

F

MODULES

SEWON'S Modular Valves are stack type valves, and require on piping. They not only rationalise system build, but they also meet the technical requirements for a variety of hydraulic systems. Stacking systems is a new era in hydraulics.

The valves have standardized mounting surface conforming to ISO4401 and optimum thickness for each size. Any hydraulic circuits can be easily composed by stacking the valves with mounting bolts. The valves can be used widely for hydraulic systems for various industries such as machine tools, special purpose machines, ships and steel mill equipment

Valve Type	Max. Operating Pressure MPa {kgf/cm ² }	Maximum Flow L/min																Page
		1	2	3	5	7	10	20	30	50	70	100	200	300	500	700	1000	
01 Series Modular Valves	31.5 {321}	01 01*																F-7
03 Series Modular Valves	25 {255}	03 03*																F-27
06 Series Modular Valves	25 {255}	06																F-45

★ Maximum Flow for Throttle and Check Modular Valves.

Hydraulic Fluids

1. Fluid Type

Any type of hydraulic fluid listed in the table below can be used.

Petroleum Base Oils	Use fluids equivalent to ISO VG 32 or VG 46.
Synthetic Fluids	Use phosphate ester or polyol ester fluids. When phosphate ester fluid is used, prefix "F-" to the model number because seals (fluororubber) are required to be used.
Water-containing Fluids	Use water-glycol fluid.

Note: For use with hydraulic fluids other than those listed above, please consult your SEWON representatives in advance.

2. Recommended Fluid Viscosity and Temperature

Use hydraulic fluids which satisfy the both recommended viscosity and oil temperatures given in the table below.

Name	Viscosity	Temperature
01 Series Modular Valves 03 Series Modular Valves 06 Series Modular Valves	15~400mm ² /s	-15℃~+70℃

3. Control of Contamination

Due caution must be paid to maintaining control over contamination of the hydraulic fluids which may otherwise lead to breakdowns and shorten the life of the valve.

Name	Contamination	Nominal Filtration
01 Series Modular Valves 03 Series Modular Valves 06 Series Modular Valves	Within NAS1638-Grade 12	25 μm or less

High Pressure, High Flow Rate Modular Valves

Features

1. Installation and mounting space can be minimized.
2. No special skill is required for assembly and any addition or alteration of the hydraulic circuit can be made quickly and easily.
3. Problems such as oil-leaks, vibration and noise which may be caused by piping are minimized, increasing the reliability of the hydraulic system.
4. Maintenance and system check-ups can be easily carried out as they are normally installed in stackable units.

Specifications

Series	Valve Size	Max. Operating Pressure MPa {kgf/cm ² }	Max.Flow L/min	Number ^{★2} of Stack
01 Series Modular Valve	1/8	31.5 {321}	35(60) ^{★1}	1~5 ^{★3}
03 Series Modular Valve	3/8	25 {255}	70(120) ^{★1}	1~5
06 Series Modular Valve	3/4	25 {255}	500	

★1. The values in parentheses represent the max.flow rates for throttle modular valves(MSP) and throttle check modular valves(MSA/MSB/MAW).

★2. Solenoid operated directional valve is included in the number of stack.

★3. Solenoid operated directional valve is included in the number of stack. If the working pressure is above 25 MPa {255kgf/cm²}, the maximum number of larsers in a stack is 4 including the solenoid operated directional valve.

Mounting Surface

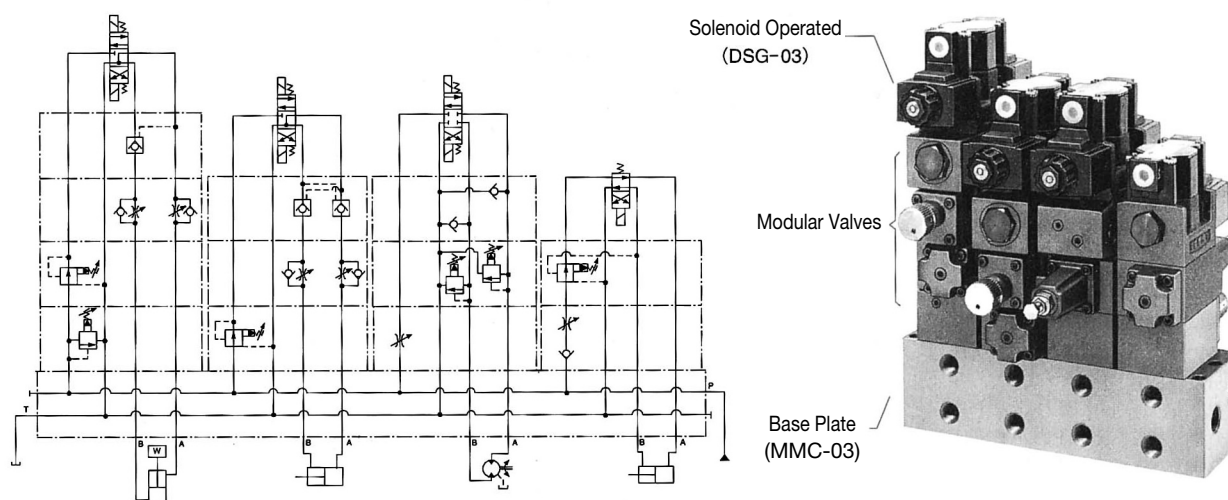
01~10 Series

Mounting surface dimensions conform to ISO 4401(Hydraulic fluid power four port directional control valves mounting surface) as listed in the table below.

