

# 3/8 Modular Valves

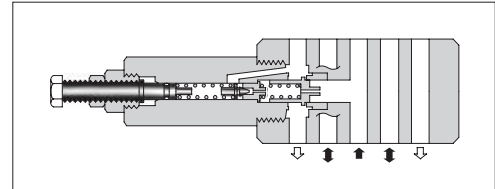
## Type of Modular Valve

| Class                   | Model Numbers                                                                                                                               | Graphic Symbols | Page                     | Class                             | Model Numbers                                                                                  | Graphic Symbols | Page |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------|-----------------------------------|------------------------------------------------------------------------------------------------|-----------------|------|
| Pressure Control Valves | Solenoid Operated Directional Valve<br>(S-)DSG-03-***-50/5090<br>E-DSG-03-***-D*50/5090<br>T-DSG-03-***-D24*50/5090<br>G-DSG-03-***-50/5090 |                 | 361<br>378<br>379<br>412 | Flow Control Valves               | Temperature Compensated Throttle and Check Valves (for "A&B-Lines", Metre-out)<br>MSTW-03-X-20 |                 | 595  |
|                         | Relief Valves (for "P-Line")<br>MBP-03-*30                                                                                                  |                 | 578                      |                                   | Throttle Valves (for "P-Line")<br>MSP-03-30                                                    |                 | 598  |
|                         | Relief Valves (for "A-Line")<br>MBA-03-*30                                                                                                  |                 | 578                      |                                   | Check and Throttle Valves (for "P-Line")<br>MSCP-03-20                                         |                 | 600  |
|                         | Relief Valves (for "B-Line")<br>MBB-03-*30                                                                                                  |                 | 578                      |                                   | Throttle and Check Valves (for "A-Line", Metre-out)<br>MSA-03-X-40                             |                 | 602  |
|                         | Relief Valves (for "A&B-Lines")<br>MBW-03-*30                                                                                               |                 | 578                      |                                   | Throttle and Check Valves (for "A-Line", Metre-in)<br>MSA-03-Y-40                              |                 | 602  |
|                         | Reducing Valves (for "P-Line")<br>MRP-03-*30/3090                                                                                           |                 | 581                      |                                   | Throttle and Check Valves (for "B-Line", Metre-out)<br>MSB-03-X-40                             |                 | 602  |
|                         | Reducing Valves (for "A-Line")<br>MRA-03-*30/3090                                                                                           |                 | 581                      |                                   | Throttle and Check Valves (for "B-Line", Metre-in)<br>MSB-03-Y-40                              |                 | 602  |
|                         | Reducing Valves (for "B-Line")<br>MRB-03-*30/3090                                                                                           |                 | 581                      |                                   | Throttle and Check Valves (for "A&B-Lines", Metre-out)<br>MSW-03-X-40                          |                 | 602  |
|                         | Reducing Valves for Low Pressure Setting (for "P-Line")<br>MRLP-03-10/1090                                                                  |                 | 584                      |                                   | Throttle and Check Valves (for "A&B-Lines", Metre-in)<br>MSW-03-Y-40                           |                 | 602  |
|                         | Reducing Valves for Low Pressure Setting (for "A-Line")<br>MRLA-03-10/1090                                                                  |                 | 584                      | Directional Control Valves        | Check Valves (for "P-Line")<br>MCP-03-*10                                                      |                 | 605  |
|                         | Reducing Valves for Low Pressure Setting (for "B-Line")<br>MRLB-03-10/1090                                                                  |                 | 584                      |                                   | Check Valves (for "A-Line")<br>MCA-03-*20                                                      |                 | 605  |
|                         | Sequence Valves (for "P-Line")<br>MHP-03-*20                                                                                                |                 | 588                      |                                   | Check Valves (for "B-Line")<br>MCB-03-*20                                                      |                 | 605  |
|                         | Counterbalance Valves (for "A-Line")<br>MHA-03-*20                                                                                          |                 | 588                      |                                   | Check Valves (for "T-Line")<br>MCT-03-*10                                                      |                 | 605  |
|                         | Counterbalance Valves (for "B-Line")<br>MHB-03-*20                                                                                          |                 | 588                      |                                   | Check Valves (for "P&T-Lines")<br>MCPT-03-P*-T*-10                                             |                 | 607  |
| Flow Control Valves     | Flow Control Valves (for "P-Line")<br>MFP-03-11                                                                                             |                 | 591                      |                                   | Anti-Cavitation Valves<br>MAC-03-10                                                            |                 | 609  |
|                         | Flow Control and Check Valves (for "A-Line", Metre-out)<br>MFA-03-X-11                                                                      |                 | 591                      |                                   | Pilot Operated Check Valves (for "A-Line")<br>MPA-03-*20/2001                                  |                 | 610  |
|                         | Flow Control and Check Valves (for "A-Line", Metre-in)<br>MFA-03-Y-11                                                                       |                 | 591                      |                                   | Pilot Operated Check Valves (for "B-Line")<br>MPB-03-*20/2001                                  |                 | 610  |
|                         | Flow Control and Check Valves (for "B-Line", Metre-out)<br>MFB-03-X-11                                                                      |                 | 591                      |                                   | Pilot Operated Check Valves (for "A&B-Lines")<br>MPW-03-*20/2001                               |                 | 610  |
|                         | Flow Control and Check Valves (for "B-Line", Metre-in)<br>MFB-03-Y-11                                                                       |                 | 591                      | Modular Plates and Mounting Bolts | End Plates (Blocking Plates)<br>MDC-03-A-10                                                    |                 | 613  |
|                         | Flow Control and Check Valves (for "A&B-Lines", Metre-out)<br>MFW-03-X-11                                                                   |                 | 591                      |                                   | End Plates (Bypass Plates)<br>MDC-03-B-10                                                      |                 | 613  |
|                         | Flow Control and Check Valves (for "A&B-Lines", Metre-in)<br>MFW-03-Y-11                                                                    |                 | 591                      |                                   | Connecting Plates<br>MDS-03-10/1090                                                            |                 | 614  |
|                         | Temperature Compensated Throttle and Check Valves (for "A-Line", Metre-out)<br>MSTA-03-X-20                                                 |                 | 595                      |                                   | Base Plates<br>MMC-03-T-*21/2180/2190                                                          |                 | 615  |
|                         | Temperature Compensated Throttle and Check Valves (for "B-Line", Metre-out)<br>MSTB-03-X-20                                                 |                 | 595                      |                                   | Bolt Kits<br>MBK-03-*10/1090                                                                   |                 | 618  |

# Relief Modular Valves

## Specifications

| Model Numbers                                                | Max. Operating Pressure<br>MPa (PSI) | Max. Flow<br>L/min (U.S.GPM) |
|--------------------------------------------------------------|--------------------------------------|------------------------------|
| MBP-03-* -30<br>MBA-03-* -30<br>MBB-03-* -30<br>MBW-03-* -30 | 31.5 (4570)                          | 70 (18.5)                    |



## Model Number Designation

| F-                                                                                         | MBA                                                                                                                                                             | -03        | -B                                                                             | -30           | *                      |
|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------------------|---------------|------------------------|
| Special Seals                                                                              | Series Number                                                                                                                                                   | Valve Size | Pres. Adj. Range<br>MPa (PSI)                                                  | Design Number | Design Standard        |
| <b>F:</b><br>Special Seals for<br>Phosphate Ester<br>Type Fluids (Omit<br>if not required) | <b>MBP</b> : Relief Valve for P-Line<br><b>MBA</b> : Relief Valve for A-Line<br><b>MBB</b> : Relief Valve for B-Line<br><b>MBW</b> : Relief Valve for A&B-Lines | <b>03</b>  | <b>B</b> : *-7 <sup>★1</sup><br>(* -1020)<br><b>H</b> : 3.5-31.5<br>(510-4570) | <b>30</b>     | Refer to <sup>★2</sup> |

★1. See the "Minimum Adjustment Pressure" of the next page for the item marked \*.

★2. Design Standards: None ..... Japanese Standard "JIS", European Design Standard and N. American Design Standard

## Instructions

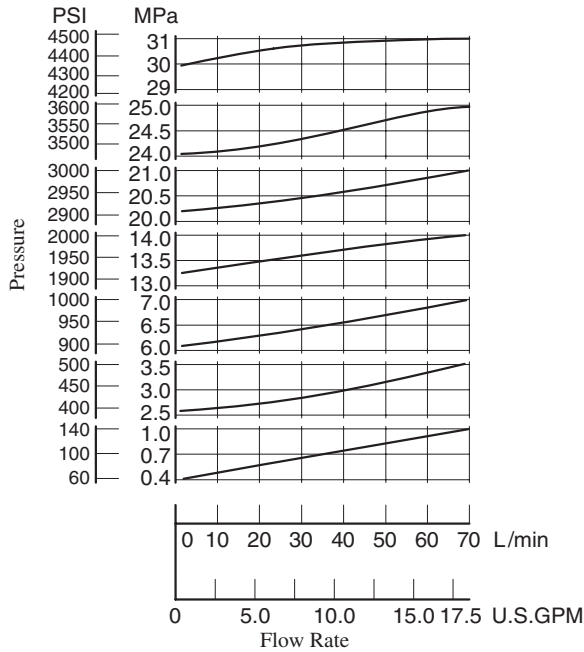
- The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of the [next page](#). This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side 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 .

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

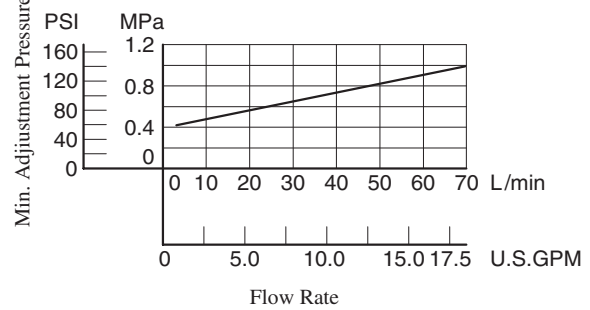
## Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm<sup>2</sup>/s (164 SSU), Specific Gravity 0.850

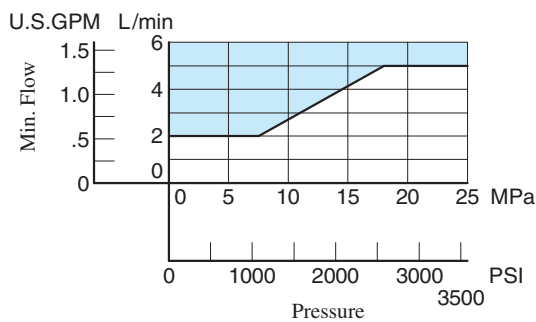
### Nominal Override Characteristics



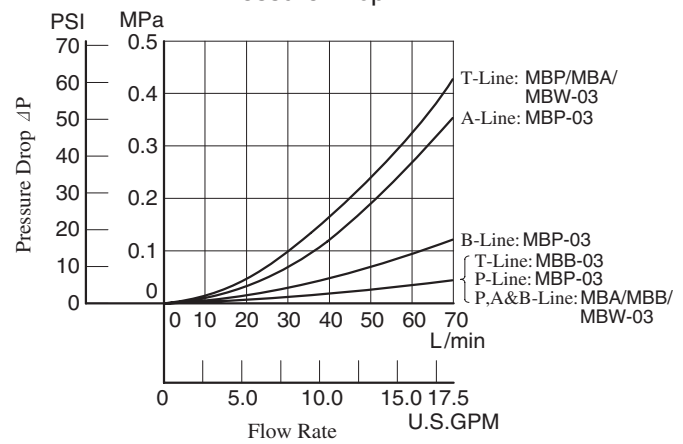
### Min. Adjustment Pressure



### Min. Flow vs. Adjustment Pressure

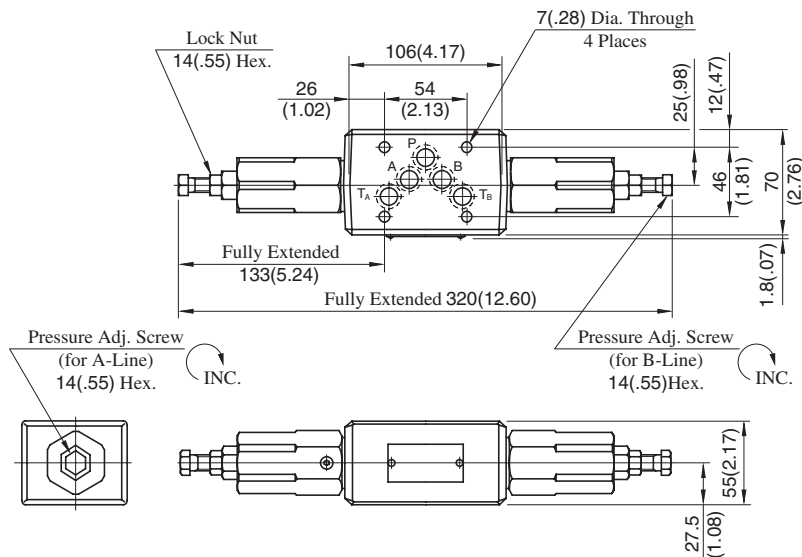


### Pressure Drop



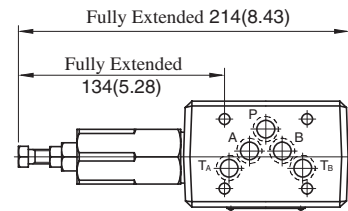
**MBW-03-\*-30**

**DIMENSIONS IN  
MILLIMETRES (INCHES)**



Approx. Mass.....3.8 kg (8.4 lbs.)

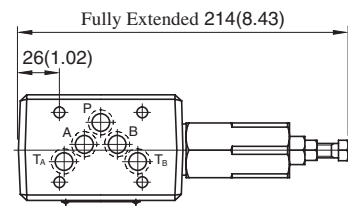
**MBP-03-\*-30  
MBA-03-\*-30**



Approx. Mass.....3.1 kg (6.8 lbs.)

• For other dimensions, refer to "MBW-03" drawing left.

**MBB-03-\*-30**

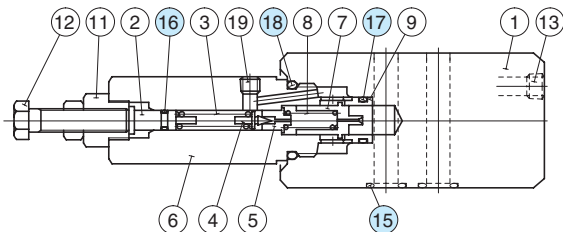


Approx. Mass.....3.1 kg (6.8 lbs.)

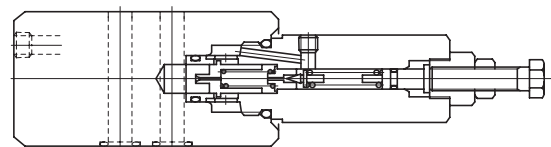
• For other dimensions, refer to "MBW-03" drawing left.

**■ Spare Parts List**

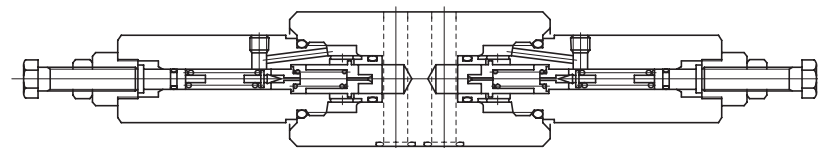
**MBP-03-\*-30  
MBA-03-\*-30**



**MBB-03-\*-30**



**MBW-03-\*-30**



● List of Seals

| Item | Name of Parts | Part Numbers | Quantity |        |        |        |
|------|---------------|--------------|----------|--------|--------|--------|
|      |               |              | MBP-03   | MBA-03 | MBB-03 | MBW-03 |
| 15   | O-Ring        | SO-NB-A014   | 5        | 5      | 5      | 5      |
| 16   | O-Ring        | SO-NA-P6     | 1        | 1      | 1      | 2      |
| 17   | O-Ring        | SO-NB-P16    | 1        | 1      | 1      | 2      |
| 18   | O-Ring        | SO-NB-P26    | 1        | 1      | 1      | 2      |

Note: When ordering seals, please specify the seal kit number from the table right.

● List of Seal Kits

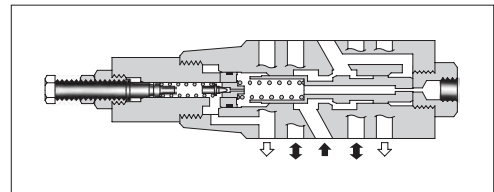
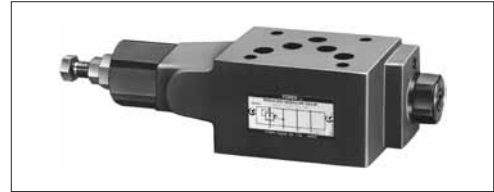
| Valve Model Numbers | Seal kit Numbers |
|---------------------|------------------|
| MBP-03              | KS-MBP-03-30     |
| MBA-03              |                  |
| MBB-03              |                  |
| MBW-03              | KS-MBW-03-30     |

## Reducing Modular Valves

### Specifications

| Model Numbers                                               | Max. Operating Pressure<br>MPa(PSI) | Max. Flow<br>L/min (U.S.GPM) |
|-------------------------------------------------------------|-------------------------------------|------------------------------|
| MRP-03-* -30/3090<br>MRA-03-* -30/3090<br>MRB-03-* -30/3090 | 25 (3630)                           | 70 (18.5) ★                  |

★ In pressure adjustment range "H", if the pressure in the primary side is set above 20 MPa (2900 PSI) and the pressure in the secondary side is set below 10 MPa (1450 PSI), the maximum flow is limited to 50 L/min (13.2 U.S.GPM).



### Model Number Designation

| F-                                                                                         | MRP                                                                                                                     | -03        | -B                                                        | -30              | *               |
|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------------|-----------------------------------------------------------|------------------|-----------------|
| Special Seals                                                                              | Series Number                                                                                                           | Valve Size | Pres. Adj. Range<br>MPa (PSI)                             | Design<br>Number | Design Standard |
| <b>F:</b><br>Special Seals for<br>Phosphate Ester<br>Type Fluids (Omit<br>if not required) | <b>MRP:</b> Reducing Valve for P-Line<br><b>MRA:</b> Reducing Valve for A-Line<br><b>MRB:</b> Reducing Valve for B-Line | <b>03</b>  | <b>B:</b> 1-7 (145-1020)<br><b>H:</b> 3.5-24.5 (510-3550) | <b>30</b>        | Refer to ★      |

★ Design Standards: None ..... Japanese Standard "JIS" and European Design Standard  
90 ..... N. American Design Standard

### Instructions

- The minimum adjustment pressure equals the lower limit of either pressure adjustment range (B, H) plus the tank line back pressure of the [next 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.

