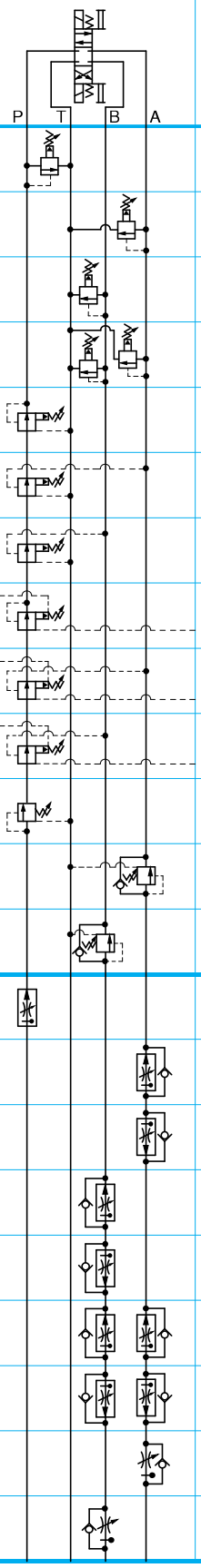
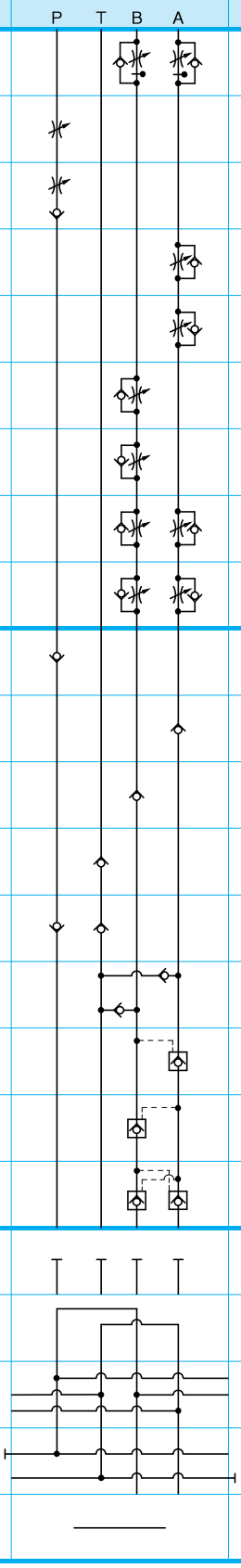
Type of Modular Valve

Class	Model Numbers	Page
	Solenoid Operated Directional Valve (S-)DSG-03-✻✻✻-✻-50/5090 E-DSG-03-✻✻✻-D✻-50/5090 T-DSG-03-✻✻✻-D24✻-50/5090 G-DSG-03-✻✻✻-✻-50/5090	361 378 379 412
Pressure Control Valves	Releif Valves (for "P-Line") MBP-03-✻-30	578
	Releif Valves (for "A-Line") MBA-03-✻-30	578
	Releif Valves (for "B-Line") MBB-03-✻-30	578
	Releif Valves (for "A&B-Lines") MBW-03-✻-30	578
	Reducing Valves (for "P-Line") MRP-03-✻-30/3090	581
	Reducing Valves (for "A-Line") MRA-03-✻-30/3090	581
	Reducing Valves (for "B-Line") MRB-03-✻-30/3090	581
	Reducing Valves for Low Pressure Setting (for "P-Line") MRLP-03-10/1090	584
	Reducing Valves for Low Pressure Setting (for "A-Line") MRLA-03-10/1090	584
	Reducing Valves for Low Pressure Setting (for "B-Line") MRLB-03-10/1090	584
	Sequence Valves (for "P-Line") MHP-03-✻-20	588
	Counterbalance Valves (for "A-Line") MHA-03-✻-20	588
	Counterbalance Valves (for "B-Line") MHB-03-✻-20	588
Flow Control Valves	Flow Control Valves (for "P-Line") MFP-03-11	591
	Flow Control and Check Valves (for "A-Line", Metre-out) MFA-03-X-11	591
	Flow Control and Check Valves (for "A-Line", Metre-in) MFA-03-Y-11	591
	Flow Control and Check Valves (for "B-Line", Metre-out) MFB-03-X-11	591
	Flow Control and Check Valves (for "B-Line", Metre-in) MFB-03-Y-11	591
	Flow Control and Check Valves (for "A&B-Lines", Metre-out) MFW-03-X-11	591
	Flow Control and Check Valves (for "A&B-Lines", Metre-in) MFW-03-Y-11	591
	Temperature Compensated Throttle and Check Valves (for "A-Line", Metre-out) MSTA-03-X-20	595
	Temperature Compensated Throttle and Check Valves (for "B-Line", Metre-out) MSTB-03-X-20	595



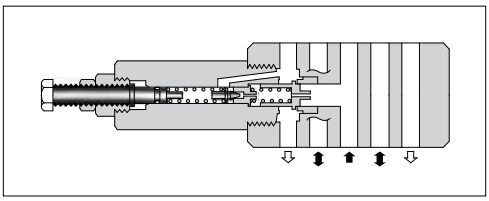
Class	Model Numbers	Page
Flow Control Valves	Temperature Compensated Throttle and Check Valves (for "A&B-Lines", Metre-out) MSTW-03-X-20	595
	Throttle Valves (for "P-Line") MSP-03-30	598
	Check and Throttle Valves (for "P-Line") MSCP-03-20	600
	Throttle and Check Valves (for "A-Line", Metre-out) MSA-03-X-40	602
	Throttle and Check Valves (for "A-Line", Metre-in) MSA-03-Y-40	602
	Throttle and Check Valves (for "B-Line", Metre-out) MSB-03-X-40	602
	Throttle and Check Valves (for "B-Line", Metre-in) MSB-03-Y-40	602
	Throttle and Check Valves (for "A&B-Lines", Metre-out) MSW-03-X-40	602
	Throttle and Check Valves (for "A&B-Lines", Metre-in) MSW-03-Y-40	602
Directional Control Valves	Check Valves (for "P-Line") MCP-03-✻-10	605
	Check Valves (for "A-Line") MCA-03-✻-20	605
	Check Valves (for "B-Line") MCB-03-✻-20	605
	Check Valves (for "T-Line") MCT-03-✻-10	605
	Check Valves (for "P&T-Lines") MCPT-03-P✻-T✻-10	607
	Anti-Cavitation Valves MAC-03-10	609
	Pilot Operated Check Valves (for "A-Line") MPA-03-✻-20/2001	610
	Pilot Operated Check Valves (for "B-Line") MPB-03-✻-20/2001	610
	Pilot Operated Check Valves (for "A&B-Lines") MPW-03-✻-20/2001	610
Modular Plates and Mounting Bolts	End Plates (Blocking Plates) MDC-03-A-10	613
	End Plates (Bypass Plates) MDC-03-B-10	613
	Connecting Plates MDS-03-10/1090	614
	Base Plates MMC-03-T-✻-21/2180/2190	615
	Bolt Kits MBK-03-✻-10/1090	618



Relief Modular Valves

Specifications

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



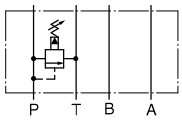
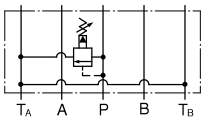
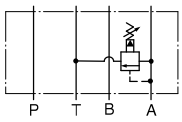
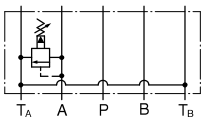
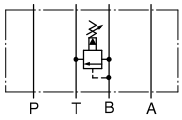
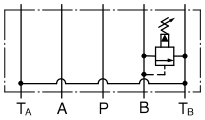
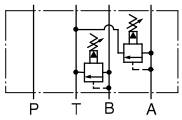
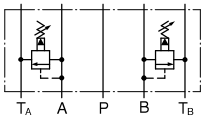
Model Number Designation

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

★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

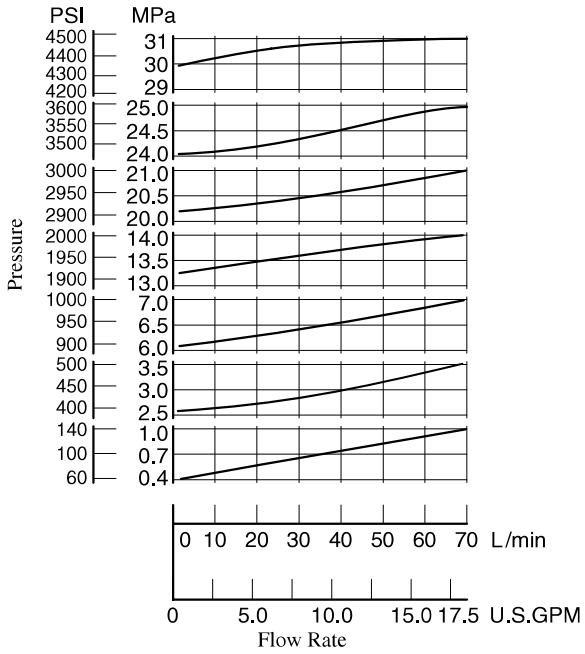
- The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of the next page. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the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

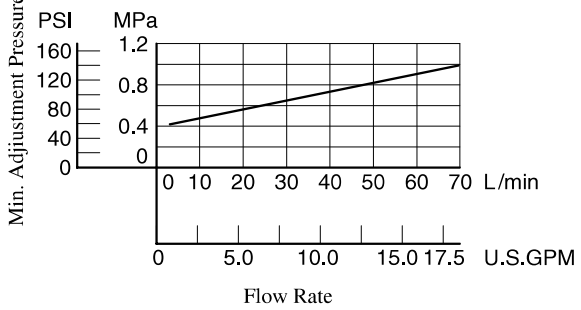
Typical Performance Characteristics

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

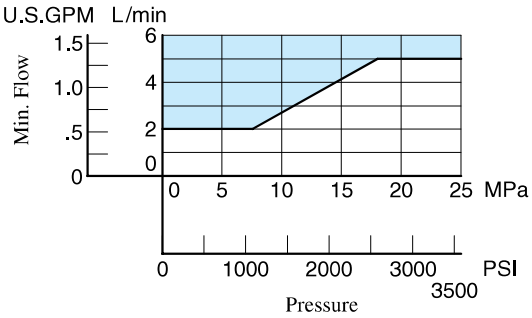
Nominal Override Characteristics



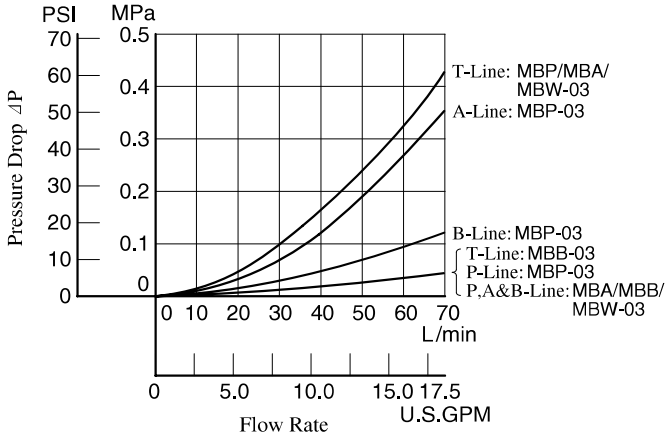
Min. Adjustment Pressure



Min. Flow vs. Adjustment Pressure



Pressure Drop

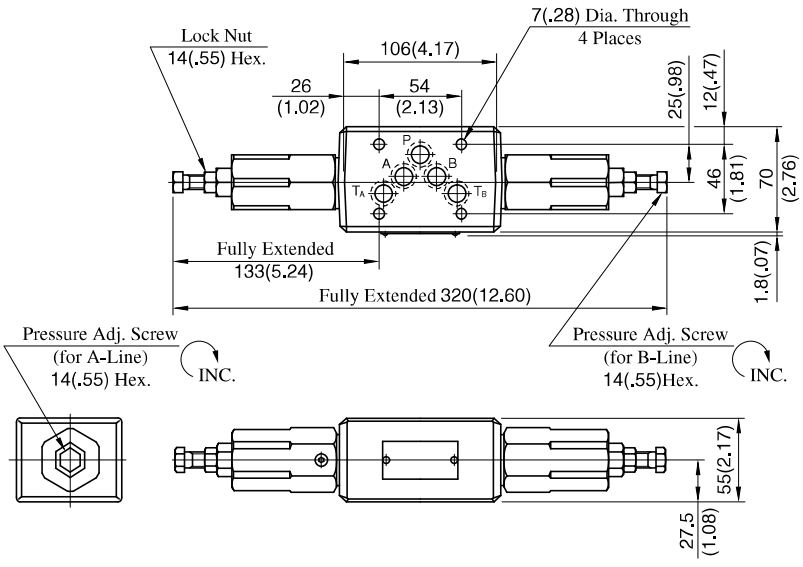


F

03 Series Modular Valves

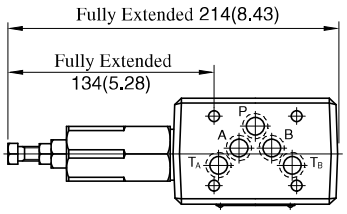
MBW-03-∗-30

DIMENSIONS IN MILLIMETRES (INCHES)



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

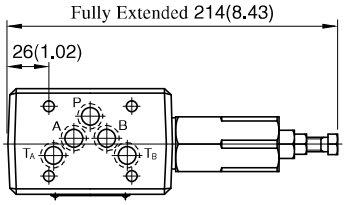
MBP-03-∗-30
MBA-03-∗-30



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

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

MBB-03-∗-30

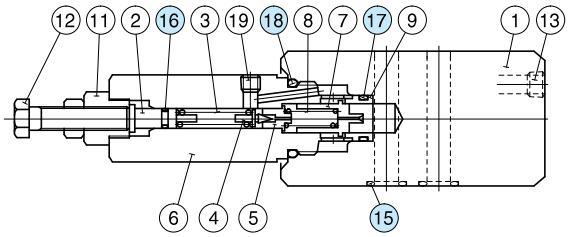


Approx. Mass.....3.1 kg (6.8 lbs.)

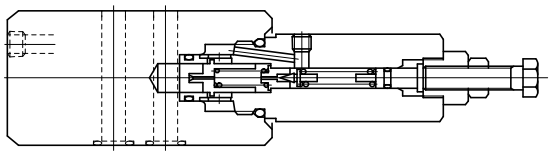
- For other dimensions, refer to "MBW-03" drawing left.

Spare Parts List

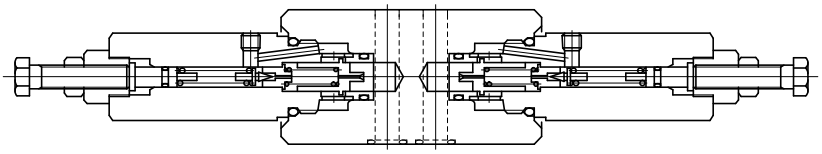
MBP-03-∗-30
MBA-03-∗-30



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

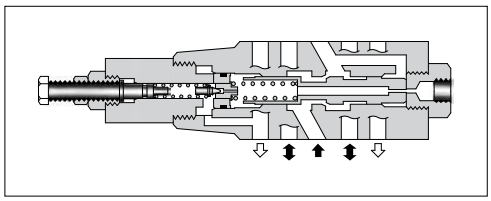
Valve Model Numbers	Seal kit Numbers
MBP-03	KS-MBP-03-30
MBA-03	
MBB-03	
MBW-03	KS-MBW-03-30

Reducing Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa(PSI)	Max. Flow L/min (U.S.GPM)
MRP-03-*-30/3090 MRA-03-*-30/3090 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).



