

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

SIEMENS

6DR5510-0EG00-0AA0

SINGLE ACTING ELECTROPNEUMATIC POSITIONER

Used with the applicable SIPART PS2 PA configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Siemens SIPART PS2 PA Manual A5E00127926-05; dimensional drawing p.45, technical data pp.162 to 164, ordering data pp.168 to 169



**Electropneumatic Positioner
SIPART PS2 PA
6DR55xx**



sipart

SIEMENS

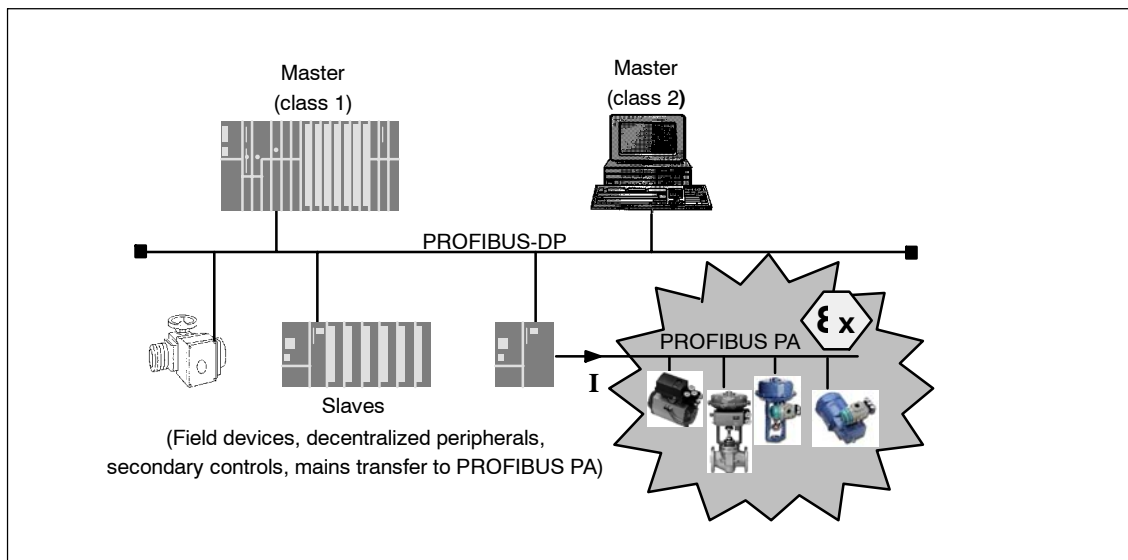


Figure 5 Typical PROFIBUS automation system

Figure 5 shows the section of a typical PROFIBUS automation system. The control system consists of two masters with distributed tasks.

The class 1 master looks after the control and regulation functions, while the class 2 master enables operating and monitoring functions. A cyclic exchange of measuring and setting data takes place between master 1 and the field devices. Parallel to this data, the status data of the field devices is transmitted to and evaluated in the class 1 master. No field device parameters are set or other device information read during cyclic operation.

The information necessary for establishing communication is available to the control system from the stored, device-specific device master data (GS*) files. The files are available on the Internet at:

www.siemens.com/sipartps2

Click on "More Info" and "-> Instructions and Manuals".

One or more class 2 masters can access the field devices acyclically in addition to the cyclic mode. With this communication type further information can be fetched from the devices or settings made in the devices.

1.2.3 Properties of the PROFIBUS PA

The PROFIBUS PA enables bi-directional communication between a bus master and the field devices via a shielded two-wire line. At the same time the power is supplied to the two-wire field devices on the same lines.

Preparing for operation

3

This chapter describes all the preparations necessary for operating the positioner.

3.1 Instrument identification (type key)

The order number of the positioner is printed on the rating plate and on the packaging. Compare this with the order number in chapter 8.1, page 168

Installation of any modules required is described in chapter 2.6, page 31 of this technical manual.

