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CAD drawing data catalog  
is available.



# KOGANEI

## ACTUATORS GENERAL CATALOG

SLIM CYLINDERS

# SLIM CYLINDERS CONTENTS

Features/Allowable Kinetic Energy ————— 313	End Keep Cylinders Specifications/Order Codes — 355 Inner Construction and Major Parts ————— 356 Dimensions ————— 357	Dual Stroke Cylinders Specifications/Order Codes — 395 Inner Construction and Major Parts ————— 396 Dimensions ————— 397
Double Acting Type Specifications/Order Codes — 314 Inner Construction and Major Parts ————— 315 Dimensions ————— 316	Handling Instructions and Precautions ————— 360	Heat Resistant Specification Cylinders Specifications/Order Codes — 398 Dimensions ————— 399
Single Acting Push Type Specifications/Order Codes — 321 Inner Construction and Major Parts ————— 322 Dimensions ————— 323	Brake Cylinders Specifications/Order Codes — 361 Inner Construction and Major Parts ————— 362 Dimensions ————— 363	Low Speed Cylinders Specifications/Order Codes — 400 Dimensions ————— 401
Square Rod Cylinders Specifications/Order Codes — 325 Inner Construction and Major Parts ————— 326 Dimensions ————— 327	Handling Instructions and Precautions ————— 368	Made to Order Product Cylinders with Scrapers Specifications/Order Codes — 402 Dimensions ————— 403
Double Rod Cylinders Specifications/Order Codes — 331 Inner Construction and Major Parts ————— 332 Dimensions ————— 333	Block Cylinders Specifications/Order Codes — 371 Inner Construction and Major Parts ————— 372 Dimensions ————— 373	Block Heat Resistant Specification Cylinders Specifications/Order Codes — 404 Dimensions ————— 405
Low Hydraulic Cylinders Specifications/Order Codes — 336 Inner Construction and Major Parts ————— 337 Dimensions ————— 338	Block Square Rod Cylinders Specifications/Order Codes — 375 Inner Construction and Major Parts ————— 376 Dimensions ————— 377	Block Low Speed Cylinders Specifications/Order Codes — 407 Dimensions ————— 408
Valpack Cylinders Specifications/Bore Size and Stroke ————— 342 Inner Construction and Major Parts/Order Codes ————— 343 Dimensions ————— 344	Block Cylinders with Variable Cushion Specifications/Order Codes — 379 Dimensions ————— 380	Cylinders with Wrench Flats Specifications/Order Codes — 410 Dimensions ————— 411
Stroke Adjusting Cylinders Specifications/Order Codes — 349 Inner Construction and Major Parts ————— 350 Dimensions ————— 351	Block End Keep Cylinders Specifications/Order Codes — 381 Inner Construction and Major Parts ————— 382 Dimensions ————— 383	All SUS Type Cylinders Specifications/Order Codes — 412 Dimensions ————— 413
	Handling Instructions and Precautions ————— 391	Pivot Mounting Type Cylinders with Bushing Specifications/Order Codes/Dimensions ————— 414
	Tandem Cylinders Specifications/Order Codes — 392 Inner Construction and Major Parts ————— 393 Dimensions ————— 394	Optional Rod End Shape Patterns ————— 415
		Sensor Switches ————— 416
		Options Rod End Accessories ————— 420 Bellows, Mounting Brackets — 421



**Caution**

Before use, be sure to read the "Safety Precautions" on p. 57.

High-quality stainless steel cylinders ahead of all others

# SLIM CYLINDERS

## Use durable piston seals.

The two piston seals are the durable PPY type. This prevents inner air leakage, and achieves smooth operation from low-speed to high-speed ranges.

## Sensor switches can be installed anytime after cylinder installation.

Magnets as standard equipment across the entire series allow sensor switches to be installed anytime after the cylinder has been installed.

## High installation accuracy and simple mounting operations.

A centering location on the rod cover improves mounting precision. Moreover, the mounting nut's improved thread precision means that holding the cylinder body in place by hand is sufficient for mounting nut tightening operations. Mounting in hard-to-reach places is easy.

## Criteria for Selection: Slim Cylinder Allowable Kinetic Energy

Slim cylinders (with the exception of heat resistant specifications) include a cushioning mechanism.

This mechanism is intended to reduce as much as possible the impact of pistons with high kinetic energy when they stop at the end of the stroke. There are two types of cushions, as shown below.

### ● Rubber bumpers (Standard equipment)

Rubber bumpers installed on both sides of the piston soften the impact at the end of the stroke, and absorb the impact noise during stopping, in response to high-frequency and high-speed operations. They are standard equipment across the whole series, with the exception of heat resistant specifications.

Note that a certain amount of rebound will occur at the end of the stroke on the cylinder with the rubber bumpers.

### ● Variable cushions

Use variable cushions for large load or high-speed operations that rubber bumpers cannot adequately absorb. The impact is absorbed by compressing air, when the piston stops at the end of the stroke.

Since the cushioning stroke is included within the cylinder stroke, be careful to ensure that the cushion is not excessively performed during cylinder applications of 25mm strokes or less. An excessively performed cushion can result in too much time for each stroke, reducing efficiency. When operated at or below the absorbable kinetic energy shown in the table below, the cushion seal life is 1 million operations or more.

The load kinetic energy can be obtained through the formulas shown below.

$$Ex = \frac{m}{2} v^2$$

Ex: Kinetic energy (J)  
m: Load mass (kg)  
v: Piston speed (m/s)

$$E'x = \frac{W}{2g} v'^2$$

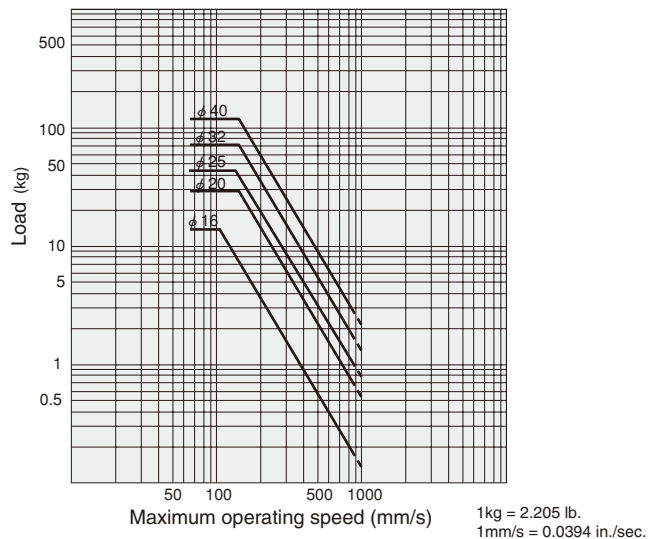
E'x: Kinetic energy [ft·lbf]  
W: Load [lbf.]  
v': Piston speed [ft./sec.]  
g: Acceleration of gravity 32.2 [ft./sec.<sup>2</sup>]

### Operating speed range

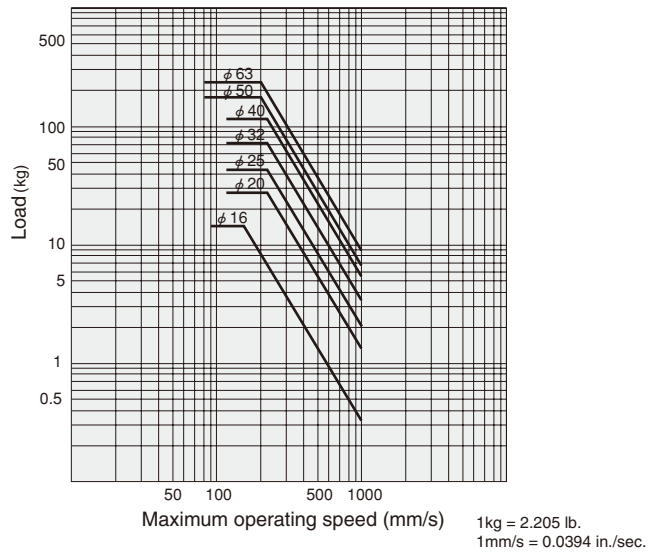
- Rubber bumper ..... 30~800mm/s [1.2~31.5in./sec.]
- Variable cushion ..... 30~1000mm/s [1.2~39.4in./sec.]

Bore size mm [in.]	Allowable kinetic energy J [ft·lbf]	
	With rubber bumpers	With variable cushion
16 [0.630]	0.07 [0.052]	0.18 [0.13]
20 [0.787]	0.27 [0.20]	0.7 [0.52]
25 [0.984]	0.40 [0.30]	1.05 [0.77]
32 [1.260]	0.65 [0.48]	1.8 [1.33]
40 [1.575]	1.2 [0.89]	2.8 [2.07]
50 [1.969]	—	3.5 [2.58]
63 [2.480]	—	4.5 [3.32]

Rubber bumper (Graph 1)



Variable cushion (Graph 2)



### How to read the graphs

From Graph 1, the capacity of the rubber bumpers limits the maximum speed to 500mm/s [19.7in./sec.] or less when a φ 32 Slim Cylinder is used to carry a load of 5kg [11.0lb.].

From Graph 2, a φ 32 cylinder with variable cushion can be selected to carry a load of 8kg [17.6lb.] at a maximum speed of 600mm/s [23.6in./sec.].

# SLIM CYLINDERS

## Double Acting Type



### Symbols

- Without variable cushion    ● With variable cushion



### Specifications

Item		Bore size mm [in.]	20, 25 [0.787, 0.984]	32, 40 [1.260, 1.575]	50, 63 [1.969, 2.480]
Operation type		Double acting type			
Media		Air			
Mounting type		Basic type, Foot type, Flange type, Pivot type, Head trunnion type, Rod trunnion type			Basic type, Foot type, Flange type, Pivot type
Operating pressure range MPa [psi.]	Standard cylinder	0.04~0.9 [6~131]			0.04~0.7 [6~102]
	Cylinder with variable cushion	0.15~0.9 [22~131]	0.1~0.9 [15~131]		
Proof pressure	MPa [psi.]	1.32 [191]			1.03 [149]
Operating temperature range	°C [°F]	0~70 [32~158]			
Operating speed range	mm/s [in./sec.]	30~800 [1.2~31.5] (With variable cushion is 30~1000 [1.2~39.4])			30~500 [1.2~19.7]
Cushion	Standard cylinder	Fixed type (Rubber bumper)			Variable type as standard (Stroke 12mm [0.472in.])
	Cylinder with variable cushion	Variable type (12mm [0.472in.] stroke)			
Lubrication		Not required			
Port size	Rc	1/8			1/4

### Bore Size and Stroke

Bore size	Standard strokes	Maximum stroke		Maximum available stroke	
		No bellows	With bellows	No bellows	With bellows
20	25 50 75 100 125 150	200		1050	740
25	25 50 75 100 125 150 200	250			
32	25 50 75 100 125 150 200	300			
40	25 50 75 100 125 150 200 250 300	400	300	900	740
50	25 50 75 100 150 200 [250 300 350 400]	300[500]	300		
63	25 50 75 100 150 200 [250 300 350 400 500]	300[600]	300		

- Remarks: 1. Stroke tolerance  ${}^{+1}_{0} [{}^{+0.039}_{0}\text{in.}]$   
 2. For non-standard strokes, consult us.  
 3. Items in parentheses [ ] are for cases when foot mounting brackets are used for mounting.  
 4. The minimum operating pressure when the stroke is over the maximum stroke at bore sizes of  $\phi 20 \sim \phi 40$  is 0.2MPa [29psi.].

### Order Codes

**DA** [ ] [ ] **20×50** - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ]

**Bore size**  
 ×  
**Stroke**

**Non-ion specification**  
 Blank — Standard  
 NCU — Non-ion specification

**Bellows or scraper**  
 Blank — No bellows  
 J — With bellows (Made to order)  
 Y — With scraper (Made to order; available at  $\phi 50$  and  $\phi 63$  only)

**With or without variable cushion**  
 Blank — Standard cylinder  
 C — Cylinder with variable cushion (Available at  $\phi 20 \sim \phi 40$  only) (Standard equipment for  $\phi 50$  and  $\phi 63$ )

**Mounting type**  
 Blank — Basic type  
 1 — Double foot mounting type  
 3 — Flange mounting type  
 8B — Pivot mounting type with bushing ( $\phi 50$  and  $\phi 63$  only)  
 8E — Pivot mounting type with supporting bracket (with pin) ( $\phi 20 \sim \phi 40$  only)  
 8B-8E — Pivot mounting type with bushing and supporting bracket ( $\phi 50$  and  $\phi 63$  only)  
 11 — Head trunnion type\*  
 12 — Rod trunnion type\*  
 11-11T — Head trunnion type, with supporting bracket\*  
 12-12T — Rod trunnion type, with supporting bracket\*  
 ● For the pivot mounting type with bushing at  $\phi 20 \sim \phi 40$ , see made to order specifications on p.414.  
 ● Trunnion type is available at  $\phi 20 \sim \phi 40$  only. Moreover, it is not available for the variable cushion type.  
 ● Mounting brackets are included at shipping. (Except pivot type and pivot type with bushing)  
 ※ A head cover for the standard is a short head. Order code "A" is not required.

**Rod end accessory**  
 Blank — No rod end accessory  
 I — I type knuckle  
 Y — Y type knuckle (with pin)  
 ● For the cylinder joint and cylinder rod end, see p.1568.

**Number of sensor switches**  
 1 — With 1 sensor switch  
 2 — With 2 sensor switches  
 3 — With 3 sensor switches  
 : — :  
 :

**Lead wire length**  
 (Applies to all except CS□F)  
 A — 1000mm [39in.]  
 B — 3000mm [118in.]

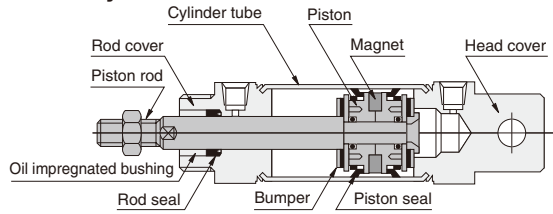
**Sensor switch (for cylinders with sensor switches)**  
 Blank — No sensor switch  
 ZG530 — 2-lead wire Solid state type with indicator lamp DC10~28V  
 ZG553 — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
 CS3M — Reed switch type with indicator lamp AC85~230V  
 CS4M — Reed switch type with indicator lamp DC10~30V  
 CS5M — Reed switch type without indicator lamp AC85~115V  
 CS2F — Reed switch type with indicator lamp AC85~230V  
 CS3F — Reed switch type with indicator lamp DC10~30V  
 CS4F — Reed switch type with indicator lamp DC10~30V  
 CS5F — Reed switch type without indicator lamp DC3~30V  
 ● For details of sensor switches, see p.1544.  
 ● CS□F comes with DIN connector. All others are grommet type.

**Head cover specification**  
 Blank — Standard head  
 A — Short head (For the basic type and flange mounting type only)

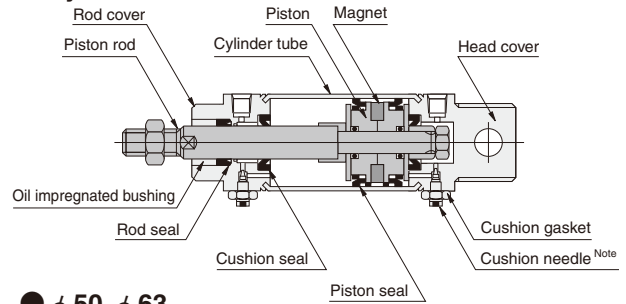
**Slim double acting cylinder**

# Inner Construction and Major Parts (cannot be disassembled)

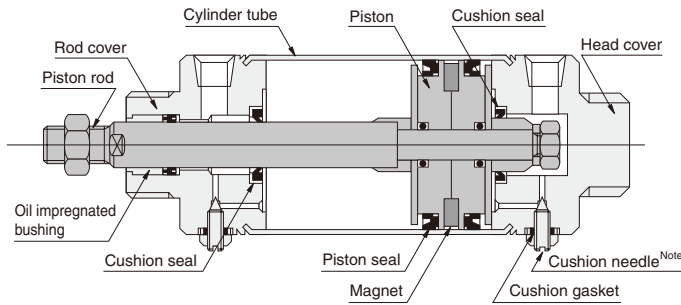
## ● $\phi 20 \sim \phi 40$ Standard cylinder



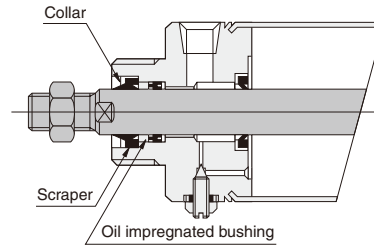
## ● $\phi 20 \sim \phi 40$ Cylinder with variable cushion



## ● $\phi 50, \phi 63$ Standard cylinder



## ● $\phi 50, \phi 63$ With scraper



Note: Set the cushion needle tightening torque to 1.0N·m [8.85in·lbf] or less.

## Major Parts and Materials

Parts	Bore size	20	25~40	50, 63
Cylinder tube		Stainless steel		
Piston		Plastic		
Piston rod		Steel (hard chrome plated)		
Rod cover		Aluminum alloy (anodized)		
Head cover				
Seal		Synthetic rubber (NBR)		
Bumper		Synthetic rubber (NBR)	—	
Scraper		—		Synthetic rubber (NBR)
Collar		—		Aluminum (anodized)
Magnet		Plastic magnet		
Bellows		Nylon tarpaulin (heat resistant temperature 70°C [158°F])		
Y type knuckle, I type knuckle Pivot mounting with supporting bracket		Mild steel (zinc plated)		

## Seals

Note: Seals cannot be replaced.

Parts	Rod seal	Piston seal	Cushion seal	Cushion gasket	Scraper
Bore mm [in.]	Quantity	1	2	2	1
20 [0.787]	1	PPY-20	GYH-9	DT-1-4	—
25 [0.984]	1	PPY-25	GYH-11	DT-1-4	—
32 [1.260]	1	PPY-32	PCS-14	DT-1-4	—
40 [1.575]	1	PPY-40	PCS-18	DT-1-4	—
50 [1.969]	1	PGY-50	PCS-20	DT-1-5	SCB-16
63 [2.480]	1	PGY-63	PCS-20	DT-1-5	SCB-16

## Mass

Bore size mm [in.]	Zero stroke mass				Additional mass for each 1mm [0.0394in.] stroke	Mass of mounting bracket				
	Standard head type	Short head type	Pivot mounting type	Trunnion type		Foot bracket	Flange bracket	Pivot bracket	Y type knuckle	I type knuckle
20 [0.787]	0.16 [0.35] (0.14 [0.31])	0.15 [0.33] (0.13 [0.29])	—	0.35 [0.77]	0.0008 [0.0018]	0.14 [0.31]	0.08 [0.18]	0.06 [0.13]	0.041 [0.090]	0.036 [0.079]
25 [0.984]	0.21 [0.46] (0.18 [0.40])	0.20 [0.44] (0.17 [0.37])	—	0.39 [0.86]	0.0011 [0.0024]	0.16 [0.35]	0.08 [0.18]	0.06 [0.13]	0.075 [0.165]	0.070 [0.154]
32 [1.260]	0.33 [0.73] (0.30 [0.66])	0.31 [0.68] (0.28 [0.62])	—	0.50 [1.10]	0.0015 [0.0033]	0.19 [0.42]	0.10 [0.22]	0.14 [0.31]	0.075 [0.165]	0.070 [0.154]
40 [1.575]	0.49 [1.08] (0.43 [0.95])	0.45 [0.99] (0.39 [0.86])	—	0.65 [1.43]	0.0024 [0.0053]	0.29 [0.64]	0.13 [0.29]	0.14 [0.31]	0.120 [0.265]	0.132 [0.291]
50 [1.969]	0.91 [2.01]	0.86 [1.90]	0.83 [1.83]	—	0.0028 [0.0062]	0.55 [1.21]	0.28 [0.62]	0.24 [0.53]	0.120 [0.265]	0.132 [0.291]
63 [2.480]	1.24 [2.73]	1.20 [2.65]	1.17 [2.58]	—	0.0033 [0.0073]	0.73 [1.61]	0.37 [0.82]	0.24 [0.53]	0.120 [0.265]	0.132 [0.291]

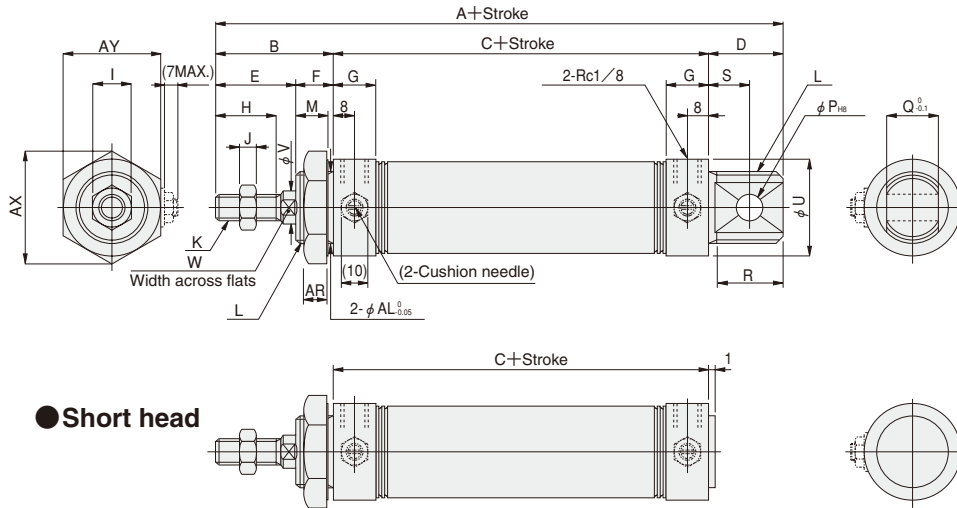
Note: Figures in parentheses ( ) are for cylinders with variable cushions of bore sizes  $\phi 20 \sim \phi 40$ .  
 Calculation example: For foot mounting type of 32mm bore size and 100mm stroke  
 $0.33 + 0.19 + (0.0015 \times 100) = 0.67\text{kg}$  [1.48lb.]

# Dimensions of Basic Type (mm)

●  $\phi 20 \sim \phi 40$  DA  Bore size  Stroke

● Figures in parentheses ( ) are for type with variable cushion.

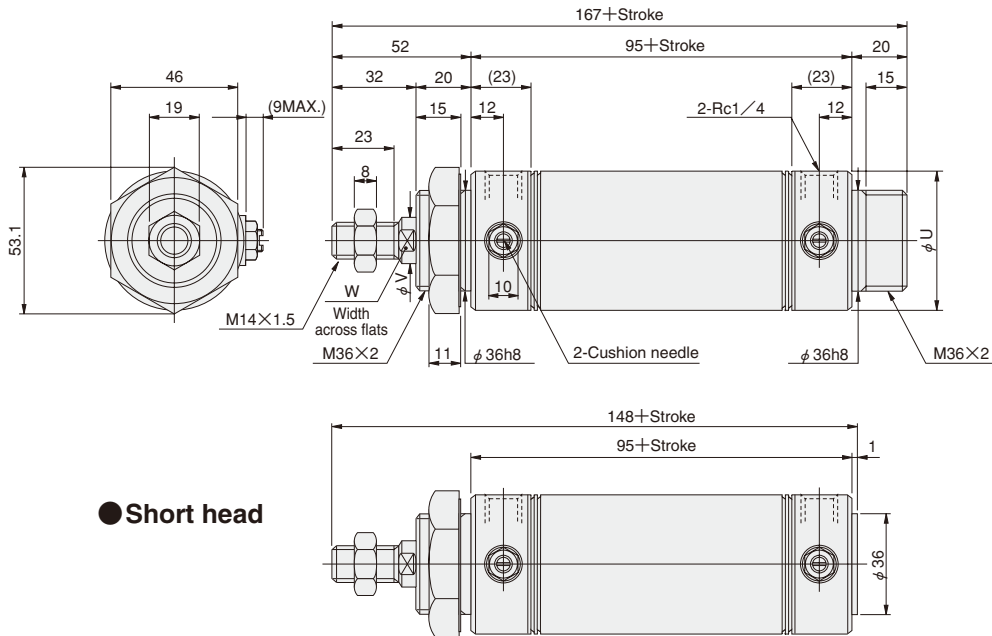
CAD DA-  Bore size SLIM-A



Code	A	B	C	D	E	F	G	H	I	J	K	L	M	P	Q	R	S	U	V	W	AR	AX	AY	AL
20 [0.787]	132	35	76	21	23	12	16	15	12	5	M 8×1	M20×1.5	10	8	12	19	12	27	8	6	7.5	31.2	27	20
25 [0.984]	137	40	76	21	26	14	16	18	14	6	M10×1.25	M22×1.5	12	8	12	19	12	29	10	8	9.5	34.6	30	22
32 [1.260]	148	45	76	27	31	14	16	23	14	6	M10×1.25	M27×2	12	10	20	25	15	35	12	10	9.5	41.6	36	27
40 [1.575]	148	45	76	27	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	10	20	25	15	41.6	16	14	9.5	47.3	41	33

●  $\phi 50, \phi 63$  DA  Bore size  Stroke

CAD DA-  Bore size SLIM-A



Code	U	V	W
50 [1.969]	52	16	14
63 [2.480]	65.4	16	14



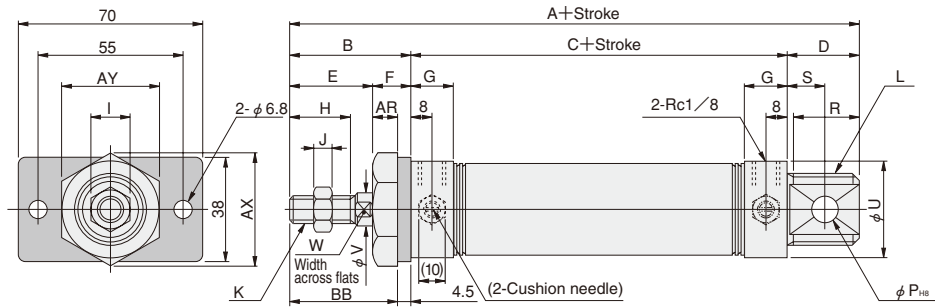
# Dimensions of Flange Mounting Type (mm)

●  $\phi 20 \sim \phi 40$  DA  Bore size  Stroke  -3

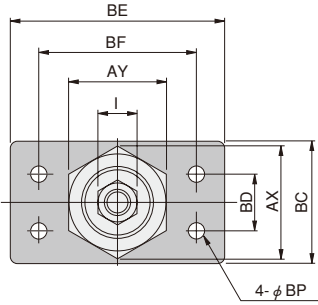
● Figures in parentheses ( ) are for type with variable cushion.

CAD DA-  Bore size SLIM-FL3

●  $\phi 20, \phi 25$



●  $\phi 32, \phi 40$

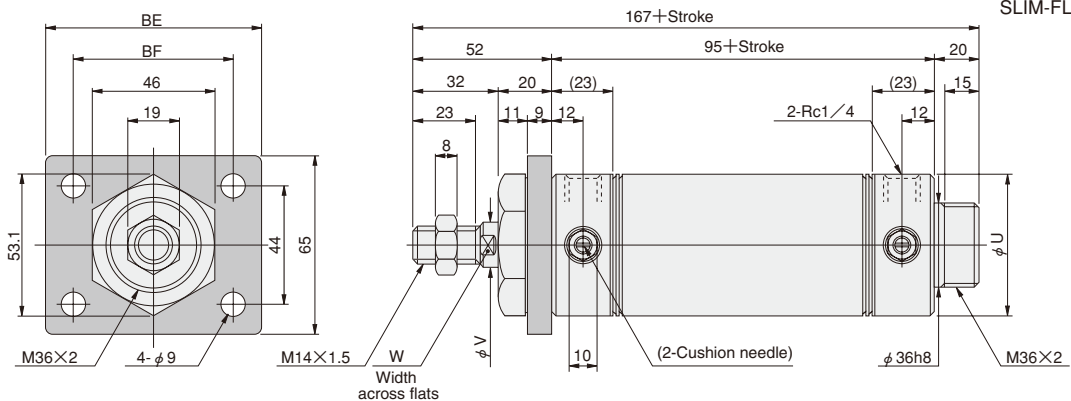


Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	P	R	S	U	V	W
20 [0.787]	132	35	76	21	23	12	16	15	12	5	M 8×1	M20×1.5	8	19	12	27	8	6	
25 [0.984]	137	40	76	21	26	14	16	18	14	6	M10×1.25	M22×1.5	8	19	12	29	10	8	
32 [1.260]	148	45	76	27	31	14	16	23	14	6	M10×1.25	M27×2	10	25	15	35	12	10	
40 [1.575]	148	45	76	27	31	14	(14.5)	23	19	8	M14×1.5	M33×2	10	25	15	41.6	16	14	

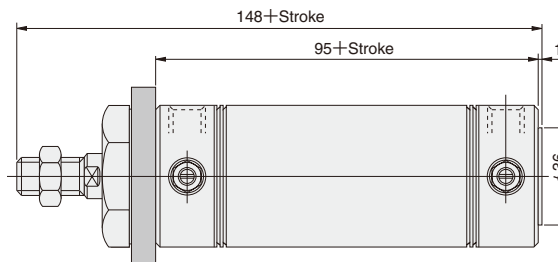
Bore mm [in.]	Code	AR	AX	AY	BB	BC	BD	BE	BF	BP
20 [0.787]		7.5	31.2	27	30.5	—	—	—	—	—
25 [0.984]		9.5	34.6	30	35.5	—	—	—	—	—
32 [1.260]		9.5	41.6	36	40.5	45	20	80	60	6.8
40 [1.575]		9.5	47.3	41	40.5	50	30	100	80	9

●  $\phi 50, \phi 63$  DA  Bore size  Stroke  -3

CAD DA-  Bore size SLIM-A SLIM-FL3



● Short head



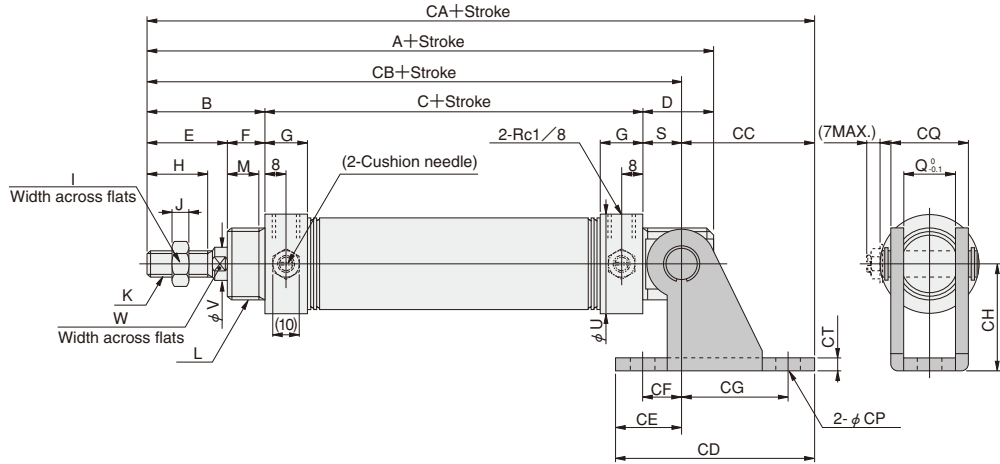
Bore mm [in.]	Code	U	V	W	BE	BF
50 [1.969]		52	16	14	80	60
63 [2.480]		65.4	16	14	100	80



# Dimensions of Pivot Mounting Type (mm)

●  $\phi 20 \sim \phi 40$  DA  Bore size   $\times$   Stroke **-8E** ● Figures in parentheses ( ) are for type with variable cushion.

CAD DA-  Bore size SLIM-CL7

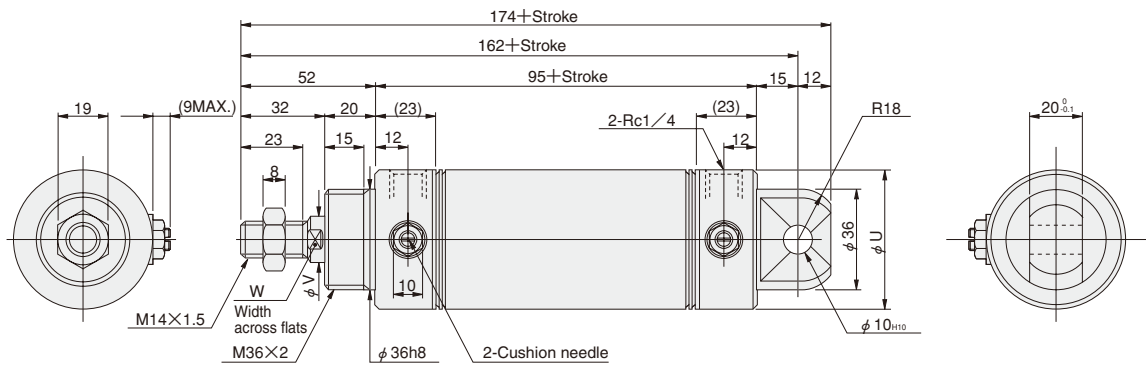


Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	Q	S	U	V	W
20 [0.787]		132	35	76	21	23	12	16	15	12	5	M 8×1	M20×1.5	10	12	12	27	8	6
25 [0.984]		137	40	76	21	26	14	16	18	14	6	M10×1.25	M22×1.5	12	12	12	29	10	8
32 [1.260]		148	45	76	27	31	14	16	23	14	6	M10×1.25	M27×2	12	20	15	35	12	10
40 [1.575]		148	45	76	27	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	20	15	41.6	16	14

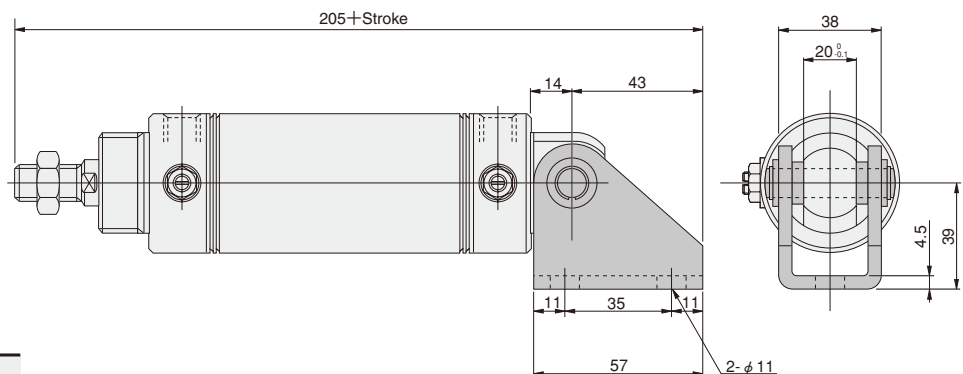
Bore mm [in.]	Code	CA	CB	CC	CD	CE	CF	CG	CH	CP	CQ	CT
20 [0.787]		160	123	37	59	22	15	30	30	6.8	18.4	3.2
25 [0.984]		165	128	37	59	22	15	30	30	6.8	18.4	3.2
32 [1.260]		186	136	50	75	25	15	40	40	9	28	4
40 [1.575]		186	136	50	75	25	15	40	40	9	28	4

●  $\phi 50, \phi 63$

● Pivot mounting type with bushing DA  Bore size   $\times$   Stroke **-8B**



● Pivot mounting type with bushing DA  Bore size   $\times$   Stroke **-8B-8E**  
(With supporting bracket)



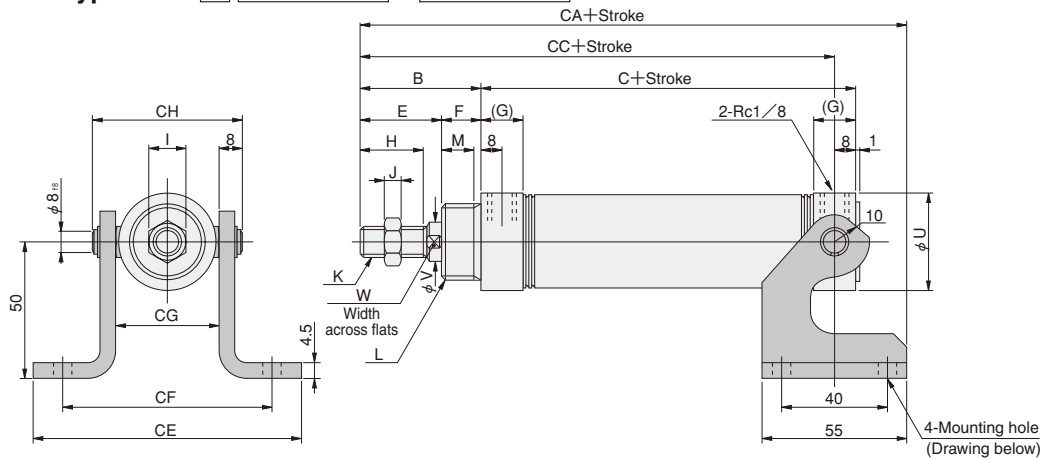
Bore mm [in.]	Code	U	V	W
50 [1.969]		52	16	14
63 [2.480]		65.4	16	14

# Dimensions of Trunnion Type (mm)

●  $\phi 20 \sim \phi 40$

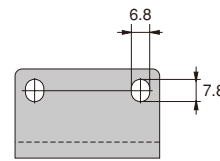
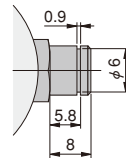
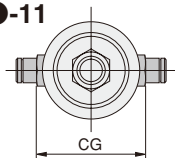
● Head trunnion type DA  Bore size  Stroke  -11-11T

CAD DA-  Bore size SLIM-TR



● -11

● Trunnion pin dimensions



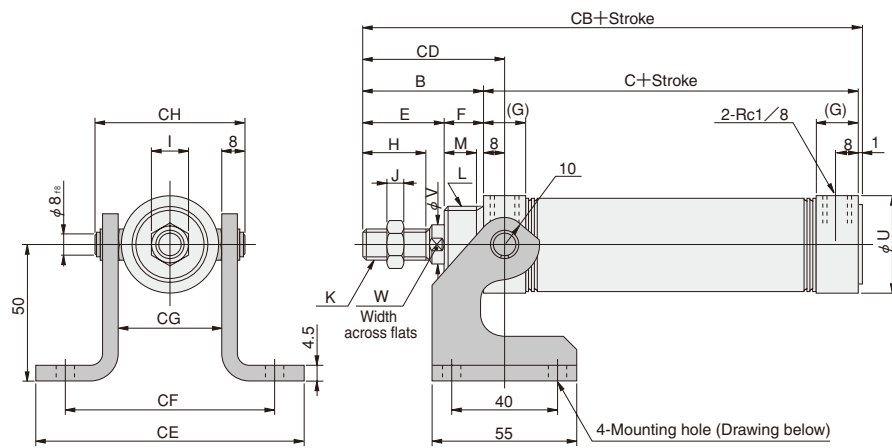
Bore mm [in.]	Code	B	C	E	F	G	H	I	J	K	L	M	U	V	W	CA	CE	CF	CG	CH	CC
20	[0.787]	35	76	23	12	16	15	12	5	M 8×1	M20×1.5	10	27	8	6	130.5	92	72	32	48	103
25	[0.984]	40	76	26	14	16	18	14	6	M10×1.25	M22×1.5	12	29	10	8	135.5	94	74	34	50	108
32	[1.260]	45	76	31	14	16	23	14	6	M10×1.25	M27×2	12	35	12	10	140.5	100	80	40	56	113
40	[1.575]	45	76	31	14	14.5	23	19	8	M14×1.5	M33×2	12	41.6	16	14	140.5	107	87	47	63	113

Remark : Head cover specification for the head trunnion type comes with a short head. Order code -A is not required.

●  $\phi 20 \sim \phi 40$

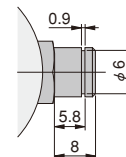
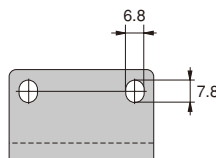
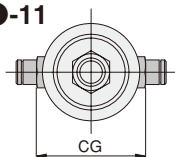
● Rod trunnion type DA  Bore size  Stroke  -12-12T

CAD DA-  Bore size SLIM-TR



● -11

● Trunnion pin dimensions

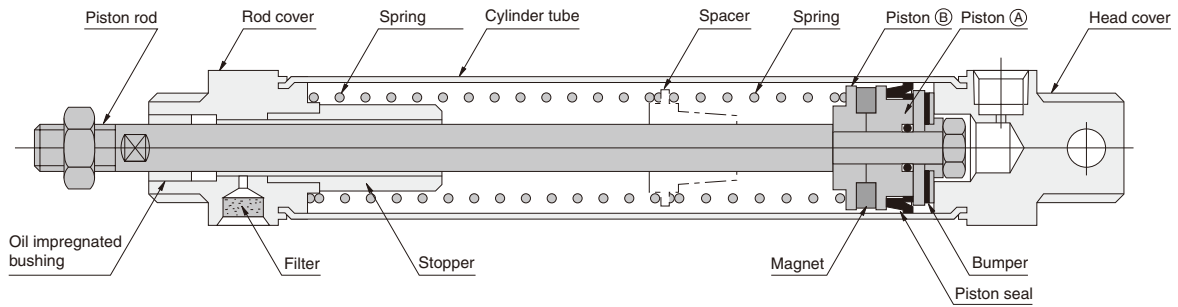


Bore mm [in.]	Code	B	C	E	F	G	H	I	J	K	L	M	U	V	W	CB	CE	CF	CG	CH	CD
20	[0.787]	35	76	23	12	16	15	12	5	M 8×1	M20×1.5	10	27	8	6	112	92	72	32	48	43
25	[0.984]	40	76	26	14	16	18	14	6	M10×1.25	M22×1.5	12	29	10	8	117	94	74	34	50	48
32	[1.260]	45	76	31	14	16	23	14	6	M10×1.25	M27×2	12	35	12	10	122	100	80	40	56	53
40	[1.575]	45	76	31	14	14.5	23	19	8	M14×1.5	M33×2	12	41.6	16	14	122	107	87	47	63	53

Remark : Head cover specification for the rod trunnion type comes with a short head. Order code -A is not required.



## Inner Construction and Major Parts (cannot be disassembled)



SLIM CYLINDERS

## Major Parts and Materials

Parts	Bore size	20, 32
Cylinder tube		Stainless steel
Piston (A)		Plastic
Piston (B)		Stainless steel
Piston rod		Steel (hard chrome plated)
Rod cover		Aluminum alloy (anodized)
Head cover		
Seal		Synthetic rubber (NBR)
Bumper		
Stopper		Steel pipe
Spacer		Steel
Spring		Piano wire
Filter		Foamed metal
Magnet		Plastic magnet
Bellows		Nylon tarpaulin (heat resistant temperature 70°C [158°F])
Y type knuckle, I type knuckle Pivot mounting with supporting bracket		Mild steel (zinc plated)

## Air Consumption

- Air consumption for every 100mm stroke in single acting cylinder per 1 reciprocation

Bore size mm [in.]	Air pressure MPa [psi.]								ℓ [ft. <sup>3</sup> ] (ANR)
	0.2 [29]	0.3 [44]	0.4 [58]	0.5 [73]	0.6 [87]	0.7 [102]	0.8 [116]	0.9 [131]	
<b>20 [0.787]</b>	0.1 [0.0035]	0.13 [0.0046]	0.16 [0.0056]	0.19 [0.0067]	0.22 [0.0078]	0.25 [0.0088]	0.28 [0.0099]	0.31 [0.0109]	
<b>32 [1.260]</b>	0.24 [0.0085]	0.32 [0.0113]	0.40 [0.0141]	0.48 [0.0169]	0.56 [0.0198]	0.64 [0.0226]	0.76 [0.0268]	0.80 [0.0282]	

## Seals

Note: Seals cannot be replaced.

Parts	Quantity	Piston seal
Bore size mm		1
<b>20</b>		PPY-20
<b>32</b>		PPY-32

## Mass

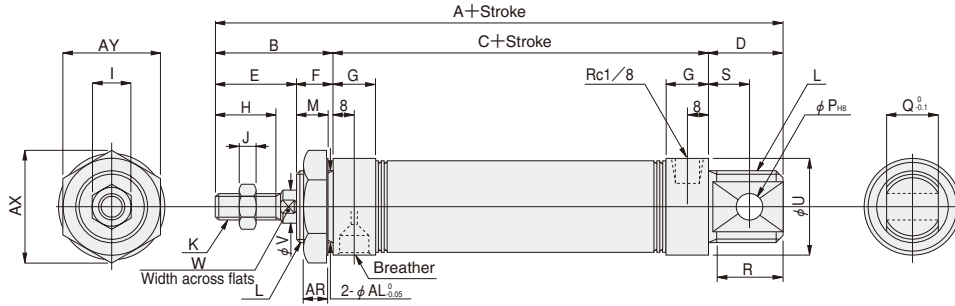
Bore size mm [in.]	Mass of basic type				Mass of mounting bracket				
	Stroke mm				Foot bracket	Flange bracket	Pivot bracket	Y type knuckle	I type knuckle
	25	50	75	100					
<b>20 [0.787]</b>	0.22 [0.49] (0.21 [0.46])	0.27 [0.60] (0.26 [0.57])	0.32 [0.71] (0.31 [0.68])	—	0.14 [0.31]	0.08 [0.18]	0.06 [0.13]	0.041 [0.090]	0.036 [0.079]
<b>32 [1.260]</b>	0.37 [0.82] (0.35 [0.77])	0.56 [1.23] (0.54 [1.19])	0.71 [1.57] (0.69 [1.52])	0.80 [1.76] (0.78 [1.72])	0.19 [0.42]	0.10 [0.22]	0.14 [0.31]	0.075 [0.165]	0.070 [0.154]

Note: Figures in parentheses ( ) are for short head type.  
 Calculation example: For foot mounting type of 32mm bore size and 75mm stroke  
 $0.71 + 0.19 = 0.90\text{kg}$  [1.98lb.]

# Dimensions of Single Acting Push Type (mm)

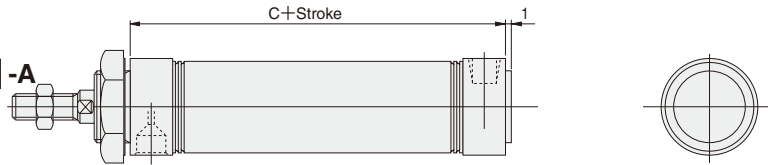
● Basic type SA Bore size × Stroke

CAD SA- Bore size



● Short head

SA Bore size × Stroke



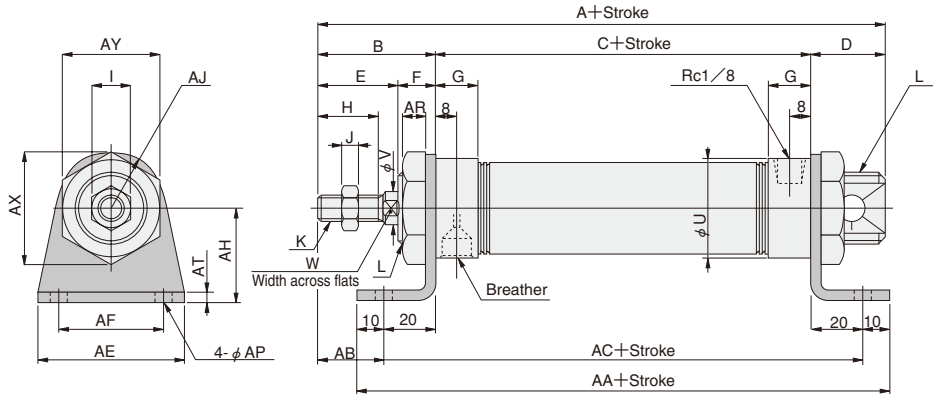
CAD SLIM-A

Code Stroke	A						B	C						D	E	F	G	H
	0~25	26~50	51~75	76~100	101~125	126~150		0~25	26~50	51~75	76~100	101~125	126~150					
20 [0.787]	140	157	177	—	—	—	35	84	101	121	—	—	—	21	23	12	16	15
32 [1.260]	156	170	193	207	—	—	45	84	98	121	135	—	—	27	31	14	16	23

Code	I	J	K	L	M	P	Q	R	S	U	V	W	AR	AX	AY	AL
20 [0.787]	12	5	M 8×1	M20×1.5	10	8	12	19	12	27	8	6	7.5	31.2	27	20
32 [1.260]	14	6	M10×1.25	M27×2	12	10	20	25	15	35	12	10	9.5	41.6	36	27

● Foot mounting type SA Bore size × Stroke -1

CAD SA- Bore size SLIM-F01



Code Stroke	A						B	C						D	E	F	G	H
	0~25	26~50	51~75	76~100	101~125	126~150		0~25	26~50	51~75	76~100	101~125	126~150					
20 [0.787]	140	157	177	—	—	—	35	84	101	121	—	—	—	21	23	12	16	15
32 [1.260]	156	170	193	207	—	—	45	84	98	121	135	—	—	27	31	14	16	23

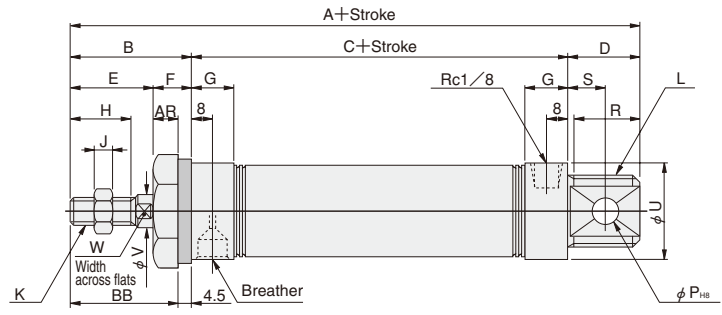
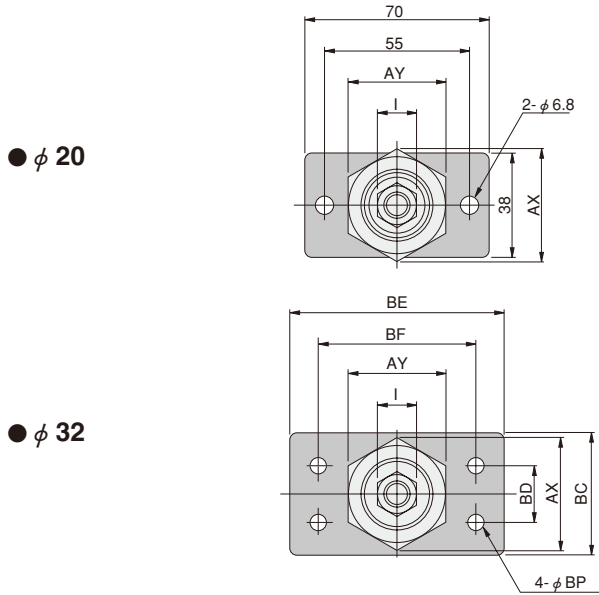
Code	I	J	K	L	U	V	W
20 [0.787]	12	5	M 8×1	M20×1.5	27	8	6
32 [1.260]	14	6	M10×1.25	M27×2	35	12	10

Code Stroke	AA						AB	AC						AE	AF	AH	AJ	AP	AR	AT	AX	AY
	0~25	26~50	51~75	76~100	101~125	126~150		0~25	26~50	51~75	76~100	101~125	126~150									
20 [0.787]	144	161	181	—	—	—	15	124	141	161	—	—	—	55	40	25	15.5	6.8	7.5	3.2	31.2	27
32 [1.260]	144	158	181	195	—	—	25	124	138	161	175	—	—	55	40	35	20	6.8	9.5	3.2	41.6	36

# Dimensions of Single Acting Push Type (mm)

● Flange mounting type SA Bore size × Stroke -3

CAD SA- Bore size SLIM-FL3

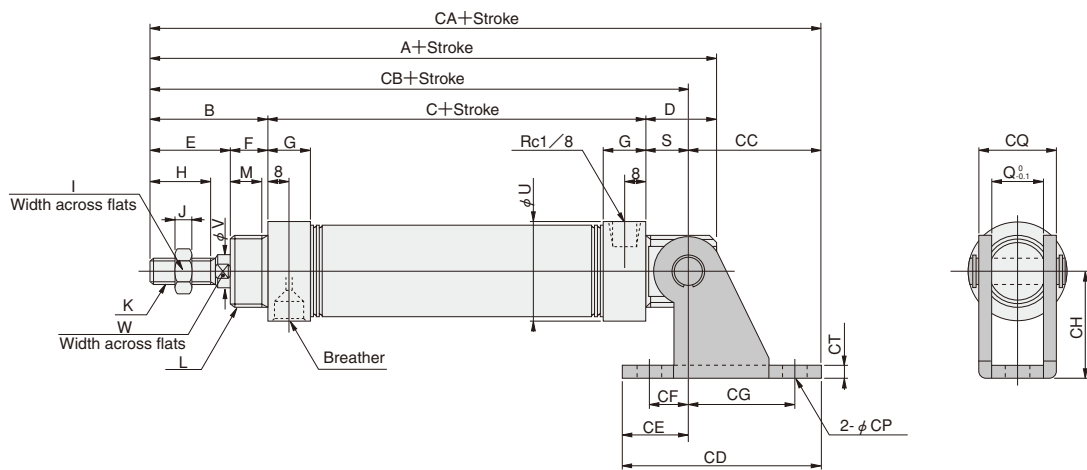


Code Stroke	A						B	C						D	E	F	G	H
	0~25	26~50	51~75	76~100	101~125	126~150		0~25	26~50	51~75	76~100	101~125	126~150					
20 [0.787]	140	157	177	—	—	—	35	84	101	121	—	—	—	21	23	12	16	15
32 [1.260]	156	170	193	207	—	—	45	84	98	121	135	—	—	27	31	14	16	23

Code	I	J	K	L	P	R	S	U	V	W	AR	AX	AY	BB	BC	BD	BE	BF	BP
20 [0.787]	12	5	M8×1	M20×1.5	8	19	12	27	8	6	7.5	31.2	27	30.5	—	—	—	—	—
32 [1.260]	14	6	M10×1.25	M27×2	10	25	15	35	12	10	9.5	41.6	36	40.5	45	20	80	60	6.8

● Pivot mounting type with supporting bracket SA Bore size × Stroke -8E

CAD SA- Bore size SLIM-CL7



Code Stroke	A						B	C						D	E	F	G	H	I	J	K	L	M
	0~25	26~50	51~75	76~100	101~125	126~150		0~25	26~50	51~75	76~100	101~125	126~150										
20 [0.787]	140	157	177	—	—	—	35	84	101	121	—	—	—	21	23	12	16	15	12	5	M 8×1	M20×1.5	10
32 [1.260]	156	170	193	207	—	—	45	84	98	121	135	—	—	27	31	14	16	23	14	6	M10×1.25	M27×2	12

Code Stroke	Q	S	U	V	W	CA						CB						CC	CD	CE	CF	CG	CH	CP	CQ	CT
						0~25	26~50	51~75	76~100	101~125	126~150	0~25	26~50	51~75	76~100	101~125	126~150									
20 [0.787]	12	12	27	8	6	168	185	205	—	—	—	131	148	168	—	—	—	37	59	22	15	30	30	6.8	18.4	3.2
32 [1.260]	20	15	35	12	10	194	208	231	245	—	—	144	158	181	195	—	—	50	75	25	15	40	40	9	28	4

SLIM CYLINDERS

# SLIM SQUARE ROD CYLINDERS



## Symbol



## Specifications

Item	Bore size mm [in.]		
	20, 25 [0.787, 0.984]	32, 40 [1.260, 1.575]	50, 63 [1.969, 2.480]
Operation type	Double acting type		
Media	Air		
Mounting type	Basic type, Foot type, Flange type, Pivot type		
Operating pressure range MPa [psi.]	0.1~0.9 [15~131]		0.05~0.7 [7~102]
Proof pressure MPa [psi.]	1.32 [191]		1.03 [149]
Operating temperature range °C [°F]	0~70 [32~158]		
Operating speed range mm/s [in./sec.]	50~700 [2.0~27.6]		50~500 [2.0~19.7]
Cushion	Fixed type (Rubber bumper)		Variable type (Stroke15mm [0.59in.])
Lubrication	Not required		
Non-rotating accuracy	±1.5°		±1°
Port size	Rc	1/8	1/4

## Bore Size and Stroke

Bore size	Standard strokes	mm	
		Maximum stroke	Maximum available stroke
20	25 50 75 100 125 150	150	500
25			
32			
40			
50	25 50 75 100 150		
63			

- Remarks: 1. Stroke tolerance  $+0.039\text{in.}$   
 2. For non-standard strokes, consult us.  
 3. The minimum operating pressure when the stroke is over the maximum stroke is 0.2MPa [29psi.].

## Order Codes

**DA** **L** **20×50** - - - - -

**Bore size × Stroke**

**Bellows**  
 Blank — No bellows  
 J — With bellows  
 ● (Made to order, available at φ 25 and φ 40 only.)

**Square rod cylinder**

**Slim double acting cylinder**

**Head cover specification**  
 Blank — Standard head  
 A — Short head

**Rod end accessory**  
 Blank — No rod end accessory  
 I — I type knuckle  
 Y — Y type knuckle (with pin)  
 ● For the cylinder joint and cylinder rod end, see p.1568.

