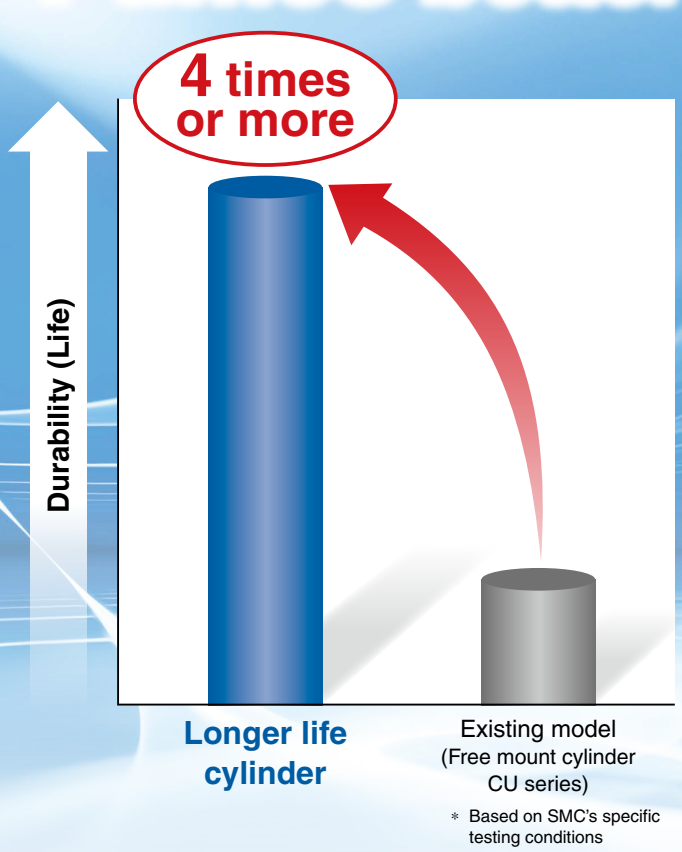
High Durability Series

Longer Life Cylinder

New

RoHS

New technology offers at least 4 times better durability



＊ Based on SMC's specific testing conditions

- **The maintenance intervals will be extended**

- **Employs the same specification and dimensions as the existing models, CU Free Mount Cylinder series**

High Durability Series

High Durability Series is the series name for the "special specification" that offers superior durability and environmental resistance compared to standard products.

Series Variations

Series	Action	Model	Bore size						Cushion	Standard stroke
			6	10	16	20	25	32		
Free mount cylinder CU series 	Double acting, Single rod	**CU-XB24**	●	●	●	●	●	●	Rubber bumper	ø6, ø10, ø16: 5 to 30 ø20, ø25, ø32: 5 to 50

CU-XB24

SMC

CAT.ES20-287A

High Durability Series

Longer Life Cylinder
Double Acting, Single Rod
CU-XB24

RoHS

ø6, ø10, ø16, ø20, ø25, ø32

How to Order

CU 6 □ – 30 D – XB24

With auto switch **CDU 6 □ – 30 D – M9BW □ – XB24**

Built-in magnet

Longer life cylinder

Bore size

6	6 mm
10	10 mm
16	16 mm
20	20 mm
25	25 mm
32	32 mm

Number of auto switches

Nil	2
S	1

Auto switch

Nil	Without auto switch

∗ For applicable auto switches, refer to the table below.

Port thread type

Symbol	Type	Bore size
Nil	M5 x 0.8	ø6, ø10, ø16, ø20, ø25
	Rc1/8	ø32
TN	NPT1/8	
TF	G1/8	

Action

D	Double acting

Standard stroke [mm]

ø6, ø10, ø16	5, 10, 15, 20, 25, 30
ø20, ø25, ø32	5, 10, 15, 20, 25, 30, 40, 50

Built-in Magnet Cylinder Model

If a built-in magnet cylinder without an auto switch is required, there is no need to enter the symbol for the auto switch.
(Example) CDU20-25D-XB24

