mounting kits D) — **6 D R 6 0 3 - _ _ _ _ - _ _ A _**

Connections, pneumatic
- G ¼ — **1**
- ¼-18 NPT — **2**

Shutoff valve[1] for replacement during operation
- Without — **0**
- With — **1**

Interface for solenoid valve according to VDI/VDE 3845
- Without — **0**
- With (pneumatic connections only G ¼) — **1 1**

Gauge
- Without — **A**
- Gauge made of steel, scaled in bar/Mpa/psi — **B**

Magnet holder (contains magnet for position detection on a non-contacting basis)
- Without — **0**
- With — **1**

Further designs	Order code
Measuring point number (TAG No.) Max. 8 characters, specify in plain text **Y17:.....**	**Y17**

[1] Available soon

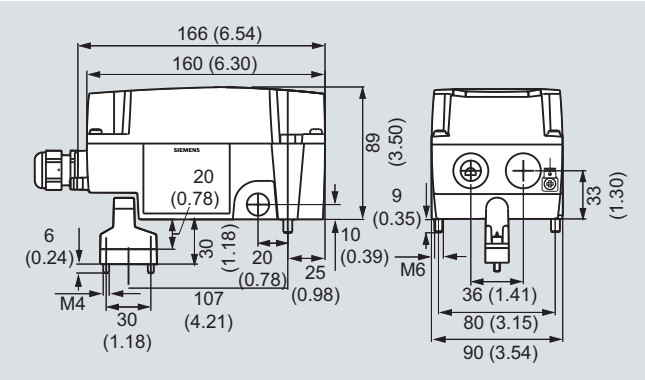
D) Subject to export regulations AL:N, ECCN: EAR99H.

Selection and Ordering data

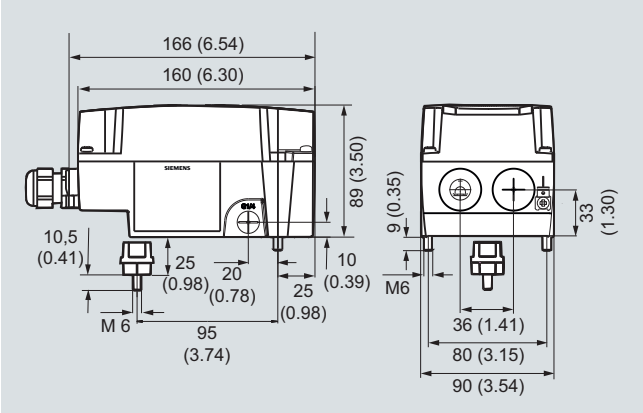
	Order No.
Magnet holder (contains magnet for position detection on a non-contacting basis)	
Linear actuators up to 60 mm (2.36 inch)	**6DR6003-1P**
Part-turn actuators and linear actuators > 60 mm (2.36 inch)	**6DR6003-2P**
Single-acting gauge	
Block made of aluminum, connection G¼, gauge made of steel, scaled in bar/Mpa/psi, thread G1/8	**6DR6003-1MG1**
Block made of aluminum, connection ¼-18 NPT, gauge made of steel, scaled in bar/Mpa/psi, thread 1/8-27 NPT	**6DR6003-1MN1**
double-acting gauge[1)]	
Block made of aluminum, connection G¼, gauge made of steel, scaled in bar/Mpa/psi, thread G1/8	**6DR6003-2MG1**
Block made of aluminum, connection ¼-18 NPT, gauge made of steel, scaled in bar/Mpa/psi, thread 1/8-27 NPT	**6DR6003-2MN1**
Shut-off module (single-acting and double-acting)[1)]	
Module made of aluminum	**6DR6003-8L**
Module for solenoid valve interface according to VDI/VDE 3845	
Aluminium module, connection G¼ (not for integrated actuators)	**6DR6003-8SG1**
Position feedback module (4 to 20 mA)[1)]	
Non explosion-proof	**6DR6003-8J**
Explosion protection	**6DR6003-6J**
Alarm module, electronic[1)]	
Non explosion-proof	**6DR6003-8A**
Explosion protection	**6DR6003-6A**
Cover plate for solenoid valve interface	
Aluminum	**6DR6003-8SC1**
Documentation	
Operating instructions in German	**A5E01258635**
Operating instructions in English	**A5E01258666**

[1)] Available soon

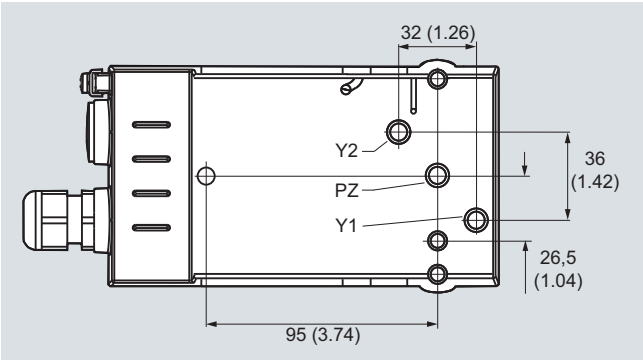
Dimensional drawings



Linear actuator, dimensions in mm (inch)



Part-turn actuator, dimensions in mm (inch)



Rear side, dimensions in mm (inch)

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Technical description

Overview

Electropneumatic positioner SIPART PS2 in the Makrolon enclosure

SIPART PS2 Ex d electropneumatic positioner in flameproof aluminium enclosure (Ex d)

SIPART PS2 in stainless steel enclosure

The SIPART PS2 electropneumatic positioner is used to control the final control element of pneumatic linear or part-turn actuators. The electropneumatic positioner moves the actuator to a valve position corresponding to the setpoint. Additional function inputs can be used to block the valve or to set a safety position. A binary input is present as standard in the basic device for this purpose.

Benefits

SIPART PS2 positioners offer decisive advantages:

- Simple installation and automatic commissioning (self-adjustment of zero and span)
- Simple operation with
  - Local operation (manual operation) and configuration of the device using three buttons and a user-friendly two-line display
  - Parameterization via SIMATIC PDM
- Very high-quality control thanks to an online adaptation procedure
- Negligible air consumption in stationary operation
- "Tight shut-off" function (ensures maximum positioning pressure on the valve seat)
- Numerous functions can be activated by simple configuring (e.g. characteristic curves and limits)
- Extensive diagnostic functions for valve and actuator
- Only one device version for linear and part-turn actuators
- Few moving parts, hence insensitive to vibrations
- External non-contacting position sensor as option for extreme ambient conditions
- "Intelligent solenoid valve": Partial Stroke Test and solenoid valve function in a single device
- Partial Stroke Test e.g. for safety valves
- Can also be operated with natural gas
- SIL (Safety Integrity Level) 2

Application

The SIPART PS2 positioner is used, for example, in the following industries:

- Chemical/petrochemical
- Power stations
- Paper and glass
- Water, waste water
- Food and pharmaceuticals
- Offshore plants

The SIPART PS2 positioner is available:

- For single-acting actuators: In Makrolon, stainless steel or aluminum enclosure, as well as flameproof aluminum enclosure (Ex d)
- For double-acting actuators: In Makrolon enclosure, stainless steel enclosure and flameproof aluminum enclosure (Ex d)
- For non-hazardous applications
- For hazardous applications in the versions
  - Type of protection intrinsic safety "Ex i"
  - Type of protection flameproof enclosure "Ex d" in flameproof aluminium enclosure
  - Type of protection non-sparking "Ex nA", energy-limited "Ex nL", dust protection via enclosure "Ex tD"

and in the versions:

- With 0/4 ... 20 mA control with/without communication through HART signal
- With PROFIBUS PA communication interface
- With Foundation Fieldbus (FF) communications interface.

Explosion-proof versions

The device is available in the following versions for use in atmospheres subject to explosion hazards:

- Flameproof design for use in zone 1 and class I, division 1
- Intrisically safe design for use in zone 1 and class I, division 1
- Non-sparking and energy-limited design for use in zone 2 and class I, division 2
- Dust-protected design for use in zone 22
- Dust-protected design for use in class II, division 1 and 2 and class III

Stainless steel enclosure for extreme ambient conditions

The SIPART PS2 is available in a stainless steel enclosure (with no window in the cover) for use in particularly aggressive environments (e.g. offshore operation, chlorine plants etc.). The device functions are the same as for the basic version.

Design

The SIPART PS2 positioner is a digital field device with a highly-integrated microcontroller.

The positioner consists of the following components:

- Enclosure and cover
- PCB with corresponding electronics with or without communication through HART or with electronics for communication in accordance with
  - PROFIBUS PA specification, IEC 61158-2; bus-supplied device, or
  - Foundation Fieldbus (FF) specification, IEC 61158-2, bus-supplied device
- Position detection system
- Terminal housing with screw terminals
- Pneumatic valve manifold with piezoelectric valve precontrol.

The valve manifold is located in the housing, the pneumatic connections for the inlet air and the positioning pressure on the right-hand side. A pressure gauge block and/or a safety solenoid valve can be connected there as options. The SIPART PS2 positioner is fitted to the linear or part-turn actuator using an appropriate mounting kit. The circuit board container in the casing provides slots for separately ordered boards with the following functions:

I_y module:

- Position feedback as a two-wire signal 4 to 20 mA

Alarm module (3 outputs, 1 input):

- Signaling of two limits of the travel or angle by binary signals. The two limits can be set independently as maximum or minimum values.
- Output of an alarm if the setpoint position of the final control element is not reached in automatic mode or if a device fault occurs.
- Second binary input for alarm signals of for triggering safety reactions, e.g. blocking function or safety position.

Limit signaling through slot-type initiators (SIA module)

Two limits can be signaled redundantly as NAMUR signals (EN 60947-5-6) by slot-type initiators. An alarm output is also integrated in the module (see Alarm module).

Limit value signal via mechanical contacts (limit value contact module)

Two limits can be signaled redundantly by switching contacts. An alarm output is also integrated in the module (see Alarm module).

Valid for all modules described above:

All signals are electrically isolated from one another and from the basic unit. The outputs indicate self-signaling faults. The modules are easy to retrofit.

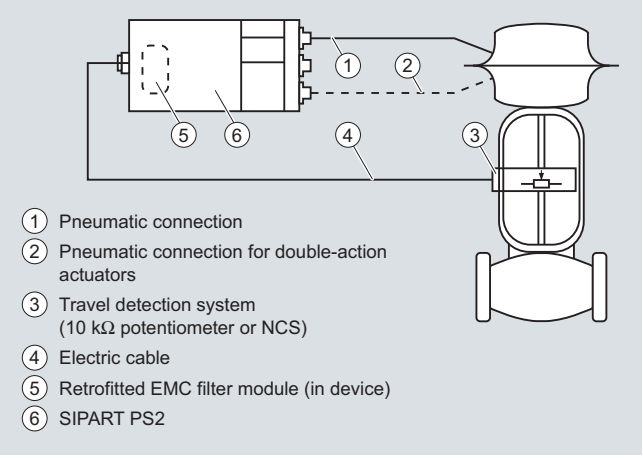
Separate mounting of positioner detection system and controller unit

The position detection system and controller unit can be connected separately for all casing versions of the SIPART PS2 (except flameproof design). Measurement of the travel or angle is carried out directly on the actuator. The controller unit can then be fitted a certain distance away, e.g. on a mounting pipe or similar, and is connected to the position detection system by an electric cable and to the actuator by one or two pneumatic lines. Such a split design is frequently advantageous if the ambient conditions at the fitting exceed the specified values for the positioner (e.g. strong vibrations).

The following can be used for measuring the travel or angle:

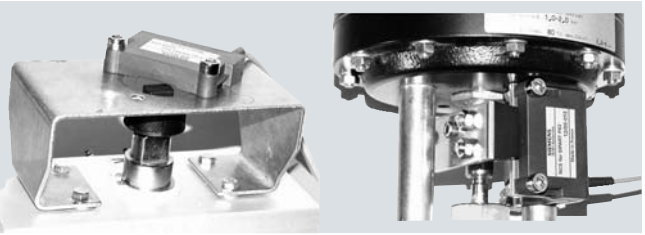
- NCS sensor
- External position detection system C73451-A430-D78
- A commercially available potentiometer (10 kΩ resistance), e.g. for higher application temperatures or customer-specific applications

The use of potentiometers is recommended for very small linear actuators with a short valve travel since, on the one hand, the space required by the potentiometer is very small and, on the other, the transmission characteristic is optimum for a small travel.



