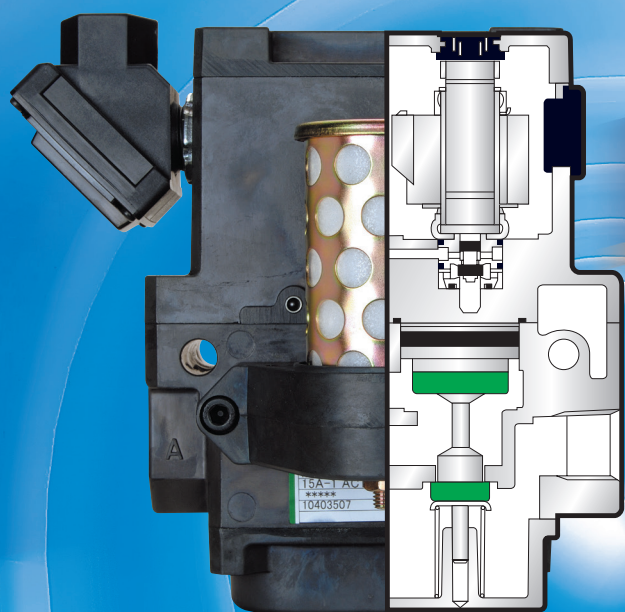


KONAN[®]

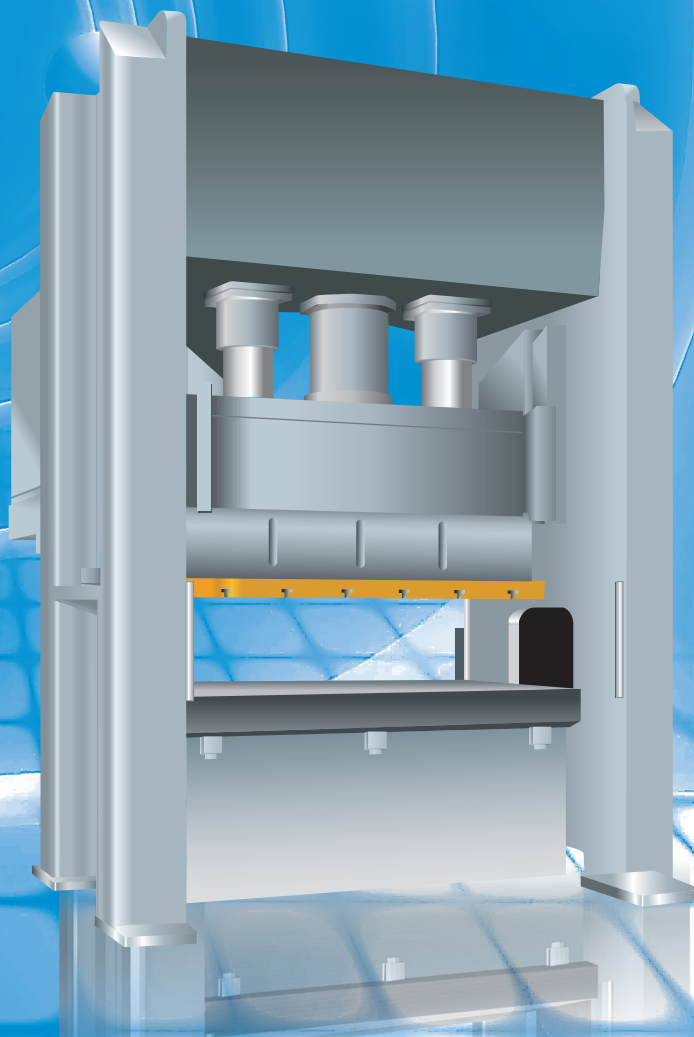
Download PDF catalog data
from the following website

**URL=[http://www.
konan-em.com/](http://www.konan-em.com/)**

Pneumatic-Control Equipment for Press Machines

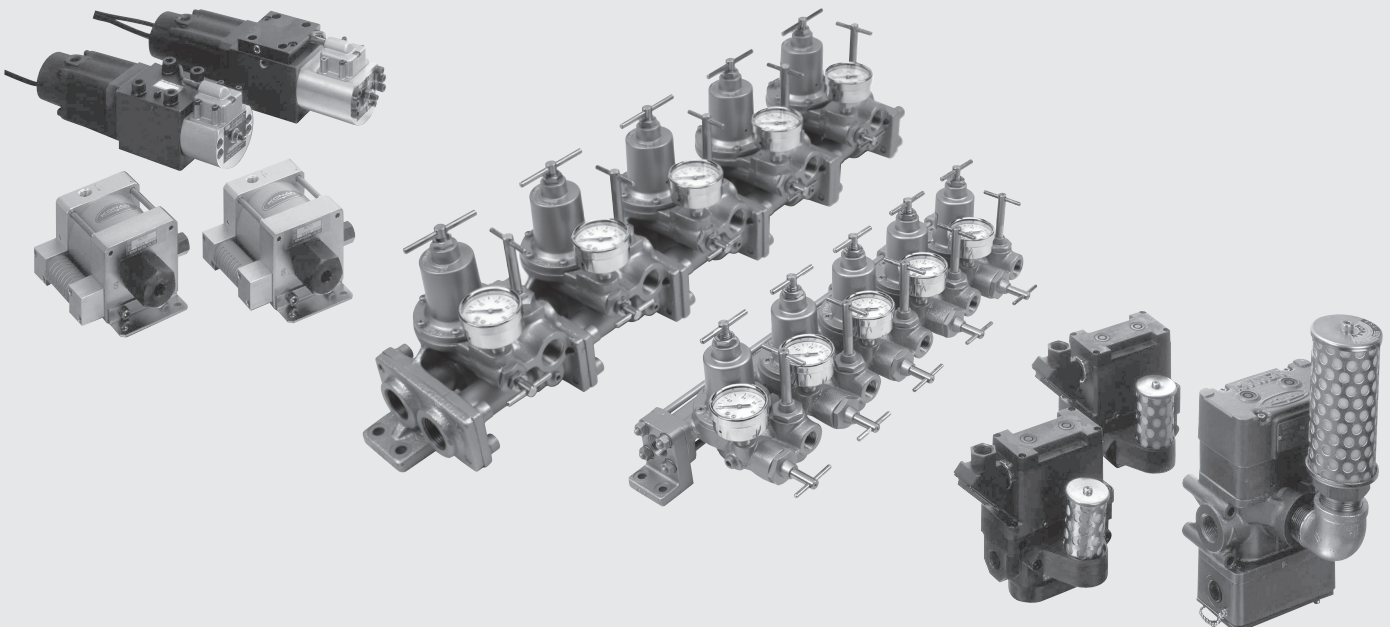
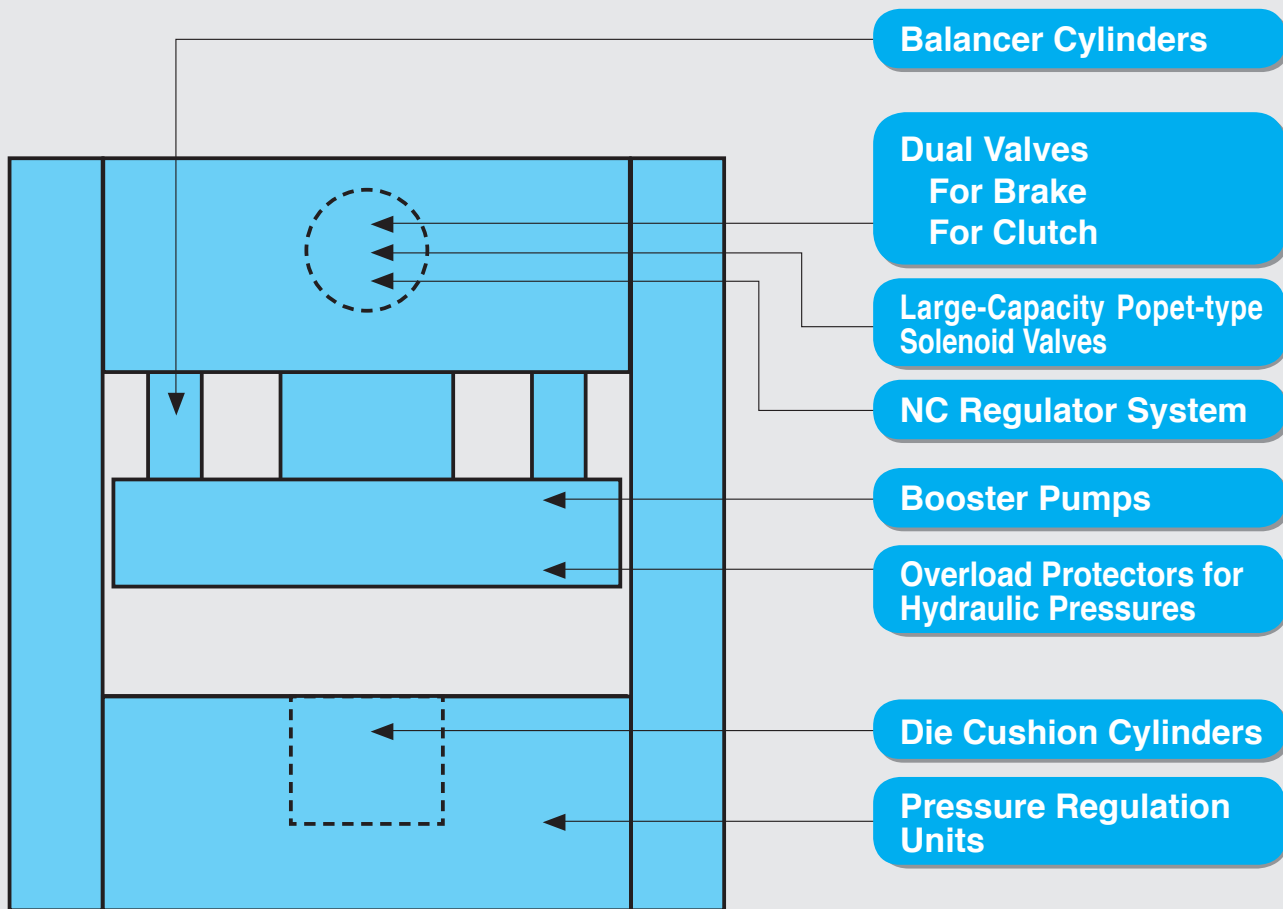


Solenoid Valves for Press Machine
Press-Related Products



KONAN ELECTRIC CO.,LTD.

Distribution diagram of press machine



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General Handling Instructions and Precautions

Please read the following safety precautions carefully before ordering pneumatic cylinders.



Solenoid valves are precision devices. Excessive impact and vibrations may cause malfunctions, looseness of tightened parts or accelerate wear of devices.

By referring to the following vibration and impact resistance values, for vibration and impact, try to match the direction whose acceleration is larger with the direction where the solenoid valve is resistant to vibrations.

Vibration and impact resistance values: MVW6N series ... 10G



Do not leave the device on a place subject to water splash or dust without it packaged. Do not remove the plastic pipe plug at the pipe port until connecting the pipe.

It is necessary to use extra caution to atmosphere where the solenoid valve is installed.

Avoid installing it in a place subject to corrosive gas, chemicals, seawater, steam, etc.



The service life and operation frequency are a part of characteristics which are determined when designing various valves. Make sure the characteristics and use the most suitable one.



For P port (inlet side) pipe of solenoid valve, use the pipe equivalent to the nominal pipe diameter or larger.

In addition, use a pipe whose inside is galvanized (white pipe).



For lubrication oil, use extra caution to the quality. The gasket used for the solenoid valve functions stably only in case of use of high-quality mineral oil. Note that unsuitable lubrication oil may spoil the seal and spindle oil may often swell the gasket.

Select oil which may not emulsify even if mixing into drain.

Generally as lubrication oil, use JIS K2213 additive turbine oil No. 1 or 2 or equivalent. (Avoid using spindle oil.)



After plumbing work, flush the pipes sufficiently.



In the case where a solenoid valve has been left behind for 1 or more years as a spare part, inspect well that no deterioration, shrinkage, deformation, etc. is observed before use.



Check the details on the nameplate and apply the designated rated voltage.



Dust, drain, etc. in fluid may damage the functions of valve significantly, resulting in shortage in service life. Therefore, use clean air.



Do not mistake each pipe port for another port.

P: Air supply port

A: Connection port to operation devices

R: Port for release into the atmosphere

3-Port Dual Valves

MVW6N series pneumatic solenoid valves are constantly-closed (normal closed) type 3-port dual solenoid valves pursuing for “stability of working time” in addition to “safety” and “durability” for brakes and clutches of press machines.

Adjustment for timing unit

This is a unit in which fixed orifices are mounted in parallel on the flowing line leading from the OUT port of pilot valve to the main valve piston and appropriate volume is provided on the upper part of the main valve piston.

Narrowing the air supply and exhausting amount to the main valve enables the time lag between the excitation of solenoid and change of the main valve to delay. The time lag length can be changed arbitrarily by changing the orifice diameter.

For clutch

Enables the time from turning ON the solenoid to opening the main valve to delay arbitrarily.

For brake

Enables the time from turning OFF the solenoid to closing the main valve to delay arbitrarily.

※ Solenoid valves for clutch and brake have undergone incorporation of securing orifice with hole diameter of $\phi 1.2\text{mm}$ and been shipped from our factory. If changing the timing from the standard, process included (4) orifices whose holes are not processed to proper hole diameter before use.

Main Valve

A urethane rubber molded component is used for the main valve in the same manner as the pilot valve. This valve has the durability to enable operations 20 million times.

