

The maximum output in minimum energy.

Hydraulic Power

RIKEN

R

PRODUCTS LINEUP

Hydraulic Cylinder

Hydraulic Pump

Hydraulic Valve

Accessory

Exclusive Equipment

100MPa Series

200MPa Series

Water Equipment

RIKEN KIKI CO., LTD

SI Units

In this catalogue, the units of pressure, force (load), torque, and stress are expressed in the international system of units (SI units).

	SI unit	Conventional unit	Conversion rate	*Coefficient
Weight	kg	kgf (weight)	1 kg = 1 kgf	1
Force/Load	N	kgf	1 N = 0.102 kgf	x 9.80
Pressure	MPa	kgf/cm ²	1 MPa = 10.2 kgf/cm ²	x 0.098
Torque	N • m	kgf • m	1 N • m = 0.102 kgf • m	x 9.80
Stress	N/mm ²	kgf/mm ²	1 N/mm ² = 0.102 kgf/mm ²	x 9.80

The values (*) in the table show coefficients that convert conventional units into SI units.

■ When calculating the necessary pressure in the SI unit:

$$\text{Pressure (MPa)} = \frac{\text{Output (kN)}}{\text{Cylinder effective area (cm}^2\text{)}} \times 10$$

(Reference) To calculate the pressure of a 100 kN cylinder:

$$\begin{aligned}\text{Pressure (MPa)} &= \frac{100 \text{ (kN)}}{14.52 \text{ (cm}^2\text{)}} \times 10 \\ &= 68.87 \text{ (MPa)}\end{aligned}$$

■ When calculating the cylinder output in the SI unit:


$$\text{Output (kN)} = \frac{\text{Pressure (MPa)} \times \text{Cylinder effective area (cm}^2\text{)}}{10}$$

(Reference) To calculate the pressure of a 100 kN cylinder:

$$\begin{aligned}\text{Output (kN)} &= \frac{70 \text{ (MPa)} \times 14.52 \text{ (cm}^2\text{)}}{10} \\ &= 101.64 \text{ (kN)}\end{aligned}$$

Cautions and Warnings

Be sure to read the operation manual for the product thoroughly before use to obtain a good understanding of the product.

Precautions with the  icon in this catalogue are classified into the two categories as shown below. These must be observed to ensure safety.



Warnings are indicated when mishandling the product may result in death or serious injury.



Cautions are indicated when mishandling the product may result in minor injury to the user, or only physical damage to this product.

Note: These warnings and cautions do not cover all conceivable ways in which service might be done or all possible hazardous consequences.

Be sure to read the operation manual for the product thoroughly before use to obtain a good understanding of the product. Whenever using the product, keep safety first in mind.

Riken Products

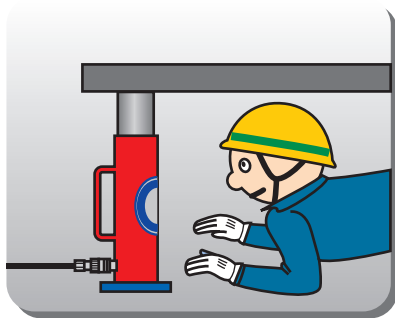
1. Riken products are designed for indoor use. They must not be used where exposed to rain water (except some products).
2. Do not use any Riken products where serious damage could result if the hydraulic oil leaks. In particular, they must not be used near fire. Otherwise, injury or fire could result.
3. Riken products must be used at an ambient temperature of 0 to 40 °C.
4. Riken products do not comply with Japanese Fire Service Act.
5. Some actual logos are different from those of pictures in this catalogue.
6. The contents of this catalogue are subject to change without notice. We are always engaging in new product development and provides our latest product information on our website: <http://www.rikenkiki.co.jp>

Warranty

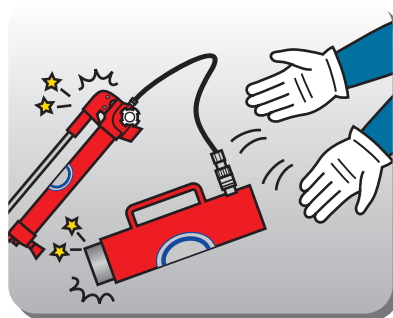
All our products purchased and properly used in Japan are covered by a one-year warranty from the date of purchase. If the products are to be used hundreds of times a day, this should be informed prior to purchase; in some cases the warranty will not apply even within the first year. Defective products which Riken is responsible for will be repaired or replaced free of charge. However, the company will not be responsible for any damage that occurred in association with the problem caused by its defective product(s), the expenses for removal of other defective product(s) and attachment of the replacement, the replacement work, and so on.

Website of RIKEN KIKI CO., LTD
<http://www.rikenkiki.co.jp>

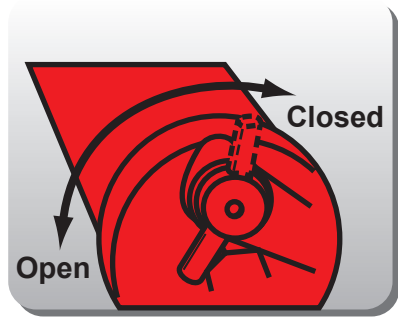
cat-No.78E since2017



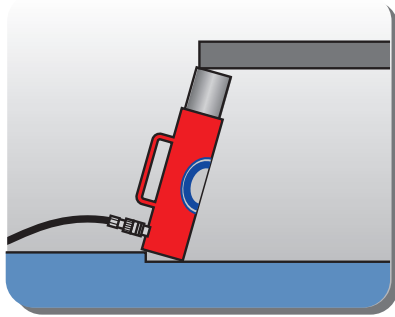
Do not get in under an object that is jacked up.



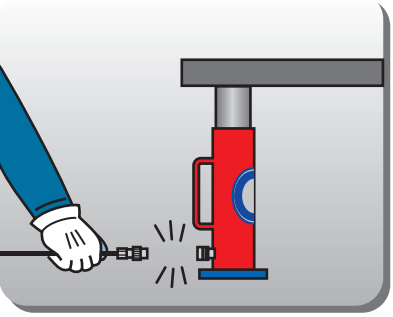
Do not throw hydraulic equipment or handle it roughly.



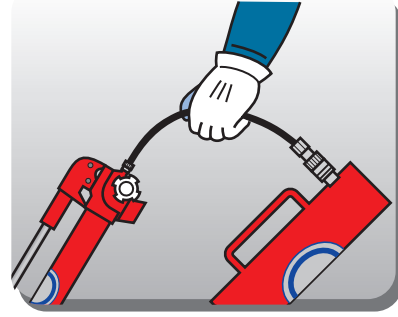
Be sure to open the air valve before use.



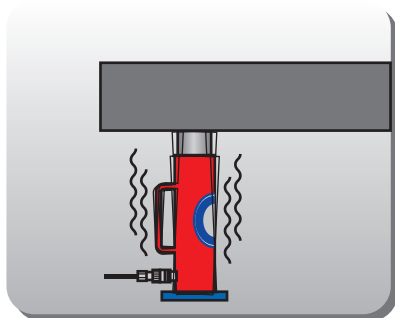
The cylinder must be used on a flat surface. Be sure to apply a load to the center of the rod.



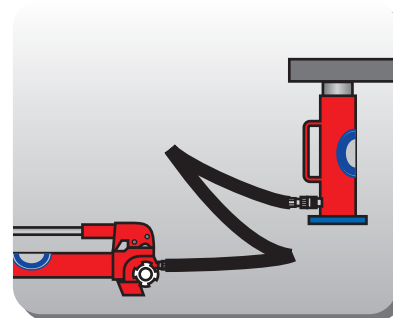
Do not remove the coupler while pressure is applied.



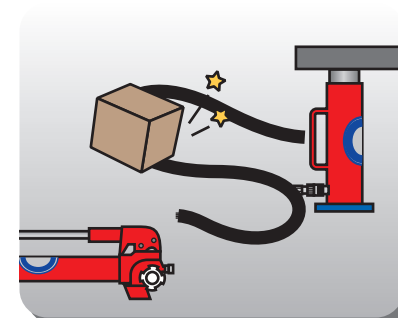
When moving the equipment to another location, do not lift it by holding the hydraulic hose.



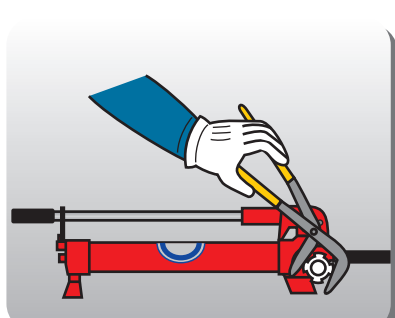
Do not apply a load that exceeds the maximum cylinder output.



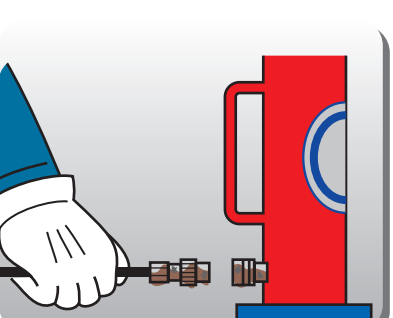
Do not bend the hose to a bend radius smaller than the minimum one specified in the catalogue.



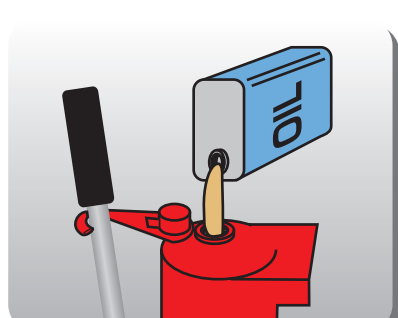
Do not place or allow any object to fall on the hose.



Do not hold the operating valve with a pair of pliers.



A duster cap is included with the coupler. Attach the cap to the coupler after use to prevent dust.



Use the product within the oil volume range of the oil level gauge.

1

How much output is required ?

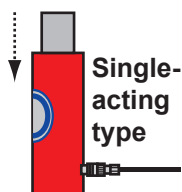
Output required \rightarrow kN Stroke \rightarrow mm

While the cylinder is operating, the output must be 70 to 80 % of the maximum output specified in the specifications. Select a cylinder that is longer than the stroke to be used.

- We can manufacture 5000 kN or larger cylinders and even those that are not listed in the catalogue, upon request. Please contact us for further information.

Selecting a single- or double-acting type

A single- or double-acting type can be selected by return type.

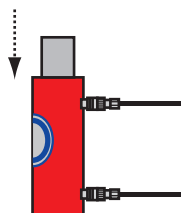


[Load-return type]

An external force is required to return the piston. For the return force, see the specifications for the cylinder.

[Spring-return type]

The return spring generates force to return the piston only. In addition, the return time varies depending on the hose length, the hydraulic oil temperature, and so on.



[Double-acting type]

Select a double-acting type if the cylinder is frequently used and the operating cycle time needs to be managed, if pull output is required when a heavy jig is attached to the piston, or if pressure fluctuations are large.



WARNING

- Be sure to use a cylinder within the operating pressure range. If the internal pressure exceeds the maximum operating pressure, the cylinder or the hose may be damaged resulting in an accident.
- The cylinder must receive a vertical load at its center. Install the cylinder vertically to the receiving surface. An eccentric load may overturn or damage the cylinder.
- The allowable eccentric load is within 2.5 % of the load specified in the specifications. Do not apply a diagonal load or impact load. Doing so may overturn or damage the cylinder.



CAUTION

- The collar thread must be usually used to secure the cylinder with a flange or the like (see page 49).
- Be sure to use a cap or relative item if the piston thread receives a load directly. In addition, use parts for cylinders (see pages 48 to 52) according to the application.
- If using cylinder parts such as caps, be sure to screw them completely. If they are not screwed completely and are also used frequently, the piston thread may be damaged. Accordingly, they may be broken off or not be able to be removed. If the orientations of cylinder parts such as cylinder bases and clevises are required to be aligned, please let us know your request.
- If the cylinder is frequently used, use a strong-type cylinder (see pages 34 to 36). Cylinders may be damaged and need repair at an early stage.
- The cylinder output must be within 70 to 80 % of the maximum output. Cylinders may be damaged and need repair at an early stage.
- Select a cylinder that is longer than the necessary stroke. Avoid abutting by using the whole stroke. Otherwise, device failure could result.

Selecting a manual (foot) pump or electric pump

- In the case of manual pumps and two-stage electric pumps, low-pressure discharge volume switches to high-pressure one automatically. Rapid traverse is made under no load condition, which increases work efficiency.
- A combination of valves determines the suitable control circuit, such as a falling-by-self-weight prevention circuit or a pressure control circuit. See the examples of combinations (see pages 9 and 10) and the examples of valve applications with circuits (see pages 104 and 105). Please contact us for further information.
- When refilling the hydraulic oil, use ISO VG 32 oil. Use ISO VG46 for MP-17 electric pumps or larger ones and electric pumps of the 200 MPa series. For hydraulic oil, see "Riken's Genuine Power Oil" on page 175. For details on hydraulic oils made by oil manufactures, see page 224.

