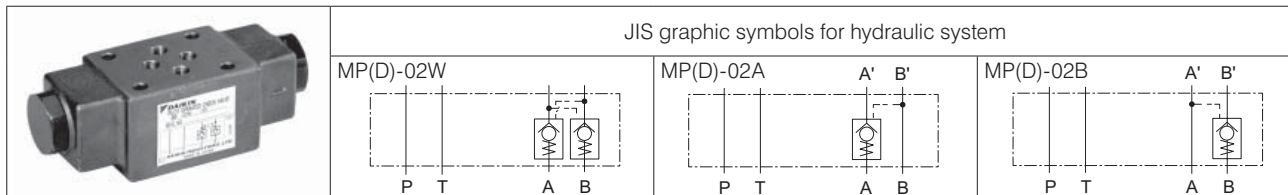




# 02 Series Stacking Type Pilot Operated Check Valves



## Nomenclature

※	-	<b>MP</b>	※	-	<b>02</b>	※	-	※※	-	※※
1	2	3	4	5	6	7				

- Applicable fluid code**  
No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid
- Model No.**  
MP: Modular stacking type pilot operated check valve
- Decompression code**  
No designation: Direct operated type  
D: Decompression type (applicable only to design No. 55)
- Nominal diameter**  
02: 1/4
- Control port**  
W: Port A/B  
A: Port A  
B: Port B
- Cracking pressure code**  
20: 0.2 MPa {2 kgf/cm<sup>2</sup>}  
50: 0.5 MPa {5 kgf/cm<sup>2</sup>}
- Design No.**  
(The design No. is subject to change)  
55: 25 MPa {250 kgf/cm<sup>2</sup>}  
60: 35 MPa {350 kgf/cm<sup>2</sup>}

## Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Cracking pressure MPa {kgf/cm <sup>2</sup> }	Area ratio *1	Mass kg
MP※-02※-20-55	25 {250}	40	0.2 {2}	(1) 2.7 :1	1.1
MP※-02※-50-55			0.5 {5}		
MP※-02※-20-60	35 {350}		0.2 {2}	(3) 16 :1	
MP※-02※-50-60			0.5 {5}		

## Handling

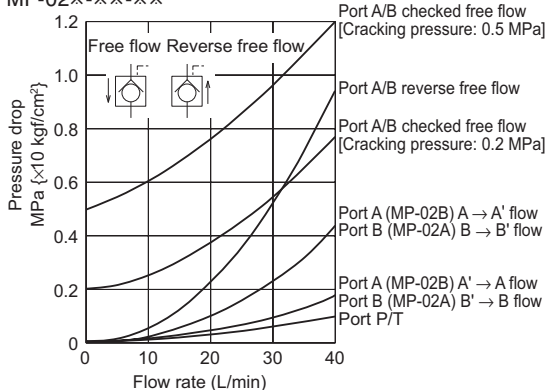
- The internal drain type is adopted.

Note: \*1 Area ratio (1) <MP> Pilot piston: Check valve (2) <MPD> Pilot piston: Large check valve (3) <MPD> Pilot piston: Small check valve

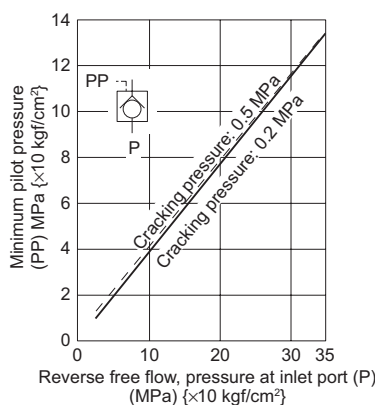
## Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

### Pressure drop characteristics

MP-02※-※※-※※

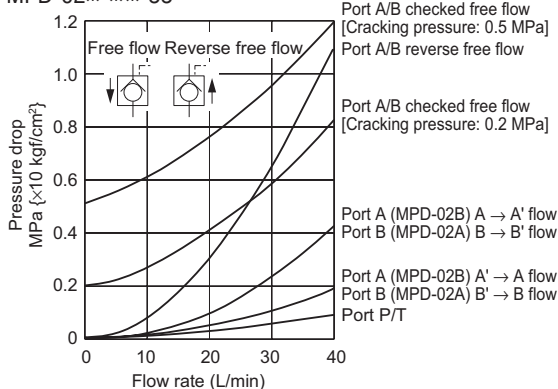


### Pilot pressure characteristics

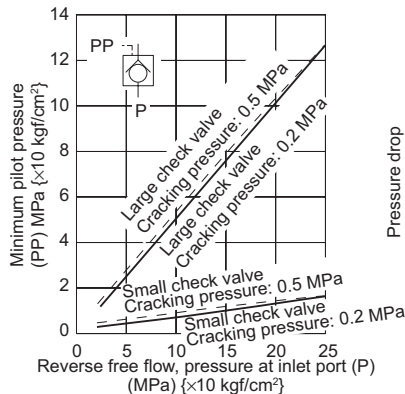


### Pressure drop characteristics

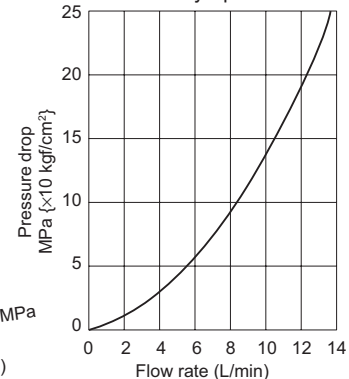
MPD-02※-※※-55



### Pilot pressure characteristics



### Pressure drop characteristics with the small valve fully open



**02 series modular stack valve model table**

Classification	Name	Model code	JIS graphic symbols for hydraulic system	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Height mm	Mass kg	Pressure adjustment range Cracking pressure MPa {kgf/cm <sup>2</sup> }	Page
Pressure control valves	Port A Counter balance valve	MQC-02A-2		25 {250}	40	40	1.4	Pressure adjustment range	I-29 to I-30
	Port B Counter balance valve	MQC-02B-2						2: 0.7 to 14 {7 to 140}	
	Brake valve	MB-02W-*		35 {350}	20		1.5	Pressure adjustment range	I-31 to I-32
	Port P Pressure switch	MPS-02P-**		25 {250}	40		1.8	Pressure adjustment range	I-33 to I-34
	Port A/B Pressure switch	MPS-02W-**							
	Port A Pressure switch	MPS-02A-**							
	Port B Pressure switch	MPS-02B-**							
Flow control valves	Port P Throttle valve	MT-02P		35 {350}	40	40	0.9	-	I-35 to I-36
	Port T Throttle valve	MT-02T							
	Port P Throttle valve with check valve	MTC-02P		25 {250}			1.0	Check valve cracking pressure	0.04 {0.4}
	Meter-out Port A/B Throttle valve	MT-02W		25 {250} 35 {350}			1.3	Check valve cracking pressure	0.08 {0.8}

MODULAR STACK VALVES

**02 series modular stack valve model table**

Classification	Name	Model code	JIS graphic symbols for hydraulic system	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Height mm	Mass kg	Pressure adjustment range Cracking pressure MPa {kgf/cm <sup>2</sup> }	Page
Flow control valves	Meter-out Port A Throttle valve	MT-02A		25 {250} 35 {350}	40	40	1.0	Check valve cracking pressure 0.08 {0.8}	I-37 to I-42
	Meter-out Port B Throttle valve	MT-02B							
	Meter-in Port A/B Throttle valve	MT-02Wi							
	Meter-in Port A Throttle valve	MT-02Ai		25 {250}					
	Meter-in Port B Throttle valve	MT-02Bi							
	Meter-out Port A/B Throttle valve	MT-02W...32 MT-02W...33							
	Meter-out Port A Throttle valve	MT-02A...32 MT-02A...33		25 {250}					
	Meter-out Port B Throttle valve	MT-02B...32 MT-02B...33							
	Meter-in Port A/B Throttle valve	MT-02Wi...32 MT-02Wi...33							
	Meter-in Port A Throttle valve	MT-02Ai...32 MT-02Ai...33							
	Meter-in Port B Throttle valve	MT-02Bi...32 MT-02Bi...33							
	Meter-in Port B Throttle valve	MT-02Bi...32 MT-02Bi...33							

**02 series modular stack valve model table**

Classification	Name	Model code	JIS graphic symbols for hydraulic system	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Height mm	Mass kg	Pressure adjustment range Cracking pressure MPa {kgf/cm <sup>2</sup> }	Page
Flow control valves	Port P Flow adjusting valve	MF-02P		25 {250}	20	40	1.2	Check valve cracking pressure 0.08 {0.8}	I-43 to I-44
	Meter-out Port A/B Flow adjusting valve	MF-02W							
	Meter-out Port A Flow adjusting valve	MF-02A			1.8				
	Meter-out Port B Flow adjusting valve	MF-02B					2		
	Meter-in Port A/B Flow adjusting valve	MF-02Wi			1.8				
	Meter-in Port A Flow adjusting valve	MF-02Ai							
	Meter-in Port B Flow adjusting valve	MF-02Bi							
Directional control valves	Port P Check valve	MC-02P-**		35 {350}	40	40	0.9	Check valve cracking pressure 05 : 0.05 {0.5} 50 : 0.5 {5}	I-47 to I-48
	Port A Check valve	MC-02A-**							
	Port B Check valve	MC-02B-**							
	Port T Check valve	MC-02T-**							
	Port P-A Check valve	MC-02PA-**							
	Port P-B Check valve	MC-02PB-**							
	Port A/B Check valve	MC-02AB-**		25 {250}			1.1		
	Vacuum check valve	MC-02W							

MODULAR STACK VALVES I

**02 series modular stack valve model table**

Classification	Name	Model code	JIS graphic symbols for hydraulic system	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Height mm	Mass kg	Pressure adjustment range Cracking pressure MPa {kgf/cm <sup>2</sup> }	Page		
Directional control valves	Port A/B Pilot operated check valve	MP-02W-××		25 {250} 35 {350}	40	40	1.1	Check valve cracking pressure 20: 0.2 {2} 50: 0.5 {5}	I-49 to I-51		
	Port A Pilot operated check valve	MP-02A-××									
	Port B Pilot operated check valve	MP-02B-××									
	Port A/B Decompression type pilot operated check valve	MPD-02W-××		25 {250}							
	Port A Decompression type pilot operated check valve	MPD-02A-××									
	Port B Decompression type pilot operated check valve	MPD-02B-××									
Blocks/mounting bolts	Port P/T Pressure take-out block	BG-02PT		25 {250}	40	40	1	-	I-52		
	Port A/B Pressure take-out block	BG-02AB									
	Blocking block	BS-02			-						
	Bypass block	BD-02PA		25 {250}	40	40	0.8		-	I-53	
	Bypass block	BD-02PT									
	Bypass block	BE-02									
	Bypass block	BF-02									
	Bypass block	BH-02		25	40	-	-			-	I-54 to I-55
	Manifold block	BT-×02	-								
	2-speed plate	BW-02	-								
	Mounting bolt	HB10× SB10×	-	-	-	-	-			Hexagon socket head cap bolt: M5 Stud bolt: M5	I-57

### 03 series modular stack valve model table

Classification	Name	Model code	JIS graphic symbols for hydraulic system	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Height mm	Mass kg	Pressure adjustment range Cracking pressure MPa {kgf/cm <sup>2</sup> }	Page																																							
Directional control valves	Solenoid valve	KSO-G03		35 {350}	130 (AC) 160 (DC)	—	—	—	G-12																																							
Pressure control valves	Port P Relief valve	MR-03P-※		25 {250}	80	55	4	Pressure adjustment range 1: 0.7 to 7 { 7 to 70} 3: 3.5 to 25 {35 to 250}	I-58 to I-59																																							
	Port A/B Relief valve	MR-03W-※						Pressure adjustment range 1: 0.8 to 7 { 8 to 70} 3: 3.5 to 25 {35 to 250}	I-60 to I-61																																							
	Port A Relief valve	MR-03A-※						Pressure adjustment range 1: UP to 7 {UP to 70} 3: 3.5 to 25 {35 to 250}	I-62 to I-63																																							
	Port B Relief valve	MR-03B-※						Pressure adjustment range 03: 0.3 to 7 { 3 to 70} 1: 0.7 to 7 { 7 to 70} 3: 3.5 to 25 {35 to 250}	I-64 to I-65																																							
	Port P Reducing valve	MG-03P-※※		16 {160} 25 {250}				3.9	4.8	MQC-03※ Check valve cracking pressure 0.05 {0.5}	I-66 to I-67																																					
	Port A Reducing valve	MG-03A-※※		25 {250}								3.9	4.8	MQC-03※ Check valve cracking pressure 0.05 {0.5}	I-68 to I-69																																	
	Port B Reducing valve	MG-03B-※※														25 {250}	3.9	4.8	MQC-03※ Check valve cracking pressure 0.05 {0.5}	I-70 to I-71																												
	Port P Sequence valve	MQ-03P-2※																			25 {250}	3.9	4.8	MQC-03※ Check valve cracking pressure 0.05 {0.5}	I-72 to I-73																							
	Port B Counter balance valve	MQ-03B-1※																								25 {250}	3.9	4.8	MQC-03※ Check valve cracking pressure 0.05 {0.5}	I-74 to I-75																		
	Port A Counter balance valve	MQC-03A-1※																													25 {250}	3.9	4.8	MQC-03※ Check valve cracking pressure 0.05 {0.5}	I-74 to I-75													
	Port B Counter balance valve	MQC-03B-1※																																		25 {250}	3.9	4.8	MQC-03※ Check valve cracking pressure 0.05 {0.5}	I-74 to I-75								
Break valve	MB-03W-※		25 {250}		3.9	4.8	MQC-03※ Check valve cracking pressure 0.05 {0.5}																																		I-74 to I-75							
Flow control valves	Port P Throttle valve	MT-03P																																									25 {250}	80	55	2.3	—	I-72 to I-73
	Meter-out Port A/B Throttle valve	MT-03W																																									25 {250} 35 {350}					

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MODULAR STACK VALVES

**03 series modular stack valve model table**

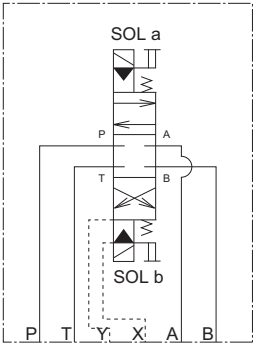
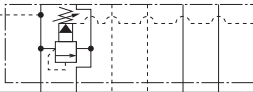
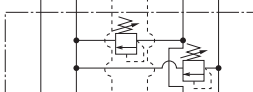
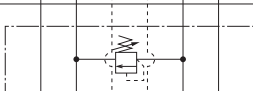


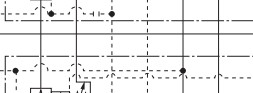
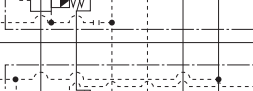

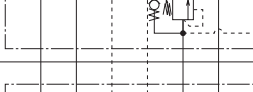
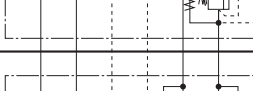
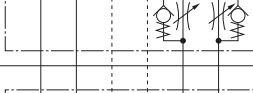
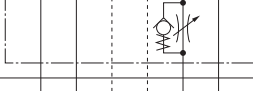
Classification	Name	Model code	JIS graphic symbols for hydraulic system	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Height mm	Mass kg	Pressure adjustment range Cracking pressure MPa {kgf/cm <sup>2</sup> }	Page
Flow control valves	Meter-in Port A/B Throttle valve	MT-03Wi		25 {250} 35 {350}	80	55	3.1	Check valve cracking pressure 0.16 {1.6}	I-74 to I-75
	Port P Flow adjusting valve	MF-03P		25 {250}	60			–	I-76 to I-77
	Meter-out Port A/B Flow adjusting valve	MF-03W		25 {250}	60	55	5	Check valve cracking pressure 0.1 {1}	I-78 to I-79
	Meter-out Port A Flow adjusting valve	MF-03A							
	Meter-out Port B Flow adjusting valve	MF-03B							
	Meter-in Port A/B Flow adjusting valve	MF-03Wi							
	Meter-in Port A Flow adjusting valve	MF-03Ai							
	Meter-in Port B Flow adjusting valve	MF-03Bi							
Directional control valves	Port P Check valve	MC-03P-xx		25 {250}	80	55	2.1	Check valve cracking pressure 05: 0.05 {0.5} 45: 0.45 {4.5}	I-80 to I-83
	Port A Check valve	MC-03A-xx							
	Port B Check valve	MC-03B-xx							
	Port T Check valve	MC-03T-xx							
	Port P-B Check valve	MC-03PB-xx					2.1	05: 0.05 {0.5}	
	Port A/B Check valve	MC-03AB-xx					3.5	Check valve cracking pressure 05: 0.05 {0.5} 45: 0.45 {4.5}	
	Vacuum check valve	MC-03W...56					4.5	Check valve cracking pressure 0.01 {0.1}	
	Port A/B Pilot operated check valve	MP-03W-xx					3.5	Check valve cracking pressure 20: 0.2 {2} 50: 0.5 {5}	I-84 to I-86

**03 series modular stack valve model table**

Classification	Name	Model code	JIS graphic symbols for hydraulic system	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Height mm	Mass kg	Pressure adjustment range Cracking pressure MPa {kgf/cm <sup>2</sup> }	Page
Directional control valves	Port A Pilot operated check valve	MP-03A-××		25 {250}	80	55	3.5	Check valve cracking pressure 20: 0.2 {2} 50: 0.5 {5}	I-84 to I-86
	Port B Pilot operated check valve	MP-03B-××							
	Port A/B Decompression type pilot operated check valve	MPD-03W-××		35 {350}					
	Port A Decompression type pilot operated check valve	MPD-03A-××							
	Port B Decompression type pilot operated check valve	MPD-03B-××							
Blocks/mounting bolts	Port P Pressure take-out block	BG-03PP...40		25 {250}	80	55	2.6	-	I-87
	Port P/T Pressure take-out block	BG-03PT...70							
	Port A/B Pressure take-out block	BG-03AB							
	Blocking block	BS-03		25 {250}	-	26.5	2.6	-	
	Bypass block	BD-03PA							
	Bypass block	BE-03		25 {250}	80	32	1.4	-	I-88
	Bypass block	BH-03							
	Manifold block	BT-×03	-	-	95	-	×	Number of series (1- to 6-series)	I-89 to I-90
	Size conversion plate	BSC-0203×	-	25 {250}	80 40	-	1 3	-	I-91
	2-speed plate	BW-03	-	25 {250}	80	-	6.7	-	I-92
	Mounting bolt	HB30× SB30×	-	-	-	-	-	Hexagon socket head cap bolt: M6 Stud bolt: M6	I-93

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MODULAR STACK VALVES

**04 series modular stack valve model table**

Classification	Name	Model code	JIS graphic symbols for hydraulic system	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Height mm	Mass kg	Pressure adjustment range Cracking pressure MPa {kgf/cm <sup>2</sup> }	Page		
Directional control valves	Solenoid pilot operated directional control valve	KSH-G04		35 {350}	300	-	-	-	G-37		
Pressure control valves	Port P Relief valve	MR-04P-*		35 {350}	300	70	7	Pressure adjustment range 1: UP to 7 {UP to 70} 2: 2 to 16 {20 to 160} 3: 3.5 to 25 {35 to 250}	I-94 to I-96		
	Port A/B Direct operated relief valves	MRD-04W-*			50 (300)		6.5	Pressure adjustment range 1: 0.8 to 7 { 8 to 70} 3: 3.5 to 25 {35 to 250} 4: 7 to 35 {70 to 350}	I-97 to I-98		
	Port A Direct operated relief valves	MRD-04A-*									
	Port B Direct operated relief valves	MRD-04B-*									
	Port P Reducing valve	MG-04P-*								Pressure adjustment range 1: 0.8 to 7 { 8 to 70} 2: 2 to 16 {20 to 160} 3: 3.5 to 25 {35 to 250}	I-99 to I-100
	Port A Reducing valve	MG-04A-*									
	Port B Reducing valve	MG-04B-*					300		8		
	Port A Counter balance valve	MQC-04A-1*								Pressure adjustment range A: 0.25 to 0.85 { 2.5 to 8.5} B: 0.5 to 3.5 { 5 to 35 } C: 2 to 14 {20 to 140 }	I-101 to I-102
	Port B Counter balance valve	MQC-04B-1*									
Flow control valves	Meter-out Port A/B Throttle valve	MT-04W		35 {350}	300	70	6.5	Check valve cracking pressure 0.1 {1}	I-103 to I-104		
	Meter-out Port A Throttle valve	MT-04A									
	Meter-out Port B Throttle valve	MT-04B									

**04 series modular stack valve model table**

Classification	Name	Model code	JIS graphic symbols for hydraulic system	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Height mm	Mass kg	Pressure adjustment range Cracking pressure MPa {kgf/cm <sup>2</sup> }	Page
Flow control valves	Meter-in Port A/B Throttle valve	MT-04Wi		35 {350}	300	70	6.5	Check valve cracking pressure 0.1 {1}	I-103 to I-104
	Meter-in Port A Throttle valve	MT-04Ai							
	Meter-in Port B Throttle valve	MT-04Bi							
	Port P Throttle valve with check valve	MTC-04P							
	Meter-out Port A/B Flow adjusting valve	MF-04W-xx				85	11	Check valve cracking pressure 0.1 {1}	I-107 to I-109
	Meter-out Port A Flow adjusting valve	MF-04A-xx							
	Meter-out Port B Flow adjusting valve	MF-04B-xx							
	Meter-in Port A/B Flow adjusting valve	MF-04Wi-xx							
	Meter-in Port A Flow adjusting valve	MF-04Ai-xx							
	Meter-in Port B Flow adjusting valve	MF-04Bi-xx							
Directional control valves	Port P Check valve	MC-04P-xx		35 {350}	300	70	4.5	Check valve cracking pressure 04: 0.04 {0.4} 10: 0.1 {1} 20: 0.2 {2} 35: 0.35 {3.5} 50: 0.5 {5} 60: 0.6 {6}	I-110 to I-112
	Port A Check valve	MC-04A-xx							
	Port T Check valve	MC-04T-xx							
	Port PA Check valve	MC-04PA-xx							
	Vacuum check valve	MC-04W-01					6	Check valve cracking pressure 01: 0.01 {0.1}	

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MODULAR STACK VALVES

### 04 series modular stack valve model table

Classification	Name	Model code	JIS graphic symbols for hydraulic system	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Height mm	Mass kg	Pressure adjustment range Cracking pressure MPa {kgf/cm <sup>2</sup> }	Page
Directional control valves	Port A/B Pilot operated check valve	MPD-04W-××		35 {350}	300	70	6.8	Check valve cracking pressure 20: 0.2 {2} 50: 0.5 {5}	I-113 to I-114
	Port A Pilot operated check valve	MPD-04A-××							
	Port B Pilot operated check valve	MPD-04B-××							
Blocks/mounting bolts	Port P/T/A/B Pressure take-out block	BG-04PTAB		25 {250}	160	70	6.4	—	I-115
	Blocking block	BS-04				34	2.9	—	I-115
	Manifold block	BT-×04	—			145	—	—	I-116
	Size conversion plate	BSC-××-04-×	—			—	—	—	I-117 to I-118
	Mounting bolt	HB104××××× HB064××××× SB104××××× SB064×××××	—			—	—	—	Hexagon socket head cap bolt: M10 Hexagon socket head cap bolt: M6 Stud bolt: M10 Stud bolt: M6

### 06 series modular stack valve model table

Classification	Name	Model code	JIS graphic symbols for hydraulic system	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Height mm	Mass kg	Pressure adjustment range Cracking pressure MPa {kgf/cm <sup>2</sup> }	Page
Directional control valves	Solenoid valve	JS-G06		25 {250}	300	—	—	—	G-58
		KSH-G06		35 {350}	681	—	—	—	G-44
Pressure control valves	Port P Reducing valve	MG-06P-×		21 {210}	120	88.9	11.6	Pressure adjustment range 1: 0.8 to 7 { 8 to 70 } 2: 3.5 to 14 { 35 to 140 } 3: 10.5 to 21 {105 to 210 }	I-121 to I-122
	Port B Reducing valve	MG-06B-×				70	13.3		
	Port P Sequence valve	MQ-06P-2×				88.9	11		I-123 to I-124
	Port B Counter balance valve	MQ-06B-1×				101.6	12.8		

**06 series modular stack valve model table**

Classification	Name	Model code	JIS graphic symbols for hydraulic system	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Height mm	Mass kg	Pressure adjustment range Cracking pressure MPa {kgf/cm <sup>2</sup> }	Page
Flow control valves	Meter-out Port A/B Throttle valve	MT-06W		31.5 {315}	500	90	13.6	Check valve cracking pressure 0.15 {1.5}	I-127 to I-129
	Meter-out Port A Throttle valve	MT-06A							
	Meter-out Port B Throttle valve	MT-06B							
	Meter-in Port A/B Throttle valve	MT-06Wi							
	Meter-in Port A Throttle valve	MT-06Ai							
	Meter-in Port B Throttle valve	MT-06Bi							
Directional control valves	Port P Check valve	MC-06P-※※		21 {210}	120	88.9	10.5	Check valve cracking pressure 05: 0.05 {0.5} 45: 0.45 {4.5}	I-130 to I-131
	Port T Check valve	MC-06T-※※							
	Port A/B Decompression type pilot operated check valve	MPD-06W-※※		31.5 {315}	500	90	13.6	Check valve cracking pressure 20: 0.2 {2} 50: 0.5 {5}	I-132 to I-133
	Port A Decompression type pilot operated check valve	MPD-06A-※※							
	Port B Decompression type pilot operated check valve	MPD-06B-※※							

I  
MODULAR STACK VALVES

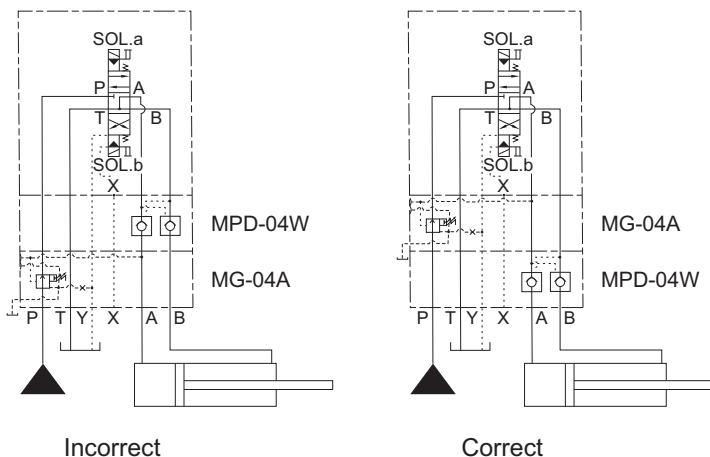
**Handling**

- **Hydraulic oil**
  - Use a petroleum-based hydraulic fluid equivalent to ISO VG32 to 68.
  - Operate the unit in an environment where both the following conditions are satisfied: viscosity range from 15 to 400 mm<sup>2</sup>/s {cSt} and oil temperature from -15 to 70°C.
  - Contamination of the hydraulic fluid causes valve trouble and reduces the service life, so pay due attention to controlling contamination and ensure that it goes no higher than NAS contamination class 12.
- **Installation and maintenance**
  - There is no restriction on the installation direction. However, valves of the 04 and 06 series may cause uneven load so stack them oriented upward.
  - Finish the face on which the valve is mounted to a surface roughness of 1.6a or better and a flatness tolerance within 0.01 mm.
  - When stacking stack valves, give adequate consideration to the order in which the valves are arrayed and stacked, taking the space required to operate the adjusting screws, the adjusting handles and their lock nuts into consideration.
- **Filters**
  - Use a line filter with a filtration accuracy of 25 μm or better.

### Notes on circuit construction

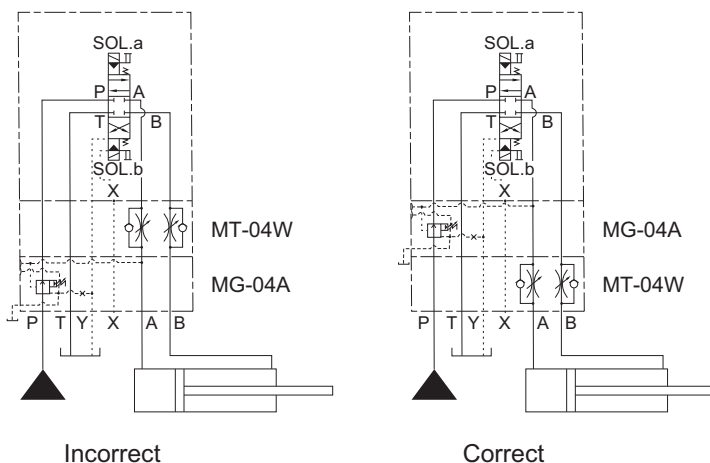
#### When constructing a circuit with a reducing valve and a pilot operated check valve

In the incorrect circuit shown on the left, the position cannot be maintained with the pilot operated check valve due to internal leakage from the reducing valve's pilot line. Therefore, the valves need to be stacked as shown in the correct circuit on the right.



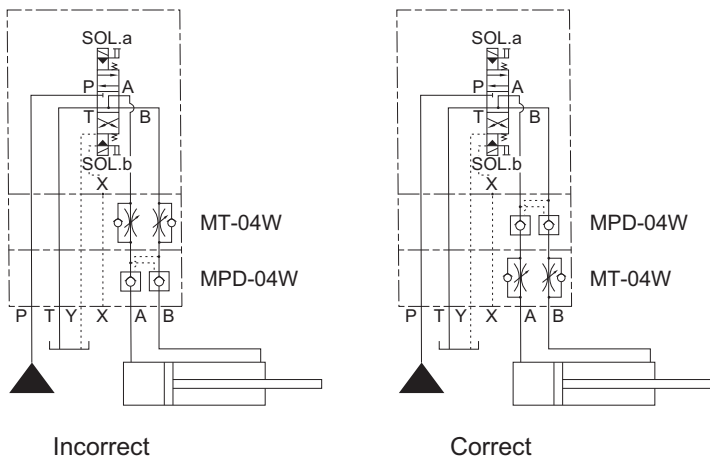
#### When constructing a circuit with a reducing valve and a throttle valve with check valve (meter-out)

In the incorrect circuit shown on the left, the cylinder output may be insufficient or the cylinder may not operate smoothly when retracting the cylinder because the reducing valve operates due to the throttle load of the throttle valve. Therefore, the valves need to be stacked as shown in the correct circuit on the right.