R port

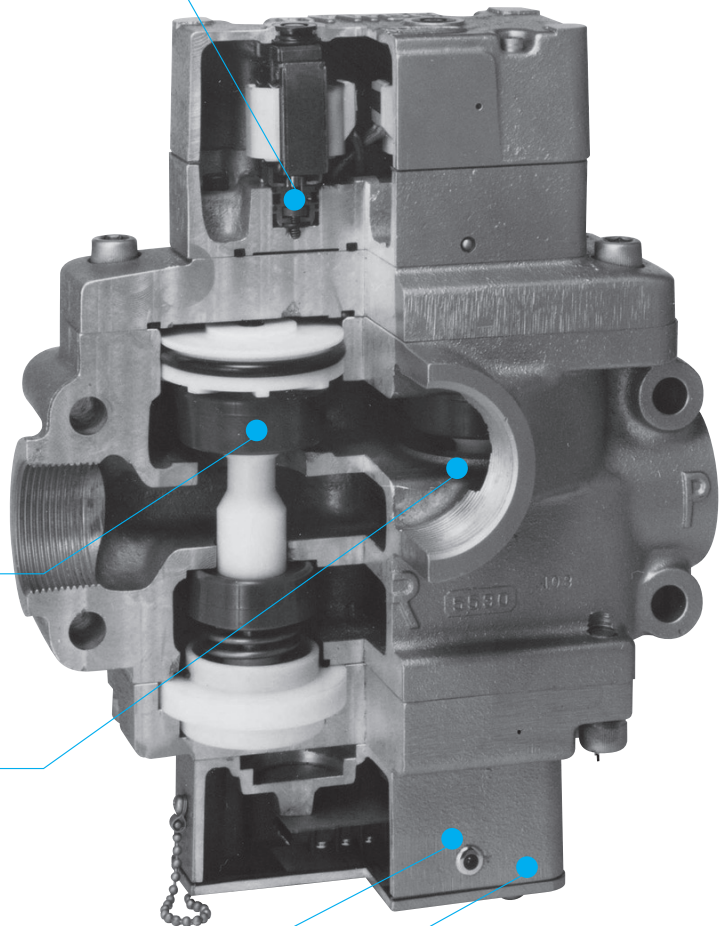
Even one of 2 valves malfunctions, the other one operates to exhaust air. In the case where pressure at supply side is 0.5MPa, the exhaust pressure is approx. 0.01 to 0.025MPa (2 to 5%) with the silencer provided. In addition, all MVW6N series solenoid valves are equipped with silencers as standard.

Indicate Lamp

In order to identify electric signals to solenoid, all models of MVW6N series are equipped with neon lamps as standard.

Pilot Valve

A urethane rubber molded component is used for the poppet-type pilot valve, which has the durability to enable operations 20 million or more times. The separate type to prevent air from entering the solenoid part is used. As a result, this valve is not easily affected by drain, oil mist, etc., and eliminates variation in operating time after long-term use.



Terminal box

A highly-reliable round crimping terminal can be attached to this terminal box. It is unnecessary to disassemble the pilot part when attaching because wiring is made in the terminal box (proximity switch box or monitor box). In addition, in case of a terminal box with a proximity switch or monitor, attach the box here.

Types

Standard Type / MVW6N-08・14

for Brake / MVW6N-08・14-B1

for Clutch / MVW6N-08・14-C1

w/Proximity Switch / MVW6N-08・14-K

for Brake / MVW6N-08・14-K-B1

for Clutch / MVW6N-08・14-K-C1

w/Monitor / MVW6N-08・14-M1

for Brake / MVW6N-08・14-M1-B1

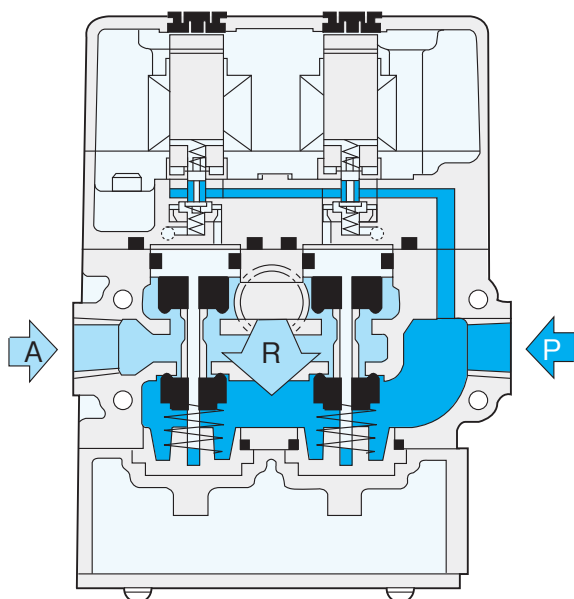
for Clutch / MVW6N-08・14-M1-C1

Operation

De-energized

P → Close

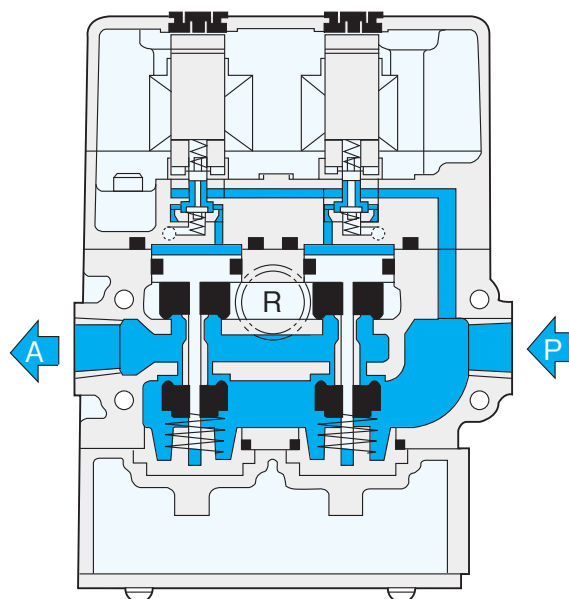
A → R



Energized

P → A

R → Close

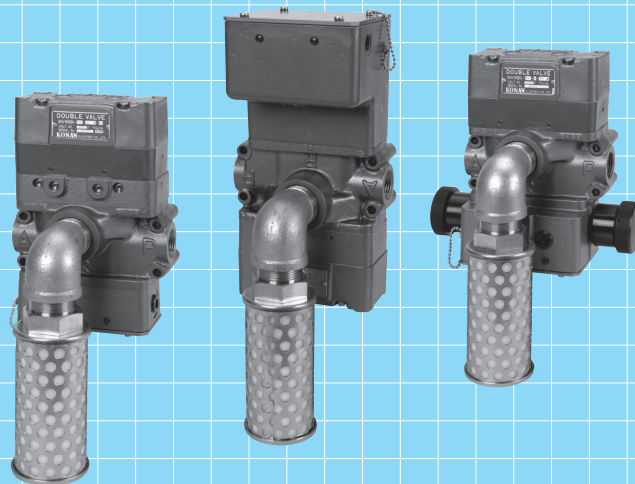


3 Port Dual Valves

Standard Type : MVW6N-08-14-B1 (C1)
w/Proximity Switch : MVW6N-08-14-K-B1 (C1)
w/Monitor : MVW6N-08-14-M2-B1 (C1)

For Brake and Clutch

Port size Rc 3/4 · 1 · 1 1/4 · 1 1/2

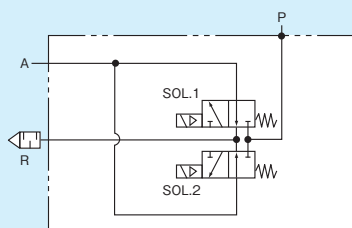


JIS symbol

Standard Type

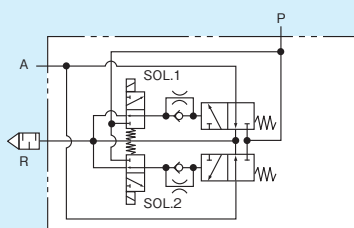
Without timing adjustment mechanism

MVW6N-08/14



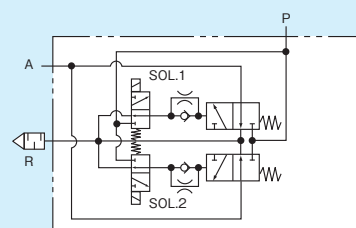
For brake

MVW6N-08/14-B1



For clutch

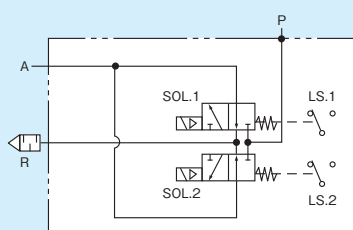
MVW6N-08/14-C1



w/Proximity Switch

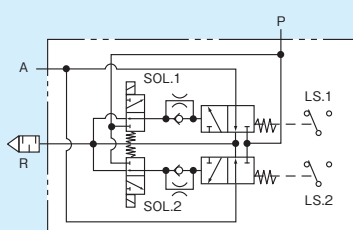
Without timing adjustment mechanism

MVW6N-08/14-K



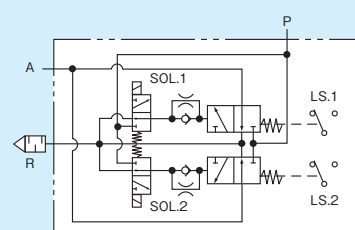
For brake

MVW6N-08/14-K-B1



For clutch

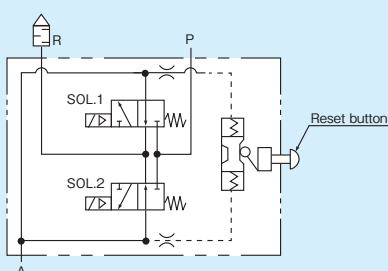
MVW6N-08/14-K-C1



w/Monitor

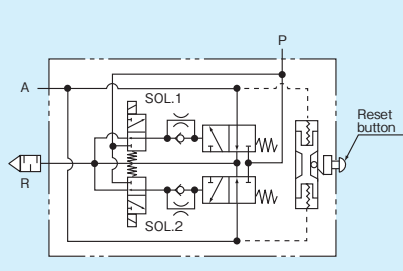
Without timing adjustment mechanism

MVW6N-08/14-M3



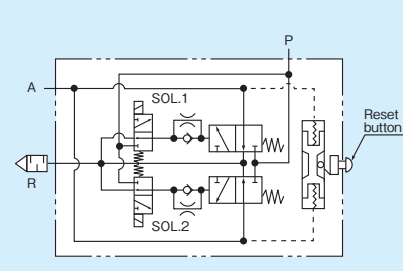
For brake

MVW6N-08/14-M3-B1



For clutch

MVW6N-08/14-M3-C1



Specifications

Model code	Standard Type		MVW6N-08		MVW6N-14	
	w/Proximity Switch		MVW6N-08-K		MVW6N-14-K	
	w/Monitor		MVW6N-08-M3		MVW6N-14-M3	
Port size		“P・A” Ports	Rc 3/4	Rc1	Rc1 1/4	Rc1 1/2
		“R” Port	Rc1 1/4		Rc2	
Fluid			Compressed air (Dry air filter passage less than 40 μm.)			
Working pressure			0.2 ~ 1MPa (Normal operation pressure : 0.5MPa)			
Fluid temp.			－ 5 ~ 60℃ (Normal temperature : 5 ~ 50℃)			
Ambient temp.			－ 5 ~ 50℃ (Be care so as not to be frozen.)			
Effective sectional area	P → A		50mm ²		150mm ²	
	※ 1 A → R		380mm ²		880mm ²	
※ 2 Response time	Sol ON → Valve open		Less than 25ms		Less than 40ms	
	Sol OFF → Valve closed		Less than 30ms		Less than 60ms	
Operating frequency			Max.100times/min			
Installation position			As desired			
Mass	Standard Type		5.5kg		13.5kg	
	w/Proximity Switch		7.0kg		16.0kg	
	w/Monitor		6.0kg		14.0kg	

Note) 1.A → R value of the above effective sectional area shows values without silencer.

2.The response time shows a value without timing adjustment mechanism. In case of brake use (B1) and clutch use (C1), consult with us separately.

Specifications for Solenoid

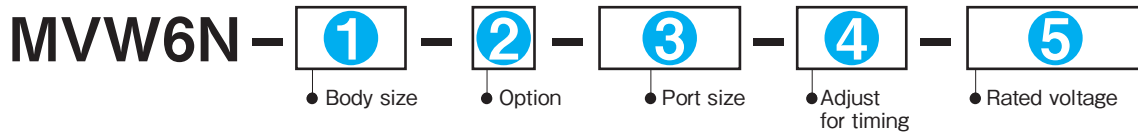
Rated voltage		AC							
		100		110		200		220	
Frequency Hz		50	60	50	60	50	60	50	60
Apparent power	Issuance VA	64.5	42.0	66.0	42.9	61.2	42.0	63.3	43.5
	Holding VA	21.5	14.0	22.0	14.3	20.4	14.0	21.1	14.5
Allowable voltage fluctuation		± 10% of the rated voltage							
Insulation class		JIS C 4003 Class B							
Temperature rise		Max.45°C							

Note) 1.Power consumption shows the value of one solenoid.

2.If requesting voltage other than the above, consult with us separately.

Model Code

When ordering, specify the model as follows.



① Body size

08	Rc 3/4	08
	Rc 1	
14	Rc 1 1/4	14
	Rc 1 1/2	

● The port size shows a bore of P, A port

② Option

Standard Type	No entry
w/Proximity Switch	K
w/Monitor	M3

③ Port size

08	Rc 3/4	20A
	Rc 1	25A
14	Rc 1 1/4	32A
	Rc 1 1/2	40A

④ Adjust for timing

Without	No entry
For brake	B1
For clutch	C1

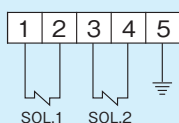
⑤ Rated voltage

AC100V (50/60Hz)	AC100
AC110V (50/60Hz)	AC110
AC200V (50/60Hz)	AC200
AC220V (50/60Hz)	AC220

● If requesting voltage other than above mentioned, consult with us separately.

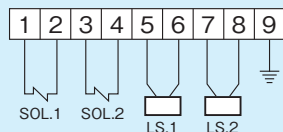
Wiring

Standard Type

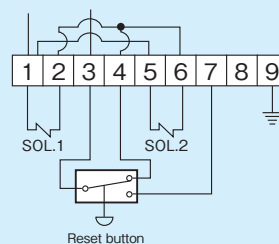


Built-in terminal box : 5P

w/Proximity Switch



w/Monitor



Rating of proximity switch

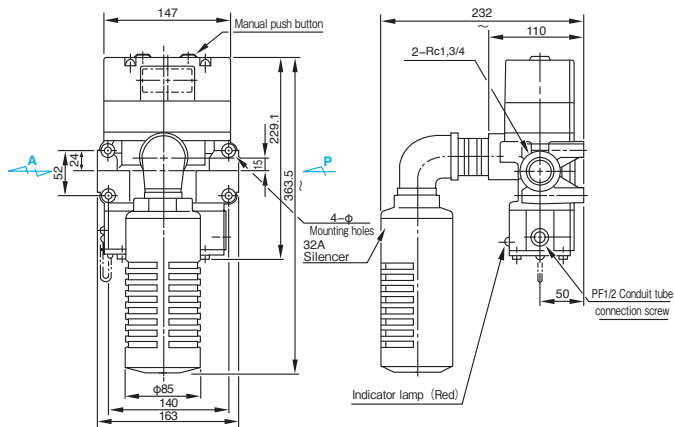
Voltage	AC90 ~ 250V (50/60Hz)
Power consumption	0.5VA or less (AC100V) 1.0VA or less (AC200V)
Loading current	Max.200mA (induced load)

Note) 1. Be sure to connect to the current via load. Direct connection damages the internal element.

