



High Thrust Air Cylinder

PNEUMATIC POWER CYLINDER

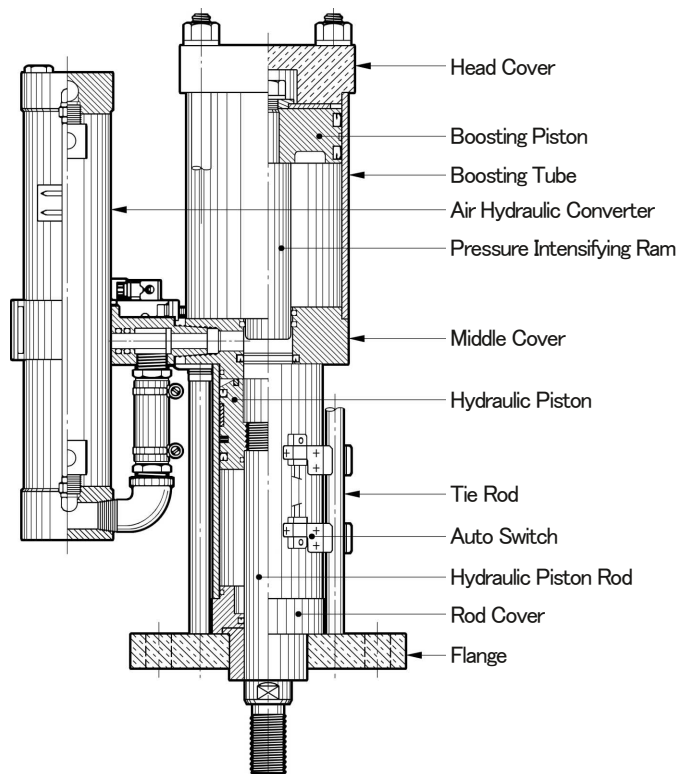
Generates high thrust of 20 tons or more only with air pressure.
The special mechanism allows for high speed operation.



HIROTA MFG. CO.,LTD.

Overview

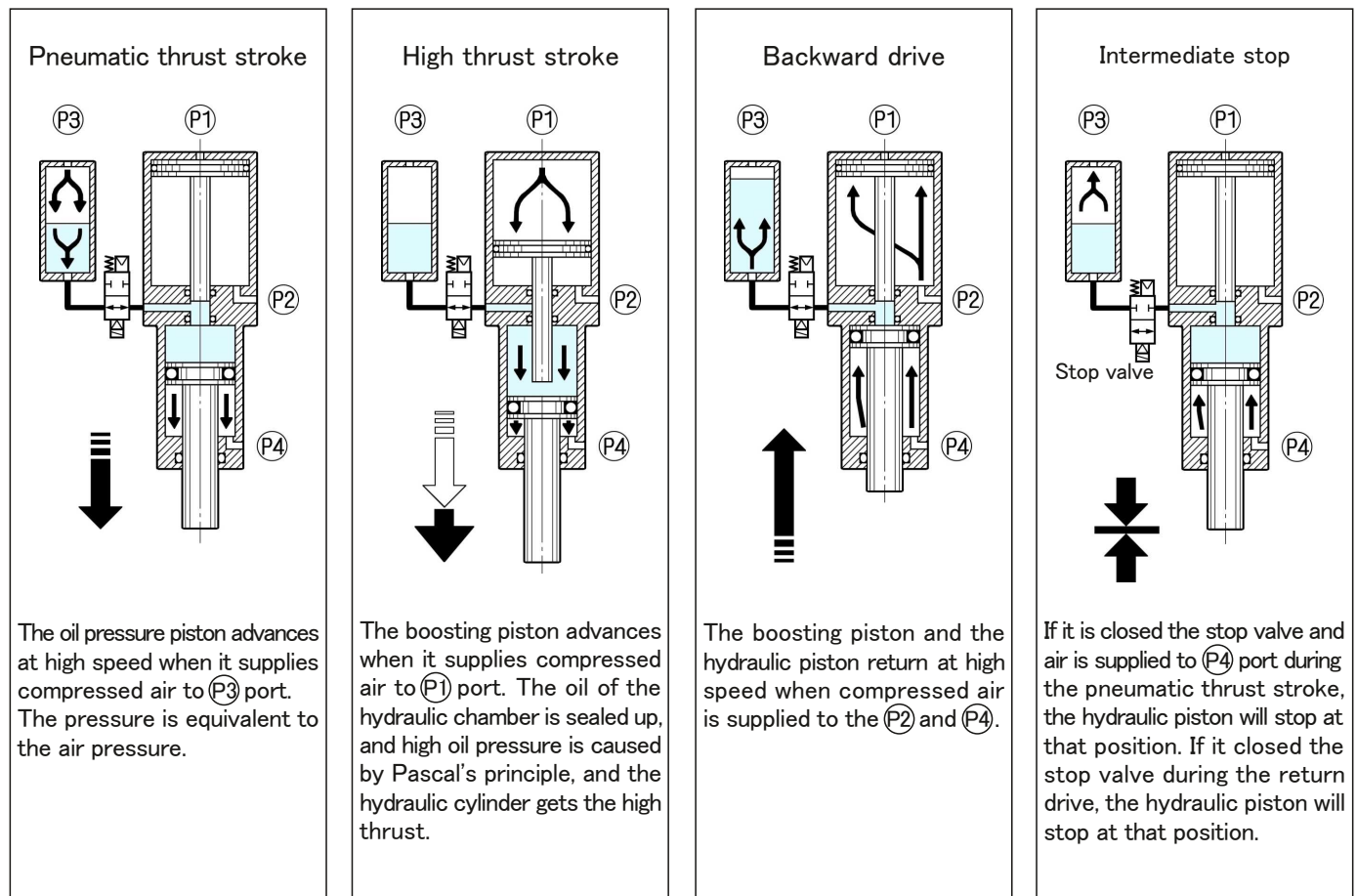
The pneumatic power cylinder is a compact all-in-one unit that combines a hydraulic cylinder with the popular pneumatic booster developed by HIROTAKA SEIKI. The long stroke cylinder delivers high thrust and high speed performance for hydraulic operations. In addition to the standard model, the product line has been expanded with the introduction of a compact miniature series. Other models are available with switches, for easy output of motion signals, and with stop valves for emergency stop and inching motion. Devices such as press-fitting, clinching, cutting, crimping, bending, marking, punching, and clamping can be constructed with a simple pneumatic circuit.



Feature

- ① Generates high thrust of 1 to 40 tons via only air pressure.
- ② The stroke can be lengthened. (100 mm or more)
- ③ Special mechanism allows for high speed operation. (200 mm at 0.5 seconds or less)
- ④ Simple mechanism ensures trouble-free operation.
- ⑤ Controllable by pneumatic valve alone.
- ⑥ Delivers variable thrust by means of modifying the air pressure.
- ⑦ Available with auto switch.
(Symbol : PCMW, PCSW, PCHW)
Standard products allow for position detection using a timer, limit switch or other device. Models with switches deliver easy position detection by installing auto switch to the hydraulic cylinder.
- ⑧ Available with operating valve.
(Symbol : PCMV※, PCSV※, PCHV※)
Includes two valves to reduce piping labor. The user simply provides piping to the pressure source.
- ⑨ Available with operating valve and auto switch.
(Symbol : PCMV※W, PCSV※W, PCHV※W)
Includes operation valve and auto switch for optimum ease of use.
- ⑩ The operating valved models can be installed sandwich regulator for adjustment of the high thrust only, drop prevention valve for supply air disappears.
- ⑪ Available with stop valve. (Symbol : V※)
Performs emergency stop and inching motion. (Usable only for long stroke motion during die replacement, and for high thrust during working operation.)

Mechanisms and Action description



Range of standard products

Table 1 All model are Rod side flange type.

("Circle mark" indicates standard products. "Triangle mark" indicates semi-standard products.

		Total stroke High thrust stroke (mm) Maximum thrust	50 mm				100 mm				150 mm				200 mm				300 mm			
			5	10	15	20	5	10	15	20	5	10	15	20	5	10	15	20	5	10	15	20
Miniature type	PCM -005	0.5 t	○	○	△	△	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	PCMW-005	0.5 t	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	PCM-01	1 t	○	△	△	△	○	○	△	△	○	○	○	△	○	○	○	○	○	○	○	○
	PCS-02	2 t	○	○	△	△	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	PCS-04	4 t	○	△	△	△	○	○	△	△	○	○	○	△	○	○	○	○	○	○	○	○
Standard type	PCH-03	3 t	△	△	△	△	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	PCH-06	6 t	△	△	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○
	PCH-08	8 t	△	△	△	△	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	PCH-13	13 t	△	△	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○
	PCH-17	17 t	△	△	△	△	○	○	△	△	○	○	△	○	○	○	○	○	○	○	○	○
	PCH-24	24 t	△	△	△	△	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	PCH-35	35 t	△	△	△	△	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	PCH-44	44 t	△	△	△	△	○	○	○	△	○	○	○	○	○	○	○	○	○	○	○	○

Table 2 Minimum starting position of the high thrust stroke from the piston rod retracted position.

High thrust stroke		5 mm	10 mm	15 mm	20 mm
Miniature type	PCM-005	11	31	51	71
	PCM-01	32	73	114	155
	PCMW-005	0	11	31	51
	PCMW-01	12	53	94	135
	PCS-02	10	30	50	70
	PCS-04	30	70	100	140
Standard type	PCH-03	0	1	21	41
	PCH-06	0	36	72	108
	PCH-13	0	25	65	105
	PCH-17	10	60	110	160

Note

- The total stroke includes the pneumatic thrust stroke and the high thrust stroke.
- High thrust stroke can be switched anywhere in the total stroke.
(Refer to circuit on page 14, 15)
However, for the types shown in Table 2, switch the pneumatic thrust stroke to high thrust stroke after operating each valve or more from the piston rod retracted position.
(To secure the high thrust stroke)
PCH-35-1020 70 mm
PCH-35-1520 20 mm
PCH-44-1015 50 mm
PCH-44-1520 125 mm
PCH-44-2020 75 mm
or more, operate the stroke.
- For other special stroke, consult with our distributor. The total stroke can be special ordered up to 500 mm. The high thrust stroke can be special ordered up to 30 mm.
- Refer to the table in the dimensions for the semi-standard products because the total length dimensions are different from the standard products. (Page 6 to 10)

Specifications

(Theoretical value)												
Maximum thrust	0.5 ton	1 ton	2 ton	4 ton	3 ton	6 ton	8 ton	13 ton	17 ton	24 ton	35 ton	44 ton
Model	PCM005	PCM-01	PCS-02	PCS-04	PCH-03	PCH-06	PCH-08	PCH-13	PCH-17	PCH-24	PCH-35	PCH-44
Pneumatic cylinder diameter	φ 50	φ 50	φ 100	φ 100	φ 125	φ 125	φ 125	φ 180	φ 180	φ 180	φ 180	φ 180
Ram diameter	φ 20	φ 14	φ 25	φ 18	φ 40	φ 30	φ 25	φ 45	φ 40	φ 34	φ 34	φ 30
Pressure boosting ratio	1:6.25	1:12.7	1:16	1:30	1:9.76	1:17.3	1:25	1:16	1:20	1:28	1:28	1:36
Hydraulic cylinder diameter	φ 40	φ 40	φ 50	φ 50	φ 80	φ 80	φ 80	φ 125	φ 125	φ 125	φ 150	φ 150
Fluid	Air											
Proof pressure	1.5 MPa											
Operating pressure	Pneumatic thrust stroke: 0.3 to 0.7 MPa, High thrust stroke: 0.1 to 0.7 MPa											
※ Piston speed mm/s	Rapid feed	300	300	300	300	280	280	280	200	200	150	150
	High thrust feed	30	29	27	27	25	22	20	16	13	10	8

※ The piston speed is based on 0.5 Mpa, no load, under moving forward.