**Mounting type**  
 Blank — Basic type  
 1 — Double foot mounting type  
 3 — Flange mounting type  
 8B — Pivot mounting type with bushing (Available at φ 50 and φ 63 only)  
 8E — Pivot mounting type with supporting bracket (with pin) (Available at φ 20~40 only)  
 8B-8E — Pivot mounting type with bushing and supporting bracket (Available at φ 50 and φ 63 only)  
 ● Mounting brackets are included at shipping. (Except pivot mounting type and pivot mounting type with bushing)

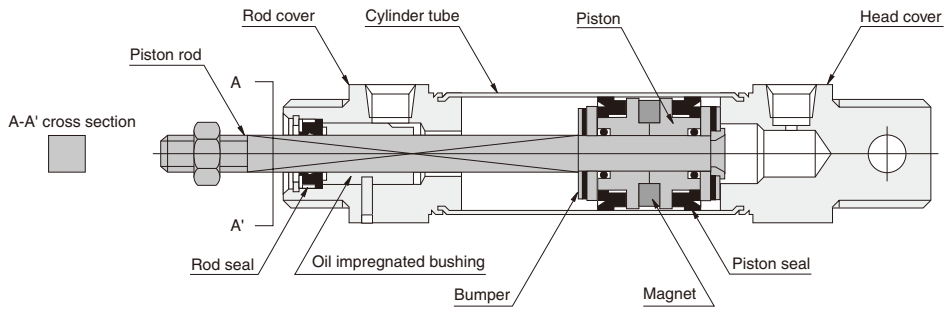
**Number of sensor switches**  
 1 — With 1 sensor switch  
 2 — With 2 sensor switches  
 3 — With 3 sensor switches  
 ⋮

**Lead wire length**  
 (Applies to all except CS□F)  
 A — 1000mm  
 B — 3000mm

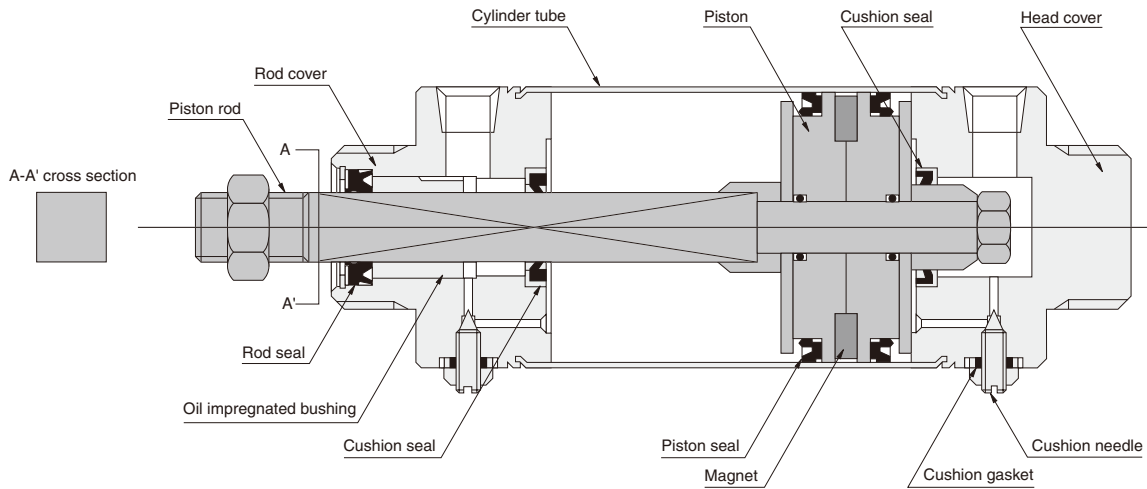
**Sensor switch (for cylinders with sensor switches)**  
 Blank — No sensor switch  
 ZG530 — 2-lead wire Solid state type with indicator lamp DC10~28V  
 ZG553 — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
 CS3M — Reed switch type with indicator lamp DC10~30V  
 AC85~230V  
 CS4M — Reed switch type with indicator lamp DC10~30V  
 AC85~115V  
 CS5M — Reed switch type without indicator lamp DC3~30V  
 AC85~115V  
 CS2F — Reed switch type with indicator lamp AC85~230V  
 CS3F — Reed switch type with indicator lamp DC10~30V  
 CS4F — Reed switch type with indicator lamp DC10~30V  
 CS5F — Reed switch type without indicator lamp DC3~30V  
 ● For details of sensor switches, see p.1544.  
 ● CS□F comes with DIN connector. All others are grommet type.

# Inner Construction and Major Parts (cannot be disassembled)

●  $\phi 20 \sim \phi 40$



●  $\phi 50, \phi 63$



## Major Parts and Materials

Parts	Bore size	20~40	50, 63
Cylinder tube		Stainless steel	
Piston		Plastic	
Piston rod		Steel (hard chrome plated)	
Rod cover		Aluminum alloy (anodized)	
Head cover			
Seal		Synthetic rubber (NBR)	
Bumper		Synthetic rubber (NBR)	—
Magnet		Plastic magnet	
Bellows		Nylon tarpaulin (heat resistant temperature 70°C [158°F])	
Y type knuckle, I type knuckle Pivot mounting with supporting bracket		Mild steel (zinc plated)	

## Seals Note: Seals cannot be replaced.

Parts	Rod seal	Piston seal	Cushion seal	Cushion gasket
Bore mm	Quantity	1	2	2
20		KC-7.4	PPY-20	—
25		KC-7.4	PPY-25	—
32		KC-10	PPY-32	—
40		KC-13	PPY-40	—
50		KC-13	PGY-50	PCS-20
63		KC-13	PGY-63	PCS-20

## Mass

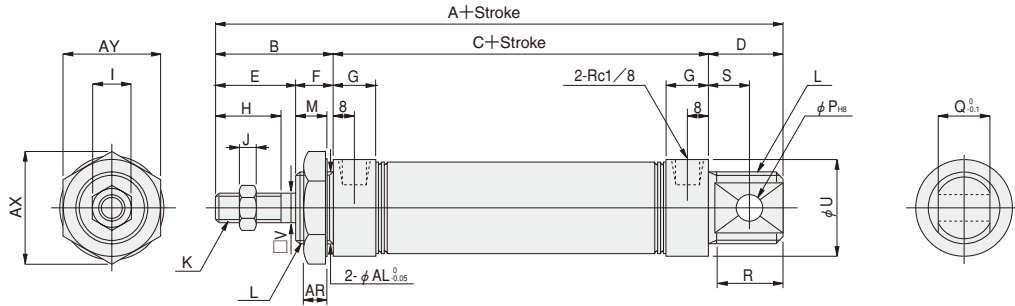
Bore size mm [in.]	Zero stroke mass			Additional mass for each 1mm [0.0394in.] stroke	Mass of mounting bracket				
	Standard head type	Short head type	Pivot mounting type		Foot bracket	Flange bracket	Pivot bracket	Y type knuckle	I type knuckle
20 [0.787]	0.16 [0.35]	0.15 [0.33]	—	0.0008 [0.0018]	0.14 [0.31]	0.08 [0.18]	0.06 [0.13]	0.041 [0.090]	0.036 [0.079]
25 [0.984]	0.20 [0.44]	0.19 [0.42]	—	0.0009 [0.0020]	0.16 [0.35]	0.08 [0.18]	0.06 [0.13]	0.075 [0.165]	0.070 [0.154]
32 [1.260]	0.34 [0.75]	0.32 [0.71]	—	0.0014 [0.0031]	0.19 [0.42]	0.10 [0.22]	0.14 [0.31]	0.075 [0.165]	0.070 [0.154]
40 [1.575]	0.50 [1.10]	0.46 [1.01]	—	0.0021 [0.0046]	0.29 [0.64]	0.13 [0.29]	0.14 [0.31]	0.120 [0.265]	0.132 [0.291]
50 [1.969]	0.90 [1.98]	0.85 [1.87]	0.82 [1.81]	0.0027 [0.0060]	0.55 [1.21]	0.28 [0.62]	0.24 [0.53]	0.120 [0.265]	0.132 [0.291]
63 [2.480]	1.24 [2.73]	1.20 [2.65]	1.17 [2.58]	0.0032 [0.0071]	0.73 [1.61]	0.37 [0.82]	0.24 [0.53]	0.120 [0.265]	0.132 [0.291]

Calculation example: For short head type of 50mm bore size and 100mm stroke with flange mounting bracket  
 $0.85 + (0.0026 \times 100) + 0.28 = 1.39\text{kg} [3.06\text{lb.}]$

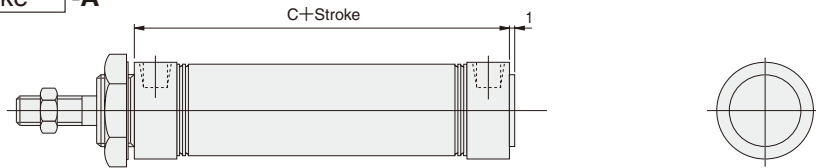


# Dimensions of Square Rod Basic Type (mm)

●  $\phi 20 \sim \phi 40$  DAL Bore size   $\times$  Stroke

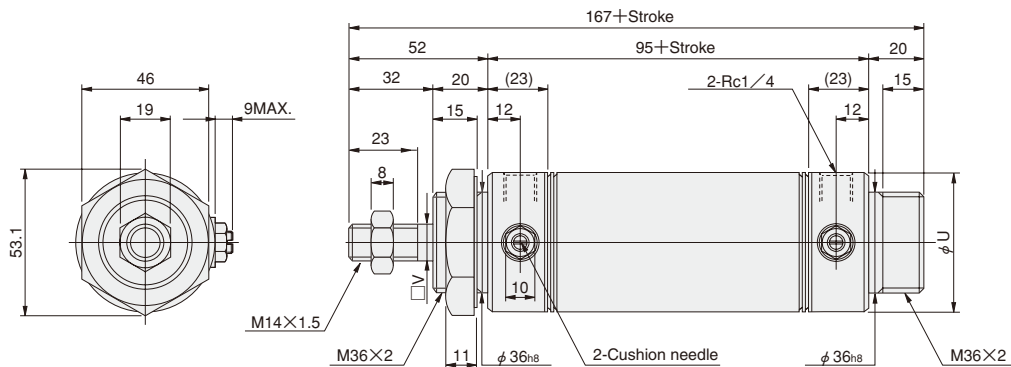


● Short head DAL Bore size   $\times$  Stroke  -A

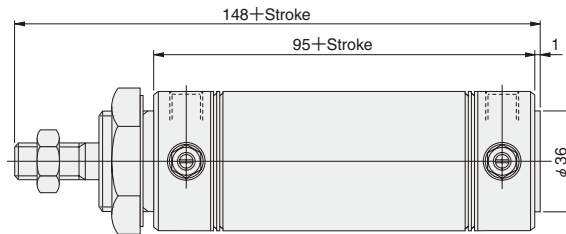


Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	P	Q	R	S	U	V	AR	AX	AY	AL
20	[0.787]	132	35	76	21	23	12	16	15	12	5	M 8×1	M20×1.5	10	8	12	19	12	27	7.4	7.5	31.2	27	20
25	[0.984]	137	40	76	21	26	14	16	18	12	5	M 8×1	M22×1.5	12	8	12	19	12	29	7.4	9.5	34.6	30	22
32	[1.260]	148	45	76	27	31	14	16	23	14	6	M10×1.25	M27×2	12	10	20	25	15	35	10	9.5	41.6	36	27
40	[1.575]	148	45	76	27	31	14	(15)	23	19	8	M14×1.5	M33×2	12	10	20	25	15	41.6	13	9.5	47.3	41	33

●  $\phi 50, \phi 63$  DAL Bore size   $\times$  Stroke



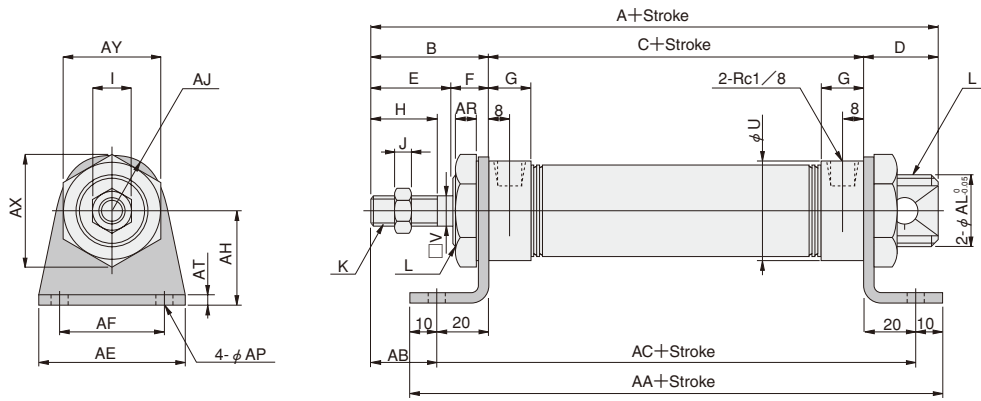
● Short head DAL Bore size   $\times$  Stroke  -A



Bore mm [in.]	Code	U	V
50	[1.969]	52	13
63	[2.480]	65.4	13

# Dimensions of Square Rod Foot Mounting Type (mm)

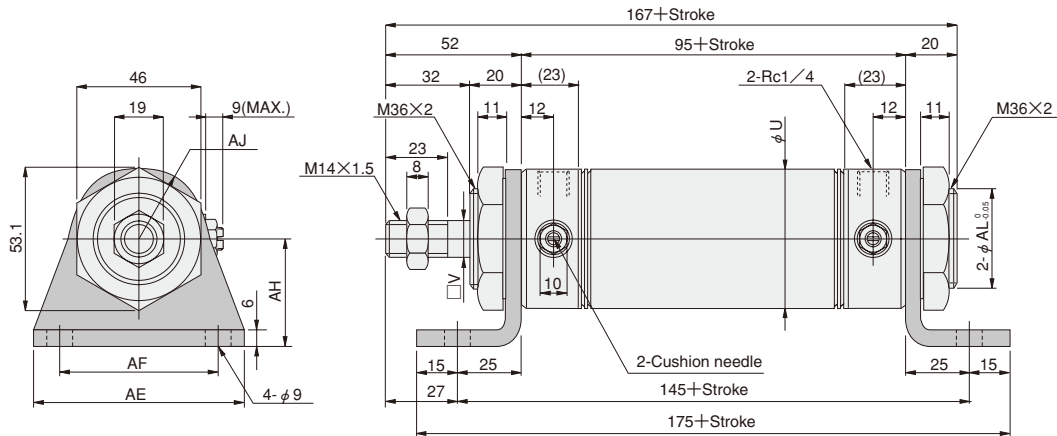
●  $\phi 20 \sim \phi 40$  DAL   $\times$   -1



Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	U	V
20 [0.787]		132	35	76	21	23	12	16	15	12	5	M 8×1	M20×1.5	27	7.4
25 [0.984]		137	40	76	21	26	14	16	18	12	5	M 8×1	M22×1.5	29	7.4
32 [1.260]		148	45	76	27	31	14	16	23	14	6	M10×1.25	M27×2	35	10
40 [1.575]		148	45	76	27	31	14	15	23	19	8	M14×1.5	M33×2	41.6	13

Bore mm [in.]	Code	AA	AB	AC	AE	AF	AH	AJ	AP	AR	AT	AX	AY
20 [0.787]		136	15	116	55	40	25	15.5	6.8	7.5	3.2	31.2	27
25 [0.984]		136	20	116	55	40	30	17	6.8	9.5	3.2	34.6	30
32 [1.260]		136	25	116	55	40	35	20	6.8	9.5	3.2	41.6	36
40 [1.575]		136	25	116	75	55	40	23.5	9	9.5	4	47.3	41

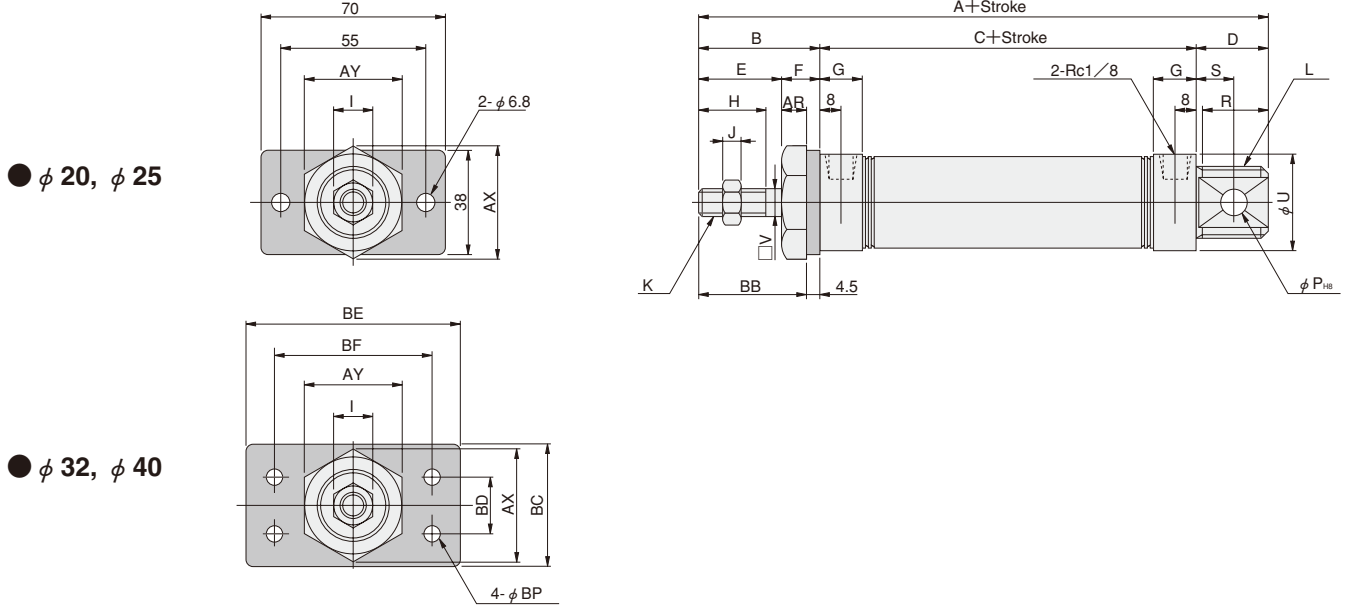
●  $\phi 50, \phi 63$  DAL   $\times$   -1



Bore mm [in.]	Code	U	V	AE	AF	AH	AJ
50 [1.969]		52	13	80	60	40	26
63 [2.480]		65.4	13	95	74	45	32

# Dimensions of Square Rod Flange Mounting Type (mm)

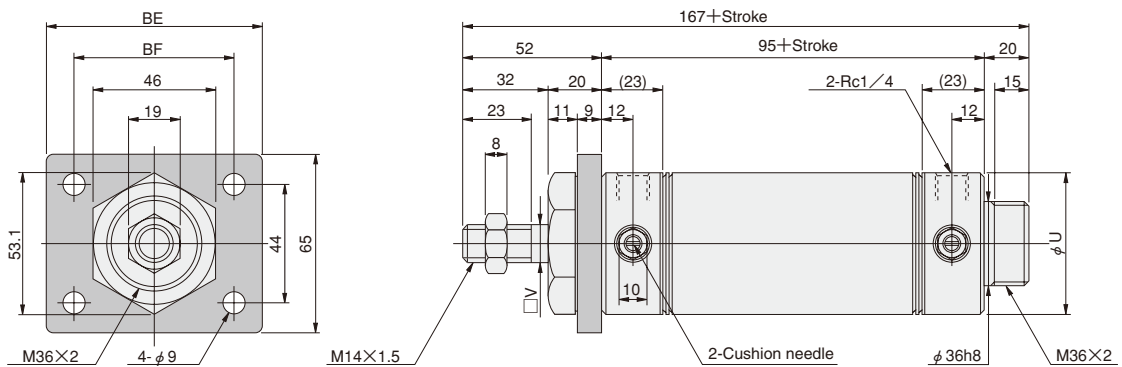
●  $\phi 20 \sim \phi 40$  DAL Bore size   $\times$  Stroke  -3



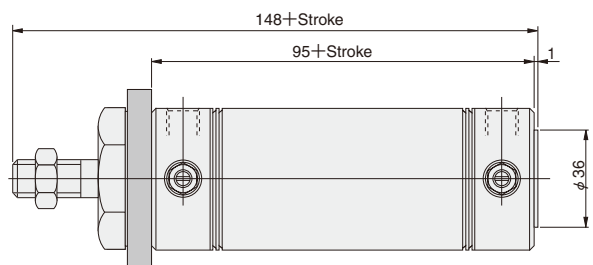
Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	P	R	S	U	V
20	[0.787]	132	35	76	21	23	12	16	15	12	5	M 8×1	M20×1.5	8	19	12	27	7.4
25	[0.984]	137	40	76	21	26	14	16	18	12	5	M 8×1	M22×1.5	8	19	12	29	7.4
32	[1.260]	148	45	76	27	31	14	16	23	14	6	M10×1.25	M27×2	10	25	15	35	10
40	[1.575]	148	45	76	27	31	14	15	23	19	8	M14×1.5	M33×2	10	25	15	41.6	13

Bore mm [in.]	Code	AR	AX	AY	BB	BC	BD	BE	BF	BP
20	[0.787]	7.5	31.2	27	30.5	—	—	—	—	—
25	[0.984]	9.5	34.6	30	35.5	—	—	—	—	—
32	[1.260]	9.5	41.6	36	40.5	45	20	80	60	6.8
40	[1.575]	9.5	47.3	41	40.5	50	30	100	80	9

●  $\phi 50, \phi 63$  DAL Bore size   $\times$  Stroke  -3



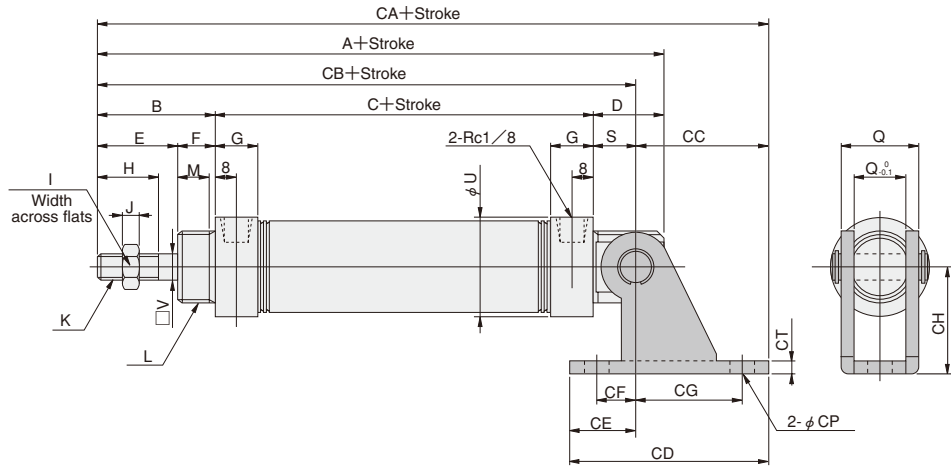
● Short head DAL Bore size   $\times$  Stroke  -A



Bore mm [in.]	Code	U	V	BE	BF
50	[1.969]	52	13	80	60
63	[2.480]	65.4	13	100	80

# Dimensions of Square Rod Pivot Mounting Type (mm)

●  $\phi 20 \sim \phi 40$  DAL Bore size  $\times$  Stroke -8E

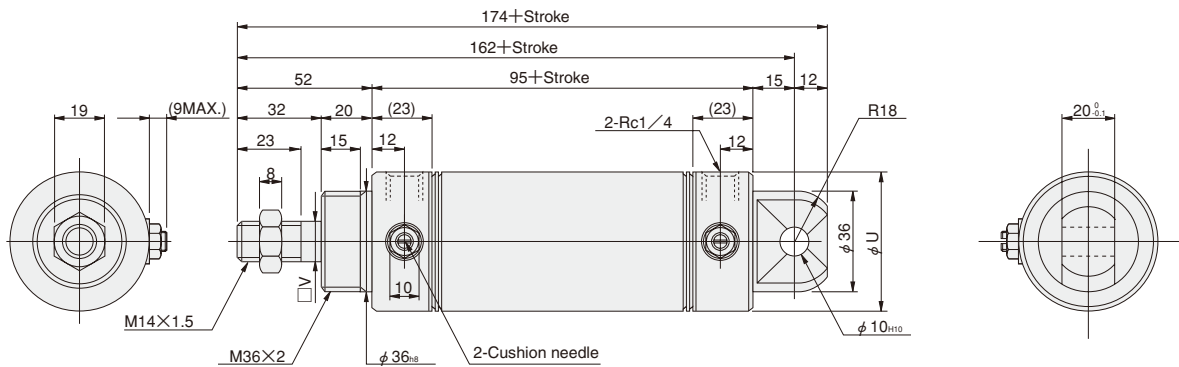


Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	Q	S	U	V
20 [0.787]		132	35	76	21	23	12	16	15	12	5	M 8×1	M20×1.5	10	12	12	27	7.4
25 [0.984]		137	40	76	21	26	14	16	18	14	6	M 8×1	M22×1.5	12	12	12	29	7.4
32 [1.260]		148	45	76	27	31	14	16	23	14	6	M10×1.25	M27×2	12	20	15	35	10
40 [1.575]		148	45	76	27	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	20	15	41.6	13

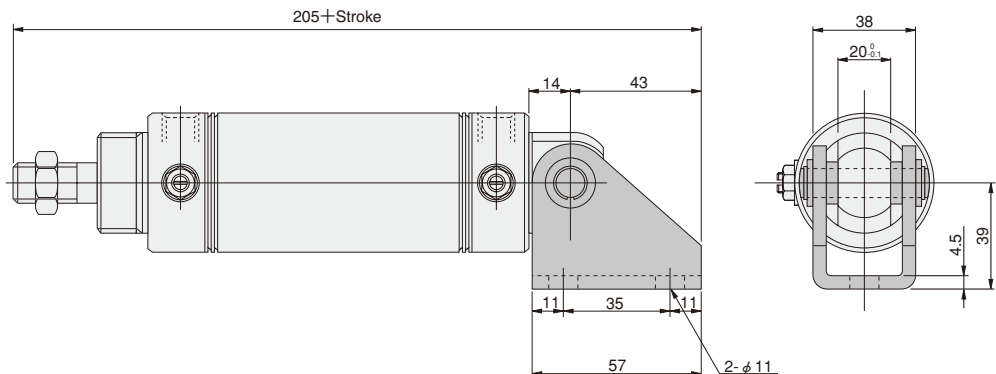
Bore mm [in.]	Code	CA	CB	CC	CD	CE	CF	CG	CH	CP	CQ	CT
20 [0.787]		160	123	37	59	22	15	30	30	6.8	18.4	3.2
25 [0.984]		165	128	37	59	22	15	30	30	6.8	18.4	3.2
32 [1.260]		186	136	50	75	25	15	40	40	9	28	4
40 [1.575]		186	136	50	75	25	15	40	40	9	28	4

●  $\phi 50, \phi 63$

● Pivot mounting type with bushing DAL Bore size  $\times$  Stroke -8B



● Pivot mounting type with bushing DAL Bore size  $\times$  Stroke -8B-8E (With supporting bracket)

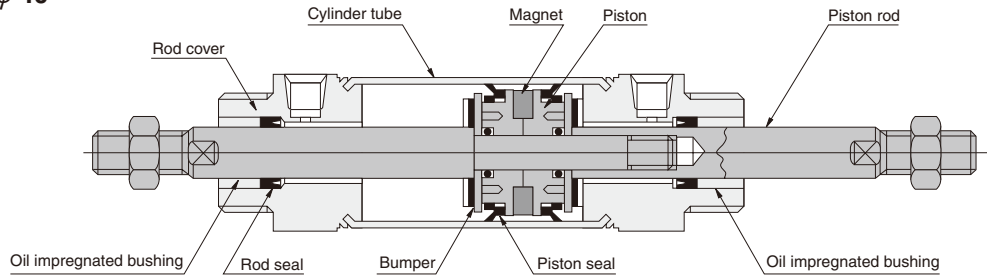


Bore mm [in.]	Code	U	V
50 [1.969]		52	13
63 [2.480]		65.4	13

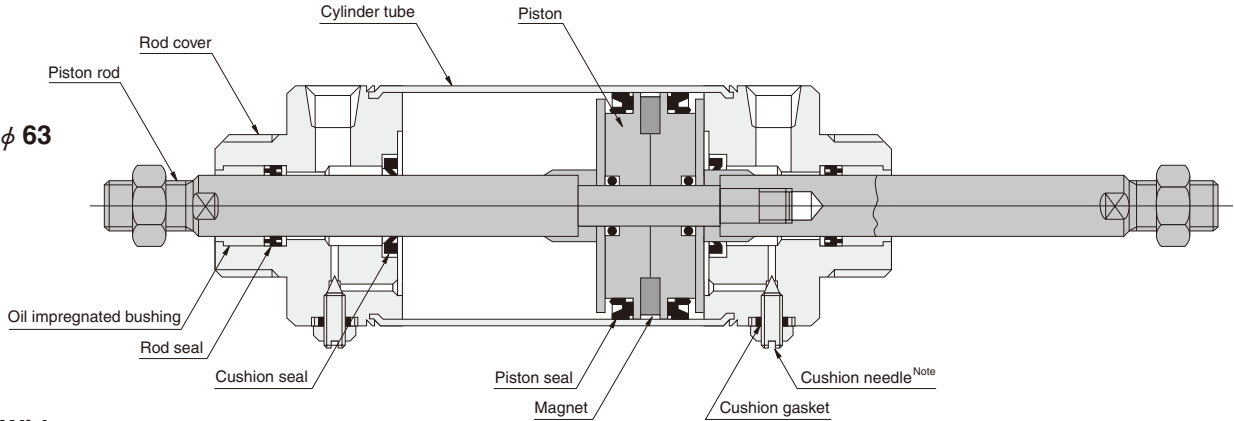


# Inner Construction and Major Parts (cannot be disassembled)

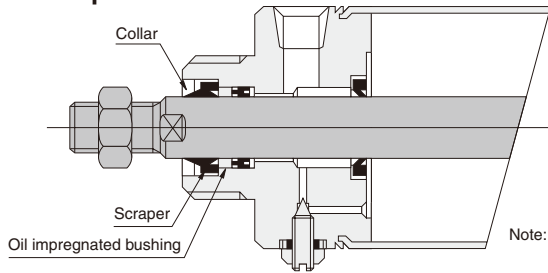
●  $\phi 20 \sim \phi 40$



●  $\phi 50, \phi 63$



● With scraper



Note: Set the cushion needle tightening torque to 1.0N·m [8.85in·lbf] or less.

## Major Parts and Materials

Parts	Bore size	20~40	50, 63
Cylinder tube		Stainless steel	
Piston		Plastic	
Piston rod		Steel (hard chrome plated)	
Rod cover		Aluminum alloy (anodized)	
Seal		Synthetic rubber (NBR)	
Bumper		Synthetic rubber (NBR)	—
Scraper		—	Synthetic rubber (NBR)
Collar		—	Aluminum (anodized)
Magnet		Plastic magnet	
Bellows		Nylon tarpaulin (heat resistant temperature 70°C [158°F])	
Y type knuckle, I type knuckle		Mild steel (zinc plated)	

## Seals Note: Seals cannot be replaced.

Parts	Rod seal	Piston seal	Cushion seal	Cushion gasket	Scraper
Quantity	2	2	2	2	2
Bore mm					
20	NY-12X8X3.5	PPY-20	—	—	—
25	NY-14X10X3.5	PPY-25	—	—	—
32	NY-17X12X4	PPY-32	—	—	—
40	NY-22X16X5	PPY-40	—	—	—
50	NY-22X16X5	PGY-50	PCS-20	DT-1-5	SCB-16
63	NY-22X16X5	PGY-63	PCS-20	DT-1-5	SCB-16

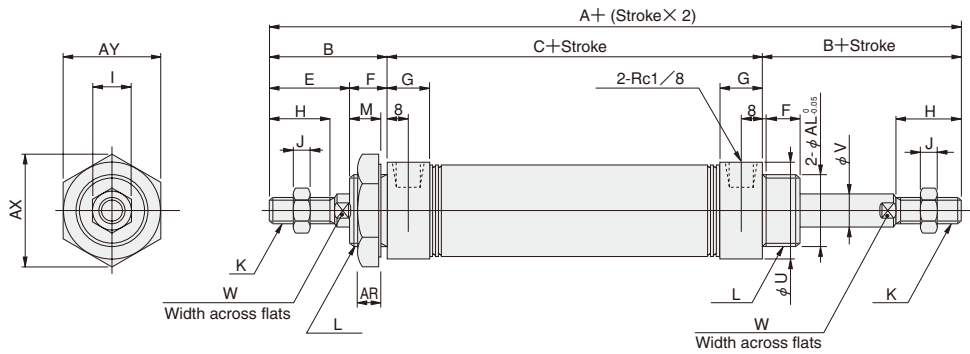
## Mass

Bore size mm [in.]	Zero stroke mass			Additional mass for each 1mm [0.0394in.] stroke	Mass of knuckle	
	Basic type	Foot mounting type	Flange mounting type		Y type knuckle	I type knuckle
20 [0.787]	0.18 [0.40]	0.32 [0.71]	0.26 [0.57]	0.0012 [0.0026]	0.041 [0.090]	0.036 [0.079]
25 [0.984]	0.25 [0.55]	0.41 [0.90]	0.33 [0.73]	0.0016 [0.0035]	0.075 [0.165]	0.070 [0.154]
32 [1.260]	0.38 [0.84]	0.57 [1.26]	0.48 [1.06]	0.0025 [0.0055]	0.075 [0.165]	0.070 [0.154]
40 [1.575]	0.58 [1.28]	0.87 [1.92]	0.71 [1.57]	0.0039 [0.0086]	0.120 [0.265]	0.132 [0.291]
50 [1.969]	0.91 [2.01]	1.63 [3.59]	1.25 [2.76]	0.0044 [0.0097]	0.120 [0.265]	0.132 [0.291]
63 [2.480]	1.23 [2.71]	2.03 [4.48]	1.67 [3.68]	0.0052 [0.0115]	0.120 [0.265]	0.132 [0.291]

Calculation example: For basic type of 50mm bore size and 100mm stroke  
 $0.91 + (0.0044 \times 100) = 1.35\text{kg} [2.98\text{lb.}]$

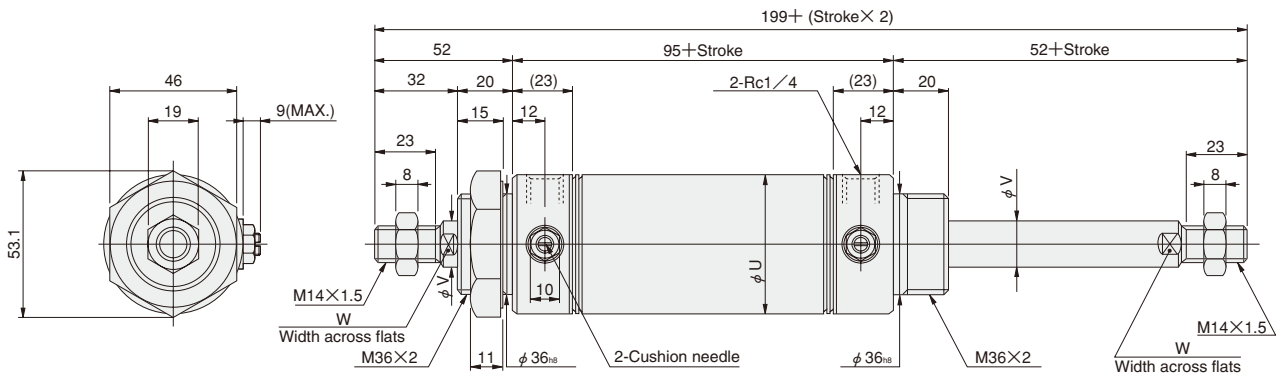
## Dimensions of Double Rod Basic Type (mm)

●  $\phi 20 \sim \phi 40$  DAD   $\times$



Code	A	B	C	E	F	G	H	I	J	K	L	M	U	V	W	AR	AX	AY	AL
20 [0.787]	146	35	76	23	12	16	15	12	5	M 8×1	M20×1.5	10	27	8	6	7.5	31.2	27	20
25 [0.984]	156	40	76	26	14	16	18	14	6	M10×1.25	M22×1.5	12	29	10	8	9.5	34.6	30	22
32 [1.260]	166	45	76	31	14	16	23	14	6	M10×1.25	M27×2	12	35	12	10	9.5	41.6	36	27
40 [1.575]	166	45	76	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	41.6	16	14	9.5	47.3	41	33

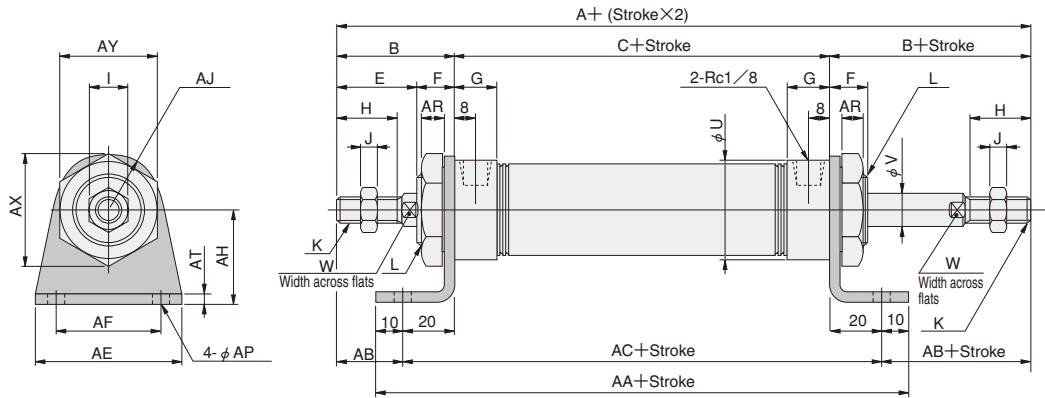
●  $\phi 50, \phi 63$  DAD   $\times$



Code	U	V	W
50 [1.969]	52	16	14
63 [2.480]	65.4	16	14

# Dimensions of Double Rod Foot Mounting Type (mm)

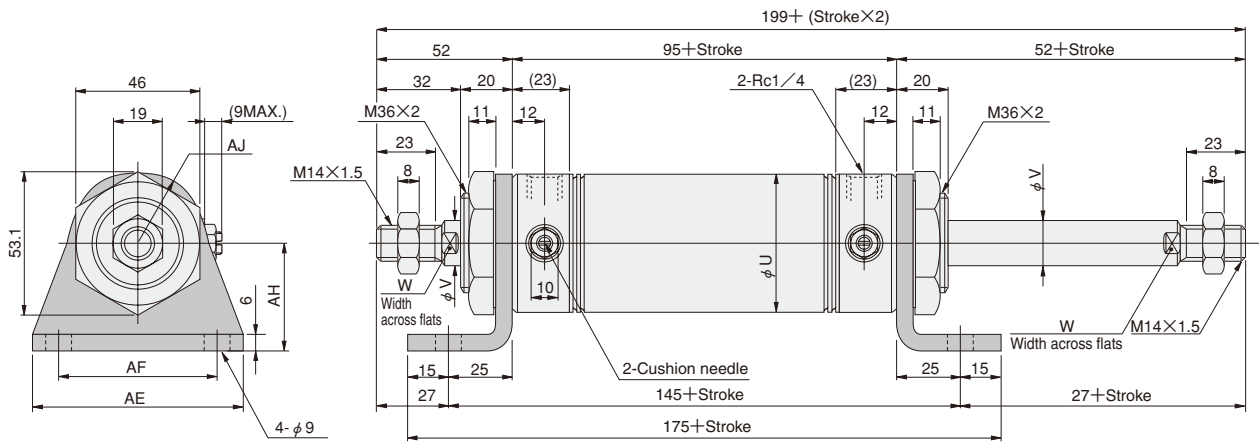
●  $\phi 20 \sim \phi 40$  DAD   $\times$   -1



Bore mm [in.]	Code	A	B	C	E	F	G	H	I	J	K	L	U	V	W
20	[0.787]	146	35	76	23	12	16	15	12	5	M 8×1	M20×1.5	27	8	6
25	[0.984]	156	40	76	26	14	16	18	14	6	M10×1.25	M22×1.5	29	10	8
32	[1.260]	166	45	76	31	14	16	23	14	6	M10×1.25	M27×2	35	12	10
40	[1.575]	166	45	76	31	14	(15)	23	19	8	M14×1.5	M33×2	41.6	16	14

Bore mm [in.]	Code	AA	AB	AC	AE	AF	AH	AJ	AP	AR	AT	AX	AY
20	[0.787]	136	15	116	55	40	25	15.5	6.8	7.5	3.2	31.2	27
25	[0.984]	136	20	116	55	40	30	17	6.8	9.5	3.2	34.6	30
32	[1.260]	136	25	116	55	40	35	20	6.8	9.5	3.2	41.6	36
40	[1.575]	136	25	116	75	55	40	23.5	9	9.5	4	47.3	41

●  $\phi 50, \phi 63$  DAD   $\times$   -1

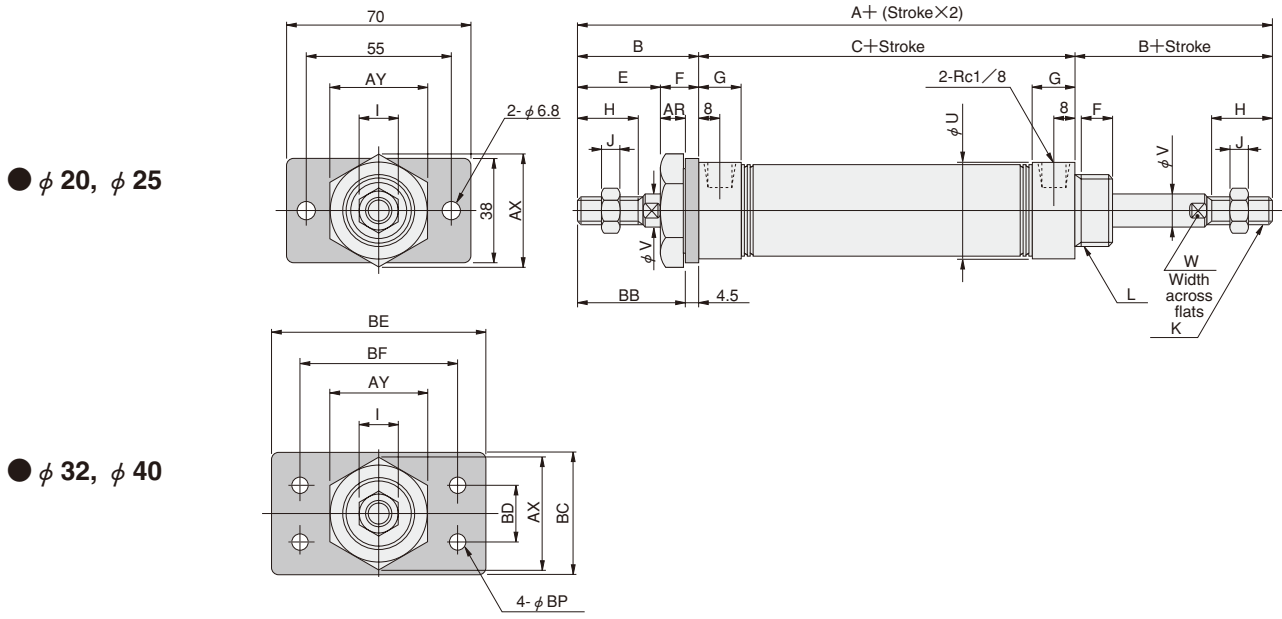


Bore mm [in.]	Code	U	V	W	AE	AF	AH	AJ
50	[1.969]	52	16	14	80	60	40	26
63	[2.480]	65.4	16	14	95	74	45	32



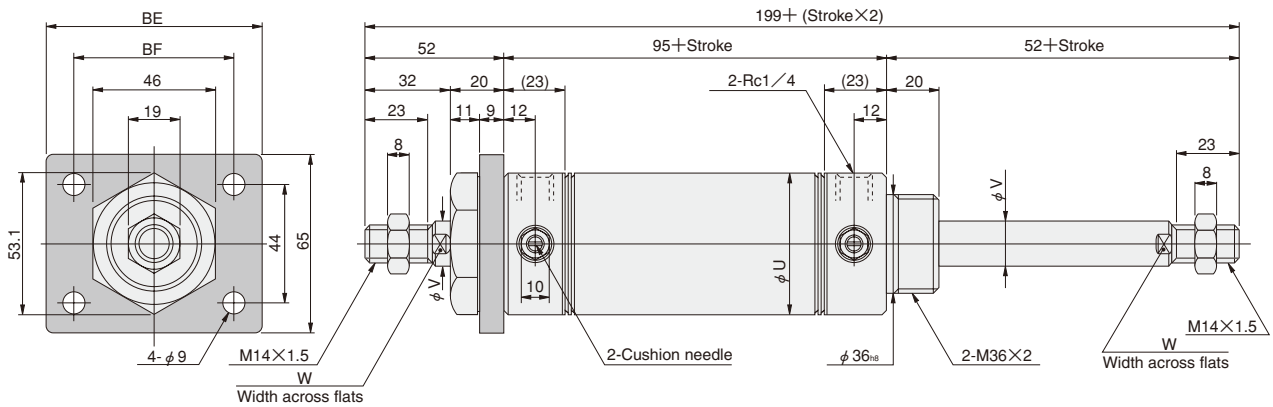
# Dimensions of Double Rod Flange Mounting Type (mm)

●  $\phi 20 \sim \phi 40$  DAD   $\times$   -3



Bore mm [in.]	Code	A	B	C	E	F	G	H	I	J	K	L	U	V	W	AR	AX	AY	BB	BC	BD	BE	BF	BP
20	[0.787]	146	35	76	23	12	16	15	12	5	M 8×1	M20×1.5	27	8	6	7.5	31.2	27	30.5	—	—	—	—	—
25	[0.984]	156	40	76	26	14	16	18	14	6	M10×1.25	M22×1.5	29	10	8	9.5	34.6	30	35.5	—	—	—	—	—
32	[1.260]	166	45	76	31	14	16	23	14	6	M10×1.25	M27×2	35	12	10	9.5	41.6	36	40.5	45	20	80	60	6.8
40	[1.575]	166	45	76	31	14	(15)	23	19	8	M14×1.5	M33×2	41.6	16	14	9.5	47.3	41	40.5	50	30	100	80	9

●  $\phi 50, \phi 63$  DAD   $\times$   -3

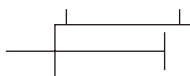


Bore mm [in.]	Code	U	V	W	BE	BF
50	[1.969]	52	16	14	80	60
63	[2.480]	65.4	16	14	100	80

# SLIM LOW HYDRAULIC CYLINDERS



## Symbol



## Specifications

Item	Bore size mm [in.]	20~40 [0.787~1.575]	50 [1.969]	63 [2.480]
Operation type		Double acting type		
Media		Turbine oil with defoaming agent (ISO VG22~100 or equivalent) or petroleum-based hydraulic oil		
Mounting type		Basic type, Foot type, Flange type, Pivot type		
Operating pressure range	MPa [psi.]	0.2~0.9 [29~131]	0.2~0.7 [29~102]	
Proof pressure	MPa [psi.]	1.32 [191]	1.03 [149]	
Operating temperature range	°C [°F]	0~70 [32~158]		
Operating speed range	When one side is air and the other side is oil	1~100 [0.04~3.94]	0.5~150 [0.02~5.91]	0.5~100 [0.02~3.94]
	When both sides are oil	1~60 [0.04~2.36]	0.5~100 [0.02~3.94]	0.5~50 [0.02~1.97]
Cushion		Fixed type (Rubber bumper)	None	
Port size	Rc	1/8	1/4	

Notes: 1. The low hydraulic cylinder is recommended to be used with oil on both sides. The use of oil on one side and air on the other side could result in imprecise speed control, and oil could leak across to the air side. In addition, use meter-out control for the speed control.  
2. Bore sizes  $\phi$  50 and  $\phi$  63 have air bleed ports. Loosen the plugs to bleed air of the cylinder inside.

3. When using the reed switch type sensor, maintain a minimum speed of 30mm/s [1.2in./sec.] or more.  
4. Do not use nonflammable hydraulic fluid, machine oil, or spindle oil.  
5. Be aware that changes in oil temperature can alter the speed.

## Bore Size and Stroke

Bore size	Standard strokes	Maximum stroke		Maximum available stroke	
		No bellows	With bellows	No bellows	With bellows
20	25 50 75 100 125 150	200		1050	740
25	25 50 75 100 125 150 200	250			
32	25 50 75 100 125 150 200	300			
40	25 50 75 100 125 150 200 250 300	400	300	900	740
50	25 50 75 100 150 200 [250 300 350 400]	300[500]	300		
63	25 50 75 100 150 200 [250 300 350 400 500]	300[600]	300		

Remarks: 1. Stroke tolerance  $^{+1}_{0}$  [  $^{+0.039}_{0}$ in.]  
2. For non-standard strokes, consult us.  
3. Figures in square brackets [ ] are for cases when foot mounting brackets are used for mounting.

## Order Codes

**DA** **H** 20×50 -   -   -   -   -   -  

**Low hydraulic cylinders**  
Slim double acting cylinder

**Bore size × Stroke**  
20×50

**Bellows**  
Blank — No bellows  
J — With bellows (Made to order)

**Rod end accessory**  
Blank — No rod end accessory  
I — I type knuckle  
Y — Y type knuckle (with pin)  
● For the cylinder joint and cylinder rod end, see p.1568.

**Mounting type**  
Blank — Basic type  
1 — Double foot mounting type  
3 — Flange mounting type  
8B — Pivot mounting type with bushing (Available at  $\phi$  50 and  $\phi$  63 only)  
8E — Pivot mounting type with supporting bracket (with pin) (Available at  $\phi$  20~40 only)  
8B-8E — Pivot mounting type with bushing and supporting bracket (Available at  $\phi$  50 and  $\phi$  63 only)  
● Mounting brackets are included at shipping.

**Head cover specification**  
Blank — Standard head  
A — Short head

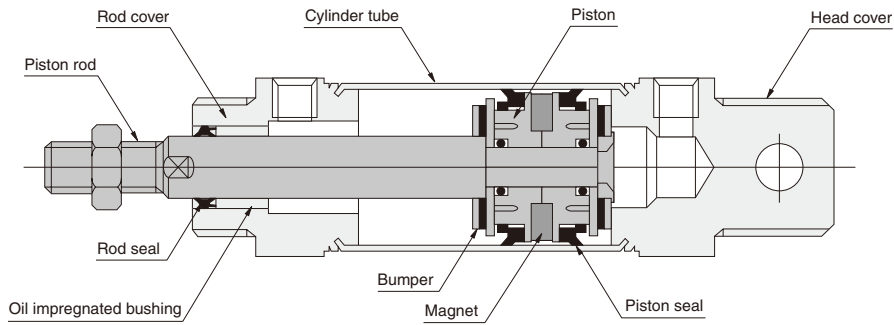
**Number of sensor switches**  
1 — With 1 sensor switch  
2 — With 2 sensor switches  
3 — With 3 sensor switches  
: — :  
: — :

**Lead wire length (Applies to all except CS□F)**  
A — 1000mm [39in.]  
B — 3000mm [118in.]

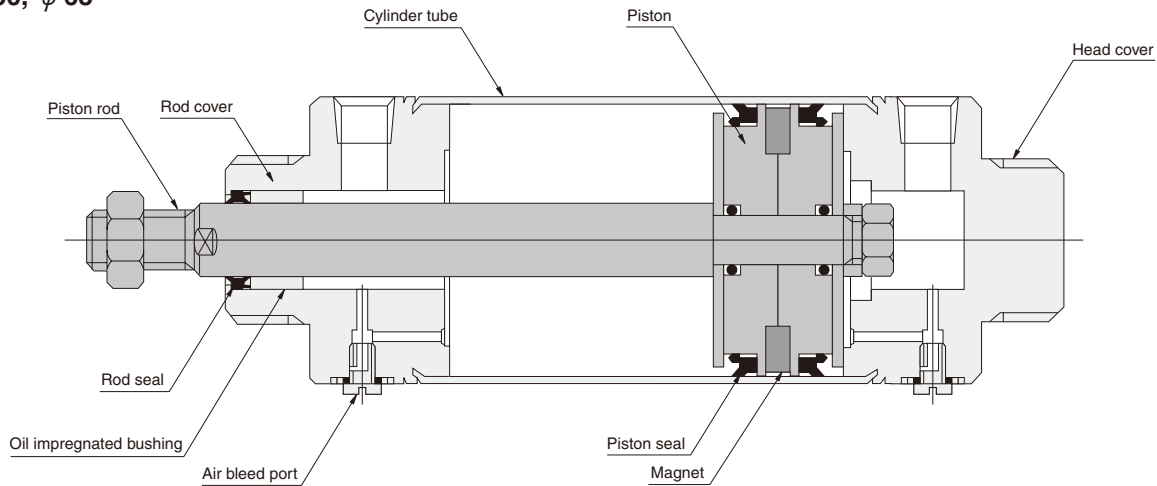
**Sensor switch (for cylinders with sensor switches)**  
Blank — No sensor switch  
ZG530 — 2-lead wire Solid state type with indicator lamp DC10~28V  
ZG553 — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
CS3M — Reed switch type with indicator lamp DC10~30V AC85~230V  
CS4M — Reed switch type with indicator lamp DC10~30V AC85~115V  
CS5M — Reed switch type without indicator lamp DC3~30V AC85~115V  
CS2F — Reed switch type with indicator lamp AC85~230V  
CS3F — Reed switch type with indicator lamp DC10~30V  
CS4F — Reed switch type with indicator lamp DC10~30V  
CS5F — Reed switch type without indicator lamp DC3~30V  
● For details of sensor switches, see p.1544.  
● CS□F comes with DIN connector. All others are grommet type.

## Inner Construction and Major Parts (cannot be disassembled)

●  $\phi 20 \sim \phi 40$



●  $\phi 50, \phi 63$



Note: Bore sizes  $\phi 50$  and  $\phi 63$  have air bleed ports.  
Loosen the plugs to bleed air of the cylinder inside.

## Major Parts and Materials

Parts	Bore size	20~40	50, 63
Cylinder tube		Stainless steel	
Piston		Plastic	
Piston rod		Steel (hard chrome plated)	
Rod cover		Aluminum alloy (anodized)	
Head cover			
Seal		Synthetic rubber (NBR)	
Bumper		Synthetic rubber (NBR)	—
Magnet		Plastic magnet	
Bellows		Nylon tarpaulin (heat resistant temperature 70°C [158°F])	
Y type knuckle, I type knuckle Pivot mounting with supporting bracket		Mild steel (zinc plated)	

## Seals

Note: Seals cannot be replaced.