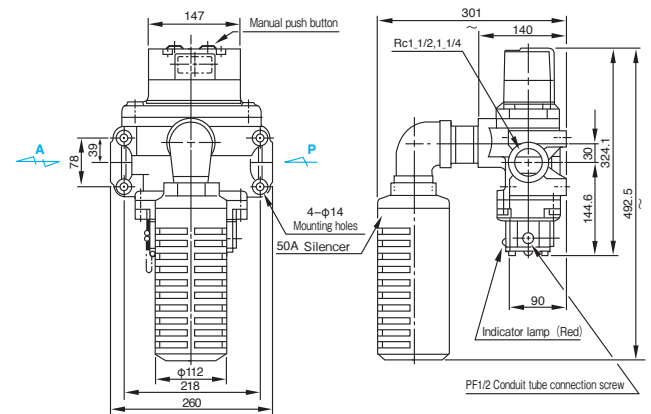
Note) Detection of malfunction: When malfunction occurs, the monitor mechanism functions to operate the limit switch and shut off the solenoid current. For the monitor mechanism, after eliminating the failures, re-start it by resetting.

External Dimensions

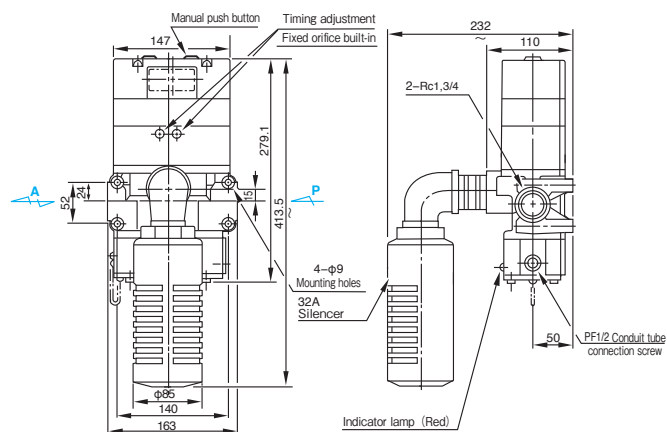
MVW6N-08



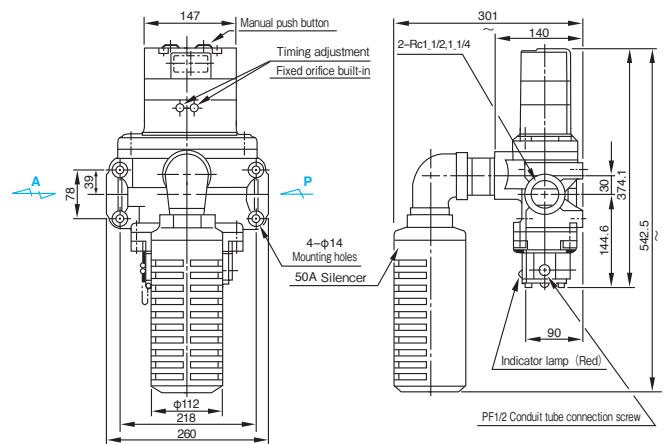
MVW6N-14



MVW6N-08-B1 (C1)

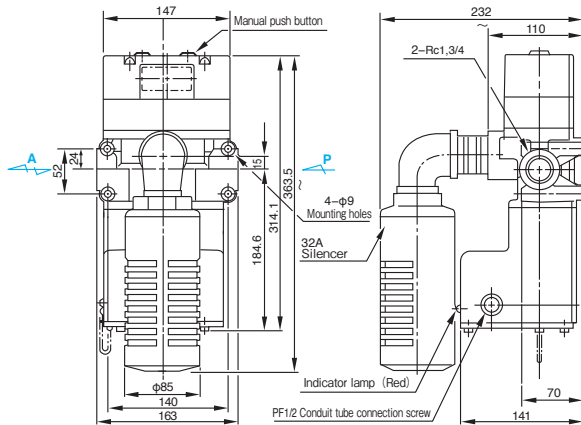


MVW6N-14-B1 (C1)

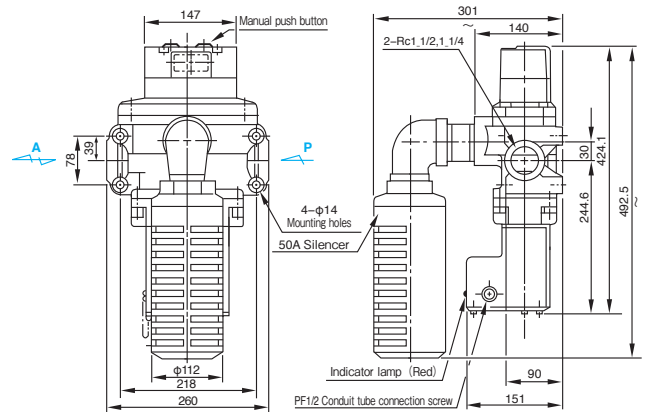


External Dimensions

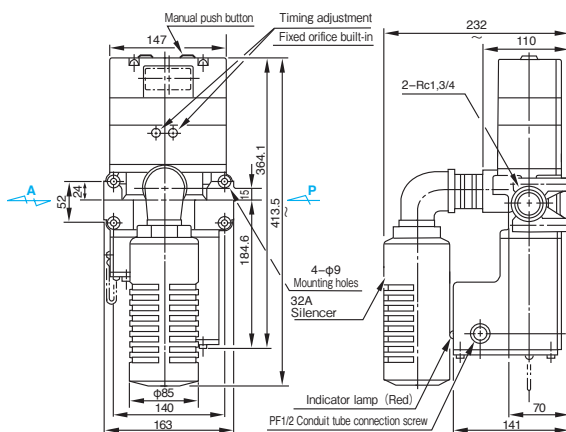
MVW6N-08-K



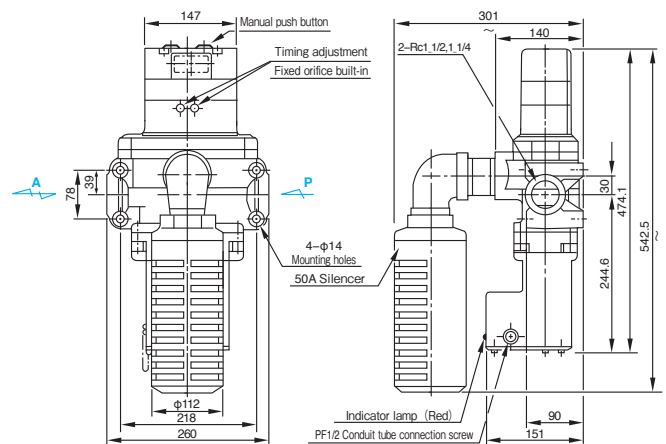
MVW6N-14-K



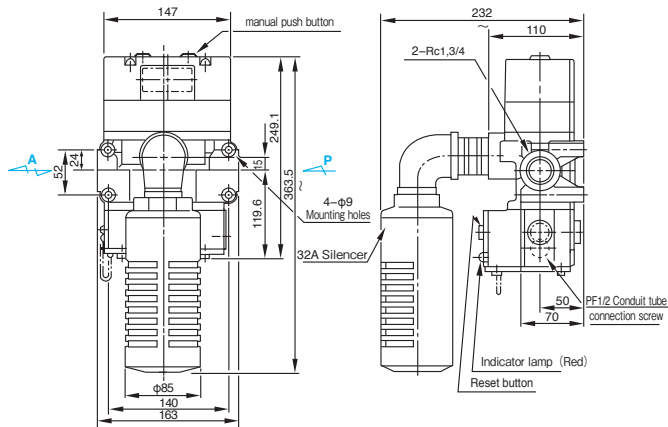
MVW6N-08-K-B1 (C1)



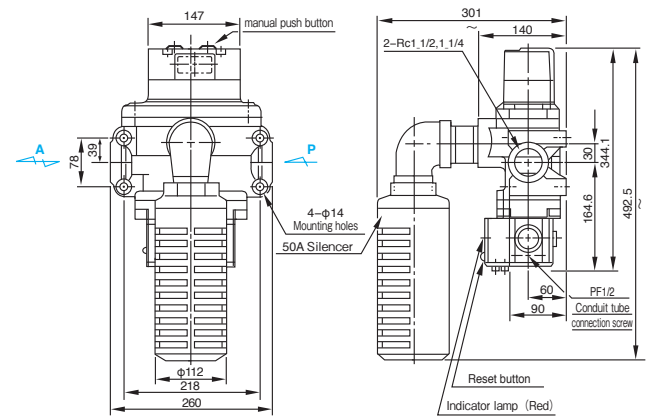
MVW6N-14-K-B1 (C1)



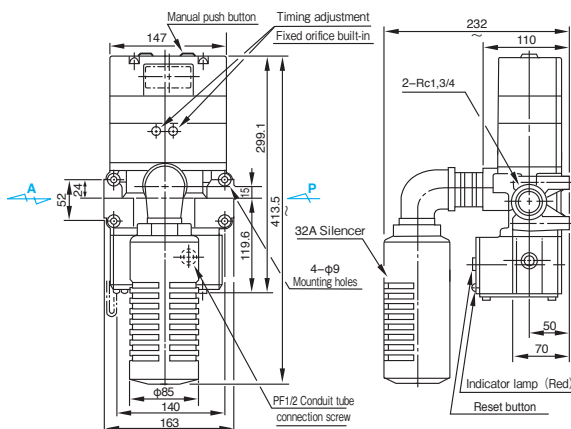
MVW6N-08-M3



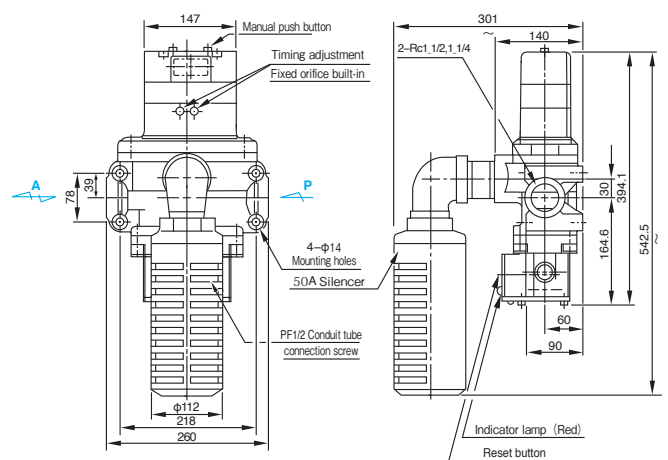
MVW6N-14-M3



MVW6N-08-M3-B1 (C1)



MVW6N-14-M3-B1 (C1)

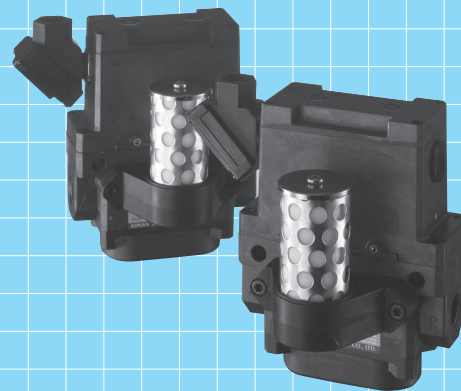


3 Port Dual Valves

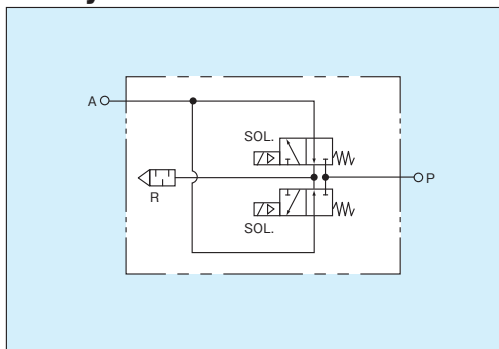
MVW6D - 04

Port size Rc 3/8 • 1/2

MVW6D dual valve is a solenoid valve to operate pneumatic clutch and brake for press machine, in which a construction satisfying article-29 of Power Press Machine Structural Standard has been adopted in accordance with regulations in article-42 of Labor Law of Industrial Safety and Health. The valve is that of "parallel flow type" combining two units of normally open type and three port solenoid, which is a poppet seal construction of excellent durability.



JIS symbol



Residual pressure during malfunction

For MVW6D dual valves, even if one of dual valves malfunctions, the other valve operates to exhaust air. The exhaust pressure (residual pressure) at this time is as follows:

0.05MPa or less in case of
supply pressure : 0.5MPa

Specifications

Model code		MVW6D-04	
Port size	P/A port	Rc 3/8	Rc 1/2
Effective area of valve	P → A	23mm ²	23mm ²
	※ A → R	75mm ²	130mm ²
Applicable fluid		Compressed air (Dry air filter passage less than 40μm.)	
Working pressure range		0.2 ~ 0.99MPa (Normal pressure:0.4 ~ 0.6MPa)	
Fluid temperature		- 5 ~ 80°C (Normal temperature:5 ~ 50°C)	
Ambient temperature		- 5 ~ 50°C (Be care so as not to be frozen.)	
Response time	AC	Less than 18ms (Energized and De-energized)	
	DC	Less than 24ms (Energized and De-energized)	
Operating frequency		Continuous 1time/s, inching 51times/s	
Proof pressure		1.5MPa	
Installation position		Vertical (Horizontal piping port, solenoid shall be upward.)	
Mass		2.4kg	

● The exhaust is performed at the time of atmosphere relief (blow-off) through silencer.

Specifications for Solenoid

Rated voltage		AC								
		100		110		200			220	
Frequency Hz		50	60	50	60	50	60		50	60
Apparent power	Issuance VA	129	84.0	132	85.8	122	84.0	127	87.1	43.5
	Holding VA	43.0	28.0	44.0	28.6	40.8	28.0	42.2	29.0	14.5
Allowable voltage fluctuation		± 10% of the rated voltage								
Insulation class		JIS C4003 Class B								
Temperature rise		Max.60℃								
Insulation resistance value		10M Ω or more (500V megar)								
Power consumption		Approx.18VA or 11W								
Wiring		Terminal block : 3P <div><div><div>1</div><div>2</div><div>3</div></div><div><div>SOL.1</div><div>SOL.2</div></div></div>								

Note) Power consumption shows the value of one solenoid.

Model Code

When ordering,specify the model as follows.