Applicable Auto Switches / Refer to the **Web Catalog** for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC	Load voltage DC	Load voltage AC	Auto switch model: Perpendicular	Auto switch model: In-line	Lead wire length [m]: 0.5 (Nil)	1 (M)	3 (L)	5 (Z)	Pre-wired connector	Applicable load	
Solid state auto switch	—	Grommet	Yes	3-wire (NPN)	24 V	5 V, 12 V	—	**M9NV**	**M9N**	●	●	●	○	○	IC circuit	Relay, PLC
				3-wire (PNP)				**M9PV**	**M9P**	●	●	●	○	○		
				2-wire		12 V		**M9BV**	**M9B**	●	●	●	○	○	—	
	Diagnostic indication (2-color indicator)			3-wire (NPN)		5 V, 12 V		**M9NWV**	**M9NW**	●	●	●	○	○	IC circuit	
				3-wire (PNP)				**M9PWV**	**M9PW**	●	●	●	○	○		
				2-wire		12 V		**M9BWV**	**M9BW**	●	●	●	○	○	—	
	Water resistant (2-color indicator)			3-wire (NPN)		5 V, 12 V		**M9NAV**∗1	**M9NA**∗1	○	○	●	○	○	IC circuit	
				3-wire (PNP)				**M9PAV**∗1	**M9PA**∗1	○	○	●	○	○		
				2-wire		12 V		**M9BAV**∗1	**M9BA**∗1	○	○	●	○	○	—	
Reed auto switch	—	Grommet	Yes	3-wire (NPN equivalent)	—	5 V	—	**A96V**	**A96**	●	—	●	—	—	IC circuit	—
				2-wire	24 V	12 V	100 V	**A93V**∗2	**A93**	●	●	●	●	—	—	Relay, PLC
			No				100 V or less	**A90V**	**A90**	●	—	●	—	—	IC circuit	

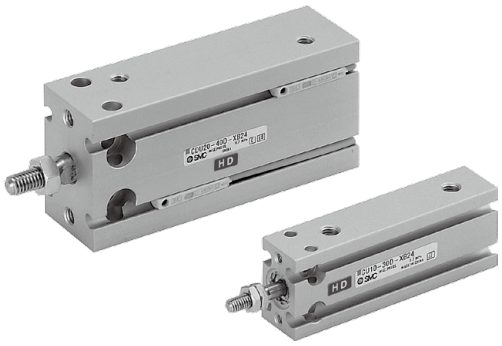
∗1 Water-resistant type auto switches can be mounted on the above models, but SMC cannot guarantee water resistance. Please contact SMC regarding water-resistant types with the above model numbers.

∗2 The 1 m lead wire is only applicable to the D-A93.

∗ Lead wire length symbols: 0.5 m ····· Nil (Example) M9NW
1 m ····· M (Example) M9NWM
3 m ····· L (Example) M9NWL
5 m ····· Z (Example) M9NWZ

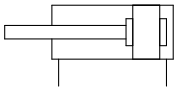
∗ Solid state auto switches marked with a "○" are produced upon receipt of order

∗ Since there are applicable auto switches other than those listed above, refer to the **Web Catalog** for details.
∗ For details on auto switches with pre-wired connectors, refer to the **Web Catalog**.
∗ Auto switches are shipped together with the product but do not come assembled.



Symbol

Double acting, Single rod, Rubber bumper



Specifications

Bore size [mm]	6	10	16	20	25	32
Fluid	Air					
Proof pressure	1.05 MPa					
Max. operating pressure	0.7 MPa					
Min. operating pressure	0.12 MPa	0.06 MPa		0.05 MPa		
Ambient and fluid temperatures	Without auto switch: −10 to 70°C With auto switch: −10 to 60°C (No freezing)					
Lubrication	Non-lube					
Piston speed	50 to 500 mm/s					
Cushion	Rubber bumper					
Rod end thread	Male thread					
Stroke length tolerance	$^{+1.0}_{0}$ mm					

Tightening Torque / When mounting the CU series, refer to the table below.

Bore size [mm]	Hexagon socket head cap screw size	Proper tightening torque [N·m]
6, 10	M3	1.08 ±10%
16	M4	2.45 ±10%
20, 25	M5	5.10 ±10%
32	M6	8.04 ±10%

