Air Cylinder CS2 Series ø125, ø140, ø160



Maximum stroke when using rotating bracket Expanded by **1.6** times (compared to the CS1 series)

Lighter cylinder reduces self-weight deflection. Stroke range extended to widen use.

Allowable lateral load equal to the CS1 series

Even if rod diameter is changed to suit various needs, function remains equal to the CS1 series.

Allowable lateral load of CS1 and CS2



P.583

CS2Y

566

Smooth Cylinder

Double

acting

Single rod



- Double clevis pin and double knuckle pin made of stainless steel
 Bod side trunnion mounted on the front of the rod cover
- With coil scraper
- Made of stainless steel
- (Piston rod is hard chrome plated)
- With rod end bracket

Combination of Standard Products and Made to Order Specifications



| ●: Standard ◎: Made to Ord | ler specifications | Series | (Sta | CS2 ndard) | CS2Y (Smooth Cylinder) | |
|---|--|----------------------|------------|---------------|---------------------------|-------------|
| Special proc Not available | luct (Contact SMC for details) | Action/Ture | Doubi | e acting | Double acting | CJ1 |
| . Not available | 5 | | Single rod | Double rod | Single rod | |
| | | | NO | n-lube | Inon-lube | υJP |
| Symbol | Specification | Applicable bore size | ø125 | to ø160 | ø125 to ø160 | C.12 |
| Standard | Standard | | • | | | 002 |
| CDS2 | Built-in magnet | a125 to a160 | • | | | JCM |
| CS2⊡-⊡ k | With rod boot | 0120100100 | • | | | |
| 20- | Copper and Fluorine-free *1 | | 0 | 0 | — | CM2 |
| -XA□ | Change of rod end shape | | 0 | 0 | 0 | 0.40 |
| -XB5 | Oversized rod cylinder | | 0 | 0 | 0 | CINI3 |
| -XB6 | Heat-resistant cylinder (0 to 150°C) | | 0 | 0 | _ | 001 |
| -XB7 | Cold-resistant cylinder | | 0 | 0 | _ | UUI |
| -XB9 | Low speed cylinder (5 to 50 mm/s) | | 0 | 0 | 0 | CG3 |
| -XC3 | Special port position | | 0 | 0 | 0 | Jun |
| -XC4 | With heavy duty scraper | | 0 | 0 | — | JMB |
| -XC5 | Heat resistant cylinder (0 to 110°C) | | 0 | 0 | — | |
| -XC6* | Made of stainless steel | | Available | e as "-XC68" | _ | MB |
| -XC7 | Tie-rod, cushion valve, tie-rod nut, etc. made of stainless steel | | 0 | 0 | 0 | MB1 |
| -XC8 | Adjustable stroke cylinder/Adjustable extension type | | 0 | _ | | 0.00 |
| -XC9 | Adjustable stroke cylinder/Adjustable retraction type | | 0 | _ | 0 | CA2 |
| -XC10 | Dual stroke cylinder/Double rod type | | Ö | _ | Ŏ | 001 |
| -XC11 | Dual stroke cylinder/Single rod type | | 0 | _ | Ŏ | 631 |
| -XC12 | Tandem cylinder | ø125 to ø160 | 0 | _ | | CS 2 |
| -XC14 | Change of trunnion bracket mounting position | | 0 | 0 | 0 | UUL |
| -XC15 | Change of tie-rod length | | 0 | 0 | 0 | |
| -XC22 | Fluororubber seal | | 0 | 0 | | |
| -XC26 | Double clevis pin/Double knuckle pin with split pin and flat washer | | 0 | _ | 0 | |
| -XC27 | Double clevis pin and double knuckle pin made of stainless steel | | 0 | _ | 0 | |
| -XC30 | Rod side trunnion mounted on the front of the rod cover | | 0 | 0 | | |
| -XC35 | With coil scraper | | 0 | 0 | | |
| -XC39 | Special trunnion bearing | | Õ | Õ | | |
| -XC40 | Clevis hole with bushing | | | _ | | |
| -XC50 | Knuckle fixed with nut | 1 1 | Õ | 0 | Ť | |
| -XC68 | Made of stainless steel (With hard chrome plated piston rod) | | 0 | 0 | 0 | |
| -XC86 | With rod end bracket | | 0 | 1 0 | | |

The specification of "-XC6" made of stainless steel is available as "-XC68".

*1 For details, refer to the SMC website.

D--X Technical Data

Air Cylinder CS2 Series ø125, ø140, ø160

How to Order



Applicable Auto Switches / For detailed auto switch specifications, refer to page 1575 to 1701

| <u> </u> | | - | đ | Minim m | L | oad volta | ge | Auto swit | ch model | Lead w | ire le | ngth | (m) | | | | |
|---|---|--------------|---------|------------------------|-------------------|------------------------|---------------|-----------|----------|--------|--------|------|-----|------------|------------|------------|---|
| Туре | Special function | Electrical | ator II | (Output) | | ~ | | Tie-rod | Band | 0.5 | 1 | 3 | 5 | Pre-wired | Applica | ble load | |
| | | entry | 말 | (Output) | L | | | | mounting | (Nil) | (M) | (L) | (Z) | connector | | | |
| | | | | 3-wire (NPN) | | 5 V 40 V | | M9N | - | • | ۲ | ۲ | 0 | 0 | IC circuit | | |
| | | Grommet | | 3-wire (PNP) | 24 V | ^{5 V, 12 V} – | M9P | - | • | • | ٠ | 0 | 0 | IC CITCUIT | | | |
| - | | | | 2-wire | | 12 V | 1 | M9B | - | | • | ٠ | 0 | 0 | - | 1 | |
| ţ | | Terminal | 1 | 3-wire (NPN) | | 5 V, 12 V | | _ | G39 | - | - | - | - | - | IC circuit | 1 | |
| sw | | conduit | | 2-wire | | 12 V | 1 | — | K39 | - | - | - | - | - | - | 1 | |
| 율 | | | 1 | 3-wire (NPN) | | 5 V 40 V |] | M9NW | - | • | • | • | 0 | 0 | IC circuit | | |
| al | Diagnostic indication | | Yes | 3-wire (PNP) | | 5 V, 12 V | | M9PW | — | • | ۲ | ۲ | 0 | 0 | IC CITCUIT | Relay, | |
| olid state | (2-color indicator) | | | 2-wire | 04.14 | 12 V | 1 | M9BW | _ | • | • | • | 0 | 0 | - | FLO | |
| | Water resistant (2-color indicator) | Grommet | | 3-wire (NPN) | 24 V | | M9NA*1 | - | 0 | 0 | ٠ | 0 | 0 | | 1 | | |
| | | | | 3-wire (PNP) 2-wire | 5 V, 12 V 12 V | | M9PA*1 | — | 0 | 0 | ٠ | 0 | 0 | IC CITCUIT | | | |
| S | | | | | | 1 | M9BA*1 | - | 0 | 0 | ٠ | 0 | 0 | - | | | |
| | Diagnostic indication (2-color indicator) | | | 4-wire (NPN) | | | 5 V, 12 V | 1 | F59F | - | • | - | • | 0 | 0 | IC circuit | |
| | Magnetic field resistant (2-color indicator) | | | 2-wire (Non-polar) | | | | _ | 1 | P3DWA | — | • | - | ٠ | • | 0 | _ |
| | | | | 3-wire | | 5 V | | A 06 | | | | | | | IC circuit | | |
| | | | | (NPN equivalent) | | 5 0 | | A90 | _ | • | - | • | | | IC CITCUIT | _ | |
| с, | | Crommet | | | | 12 V | 100 V | A93 | — | | ۲ | • | • | - | _ | | |
| Ň | | Giomine | No | | | 5 V, 12 V | 100 V or less | A90 | - | | - | • | - | - | IC circuit | Relay, | |
| ő | | | Yes | | | | 100 V, 200 V | A54 | - | | - | • | • | - | | PLC | |
| aut | | | No | 2-wire | 24 V | | 200 V or less | A64 | — | | - | • | - | - | | | |
| eq | pe | Terminal | | 2 1110 | 24 V | 12 V | — | | A33 | - | — | — | — | - | | PLC | |
| å | | conduit | Voc | | | 100 V, 200 | 100 1 200 1 | _ | A34 | - | - | - | - | - | | Below | |
| | | DIN terminal | lies | |] | | 100 V, 200 V | — | A44 | - | | | - | - | | PIC | |
| Diagnostic indication (2-color indicator) | | Grommet | | | | — | _ | A59W | _ | • | - | ۲ | - | - | | 110 | |
| ∗1 Wa | Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot quarantee water resistance | | | | | | | | | | | | | | | | |

Consult with SMC regarding water resistant types with the above model numbers.

* Lead wire length symbols: 0.5 m Nil (Example) M9NW

3 m ----- L 5 m ----- Z (Example) M9NWL (Example) M9NWZ

(Example) M9NWM 1 m M * Solid state auto switches marked with "O" are produced upon receipt of order.

Since there are applicable auto switches other than listed, refer to page 580 for details.
 Vetails about auto switches with pre-wired connector, refer to pages 1648 and 1649.
 O-A9CI, M9CI, M9CI, M9CI, M9CI, M2CI, PODWAL are shipped together (but not assembled). (Only auto switch mounting bracket is assembled at the time of shipment.)

568





Symbol

Double acting, air cushion



| Made to Order | Made to Order Specifications (For details, refer to pages 1703 to 1896.) |
|------------------|---|
| Symbol | Specifications |
| -XA□ | Change of rod end shape |
| -XB6 | Heat-resistant cylinder (150°C) |
| -XC3 | Special port position |
| -XC4 | With heavy duty scraper |
| -XC5 | Heat resistant cylinder (110°C) |
| -XC9 | Adjustable stroke cylinder/Adjustable retraction type |
| -XC10 | Dual stroke cylinder/Double rod type |
| -XC11 | Dual stroke cylinder/Single rod type |
| -XC14 | Change of trunnion bracket mounting position |
| -XC15 | Change of tie-rod length |
| -XC22 | Fluororubber seal |
| -XC26 | Double clevis pin/Double knuckle pin with split pin and flat washer |
| -XC27 | Double clevis pin and double knuckle pin made of stainless steel |
| -XC30 | Rod side trunnion mounted on the front of the rod cover |
| -XC35 | With coil scraper |
| -XC68 | Made of stainless steel (With hard chrome plated piston rod) |
| -XC86 | With rod end bracket |
| | |

Rod Boot Material

| Symbol | Material | Max. ambient temperature |
|--------|--------------------------|--------------------------|
| J | Nylon tarpaulin | 70°C |
| к | Heat resistant tarpaulin | 110°C* |

* Maximum ambient temperature for the rod boot itself

| For the specifications of cylinders with aut | to |
|--|----|
| switch, please refer to pages 587 to 589. | |

- Minimum stroke for auto switch mounting
- Auto switch proper mounting position (detection at stroke end) and its mounting height
- Operating range
- Auto switch mounting bracket part no.

