

**KOGANEI**

Air Cylinder

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**TWINPORT CYLINDER**

**INSTRUCTION MANUAL** Ver.1.0

## Handling Instructions and Precautions



### Mounting and piping

#### Mounting

- For the head side piping: **-HA**, use of a piping adapter (order code: **-L**) allows the piping direction to be changed at right-angles. To mount the piping adapter, attach the O-ring provided into the piping adapter's O-ring groove, and attach it on the cylinder.
- For the rod side piping block type: **-RB**, mounting the connection port to face the porting surface of the mechanical device and then mounting directly to the mechanical device without fittings and tubing achieve still more space-saving in piping. In this case, use the O-ring (P5 for  $\phi 16$  and  $20$ , and P10 or equivalents for  $\phi 25 \sim 40$  [JIS B2401]) into the connection port's O-ring groove, and mount it on the mechanical device.

#### Piping

For Twinport cylinders, use the fittings and speed controllers in the table below.

- Cautions:**
- In the case of a long stroke with foot mounting, we recommend using the rod side piping: **-RA** double foot type mounting.
  - When using mounting threads on a rod cover in the basic mounting, use a mounting screw that can utilize the entire effective thread depth of the mounting thread.
  - Avoid cantilever mountings by using mounting threads on a head cover piping adapter or head cover mounting bracket.



### General precautions

#### Media

- Use air for the media. For the use of any other media, consult us.
- 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

- If using in locations subject to dripping water, dripping oil, etc., or to large amounts of dust, use a cover to protect the unit.
- 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.

#### ● Applicable fittings

Cylinder type	Bore size mm [in.]	16, 20 [0.630, 0.787]	25 [0.984]	32, 40 [1.260, 1.575]
Head side piping : <b>-HA</b> Rod side piping : <b>-RA</b>		<ul style="list-style-type: none"> <li>● Quick fitting, mini type for <math>\phi 3</math>, <math>\phi 4</math>, <math>\phi 6</math> tubes</li> <li>● Quick fitting for <math>\phi 4</math> tube</li> <li>● <b>TAC</b> fittings</li> </ul>	<ul style="list-style-type: none"> <li>● Quick fitting, mini type for <math>\phi 4</math> or <math>\phi 6</math> tubes</li> </ul>	<ul style="list-style-type: none"> <li>● Quick fitting, mini type for <math>\phi 6</math> tube</li> <li>● Quick fitting for <math>\phi 6</math> or <math>\phi 8</math> tubes</li> <li>● <b>TAC</b> fittings</li> </ul>
Rod side piping Block type : <b>-RB</b>		<ul style="list-style-type: none"> <li>● Quick fitting, mini type for <math>\phi 3</math>, <math>\phi 4</math>, <math>\phi 6</math> tubes</li> <li>● Quick fitting for <math>\phi 4</math> tube</li> <li>● <b>TAC</b> fittings (excluding <b>BF□N</b>, <b>BF□U</b>, <b>SF</b>, and <b>PF</b>)</li> </ul>	<ul style="list-style-type: none"> <li>● Quick fitting for <math>\phi 4</math> or <math>\phi 6</math> tubes (excluding <b>SL4-01</b> and <b>SL6-01</b>) and <b>TSH8-01</b></li> <li>● <b>TAC</b> fittings</li> </ul>	

#### ● Applicable speed controller

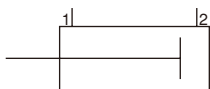
Cylinder type	Bore size mm [in.]	16, 20 [0.630, 0.787]	25 ~ 40 [0.984 ~ 1.575]
Head side piping : <b>-HA</b> Rod side piping : <b>-RA</b>		<ul style="list-style-type: none"> <li>● Speed controller with quick fitting</li> <li>● <b>SCO-US</b>, <b>SCO-UL</b></li> <li>● <b>TSC-US</b>, <b>TSC-US-BF</b></li> </ul>	<ul style="list-style-type: none"> <li>● Speed controller with quick fitting</li> </ul>
Rod side piping Block type : <b>-RB</b>		<ul style="list-style-type: none"> <li>● Speed controller with quick fitting</li> </ul>	

## TWINPORT CYLINDERS

## Head Side Piping, Rod Side Piping

※ For cylinder thrust, air consumption and air flow rate, see p.435~436.

## Symbol



1 : Pull side connection port  
2 : Push side connection port

## Specifications

Item	Bore size	mm [in.]	16 [0.630]	20 [0.787]	25 [0.984]	32 [1.260]	40 [1.575]
Operation type			Double acting type				
Media			Air				
Mounting type			Basic type, Single foot type, Double foot type, Flange type, Side mount				
Operating pressure range	MPa [psi.]		0.1 ~ 0.7 [15 ~ 102]				
Proof pressure	MPa [psi.]		1.03 [149]				
Operating temperature range	°C [°F]		0 ~ 60 [32 ~ 140]				
Operating speed range	mm/s [in./sec.]		50 ~ 500 [2.0 ~ 19.7]				
Cushion			Fixed type (Rubber bumper)				
Lubrication			Not required				
Port size			M5×0.8		Rc1/8		

