F

MODULES

YUKEN's Modular Valves are stack type valves, and require no 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 ISO 4401 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	Maximum Flow L/min (1 2 3 5 7 10 20 30 50 70 100 200 300 500 700 1000)	Page
005 Series Modular Valves	25	005	F-7
007 Series Modular Valves	25	007	F-9
01 Series Modular Valves	35	01 / ★1 01	F-11
03 Series Modular Valves	35	03 ★2 / ★1 03	F-47
04 Series Modular Valves	35	04	F-78
06 Series Modular Valves	35	06	F-88
10 Series Modular Valves	25	10	F-98

★1. Maximum Flow for Throttle and Check Modular Valves. (MSA/MSB/MSW)
★2. Maximum Flow for Reducing Modular Valves with Pressure Adjustment Range "A" is limited to 80 L/min.

Hydraulic Fluids

Fluid Types

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 the special 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(ex. W/O type Emulsion), please consult your Yuken representative in advance.

Recommended Fluid Viscosity and Temperature

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

Name	Viscosity	Temperature
005 Series Modular Valves 007 Series Modular Valves	15 – 200 mm²/s	–15 – +60°C
01 Series Modular Valves 03 Series Modular Valves 04 Series Modular Valves 06 Series Modular Valves 10 Series Modular Valves	15 – 400 mm²/s	–15 – +70°C

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
005 Series Modular Valves 007 Series Modular Valves	Within NAS1638 – Grade 11	20μm or less
01 Series Modular Valves 03 Series Modular Valves 04 Series Modular Valves 06 Series Modular Valves 10 Series Modular Valves	Within NAS1638 – Grade 12	20μm 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

Name	Valve Size	Max. Operating Pressure MPa	Max. Flow L/min	Number of Stack ★3
005 Series Modular Valves	——	25	15	1 to 4 stacks
007 Series Modular Valves				
01 Series Modular Valves	1/8	35	60 (80) ★1	1 to 5 stacks ★4
03 Series Modular Valves	3/8	35	120 (160) ★1,2	1 to 5 stacks ★4
04 Series Modular Valves	1/2	35	300	1 to 5 stacks
06 Series Modular Valves	3/4	35	500	
10 Series Modular Valves	1 1/4	25	800	

★1. The values in parentheses represent the max. flow rates for throttle modular valves (MSP) and throttle check modular valves (MSA/MSB/MSW).
★2. Maximum flow for reducing modular valves with pressure adjustment range "A" is limited to 80 L/min.
★3. Solenoid operated directional valve is included in the number of stack.
★4. If the working pressure is above 25 MPa, the maximum number of layers in a stack is 4 including the solenoid operated directional valve.

Mounting Surface

007 – 10 Series

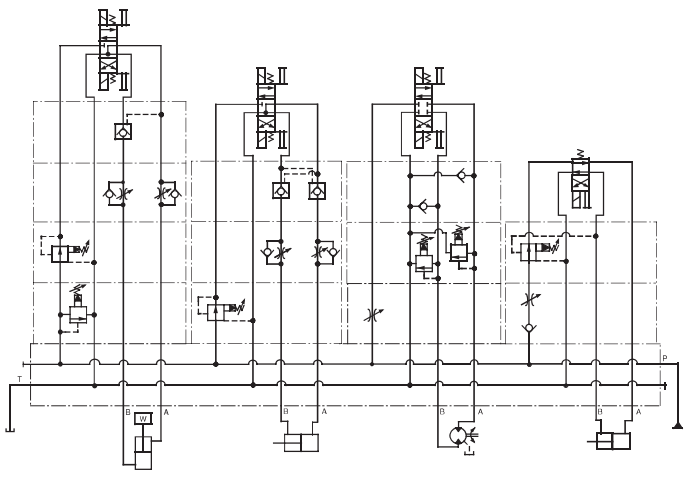
Mounting surface dimensions conform to ISO 4401 (Hydraulic fluid power four port directional control valves mounting surface) as listed in the table below.

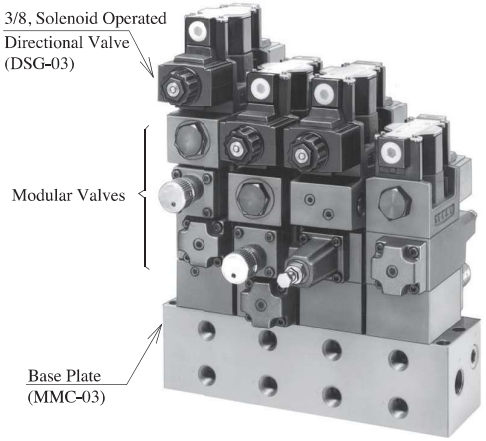
Name	ISO Mtg. Surface Code No.
007 Series Modular Valves	ISO 4401-02-01-0-05
01 Series Modular Valves	ISO 4401-03-02-0-05
03 Series Modular Valves	ISO 4401-05-04-0-05
04 Series Modular Valves	ISO 4401-07-07-0-05
06 Series Modular Valves	ISO 4401-08-08-0-05
10 Series Modular Valves	ISO 4401-10-09-0-05

★ Only 005 Series are YUKEN original specification

Stacking Example

03 Series





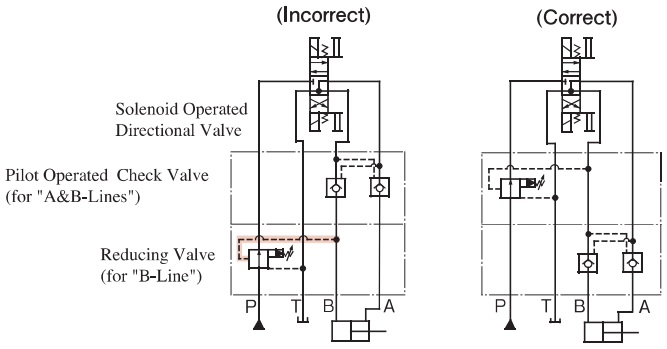
Instructions

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.

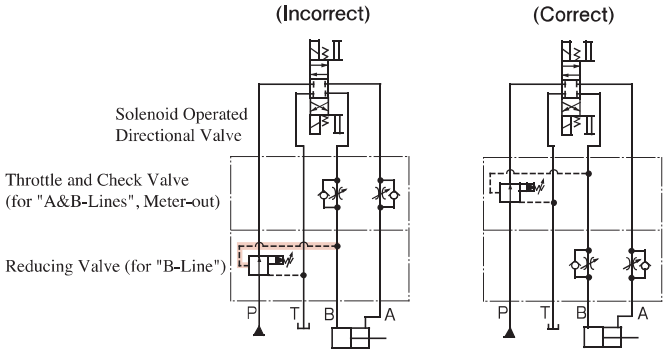
● Stacking sequence when using reducing valves (for "A" or "B" line) and pilot operated check valves.

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.



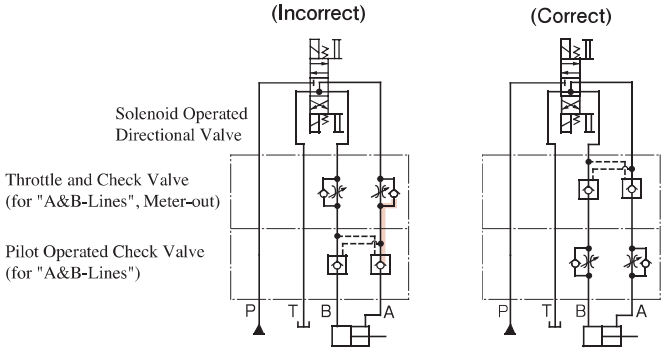
● Stacking sequence when using reducing valves (for "A" or "B" line) and throttle and check valves (for meter-out).

In B to T flow in the drawing left (incorrect), pressure is generated at □ part with a throttle effect of the throttle and check valve. Depending upon the pressure so generated, the reducing valve may perform a 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.



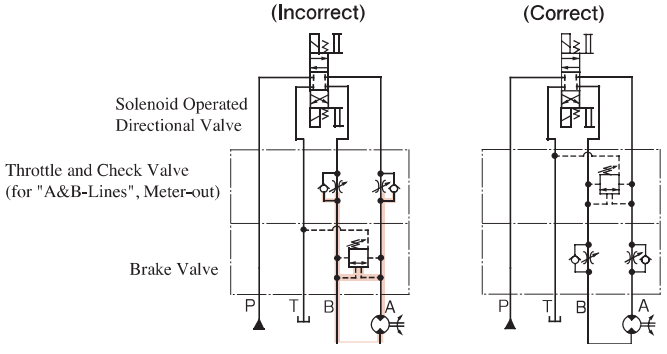
● Stacking sequence when using pilot operated check valves and throttle and check valves (for meter-out).

In A to T flow in the drawing left (incorrect), pressure is generated at □ 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 □ part (a load pressure and a back pressure from throttle effect). For structual 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 (Pa + Pb). If the setting pressure is less than Pa + Pb, 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 more than Pa + Pb, 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. (1.6▽)

Series	Base Plates		Sub-Plates	
	Model Numbers	Page	Model Numbers	Page
005 Series	Consult your Yuken representative in advance.	—	Consult your Yuken representative in advance.	—
007 Series		—		—
01 Series	MMC-01-＊-40	F-39	DSGM-01＊-31	F-108
03 Series	MMC-03-T-＊-21	F-71	DSGM-03＊-40	F-108
04 Series	Consult your Yuken representative in advance.	—	DHGM-04＊-20	F-108
06 Series		—	DHGM-06＊-50	F-109
10 Series		—	DHGM-10＊-40	F-109

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
005 Series	MBK-005-＊-20	2.5-3.5
007 Series	MBK-007-＊-10	
01 Series	MBK-01-＊-70	5-7(6-7)★
03 Series	MBK-03-＊-10	12-15
04 Series	MBK-04-＊-10	12-15(M6) 45-55(M10)
06 Series	MBK-06-＊-70	70-100(90-100)★
10 Series	MBK-10-＊-10	150-170

★ The value range in parentheses represents the tightening torque requirements if the operating pressure is above 25 MPa.

Assembly

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

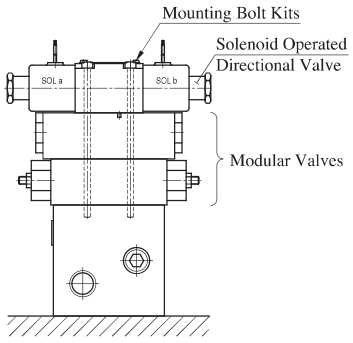
Assembly Procedure:

005/007 Series

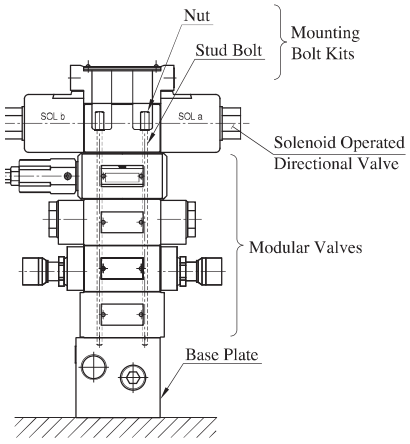
1) To stack modular valves and solenoid operated directional valves according to circuit requirements, match the O-ring surfaces to the mounting surface and check the alignment of the locating pins. (007 Series check the port arrangement)
2) Align the right and left sides of the stacked valves.
3) Tighten the four mounting bolts to the specified tightening torque. After the test run, be sure to tighten again firmly within the specified torque.

01-10 Series

1) Screw-in the four stud bolts(04, 06 and 10 series: six stud bolts), fully into the tapped holes on the mounting surface of the specified base plate, sub-plate or manifold. 01,04 and 06 series stud bolts, screw short-side into 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(04, 06 and 10 series: six nuts) onto the stud bolts and tighten with the specified torque. After the test run, be sure to retighten the nuts firmly within the specified torque.



005 Series Modular Valves



03 Series Modular Valves

Pressure Drop

Pressure Drop

Pressure drop curves of the modular valves are those based on viscosity of 35 mm²/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 mm²/s	15	20	30	40	50	60	70	80	90	100
Factor	0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

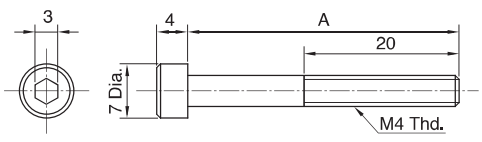
● For any other specific gravity (G'), the pressure drop (⊿P') may be obtained from the following formula. ⊿P'= ⊿P (G'/0.850)

Interchangeability in Installation between Current and New Design

The model changed for the following models have been made.

Name		Model Numbers		Mtg. Interchangeability	Page	Major changes
		Current	New			
01 Series	Relief Modular Valves	MB＊-01-＊-30	MB＊-01-＊-＊-70	Yes	F-42-F-46	Higher Operating Pressure. Modification for large flow use.
	Reducing Modular Valves	MR＊-01-＊-30	MR＊-01-＊-＊-70	Yes		
	Sequence Modular Valves	MHP-01-＊-30	MHP-01-＊-＊-70	Yes		
	Counterbalance Modular Valves	MHA-01-＊-30	MHA/MHB-01-＊-70	Yes		
	Throttle and Check Modular Valves	MS＊-01-＊＊-50	MS＊-01-＊＊-70	Yes		
	Check Modular Valves	MC＊-01-＊-30	MC＊-01-＊-70	Yes		
	Pilot Operated Check Modular Valves	MP＊-01-＊-40	MP＊-01-＊-70	Yes		
		MP＊-01-＊-4001	MP＊-01-＊-L-70			
	Bolt Kits	MBK-01-＊-30	MBK-01-＊-70	Yes		
03 Series	Relief Modular Valves	MB＊-03-＊-30	MB＊-03-＊-70	Yes	F-74-F-77	Higher Operating Pressure. Modification for large flow use.
	Reducing Modular Valves	MR＊-03-＊-30	MR＊-03-＊-70	Yes		
	Throttle and Check Modular Valves	MS＊-03-＊-40	MS＊-03-＊-70	Yes		
	Check Modular Valves	MCP/MCT-03-＊-10 MCA/B/W-03-＊-20	MC＊-03-＊-70	Yes		
	Pilot Operated Check Modular Valves	MP＊-03-＊-20	MP＊-03-＊-70	Yes		
		MP＊-03-＊-2001	MP＊-03-＊-L-70			

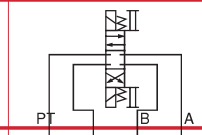
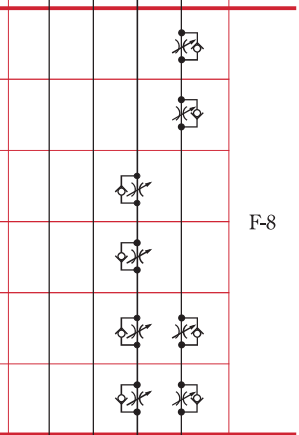
Comparison of MBK-005 bolt kit model numbers



Bolt Kit Model Numbers		Dimensions A mm	The number of the laminating steps quantity of valves to be stacked including solenoid operated directional valve
(New) 20 Design	(Current) 10 Design		
MBK-005-01-20	MBK-005-02-10	65	2
MBK-005-02-20	MBK-005-03-10	95	3
MBK-005-03-20	———	125	4
MBK-005-05-20	MBK-005-01-10	35	1

005 Series Modular Valves

Type of Modular Valve

Class	Name and Model Numbers	Graphic Symbols	Page
	Solenoid Operated Directional Valve DSG-005-＊＊＊-＊-40		★
Pressure Control Valves	Releif Valves (for "P-Line") MBP-005-＊-20		F-8
	Reducing Valves (for "P-Line") MRP-005-＊-20		F-8
Flow Control Valves	Throttle and Check Valves (for "A-Line", Meter-out) MSA-005-X-20		F-8
	Throttle and Check Valves (for "A-Line", Meter-in) MSA-005-Y-20		
	Throttle and Check Valves (for "B-Line", Meter-out) MSB-005-X-20		
	Throttle and Check Valves (for "B-Line", Meter-in) MSB-005-Y-20		
	Throttle and Check Valves (for "A&B-Lines", Meter-out) MSW-005-X-20		
	Throttle and Check Valves (for "A&B-Lines", Meter-in) MSW-005-Y-20		
Directional Control Valves	Check Valves (for "P-Line") MCP-005-0-20		F-8
	Pilot Operated Check Valves (for "A-Line") MPA-005-2-20		F-8
	Pilot Operated Check Valves (for "B-Line") MPB-005-2-20		
	Pilot Operated Check Valves (for "A&B-Lines") MPW-005-2-20		
Modular Plates and Mounting Bolts	End Plates (Blocking Plates) MDC-005-A-20		F-8
	Base Plates MMC-005-＊-20		F-8
	Bolts Kits MBK-005-＊-20		F-8

★Please refer to the catalog page of "E: Directional Control Valves".

●Further information about 005 series modular valves, please consult your Yuken representative.

Relief Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MBP-005-＊-20	25	15



Reducing Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MRP-005-＊-20	25	15



Throttle and Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MS＊-005-＊-20	25	15



Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MCP-005-0-20	25	15



Pilot Operated Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MP＊-005-2-20	25	15



End Plates

Blocking plates are used for auxiliary mounting surface or for closing unnecessary circuits.



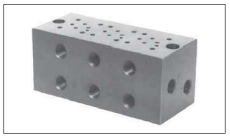
Specifications

Model Numbers	Max. Operating Pressure MPa
MDC-005-A-20	25

Base Plates For Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa
MMC-005-＊-20	25



Mounting Bolt Kits For Modular Valves

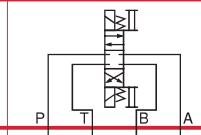
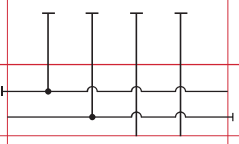
To mount the valves, four M4 bolts are used. The combination of valves varies with circuits. So, we have several mounting bolt kits suitable for different valve combinations.



Model Numbers
MBK-005-＊-10

007 Series Modular Valves

Type of Modular Valve

Class	Name and Model Numbers	Graphic Symbols	Page
	Solenoid Operated Directional Valve DSG-007-＊＊＊-＊-10		★
Pressure Control Valves	Reducing Valves (for "P-Line") MRP-007-＊-10		F-10
Flow Control Valves	Throttle and Check Valves (for "A-Line", Meter-out) MSA-007-X-10		F-10
	Throttle and Check Valves (for "A-Line", Meter-in) MSA-007-Y-10		
	Throttle and Check Valves (for "B-Line", Meter-out) MSB-007-X-10		
	Throttle and Check Valves (for "B-Line", Meter-in) MSB-007-Y-10		
	Throttle and Check Valves (for "A&B-Lines", Meter-out) MSW-007-X-10		
	Throttle and Check Valves (for "A&B-Lines", Meter-in) MSW-007-Y-10		
Directional Control Valves	Pilot Operated Check Valves (for "A-Line") MPA-007-2-10		F-10
	Pilot Operated Check Valves (for "B-Line") MPB-007-2-10		
	Pilot Operated Check Valves (for "A&B-Lines") MPW-007-2-10		
Modular Plates and Mounting Bolts	End Plates (Blocking Plates) MDC-007-A-10		F-10
	Base Plates MMC-007-＊-10		F-10
	Bolts Kits MBK-007-＊-10		F-10

★Please refer to the catalog page of "E: Directional Control Valves".

●Further information about 007 series modular valves, please consult your Yuken representative.

Reducing Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MRP-007-＊-10	25	15



Throttle and Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MS＊-007-＊-10	25	15



Pilot Operated Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MP＊-007-2-10	25	15



End Plates

Blocking plates are used for auxiliary mounting surface or for closing unnecessary circuits.



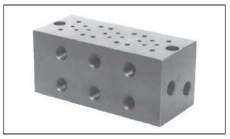
Specifications

Model Numbers	Max. Operating Pressure MPa
MDC-007-A-10	25

Base Plates For Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa
MMC-007-＊-10	25



Mounting Bolt Kits For Modular Valves

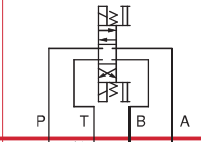
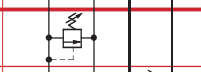
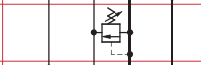
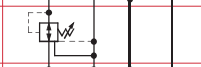
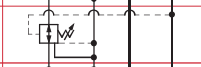
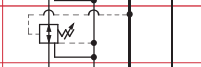
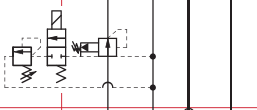
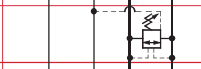
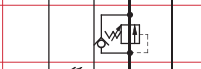
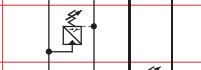
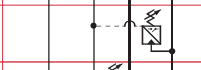
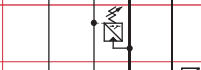
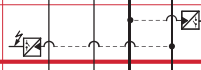
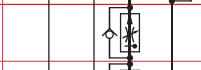
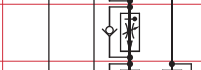
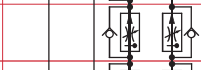
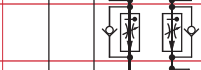
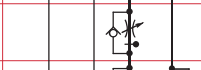
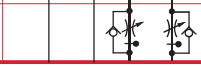
To mount the valves, four M4 bolts are used. The combination of valves varies with circuits. So, we have several mounting bolt kits suitable for different valve combinations.



Model Numbers
MBK-007-＊-10

01 Series Modular Valves

Type of Modular Valve

Class	Name and Model Numbers	Graphic Symbols	Page
	Solenoid Operated Directional Valve (S-) DSG-01-＊＊＊-70 E-DSG-01-＊＊＊-D＊-70 T-DSG-01-＊＊＊-D24＊-70 G-DSG-01-＊＊＊-＊-51		★
Pressure Control Valves	Releif Valves (for "P-Line") MBP-01-＊-70		F-12
	Releif Valves (for "A-Line") MBA-01-＊-70		F-12
	Releif Valves (for "B-Line") MBB-01-＊-70		F-12
	Reducing Valves (for "P-Line") MRP-01-＊-70		F-14
	Reducing Valves (for "A-Line") MRA-01-＊-70		F-14
	Reducing Valves (for "B-Line") MRB-01-＊-70		F-14
	Two Pressure Reducing Valves (for "P-Line") MRDP-01-＊-＊-＊-10		F-16
	Brake Valves MBR-01-＊-30		F-18
	Sequence Valves (for "P-Line") MHP-01-＊-70		F-19
	Counterbalance Valves (for "A-Line") MHA-01-＊-70		F-19
	Counterbalance Valves (for "B-Line") MHB-01-＊-70		F-19
	Pressure Switch Valves (for "P-Line") MJP-01-＊-＊-10		F-22
	Pressure Switch Valves (for "A-Line") MJA-01-＊-＊-10		F-22
	Pressure Switch Valves (for "B-Line") MJB-01-＊-＊-10		F-22
	Pressure Switch Valves (for "A&B-Line") MJW-01-J-＊-10		F-22
Flow Control Valves	Flow Control Valves (for "P-Line") MFP-01-10		F-25
	Flow Control and Check Valves (for "A-Line", Meter-out) MFA-01-X-10		F-25
	Flow Control and Check Valves (for "A-Line", Meter-in) MFA-01-Y-10		F-25
	Flow Control and Check Valves (for "B-Line", Meter-out) MFB-01-X-10		F-25
	Flow Control and Check Valves (for "B-Line", Meter-in) MFB-01-Y-10		F-25
	Flow Control and Check Valves (for "A&B-Lines", Meter-out) MFW-01-X-10		F-25
	Flow Control and Check Valves (for "A&B-Lines", Meter-in) MFW-01-Y-10		F-25
	Temperature Compensated Throttle and Check Valves (for "A-Line", Meter-out) MSTA-01-X-10		F-27
	Temperature Compensated Throttle and Check Valves (for "B-Line", Meter-out) MSTB-01-X-10		F-27
	Temperature Compensated Throttle and Check Valves (for "A&B-Lines", Meter-out) MSTW-01-X-10		F-27

Class	Name and Model Numbers	Graphic Symbols (P T B A)	Page
Flow Control Valves	Throttle Valves (for "P-Line") MSP-01-50		F-29
	Throttle Valves (for "T-Line") MST-01-50		F-29
	Check and Throttle Valves (for "P-Line") MSCP-01-30		F-30
	Throttle and Check Valves (for "A-Line", Meter-out) MSA-01-X-70		F-31
	Throttle and Check Valves (for "A-Line", Meter-in) MSA-01-Y-70		F-31
	Throttle and Check Valves (for "B-Line", Meter-out) MSB-01-X-70		F-31
	Throttle and Check Valves (for "B-Line", Meter-in) MSB-01-Y-70		F-31
	Throttle and Check Valves (for "A&B-Lines", Meter-out) MSW-01-X-70		F-31
	Throttle and Check Valves (for "A&B-Lines", Meter-in) MSW-01-Y-70		F-31
	Throttle and Check Valves (for "A&B-Lines", Meter-out, Meter-in) MSW-01-XY-70		F-31
	Throttle and Check Valves (for "A&B-Lines", Meter-in, Meter-out) MSW-01-YX-70		F-31
Directional Control Valves	Check Valves (for "P-Line") MCP-01-＊-70		F-33
	Check Valves (for "A-Line") MCA-01-＊-70		F-33
	Check Valves (for "B-Line") MCB-01-＊-70		F-33
	Check Valves (for "T-Line") MCT-01-＊-70		F-33
	Check Valves (for "A&B-Line") MCW-01-＊-70		F-33
	Anti-Cavitation Valves MAC-01-30		F-35
	Pilot Operated Check Valves (for "A-Line") MPA-01-＊-＊-70		F-36
	Pilot Operated Check Valves (for "B-Line") MPB-01-＊-＊-70		F-36
	Pilot Operated Check Valves (for "A&B-Lines") MPW-01-＊-＊-70		F-36
Modular Plates and Mounting Bolts	End Plates (Blocking Plates)) MDC-01-A-30		F-38
	End Plates (Bypass plates) MDC-01-B-30		F-38
	Connecting Plates (for "P&A-Lines") MDS-01-PA-30		F-38
	Connecting Plates (for "P&B-Lines") MDS-01-PB-30		F-38
	Connecting Plates (for "A&T-Lines") MDS-01-AT-30		F-38
	Base Plates MMC-01-＊-40		F-39
	Bolt Kits MBK-01-＊-70		F-41

★Please refer to the catalog page of "E: Directional Control Valves".

Relief Modular Valves

Specifications

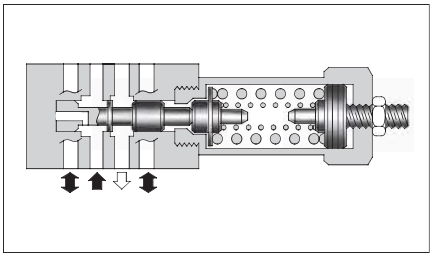
Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MB＊-01-＊-＊-70	35	60

Model Number Designation

MBP	–01	–B	–B	–70
Series Number	Valve Size	Pres. Adj. Range MPa	Pres. Adj. Screw Position	Design Number
MBP: Relief Valve for P-Line	**01**	**B:** ★-7 **C:** 3.5-14 **H:** 7-21 **K:** 14-35	**None:** A Port Side **B:** B Port Side	**70**
MBA: Relief Valve for A-Line **MBB:** Relief Valve for B-Line			—	

★See the "Min. Adjustment Pressure" of this page.

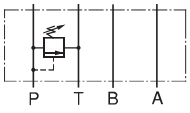




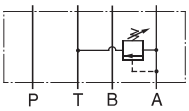
Instructions

- The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of this page. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular valve.
- 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.
- In case of a small flow, the setting pressure may become unstable. To avoid this, refer to the minimum flow characteristic curve of the next page and use the valve within a range as shown with .

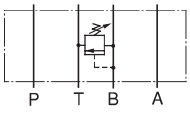
Graphic Symbols



MBP-01



MBA-01

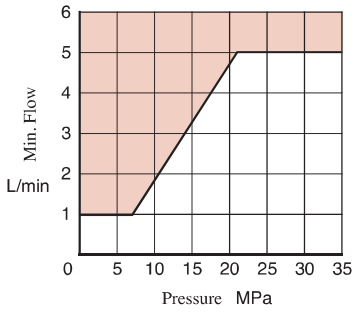


MBB-01

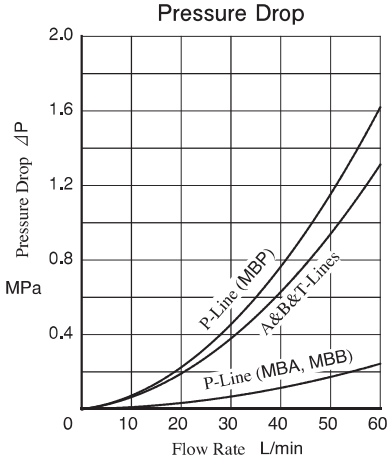
Typical Performance Characteristics

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

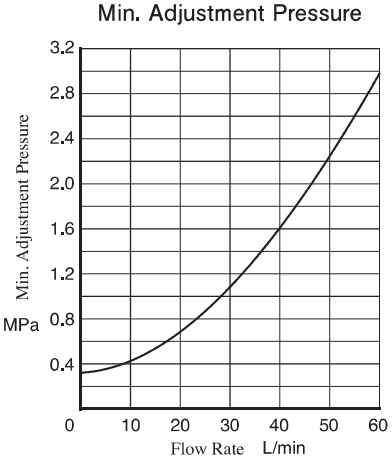
Minimum Flow



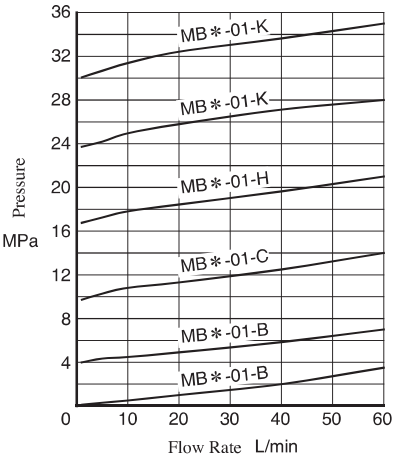
Pressure Drop



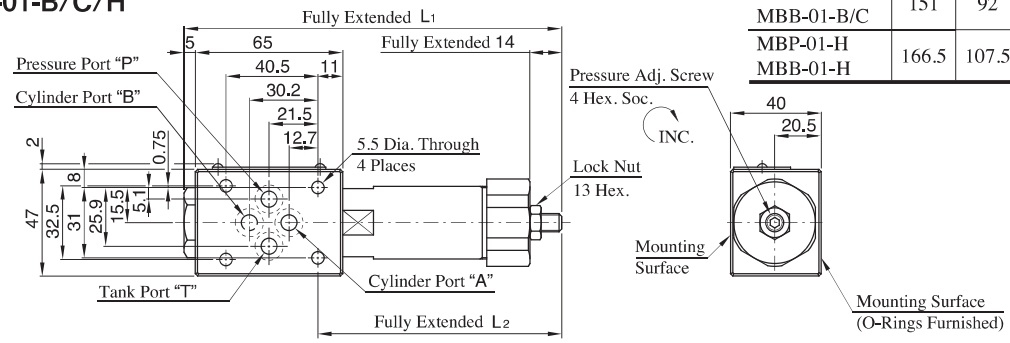
Min. Adjustment Pressure



Nominal Override Characteristics

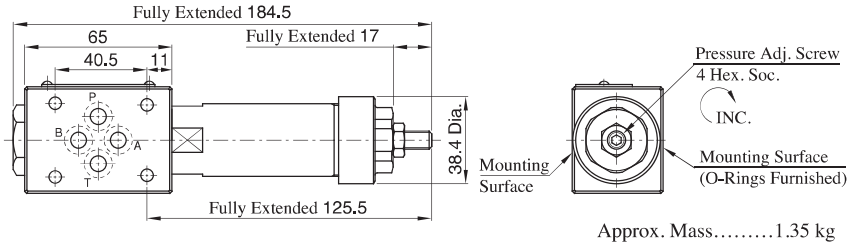


MBP-01-B/C/H
MBB-01-B/C/H



Model Numbers	L1	L2	Mass kg
MBP-01-B/C MBB-01-B/C	151	92	1.15
MBP-01-H MBB-01-H	166.5	107.5	1.25

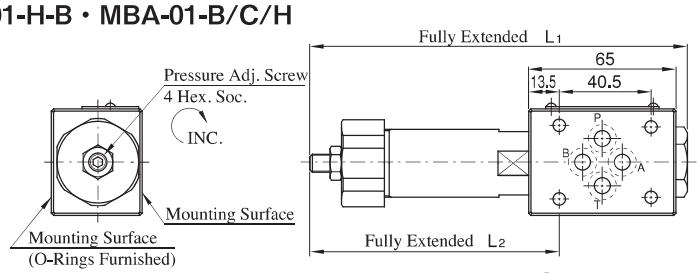
MBP-01-K
MBB-01-K



Approx. Mass.....1.35 kg

●For other dimensions, refer to the drawing above (MBP-01-B/C/H).

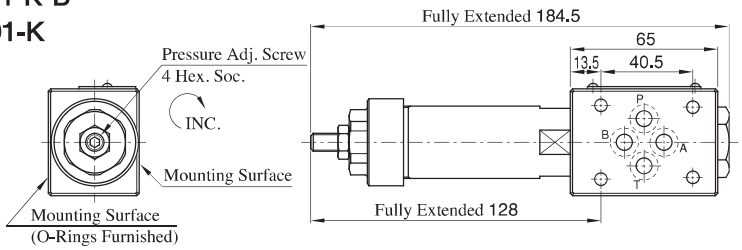
MBP-01-B-B • MBP-01-C-B
MBP-01-H-B • MBA-01-B/C/H



Model Numbers	L1	L2	Mass kg
MBP-01-B-B MBP-01-C-B MBA-01-B/C	151	94.5	1.15
MBP-01-H-B MBA-01-H	166.5	110	1.25

●For other dimensions, refer to the drawing above (MBP-01-B/C/H).

MBP-01-K-B
MBA-01-K

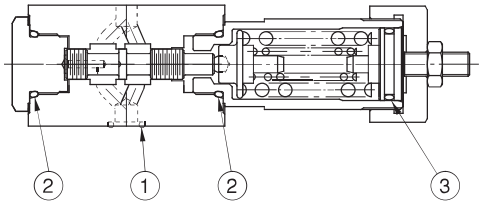


Approx. Mass.....1.35 kg

●For other dimensions, refer to the drawing above (MBP-01-B/C/H).

List of Seals

MBP-01
MBA-01
MBB-01



●MBP/MBB-01-*-B, MBA-01
The pressure adjustment part is assembled on the left side.

Item	Name of Parts	Part Numbers	Qty.
1	O-Ring	OR NBR-90 P9-N	4
2	O-Ring	OR NBR-90 P18-N	2
3	O-Ring	OR NBR-70-1 P20-N (MB*-01-B/C/H(-B)) OR NBR-70-1 P22-N (MB*-01-K(-B))	1

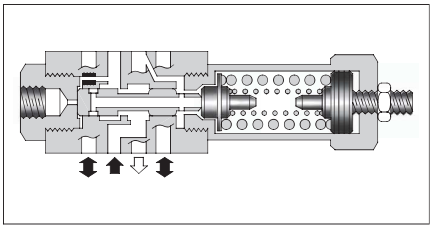
Reducing Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MR＊-01-＊-＊-70	35	60 ★

★If the pressure is set below 0.5 MPa, the maximum flow is limited. See the “Min. Adjustment Pressure vs. Max. Flow”of this page and during use, stay within the shaded zone on the graph.



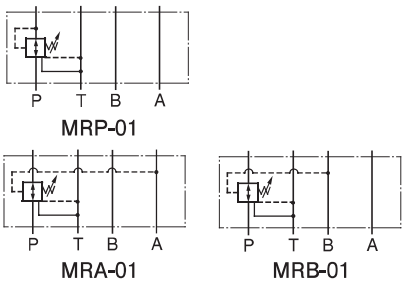


Model Number Designation

MRP	–01	–A	–B	–70
Series Number	Valve Size	Pres.Adj. Range MPa	Pres.Adj. Screw Position	Design Number
MRP: Reducing Valve for P-Line	01	**A:** ★-3.5 **B:** 0.8-7 **C:** 3.5-14 **H:** 7-21	**None:** A Port Side **B:** B Port Side	70
MRA: Reducing Valve for A-Line **MRB:** Reducing Valve for B-Line				

★See the "Min. Adjustment Pressure vs. Max. Flow" of this page.

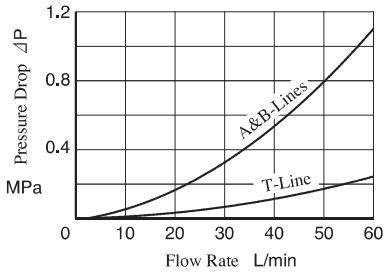
Graphic Symbols



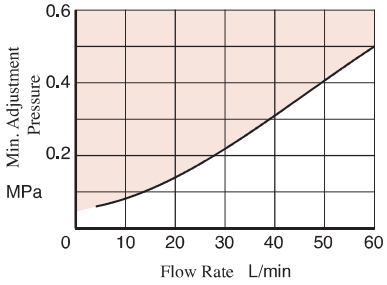
Typical Performance Characteristics

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

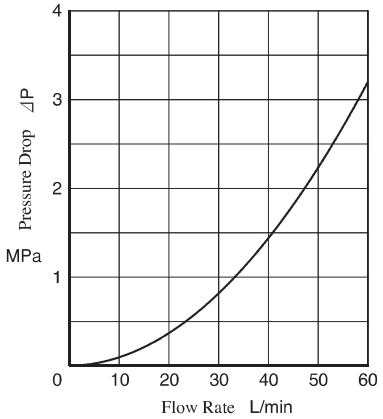
Pressure Drop



Min. Adjustment Pressure vs. Max. Flow

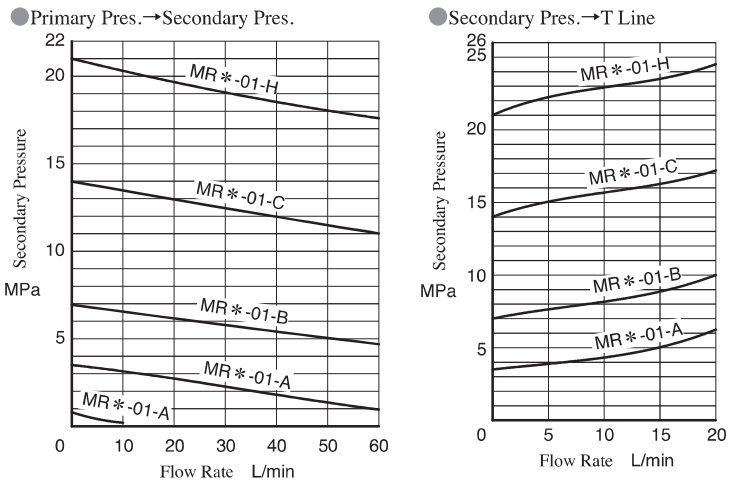


Pres. Drop at Spool Fully Open (P-Line)



Nominal Override Characteristics

Primary Pressure 35 MPa

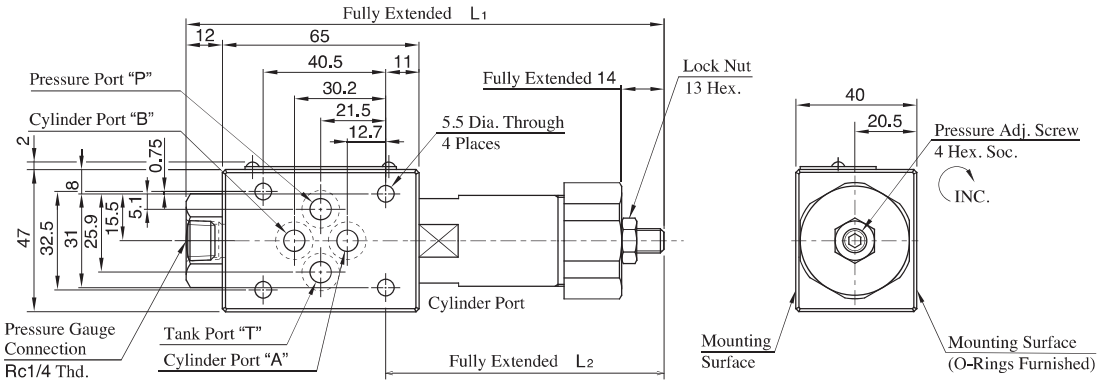


Instructions

- The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular valve.
- 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.

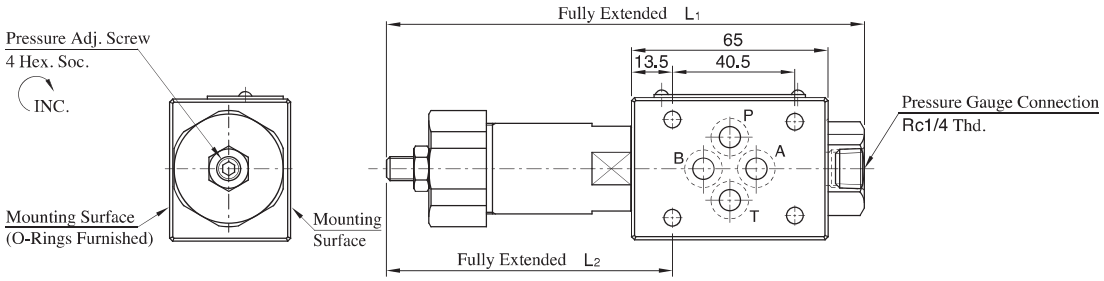
MRP-01
MRA-01
MRB-01

Model Numbers	L_1	L_2	Mass kg
MR＊-01-A	162.5	96.5	1.10
MR＊-01-B/C	158	92	1.15
MR＊-01-H	173.5	107.5	1.25



MRP-01-＊-B
MRA-01-＊-B
MRB-01-＊-B

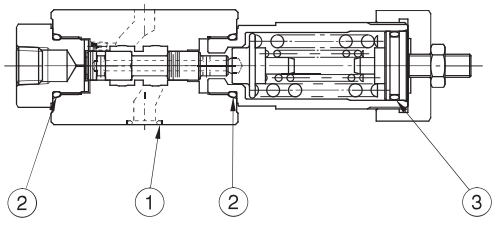
Model Numbers	L_1	L_2	Mass kg
MR＊-01-A-B	162.5	99	1.10
MR＊-01-B-B	158	94.5	1.15
MR＊-01-C-B			
MR＊-01-H-B	173.5	110	1.25



- For other dimensions, please refer to "MRP/MRA/MRB-01" in the above figure.

List of Seals

MRP-01
MRA-01
MRB-01

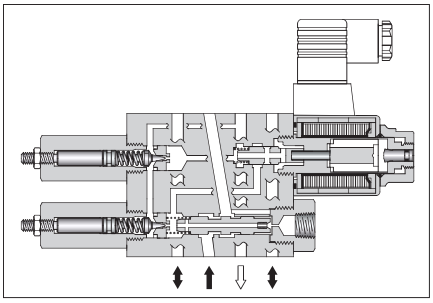


Item	Name of Parts	Part Numbers	Qty.
1	O-Ring	OR NBR-90 P9-N	4
2	O-Ring	OR NBR-90 P18-N	2
3	O-Ring	OR NBR-70-1 P20-N	1

- MR＊-01-＊-B
  The pressure adjustment part is assembled on the left side.

Two Pressure Reducing Modular Valves





Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MRDP-01-B-*-*-10	14	20 ★
MRDP-01-C-*-*-10		40 ★

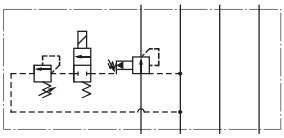
★Max. Flow is limited when set pressure is low pressure.
See the "Min. Adjustment Pressure vs. Max. Flow" of this page and operate in the range above the graph curve.

Model Number Designation

MRDP	–01	–B	–A100	–N	–10
Series Number	Valve Size	Pres. Adj. Range MPa	Coil Type	Electrical Conduit Connection	Design Number
MRDP: Two Pressure Reducing Valve for P-Line	**01**	Low Press. / High Press. **B:** 0.2-3.5 / 0.5-7 **C:** 0.5-7 / 0.5-14	AC A100, A200 DC D24 AC (Rectified) R100, R200★	**N:** Plug-in Connector Type **N1:** Plug-in Connector Type with Indicator Light (Option)	**10**

★Coil Type "R200" is treated as an option.

