

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 | | | | | | | | | | | | Page | |
|---------------------------|-----------------------------|--------------------------------------|---|---|---|---|----|----|----|----|----|-----|-----|------|-----|
| | | 1 | 2 | 3 | 5 | 7 | 10 | 20 | 30 | 50 | 70 | 100 | 200 | | 300 |
| 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} 03 ^{★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 mm ² /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 mm ² /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

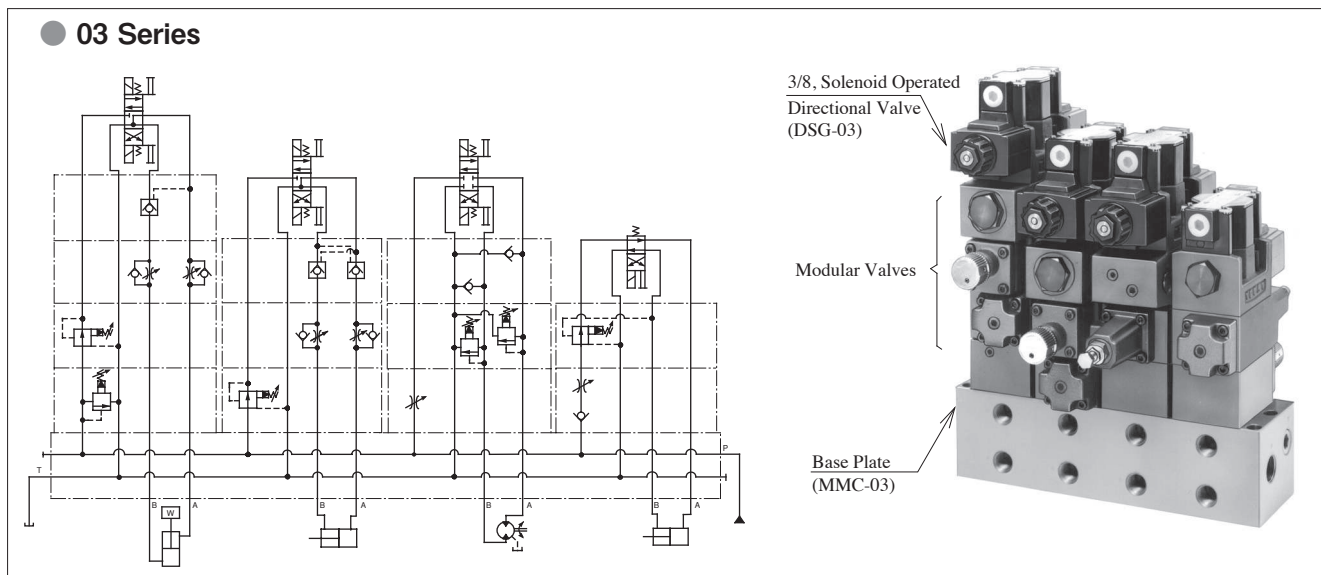
● 007 - 10 Series

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



Instructions

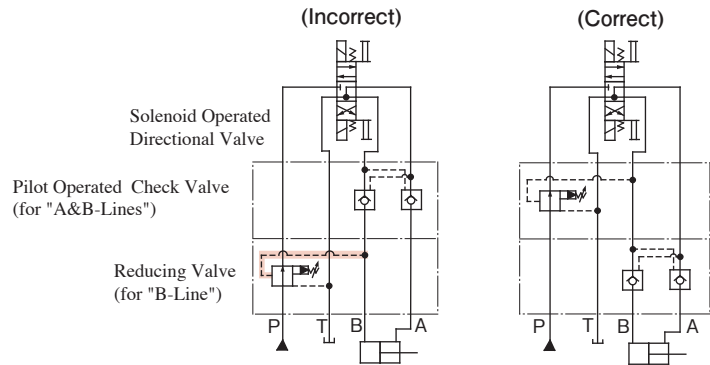
Caution in the selection of valves and circuit designing

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.

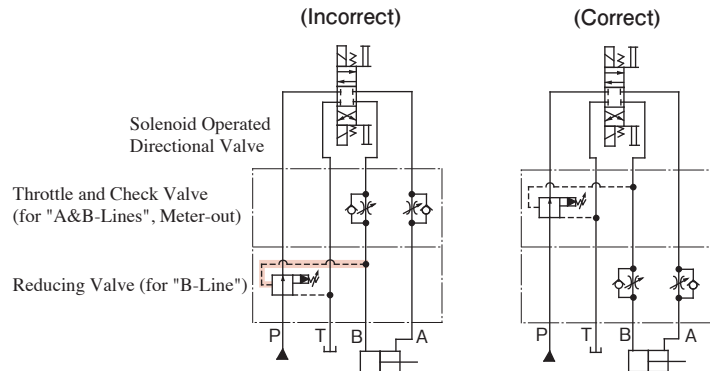
Consequently, retaining the position of the cylinder using a pilot operated check valve becomes impossible. The stacking sequence shown in the drawing right (correct) is required in order to retain the cylinder position.



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 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.

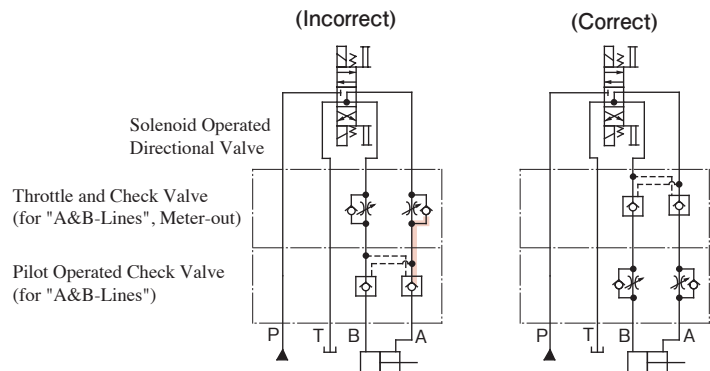
Therefore, stacking sequence in the drawing right (correct) is required in this combination.



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

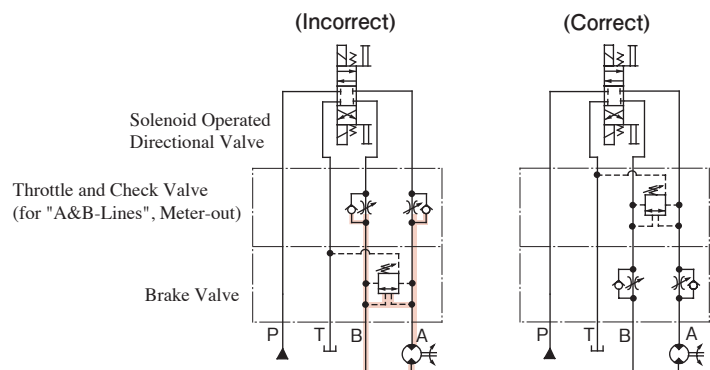
In A to T flow in the drawing left (incorrect), pressure is generated at the throttle and check valve.

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



Stacking sequence when using brake valves and throttle and check valves

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



Base Plates and Sub-Plates

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

| Series | Base Plates | | Sub-Plates | |
|------------|---|------|---|-------|
| | Model Numbers | Page | Model Numbers | Page |
| 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 |

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

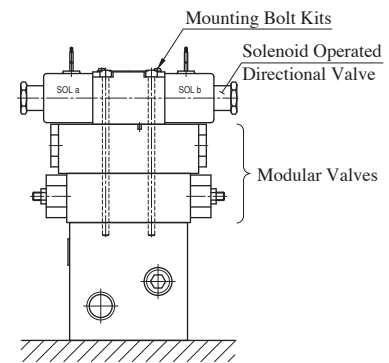
- 1) Screw-in the four stud bolts(04, 06 and 10 series: six stud bolts), fully into the tapped holes on the mounting surface of the specified base plate, sub-plate or manifold. 01,04 and 06 series stud bolts, screw short-side into the mounting surface of the specified base plate, sub-plate or manifold.
- 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.

Mounting Bolts

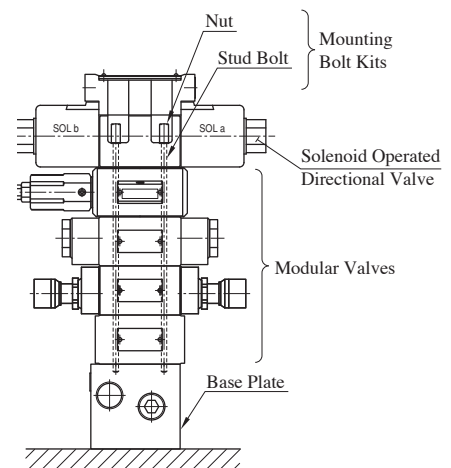
Modular valves are mounted using stud bolts which are supplied in a kit form. When mounting, see the following table for tightening torque. After the test run, be sure to tighten again firmly within the specified torque.

| 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.



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 mm ² /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 |

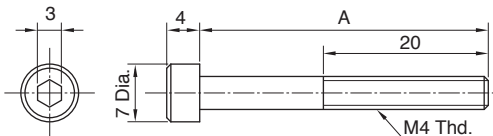
- For any other specific gravity (G'), the pressure drop ($\Delta P'$) may be obtained from the following formula. $\Delta P' = \Delta P (G'/0.850)$

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 | | | | |

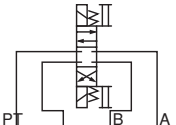













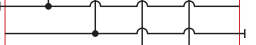

Comparison of MBK-005 bolt kit model numbers



| 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 | Relief 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 |

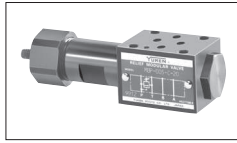
★Please refer to the catalog page of "E: Directional Control Valves".

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

Relief Modular Valves

Specifications

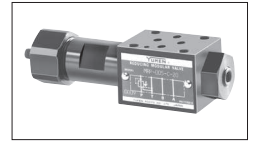
| Model Numbers | Max. Operating Pressure MPa | Max. Flow L/min |
|---------------|--------------------------------|--------------------|
| MBP-005-* -20 | 25 | 15 |



Reducing Modular Valves

Specifications

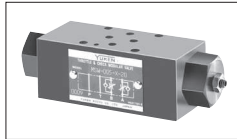
| Model Numbers | Max. Operating Pressure MPa | Max. Flow L/min |
|---------------|--------------------------------|--------------------|
| MRP-005-* -20 | 25 | 15 |



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

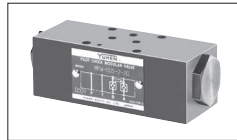
| Model Numbers | Max. Operating Pressure MPa | Max. Flow L/min |
|---------------|--------------------------------|--------------------|
| MCP-005-0-20 | 25 | 15 |



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.



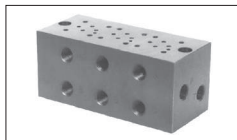
Specifications

| 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.

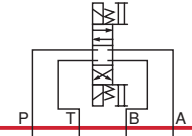









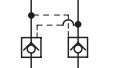





Model Numbers

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 |
| | 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 |  | | |
| Flow Control Valves | 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 |

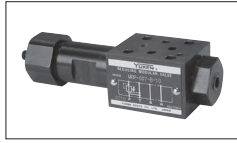
★Please refer to the catalog page of "E: Directional Control Valves".

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

Reducing Modular Valves

Specifications

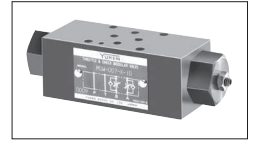
| Model Numbers | Max. Operating Pressure MPa | Max. Flow L/min |
|---------------|--------------------------------|--------------------|
| MRP-007- *-10 | 25 | 15 |



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

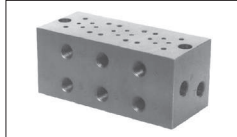
| Model Numbers | Max. Operating Pressure MPa |
|---------------|--------------------------------|
| MDC-007-A-10 | 25 |



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 | 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 | | ★ | Flow Control Valves | Throttle Valves (for "P-Line") MSP-01-50 | | F-29 | | | |
| | Pressure Control Valves | Relief Valves (for "P-Line") MBP-01-**-70 | | | F-12 | Throttle Valves (for "T-Line") MST-01-50 | | F-29 | | |
| | | Relief Valves (for "A-Line") MBA-01-**-70 | | | F-12 | Check and Throttle Valves (for "P-Line") MSCP-01-30 | | F-30 | | |
| | | Relief Valves (for "B-Line") MBB-01-**-70 | | | F-12 | Throttle and Check Valves (for "A-Line", Meter-out) MSA-01-X-70 | | F-31 | | |
| | | Reducing Valves (for "P-Line") MRP-01-**-70 | | | F-14 | Throttle and Check Valves (for "A-Line", Meter-in) MSA-01-Y-70 | | F-31 | | |
| | | Reducing Valves (for "A-Line") MRA-01-**-70 | | | F-14 | Throttle and Check Valves (for "B-Line", Meter-out) MSB-01-X-70 | | F-31 | | |
| | | Reducing Valves (for "B-Line") MRB-01-**-70 | | | F-14 | Throttle and Check Valves (for "B-Line", Meter-in) MSB-01-Y-70 | | F-31 | | |
| | | Directional Control Valves | Two Pressure Reducing Valves (for "P-Line") MRDP-01-***-10 | | | F-16 | Throttle and Check Valves (for "A&B-Lines", Meter-out) MSW-01-X-70 | | F-31 | |
| | | | Flow Control Valves | | Brake Valves MBR-01-**-30 | | F-18 | Throttle and Check Valves (for "A&B-Lines", Meter-in) MSW-01-Y-70 | | F-31 |
| | | | | | Sequence Valves (for "P-Line") MHP-01-**-70 | | F-19 | Throttle and Check Valves (for "A&B-Lines", Meter-out, Meter-in) MSW-01-XY-70 | | F-31 |
| | | | | | Counterbalance Valves (for "A-Line") MHA-01-**-70 | | F-19 | Throttle and Check Valves (for "A&B-Lines", Meter-in, Meter-out) MSW-01-YX-70 | | F-31 |
| | | | | | Counterbalance Valves (for "B-Line") MHB-01-**-70 | | F-19 | Check Valves (for "P-Line") MCP-01-**-70 | | F-33 |
| Pressure Switch Valves (for "P-Line") MJP-01-***-10 | | | | | F-22 | Check Valves (for "A-Line") MCA-01-**-70 | | F-33 | | |
| Pressure Switch Valves (for "A-Line") MJA-01-***-10 | | | | F-22 | Check Valves (for "B-Line") MCB-01-**-70 | | F-33 | | | |
| Pressure Switch Valves (for "B-Line") MJB-01-***-10 | | | | F-22 | Check Valves (for "T-Line") MCT-01-**-70 | | F-33 | | | |
| Pressure Switch Valves (for "A&B-Line") MJW-01-J-**-10 | | | | F-22 | Check Valves (for "A&B-Line") MCW-01-**-70 | | F-33 | | | |
| Modular Plates and Mounting Bolts | Flow Control Valves (for "P-Line") MFP-01-10 | | | | F-25 | Anti-Cavitation Valves MAC-01-30 | | F-35 | | |
| | Flow Control and Check Valves (for "A-Line", Meter-out) MFA-01-X-10 | | | | F-25 | Pilot Operated Check Valves (for "A-Line") MPA-01-**-70 | | F-36 | | |
| | Flow Control and Check Valves (for "A-Line", Meter-in) MFA-01-Y-10 | | | | F-25 | Pilot Operated Check Valves (for "B-Line") MPB-01-**-70 | | F-36 | | |
| | Flow Control and Check Valves (for "B-Line", Meter-out) MFB-01-X-10 | | | F-25 | Pilot Operated Check Valves (for "A&B-Lines") MPW-01-**-70 | | F-36 | | | |
| | Flow Control and Check Valves (for "B-Line", Meter-in) MFB-01-Y-10 | | F-25 | End Plates (Blocking Plates) MDC-01-A-30 | | F-38 | | | | |
| | Flow Control and Check Valves (for "A&B-Lines", Meter-out) MFW-01-X-10 | | F-25 | End Plates (Bypass plates) MDC-01-B-30 | | F-38 | | | | |
| | Flow Control and Check Valves (for "A&B-Lines", Meter-in) MFW-01-Y-10 | | F-25 | Connecting Plates (for "P&A-Lines") MDS-01-PA-30 | | F-38 | | | | |
| | Temperature Compensated Throttle and Check Valves (for "A-Line", Meter-out) MSTA-01-X-10 | | F-27 | Connecting Plates (for "P&B-Lines") MDS-01-PB-30 | | F-38 | | | | |
| | Temperature Compensated Throttle and Check Valves (for "B-Line", Meter-out) MSTB-01-X-10 | | F-27 | Connecting Plates (for "A&T-Lines") MDS-01-AT-30 | | F-38 | | | | |
| | Temperature Compensated Throttle and Check Valves (for "A&B-Lines", Meter-out) MSTW-01-X-10 | | F-27 | 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 | | | | |

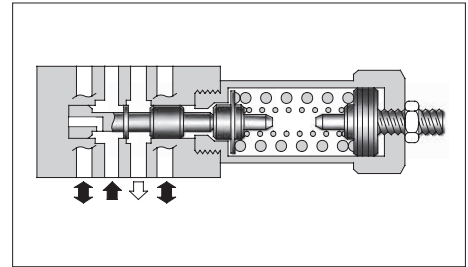
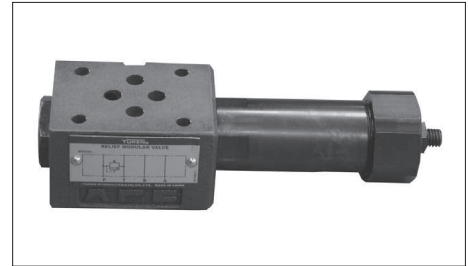
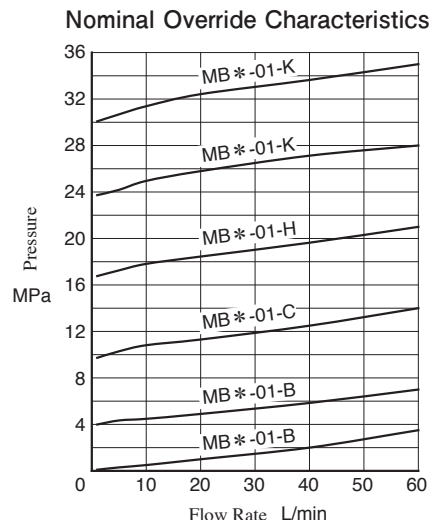
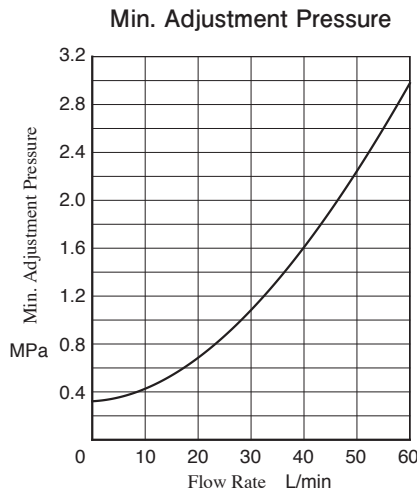
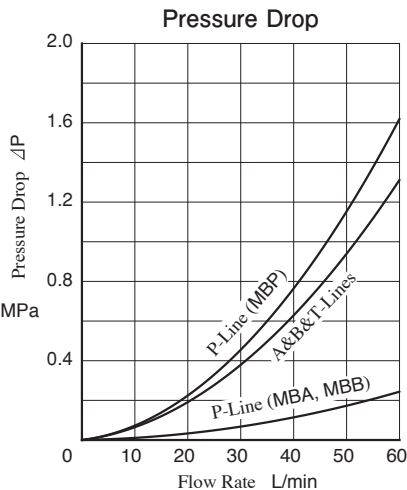
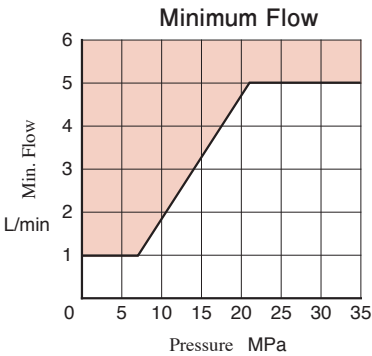
★See the "Min. Adjustment Pressure" of this page.

Instructions

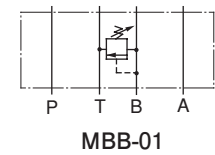
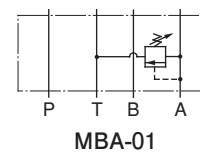
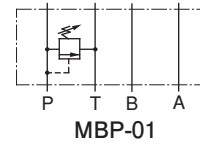
- The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of this page. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular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

Typical Performance Characteristics

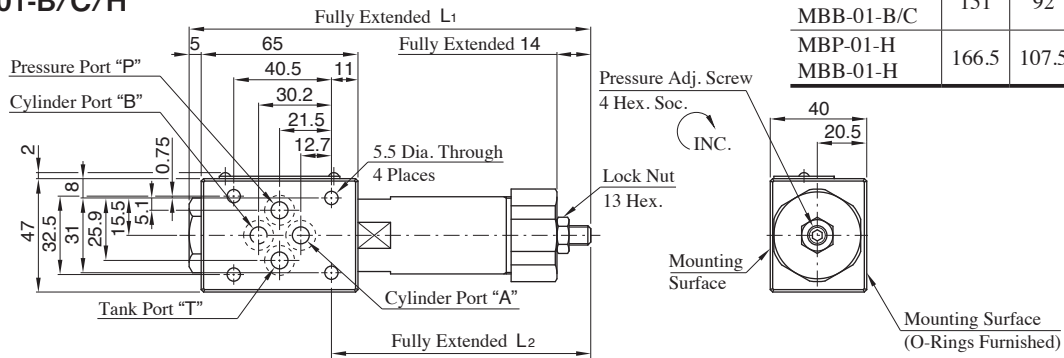
Hydraulic Fluid: Viscosity 35 mm²/s, Specific Gravity 0.850



Graphic Symbols

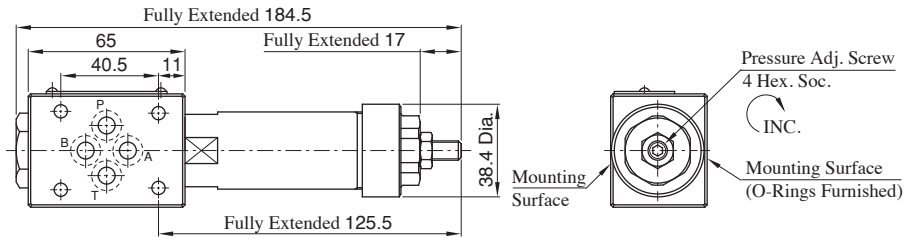


MBP-01-B/C/H MBB-01-B/C/H



| 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 |

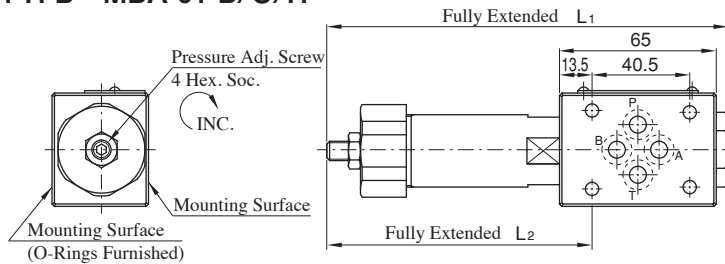
MBP-01-K MBB-01-K



Approx. Mass.....1.35 kg

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

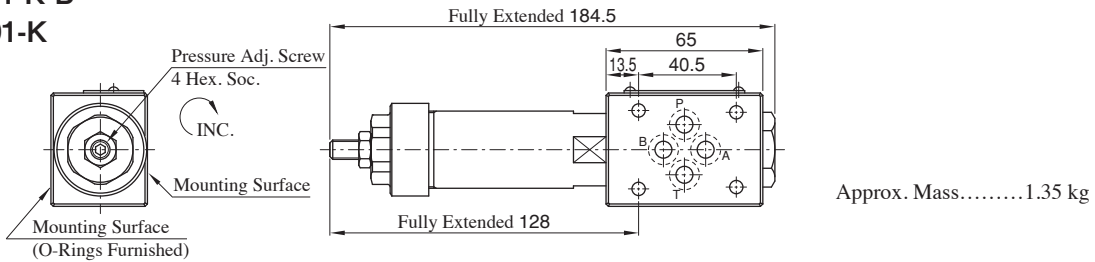
MBP-01-B-B • MBP-01-C-B MBP-01-H-B • MBA-01-B/C/H



| Model Numbers | L1 | L2 | Mass kg |
|--------------------------|-------|------|---------|
| MBP-01-B-B MBP-01-C-B | 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

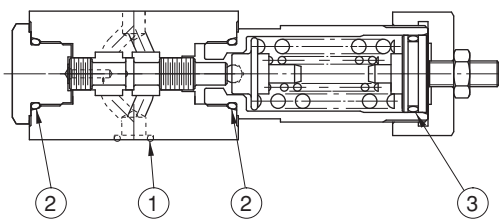


Approx. Mass.....1.35 kg

● 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

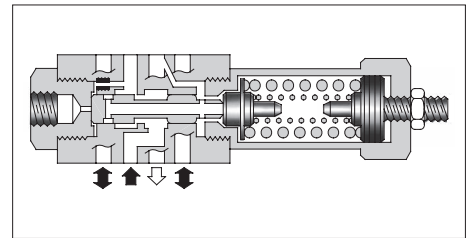
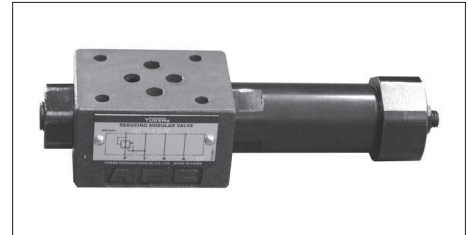
| Model Numbers | Max. Operating Pressure MPa | Max. Flow L/min |
|---------------|-----------------------------|-----------------|
| MR*-01-*-70 | 35 | 60* |

★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.

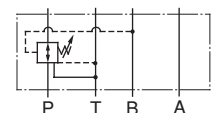
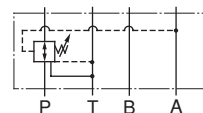
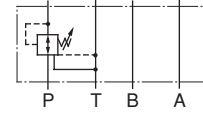
Model Number Designation

| 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 | None: A Port Side B: B Port Side | 70 |
| MRA: Reducing Valve for A-Line | | B: 0.8-7 | | |
| MRB: Reducing Valve for B-Line | | C: 3.5-14 H: 7-21 | | |

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



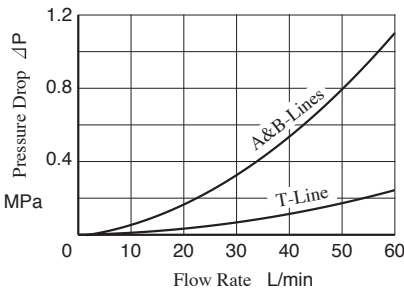
Graphic Symbols



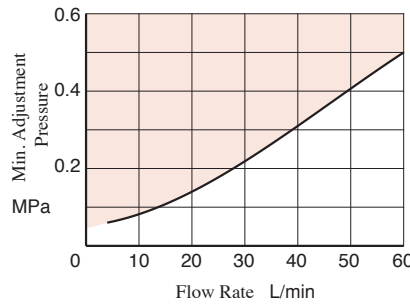
Typical Performance Characteristics

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

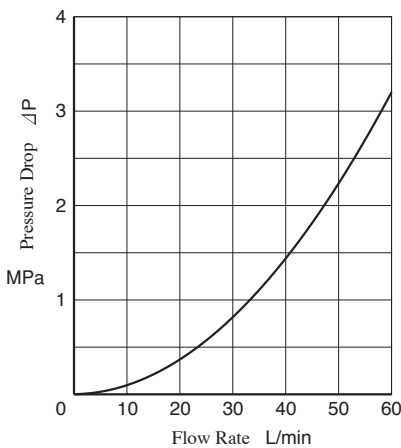
Pressure Drop



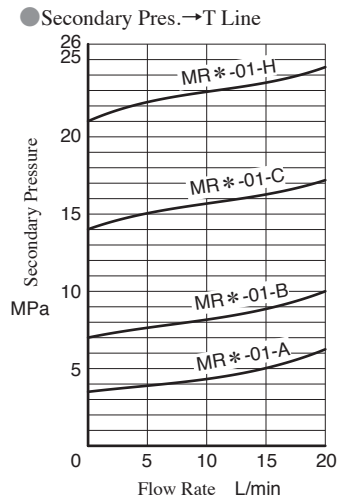
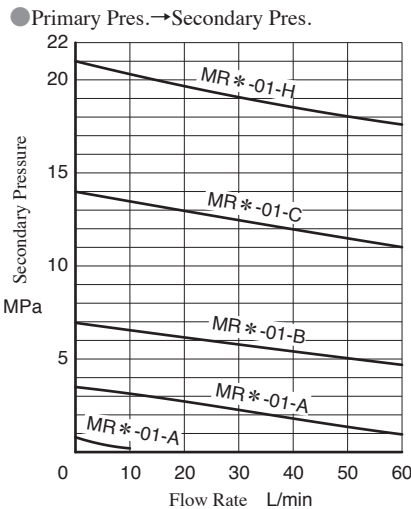
Min. Adjustment Pressure vs. Max. Flow



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



Nominal Override Characteristics Primary Pressure 35 MPa

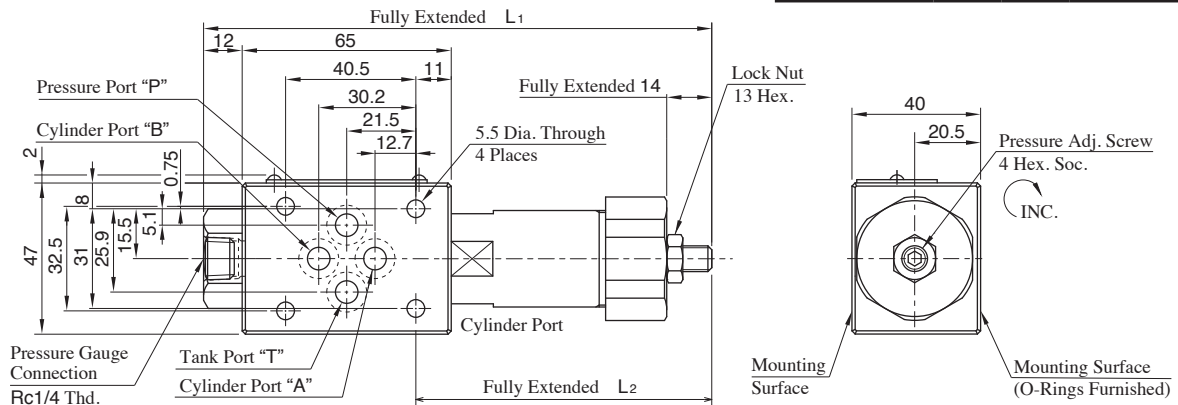


Instructions

- 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.

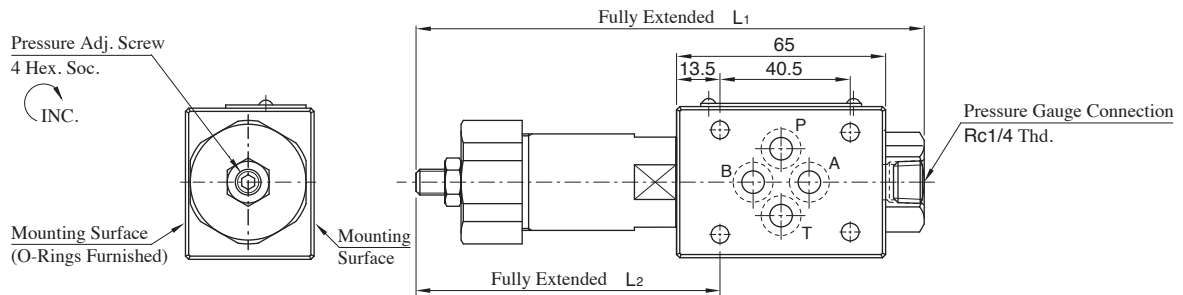
MRP-01
MRA-01
MRB-01

| Model Numbers | L1 | L2 | 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

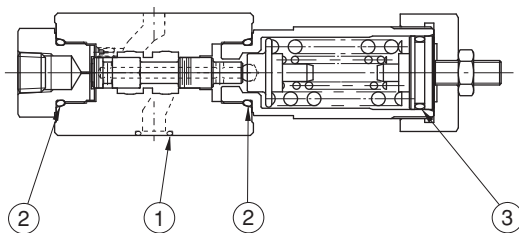
| Model Numbers | L1 | L2 | Mass kg |
|---------------|-------|------|---------|
| MR*-01-A-B | 162.5 | 99 | 1.10 |
| MR*-01-B-B | 158 | 94.5 | 1.15 |
| MR*-01-C-B | | | |
| MR*-01-H-B | 173.5 | 110 | 1.25 |



● 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.

01 Series Modular Valves

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.

Model Number Designation

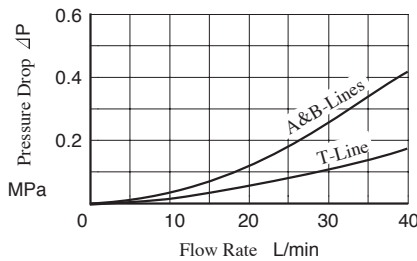
| MRDP | -01 | -B | -A100 | -N | -10 |
|--|------------|---|---|---|---------------|
| Series Number | Valve Size | Pres. Adj. Range MPa | Coil Type | Electrical Conduit Connection | Design Number |
| MRDP: Two Pressure Reducing Valve for P-Line | 01 | Low Press. / High Press. B: 0.2-3.5 / 0.5-7 C: 0.5-7 / 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.

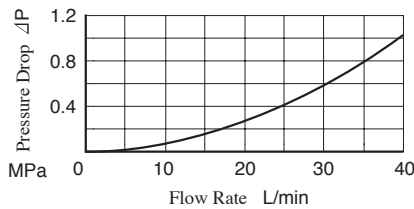
Typical Performance Characteristics

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

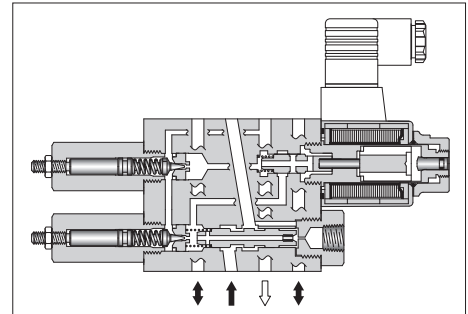
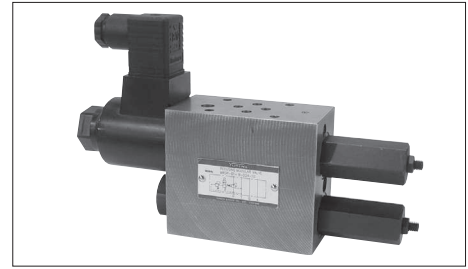
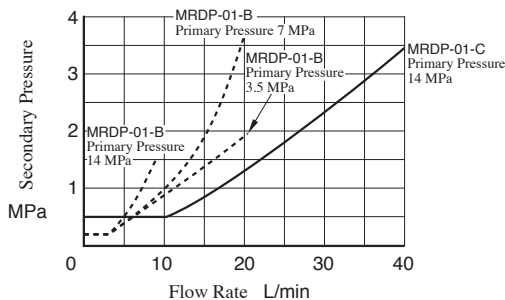
Pressure Drop



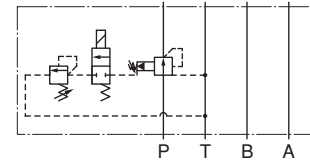
Pressure Drop at Spool Fully Open (P-Line)



Min. Adjustment Pressure vs. Max. Flow

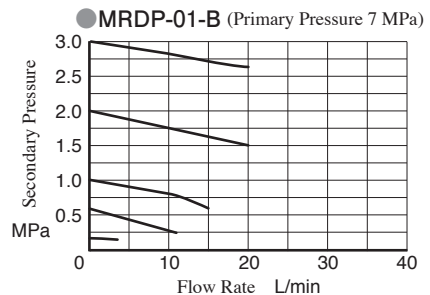
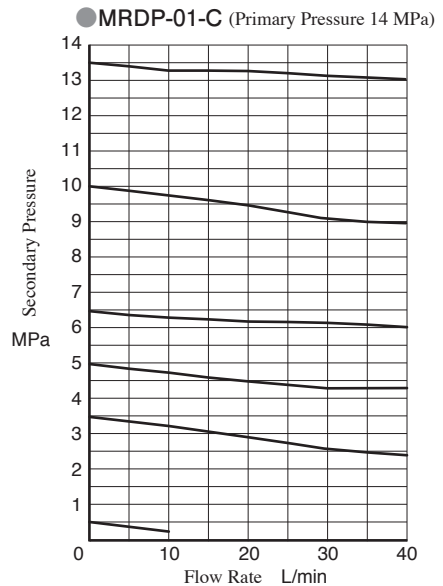


Graphic Symbol



MRDP-01

Nominal Override Characteristics



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 | — |
| | | | 100 | 90-120 | 1.45 | 0.24 | |
| | | 110 | 1.60 | | 0.27 | | |
| | A200 | 50 | 200 | 160-220 | 0.83 | 0.15 | |
| | | | 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

DC,R Fully Extended: 220.2
AC Fully Extended: 216.2
5.5 Dia. Through 4 Places
0.75
32.5
40.5
25.5
8
2
31
47
80
55
19.5
93
12.5
DC, R : 67.2
AC : 63.2
27
56.5
DC : 76, R : 79
AC : 65

High Pressure Adj. Screw (when SOL "OFF")
3 Hex. Soc
INC.

Low Pressure Adj. Screw (when SOL "ON")
3 Hex. Soc
INC.

Lock Nut 10 Hex.

Cable Departure
Applicable Cable:
Outside Dia.... 8 - 10 mm
Conductor Area....1.5mm² or less

High & Low Pressure Change Solenoid

Lock Nut ★
Tightening Torque
10.3 - 11.3 Nm

Manual Actuator
6 Dia.
Pressure Gauge Connection
Rc1/4 Thd.

Mounting Surface Dimensions: 93□47

Approx. Mass.....3 kg

The position of the plug-in connector can be changed as illustrated below by loosening the lock nut ★ (AC only 90° left and right). Be sure to tighten the lock nut after changing the position.

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

MRDP-01

19 20 10 21 6 3 33 30

12 11 8 13 7 15 9 17 5 14 2 1 18 16 4 32 31 34

- 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 | ⑩Solenoid Ass'y No. | ⑪Coil 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 |

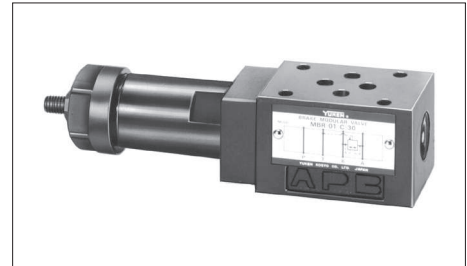
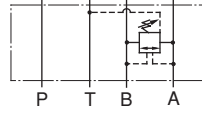
01 Series Modular Valves

Brake Modular Valves

Specifications

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

Graphic Symbol



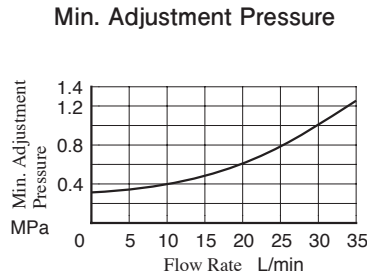
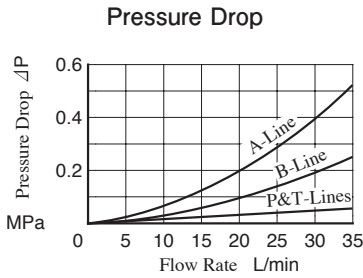
Model Number Designation

| 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



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

5.5 Dia. Through 4 Places
Lock Nut 13 Hex.
Pressure Adj. Screw 4 Hex. Soc.
INC.
Approx. Mass.....1.3 kg

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

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 | | | — | |

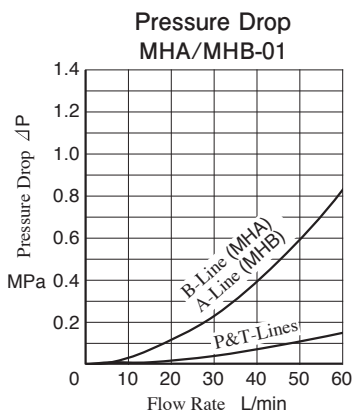
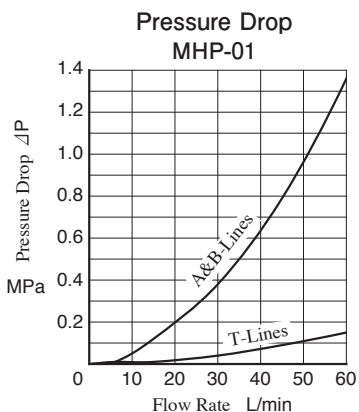
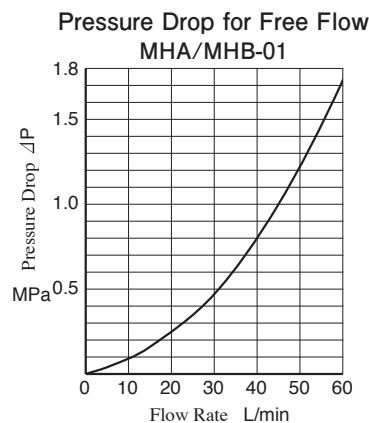
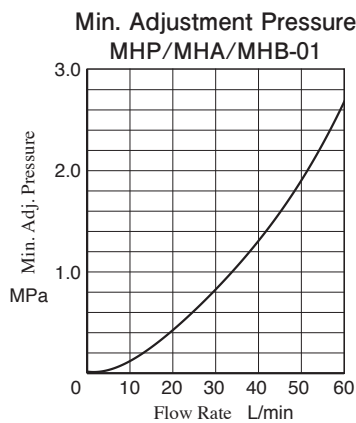
★ See the "Min. Adjustment Pressure" on this page.