## Bore Size and Stroke

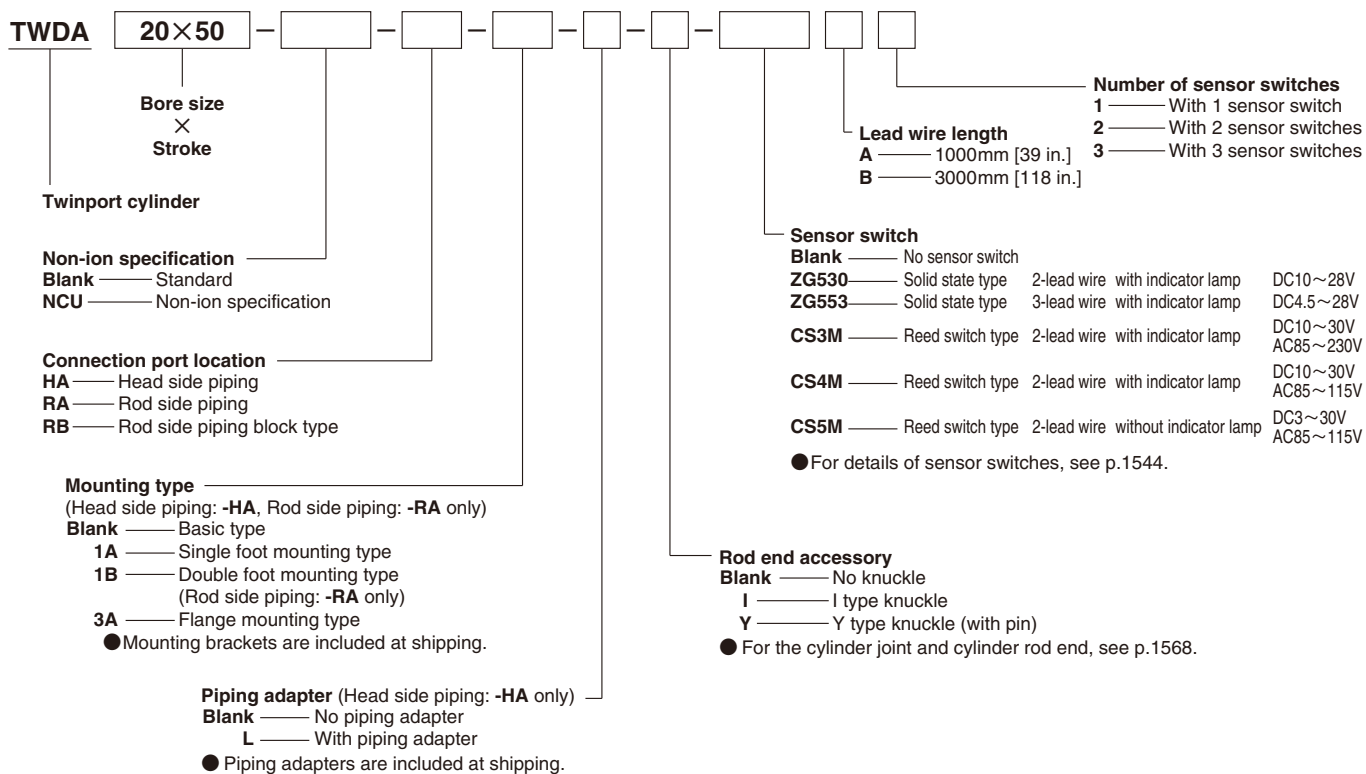
mm			
Bore size	Standard strokes	Maximum stroke	Maximum available stroke
<b>16</b>	15, 25, 50, 75, 100	100	300
<b>20</b>	15, 25, 50, 75, 100, 150	150	500
<b>25</b>	15, 25, 50, 75, 100, 150, 200	200	500
<b>32</b>	15, 25, 50, 75, 100, 150, 200	200	500
<b>40</b>	15, 25, 50, 75, 100, 150, 200, 250, 300	300	500

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

## Connection Port Location and Mounting Type

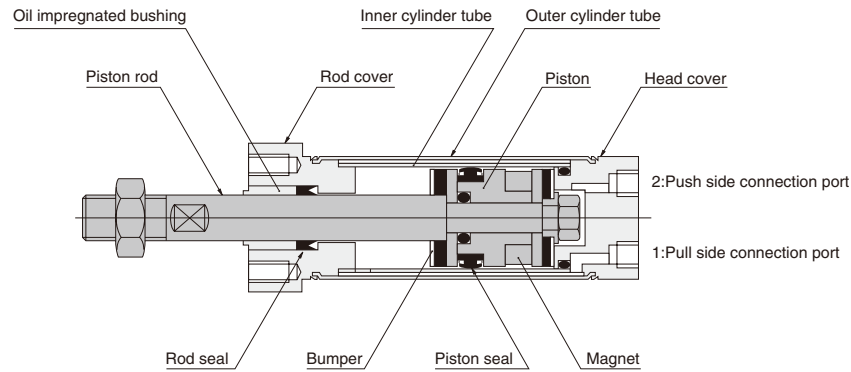
Connection port location	Mounting type
Head side piping : <b>-HA</b>	Basic type, Single foot type, and Flange type
Rod side piping : <b>-RA</b>	Basic type, Single foot type, Double foot type, and Flange type
Rod side piping block type : <b>-RB</b>	Side mount

## Order Codes



## Inner Construction and Major Parts

The diagram is for the head side piping: **-HA**



## Major Parts and Materials

Parts \ Bore size mm	16	20	25	32	40
Outer cylinder tube	Stainless steel				
Inner cylinder tube	Brass <sup>Note</sup>				
Piston	Plastic				
Piston rod	Stainless steel (Hard chrome plated)		Steel (Hard chrome plated)		
Rod cover	Aluminum (Anodized)				
Head cover					
Seal					
Bumper	Synthetic rubber (NBR)				
Magnet	Rubber magnet	Plastic magnet			
Piping adapter	Aluminum (Black anodized)				
Rod nut	Mild steel				
I type,Y type knuckle	Mild steel (Zinc plated; nickel plated for ϕ 16.)				

Note: The non-ion specification's inner cylinder tube is stainless steel, while the oil impregnated bronze bushing is changed to an oil impregnated plastic bushing.

## Seals

Parts	Rod seal	Piston seal
Bore size mm	Quantity	Quantity
16	1	1
20	1	1
25	1	1
32	1	1
40	1	1