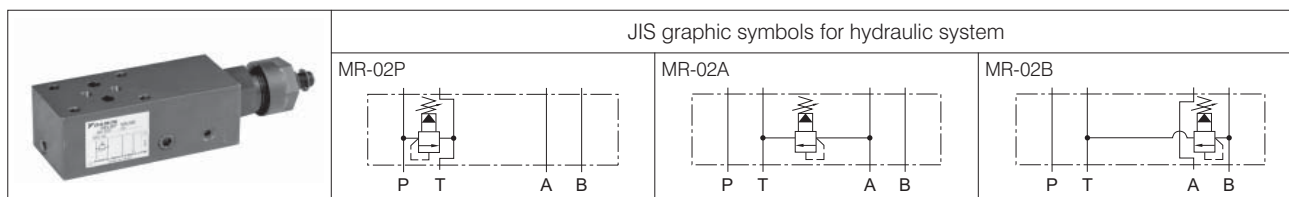


#### When constructing a circuit with a throttle valve with check valve (meter-out) and a pilot operated check valve

In the incorrect circuit shown on the left, knocking of the cylinder may be observed because the pilot operated check valve does not open sufficiently due to the throttle load of the throttle valve. Therefore, the valves need to be stacked as shown in the correct circuit on the right.



## 02 Series Stacking Type Relief Valves



### Nomenclature



- 1 Applicable fluid code**  
No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid
- 2 Model No.**  
MR: Modular stacking type relief valve
- 3 Nominal diameter**  
O2: ¼
- 4 Control port**  
P: Port P  
A: Port A  
B: Port B
- 5 Pressure adjustment range**  
1: Up to 7 MPa {Up to 70 kgf/cm<sup>2</sup>}  
2: 3.5 to 16 MPa {35 to 160 kgf/cm<sup>2</sup>}  
3: 3.5 to 25 MPa {35 to 250 kgf/cm<sup>2</sup>}  
4: 7.0 to 35 MPa {70 to 350 kgf/cm<sup>2</sup>} (applicable only to design No. 60)
- 6 Design No. (The design No. is subject to change)**  
55: 25 MPa {250 kgf/cm<sup>2</sup>} series  
60: 35 MPa {350 kgf/cm<sup>2</sup>} series
- 7 Pressure adjusting screw position**  
No designation: Adjusted at port B side  
G: Adjusted at port A side (applicable only to design No. 55)
- 8 Option code**  
No designation: Pressure adjusting screw type  
T: Pressure adjusting handle type

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range *1 MPa {kgf/cm <sup>2</sup> }	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MR-02*-1-55	25 {250}	40	Up to 7 {Up to 70}	1.4	2.5 {25}/revolution
MR-02*-2-55			3.5 to 16 {35 to 160}		4.6 {46}/revolution
MR-02*-3-55			3.5 to 25 {35 to 250}		7.9 {79}/revolution
MR-02*-1-60	35 {350}		Up to 7 {Up to 70}	1.5	2.5 {25}/revolution
MR-02*-2-60			3.5 to 16 {35 to 160}		4.6 {46}/revolution
MR-02*-3-60			3.5 to 25 {35 to 250}		7.9 {79}/revolution
MR-02*-4-60		7.0 to 35 {70 to 350}	9 {90}/revolution		

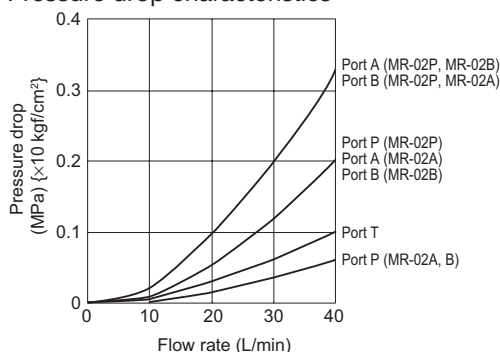
Note: \*1 The minimum adjustment pressure varies depending on the flow rate. See the minimum adjustment pressure characteristics for details.

### Handling

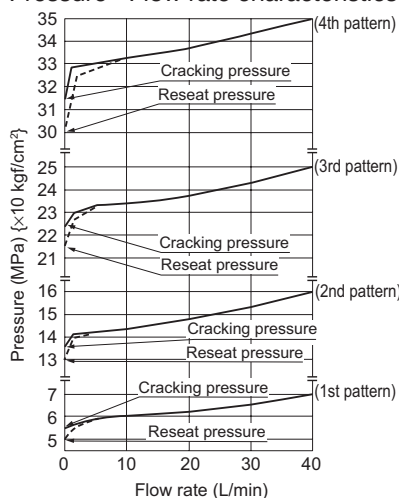
- Maintain the back pressure of the tank port at no greater than 0.5 MPa {5 kgf/cm<sup>2</sup>}.
- When using the valve as a safety valve, set the pressure 1 to 1.5 MPa {10 to 15 kgf/cm<sup>2</sup>} higher than the pressure set for the hydraulic circuit.

### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

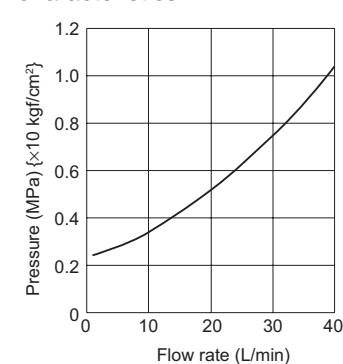
Pressure drop characteristics



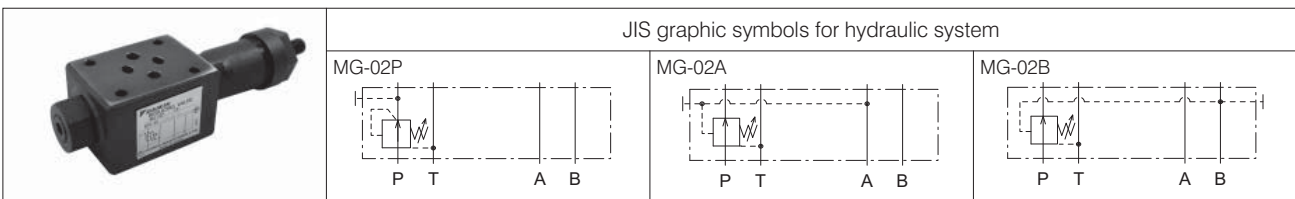
Pressure - Flow rate characteristics



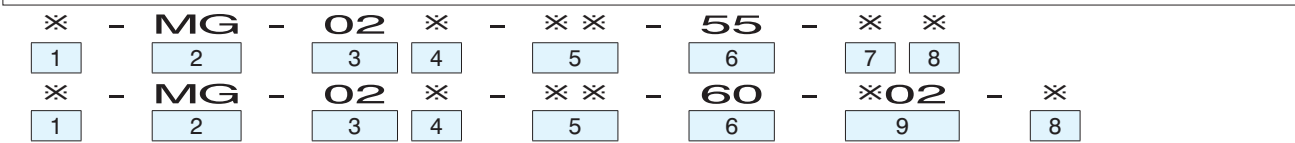
Minimum adjustment pressure characteristics



# 02 Series Stacking Type Pressure Reducing Valves



## Nomenclature



- 1 Applicable fluid code**  
No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid
- 2 Model No.**  
MG: Modular stacking type reducing valve
- 3 Nominal diameter**  
02: ¼
- 4 Control port**  
P: Port P  
A: Port A  
B: Port B
- 5 Pressure adjustment range**  
03: 0.3 to 3.5MPa { 3 to 35 kgf/cm<sup>2</sup> }  
1: 0.7 to 7 MPa { 7 to 70 kgf/cm<sup>2</sup> }  
2: 3.5 to 16 MPa { 35 to 160 kgf/cm<sup>2</sup> }
- 6 Design No. (The design No. is subject to change)**  
55: 25 MPa {250 kgf/cm<sup>2</sup>} series  
60: 35 MPa {350 kgf/cm<sup>2</sup>} series
- 7 Pressure adjusting screw position**  
(applicable only to design No. 55)  
No designation: Adjusted at port B side  
G: Adjusted at port A side
- 8 Option code**  
No designation: Pressure adjusting screw type  
T: Pressure adjusting handle type
- 9 Pressure gauge connection port**  
(applicable only to design No. 60)  
R02: Rc¼  
S02: G¼ (JIS B 2351)

## Specifications

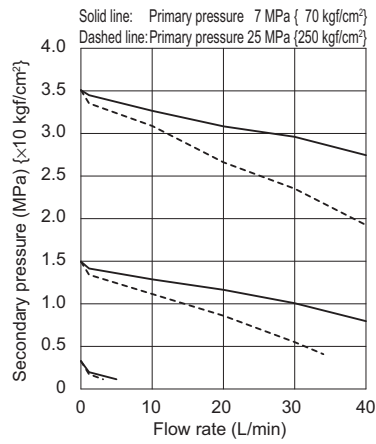
Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate (L/min)	Pressure adjustment range MPa {kgf/cm <sup>2</sup> }	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MG-02※-03-55	25 {250}	40	0.3 to 3.5 { 3 to 35 }	1.1	0.34 { 3.4 }/revolution
MG-02※- 1-55			0.7 to 7 { 7 to 70 }		0.65 { 6.5 }/revolution
MG-02※- 2-55			3.5 to 16.0 {35 to 160}		1.8 { 18.0 }/revolution
MG-02※-03-60	35 {350}		0.3 to 3.5 { 3 to 35 }	1.3	0.34 { 3.4 }/revolution
MG-02※- 1-60			0.7 to 7 { 7 to 70 }		0.65 { 6.5 }/revolution
MG-02※- 2-60			3.5 to 16.0 {35 to 160}		1.8 { 18.0 }/revolution

## Handling

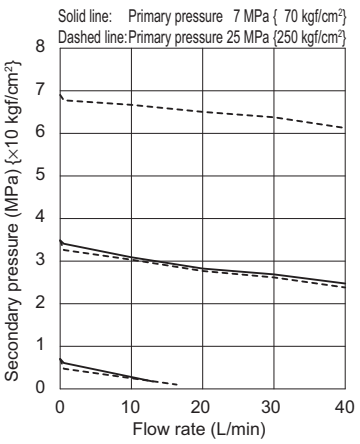
- The drain piping is connected to the tank port.
- To ensure good pressure reducing performance, set the primary side circuit pressure and the secondary pressure reducing circuit pressure difference of 1 MPa {10 kgf/cm<sup>2</sup>} minimum.

## Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

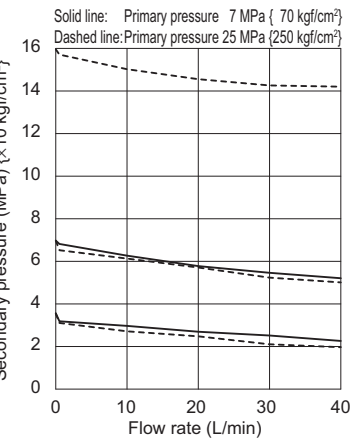
Pressure - Flow rate characteristics (tank port: vent to atmosphere)  
MG-02P-03-55



MG-02P-1-55



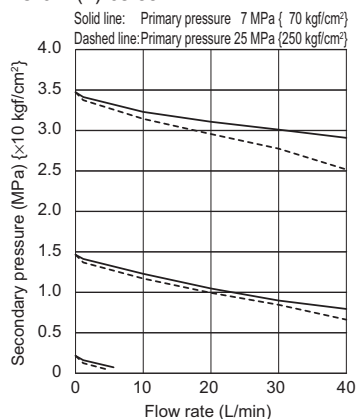
MG-02P-2-55



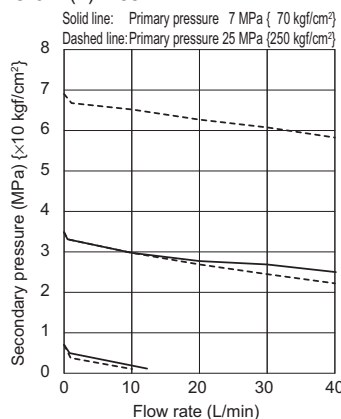
## Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

Pressure - Flow rate characteristics (tank port: vent to atmosphere)

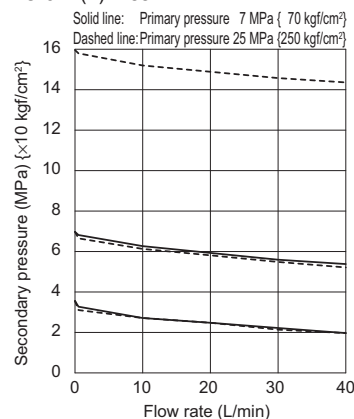
MG-02A(B)-03-55



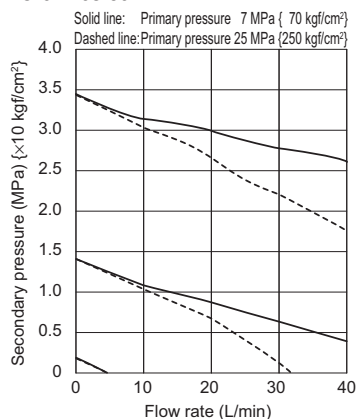
MG-02A(B)-1-55



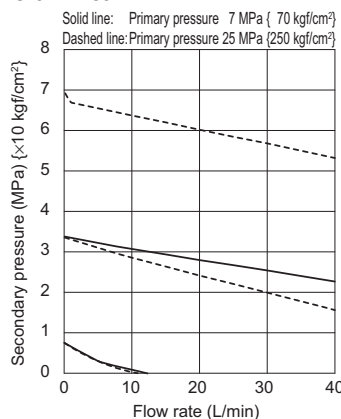
MG-02A(B)-2-55



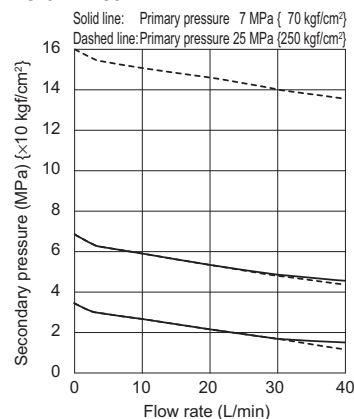
MG-02P-03-60



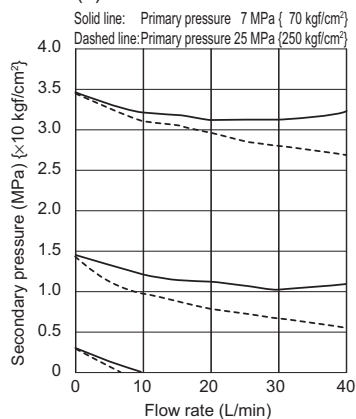
MG-02P-1-60



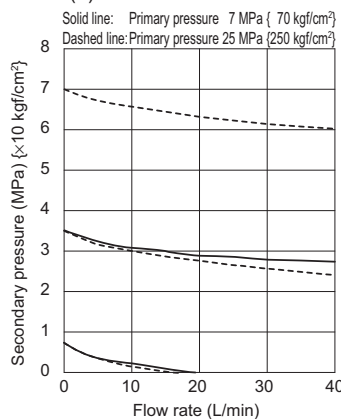
MG-02P-2-60



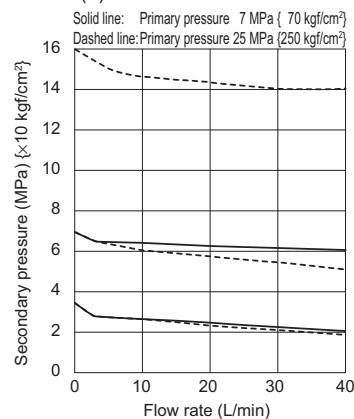
MG-02A(B)-03-60



MG-02A(B)-1-60

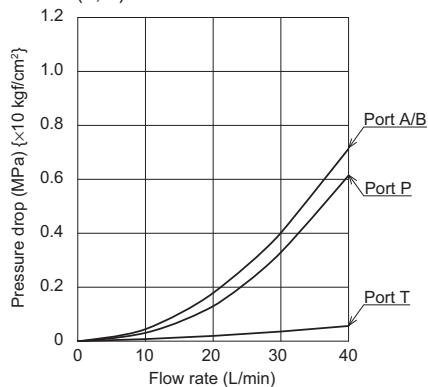


MG-02A(B)-2-60

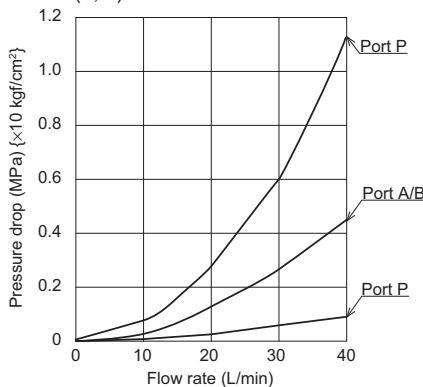


Pressure drop characteristics

MG-02P(A, B)-※※-55



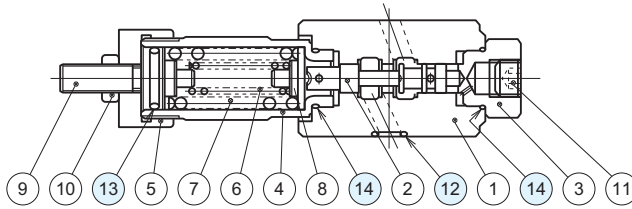
MG-02P(A, B)-※※-60



MODULAR STACK VALVES

## Sectional structural diagram

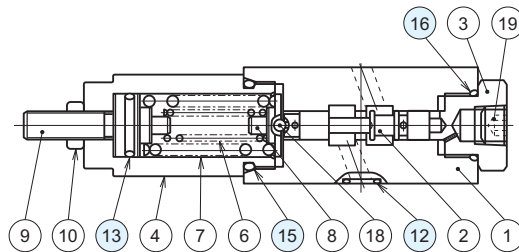
MG-02\*-\*\*-55



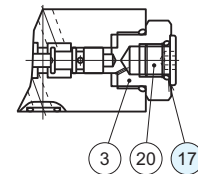
Sealing part table

Part No.	Name	Quantity	Part specifications
12	O-ring	4	AS568-012 (NBR, Hs90)
13	O-ring	1	JIS B 2401 1A P18
14	O-ring	2	AS568-017 (NBR, Hs90)

MG-02\*-\*\*-60-R02



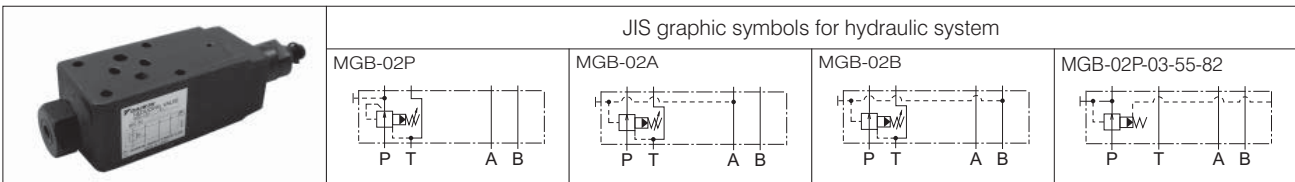
MG-02\*-\*\*-60-S02



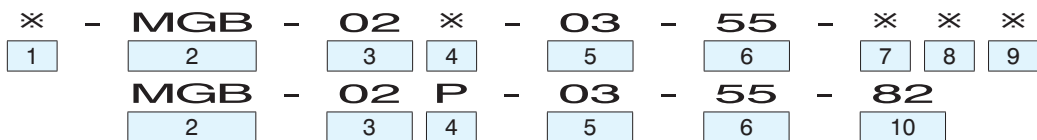
Sealing part table

Part No.	Name	Quantity	Part specifications
12	O-ring	4	AS568-012 (NBR, Hs90)
13	O-ring	1	JIS B 2401 1A P18
15	O-ring	1	JIS B 2401 1B P26
16	O-ring	1	JIS B 2401 1B P20
17	O-ring	1	JIS B 2401 1B P11

# 02 Series Stacking Type Low-pressure Reducing Valves



## Nomenclature



- 1 Applicable fluid code**  
No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid
- 2 Model No.**  
MGB: Modular stacking type low-pressure reducing valve
- 3 Nominal diameter**  
02: ¼
- 4 Control port**  
P: Port P A: Port A B: Port B
- 5 Pressure adjustment range**  
03: 0.15 to 3.5 MPa {1.5 to 35 kgf/cm<sup>2</sup>}  
: 0.5 to 7 MPa {5 to 70 kgf/cm<sup>2</sup>}  
(applicable only to control No. 82)
- 6 Design No.**  
(The design No. is subject to change)
- 7 Drainage code**  
No designation: Internal drain type  
E: External drain type
- 8 Pressure adjusting screw position**  
No designation: Adjusted at port B side  
G: Adjusted at port A side
- 9 Option code**  
No designation: Pressure adjusting screw type  
T: Pressure adjusting handle type
- 10 Control No.**  
82: With port for remote control (not equipped with pressure adjusting screw)

## Specifications

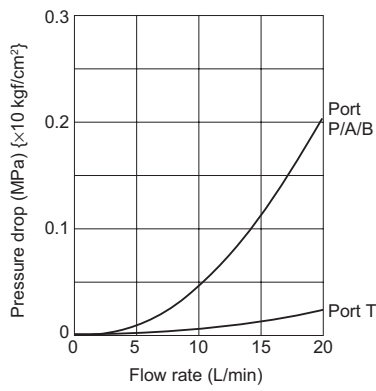
Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range MPa {kgf/cm <sup>2</sup> }	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MGB-02*-03-55	7 {70}	20	0.15 to 3.5 {1.5 to 35}	1.4	0.89 {8.9}/revolution
MGB-02P-03-55-82			0.5 to 7 {5 to 70}	1.3	-

## Handling

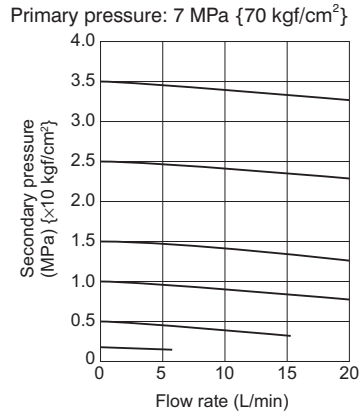
- To ensure good pressure reducing performance, set a difference of 0.4 MPa {4 kgf/cm<sup>2</sup>} minimum between the primary side main circuit pressure and the secondary pressure reducing circuit pressure.
- Directly connect the tank piping of the valve to the tank without merging it with other tank piping.
- When pressure control from the low pressure range is required, use the external drain type to reduce the influence of back pressure on the tank port.
- The external drain connection block MGB-02E-55 is provided for connection to the external drain type (drainage code: E).
- When changing the drain setting of the valve from the internal drain type to the external drain type, order the external drain connection block MGB-02E-55 separately.

## Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

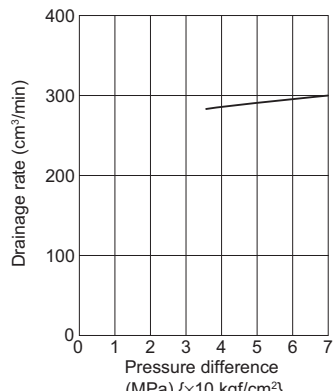
Pressure drop characteristics



Pressure - Flow rate characteristics (tank port: vent to atmosphere) MGB-02P-03-55



Drainage volume characteristics



## Drain type setting guide

Either the internal or external drain type can be set by fitting/removing plugs.

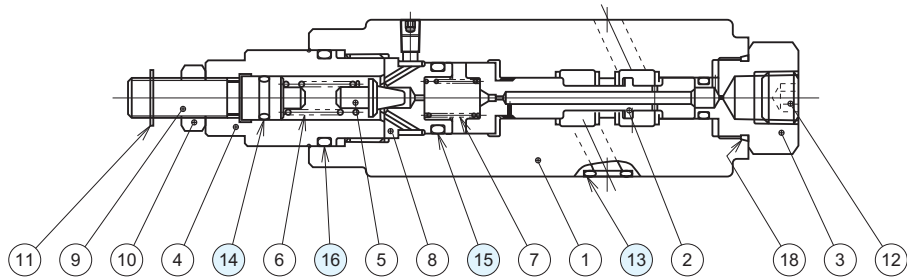
When the drain setting of the valve is changed from the internal drain type to the external drain type, stack the external drain connection block MGB-02E-55 on top of MGB-02P(A)(B).

When the valve is set as external drain type, connect the piping directly from the external drain port (Rc¼) of the MGB-02E-55 to the tank.

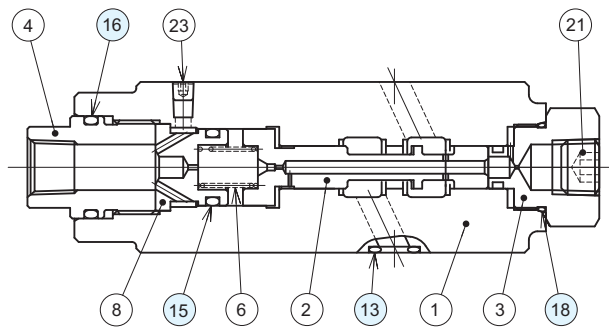
	Internal drain type	External drain type	Hexagon socket taper thread plug	Tightening torque N·m {kgf·cm}
Plug B	Not provided	Provided	NPTF <sup>1</sup> / <sub>32</sub>	0.9 to 1.2 { 9 to 12}
Plug C	Provided	Not provided	NPTF <sup>1</sup> / <sub>32</sub> <MGB-02P(B)>	
			NPTF <sup>1</sup> / <sub>16</sub> <MGB-02A >	6 to 7.5 {60 to 75}
Plug A	Provided	Provided	NPTF <sup>1</sup> / <sub>16</sub>	

**Sectional structural diagram**

MGB-02P



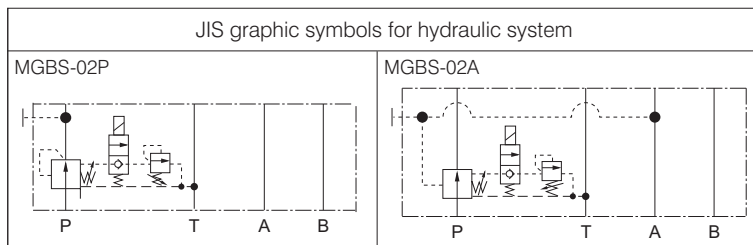
MGB-02P-03-55-82



Sealing part table

Part No.	Name	Quantity	Part specifications
13	O-ring	4	AS568-012 (NBR, Hs90)
14	O-ring	1	JIS B 2401 1A P8
15	O-ring	1	JIS B 2401 1A P14
16	O-ring	1	JIS B 2401 1A P20
18	O-ring	1	AS568-017 (NBR, Hs90)

## 02 Series Stacking Type Solenoid Operated Low-pressure Reducing valves



### Nomenclature

**MGBS** - **02** \* - **1** - **C** **03** \* - **55** - **C** \*

1                      2    3                      4                      5    6    7                      8                      9    10

- |  |   |
|--|---|
| <p><b>1 Model No.</b><br/>MGBS: Modular stacking type solenoid operated low-pressure reducing valve</p> <p><b>2 Nominal diameter</b><br/>02: ¼</p> <p><b>3 Control port</b><br/>P: Port P<br/>A: Port A</p> <p><b>4 Maximum adjustment pressure at high pressure side</b><br/>1: 6.9 MPa</p> <p><b>5 Control method</b><br/>C: Dual pressure control (High pressure when demagnetized)</p> | <p><b>6 Maximum adjustment pressure at low pressure side</b><br/>03: 3.4 MPa</p> <p><b>7 Voltage code</b><br/><b>(See the solenoid specification table)</b><br/>A: AC 100 V (50/60 Hz)<br/>B: AC 200 V (50/60 Hz)<br/>P: DC 24 V</p> <p><b>8 Design No.</b></p> <p><b>9 Option code</b><br/>C: DIN connector type (without lamp)</p> <p><b>10 Option code</b><br/>No designation: Pressure adjusting screw type<br/>T: Pressure adjusting handle type</p> |
|--|---|

MODULAR STACK VALVES I

### Specifications

Model code	Maximum operating pressure MPa	Maximum flow rate L/min	Pressure at low pressure side adjustment range MPa {kgf/cm <sup>2</sup> }	Pressure at high pressure side adjustment range MPa {kgf/cm <sup>2</sup> }	Mass kg
MGBS-02*-1-C03*-55-C	7	40	0.2 to 3.4 {2 to 34}	0.8 to 7 {8 to 70}	4.8
MGBS-02*-1-C03*-55-CT					5

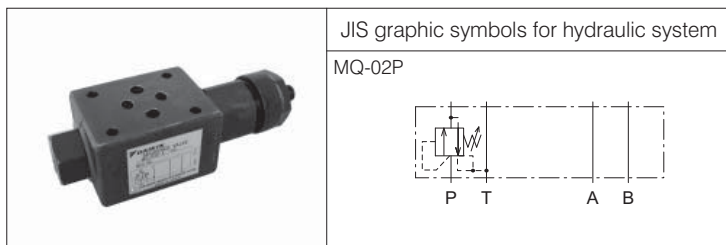
### Voltage code and solenoid specifications

Voltage code	Power supply voltage	Starting current A	Holding current A	Holding power W	Permissible voltage fluctuation %
A	AC 100 V (50 Hz)	2.42	0.51	21.5	80 to 110
	AC 100 V (60 Hz)	2.14	0.37	18	
B	AC 200 V (50 Hz)	1.21	0.26	21.5	80 to 110
	AC 200 V (60 Hz)	1.07	0.19	18	
P	DC 24 V	-	1.22	29.2	90 to 110

### Handling

- To ensure good pressure reducing performance, set a difference of 0.4 MPa minimum between the primary side main circuit pressure and the secondary pressure reducing circuit pressure.
- Directly connect the tank piping of the valve to the tank without merging it with other tank piping.
- Do not turn the handle with a hand tool or other implement when adjusting the pressure on models with a handle (-T).
- Please note that the maximum flow rate will not be attained when the low pressure range has been set.

## 02 Series Stacking Type P Port Sequence Valves



### Nomenclature

- |   |   |           |   |           |          |   |          |   |   |           |   |   |
|---|---|-----------|---|-----------|----------|---|----------|---|---|-----------|---|---|
| ※ | - | <b>MQ</b> | - | <b>02</b> | <b>P</b> | - | <b>2</b> | ※ | - | <b>55</b> | - | ※ |
| 1 |   | 2         |   | 3         | 4        |   | 5        | 6 |   | 7         |   | 8 |
- Applicable fluid code**  
No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid
  - Model No.**  
MQ: Modular stacking type pressure control valve
  - Nominal diameter**  
02: ¼
  - Control port**  
P: Port P
  - Function code**  
2: Sequence valve
  - Pressure adjustment range**  
1: 0.8 to 7 MPa { 8 to 70 kgf/cm<sup>2</sup> }  
3: 3.5 to 21 MPa {35 to 210 kgf/cm<sup>2</sup> }
  - Design No.**  
**(The design No. is subject to change)**
  - Pressure adjusting screw position**  
No designation: Adjusted at port B side  
G: Adjusted at port A side

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range *1 MPa {kgf/cm <sup>2</sup> }	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MQ-02P-21-55	25 {250}	40	0.8 to 7 { 8 to 70 }	1.1	1.8 {18}/revolution
MQ-02P-23-55			3.5 to 21 {35 to 210}		4.4 {44}/revolution

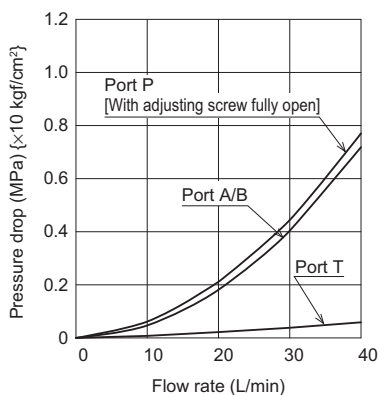
Note: \*1 The pressure adjustment ranges are indicated using cracking pressures.