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

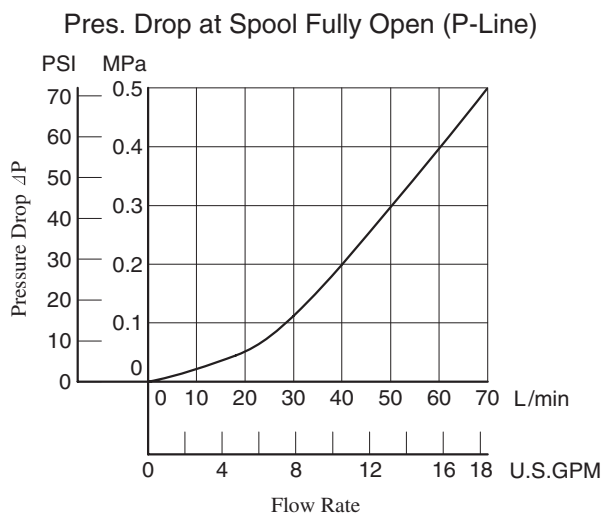
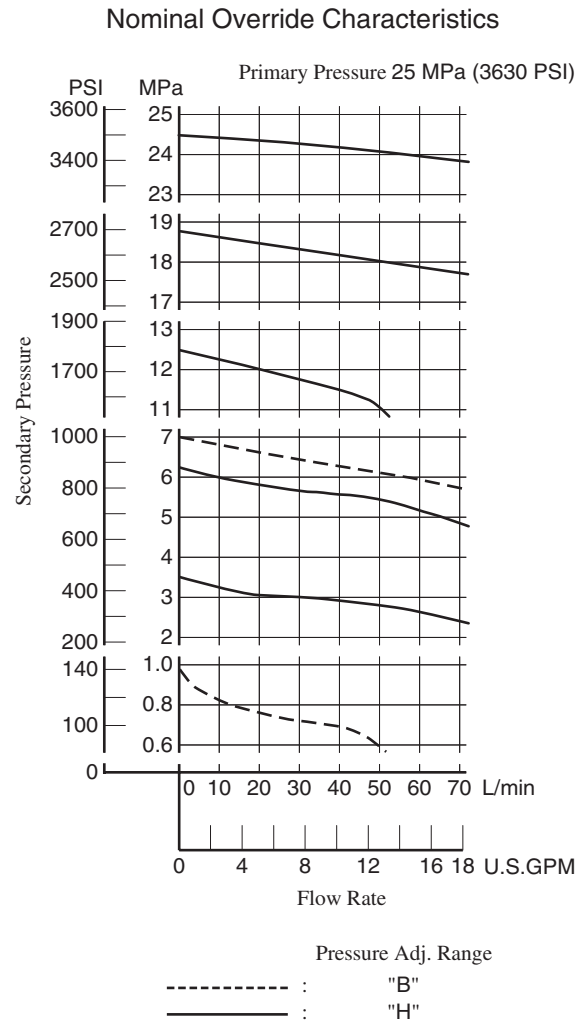
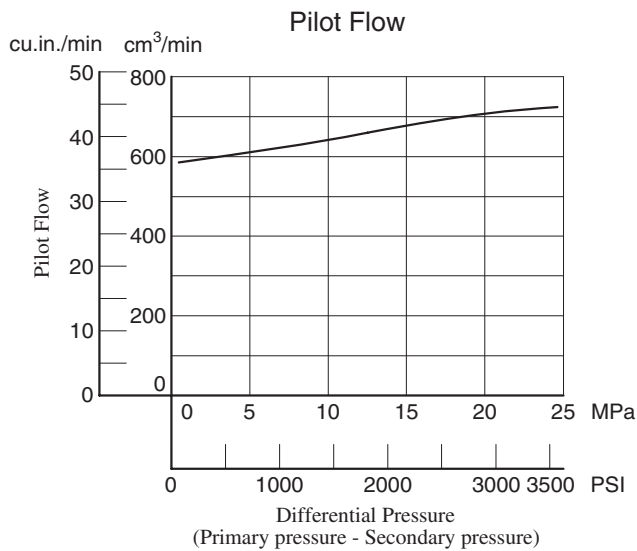
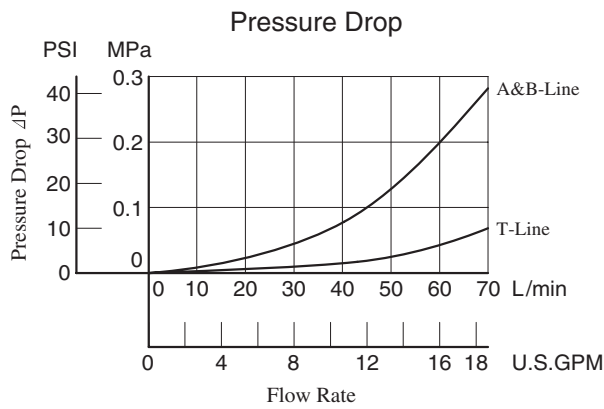
F



03 Series Modular Valves

## ■ Typical Performance Characteristics

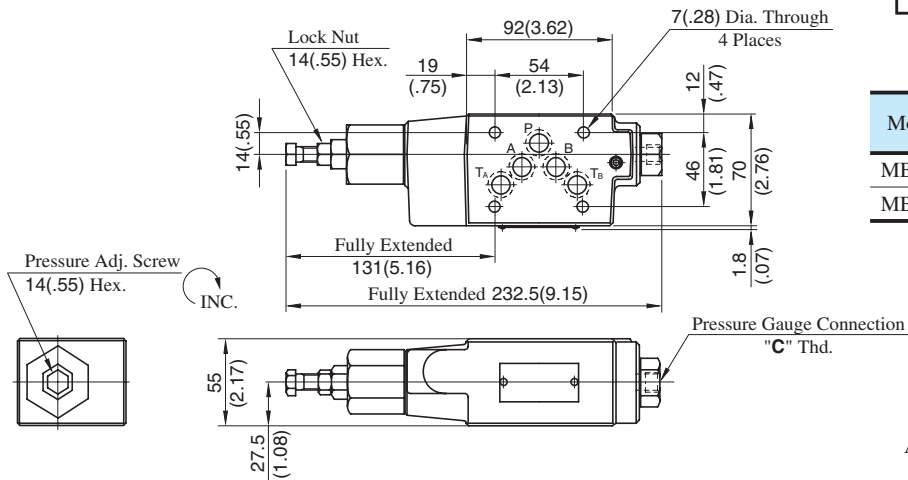
Hydraulic Fluid: Viscosity 35 mm<sup>2</sup>/s (164 SSU), Specific Gravity 0.850



MRP-03-\*-30/3090

MRB-03-\*-30/3090

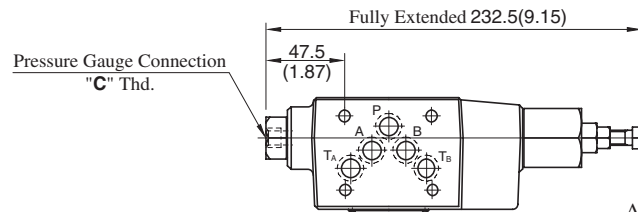
**DIMENSIONS IN  
MILLIMETRES (INCHES)**



| Model Numbers | Thread Size<br>"C" Thd. |
|---------------|-------------------------|
| MB*-01-*-30   | Rc 1/4 = 1/4 BSP.Tr     |
| MB*-01-*-3090 | 1/4 NPT                 |

Approx. Mass.....3.3 kg (7.5 lbs.)

MRA-03-\*-30/3090



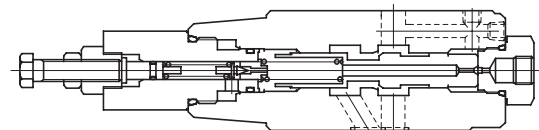
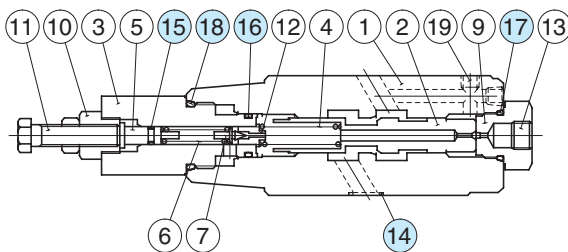
Approx. Mass.....3.3 kg (7.5 lbs.)

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

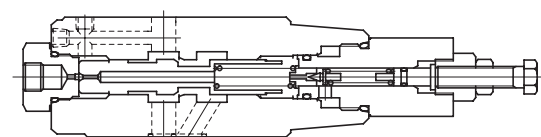
## Spare Parts List

MRP-03-\*-30/3090

MRB-03-\*-30/3090



MRA-03-\*-30/3090



## List of Seals

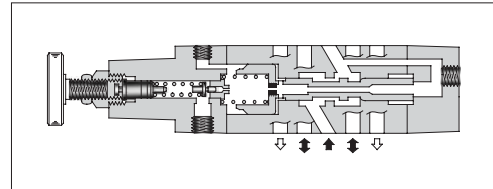
| Item | Name of Parts | Part Numbers | Qty. | Remarks                                          |
|------|---------------|--------------|------|--------------------------------------------------|
| 14   | O-Ring        | SO-NB-A014   | 5    | Included in Seal Kit<br>Kit No.:<br>KS-MRP-03-30 |
| 15   | O-Ring        | SO-NA-P6     | 1    |                                                  |
| 16   | O-Ring        | SO-NB-P16    | 1    |                                                  |
| 17   | O-Ring        | SO-NB-P18    | 1    |                                                  |
| 18   | O-Ring        | SO-NB-P26    | 1    |                                                  |

## Reducing Modular Valves For Low Pressure Setting

### Specifications

| Model Numbers                                                        | Max. Operating Pressure<br>MPa (PSI) | Pres. Adj. Range<br>MPa (PSI) | Max. Flow<br>L/min (U.S.GPM) |
|----------------------------------------------------------------------|--------------------------------------|-------------------------------|------------------------------|
| MRLP-03-10/1080/1090<br>MRLA-03-10/1080/1090<br>MRLB-03-10/1080/1090 | 7 (1020)                             | 0.2-6.5 (29-940)              | 50 (13.2) ★                  |

★ When pressure setting is less than 0.8 MPa (116 PSI), maximum flow decreases. See "Min. Adjustment Pressure vs. Max. Flow" on the [next page](#) for the appropriate range.



### Model Number Designation

| F-                                                                                   | MRLP                                                                                                                                                                                                        | -03        | -10           | *               |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------|-----------------|
| Special Seals                                                                        | Series Number                                                                                                                                                                                               | Valve Size | Design Number | Design Standard |
| <b>F:</b><br>Special Seals for Phosphate Ester Type Fluids<br>(Omit if not required) | <b>MRLP</b> : Low Pressure Setting Type Reducing Valve for P-Line<br><b>MRLA</b> : Low Pressure Setting Type Reducing Valve for A-Line<br><b>MRLB</b> : Low Pressure Setting Type Reducing Valve for B-Line | <b>03</b>  | <b>10</b>     | Refer to ★      |

★ Design Standards: None ..... Japanese Standard "JIS"  
80 ..... European Design Standard  
90 ..... N. American Design Standard

### Instructions

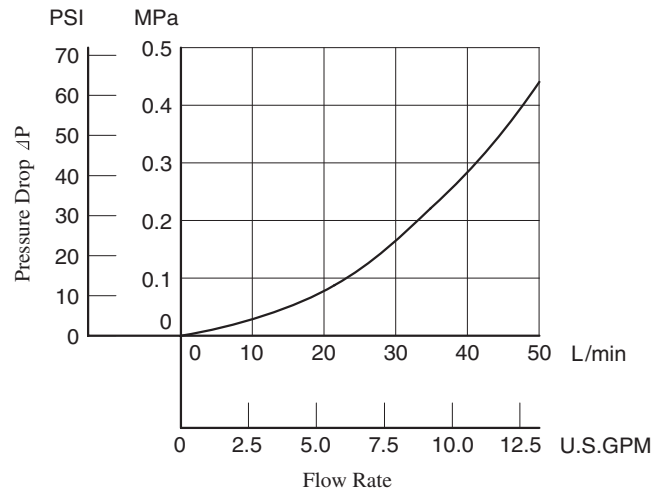
- If there is a pressure in drain line, it is added to the secondary setting pressure. Hence, drain line must be connected to tank directly with a low back pressure close to atmospheric pressure.
- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment handle clockwise or anti-clockwise. For an increase of pressure, turn the handle clockwise. Be sure to re-tighten the lock nut firmly after making adjustment to the pressure.

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

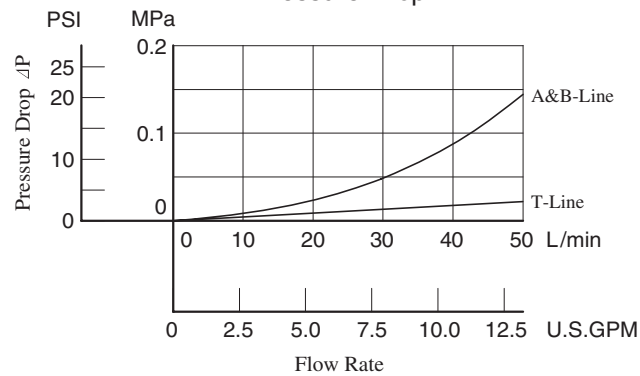
## Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm<sup>2</sup>/s (164 SSU), Specific Gravity 0.850

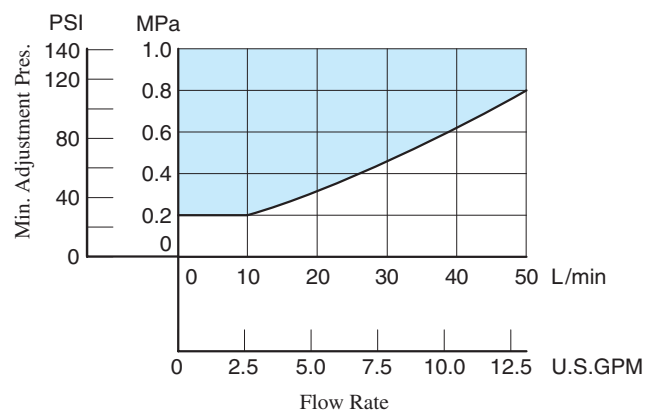
Pres. Drop at Spool Fully Open (P-Line)



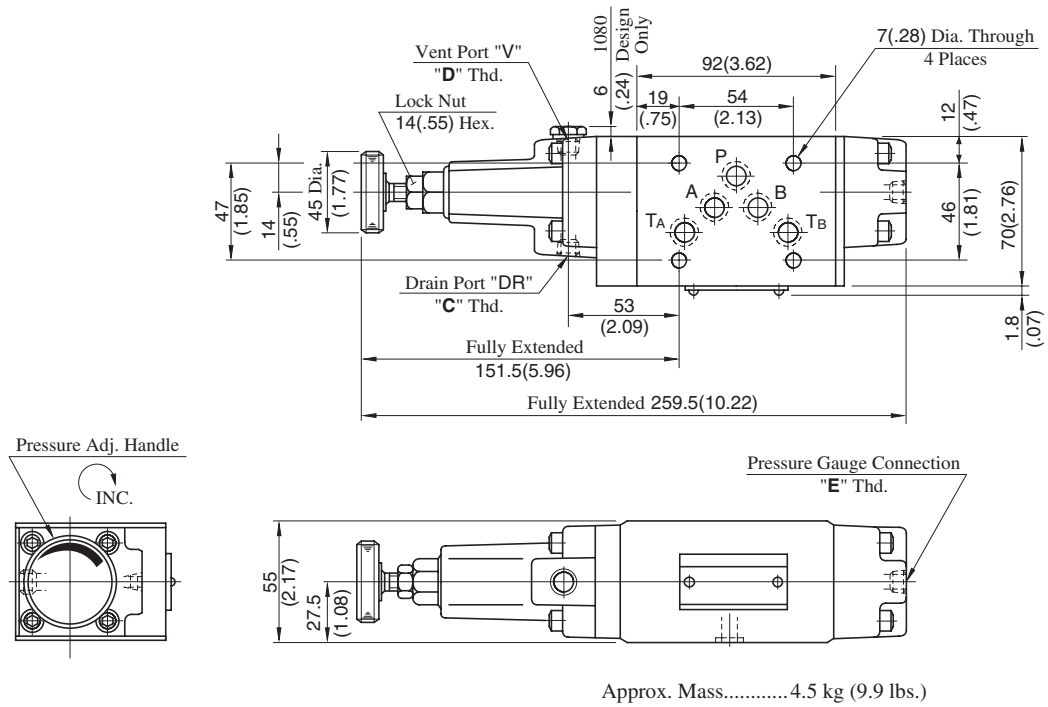
Pressure Drop



Min. Adjustment Pressure vs. Max. Flow



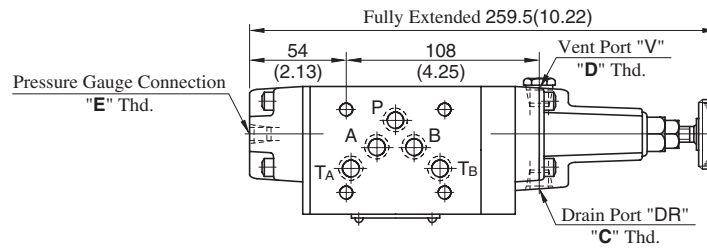
MRLP-03-10/1080/1090  
MRLB-03-10/1080/1090



| Model Numbers | Thread Size |           |            |
|---------------|-------------|-----------|------------|
|               | "C" Thd.    | "D" Thd.  | "E" Thd.   |
| MRL*-03-10    | Rc 1/4      | Rc 1/8    | Rc 1/4     |
| MRL*-03-1080  | 1/4 BSP.F   | 1/8 BSP.F | 1/4 BSP.Tr |
| MRL*-03-1090  | 1/4 NPT     | 1/8 NPT   | 1/4 NPT    |

**DIMENSIONS IN  
MILLIMETRES (INCHES)**

MRLA-03-10/1080/1090

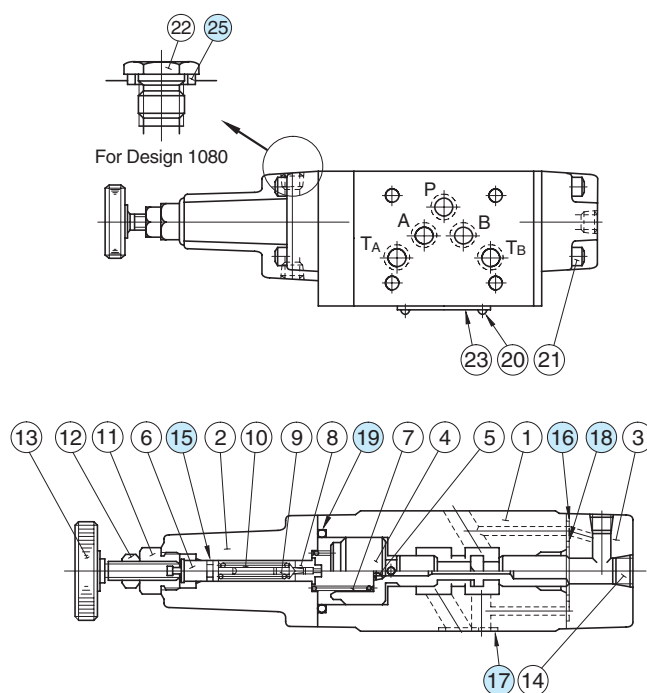


Approx. Mass.....4.5 kg (9.9 lbs.)

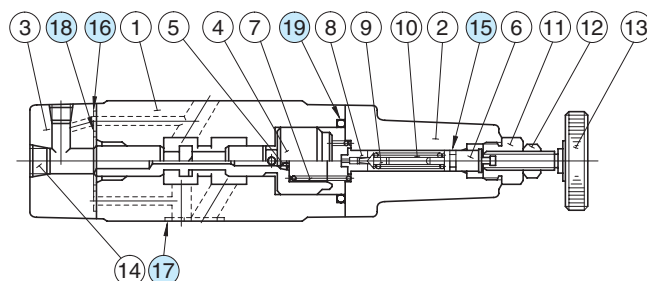
- For other dimensions, refer to "MRLP-03" drawing above.

## Spare Parts List

MRLP-03-10/1080/1090  
MRLB-03-10/1080/1090



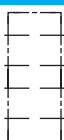
MRLA-03-10/1080/1090



### List of Seals

| Item | Name of Parts | Part Numbers | Qty. | Remarks                                       |
|------|---------------|--------------|------|-----------------------------------------------|
| 15   | O-Ring        | SO-NA-P6     | 1    | Included in Seal Kit<br>Kit No.:KS-MRLP-03-10 |
| 16   | O-Ring        | SO-NB-P6     | 2    |                                               |
| 17   | O-Ring        | SO-NB-A014   | 5    |                                               |
| 18   | O-Ring        | SO-NB-P22    | 1    |                                               |
| 19   | O-Ring        | SO-NB-P32    | 1    |                                               |
| 25   | Bonded Seal   | SG-FB-1/8    | 1    |                                               |

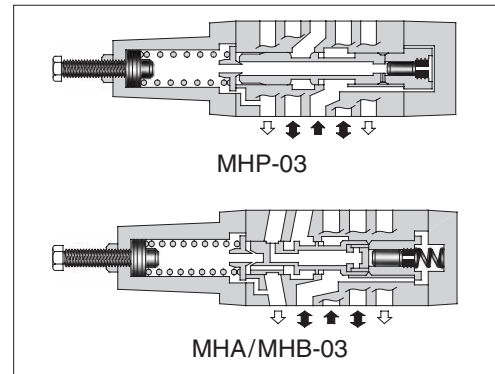
Note: No bonded seal are included in seal kits.



