

NPT thread type  
**SLIM CYLINDERS**  
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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)

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

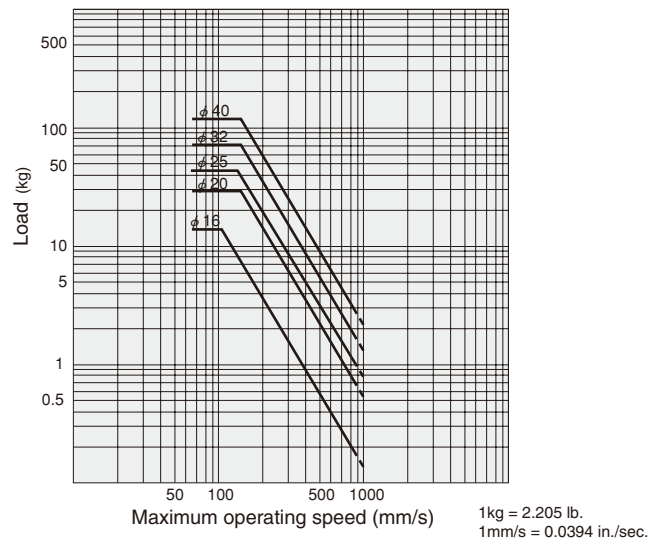
E'x: Kinetic energy [ft·lbf]  
W: Load [lbf.]  
v': Piston speed [ft./sec.]  
g: Acceleration of gravity 32.2 [ft./sec.<sup>2</sup>]

### Operating speed range

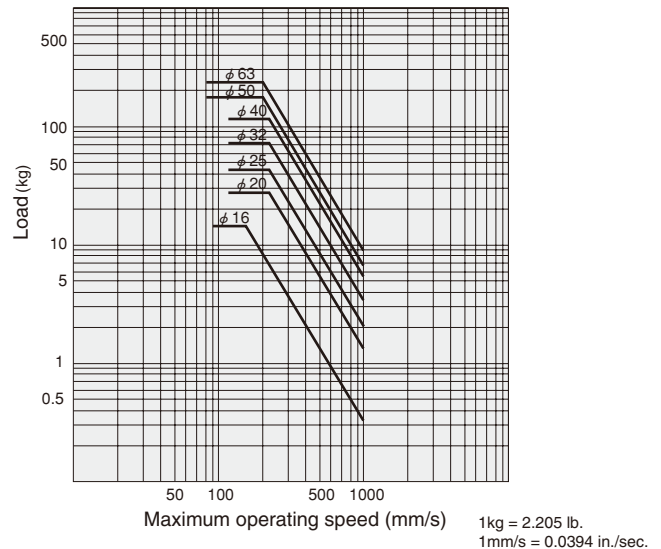
- Rubber bumper ..... 30~800mm/s [1.2~31.5in./sec.]
- Variable cushion ..... 30~1000mm/s [1.2~39.4in./sec.]

Bore size mm [in.]	Allowable kinetic energy J [ft·lbf]	
	With rubber bumpers	With variable cushion
16 [0.630]	0.07 [0.052]	
20 [0.787]	0.27 [0.20]	
25 [0.984]	0.40 [0.30]	
32 [1.260]	0.65 [0.48]	
40 [1.575]	1.2 [0.89]	
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.].

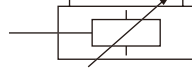
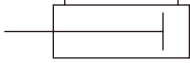
# SLIM CYLINDERS

## 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		NPT	1/8		1/4

### Bore Size and Stroke

Bore size	Standard strokes	mm
		Maximum stroke No 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
50	25 50 75 100 150 200 [250 300 350 400]	400
63	25 50 75 100 150 200 [250 300 350 400]	400

- Remarks: 1. Stroke tolerance  $^{+1}_{0}$  [ $^{+0.039}_{0}$ 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** — **F11** — [ ] — [ ] — [ ] — [ ] — [ ]

**Bore size**  
×  
**Stroke**

**With or without variable cushion**  
Blank — Standard cylinder  
(Air cushion  
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) ( $\phi 20 \sim 40$  only)  
8B-8E — Pivot mounting type with bushing and supporting bracket  
( $\phi 50$  and  $\phi 63$  only)

● Mounting brackets are included at shipping.  
(Except pivot type and pivot 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 [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

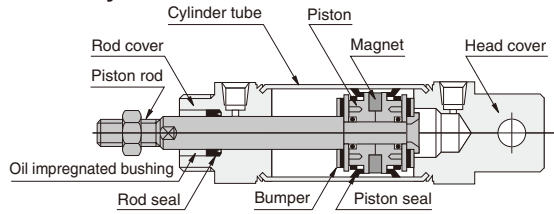
● For details of sensor switches, see p.1544.  
● CS□F comes with DIN connector. All others are grogmet type.

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

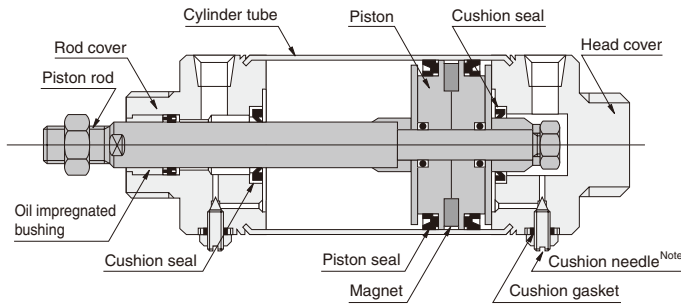
**Slim double acting cylinder**

# Inner Construction and Major Parts (cannot be disassembled)

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



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



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)	—	
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	Cushion seal	Cushion gasket
		1	2	2	2
<b>20 [0.787]</b>		NY-12×8×3.5	PPY-20	GYH-9	DT-1-4
<b>25 [0.984]</b>		NY-14×10×3.5	PPY-25	GYH-11	DT-1-4
<b>32 [1.260]</b>		NY-17×12×4	PPY-32	PCS-14	DT-1-4
<b>40 [1.575]</b>		NY-22×16×5	PPY-40	PCS-18	DT-1-4
<b>50 [1.969]</b>		NY-22×16×5	PGY-50	PCS-20	DT-1-5
<b>63 [2.480]</b>		NY-22×16×5	PGY-63	PCS-20	DT-1-5