### Handling

- The drain piping is connected to the tank port.

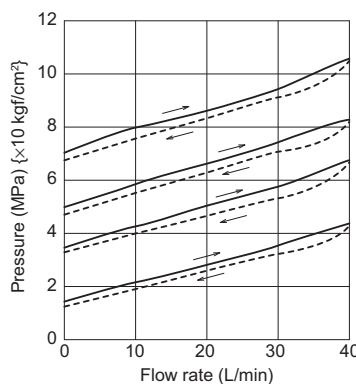
### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

Pressure drop characteristics

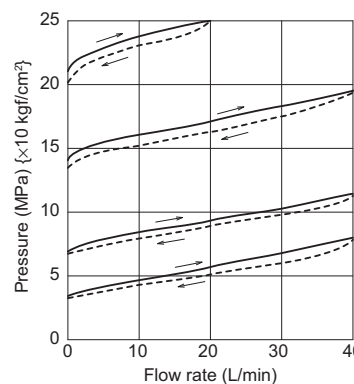


Pressure - Flow rate characteristics

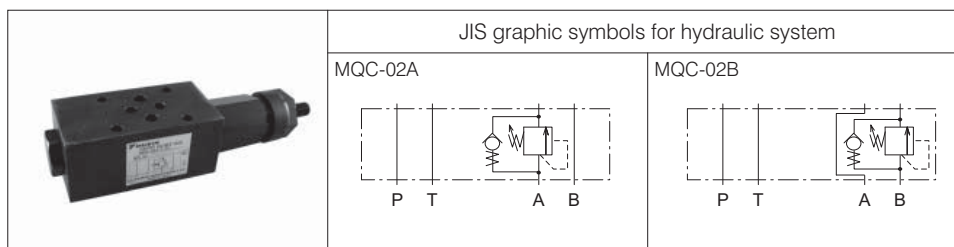
MQ-02P-21-55  
Solid line: When flow rate is increased  
Dashed line: When flow rate is decreased



MQ-02P-23-55  
Solid line: When flow rate is increased  
Dashed line: When flow rate is decreased



## 02 Series Stacking Type Port A/B Counter Balance Valves



### Nomenclature

※ - MQC - 02 ※ - 2 - 55 - ※  
 1      2      3      4      5      6      7

#### 1 Applicable fluid code

No designation: Petroleum-based hydraulic fluid,  
 water-glycol hydraulic fluid  
 F: Phosphate ester hydraulic fluid

#### 2 Model No.

MQC: Modular stacking type counter balance valve

#### 3 Nominal diameter

02: 1/4

#### 4 Control port

A: Port A  
 B: Port B

#### 5 Pressure adjustment range

2: 0.7 to 14 MPa {7 to 140 kgf/cm<sup>2</sup>}

#### 6 Design No.

(The design No. is subject to change)

#### 7 Pressure adjusting screw position

No designation: Adjusted at port B side  
 G: Adjusted at port A side

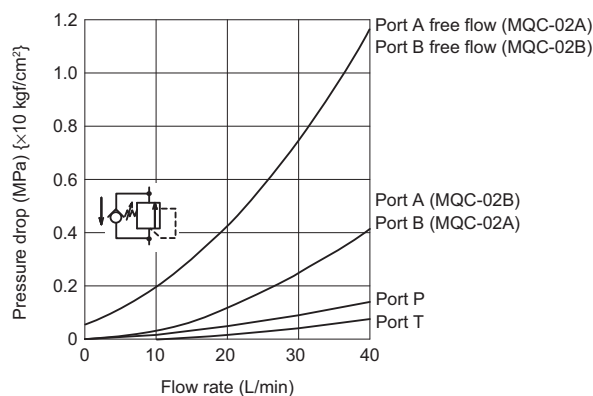
### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range *1 MPa {kgf/cm <sup>2</sup> }	Check valve cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MQC-02※-2-55	25 {250}	40	0.7 to 14 {7 to 140}	0.05 {0.5}	1.4	1.05 {10.5} / revolution

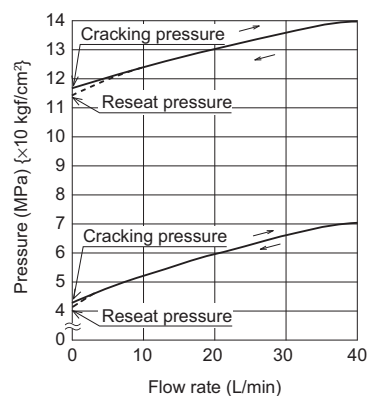
Note: \*1 The pressure adjustment ranges are indicated using cracking pressures.

### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

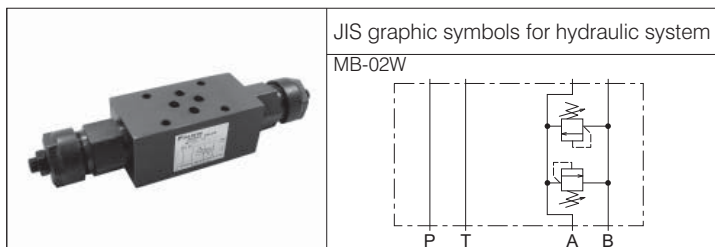
#### Pressure drop characteristics



#### Pressure - Flow rate characteristics



## 02 Series Stacking Type Brake Valves



### Nomenclature

※ - MB - 02 W - ※ - 65

1      2      3      4      5      6

**1 Applicable fluid code**

No designation: Petroleum-based hydraulic fluid,  
water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid

**2 Model No.**

MB: Modular stacking type brake valve

**3 Nominal diameter**

02: ¼

**4 Control port**

W: Port A/B

**5 Pressure adjustment range**

1: 0.8 to 7 MPa { 8 to 70 kgf/cm<sup>2</sup> }  
3: 3.5 to 21 MPa {35 to 210 kgf/cm<sup>2</sup> }

**6 Design No.**

(The design No. is subject to change)

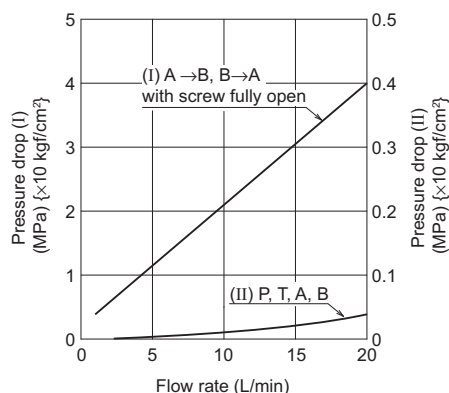
### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range *1 MPa {kgf/cm <sup>2</sup> }	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MB-02W-1-65	35 {350}	20	0.8 to 7 ( 8 to 70)	1.5	1.4 {14}/revolution
MB-02W-3-65			3.5 to 21 (35 to 210)		6.3 {63}/revolution

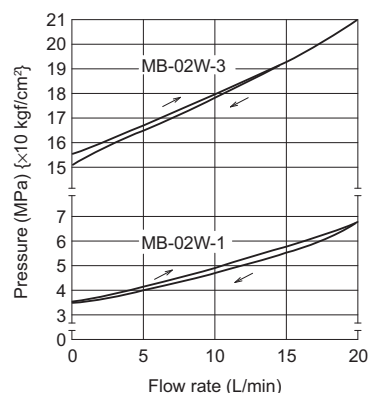
Note: \*1 The pressure adjustment ranges are indicated using cracking pressures.

### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

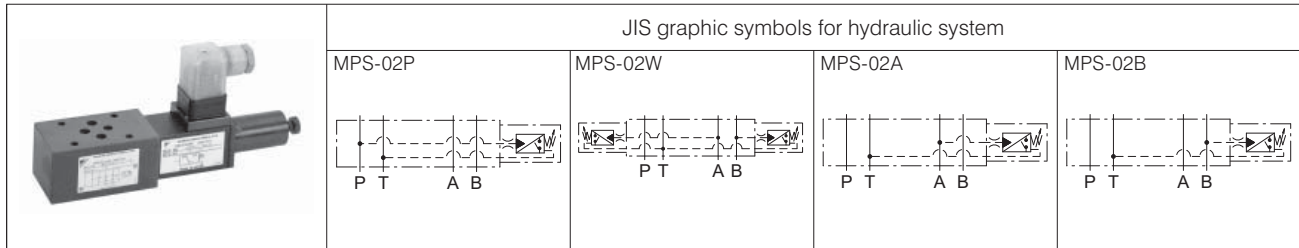
Pressure drop characteristics



Pressure - Flow rate characteristics



## 02 Series Stacking Type Pressure Switch



### Nomenclature

**MPS** - **02** \* - \* - \* - **60** - \* \* \*

1      2      3      4      5      6      7

**1 Model No.**

MPS: Modular stacking type pressure switch

**2 Nominal diameter**

02: 1/4

**3 Pressure detection port**

P: Port P  
W: Port A/B  
A: Port A  
B: Port B

**4 Pressure adjustment range**

1: 0.5 to 7 MPa {5 to 70 kgf/cm<sup>2</sup>}  
2: 0.5 to 16 MPa {5 to 160 kgf/cm<sup>2</sup>}  
3: 0.8 to 25 MPa {8 to 250 kgf/cm<sup>2</sup>}

**5 Voltage code \*1**

A: AC 100 V (50/60 Hz), AC 110 V (50/60 Hz)  
B: AC 200 V (50/60 Hz), AC 220 V (50/60 Hz)  
P: DC 24 V

**6 Design No. (The design No. is subject to change)**

**7 Option code (See the option code table)**

Note: \*1 The voltage code applies only to DIN connector type (with lamp) models.

MODULAR STACK VALVES I

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range MPa {kgf/cm <sup>2</sup> }	Permissible back pressure MPa {kgf/cm <sup>2</sup> }	Maximum switching frequency Times per minute	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MPS-02*-1*-60	25 {250}	40	0.5 to 7 {5 to 70}	2 {20}	60	1.8 *1	1.2 {12}/revolution
MPS-02*-2*-60			0.5 to 16 {5 to 160}				2.1 {21}/revolution
MPS-02*-3*-60			0.8 to 25 {8 to 250}				3.1 {31}/revolution

Note: For the specifications of the pressure switch, see those for JPS on Page E-62.

\*1 The mass of MPS-02W-\*-\*-60 is 2.5 kg.

### 7: Option code table

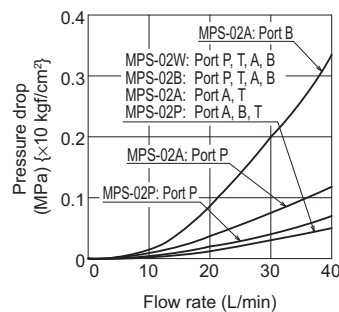
Code	Option details		
No designation	Lead wire type	Without lamp	Upward
L			Leftward
R			Rightward
D			Downward
C	DIN connector type	Without lamp	Upward
CL			Leftward
CR			Rightward
CD			Downward
CL	Wiring port PG11	With lamp	Upward
CLL			Leftward
CLR			Rightward
CLD			Downward
CG04	DN connector type	Without lamp	Upward
CG04L			Leftward
CG04R			Rightward
CG04D			Downward

### Wiring

Refer to Page E-63 for the wiring specifications.

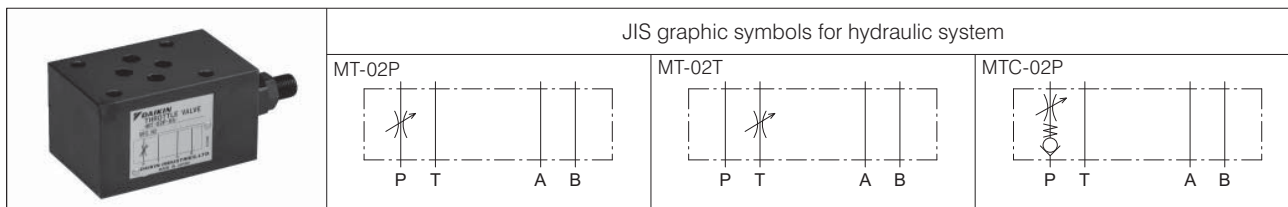
### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

Pressure drop characteristics

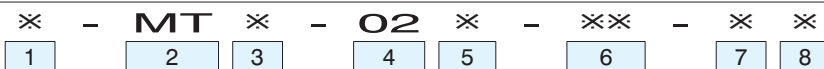


Note: For the direction of the models with option codes L, R, and D, see the external dimension diagrams.

## 02 Series Stacking Type Port P/T Throttle Valves



### Nomenclature



- 1 Applicable fluid code**  
No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid
  - 2 Model No.**  
MT: Modular stacking type throttle valve
  - 3 Check valve code**  
No designation: Without check valve  
C: With check valve
  - 4 Nominal diameter**  
02: 1/4
  - 5 Control port**  
P: Port P  
T: Port T
  - 6 Design No. (The design No. is subject to change)**  
55: MTC-02P  
65: MT-02\*
  - 7 Pressure adjusting screw position**  
No designation: Adjusted at port B side  
G: Adjusted at port A side
  - 8 Option code**  
No designation: Flow rate adjusting screw type  
T: Flow rate adjusting handle type \*<sup>1</sup>
- Note: \*<sup>1</sup> The flow rate adjusting handle type cannot be selected for MTC models.

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Check valve cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg
MT-02*-65	35 {350}	40	-	0.9
MTC-02P-55	25 {250}		0.04 {0.4}	1.0

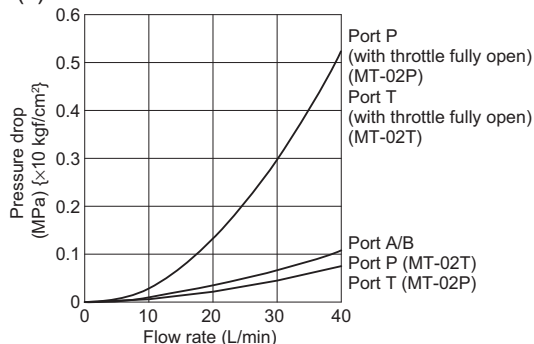
### Handling

- The flow rate will not be zero even if the flow rate adjusting screw is fully tightened.
- With the throttle valve for port T, maintain the back pressure at the tank port of the solenoid valve within the permissible range.

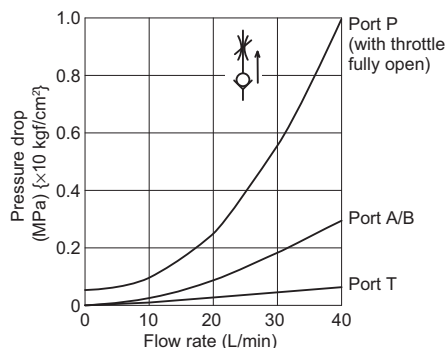
### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

#### Pressure drop characteristics

##### MT-02P(T)-65

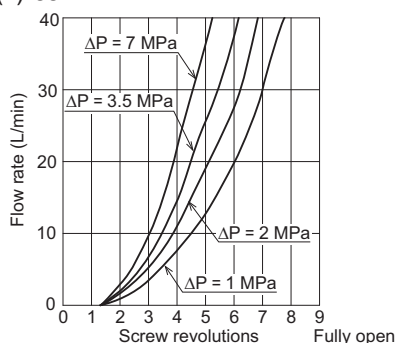


##### MTC-02P-55

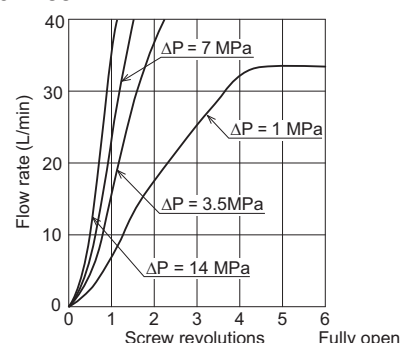


#### Flow rate adjusting screw revolution - Flow rate characteristics

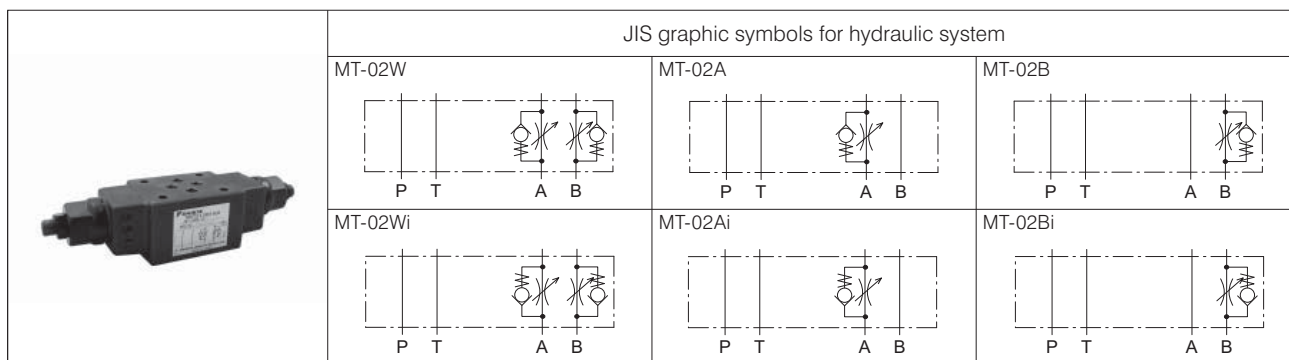
##### MT-02P(T)-65



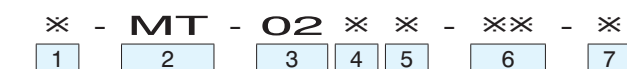
##### MTC-02P-55



## 02 Series Stacking Type Port A/B Throttle Valves



### Nomenclature



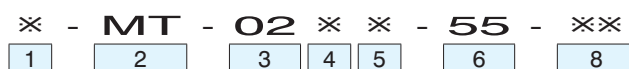
- 1 Applicable fluid code**  
 No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
 F: Phosphate ester hydraulic fluid

- 2 Model No.**  
 MT: Modular stacking type throttle valve

- 3 Nominal diameter**  
 02: 1/4

- 4 Control port**  
 W: Port A/B  
 A: Port A  
 B: Port B

- 5 Control method**  
 No designation: Meter-out control  
 i: Meter-in control



- 6 Design No. (The design No. is subject to change)**  
 55: 25 MPa {250 kgf/cm<sup>2</sup>} series  
 60: 35 MPa {350 kgf/cm<sup>2</sup>} series

- 7 Option code \*1**  
 No designation: Flow rate adjusting screw type  
 T: Flow rate adjusting handle type (applicable only to design No. 55)

- 8 Control No. <Low quantity range control type> \*1**  
 32: Control flow rate 14 L/min (at differential pressure of 2 MPa {20 kgf/cm<sup>2</sup>})  
 33: Control flow rate 20 L/min (at differential pressure of 2 MPa {20 kgf/cm<sup>2</sup>})

Note: \*1 Option code "T" cannot be combined with control No. "32" or "33".

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Check valve cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg
MT-02W※-55	25 {250}	40 *2	0.08 {0.8}	1.3
MT-02A(B)※-55				1.0
MT-02W※-55-32				1.4
MT-02A(B)※-55-32				1.1
MT-02W※-55-33				1.4
MT-02A(B)※-55-33				1.1
MT-02W※-60	35 {350}			1.4
MT-02A(B)※-60				1.2

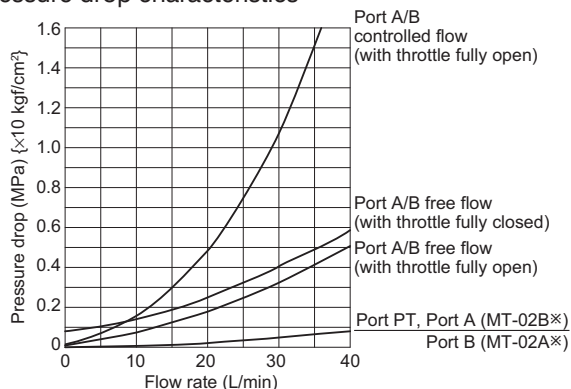
### Handling

- The flow rate will not be zero even when the flow rate adjusting screw is fully tightened.

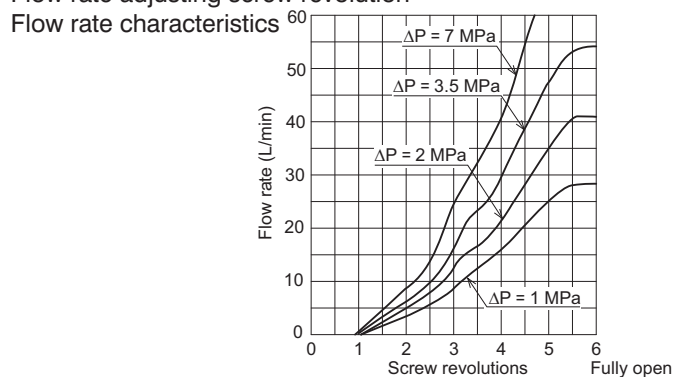
Note: \*2 Control No. 32: Control flow rate 14 L/min (at differential pressure of 2 MPa {20 kgf/cm<sup>2</sup>})  
 33: Control flow rate 20 L/min (at differential pressure of 2 MPa {20 kgf/cm<sup>2</sup>})

### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

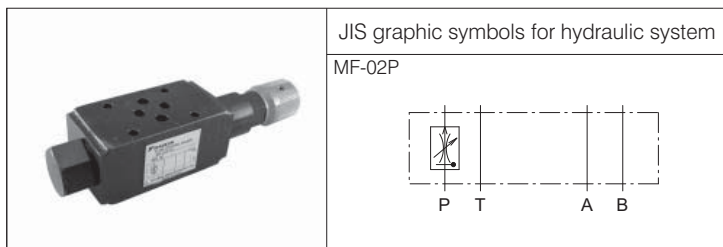
#### Pressure drop characteristics



#### Flow rate adjusting screw revolution -



## 02 Series Stacking Type Port P Flow Control Valves



### Nomenclature

1
2
3
4
5

#### 1 Applicable fluid code

No designation: Petroleum-based hydraulic fluid,  
water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid

#### 2 Model No.

MF: Modular stacking type flow control valve

#### 3 Nominal diameter

02: 1/4

#### 4 Control port

P: Port P

#### 5 Design No. (The design No. is subject to change)

Note: Contact Daikin separately for the delivery term of the products that accept phosphate ester hydraulic fluids.

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Control flow rate *1 L/min		Mass kg
			(1)	(2)	
MF-02P-55	25 {250}	20	0.1 to 20	0.5 to 20	1.2

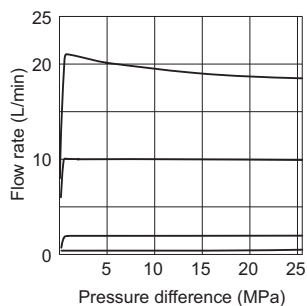
Note: \*1 Control flow rate (1) Pressure difference between the inlet and outlet ports to be 7 MPa {70 kgf/cm<sup>2</sup>} maximum  
(2) Pressure difference between the inlet and outlet ports to be 25 MPa {250 kgf/cm<sup>2</sup>} maximum

### Handling

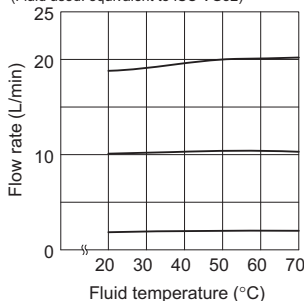
- To ensure good pressure compensation performance, maintain a pressure difference of 1 MPa {10 kgf/cm<sup>2</sup>} minimum between the inlet and outlet ports.
- The flow rate will not be zero even if the flow rate adjusting handle is fully tightened.

### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

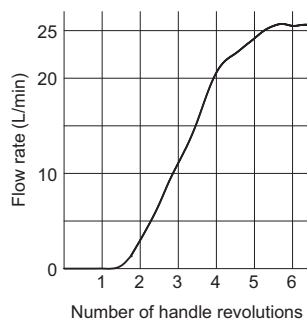
Pressure difference -  
Flow rate characteristics



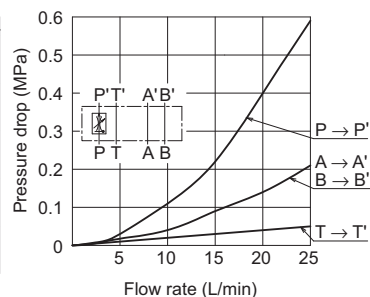
Fluid temperature -  
Flow rate characteristics  
(Fluid used: equivalent to ISO VG32)



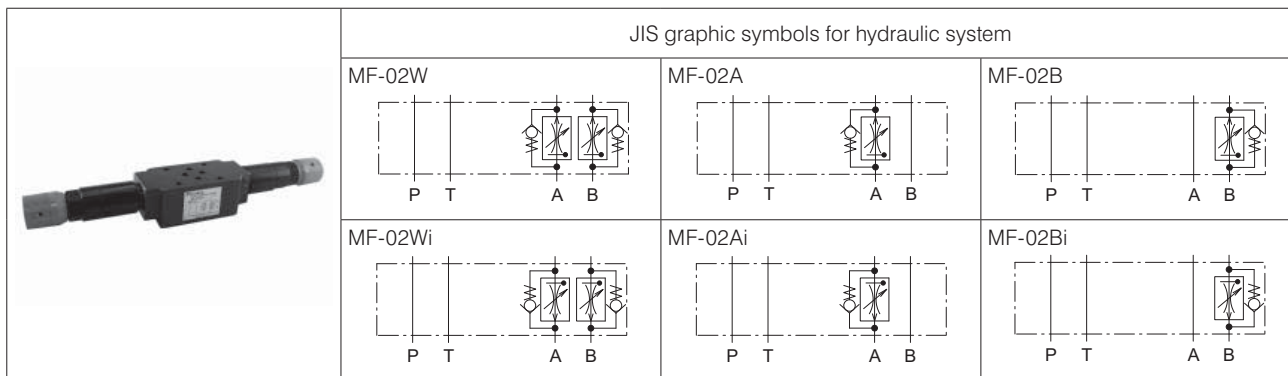
Handle revolution -  
Flow rate characteristics



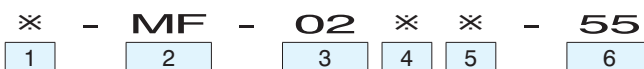
Pressure drop characteristics



## 02 Series Stacking Type Port A/B Flow Control Valves



### Nomenclature



- |  |  |
|--|--|
| <p><b>1 Applicable fluid code</b><br/>No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid<br/>F: Phosphate ester hydraulic fluid</p> <p><b>2 Model No.</b><br/>MF: Modular stacking type flow control valve</p> <p><b>3 Nominal diameter</b><br/>02: ¼</p> | <p><b>4 Control port</b><br/>W: Port A/B<br/>A: Port A<br/>B: Port B</p> <p><b>5 Control method</b><br/>No designation: Meter-out control<br/>i: Meter-in control</p> <p><b>6 Design No. (The design No. is subject to change)</b></p> |
|--|--|

Note: Contact Daikin separately for the delivery term of the products that accept phosphate ester hydraulic fluids.

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Control flow rate L/min *1		Check valve cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg
			(1)	(2)		
MF-02W※-55	25 {250}	40	0.1 to 40	0.5 to 40	0.08 {0.8}	2
MF-02A(B)※-55						1.8

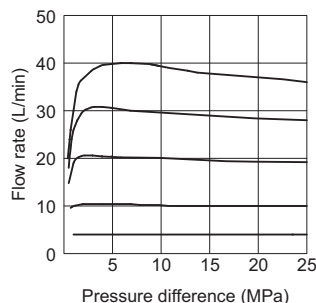
Note: \*1 Control flow rate (1) Pressure difference between the inlet and outlet ports to be 7 MPa {70 kgf/cm<sup>2</sup>} maximum  
(2) Pressure difference between the inlet and outlet ports to be 25 MPa {250 kgf/cm<sup>2</sup>} maximum

### Handling

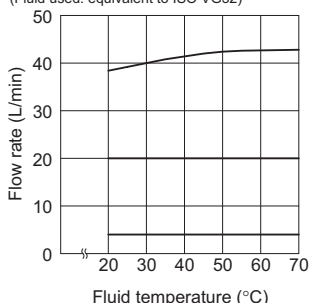
- To ensure good pressure compensation performance, maintain a pressure difference of 1 MPa {10 kgf/cm<sup>2</sup>} minimum between the inlet and outlet ports.
- The flow rate will not be zero even if the flow rate adjusting handle is fully tightened.

### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

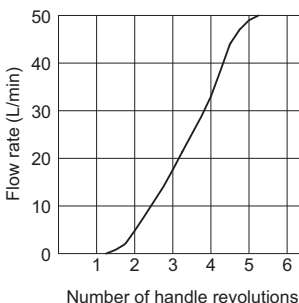
Pressure difference - Flow rate characteristics



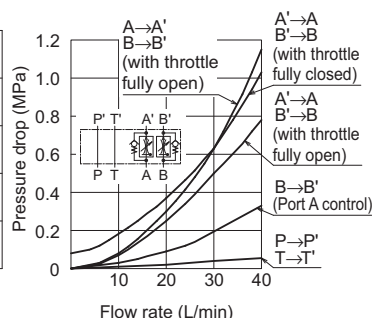
Fluid temperature - Flow rate characteristics (Fluid used: equivalent to ISO VG32)



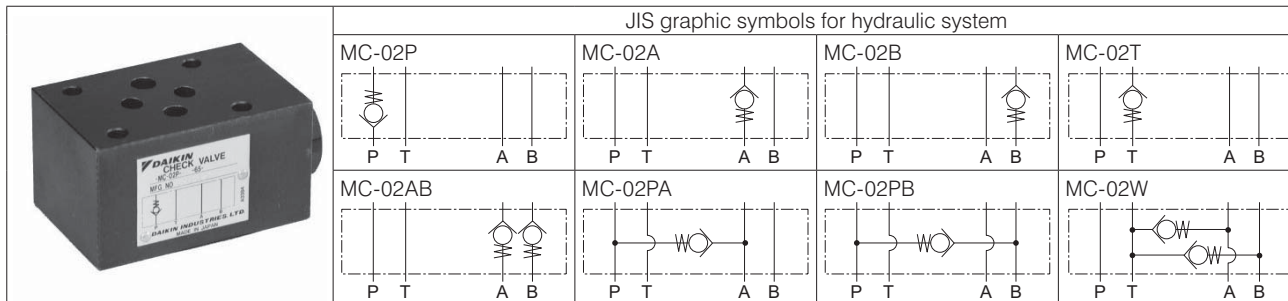
Handle revolution - Flow rate characteristics



Pressure drop characteristics



## 02 Series Stacking Type Check Valves



### Nomenclature

1	2	3	4	5	6
<b>1 Applicable fluid code</b>	<b>2 Model No.</b>	<b>3 Nominal diameter</b>	<b>4 Control port</b>	<b>5 Cracking pressure code</b>	<b>6 Design No. (The design No. is subject to change)</b>
No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid F: Phosphate ester hydraulic fluid	MC: Modular stacking type check valve	02: ¼	<ul style="list-style-type: none"> <li>○ Design No. 55 AB: Port A/B W: Port A/B (vacuum check valve)</li> <li>○ Design No. 65 P: Port P      A: Port A      B: Port B T: Port T      PA: Port A → P      PB: Port B → P</li> </ul>	No designation: 0.015 MPa {0.15 kgf/cm <sup>2</sup> } (Applicable only to MC-02W) 05: 0.05 MPa {0.5 kgf/cm <sup>2</sup> } 50: 0.5 MPa {5 kgf/cm <sup>2</sup> }	55: 25 MPa {250 kgf/cm <sup>2</sup> } series 65: 35 MPa {350 kgf/cm <sup>2</sup> } series

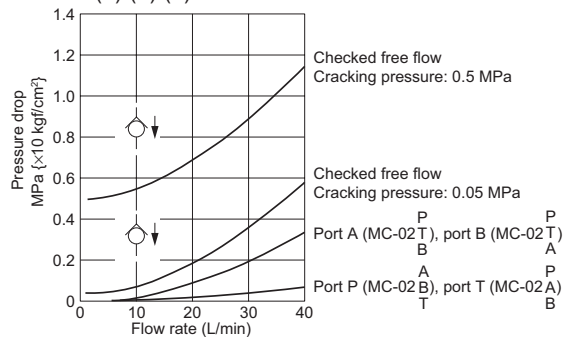
### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg
MC-02AB-05-55	25 {250}	40	0.05 {0.5}	1.1
MC-02AB-50-55			0.5 {5}	
MC-02W-55			0.015 {0.15}	
MC-02***-05-65	35 {350}	40	0.05 {0.5}	0.9
MC-02***-50-65			0.5 {5}	

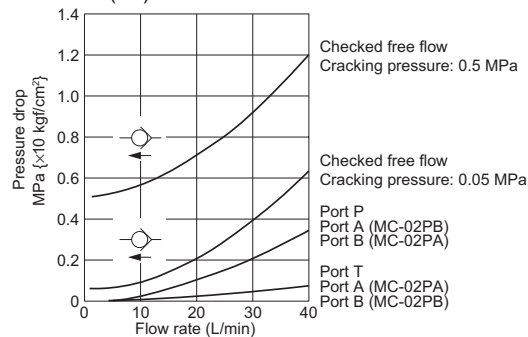
### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

Pressure drop characteristics

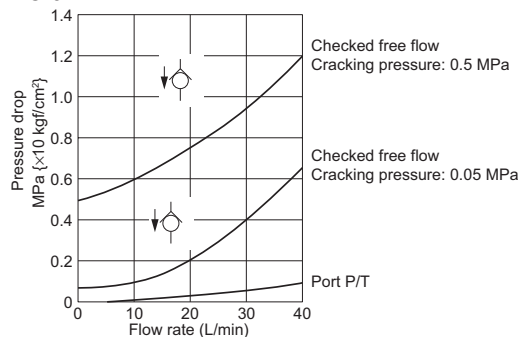
MC-02P (A) (B) (T)



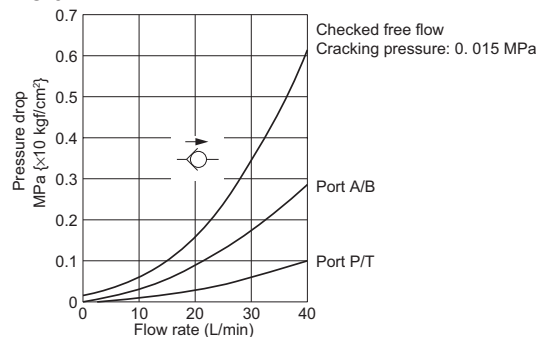
MC-02PA (PB)



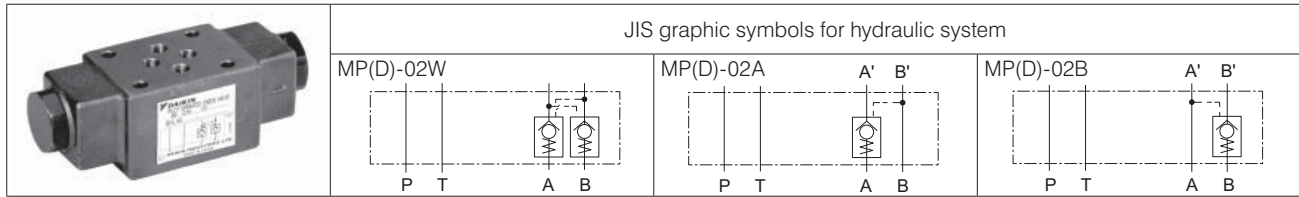
MC-02AB



MC-02W



# 02 Series Stacking Type Pilot Operated Check Valves



## Nomenclature

- |   |   |    |   |   |    |   |   |    |   |    |  |
|---|---|----|---|---|----|---|---|----|---|----|--|
| ※ | - | MP | ※ | - | 02 | ※ | - | ※※ | - | ※※ |  |
| 1 | 2 | 3  | 4 | 5 | 6  | 7 |   |    |   |    |  |
- Applicable fluid code**  
No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid
  - Model No.**  
MP: Modular stacking type pilot operated check valve
  - Decompression code**  
No designation: Direct operated type  
D: Decompression type (applicable only to design No. 55)
  - Nominal diameter**  
02: 1/4
  - Control port**  
W: Port A/B  
A: Port A  
B: Port B
  - Cracking pressure code**  
20: 0.2 MPa {2 kgf/cm<sup>2</sup>}  
50: 0.5 MPa {5 kgf/cm<sup>2</sup>}
  - Design No.**  
(The design No. is subject to change)  
55: 25 MPa {250 kgf/cm<sup>2</sup>}  
60: 35 MPa {350 kgf/cm<sup>2</sup>}

## Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Cracking pressure MPa {kgf/cm <sup>2</sup> }	Area ratio *1	Mass kg
MP※-02※-20-55	25 {250}	40	0.2 {2}	(1) 2.7 :1	1.1
MP※-02※-50-55			0.5 {5}		
MP※-02※-20-60	35 {350}		0.2 {2}	(3) 16 :1	
MP※-02※-50-60			0.5 {5}		

Note: \*1 Area ratio (1) <MP> Pilot piston: Check valve (2) <MPD> Pilot piston: Large check valve (3) <MPD> Pilot piston: Small check valve

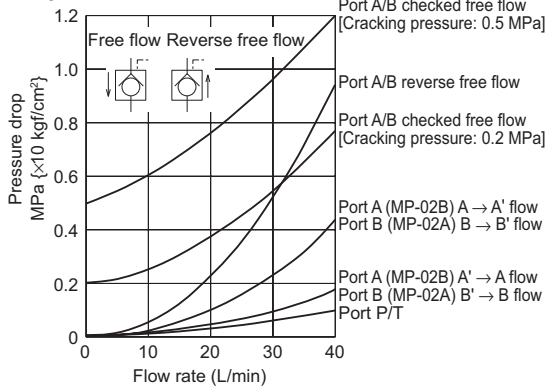
## Handling

- The internal drain type is adopted.

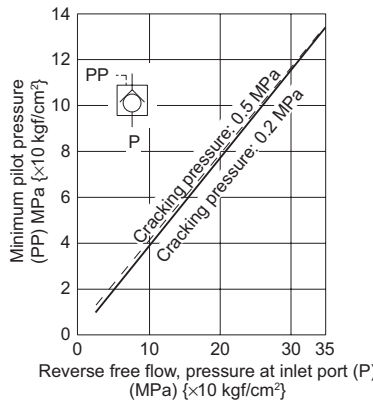
## Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

Pressure drop characteristics

MP-02※-※※-※※

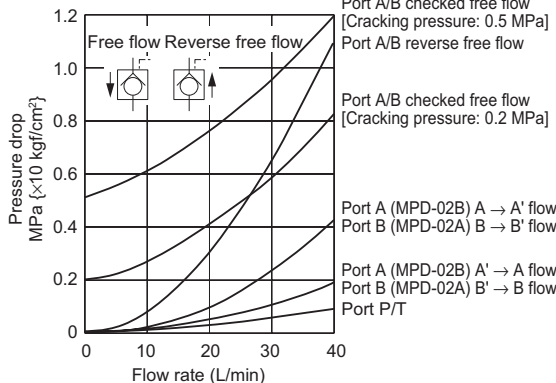


Pilot pressure characteristics

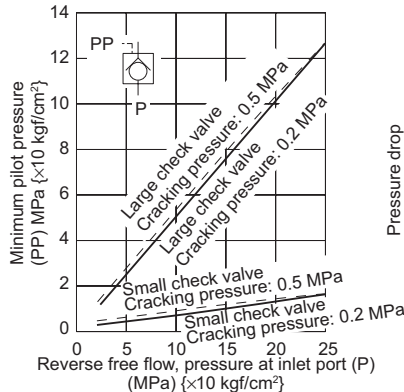


Pressure drop characteristics

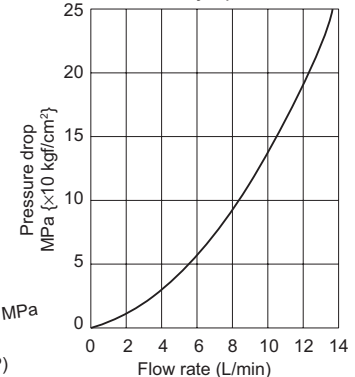
MPD-02※-※※-55



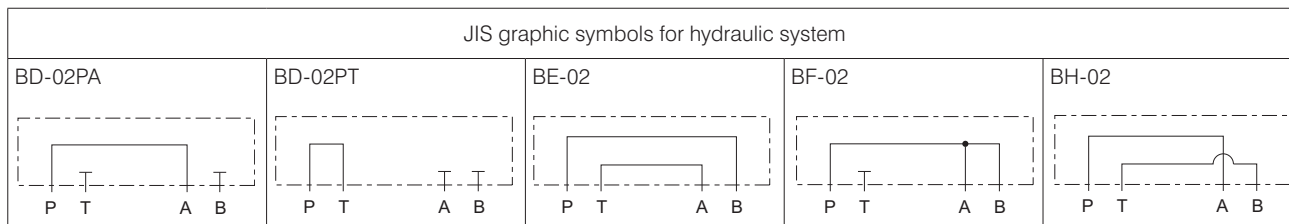
Pilot pressure characteristics



Pressure drop characteristics with the small valve fully open



## 02 Series Stack Valve Bypass Blocks



### Nomenclature

※ - **BD** - **02** ※※ - **55**  
 1      2      3      4      5

- 1 Applicable fluid code**  
 No designation: Petroleum-based hydraulic fluid,  
 water-glycol hydraulic fluid  
 F: Phosphate ester hydraulic fluid
- 2 Model No.**  
 BD: Bypass block
- 3 Nominal diameter**  
 02: ¼
- 4 Connection port**  
 PA: Port P-A  
 PT: Port P-T
- 5 Design No.**  
 (The design No. is subject to change)

※ - **B※** - **02** - **55**  
 1      2      3      4

- 1 Applicable fluid code**  
 No designation: Petroleum-based hydraulic fluid,  
 water-glycol hydraulic fluid  
 F: Phosphate ester hydraulic fluid
- 2 Model No.**  
 BE: Bypass block  
 BF: Bypass block  
 BH: Bypass block
- 3 Nominal diameter**  
 02: ¼
- 4 Design No.**  
 (The design No. is subject to change)

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Mass kg
BD-02※※-55	25 {250}	40	0.8
B※-02-55			

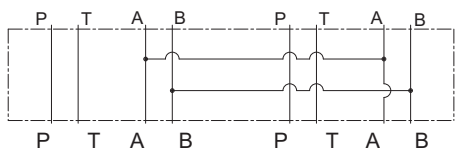
### Handling

Mounting bolts are not provided with the bypass block. Order them separately as required.



## 02 Series Stack Valve 2-speed Plates

JIS graphic symbols for hydraulic system



### Application

A speed control circuit that enables 2-speed (high-/low-speed) control can be easily constructed by simply stacking these products on the manifold block (BT-\*\*\*).

### Nomenclature

**BW** - **02** - **50**

1

2

3

**1 Model No.**

BW:2-speed plate

**2 Nominal diameter**

02: 1/4

**3 Design No. (The design No. is subject to change)**

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Mass kg
BW-02-50	25 {250}	40	2.4

### Accessories

Name	Quantity	Part specifications
O-ring	8	AS568-012 (NBR, Hs90)

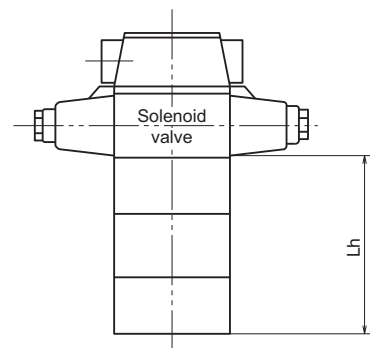
## 02 Series Stack Valve Mounting Bolts

### Bolt selection guide

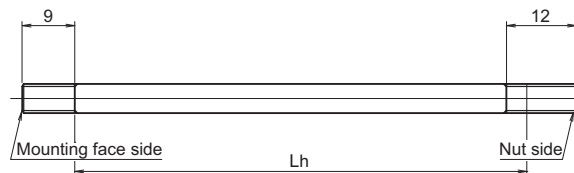
Select the bolts to be used for mounting stack valves and stacking blocks according to the stacked height (Lh) of the valves and blocks.

The heights of the most of stack valves and stacking blocks are standardized at 40 mm. This means that the applicable bolt type will be the same as long as the number of stack levels is the same, regardless of the models of the valves and blocks being stacked.

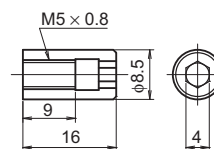
Note: The solenoid operated low-pressure reducing valves (MGBS-02P) are 90 mm high. Be careful when using these valves.



### Stud bolt



### Nut for stud bolts (provided with stud bolts)



### Tightening torque of mounting bolts

6 to 8 N·m {60 to 80 kgf·cm}

### Hexagon socket head cap bolt

Number of stack levels	Stacked dimension Lh (mm)	Mounting bolt model code	Hexagon socket head cap bolt
0	0	HB100	M5 × 45
1	40	HB101	M5 × 85
2	80	HB102	M5 × 125
3	120	HB103	M5 × 165
4	160	HB104	M5 × 205

### Stud bolt

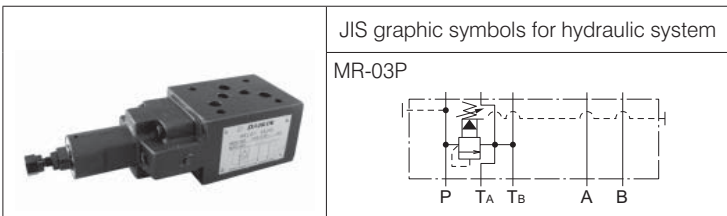
Number of stack levels	Stacked dimension Lh (mm)	Mounting bolt model code	Stud bolt
0	0	SB100	M5 × 55
1	40	SB101	M5 × 95
2	80	SB102	M5 × 135
3	120	SB103	M5 × 175
4	160	SB104	M5 × 215

Note: ○ The model codes cited above are for sets of four bolts. ○ A number of stack levels of "0" means that only a solenoid valve is used, with no stack valves.  
○ When using stud bolts, screw them at least 8 mm into the mounting face of the manifold block or other mount.

### Adjusting handle External dimension diagrams

<p><b>MR-02*-*-55-T</b></p>	<p><b>MG-02*-*-55-T</b></p>
<p><b>MGB-02*-03-55-T</b></p>	<p><b>MT-02P(T)-65-T</b></p>
<p><b>MT-02W*-55-T</b></p>	

## 03 Series Stacking Type Port P Relief Valves



### Nomenclature

※ - **MR** - **03** **P** - ※ ※ - **40** - ※  
1    2    3    4    5    6    7    8

**1 Acceptable fluid code**

No designation: Petroleum-based hydraulic fluid,  
water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid

**2 Model No.**

MR: Modular stacking type relief valve

**3 Nominal diameter**

03: 3/8

**4 Control port**

P: Port P

**5 Pressure adjustment range**

1: Up to 7 MPa { 7 to 70 kgf/cm<sup>2</sup> }  
3: 3.5 to 25 MPa { 35 to 250 kgf/cm<sup>2</sup> }

**6 Vent type code**

No designation: Low-vent type  
V: High-vent type

**7 Design No.**

**(The design No. is subject to change)**

**8 Option code**

No designation: Pressure adjusting screw type  
T: Pressure adjusting handle type

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range *1 MPa {kgf/cm <sup>2</sup> }	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MR-03P-1※-40	25 {250}	80	Up to 7 { 7 to 70 }	3.4	2.5 {25}/revolution
MR-03P-3※-40			3.5 to 25 {35 to 250}		7.9 {79}/revolution

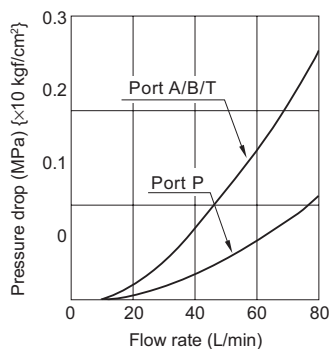
Note: \*1 The minimum adjustment pressure varies depending on the flow rate. See the minimum adjustment pressure characteristics for details.

### Handling

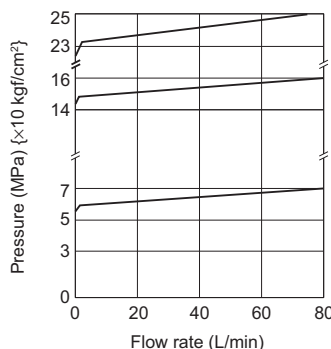
- Maintain the back pressure of the tank port at no greater than 0.5 MPa {5 kgf/cm<sup>2</sup>}.
- When using the valve in combination with a direct operated relief valve for remote control, connect the remote control valve to the vent port. Since excessive internal volume of the pilot piping may lead to vibration, use steel pipes with an inner diameter of 4 mm maximum and with thick walls for this piping.
- When using the valve as a safety valve, set the pressure 1 to 1.5 MPa {10 to 15 kgf/cm<sup>2</sup>} higher than the pressure set for the hydraulic circuit.
- The time required to switch from the unload to on-load state can be reduced by using the high-vent type.

### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

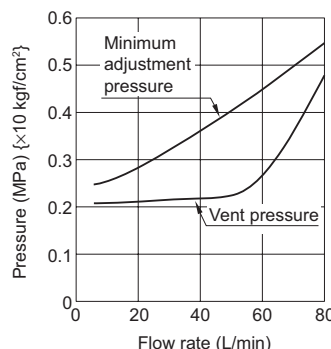
Pressure drop characteristics



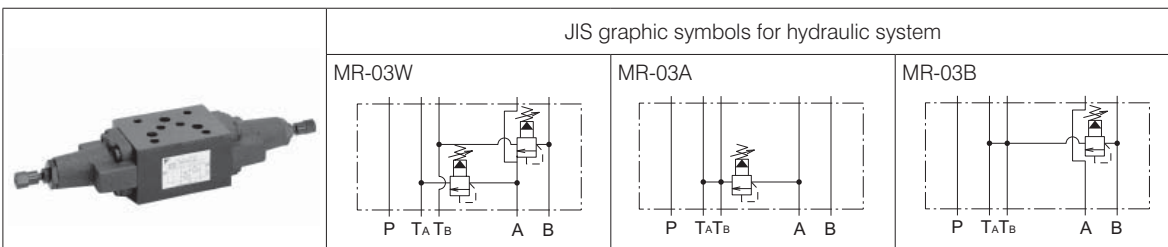
Pressure - Flow rate characteristics  
MR-03P-3-40



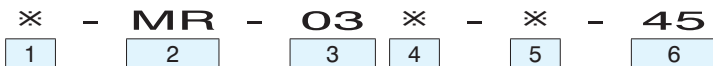
Vent unloading pressure characteristics  
Minimum adjustment pressure characteristics  
MR-03P-1※-40



# 03 Series Stacking Type Port A/B Relief Valves



## Nomenclature



**1 Applicable fluid code**

No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
 F: Phosphate ester hydraulic fluid

**2 Model No.**

MR: Modular stacking type relief valve

**3 Nominal diameter**

03: 3/8

**4 Control port**

W: Port A/B  
 A: Port A  
 B: Port B

**5 Pressure adjustment range**

1: 0.8 to 7 MPa { 8 to 70 kgf/cm<sup>2</sup> }  
 3: 3.5 to 25 MPa { 35 to 250 kgf/cm<sup>2</sup> }

**6 Design No.**

(The design No. is subject to change)

## Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range *1 MPa {kgf/cm <sup>2</sup> }	Mass kg
MR-03W-1-45	25 {250}	80	Up to 7 {Up to 70}	3.9
MR-03W-3-45			3.5 to 25 {35 to 250}	
MR-03A-1-45			Up to 7 {Up to 70}	3.1
MR-03A-3-45			3.5 to 25 {35 to 250}	
MR-03B-1-45			Up to 7 {Up to 70}	
MR-03B-3-45			3.5 to 25 {35 to 250}	

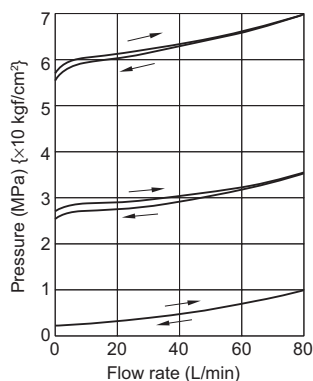
Note: \*1 The minimum adjustment pressure varies depending on the flow rate. See the minimum adjustment pressure characteristics for details.

## Handling

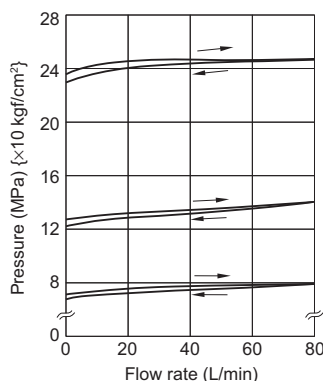
- Maintain the back pressure of the tank port at no greater than 0.2 MPa {2 kgf/cm<sup>2</sup>}.
- When using the valve as a safety valve, set the pressure 1 to 1.5 MPa {10 to 15 kgf/cm<sup>2</sup>} higher than the pressure set for the hydraulic circuit.
- Use the valve with a flow rate of 8 L/min minimum since the pressure setting may be unstable if the flow rate is too low.

## Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

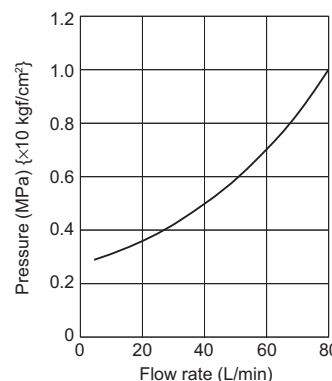
Pressure - Flow rate characteristics  
 MR-03※-1-45



MR-03※-3-45

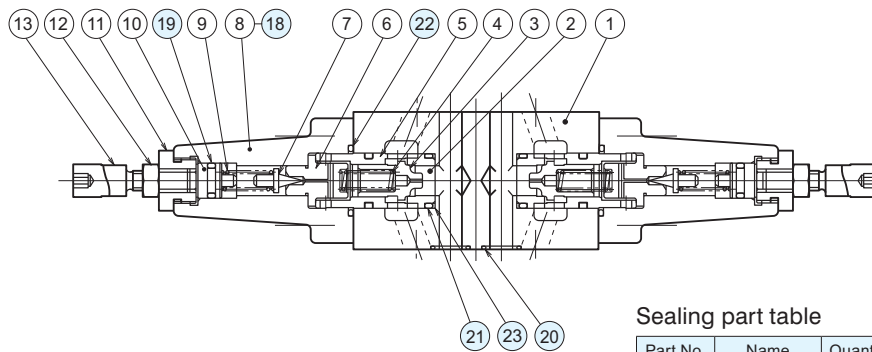


Minimum adjustment pressure characteristics



**Sectional structural diagram**

MR-03W

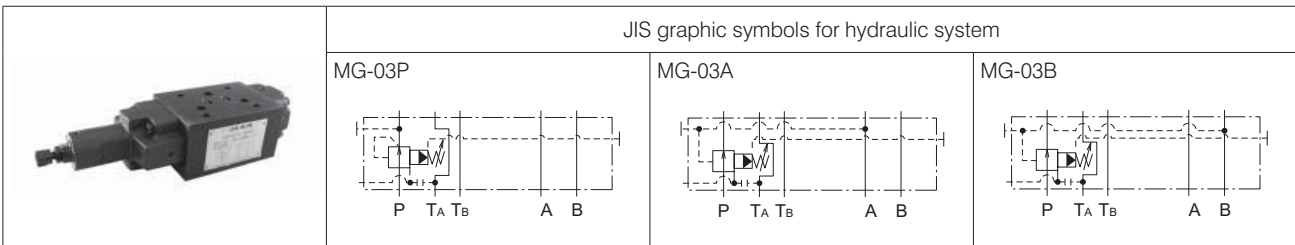


Sealing part table

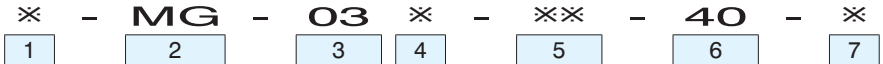
Part No.	Name	Quantity	Part specifications
18	O-ring	2	JIS B 2401 1B P7
19	O-ring	2	JIS B 2401 1A P10A
20	O-ring	5	AS568-014 (NBR, Hs90)
21	O-ring	2	JIS B 2401 1B P18
22	O-ring	2	AS568-119 (NBR, Hs90)
23	Backup ring	2	JIS B 2407 Bias cut P18

MODULAR STACK VALVES I

# 03 Series Stacking Type Reducing Valves



## Nomenclature



- 1 Applicable fluid code**  
No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid
- 2 Model No.**  
MG: Modular stacking type reducing valve
- 3 Nominal diameter**  
03: 3/8
- 4 Control port**  
P: Port P  
A: Port A  
B: Port B
- 5 Pressure adjustment range**  
03: 0.3 to 7 MPa { 3 to 70 kgf/cm<sup>2</sup> }  
1: 0.7 to 7 MPa { 7 to 70 kgf/cm<sup>2</sup> }  
3: 3.5 to 25 MPa { 35 to 250 kgf/cm<sup>2</sup> }
- 6 Design No.**  
**(The design No. is subject to change)**
- 7 Option code**  
No designation: Pressure adjusting screw type, external drain type  
T: Pressure adjusting handle type  
X: Internal drain type

## Specifications

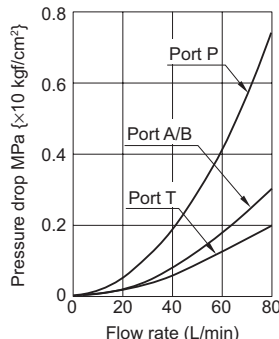
Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range MPa {kgf/cm <sup>2</sup> }	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MG-03※-03-40	16 {160}	80	0.3 to 7 { 3 to 70 }	4	2.5 {25}/revolution
MG-03※- 1-40	25 {250}		0.7 to 7 { 7 to 70 }		2.5 {25}/revolution
MG-03※- 3-40			3.5 to 25 {35 to 250}		7.9 {79}/revolution

## Handling

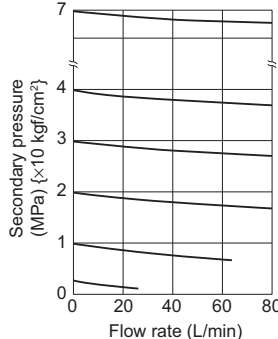
- Directly connect the drain piping to the tank without merging it with other tank piping.
- To ensure good pressure reducing performance, set the primary side main circuit pressure and the secondary pressure reducing circuit pressure such that there is a minimum difference of 1 MPa {10 kgf/cm<sup>2</sup>}.
- When using the valve in combination with a direct operated relief valve for remote control, connect the remote control valve to the vent port. Since excessive internal volume of the pilot piping may lead to vibration, use steel pipes with an inner diameter of 4 mm maximum and with thick walls for this piping.

## Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

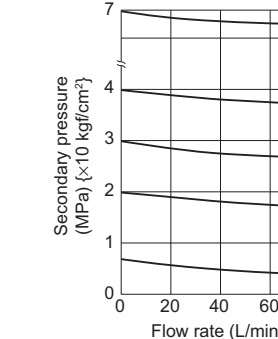
Pressure drop characteristics MG-03※-※-40



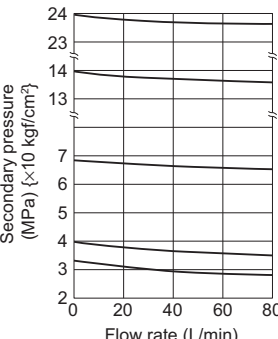
Pressure - Flow rate characteristics MG-03※-03-40 Primary pressure: 16 MPa {160 kgf/cm<sup>2</sup>}



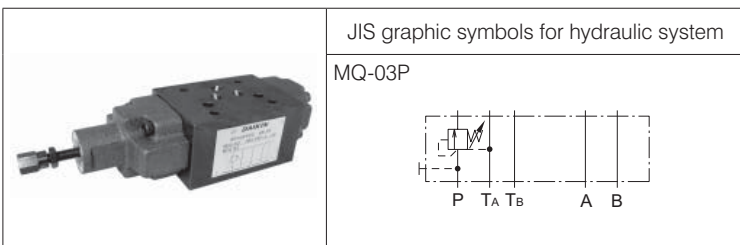
MG-03※-1-40 Primary pressure: 25 MPa {250 kgf/cm<sup>2</sup>}



MG-03※-3-40 Primary pressure: 25 MPa {250 kgf/cm<sup>2</sup>}



## 03 Series Stacking Type Port P Sequence Valves



### Nomenclature

※ - **MQ** - **03** **P** - **2** ※ - **40**  
1 2 3 4 5 6 7

**1 Applicable fluid code**

No designation: Petroleum-based hydraulic fluid,  
water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid

**2 Model No.**

MQ: Modular stacking type pressure control valve

**3 Nominal diameter**

03: 3/8

**4 Control port**

P: Port P

**5 Function code**

2: Sequence valve

**6 Pressure adjustment range**

A: 0.25 to 0.85 MPa { 2.5 to 8.5 kgf/cm<sup>2</sup> }  
C: 0.5 to 3.5 MPa { 5 to 35 kgf/cm<sup>2</sup> }  
E: 2 to 14 MPa { 20 to 140 kgf/cm<sup>2</sup> }

**7 Design No.**

**(The design No. is subject to change)**

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range *1 MPa {kgf/cm <sup>2</sup> }	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MQ-03P-2A-40	25 {250}	80	0.25 to 0.85 { 2.5 to 8.5 }	3.9	0.08 { 0.8 }/revolution
MQ-03P-2C-40			0.5 to 3.5 { 5 to 35 }		0.33 { 3.3 }/revolution
MQ-03P-2E-40			2 to 14 { 20 to 140 }		1.7 { 17 }/revolution

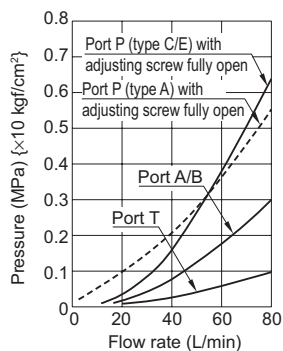
Note: \*1 The pressure adjustment ranges are indicated using cracking pressures.