Parts	Quantity	Rod seal	Piston seal
		1	2
20		NHU- 8	PPY-20
25		NHU-10	PPY-25
32		NHU-12	PPY-32 (special)
40		NHU-16	PPY-40 (special)
50		NHU-16	SKY-40
63		NHU-16	SKY-53

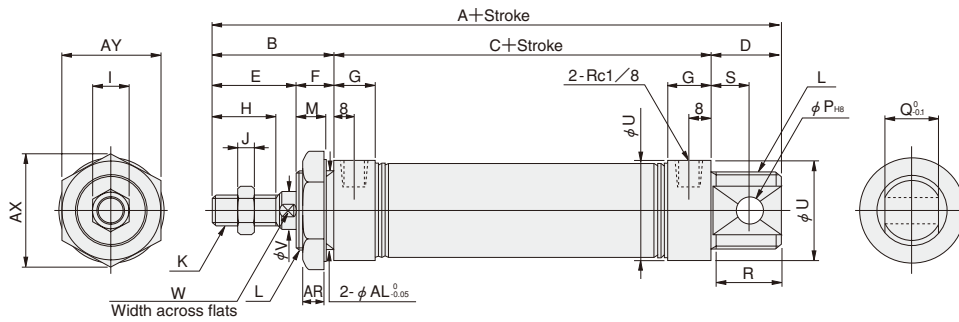
## Mass

Bore size mm [in.]	Zero stroke mass			Additional mass for each 1mm [0.0394in.] stroke	Mass of mounting bracket				
	Standard head type	Short head type	Pivot mounting type		Foot bracket	Flange bracket	Pivot bracket	Y type knuckle	I type knuckle
20 [0.787]	0.14 [0.31]	0.15 [0.33]	—	0.0008 [0.0018]	0.14 [0.31]	0.08 [0.18]	0.06 [0.13]	0.041 [0.090]	0.036 [0.079]
25 [0.984]	0.21 [0.46]	0.20 [0.44]	—	0.0011 [0.0024]	0.16 [0.35]	0.08 [0.18]	0.06 [0.13]	0.075 [0.165]	0.070 [0.154]
32 [1.260]	0.33 [0.73]	0.31 [0.68]	—	0.0015 [0.0033]	0.19 [0.42]	0.10 [0.22]	0.14 [0.31]	0.075 [0.165]	0.070 [0.154]
40 [1.575]	0.49 [1.08]	0.45 [0.99]	—	0.0024 [0.0053]	0.29 [0.64]	0.13 [0.29]	0.14 [0.31]	0.120 [0.265]	0.132 [0.291]
50 [1.969]	0.83 [1.83]	0.78 [1.72]	0.75 [1.65]	0.0028 [0.0062]	0.55 [1.21]	0.28 [0.62]	0.24 [0.53]	0.120 [0.265]	0.132 [0.291]
63 [2.480]	1.17 [2.58]	1.13 [2.49]	1.10 [2.43]	0.0033 [0.0073]	0.73 [1.61]	0.37 [0.82]	0.24 [0.53]	0.120 [0.265]	0.132 [0.291]

Calculation example: For short head type of 50mm bore size and 100mm stroke with flange mounting bracket  
 $0.78 + (0.0028 \times 100) + 0.28 = 1.34\text{kg} [2.95\text{lb.}]$

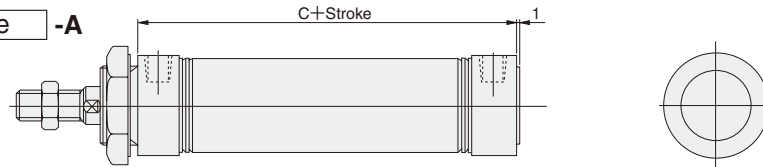
## Dimensions of Low Hydraulic Basic Type (mm)

●  $\phi 20 \sim \phi 40$  DAH Bore size  $\times$  Stroke



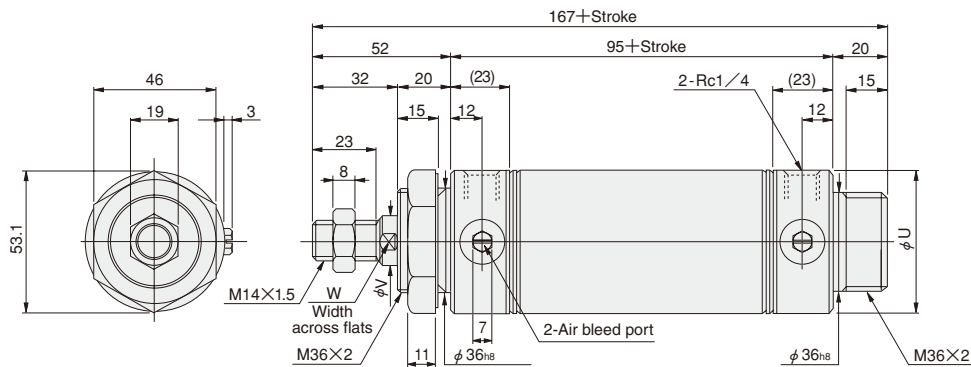
● Short head

DAH Bore size  $\times$  Stroke -A



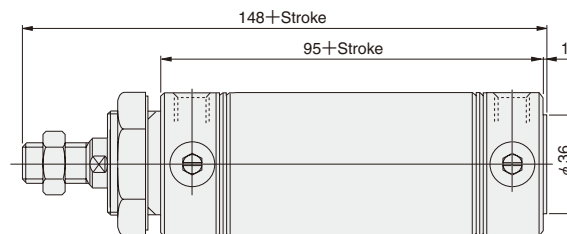
Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	P	Q	R	S	U	V	W	AR	AX	AY	AL
20	[0.787]	132	35	76	21	23	12	16	15	12	5	M 8×1	M20×1.5	10	8	12	19	12	27	8	6	7.5	31.2	27	20
25	[0.984]	137	40	76	21	26	14	16	18	14	6	M10×1.25	M22×1.5	12	8	12	19	12	29	10	8	9.5	34.6	30	22
32	[1.260]	148	45	76	27	31	14	16	23	14	6	M10×1.25	M27×2	12	10	20	25	15	35	12	10	9.5	41.6	36	27
40	[1.575]	148	45	76	27	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	10	20	25	15	41.6	16	14	9.5	47.3	41	33

●  $\phi 50, \phi 63$  DAH Bore size  $\times$  Stroke



● Short head

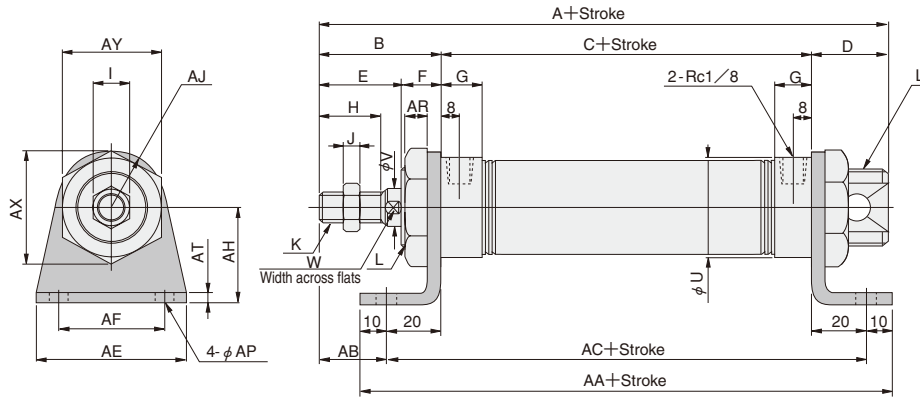
DAH Bore size  $\times$  Stroke -A



Bore mm [in.]	Code	U	V	W
50	[1.969]	52	16	14
63	[2.480]	65.4	16	14

# Dimensions of Low Hydraulic Foot Mounting Type (mm)

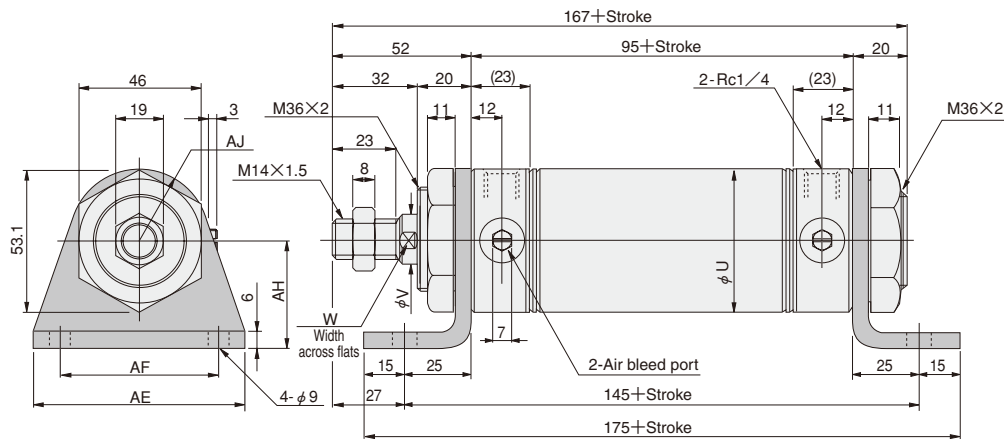
●  $\phi 20 \sim \phi 40$  DAH  ×  -1



Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	U	V	W
20 [0.787]		132	35	76	21	23	12	16	15	12	5	M 8×1	M20×1.5	27	8	6
25 [0.984]		137	40	76	21	26	14	16	18	14	6	M10×1.25	M22×1.5	29	10	8
32 [1.260]		148	45	76	27	31	14	16	23	14	6	M10×1.25	M27×2	35	12	10
40 [1.575]		148	45	76	27	31	14	(14.5)	23	19	8	M14×1.5	M33×2	41.6	16	14

Bore mm [in.]	Code	AA	AB	AC	AE	AF	AH	AJ	AP	AR	AT	AX	AY
20 [0.787]		136	15	116	55	40	25	15.5	6.8	7.5	3.2	31.2	27
25 [0.984]		136	20	116	55	40	30	17	6.8	9.5	3.2	34.6	30
32 [1.260]		136	25	116	55	40	35	20	6.8	9.5	3.2	41.6	36
40 [1.575]		136	25	116	75	55	40	23.5	9	9.5	4	47.3	41

●  $\phi 50, \phi 63$  DAH  ×  -1

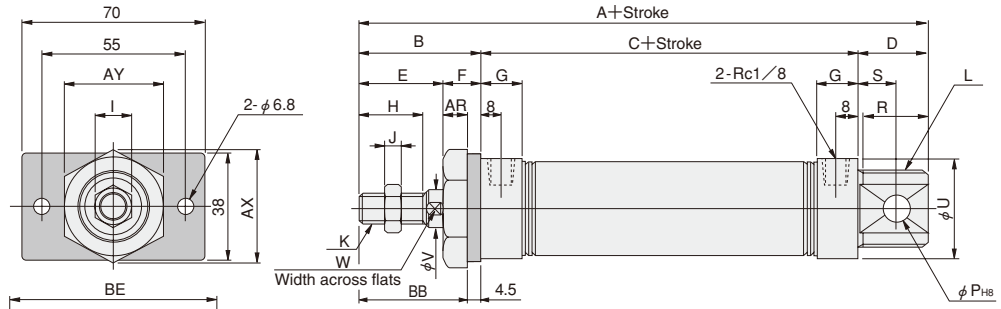


Bore mm [in.]	Code	U	V	W	AE	AF	AH	AJ
50 [1.969]		52	16	14	80	60	40	26
63 [2.480]		65.4	16	14	95	74	45	32

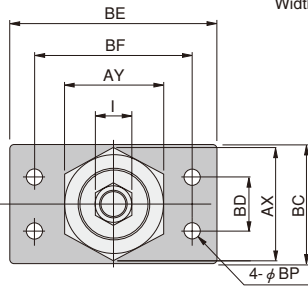
# Dimensions of Low Hydraulic Flange Mounting Type (mm)

●  $\phi 20 \sim \phi 40$  DAH Bore size   $\times$  Stroke  -3

●  $\phi 20, \phi 25$



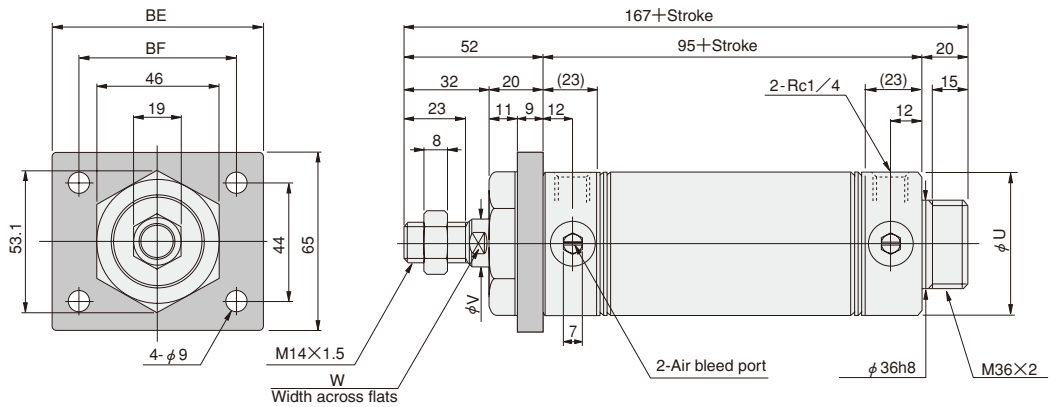
●  $\phi 32, \phi 40$



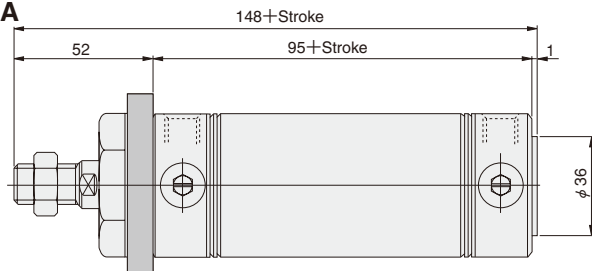
Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	P	R	S	U	V	W
20 [0.787]		132	35	76	21	23	12	16	15	12	5	M 8×1	M20×1.5	8	19	12	27	8	6
25 [0.984]		137	40	76	21	26	14	16	18	14	6	M10×1.25	M22×1.5	8	19	12	29	10	8
32 [1.260]		148	45	76	27	31	14	16	23	14	6	M10×1.25	M27×2	10	25	15	35	12	10
40 [1.575]		148	45	76	27	31	14	(14.5)	23	19	8	M14×1.5	M33×2	10	25	15	41.6	16	14

Bore mm [in.]	Code	AR	AX	AY	BB	BC	BD	BE	BF	BP
20 [0.787]		7.5	31.2	27	30.5	—	—	—	—	—
25 [0.984]		9.5	34.6	30	35.5	—	—	—	—	—
32 [1.260]		9.5	41.6	36	40.5	45	20	80	60	6.8
40 [1.575]		9.5	47.3	41	40.5	50	30	100	80	9

●  $\phi 50, \phi 63$  DAH Bore size   $\times$  Stroke  -3



● Short head DAH Bore size   $\times$  Stroke  -A



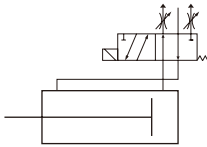
Bore mm [in.]	Code	U	V	W	BE	BF
50 [1.969]		52	16	14	80	60
63 [2.480]		65.4	16	14	100	80



# SLIM VALPACK CYLINDERS

## Standard Rod Cylinders, Square Rod Cylinders

### Symbol



SLIM CYLINDERS

### Specifications

#### ● Valpack cylinders specifications

Item	Bore size mm [in.]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	40 [1.575]
	Solenoid valve series	062 series				125 series
Operation type	Double acting type					
Media	Air					
Mounting type	Basic type, Foot type, Flange type, Rod trunnion type, Head trunnion type					
Operating pressure range MPa [psi.]	Air cylinder	0.04~0.9 [6~131]				
	Square rod cylinders (φ 25 and φ 40 only)	0.1~0.9 [15~131]				
Proof pressure MPa [psi.]	1.32 [191]					
Operating temperature range °C [°F]	0~60 [32~140]					
Operating speed range mm/s [in./sec.]	30~800	30~500	30~300	30~210	30~450	
	[1.2~31.5]	[1.2~19.7]	[1.2~11.8]	[1.2~8.3]	[1.2~17.7]	
Speed controller	Exhaust throttle valve (in both directions) is standard equipment.					
Cushion	Fixed type (Rubber bumper)					
Lubrication	Not required					Required (Turbine Oil Class 1 [ISO VG32] or equivalent)
Port size	Rc	1/4				

Note: Solenoid valve 125 series is available (as an option) for bore size φ 40 only.

#### ● Solenoid valve specifications

Item	Series	062 series	125 series
	Solenoid specification	Single	
Model	VPS062-4E1-70	VPS125-4E1-70	
Operation type	Direct operation		
Number of positions and ports	2 positions, 5 ports		
Effective area mm <sup>2</sup> [Cv]	1.8 [0.1]	3.5 [0.19]	
Port size	Rc	1/4	
Lubrication	Not required <small>Required (Turbine Oil Class 1 [ISO VG32] or equivalent)</small>		
Operating pressure range MPa [psi.]	0~0.9 [0~131] (For the solenoid valve alone, however)		
Proof pressure MPa [psi.]	1.32 [191]		
Operating temperature range °C [°F]	0~60 [32~140]		
Shock resistance m/s <sup>2</sup> [G]	Lateral direction	980.7 [100]	
	Axial direction	980.7 [100]	
Mounting direction	Any		
Maximum operation frequency Hz	5		

#### ● Solenoid specifications

Item	Rated voltage	AC100V	AC200V	DC24V	
	Operating voltage range V	90~110 (100±10%)	180~220 (200±10%)	21.6~26.4 (24±10%)	
Current value (Applied rated voltage)	Frequency Hz	50	60	50	60
	Current mA (r.m.s)	140	130	70	65
Insulation resistance MΩ	100 or more				
Wiring and lead wire length	Grommet type: About 300mm [11.8in.]				
Color of lead wire	Yellow and black	White and black	Red and black		

Notes: 1. While voltages other than those listed above can be manufactured, consult us about delivery for voltages other than AC100V and AC200V.

- Since air pressure being used as a self-holding force could cause it to be unstable when using the VPS062-4E2 solenoid valve, always supply power with an electric circuit, to the solenoid valve, while the cylinder is in operation.
- Consult us about surge suppression measures.

### Bore Size and Stroke

#### ● Standard rod cylinder

Bore size	Standard strokes	Maximum stroke	Maximum available stroke
			mm
20	25 50 75 100 125 150	200	1050 (740)
25	25 50 75 100 125 150 200	250	
32	25 50 75 100 125 150 200	300	
40	25 50 75 100 125 150 200 250 300	400 (300)	

#### ● Square rod cylinders

Bore size	Standard strokes	Maximum stroke	Maximum available stroke
			mm
20	25 50 75 100 125 150	150	500
40			

- Remarks: 1. Stroke tolerance  $^{+1}_{0}$  [+0.039in.]  
 2. For non-standard strokes, consult us.  
 3. Figures in parentheses ( ) are for cylinders with bellows.  
 4. The minimum operating pressure when the stroke is over the maximum stroke is 0.2MPa [29psi].

### Mass

#### ● Standard rod cylinder

Solenoid valve	Bore size mm	Zero stroke mass				Additional mass for each 1mm [0.0394in.] stroke
		Basic type	Foot type	Flange type	Trunnion type	
062 series	20	0.49 [1.08]	0.62 [1.37]	0.57 [1.26]	0.69 [1.52]	0.0008 [0.0018]
	25	0.54 [1.19]	0.68 [1.50]	0.62 [1.37]	0.73 [1.61]	0.0011 [0.0024]
	32	0.64 [1.41]	0.79 [1.74]	0.74 [1.63]	0.82 [1.81]	0.0015 [0.0033]
	40	0.80 [1.76]	1.01 [2.23]	0.93 [2.05]	0.97 [2.14]	0.0024 [0.0053]
125 series	40	0.86 [1.90]	1.08 [2.38]	0.99 [2.18]	1.04 [2.29]	0.0024 [0.0053]

Calculation example: For the mass of foot mounting type of 32mm bore size and 100mm stroke  
 $0.79 + (0.0015 \times 100) = 0.94\text{kg}$  [2.07lb.]

#### ● Square rod cylinder

Solenoid valve	Bore size mm	Zero stroke mass				Additional mass for each 1mm [0.0394in.] stroke
		Basic type	Foot type	Flange type	Trunnion type	
062 series	25	0.53 [1.17]	0.67 [1.48]	0.61 [1.35]	0.72 [1.59]	0.0009 [0.0020]
	40	0.81 [1.79]	1.02 [2.25]	0.94 [2.07]	0.98 [2.16]	0.0021 [0.0046]
125 series	40	0.87 [1.92]	1.09 [2.40]	1.00 [2.21]	1.05 [2.32]	0.0021 [0.0046]

Calculation example: For the mass of foot mounting type of 25mm bore size and 100mm stroke  
 $0.67 + (0.0009 \times 100) = 0.76\text{kg}$  [1.68lb.]

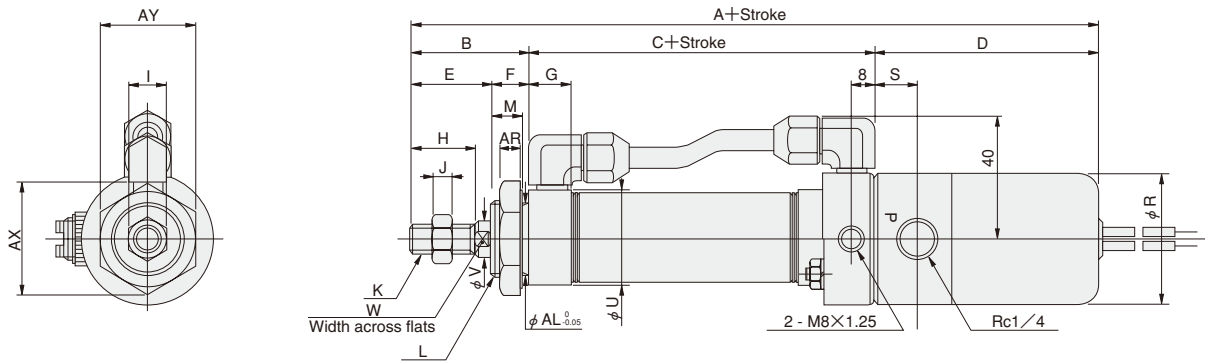
- For the mass of the mounting bracket, see p.315.





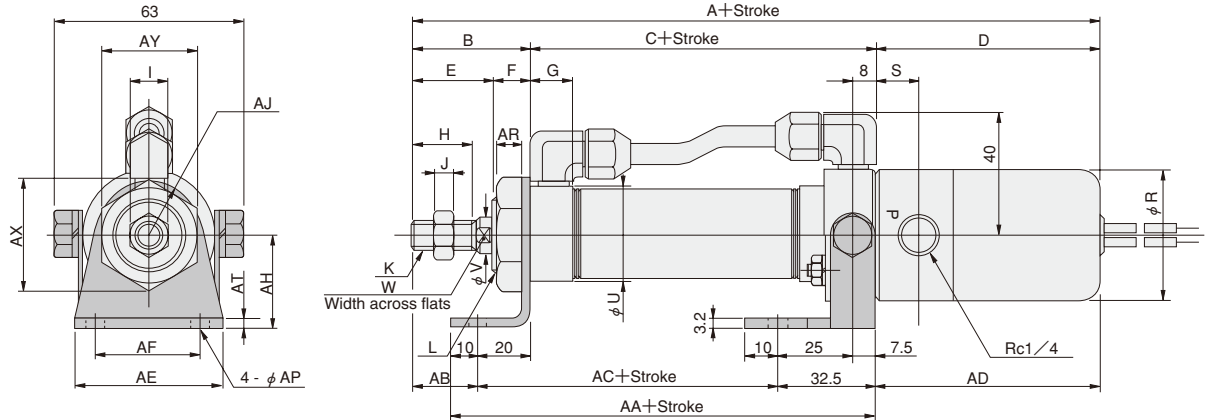
# Dimensions of Valpack Cylinder (mm)

● Basic type DV  ×



Solenoid valve	Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	R	S	U	V	W	AR	AX	AY	AL
062 series	20	[0.787]	196	35	88	73	23	12	16	15	12	5	M 8×1	M20×1.5	10	42	14.5	27	8	6	7.5	31.2	27	20
	25	[0.984]	201	40	88	73	26	14	16	18	14	6	M10×1.25	M22×1.5	12	42	14.5	29	10	8	9.5	34.6	30	22
	32	[1.260]	206	45	88	73	31	14	16	23	14	6	M10×1.25	M27×2	12	42	14.5	35	12	10	9.5	41.6	36	27
	40	[1.575]	211	45	93	73	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	42	14.5	41.6	16	14	9.5	47.3	41	33
125 series	40	[1.575]	221	45	93	83	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	46	16.5	41.6	16	14	9.5	47.3	41	33

● Foot mounting type DV  ×  -1



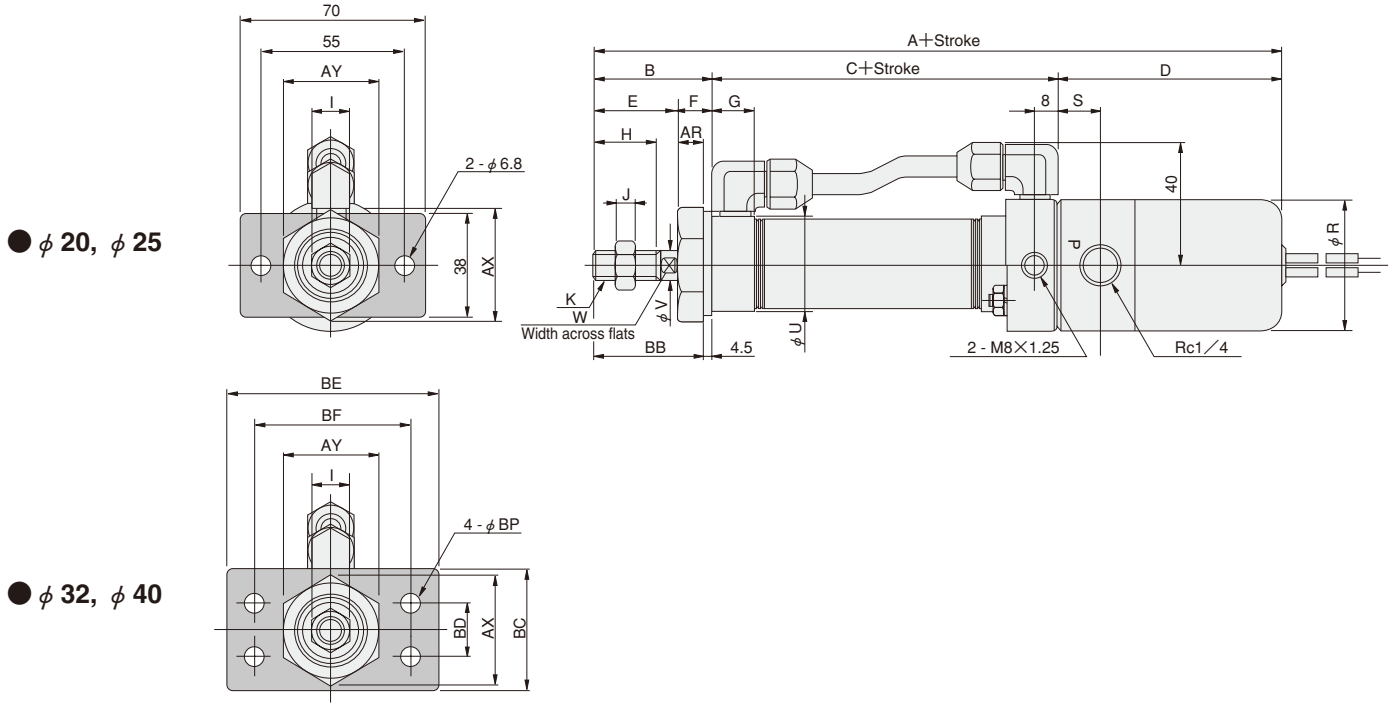
Solenoid valve	Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	R	S	U	V	W
062 series	20	[0.787]	196	35	88	73	23	12	16	15	12	5	M 8×1	42	14.5	27	8	6
	25	[0.984]	201	40	88	73	26	14	16	18	14	6	M10×1.25	42	14.5	29	10	8
	32	[1.260]	206	45	88	73	31	14	16	23	14	6	M10×1.25	42	14.5	35	12	10
	40	[1.575]	211	45	93	73	31	14	(14.5)	23	19	8	M14×1.5	42	14.5	41.6	16	14
125 series	40	[1.575]	221	45	93	83	31	14	(14.5)	23	19	8	M14×1.5	46	16.5	41.6	16	14

Solenoid valve	Bore mm [in.]	Code	AA	AB	AC	AD	AE	AF	AH	AJ	AP	AR	AT	AX	AY
062 series	20	[0.787]	117.5	15	75	73.5	55	40	25	15.5	6.8	7.5	3.2	31.2	27
	25	[0.984]	117.5	20	75	73.5	55	40	30	17	6.8	9.5	3.2	34.6	30
	32	[1.260]	117.5	25	75	73.5	55	40	35	20	6.8	9.5	3.2	41.6	36
	40	[1.575]	122.5	25	80	73.5	75	55	40	23.5	9	9.5	4	47.3	41
125 series	40	[1.575]	122.5	25	80	83.5	75	55	40	23.5	9	9.5	4	47.3	41

SLIM CYLINDERS

# Dimensions of Valpack Cylinder (mm)

● Flange mounting type DV  ×  -3

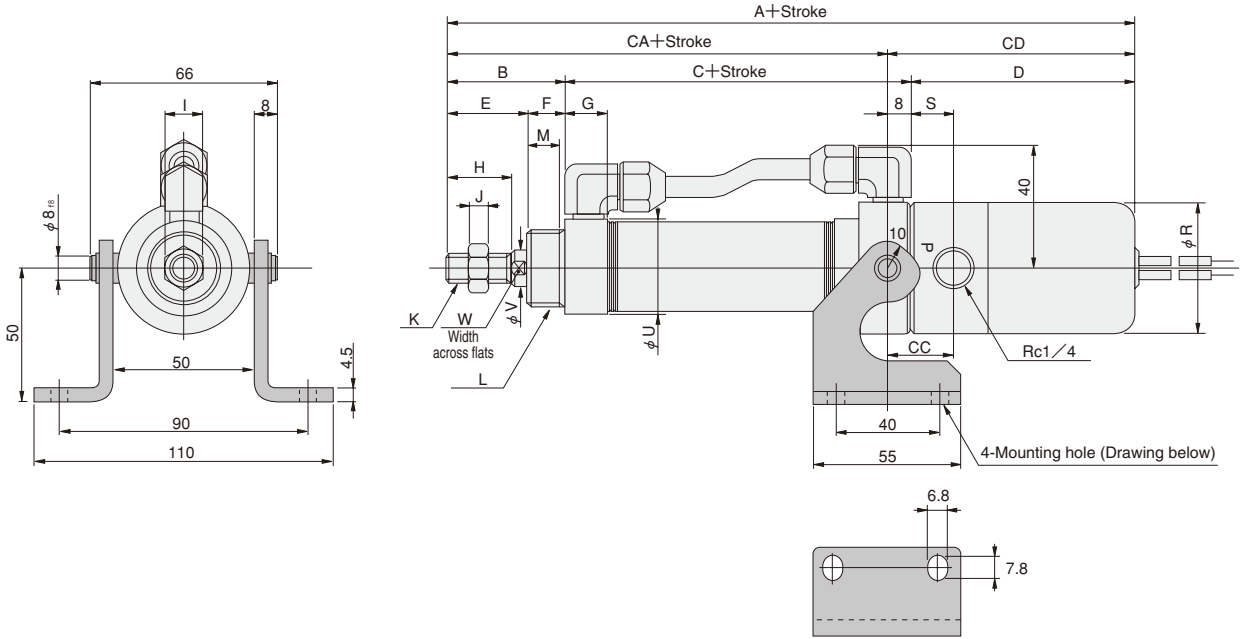


Solenoid valve	Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	R	S	U	V	W
062 series	20	[0.787]	196	35	88	73	23	12	16	15	12	5	M 8×1	42	14.5	27	8	6
	25	[0.984]	201	40	88	73	26	14	16	18	14	6	M10×1.25	42	14.5	29	10	8
	32	[1.260]	206	45	88	73	31	14	16	23	14	6	M10×1.25	42	14.5	35	12	10
125 series	40	[1.575]	211	45	93	73	31	14	(14.5)	23	19	8	M14×1.5	42	14.5	41.6	16	14
125 series	40	[1.575]	221	45	93	83	31	14	(14.5)	23	19	8	M14×1.5	46	16.5	41.6	16	14

Solenoid valve	Bore mm [in.]	Code	AR	AX	AY	BB	BC	BD	BE	BF	BP
062 series	20	[0.787]	7.5	31.2	27	30.5	—	—	—	—	—
	25	[0.984]	9.5	34.6	30	35.5	—	—	—	—	—
	32	[1.260]	9.5	41.6	36	40.5	45	20	80	60	6.8
125 series	40	[1.575]	9.5	47.3	41	40.5	50	30	100	80	9
	40	[1.575]	9.5	47.3	41	40.5	50	30	100	80	9

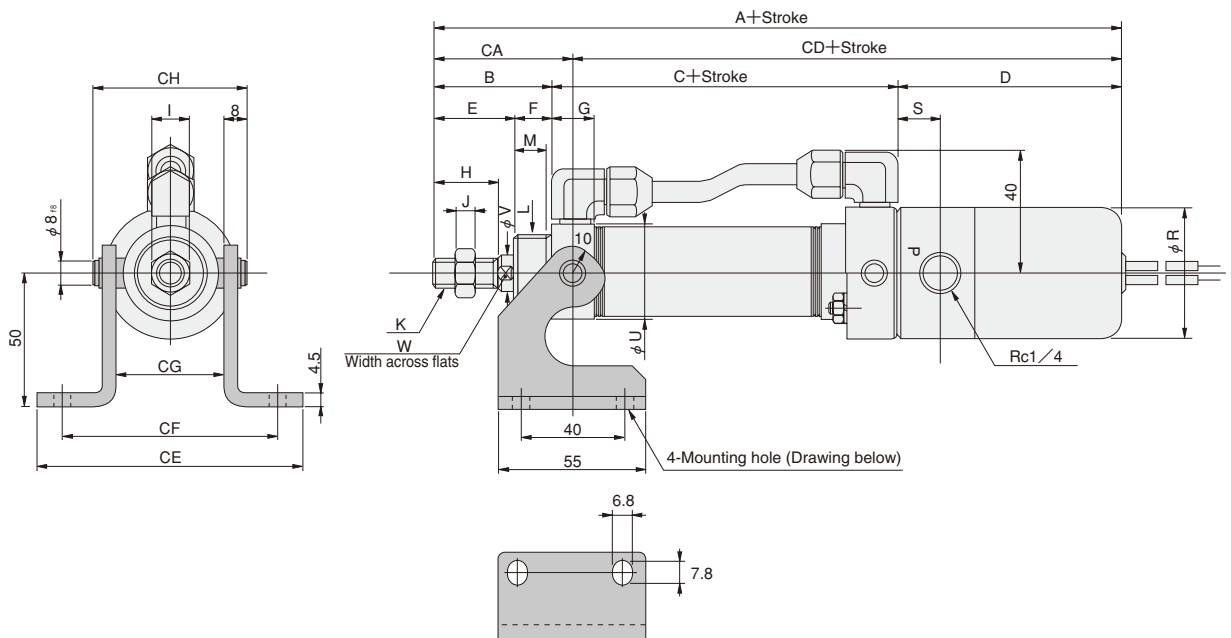
# Dimensions of Valpack Cylinder (mm)

## ● Head side trunnion type DV Bore size × Stroke -11T



Solenoid valve	Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	R	S	U	V	W	CA	CC	CD
			062 series	20 [0.787]	196	35	88	73	23	12	16	15	12	5	M8×1	M20×1.5	10	42	14.5	27	8	6	115
	25 [0.984]	201	40	88	73	26	14	16	18	14	6	M10×1.25	M22×1.5	12	42	14.5	29	10	8	120	22.5	81	
	32 [1.260]	206	45	88	73	31	14	16	23	14	6	M10×1.25	M27×2	12	42	14.5	35	12	10	125	22.5	81	
	40 [1.575]	211	45	93	73	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	42	14.5	41.6	16	14	130	22.5	81	
125 series	40 [1.575]	221	45	93	83	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	46	16.5	41.6	16	14	130	24.5	91	

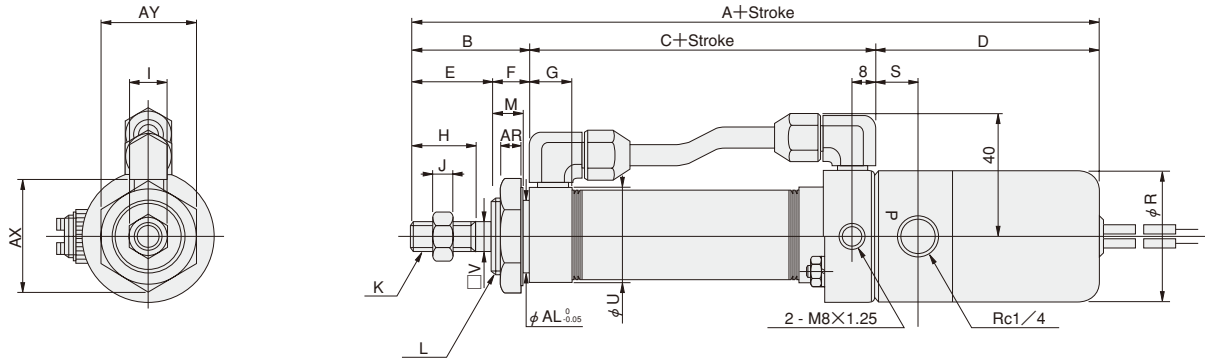
## ● Rod side trunnion type DV Bore size × Stroke -12



Solenoid valve	Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	R	S	U	V	W	CA	CD	CE	CF	CG	CH
			062 series	20 [0.787]	196	35	88	73	23	12	16	15	12	5	M8×1	M20×1.5	10	42	14.5	27	8	6	43	153	92	72
	25 [0.984]	201	40	88	73	26	14	16	18	14	6	M10×1.25	M22×1.5	12	42	14.5	29	10	8	48	153	94	74	34	50	
	32 [1.260]	206	45	88	73	31	14	16	23	14	6	M10×1.25	M27×2	12	42	14.5	35	12	10	53	153	100	80	40	56	
	40 [1.575]	211	45	93	73	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	42	14.5	41.6	16	14	53	158	107	87	47	63	
125 series	40 [1.575]	221	45	93	83	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	46	16.5	41.6	16	14	53	168	107	87	47	63	

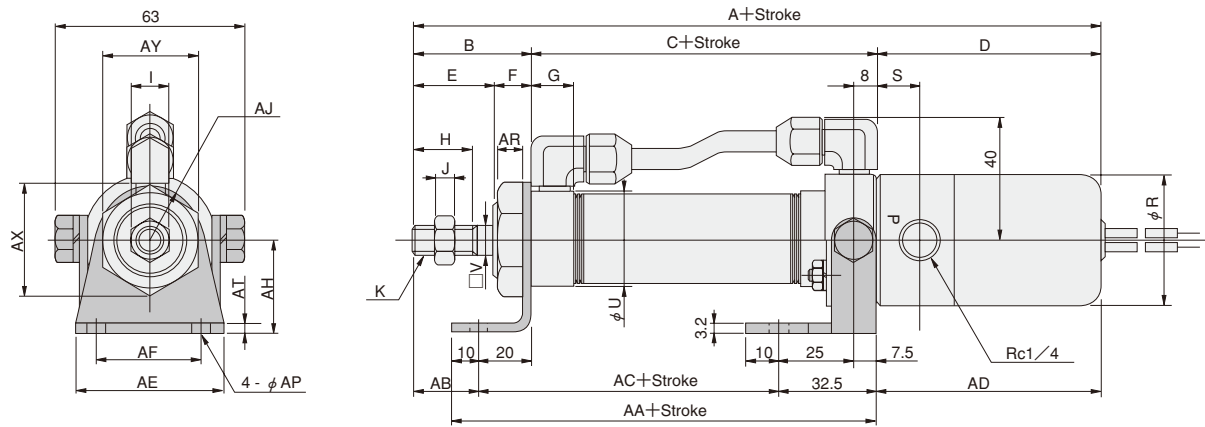
# Dimensions of Valpack Square Rod Cylinder (mm)

● Basic type DVL  ×



Solenoid valve	Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	R	S	U	V	AR	AX	AY	AL
062 series	25 [0.984]	201	40	88	73	26	14	16	18	12	5	M8×1	M22×1.5	12	42	14.5	29	7.4	9.5	34.6	30	22	
	40 [1.575]	211	45	93	73	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	42	14.5	41.6	13	9.5	47.3	41	33	
125 series	40 [1.575]	221	45	93	83	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	46	16.5	41.6	13	9.5	47.3	41	33	

● Foot mounting type DVL  ×  -1

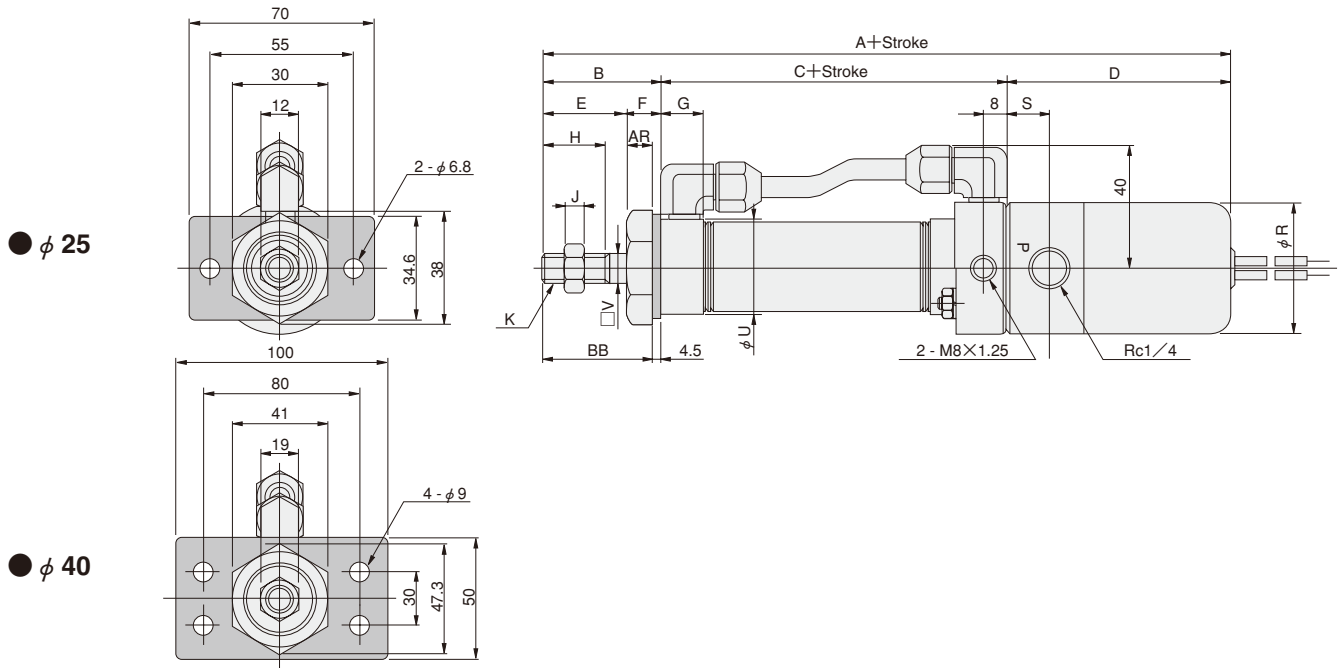


Solenoid valve	Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	R	S	U	V
062 series	25 [0.984]	201	40	88	73	26	14	16	18	12	5	M8×1	42	14.5	29	7.4	
	40 [1.575]	211	45	93	73	31	14	(14.5)	23	19	8	M14×1.5	42	14.5	41.6	13	
125 series	40 [1.575]	221	45	93	83	31	14	(14.5)	23	19	8	M14×1.5	46	16.5	41.6	13	

Solenoid valve	Bore mm [in.]	Code	AA	AB	AC	AD	AE	AF	AH	AJ	AP	AR	AT	AX	AY
062 series	25 [0.984]	201	117.5	20	75	73.5	55	40	30	17	6.8	9.5	3.2	34.6	30
	40 [1.575]	211	122.5	25	80	73.5	75	55	40	23.5	9	9.5	4	47.3	41
125 series	40 [1.575]	221	122.5	25	80	83.5	75	55	40	23.5	9	9.5	4	47.3	41

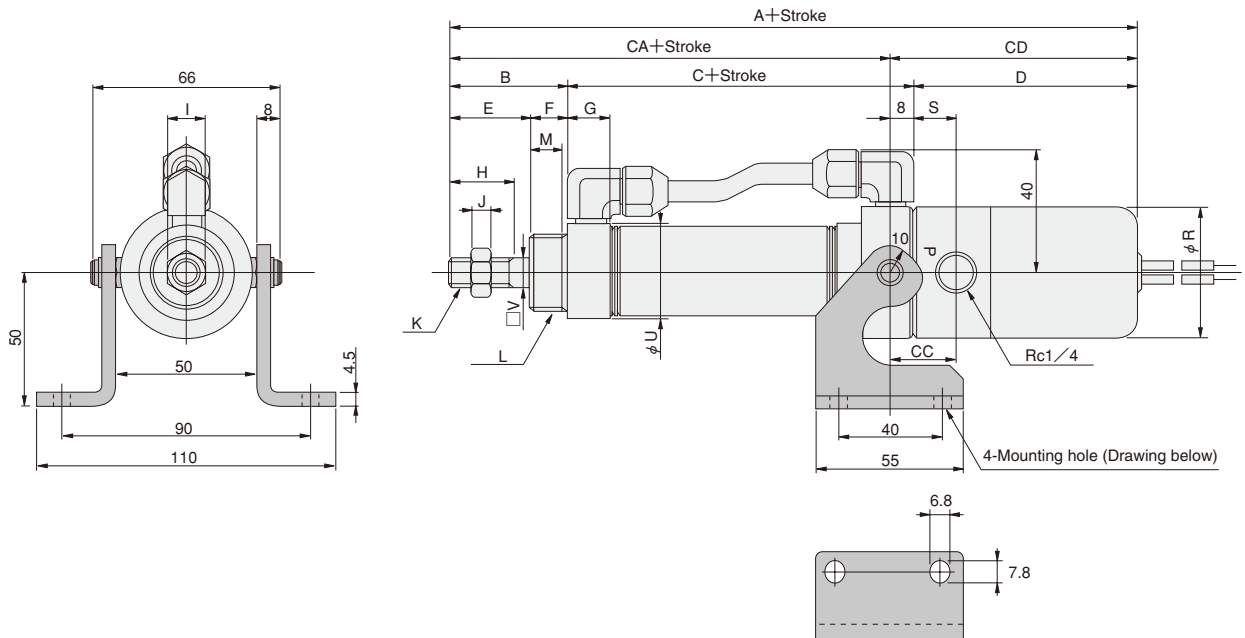
# Dimensions of Valpack Square Rod Cylinder (mm)

● Flange mounting type DVL Bore size × Stroke -3



Solenoid valve	Bore mm [in.]	Code	A	B	C	D	E	F	G	H	J	K	R	S	U	V	AR	BB
062 series	25 [0.984]		201	40	88	73	26	14	16	18	5	M8×1	42	14.5	29	7.4	9.5	35.5
	40 [1.575]		211	45	93	73	31	14	(14.5)	23	8	M14×1.5	42	14.5	41.6	13	9.5	40.5
125 series	40 [1.575]		221	45	93	83	31	14	(14.5)	23	8	M14×1.5	46	16.5	41.6	13	9.5	40.5

● Head side trunnion type DVL Bore size × Stroke -11T

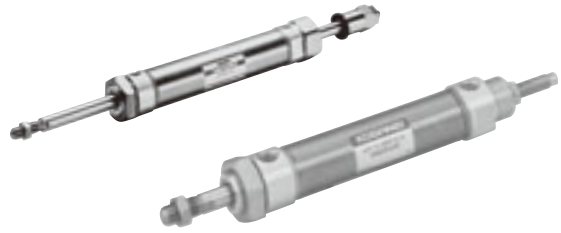


Solenoid valve	Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	R	S	U	V	CA	CC	CD
062 series	25 [0.984]		201	40	88	73	26	14	16	18	12	5	M8×1	M22×1.5	12	42	14.5	29	7.4	120	22.5	81
	40 [1.575]		211	45	93	73	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	42	14.5	41.6	13	130	22.5	81
125 series	40 [1.575]		221	45	93	83	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	46	16.5	41.6	13	130	24.5	91

SLIM CYLINDERS

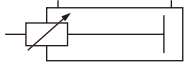
# SLIM STROKE ADJUSTING CYLINDERS

Push Side Stroke Adjusting Type,  
Pull Side Stroke Adjusting Type

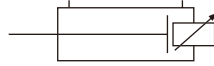


## Symbols

● Push side stroke adjusting type



● Pull side stroke adjusting type



## Specifications

Item	Bore size mm [in.]	20, 25, 32, 40 [0.787, 0.984, 1.260, 1.575] <sup>Note1</sup>
Operation type	Double acting type with stroke adjusting mechanism	
Media	Air	
Mounting type	Basic type, Foot type, Flange type	
Stroke adjusting range	mm [in.]	0~25 [0~0.984] (To the specification stroke)
Operating pressure range	MPa [psi.]	0.04~0.9 [6~131] (0.06~0.9 [9~131]) <sup>Note2</sup>
Proof pressure	MPa [psi.]	1.32 [191]
Operating temperature range	°C [°F]	0~70 [32~158]
Operating speed range	mm/s [in./sec.]	30~800 [1.2~31.5] (50~800 [2.0~31.5]) <sup>Note2</sup>
Cushion	Fixed type (Rubber bumper)	
Lubrication	Not required	
Port size	Rc	1/8

Notes: 1. Square rod cylinders are available at  $\phi$  25 and  $\phi$  40 only.  
2. For push side stroke adjusting cylinders.

## Bore Size and Stroke

Bore size <sup>Note</sup>	Standard strokes	Maximum stroke	Maximum available stroke	
			Push side stroke adjusting type	Pull side stroke adjusting type
20	20 50 75 100 125 150	200	400	1000
25	25 50 75 100 125 150 200	250		
32	25 50 75 100 125 150 200	300	500	
40	25 50 75 100 125 150 200 250 300	400 (300)		

Note: Square rod cylinders are available at  $\phi$  25 and  $\phi$  40 only.

Remarks: 1. Stroke tolerance  $+1 \left[ +0.039 \text{in.} \right]$

2. For non-standard strokes, consult us.

3. Figures in parentheses ( ) are for cylinders with bellows.

4. The minimum operating pressure when the stroke is over the maximum stroke is 0.2MPa [29psi.].

## Order Codes

**DAE** **20×50** — [ ] — [ ] — [ ] — [ ] — [ ] — [ ]

**Bore size × Stroke**

**Non-ion specification**  
Blank — Standard  
NCU — Non-ion specification

**Rod end accessory**  
Blank — No rod end accessory  
I — I type knuckle  
Y — Y type knuckle (with pin)  
● For the cylinder joint and cylinder rod end, see p.1568.

**Mounting type**  
Blank — Basic type  
1 — Foot mounting type  
3 — Flange mounting type  
● Mounting brackets are included at shipping.

**Number of sensor switches**  
1 — With 1 sensor switch  
2 — With 2 sensor switches  
3 — With 3 sensor switches  
⋮

**Lead wire length**  
(Applies to all except CS□F)  
A — 1000mm [39in.]  
B — 3000mm [118in.]

**Sensor switch** (for cylinders with sensor switches)  
Blank — No sensor switch  
ZG530 — 2-lead wire Solid state type with indicator lamp DC10~28V  
ZG553 — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
CS3M — Reed switch type with indicator lamp DC10~30V  
CS4M — Reed switch type with indicator lamp AC85~230V  
CS5M — Reed switch type without indicator lamp DC10~30V  
CS2F — Reed switch type with indicator lamp AC85~115V  
CS3F — Reed switch type with indicator lamp DC3~30V  
CS4F — Reed switch type with indicator lamp AC85~115V  
CS5F — Reed switch type without indicator lamp DC10~30V  
DC3~30V

DAE — Pull side stroke adjusting type  
DAP — Push side stroke adjusting type

DAEJ — Pull side stroke adjusting type with bellows  
DAEJL<sup>Note</sup> — Pull side stroke adjusting type Square rod cylinder with bellows  
DAEL<sup>Note</sup> — Pull side stroke adjusting type Square rod cylinder  
DAJLP<sup>Note</sup> — Push side stroke adjusting type Square rod cylinder with bellows  
DAJP — Push side stroke adjusting type with bellows  
DALP — Push side stroke adjusting type Square rod cylinder

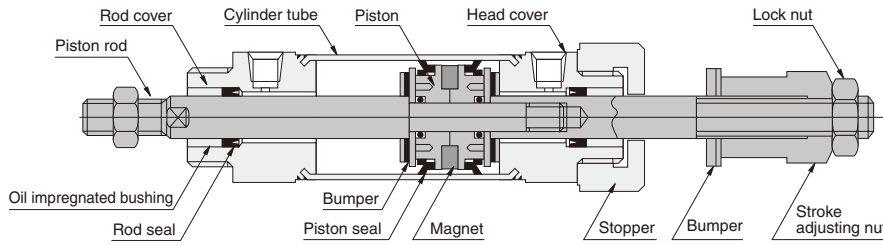
(Made to order)

Note: The available bore size is only  $\phi$  25, 40.

# Inner Construction and Major Parts (cannot be disassembled)

SLIM CYLINDERS

## ● Push side stroke adjusting type

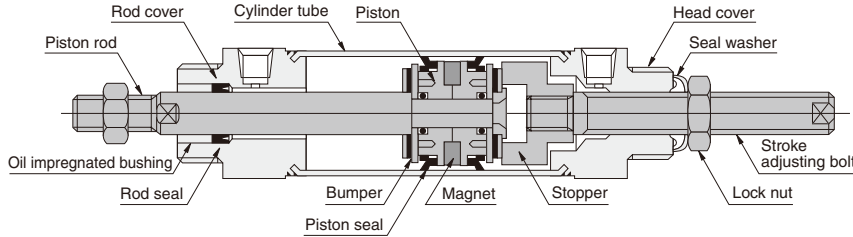


● Instructions for stroke adjustment  
For stroke adjustment, turn the stroke adjusting nut. After completing stroke adjustment, secure the stroke adjusting nut in place with a lock nut. If mounting a sensor switch, move the mounting location of the sensor switch along the length of the adjusted stroke.

Note: When re-adjusting the stroke, always use a wrench to loosen the stroke adjusting nut and then complete the adjustment according to the above procedure.

Do not use the method of securing the piston rod in place and then loosen the lock nut.

## ● Pull side stroke adjusting type



● Instructions for stroke adjustment  
For stroke adjustment, turn the stroke adjusting bolt. After completing stroke adjustment, secure the stroke adjusting bolt in place with a lock nut.

If mounting a sensor switch, move the mounting location of the sensor switch along the length of the adjusted stroke.

## Major Parts and Materials

Parts	Bore size	20, 25, 32, 40
Cylinder tube		Stainless steel
Piston		Plastic
Piston rod		Steel (hard chrome plated)
Rod cover		Aluminum alloy (anodized)
Head cover		
Seal		Synthetic rubber (NBR)
Bumper		Plastic magnet
Magnet		
Bellows		Nylon tarpaulin (heat resistant temperature 70°C [158°F])

## Seals Note: Seals cannot be replaced.

Parts	Rod seal	Piston seal
Bore mm	Quantity	
20	2(1)	2
25	NY-14×10×3.5	PPY-25
32	NY-17×12×4	PPY-32
40	NY-22×16×5	PPY-40

Note: Figures in parentheses ( ) are for pull side stroke adjusting cylinder.

## Mass

### ● Push side stroke adjusting type

Bore size mm [in.]	Zero stroke mass			Additional mass for each 1mm [0.0394in.] stroke	Mass of mounting bracket			
	Basic type	Foot mounting type	Flange mounting type		Foot bracket	Flange bracket	Y type knuckle	I type knuckle
20 [0.787]	0.29 [0.64]	0.43 [0.95]	0.37 [0.82]	0.0012 [0.0026]	0.14 [0.31]	0.08 [0.18]	0.041 [0.090]	0.036 [0.079]
25 [0.984]	0.41 [0.90]	0.57 [1.26]	0.49 [1.08]	0.0016 [0.0035]	0.16 [0.35]	0.08 [0.18]	0.075 [0.165]	0.070 [0.154]
32 [1.260]	0.57 [1.26]	0.76 [1.68]	0.67 [1.48]	0.0025 [0.0055]	0.19 [0.42]	0.10 [0.22]	0.075 [0.165]	0.070 [0.154]
40 [1.575]	0.85 [1.87]	1.14 [2.51]	0.98 [2.16]	0.0039 [0.0086]	0.29 [0.64]	0.13 [0.29]	0.120 [0.265]	0.132 [0.291]

Calculation example: For foot mounting type of 32mm bore size and 100mm stroke,  $0.76 + (0.0025 \times 100) = 1.01\text{kg}$  [2.23lb.]

### ● Pull side stroke adjusting type

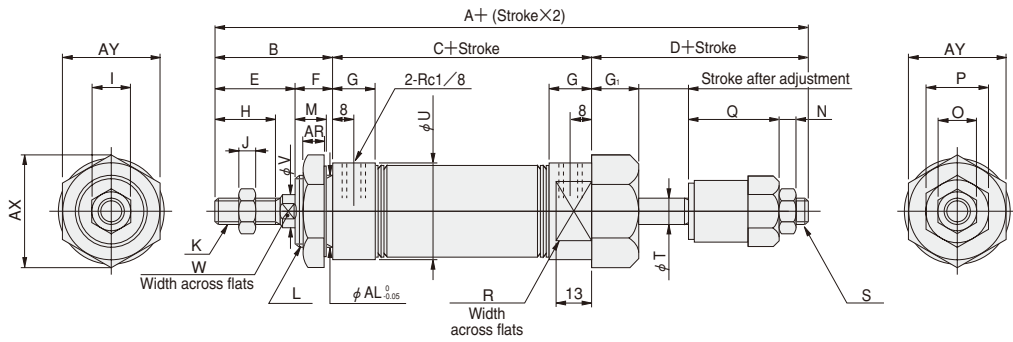
Bore size mm [in.]	Zero stroke mass			Additional mass for each 1mm [0.0394in.] stroke	Mass of mounting bracket			
	Basic type	Foot mounting type	Flange mounting type		Foot bracket	Flange bracket	Y type knuckle	I type knuckle
20 [0.787]	0.19 [0.42]	0.33 [0.73]	0.27 [0.60]	0.0008 [0.0018]	0.14 [0.31]	0.08 [0.18]	0.041 [0.090]	0.036 [0.079]
25 [0.984]	0.27 [0.60]	0.43 [0.95]	0.35 [0.77]	0.0011 [0.0024]	0.16 [0.35]	0.08 [0.18]	0.075 [0.165]	0.070 [0.154]
32 [1.260]	0.43 [0.95]	0.62 [1.37]	0.53 [1.17]	0.0015 [0.0033]	0.19 [0.42]	0.10 [0.22]	0.075 [0.165]	0.070 [0.154]
40 [1.575]	0.66 [1.46]	0.95 [2.09]	0.79 [1.74]	0.0024 [0.0053]	0.29 [0.64]	0.13 [0.29]	0.120 [0.265]	0.132 [0.291]

Calculation example: For foot mounting type of 32mm bore size and 100mm stroke,  $0.62 + (0.0015 \times 100) = 0.77\text{kg}$  [1.70lb.]