3.2 Dimensional drawings

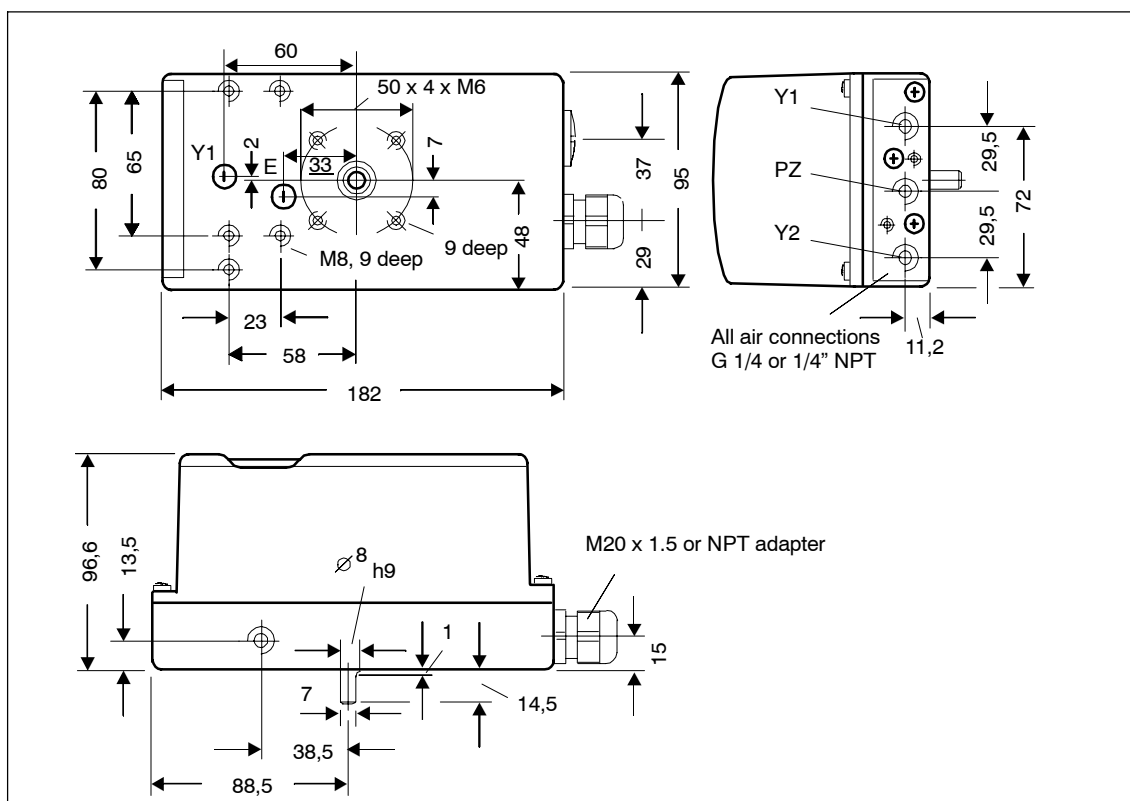


Figure 20 Dimensional drawing version plastic housing 6DR5xx0

Technical specifications

SIPART PS2 (all versions)

General data

Travel range (linear actuators)	3 ... 130 mm (0.12 ... 5.12 inch) (angle of feedback shaft 16 ... 90°)
Angle of rotation (part-turn actuators)	30 ... 100°
Installation	
• On linear actuators	Using attachment set 6DR4004-8V and where necessary with an additional lever arm 6DR4004-8L on actuators according to IEC 534-6 (NAMUR) with ribs, bars or flat face
• On part-turn actuators	Using attachment set 6DR4004-8D on actuators with mounting plane according to VDI/VDE 3845 and DIN 3337: The required mounting console has to be provided on the actuator side; shaft with groove and female thread M6
Controller	
• Five-point switch	Self-adjusting
• Dead zone	
- dEbA = Auto	Self-adjusting or can be set as fixed value
- dEbA = 0.1 ... 10%	Self-adjusting or can be set as fixed value
A/D converter	
• Scan time	10 ms
• Resolution	≤ 0.05%
• Transmission error	≤ 0.2%
• Temperature 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)
Binary input BE1 (terminals 9/10; electrically connected to the basic device)	Suitable only for floating contact; max. contact load < 5 mA with 3 V device)
Degree of protection ¹⁾	IP66 to EN 60 529/NEMA 4x
Mounting position	Any; pneumatic connections and exhaust opening not facing up in wet environment
CE marking	Conformity as regards EMC Directive 89/336 EC in accordance with the following standards
EMC requirements	EN 61326/A1 Appendix A.1 and NAMUR NE21 August 98
Material	
• Housing	
- 6DR5..0-... (plastic)	Glass-fiber-reinforced Macrolon
- 6DR5..1-... (metal)	GD AISi12
- 6DR5..2-... (stainless steel)	Austenitic stainless steel mat. No. 1.4581
- 6DR5..5-... (metal, pressure-proof)	GK AISi12
• Pressure gauge block	Aluminium AIMgSi, anodized
Vibration resistance	
• Harmonic oscillations (sine-wave) according to DIN EN 60062-2-6/05.96	3.5 mm (0.14 inch), 2 ... 27 Hz 3 cycles/axis 98.1 m/s ² (321.84 ft/s ²), 27 ... 300 Hz, 3 cycles/axis