Instructions

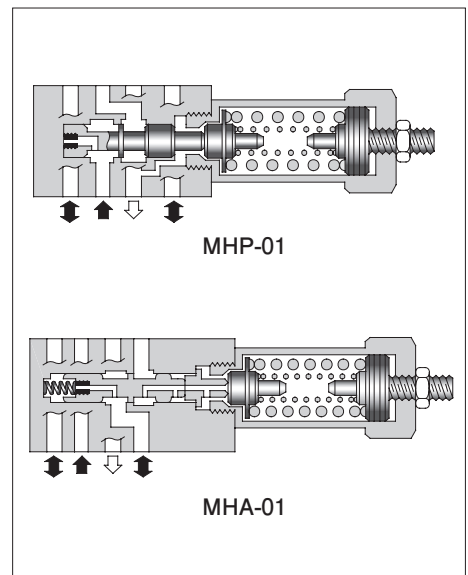
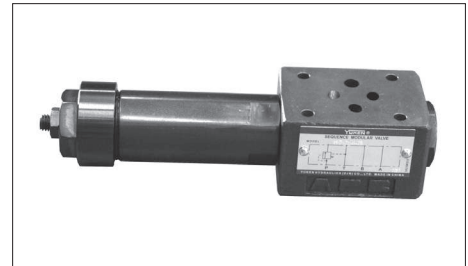
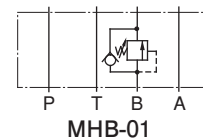
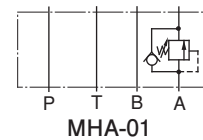
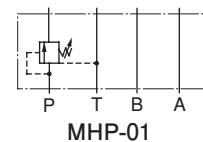
- The minimum adjustment pressure for MHP-01 equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure. This back pressure should include the value of the T-Line pressure drop characteristics of the valves stacked.
- The minimum adjustment pressure 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



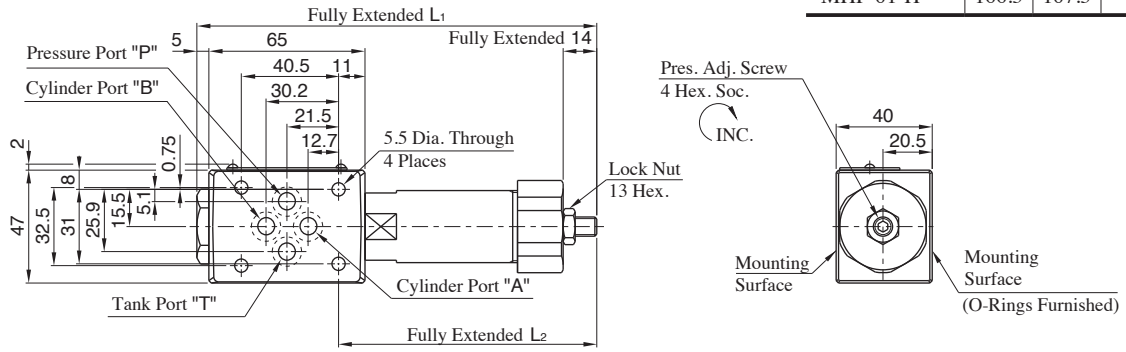
Graphic Symbols



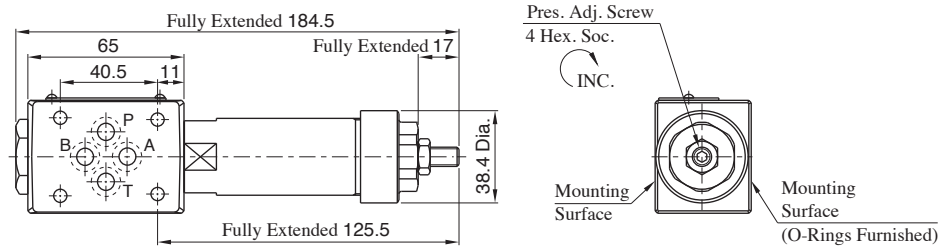
01 Series Modular Valves

MHP-01-B/C/H

| Model Numbers | L ₁ | L ₂ | Mass kg |
|---------------|----------------|----------------|---------|
| MHP-01-B/C | 151 | 92 | 1.45 |
| MHP-01-H | 166.5 | 107.5 | 1.55 |



MHP-01-K

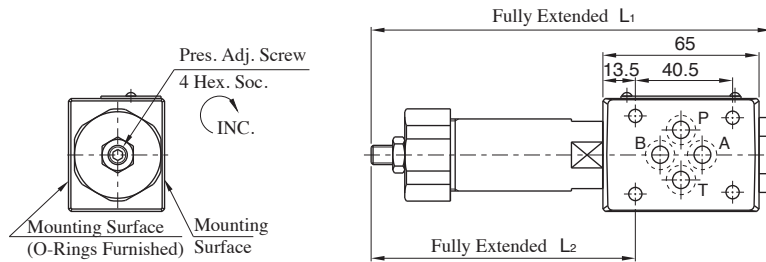


● For other dimensions, refer to "MHP-01-B/C/H" in the above figure.

Approx. Mass.....1.65 kg

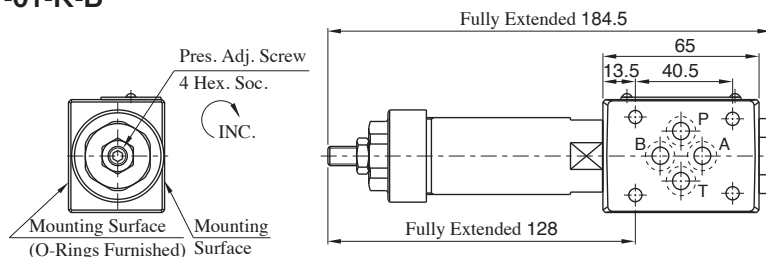
MHP-01-B-B
MHP-01-C-B
MHP-01-H-B

| Model Numbers | L ₁ | L ₂ | Mass kg |
|---------------|----------------|----------------|---------|
| MHP-01-B-B | 151 | 94.5 | 1.45 |
| MHP-01-C-B | 166.5 | 110 | 1.55 |



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

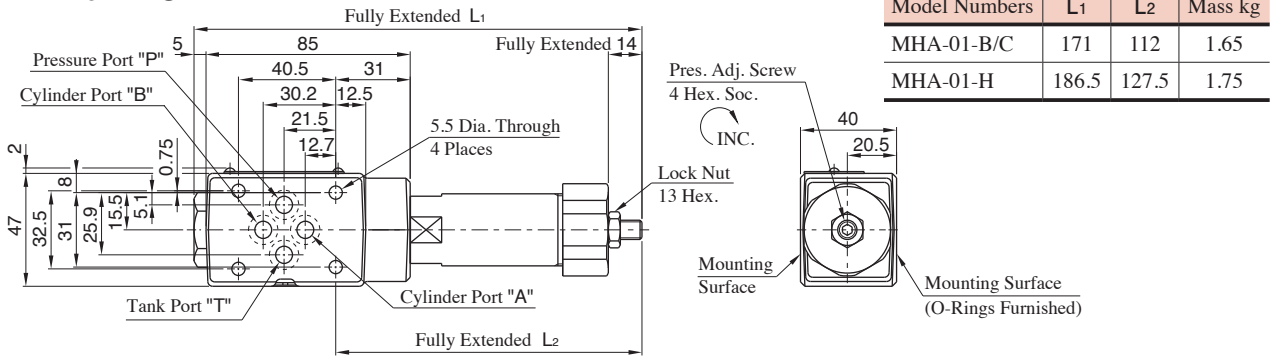
MHP-01-K-B



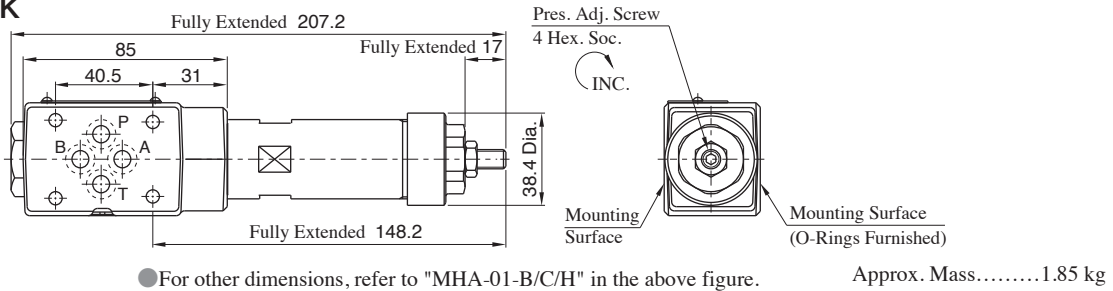
● For other dimensions, refer to "MHP-01-K" in the above figure.

Approx. Mass.....1.65 kg

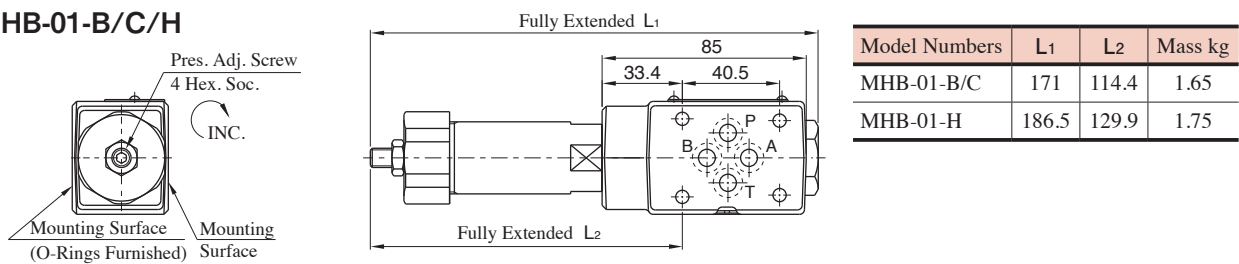
MHA-01-B/C/H



MHA-01-K

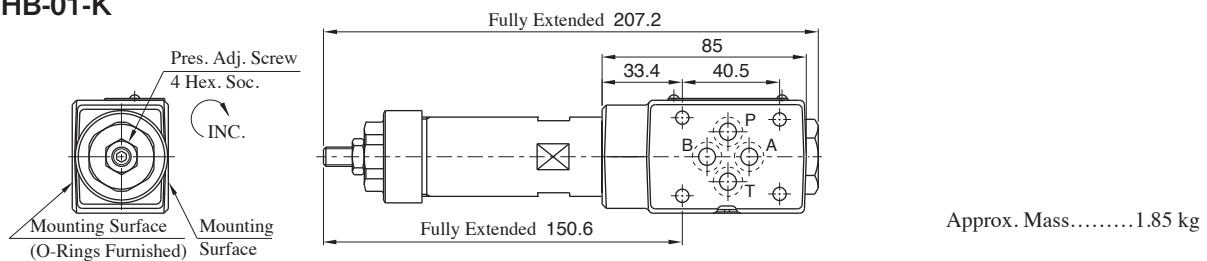


MHB-01-B/C/H



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

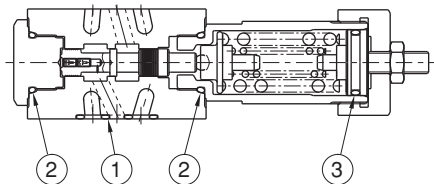
MHB-01-K



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

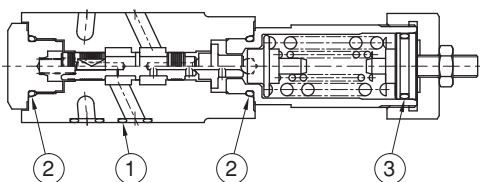
List of Seals

MHP-01



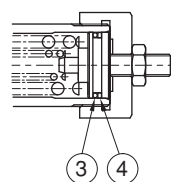
● MHP-01 - * -B has the pressure adjustment part on the left side.

MHA-01



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

MHA-01-K



| 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 |
| 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

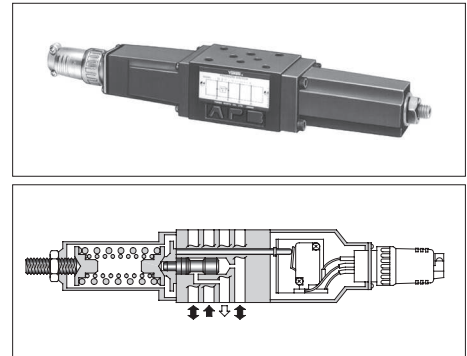
Specifications

| 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 | |

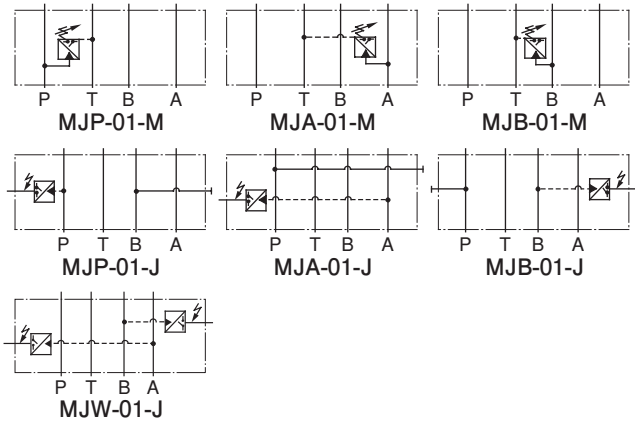
Sensitive Switch Ratings

| 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 | 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 | | 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.

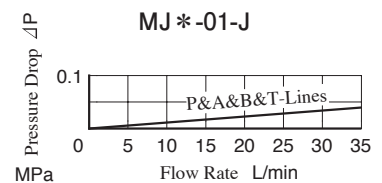
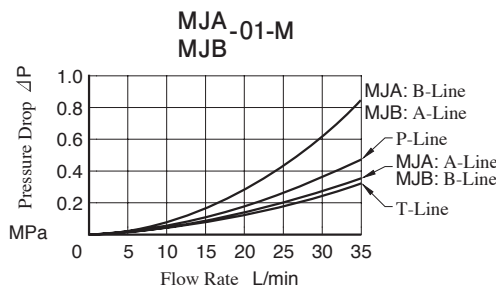
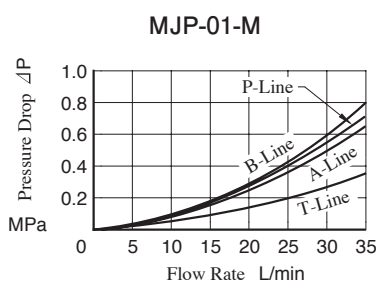
(Pressure with Sensitive Switch and The Switch Status)

| Operating Pressure | Switch Status |
|----------------------------|---------------|
| Less than Pressure setting | |
| More than Pressure setting | |

- 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

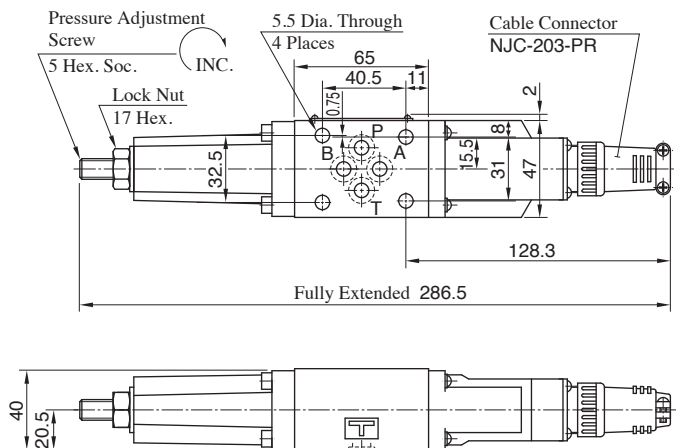


Accessories

| 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. |

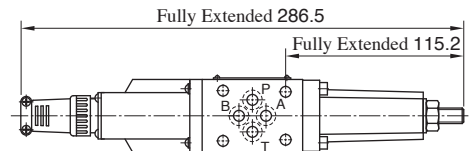
● Cable Connector Type

MJP-01-M-* -10
MJA-01-M-* -10



Approx. Mass.....1.3 kg

MJB-01-M-* -10

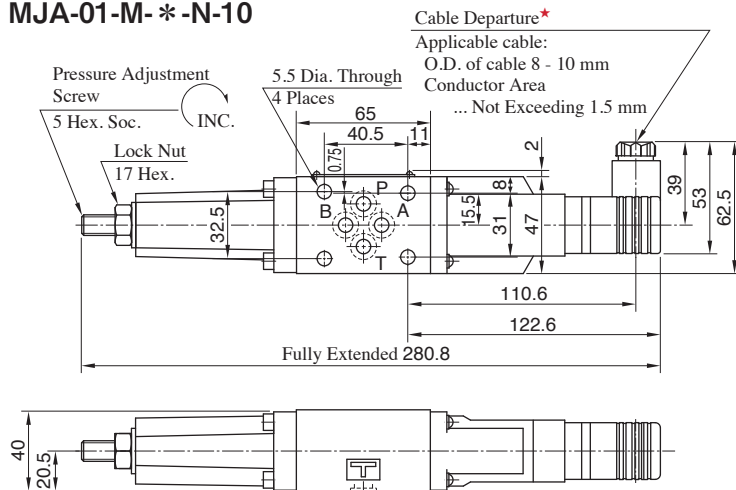


Approx. Mass.....1.3 kg

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

● Plug-in Connector Type

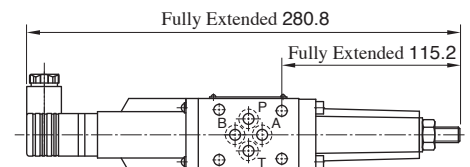
MJP-01-M-* -N-10
MJA-01-M-* -N-10



Approx. Mass.....1.3 kg

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

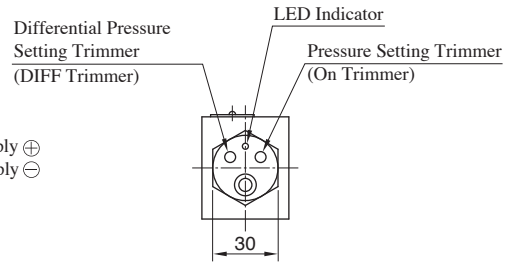
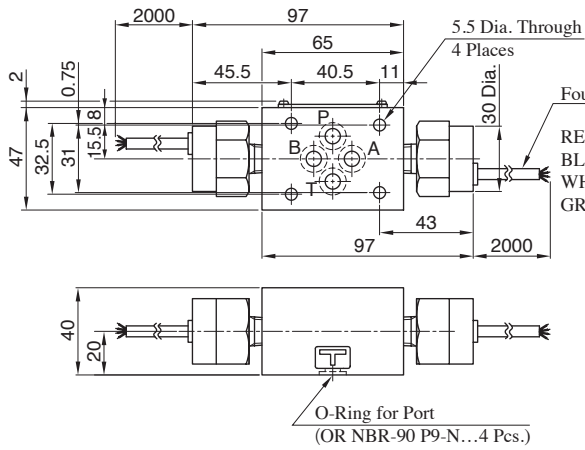
MJB-01-M-* -N-10



Approx. Mass.....1.3 kg

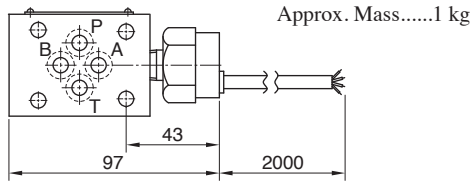
For other dimensions, refer to "MJP-01" in the drawing left.

● Semiconductor Type Pressure Switch
MJW-01-J- *-10



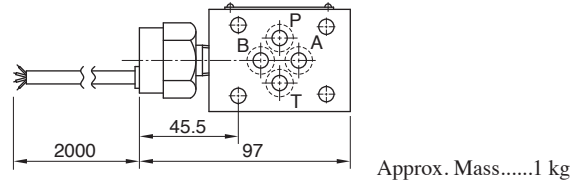
Approx. Mass.....1 kg

MJP-01-J- *-10
MJA-01-J- *-10



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

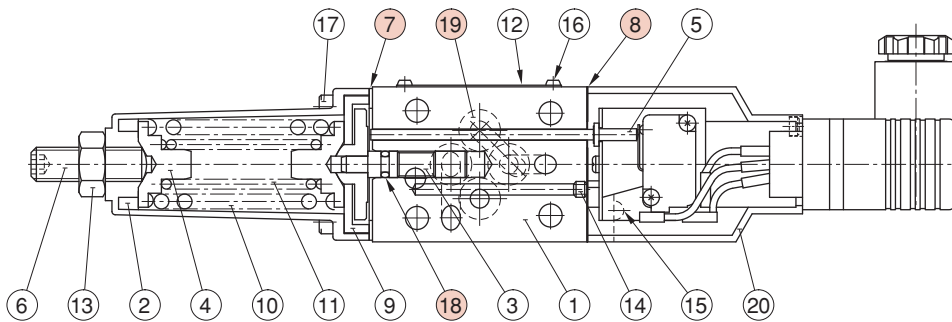
MJB-01-J- *-10



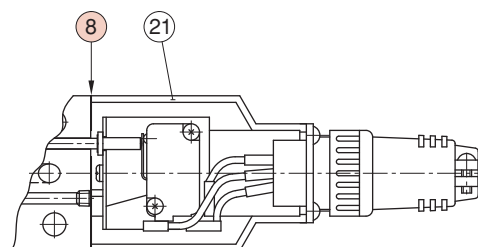
For other dimensions, refer to "MJW-01" in the drawing above.

■ List of Seals

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



MJ *-01-M- *-10
 Cable Connector Type



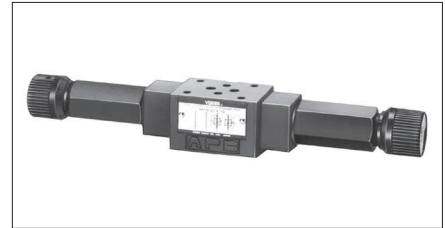
| Item | Name of Parts | Part Numbers | Qty. |
|------|---------------|------------------|------|
| 7 | Packing | 3116-VK414239-4 | 1 |
| 8 | Packing | 3116-VK414240-2 | 1 |
| 18 | O-Ring | OR NBR-70-1 P5-N | 1 |
| 19 | O-Ring | OR NBR-90 P9-N | 4 |

● 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

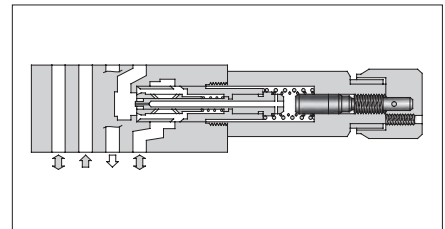
Specifications

| 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

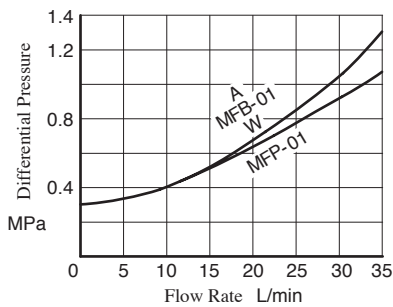


MFP-01

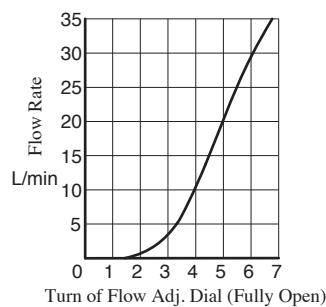
Typical Performance Characteristics

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

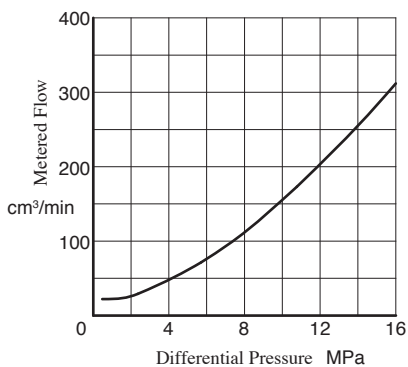
Min. Required Pressure Difference



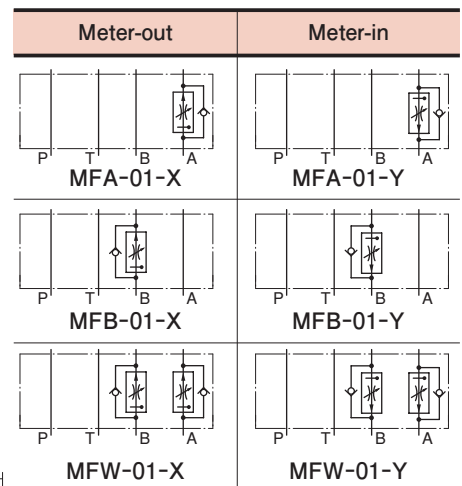
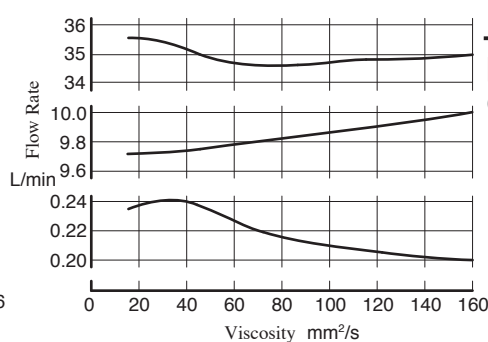
Metered Flow vs. Dial Position



Min. Metered Flow



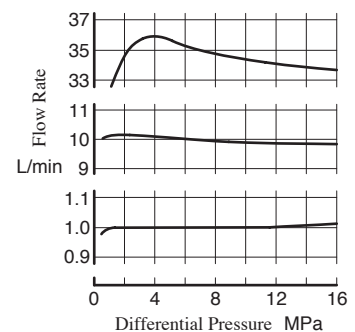
Metered Flow vs. Viscosity



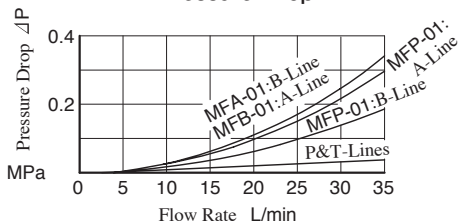
Instructions

- 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.

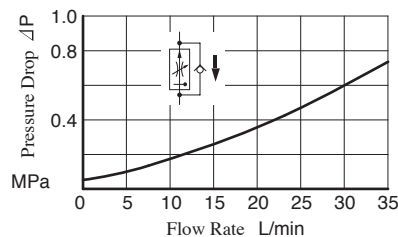
Metered Flow vs. Differential Pres.

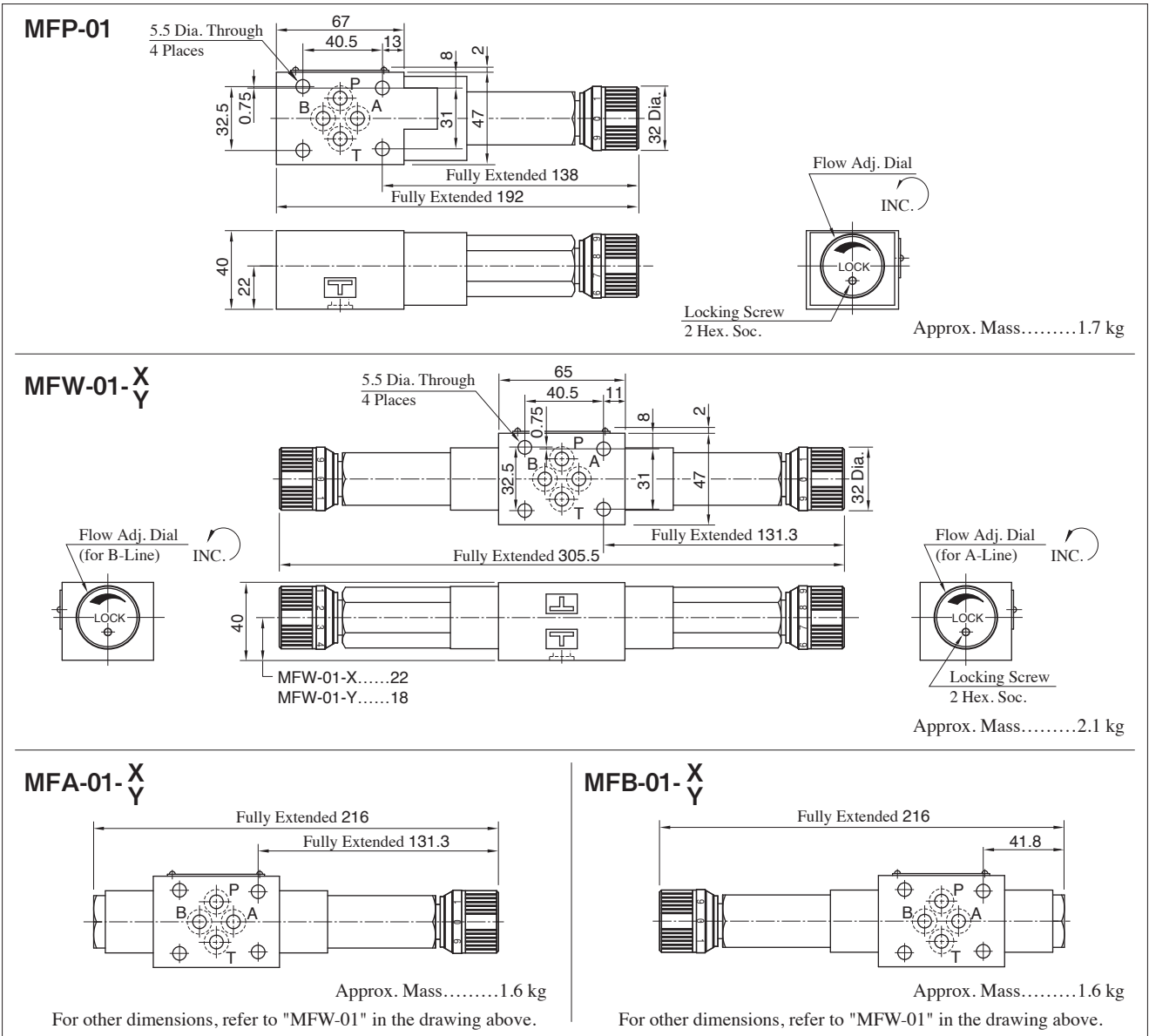


Pressure Drop

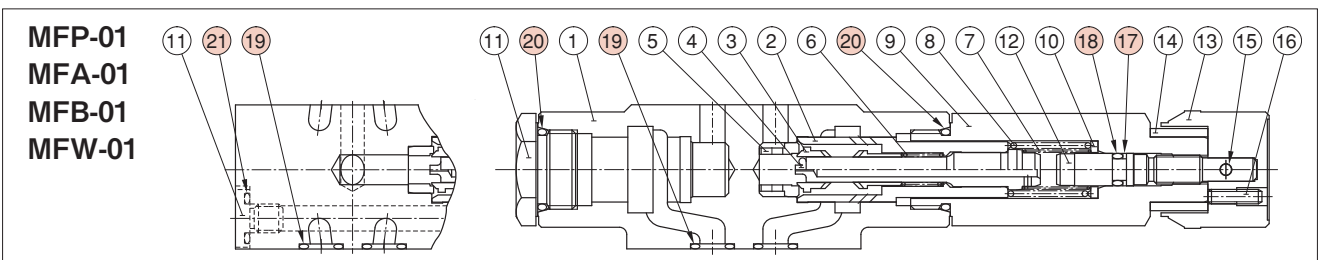


Pressure Drop for Free Flow





List of Seals



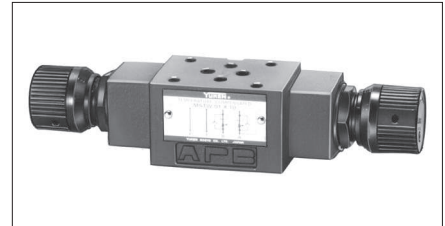
● MFB-01: Flow control part is built in the left side.
 ● MFW-01: Flow control part is built in the both sides.

| 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

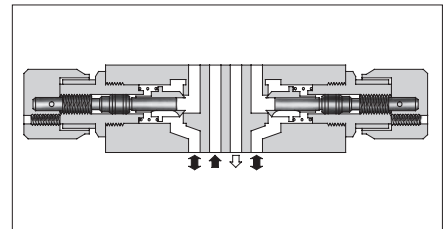
| Model Numbers | Max. Operating Pressure MPa | Max. Differential Pressure MPa | Max. Metered Flow L/min | Min. Metered Flow L/min | Max. Free Flow L/min |
|---------------|-----------------------------|--------------------------------|-------------------------|-------------------------|----------------------|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



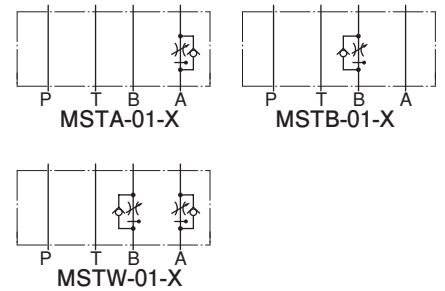
Model Number Designation

| 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 | 01 | X: Meter-out | 10 |

Temperature Compensated Throttle and Check Valve

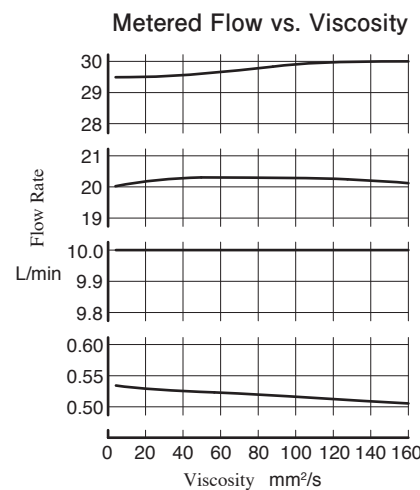
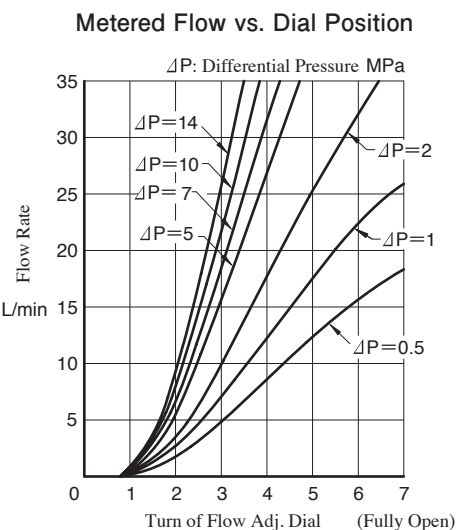
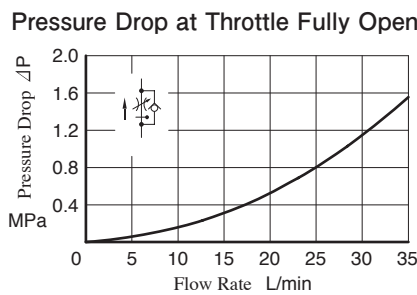
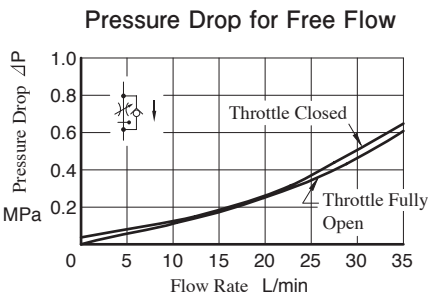
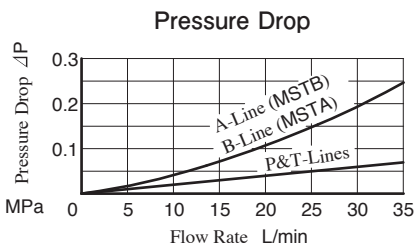


Graphic Symbols



Typical Performance Characteristics

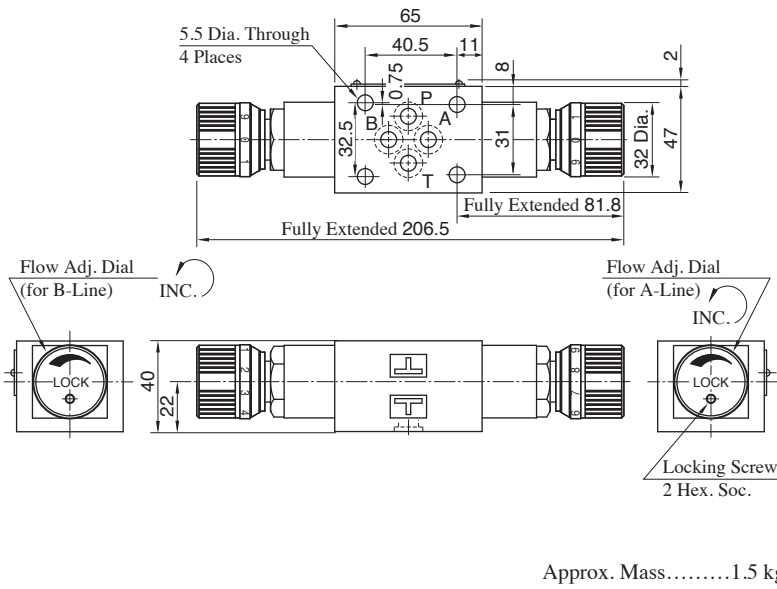
Hydraulic Fluid: Viscosity 35 mm²/s, Specific Gravity 0.850



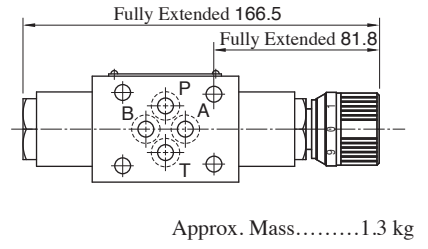
Instructions

- 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

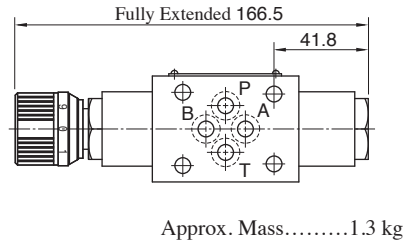


MSTA-01-X



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

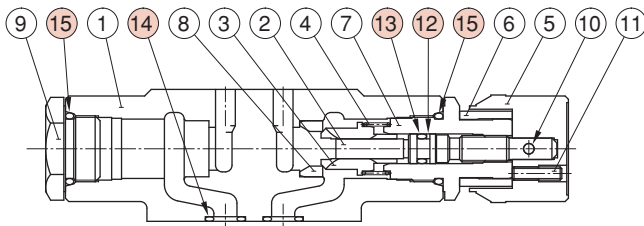
MSTB-01-X



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

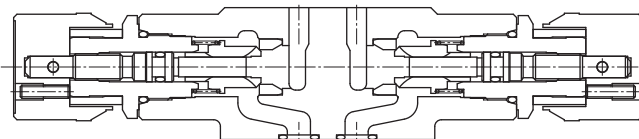
List of Seals

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

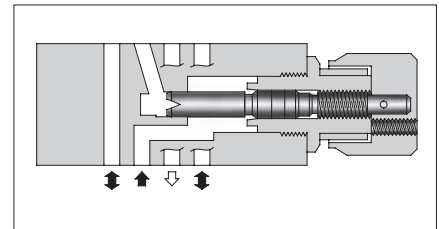
Specifications

| 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

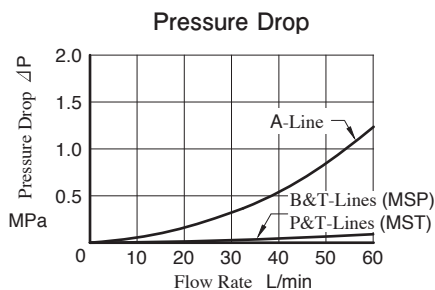
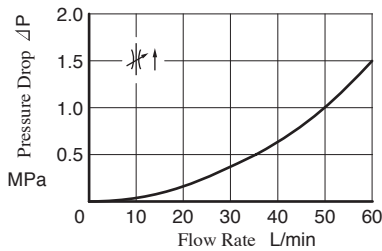
| MSP | -01 | -50 |
|---|------------|---------------|
| Series Number | Valve Size | Design Number |
| MSP: for P-Line } Throttle Valve MST: for T-Line } | 01 | 50 |



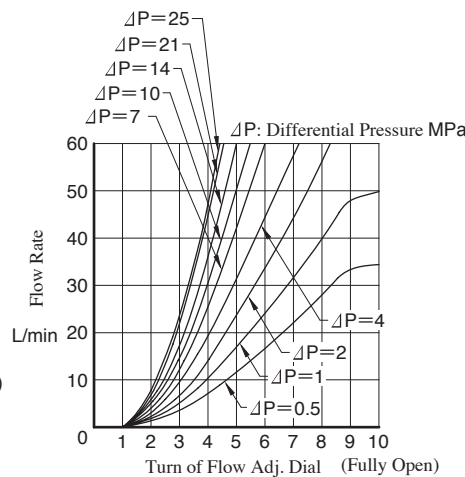
Typical Performance Characteristics

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

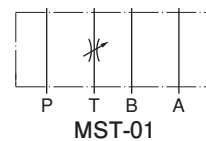
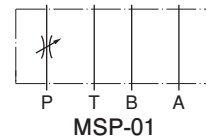
Pressure Drop at Throttle Fully Open



Metered Flow vs. Dial Position



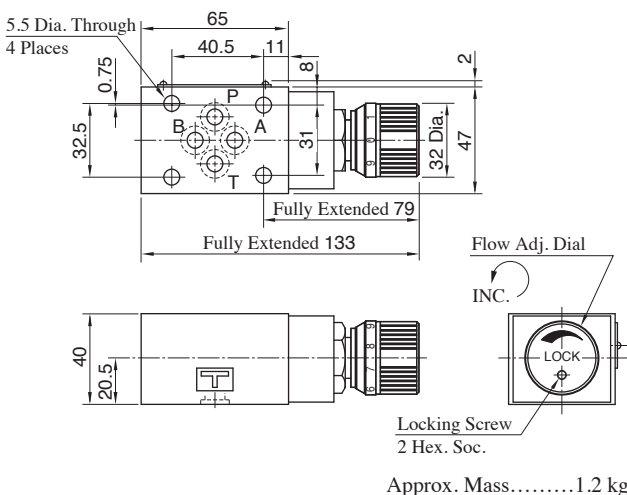
Graphic Symbols



Instructions

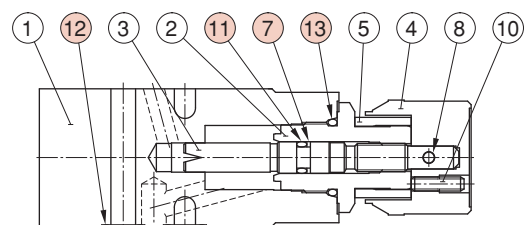
- To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

MSP-01 MST-01



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 |

01 Series Modular Valves

Check and Throttle Modular Valves

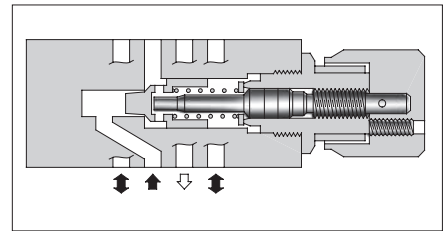
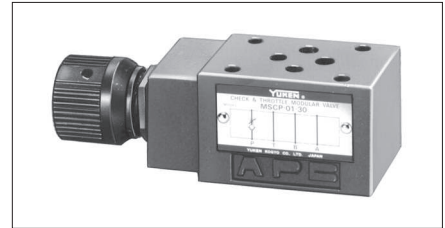
Specifications

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

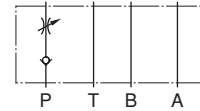
★At the low differential pressure, maximum flow is limited. See "Pressure Drop at Throttle Fully Open".