3

Pump selection

3 Pump selection

Manual pumps

- Select pumps whose effective oil volume is larger than the total oil volumes required for the cylinder used.
- Normally, manual pumps are used horizontally. If they are used vertically (with the outlet port facing downward), select vertical types for the P-16B, P-1B, and P-4 series.

Electric Pumps

- The cylinder speed is determined by the discharge volume and effective area of the pump. See the cylinder speed table on page 226.
- The operating valve attached to the pump differ between the single-acting and double-acting cylinders.

- The cylinder speed must be within the following speed specifications. Otherwise, the equipment may be damaged or scattered matter may cause injury.



Standard type

Under no load condition : 500 mm / s max.
At 70 MPa : 30 mm / s max.

Strong type

Under no load condition : 1000 mm / s max.
At 70 MPa : 50 mm / s max.



During operation, the oil temperature must be within a range of 5 to 60 °C. If the oil temperature exceeds the proper range, the equipment will be damaged and need repair (replacement of parts or the hydraulic fluid) at an early stage, resulting in poor performance.
Use optional oil cooler(s) depending on condition of use.

4 Hose selection

Selecting a high-pressure rubber hose or nylon hose

- There are two types of high-pressure hoses: rubber hose and nylon hose. The weight, the minimum bend radius, etc. are different. See pages 176 to 178.
- The hose type is determined by the pump. Change the coupler of the cylinder if the couplers of the hose and the cylinder do not match.
- See the tables (on pages 176 to 178) that show correspondence of hoses, hose lengths, pumps, and cylinders.

5 Coupler selection

Coupler selection

- Couplers whose sizes correspond to different discharge volumes of pumps are available. If the coupler size is incorrect, the predetermined cylinder speed may not be attained, and also noise and heat from the hydraulic oil could result.
- Securely and completely connect the couplers. Do not connect or separate the couplers while pressure is applied.
- A duster cap is included with a coupler. Be sure to use the cap after use.
- If the pressure fluctuates largely (e.g. punching), do not use S-1, S-2, nor ROC-13 couplers.

6 Accessory selection

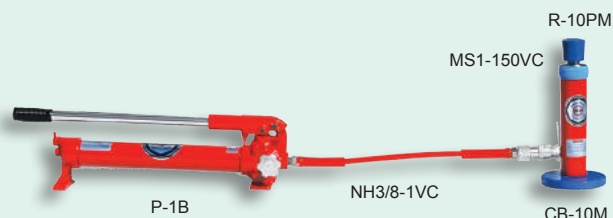
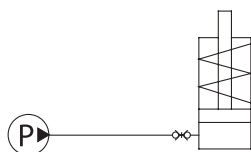
Accessory selection

- Pressure gauges and switches, various types of joints, etc. are available.
- Select joints and high-pressure piping that correspond to the maximum operating pressure of the pump used.
- Special mounting brackets are required for Riken pressure gauges and switches.

Examples of Combinations

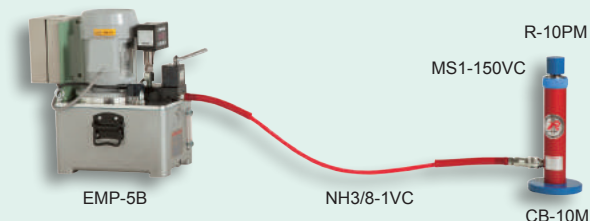
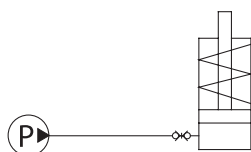
■ Type 1

- A basic combination of a manual pump and a single-acting cylinder.
- To mount a pressure gauge, a mounting bracket such as T-1 (coupler connection type), T-2, or T-5 (screw-in type) are required.



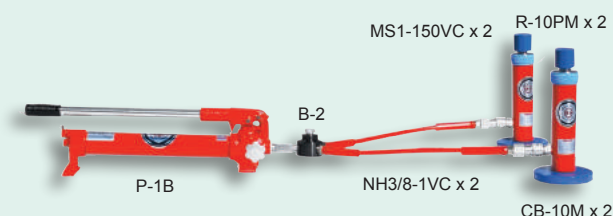
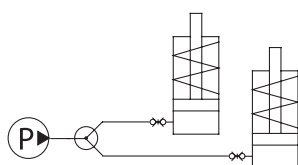
■ Type 2

- An example of combination of an electric pump and a single-acting cylinder.
- Select an electric pump according to the cylinder speed required. See the cylinder speed table (on page 226).



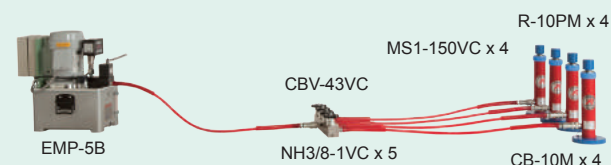
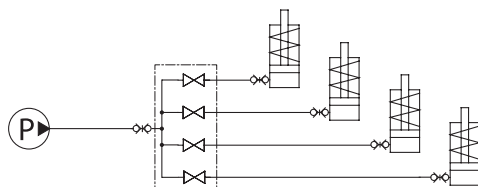
■ Type 3

- If cylinders are used by one pump, a branch is required.
- Two types of branches are available: pump connection type and hose connection type (see page 167).



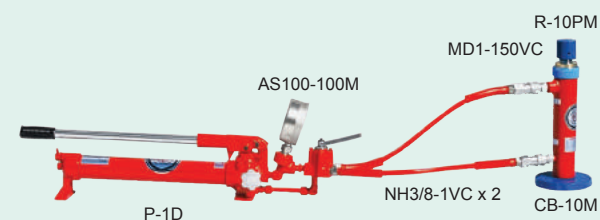
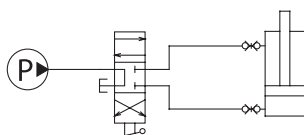
■ Type 4

- Similar to type 3, it can enable or disable each cylinder using a branch with valves (see page 168).



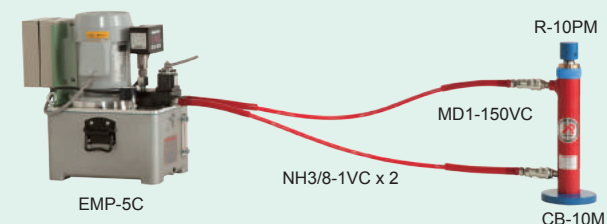
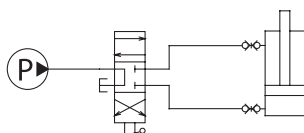
■ Type 5

- A combination of a manual pump and a double-acting cylinder.
- To use a double-acting cylinder, a pump with a 4-way direction-control valve is required.



■ Type 6

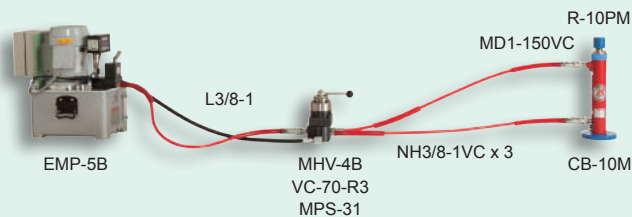
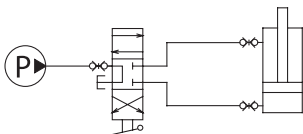
- A combination of an electric pump (with a 4-way manual direction-control valve) and a double-acting cylinder.
- To use a double-acting cylinder, a pump with a 4-way direction-control valve is required.



Examples of Combinations

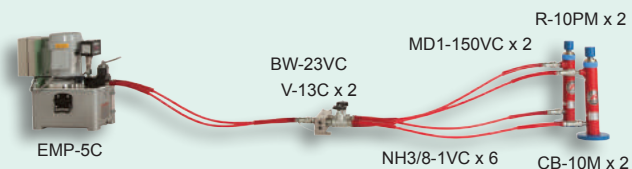
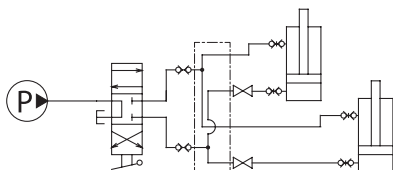
■ Type 7

- The direction control valve can be placed away from the pump to allow easy operation.
- Direction-control valves with a square flange are also available to secure a direction-control valve to a panel, etc.



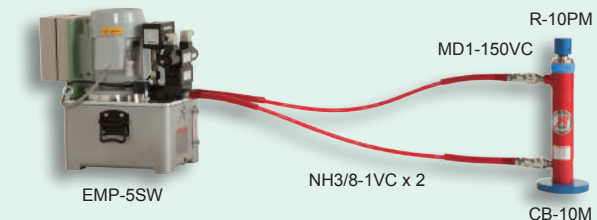
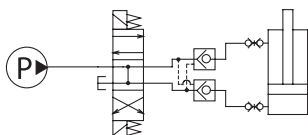
■ Type 8

- If double-acting cylinders are used by one pump, a branch is required for both push and pull sides. As standard products, the BW-23 and -24 are available for two double-acting cylinders (see page 167).



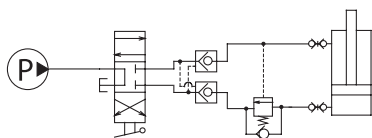
■ Type 9

- This is a solenoid valve version of type 6.
- Valves and the like may be required depending on the type of work.
- Please contact us for further information including valve combinations.

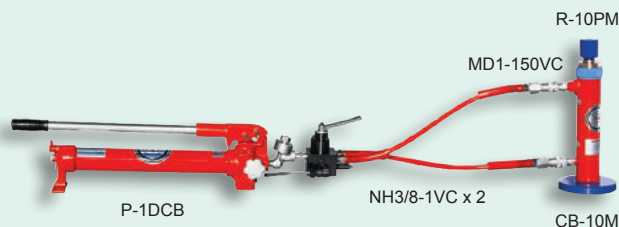


■ Type 10

- Prevents a heavy load from falling by its own weight while the cylinder is moving down the load.
- Adjusts the pressure of the counterbalance valve to appropriate one for the heavy load to ensure smooth operation.

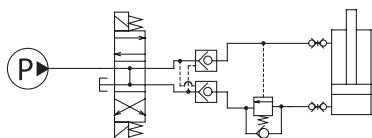


(External pilot system)

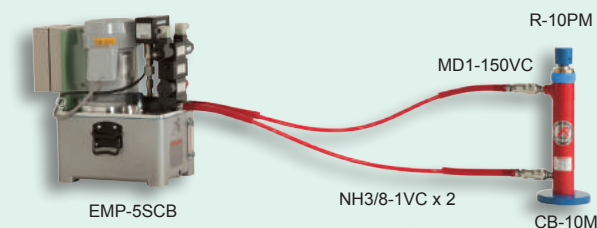


■ Type 11

- A solenoid valve version of type 10.

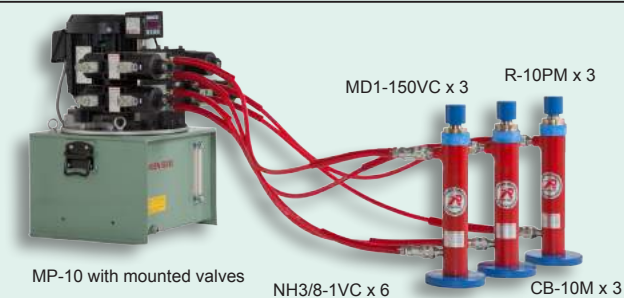
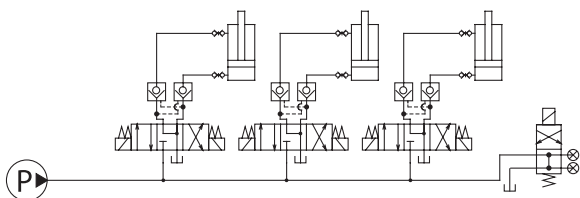


(External pilot system)



■ Type 12

- An electric pump equipped with Esperblock valve mounting units.
- This combination does not need piping joints or the like between valves. Also compact for easy circuit configuration and modification.



Hydraulic Cylinders

How to Select Hydraulic Cylinders and Handling Precautions	12
Single-Acting Cylinders	13 to 24
Double-Acting Cylinders	25 to 33
Special Cylinders	34 to 47
Cylinder Parts	48 to 53
Data	54 to 56



How to Select Hydraulic Cylinders and Handling Precautions

External and internal drawings are available for all models.

- Refer to Page 7 regarding model selection.

1 How to determine the output

- While the cylinder is operating, the output must be 70 to 80 % of the maximum output specified in the specifications.

2 How to determine the stroke

- Select a cylinder whose stroke is longer than that to be required.