### Handling

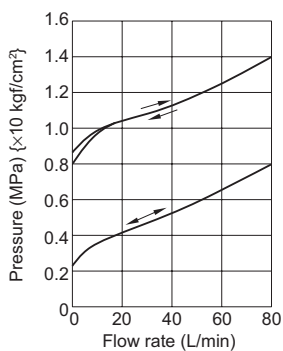
- The drain piping is connected to the tank port (port TA).
- When connecting two or more of these valves for sequential operation, set the valve pressures such that there is a minimum difference of 1 MPa {10 kgf/cm<sup>2</sup>} between two valves.

### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

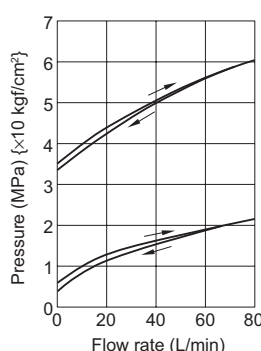
Pressure drop characteristics  
MQ-03P-2※



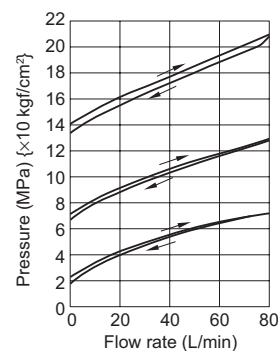
Pressure - Flow rate characteristics  
MQ-03P-2A



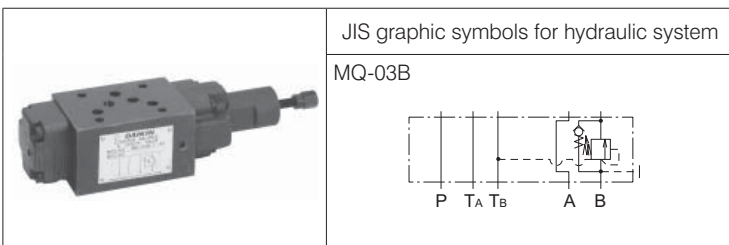
MQ-03P-2C



MQ-03P-2E



## 03 Series Stacking Type Port B Counter Balance Valves



### Nomenclature

※ - **MQ** - **03 B** - **1** ※ - **40**

1      2      3      4      5      6      7

**1 Applicable fluid code**

No designation: Petroleum-based hydraulic fluid,  
water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid

**2 Model No.**

MQ: Modular stacking type pressure control valve

**3 Nominal diameter**

03: 3/8

**4 Control port**

B: Port B

**5 Function code**

1: Counter balance valve

**6 Pressure adjustment range**

A: 0.25 to 0.85 MPa { 2.5 to 8.5 kgf/cm<sup>2</sup> }  
C: 0.5 to 3.5 MPa { 5 to 35 kgf/cm<sup>2</sup> }  
E: 2 to 14 MPa { 20 to 140 kgf/cm<sup>2</sup> }

**7 Design No.**

(The design No. is subject to change)

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range *1 MPa {kgf/cm <sup>2</sup> }	Check valve cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MQ-03B-1A-40	25 {250}	80	0.25 to 0.85 { 2.5 to 8.5 }	0.05 {0.5}	3.9	0.08 { 0.8 }/revolution
MQ-03B-1C-40			0.5 to 3.5 { 5 to 35 }			0.33 { 3.3 }/revolution
MQ-03B-1E-40			2 to 14 { 20 to 140 }			1.7 { 17 }/revolution

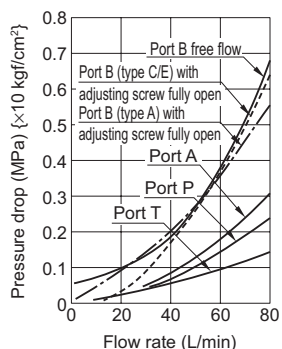
Note: \*1 The pressure adjustment ranges are indicated using cracking pressures.

### Handling

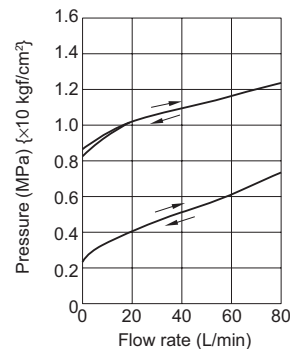
- The drain piping is connected to the tank port (port TB).
- When using the valve in combination with a pilot operated check valve, use a model MQC counter balance valve (see Page I-68).

### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

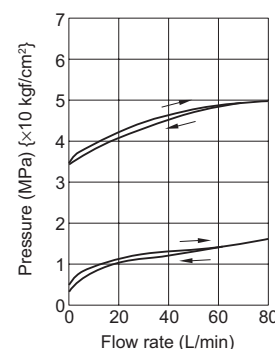
Pressure drop characteristics MQ-03B-1※



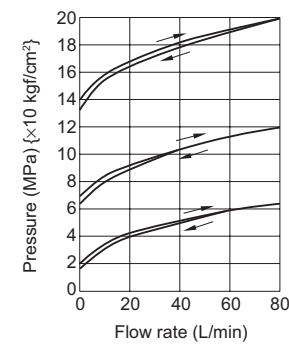
Pressure - Flow rate characteristics MQ-03B-1A



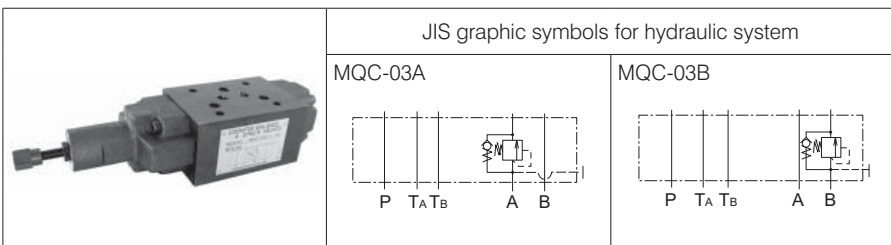
MQ-03B-1C



MQ-03B-1E



# 03 Series Stacking Type Port A/B Counter Balance Valves



## Nomenclature

1 - **MQC** - **03** 4 - **1** 5 6 - **40** 7

### 1 Applicable fluid code

No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
 F: Phosphate ester hydraulic fluid

### 2 Model No.

MQC: Modular stacking type counter balance valve

### 3 Nominal diameter

03: 3/8

### 4 Control port

A: Port A  
 B: Port B

### 5 Function code

1: Counter balance valve

### 6 Pressure adjustment range

A: 0.25 to 0.85 MPa { 2.5 to 8.5 kgf/cm<sup>2</sup> }  
 C: 0.5 to 3.5 MPa { 5 to 35 kgf/cm<sup>2</sup> }  
 E: 2 to 14 MPa { 20 to 140 kgf/cm<sup>2</sup> }

### 7 Design No.

(The design No. is subject to change)

## Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range *1 MPa {kgf/cm <sup>2</sup> }	Check valve cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MQC-03*-1A-40	25 {250}	80	0.25 to 0.85 { 2.5 to 8.5 }	0.05 {0.5 }	3.9	0.08 { 0.8 }/revolution
MQC-03*-1C-40			0.5 to 3.5 { 5 to 35 }	0.075 {0.75 }		0.33 { 3.3 }/revolution
MQC-03*-1E-40			2 to 14 { 20 to 140 }			1.7 { 17 }/revolution

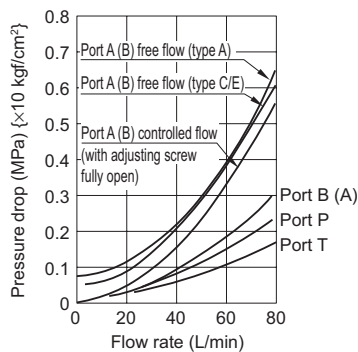
Note: \*1 The pressure adjustment ranges are indicated using cracking pressures.

## Handling

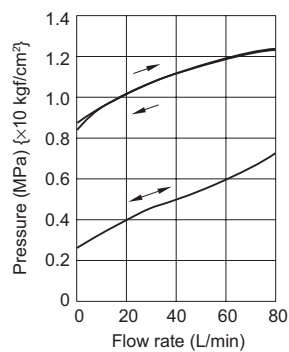
- Since this valve is set as internal drain type, connect the secondary port of the valve directly to the tank.

## Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

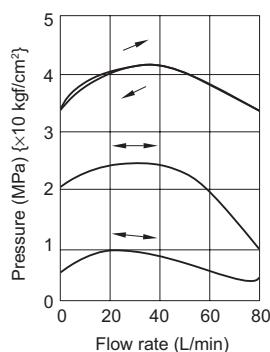
Pressure drop characteristics  
 MQC-03\*-1\*



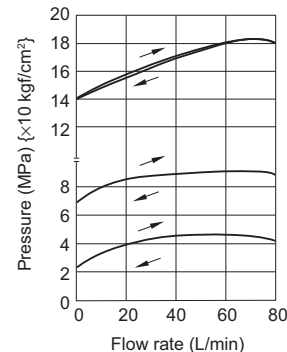
Pressure - Flow rate characteristics  
 MQC-03\*-1A



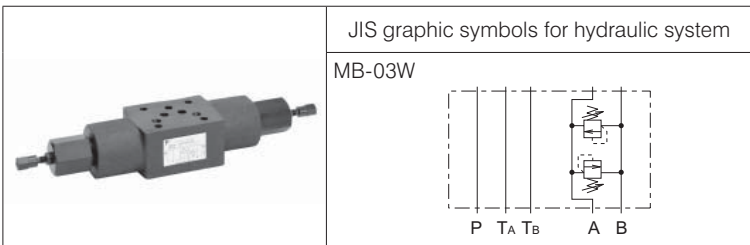
MQC-03\*-1C



MQC-03\*-1E



## 03 Series Stacking Type Brake Valves



### Nomenclature

※ - MB - 03 W - ※ - 45

**1 Applicable fluid code**

No designation: Petroleum-based hydraulic fluid,  
water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid

**2 Model No.**

MB: Modular stacking type brake valve

**3 Nominal diameter**

03:  $\frac{3}{8}$

**4 Control port**

W: Port A/B

**5 Pressure adjustment range**

1: 0.8 to 7 MPa { 8 to 70 kgf/cm<sup>2</sup> }  
3: 3.5 to 21 MPa { 35 to 210 kgf/cm<sup>2</sup> }

**6 Design No.**

(The design No. is subject to change)

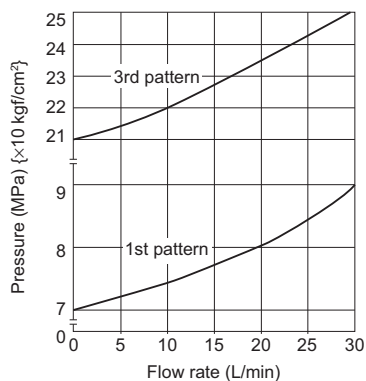
### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range *1 MPa {kgf/cm <sup>2</sup> }	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MB-03W-1-45	25 {250}	30	0.8 to 7 { 8 to 70 }	4.8	0.9 { 9 }/revolution
MB-03W-3-45			3.5 to 25 { 35 to 250 }		2.5 { 25 }/revolution

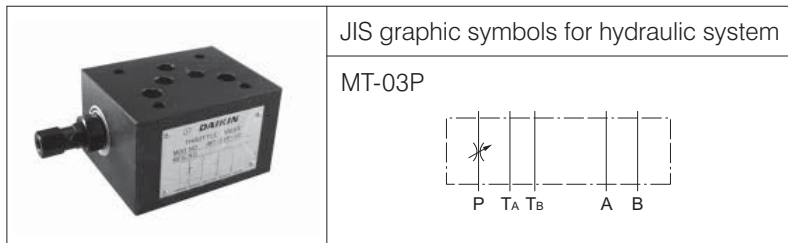
Note: \*1 The pressure adjustment ranges are indicated using cracking pressures.

### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

Pressure - Flow rate characteristics

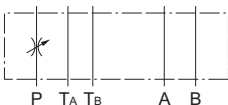


## 03 Series Stacking Type Port P Throttle Valves



JIS graphic symbols for hydraulic system

MT-03P



### Nomenclature

※ - MT - 03 P - 40 - ※

1 2 3 4 5 6

#### 1 Applicable fluid code

No designation: Petroleum-based hydraulic fluid,  
water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid

#### 2 Model No.

MT: Modular stacking type throttle valve

#### 3 Nominal diameter

03: 3/8

#### 4 Control port

P: Port P

#### 5 Design No. (The design No. is subject to change)

#### 6 Option code

No designation: Flow rate adjusting screw type  
T: Flow rate adjusting handle type

### Specifications

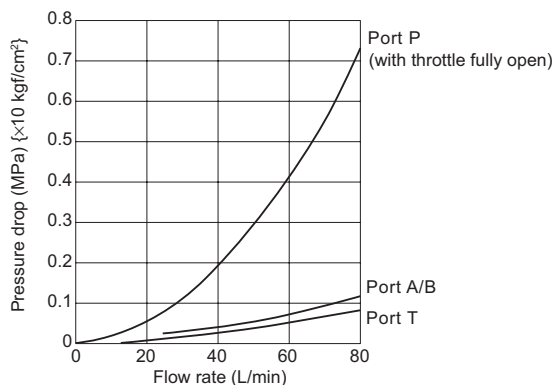
Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Mass kg
MT-03P-40	25 {250}	80	2.3

### Handling

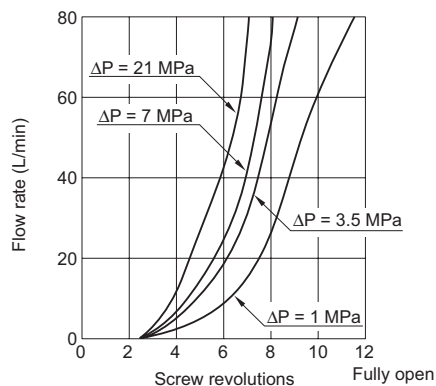
- The flow rate will not be zero even if the flow rate adjusting screw is fully tightened.

### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

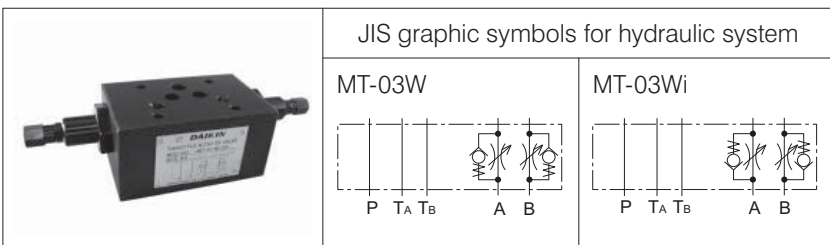
Pressure drop characteristics



Adjusting screw revolution - Flow rate characteristics



# 03 Series Stacking Type Port A/B Throttle Valves



## Nomenclature



### 1 Applicable fluid code

No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
 F: Phosphate ester hydraulic fluid

### 2 Model No.

MT: Modular stacking type throttle valve

### 3 Nominal diameter

03: 3/8"

### 4 Control port

W: Port A/B

### 5 Control method

No designation: Meter-out control  
 i: Meter-in control

### 6 Design No.

**(The design No. is subject to change)**

40: 25 MPa {250 kgf/cm<sup>2</sup>} series  
 50: 35 MPa {350 kgf/cm<sup>2</sup>} series

### 7 Option code

No designation: Flow rate adjusting screw type  
 T: Flow rate adjusting handle type

## Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Check valve cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg *1
MT-03W※-40	25 {250}	80	0.16 {1.6}	3.1
MT-03W※-50	35 {350}			

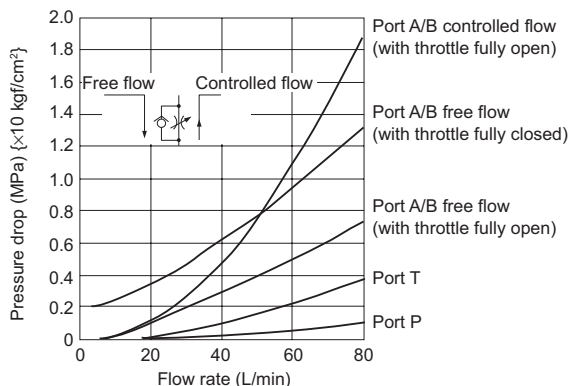
Note: \*1 The mass of the models with option code "T" (flow rate adjusting handle type) is 3.5 kg.

## Handling

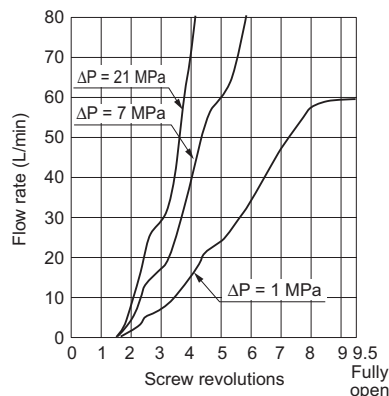
- The flow rate will not be zero even if the flow rate adjusting screw is fully tightened.

## Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

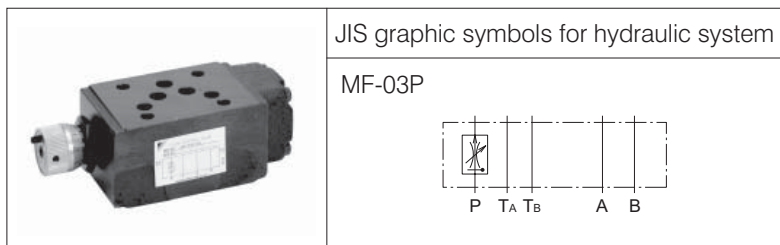
Pressure drop characteristics



Adjusting screw revolution - Flow rate characteristics

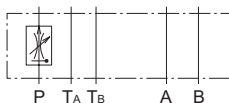


## 03 Series Stacking Type Port P Flow Control Valves



JIS graphic symbols for hydraulic system

MF-03P



### Nomenclature

⊗ - MF - 03 P - 45

1

2

3

4

5

#### 1 Applicable fluid code

No designation: Petroleum-based hydraulic fluid,  
water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid

#### 2 Model No.

MF: Modular stacking type flow control valve

#### 3 Nominal diameter

03: 3/8

#### 4 Control port

P: Port P

#### 5 Design No.

(The design No. is subject to change)

Note: Contact Daikin separately for the delivery term of the products that accept phosphate ester hydraulic fluids.

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Control flow rate *1 L/min		Mass kg
			(1)	(2)	
MF-03P-45	25 {250}	60	0.3 to 60	0.5 to 60	3.1

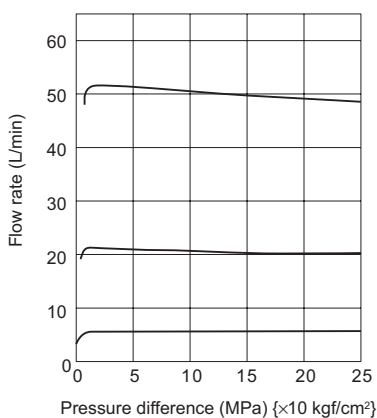
Note: \*1 Control flow rate (1) Pressure difference between the inlet and outlet ports to be 7 MPa {70 kgf/cm<sup>2</sup>} maximum  
(2) Pressure difference between the inlet and outlet ports to be 25 MPa {250 kgf/cm<sup>2</sup>} maximum

### Handling

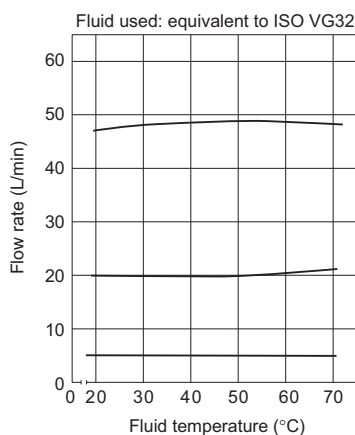
- To ensure good pressure compensation performance, maintain a pressure difference of 1 MPa {10 kgf/cm<sup>2</sup>} minimum between the inlet and outlet ports.
- The flow rate will not be zero even if the flow rate adjusting handle is fully tightened.

### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

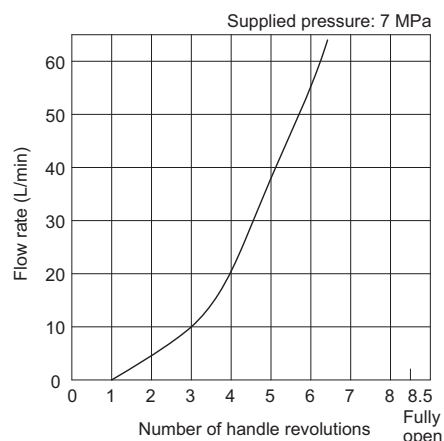
Pressure - Flow rate characteristics



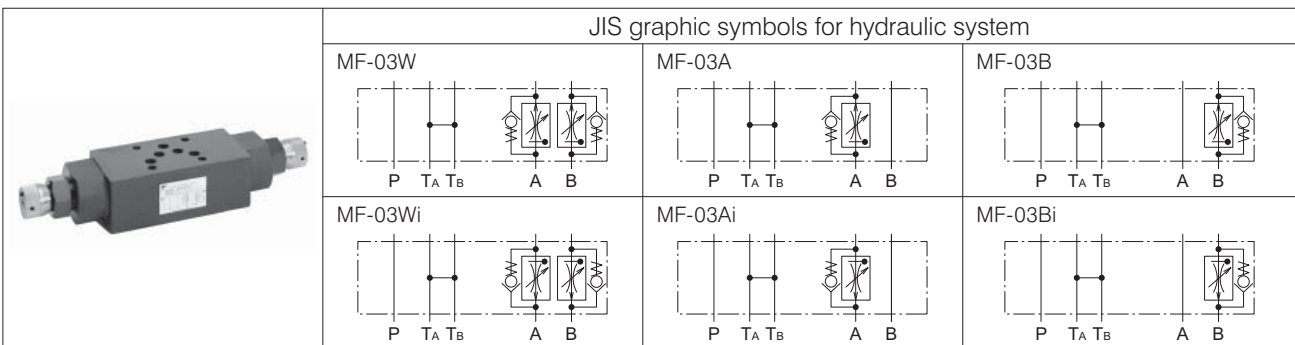
Fluid temperature - Flow rate characteristics



Handle revolution - Flow rate characteristics



# 03 Series Stacking Type Port A/B Flow Control Valves



## Nomenclature

× - **MF** - **03** × × - **45**

1	2	3	4	5	6
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**1 Applicable fluid code**  
 No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
 F: Phosphate ester hydraulic fluid

**2 Model No.**  
 MF: Modular stacking type flow control valve

**3 Nominal diameter**  
 03: 3/8

Note: Contact Daikin separately for the delivery term of the products that accept phosphate ester hydraulic fluids.

**4 Control port**  
 W: Port A/B  
 A: Port A  
 B: Port B

**5 Control method**  
 No designation: Meter-out control  
 i: Meter-in control

**6 Design No.**  
**(The design No. is subject to change)**

## Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Control flow rate *1 L/min		Check valve cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg
			(1)	(2)		
MF-03W <span style="border: 1px solid black; padding: 2px;">×</span> -45	25 {250}	60	0.5 to 60	1 to 60	0.1 {1}	5
MF-03A(B) <span style="border: 1px solid black; padding: 2px;">×</span> -45						4.6

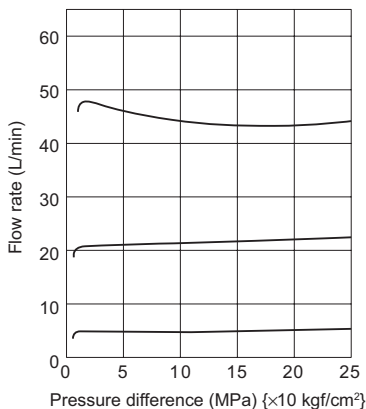
Note: \*1 Control flow rate (1) Pressure difference between the inlet and outlet ports to be 7 MPa {70 kgf/cm<sup>2</sup>} maximum  
 (2) Pressure difference between the inlet and outlet ports to be 25 MPa {250 kgf/cm<sup>2</sup>} maximum

## Handling

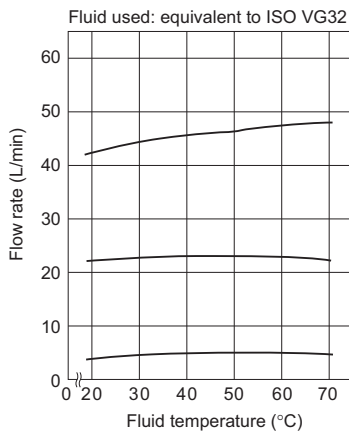
- To ensure good pressure compensation performance, maintain a pressure difference of 1 MPa {10 kgf/cm<sup>2</sup>} minimum between the inlet and outlet ports.
- The flow rate will not be zero even if the flow rate adjusting handle is fully tightened.

## Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

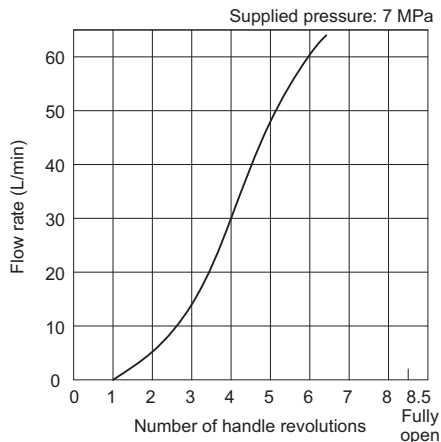
Pressure - Flow rate characteristics




Fluid temperature - Flow rate characteristics



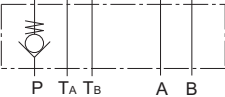
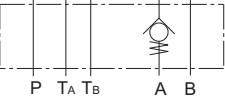
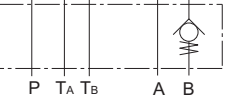
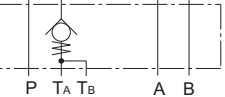
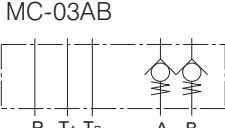
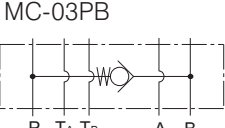
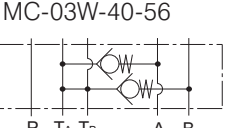
Handle revolution - Flow rate characteristics



## 03 Series Stacking Type Check Valves



JIS graphic symbols for hydraulic system

MC-03P 	MC-03A 	MC-03B 	MC-03T 
MC-03AB 	MC-03PB 	MC-03W-40-56 	

### Nomenclature

<p>※ - MC - 03 ※ - ※※ - 40</p> <p style="text-align: center;"> <span style="border: 1px solid black; padding: 2px 5px;">1</span> <span style="border: 1px solid black; padding: 2px 5px;">2</span> <span style="border: 1px solid black; padding: 2px 5px;">3</span> <span style="border: 1px solid black; padding: 2px 5px;">4</span> <span style="border: 1px solid black; padding: 2px 5px;">5</span> <span style="border: 1px solid black; padding: 2px 5px;">6</span> </p> <p><b>1 Applicable fluid code</b> No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid F: Phosphate ester hydraulic fluid</p> <p><b>2 Model No.</b> MC: Modular stacking type check valve</p> <p><b>3 Nominal diameter</b> 03: 3/8</p> <p><b>4 Control port</b> P: Port P A: Port A B: Port B T: Port T AB: Port A/B PB: B → P W: Port A/B (vacuum check valve)</p>	<p>※ - MC - 03 W - 40 - 56</p> <p style="text-align: center;"> <span style="border: 1px solid black; padding: 2px 5px;">1</span> <span style="border: 1px solid black; padding: 2px 5px;">2</span> <span style="border: 1px solid black; padding: 2px 5px;">3</span> <span style="border: 1px solid black; padding: 2px 5px;">4</span> <span style="border: 1px solid black; padding: 2px 5px;">6</span> <span style="border: 1px solid black; padding: 2px 5px;">7</span> </p> <p><b>5 Cracking pressure code</b> No designation: 0.01 MPa {0.1 kgf/cm<sup>2</sup>} *1 05: 0.05 MPa {0.5 kgf/cm<sup>2</sup>} 45: 0.45 MPa {4.5 kgf/cm<sup>2</sup>}</p> <p><b>6 Design No.</b> <b>(The design No. is subject to change)</b></p> <p><b>7 Control No.</b></p> <p>Note: *1: No designation for the cracking pressure code is applicable only when the control port code "W" (vacuum check valve) is selected.</p> <p>Note: When using MC-03W in multi-series configuration, take care handling it since it is wide.</p>
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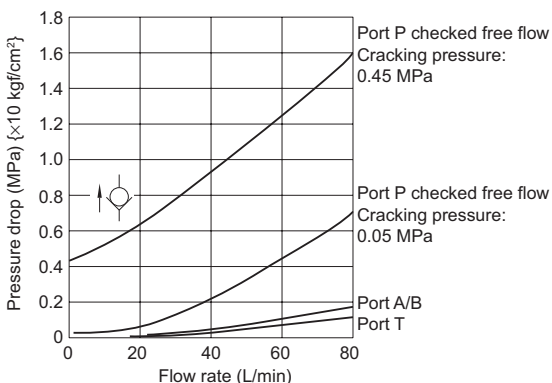
### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg		
MC-03P -05-40	25 {250}	80	0.05 {0.5}	2.1		
MC-03A -05-40						
MC-03B -05-40						
MC-03T -05-40				2.9		
MC-03AB -05-40				3.5		
MC-03PB -05-40						
MC-03P -45-40			0.45 {4.5}	80	2.1	2.1
MC-03A -45-40						
MC-03B -45-40						
MC-03T -45-40					2.9	
MC-03AB -45-40	3.5					
MC-03W -40-56	0.01 {0.1}	4.5				

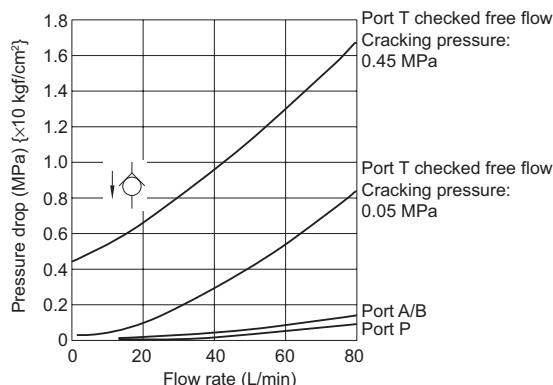
**Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})**