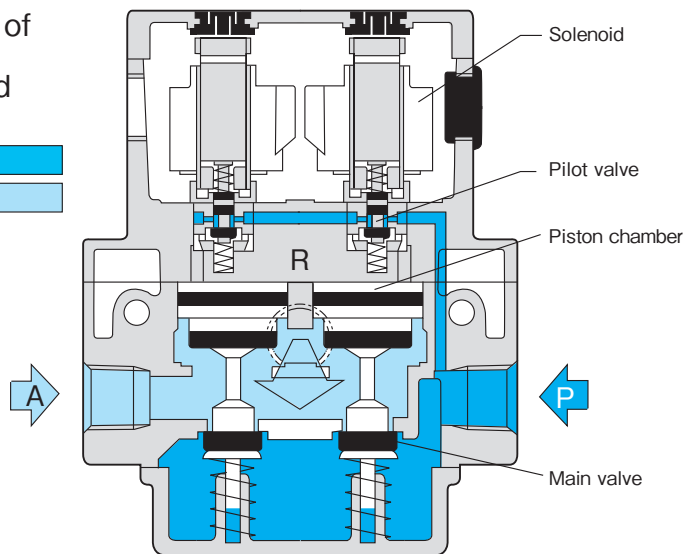
MVW6D - 04 - N - 1 **-** 2

Operation

MVW6D-04

1. In the case of solenoid de-energized

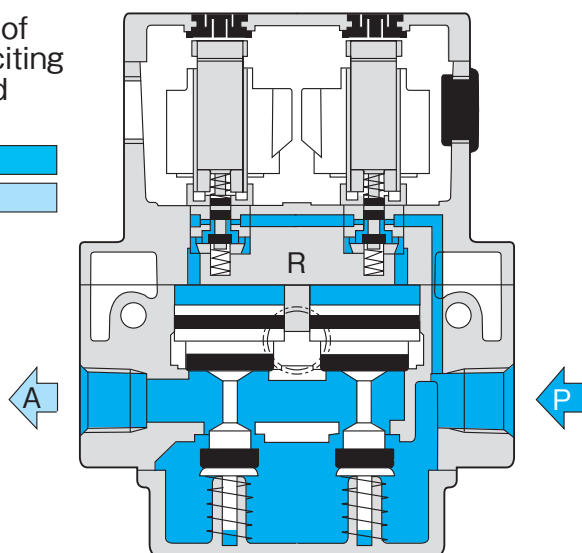
P → Close
A → R



The simultaneous solenoid degaussing resets pilot valve to exhaust air in both side piston chambers. The main valve is reset by the air pressure, then, the air supply through P-port is cut off, where the air at A-port is released to the atmosphere through silencer (R-port). The press machine is stopped.

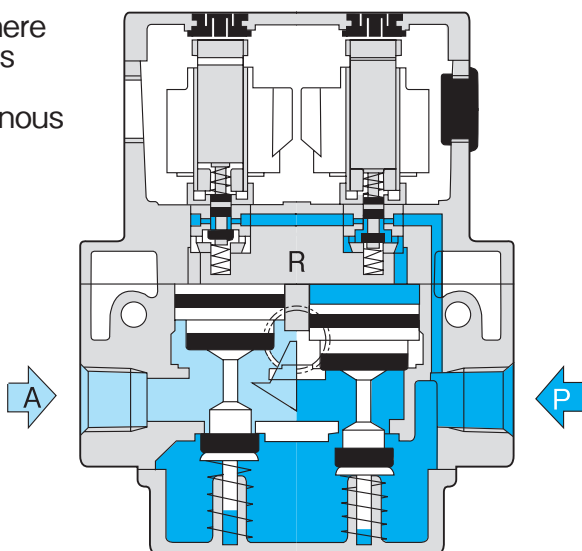
2. In the case of solenoid exciting de-energized

P → A
R → Close



The simultaneous exciting for solenoid opens pilot valve to feed air into both side piston chambers. The main valve is forcibly opened to feed air from P-port to A-port and allow press machine starting up.

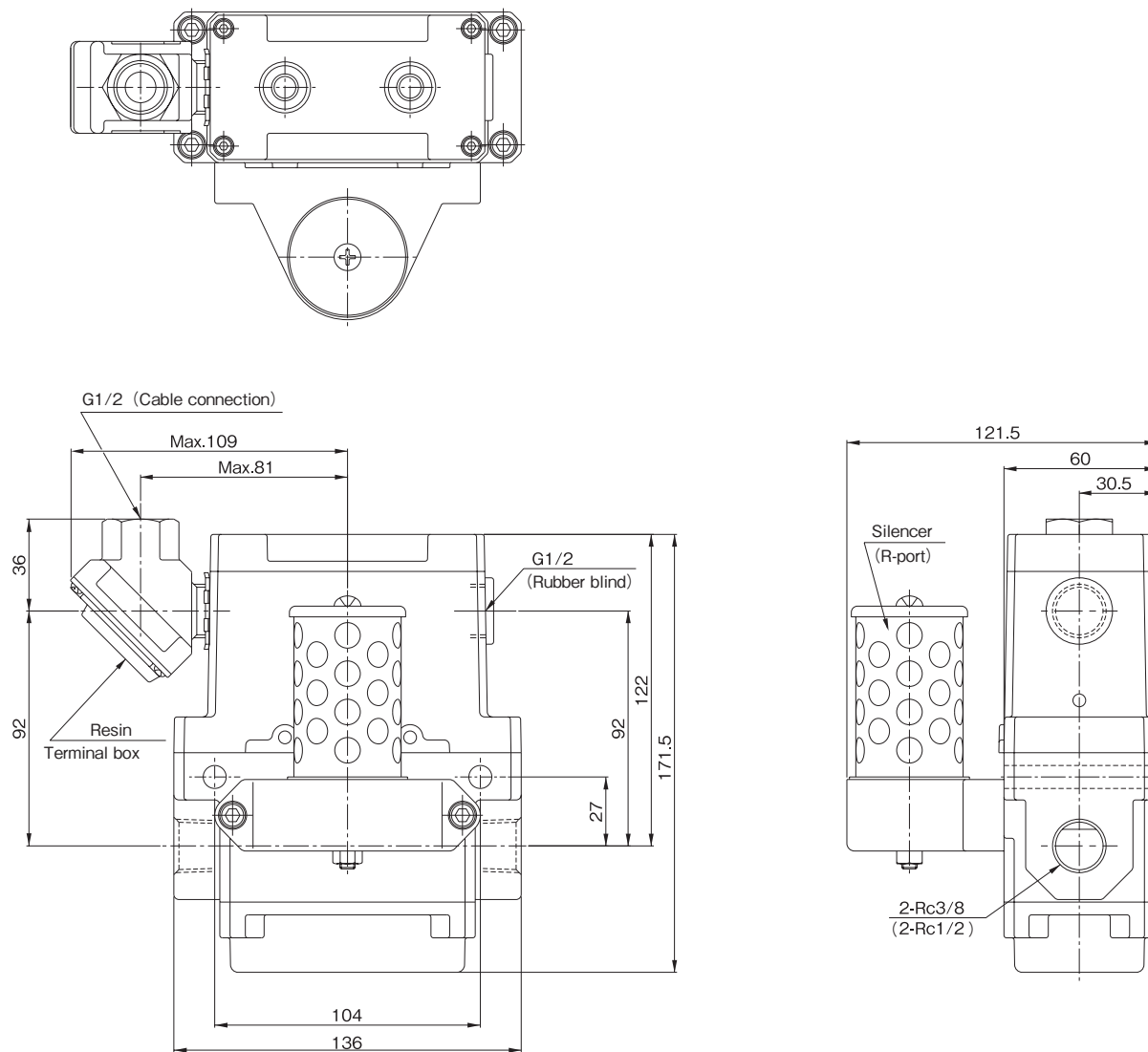
3. In cases where the valve has been under non-synchronous conditions,



When synchronism has been lost and either valve does not work, the air is supplied from either valve to A-port indeed, however, the same air is blown off by other valve through silencer at the same time. Since an adequate pressure is not produced at A-port for the reason, the press machine stops.

External Dimensions

MVW6D-04



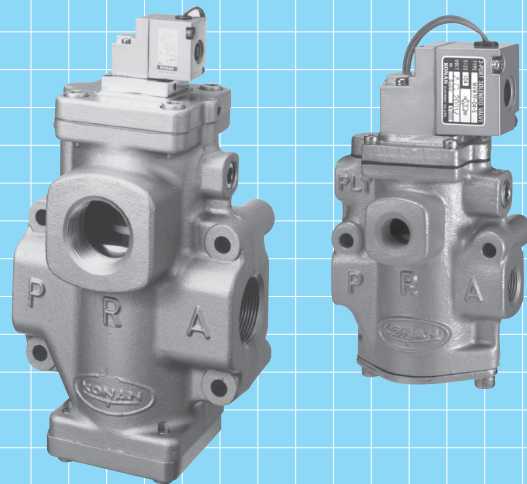
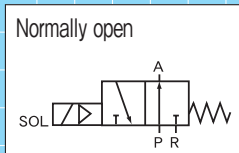
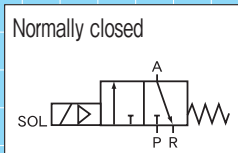
Large-Capacity (Return) 3 Ports Large-Capacity Poppet-type Solenoid Valves

Normally closed : MVW7F – S

Normally open : MVW7FR – S

Port size Rc $\frac{3}{8}$ ~ 2

**JIS
symbol**



Specifications

Model code		Normally closed	MVW7F-04-S		MVW7F-08-S		MVW7F-14-S		
		Normally open	MVW7FR-04-S		MVW7FR-08-S		MVW7FR-14-S		
Port size			Rc 3/8	Rc 1/2	Rc 3/4	Rc1	Rc1 1/4	Rc1 1/2	Rc2
Effective area of valve			70mm ²	80mm ²	200mm ²	220mm ²	700mm ²	750mm ²	800mm ²
Working pressure range			0.2 ~ 0.7MPa						
Proof pressure			1.05MPa						
Ambient temperature			- 20 ~ 50°C (remove moisture perfectly form the fluid to prevent freezing when used at 5°C or lower.)						
Solenoid	Allowable voltage fluctuation		± 10% of the rated voltage						
	Temperature rise		Max.80°C						
	Insulation class		JIS C 4003 Class B						
	Power consumption		See coil data						
Response time			less than 0.05s		less than 0.05s		less than 0.18s		
Operating frequency			Max.2time/s						
Installtion position			As desired						
Mass ※			1.1kg		1.7kg		6.1kg		

Note) The mass marked with "※" does not include options.

● For further details, refer to the "Large-capacity poppet type solenoid valve (CAT No. 4124)".

Coil data

Rated voltage (V)	AC										Rated voltage (V)	DC			
	100		110		125		200		220			24	48	100	110
Frequency (Hz)	50	60	50	60	50	60	50	60	50	60	Retention current (mA)	247	123	58	49
Issuance current (mA)	199	177	164	144	165	143	115	100	83	72		247	123	58	49
Retention current (mA)	93	75	86	60	79	62	57	42	43	30					

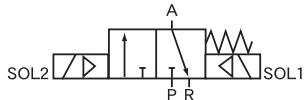
Large-Capacity (Hold) 3 Ports Large-Capacity Poppet-type Solenoid Valves

Normally closed : MVW7N — D

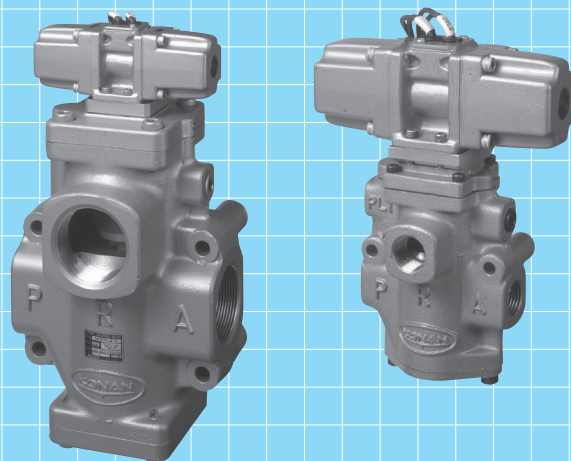
Port size Rc 3/8 ~ 2

**JIS
symbol**

Normally closed



Note) When the pneumatic pressure of P becomes "0" at the SOL.2 position, the valve will be returned to the SOL.1 position by the spring force.



Specifications

Model code		MVW7N-04-D		MVW7N-08-D		MVW7N-14-D		
Port size		Rc 3/8	Rc 1/2	Rc 3/4	Rc1	Rc1 1/4	Rc1 1/2	Rc2
Effective area of valve		70mm ²	80mm ²	200mm ²	220mm ²	700mm ²	750mm ²	800mm ²
Working pressure range		0.2 ~ 0.7MPa						
Proof pressure		1.05MPa						
Ambient temperature		- 20 ~ 50℃ (remove moisture perfectly form the fluid to prevent freezing when used at 5℃ or lower.)						
Solenoid	Allowable voltage fluctuation	± 10% of the rated voltage						
	Temperature rise	Max.80℃						
	Insulation class	JIS C 4003 Class B						
	Power consumption	See coil data						
Response time		less than 0.03s		less than 0.05s		less than 0.2s		
Operating frequency		Max.2time/s						
Installtion position		Installation of the pilot valve with its horizontal.						
Mass ※		1.8kg		2.4kg		6.4k		

Note) The mass marked with "※" does not include options.

● For further details, refer to the "Large-capacity poppet type solenoid valve (CAT No. 4124)".