Graphic Symbol

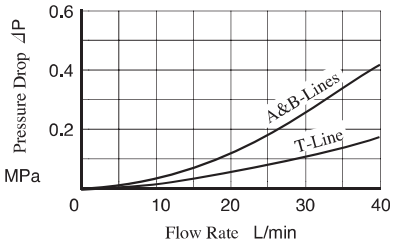


MRDP-01

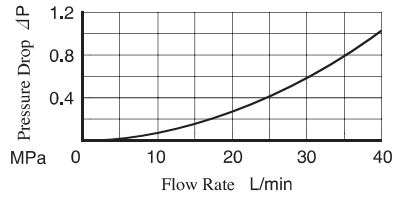
Typical Performance Characteristics

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

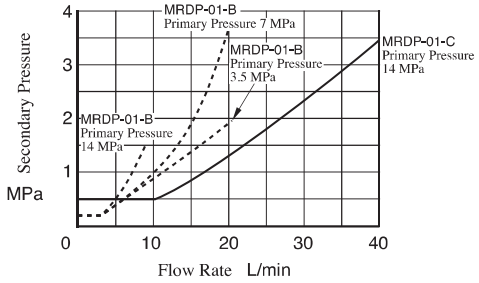
Pressure Drop



Pressure Drop at Spool Fully Open (P-Line)

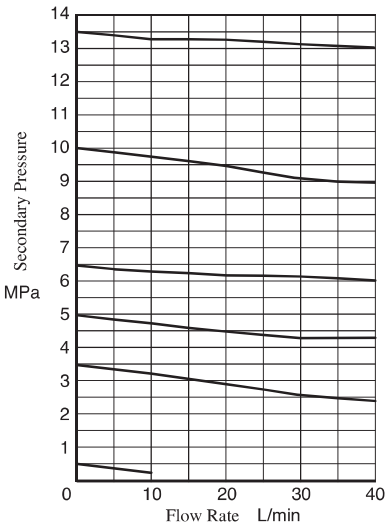


Min. Adjustment Pressure vs. Max. Flow

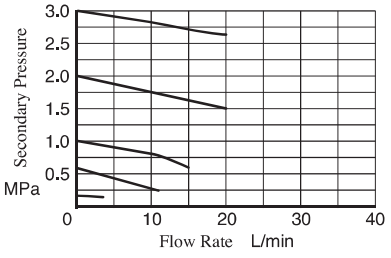


Nominal Override Characteristics

MRDP-01-C (Primary Pressure 14 MPa)



MRDP-01-B (Primary Pressure 7 MPa)



Standard Solenoid Ratings

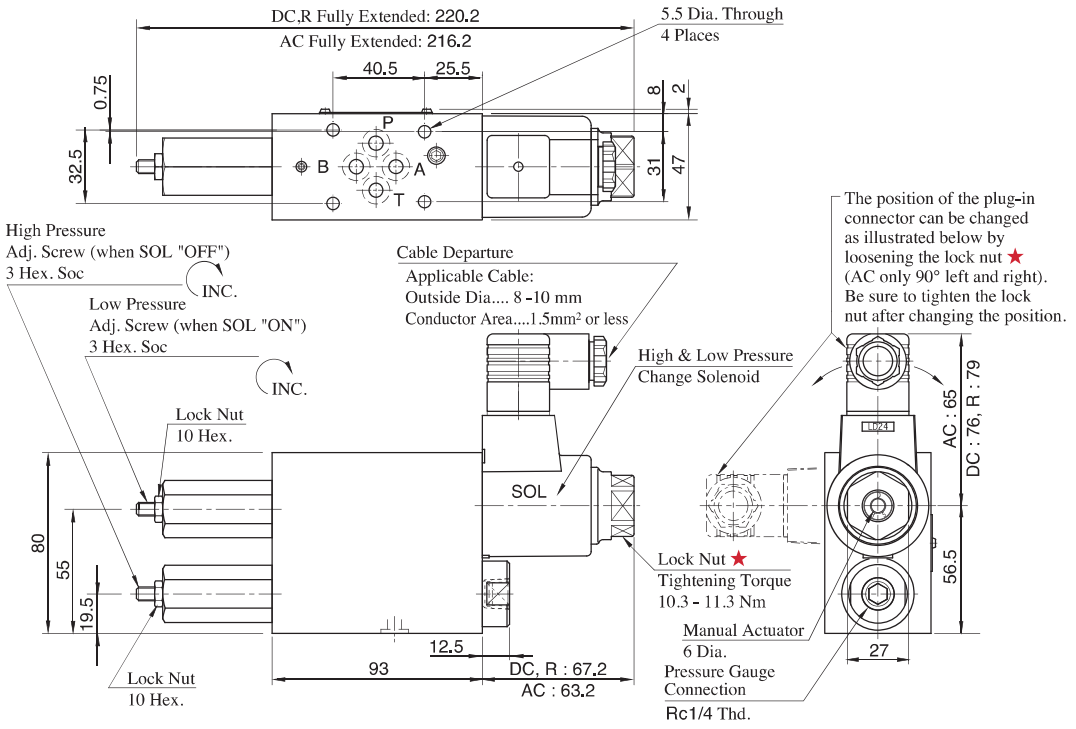
Electric Source	Coil Type	Frequency Hz	Voltage (V)		Current & Power at Rated Voltage		
			Source Rating	Serviceable Range	Inrush (A)	Holding (A)	Power (W)
AC	A100	50	100	80-110	1.65	0.30	—
		60	100	90-120	1.45	0.24	
			110		1.60	0.27	
	A200	50	200	160-220	0.83	0.15	
		60	200	180-240	0.73	0.12	
			220		0.80	0.14	
DC	D24	—	24	21.6-26.4	—	0.60	14
AC→DC (Rectified)	R100	50/60	100	90-110	—	0.168	14
	R200		200	180-220		0.084	

Instructions

- The minimum adjustment pressure equals the value of the minimum adjustment pressure on the previous page plus the tank line back pressure. This back pressure should include the value of the T-Line pressure drop characteristics of the valves stacked to the base plate side of the modular valve.
- To adjust the pressure, loosen the lock nut and turn the pressure adjustment screw slowly clockwise to increase pressure and anti-clockwise to decrease pressure. After adjustments do not forget to tighten the lock nut. Refer to the table below for the relationship between energized state of the high & low pres. change solenoid and set pressure.

High & Low Pres. Change Solenoid	Set Pres.
OFF	High
ON	Low

MRDP-01

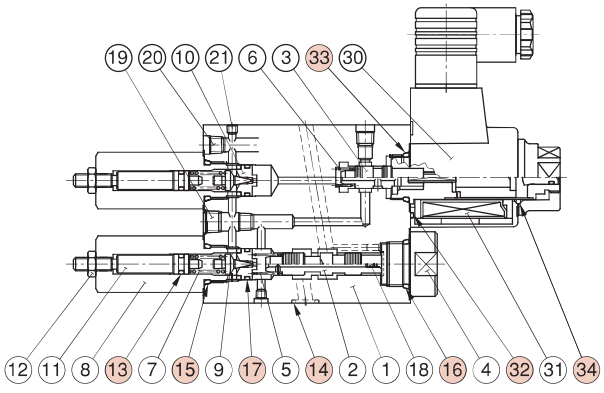


Mounting Surface Dimensions:93×47

Approx. Mass.....3 kg

List of Seals, Solenoid Ass'y, Coil Ass'y No.

MRDP-01



List of Seals

Item	Name of Parts	Part Numbers	Qty.	Notes
13	O-Ring	OR NBR-70-1 P6-N	2	
14	O-Ring	OR NBR-90 P9-N	4	
15	O-Ring	OR NBR-90 P14-N	2	
16	O-Ring	OR NBR-90 P18-N	1	
17	O-Ring	AS568-013(NBR-90)	2	
32	O-Ring	AS568-026(NBR-70-1)	1	Included in solenoid ass'y (item ㉚).
33	O-Ring	OR NBR-90 P18-N	1	
34	O-Ring	OR NBR-70-1 P20-N	1	

Solenoid Ass'y, Coil Ass'y No.

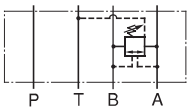
Model Numbers	㉚Solenoid Ass'y No.	㉛Coil Ass'y No.
MRDP-01-＊-A100	L-SA1-100-N-7003	C-L-SA1-100-N-70
MRDP-01-＊-A200	L-SA1-200-N-7003	C-L-SA1-200-N-70
MRDP-01-＊-D24	L-SD1-24-N-7003	C-L-SD1-24-N-70
MRDP-01-＊-R100	L-SR1-100-N-7003	C-L-SR1-100-N-70
MRDP-01-＊-R200	L-SR1-200-N-7003	C-L-SR1-200-N-70

Brake Modular Valves

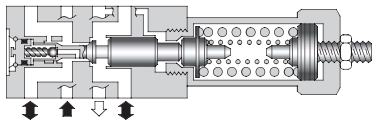
Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MBR-01-*-30	25	35

Graphic Symbol







Model Number Designation

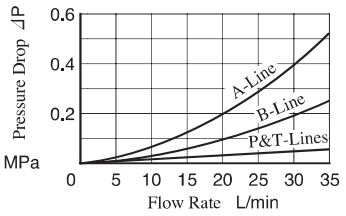
MBR	–01	–C	–30
Series Number	Valve Size	Pres. Adj. Range MPa	Design Number
MBR: Brake Valve	**01**	**C:** ★-14 **H:** 7-21	**30**

★See the "Min. Adjustment Pressure" of this page.

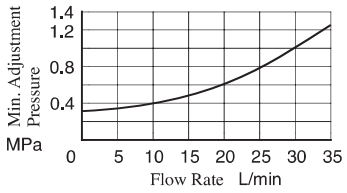
Typical Performance Characteristics

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

Pressure Drop



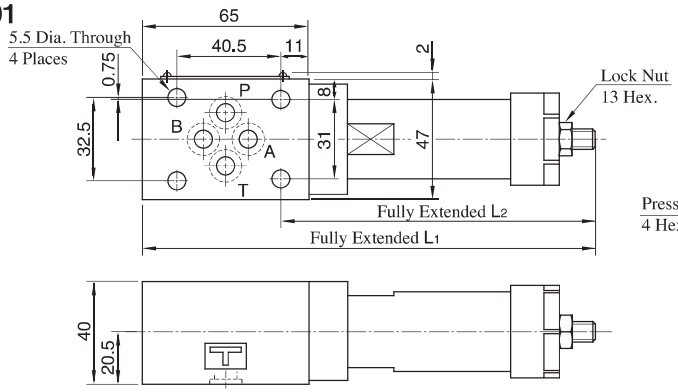
Min. Adjustment Pressure



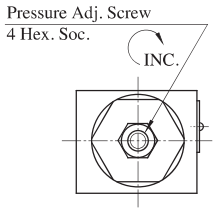
Instructions

- The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of the left. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular valve.
- 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.

MBR-01



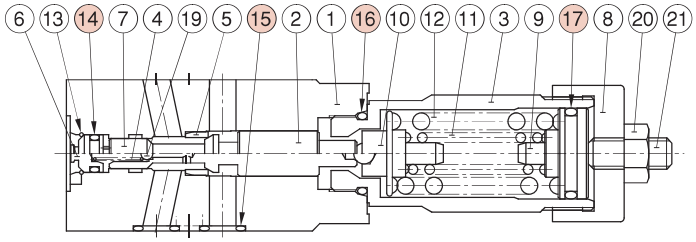
Model Numbers	L1	L2
MBR-01-C	161	107
MBR-01-H	176.5	122.5



Approx. Mass.....1.3 kg

List of Seals

MBR-01



Item	Name of Parts	Part Numbers	Qty.
14	O-Ring	OR NBR-90 P7-N	1
15	O-Ring	OR NBR-90 P9-N	4
16	O-Ring	OR NBR-90 P18-N	1
17	O-Ring	OR NBR-70-1 P20-N	1

Sequence Modular Valves/Counterbalance Modular Valves

Specifications

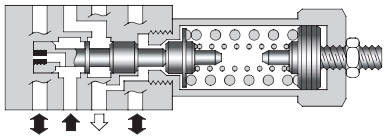
Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MHP-01-∗-∗-70	35	60
MHA/MHB-01-∗-70		



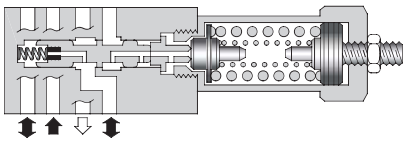
Model Number Designation

MHP	–01	–B	–B	–70
Series Number	Valve Size	Pres. Adj. Range MPa	Pres. Adj. Screw Position	Design Number
MHP: Sequence Valve for P-Line	**01**	**B:** ★-7 **C:** 3.5-14 **H:** 7-21 **K:** 14-35	**None:** A Port Side **B:** B Port Side	**70**
MHA: Counterbalance Valve for A-Line **MHB:** Counterbalance Valve for B-Line			—	

★See the "Min. Adjustment Pressure" on this page.



MHP-01



MHA-01

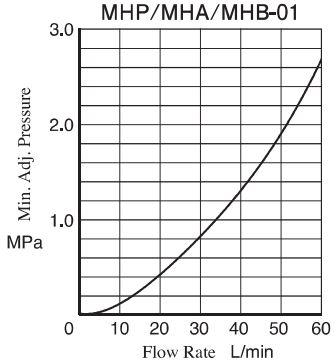
Instructions

- The minimum adjustment pressure for MHP-01 equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure. This back pressure should include the value of the T-Line pressure drop characteristics of the valves stacked.
- The minimum adjustment pressure for MHA-01 and MHP-01 equals the value obtained from the minimum adjustment pressure characteristics plus the outlet-side back pressure of the valve.
  The outlet-side back pressure should include the values of the A(B)-Line pressure drop.
- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment screw clockwise or anti-clockwise. For increasing pressure, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after making adjustment to the pressure.

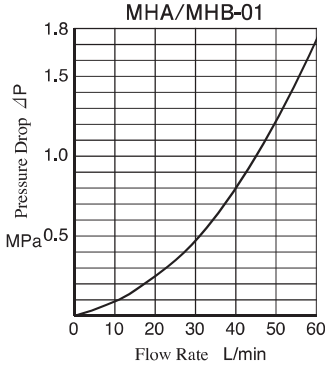
Typical Performance Characteristics

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

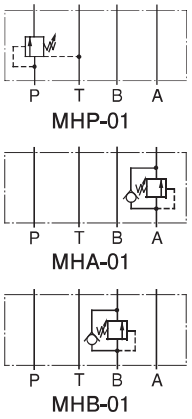
Min. Adjustment Pressure
MHP/MHA/MHB-01



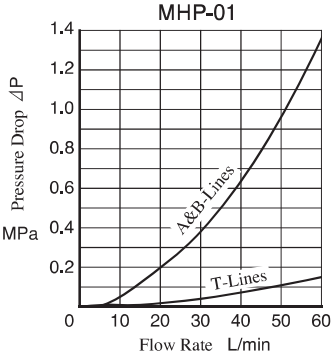
Pressure Drop for Free Flow
MHA/MHB-01



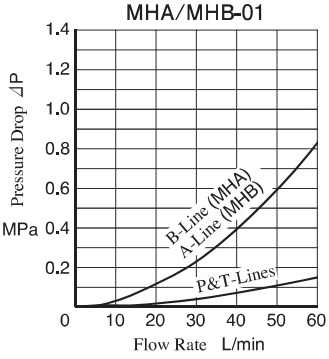
Graphic Symbols



Pressure Drop
MHP-01

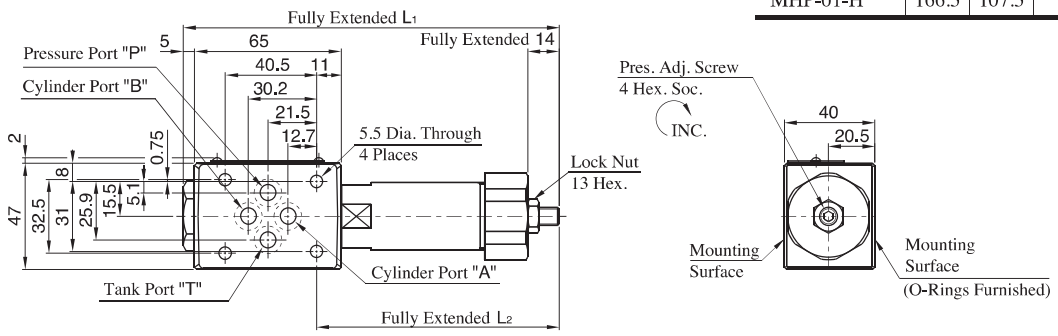


Pressure Drop
MHA/MHB-01

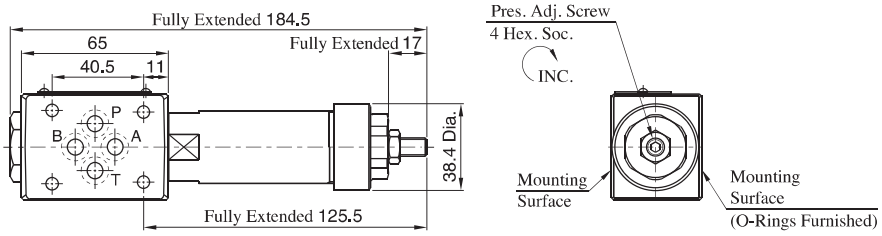


MHP-01-B/C/H

Model Numbers	L1	L2	Mass kg
MHP-01-B/C	151	92	1.45
MHP-01-H	166.5	107.5	1.55



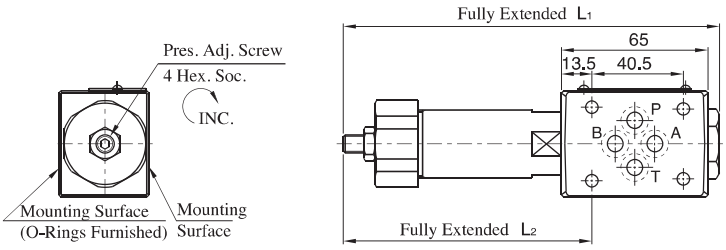
MHP-01-K



●For other dimensions, refer to "MHP-01-B/C/H" in the above figure. Approx. Mass.....1.65 kg

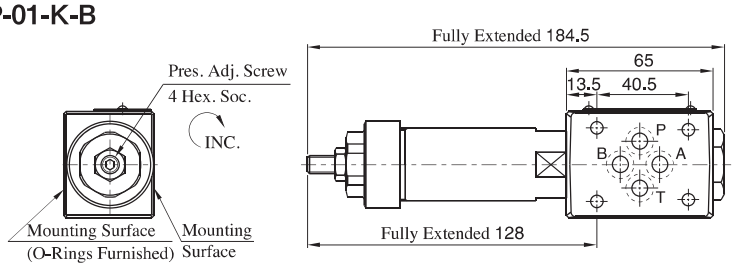
MHP-01-B-B
MHP-01-C-B
MHP-01-H-B

Model Numbers	L1	L2	Mass kg
MHP-01-B-B MHP-01-C-B	151	94.5	1.45
MHP-01-H-B	166.5	110	1.55



●For other dimensions, refer to "MHP-01-B/C/H" drawing above.

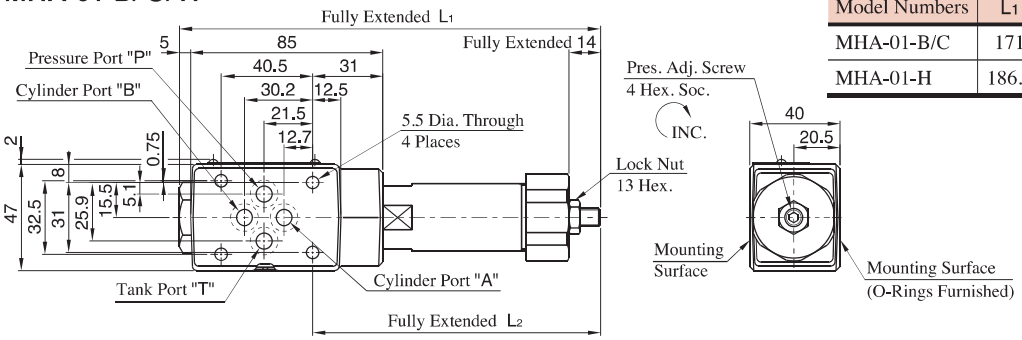
MHP-01-K-B



Approx. Mass.....1.65 kg

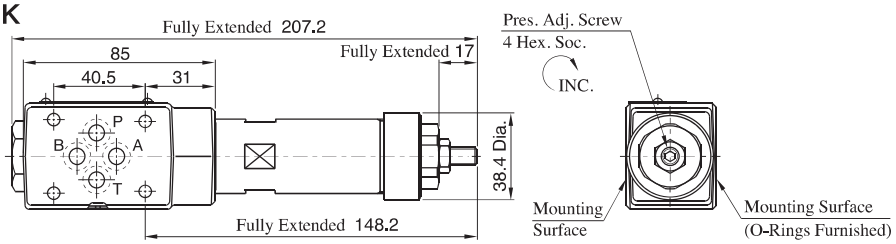
●For other dimensions, refer to "MHP-01-K" in the above figure.

MHA-01-B/C/H



Model Numbers	L1	L2	Mass kg
MHA-01-B/C	171	112	1.65
MHA-01-H	186.5	127.5	1.75

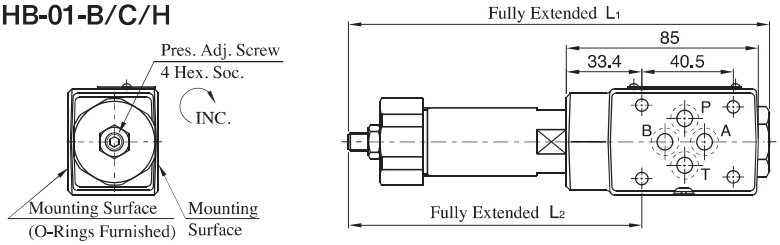
MHA-01-K



●For other dimensions, refer to "MHA-01-B/C/H" in the above figure.

Approx. Mass.....1.85 kg

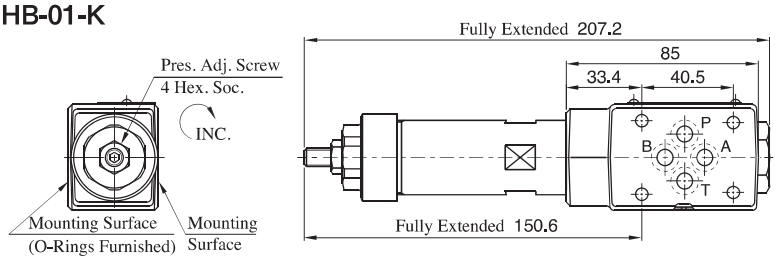
MHB-01-B/C/H



Model Numbers	L1	L2	Mass kg
MHB-01-B/C	171	114.4	1.65
MHB-01-H	186.5	129.9	1.75

●For other dimensions, refer to "MHA-01-B/C/H" in the above figure.

MHB-01-K

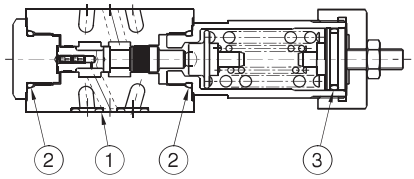


Approx. Mass.....1.85 kg

●For other dimensions, refer to "MHA-01-K" in the above figure.

List of Seals

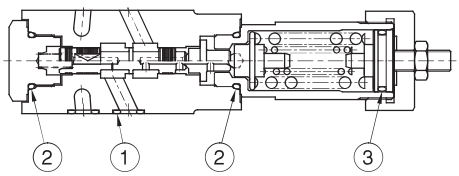
MHP-01



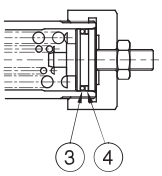
●MHP-01-*-B has the pressure adjustment part on the left side.

Item	Name of Parts	Part Numbers	Qty.
1	O-Ring	OR NBR-90 P9-N	4
2	O-Ring	OR NBR-90 P18-N	2
3	O-Ring	OR NBR-70-1 P20-N [MHP-01-B/C/H] OR NBR-70-1 P22-N [MHP-01-K]	1

MHA-01



MHA-01-K



●MHB-01 has the pressure adjustment part on the left side.

Item	Name of Parts	Part Numbers	Qty.
1	O-Ring	OR NBR-90 P9-N	4
2	O-Ring	OR NBR-90 P18-N	2
3	O-Ring	OR NBR-90 P20-N [MHA-01-B/C/H MHB-01-B/C/H] OR NBR-90 P22-N [MHA-01-K MHB-01-K]	1
4	Back-up Ring	BR JIS B 2401-4-T2-P22 [MHA-01-K MHB-01-K]	1

Pressure Switch Modular Valves

Specifications

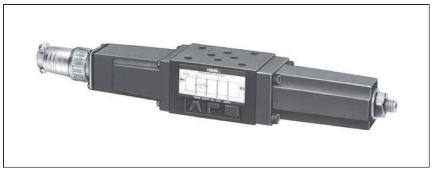
Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MJ＊-01-M-＊-＊-10	31.5	35
MJ＊-01-J-35-10	10	
MJ＊-01-J-100-10	10	
MJ＊-01-J-200-10	20	
MJ＊-01-J-350-10	35	

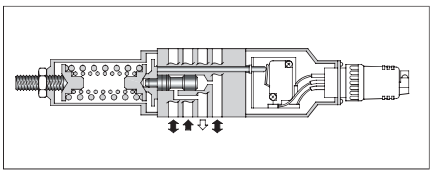
Sensitive Switch Ratings

Electric Source	AC	DC	
Voltage (V)	125・250	125	250
Current (A)	11A–1/3 HP	0.5	0.25

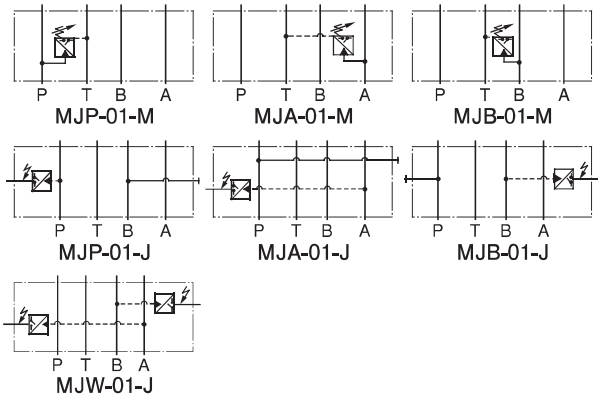
Specifications of semiconductor type pressure switch

JT-02 series is installed for semiconductor type pressure switch, refer to "C Pressure Control Valves" catalog page for details.





Graphic Symbols



Model Number Designation

MJP	–01	–M	–B	–N	–10
Series Number	Valve Size	Type of Switch	Pres. Adj. Range MPa	Type of Electrical Connection	Design Number
MJP: for P-Line **MJA:** for A-Line **MJB:** for B-Line Pressure Switch Modular Valves	01	**M:** Sensitive Switch	**B:** 1-7 **C:** 3.5-14 **H:** 7-21	**None:** Cable Connector Type **N:** With Plug-in Connector (DIN)	10
MJP: for P-Line **MJA:** for A-Line **MJB:** for B-Line **MJW:** for A&B-Line Pressure Switch Modular Valves		**J:** Semiconductor Type Pressure Switch	**35:** 0.1-3.5 **100:** 1-10 **200:** 2-20 **350:** 3.5-35	**None:** Lead Wire Type	

Instructions

Wiring of a sensitive switch should be made correctly referring to the table right. Numbers in the switch status column indicate wiring numbers in receptacles or contact numbers of connectors.

Pressure with Sensitive Switch and The Switch Status

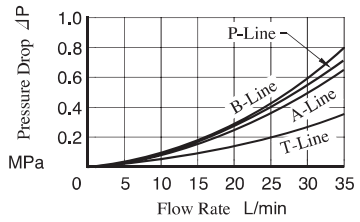
Operating Pressure	Switch Status
Less than Pressure setting	1 ○ ○2 ○3
More than Pressure setting	1 ○ ○2 ○3

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.

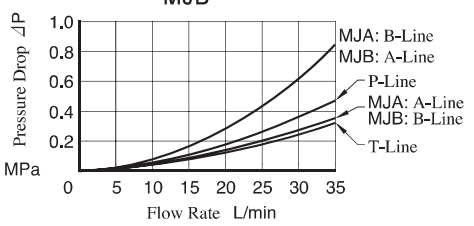
Pressure Drop

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

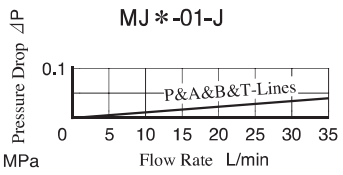
MJP-01-M



MJA_-01-M
MJB



MJ＊-01-J

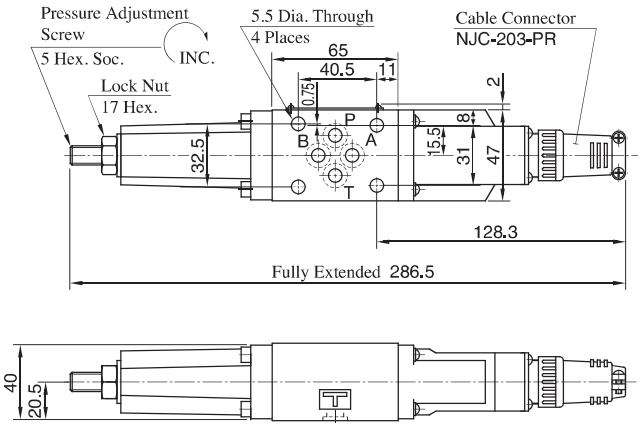


Accessories

Valve Model Numbers	Accessories
MJ＊-01-M-＊-10	Cable connector : NJC-203-PR.....1 Pc.
MJ＊-01-M-＊-N-10	DIN connector : GDM311-B-11.....1 Pc.

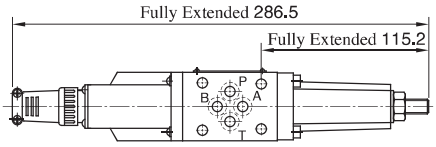
●Cable Connector Type

MJP-01-M-＊-10
MJA-01-M-＊-10



Approx. Mass.....1.3 kg

MJB-01-M-＊-10

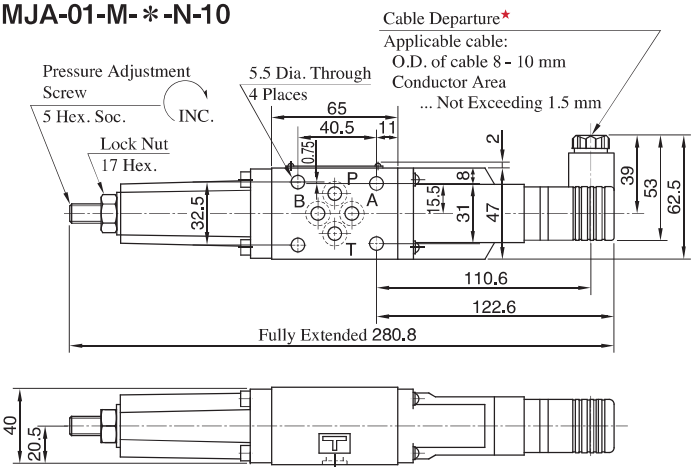


Approx. Mass.....1.3 kg

For other dimensions, refer to "MJP-01" in the drawing left.

●Plug-in Connector Type

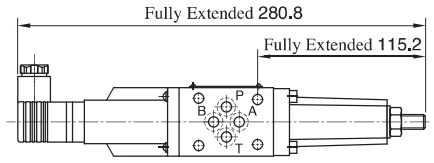
MJP-01-M-＊-N-10
MJA-01-M-＊-N-10



Approx. Mass.....1.3 kg

★As shown by the dot-and-dash line, the cable departure can also be faced opposite.

MJB-01-M-＊-N-10

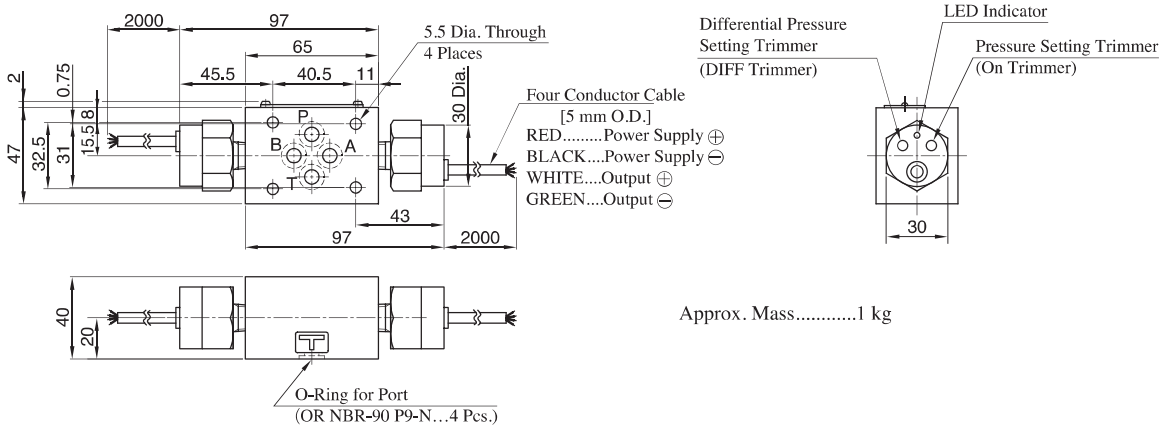


Approx. Mass.....1.3 kg

For other dimensions, refer to "MJP-01" in the drawing left.

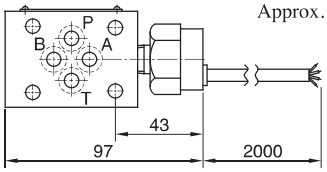
Semiconductor Type Pressure Switch

MJW-01-J-＊-10



Approx. Mass.....1 kg

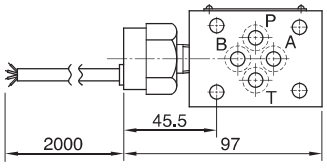
MJP-01-J-＊-10
MJA-01-J-＊-10



Approx. Mass.....1 kg

For other dimensions, refer to "MJW-01" in the drawing above.

MJB-01-J-＊-10

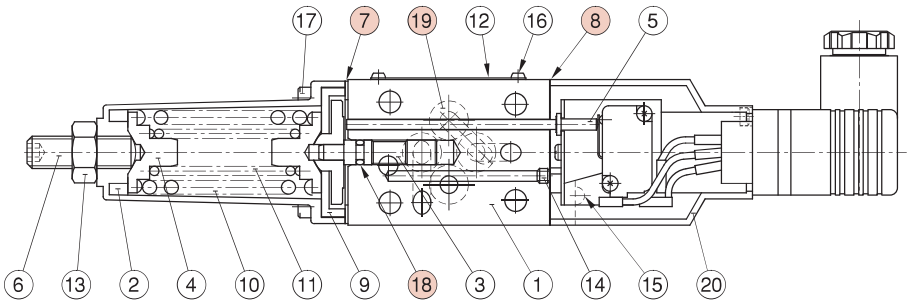


Approx. Mass.....1 kg

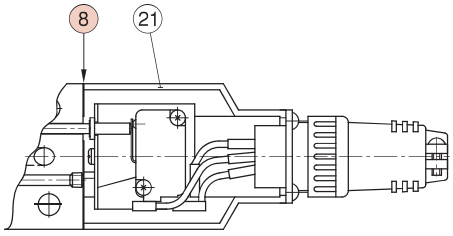
For other dimensions, refer to "MJW-01" in the drawing above.

List of Seals

MJP-01-M-＊-N-10
Plug-in Connector Type



MJ＊-01-M-＊-10
Cable Connector Type



Item	Name of Parts	Part Numbers	Qty.
7	Packing	3116-VK414239-4	1
8	Packing	3116-VK414240-2	1
18	O-Ring	OR NBR-70-1 P5-N	1
19	O-Ring	OR NBR-90 P9-N	4

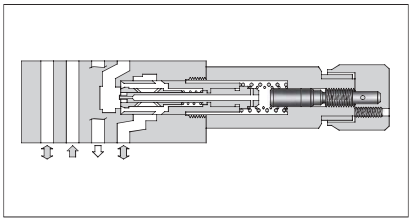
●Since MJ＊-01-J-＊-10 (Semiconductor type pressure switch) does not have any seals inside, only four(4) O-rings for the ports are required. Please refer to the drawing above.

Pressure and Temperature Compensated Flow Control (and Check) Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Metered Flow L/min	Max. Free Flow L/min
MFP-01-10	16	35	——
MF*-01-*-10			35

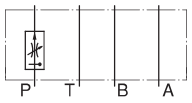




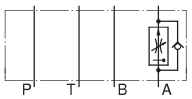
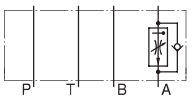
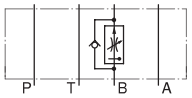
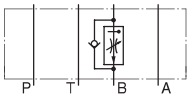
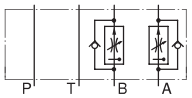
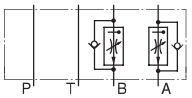
Model Number Designation

MFA	–01	–X	–10
Series Number	Valve Size	Direction of Flow	Design Number
MFP: Flow Control Valve for P-Line	01	——	10
MFA: Flow Control and Check Valve for A-Line **MFB:** Flow Control and Check Valve for B-Line **MFW:** Flow Control and Check Valve for A&B-Lines		**X:** Meter-out **Y:** Meter-in	10

Graphic Symbols



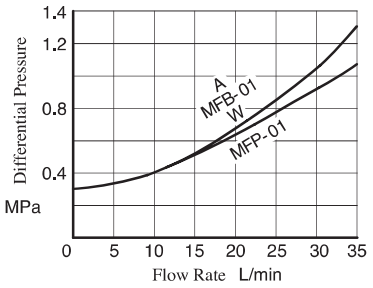
MFP-01

Meter-out	Meter-in
 MFA-01-X	 MFA-01-Y
 MFB-01-X	 MFB-01-Y
 MFW-01-X	 MFW-01-Y

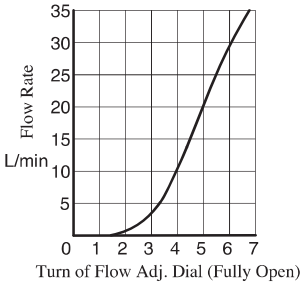
Typical Performance Characteristics

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

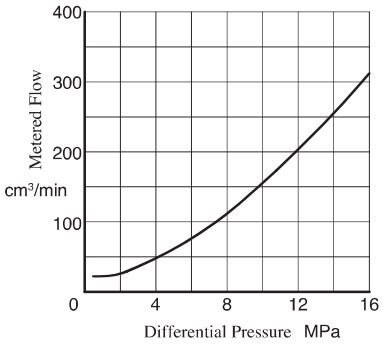
Min. Required Pressure Difference



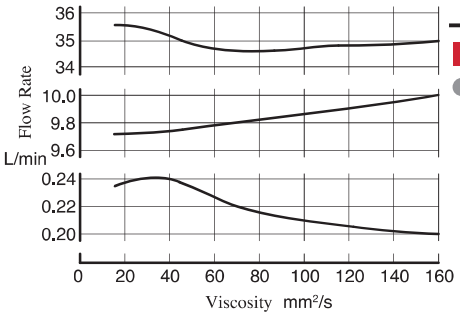
Metered Flow vs. Dial Position



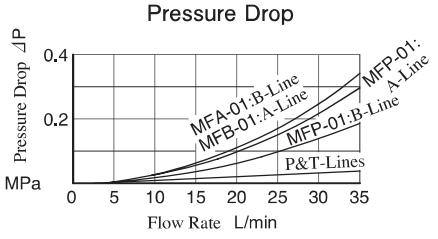
Min. Metered Flow



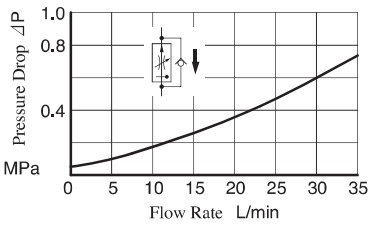
Metered Flow vs. Viscosity



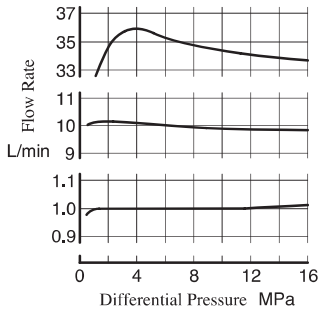
Pressure Drop



Pressure Drop for Free Flow



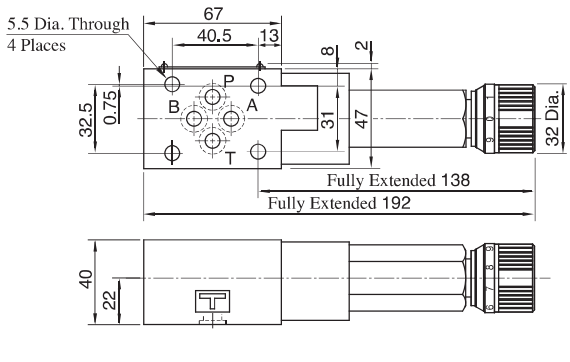
Metered Flow vs. Differential Pres.

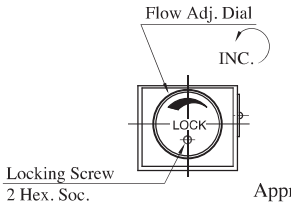


Instructions

●To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

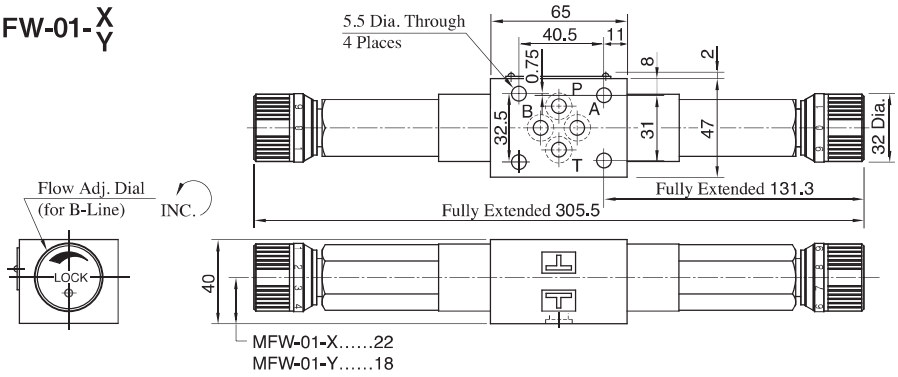
MFP-01





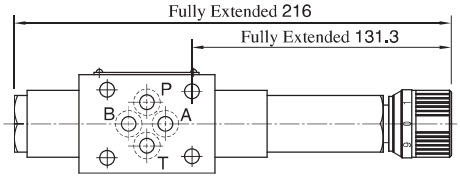
Approx. Mass.....1.7 kg

MFW-01-$\frac{X}{Y}$



Approx. Mass.....2.1 kg

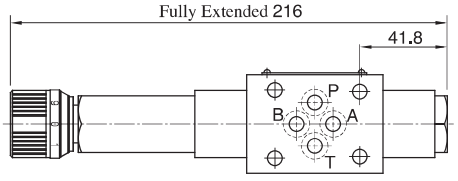
MFA-01-$\frac{X}{Y}$



Approx. Mass.....1.6 kg

For other dimensions, refer to "MFW-01" in the drawing above.

MFB-01-$\frac{X}{Y}$

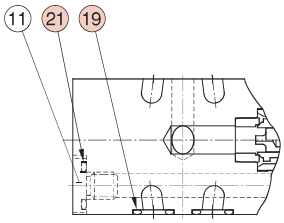


Approx. Mass.....1.6 kg

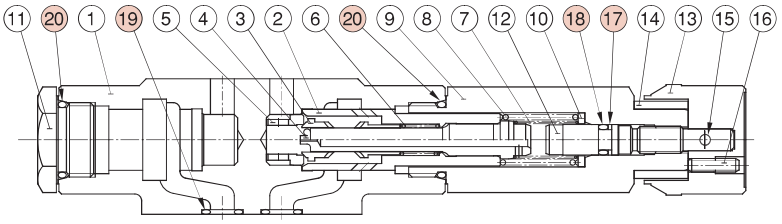
For other dimensions, refer to "MFW-01" in the drawing above.

List of Seals

MFP-01
MFA-01
MFB-01
MFW-01



MFP-01



MFA-01

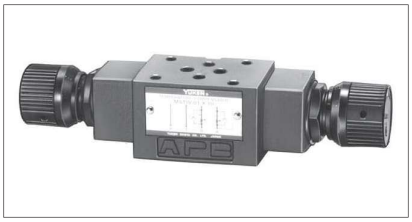
- MFB-01: Flow control part is built in the left side.
- MFW-01: Flow control part is built in the both sides.

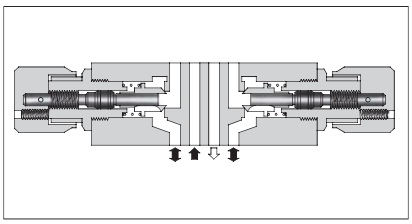
Item	Name of Parts	Part Numbers	Qty.			
			MFP–01	MFA–01	MFB–01	MFW–01
17	Back-up Ring	BR JIS B 2401-4-T2-P6	1	1	1	2
18	O-Ring	OR NBR-70-1 P6-N	1	1	1	2
19	O-Ring	OR NBR-90 P9-N	4	4	4	4
20	O-Ring	OR NBR-90 P18-N	1	2	2	2
21	O-Ring	OR NBR-90 P10-N	1	—	—	—

Temperature Compensated Throttle and Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Differential Pressure MPa	Max. Metered Flow L/min	Min. Metered Flow L/min	Max. Free Flow L/min
MST＊-01-X-10	31.5	14	35	0.5	35

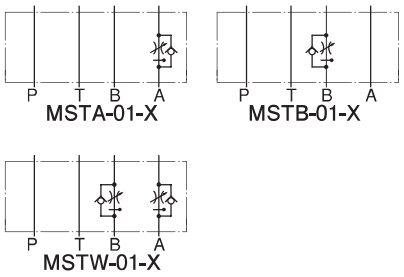




Model Number Designation

MSTA	–01	–X	–10
Series Number	Valve Size	Direction of Flow	Design Number
MSTA: for A-Line **MSTB:** for B-Line **MSTW:** for A&B-Lines } Temperature Compensated Throttle and Check Valve	**01**	**X:** Meter-out	**10**

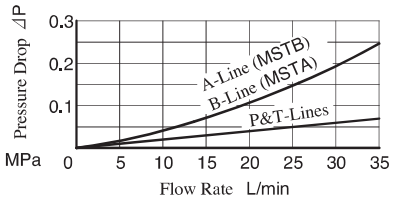
Graphic Symbols



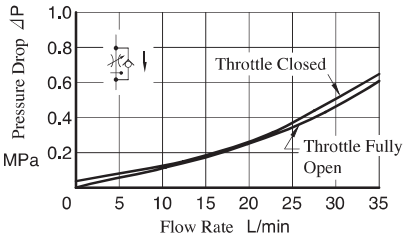
Typical Performance Characteristics

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

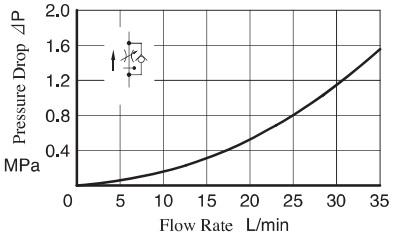
Pressure Drop



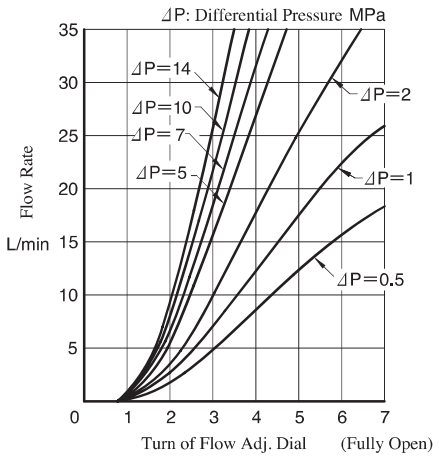
Pressure Drop for Free Flow



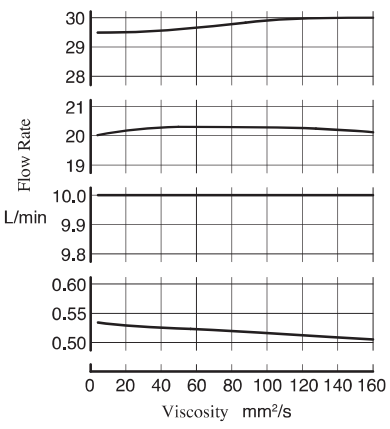
Pressure Drop at Throttle Fully Open



Metered Flow vs. Dial Position



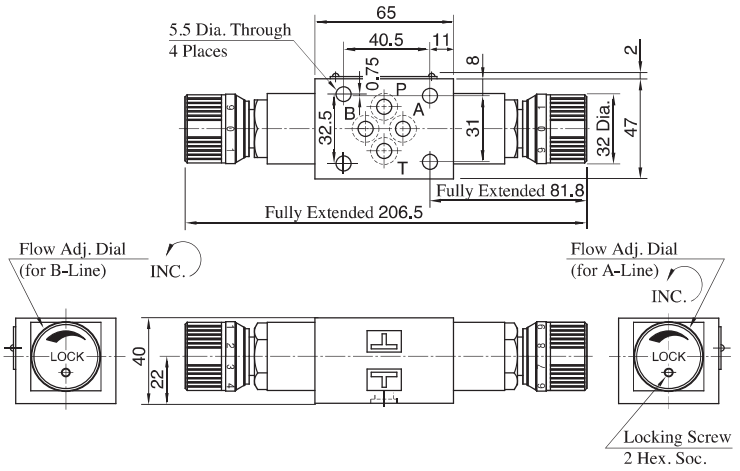
Metered Flow vs. Viscosity



Instructions

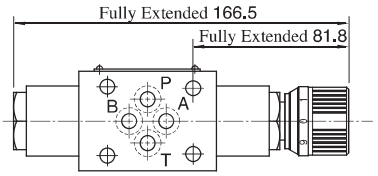
- To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

MSTW-01-X



Approx. Mass.....1.5 kg

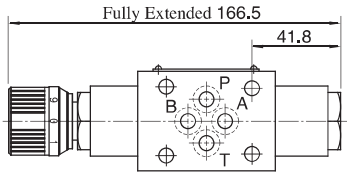
MSTA-01-X



Approx. Mass.....1.3 kg

For other dimensions, refer to "MSTW-01" in the drawing left.