Name of Valve	ISO Mtg.Surface Code No.
01 Series Modular Valve	ISO 4401-AB-03-4-A
03 Series Modular Valve	ISO 4401-AC-05-4-A
06 Series Modular Valve	ISO 4401-AE-08-4-A

Stacking Example

03 Series



Instructions

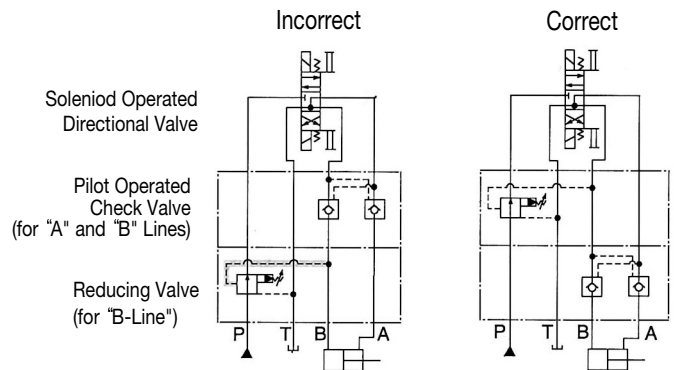
Caution in the selection of valves and circuit designing

The selection of modular valves, to suit a particular function or hydraulic circuit, are made in exactly the same way as conventional valves, taking into account of the flow and pressure of each valve to be used. In some cases, the stacking system may be restricted, so please refer to the following instructions for stacking sequence. Please note, that when designing a system using modular stacking valves, due consideration should be given to working space for future maintenance.

● Stacking sequence when using reducing valves (for "A" or "B" line) and pilot operated check valves.

Because reducing valves are spool type, there is an internal leakage. In the stacking sequence shown in the drawing left (incorrect), the cylinder moves due to leakage through the pilot pressure line.

Consequently, retaining the position of the cylinder using a pilot operated check valve becomes impossible. The stacking sequence shown in the drawing right (correct) is required in order to retain the cylinder position.

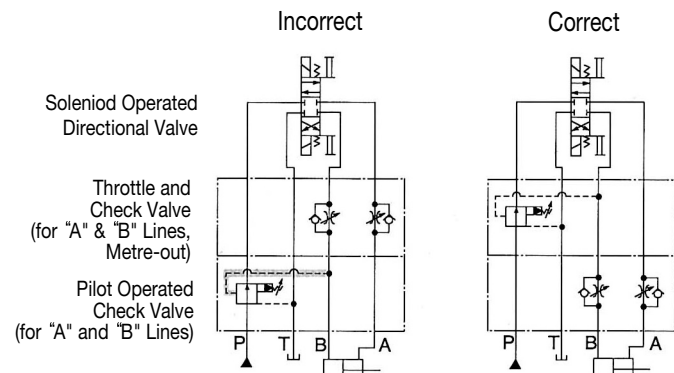


● Stacking sequence when using reducing valves (for "A" or "B" line) and throttle and check valves (for metre-out).

In B to T flow in the drawing left (incorrect), pressure is generated at the part with a throttle effect of the throttle and check valve.

Depending upon the pressure reducing function which causes a shortage of output power of the cylinder and spoils the smooth operation of the cylinder.

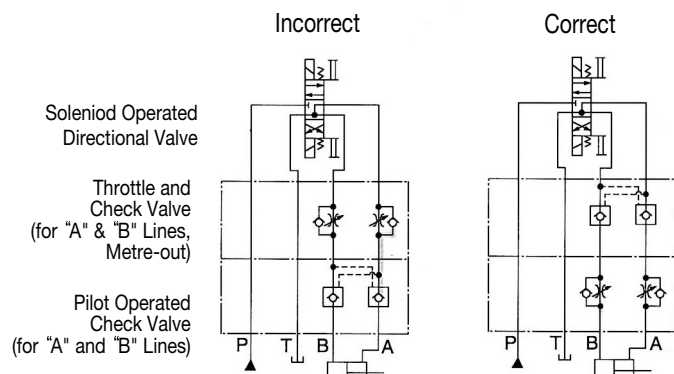
Therefore, stacking sequence in the drawing right (correct) is required in this combination.



● Stacking sequence when using pilot operated check valves and throttle and check valves (for metre-out).

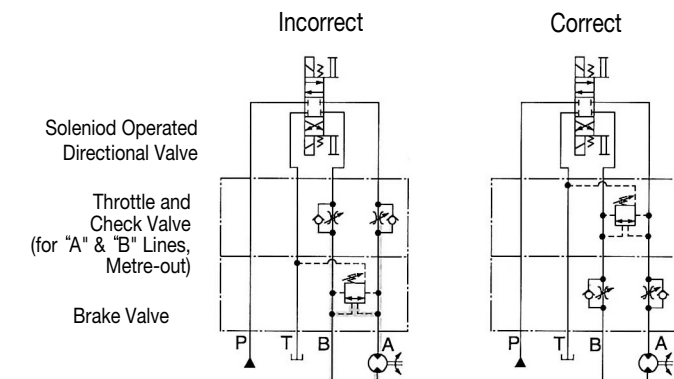
In A to T flow in the drawing left (incorrect), pressure is generated at the part with a throttle effect of the throttle and check valve.

The pressure so generated acts to shut the pilot operated check valve and eventually creates an open and shut operation of the valve repeatedly which may cause the cylinder to have a knocking effect (the same effect will occur in the case of B to T flow). Therefore, the stacking sequence in the drawing right (correct) is required in this combination.



● Stacking sequence when using brake valves and throttle and check valves.

In the drawing left (incorrect), pressure is generated at the part (a load pressure and a back pressure from throttle effect). For structural reasons of the brake valve, the load pressure and back pressure act to open the valve, therefore, the setting pressure should be more than the pressure equal to the load pressure plus back pressure ($P_a + P_b$). If the setting pressure is less than $P_a + P_b$, the brake valve acts and brakes the movement of the actuator in operation, this eventually reduces the speed of the actuator. On the contrary, if the setting pressure is made than $P_a + P_b$, shock may occur when braking the actuator since the setting pressure is too high against the load pressure. Therefore, the stacking sequence in the drawing right (correct) is required in this combination.



Base Plates and Sub-Plates

When mounting the modular valves, use base plates and sub-plates specified below. If these base plates and the sub-plates are not used, ensure that the mounting surface has a good machined finish.