## Mass

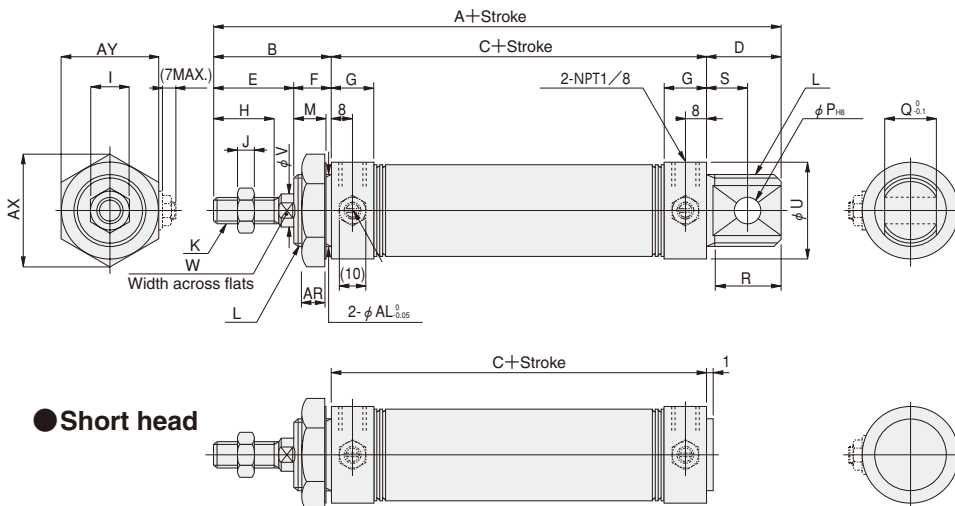
Bore size mm [in.]	kg [lb.]						
	Zero stroke mass			Additional mass for each 1mm [0.0394in.] stroke	Mass of mounting bracket		
	Standard head type	Short head type	Pivot mounting type		Foot bracket	Flange bracket	Pivot bracket
<b>20 [0.787]</b>	0.16 [0.35] (0.14 [0.31])	0.15 [0.33] (0.13 [0.29])	—	0.0008 [0.0018]	0.14 [0.31]	0.08 [0.18]	0.06 [0.13]
<b>25 [0.984]</b>	0.21 [0.46] (0.18 [0.40])	0.20 [0.44] (0.17 [0.37])	—	0.0011 [0.0024]	0.16 [0.35]	0.08 [0.18]	0.06 [0.13]
<b>32 [1.260]</b>	0.33 [0.73] (0.30 [0.66])	0.31 [0.68] (0.28 [0.62])	—	0.0015 [0.0033]	0.19 [0.42]	0.10 [0.22]	0.14 [0.31]
<b>40 [1.575]</b>	0.49 [1.08] (0.43 [0.95])	0.45 [0.99] (0.39 [0.86])	—	0.0024 [0.0053]	0.29 [0.64]	0.13 [0.29]	0.14 [0.31]
<b>50 [1.969]</b>	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]
<b>63 [2.480]</b>	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]

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)

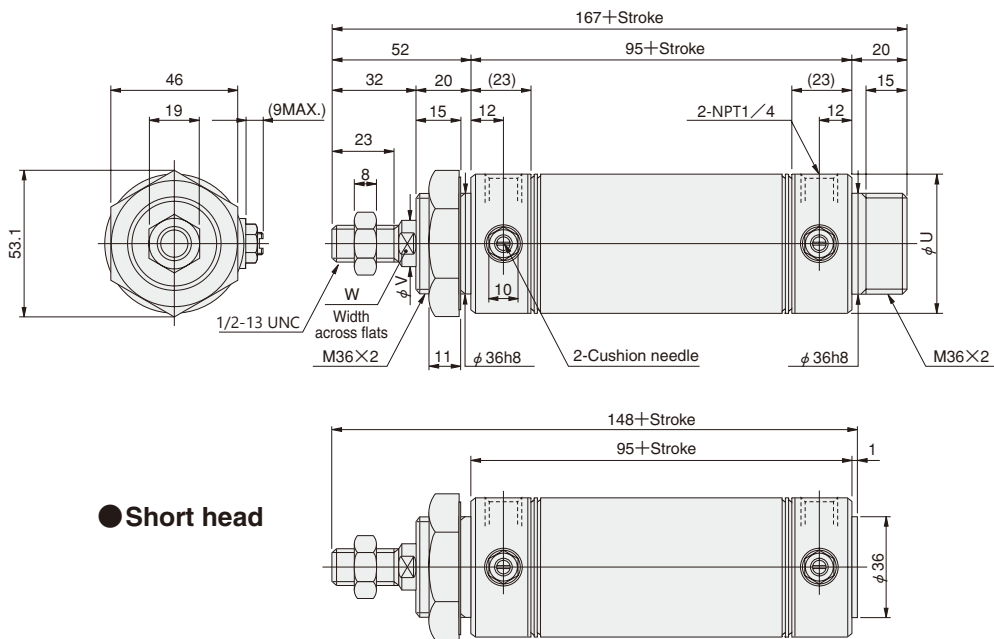
●  $\phi 20 \sim \phi 40$  DA  Bore size   $\times$   Stroke

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



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	5/16-18 UNC	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	3/8-16 UNC	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	3/8-16 UNC	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	1/2-13 UNC	M33×2	12	10	20	25	15	41.6	16	14	9.5	47.3	41	33