Model Number Designation

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



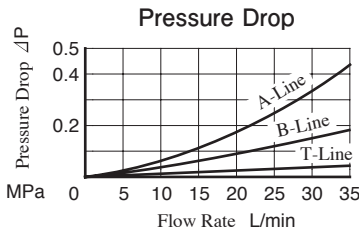
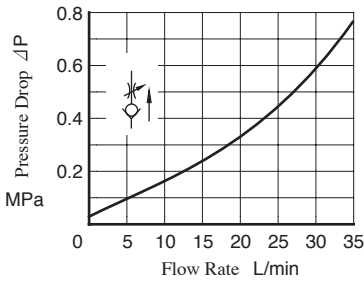
Graphic Symbol



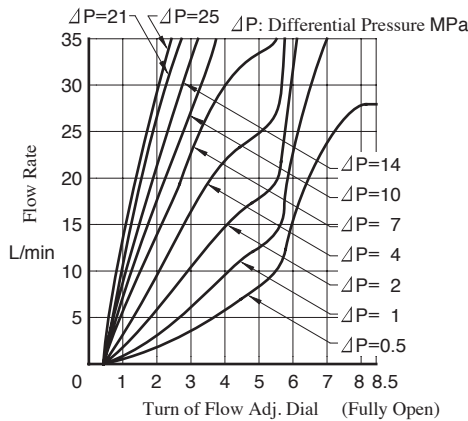
Typical Performance Characteristics

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

Pressure Drop at Throttle Fully Open



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

5.5 Dia. Through 4 Places

65, 40.5, 11, 8, 2, 0.75, 32.5, 31, 2.5, 32 Dia., 47, Fully Extended 77.5, Fully Extended 131.5

Flow Adj. Dial
INC.

Locking Screw
2 Hex. Soc.

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 |

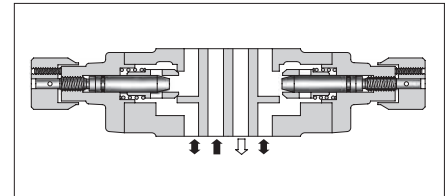
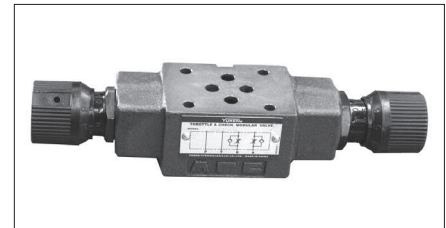
Throttle and Check Modular Valves

Specifications

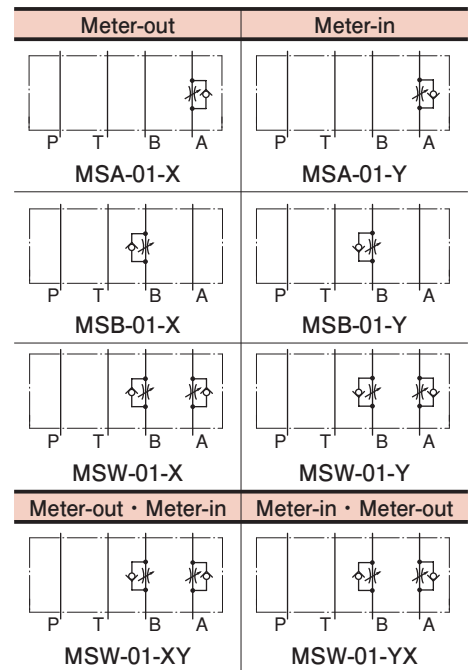
| Model Numbers | Max. Operating Pressure MPa | Max. Flow L/min |
|---------------|-----------------------------|-----------------|
| MS*-01-* *-70 | 35 | 80 |

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 | X: Meter-out | |



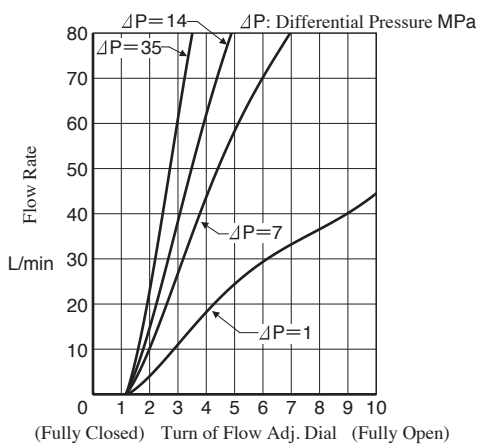
Graphic Symbols



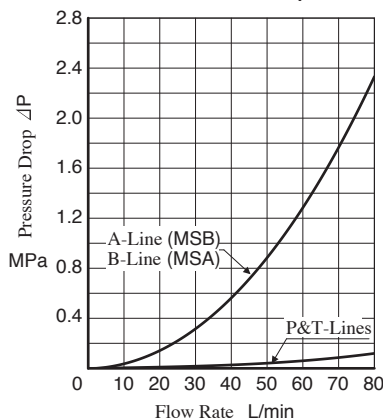
Typical Performance Characteristics

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

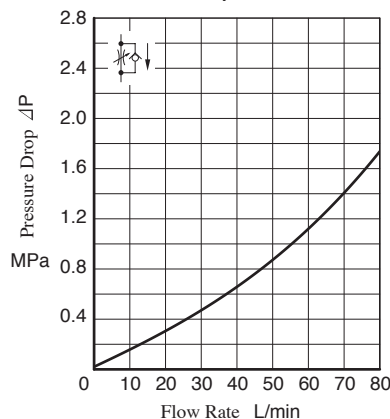
Metered Flow vs. Dial Position



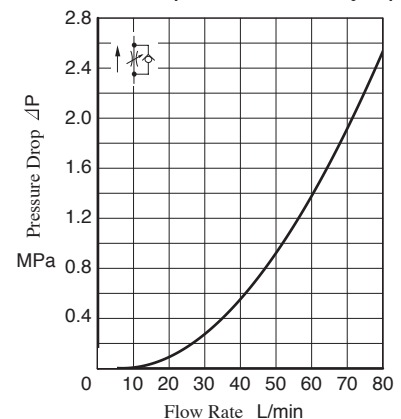
Pressure Drop



Pressure Drop for Free Flow



Pressure Drop at Throttle Fully Open

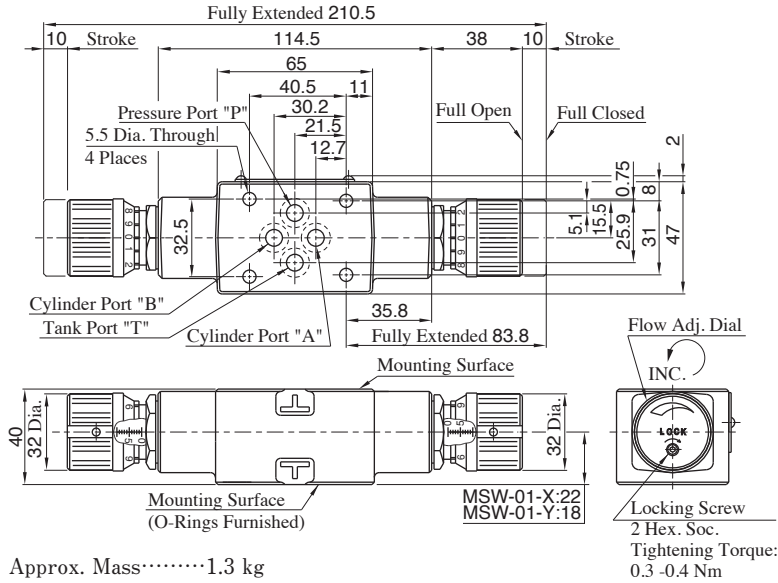


Instructions

- To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial 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.

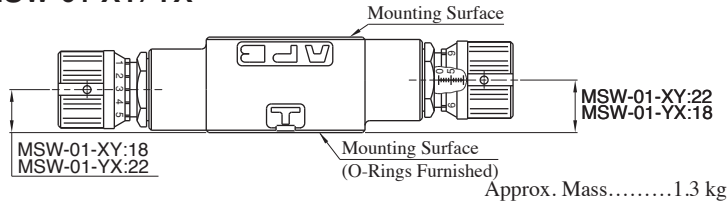
F
01 Series Modular Valves

MSW-01-X/Y



Approx. Mass.....1.3 kg

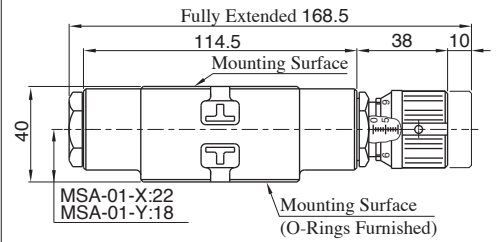
MSW-01-XY/YX



Approx. Mass.....1.3 kg

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

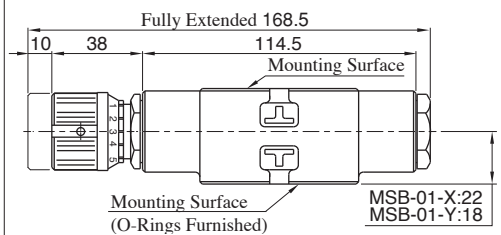
MSA-01-X/Y



Approx. Mass.....1.15 kg

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

MSB-01-X/Y

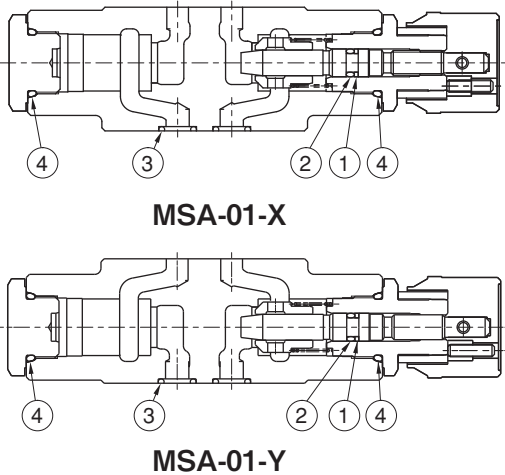


Approx. Mass.....1.15 kg

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

List of Seals

MSA-01, MSB-01, MSW-01

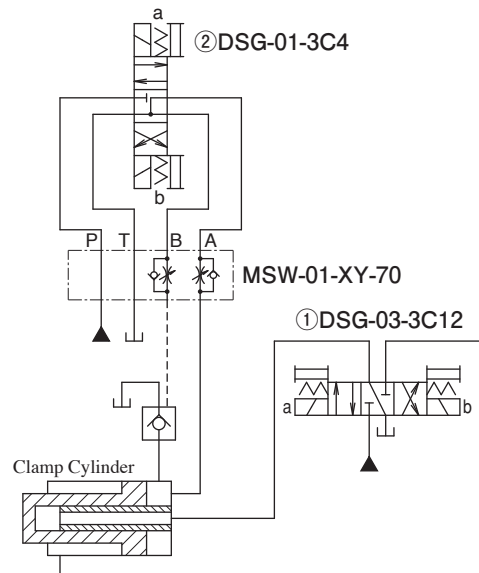


- MSB-01: Flow control part is built in the left side.
- MSW-01: Flow control part is built in the both left and right sides.

| 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 | → |

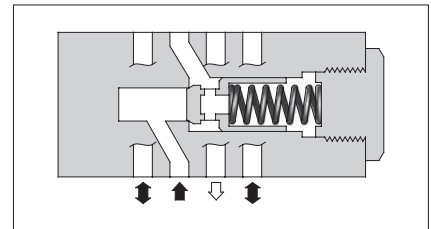
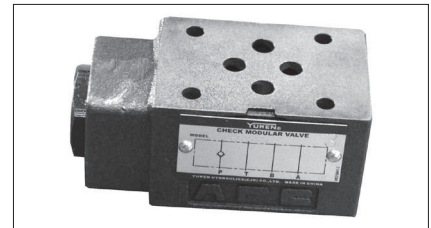
Check Modular Valves

Specifications

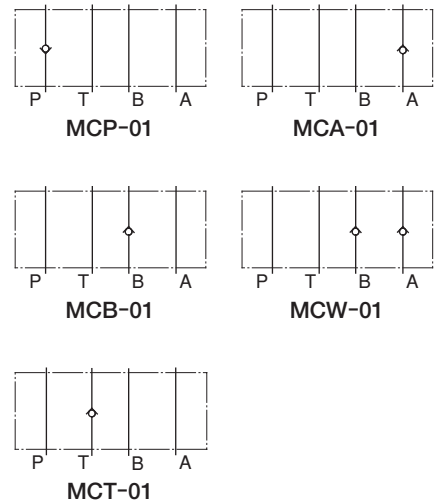
| Model Numbers | Max. Operating Pressure MPa | Max. Flow L/min |
|---------------|-----------------------------|-----------------|
| MC*-01-*-70 | 35 | 60 |

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 |



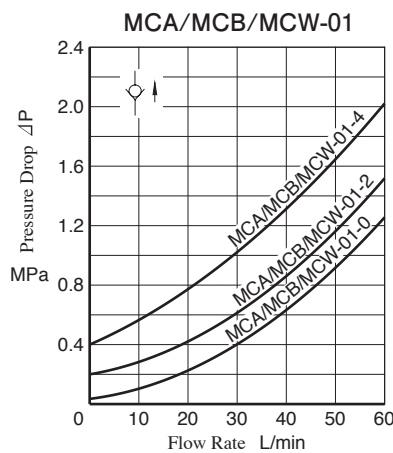
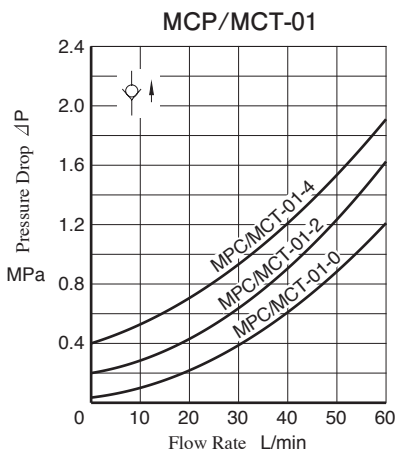
Graphic Symbols



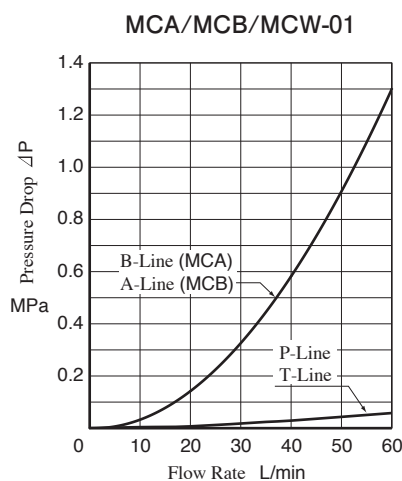
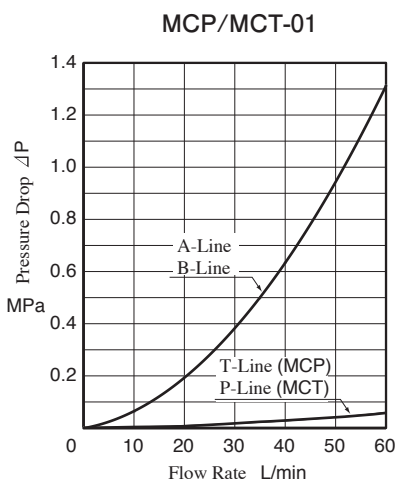
Typical Performance Characteristics

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

Pressure Drop for Free Flow

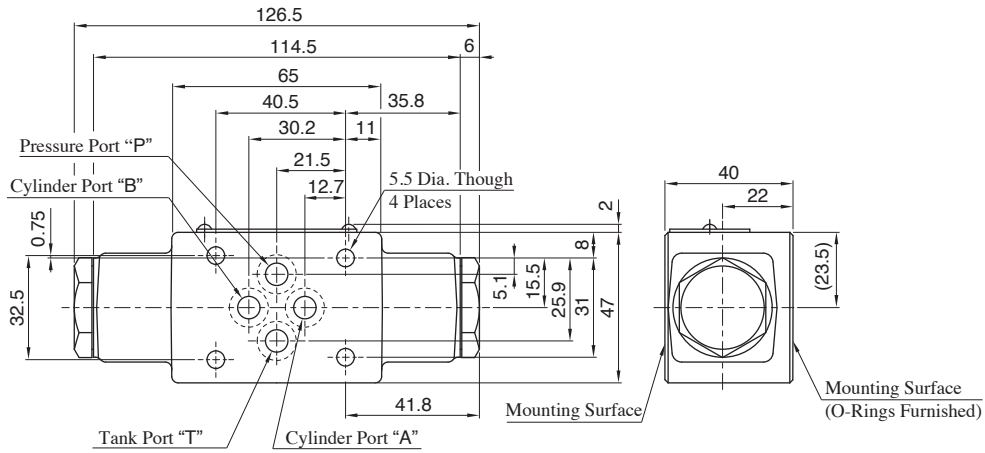


Pressure Drop of each line



01 Series Modular Valves

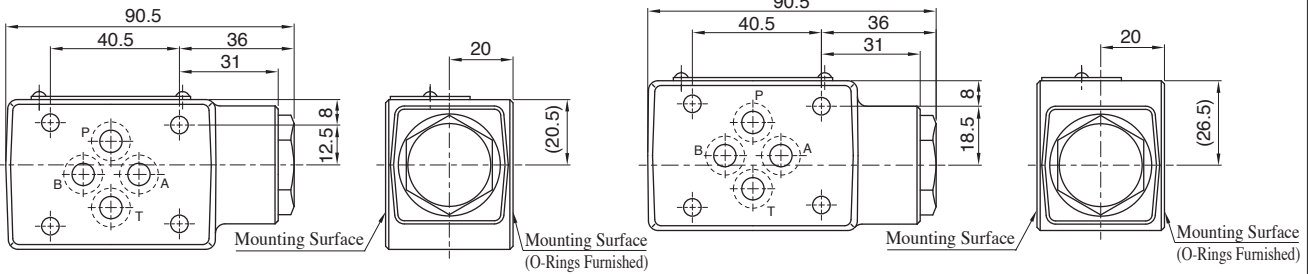
**MCA-01
MCB-01
MCW-01**



Approx. Mass.....1.2 kg

MCP-01

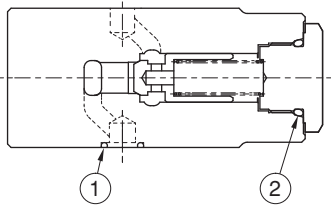
MCT-01



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

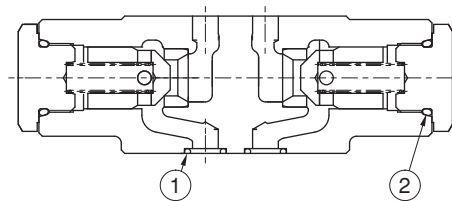
List of Seals

**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.

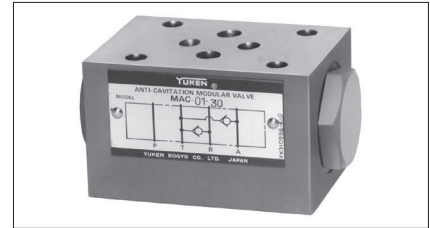
- MCA-01 does not have poppet, spring or seat built in the left side.
- MCB-01 does not have poppet, spring or seat built in the right side.

| 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

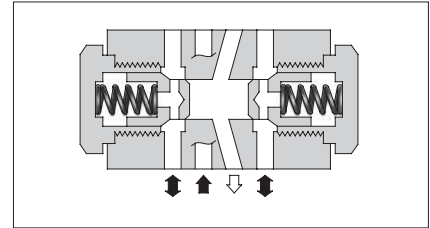
Specifications

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



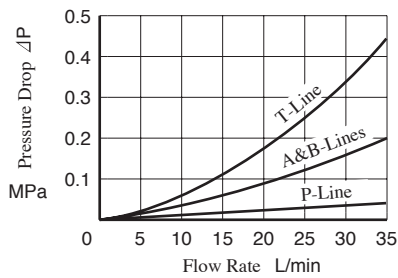
Model Number Designation

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

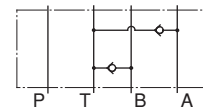


Pressure Drop

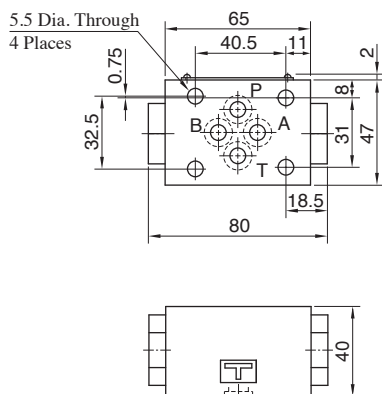
Hydraulic Fluid: Viscosity 35 mm²/s, Specific Gravity 0.850



Graphic Symbol

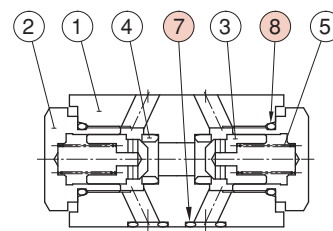


MAC-01



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 |

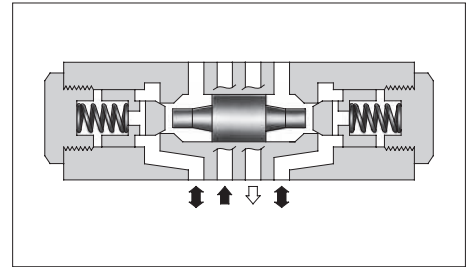
Pilot Operated Check Modular Valves

Specifications

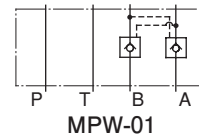
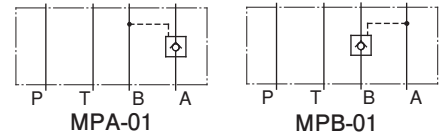
| Model Numbers | | Max. Operating Pressure MPa | Max. Flow L/min |
|---------------------------------|---------------|--------------------------------|--------------------|
| Standard | MP*-01-*-70 | 35 | 60 |
| Low Pilot Pressure Control Type | MP*-01-*-L-70 | | |

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 |

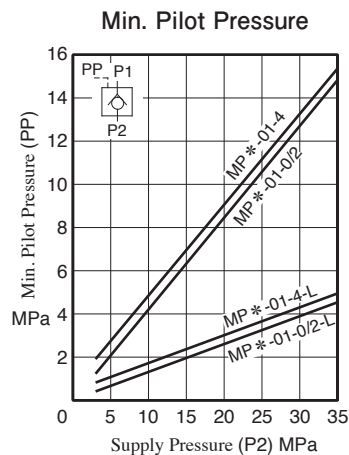
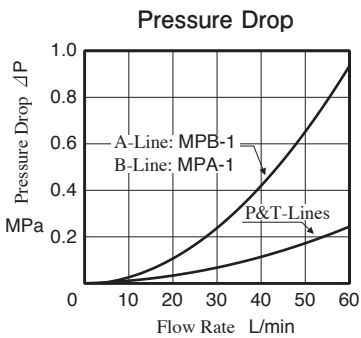
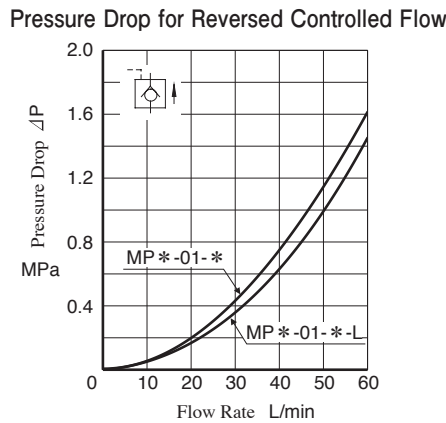
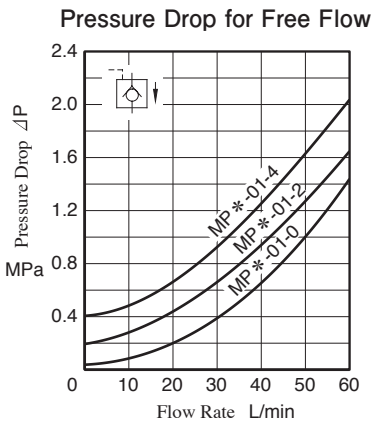


Graphic Symbols

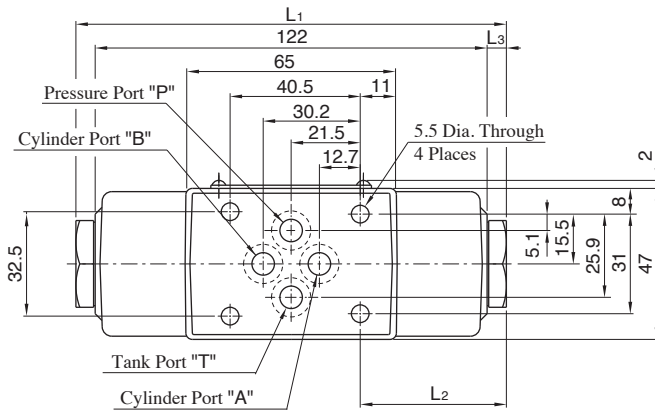


Typical Performance Characteristics

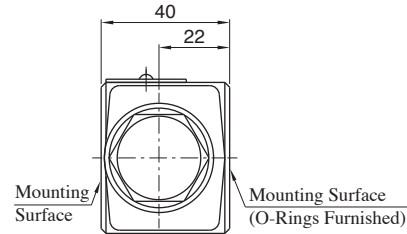
Hydraulic Fluid: Viscosity 35 mm²/s, Specific Gravity 0.850



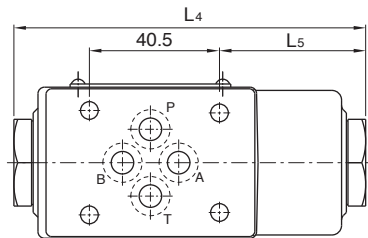
MPW-01



| Model Numbers | L1 | L2 | L3 | Approx. Mass kg |
|---------------|-----|------|----|--------------------|
| MPW-01-* | 134 | 45.5 | 6 | 1.4 |
| MPW-01- *-L | 142 | 49.5 | 10 | 1.45 |



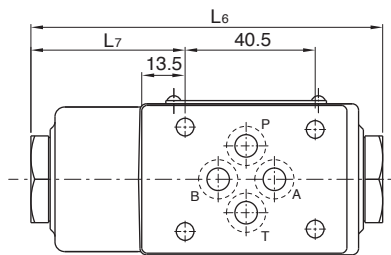
MPA-01



| Model Numbers | L4 | L5 | 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

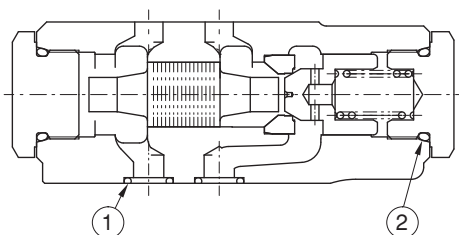


| Model Numbers | L6 | L7 | Approx. Mass kg |
|---------------|-------|----|--------------------|
| MPB-01-* | 109.5 | 48 | 1.15 |
| MPB-01- *-L | 113.5 | 52 | 1.2 |

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

List of Seals

MPA-01 MPB-01 MPW-01



MPA-01

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

| 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 |

End Plates

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

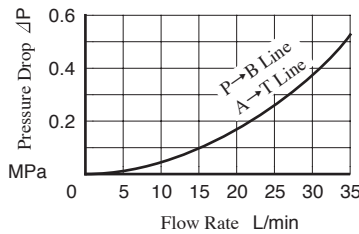
Bypass plates are used for unidirectional circuits that require no solenoid operated directional valves.

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



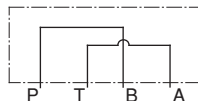
Specifications

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

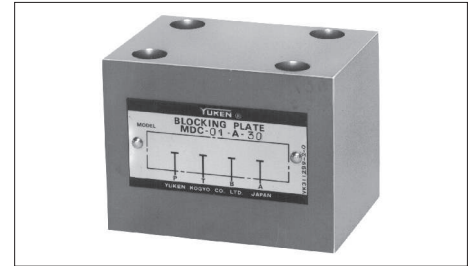
Graphic Symbols



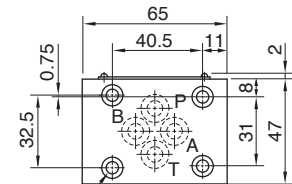
MDC-01-A



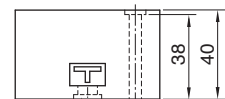
MDC-01-B



MDC-01



5.5 Dia. Through
9.5 Spotface 4 Places



O-Ring for Port
(OR NBR-90 P9-N...4 Pcs.)

Approx. Mass.....1 kg

Connecting Plates

These plates are used for detecting pressure of each line.

Model Number Designation

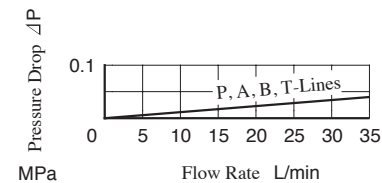
| MDS | -01 | -PA | -30 |
|------------------------------|------------|--|---------------|
| Series Number | Plate Size | Type of Detecting Line | Design Number |
| MDS: Connecting Plate | 01 | PA: P&A-Lines PB: P&B-Lines AT: A&T-Lines | 30 |

Specifications

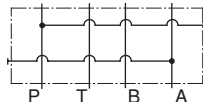
| Model Numbers | Max. Operating Pressure MPa | Max. Flow L/min |
|---------------|-----------------------------|-----------------|
| MDS-01- *-30 | 31.5 | 35 |

Pressure Drop

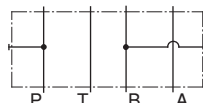
Hydraulic Fluid: Viscosity 35 mm²/s, Specific Gravity 0.850



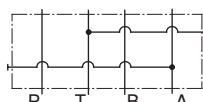
Graphic Symbols



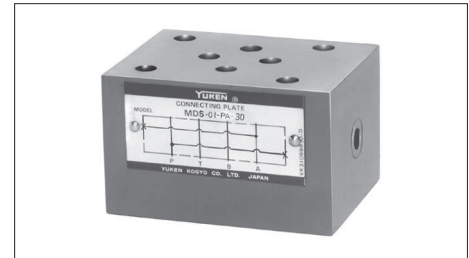
MDS-01-PA



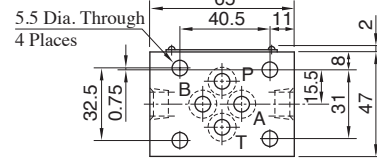
MDS-01-PB



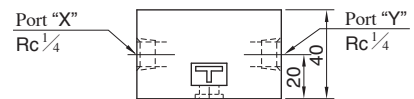
MDS-01-AT



MDS-01



5.5 Dia. Through
4 Places



O-Ring for Port
(OR NBR-90 P9-N: 4 Pcs.)

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 |

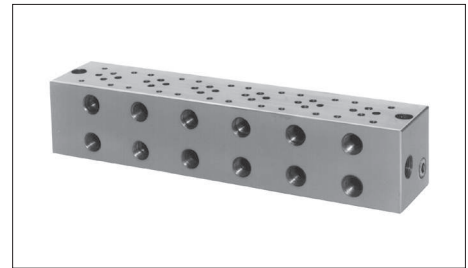
Base Plates For Modular Valves

Specifications

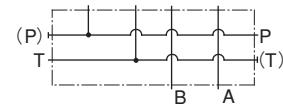
Max. Operating Pressure.....25 MPa

Model Number Designation

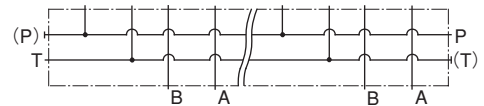
| MMC | -01 | -6 | -40 |
|-----------------|------------|---|---------------|
| Series Number | Plate Size | Number of Stations | Design Number |
| MMC: Base Plate | 01 | 1: 1 Station 2: 2 Stations 3: 3 Stations 4: 4 Stations 5: 5 Stations 6: 6 Stations 7: 7 Stations 8: 8 Stations 9: 9 Stations 10: 10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



Graphic Symbols

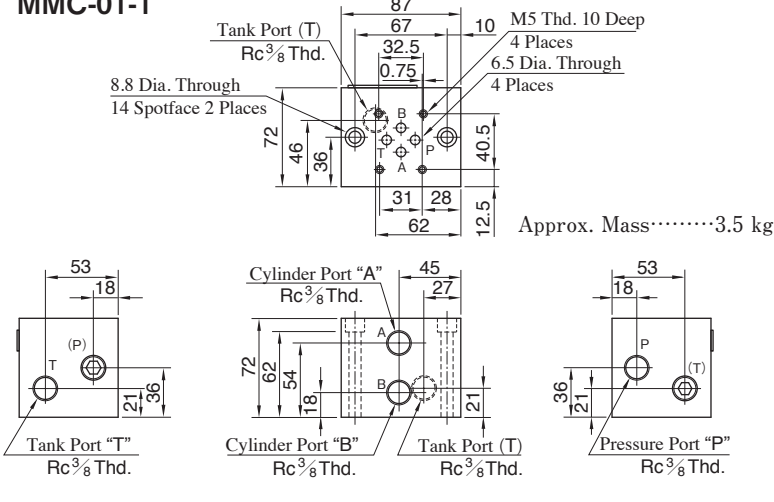


MMC-01-1



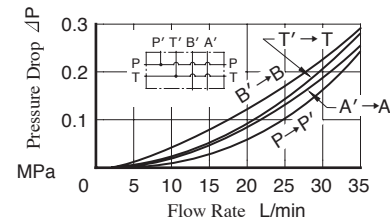
MMC-01-2~10

MMC-01-1

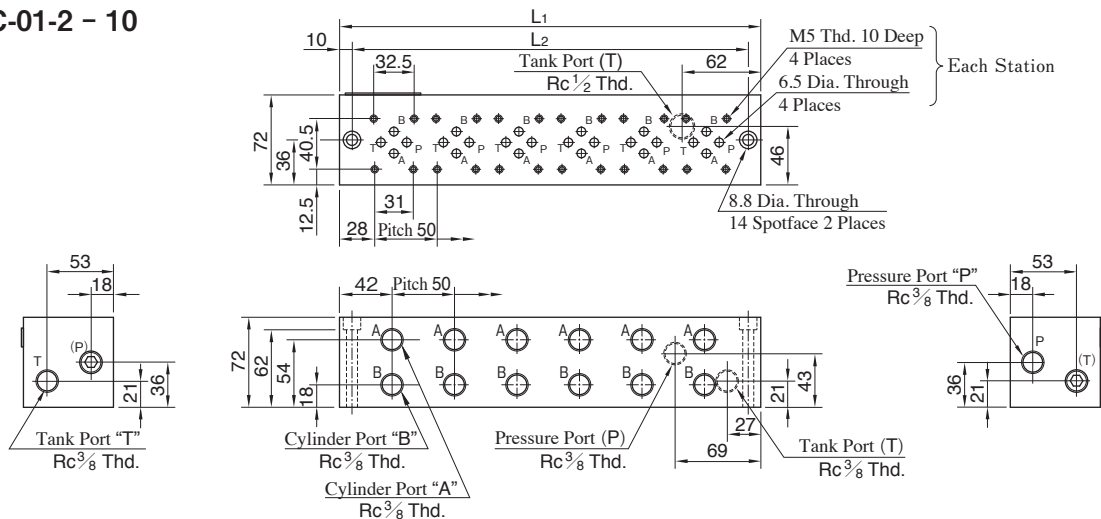


Pressure Drop

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 |

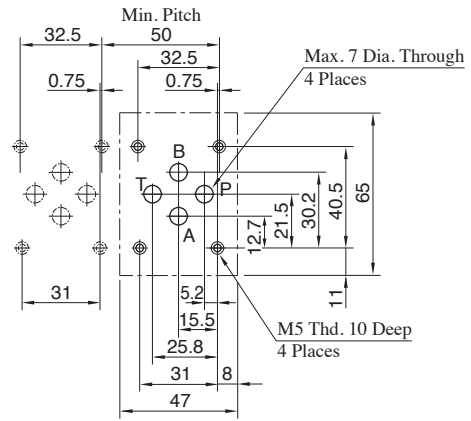
01 Series Modular Valves

■ 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. ($\sqrt{\text{R}}$)



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.