Series	Base Plates		Sub-Plates	
	Model Numbers	Page	Model Numbers	Page
01 Series	MMC-01-※-40	F-24	DSGM-01 ※-30	F-18
03 Series	MMC-03-T-※-21	F-42	DSGM-03 ※-40	F-32
06 Series		-	DHGM-06 ※-50	E-52

Assembly

Assembly should be carried out in clean conditions and in accordance with the following procedure. Caution should be paid to ensure that the interface of the valves are clean and free from dirt or other foreign materials.

Assembly Procedure:

01-06 Series

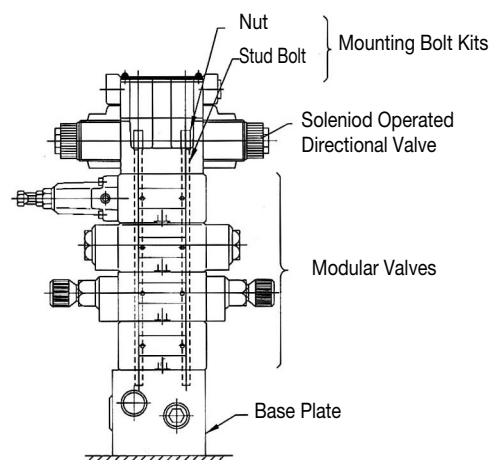
- 1) Screw-in the four stud bolts (06 series: six stud bolts) fully into the tapped holes on the mounting surface of the specified base plate, sub-plate or manifold.
- 2) Stack the modular valves and solenoid operated directional valves in accordance with the hydraulic circuit, place the O-ring inserted surface face onto the base plate and make sure that the port arrangement of the modular valves are in the correct position before stacking the valves onto the stud bolts.
- 3) Align both the end of the valves stacked.
- 4) Screw-in the four nuts (06 series: six nuts) onto the stud bolts and tighten with the specified torque. After the test run, be sure to tighten the nuts firmly within the specified torque.

Mounting Bolts

Modular valves are mounted using stud bolts which are supplied in a kit form. When mounting, see the following table for tightening torque. After the test run, be sure to tighten again firmly within the specified torque.

Series	Bolt Kit Model Numbers	Tightening Torque Nm (in.lbs.)
01 Series	MBK-01-※-30	5~6 {0.5~0.6} (6~7 {0.6~0.7}) *
03 Series	MBK-03-※-10	12~15 {1.2~1.5}
06 Series	MBK-06-※-30	50~60 {5.1~6.1}

★The valve range in parentheses represents the tightening torque requirements if the operating pressure is above 25 MPa {255kgf/cm²}



03 Series Modular Valves

Pressure Drop

Pressure Drop

Pressure drop curves of the modular valves are those based on viscosity of 35mm²/s and specific gravity of 0.850.

When using the modular valves in conditions other than the above mentioned, find the appropriate values referring to the following table and formula.

● For any other viscosity, multiply the factors in the table below.

Viscosity	mm ² /s {cSt}	15	20	30	40	50	60	70	80	90	100
SSU		77	98	141	186	232	278	324	371	417	464
Factor		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

● For any other specific gravity (G'), the pressure drop (ΔP') may be obtained from the following formula.

$$\Delta P' = \Delta P (G' / 0.850)$$

■ Interchangeability in Installation between Current and Design

The model changed for the following models have been made.

Models		Model Numbers		Mtg. Interchangeability	Main changes
		Current	New		
01 Series	Throttle Modular Valves	MSP-01-30	MSP-01-50	○	Modification for large flow use.
	Throttle and Check Modular Valves	A MSB-01-※※-40 W	A MSB-01-※※-60 W	○	Improved Controllability and Operatability.
06 Series	Reducing Modular Valves	MR ※-06-※-10	MR ※-06-※-30	○	Modification for large flow use.
	Throttle and Check Modular Valves	MS ※-06-※ $\frac{L}{H}$ -10	MS ※-06-※-30	○	Modification for large flow use.
	Pilot Check and Modular Valve	MP ※-06 ※-※-※-10	MP ※-06 ※-※-※-30	○	Modification for large flow use.

3/4 Modular Valves

Type of Modular Valve

Class	Model Numbers	Graphic Symbols	Page	Class	Graphic Symbols	Graphic Symbols	Page
						P T Y X B A	
Pressure Control Valves	★ Solenoid Controlled Pilot Operated Directional Valve DSHG-06-※※※-※-60		E-35	Directional Control Valves	Pilot Operated Check Valves (for "A-Line", Internal Pilot) MPA-06-※-30		F-50
	Reducing Valves (for "P-Line") MRP-06-※-30		F-46		Pilot Operated Check Valves (for "B-Line", Internal Pilot) MPB-06-※-30		F50
	Reducing Valves (for "A-Line") MRA-06-※-30		F-46		Pilot Operated Check Valves (for "A&B-Line", Internal Pilot) MPW-06-※-30		F-50
	Reducing Valves (for "B-Line") MRB-06-※-30		F-46	Mounting Bolts	Bolt Kits MBK-06-※-30		F-52
	Throttle and Check Valves (for "A-Line", Meter-out) MSA-06-X-30		F-48		★Because drain ports "V" and "W" are not provided for solenoid controlled pilot operated directional valves of Pressure Control Type(3H*) and models with Pilot Piston(P*), those valves cannot be used in combination with modular valves.		
	Throttle and Check Valves (for "A-Line", Meter-in) MSA-06-Y-30		F-48				
Flow Control Valves	Throttle and Check Valves (for "B-Line", Meter-out) MSB-06-X-30		F-48				
	Throttle and Check Valves (for "B-Line", Meter-in) MSB-06-Y-30		F-48				
	Throttle and Check Valves (for "A&-Line", Meter-out) MSW-06-X-30		F-48				
	Throttle and Check Valves (for "A&B-Line", Meter-in) MSW-06-Y-30		F-48				

Reducing Modular Valves

Ratings

Model Numbers	Max. Operating Pressure Mpa {kgf/cm ² }	Max. Flow* L/min
MR※-06-A-30	25 {255}	125
B		
MR※-06-C-30 H		500

★ In the pressure adjustment ranges "A" and "B", maximum flow rates are limited by the pressure setting on the secondary side. Referring to the secondary pressure vs. maximum flow characteristics on the following page, use the valve at the maximum flow rate within a zone highlighted with .