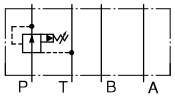
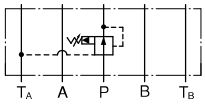
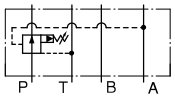
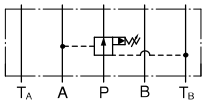
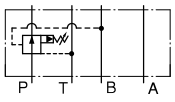
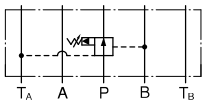
Model Number Designation

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

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

Instructions

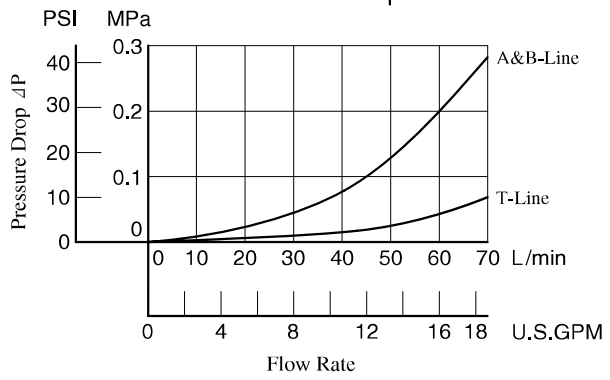
- The minimum adjustment pressure equals the lower limit of either pressure adjustment range (B, H) plus the tank line back pressure of the next page. This back pressure should include the value of the T-line pressure drop characteristics of the values stacked to the base plate side of the modular valve.
- 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		

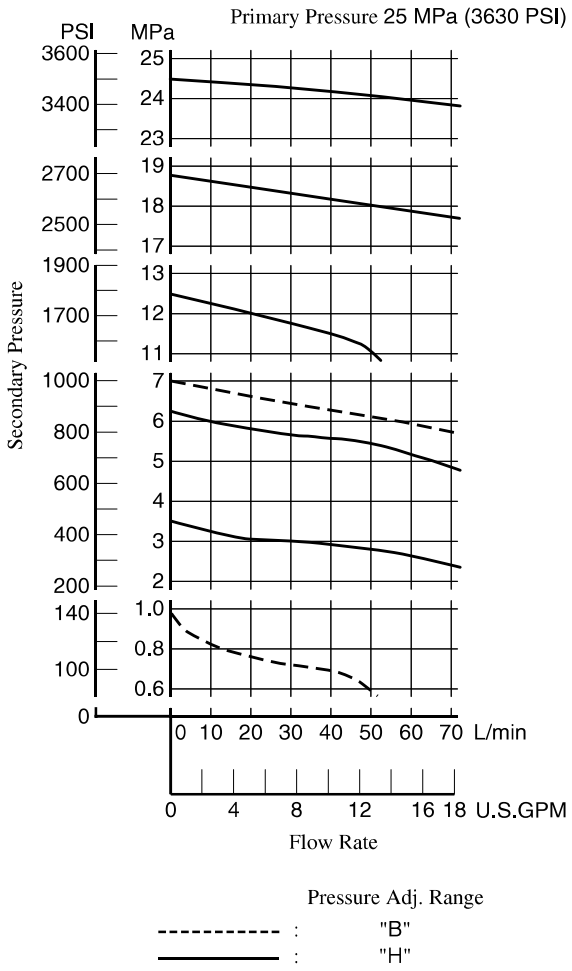
Typical Performance Characteristics

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

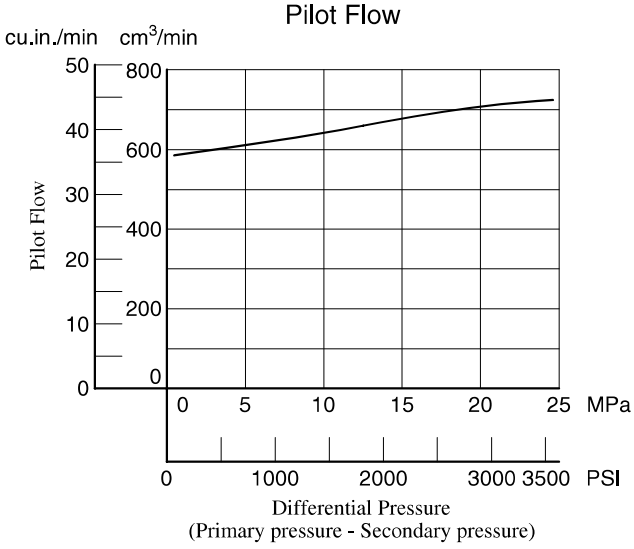
Pressure Drop



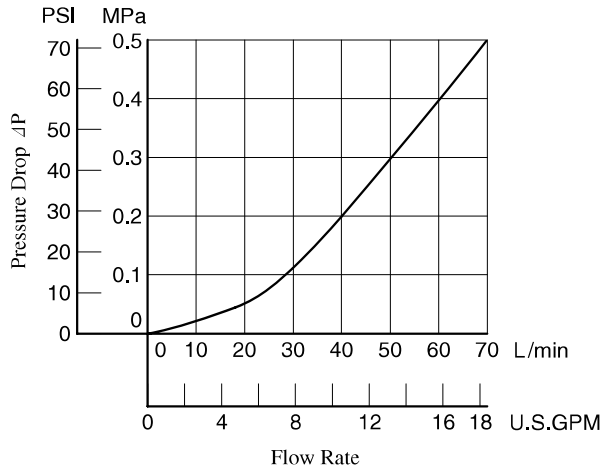
Nominal Override Characteristics



Pilot Flow

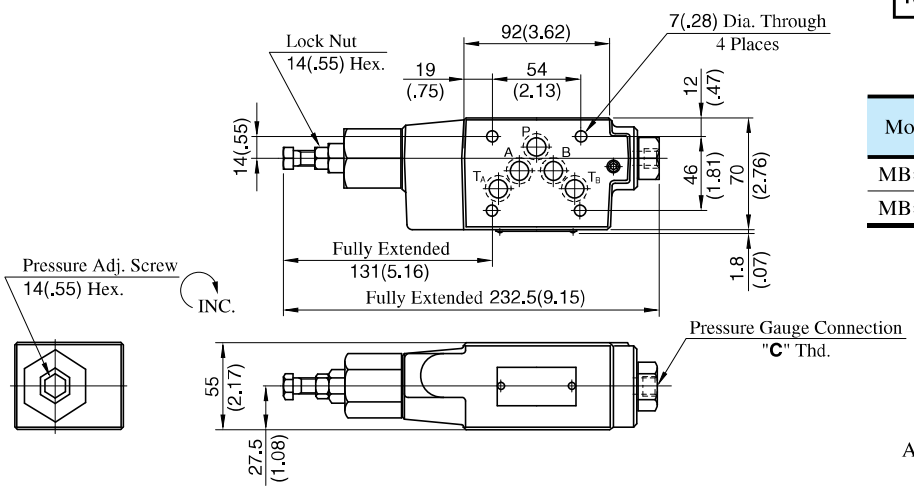


Pres. Drop at Spool Fully Open (P-Line)



MRP-03-∗-30/3090
MRB-03-∗-30/3090

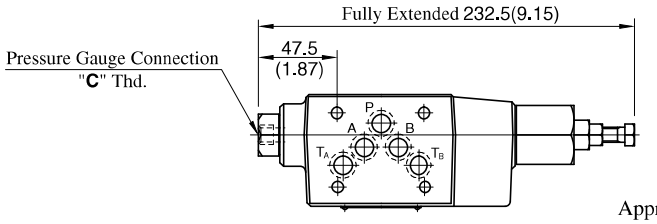
DIMENSIONS IN MILLIMETRES (INCHES)



Model Numbers	Thread Size "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

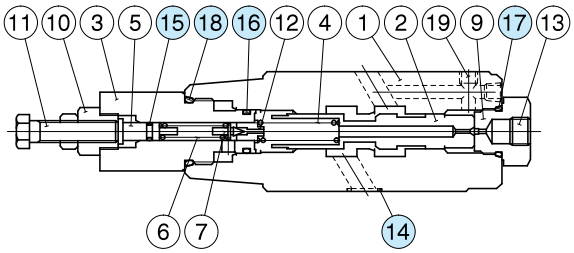


Approx. Mass.....3.3 kg (7.5 lbs.)

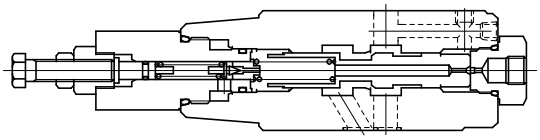
• For other dimensions, refer to "MRP-03" drawing above.

Spare Parts List

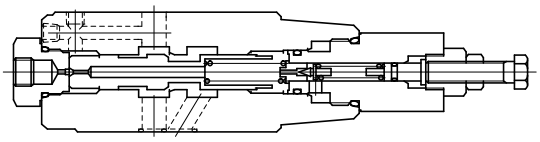
MRP-03-∗-30/3090



MRB-03-∗-30/3090



MRA-03-∗-30/3090



List of Seals

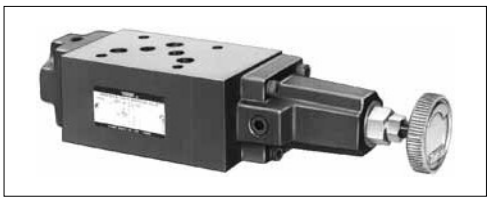
Item	Name of Parts	Part Numbers	Qty.	Remarks
14	O-Ring	SO-NB-A014	5	Included in Seal Kit Kit No.: KS-MRP-03-30
15	O-Ring	SO-NA-P6	1	
16	O-Ring	SO-NB-P16	1	
17	O-Ring	SO-NB-P18	1	
18	O-Ring	SO-NB-P26	1	

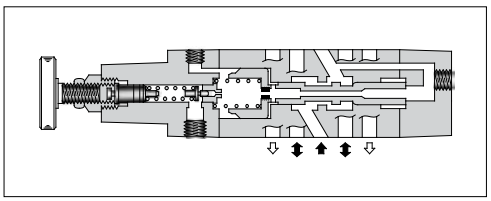
Reducing Modular Valves For Low Pressure Setting

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Pres. Adj. Range MPa (PSI)	Max. Flow L/min (U.S.GPM)
MRLP-03-10/1080/1090 MRLA-03-10/1080/1090 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.





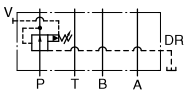
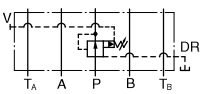
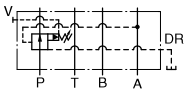
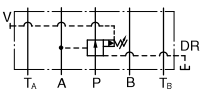
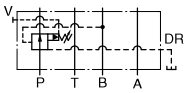
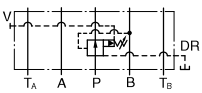
Model Number Designation

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

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

Instructions

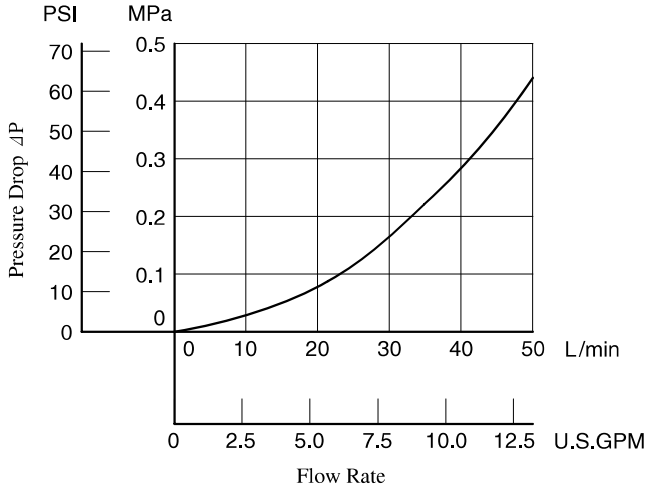
- If there is a pressure in drain line, it is added to the secondary setting pressure. Hence, drain line must be connected to tank directly with a low back pressure close to atmospheric pressure.
- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment handle clockwise or anti-clockwise. 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		

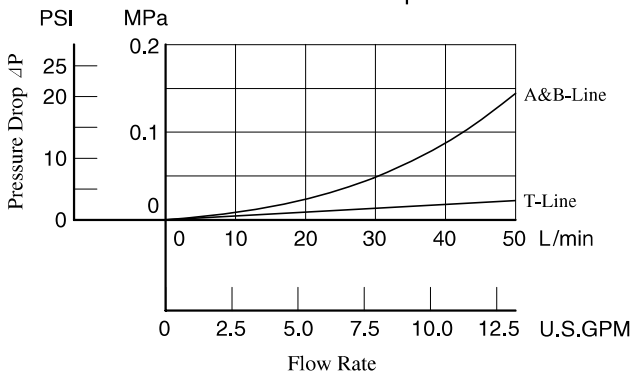
Typical Performance Characteristics

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

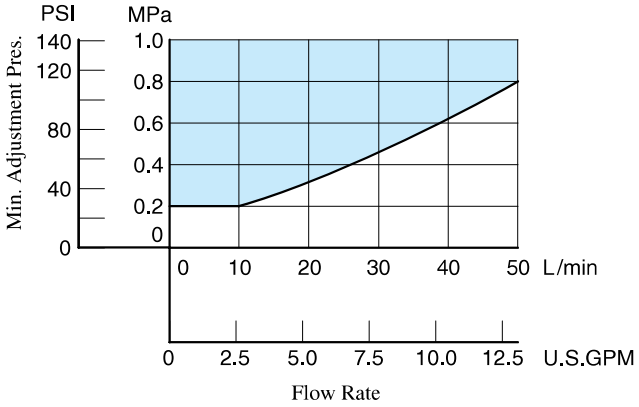
Pres. Drop at Spool Fully Open (P-Line)



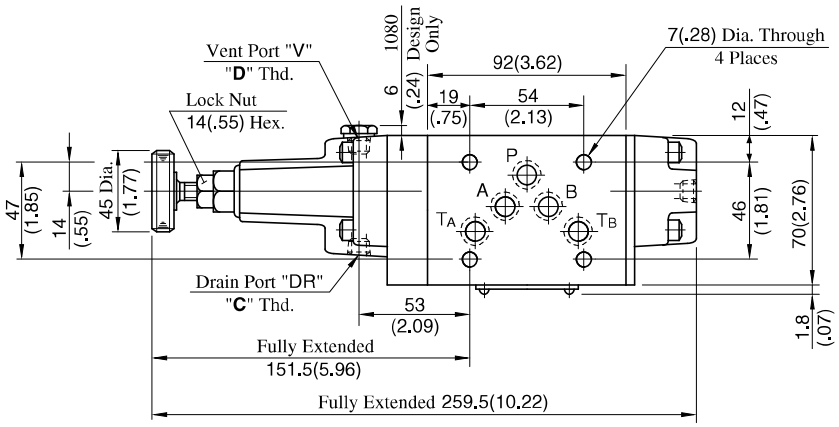
Pressure Drop

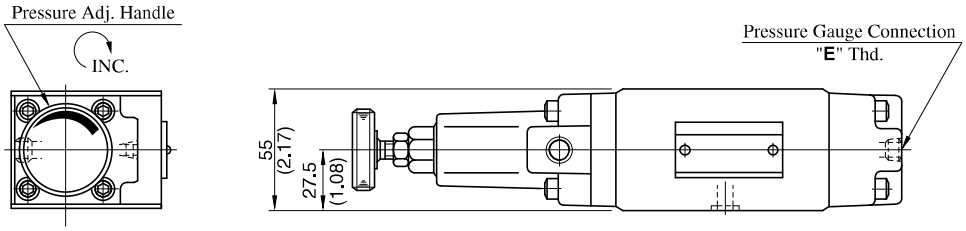


Min. Adjustment Pressure vs. Max. Flow



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



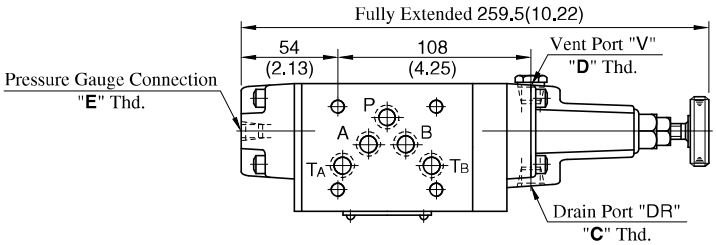


Approx. Mass.....4.5 kg (9.9 lbs.)

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

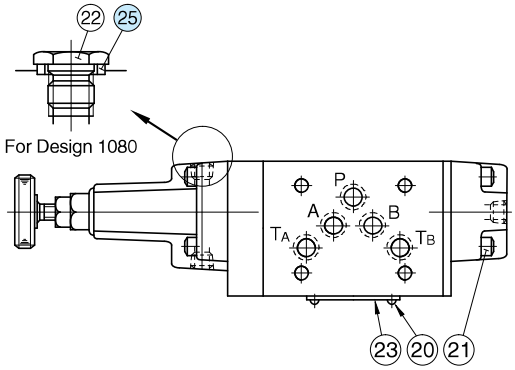


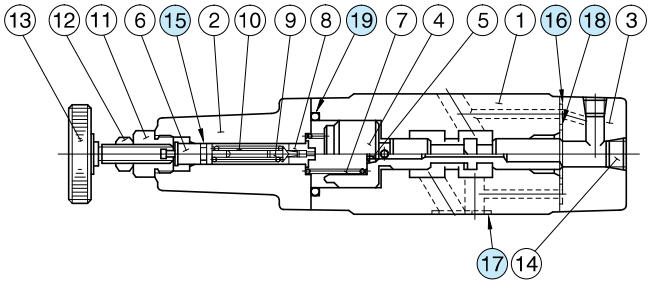
Approx. Mass.....4.5 kg (9.9 lbs.)