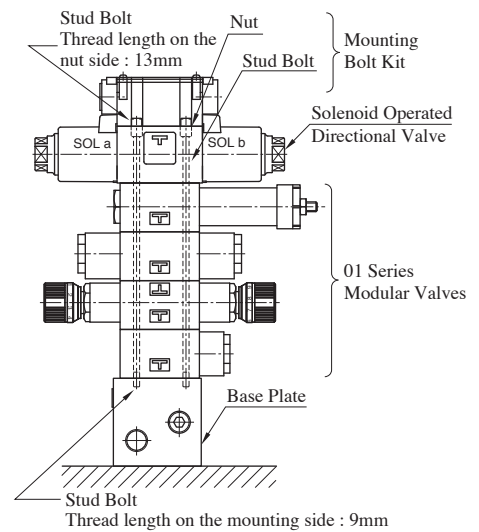
Bolt Kit Composition

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

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

Tightening Torque:

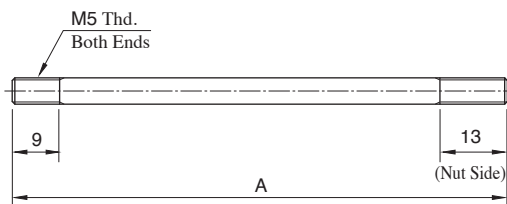
| Operating Pressure MPa | Tightening Torque Nm |
|------------------------|----------------------|
| 25 or less | 5-7 |
| More than 25 | 6-7 |



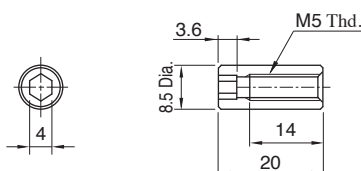
Stacking Example

MBK-01

Stud Bolt



Nut



| Bolt Numbers | A mm |
|--------------|----------------------------------|
| 01 | 98 |
| 02 | 138 |
| 03 | 178 |
| 04 | 218 |
| 05 | Socket Head Cap Screw M5x45 L |

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 substantially increased respectively.
- (2) Possible to select “B” port side of the pressure adjustment screw direction about 3 models below.
 - ① Relief Modular Valves (only for P-Line)
 - ② Reducing Modular Valves (for all P&A&B-Line)
 - ③ Sequence 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 | <ul style="list-style-type: none"> · 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

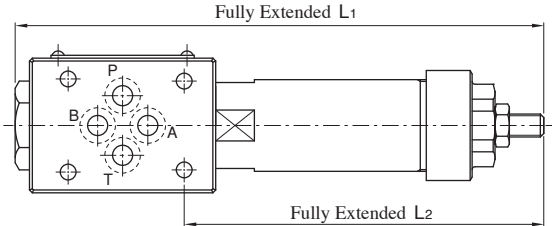
| Name | Current | | New | |
|-------------------------------------|-----------------------|--------------------|--|--------------------|
| | Model Numbers | Approx. Mass kg | Model Numbers | Approx. Mass kg |
| Relief Modular Valves | MB * -01- * -30 | 1.1 | MBP-01-B/C-70 MBP-01-B/C-B-70 MBA-01-B/C-70 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

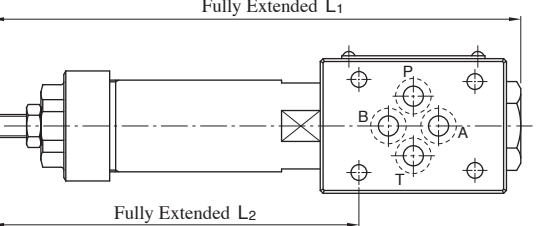
As of fully extended dimensions, height (40mm) and depth (47mm) are same between current and new models. Width is same except for the models below.

(1) Relief Modular Valves

MBP-01
MBB-01



MBP-01- *-B
MBA-01

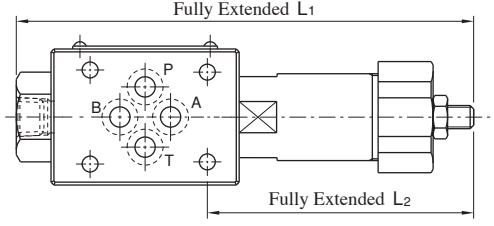


| Model Numbers | L1 | L2 |
|---------------|-------|-------|
| MBP-01-B-70 | 151 | 92 |
| MBB-01-B-70 | | |
| MBP-01-K-70 | 184.5 | 125.5 |
| MBB-01-K-70 | | |
| MBP-01-B-B-70 | 151 | 94.5 |
| MBP-01-C-B-70 | | |
| MBP-01-H-B-70 | 166.5 | 110 |
| MBA-01-B-70 | 151 | 94.5 |
| MBP-01-K-B-70 | 184.5 |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

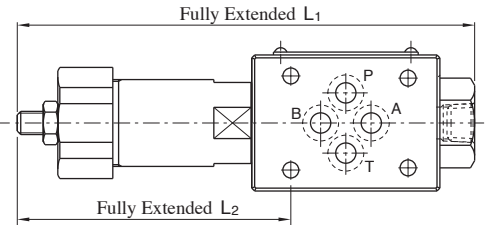
★1. Pressure adjustment range “B”, “K” newly added.
★2. Pressure adjustment screw direction B port side, newly added for P-Line.

(2) Reducing Modular Valves

MR *-01



MR *-01- *-B

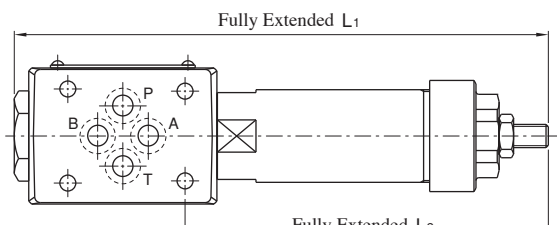


| Model Numbers | L1 | L2 |
|----------------|-------|------|
| MRA-01-A-70 | 162.5 | 96.5 |
| MR *-01-A-B-70 | 162.5 | 99 |
| MR *-01-B-B-70 | 158 | 94.5 |
| MR *-01-C-B-70 | | |
| MR *-01-H-B-70 | 173.5 | 110 |

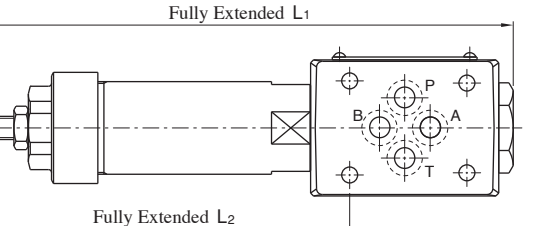
★1. Pressure adjustment range “A” newly added.
★2. Pressure adjustment screw direction B port side, newly added.

(3) Sequence Modular Valves

MHP-01



MHP-01- *-B



| Model Numbers | L1 | L2 |
|---------------|-------|-------|
| 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 | 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 | | ★ | Flow Control Valves | Temperature Compensated Throttle and Check Valves (for "A&B-Lines", Meter-out) MSTW-03-X-20 | | F-58 | |
| | Pressure Control Valves | Relief Valves (for "P-Line") MBP-03-**-70 | | | F-48 | Throttle Valves (for "P-Line") MSP-03-30 | | F-60 |
| Relief Valves (for "A-Line") MBA-03-**-70 | | | F-48 | Check and Throttle Valves (for "P-Line") MSCP-03-20 | | F-61 | | |
| Relief Valves (for "B-Line") MBB-03-**-70 | | | F-48 | Throttle and Check Valves (for "A-Line", Meter-out) MSA-03-X-70 | | F-62 | | |
| Relief Valves (for "A&B-Lines") MBW-03-**-70 | | | F-48 | Throttle and Check Valves (for "A-Line", Meter-in) MSA-03-Y-70 | | F-62 | | |
| Reducing Valves (for "P-Line") MRP-03-**-70 | | | F-50 | Throttle and Check Valves (for "B-Line", Meter-out) MSB-03-X-70 | | F-62 | | |
| Reducing Valves (for "A-Line") MRA-03-**-70 | | | F-50 | Throttle and Check Valves (for "B-Line", Meter-in) MSB-03-Y-70 | | F-62 | | |
| Reducing Valves (for "B-Line") MRB-03-**-70 | | | F-50 | Throttle and Check Valves (for "A&B-Lines", Meter-out) MSW-03-X-70 | | F-62 | | |
| Reducing Valves for Low Pressure Setting (for "P-Line") MRLP-03-10 | | | F-52 | Throttle and Check Valves (for "A&B-Lines", Meter-in) MSW-03-Y-70 | | F-62 | | |
| Reducing Valves for Low Pressure Setting (for "A-Line") MRLA-03-10 | | | F-52 | Directional Control Valves | Check Valves (for "P-Line") MCP-03-**-70 | | F-64 | |
| Reducing Valves for Low Pressure Setting (for "B-Line") MRLB-03-10 | | | F-52 | | Check Valves (for "A-Line") MCA-03-**-70 | | F-64 | |
| Sequence Valves (for "P-Line") MHP-03-**-20 | | | F-54 | | Check Valves (for "B-Line") MCB-03-**-70 | | F-64 | |
| Counterbalance Valves (for "A-Line") MHA-03-**-20 | | | F-54 | | Check Valves (for "T-Line") MCT-03-**-70 | | F-64 | |
| Counterbalance Valves (for "B-Line") MHB-03-**-20 | | | F-54 | | Check Valves (for "A&B-Lines") MCW-03-**-70 | | F-64 | |
| Flow Control Valves | | Flow Control Valves (for "P-Line") MFP-03-11 | | | F-56 | Check Valves (for "P&T-Lines") MCPT-03-P*-T*-10 | | F-66 |
| | Flow Control and Check Valves (for "A-Line", Meter-in) MFA-03-X-11 | | F-56 | | Anti-Cavitation Valves MAC-03-10 | | F-67 | |
| | Flow Control and Check Valves (for "A-Line", Meter-out) MFA-03-Y-11 | | F-56 | | Pilot Operated Check Valves (for "A-Line") MPA-03-***-70 | | F-68 | |
| | Flow Control and Check Valves (for "B-Line", Meter-out) MFB-03-X-11 | | F-56 | | Pilot Operated Check Valves (for "B-Line") MPB-03-***-70 | | F-68 | |
| | Flow Control and Check Valves (for "B-Line", Meter-in) MFB-03-Y-11 | | F-56 | | Pilot Operated Check Valves (for "A&B-Lines") MPW-03-***-70 | | F-68 | |
| | Flow Control and Check Valves (for "A&B-Lines", Meter-out) MFW-03-X-11 | | F-56 | | Modular Plates and Mounting Bolts | End Plates (Blocking Plates) MDC-03-A-10 | | F-70 |
| | Flow Control and Check Valves (for "A&B-Lines", Meter-in) MFW-03-Y-11 | | F-56 | | | End Plates (Bypass Plates) MDC-03-B-10 | | F-70 |
| | Temperature Compensated Throttle and Check Valves (for "A-Line", Meter-out) MSTA-03-X-20 | | F-58 | | | Connecting Plates MDS-03-10 | | F-70 |
| | Temperature Compensated Throttle and Check Valves (for "B-Line", Meter-out) MSTB-03-X-20 | | F-58 | | | 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.

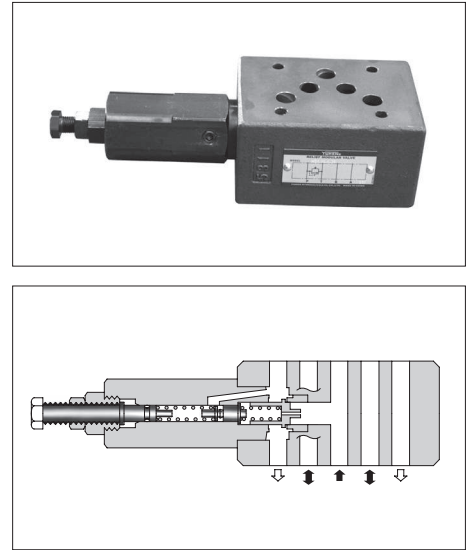
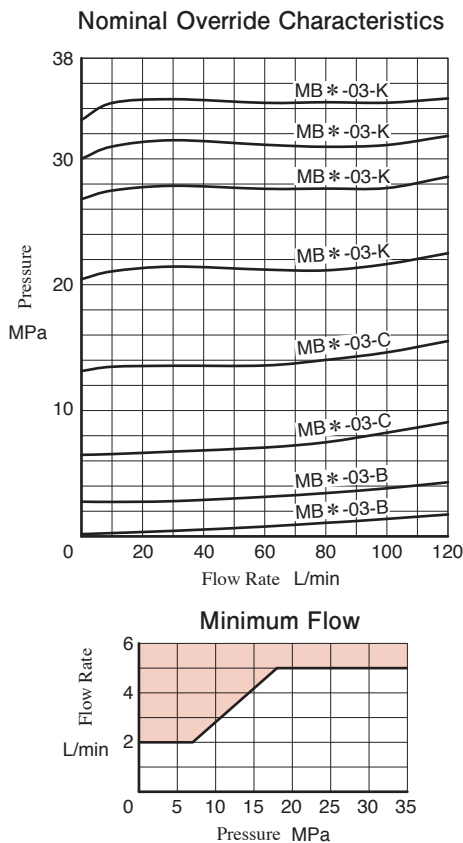
Instructions

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.

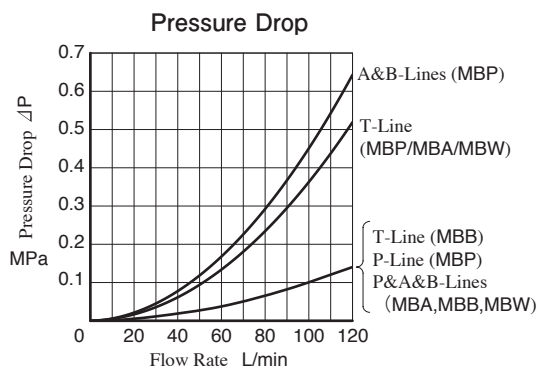
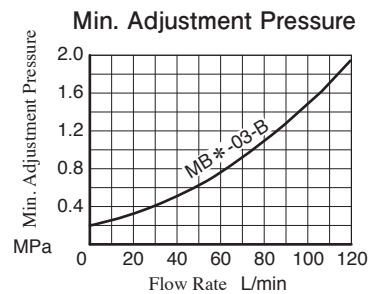
In case of a small flow, the setting pressure may become unstable. To avoid this, refer to the minimum flow characteristic curve of the this page and use the valve within a range as shown with .

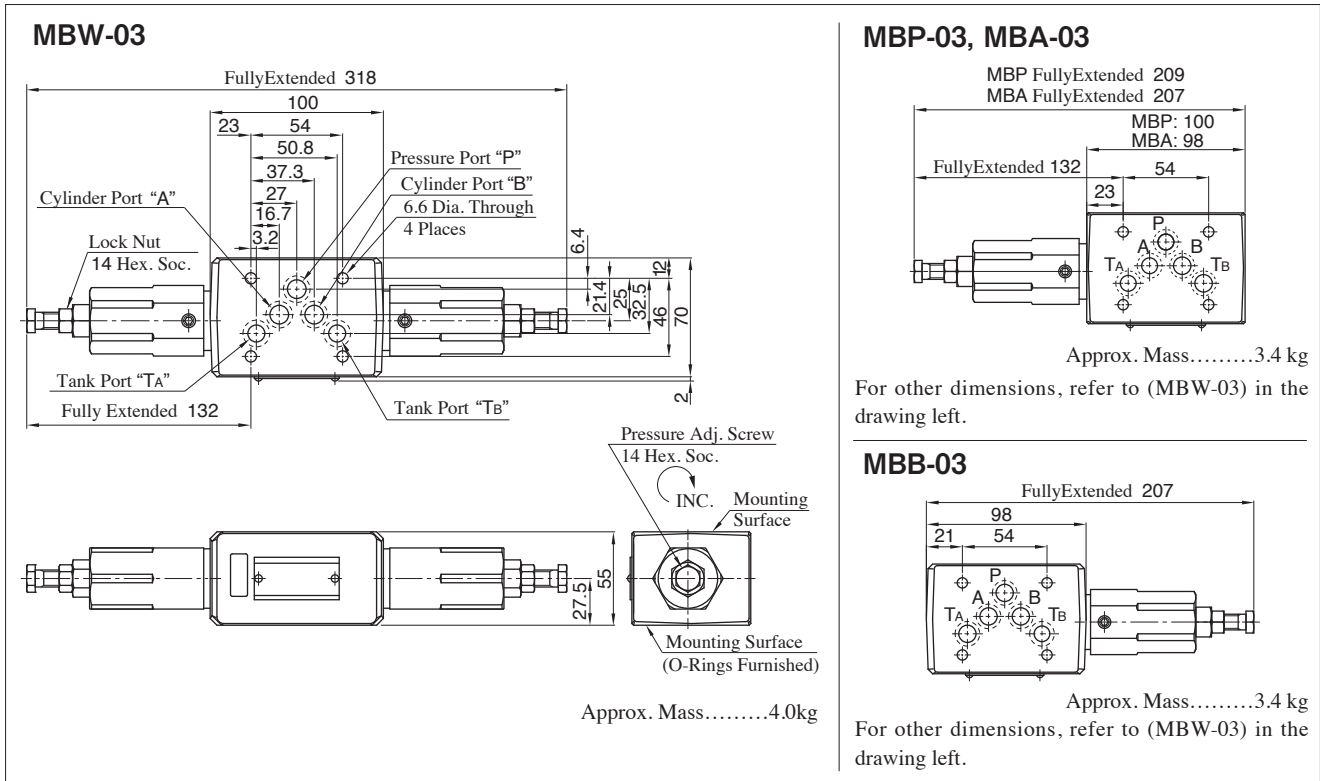
Typical Performance Characteristics

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



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





List of Seals

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

MBP-03
MBA-03

- MBP-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 |

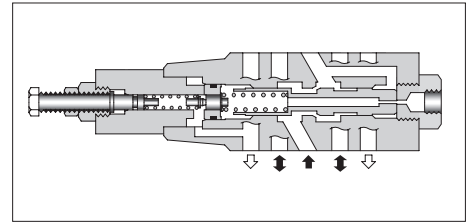
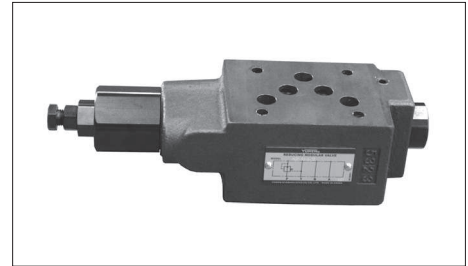
*See the "Min. Adjustment Pressure vs. Max. Flow" of this page.

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.

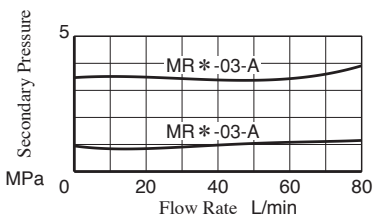
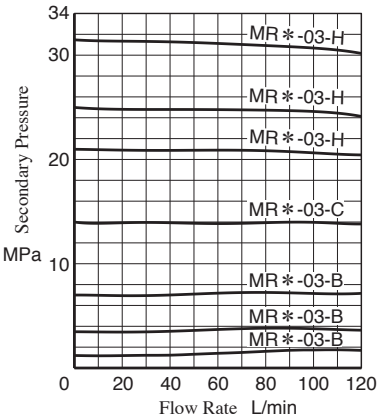
Typical Performance Characteristics

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

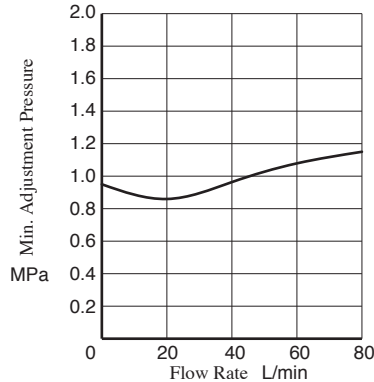


| Model Numbers | Graphic Symbols | Graphic Symbols |
|---------------|-----------------|-----------------|
| MRP-03 | | |
| MRA-03 | | |
| MRB-03 | | |

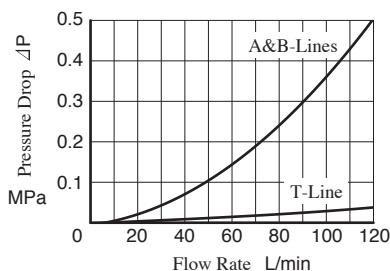
Nominal Override Characteristics
Primary Pressure 35 MPa



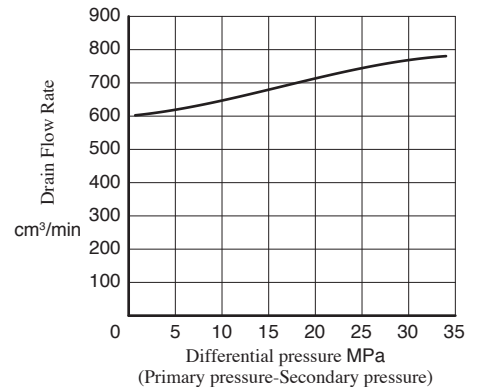
Min. Adjustment Pressure vs. Max. Flow



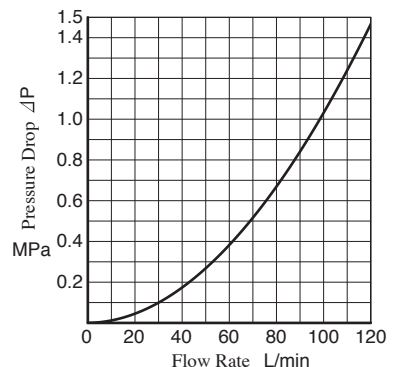
Pressure Drop



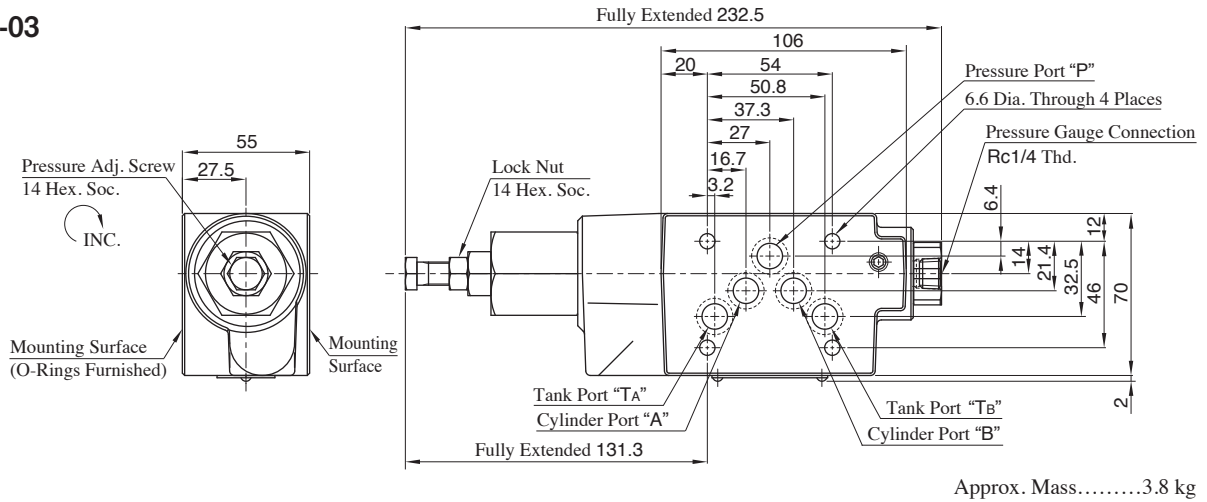
Drain Flow Rate



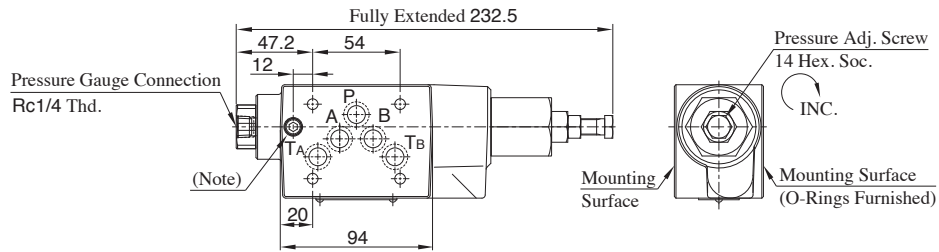
Pres. Drop at Spool Fully Open (P-Line)



MRP-03 MRB-03



MRA-03



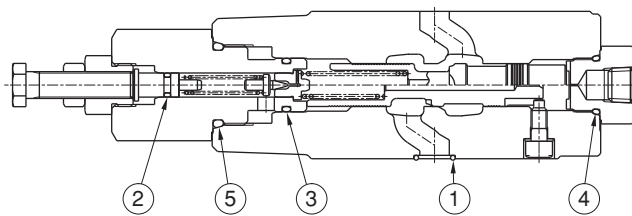
For other dimensions, refer to "MRP-03" in the drawing above.

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 | 03 | 10 |
| MRLA:Low Pressure Setting Type Reducing Valve for A-Line | | |
| MRLB:Low Pressure Setting Type Reducing Valve for B-Line | | |

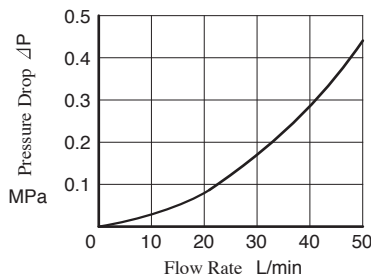
Instructions

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.

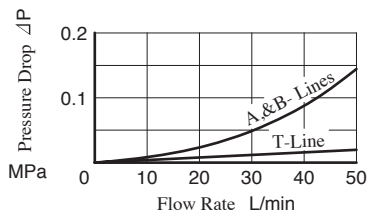
Typical Performance Characteristics

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

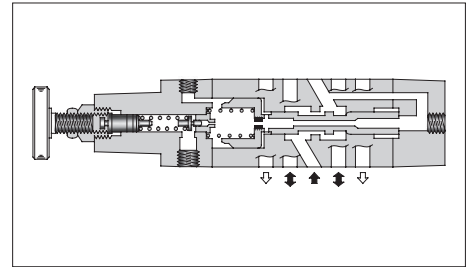
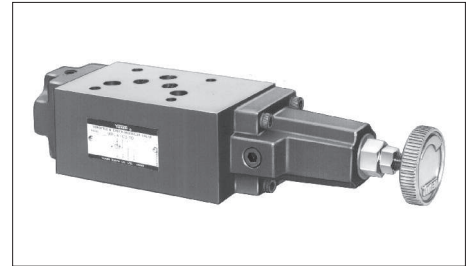
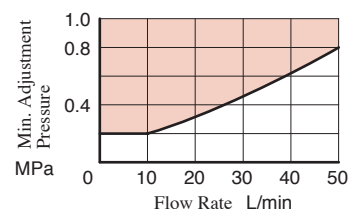
Pres. Drop at Spool Fully Open (P-Line)



Pressure Drop



Min. Adjustment Pressure vs. Max. Flow



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

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

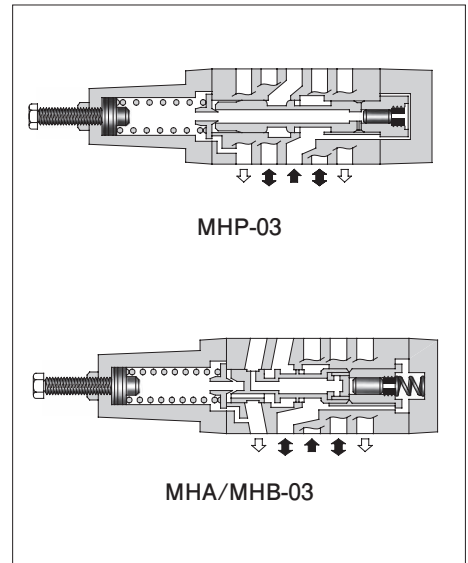
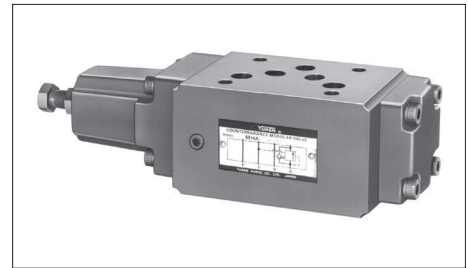
| MHP | -03 | -C | -20 |
|--------------------------------------|------------|---|---------------|
| Series Number | Valve Size | Pres. Adj. Range MPa | Design Number |
| MHP: Sequence Valve for P-Line | 03 | N: ★-1.8 A: 1.8-3.5 B: 3.5-7 C: 7-14 | 20 |
| MHA: Counterbalance Valve for A-Line | | | 20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

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

Instructions

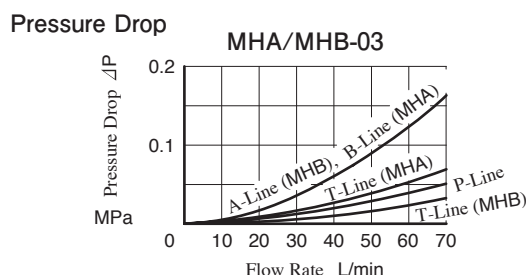
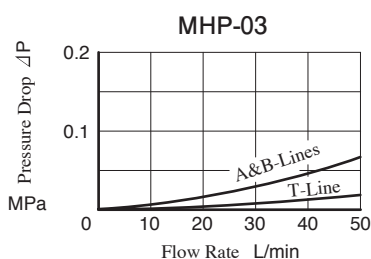
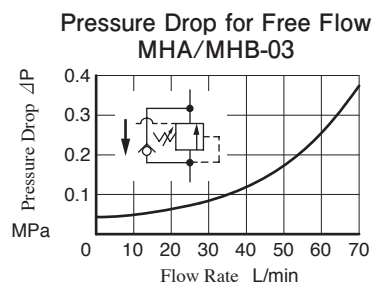
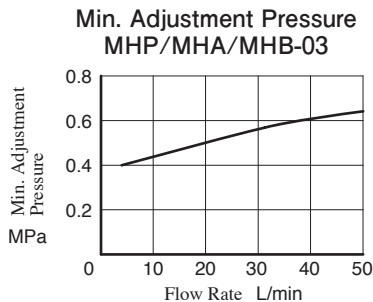
The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of this page. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular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



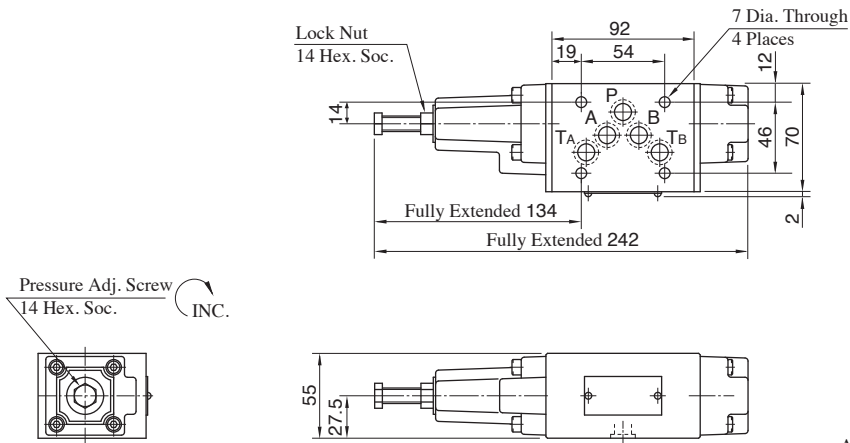
Typical Performance Characteristics

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



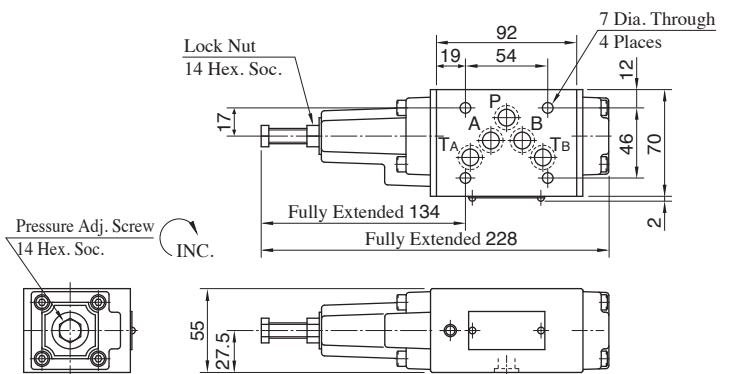
| Model Numbers | Graphic Symbols | Graphic Symbols |
|---------------|-----------------|-----------------|
| MHP-03 | | |
| MHA-03 | | |
| MHB-03 | | |

MHP-03



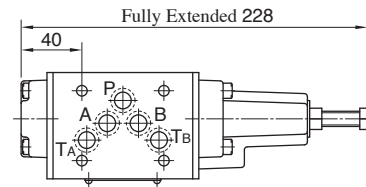
Approx. Mass.....3.5 kg

MHA-03



Approx. Mass.....3.5 kg

MHB-03

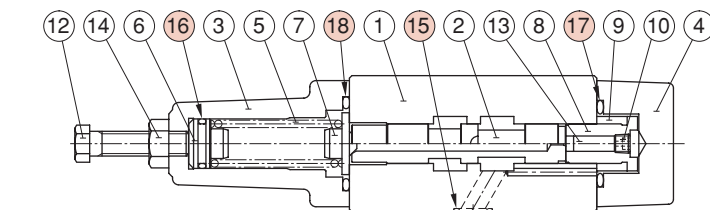


Approx. Mass.....3.5 kg

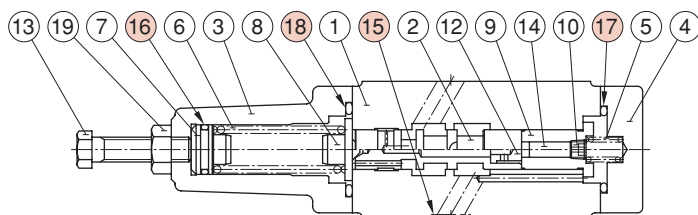
For other dimensions, refer to "MHA-03" in the drawing left..

List of Seals

MHP-03, MHA-03, MHB-03



MHP-03



MHA-03

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

| 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.

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 | Direction 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 |

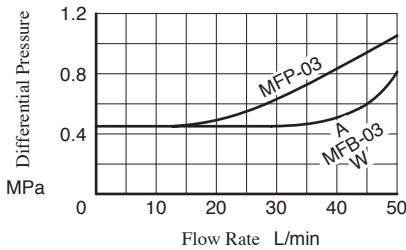
Instructions

- 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.

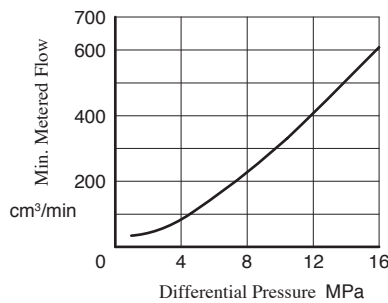
Typical Performance Characteristics

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

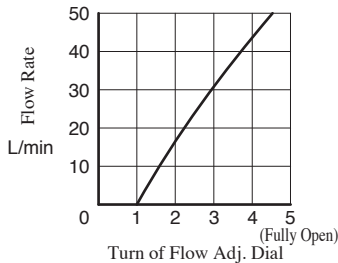
Min. Required Pressure Difference



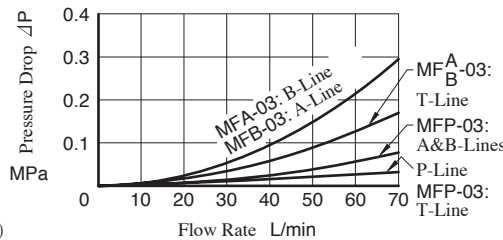
Min. Metered Flow



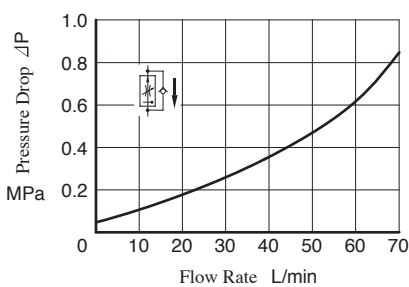
Metered Flow vs. Dial Position



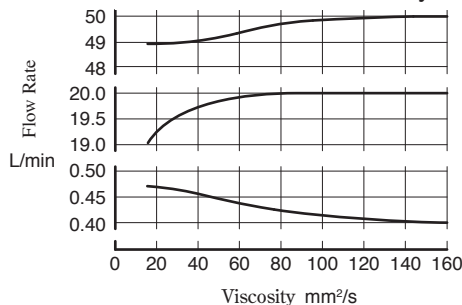
Pressure Drop



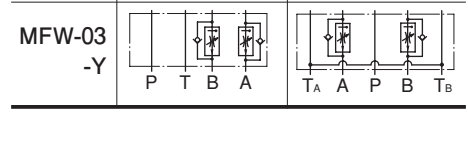
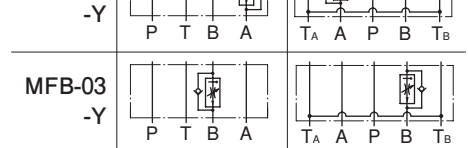
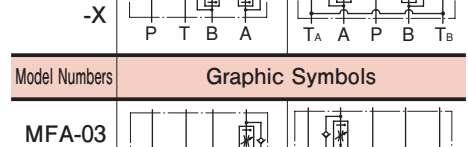
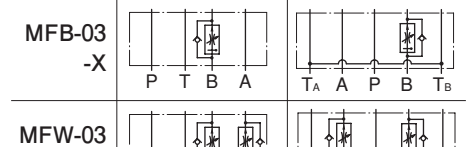
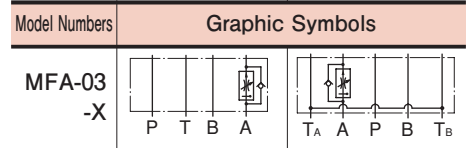
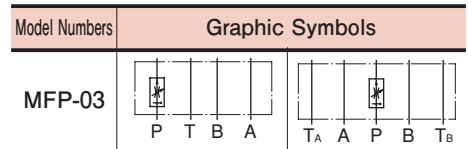
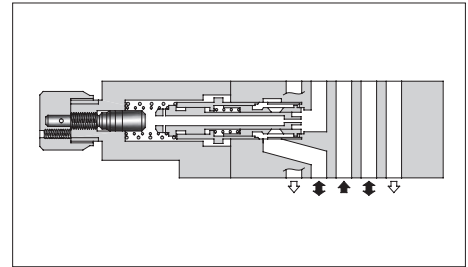
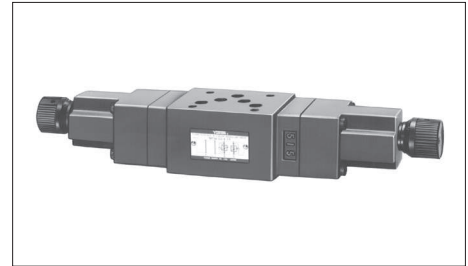
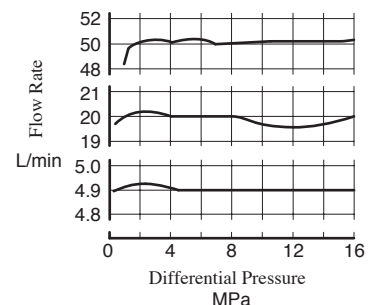
Pressure Drop for Free Flow



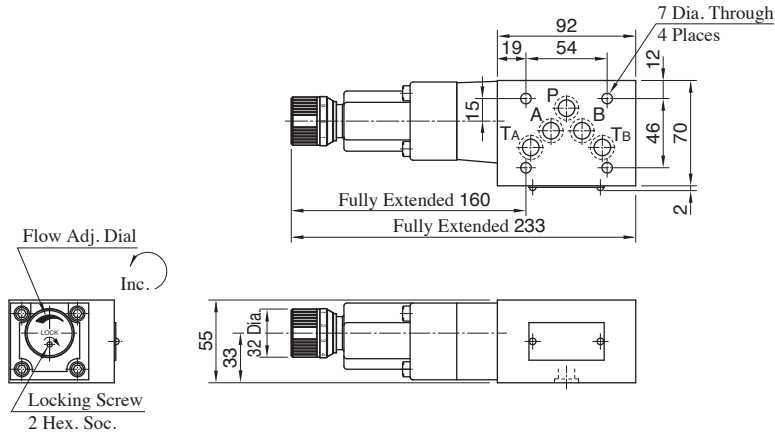
Metered Flow vs. Viscosity



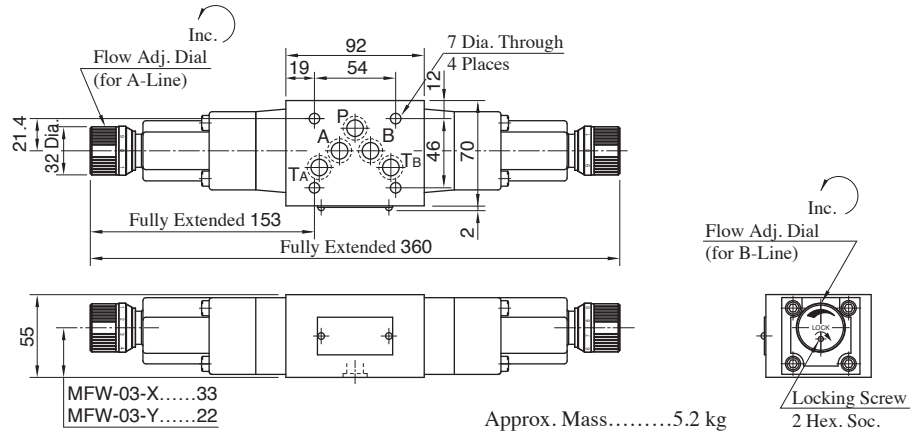
Metered Flow vs. Differential Pressure



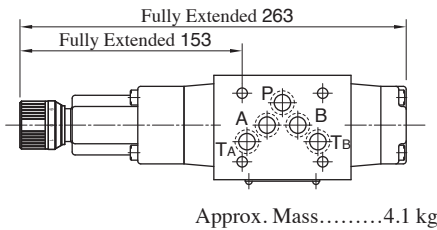
MFP-03



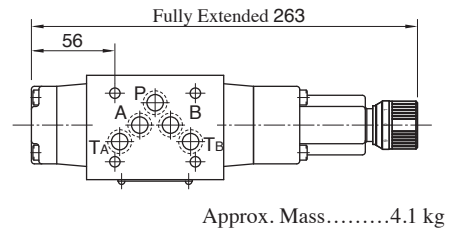
MFW-03-X Y



MFA-03-X Y



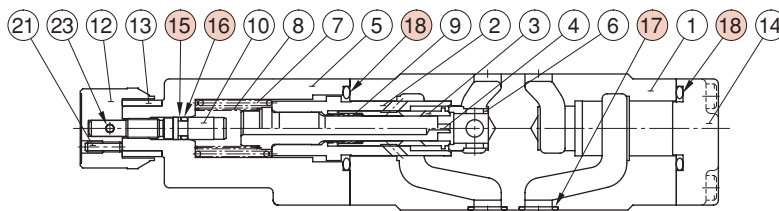
MFB-03-X Y



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

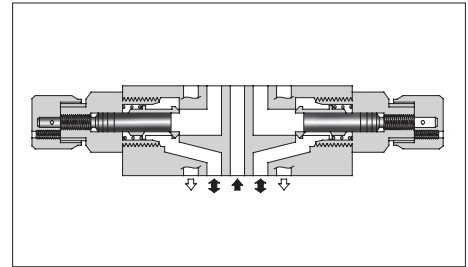
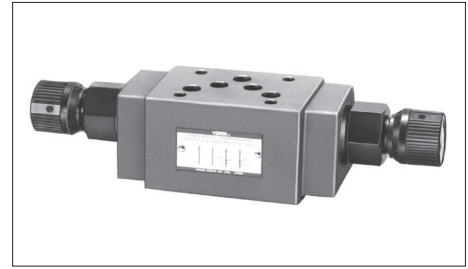
Specifications

| 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.