3 How to determine the cylinder type: single-acting or double-acting

- Cylinders are classified into the single-acting type (load-return, spring-return) and the double-acting type (hydraulic-return) according to the return function.
- Load-return types have no return function. An external force is required to return the piston.

Return force	40 kN cylinder	Approx. 0.07 kN
	100 kN cylinder	Approx. 0.15 kN
	200 kN cylinder	Approx. 0.35 kN
	300 kN cylinder	Approx. 0.45 kN
	500 kN cylinder	Approx. 0.75 kN
	1000 kN cylinder	Approx. 1.50 kN

- The return spring of a single-acting cylinder generates force to return the piston only. In addition, the return time varies depending on the hose length, etc.
- Select a double-acting type if the cylinder is frequently used or if pull output is required when a heavy jig is attached to the piston.



If attaching a heavy jig or the like to the piston, select a pump with a falling-by-self-weight prevention valve. Otherwise, there is a danger of sliding of the piston at a speed which the pump cannot handle or caused by the weight of the jig, etc. when the pump does not work.

4 How to determine the cylinder speed

- If the pump is used with an electric pump, select a pump suitable for the application referring to the cylinder speed table (on page 226).



The cylinder speed must be within the following speed specifications. Otherwise, the equipment may be damaged or scattered matter may cause injury.

[Standard type]	Under no load condition:	500 mm/s max.
	At 70 Mpa:	30 mm/s max.
[Strong type]	Under no load condition:	1000 mm/s max.
	At 70 Mpa:	50 mm/s max.

5 How to determine the mounting and securing methods

- The cylinder should be loaded vertically.
- The allowable eccentric load is within 2.5 % of the load specified in the specifications.
- The collar thread must be generally used to secure the cylinder with a flange or the like (see page 49).
- The cap should always be used when the load is received directly by the piston. In addition, use cylinder parts (see pages 48 to 53) according to the application.



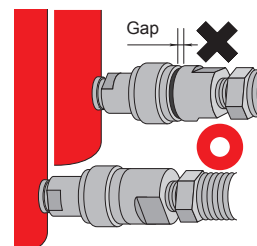
When using cylinder parts such as caps, be sure to screw them completely. When they are not screwed completely and also used frequently, the thread may be damaged, and accordingly they may be broken off or not be able to be removed. If the orientations of cylinder parts such as a cylinder base and clevis need to be aligned, please let us know your request.

6 Operating environment

- Riken products must be used at an ambient temperature of 0 to 40 °C. In the case of cylinders that need a low volume of oil, the internal pressure may increase depending on the ambient temperature. In this case, a quick coupler or a one-touch coupler may not be able to be connected.
- During operation, the hydraulic oil temperature must be within 5 to 60 °C.
- Riken products are designed for indoor use (except some products).

7 Handling Precautions

- If a cylinder that works normally with self-sealing couplers (S-1R, S-24R, S-5R) stops suddenly, the most likely cause is looseness (a gap) between the couplers. Tighten the couplers again using a tool if a gap exists.



- Avoid using the whole stroke of the cylinder. (Avoid abutting by using the whole stroke.)
- A strong cylinder (see pages 34 to 36) is recommended if the cylinder is frequently used. Please contact us for further information.

8 Special cylinders

- Upon request, 5000 kN or larger cylinders and even those that are not listed in the catalogue can be manufactured. Please contact us for further information.

9 Attached couplers

- Use a VC-70 quick coupler that eliminates loosening if a coupler is frequently removed or is subject to vibration (see page 170).
- If the impact pressure is high (e.g. punchings), do not use S-1, S-2, and ROC couplers.
- Securely and completely connect the couplers. Do not connect or separate the couplers while pressure is applied.
- If pressure is likely to be applied to the inside of the cylinder due to the ambient temperature, use the pressure elimination accessory to remove pressure before connection.

10 Other

- The contents of this catalogue are subject to change without notice. Please visit our website for the latest information.

<http://www.rikenkiki.co.jp>

100 to 2000 kN (LJ Series)

Maximum operating pressure	70 MPa
Maximum output	100 to 2000 kN
Stroke	15 mm
Cylinder system	Single-acting
Return system	Spring-return
Coupler connection port size	Rc3/8

- Thin jack with 15 mm stroke for all models.
- 500 kN and larger jacks have a handle.
- The cylinder tube and piston stop ring are plated with electroless nickel.

 For cylinder and pump selections, see page 54.

Model code structure

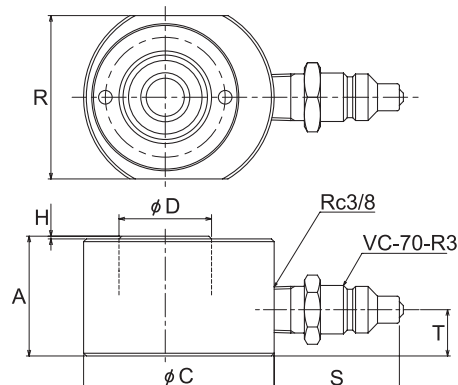
LJ	1 - 15	VC
Maximum output	Stroke (mm)	Attached coupler
1 : 100kN		VC : VC-70-R3
2 : 200kN		S : S-1R
3 : 300kN		T : ROC-13R
5 : 500kN		-NC : W/O coupler
7.5 : 750kN		
10 : 1000kN		
15 : 1500kN		
20 : 2000kN		

Single-acting cylinder
LJ series

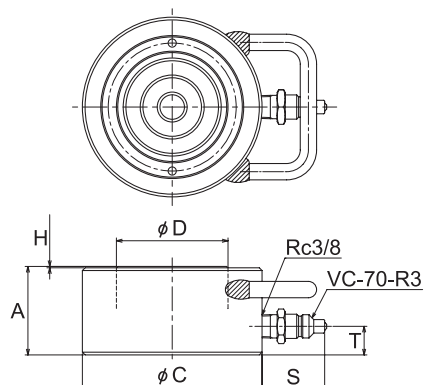
■ LJ3-15VC



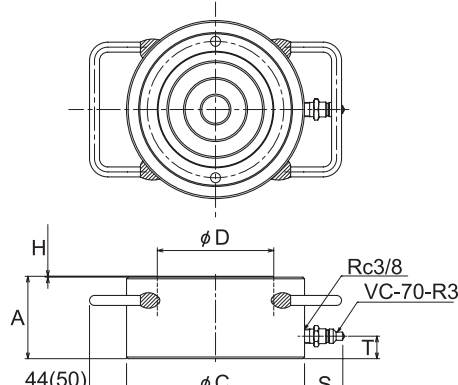
■ LJ1-15VC/LJ2-15VC/LJ3-15VC



■ LJ5-15VC/LJ7.5-15VC/LJ10-15VC



■ LJ15-15VC/LJ20-15VC



■ Specifications

Model		LJ1-15	LJ2-15	LJ3-15	LJ5-15	LJ7.5-15	LJ10-15	LJ15-15	LJ20-15
Maximum output	kN	100	200	300	500	750	1000	1500	2000
Effective area	cm ²	14.52	30.19	46.56	72.38	109.35	149.57	215.12	285.26
Minimum overall length	A	44	52	58	65	76	83	99	112
Cylinder internal diameter	φ	43	62	77	96	118	138	165.5	190.6
Cylinder external diameter	φ C	70	88	105	132	154	174	214	262
Piston diameter	φ D	34	48	60	82	105	112	140	165
Piston protrusion length	H	1							
Width across flats	R	60	78	98	—	—	—	—	—
Coupler protrusion length	VC-70-R3	≈ 46							
	S-1R	≈ 53							
	ROC-13R	≈ 49							
Coupler position	T	17	18	19	21	25	28	27	28
Required oil volume	cm ³	22	46	70	109	164	225	323	428
Approx. weight	kg	1.1	2.1	3.5	6.4	10.5	14.2	26.2	45.0

50 to 200 kN (MC Series)

Maximum operating pressure	70 MPa
Maximum output	50/100/200 kN
Cylinder system	Single-acting
Return system	Spring-return
Coupler connection port size	Rc3/8

- The piston and the inside of the cylinder tube are plated.
- A special head cover is included.
- Short type having a minimized overall length.

 For cylinder and pump selections, see page 54.

Model code structure

MC **05** - **25** **VC**

Single-acting cylinder
MC series

Maximum output
05 : 50kN
1 : 100kN
2 : 200kN

Stroke
(mm)

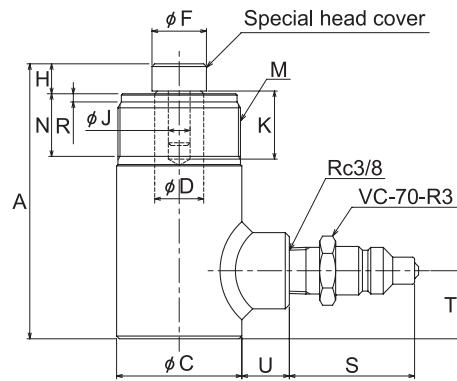
Attached coupler

VC : VC-70-R3
S : S-1R
T : ROC-13R
-NC : W/O coupler

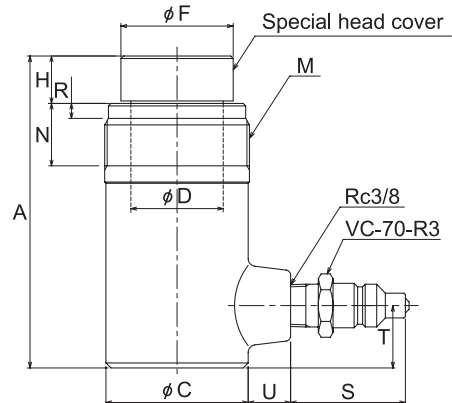
■ MC2-50VC



- MC05-25VC/50VC
- MC1-15VC/25VC/35VC
- MC2-25VC/50VC



■ MC1-50VC



■ Specifications

Model		MC05-25	MC05-50	MC1-15	MC1-25	MC1-35	MC1-50	MC2-25	MC2-50
Maximum output	kN	50		100				200	
Effective area	cm ²	7.16		14.52				28.74	
Stroke	mm	25	50	15	25	35	50	25	50
Minimum overall length	A	101	144	88	111	128	125	127	171
Cylinder internal diameter	ϕ	30.2		43				60.5	
Cylinder external diameter	ϕ C	46		57				82	
Piston diameter	ϕ D	18		28			37	38	
Head cover diameter	ϕ F	20		27			45	36	
Piston protrusion length	H	11		11			19	16	
Piston hole diameter	ϕ J	8		19			—	19	
Piston hole length	K	25		30			—	35	
Collar thread size	M	M45 x 1.5		M58 x 2				M82 x 2	
Collar thread length	N	23		25				50	
Incomplete thread length	R	3		6				6	
Coupler protrusion length	VC-70-R3	S	≈ 46	≈ 46				≈ 46	
	S-1R		≈ 53	≈ 53				≈ 53	
	ROC-13R		≈ 49	≈ 49				≈ 49	
Coupler position	T	25		21	25			25	
Boss length	U	18		17				19	
Required oil volume	cm ³	18	36	22	37	51	73	72	144
Approx. weight	kg	1.2	1.7	1.6	1.9	2.2	2.1	4.3	5.6

■ Compatible attachments

Attachment location	Cylinder parts	MC05-25	MC05-50	MC1-15	MC1-25	MC1-35	MC1-50	MC2-25	MC2-50
Piston	Tilt saddle	—		R-1020SP			—	R-1020SP	
Collar thread	Flange	5FM		10FM				20FM	

50 kN (MS Series)

Maximum operating pressure	70 MPa
Maximum output	50 kN
Cylinder internal diameter	φ 30.2
Effective area	7.16 cm ²
Cylinder system	Single-acting
Return system	Spring-return
Coupler connection port size	Rc3/8

- The piston and the inside of the cylinder tube are plated.

 For cylinder and pump selections, see page 54.