# Dimensions of Push Side Stroke Adjusting Cylinder (mm)

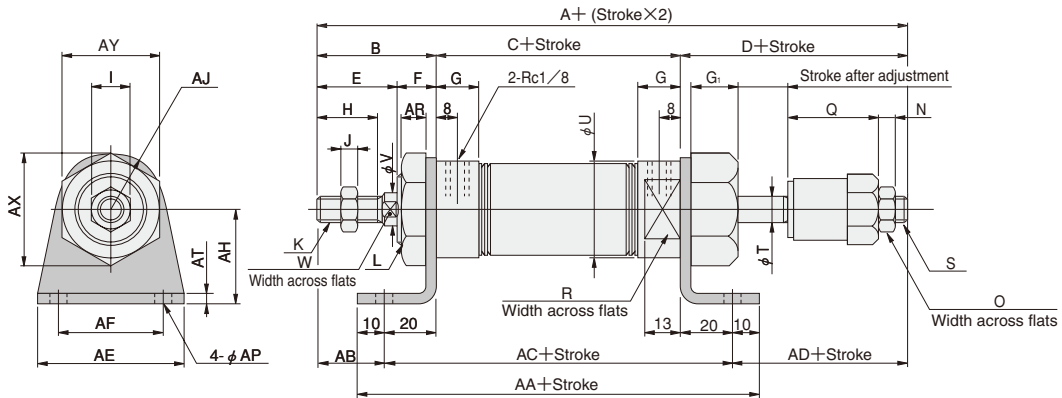
● Basic type DAP  ×



Bore mm [in.]	Code	A	B	C	D	E	F	G	G <sub>1</sub>	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
20	[0.787]	171	35	76	60	23	12	16	15	15	12	5	M 8×1	M20×1.5	10	5	12	19	36	22	M 8×1	8	27	8	6
25	[0.984]	179	40	76	63	26	14	16	17	18	14	6	M10×1.25	M22×1.5	12	6	14	22	36	24	M10×1.25	10	29	10	8
32	[1.260]	187	45	76	66	31	14	16	18	23	14	6	M10×1.25	M27×2	12	7	19	22	36.5	30	M12×1.25	12	35	12	10
40	[1.575]	191	45	76	70	31	14	(14.5)	18	23	19	8	M14×1.5	M33×2	12	10	24	27	36.5	36	M16×1.5	16	41.6	16	14

Bore mm [in.]	Code	AR	AX	AY	AL
20	[0.787]	7.5	31.2	27	20
25	[0.984]	9.5	34.6	30	22
32	[1.260]	9.5	41.6	36	27
40	[1.575]	9.5	47.3	41	33

● Foot mounting type DAP  ×  -1



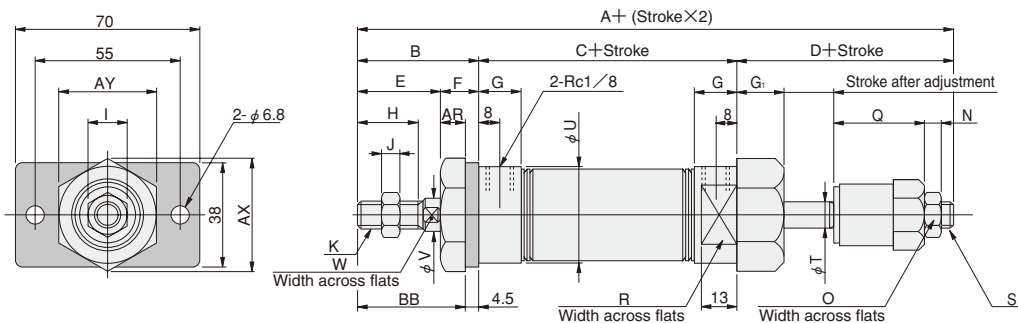
Bore mm [in.]	Code	A	B	C	D	E	F	G	G <sub>1</sub>	H	I	J	K	L	N	O	Q	R	S	T	U	V	W
20	[0.787]	171	35	76	60	23	12	16	15	15	12	5	M 8×1	M20×1.5	5	12	36	22	M 8×1	8	27	8	6
25	[0.984]	179	40	76	63	26	14	16	17	18	14	6	M10×1.25	M22×1.5	6	14	36	24	M10×1.25	10	29	10	8
32	[1.260]	187	45	76	66	31	14	16	18	23	14	6	M10×1.25	M27×2	7	19	36.5	30	M12×1.25	12	35	12	10
40	[1.575]	191	45	76	70	31	14	(14.5)	18	23	19	8	M14×1.5	M33×2	10	24	36.5	36	M16×1.5	16	41.6	16	14

Bore mm [in.]	Code	AA	AB	AC	AD	AE	AF	AH	AJ	AP	AR	AT	AX	AY
20	[0.787]	136	15	116	40	55	40	25	15.5	6.8	7.5	3.2	31.2	27
25	[0.984]	136	20	116	43	55	40	30	17	6.8	9.5	3.2	34.6	30
32	[1.260]	136	25	116	46	55	40	35	20	6.8	9.5	3.2	41.6	36
40	[1.575]	136	25	116	50	75	55	40	23.5	9	9.5	4	47.3	41

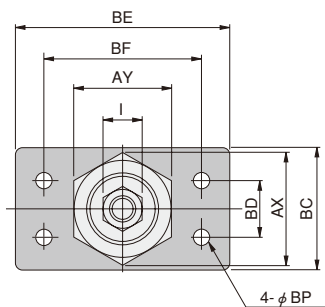
# Dimensions of Push Side Stroke Adjusting Cylinder (mm)

● Flange mounting type DAP  ×  -3

●  $\phi 20, \phi 25$



●  $\phi 32, \phi 40$

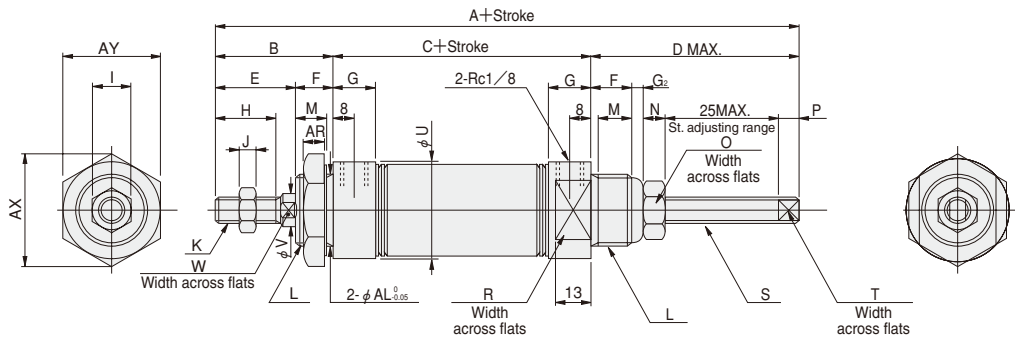


Bore mm [in.]	Code	A	B	C	D	E	F	G	G <sub>1</sub>	H	I	J	K	L	N	O	Q	R	S	T	U	V	W
20 [0.787]		171	35	76	60	23	12	16	15	15	12	5	M 8×1	M20×1.5	5	12	36	22	M 8×1	8	27	8	6
25 [0.984]		179	40	76	63	26	14	16	17	18	14	6	M10×1.25	M22×1.5	6	14	36	24	M10×1.25	10	29	10	8
32 [1.260]		187	45	76	66	31	14	16	18	23	14	6	M10×1.25	M27×2	7	19	36.5	30	M12×1.25	12	35	12	10
40 [1.575]		191	45	76	70	31	14	(14.5)	18	23	19	8	M14×1.5	M33×2	10	24	36.5	36	M16×1.5	16	41.6	16	14

Bore mm [in.]	Code	AR	AX	AY	BB	BC	BD	BE	BF	BP
20 [0.787]		7.5	31.2	27	30.5	—	—	—	—	—
25 [0.984]		9.5	34.6	30	35.5	—	—	—	—	—
32 [1.260]		9.5	41.6	36	40.5	45	20	80	60	6.8
40 [1.575]		9.5	47.3	41	40.5	50	30	100	80	9

# Dimensions of Pull Side Stroke Adjusting Cylinder (mm)

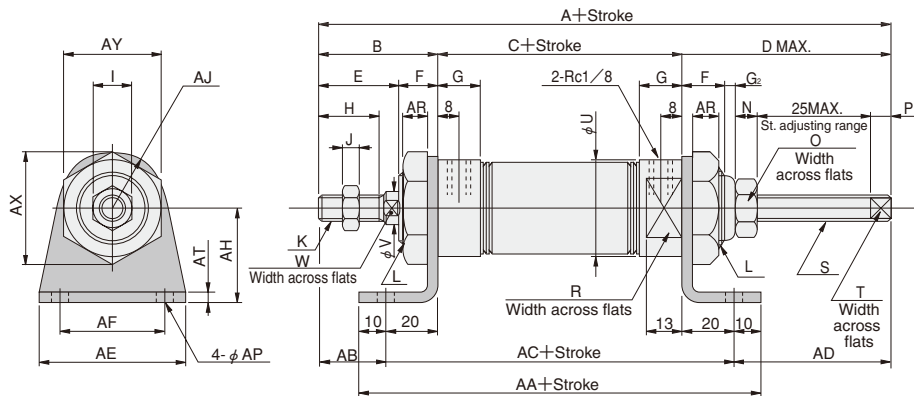
● Basic type DAE  ×



Bore mm [in.]	Code	A	B	C	D	E	F	G	G <sub>2</sub>	H	I	J	K	L	M	N	O	P	R	S	T	U	V	W
20 [0.787]		175	35	86	54	23	12	16	2	15	12	5	M 8×1	M20×1.5	10	5	12	5	22	M 8×1	6	27	8	6
25 [0.984]		183	40	86	57	26	14	16	2	18	14	6	M10×1.25	M22×1.5	12	5	12	5	24	M 8×1	6	29	10	8
32 [1.260]		196	45	91	60	31	14	16	3.5	23	14	6	M10×1.25	M27×2	12	7	19	5	30	M12×1	9	35	12	10
40 [1.575]		198	45	91	62	31	14	(14.5)	3.5	23	19	8	M14×1.5	M33×2	12	7	19	5	36	M12×1	9	41.6	16	14

Bore mm [in.]	Code	AR	AX	AY	AL
20 [0.787]		7.5	31.2	27	20
25 [0.984]		9.5	34.6	30	22
32 [1.260]		9.5	41.6	36	27
40 [1.575]		9.5	47.3	41	33

● Foot mounting type DAE  ×  -1

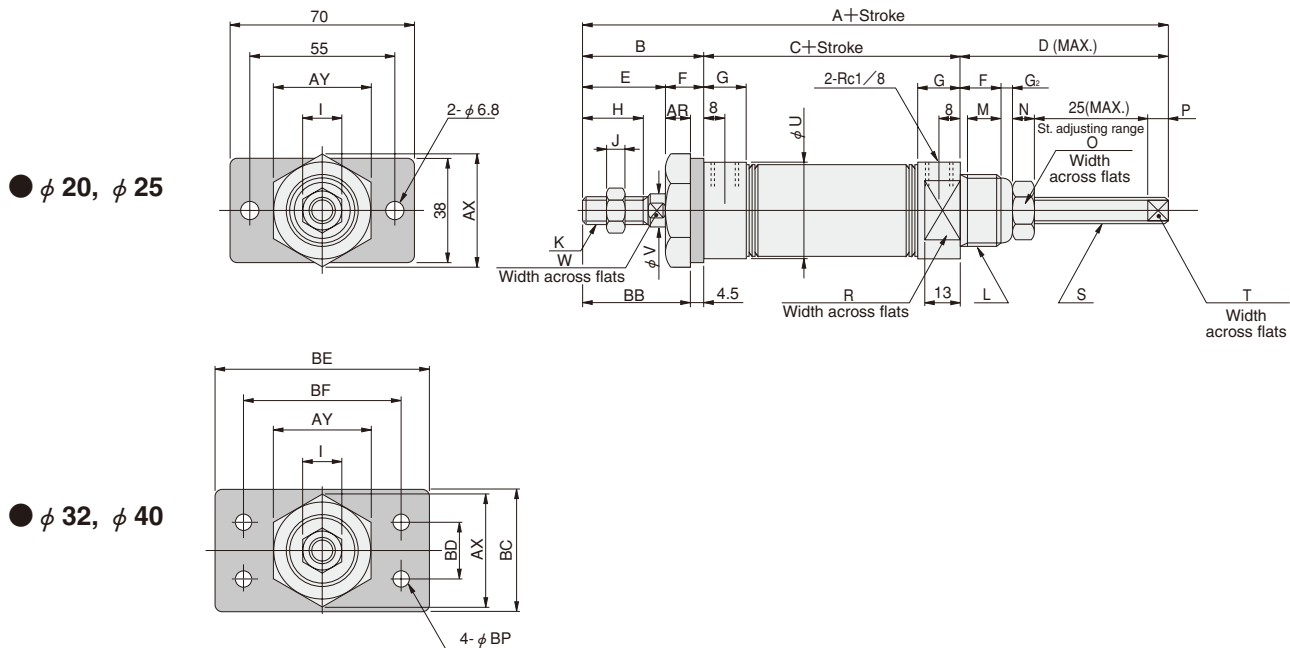


Bore mm [in.]	Code	A	B	C	D	E	F	G	G <sub>2</sub>	H	I	J	K	L	N	O	P	R	S	T	U	V	W
20 [0.787]		175	35	86	54	23	12	16	2	15	12	5	M 8×1	M20×1.5	5	12	5	22	M 8×1	6	27	8	6
25 [0.984]		183	40	86	57	26	14	16	2	18	14	6	M10×1.25	M22×1.5	5	12	5	24	M 8×1	6	29	10	8
32 [1.260]		196	45	91	60	31	14	16	3.5	23	14	6	M10×1.25	M27×2	7	19	5	30	M12×1	9	35	12	10
40 [1.575]		198	45	91	62	31	14	(14.5)	3.5	23	19	8	M14×1.5	M33×2	7	19	5	36	M12×1	9	41.6	16	14

Bore mm [in.]	Code	AA	AB	AC	AD	AE	AF	AH	AJ	AP	AR	AT	AX	AY
20 [0.787]		146	15	126	34	55	40	25	15.5	6.8	7.5	3.2	31.2	27
25 [0.984]		146	20	126	37	55	40	30	17	6.8	9.5	3.2	34.6	30
32 [1.260]		151	25	131	40	55	40	35	20	6.8	9.5	3.2	41.6	36
40 [1.575]		151	25	131	42	75	55	40	23.5	9	9.5	4	47.3	41

# Dimensions of Pull Side Stroke Adjusting Cylinder (mm)

● Flange mounting type DAE  ×  -3



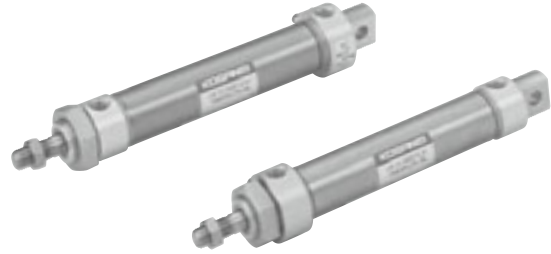
Bore mm [in.]	Code	A	B	C	D	E	F	G	G <sub>2</sub>	H	I	J	K	L	M	N	O	P	R	S	T	U	V	W
20	[0.787]	175	35	86	54	23	12	16	2	15	12	5	M 8×1	M20×1.5	10	5	12	5	22	M 8×1	6	27	8	6
25	[0.984]	183	40	86	57	26	14	16	2	18	14	6	M10×1.25	M22×1.5	12	5	12	5	24	M 8×1	6	29	10	8
32	[1.260]	196	45	91	60	31	14	16	3.5	23	14	6	M10×1.25	M27×2	12	7	19	5	30	M12×1	9	35	12	10
40	[1.575]	198	45	91	62	31	14	(14.5)	3.5	23	19	8	M14×1.5	M33×2	12	7	19	5	36	M12×1	9	41.6	16	14

Bore mm [in.]	Code	AR	AX	AY	BB	BC	BD	BE	BF	BP
20	[0.787]	7.5	31.2	27	30.5	—	—	—	—	—
25	[0.984]	9.5	34.6	30	35.5	—	—	—	—	—
32	[1.260]	9.5	41.6	36	40.5	45	20	80	60	6.8
40	[1.575]	9.5	47.3	41	40.5	50	30	100	80	9

SLIM CYLINDERS

# SLIM END KEEP CYLINDERS

Head Side End Keep,  
Rod Side End Keep



## Symbols

- Head side end keep
- Rod side end keep



## Specifications

Item	Bore size mm [in.]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]
Operation type		Double acting type, with head side or rod side end keep mechanism					
Media		Air					
Mounting type		Basic type, Foot type, Flange type, Pivot type					
Operating pressure range	MPa [psi.]	0.1~0.9 [15~131]				0.1~0.7 [15~102]	
Proof pressure	MPa [psi.]	1.32 [191]				1.03 [149]	
Operating temperature range	°C [°F]	0~70 [32~158]					
Operating speed range	mm/s [in./sec.]	50~700 [2.0~27.6]				50~500 [2.0~19.7]	
Cushion		Fixed type (Rubber bumper)				Variable type (Stroke 15mm [0.591in.])	
Lubrication		Not required					
Maximum holding force (at end keep)	N [lbf.]	194.2 [43.7]	303 [68.1]	496.2 [111.5]	775.7 [174.4]	943.4 [212.1]	1497 [336.5]
Backlash (at end keep)	mm [in.]	1.4 [0.055] MAX.			1.6 [0.063] MAX.		
Port size	Rc	1/8				1/4	

## Bore Size and Stroke

Bore size	Standard strokes	Maximum stroke		Maximum available stroke	
		No bellows	With bellows	No bellows	With bellows
20	25 50 75 100 125 150	200		1050	740
25	25 50 75 100 125 150 200	250			
32	25 50 75 100 125 150 200	300			
40	25 50 75 100 125 150 200 250 300	400	300	900	
50	25 50 75 100 150 200 [250 300 350 400]	300[500]	300		
63	25 50 75 100 150 200 [250 300 350 400 500]	300[600]	300		

- Remarks: 1. Stroke tolerance  ${}_{0}^{+1} [{}_{0}^{+0.039in.}]$   
 2. For non-standard strokes, consult us.  
 3. Figures in parentheses [ ] are for cases when foot mounting brackets are used for mounting.  
 4. The minimum operating pressure when the stroke is over the maximum stroke at bore size of  $\phi 20 \sim \phi 40$  is 0.2MPa [29psi].

## Order Codes

**DA**  **K**  **20×50** —  —  —  —  —  —  —  —  —

**Number of sensor switches**  
 1 — With 1 sensor switch  
 2 — With 2 sensor switches  
 3 — With 3 sensor switches  
 : — :

**Lead wire length**  
 (Applies to all except CS□F)  
 A — 1000mm [39in.]  
 B — 3000mm [118in.]

**End keep cylinder**  
**Bore size × Stroke**  
**End keep position**  
 HL — Head side end keep  
 RL — Rod side end keep

**Slim cylinder**  
**Scraper**  
 Blank — No scraper  
 Y — With scraper (Made to order; available at  $\phi 50$  and  $\phi 63$  only)

**Head cover specification**  
 Blank — Standard head  
 A — Short head

**Bellows**  
 Blank — No bellows  
 J — With bellows (Made to order)

**Non-ion specification**  
 Blank — Standard specification  
 NCU — Non-ion specification

**Mounting type**  
 Blank — Basic type  
 1 — Double foot mounting type  
 3 — Flange mounting type  
 8B — Pivot mounting type with bushing (Available at  $\phi 50$  and  $\phi 63$  only)  
 8E — Pivot mounting type with supporting bracket (with pin) (Available at  $\phi 20 \sim 40$  only)  
 8B-8E — Pivot mounting type with bushing and supporting bracket (Available at  $\phi 50$  and  $\phi 63$  only)  
 ● Mounting brackets are included at shipping. (Except for pivot mounting type and pivot mounting type with bushing)

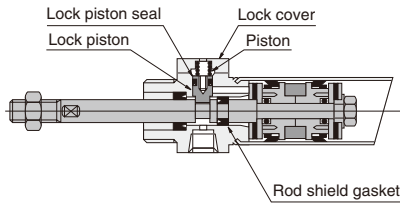
**Rod end accessory**  
 Blank — No rod end accessory  
 I — I type knuckle  
 Y — Y type knuckle (with pin)  
 ● For the cylinder joint and cylinder rod end, see p.1568.

**Sensor switch (for cylinders with sensor switches)**  
 Blank — No sensor switch  
**ZG530** — 2-lead wire Solid state type with indicator lamp DC10~28V  
**ZG553** — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
**CS3M** — Reed switch type with indicator lamp DC10~30V AC85~230V  
**CS4M** — Reed switch type with indicator lamp DC10~30V AC85~115V  
**CS5M** — Reed switch type without indicator lamp DC3~30V AC85~115V  
**CS2F** — Reed switch type with indicator lamp AC85~230V  
**CS3F** — Reed switch type with indicator lamp DC10~30V  
**CS4F** — Reed switch type with indicator lamp DC10~30V  
**CS5F** — Reed switch type without indicator lamp DC3~30V  
 ● For details of sensor switches, see p.1544.  
 ● CS□F comes with DIN connector. All others are grommet type.

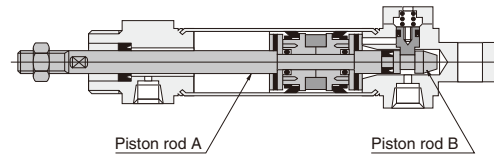
# Inner Construction and Major Parts (cannot be disassembled)

●  $\phi$  20,  $\phi$  25

### ● Rod side end keep

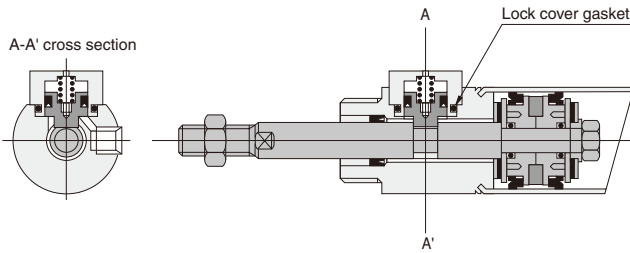


### ● Head side end keep

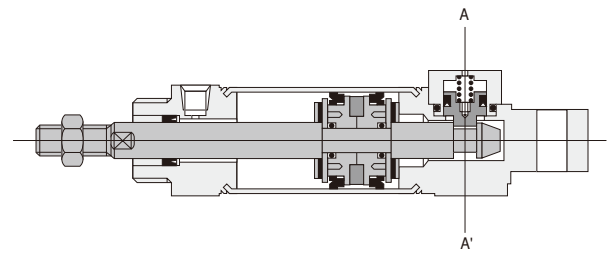


●  $\phi$  32,  $\phi$  40

### ● Rod side end keep

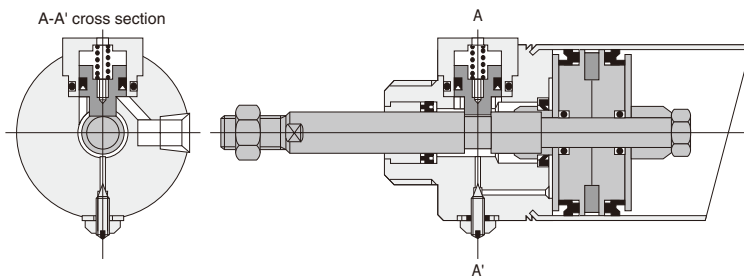


### ● Head side end keep

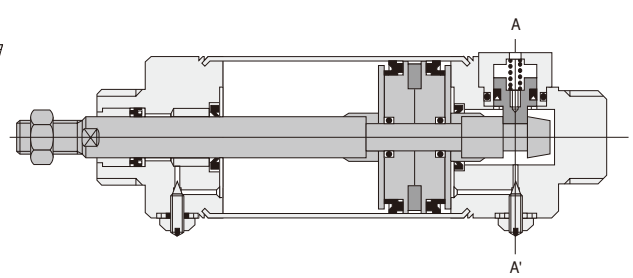


●  $\phi$  50,  $\phi$  63

### ● Rod side end keep



### ● Head side end keep



## Major Parts and Materials

Parts	20, 25	32, 40, 50, 63
Piston rod A	Steel (hard chrome plated)	
Piston rod B	Steel (zinc plated)	
Spring	Stainless steel	Piano wire
Lock piston	Stainless steel	
Rod cover	Aluminum alloy (anodized)	
Y type knuckle, I type knuckle Pivot mounting with supporting bracket	Mild steel (zinc plated)	

Other than the items listed above, they are the same as for the standard Slim Cylinder.

## Seals

Note: Seals cannot be replaced.

Parts	Rod seal	Lock piston seal	Lock cover gasket
Bore mm	Quantity	1	1
20	GYH-9	MYN-5	—
25	GYH-11	MYN-5	—
32	—	MYN-10A	S18
40	—	MYN-10A	S18
50	—	MYN-16	S22.4
63	—	MYN-16	S22.4

Other than the items listed above, they are the same as for the standard Slim Cylinder.

## Mass

Bore size mm [in.]	Zero stroke mass							Additional mass for each 1mm [0.0394in.] stroke	Mass of mounting bracket				
	-HL: Head side end keep			-RL: Rod side end keep					Foot bracket	Flange bracket	Pivot bracket	Y type knuckle	I type knuckle
	Basic type	Short head type	Pivot mounting type	Basic type	Short head type	Pivot mounting type							
20 [0.787]	0.16 [0.35]	0.15 [0.33]	—	0.15 [0.33]	0.14 [0.31]	—	0.008 [0.0018]	0.14 [0.31]	0.08 [0.18]	0.06 [0.13]	0.042 [0.093]	0.035 [0.077]	
25 [0.984]	0.21 [0.46]	0.20 [0.44]	—	1.20 [2.65]	0.19 [0.42]	—	0.011 [0.0024]	0.16 [0.35]	0.08 [0.18]	0.06 [0.13]	0.075 [0.165]	0.070 [0.154]	
32 [1.260]	0.35 [0.77]	0.33 [0.73]	—	0.34 [0.75]	0.32 [0.71]	—	0.0015 [0.0033]	0.19 [0.42]	0.10 [0.22]	0.14 [0.31]			
40 [1.575]	0.53 [1.17]	0.51 [1.12]	—	0.52 [1.15]	0.50 [1.10]	—	0.0024 [0.0053]	0.29 [0.64]	0.13 [0.29]	0.14 [0.31]	0.122 [0.269]	0.132 [0.291]	
50 [1.969]	0.99 [2.18]	0.91 [2.01]	0.94 [2.07]	0.96 [2.12]	0.88 [1.94]	0.91 [2.01]	0.0028 [0.0062]	0.55 [1.21]	0.28 [0.62]	0.24 [0.53]			
63 [2.480]	1.32 [2.91]	1.26 [2.78]	1.28 [2.82]	1.29 [2.84]	1.22 [2.69]	1.25 [2.76]	0.0035 [0.0077]	0.73 [1.61]	0.37 [0.82]	0.24 [0.53]			

Calculation example: For head side end keep foot mounting type of 32mm bore size and 100mm stroke  
 $0.35 + 0.19 + (0.0015 \times 100) = 0.69\text{kg} [1.52\text{lb.}]$

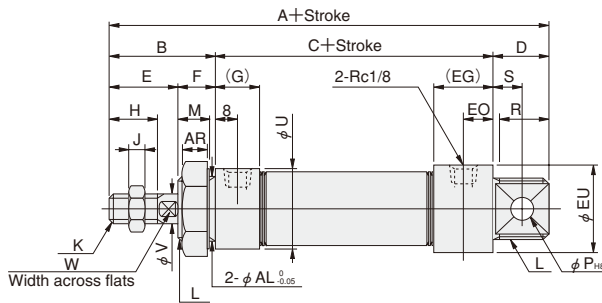
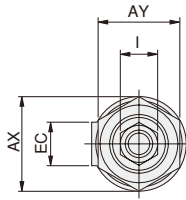
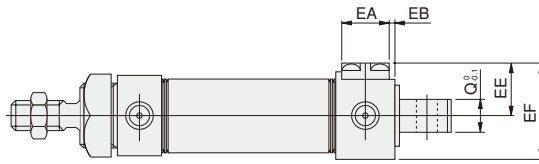
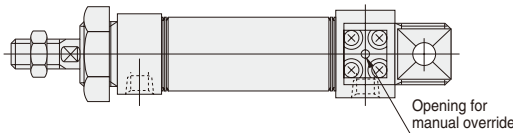
# -HL Dimensions of Head Side End Keep Basic Type (mm)

●  $\phi 20 \sim \phi 40$

DAK Bore size  $\times$  Stroke -HL



DAK Bore size -HL

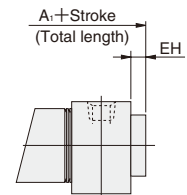


● Short head

DAK Bore size  $\times$  Stroke -A-HL



SLIM-A



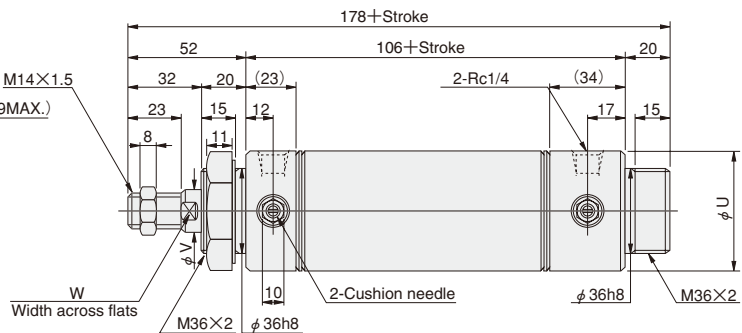
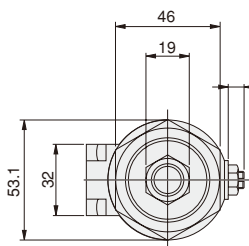
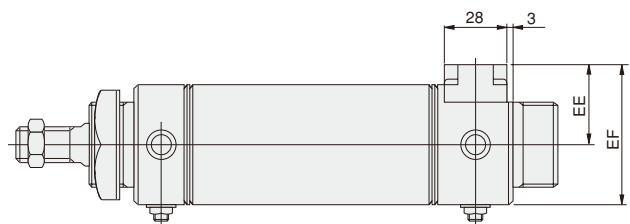
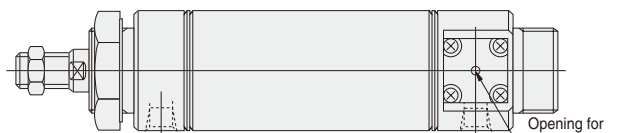
Bore mm [in.]	Code	A	A <sub>1</sub>	B	C	D	E	F	G	H	I	J	K	L	M	P	Q	R	S	U	V	W
20 [0.787]		132	117	35	76	21	23	12	16	15	12	5	M8×1	M20×1.5	10	8	12	19	12	27	8	6
25 [0.984]		137	122	40	76	21	26	14	16	18	14	6	M10×1.25	M22×1.5	12	8	12	19	12	29	10	8
32 [1.260]		160	134	45	88	27	31	14	16	23	14	6	M10×1.25	M27×2	12	10	20	25	15	35	12	10
40 [1.575]		165	139	45	93	27	31	14	15	23	19	8	M14×1.5	M33×2	12	10	20	25	15	41.6	16	14

Bore mm [in.]	Code	AR	AX	AY	AL	EA	EB	EC	EE	EF	EG	EH	EO	EU
20 [0.787]		7.5	31.2	27	20	16	—	16	17.5	32	16	6	8	29
25 [0.984]		9.5	34.6	30	22	16	—	16	18.5	36	16	6	8	35
32 [1.260]		9.5	41.6	36	27	24	2	25	22.5	40.5	26	1	14	35
40 [1.575]		9.5	47.3	41	33	24	4	25	25.5	46	31	1	16	41.6

●  $\phi 50, \phi 63$  DAK Bore size  $\times$  Stroke -HL



DAK Bore size -HL

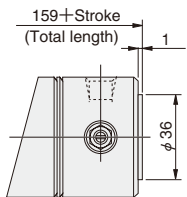


● Short head

DAK Bore size  $\times$  Stroke -A-HL

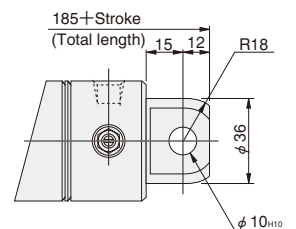
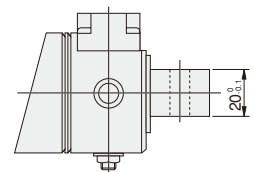


SLIM-A



● Pivot mounting type head

DAK Bore size  $\times$  Stroke -HL-8B



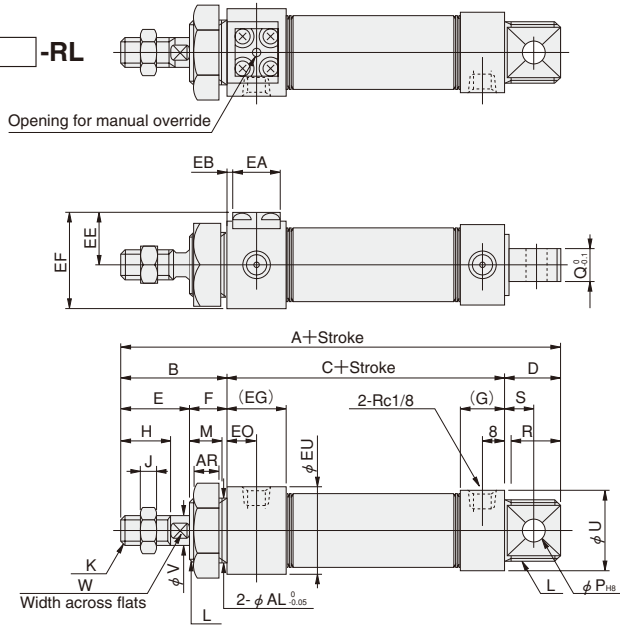
Bore mm [in.]	Code	U	V	W	EE	EF
50 [1.969]		52	16	14	35.5	61.5
63 [2.480]		65.4	16	14	35.5	68.5

# -RL Dimensions of Rod Side End Keep Basic Type (mm)

●  $\phi 20 \sim \phi 40$

DAK Bore size  $\times$  Stroke -RL

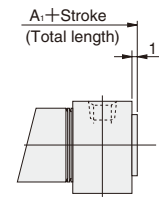
DAK Bore size -RL



● Short head

DAK Bore size  $\times$  Stroke -A-RL

SLIM-A

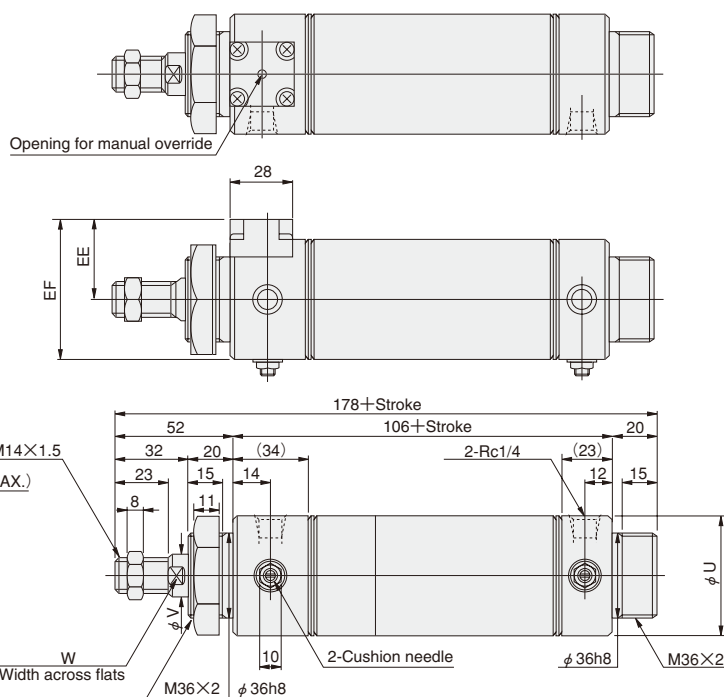


Bore mm [in.]	Code	A	A <sub>1</sub>	B	C	D	E	F	G	H	I	J	K	L	M	P	Q	R	S	U	V	W
20 [0.787]		132	112	35	76	21	23	12	16	15	12	5	M8×1	M20×1.5	10	8	12	19	12	27	8	6
25 [0.984]		137	117	40	76	21	26	14	16	18	14	6	M10×1.25	M22×1.5	12	8	12	19	12	29	10	8
32 [1.260]		160	134	45	88	27	31	14	16	23	14	6	M10×1.25	M27×2	12	10	20	25	15	35	12	10
40 [1.575]		165	139	45	93	27	31	14	15	23	19	8	M14×1.5	M33×2	12	10	20	25	15	41.6	16	14

Bore mm [in.]	Code	AR	AX	AY	AL	EA	EB	EC	EE	EF	EG	EO	EU
20 [0.787]		7.5	31.2	27	20	16	—	16	17.5	32	16	8	29
25 [0.984]		9.5	34.6	30	22	16	—	16	18.5	36	16	8	35
32 [1.260]		9.5	41.6	36	27	24	2	25	22.5	40.5	26	14	35
40 [1.575]		9.5	47.3	41	33	24	4	25	25.5	46	31	16	41.6

●  $\phi 50, \phi 63$  DAK Bore size  $\times$  Stroke -RL

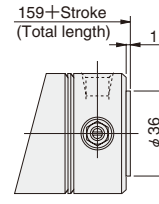
DAK Bore size -RL



● Short head

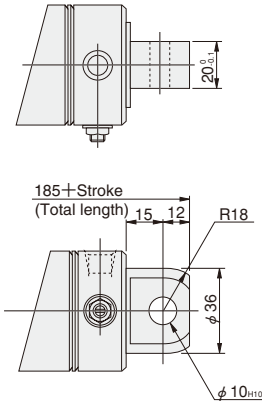
DAK Bore size  $\times$  Stroke -A-RL

SLIM-A



● Pivot mounting type head

DAK Bore size  $\times$  Stroke -RL-8B



Bore mm [in.]	Code	U	V	W	EE	EF
50 [1.969]		52	16	14	35.5	61.5
63 [2.480]		65.4	16	14	35.5	68.5

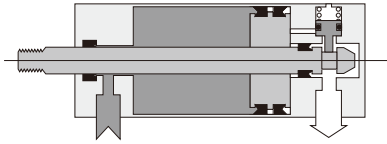
SLIM CYLINDERS



# Operating Principle

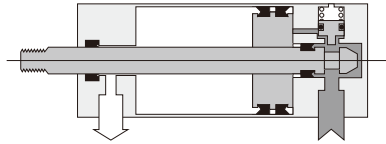
## Keep

When the piston reaches the end of the stroke, and the head side is completely exhausted, spring force causes the lock piston to engage, and automatically keep the end of stroke position.



## Release

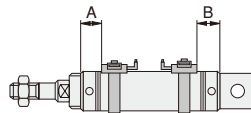
Supplying compressed air to the port on the locking mechanism side pushes up the lock piston and releases the lock. When the lock is released, the by-pass air passage opens to supply compressed air to the piston side.



# Mounting Location of Sensor Switch

When the sensor switch is mounted in the location shown in the diagram (figures in the table are reference values), the magnet comes to the sensor switch's maximum sensing location at the end of the stroke.

● Air cylinder



## ●-HL: Head side end keep

mm [in.]

Sensor switch model	Bore size Code	Air cylinder					
		20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]
ZG530 □	A	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]	36 [1.417]	36 [1.417]
ZG553 □	B	27 [1.063]	27 [1.063]	39 [1.535]	44 [1.732]	47 [1.850]	47 [1.850]
CS □ M	A	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]	36 [1.417]	36 [1.417]
	B	27 [1.063]	27 [1.063]	39 [1.535]	44 [1.732]	47 [1.850]	47 [1.850]
CS □ F	A	24 [0.945]	24 [0.945]	24 [0.945]	24 [0.945]	34 [1.339]	34 [1.339]
	B	24 [0.945]	24 [0.945]	38 [1.496]	41 [1.614]	46 [1.811]	46 [1.811]

## ●-RL: Rod side end keep

mm [in.]

Sensor switch model	Bore size Code	Air cylinder					
		20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]
ZG530 □	A	27 [1.063]	27 [1.063]	39 [1.535]	44 [1.732]	47 [1.850]	47 [1.850]
ZG553 □	B	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]	36 [1.417]	36 [1.417]
CS □ M	A	27 [1.063]	27 [1.063]	39 [1.535]	44 [1.732]	47 [1.850]	47 [1.850]
	B	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]	36 [1.417]	36 [1.417]
CS □ F	A	24 [0.945]	24 [0.945]	38 [1.496]	41 [1.614]	46 [1.811]	46 [1.811]
	B	24 [0.945]	24 [0.945]	24 [0.945]	24 [0.945]	34 [1.339]	34 [1.339]



## Control circuit

For control of Slim End Keep Cylinders, we recommend the use of 2-position, 4-, 5-port valves. Avoid the use of a control circuit of exhaust centers with 3-position valves or other control circuits that exhaust air from 2 delivery ports.

- Notes:
1. It is dangerous to supply air to a connection port on a side with a locking mechanism while already exhausted, because the piston rod could suddenly extend (or retract). In addition, since it could also cause galling of the lock piston and piston rod, resulting in defective operation. Always supply air to the connection port on the opposite side to ensure that back pressure is applied.
  2. When restarting operations after air has been exhausted from the cylinder due to completion of operations or to an emergency stop, always start by supplying air to the connection port on the opposite side of the locking mechanism.



## Manual operation

While the locking mechanism is normally released automatically through cylinder operations, it can also be released manually. For manual release, insert an M3 × 0.5 (M2.5×0.45 for  $\phi 16$ ) screw that has 30mm [1.18in.] below head length into the opening for manual override, thread it in about 3 turns into the internal lock piston, and then pull up the screw. To maintain the manual override for adjustment, etc., thread the locknut onto the screw and, with the locking mechanism in a released state, tighten the locknut against the cylinder.

- Notes:
1. It is dangerous to release the lock when a load (weight) is present on the piston rod, because it may cause a sudden fall or cause the unintended piston rod's extension (or retraction). In this case, always supply air to the connection port opposite the one adjacent to the locking mechanism before releasing the locking mechanism.
  2. If the locking mechanism cannot easily be released even with manual override, it could be the result of galling of the lock piston and piston rod. In this case, supply air to the connection port opposite the one adjacent to the locking mechanism before releasing the locking mechanism.



## General precautions

### Media

1. Use air for the media. For the use of any other media, consult us.
2. Air used for the cylinder should be clean air that contains no deteriorated compressor oil, etc. Install an air filter (filtration of a minimum 40  $\mu\text{m}$ ) near the cylinder or valve to remove collected liquid or dust. In addition, drain the air filter periodically.  
Collected liquid or dust entering the cylinder may cause improper operation.

### Lubrication

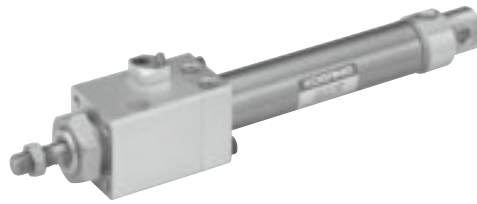
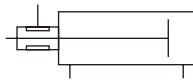
The product can be used without lubrication, if lubrication is required, use Turbine Oil Class 1 (ISO VG32) or equivalent. Avoid using spindle oil or machine oil.

### Atmosphere

1. Because water, oil, dust, etc., entering the opening for manual override may cause defective locks or other erratic operation. If using in locations subject to dripping water, dripping oil etc., or to large amounts of dust, use a cover to protect the unit.
2. The product cannot be used when the media or ambient atmosphere contains any of the substances listed below.  
Organic solvents, phosphate ester type hydraulic oil, sulphur dioxide, chlorine gas, or acids, etc.

# SLIM BRAKE CYLINDERS

## Symbol



## Specifications

Item		Bore size mm [in.]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
Media			Air			
Proof pressure		MPa [psi.]	1.32 [191]			
Operating temperature range		°C [°F]	5~60 [41~140]			
Operating speed range		mm/s [in./sec.]	50~500 [2.0~19.7]			
Cylinder section	Operation type		Double acting type			
	Mounting type		Basic type, Foot type, Flange type, Pivot type, Head trunnion type			
	Operating pressure range	MPa [psi.]	0.08~0.9 [12~131]			
	Cushion		Fixed type (Rubber bumper)			
	Lubrication		Not required			
	Port size	Rc	1/8			
Brake section	Operation type		Spring, spring assisted air pressure type <sup>Note1</sup>			
	Operating pressure range (When air is applied to brake port)	MPa [psi.]	0.3~0.9 [44~131] (0.34~0.5 [49~73])			
	Lubrication		Prohibited <sup>Note2</sup>			
	Retaining force (When pneumatic lock is pressurized to 0.4Mpa. [58psi.])	N [lbf.]	156.9 [35.27] (245.2 [55.12])	245.2 [55.12] (392.3 [88.19])	392.3 [88.19] (617.8 [138.9])	617.8 [138.9] (980.7 [220.5])
	Allowable kinetic energy of lock	J [ft-lbf]	0.265 [0.195]	0.422 [0.311]	0.696 [0.513]	1.187 [0.875]
	Repeatability (When air is applied to brake port)	mm [in.]	±1 [0.039] (±0.5 [0.020]) <sup>Note3</sup>			
Port size	Rc	1/8				

Notes: 1. The body is for common use. For details, see the Handling Instructions and Precautions on p.369.

2. Do not use lubrication.

3. For the case where cylinder speed is 300mm [11.8in./sec.], pressure is 0.5MPa [73psi.], and the load ratio is 25%. For details, see the Handling Instructions and Precautions on p.369.

## Bore Size and Strokes

Bore size	Standard strokes	Maximum stroke		Maximum available stroke	
		No bellows	With bellows	No bellows	With bellows
		20	25 50 75 100 125 150	200	
25	25 50 75 100 125 150 200	250			
32	25 50 75 100 125 150 200	300			
40	25 50 75 100 125 150 200 250 300	400	300		

Remarks: 1. Stroke tolerance  $+1 \begin{matrix} +0.039in. \\ 0 \end{matrix}$

2. For non-standard strokes, consult us.

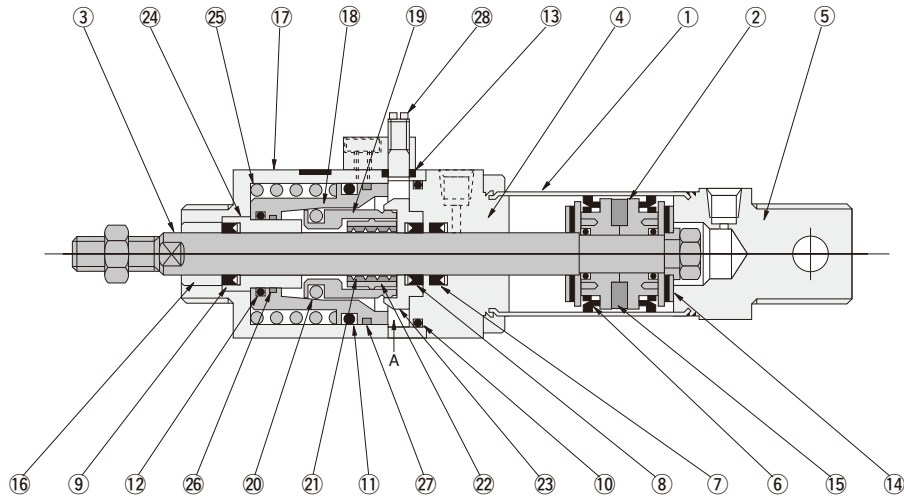
3. The minimum operating pressure when the stroke is over the maximum stroke is 0.2MPa [29psi.].

## Order Codes

**DA** R 20×50 -   -   -   -   -   -   -  

**DA** — Slim double acting cylinder  
**R** — Bellows  
**Blank** — No bellows  
**J** — With bellows (Made to order)  
**20×50** — Bore size × Stroke  
**20** — Bore size  
**50** — Stroke  
**Blank** — Rod end accessory  
**I** — I type knuckle  
**Y** — Y type knuckle (with pin)  
**●** For the cylinder joint and cylinder rod end, see p.1568.  
**Blank** — Mounting type  
**1** — Foot mounting type  
**3** — Flange mounting type  
**8E** — Pivot mounting type with supporting bracket (with pin)  
**11** — Head trunnion type  
**11-11T** — Head trunnion type with supporting bracket  
**●** Mounting brackets are included at shipping.  
**Blank** — Head cover specification  
**A** — Short head  
**Number of sensor switches**  
**1** — With 1 sensor switch  
**2** — With 2 sensor switches  
**3** — With 3 sensor switches  
**⋮** —   
**Lead wire length** (Applies to all except **CS□F**)  
**A** — 1000mm [39in.]  
**B** — 3000mm [118in.]  
**Sensor switch** (for cylinders with sensor switches)  
**Blank** — No sensor switch  
**ZG530** — 2-lead wire Solid state type with indicator lamp DC10~28V  
**ZG553** — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
**CS3M** — Reed switch type with indicator lamp DC10~30V  
**CS4M** — Reed switch type with indicator lamp AC85~230V  
**CS5M** — Reed switch type without indicator lamp DC10~30V  
**CS2F** — Reed switch type with indicator lamp AC85~115V  
**CS3F** — Reed switch type with indicator lamp DC3~30V  
**CS4F** — Reed switch type with indicator lamp AC85~115V  
**CS5F** — Reed switch type without indicator lamp AC85~230V  
**●** For details of sensor switches, see p.1544.  
**● CS□F** comes with DIN connector. All others are grommet type.

# Inner Construction (cannot be disassembled)



The diagram shows the brake release state.

## Major Parts and Materials

No.	Parts	Materials
①	Cylinder tube	Stainless steel
②	Piston	Plastic
③	Piston rod	Steel (hard chrome plated)
④	Rod cover	Aluminum (anodized)
⑤	Head cover	
⑥	Piston seal	Synthetic rubber (NBR)
⑦~⑨	Rod seal	
⑩~⑬	O-ring	
⑭	Bumper	
⑮	Magnet	Plastic magnet
⑯	Rod bushing	Oil impregnated bronze sintered alloy
⑰	Brake head	Aluminum (anodized)
⑱	Brake piston	Special steel (heat-treated)
⑲	Collet	
⑳	Steel ball	High carbon steel
㉑	Brake shoe	Special brake lining (copper sintered material)
㉒	Brake shoe holder	Special steel (heat-treated)
㉓	Holder	
㉔	Guide	Aluminum alloy
㉕	Spring	Piano wire (zinc plated)
㉖~㉗	Wear ring	Plastic
㉘	Brake release screw	Mild steel (zinc plated)
	Bellows	Nylon tarpaulin (heat resistant temperature 60°C)

## Operating Principle

### Brake operation

When air is exhausted from chamber A, brake piston ⑱ is moved by spring ㉕ to the right, steel ball ⑳ in contact with the tapered section inside of brake piston ⑱ is pushed to the inner side, and collet ⑲ works as a lever with holder ㉓ and brake shoe holder ㉒ as a pivot point. This action presses brake shoe ㉑ to tighten the piston rod and activate the brake.

### Brake release

When air is supplied to chamber A, brake piston ⑱ moves to the left against spring ㉕, steel ball ⑳ is separated from the tapered section inside of brake piston ⑱, and collet ⑲ expands and brake shoe ㉑ spreads to release the piston rod and disengage the brake.

## Seals

Note: Seals cannot be replaced.

Parts	Rod seal ⑦~⑨	Piston seal ⑥	O-ring ⑩	O-ring ⑪	O-ring ⑫	O-ring ⑬
Quantity	3	2	1	1	1	1
Bore						
20	NY-12×8×3.5	PPY-20	L090102	P21	P12	P5
25	NY-14×10×3.5	PPY-25	S26	P24	P14	P5
32	NY-17×12×4	PPY-32	S34	P32	P18	P6
40	NY-22×16×5	PPY-40	S42	P40	P22	P6

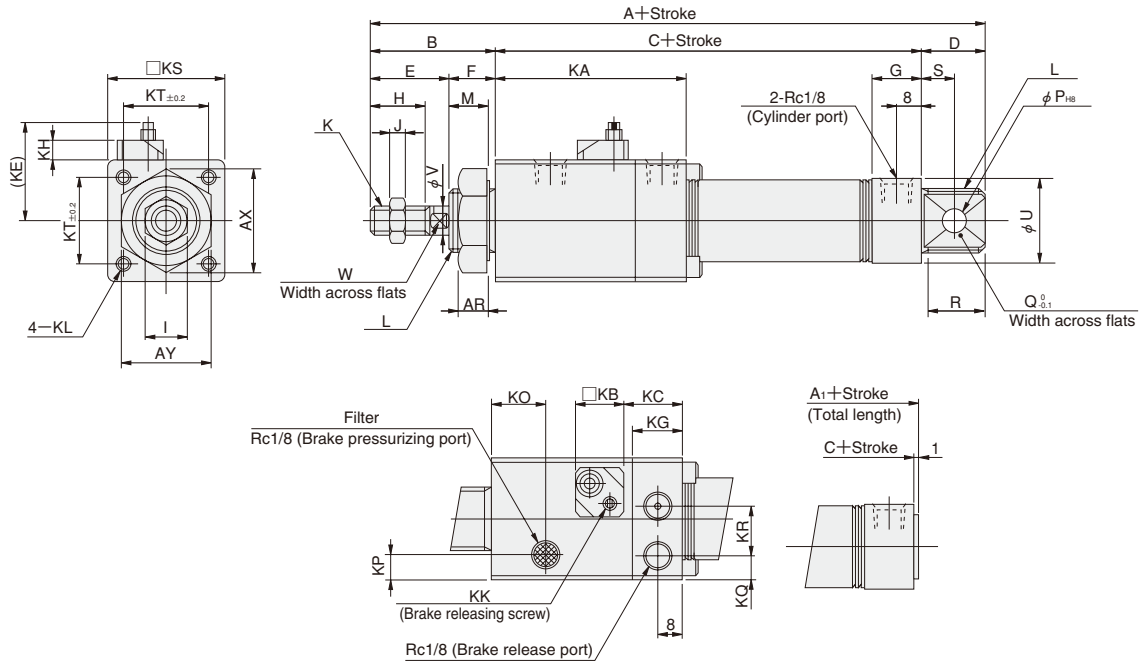
## Mass

Bore size mm [in.]	Zero stroke mass			Additional mass for each 1mm [0.0394in.] stroke	Mass of mounting bracket		
	Standard head type	Short head type	Trunnion type		Foot mounting type	Flange mounting type	Clevis mounting type
20 [0.787]	0.37 [0.82]	0.36 [0.79]	0.56 [1.23]	0.0008 [0.0018]	0.14 [0.31]	0.08 [0.18]	0.06 [0.13]
25 [0.984]	0.54 [1.19]	0.53 [1.17]	0.72 [1.59]	0.0011 [0.0024]	0.16 [0.35]	0.08 [0.18]	0.06 [0.13]
32 [1.260]	0.84 [1.85]	0.82 [1.81]	1.01 [2.23]	0.0015 [0.0033]	0.19 [0.42]	0.10 [0.22]	0.14 [0.31]
40 [1.575]	1.30 [2.87]	1.28 [2.82]	1.48 [3.26]	0.0024 [0.0053]	0.29 [0.64]	0.13 [0.29]	0.14 [0.31]

# Dimensions of Brake Cylinder Basic Type (mm)

DAR Bore size × Stroke

CAD DAR- Bore size



Brake head section

● Short head

DAR Bore size × Stroke -A

CAD SLIM-A

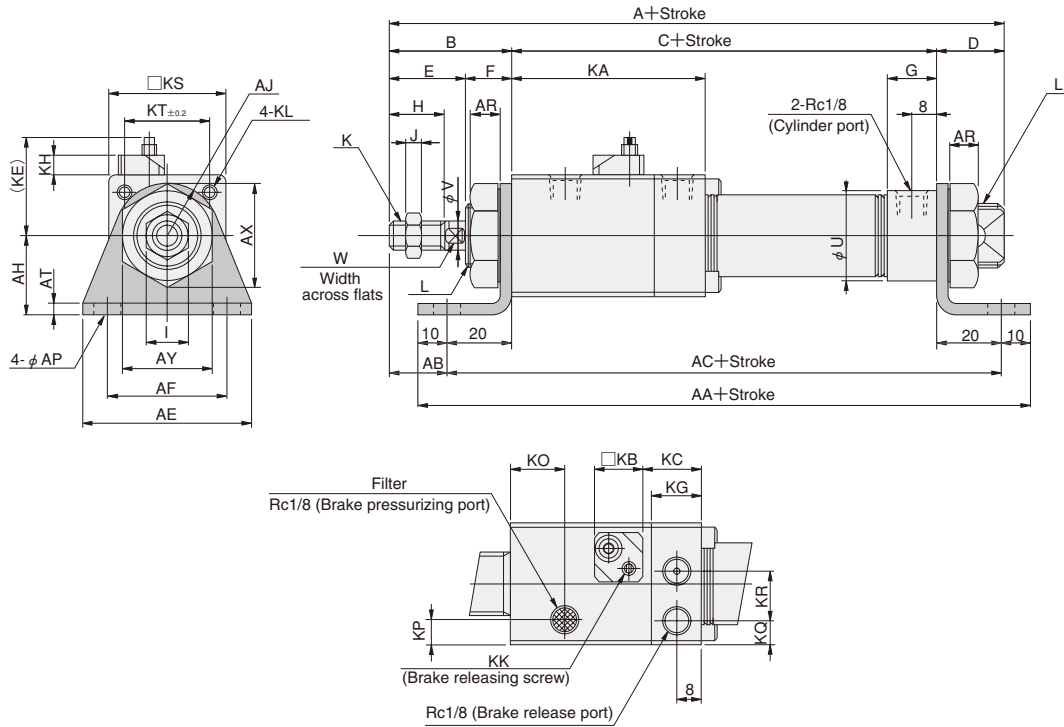
Bore mm [in.]	Code	A	A <sub>1</sub>	B	C	D	E	F	G	H	I	J	K	L	M	P	Q	R	S	U	V	W	AR	AX	AY
20	[0.787]	175	155	35	119	21	23	12	16	15	12	5	M8×1	M20×1.5	10	8	12	19	12	27	8	6	7.5	31.2	27
25	[0.984]	184	164	40	123	21	26	14	16	18	14	6	M10×1.25	M22×1.5	12	8	12	19	12	29	10	8	9.5	34.6	30
32	[1.260]	202	176	45	130	27	31	14	16	23	14	6	M10×1.25	M27×2	12	10	20	25	15	35	12	10	9.5	41.6	36
40	[1.575]	217	191	45	145	27	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	10	20	25	15	41.6	16	14	9.5	47.3	41

Bore mm [in.]	Code	KA	KB	KC	KE	KG	KH	(KK)	KL	KO	KP	KQ	KR	KS	KT
20	[0.787]	59	16	19	29	16	6.5	M5×0.8	M5×0.8 Depth7	16.5	7	7	14.5	35	26
25	[0.984]	63	16	19.5	32	16	6.5	M5×0.8	M5×0.8 Depth9	18	8	8	16	40	28
32	[1.260]	70	20	19	38	16	9	M6×1	M5×0.8 Depth9	23	8	14.5	16	45	34
40	[1.575]	83	20	20	40	16	9	M6×1	M6×1 Depth10	27	9	18	16	52	40

# Dimensions of Brake Cylinder Foot Mounting Type (mm)

DAR Bore size × Stroke -1

CAD DAR- Bore size SLIM-F01



Brake head section

Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	U	V	W
20	[0.787]	175	35	119	21	23	12	16	15	12	5	M8×1	M20×1.5	27	8	6
25	[0.984]	184	40	123	21	26	14	16	18	14	6	M10×1.25	M22×1.5	29	10	8
32	[1.260]	202	45	130	27	31	14	16	23	14	6	M10×1.25	M27×2	35	12	10
40	[1.575]	217	45	145	27	31	14	(14.5)	23	19	8	M14×1.5	M33×2	41.6	16	14

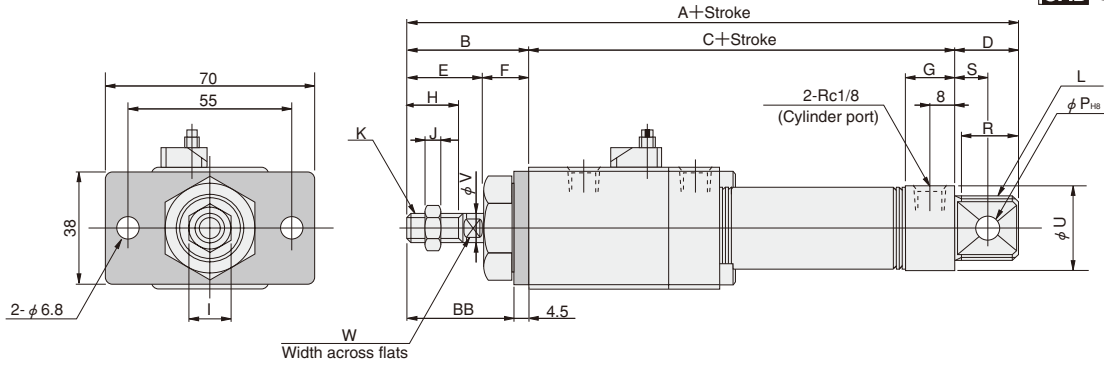
Bore mm [in.]	Code	KA	KB	KC	KE	KG	KH	(KK)	KL	KO	KP	KQ	KR	KS	KT
20	[0.787]	59	16	19	29	16	6.5	M5×0.8	M5×0.8 Depth7	16.5	7	7	14.5	35	26
25	[0.984]	63	16	19.5	32	16	6.5	M5×0.8	M5×0.8 Depth9	18	8	8	16	40	28
32	[1.260]	70	20	19	38	16	9	M6×1	M5×0.8 Depth9	23	8	14.5	16	45	34
40	[1.575]	83	20	20	40	16	9	M6×1	M6×1 Depth10	27	9	18	16	52	40

Bore mm [in.]	Code	AA	AB	AC	AE	AF	AH	AJ	AP	AR	AT	AX	AY
20	[0.787]	179	15	159	55	40	25	15.5	6.8	7.5	3.2	31.2	27
25	[0.984]	183	20	163	55	40	30	17	6.8	9.5	3.2	34.6	30
32	[1.260]	190	25	170	55	40	35	20	6.8	9.5	3.2	41.6	36
40	[1.575]	205	25	185	75	55	40	23.5	9	9.5	4	47.3	41

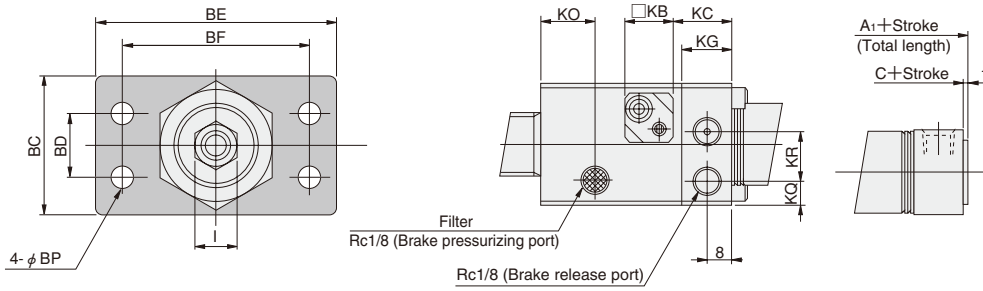
SLIM CYLINDERS

# Dimensions of Brake Cylinder Flange Mounting Type (mm)

●  $\phi 20 \sim \phi 25$  DAR  ×  -3



●  $\phi 32 \sim \phi 40$



Brake head section ● Short head

DAR  ×  -A-3



Bore mm [in.]	Code	A	A <sub>1</sub>	B	C	D	E	F	G	H	I	J	K	L	P	R	S	U	V	W
20	[0.787]	175	155	35	119	21	23	12	16	15	12	5	M8×1	M20×1.5	8	19	12	27	8	6
25	[0.984]	184	164	40	123	21	26	14	16	18	14	6	M10×1.25	M22×1.5	8	19	12	29	10	8
32	[1.260]	202	176	45	130	27	31	14	16	23	14	6	M10×1.25	M27×2	10	25	15	35	12	10
40	[1.575]	217	191	45	145	27	31	14	(14.5)	23	19	8	M14×1.5	M33×2	10	25	15	41.6	16	14

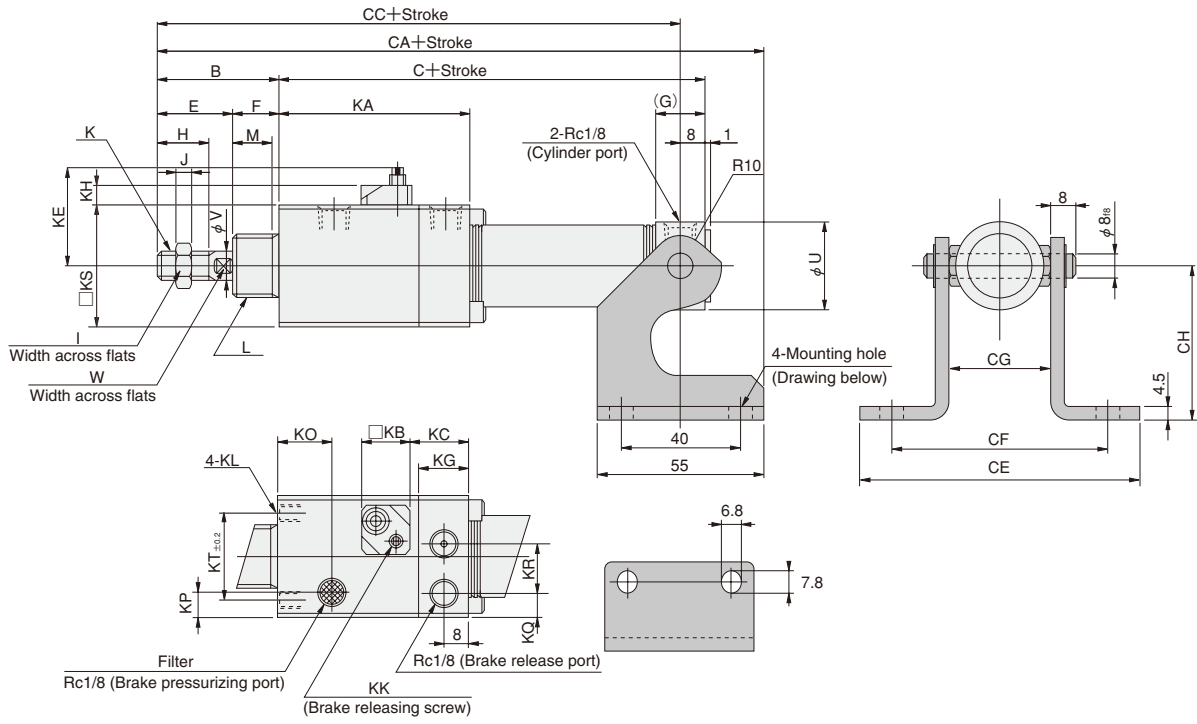
Bore mm [in.]	Code	BB	BC	BD	BE	BF	BP	KQ	KR	KO	KB	KC	KG
20	[0.787]	30.5	—	—	—	—	—	7	14.5	16.5	16	19	16
25	[0.984]	35.5	—	—	—	—	—	8	16	18	16	19.5	16
32	[1.260]	40.5	45	20	80	60	6.8	14.5	16	23	20	19	16
40	[1.575]	40.5	50	30	100	80	9	18	16	27	20	20	16





# Dimensions of Brake Cylinder Head Trunnion Type (mm)

DAR Bore size × Stroke -11-11T



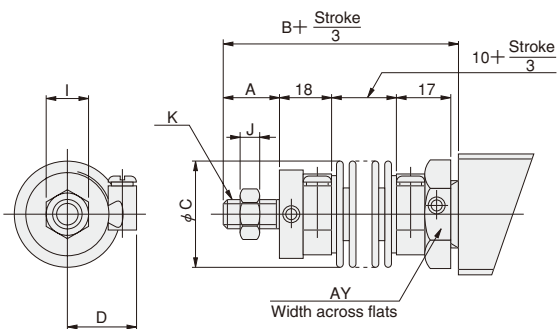
Brake head section

Bore mm [in.]	Code	B	C	E	F	G	H	I	J	K	L	M	U	V	W
20	[0.787]	35	119	23	12	16	15	12	5	M8×1	M20×1.5	10	27	8	6
25	[0.984]	40	123	26	14	16	18	14	6	M10×1.25	M22×1.5	12	29	10	8
32	[1.260]	45	130	31	14	16	23	14	6	M10×1.25	M27×2	12	35	12	10
40	[1.575]	45	145	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	41.6	16	14

Bore mm [in.]	Code	KA	KB	KC	KE	KG	KH	(KK)	KL	KO	KP	KQ	KR	KS	KT
20	[0.787]	59	16	19	29	16	6.5	M5×0.8	M5×0.8 Depth7	16.5	7	7	14.5	35	26
25	[0.984]	63	16	19.5	32	16	6.5	M5×0.8	M5×0.8 Depth9	18	8	8	16	40	28
32	[1.260]	70	20	19	38	16	9	M6×1	M5×0.8 Depth9	23	8	14.5	16	45	34
40	[1.575]	83	20	20	40	16	9	M6×1	M6×1 Depth10	27	9	18	16	52	40

Bore mm [in.]	Code	CA	CE	CF	CG	CH	CC
20	[0.787]	173.5	92	72	32	50	146
25	[0.984]	182.5	94	74	34	50	155
32	[1.260]	194.5	100	80	40	50	167
40	[1.575]	209.5	107	87	47	50	182

# Dimensions of Brake Cylinder with Bellows (mm)



Bore mm [in.]	Code	A	B	C	D	AY	I	J	K
20	[0.787]	15	63	35	23	27	12	5	M8×1
25	[0.984]	18	66	35	23	30	14	6	M10×1.25
32	[1.260]	23	71	40	26	36	14	6	M10×1.25
40	[1.575]	23	71	48	29	41	19	8	M14×1.5



## Mounting and piping

### Control circuit

#### Electric control

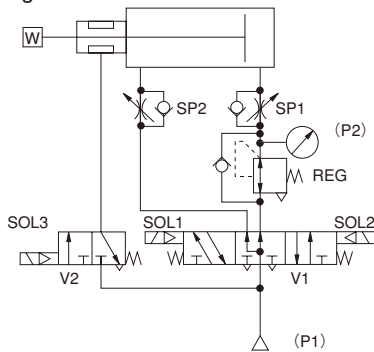
When using a sequencer for control, the scanning time of the sequencer will affect the stopping position error. To improve the stopping position accuracy, use a TTL circuit, etc., to directly control the signal from the cylinder's sensor switch, and operate the valve.