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

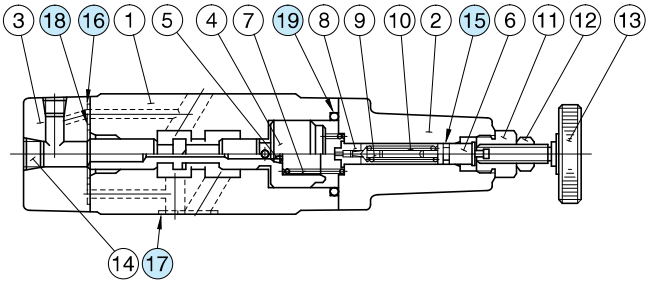
Spare Parts List

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





MRLA-03-10/1080/1090



List of Seals

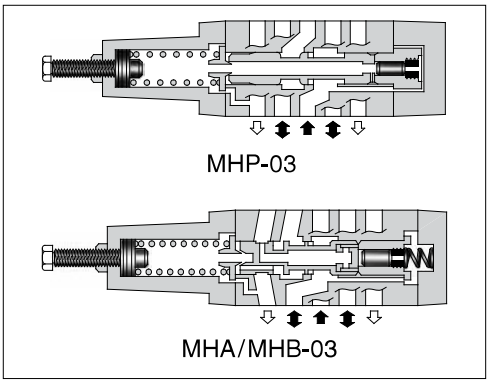
Item	Name of Parts	Part Numbers	Qty.	Remarks
15	O-Ring	SO-NA-P6	1	Included in Seal Kit Kit No.:KS-MRLP-03-10
16	O-Ring	SO-NB-P6	2	
17	O-Ring	SO-NB-A014	5	
18	O-Ring	SO-NB-P22	1	
19	O-Ring	SO-NB-P32	1	
25	Bonded Seal	SG-FB-1/8	1	

Note: No bonded seal are included in seal kits.

Sequence Modular Valves/Counterbalance Modular Valves

Specifications

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



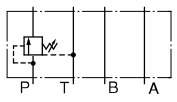
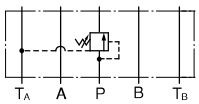
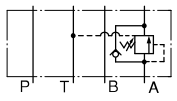
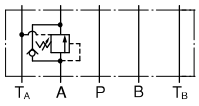
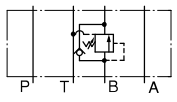
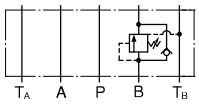
Model Number Designation

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

★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

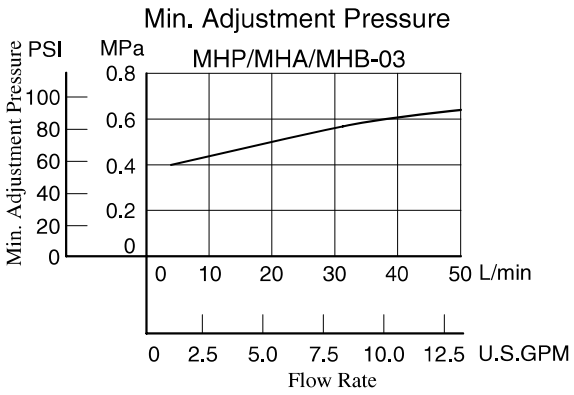
Instructions

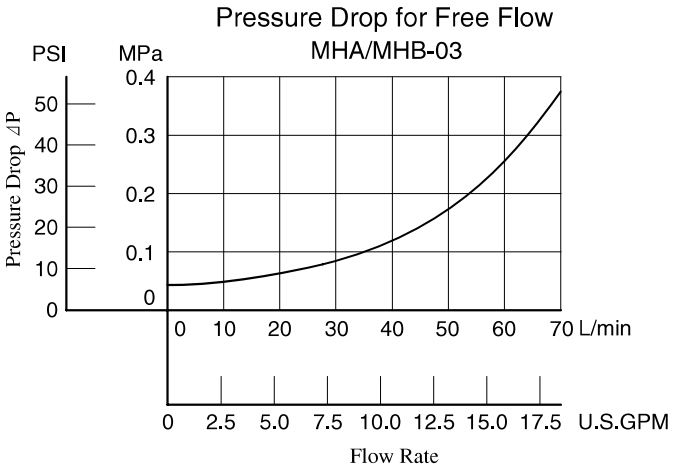
- The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of the next page. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the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

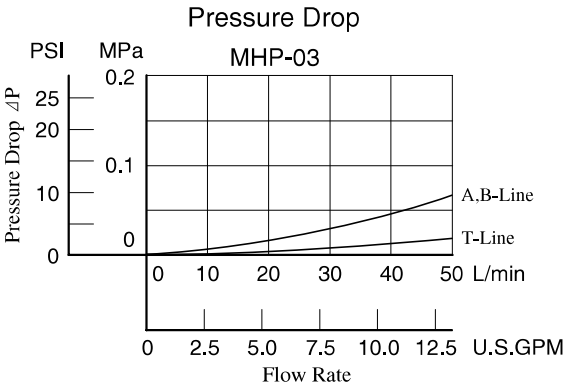
Model Numbers	Graphic Symbols	Detailed Graphic Symbols
MHP-03		
MHA-03		
MHB-03		

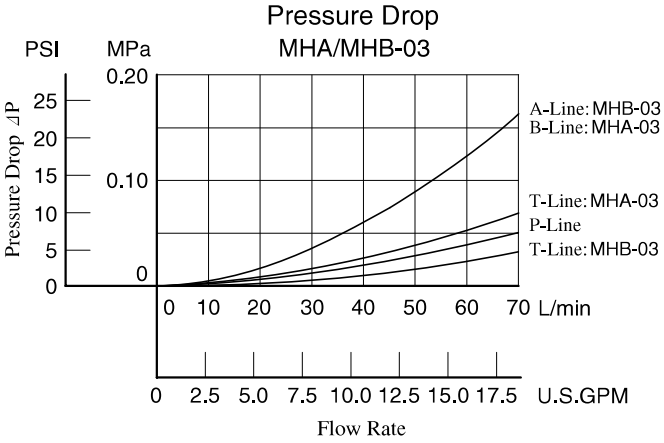
Typical Performance Characteristics

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

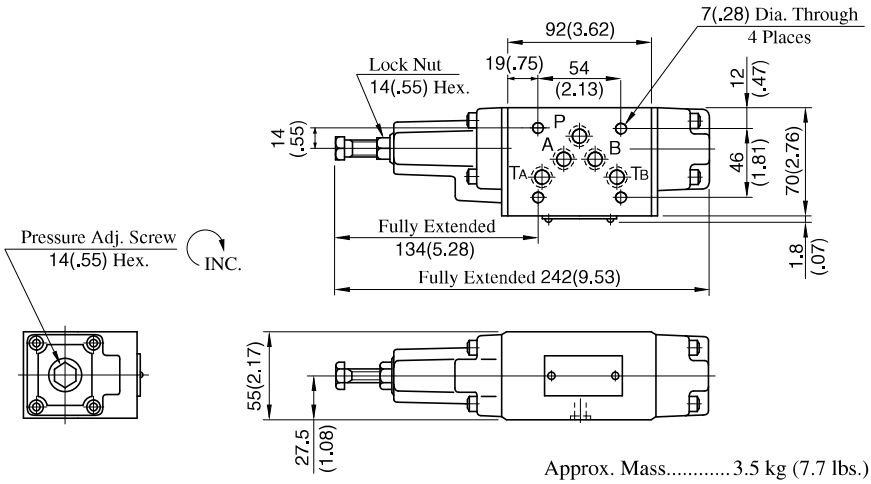








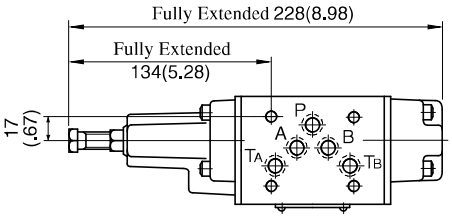
MHP-03-∗-20



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

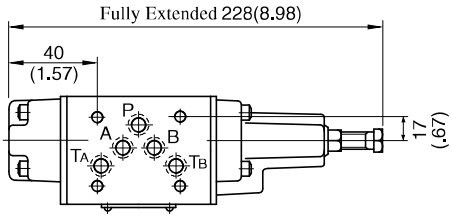
DIMENSIONS IN MILLIMETRES (INCHES)

MHA-03-∗-20



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

MHA-03-∗-20

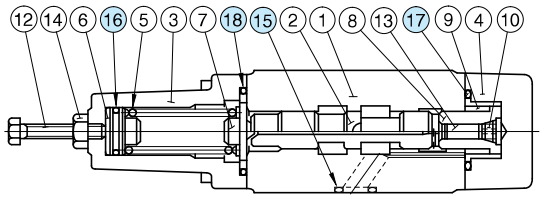


Approx. Mass.....3.5 kg (7.7 lbs.)

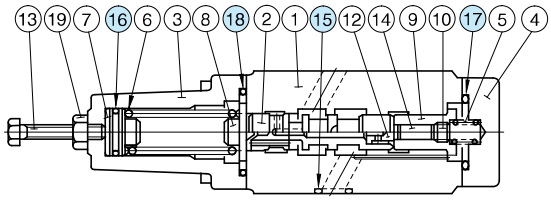
● For other dimensions, refer to "MHP-03" drwaing above.

Spare Parts List

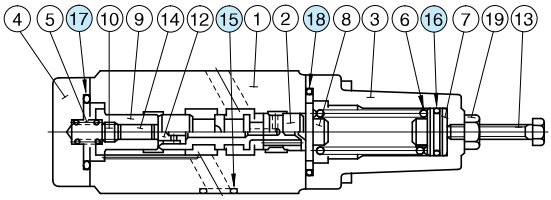
MHP-03-∗-20



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 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	

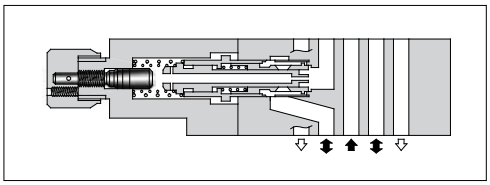
MHB-03

Item	Name of Parts	Part Numbers	Qty.	Remarks
15	O-Ring	SO-NB-A014	5	Included in Seal Kit 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 MPa (PSI)	Max. Metred Flow L/min (U.S.GPM)	Max. Free Flow L/min (U.S.GPM)
MFP-03-11	16 (2320)	50 (13.2)	—
MFA-03-∗-11 MFB-03-∗-11 MFW-03-∗-11			70 (18.5)



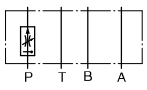
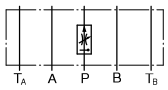
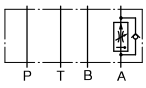
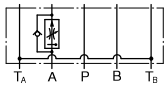
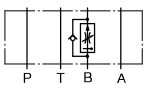
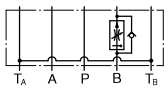
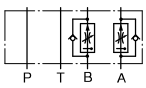
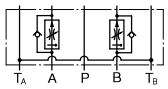
Model Number Designation

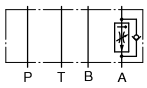
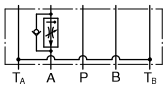
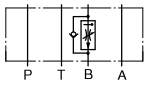
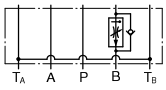
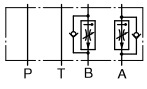
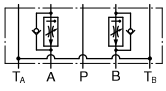
F-	MFA	-03	-X	-11	∗
Special Seals	Series Number	Valve Size	Direction of Flow	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	**MFP** : Flow Control Valve for P-Line	**03**	—	**11**	Refer to ★
	MFA : Flow Control and Check Valve for A-Line **MFB**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

★ 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.

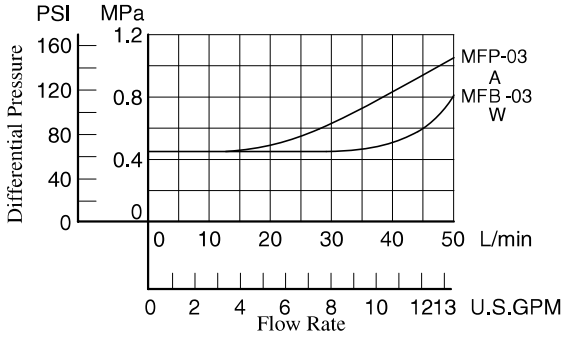
Model No.	Graphic Symbols	Detailed Graphic Symbols
MFP-03		
Model No.	**Metre-out**	
MFA-03-X		
MFB-03-X		
MFW-03-X		

Model No.	Graphic Symbols	Detailed Graphic Symbols
Metre-in		
MFA-03-Y		
MFB-03-Y		
MFW-03-Y		

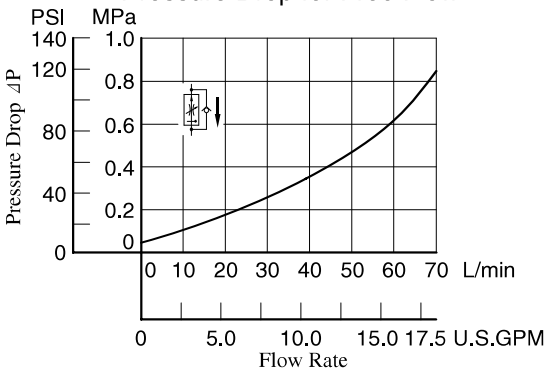
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850