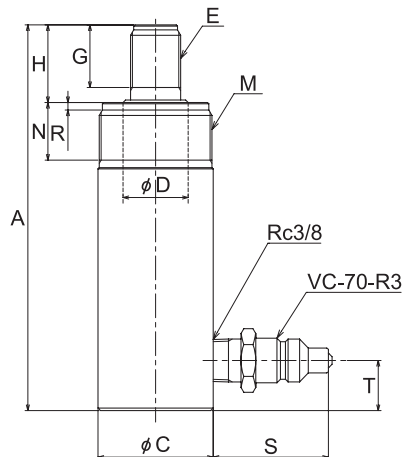
Model code structure

MS	05	-	50	VC
Single-acting cylinder MS series	Maximum output 05 : 50 kN		Stroke (mm)	Attached coupler VC : VC-70-R3 S : S-1R T : ROC-13R -NC : W/O coupler

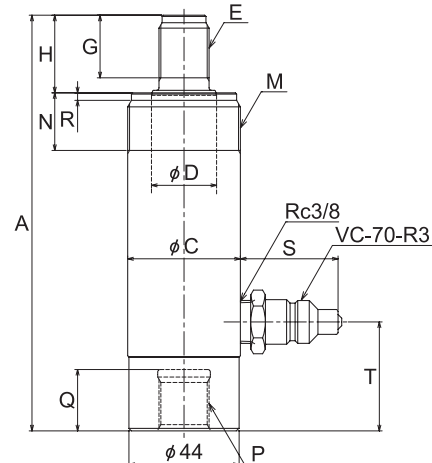
■ MS05-100VC



■ MS05-50VC



■ MS05-75VC/100VC/125VC/150VC



■ Specifications

Model		MS05-50	MS05-75	MS05-100	MS05-125	MS05-150
Stroke	mm	50	75	100	125	150
Minimum overall length	A	154	211	236	261	286
Cylinder external diameter	ϕ C	46	45			
Piston diameter	ϕ D	26				
Piston thread size	E	M20 x 1.5				
Piston thread length	G	25				
Piston protrusion length	H	31				
Collar thread size	M	M45 x 1.5				
Collar thread length	N	23				
Base thread size	P	—	M20 x 1.5			
Base thread depth	Q	—	24			
Incomplete thread length	R	3				
Coupler protrusion length	VC-70-R3	S	≈ 46	≈ 39		
	S-1R		≈ 53	≈ 46		
	ROC-13R		≈ 49	≈ 42		
Coupler position	T	20	43			
Required oil volume	cm³	36	54	72	90	108
Approx. weight	kg	1.5	2.0	2.3	2.5	2.7

■ Compatible attachments

Attachment location	Cylinder parts	MS05-50	MS05-75	MS05-100	MS05-125	MS05-150
Piston thread	Cap	R-5PM				
	Piston base	RB-5M				
	Clevis	CLF-5-1 (2)				
Collar thread	Flange	5FM				
Base thread	Cylinder base	—	CB-5M			
	Clevis	—	CLM-5-1 (2)			

40 kN (D Series)

Maximum operating pressure	70 MPa
Maximum output on the push side	40 kN
Effective area on the push side	6.42 cm ²
Cylinder internal diameter	φ 28.6
Maximum output on the pull side	16.3 kN
Effective area on the pull side	2.62 cm ²
Cylinder system	Double-acting
Coupler connection port size	Rc3/8

- The piston is plated.

For cylinder and pump selections, see page 54.

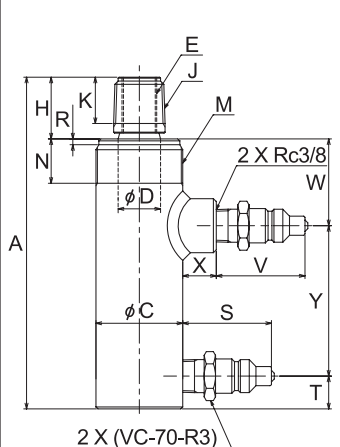
Model code structure

D	04	-	50	VC
Double-acting cylinder D series	Maximum output 04 : 40 kN		Stroke (mm)	Attached coupler VC : VC-70-R3 S : S-1R T : ROC-13R -NC : W/O coupler

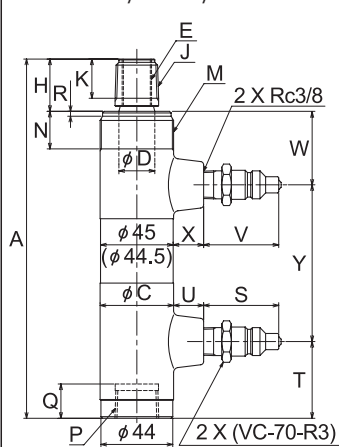
■ D04-50VC



■ D04-50VC

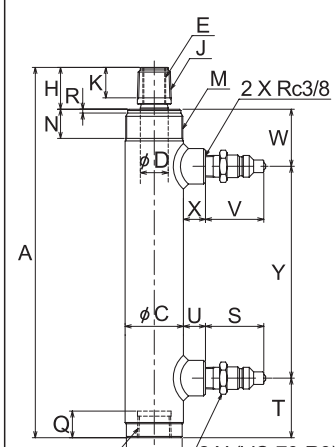


■ D04-85VC/150VC/200VC



*The dimensions in parentheses show those of the D04-85VC.

■ D04-250VC



■ Specifications

Model		D04-50	D04-85	D04-150	D04-200	D04-250
Stroke	mm	50	85	150	200	250
Minimum overall length	A	172	220	287	337	386
Cylinder external diameter	φ C	45		46		
Piston diameter	φ D	22				
Piston thread size	E	M18 x 1.5				
Piston protrusion length	H	32		33		
Cap thread size	J	3/4-14NPT				
Cap thread length	K	24				
Collar thread size	M	M45 x 1.5				
Collar thread length	N	23				
Base thread size	P	—	3/4-14NPT			
Base thread depth	Q	—	21			
Incomplete thread length	R	3		4		3
Coupler pro- trusion length	VC-70-R3	S (push side) V (pull side)	≈ 46			
	S-1R		≈ 53			
	ROC-13R		≈ 49			
Coupler position on the push side	T	17	47			
Boss length on the push side	U	—	18	19		17
Coupler position on the pull side	W	45				
Boss length on the pull side	X	17	18	19		17
Distance between the ports	Y	78	96	162	212	261
Required oil volume	cm ³	33	55	97	129	161
Approx. weight	kg	2.0	2.6	3.3	3.9	4.3

■ Compatible attachments

Attachment location		Cylinder parts	D04-50	D04-85	D04-150	D04-200	D04-250
Cap thread	Cap		R-4P				
	Piston base		RB-4				
	Clevis		CLF-4-A (B)				
Collar thread	Flange		4FD				
Base thread	Cylinder base	—	CB-4				
	Clevis	—	CLM-4-A (B)				

50 kN (MD Series)

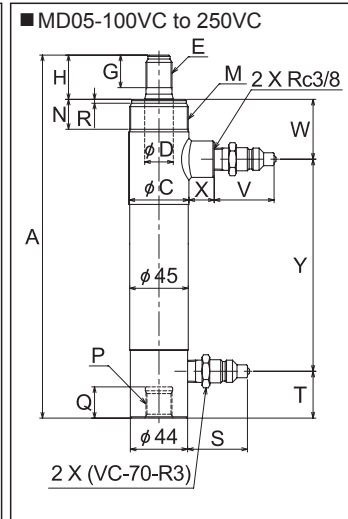
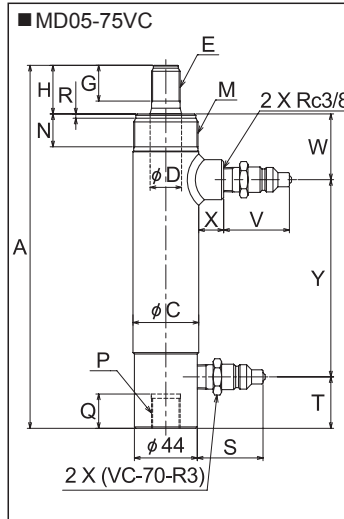
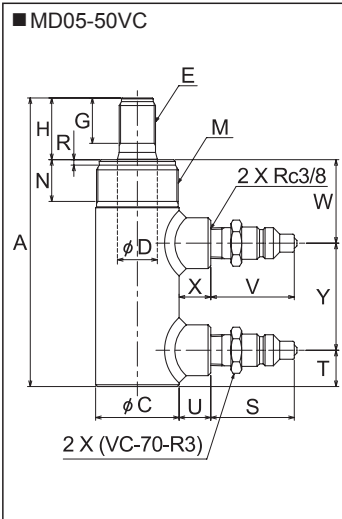
Maximum operating pressure	70 MPa
Maximum output on the push side	50 kN
Effective area on the push side	7.16 cm ²
Cylinder internal diameter	φ 30.2
Maximum output on the pull side	23.4 kN
Effective area on the pull side	3.36 cm ²
Cylinder system	Double-acting
Coupler connection port size	Rc3/8

- The piston is plated.

 For cylinder and pump selections, see page 54.

Model code structure

MD	05	-	50	VC
Double-acting cylinder MD series	Maximum output 05 : 50 kN		Stroke (mm)	Attached coupler VC : VC-70-R3 S : S-1R T : ROC-13R -NC : W/O coupler



■ Specifications

Model		MD05-50	MD05-75	MD05-100	MD05-150	MD05-200	MD05-250
Stroke	mm	50	75	100	150	200	250
Minimum overall length	A	159	254	279	329	379	429
Cylinder external diameter	ϕ C	46					
Piston diameter	ϕ D	22					
Piston thread size	E	M20 x 1.5					
Piston thread length	G	25					
Piston protrusion length	H	34					
Collar thread size	M	M45 x 1.5					
Collar thread length	N	23					
Base thread size	P	—	M20 x 1.5				
Base thread depth	Q	—	24				
Incomplete thread length	R	3					
Coupler protrusion length	VC-70-R3	S (push side) V (pull side)	≈ 46				
	S-1R		≈ 53				
	ROC-13R		≈ 49				
Coupler position on the push side	T	20	36				
Boss length on the push side	U	17	—				
Coupler position on the pull side	W	46					
Boss length on the pull side	X	17		19			
Distance between the ports	Y	59	138	163	213	263	313
Required oil volume	cm ³	36	54	72	108	144	179
Approx. weight	kg	1.9	2.8	3.0	3.5	4.0	4.5

■ Compatible attachments

Attachment location	Cylinder parts	MD05-50	MD05-75	MD05-100	MD05-150	MD05-200	MD05-250
Piston thread	Cap	R-5PM					
	Piston base	RB-5M					
	Clevis	CLF-5-1 (2)					
Collar thread	Flange	5FM					
Base thread	Cylinder base	—	CB-5M				
	Clevis	—	CLM-5-1 (2)				

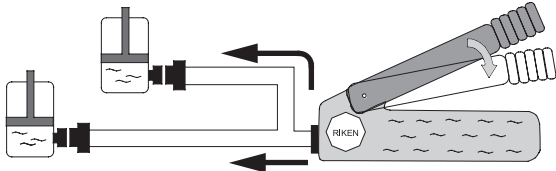
Hydraulic Pumps

Manual Pumps	.....	58 to	65
Battery Pumps	.....		66
Discharge Volume List by Model	.....		67
SMP Series	.....	68 to	74
Electric Pumps	.....	75 to	92
Special Pumps	.....	93 to	101
Oil Coolers	.....		102

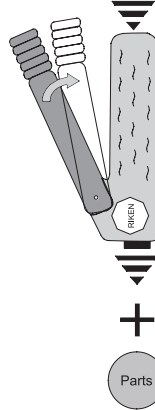


Manual Pumps

- The standard maximum operating pressure of the Riken manual hydraulic pumps is 70 MPa.
- A wide variety of models is available to meet the required oil volume or operating speed of the cylinder.
- The two-stage speed control, by which the pressure automatically switches between high and low speed modes, is provided (except some models), offering high work efficiency.
- These pumps include all necessary valves such as a safety valve, air valve, and operating valve, and also incorporate an oil tank. Accordingly, they are compact, lightweight, and easy to handle.
- We can also manufacture special pumps such as low-pressure manual pumps, a pump combined with a cylinder. Please contact us for further information.

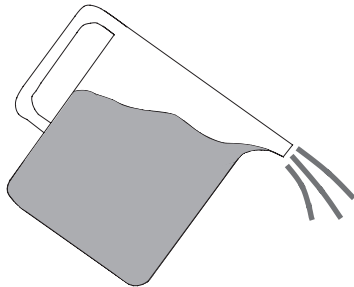


Select pumps whose effective oil volume is larger than the total oil volumes required for cylinders used. In particular, caution is required when several cylinders are operated by a single pump.

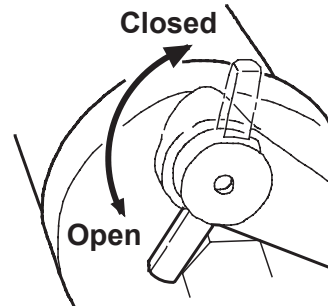


Normally, manual pumps are used horizontally. If they are used vertically (with the outlet port facing downward), select the P-16B-V, P-1B-V, or P-4-V.

If the P-16B, P-1B, or P-4, which is vertically used, an additional part is needed.



Do not refill the pump with hydraulic oil while the cylinder is extended. When refilling the tank, use the attached oil level gauge to check whether the oil volume is appropriate. If oil is excessively refilled, the oil may leak from the air valve.



Be sure to open the air valve before use. Using the pump with the air valve closed may evacuate the inside of the tank, causing suction failure or damage to the tank, etc.

- Pressure gauges are optional. (See pages 161 and 162.)
 - * For manual pumps for single-acting cylinders, a pressure gauge mounting bracket is also optional. (See page 163.)
 - * For manual pumps for double-acting cylinders, only the P-1D (DCB), P-4D (DCB), and P-8D (DCB) include a pressure gauge mounting bracket.
- Hydraulic oil

Pumps are delivered filled with hydraulic oil. When refilling hydraulic oil, use only Riken's Genuine Power Oil (see page 175) or an ISO VG32 general hydraulic oil (see page 224). Contact us if using other oil that is not general hydraulic one.