Coil data

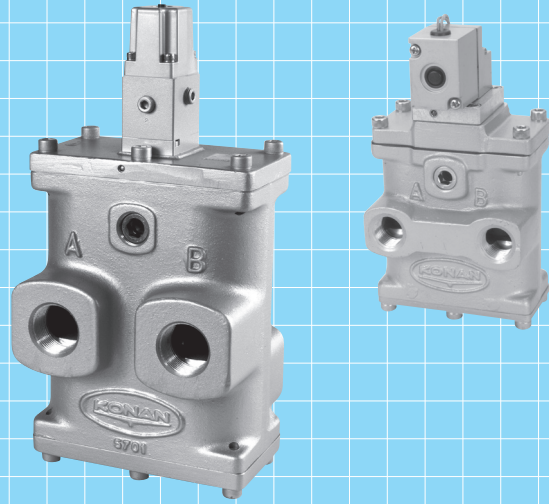
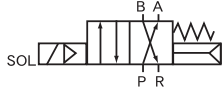
Rated voltage (V)	AC								Rated voltage (V)	DC		
	100		110		200		220			24	48	100
Frequency (Hz)	50	60	50	60	50	60	50	60	Retention current (mA)			
Issuance current (mA)	1415	995	1441	1200	733	500	718	639				
Retention current (mA)	283	199	288	240	147	100	144	128		583	292	140

Large-Capacity (Return) 4 Ports Large-Capacity Poppet-type Solenoid Valves

MVW344F — S

Port size Rc 3/8 ~ 2

**JIS
symbol**



Specifications

Model code		MVW344F – 04 – S		MVW344F – 08 – S		MVW344F – 14 – S		
Port size		Rc 3/8	Rc 1/2	3/4	Rc1	Rc1 1/4	Rc1 1/2	Rc2
Effective area of valve		70mm ²	80mm ²	200mm ²	220mm ²	700mm ²	750mm ²	800mm ²
Working pressure range		0.2 ~ 0.7MPa						
Proof pressure		1.05MPa						
Ambient temperature		– 20 ~ 50℃ (remove moisture perfectly from the fluid to prevent freezing when used at 5℃ or lower.)						
Solenoid	Allowable voltage fluctuation	± 10% of the rated voltage						
	Temperature rise	Max.80℃						
	Insulation class	JIS C 4003 Class B						
	Power consumption	See coil data						
Response time		less than 0.05s		less than 0.07s		less than 0.3s		
Operating frequency		Max.2time/s						
Installtion position		As desired						
Mass ※		2.1kg		3.0kg		10.6kg		

Note) The mass marked with "※" does not include options.

● For further details, refer to the "Large-capacity poppet type solenoid valve (CAT No. 4124)".

Coil data

〔Model : MVW344F — 04 — S/MVW344F — 08 — S〕

Rated voltage (V)	AC										Rated voltage (V)	DC			
	100		110		125		200		220			24	48	100	110
Frequency (Hz)	50	60	50	60	50	60	50	60	50	60	Retention current (mA)				
Issuance current (mA)	199	177	164	144	165	143	115	100	83	72		247	123	58	49
Retention current (mA)	93	75	86	60	79	62	57	42	43	30					

〔Model : MVW344F — 14 — S〕

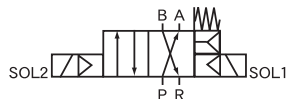
Rated voltage (V)	AC								Rated voltage (V)	DC		
	100		110		200		220			24	48	100
Frequency (Hz)	50	60	50	60	50	60	50	60	Retention current (mA)	24	48	100
Issuance current (mA)	1415	995	1441	1200	733	500	718	639		583	292	140
Retention current (mA)	283	199	288	240	147	100	144	128				

Large-Capacity (Hold) 4 Ports Large-Capacity Poppet-type Solenoid Valves

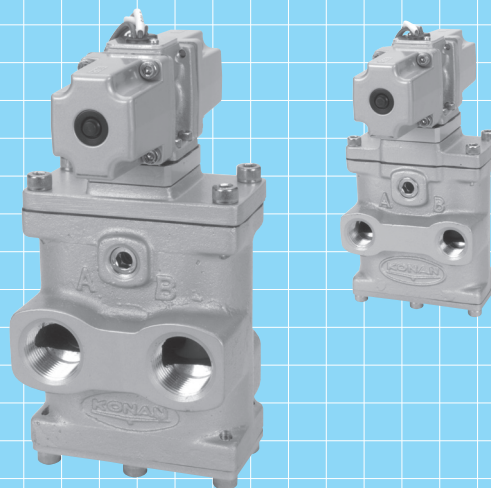
MVW344N — D

Port size Rc 3/8 ~ 1

**JIS
symbol**



Note) When the pneumatic pressure of P becomes "0" at the SOL.2 position, the valve will be returned to the SOL.1 position by the spring force.



Specifications

Model code		MVW344N — 04 — D		MVW344N — 08 — D		MVW344N — 14 — D		
Port size		Rc 3/8	Rc 1/2	3/4	Rc1	Rc1 1/4	Rc1 1/2	Rc2
Effective area of valve		70mm ²	80mm ²	200mm ²	220mm ²	700mm ²	750mm ²	800mm ²
Working pressure range		0.2 ~ 0.7MPa						
Proof pressure		1.05MPa						
Ambient temperature		- 20 ~ 50℃ (remove moisture perfectly form the fluid to prevent freezing when used at 5℃ or lower.)						
Solenoid	Allowable voltage fluctuation	± 10% of the rated voltage						
	Temperature rise	Max.80℃						
	Insulation class	JIS C 4003 Class B						
	Power consumption	See coil data						
Response time		less than 0.03s		less than 0.05s		less than 0.3s		
Operating frequency		Max.2time/s						
Installtion position		Installation of the pilot valve with its horizontal.						
Mass ※		2.4kg		3.3kg		11.2kg		

Note) The mass marked with "※" does not include options.

● For further details, refer to the "Large-capacity poppet type solenoid valve (CAT No. 4124)".

Coil data

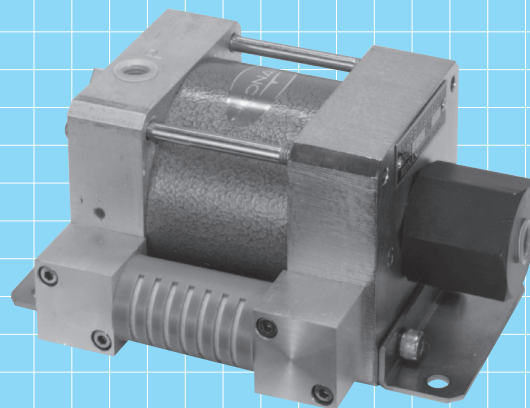
Rated voltage (V)	AC								Rated voltage (V)	DC		
	100		110		200		220			24	48	100
Frequency (Hz)	50	60	50	60	50	60	50	60	Retention current (mA)	24	48	100
Issuance current (mA)	1415	995	1441	1200	733	500	718	639		583	292	140
Retention current (mA)	283	199	288	240	147	100	144	128				

Booster Pumps

MC5B • BP2

The booster pumps are small-sized, high-performance piston-type plunger pumps to enable you to obtain high hydraulic pressure easily using pneumatic pressure as power source.

Pressure drop at the discharge side automatically starts operation and keeps the pressure constant after increasing to the set pressure. These pumps are the most suitable for power source of press machines, etc.



Features

- Small-sized, high-performance power generator to enable you to obtain high hydraulic pressure easily using even commonly-available air source
- Efficiently-integrated respective functions such as cylinder, pump and change valve.
Highly-efficient long-life structure by simple design
- A filter and muffler are built in, which prevents internal components from being damaged and provides quiet work environments by excellent silence effect.
- Because operations are automatically stopped as long as no decrease in pressure (leakage, etc.) occurs on the discharge side when the discharge pressure reaches the predetermined pressure, efficient and economic running is possible.
- These pumps are applicable to any operating fluid such as anti-corrosive fluid, etc. in addition to hydraulic operating oil. (For details, please consult with us separately.)

Specifications

Type		Direct mount type	Base mount type	
Model code		MC5B	BP2-7215-B	BP2-7215-C
Port size	Suction port	Rc 1/4	φ 14	
	Delivery port	Rc 1/4		
	Air supply port	Rc 1/4		
Operation liquid		Liquid of corrosion resistance		
Operating air pressure		0.3 ~ 0.7MPa	0.4 ~ 0.7MPa	
Fluid temperature		－ 5 ~ 70℃	－ 20 ~ 70℃ (Common use 5 ~ 70℃)	
Ambient temperature		－ 5 ~ 40℃	－ 20 ~ 55℃ (Common use 5 ~ 55℃)	
Proof pressure	Hydraulic Section	35MPa		
	Pneumatic Section	1.0MPa		
Delivery pressure		See p.23.	21 × (Operating pressure － 0.045) MPa	
Discharge flow rate		【At discharge pressure 3.9 MPa.】 ◎ Discharge port A : 3.6 min Min. ◎ Discharge port B : 2.5 min Min.	【At discharge pressure 3.9 MPa.】 ◎ Discharge port A : 1.4 min Min. 【At no load.】 ◎ Discharge port A : 1.8 min Min.	
High of suction		70cm Max.	40cm Max.	
Mass		3.5kg	4.0kg	

Model Code

When ordering, specify the model as follows.

Direct mount type (Foot mounting)

MC5B

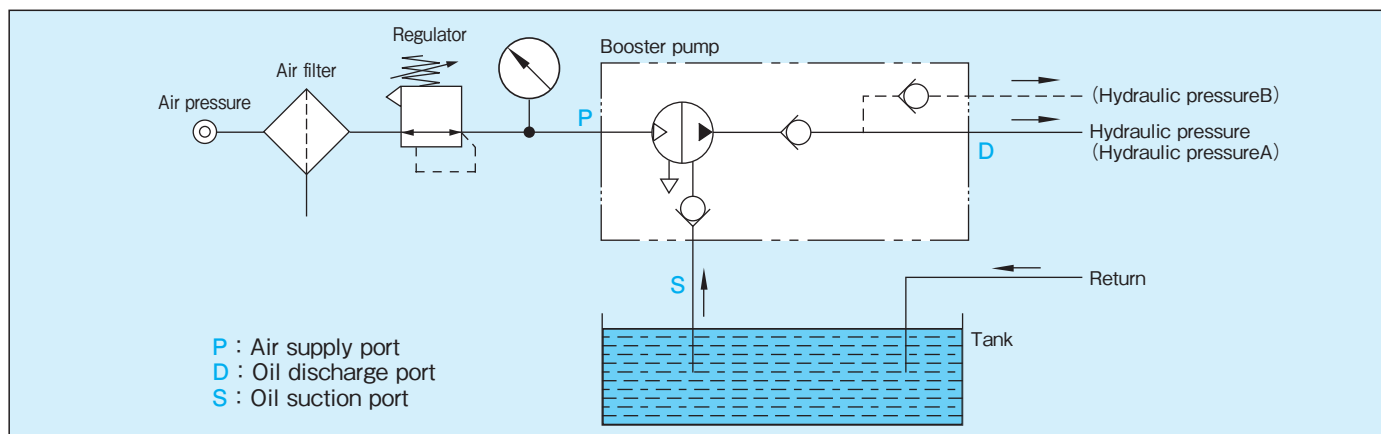
Base mount type

BP2 – 1

• Discharge port

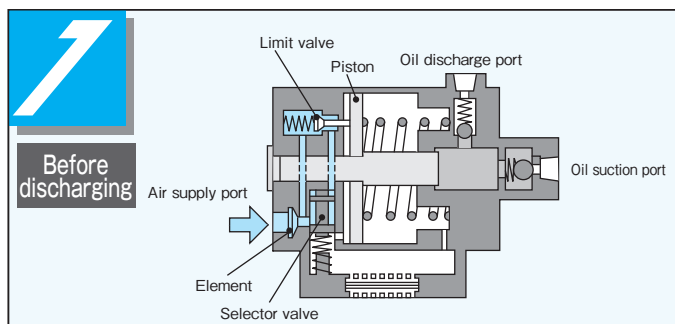
1 Discharge port	
No. of out port	Code
2	7215-B
1	7215-C

Circuit

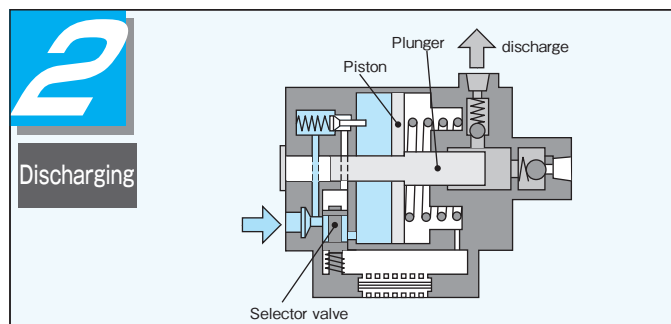


Structure / Operation

(Note that the following drawings are slightly different from the actual components because they are sketched for explanation of operations.)

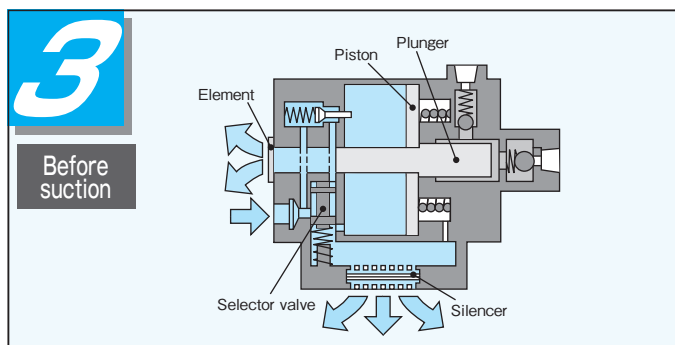


Pressurized compression air from the air supply port passes through the limit valve pressed and opened by the piston and holds the main valve.



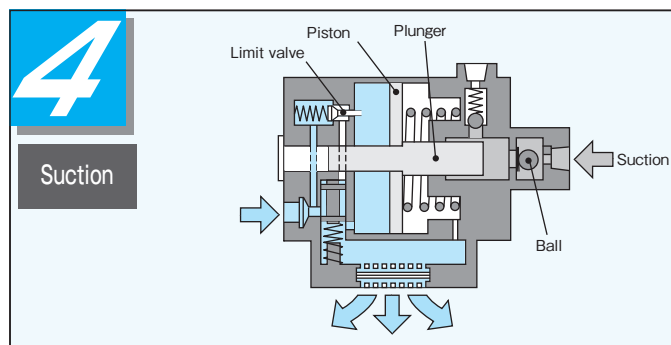
The held main valve is moved and air passed through the main valve is flowed into the cylinder chamber, and holds the piston and plunger and move them.

Hydraulic pressure in the pump discharges only the amount of plunger moved together with the piston.



When the piston stops at the final end, the back end of plunger is opened and air pressurizing the main valve is released into the atmosphere through the filter.

Therefore, the main valve is returned and changed by spring force, and air pressurizing the piston is released into the atmosphere through the silencer.