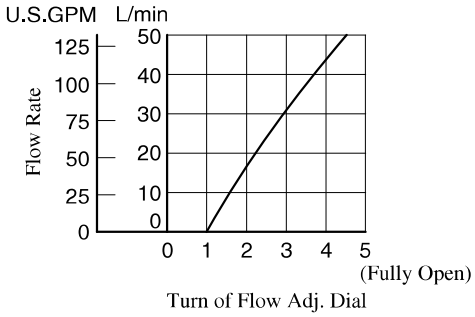
Min. Required Pressure Difference



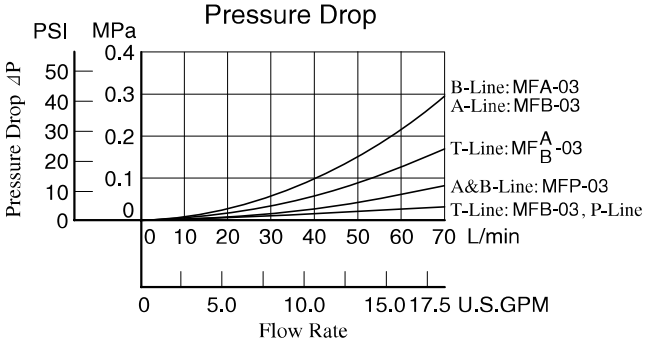
Pressure Drop for Free Flow



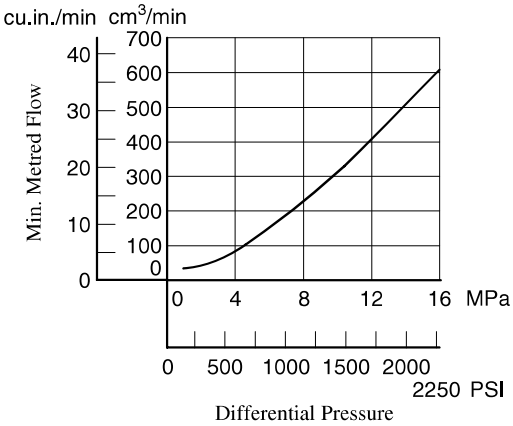
Metred Flow vs. Dial Position



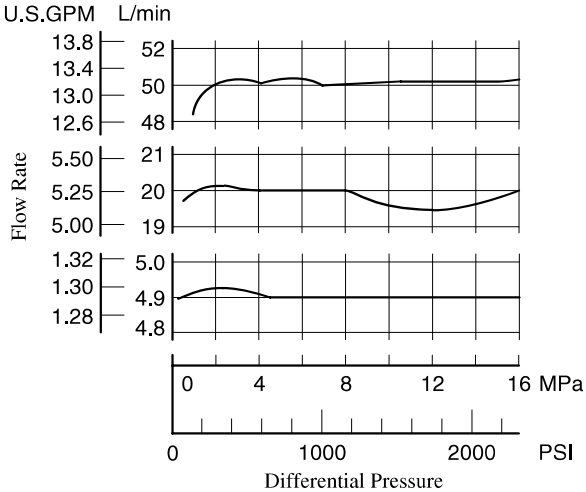
Pressure Drop



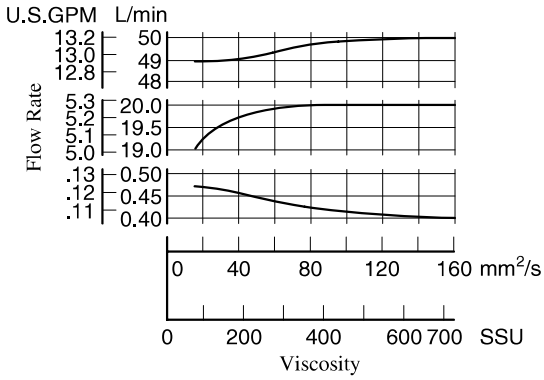
Min. Metred Flow



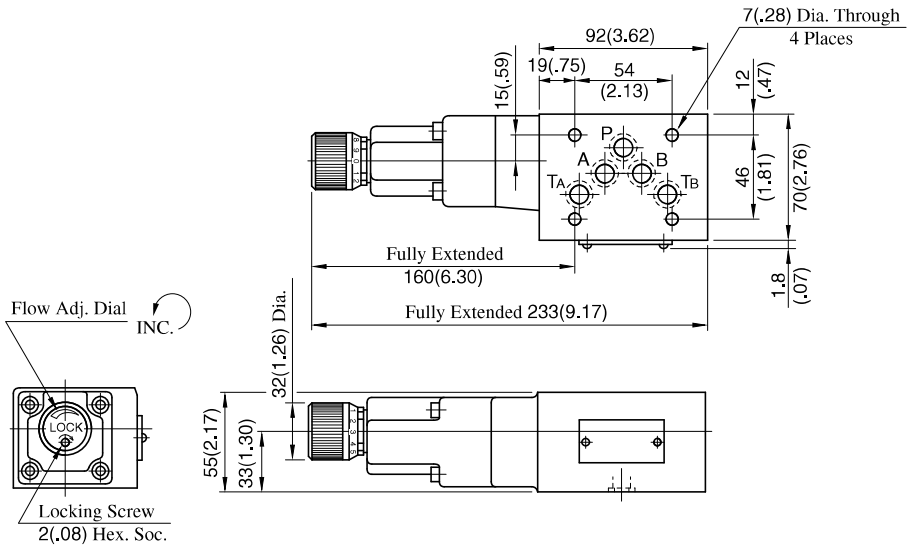
Metred Flow vs. Differential Pressure



Metred Flow vs. Viscosity



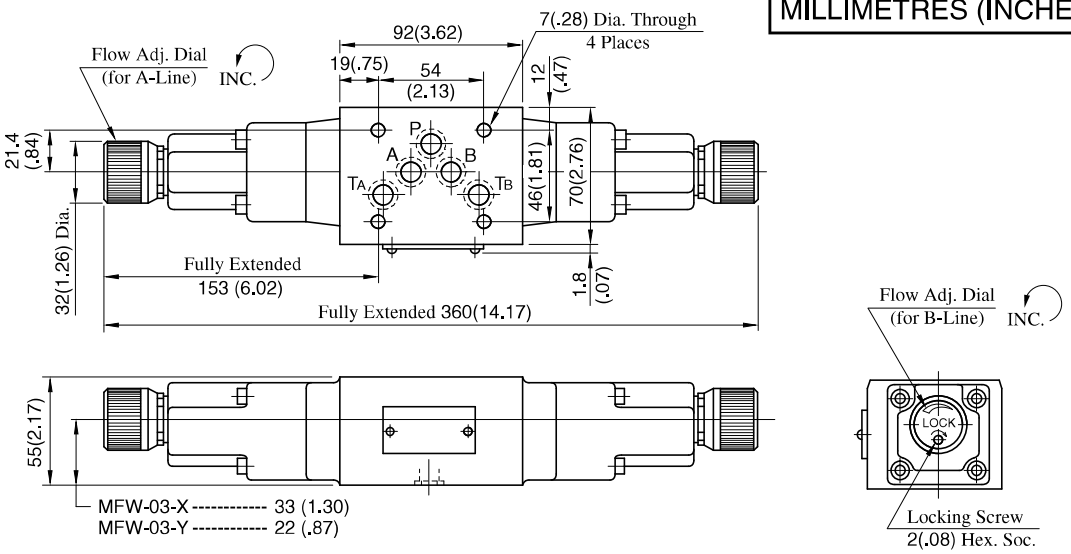
MFP-03-11



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

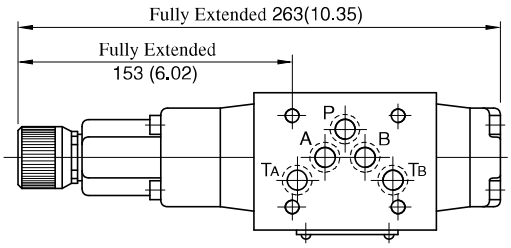
MFW-03-$^{X}_{Y}$-11

DIMENSIONS IN MILLIMETRES (INCHES)



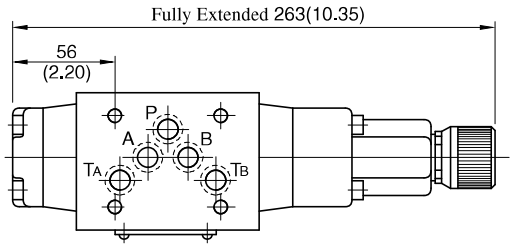
Approx. Mass.....5.2 kg (11.5 lbs.)

MFA-03-$^{X}_{Y}$-11



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

MFB-03-$^{X}_{Y}$-11

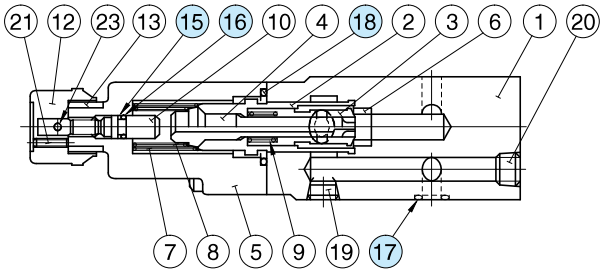


Approx. Mass.....4.1 kg (9.0 lbs.)

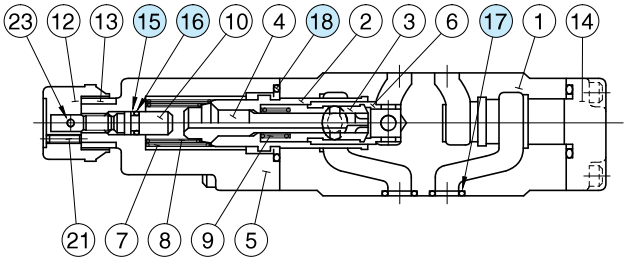
- For other dimensions, refer to "MFW-03" drawing above.

Spare Parts List

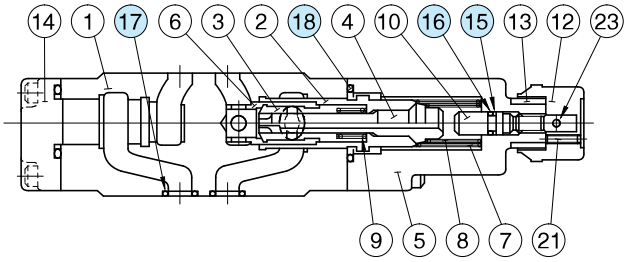
MFP-03-11



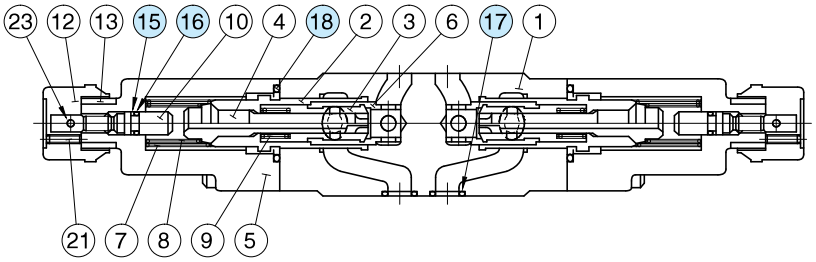
MFA-03-$\frac{X}{Y}$-11



MFB-03-$\frac{X}{Y}$-11



MFW-03-$\frac{X}{Y}$-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

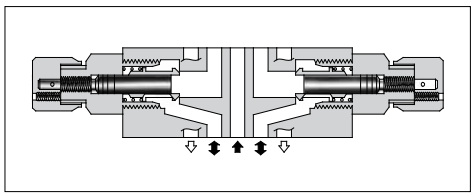
Valve Model Numbers	Seal Kit Numbers
MFP-03	KS-MFP-03-10
MFA-03	KS-MFA-03-10
MFB-03	
MFW-03	KS-MFW-03-10

Temperature Compensated Throttle and Check Modular Valves

Specifications

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

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



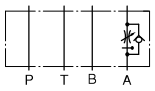
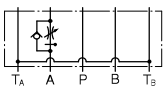
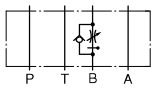
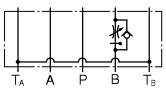
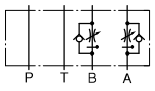
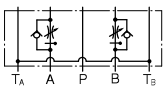
Model Number Designation

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

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

Instructions

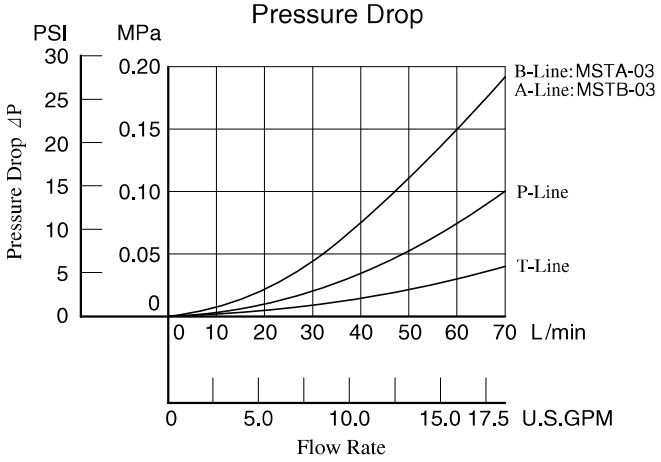
- To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

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

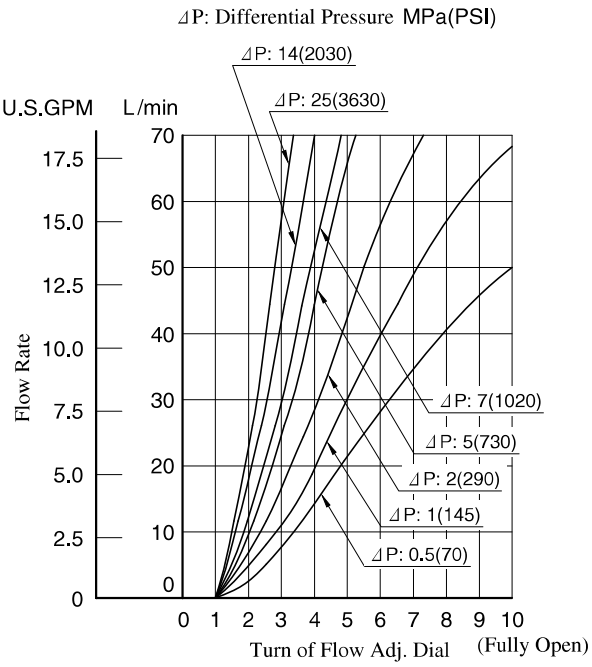
Typical Performance Characteristics

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

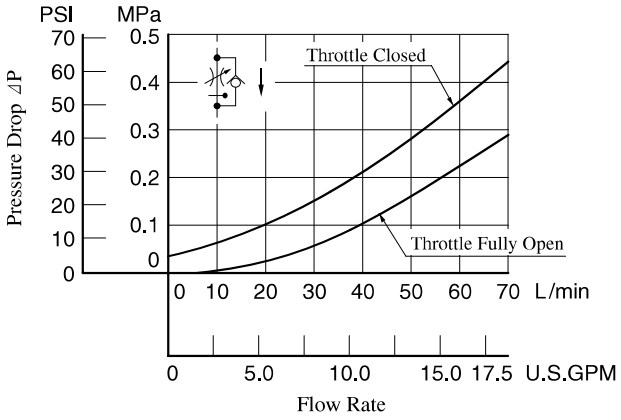
Pressure Drop



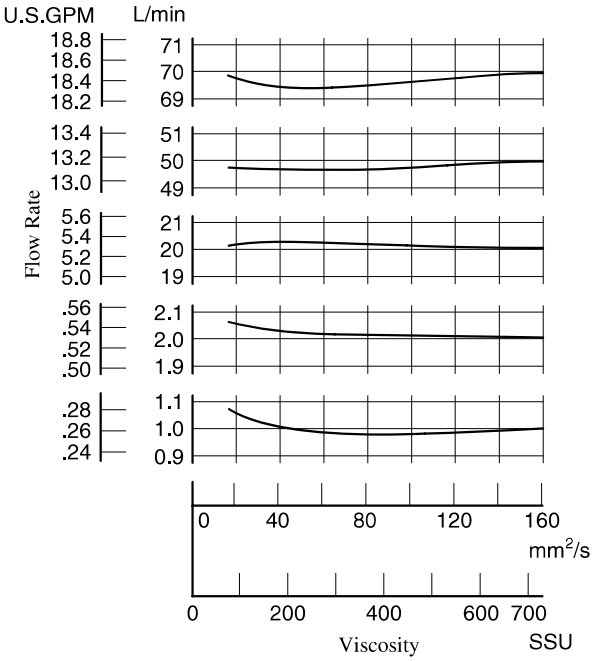
Metred Flow vs. Dial Position



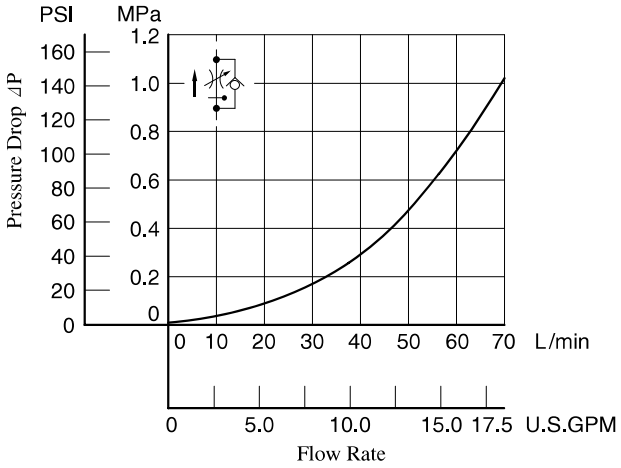
Pressure Drop for Free Flow



Metred Flow vs. Viscosity

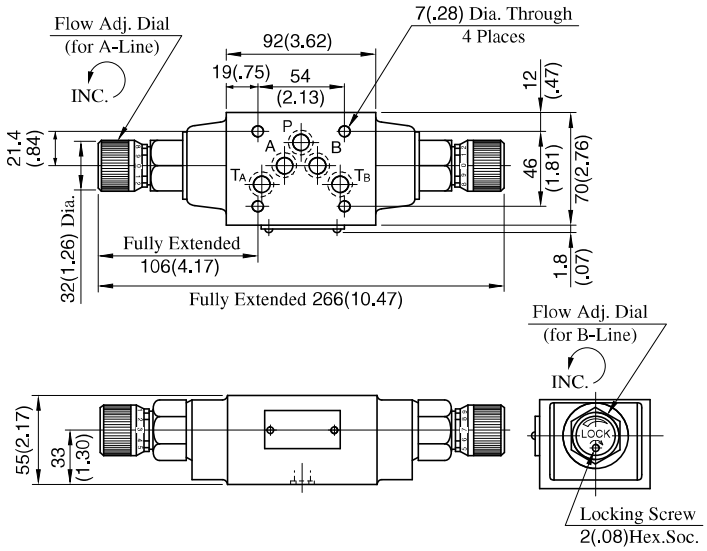


Pressure Drop at Throttle Fully Open



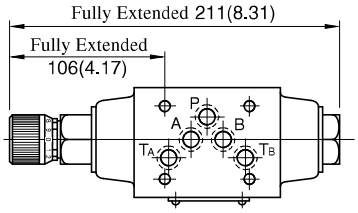
MSTW-03-X-20

DIMENSIONS IN MILLIMETRES (INCHES)



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

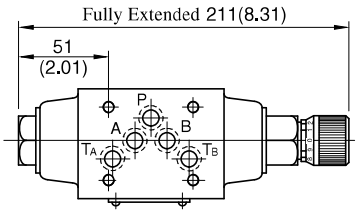
MSTA-03-X-20



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

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

MSTB-03-X-20

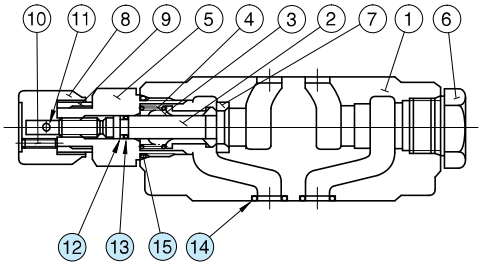


Approx. Mass.....3.5 kg (7.7 lbs.)