## Mass

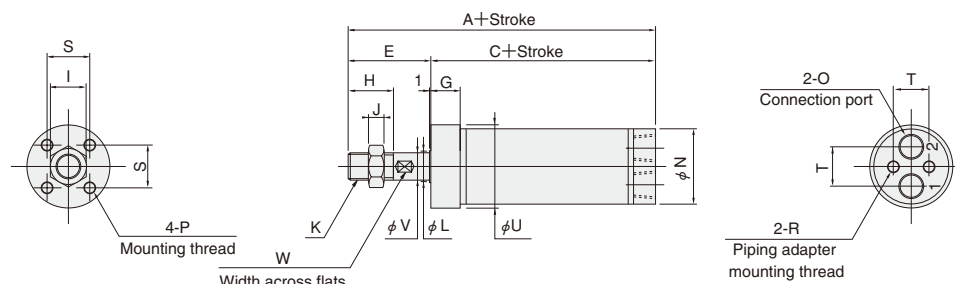
kg [lb.]									
Connection port location	Bore size mm [in.]	Zero stroke mass Basic type	Additional mass for each 1mm [0.0394in.] stroke	Additional mass					
				Single foot mounting type	Double foot mounting type	Flange mounting type	With piping adapter	I type knuckle	Y type knuckle
Head side piping : <b>-HA</b>	16 [0.630]	0.060 [0.132]	0.0008 [0.0018]	0.028 [0.062]	—	0.030 [0.066]	0.008 [0.018]	0.022 [0.049]	0.015 [0.033]
	20 [0.787]	0.110 [0.243]	0.0012 [0.0026]	0.050 [0.110]		0.054 [0.119]	0.013 [0.029]	0.036 [0.079]	0.041 [0.090]
	25 [0.984]	0.165 [0.364]	0.0016 [0.0035]	0.070 [0.154]		0.076 [0.168]	0.030 [0.066]	0.070 [0.154]	0.075 [0.165]
	32 [1.260]	0.275 [0.606]	0.0023 [0.0051]	0.105 [0.232]		0.135 [0.298]	0.060 [0.132]	0.070 [0.154]	0.075 [0.165]
	40 [1.575]	0.485 [1.069]	0.0033 [0.0073]	0.185 [0.408]		0.235 [0.518]	0.095 [0.209]	0.132 [0.291]	0.120 [0.265]
Rod side piping : <b>-RA</b>	16 [0.630]	0.075 [0.165]	0.0008 [0.0018]	0.028 [0.062]	0.055 [0.121]	0.030 [0.066]	—	—	—
	20 [0.787]	0.130 [0.287]	0.0012 [0.0026]	0.050 [0.110]	0.098 [0.216]	0.054 [0.119]			
	25 [0.984]	0.210 [0.463]	0.0016 [0.0035]	0.070 [0.154]	0.140 [0.309]	0.076 [0.168]			
	32 [1.260]	0.365 [0.805]	0.0023 [0.0051]	0.105 [0.232]	0.205 [0.452]	0.135 [0.298]			
	40 [1.575]	0.650 [1.433]	0.0033 [0.0073]	0.185 [0.408]	0.355 [0.783]	0.235 [0.518]			
Rod side piping Block type : <b>-RB</b>	16 [0.630]	0.090 [0.198]	0.0008 [0.0018]	—	—	—	—	—	—
	20 [0.787]	0.155 [0.342]	0.0012 [0.0026]						
	25 [0.984]	0.245 [0.540]	0.0016 [0.0035]						
	32 [1.260]	0.430 [0.948]	0.0023 [0.0051]						
	40 [1.575]	0.775 [1.709]	0.0033 [0.0073]						

Calculation example: For head side piping: **-HA** single foot mounting type of 20mm bore size and 50mm stroke, with piping adapter,  $0.110 + (0.0012 \times 50) + 0.050 + 0.013 = 0.233\text{kg}$  [0.514 lb.]


# -HA Dimensions of Head Side Piping Type (mm)

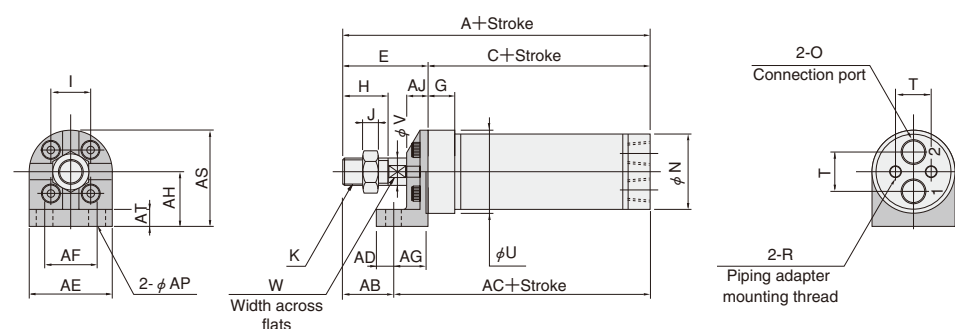
● Basic type TWDA  ×  -HA

 TWDA  HA



● Single foot mounting type TWDA  ×  -HA-1A


 TWDA  HA  
TWDA-1A



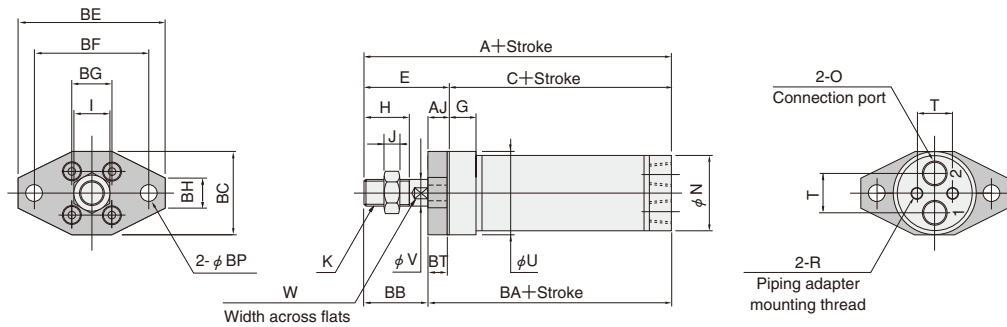
Bore mm [in.]	Code	A	C	E	G	H	I	J	K	L	N	O	P	R	S	T	U	V	W
16 [0.630]		77	51	26	8	15	10	5	M6×1	8 <sub>-0.05</sub> <sup>0</sup>	19	M5×0.8	M3×0.5 Depth5.5	M3×0.5 Depth6	12	11	22	6	—
20 [0.787]		89	58	31	10	15	12	5	M8×1	10 <sub>-0.05</sub> <sup>0</sup>	23.6	M5×0.8	M4×0.7 Depth7.5	M4×0.7 Depth6	14	13	28	8	6
25 [0.984]		96	62	34	10	18	14	6	M10×1.25	12 <sub>-0.05</sub> <sup>0</sup>	28.8	Rc1/8	M5×0.8 Depth7.5	M4×0.7 Depth6	16	15	32	10	8
32 [1.260]		107	68	39	10	23	14	6	M10×1.25	15 <sub>-0.05</sub> <sup>0</sup>	36.4	Rc1/8	M5×0.8 Depth7.5	M5×0.8 Depth7	20	20	40	12	10
40 [1.575]		117	77	40	12	23	19	8	M14×1.5	20 <sub>-0.05</sub> <sup>0</sup>	44.6	Rc1/8	M6×1 Depth9.5	M5×0.8 Depth7	26	26	50	16	14