MSTB-01-X

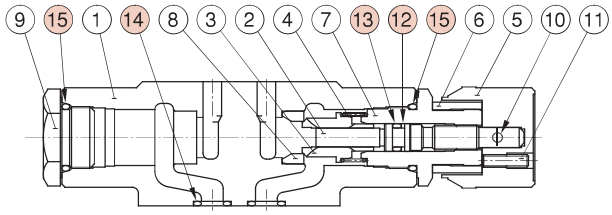


Approx. Mass.....1.3 kg

For other dimensions, refer to "MSTW-01" in the drawing left.

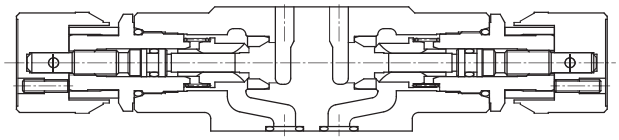
List of Seals

MSTA-01
MSTB-01
MSTW-01



MSTA-01-X

●MSTB-01-X: Flow control part is built in the left side.



MSTW-01-X

Item	Name of Parts	Part Numbers	Qty.		
			MSTA	MSTB	MSTW
12	Back-up Ring	BR JIS B 2401 -4-T2-P6	1	1	2
13	O-Ring	OR NBR-70-1 P6-N	1	1	2
14	O-Ring	OR NBR-90 P9-N	4	4	4
15	O-Ring	OR NBR-90 P18-N	2	2	2

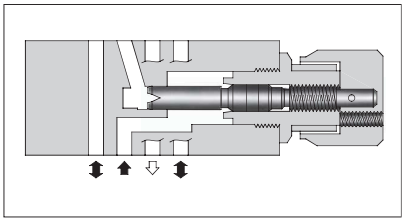
Throttle Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MS＊-01-50	31.5	60 ★

★At the low differential pressure, maximum flow is limited. See "Pressure Drop at Throttle Fully Open".





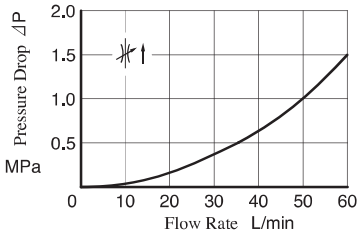
Model Number Designation

MSP	–01	–50
Series Number	Valve Size	Design Number
MSP: for P-Line **MST:** for T-Line } Throttle Valve	**01**	**50**

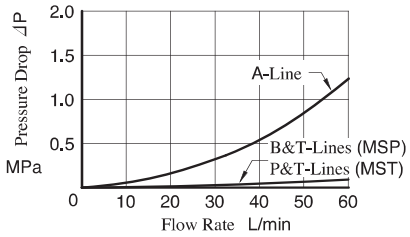
Typical Performance Characteristics

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

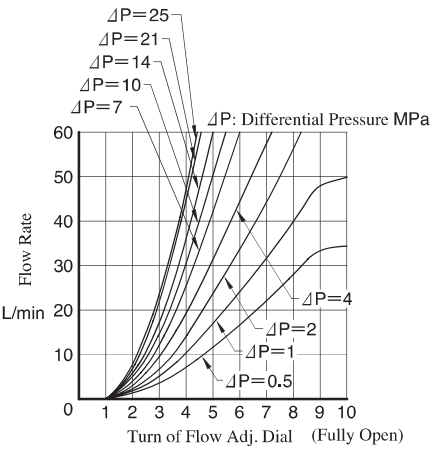
Pressure Drop at Throttle Fully Open



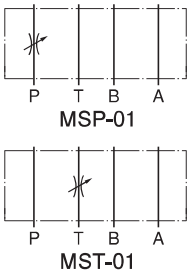
Pressure Drop



Metered Flow vs. Dial Position



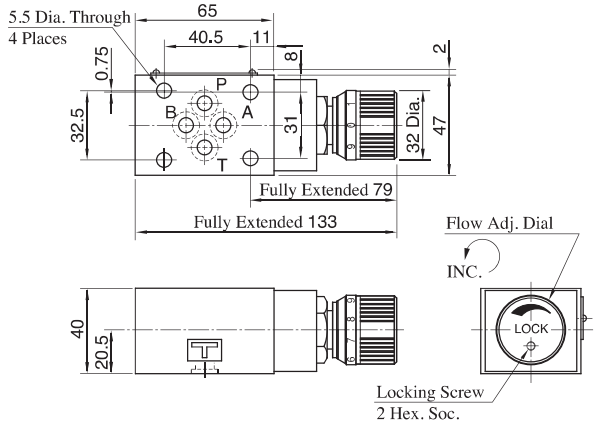
Graphic Symbols



Instructions

●To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

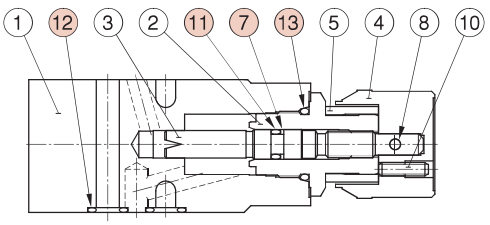
MSP-01
MST-01



Approx. Mass.....1.2 kg

List of Seals

MSP-01
MST-01



Item	Name of Parts	Part Numbers	Qty.
7	Back-up Ring	BR JIS B 2401-4-T2-P6	1
11	O-Ring	OR NBR-70-1 P6-N	1
12	O-Ring	OR NBR-90 P9-N	4
13	O-Ring	OR NBR-90 P18-N	1

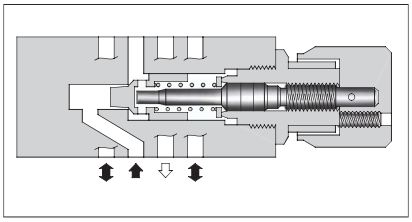
Check and Throttle Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MSCP-01-30	31.5	35 ★

★At the low differential pressure, maximum flow is limited. See "Pressure Drop at Throttle Fully Open".

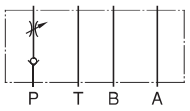




Model Number Designation

MSCP	–01	–30
Series Number	Valve Size	Design Number
MSCP: Check and Throttle **MSCP:** Valve for P-Line	**01**	**30**

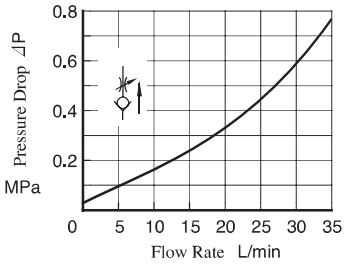
Graphic Symbol



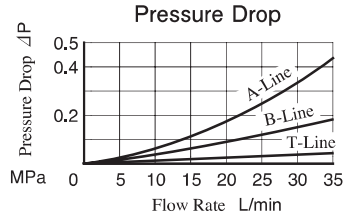
Typical Performance Characteristics

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

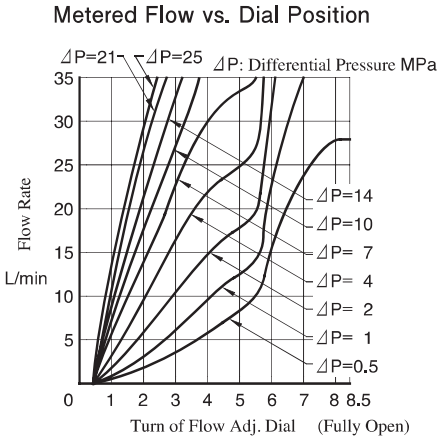
Pressure Drop at Throttle Fully Open



Pressure Drop



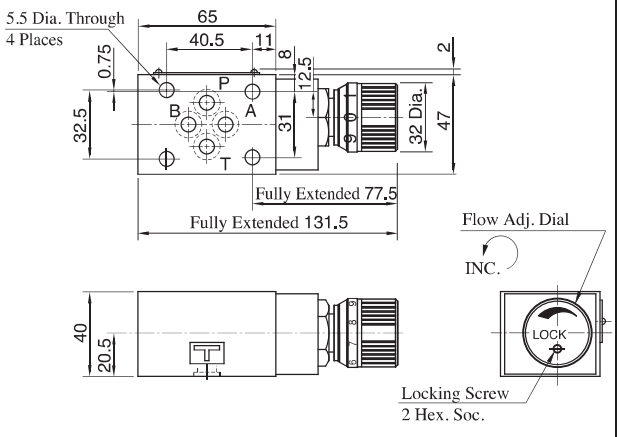
Metered Flow vs. Dial Position



Instructions

●To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

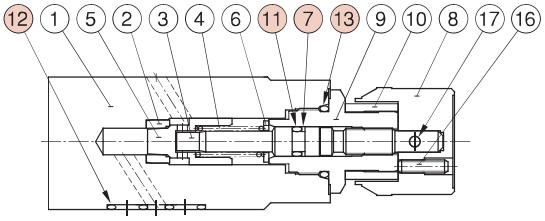
MSCP-01



Approx. Mass.....1.2 kg

List of Seals

MSCP-01



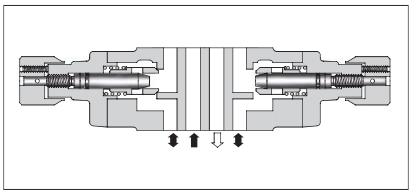
Item	Name of Parts	Part Numbers	Qty.
7	Back-up Ring	BR JIS B 2401-4-T2-P6	1
11	O-Ring	OR NBR-70-1 P6-N	1
12	O-Ring	OR NBR-90 P9-N	4
13	O-Ring	OR NBR-90 P18-N	1

Throttle and Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MS∗-01-∗ ∗-70	35	80

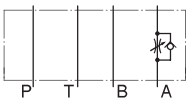
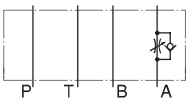
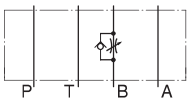
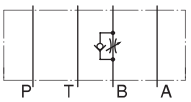
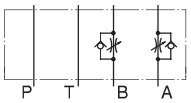
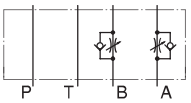
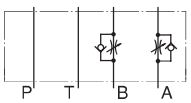
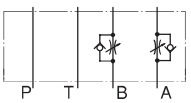




Model Number Designation

MSW	–01	–X	Y	–70
Series Number	Valve Size	Direction of Flow ("A" Line)	Direction of Flow ("B" Line)	Design Number
MSA: Throttle and Check Valve for A-Line	01	**X:** Meter-out **Y:** Meter-in	—	70
MSB: Throttle and Check Valve for B-Line		—	**X:** Meter-out **Y:** Meter-in	
MSW: Throttle and Check Valve for A&B-Lines		**X:** Meter-out **Y:** Meter-in		
		X: Meter-out	**Y:** Meter-in	
		Y: Meter-in	**X:** Meter-out	

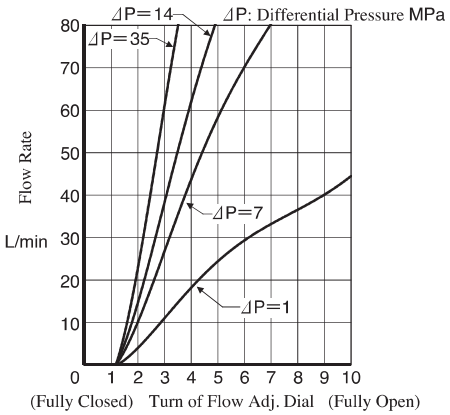
Graphic Symbols

Meter-out	Meter-in
 MSA-01-X	 MSA-01-Y
 MSB-01-X	 MSB-01-Y
 MSW-01-X	 MSW-01-Y
Meter-out · Meter-in	**Meter-in · Meter-out**
 MSW-01-XY	 MSW-01-YX

Typical Performance Characteristics

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

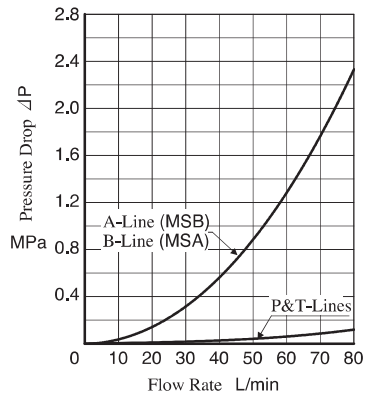
Metered Flow vs. Dial Position



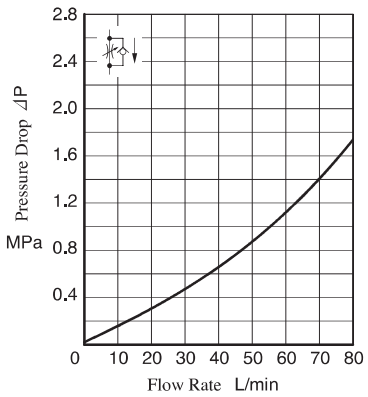
Instructions

To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial cloackwise. For a decrease of flow turn the dial clockwise. Be sure to re-tighten the locking screw frimly after the adjustment of the flow rate.

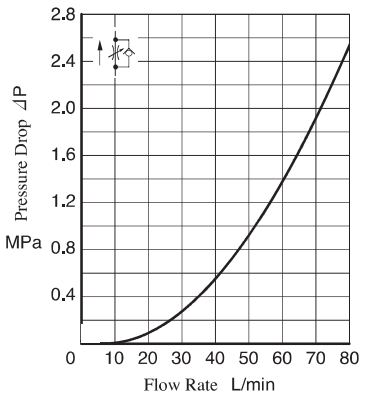
Pressure Drop



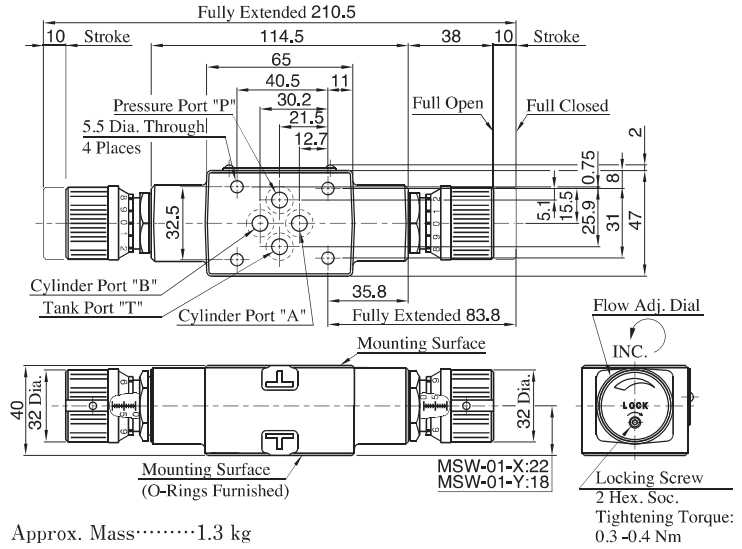
Pressure Drop for Free Flow



Pressure Drop at Throttle Fully Open

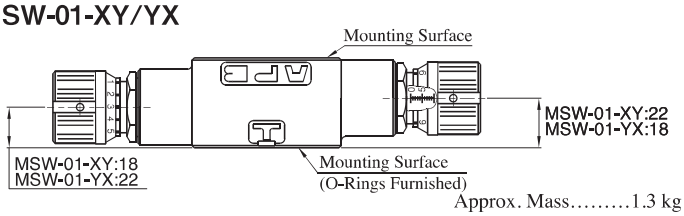


MSW-01-X/Y



Approx. Mass·····1.3 kg

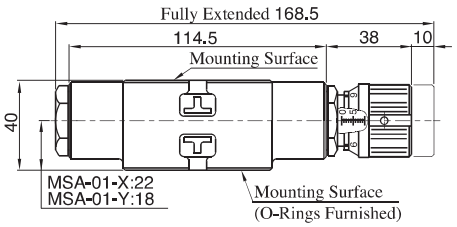
MSW-01-XY/YX



Approx. Mass.....1.3 kg

For other dimensions, refer to "MSW-01-X/Y" in the drawing above.

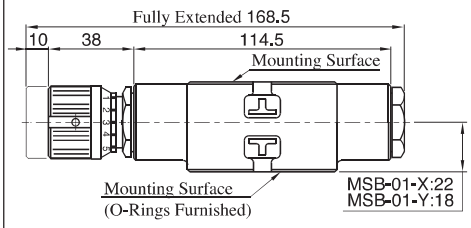
MSA-01-X/Y



Approx. Mass.....1.15 kg

For other dimensions, refer to "MSW-01" in the drawing left.

MSB-01-X/Y

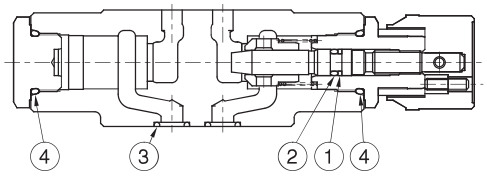


Approx. Mass.....1.15 kg

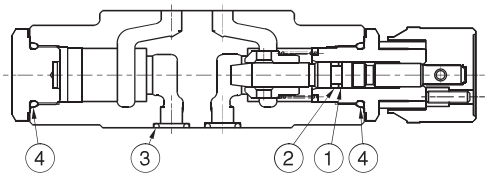
For other dimensions, refer to "MSW-01" in the drawing left.

List of Seals

MSA-01, MSB-01, MSW-01



MSA-01-X



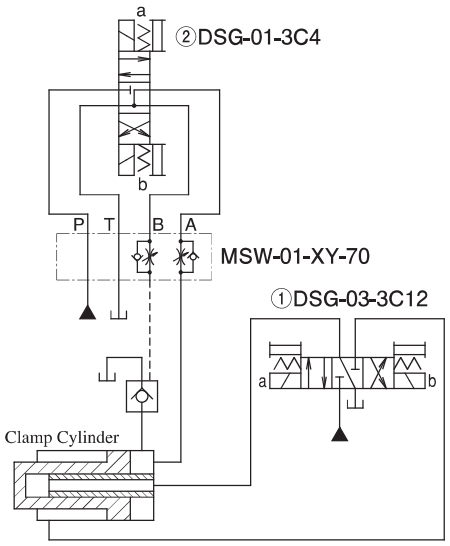
MSA-01-Y

- MSB-01: Flow control part is built in the left side.
- MSW-01: Flow control part is built in the both left and right sides.

Item	Name of Parts	Part Numbers	Qty.	
			MSA,MSB	MSW
1	Back-up Ring	BR JIS B 2401-4-T2-P6	1	2
2	O-Ring	OR NBR-70-1 P6-N	1	2
3	O-Ring	OR NBR-90 P9-N	4	4
4	O-Ring	OR NBR-90 P18-N	2	2

Application

- Circuit of Clamp Cylinder for Injection Molding Machine

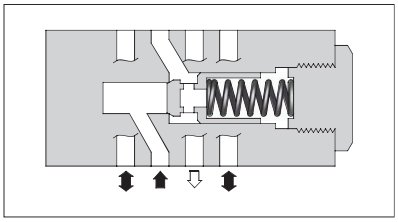


Operation Sequence

Clamp Cylinder	Advance	End Point Pressurization	Decompression	Retreat
Solenoid Operated Directional Valve ①	Sol.a ON	———	Center Position	Sol.b ON
Solenoid Operated Directional Valve ②	Sol.b ON	Sol.a ON	Sol.b ON	———

Check Modular Valves





Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MC∗-01-∗-70	35	60

Model Number Designation

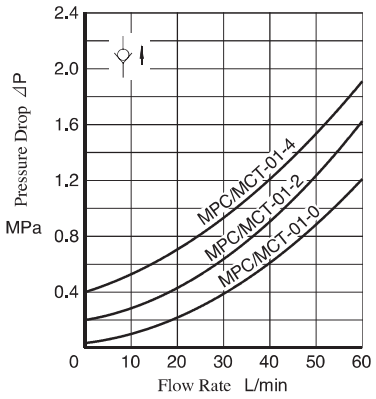
MCP	–01	–0	–70
Series Number	Valve Size	Cracking Pressure MPa	Design Number
MCP: Check Valve for P-Line **MCA:** Check Valve for A-Line **MCB:** Check Valve for B-Line **MCT:** Check Valve for T-Line **MCW:** Check Valve for A-Line & B-Line	**01**	**0:** 0.035 **2:** 0.2 **4:** 0.4	**70**

Typical Performance Characteristics

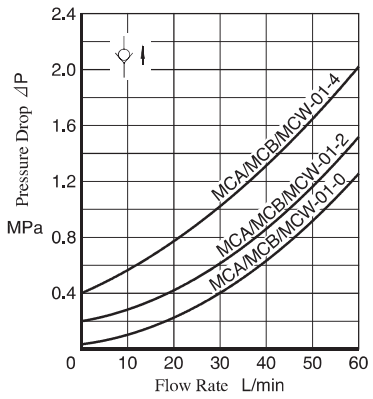
Hydraulic Fluid:Viscosity 35 mm²/s, Specific Gravity 0.850

Pressure Drop for Free Flow

MCP/MCT-01

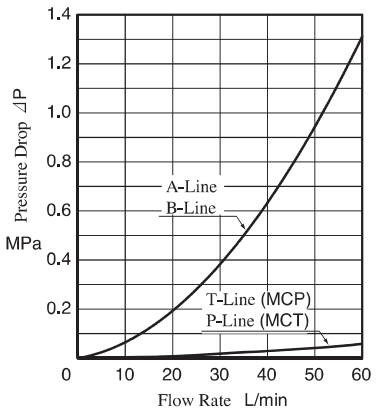


MCA/MCB/MCW-01

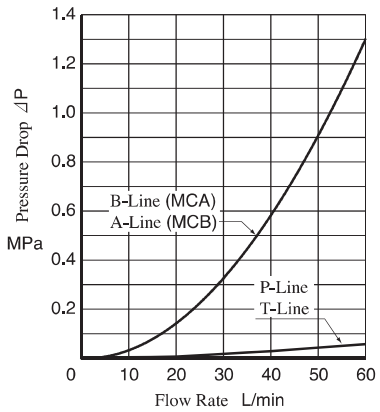


Pressure Drop of each line

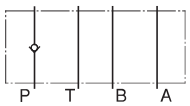
MCP/MCT-01



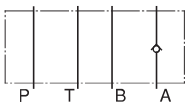
MCA/MCB/MCW-01



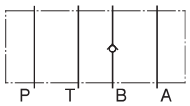
Graphic Symbols



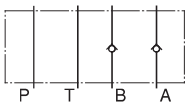
MCP-01



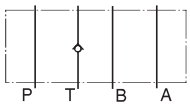
MCA-01



MCB-01

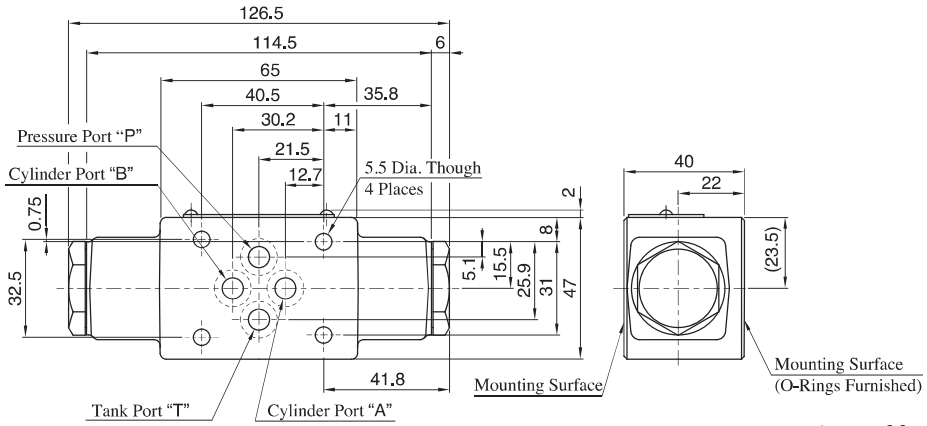


MCW-01



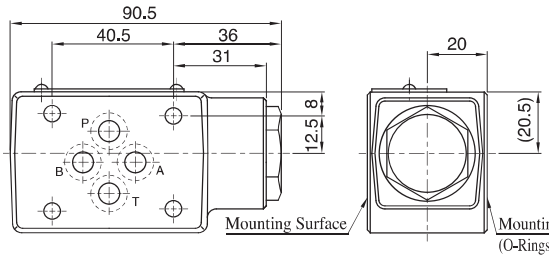
MCT-01

MCA-01
MCB-01
MCW-01

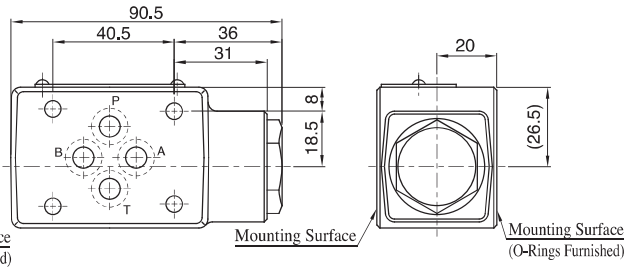


Approx. Mass.....1.2 kg

MCP-01



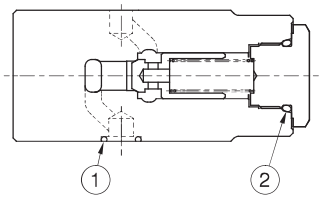
MCT-01



●Please refer to the drawing above (MCA-01/MCB-01/MCW-01) for other dimensions. Approx. Mass.....1.0 kg

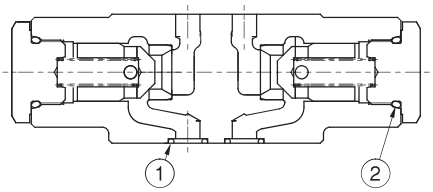
List of Seals

MCP-01
MCT-01



Item	Name of Parts	Part Numbers	Qty.
1	O-Ring	OR NBR-90 P9-N	4
2	O-Ring	OR NBR-90 P18-N	1

MCA-01
MCB-01
MCW-01



Please refer to the drawing above for MCW-01.

●MCA-01 does not have poppet, spring or seat built in the left side.

●MCB-01 does not have poppet, spring or seat built in the right side.

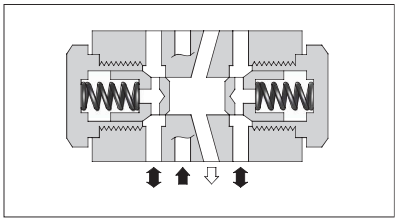
Item	Name of Parts	Model of Parts	Qty.
1	O-Ring	OR NBR-90 P9-N	4
2	O-Ring	OR NBR-90 P18-N	2

Anti-Cavitation Modular Valves



Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MAC-01-30	31.5	35

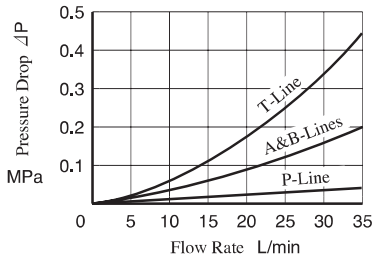


Model Number Designation

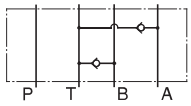
MAC	–01	–30
Series Number	Valve Size	Design Number
MAC: Anti-Cavitation Valve	**01**	**30**

Pressure Drop

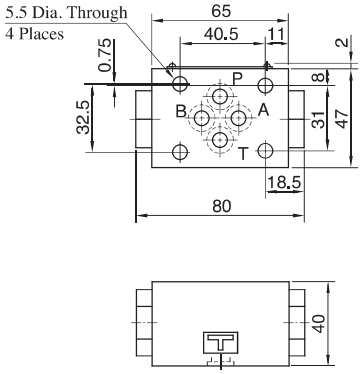
Hydraulic Fluid: Viscosity 35 mm²/s, Specific Gravity 0.850



Graphic Symbol

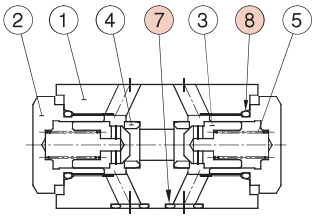


MAC-01



Approx. Mass.....0.8 kg

List of Seals
MAC-01



Item	Name of Parts	Part Numbers	Qty.
7	O-Ring	OR NBR-90 P9-N	4
8	O-Ring	OR NBR-90 P18-N	2

Pilot Operated Check Modular Valves

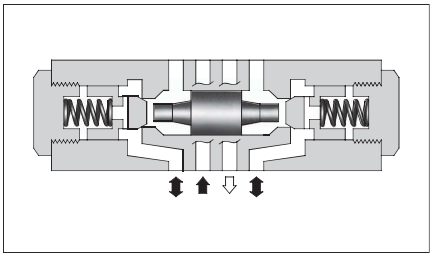
Specifications

Model Numbers		Max. Operating Pressure MPa	Max. Flow L/min
Standard	MP∗-01-∗-70	35	60
Low Pilot Pressure Control Type	MP∗-01-∗-L-70		

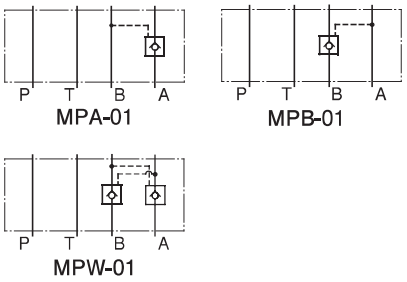


Model Number Designation

MPA	–01	–2	–L	–70
Series Number	Valve Size	Cracking Pressure MPa	Pilot Operation Format	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	**01**	**0:** 0.035 **2:** 0.2 **4:** 0.4	**None:** Standard **L:** Low Pilot Pressure Type	**70**



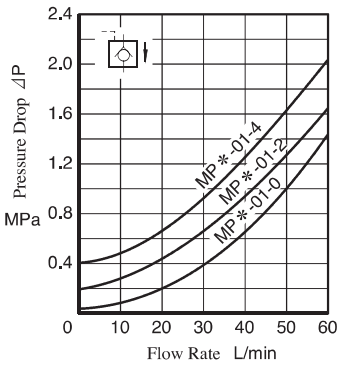
Graphic Symbols



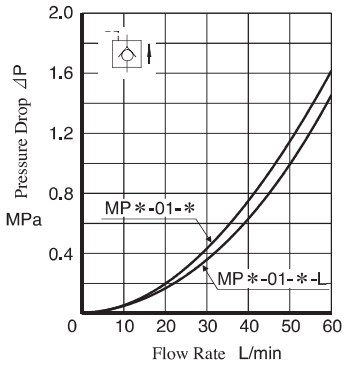
Typical Performance Characteristics

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

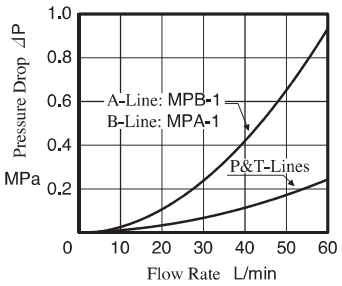
Pressure Drop for Free Flow



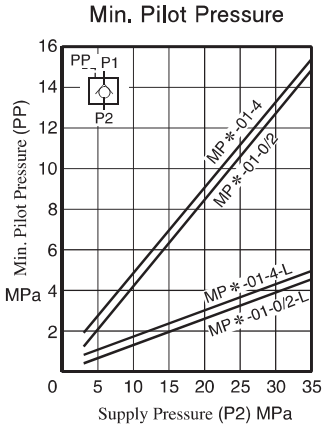
Pressure Drop for Reversed Controlled Flow



Pressure Drop

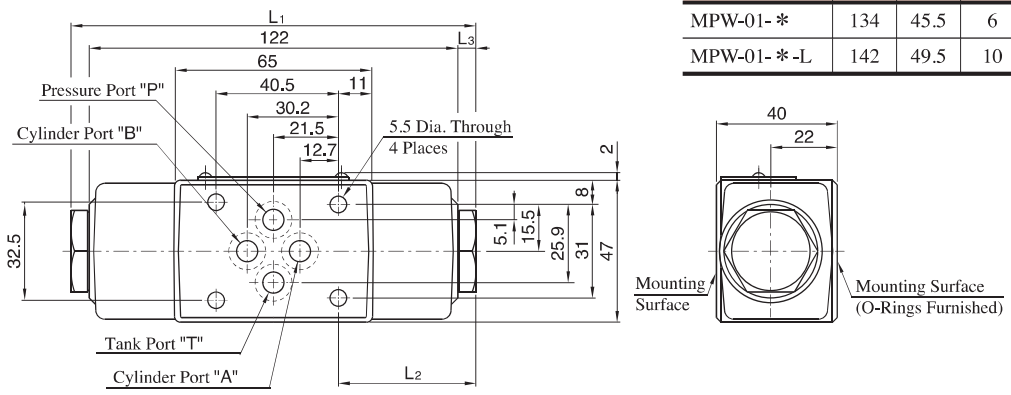


Min. Pilot Pressure

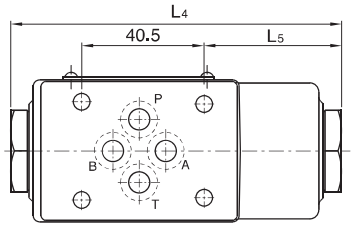


MPW-01

Model Numbers	L_1	L_2	L_3	Approx. Mass kg
MPW-01-*	134	45.5	6	1.4
MPW-01-*-L	142	49.5	10	1.45



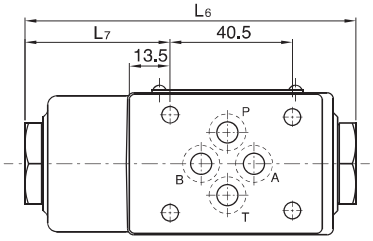
MPA-01



Model Numbers	L_4	L_5	Approx. Mass kg
MPA-01-*	109.5	45.5	1.15
MPA-01-*-L	113.5	49.5	1.2

●Please refer to the drawing above (MPW-01) for other dimensions.

MPB-01

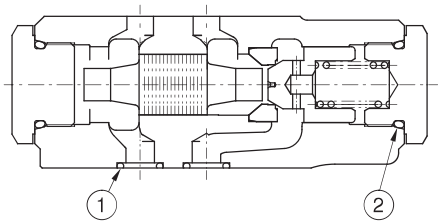


Model Numbers	L_6	L_7	Approx. Mass kg
MPB-01-*	109.5	48	1.15
MPB-01-*-L	113.5	52	1.2

●Please refer to the drawing above (MPW-01) for other dimensions.

List of Seals

MPA-01
MPB-01
MPW-01



MPA-01

Item	Name of Parts	Part Numbers	Qty.
1	O-Ring	OR NBR-90 P9-N	4
2	O-Ring	OR NBR-90 P18-N	2

●MPW-01 has a check valve built in the left side.
●MPW-01 has check valves built in the both left and right sides.

End Plates

Blocking plates are used for auxiliary mounting surface or for closing unnecessary circuits.
Bypass plates are used for unidirectional circuits that require no solenoid operated directional valves.

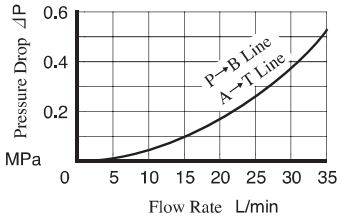


Model Number Designation

MDC	–01	–A	–30
Series Number	Plate Size	Type of Plate	Design Number
MDC: End Plate	**01**	**A:** Blocking Plate **B:** Bypass Plate	**30**

Typical Performance Characteristics

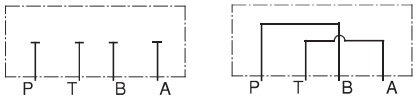
Hydraulic Fluid: Viscosity 35 mm²/s, Specific Gravity 0.850



Specifications

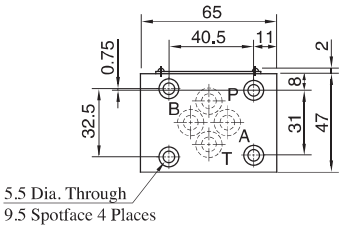
Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MDC-01-*-30	31.5	35

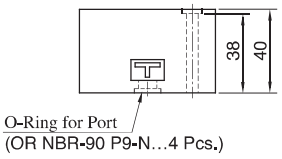
Graphic Symbols



MDC-01-A MDC-01-B

MDC-01





Approx. Mass.....1 kg

Connecting Plates

These plates are used for detecting pressure of each line.



Model Number Designation

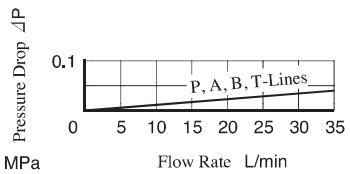
MDS	–01	–PA	–30
Series Number	Plate Size	Type of Detecting Line	Design Number
MDS: Connecting Plate	**01**	**PA:** P&A-Lines **PB:** P&B-Lines **AT:** A&T-Lines	**30**

Specifications

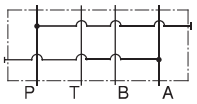
Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MDS-01-*-30	31.5	35

Pressure Drop

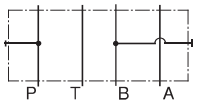
Hydraulic Fluid: Viscosity 35 mm²/s, Specific Gravity 0.850



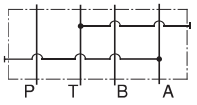
Graphic Symbols



MDS-01-PA

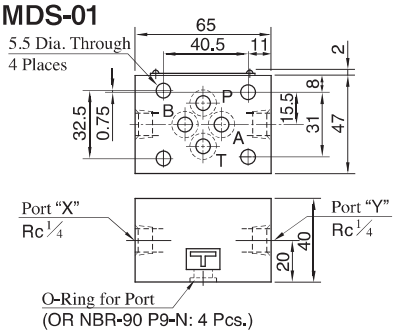


MDS-01-PB



MDS-01-AT

MDS-01



Approx. Mass.....0.8 kg

Model Numbers	Pressure Detecting Line	
	Port "X"	Port "Y"
MDS-01-PA	P-Line	A-Line
MDS-01-PB	B-Line	P-Line
MDS-01-AT	T-Line	A-Line

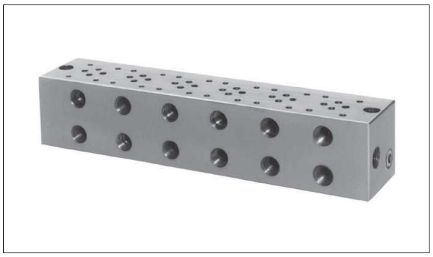
Base Plates For Modular Valves

Specifications

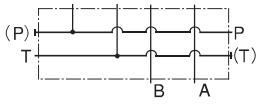
Max. Operating Pressure……25 MPa

Model Number Designation

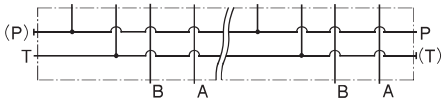
MMC	–01	–6	–40
Series Number	Plate Size	Number of Stations	Design Number
MMC: Base Plate	**01**	**1:** 1 Station **6:** 6 Stations **2:** 2 Stations **7:** 7 Stations **3:** 3 Stations **8:** 8 Stations **4:** 4 Stations **9:** 9 Stations **5:** 5 Stations **10:** 10 Stations	**40**



Graphic Symbols

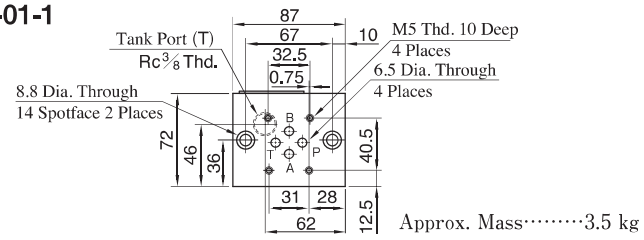


MMC-01-1

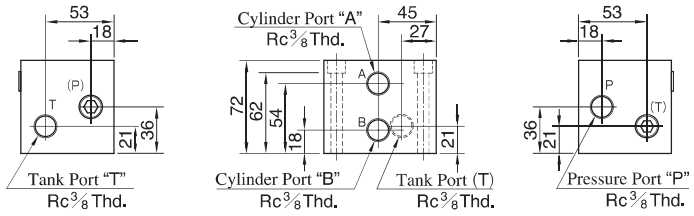


MMC-01-2~10

MMC-01-1

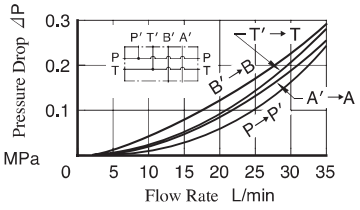


Approx. Mass·····3.5 kg

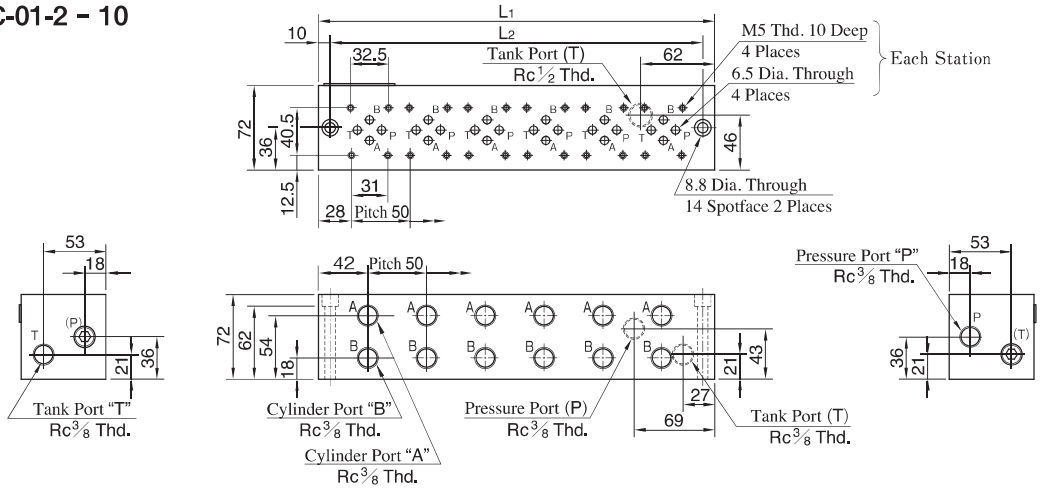


Pressure Drop

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



MMC-01-2 – 10



Model Numbers	L1	L2	Mass kg
MMC-01-2	137	117	5.5
MMC-01-3	187	167	7.0
MMC-01-4	237	217	8.5
MMC-01-5	287	267	10.0
MMC-01-6	337	317	11.5

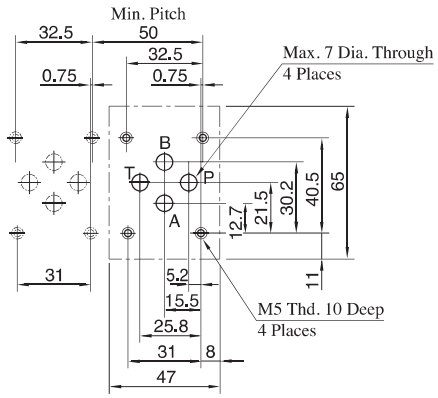
Model Numbers	L1	L2	Mass kg
MMC-01- 7	387	367	13.0
MMC-01- 8	437	417	14.5
MMC-01- 9	487	467	16.0
MMC-01-10	537	517	17.5

Instructions

- Port Used: Base plate has three (two, in case of 1 station type) pressure port "P"s and four tank port "T"s. Any one of these ports or two or more ports may be used. However, please note that the ports marked with (P) or (T) in the drawing are normally plugged. Remove the plugs when using such ports. Make sure that ports that are not currently used are properly plugged.

Interface Mounting Surface Dimensions for 01 Series Modular Valve

When standard base plates (MMC-01) are not used, the mounting surface described below must be prepared. The mounting surface should have a good machined finish. ($\frac{1.6}{\nabla}$)



Mounting Bolt Kits For Modular Valves

Valves are mounted with four 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 bolt kit, be sure to give the bolt kit model number from the table below.



Model Number Designation

MBK	–01	–02	–70
Series Number	Size of Modular Valve	Bolt Number	Design Number
MBK : Bolt Kits for Modular Valves	01	01, 02, 03, 04, 05 (Refer to the following chart)	70

Bolt Kits Selection Chart

Model Numbers	Quantity of valves to be stacked			Approx. Mass g	Max. Operating Pressure MPa
	Solenoid Operated Directional Valve (∗-DSG-01)	End Plate (MDC-01)	Modular Valve & Connecting Plate (M∗∗-01) ★2		
MBK–01–01–70	1	0	1	85	35
	0	1			
MBK–01–02–70	1	0	2	110	35
	0	1			
MBK–01–03–70	1	0	3	135	35
	0	1			
MBK–01–04–70 ★1	1	0	4	160	25
	0	1			
MBK–01–05–70	1	0	0	32	35
	0	1			

★1. In case of MBK-01-04-70, operating pressure is restricted at 25 MPa or less.
★2. Two Pressure Reducing Valve(MRDP-01), that height of tightening position is equal to 2 pieces of other modular valves, so that if use Two Pressure Reducing Valves, add 1 piece to the actual using quantity.