※ The hydraulic fluid must be a standard mineral hydraulic fluid from any manufacturer. (ISO VG22 or VG32)

※ Guides must be installed, similar to normal hydraulic cylinders.

※ The construction of the air hydro cylinder can generate a slight sliding leakage that is unavoidable under operation. The leaked hydraulic fluid can be discharged to the outside from P3, P4 port. The installation of a mist separator or similar.
(See the oil film removal specification product shown on page 13.)

Air consumption volume

Unit : L										
Maximum thrust	Model No.	Total stroke					High thrust stroke			
		50mm	100mm	150mm	200mm	300mm	5mm	10mm	15mm	20mm
0.5t	PCM-005	1.3	2.0	2.6	3.3	4.6	1.1	1.5	2.0	2.4
1t	PCM-01	1.3	2.0	2.6	3.3	4.6	1.6	2.5	3.4	4.4
2t	PCS-02	1.8	2.8	3.8	5.3	7.3	4.9	6.7	8.5	10.3
4t	PCS-04	1.8	2.8	3.8	5.3	7.3	6.8	10.5	14.1	17.8
3t	PCH-03	4.7	7.3	9.9	12.6	17.8	8.8	11.5	14.3	17.1
6t	PCH-06	4.7	7.3	9.9	12.6	17.8	11.7	16.8	21.9	27.0
8t	PCH-08	4.7	7.3	9.9	12.6	17.8	16.7	24.5	32.4	40.2
13t	PCH-13	10.7	17.1	23.6	30.0	42.9	28.4	40.1	51.8	63.5
17t	PCH-17	10.7	17.1	23.6	30.0	42.9	34.4	49.2	63.9	78.6
24t	PCH-24	10.7	17.1	23.6	30.0	42.9	40.6	61.4	82.1	103.0
35t	PCH-35	15.2	23.8	32.4	41.0	58.2	58.5	88.1	118.0	148.0
44t	PCH-44	15.2	23.8	32.4	41.0	58.2	68.5	106.0	143.0	180.0

Note)

These values represent the theoretical air consumption volume for one reciprocating stroke using an air pressure of 0.5 MPa, then converted to the atmospheric pressure.

Example)

For the air consumption volume of PCH-03-1005 under the above conditions.

Model No. : PCH-03

Total stroke 100mm : 7.3L

High thrust stroke 5mm : 8.8L

Therefore, the total air consumption volume for one reciprocating stroke is as follows : 7.3L + 8.8L = 16.1L

Thrust table

Unit : N (Theoretical value)												
Thrust	Direction	Model	Miniature type				Standard type					
		Pressure (MPa)	PCM-005	PCM-01	PCS-02	PCS-04	PCH-03	PCH-06	PCH-08	PCH-13	PCH-17	PCH-24
Pneumatic thrust	Advance	0.3	370	370	580	580	1,500	1,500	1,500	3,680	3,680	3,680
		0.4	500	500	780	780	2,010	2,010	2,010	4,900	4,900	4,900
		0.5	620	620	980	980	2,510	2,510	2,510	6,130	6,130	6,130
		0.6	750	750	1,170	1,170	3,010	3,010	3,010	7,360	7,360	7,360
		0.7	870	870	1,370	1,370	3,510	3,510	3,510	8,590	8,590	8,590
	Return	0.3	280	280	440	440	1,130	1,130	1,130	2,830	2,830	2,830
		0.4	370	370	580	580	1,500	1,500	1,500	3,770	3,770	3,770
		0.5	470	470	730	730	1,880	1,880	1,880	4,720	4,720	4,720
		0.6	560	560	880	880	2,260	2,260	2,260	5,660	5,660	5,660
		0.7	650	650	1,030	1,030	2,630	2,630	2,630	6,610	6,610	6,610
High thrust	Advance only	0.1	780	1,600	3,140	6,060	4,900	8,720	12,560	19,630	24,850	34,390
		0.2	1,570	3,200	6,280	12,120	9,810	17,450	25,130	39,260	49,700	68,790
		0.3	2,350	4,800	9,420	18,180	14,720	26,170	37,690	58,900	74,550	103,180
		0.4	3,140	6,410	12,560	24,240	19,630	34,900	50,260	78,530	99,400	137,580
		0.5	3,920	8,010	15,700	30,300	24,540	43,630	62,830	98,170	124,250	171,970
		0.6	4,710	9,610	18,840	36,360	29,450	52,350	75,390	117,800	149,100	206,370
		0.7	5,490	11,210	21,990	42,420	34,360	61,080	87,960	137,440	173,950	240,760

Note 1) The weight of jig or mold during vertical operation should be 50% or less of the backward thrust value to obtain stable operation and speed.

Note 2) High thrust should be 70% or less of the high thrust value to obtain stable operation and speed.

How to order

PCS V1 W - 02 - 05 05 - 3 - H2ME - V1 - B - RT - G - S2

Symbol	Series
PCM	Miniature type
PCS	
PCH	Standard type

Symbol	Operating valve
Nil	Without valve
V1	With 100 VAC
V2	With 200 VAC
V3	With 24 VDC

Type of PCH-35 and 44 are without valve only.

Symbol	With auto switch (Built-in magnet)
Nil	Without magnet
W	Magnet sensing

Symbol	Maximum thrust (at 0.7 MPa)
PCM	
005	0.5 ton
01	1 ton
PCS	
02	2 ton
04	4 ton
PCH	
03	3 ton
06	6 ton
08	8 ton
13	13 ton
17	17 ton
24	24 ton
	35 ton
	44 ton

Symbol	Total stroke
05	50 mm
10	100 mm
15	150 mm
20	200 mm
30	300 mm

Symbol	High thrust stroke
05	5 mm
10	10 mm
15	15 mm
20	20 mm

Symbol	Number of Auto switches
1	1 pc.
2	2 pcs.
3	3 pcs.
N	"N" pcs.

Symbol	Oil film removal specification for rod
Nil	Without measures
B	With measures

Symbol	Stop valve
Nil	Without stop valve
V1	With 100 VAC
V2	With 200 VAC
V3	With 24 VDC

Symbol	Auto switch
Nil	Read auto switch
H2ME	Solid state auto switch

Symbol	Regulator for high thrust
Nil	Without regulator
R	With regulator

Selectable only with operating valve. All PCM series can be selected.

Symbol	Speed controller
S2	High thrust feed speed
S3	Backward drive speed
S4	Pneumatic thrust feed speed

Selectable only with operating valve. Multiple selections possible. Example : S234

Symbol	Oil pressure gauge
Nil	Without pressure gauge
G	MPa indication
GX	MPa-kN indication

Hydraulic pressure sensor is also available. See the accessories.

Symbol	Drop prevention valve
Nil	Without valve
T	With valve

Selectable only with operating valve. PCM series cannot be selected.

Selection method for product number

- Determine the type that will provide the required high thrust.
(If the thrust of 43000N at 0.5MPa is required, look at the thrust table and decide it as PCH-08 that can produce the thrust of 62830N at 0.5MPa.)
- Next, determine the total stroke required to operation.
(If the punch needs to be 70mm away from the work to supply and discharge the work, allow 100mm for the total stroke.)

- Determines high thrust stroke.
(If you press-fit a bush with a height of 2 mm at 43000N, add about 50% to make it 3 mm, which is a close stroke of 5 mm. With the above, the product number is determined to be PCH-08-1005.)

Required amount of oil

Unit : liter

Model No.	Total stroke	Required amount
PCM-005 ~ 01	05	0.20
	10	0.30
	15	0.40
	20	0.45
	30	0.55
PCH-03 ~ 08	10	1.00
	15	1.60
	20	1.90
	30	2.50
PCH-13 ~ 24	10	2.70
	15	3.40
	20	4.10
	30	6.20
PCH-35 ~ 44	10	3.80
	15	4.70
	20	5.60
	30	7.40

Model No.	Total stroke	Required amount
PCS-02 ~ 04	05	0.35
	10	0.45
	15	0.55
	20	0.75
	30	0.95

Hydraulic fluid

Oil brand, product name and viscosity

Brand	Product name • Viscosity
Royal Dutch Shell	Tellus S2V 22 or 32
Exxon Mobil	DTE 22 or 24

Hydraulic fluid : Standard mineral hydraulic fluid

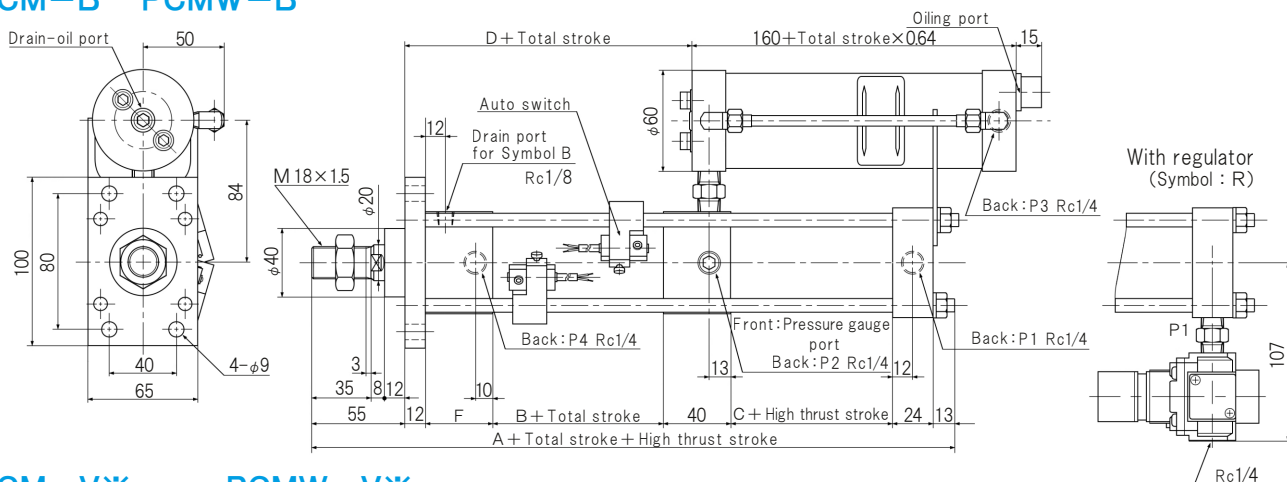
ISO viscosity grade : VG22 or 32

Note) Hydraulic fluid is not attached at the time of shipment.