Specifications

| Bore size (mm) | 125 | 140 |) | 160 | | | |
|-------------------------------|---|---------------|-------------------------|-----------|--|--|--|
| Action | Do | puble acting, | , Single ro | d | | | |
| Fluid | | Air | | | | | |
| Proof pressure | 1.57 MPa | | | | | | |
| Maximum operating pressure | | 0.97 MPa | | | | | |
| Minimum operating pressure | | 0.05 N | 1Pa | | | | |
| Piston speed | | 50 to 500 | mm/s | | | | |
| Cushion | | Air cus | hion | | | | |
| Ambient and fluid temperature | Without auto s | witch | 0 to 70°C (No freezing) | | | | |
| Amplent and huid temperature | With auto switch 0 to 60°C (No freezi | | | | | | |
| Lubrication | N | ot required (| (Non-lube |) | | | |
| | Stroke | | | Tolerance | | | |
| | 250 or les | s | | +1.0 | | | |
| Stroke length tolerance (mm) | 251 to 100 | 00 | | +1.4 0 | | | |
| | 1001 to 15 | 00 | | +1.8 | | | |
| | 1501 to 16 | 00 | +2.2 | | | | |
| Mounting | Basic, Foot, Rod flange, Head flange, | | | | | | |
| woulding | Single clevis, Double clevis, Center trunnion | | | | | | |

Maximum Stroke

| | | (mr | m) | | | | | |
|----------------------|---|------------------|----|--|--|--|--|--|
| Mounting | Maximum stroke | | | | | | | |
| bracket Bore size | Basic, Head flange, Single clevis, Double clevis, Center trunnion | Foot, Rod flange | | | | | | |
| 125 | 1000 or loop | | | | | | | |
| 140 | Tood of less | 1600 or less | | | | | | |
| 160 | 1200 or less | | | | | | | |
| | | | | | | | | |

Accessory

| Mounting | | Basic | Foot | Rod flange | Head flange | Single clevis | Double clevis | Center trunnion |
|-----------------------|---|-------|------|---------------|----------------|---------------|---------------|--------------------|
| Standard equipment | Clevis pin | | - | - | - | - | • | - |
| | Rod end nut | • | • | • | • | • | • | • |
| | Single knuckle joint | • | ۲ | • | • | • | ٠ | • |
| Option | Double knuckle joint (Knuckle pin, Split pin) | ۲ | • | • | • | • | • | • |
| | Rod boot | • | • | • | • | • | • | • |

 If using the rod end nut with a single knuckle joint or a double knuckle joint, use the type with rod end bracket (-XC86) or order the accessory separately. For part numbers and dimensions of accessories, refer to page 577.

Mounting Bracket Part No.

| Bore size (mm) | 125 | 140 | 160 |
|-----------------|---------|---------|---------|
| Foot* | CS2-L12 | CS2-L14 | CS2-L16 |
| Flange | CS2-F12 | CS2-F14 | CS2-F16 |
| Single clevis | CS2-C12 | CS2-C14 | CS2-C16 |
| Double clevis** | CS2-D12 | CS2-D14 | CS2-D16 |

* Order two foot brackets per cylinder.

D-

-X□

Technical Data

^{**} When ordering the double clevis type, the clevis pin and 2 split pins are included as accessories.

CS2 Series

Weight

| | | | | (kg |
|----------------------|---|------|-------|-------|
| | Bore size (mm) | 125 | 140 | 160 |
| | Basic | 5.46 | 6.50 | 9.07 |
| | Foot | 7.49 | 9.50 | 12.45 |
| | Rod flange | 8.51 | 12.03 | 15.80 |
| Basic weight | Head flange | 8.51 | 12.03 | 15.80 |
| | Single clevis | 8.53 | 10.79 | 14.56 |
| | Double clevis | 8.99 | 11.54 | 15.41 |
| | Trunnion | 9.59 | 12.23 | 15.47 |
| Additi (With buil | onal weight with magnet t-in magnet and auto switch) | 0.07 | 0.07 | 0.08 |
| Additiona | al weight per each 100 mm of stroke | 1.55 | 1.67 | 2.23 |
| | Single knuckle | 0.91 | 1.16 | 1.56 |
| Accessory bracket | Double knuckle (With Knuckle pin, Split pin) | 1.37 | 1.81 | 2.48 |
| | Rod end nut | 0.16 | 0.16 | 0.23 |
| | | | | |

Calculation: (Example) CS2L160-500

- Basic weight 12.45 (kg)
- Additional weight 2.23 (kg/100 mm)
- 12.45 + 2.23 x 500/100 = 23.60 (kg)

≜ Warning

- 1. Do not use the cylinder as a shock absorber.
 - Using the cylinder as a shock absorber may cause damage.
- 2. Do not open the cushion valve beyond the stopper.

As a retaining mechanism for the cushion valve, retaining ring is installed, and the cushion valve should not be opened beyond that point.

If not operated in accordance with the above precautions, the cushion valve may be ejected from the cover when air pressure is supplied.

To adjust the cushion valve, use the JIS B 4648 hexagon wrench key 4 (width across flats of cushion valve: 4).

3. Use the air cushion at the end of cylinder stroke.

≜Caution

1. Regarding the installation of a knuckle joint

Please contact SMC if a knuckle joint must be installed on the piston rod by using the rod end nut.

2. Regarding the screw-in of fittings when piping

When ports and fittings are screwed in, tighten them with the proper tightening torque below.

| Bore size (mm) | Connecting thread nominal size | Proper tightening torque N·m |
|-------------------|--------------------------------|---------------------------------|
| 125, 140 | 1/2 | 00.4- 00 |
| 160 | 3/4 | 28 to 30 |

- 3. Do not deform cushion rings when removing and assembling.
- Cushion rings are press molded products. If a cushion ring bumps with something when removing and assembling, the air cushion may not function properly due to cushion ring deformation.
- 4. Do not place tape or other objects onto the painted surface of the unit.

The paint of the CS cylinder is dried naturally, so it may peel off if tape or another object is placed onto it.

→OUT → IN

| | | | | | | | | | | | | Unit: N |
|-----------|-------------------------------|-----------|-------------|------|--------------------------|------|-------|-------|-------|-------|-------|---------|
| Bore size | Rod size Opera (mm) direct | Operating | Piston area | | Operating pressure (MPa) | | | | | | | |
| (mm) | | direction | (mm²) | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| 125 | | OUT | 12300 | 2460 | 3690 | 4920 | 6150 | 7380 | 8610 | 9840 | 11100 | 12300 |
| | 32 | IN | 11500 | 2300 | 3450 | 4600 | 5750 | 6900 | 8050 | 9200 | 10400 | 11500 |
| 140 | 20 | OUT | 15400 | 3080 | 4620 | 6160 | 7700 | 9240 | 10800 | 12300 | 13900 | 15400 |
| 140 | 32 | IN | 14600 | 2920 | 4380 | 5840 | 7300 | 8760 | 10200 | 11700 | 13100 | 14600 |
| 160 | 38 | OUT | 20100 | 4020 | 6030 | 8040 | 10100 | 12100 | 14100 | 16100 | 18100 | 20100 |
| | | IN | 19000 | 3800 | 5700 | 7600 | 9500 | 11400 | 13300 | 15200 | 17100 | 19000 |
| | | | | | | | | | | | | |

Theoretical Output / Double Acting

Air Cylinder CS2 Series

Relation between Cylinder Size and Maximum Stroke

The below table shows the applicable maximum stroke (in cm units), found by calculation assuming the case where the force generated by the cylinder itself acts as buckling force on the piston rod, or piston rod and cylinder tube.

Therefore, it is possible to find the applicable maximum stroke for each cylinder size using the relationship between the size of the operating pressure and the cylinder support type, regardless of the load ratio.

[Reference] If it is stopped with the external stopper on the cylinder extension side, even with a light load, the maximum generated force of the cylinder will act on the cylinder itself.

| <u>، ات ا</u> | (cm) | | | | | | | |
|---------------|--------------------|--------------------------|-----------------|--------------------|-------------------|--------------------------|--|---|
| CM | ling strength (cm) | stroke according to buck | Applicable max. | Operating pressure | | unting | Мо | |
| CM | 160 | 140 | 125 | (MPa) | Nominal symbol | al symbol gram | oracket nomina schematic diag | Support and |
| CG | 113 | 92 | 103 | 0.3 | | Head flange: G | Rod flange: F | Foot: L |
| CG | 86 | 70 | 79 | 0.5 | L, F | Ŵ | W | W |
| | 72 | 58 | 66 | 0.7 | | | 1 | |
| JIVI | 47 | 38 | 45 | 0.3 | | ů, | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | |
| MB | 34 | 27 | 33 | 0.5 | G | | H. | |
| MB | 27 | 22 | 26 | 0.7 | | | U | |
| | 106 | 83 | 96 | 0.3 | | ter trunnion: T | D Cen | Clevis: C, |
| LA | 76 | 61 | 71 | 0.5 | C, D | | | |
| CS | 62 | 50 | 59 | 0.7 | | | | |
| CS | 147 | 119 | 135 | 0.3 | | | | |
| | 111 | 89 | 101 | 0.5 | т | 题 | | Į, |
|] | 91 | 74 | 84 | 0.7 | | | | |
|] | 330 | 267 | 301 | 0.3 | | Head flange: G | Rod flange: F | Foot: L |
| | 253 | 207 | 231 | 0.5 | L, F | | | |
|] | 212 | 172 | 193 | 0.7 | | | | 1 |
|] | 156 | 126 | 144 | 0.3 | | ф, | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | ł. |
|] | 118 | 94 | 109 | 0.5 | G | | Щ | |
|] | 97 | 78 | 90 | 0.7 | | | U | ₽ ₽ |
| | 476 | 386 | 433 | 0.3 | | Head flange: G | Rod flange: F | Foot: L |
| | 367 | 297 | 334 | 0.5 | L, F | | | |
| | 309 | 250 | 281 | 0.7 | | | | |
| | 229 | 185 | 210 | 0.3 | | l ál | | |
| | 175 | 141 | 160 | 0.5 | G | | Ĥ | |
| 1 | 120 | 117 | 194 | 0.7 | | NJ | L 11.1 | 신 말 문 비 비 비 비 비 비 비 비 비 비 비 비 비 비 비 비 비 비 |