Separate mounting of positioner detection system and controller unit

Non-contacting position sensor (NCS)



Contact and non-contacting position sensor (NCS) for part-turn actuator (left) and for linear actuator ≤ 14 mm (0.55 inch) (right)

Technical description

NCS for travels >14 mm (0.55 inch)

The NCS sensor consists of a non-contacting position sensor. All coupling elements are omitted such as coupling wheel and driver pin with part-turn actuators or lever and pick-up bracket with linear actuators for up to 14 mm travel.

This results in:

- Even greater resistance to vibration and shock
- No wear of sensor
- Problem-free mounting on very small actuators
- Negligible hysteresis with very small travels.

The sensor does not require an additional power supply, i.e. SIPART PS2 (not for Ex d version) can be operated in a 2-wire system. The NCS (Non Contacting Position Sensor) consists of a potted sensor housing which must be mounted permanently and a magnet which is mounted on the spindle of linear actuators or on the shaft butt of part-turn actuators. For the version for travels >14 mm (0.55 inch), the magnet and the NCS are premounted on a stainless steel frame and offer the same interface mechanically as the positioner itself, i.e. they can be mounted using the standard mounting kits 6DR4004-8V, -8VK and -8VL.

The installation of a EMC filter module in the positioner (controller unit) is necessary in order to ensure a connection level with EMC according to EC Declaration of Conformity when using external sensors (see Selection and ordering data for "EMC filter module").

Function

The SIPART PS2 electropneumatic positioner works in a completely different way to normal positioners.

Mode of operation

Comparison of the setpoint and the actual value takes place electronically in a microcontroller. If the microcontroller detects a deviation, it uses a 5-way switch procedure to control the piezoelectric valves, which regulates the flow of air into and from the chambers of the pneumatic actuator or blows it in the opposite direction.

The microcontroller then outputs an electric control command to the piezoelectric valve in accordance with the size and direction of the deviation (deviation between setpoint and actual values). The piezoelectric valve converts the command into a pneumatic positional increment.

The positioner outputs a continuous signal in the area where there is a large system deviation (high-speed zone); in areas of moderate system deviation (slow-speed zone) it outputs a sequence of pulses. No positioning signals are output in the case of a small system deviation (adaptive or variable deadband).

The linear or rotary motion of the actuator is detected by the mounting kit and transferred to a high-quality potentiometer over a shaft and a non-floating gear transmission.

The angular error of the pick-up in cases where the assembly is mounted on a linear actuator is corrected automatically.

When connected in a 2-wire system, the SIPART PS2 draws its power exclusively from the 4 to 20 mA setpoint signal. The electric power is also connected through the 2-wire bus signal with PROFIBUS operation (SIPART PS2 PA). The same applies for the FOUNDATION Fieldbus version.

Pneumatic valve manifold with piezoelectric valve precontrol

The piezoelectric valve can release very short control pulses. This helps achieve a high positioning accuracy. The pilot element is a piezoelectric bending converter which switches the pneumatic main controller unit. The valve manifold is characterized by an extremely long service life.

Local operation

Local operation is performed using the built-in display and the three buttons. Switching between the operating levels Automatic, Manual, Configuring and Diagnosis is possible at the press of a button.

In manual mode the drive can be adjusted over the entire range without interrupting the circuit.

Operation and monitoring with the SIMATIC PDM configuration software

The configuration software SIMATIC PDM permits simple operation, monitoring, configuration and parameterization of the device. The diagnostic information available can be read via SIMATIC PDM from the device. Communication is carried out via the HART protocol or PROFIBUS PA. For the HART protocol, the device can be accessed both via a HART modem and via a HART-compatible input/output module (remote IO). The corresponding device description files, such as GSD and (Enhanced) EDD are available for both types of communication.

In addition, the SITRANS DTM provides software based on tried and tested EDD technology that can be used to parameterize field devices via a DTM (Device Type Manager) using an FDT frame application (e.g. PACTware). SITRANS DTM and the necessary device-specific enhanced EDD are available for download free of charge. The software provides the relevant communication interfaces for HART and PROFIBUS.

Automatic commissioning

With a simple configuration menu the SIPART PS2 can be quickly adapted to the fitting and adjusted by means of an automatic startup function.

During initialization, the microcontroller determines the zero point, full-scale value, the direction of action and the positioning speed of the fitting. From this data it establishes the minimum pulse time and the deadband, thus optimizing the control.

Low air consumption

A hallmark of the SIPART PS2 is its own extremely low consumption of air. Normal air losses on conventional positioners are very costly. Thanks to the use of modern piezoelectric technology, the SIPART PS2 consumes air only when it is needed, which means that it pays for itself within a very short time.

Comprehensive monitoring functions

The SIPART PS2 has various monitoring functions with which changes on the actuator and valve can be detected and signaled if applicable when a selectable limit has been exceeded. This information may be important for diagnosis of the actuator or valve. The measuring data to be determined and monitored, some of whose limits can be adjusted, include:

- Travel integral
- Number of changes in direction
- Alarm counter
- Self-adjusting deadband
- Valve end limit position (e.g. for detection of valve seat wear or deposits)
- Operating hours (also according to temperature and travel ranges) as well as min./max. temperature
- Operating cycles of piezoelectric valves
- Valve positioning time
- Actuator leakages

Status monitoring with 3-stage alarm concept

The intelligent electropneumatic SIPART PS2 positioner is equipped with additional monitoring functions. The status indications derived from these monitoring functions signal active faults of the unit. The severity of these faults are graded using "traffic light signaling", symbolized by a wrench in the colors green, yellow and red (in SIMATIC PDM and Maintenance Station):

- Need for maintenance (green wrench)
- Urgent need for maintenance (yellow wrench)
- Imminent danger of unit failure or general failure (red wrench)

This allows users to put early measures into action before a serious valve or actuator fault occurs which could result in a system shutdown. The fact that a fault indication is signaled, such as the onset of a diaphragm break in the actuator or the progressive sluggishness of a unit, enables the user to ensure system reliability at any time by means of suitable maintenance strategies.

This three-stage alarm hierarchy also allows early detection and signaling of other faults, such as the static friction of a packing box, the wearing of a valve plug/seating, or precipitations or incrustations on the fittings.

These fault indications can be output either line-conducted over the alarm outputs (see above) of the positioner (max. 3), or via communication over the HART or field bus interfaces. In this case, the HART, PROFIBUS and FF versions of SIPART PS2 permit a differentiation of the various fault indications, as well as a trend representation and histogram function of all key process variables with regard to the fittings.

The device display also displays the graded maintenance requirements, complete with identification of the source of the fault.

Functional safety acc. to SIL 2

The SIPART PS2 positioners are also suitable for the control of fittings, which meet the special requirements of the functional safety up to SIL 2 to IEC 61508 or IEC 61511-1.

This is a single-acting, venting positioner with an input of 4 to 20 mA, PROFIBUS PA and FOUNDATION Fieldbus (FF) for mounting on pneumatic actuators with spring return.

The positioner vents the valve actuator on demand/in the event of a fault and puts the valve in the preset safety position.

This positioner meets the following requirements:

- Functional safety up to SIL 2 conforming to IEC 61508 or IEC 61511-1 for safe venting
- Explosion protection for the versions 6DR5...-.E...
- Electromagnetic compatibility to EN 61326/A1, Appendix A.1

SIPART PS 2 as "intelligent solenoid valve“

Open / Close valves, safety fittings in particular, are generally pneumatically controlled over a solenoid valve. If you use SIPART PS2 instead of this type of solenoid valve, the positioner performs two tasks in a single device (without extra wiring)

- Firstly, it switches the fitting off on demand by venting the actuator (functional safety acc. to SIL 2 (see above)
- Secondly, it can perform a Partial Stroke Test at regular intervals (1 - 365 days), which prevents the blocking of the fitting, e.g. due to corrosion or furring.

As in this case SIPART PS2 is constantly working in normal operation (e.g. 99 % position), it also acts as a permanent test function for the pneumatic output circuit, which is not usually possible when using a solenoid valve.

Solenoid valves on control valves can also not normally be tested during operation. They are therefore not necessary when using SIPART PS 2 with a 4-wire connection system as the venting is carried out on demand by SIPART PS2. This means that on control valves, both the control function and the shut-off function can be carried out by a single device.

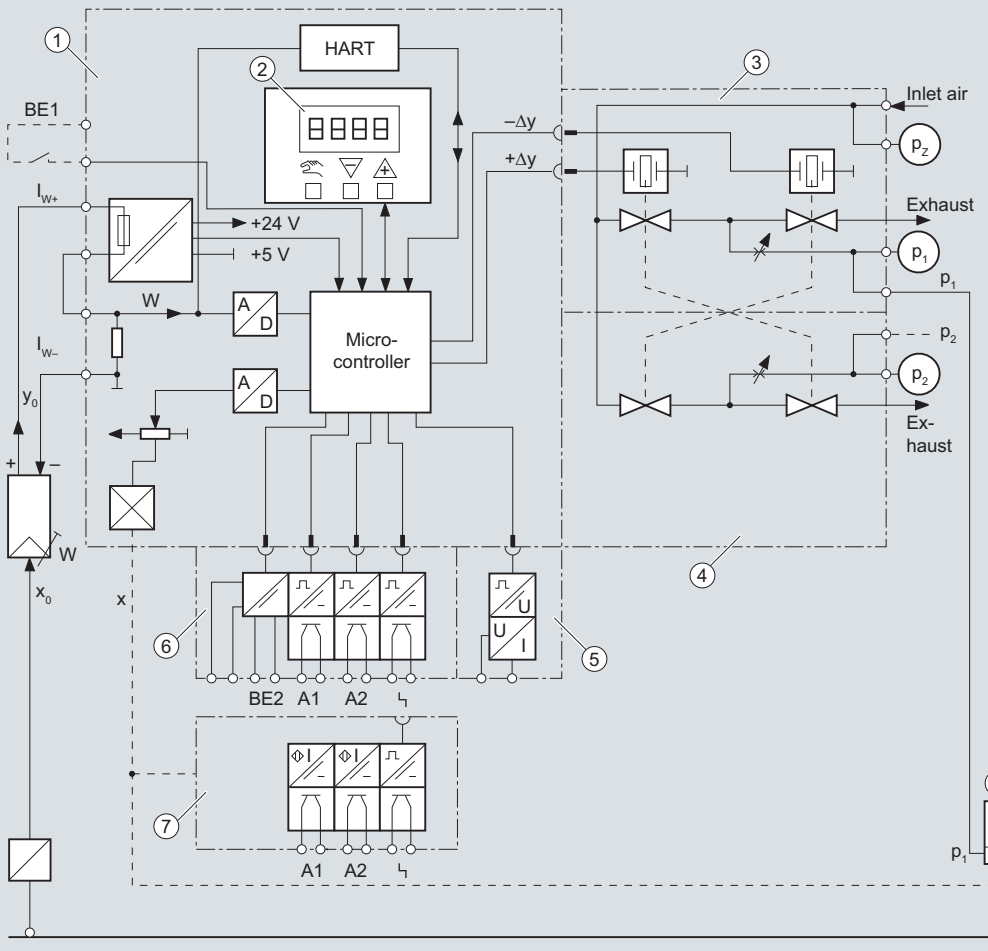
Configuring

In configuring mode, the SIPART PS2 positioner can be configured to requirements and include the following settings:

- Input current range 0 to 20 mA or 4 to 20 mA
- Rising or falling characteristic curve at the setpoint input
- Positioning speed limit (setpoint ramp)
- Split-range operation; adjustable start-of-scale and full-scale values
- Response threshold (deadband); self-adjusting or fixed
- Direction of action; rising or falling output pressure with rising setpoint
- Limits (start-of-scale and full-scale values) of positioning range
- Limits (alarms) of the final control element position; minimum and maximum values
- Automatic "tight shut-off" (with adjustable response threshold)
- The travel can be corrected in accordance with the valve characteristic curve.
- Function of binary inputs
- Function of alarm output etc.

Configuration of the various SIPART PS2 versions is largely identical.