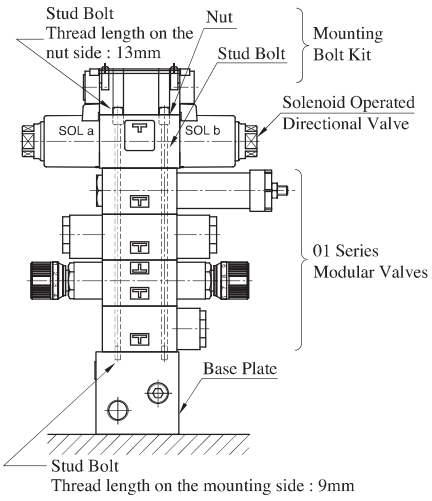
Bolt Kit Composition

Stud Bolt..... 4 Pcs.
Nut ..... 4 Pcs. } 1 Set

Note: In case of bolt kit model number having "05", four hexagon socket head cap screws only.

Tightening Torque:

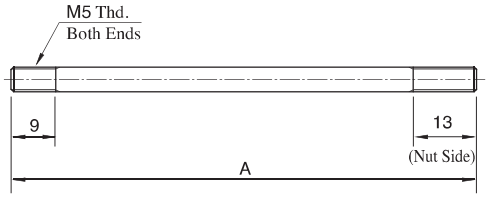
Operating Pressure MPa	Tightening Torque Nm
25 or less	5-7
More than 25	6-7



Stacking Example

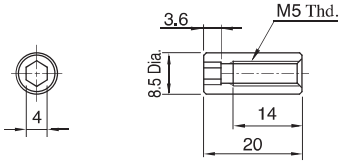
MBK-01

Stud Bolt



Bolt Numbers	A mm
01	98
02	138
03	178
04	218
05	Socket Head Cap Screw M5×45 L

Nut



Interchangeability in Installation between Current and New Design

The following models of 01 Series Modular Valves have changed to 70 design numbers model to operate higher pressure and modification for large flow use.

Name	Model Numbers
Relief Modular Valves	MB＊-01-＊-＊-70
Reducing Modular Valves	MR＊-01-＊-＊-70
Sequence Modular Valves	MHP-01-＊-＊-70
Counterbalance Modular Valves	MHA/MHB-01-＊-70
Throttle and Check Modular Valves	MS＊-01-＊＊-70
Check Modular Valves	MC＊-01-＊-70
Pilot Operated Check Modular Valves	MP＊-01-＊-＊-70
Bolt Kits	MBK-01-＊-70

●Major Changes

(1) Max.Operating Pressure (35MPa) & Max. Flow have substancially increased respectively.

(2) Possible to select "B" port side of the pressure adjustment screw direction about 3 models below.

①Relief Modular Valves (only for P-Line)

②Reducing Modular Valves (for all P&A&B-Line)

③Sequence Modular Valves

(3) Add B-Line for Counterbalance Modular Valves.

(4) Selectable low pilot operation type as standard model for Pilot Operated Check Modular Valves.

●Mounting Interchangeability

Interchangeability	Details
Yes	・Mounting surface is not changed from current models. ・If use the adjustment pressure as more than 25 MPa, have to select 70 design bolt kits (MBK-01). Mounting bolt kits of 70 design, the length of both sides screw is different, so refer to the assembly example about 01 series modular valves on page F-41.

●Specifications

Max. Operating Pressure

Name	Current		New	
	Model Numbers	Max. Operating Pressure MPa	Model Numbers	Max. Operating Pressure MPa
Relief Modular Valves	MB＊-01-＊-30	21	MB＊-01-＊-＊-70	35
Reducing Modular Valves	MR＊-01-＊-30	31.5	MR＊-01-＊-＊-70	
Sequence Modular Valves	MHP-01-＊-30	25	MHP-01-＊-＊-70	
Counterbalance Modular Valves	MHA-01-＊-30	25	MHA/MHB-01-＊-70	
Throttle and Check Modular Valves	MS＊-01-＊＊-50	31.5	MS＊-01-＊＊-70	
Check Modular Valves	MC＊-01-＊-30	31.5	MC＊-01-＊-70	
Pilot Operated Check Modular Valves	MP＊-01-＊-40	31.5	MP＊-01-＊-70	
	MP＊-01-＊-4001	31.5	MP＊-01-＊-L-70	

Max. Flow

Name	Current		New	
	Model Numbers	Max. Flow L/min	Model Numbers	Max. Flow L/min
Relief Modular Valves	MB＊-01-＊-30	35	MB＊-01-＊-＊-70	60
Reducing Modular Valves	MR＊-01-＊-30	35	MR＊-01-＊-＊-70	60
Sequence Modular Valves	MHP-01-＊-30	35	MHP-01-＊-＊-70	60
Counterbalance Modular Valves	MHA-01-＊-30	35	MHA/MHB-01-＊-70	60
Throttle and Check Modular Valves	MS＊-01-＊＊-50	60	MS＊-01-＊＊-70	80
Check Modular Valves	MC＊-01-＊-30	35	MC＊-01-＊-70	60
Pilot Operated Check Modular Valves	MP＊-01-＊-40	35	MP＊-01-＊-70	60
	MP＊-01-＊-4001	35	MP＊-01-＊-L-70	60

●Model Number Designation

Function Addition

Name	Model Numbers	Additional Functions
Relief Modular Valves	MBP-01-＊-B-70	Direction of the pressure adjustment screw, selectable B port side
Reducing Modular Valves	MR＊-01-＊-B-70	Direction of the pressure adjustment screw, selectable B port side
Sequence Modular Valves	MHP-01-＊-B-70	Direction of the pressure adjustment screw, selectable B port side
Counterbalance Modular Valves	MHB-01-＊-70	Add the Counterbalance Modular Valves for B-Line
Pilot Operated Check Modular Valves	MP＊-01-＊-L-70	Low pilot operation type, selectable as standard product

Pressure Adjustment Range

Name	Current		New	
	Model Numbers	Pres. Adj. Range MPa	Model Numbers	Pres. Adj. Range MPa
Relief Modular Valves	MB＊-01-＊-30	**C:** ★-14 **H:** 7-21	MB＊-01-＊-＊-70	**B:** ★-7 **C:** 3.5-14 **H:** 7-21 **K:** 14-35
Reducing Modular Valves	MR＊-01-＊-30	**B:** ★-7 **C:** 3.5-14 **H:** 7-21	MR＊-01-＊-＊-70	**A:** ★-3.5 **B:** 0.8-7 **C:** 3.5-14 **H:** 7-21
Sequence Modular Valves	MHP-01-＊-30	**C:** ★-14 **H:** 7-21	MHP-01-＊-＊-70	**B:** ★-7 **C:** 3.5-14 **H:** 7-21 **K:** 14-35
Counterbalance Modular Valves	MHA-01-＊-30		MHA/MHB-01-＊-70	

Cracking Pressure

Name	Current		New	
	Model Numbers	Cracking Pressure MPa	Model Numbers	Cracking Pressure MPa
Pilot Operated Check Modular Valves	MP＊-01-＊-40	**2:** 0.2 **4:** 0.4	MP＊-01-＊-70	**0:** 0.035 **2:** 0.2 **4:** 0.4
	MP＊-01-＊-4001		MP＊-01-＊-L-70	

●Typical Performance Characteristics

Characteristics of all models have been changed.

● Approx. Mass

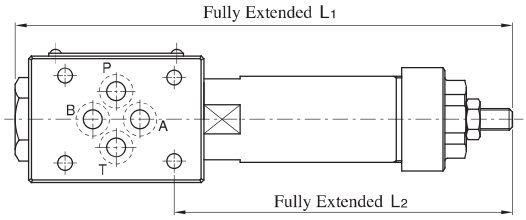
Name	Current		New	
	Model Numbers	Approx. Mass kg	Model Numbers	Approx. Mass kg
Relief Modular Valves	MB＊-01-＊-30	1.1	MBP-01-B/C-70 MBP-01-B/C-B-70 MBA-01-B/C-70 MBB-01-B/C-70	1.15
			MBP-01-H-70 MBP-01-H-B-70 MBA-01-H-70 MBB-01-H-70	1.25
Reducing Modular Valves	MR＊-01-B/C-30	1.1	MR＊-01-B/C-70	1.15
	MR＊-01-H-30		MR＊-01-H-70	1.25
Sequence Modular Valves	MHP-01-＊-30	1.1	MHP-01-B/C-＊-70	1.45
			MHP-01-H-＊-70	1.55
Counterbalance Modular Valves	MHA-01-＊-30	1.3	MHA-01-B/C-＊-70	1.65
			MHB-01-B/C-＊-70	1.65
			MHA/MHB-01-H-＊-70	1.75
Throttle and Check Modular Valves	MSA/MSB-01-＊＊-50	1.3	MSA/MSB-01-＊＊-70	1.15
	MSW-01-＊＊-50	1.5	MSW-01-＊＊-70	1.3
Check Modular Valves	MCP/MCT-01-＊-30	1.1	MCP/MCT-01-＊-70	1.0
	MCA/MCB/MCW-01-＊-30	1.3	MCA/MCB/MCW-01-＊-70	1.2
Pilot Operated Check Modular Valves	MP＊-01-＊-40/4001	1.2	MPA/MPB-01-＊-70	1.15
			MPW-01-＊-70	1.4
			MPA/MPB-01-＊-L-70	1.2
			MPW-01-＊-L-70	1.45
Mounting Bolt Kits	MBK-01-01-30	0.060	MBK-01-01-70	0.085
	MBK-01-02-30	0.100	MBK-01-02-70	0.110
	MBK-01-03-30	0.130	MBK-01-03-70	0.135
	MBK-01-05-30	0.040	MBK-01-05-70	0.032

Dimensions

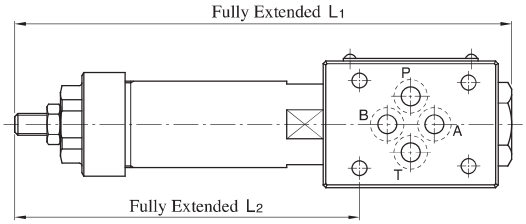
As of fully extended dimensions, height (40mm) and depth (47mm) are same between current and new models. Width is same except for the models below.

(1) Relief Modular Valves

MBP-01
MBB-01



MBP-01-＊-B
MBA-01

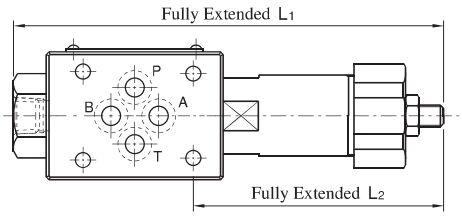


	Model Numbers	L1	L2
New	MBP-01-B-70	151	92
	MBB-01-B-70		
	MBP-01-K-70	184.5	125.5
	MBB-01-K-70		
	MBP-01-B-B-70	151	94.5
	MBP-01-C-B-70		
	MBP-01-H-B-70	166.5	110
	MBA-01-B-70	151	94.5
	MBP-01-K-B-70	184.5	128
	MBA-01-K-B-70		

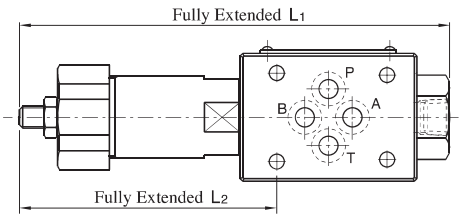
★1. Pressure adjustment range “B”, “K” newly added.
★2. Pressure adjustment screw direction B port side, newly added for P-Line.

(2) Reducing Modular Valves

MR＊-01



MR＊-01-＊-B

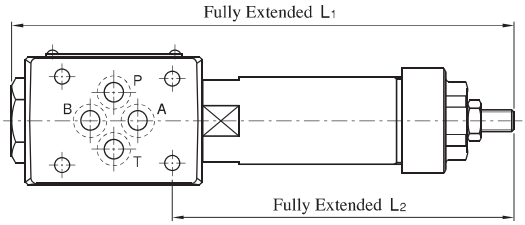


	Model Numbers	L1	L2
New	MRA-01-A-70	162.5	96.5
	MR＊-01-A-B-70	162.5	99
	MR＊-01-B-B-70	158	94.5
	MR＊-01-C-B-70		
	MR＊-01-H-B-70	173.5	110

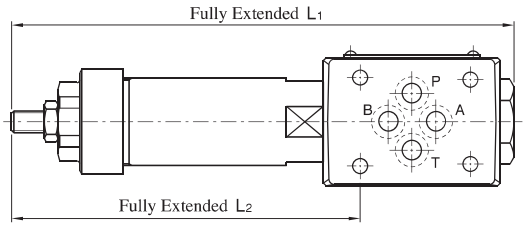
★1. Pressure adjustment range “A” newly added.
★2. Pressure adjustment screw direction B port side, newly added.

(3) Sequence Modular Valves

MHP-01



MHP-01-＊-B

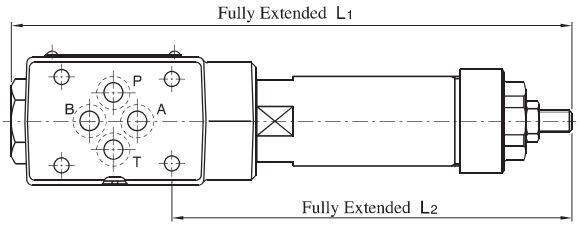


	Model Numbers	L1	L2
New	MHP-01-B-70	151	92
	MHP-01-K-70	184.5	125.5
	MHP-01-B-B-70	151	94.5
	MHP-01-C-B-70		
	MHP-01-H-B-70	166.5	110
	MBP-01-K-B-70	184.5	128

★1. Pressure adjustment range “B”, “K” newly added.
★2. Pressure adjustment screw direction B port side, newly added.

(4) Counterbalance Modular Valves

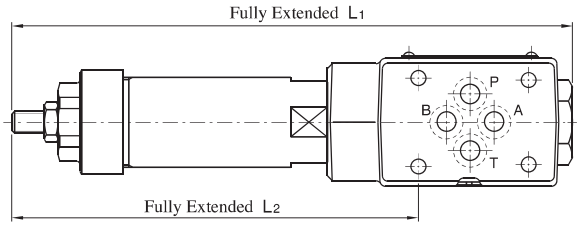
MHA-01



Model Numbers		L1	L2
New	MHA-01-B-70	171	112
	MHA-01-K-70	207.2	148.2

★Pressure adjustment range "B", "K" newly added.

MHB-01

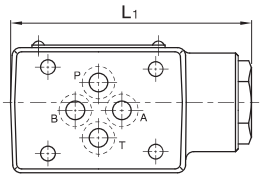


Model Numbers		L1	L2
New	MHB-01-B-70	171	114.4
	MHB-01-C-70		
	MHB-01-H-70	186.5	129.9
	MHB-01-K-70	207.2	150.6

★Newly added for B-Line.

(5) Check Modular Valves

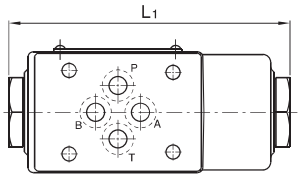
MCP/MCT-01



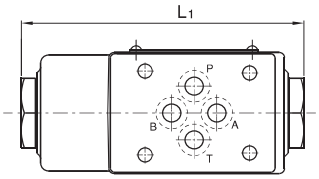
Model Numbers		L1
Current	MCP/MCT-01-*-30	90
New	MCP/MCT-01-*-70	90.5

(6) Pilot Operated Check Modular Valves

MPA-01



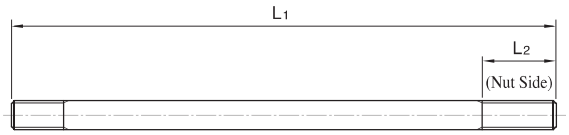
MPB-01



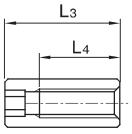
Model Numbers		L1
Current	MPA/MPB-01-*-40	134
	MPA/MPB-01-*-4001	138
New	MPA/MPB-01-*-70	109.5
	MPA/MPB-01-*-L-70	113.5

(7) Mounting Bolt Kits

●Stud Bolt



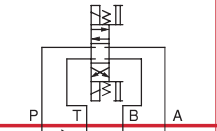
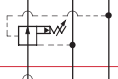
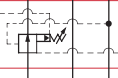
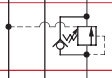
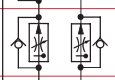
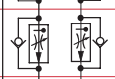
●Nut



Model Numbers		L1	L2	L3	L4
Current	MBK-01-01-30	94	9	15	9
	MBK-01-02-30	134			
	MBK-01-03-30	174			
	MBK-01-04-30	214			
New	MBK-01-01-70	98	13	20	14
	MBK-01-02-70	138			
	MBK-01-03-70	178			
	MBK-01-04-70	218			

03 Series Modular Valves

Type of Modular Valve

Class	Name and Model Numbers	Graphic Symbols	Page
	Solenoid Operated Directional Valves (S-) DSG-03-＊＊＊-＊-50 E-DSG-03-＊＊＊-D＊-50 T-DSG-03-＊＊＊-D24＊-50 G-DSG-03-＊＊＊-＊-51		★
Pressure Control Valves	Relief Valves (for "P-Line") MBP-03-＊-70		F-48
	Relief Valves (for "A-Line") MBA-03-＊-70		F-48
	Relief Valves (for "B-Line") MBB-03-＊-70		F-48
	Relief Valves (for "A&B-Lines") MBW-03-＊-70		F-48
	Reducing Valves (for "P-Line") MRP-03-＊-70		F-50
	Reducing Valves (for "A-Line") MRA-03-＊-70		F-50
	Reducing Valves (for "B-Line") MRB-03-＊-70		F-50
	Reducing Valves for Low Pressure Setting (for "P-Line") MRLP-03-10		F-52
	Reducing Valves for Low Pressure Setting (for "A-Line") MRLA-03-10		F-52
	Reducing Valves for Low Pressure Setting (for "B-Line") MRLB-03-10		F-52
	Sequence Valves (for "P-Line") MHP-03-＊-20		F-54
	Counterbalance Valves (for "A-Line") MHA-03-＊-20		F-54
	Counterbalance Valves (for "B-Line") MHB-03-＊-20		F-54
Flow Control Valves	Flow Control Valves (for "P-Line") MFP-03-11		F-56
	Flow Control and Check Valves (for "A-Line", Meter-in) MFA-03-X-11		F-56
	Flow Control and Check Valves (for "A-Line", Meter-in) MFA-03-Y-11		F-56
	Flow Control and Check Valves (for "B-Line", Meter-out) MFB-03-X-11		F-56
	Flow Control and Check Valves (for "B-Line", Meter-in) MFB-03-Y-11		F-56
	Flow Control and Check Valves (for "A&B-Lines", Meter-out) MFW-03-X-11		F-56
	Flow Control and Check Valves (for "A&B-Lines", Meter-in) MFW-03-Y-11		F-56
	Temperature Compensated Throttle and Check Valves (for "A-Line", Meter-out) MSTA-03-X-20		F-58
	Temperature Compensated Throttle and Check Valves (for "B-Line", Meter-out) MSTB-03-X-20		F-58

Class	Name and Model Numbers	Graphic Symbols	Page
		P T B A	
Flow Control Valves	Temperature Compensated Throttle and Check Valves (for "A&B-Lines", Meter-out) MSTW-03-X-20		F-58
	Throttle Valves (for "P-Line") MSP-03-30		F-60
	Check and Throttle Valves (for "P-Line") MSCP-03-20		F-61
	Throttle and Check Valves (for "A-Line", Meter-out) MSA-03-X-70		F-62
	Throttle and Check Valves (for "A-Line", Meter-in) MSA-03-Y-70		F-62
	Throttle and Check Valves (for "B-Line", Meter-out) MSB-03-X-70		F-62
	Throttle and Check Valves (for "B-Line", Meter-in) MSB-03-Y-70		F-62
	Throttle and Check Valves (for "A&B-Lines", Meter-out) MSW-03-X-70		F-62
	Throttle and Check Valves (for "A&B-Lines", Meter-in) MSW-03-Y-70		F-62
Directional Control Valves	Check Valves (for "P-Line") MCP-03-＊-70		F-64
	Check Valves (for "A-Line") MCA-03-＊-70		F-64
	Check Valves (for "B-Line") MCB-03-＊-70		F-64
	Check Valves (for "T-Line") MCT-03-＊-70		F-64
	Check Valves (for "A&B-Lines") MCW-03-＊-70		F-64
	Check Valves (for "P&T-Lines") MCPT-03-P＊-T＊-10		F-66
	Anti-Cavitation Valves MAC-03-10		F-67
	Pilot Operated Check Valves (for "A-Line") MPA-03-＊-＊-70		F-68
	Pilot Operated Check Valves (for "B-Line") MPB-03-＊-＊-70		F-68
	Pilot Operated Check Valves (for "A&B-Lines") MPW-03-＊-＊-70		F-68
Modular Plates and Mounting Bolts	End Plates (Blocking Plates) MDC-03-A-10		F-70
	End Plates (Bypass Plates) MDC-03-B-10		F-70
	Connecting Plates MDS-03-10		F-70
	Base Plates MMC-03-T-＊-21		F-71
	Bolt Kits MBK-03-＊-10		F-73

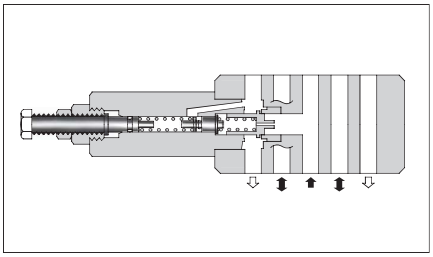
★Refer to the relevant pages of catalog "E: DIRECTIONAL CONTROLS"

Relief Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MB＊-03-＊-70	35	120





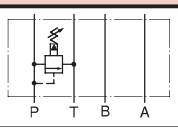
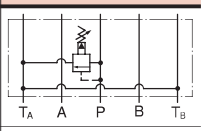
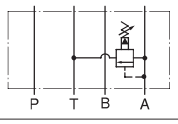
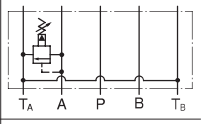
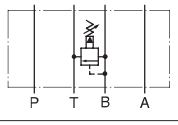
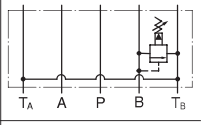
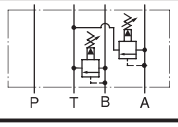
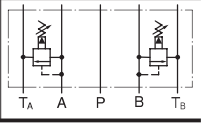
Model Number Designation

MBA	–03	–B	–70
Series Number	Valve Size	Pres. Adj. Range MPa	Design Number
MBP: Relief Valve for P-Line **MBA:** Relief Valve for A-Line **MBB:** Relief Valve for B-Line **MBW:** Relief Valve for A&B-Lines	**03**	**B:** ★–7 **C:** 3.5–14 **K:** 7–35	**70**

★See the "Min. Adjustment Pressure" of this page.

Instructions

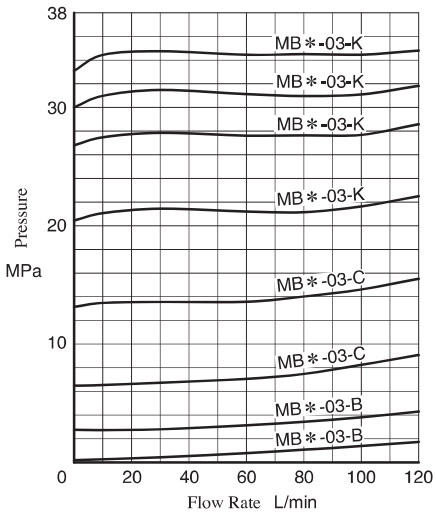
The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of this page. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular valve.
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.
In case of a small flow, the setting pressure may become unstable. To avoid this, refer to the minimum flow characteristic curve of the this page and use the valve within a range as shown with .

Model Numbers	Graphic Symbols	Graphic Symbols
MBP-03		
MBA-03		
MBB-03		
MBW-03		

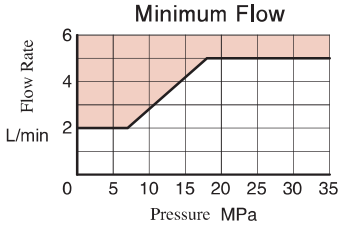
Typical Performance Characteristics

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

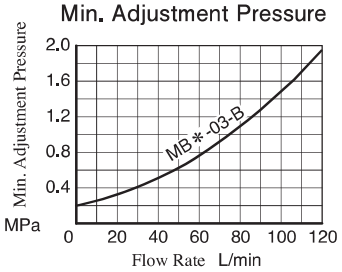
Nominal Override Characteristics



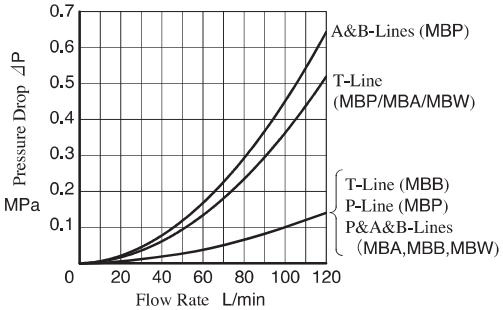
Minimum Flow



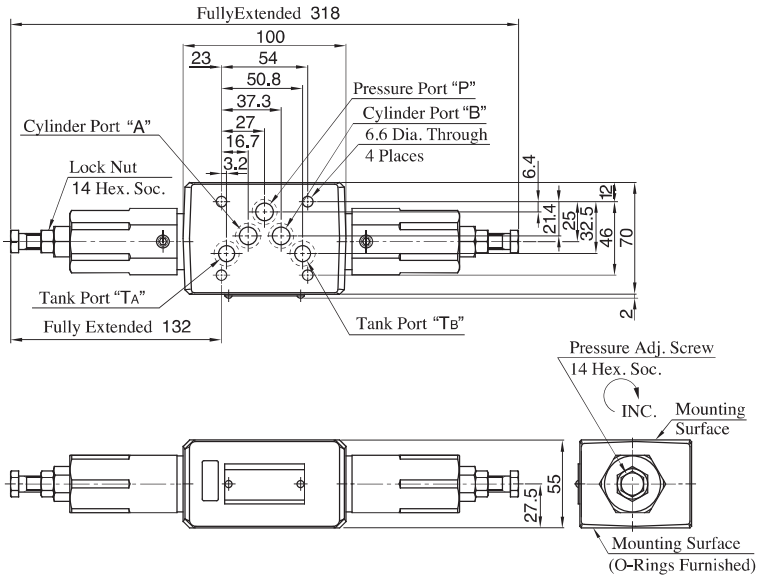
Min. Adjustment Pressure



Pressure Drop

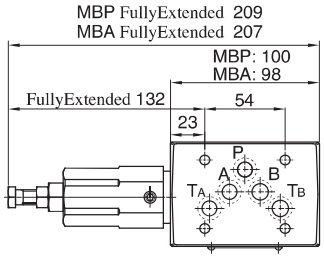


MBW-03



Approx. Mass.....4.0kg

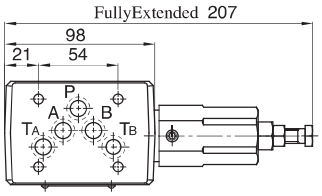
MBP-03, MBA-03



Approx. Mass.....3.4 kg

For other dimensions, refer to (MBW-03) in the drawing left.

MBB-03

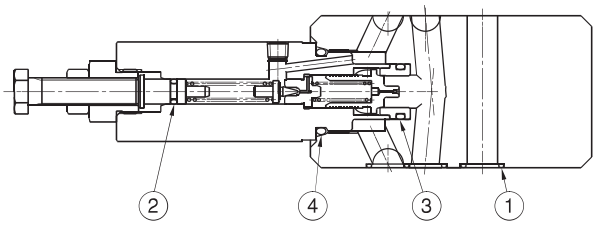


Approx. Mass.....3.4 kg

For other dimensions, refer to (MBW-03) in the drawing left.

List of Seals

MBP-03
MBA-03
MBB-03
MBW-03



MBP-03
MBA-03

- MBB-03:The pressure adjustment part is assembled on the right side.
- MBW-03:The pressure adjustment part is assembled on the both sides.

Item	Name of Parts	Part Numbers	Qty.			
			MBP-03	MBA-03	MBB-03	MBW-03
1	O-Ring	AS568-014 (NBR-90)	5	5	5	5
2	O-Ring	OR NBR-70-1 P6-N	1	1	1	2
3	O-Ring	OR NBR-90 P16-N	1	1	1	2
4	O-Ring	OR NBR-90 P26-N	1	1	1	2

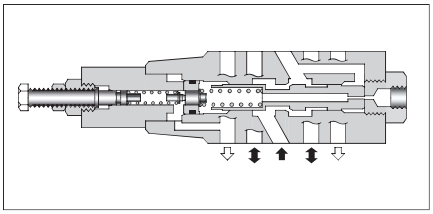
Reducing Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max.Flow L/min
MR＊-03-A-70★	35	80
MR＊-03-B/C/H-70		120

★If the pressure is set below 1.2 MPa, the maximum flow is limited. See the "Min. Adjustment Pressure vs. Max. Flow" of this page.

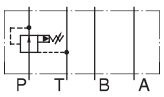
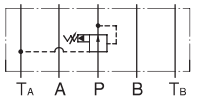
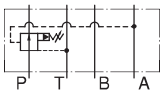
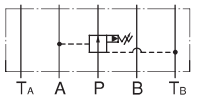
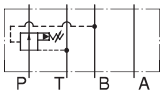
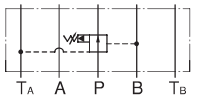




Model Number Designation

MRP	–03	–B	–70
Series Number	Valve Size	Pres. Adj. Range MPa	Design Number
MRP: Reducing Valve for P-Line **MRA:** Reducing Valve for A-Line **MRB:** Reducing Valve for B-Line	**03**	**A:** ★–3.5 **B:** 1–7 **C:** 3.5–14 **H:** 7–31.5	**70**

★See the "Min. Adjustment Pressure vs. Max. Flow" of this page.

Model Numbers	Graphic Symbols	Graphic Symbols
MRP-03		
MRA-03		
MRB-03		

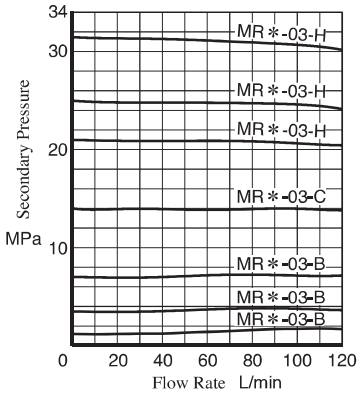
Instructions

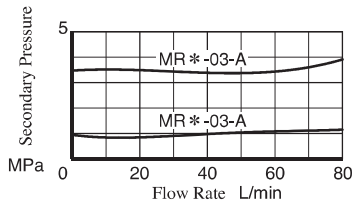
The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of this page. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular valve. To make pressure adjustment, loosen the lock nut and turn the pressure adjustment screw clockwise or anticlockwise. 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

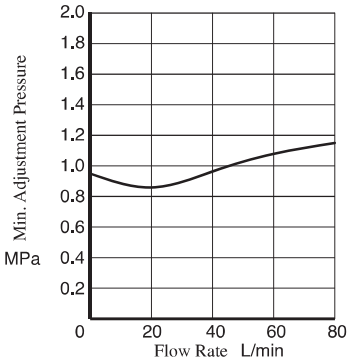
Hydraulic Fluid: Viscosity 35 mm²/s, Specific Gravity 0.850

Nominal Override Characteristics Primary Pressure 35 MPa

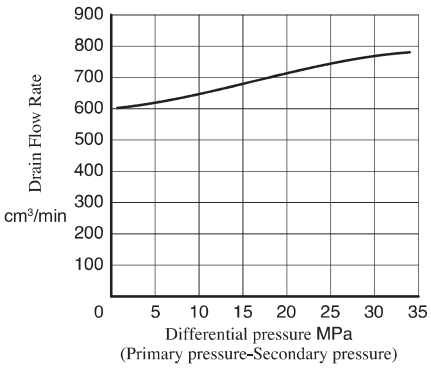




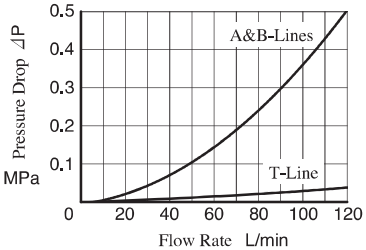
Min. Adjustment Pressure vs. Max. Flow



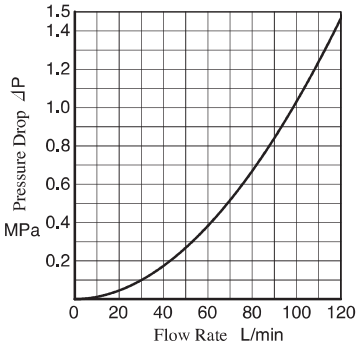
Drain Flow Rate



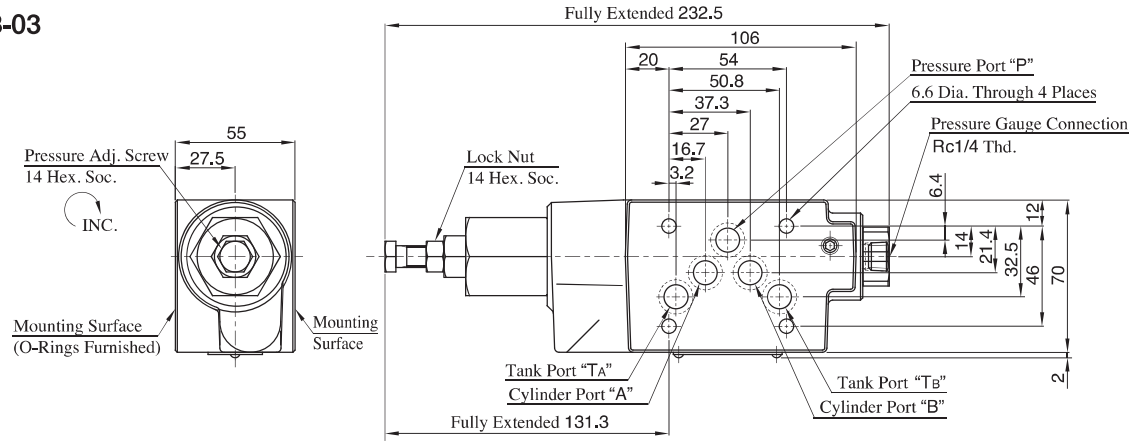
Pressure Drop



Pres. Drop at Spool Fully Open (P-Line)

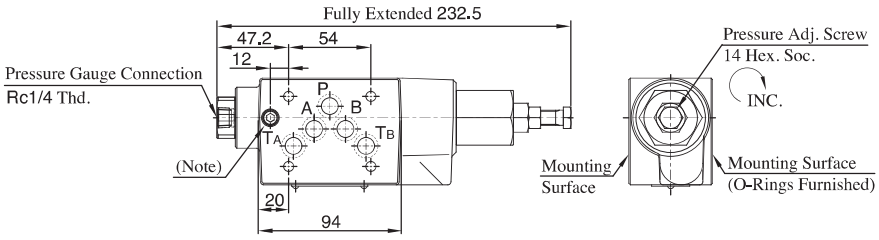


MRP-03
MRB-03



Approx. Mass.....3.8 kg

MRA-03



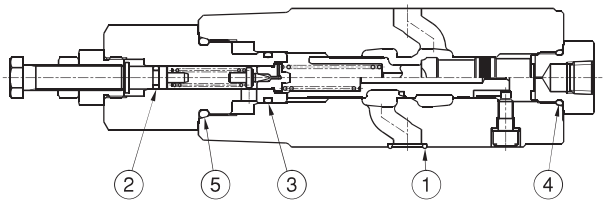
For other dimensions, refer to "MRP-03" in the drawing abobe.

Approx. Mass.....3.8 kg

Note: If mounting surface dimension equipped with the valves based on ISO 4401-05-05-0-05, pilot port of stacking valves will interfere with bolt hole of MRA-03, so check gasket surface of the stacking valves.

List of Seals

MRP-03
MRA-03
MRB-03



MRP-03

Item	Name of Parts	Part Numbers	Qty.
1	O-Ring	AS568-014 (NBR-90)	5
2	O-Ring	OR NBR-70-1 P6-N	1
3	O-Ring	OR NBR-90 P16-N	1
4	O-Ring	OR NBR-90 P18-N	1
5	O-Ring	OR NBR-90 P26-N	1

- MRA-03:The pressure adjustment part is assembled on the right side.
- MRB-03:The pressure adjustment part is assembled on the left side.

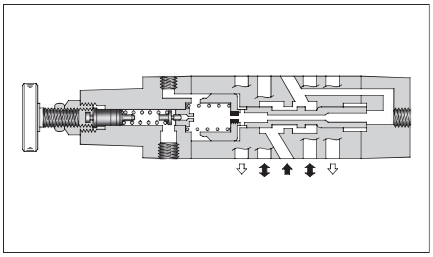
Reducing Modular Valves for Low Pressure Setting

Specifications

Model Numbers	Max. Operating Pressure MPa	Pres. Adj. Range MPa	Max.Flow L/min
MRL＊–03–10	7	0.2-6.5	50 ★

★ If the pressure is set below 0.8 MPa, the maximum flow is limited.
See the "Min. Adjustment Pressure vs. Max. Flow" of this page and during use, stay within the shaded zone on the graph.



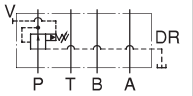
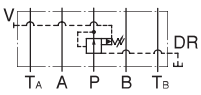
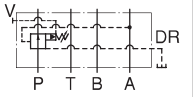
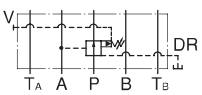
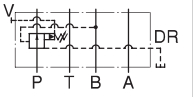
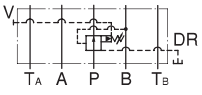


Model Number Designation

MRLP	–03	–10
Series Number	Valve Size	Design Number
MRLP:Low Pressure Setting Type Reducing Valve for P-Line MRLA:Low Pressure Setting Type Reducing Valve for A-Line MRLB:Low Pressure Setting Type Reducing Valve for B-Line	03	10

Instructions

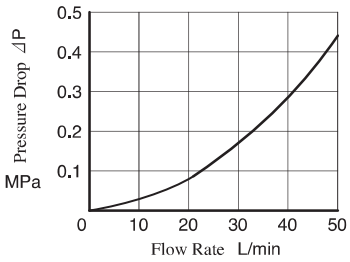
If there is a pressure in drain line, it is added to the secondary setting pressure. Hence, drain line must be connected to tank directly with a low back pressure close to atmospheric pressure.

Model Numbers	Graphic Symbols	Graphic Symbols
MRLP-03		
MRLA-03		
MRLB-03		

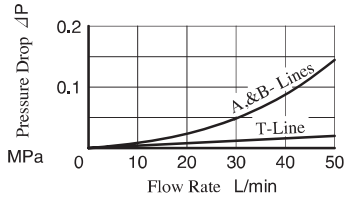
Typical Performance Characteristics

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

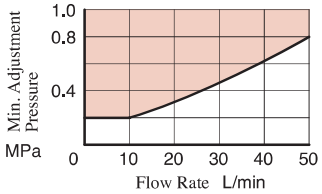
Pres. Drop at Spool Fully Open (P-Line)



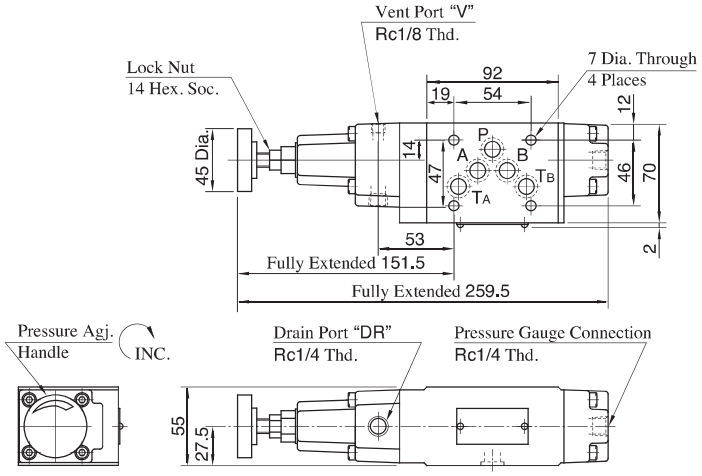
Pressure Drop



Min. Adjustment Pressure vs. Max. Flow

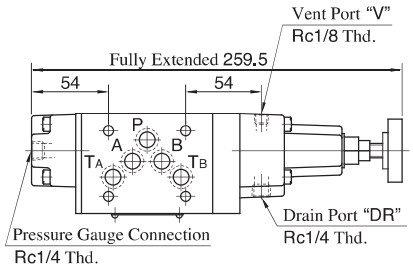


MRLP-03
MRLB-03



Approx. Mass.....4.5 kg

MRLA-03

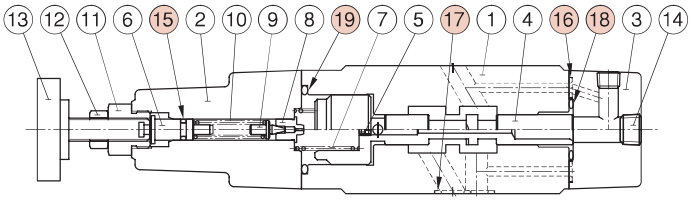


Approx. Mass.....4.5 kg

For other dimensions, refer to "MRLP-03/MRLB-03" in the drawing left.

List of Seals

MRLP-03
MRLA-03
MRLB-03



MRLP-03

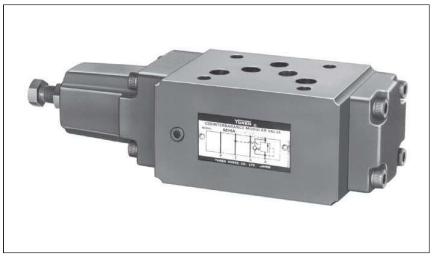
Item	Name of Parts	Part Numbers	Qty.
15	O-Ring	OR NBR-70-1 P6-N	1
16	O-Ring	OR NBR-90 P6-N	2
17	O-Ring	AS568-014 (NBR-90)	5
18	O-Ring	OR NBR-90 P22-N	1
19	O-Ring	OR NBR-90 P32-N	1

- MRLA-03: The pressure adjustment part is assembled on the right side.
- MRLB-03: The cover will be rotated 180 degrees with respect to MRLP.

Sequence Modular Valves / Counterbalance Modular

Specifications

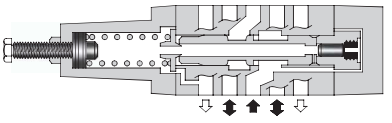
Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min	Free Flow L/min
MHP–03–＊–20	25	50	———
MH＊–03–＊–20			70



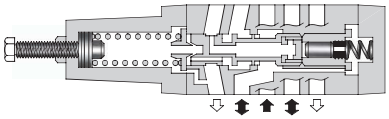
Model Number Designation

MHP	–03	–C	–20
Series Number	Valve Size	Pres. Adj. Range MPa	Design Number
MHP: Sequence Valve for P-Line	03	N: ★–1.8 A: 1.8–3.5 B: 3.5–7 C: 7–14	20
MHA: Counterbalance Valve for A-Line MHB: Counterbalance Valve for B-Line			20

★See the "Min. Adjustment Pressure vs. Max. Flow" of this page.



MHP-03



MHA/MHB-03

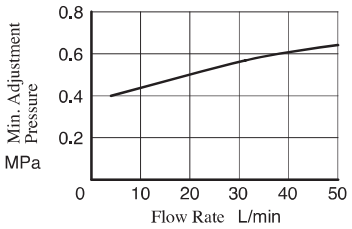
Instructions

The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of this page. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular valve.
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.

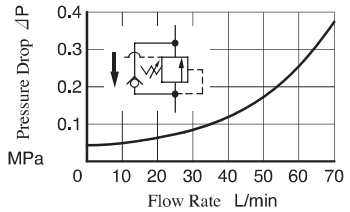
Typical Performance Characteristics

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

Min. Adjustment Pressure
MHP/MHA/MHB-03

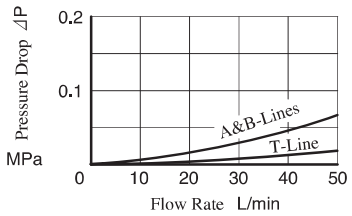


Pressure Drop for Free Flow
MHA/MHB-03

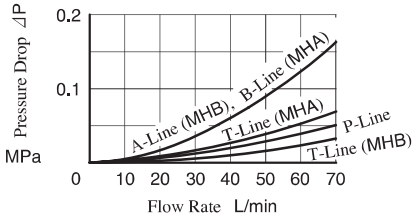


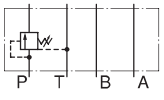
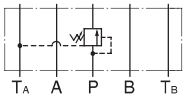
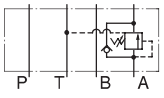
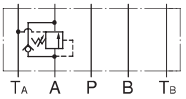
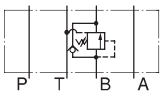
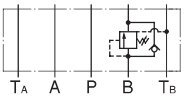
Pressure Drop

MHP-03

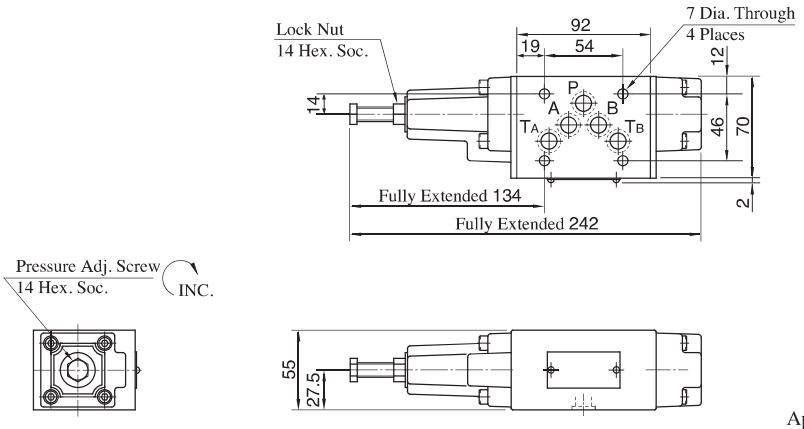


MHA/MHB-03



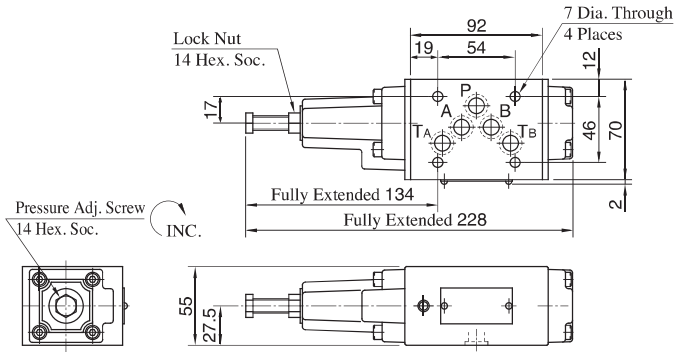
Model Numbers	Graphic Symbols	Graphic Symbols
MHP-03		
MHA-03		
MHB-03		

MHP-03



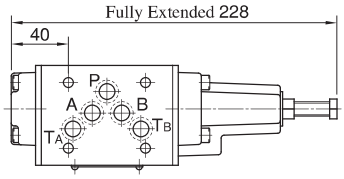
Approx. Mass.....3.5 kg

MHA-03



Approx. Mass.....3.5 kg

MHB-03

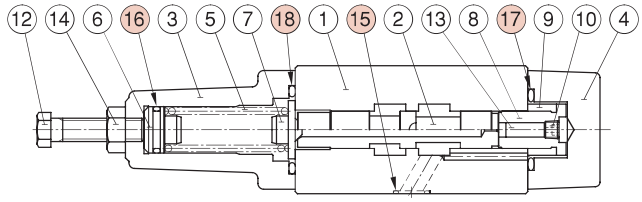


Approx. Mass.....3.5 kg

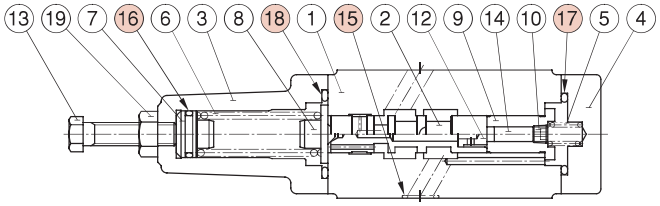
For other dimensions, refer to "MHA-03"in the drawing left..

