



Installation and Maintenance Manual

Special Rotary Clamp Cylinder

MKB50*-*Z-DCR765GR

CE Ex II 2GD c 101°C (T4) Ta -10°C to 40°C
121°C (T4) Ta 40°C to 60°C

Marking description
Group II, Category 2
Suitable for Gas and Dust environment
Type of protection "constructional safety"
The maximum surface temperature is 101°C and the temperature class is T4 when the ambient temperature is: -10°C to 40°C
The maximum surface temperature is 121°C and the temperature class is T4 when the ambient temperature is 40°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 decided by the person who designs the equipment or decides its specification based on necessary analysis and test results. The expected performance and safety performance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review the specification of the product expressed in this document. The specification of this product is subject to change and this will be expressed in revisions of this document. The designer must monitor these revisions to ensure ongoing compatibility with the application.

- Only trained personnel should operate pneumatically operated machinery and equipment.**

The product specified here may become unsafe if handled incorrectly.

The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

- Do not service machinery/equipment or attempt to remove components until safety is confirmed.**

1) The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.

2) When equipment is to be removed, confirm the safety measures as mentioned above are implemented and the power from any appropriate source is cut.

1 Safety Instructions (Continued)

3) Read and understand the specific product precautions of all relevant products carefully.

4) Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

- Do not use this product outside of the specifications.**
- Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**

1) Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.

2) Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustions and recreation, or equipment in contact with food or beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the specification described in this document.

3) An application which could have negative effects on people, property or animals requiring special safety analysis outside the scope of ISO 13849 described in this document.

4) Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

- Always ensure compliance with relevant safety laws and standards.**

Pay particular attention to the requirements of ISO 4414.

Caution

- The product is provided for peaceful use in manufacturing industries.**

If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.

If anything is unclear, contact your nearest sales branch.

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

2 Specifications

2.1 Specifications.

Fluid	Air
Max. operating pressure	1 MPa
Min. operating pressure	0.1 MPa
Ambient and fluid temperature	-10 ~ 60°C (no freezing)
Lubrication	Not required
Operating piston speed	50 ~ 200 mm/s
Cushion	Rubber cushion at the rod side
Arm length and moment of inertia	Refer to the MK-Z series catalogue
Rotary angle	90° ±10°
Rotary stroke	19mm
Theoretical clamping force at 0.5 MPa	825 N
Explosive atmosphere	Gas and Dust
Zone	1, 21, 2 and 22

2.2 Production batch code

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

Production batch codes						
Year	2014	...	2021	2022	2023	...
Month	S	...	Z	A	B	...
Jan	O	SO	...	ZO	AO	BO
Feb	P	SP	...	ZP	AP	BP
Mar	Q	SQ	...	ZQ	AQ	BQ
Apr	R	SR	...	ZR	AR	BR
May	S	SS	...	ZS	AS	BS
Jun	T	ST	...	ZT	AT	BT
Jul	U	SU	...	ZU	AU	BU
Aug	V	SV	...	ZV	AV	BV
Sep	W	SW	...	ZW	AW	BW
Oct	X	SX	...	ZX	AX	BX
Nov	Y	SY	...	ZY	AY	BY
Dec	Z	SZ	...	ZZ	AZ	BZ

3 Installation

3.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.

3.2 Environment

Warning

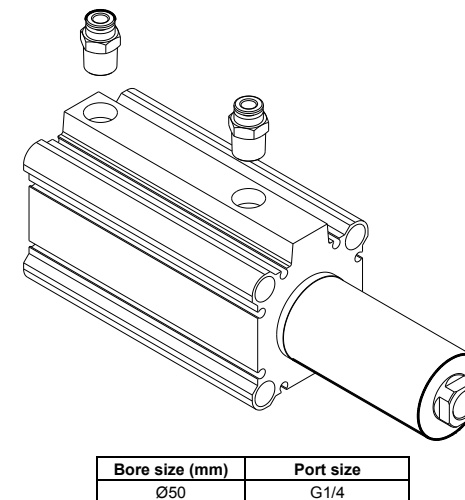
- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere except within the specified rating.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact.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

- Do not mount in a location exposed to radiant heat.
- Do not use in case of heavy dusty environment where dust can penetrate into the cylinder and dry the grease.
- Do not use in wet environments.