• Bumping (half-sine) to DIN EN 60068-2-29/03.95	150 m/s ² (492 ft/s ²), 6 ms, 1000 shocks/axis
• Noise (digitally controlled) to DIN 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/s ² (≤ 98.4 ft/s ²) without resonance sharpness
Weight, basic device	
• Plastic casing	Approx. 0.9 kg (0.90 kg)
• Metal casing, aluminium	Approx. 1.3 kg (1.30 kg)
• Metal casing, stainless steel	Approx. 3.9 kg (3.90 kg)
• Metal casing EEx d version	Approx. 5.2 kg (11.46 lb)
Dimensions	See Dimensional drawings
Climate class 4	To DIN 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)

Certificate and approvals

Classification according to pressure equipment directive (DRGL 97/23/EC)	For gases of fluid group 1, complies with requirements of article 3, paragraph 3 (sound engineering practice SEP)
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Pneumatic data

Power supply (inlet air)	
• Pressure	1.4 ... 7 bar (20.3 ... 101.5 psi): Sufficiently greater than max. drive pressure (actuating pressure)
Air quality to ISO 8573-1	
• Solid particle size and density	Class 2
• Pressure dew point	Class 2 (min. 20 K (36 °F) below ambient temperature)
• Oil content	Class 2
Unthrottled flow	
• Inlet air valve (ventilate actuator) ⁴⁾	
- 2 bar (29 psi)	4.1 Nm ³ /h (18.1 USgpm)
- 4 bar (58 psi)	7.1 Nm ³ /h (31.3 USgpm)
- 6 bar (87 psi)	9.8 Nm ³ /h (43.1 USgpm)
• Outlet air valve (ventilate actuator) ⁴⁾	
- 2 bar (29 psi)	8.2 Nm ³ /h (36.1 USgpm)
- 4 bar (58 psi)	13.7 Nm ³ /h (60.3 USgpm)
- 6 bar (87 psi)	19.2 Nm ³ /h (84.5 USgpm)
Valve leakage	< 6·10 ⁻⁴ Nm ³ /h (0.0026 USgpm)
Throttle ratio	Adjustable up to ∞ : 1
Power consumption in the controlled state	< 3.6·10 ⁻² Nm ³ /h (0.158 USgpm)
Types of actuators	
• In plastic casing	Single-action and double-action
• In aluminium casing	Single-action
• In flameproof casing	Single-action and double-action
• In stainless steel casing	Single-action and double-action

- 1) Impact energy max. 1 Joule for plastic/aluminium casing.
- 2) During commissioning at ≤ 0 °C (≤ 32 °F) make sure that the valves are flushed long enough with the dry medium.
- 3) At ≤ -10 °C (14 °F) the display refresh rate of the LCD is limited. Only T4 is permissible when using I_y module.
- 4) With EEx d version (6DR5..5-...) the values are reduced by approx. 20%

Technical specifications

SIPART PS2 PA	Basic device without Ex protection	Basic device with EEx-d protection (flameproof casing)	Basic device with EEx ia/ib protection	Basic device with EEx n protection
Explosion protection to EN 50014, EN 50020 and EN 50021	Without	EEx d II 2 G EEx d II C T4/T5/T6	EEx ia/ib II 2 G EEx ia/ib II C T6	EEx n II 3 G EEx nA L [L] II C T6
Mounting location		Zone 1 or zone 2	Zone 1	Zone 2
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 LCD is limited. (for basic devices with Ex protection the following applies: Only T4 is permissible when using I _y module.)				