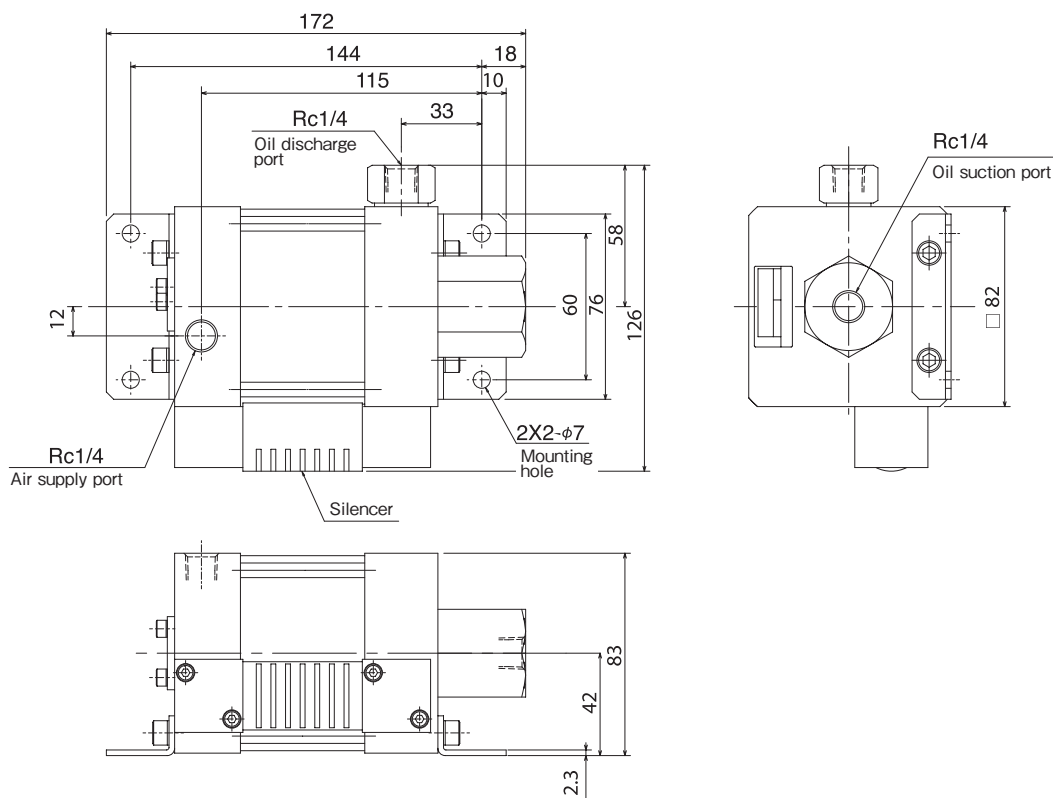


The piston and plunger are moved and returned by spring force. At this time, the suction valve opens and sucks oil. When the piston moves to the final end, the limit valve is pressed and returned to the condition "1". As shown above, operations are repeated in the order from 1 through 4 until the discharge pressure (hydraulic pressure) and the piston pressure receiving force are balanced and are automatically stopped when reaching the predetermined pressure.

When imbalance occurs due to decrease in hydraulic pressure, operations are started again.

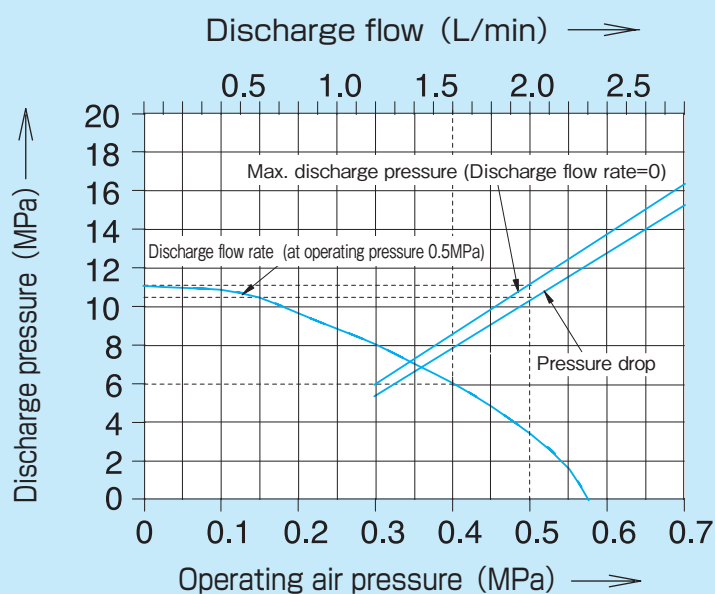
External Dimensions

MC5B



Performance Graph

MC5B



Discharging pressure

Example

Q : Obtain the maximum discharging pressure and pressure drop when operations are started in case of 0.5 MPa as operating pressure.

A : From the intersecting point with the perpendicular line of 0.5 MPa as operating pressure, the following values are obtained.
Maximum discharging pressure = 11.1 MPa
Pressure drop when operations are started = 10.6 MPa

Discharging flow rate

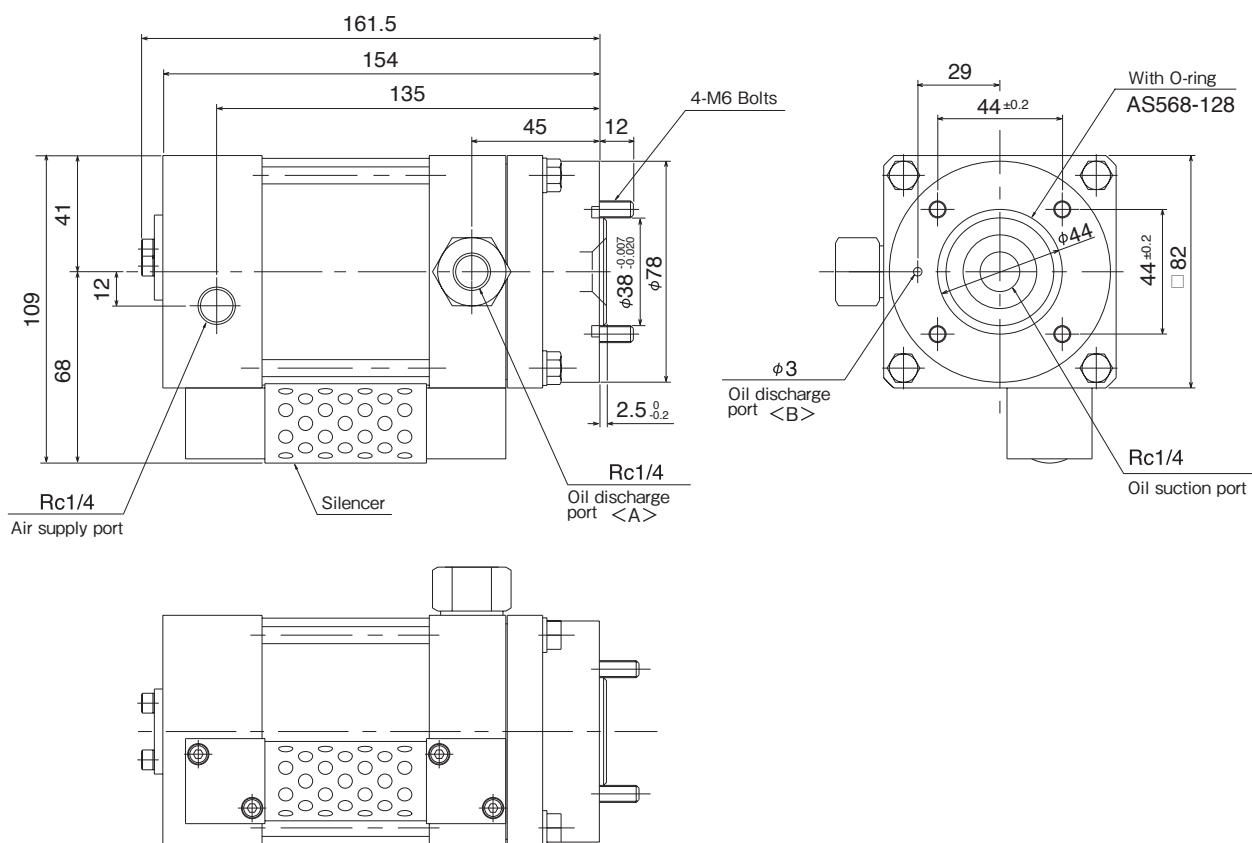
Example

Q : How much is the discharging flow rate in case of 6 MPa as discharging pressure?

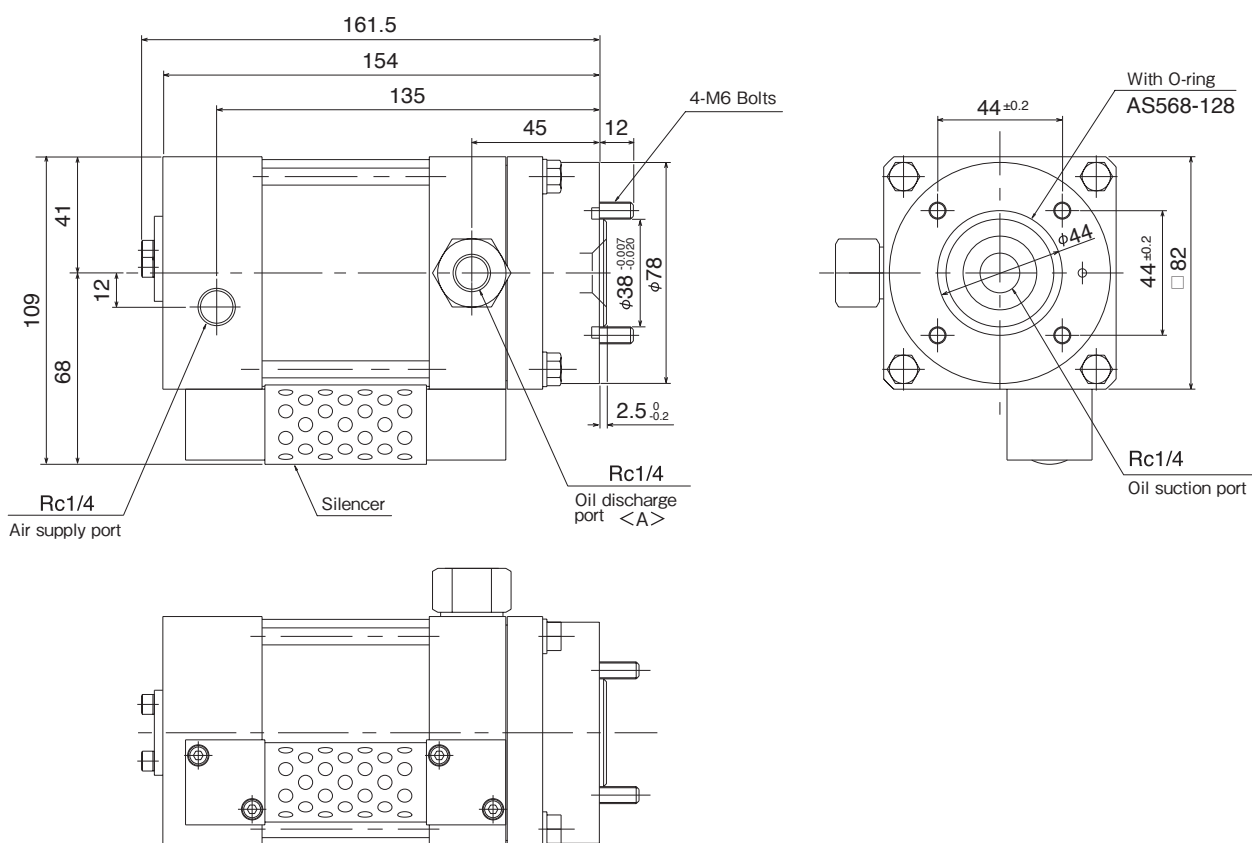
A : From the intersecting point of the discharging pressure of 6 MPa and discharging flow rate curve of 0.5 MPa as operating pressure, the following value is obtained.
Discharging flow rate = 1.6 L/min.

External Dimensions

BP2-7215-B



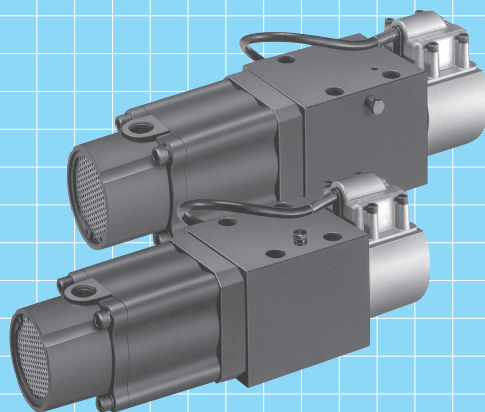
BP2-7215-C



Overload Protectors for Hydraulic Pressures

The overload protector uses pneumatic pressure as power source, in which high-precision booster pumps, a highly-sensitive relief valves and pressure switches are integrated compactly.

This protector detects hydraulic pressure at the overload cylinder of press machine and sharply grasps fluctuations in load to pressurize quickly when hydraulic pressure decreases and relieve the hydraulic pressure instantaneously when overload occurs. Further, this protector is capable of surely stopping the press machine with functions of proximity switch in any event. Excellent characteristics and sharp response protect small-sized through large-sized press machines and molds from damages due to abnormal overload of overload cylinders.

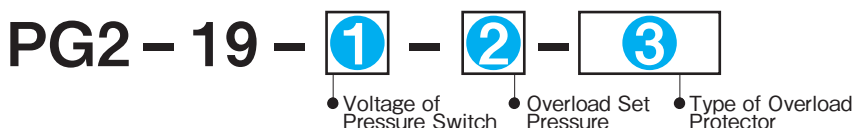


Specifications

Model Code	PG2-19-□-□-SR・PG2-19-□-□-EP	
Working Fluid	Compressed air (After 40 μm filtration)	
Operating Pressure	0.25 ~ 0.7MPa (Above 1/100 of overload set pressure)	
Lubricant	Turbine oil : VG10 ~ 32	
Ambient Temperature	- 20 ~ 55°C (Common use : 5 ~ 40°C)	
Oil Temperature	- 20 ~ 70°C (Common use : 5 ~ 70°C)	
Overload Set Pressure	Static pressure : 20 ~ 35MPa ± 2%	
Relief Flow Rate	Less than 1900L / min	
Pumping Height	Less than 700mm above oil level	
Vibration	Less than 30G (300Hz)	
Booster Pump	Min.Operating Pressure	Less than 0.12MPa
	Delivery Pressure	Vent press. = 24 × (Operating press. - 0.05) MPa
	Delivery Flow	More than 1L/min when unloaded (In operating press. 0.5MPa , oil viscosity 20 mm²/s)
	Operating Sound Level	Less than 80dB at a distance of 1m
Proof Pressure	Pneumatic Section	1.0MPa
	Hydraulic Section	44MPa (In high press. line only)

Model Code

When ordering,specify the model as follows.