Bore mm [in.]	Code	AB	AC	AD	AE	AF	AG	AH	AJ	AP	AS	AT
16 [0.630]		15	62	4	22	14	10	16	7	4.5	27	6
20 [0.787]		18	71	5	28	18	12	19	8	5.5	33	7
25 [0.984]		19	77	6	32	20	14	21	9	6.5	37	8
32 [1.260]		24	83	6	40	28	14	25	9	6.5	45	8
40 [1.575]		21	96	8	50	34	18	30	10	9	55	9

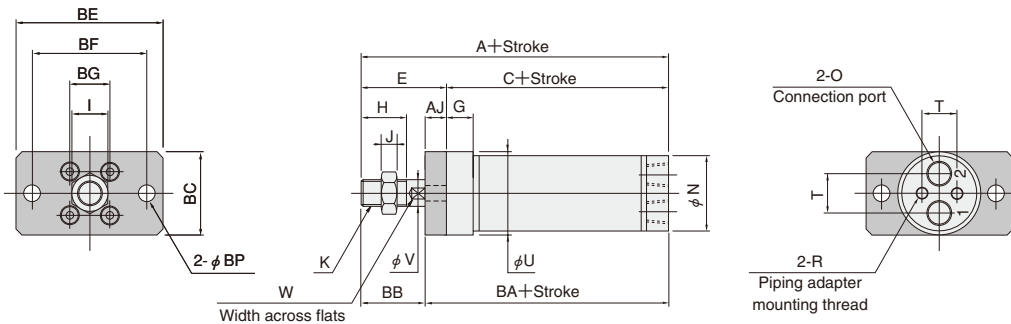
# ● Flange mounting type

 TWDA Bore size HA  
TWDA-3A


φ 16 ~ φ 25 TWDA Bore size × Stroke -HA-3A

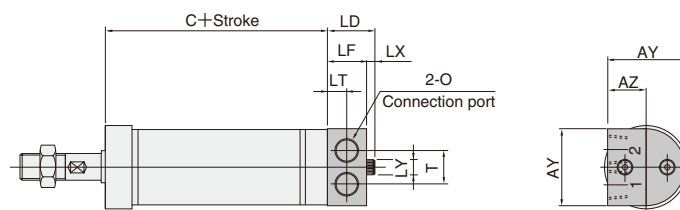


φ 32, φ 40 TWDA Bore size × Stroke -HA-3A



With piping adapter TWDA Bore size × Stroke -HA-L

 TWDA Bore size HA  
TWDA-L




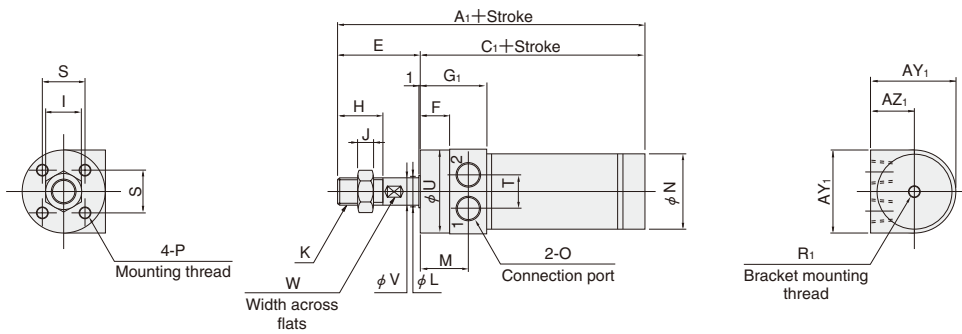
Code Bore mm [in.]	A	C	E	G	H	I	J	K	N	O	R	T	U	V	W
16 [0.630]	77	51	26	8	15	10	5	M6×1	19	M5×0.8	M3×0.5 Depth6	11	22	6	—
20 [0.787]	89	58	31	10	15	12	5	M8×1	23.6	M5×0.8	M4×0.7 Depth6	13	28	8	6
25 [0.984]	96	62	34	10	18	14	6	M10×1.25	28.8	Rc1/8	M4×0.7 Depth6	15	32	10	8
32 [1.260]	107	68	39	10	23	14	6	M10×1.25	36.4	Rc1/8	M5×0.8 Depth7	20	40	12	10
40 [1.575]	117	77	40	12	23	19	8	M14×1.5	44.6	Rc1/8	M5×0.8 Depth7	26	50	16	14

Code Bore mm [in.]	AJ	AY	AZ	BA	BB	BC	BE	BF	BG	BH	BP	BT	LD	LF	LT	LX	LY
16 [0.630]	7	20	10	58	19	22	40	32	12	8	4.5	6	9	8	4	1	5.5
20 [0.787]	8	24.6	12.3	66	23	28	50	40	14	10	5.5	7	10	8	4	2	7
25 [0.984]	9	29.8	14.9	71	25	32	56	44	16	12	6.5	8	19	16	8	3	7
32 [1.260]	9	41	20.5	77	30	40	66	54	20	—	6.5	—	19	16	8	3	8.5
40 [1.575]	10	51	25.5	87	30	50	84	68	26	—	9	—	19	16	8	3	8.5


# -RA Dimensions of Rod Side Piping Type (mm)

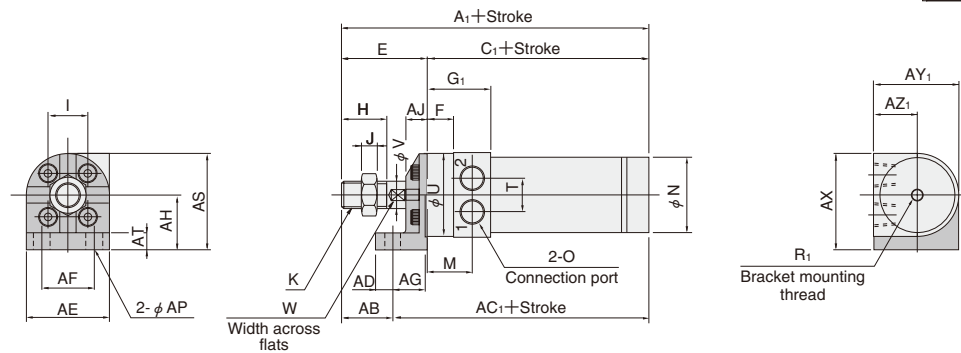
## ● Basic type TWDA Bore size × Stroke -RA

