



Installation and Maintenance Manual

Cylinder positioner Series 56-IP200/56-IP210

CE Ex II 3GD 60°C (T6) -5°C ≤ Ta ≤ 60°C *

* for High / Low temperature model ATEX classifications refer to specifications table

Marking description
Group II, Category 3
Suitable for Gas and Dust environment
The maximum surface temperature is 60°C and the temperature class is T6 when the ambient temperature is -5°C to 60°C *

1 Safety Instructions

This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.

- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of "Caution", "Warning" or "Danger", followed by important safety information which must be carefully followed.
- To ensure safety of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.

Caution	Indicates a hazard with a low level of risk, which if not avoided, could result in minor or moderate injury.
Warning	Indicates a hazard with a medium level of risk, which if not avoided, could result in death or serious injury.
Danger	Indicates a hazard with a high level of risk, which if not avoided, will result in death or serious injury.

Warning

- The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications. Since the products specified here can be used in various operating conditions, their compatibility with the specific pneumatic system must be based on specifications or after analysis and/or tests to meet specific requirements.
- Only trained personnel should operate pneumatically operated machinery and equipment.** Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced personnel.
- Do not service machinery/equipment or attempt to remove components until safety is confirmed.**
 - Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
 - When equipment is to be removed, confirm the safety process as mentioned above. Switch off air and electrical supplies and exhaust all residual compressed air in the system.
 - Before machinery/equipment is re-started, ensure all safety measures to prevent sudden movement of cylinders etc. (Supply air into the system gradually to create back pressure, i.e. incorporate a soft-start valve).
- Do not use this product outside of the specifications. Contact SMC if it is to be used in any of the following conditions:**
 - Conditions and environments beyond the given specifications, or if the product is to be used outdoors.
 - Installations in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverage, recreation equipment, emergency stop circuits, press applications, or safety equipment.
 - An application, which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

Caution

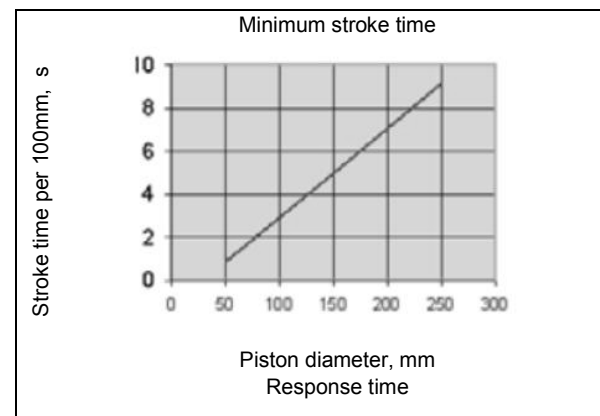
- Ensure that the air supply system is filtered to 5 microns.

2 Specifications

2.1 Specifications

Refer to the Operation Manual for this product.

Fluid	Air, 5µm filtration degree, no lubrication
Supply pressure	0.3 to 0.7 MPa
Signal pressure	0.02 to 0.1 MPa
Port size	Rc1/4"
Pressure gauge port size	Rc1/8"
Linearity	Less than ± 2% F.S.
Hysteresis	Less than 1% F.S.
Repeatability	Less than 1% F.S.
Sensitivity	Less than 0.5% F.S.
Air consumption	18 L/min (ANR) or less (at 0.5 MPa supply)
Max. Air flow	200L/min (ANR) or more (at 0.5 MPa supply)
Supply pressure variation	1 % (at 0.5 ± 0.05 MPa supply)
Applicable cylinder (mm)	50 to 300 mm bore size / 25 to 300 mm stroke
Operating temperature	-30° to 60°C (low temperature)
	-5° to 60°C (standard)
	-5° to 100°C (high temperature)



Classification	Ambient temperature range		
	Low Temp. model 56-IP2#0-***L*.*	Standard model 56-IP2#0-***.*	High Temp. model 56-IP2#0-***T*.*
II 3GD 100°C (T5)	-	-	-5°C < Ta < 100 °C
II 3GD 60°C (T6)	-30°C < Ta < 60 °C	-5°C < Ta < 60 °C	-

2.2 Production Batch

The production batch cod printed on the label indicates the month and year of production as per the following table:

Production batch codes									
Year	2009	2010	2011	...	2021	2022	2023	...	
Month	N	O	P	...	Z	A	B	...	
Jan	O	NO	OO	PO	...	ZO	AO	BO	...
Feb	P	NP	OP	PP	...	ZP	AP	BP	...
Mar	Q	NQ	OQ	PQ	...	ZQ	AQ	BQ	...
Apr	R	NR	OR	PR	...	ZR	AR	BR	...
May	S	NS	OS	PS	...	ZS	AS	BS	...
Jun	T	NT	OT	PT	...	ZT	AT	BT	...
Jul	U	NU	OU	PU	...	ZU	AU	BU	...
Aug	V	NV	OV	PV	...	ZV	AV	BV	...
Sep	W	NW	OW	PW	...	ZW	AW	BW	...
Oct	X	NX	OX	PX	...	ZX	AX	BX	...
Nov	Y	NY	OY	PY	...	ZY	AY	BY	...
Dec	Z	NZ	OZ	PZ	...	ZZ	AZ	BZ	...