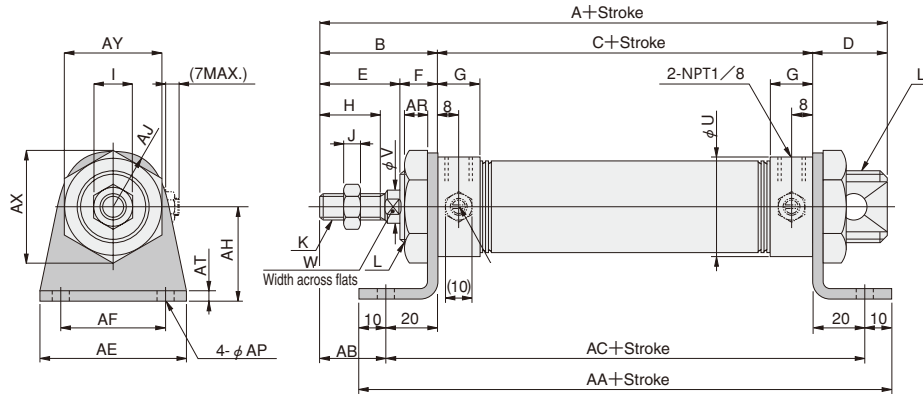
●  $\phi 50, \phi 63$  DA  Bore size   $\times$   Stroke



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

# Dimensions of Foot Mounting Type (mm)

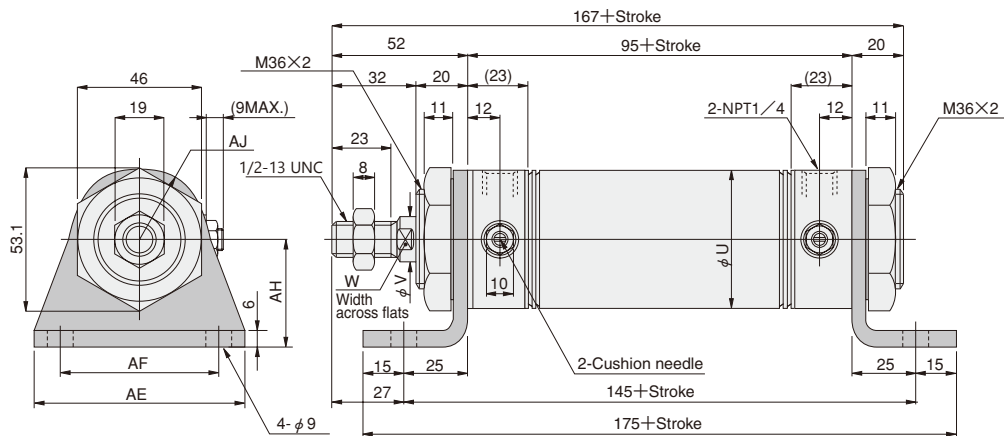
●  $\phi 20 \sim \phi 40$  DA  Bore size   $\times$   Stroke  -1



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	5/16-18 UNC	M20 $\times$ 1.5	27	8	6
25 [0.984]		137	40	76	21	26	14	16	18	14	6	3/8-16 UNC	M22 $\times$ 1.5	29	10	8
32 [1.260]		148	45	76	27	31	14	16	23	14	6	3/8-16 UNC	M27 $\times$ 2	35	12	10
40 [1.575]		148	45	76	27	31	14	(14.5)	23	19	8	1/2-13 UNC	M33 $\times$ 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

●  $\phi 50, \phi 63$  DA  Bore size   $\times$   Stroke  -1

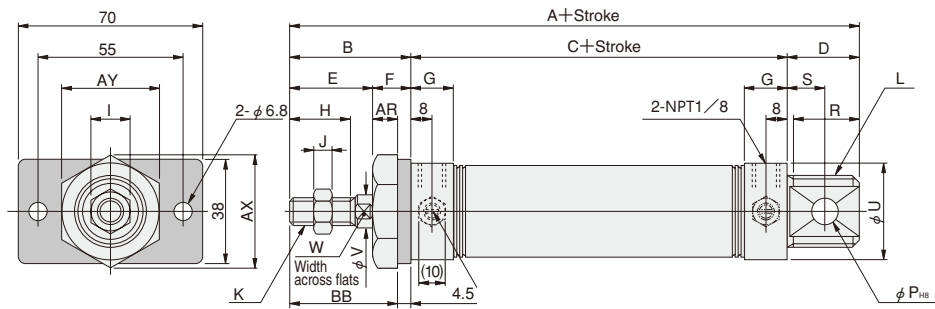


Bore mm [in.]	Code	U	V	W	AE	AF	AH	AJ
50 [1.969]		52	16	14	80	60	40	26
63 [2.480]		65.4	16	14	95	74	45	32

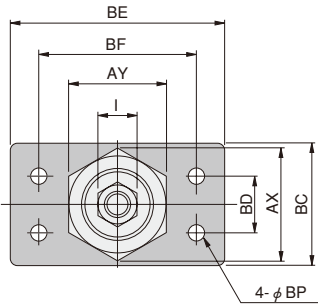
# Dimensions of Flange Mounting Type (mm)