 TWDA Bore size RA




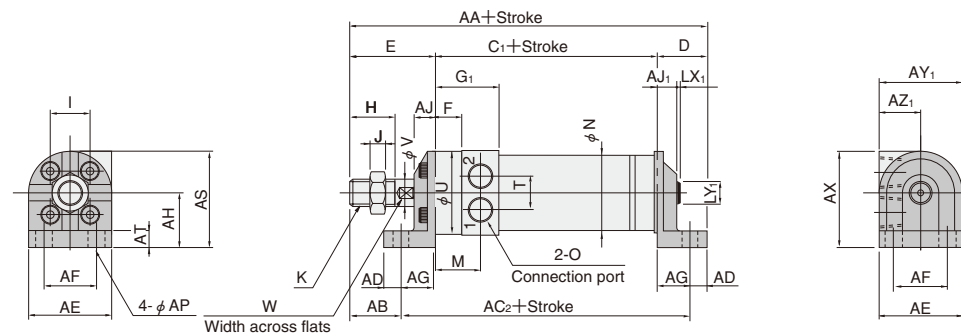
## ● Single foot mounting type TWDA Bore size × Stroke -RA-1A

 TWDA Bore size RA TWDA-1A



## ● Double foot mounting type TWDA Bore size × Stroke -RA-1B

 TWDA Bore size RA TWDA-1B1 TWDA-1B2



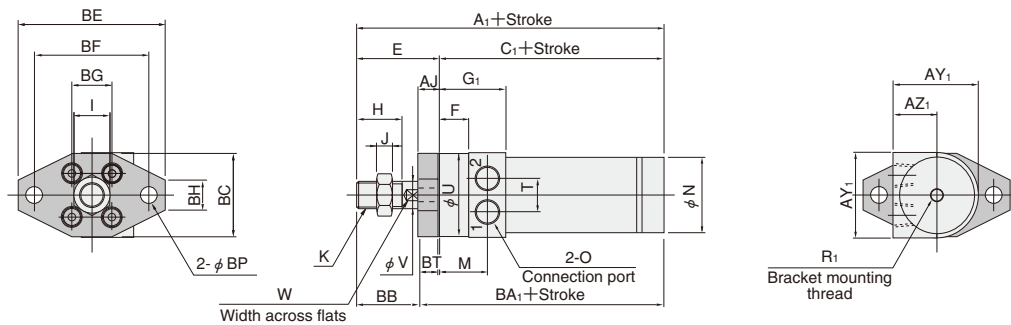
Bore mm [in.]	Code	A <sub>1</sub>	C <sub>1</sub>	D	E	F	G <sub>1</sub>	H	I	J	K	L	M	N	O	P	R <sub>1</sub>	S	T	U	V	W
16 [0.630]		87	61	14	26	10	18	15	10	5	M6×1	8 <sup>0</sup> <sub>-0.05</sub>	14	19	M5×0.8	M3×0.5 Depth5.5	M3×0.5 Depth6	12	11	22	6	—
20 [0.787]		99	68	17	31	12	20	15	12	5	M8×1	10 <sup>0</sup> <sub>-0.05</sub>	16	23.6	M5×0.8	M4×0.7 Depth7.5	M4×0.7 Depth6	14	13	28	8	6
25 [0.984]		111	77	20	34	11	25	18	14	6	M10×1.25	12 <sup>0</sup> <sub>-0.05</sub>	18	28.8	Rc1/8	M5×0.8 Depth7.5	M5×0.8 Depth7	16	15	32	10	8
32 [1.260]		127	88	20	39	16	30	23	14	6	M10×1.25	15 <sup>0</sup> <sub>-0.05</sub>	23	36.4	Rc1/8	M5×0.8 Depth7.5	M5×0.8 Depth7	20	20	40	12	10
40 [1.575]		142	102	26	40	23	37	23	19	8	M14×1.5	20 <sup>0</sup> <sub>-0.05</sub>	30	44.6	Rc1/8	M6×1 Depth9.5	M6×1 Depth9	26	26	50	16	14

Bore mm [in.]	Code	AA	AB	AC <sub>1</sub>	AC <sub>2</sub>	AD	AE	AF	AG	AH	AJ	AJ <sub>1</sub>	AP	AS	AT	AX	AY <sub>1</sub>	AZ <sub>1</sub>	LX <sub>1</sub>	LY <sub>1</sub>
16 [0.630]		101	15	72	82	4	22	14	10	16	7	6	4.5	27	6	27.5	23	11.5	—	—
20 [0.787]		116	18	81	93	5	28	18	12	19	8	7	5.5	33	7	33.5	29	14.5	2	7
25 [0.984]		131	19	92	106	6	32	20	14	21	9	8	6.5	37	8	37.5	33	16.5	1	8.5
32 [1.260]		147	24	103	117	6	40	28	14	25	9	8	6.5	45	8	45.5	41	20.5	1	8.5
40 [1.575]		168	21	121	139	8	50	34	18	30	10	9	9	55	9	55.5	51	25.5	1	10