3 Installation

3.1 Installation

Warning

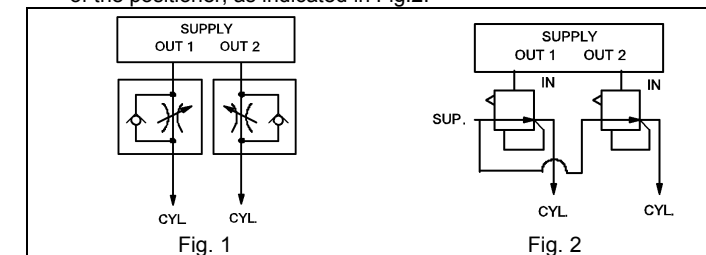
- Do not install the product unless the safety instructions have been read and understood.
- Supply air must be dry and dust free. SMC Mist Separator is recommended for perfect filtration.
- If the cylinder requires air line lubrication, the lubricator should be installed in the output air lines and not in the supply air line.

3 Installation (continued)

- The velocity of the piston must not be so great as to exceed the speed corresponding to the minimum stroke time indicated in the response time diagram. Instability and stroke exceeding can occur if the speed reaches fast levels.

Speed adjustment method:

- When the speed is too fast (2 seconds/full stroke), attach meter-out type speed controllers in the output side as indicated in Fig.1, as it may cause overshooting or hunting.
- When the speed is too slow, attach booster relays on the output side of the positioner, as indicated in Fig.2.



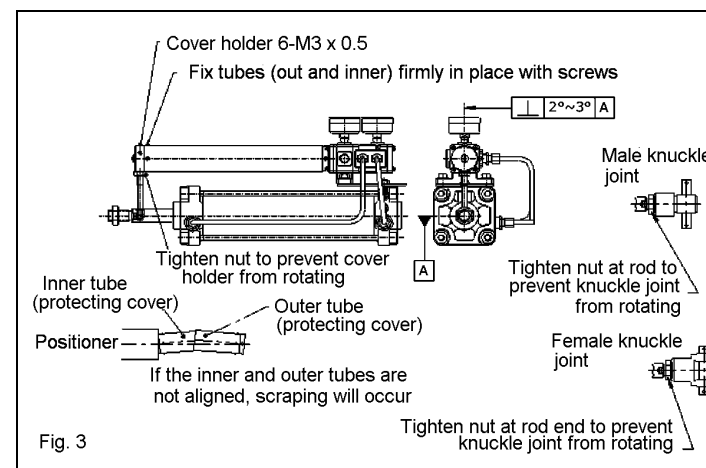
- The positioner should be protected from vibration as it may cause oscillation of the feedback spring and a generally unstable behavior. The sensitivity to these vibrations increases in proportion to the total development of the cylinder capacity. Naturally, they can be damped by reducing the working pressure or by using the regulation valves, as mentioned previously.
- Use copper or brass tubes for pipe line arrangement and blow them out before installation.

Caution

- Do not apply pressure on the protection cover. Install the cylinder rod without twisting (See Fig.3). If the cylinder rod is subject to twisting, there is a special anti-rotation device that will restrict such twisting from being transmitted to the positioner. Ask for further information.
- This positioner cannot be used to cause cylinder to compress when

input signal pressure is increased. It will be necessary to replace with a double rod cylinder or install a reversing relay for the input pressure signal.

- Make installation to keep the lateral load on cylinder bearings below one twentieth of the maximum cylinder force.



3.2 Environment

Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere except within the specified rating.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact. Check the product specifications.
- Do not mount in a location exposed to radiant heat.

3 Installation (continued)

Caution

- Always handle with care.
- Do not leave exposed to weather.
- When this product is shipped from the factory it is protected by dust proof sealing (vinyl) against infiltration of dust into the positioner. Leave sealing in place after unpacking until ready to connect to the circuit.
- When it becomes necessary to store for a period after unpacking, select a storage area free from humidity and corrosive gases. When the product leaves the factory, the surfaces are painted and treated according to product specifications but under unfavorable conditions, corrosion may appear. Be careful of storage environment.

3.3 Piping

Warning

- Before piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1.5 to 2 threads exposed on the end of the pipe/fitting.
- Tighten fittings to the specified tightening torque.

Thread	Tightening Torque, Nm
Rc 1/4	12 to 14

- If the operating air supply contains dust or there is rust, metal filings or oil in the piping, they can cause clogging in the fixed orifice and faulty spool movements.
- Use copper piping for air supply and transmission of force to avoid corrosion. When connecting piping to positioner, carry out adequate air purging beforehand. Be careful to make correct connections. If high air pressure is inadvertently connected to the input pressure connecting port, the diaphragm will be damaged.