WARNING

- Be sure to read the operation manual for the product thoroughly before use to obtain a good understanding of the product.
- Riken products must be not used where serious damage could result if the hydraulic oil leaks. In particular, they must not be used near fire. Otherwise, injury or fire could result.
- Do not modify the product. Any modification that is not recommended by Riken could lead to an accident.
- When using the models shown below, be sure to open the air valve before use. Using the pump with the air valve closed may increase the pressure inside the oil tank when the hydraulic oil returns, damaging the tank and leading to an accident.
[All models of manual (foot) pumps (except the P-3 and P-18) and all models of the SMP series]
- If an amount of hydraulic oil that is outside of the rated range returns to the oil tank, the pressure inside the tank may increase damaging the tank and leading to an accident.
- The maximum operating pressure for the product is 70 MPa. Because high-pressure safety valves are used as safety equipment, whose maximum operating pressure is set to 73 MPa before shipment, do not change the setting to more than 73 MPa. Otherwise, the equipment may be damaged causing a serious accident.
- If using hydraulic equipment whose maximum operating pressure is less than 70 MPa, for the high-pressure safety valve, set the operating pressure to be used for the application before use. Otherwise, the equipment may be damaged or scattered matter may be produced. If the maximum operating pressure is set to 30 MPa or less, some pumps need parts replacement. Please contact us for further information.



CAUTION

- Be sure to remove air from inside the pipe before applying pressure.
If air remains, pressure may fluctuate or not be raised.

Manual Pumps (P-1 Series)

Model code structure

P - 1 B

Manual pump

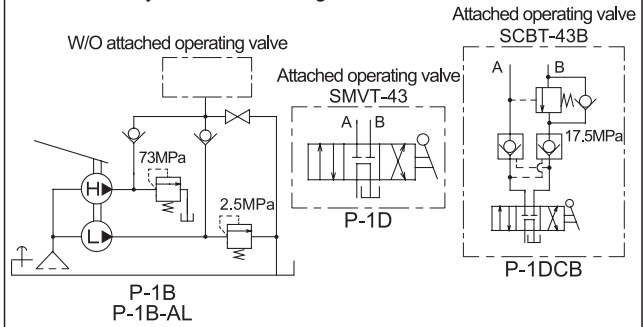
Series No.

Blank : Standard model
-V : Vertical model

B : For single-acting cylinders
D : For double-acting cylinders
DCB : For double-acting cylinders with counterbalance valve
B-AL : For single-acting lightweight aluminum model

*The P-1DCB is a make-to-order product.

P-1 series hydraulic circuit diagrams



P-1B



P-1B-AL

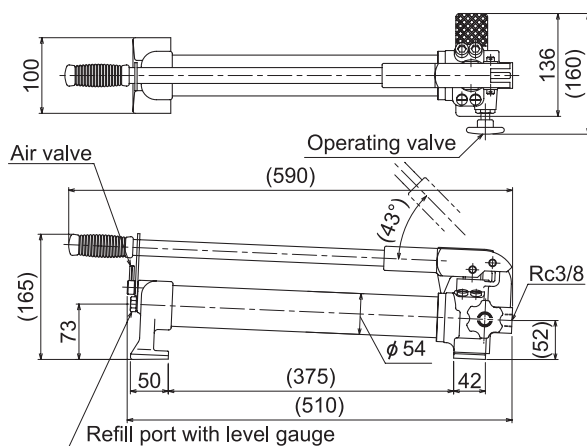


Specifications

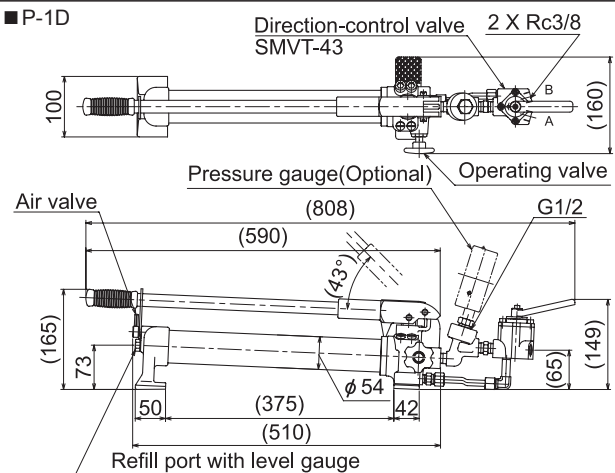
Model	Maximum operating pressure MPa		Discharge volume cm ³ /stroke		Outlet port Rc	Hydraulic oil	Tank oil volume cm ³	Effective oil volume cm ³	Lever load N (at 70 MPa)	Approx. weight kg	Attached operating valve
	High pressure	Low pressure	At high pressure	At low pressure							
P-1B (-V)	70	2	2.3	13.0	3/8	ISO VG32	700	600	534	7.0	—
P-1D (-V)										9.0	SMVT-43
P-1DCB (-V)										11.0	SCBT-43B
P-1B-AL (-V)										4.8	—

*The oil tank is filled up with hydraulic oil before shipment.

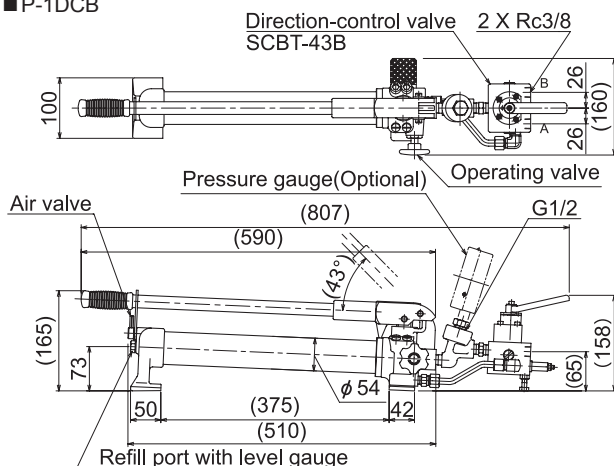
P-1B



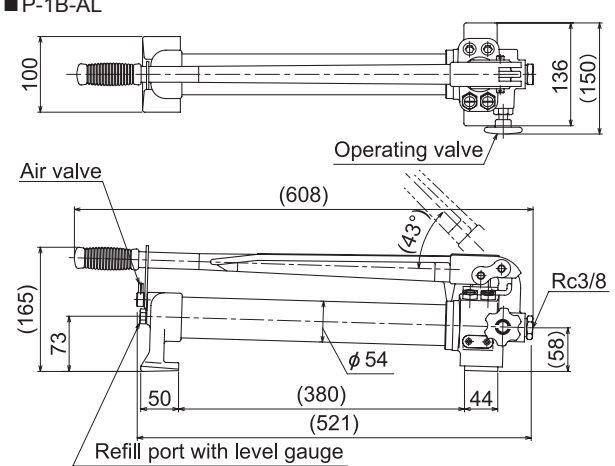
P-1D



P-1DCB



P-1B-AL



Manual Pumps (P-4 Series)

Model code structure



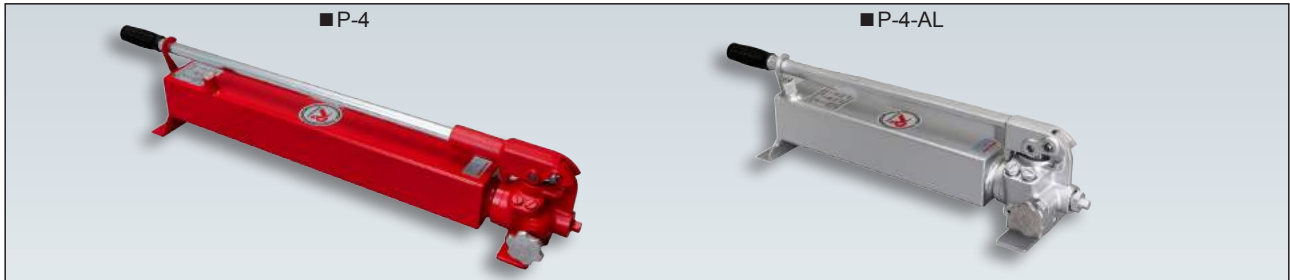
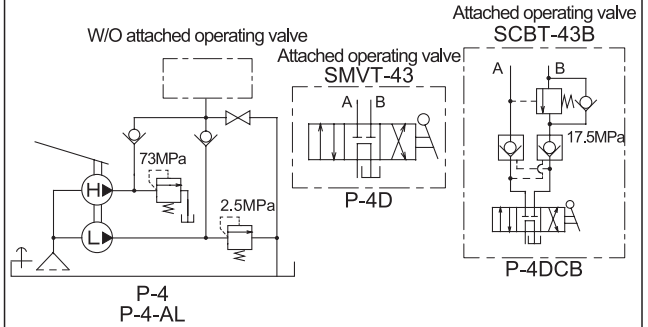
Blank : Standard model
-V : Vertical model

Blank : For single-acting cylinders
D : For double-acting cylinders
DCB : For double-acting cylinders with counterbalance valve
-AL : For single-acting lightweight aluminum model

Series No.
Manual pump

*The P-4DCB is a make-to-order product.

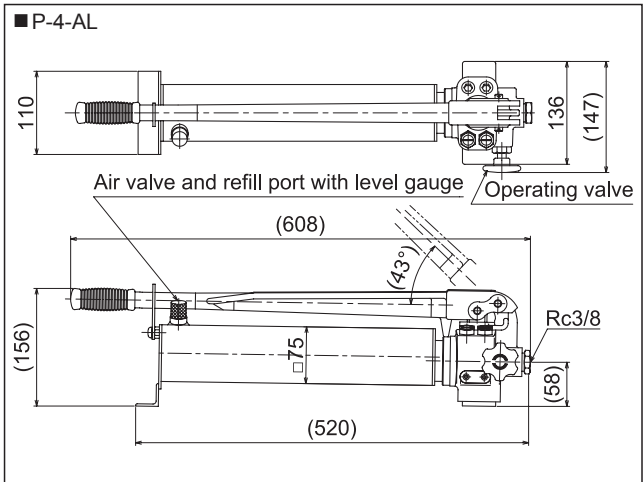
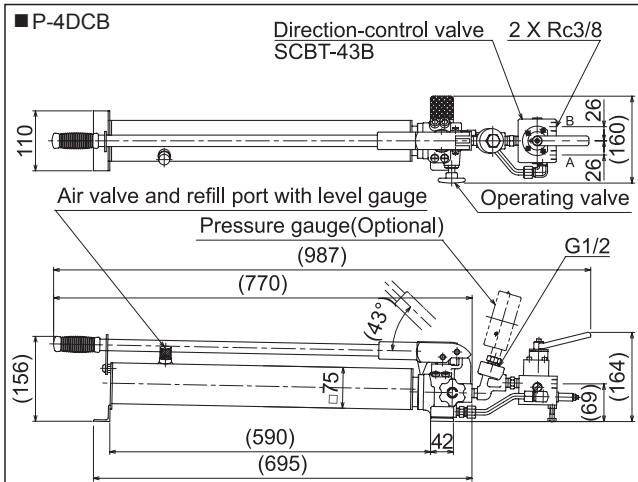
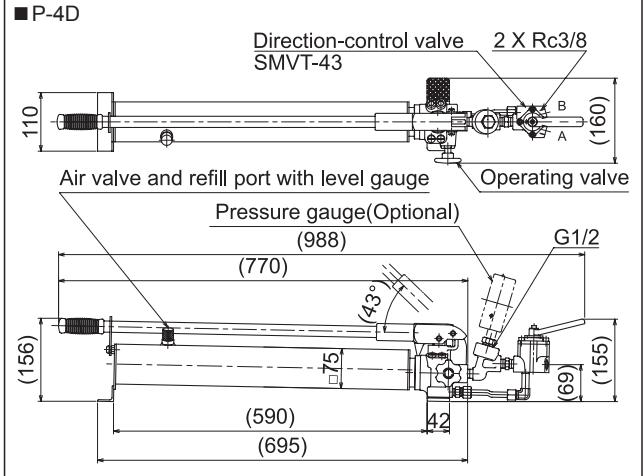
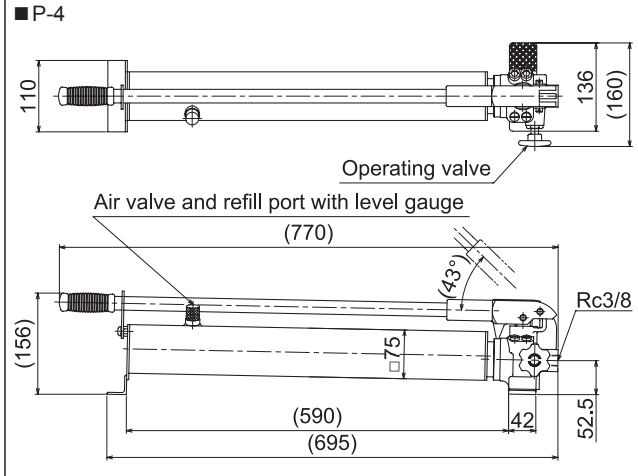
P-4 series hydraulic circuit diagrams



Specifications

Model	Maximum operating pressure MPa		Discharge volume cm ³ /stroke		Outlet port Rc	Hydraulic oil	Tank oil volume cm ³	Effective oil volume cm ³	Lever load N (at 70 MPa)	Approx. weight kg	Attached operating valve
	High pressure	Low pressure	At high pressure	At low pressure							
P-4 (-V)	70	2	2.3	13.0	3/8	ISO VG32	2500	1800	338	11.5	—
P-4D (-V)										13.5	SMVT-43
P-4DCB (-V)										15.5	SCBT-43B
P-4-AL (-V)							1500	1200	534	6.3	—

*The oil tank is filled up with hydraulic oil before shipment.