#### Pneumatic circuit

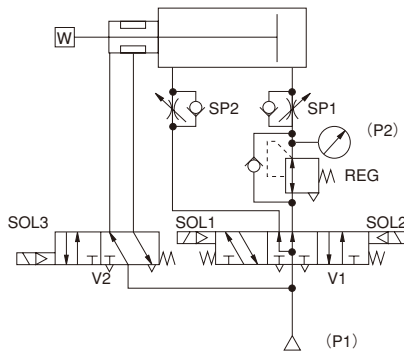
- To achieve a balance with the load, and a balance of differences in rod diameter area, always use a regulator with check valve. Regulators we recommend include the F.R.L. multi series **R152**, the manifold regulator **MR102**, or the solenoid valve 180 series sub-base regulator -54 (for single unit order code: **M020014**).
- For the cylinder control solenoid valve (V1), use a pressure center type 3-position solenoid valve (**113-4E2-14**, **183-4E2-14**), etc.
- Install the solenoid valve for brake (V2) as close to the cylinder as possible. Moreover, using a DC current solenoid valve will improve response (repeatability).

#### Standard circuit

##### ● Horizontal mounting Spring lock



##### Spring assisted air pressure lock



#### Regulator pressure setting

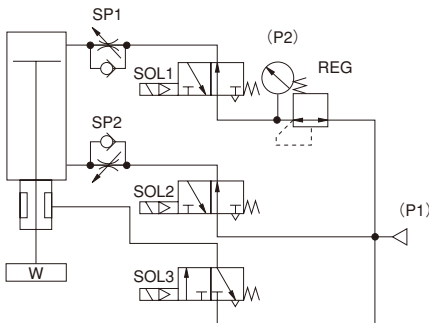
$$P2 = \frac{D^2 - d^2}{D^2} \cdot P1$$

D : Cylinder bore (mm)  
d : Rod diameter (mm)  
P1 : Supply pressure (MPa)

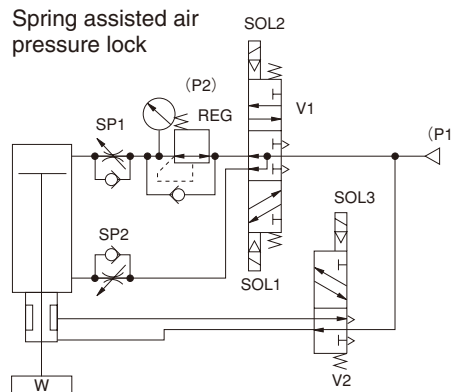
$$P2' = \frac{D'^2 - d'^2}{D'^2} \cdot P1'$$

D' : Cylinder bore [in.]  
d' : Rod diameter [in.]  
P1' : Supply pressure [psi.]

##### ● Vertical mounting Spring lock



##### Spring assisted air pressure lock



#### Regulator pressure setting

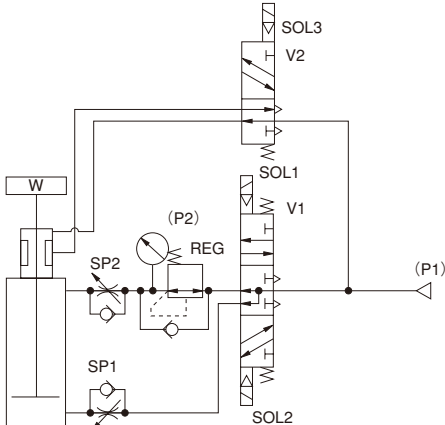
$$P2 = \frac{\pi (D^2 - d^2) P1 - 4W}{\pi \cdot D^2}$$

D : Cylinder bore (mm)  
d : Rod diameter (mm)  
P1 : Supply pressure (MPa)  
W : Load (N)

$$P2' = \frac{\pi (D'^2 - d'^2) P1' - 4W'}{\pi \cdot D'^2}$$

D' : Cylinder bore [in.]  
d' : Rod diameter [in.]  
P1' : Supply pressure [psi.]  
W' : Load [lbf]

##### ● Vertical mounting (push up) spring assisted air pressure lock



#### Regulator pressure setting

$$P2 = \frac{\pi \cdot D^2 \cdot P1 - 4W}{\pi (D^2 - d^2)}$$

D : Cylinder bore (mm)  
d : Rod diameter (mm)  
P : Supply pressure (MPa)  
W : Load (N)

$$P2' = \frac{\pi \cdot D'^2 \cdot P1' - 4W'}{\pi (D'^2 - d'^2)}$$

D' : Cylinder bore [in.]  
d' : Rod diameter [in.]  
P' : Supply pressure [psi.]  
W' : Load [lbf]

Solenoid ON, OFF switching sequence (same for all applications)

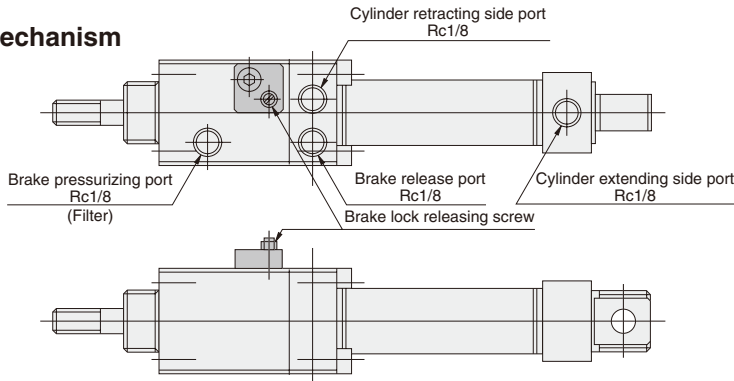
Valve Operating status	V1			V2
	SOL1	SOL2	SOL3	
Intermediate stop	OFF	OFF	OFF	
Extend	OFF	ON	ON	
Retract	ON	OFF	ON	

# Handling Instructions and Precautions



## Mounting and piping

### Brake mechanism



### Manual operation

- **Brake release**  
Apply 0.3~0.9MPa [44~131psi.] air pressure to the brake release port, then use a small screwdriver, etc., to thread the brake lock releasing screw in the clockwise direction until the screw thread disappears.
- **Brake operation**  
To again operate the brake, apply 0.3~0.9MPa [44~131psi.] air pressure to the brake release port, then use a small screwdriver, etc., to return the brake lock releasing screw in the counterclockwise direction until the screw comes to a stop.
- **Brake release**  
For safety, the brake lock releasing screw is designed to be immovable if no air has been applied to the brake release port.

### Spring assisted air pressure lock

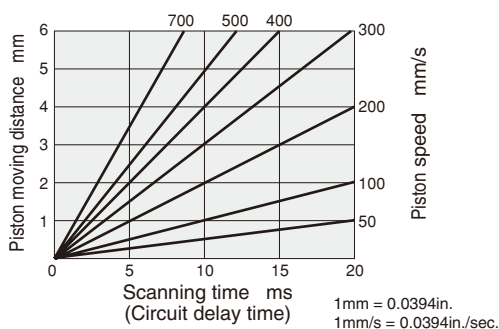
- To increase the holding force, use a screwdriver, etc., to remove the filter on the brake pressurizing port and use it as a connection port for spring assisted air pressure type brake.
- While using a spring assisted air pressure brake will approximately double the holding force, too much pressure on the brake pressurizing port could reduce the durability of the brake mechanism. For this reason, always maintain air pressure in the pressurizing port within a range of 0.34~0.50MPa [49~73psi.] when using a 4 way valve to switch between the brake release port and the pressurizing port.

### Stopping position accuracy

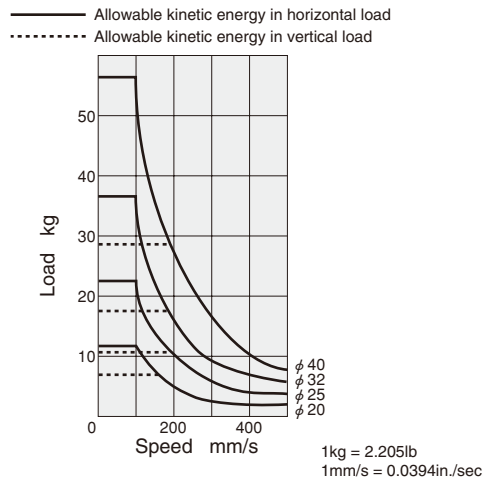
1. Stopping position accuracy (repeatability) shown in the specifications table is for initial conditions. This can change over time as the piston rod grease deteriorates, and as wear on the brake shoe and piston rod progresses.
2. The stopping position accuracy can vary in accordance with cylinder speed, control circuit delay time (sequencer scanning time, etc.), fluctuation in brake valve (V2) operating time, piping length, and piping diameter, etc.
3. To improve the stopping position accuracy, install a pressure reducing valve to ensure there are no pressure fluctuations in the media.
4. Use the brake cylinder within the allowable kinetic energy range.

● Fluctuations in cylinder stopping time arising during the sequencer's scanning time (or circuit operating time).

● Allowable kinetic energy when locked



- Examples: 1. A brake cylinder operated at a scanning time of 10ms (which will vary according to the sequencer and the number of program steps) and a cylinder speed of 300mm/s [11.8in./sec.] will cause a fluctuation of 3mm [0.118in.].
2. When 10ms is required for the response time of relays, etc., at least 3mm [0.118in.] of operating distance is required for the sensor. (When the cylinder speed is 300mm/s [11.8 in./sec.]



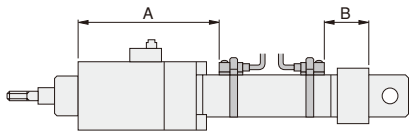
Note: Use the brake cylinder within the allowable kinetic energy range.

## Handling Instructions and Precautions



### Sensor switch mounting location

For moving sensor switch, see p.419.  
Since dimensions for the mounting location will vary, see the table below.



#### ● Mounting location of end of stroke detection sensor switch

Sensor switch model	Bore size mm [in.]	20	25	32	40
		[0.787]	[0.984]	[1.260]	[1.575]
ZG530□	A	70 [2.756]	74 [2.913]	81 [3.189]	95 [3.740]
	B	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]
ZG553□	A	70 [2.756]	74 [2.913]	81 [3.189]	95 [3.740]
	B	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]
CS□M	A	70 [2.756]	74 [2.913]	81 [3.189]	95 [3.740]
	B	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]
CS□F	A	65 [2.559]	69 [2.717]	76 [2.992]	90 [3.543]
	B	22 [0.866]	22 [0.866]	22 [0.866]	22 [0.866]



### General precautions

#### Media

1. Air used in the brake cylinder should be clean air that contains no lubrication. Use of lubrication or humidified air could cause the grease inside the braking mechanism to wash out, which could later result in rapid wear on the braking mechanism caused by the consequent shortage of lubrication, etc.
2. Air used for the cylinder should be clean air that contains no deteriorated compressor oil, etc. Install an air filter (filtration of a minimum 40 μm) near the cylinder or valve to remove collected liquid or dust. In addition, drain the air filter periodically. Collected liquid or dust entering the cylinder may cause improper operation.

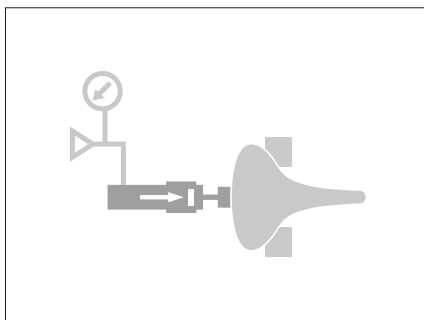
#### Maintenance

If the above basic precautions are observed, the brake cylinder can be used maintenance-free for a long period of time.

#### Atmosphere

1. If using in locations subject to dripping water, dripping oil, etc., or to large amounts of dust, use a cover to protect the unit.
2. The product cannot be used when the media or ambient atmosphere contains any of the substances listed below.  
Organic solvents, phosphate ester type hydraulic oil, sulphur dioxide, chlorine gas, or acids, etc.

## Application Examples

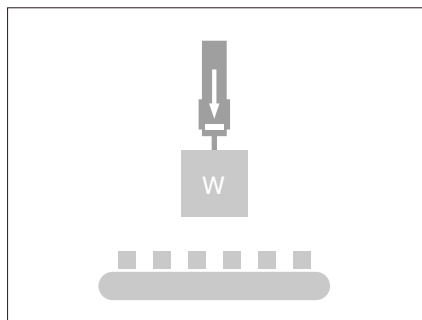


#### The piston rod locking

Use low pressure to press down cathode-ray tubes, etc., and then lock.

[To hold in place glass products, plastic, and other easily deformable items.]

- Cathode-ray tube manufacturing line
- Injection machine peripheral devices
- Tire production line

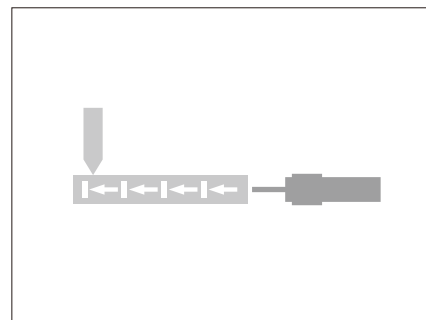


#### Prevention of falls in intermediate positions

The load is locked in place to prevent damage to work, etc., even when air pressure drops suddenly due to power failures, etc.

[Used for working operations which are set in intermediate positions.]

- Pick and place
- FMS (multi-item, small-lot production) conveyor line
- Automatic packaging machine



#### Multi-point operations

Spot welding at multiple points.

#### Workpiece switching

Select the products, and classify into several categories.

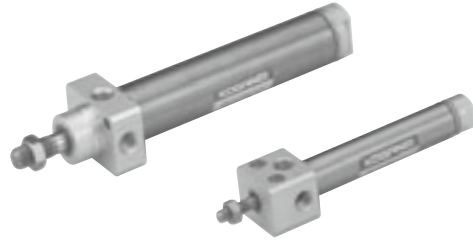
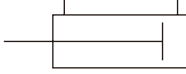
#### Fixture replacement

Move fixture to desired device.

- Spot welding machine
- Metal mold exchange
- Automatic chuck exchange

# SLIM BLOCK CYLINDERS

## Symbol



## Specifications

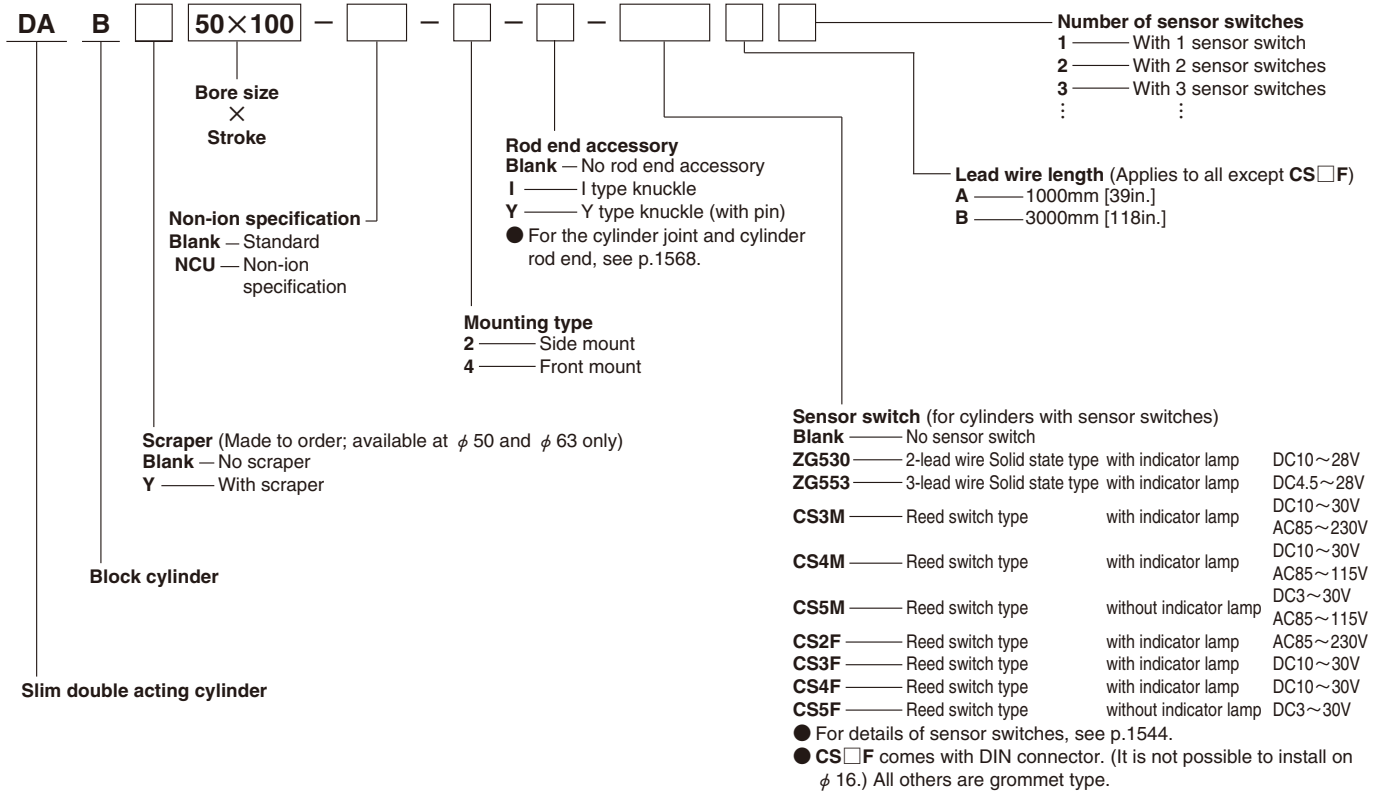
Item	Bore size mm [in.]	16 [0.630]	20~40 [0.787~1.575]	50, 63 [1.969, 2.480]
Operation type		Double acting type		
Media		Air		
Mounting type		Side mount, Front mount		
Operating pressure range	MPa [psi.]	0.04~0.9 [6~131]	0.04~0.7 [6~102]	
Proof pressure	MPa [psi.]	1.32 [191]	1.03 [149]	
Operating temperature range	°C [°F]	0~70 [32~158]		
Operating speed range	mm/s [in./sec.]	30~700 [1.2~27.6]	30~500 [1.2~19.7]	
Cushion		Fixed type (Rubber bumper)		Variable type (Stroke 15mm [0.59in.])
Lubrication		Not required		
Port size	Rc	1/8	1/4	

## Bore Size and Stroke

Bore size	Standard strokes	Maximum stroke	mm	
			Maximum available stroke	
16	15 25 50 75 100	100	300	
20	25 50 75 100 125 150	150	500	
25	25 50 75 100 125 150 200	200		
32	25 50 75 100 125 150 200	200		
40	25 50 75 100 125 150 200 250 300	300		
50	25 50 75 100 150 200 250 300	300		
63	25 50 75 100 150 200 250 300	300		

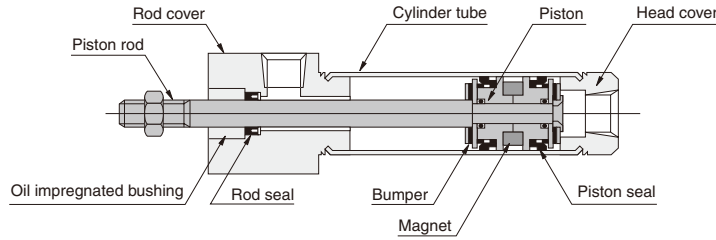
Remarks: 1. Stroke tolerance  $^{+1}_{0} [^{+0.039}_{0} \text{in.}]$   
 2. For non-standard strokes, consult us.

## Order Codes

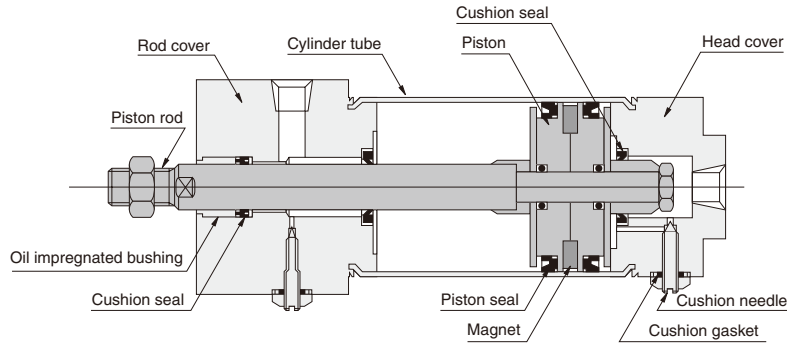


# Inner Construction and Major Parts (cannot be disassembled)

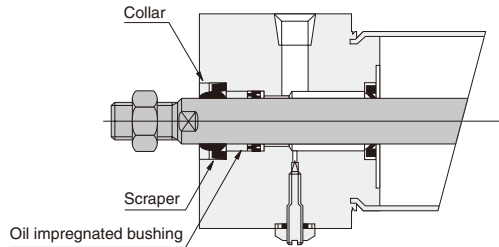
●  $\phi 16 \sim \phi 40$



●  $\phi 50, \phi 63$



● With scraper



## Major Parts and Materials

Parts	Bore size	16	20~40	50, 63
Cylinder tube		Stainless steel		
Piston		Plastic		
Piston rod		Stainless steel (hard chrome plated)	Steel (hard chrome plated)	
Rod cover		Aluminum (anodized)		
Head cover		Aluminum (anodized)		
Seal		Synthetic rubber (NBR)		
Bumper		Synthetic rubber (NBR)	—	
Scraper		—	Synthetic rubber (NBR)	
Collar		—	Aluminum (anodized)	
Magnet		Plastic magnet		
I type knuckle		Mild steel (nickel plated)	Mild steel (zinc plated)	
Y type knuckle		Mild steel (zinc plated)		

## Seals

Note: Seals cannot be replaced.

Parts	Rod seal	Piston seal	Cushion seal	Cushion gasket	Scraper
Quantity	1	2	2	2	1
Bore mm					
16	NY-3-6	PPY-16	—	—	—
20	NY-12X8X3.5	PPY-20	—	—	—
25	NY-14X10X3.5	PPY-25	—	—	—
32	NY-17X12X4	PPY-32	—	—	—
40	NY-22X16X5	PPY-40	—	—	—
50	NY-22X16X5	PGY-50	PCS-20	DT-1-5	SCB-16
63	NY-22X16X5	PGY-63	PCS-20	DT-1-5	SCB-16

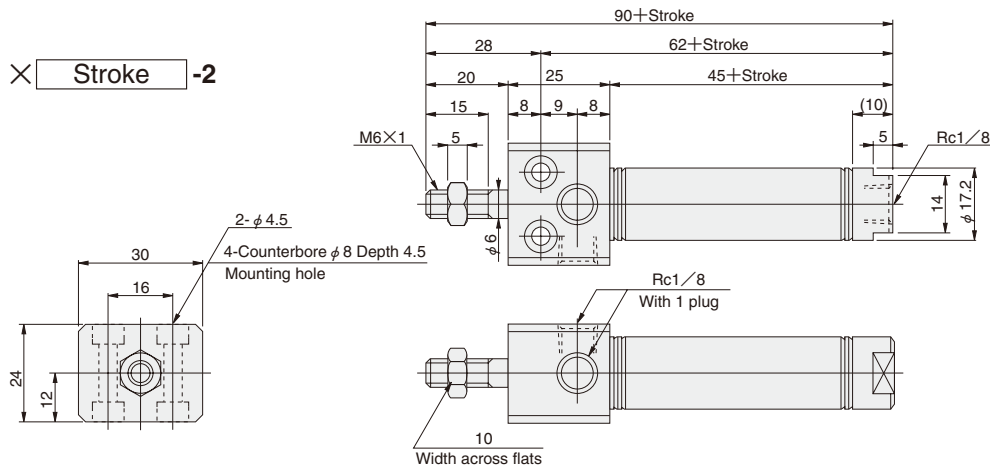
## Mass

Bore size mm [in.]	Zero stroke mass		Additional mass for each 1mm [0.0394in.] stroke	Mass of knuckle	
	Side mount	Front mount		Y type knuckle	I type knuckle
16 [0.630]	0.09 [0.20]	0.08 [0.18]	0.0005 [0.0011]	0.017 [0.037]	0.020 [0.044]
20 [0.787]	0.15 [0.33]	0.14 [0.31]	0.0008 [0.0018]	0.041 [0.090]	0.036 [0.079]
25 [0.984]	0.22 [0.49]	0.19 [0.42]	0.0011 [0.0024]	0.075 [0.165]	0.070 [0.154]
32 [1.260]	0.37 [0.82]	0.30 [0.66]	0.0015 [0.0033]	0.075 [0.165]	0.070 [0.154]
40 [1.575]	0.66 [1.46]	0.49 [1.08]	0.0024 [0.0053]	0.120 [0.265]	0.132 [0.291]
50 [1.969]	1.15 [2.54]	0.90 [1.98]	0.0028 [0.0062]	0.120 [0.265]	0.132 [0.291]
63 [2.480]	1.62 [3.57]	1.26 [2.78]	0.0033 [0.0073]	0.120 [0.265]	0.132 [0.291]

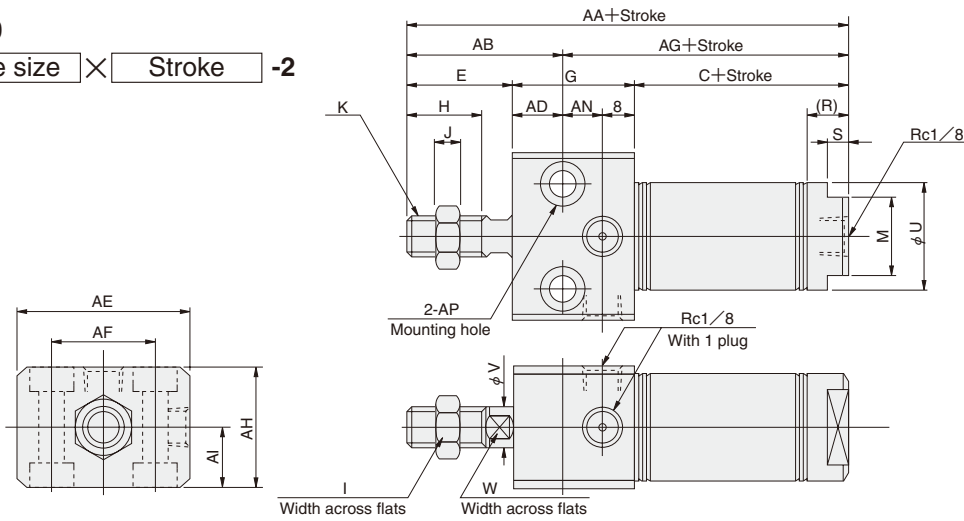
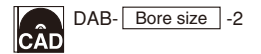
Calculation example: For the mass of side mount type of 32mm bore size and 100mm stroke  
 $0.037 + (0.0015 \times 100) = 0.52\text{kg} [1.15\text{lb.}]$

# Dimensions of Block Cylinder Side Mounting Type (mm)

●  $\phi 16$   
**DAB 16** ×  -2

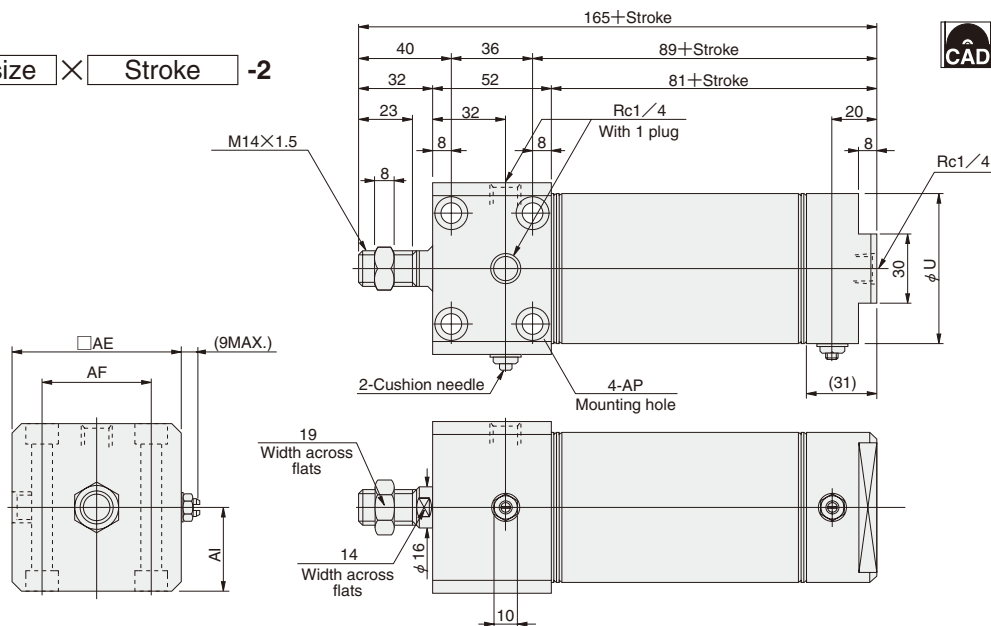


●  $\phi 20 \sim \phi 40$   
**DAB**  ×  -2



Bore mm [in.]	Code	C	E	G	H	I	J	K	M	R	S	U	V	W	AA	AB	AD	AE	AF	AG	AH	AI	AN	AP
20 [0.787]	53	23	28	15	12	5	M8×1	17	10	5	21.4	8	6	104	34	11	38	22	70	28	14	9	$\phi 6.6$ 2-Counterbore $\phi 11$ Depth6.5	
25 [0.984]	53	26	30	18	14	6	M10×1.25	19	10	5	26.4	10	8	109	38	12	42	26	71	30	15	10	$\phi 6.6$ 2-Counterbore $\phi 11$ Depth6.5	
32 [1.260]	54	31	36	23	14	6	M10×1.25	22	11	6	33.6	12	10	121	45	14	54	34	76	36	18	14	$\phi 9$ 2-Counterbore $\phi 14$ Depth8.6	
40 [1.575]	60	31	44	23	19	8	M14×1.5	22	13	6	41.6	16	14	135	48	17	68	46	87	44	22	19	$\phi 11$ 2-Counterbore $\phi 17.5$ Depth10.8	

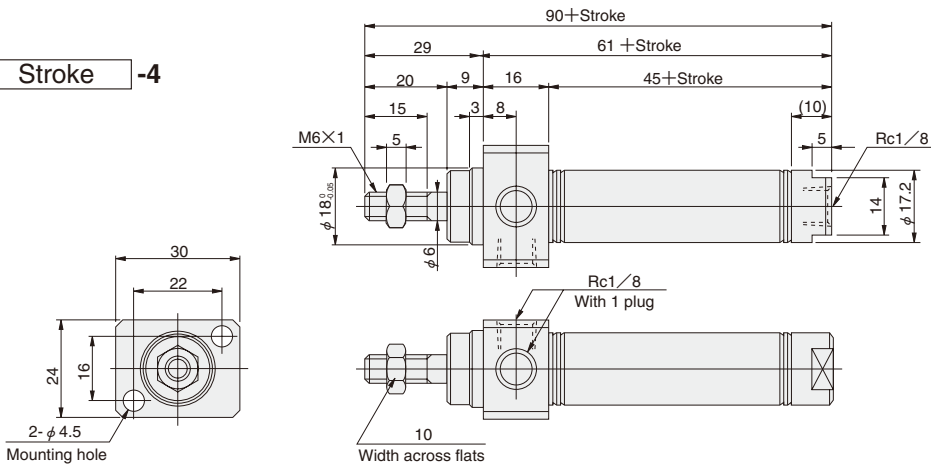
●  $\phi 50, \phi 63$   
**DAB**  ×  -2



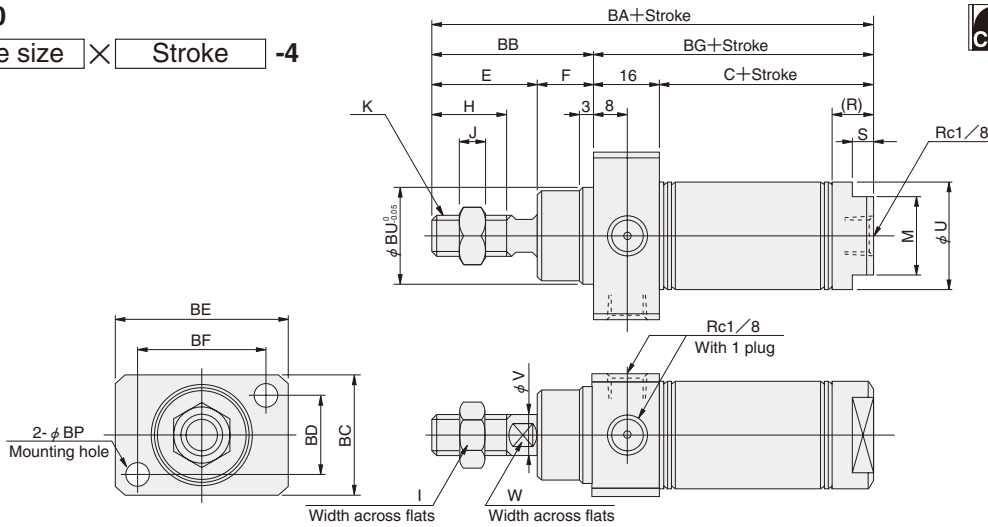
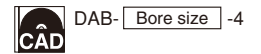
Bore mm [in.]	Code	U	AE	AF	AI	AP
50 [1.969]	52	62	44	31	$\phi 6.6$ 2-Counterbore $\phi 11$ Depth6.5	
63 [2.480]	65.4	74	48	37	$\phi 9$ 2-Counterbore $\phi 14$ Depth8.6	

# Dimensions of Block Cylinder Front Mounting Type (mm)

●  $\phi 16$   
**DAB 16**  $\times$   -4

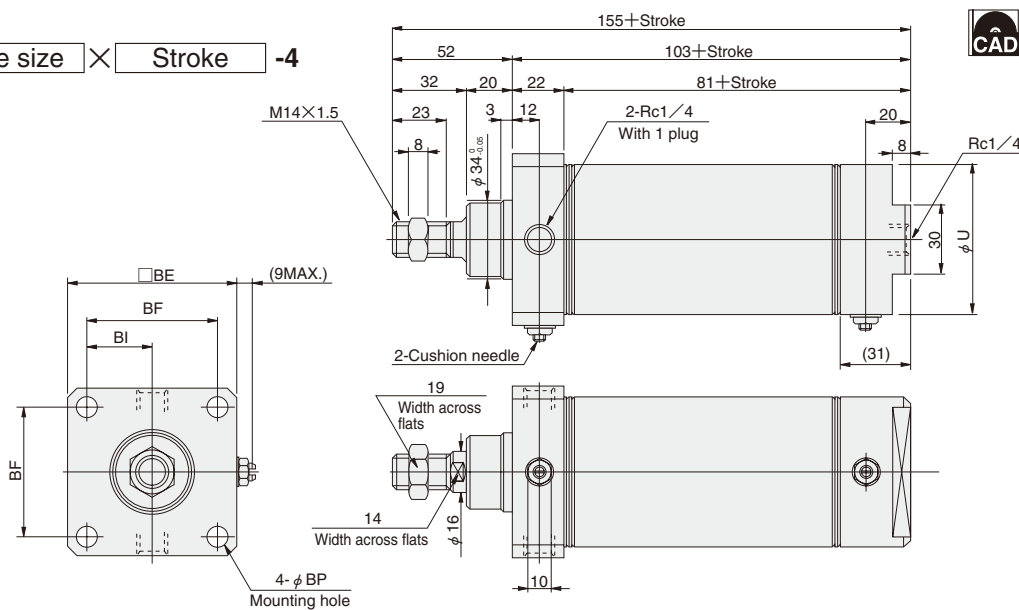
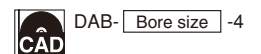


●  $\phi 20 \sim \phi 40$   
**DAB**   $\times$   -4



Bore mm (in.)	Code	C	E	F	H	I	J	K	M	R	S	U	V	W	BA	BB	BC	BD	BE	BF	BG	BP	BU
	<b>20 [0.787]</b>	53	23	12	15	12	5	M8×1	17	10	5	21.4	8	6	104	35	28	18	38	28	69	5.5	22
	<b>25 [0.984]</b>	53	26	14	18	14	6	M10×1.25	19	10	5	26.4	10	8	109	40	30	20	42	32	69	5.5	24
	<b>32 [1.260]</b>	54	31	14	23	14	6	M10×1.25	22	11	6	33.6	12	10	115	45	36	24	54	42	70	6.6	28
	<b>40 [1.575]</b>	60	31	14	23	19	8	M14×1.5	22	13	6	41.6	16	14	121	45	44	28	68	52	76	9	34

●  $\phi 50, \phi 63$   
**DAB**   $\times$   -4



Bore mm (in.)	Code	U	BE	BF	BI	BP
	<b>50 [1.969]</b>	52	62	48	24	6.6
	<b>63 [2.480]</b>	65.4	74	58	29	9



# SLIM BLOCK SQUARE ROD CYLINDERS

## Symbol



## Specifications

Item	Bore size mm [in.]	20, 25 [0.787, 0.984]	32, 40 [1.260, 1.575]	50, 63 [1.969, 2.480]
Operation type	Double acting type			
Media	Air			
Mounting type	Side mount, Front mount			
Operating pressure range MPa [psi.]	0.1~0.9 [15~131]		0.05~0.7 [7~102]	
Proof pressure MPa [psi.]	1.32 [191]		1.03 [149]	
Operating temperature range °C [°F]	0~70 [32~158]			
Operating speed range mm/s [in./sec.]	50~700 [2.0~27.6]		50~500 [2.0~19.7]	
Cushion	Fixed type (Rubber bumper)		Variable type (Stroke 15mm [0.59in.])	
Lubrication	Not required			
Non-rotating accuracy	±1.5°		±1°	
Port size	Rc	1/8	1/4	

## Bore Size and Stroke

Bore size	Standard strokes	mm	
		Maximum stroke	Maximum available stroke
20	25 50 75 100 125 150	150	500
25			
32			
40	25 50 75 100 150	150	500
50			
63			

Remarks: 1. Stroke tolerance  $^{+1}_{0}$  [ $^{+0.039}_{0}$ in.]  
 2. For non-standard strokes, consult us.

## Order Codes

**DA** **BL** **50×100** - [ ] - [ ] - [ ] [ ] [ ]

**Block square rod cylinder**  
 Slim double acting cylinder

**Bore size × Stroke**  
 50 × 100

**Mounting type**  
 2 — Side mount  
 4 — Front mount

**Rod end accessory**  
 Blank — No rod end accessory  
 I — I type knuckle  
 Y — Y type knuckle (with pin)  
 ● For the cylinder joint and cylinder rod end, see p.1568.

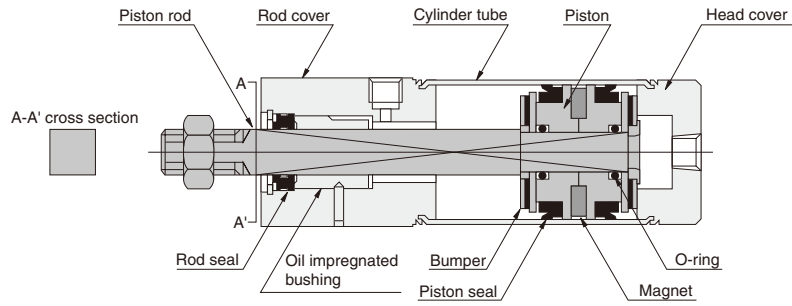
**Number of sensor switches**  
 1 — With 1 sensor switch  
 2 — With 2 sensor switches  
 3 — With 3 sensor switches  
 ⋮ — ⋮

**Lead wire length**  
 (Applies to all except **CS□F**)  
 A — 1000mm [39in.]  
 B — 3000mm [118in.]

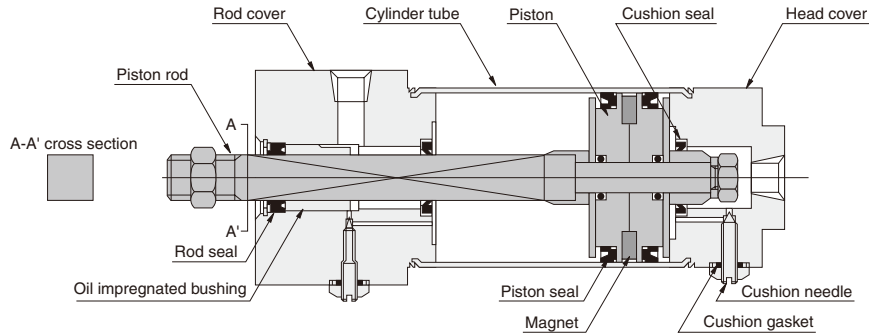
**Sensor switch (for cylinders with sensor switches)**  
 Blank — No sensor switch  
**ZG530** — 2-lead wire Solid state type with indicator lamp DC10~28V  
**ZG553** — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
**CS3M** — Reed switch type with indicator lamp DC10~30V  
**CS4M** — Reed switch type with indicator lamp AC85~230V  
**CS5M** — Reed switch type without indicator lamp DC10~30V  
**CS2F** — Reed switch type with indicator lamp AC85~115V  
**CS3F** — Reed switch type with indicator lamp DC3~30V  
**CS4F** — Reed switch type with indicator lamp AC85~230V  
**CS5F** — Reed switch type without indicator lamp DC10~30V  
 ● For details of sensor switches, see p.1544.  
 ● **CS□F** comes with DIN connector.  
 All others are grommet type.

# Inner Construction and Major Parts (cannot be disassembled)

●  $\phi 20 \sim \phi 40$



●  $\phi 50, \phi 63$



## Major parts and Materials

Parts	Bore size	20~40	50, 63
Cylinder tube		Stainless steel	
Piston		Plastic	
Piston rod		Steel (hard chrome plated)	
Rod cover		Aluminum (anodized)	
Head cover		Aluminum (anodized)	
Seal		Synthetic rubber (NBR)	
Bumper		Synthetic rubber (NBR)	—
Magnet		Plastic magnet	
I type knuckle		Mild steel (zinc plated)	
Y type knuckle		Mild steel (zinc plated)	

## Mass

Bore size mm [in.]	Zero stroke mass		Additional mass for each 1mm [0.0394in.] stroke
	Side mount	Front mount	
20 [0.787]	0.15 [0.33]	0.14 [0.31]	0.0008 [0.0018]
25 [0.984]	0.21 [0.46]	0.18 [0.40]	0.0009 [0.0020]
32 [1.260]	0.40 [0.88]	0.33 [0.73]	0.0014 [0.0031]
40 [1.575]	0.66 [1.46]	0.49 [1.08]	0.0021 [0.0046]
50 [1.969]	1.15 [2.54]	0.90 [1.98]	0.0027 [0.0060]
63 [2.480]	1.62 [3.57]	1.26 [2.78]	0.0032 [0.0071]

Calculation example: For the mass of side mount type of 40mm bore size and 100mm stroke  
 $0.066 + (0.0021 \times 100) = 0.87\text{kg} [1.92\text{lb.}]$

## Seals

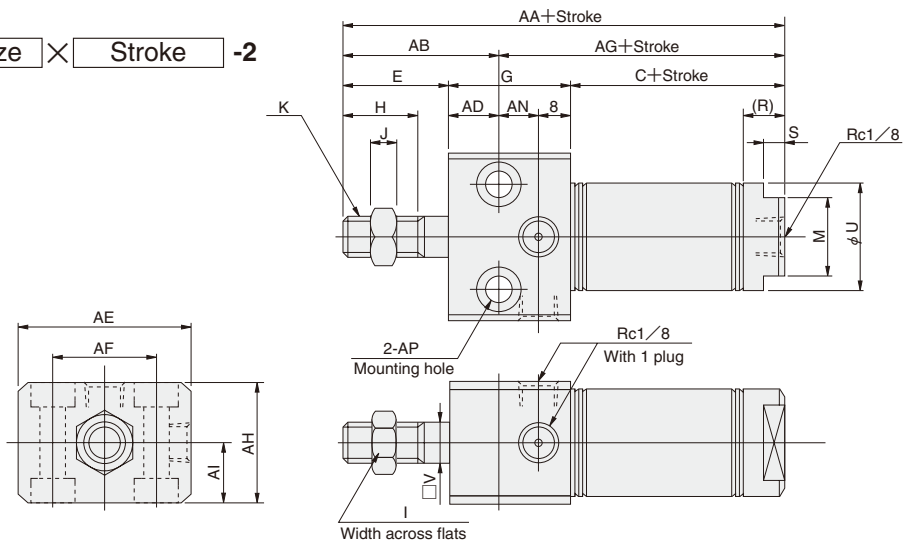
Note: Seals cannot be replaced.

Parts	Rod seal	Piston seal	Cushion seal	Cushion gasket
Bore mm	Quantity	1	2	2
20		KC-7.4	PPY-20	—
25		KC-7.4	PPY-25	—
32		KC-10	PPY-32	—
40		KC-13	PPY-40	—
50		KC-13	PGY-50	PCS-20
63		KC-13	PGY-63	PCS-20

# Dimensions of Block Square Rod, Side Mounting Type (mm)

●  $\phi 20 \sim \phi 40$

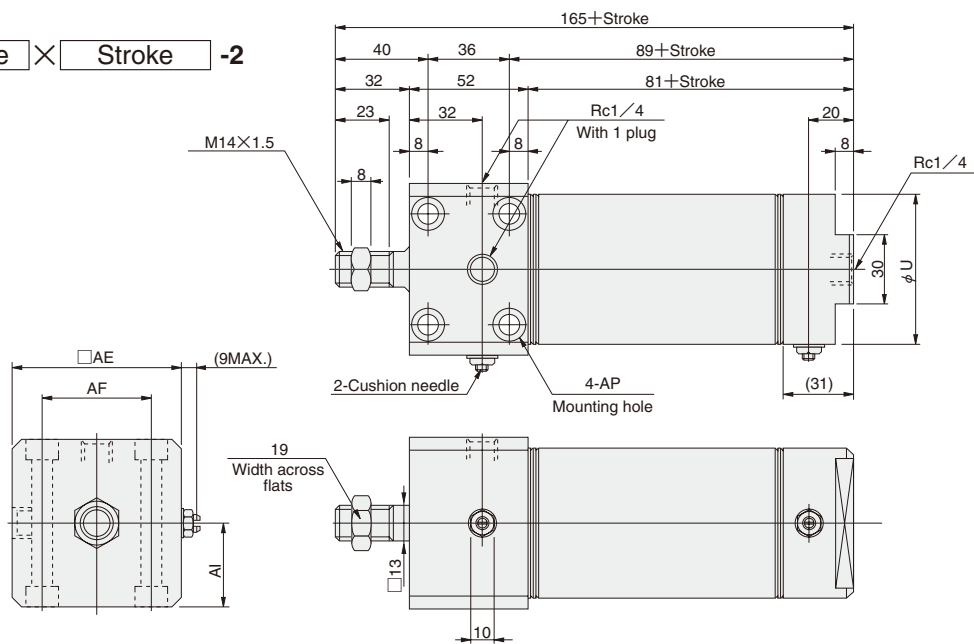
DABL Bore size  $\times$  Stroke -2



Bore mm [in.]	Code	C	E	G	H	I	J	K	M	R	S	U	$\square$ V	AA	AB	AD	AE	AF	AG	AH	AI	AN	AP
20	[0.787]	53	23	28	15	12	5	M8 $\times$ 1	17	10	5	21.4	7.4	104	34	11	38	22	70	28	14	9	$\phi$ 6.6 2-Counterbore $\phi$ 11 Depth6.5
25	[0.984]	53	26	30	18	14	6	M8 $\times$ 1	19	10	5	26.4	7.4	109	38	12	42	26	71	30	15	10	$\phi$ 6.6 2-Counterbore $\phi$ 11 Depth6.5
32	[1.260]	54	31	36	23	14	6	M10 $\times$ 1.25	22	11	6	33.6	10	121	45	14	54	34	76	36	18	14	$\phi$ 9 2-Counterbore $\phi$ 14 Depth8.6
40	[1.575]	60	31	44	23	19	8	M14 $\times$ 1.5	22	13	6	41.6	13	135	48	17	68	46	87	44	22	19	$\phi$ 11 2-Counterbore $\phi$ 17.5 Depth10.8

●  $\phi 50, \phi 63$

DABL Bore size  $\times$  Stroke -2

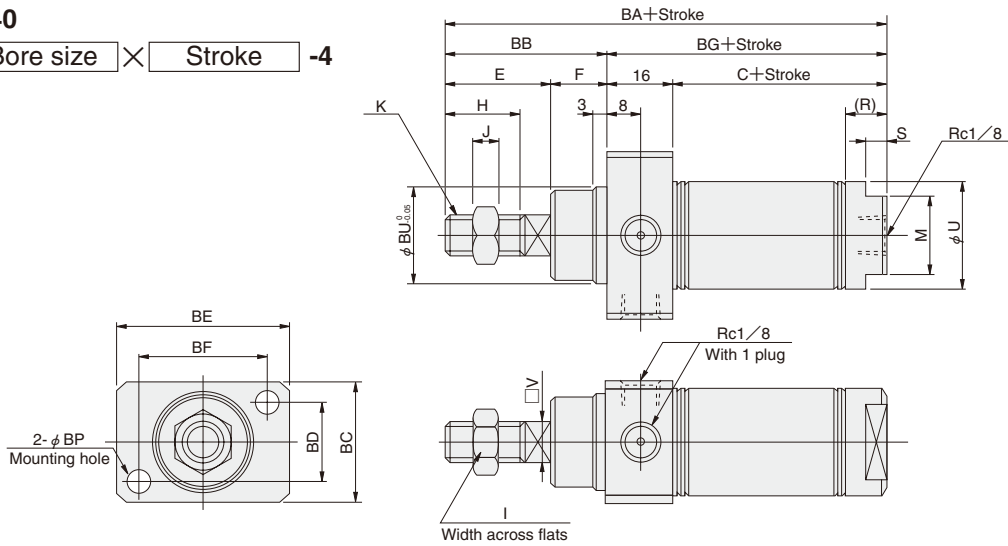


Bore mm [in.]	Code	U	AE	AF	AI	AP
50	[1.969]	52	62	44	31	$\phi$ 6.6 2-Counterbore $\phi$ 11 Depth6.5
63	[2.480]	65.4	74	48	37	$\phi$ 9 2-Counterbore $\phi$ 14 Depth8.6

# Dimensions of Block Square Rod, Front Mounting Type (mm)

●  $\phi 20 \sim \phi 40$

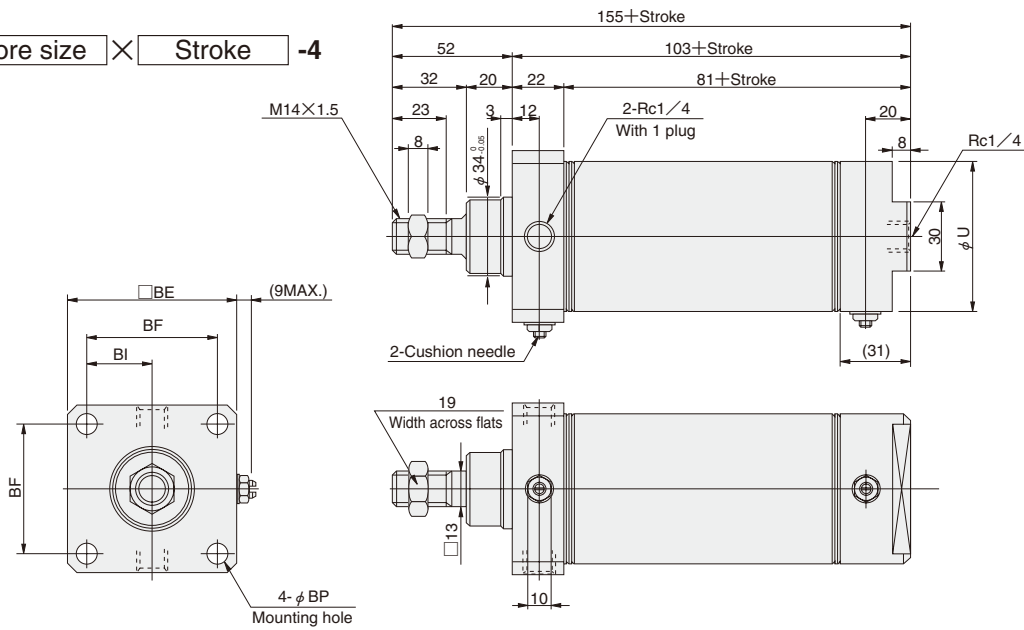
DABL Bore size  $\times$  Stroke -4



Bore mm [in.]	Code	C	E	F	H	I	J	K	M	R	S	U	V	BA	BB	BC	BD	BE	BF	BG	BP	BU
20	[0.787]	53	23	12	15	12	5	M8×1	17	10	5	21.4	7.4	104	35	28	18	38	28	69	5.5	22
25	[0.984]	54	26	14	18	14	6	M8×1	19	10	5	26.4	7.4	109	40	30	20	42	32	69	5.5	24
32	[1.260]	54	31	14	23	14	6	M10×1.25	22	11	6	33.6	10	115	45	36	24	54	42	70	6.6	28
40	[1.575]	60	31	14	23	19	8	M14×1.5	22	13	6	41.6	13	121	45	44	28	68	52	76	9	34

●  $\phi 50, \phi 63$

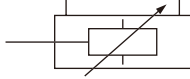
DABL Bore size  $\times$  Stroke -4



Bore mm [in.]	Code	U	BE	BF	BI	BP
50	[1.969]	52	62	48	24	6.6
63	[2.480]	65.4	74	58	29	9

# SLIM BLOCK CYLINDERS WITH VARIABLE CUSHION

## Symbol



## Specifications

Item	Bore size mm [in.]	16 [0.630]	20, 25 [0.787, 0.984]	32, 40 [1.260, 1.575]
Operation type		Double acting type		
Media		Air		
Mounting type		Side mount, Front mount		
Operating pressure range MPa [psi.]		0.15~0.9 [22~131]	0.1~0.9 [15~131]	
Proof pressure MPa [psi.]		1.32 [191]		
Operating temperature range °C [°F]		0~70 [32~158]		
Operating speed range mm/s [in./sec.]		30~1000 [1.2~39.4]		
Cushion stroke mm [in.]		9 [0.35]	12 [0.47]	
Lubrication		Not required		
Port size	Rc	1/8		

## Bore Size and Stroke

Bore size	Standard strokes		Maximum available stroke
	mm		
16	25 50 75 100	200	
20	25 50 75 100 125 150	500	
25	25 50 75 100 125 150 200		
32	25 50 75 100 125 150 200 250 300		
40	25 50 75 100 125 150 200 250 300		

Remarks: 1. Stroke tolerance  ${}^+{}_0\left[{}^+{}_{0}{}^{+0.039\text{in.}}\right]$   
 2. For non-standard strokes, consult us.