3.3 Piping

Caution

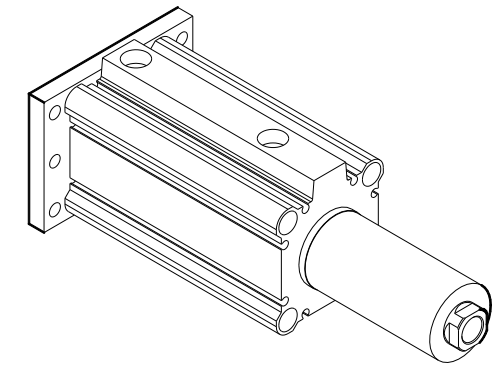
- Before piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1.5 to 2 threads exposed on the end of the pipe/fitting.



3 Installation (Continued)

3.6 Mounting accessories

Rear flange



- When replacing the rear flange, use the hexagon wrenches shown below.

Bore size (mm)	Width across flats (mm)	Tightening torque (Nm)
Ø50	5	11.4 to 22.4

3.7 Clamp Arm Mounting

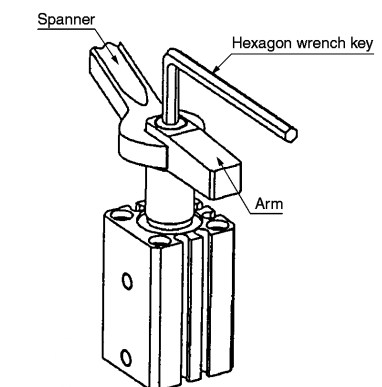
Danger

- Use a clamp arm that is available as an option.
To fabricate a clamp arm, make sure that the allowable bending moment and the inertial moment are within the specified range. Refer to the MK-Z series catalogue.

3.8 Clamp Arm Mounting and Removal

Caution

- When the arm is mounted onto or removed from the piston rod, do not fix the cylinder body, but hold the arm with a spanner when tightening or loosening the bolt.
- If the bolt is tightened with the cylinder body fixed, excessive rotation force will be applied to the piston rod, which may damage the internal components.
- Note that when making an arm, machine it so that it engages with the width across flats on the rod end to prevent it from rotating.



Tightening Torque	
Bore size (mm)	Final torque (Nm)
Ø50	75 to 90

Caution

The actuator could malfunction, or the non-rotating accuracy could be affected if a rotational force is applied to the piston rod. Observe the following instructions before operating the actuator:

3.4 Lubrication

Caution

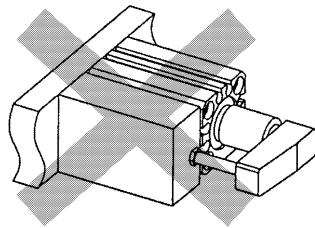
- SMC products have been lubricated for life at manufacture, and do not require lubrication in service.

3.5 Electrical connection

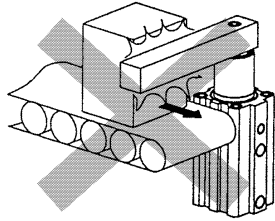
Warning

- Provide a grounding connection to the actuator to avoid any spark arising from potential differences.

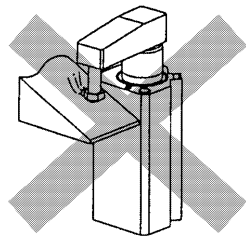
3 Installation (Continued)



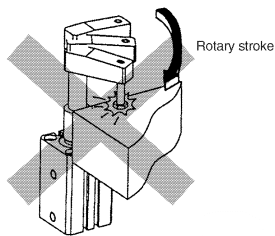
Do not operate the cylinder horizontally.



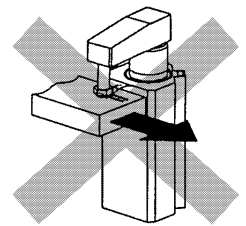
Do not perform any work in the rotary direction.



Do not clamp on a slanted surface.



Do not clamp during the rotary stroke. Clamping should be performed only within the clamp stroke.



Make sure that the workpiece does not move during clamping.

⚠ Danger

It is the Customer's responsibility to ensure that no sparks are generated when the arm clamps the workpiece.

3.9 Ensuring Safety

⚠ Caution

If one side of the piston is pressurized by supplying air with the clamp arm attached, the piston will move vertically while the clamp arm rotates. This operation could be hazardous to personnel, as their hands or feet could get caught by the clamp arm, or could lead to equipment damage. Therefore, it is important to secure as a danger zone, a cylindrical area with the length of the clamp arm as its radius, and the length of the stroke plus 20mm as its height.

4 Settings

Install speed controllers (meter-out) and adjust the piston rod speed between 50 and 200 mm/s. Refer to the "model selection" in the MK-Z series catalogue. To adjust the speed, start with the needle in the completely closed position and then adjust it by opening gradually.