Manual Pumps (P-8 Series)

Model code structure

P - 8

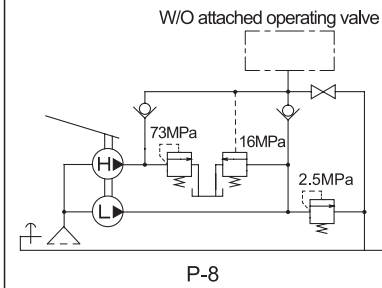
Manual pump

Series No.

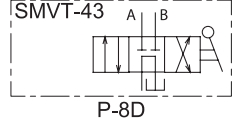
Blank : For single-acting cylinders
 D : For double-acting cylinders
 DCB : For double-acting cylinders with counterbalance valve

*The P-8DCB is a make-to-order product.

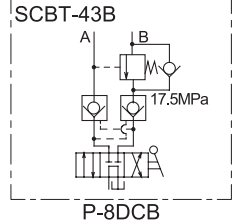
■ P-8 series hydraulic circuit diagrams



Attached operating valve



Attached operating valve



■ Specifications

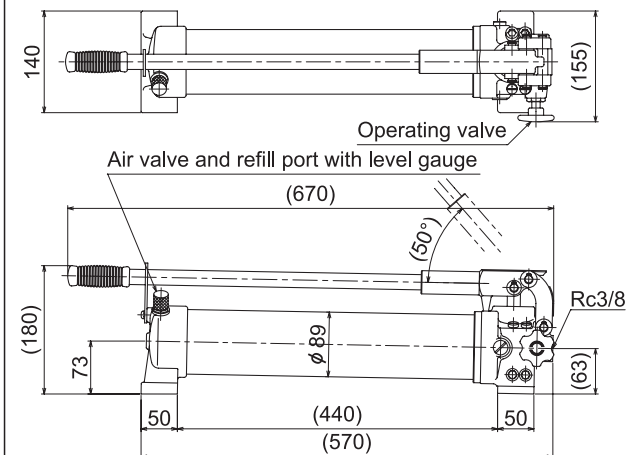
Model	Maximum operating pressure MPa		Discharge volume cm ³ /stroke		Outlet port Rc	Hydraulic oil	Tank oil volume cm ³	Effective oil volume cm ³	Lever load N (at 70 MPa)	Approx. weight kg	Attached operating valve
	High pressure	Low pressure	At high pressure	At low pressure							
P-8	70	2	3.1	31.0	3/8	ISO VG32	2100	1800	461	13.5	—
P-8D										15.5	SMVT-43
P-8DCB										17.5	SCBT-43B

*The oil tank is filled up with hydraulic oil before shipment.

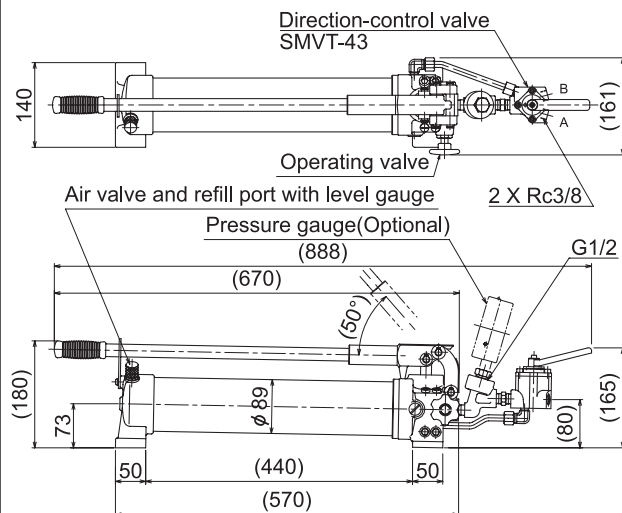
■ P-8



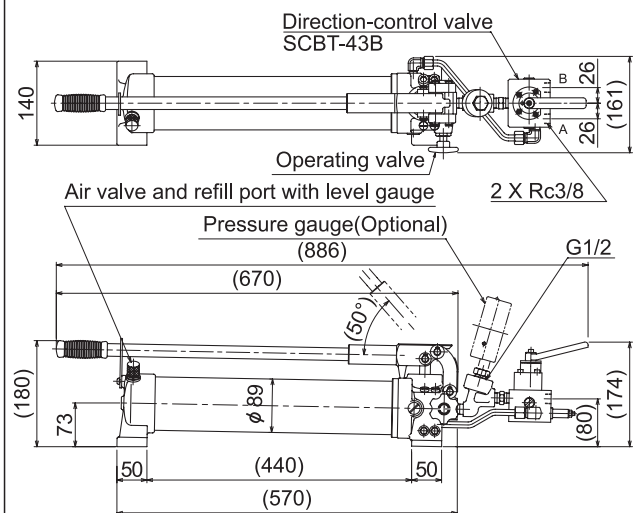
■ P-8



■ P-8D



■ P-8DCB



Manual and Foot Pumps for Single-Acting Cylinders



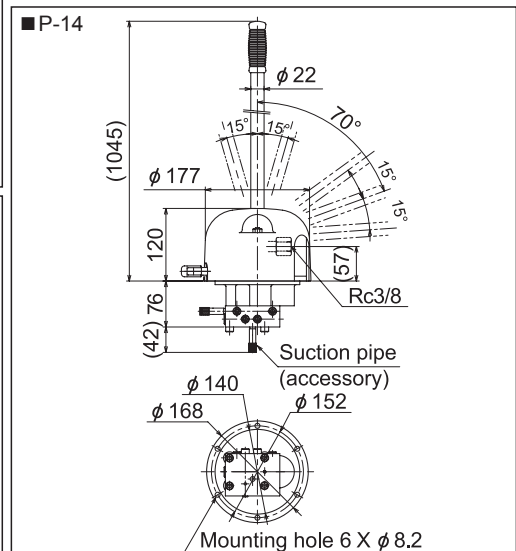
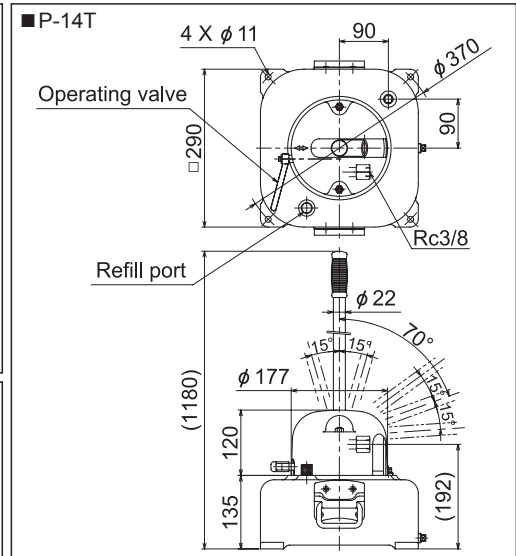
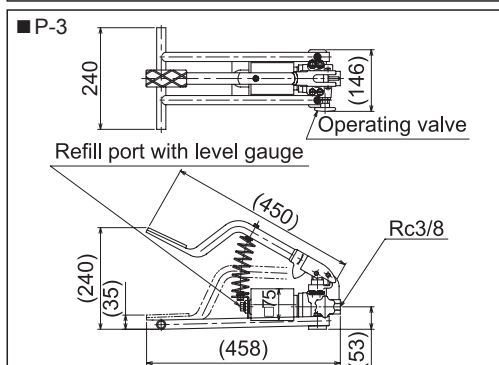
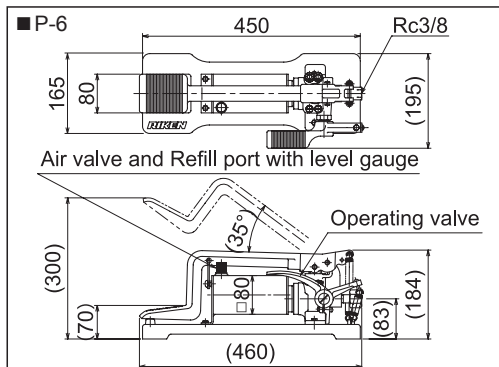
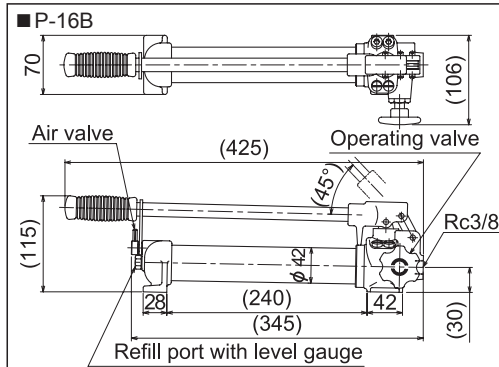
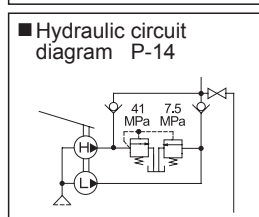
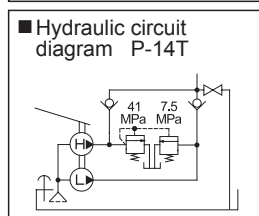
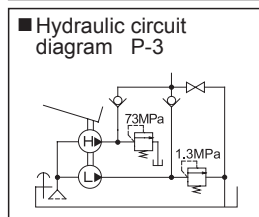
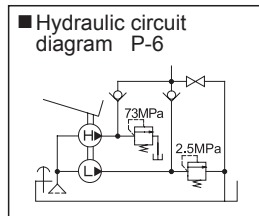
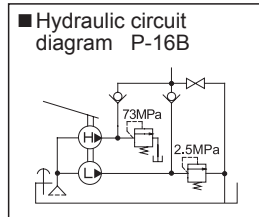
Specifications

Model	Maximum operating pressure MPa		Discharge volume cm³/stroke		Outlet port Rc	Hydraulic oil	Tank oil volume cm³	Effective oil volume cm³	Lever load N	Approx. weight kg
	High pressure	Low pressure	At high pressure	At low pressure						
P-16B	70	2	1.0	5.0	3/8	ISO VG32	280	220	265	3.1
P-6	70	2	1.9	10.8			800	550	706	8.3
P-3	70	1	1.7	9.5			300	170	568	8.0
P-14T	40	7	5.1	25.0			6000	5500	196	23.0
P-14							—	—		10.0

*The P-14 has no oil tank. A suction pipe and a packing for tank are included.

*The discharge volume of the P-14 and P-14T represents a discharge volume produced during one cycle of the lever.

*The oil tank is filled up with hydraulic oil before shipment.