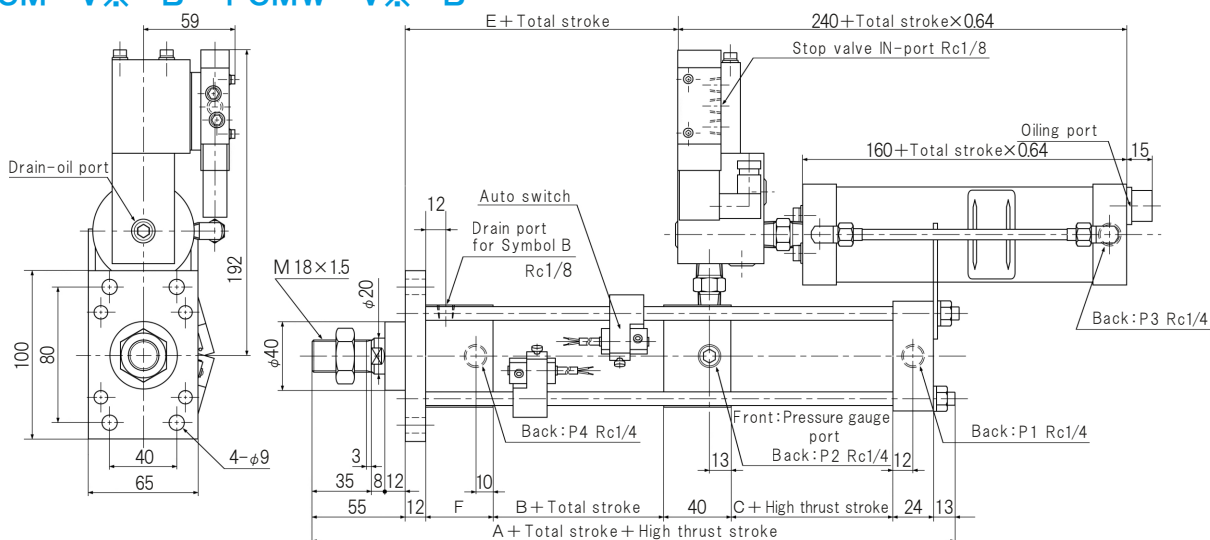
Please prepare at your company.

However, PCM and PCS are shipped with oil enclosed.

PCM	PCMW
PCM-B	PCMW-B



PCM-V※ PCMW-V※
PCM-V※-B PCMW-V※-B



(Unit: mm)							
Model No.	Symbol	A	B	C	D	E	F
PCM-005		253	31	55	83	73	23
PCMW-005		273	51	55	103	93	23
PCM-005-B		270	31	55	100	90	40
PCMW-005-B		290	51	55	120	110	40

Model No.	Symbol	A	B	C	D	E	F
PCM-01		253	31	55	83	73	23
PCMW-01		273	51	55	103	93	23
PCM-01-B		270	31	55	100	90	40
PCMW-01-B		290	51	55	120	110	40

Dimension to convert “stroke” in external dimensions.

Symbol	Total stroke					High thrust stroke			
	05	10	15	20	30	05	10	15	20
PCM-005	50	100	150	200	300	20	40	60	80
PCM-01	50	100	150	200	300	41	82	123	164

Note)

PCM-005 and 01 are attached a rod end nut.

Semi-standard product full length dimensions and minimum high thrust switching position for pneumatic thrust stroke.

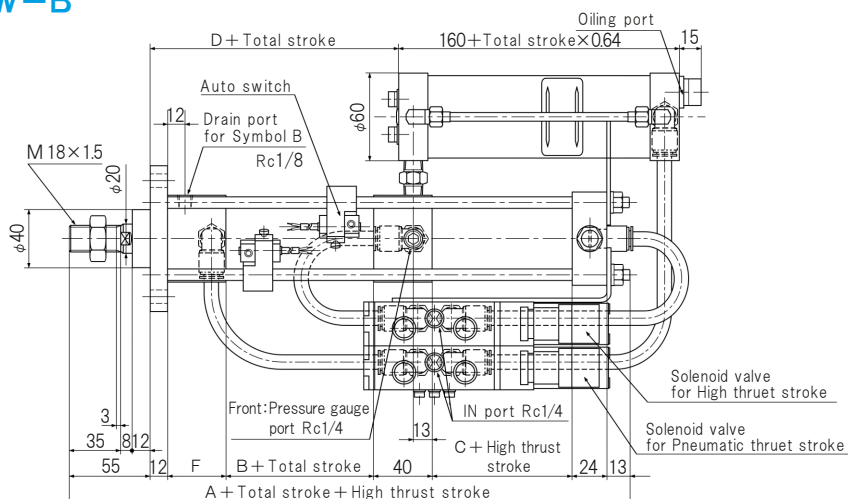
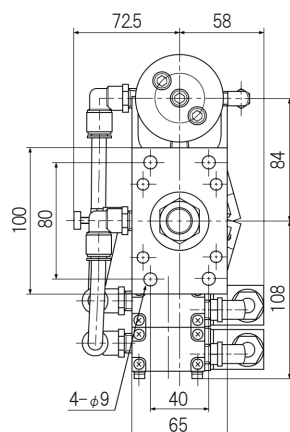
Semi-standard products with the following model numbers have the same total length dimensions as the same length model number.

Also, operate the pneumatic thrust stroke more than the values in the table and switch to high thrust stroke.

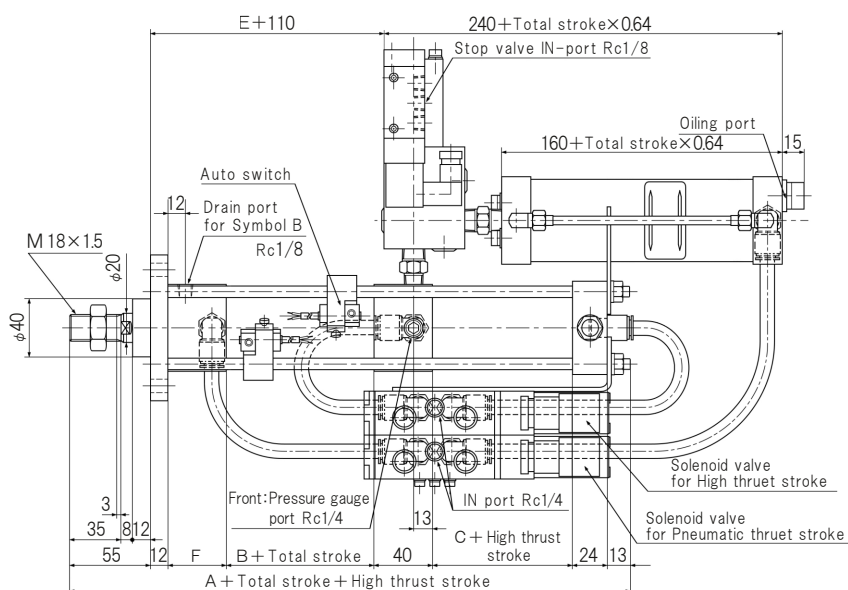
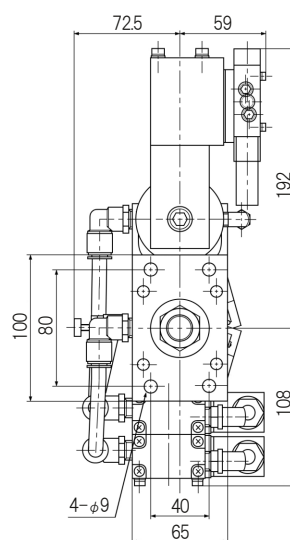
Model number	005-0515	005-0520	01-0510	01-0515 01-1015	01-0520 01-1020 01-1520	W-005-0520	W-01-0510	W-01-0515 W-01-1015	W-01-0520 W-01-1020 W-01-1520
Same length model No.	005-1015	005-1020	01-1010	01-1515	01-2020	W-005-1020	W-01-1010	W-01-1515	W-01-2020
Pneumati thrust stroke	1	21	23	14 64	5 55 105	1	3	0 44	0 35 85

Dimensions

PCMV※ PCMV※W
PCMV※-B PCMV※W-B



PCMV*~~-V*~~ PCMV*W~~-V*~~
PCMV*~~-V*-B~~ PCMV*W~~-V*-B~~



(Unit: mm)							
Model No.	Symbol	A	B	C	D	E	F
PCMV※-005		253	31	55	83	73	23
PCMV※W-005		273	51	55	103	93	23
PCMV※-005-B		270	31	55	100	90	40
PCMV※W-005-B		290	51	55	120	110	40

		(Unit: mm)					
Model No.	Symbol	A	B	C	D	E	F
PCMV※-01		253	31	55	83	73	23
PCMV※W-01		273	51	55	103	93	23
PCMV※-01-B		270	31	55	100	90	40
PCMV※W-01-B		290	51	55	120	110	40

Dimension to convert “stroke” in external dimensions.

Symbol		Total stroke					High thrust stroke			
Model No.		05	10	15	20	30	05	10	15	20
PCM-005		50	100	150	200	300	20	40	60	80
PCM-01		50	100	150	200	300	41	82	123	164

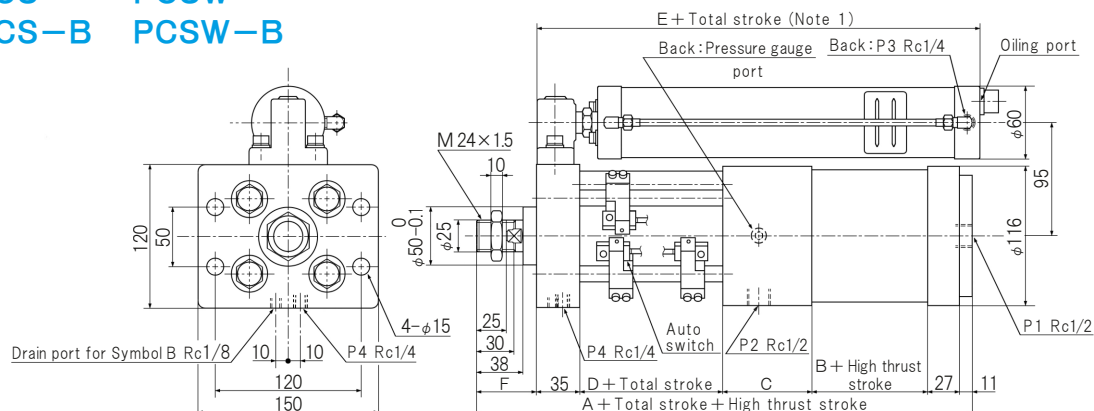
Note)

PCM-005 and 01 are attached a rod end nut.