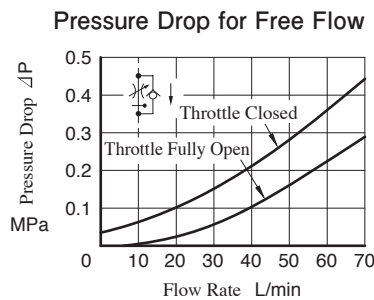
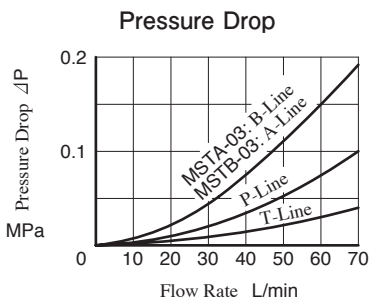
Model Number Designation

| 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 | 03 | X: Meter-out | 20 |
| Temperature Compensated Throttle and Check Valve | | | |

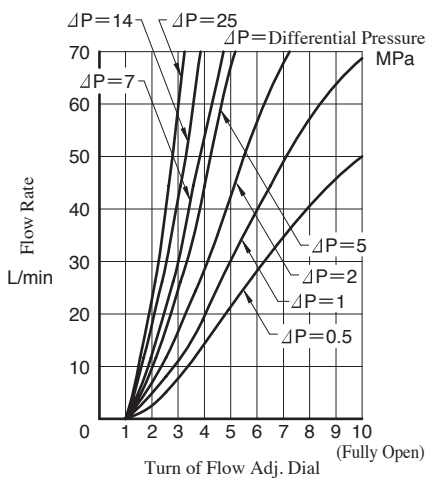


Typical Performance Characteristics

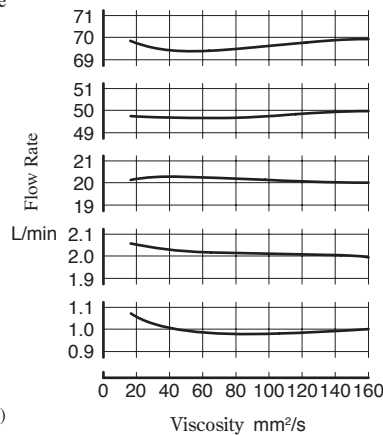
Hydraulic Fluid: Viscosity 35 mm²/s, Specific Gravity 0.850



Metered Flow vs. Dial Position



Metered Flow vs. Viscosity

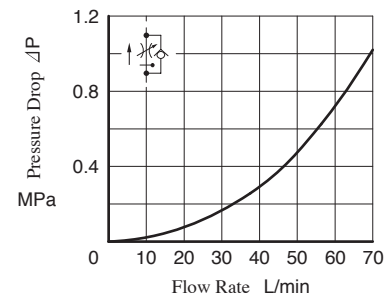


| Model Numbers | Graphic Symbols | Detailed Graphic Symbols |
|---------------|-----------------|--------------------------|
| | Meter-out | |
| MSTA-03-X | | |
| MSTB-03-X | | |
| MSTW-03-X | | |

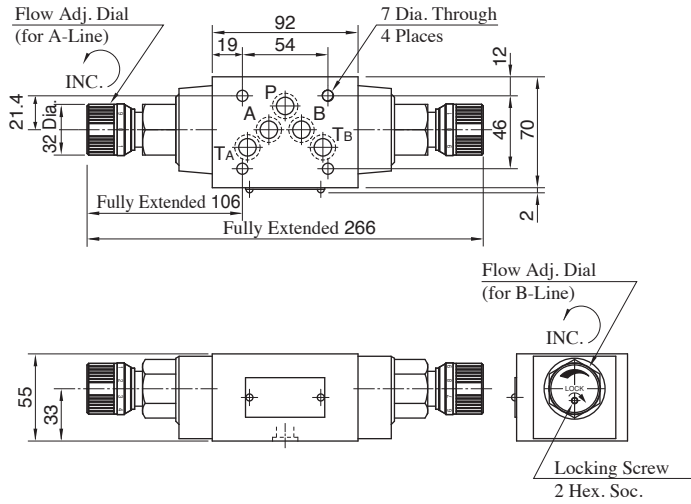
Instructions

- 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

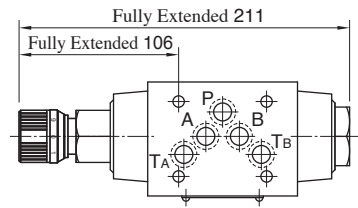


MSTW-03-X



Approx. Mass.....3.7 kg

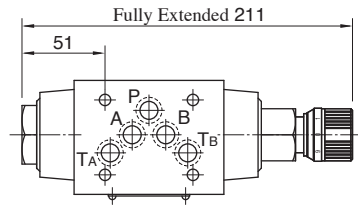
MSTA-03-X



Approx. Mass.....3.5 kg

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

MSTB-03-X

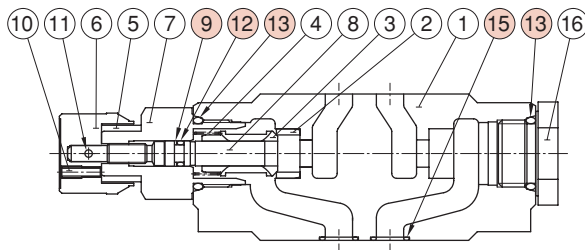


Approx. Mass.....3.5 kg

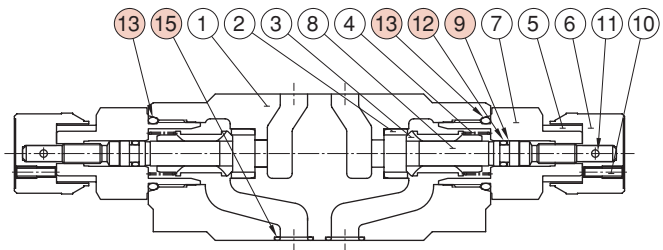
For other dimensions, refer to "MSTW-03" in the drawing left.

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

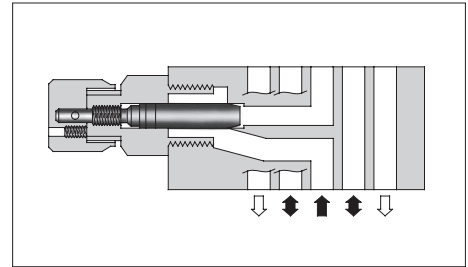
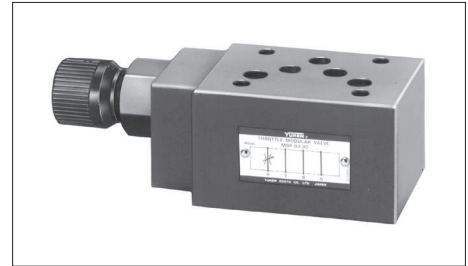
Specifications

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

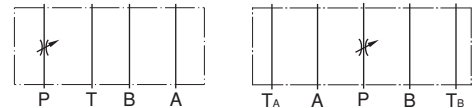
★ Maximum flow decreases when the differential pressure is less than 1 MPa. See the "Pressure Drop at Throttle Fully Open" of this page.

Model Number Designation

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



Graphic Symbols

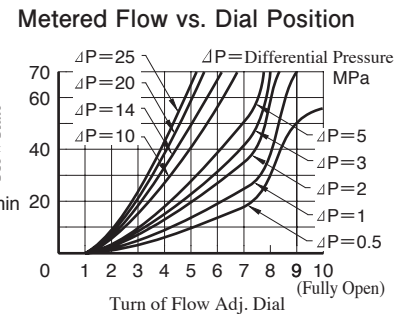
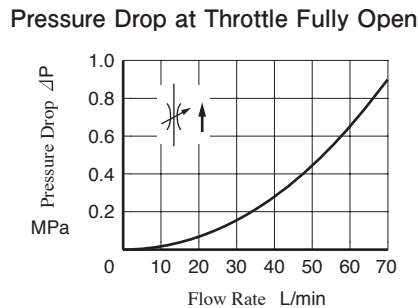
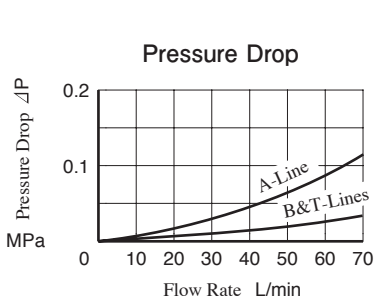


Instructions

- 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

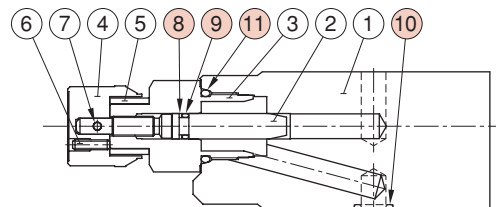


MSP-03

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

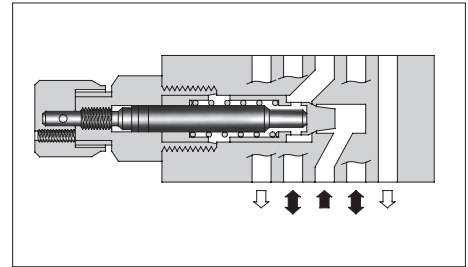
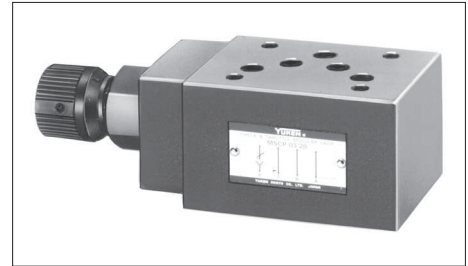
Specifications

| 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

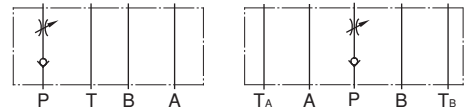
| MSCP | -03 | -20 |
|---|------------|---------------|
| Series Number | Valve Size | Design Number |
| MSCP: Check & Throttle Valve for P-Line | 03 | 20 |



Instructions

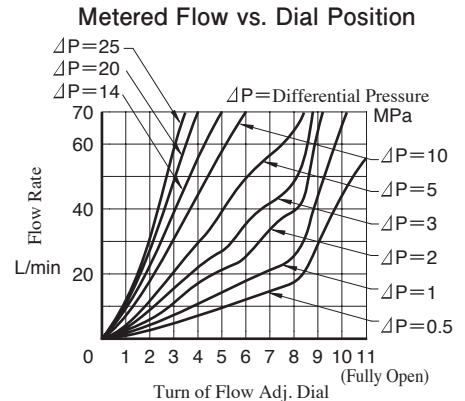
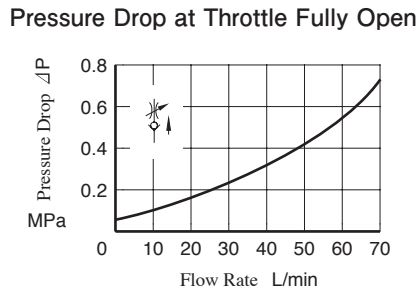
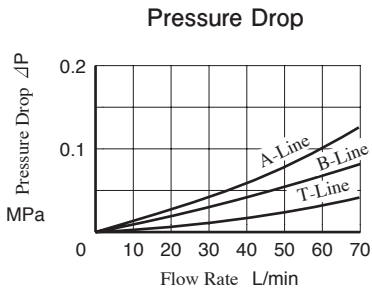
- To make flow adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

Graphic Symbols

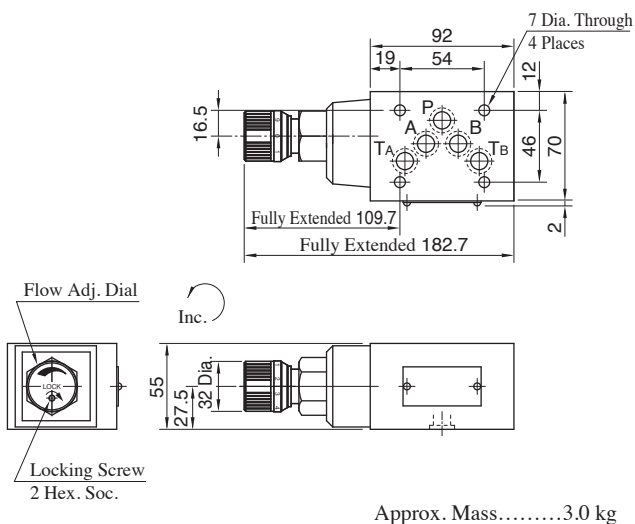


Typical Performance Characteristics

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

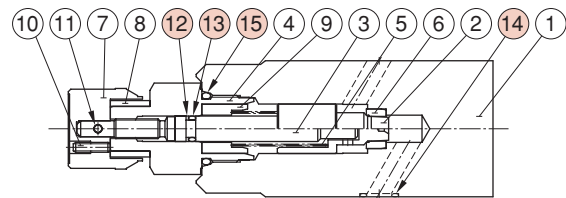


MSCP-03



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 |

03 Series Modular Valves

Throttle and Check Modular Valves

Specifications

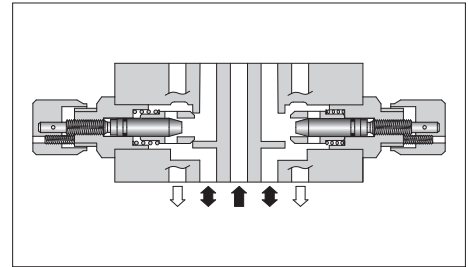
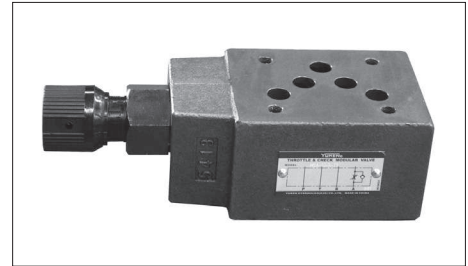
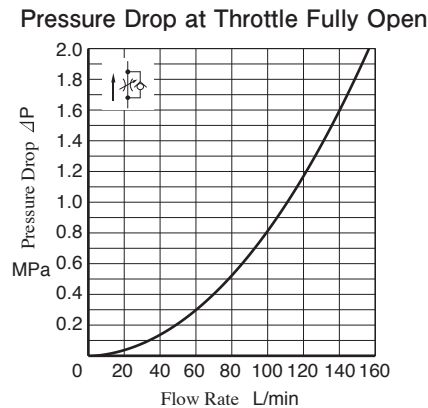
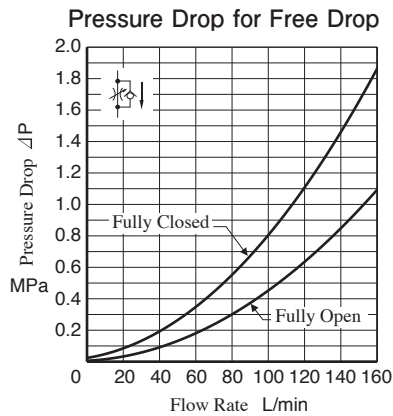
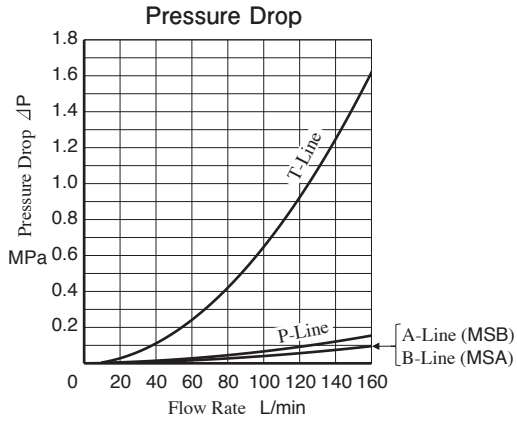
| Model Numbers | Max. Operating Pressure MPa | Max. Flow L/min |
|---------------|-----------------------------|-----------------|
| MS*-03*-70 | 35 | 160 |

Model Number Designation

| MSA | -03 | -X | -70 |
|---|------------|-----------------------------|---------------|
| Series Number | Valve Size | Direction 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

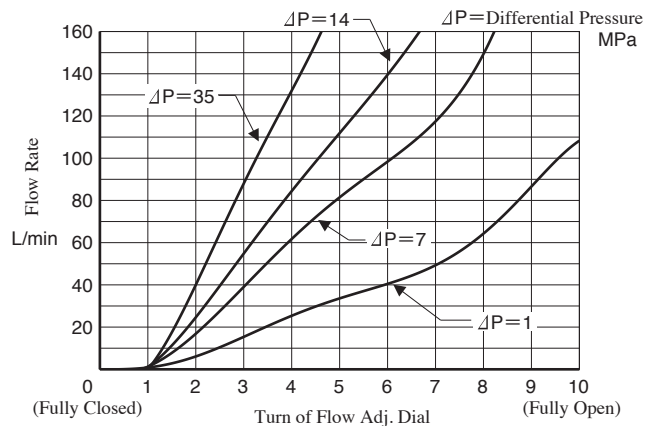
Hydraulic Fluid: Viscosity 35 mm²/s, Specific Gravity 0.850



| 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 |

Instructions

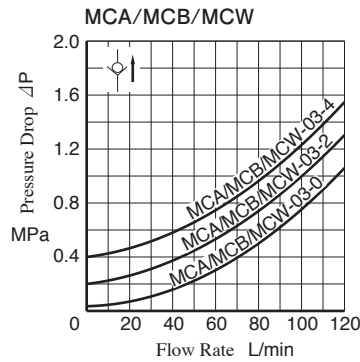
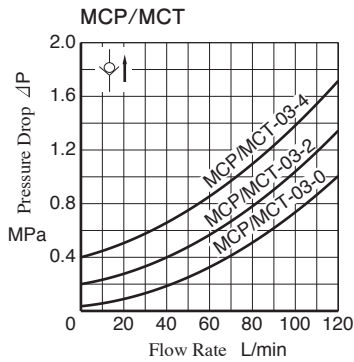
Tank Line Used

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

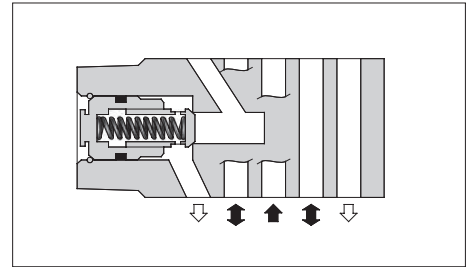
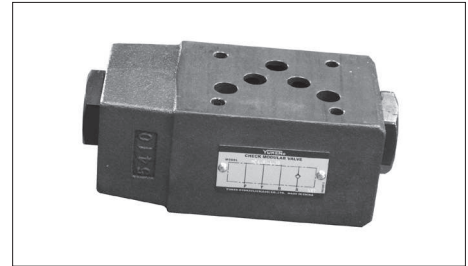
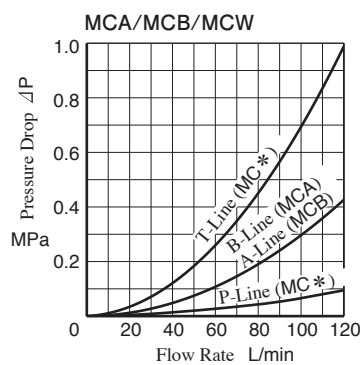
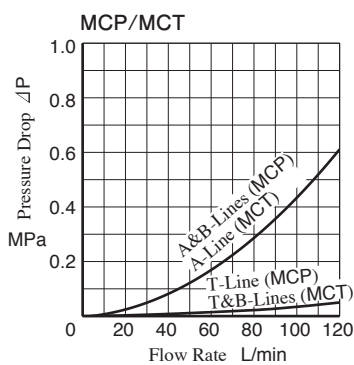
Typical Performance Characteristics

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

Pressure Drop for Free Flow

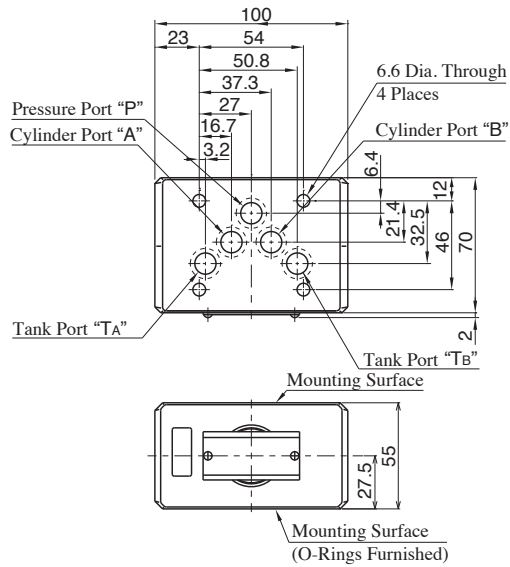


Pressure Drop



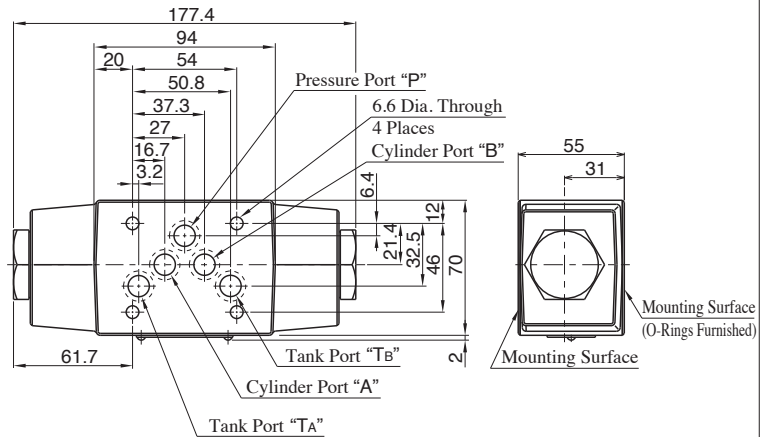
| Model Numbers | Graphic Symbols | |
|---------------|-----------------|--|
| MCP-03 | | |
| MCA-03 | | |
| MCB-03 | | |
| MCW-03 | | |
| MCT-03 | | |

MCP-03



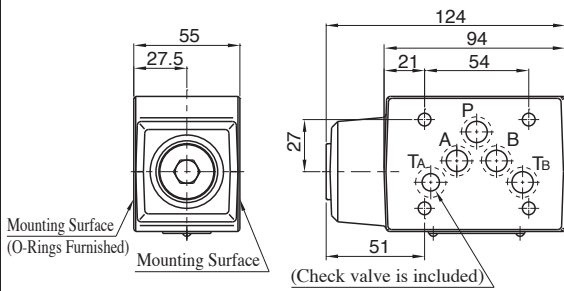
Approx. Mass.....2.6 kg

MCW-03



Approx. Mass.....3.7 kg

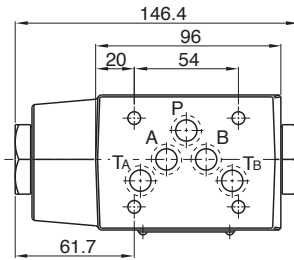
MCT-03



Approx. Mass.....3.0 kg

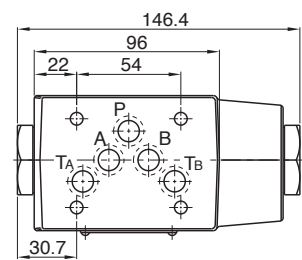
For other dimensions, refer to "MCW-03" in the drawing above.

MCA-03



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

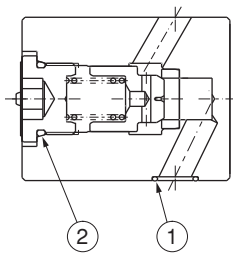
MCB-03



Approx. Mass.....3.0 kg

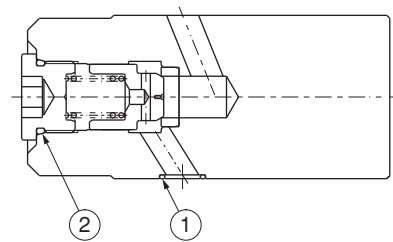
List of Seals

MCP-03



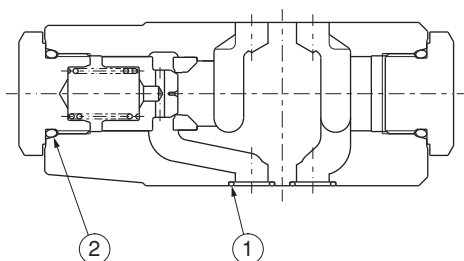
| Item | Name of Parts | Part Numbers | Qty. |
|------|---------------|--------------------|------|
| 1 | O-Ring | AS568-014 (NBR-90) | 5 |
| 2 | O-Ring | OR NBR-90 P21-N | 1 |

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.

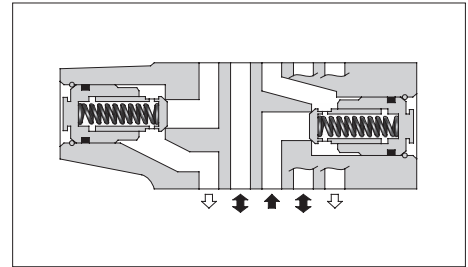
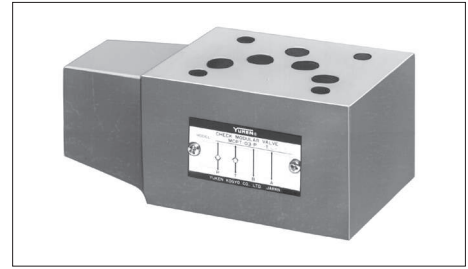
Check Modular Valves For “P&T” Lines

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

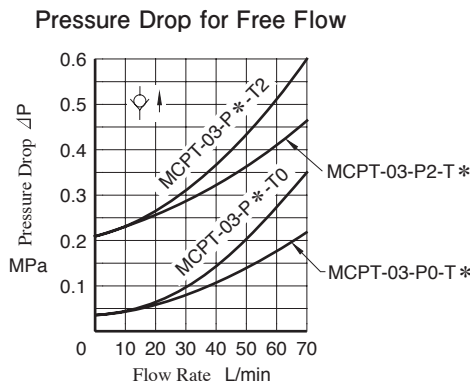
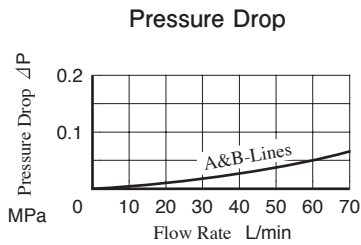
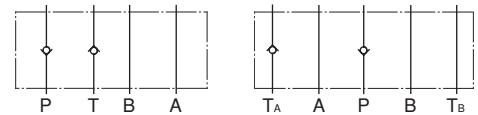
Tank Line Used

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

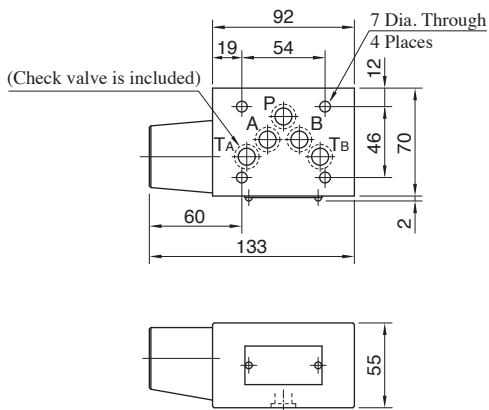
Typical Performance Characteristics

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

Graphic Symbols



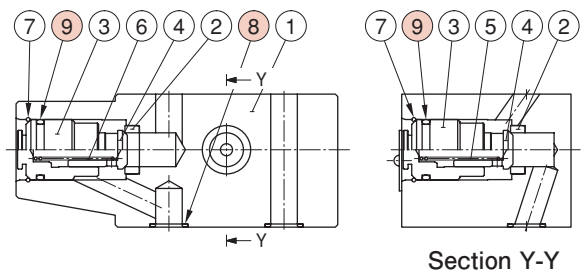
MCPT-03



Approx. Mass.....2.7 kg

List of Seals

MCPT-03



| 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

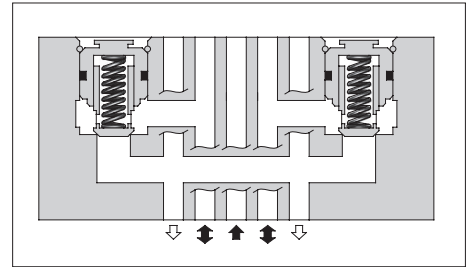
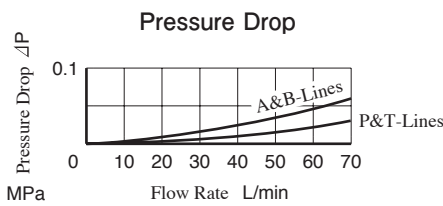
| Model Numbers | Max. Operating Pressure MPa | Max. Flow L/min |
|---------------|-----------------------------|-----------------|
| MAC-03-10 | 25 | 70 |

Model Number Designation

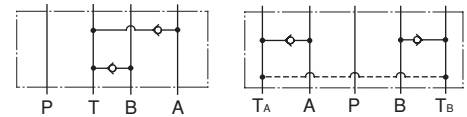
| MAC | -03 | -10 |
|----------------------------|------------|---------------|
| Series Number | Valve Size | Design Number |
| MAC: Anti-Cavitation Valve | 03 | 10 |

Typical Performance Characteristics

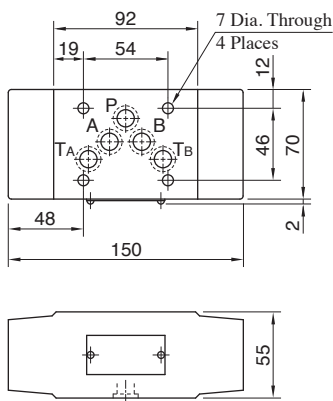
Hydraulic Fluid: Viscosity 35 mm²/s, Specific Gravity 0.850



Graphic Symbols



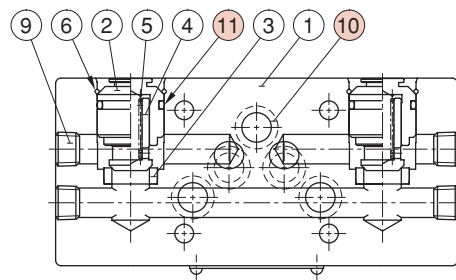
MAC-03



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 |

F
03 Series Modular Valves

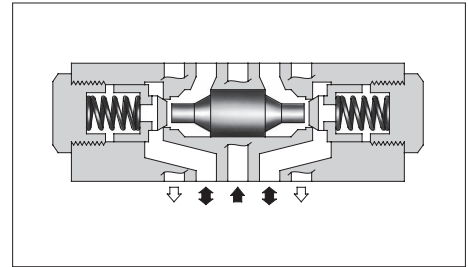
Pilot Operated Check Modular Valves

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 | | |

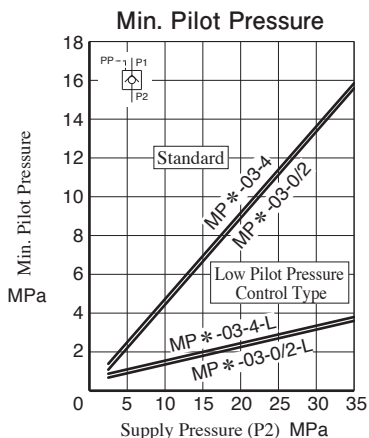
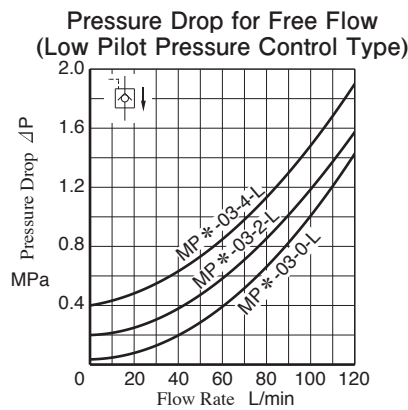
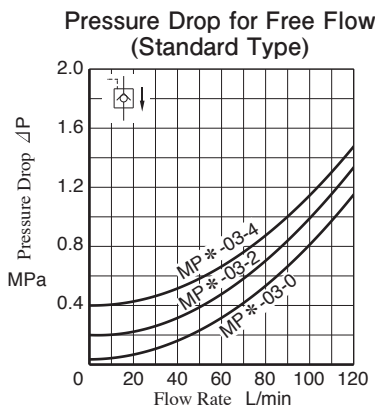
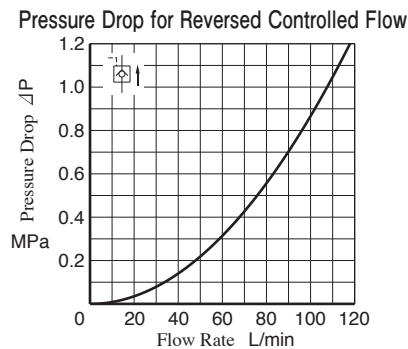
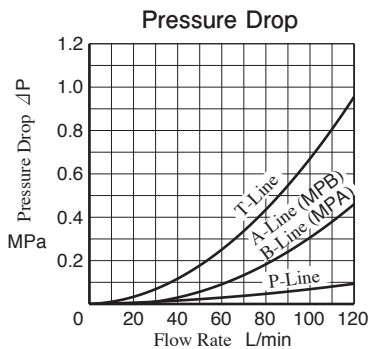
Model Number Designation

| 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 |



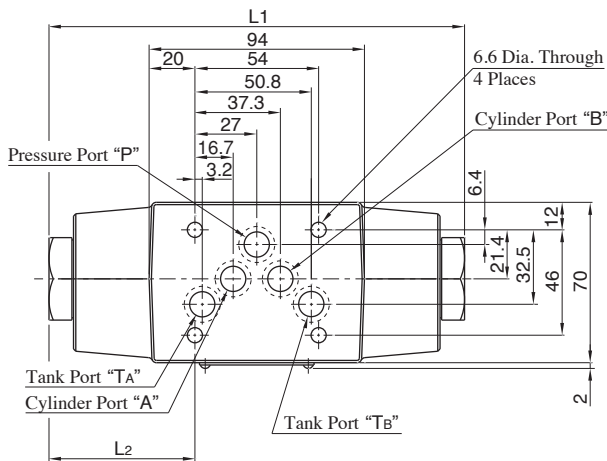
Typical Performance Characteristics

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

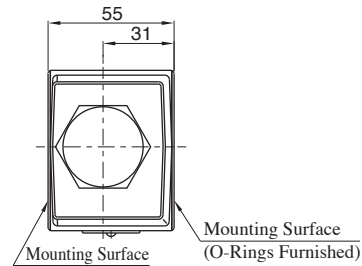


| Model Numbers | Graphic Symbols | |
|---------------|-----------------|--|
| MPA-03 | | |
| MPB-03 | | |
| MPW-03 | | |

MPW-03

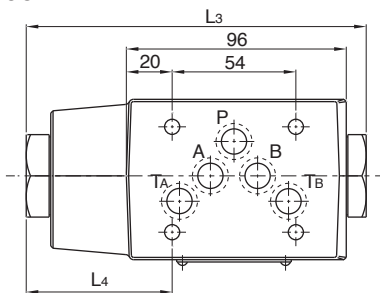


| Model Numbers | L1 | L2 |
|---------------|-------|------|
| MPW-03- * | 177.4 | 61.7 |
| MPW-03- *-L | 181.4 | 63.7 |



Approx. Mass.....3.7 kg

MPA-03

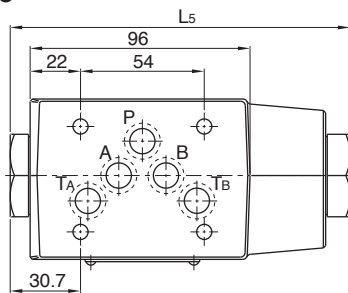


| Model Numbers | L3 | L4 |
|---------------|-------|------|
| MPA-03- * | 146.4 | 61.7 |
| MPA-03- *-L | 148.4 | 63.7 |

Approx. Mass.....3.0 kg

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

MPB-03



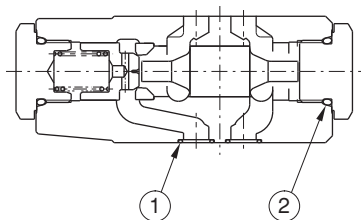
| Model Numbers | L5 |
|---------------|-------|
| MPB-03- * | 146.4 |
| MPB-03- *-L | 148.4 |

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



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

MPA-03

- 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

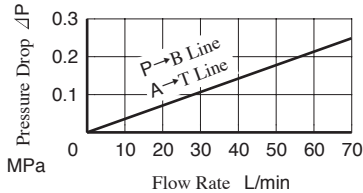
| Model Numbers | Max. Operating Pressure MPa | Max. Flow L/min |
|---------------|-----------------------------|-----------------|
| MDC-03-* -10 | 25 | 70 |

Model Number Designation

| MDC | -03 | -A | -10 |
|----------------|------------|--------------------------------------|---------------|
| Series Number | Valve Size | Type of Plate | Design Number |
| MDC: End Plate | 03 | A: Blocking Plate B: Bypass Plate | 10 |

Pressure Drop

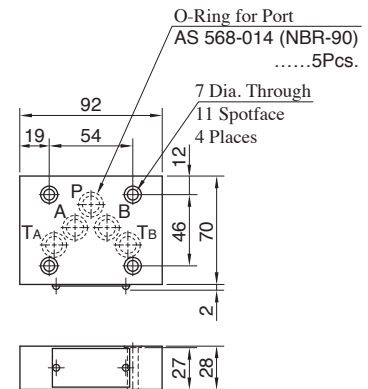
Hydraulic Fluid: Viscosity 35 mm²/s, Specific Gravity 0.850



| Model Numbers | Graphic Symbols | |
|---------------|-----------------|--|
| MDC-03 -A | | |
| MDC-03 -B | | |



MDC-03



Approx. Mass.....1.2 kg

Connecting Plates

These plates are used for detecting pressure of each line.