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

●  $\phi 20, \phi 25$



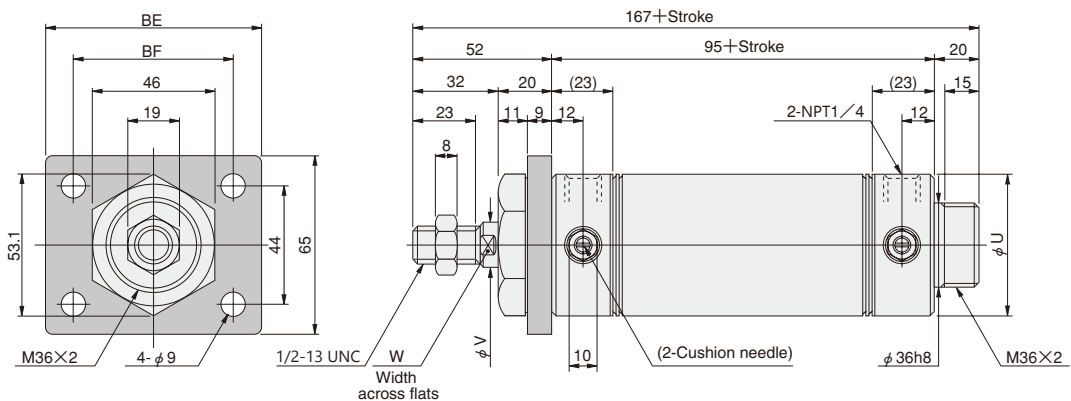
●  $\phi 32, \phi 40$



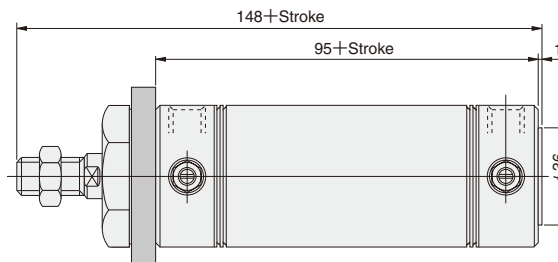
Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	P	R	S	U	V	W
20 [0.787]	132	35	76	21	23	12	16	15	12	5	5/16-18 UNC	M20×1.5	8	19	12	27	8	6	
25 [0.984]	137	40	76	21	26	14	16	18	14	6	3/8-16 UNC	M22×1.5	8	19	12	29	10	8	
32 [1.260]	148	45	76	27	31	14	16	23	14	6	3/8-16 UNC	M27×2	10	25	15	35	12	10	
40 [1.575]	148	45	76	27	31	14	(14.5)	23	19	8	1/2-13 UNC	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   $\times$   Stroke -3



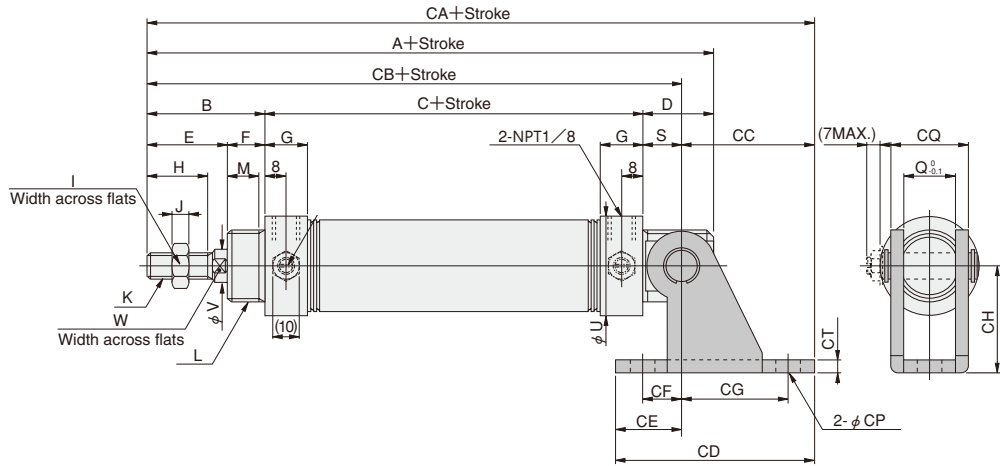
● Short head



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

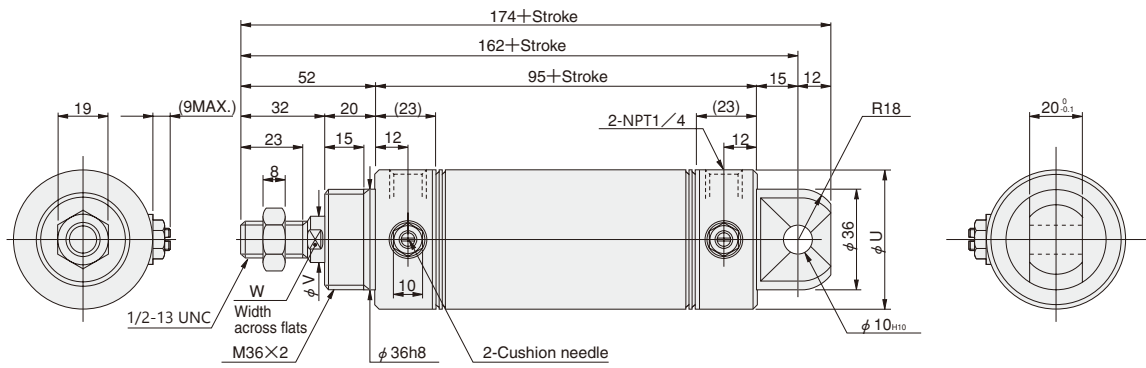


Bore mm [in.]	Code	A	B	C	D	E	F	G	H	I	J	K	L	M	Q	S	U	V	W
20 [0.787]		132	35	76	21	23	12	16	15	12	5	5/16-18 UNC	M20×1.5	10	12	12	27	8	6
25 [0.984]		137	40	76	21	26	14	16	18	14	6	3/8-16 UNC	M22×1.5	12	12	12	29	10	8
32 [1.260]		148	45	76	27	31	14	16	23	14	6	3/8-16 UNC	M27×2	12	20	15	35	12	10
40 [1.575]		148	45	76	27	31	14	(14.5)	23	19	8	1/2-13 UNC	M33×2	12	20	15	41.6	16	14

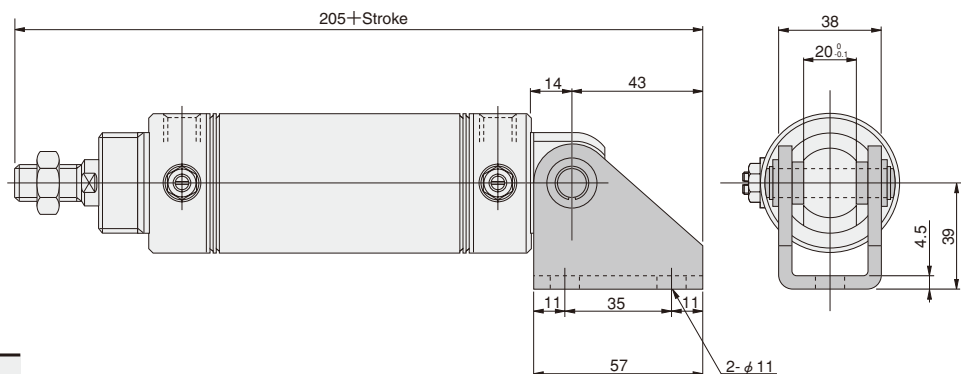
Bore mm [in.]	Code	CA	CB	CC	CD	CE	CF	CG	CH	CP	CQ	CT
20 [0.787]		160	123	37	59	22	15	30	30	6.8	18.4	3.2
25 [0.984]		165	128	37	59	22	15	30	30	6.8	18.4	3.2
32 [1.260]		186	136	50	75	25	15	40	40	9	28	4
40 [1.575]		186	136	50	75	25	15	40	40	9	28	4