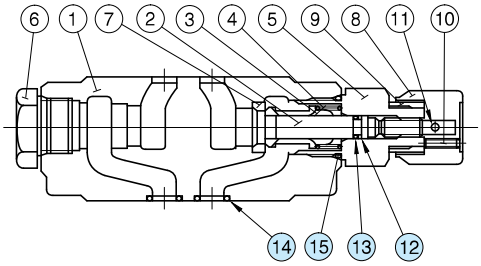
- For other dimensions, refer to "MSTW-03" drawing left.

Spare Parts List

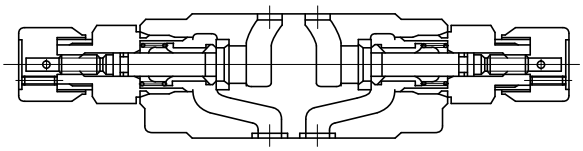
MSTA-03-X-20



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

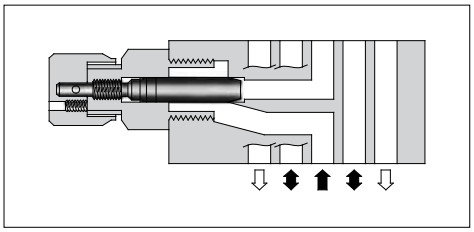
Valve Model Numbers	Seal Kit Numbers
MSTA-03	KS-MSTA-03-20
MSTB-03	
MSTW-03	KS-MSTW-03-20

Throttle Modular Valves

Specifications

Model Number	Max. Operating Pressure MPa (PSI)	Max. Flow 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".

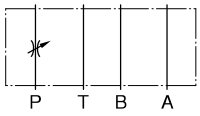


Model Number Designation

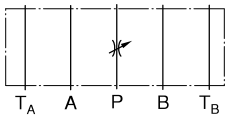
F-	MSP	-03	-30	✻
Special Seals	Series Number	Valve Size	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MSP : Throttle Valve for P-Line	03	30	Refer to ★

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

Graphic Symbol



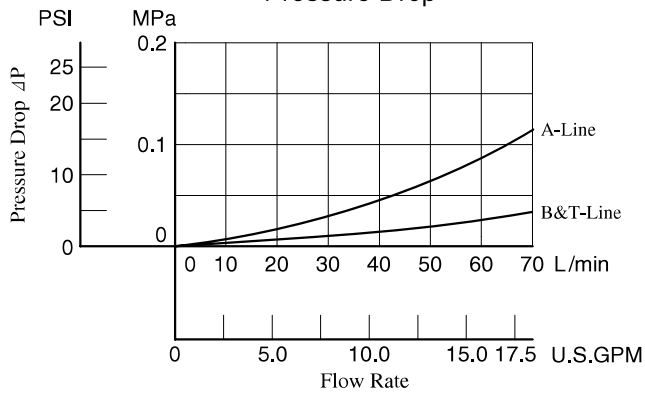
Detailed Graphic Symbol



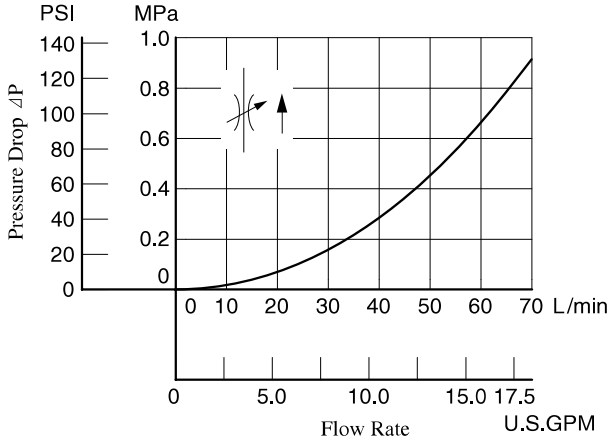
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850

Pressure Drop

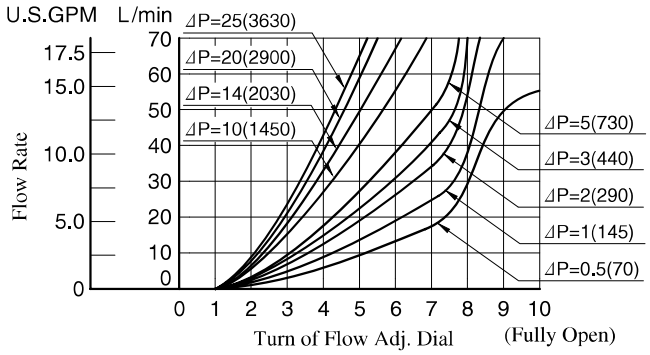


Pressure Drop at Throttle Fully Open



Metred Flow vs. Dial Position

⊿P: Differential Pressure MPa (PSI)

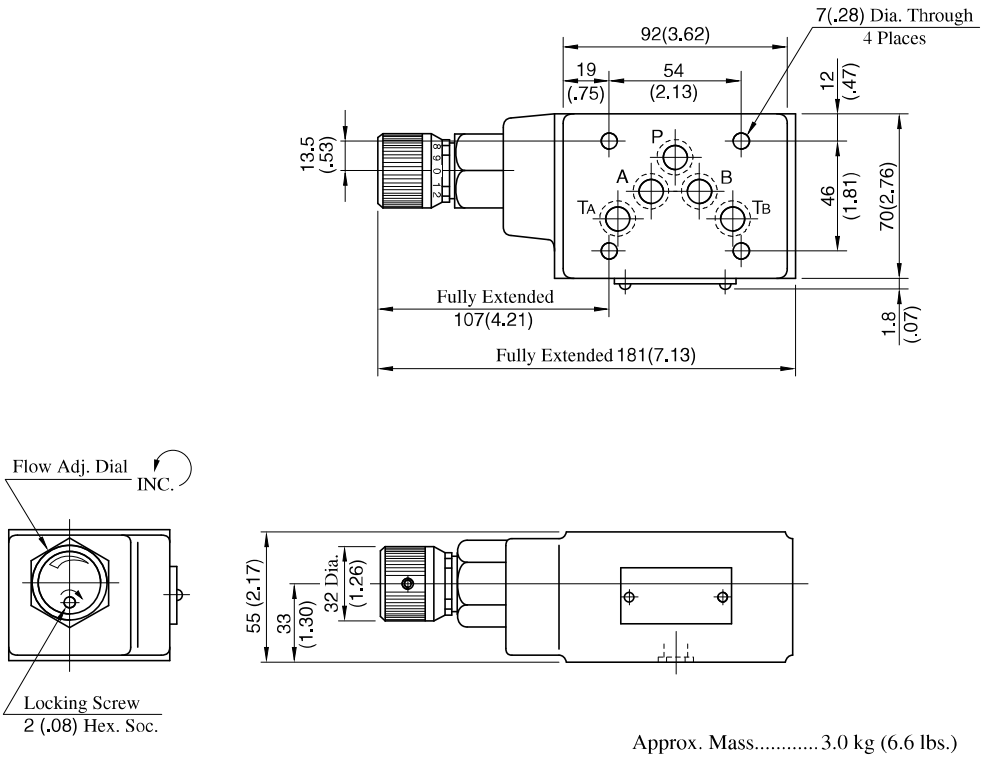


Instructions

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

MSP-03-30

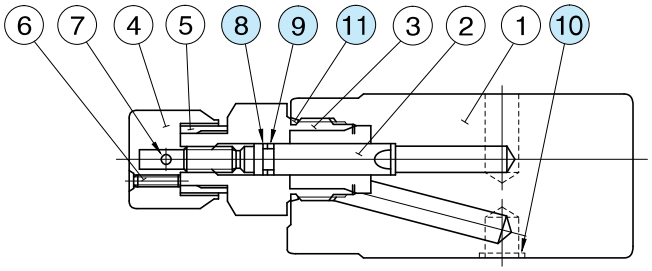
DIMENSIONS IN MILLIMETRES (INCHES)



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

Spare Parts List

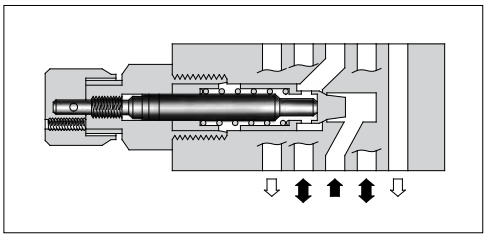
MSP-03-30



List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
8	Back Up Ring	900-VK411915-2	1	Included in Seal Kit 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 MPa (PSI)	Max. Flow L/min (U.S.GPM)
MSCP-03-20	25 (3630)	70 (18.5)★

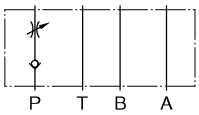
★Maximum flow decreases when the differential pressure is less than 1 MPa (145 PSI).
See "Pressure Drop at Throttle Fully Open".

Model Number Designation

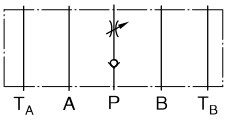
F-	MSCP	-03	-20	✻
Special Seals	Series Number	Valve Size	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MSCP : Check and Throttle Valve for P-Line	03	20	Refer to ★

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

Graphic Symbol



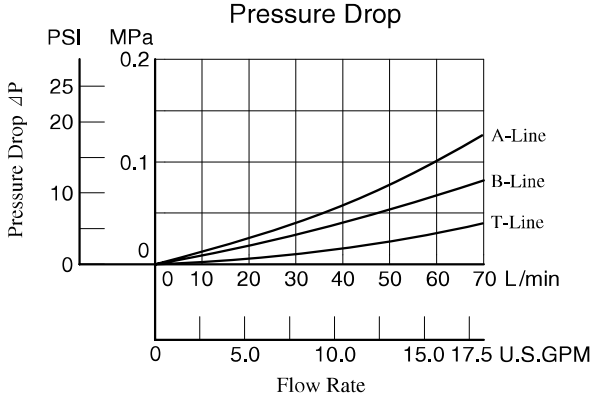
Detailed Graphic Symbol



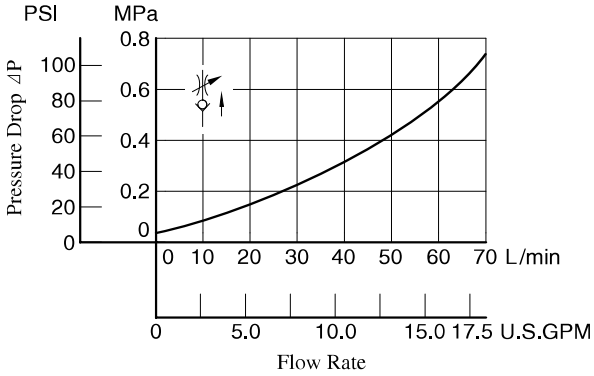
Typical Performance Characteristics

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

Pressure Drop

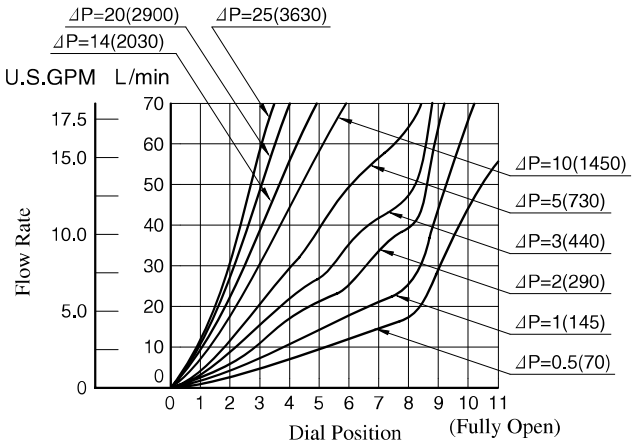


Pressure Drop at Throttle Fully Open



Metred Flow vs. Dial Position

⊿P: Differential Pressure MPa (PSI)

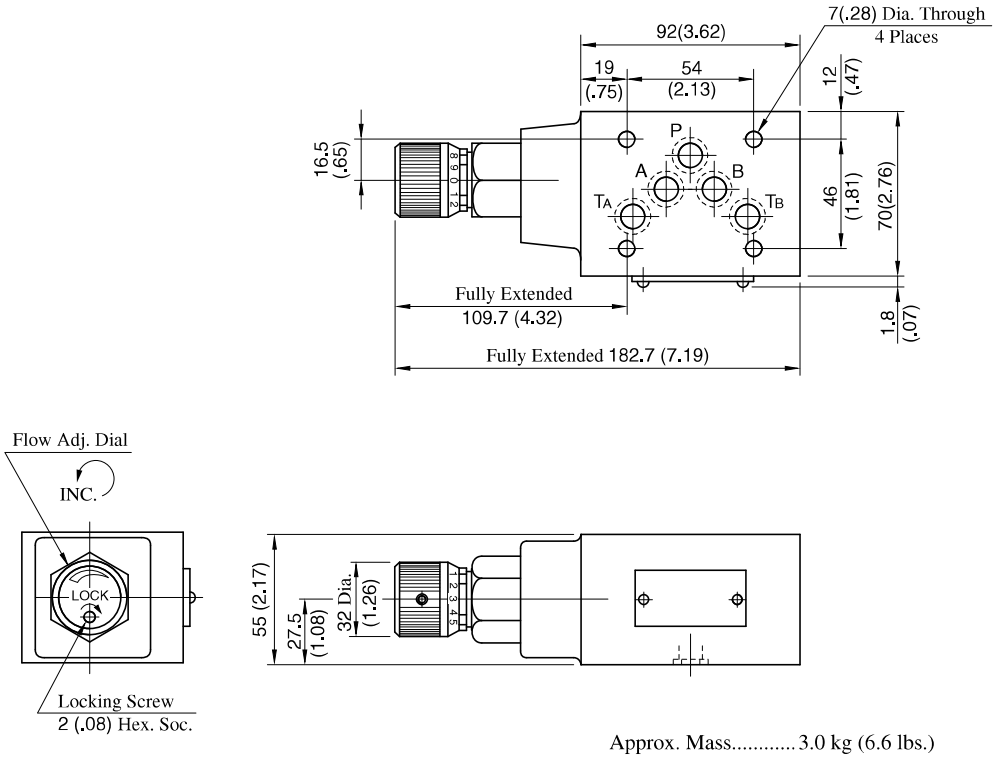


Instructions

- 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

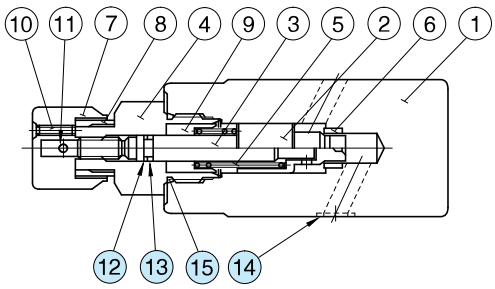
DIMENSIONS IN MILLIMETRES (INCHES)



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

Spare Parts List

MSCP-03-20



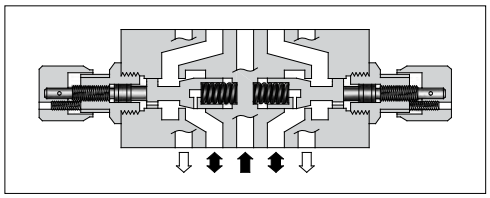
List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
12	Back Up Ring	900-VK411915-2	1	Included in Seal Kit 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 MPa (PSI)	Max. Flow L/min (U.S.GPM)
MSA-03-∗-40 MSB-03-∗-40 MSW-03-∗-40	25 (3630)	120 (31.7)



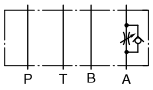
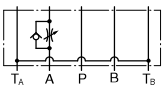
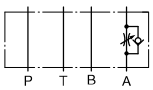
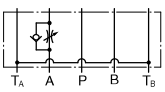
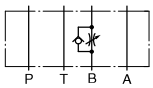
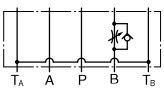
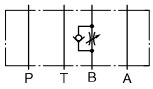
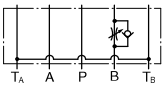
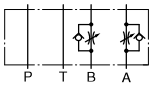
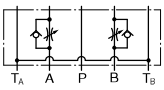
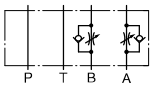
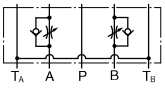
Model Number Designation

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

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

Instructions

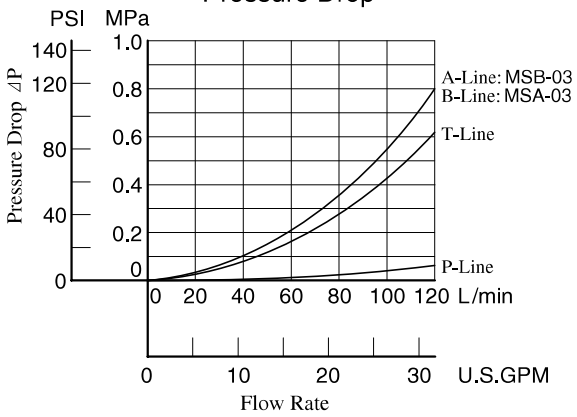
- To make flow rate adjustment, loosen locking screw for the dial and turn the flow adjustment dial clockwise or anti-clockwise. For a decrease of flow, turn the dial clockwise. Be sure to re-tighten the locking screw firmly after the adjustment of the flow rate.