List of Seals

MHP-03, MHA-03, MHB-03



MHP-03



MHA-03

Item	Name of Parts	Part Numbers	Qty.
15	O-Ring	AS568-014 (NBR-90)	5
16	O-Ring	OR NBR-90 P16-N (OR NBR-70-1 P16-N)★	1
17	O-Ring	OR NBR-90 P29-N	1
18	O-Ring	OR NBR-90 P32-N	1

★ If use MHP-03, the O-Ring of item 16 use the one within brackets.

●MHB-03: The pressure adjustment part is assembled on the right side.

Pressure and Temperature Compensated Flow Control (and Check) Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min	Free Flow L/min
MFP-03-11	16	50	———
MF*-03-*-11			70

Model Number Designation

MFA	–03	–X	–11
Series Number	Valve Size	Directoin of Flow	Design Number
MFP:Pressure & Temperature Compensated Flow Control Valve for P-Line	03	———	11
MFA:Pressure & Temperature Compensated Flow Control & Check Valve for A-Line MFB:Pressure & Temperature Compensated Flow Control & Check Valve for B-Line MFW:Pressure & Temperature Compensated Flow Control & Check Valve for A&B-Lines		**X:** Meter-out **Y:** Meter-in	11

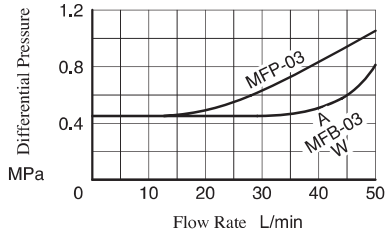
Instructions

●To make flow adjustment,loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

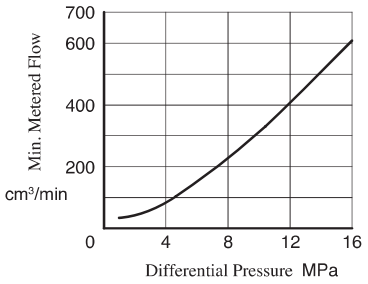
Typical Performance Characteristics

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

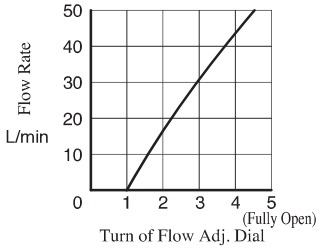
Min. Required Pressure Difference



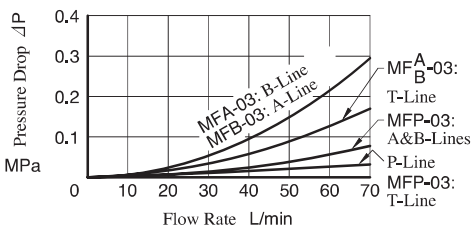
Min. Metered Flow



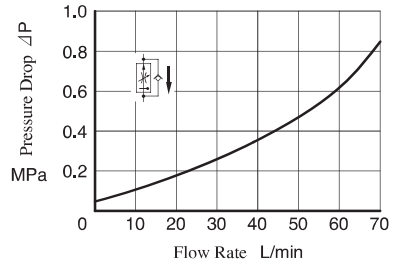
Metered Flow vs. Dial Position



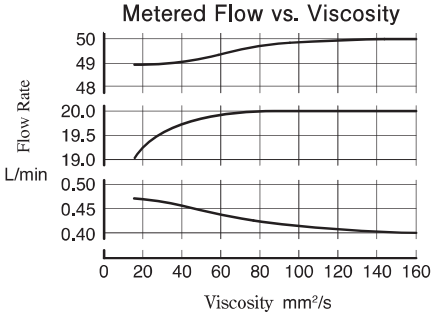
Pressure Drop



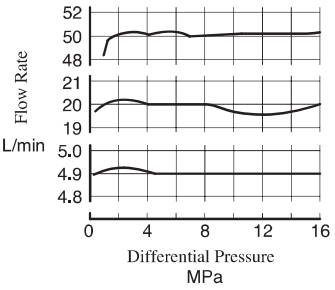
Pressure Drop for Free Flow



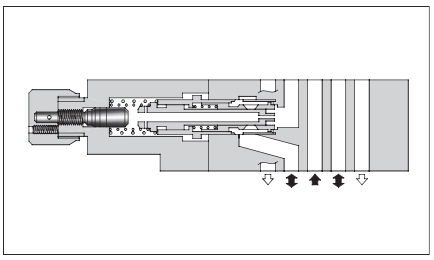
Metered Flow vs. Viscosity

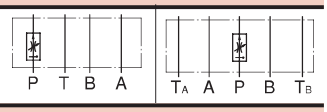


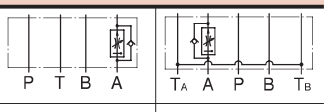
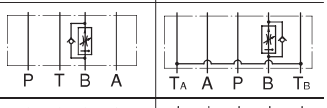
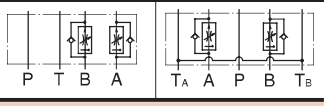
Metered Flow vs. Differential Pressure

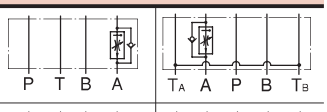
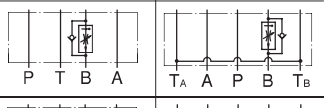
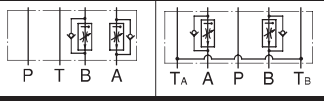




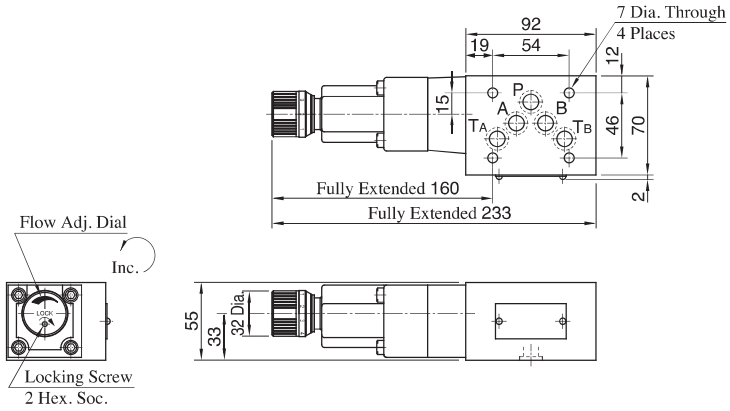


Model Numbers	Graphic Symbols
MFP-03	

Model Numbers	Graphic Symbols
MFA-03 -X	
MFB-03 -X	
MFW-03 -X	

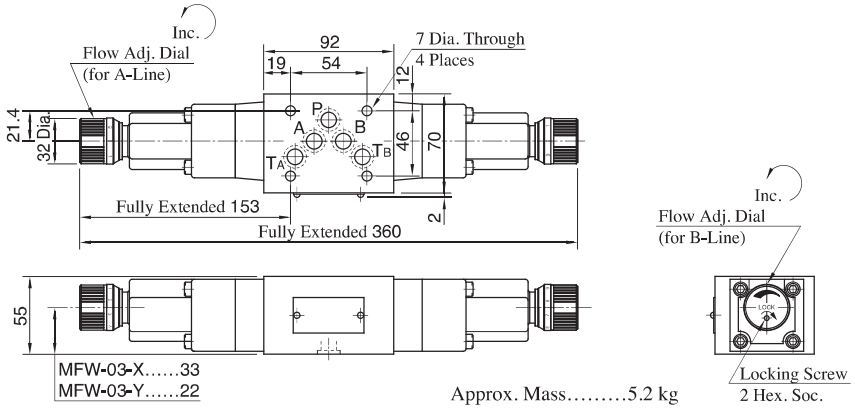
Model Numbers	Graphic Symbols
MFA-03 -Y	
MFB-03 -Y	
MFW-03 -Y	

MFP-03



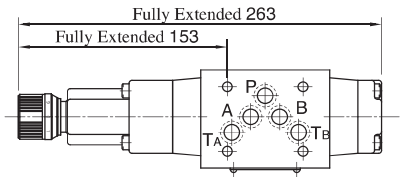
Approx. Mass.....4.2 kg

MFW-03-X/Y



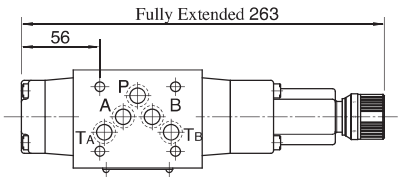
Approx. Mass.....5.2 kg

MFA-03-X/Y



Approx. Mass.....4.1 kg

MFB-03-X/Y

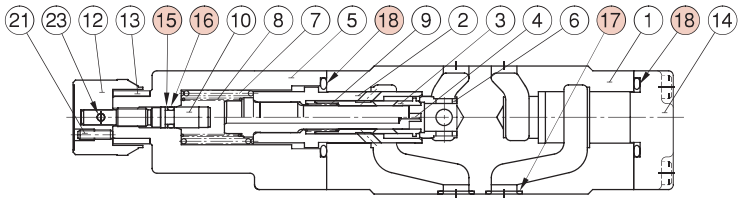


Approx. Mass.....4.1 kg

For other dimensions, refer to "MFW-03" in the drawing above.

List of Seals

MFP-03
MFA-03
MFB-03
MFW-03



MFA-03

- MFP-03: The body ① is different.
- MFB-03: The flow adjustment part is built in the right side.
- MFW-03:The flow adjustment part is built in the both left and right sides.

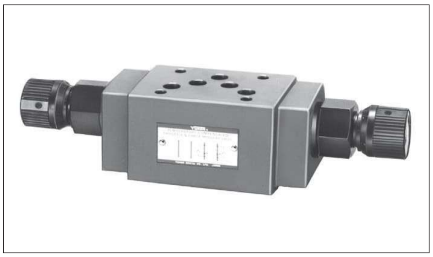
Item	Name of Parts	Part Numbers	Qty.			
			MFP–03	MFA–03	MFB–03	MFW–03
15	Back-up Ring	BR JIS B 2401-4-T2-P6	1	1	1	2
16	O-Ring	OR NBR-70-1 P6-N	1	1	1	2
17	O-Ring	AS568-014 (NBR-90)	5	5	5	5
18	O-Ring	OR NBR-90 P28-N	1	2	2	2

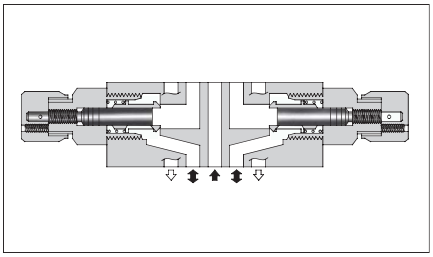
Temperature Compensated Throttle and Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Differential Pressure MPa	Max. Metered Flow L/min	Min. Metered Flow L/min	Max. Free Flow L/min
MST∗-03-X-20	25	25	70	2 (1)★	70

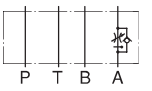
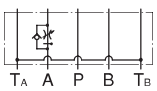
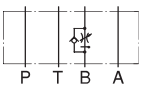
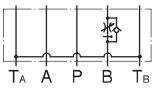
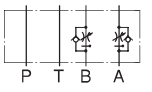
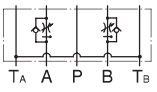
★The figures in parentheses are the values when the differential pressure is less than 3.5 MPa.





Model Number Designation

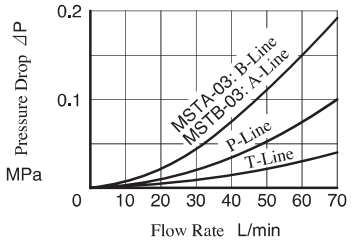
MSTA	–03	–X	–20
Series Number	Valve Size	Direction of Flow	Design Number
MSTA: for A-Line MSTB: for B-Line MSTW: for A&B-Lines } Temperature Compensated Throttle and Check Valve	03	X: Meter-out	20

Model Numbers	Graphic Symbols	Detailed Graphic Symbols
	Meter-out	
MSTA -03-X		
MSTB -03-X		
MSTW -03-X		

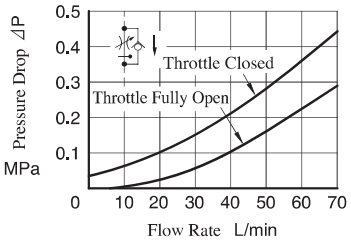
Typical Performance Characteristics

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

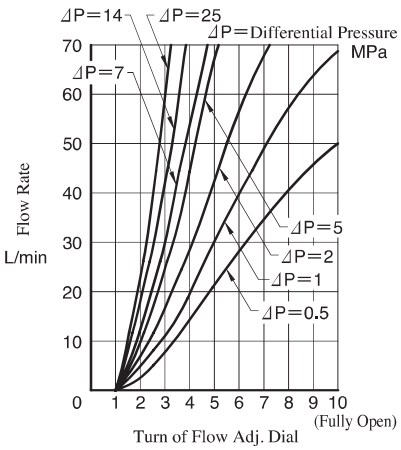
Pressure Drop



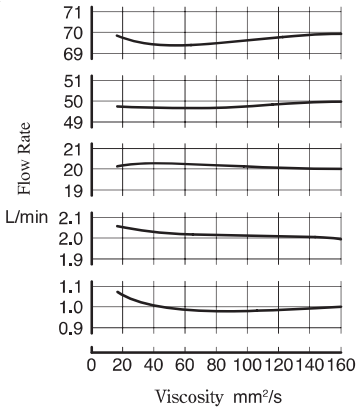
Pressure Drop for Free Flow



Metered Flow vs. Dial Position



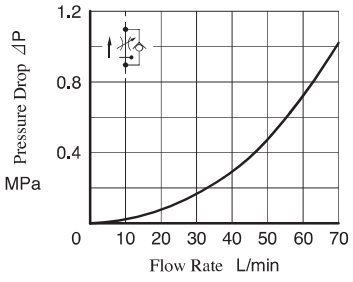
Metered Flow vs. Viscosity



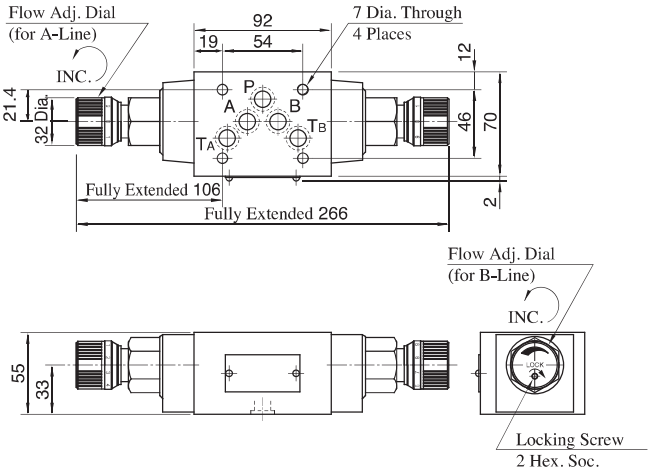
Instructions

●To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

Pressure Drop at Throttle Fully Open

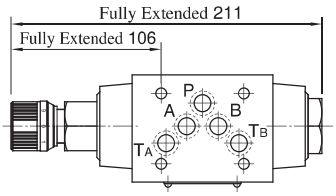


MSTW-03-X



Approx. Mass.....3.7 kg

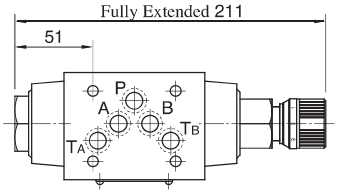
MSTA-03-X



Approx. Mass.....3.5 kg

For other dimensions, refer to "MSTW-03" in the drawing left.

MSTB-03-X

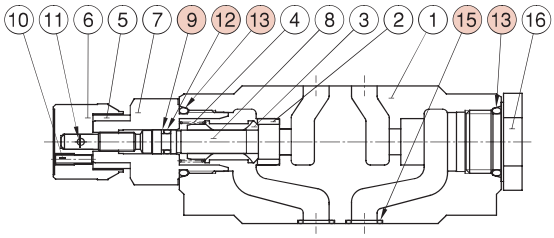


Approx. Mass.....3.5 kg

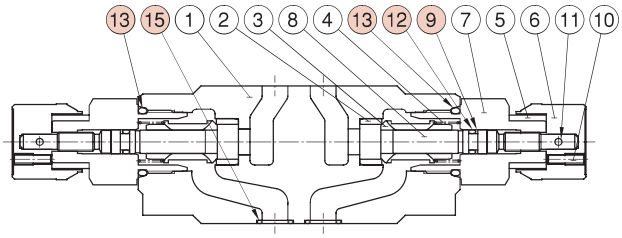
For other dimensions, refer to "MSTW-03" in the drawing left.

List of Seals

MSTA-03-X
MSTB-03-X
MSTW-03-X



MSTA-03-X



MSTW-03-X

●MSTB-03-X : The pressure adjustment part is built in the right side.

Item	Name of Parts	Part Numbers	Qty.		
			MSTA–03	MSTB–03	MSTW–03
9	Back-up Ring	900-VK411915-2	1	1	2
12	O-Ring	OR NBR-70-1 P7-N	1	1	2
13	O-Ring	OR NBR-90 P24-N	2	2	2
15	O-Ring	AS568-014 (NBR-90)	5	5	5

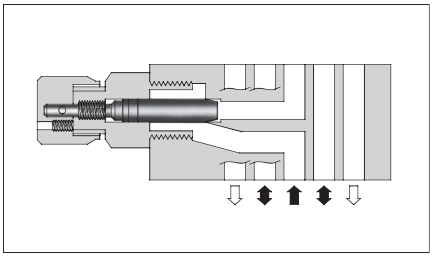
Throttle Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MSP-03-30	25	70 ★

★Maximum flow decreases when the differential pressure is less than 1 MPa. See the "Pressure Drop at Throttle Fully Open" of this page.





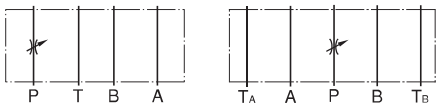
Model Number Designation

MSP	–03	–30
Series Number	Valve Size	Design Number
MSP: Throttle Valve for P-Line	**03**	**30**

Instructions

●To make flow adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

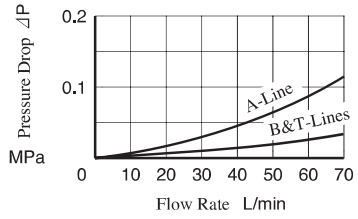
Graphic Symbols



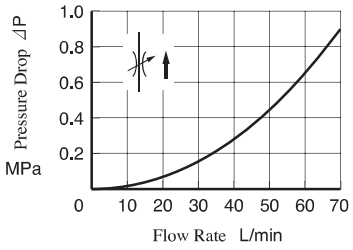
Typical Performance Characteristics

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

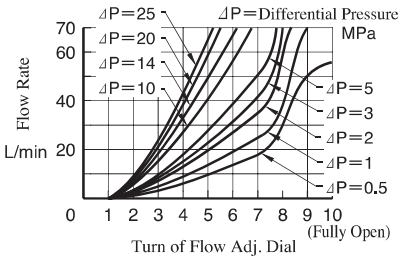
Pressure Drop



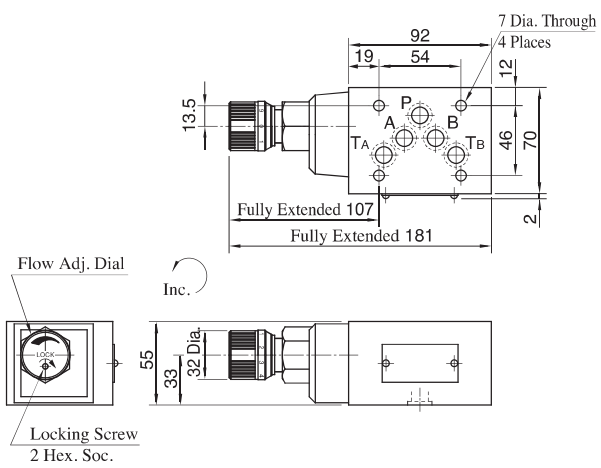
Pressure Drop at Throttle Fully Open



Metered Flow vs. Dial Position



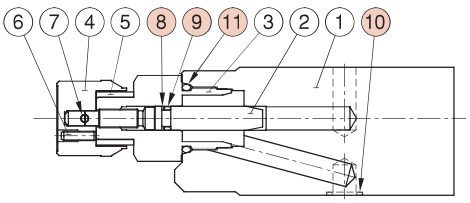
MSP-03



Approx. Mass.....3.0 kg

List of Seals

MSP-03



Item	Name of Parts	Part Numbers	Qty.
8	Back-up Ring	900-VK411915-2	1
9	O-Ring	OR NBR-70-1 P7-N	1
10	O-Ring	AS568-014 (NBR-90)	5
11	O-Ring	OR NBR-90 P24-N	1

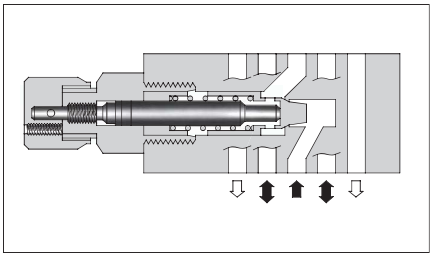
Check and Throttle Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MSCP–03–20	25	70 ★

★Maximum flow decreases when the differential pressure is less than 0.8 MPa. See the "Pressure Drop at Throttle Fully Open" of this page.





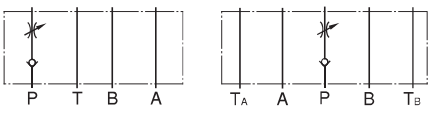
Model Number Designation

MSCP	–03	–20
Series Number	Valve Size	Design Number
MSCP: Check & Throttle Valve for P-Line	03	20

Instructions

●To make flow adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

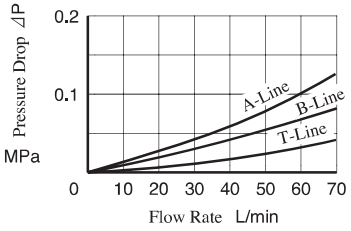
Graphic Symbols



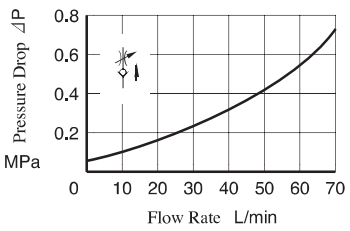
Typical Performance Characteristics

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

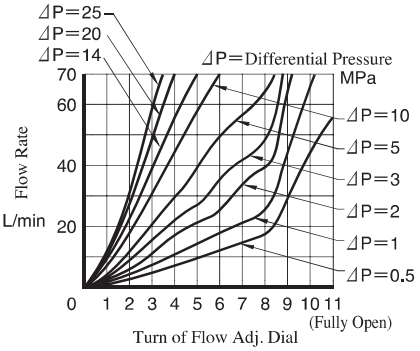
Pressure Drop



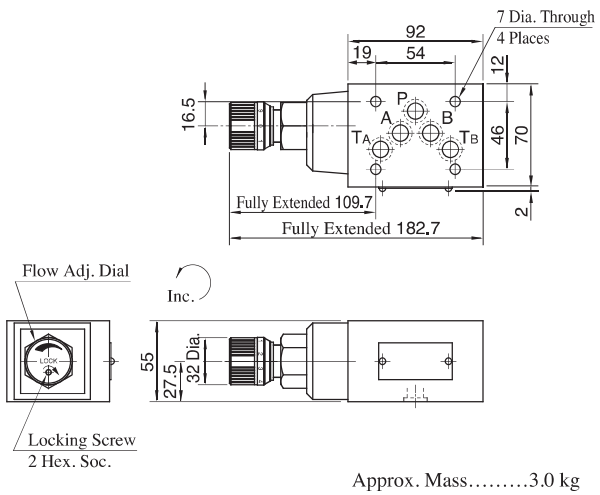
Pressure Drop at Throttle Fully Open



Metered Flow vs. Dial Position



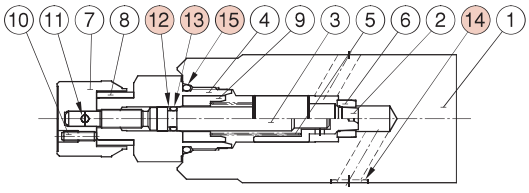
MSCP-03



Approx. Mass.....3.0 kg

List of Seals

MSCP-03



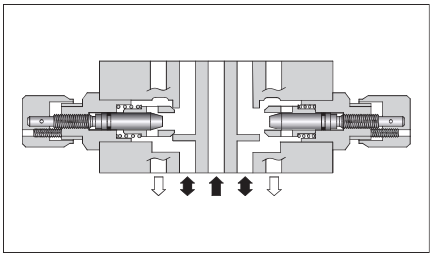
Item	Name of Parts	Part Numbers	Qty.
12	Back-up Ring	900-VK411915-2	1
13	O-Ring	OR NBR-70-1 P7-N	1
14	O-Ring	AS568-014 (NBR-90)	5
15	O-Ring	OR NBR-90 P24-N	1

Throttle and Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MS∗–03–∗–70	35	160





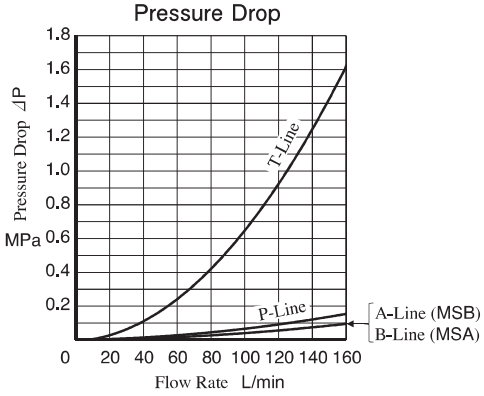
Model Number Designation

MSA	–03	–X	–70
Series Number	Valve Size	Directoin of Flow	Design Number
MSA:Throttle & Check Valve for A-Line MSB:Throttle & Check Valve for B-Line MSW:Throttle & Check Valve for A&B-Lines	**03**	**X:** Meter-out **Y:** Meter-in	**70**

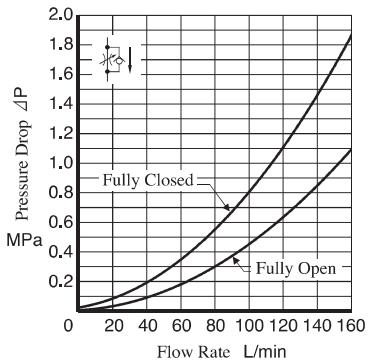
Typical Performance Characteristics

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

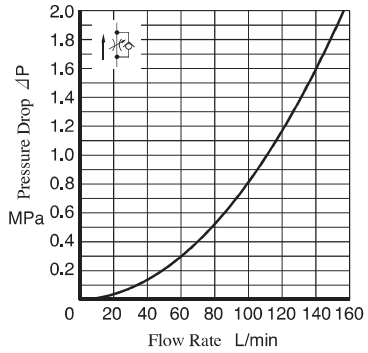
Pressure Drop

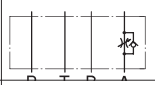
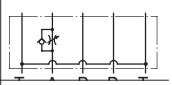
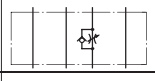
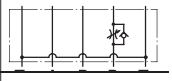
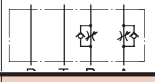
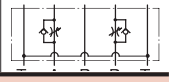


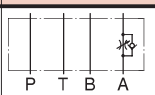
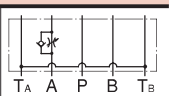
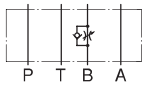
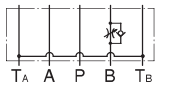
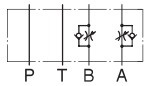
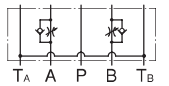
Pressure Drop for Free Drop



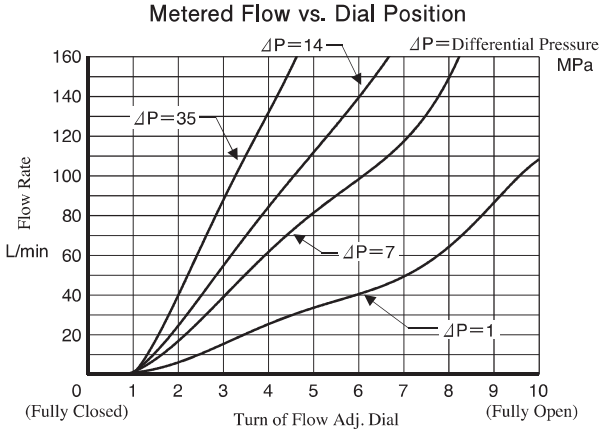
Pressure Drop at Throttle Fully Open



Model Numbers	Graphic Symbols	
MSA-03 -X		
MSB-03 -X		
MSW-03 -X		

Model Numbers	Graphic Symbols	
MSA-03 -Y		
MSB-03 -Y		
MSW-03 -Y		

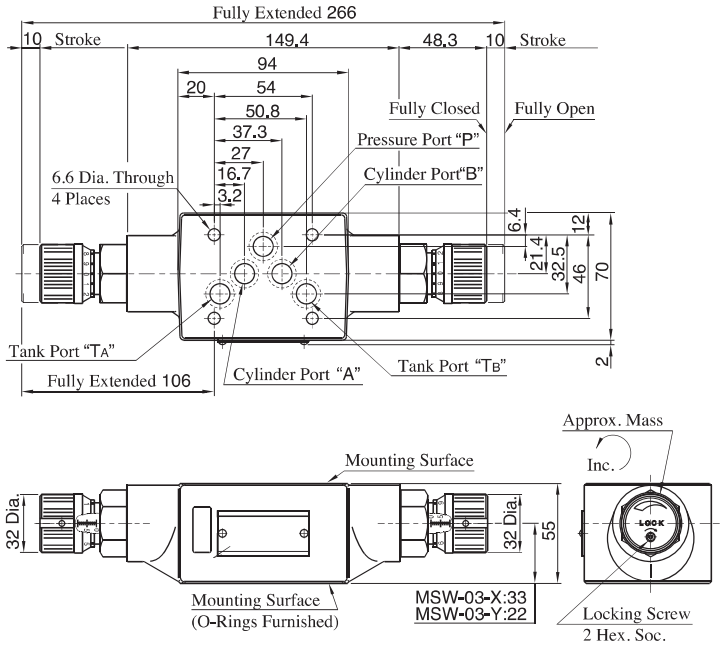
Metered Flow vs. Dial Position



Instructions

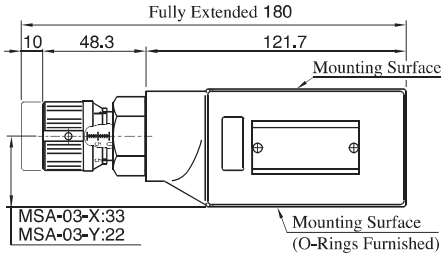
●To make flow adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

MSW-03-X/Y



Approx. Mass.....3.5 kg

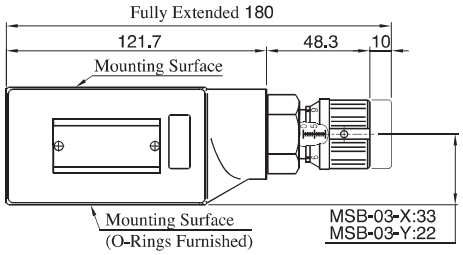
MSA-03-X/Y



Approx. Mass.....2.8 kg

For other dimensions, refer to "MSW-03"in the drawing left.

MSB-03-X/Y

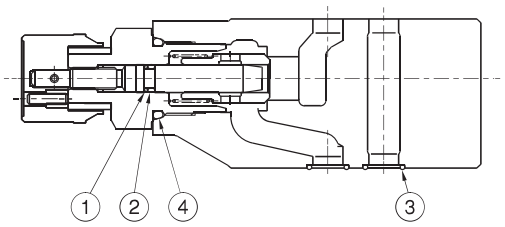


Approx. Mass.....2.8 kg

For other dimensions, refer to "MSW-03"in the drawing left.

List of Seals

MSA-03
MSB-03
MSW-03



MSA-03

●MSB-03 : The flow adjustment part is built in the right side.
●MSW-03 : The flow adjustment part is built in the both left and right sides.

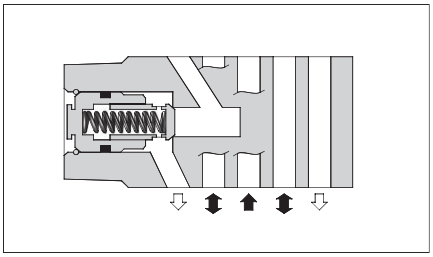
Item	Name of Parts	Part Numbers	Qty.		
			MSA-03	MSB-03	MSW-03
1	Back-up Ring	900-VK411915-2 (P7)	1	1	2
2	O-Ring	OR NBR-70-1 P7-N	1	1	2
3	O-Ring	AS568-014 (NBR-90)	5	5	5
4	O-Ring	OR NBR-90 P24-N	1	1	2

Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MCP–03–＊–70	35	120
MCA–03–＊–70		
MCB–03–＊–70		
MCW–03–＊–70		
MCT–03–＊–70		





Model Number Designation

MCP	–03	–0	–70
Series Number	Valve Size	Cracking Pressure MPa	Design Number
MCP:Check Valve for P-Line MCA:Check Valve for A-Line MCB:Check Valve for B-Line MCW:Check Valve for A&B-Lines MCT:Check Valve for T-Line	**03**	**0:** 0.035 **2:** 0.2 **4:** 0.4	**70**

Model Numbers	Graphic Symbols	
MCP-03	P T B A	T_A A P B T_B
MCA-03	P T B A	T_A A P B T_B
MCB-03	P T B A	T_A A P B T_B
MCW-03	P T B A	T_A A P B T_B
MCT-03	P T B A	T_A A P B T_B

Instructions

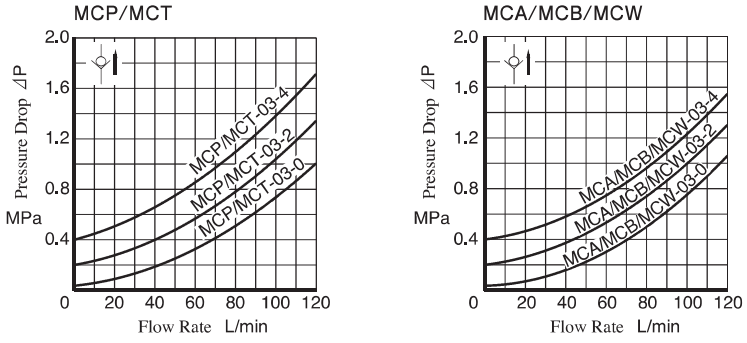
●Tank Line Used

Check Valve function of MCT-03 is included in T_A-Line.
Therefore, the tank line for a circuit that used this valve must be T_A-Line.

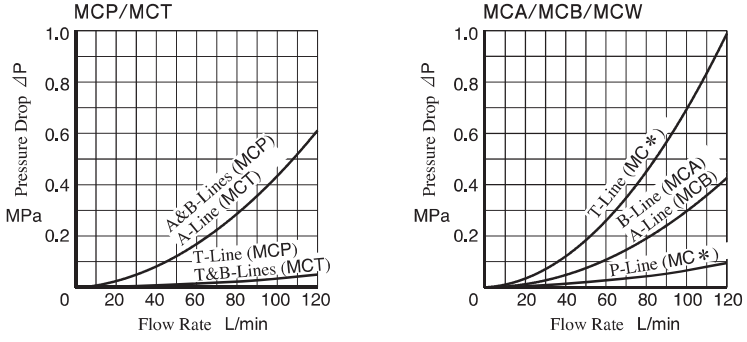
Typical Performance Characteristics

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

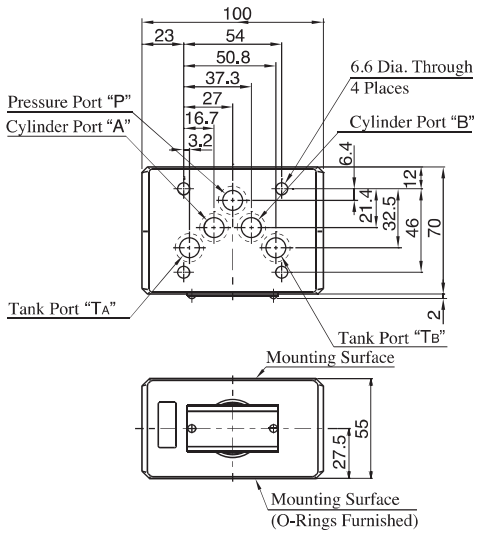
Pressure Drop for Free Flow



Pressure Drop

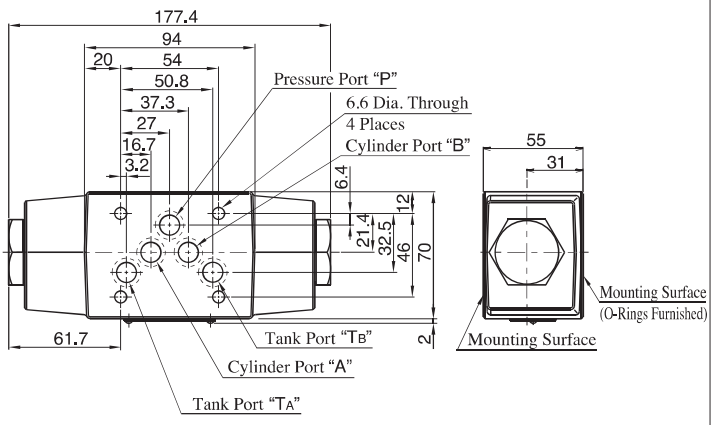


MCP-03



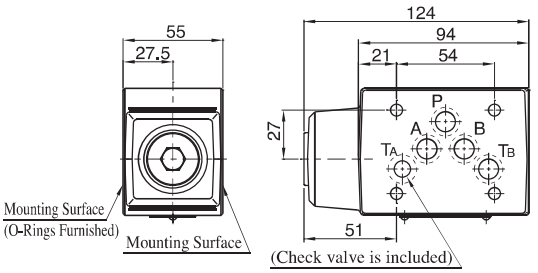
Approx. Mass.....2.6 kg

MCW-03



Approx. Mass.....3.7 kg

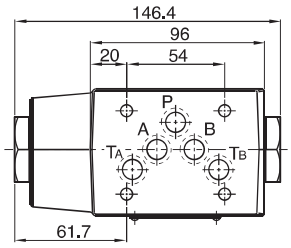
MCT-03



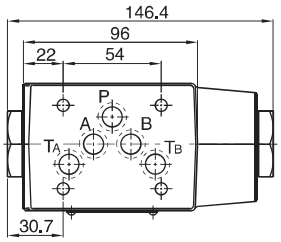
Approx. Mass.....3.0 kg

For other dimensions, refer to "MCW-03" in the drawing above.

MCA-03



MCB-03

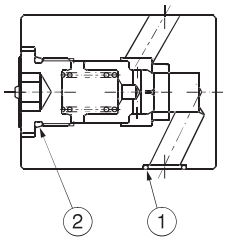


Approx. Mass.....3.0 kg

For other dimensions, refer to "MCW-03" in the drawing above.

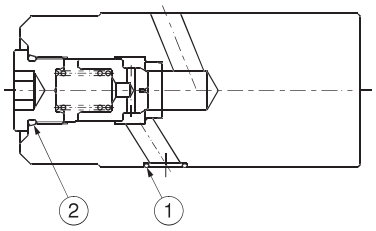
List of Seals

MCP-03



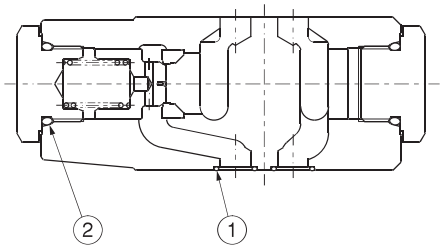
Item	Name of Parts	Part Numbers	Qty.
1	O-Ring	AS568-014 (NBR-90)	5
2	O-Ring	OR NBR-90 P21-N	1

MCT-03



Item	Name of Parts	Part Numbers	Qty.
1	O-Ring	AS568-014 (NBR-90)	5
2	O-Ring	OR NBR-90 P21-N	1

MCA-03
MCB-03
MCW-03



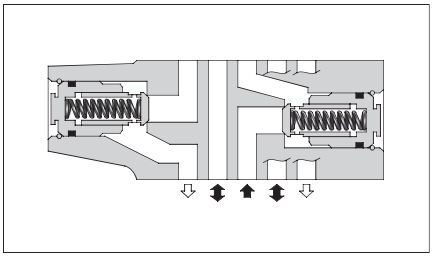
MCA-03

Item	Name of Parts	Part Numbers	Qty.
1	O-Ring	AS568-014 (NBR-90)	5
2	O-Ring	OR NBR-90 P24-N	2

- MCB-03: Check valve is assembled on the right side.
- MCW-03: Check valve is assembled on the both sides.

Check Modular Valves For "P&T" Lines





Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MCPT–03–P∗–T∗–10	25	70

Model Number Designation

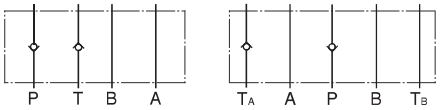
MCPT	–03	–P0	–T0	–10
Series Number	Valve Size	Cracking Pressure of P-Line MPa	Cracking Pressure of T-Line MPa	Design Number
MCPT: Check Valve for P&T-Lines	**03**	**P0:** 0.035 **P2:** 0.2	**P0:** 0.035 **P2:** 0.2	**10**

Instructions

●Tank Line Used

Check Valve function of Tank Line is included in T_A-Line.
Therefore, the tank line for a circuit that used this valve must be T_A-Line.