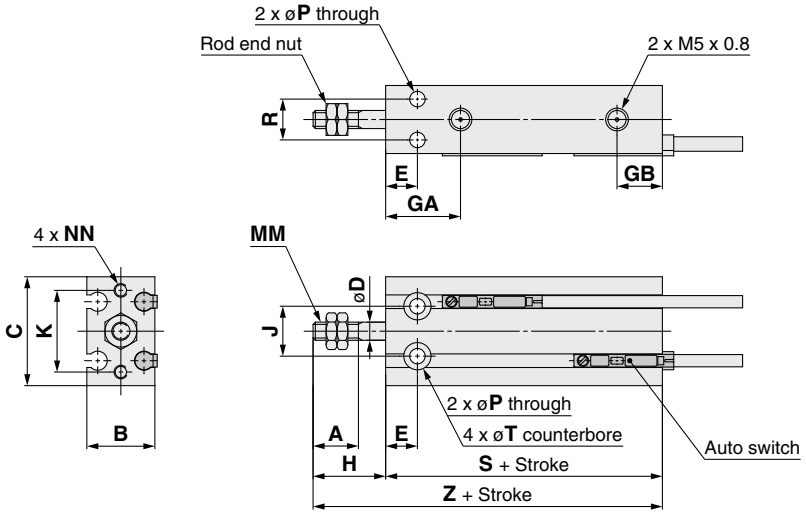
Moisture Control Tube
IDK Series

When operating an actuator with a small bore size and a short stroke at a high frequency, dew condensation (water droplets) may occur inside the piping depending on the conditions.
Simply connecting the moisture control tube to the actuator will prevent dew condensation from occurring. For details, refer to the **Web Catalog**.

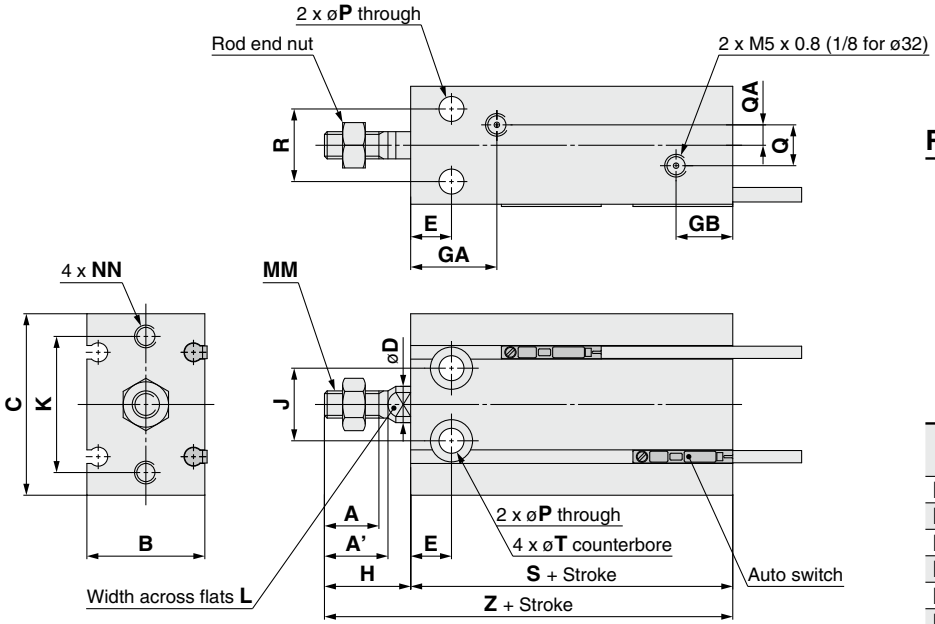
The operating speed, allowable lateral loads at the rod end, theoretical output, and weight are equivalent to those of the Free Mount Cylinder CU series. For details, refer to the Web Catalog.

Dimensions: Double Acting, Single Rod

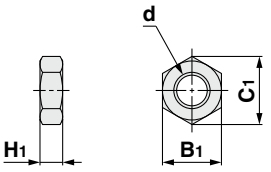
ø6, ø10



ø16 to ø32



Rod End Nut/Accessory



Material: Carbon steel

Part no.	Applicable bore size [mm]	d	H_1	B_1	C_1
NTP-006	**6**	M3 x 0.5	1.8	5.5	6.4
NTP-010	**10**	M4 x 0.7	2.4	7	8.1
NTJ-015A	**16**	M5 x 0.8	4	8	9.2
NT-015A	**20**	M6 x 1.0	5	10	11.5
NT-02	**25**	M8 x 1.25	5	13	15.0
NT-03	**32**	M10 x 1.25	6	17	19.6

[mm]