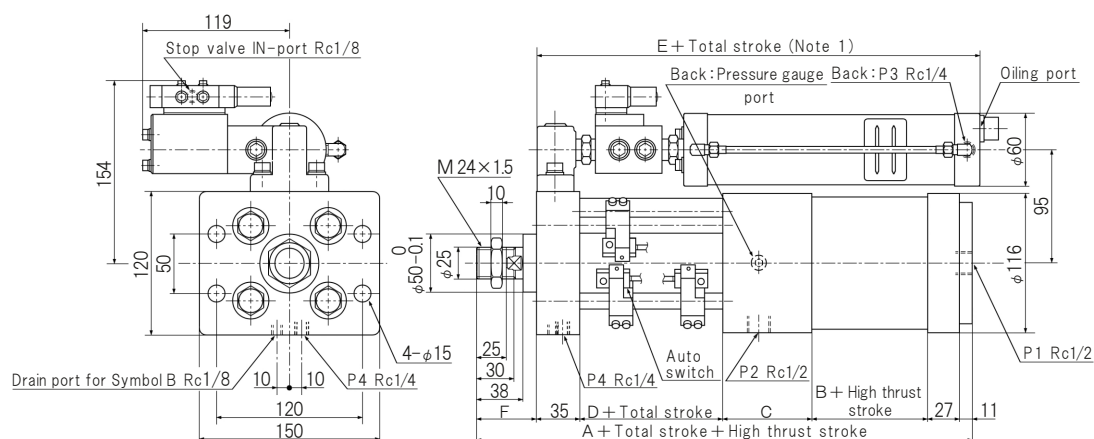
Note) Semi-standard product full length dimensions and minimum high thrust switching position for pneumatic thrust stroke are the same as the table on page 6.

Dimensions

PCS PCSW
PCS-B PCSW-B



PCS-V※ PCSW-V※
PCS-V※-B PCSW-V※-B



(Unit: mm)

Model No.	Symbol	A	B	C	D	E	F
PCS-02		265	47	75	20	247	50
PCS-02-B		279	47	75	20	247	64
PCSW-02		315	47	75	70	247	50
PCSW-02-B		329	47	75	70	247	64
PCS-02-V※		265	47	75	20	327	50
PCS-02-V※-B		279	47	75	20	327	64
PCSW-02-V※		315	47	75	70	327	50
PCSW-02-V※-B		329	47	75	70	327	64

(Unit: mm)

Model No.	Symbol	A	B	C	D	E	F
PCS-04		255	47	65	20	247	50
PCS-04-B		269	47	65	20	247	64
PCSW-04		305	47	65	70	247	50
PCSW-04-B		319	47	65	70	247	64
PCS-04-V※		255	47	65	20	327	50
PCS-04-V※-B		269	47	65	20	327	64
PCSW-04-V※		305	47	65	70	327	50
PCSW-04-V※-B		319	47	65	70	327	64

Dimension to convert "stroke" in external dimensions.

(Unit: mm)

Model No.	Symbol	Total stroke					High thrust stroke			
		05	10	15	20	30	05	10	15	20
PCS-02		50	100	150	200	300	20	40	60	80
PCS-04		50	100	150	200	300	40	80	120	160

Note 1)

If the total stroke symbol is 20 or more, "E + Total stroke" will be "E + Total stroke + 100".

Note)

PCS-02 and 04 are attached a rod end nut.

Semi-standard product full length dimensions and minimum high thrust switching position for pneumatic thrust stroke.

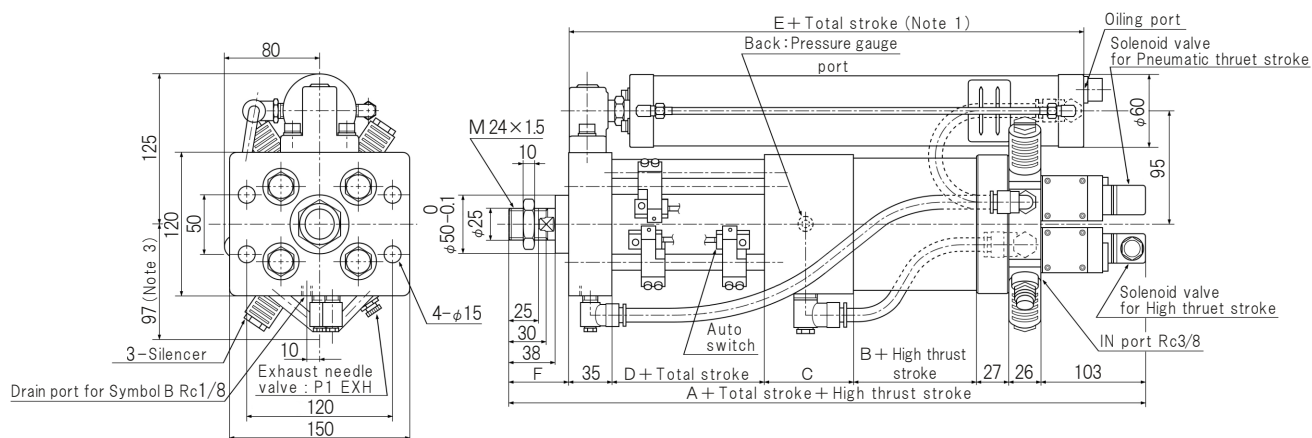
Semi-standard products with the following model numbers have the same total length dimensions as the same length model number.

Also, operate the pneumatic thrust stroke more than the values in the table and switch to high thrust stroke.

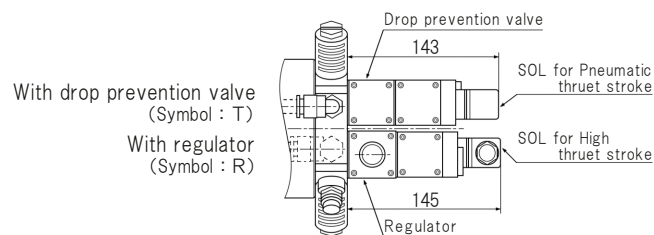
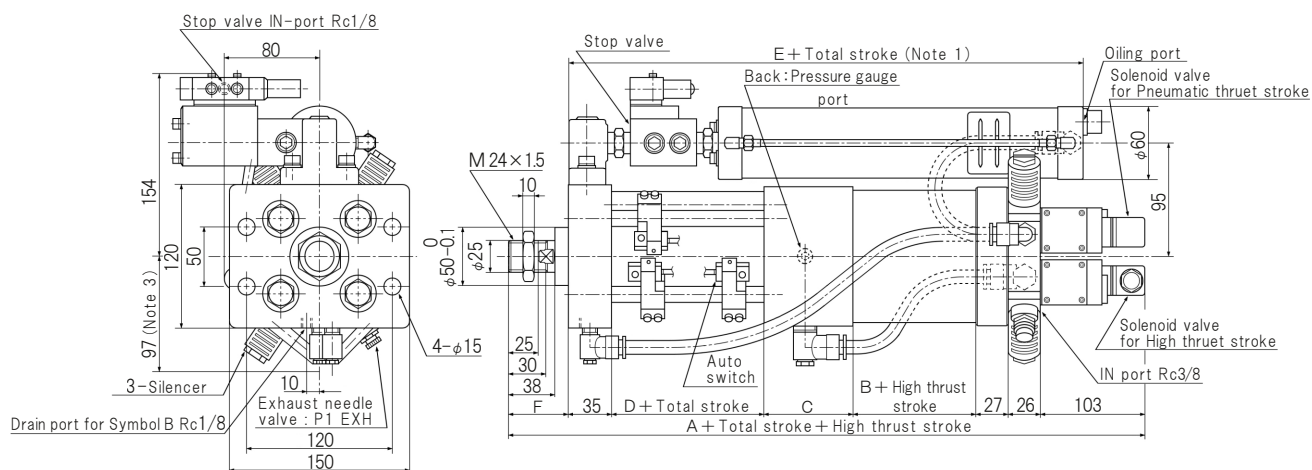
Model number	02-0515	02-0520	04-0510	04-0515 04-1015	04-0520 04-1020 04-1520
Same length model No.	02-1015	02-1020	04-1010	04-1515	04-2020
Pneumati thrust stroke	0	20	20	0 50	0 40 90

Dimensions

PCSV※ PCSV※W
PCSV※-B PCSV※W-B



PCSV*~~V~~ PCSV*W~~V~~
PCSV*~~V~~~~B~~ PCSV*W~~V~~~~B~~



		(Unit : mm)					
Model No.	Symbol	A	B	C	D	E	F
PCSV※-02		383	47	75	20	247	50
PCSV※-02-B		397	47	75	20	247	64
PCSV※W-02		433	47	75	70	247	50
PCSV※W-02-B		447	47	75	70	247	64
PCSV※-02-V※		383	47	75	20	327	50
PCSV※-02-V※-B		397	47	75	20	327	64
PCSV※W-02-V※		433	47	75	70	327	50
PCSV※W-02-V※-B		447	47	75	70	327	64

		(Unit: mm)					
Model No.	Symbol	A	B	C	D	E	F
PCSV※-04		373	47	65	20	247	50
PCSV※-04-B		387	47	65	20	247	64
PCSV※W-04		423	47	65	70	247	50
PCSV※W-04-B		437	47	65	70	247	64
PCSV※-04-V※		373	47	65	20	327	50
PCSV※-04-V※-B		387	47	65	20	327	64
PCSV※W-04-V※		423	47	65	70	327	50
PCSV※W-04-V※-B		437	47	65	70	327	64

Dimension to convert “stroke” in external dimensions.

Symbol	Total stroke					High thrust stroke			
	05	10	15	20	30	05	10	15	20
PCS-02	50	100	150	200	300	20	40	60	80
PCS-04	50	100	150	200	300	40	80	120	160

Note) Semi-standard product full length dimensions and minimum high thrust switching position for pneumatic thrust stroke are the same as the table on page 8.

Note 1)

If the total stroke symbol is 20 or more, “E + Total stroke” will be “E + Total stroke + 100”.

Note 3)

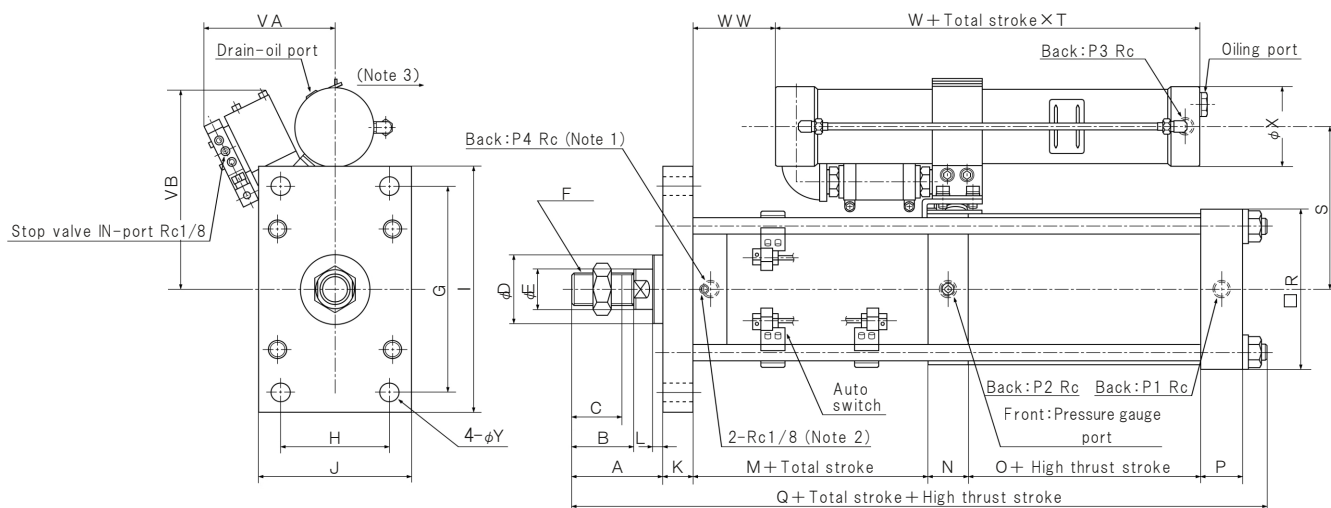
Maximum 111 mm for model with speed controller.