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		

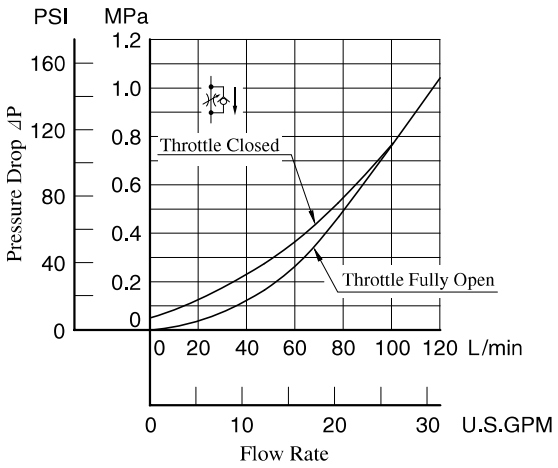
Typical Performance Characteristics

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

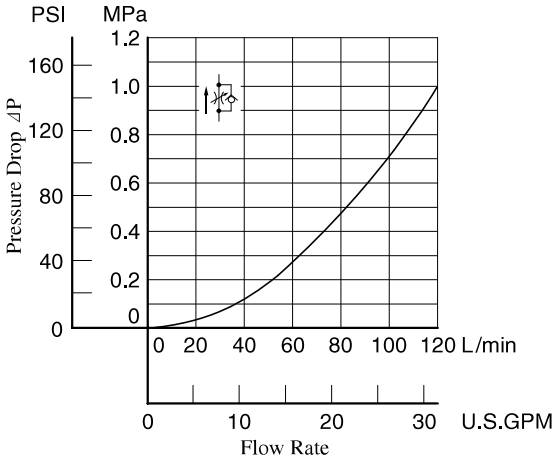
Pressure Drop



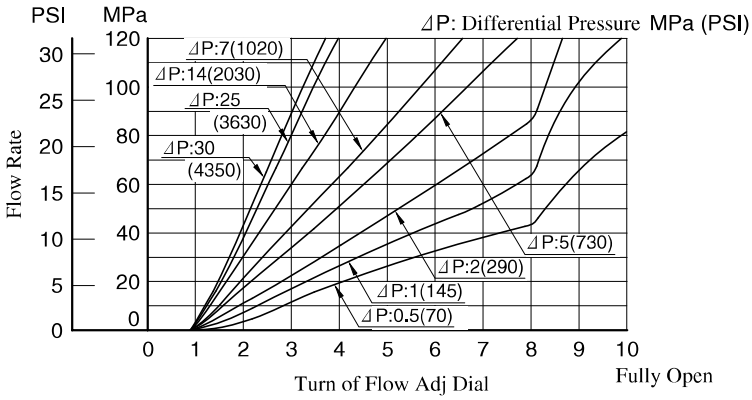
Pressure Drop for Free Flow



Pressure Drop at Throttle Fully Open

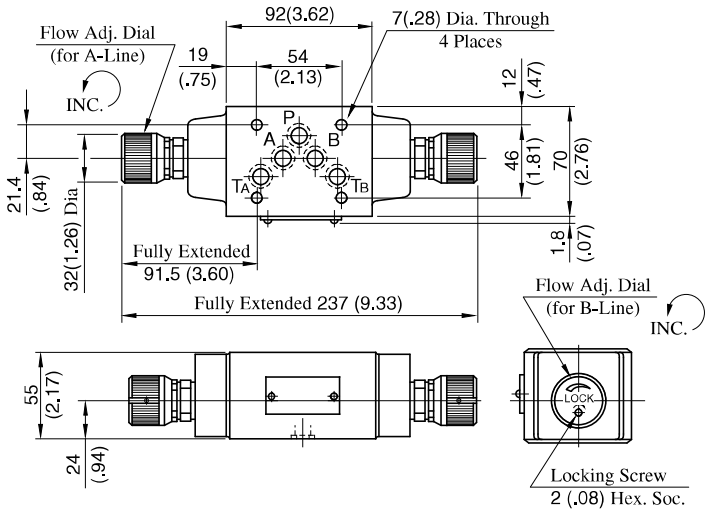


Metred Flow vs Dial Position



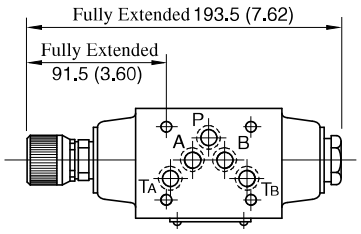
MSW-03-$\frac{X}{Y}$-40

DIMENSIONS IN MILLIMETRES (INCHES)



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

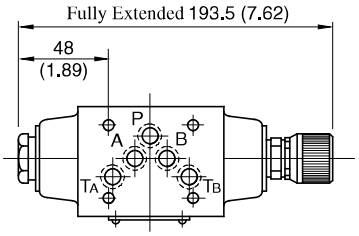
MSA-03-$\frac{X}{Y}$-40



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

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

MSB-03-$\frac{X}{Y}$-40

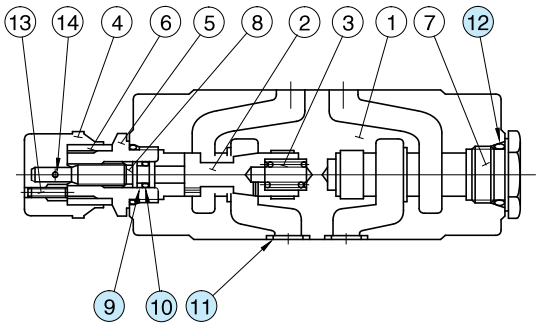


Approx. Mass.....3.5 kg (7.7 lbs.)

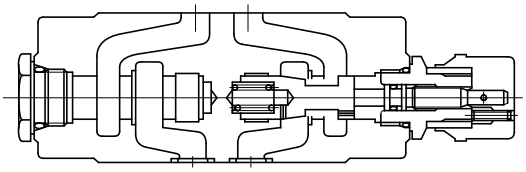
- For other dimensions, refer to "MSW-03" drawing left.

Spare Parts List

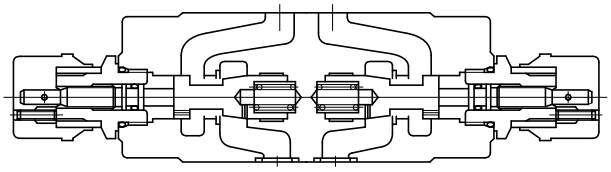
MSA-03-$\frac{X}{Y}$-40



MSB-03-$\frac{X}{Y}$-40



MSW-03-$\frac{X}{Y}$-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.

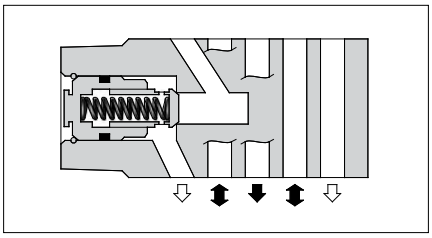
List of Seal Kits

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 MPa (PSI)	Max. Flow L/min (U.S.GPM)
MCP-03-∗-10 MCA-03-∗-20 MCB-03-∗-20 MCT-03-∗-10	25 (3630)	70 (18.5)



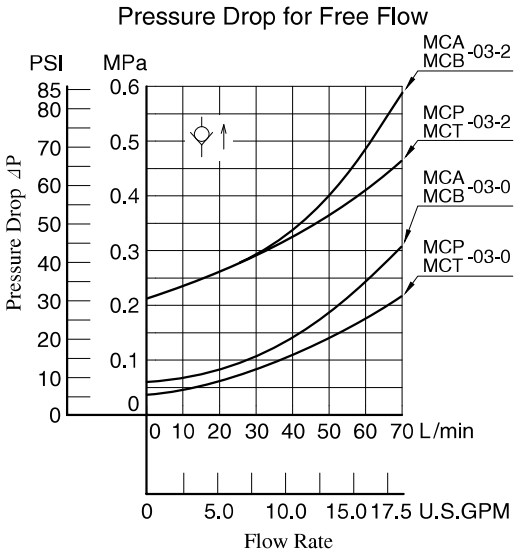
Model Number Designation

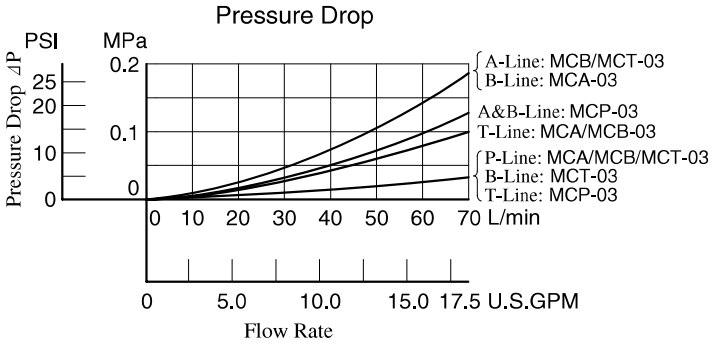
F-	MCP	-03	-0	-10	∗
Special Seals	Series Number	Valve Size	Cracking Pressure MPa(PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	**MCP** : Check Valve for P-Line	**03**	**0** : 0.035(5) **2** : 0.2(29)	**10**	Refer to ★
	MCA : Check Valve for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

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

Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850





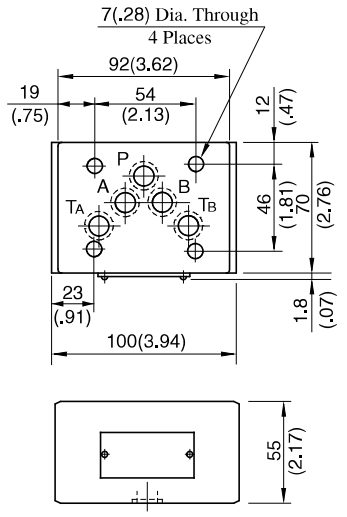
Model No.	Graphic Symbols	Detailed Graphic Symbols
MCP-03	P T B A	T_A A P B T_B
MCA-03	P T B A	T_A A P B T_B
MCB-03	P T B A	T_A A P B T_B
MCT-03	P T B A	T_A A P B T_B

Instructions

● **Tank Line Used**

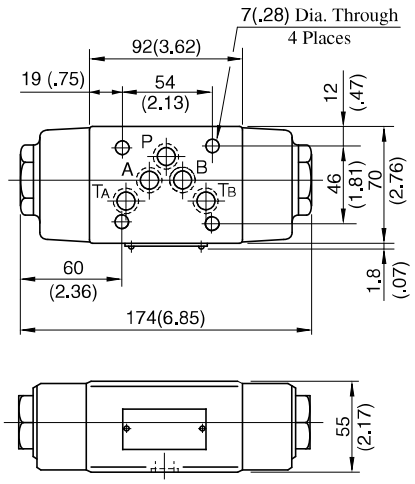
Check valve function of MCT-03 is included in T_A-Line. Therefore, the tank line for a circuit that uses this valve must be T_A-line.

MCP-03-∗-10



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

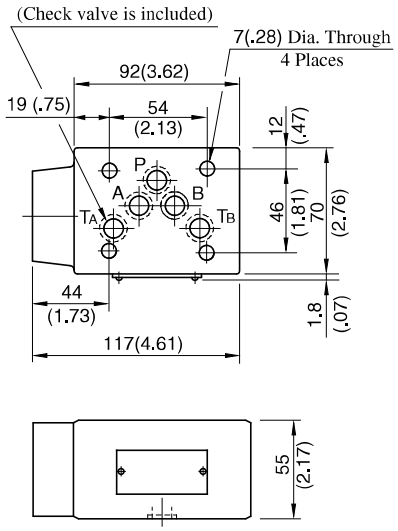
MCA-03-∗-20
MCB-03-∗-20



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

DIMENSIONS IN MILLIMETRES (INCHES)

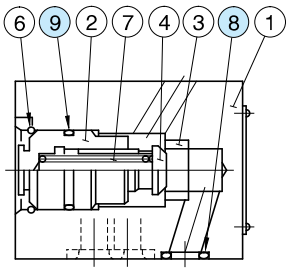
MCT-03-∗-10



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

Spare Parts List

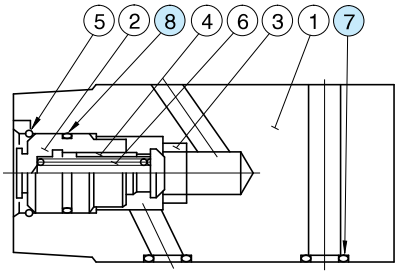
MCP-03-∗-10



● List of Seals

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

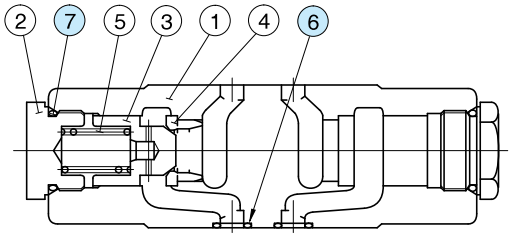
MCT-03-∗-10



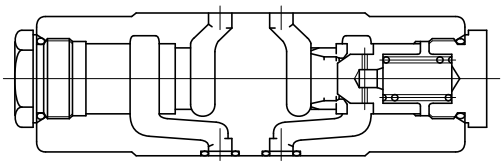
● List of Seals

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

MCA-03-∗-20



MCB-03-∗-20



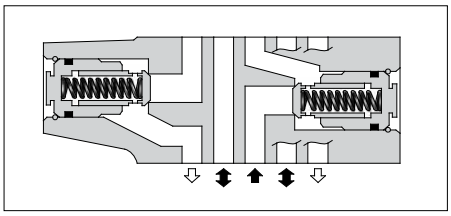
● List of Seals

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

Check Modular Valves For "P&T" Lines

Specifications

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



Model Number Designation

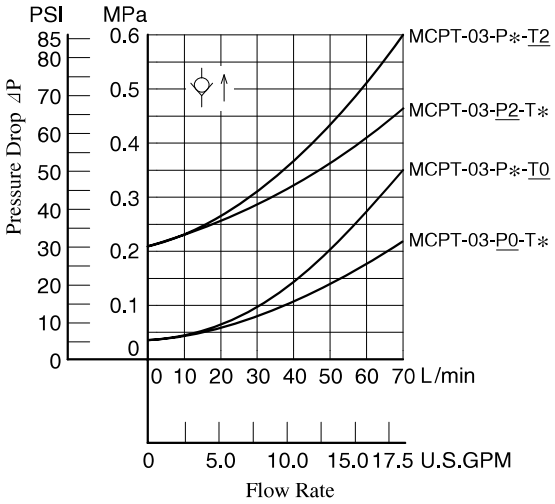
F-	MCPT	-03	-P0	-T0	-10	∗
Special Seals	Series Number	Valve Size	Cracking Pres. of P-Line MPa(PSI)	Cracking Pres. of T-Line MPa(PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	**MCPT** : Check Valve for P&T-Lines	**03**	**P0** : 0.035(5) **P2**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

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

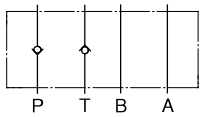
Typical Performance Characteristics

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850

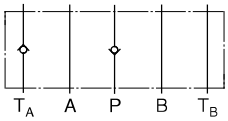
Pressure Drop for Free Flow



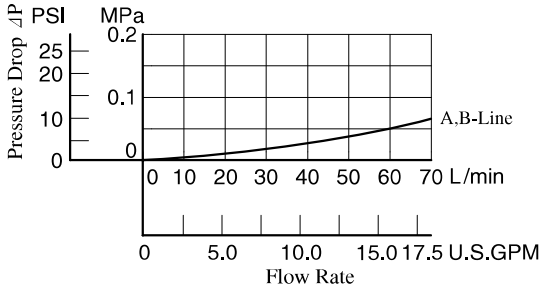
Graphic Symbol



Detailed Graphic Symbol



Pressure Drop

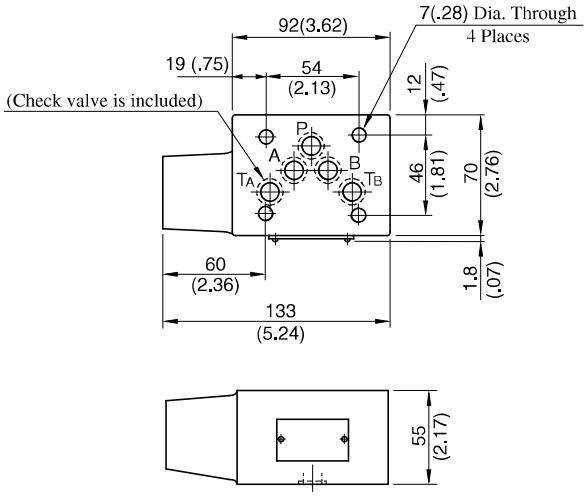


Instructions

● **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.