## Order Codes

**DA** **BC** **20×100** — [ ] — [ ] — [ ] [ ] [ ]

**Block cylinder with variable cushion**

**Bore size × Stroke**

**Rod end accessory**  
**Blank** — No rod end accessory  
**I** — I type knuckle  
**Y** — Y type knuckle (with pin)  
 ● For the cylinder joint and cylinder rod end, see p.1568.

**Mounting type**  
**2** — Side mount  
**4** — Front mount

**Number of sensor switches**  
**1** — With 1 sensor switch  
**2** — With 2 sensor switches  
**3** — With 3 sensor switches  
 ⋮

**Lead wire length**  
 (Applies to all except **CS□F**)  
**A** — 1000mm [39in.]  
**B** — 3000mm [118in.]

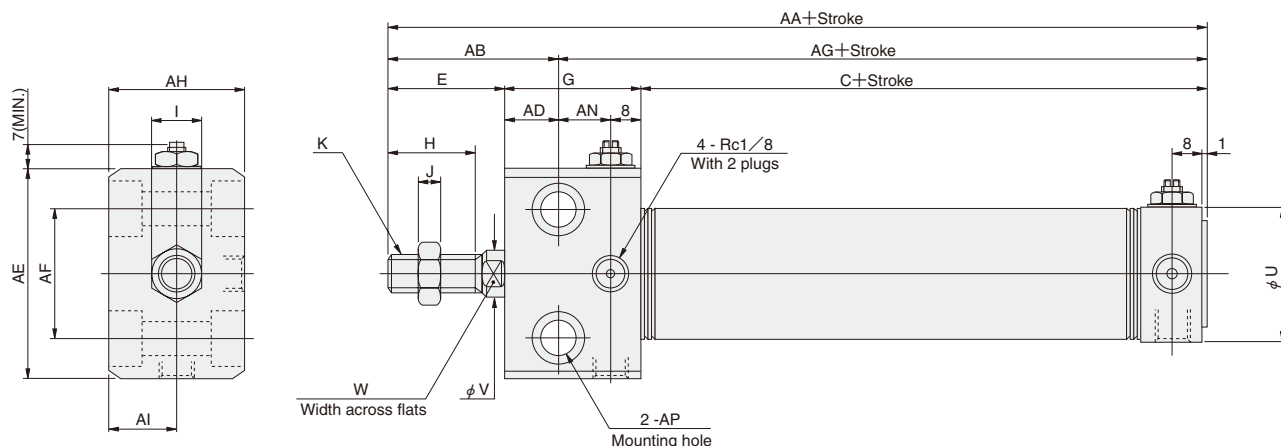
**Sensor switch** (for cylinders with sensor switches)  
**Blank** — No sensor switch  
**ZG530** — 2-lead wire Solid state type with indicator lamp DC10~28V  
**ZG553** — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
**CS3M** — Reed switch type with indicator lamp DC10~30V  
**CS4M** — Reed switch type with indicator lamp AC85~230V  
**CS5M** — Reed switch type without indicator lamp DC10~30V  
**CS2F** — Reed switch type with indicator lamp AC85~115V  
**CS3F** — Reed switch type with indicator lamp DC3~30V  
**CS4F** — Reed switch type with indicator lamp AC85~230V  
**CS5F** — Reed switch type without indicator lamp DC10~30V  
 DC3~30V

● For details of sensor switches, see p.1544.  
 ● **CS□F** comes with DIN connector. (It is not possible to install on φ 16.) All others are grommet type.

**Slim double acting cylinder**

## Dimensions of Block Cylinder with Variable Cushion, Side Mounting Type (mm)

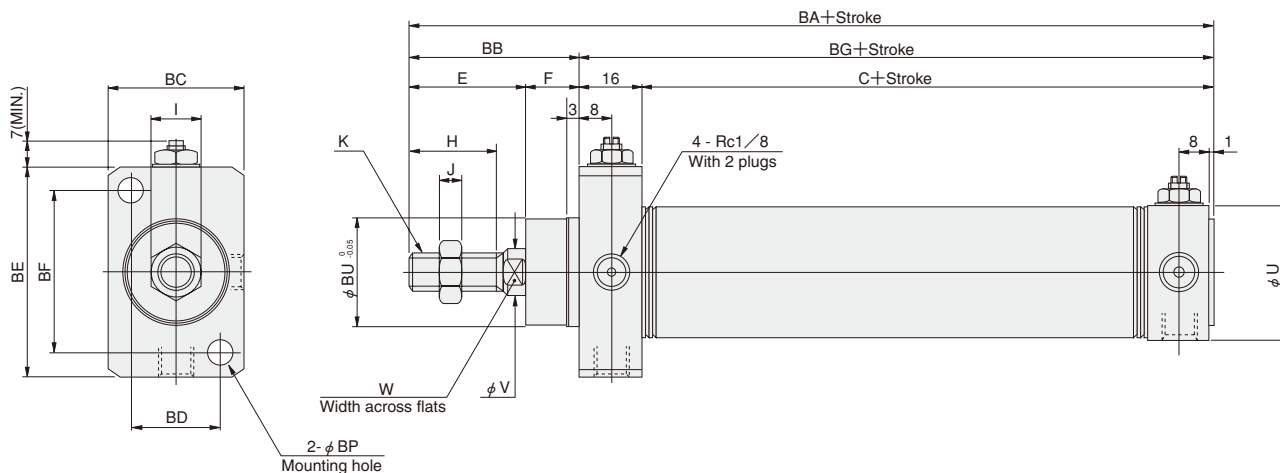
●  $\phi 16 \sim \phi 40$  DABC Bore size   $\times$  Stroke  -2



Bore mm (in.)	Code	C	E	G	H	I	J	K	U	V	W	AA	AB	AD	AE	AF	AG	AH	AI	AP		AN
16 [0.630]	53	20	25	15	10	5	5	M6×1	22	6	—	98	28	8	30	16	70	24	12	$\phi 4.5$ Counterbore $\phi 8$ Depth4.5	9	
20 [0.787]	61	23	28	15	12	5	5	M8×1	27	8	6	112	34	11	38	22	78	28	14	$\phi 6.6$ Counterbore $\phi 11$ Depth6.5	9	
25 [0.984]	61	26	30	18	14	6	6	M10×1.25	29	10	8	117	38	12	42	26	79	30	15	$\phi 6.6$ Counterbore $\phi 11$ Depth6.5	10	
32 [1.260]	61	31	36	23	14	6	6	M10×1.25	35	12	10	128	45	14	54	34	83	36	18	$\phi 9$ Counterbore $\phi 14$ Depth8.6	14	
40 [1.575]	63	31	44	23	19	8	8	M14×1.5	41.6	16	14	138	48	17	68	46	90	44	22	$\phi 11$ Counterbore $\phi 17.5$ Depth10.8	19	

## Dimensions of Block Cylinder with Variable Cushion, Front Mounting Type (mm)

●  $\phi 16 \sim \phi 40$  DABC Bore size   $\times$  Stroke  -4



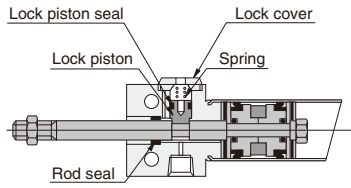
Bore mm (in.)	Code	C	E	F	H	I	J	K	U	V	W	BA	BB	BC	BD	BE	BF	BG	BP	BU
16 [0.630]	53	20	9	15	10	5	5	M6×1	22	6	—	98	29	24	16	30	22	69	4.5	18
20 [0.787]	61	23	12	15	12	5	5	M8×1	27	8	6	112	35	28	18	38	28	77	5.5	22
25 [0.984]	61	26	14	18	14	6	6	M10×1.25	29	10	8	117	40	30	20	42	32	77	5.5	24
32 [1.260]	61	31	14	23	14	6	6	M10×1.25	35	12	10	122	45	36	24	54	42	77	6.6	28
40 [1.575]	63	31	14	23	19	8	8	M14×1.5	41.6	16	14	124	45	44	28	68	52	79	9	34



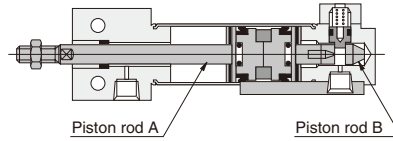
# Inner Construction and Major Parts (cannot be disassembled)

●  $\phi$  16

● Rod side end keep

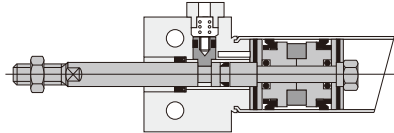


● Head side end keep

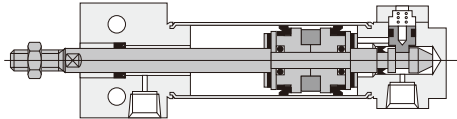


●  $\phi$  20,  $\phi$  25

● Rod side end keep



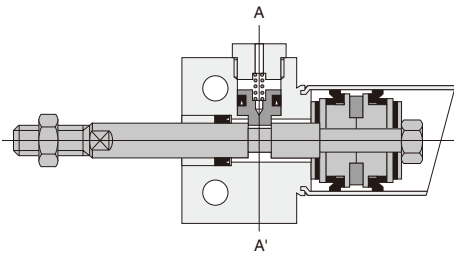
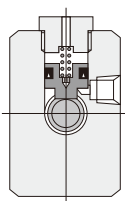
● Head side end keep



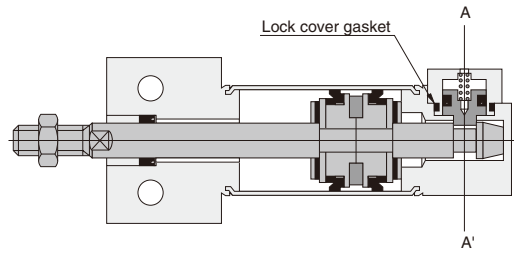
●  $\phi$  32,  $\phi$  40

● Rod side end keep

A-A' cross section



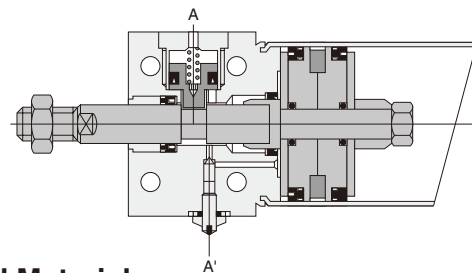
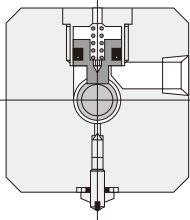
● Head side end keep



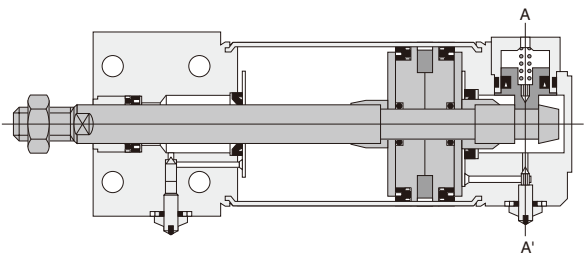
●  $\phi$  50,  $\phi$  63

● Rod side end keep

A-A' cross section



● Head side end keep



## Major Parts and Materials

Parts	Bore size		
	16	20, 25	32, 40, 50, 63
Piston rod A	Stainless steel (hard chrome plated)	Steel (hard chrome plated)	
Piston rod B	Stainless steel	Steel (zinc plated)	
Spring	Stainless steel		Piano wire
Lock piston	Stainless steel		
Lock cover	Stainless steel	Aluminum (anodized)	
Y type knuckle, I type knuckle	Mild steel (zinc plated)		

Other than the items listed above, it is the same as for the standard Slim Cylinder.

## Seals

Note: Seals cannot be replaced.

Parts	Rod seal	Lock piston seal	Lock cover gasket
	Quantity	1	1
Bore mm	1	1	1
16	—	MYN-5	O-ring (Special dimensions)
20	GYH-9	MYN-5	—
25	GYH-11	MYN-5	—
32	—	MYN-10A	S18
40	—	MYN-10A	S18
50	—	MYN-16	S22.4
63	—	MYN-16	S22.4

Other than the items listed above, it is the same as for the standard Slim Cylinder.

## Mass

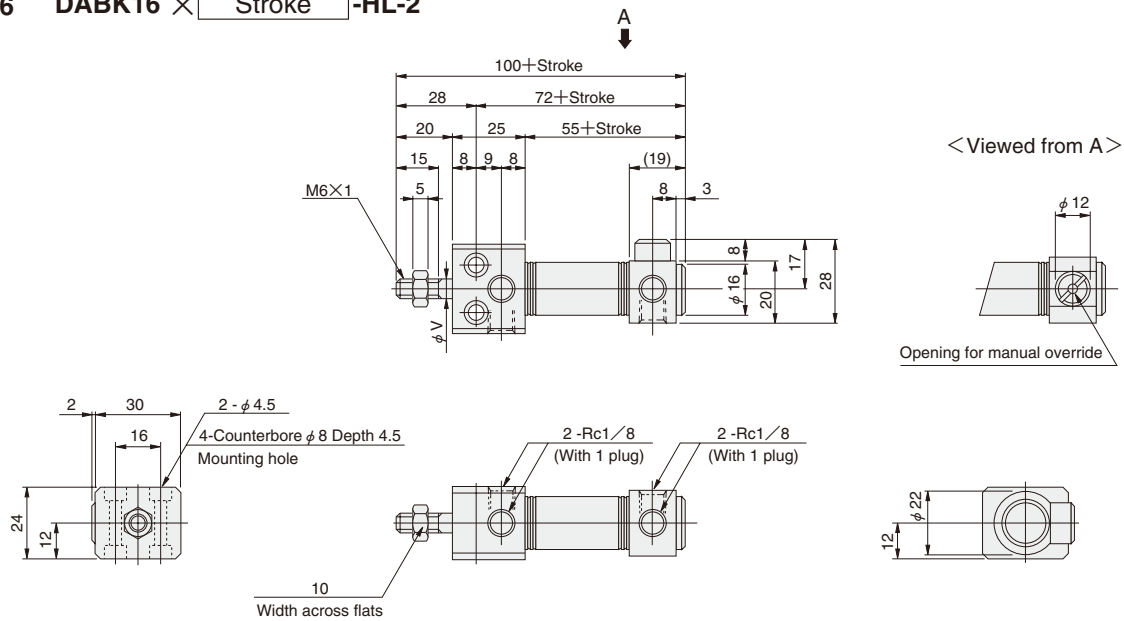
Bore size mm [in.]	Zero stroke mass				Additional mass for each 1mm [0.0394in.] stroke	Mass of knuckle	
	-HL : Head side end keep		-RL : Rod side end keep			Y type knuckle	I type knuckle
	Side mount	Front mount	Side mount	Front mount			
16 [0.630]	0.11 [0.24]	0.10 [0.22]	0.10 [0.22]	0.09 [0.20]	0.0005 [0.0011]	0.017 [0.037]	0.020 [0.044]
20 [0.787]	0.18 [0.40]	0.17 [0.37]	0.17 [0.37]	0.16 [0.35]	0.0008 [0.0018]	0.042 [0.093]	0.035 [0.077]
25 [0.984]	0.25 [0.55]	0.23 [0.51]	0.24 [0.53]	0.22 [0.49]	0.0011 [0.0024]	0.075 [0.165]	0.070 [0.154]
32 [1.260]	0.39 [0.86]	0.36 [0.79]	0.38 [0.84]	0.35 [0.77]	0.0015 [0.0033]		
40 [1.575]	0.70 [1.54]	0.67 [1.48]	0.68 [1.50]	0.65 [1.43]	0.0024 [0.0053]	0.122 [0.269]	0.132 [0.291]
50 [1.969]	1.22 [2.69]	1.17 [2.58]	1.20 [2.65]	1.14 [2.51]	0.0029 [0.0064]		
63 [2.480]	1.69 [3.73]	1.30 [2.87]	1.67 [3.68]	1.28 [2.82]	0.0035 [0.0077]		

Calculation example: For head side end keep side mount type of 32mm bore size and 100mm stroke,  $0.39 + (0.0015 \times 100) = 0.54\text{kg}$  [1.19lb.]

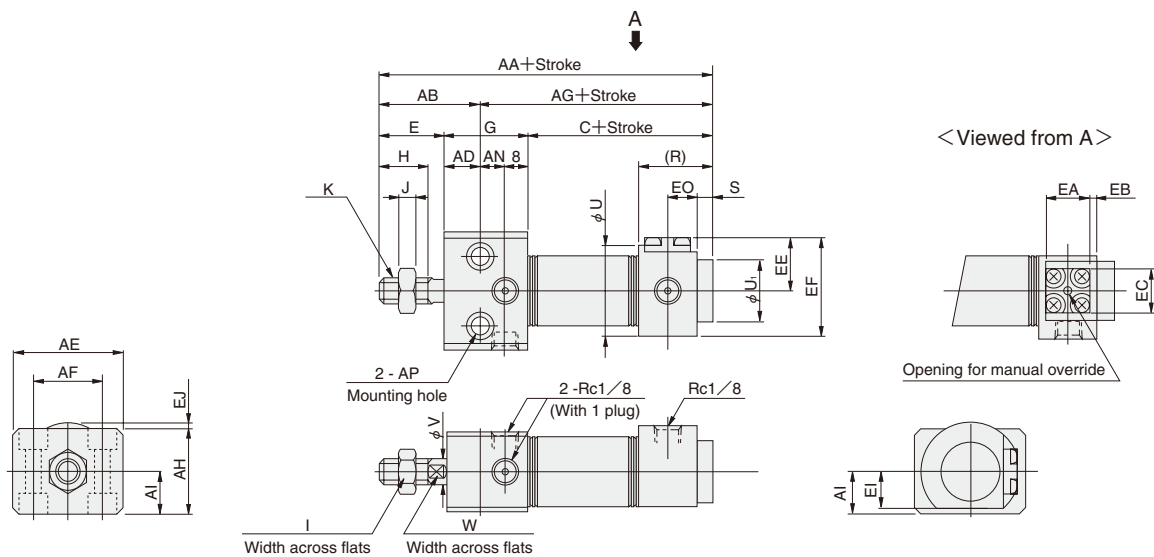


# -HL Dimensions of Head Side End Keep, Side Mounting Type (mm)

## ● $\phi 16$ DABK16 $\times$ -HL-2



## ● $\phi 20 \sim \phi 40$ DABK $\times$ -HL-2



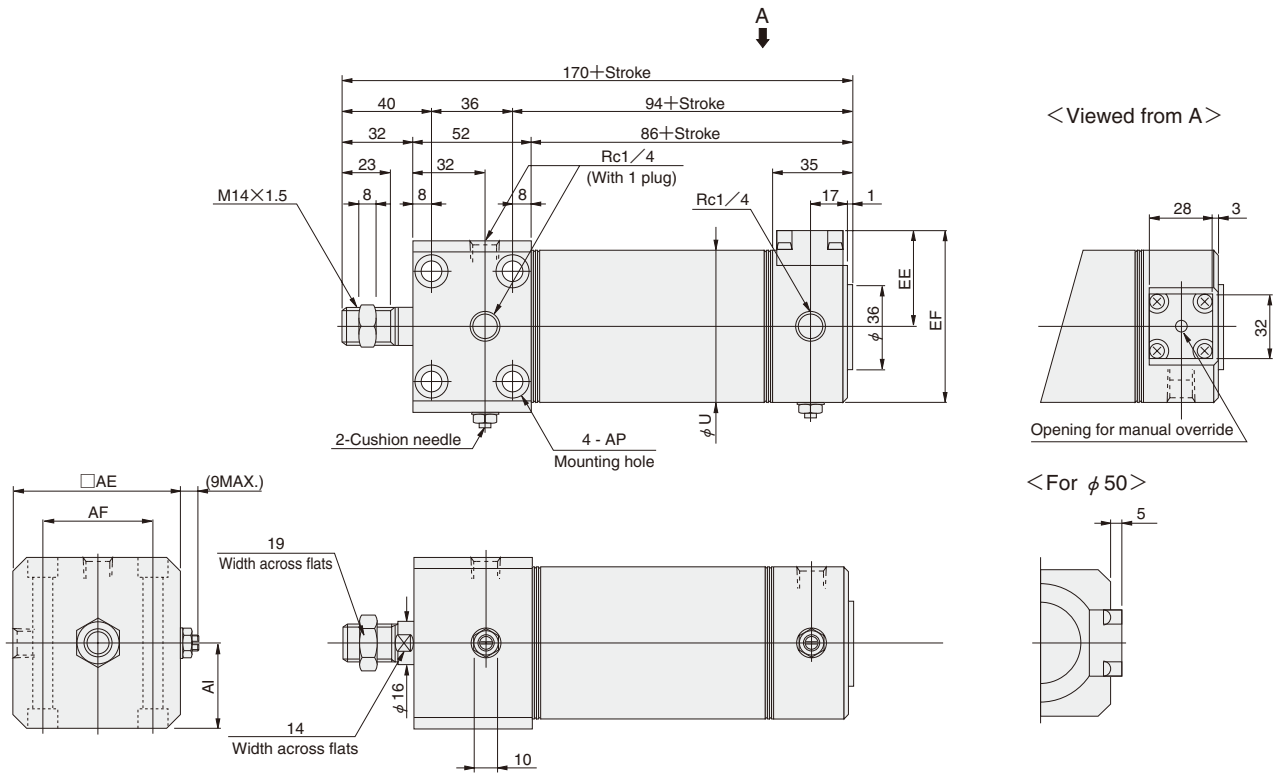
● The drawing is for the  $\phi 20$  and  $\phi 25$ . (Contour dimensions of the  $\phi 32$  and  $\phi 40$  head covers are smaller than the block portion.)

Bore mm [in.]	Code	C	E	G	H	I	J	K	R	S	U	U <sub>1</sub>	V	W
20 [0.787]		66	23	28	15	12	5	M8×1	22	6		20	8	6
25 [0.984]		66	26	30	18	14	6	M10×1.25	22	6	29	22	10	8
32 [1.260]		73	31	36	23	14	6	M10×1.25	27	1		27	12	10
40 [1.575]		80	31	44	23	19	8	M14×1.5	32	1	35	33	16	14

Bore mm [in.]	Code	AA	AB	AD	AE	AF	AG	AH	AI	AN	AP	EA	EB	EC	EE	EF	EI	EJ	EO
20 [0.787]		117	34	11	38	22	83	28	14	9	φ 6.6 Counterbore φ 11 Depth 6.5	16	—	16	17.5	32	12.5	0.5	8
25 [0.984]		122	38	12	42	26	84	30	15	10	φ 6.6 Counterbore φ 11 Depth 6.5	16	—	16	18.5	36	13.5	2.5	8
32 [1.260]		140	45	14	54	34	95	36	18	14	φ 9 Counterbore φ 14 Depth 8.6	24	2	25	22.5	40.5	17.5	—	14
40 [1.575]		155	48	17	68	46	107	44	22	19	φ 11 Counterbore φ 17.5 Depth 10.8	24	4	25	25.5	46	21	—	16

# -HL Dimensions of Head Side End Keep, Side Mounting Type (mm)

●  $\phi 50$ ,  $\phi 63$  DABK  ×  -HL-2

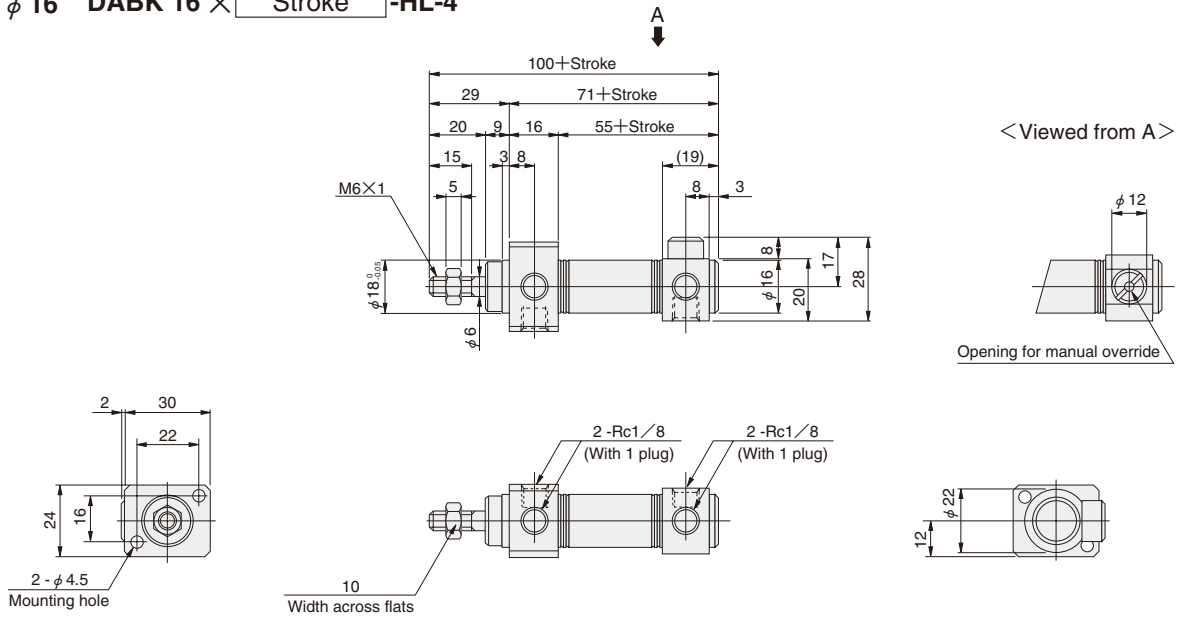


SLIM CYLINDERS

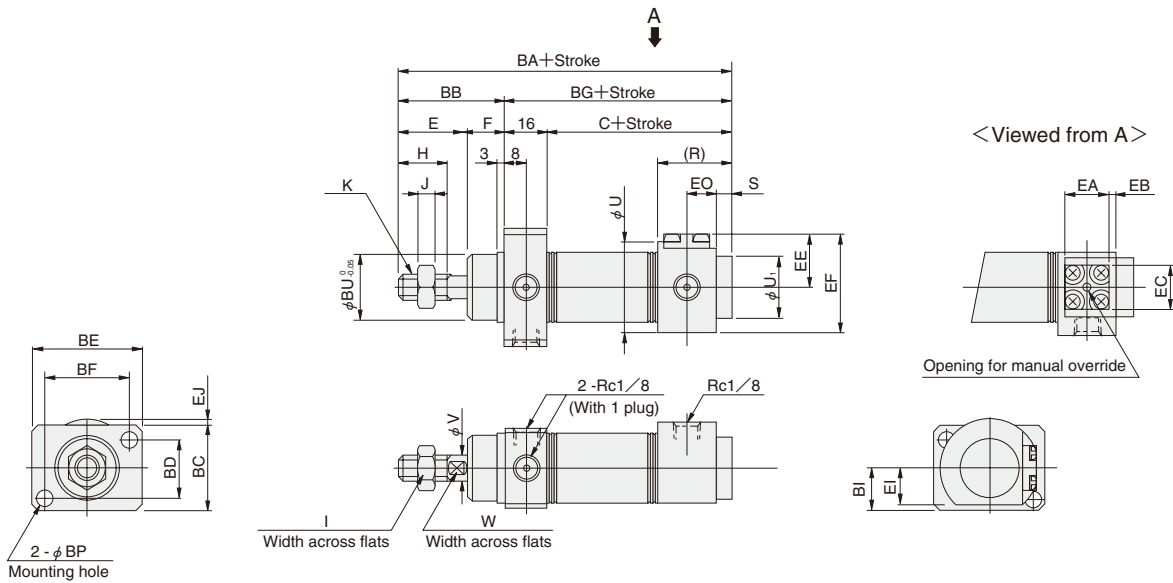
Bore mm [in.]	Code	U	AE	AF	AI	AP	EE	EF
50 [1.969]		52	62	44	31	$\phi 6.6$ Counterbore $\phi 11$ Depth 6.5	35.5	61.5
63 [2.480]		65.4	74	48	37	$\phi 9$ Counterbore $\phi 14$ Depth 8.6	35.5	68.5

# -HL Dimensions of Head Side End Keep, Front Mounting Type (mm)

## ● $\phi 16$ DABK 16 $\times$ -HL-4



## ● $\phi 20 \sim \phi 40$ DABK $\times$ -HL-4



● The drawing is for the  $\phi 20$  and  $\phi 25$ . (Contour dimensions of the  $\phi 32$  and  $\phi 40$  head covers are smaller than the block portion.)

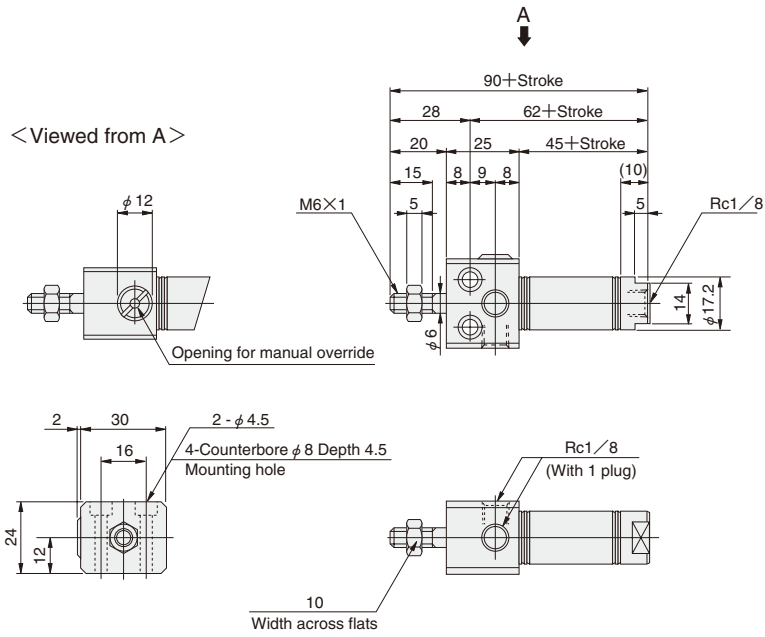
Code	C	E	F	H	I	J	K	R	S	U	U <sub>1</sub>	V	W
20 [0.787]	66	23	12	15	12	5	M8×1	22	6		20	8	6
25 [0.984]	66	26	14	18	14	6	M10×1.25	22	6	29	22	10	8
32 [1.260]	73	31	14	23	14	6	M10×1.25	27	1		27	12	10
40 [1.575]	80	31	14	23	19	8	M14×1.5	32	1	35	33	16	14

Code	BA	BB	BC	BD	BE	BF	BG	BI	BP	BU	EA	EB	EC	EE	EF	EI	EJ	EO
20 [0.787]	117	35	28	18	38	28	82	14	5.5	22	16	—	16	17.5	32	12.5	0.5	8
25 [0.984]	122	40	30	20	42	32	82	15	5.5	24	16	—	16	18.5	36	13.5	2.5	8
32 [1.260]	134	45	36	24	54	42	89	18	6.6	28	24	2	25	22.5	40.5	17.5	—	14
40 [1.575]	141	45	44	28	68	52	96	22	9	34	24	4	25	25.5	46	21	—	16

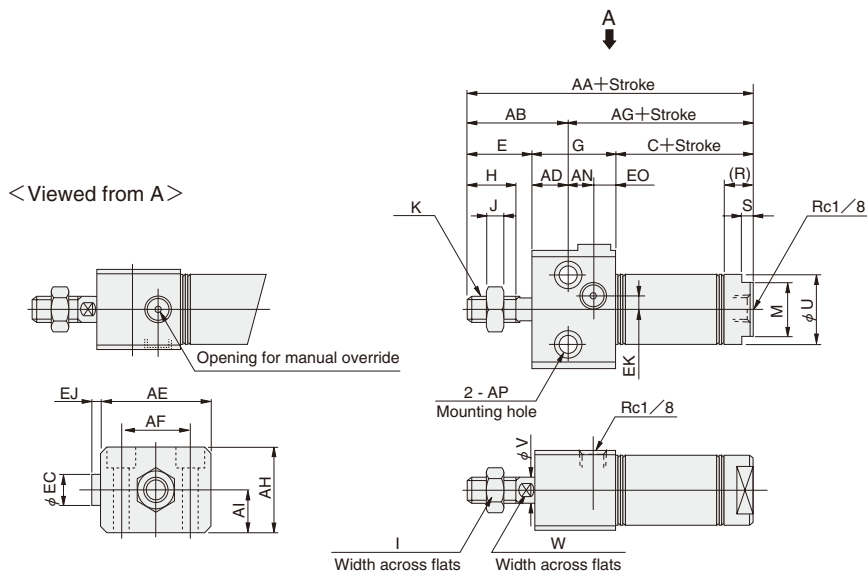


# -RL Dimensions of Rod Side End Keep, Side Mounting Type (mm)

●  $\phi 16$  DABK16  $\times$  Stroke -RL-2



●  $\phi 20 \sim \phi 40$  DABK Bore size  $\times$  Stroke -RL-2



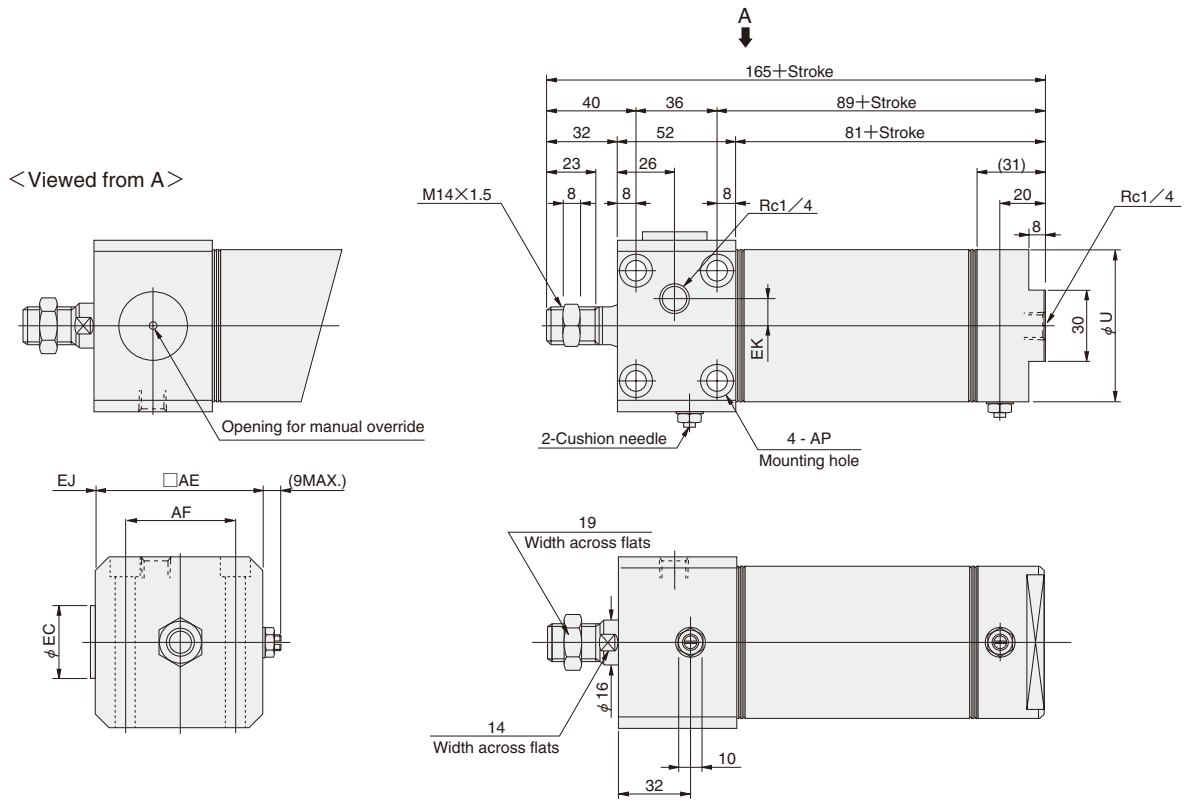
● The drawing is for the  $\phi 20$  and  $\phi 25$ . (Contour dimensions of the  $\phi 32$  and  $\phi 40$  head covers are smaller than the block portion.)

Bore mm [in.]	Code	C	E	G	H	I	J	K	M	R	S	U	V	W
20	[0.787]	53	23	28	15	12	5	M8×1	17	10	5	21.4	8	6
25	[0.984]	53	26	30	18	14	6	M10×1.25	19	10	5	26.4	10	8
32	[1.260]	54	31	36	23	14	6	M10×1.25	22	11	6	33.6	12	10
40	[1.575]	60	31	50	23	19	8	M14×1.5	22	13	6	41.6	16	14

Bore mm [in.]	Code	AA	AB	AD	AE	AF	AG	AH	AI	AN	AP	EC	EJ	EK	EO
20	[0.787]	104	34	11	38	22	70	28	14	9	$\phi 6.6$ Counterbore $\phi 11$ Depth6.5	12	4	0	8
25	[0.984]	109	38	12	42	26	71	30	15	10	$\phi 6.6$ Counterbore $\phi 11$ Depth6.5	12	3	0	8
32	[1.260]	121	42	11	54	34	79	36	18	14	$\phi 9$ Counterbore $\phi 14$ Depth8.6	17.5	5	7.5	11
40	[1.575]	141	48	17	68	46	93	44	22	19	$\phi 11$ Counterbore $\phi 17.5$ Depth10.8	—	0	10	14

# -RL Dimensions of Rod Side End Keep, Side Mounting Type (mm)

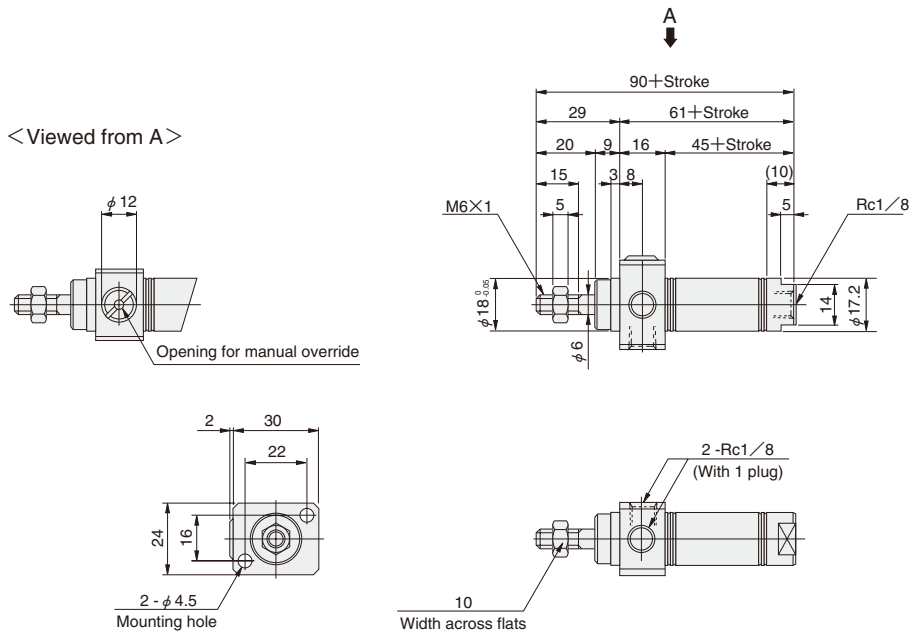
●  $\phi 50$ ,  $\phi 63$  DABK Bore size  $\times$  Stroke -RL-2



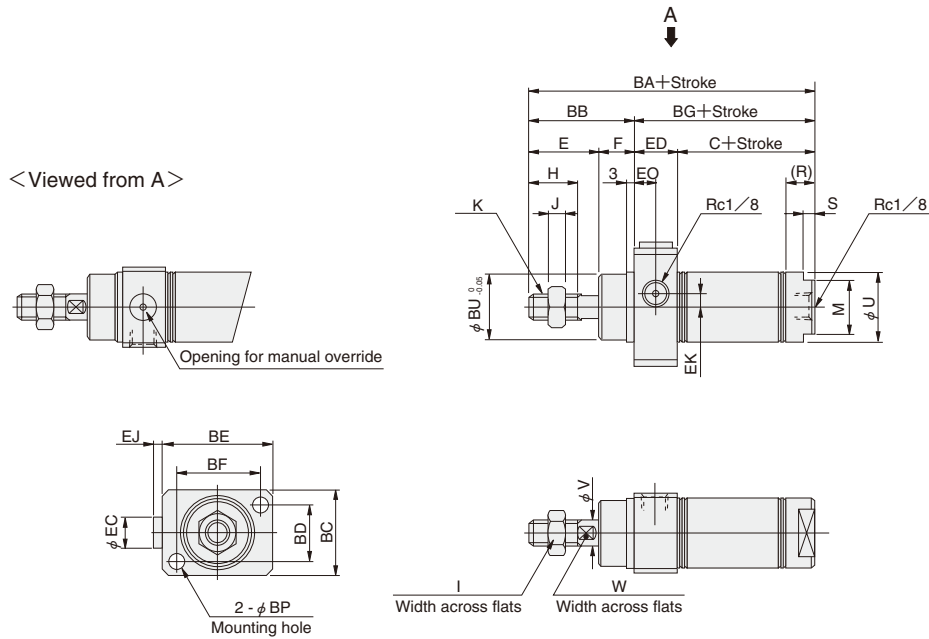
Bore mm [in.]	Code	U	AE	AF	AP	EC	EJ	EK
50 [1.969]		52	62	44	$\phi 6.6$ Counterbore $\phi 11$ Depth 6.5	30	6	10
63 [2.480]		65.4	74	48	$\phi 6.6$ Counterbore $\phi 11$ Depth 6.5	—	0	10

# -RL Dimensions of Rod Side End Keep, Front Mounting Type (mm)

●  $\phi 16$  DABK16  $\times$  Stroke -RL-4



●  $\phi 20 \sim \phi 40$  DABK Bore size  $\times$  Stroke -RL-4



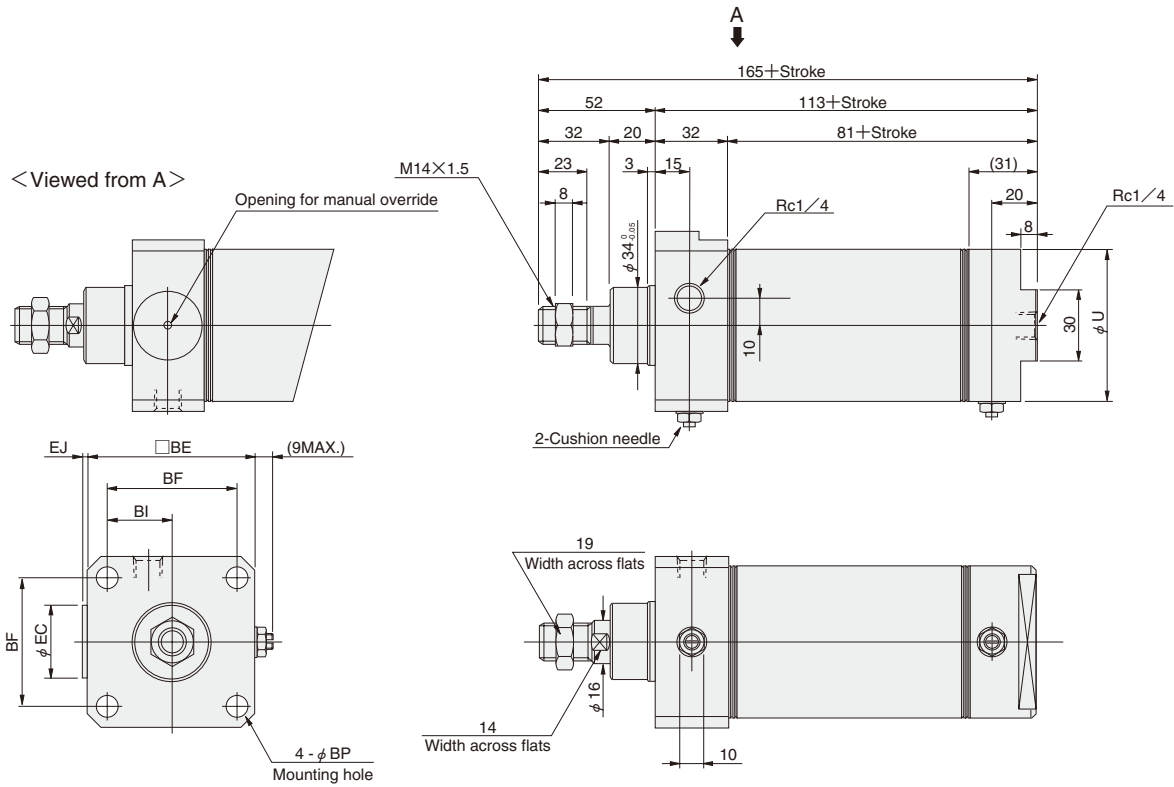
● The drawing is for the  $\phi 20$  and  $\phi 25$ . (Contour dimensions of the  $\phi 32$  and  $\phi 40$  head covers are smaller than the block portion.)

Bore mm [in.]	Code	C	E	F	H	I	J	K	M	R	S	U	V	W
20 [0.787]		53	23	12	15	12	5	M8×1	17	10	5	21.4	8	6
25 [0.984]		53	26	14	18	14	6	M10×1.25	19	10	5	26.4	10	8
32 [1.260]		54	31	14	23	14	6	M10×1.25	22	11	6	33.6	12	10
40 [1.575]		60	31	14	23	19	8	M14×1.5	22	13	6	41.6	16	14

Bore mm [in.]	Code	BA	BB	BC	BD	BE	BF	BG	BP	BU	EC	ED	EJ	EK	EO
20 [0.787]		104	35	28	18	38	28	69	5.5	22		16	4	0	8
25 [0.984]		109	40	30	20	42	32	69	5.5	24	12	16	3	0	8
32 [1.260]		124	45	36	24	54	42	79	6.6	28		25	5	7.5	11
40 [1.575]		131	45	44	28	68	52	86	9	34	12	26	0	10	14

# -RL Dimensions of Rod Side End Keep, Front Mounting Type (mm)

●  $\phi$  50,  $\phi$  63 DABK  ×  -RL-4



Bore mm [in.]	Code	U	BE	BF	BI	BP	EC	EJ
50 [1.969]		52	62	48	24	6.6	30	6
63 [2.480]		65.4	74	58	29	9	—	0

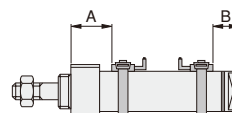
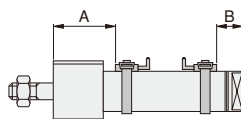


## Mounting Location of Sensor Switch

When the sensor switch is mounted in the location shown in the diagram (figures in the tables are reference values), the magnet comes to the sensor switch's maximum sensing location at the end of the stroke.

● Block cylinder, side mount

● Block cylinder, front mount



### ●-HL : Head side end keep

mm [in.]

Sensor switch model	Bore size Code	Block cylinder													
		Side mount						Front mount							
		16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]
ZG530□	A	32 [1.260]	39 [1.535]	41 [1.614]	47 [1.850]	57 [2.244]	66 [2.598]	66 [2.598]	23 [0.906]	27 [1.063]	27 [1.063]	27 [1.063]	29 [1.142]	36 [1.417]	36 [1.417]
	B	26 [1.024]	27 [1.063]	27 [1.063]	39 [1.535]	44 [1.732]	47 [1.850]	47 [1.850]	26 [1.024]	27 [1.063]	39 [1.535]	39 [1.535]	44 [1.732]	47 [1.850]	47 [1.850]
CS□M	A	32 [1.260]	39 [1.535]	41 [1.614]	47 [1.850]	57 [2.244]	66 [2.598]	66 [2.598]	23 [0.906]	27 [1.063]	27 [1.063]	27 [1.063]	29 [1.142]	36 [1.417]	36 [1.417]
	B	26 [1.024]	27 [1.063]	27 [1.063]	39 [1.535]	44 [1.732]	47 [1.850]	47 [1.850]	26 [1.024]	27 [1.063]	39 [1.535]	39 [1.535]	44 [1.732]	47 [1.850]	47 [1.850]
CS□F	A	—	36 [1.417]	38 [1.496]	44 [1.732]	54 [2.126]	64 [2.520]	64 [2.520]	—	24 [0.945]	24 [0.945]	24 [0.945]	26 [1.024]	34 [1.339]	34 [1.339]
	B	—	24 [0.945]	24 [0.945]	38 [1.496]	41 [1.614]	46 [1.811]	46 [1.811]	—	24 [0.945]	38 [1.496]	38 [1.496]	41 [1.614]	46 [1.811]	46 [1.811]

### ●-RL : Rod side end keep

mm [in.]

Sensor switch model	Bore size Code	Block cylinder													
		Side mount						Front mount							
		16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]
ZG530□	A	32 [1.260]	39 [1.535]	41 [1.614]	47 [1.850]	63 [2.480]	66 [2.598]	66 [2.598]	23 [0.906]	27 [1.063]	27 [1.063]	36 [1.417]	39 [1.535]	46 [1.811]	46 [1.811]
	B	16 [0.630]	20 [0.787]	20 [0.787]	21 [0.827]	25 [0.984]	44 [1.732]	44 [1.732]	16 [0.630]	20 [0.787]	20 [0.787]	21 [0.827]	25 [0.984]	44 [1.732]	44 [1.732]
CS□M	A	32 [1.260]	39 [1.535]	41 [1.614]	47 [1.850]	63 [2.480]	66 [2.598]	66 [2.598]	23 [0.906]	27 [1.063]	27 [1.063]	36 [1.417]	39 [1.535]	46 [1.811]	46 [1.811]
	B	16 [0.630]	20 [0.787]	20 [0.787]	21 [0.827]	25 [0.984]	44 [1.732]	44 [1.732]	16 [0.630]	20 [0.787]	20 [0.787]	21 [0.827]	25 [0.984]	44 [1.732]	44 [1.732]
CS□F	A	—	36 [1.417]	38 [1.496]	44 [1.732]	60 [2.362]	64 [2.520]	64 [2.520]	—	24 [0.945]	24 [0.945]	27 [1.063]	36 [1.417]	44 [1.732]	44 [1.732]
	B	—	17 [0.669]	17 [0.669]	18 [0.709]	20 [0.787]	42 [1.654]	42 [1.654]	—	17 [0.669]	17 [0.669]	18 [0.709]	20 [0.787]	42 [1.654]	42 [1.654]

## Handling Instructions and Precautions



### Control circuit

For control of Slim End Keep Cylinders, we recommend the use of 2-position, 4-, 5-port valves. Avoid the use of a control circuit of exhaust centers with 3-position valves or other control circuits that exhaust air from 2 delivery ports.

- Notes: 1. It is dangerous to supply air to a connection port on a side with a locking mechanism while already exhausted, because the piston rod could suddenly extend (or retract). In addition, since it could also cause galling of the lock piston and piston rod, resulting in defective operation. Always supply air to the connection port on the opposite side to ensure that back pressure is applied.
2. When restarting operations after air has been exhausted from the cylinder due to completion of operations or to an emergency stop, always start by supplying air to the connection port on the opposite side of the locking mechanism.



### Manual operation

While the locking mechanism is normally released automatically through cylinder operations, it can also be released manually. For manual release, insert an M3 × 0.5 (M2.5 × 0.45 for φ16) screw that has 30mm [1.18in.] below head length into the opening for manual override, thread it in about 3 turns into the internal lock piston, and then pull up the screw. To maintain the manual override for adjustment, etc., thread the locknut onto the screw and, with the locking mechanism in a released state, tighten the locknut against the cylinder.

- Notes: 1. It is dangerous to release the lock when a load (weight) is present on the piston rod, because it may cause a sudden fall or cause the unintended piston rod's extension (or retraction). In this case, always supply air to the connection port opposite the one adjacent to the locking mechanism before releasing the locking mechanism.
2. If the locking mechanism cannot easily be released even with manual override, it could be the result of galling of the lock piston and piston rod. In this case, supply air to the connection port opposite the one adjacent to the locking mechanism before releasing the locking mechanism.



### General precautions

#### Media

1. Use air for the media. For the use of any other media, consult us.
2. Air used for the cylinder should be clean air that contains no deteriorated compressor oil, etc. Install an air filter (filtration of a minimum 40 μm) near the cylinder or valve to remove collected liquid or dust. In addition, drain the air filter periodically.  
Collected liquid or dust entering the cylinder may cause improper operation.

#### Lubrication

The product can be used without lubrication, if lubrication is required, use Turbine Oil Class 1 (ISO VG32) or equivalent. Avoid using spindle oil or machine oil.

#### Atmosphere

1. Because water, oil, dust, etc., entering the opening for manual override may cause defective locks or other erratic operation. If using in locations subject to dripping water, dripping oil etc., or to large amounts of dust, use a cover to protect the unit.
2. The product cannot be used when the media or ambient atmosphere contains any of the substances listed below.  
Organic solvents, phosphate ester type hydraulic oil, sulphur dioxide, chlorine gas, or acids, etc.

# SLIM TANDEM CYLINDERS

## Symbol



## Specifications

Item	Bore size mm [in.]	20, 25, 32, 40 [0.787, 0.984, 1.260, 1.575]
Operation type	Double acting type	
Media	Air	
Mounting type	Basic type, Foot type, Flange type, Pivot type	
Operating pressure range MPa [psi.]	0.08~0.9 [12~131]	
Proof pressure MPa [psi.]	1.32 [191]	
Operating temperature range °C [°F]	0~70 [32~158]	
Operating speed range mm/s [in./sec.]	50~800 [2.0~31.5]	
Cushion	Fixed type (Rubber bumper)	
Lubrication	Not required	
Port size	Rc	1/8

## Bore Size and Stroke

Bore size	Stroke1 (Standard)						Maximum available stroke	
	25	50	75	100	150	mm		
20	0	25	50	75	100	150	200	650
25	0	25	50	75	100	150	200	
32	0	25	50	75	100	150	200	
40	0	25	50	75	100	150	200	

Note: Figures in the table are combination of stroke 1 (standard) and its corresponding stroke 2 (standard).  
Stroke 1 is available up to 150 strokes.

## Order Codes

**DA T 20×50×50** - [ ] - [ ] - [ ] - [ ] - [ ] - [ ]

**DA** — Slim double acting cylinder

**T** — Tandem cylinder

**20×50×50** — Bore size × Stroke1 × Stroke2

**Head cover specification**  
Blank — Standard head  
A — Short head

**Mounting type**  
Blank — Basic type  
1 — Foot mounting type  
3 — Flange mounting type  
8E — Pivot mounting type with supporting bracket (with pin)  
● Mounting brackets are included at shipping.

**Rod end accessory**  
Blank — No rod end accessory  
I — I type knuckle  
Y — Y type knuckle (with pin)  
● For the cylinder joint and cylinder rod end, see p.1568.

**Number of sensor switches**  
1 — With 1 sensor switch  
2 — With 2 sensor switches  
3 — With 3 sensor switches  
⋮

**Lead wire length**  
(Applies to all except CS□F)  
A — 1000mm [39in.]  
B — 3000mm [118in.]

**Sensor switch (for cylinders with sensor switches)**  
Blank — No sensor switch  
ZG530 — 2-lead wire Solid state type with indicator lamp DC10~28V  
ZG553 — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
CS3M — Reed switch type with indicator lamp DC10~30V  
CS4M — Reed switch type with indicator lamp AC85~230V  
CS5M — Reed switch type without indicator lamp DC10~30V  
CS2F — Reed switch type with indicator lamp AC85~115V  
CS3F — Reed switch type with indicator lamp AC85~115V  
CS4F — Reed switch type with indicator lamp DC3~30V  
CS5F — Reed switch type without indicator lamp DC3~30V

● For details of sensor switches, see p.1544.  
● CS□F comes with DIN connector.  
All others are grommet type.