Model Number Designation

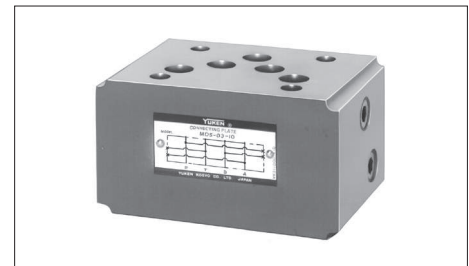
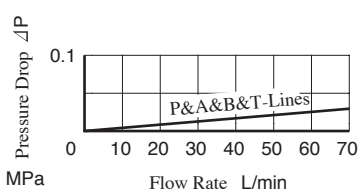
| MDS | -03 | -10 |
|-----------------------|------------|---------------|
| Series Number | Valve Size | Design Number |
| MDS: Connecting Plate | 03 | 10 |

Specifications

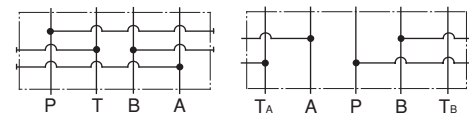
| Model Numbers | Max. Operating Pressure MPa | Max. Flow L/min |
|---------------|-----------------------------|-----------------|
| MDS-03-10 | 25 | 70 |

Pressure Drop

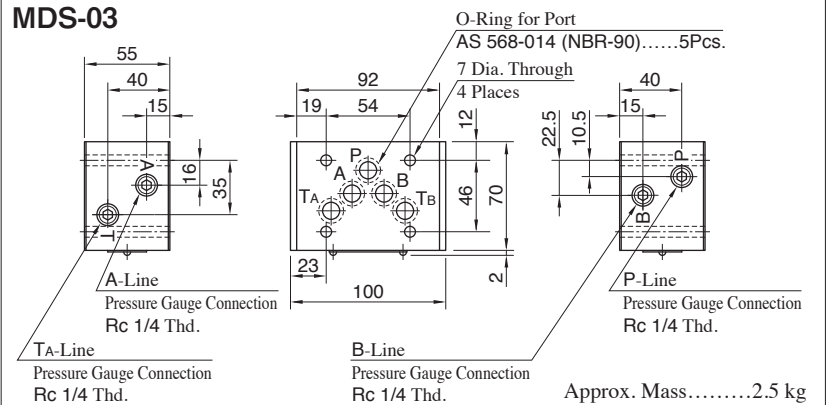
Hydraulic Fluid: Viscosity 35 mm²/s, Specific Gravity 0.850



Graphic Symbols



MDS-03

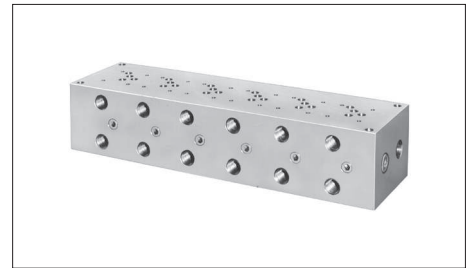


Approx. Mass.....2.5 kg

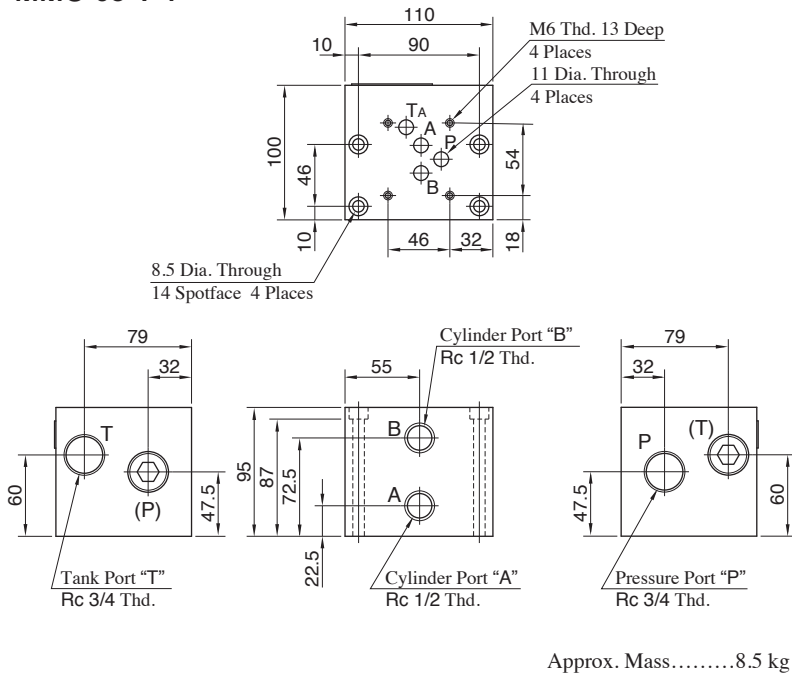
Base Plates For Modular Valves

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 |



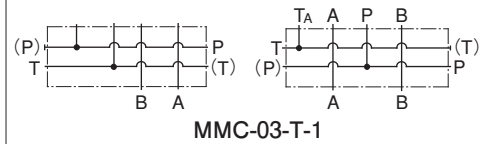
MMC-03-T-1



Specifications

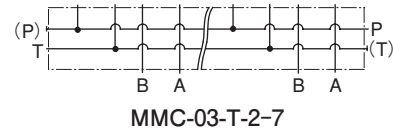
Max. Operating Pressure.....25 MPa

Graphic Symbol Detailed Graphic Symbol



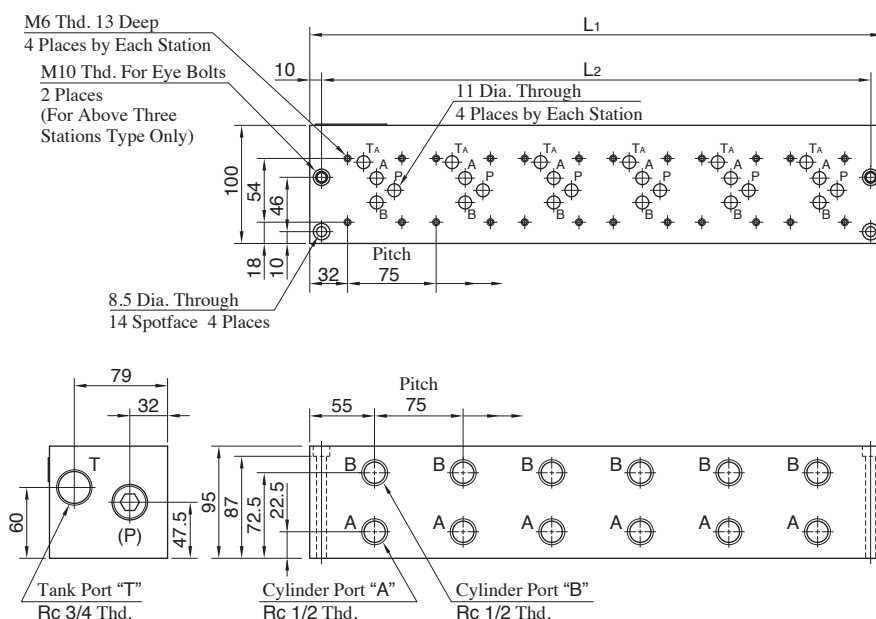
MMC-03-T-1

Graphic Symbol



MMC-03-T-2-7

MMC-03-T-2-7

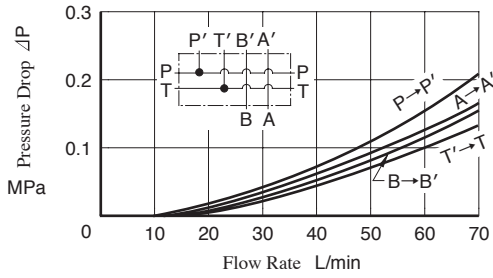


| Model Numbers | L1 | L2 | Mass kg |
|---------------|-----|-----|---------|
| MMC-03-T-2 | 185 | 165 | 14 |
| MMC-03-T-3 | 260 | 240 | 19.5 |
| MMC-03-T-4 | 335 | 315 | 25 |
| MMC-03-T-5 | 410 | 390 | 30.5 |
| MMC-03-T-6 | 485 | 465 | 36 |
| MMC-03-T-7 | 560 | 540 | 41 |

03 Series Modular Valves

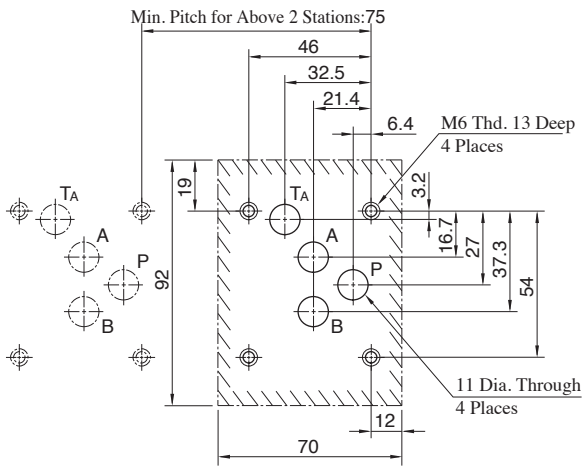
Pressure Drop

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. ($\frac{1.6}{\sqrt{R}}$)



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.

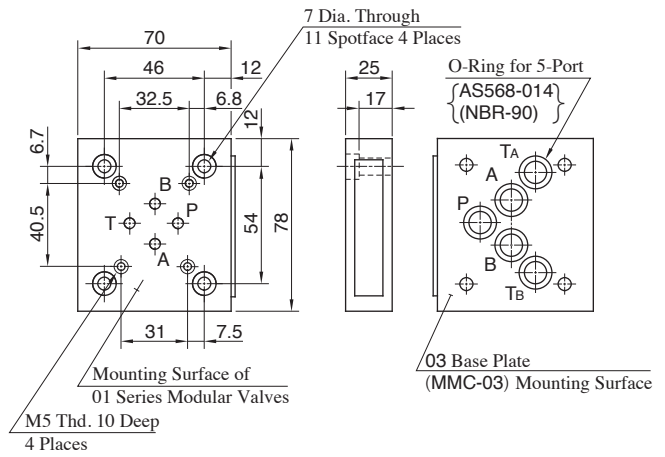
Model Numbers: DSGM-03-4010

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 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 | | |

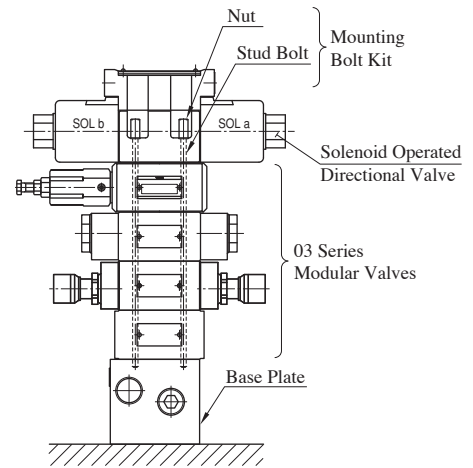


Bolt Kit Composition

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

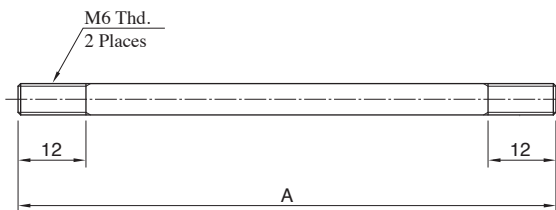


Stacking Example

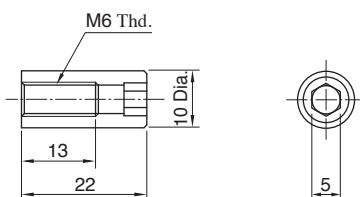
F
03 Series Modular Valves

MBK-03

Stud Bolt



Nut



| Bolt Number | A mm |
|-------------|----------------------------------|
| 01 | 103 |
| 02 | 158 |
| 03 | 213 |
| 04 | 268 |
| 05 | Socket Head Cap Screw M6CB5 L |

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- * -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 MP * -03- * -2001 | 2: 0.2 2: 0.4 | MP * -03- * -70 MP * -03- * -L-70 | 0: 0.035 2: 0.2 4: 0.4 |

● 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

Fully Extended L1

Fully Extended L2

MBP/MBA-03

Fully Extended L1

Fully Extended L2

MBB-03

Fully Extended L1

Fully Extended L2

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

(2) Reducing Modular Valves

MRP/MRB-03

Fully Extended L2

MRA-03

Fully Extended L2

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

(3) Throttle and Check Modular Valves

MSW-03

Fully Extended L1

Fully Extended L2

MSA-03

Fully Extended L1

Fully Extended L2

MSB-03

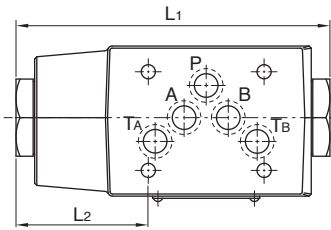
Fully Extended L1

Fully Extended L2

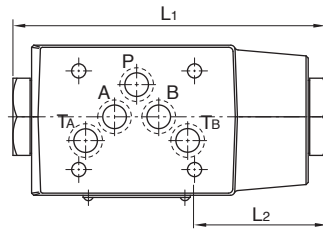
| Model Numbers | | L1 | L2 |
|---------------|--------------|-------|------|
| Current | MSA-03- *-40 | 193.5 | 91.5 |
| | MSB-03- *-40 | 193.5 | |
| | MSW-03- *-40 | 237 | |
| New | MSA-03- *-70 | 180 | 106 |
| | MSB-03- *-70 | 180 | |
| | MSW-03- *-70 | 266 | |

(4) Check Modular Valves

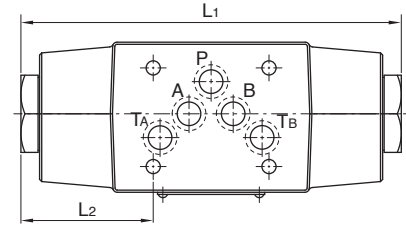
MCA-03



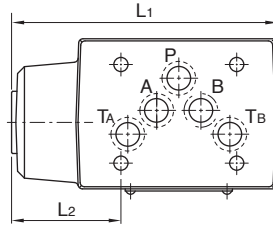
MCB-03



MCW-03



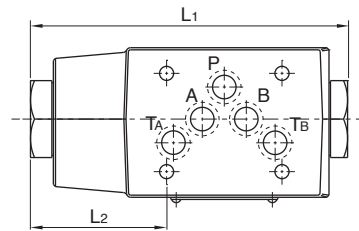
MCT-03



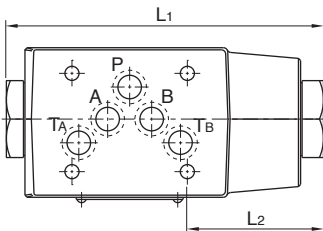
| Model Numbers | | L1 | L2 |
|---------------|------------------|-------|------|
| Current | MCA/MCB-03- *-20 | 174 | 60 |
| | MCW-03- *-20 | 174 | 60 |
| | MCT-03- *-10 | 117 | 44 |
| New | MCA/MCB-03- *-70 | 146.4 | 61.7 |
| | MCW-03- *-70 | 177.4 | 61.7 |
| | MCT-03- *-70 | 124 | 51 |

(5) Pilot Operated Check Modular Valves

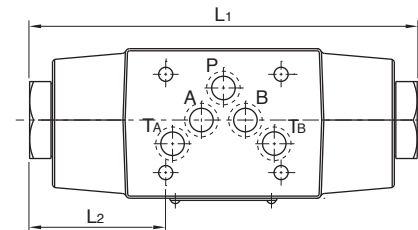
MPA-03- *
MPA-03- *-L



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 | Class | Name and Model Numbers | Graphic Symbols | | | | | | Page | |
|---|---|-----------------|------|----------------------------|--|---------------------------|---|------|---|---|---|------|------|
| | | | | | | P | T | Y | X | B | A | | |
| Solenoid Operated Directional Valve | (S-) DSHG-04-***-*-52 | | ★ | 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 | | | | | |
| Pressure Control Valves | Reducing Valves (for "P-Line") MRP-04-**-10 | | F-79 | | Mounting Bolts | Bolt Kits MBK-04-**-10 | | | | | | | F-86 |
| | Reducing Valves (for "A-Line") MRA-04-**-10 | | F-79 | | | | | | | | | | |
| | Reducing Valves (for "B-Line") MRB-04-**-10 | | F-79 | | | | | | | | | | |
| | 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 | | | | | | | | | |
| Flow Control Valves | 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 | | | | | | | | | |

★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 | 04 | A: 0.7-7 B: 1.5-7 C: 3.5-14 H: 7-25 | 10 |
| Reducing Modular Valves | | | |

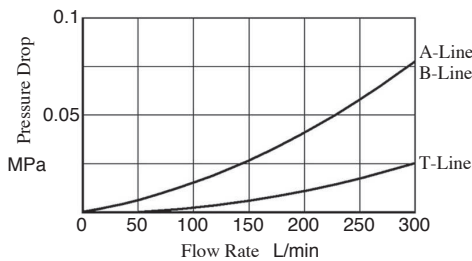
Instructions

- 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.

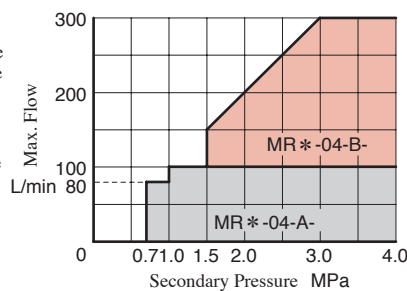
Typical Performance Characteristics

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

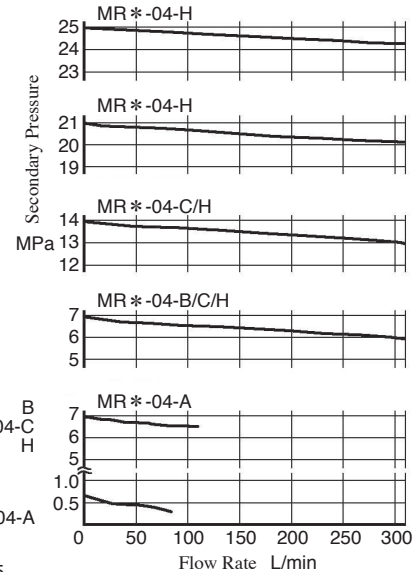
Pressure Drop



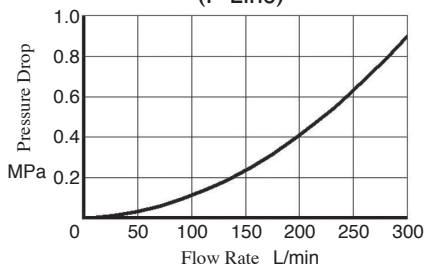
Secondary Pressure vs. Max. Flow



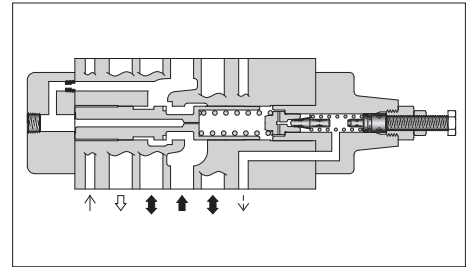
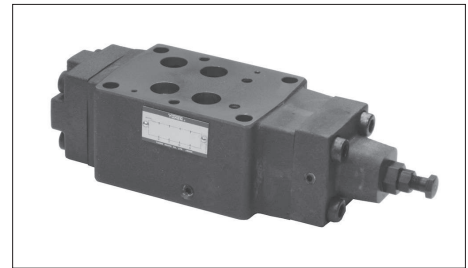
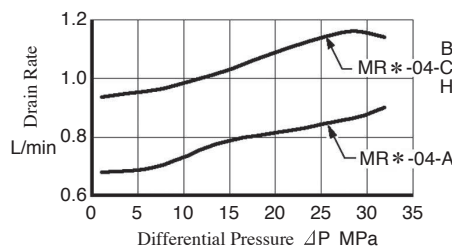
Nominal Override Characteristics
Primary Pressure 35 MPa



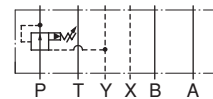
Pres. Drop at Spool Fully Open (P-Line)



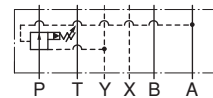
Drain Characteristics



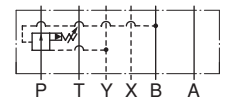
Graphic Symbols



MRP-04



MRA-04

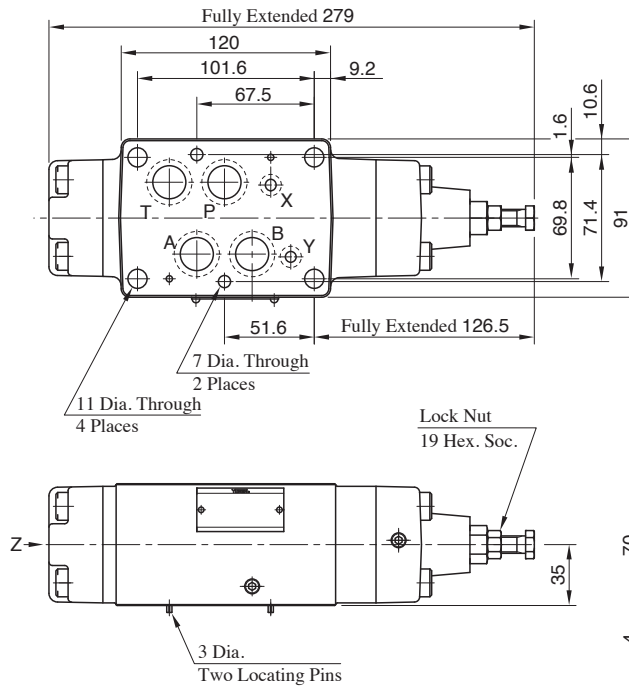
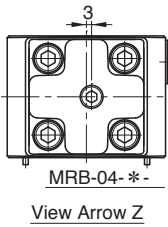
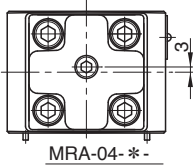
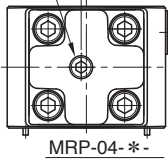


MRB-04

04 Series Modular Valves

**MRP-04
MRA-04
MRB-04**

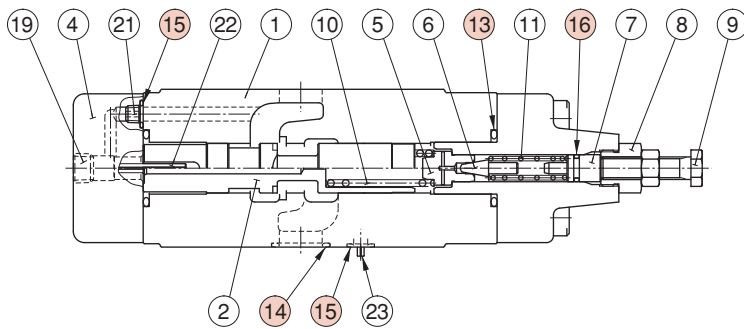
Secondary Pressure Gauge Connection
Rc1/4 Thd.



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 |

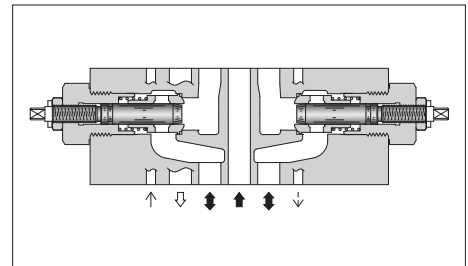
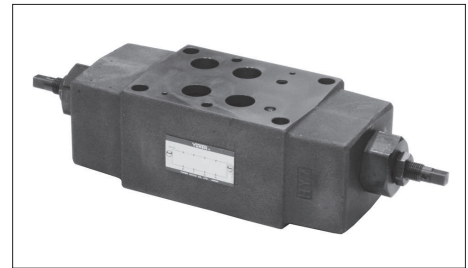
Throttle and Check Modular Valves

Specifications

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

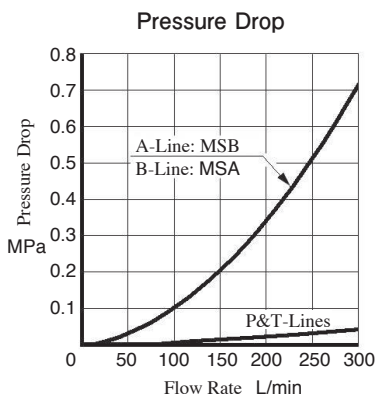
Model Number Designation

| 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 | 04 | X: Meter-out Y: Meter-in | 10 |

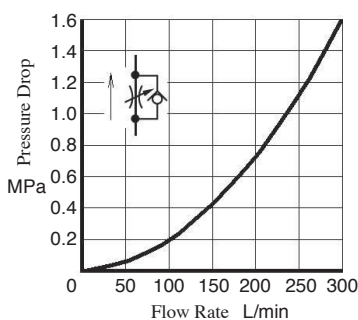


Typical Performance Characteristics

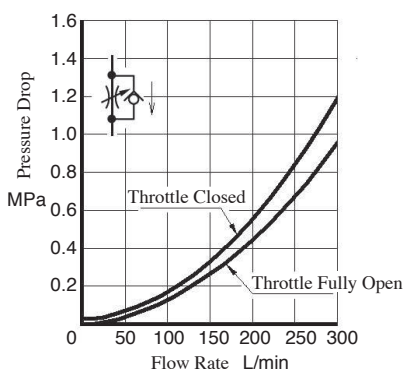
Hydraulic Fluid: Viscosity 35 mm²/s, Specific Gravity 0.850



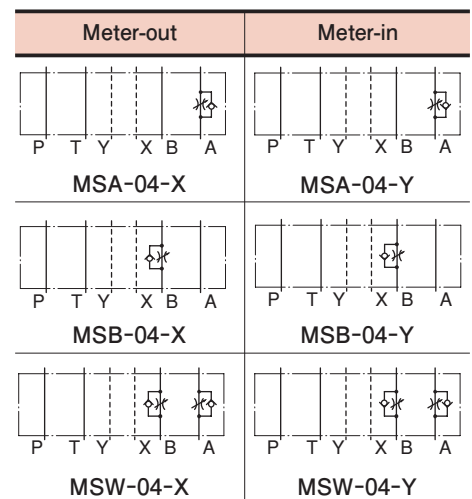
Pressure Drop at Throttle Fully Open



Pressure Drop for Free Flow



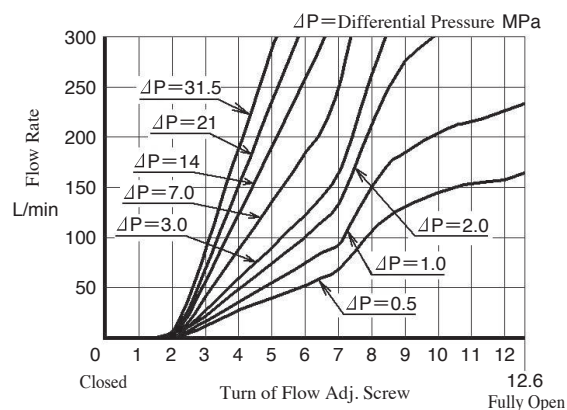
Graphic Symbols



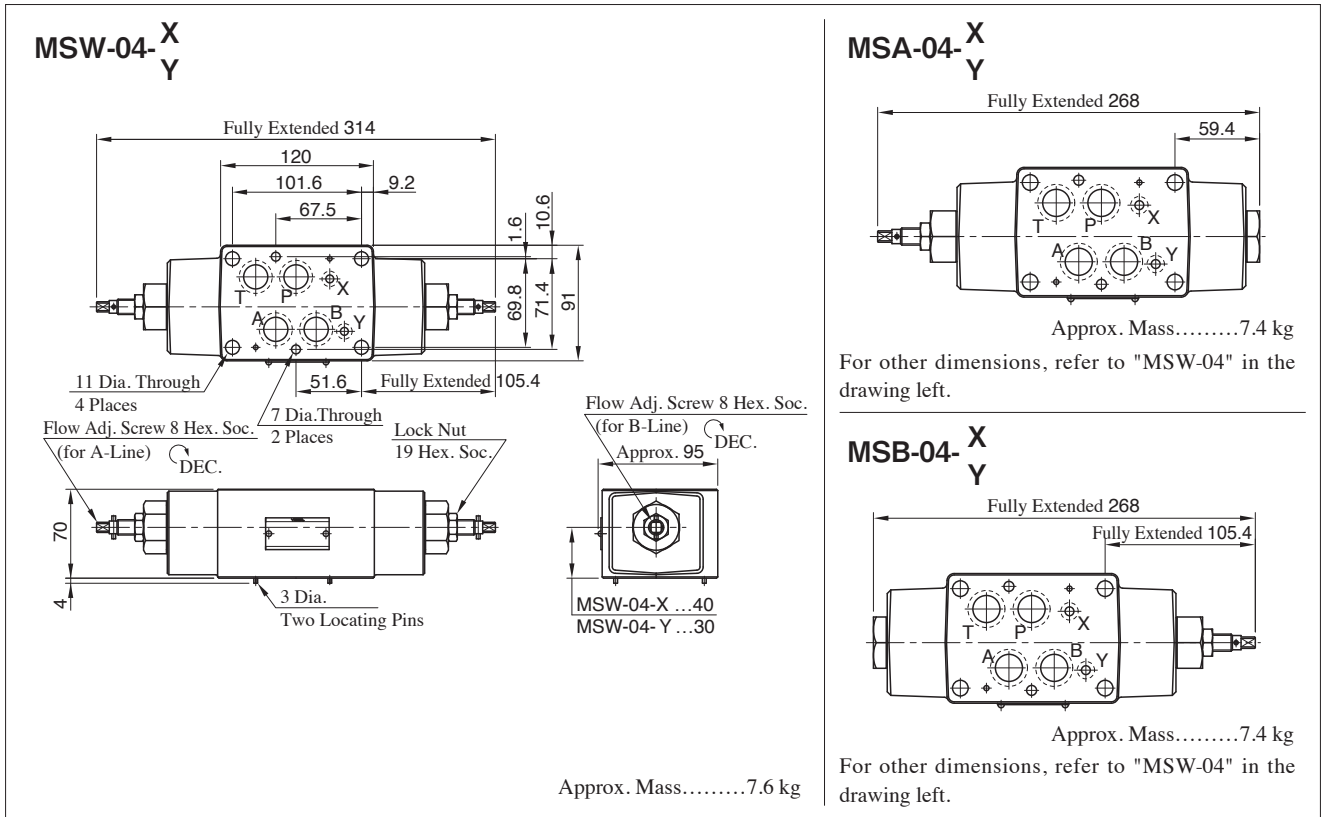
Instructions

- 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.

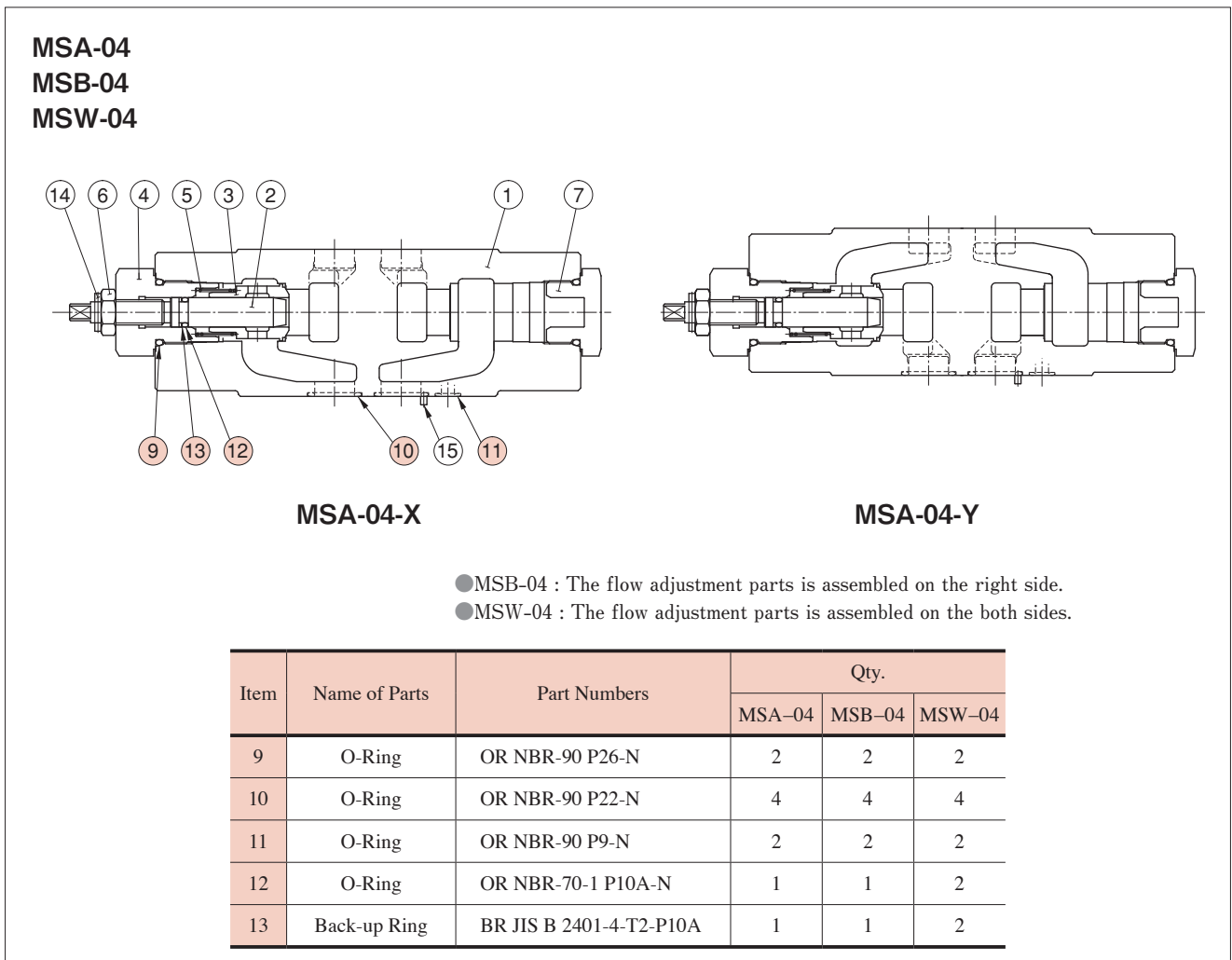
Metered Flow vs. Screw Position



04 Series Modular Valves



List of Seals



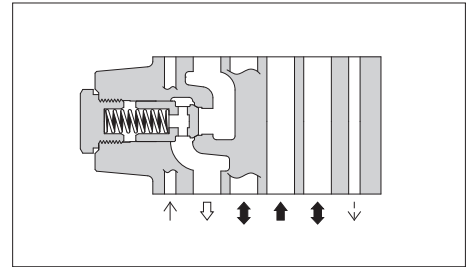
Check Modular Valves

Specifications

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

Model Number Designation

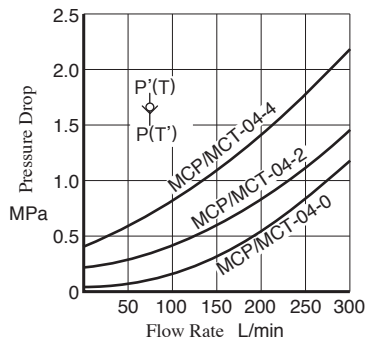
| MCP | -04 | -0 | -10 |
|-----------------------------|------------|-----------------------|---------------|
| Series Number | Valve Size | Cracking Pressure MPa | Design Number |
| MCP: Check Valve for P-Line | 04 | 0: 0.035 | 10 |
| MCT: Check Valve for T-Line | | 2: 0.2 4: 0.4 | 10 |



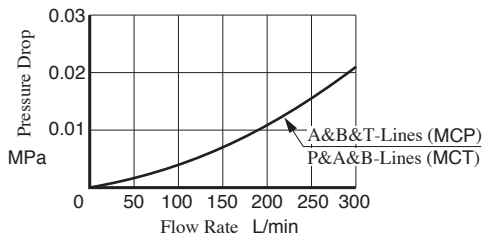
Typical Performance Characteristics

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

Pressure Drop for Free Flow



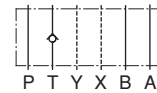
Pressure Drop



Graphic Symbols



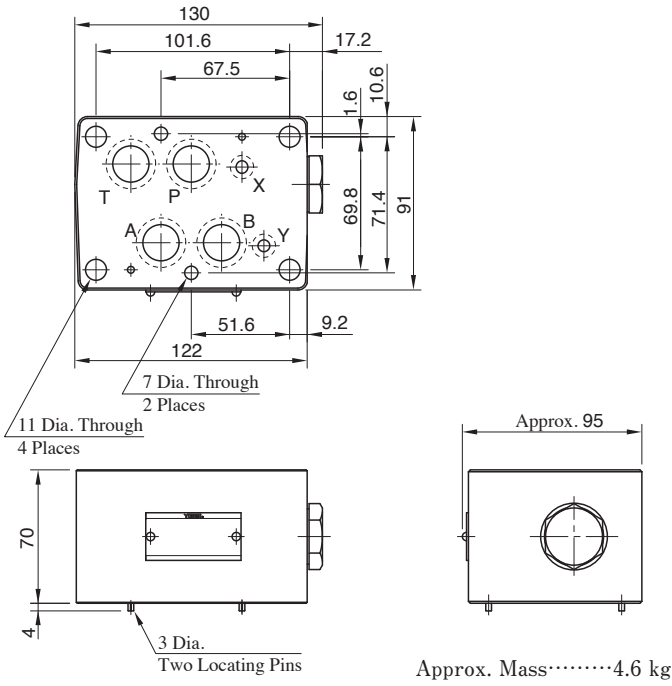
MCP-04



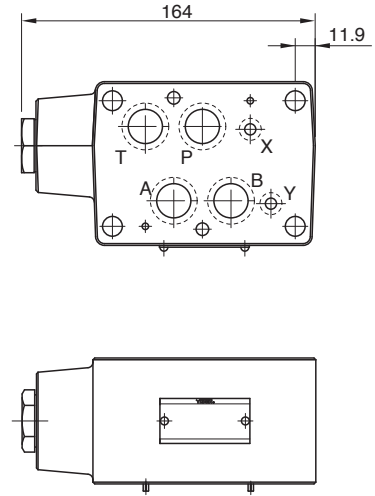
MCT-04

04 Series Modular Valves

MCP-04



MCT-04

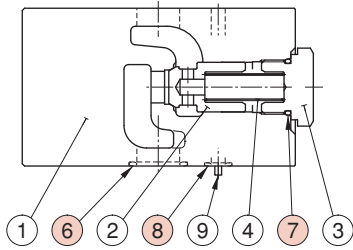


Approx. Mass.....5.4 kg

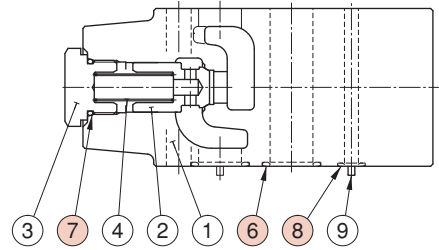
For other dimensions, refer to "MCP-04" in the drawing left.