●  $\phi 50, \phi 63$

● 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)

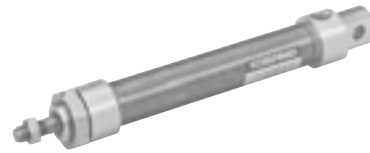


Bore mm [in.]	Code	U	V	W
50 [1.969]		52	16	14
63 [2.480]		65.4	16	14

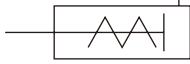


# SLIM CYLINDERS

## Single Acting Push Type



### Symbol



### Specifications

Item	Bore size mm [in.]	20, 32 [0.787, 1.260]
Operation type		Single acting push type
Media		Air
Mounting type		Basic type, Foot type, Flange type, Pivot type
Operating pressure range MPa [psi.]		0.16~0.9 [23~131]
Proof pressure MPa [psi.]		1.32 [191]
Operating temperature range °C [°F]		0~70 [32~158]
Operating speed range mm/s [in./sec.]		100~700 [3.9~27.6]
Returning speed mm/s [in./sec.]		350 [13.8]
Cushion		Fixed type (The retracted side only has a rubber bumper.)
Lubrication		Not required
Port size NPT		1/8
Breather		With filter

### Bore Size and Stroke

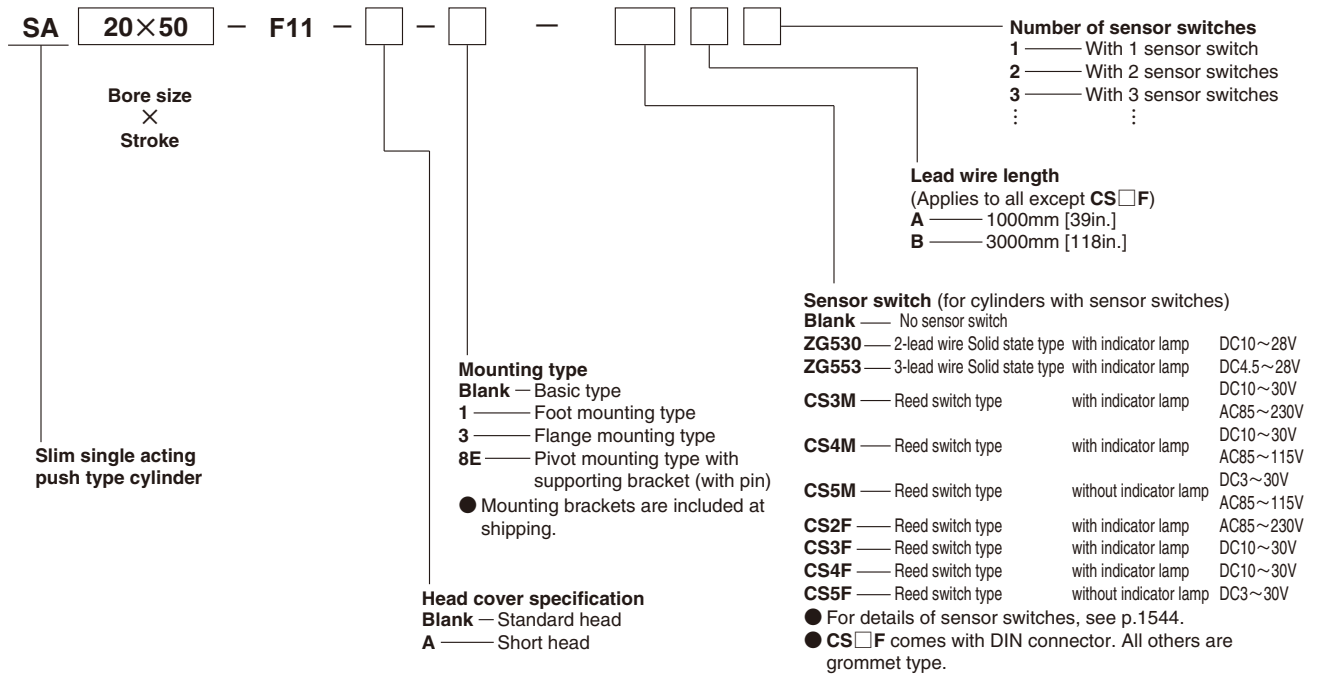
Bore size	Standard strokes	Maximum stroke	mm
			Maximum available stroke
20	25 50 75	75	No bellows
			500
32	25 50 75 100	100	500

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 is 0.2MPa [29psi.].

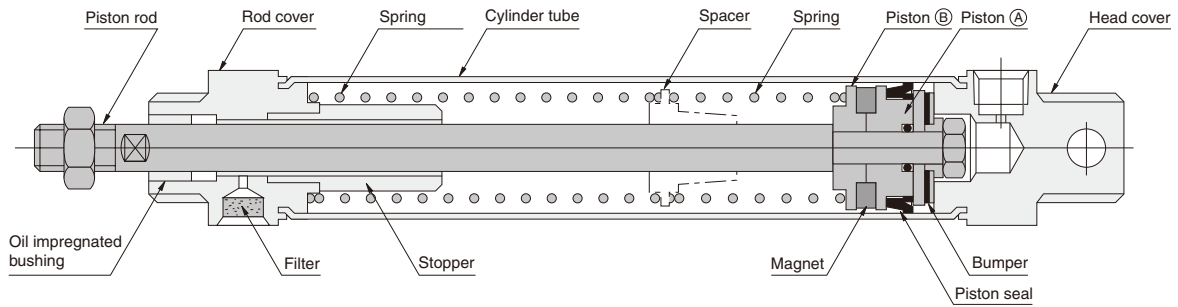
### Spring Return Force

Bore size mm [in.]	Zero stroke	N [lbf.]
		Stroke end
20 [0.787]	7.5 [1.69]	38.2 [8.59]
32 [1.260]	14.7 [3.30]	76.5 [17.2]

### Order Codes



## 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

## Air Consumption

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

ℓ [ft.<sup>3</sup>] (ANR)