Pressure drop characteristics

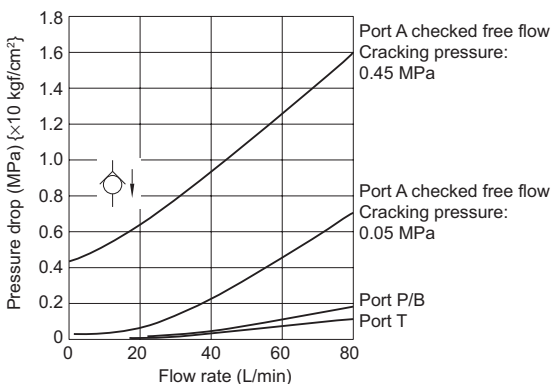
MC-03P-※※-40



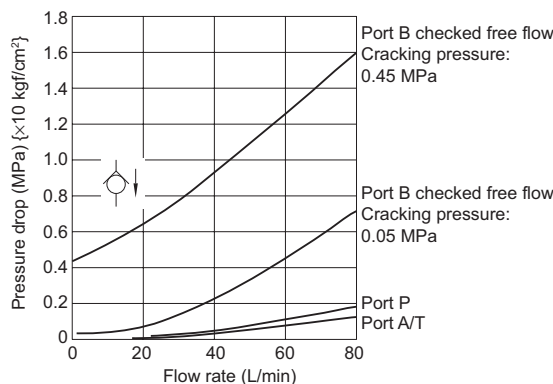
MC-03T-※※-40



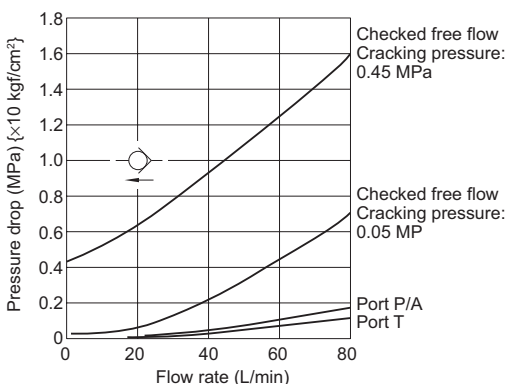
MC-03A-※※-40



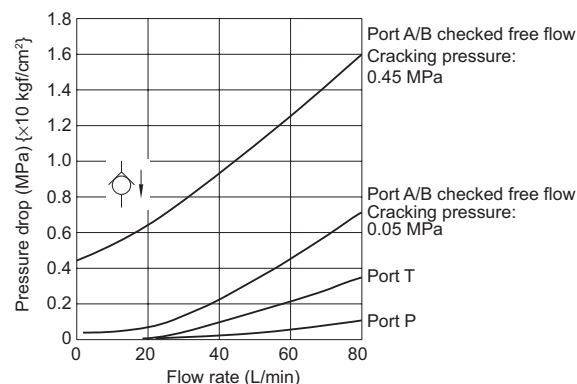
MC-03B-※※-40



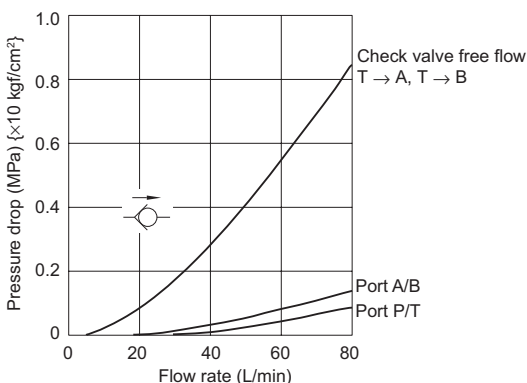
MC-03PB-05-40



MC-03AB-※※-40

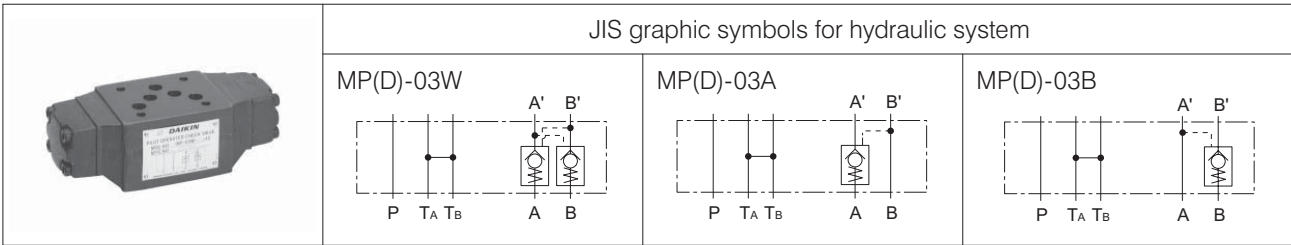


MC-03W-40-56



MODULAR STACK VALVES

# 03 Series Stacking Type Pilot Operated Check Valves



## Nomenclature



### 1 Applicable fluid code

No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
 F: Phosphate ester hydraulic fluid

### 2 Model No.

MP: Modular stacking type pilot operated check valve (Applicable only to design No. 40)  
 MPD: Modular stacking type pilot operated check valve (Applicable only to design No. 50)

### 3 Nominal diameter

03: 3/8

### 4 Control port

W: Port A/B  
 A: Port A  
 B: Port B

### 5 Cracking pressure code

20: 0.2 MPa {2 kgf/cm<sup>2</sup>}  
 50: 0.5 MPa {5 kgf/cm<sup>2</sup>}

### 6 Design No. (The design No. is subject to change)

40: 25 MPa {250 kgf/cm<sup>2</sup>} series  
 50: 35 MPa {350 kgf/cm<sup>2</sup>} series

## Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Cracking pressure MPa {kgf/cm <sup>2</sup> }	Area ratio *1	Mass kg
MP-03*-20-40	25 {250}	80	0.2 {2}	(1) 2 :1	3.5
MP-03*-50-40			0.5 {5}	(2) 13.7:1	
MPD-03*-20-50	35 {350}	80	0.2 {2}	(1) 2 :1	
MPD-03*-50-50			0.5 {5}	(2) 10.8:1	

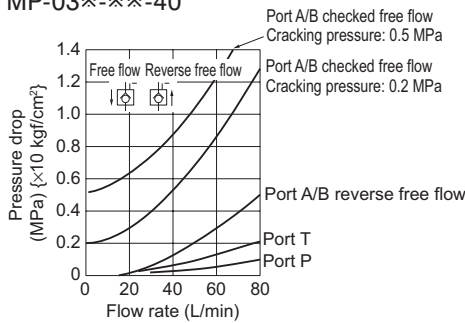
Note: \*1 Area ratio (1) Pilot piston: Large check valve (2) Pilot piston: Small check valve

## Handling

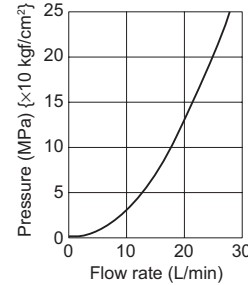
- These pilot operated check valves are of the decompression type.
- The internal drain type is adopted.

## Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

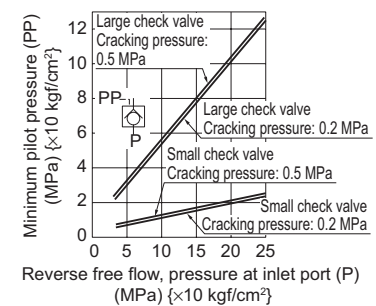
Pressure drop characteristics MP-03\*-\*\*-40



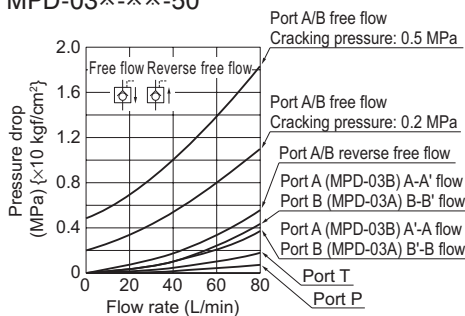
Pressure drop characteristics (with the small check valve fully open) MP-03\*-\*\*-40



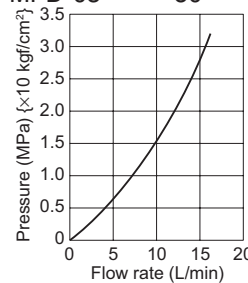
Pilot pressure characteristics MP-03\*-\*\*-40



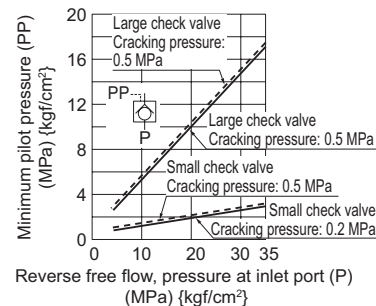
Pressure drop characteristics MPD-03\*-\*\*-50



Pressure drop characteristics (with the small check valve fully open) MPD-03\*-\*\*-50

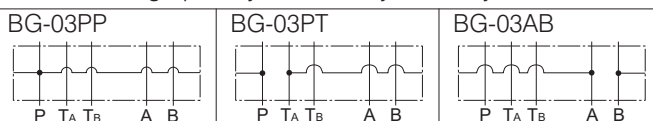


Pilot pressure characteristics MPD-03\*-\*\*-50



## 03 Series Stack Valve Pressure Take-out Blocks

JIS graphic symbols for hydraulic system



### Nomenclature

※ - **BG** - **03** ※※ - **40** - ※※

1 2 3 4 5 6

- 1 **Applicable fluid code**  
No designation: Petroleum-based hydraulic fluid,  
water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid
- 2 **Model No.**  
BG: Pressure take-out block
- 3 **Nominal diameter**  
03:  $\frac{3}{8}$
- 4 **Pressure take-out port**  
PP: Port P (two locations)  
PT: Port P/T  
AB: Port A/B
- 5 **Design No. (The design No. is subject to change)**
- 6 **Control No.**  
No designation: When AB is designated as the pressure take-out port code.  
40: When PP is designated as the pressure take-out port code.  
70: When PT is designated as the pressure take-out port code.

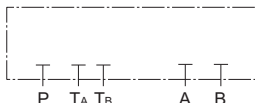
### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Mass kg
BG-03PP-40-40	25 {250}	80	2.6
BG-03PT-40-70			
BG-03AB-40			

## 03 Series Stack Valve Blocking Blocks

JIS graphic symbols for hydraulic system

BS-03



### Nomenclature

※ - **BS** - **03** - **40**

1 2 3 4

- 1 **Applicable fluid code**  
No designation: Petroleum-based hydraulic fluid,  
water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid
- 2 **Model No.**  
BS: Blocking block
- 3 **Nominal diameter**  
03:  $\frac{3}{8}$
- 4 **Design No. (The design No. is subject to change)**

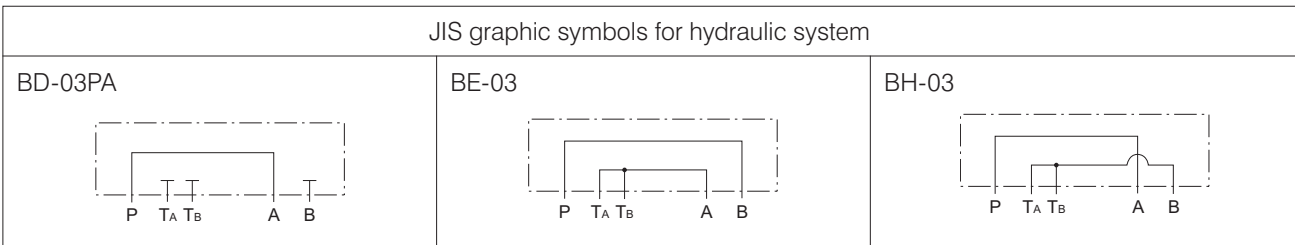
### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Mass kg
BS-03-40	25 {250}	1.2

### Handling

Mounting bolts are not provided with the blocking block. Order the bolts separately as required.

## 03 Series Stack Valve Bypass Blocks



### Nomenclature

※ - BD - 03 PA - 40

- 1 Applicable fluid code**  
No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid
- 2 Model No.**  
BD: Bypass block
- 3 Nominal diameter**  
03:  $\frac{3}{8}$
- 4 Connection port**  
PA: Port P-A
- 5 Design No.**  
(The design No. is subject to change)

※ - B※ - 03 - 40

- 1 Applicable fluid code**  
No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid
- 2 Model No.**  
BE: Bypass block  
BH: Bypass block
- 3 Nominal diameter**  
03:  $\frac{3}{8}$
- 4 Design No.**  
(The design No. is subject to change)

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Mass kg
BD-03PA-40	25 {250}	80	1.4
B※-03-40			

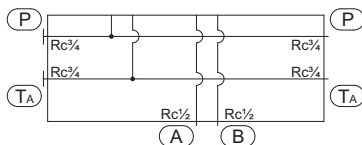
### Handling

Mounting bolts are not provided with the bypass block. Order the bolts separately as required.

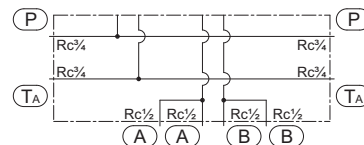
## 03 Series Stack Valve Manifold Blocks

JIS graphic symbols for hydraulic system

BT-※03-40



BT-※03-40-WH



### Nomenclature

**BT** - ※ **03** - **40** - ※※

1      2      3      4      5

**1 Model No.**

BT: Manifold block

**2 Number of series**

1 to 6: 1- to 6-series (When selecting option code "WH", select the number of series in the range 1 to 5.)

**3 Nominal diameter**

03: 3/8

**4 Design No.**

(The design No. is subject to change)

**5 Option code**

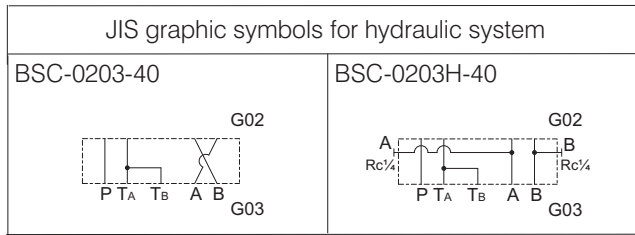
No designation: Port on one face

WH: Ports on both faces

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min
BT-※03-40	25 {250}	80
BT-※03-40-WH		

## 03 Series Stack Valve Size Conversion Plates



### Application

Size conversion plates are used to convert the size of a solenoid valve or stack valve to mount it on a larger manifold block (BT-\*\*\*\*) or sub-plate.

### Nomenclature

**BSC - 02 03 \* - 40**

1   
 2   
 3   
 4   
 5

**1 Model No.**

BSC: Size conversion plate

**2 Top size: Nominal diameter** 02: ¼

**3 Bottom size: Nominal diameter** 03: ⅜

**4 Option code**

No designation: A-B, B-A connection (02-03)  
 H: A-A, B-B connection (02-03)

**5 Design No.**

(The design No. is subject to change.)

### Specifications

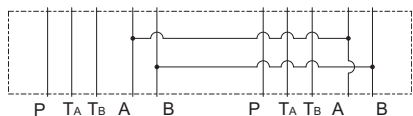
Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Mass kg
BSC-0203-40	25 {250}	40	1.0
BSC-0203H-40			3.0

### Accessories

Model code	Part name	Part specifications	Quantity
BSC-0203-40	O-ring	AS568-014 (NBR, Hs90)	5
	Hexagon socket head cap bolt	M6 × 30	4
BSC-0203H-40	O-ring	AS568-014 (NBR, Hs90)	5
	Hexagon socket head cap bolt	M6 × 40	4

## 03 Series Stack Valve 2-speed Plates

JIS graphic symbols for hydraulic system



### Application

A speed control circuit that enables 2-speed (high-/low-speed) control can be easily constructed by simply stacking these products on the manifold block (BT-\*\*\*).

### Nomenclature

**BW - 03 - 40**

1

2

3

**1 Model No.**

BW: 2-speed plate

**2 Nominal diameter**

03: 3/8

**3 Design No.**

(The design No. is subject to change.)

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Mass kg
BW-03-40	25 {250}	80	6.7

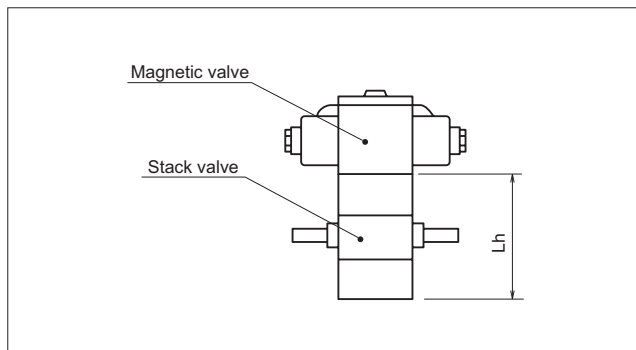
### Accessories

Part name	Part specifications	Quantity
O-ring	AS568-014 (NBR, Hs90)	10

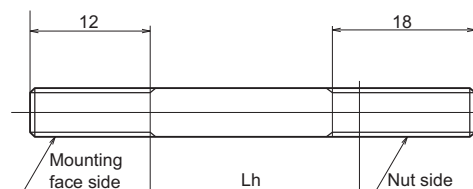
## 03 Series Stack Valve Mounting Bolts

### Bolt selection guide

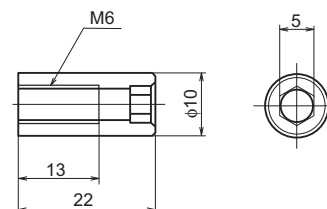
Select the bolts to be used for mounting stack valves and stacking blocks according to the stacked height (Lh) of the valves and blocks.



### Stud bolt



### Nut for stud bolts (provided with stud bolts)



### Tightening torque of mounting bolts

13 to 15 N·m {130 to 150 kgf·cm}

### Hexagon socket head cap bolt

Number of stack levels	Stacked dimension Lh (mm)	Mounting bolt model code	Hexagon socket head cap bolt
0	0	HB300	M6 × 40
1	55	HB301	M6 × 95
2	110	HB302	M6 × 150
3	165	HB303	M6 × 205
4	220	HB304	M6 × 260

### Stud bolt

Number of stack levels	Stacked dimension Lh (mm)	Mounting bolt model code	Stud bolt
0	0	SB300	M6 × 50
1	55	SB301	M6 × 105
2	110	SB302	M6 × 160
3	165	SB303	M6 × 215
4	220	SB304	M6 × 270

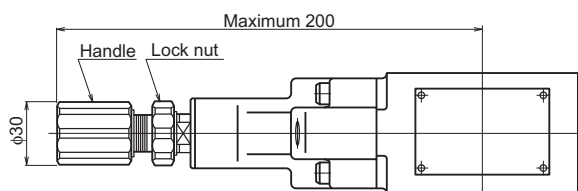
Note: ○ The model codes cited above are for sets of four bolts.

○ A number of stack levels of "0" means that only a solenoid valve is used, with no stack valves stacked.

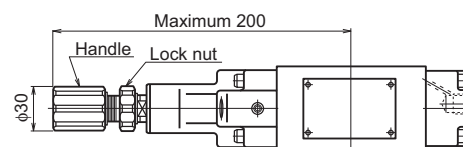
○ When using stud bolts, screw them at least 9 mm into the mounting face of the manifold block or other mount.

### Adjusting handle type External dimension diagram

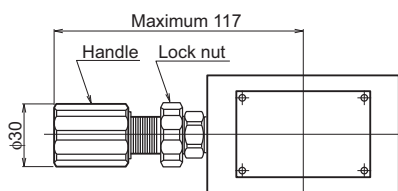
#### MR-03P-※※-40-T



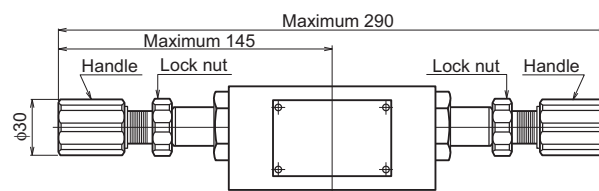
#### MG-03P(B)-※※-40-T



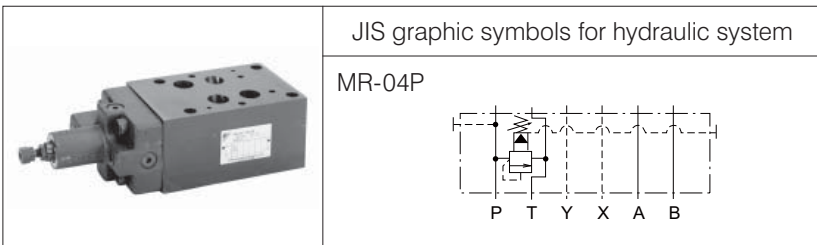
#### MT-03P-40-T



#### MT-03W※-40-T



## 04 Series Stacking Type Port P Relief Valves



### Nomenclature

- |   |   |           |   |           |          |   |   |   |   |           |   |             |   |   |
|---|---|-----------|---|-----------|----------|---|---|---|---|-----------|---|-------------|---|---|
| ※ | - | <b>MR</b> | - | <b>04</b> | <b>P</b> | - | ※ | ※ | - | <b>10</b> | - | ※ <b>02</b> | - | ※ |
| 1 |   | 2         |   | 3         | 4        |   | 5 | 6 |   | 7         |   | 8           |   | 9 |
- 1 Applicable fluid code**  
No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid
  - 2 Model No.**  
MR: Modular stacking type relief valve
  - 3 Nominal diameter**  
04: ½
  - 4 Control port**  
P: Port P
  - 5 Pressure adjustment range**  
1: Up to 7 MPa {Up to 70 kgf/cm<sup>2</sup>}  
2: 2 to 16 MPa {20 to 160 kgf/cm<sup>2</sup>}  
3: 3.5 to 25 MPa {35 to 250 kgf/cm<sup>2</sup>}  
4: 7 to 35 MPa {70 to 350 kgf/cm<sup>2</sup>}
  - 6 Vent type code**  
No designation: Low-vent type  
V: High-vent type
  - 7 Design No.**  
(The design No. is subject to change)
  - 8 Piping port**  
R02: Connection port Rc¼  
S02: Connection port G¼ O-ring boss (JIS B 2351)
  - 9 Drainage code**  
No designation: Internal drain type  
E: External drain type

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range *1 MPa {kgf/cm <sup>2</sup> }	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MR-04P-1※-10	35 {350}	300	Up to 7 {Up to 70}	7	2.5 {25}/revolution
MR-04P-2※-10			2 to 16 {20 to 160}		4.6 {46}/revolution
MR-04P-3※-10			3.5 to 25 {35 to 250}		7.9 {79}/revolution
MR-04P-4※-10			7 to 35 {70 to 350}		9.1 {91}/revolution

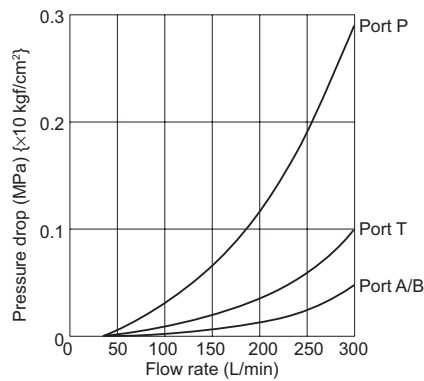
Note: \*1 The minimum adjustment pressure varies depending on the flow rate. See the minimum adjustment pressure characteristics for details.

### Handling

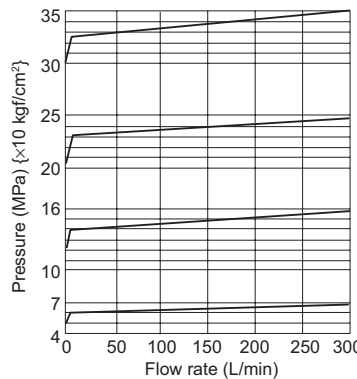
- Maintain the back pressure of the tank port at no greater than 0.5 MPa {5 kgf/cm<sup>2</sup>}.
- When using the valve in combination with a direct operated relief valve for remote control, connect it to the vent port of the valve. Since excessive internal volume of the vent piping may lead to vibration, use steel pipes with an inner diameter of 4 mm maximum and thick walls for piping.
- When using the valve as a safety valve, set the pressure 1 to 1.5 MPa {10 to 15 kgf/cm<sup>2</sup>} higher than the pressure set for the hydraulic circuit.
- Use the valve with a flow rate of 8 L/min minimum since the pressure setting may be unstable if the flow rate is too low.
- The time required to switch from the unload to on-load state can be reduced by using the high-vent type.
- The drain type setting can be changed by fitting/removing plugs. See the sectional structural diagram on Page I-96 for details.

**Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})**

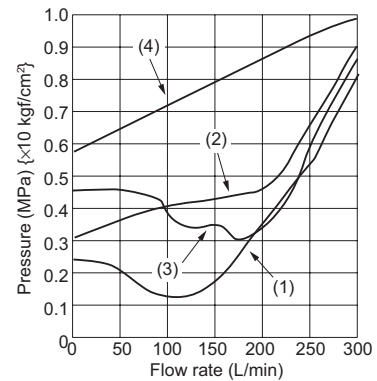
Pressure drop characteristics



Pressure - Flow rate characteristics Internal drain type



Vent unloading pressure characteristics Minimum adjustment pressure characteristics

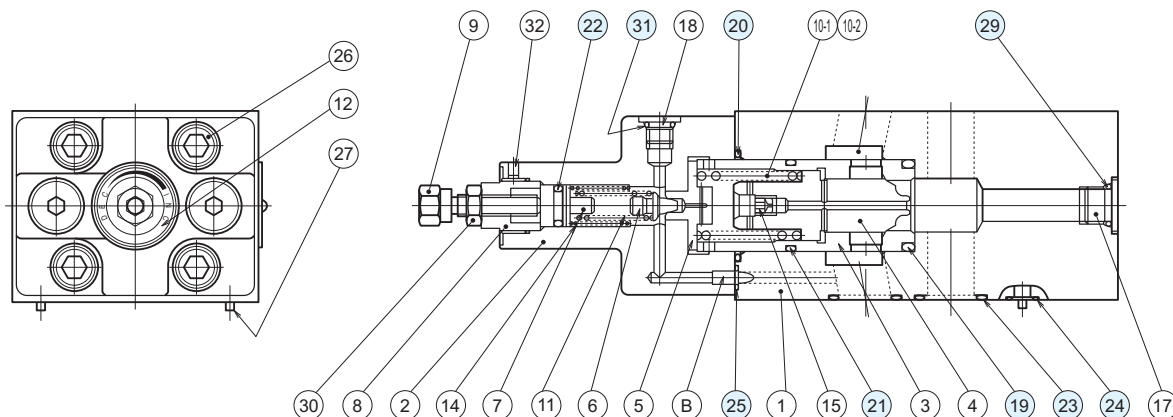


- Note: (1) Low vent type: Vent unload pressure: When the vent port vents to the atmosphere  
 (2) Low vent type: Minimum adjustment pressure: With the handle fully open  
 (3) High vent type: Vent unload pressure: When the vent port vents to the atmosphere  
 (4) High vent type: Minimum adjustment pressure: With the handle fully open



## Sectional structural diagram

MR-04P



Sealing part table

Part No.	Name	Part specifications	Quantity	
			-S02	-R02
19	O-ring	JIS B 2401 1B P28	1	1
20	O-ring	AS568-127 (NBR, Hs90)	1	1
21	O-ring	AS568-122 (NBR, Hs90)	1	1
22	O-ring	JIS B 2401 1A P11	1	1
23	O-ring	AS568-118 (NBR, Hs90)	4	4
24	O-ring	AS568-012 (NBR, Hs90)	2	2
25	O-ring	JIS B 2401 1B P6	1	1
29	O-ring	JIS B 2401 1B P11	3	-
31	O-ring	JIS B 2401 1B P8	2	2

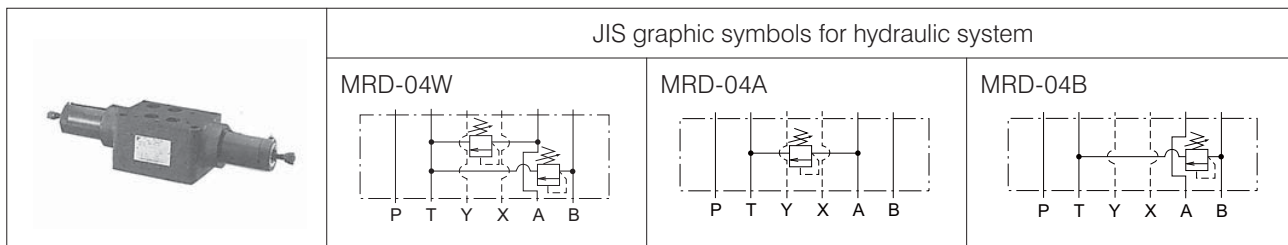
## Drain type setting guide

- Either the internal or external drain type can be set by fitting/removing plugs.

To change the internal drain type to the external drain type, fit a plug (NPTF1/32) to port B and remove the plug (R $\frac{1}{4}$  plug for R02 or G $\frac{1}{4}$  hexagon socket thread plug with flange for S02) from the external drain port.

Tightening torque of NPTF1/32 hexagon socket taper thread plug:  
0.9 to 1.2 N·m {9 to 12 kgf·cm}

## 04 Series Stacking Type Port A/B Direct Operated Relief Valves



### Nomenclature

※ - **MRD** - **04** ※ - ※ - **10**

- |  |   |
|--|---|
| <p><b>1</b> <b>Applicable fluid code</b><br/>No designation: Petroleum-based hydraulic fluid,<br/>water-glycol hydraulic fluid<br/>F: Phosphate ester hydraulic fluid</p> <p><b>2</b> <b>Model No.</b><br/>MRD: Modular stacking type direct operated relief valve<br/>(surge absorbing valve)</p> <p><b>3</b> <b>Nominal diameter</b><br/>04: ½</p> | <p><b>4</b> <b>Control port</b><br/>W: Port A/B<br/>A: Port A<br/>B: Port B</p> <p><b>5</b> <b>Pressure adjustment range</b><br/>1: 0.8 to 7 MPa { 8 to 70 kgf/cm<sup>2</sup> }<br/>3: 3.5 to 25 MPa { 35 to 250 kgf/cm<sup>2</sup> }<br/>4: 7 to 35 MPa { 70 to 350 kgf/cm<sup>2</sup> }</p> <p><b>6</b> <b>Design No.</b><br/>(The design No. is subject to change)</p> |
|--|---|

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range *2 MPa {kgf/cm <sup>2</sup> }	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MRD-04※-1-10	35 {350}	50 (300) *1	0.8 to 7 { 8 to 70 }	6.5	0.63 { 6.3 }/revolution
MRD-04※-3-10			3.5 to 25 { 35 to 250 }		2.4 { 24 }/revolution
MRD-04※-4-10			7 to 35 { 70 to 350 }		3 { 30 }/revolution

Note: \*1 The flow rate through the port is 300 L/min.