Battery Pumps (BTP Series)

- Lightweight and easy-to-operate pumps alternative to manual pumps.
- The improved tank structure requires no air valve, which prevents operators from forgetting to close the air valve and oil leakage from occurring.
- Driven by a Panasonic nickel metal hydrogen (NiMH) battery pack (EZ9200S) or a lithiumion battery pack (EZ9L45, 4.2 Ah) with a Panasonic battery adapter (EZ9740). (A battery pack is not included and must be prepared by the user.)
- If the pump with a fully charged battery pack is used in combination with a Riken S2-50 single-acting cylinder (200 kN x 50 mm stroke) and a 2 m hose, and if pressure is repeatedly raised to 70 MPa after the cylinder is extended 50 mm without a load, the numbers of operation cycles of the pump are as follows:
Approx. 30 cycles with a Panasonic EZ9200S battery pack
Approx. 70 cycles with a Panasonic EZ9L45 battery pack

Model code structure

BTP - 20 B

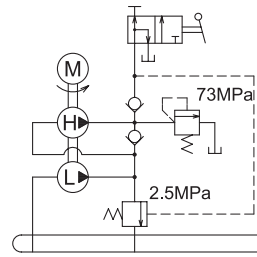
Type
B : For single-acting cylinders (manual direction-control valve)
SK : For single-acting cylinders (remote control)

Series No.
Battery pump

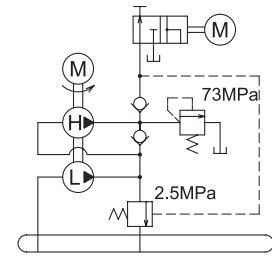
■ BTP-20B



■ BTP-20B hydraulic circuit diagram



■ BTP-20SK hydraulic circuit diagram



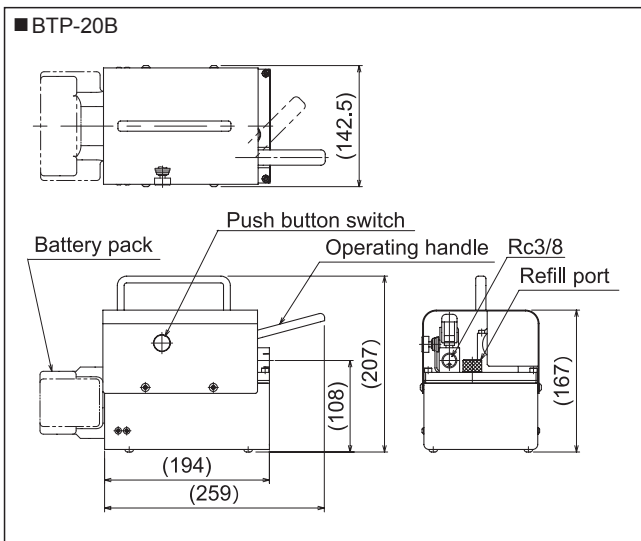
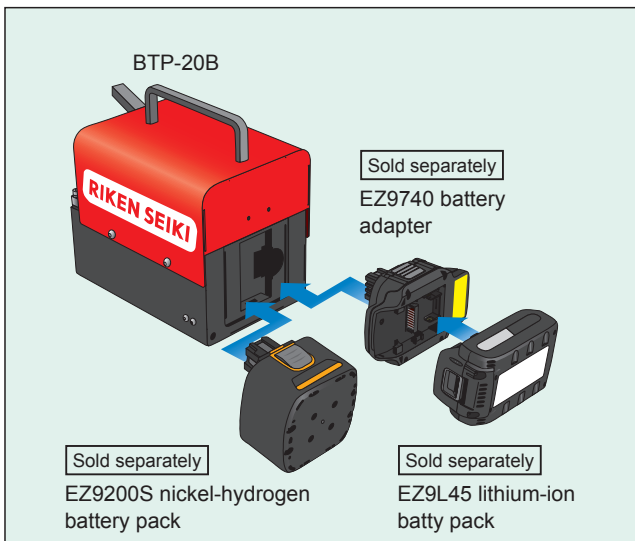
■ Specifications

Model	Maximum operating pressure MPa		Discharge volume cm ³ /min		Outlet port Rc	Hydraulic oil	Tank oil volume L	Effective oil volume L	Approx. weight kg
	High pressure	Low pressure	At high pressure	At low pressure					
BTP-20B	70	2	60	700	3/8	ISO VG32	0.8	0.7	6.8
BTP-20SK									8.4

*The approx. weight does not include the weight of the battery pack.

■ Explanation of functions and operations

Model	Functions and operations
BTP-20B	After the 3-way direction-control valve is closed, pressing and holding the push button moves the cylinder forward. Releasing button stops the movement of the cylinder.
BTP-20SK	Remote control is possible due to a 3 m cable with a push-button. Pressing and holding the push button moves the cylinder forward. Releasing the button stops the movement of the cylinder. Pressing and holding the return button retracts the cylinder.



*The Panasonic EZ9L45 lithiumion batty pack stops operation below a certain voltage to prevent over discharge.

Hydraulic Valves

Examples of Valve Applications Shown in Circuit Diagrams	104 to 105
Control Valves	106 to 110
Direction-Control Valves	111 to 120
KD Series	121 to 133
E Series	134 to 139
M Series	140 to 155
Large-Size Modular Valves	156 to 159



Accessories

Pressure Gauges	.....	161 to 163
Pressure Switches	.....	164 to 165
Switches	.....	166
Branches	.....	167 to 169
Couplers	.....	170 to 175
Oils	.....	175
Hoses	.....	176 to 179
Joints	.....	180 to 186



Equipment for Special Use

Standard Press Stands	.....	188 to 189
Mini Press Stands	.....	190 to 191
Bolt Tensioners	.....	192
Coupling Pullers	.....	193
Straighteners	.....	194
Rod Cutters	.....	195
Pinch-Off Presses	.....	196
Master Punch	.....	197 to 198
Port Punch	.....	199
Punchings	.....	200
Cable Cutters	.....	200



CD Standard Press Stands

- Press frames compatible with Riken's 70 MPa standard cylinders.
- A cylinder can be easily mounted by means of screwing the cylinder collar thread into the thread of the press stand.

■ CD-10-10M



■ CD-50



Model code structure

CD - 10 - 10M

CD standard press stand	Frame capacity	Cylinder mounting thread (CD-10/CD-20 only)	
		CD-10	CD-20
	10 : 100kN	4S : 1 1/2-16NS	10 : 2 1/4-14NS
	20 : 200kN	45 : M45 x 1.5	10M : M58 x 2
	50 : 500kN		
	100 : 1000kN		
		10 : 2 1/4-14NS	10M : M58 x 2
		10M : M58 x 2	20 : 3 5/16-12NS
			20M : M82 x 2

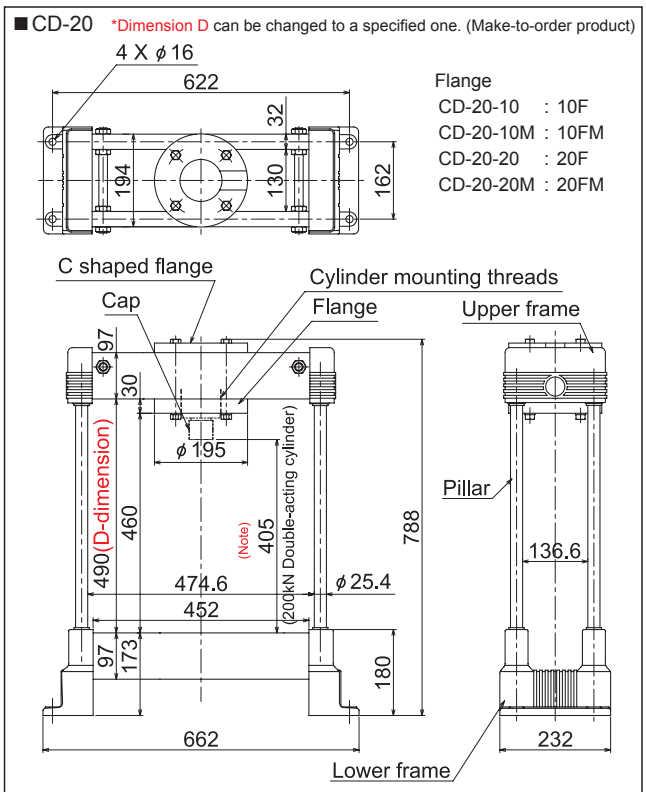
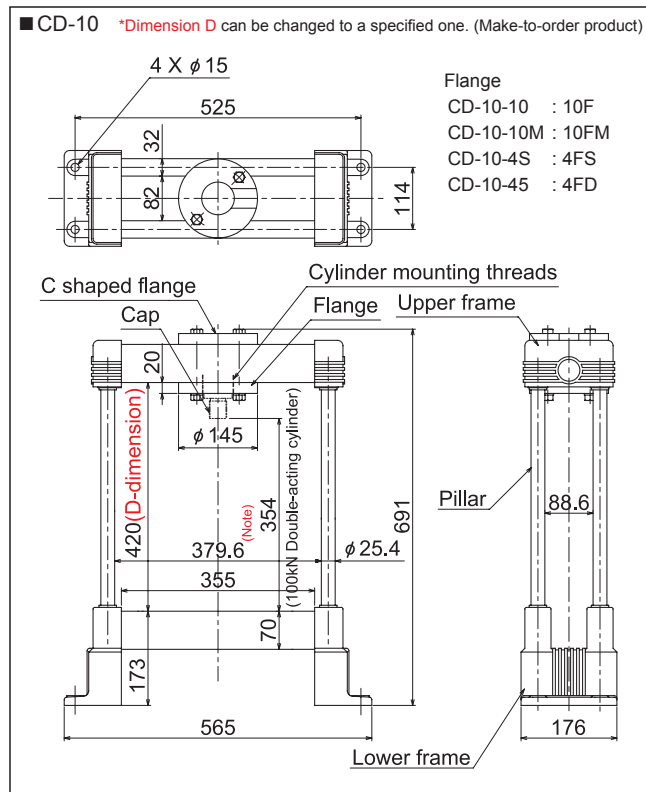
Specifications

Model	Frame capacity	Compatible cylinder	Cylinder mounting thread	Parallelism between the upper and lower frames (max.)	Approx. weight kg
CD-10-4S	100 kN	S04 single-acting cylinders	1 1/2-16NS	±0.3	45
CD-10-45		MC05/MS05 single-acting cylinders/D04/MD05 double-acting cylinders	M45 x 1.5		
CD-10-10		S1 single-acting cylinders/D1 double-acting cylinders	2 1/4-14NS		
CD-10-10M		MC1/MS1 single-acting cylinders/MD1 double-acting cylinders	M58 x 2		
CD-20-10	200 kN	S1 single-acting cylinders/D1 double-acting cylinders	2 1/4-14NS	±0.3	80
CD-20-10M		MC1/MS1 single-acting cylinders/MD1 double-acting cylinders	M58 x 2		
CD-20-20		S2 single-acting cylinders/D2 double-acting cylinders	3 5/16-12NS		
CD-20-20M		MC2/MS2 single-acting cylinders/MD2 double-acting cylinders	M82 x 2		
CD-50	500 kN	S5 single-acting cylinders/D5 double-acting cylinders	M127 x 2.5	±0.5	135
CD-100	1000 kN	D10 double-acting cylinders (D10-500 cylinders cannot be mounted.)	M170 x 3	±1.3	285

*The weight does not include the weights of the cylinder and other equipment.

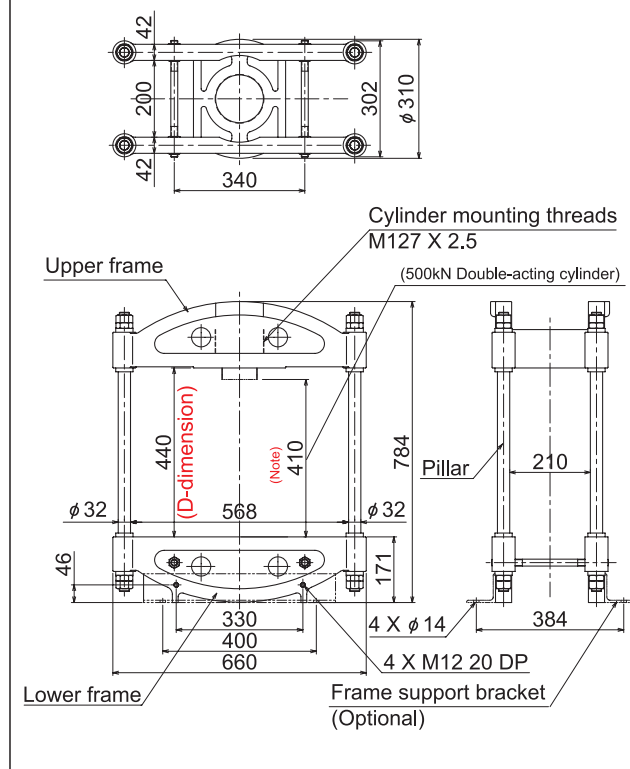
*The parallelism between the lower frames is approx. ±0.5.

If the frames needs to be parallel, use the stand with a die set and so on.

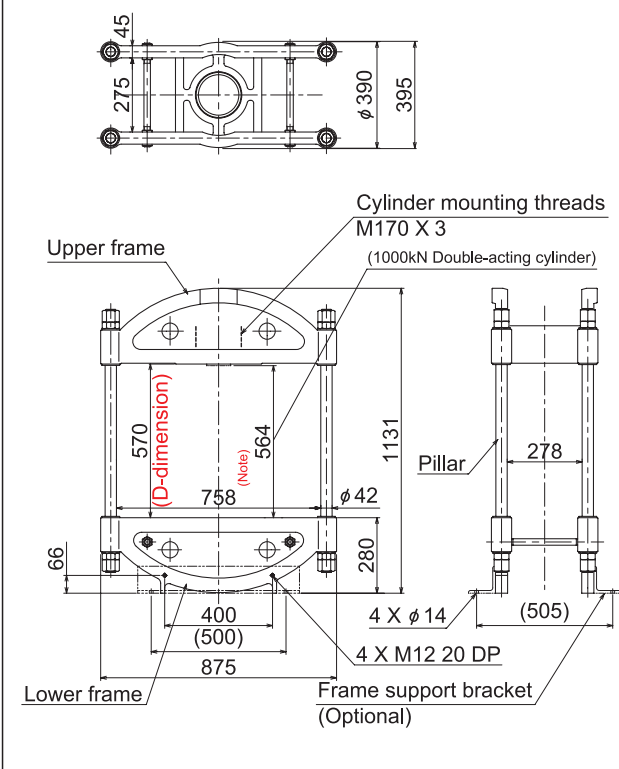


(Note) The dimensions shown above vary depending on the cylinder used. They are the minimum values.