## Sequence Modular Valves/Counterbalance Modular Valves

### Specifications

| Model Numbers | Max. Operating Pressure<br>MPa (PSI) | Max. Flow<br>L/min<br>(U.S.GPM) | Max. Free Flow<br>L/min<br>(U.S.GPM) |
|---------------|--------------------------------------|---------------------------------|--------------------------------------|
| MHP-03-*20    | 25 (3630)                            | 50 (13.2)                       | —                                    |
| MHA-03-*20    |                                      |                                 | 70 (18.5)                            |
| MHB-03-*20    |                                      |                                 |                                      |



### Model Number Designation

| F-                                                                                         | MHA                                                                                        | -03        | -C                                                                                                                                | -20           | *                       |
|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------|-------------------------|
| Special Seals                                                                              | Series Number                                                                              | Valve Size | Pres. Adj. Range<br>MPa (PSI)                                                                                                     | Design Number | Design Standard         |
| <b>F:</b><br>Special Seals for<br>Phosphate Ester<br>Type Fluids (Omit<br>if not required) | <b>MHP:</b> Sequence Valve for P-Line                                                      | <b>03</b>  | <b>N:</b> *-1.8 (*-260) ★ <sup>1</sup><br><b>A:</b> 1.8-3.5 (260-510)<br><b>B:</b> 3.5-7 (510-1020)<br><b>C:</b> 7-14 (1020-2030) | <b>20</b>     | Refer to ★ <sup>2</sup> |
|                                                                                            | <b>MHA:</b> Counterbalance Valve for A-Line<br><b>MHB:</b> Counterbalance Valve for B-Line |            |                                                                                                                                   | <b>20</b>     |                         |

★<sup>1</sup>. See the "Minimum Adjustment Pressure" of the next page for the item marked \*.

★<sup>2</sup>. Design Standards: None..... Japanese Standard "JIS", European Design Standard and N. American Design Standard

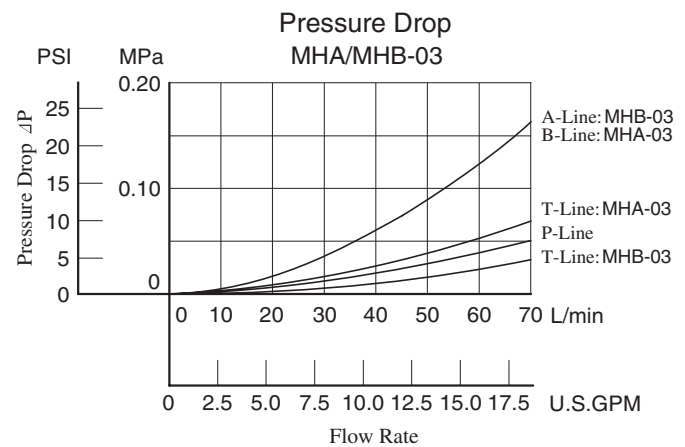
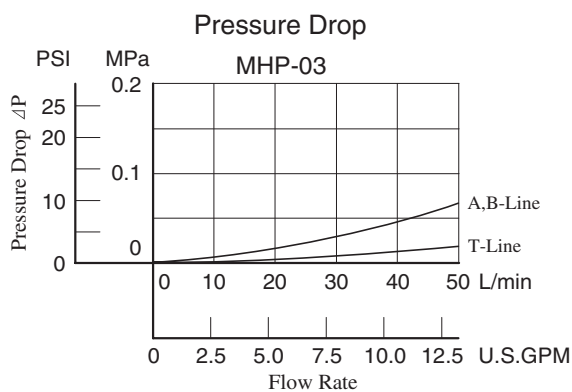
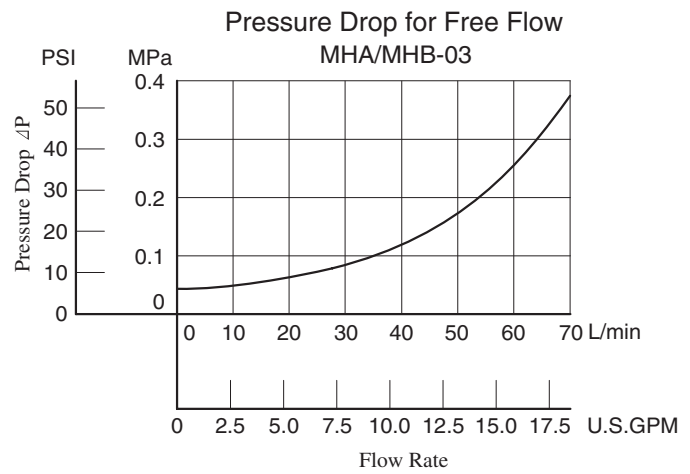
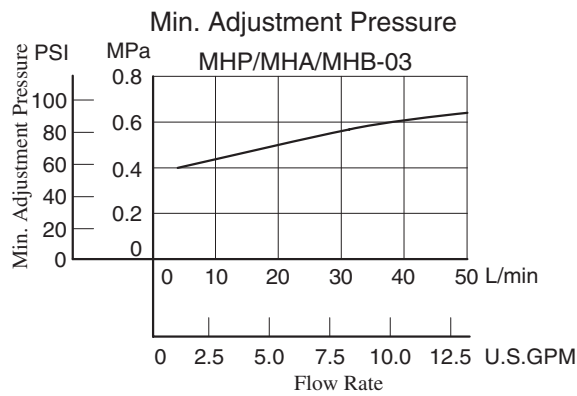
### Instructions

- The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of the [next 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.

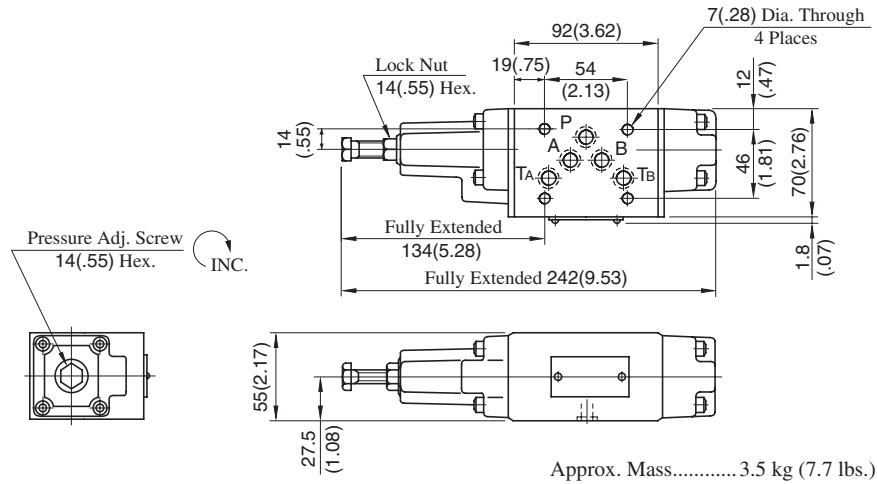
| Model Numbers | Graphic Symbols | Detailed Graphic Symbols |
|---------------|-----------------|--------------------------|
| MHP-03        |                 |                          |
| MHA-03        |                 |                          |
| MHB-03        |                 |             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

## Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm<sup>2</sup>/s (164 SSU), Specific Gravity 0.850

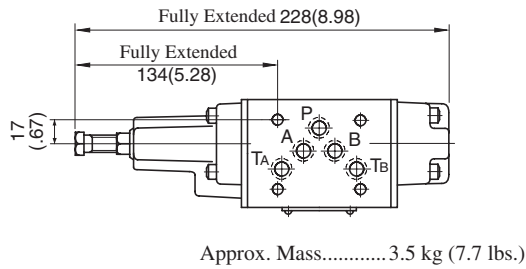


**MHP-03-\*-20**

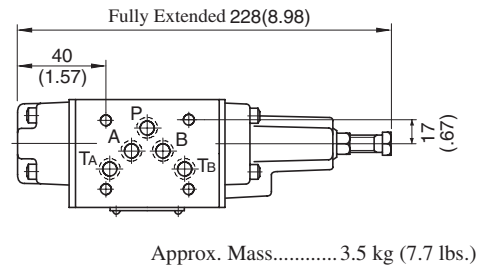


**DIMENSIONS IN  
MILLIMETRES (INCHES)**

**MHA-03-\*-20**



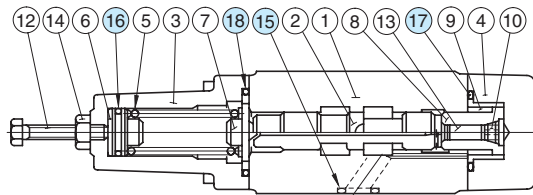
**MHA-03-\*-20**



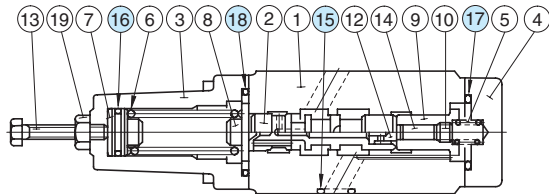
• For other dimensions, refer to "MHP-03" drawing above.

**■ Spare Parts List**

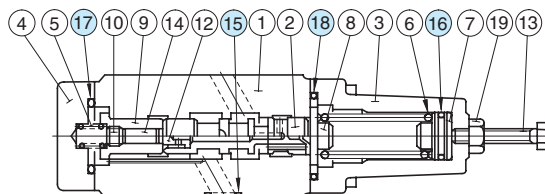
**MHP-03-\*-20**



**MHA-03-\*-20**



**MHB-03-\*-20**



• **List of Seals**

**MHP-03, MHA-03**

| Item | Name of Parts | Part Numbers | Qty. | Remarks                                      |
|------|---------------|--------------|------|----------------------------------------------|
| 15   | O-Ring        | SO-NB-A014   | 5    | Included in Seal Kit<br>Kit No.:KS-MHP-03-20 |
| 16   | O-Ring        | SO-NB-P16    | 1    |                                              |
| 17   | O-Ring        | SO-NB-P29    | 1    |                                              |
| 18   | O-Ring        | SO-NB-P32    | 1    |                                              |

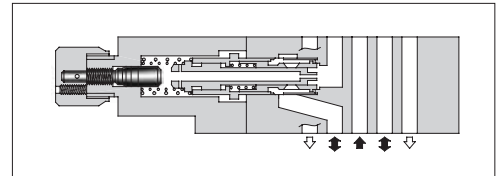
**MHB-03**

| Item | Name of Parts | Part Numbers | Qty. | Remarks                                      |
|------|---------------|--------------|------|----------------------------------------------|
| 15   | O-Ring        | SO-NB-A014   | 5    | Included in Seal Kit<br>Kit No.:KS-MHB-03-20 |
| 16   | O-Ring        | SO-NA-P16    | 1    |                                              |
| 17   | O-Ring        | SO-NB-P29    | 1    |                                              |
| 18   | O-Ring        | SO-NB-P32    | 1    |                                              |

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

## Specifications

| Model Numbers | Max. Operating Pressure<br>MPa (PSI) | Max. Metred Flow<br>L/min (U.S.GPM) | Max. Free Flow<br>L/min (U.S.GPM) |
|---------------|--------------------------------------|-------------------------------------|-----------------------------------|
| MFP-03-11     | 16 (2320)                            | 50 (13.2)                           | —                                 |
| MFA-03-*-11   |                                      |                                     | 70 (18.5)                         |
| MFB-03-*-11   |                                      |                                     |                                   |
| MFW-03-*-11   |                                      |                                     |                                   |



## Model Number Designation

| F-                                                                         | MFA                                              | -03        | -X                            | -11           | *               |
|----------------------------------------------------------------------------|--------------------------------------------------|------------|-------------------------------|---------------|-----------------|
| Special Seals                                                              | Series Number                                    | Valve Size | Direction of Flow             | Design Number | Design Standard |
| F:<br>Special Seals for Phosphate Ester Type Fluids (Omit if not required) | MFP : Flow Control Valve for P-Line              | 03         | —                             | 11            | Refer to ★      |
|                                                                            | MFA : Flow Control and Check Valve for A-Line    |            | X : Metre-out<br>Y : Metre-in | 11            |                 |
|                                                                            | MFB : Flow Control and Check Valve for B-Line    |            |                               |               |                 |
|                                                                            | MFW : Flow Control and Check Valve for A&B-Lines |            |                               |               |                 |

★ Design Standards: None ..... Japanese Standard "JIS", European Design Standard and N. American Design Standard

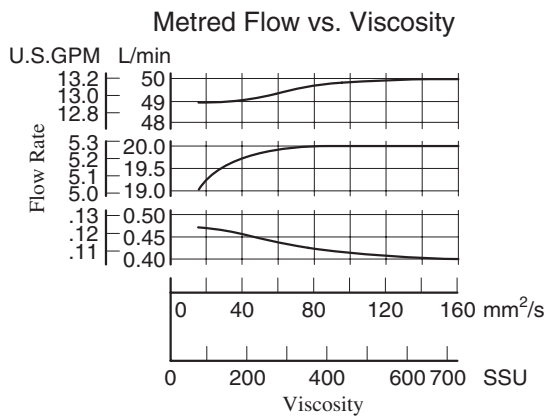
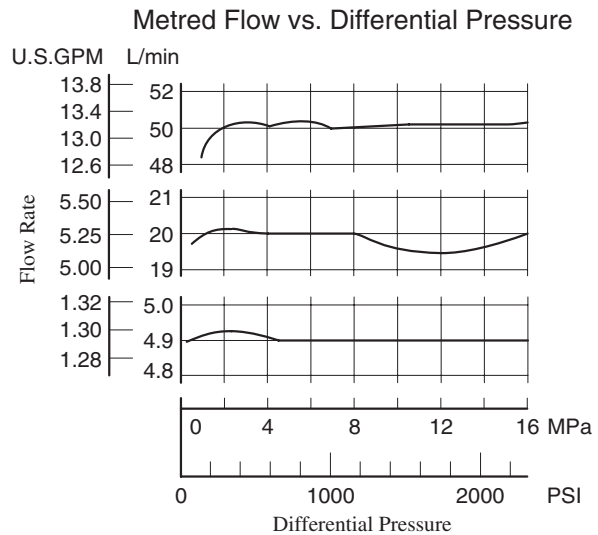
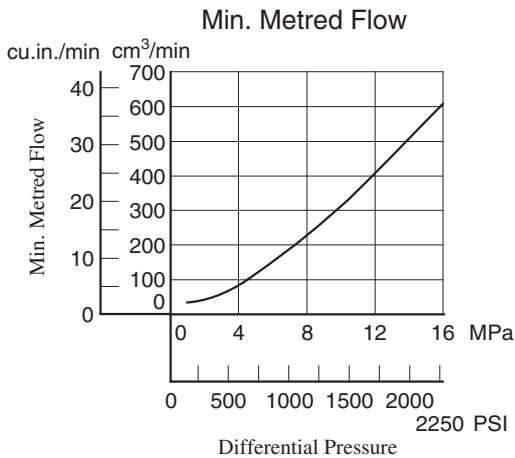
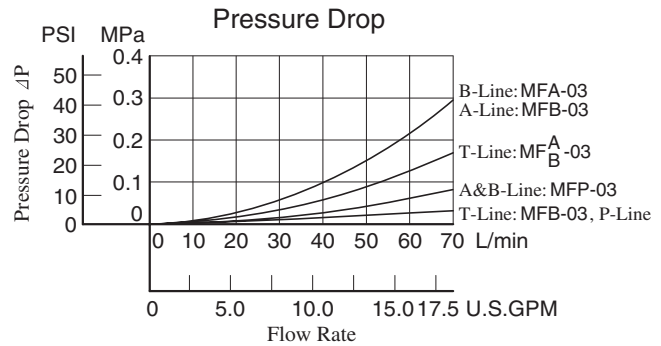
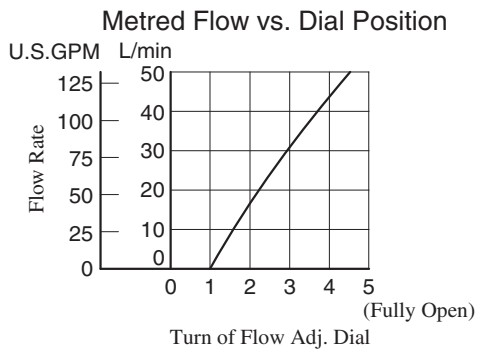
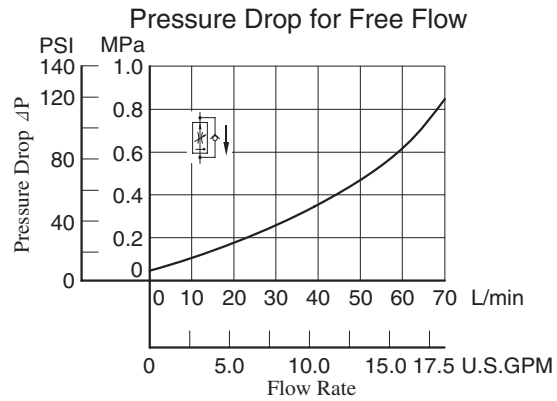
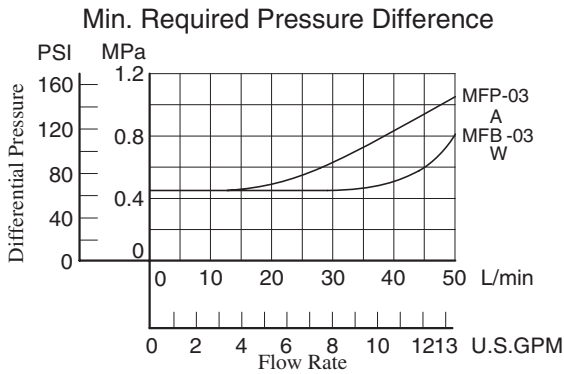
## Instructions

- 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.

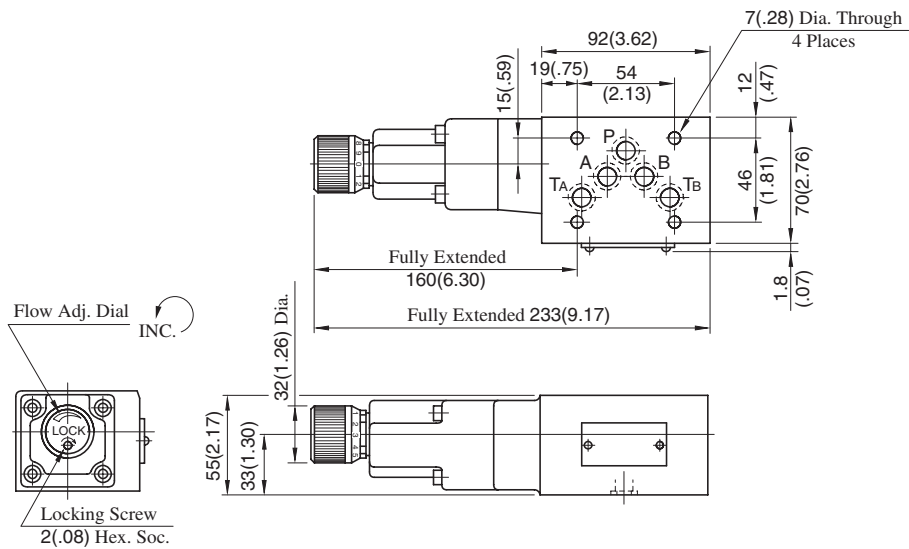
| Model No. | Graphic Symbols | Detailed Graphic Symbols |           |                 |                          |
|-----------|-----------------|--------------------------|-----------|-----------------|--------------------------|
| MFP-03    |                 |                          |           |                 |                          |
| Model No. | Metre-out       |                          | Model No. | Graphic Symbols | Detailed Graphic Symbols |
| MFA-03-X  |                 |                          | MFA-03-Y  |                 |                          |
| MFB-03-X  |                 |                          | MFB-03-Y  |                 |                          |
| MFW-03-X  |                 |                          | MFW-03-Y  |                 |                          |

## Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm<sup>2</sup>/s (164 SSU), Specific Gravity 0.850



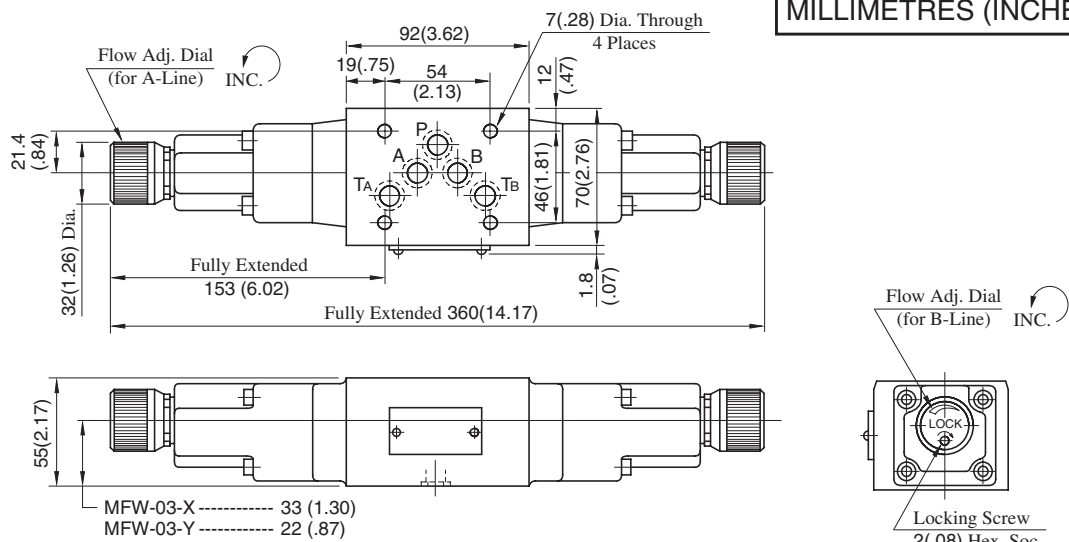
## MFP-03-11



Approx. Mass.....4.2 kg (9.3 lbs.)