Technical description



1. Motherboard with microcontroller and input circuit
2. Control panel with display and pushbuttons
3. Piezoelectric valve unit, always present
4. Valve unit, present as accessory in double-action positioner
5. ly module for SIPART PS2 controller
6. Alarm module for 3 alarm outputs and one binay input
7. SIA module (slot initiator alarm module, fig.) or limit value contact module
8. Spring loaded pneumatic actuator (single-action)
9. Springless pneumatic actuator (double-action)

Note:
Alarm module (6) and SIA module (7) can only be inserted as alternatives.

SIPART PS2, electropneumatic positioner, function diagram

Technical specifications

SIPART PS2 (all versions)

Rated conditions	
Permissible ambient temperature for operation	See Technical specifications on page 6/20
Degree of protection [1]	IP66 according to EN 60529/NEMA 4X
Mounting position	Any; pneumatic connections and exhaust opening not facing up in wet environment
Vibration resistance	
• Harmonic oscillations (sine-wave) according to EN 60068-2-6/05.96	3.5 mm (0.14"), 2 ... 27 Hz, 3 cycles/axis 98.1 m/s² (321.84 ft/s²), 27 ... 300 Hz, 3 cycles/axis
• Bumping (half-sine) according to EN 60068-2-29/03.95	150 m/s² (492 ft/s²), 6 ms, 1000 shocks/axis
• Noise (digitally controlled) according to EN 60068-2-64/08.95	10 ... 200 Hz; 1 $(m/s^2)^2$/Hz (3.28 $(ft/s^2)^2$/Hz) 200 ... 500 Hz; 0.3 $(m/s^2)^2$/Hz (0.98 $(ft/s^2)^2$/Hz) 4 hours/axis
• Recommended continuous duty range of the complete fitting	≤ 30 m/s² (98.4 ft/s²) without resonance sharpness
Climatic class	According to EN 60721-3-4
• Storage [2]	1K5, but -40 ... +80 °C (1K5, but -40 ... +176 °F)
• Transport [2]	2K4, but -40 ... +80 °C (2K4, but -40 ... +176 °F)
• Operation [3]	4K3, but -30 ... +80 °C (4K3, but -22 ... +176 °F)[4]
Pneumatic data	
Auxiliary power (air supply)	Compressed air, nitrogen or cleaned natural gas
• Pressure	1.4 ... 7 bar (20.3 ... 101.5 psi):
Air quality to ISO 8573-1	
• Solid particulate size and density	Class 2
• Pressure dew point	Class 2 (min. 20 K (36 °F) below ambient temperature)
• Oil content	Class 2
Unrestricted flow (DIN 1945)	
• Inlet air valve (ventilate actuator) [5]	
- 2 bar (29 psi)	4.1 Nm³/h (18.1 USgpm)
- 4 bar (58 psi)	7.1 Nm³/h (31.3 USgpm)
- 6 bar (87 psi)	9.8 Nm³/h (43.1 USgpm)
• Outlet air valve (vent actuator) [5]	
- 2 bar (29 psi)	8.2 Nm³/h (36.1 USgpm)
- 4 bar (58 psi)	13.7 Nm³/h (60.3 USgpm)
- 6 bar (87 psi)	19.2 Nm³/h (84.5 USgpm)
Valve leakage	< $6 \cdot 10^{-4}$ Nm³/h (0.0026 USgpm)
Throttle ratio	Adjustable up to ∞ : 1
Auxiliary power consumption in the controlled state	< $3{,}6 \cdot 10^{-2}$ Nm³/h (0.158 USgpm)

Design	
Mode of operation	
• Range of stroke (linear actuators)	3 ... 130 mm (0.12 ... 5.12") (angle of positioner shaft 16 ... 90°)
• Angle of rotation range (part-turn actuators)	30 ... 100°
Mounting type	
• On linear actuator	Using mounting kit 6DR4004-8V and where necessary with an additional lever arm 6DR4004-8L on actuators according to IEC 60534-6-1 (NAMUR) with ribs, bars or flat face.
• On part-turn actuator	Using mounting kit 6DR4004-8D on actuators with mounting plane according to VDI/VDE 3845 and IEC 60534-6-2: The necessary mounting console is fitted on the actuator side.
Material	
• Enclosure	
- 6DR5**0-*** (Makrolon)	Glass-fiber reinforced polycarbonate (PC)
- 6DR5**1-*** (aluminium)	GD AlSi12
- 6DR5**2-*** (stainless steel)	Austenitic stainless steel mat. No. 1.4581
- 6DR5**5-*** (aluminium, flameproof)	GK AlSi12
• Pressure gauge block	Aluminium AlMgSi, anodized
Weight, basic device	
• Glass-fiber reinforced enclosure made from polycarbonate	Approx. 0.9 kg (1.98 lb)
• Aluminum enclosure	Approx. 1.3 kg (2.86 lb)
• Stainless steel enclosure	Approx. 3.9 kg (8.6 lb)
• Pressure-proof aluminum enclosure	Approx. 5.2 kg (11.46 lb)
Dimensions	See dimensional drawings on page 6/34
Device versions	
• In Makrolon enclosure	Single-acting and double-acting
• In aluminum enclosure	single-acting
• Im flameproof aluminium enclosure	Single-acting and double-acting
• In stainless steel enclosure	Single-acting and double-acting
Gauge	
• Degree of protection	
- Gauge made of plastic	IP31
- Gauge made of steel	IP44
- Gauge made of stainless steel 316	IP54
• Vibration resistance	According to EN 837-1
Controller	
Controller unit	
• Five-point switch	Self-adjusting
• Deadband	
- dEbA = Auto	Self-adjusting or can be set as fixed value
- dEbA = 0.1 … 10 %	Self-adjusting or can be set as fixed value

Technical specifications

Analog-to-digital converter	
• Scan time	10 ms
• Resolution	≤ 0,05 %
• Transmission error	≤ 0,2 %
• Temperature influence effect	≤ 0.1 %/10 K (≤ 0.1 %/18 °F)
Cycle time	
• 20 mA/HART device	20 ms
• PA device	60 ms
• FF device	60 ms (min. loop time)
Certificates and approvals	
Classification according to Pressure Equipment Directive (PED 97/23/EC)	For gases of fluid group 1, complies with requirements of article 3, paragraph 3 (sound engineering practice SEP)
CE marking	The designated product matches the versions launched onto the market by us with the relevant European guidelines in accordance with the EC Declaration of Conformity.
EMC requirements	See EC Declaration of Conformity on the internet or included with the product.

1) Max. impact energy 1 Joule for enclosure with inspection window.

2) During commissioning at ≤ 0 °C (≤ 32 °F) make sure that the positioner is operated for long enough with dry pneumatic power supply.

3) At ≤ -10 °C (≤ 14 °F) the display refresh rate of the indicator is limited.

4) -20 ... +80 °C (-4 ... + 176 °F) for 6DR55..-0G..., 6DR56..-0G..., 6DR55..-0D... and 6DR56..-0D...

5) With Ex d version (6DR5..5-…) values reduced by approx. 20 %.

SIPART PS2 with and without HART

	Basic device without Ex protection	Basic device with Ex d protection (flameproof enclosure)	Basic device with Ex i explosion protection	Basic device with Ex protection Ex ic/Ex nL/ Ex nA/Ex tD
Input				
2-wire connection (terminals 6/8)				
Rated signal range		4 … 20 mA		
Current to maintain the auxiliary power supply		≥ 3.6 mA		
Required load voltage U_B (corresponds to Ω at 20mA)				
• Without HART (6DR50..)				
- Typical	6.36 V (= 318 Ω)	6.36 V (= 318 Ω)	7.8 V (= 390 Ω)	7.8 V (= 390 Ω)
- max.	6.48 V (= 324 Ω)	6.48 V (= 324 Ω)	8.3 V (= 415 Ω)	8.3 V (= 415 Ω)
• Without HART (6DR53..)				
- Typical	7.9 V (= 395 Ω)	-	-	-
- max.	8.4 V (= 420 Ω)	-	-	-
• With HART (6DR51..)				
- Typical	6.6 V (= 330 Ω)	6.6 V (= 330 Ω)	-	-
- max.	6.72 V (= 336 Ω)	6.72 V (= 336 Ω)	-	-
• With HART (6DR52..)				
- Typical	-	8.4 V (= 420 Ω)	8.4 V (= 420 Ω)	8.4 V (= 420 Ω)
- max.	-	8.8 V (= 440 Ω)	8.8 V (= 440 Ω)	8.8 V (= 440 Ω)
• Static destruction limit	±40 mA	±40 mA	-	-
Maximum internal capacitance C_i				
• Without HART	-	-	22 nF	22 nF (at "nL")
• With HART	-	-	7 nF	7 nF (at "nL")
Maximum internal inductance L_i				
• Without HART	-	-	0.12 mH	0.12 mH (at "nL")
• With HART	-	-	0.24 mH	0.24 mH (at "nL")
For connecting to circuits with the following peak values	-	-	Intrinsically safe U_i = 30 V I_i = 100 mA P_i = 1 W	At "nA" and "tD": U_n = 30 V DC I_n = 100 mA at "nL": U_i = 30 V I_n = 100 mA
Test voltage		840 V DC, 1 s		
Binary input BE1 (terminals 9/10; electrically connected to the basic device)		Suitable only for floating contact; max. contact load < 5 µA at 3 V		
3-/4-wire device (terminals 2/4 and 6/8) (6DR52.. and 6DR53..)				
Power supply U_H	18 ... 35 V DC	18 ... 35 V DC	18 ... 30 V DC	18 ... 30 V DC
Current consumption I_H		(U_H -7.5 V)/2.4 kΩ [mA]		
Maximum internal capacitance C_i	-	-	22 nF	22 nF (at "nL")
Maximum internal inductance L_i	-	-	0.12 mH	0.12 mH (at "nL")
For connecting to circuits with the following peak values	-	-	Intrinsically safe U_i = 30 V DC I_i = 100 mA Pi = 1 W	At "nA" and "tD": U_n = 30 V DC I_n = 100 mA at "nL": U_i = 30 V DC I_i = 100 mA

Technical specifications

	Basic device without Ex protection	Basic device with Ex d protection (flameproof enclosure)	Basic device with Ex i explosion protection	Basic device with Ex protection Ex ic/Ex nL/ Ex nA/Ex tD
Current input I_W				
• Rated signal range		0/4 ... 20 mA		
• Load voltage at 20 mA	≤ 0.2 V (= 10 Ω)	≤ 0.2 V (= 10 Ω)	≤ 1 V (= 50 Ω)	≤ 1 V (= 50 Ω)
• Maximum internal capacitance C_i	-	-	22 nF	22 nF (at "nL")
• Maximum internal inductance L_i	-	-	0.12 mH	0.12 mH (at "nL")
• For connecting to circuits with the following peak values	-	-	Intrinsically safe U_i = 30 V DC Ii = 100 mA P_i = 1 W	At "nA" and "tD": U_n = 30 V DC I_n = 100 mA at "nL": U_i = 30 V DC I_i = 100 mA
Electrical isolation	between U_H and I_W	between U_H and I_W	between U_H and I_W (2 intrinsically safe circuits)	between U_H and I_W
Test voltage		840 V DC, 1 s		
Binary input BE1 (terminals 9/10; electrically connected to the basic device)		Suitable only for floating contact; max. contact load < 5 µA at 3 V		
Design				
Connections, electrical				
• Screw terminals		2.5 AWG28-12		
• Cable gland	M20x1.5 or ½- 14 NPT	Ex d certified cable gland M20x1.5, ½- 14 NPT or M25x1.5	M20x1.5 or ½- 14 NPT	M20x1.5 or ½- 14 NPT
Connections, pneumatic		Female thread G¼ or ¼- 18 NPT		
Certificates, approvals, explosion protection				
Permissible ambient temperature for operation	-30...+80 °C (-22...+176°F)	T4: -30...+80 °C (-22...+176 °F) T5: -30...+65 °C (-22...+149 °F) T6: -30...+50 °C (-22...+122 °F)		
	At ≤ -10 °C (+14°F) the display refresh rate of the indicator is limited. For basic devices with Ex protection the following applies: Only T4 is permissible when using I_y module type 6DR4004-6J.			
Explosion protection as per ATEX/IECEx	-	Zone 1: II 2 G Ex d IIC T6	Zone 1: II 2 G Ex ia IIC T6//4 Gb	Zone 2: II 3 G Ex ic IIC T6/T4 Gc II 3 G Ex nL IIC T6/T4Gc II 3 G Ex nA nL IIC T6/T4 Gc Zone 22: II 3 D Ex tD A22 IP66 T100 °C
Explosion protection according to FM/CSA	-	XP, Class I, Division 1 Class I, Zone 1, Ex d DIP, Class II, Division 1 DIP, Class III	IS, Class I, Division 1 Class I, Division 1, Ex i	NI, Class I, Division 2 Class 1, Zone 2
Mounting location		Zone 1	Zone 1	Zone 2/22