Note)

PCS-02 and 04 are attached a rod end nut.

Dimensions

PCH PCHW PCH-V※ PCHW-V※
PCH-B PCHW-B PCH-V※-B PCHW-V※-B



(Unit: mm)

Symbol Model No.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
PCH-03	90	60	50	70 ^{-0.02/-0.1}	40	M30×1.5	198	108	240	150	30	10	130	45	105	32	461	150	154	1.4
PCH-06	90	60	50	70 ^{-0.02/-0.1}	40	M30×1.5	198	108	240	150	30	10	130	45	108	32	463	150	154	1.4
PCH-08	90	60	50	70 ^{-0.02/-0.1}	40	M30×1.5	198	108	240	150	30	10	130	45	123	32	478	150	154	1.4
PCH-13	110	70	65	100 ^{-0.02/-0.1}	60	M50×1.5	255	165	310	220	40	10	185	40	130	50	587	220	205	1.5
PCH-17	110	70	65	100 ^{-0.02/-0.1}	60	M50×1.5	255	165	310	220	40	10	185	40	140	50	597	220	205	1.5
PCH-24	110	70	65	100 ^{-0.02/-0.1}	60	M50×1.5	255	165	310	220	40	10	185	40	149	50	609	220	205	1.5
PCH-35	160	120	110	130 ^{-0.05/-0.1}	90	M80×2.0	320	180	400	260	50	20	230	50	168	65	768	260	220	1.5
PCH-44	160	120	110	130 ^{-0.05/-0.1}	90	M80×2.0	320	180	400	260	50	20	230	50	176	65	776	260	220	1.5

Symbol Model No.	VA	VB	W	WW	X	Y	Rc
PCH-03	129	187	280	60	80	19	12
PCH-06	129	187	280	60	80	19	12
PCH-08	129	187	280	60	80	19	12
PCH-13	143	219	325	80	110	32	34
PCH-17	143	219	325	80	110	32	34
PCH-24	143	219	325	80	110	32	34
PCH-35	130	230	345	125	130	45	1
PCH-44	130	230	345	125	130	45	1

Note 1) Only P4 port size of PCH-03 to 08 is Rc3/8.

Note 2) Drain port of Oil film removal specification for rod.

Note 3) The model of PCH(W)-35 and 44 with the stop valve, the air hydraulic converter) moves 34 mm in the (→) direction. Then, WW dimension is 150 mm.

There is no change in VA dimensions..

Note) PCH-03 to 08 are attached a rod end nut.

Dimension to convert "stroke" in external dimensions.
(Unit: mm)

Symbol Model No.	Total stroke				High thrust stroke			
	10	15	20	30	05	10	15	20
PCH-03	100	150	200	300	20	40	60	80
PCH-06	100	150	200	300	36	72	108	144
PCH-08	100	150	200	300	55	110	165	220
PCH-13	100	150	200	300	40	80	120	160
PCH-17	100	150	200	300	50	100	150	200
PCH-24	100	150	200	300	70	140	210	280
PCH-35	100	150	200	300	100	200	300	400
PCH-44	100	150	200	300	125	250	375	500

Semi-standard product full length dimensions and minimum high thrust switching position for pneumatic thrust stroke.

Semi-standard products with the following model numbers have the same total length dimensions as the same length model number.

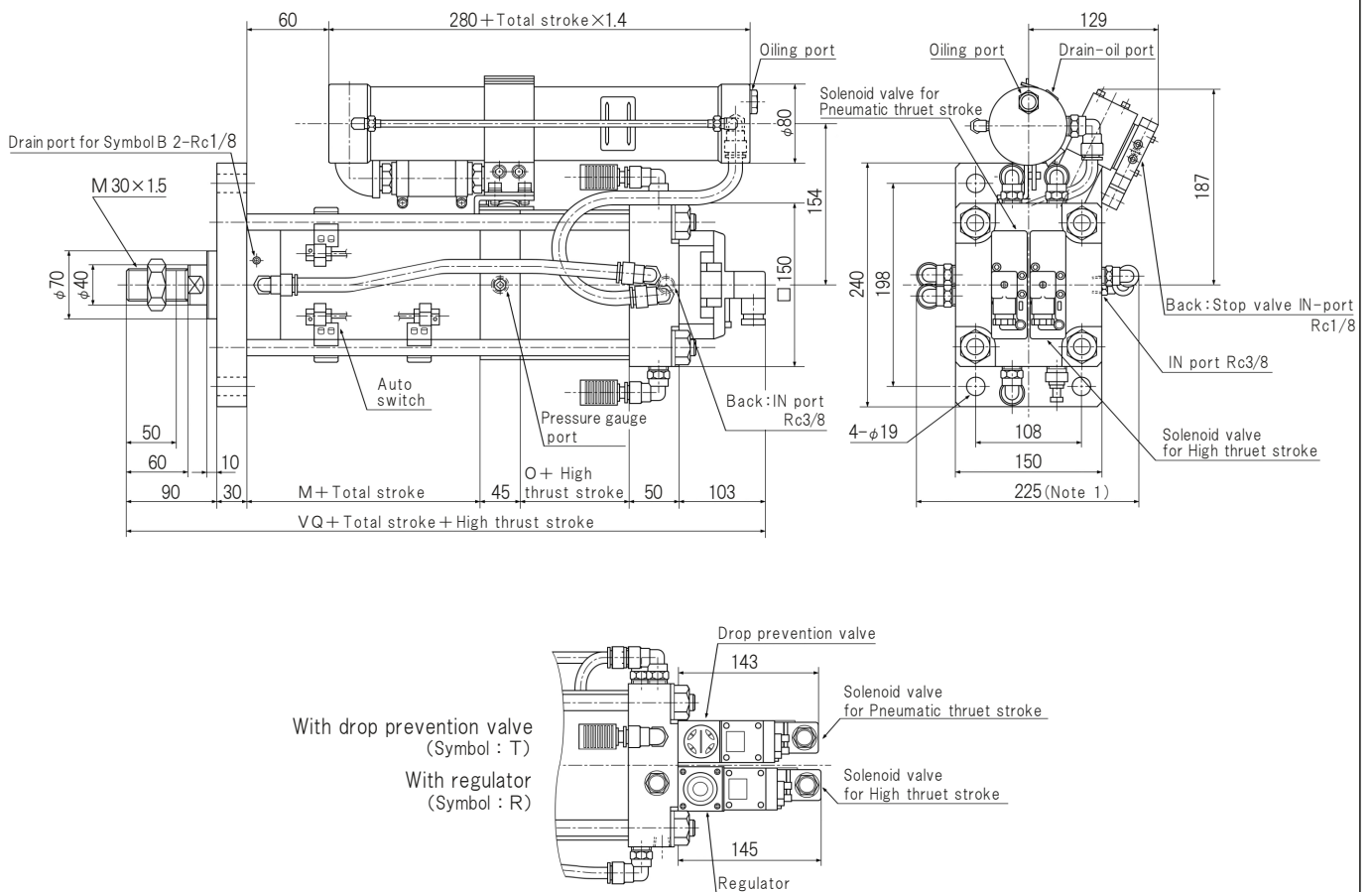
Also, operate the pneumatic thrust stroke more than the values in the table and switch to high thrust stroke.

Model number	03-0505	03-0510	03-0515	03-0520	06-0505	06-0510	06-0515	06-0520	08-0505	08-0510	08-0515	08-0520	13-0505	13-0510	13-0515	13-0520
Same length model No.	03-1005	03-1010	03-1015	03-1020	06-1005	06-1010	06-1015	06-1020	08-1005	08-1010	08-1015	08-1020	13-1005	13-1010	13-1015	13-1020
Pneumati thrust stroke	0	0	0	0	0	0	22	8 58	0	0	0	0	0	0	15	5 55

Model number	17-0505	17-0510	17-0515	17-0520	17-1015	17-1020	24-0505	24-0510	24-0515	24-0520	35-0505	35-0510	35-0515	35-0520	44-0505	44-0510	44-0515	44-0520	44-1020
Same length model No.	17-1005	17-1010	17-	17-	17-1515	17-2020	24-1005	24-1010	24-1015	24-1020	35-1005	35-1010	35-1015	35-1520	44-1005	44-1010	44-1515	44-2520	44-2020
Pneumati thrust stroke	0	10	1515	2020	60	60 110	0	0	0	0	0	0	0	10	0	0	0	18	68

Dimensions

PCHV※-03~08 PCHV※W-03~08 PCHV※-03~08-V※ PCHV※W-03~08-V※
PCHV※-03~08-B PCHV※W-03~08-B PCHV※-03~08-V※-B PCHV※W-03~08-V※-B



(Unit: mm)

Symbol Model No.	A	B	C	D	E	F	G	H	I	J
PCH-03	90	60	50	70 ^{-0.02/-0.1}	40	M30×1.5	198	108	240	150
PCH-06	90	60	50	70 ^{-0.02/-0.1}	40	M30×1.5	198	108	240	150
PCH-08	90	60	50	70 ^{-0.02/-0.1}	40	M30×1.5	198	108	240	150

Dimension to convert “stroke” in external dimensions.
(Unit: mm)

Symbol Model No.	K	L	M	N	O	P	Q	R	S	T	VQ
PCH-03	30	10	130	45	97	50	461	150	154	1.4	545
PCH-06	30	10	130	45	100	50	463	150	154	1.4	548
PCH-08	30	10	130	45	115	50	478	150	154	1.4	563

Symbol Model No.	Total stroke				High thrust stroke			
	10	15	20	30	05	10	15	20
PCH-03	100	150	200	300	20	40	60	80
PCH-06	100	150	200	300	36	72	108	144
PCH-08	100	150	200	300	55	110	165	220