■ CD-50 *Dimension D can be changed to a specified one. (Make-to-order product)



■ CD-100 *Dimension D can be changed to a specified one. (Make-to-order product)



(Note) The dimensions shown above vary depending on the cylinder used. They are the minimum values.

Press Sets

Make-to-order product

- No safety equipment is included. Contact us if needed.
- Delivered not as a set but as individual products.
- The following combinations are examples. The cylinder speed varies if the pump is replaced by a different model. Contact us for details.

■ Combinations

Model	Press stand	Double-acting cylinder	Cylinder cap	High-pressure hose	Electric pump
CD-10PA	CD-10-10M	MD1-200VC	R-10PM	H3/8-2VC (x 2)	EMP-5SW-PA
CD-20PA	CD-20-20M	MD2-200VC	R-20PM	H3/8-2VC (x 2)	MP-10SW-PA
CD-50PA	CD-50	D5-150VC	R-50P	H3/8-2VC (x 2)	MP-12SW-PA
CD-100PA	CD-100	D10-300VC	R-100P	H1/2-3VC (x 2)	MP-15S-PA

*The push button switch with a 5 m operation cable is included.

■ Specifications

Model	Output kN	Stroke mm	Speed mm/min (at 50 Hz)			
			Under no load condition (push)	Under load condition (push)	Under no load condition (pull)	Under load condition (pull)
CD-10PA	100	200	2754	275	5369	536
CD-20PA	200	200	2261	313	4365	604
CD-50PA	500	150	1186	209	2122	374
CD-100PA	1000	300	1364	170	2651	331

*The cylinder operates while the push button is pressed down. When the button is released, the cylinder stops immediately.

*If necessary, the pump can be replaced by a manual direction-control valve and a pressure reducing circuit can be added to the combination.

*A counterbalance valve is necessary if the cylinder falls by its own weight.

*The above cylinder speeds are just reference values. It varies depending on the operating conditions.

*If the CD-50PA is used with a high-pressure hose longer than 5 m, select the D5-150VC (with VC-70-R4 coupler) and the H3/8B-VC (with VC-70-RC3 coupler).

CDM Press Frames

- CDM press frames are available for 50, 100, and 200 kN. They can be used for powder injection molding, material compression tests, etc.
- Press frames for 300/350 kN can be manufactured. (Make-to-order product)

■ CDM-5M



Model code structure

CDM - 5 M

Blank : For unified threaded cylinders

M : For metric threaded cylinders

(50/100/200 kN models only)

Frame capacity

4 : 40 kN

5 : 50 kN

10 : 100 kN

20 : 200 kN

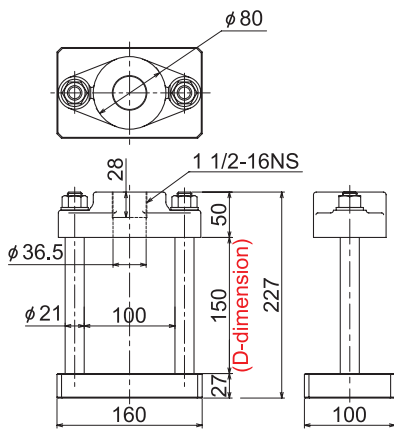
CDM press frame

■ Specifications

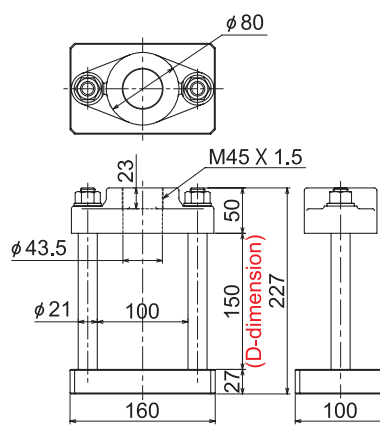
Model	Frame capacity	Compatible cylinder	Cylinder mounting thread	Approx. weight kg
CDM-4	50 kN	S04 single-acting cylinders	1 1/2-16NS	6
CDM-5M		MC05/MS05 single-acting cylinders D04/MD05 double-acting cylinders	M45 x 1.5	
CDM-10	100 kN	S1 single-acting cylinders D1 double-acting cylinders	2 1/4-14NS	17
CDM-10M		MC1/MS1 single-acting cylinders MD1 double-acting cylinders	M58 x 2	
CDM-20	200 kN	S2 single-acting cylinders D2 double-acting cylinders	3 5/16-12NS	41
CDM-20M		MC2/MS2 single-acting cylinders MD2 double-acting cylinders	M82 x 2	

*The weight does not include the weights of the cylinder and other equipment.

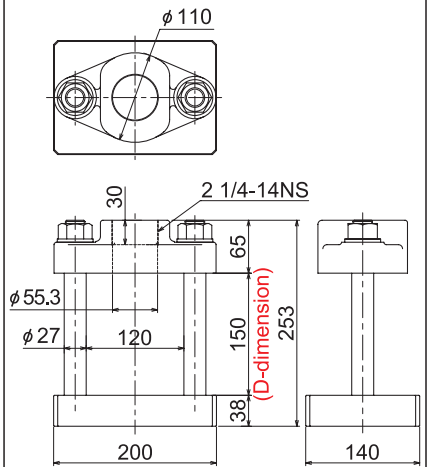
■ CDM-4



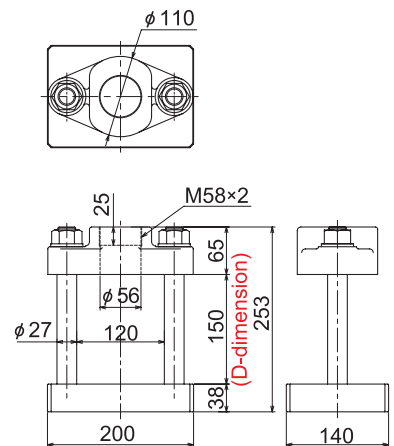
■ CDM-5M



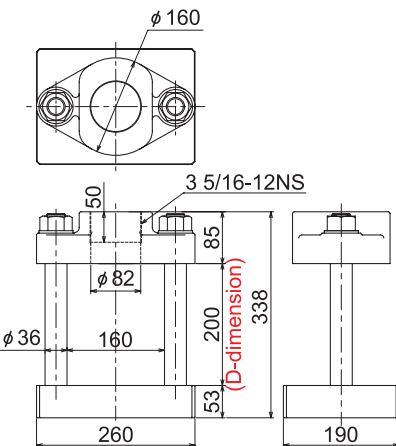
■ CDM-10



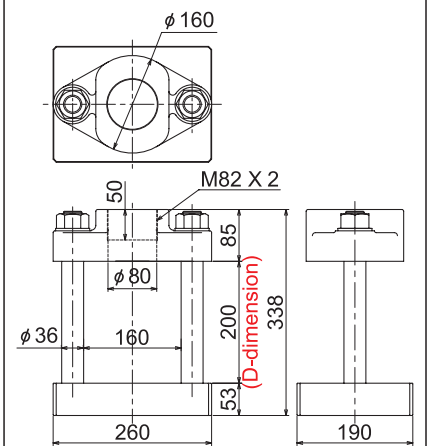
■ CDM-10M



■ CDM-20



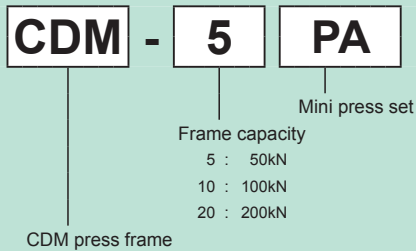
■ CDM-20M



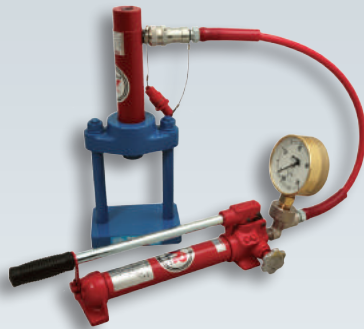
Mini Press Sets

- No safety equipment is included. Contact us if needed.
- Delivered not as a set but as individual products.
- The following combinations are examples. The combinations can be changed. Contact us for details.
- The pressure gauges can be changed to one with a load scale.
(For pressure gauges with a load scale, see page 162.)
- **Dimension D** can be changed to a specified one. (Make-to-order product)

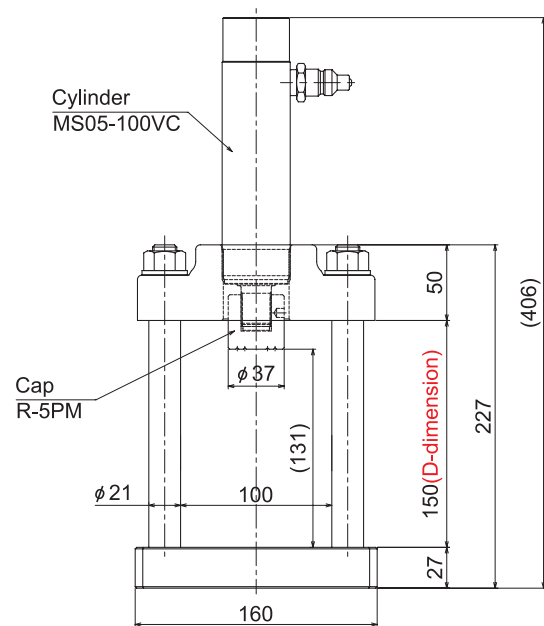
Model code structure



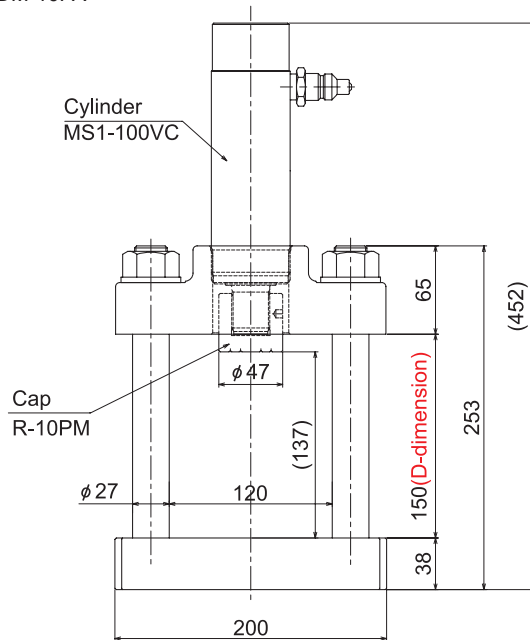
■ CDM-5PA



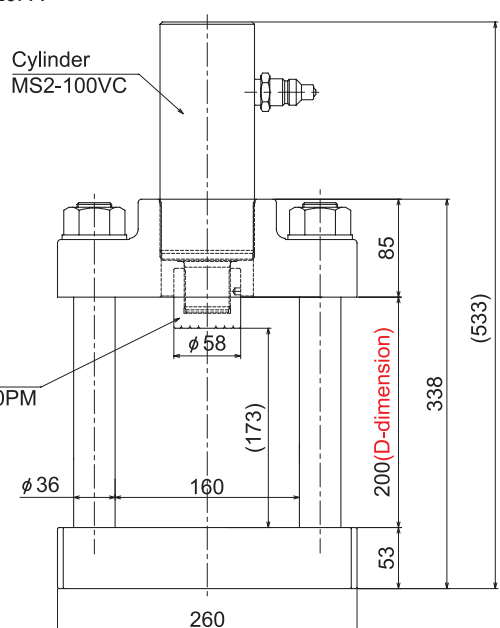
■ CDM-5PA



■ CDM-10PA



■ CDM-20PA



■ Combinations

Model	Press stand	Single-acting cylinder	Cylinder cap	High-pressure hose	Manual pump	Pressure gauge mounting bracket	Pressure gauge
CDM-5PA	CDM-5M	MS05-100VC	R-5PM	NH3/8-1.5VC	P-16B	T-5	AS100-100M
CDM-10PA	CDM-10M	MS1-100VC	R-10PM	NH3/8-1.5VC	P-1B	T-5	AS100-100M
CDM-20PA	CDM-20M	MS2-100VC	R-20PM	NH3/8-1.5VC	P-1B	T-5	AS100-100M



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