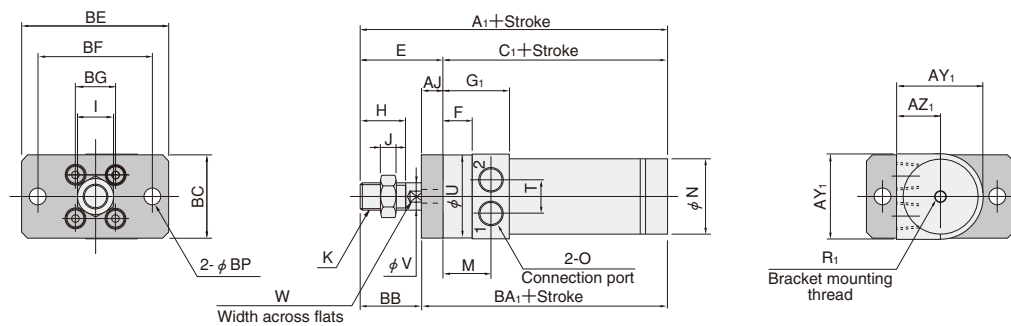
# ● Flange mounting type

φ 16 ~ φ 25 TWDA Bore size × Stroke -RA-3A

CAD TWDA Bore size RA  
TWDA-3A



φ 32, φ 40 TWDA Bore size × Stroke -RA-3A



Bore mm [in.]	Code	A <sub>1</sub>	C <sub>1</sub>	E	F	G <sub>1</sub>	H	I	J	K	M	N	O	R <sub>1</sub>	T	U	V	W
16 [0.630]		87	61	26	10	18	15	10	5	M6×1	14	19	M5×0.8	M3×0.5 Depth6	11	22	6	—
20 [0.787]		99	68	31	12	20	15	12	5	M8×1	16	23.6	M5×0.8	M4×0.7 Depth6	13	28	8	6
25 [0.984]		111	77	34	11	25	18	14	6	M10×1.25	18	28.8	Rc1/8	M5×0.8 Depth7	15	32	10	8
32 [1.260]		127	88	39	16	30	23	14	6	M10×1.25	23	36.4	Rc1/8	M5×0.8 Depth7	20	40	12	10
40 [1.575]		142	102	40	23	37	23	19	8	M14×1.5	30	44.6	Rc1/8	M6×1 Depth9	26	50	16	14

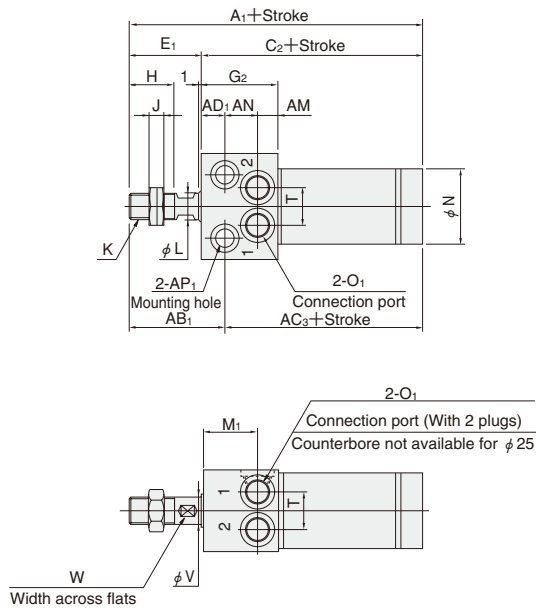
Bore mm [in.]	Code	A <sub>J</sub>	A <sub>Y1</sub>	A <sub>Z1</sub>	B <sub>A1</sub>	B <sub>B</sub>	B <sub>C</sub>	B <sub>E</sub>	B <sub>F</sub>	B <sub>G</sub>	B <sub>H</sub>	B <sub>P</sub>	B <sub>T</sub>
16 [0.630]		7	23	11.5	68	19	22	40	32	12	8	4.5	6
20 [0.787]		8	29	14.5	76	23	28	50	40	14	10	5.5	7
25 [0.984]		9	33	16.5	86	25	32	56	44	16	12	6.5	8
32 [1.260]		9	41	20.5	97	30	40	66	54	20	—	6.5	—
40 [1.575]		10	51	25.5	112	30	50	84	68	26	—	9	—



# -RB Dimensions of Rod Side Piping Block Type (mm)

●Side mount TWDA Bore size × Stroke -RB

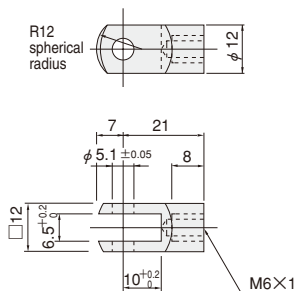
CAD TWDA Bore size RB



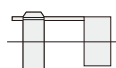
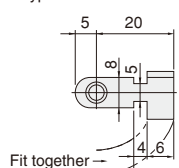
Code	A <sub>1</sub>	C <sub>2</sub>	E <sub>1</sub>	G <sub>2</sub>	H	I	J	K	L	M <sub>1</sub>	N	O <sub>1</sub>	T	V	W	AB <sub>1</sub>	AC <sub>3</sub>	AD <sub>1</sub>	AE <sub>1</sub>	AF <sub>1</sub>	AH <sub>1</sub>	AM	AN	AP <sub>1</sub>	AS <sub>1</sub>
16 [0.630]	87	64	23	21	15	10	5	M6×1	8 <sub>-0.05</sub> <sup>0</sup>	15	19	M5×0.8 Counterbore φ 8.4 Depth1.8	11	6	—	28	59	5	30	16	12	6	10	φ 4.5 C'bore φ 8 Depth4.5	24
20 [0.787]	99	72	27	24	15	12	5	M8×1	10 <sub>-0.05</sub> <sup>0</sup>	18	23.6	M5×0.8 Counterbore φ 8.4 Depth1.8	13	8	6	34	65	7	38	22	14	6	11	φ 6.6 C'bore φ 11 Depth6.5	28
25 [0.984]	111	82	29	30	18	14	6	M10×1.25	12 <sub>-0.05</sub> <sup>0</sup>	22	28.8	Rc1/8 Counterbore φ 13.4 Depth1.8	15	10	8	38	73	9	42	26	15	8	13	φ 6.6 C'bore φ 11 Depth6.5	30
32 [1.260]	127	94	33	36	23	14	6	M10×1.25	15 <sub>-0.05</sub> <sup>0</sup>	28	36.4	Rc1/8 Counterbore φ 13.4 Depth1.8	20	12	10	45	82	12	54	34	19	8	16	φ 9 C'bore φ 14 Depth8.6	38
40 [1.575]	142	109	33	44	23	19	8	M14×1.5	20 <sub>-0.05</sub> <sup>0</sup>	36	44.6	Rc1/8 Counterbore φ 13.4 Depth1.8	26	16	14	48	94	15	68	46	23	8	21	φ 11 C'bore φ 17.5 Depth10.8	46

## Dimensions of Rod End Accessories (mm)

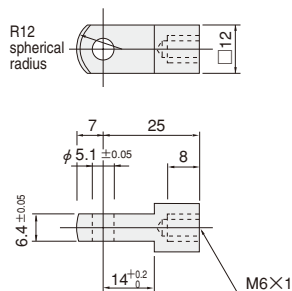
●Y type  
for φ 16 [0.630 in.]