Bore size mm [in.]	Air pressure MPa [psi.]							
	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

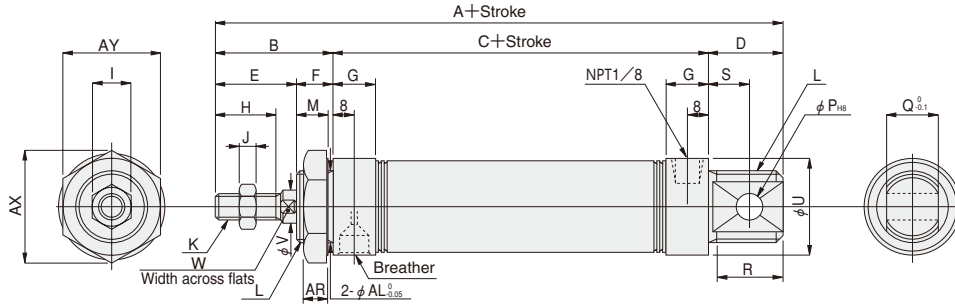
Bore size mm [in.]	Mass of basic type				Mass of mounting bracket		
	Stroke mm				Foot bracket	Flange bracket	Pivot bracket
	25	50	75	100			
<b>20 [0.787]</b>	0.22 [0.49] (0.21 [0.46])	0.27 [0.60] (0.26 [0.57])	0.32 [0.71] (0.31 [0.68])	—	0.14 [0.31]	0.08 [0.18]	0.06 [0.13]
<b>32 [1.260]</b>	0.37 [0.82] (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]

Note: Figures in parentheses ( ) are for short head type.

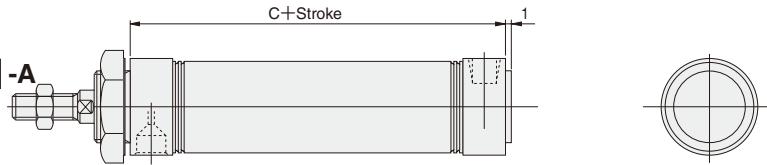
Calculation example: For foot mounting type of 32mm bore size and 75mm stroke  
 $0.71 + 0.19 = 0.90\text{kg}$  [1.98lb.]

# Dimensions of Single Acting Push Type (mm)

● Basic type SA  ×



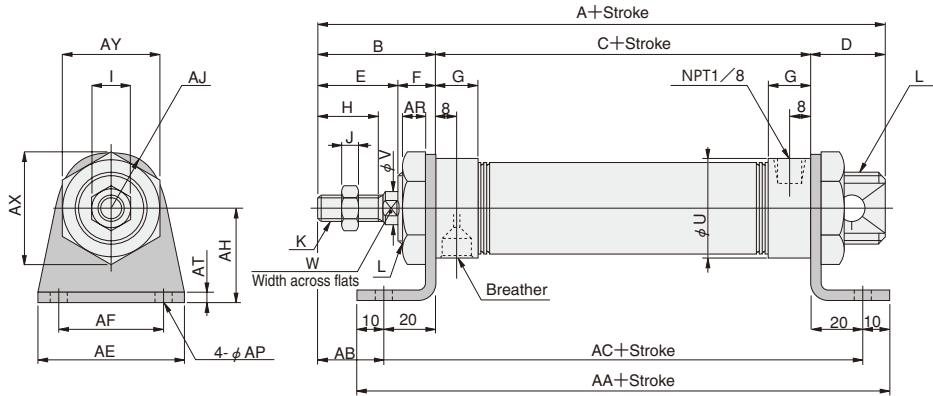
● Short head SA  ×  -A



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	5/16-18 UNC	M20×1.5	10	8	12	19	12	27	8	6	7.5	31.2	27	20
32 [1.260]	14	6	3/8-16 UNC	M27×2	12	10	20	25	15	35	12	10	9.5	41.6	36	27

● Foot mounting type SA  ×  -1



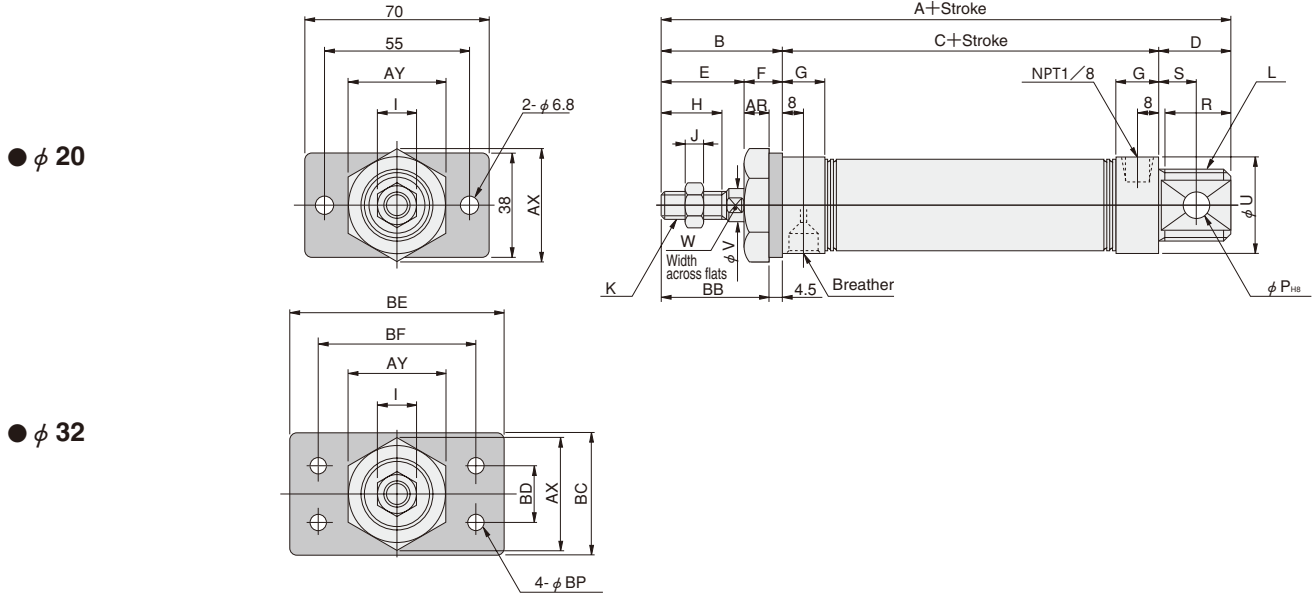
Code Stroke	A						B	C						D	E	F	G	H
	0~25	26~50	51~75	76~100	101~125	126~150		0~25	26~50	51~75	76~100	101~125	126~150					
20 [0.787]	140	157	177	—	—	—	35	84	101	121	—	—	—	21	23	12	16	15
32 [1.260]	156	170	193	207	—	—	45	84	98	121	135	—	—	27	31	14	16	23