MCPT-03-P∗-T∗-10

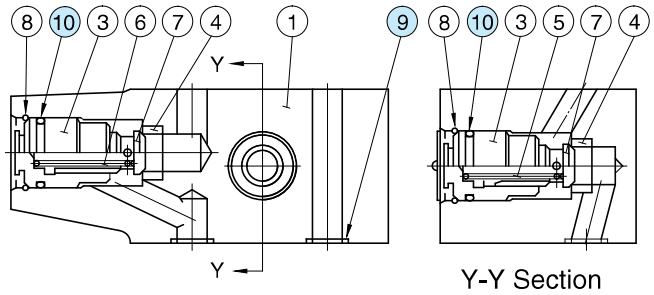


Approx. Mass.....2.7 kg (6.0 lbs.)

DIMENSIONS IN MILLIMETRES (INCHES)

Spare Parts List

MCPT-03-P∗-T∗-10



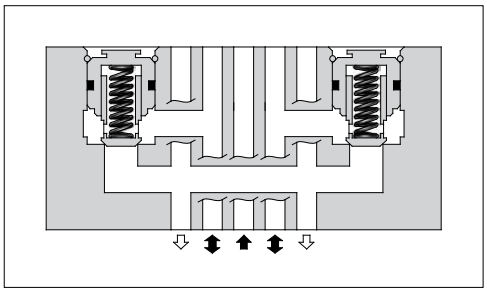
List of Seals

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

Anti-Cavitation Modular Valves

Specifications

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



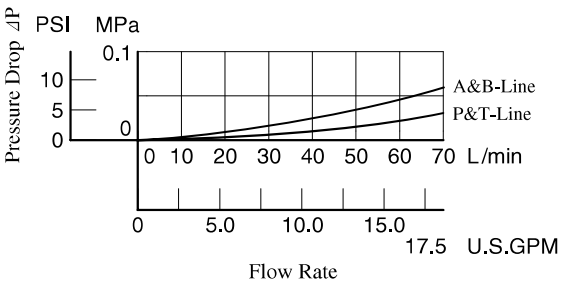
Model Number Designation

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

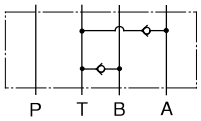
★ Design Standards: None ..... Japanese Standard "JIS", European Design Standard and N. American Design Standard

Pressure Drop

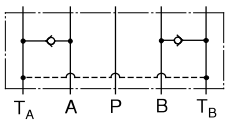
Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



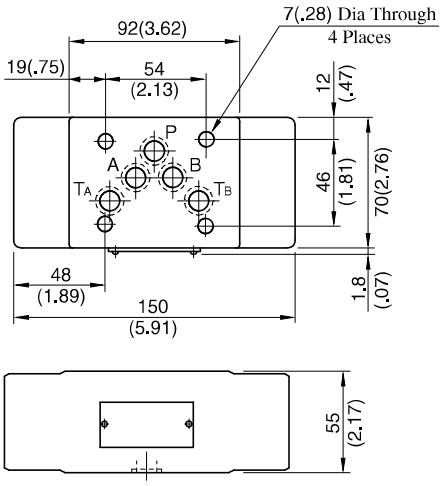
Graphic Symbol



Detailed Graphic Symbol



MAC-03-10

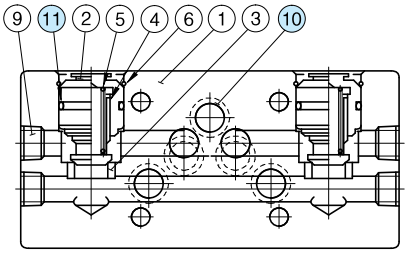


Approx. Mass.....3.8 kg (8.4 lbs.)

DIMENSIONS IN MILLIMETRES (INCHES)

Spare Parts List

MAC-03-10



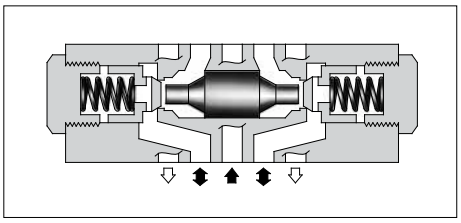
List of Seals

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

Pilot Operated Check Modular Valves

Specifications

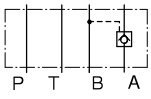
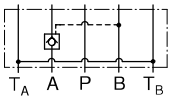
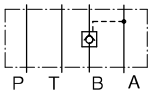
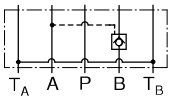
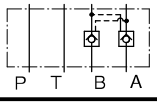
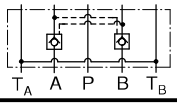
Model Numbers		Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
Standard	MP∗-03-∗-20	25 (3630)	70 (18.5)
Low Pilot Pressure Control Type	MP∗-03-∗-2001		



Model Number Designation

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

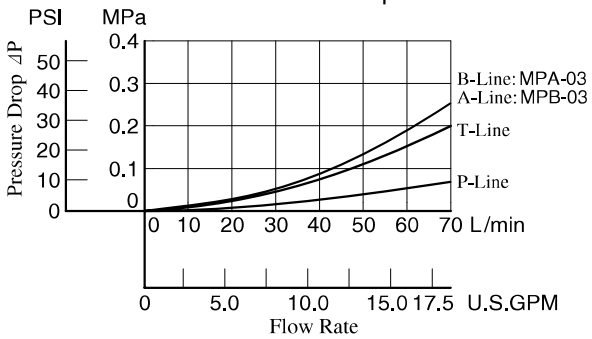
★ Design Standards: None ..... Japanese Standard "JIS", European Design Standard and N. American Design Standard

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

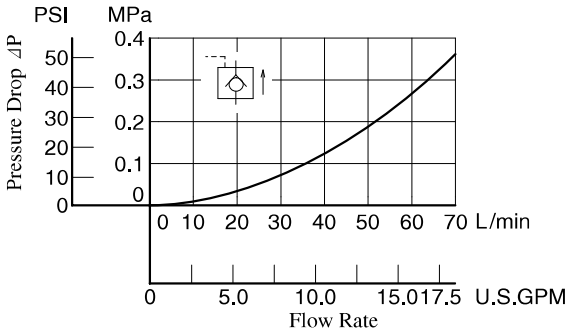
Typical Performance Characteristics

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

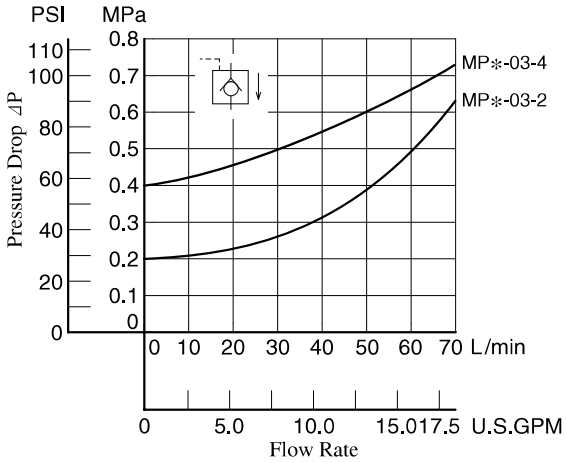
Pressure Drop



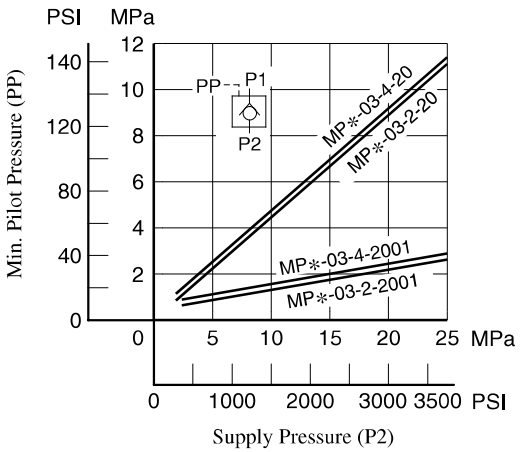
Pressure Drop for Reversed Controlled Flow



Pressure Drop for Free Flow



Min. Pilot Pressure

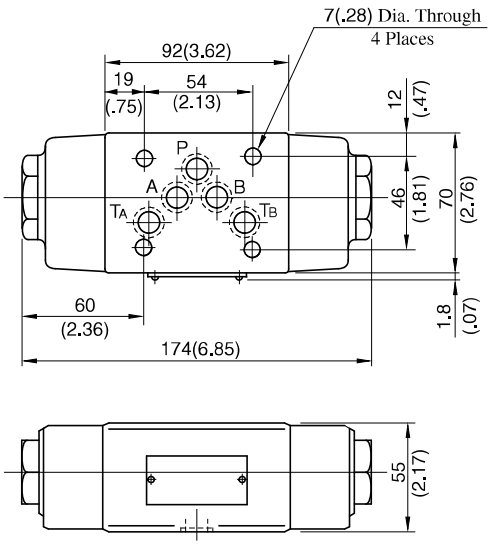


F

03 Series Modular Valves

MPA-03-∗-20/2001
MPB-03-∗-20/2001
MPW-03-∗-20/2001

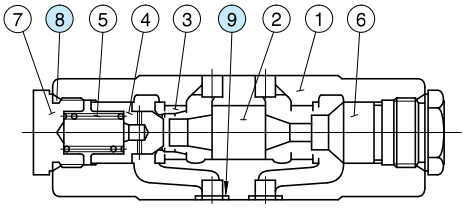
DIMENSIONS IN MILLIMETRES (INCHES)



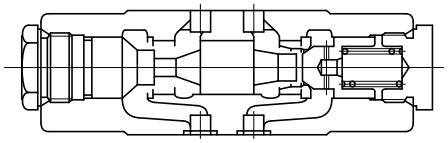
Approx. Mass.....3.5 kg (7.7 lbs.)

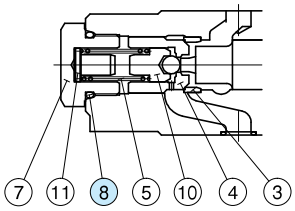
Spare Parts List

MPA-03-∗-20



MPB-03-∗-20



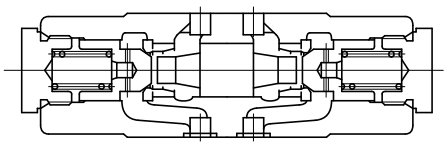


Low Pilot Pressure Control Type
(MPA-03-∗-2001)

List of Seals

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

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

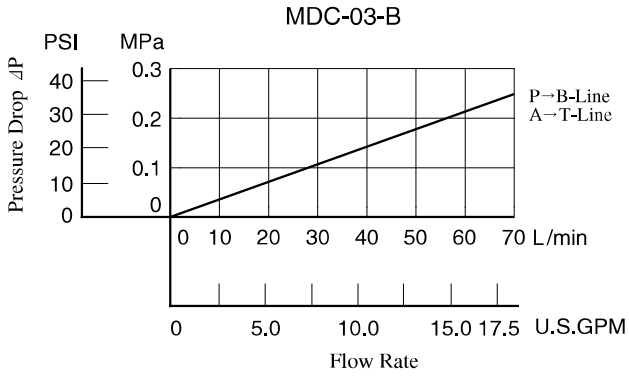
Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MDC-03-∗-10	25 (3630)	70 (18.5)

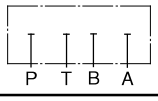
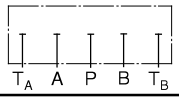
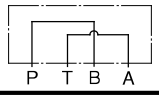
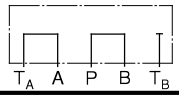
Model Number Designation

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

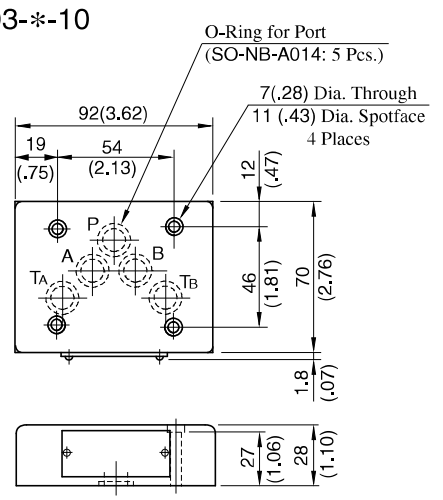
Pressure Drop

Hydraulic Fluid: Viscosity 35 mm²/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

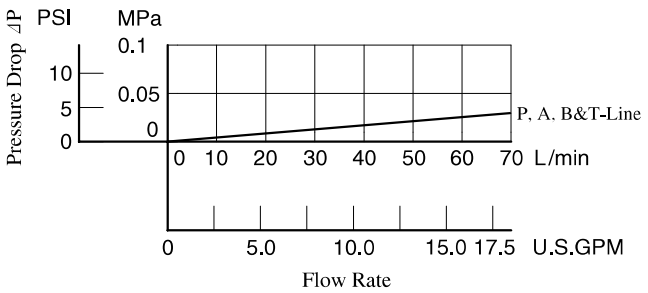
Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MDS-03-10/1090	25 (3630)	70 (18.5)

Model Number Designation

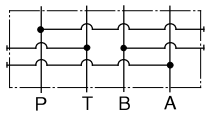
F-	MDS	-03	-10	*
Special Seals	Series Number	Valve Size	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	**MDS :** Connecting Plate	**03**	**10**	**None**: Japanese Standard "JIS" and European design Standard **90** : N.American Design Standard

Pressure Drop

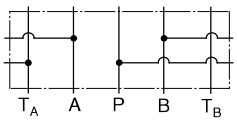
Hydraulic Fluid: Viscosity 35 mm^2/s (164 SSU), Specific Gravity 0.850



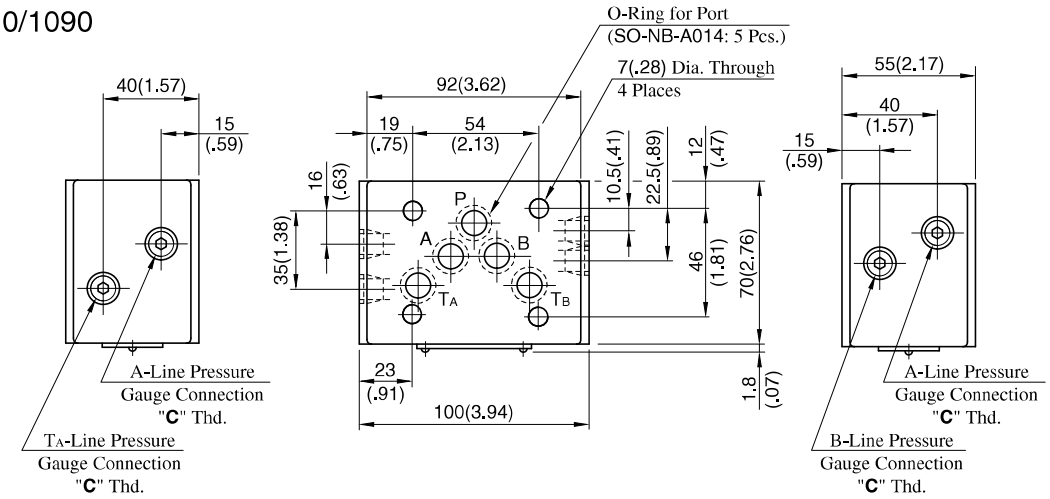
Graphic Symbol



Detailed Graphic Symbol



MDS-03-10/1090



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

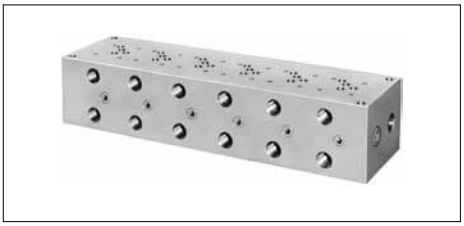
Model Numbers	Thread Size "**C**" Thd.
MDS-03-10	Rc 1/4 = 1/4 BSP.Tr
MDS-03-1090	1/4 NPT

DIMENSIONS IN MILLIMETRES (INCHES)