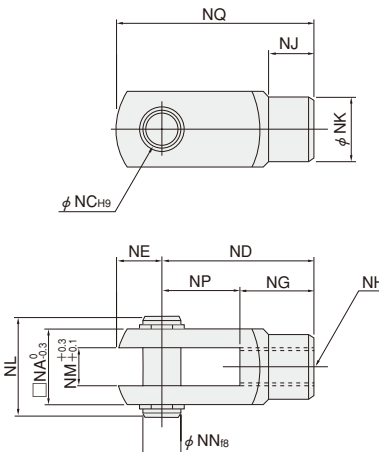
Pin bracket for  
Y type knuckle



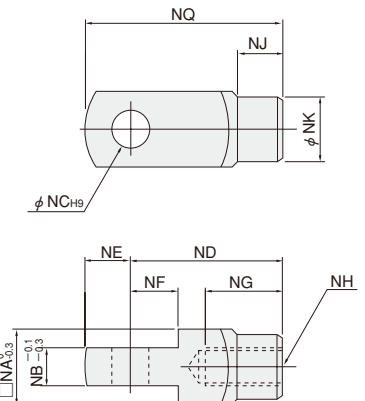
●I type  
for φ 16 [0.630 in.]



●Y type for φ 20 [0.787 in.]  
~ φ 40 [1.575 in.]



●I type for φ 20 [0.787 in.]  
~ φ 40 [1.575 in.]



Code	NA	NB	NC	ND	NE	NF	NG	NH	NJ	NK	NL	NM	NN	NP	NQ
20 [0.787]	16	8	8	30	10	11	15	M8×1	10	14	21	8	8	15	40
25, 32 [0.984, 1.260]	19	10	10	40	12	13	20	M10×1.25	12	16	25	10	10	20	52
40 [1.575]	24	14	10	45	12	13	25	M14×1.5	15	22	30	14	10	20	57

# SENSOR SWITCHES

## Order Codes for Sensor Switches

### ● Sensor switches (with mounting strap)

				Sensor switch model	Lead wire length	Cylinder basic type	Bore size
Solid state type	2-lead wire	With indicator lamp	DC10~28V	ZG530	A B	-TWDA	16 20 25 32 40
Solid state type	3-lead wire	With indicator lamp	DC4.5~28V	ZG553			
Reed switch type	2-lead wire	With indicator lamp	DC10~30V AC85~230V	CS3M			
Reed switch type	2-lead wire	With indicator lamp	DC10~30V AC85~115V	CS4M			
Reed switch type	2-lead wire	Without indicator lamp	DC3~30V AC85~115V	CS5M			

Remark: For details of sensor switches, see p.1544.

- A : 1000mm [39 in.]
- B : 3000mm [118 in.]

### ● Order codes for mounting straps only

G5- TWDA

**Bore size**  
 16 : For  $\phi$  16  
 20 : For  $\phi$  20  
 25 : For  $\phi$  25  
 32 : For  $\phi$  32  
 40 : For  $\phi$  40

**Cylinder basic type**

**Sensor switch type**  
 G5: For solid state type sensor switches (ZG5)  
 For reed switch type sensor switches (CS)

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

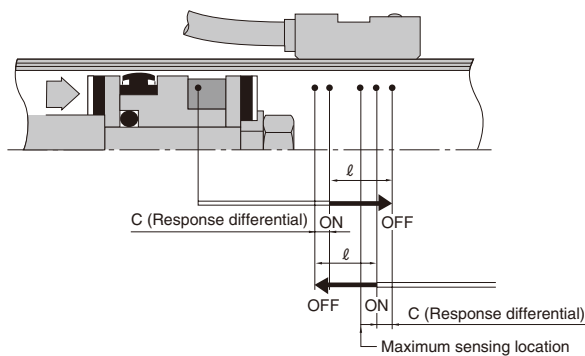
### For ZG5 and CSM types

#### ● 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.

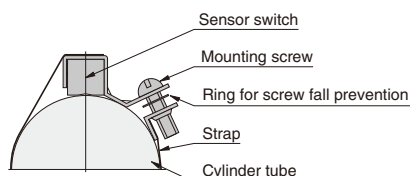


Bore size mm [in.]	ZG530 <input type="text"/> , ZG553 <input type="text"/>			CS <input type="text"/> <input type="text"/> M <input type="text"/>		
	Operating range	Response differential	Maximum sensing location <sup>Note</sup>	Operating range	Response differential	Maximum sensing location <sup>Note</sup>
16 [0.630]	2.7~4.5 [0.106~0.177]	0.7 [0.028] or less	11 [0.433]	7.0~9.0 [0.276~0.354]	2.0 [0.079] or less	11 [0.433]
20 [0.787]	2.8~4.7 [0.110~0.185]			8.5~10.5 [0.335~0.413]		
25 [0.984]	2.7~4.5 [0.106~0.177]			7.0~8.5 [0.276~0.335]		
32 [1.260]	3.0~5.1 [0.118~0.201]	0.8 [0.031] or less		8.0~10.0 [0.315~0.394]		
40 [1.575]	3.3~5.5 [0.130~0.217]			9.5~11.0 [0.374~0.433]		

Remark: The above table shows reference values.

Note: This is the length measured from the switch's opposite end side to the lead wire.

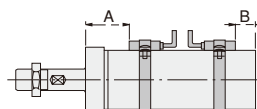
## Moving Sensor Switch



- 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] or less.

## Mounting Location of Sensor Switch

When the piston reaches the end of the stroke with the sensor switch installed in the location shown in the diagram, the magnet mounted on the piston comes to the sensor switch's maximum sensing location.



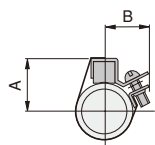
Bore size mm [in.]	mm [in.]	
	ZG5□□□, CS□M□	
	A	B
16 [0.630]	9 [0.354]	8 [0.315] (16 [0.630])
20 [0.787]	12 [0.472]	9 [0.354] (17 [0.669])
25 [0.984]	14 [0.551]	11 [0.433] (27 [1.063])
32 [1.260]	17 [0.669]	13 [0.512] (29 [1.142])
40 [1.575]	20 [0.787]	17 [0.669] (33 [1.299])

Remarks 1: The value is the same regardless of the connection port location.

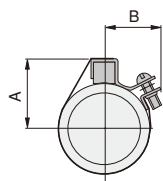
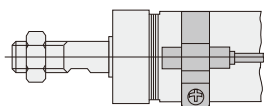
2: Figure in parentheses ( ) are for the distance from the piping adapter end surface, for the case of piping adapter: -L.