CJ1

CJP

CJ2 JCM

571

CS2 Series

Construction





Component Parts

| No. | Description | Material | Note |
|-----|----------------|-------------------|---------------------|
| 1 | Rod cover | Aluminum die-cast | Chromated |
| 2 | Head cover | Aluminum die-cast | Chromated |
| 3 | Cylinder tube | Aluminum alloy | Hard anodized |
| 4 | Piston | Aluminum alloy | Chromated |
| 5 | Piston rod | Carbon steel | Hard chrome plated |
| 6 | Bushing | Bearing alloy | |
| 7 | Tie-rod | Carbon steel | Zinc chromated |
| 8 | Tie-rod nut | Rolled steel | Nickel plated |
| 9 | Cushion ring | Stainless steel | |
| 10 | Cushion valve | Rolled steel | Nickel plated |
| 11 | Piston nut | Carbon steel | Nickel plated |
| 12 | Flat washer | Carbon steel | Nickel plated |
| 13 | Wear ring | Resin | |
| 14 | Magnet* | _ | |
| 15 | Retaining ring | Spring steel | Phosphate treatment |

* Built-in magnet type with auto switch

Component Parts

| No. | Description | Material | Note |
|-----|---------------|----------|------|
| 16 | Rod seal | NBR | |
| 17 | Cushion seal | Urethane | |
| 18 | Piston seal | NBR | |
| 19 | Valve seal | NBR | |
| 20 | Tube gasket | NBR | |
| 21 | Piston gasket | NBR | |

Replacement Parts: Seal Kit

| Bore size (mm) | Kit no. | Content |
|----------------|-------------|-----------------------|
| 125 | CS2-125A-PS | Catefree |
| 140 | CS2-140A-PS | set of nos. |
| 160 | CS2-160A-PS | above (0, (0, (0, Q). |

Seal kit includes a grease pack (40 g).
 Order with the following part number when only the grease pack is needed.
 Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)

CJ1

CJP

CJ2

JCM

CM2

CM3

CG1

CG3

JMB MB MB1 CA2

CS1 CS2

M36 x 1.5

Dimensions

Basic: CS2B



M16 x 1.5

15 20 17 34 30.5

| | | | | | | | | | | (mm) |
|-----------|------|-----|-----|---------|----------|----|----|--------|------------|-------|
| Bore size | N | Б | 6 | Without | rod boot | | | With r | od boot | |
| (mm) | IN | F | 3 | Н | ZZ | е | f | h | l | ZZ1 |
| 125 | 30.5 | 1/2 | 98 | 110 | 235 | 75 | 40 | 133 | 1/5 stroke | 258 |
| 140 | 30.5 | 1/2 | 98 | 110 | 235 | 75 | 40 | 133 | ⅓ stroke | 258 |
| 160 | 34.5 | 3/4 | 106 | 120 | 256.5 | 75 | 40 | 141 | ⅓ stroke | 277.5 |

* The minimum stroke with rod boot is 30 mm or more

56 53 177 144 38 78.5 42 18

** For auto switch mounting position and its mounting height, refer to page 587. *** Refer to "Minimum Stroke for Auto Switch Mounting" on page 588.

Foot: CS2L

160

Up to 1200



| Bore size (mm) | Stroke range (mm) | Α | AL | □B | в | □C | D | E | F | G | J | v | w | к | KA | LD | LH | LS |
|-------------------|----------------------|----|----|-----|-----|-----|----|------|----|----|-----------|----|----|----|----|----|-----|-----|
| 125 | Up to 1600 | 50 | 47 | 143 | 143 | 115 | 32 | 71 | 43 | 15 | M14 x 1.5 | 15 | 17 | 15 | 27 | 19 | 85 | 188 |
| 140 | Up to 1600 | 50 | 47 | 157 | 157 | 128 | 32 | 71 | 43 | 15 | M14 x 1.5 | 15 | 17 | 15 | 27 | 19 | 100 | 188 |
| 160 | Up to 1600 | 56 | 53 | 177 | 177 | 144 | 38 | 78.5 | 42 | 18 | M16 x 1.5 | 15 | 20 | 17 | 34 | 19 | 106 | 206 |
| | (mm) | | | | | | | | | | | | | | | | | |

| Bore size | 1.7 | 1.2 | 1.2 | NANA | N | Р | 6 | v | v | Without | rod boot | | | With I | rod boot | |
|-----------|------------|-----|-------|-----------|------|-----|-----|----|----|---------|----------|----|----|--------|------------|-----|
| (mm) | L 1 | | L1 | IVIIVI | IN | F | 3 | ^ | T | н | ZZ | е | f | h | l | ZZ1 |
| 125 | 8 | 100 | 156.5 | M30 x 1.5 | 30.5 | 1/2 | 98 | 45 | 20 | 110 | 273 | 75 | 40 | 133 | ⅓ stroke | 296 |
| 140 | 9 | 112 | 178.5 | M30 x 1.5 | 30.5 | 1/2 | 98 | 45 | 30 | 110 | 283 | 75 | 40 | 133 | 1/5 stroke | 306 |
| 160 | 9 | 118 | 194.5 | M36 x 1.5 | 34.5 | 3/4 | 106 | 50 | 25 | 120 | 301 | 75 | 40 | 141 | ⅓ stroke | 322 |

* The minimum stroke with rod boot is 30 mm or more.

** For auto switch mounting position and its mounting height, refer to page 587.

*** Refer to "Minimum Stroke for Auto Switch Mounting" on page 588.

D--X□

Technical Data

CS2 Series

h + ℓ

ZZ1 + ℓ + Stroke

Dimensions

ő



FT

ĸ

н

F N

Α



(mm)

| | | | | | | | | | | | | | | | | | (mm) |
|-------------------|----------------------|----|----|-----|-----|-----|----|------|----|----|----|-----|-----|-----|----|-----------|------|
| Bore size (mm) | Stroke range (mm) | A | AL | □B | в | □C | D | E | F | FD | FT | FX | FY | FZ | G | J | v |
| 125 | Up to 1600 | 50 | 47 | 143 | 145 | 115 | 32 | 71 | 43 | 19 | 14 | 190 | 100 | 230 | 15 | M14 x 1.5 | 15 |
| 140 | Up to 1600 | 50 | 47 | 157 | 160 | 128 | 32 | 71 | 43 | 19 | 20 | 212 | 112 | 255 | 15 | M14 x 1.5 | 15 |
| 160 | Up to 1600 | 56 | 53 | 177 | 180 | 144 | 38 | 78.5 | 42 | 19 | 20 | 236 | 118 | 275 | 18 | M16 x 1.5 | 15 |

ZZ + Stroke

S + Stroke

Ν

Μ

| | | | | | | | | | | | | | | | (mm) |
|-----------|----------|---------------|----|---------|-----------|------|-----|------|----------|-----|----|----|-----|------------|------|
| Bore size | W | K KA M MM N P | 6 | Without | rod boot | | | With | rod boot | | | | | | |
| (mm) | vv | n n | | | | | P | 3 | н | ZZ | е | f | h | l | ZZ1 |
| 125 | 17 | 15 | 27 | 13 | M30 x 1.5 | 30.5 | 1/2 | 98 | 110 | 221 | 75 | 40 | 133 | 1/s stroke | 244 |
| 140 | 17 | 15 | 27 | 13 | M30 x 1.5 | 30.5 | 1/2 | 98 | 110 | 221 | 75 | 40 | 133 | 1/5 stroke | 244 |
| 160 | 20 | 17 | 34 | 15 | M36 x 1.5 | 34.5 | 3/4 | 106 | 120 | 241 | 75 | 40 | 141 | 1/5 stroke | 262 |

* The minimum stroke with rod boot is 30 mm or more.

** For auto switch mounting position and its mounting height, refer to page 587. *** Refer to "Minimum Stroke for Auto Switch Mounting" on page 588.

Head flange: CS2G



| | | | | | | | | | | | | | | | | | (11111) |
|-------------------|----------------------|----|----|-----|-----|-----|----|------|----|----|----|-----|-----|-----|----|-----------|---------|
| Bore size (mm) | Stroke range (mm) | A | AL | □B | в | □C | D | E | F | FD | FT | FX | FY | FZ | G | J | v |
| 125 | Up to 1000 | 50 | 47 | 143 | 145 | 115 | 32 | 71 | 43 | 19 | 14 | 190 | 100 | 230 | 15 | M14 x 1.5 | 15 |
| 140 | Up to 1000 | 50 | 47 | 157 | 160 | 128 | 32 | 71 | 43 | 19 | 20 | 212 | 112 | 255 | 15 | M14 x 1.5 | 15 |
| 160 | Up to 1200 | 56 | 53 | 177 | 180 | 144 | 38 | 78.5 | 42 | 19 | 20 | 236 | 118 | 275 | 18 | M16 x 1.5 | 15 |
| | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | . , |
|-----------|----|-----|-----------|-----------|---------|-----|-----|---------|----------|----|----|------|------------|-----|
| Bore size | w | r | K A | NANA | N | п | 6 | Without | rod boot | | | With | rod boot | |
| (mm) | | n n | NA | | IN 20.5 | - F | 3 | н | ZZ | е | f | h | l | ZZ1 |
| 125 | 17 | 15 | 27 | M30 x 1.5 | 30.5 | 1/2 | 98 | 110 | 222 | 75 | 40 | 133 | 1/5 stroke | 245 |
| 140 | 17 | 15 | 27 | M30 x 1.5 | 30.5 | 1/2 | 98 | 110 | 228 | 75 | 40 | 133 | 1/5 stroke | 251 |
| 160 | 20 | 17 | 34 | M36 x 1.5 | 34.5 | 3/4 | 106 | 120 | 246 | 75 | 40 | 141 | 1/5 stroke | 267 |

* The minimum stroke with rod boot is 30 mm or more.