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

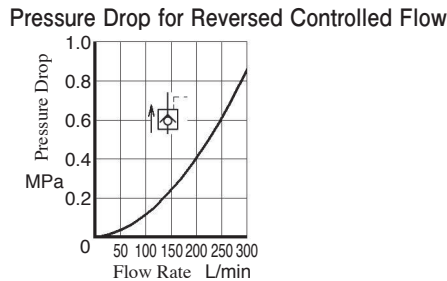
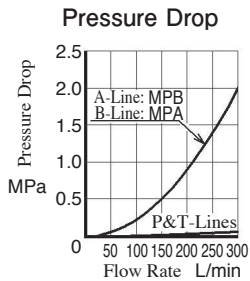
| Model Numbers | Max. Operating Pressure MPa | Max. Flow L/min |
|---------------|-----------------------------|-----------------|
| MP*-04-* -10 | 35 | 300 |

Model Number Designation

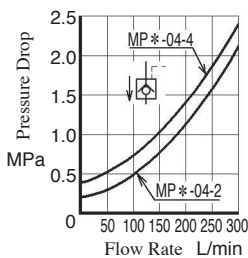
| MPA | -04 | -2 | -10 |
|--|------------|-----------------------|---------------|
| Series Number | Valve Size | Cracking Pressure MPa | Design Number |
| MPA: For A-Line MPB: For B-Line MPW: For A&B-Lines | 04 | 2: 0.2 4: 0.4 | 10 |

Typical Performance Characteristics

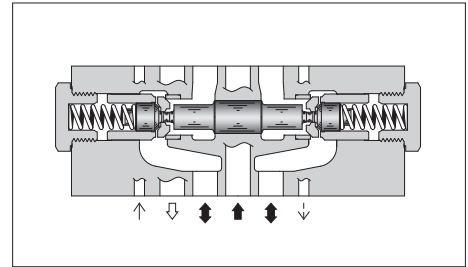
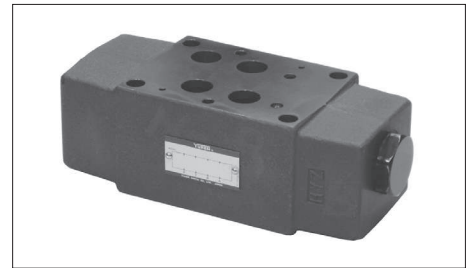
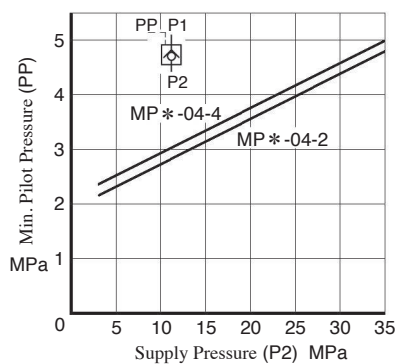
Hydraulic Fluid: Viscosity 35 mm²/s, Specific Gravity 0.850



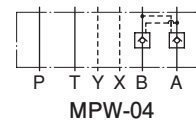
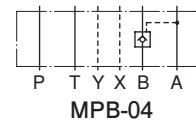
Pressure Drop for Free Flow



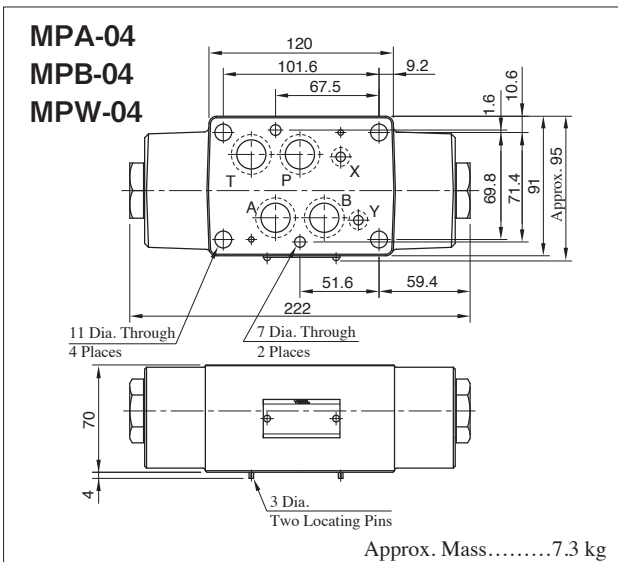
Min. Pilot Pressure



Graphic Symbols

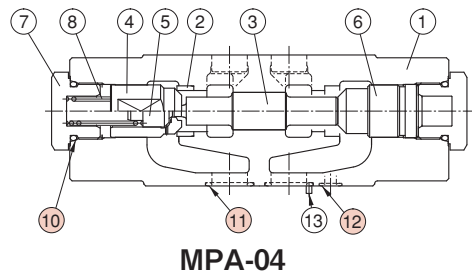


04 Series Modular Valves



List of Seals

MPA-04
MPB-04
MPW-04



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

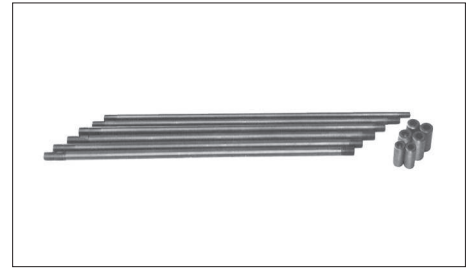
| Item | Name of Parts | Part Numbers | Qty. |
|------|---------------|-----------------|------|
| 10 | O-Ring | OR NBR-90 P26-N | 2 |
| 11 | O-Ring | OR NBR-90 P22-N | 4 |
| 12 | O-Ring | OR NBR-90 P9-N | 2 |

Mounting Bolt Kits For Modular Valves

Valves are mounted with six stud bolts (M6□, M10□). 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 Kit Composition

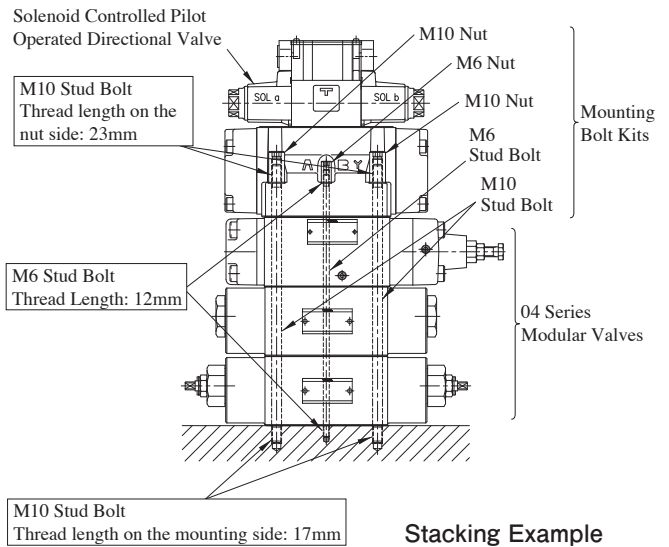
- M6 Stud Bolt 2 Pcs.
 - M6 Nut 2 Pcs.
 - M10 Stud Bolt 4 Pcs.
 - M10 Nut 4 Pcs.
- } 1 Set

Tightening Torque

- M6 12-15 Nm
- M10 45-55 Nm

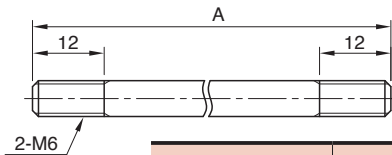
Bolt Kits Selection Chart

| 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 |



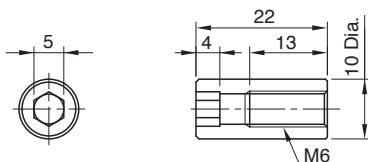
MBK-04

Stud Bolt M6

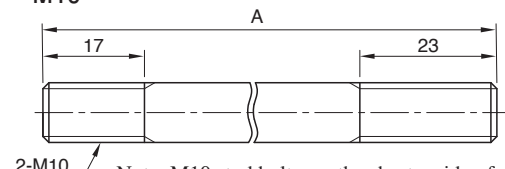


| Model Numbers | A | |
|---------------|-----|-----|
| | M6 | M10 |
| MBK-04-01-10 | 125 | 140 |
| MBK-04-02-10 | 195 | 210 |
| MBK-04-03-10 | 265 | 280 |
| MBK-04-04-10 | 335 | 350 |

Nut M6

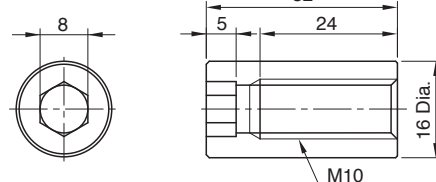


M10



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.

M10

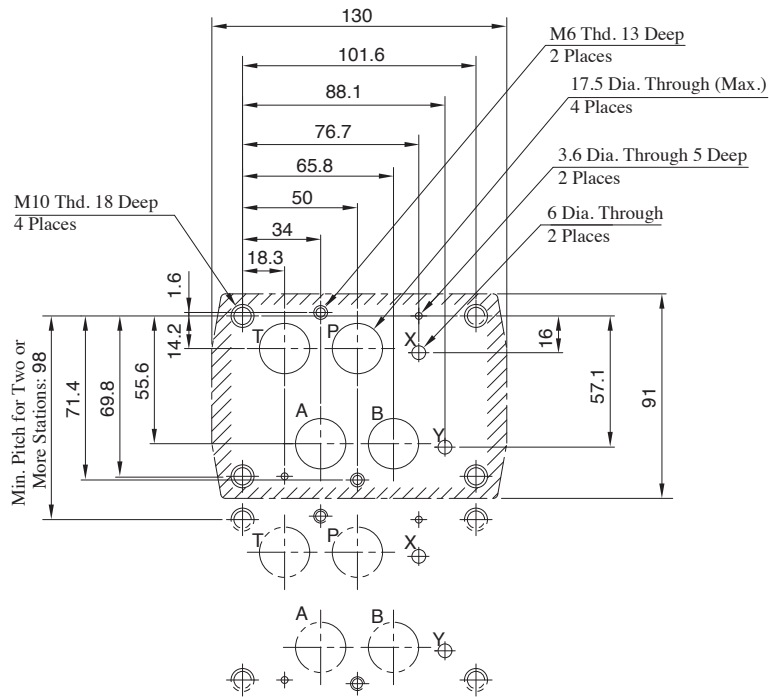


— Mounting Surface Dimensions for 04 Series Modular Valve —

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. ($\sqrt{16}$)

06 Series Modular Valves

Type of Modular Valve

| Class | Name and Model Numbers | Graphic Symbols | Page | Class | Name and Model Numbers | Graphic Symbols | | | | | | Page |
|-------------------------|---|---------------------------|------|----------------------------|---|-----------------|---|---|---|------|------|------|
| | | | | | | P | T | Y | X | B | A | |
| Pressure Control Valves | ★1 Solenoid Controlled Pilot Operated Directional Valve (S-) DSHG-06-***-53 | | ★2 | 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 | |
| | Reducing Valves (for "P-Line") MRP-06-**-70 | | F-89 | | | | | | | | F-93 | |
| | Reducing Valves (for "A-Line") MRA-06-**-70 | | F-89 | | | | | | | | F-93 | |
| | Reducing Valves (for "B-Line") MRB-06-**-70 | | F-89 | | | | | | | | F-93 | |
| Flow Control Valves | Throttle and Check Valves (for "A-Line", Meter-out) MSA-06-X-70 | | F-91 | | | | | | | | F-93 | |
| | Throttle and Check Valves (for "A-Line", Meter-in) MSA-06-Y-70 | | F-91 | | | | | | | | F-93 | |
| | Throttle and Check Valves (for "B-Line", Meter-out) MSB-06-X-70 | | F-91 | | | | | | | | F-93 | |
| | Throttle and Check Valves (for "B-Line", Meter-in) MSB-06-Y-70 | | F-91 | | | | | | | F-93 | | |
| | Throttle and Check Valves (for "A&B-Lines", Meter-out) MSW-06-X-70 | | F-91 | | | | | | | F-93 | | |
| | Throttle and Check Valves (for "A&B-Lines", Meter-in) MSW-06-Y-70 | | F-91 | | | | | | | F-93 | | |
| | Mounting Bolts | Bolt Kits MBK-06-**-70 | | F-96 | | | | | | | 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 |
| B MR *-06-C-70 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

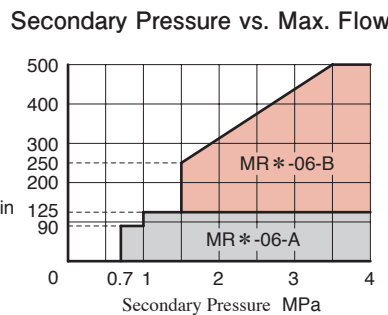
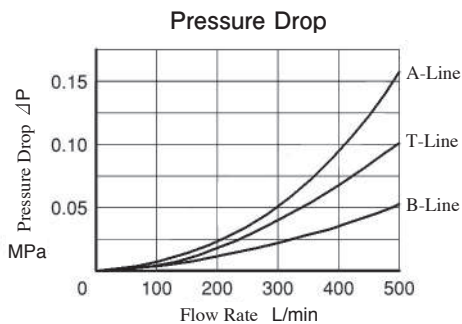
| MRP | -06 | -A | -70 |
|---|------------|--|---------------|
| Series Number | Valve Size | Pres. Adj. Range MPa | Design Number |
| MRP: For P-Line MRA: For A-Line MRB: For B-Line | 06 | A: 0.7-7 B: 1.5-7 C: 3.5-14 H: 7-25 | 70 |
| Reducing Valve | | | |

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.

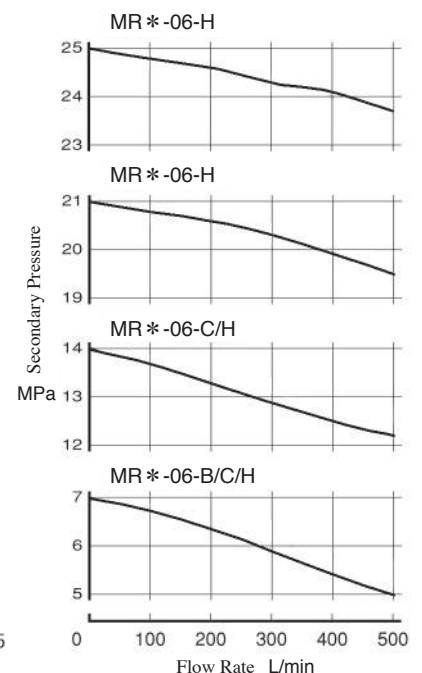
Typical Performance Characteristics

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

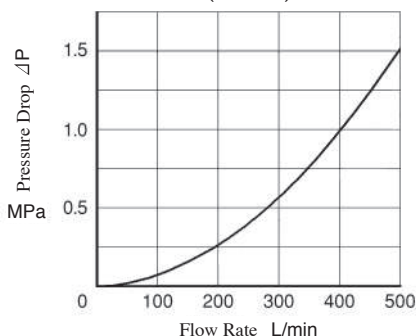


Nominal Override Characteristics

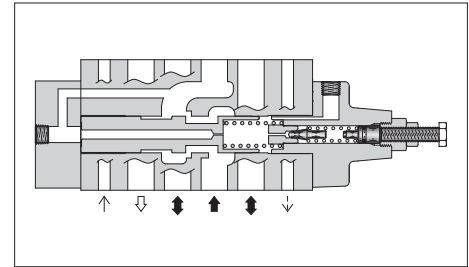
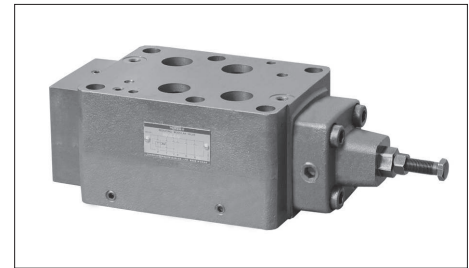
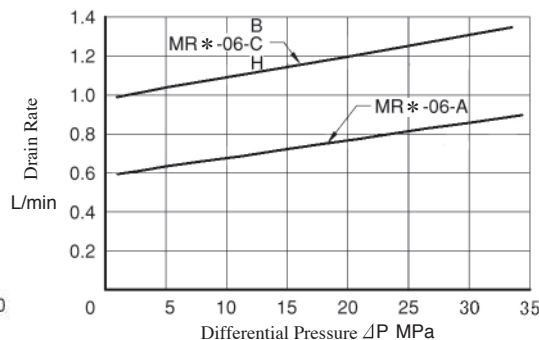
Primary Pressure 35 MPa



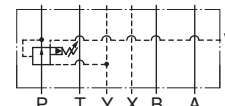
Pressure Drop at Spool Fully Open (P-Line)



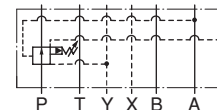
Drain Characteristics



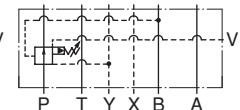
Graphic Symbols



MRP-06



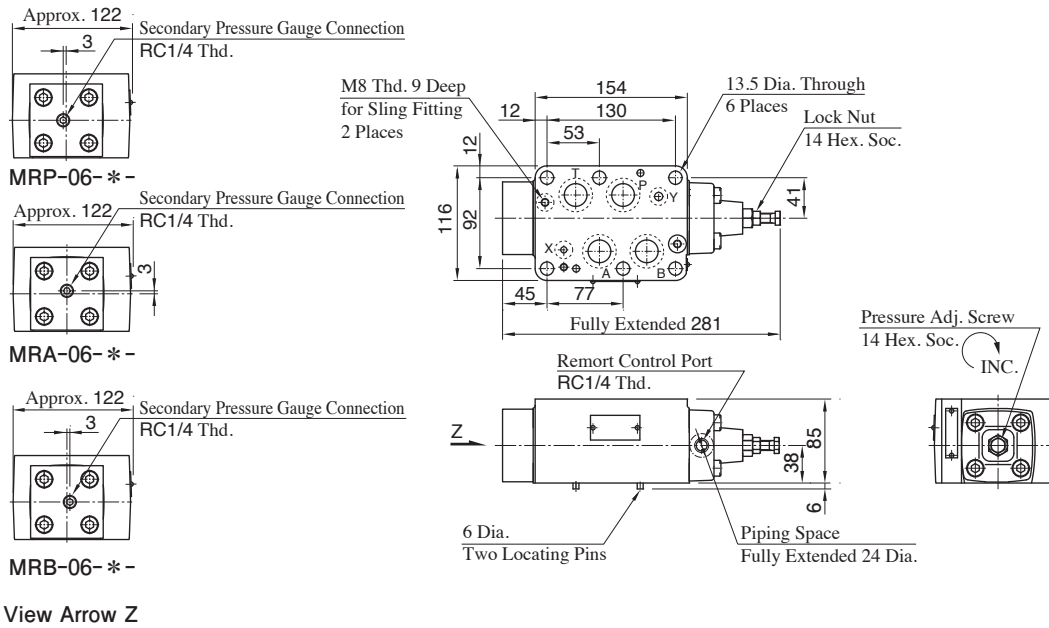
MRA-06



MRB-06

06 Series Modular Valves

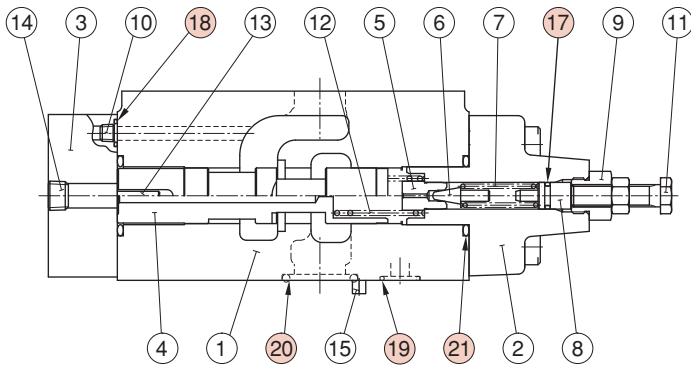
**MRP-06
MRA-06
MRB-06**



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 |

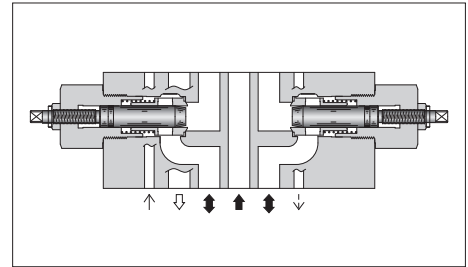
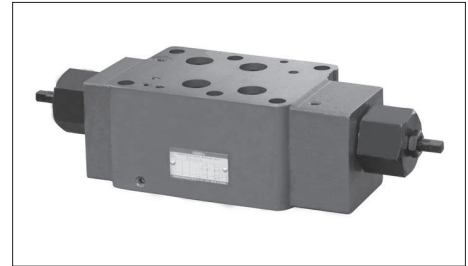
Throttle and Check Modular Valves

Specifications

| Model Numbers | Max. Operating Pressure MPa | Max. Flow L/min |
|---------------|-----------------------------|-----------------|
| MS*-06-*-70 | 35 | 500 |

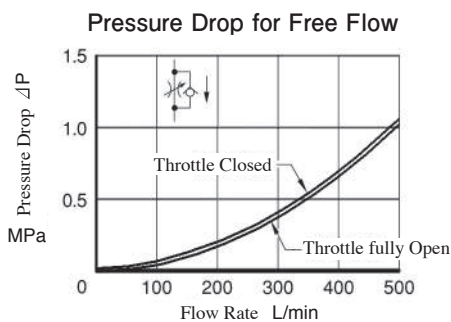
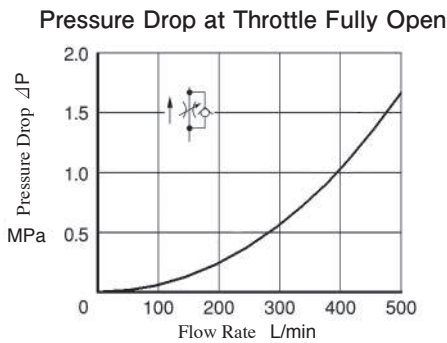
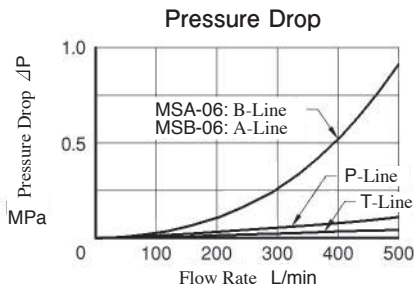
Model Number Designation

| 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 | 06 | X: Meter-out Y: Meter-in | 70 |
| Throttle and Check Valve | | | |

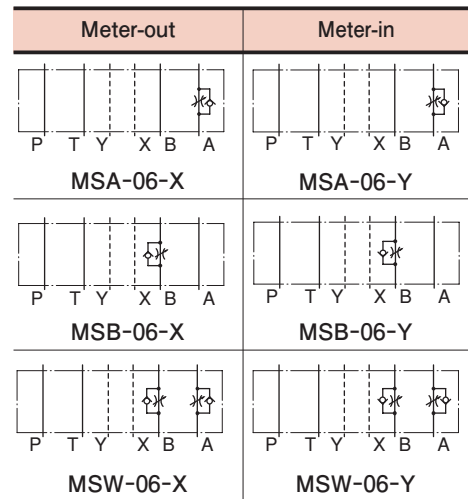


Typical Performance Characteristics

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



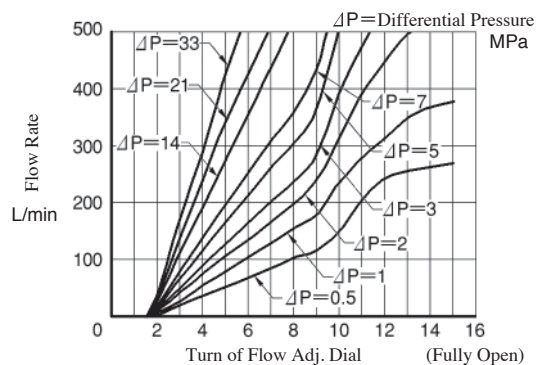
Graphic Symbols



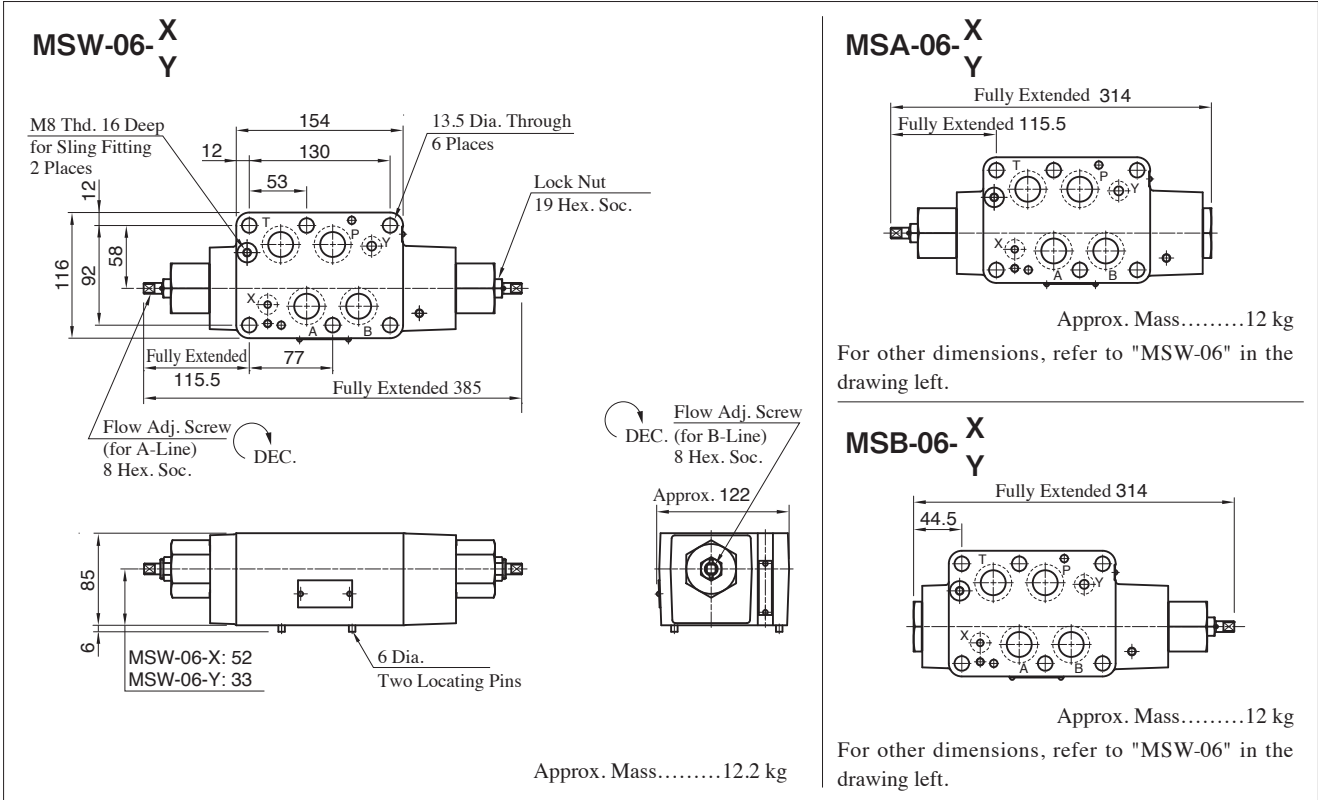
Instructions

- 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.

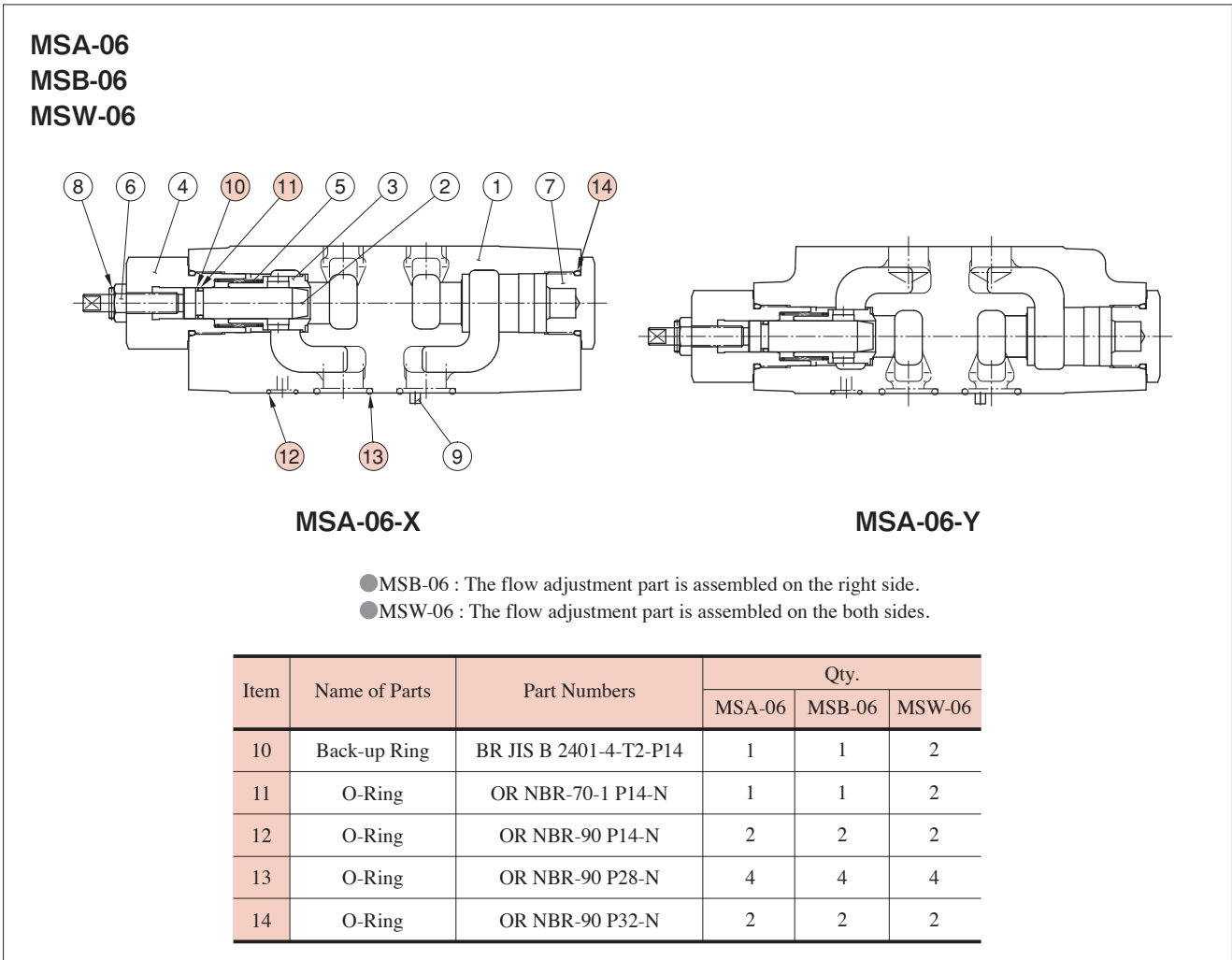
Metered Flow vs. Screw Position



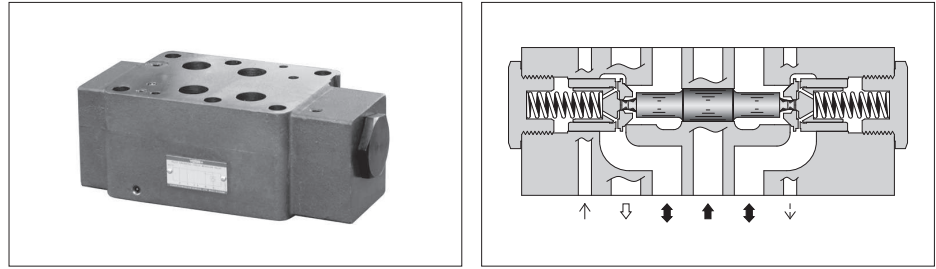
06 Series Modular Valves



List of Seals



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 | 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 |
| Pilot Operated Check Valve | | | | | |

- *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").

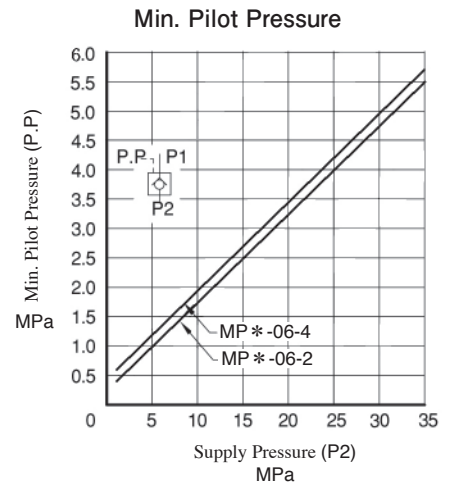
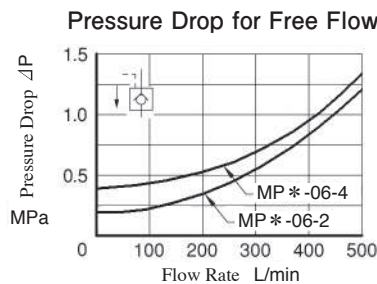
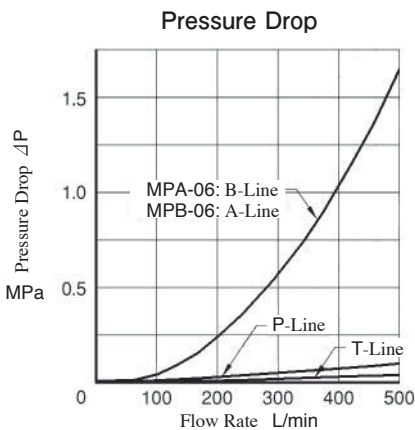
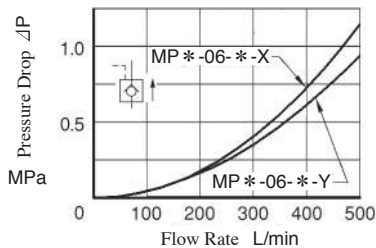
Specifications

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

Typical Performance Characteristics

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

Pressure Drop for Reversed Controlled Flow



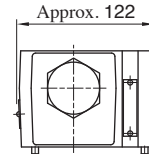
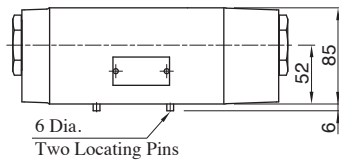
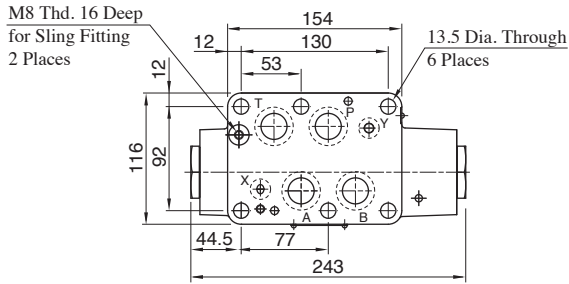
Graphic Symbols

| Model Numbers | Pilot-Drain Type | | | |
|---------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| | Internal Pilot-Internal Drain Type | External Pilot-External Drain Type | External Pilot-Internal Drain Type | External Pilot-Internal Drain Type |
| MPA-06 | | | | |
| | MPA-06-* | MPA-06*-*-X | MPA-06*-*-Y | |
| MPB-06 | | | | |
| | MPB-06-* | MPB-06*-*-X | MPB-06*-*-Y | |
| MPW-06 | | | | |
| | MPW-06-* | | | |

06 Series Modular Valves

● Internal Pilot - Internal Drain Type

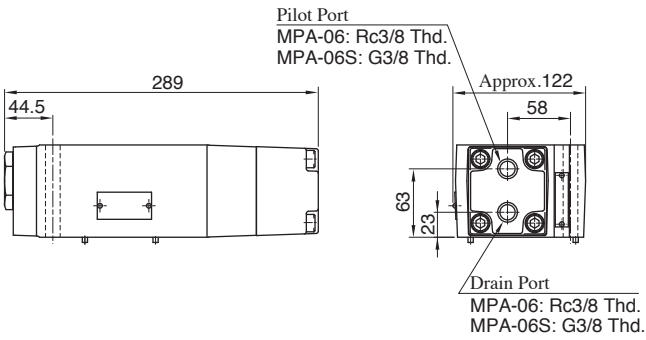
MPA-06
MPB-06
MPW-06



Approx. Mass.....11.6 kg

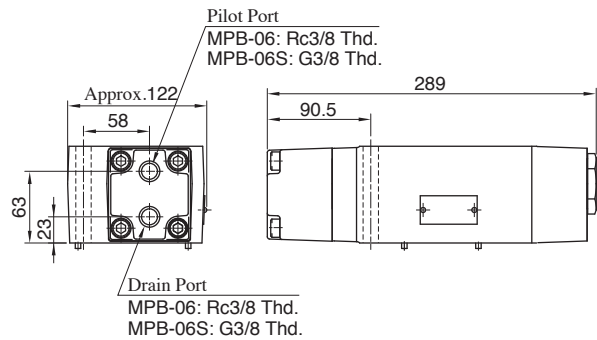
● External Pilot - External Drain Type

MPA-06 * - * -X



Approx. Mass.....13 kg

MPB-06 * - * -X

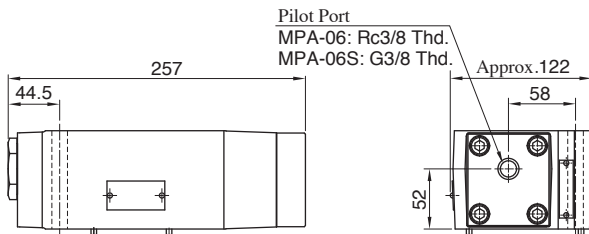


Approx. Mass.....13 kg

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

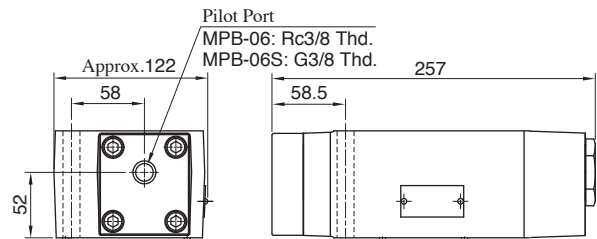
● External Pilot - Internal Drain Type

MPA-06 * - * -Y



Approx. Mass.....11.6 kg

MPB-06 * - * -Y



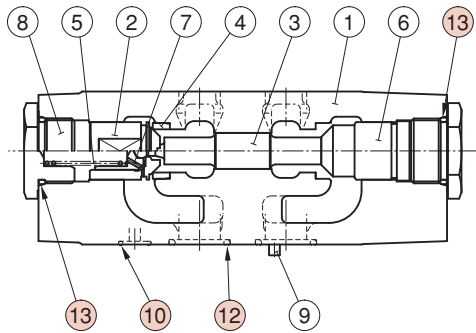
Approx. Mass.....11.6 kg

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

List of Seals

MPA-06
MPB-06
MPW-06

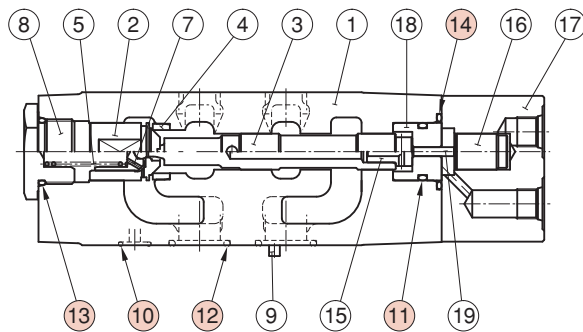
Internal Pilot - Internal Drain Type



MPA-06

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

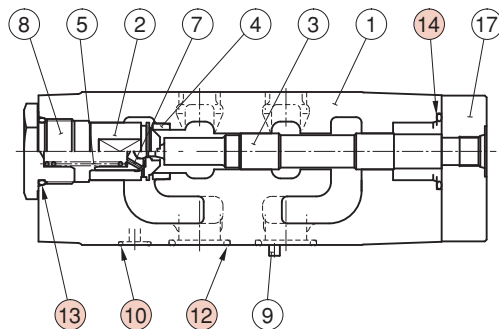
External Pilot - External Drain Type



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

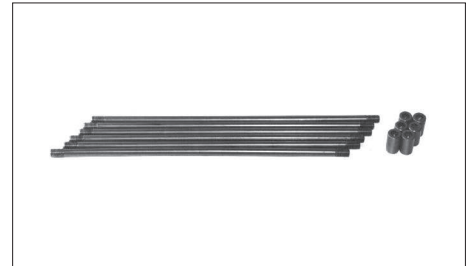
Valves are mounted with six stud bolts. Valve combination varies according to the circuit type. Hence, the mounting bolt kits are available on a combination type basis. When ordering the mounting bolt kit, be sure to give the bolt kit model number from the table below.