Model Number Designation

MRP	-06	-B	-30
Series Number	Valve Size	Pres. Adj. Range Mpa {kgf/cm ² }	Design Number
MRP : Reducing Valve for P-Line MRA : Reducing Valve for A-Line MRB : Reducing Valve for B-Line	06	A : 0.7~7 {7.1~71.4} B : 1.5~7 {15.3~71.4} C : 3.5~14 {35.7~143} H : 7~21 {71.4~214}	30 (Standard) 3010 (with Remote Control)

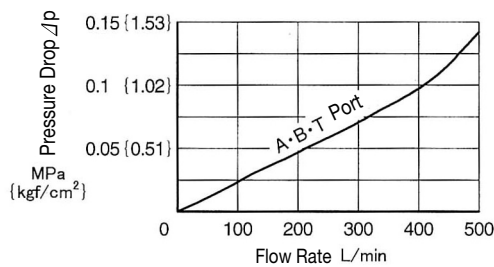
Instructions

- Connect Drain Line (Y port) to oil tank independently so as to obtain stable pressure setting. At the same time, the solenoid controlled pilot operated directional valve to be used in combination with this valve must be of internal drain type (with T).
- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment screw clockwise or anti-clockwise. For an increase of pressure, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after making adjustment to the pressure.

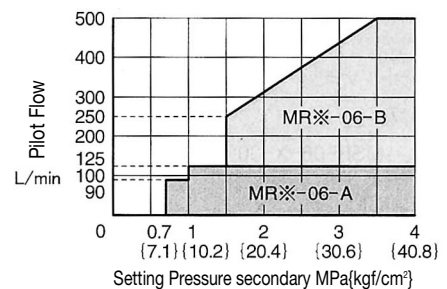
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35mm²/s, Specific Gravity 0.850

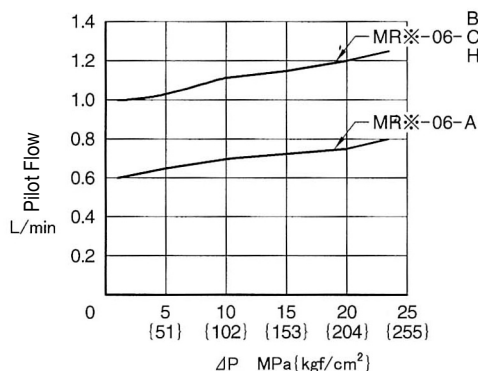
Pressure Drop



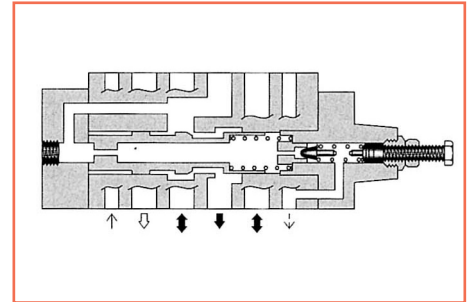
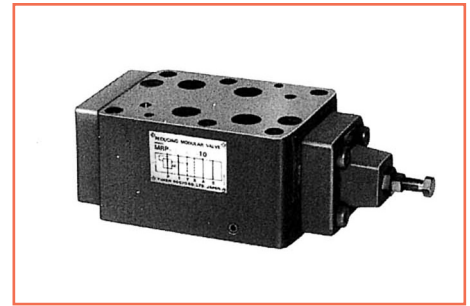
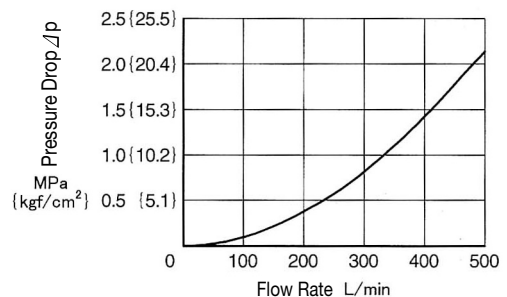
Secondary Pressure vs. Max. Flow



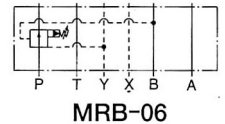
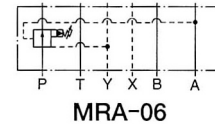
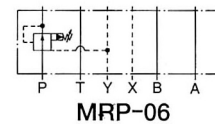
Pilot Flow



Pressure Drop at Spool Fully Open (P-Line)