SIPART PS2 with PROFIBUS PA

	Basic device without Ex protection	Basic device with Ex d protection (flameproof enclosure)	Basic device with Ex i explosion protection	Basic device with Ex protection Ex ic/Ex nL/ Ex nA/Ex tD
Input				
Power supply (terminals 6/7)		Bus-supplied		
Bus voltage	9 ... 32 V	9 ... 32 V	9 ... 24 V	9 ... 32 V
• Bus connection with supply unit			Intrinsically safe FISCO	At "nA" and "tD": Un = 32 V DC at "nL": FNICO
- Max. supply voltage U_o	-	-	17.5 V	17.5 V
- Max. short-circuit current I_o	-	-	380 mA	570 mA
- Max. power P_o	-	-	5.32 W	-
• Bus connection with barrier			Intrinsically safe	at "nL"
- Max. supply voltage U_o	-	-	24 V	32 V
- Max. short-circuit current I_o	-	-	250 mA	-
- Max. power P_o	-	-	1.2 W	-
Current consumption		11.5 mA ± 10 %		
Additional error signal		0 mA		
Maximum internal capacitance C_i	-	-	Negligible	Negligible
Maximum internal inductance L_i	-	-	8 µH	8 µH (at "nL")
Safety shutdown can be activated with coding bridge (terminals 81/82; electrically isolated from the basic device)				
• Input resistance		> 20 kΩ		
• Signal state "0" (shutdown active)		0 ... 4.5 V or unconnected		
• Signal state "1" (shutdown not active)		13 ... 30 V		
• Maximum internal capacitance C_i	-	-	Negligible	Negligible
• Maximum internal inductance L_i	-	-	Negligible	Negligible
• For connection to power supply with	-	-	Intrinsically safe	At "nA", "nL" and "tD"
- Max. supply voltage U_i	-	-	30 V	30 V
- Max. short-circuit current I_i	-	-	100 mA	100 mA
- Max. power P_{oi}	-	-	1 W	-
Electrical isolation	Between basic device and the input for safety shutdown, as well as the outputs of the option modules		The basic device and the input to the safety shutdown, as well as the outputs of the option modules, are separate, intrinsically safe circuits.	Between basic device and the input for safety shutdown, as well as the outputs of the option modules
Test voltage		840 V DC, 1 s		
Binary input BE1 for PROFIBUS (terminals 9/10; electrically connected to the basic device)		Suitable only for floating contact; max. contact load < 5 µA at 3 V		
Design				
Connections, electrical				
• Screw terminals		2.5 AWG28-12		
• Cable gland	M20x1.5 or ½-14 NPT	Ex d certified cable gland M20x1.5; ½-14 NPT or M25x1.5	M20x1.5 or ½-14 NPT	M20x1.5 or ½-14 NPT
Connections, pneumatic		Female thread G¼ or ¼- -18 NPT		

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Technical specifications

	Basic device without Ex protection	Basic device with Ex d protection (flameproof enclosure)	Basic device with Ex i explosion protection	Basic device with Ex protection Ex ic/Ex nL/ Ex nA/Ex tD
Certificates, approvals, explosion protection				
Permissible ambient temperature for operation	-30 ... +80 °C (-22 ... +176 °F)	T4: -30 ... +80 °C (-22 ... +176 °F) T5: -30 ... +65 °C (-22 ... +149 °F) T6: -30 ... +50 °C (-22 ... +122 °F)		T4: -20 ... +75 (-4 ... +75.00) T6: -20 ... +50 °C (-4 ... +122 °F)
	At ≤ -10 °C (+14°F) the display refresh rate of the indicator is limited. For basic devices with Ex protection the following applies: Only T4 is permissible when using I_y module type 6DR4004-6J.			
Explosion protection as per ATEX/IECEx	-	Zone 1: II 2 G Ex d IIC T6	Zone 1: II 2 G Ex ia IIC T6/4 Gb	Zone 2: II 3 G Ex ic IIC T6/T4 Gc II 3 G Ex nL IIC T6/T4Gc II 3 G Ex nA nL IIC T6/T4 Gc Zone 22: II 3 D Ex tD A22 IP66 T100 °C
Explosion protection according to FM/CSA	-	XP, Class I, Division 1 Class I, Zone 1, Ex d DIP, Class II, Division 1 DIP, Class III	IS, Class I, Division 1 Class I, Division 1, Ex i	NI, Class I, Division 2 Class 1, Zone 2
Mounting location		Zone 1	Zone 1	Zone 2/22
Communication				
Communication	Layers 1 and +2 according to PROFIBUS PA, transmission technology according to IEC 61158-2; slave function; layer 7 (protocol layer) according to PROFIBUS DP, EN 50170 standard with the extended PROFIBUS functions (all data acyclic, manipulated variable, feedbacks and status also cyclic)			
C2 connections	Four connections to master class 2 are supported; automatic connection setup 60 s after break in communication			
Device profile	PROFIBUS PA profile B, version 3.0, more than 150 objects			
Response time to master message	Typically 10 ms			
Device address	126 (when delivered)			
PC parameterizing software	SIMATIC PDM; supports all device objects. The software is not included in the scope of delivery.			

SIPART PS2 with FOUNDATION Fieldbus

	Basic device without Ex protection	Basic device with Ex d protection (flameproof enclosure)	Basic device with Ex i explosion protection	Basic device with Ex protection Ex ic/Ex nL/ Ex nA/Ex tD
Input				
Power supply (terminals 6/7)		Bus-supplied		
Bus voltage	9 ... 32 V	9 ... 32 V	9 ... 24 V	9 ... 32 V
• Bus connection with supply unit			Intrinsically safe FISCO	At "nA" and "tD": U_n = 32 V DC at "nL": FNICO
- Max. supply voltage U_o	-	-	17.5 V	17.5 V
- Max. short-circuit current I_o	-	-	380 mA	570 mA
- Max. power P_o	-	-	5.32 W	-
• Bus connection with barrier			Intrinsically safe	at "nL"
- Max. supply voltage U_o	-	-	24 V	32 V
- Max. short-circuit current I_o	-	-	250 mA	-
- Max. power P_o	-	-	1.2 W	-
Current consumption		11.5 mA ± 10 %		
Additional error signal		0 mA		
Maximum internal capacitance C_i	-	-	Negligible	Negligible
Maximum internal inductance L_i	-	-	8 µH	8 µH (at "nL")
Safety shutdown can be activated with coding bridge (terminals 81/82; electrically isolated from the basic device)				
• Input resistance		> 20 kΩ		
• Signal state "0" (shutdown active)		0 ... 4.5 V or unconnected		
• Signal state "1" (shutdown not active)		13 ... 30 V		
• Maximum internal capacitance C_i	-	-	Negligible	Negligible
• Maximum internal inductance L_i	-	-	Negligible	Negligible
• For connection to power supply with	-	-	Intrinsically safe	At "nA", "nL" and "tD"
- Max. supply voltage U_i	-	-	30 V	30 V
- Max. short-circuit current I_i	-	-	100 mA	100 mA
- Max. power P_{oi}	-	-	1 W	-
Electrical isolation	Between basic device and the input for safety shutdown, as well as the outputs of the option modules		The basic device and the input to the safety shutdown, as well as the outputs of the option modules, are separate, intrinsically safe circuits.	Between basic device and the input for safety shutdown, as well as the outputs of the option modules
Test voltage		840 V DC, 1 s		
Design				
Connections, electrical				
• Screw terminals		2.5 AWG28-12		
• Cable gland	M20x1.5 or ½-14 NPT	Ex d certified cable gland M20x1.5, ½-14 NPT or M25x1.5	M20x1.5 or ½-14 NPT	M20x1.5 or ½-14 NPT
Connections, pneumatic		Female thread G¼ or ¼- -18 NPT		

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Technical specifications

	Basic device without Ex protection	Basic device with Ex d protection (flameproof enclosure)	Basic device with Ex i explosion protection	Basic device with Ex protection Ex ic/Ex nL/ Ex nA/Ex tD
Certificates, approvals, explosion protection				
Permissible ambient temperature for operation	-30 ... +80 °C (-22 ... +176 °F)	T4: -30 … +80 °C (-22 … +176 °F) T5: -30 … +65 °C (-22 … +149 °F) T6: -30 … +50 °C (-22 … +122 °F)		T4: -20 … +75 (-4 … +75.00) T6: -20 … +50 °C (-4 … +122 °F)
	At ≤ -10 °C (+14°F) the display refresh rate of the indicator is limited. For basic devices with Ex protection the following applies: Only T4 is permissible when using Iy module type 6DR4004-6J.			
Explosion protection as per ATEX/IECEx	-	Zone 1: II 2 G Ex d IIC T6	Zone 1: II 2 G Ex ia IIC T6/4 Gb	Zone 2: II 3 G Ex ic IIC T6/T4 Gc II 3 G Ex nL IIC T6/T4Gc II 3 G Ex nA nL IIC T6/T4 Gc Zone 22: II 3 D Ex tD A22 IP66 T100 °C
Explosion protection according to FM/CSA	-	XP, Class I, Division 1 Class I, Zone 1, Ex d DIP, Class II, Division 1 DIP, Class III	IS, Class I, Division 1 Class I, Division 1, Ex i	NI, Class I, Division 2 Class 1, Zone 2
Mounting location		Zone 1	Zone 1	Zone 2/22
Communication				
Communications group and class	According to technical specification of the Fieldbus Foundation for H1 communication			
Function blocks	Group 3, Class 31PS (Publisher Subscriber) 1 Resource Block (RB2) 1 Analog Output Function Block (AO) 1 PID Function Block (PID) 1 Transducer Block (Standard Advanced Positioner Valve)			
Execution times of the blocks	AO: 60 ms PID: 80 ms			
Physical layer profile	123, 511			
FF registration	Tested with ITK 5.0			
Device address	22 (when delivered)			

Technical specifications for option modules

	Without Ex protection/with Ex protection Ex d	With Ex n protection Ex i	With Ex protection Ex ic/Ex nL/ Ex nA/Ex tD
Certificates, approvals, explosion protection			
Explosion protection as per ATEX/IECEx	-	Zone 1: II 2 G Ex ia IIC T6/T4 Gb	Zone 2: II 3 G Ex ic IIC T6/T4 Gc II 3 G Ex nL IIC T6/T4 Gc II 3 G Ex nA nL IIC T6/T4 Gc Zone 22: II 3 D Ex tD A22 IP66 T100°C
Explosion protection according to FM/CSA		IS, Class I, Division 1 Class I, Division 1, Ex i	NI, Class I Division 2 Class I Zone 2
Mounting location	-	Zone 1	Zone 2/22
Permissible ambient temperature for operation	-30 ... +80 °C (-22 ... +176 °F)	T4: -30 ... +80 (-22 ... +80.00) T6: -30 ... +50 °C (-22 ... +122 °F) ly module type 6DR4004-6J must only be used in T4.	
Alarm module	6DR4004-8A	6DR4004-6A	6DR4004-6A
Binary alarm outputs A1, A2 and alarm output			
• Signal state			
- High (not activated)	Conductive, R = 1 kΩ, +3/-1 % *)	≥ 2.1 mA	≥ 2.1 mA
- Low *) (activated)	Blocked, I_R < 60 µA	≤ 1.2 mA	≤ 1.2 mA
*) Low is also the status when the basic device is faulty or is without additional electrical power supply.	*) When used in the flameproof enclosure the current consumption must be limited to 10 mA per output.	Switching threshold with supply to EN 60947-5-6: U_H = 8.2 V, R_i = 1 kΩ	Switching threshold with supply to EN 60947-5-6: U_H = 8.2 V, R_i = 1 kΩ
• Effective internal capacitance C_i	-	5.2 nF	5.2 nF (at "nL")
• Effective internal inductance Li	-	Negligible	Negligible
• Power supply U_H	≤ 35 V	-	-
• Connecting to circuits with the following peak values	-	Intrinsically safe switching amplifier to EN 60947-5-6 U_i = 15.5 V DC I_i = 25 mA P_i = 64 mW	At "nA" and "tD": U_H = 15.5 V DC at "nL": Ui $_i$ = 15.5 V DC I $_i$ = 25 mA
Binary input BE2			
• Electrically connected to the basic device			
- Signal state 0		Floating contact, open	
- Signal state 1		Floating contact, closed	
- Contact load		3 V, 5 µA	
• Electrically isolated from the basic device			
- Signal state 0		≤ 4.5 V or open	
- Signal state 1		≥ 13 V	
- Natural resistance		≥ 25 kΩ	
• Static destruction limit	± 35 V	-	-
• Effective internal inductance and capacitance	-	Negligible	Negligible
• Connecting to circuits with the following peak values	-	Intrinsically safe U_i = 25.2 V	At "nA" and "tD": U_n = 25.2 V DC at "nL": U_i = 25.2 V DC
Electrical isolation	The 3 outputs, the input BE2 and the basic device are electrically isolated from each other		
Test voltage	840 V DC, 1 s		