** For auto switch mounting position and its mounting height, refer to page 587.

*** Refer to "Minimum Stroke for Auto Switch Mounting" on page 588.

574

Dimensions

Single clevis: CS2C



Double clevis: CS2D



| Bore size | Stroke rang | e , | • | | | | | CDuus | OT | Single clevis | Doub | e clevis | | - | - | 6 | | v | 14/ | |
|-----------|-------------|-----|----|-----|------------|------|-----|-------------|----|---------------|---------|-----------|-----|------|-----|------|------------|------------|------|-----|
| (mm) | (mm) | 1 | • | AL | | | | CDH10 | CI | СХ | СХ | CZ | יר | - | - F | G | J | v | vv | |
| 125 | Up to 100 | 0 5 | i0 | 47 | 143 | 115 | 145 | 25 +0.084 | 17 | 32 -0.1 | 32 +0.3 | 64 -0.2 | 32 | 71 | 43 | 15 | M14 x 1.5 | 15 | 17 | |
| 140 | Up to 100 | 0 5 | 60 | 47 | 157 | 128 | 160 | 28 +0.084 0 | 17 | 36 -0.1 | 36 +0.3 | 72 _0.2 | 32 | 71 | 43 | 15 | M14 x 1.5 | 15 | 17 | |
| 160 | Up to 120 | 0 5 | 6 | 53 | 177 | 144 | 180 | 32 +0.100 | 20 | 40 -0.1 | 40 +0.3 | 80 -0.2 | 38 | 78.5 | 42 | 18 | M16 x 1.5 | 15 | 20 | |
| | | | | | | | | | | | | | | | | | | | (mm) | |
| Bore size | v | ~ | | | NANA | N | | 6 | | DD | With | out rod b | oot | | | With | rod boot | | | |
| (mm) | ^ | ĸА | - | - | IVIIVI | | " | 13 | 0 | | н | Z | ZZ | е | f | h | l | Z 1 | ZZ1 | |
| 125 | 15 | 27 | 6 | 5 N | //30 x 1.5 | 30.5 | 1/2 | 98 | 35 | 29 | 110 | 273 | 302 | 75 | 40 | 133 | 1/5 stroke | 296 | 325 | D-🗆 |
| 140 | 15 | 27 | 7 | 5 N | //30 x 1.5 | 30.5 | 1/2 | 98 | 40 | 32 | 110 | 283 | 315 | 75 | 40 | 133 | 1/5 stroke | 306 | 338 | |
| 160 | 17 | 34 | 8 | 0 N | //36 x 1.5 | 34.5 | 3/4 | 106 | 45 | 36 | 120 | 306 | 342 | 75 | 40 | 141 | 1/5 stroke | 327 | 363 | -X□ |

* The minimum stroke with rod boot is 30 mm or more.

** For auto switch mounting position and its mounting height, refer to page 587.

*** Refer to "Minimum Stroke for Auto Switch Mounting" on page 588.

575

Technical Data

(mm)

MB

MB1

CS2 Series

Dimensions

Center trunnion: CS2T



| Bore size (mm) | Stroke ra (mm) | ange) | Α | AL | □В | □c | D | E | F | G | J | v | ' | w | к | КА | м | ММ | N |
|-------------------|-------------------|-----------|----|------|-----|-----------|-----|------|----|-------|------------|------|---|----|----|----------|--------|-----------|------|
| 125 | 25 to 10 | 000 | 50 | 47 | 143 | 115 | 32 | 71 | 43 | 15 | M14 x 1. | 5 15 | 5 | 17 | 15 | 27 | 13 | M30 x 1.5 | 30.5 |
| 140 | 30 to 10 | 000 | 50 | 47 | 157 | 128 | 32 | 71 | 43 | 15 | M14 x 1. | 5 15 | 5 | 17 | 15 | 27 | 13 | M30 x 1.5 | 30.5 |
| 160 | 35 to 12 | 200 | 56 | 53 | 177 | 144 | 38 | 78.5 | 42 | 18 | M16 x 1. | 5 15 | 5 | 20 | 17 | 34 | 15 | M36 x 1.5 | 34.5 |
| | | | | | | | | | | | | | | | | | | | (mm) |
| Bore size | | - | | | | TT | τv | τv | 77 | Witho | ut rod boo | t | | | | With roo | d boot | | |
| (mm) | P | n | 5 | 1 11 | Jea | | 1.4 | 11 | 12 | н | 7 7 | 7 | • | f | h | | 1 | 71 | 771 |

(mm)

| | | | | | | TV | TV | | | | | | | | | | |
|------|-----|-----|-----|------------------|----|-----------|-----------|-----|-----|-----|-----|----|----|-----|------------|------------|-----|
| (mm) | P | R | 3 | I De8 | | 17 | IT | 12 | н | Z | ZZ | е | f | h | l | Z 1 | ZZ1 |
| 125 | 1/2 | 1 | 98 | 32 -0.050 | 50 | 170 | 164 | 234 | 110 | 159 | 221 | 75 | 40 | 133 | 1/s stroke | 182 | 244 |
| 140 | 1/2 | 1.5 | 98 | 36 -0.050 -0.089 | 55 | 190 | 184 | 262 | 110 | 159 | 221 | 75 | 40 | 133 | 1/s stroke | 182 | 244 |
| 160 | 3/4 | 1.5 | 106 | 40 -0.050 -0.089 | 60 | 212 | 204 | 292 | 120 | 173 | 241 | 75 | 40 | 141 | 1/s stroke | 194 | 262 |

* The minimum stroke with rod boot is 30 mm or more for ø125, ø140 and 35 mm or more for ø160.

** For auto switch mounting position and its mounting height, refer to page 587. *** Refer to "Minimum Stroke for Auto Switch Mounting" on page 588.



I Type Single Knuckle Joint*



| | | | | | | | | | Material: | Cast | iron |
|--------|----------|---------------------------------|------------|----|----|-----|-----------|----------------------|----------------------------|------|------|
| \Box | Part no. | Applicable bore size (mm) | A 1 | A2 | E1 | Lı | мм | NDH10 | NX | RRı | U₁ |
| | I-12A | 125 | 8 | 54 | 46 | 100 | M30 x 1.5 | 25 ^{+0.084} | 32 ^{-0.1} -0.3 | 27 | 33 |
| | I-14A | 140 | 8 | 54 | 48 | 105 | M30 x 1.5 | 28 +0.084 | 36 -0.1 | 30 | 39 |
| | I-16A | 160 | 8 | 60 | 55 | 110 | M36 x 1.5 | 32 +0.1 | 40 -0.1 | 34 | 39 |

Y Type Double Knuckle Joint*



* Use a single knuckle joint or a double knuckle joint individually

(Screw it entirely over the rod end threads and tighten it.) * Extend the dimensions of A, H. when using a single/double knuckle joint together with a rod end nut.

(To extend dimensions A, H, refer to the below table, and specify the product as made-to-order -XA0.)

* A pin and split pin are included with the double knuckled joint.

• "Made to order" with rod end bracket (-XC86) is available when ordering cylinders and accessories together. Please refer to page 1855 for details.

Single/Double Knuckle Joint



| Symbol | ц | • | | | ш. | Applicable knuckle | e joint part number |
|-----------|-----|----|-----|-----|-------|-----------------------|-----------------------|
| size (mm) | п | ~ | u u | 5 | - 11 | I type single knuckle | Y type double knuckle |
| 125 | 110 | 50 | 3.5 | 100 | 156.5 | I-12A | Y-12A |
| 140 | 110 | 50 | 3.5 | 105 | 161.5 | I-14A | Y-14A |
| 160 | 120 | 56 | 3.5 | 110 | 170.5 | I-16A | Y-16A |

Knuckle Pin / Clevis Pin

Dd9

25 -0.065

28 -0.065

32 -0.080

Part no. Applicabl

IY-12 125

IY-14 140

IY-16 160

* Split pin is included.

Rod End Nut

| ۲ د - | - m - m - m | | | | | CJ1 CJP |
|----------|-------------------|-------|---------------------|--------------|------------------|------------|
| | | - | | | | CJ2 |
| | Mat | erial | Carb | on s | steel | JCM |
| L | l | m | d (Dril through) | Appl spli | icable it pin | |
| 79.5 | 69.5 | 5 | 4 | ø4 | x 40 | CM2 |
| 86.5 | 76.5 | 5 | 4 | ø4 | x 40 | CM3 |
| 94.5 | 84.5 | 5 | 4 | ø4 | x 40 | UNIS |
| | | | | | | CG1 |
| | | | | | | CG3 |
| | | | | | | JMB |
| d | * | | T | | | MB |

MB1 CA2



| | | | | | | | - |
|----------|-------------------------|-----------|----|---------|--------|---------|-----|
| | | | Ma | terial: | Rollec | d steel | |
| Part no. | Applicable bore size | d | н | в | с | D | CS1 |
| NT-12 | (mm) 125, 140 | M30 x 1.5 | 18 | 46 | 53.1 | 44 | CS2 |
| NT-16 | 160 | M36 x 1.5 | 21 | 55 | 63.5 | 53 | |

A, H Dimensions when Mounting a Single/Double Knuckle Joint together with a Rod End Nut

| | - | | |
|----------------|----|-----|----------|
| Bore size (mm) | Α | н | |
| 125 | 65 | 125 | |
| 140 | 65 | 125 | -~ |
| 160 | 76 | 140 | Technica |
| | | | Data |

577

Air Cylinder, Double Rod **CS2W** Series ø125. ø140. ø160

How to Order



| Type | Special function | entry | 1 de | (Output) | D | C | AC | Tie-rod | Band | 0.5 | 1 | 3 | 5 | connector | Applicat | Jie load |
|-------|--|--------------|------|----------------------------|-------|-----------|---------------|----------|----------|-------|-----|-----|-----|-----------|------------|----------|
| | | , | B | (Output) | | • | 1.0 | mounting | mounting | (Nil) | (M) | (L) | (Z) | | | |
| | | | | 3-wire (NPN) | | E V 10 V | | M9N | — | • | • | • | 0 | 0 | 10 | |
| | | Grommet | | 3-wire (PNP) | 24 V | 5 V, 12 V | _ | M9P | _ | • | • | | 0 | 0 | IC CIrcuit | |
| £ | | | | 2-wire | | 12 V | 1 | M9B | _ | • | ۲ | • | 0 | 0 | _ | |
| j | | Terminal | 1 | 3-wire (NPN) | | 5 V, 12 V | | _ | G39 | - | - | - | - | - | IC circuit | |
| sv | | conduit | | 2-wire | | 12 V | 1 | _ | K39 | - | - | - | - | - | _ | |
| 육 | Disconnetis indiantian | | 1 | 3-wire (NPN) | | 5 V 40 V | 1 | M9NW | — | • | ۲ | • | 0 | 0 | | |
| al | Diagnostic indication | | Yes | 3-wire (PNP) | | 5 V, 12 V | | M9PW | — | • | • | • | 0 | 0 | IC circuit | Relay, |
| ate | (2-color indicator) | | | 2-wire | 04.14 | 12 V | 1 | M9BW | — | • | • | • | 0 | 0 | _ | PLC |
| 1st | | 0 | | 3-wire (NPN) | 24 V | 5 V 40 V | 1 - | M9NA*1 | — | 0 | 0 | • | 0 | 0 | | |
| iế | Water resistant (2-color indicator) | Grommet | | 3-wire (PNP) | | 5 V, 12 V | | M9PA*1 | — | 0 | 0 | • | 0 | 0 | IC CIrcuit | |
| Ň | | | | 2-wire | | 12 V |] | M9BA*1 | _ | 0 | 0 | | 0 | 0 | _ | |
| | Diagnostic indication (2-color indicator) | | | 4-wire (NPN) | | 5 V, 12 V |] | F59F | — | • | — | • | 0 | 0 | IC circuit | |
| | Magnetic field resistant (2-color indicator) | | | 2-wire (Non-polar) | | _ |] | P3DWA | — | • | - | • | • | 0 | _ | |
| | | | | 3-wire (NPN equivalent) | _ | 5 V | — | A96 | _ | • | - | | - | - | IC circuit | - |
| ÷ | | | res | | | 12 V | 100 V | A93 | — | • | ۲ | • | • | - | _ | |
| , ito | | Grommet | No | | | 5 V, 12 V | 100 V or less | A90 | — | • | - | • | - | - | IC circuit | Relay, |
| s | | | Yes | | | | 100 V, 200 V | A54 | — | | — | | | — | | PLC |
| 육 | | | No | 2-wiro | 04 V | | 200 V or less | A64 | _ | | - | | - | - | | |
| lai | | Terminal | | 2-1116 | 24 V | 12 V | — | _ | A33 | - | - | - | - | - | | PLC |
| ee | | conduit | | | | | 100 V 200 V | _ | A34 | - | - | - | - | - | _ | Balay |
| ć | | DIN terminal | lies | | | | 100 V, 200 V | _ | A44 | - | - | - | - | - | | nelay, |
| | Diagnostic indication (2-color indicator) | Grommet | | | | _ | _ | A59W | — | | - | | - | - | | FLC |

*1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance.