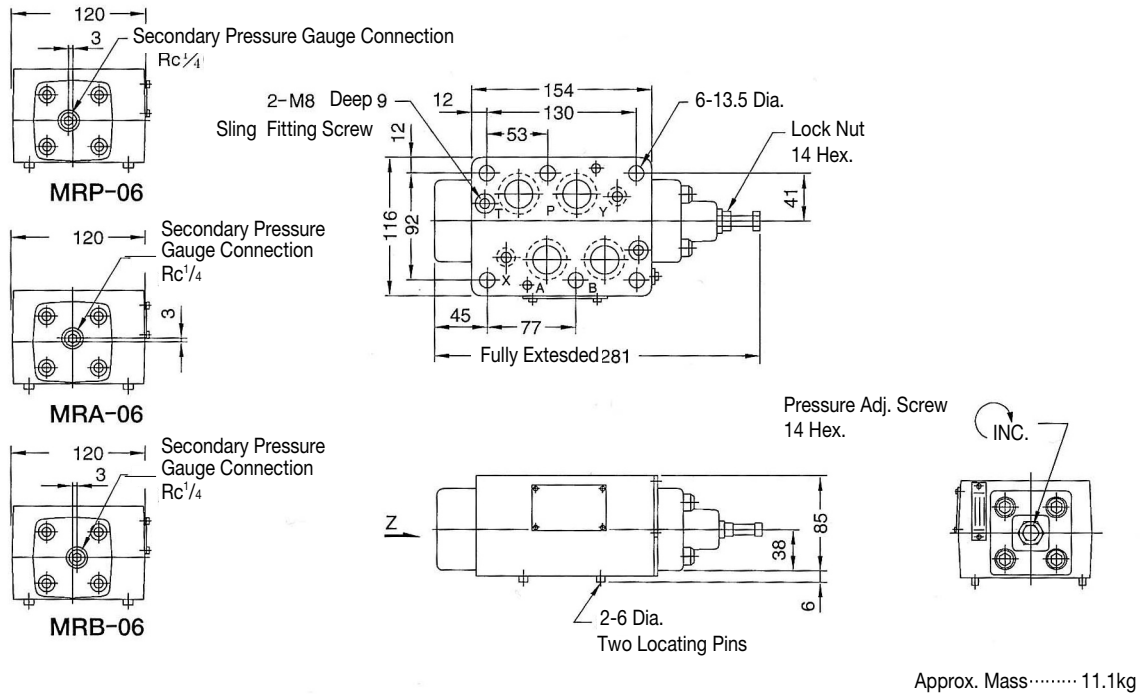


KS Graphic Symbols



MRP-06
MRA-06
MRB-06

View Z

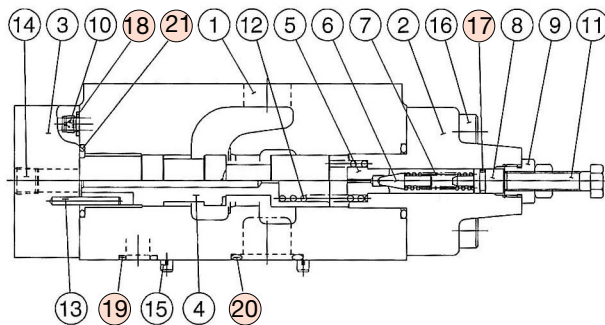


CAUTION

When making replacement of seals, please do it carefully after reading through the relevant instructions in the Operator's Manual.

List of Seals

MRP-06
MRA-06
MRB-06



Item	Name of Parts	Part Numbers	Qty.
17	O-Ring	JIS B 2401-1A-P9	1
18	O-Ring	JIS B 2401-1B-P9	5
19	O-Ring	JIS B 2401-1B-P14	2
20	O-Ring	JIS B 2401-1B-P28	4
21	O-Ring	JIS B 2401-1B-P30	2

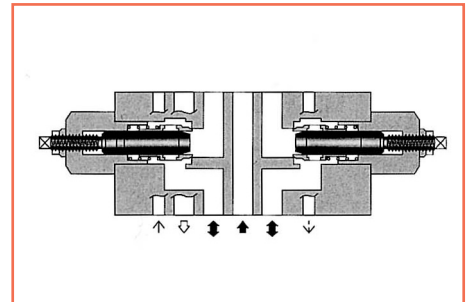
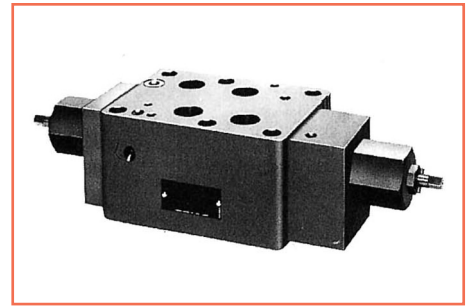
Throttle and Check Modular Valves

Ratings

Model Numbers	Max. Operating Pressure Mpa {kgf/cm ² }	Max. Flow L/min
MS※-06-※-30	25 {255}	500

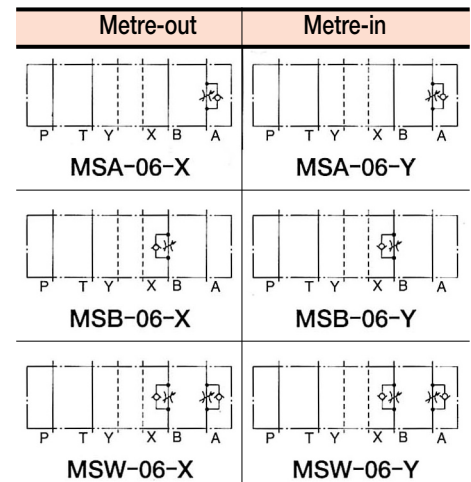
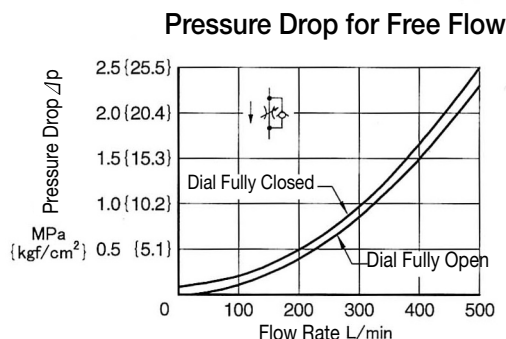
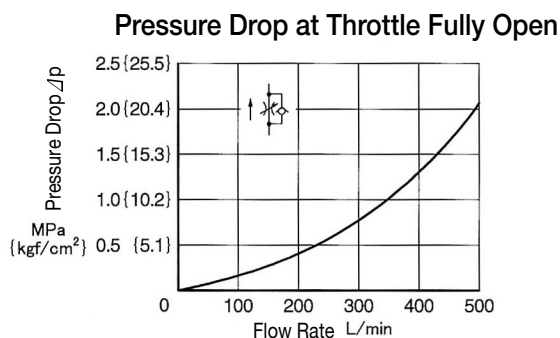
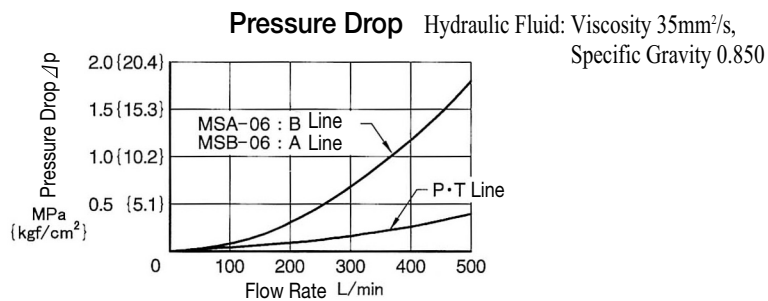
Model Number Designation