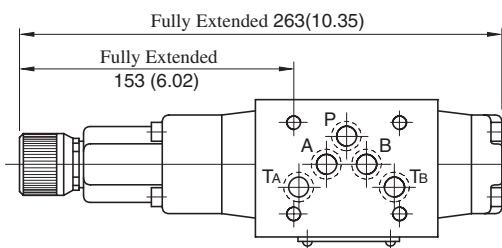
## MFW-03-X-Y-11

**DIMENSIONS IN  
MILLIMETRES (INCHES)**



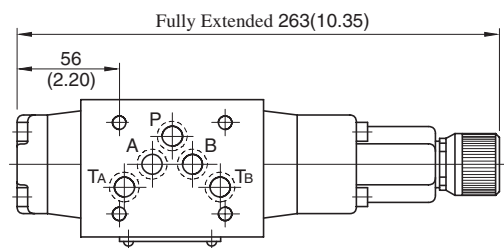
Approx. Mass.....5.2 kg (11.5 lbs.)

## MFA-03-X-Y-11



Approx. Mass.....4.1 kg (9.0 lbs.)

## MFB-03-X-Y-11



Approx. Mass.....4.1 kg (9.0 lbs.)

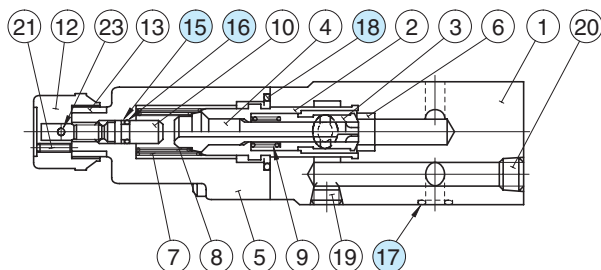
• For other dimensions, refer to "MFW-03" drawing above.

F

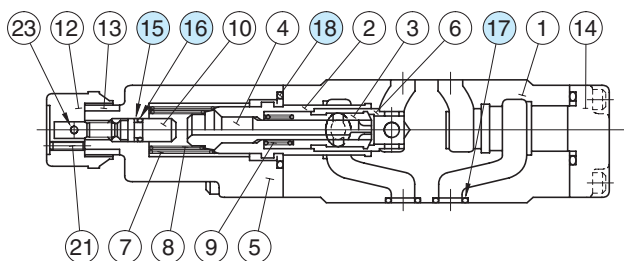
03 Series Modular Valves

■ Spare Parts List

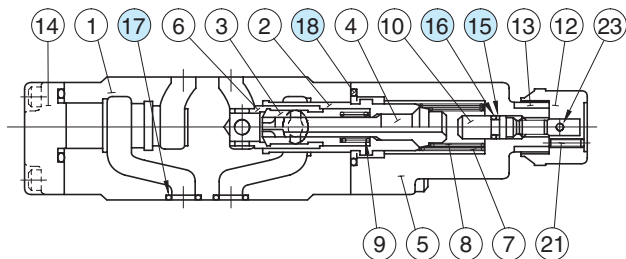
MFP-03-11



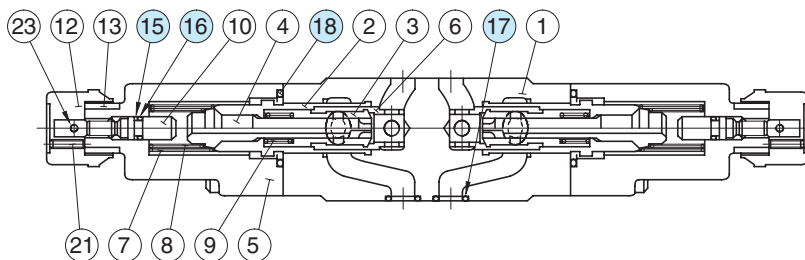
MFA-03-X<sub>Y</sub>-11



MFB-03-X<sub>Y</sub>-11



MFW-03-X<sub>Y</sub>-11



● List of Seals

| Item | Name of Parts | Part Numbers | Quantity |        |        |        |
|------|---------------|--------------|----------|--------|--------|--------|
|      |               |              | MFP-03   | MFA-03 | MFB-03 | MFW-03 |
| 15   | Back Up Ring  | SO-BB-P6     | 1        | 1      | 1      | 2      |
| 16   | O-Ring        | SO-NA-P6     | 1        | 1      | 1      | 2      |
| 17   | O-Ring        | SO-NB-A014   | 5        | 5      | 5      | 5      |
| 18   | O-Ring        | SO-NB-P28    | 1        | 2      | 2      | 2      |

Note: When ordering seals, please specify the seal kit number from the table right.

● List of Seal Kits

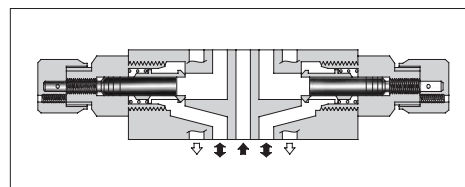
| Valve Model Numbers | Seal Kit Numbers |
|---------------------|------------------|
| MFP-03              | KS-MFP-03-10     |
| MFA-03              | KS-MFA-03-10     |
| MFB-03              |                  |
| MFW-03              | KS-MFW-03-10     |

## Temperature Compensated Throttle and Check Modular Valves

### Specifications

| Model Numbers                                | Max. Operating Pressure<br>MPa<br>(PSI) | Max. Differential Pressure<br>MPa<br>(PSI) | Max. Metred Flow<br>L/min<br>(U.S.GPM) | Min. Metred Flow<br>L/min<br>(U.S.GPM) | Max. Free Flow<br>L/min<br>(U.S.GPM) |
|----------------------------------------------|-----------------------------------------|--------------------------------------------|----------------------------------------|----------------------------------------|--------------------------------------|
| MSTA-03-X-20<br>MSTB-03-X-20<br>MSTW-03-X-20 | 25<br>(3630)                            | 25<br>(3630)                               | 70<br>(18.5)                           | 2 (.53)<br>{ 1 (.26) }★                | 70<br>(18.5)                         |

★ The figures in parentheses are the values when the differential pressure is less than 3.5 MPa (510 PSI).



### Model Number Designation

| F-                                                                                         | MSTA                                                                                                                                                                                                                                            | -03        | -X                   | -20           | *               |
|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------------|---------------|-----------------|
| Special Seals                                                                              | Series Number                                                                                                                                                                                                                                   | Valve Size | Direction of Flow    | Design Number | Design Standard |
| <b>F:</b><br>Special Seals for<br>Phosphate Ester Type<br>Fluids<br>(Omit if not required) | <b>MSTA</b> : Temperature Compensated<br>Throttle and Check Valve for A-Line<br><b>MSTB</b> : Temperature Compensated<br>Throttle and Check Valve for B-Line<br><b>MSTW</b> : Temperature Compensated<br>Throttle and Check Valve for A&B-Lines | <b>03</b>  | <b>X</b> : Metre-out | <b>20</b>     | Refer to ★      |

★ Design Standards: None ..... Japanese Standard "JIS", European Design Standard and N. American Design Standard

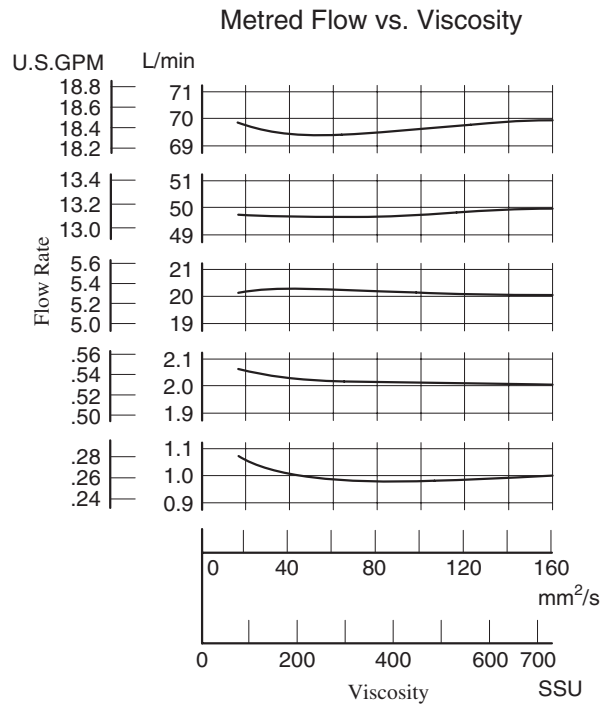
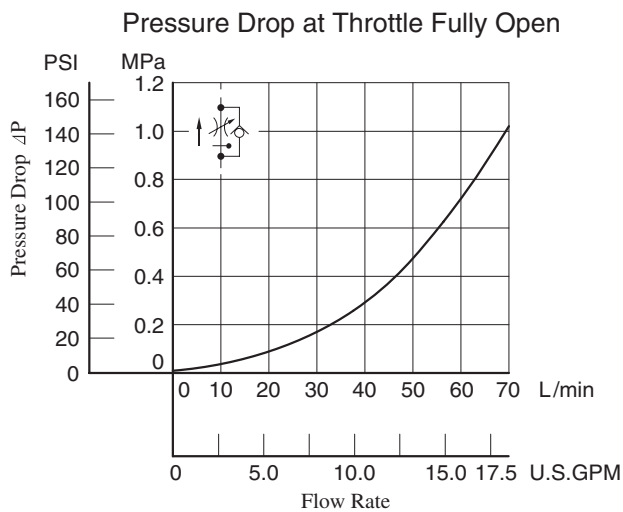
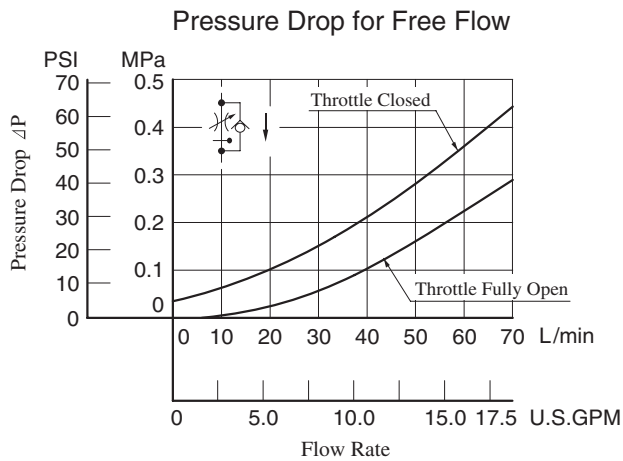
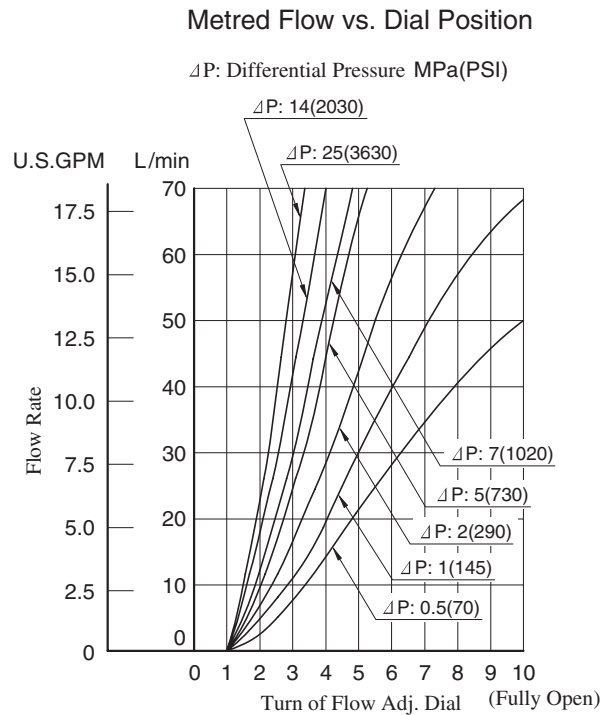
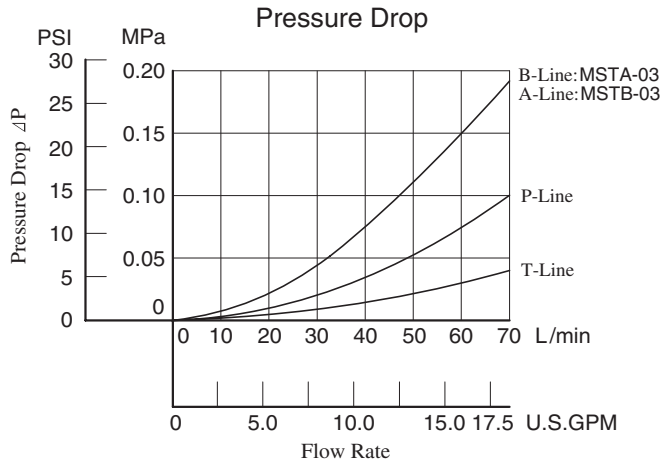
### Instructions

- 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.

| Model No. | Graphic Symbols | Detailed Graphic Symbols |
|-----------|-----------------|--------------------------|
|           | Metre-out       |                          |
| MSTA-03-X |                 |                          |
| MSTB-03-X |                 |                          |
| MSTW-03-X |                 |                          |

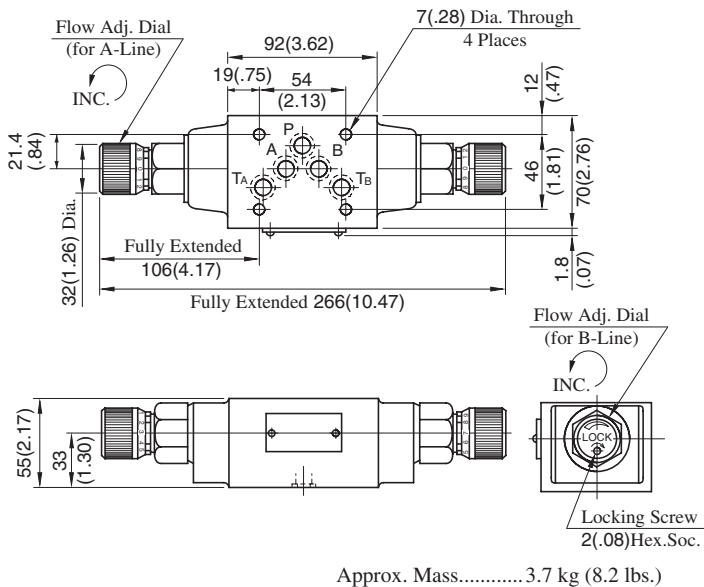
## Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm<sup>2</sup>/s (164 SSU), Specific Gravity 0.850

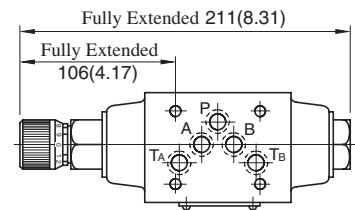


## MSTW-03-X-20

### DIMENSIONS IN MILLIMETRES (INCHES)



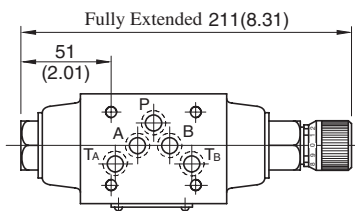
## MSTA-03-X-20



Approx. Mass..... 3.5 kg (7.7 lbs.)

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

## MSTB-03-X-20

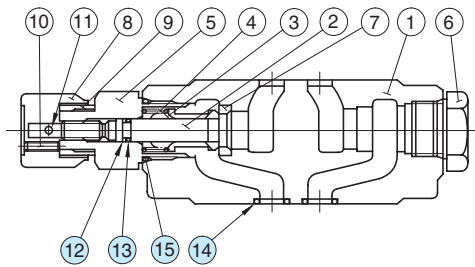


Approx. Mass..... 3.5 kg (7.7 lbs.)

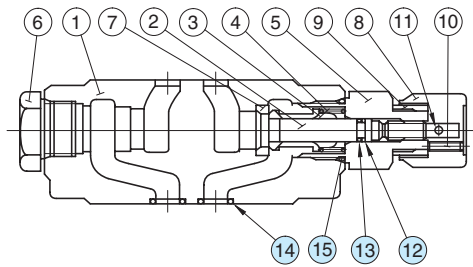
- For other dimensions, refer to "MSTW-03" drawing left.

## Spare Parts List

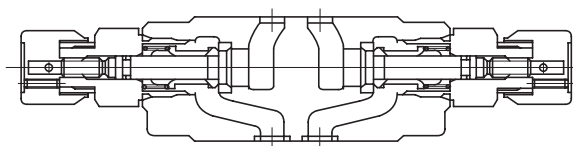
### MSTA-03-X-20



### MSTB-03-X-20



### MSTW-03-X-20



#### • List of Seals

| Item | Name of Parts | Part Numbers   | Quantity |         |         |
|------|---------------|----------------|----------|---------|---------|
|      |               |                | MSTA-03  | MSTB-03 | MSTW-03 |
| 12   | Back Up Ring  | 900-VK411915-2 | 1        | 1       | 2       |
| 13   | O-Ring        | SO-NA-P7       | 1        | 1       | 2       |
| 14   | O-Ring        | SO-NB-A014     | 5        | 5       | 5       |
| 15   | O-Ring        | SO-NB-P24      | 2        | 2       | 2       |

Note: When ordering seals, please specify the seal kit number from the table right.

#### • List of Seal Kits

| Valve Model Numbers | Seal Kit Numbers |
|---------------------|------------------|
| MSTA-03             | KS-MSTA-03-20    |
| MSTB-03             |                  |
| MSTW-03             | KS-MSTW-03-20    |

## Throttle Modular Valves

### Specifications

| Model Number | Max. Operating Pressure<br>MPa (PSI) | Max. Flow<br>L/min (U.S.GPM) |
|--------------|--------------------------------------|------------------------------|
| MSP-03-30    | 25 (3630)                            | 70 (18.5) ★                  |

★ Maximum flow decreases when the differential pressure is less than 1 MPa (145 PSI).  
See "Pressure Drop at Throttle Fully Open".