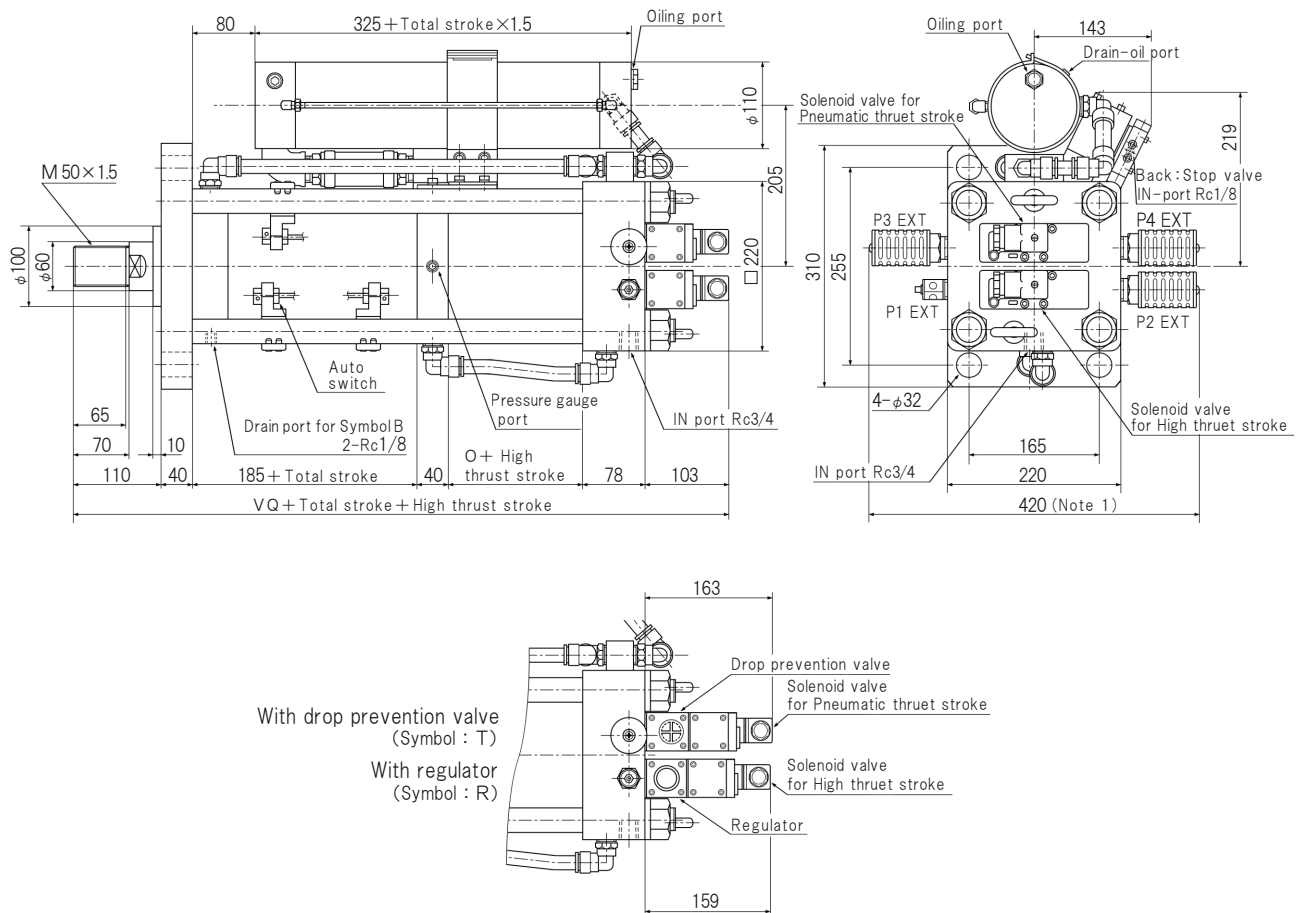
Note 1) Maximum 230 mm for model with speed controller.

Note) PCH-03 to 08 are attached a rod end nut.

Note) Semi-standard product full length dimensions and minimum high thrust switching position for pneumatic thrust stroke are the same as the table on page 10.

Dimensions

PCHV※-13~24 PCHV※W-13~24 PCHV※-13~24-V※ PCHV※W-13~24-V※
PCHV※-13~24-B PCHV※W-13~24-B PCHV※-13~24-V※-B PCHV※W-13~24-V※-B



Symbol Model No.	A	B	C	D	E	F	G	H	I	J
PCH-13	110	70	65	100 ^{-0.02 -0.1}	60	M50×1.5	255	165	310	220
PCH-17	110	70	65	100 ^{-0.02 -0.1}	60	M50×1.5	255	165	310	220
PCH-24	110	70	65	100 ^{-0.02 -0.1}	60	M50×1.5	255	165	310	220

(Unit : mm)											
Symbol	K	L	M	N	O	P	Q	R	S	T	VQ
PCH-13	40	10	185	40	130	78	587	220	205	1.5	686
PCH-17	40	10	185	40	140	78	597	220	205	1.5	696
PCH-24	40	10	185	40	149	78	609	220	205	1.5	705

- Dimension to convert “stroke” in external dimensions.
(Unit : mm)

Symbol Model No.	Total stroke				High thrust stroke			
	10	15	20	30	05	10	15	20
PCH-13	100	150	200	300	40	80	120	160
PCH-17	100	150	200	300	50	100	150	200
PCH-24	100	150	200	300	70	140	210	280

Note 1) The type with speed controller is attached the same silencer with throttle valve as P1 exhaust.

Note 2) PCH-13 to 24 are supplied with the "Operating valve", "Regulator" and "Fall prevention valve" in the same package, so please assemble them by the customer.

Note) Semi-standard product full length dimensions and minimum high thrust switching position for pneumatic thrust stroke are the same as the table on page 10.

Oil film removal specification for rod

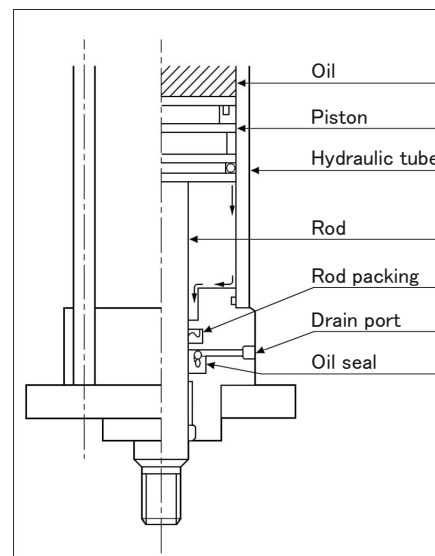
PCM-B
PCS-B
PCH-B

With commonly used packing, the oil that leaks from the piston rod is not seen as "leak" due to the sliding of the hydraulic cylinder. However, when molding electronic parts or caulking, a drop of oil will result in a defective product.

The rod oil film removal specification protects parts from oil by minimizing oil discharge from the sliding parts of the piston rod.

Internal structure

As the piston slides, the oil that adheres to the inner surface of the hydraulic tube becomes a thin oil film that flows to the rod packing. The rod packing seals the air pressure, but the oil film cannot be cut completely and goes out through the rod. Before this oil goes out, the oil film is removed by the oil seal and discharged from



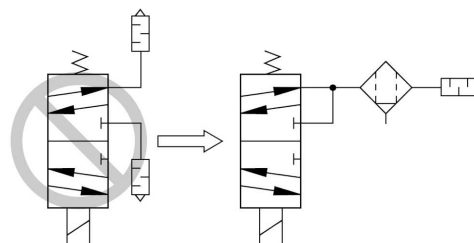
About use in the environment that hates oil

For the type with oil film removal specification for rod, only oil film measures for the piston rod are taken, so take separate oil measures for the valve exhaust port and drain port.

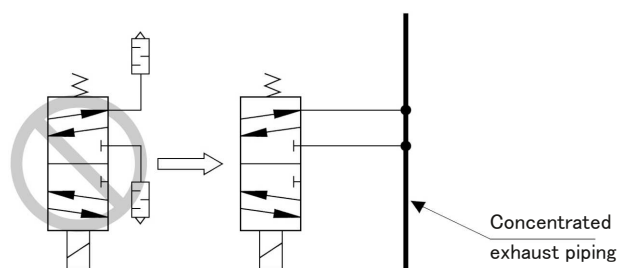
As shown in the illustration, the solenoid valve should be exhausted through a mist separator or similar device.

(These drawings supplement the "Air Piping Application Examples" shown on page 12 and 13.)

Recommended product: Exhaust Cleaner
Maker: SMC, CKD, etc

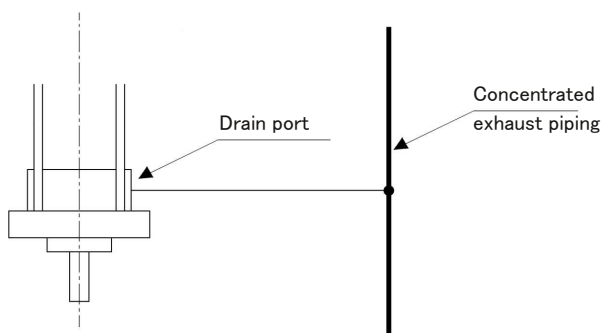


Connect to the concentrated exhaust pipe and discharge it outdoors.



Drain port

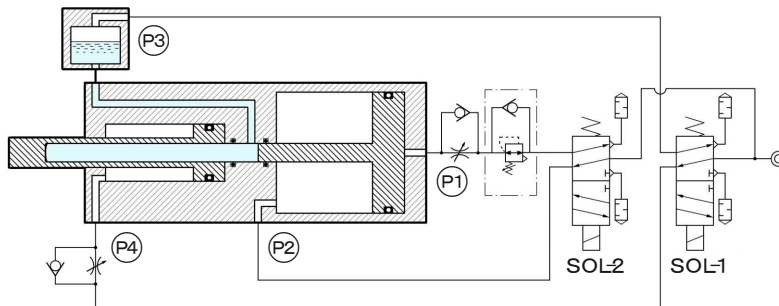
As shown in the illustration, connect to the concentrated exhaust pipe and discharge it outdoors.



Example for air circuit

The type without operating valve

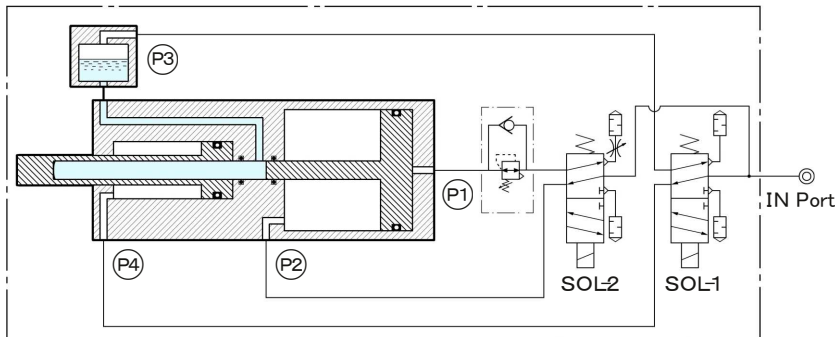
PCM
PCS
PCH



- ※ Install the regulator when adjusting high thrust in order not to reduce the backward thrust.
- ※ The speed controller (P1) should be installed in the direction shown in the illustration to prevent negative pressure in the oil.

The type with operating valve

PCMV※
PCSV※
PCHV※



- ※ Install the regulator when adjusting high thrust in order not to reduce the backward thrust.
Install the spacer type regulator.
- ※ The silencer with needle valve is attached at the position shown in the illustration to prevent negative pressure in the oil. The PCM type is attached to the P1.

“circle mark” indicates supply, “cross mark” indicates exhaust.

Operating condition	SOL-1	SOL-2	P1	P2	P3	P4	Progress condition
Stop	OFF	OFF	×	○	×	○	Condition of illustration
Pneumatic thrust stroke	ON	OFF	×	○	○	×	Forward at rapid speed
High thrust stroke	ON	ON	○	×	○	×	Forward at high thrust
Backward drive	OFF	OFF	×	○	×	○	Backward at rapid speed

How to adjust the cylinder speed.

Install a meter-out type of speed controller to each port.