MSA	-06	-X	-30
Series Number	Valve Size	Direction of Flow	Design Number
MSA: Throttle and Check Valve for A-Line MSB: Throttle and Check Valve for B-Line MSW: Throttle and Check Valve for A&B-Line	06	X : Metre-out Y : Metre-in	30



KS Graphic Symbols

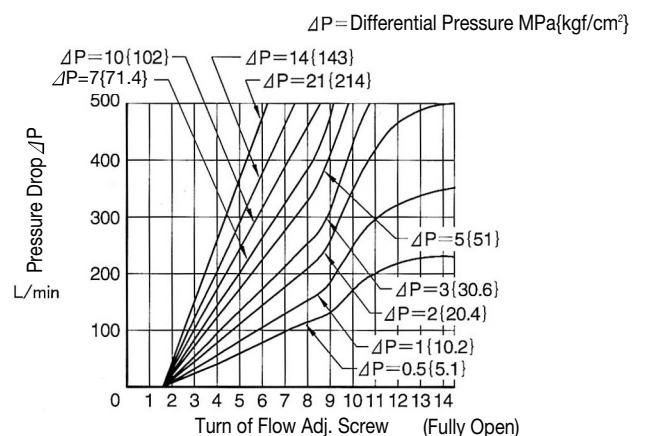
Typical Performance Characteristics



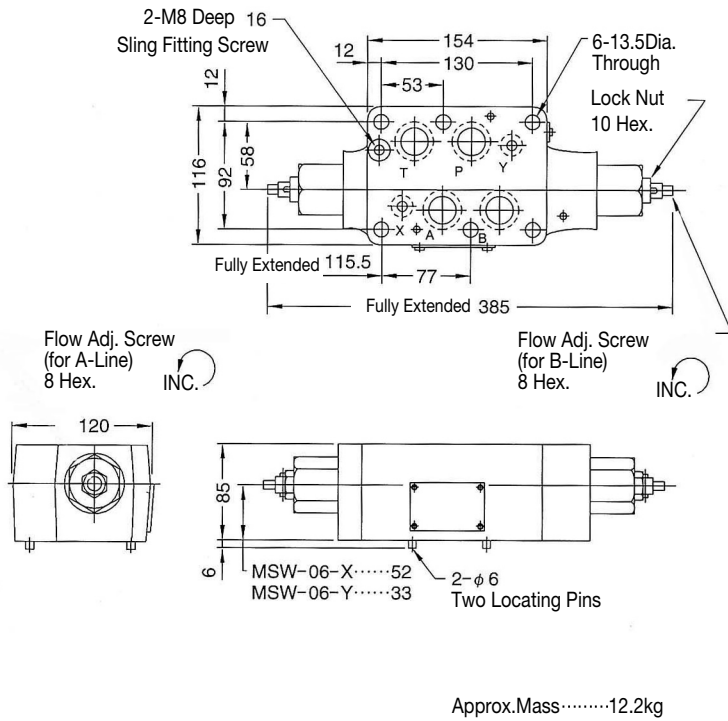
Instructions

- To make flow rate adjustment, loosen lock nut and turn the flow adjustment screw clockwise or anti-clockwise. To throttle the flow, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after the adjustment of the flow rate is completed.

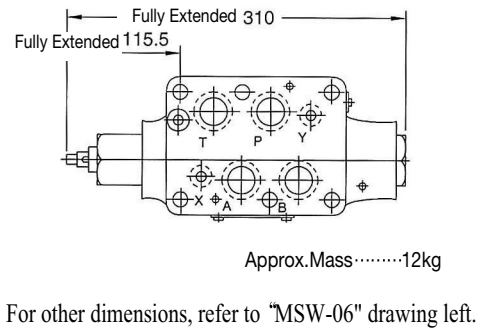
Metred Flow vs. Screw Position



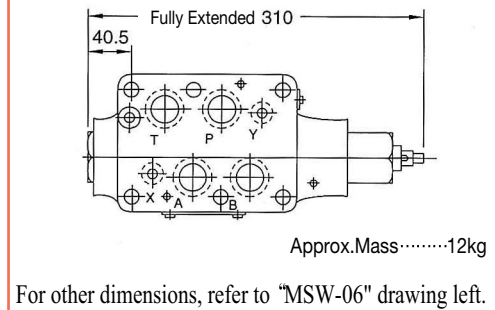
MSW-06-X Y



MSA-06-X Y



MSB-06-X Y

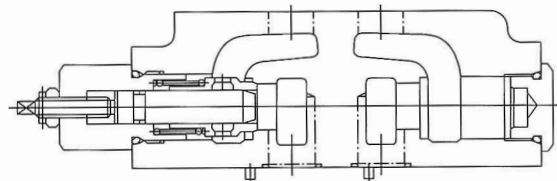
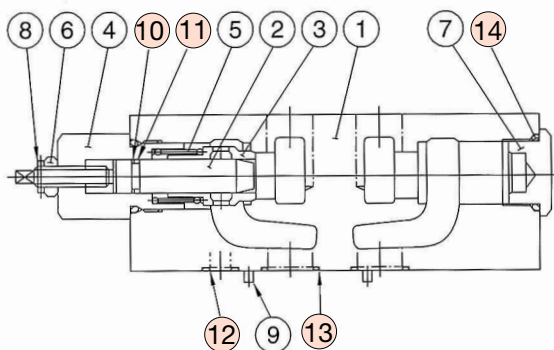


CAUTION

When making replacement of seals, please do it carefully after reading through the relevant instructions in the Operator's Manual.