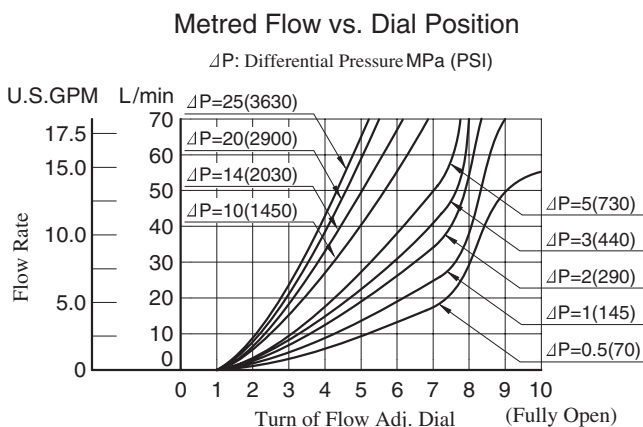
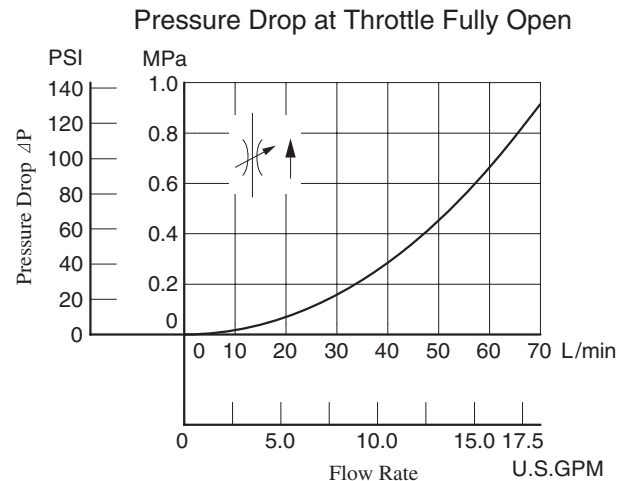
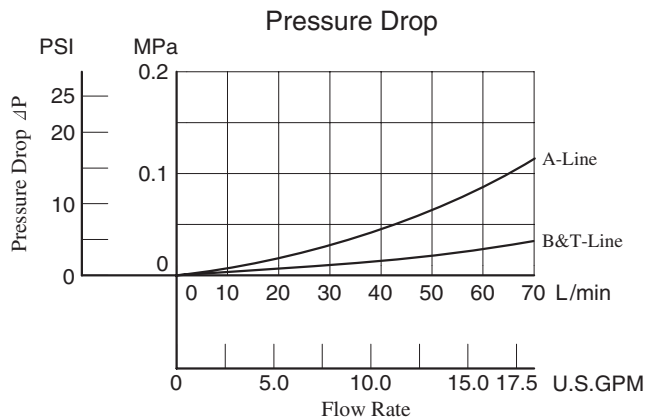
### Model Number Designation

| F-                                                                                         | MSP                                       | -03        | -30           | *               |
|--------------------------------------------------------------------------------------------|-------------------------------------------|------------|---------------|-----------------|
| Special Seals                                                                              | Series Number                             | Valve Size | Design Number | Design Standard |
| <b>F:</b><br>Special Seals for<br>Phosphate Ester<br>Type Fluids (Omit<br>if not required) | <b>MSP :</b> Throttle Valve<br>for P-Line | <b>03</b>  | <b>30</b>     | Refer to ★      |

★ Design Standards: None ..... Japanese Standard "JIS", European Design Standard and N. American Design Standard

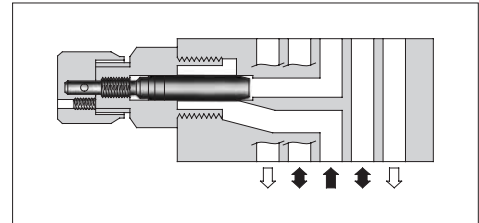
### Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm<sup>2</sup>/s (164 SSU), Specific Gravity 0.850

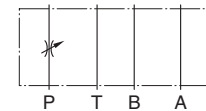


### Instructions

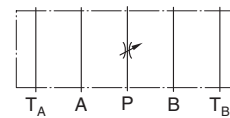
- To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.



Graphic Symbol

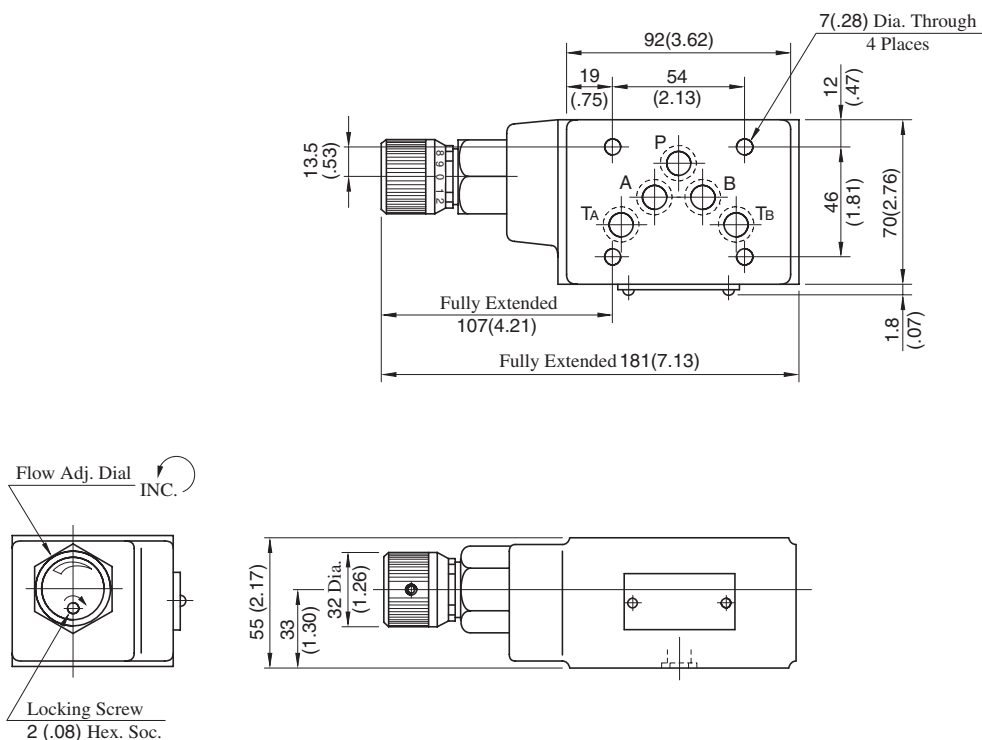


Detailed Graphic Symbol



## MSP-03-30

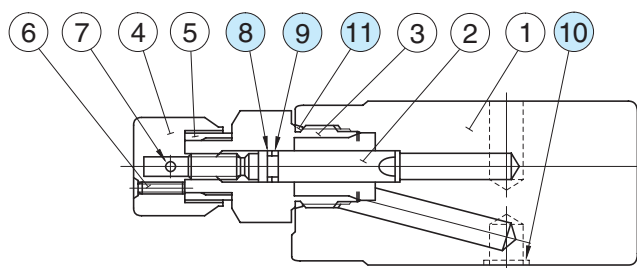
DIMENSIONS IN  
MILLIMETRES (INCHES)



Approx. Mass.....3.0 kg (6.6 lbs.)

## ■ Spare Parts List

### MSP-03-30



#### ● List of Seals

| Item | Name of Parts | Part Numbers   | Qty. | Remarks                                       |
|------|---------------|----------------|------|-----------------------------------------------|
| 8    | Back Up Ring  | 900-VK411915-2 | 1    | Included in Seal Kit<br>Kit No.: KS-MSP-03-30 |
| 9    | O-Ring        | SO-NA-P7       | 1    |                                               |
| 10   | O-Ring        | SO-NB-A014     | 5    |                                               |
| 11   | O-Ring        | SO-NB-P24      | 1    |                                               |

## Check and Throttle Modular Valves

### Specifications

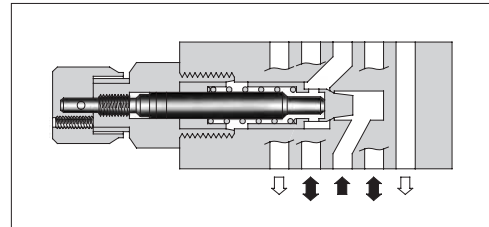
| Model Number | Max. Operating Pressure<br>MPa (PSI) | Max. Flow<br>L/min (U.S.GPM) |
|--------------|--------------------------------------|------------------------------|
| MSCP-03-20   | 25 (3630)                            | 70 (18.5) *                  |

★ Maximum flow decreases when the differential pressure is less than 1 MPa (145 PSI).  
See "Pressure Drop at Throttle Fully Open".

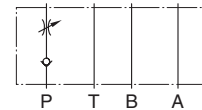
### Model Number Designation

| F-                                                                                         | MSCP                                                    | -03        | -20           | *               |
|--------------------------------------------------------------------------------------------|---------------------------------------------------------|------------|---------------|-----------------|
| Special Seals                                                                              | Series Number                                           | Valve Size | Design Number | Design Standard |
| <b>F:</b><br>Special Seals for<br>Phosphate Ester<br>Type Fluids (Omit<br>if not required) | <b>MSCP :</b><br>Check and Throttle<br>Valve for P-Line | <b>03</b>  | <b>20</b>     | Refer to ★      |

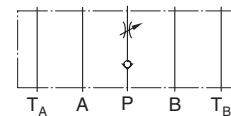
★ Design Standards: None ..... Japanese Standard "JIS", European Design Standard and N. American Design Standard



Graphic Symbol

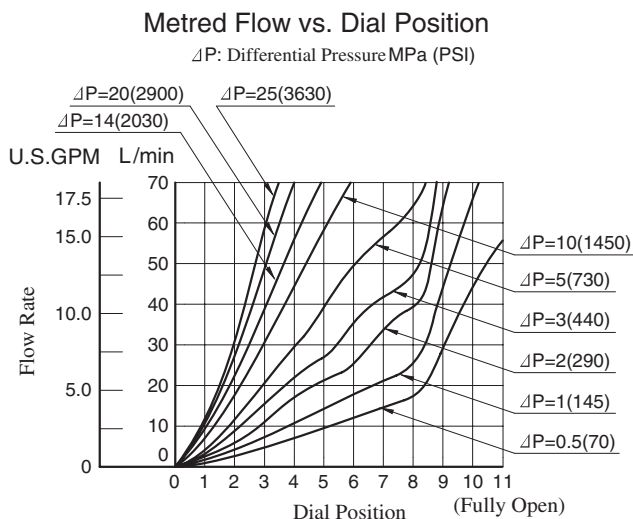
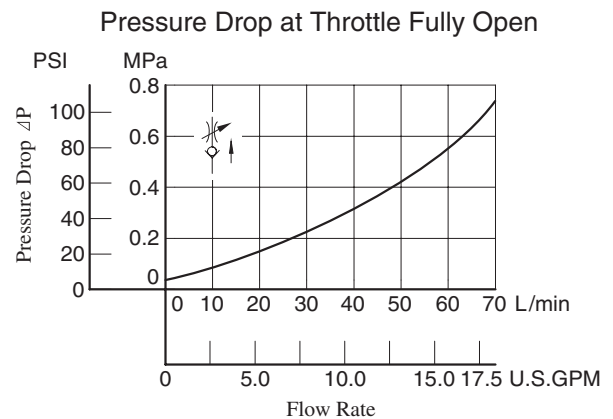
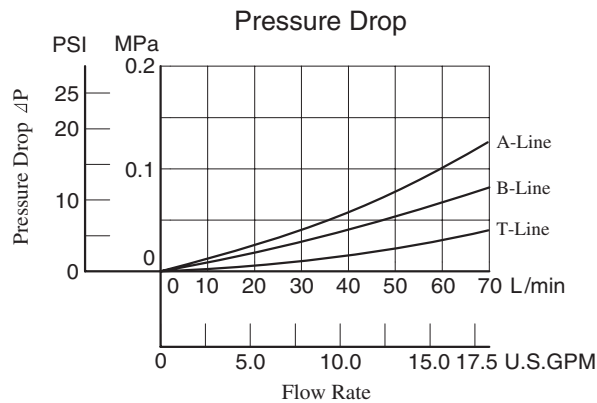


Detailed Graphic Symbol



### Typical Performance Characteristics

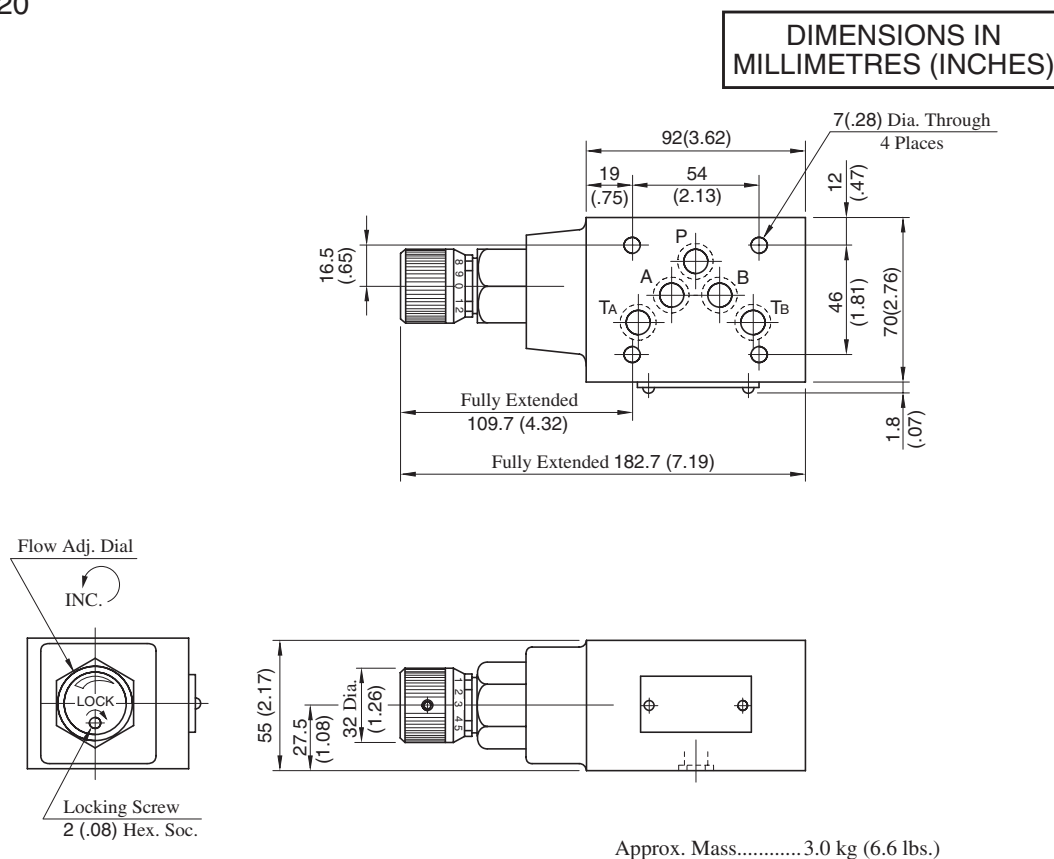
Hydraulic Fluid: Viscosity 35 mm<sup>2</sup>/s (164 SSU), Specific Gravity 0.850



### Instructions

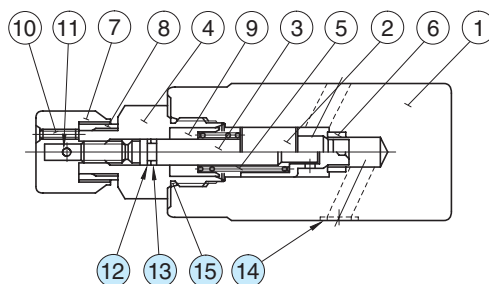
- To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

## MSCP-03-20



## ■ Spare Parts List

## MSCP-03-20



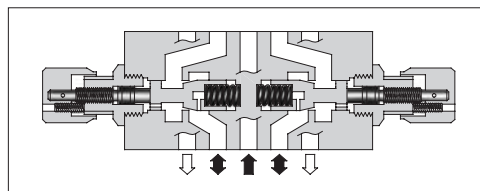
## ● List of Seals

| Item | Name of Parts | Part Numbers   | Qty. | Remarks                                       |
|------|---------------|----------------|------|-----------------------------------------------|
| 12   | Back Up Ring  | 900-VK411915-2 | 1    | Included in Seal Kit<br>Kit No.: KS-MSP-03-30 |
| 13   | O-Ring        | SO-NA-P7       | 1    |                                               |
| 14   | O-Ring        | SO-NB-A014     | 5    |                                               |
| 15   | O-Ring        | SO-NB-P24      | 1    |                                               |

## Throttle and Check Modular Valves

### Specifications

| Model Numbers                             | Max. Operating Pressure<br>MPa (PSI) | Max. Flow<br>L/min (U.S.GPM) |
|-------------------------------------------|--------------------------------------|------------------------------|
| MSA-03-*-40<br>MSB-03-*-40<br>MSW-03-*-40 | 25 (3630)                            | 120 (31.7)                   |



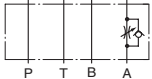
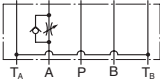
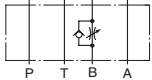
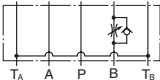
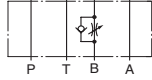
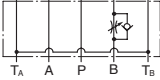
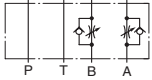
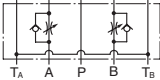
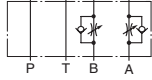
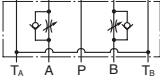
### Model Number Designation

| F-                                                                                | MSW                                                                                                                                                         | -03        | -X                                          | -40           | *               |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------------|---------------|-----------------|
| Special Seals                                                                     | Series Number                                                                                                                                               | Valve Size | Direction of Flow                           | Design Number | Design Standard |
| <b>F:</b><br>Special Seals for Phosphate Ester Type Fluids (Omit if not required) | <b>MSA</b> : Throttle and Check Valve for A-Line<br><b>MSB</b> : Throttle and Check Valve for B-Line<br><b>MSW</b> : Throttle and Check Valve for A&B-Lines | <b>03</b>  | <b>X</b> : Metre-out<br><b>Y</b> : Metre-in | <b>40</b>     | Refer to ★      |

★ Design Standards: None ..... Japanese Standard "JIS", European Design Standard and N. American Design Standard

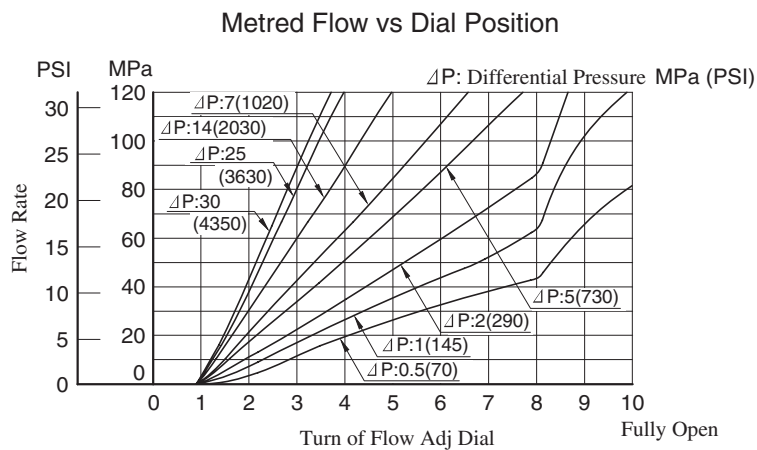
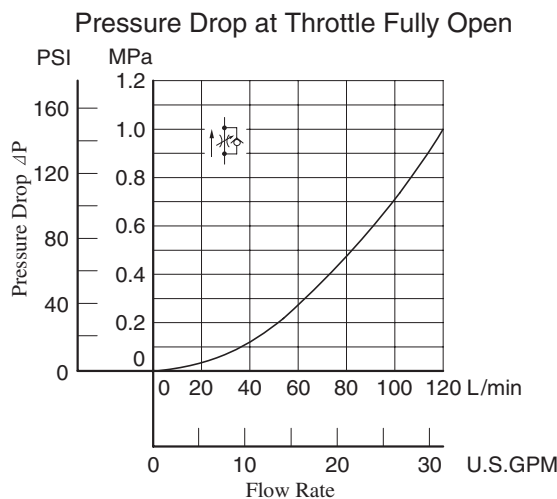
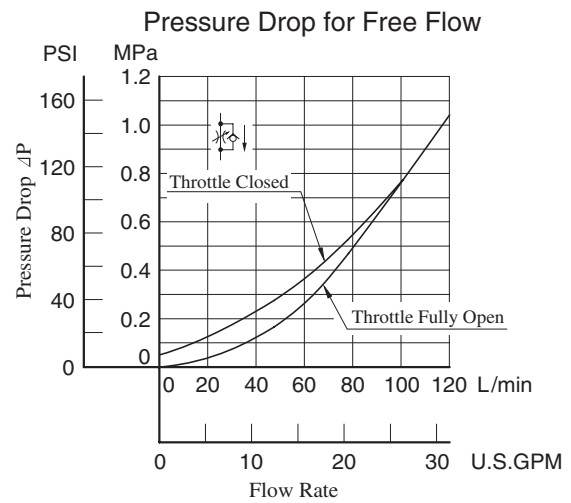
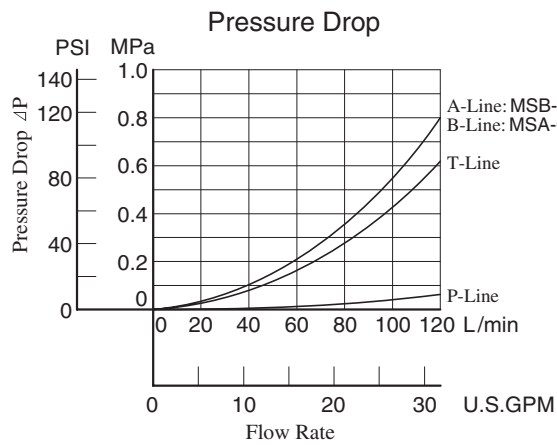
### Instructions