Code	I	J	K	L	U	V	W
20 [0.787]	12	5	5/16-18 UNC	M20×1.5	27	8	6
32 [1.260]	14	6	3/8-16 UNC	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



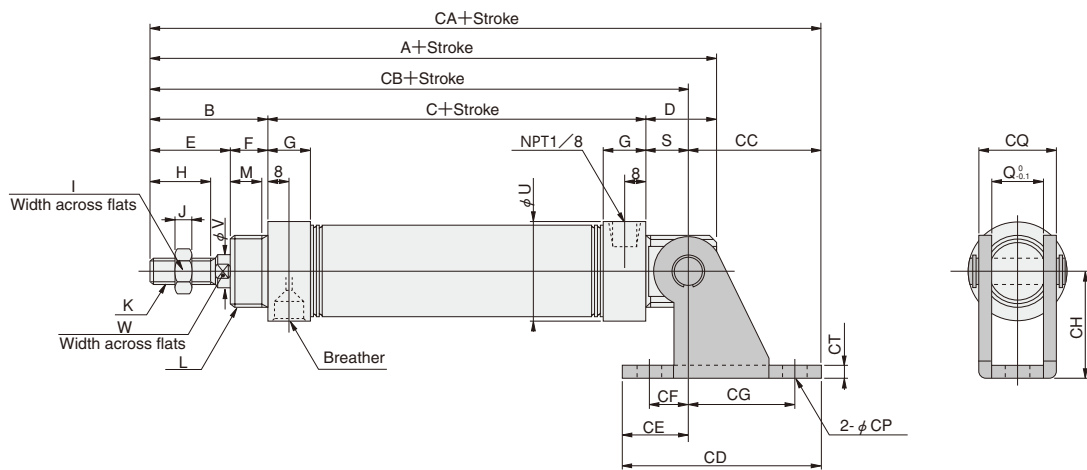
● φ 20

● φ 32

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	5/16-18 UNC	M20×1.5	8	19	12	27	8	6	7.5	31.2	27	30.5	—	—	—	—	—
32 [1.260]	14	6	3/8-16 UNC	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



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	5/16-18 UNC	M20×1.5	10
32 [1.260]	156	170	193	207	—	—	45	84	98	121	135	—	—	27	31	14	16	23	14	6	3/8-16 UNC	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

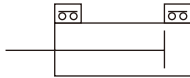
# SENSOR SWITCHES

## 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.

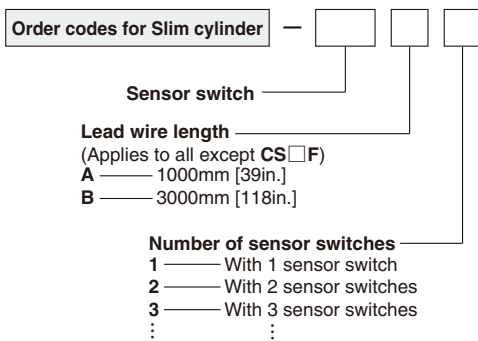
Note: Except the heat resistant specification cylinder.

### Symbol



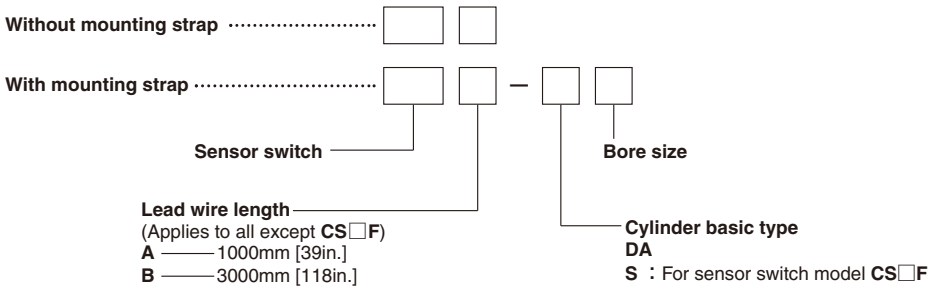
### Order Codes

#### ● Order codes for sensor switches mounted on the Slim cylinders

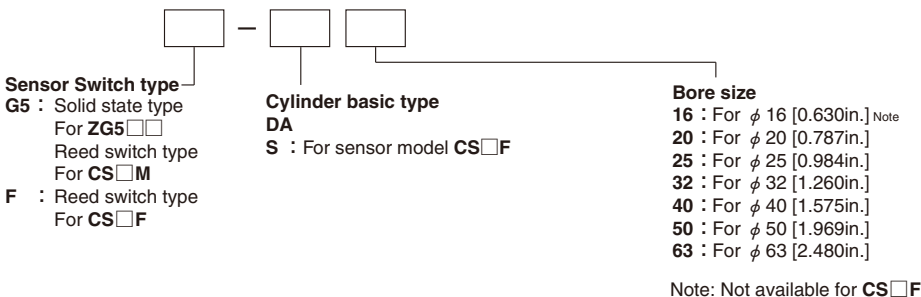


Sensor switch			
ZG530	Solid state type	For $\phi 16 \sim \phi 63$ with indicator lamp	DC10~30V
ZG553	Solid state type	For $\phi 16 \sim \phi 63$ with indicator lamp	DC4.5~28V
CS3M	Reed switch type	For $\phi 16 \sim \phi 63$ with indicator lamp	DC10~30V
CS4M	Reed switch type	For $\phi 16 \sim \phi 63$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