Consult with SMC regarding water resistant types with the above model numbers.

| * Lead wire | length | symbo |
|-------------|--------|-------|
|-------------|--------|-------|

ols: 0.5 m Nil (Example) M9NW 1 m M (Example) M9NWM

(Example) M9NWL 5 m..... Z (Example) M9NWZ

* Solid state auto switches marked with "O" are produced upon receipt of order.

* Since there are applicable auto switches other than listed, refer to page 589 for details

* For details about auto switches with pre-wired connector, refer to pages 1648 and 1649.

* D-A9□, M9□, M9□W, M9□A, P3DWA□ are shipped together (but not assembled). (Only auto switch mounting bracket is assembled at the time of shipment.)

578



3 m----- L

Air Cylinder, Double Rod CS2W Series

Symbol

Double acting, air cushion



Rod Boot Material

| Symbol | Material | Max. ambient temperature |
|--------|--------------------------|--------------------------|
| J | Nylon tarpaulin | 70°C |
| к | Heat resistant tarpaulin | 110°C* |

* Maximum ambient temperature for the rod boot itself.

Minimum Stroke for Auto Switch Mounting

For details on the minimum number of strokes required for mounting, please refer to the "Minimum Stroke for Auto Switch Mounting" table on page 588.

| Made to Order | Made to Order Specifications (For details, refer to pages 1703 to 1896.) |
|------------------|--|
| Symbol | Specifications |
| -XA□ | Change of rod end shape |
| -XB6 | Heat-resistant cylinder (150°C) |
| -XC4 | With heavy duty scraper |
| -XC5 | Heat resistant cylinder (110°C) |
| -XC14 | Change of trunnion bracket mounting positions |
| -XC15 | Change of tie-rod length |
| -XC22 | Fluororubber seal |
| -XC30 | Rod side trunnion mounted on the front of the rod cover |
| -XC35 | With coil scraper |
| -XC68 | Made of stainless steel (With hard chrome plated piston rod) |

For the specifications of cylinders with autoswitch, please refer to pages 587 to 589.

Minimum stroke for auto switch mounting

 Auto switch proper mounting position (detection at stroke end) and its mounting height

· Operating range

• Auto switch mounting bracket part no.

Specifications

| Bore size (mm) | 125 | 14 | 0 | 160 | | | |
|-------------------------------|--|--------------|------------|-------------------|--|--|--|
| Action | D | ouble acting | , Double r | od | | | |
| Fluid | | Ai | r | | | | |
| Proof pressure | | 1.57 | MPa | | | | |
| Maximum operating pressure | | 0.97 | MPa | | | | |
| Minimum operating pressure | | 0.05 | MPa | | | | |
| Piston speed | | 50 to 50 | 0 mm/s | | | | |
| Cushion | | Air cu: | shion | | | | |
| Ambient and fluid temperature | Without auto s | witch | 0 to 7 | 0°C (No freezing) | | | |
| Ambient and huid temperature | With auto sw | itch | 0 to 6 | 0°C (No freezing) | | | |
| Lubrication | Not required (Non-lube) | | | | | | |
| Stroke length tolerance | 250 or less st : $^{+1.0}_{0}$, 251 to 1,000 st : $^{+1.4}_{0}$, 1,001 to 1,200 st : $^{+1.8}_{0}$ | | | | | | |
| Mounting | Basic, Foot, Rod flange, Head flange, Center trunnion | | | | | | |

Maximum Stroke

| | (1111) | . L |
|-----------|----------------|-----|
| Bore size | Maximum stroke | 6 |
| 125 | 1000 or loss | |
| 140 | 1000 of less | Г |
| 160 | 1200 or less | Ŀ |

Accessory

| | Mounting | Basic | Foot | Rod flange | Center trunnion |
|--------|--|-------|------|---------------|--------------------|
| | Rod end nut | • | • | • | • |
| | Single knuckle joint | • | • | • | • |
| Option | Double knuckle joint (Knuckle pin, Split pin) | • | • | • | • |
| | Rod boot | • | • | • | ۲ |

* If using the rod end nut together with a single knuckle joint and a double knuckle joint, please refer to page 577.

Mounting Bracket Part No.

| Bore size (mm) | 125 | 140 | 160 |
|----------------|---------|---------|---------|
| Foot* | CS2-L12 | CS2-L14 | CS2-L16 |
| Flange | CS2-F12 | CS2-F14 | CS2-F16 |
| | | | |

* Order two foot brackets per cylinder.

Weight / Aluminum tube: Lube type

| | | | | (kg) |
|----------------------|---|----------------|-------|-------|
| | Bore size (mm) | 125 | 140 | 160 |
| | Basic | 6.36 | 7.54 | 9.93 |
| Basic | Foot | 8.39 | 10.54 | 13.31 |
| weight | Rod flange | 9.41 | 13.07 | 16.66 |
| | Trunnion | 10.49 | 13.27 | 16.33 |
| Addit (With bui | ional weight with magnet It-in magnet and auto switch) | 0.07 | 0.07 | 0.08 |
| Additiona | I weight per 100 mm of stroke | 2.18 | 2.30 | 3.11 |
| | Single knuckle | 0.91 | 1.16 | 1.56 |
| Accessory bracket | Double knuckle joint (Knuckle pin, Split pin) | 1.37 | 1.81 | 2.48 |
| | Rod end nut | 0.16 | 0.16 | 0.23 |
| Calculation | (Example) CS2WL160-500 | • | | |
| | Basic weight 13 | 3.31 (kg) | | |
| | • Additional weight 3. | 11 (kg/100 mm) | | |
| | Cylinder stroke 50 | 0 (mm) | | |

13.31 + 3.11 x 500/100 = 28.86 (kg)

579

D-

-X□

Technical Data

CS2W Series

Construction





Component Parts

| No. | Description | Material | Note |
|-----|----------------|-------------------|---------------------|
| 1 | Rod cover | Aluminum die-cast | Chromated |
| 2 | Cylinder tube | Aluminum alloy | Hard anodized |
| 3 | Piston | Aluminum alloy | Chromated |
| 4 | Piston rod A | Carbon steel | Hard chrome plated |
| 5 | Piston rod B | Carbon steel | Hard chrome plated |
| 6 | Bushing | Bearing alloy | |
| 7 | Tie-rod | Carbon steel | Zinc chromated |
| 8 | Tie-rod nut | Rolled steel | Nickel plated |
| 9 | Cushion ring | Stainless steel | |
| 10 | Cushion valve | Rolled steel | Nickel plated |
| 11 | Retaining ring | Spring steel | Phosphate treatment |
| 12 | Flat washer | Carbon steel | Nickel plated |
| 13 | Pin | Spring steel | Phosphate treatment |
| 14 | Magnet* | — | |

* Built-in magnet type with auto switch

Component Parts

| | - | | |
|-----|---------------|----------|------|
| No. | Description | Material | Note |
| 15 | Rod seal | NBR | |
| 16 | Cushion seal | Urethane | |
| 17 | Piston seal | NBR | |
| 18 | Valve seal | NBR | |
| 19 | Tube gasket | NBR | |
| 20 | Piston gasket | NBR | |

Replacement Parts: Seal Kit

| Bore size (mm) | Kit no. | Content |
|----------------|-------------|-----------------------|
| 125 | CS2W125A-PS | 0.1.7 |
| 140 | CS2W140A-PS | Set of nos. |
| 160 | CS2W160A-PS | above 15, 16, 17, 19. |

Seal kit includes a grease pack (40 g).
 Order with the following part number when only the grease pack is needed.
 Grease pack part number: GR-S-010 (10 g), GR-S-020 (20 g)

SMC

Air Cylinder, Double Rod CS2W Series

Dimensions



| Bore size (mm) | Stroke range (mm) | A | AL | □В | в | с | D | E | F | G | J | ۷ | w | к | KA | LD | LH | LS | LT | LX | LY |
|-------------------|----------------------|----|----|-----|-----|-----|----|------|----|----|-----------|----|----|----|----|----|-----|-----|----|-----|-------|
| ø 125 | Up to 1000 | 50 | 47 | 143 | 143 | 115 | 32 | 71 | 43 | 15 | M14 x 1.5 | 15 | 17 | 15 | 27 | 19 | 85 | 188 | 8 | 100 | 156.5 |
| ø 140 | Up to 1000 | 50 | 47 | 157 | 157 | 128 | 32 | 71 | 43 | 15 | M14 x 1.5 | 15 | 17 | 15 | 27 | 19 | 100 | 188 | 9 | 112 | 178.5 |
| ø 160 | Up to 1200 | 56 | 53 | 177 | 177 | 144 | 38 | 78.5 | 42 | 18 | M16 x 1.5 | 15 | 20 | 17 | 34 | 19 | 106 | 206 | 9 | 118 | 194.5 |

(mm)

| Bore size | | | | _ | v | v | Without | rod boot | With rod boot (Single side) | | | | | | | | |
|--------------|-----------|------|-----|-----|----|----|---------|----------|-----------------------------|----|-----|------------|-----|-----|--|--|--|
| (mm) | IVIIVI | IN | Р | 5 | ^ | T | н | ZZ | е | f | h | l | ZZ | ZZ | | | |
| ø 125 | M30 x 1.5 | 30.5 | 1/2 | 98 | 45 | 20 | 110 | 318 | 75 | 40 | 133 | 1/5 stroke | 341 | 364 | | | |
| ø 140 | M30 x 1.5 | 30.5 | 1/2 | 98 | 45 | 30 | 110 | 318 | 75 | 40 | 133 | 1/5 stroke | 341 | 364 | | | |
| ø 160 | M36 x 1.5 | 34.5 | 3/4 | 106 | 50 | 25 | 120 | 346 | 75 | 40 | 141 | 1/5 stroke | 367 | 388 | | | |

* The minimum stroke with rod boot is 30 mm or more.