Base Plates For Modular Valves

Specifications

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

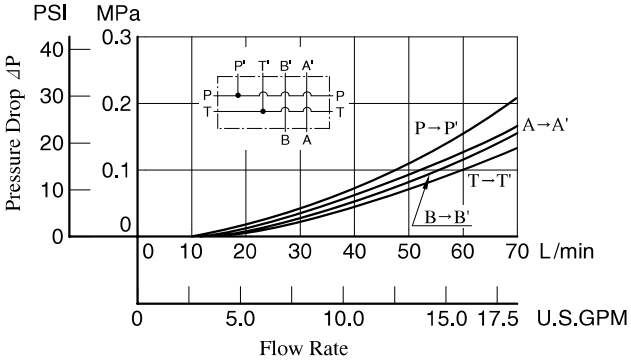


Model Number Designation

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 **2 :** 2 Stations **3 :** 3 Stations **4 :** 4 Stations **5 :** 5 Stations **6 :** 6 Stations **7 :** 7 Stations	**21**	**None :** Japanese Standard "JIS" **80 :** European Design Standard **90 :** N.American Design Standard

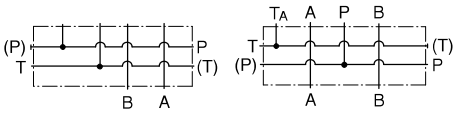
Pressure Drop

Hydraulic Fluid: Viscosity 35 mm²/s (164 SSU), Specific Gravity 0.850



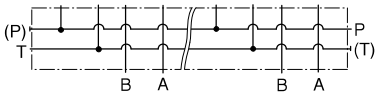
Graphic Symbol

Detailed Graphic Symbol



MMC-03-T-1

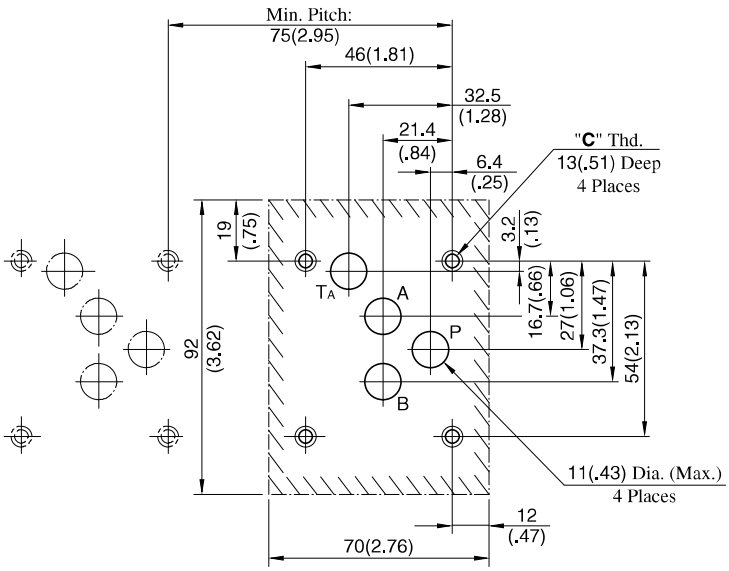
Graphic Symbol



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

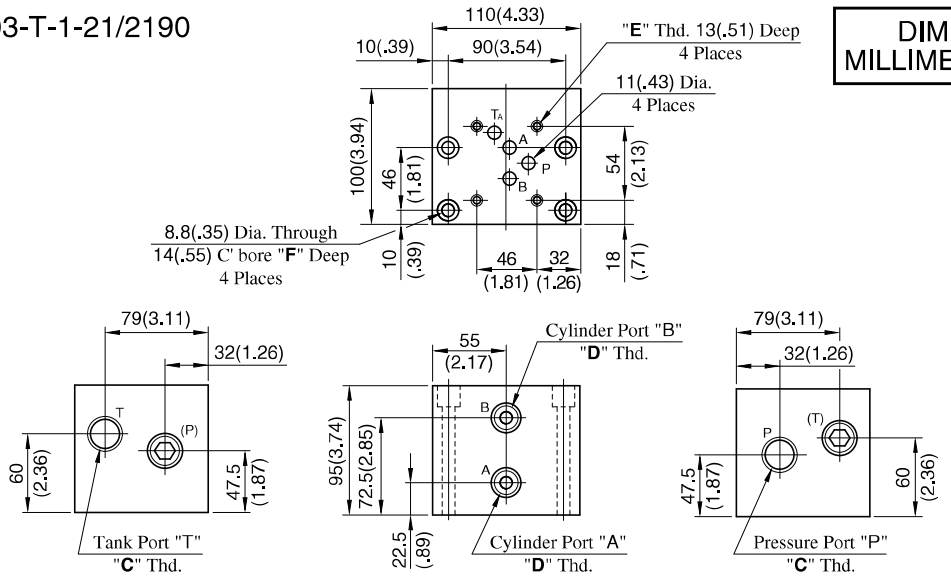
- Although two ports are provided for both **pressure port "P"** and **tank port "T"**, either may be used.
  However, the ports having (P) or (T) in the drawing are normally plugged. Remove the plugs of the ports when they are used. Make sure that the ports that are not currently used are properly plugged.

DIMENSIONS IN MILLIMETRES (INCHES)

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

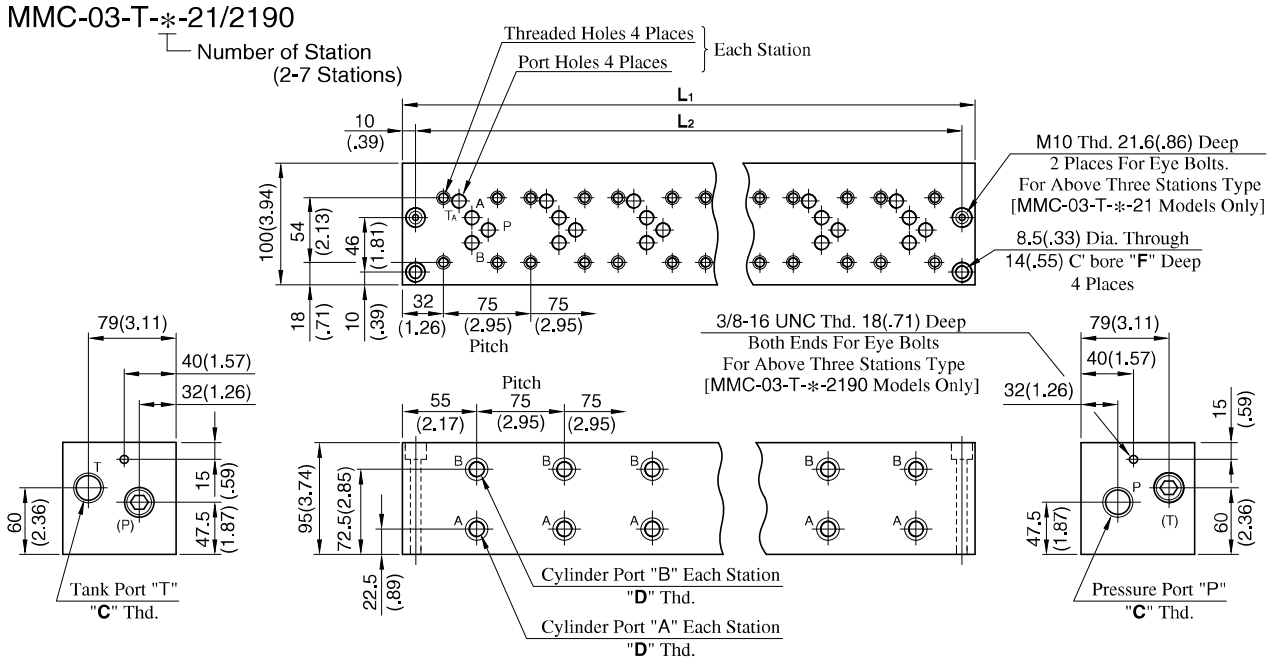
MMC-03-T-1-21/2190

DIMENSIONS IN MILLIMETRES (INCHES)



MMC-03-T-∗-21/2190

Number of Station
(2-7 Stations)

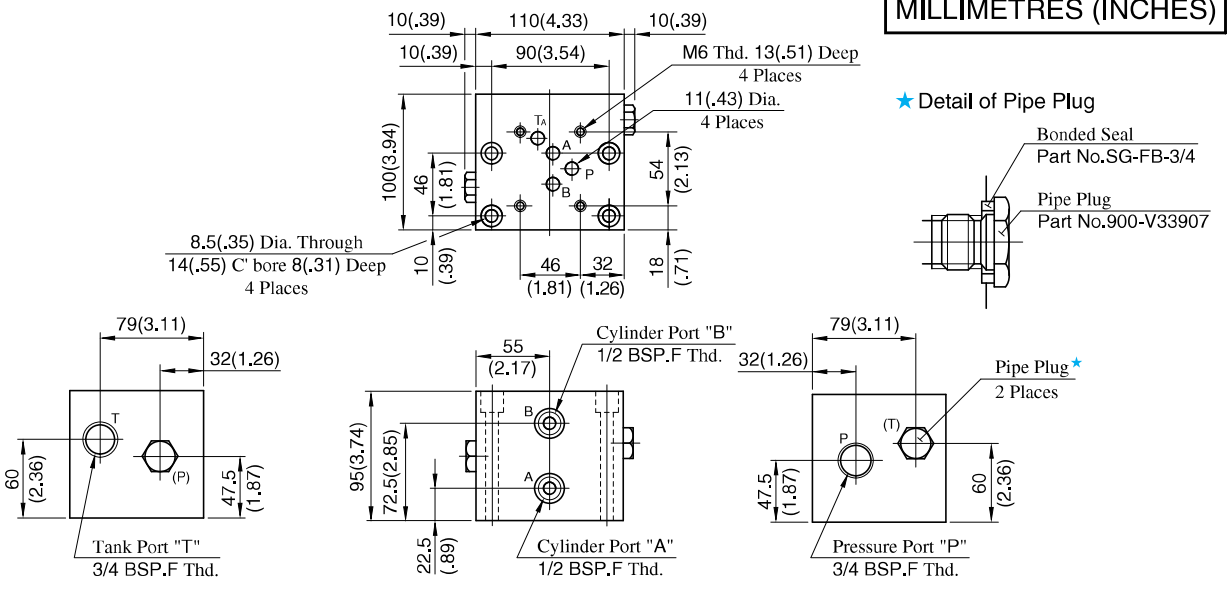


- For other dimensions, refer to above Model MMC-03-T-1.

Model Numbers	Thread Size			Dimensions mm (Inches)			Approx. Mass kg (lbs.)
	"C" Thd.	"D" Thd.	"E" Thd.	F	L_1	L_2	
MMC-03-T-1-21	Rc 3/4	Rc 1/2	M6	8.6 (.34)	—	—	8.5 (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 (7.28)	165 (6.50)	14 (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 (10.24)	240 (9.45)	19.5 (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 (13.19)	315 (12.40)	25 (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 (16.14)	390 (15.35)	30.5 (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 (19.09)	465 (18.31)	36 (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 (22.05)	540 (21.26)	41 (90.4)
MMC-03-T-7-2190	3/4 NPT	1/2 NPT	1/4-20 UNC	22 (.87)			

MMC-03-T-1-2180

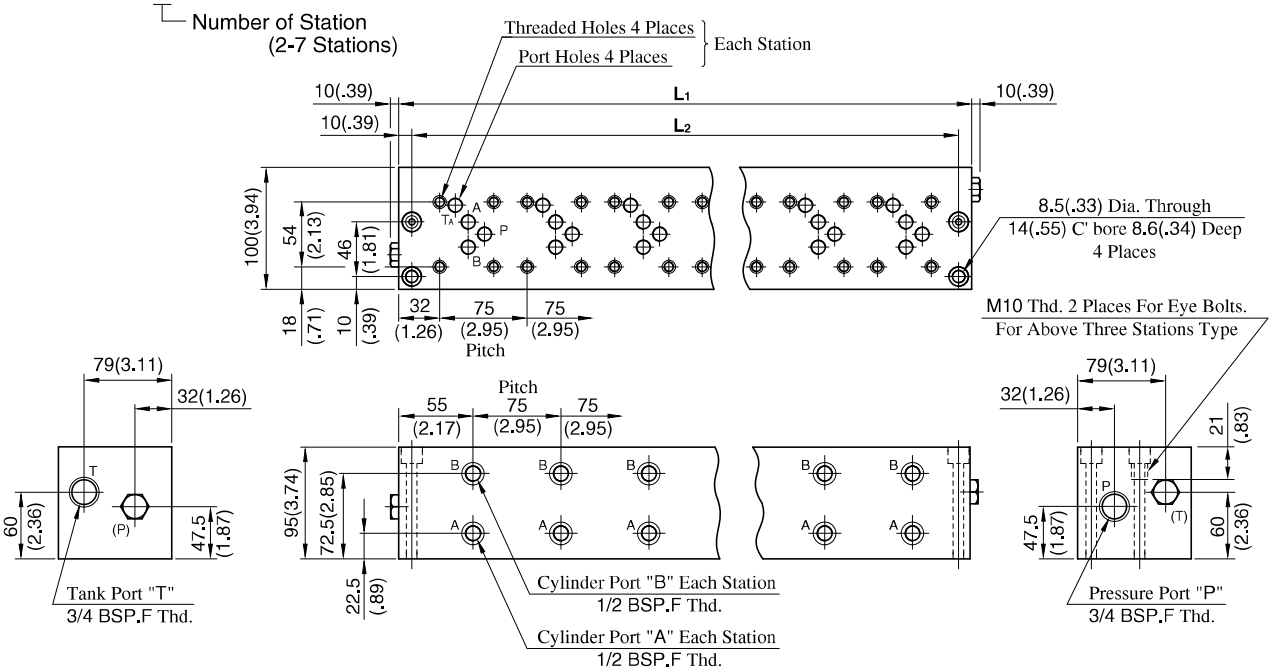
DIMENSIONS IN MILLIMETRES (INCHES)



Approx. Mass : 8.5 kg (18.7 lbs.)

MMC-03-T-∗-2180

Number of Station
(2-7 Stations)

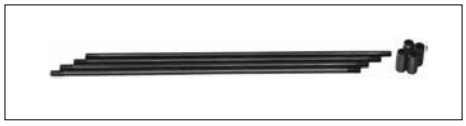


• For other dimensions, refer to above Model MMC-03-T-1.

Model Numbers	Dimensions mm (Inches)		Approx. Mass kg (lbs.)
	L_1	L_2	
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** (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.

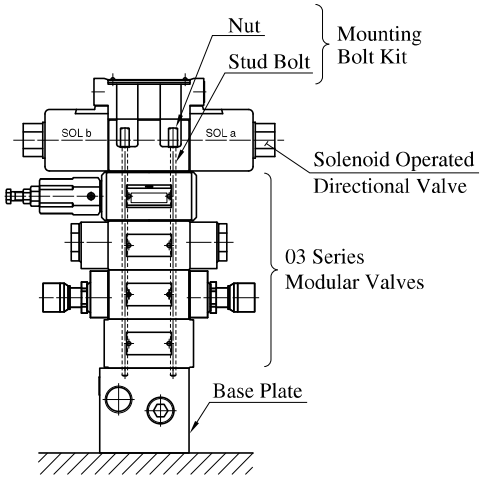
Tightening Torque:

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

Bolt Kits Selection Chart

Model Numbers	Quantity of valves to be stacked: Solenoid Operated Directional Valve (∗-DSG-03)	End Plate (MDC-03)	Modular Valve & Connecting Plate	Approx. Mass g (lbs.)
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		

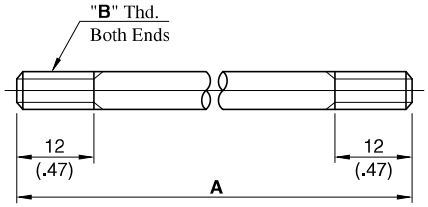
★ The solenoid operated directional valve comes with mounting bolts.



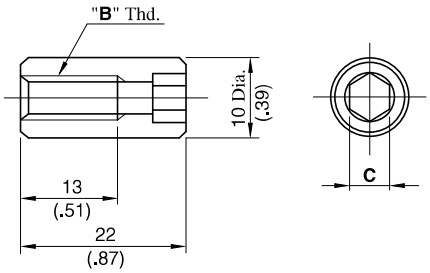
Stacking Example

MBK-03-∗-10/1090

Stud Bolt

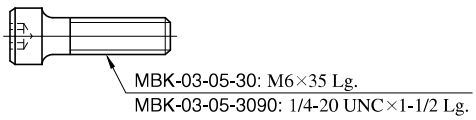


Nut



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 (3/16)
MBK-03-02-1090	158 (6.22)		
MBK-03-03-1090	213 (8.39)		
MBK-03-04-1090	268 (10.55)		