List of Seals

MSA-06 MSB-06 MSW-06

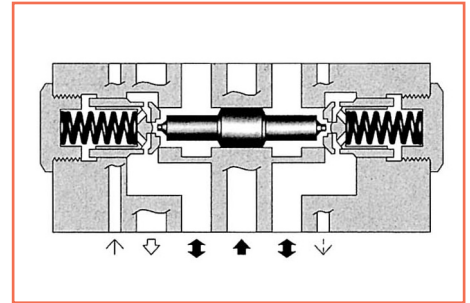
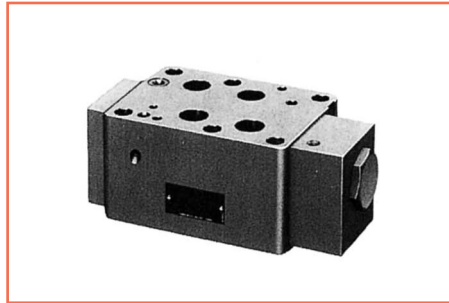


MSA-06-Y

MSA-06-X

Item	Name of Parts	Part Numbers	Qty.		
			MSA-06	MSB-06	MSW-06
10	Backup Ring	JIS B 2407-T2-P14	1	1	2
11	O-Ring	JIS B 2401-1A-P14	1	1	2
12	O-Ring	JIS B 2401-1B-P14	2	2	2
13	O-Ring	JIS B 2401-1B-P28	4	4	4
14	O-Ring	JIS B 2401-1B-P32	2	2	2

Pilot Operated Check Modular Valves



Model Number Designation

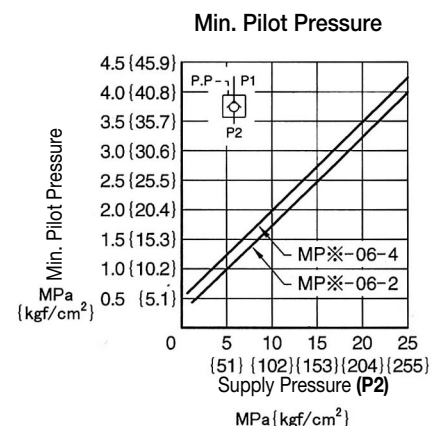
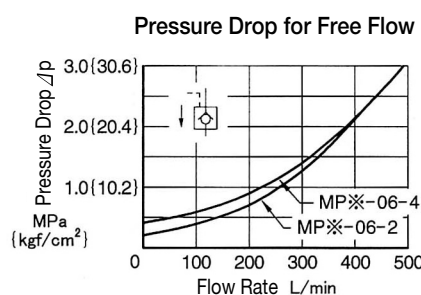
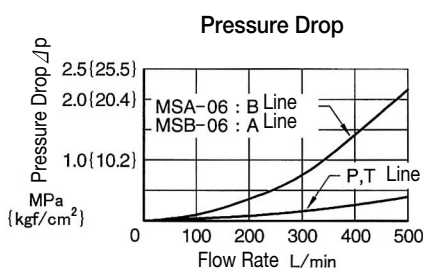
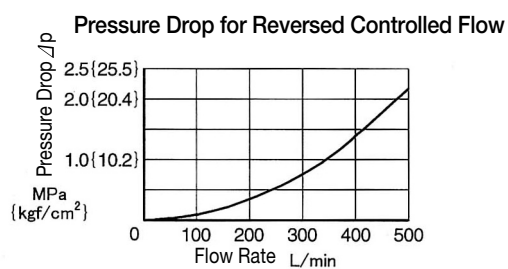
MPA	-06	-2	-30
Series Number	Valve Size	Cracking Pressure MPa {kgf/cm ² }	Design Number
MPA : Pilot Operated Check Valve for A-Line MPB : Pilot Operated Check Valve for B-Line MPW : Pilot Operated Check Valve for A&B-Line	06	2 : 0.2 {2.0} 4 : 0.4 {4.1}	30

Ratings

Model Numbers	Max. Operating Pressure Mpa {kgf/cm ² }	Max. Flow L/min
MP※-06-※-30	25 {255}	500

Typical Performance Characteristics

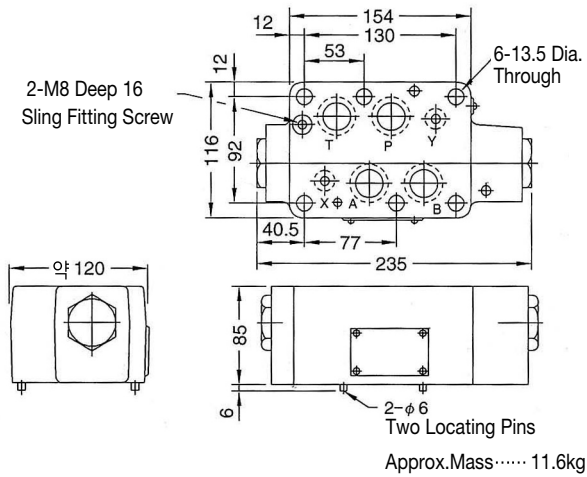
Hydraulic Fluid: Viscosity 35mm²/s
Specific Gravity 0.850



KS Graphic Symbols

Pilot-Drain type Model No.	Internal pilot- Internal drain type
MPA-06	 MPA-06-※
MPB-06	 MPB-06-※
MPW-06	 MPW-06-※

MPA-06 (Internal Pilot-
MPB-06 Internal Drain Type)
MPW-06



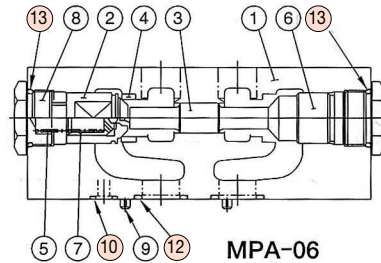
List of Seals

MPA-06
MPB-06
MPW-06

CAUTION

When making replacement of seals, please do it carefully after reading through the relevant instructions in the Operator's Manual.