① Voltage of Pressure Switch	
AC80V ~ 120V · 50/60Hz	A
DC24V	D

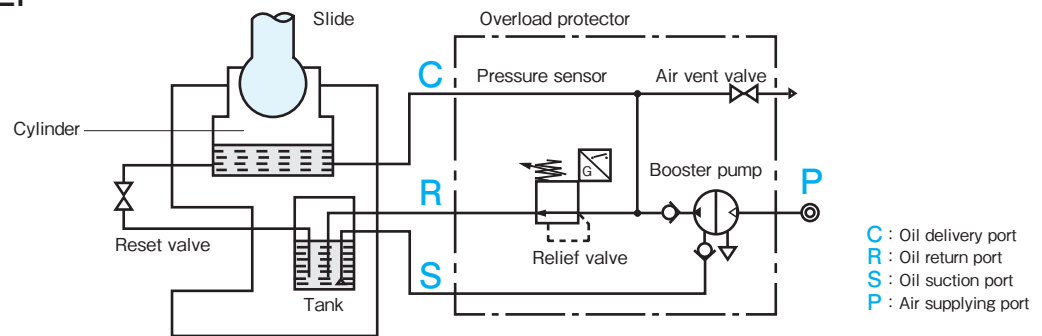
② Overload Set Pressure	
Please specify the real number (Unit : MPa) pressure : 20 ~ 35MPa	

● As overload pressure set value, consider tolerance values by ± 2%.

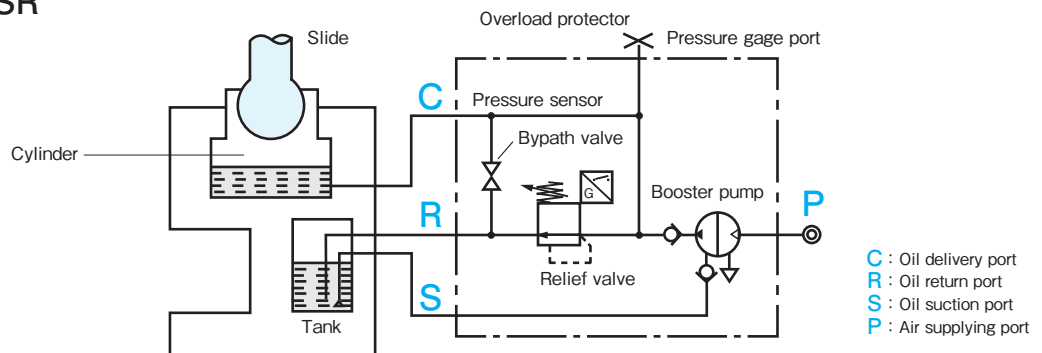
③ Type of Overload Protector		
C-port (high press.) Bottom Piping		EP
C-port (high press.) Side Piping		SR
w/Tank	Tank Cylinder Volume 0.7L	T7
	Tank Cylinder Volume 1.2L	T12
	Tank Cylinder Volume 2.3L	T23

Circuit

PG2-19-□-□-EP



PG2-19-□-□-SR



Specifications for Pressure Switch

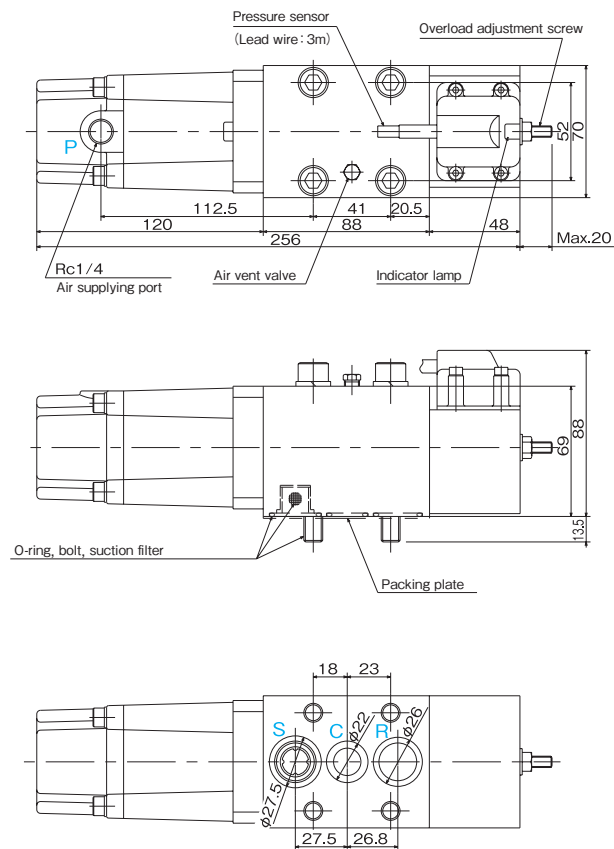
Type	For AC (TYPE : A)	For DC (TYPE : D)
Structure	Ferrous plate proximity switch	
Voltage	AC80 ~ 120V	DC24V ± 10%
Max. contact capacity	50VA	24W
Indicator lamp	OFF during operation	ON during operation
Leakage current	Less than 0.3mA	—
Dielectric pressure	AC1500V / min	
Insulation resistance	More than 100M Ω (500V megger test)	

Pressure Switch / Wiring

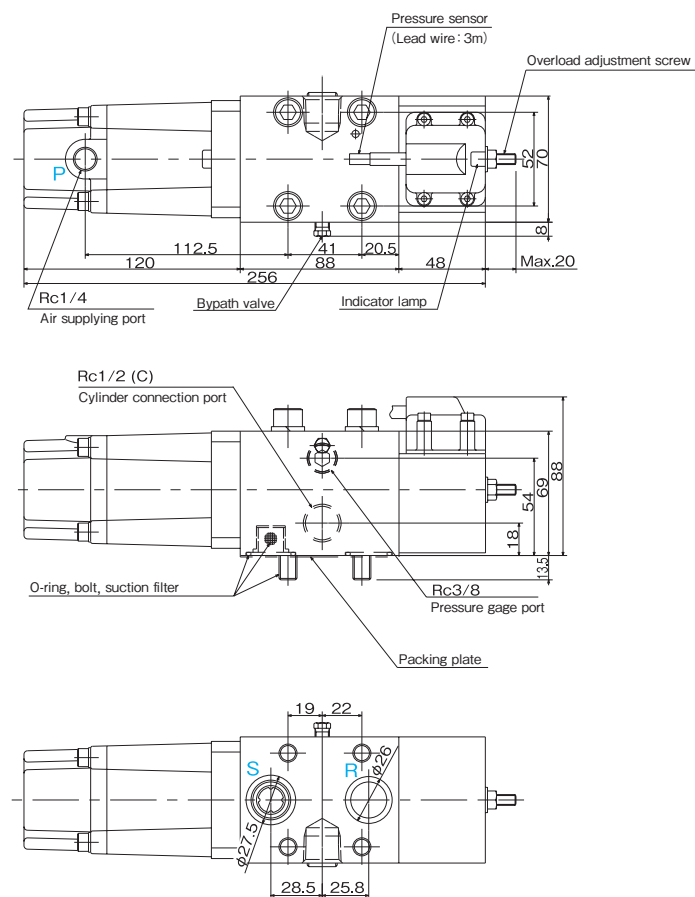
TYPE : A	TYPE : D
<p>L : LOAD</p>	<p>L : LOAD</p>

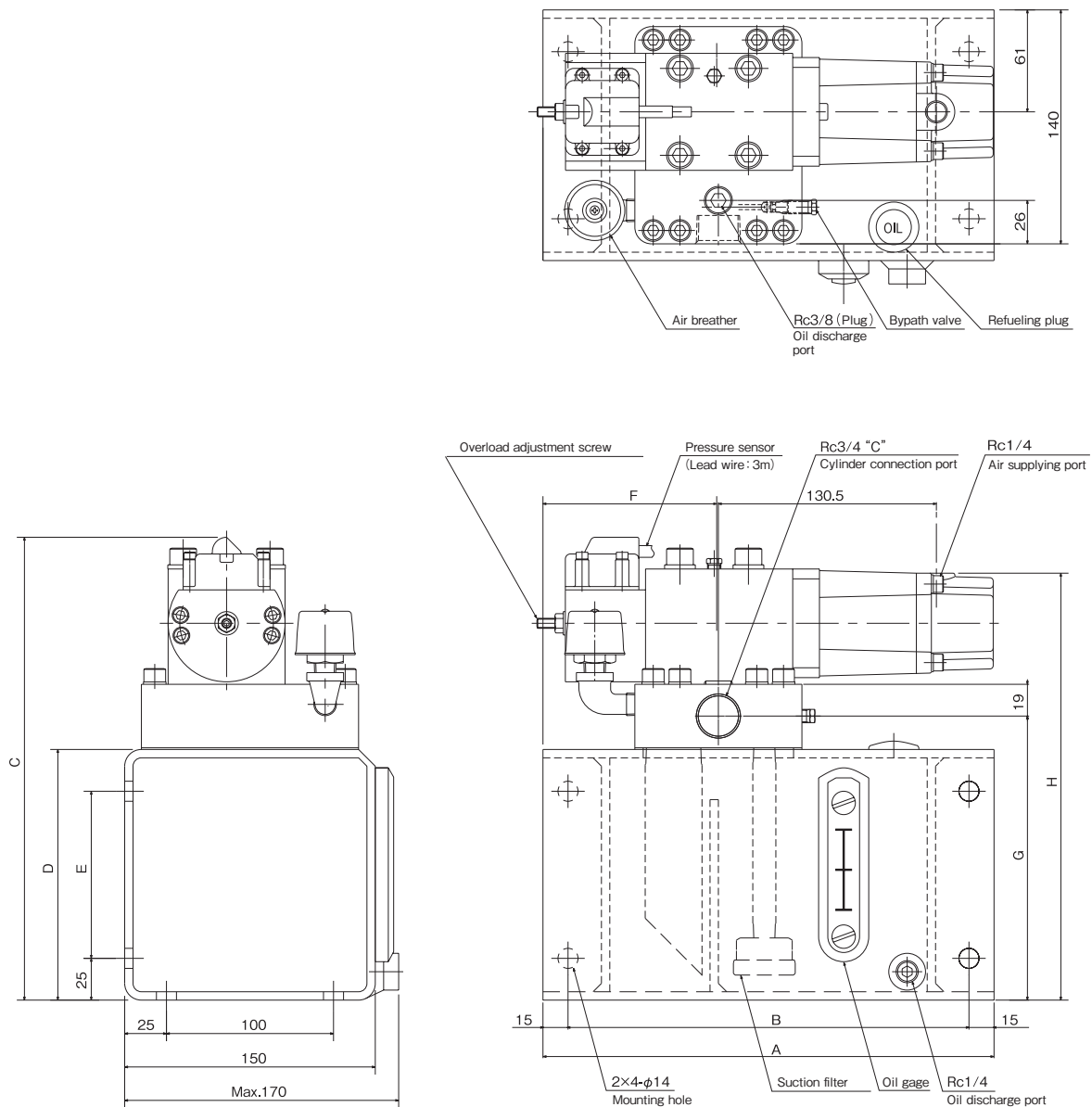
External Dimensions

PG2-19-□-□-EP



PG2-19-□-□-SR



PG2-19- - -T (w/Tank)

■ Dimensional Table

Body	Cylinder volume	Tank nominal capacity	Dimensions										Mass (About)
			A	B	C	D	E	F	G	H			
T7	0.7 ℓ	3.0 ℓ	270	240	280	150	100	105	170	255			17kg
T12	1.2 ℓ	4.6 ℓ	370	340	280	150	100	205	170	255			20kg
T23	2.3 ℓ	6.2 ℓ	370	340	330	200	150	205	220	305			22kg

Method of the choice

To select suitable overload protectors, the following use conditions of press machines are required.

[Specifications for press machines]

1) Pressurizing capacity : F (KN)

The maximum pressurizing force which the press machine can generate (also called pressurizing capacity)

2) Capacity generation position : H (mm)

Height from the bottom dead center where the press machine can generate the maximum pressurizing force

3) Length of stroke : S (mm)

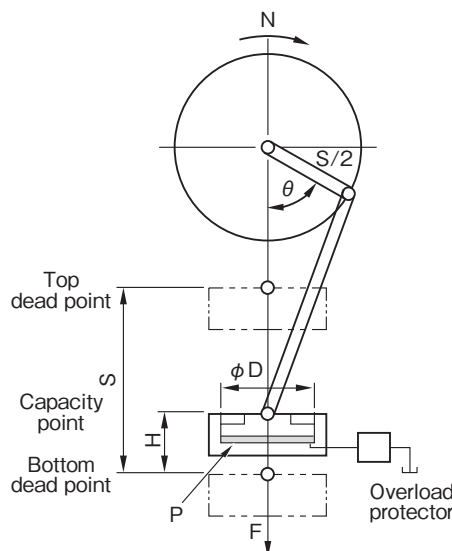
Movement distance of slide per one stroke

4) Number of strokes : N (spm)

Number of strokes of slide per one minute

5) Overload cylinder diameter : D (mm)

Cylinder for overload



Method of the setting pressure

To make the relief valve operate when the hydraulic pressure equivalent to 110% of pressurizing capacity is generated in the overload cylinder, determine the overload setting pressure: P.

$$P = 1.4 \times F \times 10^3 \div D^2 \quad (\text{MPa})$$

- Note) 1. It is ideal to set the setting pressure to high (minimize the cylinder diameter) as much as possible.
2. This formula shows a case where one overload cylinder is installed.

Reference

$$P = F \times 1.1 \times 10^3 \times 4 \div \pi \div D^2 \div 1.4 \times F \times 10^3 \div D^2 \quad (\text{MPa})$$

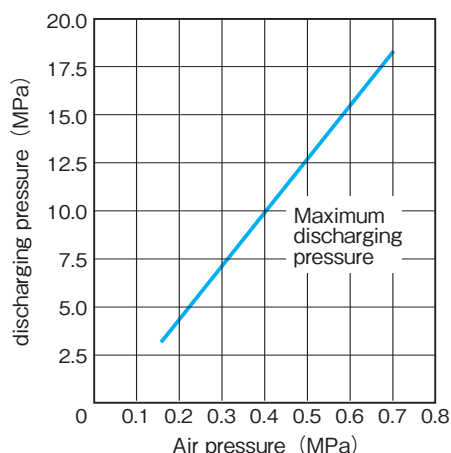
— Cylinder area (mm²)
— Unit conversion
— Increasing rate of pressurizing capacity
— Pressurizing capacity (KN)

Plan to set the increasing rate of pressurizing capacity to 100 to 120%.