Electrical data

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 FISCO supply unit, ia or ib group IIC or IIB		—		
- Max. supply voltage U _o	—	—	17.5 V	—
- Max. short-circuit current I _o	—	—	380 mA	—
- Max. power P _o	—	—	5.32 W	—
• Bus connection with barrier, ia or ib group IIC or IIB		—		
- Max. supply voltage (U _o)	—	—	24 V	—
- Max. short-circuit current (I _o)	—	—	250 mA	—
- Max. power P _o	—	—	1.2 W	—
Current consumption	10.5 mA ± 10%	10.5 mA ± 10%	10.5 mA ± 10%	10.5 mA ± 10%
Fault current	0 mA	0 mA	0 mA	0 mA
Effective internal inductance	—	—	L _i ≤ 8 µH	—
Effective internal capacitance	—	—	Negligible	—
Connection	—	—	Certified intrinsically safe circuit	—
Safety shutdown can be activated with coding bridge (terminals 81/82; electrically isolated from the basic device)				
• Input resistance	> 20 kΩ	> 20 kΩ	> 20 kΩ	> 20 kΩ
• Signal status "0" (shutdown active)	0 ... 4.5 V or unused	0 ... 4.5 V or unused	0 ... 4.5 V or unused	0 ... 4.5 V or unused
• Signal status "1" (shutdown not active)	13 ... 30 V	13 ... 30 V	13 ... 30 V	13 ... 30 V
• Effective Internal capacitance C _i	—	—	Negligible	—
• Effective internal inductance L _i	—	—	Negligible	—
• For connection to power supply with	—	—	Intrinsically safe	—
- Max. supply voltage U _i	—	—	< 30 V	< 30 V
- Max. short-circuit current I _i	—	—	< 100 mA	< 100 mA
- Maximum power P _i	—	—	< 1 W	—
Electrical isolation	Between basic device and the input for safety shutdown, as well as the outputs of the option modules	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 individual, 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	840 V DC, 1 s	840 V DC, 1 s	840 V DC, 1 s

SIPART PS2 PA	Basic device without Ex protection	Basic device with EEx-d protection (flameproof casing)	Basic device with EEx ia/ib protection	Basic device with EEx n protection
Communication	Layers 1 and +2 according to PROFIBUS PA, transmission technique according to IEC 1158-2; 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	Typical 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			
Connections				
• Electric	Screw terminals 2.5 AWG28-12 Cable gland M20 x 1.5 or ½-14 NPT	Screw terminals 2.5 AWG28-12 EEx d certified cable gland M20 x 1.5, ½-14 NPT or M25 x 1.5	Screw terminals 2.5 AWG28-12 Cable gland M20 x 1.5 or ½-14 NPT	Screw terminals 2.5 AWG28-12 Cable gland M20 x 1.5 or ½-14 NPT
• Pneumatic	Female thread G¼ DIN 45141 (¼-18 NPT)	Female thread G¼ DIN 45141 (¼-18 NPT)	Female thread G¼ DIN 45141 (¼-18 NPT)	Female thread G¼ DIN 45141 (¼-18 NPT)
External position sensor (potentiometer or NCS; as option)				
• U _o	–	–	< 5 V	< 5 V
• I _o	–	–	<75 mA	<75 mA
• I _s	–	–	<160 mA	<160 mA
• P _o	–	–	<120 mW	<120 mW
• Maximum permissible external capacitance C _o	–	–	< 1 µF	< 1 µF
• Maximum permissible external inductance L _o	–	–	< 1 mH	< 1 mH