3.4 Lubrication

Caution

- SMC products have been lubricated for life at manufacture, and do not require lubrication in service.

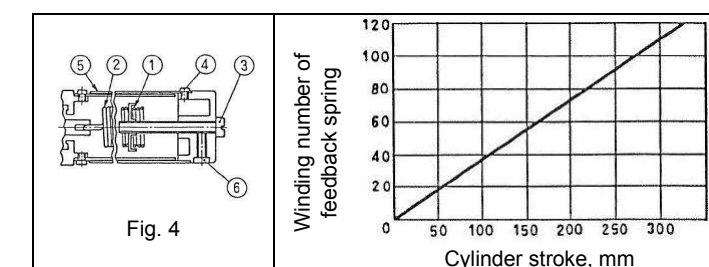
- The nozzle flapper system has been adopted for the pilot valve and a lubricator should not be used in the supply air line.

4 Settings

4.1 Adjusting method

Span adjustment

- In order to obtain a cylinder stroke corresponding to the pressure signal of 0.02~0.1MPa, the winding number of feedback spring (2) is varied by the span adjusting device (1). When the winding number is increased, the span will expand and when decreased, it will compress. When adjusting span, refer to Fig. 4 and check the winding number to a given stroke.
- Take out the feedback spring (2) and adjust the winding number by adjusting device (1). With the cylinder installed, adjust the zero adjusting screw (3) so that the cylinder will start moving at an input signal pressure of 0.02MPa and increase to 0.1MPa.
- If the cylinder does not reach full extension, increase the number of winding, and if it over extends, decrease the number of winding. When changing the number of winding, remove the small screw (4) and shift cover (5) toward the left side with the signal pressure increased to 0.1MPa. Zero adjustment must be made when the winding number is changed.



Zero adjustment:

Loosen lock screw (6). When the zero adjustment screw (3) is turned right, the cylinder will retract and when turned left, it will extend.

5 How to Order

Refer to the operation manual for this product.

6 Outline Dimensions

Refer to the operation manual for this product.

7 Maintenance

7.1 General Maintenance

Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous. Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.

8 Limitations of Use

Danger

- Do not exceed any of the specifications listed in section 2 of this document or the specific product catalogue.
- Air equipment has standard air leakage within certain limits. Do not use the equipment when the air itself can lead to explosion.
- Do not use this equipment where vibration could lead to equipment failure. Contact SMC for this specific situation.
- External impacts on the cylinder body could result in spark and/or cylinder damage. Avoid any application where foreign objects can hit the cylinder. In such situations install a suitable guard to prevent such impacts.

Troubleshooting

Fluid	Possible causes	Corrective actions
Cylinder does not move when pressure signal is raised or lowered.	The fixed orifice in positioner is clogged.	Remove orifice and clean with a 0.4 mm pin.
	Piston packing in cylinder is worn.	Replace packing.
When pressure signal is raised or lowered, operation is jerky.	1. Action is not smooth due to object caught in spool.	1. Clean out the spool.
	2. Fixed orifice in positioner is clogged.	2. Remove fixed orifice and clean out with 0.4mm pin.
Cylinder will not move at pressure signal of 0.02MPa. or Cylinder moves at pressure signal below 0.02 MPa.	The zero adjustment screw is loosened and is out of place.	Loosen lock screw and adjust zero point with zero adjusting screw.
Cylinder movement corresponding to pressure signal of 0.02~0.1 MPa cannot be obtained.	Position of span adjusting device is not proper.	Remove screw from protection cover and adjust span adjusting device to best position with pressure signal at about 0.06MPa. If span is overextended, decrease spring winding, and if too short, increase spring winding. This adjustment should be made together with zero adjustment.

9 Contacts

AUSTRIA	(43) 2262 62280-0	LATVIA	(371) 781 77 00
BELGIUM	(32) 3 355 1464	LITHUANIA	(370) 5 264 8126
BULGARIA	(359) 2 974 4492	NETHERLANDS	(31) 20 531 8888
CZECH REP.	(420) 541 424 611	NORWAY	(47) 67 12 90 20
DENMARK	(45) 7025 2900	POLAND	(48) 22 211 9600
ESTONIA	(372) 651 0370	PORTUGAL	(351) 21 471 1880
FINLAND	(358) 207 513513	ROMANIA	(40) 21 320 5111
FRANCE	(33) 1 6476 1000	SLOVAKIA	(421) 2 444 56725
GERMANY	(49) 6103 4020	SLOVENIA	(386) 73 885 412
GREECE	(30) 210 271 7265	SPAIN	(34) 945 184 100
HUNGARY	(36) 23 511 390	SWEDEN	(46) 8 603 1200
IRELAND	(353) 1 403 9000	SWITZERLAND	(41) 52 396 3131
ITALY	(39) 02 92711	UNITED KINGDOM	(44) 1908 563888

SMC Corporation

URL : [http:// www.smcworld.com](http://www.smcworld.com) (Global) <http:// www.smceu.com> (Europe)

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