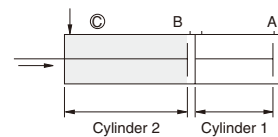
● About stroke 1 and stroke 2

Stroke 1 is the stroke of cylinder 1.  
Stroke 2 is obtained by subtracting stroke 1 from the stroke of cylinder 2.

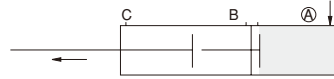


## Operation of Tandem Cylinders

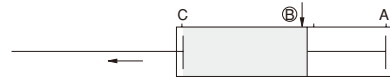
Tandem Cylinders are a set of 2 cylinders joined end to end. It can be used as a 2-stage stroke cylinder by supplying air to either Port A or Port B. It can also obtain twice the thrust within the "stroke 1" range.



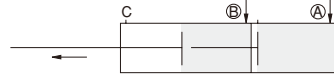
The rod retracts stroke 2 and stroke 1 when air is supplied from Port C.



The rod moves stroke 1 when air is supplied from Port A.

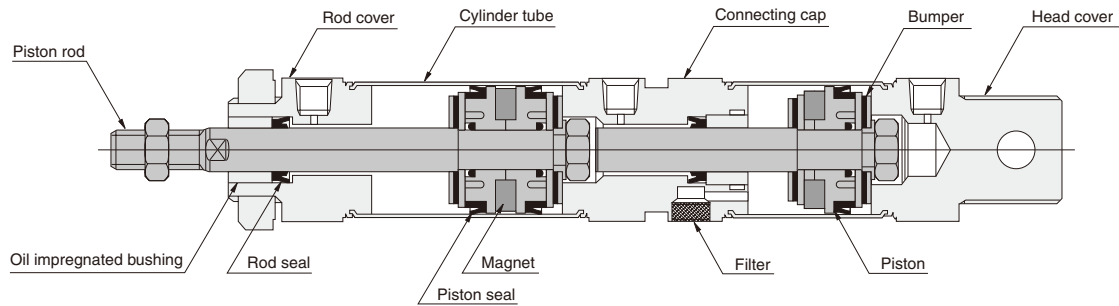


The rod moves stroke 2 when air is supplied from Port B.



Twice the thrust is obtained within the stroke 1 range when air is supplied from Ports A and B.

# Inner Construction and Major Parts (cannot be disassembled)



## Major Parts and Materials

Parts	Bore size	20~40
Cylinder tube		Stainless steel tube
Piston		Plastic
Piston rod		Steel (hard chrome plated)
Rod cover		Aluminum (anodized)
Head cover		
Connecting cap		
Seal		Synthetic rubber (NBR)
Bumper		
Magnet		Plastic magnet
Filter		Foamed metal

## Seals

Note: Seals cannot be replaced.

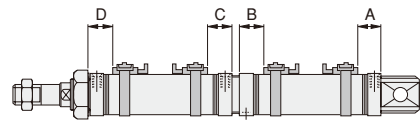
mm		
Parts	Rod seal	Piston seal
Bore size	Quantity	
20	2	3
25	NY-12×8×3.5	PPY-20
32	NY-14×10×3.5	PPY-25
40	NY-17×12×4	PPY-32
	NY-22×16×5	PPY-40

## Mass

kg [lb.]									
Bore size mm [in.]	Zero stroke mass		Additional mass for each 1mm [0.0394in.] stroke		Mass of mounting bracket				
	Standard head	Short head	Stroke 1	Stroke 2	Foot bracket	Flange bracket	Pivot bracket	Y type knuckle	I type knuckle
20 [0.787]	0.30 [0.66]	0.26 [0.57]	0.0016 [0.0035]	0.0008 [0.0018]	0.14 [0.31]	0.08 [0.18]	0.06 [0.13]	0.041 [0.090]	0.036 [0.079]
25 [0.984]	0.35 [0.77]	0.34 [0.75]	0.0022 [0.0049]	0.0011 [0.0024]	0.16 [0.35]	0.08 [0.18]	0.06 [0.13]	0.075 [0.165]	0.070 [0.154]
32 [1.260]	0.45 [0.99]	0.43 [0.95]	0.003 [0.0066]	0.0015 [0.0033]	0.19 [0.42]	0.10 [0.22]	0.14 [0.31]	0.075 [0.165]	0.070 [0.154]
40 [1.575]	0.6 [1.32]	0.56 [1.23]	0.0048 [0.0106]	0.0024 [0.0053]	0.29 [0.64]	0.13 [0.29]	0.14 [0.31]	0.120 [0.265]	0.132 [0.291]

Calculation example: For tandem cylinder of 25mm bore size and stroke 1 of 50mm and stroke 2 of 100mm  
 $0.35 + (0.0022 \times 50) + (0.0011 \times 100) = 0.57\text{kg} [1.26\text{lb.}]$

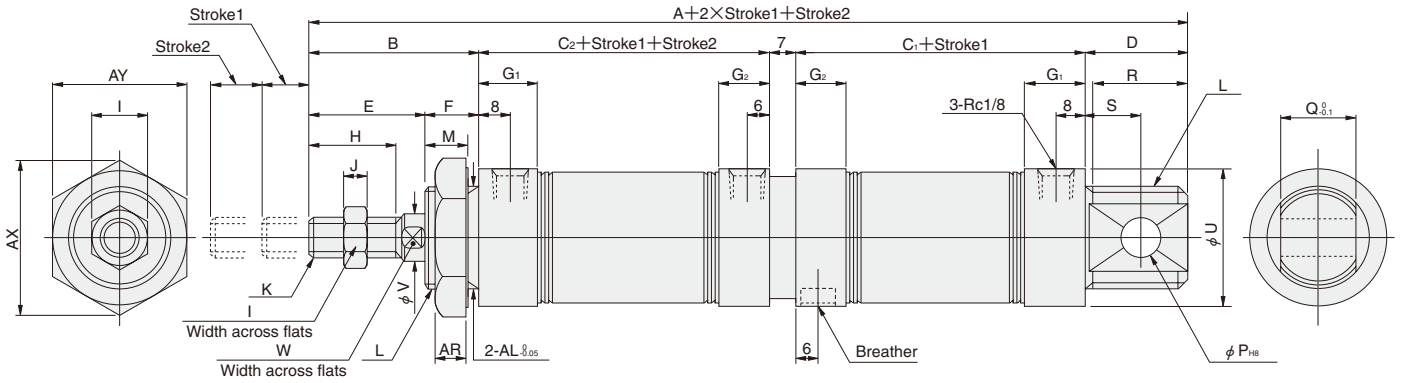
## Mounting Location of Sensor Switch



		mm [in.]			
Sensor switch model	Bore size	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
	Code				
ZG530□	A	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]
	B	16.5 [0.650]	16.5 [0.650]	17 [0.669]	15.5 [0.610]
ZG553□	C	25 [0.984]	25 [0.984]	25 [0.984]	25 [0.984]
	D	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]
CS□M	A	22 [0.866]	22 [0.866]	22 [0.866]	22 [0.866]
	B	11.5 [0.453]	11.5 [0.453]	12 [0.472]	10.5 [0.413]
	C	20 [0.787]	20 [0.787]	20 [0.787]	20 [0.787]
	D	22 [0.866]	22 [0.866]	22 [0.866]	22 [0.866]

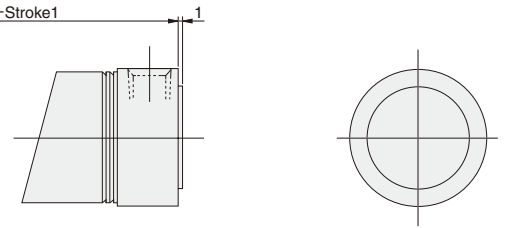
# Dimensions of Tandem Cylinder Basic Type (mm)

●  $\phi 20 \sim \phi 40$  DAT  ×  ×



SLIM CYLINDERS

● Short head  
DAT  ×  ×  -A

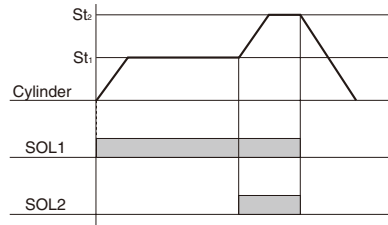
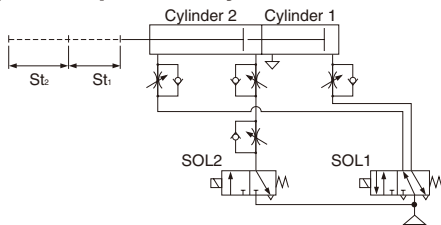


Code	A	B	C <sub>1</sub>	C <sub>2</sub>	D	E	F	G <sub>1</sub>	G <sub>2</sub>	H	I	J	K	L	M	P	Q	R	S	AL	U	V	W	AR	AX	AY
20 [0.787]	203.5	35	66.5	74	21	23	12	16	14	15	12	5	M8×1	M20×1.5	10	8	12	19	12	20	27	8	6	7.5	31.2	27
25 [0.984]	208.5	40	66.5	74	21	26	14	16	14	18	14	6	M10×1.25	M22×1.5	12	8	12	19	12	22	29	10	8	9.5	34.6	30
32 [1.260]	220	45	67	74	27	31	14	16	14	23	14	6	M10×1.25	M27×2	12	10	20	25	15	27	35	12	10	9.5	41.6	36
40 [1.575]	218.5	45	65.5	74	27	31	14	14.5	12.5	23	19	8	M14×1.5	M33×2	12	10	20	25	15	33	41.6	16	14	9.5	47.3	41

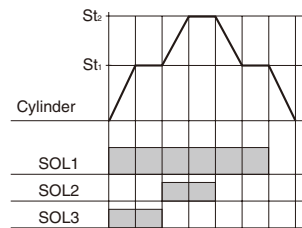
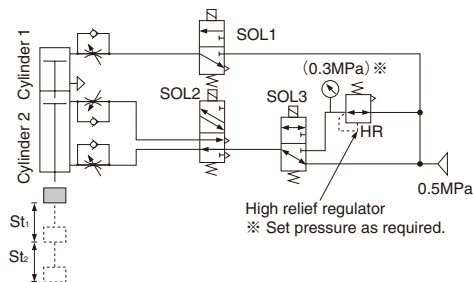
## Example of Air Circuit for Tandem Cylinders

See the following air circuit when using the tandem cylinder as a 2-staged stroke cylinder. Consult us for air circuits not shown below.

### ● For upward-operation cylinder



### ● For downward- or horizontal-operation cylinder



# SLIM DUAL STROKE CYLINDERS

## Symbol



## Specifications

Item	Bore size mm [in.]	20, 25, 32, 40 [0.787, 0.984, 1.260, 1.575]
Operation type		Double acting type
Media		Air
Mounting type		Basic type, Foot type, Flange type
Operating pressure range MPa [psi.]		0.04~0.9 [6~131]
Proof pressure MPa [psi.]		1.32 [191]
Operating temperature range °C [°F]		0~70 [32~158]
Operating speed range mm/s [in./sec.]		30~800 [1.2~31.5]
Cushion		Fixed type (Rubber bumper)
Lubrication		Not required
Port size	Rc	1/8

## Bore Size and Stroke

Bore size	Stroke 1 (Std.)						Maximum available stroke
	25	50	75	100	150		
20	0	25	50	75	100	150	650
25	0	25	50	75	100	150	
32	0	25	50	75	100	150	
40	0	25	50	75	100	150	

Note: Figures in the table are a combination of stroke 1 (standard) and the corresponding stroke 2 (standard).  
Stroke 1 is available up to 150 strokes.

## Order Codes

**DA** **W** **20×50×50** - [ ] - [ ] - [ ] [ ] [ ]

**Dual stroke cylinder**

**Bore size**  
× Stroke1  
× Stroke2

**Rod end accessory**  
Blank — No rod end accessory  
I — I type knuckle  
Y — Y type knuckle (with pin)  
● For the cylinder joint and cylinder rod end, see p.1568.

**Mounting type**  
Blank — Basic type  
1 — Foot mounting type  
3 — Flange mounting type  
● Mounting brackets are included at shipping.

**Number of sensor switches**  
1 — With 1 sensor switch  
2 — With 2 sensor switches  
3 — With 3 sensor switches  
: : :

**Lead wire length**  
(Applies to all except CS□F)  
A — 1000mm [39in.]  
B — 3000mm [118in.]

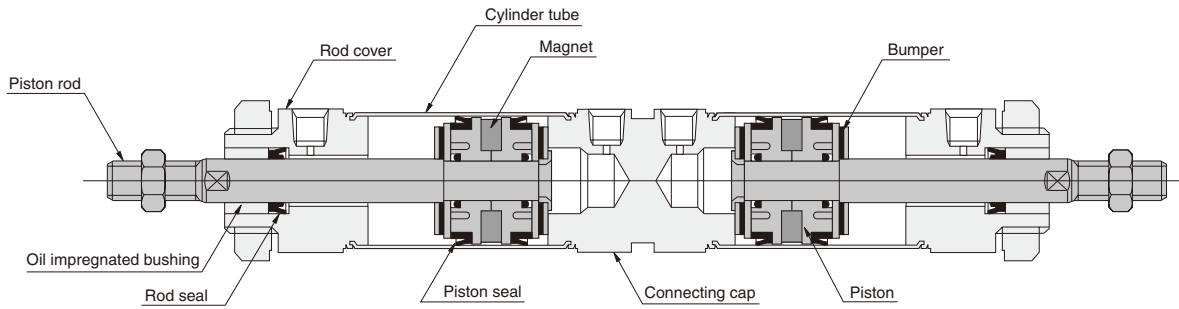
**Sensor switch** (for cylinders with sensor switches)  
Blank — No sensor switch  
ZG530 — 2-lead wire Solid state type with indicator lamp DC10~28V  
ZG553 — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
CS3M — Reed switch type with indicator lamp DC10~30V  
CS4M — Reed switch type with indicator lamp AC85~230V  
CS5M — Reed switch type without indicator lamp DC10~30V  
CS2F — Reed switch type with indicator lamp AC85~115V  
CS3F — Reed switch type with indicator lamp DC3~30V  
CS4F — Reed switch type with indicator lamp AC85~230V  
CS5F — Reed switch type without indicator lamp DC10~30V  
DC3~30V

● For details of sensor switches, see p.1544.  
● CS□F comes with DIN connector.  
All others are grommet type.

**Slim double acting cylinder**

# Inner Construction and Major Parts (cannot be disassembled)

SLIM CYLINDERS



## Major Parts and Materials

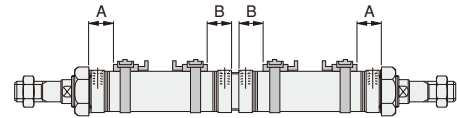
Parts	Bore size	20~40
Cylinder tube		Stainless steel
Piston		Plastic
Piston rod		Steel (hard chrome plated)
Rod cover		Aluminum (anodized)
Head cover		
Seal		Synthetic rubber (NBR)
Bumper		
Magnet		Plastic magnet

## Seals

Note: Seals cannot be replaced.

mm		
Parts	Rod seal	Piston seal
Bore size	Quantity	
20	2	4
25	NY-12×8×3.5	PPY-20
32	NY-14×10×3.5	PPY-25
40	NY-17×12×4	PPY-32
	NY-22×16×5	PPY-40

## Mounting Location of Sensor Switch



		mm [in.]			
Sensor switch model	Bore size	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
	Code				
ZG530 <input type="checkbox"/>	A	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]
ZG553 <input type="checkbox"/>	B	25 [0.984]	25 [0.984]	25 [0.984]	25 [0.984]
CS <input type="checkbox"/> M	A	22 [0.866]	22 [0.866]	22 [0.866]	22 [0.866]
CS <input type="checkbox"/> F	B	20 [0.787]	20 [0.787]	20 [0.787]	20 [0.787]

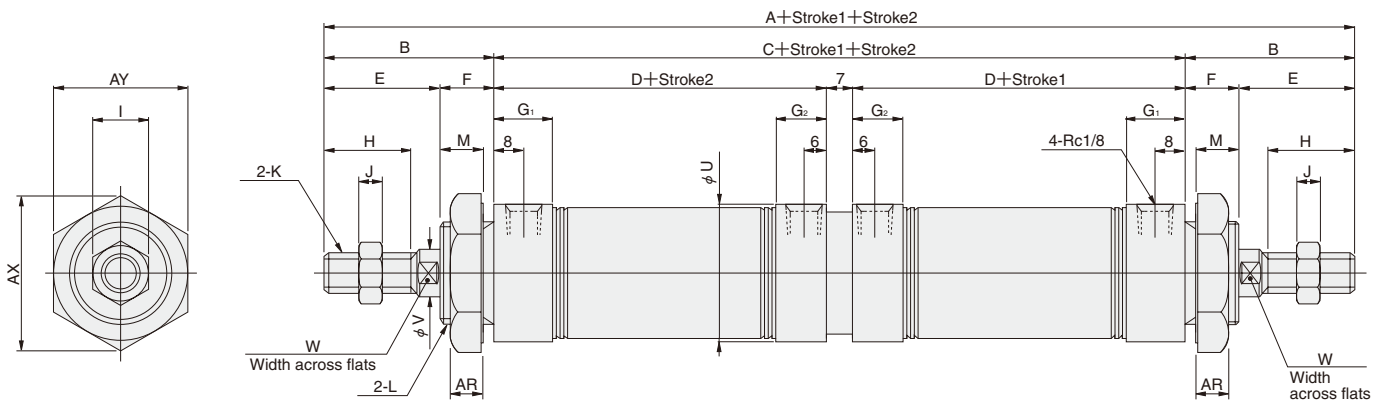
## Mass

Bore size mm [in.]	Zero stroke mass	Additional mass for each 1mm [0.0394in.] stroke		Mass of mounting bracket			
		Stroke 1	Stroke 2	Foot bracket	Flange bracket	Y type knuckle	I type knuckle
		kg [lb.]					
20 [0.787]	0.30 [0.66]	0.0008 [0.0018]	0.0008 [0.0018]	0.14 [0.31]	0.08 [0.18]	0.041 [0.090]	0.036 [0.079]
25 [0.984]	0.39 [0.86]	0.0011 [0.0024]	0.0011 [0.0024]	0.16 [0.35]	0.08 [0.18]	0.075 [0.165]	0.070 [0.154]
32 [1.260]	0.60 [1.32]	0.0015 [0.0033]	0.0015 [0.0033]	0.19 [0.42]	0.10 [0.22]	0.075 [0.165]	0.070 [0.154]
40 [1.575]	0.90 [1.98]	0.0024 [0.0053]	0.0024 [0.0053]	0.29 [0.64]	0.13 [0.29]	0.120 [0.265]	0.132 [0.291]

Calculation example: For dual stroke cylinder of 25mm bore size and stroke 1 of 50mm and stroke 2 of 100mm  
 $0.39 + (0.0011 \times 50 + 0.0011 \times 100) = 0.555\text{kg} [1.224\text{lb.}]$

## Dimensions of Dual Stroke Basic Type (mm)

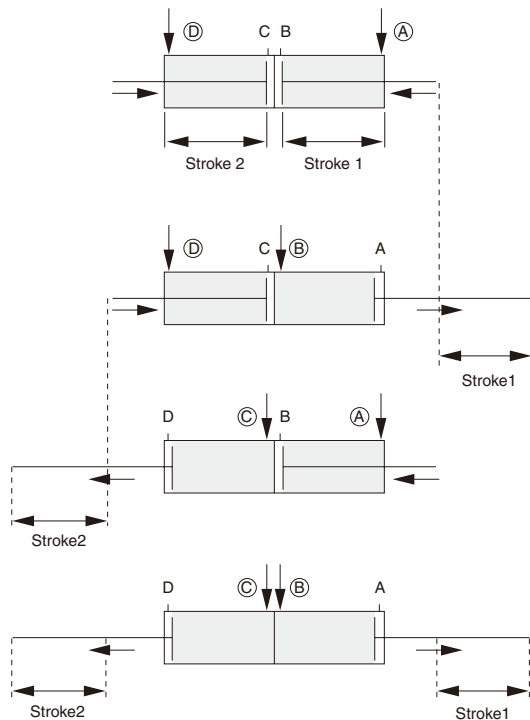
●  $\phi 20 \sim \phi 40$  DAW Bore size  $\times$  Stroke1  $\times$  Stroke2



Code Bore mm [in.]	A	B	C	D	E	F	G <sub>1</sub>	G <sub>2</sub>	H	I	J	K	L	M	U	V	W	AR	AX	AY
20 [0.787]	225	35	155	74	23	12	16	14	15	12	5	M8×1	M20×1.5	10	27	8	6	7.5	31.2	27
25 [0.984]	235	40	155	74	26	14	16	14	18	14	6	M10×1.25	M22×1.5	12	29	10	8	9.5	34.6	30
32 [1.260]	245	45	155	74	31	14	16	14	23	14	6	M10×1.25	M27×2	12	35	12	10	9.5	41.6	36
40 [1.575]	245	45	155	74	31	14	14.5	12.5	23	19	8	M14×1.5	M33×2	12	41.6	16	14	9.5	47.3	41

## Operation of Dual Stroke Cylinders

Dual Stroke Cylinders are a set of 2 cylinders connected back to back.  
The cylinder body can be secured in place and each stroke can be controlled separately. It can also be used to obtain 2-stage or 3-stage strokes by securing the piston rod on one side in place.



The rods retract stroke 2 and stroke 1 when air is supplied from Ports (A) and (D).

The rod moves stroke 1 when air is supplied from Ports (B) and (D).

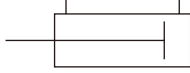
The rod moves stroke 2 when air is supplied from Ports (A) and (C).

The rod moves stroke 1 and stroke 2 when air is supplied from Ports (B) and (C).

# SLIM HEAT RESISTANT SPECIFICATION CYLINDERS



## Symbol



## Specifications

Item	Bore size mm [in.]	20, 25, 32, 40 [0.787, 0.984, 1.260, 1.575]
Operation type		Double acting type
Media		Air
Mounting type		Basic type, Foot type, Flange type, Pivot type
Operating pressure range MPa [psi.]		0.1~0.9 [15~131]
Proof pressure MPa [psi.]		1.32 [191]
Operating temperature range °C [°F]		0~130 [32~266]
Operating speed range mm/s [in./sec.]		100~700 [3.9~27.6]
Cushion		Fixed type (Rubber bumper)
Lubrication		Not required
Port size	Rc	1/8

## Cylinder Bore Size and Stroke

Bore size	Standard strokes		Maximum stroke	Maximum available stroke
	mm			
20	25 50 75 100 125 150		200	500
25	25 50 75 100 125 150 200		250	
32	25 50 75 100 125 150 200		300	
40	25 50 75 100 125 150 200 250 300		400	

Remarks 1: Stroke tolerance  ${}^+_1 \begin{matrix} +0.039in. \\ 0 \end{matrix}$

2: For non-standard strokes, consult us.

3: The minimum operating pressure when the stroke is over the maximum stroke at bore size of  $\phi 20$ - $\phi 40$  is 0.2MPa [29psi.].

## Order Codes

**DA** **F** **20×50** -  -  -

**Heat resistant specification**  
**Slim double acting cylinder**

**Bore size × Stroke**

**Rod end accessory**  
**Blank** — No rod end accessory  
**I** — I type knuckle  
**Y** — Y type knuckle (with pin)

**Mounting type**  
**Blank** — Basic type  
**1** — Foot mounting type  
**3** — Flange mounting type  
**8E** — Pivot mounting type with supporting bracket (with pin)  
 ● Mounting brackets are included at shipping.

**Head cover specification**  
**Blank** — Standard head  
**A** — Short head

**Caution** Since a magnet for sensor switch is not built into the heat resistant specification cylinder, sensor switches will not be functional.

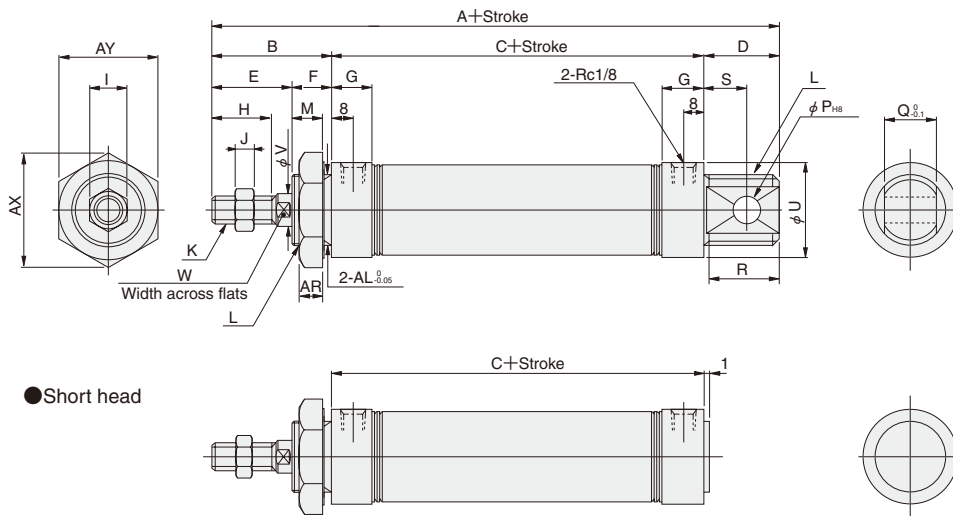


## Major Parts and Materials

Parts	Bore size	20, 25, 32, 40
Cylinder tube		Stainless steel
Piston		Aluminum (anodized)
Piston rod		Steel (hard chrome plated)
Rod cover		Aluminum (anodized)
Head cover		
Seal		Fluoro rubber (FKM)
Bumper		

## Dimensions of Heat Resistant Specification Cylinder Basic Type (mm)

●  $\phi 20 \sim \phi 40$  DAF   $\times$

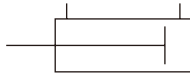


Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	P	Q	R	S	U	V	W
20	[0.787]	132	35	76	21	23	12	16	15	12	5	M8×1	M20×1.5	10	8	12	19	12	27	8	6
25	[0.984]	137	40	76	21	26	14	16	18	14	6	M10×1.25	M22×1.5	12	8	12	19	12	29	10	8
32	[1.260]	148	45	76	27	31	14	16	23	14	6	M10×1.25	M27×2	12	10	20	25	15	35	12	10
40	[1.575]	148	45	76	27	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	10	20	25	15	41.6	16	14

Bore mm [in.]	Code	AR	AX	AY	AL
20	[0.787]	7.5	31.2	27	20
25	[0.984]	9.5	34.6	30	22
32	[1.260]	9.5	41.6	36	27
40	[1.575]	9.5	47.3	41	33

# SLIM LOW SPEED CYLINDERS

## Symbol



## Specifications

Item	Bore size mm [in.]	
	20, 25, 32, 40 [0.787, 0.984, 1.260, 1.575]	50, 63 [1.969, 2.480]
Operation type	Double acting type	
Media	Air	
Mounting type	Basic type, Foot type, Flange type, Pivot type	
Operating pressure range MPa [psi.]	0.06~0.9 [9~131]	0.05~0.7 [7~102]
Proof pressure MPa [psi.]	1.32 [191]	1.03 [149]
Operating temperature range °C [°F]	0~60 [32~140]	
Operating speed range <sup>1)2)</sup> mm/s [in./sec.]	10~500 [0.4~19.7]	10~300 [0.4~11.8]
Cushion	Fixed type (Rubber bumper)	Variable type is standard equipment. (Stroke 15mm [0.59in.])
Lubrication	Not required	
Port size	Rc 1/8	1/4

Note: When mounting and using sensor switches other than ZG530 and ZG553, maintain the minimum speed at 30mm/s [1.2in./sec.] or more.

## Bore Size and Stroke

Bore size	Standard strokes		Maximum stroke	Maximum available stroke
	mm			
20	25 50 75 100 125 150	200	500	
25	25 50 75 100 125 150 200	250		
32	25 50 75 100 125 150 200	300		
40	25 50 75 100 125 150 200 250 300	400		
50	25 50 75 100 150 200	300		
63	25 50 75 100 150 200	300		

Remarks: 1. Stroke tolerance  $^{+1}_{0} [^{+0.039}_{0} \text{in.}]$

2. For non-standard strokes, consult us.

3. The minimum operating pressure when the stroke is over the maximum stroke at bore size of  $\phi 20 \sim \phi 40$  is 0.2MPa [29psi.].

## Order Codes

**DA** **N** **20×50** —  —  —  —

**Low speed cylinder**  
**Slim double acting cylinder**

**Bore size × Stroke**  
**Number of sensor switches**  
 1 — With 1 sensor switch  
 2 — With 2 sensor switches  
 3 — With 3 sensor switches  
 : — :

**Lead wire length**  
 (Applies to all except CS□F)  
**A** — 1000mm [39in.]  
**B** — 3000mm [118in.]

**Rod end accessory**  
**Blank** — No rod end accessory  
**I** — I type knuckle  
**Y** — Y type knuckle (with pin)  
 ● For the cylinder joint and cylinder rod end, see p.1568.

**Mounting type**  
**Blank** — Basic type  
**1** — Foot mounting type  
**3** — Flange mounting type  
**8B** — Pivot mounting type with bushing (Available at  $\phi 50$  and  $\phi 63$  only)  
**8E** — Pivot mounting type with supporting bracket (with pin) (Available at  $\phi 20 \sim 40$  only)  
**8B-8E** — Pivot mounting type with bushing and supporting bracket (with pin) (Available at  $\phi 50$  and  $\phi 63$  only)  
 ● Mounting brackets are included at shipping.

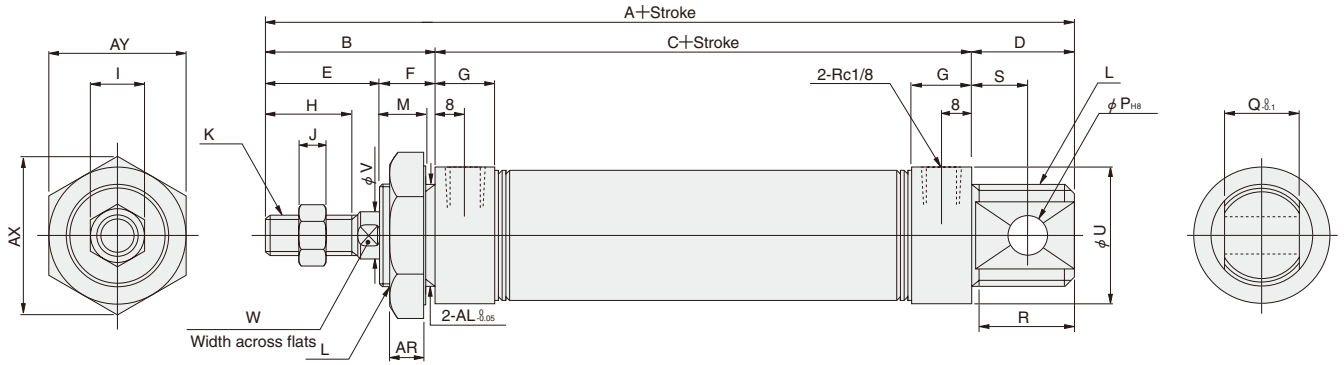
**Head cover specification**  
**Blank** — Standard head  
**A** — Short head

**Sensor switch (for cylinders with sensor switches)**  
**Blank** — No sensor switch  
**ZG530** — 2-lead wire Solid state type with indicator lamp DC10~28V  
**ZG553** — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
**CS3M** — Reed switch type with indicator lamp DC10~30V  
**CS4M** — Reed switch type with indicator lamp AC85~115V  
**CS5M** — Reed switch type without indicator lamp DC3~30V  
**CS2F** — Reed switch type with indicator lamp AC85~230V  
**CS3F** — Reed switch type with indicator lamp DC10~30V  
**CS4F** — Reed switch type with indicator lamp DC10~30V  
**CS5F** — Reed switch type without indicator lamp DC3~30V  
 ● For details of sensor switches, see p.1544.  
 ● CS□F comes with DIN connector. All others are grommet type.

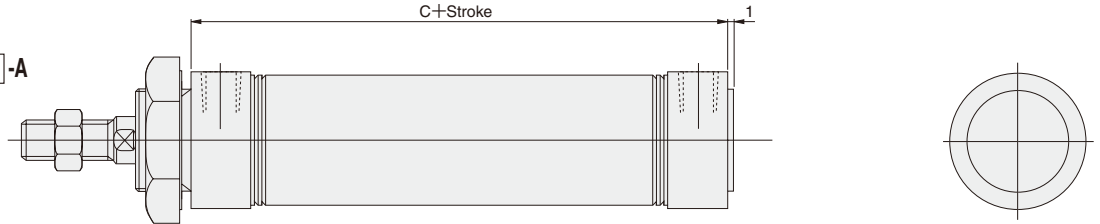
Note: When mounting and using sensor switches other than ZG530 and ZG553, maintain the minimum speed at 30mm/s [1.2in./sec.] or more.

# Dimensions of Low Speed Cylinder Basic Type (mm)

●  $\phi 20 \sim \phi 40$  DAN Bore size  $\times$  Stroke



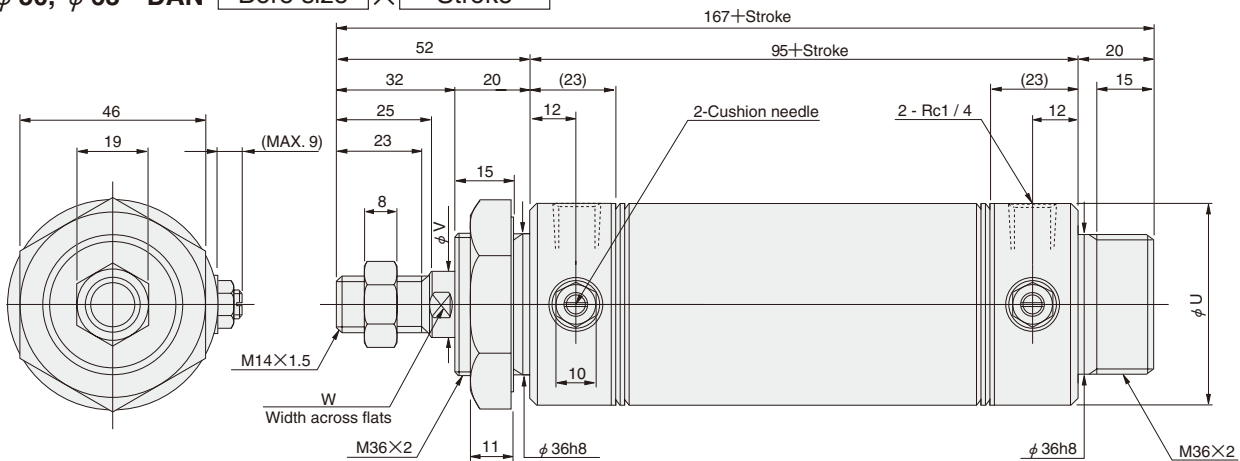
● Short head DAN Bore size  $\times$  Stroke -A



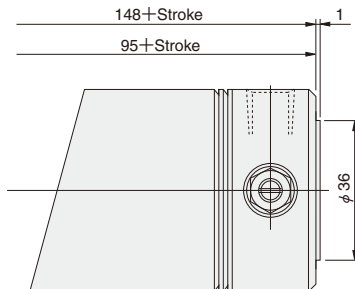
Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	P	Q	R	S	U	V	W
20 [0.787]		132	35	76	21	23	12	16	15	12	5	M8 $\times$ 1	M20 $\times$ 1.5	10	8	12	19	12	27	8	6
25 [0.984]		137	40	76	21	26	14	16	18	14	6	M10 $\times$ 1.25	M22 $\times$ 1.5	12	8	12	19	12	29	10	8
32 [1.260]		148	45	76	27	31	14	16	23	14	6	M10 $\times$ 1.25	M27 $\times$ 2	12	10	20	25	15	35	12	10
40 [1.575]		148	45	76	27	31	14	(14.5)	23	19	8	M14 $\times$ 1.5	M33 $\times$ 2	12	10	20	25	15	41.6	16	14

Bore mm [in.]	Code	AR	AX	AY	AL
20 [0.787]		7.5	31.2	27	20
25 [0.984]		9.5	34.6	30	22
32 [1.260]		9.5	41.6	36	27
40 [1.575]		9.5	47.3	41	33

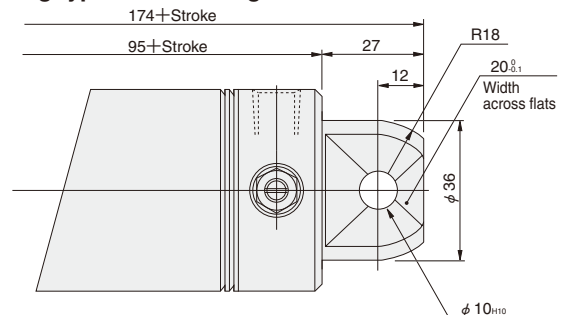
●  $\phi 50, \phi 63$  DAN Bore size  $\times$  Stroke



● Short head DAN Bore size  $\times$  Stroke -A



● Pivot mounting type with bushing DAN Bore size  $\times$  Stroke -8B



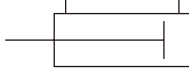
Bore mm [in.]	Code	U	V	W
50 [1.969]		52	16	14
63 [2.480]		65.4	16	14

# MADE TO ORDER PRODUCT

● For delivery, consult us.

## Cylinders with Scrapers

### Symbol



SLIM CYLINDERS

### Specifications

Item	Bore size mm [in.]	20, 25, 32, 40 [0.787, 0.984, 1.260, 1.575]
Operation type		Double acting type
Media		Air
Mounting type		Basic type, Foot type, Flange type, Pivot type
Operating pressure range MPa [psi.]		0.1~0.9 [15~131]
Proof pressure MPa [psi.]		1.32 [191]
Operating temperature range °C [°F]		0~70 [32~158]
Operating speed range mm/s [in./sec.]		30~800 [1.2~31.5]
Cushion		Fixed type (Rubber bumper)
Lubrication		Not required
Port size	Rc	1/8

### Bore Size and Stroke

Bore size	Standard strokes							Maximum stroke	Maximum available stroke
	25	50	75	100	125	150	200		
20	25	50	75	100	125	150		200	1050
25	25	50	75	100	125	150	200	250	
32	25	50	75	100	125	150	200	300	
40	25	50	75	100	125	150	200	250	

Remarks: 1. Stroke tolerance  ${}^+_1\begin{matrix} +0.039in. \\ 0 \end{matrix}$

2. For non-standard strokes, consult us.

3. The minimum operating pressure when the stroke is over the maximum stroke at bore size of  $\phi 20 \sim \phi 40$  is 0.2MPa [29psi.].

### Order Codes

**DA** **Y** **20×50** - [ ] - [ ] - [ ] - [ ] [ ] [ ]

**Bore size × Stroke**

**With scraper**

**Slim double acting cylinder**

**Head cover specification**  
**Blank** — Standard head  
**A** — Short head

**Mounting type**  
**Blank** — Basic type  
**1** — Foot mounting type  
**3** — Flange mounting type  
**8E** — Pivot mounting type with supporting bracket (with pin)  
 ● Mounting brackets are included at shipping.

**Rod end accessory**  
**Blank** — No rod end accessory  
**I** — I type knuckle  
**Y** — Y type knuckle (with pin)  
 ● Mounting brackets are included at shipping.  
 ● For the cylinder joint and cylinder rod end, see p.1568.

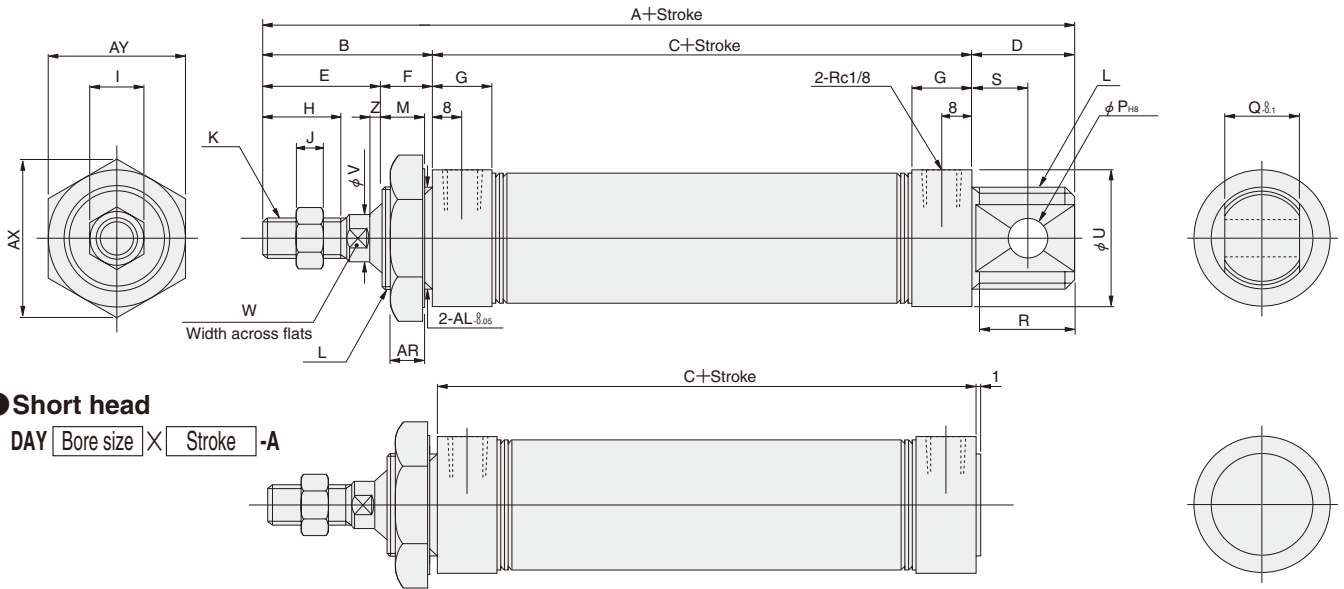
**Number of sensor switches**  
**1** — With 1 sensor switch  
**2** — With 2 sensor switches  
**3** — With 3 sensor switches  
 ⋮

**Lead wire length**  
 (Applies to all except **CS□F**)  
**A** — 1000mm [39in.]  
**B** — 3000mm [118in.]

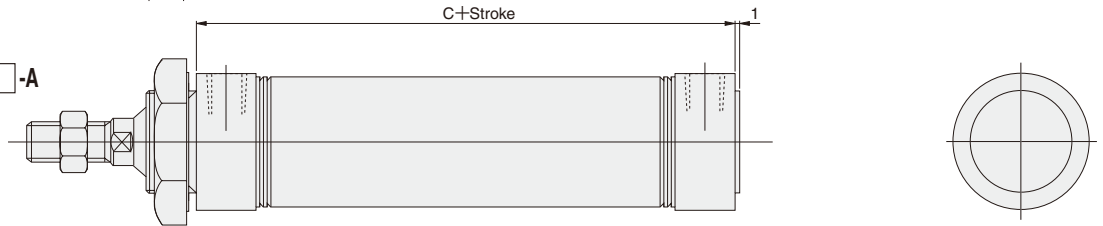
**Sensor switch (for cylinders with sensor switches)**  
**Blank** — No sensor switch  
**ZG530** — 2-lead wire Solid state type with indicator lamp DC10~28V  
**ZG553** — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
**CS3M** — Reed switch type with indicator lamp DC10~30V  
**CS4M** — Reed switch type with indicator lamp AC85~230V  
**CS5M** — Reed switch type without indicator lamp DC10~30V  
**CS2F** — Reed switch type with indicator lamp AC85~115V  
**CS3F** — Reed switch type with indicator lamp AC85~115V  
**CS4F** — Reed switch type with indicator lamp DC10~30V  
**CS5F** — Reed switch type without indicator lamp DC10~30V  
 ● For details of sensor switches, see p.1544.  
 ● **CS□F** comes with DIN connector. All others are grommet type.

# Dimensions of Cylinder with Scraper Basic Type (mm)

●  $\phi 20 \sim \phi 40$  DAY Bore size   $\times$  Stroke



● Short head DAY Bore size   $\times$  Stroke  -A



Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	P	Q	R	S	U	V	W	Z
20 [0.787]		132	35	76	21	23	12	16	15	12	5	M8×1	M20×1.5	10	8	12	19	12	27	8	6	(2)
25 [0.984]		137	40	76	21	26	14	16	18	14	6	M10×1.25	M22×1.5	12	8	12	19	12	29	10	8	(2)
32 [1.260]		148	45	76	27	31	14	16	20	14	6	M10×1.25	M27×2	12	10	20	25	15	35	12	10	(3)
40 [1.575]		148	45	76	27	31	14	(14.5)	20	19	8	M14×1.5	M33×2	12	10	20	25	15	41.6	16	14	(3)

Bore mm [in.]	Code	AR	AX	AY	AL
20 [0.787]		7.5	31.2	27	20
25 [0.984]		9.5	34.6	30	22
32 [1.260]		9.5	41.6	36	27
40 [1.575]		9.5	47.3	41	33

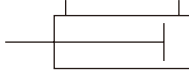
# MADE TO ORDER PRODUCT

## Block Heat Resistant Specification Cylinders

● For delivery, consult us.



### Symbol



### Specifications

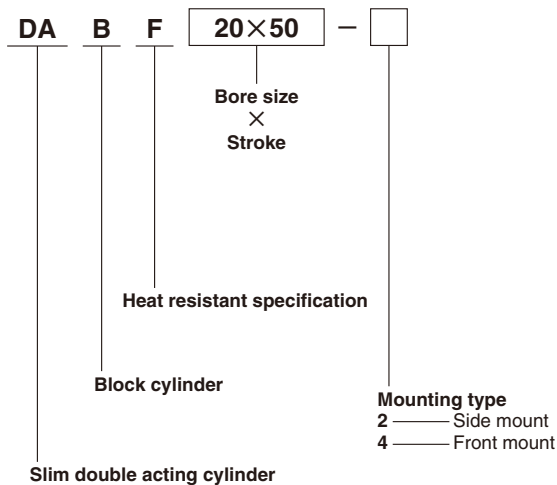
Item	Bore size mm [in.]	16, 20, 25, 32, 40 [0.630, 0.787, 0.984, 1.260, 1.575]
Operation type		Double acting type
Media		Air
Mounting type		Side mount, Front mount
Operating pressure range MPa [psi.]		0.1~0.9 [15~131]
Proof pressure MPa [psi.]		1.32 [191]
Operating temperature range °C [°F]		0~130 [32~266]
Operating speed range mm/s [in./sec.]		100~700 [3.9~27.6]
Cushion		Fixed type (Rubber bumper)
Lubrication		Not required
Port size	Rc	1/8

### Bore Size and Stroke

Bore size	Standard strokes	mm	
		Maximum stroke	Maximum available stroke
16	15 25 50 75 100	100	300
20	25 50 75 100 125 150	150	500
25	25 50 75 100 125 150 200	200	
32	25 50 75 100 125 150 200	200	
40	25 50 75 100 125 150 200 250 300	300	

- Remarks: 1. Stroke tolerance  ${}_{0}^{+1} [{}_{0}^{+0.039}\text{in.}]$   
 2. For non-standard strokes, consult us.  
 3. The minimum operating pressure when the stroke is over the maximum stroke at bore size of  $\phi 20 \sim \phi 40$  is 0.2MPa [29psi.].

### Order Codes



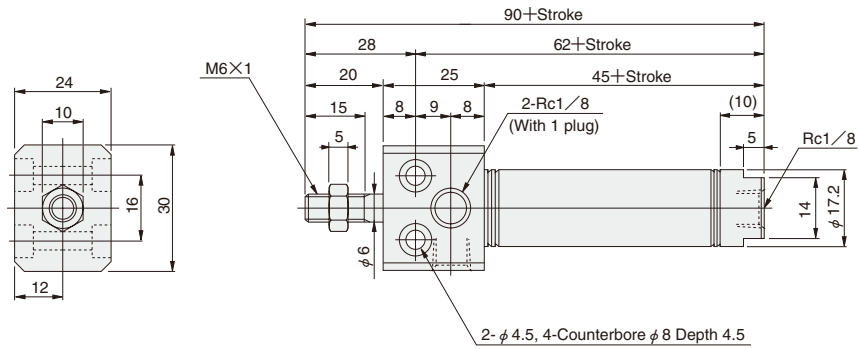
### Major Parts and Materials

Parts	Bore size	16	20~40
Cylinder tube		Stainless steel	
Piston		Aluminum (anodized)	
Piston rod		Stainless steel (hard chrome plated)	Steel (hard chrome plated)
Rod cover		Aluminum (anodized)	
Head cover		Aluminum (anodized)	
Seal		Fluoro rubber (FKM)	
Bumper		Fluoro rubber (FKM)	

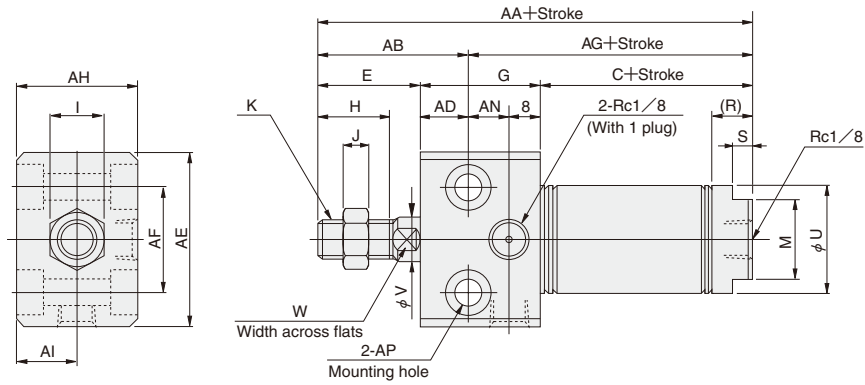
**Caution** Since a magnet for sensor switch is not built into the heat resistant specification cylinder, sensor switches will not be functional.

# Dimensions of Block Heat Resistant Specification Cylinder Side Mounting Type (mm)

●  $\phi 16$  DABF16  $\times$   -2



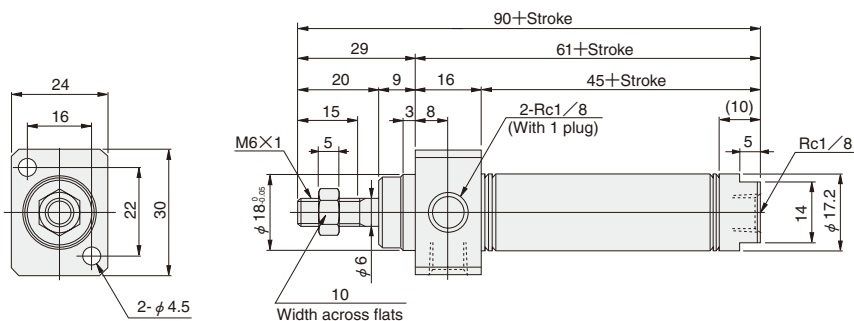
●  $\phi 20 \sim \phi 40$  DABF   $\times$   -2



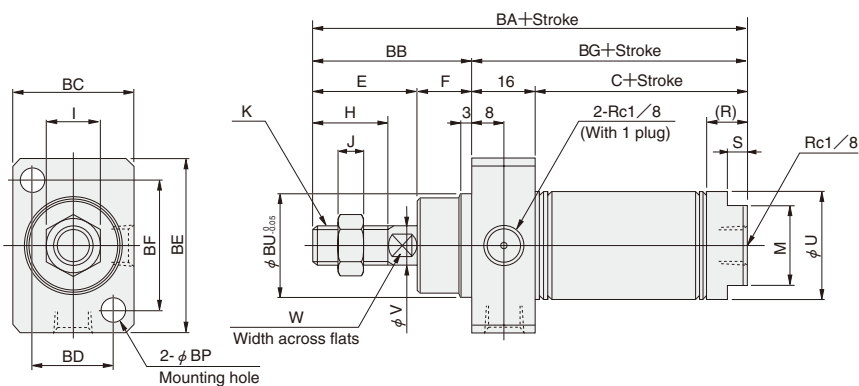
Bore mm [in.]	Code	C	E	G	H	I	J	K	M	R	S	U	V	W	AA	AB	AD	AE	AF	AG	AH	AI	AN	AP
20 [0.787]		53	23	28	15	12	5	M8×1	17	10	5	21.4	$\phi 8$	6	104	34	11	38	22	70	28	14	9	$\phi 6.6$ 2-Counterbore $\phi 11$ Depth6.5
25 [0.984]		53	26	30	18	14	6	M10×1.25	19	10	5	26.4	$\phi 10$	8	109	38	12	42	26	71	30	15	10	$\phi 6.6$ 2-Counterbore $\phi 11$ Depth6.5
32 [1.260]		54	31	36	23	14	6	M10×1.25	22	11	6	33.6	$\phi 12$	10	121	45	14	54	34	76	36	18	14	$\phi 9$ 2-Counterbore $\phi 14$ Depth8.6
40 [1.575]		60	31	44	23	19	8	M14×1.5	22	13	6	41.6	$\phi 16$	14	135	48	17	68	46	87	44	22	19	$\phi 11$ 2-Counterbore $\phi 17.5$ Depth10.8

# Dimensions of Block Heat Resistant Specification Cylinder Front Mounting Type (mm)

●  $\phi 16$  DABF16  $\times$   -4



●  $\phi 20 \sim \phi 40$  DABF   $\times$   -4



Bore mm [in.]	Code	C	E	F	H	I	J	K	M	R	S	U	V	W	BA	BB	BC	BD	BE	BF	BG	BP	BU
20 [0.787]		53	23	12	15	12	5	M8x1	17	10	5	21.4	$\phi 8$	6	104	35	28	18	38	28	69	5.5	22
25 [0.984]		53	26	14	18	14	6	M10x1.25	19	10	5	26.4	$\phi 10$	8	109	40	30	20	42	32	69	5.5	24
32 [1.260]		54	31	14	23	14	6	M10x1.25	22	11	6	33.6	$\phi 12$	10	115	45	36	24	54	42	70	6.6	28
40 [1.575]		60	31	14	23	19	8	M14x1.5	22	13	6	41.6	$\phi 16$	14	121	45	44	28	68	52	76	9	34

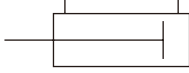


# MADE TO ORDER PRODUCT

## Block Low Speed Cylinders



### Symbol



### Specifications

Item	Bore size mm [in.]	
	20~40 [0.787~1.575]	50, 63 [1.969, 2.480]
Operation type	Double acting type	
Media	Air	
Mounting type	Side mount, Front mount	
Operating pressure range MPa [psi.]	0.06~0.9 [9~131]	0.05~0.7 [7~102]
Proof pressure MPa [psi.]	1.32 [191]	1.03 [149]
Operating temperature range °C [°F]	0~60 [32~140]	
Operating speed range <sup>Note</sup> mm/s [in./sec.]	10~500 [0.4~19.7]	10~300 [0.4~11.8]
Cushion	Fixed type (Rubber bumper)	Variable type (Stroke 15mm [0.59in.])
Lubrication	Not required	
Port size	Rc 1/8	1/4

Note: When mounting and using sensor switches other than ZG530 and ZG553, maintain the minimum speed at 30mm/s [1.2in./sec.] or more.

### Bore Size and Stroke

Bore size	Standard strokes	Maximum stroke	mm
			Maximum available stroke
20	25 50 75 100 125 150	150	500
25	25 50 75 100 125 150 200	200	
32	25 50 75 100 125 150 200	200	
40	25 50 75 100 125 150 200 250 300	300	
50	25 50 75 100 150 200 250 300	300	
63	25 50 75 100 150 200 250 300	300	

- Remarks: 1. Stroke tolerance  ${}^+1_0$  [  ${}^{+0.039}_{0}$ in.]  
 2. For non-standard strokes, consult us.  
 3. The minimum operating pressure when the stroke is over the maximum stroke at bore size of  $\phi 20 \sim \phi 40$  is 0.2MPa [29psi.].

### Order Codes

**DA** **B** **N** **50×100** - [ ] - [ ] - [ ] [ ] [ ]

**DA** — Slim double acting cylinder  
**B** — Block cylinder  
**N** — Low speed cylinder  
**50×100** — Bore size × Stroke

**Rod end accessory**  
**Blank** — No rod end accessory  
**I** — I type knuckle  
**Y** — Y type knuckle (with pin)  
 ● For the cylinder joint and cylinder rod end, see p.1568.

**Mounting type**  
**2** — Side mount  
**4** — Front mount

**Number of sensor switches**  
**1** — With 1 sensor switch  
**2** — With 2 sensor switches  
**3** — With 3 sensor switches  
 ⋮ — ⋮

**Lead wire length**  
 (Applies to all except **CS□F**)  
**A** — 1000mm [39in.]  
**B** — 3000mm [118in.]

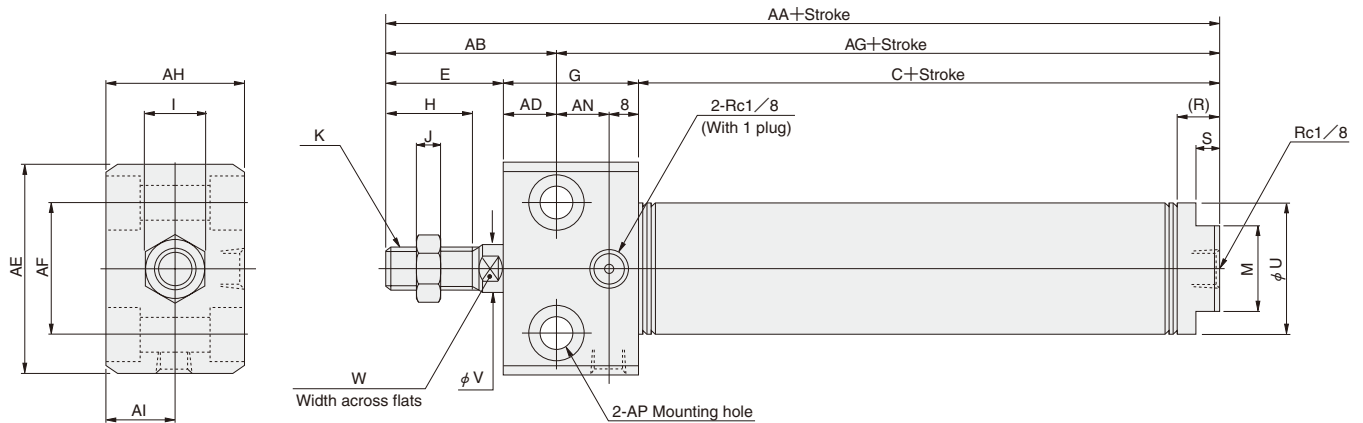
**Sensor switch (for cylinders with sensor switches)**  
**Blank** — No sensor switch  
**ZG530** — 2-lead wire Solid state type with indicator lamp DC10~28V  
**ZG553** — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
**CS3M** — Reed switch type with indicator lamp DC10~30V AC85~230V  
**CS4M** — Reed switch type with indicator lamp DC10~30V AC85~115V  
**CS5M** — Reed switch type without indicator lamp DC3~30V AC85~115V  
**CS2F** — Reed switch type with indicator lamp AC85~230V  
**CS3F** — Reed switch type with indicator lamp DC10~30V  
**CS4F** — Reed switch type with indicator lamp DC10~30V  
**CS5F** — Reed switch type without indicator lamp DC3~30V

● For details of sensor switches, see p.1544.  
 ● **CS□F** comes with DIN connector. All others are grommet type.