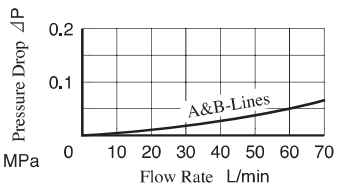
Graphic Symbols



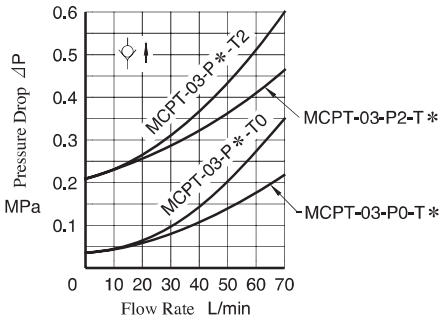
Typical Performance Characteristics

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

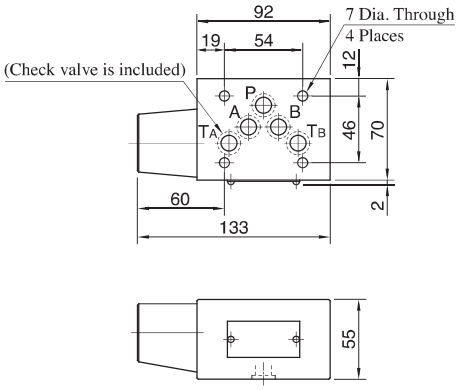
Pressure Drop



Pressure Drop for Free Flow



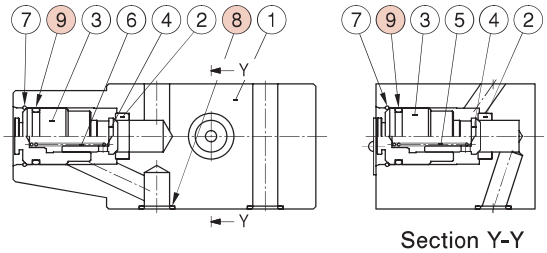
MCPT-03



Approx. Mass.....2.7 kg

List of Seals

MCPT-03



Section Y-Y

Item	Name of Parts	Part Numbers	Qty.
8	O-Ring	AS568-014 (NBR-90)	5
9	O-Ring	OR NBR-90 P21-N	2

Anti-Cavitation Modular Valves

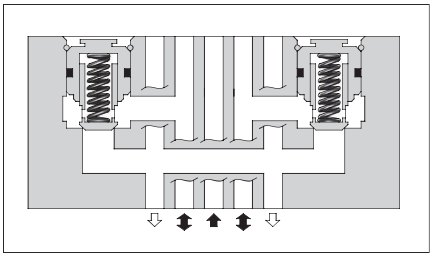
Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MAC–03–10	25	70



Model Number Designation

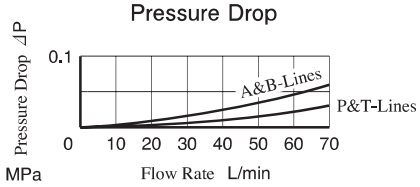
MAC	–03	–10
Series Number	Valve Size	Design Number
MAC: Anti-Cavitation Valve	**03**	**10**



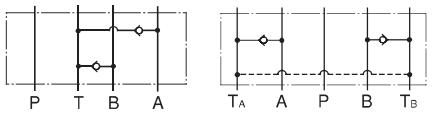
Typical Performance Characteristics

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

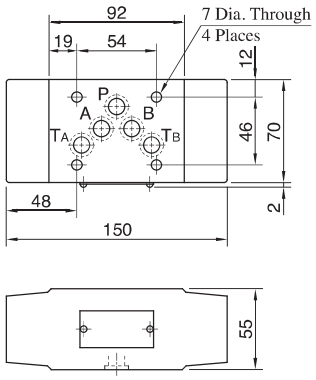
Pressure Drop



Graphic Symbols



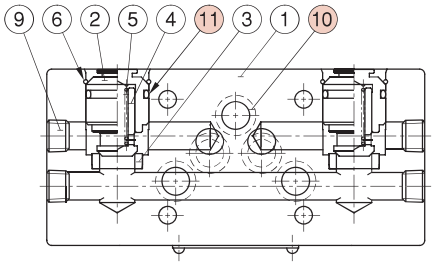
MAC-03



Approx. Mass.....3.8 kg

List of Seals

MAC-03



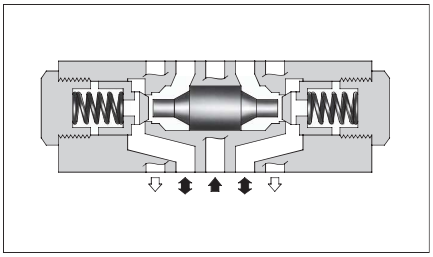
Item	Name of Parts	Part Numbers	Qty.
10	O-Ring	AS568-014 (NBR-90)	5
11	O-Ring	OR NBR-90 P21-N	2

Pilot Operated Check Modular Valves

Specifications

Model Numbers		Max. Operating Pressure MPa	Max. Flow L/min
Standard	MP∗-03-∗-70	35	120
Low Pilot Pressure Control Type	MP∗-03-∗-L-70		





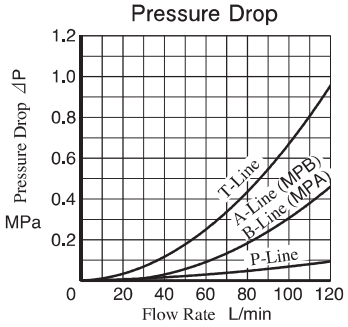
Model Number Designation

MPA	–03	–2	–L	–70
Series Number	Valve Size	Cracking Pressure MPa	Pilot Pressure Control Type	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-Lines	**03**	**0:** 0.035 **2:** 0.2 **4:** 0.4	None: Standard L: Low Pilot Pressure Control Type	**70**

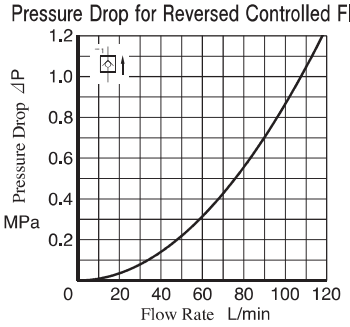
Typical Performance Characteristics

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

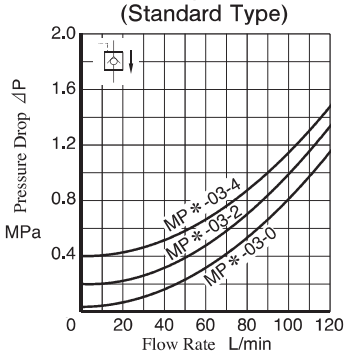
Pressure Drop



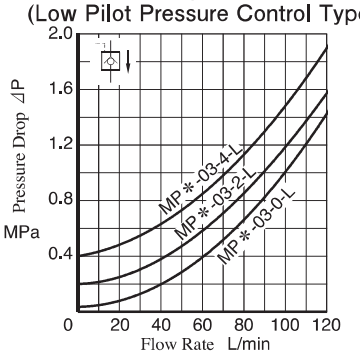
Pressure Drop for Reversed Controlled Flow



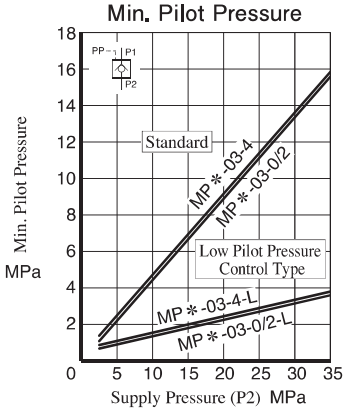
Pressure Drop for Free Flow (Standard Type)

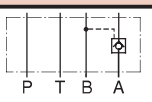
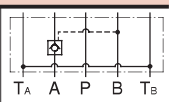
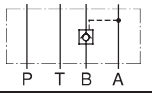
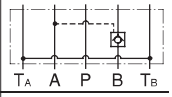
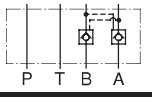
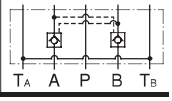


Pressure Drop for Free Flow (Low Pilot Pressure Control Type)

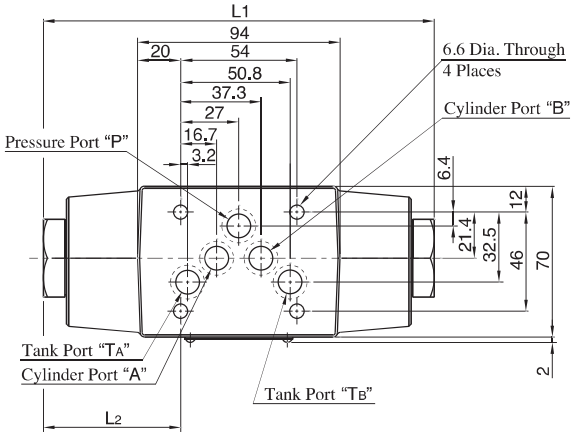


Min. Pilot Pressure

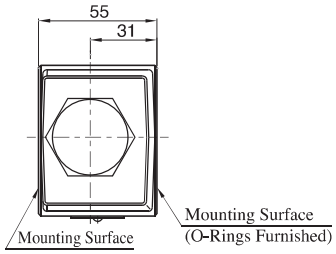


Model Numbers	Graphic Symbols	
MPA-03		
MPB-03		
MPW-03		

MPW-03

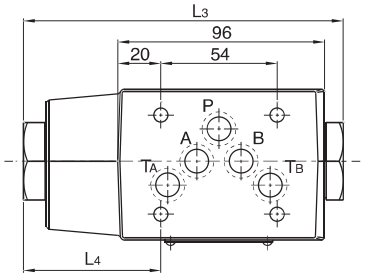


Model Numbers	L1	L2
MPW-03-*	177.4	61.7
MPW-03-*-L	181.4	63.7



Approx. Mass.....3.7 kg

MPA-03

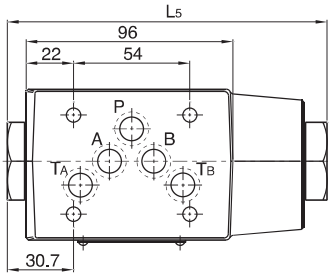


Model Numbers	L3	L4
MPA-03-*	146.4	61.7
MPA-03-*-L	148.4	63.7

Approx. Mass.....3.0 kg

For other dimensions, refer to "MPW-03" in the drawing above.

MPB-03



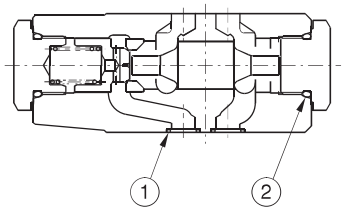
Model Numbers	L5
MPB-03-*	146.4
MPB-03-*-L	148.4

Approx. Mass.....3.0 kg

For other dimensions, refer to "MPW-03" in the drawing above.

List of Seals

MPA-03
MPB-03
MPW-03



MPA-03

Item	Name of Parts	Part Numbers	Qty.
1	O-Ring	AS568-014 (NBR-90)	5
2	O-Ring	OR NBR-90 P24-N	2

- MPB-03: Check valve is assembled on the right side.
- MPW-03: Check valve is assembled on the both left and right side.

End Plates

Blocking plates are used for auxiliary mounting surface or for closing unnecessary circuits. Bypass plates are used for unidirectional circuits that require no solenoid operated directional valves.



Specifications

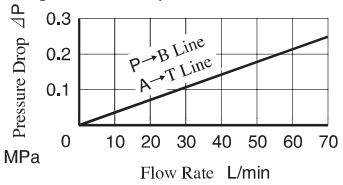
Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MDC–03–*–10	25	70

Model Number Designation

MDC	–03	–A	–10
Series Number	Valve Size	Type of Plate	Design Number
MDC: End Pate	**03**	A: Blocking Plate B: Bypass Plate	**10**

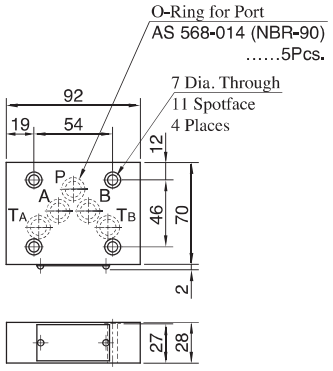
Pressure Drop

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



Model Numbers	Graphic Symbols
MDC-03 -A	P T B A / T_A A P B T_B
MDC-03 -B	P T B A / T_A A P B T_B

MDC-03



Approx. Mass.....1.2 kg

Connecting Plates

These plates are used for detecting pressure of each line.



Model Number Designation

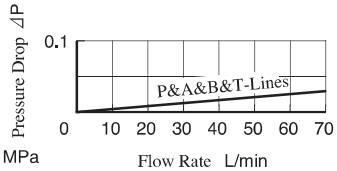
MDS	–03	–10
Series Number	Valve Size	Design Number
MDS: Connecting Plate	03	10

Specifications

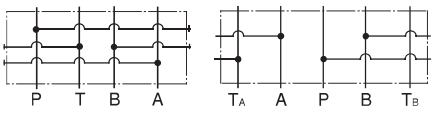
Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MDS–03–10	25	70

Pressure Drop

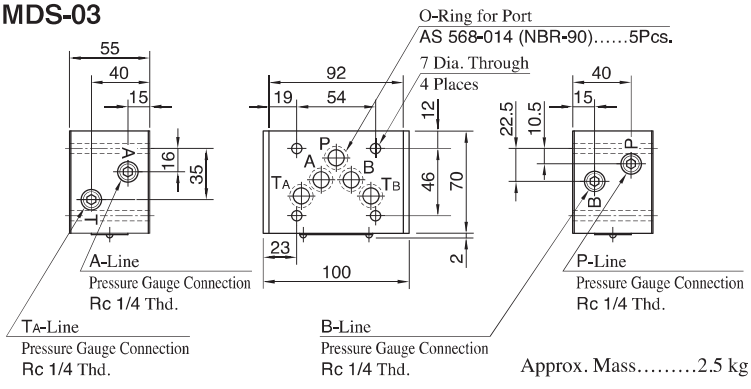
Hydraulic Fluid: Viscosity 35 mm²/s,
Specific Gravity 0.850



Graphic Symbols



MDS-03



Approx. Mass.....2.5 kg

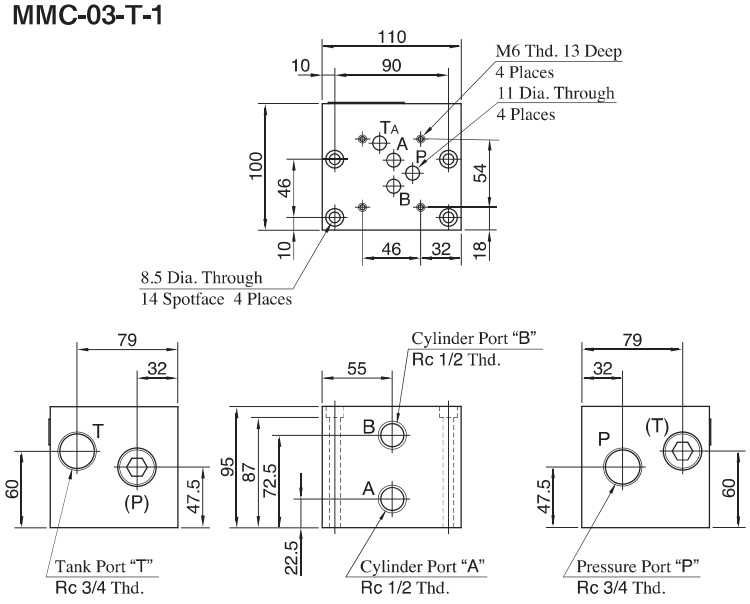
Base Plates For Modular Valves

Model Number Designation

MMC	–03	–T	–6	–21
Series Number	Plate Size	Type of Connection	Number of Stations	Design Number
MMC: Base Plate	**03**	**T:** Threaded Connection	**1:** 1 Station **5:** 5 Stations **2:** 2 Stations **6:** 6 Stations **3:** 3 Stations **7:** 7 Stations **4:** 4 Stations	**21**



MMC-03-T-1

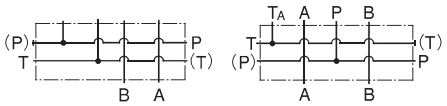


Approx. Mass.....8.5 kg

Specifications

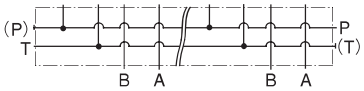
Max. Operating Pressure.....25 MPa

Graphic Symbol Detailed Graphic Symbol



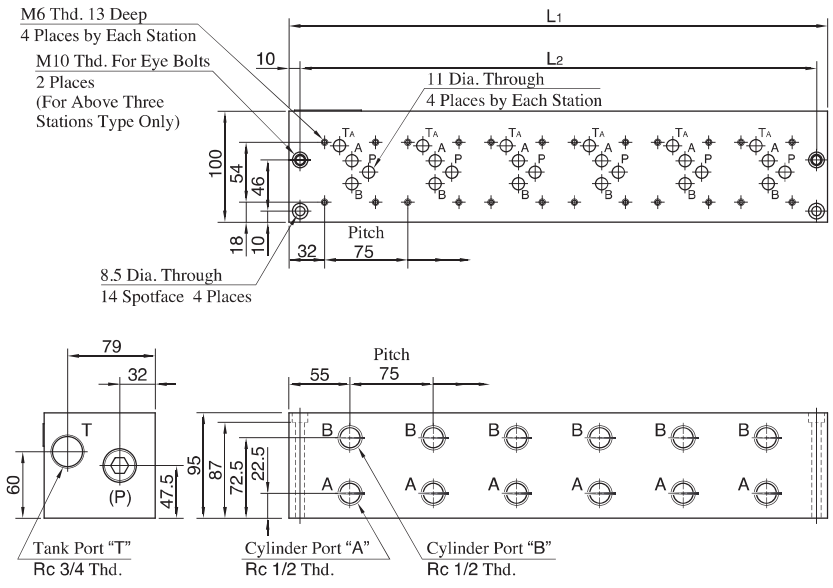
MMC-03-T-1

Graphic Symbol



MMC-03-T-2-7

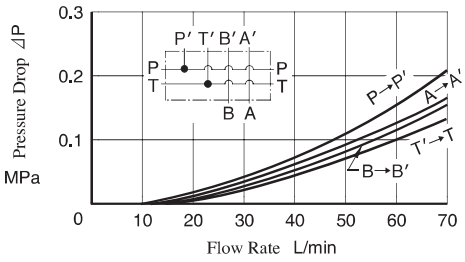
MMC-03-T-2–7



Model Numbers	L1	L2	Mass kg
MMC–03–T–2	185	165	14
MMC–03–T–3	260	240	19.5
MMC–03–T–4	335	315	25
MMC–03–T–5	410	390	30.5
MMC–03–T–6	485	465	36
MMC–03–T–7	560	540	41

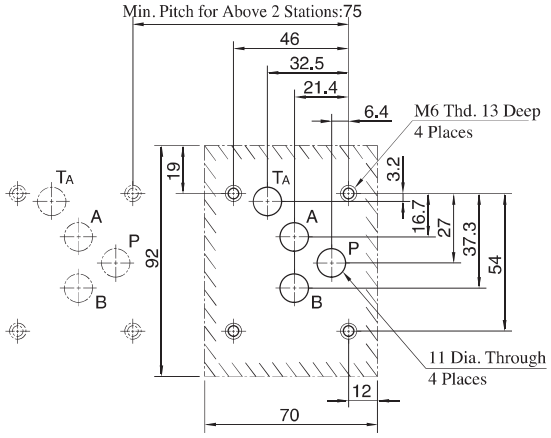
Pressure Drop

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



Mounting Surface Dimensions for 03 Series Modular Valve

When the standard base plate (MMC-03) is not used, the following mounting surface must be prepared. Also, the mounting surface must have a good machined finish. (1.6▽)



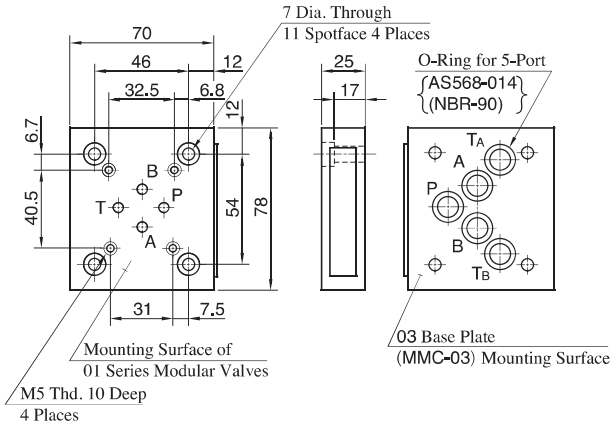
Instructions

- Although two ports are provided for both pressure port "P" and tank port "T", either may be used.
  However, the ports having (P) or (T) in the drawing are normally plugged. Remove the plugs of the ports when they are used. Make sure that the ports that are not currently used are properly plugged.

Spacer Kits

If 01 Series Modular Valves stacking on the 03 Base Plates, use this spacer.
If use, order by the model number below.
Model Numbers: DSGM-03-4010
Approx. Mass: 1kg
Accessories: Mounting Bolt 4 Pcs. : M6×25L
O-Ring 5 Pcs. : AS568-014 (NBR-90)

DSGM-03-4010



Note:
In the spacer above, 01 side "A" ⇔ 03 side "B", 01 side "B" ⇔ 03 side "A" are connected.

Mounting Bolt Kits For Modular Valves

Valves are mounted with four M6 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	–03	–04	–10
Series Number	Size of Modular Valve	Bolt Number	Design Number
MBK: Mounting Bolt Kits for Modular Valve	03	01, 02, 03, 04, 05 (Refer to the following chart)	10

● Bolt Kit Composition

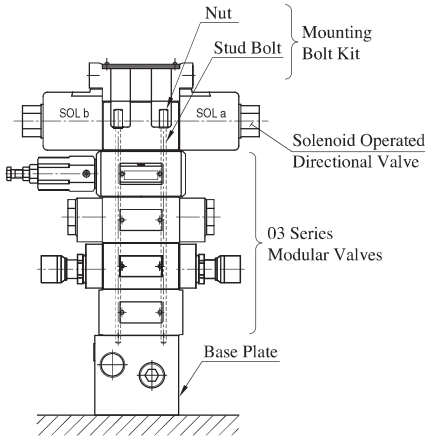
Stud Bolt ..... 4 Pcs. } 1 Set
Nut ..... 4 Pcs. }

Note: In case of bolt kit model number having "05", four hexagon socket head cap screws only.

● Tightening Torque..... 12-15 Nm

Bolt Kits Selection Chart

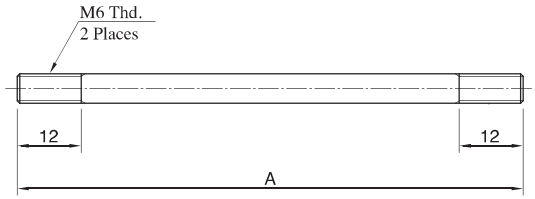
Model Numbers	Quantity of valves to be stacked			Approx. Mass (1 Set) g
	Solenoid Operated Directional Valve (∗–DSG–03)	End Plate (MDC–03)	Modular Valve or Connecting Plate (M∗∗–03)	
MBK–03–01–10	1	0	1	120
	0	1		
MBK–03–02–10	1	0	2	160
	0	1		
MBK–03–03–10	1	0	3	200
	0	1		
MBK–03–04–10	1	0	4	240
	0	1		
MBK–03–05–10	1	0	0	40
	0	1		



Stacking Example

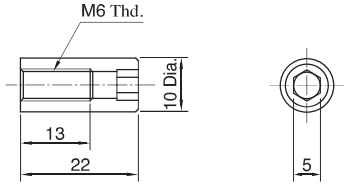
MBK-03

● Stud Bolt



Bolt Number	A mm
01	103
02	158
03	213
04	268
05	Socket Head Cap Screw M6×35 L

● Nut



Interchangeability in Installation between Current and New Design

The following models of 03 Series Modular Valves have changed to 70 design numbers model to operate higher pressure and modification for large flow use.

Name	Model Numbers
Relief Modular Valves	MB＊-03-＊-70
Reducing Modular Valves	MR＊-03-＊-70
Throttle and Check Modular Valves	MS＊-03-＊-70
Check Modular Valves	MC＊-03-＊-70
Pilot Operated Check Modular Valves	MP＊-03-＊-＊-70

Major Changes

(1) Max. Operating Pressure (35MPa) & Max. Flow have substantially increased respectively.
(2) Selectable low pilot operation type as standard model for Pilot Operated Check Modular Valves.

Mounting Interchangeability

Yes
Mounting surface is not changed from current models.

Specifications

Max. Operating Pressure

Name	Current		New	
	Model Numbers	Max. Operating Pressure MPa	Model Numbers	Max. Operating Pressure MPa
Relief Modular Valves	MB＊-03-＊-30	31.5	MB＊-03-＊-70	35
Reducing Modular Valves	MR＊-03-＊-30	25	MR＊-03-＊-70	
Throttle and Check Modular Valves	MS＊-03-＊-40		MS＊-03-＊-70	
Check Modular Valves	MCP/MCT-03-＊-10 MCA/MCB/MCW-03-＊-20		MC＊-03-＊-70	
Pilot Operated Check Modular Valves	MP＊-03-＊-20		MP＊-03-＊-70	
	MP＊-03-＊-2001		MP＊-03-＊-L-70	

Max. Flow

Name	Current		New	
	Model Numbers	Max. Flow L/min	Model Numbers	Max. Flow L/min
Relief Modular Valves	MB＊-03-＊-30	70	MB＊-03-＊-70	120
Reducing Modular Valves	MR＊-03-＊-30	70	MR＊-03-A-70	80
			MR＊-03-B/C/H-70	120
Throttle and Check Modular Valves	MS＊-03-＊-40	120	MS＊-03-＊-70	160
Check Modular Valves	MCP/MCT-03-＊-10 MCA/MCB/MCW-03-＊-20	70	MC＊-03-＊-70	120
Pilot Operated Check Modular Valves	MP＊-03-＊-20		MP＊-03-＊-70	
	MP＊-03-＊-2001		MP＊-03-＊-L-70	

Model Number Designation

Function Addition

Name	Model Numbers	Additional Functions
Pilot Operated Check Modular Valves	MP∗-03-∗-L-70	Low pilot operation type, selectable as standard product

Pressure Adjustment Range

Name	Current		New	
	Model Numbers	Pres. Adj. Range MPa	Model Numbers	Pres. Adj. Range MPa
Relief Modular Valves	MB∗-03-∗-30	**B:** ★-7 **H:** 3.5-31.5	MB∗-03-∗-70	**B:** ★-7 **C:** 3.5-14 **K:** 7-35
Reducing Modular Valves	MR∗-03-∗-30	**B:** 1-7 **H:** 3.5-24.5	MR∗-03-∗-70	**A:** ★-3.5 **B:** 1-7 **C:** 3.5-14 **H:** 7-31.5

Cracking Pressure

Name	Current		New	
	Model Numbers	Cracking Pressure MPa	Model Numbers	Cracking Pressure MPa
Check Modular Valves	MCP/MCT-03-∗-10 MCA/MCB/MCW-03-∗-20	**0:** 0.035 **2:** 0.2	MC∗-03-∗-70	**0:** 0.035 **2:** 0.2 **2:** 0.4
Pilot Operated Check Modular Valves	MP∗-03-∗-20	**2:** 0.2 **2:** 0.4	MP∗-03-∗-70	**0:** 0.035 **2:** 0.2 **4:** 0.4
	MP∗-03-∗-2001		MP∗-03-∗-L-70	

Typical Performance Characteristics

Characteristics of all models have been changed.

Approx. Mass

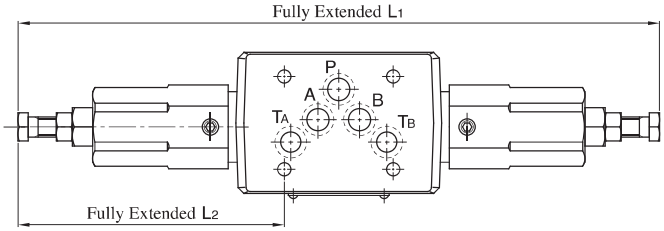
Name	Current		New	
	Model Numbers	Approx. Mass kg	Model Numbers	Approx. Mass kg
Relief Modular Valves	MBP/MBA/MBB-03-∗-30	3.1	MBP/MBA/MBB-03-∗-70	3.4
	MBW-03-∗-30	3.8	MBW-03-∗-70	4.0
Reducing Modular Valves	MR∗-03-∗-30	3.3	MR∗-03-∗-70	3.8
Throttle and Check Modular Valves	MSA/MSB-03-∗-40	3.5	MSA/MSB-03-∗-70	2.8
	MSW-03-∗-40	3.7	MSW-03-∗-70	3.5
Check Modular Valves	MCP-03-∗-10	2.5	MCP-03-∗-70	2.6
	MCA/MCB-03-∗-20	3.5	MCA/MCB-03-∗-70	3.0
	MCW-03-∗-20	3.5	MCW-03-∗-70	3.7
	MCT-03-∗-10	2.8	MCT-03-∗-70	3.0
Pilot Operated Check Modular Valves	MPA/MPB-03-∗-20	3.5	MPA/MPB-03-∗-∗-70	3.0
	MPW-03-∗-2001	3.5	MPW-03-∗-∗-70	3.7

●Dimensions

As of fully extended dimensions, height (55mm) and depth (70mm) are same between current and new models. Width is same except for the models below.

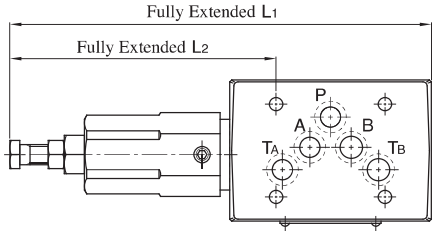
(1) Relief Modular Valves

MBW-03

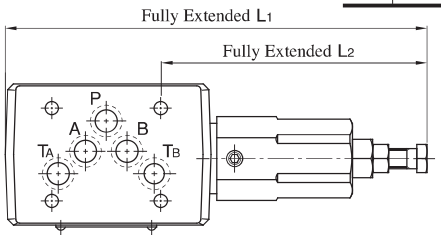


	Model Numbers	L1	L2
Current	MBP-03-＊-30	214	134
	MBA-03-＊-30	214	134
	MBB-03-＊-30	214	—
	MBW-03-＊-30	320	133
New	MBP-03-＊-70	209	132
	MBA-03-＊-70	207	132
	MBB-03-＊-70	207	—
	MBW-03-＊-70	318	132

MBP/MBA-03

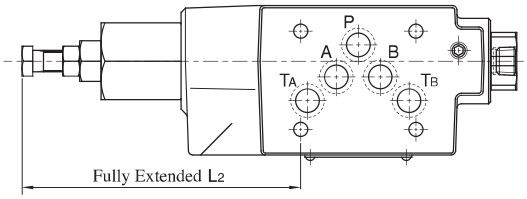


MBB-03

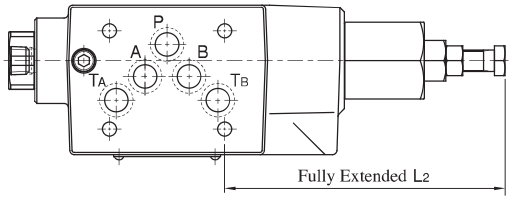


(2) Reducing Modular Valves

MRP/MRB-03



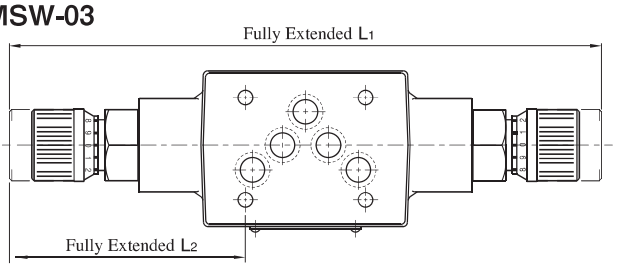
MRA-03



	Model Numbers	L2
Current	MR＊-03-＊-30	131
New	MR＊-03-＊-70	131.3

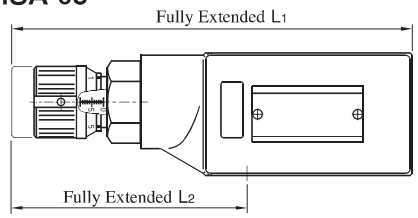
(3) Throttle and Check Modular Valves

MSW-03

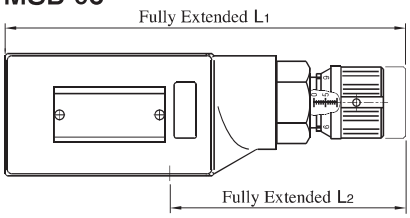


	Model Numbers	L1	L2
Current	MSA-03-＊-40	193.5	91.5
	MSB-03-＊-40	193.5	
	MSW-03-＊-40	237	
New	MSA-03-＊-70	180	106
	MSB-03-＊-70	180	
	MSW-03-＊-70	266	

MSA-03

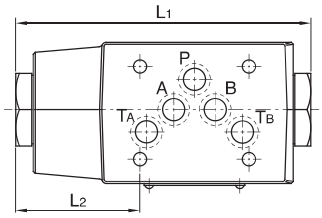


MSB-03

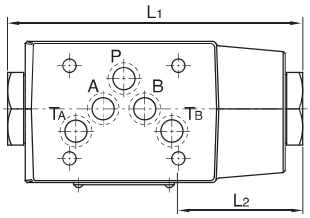


(4) Check Modular Valves

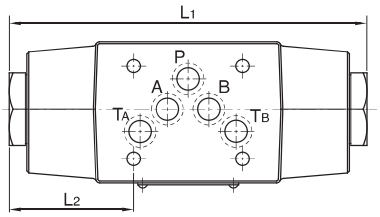
MCA-03



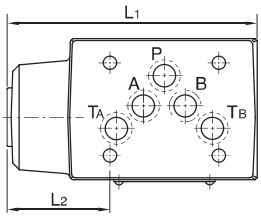
MCB-03



MCW-03



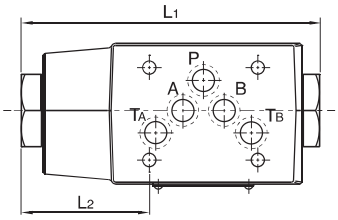
MCT-03



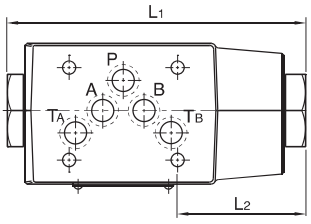
	Model Numbers	L1	L2
Current	MCA/MCB-03-*-20	174	60
	MCW-03-*-20	174	60
	MCT-03-*-10	117	44
New	MCA/MCB-03-*-70	146.4	61.7
	MCW-03-*-70	177.4	61.7
	MCT-03-*-70	124	51

(5) Pilot Operated Check Modular Valves

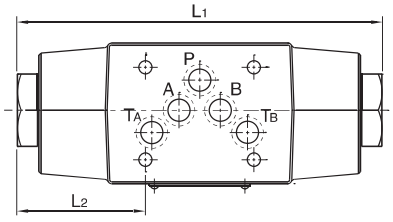
**MPA-03-*
MPA-03-*-L**



**MPB-03-*
MPB-03-*-L**



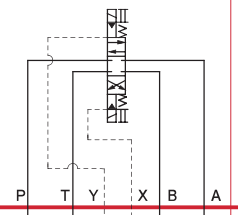
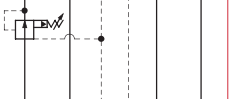
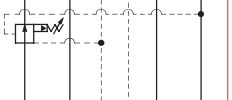
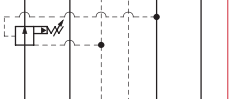
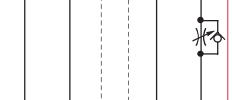
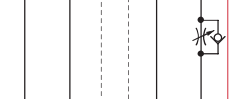
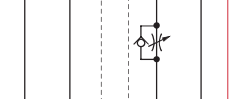
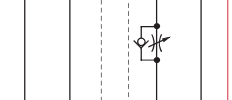
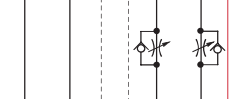
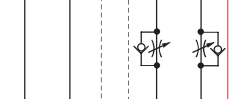
**MPW-03-*
MPW-03-*-L**

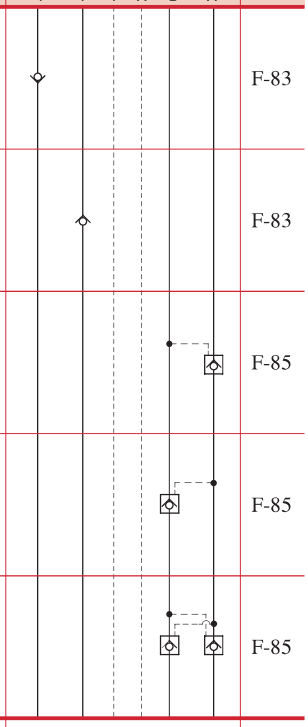


	Model Numbers	L1	L2
Current	MPA/MPB-03-*-20	174	60
	MPW-03-*-20	174	60
	MPA/MPB-03-*-2001	178	62
	MPW-03-*-2001	178	62
New	MPA/MPB-03-*-70	146.4	61.7
	MPW-03-*-70	177.4	61.7
	MPA/MPB-03-*-L-70	148.4	63.7
	MPW-03-*-L-70	181.4	63.7

04 Series Modular Valves

Type of Modular Valve

Class	Name and Model Numbers	Graphic Symbols	Page
	Solenoid Operated Directional Valve (S-) DSHG-04-＊＊＊-＊-52		★
Pressure Control Valves	Reducing Valves (for "P-Line") MRP-04-＊-10		F-79
	Reducing Valves (for "A-Line") MRA-04-＊-10		F-79
	Reducing Valves (for "B-Line") MRB-04-＊-10		F-79
Flow Control Valves	Throttle and Check Valves (for "A-Line", Meter-out) MSA-04-X-10		F-81
	Throttle and Check Valves (for "A-Line", Meter-in) MSA-04-Y-10		F-81
	Throttle and Check Valves (for "B-Line", Meter-out) MSB-04-X-10		F-81
	Throttle and Check Valves (for "B-Line", Meter-in) MSB-04-Y-10		F-81
	Throttle and Check Valves (for "A&B-Lines", Meter-out) MSW-04-X-10		F-81
	Throttle and Check Valves (for "A&B-Lines", Meter-in) MSW-04-Y-10		F-81

Class	Name and Model Numbers	Graphic Symbols	Page
Directional Control Valves	Check Valves (for "P-Line") MCP-04-＊-10		F-83
	Check Valves (for "T-Line") MCT-04-＊-10		F-83
	Pilot Operated Check Valves (for "A-Line") MPA-04-＊-10		F-85
	Pilot Operated Check Valves (for "B-Line") MPB-04-＊-10		F-85
	Pilot Operated Check Valves (for "A&B-Lines") MPW-04-＊-10		F-85
Mounting Bolts	Bolt Kits MBK-04-＊-10		F-86

★Refer to the relevant pages of catalog "E: DIRECTIONAL CONTROLS"

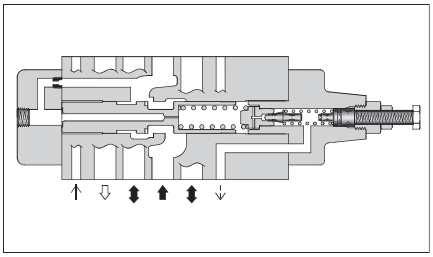
Reducing Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow ★ L/min
MR＊-04-A-10	35	100
MR＊-04-C-10 B H		300

★In case of pressure adjustment range "A" "B", the maximum flow is limited by the pressure in the secondary side. Use in the range of refer to "Secondary Side Pressure - Max. Flow Characteristics " below.

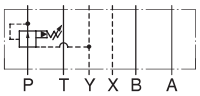




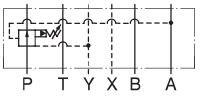
Model Number Designation

MRP	–04	–A	–10
Series Number	Valve Size	Pres. Adj. Range MPa	Design Number
MRP: for P-Line MRA: for A-Line MRB: for B-Line } Reducing Modular Valves	04	**A:** 0.7-7 **B:** 1.5-7 **C:** 3.5-14 **H:** 7-25	10

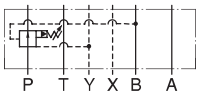
Graphic Symbols



MRP-04



MRA-04



MRB-04

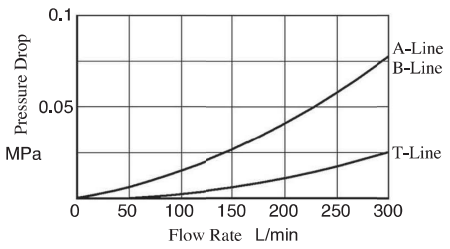
Instructions

- The drain line (Y-port) must be connected to tank directly to keep setting pressure stable. If use solenoid controlled pilot operated directional valves with these modular valves, please select the internal drain type (T-line).
- 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.

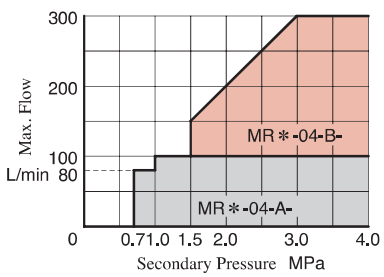
Typical Performance Characteristics

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

Pressure Drop

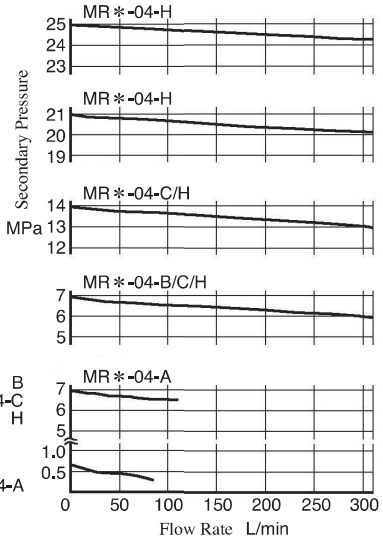


Secondary Pressure vs. Max. Flow

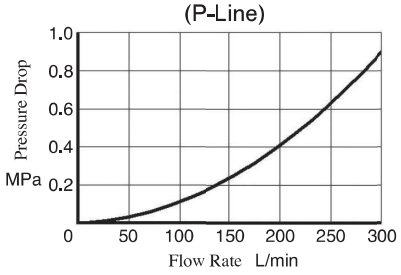


Nominal Override Characteristics

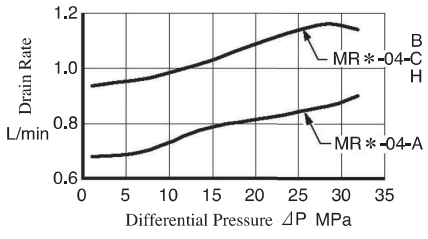
Primary Pressure 35 MPa



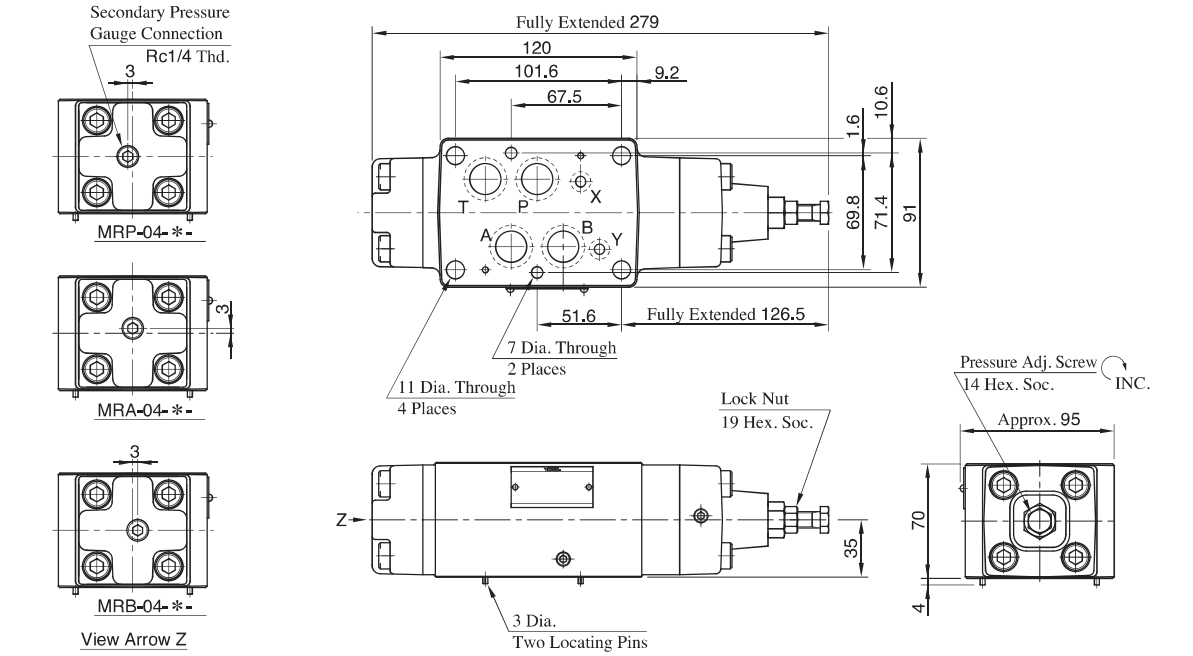
Pres. Drop at Spool Fully Open (P-Line)



Drain Characteristics



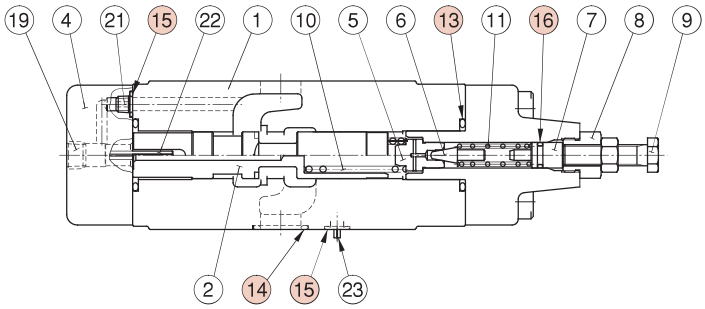
MRP-04
MRA-04
MRB-04



Approx. Mass·····7.4 kg

List of Seals

MRP-04
MRA-04
MRB-04



Item	Name of Parts	Part Numbers	Qty.
13	O-Ring	OR NBR-90 P28-N	2
14	O-Ring	OR NBR-90 P22-N	4
15	O-Ring	OR NBR-90 P9-N	7
16	O-Ring	OR NBR-70-1 P9-N	1

Throttle and Check Modular Valves

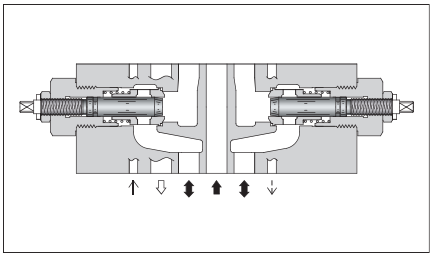
Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MS＊-04-＊-10	35	300

Model Number Designation

MSA		–04	–X	–10
Series Number		Valve Size	Direction of Flow	Design Number
MSA: For A-Line MSB: For B-Line MSW: For A&B-Lines	Throttle and Check Valve	04	**X:** Meter-out **Y:** Meter-in	10

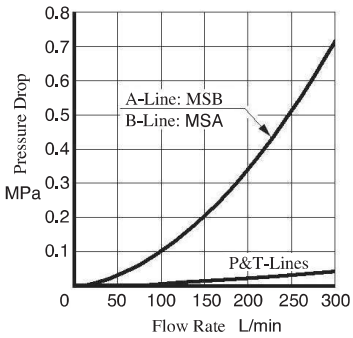




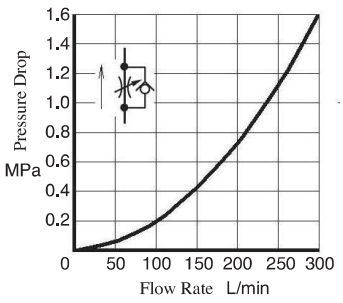
Typical Performance Characteristics

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

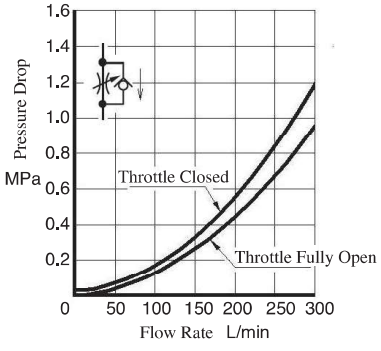
Pressure Drop



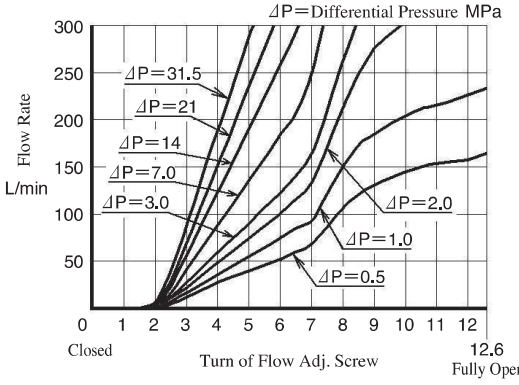
Pressure Drop at Throttle Fully Open



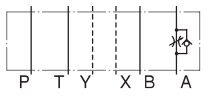
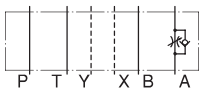
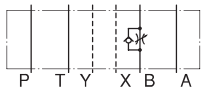
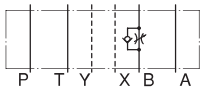
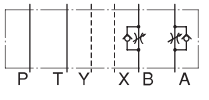
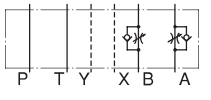
Pressure Drop for Free Flow



Metered Flow vs. Screw Position



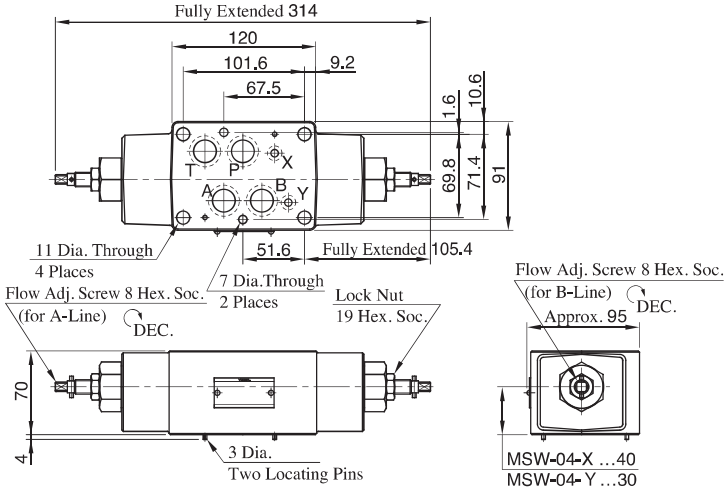
Graphic Symbols

Meter-out	Meter-in
 MSA-04-X	 MSA-04-Y
 MSB-04-X	 MSB-04-Y
 MSW-04-X	 MSW-04-Y

Instructions

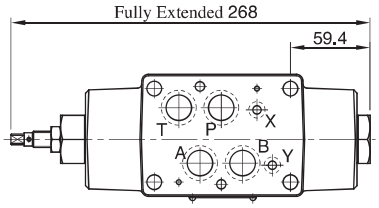
●To make flow rate adjustment, loosen lock nut and turn the flow adjustment screw clockwise or anti-clockwise. Turn the screw anti-clockwise, the flow rate increase. Be sure to re-tighten the lock nut firmly after the adjustment of the flow rate is completed.