- 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.

| Model No. | Graphic Symbols                                                                     | Detailed Graphic Symbols                                                            | Model No. | Graphic Symbols                                                                      | Detailed Graphic Symbols                                                              |
|-----------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|           | Metre-out                                                                           |                                                                                     |           | Metre-in                                                                             |                                                                                       |
| MSA-03-X  |  |  | MSA-03-Y  |  |  |
| MSB-03-X  |  |  | MSB-03-Y  |  |  |
| MSW-03-X  |  |  | MSW-03-Y  |  |  |

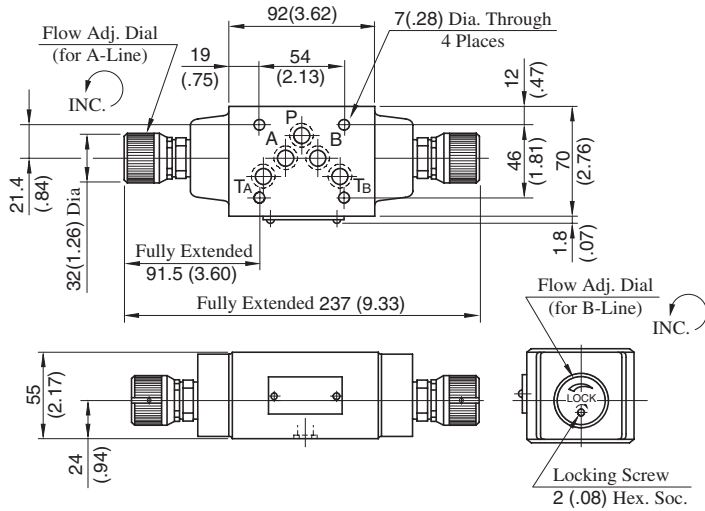
## Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm<sup>2</sup>/s (164 SSU), Specific Gravity 0.850



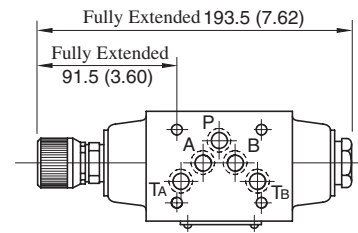
### MSW-03-X-Y-40

**DIMENSIONS IN  
MILLIMETRES (INCHES)**



Approx. Mass.....3.7 kg (8.2 lbs.)

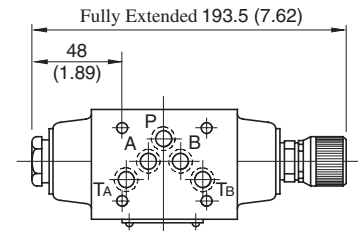
### MSA-03-X-Y-40



Approx. Mass.....3.5 kg (7.7 lbs.)

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

### MSB-03-X-Y-40

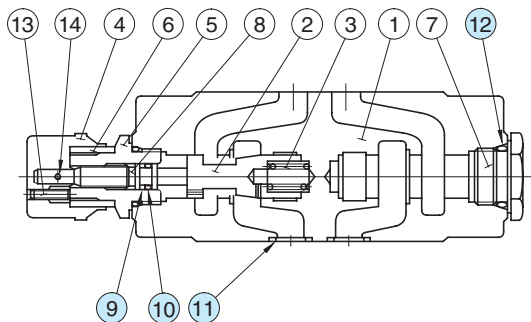


Approx. Mass.....3.5 kg (7.7 lbs.)

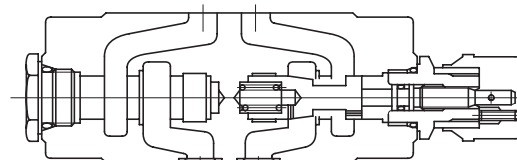
• For other dimensions, refer to "MSW-03" drawing left.

## ■ Spare Parts List

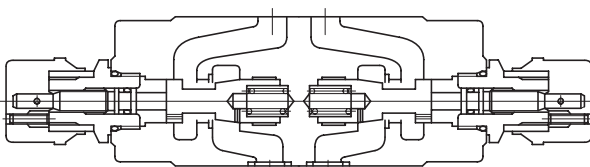
### MSA-03-X-Y-40



### MSB-03-X-Y-40



### MSW-03-X-Y-40



#### ● List of Seals

| Item | Name of Parts | Part Numbers | Quantity |        |        |
|------|---------------|--------------|----------|--------|--------|
|      |               |              | MSA-03   | MSB-03 | MSW-03 |
| 9    | Back Up Ring  | SO-BB-P8     | 1        | 1      | 2      |
| 10   | O-Ring        | SO-NA-P8     | 1        | 1      | 2      |
| 11   | O-Ring        | SO-NB-A014   | 5        | 5      | 5      |
| 12   | O-Ring        | SO-NB-P18    | 2        | 2      | 2      |

Note: When ordering seals, please specify the seal kit number from the table right.

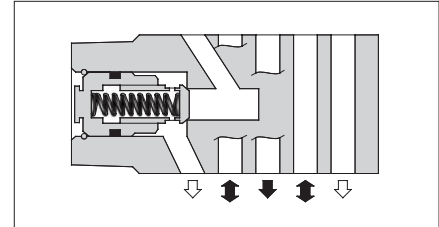
#### ● List of Seal Kits

| Valve Model Numbers | Seal Kit Numbers |
|---------------------|------------------|
| MSA-03              | KS-MSA-03-40     |
| MSB-03              |                  |
| MSW-03              | KS-MSW-03-40     |

## Check Modular Valves

### Specifications

| Model Numbers                                            | Max. Operating Pressure<br>MPa (PSI) | Max. Flow<br>L/min (U.S.GPM) |
|----------------------------------------------------------|--------------------------------------|------------------------------|
| MCP-03-*-10<br>MCA-03-*-20<br>MCB-03-*-20<br>MCT-03-*-10 | 25 (3630)                            | 70 (18.5)                    |



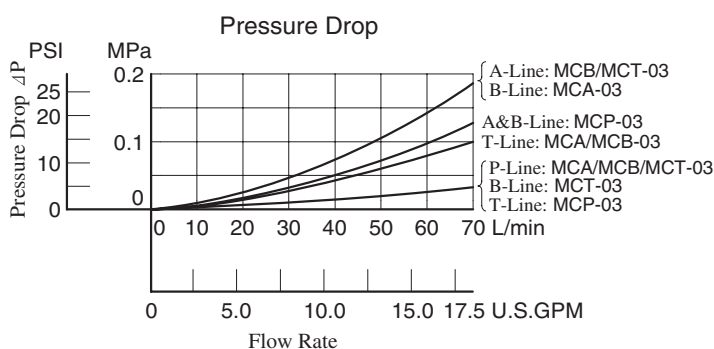
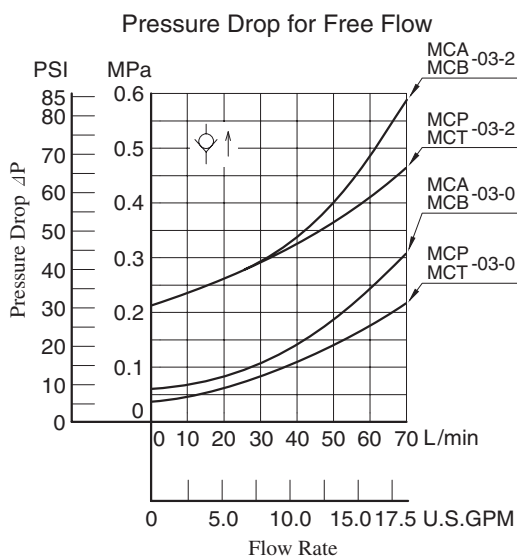
### Model Number Designation

| F-                                                                                 | MCP                                 | -03        | -0                                        | -10           | *               |
|------------------------------------------------------------------------------------|-------------------------------------|------------|-------------------------------------------|---------------|-----------------|
| Special Seals                                                                      | Series Number                       | Valve Size | Cracking Pressure<br>MPa(PSI)             | Design Number | Design Standard |
| <b>F</b> : Special Seals for Phosphate Ester Type Fluids<br>(Omit if not required) | <b>MCP</b> : Check Valve for P-Line | <b>03</b>  | <b>0</b> : 0.035(5)<br><b>2</b> : 0.2(29) | <b>10</b>     | Refer to ★      |
|                                                                                    | <b>MCA</b> : Check Valve for A-Line |            |                                           | <b>20</b>     |                 |
|                                                                                    | <b>MCB</b> : Check Valve for B-Line |            |                                           | <b>10</b>     |                 |
|                                                                                    | <b>MCT</b> : Check Valve for T-Line |            |                                           |               |                 |

★ Design Standards: None ..... Japanese Standard "JIS", European Design Standard and N. American Design Standard

### Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm<sup>2</sup>/s (164 SSU), Specific Gravity 0.850



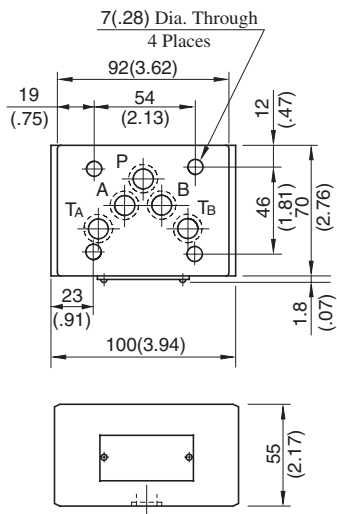
| Model No. | Graphic Symbols | Detailed Graphic Symbols |
|-----------|-----------------|--------------------------|
| MCP-03    |                 |                          |
| MCA-03    |                 |                          |
| MCB-03    |                 |                          |
| MCT-03    |                 |                          |

### Instructions

#### ● Tank Line Used

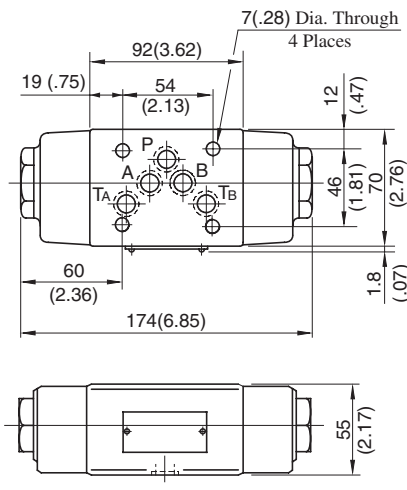
Check valve function of MCT-03 is included in T<sub>A</sub>-Line. Therefore, the tank line for a circuit that uses this valve must be T<sub>A</sub>-line.

### MCP-03-\*-10



Approx. Mass.....2.5 kg (5.5 lbs.)

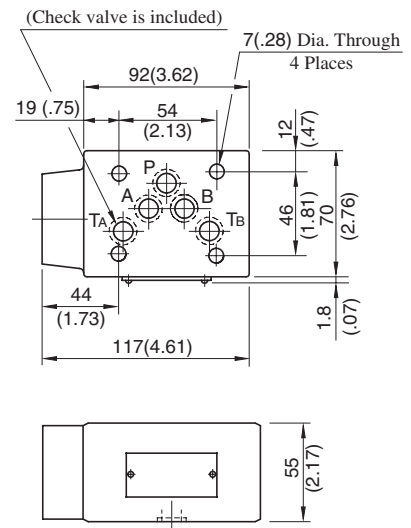
### MCA-03-\*-20 MCB-03-\*-20



Approx. Mass.....3.5 kg (7.7 lbs.)

**DIMENSIONS IN  
MILLIMETRES (INCHES)**

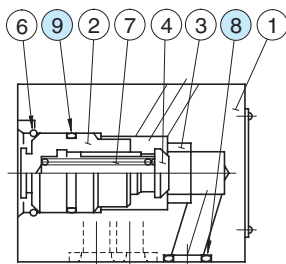
### MCT-03-\*-10



Approx. Mass.....2.8 kg (6.2 lbs.)

## ■ Spare Parts List

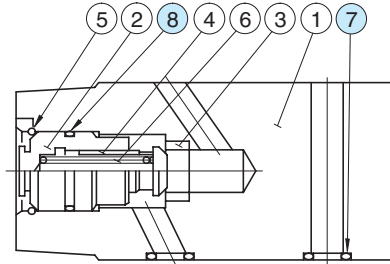
### MCP-03-\*-10



#### ● List of Seals

| Item | Name of Parts | Part Numbers | Qty. | Remarks                                       |
|------|---------------|--------------|------|-----------------------------------------------|
| 8    | O-Ring        | SO-NB-A014   | 5    | Included in Seal Kit<br>Kit No.: KS-MCP-03-10 |
| 9    | O-Ring        | SO-NB-P21    | 1    |                                               |

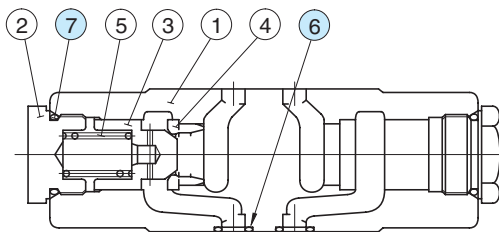
### MCT-03-\*-10



#### ● List of Seals

| Item | Name of Parts | Part Numbers | Qty. | Remarks                                       |
|------|---------------|--------------|------|-----------------------------------------------|
| 7    | O-Ring        | SO-NB-A014   | 5    | Included in Seal Kit<br>Kit No.: KS-MCP-03-10 |
| 8    | O-Ring        | SO-NB-P21    | 1    |                                               |

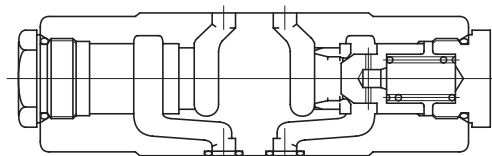
### MCA-03-\*-20



#### ● List of Seals

| Item | Name of Parts | Part Numbers | Qty. | Remarks                                       |
|------|---------------|--------------|------|-----------------------------------------------|
| 6    | O-Ring        | SO-NB-A014   | 5    | Included in Seal Kit<br>Kit No.: KS-MCA-03-20 |
| 7    | O-Ring        | SO-NB-P24    | 2    |                                               |

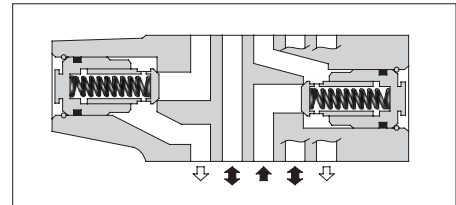
### MCB-03-\*-20



## Check Modular Valves For "P&T" Lines

### Specifications

| Model Numbers    | Max. Operating Pressure<br>MPa (PSI) | Max. Flow<br>L/min (U.S.GPM) |
|------------------|--------------------------------------|------------------------------|
| MCPT-03-P*-T*-10 | 25 (3630)                            | 70 (18.5)                    |



### Model Number Designation

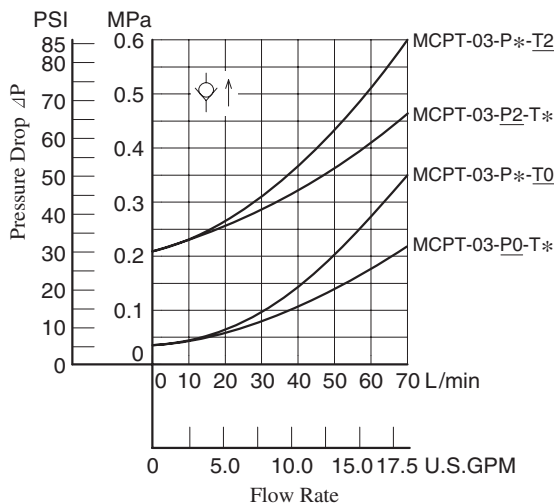
| F-                                                                                 | MCPT                                    | -03        | -P0                                         | -T0                                         | -10           | *               |
|------------------------------------------------------------------------------------|-----------------------------------------|------------|---------------------------------------------|---------------------------------------------|---------------|-----------------|
| Special Seals                                                                      | Series Number                           | Valve Size | Cracking Pres. of P-Line MPa(PSI)           | Cracking Pres. of T-Line MPa(PSI)           | Design Number | Design Standard |
| <b>F</b> : Special Seals for Phosphate Ester Type Fluids<br>(Omit if not required) | <b>MCPT</b> : Check Valve for P&T-Lines | <b>03</b>  | <b>P0</b> : 0.035(5)<br><b>P2</b> : 0.2(29) | <b>T0</b> : 0.035(5)<br><b>T2</b> : 0.2(29) | <b>10</b>     | Refer to ★      |

★ Design Standards: None ..... Japanese Standard "JIS", European Design Standard and N. American Design Standard

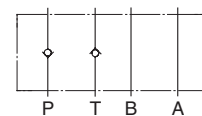
### Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm<sup>2</sup>/s (164 SSU), Specific Gravity 0.850

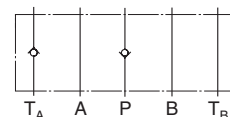
Pressure Drop for Free Flow



Graphic Symbol



Detailed Graphic Symbol

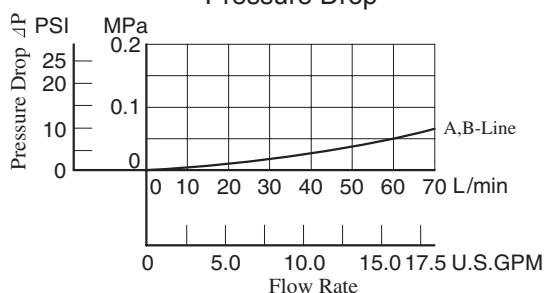


### Instructions

#### ● Tank Line Used

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

Pressure Drop





## Anti-Cavitation Modular Valves

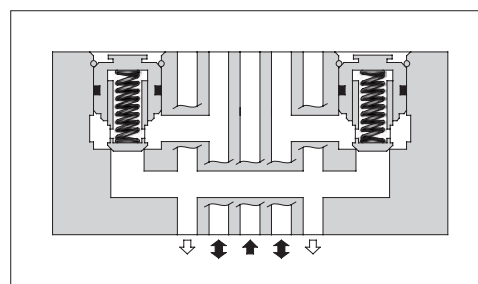
### Specifications

| Model Number | Max. Operating Pressure<br>MPa (PSI) | Max. Flow<br>L/min (U.S.GPM) |
|--------------|--------------------------------------|------------------------------|
| MAC-03-10    | 25 (3630)                            | 70 (18.5)                    |

### Model Number Designation

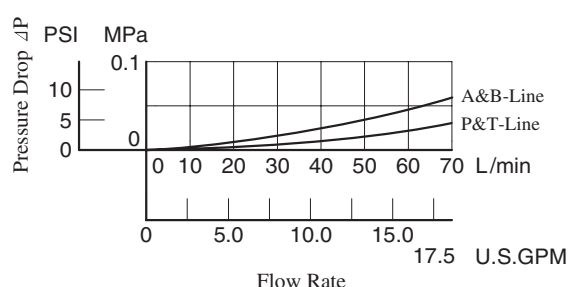
| F-                                                                                   | MAC                               | -03        | -10           | *               |
|--------------------------------------------------------------------------------------|-----------------------------------|------------|---------------|-----------------|
| Special Seals                                                                        | Series Number                     | Valve Size | Design Number | Design Standard |
| <b>F:</b><br>Special Seals for Phosphate Ester Type Fluids<br>(Omit if not required) | <b>MAC:</b> Anti-Cavitation Valve | <b>03</b>  | <b>10</b>     | Refer to ★      |

★ Design Standards: None ..... Japanese Standard "JIS", European Design Standard and N. American Design Standard

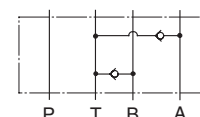


### Pressure Drop

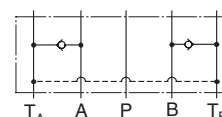
Hydraulic Fluid: Viscosity 35 mm<sup>2</sup>/s (164 SSU), Specific Gravity 0.850



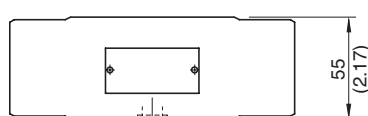
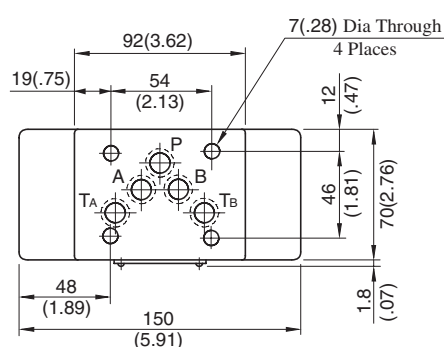
### Graphic Symbol



### Detailed Graphic Symbol



### MAC-03-10

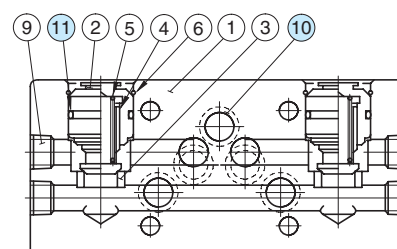


Approx. Mass.....3.8 kg (8.4 lbs.)