** For auto switch mounting position and its mounting height, refer to page 587.

*** Refer to "Minimum Stroke for Auto Switch Mounting" on page 588.

581

D-□ -X□

Technical

Data

CS2W Series

Dimensions

Rod flange: CS2WF



| Bore size (mm) | Stroke range (mm) | A | AL | □B | в | с | D | E | F | FD | FT | FX | FY | FZ | G | J | v | w | к | KA | м |
|-------------------|----------------------|----|----|-----|-----|-----|----|------|----|----|----|-----|-----|-----|----|-----------|----|----|----|----|----|
| ø 125 | Up to 1000 | 50 | 47 | 143 | 145 | 115 | 32 | 71 | 43 | 19 | 14 | 190 | 100 | 230 | 15 | M14 x 1.5 | 15 | 17 | 15 | 27 | 13 |
| ø 140 | Up to 1000 | 50 | 47 | 157 | 160 | 128 | 32 | 71 | 43 | 19 | 20 | 212 | 112 | 255 | 15 | M14 x 1.5 | 15 | 17 | 15 | 27 | 13 |
| ø160 | Up to 1200 | 56 | 53 | 177 | 180 | 144 | 38 | 78.5 | 42 | 19 | 20 | 236 | 118 | 275 | 18 | M16 x 1.5 | 15 | 20 | 17 | 34 | 15 |

| | | | | | | | | | | | | (mm) | |
|--------------|-----------|------|-----|-----|-----|---------|----------|----|------|------------|-------------------|------|--------------|
| Bore size | NANA | N | Р | - | | Without | rod boot | | With | n rod b | oot (Single side) | | (Both sides) |
| (mm) | | IN | ۲ | 5 | н | ZZ | е | f | h | l | ZZ | ZZ | |
| ø 125 | M30 x 1.5 | 30.5 | 1/2 | 98 | 110 | 318 | 75 | 40 | 133 | 1/5 stroke | 341 | 364 | |
| ø 140 | M30 x 1.5 | 30.5 | 1/2 | 98 | 110 | 318 | 75 | 40 | 133 | 1/5 stroke | 341 | 364 | |
| ø 160 | M36 x 1.5 | 34.5 | 3/4 | 106 | 120 | 346 | 75 | 40 | 141 | 1/5 stroke | 367 | 388 | |

* The minimum stroke with rod boot is 30 mm or more.

** For auto switch mounting position and its mounting height, refer to page 587.

*** Refer to "Minimum Stroke for Auto Switch Mounting" on page 588

Center trunnion: CS2WT



| | n) | | | | | | | | | | | | | | | (mm) | | | | |
|-------------------|----------------------|----|----|-----|-----|----|------|----|----|-----------|----|----|----|----|----|-----------|------|-----|-----|-----|
| Bore size (mm) | Stroke range (mm) | A | AL | в | С | D | Е | F | G | J | v | w | к | ка | м | мм | Ν | Ρ | R | s |
| ø 125 | 25 to 1000 | 50 | 47 | 143 | 115 | 32 | 71 | 43 | 15 | M14 x 1.5 | 15 | 17 | 15 | 27 | 13 | M30 x 1.5 | 30.5 | 1/2 | 1 | 98 |
| ø 140 | 30 to 1000 | 50 | 47 | 157 | 128 | 32 | 71 | 43 | 15 | M14 x 1.5 | 15 | 17 | 15 | 27 | 13 | M30 x 1.5 | 30.5 | 1/2 | 1.5 | 98 |
| ø160 | 35 to 1200 | 56 | 53 | 177 | 144 | 38 | 78.5 | 42 | 18 | M16 x 1.5 | 15 | 20 | 17 | 34 | 15 | M36 x 1.5 | 34.5 | 3/4 | 1.5 | 106 |

| | | | | | | | | | | | | | | | (mm) |
|--------------|---------------------|----|-----|-----|-----|------------------|-----|-----------------------------|----|----|-----|------------|-----|--------------|------|
| Bore size | TD - | TT | τv | TV | TZ | Without rod boot | | With rod boot (Single side) | | | | | | (Both sides) | |
| (mm) | I De8 | | 17 | IT | | н | Z | ZZ | е | f | h | l | Z | ZZ | ZZ |
| ø 125 | 32 -0.050 -0.089 | 50 | 170 | 164 | 234 | 110 | 159 | 318 | 75 | 40 | 133 | 1/s stroke | 182 | 341 | 364 |
| ø 140 | 36 -0.050 -0.089 | 55 | 190 | 184 | 262 | 110 | 159 | 318 | 75 | 40 | 133 | 1/s stroke | 182 | 341 | 364 |
| ø 160 | 40 -0.050 | 60 | 212 | 204 | 292 | 120 | 173 | 346 | 75 | 40 | 141 | 1/5 stroke | 194 | 367 | 388 |

* The minimum stroke with rod boot is 30 mm or more for ø125, ø140, and 35 mm or more for ø160.

** For auto switch mounting position and its mounting height, refer to page 587. *** Refer to "Minimum Stroke for Auto Switch Mounting" on page 588.

582



Smooth Cylinder **CS2Y** Series Ø125, Ø140, Ø160



Relay. Diagnostic indication 5 V, 12 V IC circuit M9PW • Ō Yes 3-wire (PNP) PLC (2-color indicator) 2-wire 12 V M9BW . . . \cap 24 V 3-wire (NPN) M9NA*1 • Solid Grommet 5 V, 12 V IC circuit Water resistant (2-color indicator) 3-wire (PNP) M9PA*1 2-wire 12 V M9BA*1 • Diagnostic indication (2-color indicator) 4-wire (NPN) IC circuit 5 V, 12 V F59F • • • • • Magnetic field resistant (2-color indicator) 2-wire (Non-polar) **P3DWA** 3-wire 5 V A96 . IC circuit Yes 12 V 100 V A93 • • ۰ . auto switch Grommet No 5 V. 12 V 100 V or less A90 IC circuit Relay Yes 100 V. 200 V A54 • • . PI C No 200 V or less A64 . ۲ 2-wire 24 V Terminal 12 V A33 PLC Reed conduit A34 100 V, 200 V Relay, Yes DIN termina A44 PI C Diagnostic indication (2-color indicator) Grommet A59W .

*1 Water resistant type auto switches can be mounted on the above models, but in such case SMC cannot guarantee water resistance

Consult with SMC regarding water resistant types with the above model numbers.

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

* Solid state auto switches marked with "O" are produced upon receipt of order.

* Since there are applicable auto switches other than listed, refer to page 589 for details.
* For details about auto switches with pre-wired connector, refer to pages 1648 and 1649.

D-A9__MO_MO_MO_MO_A PAIL AND A PAIL AND A

SMC

Courtesy of Steven Engineering, Inc - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com



583

CS2Y Series

Designed with a low sliding resistance of the piston, this air cylinder is ideal for applications such as contact pressure control, which requires smooth movements at low pressure.

Low sliding resistance

Min. operating pressure - 0.005 MPa

Auto switch mounting is possible



Symbol

Double acting, without cushion





Made to Order specifications (For details, refer to pages 1703 to 1896.)

| Symbol | Specifications |
|--------|--|
| -XA□ | Change of rod end shape |
| -XC3 | Special port position |
| -XC9 | Adjustable stroke cylinder/Adjustable retraction type |
| -XC14 | Change of trunnion bracket mounting position |
| -XC15 | Change of tie-rod length |
| -XC26 | Double clevis pin/Double knuckle pin with split pin and flat washer |
| -XC27 | Double clevis pin and double knuckle pin made of stainless steel |
| -XC30 | Rod side trunnion mounted on the front of the rod cover |
| -XC68 | Made of stainless steel (With hard chrome plated piston rod) |
| -XC86 | With rod end bracket |

For the specifications of cylinders with autoswitch, please refer to pages 587 to 589.

- Minimum stroke for auto switch mounting
- Auto switch proper mounting position (detection at stroke end) and its mounting height
- Operating range
- Auto switch mounting bracket part no.

Application Example



Specifications

| Bore size (mm) | 125 | 140 | 160 | | | |
|-------------------------------|--|---------------------|------------------|--|--|--|
| Action | Doi | uble acting, Single | rod | | | |
| Direction of low friction | | Both directions | | | | |
| Fluid | | Air | | | | |
| Proof pressure | | 1.05 MPa | | | | |
| Maximum operating pressure | 0.7 MPa | | | | | |
| Minimum operating pressure | 0.005 MPa* | | | | | |
| Piston speed | 5 to 500 mm/s | | | | | |
| Ambient and fluid temperature | Without auto s | witch 0 to 70 | °C (No freezing) | | | |
| Ambient and huid temperature | Vithout custoin** Other Cost *e 0.0005 MPa* 5 to 500 mm/s Without auto switch 0 to 70°C (No free With auto switch 0 to 60°C (No free Less than 0.5 L/min (ANR) Without custoin*** (manufacturable with custoin** | °C (No freezing) | | | | |
| Allowable leakage | Les | s than 0.5 L/min (A | NR) | | | |
| Cushion | Without cushior | n** (manufacturab | le with cushion) | | | |
| Lubrication | Not required (Non-lube) | | | | | |
| Mounting | Basic, Foot, Rod flange, Head flange, | | | | | |
| wounting | Single clevis, Dou | ble clevis, Center | trunnion | | | |

* If a cushion is used, this value will not include the operating pressure within the cushion stroke.
* If an air cushion is not used, set the energy at the stroke end to 0.36J (e125, e140) or less, 0.3J (e160) or less.