MSW-04-X Y



Approx. Mass.....7.6 kg

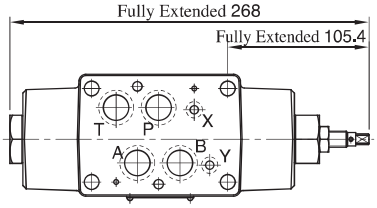
MSA-04-X Y



Approx. Mass.....7.4 kg

For other dimensions, refer to "MSW-04" in the drawing left.

MSB-04-X Y

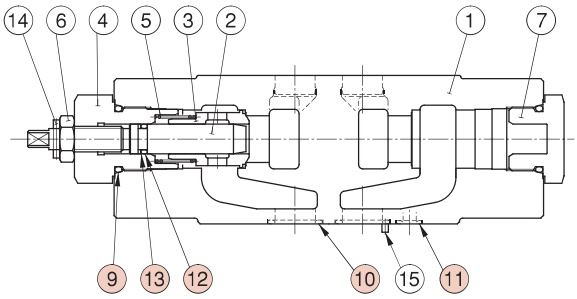


Approx. Mass.....7.4 kg

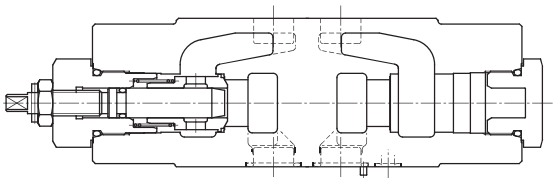
For other dimensions, refer to "MSW-04" in the drawing left.

List of Seals

MSA-04
MSB-04
MSW-04



MSA-04-X



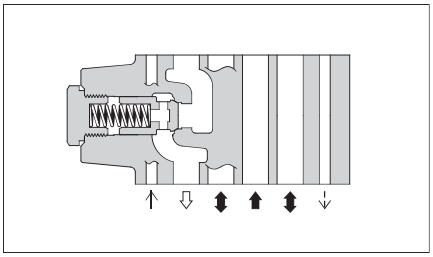
MSA-04-Y

- MSB-04 : The flow adjustment parts is assembled on the right side.
- MSW-04 : The flow adjustment parts is assembled on the both sides.

Item	Name of Parts	Part Numbers	Qty.		
			MSA–04	MSB–04	MSW–04
9	O-Ring	OR NBR-90 P26-N	2	2	2
10	O-Ring	OR NBR-90 P22-N	4	4	4
11	O-Ring	OR NBR-90 P9-N	2	2	2
12	O-Ring	OR NBR-70-1 P10A-N	1	1	2
13	Back-up Ring	BR JIS B 2401-4-T2-P10A	1	1	2

Check Modular Valves





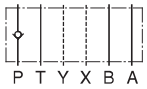
Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MCP-04-*-10	35	300
MCT-04-*-10		

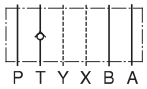
Model Number Designation

MCP	–04	–0	–10
Series Number	Valve Size	Cracking Pressure MPa	Design Number
MCP: Check Valve for P-Line	04	**0:** 0.035 **2:** 0.2 **4:** 0.4	**10**
MCT: Check Valve for T-Line			**10**

Graphic Symbols



MCP-04

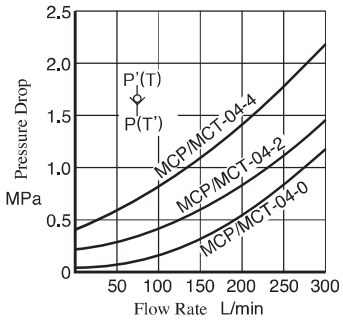


MCT-04

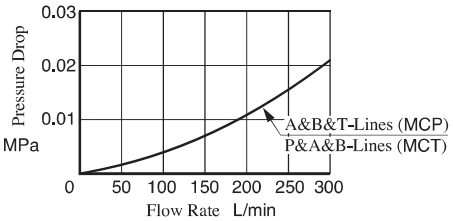
Typical Performance Characteristics

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

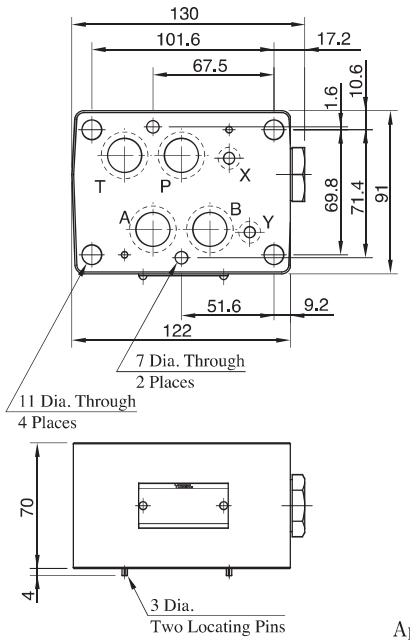
Pressure Drop for Free Flow

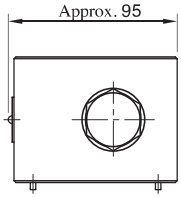


Pressure Drop



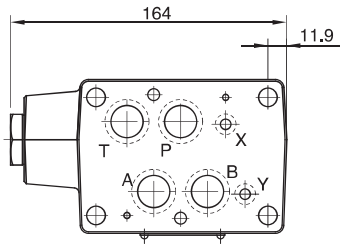
MCP-04

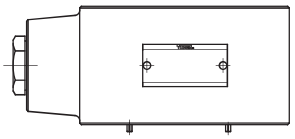




Approx. Mass·····4.6 kg

MCT-04



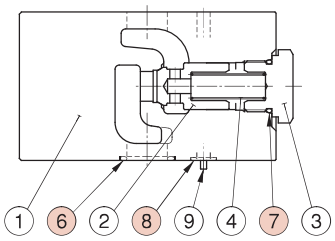


Approx. Mass.....5.4 kg

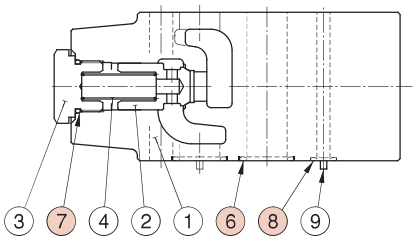
For other dimensions, refer to "MCP-04" in the drawing left.

List of Seals

MCP-04



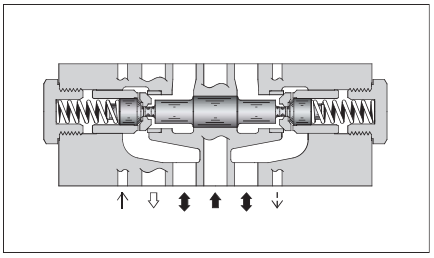
MCT-04



Item	Name of Parts	Part Numbers	Qty.
6	O-Ring	OR NBR-90 P22-N	4
7	O-Ring	OR NBR-90 P21-N	1
8	O-Ring	OR NBR-90 P9-N	2

Pilot Operated Check Modular Valves





Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MP＊–04–＊–10	35	300

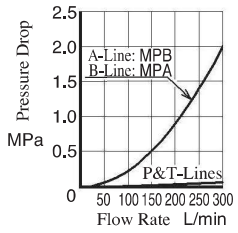
Model Number Designation

MPA	–04	–2	–10
Series Number	Valve Size	Cracking Pressure MPa	Design Number
MPA: For A-Line MPB: For B-Line MPW: For A&B-Lines } Pilot Operated Check Valve	**04**	**2:** 0.2 **4:** 0.4	**10**

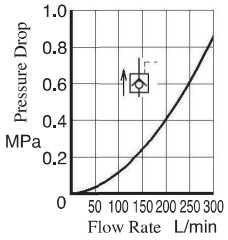
Typical Performance Characteristics

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

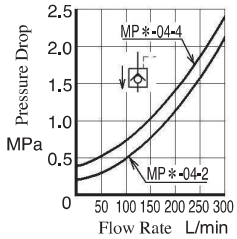
Pressure Drop



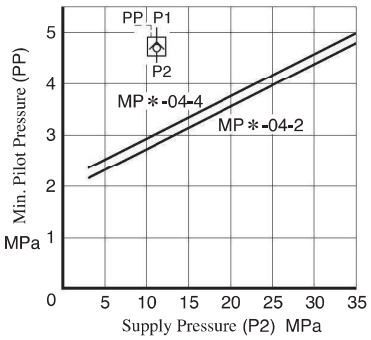
Pressure Drop for Reversed Controlled Flow



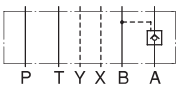
Pressure Drop for Free Flow



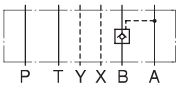
Min. Pilot Pressure



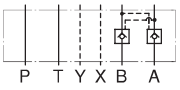
Graphic Symbols



MPA-04

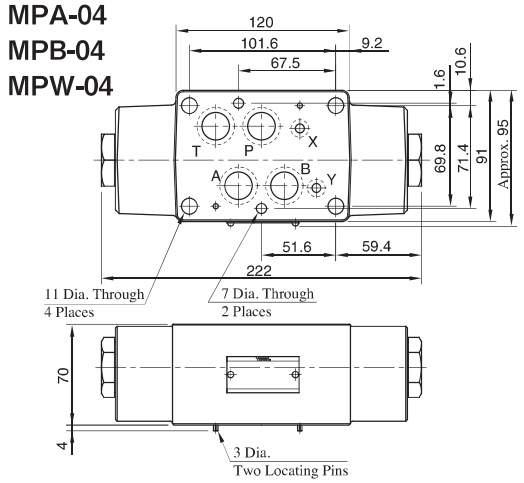


MPB-04



MPW-04

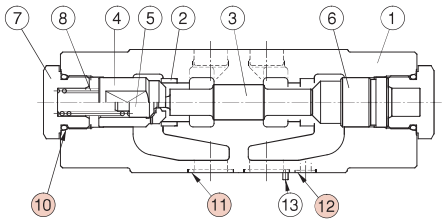
MPA-04
MPB-04
MPW-04



Approx. Mass.....7.3 kg

List of Seals

MPA-04
MPB-04
MPW-04



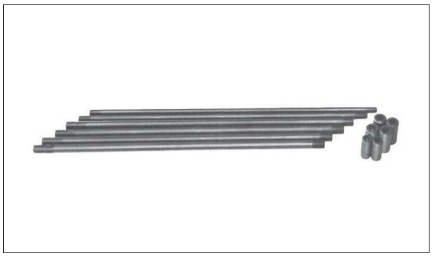
MPA-04

- MPB-04: The Check Valve is assembled on the right side.
- MPW-04: The Check Valve is assembled on the both sides.

Item	Name of Parts	Part Numbers	Qty.
10	O-Ring	OR NBR-90 P26-N	2
11	O-Ring	OR NBR-90 P22-N	4
12	O-Ring	OR NBR-90 P9-N	2

Mounting Bolt Kits For Modular Valves

Valves are mounted with six stud bolts (M6×2, M10×4). 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	–04	–01	–10
Series Number	Size of Modular Valve	Bolt Number	Design Number
MBK: Mounting Bolt Kits for Modular Valves	**04**	**01, 02, 03, 04** (Refer to the selection chart below)	**10**

Bolt Kits Selection Chart

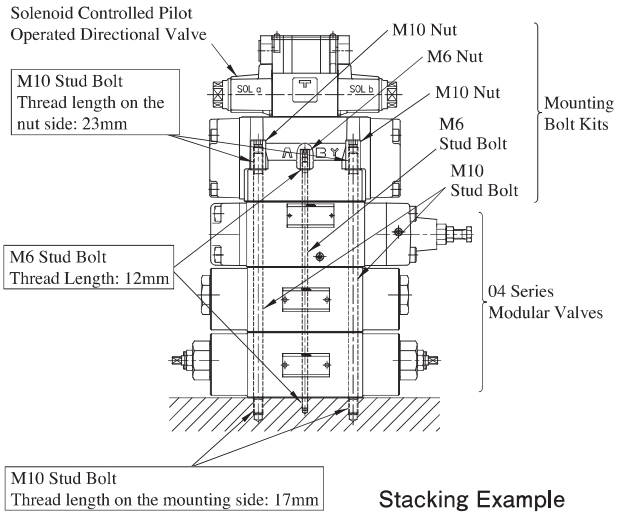
Bolt Kit Model Numbers	Quantity of Valves to be Stacked		Approx. Mass (1 set) kg
	Sol. Cont. Pilot Operated Directional Valves (DSHG-04, 52Design)	Modular Valve	
MBK–04–01–10	1	1	0.6
MBK–04–02–10	1	2	0.8
MBK–04–03–10	1	3	1.0
MBK–04–04–10	1	4	1.2

Bolt Kit Composition

M6 Stud Bolt ..... 2 Pcs.
M6 Nut ..... 2 Pcs.
M10 Stud Bolt ..... 4 Pcs.
M10 Nut ..... 4 Pcs.
} 1 Set

Tightening Torque

M6 ..... 12–15 Nm
M10 ..... 45–55 Nm

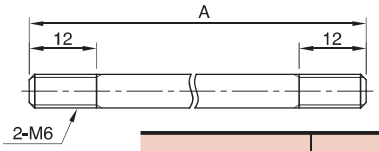


Stacking Example

MBK-04

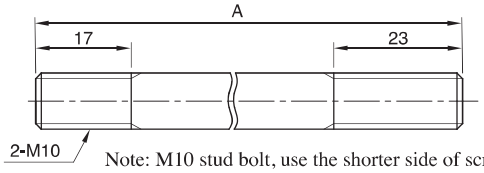
Stud Bolt

M6



Model Numbers	A	
	M6	M10
MBK-04-01-10	125	140
MBK-04-02-10	195	210
MBK-04-03-10	265	280
MBK-04-04-10	335	350

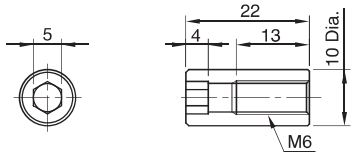
M10



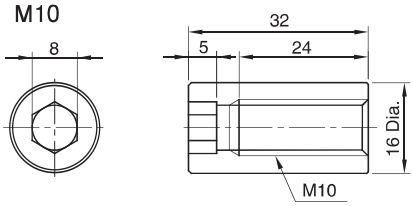
Note: M10 stud bolt, use the shorter side of screw part to the mounting surface side, the longer side to the nut side.
About more details, refer to the stacking example of the 04 series modular valves.

Nut

M6



M10

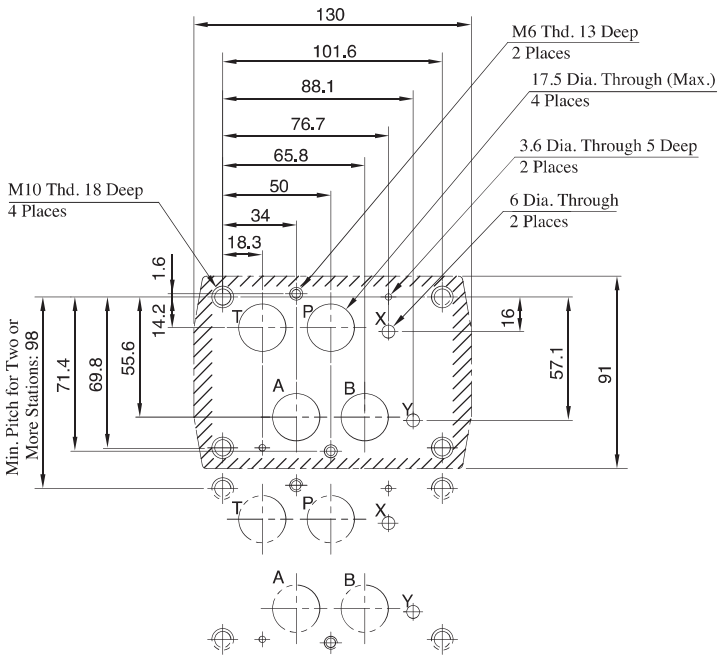


Mounting Surface Dimensions for 04 Series Modular Valve

When mounting 04 series modular valve, be sure to use a sub-plate for 1/2 solenoid controlled pilot operated directional valves

Name	Model Numbers	Page
Sub-plate for 1/2 Solenoid Controlled Pilot Operated Directional Valves	DHGM–04✻–20	F-108

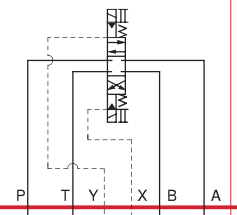
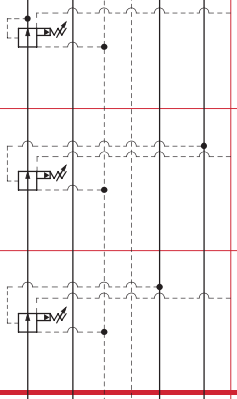
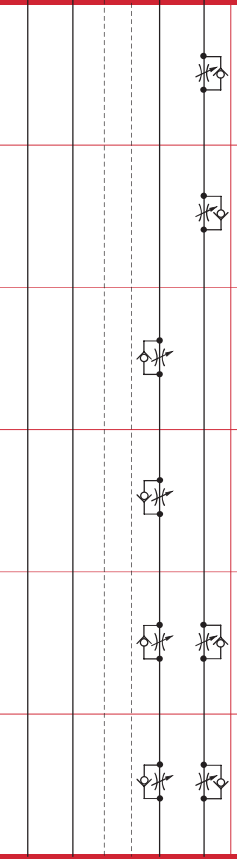
Also, when no sub-plates are used, be sure to use the following mounting surface.

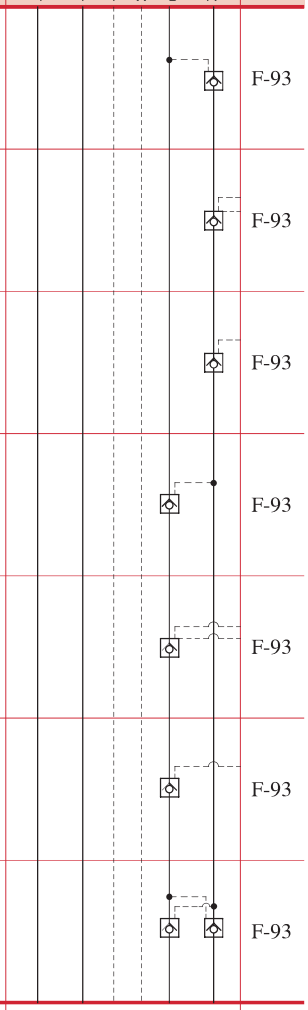


Note: The mounting surface of shaded parts above has a good machined finish. (1.6▽)

06 Series Modular Valves

Type of Modular Valve

Class	Name and Model Numbers	Graphic Symbols	Page
	★1 Solenoid Controlled Pilot Operated Directional Valve (S-) DSHG-06-＊＊＊-＊-53		★2
Pressure Control Valves	Reducing Valves (for "P-Line") MRP-06-＊-70		F-89
	Reducing Valves (for "A-Line") MRA-06-＊-70		F-89
	Reducing Valves (for "B-Line") MRB-06-＊-70		F-89
Flow Control Valves	Throttle and Check Valves (for "A-Line", Meter-out) MSA-06-X-70		F-91
	Throttle and Check Valves (for "A-Line", Meter-in) MSA-06-Y-70		F-91
	Throttle and Check Valves (for "B-Line", Meter-out) MSB-06-X-70		F-91
	Throttle and Check Valves (for "B-Line", Meter-in) MSB-06-Y-70		F-91
	Throttle and Check Valves (for "A&B-Lines", Meter-out) MSW-06-X-70		F-91
	Throttle and Check Valves (for "A&B-Lines", Meter-in) MSW-06-Y-70		F-91

Class	Name and Model Numbers	Graphic Symbols	Page
		P T Y X B A	
Directional Control Valves	Pilot Operated Check Valves (for "A-Line", Internal Pilot-Internal Drain Type) MPA-06-＊-70		F-93
	Pilot Operated Check Valves (for "A-Line", External Pilot-External Drain Type) MPA-06＊-＊-X-70		F-93
	Pilot Operated Check Valves (for "A-Line", External Pilot-Internal Drain Type) MPA-06＊-＊-Y-70		F-93
	Pilot Operated Check Valves (for "B-Line", Internal Pilot-Internal Drain Type) MPB-06-＊-＊-70		F-93
	Pilot Operated Check Valves (for "B-Line", External Pilot-External Drain Type) MPB-06＊-＊-X-70		F-93
	Pilot Operated Check Valves (for "B-Line", External Pilot-Internal Drain Type) MPB-06＊-＊-Y-70		F-93
	Pilot Operated Check Valves (for "A&B-Lines", Internal Pilot-Internal Drain Type) MPW-06-＊-70		F-93
Mounting Bolts	Bolt Kits MBK-06-＊-70	———	F-96

★1. Because drain ports "V" and "W" are not provided for solenoid controlled pilot operated directional valves of Pressure Centered Type (3H*) and models with Pilot Piston (P*), those valves cannot be used in combination with modular valves.
★2. Refer to the relevant pages of catalog "E: DIRECTIONAL CONTROLS"

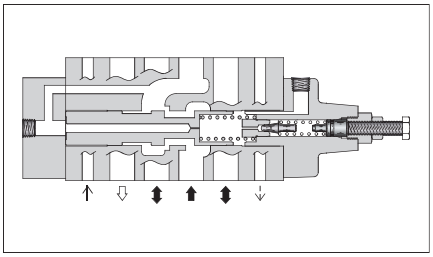
Reducing Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow ★ L/min
MR＊-06-A-70	35	125
MR＊-06-C-70 B H		500

★In the pressure adjustment ranges "A" and "B", maximum flow rates are limited by the pressure setting on the secondary side. See the "Secondary Pressure vs. Max. Flow"of this page, use the valve at the maximum flow rate within a zone highlighted with .

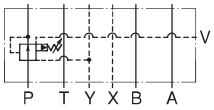




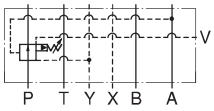
Model Number Designation

MRP	–06	–A	–70
Series Number	Valve Size	Pres. Adj. Range MPa	Design Number
MRP: For P-Line MRA: For A-Line MRB: For B-Line } Reducing Valve	**06**	**A:** 0.7-7 **B:** 1.5-7 **C:** 3.5-14 **H:** 7-25	**70**

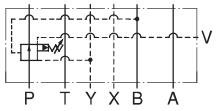
Graphic Symbols



MRP-06



MRA-06



MRB-06

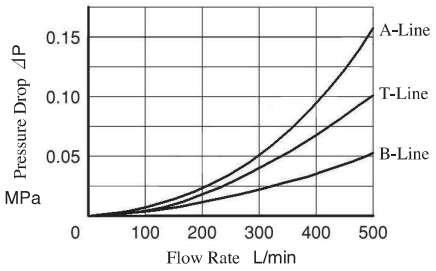
Instructions

- 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.

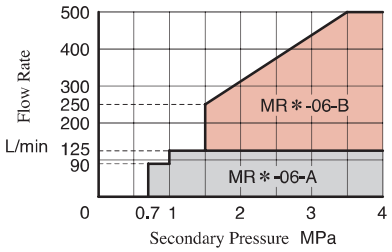
Typical Performance Characteristics

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

Pressure Drop

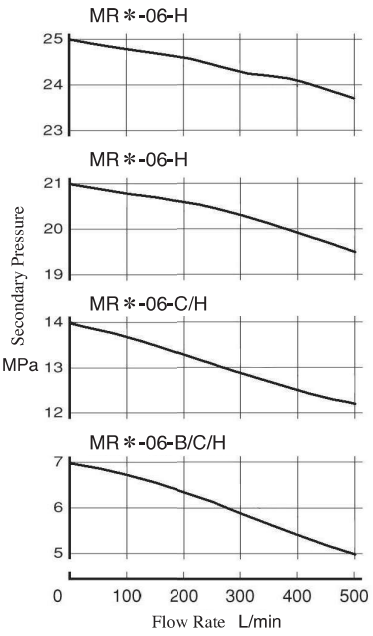


Secondary Pressure vs. Max. Flow

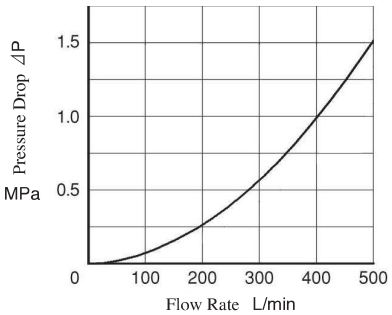


Nominal Override Characteristics

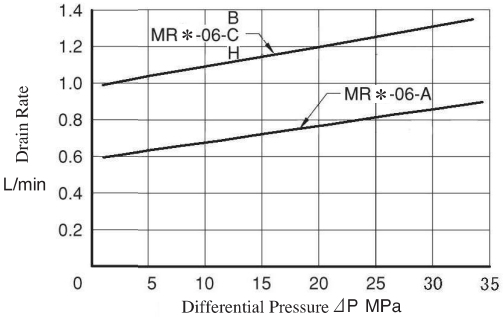
Primary Pressure 35 MPa



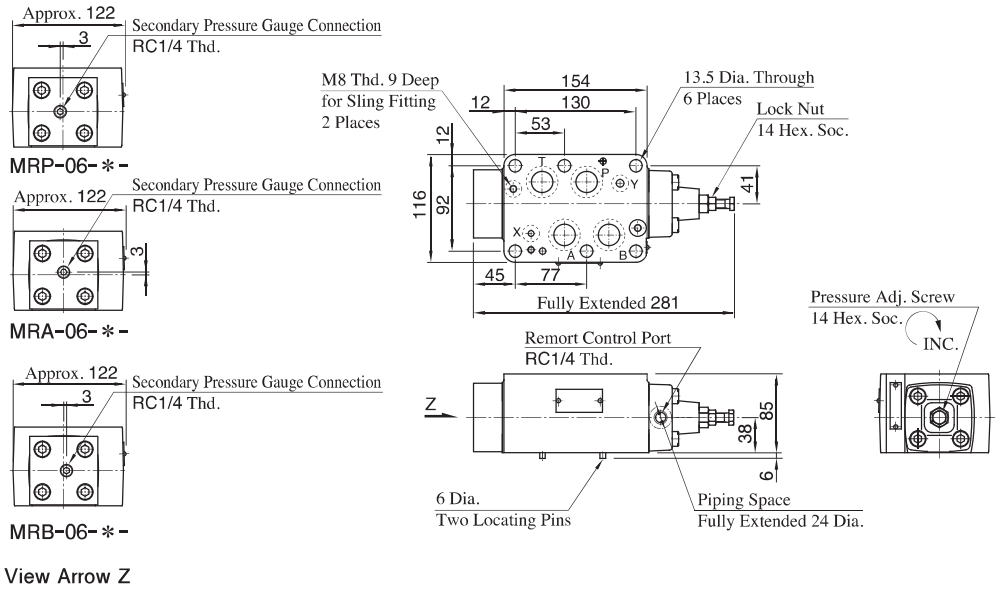
Pressure Drop at Spool Fully Open (P-Line)



Drain Characteristics



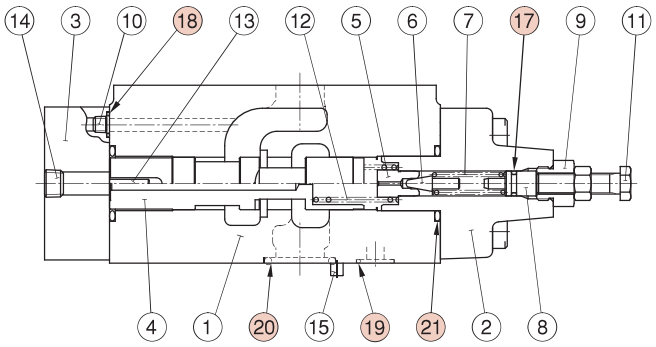
MRP-06
MRA-06
MRB-06



Approx. Mass·····11.1 kg

List of Seals

MRP-06
MRA-06
MRB-06



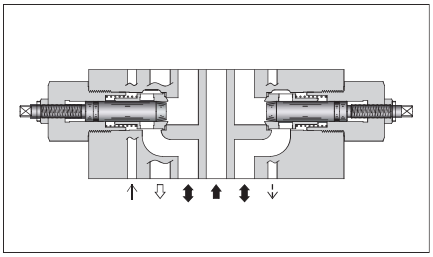
Item	Name of Parts	Part Numbers	Qty.
17	O-Ring	OR NBR-70-1 P9-N	1
18	O-Ring	OR NBR-90 P9-N	5
19	O-Ring	OR NBR-90 P14-N	2
20	O-Ring	OR NBR-90 P28-N	4
21	O-Ring	OR NBR-90 P30-N	2

Throttle and Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MS∗–06–∗–70	35	500





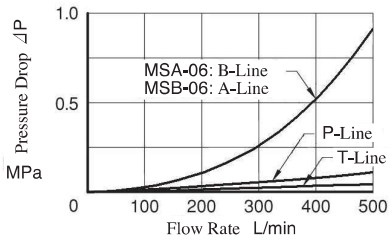
Model Number Designation

MSA		–06	–X	–70
Series Number		Valve Size	Direction of Flow	Design Number
MSA: For A-Line MSB: For B-Line MSW: For A&B-Line	Throttle and Check Valve	06	**X:** Meter-out **Y:** Meter-in	70

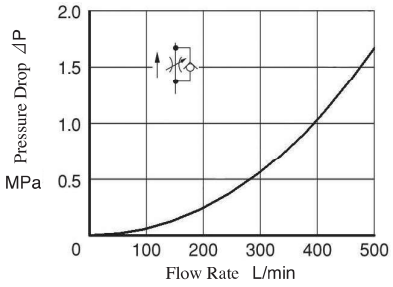
Typical Performance Characteristics

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

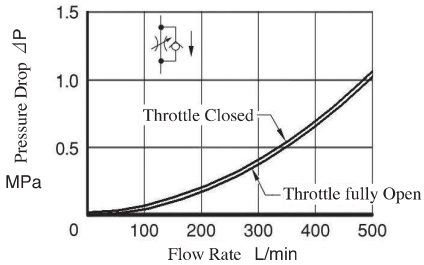
Pressure Drop



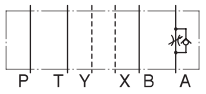
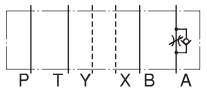
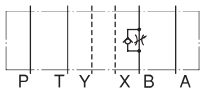
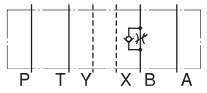
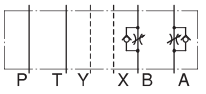
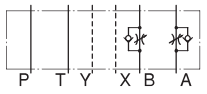
Pressure Drop at Throttle Fully Open



Pressure Drop for Free Flow



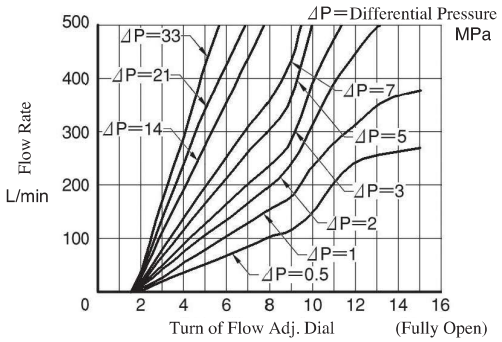
Graphic Symbols

Meter-out	Meter-in
 MSA-06-X	 MSA-06-Y
 MSB-06-X	 MSB-06-Y
 MSW-06-X	 MSW-06-Y

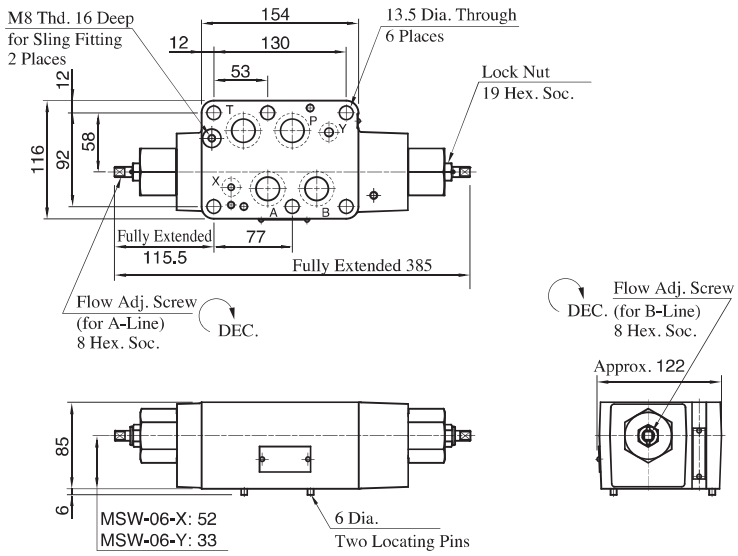
Instructions

●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.

Metered Flow vs. Screw Position

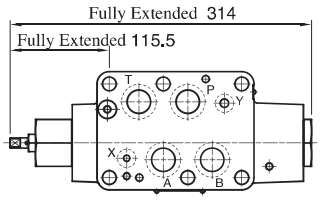


MSW-06-X Y



Approx. Mass.....12.2 kg

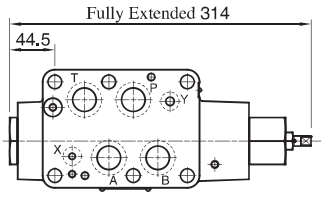
MSA-06-X Y



Approx. Mass.....12 kg

For other dimensions, refer to "MSW-06" in the drawing left.

MSB-06-X Y

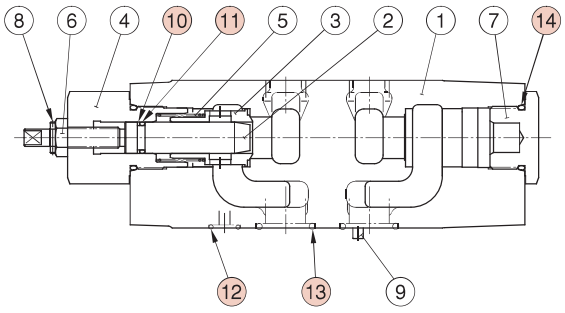


Approx. Mass.....12 kg

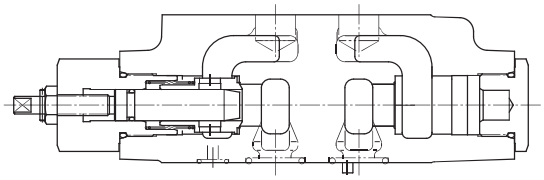
For other dimensions, refer to "MSW-06" in the drawing left.

List of Seals

MSA-06
MSB-06
MSW-06



MSA-06-X



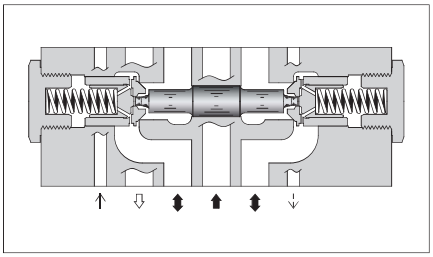
MSA-06-Y

- MSB-06 : The flow adjustment part is assembled on the right side.
- MSW-06 : The flow adjustment part is assembled on the both sides.

Item	Name of Parts	Part Numbers	Qty.		
			MSA-06	MSB-06	MSW-06
10	Back-up Ring	BR JIS B 2401-4-T2-P14	1	1	2
11	O-Ring	OR NBR-70-1 P14-N	1	1	2
12	O-Ring	OR NBR-90 P14-N	2	2	2
13	O-Ring	OR NBR-90 P28-N	4	4	4
14	O-Ring	OR NBR-90 P32-N	2	2	2

Pilot Operated Check Modular Valves





Model Number Designation

MPA	–06	S	–2	–X	–70
Series Number	Valve Size	Port Tapping Feature of Pilot-Drain Port ★1	Cracking Pressure MPa	Pilot-Drain Connection ★2	Design Number
MPA: For A-Line MPB: For B-Line MPW: For A&B-Line } Pilot Operated Check Valve	06	**None:** Rc 3/8 **S:** G 3/8	**2:** 0.2 **4:** 0.4	**None:** Internal Pilot-Internal Drain **X:** External Pilot-External Drain **Y:** External Pilot-Internal Drain	70

★1. This item applies only to External Pilot or External Drain Type.
★2. Only "None: Internal Pilot-Internal Drain Type" is available for MPW (for "A&B-Lines").

Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MP＊–06＊–＊–＊–70	35	500

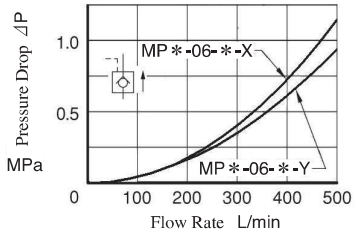
Graphic Symbols

Model Numbers \ Pilot-Drain Type	Internal Pilot-Internal Drain Type	External Pilot-External Drain Type	External Pilot-Internal Drain Type
MPA-06	P T Y X B A MPA-06-＊	P T Y X B A MPA-06＊-＊-X	P T Y X B A MPA-06＊-＊-Y
MPB-06	P T Y X B A MPB-06-＊	P T Y X B A MPB-06＊-＊-X	P T Y X B A MPB-06＊-＊-Y
MPW-06	P T Y X B A MPW-06-＊	—	—

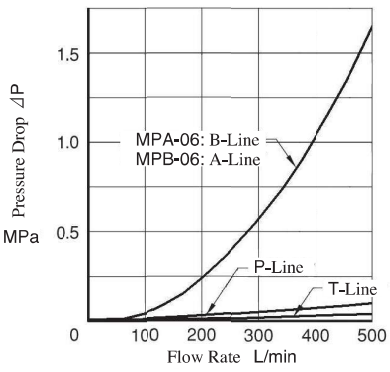
Typical Performance Characteristics

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

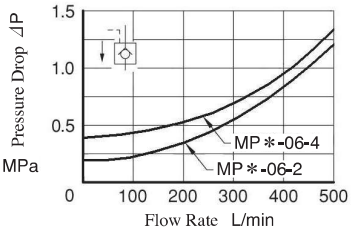
Pressure Drop for Reversed Controlled Flow



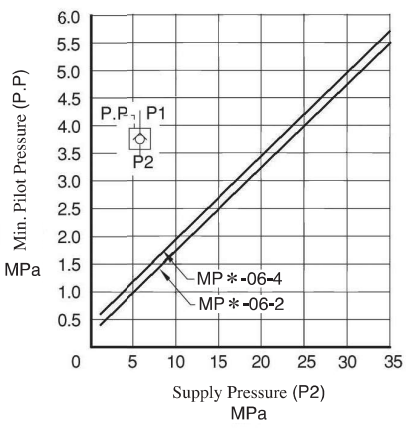
Pressure Drop



Pressure Drop for Free Flow

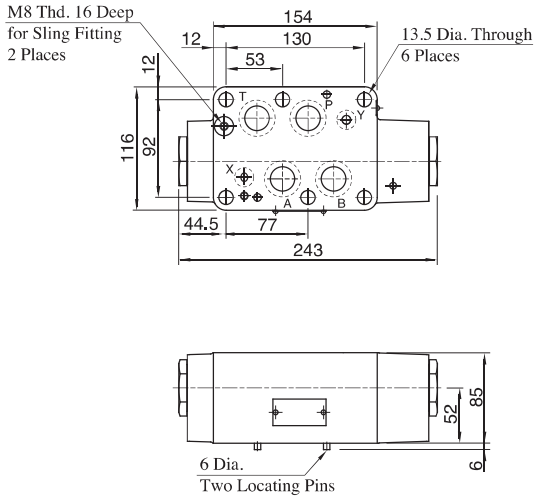


Min. Pilot Pressure



Internal Pilot – Internal Drain Type

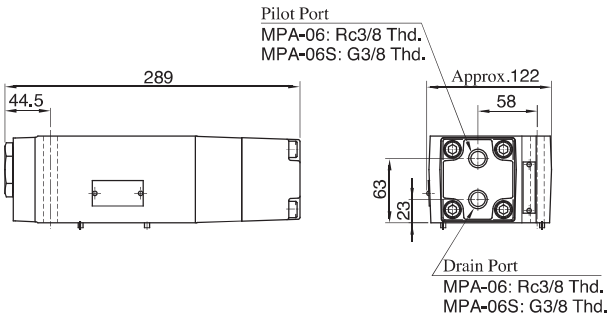
MPA-06
MPB-06
MPW-06



Approx. Mass.....11.6 kg

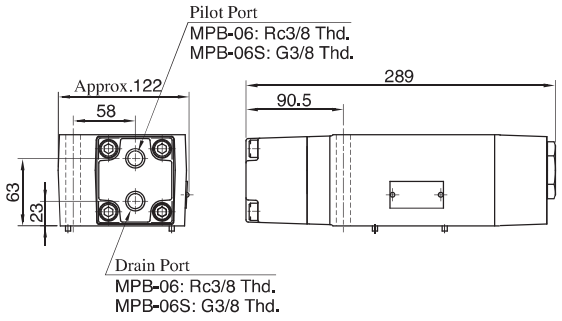
External Pilot - External Drain Type

MPA-06∗-∗-X



Approx. Mass.....13 kg

MPB-06∗-∗-X

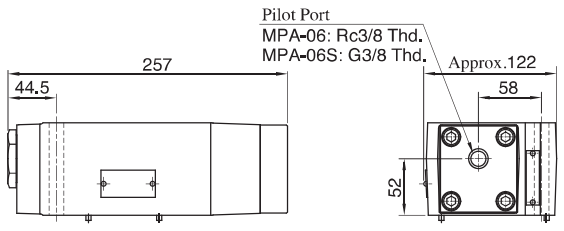


Approx. Mass.....13 kg

For other dimensions, refer to "Internal Pilot-Internal Drain Type" in the drawing above.

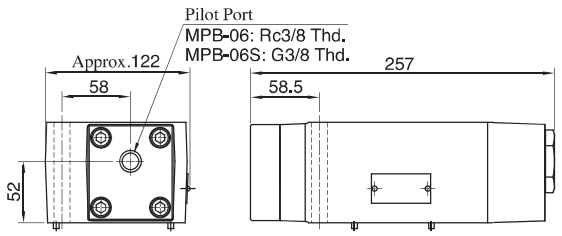
External Pilot - Internal Drain Type

MPA-06∗-∗-Y



Approx. Mass.....11.6 kg

MPB-06∗-∗-Y



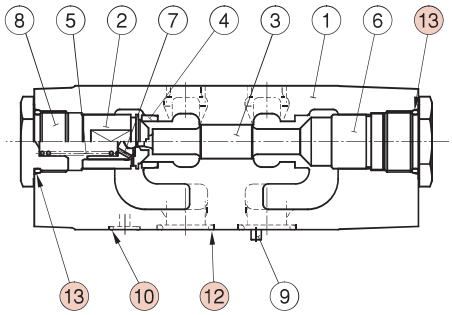
Approx. Mass.....11.6 kg

For other dimensions, refer to "Internal Pilot-Internal Drain Type" in the drawing above.

List of Seals

MPA-06
MPB-06
MPW-06

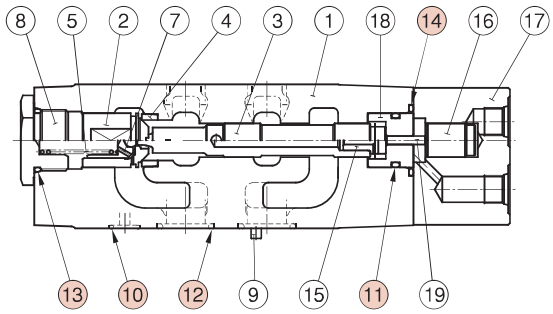
Internal Pilot - Internal Drain Type



MPA-06

●MPB-06: The Check Valve is assembled on the right side.
●MPW-06: The Check Valve is assembled on the both sides.

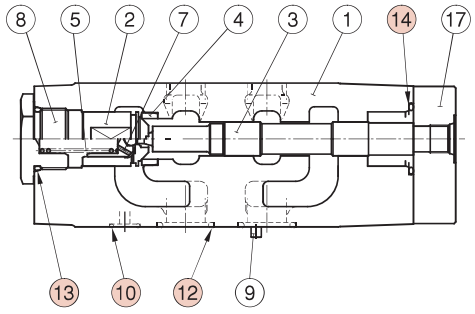
External Pilot - External Drain Type



MPA-06＊-＊-X

●MPB-06: The Check Valve is assembled on the right side.

External Pilot - Internal Drain Type



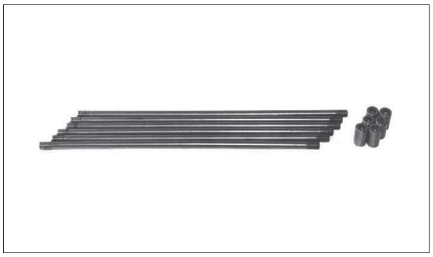
MPA-06＊-＊-Y

●MPB-06: The Check Valve is assembled on the right side.