Internal Pilot · Internal Drain Type



Item	Name of Parts	Part Numbers	Qty.
			Internal Pilot Internal Drain Type
10	O-Ring	JIS B 2401-1B-P14	2
12	O-Ring	JIS B 2401-1B-P28	4
13	O-Ring	JIS B 2401-1B-P32	2

F



06 Series Modular
Valves

■ Mounting Bolt Kits For Modular Valves

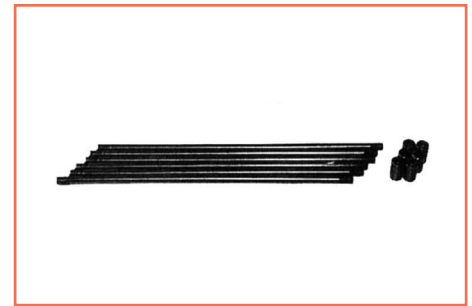
Valves are mounted with six stud bolts. Valve combination varies according to the circuit type. Hence, the mounting bolt kits are available on a combination type basis. When ordering the mounting bolt kit, be sure to give the bolt kit model number from the table below.

■ Model Number Designation

MBK	-06	-04	-30
Series Number	Size of Modular Valve	Bolt Number	Design Number
MBK :Bolt kits for Modular Valves	06	01, 02, 03, 04	30

■ Bolt kits Selection Chart

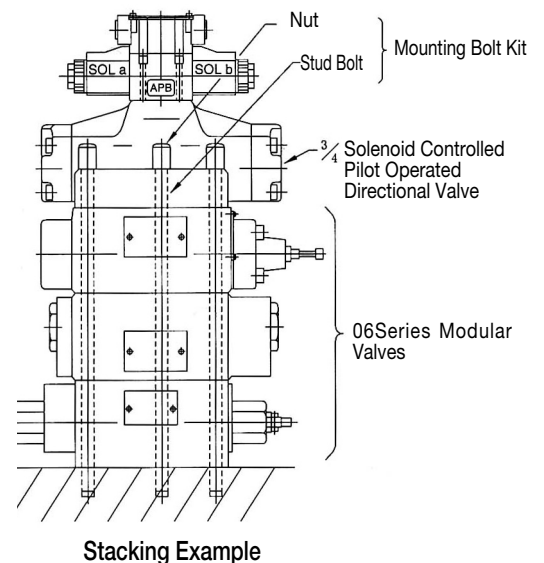
Bolt kits Model Numbers	Quantity of Valves to be Stacked		Approx. Mass kg
	Sol. Cont. Pilot Operated Directional Valves	Modular Valves	
MBK-06-01-30	1	1	1.1
MBK-06-02-30	1	2	1.5
MBK-06-03-30	1	3	2.0
MBK-06-04-30	1	4	2.4



● Bolt Kit Composition

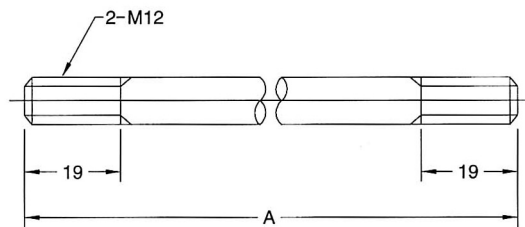
Stud Bolt6Pcs.
Nut.....6Pcs. } 1Set

● Tightening Torque.....50~60Nm {5.1~6.1kgf · m}

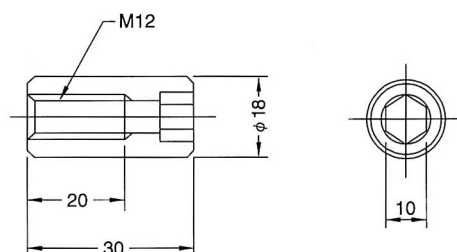


MBK-06

● Stud Bolt



● Nut



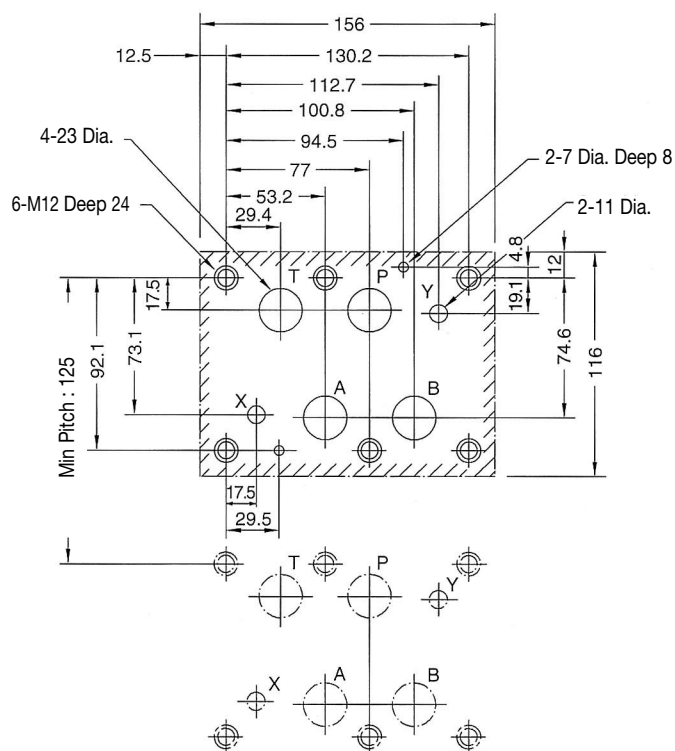
Bolt Number	A mm
01	161
02	246
03	331
04	416

Mounting Surface Dimensions for 3/4 Modular Valve

When mounting 06 series modular valve, be sure to use a sub-plate for 3/4 solenoid controlled pilot operated directional valves.

Name	Sub-plate Model Number	Page
Sub-Plate of 3/4 Solenoid controlled pilot operated directional valves	DHGM-06※-50	D-52

Also, when no sub-plate are used, be sure to use the following mounting surface.



NOTE) /// Surface = 6-S Grading