## Dimensions of Sensor Switch

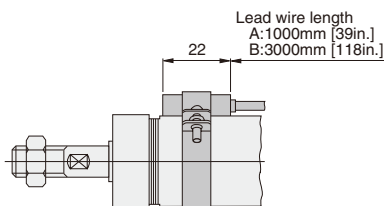
For ZG5□□□ and CS□M□ types



φ16



φ20~φ63



Bore size mm [in.]	mm [in.]	
	A	B
16 [0.630]	17 [0.669]	15 [0.591]
20 [0.787]	19.5 [0.768]	17.5 [0.689]
25 [0.984]	22.5 [0.886]	18 [0.709]
32 [1.260]	27 [1.063]	19.5 [0.768]
40 [1.575]	30 [1.181]	—*

※ When used on φ40, dimension B is the radius of the cylinder tube's outer diameter. Therefore, there is no protrusion in the B direction of the mounting portion.

## Cylinder Thrust

Bore size mm [in.]	Rod dia. mm [in.]	Operation type	Pressure area mm <sup>2</sup> [in. <sup>2</sup> ]	Air pressure MPa [psi.]						
				0.1 [15]	0.2 [29]	0.3 [44]	0.4 [58]	0.5 [73]	0.6 [87]	0.7 [102]
16 [0.630]	6 [0.236]	Double acting type	Push side	201 [0.312]	20.1 [4.52]	40.2 [9.04]	60.3 [13.56]	80.4 [18.07]	100.5 [22.59]	120.6 [27.11]
			Pull side	172 [0.267]	17.2 [3.87]	34.4 [7.73]	51.6 [11.60]	68.8 [15.47]	86.0 [19.33]	103.2 [23.20]
20 [0.787]	8 [0.315]	Double acting type	Push side	314 [0.487]	31.4 [7.06]	62.8 [14.12]	94.2 [21.18]	125.6 [28.23]	157.0 [35.29]	188.4 [42.35]
			Pull side	264 [0.409]	26.4 [5.93]	52.8 [11.87]	79.2 [17.80]	105.6 [23.74]	132.0 [29.67]	158.4 [35.61]
25 [0.984]	10 [0.394]	Double acting type	Push side	490 [0.760]	49.0 [11.02]	98.0 [22.03]	147.0 [33.05]	196.0 [44.06]	245.0 [55.08]	294.0 [66.09]
			Pull side	412 [0.639]	41.2 [9.26]	82.4 [18.52]	123.6 [27.79]	164.8 [37.05]	206.0 [46.31]	247.2 [55.57]
32 [1.260]	12 [0.472]	Double acting type	Push side	804 [1.246]	80.4 [18.07]	160.8 [36.15]	241.2 [54.22]	321.6 [72.30]	402.0 [90.37]	482.4 [108.44]
			Pull side	690 [1.070]	69.0 [15.51]	138.0 [31.02]	207.0 [46.53]	276.0 [62.04]	345.0 [77.56]	414.0 [93.07]
40 [1.575]	16 [0.630]	Double acting type	Push side	1256 [1.947]	125.6 [28.23]	251.2 [56.47]	376.8 [84.70]	502.4 [112.94]	628.0 [141.17]	753.6 [169.41]
			Pull side	1055 [1.635]	106.0 [23.83]	211.0 [47.43]	317.0 [71.26]	422.0 [94.87]	528.0 [118.69]	633.0 [142.30]

## Air Consumption and Air Flow Rate

The figures in the table below show the air consumption when a Twinport Cylinder makes 1 reciprocation with stroke of 1mm [0.039in.]. The air flow rate and air consumption actually required is found by the calculation below.

### Air consumption for each 1mm [0.0394in.] stroke

cm<sup>3</sup> [in.<sup>3</sup>]/reciprocation (ANR)

Bore size mm [in.]	Air pressure MPa [psi.]						
	0.1 [15]	0.2 [29]	0.3 [44]	0.4 [58]	0.5 [73]	0.6 [87]	0.7 [102]
16 [0.630]	0.79 [0.0482]	1.18 [0.0720]	1.57 [0.0958]	1.96 [0.1196]	2.35 [0.1434]	2.74 [0.1672]	3.13 [0.1910]
20 [0.787]	1.24 [0.0757]	1.86 [0.1135]	2.45 [0.1495]	3.07 [0.1873]	3.68 [0.2246]	4.29 [0.2618]	4.90 [0.2990]
25 [0.984]	1.94 [0.1184]	2.89 [0.1764]	3.83 [0.2337]	4.79 [0.2923]	5.75 [0.3509]	6.71 [0.4095]	7.67 [0.4681]
32 [1.260]	3.18 [0.1941]	4.73 [0.2886]	6.28 [0.3832]	7.85 [0.4790]	9.41 [0.5742]	10.98 [0.6700]	12.55 [0.7659]
40 [1.575]	4.95 [0.3021]	7.40 [0.4516]	9.83 [0.5999]	12.26 [0.7482]	14.69 [0.8964]	17.16 [1.047]	19.60 [1.196]

● Finding the air consumption

Example 1. When operating a Twinport Cylinder with bore size of 16mm and stroke of 50mm under air pressure of 0.5MPa  
 $2.35 \times 50 \times 10^{-3} = 0.1175 \text{ ℓ [7.17in}^3\text{]/reciprocation (ANR)}$

From the table    Stroke

Example 2. When operating a Twinport Cylinder with bore size of 16mm and stroke of 50mm under air pressure of 0.5MPa, at rate of 20 reciprocations per minute  
 $2.35 \times 50 \times 20 \times 10^{-3} = 2.35 \text{ ℓ [143in}^3\text{]/min(ANR)}$

From the table    Stroke    Operating frequency per minute (reciprocation)

● Finding the air flow rate (for selecting F.R.L., valves, etc.)

Example: When operating a Twinport Cylinder with bore size of 16mm at speed of 100mm/s under air pressure of 0.5MPa

$$2.35 \times 100 \times \frac{1}{2} \times 10^{-3} = 0.1175 \text{ ℓ [7.17in}^3\text{]/s (ANR)}$$

From the table    Speed mm/s

(The flow rate per minute at this time is  
 $0.1175 \times 60 = 7.05 \text{ ℓ [430in}^3\text{]/min (ANR).}$ )