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Technical specifications

	Without Ex protection/with Ex protection Ex d	With Ex n protection Ex i	With Ex protection Ex ic/Ex nL/ Ex nA/Ex tD
I_y module	6DR4004-8J	6DR4004-6J	6DR4004-6J
DC output for position feedback		2-wire connection	
Rated signal range		4 ... 20 mA, short-circuit proof	
Total operating range		3.6 … 20.5 mA	
Power supply U_H	+12 … +35 V	+12 … +30 V	+12 … +30 V
External loads R_B [kΩ]	≤ (U_H [V] – 12 V)/i [mA]		
Transmission error		≤ 0,3 %	
Temperature influence effect		≤ 0.1 %/10 K (≤ 0.1 %/18 °F)	
Resolution		≤ 0,1 %	
Residual ripple		≤ 1 %	
Maximum internal capacitance C_i	-	11 nF	11 nF (at "nL")
Maximum internal inductance L_i	-	Negligible	Negligible
For connecting to circuits with the following peak values		Intrinsically safe U_i = 30 V DC I_i = 100 mA P_i = 1 W (T4 only)	At "nA" and "tD": U_n = 30 V DC I_n = 100 mA P_n = 1 W (T4 only) at "nL": U_i = 30 V DC I_i = 100 mA
Electrical isolation	Electrically isolated from the basic device		
Test voltage	840 V DC, 1 s		

	Without Ex protection	With Ex n protection Ex i	With Ex protection Ex ic/Ex nL/ Ex nA/Ex tD
SIA module	6DR4004-8G	6DR4004-6G	6DR4004-6G
Limit transmitter with slot-type initiators and alarm output			
Limit transmitter A1, A2	2-wire connection		
• Connection	2-wire system to EN 60947-5-6 (NAMUR), for switching amplifier to be connected on load side		
• Signal state Low (activated)	< 1.2 mA		
• 2 slot-type initiators	Type SJ2-SN		
• Function	NC (normally closed)		
• Effective internal capacitance C_i	-	41 nF	41 nF (at "nL")
• Effective internal inductance L_i	-	100 µH	100 µH (at "nL")
• Connecting to circuits with the following peak values	Rated voltage 8 V current consumption: ≥ 3 mA (limit value not responded), ≤ 1 mA (limit value responded)	Intrinsically safe switching amplifier EN 60947-5-6 U_i = 15.5 V DC I_i = 25 mA P_i = 64 mW	At "nA" and "tD": U_n = DC 15.5 V P_n = 64 mW at "nL": U_i = DC 15.5 V I_i = 25 mA
Alarm output			
• Connection	On switching amplifier according to EN 60947-5-6: (NAMUR), U_H = 8.2 V, R_i = 1 kΩ).		
• Signal state High (not activated)	R = 1.1 kΩ	> 2.1 mA	> 2.1 mA
• Signal state Low (activated)	R = 10 kΩ	< 1.2 mA	< 1.2 mA
• Effective internal capacitance C_i	-	≤ 5.2 nF	≤ 5.2 nF
• Effective internal inductance L_i	-	Negligible	Negligible
• Power supply U_H	U_H ≤ 35 V DC I ≤ 20 mA	-	-
• Connecting to circuits with the following peak values	-	Intrinsically safe switching amplifier EN 60947-5-6 Ui_i = 15.5 V DC I_i = 25 mA P_i = 64 mW	At "nA" and "tD": U_n = 15.5 V DC at "nL": U_i = 15.5 V DC I_i = 25 mA
Electrical isolation	The 3 outputs are electrically isolated from the basic device.		
Test voltage	840 V DC, 1 s		
Limit value contact module	6DR4004-8K	6DR4004-6K	6DR4004-6K
Limit transmitter with mechanical switching contacts			
• Max. switching current AC/DC	4 A	Connecting to intrinsically safe circuits with the following peak values: U_i = 30 V I_i = 100 mA P_i = 750 mW	Connecting to intrinsically safe circuits with the following peak values: at "nL": U_i = 30 V I_i = 100 mA
• Max. switching voltage AC/DC	250 V/24 V	30 V DC	30 V DC
• Maximum internal capacitance C_i	-	Negligible	Negligible
• Maximum internal inductance L_i	-	Negligible	Negligible
Alarm output			
• Connection	On switching amplifier according to EN 60947-5-6: (NAMUR), U_H = 8.2 V, R_i = 1 kΩ).		-
• Signal state High (not activated)	R = 1.1 kΩ	> 2.1 mA	> 2.1 mA
• Signal state Low (activated)	R = 10 kΩ	< 1.2 mA	< 1.2 mA
• Maximum internal capacitance C_i	-	≤ 5.2 nF	≤ 5.2 nF (at "nL")
• Maximum internal inductance L_i	-	Negligible	Negligible
• Power supply U_H	U_H ≤ 35 V DC I ≤ 20 mA	-	-
• Connecting to circuits with the following peak values	-	Intrinsically safe switching amplifier EN 60947-5-6 U_i = 15.5 V DC I_i = 25 mA P_i = 64 mW	At "nA" and "tD": U_n = 15.5 V DC at "nL": U_i = 15.5 V DC I_i = 25 mA

Technical specifications

	Without Ex protection	With Ex n protection Ex i	With Ex protection Ex ic/Ex nL/ Ex nA/Ex tD
EMC filter module			
EMC filter module is required for NCS sensor or external potentiometer.			
External position sensor (potentiometer or NCS; as option) with the following peak values:			
• Maximum output voltage (U_o)	-	5 V	5 V
• Maximum output current static (I_o)	-	75 mA	75 mA
• Maximum output current short-term (I_s)	-	160 mA	-
• Maximum output power (P_o)	-	120 mW	120 mW
• Maximum external capacitance C_o	-	1 µF	1 µF
• Maximum external inductance L_o	-	1 mH	1 mH
Test voltage	840 V DC, 1 s		
NCS sensor			
Position range			
• Linear actuator	3 ... 130 mm (0.12 ... 5.12"); up to 200 mm (7.87") on request		
• Part-turn actuator	30° ... 100°		
Linearity (after correction by positioner)			
• Linear actuator	± 1 %		
• Part-turn actuator	± 1 %		
Hysteresis	± 0,2 %		
Continuous working temperature	-40 °C ... +85 °C (-40 °F ... +185 °F), extended temperature range on request		
Vibration resistance			
• Harmonic oscillations (sine-wave) according to EN 60068-2-6/05.96	7 mm (0.28"), 5 ... 54 Hz; 500 m/s2 (1640 ft/s2), 80 ... 200 Hz		
Degree of protection of enclosure	IP68/NEMA 4X		
For connecting to circuits with the following peak values	-	Intrinsically safe U_i = 5 V DC	at "nL": U_i = 5 V DC
Maximum internal capacitance C_i	-	10 nF	10 nF (at "nL")
Maximum internal inductance L_i	-	240 µH	240 µH (at "nL")

Selection and Ordering data	Order No.														
SIPART PS2 electropneumatic positioner, without Ex protection, with "Ex i" and with "Ex n"	6	D	R	5			-	0			-			A	
Version															
2-wire (4 to 20 mA)															
• Without HART ▶				0											
• With HART, not explosion-protected ▶				1											
2-, 3-, 4-wire (0/4 to 20 mA)															
• With HART, explosion-protected ▶				2											
• Without HART, not explosion-protected ▶				3											
PROFIBUS PA connection ▶				5											
FOUNDATION Fieldbus connection ▶				6											
For actuator															
single-acting ▶					1										
double-acting ▶					2										
Enclosure															
Makrolon ▶						0									
Aluminum; only single-acting ▶					1	1									
Stainless steel (without window) ▶						2									
Explosion protection															
Without ▶								N							
In type of protection (ATEX/IECEx/FM/CSA) ▶								E							
• intrinsic safety "Ex ia", zone 1															
In type of protection (ATEX/IECEx/FM/CSA) [1]								D							
• non-sparking "Ex nA", zone 2															
• energy-limited "Ex nL", zone 2															
In type of protection (ATEX/IECEx)															
• dust protection via enclosure "Ex tD", zone 22															
In type of protection (ATEX/IECEx/FM/CSA) [2] [3]								F							
• intrinsic safety "Ex ia", zone 1															
• intrinsic safety "Ex ic", zone 2															
• non-sparking "Ex nA", zone 2															
• energy-limited "Ex nL", zone 2															
In type of protection (ATEX/IECEx/FM/CSA) [2]								G							
• non-sparking "Ex nA", zone 2															
• energy-limited "Ex nL", zone 2															
In type of protection (ATEX/IECEx/FM/CSA) [1] [3]								K							
• intrinsic safety "Ex ia", zone 1															
• intrinsic safety "Ex ic", zone 2															
• non-sparking "Ex nA", zone 2															
• energy-limited "Ex nL", zone 2															
In type of protection (ATEX/IECEx)															
• dust protection via enclosure "Ex tD", zone 22															
Connection thread electrical/pneumatic															
M20 x 1.5 / G¼ ▶								G							
½-14 NPT / ¼-18 NPT [4]								N							
M20 x 1.5 / ¼-18 NPT								M							
½-14 NPT / G¼ [1]								P							
With plug M12 / G¼								R							
With plug M12 / ¼-18 NPT								S							
Limit monitor															
Installed, incl. 2nd cable gland															
Without ▶									0						
Alarm module; electronic (6DR4004-.A)									1						
SIA module; slot-type initiators (6DR4004-.G)									2						
Limit value contact module (mechanical switching contacts (6DR4004-.K)									3						

Selection and Ordering data	Order No.														
SIPART PS2 electropneumatic positioner, without Ex protection, with "Ex i" and with "Ex n"	6	D	R	5			-	0			-			A	
Option modules															
Installed, incl. 2nd cable gland															
Without ▶										0					
ly module for position feedback signal (4 ... 20 mA) (6DR4004-.J)										1					
EMC filter module for external position sensor in the SIPART PS2 enclosure (C73451-A430-D23), NCS sensor 6DR4004-8/6NN1/2/30 and external position sensing with non-Siemens potentiometer										2					
ly module and EMC filter module for external position sensor										3					
Customer-specific design															
Without ▶											0				
Brief instructions															
German/English ▶													A		
French/Spanish/Italian													B		
Mounted pressure gauge block															
Without ▶															0
Gauge made of plastic, block made of aluminium, single-acting G¼, scaled in MPa and bar															1
Gauge made of plastic, block made of aluminium, double-acting G¼, scaled in MPa and bar															2
Gauge made of plastic, block made of aluminium, single-acting ¼-18 NPT, scaled in MPa and psi															3
Gauge made of plastic, block made of aluminium, double-acting ¼-18 NPT, scaled in MPa and psi															4
Gauge version with order code R. (see "Further designs")															9