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 |

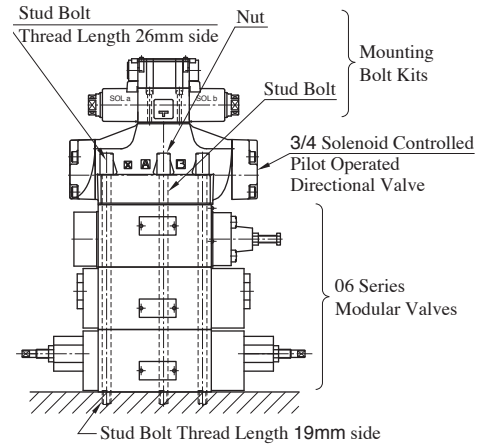
Bolt Kits Selection Chart

| 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. } 1 Set
 Nut 6 Pcs. }

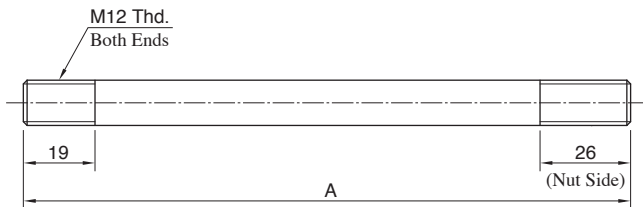
- **Tightening Torque** :..... 70-100 Nm
 [If the operating pressure is more than 25 MPa 90-100 Nm]



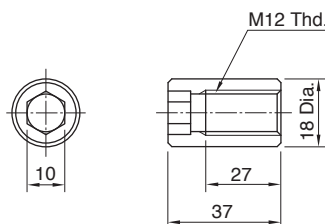
Stacking Example

MBK-06

● Stud Bolt



● Nut



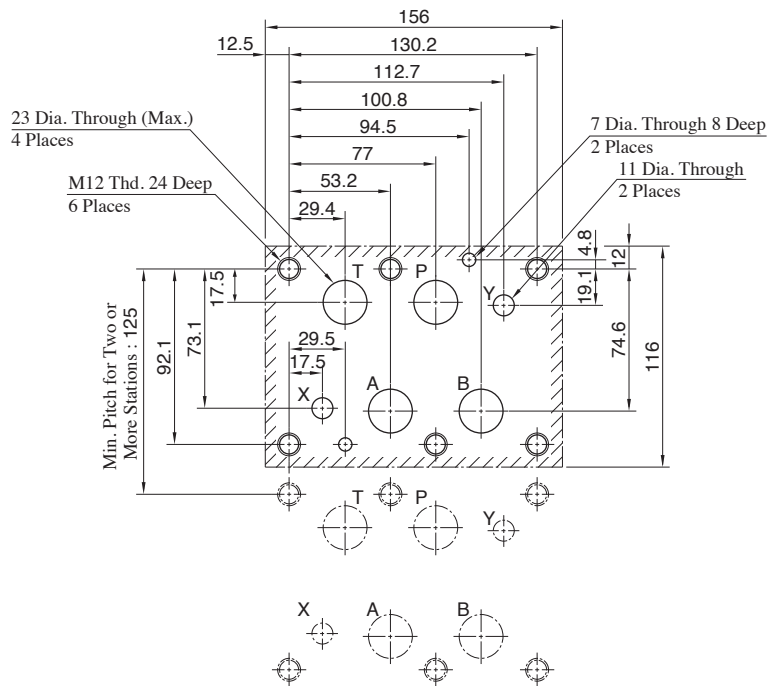
| Bolt Number | A mm |
|-------------|------|
| 01 | 168 |
| 02 | 253 |
| 03 | 338 |
| 04 | 423 |

— 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. ($\sqrt{1.6}$)

— 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 | Class | Name and Model Numbers | Graphic Symbols | | | | | | Page |
|-------------------------|---|-----------------|---|--|---|-----------------|---|---|---|-------|-------|-------|
| | | | | | | P | T | Y | X | B | A | |
| Pressure Control Valves | ★1 Solenoid Controlled Pilot Operated Directional Valve (S-) DSHG-10-***-43 | | ★2 | 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 |
| | | | 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 | | | | | 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 |
| | | | | | 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 | | |
| 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 |
| B | | 800 |
| MR*-10-C-30 H | | |

★ 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

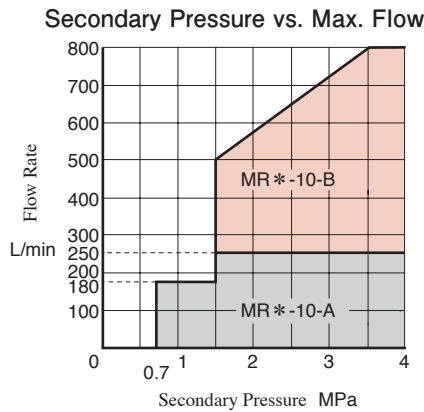
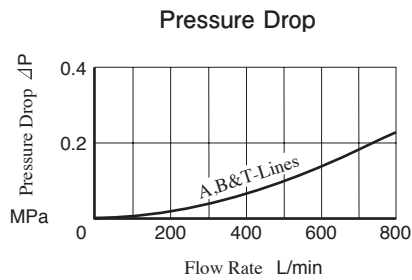
| MRP | -10 | -B | -30 |
|---|------------|--|---------------|
| Series Number | Valve Size | Pres. Adj. Range MPa | Design Number |
| MRP: For P-Line MRA: For A-Line MRB: For B-Line | 10 | A: 0.7-7 B: 1.5-7 C: 3.5-14 H: 7-21 | 30 |
| Reducing Valve | | | |

Instructions

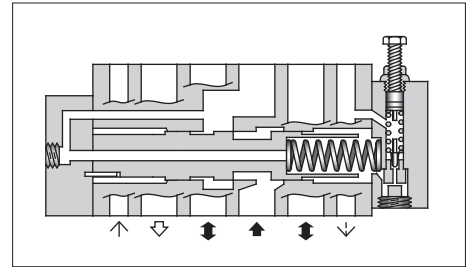
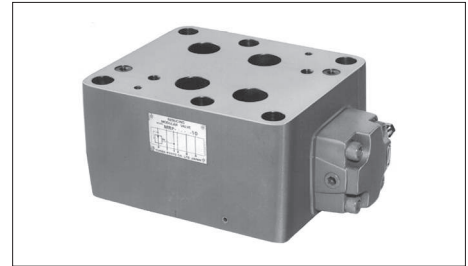
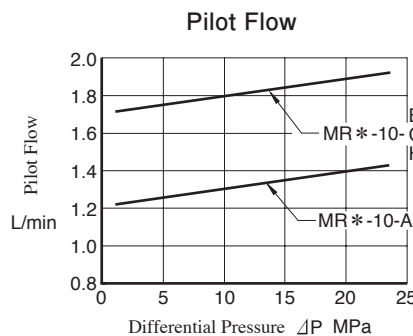
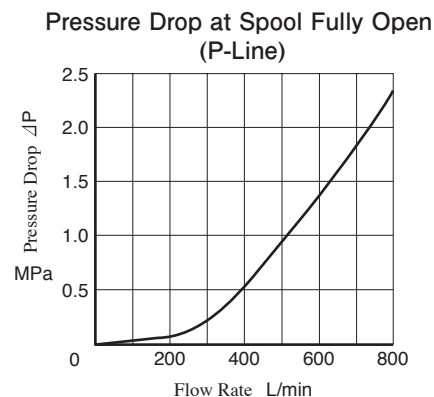
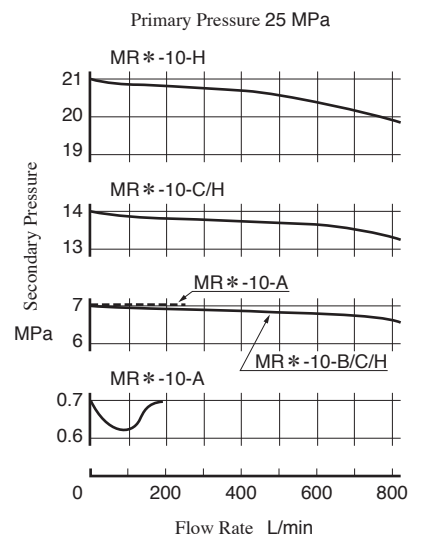
- Connect Drain Line (Y port) to oil tank independently so as to obtain stable pressure setting. At the same time, the solenoid controlled pilot operated directional valve to be used in combination with this valve must be of internal drain type (with T).
- To make pressure adjustment, loosen the lock 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

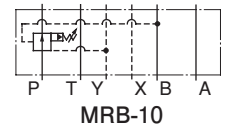
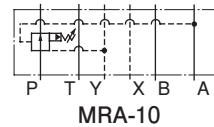
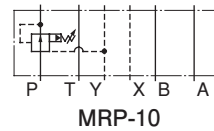
Hydraulic Fluid: Viscosity 35 mm²/s, Specific Gravity 0.850



Nominal Override Characteristics



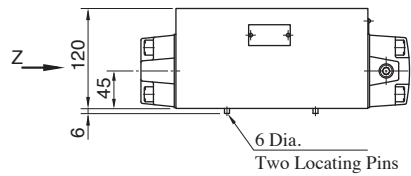
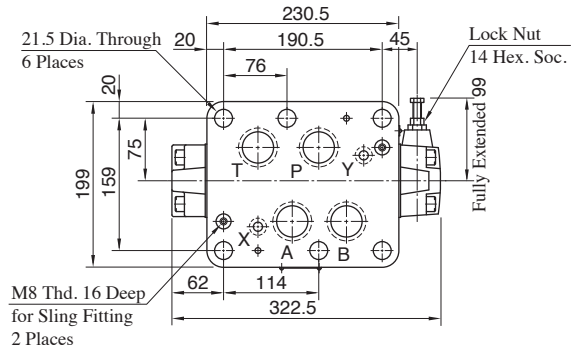
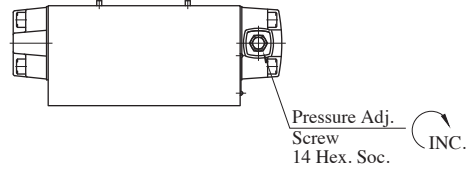
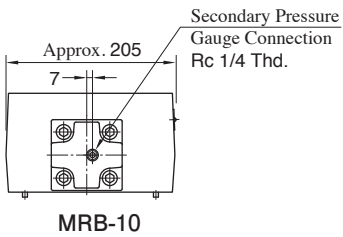
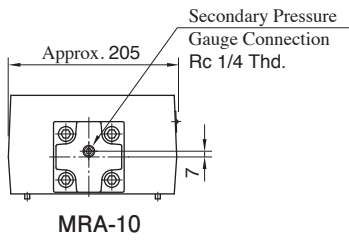
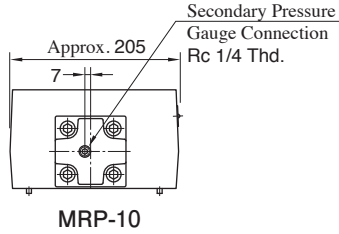
Graphic Symbols



10 Series Modular Valves

**MRP-10
MRA-10
MRB-10**

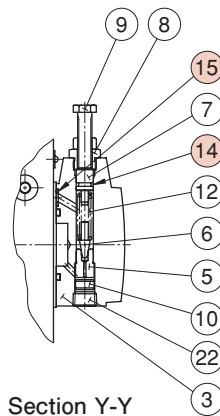
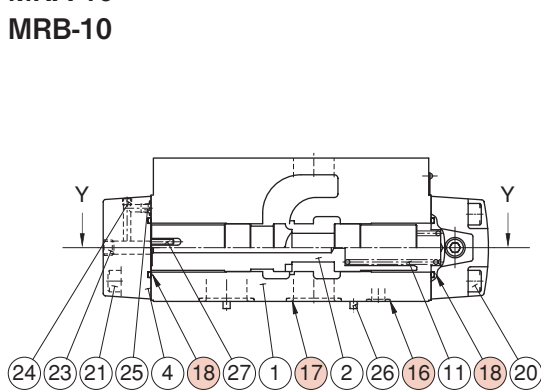
View Arrow Z



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 |

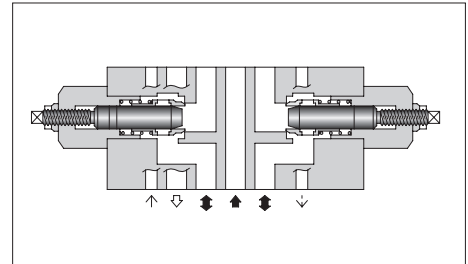
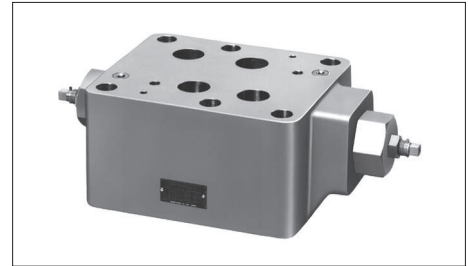
Throttle and Check Modular Valves

Specifications

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

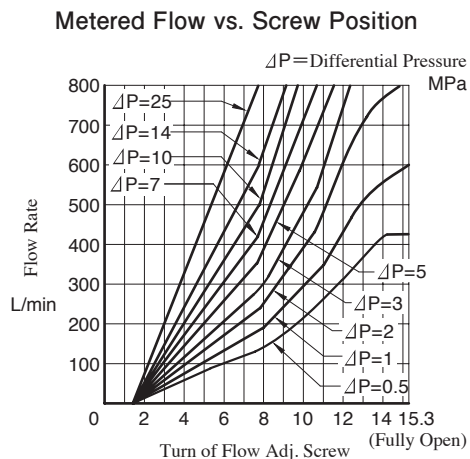
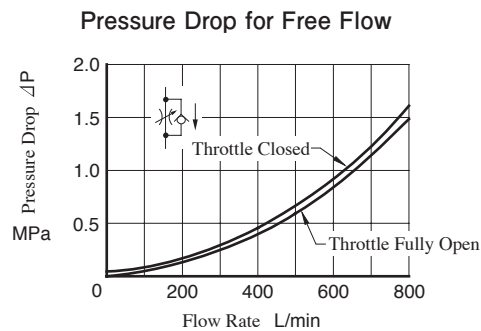
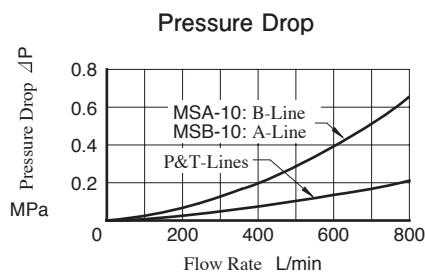
Model Number Designation

| 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 | 10 | X: Meter-out Y: Meter-in | 30 |

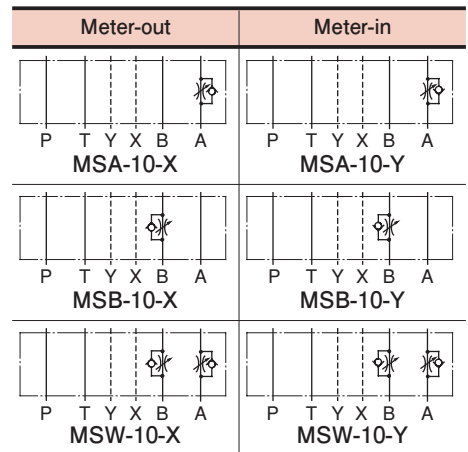


Typical Performance Characteristics

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



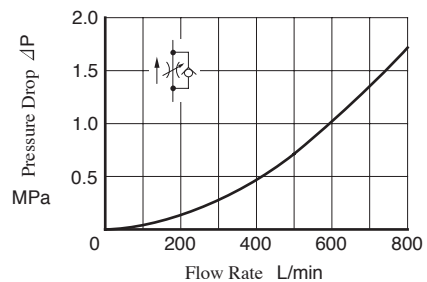
Graphic Symbols



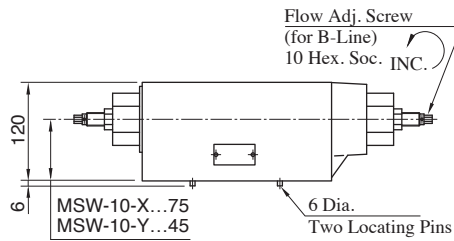
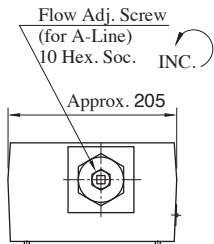
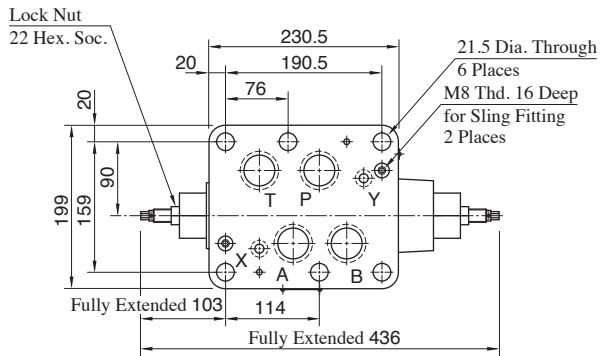
Instructions

- 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 after the adjustment of the flow rate is completed.

Pressure Drop at Throttle Fully Open

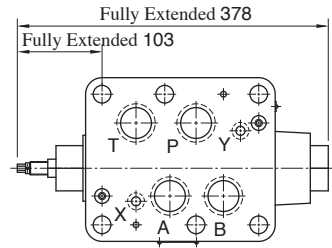


MSW-10-X_Y



Approx. Mass.....35.7 kg

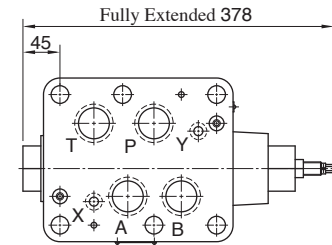
MSA-10-X_Y



Approx. Mass.....35 kg

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

MSB-10-X_Y

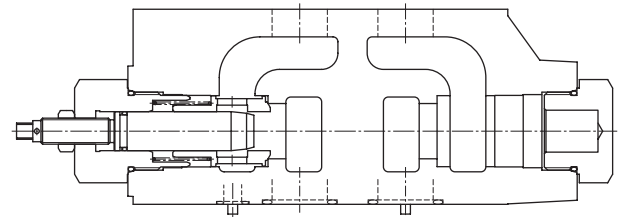
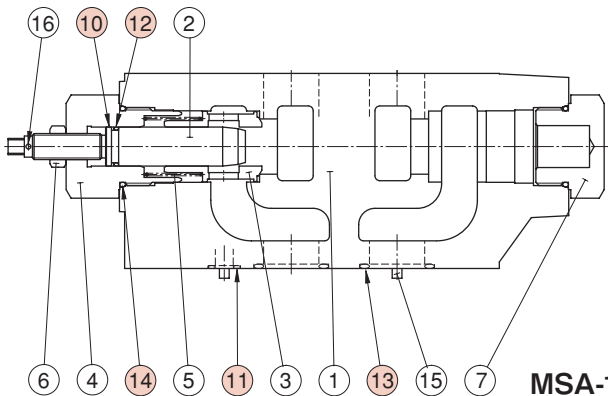


Approx. Mass.....35 kg

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

List of Seals

**MSA-10
MSB-10
MSW-10**

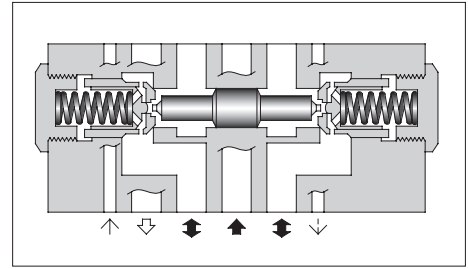
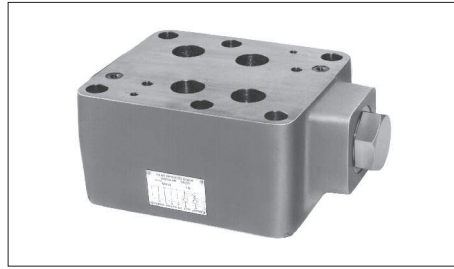


MSA-10-Y

- 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 } Pilot Operated MPB: For B-Line } 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 | |

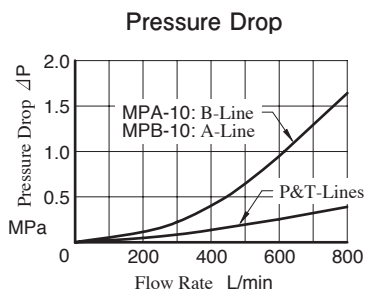
*1. This item applies only to External Pilot or External Drain Type.

Specifications

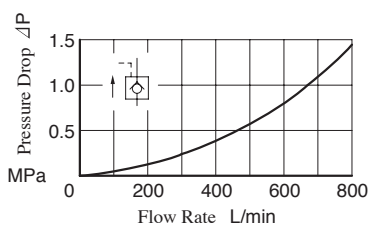
| Model Numbers | Max. Operating Pressure MPa | Max. Flow L/min |
|---------------|-----------------------------|-----------------|
| MP*-10*-*-30 | 25 | 800 |

Typical Performance Characteristics

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



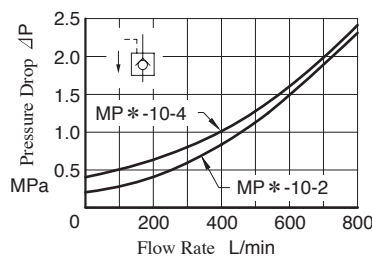
Pressure Drop for Reversed Controlled Flow



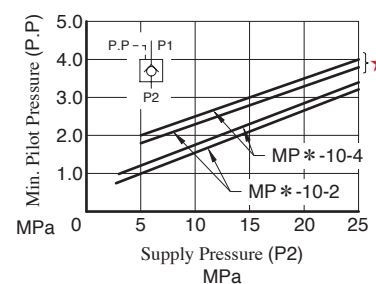
Graphic Symbols

| Model Numbers | Pilot-Drain type | | | |
|---------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| | Internal Pilot-Internal Drain Type | External Pilot-External Drain Type | External Pilot-Internal Drain Type | External Pilot-Internal Drain Type |
| MPA-10 | | | | |
| MPB-10 | | | | |
| MPW-10 | | — | — | — |

Pressure Drop for Free Flow



Min. Pilot Pressure

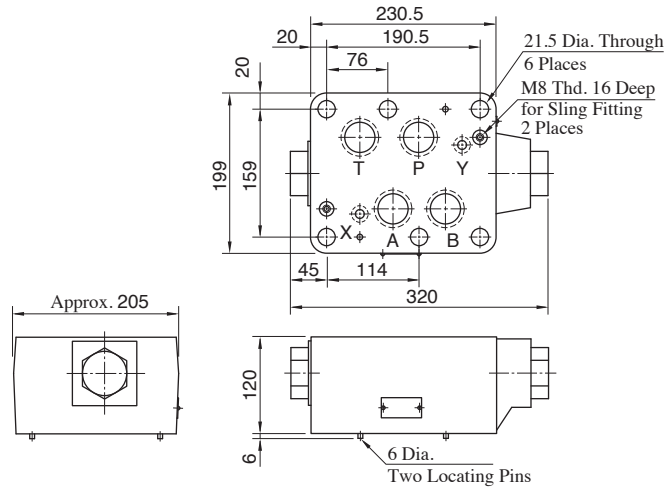


*In case of 500 L/min or more.

10 Series Modular Valves

● Internal Pilot - Internal Drain Type

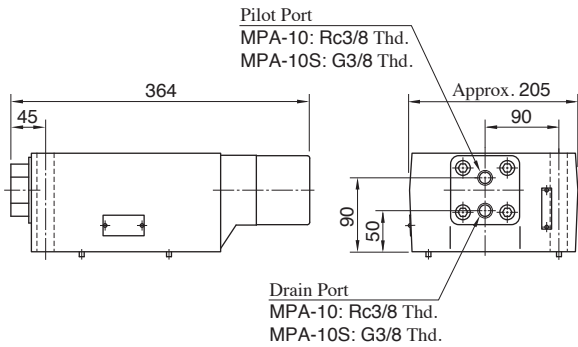
MPA-10
MPB-10
MPW-10



Approx. Mass.....36.5 kg

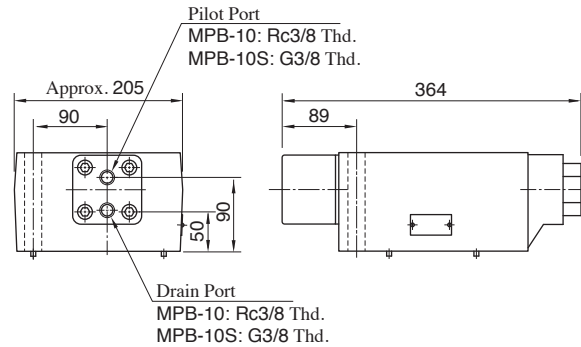
● External Pilot - External Drain Type

MPA-10* - * -X



Approx. Mass.....38 kg

MPB-10* - * -X

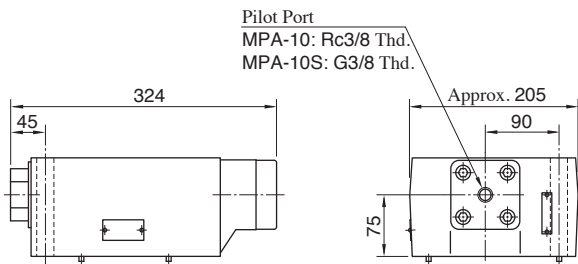


Approx. Mass.....38 kg

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

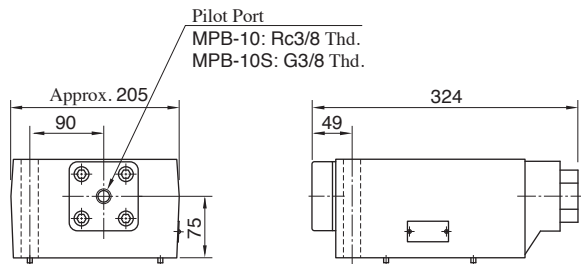
● External Pilot - Internal Drain Type

MPA-10* - * -Y



Approx. Mass.....36.5 kg

MPB-10* - * -Y



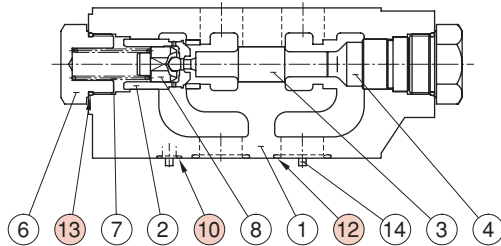
Approx. Mass.....36.5 kg

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

List of Seals

MPA-10
MPB-10
MPW-10

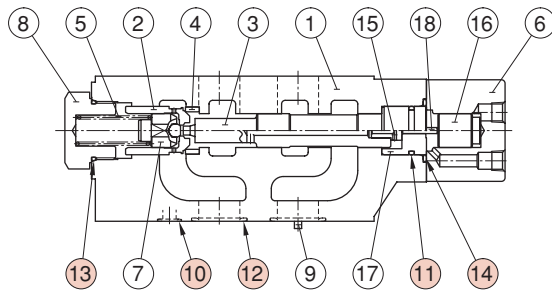
Internal Pilot - Internal Drain Type



MPA-10

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

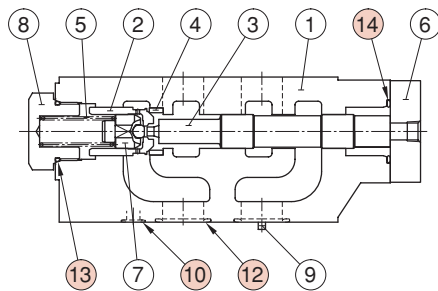
External Pilot - External Drain Type



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

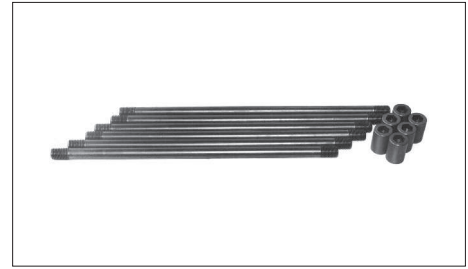
Valves are mounted with six stud bolts. Valve combination varies according to the circuit type. Hence, the mounting bolt kits are available on a combination type basis. When ordering the mounting bolt kit, be sure to give the bolt kit model number from the table below.

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

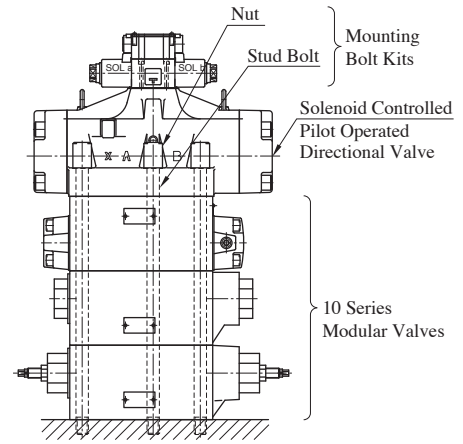
| Model Numbers | Quantity of Valves to be Stacked | | Approx. Mass (1 Set) kg |
|---------------|--|---------------|-------------------------|
| | Sol. Cont. Pilot Operated Directional Valves (DSHG-10) | Modular Valve | |
| MBK-10-01-10 | 1 | 1 | 3.9 |
| MBK-10-02-10 | 1 | 2 | 5.7 |
| MBK-10-03-10 |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



Bolt Kit Composition

Stud Bolt6 Pcs. } 1 Set
Nut6 Pcs. }

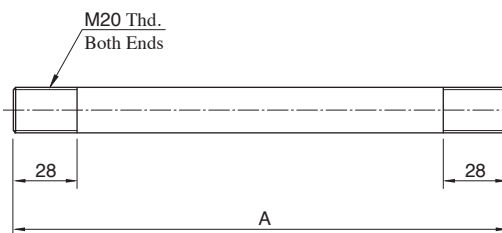
Tightening Torque...150-170 Nm



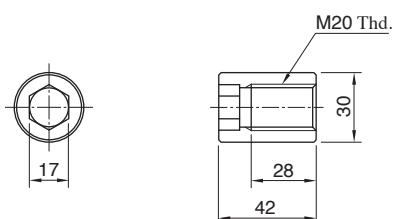
Stacking Example

MBK-10

Stud Bolt



Nut



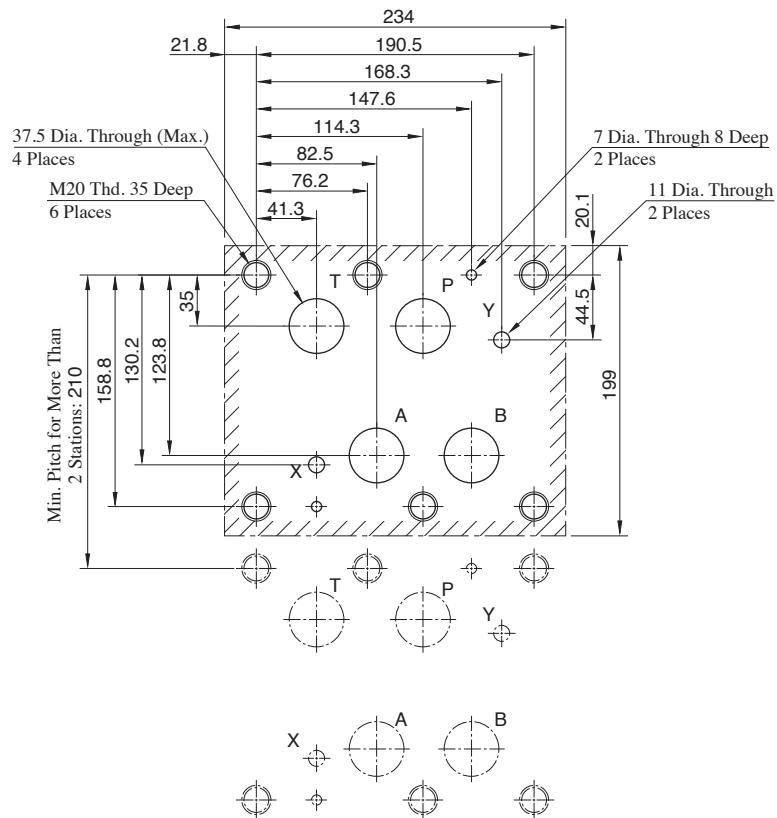
| Bolt Number | A mm |
|-------------|------|
| 01 | 217 |
| 02 | 337 |
| 03 | 457 |
| 04 | 577 |

— 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.

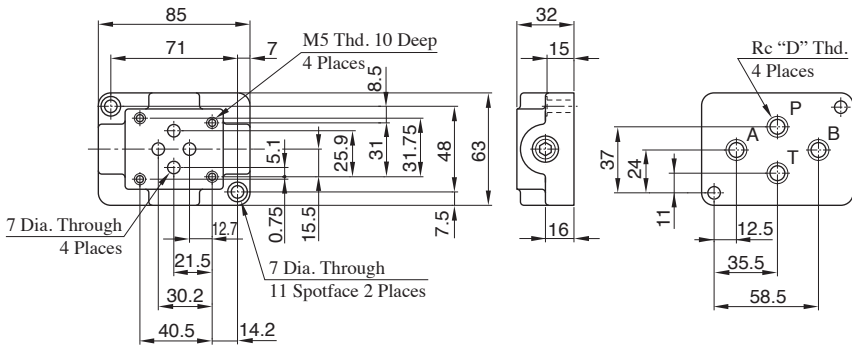
| Name | Sub-plate Model Numbers | Page |
|---|-------------------------|-------|
| Sub-plate for 1-1/4 Solenoid Controlled Pilot Operated Directional Valves | DHGM-10*-40 | F-109 |

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



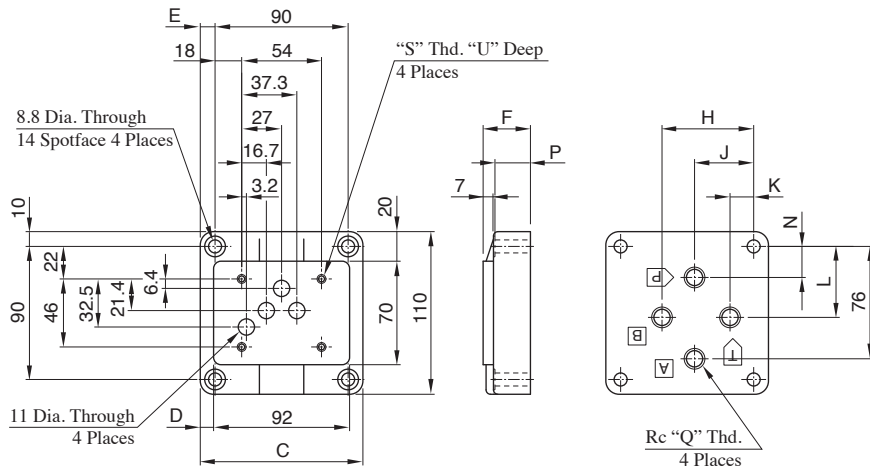
Note: The mounting surface of shaded parts above has a good machined finish. ($\sqrt{16}$)

■ Sub Plate : **DSGM-01、01X、01Y**



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

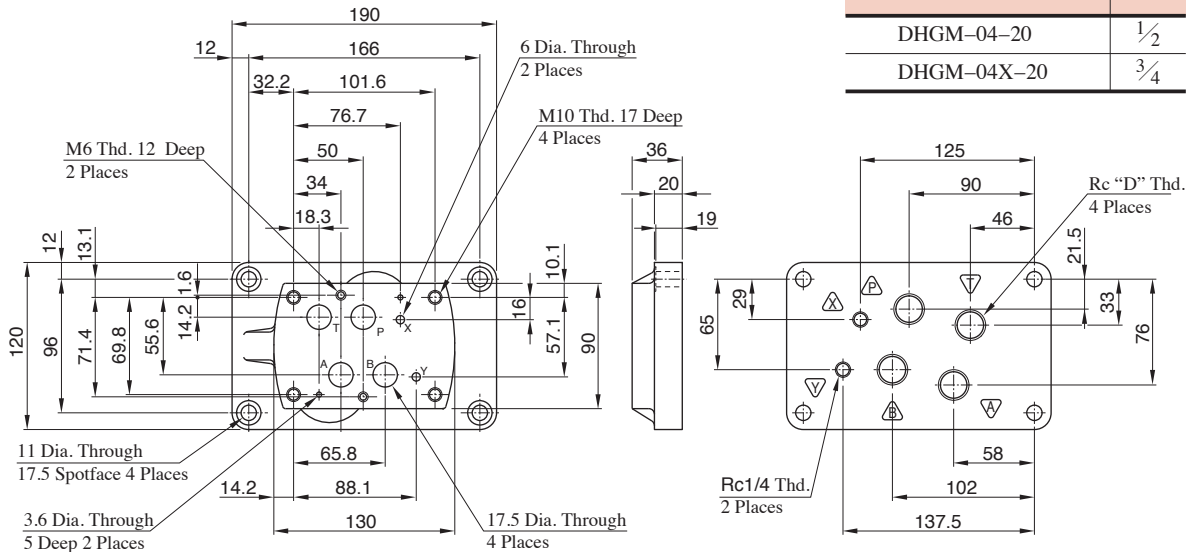
■ Sub Plate : **DSGM-03 / 03X / 03Y**



| 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**



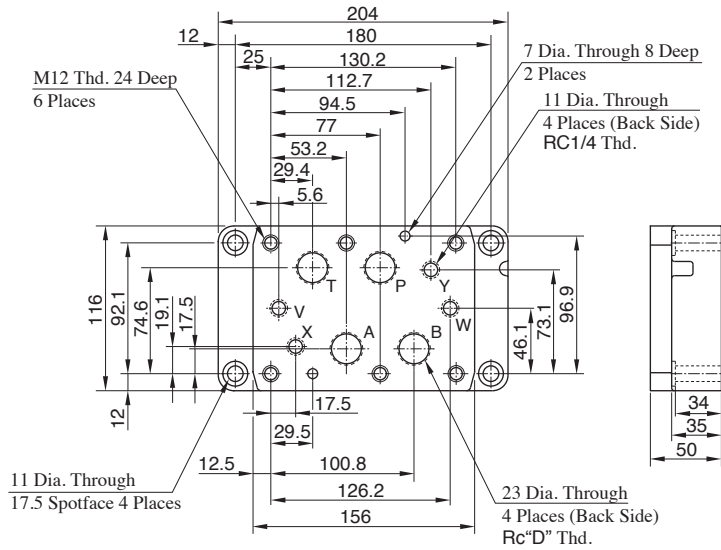
| Model Numbers | D |
|---------------|-----|
| DHGM-04-20 | 1/2 |
| DHGM-04X-20 | 3/4 |

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. |

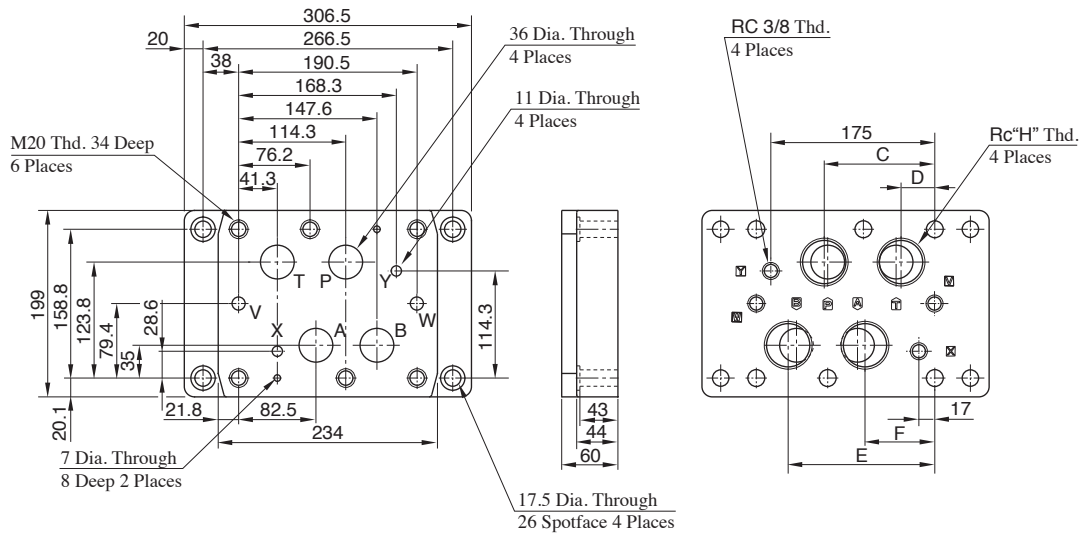
Sub Plate

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.