DIMENSIONS IN  
MILLIMETRES (INCHES)

### Spare Parts List

#### MAC-03-10



### List of Seals

| Item | Name of Parts | Part Numbers | Qty. | Remarks               |
|------|---------------|--------------|------|-----------------------|
| 10   | O-Ring        | SO-NB-A014   | 5    | Included in Seal Kit  |
| 11   | O-Ring        | SO-NB-P21    | 2    | Kit No.: KS-MAC-03-10 |

## Pilot Operated Check Modular Valves

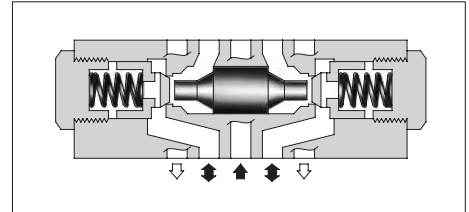
### Specifications

| Model Numbers                   |               | Max. Operating Pressure<br>MPa (PSI) | Max. Flow<br>L/min (U.S.GPM) |
|---------------------------------|---------------|--------------------------------------|------------------------------|
| Standard                        | MP*-03-*-20   | 25 (3630)                            | 70 (18.5)                    |
| Low Pilot Pressure Control Type | MP*-03-*-2001 |                                      |                              |



### Model Number Designation

| F-                                                                                | MPA                                                                                                                                                               | -03        | -2                                         | -20                                                                         | *               |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------------------------|-----------------------------------------------------------------------------|-----------------|
| Special Seals                                                                     | Series Number                                                                                                                                                     | Valve Size | Cracking Pressure<br>MPa (PSI)             | Design Number                                                               | Design Standard |
| <b>F:</b><br>Special Seals for Phosphate Ester Type Fluids (Omit if not required) | <b>MPA</b> : Pilot Operated Check Valve for A-Line<br><b>MPB</b> : Pilot Operated Check Valve for B-Line<br><b>MPW</b> : Pilot Operated Check Valve for A&B-Lines | <b>03</b>  | <b>2</b> : 0.2 (29)<br><b>4</b> : 0.4 (58) | <b>20</b><br>(Standard)<br><b>2001</b><br>(Low Pilot Pressure Control Type) | Refer to ★      |

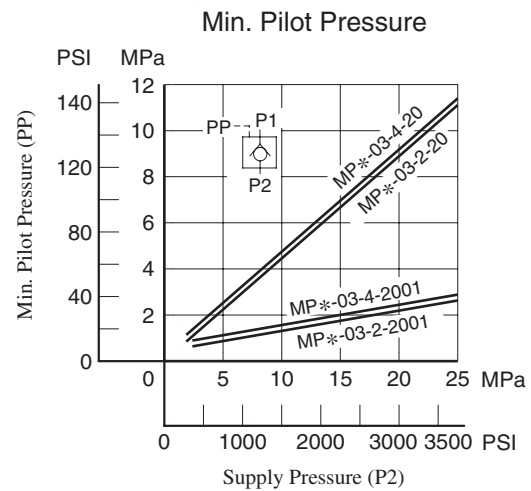
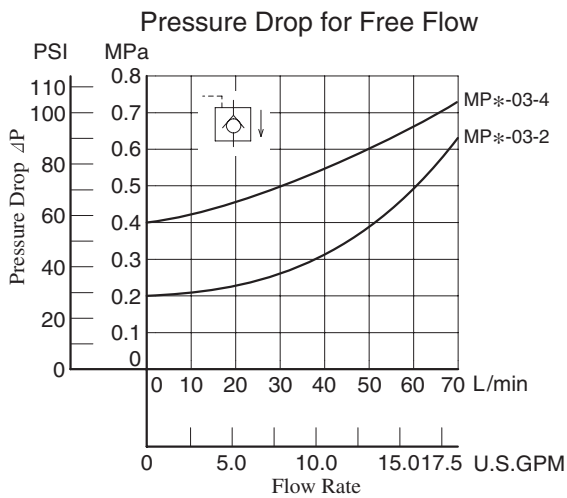
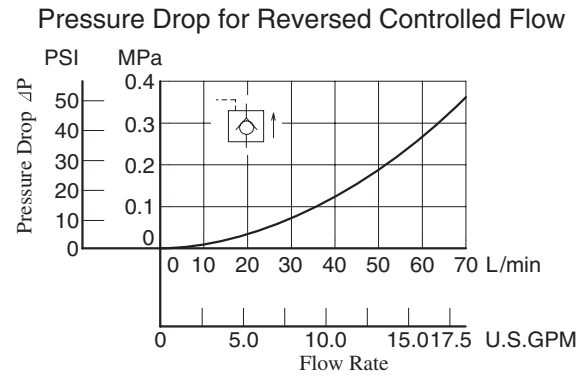
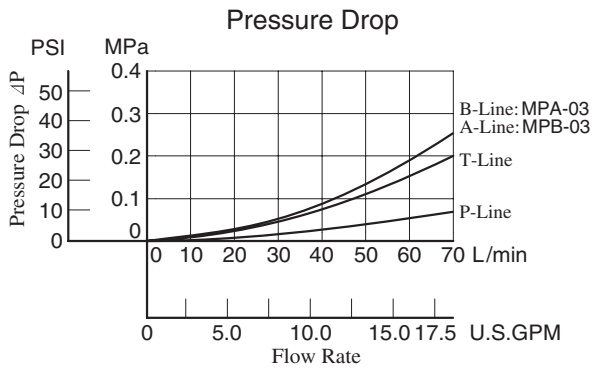


★ Design Standards: None ..... Japanese Standard "JIS", European Design Standard and N. American Design Standard

| Model No. | Graphic Symbols | Detailed Graphic Symbols |
|-----------|-----------------|--------------------------|
| MPA-03    |                 |                          |
| MPB-03    |                 |                          |
| MPW-03    |                 |                          |

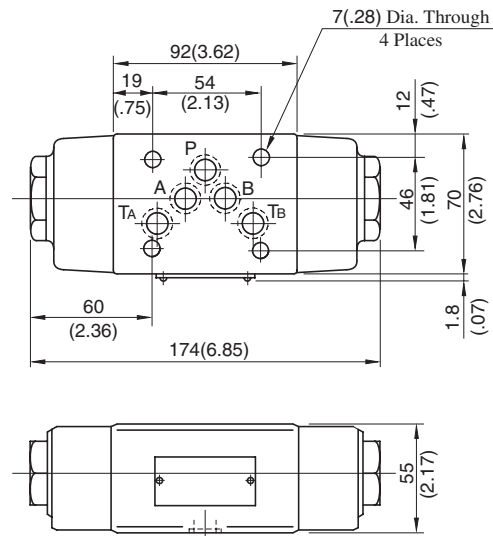
## Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm<sup>2</sup>/s (164 SSU), Specific Gravity 0.850



MPA-03-\*-20/2001  
MPB-03-\*-20/2001  
MPW-03-\*-20/2001

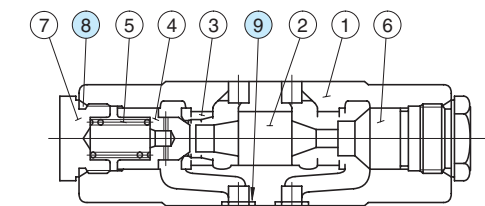
**DIMENSIONS IN  
MILLIMETRES (INCHES)**



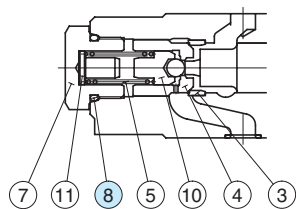
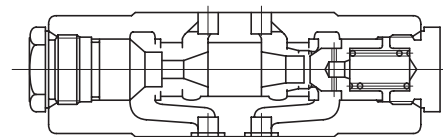
Approx. Mass.....3.5 kg (7.7 lbs.)

## ■ Spare Parts List

MPA-03-\*-20



MPB-03-\*-20

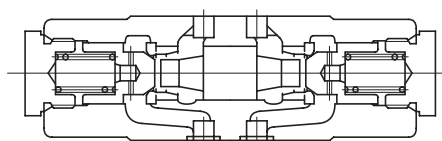


Low Pilot Pressure Control Type  
(MPA-03-\*-2001)

## ● List of Seals

| Item | Name of Parts | Part Numbers | Qty. | Remarks               |
|------|---------------|--------------|------|-----------------------|
| 8    | O-Ring        | SO-NB-P24    | 2    | Included in Seal Kit  |
| 9    | O-Ring        | SO-NB-A014   | 5    | Kit No.: KS-MPA-03-20 |

MPW-03-\*-20



## End Plates

Blocking plates are used for auxiliary mounting surfaces or for closing unnecessary circuit.

Bypass plates are used for one-way flow circuit that requires no solenoid operated directional valves.



## Specifications

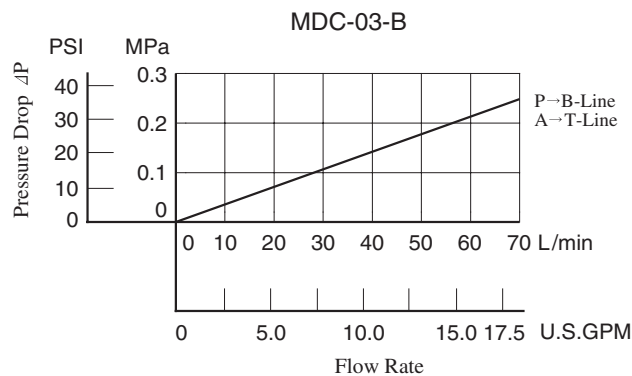
| Model Numbers | Max. Operating Pressure<br>MPa (PSI) | Max. Flow<br>L/min (U.S.GPM) |
|---------------|--------------------------------------|------------------------------|
| MDC-03-*-10   | 25 (3630)                            | 70 (18.5)                    |

## Model Number Designation

| F-                                                                                      | MDC                   | -03        | -A                                                 | -10           | *                                                                                                    |
|-----------------------------------------------------------------------------------------|-----------------------|------------|----------------------------------------------------|---------------|------------------------------------------------------------------------------------------------------|
| Special Seals                                                                           | Series Number         | Valve Size | Type of Plate                                      | Design Number | Design Standard                                                                                      |
| <b>F:</b><br>Special Seals for Phosphate<br>Ester Type Fluids<br>(Omit if not required) | <b>MDC:</b> End Plate | <b>03</b>  | <b>A:</b> Blocking Plate<br><b>B:</b> Bypass Plate | <b>10</b>     | <b>None:</b> Japanese Standard "JIS",<br>European Design Standard and<br>N. American Design Standard |

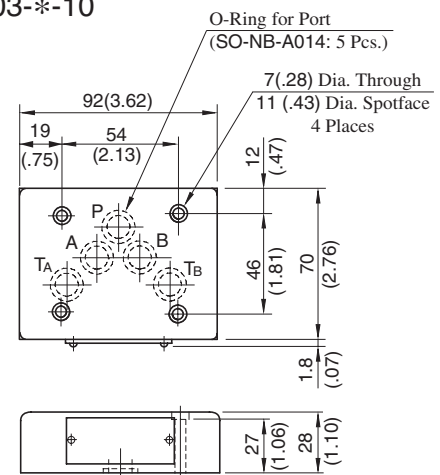
## Pressure Drop

Hydraulic Fluid: Viscosity 35 mm<sup>2</sup>/s (164 SSU), Specific Gravity 0.850



| Model No. | Graphic Symbols | Detailed Graphic Symbols |
|-----------|-----------------|--------------------------|
| MDC-03-A  |                 |                          |
| MDC-03-B  |                 |                          |

### MDC-03-\*-10



Approx. Mass : 1.2 kg (2.6 lbs.)

DIMENSIONS IN  
MILLIMETRES (INCHES)



## Connecting Plates

### Specifications

| Model Numbers  | Max. Operating Pressure<br>MPa (PSI) | Max. Flow<br>L/min (U.S.GPM) |
|----------------|--------------------------------------|------------------------------|
| MDS-03-10/1090 | 25 (3630)                            | 70 (18.5)                    |

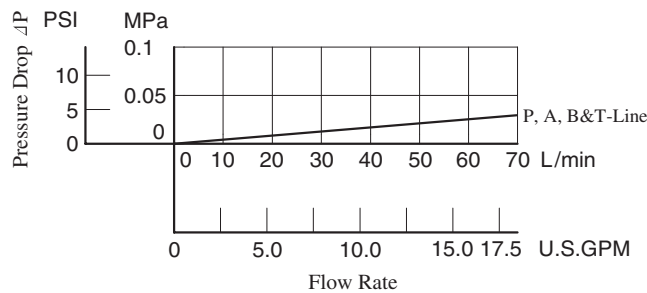


### Model Number Designation

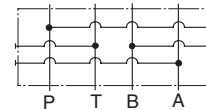
| F-                                                                              | MDS                           | -03        | -10           | *                                                                                                            |
|---------------------------------------------------------------------------------|-------------------------------|------------|---------------|--------------------------------------------------------------------------------------------------------------|
| Special Seals                                                                   | Series Number                 | Valve Size | Design Number | Design Standard                                                                                              |
| <b>F</b> : Special Seals for Phosphate Ester Type Fluids (Omit if not required) | <b>MDS</b> : Connecting Plate | <b>03</b>  | <b>10</b>     | <b>None</b> : Japanese Standard "JIS" and European design Standard<br><b>90</b> : N.American Design Standard |

### Pressure Drop

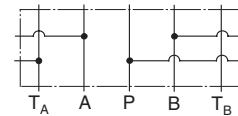
Hydraulic Fluid: Viscosity 35 mm<sup>2</sup>/s (164 SSU), Specific Gravity 0.850



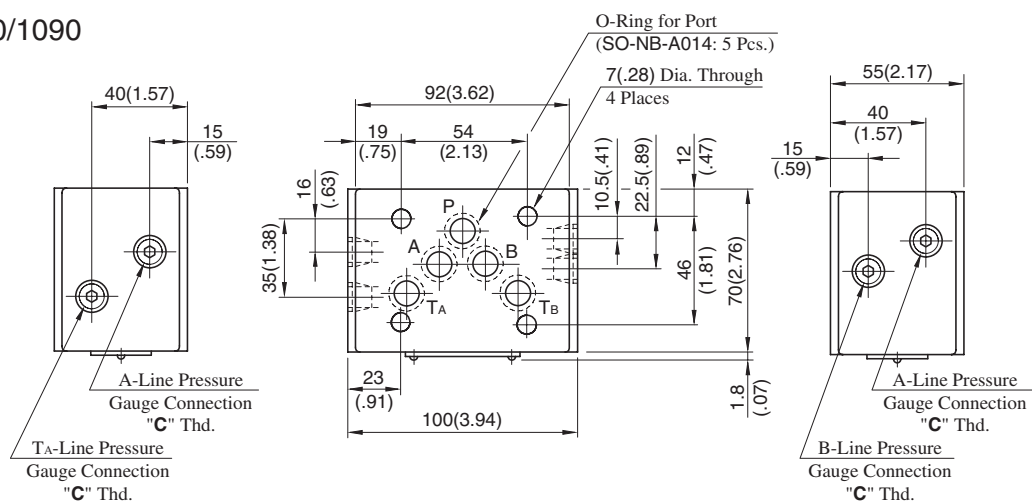
### Graphic Symbol



### Detailed Graphic Symbol



### MDS-03-10/1090



Approx. Mass.....2.5 kg (5.5 lbs.)

| Model Numbers | Thread Size "C" Thd. |
|---------------|----------------------|
| MDS-03-10     | Rc 1/4 = 1/4 BSP.Tr  |
| MDS-03-1090   | 1/4 NPT              |

**DIMENSIONS IN  
MILLIMETRES (INCHES)**

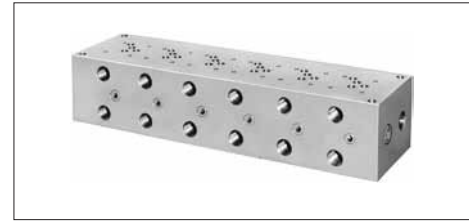
## Base Plates For Modular Valves

### Specifications

Max. Operating Pressure ----- 25 MPa (3630 PSI)

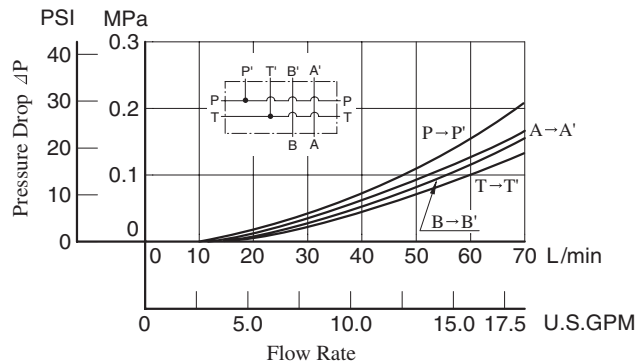
### Model Number Designation

| MMC              | -03        | -T                      | -6                                                                  | -21           | *                                                                                                  |
|------------------|------------|-------------------------|---------------------------------------------------------------------|---------------|----------------------------------------------------------------------------------------------------|
| Series Number    | Plate Size | Type of Connection      | Number of Stations                                                  | Design Number | Design Standard                                                                                    |
| MMC : Base Plate | 03         | T : Threaded Connection | 1 : 1 Station<br>2 : 2 Stations<br>3 : 3 Stations<br>4 : 4 Stations | 21            | None : Japanese Standard "JIS"<br>80 : European Design Standard<br>90 : N.American Design Standard |

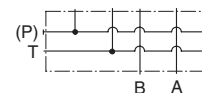


### Pressure Drop

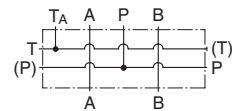
Hydraulic Fluid: Viscosity 35 mm<sup>2</sup>/s (164 SSU), Specific Gravity 0.850