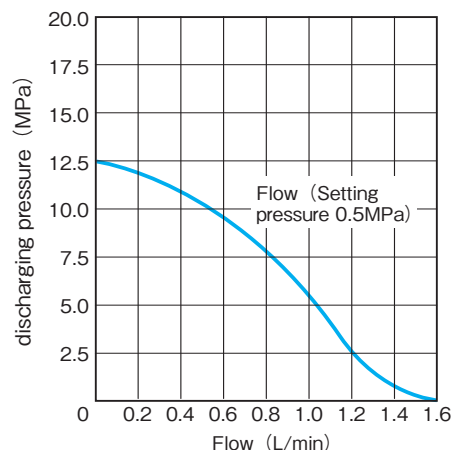
In this formula, the increasing rate is simply set to 110%.

Characteristic graph

● Maximum discharging pressure characteristics



● Flow rate characteristics



Method of the relief flow rate

Flow rate of fluid to be discharged from the overload cylinder in case of overloading. Calculate the relief flow rate by obtaining the slide speed in the capacity position. However, obtain the angle θ in the capacity position with $\rho = 0.2$.

$$\theta = \cos^{-1} 5 \times (-1 + \sqrt{1.44 - 0.8 \times H \div S}) \quad (^{\circ})$$

Slide speed: Obtain V by assigning the angle: θ to the following formula.

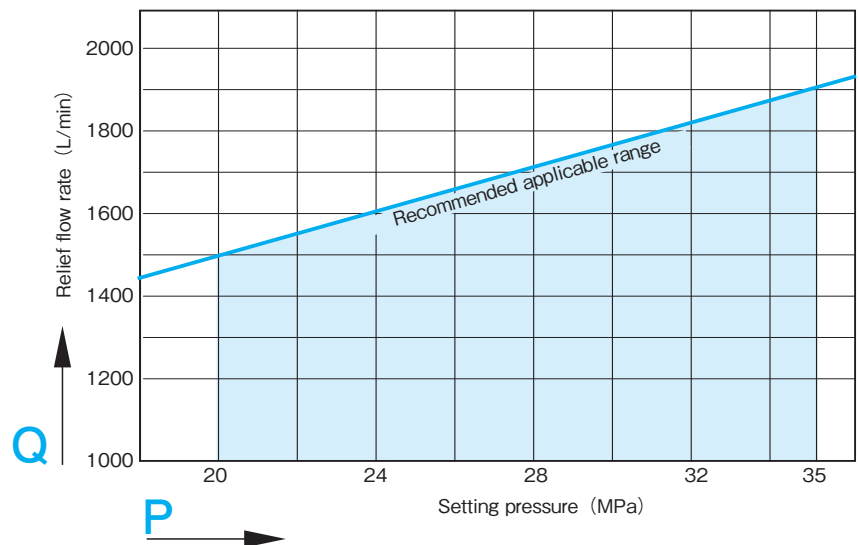
$$V = 0.052 \times S \times N \times (\sin \theta + 0.1 \times \sin 2 \theta) \quad (\text{mm/s})$$

Calculate the relief flow rate: Q by the following formula.

$$Q = 47 \times D^2 \times V \times 10^{-6} \quad (\text{L/min})$$

Range that applies over load protector

Check whether or not the relation of the setting pressure: P and the relief flow rate: Q is within the applicable range. Even if it is out of applicable range, the protectors may be usable by actual measurement in some cases, therefore, consult with us separately



Reference

【Exercise 1】

- Setting conditions
 - Pressurizing capacity 2000KN
 - Number of strokes 50spm
 - Length of stroke 250mm
 - Capacity generation position 10mm
 - Overload cylinder diameter 310mm (1 pc.)
- Calculation method

$P = 1.4 \times F \times 10^3 \div D^2 = 1.4 \times 2000 \times 10^3 \div 310^2 \div 29.1 \text{ (MPa)}$
 $\theta = \cos^{-1} 5 \times (-1 + \sqrt{1.44 - 0.8 \times H \div S})$
 $= \cos^{-1} 5 \times (-1 + \sqrt{1.44 - 0.8 \times 10 \div 250}) \div 21 (^{\circ})$
 $V = 0.052 \times S \times N \times (\sin \theta + 0.1 \times \sin 2 \theta)$
 $= 0.052 \times 250 \times 50 \times (\sin 21 + 0.1 \times \sin 2 \times 21) \div 276 \text{ (mm/s)}$
 $Q = 47 \times D^2 \times V \times 10^{-6} = 47 \times 310^2 \times 276 \times 10^{-6} \div 1246 \text{ (L/min)}$
- Selection of overload protector

From $P = 29.1 \text{ (MPa)}$ and $Q = 1246 \text{ (L/min)}$, it falls within the use range of **PG2-19 type**.

【Exercise 2】

- Setting conditions
 - Pressurizing capacity 3500KN
 - Number of strokes 30spm
 - Length of stroke 300mm
 - Capacity generation position 12mm
 - Overload cylinder diameter 290mm (2 pc.)
- Calculation method

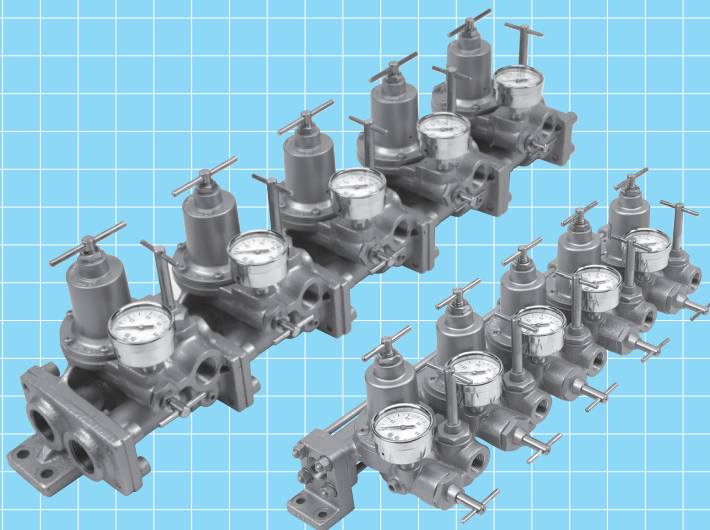
$P = 1.4 \times F \times 10^3 \div D^2 \div \text{pc.} = 1.4 \times 3500 \times 10^3 \div 290^2 \div 2 \div 29.1 \text{ (MPa)}$
 $\theta = \cos^{-1} 5 \times (-1 + \sqrt{1.44 - 0.8 \times H \div S})$
 $= \cos^{-1} 5 \times (-1 + \sqrt{1.44 - 0.8 \times 12 \div 300}) \div 21 (^{\circ})$
 $V = 0.052 \times S \times N \times (\sin \theta + 0.1 \times \sin 2 \theta)$
 $= 0.052 \times 300 \times 30 \times (\sin 21 + 0.1 \times \sin 2 \times 21) \div 199 \text{ (mm/s)}$
 $Q = 47 \times D^2 \times \text{pc.} \times V \times 10^{-6} = 47 \times 290^2 \times 2 \times 199 \times 10^{-6} \div 1573 \text{ (L/min)}$
- Selection of overload protector

From $P = 29.1 \text{ (MPa)}$ and $Q = 1573 \text{ (L/min)}$, it falls within the use range of **PG2-19 type**.

Pressure Regulation Units

RDU1
RDU5

Port size Rc 1/2 • 3/4 • 1

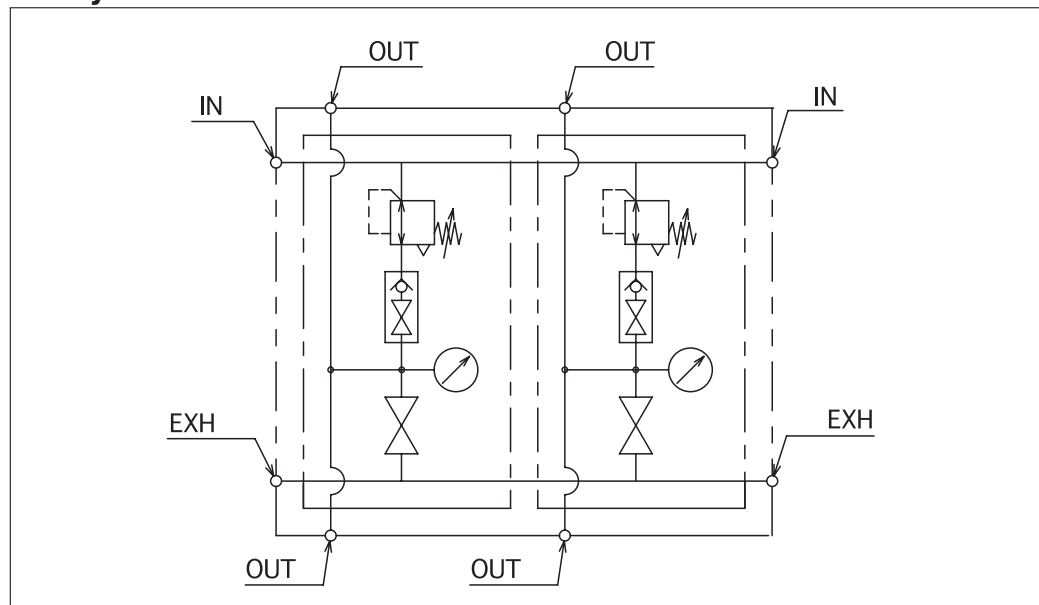


This pressure regulator unit is consisting of pressure reducing valve, check valve and pressure gage. There are designed for mounting into any desired number of units to simplify piping and central control. In particular for press machine, to supply various kinds of pressure. Each pressure and exhaust port is connected to common pressure and exhaust port. Each unit is independent with each other and can be set independently by at any pressure. Each load can be operated independently.

Specifications

Model Code		RDU1F	RDU5F	
Port size	OUT	Rc 1/2	Rc 3/4	Rc 1
	IN	Rc 3/4	Rc 1	Rc 1 1/4
Working pressure	Primary Press. (IN)	Max. 1.0MPa		
	Secondary Press. (OUT)	0.05 ~ 0.7MPa		
Proof Pressure		1.5MPa		
Working Temperature		5 ~ 60°C		
Leakage Quantity from Valve		0 cm ³ /min (N) (at Primary side : 0.7MPa, at Secondary side : Atmosphere)		
Leakage Quantity from Relief port		15 cm ³ /min (N) (at Primary side : 0.7MPa, at Secondary side : 0.5MPa)		
Mounting Direction		As desired		
Mass		See External Dimensions		

JIS symbol



Note) In case of RDU1 type, the EXH port is for individual discharging.

Model Code

When ordering,specify the model as follows.

RDU1F – 1 – 2

1

• Unit number

2

• Port size

RDU5F – 1 – 3

1

• Unit number

3

• Port size

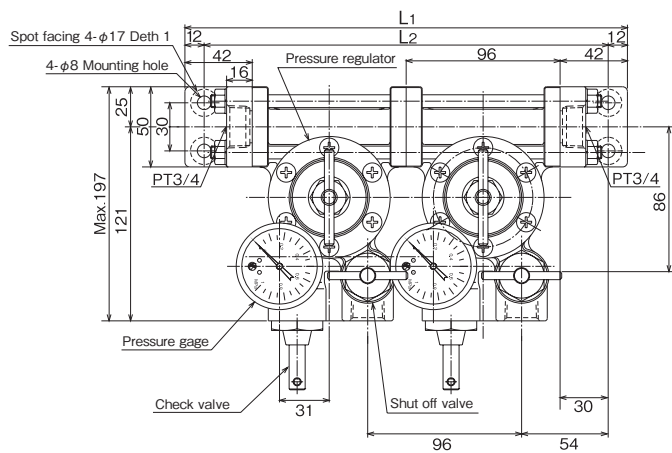
① Unit number	
1	1
2	2
3	3
4	4
5	5

② OUT Side Port size	
Rc 1/2	15A

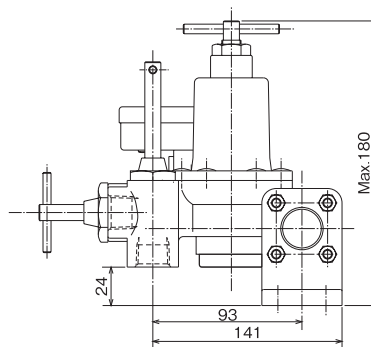
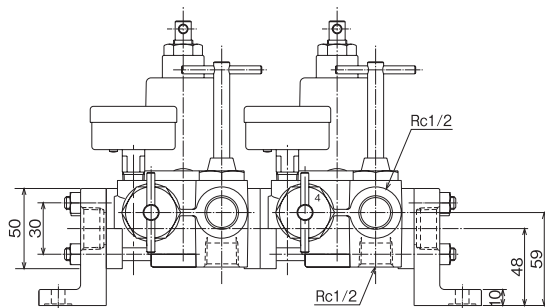
③ OUT Side Port size	
Rc 3/4	20A
Rc 1	25A

External Dimensions

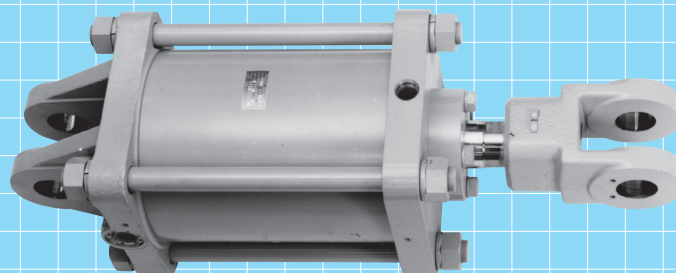
RDU1F- □ -15A



Unit Number	Model Code	Dimension		Mass
		L ₁	L ₂	
1	RDU1F-1-15A	180	156	about 5kg
2	RDU1F-2-15A	276	252	8
3	RDU1F-3-15A	372	348	11
4	RDU1F-4-15A	468	444	14
5	RDU1F-5-15A	564	540	17
6	RDU1F-6-15A	660	636	20



Actuators for Press Machine



Die Cushion Cylinders

Die cushion cylinders are attached to the inside of bed to perform drawing and push up products in press work generally. As a die cushion device, pneumatic type, hydraulic type and pneumatic and hydraulic hybrid type are available, however, the pneumatic type is employed as our type.

Balancer Cylinders

Balancer cylinders support weights of the slide, crank pin connecting rod, etc. to smooth the vertical motion of the slide.

Balancer cylinders are widely used in medium-and large-sized press machines.

Specifications

Working pressure	0.5 ~ 0.7MPa
Ambient temp.	5 ~ 60°C
Piston speed	380 ~ 450mm /s (for balancers)
Installation position	Vertical (Piston rod shall be downward.)

● Please contact us, for details.

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