Further designs	Order code
Add "-Z" to Order No. and specify order code.	
Gauge made of steel, block made of aluminium, single-acting G¼, scaled in MPa, bar, psi	**R1A**
Gauge made of steel, Block made of aluminium, double-acting G¼, scaled in MPa, bar, psi	**R2A**
Gauge made of steel, Block made of aluminium, single-acting ¼-18 NPT, scaled in MPa, bar, psi	**R1B**
Gauge made of steel, Block made of aluminium, double-acting ¼-18 NPT, scaled in MPa, bar, psi	**R2B**
Gauge made of stainless steel 316, Block made of stainless steel 316, single-acting G¼, scaled in MPa, bar, psi	**R1C**
Gauge made of stainless steel 316, Block made of stainless steel 316, double-acting G¼, scaled in MPa, bar, psi	**R2C**
Gauge made of stainless steel 316 Block made of stainless steel 316, single-acting ¼-18 NPT, scaled in MPa, bar, psi	**R1D**
Gauge made of stainless steel 316 Block made of stainless steel 316, double-acting ¼-18 NPT, scaled in MPa, bar, psi	**R2D**
Pneumatic terminal block made of stainless steel 316 For device versions in Makrolon enclosure	**K18**
Version with stainless steel sound absorbers Standard with stainless steel enclosure	**A40**

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Selection and Ordering data

Selection and Ordering data	Order No.
SIPART PS2 electropneumatic positioner, without Ex protection, with "Ex i" and with "Ex n"	**6 D R 5 ■ ■ ■ - 0 ■ ■ ■ ■ - ■ ■ A ■**
Measuring point number (TAG No.) Max. 8 characters for HART, max. 32 characters for PROFIBUS PA, FOUNDATION Fieldbus and 4 ... 20 mA, specify in plain text: **Y17: .....**	**Y17**[5]
Measuring point description Max. 16 characters for HART, max. 32 characters for PROFIBUS PA, FOUNDATION Fieldbus and 4 ... 20 mA, specify in plain text: **Y15: .....**	**Y15**[5]
Measuring point text Max. 24 characters for HART, max. 32 characters for PROFIBUS PA, FOUNDATION Fieldbus and 4 ... 20 mA, specify in plain text: **Y16: .....**	**Y16**[5]
TAG plate made of stainless steel, 3-line Text line 1: Plain text from Y17 Text line 2: Plain text from Y15 Text line 3: Plain text from Y16	**A20**[5]
Preset bus address Specify in plain text: **Y25: .....** (only for 6DR55.. and 6DR56..)	**Y25**[5]

► Available ex stock (select combinations)

1) Enclosure: Aluminium or stainless steel, each without inspection window in the cover.

2) Enclosure: Aluminium or Makrolon, each with inspection window in the cover.

3) Available in 01/2011

4) Connection thread, electrical using NPT adapter on Makrolon and aluminum enclosure.

5) Only for Makrolon enclosure, for other enclosures on request.

Selection and Ordering data	Order No.
SIPART PS2 electropneumatic positioner, Ex d explosion protection, aluminum enclosure, without cable gland	6 D R 5 ■■ 5 - 0 E ■■■ - ■■ A ■
Version	
2-wire (4 to 20 mA)	
• Without HART ►	0
• With HART	1
2-, 3-, 4-wire (0/4 to 20 mA)	
• With HART ►	2
• Without HART	3
PROFIBUS PA connection	5
FOUNDATION Fieldbus connection	6
For actuator	
single-acting ►	1
double-acting ►	2
Connection thread electrical/pneumatic	
M20 x 1.5 / G¼ ►	G
½-14 NPT / ¼-18 NPT ►	N
M20 x 1.5 / ¼-18 NPT	M
½-14 NPT / G¼	P
M25x1.5 / G¼	Q
Limit monitor Built-in	
Without ►	0
Alarm module; electronic (6DR4004-8A)	1
Option modules Built-in	
Without ►	0
ly module for position feedback signal (4 ... 20 mA) (6DR4004-8J)	1
Customer-specific design	
Without ►	0
Brief instructions	
German/English ►	A
French/Spanish/Italian	B
Mounted pressure gauge block	
Without ►	0
Gauge made of plastic, block made of aluminium, single-acting G¼, scaled in MPa and bar	1
Gauge made of plastic, block made of aluminium, double-acting G¼, scaled in MPa and bar	2
Gauge made of plastic, block made of aluminium, single-acting ¼-18 NPT, scaled in MPa and psi	3
Gauge made of plastic, block made of aluminium, double-acting ¼-18 NPT, scaled in MPa and psi	4

Selection and Ordering data	Order No.
SIPART PS2 electropneumatic positioner, Ex d explosion protection, aluminum enclosure, without cable gland	6 D R 5 ■■ 5 - 0 E ■■■ - ■■ A ■
Further designs Add "-Z" to Order No. and specify order code.	Order code
Measuring point number (TAG No.) Max. 8 characters for HART, max. 32 characters for PROFIBUS PA and FOUNDATION Fieldbus, specify in plain text: **Y17: .....**	**Y17**[1]
Measuring point description Max. 16 characters for HART, max. 32 characters for PROFIBUS PA and FOUNDATION Fieldbus, specify in plain text: **Y15: .....**	**Y15**[1]
Measuring point text Max. 24 characters for HART, max. 32 characters for PROFIBUS PA and FOUNDATION Fieldbus, specify in plain text: **Y16: .....**	**Y16**[1]
TAG plate made of stainless steel, 3-line Text line 1: Plain text from Y17 Text line 2: Plain text from Y15 Text line 3: Plain text from Y16	**A20**[1]
Preset bus address Specify in plain text: **Y25: .....** only for 6DR55.. and 6DR56..)	**Y25**[1]

► Available ex stock (select combinations)

[1] On request.

6

Selection and Ordering data
Accessories

Selection and Ordering data	Order No.
Accessories	
ly module for position feedback signal (4 to 20 mA)	
• Without explosion protection ▶	**6DR4004-8J**
• With explosion protection CENELEC/ATEX ▶	**6DR4004-6J**
• With explosion protection FM/CSA	**6DR4004-7J**
Alarm module for 3 alarm outputs and 1 binary input (functionality: 2 limit monitors, 1 fault alarm, 1 binary input)	
• Without explosion protection ▶	**6DR4004-8A**
• With explosion protection CENELEC/ATEX ▶	**6DR4004-6A**
• With explosion protection FM/CSA	**6DR4004-7A**
SIA module (slot-type initiator alarm module, not for Ex d version)	
• Without explosion protection ▶	**6DR4004-8G**
• With CENELEC/ATEX and FM/CSA explosion protection ▶	**6DR4004-6G**
Limit value contact module (with mechanical ground contacts, not for Ex d version)	
• Without explosion protection ▶	**6DR4004-8K**
• With explosion protection ▶	**6DR4004-6K**
EMC filter module for connection of external position sensor (10 kΩ) or NCS sensor (not for Ex d version)	**C73451-A430-D23**

Selection and Ordering data	Order No.			
Accessories				
NCS sensor for non-contacting detection of position (not for Ex d version), cable length 6 m (19.68 ft)	6DR4004-	■	NN	■ 0
Non explosion-proof		8		
Explosion protection, Ex i		6		
For part-turn actuators, without mounting console			1	
For linear actuators up to 14 mm (0.55 inch), without mounting bracket			2	
For linear actuators >14 mm (0.55 inch), up to 130 mm (5.12 inch), mounting kit same as for SIPART PS2 (separate ordering item)			3	
The EMC filter module is additionally required for the controller unit (separate ordering item, see below)				

Selection and Ordering data	Order No.
External position detection system (with explosion protection to CENELEC/ATEX, Ex i) for separate mounting of position sensor and controller unit (not for Ex d version), comprising SIPART PS2 Makrolon enclosure with integral potentiometer and sliding clutch (without electronics and valve block)	**C73451-A430-D78**
The EMC filter module is additionally required for the controller unit. (separate ordering item, see above).	
Gauge block with	
2 gauges made of plastic, block made of aluminium, single-acting G¼, scaled in Mpa and bar ▶	**6DR4004-1M**
3 gauges made of plastic, block made of aluminium, double-acting G¼, scaled in Mpa and bar ▶	**6DR4004-2M**
2 gauges made of plastic, block made of aluminium, single-acting G¼-18 NPT, scaled in Mpa and psi ▶	**6DR4004-1MN**
3 gauges made of plastic, block made of aluminium, double-acting G¼-18 NPT, scaled in Mpa and psi ▶	**6DR4004-2MN**
2 gauges made of steel Block made of aluminum, single-acting G¼, scaled in Mpa, bar, ps	**6DR4004-1P**
3 gauges made of steel Block made of aluminum, double-acting G¼, scaled in Mpa, bar, ps	**6DR4004-2P**
2 gauges made of steel Block made of aluminum, single-acting ¼-18 NPT, scaled in Mpa, bar, psi	**6DR4004-1PN**
3 gauges made of steel Block made of aluminum, double-acting ¼-18 NPT, scaled in Mpa, bar, psi	**6DR4004-2PN**
2 gauges made of stainless steel 316 Block made of stainless steel 316, single-acting G¼, scaled in Mpa, bar, psi	**6DR4004-1Q**
3 gauges made of stainless steel 316 Block made of stainless steel 316, double-acting G¼, scaled in Mpa, bar, psi	**6DR4004-2Q**
2 gauges made of stainless steel 316 Block made of stainless steel 316, single-acting ¼-18 NPT, scaled in Mpa, bar, psi	**6DR4004-1QN**
3 gauges made of stainless steel 316 Block made of stainless steel 316, double-acting ¼-18 NPT, scaled in Mpa, bar, psi	**6DR4004-2QN**
Pneumatic terminal block made of stainless steel 316	
to replace the pneumatic terminal block made of aluminium for SIPART PS2 with Makrolon enclosure	
single-acting with G¼	**6DR4004-1R**
double-acting with G¼	**6DR4004-2R**
single-acting with ¼-18 NPT	**6DR4004-1RN**
double-acting with ¼-18 NPT	**6DR4004-2RN**
Mounting kit for NAMUR part-turn actuators	
(VDI/VDE 3845, with plastic coupling wheel, without mounting console) ▶ C)	**6DR4004-8D**
(VDI/VDE 3845, with stainless steel coupling, without mounting console) ▶	**TGX:16300-1556**
The following mounting consoles can be used with the NAMUR part-turn actuator mounting kit 6DR4004-8D. Size W x L x H (H = height of shaft butt)	
• 30 x 80 x 20 mm ▶ C)	**TGX:16152-105**
• 30 x 80 x 30 mm ▶ C)	**TGX:16300-147**
• 30 x 130 x 30 mm ▶ C)	**TGX:16300-149**
• 30 x 130 x 50 mm ▶ C)	**TGX:16300-151**

C) Subject to export regulations AL: N, ECCN: EAR99.