Graphic Symbol

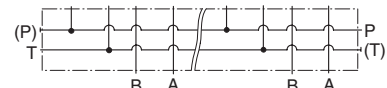


Detailed Graphic Symbol



MMC-03-T-1

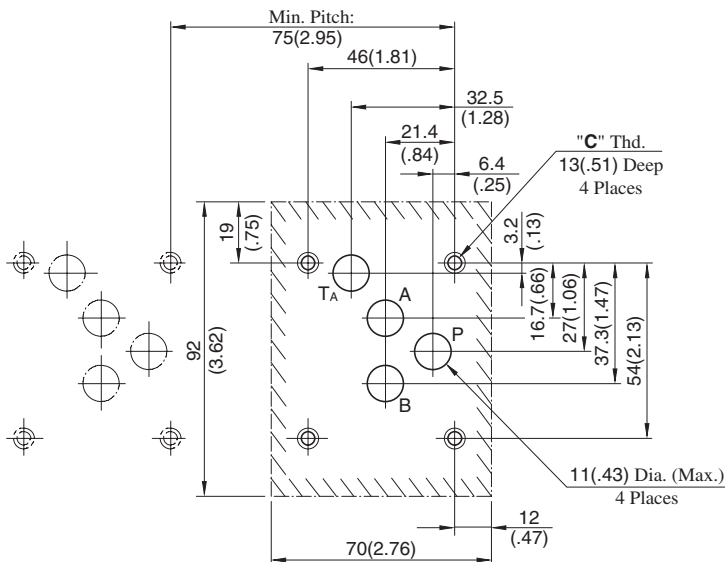
Graphic Symbol



MMC-03-T-2-7

### Mounting Surface Dimensions for 3/8 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.



### Instructions

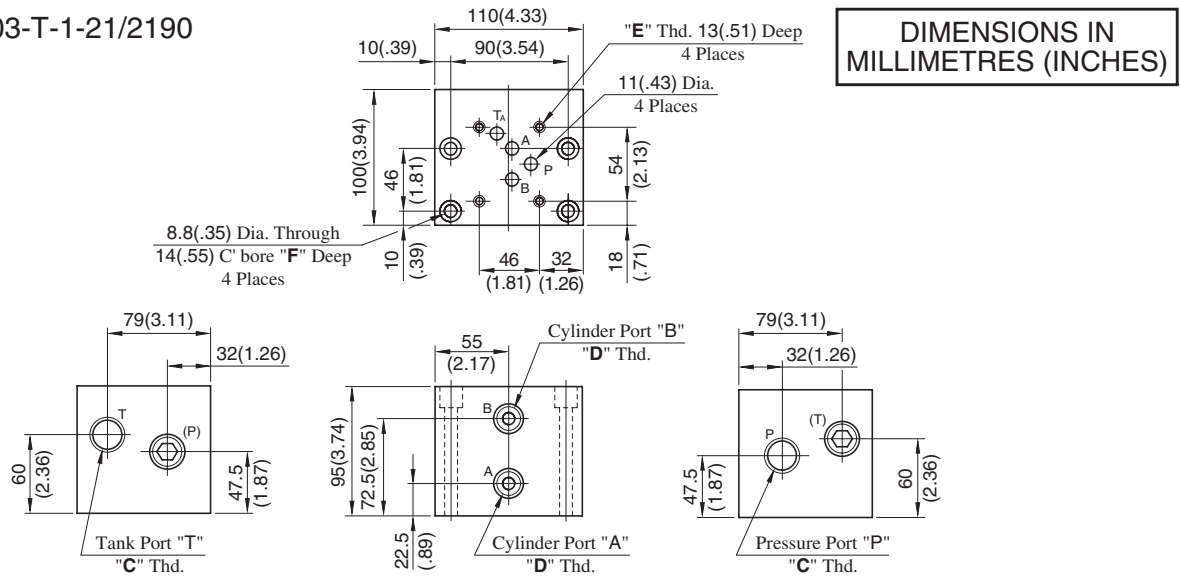
- Although two ports are provided for both **pressure port "P"** and **tank port "T"**, either may be used.

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.

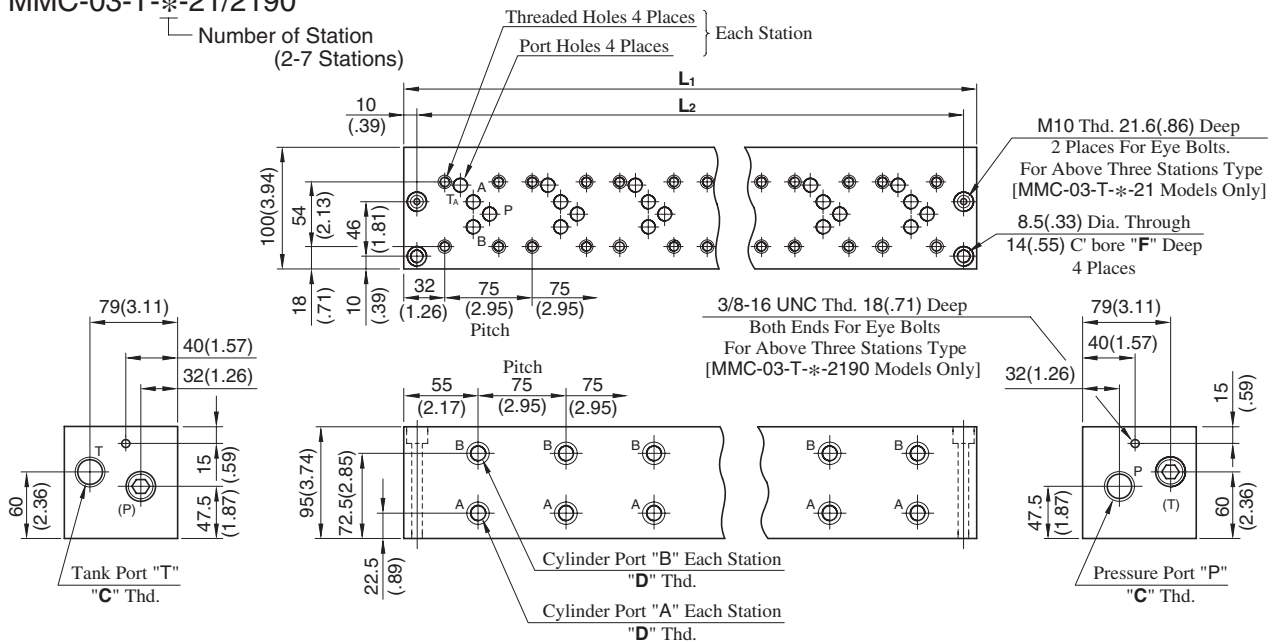
DIMENSIONS IN MILLIMETRES (INCHES)

| Design Std.                                          | "C" Thd.   |
|------------------------------------------------------|------------|
| Japanese Standard "JIS" and European Design Standard | M6         |
| N.American Design Standard                           | 1/4-20 UNC |

**MMC-03-T-1-21/2190**



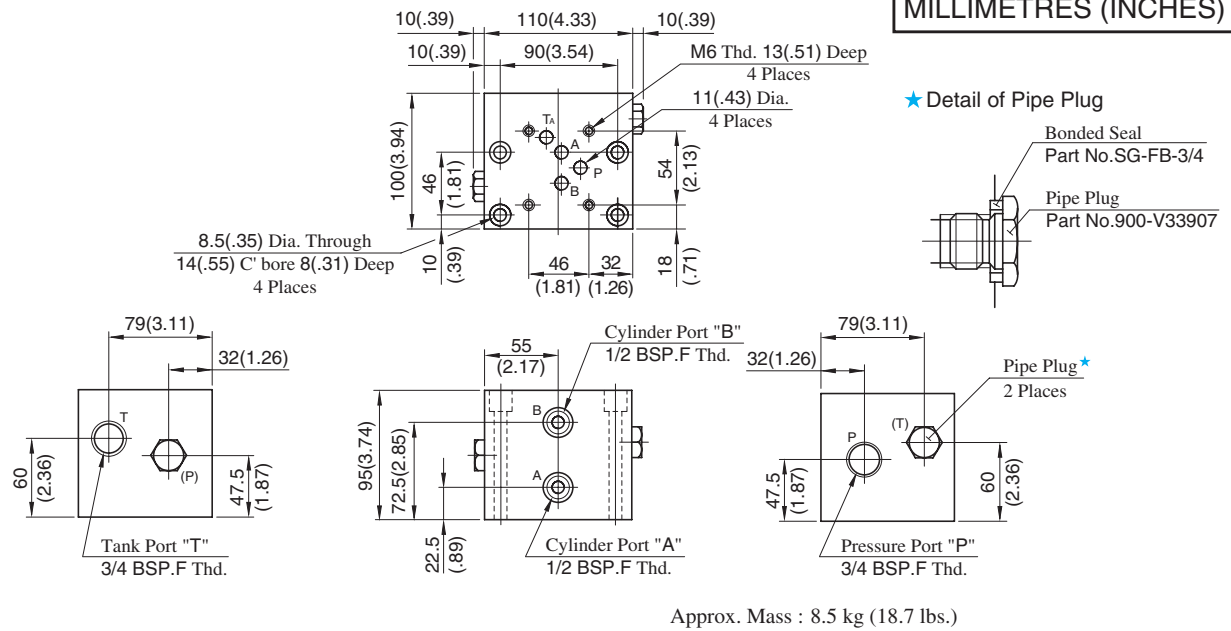
**MMC-03-T-\*-21/2190**



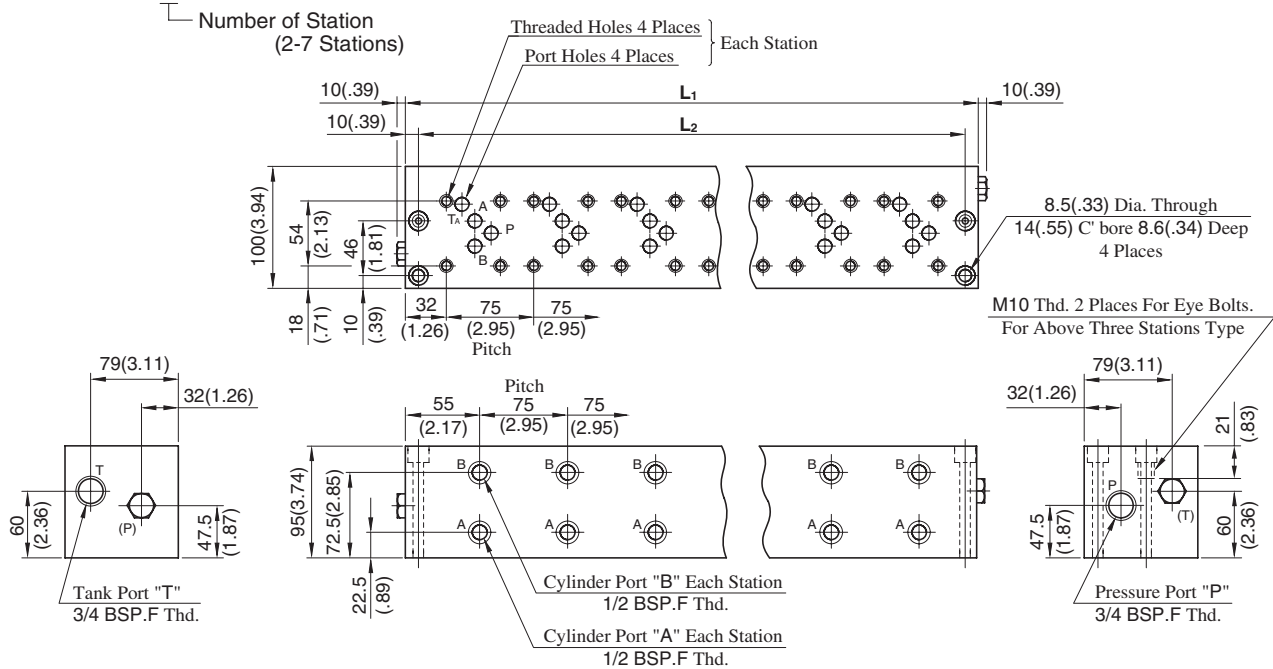
• For other dimensions, refer to above Model MMC-03-T-1.

| Model Numbers   | Thread Size |          |            | Dimensions mm (Inches) |                |                | Approx. Mass<br>kg (lbs.) |
|-----------------|-------------|----------|------------|------------------------|----------------|----------------|---------------------------|
|                 | "C" Thd.    | "D" Thd. | "E" Thd.   | F                      | L <sub>1</sub> | L <sub>2</sub> |                           |
| MMC-03-T-1-21   | Rc 3/4      | Rc 1/2   | M6         | 8.6 (.34)              | —              | —              | 8.5<br>(18.7)             |
| MMC-03-T-1-2190 | 3/4 NPT     | 1/2 NPT  | 1/4-20 UNC | 22 (.87)               | —              | —              |                           |
| MMC-03-T-2-21   | Rc 3/4      | Rc 1/2   | M6         | 8.6 (.34)              | 185<br>(7.28)  | 165<br>(6.50)  | 14<br>(30.9)              |
| MMC-03-T-2-2190 | 3/4 NPT     | 1/2 NPT  | 1/4-20 UNC | 22 (.87)               |                |                |                           |
| MMC-03-T-3-21   | Rc 3/4      | Rc 1/2   | M6         | 8.6 (.34)              | 260<br>(10.24) | 240<br>(9.45)  | 19.5<br>(43.0)            |
| MMC-03-T-3-2190 | 3/4 NPT     | 1/2 NPT  | 1/4-20 UNC | 22 (.87)               |                |                |                           |
| MMC-03-T-4-21   | Rc 3/4      | Rc 1/2   | M6         | 8.6 (.34)              | 335<br>(13.19) | 315<br>(12.40) | 25<br>(55.1)              |
| MMC-03-T-4-2190 | 3/4 NPT     | 1/2 NPT  | 1/4-20 UNC | 22 (.87)               |                |                |                           |
| MMC-03-T-5-21   | Rc 3/4      | Rc 1/2   | M6         | 8.6 (.34)              | 410<br>(16.14) | 390<br>(15.35) | 30.5<br>(67.3)            |
| MMC-03-T-5-2190 | 3/4 NPT     | 1/2 NPT  | 1/4-20 UNC | 22 (.87)               |                |                |                           |
| MMC-03-T-6-21   | Rc 3/4      | Rc 1/2   | M6         | 8.6 (.34)              | 485<br>(19.09) | 465<br>(18.31) | 36<br>(79.4)              |
| MMC-03-T-6-2190 | 3/4 NPT     | 1/2 NPT  | 1/4-20 UNC | 22 (.87)               |                |                |                           |
| MMC-03-T-7-21   | Rc 3/4      | Rc 1/2   | M6         | 8.6 (.34)              | 560<br>(22.05) | 540<br>(21.26) | 41<br>(90.4)              |
| MMC-03-T-7-2190 | 3/4 NPT     | 1/2 NPT  | 1/4-20 UNC | 22 (.87)               |                |                |                           |

## MMC-03-T-1-2180



## MMC-03-T-\*2180



• For other dimensions, refer to above Model MMC-03-T-1.

| Model Numbers   | Dimensions mm (Inches) |                | Approx. Mass<br>kg (lbs.) |
|-----------------|------------------------|----------------|---------------------------|
|                 | L <sub>1</sub>         | L <sub>2</sub> |                           |
| MMC-03-T-2-2180 | 185 (7.28)             | 165 (6.50)     | 14 (30.9)                 |
| MMC-03-T-3-2180 | 260 (10.24)            | 240 (9.45)     | 19.5 (43.0)               |
| MMC-03-T-4-2180 | 335 (13.19)            | 315 (12.40)    | 25 (55.1)                 |
| MMC-03-T-5-2180 | 410 (16.14)            | 390 (15.35)    | 30.5 (67.3)               |
| MMC-03-T-6-2180 | 485 (19.09)            | 465 (18.31)    | 36 (79.4)                 |
| MMC-03-T-7-2180 | 560 (22.05)            | 540 (21.26)    | 41 (90.4)                 |

## 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 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 | Design Standard |
| MBK: Mounting Bolt Kits for Modular Valve | 03                    | 01, 02, 03, 04, 05<br>(Refer to the following chart) | 10            | Refer to ★      |

★ Design Standards: None ..... Japanese Standard "JIS" and European Design Standard  
90 ..... N. American Design Standard

### 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.

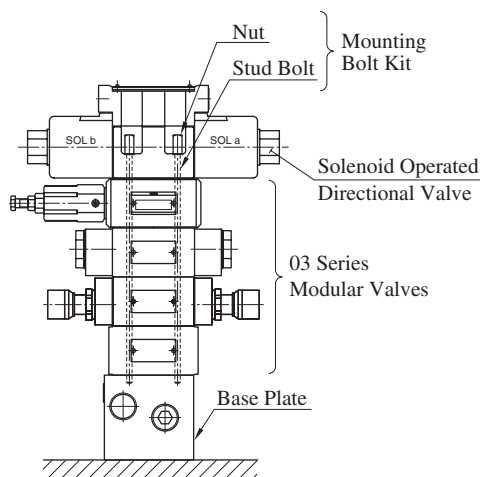
### Tightening Torque:

12-15 Nm (106-133 IN. lbs.)

### Bolt Kits Selection Chart

| Model Numbers | Quantity of valves to be stacked                   |                    |                                  | Approx. Mass<br>g (lbs.) |
|---------------|----------------------------------------------------|--------------------|----------------------------------|--------------------------|
|               | Solenoid Operated Directional Valve<br>(* -DSG-03) | End Plate (MDC-03) | Modular Valve & Connecting Plate |                          |
| MBK-03-01-10* | 1                                                  | 0                  | 1                                | 120(.26)                 |
|               | 0                                                  | 1                  |                                  |                          |
| MBK-03-02-10* | 1                                                  | 0                  | 2                                | 160(.35)                 |
|               | 0                                                  | 1                  |                                  |                          |
| MBK-03-03-10* | 1                                                  | 0                  | 3                                | 200(.44)                 |
|               | 0                                                  | 1                  |                                  |                          |
| MBK-03-04-10* | 1                                                  | 0                  | 4                                | 240(.53)                 |
|               | 0                                                  | 1                  |                                  |                          |
| MBK-03-05-10* | 1★                                                 | 0                  | 0                                | 40(.09)                  |
|               | 0                                                  | 1                  |                                  |                          |

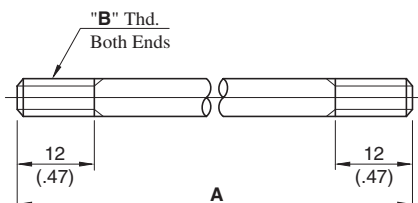
★ The solenoid operated directional valve comes with mounting bolts.



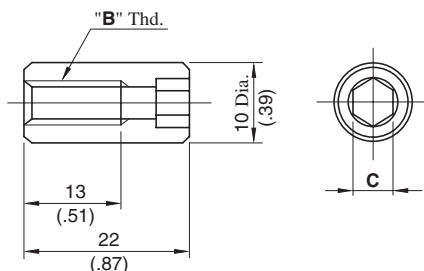
Stacking Example

### MBK-03-\*-10/1090

#### Stud Bolt

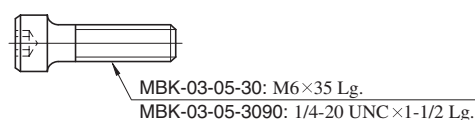


#### Nut



### MBK-03-05-10/1090

#### Socket Head Cap Screw



**DIMENSIONS IN  
MILLIMETRES (INCHES)**

| Model Numbers  | A mm (In.)  | "B" Thd.   | C              |
|----------------|-------------|------------|----------------|
| MBK-03-01-10   | 103 ( 4.06) | M6         | 5 (.20)        |
| MBK-03-02-10   | 158 ( 6.22) |            |                |
| MBK-03-03-10   | 213 ( 8.39) |            |                |
| MBK-03-04-10   | 268 (10.55) |            |                |
| MBK-03-01-1090 | 103 ( 4.06) | 1/4-20 UNC | 4.76<br>(3/16) |
| MBK-03-02-1090 | 158 ( 6.22) |            |                |
| MBK-03-03-1090 | 213 ( 8.39) |            |                |
| MBK-03-04-1090 | 268 (10.55) |            |                |