Item	Name of Parts	Part Numbers	Qty.		
			Internal Pilot - Internal Drain Type	External Pilot - External Drain Type	External Pilot - Internal Drain Type
10	O-Ring	OR NBR-90 P14-N	2	2	2
11	O-Ring	OR NBR-70-1 P26-N	—	1	—
12	O-Ring	OR NBR-90 P28-N	4	4	4
13	O-Ring	OR NBR-90 P32-N	2	1	1
14	O-Ring	OR NBR-90 P36-N	—	1	1

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	–01	–70
Series Number	Size of Modular Valve	Bolt Number	Design Number
MBK: Mounting Bolt Kits for Modular Valves	**06**	**01, 02, 03, 04** (Refer to the chart below)	**70**

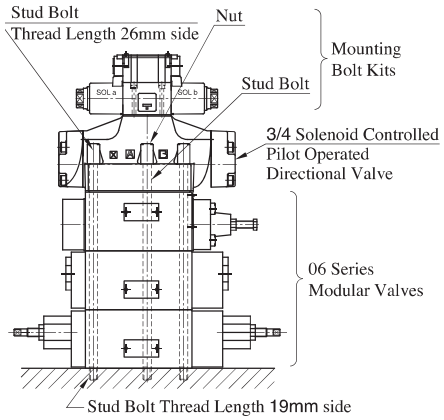
Bolt Kits Selection Chart

Bolt Kit Model Numbers	Quantity of Valves to be Stacked		Approx. Mass (1 Set) kg
	Sol. Cont. Pilot Operated Directional Valves (DSHG-06、53Design)	Modular Valve	
MBK–06–01–70	1	1	1.2
MBK–06–02–70	1	2	1.7
MBK–06–03–70	1	3	2.1
MBK–06–04–70	1	4	2.6

●Bolt Kit Composition

Stud Bolt····· 6 Pcs.
Nut ····· 6 Pcs. } 1 Set

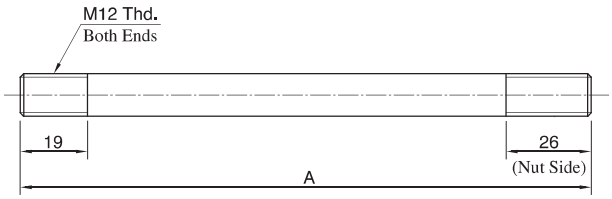
●Tightening Torque :····· 70–100 Nm
〔If the operating pressure is more than 25 MPa 90–100 Nm〕



Stacking Example

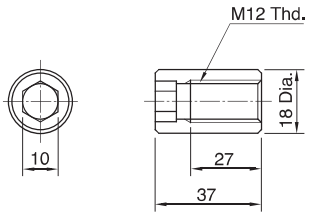
MBK-06

●Stud Bolt



Bolt Number	**A** mm
01	168
02	253
03	338
04	423

●Nut

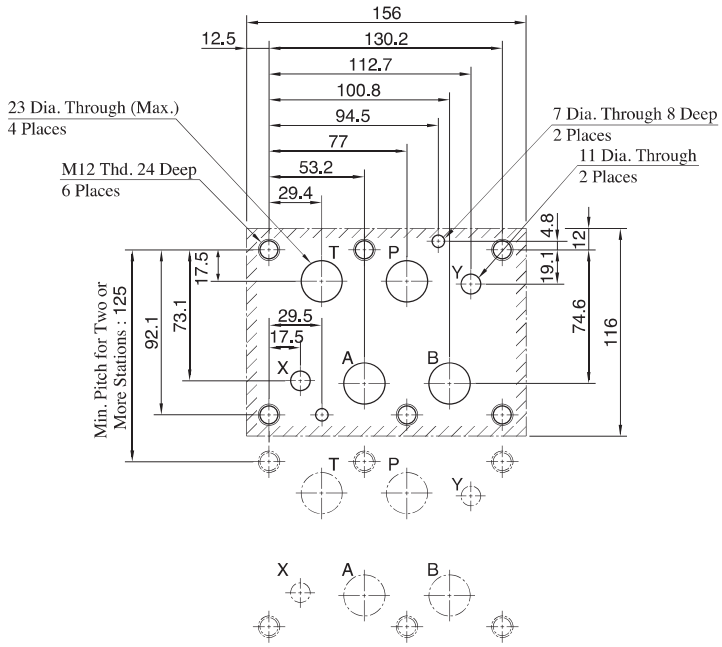


Mounting Surface Dimensions for 06 Series Modular Valve

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

Name	Model Numbers	Page
Sub-plate for 3/4 Solenoid Controlled Pilot Operated Directional Valves	DHGM–06✻–50	F-109

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



Note: The mounting surface of shaded parts above has a good machined finish. (▽)

Interchangeability in Installation between Current and New Design

06 Series Modular Valves have changed from 30 to 70 design numbers model to operate higher max. pressure. The mounting surface has no changes.

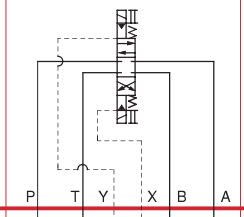
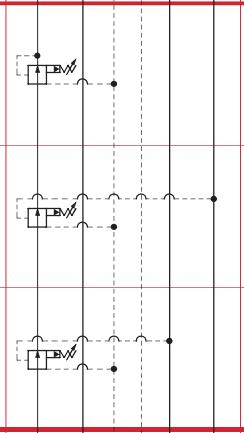
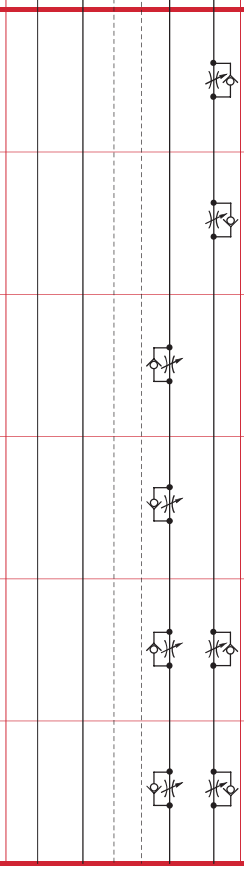
But if use the operating pressure as more than 25 MPa, have to select design No. 70 bolt kits (MBK-06).

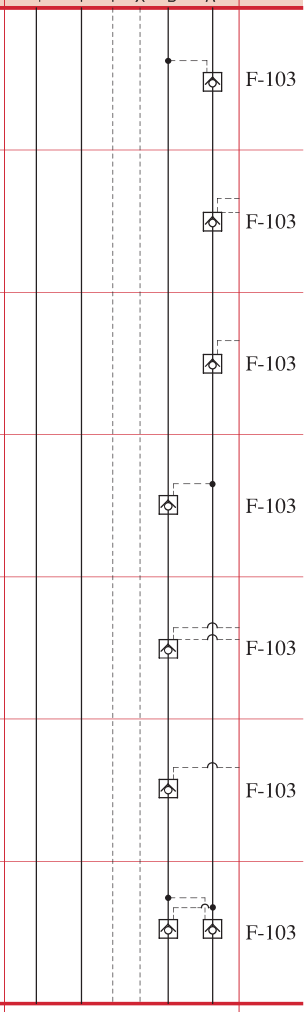
Mounting bolt kits of design No. 70, the length of both sides screw is different, so refer to the stacking example about 06 series model valves on page F-96.

If current and new designs in mixed use, the max. pressure is equal to the current design's pressure.

10 Series Modular Valves

Type of Modular Valve

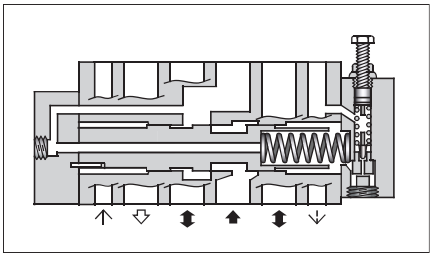
Class	Name and Model Numbers	Graphic Symbols	Page
	★1 Solenoid Controlled Pilot Operated Directional Valve (S-) DSHG-10-＊＊＊-＊-43		★2
Pressure Control Valves	Reducing Valves (for "P-Line") MRP-10-＊-30		F-99
	Reducing Valves (for "A-Line") MRA-10-＊-30		F-99
	Reducing Valves (for "B-Line") MRB-10-＊-30		F-99
Flow Control Valves	Throttle and Check Valves (for "A-Line", Meter-out) MSA-10-X-30		F-101
	Throttle and Check Valves (for "A-Line", Meter-in) MSA-10-Y-30		F-101
	Throttle and Check Valves (for "B-Line", Meter-out) MSB-10-X-30		F-101
	Throttle and Check Valves (for "B-Line", Meter-in) MSB-10-Y-30		F-101
	Throttle and Check Valves (for "A&B-Lines", Meter-out) MSW-10-X-30		F-101
	Throttle and Check Valves (for "A&B-Lines", Meter-in) MSW-10-Y-30		F-101

Class	Name and Model Numbers	Graphic Symbols	Page
		P T Y X B A	
Directional Control Valves	Pilot Operated Check Valves (for "A-Line", Internal Pilot-Internal Drain Type) MPA-10-＊-30		F-103
	Pilot Operated Check Valves (for "A-Line", External Pilot-External Drain Type) MPA-10＊-＊-X-30		F-103
	Pilot Operated Check Valves (for "A-Line", External Pilot-Internal Drain Type) MPA-10＊-＊-Y-30		F-103
	Pilot Operated Check Valves (for "B-Line", Internal Pilot-Internal Drain Type) MPB-10-＊-30		F-103
	Pilot Operated Check Valves (for "B-Line", External Pilot-External Drain Type) MPB-10＊-＊-X-30		F-103
	Pilot Operated Check Valves (for "B-Line", External Pilot-Internal Drain Type) MPB-10＊-＊-Y-30		F-103
	Pilot Operated Check Valves (for "A&B-Lines", Internal Pilot-Internal Drain Type) MPW-10-＊-30		F-103
Mounting Bolts	Bolt Kits MBK-10-＊-10		F-106

★1. Because drain ports "V" and "W" are not provided for solenoid controlled pilot operated directional valves of Pressure Centered Type (3H*) and models with Pilot Piston (P*), those valves cannot be used in combination with modular valves.
★2. Refer to the relevant pages of catalog "E: DIRECTIONAL CONTROLS"

Reducing Modular Valves





Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow ★ L/min
MR＊–10–A–30	25	250
MR＊-10–C–30 B H		800

★In the pressure adjustment ranges "A" and "B", maximum flow rates are limited by the pressure setting on the secondary side. See the "Secondary Pressure vs. Max. Flow"of this page, use the valve at the maximum flow rate within a zone highlighted with .

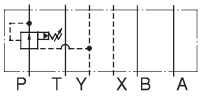
Model Number Designation

MRP	–10	–B	–30
Series Number	Valve Size	Pres. Adj. Range MPa	Design Number
MRP: For P-Line MRA: For A-Line MRB: For B-Line } Reducing Valve	10	**A:** 0.7-7 **B:** 1.5-7 **C:** 3.5-14 **H:** 7-21	30

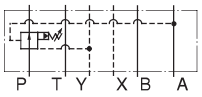
Instructions

- 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.

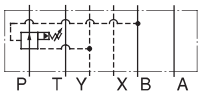
Graphic Symbols



MRP-10



MRA-10

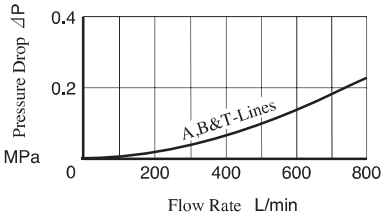


MRB-10

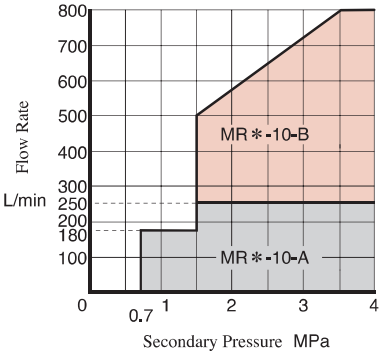
Typical Performance Characteristics

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

Pressure Drop

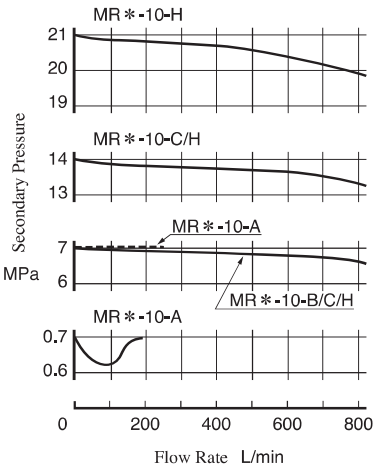


Secondary Pressure vs. Max. Flow

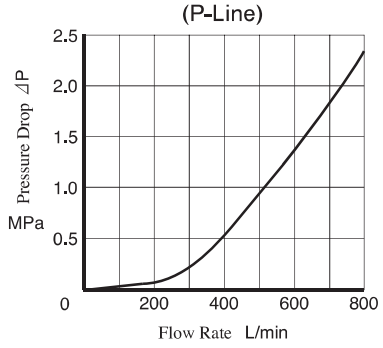


Nominal Override Characteristics

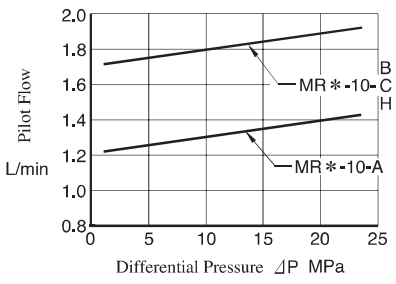
Primary Pressure 25 MPa



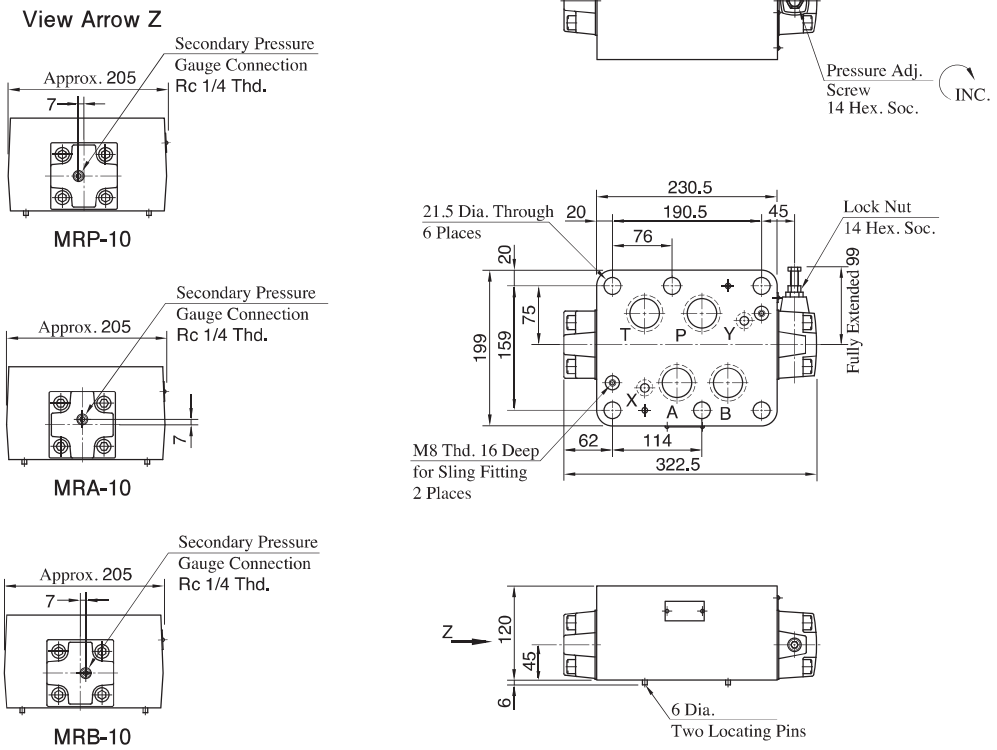
Pressure Drop at Spool Fully Open (P-Line)



Pilot Flow



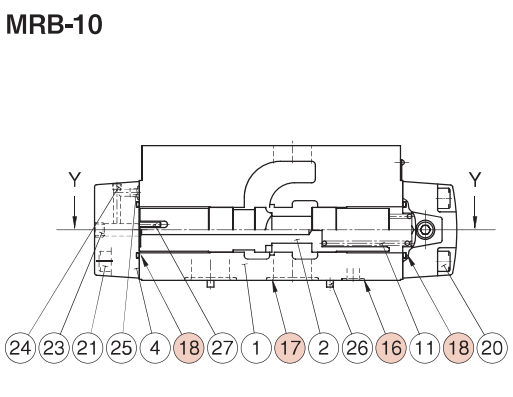
MRP-10
MRA-10
MRB-10

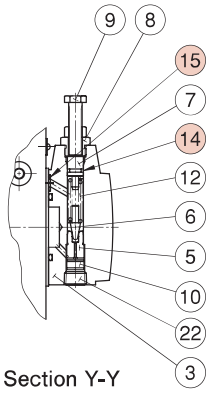


Approx. Mass.....36.6 kg

List of Seals

MRP-10
MRA-10
MRB-10

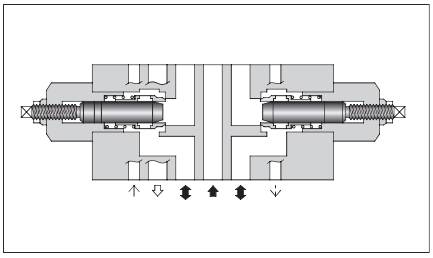




Item	Name of Parts	Part Numbers	Qty.
14	O-Ring	OR NBR-70-1 P9-N	1
15	O-Ring	OR NBR-90 P9-N	5
16	O-Ring	OR NBR-90 P16-N	2
17	O-Ring	OR NBR-90 P40-N	4
18	O-Ring	OR NBR-90 P44-N	2

Throttle and Check Modular Valves





Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MS∗–10–∗–30	25	800

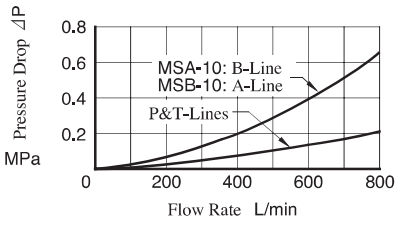
Model Number Designation

MSA		–10	–X	–30
Series Number		Valve Size	Direction of Flow	Design Number
MSA: For A-Line MSB: For B-Line MSW: For A&B-Line	Throttle and Check Valves	10	**X:** Meter-out **Y:** Meter-in	30

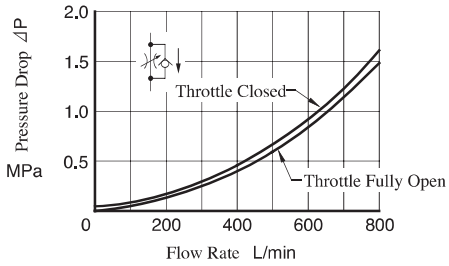
Typical Performance Characteristics

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

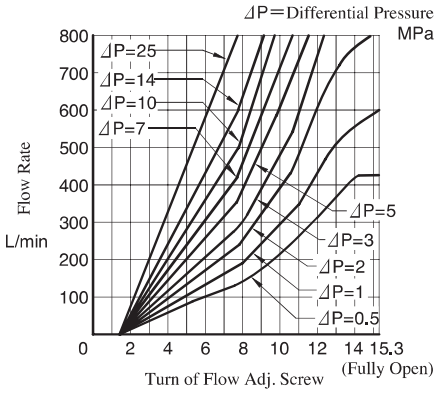
Pressure Drop



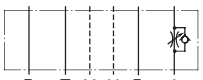
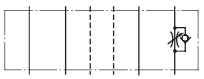
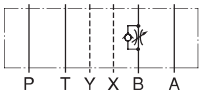
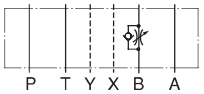
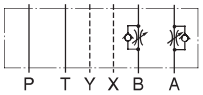
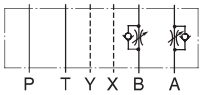
Pressure Drop for Free Flow



Metered Flow vs. Screw Position



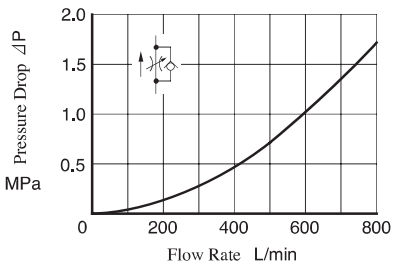
Graphic Symbols

Meter-out	Meter-in
 P T Y X B A MSA-10-X	 P T Y X B A MSA-10-Y
 P T Y X B A MSB-10-X	 P T Y X B A MSB-10-Y
 P T Y X B A MSW-10-X	 P T Y X B A MSW-10-Y

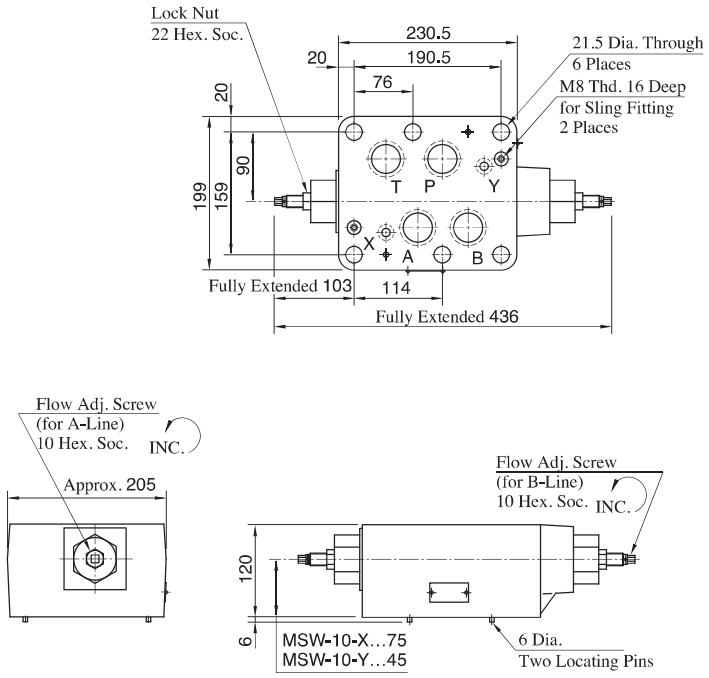
Instructions

- To make flow rate adjustment, loosen the 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.

Pressure Drop at Throttle Fully Open

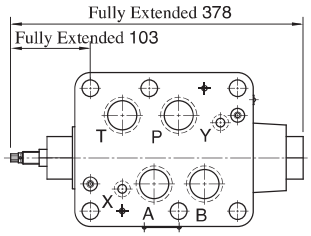


MSW-10-$\frac{X}{Y}$



Approx. Mass.....35.7 kg

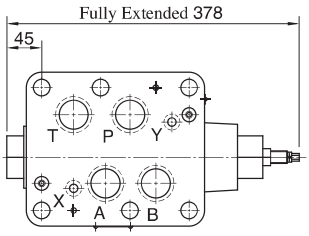
MSA-10-$\frac{X}{Y}$



Approx. Mass.....35 kg

For other dimensions, refer to "MSW-10" in the drawing left.

MSB-10-$\frac{X}{Y}$

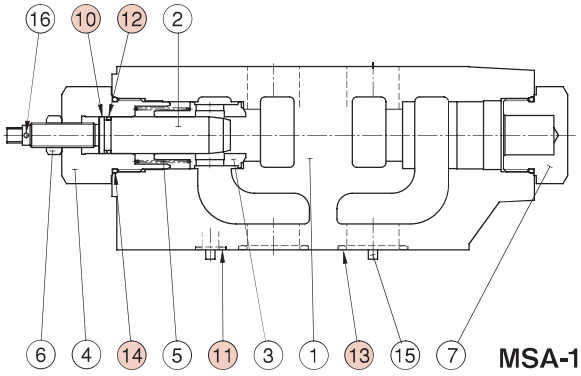


Approx. Mass.....35 kg

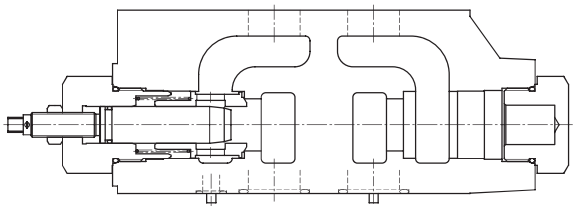
For other dimensions, refer to "MSW-10" in the drawing left.

List of Seals

MSA-10
MSB-10
MSW-10



MSA-10-X



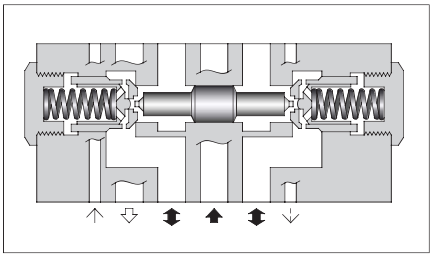
MSA-10-Y

- MSB-10 : The flow adjustment part is assembled on the right side.
- MSW-10 : The flow adjustment part is assembled on the both sides.

Item	Name of Parts	Part Numbers	Qty.		
			MSA-10	MSB-10	MSW-10
10	Back-up Ring	BR JIS B 2407-4-T2-P20	1	1	2
11	O-Ring	OR NBR-90 P16-N	2	2	2
12	O-Ring	OR NBR-70-1 P20-N	1	1	2
13	O-Ring	OR NBR-90 P40-N	4	4	4
14	O-Ring	OR NBR-90 P44-N	2	2	2

Pilot Operated Check Modular Valves





Model Number Designation

MPA	–10	S	–2	–X	–30
Series Number	Valve Size	Port Tapping Feature of Pilot-Drain Port ★1	Cracking Pressure MPa	Pilot-Drain Connection	Design Number
MPA: For A-Line / MPB: For B-Line — Pilot Operated Check Valve	10	**None:** Rc3／8 **S:** G3／8	**2:** 0.2 **4:** 0.4	**None:** Internal Pilot-Internal Drain **X** : External Pilot-External Drain **Y** : External Pilot-Internal Drain	30
MPW: For A&B-Lines — Pilot Operated Check Valve		—		**None:** Internal Pilot-Internal Drain	

★1. This item applies only to External Pilot or External Drain Type.

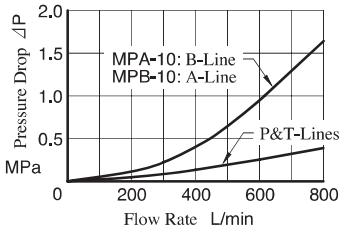
Specifications

Model Numbers	Max. Operating Pressure MPa	Max. Flow L/min
MP＊-10＊-＊-＊-30	25	800

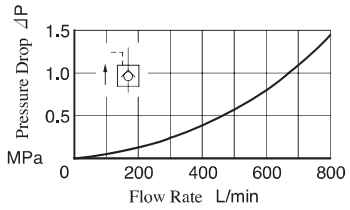
Typical Performance Characteristics

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

Pressure Drop



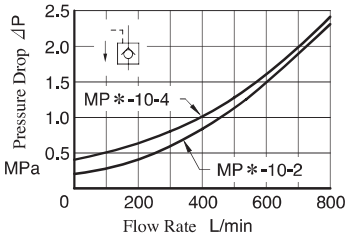
Pressure Drop for Reversed Controlled Flow



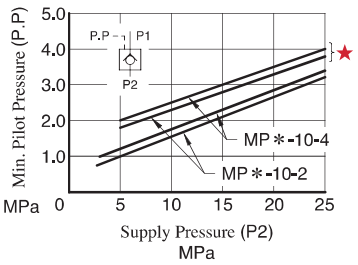
Graphic Symbols

Model Numbers \ Pilot-Drain type	Internal Pilot-Internal Drain Type	External Pilot-External Drain Type	External Pilot-Internal Drain Type
MPA-10	P T Y X B A MPA-10-＊	P T Y X B A MPA-10＊-＊-X	P T Y X B A MPA-10＊-＊-Y
MPB-10	P T Y X B A MPB-10-＊	P T Y X B A MPB-10＊-＊-X	P T Y X B A MPB-10＊-＊-Y
MPW-10	P T Y X B A MPW-10-＊	—	—

Pressure Drop for Free Flow



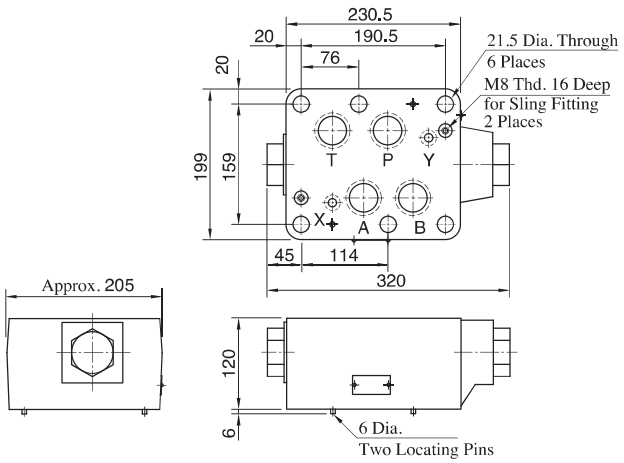
Min. Pilot Pressure



★In case of 500 L/min or more.

Internal Pilot - Internal Drain Type

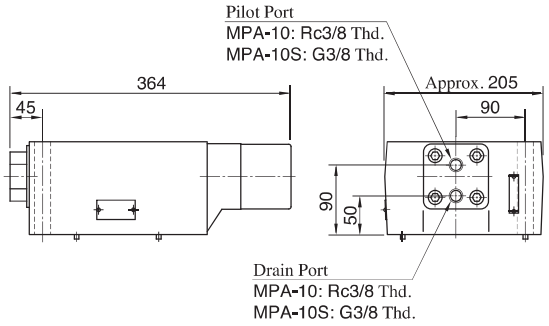
MPA-10
MPB-10
MPW-10



Approx. Mass.....36.5 kg

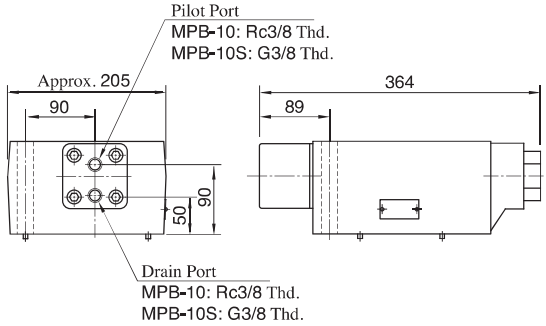
External Pilot - External Drain Type

MPA-10∗-∗-X



Approx. Mass.....38 kg

MPB-10∗-∗-X

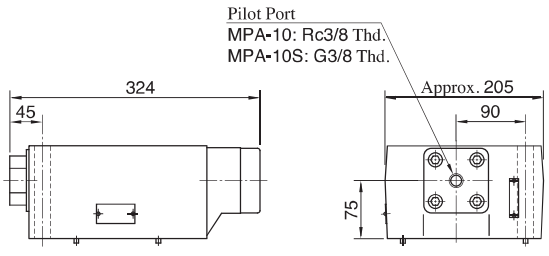


Approx. Mass.....38 kg

For other dimensions, refer to "Internal Pilot-Internal Drain Type" in the drawing above.

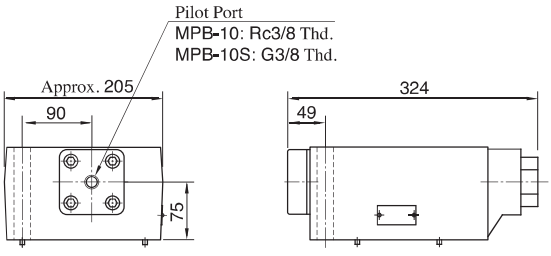
External Pilot - Internal Drain Type

MPA-10∗-∗-Y



Approx. Mass.....36.5 kg

MPB-10∗-∗-Y



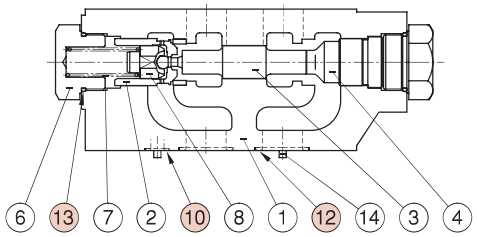
Approx. Mass.....36.5 kg

For other dimensions, refer to "Internal Pilot-Internal Drain Type" in the drawing above.

List of Seals

MPA-10
MPB-10
MPW-10

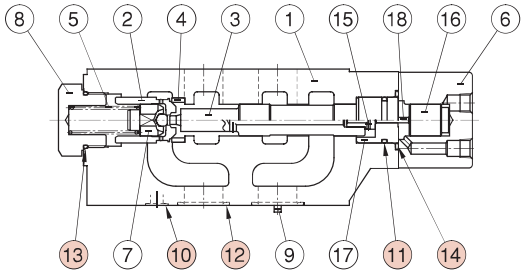
Internal Pilot - Internal Drain Type



MPA-10

- MPB-10 : The check valve is assembled on the right side.
- MPW-10 : The check valve is assembled on the both sides.

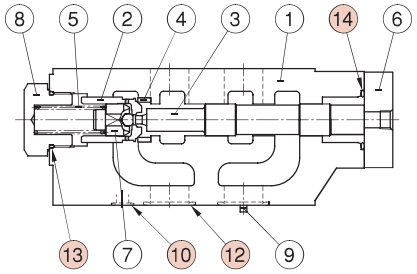
External Pilot - External Drain Type



MPA-10＊-＊-X

- MPB-10 : The check valve is assembled on the right side.

External Pilot - Internal Drain Type



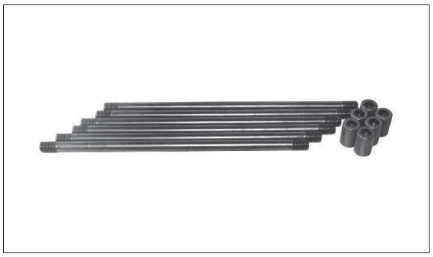
MPA-10＊-＊-Y

- MPB-10 : The check valve is assembled on the right side.

Item	Name of Parts	Part Numbers	Qty.		
			Internal Pilot-Internal Drain	External Pilot-External Drain	External Pilot-Internal Drain
10	O-Ring	OR NBR-90 P16-N	2	2	2
11	O-Ring	OR NBR-90 P34-N	—	1	—
12	O-Ring	OR NBR-90 P40-N	4	4	4
13	O-Ring	OR NBR-90 P44-N	2	1	1
14	O-Ring	OR NBR-90 P46-N	—	1	1

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	–10	–04	–10
Series Number	Size of Modular Valve	Bolt Number	Design Number
MBK: Mounting Bolt Kits for Modular Valves	**10**	**01, 02, 03, 04** (Refer to the chart below)	**10**

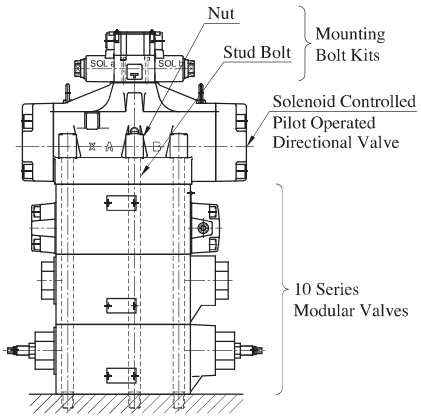
Bolt Kits Selection Chart

Model Numbers	Quantity of Valves to be Stacked		Approx. Mass (1 Set) kg
	Sol. Cont. Pilot Operated Directional Valves (DSHG–10)	Modular Valve	
MBK–10–01–10	1	1	3.9
MBK–10–02–10	1	2	5.7
MBK–10–03–10	1	3	7.4
MBK–10–04–10	1	4	9.2

● Bolt Kit Composition

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

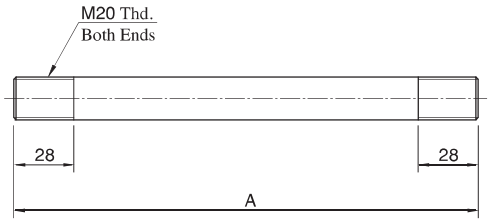
● Tightening Torque...150-170 Nm



Stacking Example

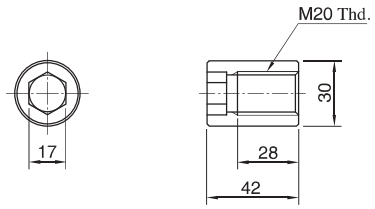
MBK-10

● Stud Bolt



Bolt Number	**A** mm
01	217
02	337
03	457
04	577

● Nut

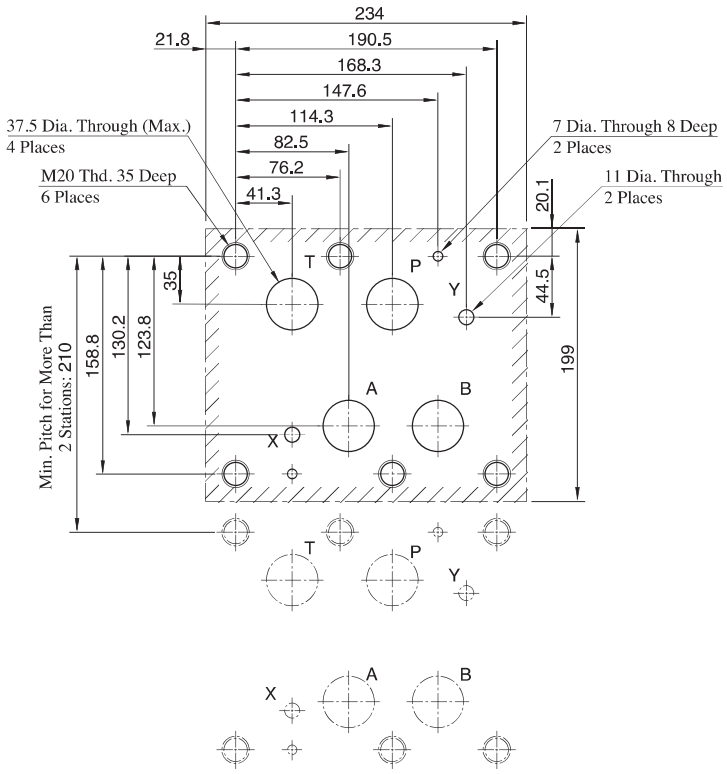


Mounting Surface Dimensions for 10 Series Modular Valve

When mounting 10 series modular valve, be sure to use a sub-plate for 1-1/4 solenoid controlled pilot operated directional valves.

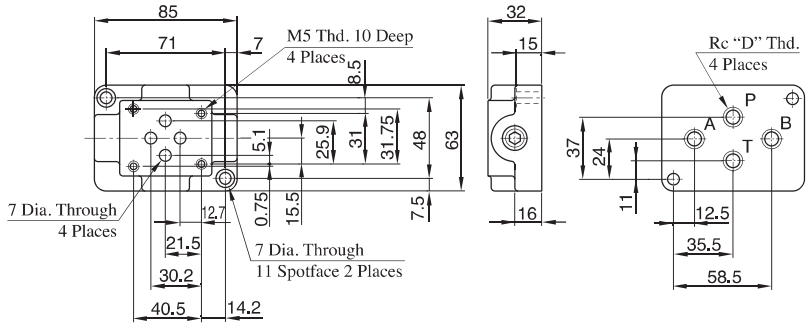
Name	Sub-plate Model Numbers	Page
Sub-plate for 1-1/4 Solenoid Controlled Pilot Operated Directional Valves	DHGM–10∗–40	F-109

When no sub-plates are used, be sure to use the following mounting surface.



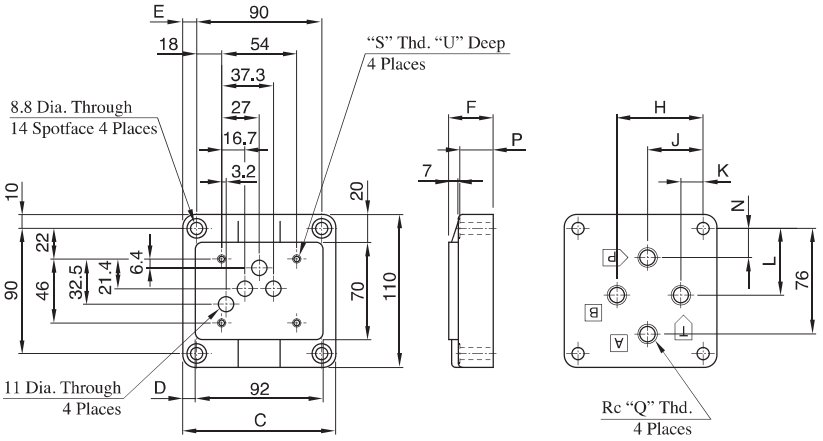
Note: The mounting surface of shaded parts above has a good machined finish. (1.6▽)

Sub Plate：DSGM-01、01X、01Y



Model Numbers	D
DSGM-01-31	1/8
DSGM-01X-31	1/4
DSGM-01Y-31	3/8

Sub Plate：DSGM-03／03X／03Y

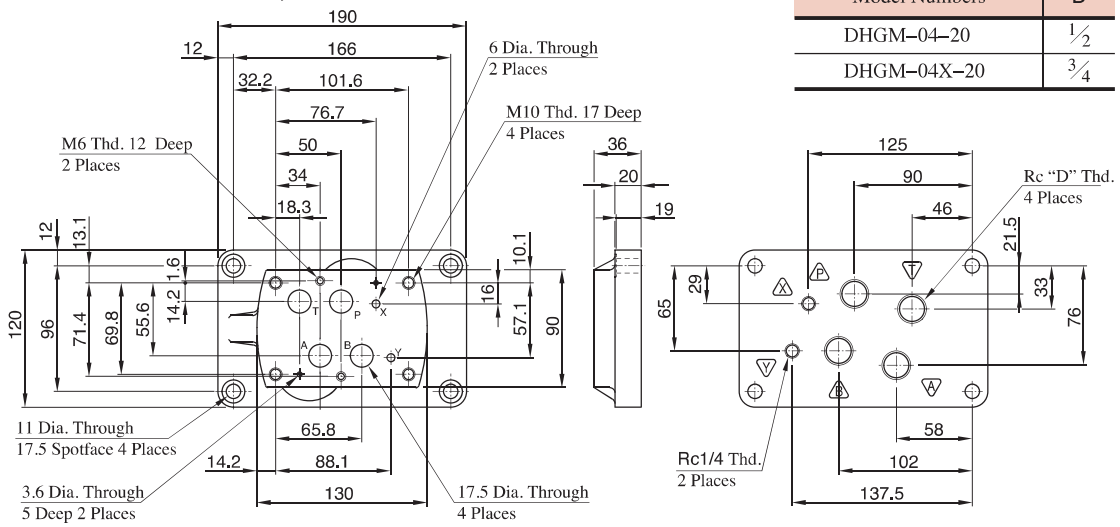


Model Numbers	C	D	E	F	H	J	K	L	N	P	Q
DSGM-03-40/4002	110	9	10	32	62	40	16	48	21	24	3/8
DSGM-03X-40/4002											1/2
DSGM-03Y-40/4002	120	14	15	50	80	45	10	47	16	42	3/4

Model Numbers	S	U	Remarks
DSGM-03＊-40	M6	13	Standard
DSGM-03＊-4002	M8	14	Option

Sub Plate：DHGM-04, 04X

Model Numbers	D
DHGM-04-20	1/2
DHGM-04X-20	3/4

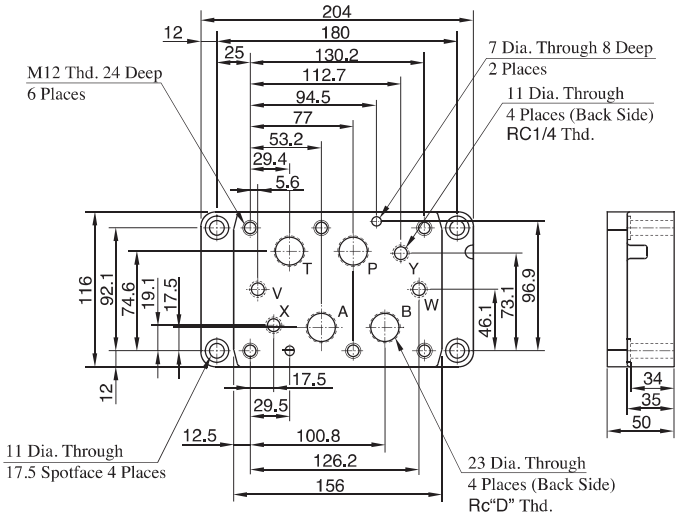


Note: Use Division of Port "X"&"Y"

Pilot Pressure Port " X "	Drain Port " Y "
Use only with external type valves. If use internal type valves, have to plug.	Use as drain port only with external type valves. If use internal type valves, have to plug.

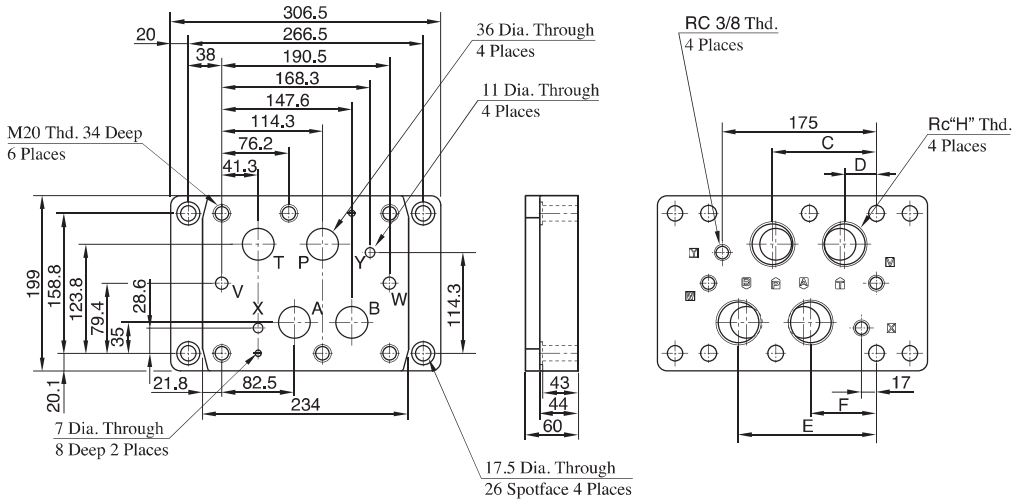
Sub Plate

DHGM-06, 06X



Model Numbers	"D"
DHGM–06–50	3/4
DHGM–06X–50	1

DHGM-10, 10X



Model Numbers	C	D	E	F	H
DHGM–10–40	114	41	147.5	82.5	1 1/4
DHGM–10X–40	118	36	156.5	74.5	1 1/2

Note: Use Division of "X", "Y", "V" & "W" Port

Model and Type of Valve	Pilot Pressure Port "X"	Pilot Drain Port "Y"	Drain Port "V"	Drain Port "W"
Spring Centered, No Spring, Spring Offset	Use only with external type valves. If use with internal type valves, have to plug.	Use as drain port only with external type valves. If use internal type valves, have to plug.★	Not Use (Need Not Plug)	
Pressure Centered			Use	Not Use (Need Not Plug)
Pilot Piston with Both Ends			Use	Use
Pilot Piston with Port "A" Side			Use	Not Use (Need Not Plug)
Pilot Piston with Port "B" Side			Not Use (Need Not Plug)	Use

★ The screw is on the body side of valve, so plug either sub-plate or body.