Mounting kit for other part-turn actuators		
The following mounting consoles can be used together with the NAMUR part-turn actuator mounting kit 6DR4004-8D.		
• SPX (DEZURIK) Power Rac, sizes R1, R1A, R2 and R2A	▶ C)	**TGX:16152-328**
• Masoneilan Camflex II	▶ C)	**TGX:16152-350**
• Fisher 1051/1052/1061, sizes 30, 40, 60 to 70	▶ C)	**TGX:16152-364**
• Fisher 1051/1052, size 33	▶ C)	**TGX:16152-348**
Mounting kit for NAMUR-linear actuators		
NAMUR linear actuator mounting kit with short lever arm (2 to 35 mm)	▶	**6DR4004-8V**
• Lever arm for travels from 35 mm to 130 cm (1.38 inch to 5.12 inch)	▶	**6DR4004-8L**
• Reduced mounting kit for linear actuator (like 6DR4004-8V but without fixing angle and U-bolt), with short lever with up to 35 mm travel (1.38 inch)	▶	**6DR4004-8VK**
• Reduced mounting kit for linear actuator (like 6DR4004-8V but without fixing angle and U-bolt), with short lever with up to 35 mm travel (1.38 inch)	▶	**6DR4004-8VL**
• Roll and disk made of stainless steel 316 for replacement of the Teflon roll and aluminum disk in the 6DR4004-8, -8VK and -8VL mounting kits for NAMUR linear actuators		**6DR4004-3N**
• Two terminal blocks made of stainless steel 316 for replacement of the aluminum terminal blocks in the 6DR4004-8V, -8VK and -8VL mounting kits for NAMUR linear actuators		**6DR4004-3M**
Mounting kit for other linear actuators		
• Retrofitting kit for Moore series 72 and 750 valve positioners	▶ C)	**TGX:16152-117**
• Fisher type 657/667, size 30 to 80	▶ C)	**TGX:16152-110**
• Samson actuator type 3277 (yoke dimension (H5) = 101 mm^2 (integrated connection without tube), not for Ex d	▶	**6DR4004-8S**
Connection block, for safety solenoid valve with extended mounting flange to NAMUR		
• For mounting to IEC 534-6	▶	**6DR4004-1B**
• For SAMSON actuator (integrated mounting) see above	▶	**6DR4004-1C**[1)]
Pipe mounting		
Additional actuator components can be found at the following Internet address: www.siemens.de/sipartps2		
Customer-specific mounting kits available on request.		
Mounting bracket for pipe mounting of the SIPART PS2 positioner (e.g. when using the NCS sensor)	▶ C)	**TGX:16152-336**
Documentation (see notes below)		
Instruction Manual SIPART PS2 with and without HART		
• German		**A5E00074630**
• English		**A5E00074631**
• French/Italian/Spanish		**A5E00074601**
Instruction Manual for SIPART PS2 PROFIBUS PA		
• German		**A5E00127924**
• English		**A5E00127926**
• French/Italian/Spanish		**A5E00120717**
Instruction Manual SIPART PS2 FOUNDATION Fieldbus		
• German		**A5E00214568**
• English		**A5E00214569**
• French/Italian/Spanish		**A5E00351420**
Instruction Manual for NCS Sensor		
• German/English/French/Spanish/Italian		**A5E00097485**
SIPART PS2 device documentation		
• CD-ROM with complete documentation for all device versions		**A5E00214567**
SITRANS I200 output isolator HART (see "SITRANS I supply units and isolation amplifiers") with		
• 24 V DC power supply	▶	**7NG4131-0AA00**
HART modem for connecting to PC or laptop		
• with RS232 interface	▶ D)	**7MF4997-1DA**
• with USB interface	▶ D)	**7MF4997-1DB**

▶ Available ex stock.

[1)] Only together with 6DR4004-8S and 6DR4004-1M.

C) Subject to export regulations AL: N, ECCN: EAR99.
D) Subject to export regulations AL: N, ECCN: EAR99H.

Note:

All the above mentioned manuals are included on CD-ROM and can be downloaded from www.siemens.de/sipartps2.

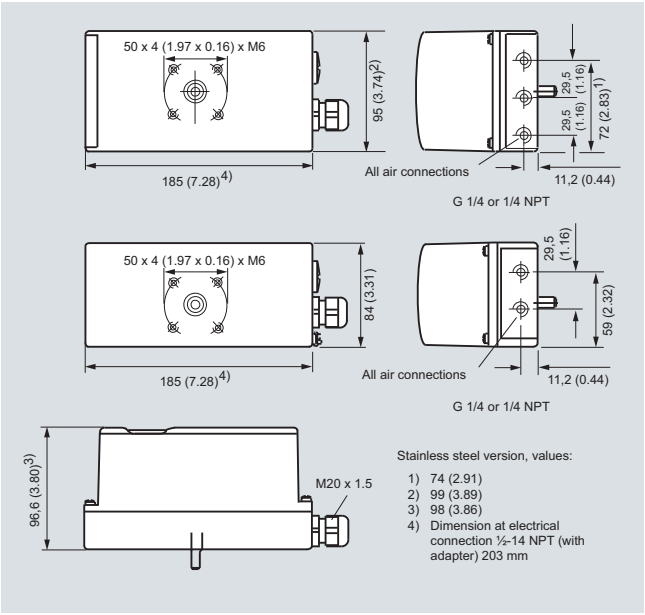
Scope of delivery for positioner

- 1 SIPART PS2 positioner as ordered
- 1 CD-ROM with the complete documentation for all versions and accessories
- Manual "SIPART PS2 - Configuration At a Glance"

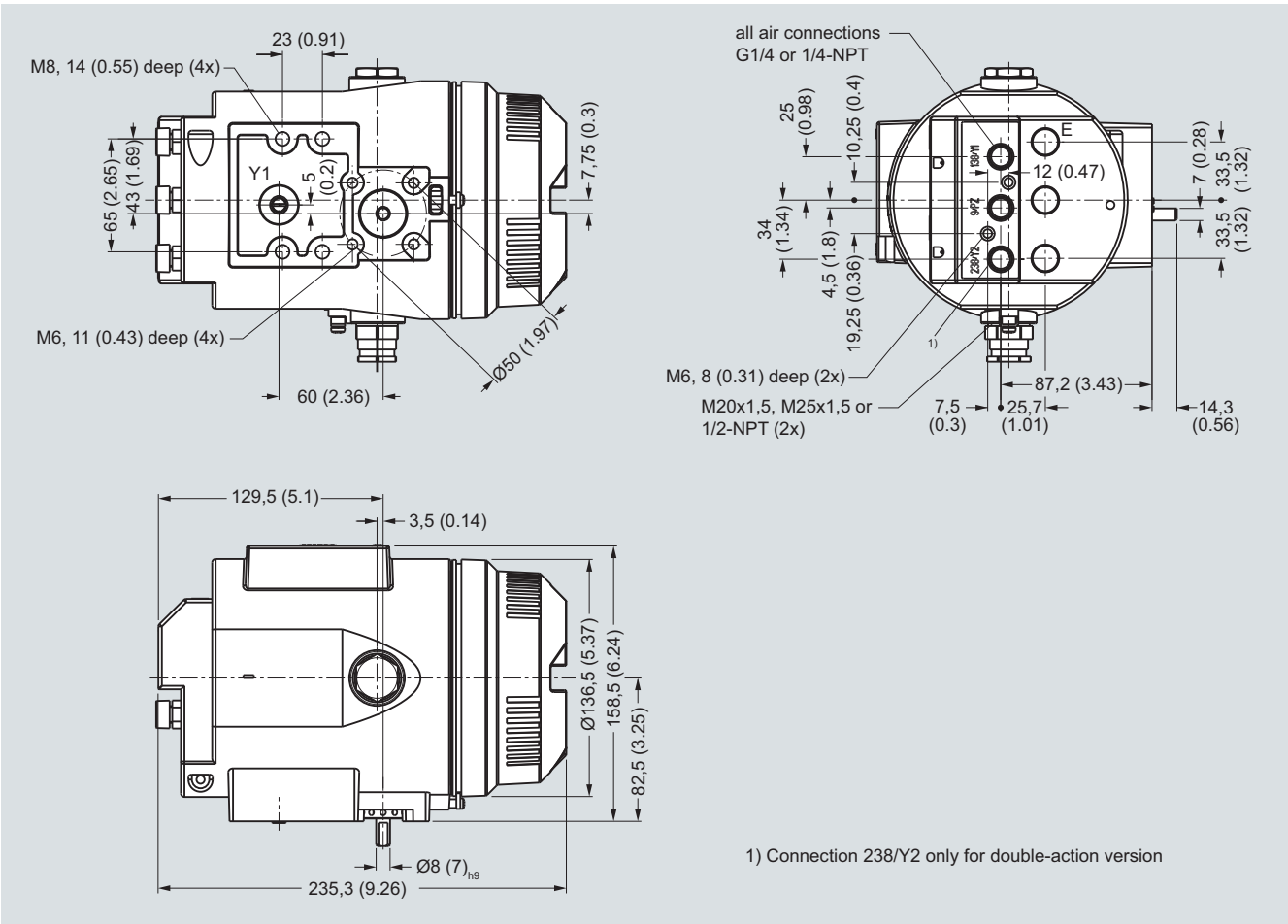
6

Dimensional drawings

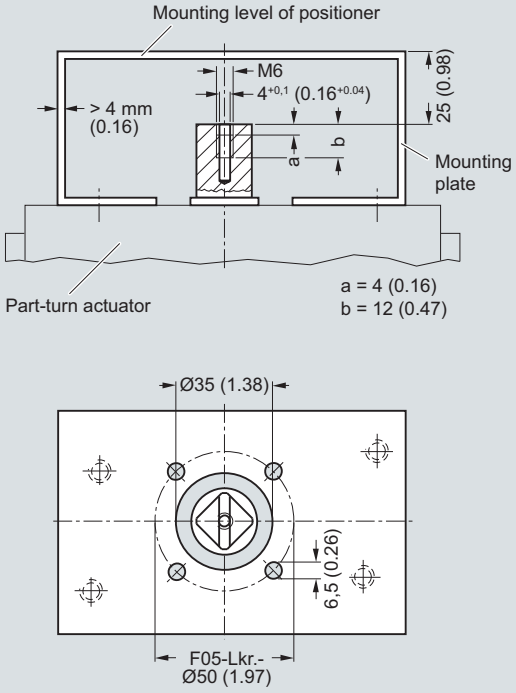
Dimensional drawings



Makrolon and stainless steel enclosure (top), aluminum enclosure (center), Makrolon and aluminum enclosure (bottom), dimensions in mm (inch)



Flameproof enclosure left, dimensions in mm (inch)

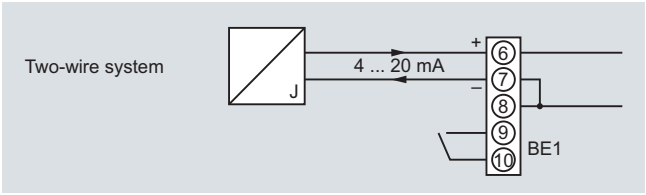


Mounting onto part-turn actuators; mounting consoles (scope of delivery of actuator manufacturer), extract from VDI/VDE 3845, dimensions in mm (inch)

Schematics

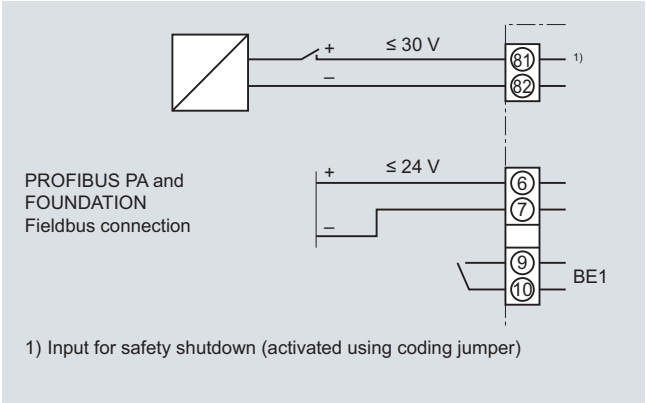
Electric connection of 2-wire devices (6DR50.. and 6DR51..)

Devices of types 6DR50.. and 6DR51.. are operated in a 2-wire system.



SIPART PS2 electropneumatic positioner, input circuit for 6DR50.. and 6DR51..

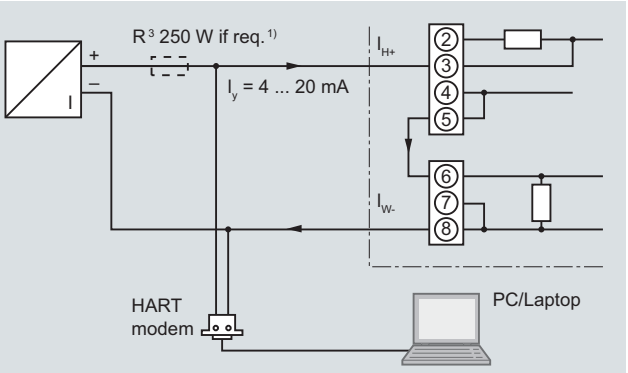
Electric connection of PROFIBUS PA device (6DR55..) and Foundation Fieldbus device (6DR56..)