Maximum Stroke

| | | (mm) |
|--|---|---------------------|
| Mounting bracket Bore size (mm) | Basic, Head flange, Single clevis, Double clevis, Center trunnion | Foot, Rod flange |
| 125 | 1000 or loop | 1000 or loss |
| 140 | 1000 of less | 1600 of less |
| 160 | 1200 or less | 1600 or less |

Accessory

| | Mounting | Basic | Foot | Rod flange | Head flange | Single clevis | Double clevis | Center trunnion |
|-----------------------|---|-------|------|---------------|----------------|---------------|------------------|--------------------|
| Standard equipment | Clevis pin | - | | - | - | 1 | • | - |
| | Rod end nut | • | • | • | • | ٠ | • | • |
| | Single knuckle joint | • | • | • | • | • | • | • |
| Option | Double knuckle joint (Knuckle pin, Split pin) | • | • | • | • | • | • | • |
| | Rod boot | • | • | • | • | • | • | • |

584

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Mounting Bracket Part No.

| Bore size (mm) | 125 | 140 | 160 |
|-----------------|---------|---------|---------|
| Foot* | CS2-L12 | CS2–L14 | CS2–L16 |
| Flange | CS2-F12 | CS2-F14 | CS2-F16 |
| Single clevis | CS2-C12 | CS2-C14 | CS2-C16 |
| Double clevis** | CS2-D12 | CS2-D14 | CS2–D16 |

* Order two foot brackets per cylinder

** When ordering the double clevis type, the clevis pin and 2 split pins are included as accessories.

Weight

| | | | | (kg) |
|-----------------------|--|-----------------------|-------|-------|
| | Bore size (mm) | 125 | 140 | 160 |
| | Basic | 5.46 | 6.50 | 9.07 |
| | Foot | 7.49 | 9.50 | 12.45 |
| Basic weight | Rod flange | 8.51 | 12.03 | 15.80 |
| | Head flange | 8.51 | 12.03 | 15.80 |
| | Single clevis | 8.53 | 10.79 | 14.56 |
| | Double clevis | 8.99 | 11.54 | 15.41 |
| | Trunnion | 9.59 | 12.23 | 15.47 |
| Additi (With built | onal weight with magnet -in magnet and auto switch) | magnet 0.07 0.07 0.08 | | 0.08 |
| Additional v | veight per each 100 mm of stroke | 1.55 | 1.67 | 2.23 |
| | Single knuckle | 0.91 | 1.16 | 1.56 |
| Accessory bracket | Double knuckle (With Knuckle pin, Split pin) | 1.37 | 1.81 | 2.48 |
| | Rod end nut | 0.16 | 0.16 | 0.23 |

Calculation: (Example) CS2Y160-500

Additional weight 2.23 (kg/100 mm)

Cylinder stroke 500 (mm)

12.45 + 2.23 x 500/100 = 23.60 (kg)

Sliding Resistance



Rod Boot Material

Sy

* M

| | Max. ambient temperature | Material | mbol |
|------|--------------------------|---------------------------|-------|
| | 70°C | Nylon tarpaulin | J |
| C 11 | 110°C* | Heat resistant tarpaulin | К |
| UJI | or the rod boot itself. | im ambient temperature fo | aximu |
| CJP | | | |
| CJ2 | | | |
| JCM | | | |
| CM2 | | | |
| CM3 | | | |
| CG1 | | | |
| CG3 | | | |
| JMB | | | |
| MB | | | |
| MB1 | | | |
| CA2 | | | |
| CS1 | | | |
| CS2 | | | |
| | | | |
| | | | |
| | | | |



CS2Y Series

Construction





Component Parts

| No. | Description | Material | Note | | |
|-----|----------------|-------------------|---------------------|--|--|
| 1 | Rod cover | Aluminum die-cast | Chromated | | |
| 2 | Head cover | Aluminum die-cast | Chromated | | |
| 3 | Cylinder tube | Aluminum alloy | Hard anodized | | |
| 4 | Piston | Aluminum alloy | Chromated | | |
| 5 | Piston rod | Carbon steel | Hard chrome plated | | |
| 6 | Bushing | Bearing alloy | | | |
| 7 | Tie-rod | Carbon steel | Zinc chromated | | |
| 8 | Tie-rod nut | Rolled steel | Nickel plated | | |
| 9 | Cushion ring | Stainless steel | | | |
| 10 | Cushion valve | Rolled steel | Nickel plated | | |
| 11 | Piston nut | Carbon steel | Nickel plated | | |
| 12 | Flat washer | Carbon steel | Nickel plated | | |
| 13 | Wear ring | Resin | | | |
| 14 | Magnet* | — | | | |
| 15 | Retaining ring | Spring steel | Phosphate treatment | | |
| 16 | Rod seal | NBR | | | |
| 17 | Cushion seal** | Urethane | | | |
| 18 | Piston seal | NBR | | | |
| 19 | Valve seal | NBR | | | |
| 20 | Tube gasket | NBR | | | |
| 21 | Piston gasket | NBR | | | |

Replacement Parts: Seal kit.

| Bore size (mm) | Kit no. | Content | | | | |
|----------------|--------------|--|--|--|--|--|
| 125 | CS2Y125A-PS | Without cushion | | | | |
| 140 | CS2Y140A-PS | Consists of Component Part | | | | |
| 160 | CS2Y160A-PS | Numbers 16, 18, and 20 | | | | |
| 125 | CS2Y125AA-PS | With single-side cushion Consists of Component Part | | | | |
| 140 | CS2Y140AA-PS | | | | | |
| 160 | CS2Y160AA-PS | Numbers 16, 17 (two), 18, and 20 | | | | |
| 125 | CS2Y125AR-PS | With single-side cushion Consists of Component Part Numbers (6, 17 (one), (8 and 20. | | | | |
| 140 | CS2Y140AR-PS | | | | | |
| 160 | CS2Y160AR-PS | | | | | |
| | | | | | | |

* Seal kit does not include a grease pack.

Order with the following part number when only the grease pack is needed. Grease pack part number: GR-L-005 (5 g), GR-S-010 (10 g), GR-L-150 (150g)

Dimensions

The dimensions and accessories are the same as the CS2 standard type. Refer to pages 573 to 577.

* For types with built-in magnet or with auto switch.

** Used with cushion only.

SMC

CS2 Series Auto Swich Mounting 1

Auto Switch Proper Mounting Position (Detection at stroke end) and Its Mounting Height

<Band mounting> D-A3□ type D-G3/K3 type





* The indicator light faces the inside

D-F5 /J59/D-F5NT type D-F5BAL/F59F type D-F5 W/J59W type



Auto Switch Proper Mounting Position

| Auto switch model | ^{to} D-M9 D-M9 D-M9 D-M9 W D-M9 WV D-M9 A D-M9 AV | | D-A D-A | 9□ 9□V | D-Z7 D-Y5 D-Y7P D-Y7 D-Y7 D-Y7 D-Y7 |]/Z80]/Y6□]/Y7PV]W]WV]WV }A | D-A5 D-A6 D-A3 D-A44 D-G39 D-K39 | | D-A59W | | D-F5 UW D-J59W D-F5BA D-F5 U D-J59 D-F59F | | D-F5NT | | D-P3DWA | |
|-------------------------|--|----|------------|-----------|---|--|---|---|--------|---|--|-----|--------|------|---------|-----|
| Bore size | Α | В | Α | В | Α | В | Α | В | Α | В | Α | В | Α | В | Α | В |
| 125 | 13 | 12 | 9 | 8 | 6.5 | 5.5 | 3 | 2 | 7 | 6 | 9.5 | 8.5 | 14.5 | 13.5 | 8.5 | 7.5 |
| 140 | 13 | 12 | 9 | 8 | 6.5 | 5.5 | 3 | 2 | 7 | 6 | 9.5 | 8.5 | 14.5 | 13.5 | 8.5 | 7.5 |
| 160 | 13 | 12 | 9 | 8 | 6.5 | 5.5 | 3 | 2 | 7 | 6 | 9.5 | 8.5 | 14.5 | 13.5 | 8.5 | 7.5 |

* Provided as guidelines for auto switch proper mounting position (detection at stroke end). When setting an auto switch, confirm the operation and adjust its mounting position

Auto Switch Mounting Height

| Auto switch model | D-M9 D-M9 W D-M9 A D-M9 A D-A9 U-A9 V | | | | D-A3□ D-G39 D-A44 D-K39 | | D-A5□ D-A6□ D-A59W | | D-F5□ D-J59 D-F5□W D-J59W D-F5BA D-F59F D-F59F | | D-P3DWA | | | |
|-------------------------|--|------|------|------|-------------------------------|------|--------------------------|-------|--|------|---------|------|----|------|
| Bore size | Hs | Ht | Hs | Ht | Hs | Ht | Hs | Hs | Hs | Ht | Hs | Ht | Hs | Ht |
| 125 | 69 | 69.5 | 71.5 | 69.5 | 69 | 69.5 | 116 | 126 | 75.5 | 69.5 | 74.5 | 70 | 76 | 69.5 |
| 140 | 76 | 76 | 77.5 | 76 | 76 | 76 | 124 | 134 | 81 | 76.5 | 80 | 76.5 | 82 | 76 |
| 160 | 85 | 85 | 86 | 85 | 85 | 85 | 134.5 | 144.5 | 89 | 87.5 | 88 | 87.5 | 91 | 85 |







CJP

CJ2

JCM

CM2

CM3

CG1

CG3 JMB

MB

MB1

CA2

CS1

CS2

D-A5 /A6 type

<Tie-rod mounting>

D-M9 W/M9 WV type

D-M9 A/M9 AV type

D-M9□/M9□V type

D-A9 /A9 V type



D-P3DWA type





(mm)

(mm)