P2 : The speed for the high thrust stroke.

P3 : The speed for the backward drive.

P4 : The speed for the pneumatic thrust stroke.

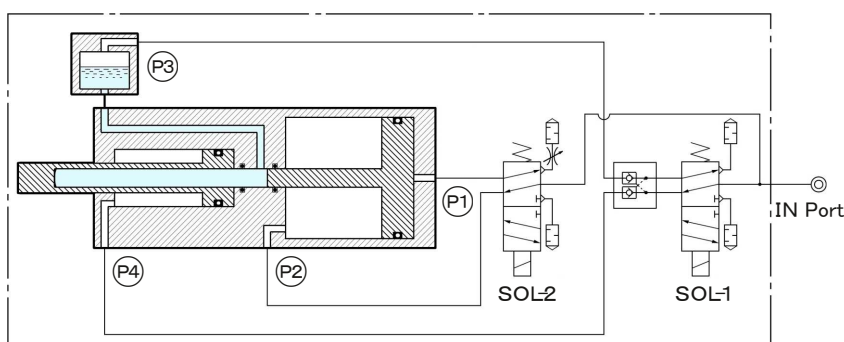
Measures to prevent the JIG weight from falling when the supply air pressure is cut off.

By installing a pilot check valve on the P4 port and taking in the supply air as pilot air, it is possible to prevent its own weight from falling. However, it may gradually fall over time.

Also, when releasing the residual pressure, there is a danger that it will operate unexpectedly due to its own weight dropping, so take measures such as using a safety block.

The type with drop prevention valve

PCSV※-T PCHV※-T

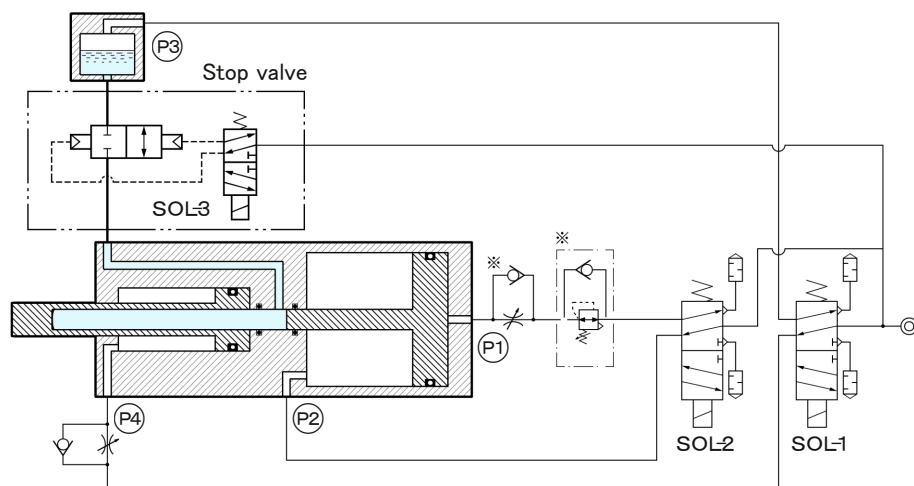


- ※ The drop prevention valve is used to prevent the JIG weight from falling when the supply air pressure is cut off at the upper end of the stroke of the cylinder or at the intermediate stop position. However, it may gradually fall over time. Also, when releasing the residual pressure, there is a danger that it will operate unexpectedly due to its own weight dropping, so take measures such as using a safety block.
- ※ The silencer with needle valve is attached at the position shown in the illustration to prevent negative pressure in the oil.

Example for air circuit

The type with stop valve

PCM....V※ PCS....V※ PCH....V※



※ Install the regulator when adjusting high thrust in order not to reduce the backward thrust.

※ The speed controller (P1) should be installed in the direction shown in the illustration to prevent negative pressure in the oil.

※ For the type with a stop valve, use a 2 position single solenoid valve. With other type of actuation such as 2 position double and 3 position closed center, the air pressure inside the cylinder may be insufficient, and emergency stop, intermediate stop may not be performed, or it may take a long time to stop.

How to intermediate stop (Emergency stop, Inching)

“circle mark” indicates supply, “cross mark” indicates exhaust.

Operating condition	SOL-1	SOL-2	SOL-3	P1	P2	P3	P4	Progress condition
Stop	OFF	OFF	OFF	X	○	X	○	Condition of illustration
Pneumatic thrust stroke	ON	OFF	ON	X	○	○	X	Forward at rapid speed
Intermediate stop	OFF	OFF	OFF	X	○	X	○	Intermediate stop
High thrust stroke	ON	ON	ON	○	X	○	X	Forward at high thrust
Backward drive	OFF	OFF	ON	X	○	X	○	Backward at rapid speed

It does not stop during the high thrust stroke, stops after the high thrust stroke returns.

How to continuous operation for high thrust stroke drive only

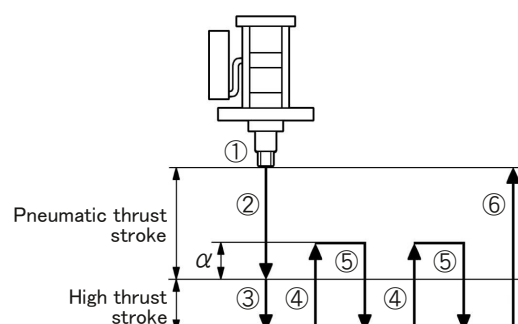
“circle mark” indicates supply, “cross mark” indicates exhaust.

Operating condition	SOL-1	SOL-2	SOL-3	P1	P2	P3	P4	Progress condition
① Stop	OFF	OFF	OFF	X	○	X	○	Condition of illustration
② Pneumatic thrust stroke	ON	OFF	ON	X	○	○	X	Advance at fast speed
③ High thrust stroke	ON	ON	ON	○	X	○	X	Advance at high thrust
④ High thrust stroke return drive	OFF	OFF	OFF	X	○	X	○	Return at (High thrust + α) stroke (Note 1)
⑤ High thrust stroke	OFF	ON	OFF	○	X	X	○	Advance at (α + High thrust) stroke (Note 1)
⑥ Backward drive	OFF	OFF	ON	X	○	X	○	Return at condition of illustration

(Note 1) The α stroke is a stroke that returns by α mm from the position at the start of high thrust stroke drive.

There is no high thrust during α stroke forward. The α stroke of each model is shown in the table below.

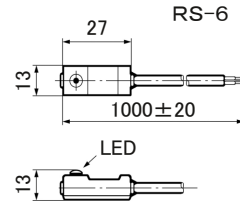
Model	α stroke (mm)
PCS-02-V※	about 5.5
PCS-04-V※	about 3.1
PCH-03-V※	about 2.1
PCH-06-V※	about 3.6
PCH-08-V※	about 2.8
PCH-13-V※	about 2.0
PCH-17-V※	about 1.8
PCH-24-V※	about 1.4
PCH-35-V※	about 4.5
PCH-44-V※	about 1.8



Auto Switch

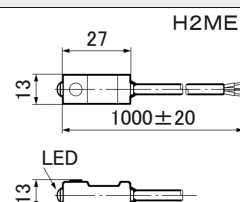
Read auto switch		
Model No.	RS-6	
Voltage	24 VDC	100 V / 200 VAC
Max. switching current	20 mA	20 mA
Max. switching capacity	5 W	5 VA
Average operating time	1 mSEC	
Insulation resistance	100 MΩ or more (500 VDC measured via megger)	
Impact resistance	30 G	
Working temperature range	-10 to 60 °C (Non-freezing)	
Lead wire	Two - core cable, 1 m	
Indicating lamp	Red LED illuminates when turned ON	

Read auto switch

Dimintions and internal circuit	
	<p>RS-6</p> <p>Contact protection circuit</p> <p>Brown(+) ○ — () —</p> <p>Blue(-) ○ —</p>

Solid state auto switch	
Model No.	H2ME
Output type	NPN
Voltage	5, 12, 24 VDC
Max. load current	5 mA (5 VDC), 10 mA (12 VDC), 20 mA (24 VDC)
Max. switching current	100 mA (5 VDC), 200 mA (24 VDC)
Internal voltage drop	0.6 V or less (24 VDC)
Max. leakage current	0.1 mA or less (24 VDC)
Impact resistance	30 G
Working temperature range	-10 to 60 °C (Non-freezing)
Lead wire	Three - core cable, 1 m
Indicating lamp	Red LED illuminates when turned ON

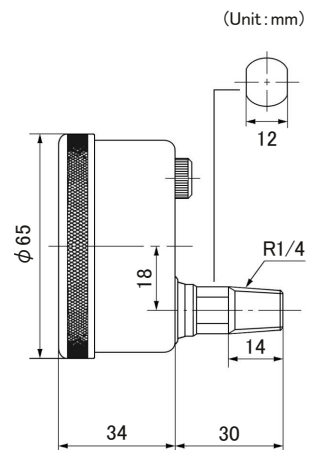
Solid state auto switch

Dimintions and internal circuit	
	<p>H2ME</p> <p>Contact protection circuit</p> <p>Brown(+) ○ —</p> <p>Black OUT ○ —</p> <p>Blue(-) ○ —</p> <p>Main Circuit</p>

About mounting compatibility: Read auto switch (RS-6) and Solid state auto switch (H2ME) can use the same switch bracket.

Oil pressure gauge

Model No.	2315-63-25B	GX-0204	GX-0308	GX-1324	GX-3544
Pressure range	0 to 25 MPa				
Indication	MPa	MPa and kN			
Accuracy	± 1.6 % or less of full scale				
Heat resistance temperature	- 5 to + 45 °C				
Glycerine filling	This pressure gauge is filled with pure glycerine.				
Temperature characteristic	Accuracy change of + 0.3 % for each + 10 °C rise based on + 20 °C, and - 0.3 % for every - 10 °C.				



Solenoid valve

Operating valve

PCMV※

Valve specifications	
Fluid	Air
Operating pressure range	0.1 to 0.97 MPa
Ambient temperature	Ambient temp: -5 to 60°C, Fluid temp: 5 to 60°C
Action	Pilot operated
Effective sectional area	15 mm ²
Lubrication	No required
Manual override	Locking type

Solenoid specifications

Rated voltage	100 VAC (50/60 Hz)	200 VAC (50/60 Hz)	24 VDC
Starting current	0.170/0.140 A	0.090/0.070 A	0.250 A
Holding current	0.100/0.080 A	0.050/0.040 A	
Power consumption	5.0/4.0 W	5.0/4.0 W	6 W
Thermal class	B (Molded coil)		
Wiring method	DIN connector		

PCSV※ PCHV※

Valve specifications	
Fluid	Air
Operating pressure range	0.15 to 0.97 MPa
Ambient temperature	Ambient temp: -5 to 60°C, Fluid temp: 5 to 60°C
Action	Pilot operated
Effective sectional area	PCSV※, PCHV※03 to 08: 33 mm ² PCHV※13 to 24: 65 mm ²
Lubrication	No required
Manual override	Non-locking push type

Solenoid specifications

Rated voltage	100 VAC (50/60 Hz)	200 VAC (50/60 Hz)	24 VDC
Starting current	0.056/0.044 A	0.034/0.026 A	0.042 A
Holding current	0.028/0.022 A	0.017/0.013 A	
Power consumption	1.8/1.4 W	2.1/1.6 W	1.2 W
Thermal class	B (Molded coil)		
Wiring method	DIN connector, with surge suppressor, lamp		

Stop valve

PCM...V※ PCS...V※ PCH...V※

Valve specifications	
Fluid	Air
Operating pressure range	0.3 to 0.7 MPa
Ambient temperature	Ambient temp: -5 to 50°C, Fluid temp: 5 to 50°C
Action	Pilot operated
Port size	Rc 1/8
Effective sectional area	7 mm ²
Lubrication	No required
Manual override	Non-locking type

Solenoid specifications

Rated voltage	100 VAC (50/60 Hz)	200 VAC (50/60 Hz)	24 VDC
Starting current	0.056/0.044 A	0.028/0.022 A	0.075 A
Holding current	0.028/0.022 A	0.014/0.011 A	
Power consumption	1.8/1.5 W	1.8/1.5 W	2.0 W
Thermal class	B (Molded coil)		
Wiring method	DIN connector, with surge suppressor, lamp		

Wiring

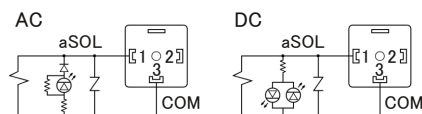
Improper connection of terminals can lead to problems such as the malfunctioning of solenoid valves. Carefully study the following diagram before connection.