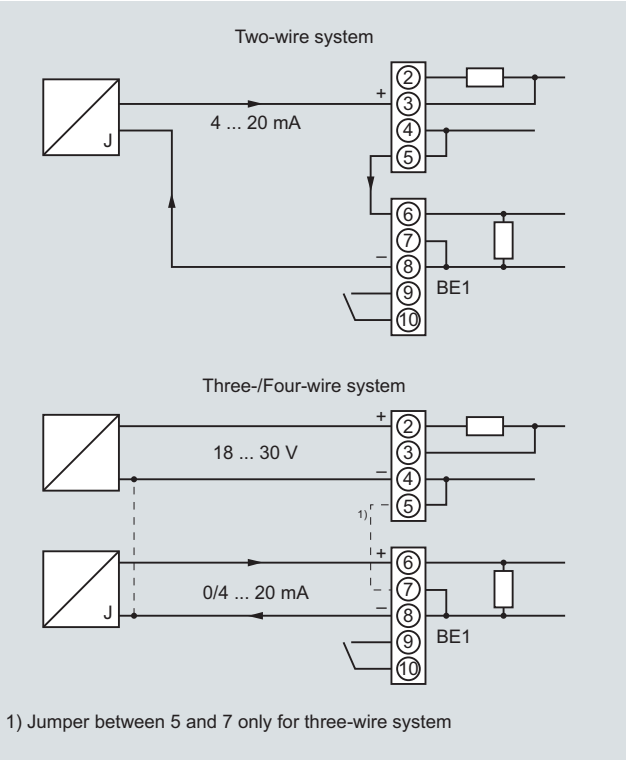
SIPART PS2 PA and SIPART PS2 FF electropneumatic positioner, input circuit for 6DR55.. and 6DR56..

Electric connection of 2-, 3- and 4-wire device (6DR52.. and 6DR53..)

Devices of types 6DR52.. and 6DR53.. can be operated in a 2-, 3- and 4-wire system.



SIPART PS2 electropneumatic positioner, example of connection for communication through HART for 6DR52..



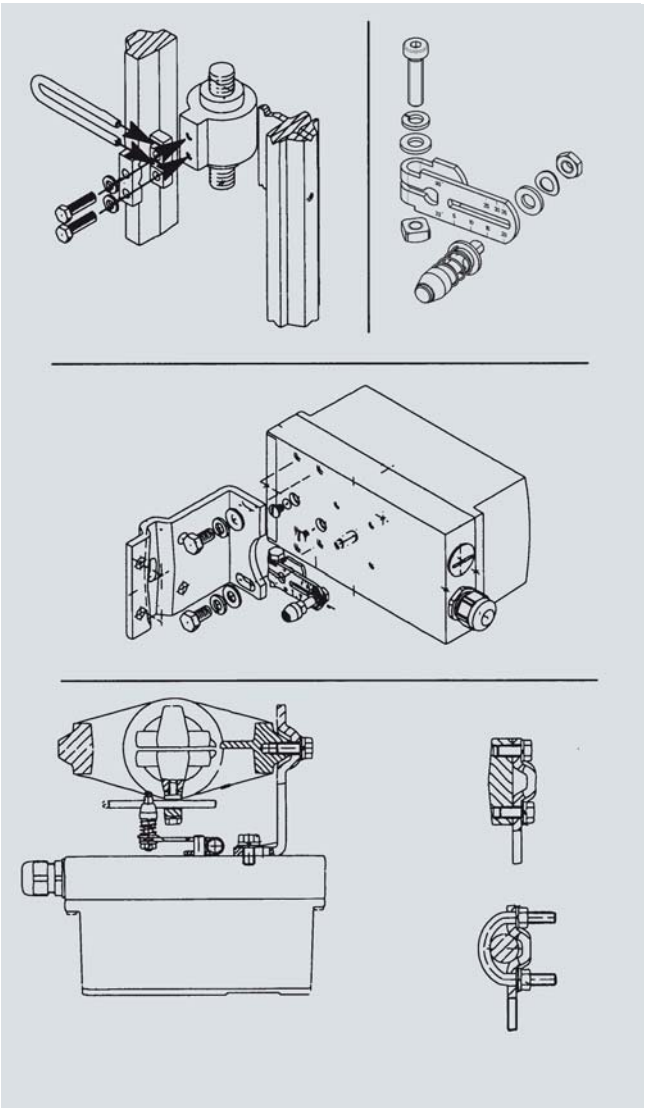
SIPART PS2 electropneumatic positioner, input circuits for 6DR52.. and 6DR53..

6

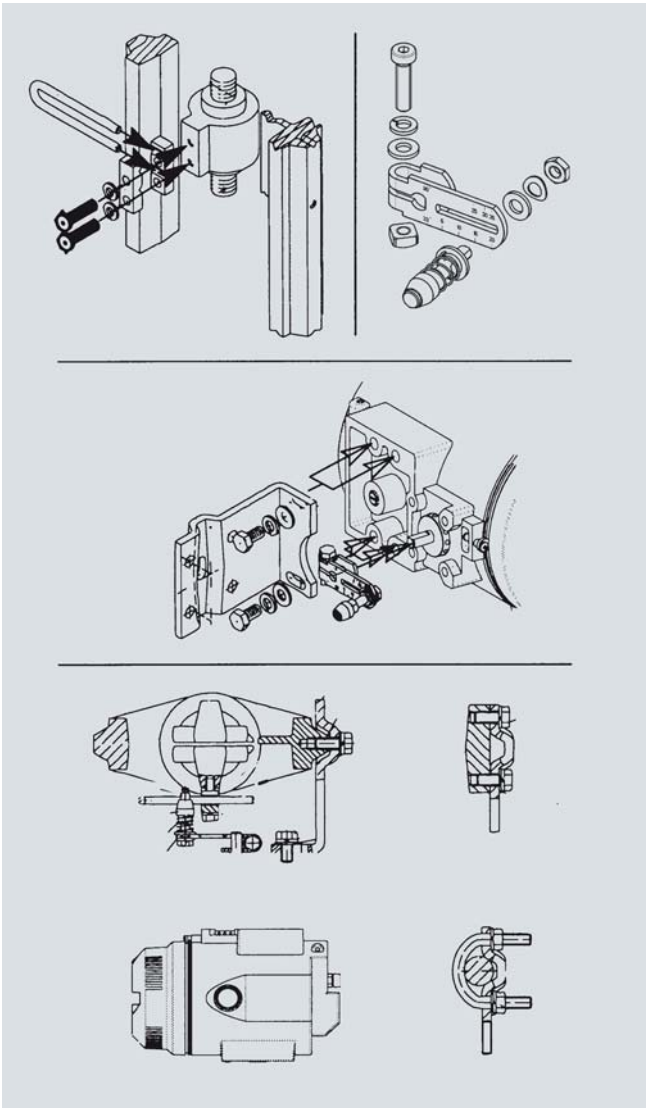
Mounting kit

Mounting kit for NAMUR linear actuators

- 1 mounting bracket
- 2 mounting prisms
- 1 U-bracket
- 1 lever arm with adjustable pick-up roll
- 2 U-bolts
- Various screws and lock washers



Mounting of SIPART PS2 on linear actuators

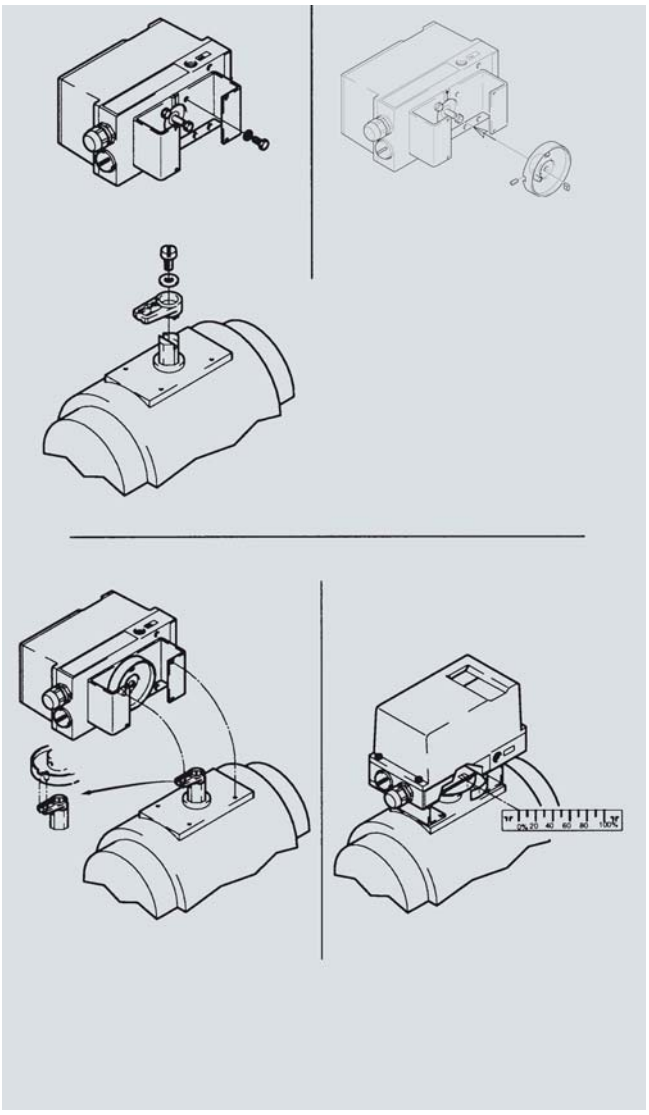


Mounting of SIPART PS2 Ex d on linear actuators

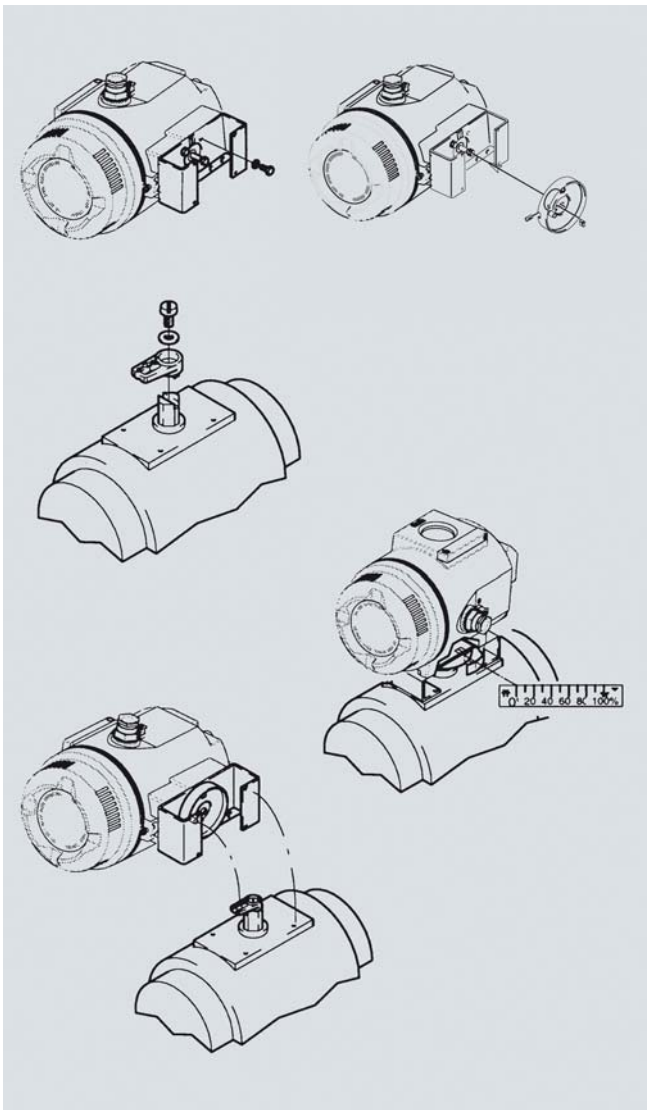
Mounting kit for NAMUR part-turn actuators

- 1 coupling wheel
- 1 driver pin
- 8 scales
- 1 pointer
- Various screws and lock washers

Caution: The mounting consoles and the screws for mounting onto the part-turn actuator are not included in the scope of delivery and must be provided by the customer (see "Technical specifications")



Mounting of SIPART PS2 on part-turn actuators



Mounting of SIPART PS2 Ex d on part-turn actuators

More information

Training

Refer to Catalog ITC for details of training courses for these devices.

Special versions

On request