SMC

CS2 Series Auto Swich Mounting 2

Minimum Stroke for Auto Switch Mounting

| | | | | | n: Number of auto switches (mm) | |
|----------------------------------|--|----------------------------|---|-------------------------------|---------------------------------|--|
| Auto switch | Number of auto switches | Mounting brackets | | Center trunnion | | |
| model | mounted | other than center trunnion | ø 125 | ø140 | ø160 | |
| | With 2 pcs. (Different surfaces, Same surface), With 1 pc. | 15 | 105 | 110 | 115 | |
| D-M9⊟W | | $15 + 40 \frac{(n-2)}{2}$ | $105 + 40\frac{(n-4)}{2}$ | $110 + 40\frac{(n-4)}{2}$ | $115 + 40 \frac{(n-4)}{2}$ | |
| | With n pcs. | (n = 2, 4, 6, 8) Note 1) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12, 16) Note 2) | |
| | With 2 pcs. (Different surfaces, Same surface), With 1 pc. | 10 | 80 | 85 | 90 | |
| D-M9⊟WV | With p.pcs | $10 + 30 \frac{(n-2)}{2}$ | $80 + 30 \frac{(n-4)}{2}$ | $85 + 30\frac{(n-4)}{2}$ | $90 + 30 \frac{(n-4)}{2}$ | |
| | With pos. | (n = 2, 4, 6, 8) Note 1) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12, 16) Note 2) | |
| D-M9□A | With 2 pcs. (Different surfaces, Same surface), With 1 pc. 20 | | 115 | 120 | | |
| | With n pcs. | $20 + 40 \frac{(n-2)}{2}$ | $115 + 40\frac{(n-4)}{2}$ $120 + 40\frac{(n-4)}{2}$ | | | |
| | | (n = 2, 4, 6, 8) Note 1) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12, | 16…) Note 2) | |
| | With 2 pcs. (Different surfaces, Same surface), With 1 pc. | rfaces, 15 90 | | 95 | | |
| D-M9□AV | With p pos | $15 + 30 \frac{(n-2)}{2}$ | $90 + 30\frac{(n-4)}{2}$ $95 + 30\frac{(n-4)}{2}$ | | | |
| | with the pest | (n = 2, 4, 6, 8) Note 1) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12, 16) Note 2) | | |
| B 44- | With 2 pcs. (Different surfaces, Same surface), With 1 pc. | 15 | 100 | 105 | 110 | |
| D-A9 | With n pcs | $15 + 40 \frac{(n-2)}{2}$ | $100 + 40\frac{(n-4)}{2}$ | $105 + 40\frac{(n-4)}{2}$ | $110 + 40\frac{(n-4)}{2}$ | |
| | | (n = 2, 4, 6, 8) Note 1) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12, 16) Note 2) | |
| | With 2 pcs. (Different surfaces, Same surface), With 1 pc. | 10 | 75 | 80 | 85 | |
| D-A9⊡V | With n pcs | $10 + 30 \frac{(n-2)}{2}$ | $75 + 30\frac{(n-4)}{2}$ | $80 + 30 \frac{(n-4)}{2}$ | $85 + 30 \frac{(n-4)}{2}$ | |
| | With the post | (n = 2, 4, 6, 8) Note 1) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12, 16) Note 2) | |
| D-A5□/A6□ D-A59W D-F5□/J59 | With 2 pcs. (Different surfaces, Same surface), With 1 pc. | 25 | 125 | 1 | 35 | |
| D-F5⊡W D-J59W | With n ncs (Same surface) | $25 + 55 \frac{(n-2)}{2}$ | $125 + 55 \frac{(n-4)}{2}$ | 135 + 5 | $55\frac{(n-4)}{2}$ | |
| D-F5BA D-F59F | | (n = 2, 4, 6, 8) Note 1) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12 | , 16…) Note 2) | |
| | With 2 pcs. (Different surfaces, Same surface), With 1 pc. | 35 | 145 | 155 | | |
| D-F5NT | With n pcs. (Same surface) $35 + 55 \frac{(n-2)}{2}$ | | $145 + 55\frac{(n-4)}{2}$ | $155 + 55\frac{(n-4)}{2}$ | | |
| | <i>⊆</i> Ø Different surfaces | (11 = 2, 4, 6, 6) (1010 1) | (11 = 4, 6, 12, 10) (1018 2) | (1=4, 6, 12 | , 10) (1018 2) | |
| | Same surface | 100 | | 110 | | |
| D-A3 | 2 Different surfaces | 35 + 30(n - 2) | | 110 + 30(n - 2) | | |
| D-G39 D-K39 | с | (n = 2, 3, 4, 5) | | $(n = 2, 4, 6, 8)^{(NOLE 1)}$ | | |
| 5 100 | Same surface | (n = 2, 3, 4, 5) | | $(n = 2, 4, 6, 8)^{Note 1}$ | | |
| | With 1 pc. | 15 | | 110 | | |
| | £g Different surfaces | 35 | | 110 | | |
| | N Same surface | 55 35 + 30(p - 2) | | $110 \pm 30(p - 2)$ | | |
| D-A44 | Different surfaces | (n = 2, 3, 4, 5…) | | (n = 2, 4, 6, 8) Note 1) | | |
| | ≨ Same surface | 55 + 55(n - 2) | | 110 + 50(n - 2) | | |
| | With 1 nc | (n = 2, 3, 4, 5…) 15 | | (n = 2, 4, 6, 8) Note 1) | | |
| D-Z7□ D-Z80 | With 2 pcs. (Different surfaces, Same surface) With 1 pc | 15 | 105 | 110 | 115 | |
| D-Y59□ | Gane Sanacej, Warr pe. | $15 + 40^{(n-2)}$ | $105 \pm 40^{(n-4)}$ | $110 + 40^{(n-4)}$ | $115 \pm 40^{(n-4)}$ | |
| D-Y7⊡W | With n pcs. | (n = 2, 4, 6, 8) Note 1) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12, 16) Note 2) | |
| D-Y69□ | With 2 pcs. (Different surfaces, Same surface), With 1 pc. | 10 | 90 | 95 | 100 | |
| D-Y7PV | MGAb a see | $10 + 30 \frac{(n-2)}{2}$ | $90 + 30 \frac{(n-4)}{2}$ | $95 + 30 \frac{(n-4)}{2}$ | $100 + 30 \frac{(n-4)}{2}$ | |
| | with h pcs. | (n = 2, 4, 6, 8) Note 1) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12, 16) Note 2) | |
| | With 2 pcs. (Different surfaces, Same surface), With 1 pc. | 20 | 115 | 120 | 125 | |
| D-Y7BA | With n ncs | $20 + 45 \frac{(n-2)}{2}$ | $115 + 45\frac{(n-4)}{2}$ | $120 + 45\frac{(n-4)}{2}$ | $125 + 45\frac{(n-4)}{2}$ | |
| | than it pool | (n = 2, 4, 6, 8) Note 1) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12, 16) Note 2) | |
| DODINA | With 2 pcs. (Different surfaces, Same surface), With 1 pc. | 20 | 105 | 110 | 115 | |
| P3DWA | With n nes | $20 + 50 \frac{(n-2)}{2}$ | $105 + 50\frac{(n-4)}{2}$ | $110 + 50\frac{(n-4)}{2}$ | $115 + 50 \frac{(n-4)}{2}$ | |
| | | (n = 2, 4, 6, 8) Note 1) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12, 16) Note 2) | (n = 4, 8, 12, 16) Note 2) | |

Note 1) When "n" is an odd number, an even number that is one larger than this odd number is used for the calculation. Note 2) When "n" is an odd number, a multiple of 4 that is larger than this odd number is used for the calculation.

588

SMC

Operating Range

| | | | (mm) | |
|---|-----------|------|------|--|
| Auto autitab madal | Bore size | | | |
| Auto switch model | 125 | 140 | 160 | |
| D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV | 6 | 6.5 | 6.5 | |
| D-A9□/A9□V | 12 | 12.5 | 11.5 | |
| D-Z7□/Z80 | 14 | 14.5 | 13 | |
| D-A3□/A44 D-A5□/A6□ | 10 | 10 | 10 | |
| D-A59W | 17 | 17 | 17 | |
| D-Y59□/Y69□ D-Y7P/Y7PV D-Y7□W/Y7□WV D-Y7BA | 12 | 13 | 7 | |
| D-F5□/J59/F5□W D-J59W/F5BA D-F5NT/F59F | 5 | 5 | 5.5 | |
| D-G39/K39 | 11 | 11 | 10 | |
| P3DWA | 7 | 7 | 7 | |

* Since this is a guideline including hysteresis, not meant to be guaranteed.

(Assuming approximately ±30% dispersion.)

There may be the case it will vary substantially depending on an ambient environment.

Auto Switch Mounting Bracket Part No.

| Auto outitals model | |] | | |
|--|-----------------|--------------|----------|-----|
| Auto switch model | ø125 | ø 140 | ø160 | 1 |
| D-M9□/M9□V D-M9□W/M9□WV D-M9□A/M9□AV D-A9□/A9□V | BS5-125 | BS5-125 | BS5-160 | CJ1 |
| D-A5□/A6□ | | | | UJP |
| D-A59W D-F5□/J59 D-F5NT | BT-12 | BT-12 | BT-16 | CJ2 |
| D-F5□W/J59W D-F5BAL/F59F | | | | JCM |
| D-A3□/A44 D-G39/K39 | BS1-125 | BS1-140 | BS1-160 | CM2 |
| D-Z7□/Z80 D-Y59□/Y69□ | DO 1 105 | 504.405 | 504.400 | CM3 |
| D-Y70W/Y70WV D-Y7BA | въ4-125 | 854-125 | 854-160 | CG1 |
| P3DWA | BS7-125S | BS7-125S | BS7-160S | CG3 |

[Mounting screws set made of stainless steel]

The following set of mounting screws made of stainless steel (including set screws) is also available. Use it in accordance with the operating environment. (Please order the auto switch mounting bracket separately, since it is not included.) BBA1: For D-A5, A6, F5, J5 type

"D-F5BA" auto switch is set on the cylinder with the stainless steel screws above when shipped.

When only an auto switch is shipped independently, "BBA1" screws are attached. Note) When using the D-M9□A/M9□AV or Y7BA model, do not use the steel set screw

which is included with the auto switch mounting bracket in the above table (BS5-00, BS4-00). Please separately prepare the stainless steel screw set (BBA1), and select and use the M4 x 8L stainless steel set screw included in BBA1.



Note 1) Refer to page 1689 for the details of BBA1 screws.

* Shows an example of mounting the D-A90(V), M90(V), M90W(V), M9□A(V) model.

| Туре | Model | Electrical entry (Direction) | Features |
|-------------------------|-----------------------|------------------------------|-------------------------------------|
| | D-A90V | Cremmet (Demendieuler) | Without indicator light |
| | D-A93V, A96V | Gronnet (Perpendicular) | |
| Pood outo owitch | D-Z73, Z76 | | |
| Reed auto switch | D-A53, A56 | Overset (in line) | |
| | D-A67 | Grommet (in-line) | Without indicator light |
| | D-Z80 | | |
| | D-F59, F5P, J59 | | _ |
| | D-Y59A, Y59B, Y7P | | |
| | D-F59W, F5PW, J59W | Crommot (in line) | 2-color indicator |
| | D-Y7NW, Y7PW, Y7BW | Giommer (m-ime) | |
| | D-F5BA, Y7BA | | Water resistant (2-color indicator) |
| Solid state auto switch | D-F5NT | | With timer |
| | D-M9NV, M9PV, M9BV | | - |
| | D-Y69A, Y69B, Y7PV | | |
| | D-M9NWV, M9PWV, M9BWV | Grommet (Perpendicular) | 2-color indicator |
| | D-Y7NWV, Y7PWV, Y7BWV | | |
| | D-M9NAV, M9PAV, M9BAV | | Water resistant (2-color indicator) |

D--Х□ Technical Data

JMB

MB

MB1

CA2

CS1 CS2

SMC