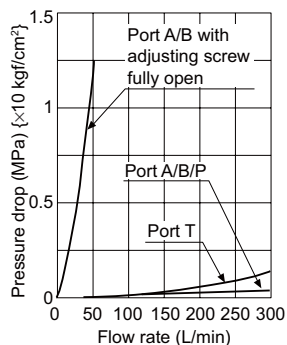
\*2 The pressure adjustment ranges are indicated using cracking pressures.

### Handling

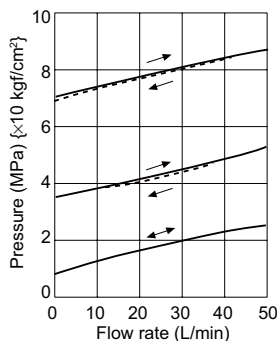
- Maintain the back pressure of the tank port at no greater than 0.5 MPa { 5 kgf/cm<sup>2</sup> }.

### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

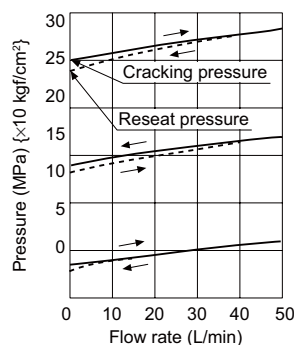
Pressure drop characteristics  
MRD-04※-※



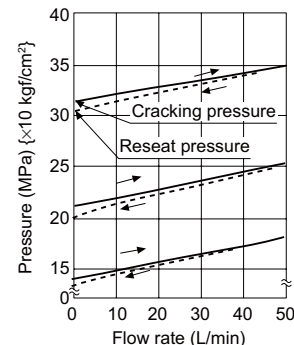
Pressure - Flow rate characteristics  
MRD-04※-1



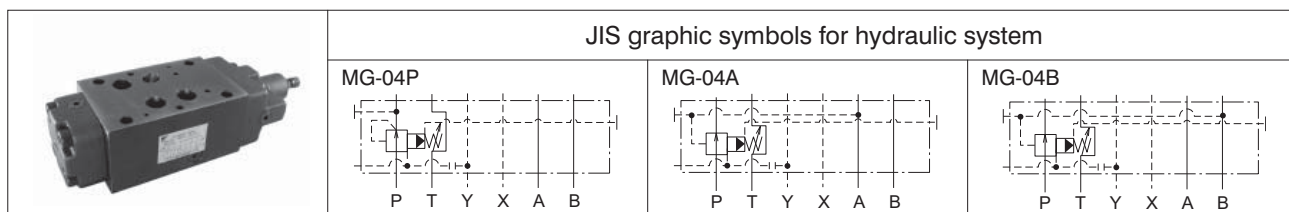
MRD-04※-3



MRD-04※-4



## 04 Series Stacking Type Reducing Valves



### Nomenclature



- 1 Applicable fluid code**  
No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid
- 2 Model No.**  
MG: Modular stacking type reducing valve
- 3 Nominal diameter**  
04: ½
- 4 Control port**  
P: Port P  
A: Port A  
B: Port B
- 5 Pressure adjustment range**  
1: 0.8 to 7 MPa { 8 to 70 kgf/cm<sup>2</sup> }  
2: 2 to 16 MPa { 20 to 160 kgf/cm<sup>2</sup> }  
3: 3.5 to 25 MPa { 35 to 250 kgf/cm<sup>2</sup> }
- 6 Design No.**  
**(The design No. is subject to change)**
- 7 Piping port**  
R02: Connection port Rc¼  
S02: Connection port G¼ O-ring boss (JIS B 2351)
- 8 Drainage code**  
No designation: External drain type (external piping connection type)  
B: External drain type (port Y open type)

### Specifications

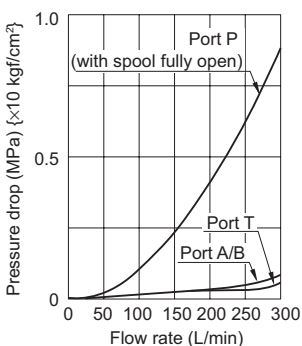
Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range MPa {kgf/cm <sup>2</sup> }	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MG-04※-1-10	35 {350}	300	0.8 to 7 { 8 to 70 }	8	2.5 {25}/revolution
MG-04※-2-10			2 to 16 { 20 to 160 }		4.6 {46}/revolution
MG-04※-3-10			3.5 to 25 { 35 to 250 }		7.9 {79}/revolution

### Handling

- Directly connect the drain piping to the tank without merging it with other tank piping.
- To ensure good pressure reducing performance, set the primary side main circuit pressure and the secondary pressure reducing circuit pressure such that there is a minimum difference of 1 MPa {10 kgf/cm<sup>2</sup>}.
- When using the valve in combination with a direct operated relief valve for remote control, connect it to the vent port of the valve. Since excessive internal volume of the vent piping may lead to vibration, use steel pipes with an inner diameter of 4 mm maximum and thick walls for piping.
- The drain type setting can be changed by fitting/removing plugs. See the sectional structural diagram on Page I-100 for details.
- The control port setting can be changed by rearranging the bottom lid. See the sectional structural diagram on Page I-100 for details.

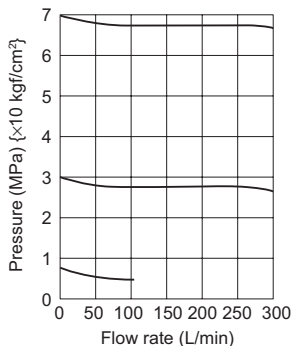
### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

Pressure drop characteristics  
MG-04※-※

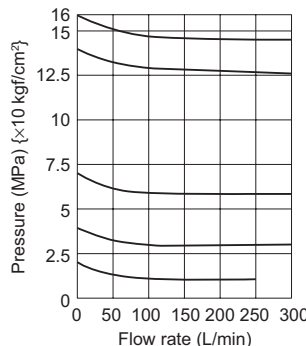


Pressure - Flow rate characteristics

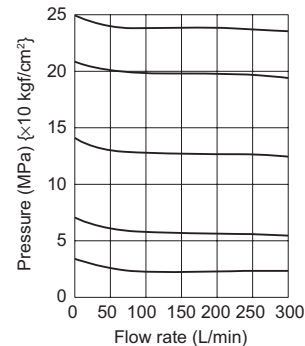
MG-04※-1  
Primary pressure:  
35 MPa {350 kgf/cm<sup>2</sup>}



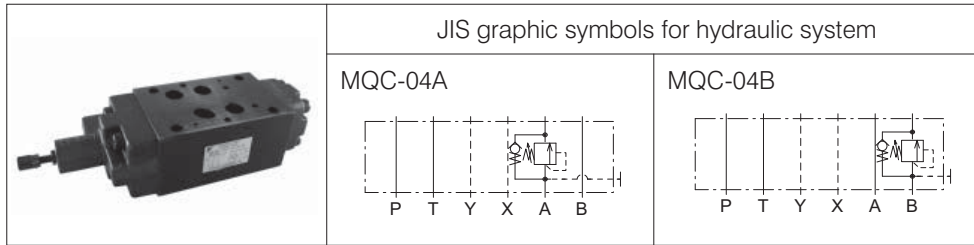
MG-04※-2  
Primary pressure:  
35 MPa {350 kgf/cm<sup>2</sup>}



MG-04※-3  
Primary pressure:  
35 MPa {350 kgf/cm<sup>2</sup>}



# 04 Series Stacking Type Port A/B Counter Balance Valves



## Nomenclature

※ - MQC - 04 ※ - 1 ※ - 10 - ※02

1      2      3      4      5      6      7      8

### 1 Applicable fluid code

No designation: Petroleum-based hydraulic fluid,  
water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid

### 2 Model No.

MQC: Modular stacking type counter balance valve

### 3 Nominal diameter

04: ½

### 4 Control port

A: Port A  
B: Port B

### 5 Function code

1: Counter balance valve

### 6 Pressure adjustment range

A: 0.25 to 0.85 MPa { 2.5 to 8.5 kgf/cm<sup>2</sup> }  
C: 0.5 to 3.5 MPa { 5 to 35 kgf/cm<sup>2</sup> }  
E: 2 to 14 MPa { 20 to 140 kgf/cm<sup>2</sup> }

### 7 Design No.

(The design No. is subject to change)

### 8 Piping port

R02: Connection port Rc¼  
S02: Connection port G¼ O-ring boss (JIS B 2351)

## Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range *1 MPa {kgf/cm <sup>2</sup> }	Check valve cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MQC-04※-1A-10	35 {350}	300	0.25 to 0.85 { 2.5 to 8.5 }	0.05 {0.5}	8	0.12 { 1.2 }/revolution
MQC-04※-1C-10			0.5 to 3.5 { 5 to 35 }			0.47 { 4.7 }/revolution
MQC-04※-1E-10			2 to 14 { 20 to 140 }			1.9 { 19 }/revolution

Note: \*1 The pressure adjustment ranges are indicated using cracking pressures.

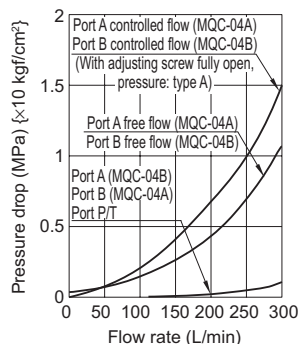
## Handling

- Since this valve is set as internal drain type, connect the secondary port of the valve directly to the tank.

## Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

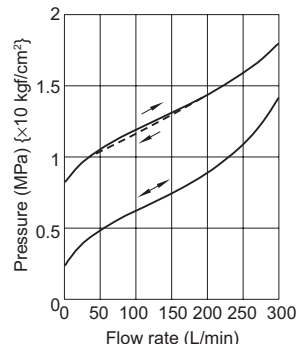
### Pressure drop characteristics

MQC-04※-1※

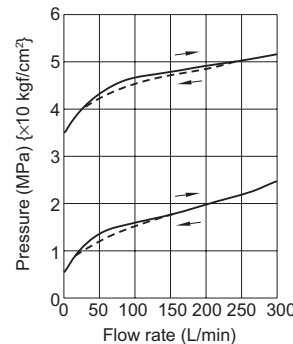


### Pressure - Flow rate characteristics

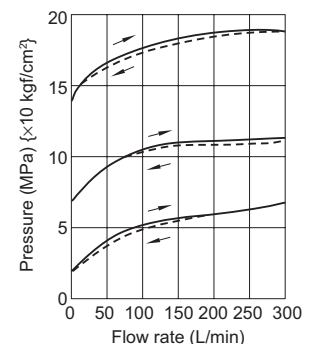
MQC-04※-1A



MQC-04※-1C

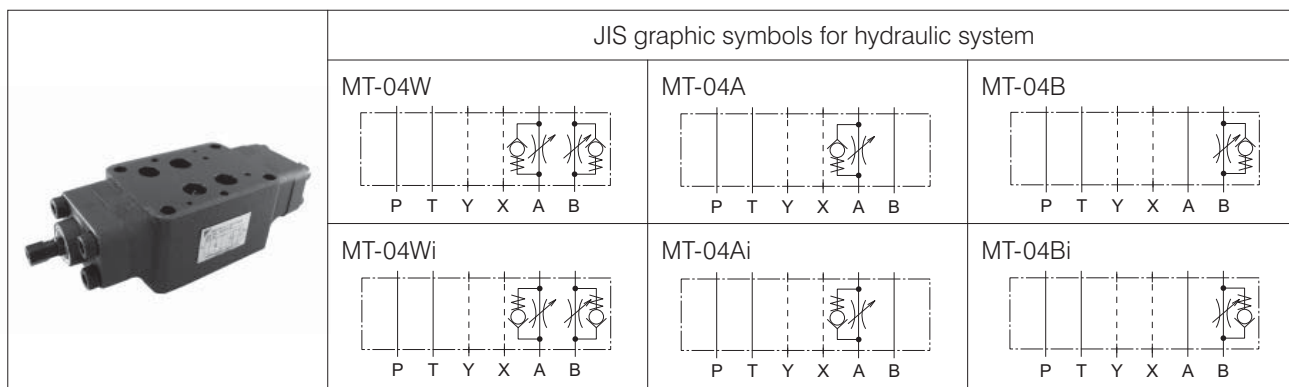


MQC-04※-1E



MODULAR STACK VALVES I

## 04 Series Stacking Type Throttle Valves for Port A/B



### Nomenclature

1
2
3
4
5
6

**1 Applicable fluid code**

No designation: Petroleum-based hydraulic fluid,  
water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid

**2 Model No.**

MT: Modular stacking type throttle valve

**3 Nominal diameter**

04: 1/2

**4 Control port**

W: Port A/B  
A: Port A  
B: Port B

**5 Control method**

No designation: Meter-out control  
i: Meter-in control

**6 Design No.**

(The design No. is subject to change)

### Specifications

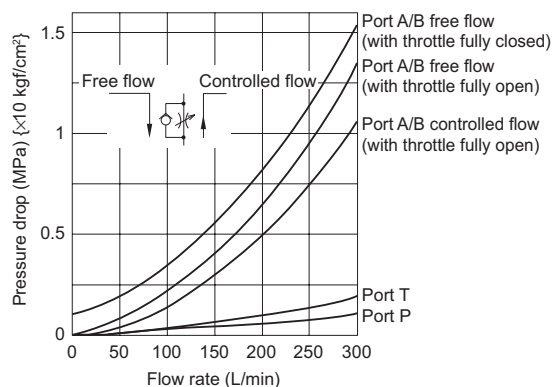
Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Check valve cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg
MT-04**10	35 {350}	300	0.1 {1}	6.5

### Handling

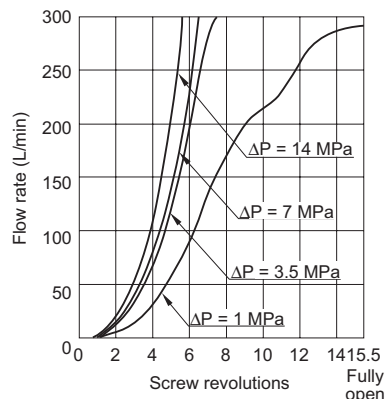
- The flow rate will not be zero even if the flow rate adjusting screw is fully tightened.

### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

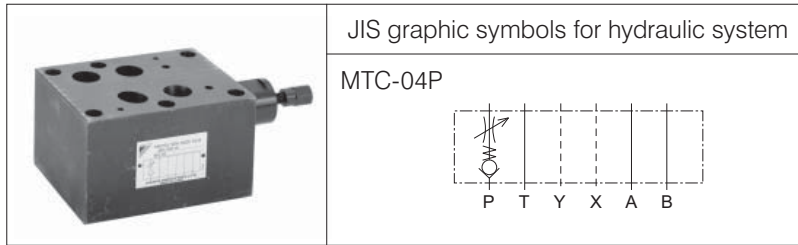
Pressure drop characteristics



Adjusting screw revolution - Flow rate characteristics



## 04 Series Stacking Type Port P Throttle Valves with Check Valves



### Nomenclature

※ - **MT** **C** - **04** **P** - **10**

1      2    3      4    5      6

**1 Applicable fluid code**

No designation: Petroleum-based hydraulic fluid,  
water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid

**2 Model No.**

MT: Modular stacking type throttle valve

**3 Check valve code**

C: With check valve

**4 Nominal diameter**

04: ½

**5 Control port**

P: Port P

**6 Design No.**

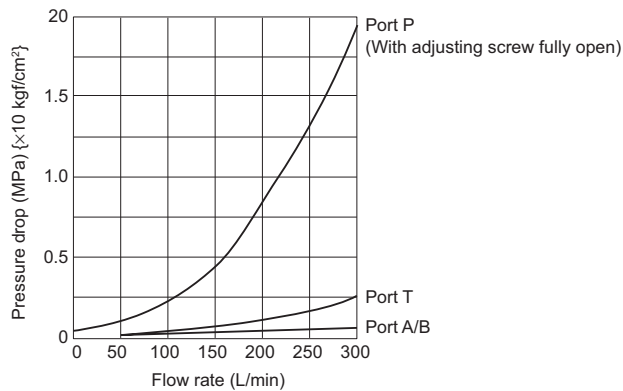
(The design No. is subject to change)

### Specifications

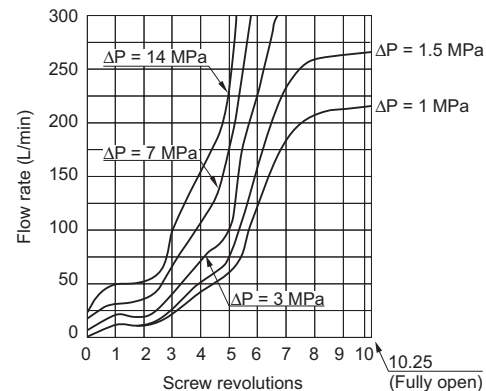
Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Check valve cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg
MTC-04P-10	35 {350}	300	0.04 {0.4}	4.5

### Performance curves (viscosity: 42 mm<sup>2</sup>/s {cSt})

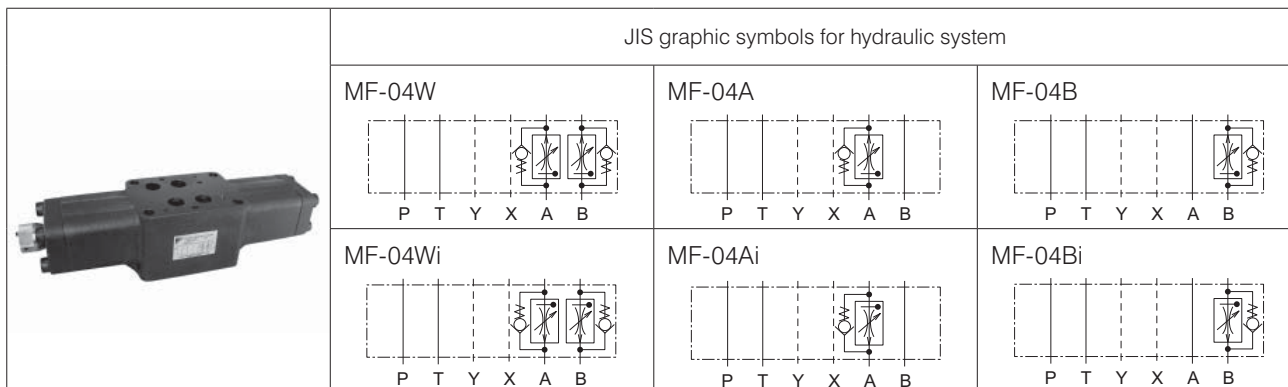
Pressure drop characteristics



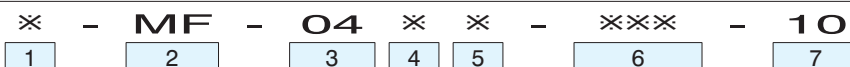
Adjusting screw revolution - Flow rate characteristics



## 04 Series Stacking Type Port A/B Flow Control Valves



### Nomenclature



- |  |  |
|--|--|
| <p><b>1 Applicable fluid code</b><br/>No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid<br/>F: Phosphate ester hydraulic fluid</p> <p><b>2 Model No.</b><br/>MF: Modular stacking type flow control valve</p> <p><b>3 Nominal diameter</b><br/>04: ½</p> | <p><b>4 Control port</b><br/>W: Port A/B A: Port A B: Port B</p> <p><b>5 Control method</b><br/>No designation: Meter-out control<br/>i: Meter-in control</p> <p><b>6 Control flow rate</b><br/>100: 100 L/min<br/>200: 200 L/min</p> <p><b>7 Design No. (The design No. is subject to change)</b></p> |
|--|--|

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Control flow rate *1 L/min			Check valve cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg
			(1)	(2)	(3)		
MF-04 <span style="border: 1px solid black; padding: 2px;">1</span> -100-10	35 {350}	300	10 to 100	15 to 100	20 to 100	0.1 {1}	11
MF-04 <span style="border: 1px solid black; padding: 2px;">2</span> -200-10			10 to 200	15 to 200	20 to 200		

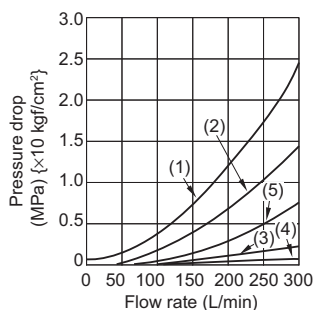
Note: \*1 Control flow rate (1) Pressure difference between the inlet and outlet ports to be 20.5 MPa {205 kgf/cm<sup>2</sup>} maximum  
(2) Pressure difference between the inlet and outlet ports to be 24.5 MPa {245 kgf/cm<sup>2</sup>} maximum  
(3) Pressure difference between the inlet and outlet ports to be 35 MPa {350 kgf/cm<sup>2</sup>} maximum

### Handling

- To ensure good pressure compensation performance, maintain a pressure difference of 0.8 MPa {8 kgf/cm<sup>2</sup>} minimum between the inlet and outlet ports for the models with a control flow rate of 100 L/min or 1.5 MPa {15 kgf/cm<sup>2</sup>} for the models with a control flow rate of 200 L/min.
- The minimum control flow rate is the value when the flow rate fluctuation is within 10% with the pressure compensated.

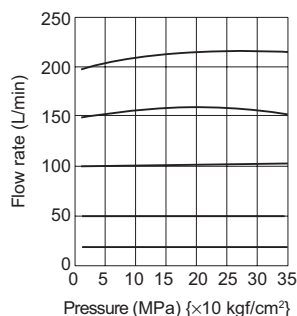
### Performance curves (viscosity: 42 mm<sup>2</sup>/s {cSt})

Pressure drop characteristics

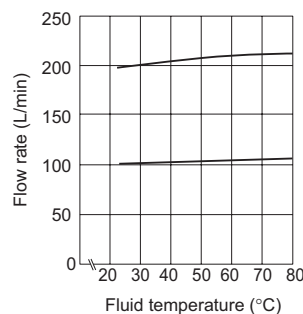


- (1): Port A/B free flow (with handle fully closed)  
(2): Port A/B free flow (with handle fully open)  
(3): Port T  
(4): Port P  
(5): Port A/B with no controlling parts (MF-04A, MF-04B)

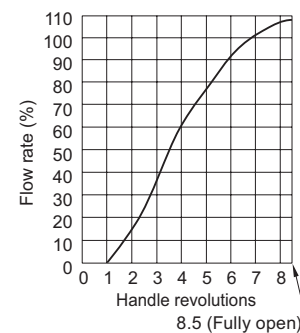
Pressure - Flow rate characteristics



Fluid temperature - Flow rate characteristics



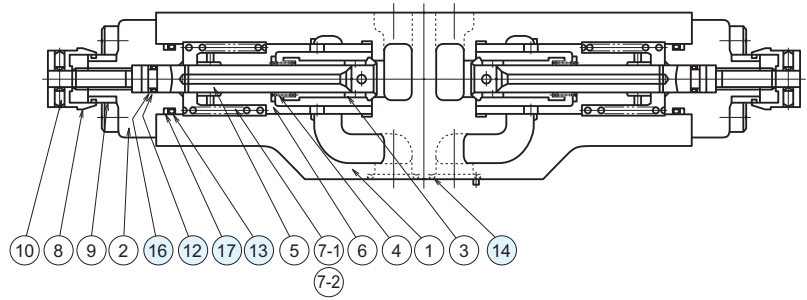
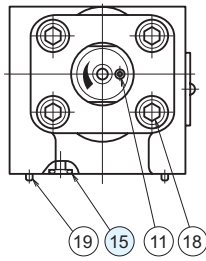
Adjusting handle revolution - Flow rate characteristics



I  
MODULAR STACK VALVES

## Sectional structural diagram

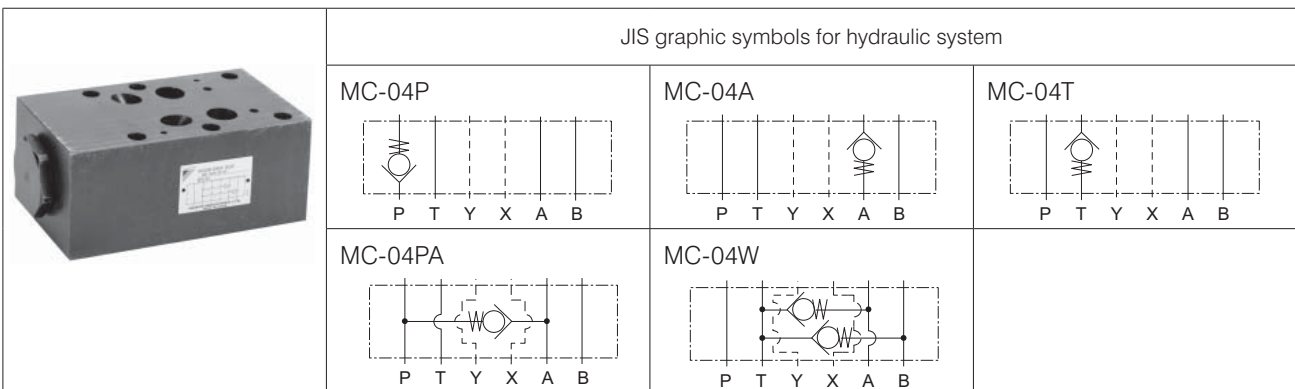
MF-04\*\*



Sealing part table

Part No.	Name	Part specifications	Quantity		
			04W(i)	04A(i)	04B(i)
12	O-ring	JIS B 2401 1BP10A	2	1	1
13	O-ring	JIS B 2401 1BP30	2	2	2
14	O-ring	AS568-118 (NBR, Hs90)	4	4	4
15	O-ring	AS568-012 (NBR, Hs90)	2	2	2
16	Backup ring	JIS B 2407 Bias cut P10A	2	1	1
17	Backup ring	JIS B 2407 Bias cut P30	2	2	2

# 04 Series Stacking Type Check Valves



## Nomenclature



- 1 Applicable fluid code**  
No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid
- 2 Model No.**  
MC: Modular stacking type check valve
- 3 Nominal diameter**  
04: ½
- 4 Control port**  
P: Port P  
A: Port A  
T: Port T  
PA: A → P  
W: Port A/B (vacuum check valve)
- 5 Cracking pressure code**  
01: 0.01 MPa {0.1 kgf/cm<sup>2</sup>}  
04: 0.04 MPa {0.4 kgf/cm<sup>2</sup>}  
10: 0.1 MPa {1 kgf/cm<sup>2</sup>}  
20: 0.2 MPa {2 kgf/cm<sup>2</sup>}  
35: 0.35 MPa {3.5 kgf/cm<sup>2</sup>}  
50: 0.5 MPa {5 kgf/cm<sup>2</sup>}  
60: 0.6 MPa {6 kgf/cm<sup>2</sup>}
- 6 Design No.**  
(The design No. is subject to change)

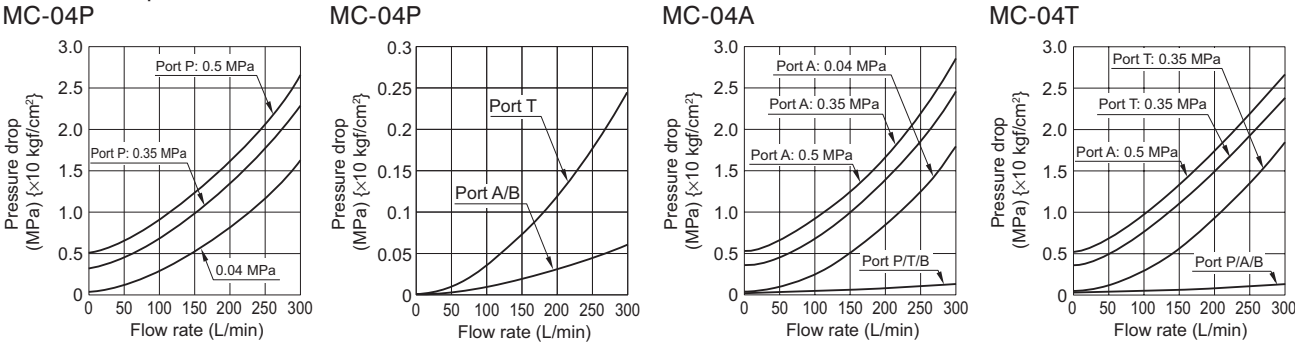
## Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg
MC-04W -01-10	35 {350}	300	0.01 {0.1}	(1) 4.5 (2) 6
MC-04※※-04-10			0.04 {0.4}	
MC-04※※-10-10			0.1 {1 }	
MC-04※※-20-10			0.2 {2 }	
MC-04※※-35-10			0.35 {3.5}	
MC-04※※-50-10			0.5 {5 }	
MC-04※※-60-10			0.6 {6 }	

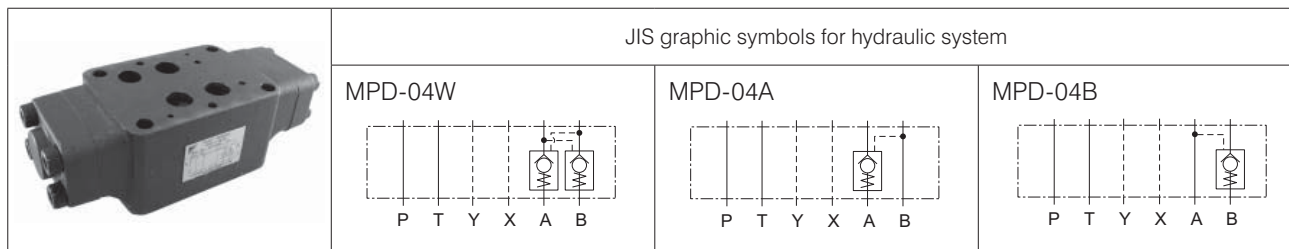
Note: Mass (1) Control port: P, A, PA (2) Control port: T, W

## Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

Pressure drop characteristics



## 04 Series Stacking Type Pilot Operated Check Valves



### Nomenclature

- |   |   |            |   |           |   |   |    |   |           |
|---|---|------------|---|-----------|---|---|----|---|-----------|
| ※ | - | <b>MPD</b> | - | <b>04</b> | ※ | - | ※※ | - | <b>10</b> |
| 1 | 2 | 3          | 4 | 5         | 6 | 7 |    |   |           |
- Applicable fluid code**  
No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid
  - Model No.**  
MP: Modular stacking type pilot operated check valve
  - Decompression code**  
D: Decompression type
  - Nominal diameter**  
04: ½
  - Control port**  
W: Port A/B  
A: Port A  
B: Port B
  - Cracking pressure code**  
20: 0.2 MPa {2 kgf/cm<sup>2</sup>}  
50: 0.5 MPa {5 kgf/cm<sup>2</sup>}
  - Design No.**  
(The design No. is subject to change)

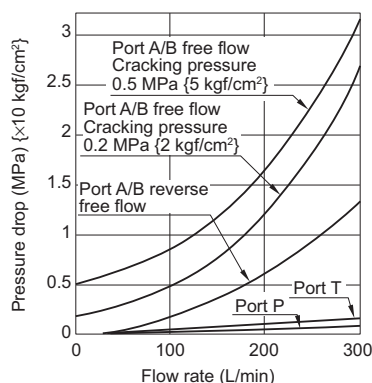
### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Cracking pressure MPa {kgf/cm <sup>2</sup> }	Area ratio *1	Mass kg
MPD-04※-20-10	35 {350}	300	0.2 {2}	(1) 2 :1	6.8
MPD-04※-50-10			0.5 {5}	(2) 13.27:1	

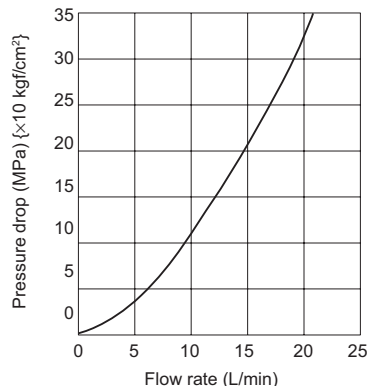
Note: \*1 Area ratio (1) Pilot piston: Large check valve  
(2) Pilot piston: Small check valve

### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

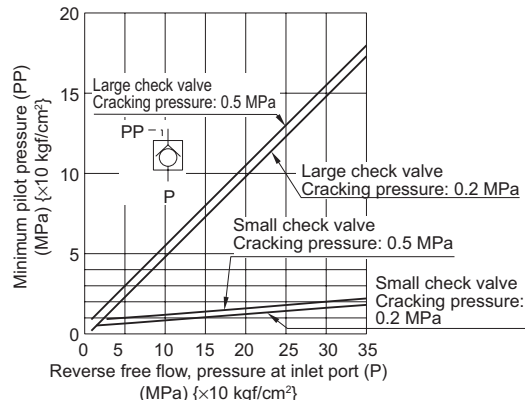
Pressure drop characteristics



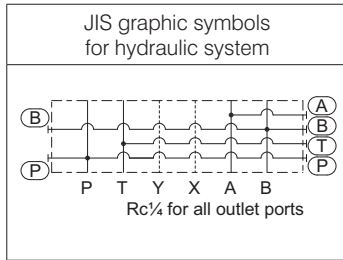
Pressure drop characteristics (with the small check valve fully open)



Pilot pressure characteristics



## 04 Series Stack Valve Pressure Take-out Blocks



### Nomenclature

**BG - 04 PTAB - 10**

1 2 3 4

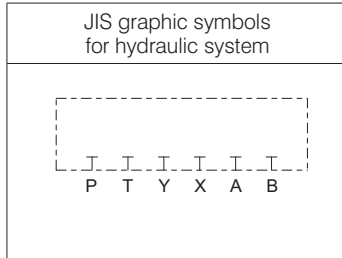
- 1 **Model No.** BG: Pressure take-out block
- 2 **Nominal diameter** 04: ½
- 3 **Pressure take-out port** PTAB: Port P, T, A, B
- 4 **Design No. (The design No. is subject to change)**

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Mass kg
BG-04PTAB-10	25 {250}	160	6.4

● Not applicable to hydro-center type solenoid valves.