Note: When mounting and using sensor switches other than ZG530 and ZG553, maintain the minimum speed at 30mm/s [1.2in./sec.] or more.

# Dimensions of Block Low Speed Cylinder Side Mounting Type (mm)

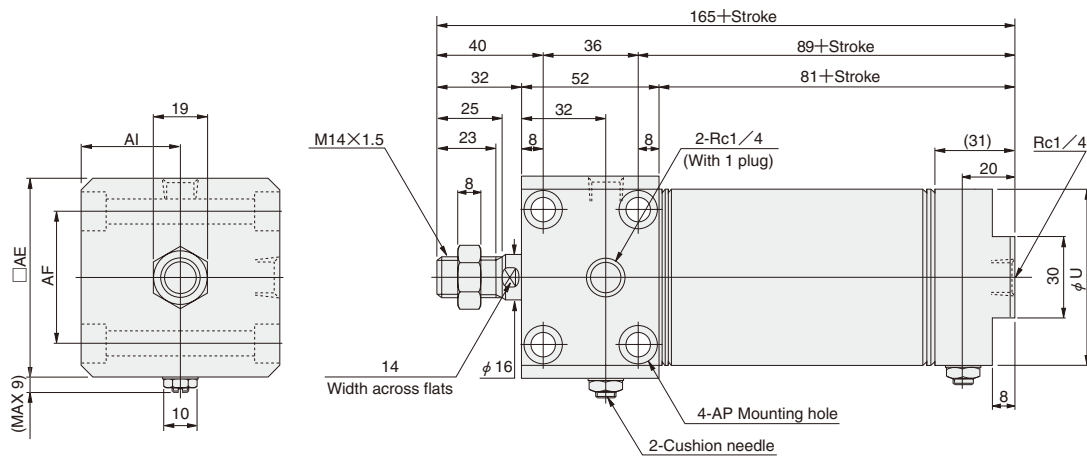
●  $\phi 20 \sim \phi 40$  DABN   $\times$   -2



Bore mm [in.]	Code	C	E	G	H	I	J	K	M	R	S	U	V	W
20 [0.787]		53	23	28	15	12	5	M8×1	17	10	5	21.4	8	6
25 [0.984]		53	26	30	18	14	6	M10×1.25	19	10	5	26.4	10	8
32 [1.260]		54	31	36	23	14	6	M10×1.25	22	11	6	33.6	12	10
40 [1.575]		60	31	44	23	19	8	M14×1.5	22	13	6	41.6	16	14

Bore mm [in.]	Code	AA	AB	AD	AE	AF	AG	AH	AI	AN	AP	
20 [0.787]		104	34	11	38	22	70	28	14	9	$\phi 6.6$ 2-Counterbore $\phi 11$	Depth6.5
25 [0.984]		109	38	12	42	26	71	30	15	10	$\phi 6.6$ 2-Counterbore $\phi 11$	Depth6.5
32 [1.260]		121	45	14	54	34	76	36	18	14	$\phi 9$ 2-Counterbore $\phi 14$	Depth8.6
40 [1.575]		135	48	17	68	46	87	44	22	19	$\phi 11$ 2-Counterbore $\phi 17.5$	Depth10.8

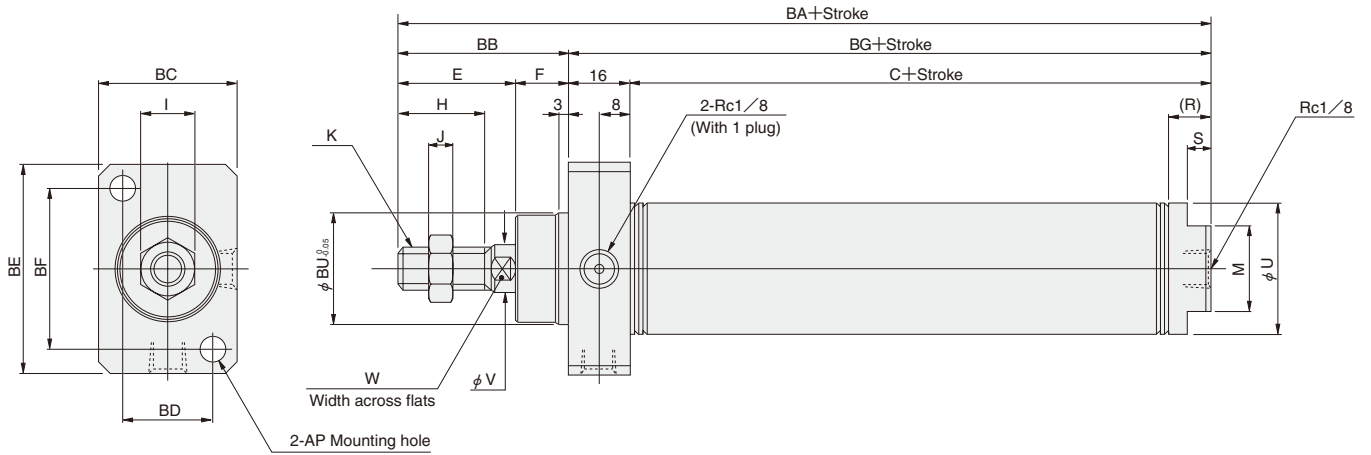
●  $\phi 50, \phi 63$  DABN   $\times$   -2



Bore mm [in.]	Code	U	AE	AF	AI	AP
50 [1.969]		52	62	44	31	$\phi 6.6$ 2-Counterbore $\phi 11$ Depth6.5
63 [2.480]		65.4	74	48	37	$\phi 9$ 2-Counterbore $\phi 14$ Depth8.6

# Dimensions of Block Low Speed Cylinder Front Mounting Type (mm)

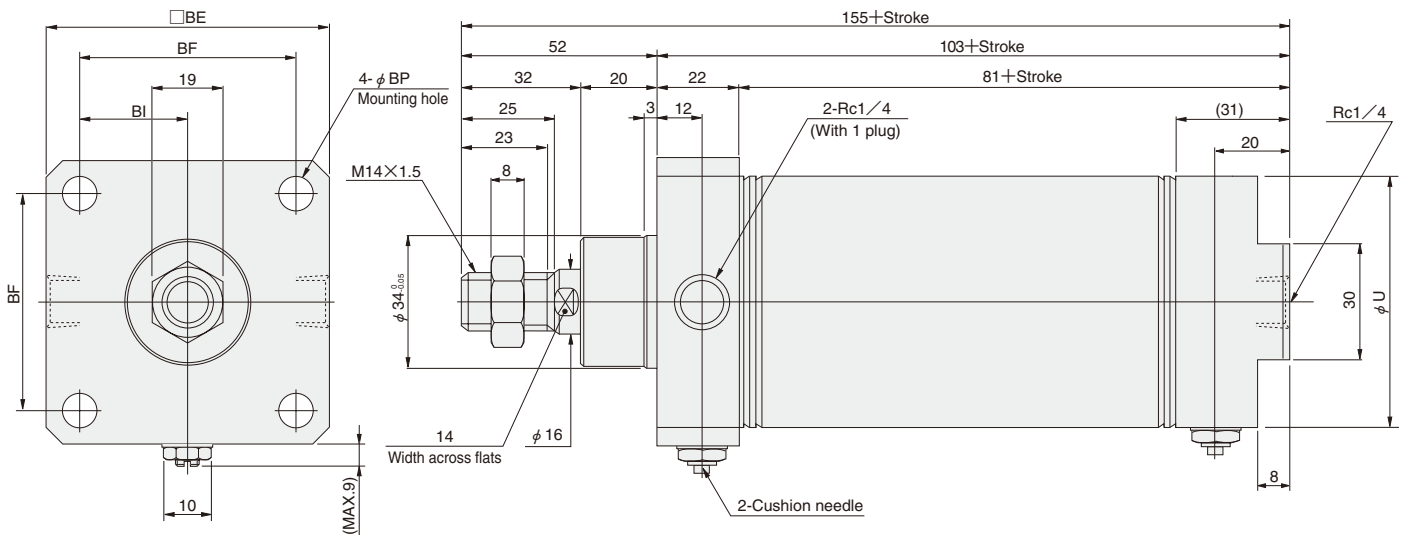
●  $\phi 20 \sim \phi 40$  DABN  ×  -4



Bore mm [in.]	Code	C	E	F	H	I	J	K	M	R	S	U	V	W
20 [0.787]		53	23	12	15	12	5	M8×1	17	10	5	21.4	8	6
25 [0.984]		53	26	14	18	14	6	M10×1.25	19	10	5	26.4	10	8
32 [1.260]		54	31	14	23	14	6	M10×1.25	22	11	6	33.6	12	10
40 [1.575]		60	31	14	23	19	8	M14×1.5	22	13	6	41.6	16	14

Bore mm [in.]	Code	BA	BB	BC	BD	BE	BF	BG	BP	BU
20 [0.787]		104	35	28	18	38	28	69	5.5	22
25 [0.984]		109	40	30	20	42	32	69	5.5	24
32 [1.260]		115	45	36	24	54	42	70	6.6	28
40 [1.575]		121	45	44	28	68	52	76	9	34

●  $\phi 50, \phi 63$  DABN  ×  -4



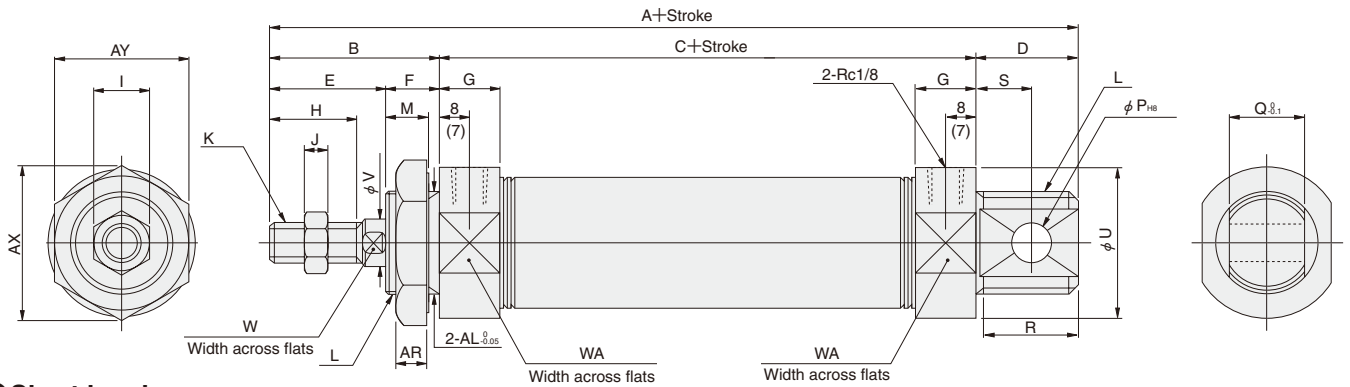
Bore mm [in.]	Code	U	BE	BF	BI	BP
50 [1.969]		52	62	48	24	6.6
63 [2.480]		65.4	74	58	29	9



# Dimensions of Cylinder with Wrench Flats Basic Type (mm)

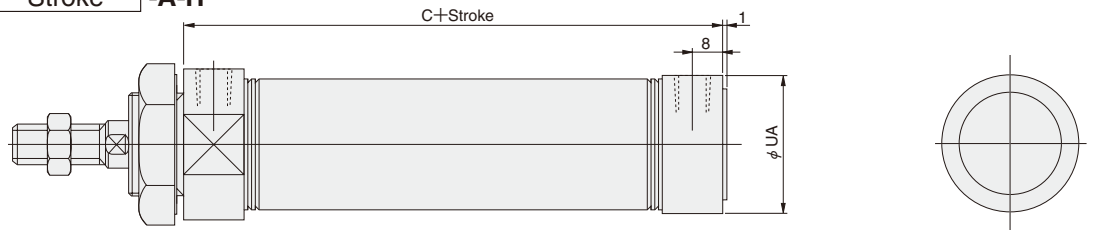
●  $\phi 20 \sim \phi 40$  DA Bore size  $\times$  Stroke -H

( ) shows for  $\phi 40$ .



## ● Short head

DA Bore size  $\times$  Stroke -A-H



Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	P	Q	R	S	U	UA	V	W	WA
20	[0.787]	132	35	76	21	23	12	16	15	12	5	M8×1	M20×1.5	10	8	12	19	12	27	27	8	6	24
25	[0.984]	137	40	76	21	26	14	16	18	14	6	M10×1.25	M22×1.5	12	8	12	19	12	29	29	10	8	27
32	[1.260]	148	45	76	27	31	14	16	23	14	6	M10×1.25	M27×2	12	10	20	25	15	38	35	12	10	35
40	[1.575]	148	45	76	27	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	10	20	25	15	44.6	41.6	16	14	42

Bore mm [in.]	Code	AR	AX	AY	AL
20	[0.787]	7.5	31.2	27	20
25	[0.984]	9.5	34.6	30	22
32	[1.260]	9.5	41.6	36	27
40	[1.575]	9.5	47.3	41	33

# MADE TO ORDER PRODUCT

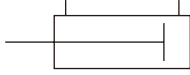
## All SUS Type Cylinders

● For delivery, consult us.



SLIM CYLINDERS

### Symbol



### Specifications

Item	Bore size mm [in.]	20, 25, 32, 40 [0.787, 0.984, 1.260, 1.575]
Operation type		Double acting type
Media		Air
Mounting type		Basic type
Operating pressure range	MPa [psi.]	0.04~0.9 [6~131]
Proof pressure	MPa [psi.]	1.32 [191]
Operating temperature range	°C [°F]	0~70 [32~158]
Operating speed range	mm/s [in./sec.]	30~700 [1.2~27.6]
Cushion		Fixed type (Rubber bumper)
Lubrication		Not required
Port size	Rc	1/8

### Bore Size and Stroke

Bore size	Standard strokes							Maximum stroke	Maximum available stroke
	25	50	75	100	125	150	200		
20	25	50	75	100	125	150		200	1050
25	25	50	75	100	125	150	200	250	
32	25	50	75	100	125	150	200	300	
40	25	50	75	100	125	150	200	250	

Remarks: 1. Stroke tolerance  ${}^+1_0 \left[ \begin{smallmatrix} +0.039in. \\ 0 \end{smallmatrix} \right]$

2. For non-standard strokes, consult us.

3. The minimum operating pressure when the stroke is over the maximum stroke at bore size of  $\phi 20 \sim \phi 40$  is 0.2MPa [29psi.].

### Order Codes

**SUS** — **DA** **20×50** — [ ] — [ ] [ ] [ ]

**SUS specification**

**DA** — Slim double acting cylinder

**20×50** — Bore size × Stroke

**Head cover specification**  
**Blank** — Standard head  
**A** — Short head

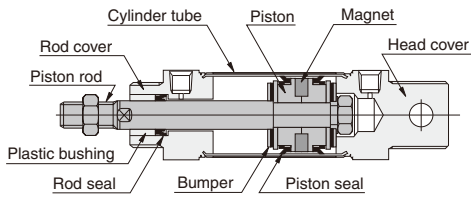
**Number of sensor switches**  
**1** — With 1 sensor switch  
**2** — With 2 sensor switches  
**3** — With 3 sensor switches  
**:** — :

**Lead wire length** (Applies to all except **CS□F**)  
**A** — 1000mm [39in.]  
**B** — 3000mm [118in.]

**Sensor switch** (for cylinders with sensor switches)  
**Blank** — No sensor switch  
**ZG530** — 2-lead wire Solid state type with indicator lamp DC10~28V  
**ZG553** — 3-lead wire Solid state type with indicator lamp DC4.5~28V  
**CS3M** — Reed switch type with indicator lamp DC10~30V  
**CS4M** — Reed switch type with indicator lamp AC85~230V  
**CS5M** — Reed switch type without indicator lamp DC10~30V  
**CS2F** — Reed switch type with indicator lamp AC85~115V  
**CS3F** — Reed switch type with indicator lamp AC85~115V  
**CS4F** — Reed switch type with indicator lamp DC3~30V  
**CS5F** — Reed switch type without indicator lamp DC10~30V  
**DC10~30V**  
**AC85~230V**  
**AC85~115V**  
**DC3~30V**

● For details of sensor switches, see p.1544.  
 ● **CS□F** comes with DIN connector. All others are grommet type.

# Inner Construction and Major Parts

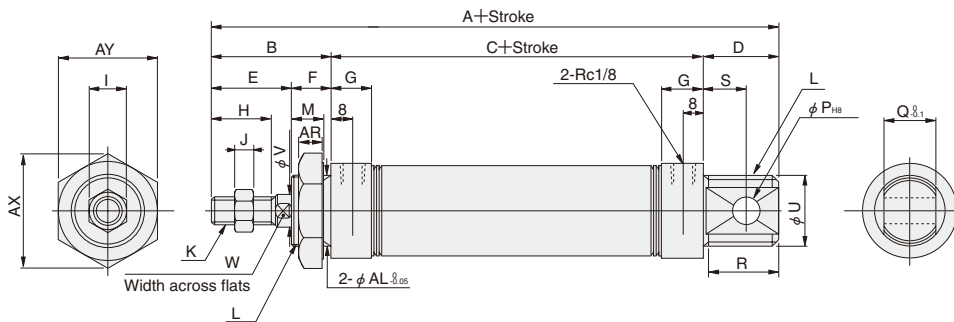


## Major Parts and Materials

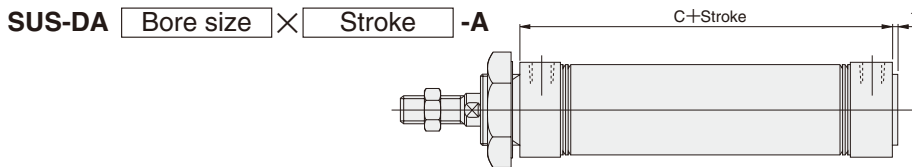
Parts	Bore size	20~40
Cylinder tube		Stainless steel
Piston		Plastic
Piston rod		Stainless steel (hard chrome plated)
Rod cover		Stainless steel
Head cover		
Seal		Synthetic rubber (NBR)
Bumper		Synthetic rubber (NBR)
Magnet		Plastic magnet

## Dimensions of All SUS Type Cylinder Basic Type (mm)

● Basic type SUS-DA  ×



● Short head



Code	A	B	C	D	E	F	G	H	I	J	K	L	M	P	Q	R	S	U	V	W
20 [0.787]	132	35	76	21	23	12	16	15	12	5	M8×1	M20×1.5	10	8	12	19	12	27	8	6
25 [0.984]	137	40	76	21	26	14	16	18	14	6	M10×1.25	M22×1.5	12	8	12	19	12	29	10	8
32 [1.260]	148	45	76	27	31	14	16	23	14	6	M10×1.25	M27×2	12	10	20	25	15	35	12	10
40 [1.575]	148	45	76	27	31	14	(14.5)	23	19	8	M14×1.5	M33×2	12	10	20	25	15	41.6	16	14

Code	AR	AX	AY	AL
20 [0.787]	7.5	31.2	27	20
25 [0.984]	9.5	34.6	30	22
32 [1.260]	9.5	41.6	36	27
40 [1.575]	9.5	47.3	41	33

# MADE TO ORDER PRODUCT

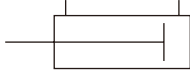
● For delivery, consult us.

## Pivot Mounting Type Cylinders with Bushing



SLIM CYLINDERS

### Symbol



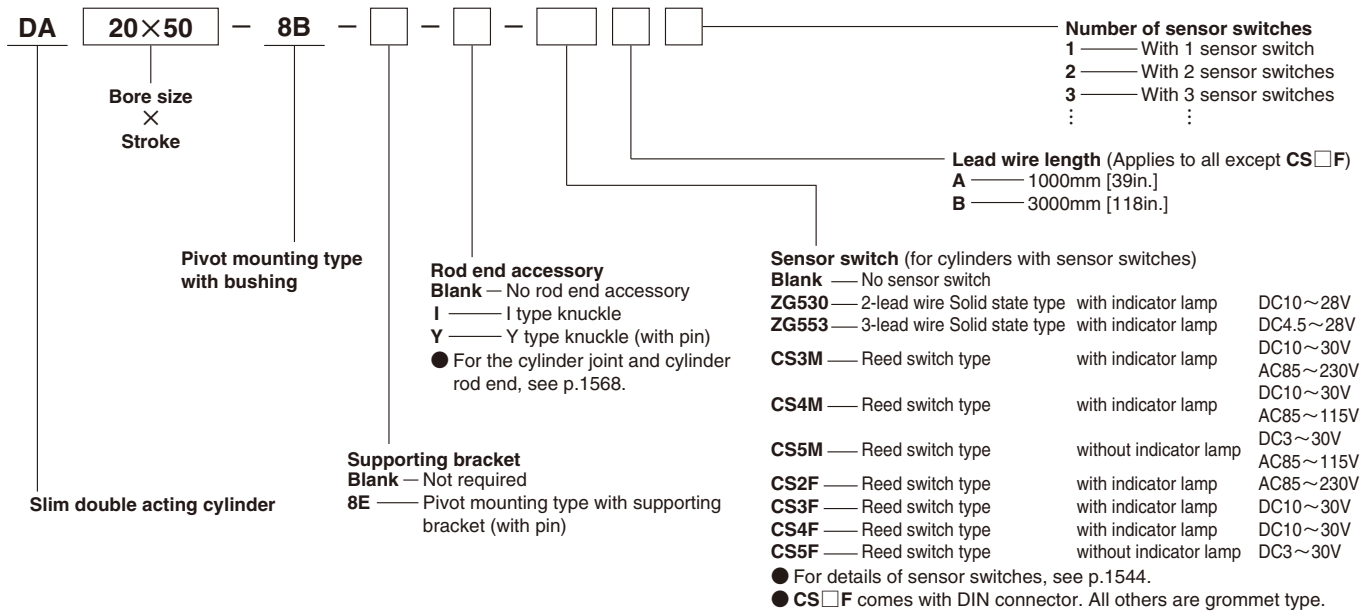
### Specifications

Same as for standard items. See p.314.  
 Available at bore sizes  $\phi 20$ ,  $\phi 25$ ,  $\phi 32$ , and  $\phi 40$  [ $\phi 0.787$ in.,  $\phi 0.984$ in.,  $\phi 1.260$ in.,  $\phi 1.575$ in.] only.  
 However, bore sizes  $\phi 50$  and  $\phi 63$  [ $\phi 1.969$ in.,  $\phi 2.480$ in.] are standard with bushing.

### Bore Size and Stroke

Same as for standard items. See p.314.

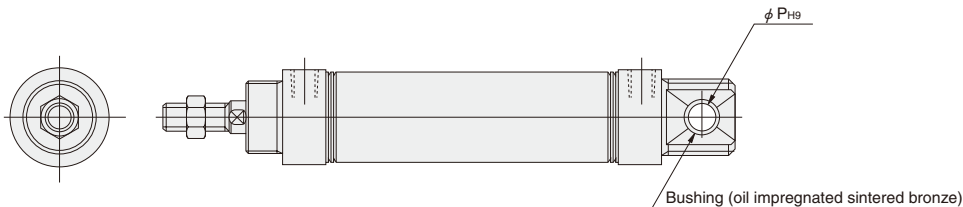
### Order Codes



### Dimensions of Pivot Mounting Type Cylinder with Bushing Basic Type

Other than the dimension and note shown below, all are the same as the standard items. See the basic type on p.316.

DA [Bore size] × [Stroke] -8B



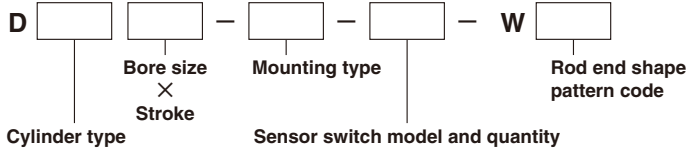


# OPTIONAL ROD END SHAPE PATTERNS

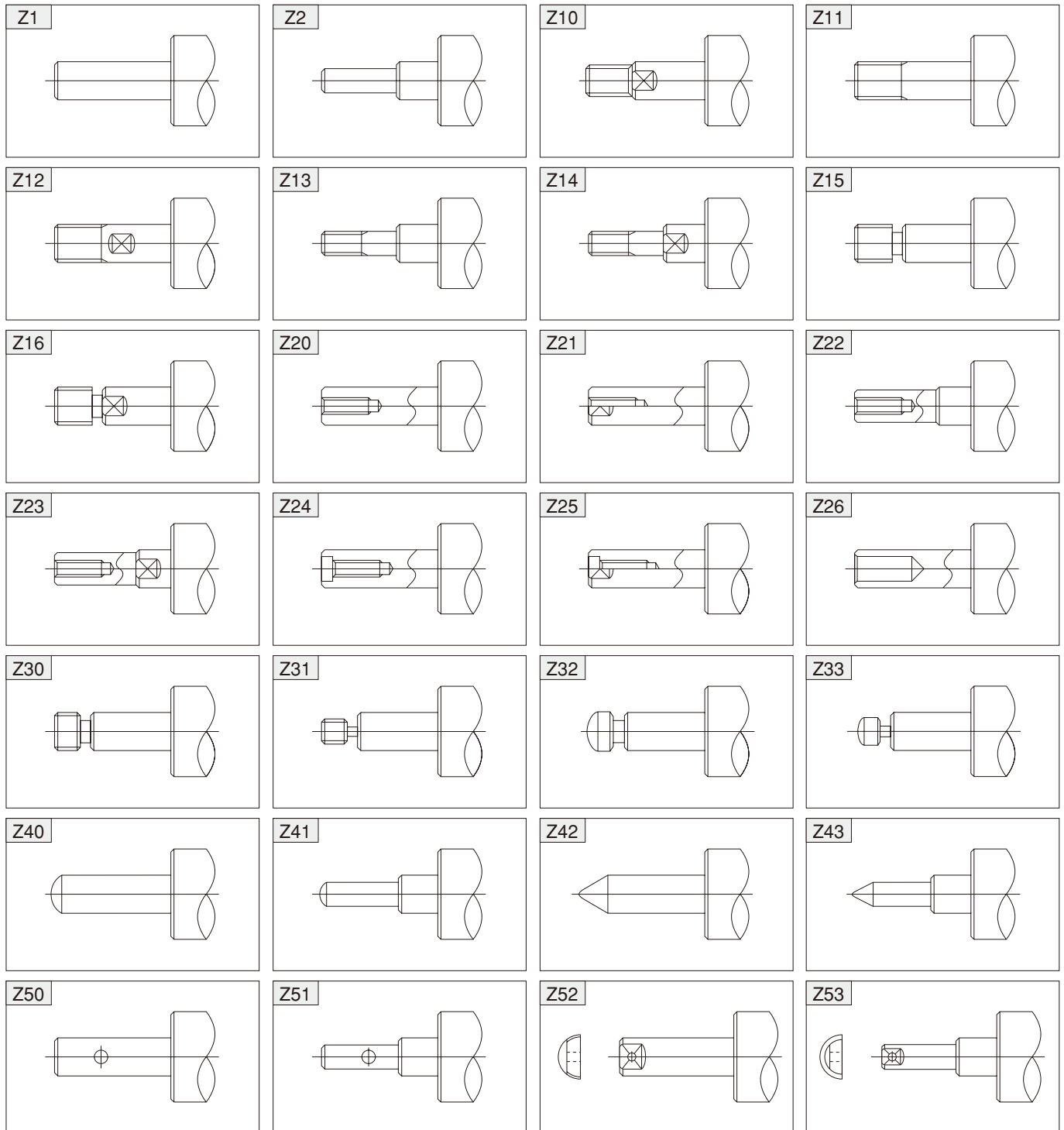
Use an order form of rod end pattern and fill the items on the selected one from among 28 types of optional patterned shapes to obtain made-to-order cylinders of non-standard rod end shapes.

The shapes can be applied to the entire Slim cylinders series with the exception of square rod cylinders and cylinders with bellows. For the order form containing the optional patterned shapes, consult us.

## Order Codes



## Piston Rod End Shape Pattern Diagram (28 Types)



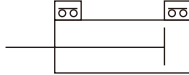
# SENSOR SWITCHES

## Solid State Type, Reed Switch Type

- Since a magnet is already standard on the Slim cylinders series <sup>Note</sup>, mounting a sensor switch will enable use in sensor switch applications.

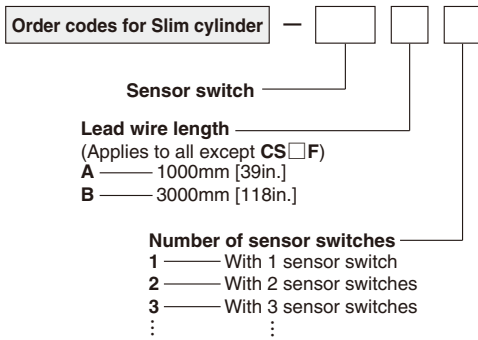
Note: Except the heat resistant specification cylinder.

### Symbol



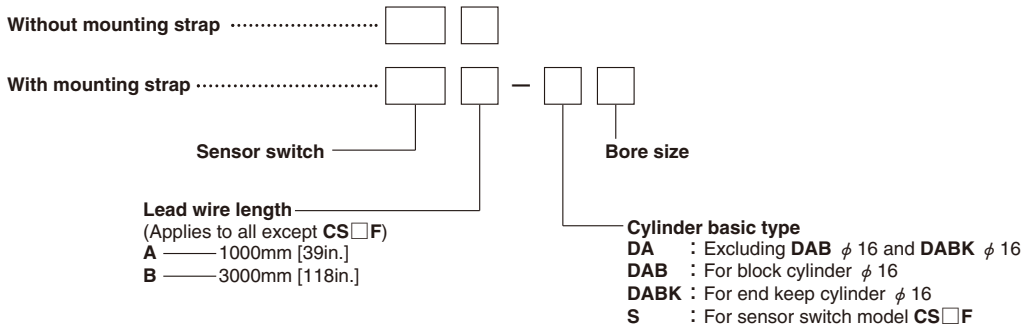
### Order Codes

- Order codes for sensor switches mounted on the Slim cylinders

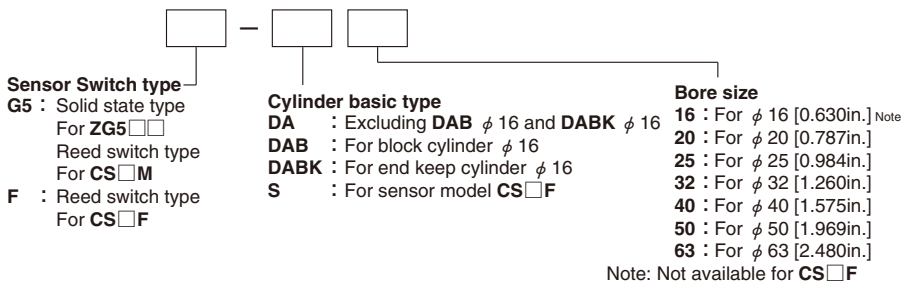


Sensor switch			
<b>ZG530</b>	Solid state type	For $\phi 16 \sim \phi 63$ with indicator lamp	DC10~30V
<b>ZG553</b>	Solid state type	For $\phi 16 \sim \phi 63$ with indicator lamp	DC4.5~28V
<b>CS3M</b>	Reed switch type	For $\phi 16 \sim \phi 63$ with indicator lamp	DC10~30V
<b>CS4M</b>	Reed switch type	For $\phi 16 \sim \phi 63$ with indicator lamp	AC85~230V
<b>CS5M</b>	Reed switch type	For $\phi 16 \sim \phi 63$ without indicator lamp	DC10~30V
<b>CS2F</b>	Reed switch type	For $\phi 20 \sim \phi 63$ with indicator lamp	AC85~115V
<b>CS3F</b>	Reed switch type	For $\phi 20 \sim \phi 63$ with indicator lamp	DC3~30V
<b>CS4F</b>	Reed switch type	For $\phi 20 \sim \phi 63$ with indicator lamp	AC85~230V
<b>CS5F</b>	Reed switch type	For $\phi 20 \sim \phi 63$ without indicator lamp	DC10~30V
			DC3~30V

- Order codes for sensor switch only



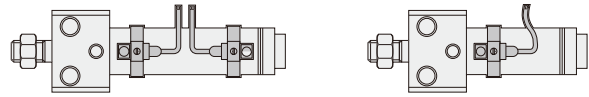
- Order codes for mounting strap only



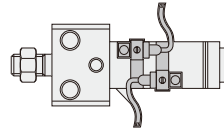
# Minimum Cylinder Strokes When Using Sensor Switches

Sensor switch model	Bore size	mm		
		2 pcs. mounting		1 pc. mounting
		Along a straight line	In staggered positions	
ZG530	16	20	10	10
ZG553	20~63	20	10	10
CS□M	16~63	20	15	15
CS□F	20~63	40	21	15

- Two pieces mounting ● One piece mounting
- When mounted in-line

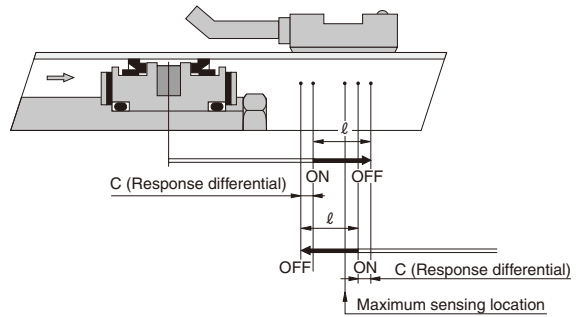


- When mounted in staggered positions



## Sensor Switch Operating Range, Response Differential, and Maximum Sensing Location

- Operating range :  $\ell$   
The distance the piston travels in one direction, while the switch is in the ON position.
- Response differential : C  
The distance between the point where the piston turns the switch ON and the point where the switch is turned OFF as the piston travels in the opposite direction.



Item	Bore size	mm [in.]						
		16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]	50 [1.969]	63 [2.480]
Operating range : $\ell$	ZG530□	2.5~4.1 [0.098~0.161]	2.5~4.2 [0.098~0.165]	2.6~4.3 [0.102~0.169]	3.0~4.8 [0.118~0.189]	3.1~5.0 [0.122~0.197]	3.3~5.4 [0.130~0.213]	3.5~5.7 [0.138~0.224]
	ZG533□	—	—	—	—	—	—	—
	CS□M	6.7~7 [0.264~0.276]	7~8.5 [0.276~0.335]	7~8.5 [0.276~0.335]	8~9 [0.315~0.354]	9~10.5 [0.354~0.413]	7~8 [0.276~0.315]	8~9.5 [0.315~0.374]
	CS□F	—	7~8.5 [0.276~0.335]	8.5~10 [0.335~0.394]	9~10.5 [0.354~0.413]	10.5~12 [0.413~0.472]	9~10 [0.354~0.394]	9~10.5 [0.354~0.413]
Response differential : C	ZG530	0.7 [0.028] or less	0.7 [0.028] or less	0.8 [0.031] or less	0.7 [0.028] or less	0.8 [0.031] or less	0.8 [0.031] or less	0.8 [0.031] or less
	ZG533	0.7 [0.028] or less	0.7 [0.028] or less	0.8 [0.031] or less	0.7 [0.028] or less	0.8 [0.031] or less	0.8 [0.031] or less	0.8 [0.031] or less
	CS□M	1 [0.039] or less	1 [0.039] or less	1 [0.039] or less	1 [0.039] or less	1 [0.039] or less	1.2 [0.047] or less	1.2 [0.047] or less
	CS□F	—	1.5 [0.059] or less	1.5 [0.059] or less	1.5 [0.059] or less	1.5 [0.059] or less	2 [0.079] or less	1.5 [0.059] or less
Maximum sensing location	ZG530, ZG533 <sup>Note 1</sup>	11 [0.433]	11 [0.433]	11 [0.433]	11 [0.433]	11 [0.433]	11 [0.433]	11 [0.433]
	CS□M <sup>Note 1</sup>	11 [0.433]	11 [0.433]	11 [0.433]	11 [0.433]	11 [0.433]	11 [0.433]	11 [0.433]
	CS□F <sup>Note 2</sup>	—	16 [0.630]	16 [0.630]	16 [0.630]	16 [0.630]	16 [0.630]	16 [0.630]

Remark: Figures in the table above are reference values.

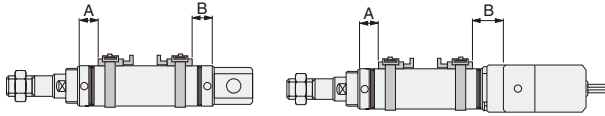
- Notes: 1. Figures are lengths measured from the switch's opposite end side to the lead wire.  
2. Figures are lengths measured from the connector side's end surface to the lead wire.

# Mounting Location of End of Stroke Detection Sensor Switch

When the sensor switch is mounted in the location shown in the diagram (figures in the table are reference values), the magnet comes to the sensor switch's maximum sensing location at the end of the stroke.

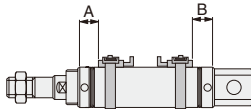
## ● Air cylinder, Low hydraulic cylinder, Valpack cylinder

- Air cylinder, Low hydraulic cylinder
- Valpack cylinder



		mm [in.]													
Sensor switch model	Bore size Code	Air cylinder, Low hydraulic cylinder						Valpack cylinder							
		20	25	32	40	50	63	20	25	32	40				
ZG530 □ ZG553 □	A	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]	36 [1.417]	36 [1.417]	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]
	B	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]	36 [1.417]	36 [1.417]	39 [1.535]	39 [1.535]	39 [1.535]	39 [1.535]	44 [1.732]	44 [1.732]	44 [1.732]	44 [1.732]
CS □ M	A	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]	36 [1.417]	36 [1.417]	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]
	B	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]	36 [1.417]	36 [1.417]	39 [1.535]	39 [1.535]	39 [1.535]	39 [1.535]	44 [1.732]	44 [1.732]	44 [1.732]	44 [1.732]
CS □ F	A	22 [0.866]	22 [0.866]	22 [0.866]	22 [0.866]	32 [1.260]	32 [1.260]	22 [0.866]	22 [0.866]	22 [0.866]	22 [0.866]	22 [0.866]	22 [0.866]	22 [0.866]	22 [0.866]
	B	22 [0.866]	22 [0.866]	22 [0.866]	22 [0.866]	32 [1.260]	32 [1.260]	34 [1.339]	34 [1.339]	34 [1.339]	34 [1.339]	39 [1.535]	39 [1.535]	39 [1.535]	39 [1.535]

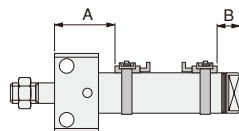
## ● Single acting cylinder



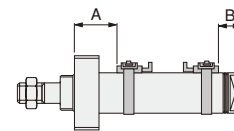
		mm [in.]				
Sensor switch model	Bore size Code	Stroke	20	25	32	40
			[0.787]	[0.984]	[1.260]	[1.575]
ZG530 □ ZG553 □ CS □ M	A	0~25	35 [1.378]	36 [1.417]	35 [1.378]	37 [1.457]
		26~50	52 [2.047]	49 [1.929]	49 [1.929]	53 [2.087]
		51~75	72 [2.835]	71 [2.795]	72 [2.835]	68 [2.677]
		76~100	—	84 [3.307]	86 [3.386]	95 [3.740]
		101~125	—	—	—	110 [4.331]
		126~150	—	—	—	125 [4.921]
	B	—	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]
CS □ F	A	0~25	30 [1.181]	31 [1.220]	30 [1.181]	32 [1.260]
		26~50	47 [1.850]	44 [1.732]	44 [1.732]	48 [1.890]
		51~75	67 [2.638]	66 [2.598]	67 [2.638]	63 [2.480]
		76~100	—	79 [3.110]	81 [3.189]	90 [3.543]
		101~125	—	—	—	105 [4.134]
		126~150	—	—	—	120 [4.724]
	B	—	22 [0.866]	22 [0.866]	22 [0.866]	22 [0.866]

## ● Block cylinder

### ● Side mount



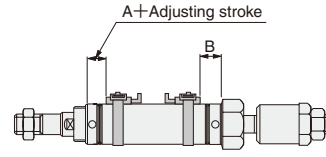
### ● Front mount



Mounting type		mm [in.]													
Bore size		16	20	25	32	40	50	63	16	20	25	32	40	50	63
ZG530 □ ZG553 □	A Rod side	32 [1.260]	39 [1.535]	41 [1.614]	47 [1.850]	57 [2.244]	67 [2.638]	67 [2.638]	23 [0.906]	27 [1.063]	27 [1.063]	27 [1.063]	29 [1.142]	37 [1.457]	37 [1.457]
	B Rod side	16 [0.630]	20 [0.787]	20 [0.787]	21 [0.827]	25 [0.984]	45 [1.772]	45 [1.772]	16 [0.630]	20 [0.787]	20 [0.787]	21 [0.827]	25 [0.984]	45 [1.772]	45 [1.772]
CS □ M	A Rod side	32 [1.260]	39 [1.535]	41 [1.614]	47 [1.850]	57 [2.244]	66 [2.598]	66 [2.598]	23 [0.906]	27 [1.063]	27 [1.063]	27 [1.063]	29 [1.142]	36 [1.417]	36 [1.417]
	B Rod side	16 [0.630]	20 [0.787]	20 [0.787]	21 [0.827]	25 [0.984]	44 [1.732]	44 [1.732]	16 [0.630]	20 [0.787]	20 [0.787]	21 [0.827]	25 [0.984]	44 [1.732]	44 [1.732]
CS □ F	A Rod side	—	36 [1.417]	38 [1.496]	44 [1.732]	52 [2.047]	64 [2.520]	64 [2.520]	—	24 [0.945]	24 [0.945]	24 [0.945]	24 [0.945]	34 [1.339]	34 [1.339]
	B Rod side	—	17 [0.669]	17 [0.669]	18 [0.709]	20 [0.787]	42 [1.654]	42 [1.654]	—	17 [0.669]	17 [0.669]	18 [0.709]	22 [0.866]	42 [1.654]	42 [1.654]

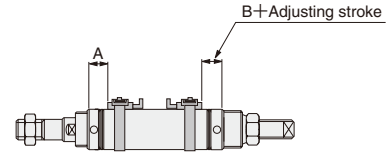
SLIM CYLINDERS

## ● Push side stroke adjusting cylinder



		mm [in.]			
Sensor switch model	Bore size Code	20	25	32	40
		[0.787]	[0.984]	[1.260]	[1.575]
ZG530 □ ZG553 □ CS □ M	A	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]
	B	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]
CS □ F	A	22 [0.866]	22 [0.866]	22 [0.866]	22 [0.866]
	B	22 [0.866]	22 [0.866]	22 [0.866]	22 [0.866]

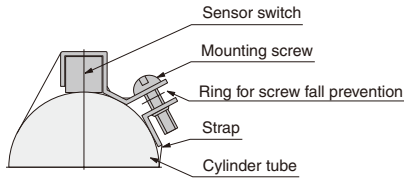
## ● Pull side stroke adjusting cylinder



		mm [in.]			
Sensor switch model	Bore size Code	20	25	32	40
		[0.787]	[0.984]	[1.260]	[1.575]
ZG530 □ ZG553 □ CS □ M	A	27 [1.063]	27 [1.063]	27 [1.063]	27 [1.063]
	B	37 [1.457]	37 [1.457]	42 [1.654]	42 [1.654]
CS □ F	A	22 [0.866]	22 [0.866]	22 [0.866]	22 [0.866]
	B	32 [1.260]	32 [1.260]	37 [1.457]	37 [1.457]

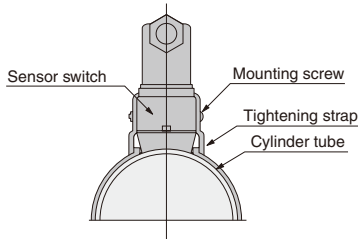
## Moving Sensor Switch

- ZG530
- ZG553
- CS  M



- Loosening the mounting screw allows the sensor switch to be moved freely along with the strap in the axial and circumferential direction. The sensor switch alone cannot be moved.
- To remove the sensor switch from the strap, first detach the strap from the cylinder tube and then remove the sensor switch from the strap.
- Tighten the mounting screw with a tightening torque of 49N·cm [4.3in·lbf].

- CS  F

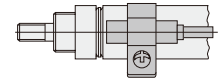
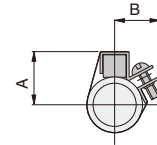


- Loosening the mounting screw allows the sensor switch to be moved freely in the axial and circumferential direction.
- Slightly loosening the mounting screw allows fine adjustment of the lead switch only, up to 5mm [0.2in.] in the axial direction. Tighten the mounting screw with a tightening torque of 68.6N·cm [6.1in·lbf].

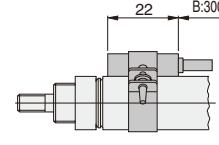
## Dimensions of Sensor Switch (mm)

- ZG530
- ZG553
- CS  M

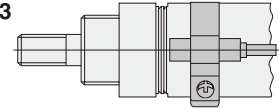
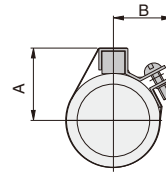
φ 16



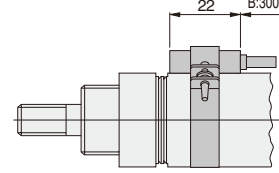
Lead wire length  
A:1000mm [39in.]  
B:3000mm [118in.]



φ 20 ~ φ 63



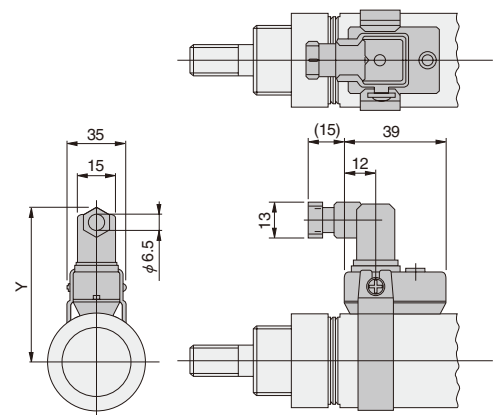
Lead wire length  
A:1000mm [39in.]  
B:3000mm [118in.]



		mm [in.]	
Bore	Code	A	B
16	16	15	15
[0.630]	[0.630]	[0.591]	[0.591]
20	19	17	17
[0.787]	[0.748]	[0.669]	[0.669]
25	20.5	17.5	17.5
[0.984]	[0.807]	[0.689]	[0.689]
32	25	19	19
[1.260]	[0.984]	[0.748]	[0.748]
40	29	—*	—*
[1.575]	[1.142]		
50	34	—*	—*
[1.969]	[1.339]		
63	41	—*	—*
[2.480]	[1.614]		

\* At φ 40 or larger, dimension B is the radius of the cylinder tube. Therefore, the protrusion in the B direction of the mounting section disappears.

- CS  F



		mm [in.]
Bore	Code	Y
20	59	59
[0.787]	[2.323]	[2.323]
25	61.5	61.5
[0.984]	[2.421]	[2.421]
32	65	65
[1.260]	[2.559]	[2.559]
40	69	69
[1.575]	[2.717]	[2.717]
50	76	76
[1.969]	[2.992]	[2.992]
63	83	83
[2.480]	[3.268]	[3.268]

# ROD END ACCESSORIES

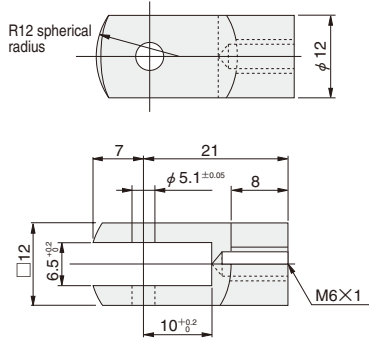
## Option

### Dimensions

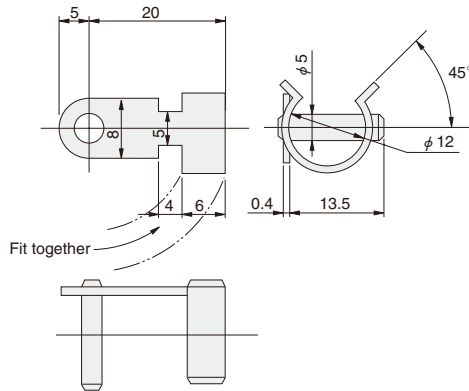
●  $\phi 16$

● Y type

 SLIM-Y

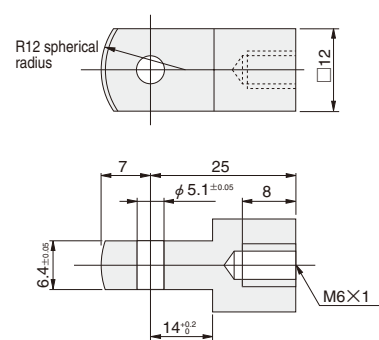


Pin for Y type knuckle



● I type

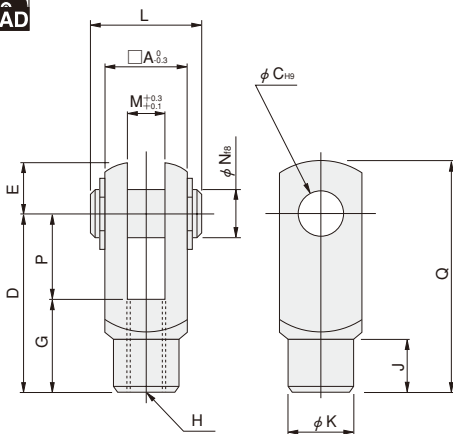
 SLIM-I



●  $\phi 20 \sim \phi 63$

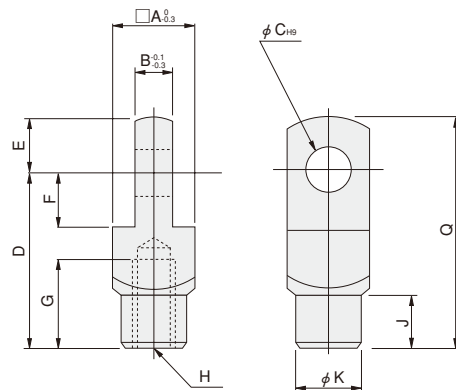
● Y type

 SLIM-Y



● I type

 SLIM-I



		mm [in.]														
Bore	Code	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
20 [0.787], 25 [0.984]	※	16	8	8	30	10	11	15	M8×1	10	14	21	8	8	15	40
25 [0.984], 32 [1.260]		19	10	10	40	12	13	20	M10×1.25	12	16	25	10	10	20	52
40 [1.575], 50 [1.969], 63 [2.480]		24	14	10	45	12	13	25	M14×1.5	15	22	30	14	10	20	57

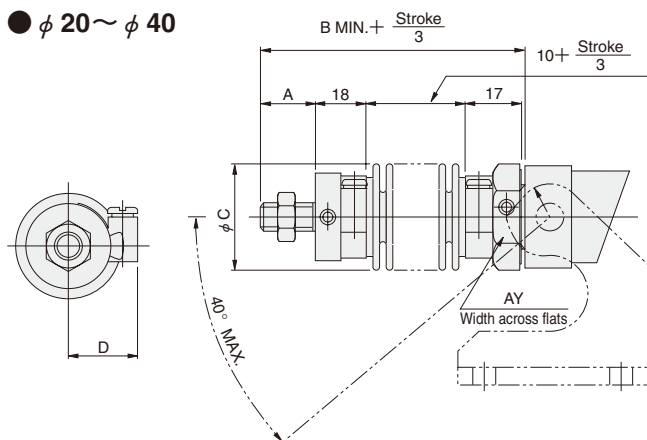
Note: Items marked with ※ are for the square rod cylinders.

# BELLOWS, MOUNTING BRACKETS



## Dimensions (For brake cylinders with bellows, see p.367.)

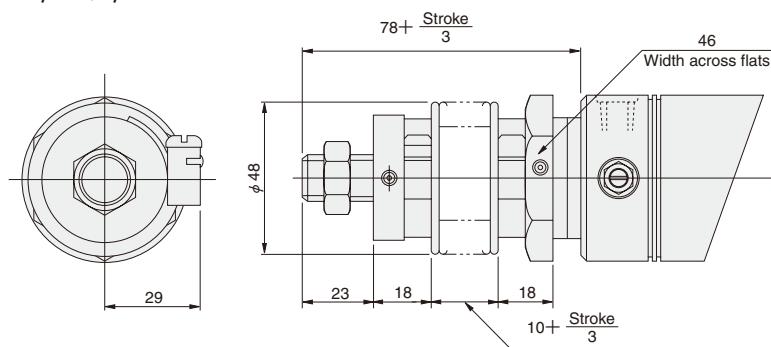
### ● $\phi 20 \sim \phi 40$



Bore	Code	A	B	C	D	AY
20	[0.787]	15 [0.591]	63 [2.480]	35 [1.378]	23 [0.906]	27 [1.063]
25	[0.984]	18 [0.709]	66 [2.598]	35 [1.378]	23 [0.906]	30 [1.181]
32	[1.260]	23 [0.906]	71 [2.795]	40 [1.575]	26 [1.024]	36 [1.417]
40	[1.575]	23 [0.906]	71 [2.795]	48 [1.890]	29 [1.142]	41 [1.614]

Note: Supporting brackets for the rod trunnion type with bellows should be mounted in the direction opposite to the case of no bellows shown in the diagram.

### ● $\phi 50, \phi 63$



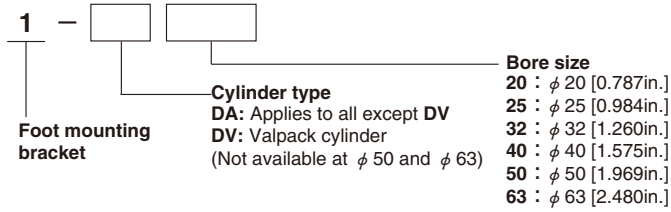
## Mass of Slim Cylinder with Bellows

Bore size mm [in.]	Zero stroke mass				Additional mass for each 1mm [0.0394in.] stroke
	Standard head	Short head	Pivot mounting type	Trunnion type	
20 [0.787]	0.25 [0.55] (0.23 [0.51])	0.24 [0.53] (0.22 [0.49])	—	0.44 [0.97]	0.0009 [0.0020]
25 [0.984]	0.29 [0.64] (0.27 [0.60])	0.28 [0.62] (0.26 [0.57])	—	0.47 [1.04]	0.0013 [0.0029]
32 [1.260]	0.43 [0.95] (0.40 [0.88])	0.41 [0.90] (0.38 [0.84])	—	0.60 [1.32]	0.0018 [0.0040]
40 [1.575]	0.62 [1.37] (0.56 [1.23])	0.58 [1.28] (0.52 [1.15])	—	0.78 [1.72]	0.0029 [0.0064]
50 [1.969]	1.03 [2.27]	0.98 [2.16]	0.95 [2.09]	—	0.0033 [0.0073]
63 [2.480]	1.36 [3.00]	1.32 [2.91]	1.29 [2.84]	—	0.0038 [0.0084]

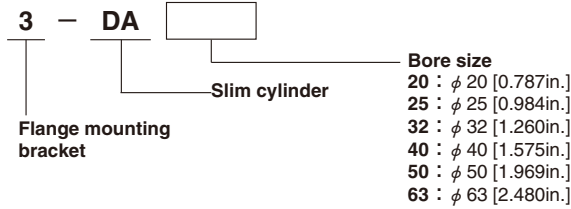
Note: Figures in parentheses ( ) are for the cylinder with variable cushion.

# Order Codes for Mounting Bracket

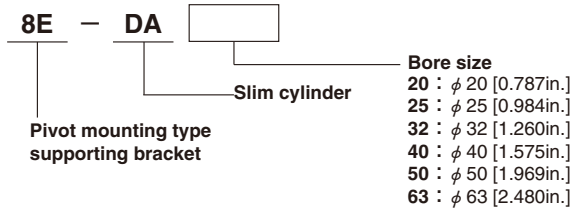
## (1) Foot mounting bracket



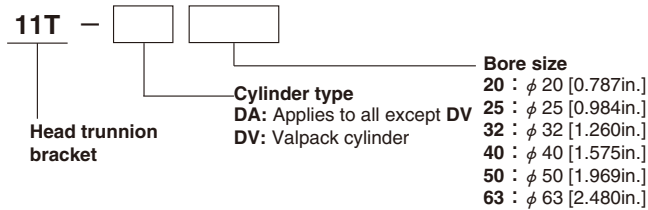
## (2) Flange mounting bracket



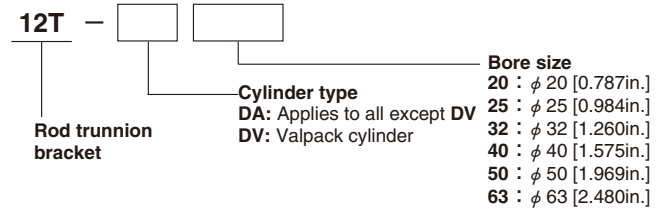
## (3) Pivot mounting type supporting bracket



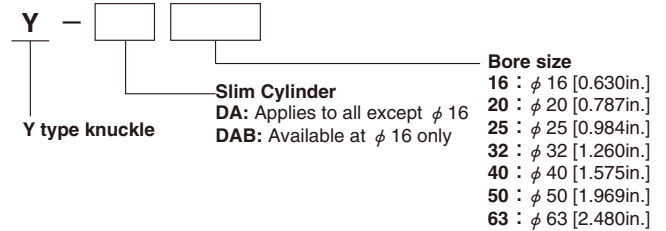
## (4) Head trunnion bracket



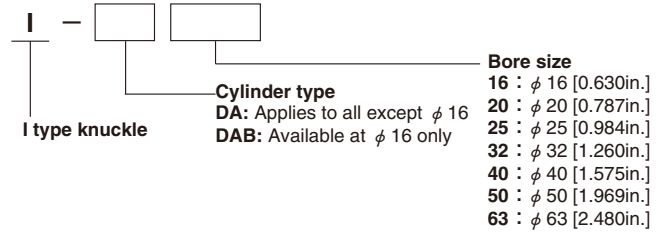
## (5) Rod trunnion bracket



## (6) Y type knuckle



## (7) I type knuckle



SLIM CYLINDERS