5 How to order

Refer to the customer drawing for the product.

6 Outline dimensions

Refer to the customer drawing 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.
- Periodically check the rod surface, the rod seal and the cylinder tube external surface. Any damage or rust appearing on these components could increase friction and lead to dangerous conditions. Replace the

whole actuator if any of these conditions should appear.

- Replace the seals, when air leakage is above allowable value given in the table below.

Internal leakage	10 cm ³ /min (ANR)
External leakage	5 cm ³ /min (ANR)

- Do not allow dust to form deposits on the outer surface of the actuator and mounting bracket. Check carefully the area around the coil scraper.
- Periodically check for presence of lubrication.

7.2 Seal replacement

⚠ Warning

- Only use SMC seal kits as listed in the table below:

Seal kit no.	Contents
MK2T50-PS	Coil scraper, rod seal, piston seal, tube gasket

7.3 Guide pin replacement

⚠ Warning

- Only use the SMC kit listed below:

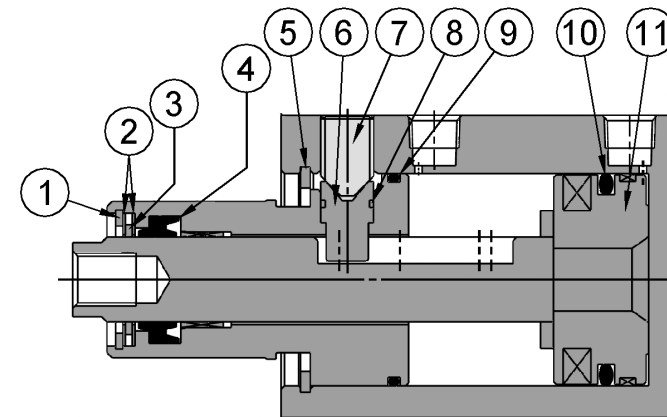
Guide pin kit no.	Contents
MK50Z-GS	Hexagon socket head screw, guide pin, O-ring.

7.4 Disassembly procedure

- Disassemble the cylinder, remove the old grease and place all the parts on a clean cloth in a clean environment. Use snap ring pliers to remove the snap ring, the hexagon socket head screw and the guide pin. Remove the old tube gaskets, coil scraper, rod seal and piston seal using a fine screwdriver where necessary.

7 Maintenance (Continued)

Model: MKB50*-Z-DCR765GR



1	R-type snap ring	7	Hexagon socket head screw
2	Scraper retainer	8	O-ring
3	Coil scraper	9	Tube gasket
4	Rod seal	10	Piston seal
5	C-type snap ring	11	Piston
6	Guide pin		

7.5 Lubrication procedure

- Apply lubricant to:
 - rod seal
 - rod seal groove on the rod cover
 - piston outer surface
 - piston seal groove
 - piston seal
 - tube gasket
- Lubricate the parts using the following SMC grease packs:
 - piston rod surface and groove
 - tube inner surface

Grease pack number	Weight (g)
GR-S-010	10
GR-S-020	20

- The amount of lubricant to be applied is listed in the following table.

Bore size (mm)	Required amount of grease for the minimum stroke (g)	Additional amount of grease required for each 5mm of stroke (g)
∅50	10 mm stroke	0.665
		0.055

7.6 Assembly procedure

- Insert the piston rod assembly into the rod cover with care to prevent any damage to the rod seal.
- Insert the coil scraper and secure it with the snap ring.
- Insert the guide pin and the O-ring into the rod cover, making sure that the pin engages in the piston rod groove.
- Insert the piston and the rod cover assembly in the tube carefully to prevent any damage to the piston seal and tube gasket.
- Secure the rod cover to the tube with the snap ring. Use appropriate pliers (tool for C shape snap ring) for installation.
- Tighten the hexagon socket head screw.

⚠ Caution

When installing the snap rings, be aware that they may come off the pliers and could result in operator injury or equipment damage. Also make sure that both the rings are firmly seated in their ring grooves.

- Checking assembly.

Make sure that no air is leaking from packing seals and that the cylinder operates smoothly at minimum operating pressure. Check for cylinder smooth movement and for air leakage.

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.
- Do not install or use this actuator in applications where the piston rod or clamp arm can impact foreign objects and cause sparks.
- Use only ATEX certified auto switches. Order them separately.
- Do not use in the presence of strong magnetic fields that could generate a surface temperature higher than the value given for the temperature class.

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](http:// www.smceu.com) (Europe)
 'SMC Corporation, Akihabara UDX15F, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 100 0021

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