Electric connection circuit diagram

Operating valve **PCMV※**

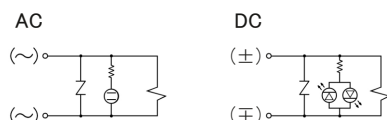


PCSV※ PCHV※



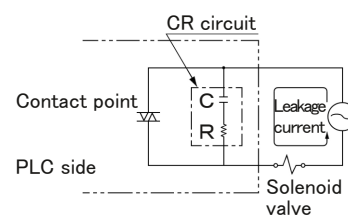
Stop valve

PCM...V※ PCS...V※ PCH...V※



Restriction of leakage current

When using a programmable controller, etc., the leakage current may affect the solenoid valve and the valve may not switch even if the solenoid valve is de-energized. Make sure that the leakage current is less than the valve shown in the table below.



AC100V	3.0 mA or less
AC200V	1.5 mA or less
DC24V	1.8 mA or less

Precautions for safe handling

1

Installation direction

Install the Pneumatic Power Cylinder so that the piston rod faces downward. It can be installed upward or sideways, but the standard models cannot be used. Pneumatic Power Cylinder must be installed in the orientation shown in the illustration. so please contact us in advance. (Special model)

Installation method of air-hydro converter.

When installing the air-hydro converter away from the cylinder body, install on the equipment side using the mounting brackets of each type of air-hydro converter.

Connect the air-hydro converter and the body of the Pneumatic Power Cylinder with hydraulic piping of low pressure type.

In the case of upward PCH type, there is the type that an air release valve is attached in the width across flats of the piston rod. Perform the air release once every one or two months.

2

Checking the amount of hydraulic oil

There is an oil level tube on the side of the air-hydro converter. If an oil falls below the MIN level when the piston rod is pulled in and replenish the oil.

3

Using by punching

Since the Pneumatic Power Cylinder operates by air pressure, when the reaction force suddenly disappears during power stroke such as punching, the higher the load factor, the more rapidly the piston rod and ram operate after punching the work.

The cylinder may break.

Be sure to select a longer power stroke and install a shock absorbing stopper such as urethane rubber on the outside.

Examples: Deburring machine for castings, high load punching, destruction testing machine, etc.

4

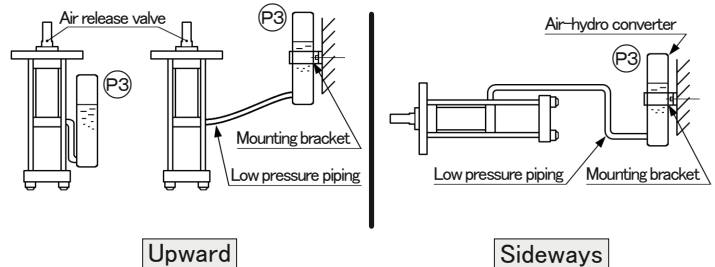
The load of JIG, Mold are heavy

If the load of JIG, Mold, etc. is high with respect to the thrust when the cylinder backward, the operation of the cylinder will be affected, such as slowing down the backward speed or not returning.

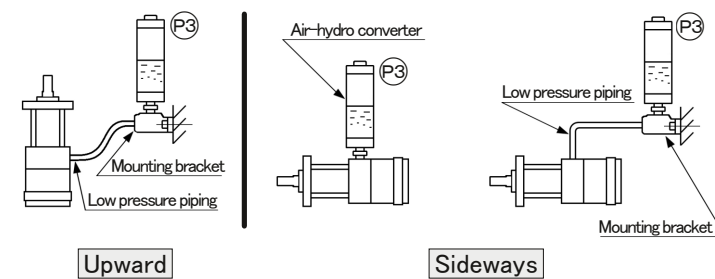
In that case, increasing the supply air pressure to the cylinder (P4 port) may increase the backward thrust and improve it.

In addition, by installing an air cylinder for auxiliary thrust when the cylinder backward, the backward thrust can be increased without changing the supply air pressure. (Refer right illustration)

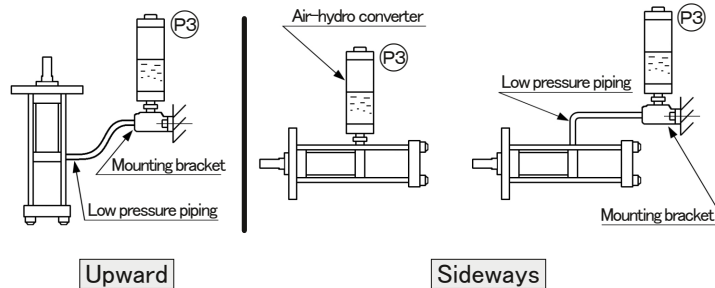
PCH



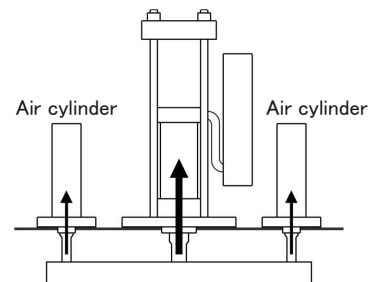
PCS



PCM



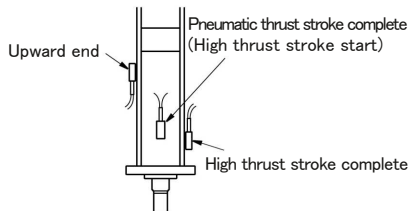
Air-hydro converter should always be mounted with the P3 facing up, regardless of the mounting orientation of Pneumatic Power Cylinder.



How to get the operation signal

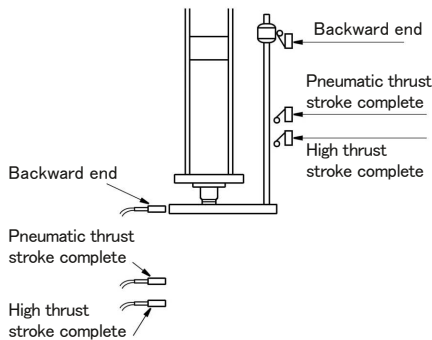
1

Use the type with auto switch to switch the solenoid valve at each position.



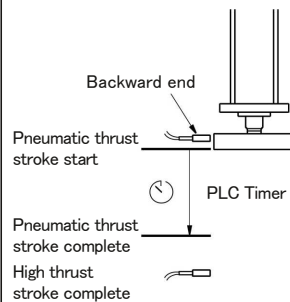
2

Use a proximity sensor or limit switch.



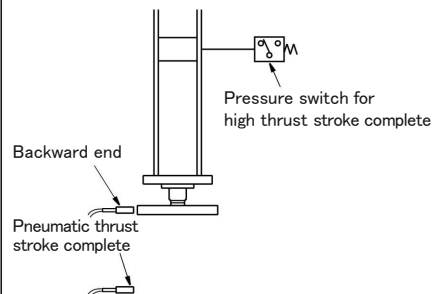
3

By switching to high thrust stroke after the time up, the variation in work height is absorbed.



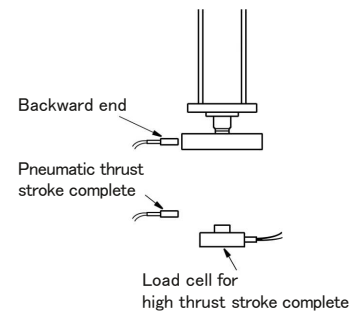
4

By monitoring the internal oil pressure, both the position and the oil pressure can be confirmed, which helps improve quality.



5

The actual thrust value is measured by using the load cell, and more precise quality control is performed.



Mass

Model	Basic weight	Unit: kg	
		Total stroke Additional weight per each 10 mm of stroke	High thrust stroke Additional weight per each 1 mm of stroke
PCM	4.0	0.20	0.1
PCM-B	4.2	0.20	0.1
PCMW	12.8	0.25	0.1
PCMW-B	13.3	0.25	0.2
PCS-02	14.5	0.25	0.1
PCSW-02	15.0	0.25	0.1
PCS-04	14.5	0.25	0.1
PCSW-04	15.0	0.25	0.1
PCSV※-02	14.5	0.25	0.1
PCSV※W-02	15.0	0.25	0.1
PCSV※-04	14.5	0.25	0.1
PCSV※W-04	15.0	0.25	0.1

Model	Basic weight	Unit: kg	
		Total stroke Additional weight per each 10 mm of stroke	High thrust stroke Additional weight per each 1 mm of stroke
PCH-03	32	0.4	0.2
PCH-06	32	0.4	0.3
PCH-08	32	0.4	0.4
PCH-13	100	1.0	0.5
PCH-17	100	1.0	0.6
PCH-24	101	1.1	1.0
PCH-35	195	2.0	1.7
PCH-44	195	2.0	2.2

Example of weight for PCH-08-1010
 $32 + 0.4 \times 100/10 + 0.4 \times 10 = 40 \text{ kg}$

Applications

- Press fitting machine
- Rivet caulking
- Punching press
- Bending
- Work holding for leak tester
- Forming press
- Cutting
- Auto marking
- Thompson blade punching
- Crimping
- Caulking
- Work clamping
- Drawing press
- Compressive press
- Deburring



HIROTAKA MFG. CO.,LTD.

HEAD OFFICE 5-89, Ikoma-cho, Kita-ku, Nagoya City, Aichi 462-0832, JAPAN

Phone +81-52-991-6111 Fax +81-52-991-6115

●LINE UP●

PNEUMATIC POWER CYLINDER

PNEUMATIC BOOSTER

POWER PACK CYLINDER

RUSH BOOSTER

HYDRAULIC CYLINDER

FREE LOCK PAD

SELLOCK CYLINDER

FLOATING CONNECTOR

AUTO CLAMPER

SEL NUT

LINEA BRAKE

**PNEUMATIC AND HYDRAULIC
EQUIPMENT**