#### ● Order codes for sensor switch only



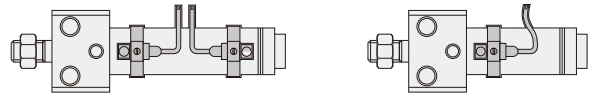
#### ● Order codes for mounting strap only



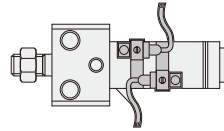
# Minimum Cylinder Strokes When Using Sensor Switches

Sensor switch model	Bore size	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

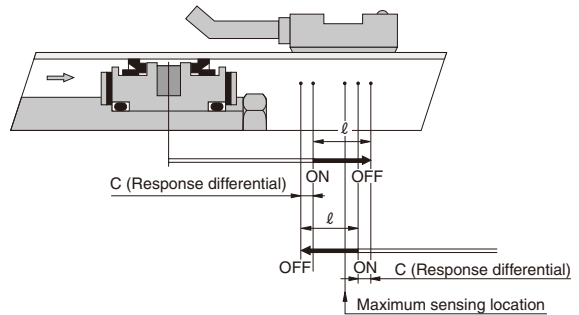


- When mounted in staggered positions



## 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]

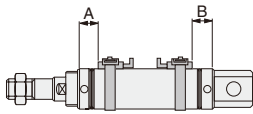
Remark: Figures in the table above are reference values.

- 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.

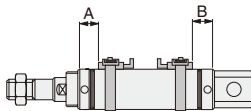
## ● Air cylinder



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]
	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]	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]
	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]	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]
	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]	39 [1.535]

## ● Single acting cylinder

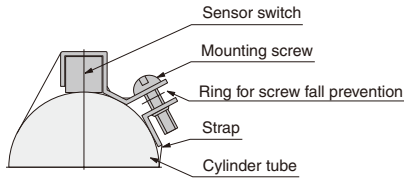


mm [in.]

Sensor switch model	Code	Stroke	Bore size			
			20 [0.787]	25 [0.984]	32 [1.260]	40 [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]

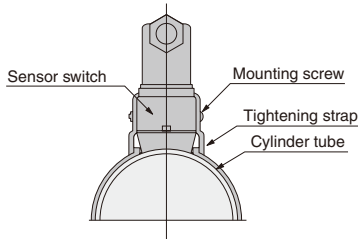
## Moving Sensor Switch

- 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

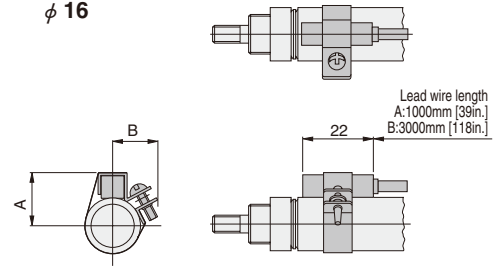


- Loosening the mounting screw allows the sensor switch to be moved freely in the axial and circumferential direction.
- Slightly loosening the mounting screw allows fine adjustment of the lead switch only, up to 5mm [0.2in.] in the axial direction. Tighten the mounting screw with a tightening torque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

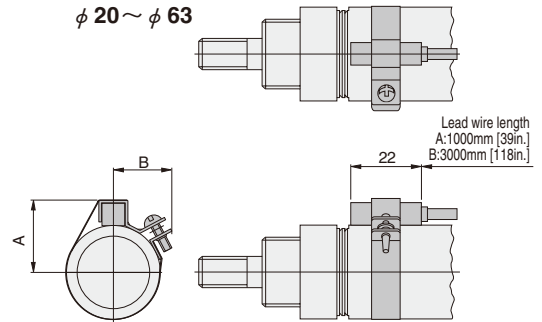
## Dimensions of Sensor Switch (mm)

- ZG530
- ZG553
- CS  M

φ 16



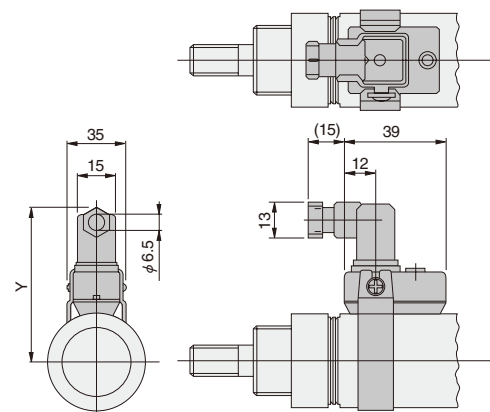
φ 20 ~ φ 63



		mm [in.]	
Bore	Code	A	B
16	16	15	15
	[0.630]	[0.630]	[0.591]
20	19	17	17
	[0.787]	[0.748]	[0.669]
25	20.5	17.5	17.5
	[0.984]	[0.807]	[0.689]
32	25	19	19
	[1.260]	[0.984]	[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

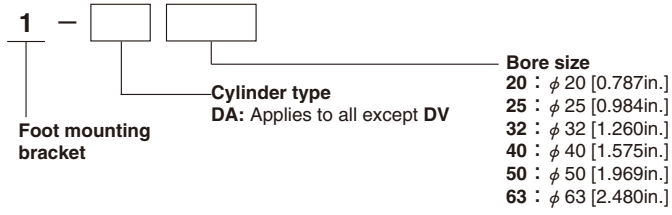


		mm [in.]
Bore	Code	Y
20	59	59
	[0.787]	[2.323]
25	61.5	61.5
	[0.984]	[2.421]
32	65	65
	[1.260]	[2.559]
40	69	69
	[1.575]	[2.717]
50	76	76
	[1.969]	[2.992]
63	83	83
	[2.480]	[3.268]

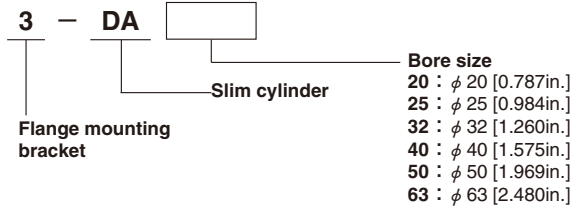


# Order Codes for Mounting Bracket

## (1) Foot mounting bracket



## (2) Flange mounting bracket



## (3) Pivot mounting type supporting bracket