8.1 Ordering data

Selection and ordering data	Order No.											
Electropneumatic positioner SIPART PS2, PS2 PA and PS2 FF	6	DR	5									
Version												
2-wire												
• Without HART (4 to 20 mA)												0
• With HART, not explosion-protected (except EEx d)												1
2-, 3-, 4-wire												
• With HART, explosion-protected												2
• Without HART, not explosion-protected												3
PROFIBUS PA connection												5
FOUNDATION Fieldbus connection (not EEx n)												6
For actuator												
Single-action												1
Double-action												2
Casing												
Plastic												0
Aluminum; only single-action												1
Stainless steel; not for EEx d version; not FM/CSA and not EEx n												2
Aluminum; EEx d housing (flameproof) ¹⁾ , not CSA												5
Explosion protection												
Without												
With explosion protection EEx ia/ib or EEx d (CENELEC/FM/CSA)												
With explosion protection EEx n (CENELEC)												
Connection thread electrical/pneumatic												
M20 x 1.5 / G $\frac{1}{4}$												
$\frac{1}{2}$ -14 NPT / $\frac{1}{4}$ -18 NPT												
M20 x 1.5 / $\frac{1}{4}$ -18 NPT												
$\frac{1}{2}$ -14 NPT / G $\frac{1}{4}$												
M25 x 1.5 / G $\frac{1}{4}$ (only EEx d version) ¹⁾												
With PROFIBUS plug M12 / G $\frac{1}{4}$ ²⁾												
With PROFIBUS plug M12 / $\frac{1}{4}$ -18 NPT ²⁾												
M20 x 1.5 / VDI/VDE 3847												
Limit monitor												
Installed, incl. 2nd cable gland ³⁾												
Without												0
Alarm module; electronic (6DR4004-.A)												1
SIA module; slot-type initiators (6DR4004-.G); not for EEx d version)												2
Limit value contact module (mechanical switching contacts (6DR4004-.K); not for EEx d version)												3
Optional modules												
Installed, incl. 2nd cable gland ³⁾												
Without												0
Iy module for position feedback signal (4 ... 20 mA) (6DR4004-.J)												1
EMC filter module for external position sensor (C73451-A430-D23), (not for EEx d version)												2
Iy module and EMC filter module for external position sensor, not for EEx d version												3

Selection and ordering data	Order No.											
Electropneumatic positioner SIPART PS2, PS2 PA and PS2 FF	6	DR	5									
Customer-specific design												
Without												0
Brief instructions												
German/English												A
French/Spanish/Italian												B
Mounted pressure gauge block												
Without												0
Single-action G $\frac{1}{4}$												1
Double-action G $\frac{1}{4}$												2
Single-action $\frac{1}{4}$ -18 NPT												3
Double-action $\frac{1}{4}$ -18 NPT												4
Further designs												
Add "-Z" to Order No. and specify Order Code.												
Version with stainless steel sound absorbers	A40											
not for EEx d version; standard with stainless steel enclosures												
Customized preset bus address (max. 126) and/or software tag No.	Y25											
for PROFIBUS PA and FOUNDATION Fieldbus version, for plastic enclosures, for metal enclosures on request.												

► Available ex stock

1) EEx d version without cable gland.

2) Not for EEx d, FM/CSA approval, EEx ia/ib (CENELEC) on request

8.2 Scope of delivery of options

Option	Bestellnummer
I _y module without explosion protection	6DR4004-8J
I _y module with explosion protection PTB ¹⁾ I _y module with explosion protection FM ²⁾	6DR4004-6J 6DR4004-7J
Alarm module without explosion protection	6DR4004-8A
Alarm module with explosion protection PTB ¹⁾ Alarm module with explosion protection FM ²⁾	6DR4004-6A 6DR4004-7A
SIA module without explosion protection	6DR4004-8G
SIA module with explosion protection CENELEC and FM ¹⁾²⁾	6DR4004-6G
Mechanical limit switch module without explosion protection	6DR4004-8K
Mechanical limit switch module with explosion protection CENELEC and FM ¹⁾²⁾³⁾	6DR4004-6K

1) EC-type examination certificates

2) Approval Reports of Factory Mutual System

3) In preparation

8.3 Scope of delivery of accessories

Accessories	Order number
Mounting kit set linear actuators IEC 534-6 including lever arm for 3 to 35 mm way	6DR4004-8V
Additional lever for > 35 to 130 mm way	6DR4004-8L
Mounting kit part-turn actuators VDI/VDE 3845	6DR4004-8D
Solenoid valve block for SAMSON actuator (integrated mounting)	6DR4004-1C
Manometer block single-acting	6DR4004-1M
Manometer block double-acting	6DR4004-2M
Solenoid valve block single-acting (NAMUR)	6DR4004-1B
Mounting set for SAMSON actuator (integrated mounting)	6DR4004-8S
NCS-Sensor non explosion-proof explosion-proof cable length 6 m (19.68 ft) for part-turn actuators for linear actuators up to 14 mm (0.55 inch) (on request) for linear actuators > 14 mm (0.55 inch)	6DR4004-__N__0 6DR4004-8N 6DR4004-6N 6DR4004-__NN 6DR4004-__N_10 6DR4004-__N_20 6DR4004-__N_30
EMC filter module	C73451-A430-D23
External position detection system	C73451-A430-D78
Operating software SIMATIC PDM	on request