## 04 Series Stack Valve Blocking Blocks



### Nomenclature

**BS - 04 - 10**

1 2 3

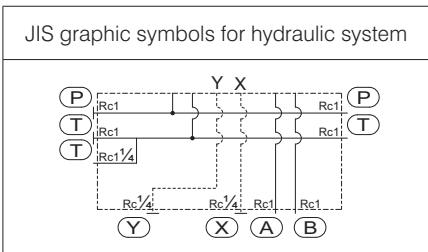
- 1 **Model No.** BS: Blocking block
- 2 **Nominal diameter** 04: ½
- 3 **Design No. (The design No. is subject to change)**

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Mass kg
BS-04-10	25 {250}	2.9

● Not applicable to hydro-center type solenoid valves.

## 04 Series Stack Valve Manifold Blocks



### Nomenclature

**BT** - **※** **04** - **10**

1 2 3 4

**1 Model No.**

BT: Manifold block

**2 Number of series**

1 to 3: 1- to 3-series

**3 Nominal diameter**

04: 1/2

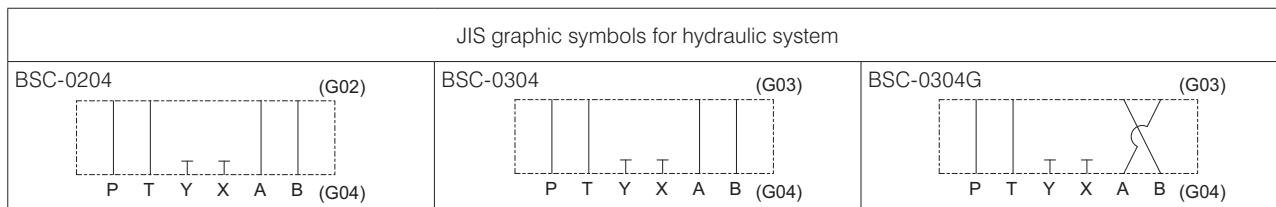
**4 Design No. (The design No. is subject to change)**

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min
BT-※04-10	25 {250}	160

- Ports X are isolated in each series.
- Ports Y are connected inside the manifold.
- Not applicable to hydro-center type solenoid valves.

## 04 Series Stack Valve Size Conversion Plates



### Nomenclature

**BSC** - **02** **04** **0** - **10**

1   
 2   
 3   
 4   
 5

**1 Model No.**

BSC: Size conversion plate

**2 Top size: Nominal diameter**

02: ¼  
03: ⅜

**3 Bottom size: Nominal diameter**

04: ½

**4 Option code**

No designation: Forward arrangement type  
G: Reverse arrangement type

**5 Design No.**

(The design No. is subject to change)

### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Mass kg
BSC-0204-10	25 {250}	40	4.4
BSC-0304-10		80	3.5
BSC-0304G-10			8.4

### Application

Size conversion plates are used to convert the size of a solenoid valve or stack valve to mount it on a larger manifold block (BT-\*\*\*\*) or sub-plate.

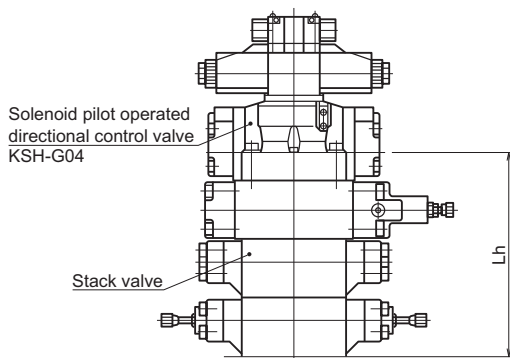
### Accessories

Model code	Part name	Part specifications	Quantity
BSC-***04-40	O-ring	AS568-012 (NBR, Hs90)	2
	O-ring	AS568-118 (NBR, Hs90)	4
	Hexagon socket head cap bolt	M6 × 45	2
	Hexagon socket head cap bolt	M10 × 50	4
BSC-0304G-40	O-ring	AS568-012 (NBR, Hs90)	1
	O-ring	AS568-017 (NBR, Hs90)	1
	O-ring	AS568-118 (NBR, Hs90)	4
	Hexagon socket head cap bolt	M6 × 100	2
	Hexagon socket head cap bolt	M10 × 100	4

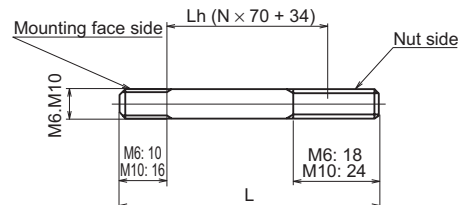
## 04 Series Stack Valve Mounting Bolts

### Bolt selection guide

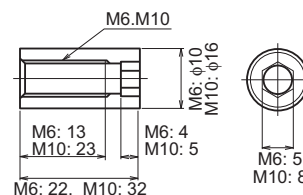
Select the bolts to be used for mounting stack valves and stacking blocks according to the stacked height (Lh) of the valves and blocks.



### Stud bolt



### Nut for stud bolts (provided with stud bolts)



### Tightening torque of mounting bolts

Bolt	Tightening torque N·m {kgf·cm}
M6	13 to 15 {130 to 150}
M10	50 to 55 {500 to 550}

### Hexagon socket head cap bolt

The heights of 04 series stack valves are standardized at 85 mm for MF-04\*\* and at 70 mm for all the others. Select mounting bolts from section \*1 when one MF-04\*\* unit is included in the stack and from section \*2 when two units are included.

N: Number of stack levels	Lh: Stacked dimension (mm)	M10			M6			
		Mounting bolt model code	Hexagon socket head cap bolt	Strength classification	Mounting bolt model code	Hexagon socket head cap bolt	Strength classification	
	0	34	HB1040050	M10 × 50	12.9	HB0640045	M6 × 45	12.9
	1	104	HB1041120	M10 × 120		HB0641115	M6 × 115	
	2	174	HB1042190	M10 × 190		HB0642185	M6 × 185	
	3	244	HB1043260	M10 × 260		HB0643260	M6 × 260	
	4	314	HB1044330	M10 × 330	10.9	–	–	–
*1	1	119	HB1041135	M10 × 135	12.9	HB0641130	M6 × 130	12.9
	2	189	HB1042205	M10 × 205		HB0642200	M6 × 200	
	3	259	–	–		HB0643270	M6 × 270	
	4	329	–	–	–	–	–	
*2	2	204	HB1042220	M10 × 220	12.9	HB0642215	M6 × 215	12.9
	3	274	HB1043290	M10 × 290		–	–	10.9

Note: ○ The model codes cited above are for sets of four M10 bolts or two M6 bolts.  
 ○ A number of stack levels of "0" means that only a solenoid pilot operated directional control valve is used, with no stack valves. (Solenoid pilot operated directional control valves are provided with hexagon socket head cap bolts.)  
 ○ For four stack levels, use stud bolts.

## Stud bolt

The heights of 04 series stack valves are standardized at 85 mm for MF-04\*\* and at 70 mm for all the others. Select mounting bolts from section \*1 when one MF-04\*\* unit is included in the stack and from section \*2 when two units are included.

N: Number of stack levels	Lh: Stacked dimension (mm)	M10		M6		
		Mounting bolt model code	Stud bolt	Mounting bolt model code	Stud bolt	
	0	34	SB1040070	M10 × 70	SB0640055	M6 × 55
	1	104	SB1041140	M10 × 140	SB0641125	M6 × 125
	2	174	SB1042210	M10 × 210	SB0642195	M6 × 195
	3	244	SB1043280	M10 × 280	SB0643265	M6 × 265
	4	314	SB1044350	M10 × 350	SB0644335	M6 × 335
*1	1	119	SB1041155	M10 × 155	SB0641140	M6 × 140
	2	189	SB1042225	M10 × 225	SB0642210	M6 × 210
	3	259	SB1043295	M10 × 295	SB0643280	M6 × 280
	4	329	SB1044365	M10 × 365	SB0644350	M6 × 350
*2	2	204	SB1042240	M10 × 240	SB0642225	M6 × 225
	3	274	SB1043310	M10 × 310	SB0643295	M6 × 295

Note: ○ The model codes cited above are for sets of four M10 bolts or two M6 bolts.

○ A number of stack levels of "0" means that only a solenoid pilot operated directional control valve is used, with no stack valves stacked. (Solenoid pilot operated directional control valve is provided with hexagon socket head cap bolts.)

○ The strength classification of all stud bolts is 12.9.

○ When using M6 stud bolts, screw them at least 9 mm into the mounting face of the manifold block or other mount.

○ When using M10 stud bolts, screw them at least 15 mm into the mounting face of the manifold block or other mount.

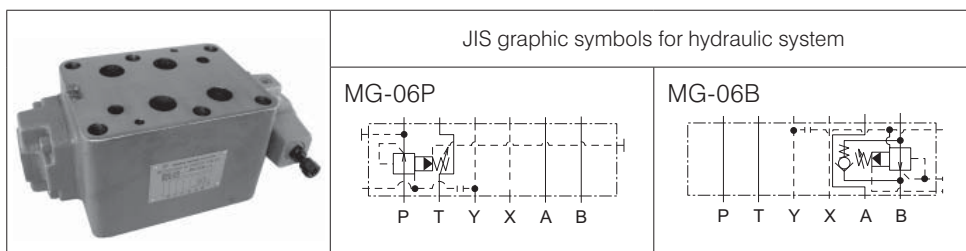
## Number of stack levels of stack valves and permissible operating pressure

Port						Permissible operating pressure MPa {kgf/cm <sup>2</sup> }			
P	A	B	T	X	Y	Number of stack levels			
						1	2	3	4
Pressure						19.6 {196}	19.6 {196}	19.6 {196}	14.6 {146}
Pressure					Open	24.5 {245}	24.5 {245}	24.5 {245}	18.3 {183}
Pressure			Open	Pressure	Open	28 {280}	28 {280}	27.4 {274}	20.5 {205}
Pressure		Open		Pressure	Open	35 {350}	35 {350}	34.3 {343}	24.5 {245}
Pressure	Open	Pressure	Open	Pressure	Open	35 {350}	35 {350}	34.3 {343}	24.5 {245}

## Maximum operating pressure of each port

Port	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }
T	21 {210}
X	25 {250}
Y	16 {160}

## 06 Series Stacking Type Reducing Valves



### Nomenclature

**MG** - **06** **※** - **※** - **11**

1                      2                      3                      4                      5

**1 Model No.**

MG: Modular stacking type reducing valve

**2 Nominal diameter**

06: ¾

**3 Control port**

P: Port P  
B: Port B

**4 Pressure adjustment range**

1: 0.8 to 7 MPa { 8 to 70 kgf/cm<sup>2</sup> }  
2: 3.5 to 14 MPa { 35 to 140 kgf/cm<sup>2</sup> }  
3: 10.5 to 21 MPa { 105 to 210 kgf/cm<sup>2</sup> }

**5 Design No.**

(The design No. is subject to change)

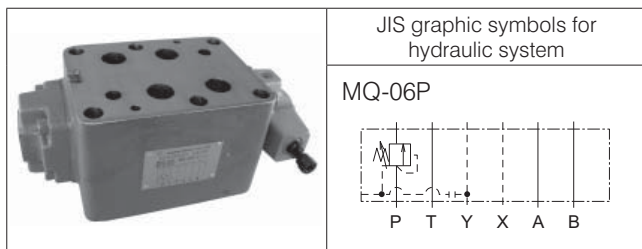
### Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg	Check valve cracking pressure MPa {kgf/cm <sup>2</sup> }	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution	
MG-06P-1-11	21 {210}	120	0.8 to 7 { 8 to 70 }	11.6	-	2.3 {23}/revolution	
MG-06P-2-11			3.5 to 14 { 35 to 140 }			3.9 {39}/revolution	
MG-06P-3-11			10.5 to 21 {105 to 210}			5.9 {59}/revolution	
MG-06B-1-11			0.8 to 7 { 8 to 70 }	13.3		0.05 {0.5}	2.3 {23}/revolution
MG-06B-2-11			3.5 to 14 { 35 to 140 }				3.9 {39}/revolution
MG-06B-3-11			10.5 to 21 {105 to 210}				5.9 {59}/revolution

### Handling

- Directly connect the drain piping to the tank without merging it with other tank piping.
  - To ensure good pressure reducing performance, set the primary side main circuit pressure and the secondary pressure reducing circuit pressure such that there is a minimum difference of 1 MPa {10 kgf/cm<sup>2</sup>}.
  - When using the valve in combination with a direct operated relief valve for remote control, connect the remote control valve to the vent port.
- Since excessive internal volume of the pilot piping may lead to vibration, use steel pipes with an inner diameter of 4 mm maximum and with thick walls for this piping.

## 06 Series Stacking Type Port P Sequence Valves



### Nomenclature

**MQ - 06 P - 2 ※ - 11**

1      2      3      4      5      6

**1 Model No.**

MQ: Modular stacking type pressure control valve

**2 Nominal diameter**

06: ¾

**3 Control port**

P: Port P

**4 Function code**

2: Sequence valve

**5 Pressure adjustment range**

A: 0.25 to 0.85 MPa { 2.5 to 8.5 kgf/cm<sup>2</sup> }  
 B: 0.5 to 1.75 MPa { 5 to 17.5 kgf/cm<sup>2</sup> }  
 C: 0.85 to 3.5 MPa { 8.5 to 35 kgf/cm<sup>2</sup> }  
 D: 1.75 to 7 MPa { 17.5 to 70 kgf/cm<sup>2</sup> }  
 E: 3.5 to 14 MPa { 35 to 140 kgf/cm<sup>2</sup> }

**6 Design No.**

(The design No. is subject to change)

### Specifications

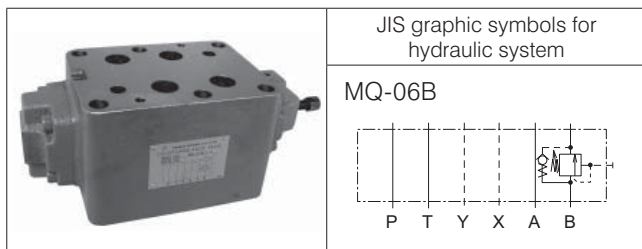
Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range *1 MPa {kgf/cm <sup>2</sup> }	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MQ-06P-2A-11	21 {210}	120	0.25 to 0.85 { 2.5 to 8.5 }	11	0.075 { 0.75 }/revolution
MQ-06P-2B-11			0.5 to 1.75 { 5 to 17.5 }		0.25 { 2.5 }/revolution
MQ-06P-2C-11			0.85 to 3.5 { 8.5 to 35 }		0.31 { 3.1 }/revolution
MQ-06P-2D-11			1.75 to 7 { 17.5 to 70 }		0.6 { 6 }/revolution
MQ-06P-2E-11			3.5 to 14 { 35 to 140 }		2 { 20 }/revolution

Note: \*1 The pressure adjustment ranges are indicated using cracking pressures.

### Handling

- Directly connect the drain piping to the tank without merging it with other tank piping.
- When connecting two or more of these valves for sequential operation, set the valve pressures such that there is a minimum difference of 1 MPa {10 kgf/cm<sup>2</sup>} between two valves.

## 06 Series Stacking Type Port B Counter Balance Valves



### Nomenclature

**MQ - 06 B - 1 ※ - 11**

**1 Model No.**

MQ: Modular stacking type counter balance valve

**2 Nominal diameter**

06: ¾

**3 Control port**

B: Port B

**4 Function code**

1: Counter balance valve

**5 Pressure adjustment range**

A: 0.25 to 0.85 MPa { 2.5 to 8.5 kgf/cm<sup>2</sup> }  
 B: 0.5 to 1.75 MPa { 5 to 17.5 kgf/cm<sup>2</sup> }  
 C: 0.85 to 3.5 MPa { 8.5 to 35 kgf/cm<sup>2</sup> }  
 D: 1.75 to 7 MPa { 17.5 to 70 kgf/cm<sup>2</sup> }  
 E: 3.5 to 14 MPa { 35 to 140 kgf/cm<sup>2</sup> }

**6 Design No.**

(The design No. is subject to change)

### Specifications

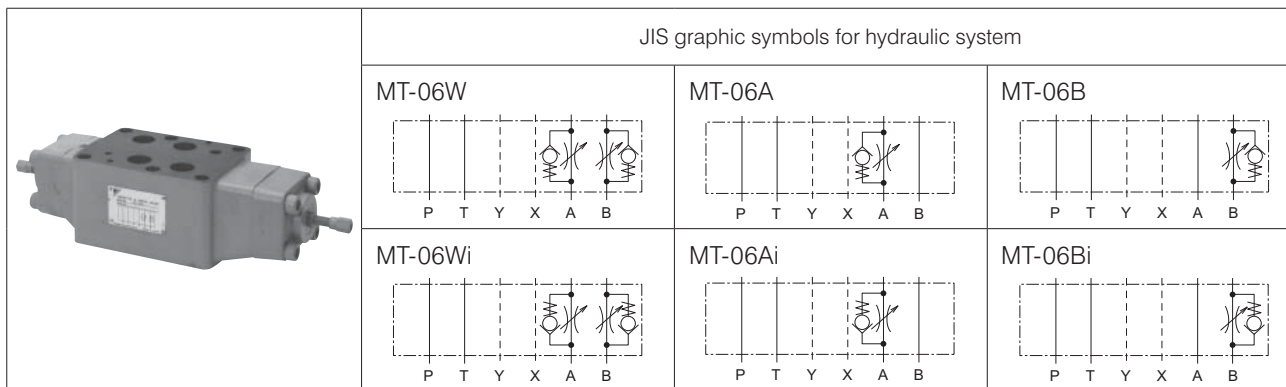
Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Pressure adjustment range *1 MPa {kgf/cm <sup>2</sup> }	Check valve cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg	Pressure change MPa {kgf/cm <sup>2</sup> } per screw revolution
MQ-06B-1A-11	21 {210}	120	0.25 to 0.85 { 2.5 to 8.5 }	0.05 {0.5}	12.8	0.075 { 0.75 }/revolution
MQ-06B-1B-11			0.5 to 1.75 { 5 to 17.5 }			0.25 { 2.5 }/revolution
MQ-06B-1C-11			0.85 to 3.5 { 8.5 to 35 }			0.31 { 3.1 }/revolution
MQ-06B-1D-11			1.75 to 7 { 17.5 to 70 }			0.6 { 6 }/revolution
MQ-06B-1E-11			3.5 to 14 { 35 to 140 }			2 { 20 }/revolution

Note: \*1 The pressure adjustment ranges are indicated using cracking pressures.

### Handling

- Since this valve is set as internal drain type, connect the secondary port of the valve directly to the tank.

## 06 Series Stacking Type Port A/B Throttle Valves



### Nomenclature



**1 Applicable fluid code**

No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
 F: Phosphate ester hydraulic fluid

**2 Model No.**

MT: Modular stacking type throttle valve

**3 Nominal diameter**

06:  $\frac{3}{4}$

**4 Control port**

W: Port A/B  
 A: Port A  
 B: Port B

**5 Control method**

No designation: Meter-out control  
 i: Meter-in control

**6 Design No.**

(The design No. is subject to change)

### Specifications

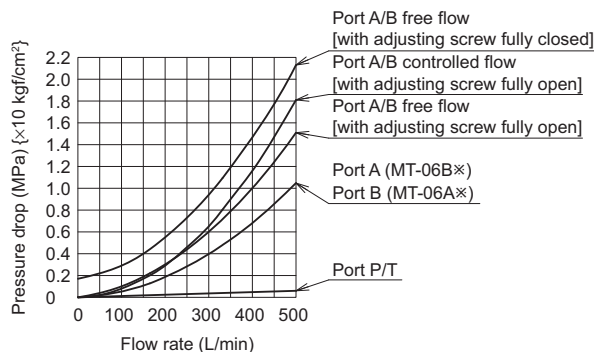
Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Check valve cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg
MT-06※※-20	31.5 {315}	500	0.15 {1.5}	13.6

### Handling

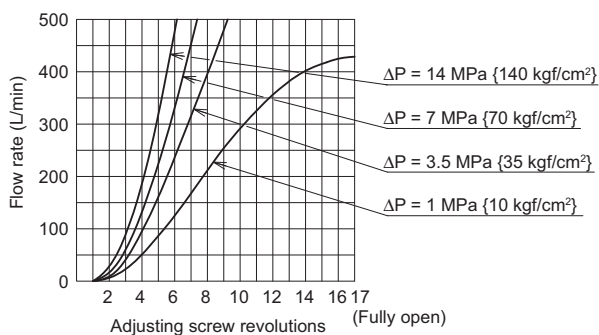
- The flow rate will not be zero even if the flow rate adjusting screw is fully tightened.

### Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

Pressure drop characteristics

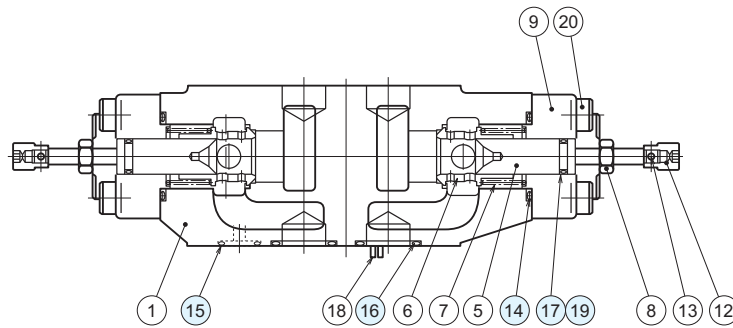


Adjusting screw revolution - Flow rate characteristics



## Sectional structural diagram

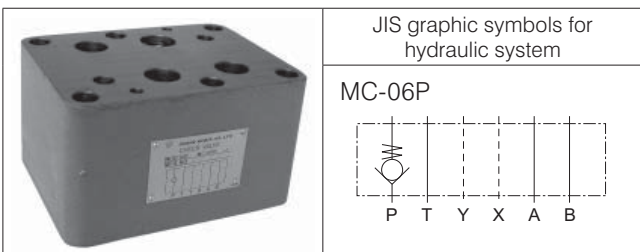
MT-06W



Sealing part table

Part No.	Name	Quantity	Part specifications
14	O-ring	4	JIS B 2401 1BP44
15	O-ring	2	JIS B 2401 1BP20
16	O-ring	4	JIS B 2401 1BP28
17	O-ring	2	JIS B 2401 1BP16
19	Backup ring	2	JIS B 2407 Bias cut P16

# 06 Series Stacking Type Port P Check Valves



## Nomenclature

**MC - 06 × - ×× - 10**

1      2      3      4      5

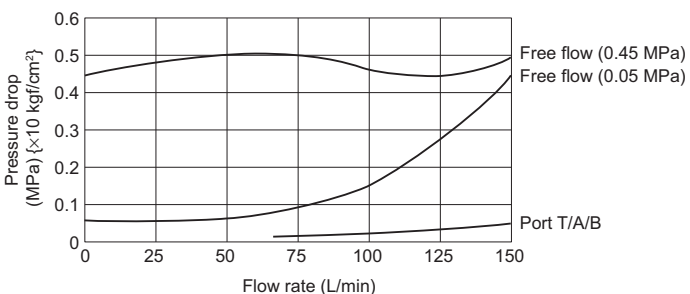
- 1 Model No.**  
MC: Modular stacking type check valve
- 2 Nominal diameter**  
06: 3/4
- 3 Control port**  
P: Port P  
T: Port T
- 4 Cracking pressure code**  
05: 0.05 MPa {0.5 kgf/cm<sup>2</sup>}  
45: 0.45 MPa {4.5 kgf/cm<sup>2</sup>} (Applicable only to control port code P)
- 5 Design No.**  
**(The design No. is subject to change)**

## Specifications

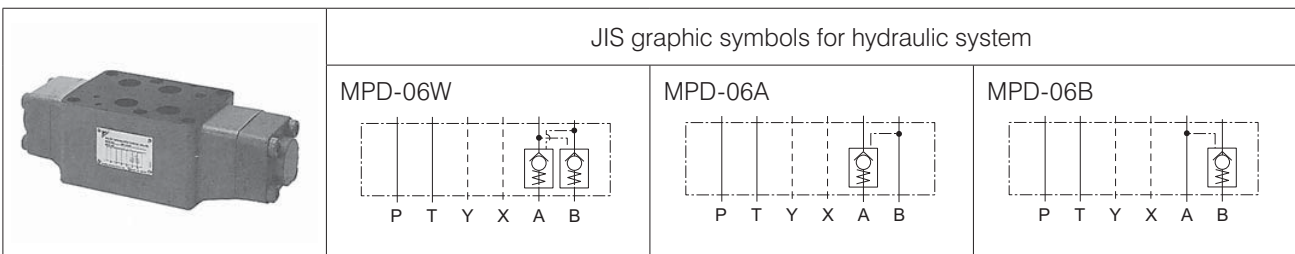
Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Check valve Cracking pressure MPa {kgf/cm <sup>2</sup> }	Mass kg
MC-06P-05-11	21 {210}	120	0.05 {0.5}	10.5
MC-06P-45-11			0.45 {4.5}	

## Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

Pressure drop characteristics



# 06 Series Stacking Type Pilot Operated Check Valves



## Nomenclature



- 1 Applicable fluid code**  
No designation: Petroleum-based hydraulic fluid, water-glycol hydraulic fluid  
F: Phosphate ester hydraulic fluid
- 2 Model No.**  
MP: Modular stacking type pilot operated check valve
- 3 Decompression code**  
D: Decompression type
- 4 Nominal diameter**  
06: 3/4"

- 5 Control port**  
W: Port A/B  
A: Port A  
B: Port B
- 6 Cracking pressure code**  
20: 0.2 MPa {2 kgf/cm<sup>2</sup>}  
50: 0.5 MPa {5 kgf/cm<sup>2</sup>}
- 7 Design No.**  
**(The design No. is subject to change)**

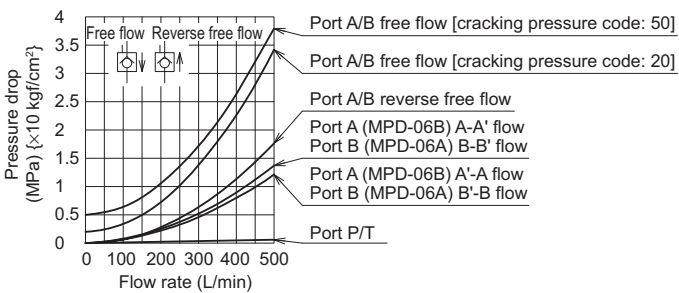
## Specifications

Model code	Maximum operating pressure MPa {kgf/cm <sup>2</sup> }	Maximum flow rate L/min	Cracking pressure MPa {kgf/cm <sup>2</sup> }	Area ratio *1	Mass kg
MPD-06※-20-20	31.5 {315}	500	0.2 {2}	(1) 2.0:1 (2) 15.2:1	13.6
MPD-06※-50-20			0.5 {5}		

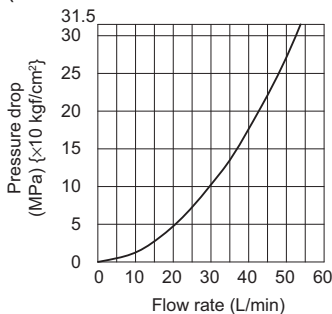
Note: \*1 Area ratio (1) Pilot piston: Large check valve  
(2) Pilot piston: Small check valve

## Performance curves (viscosity: 32 mm<sup>2</sup>/s {cSt})

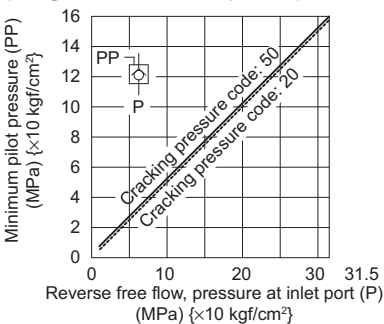
Pressure drop characteristics



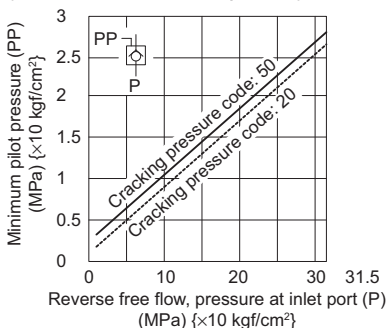
Pressure drop characteristics (with the small check valve fully open)



Pilot pressure characteristics (Large check valve: piston)



Pilot pressure characteristics (Small check valve: piston)



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