Bore size [mm]	A	A'	B	C	D	E	GA	GB	H	J	K	L	MM	NN	P	Q	QA
6	7	—	13	22	3	7	15	10	13	10	17	—	M3 x 0.5	M3 x 0.5 depth 5	3.2	—	—
10	10	—	15	24	4	7	16.5	10	16	11	18	—	M4 x 0.7	M3 x 0.5 depth 5	3.2	—	—
16	11	12.5	20	32	6	7	16.5*1	11.5	16	14	25	5	M5 x 0.8	M4 x 0.7 depth 6	4.5	4	2
20	12	14	26	40	8	9	19	12.5	19	16	30	6	M6 x 1.0	M5 x 0.8 depth 8	5.5	9	4.5
25	15.5	18	32	50	10	10	21.5	13	23	20	38	8	M8 x 1.25	M5 x 0.8 depth 8	5.5	9	4.5
32	19.5	22	40	62	12	11	23	12.5	27	24	48	10	M10 x 1.25	M6 x 1.0 depth 9	6.6	13.5	4.5

Bore size [mm]	R	T	Without auto switch		With auto switch	
			S	Z	S	Z
6	7	6 depth 4.8	33	46	33	46
10	9	6 depth 5	36	52	36	52
16	12	7.6 depth 6.5	30	46	40	56
20	16	9.3 depth 8	36	55	46	65
25	20	9.3 depth 9	40	63	50	73
32	24	11 depth 11.5	42	69	52	79

*1 5 mm stroke (CU16-5D): 14.5 mm

CU-XB24 / Specific Product Precautions

Be sure to read this before handling the products. Refer to the back cover for safety instructions. For actuator and auto switch precautions, refer to the "Handling Precautions for SMC Products," the "Operation Manual," and free mount cylinder CU series specific product precautions on the SMC website.

Mounting

⚠Caution

This cylinder is designed to create compact mechanical equipment and promote space saving. Thus, if it is used in the same manner as existing cylinders such as tie-rod cylinders, it may degrade the performance. Pay sufficient attention to the operating conditions when using.

1. Allowable lateral load

Lateral load that can apply to the piston rod end is limited. If a cylinder is used with a lateral load over the limit, it may cause air leakage due to abnormal friction of seals, galling of cylinder tubes and pistons, or abnormal friction of the bearing part. The lateral load applied to the piston rod must be within the allowable range indicated in this catalog. When the load exceeds the limit, install a guide or change the bore size to suit the load in order to make the load within the allowable range.

2. Connection with a workpiece

When a workpiece is mounted on the piston rod end, connect them aligning the center of piston rod and a workpiece. If they are off-center, lateral load is generated and phenomena mentioned in 1. may occur. In order not to apply the off-center load, use of a floating joint is recommended.

3. Simultaneous use of multiple cylinders

It is difficult to control the speed of pneumatic cylinders. The following conditions cause speed change: change in supply pressure, load, temperature and lubrication, performance difference of each cylinder, deterioration of each part over time, etc. A speed controller can be used to control the speed of multiple cylinders simultaneously for a short period of time, but depending on conditions, it may not work as desired. If multiple cylinders cannot operate simultaneously, unreasonable force is applied to the piston rod because cylinder positions may not be the same. This may cause abnormal friction of seals and bearings, and galling of cylinder tubes and pistons. Do not use an application to operate several cylinders simultaneously by adjusting cylinder speed. If this is inevitable, use a high rigid guide against load, so that the cylinder is not damaged even when the each cylinder output is slightly different.

Retaining Ring Installation/Removal

⚠Caution

1. For installation and removal, use an appropriate pair of pliers (tool for installing a type C retaining ring).

2. Even if a proper plier (tool for installing a type C retaining ring) is used, it is likely to inflict damage to a human body or peripheral equipment, as a retaining ring may be flown out of the tip of a plier (tool for installing a type C retaining ring). Be much careful with the popping of a retaining ring. Besides, be certain that a retaining ring is placed firmly into the groove of rod cover before supplying air at the time of installment.

Durability of The Cylinder

The durability of a longer life cylinder has been evaluated by comparison with the existing cylinders under SMC's test conditions.
The durability of a cylinder depends on the customer's operating conditions and operating environment.
Therefore, durability of four times or longer will not be guaranteed under all conditions.

⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

⚠ Caution: **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

⚠ Warning: **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

⚠ Danger : **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots – Safety.
etc.

⚠ Warning

1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

2. Only personnel with appropriate training should operate 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.

3. Do not service or attempt to remove product and machinery/ equipment 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 the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. 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, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
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.

⚠ Caution

1. The product is provided for use in manufacturing industries.

The product herein described is basically 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.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.*2)
   Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
   This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) **Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

⚠ Caution

SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

⚠ Safety Instructions	Be sure to read the "Handling Precautions for SMC Products" (M-E03-3) and "Operation Manual" before use.