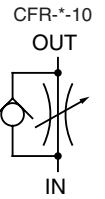




Throttle (and Check) Valve

190 ℓ /min
21MPa



Features

- ① Compact and lightweight, requires very little space for installation.
- ② Special needle valve configuration provides smooth flow rate control.
- ③ Pressure is internally balanced for light handle operation, even at high pressure.

Specifications

Model No.		Nominal Diameter (Size)	Maximum Flow Rate ℓ /min	Cracking pressure MPa{kgf/cm ² }	Maximum Working Pressure MPa{kgf/cm ² }	Weight kg	
Screw Mounting	Gasket Mounting					T Type	G Type
(C)FR-T03-10	(C)FR-G03-10	3/8	30	0.15{1.5}	21{214}	1.3	1.7
(C)FR-T06-10	(C)FR-G06-10	3/4	75	0.1{1.0}		3.0	3.7
(C)FR-T10-10	(C)FR-G10-10	1 1/4	190			5.6	5.8

● Handling

- 1 The control flow rate is increased by counter clockwise (leftward) rotation of the flow rate control handle.
- 2 The control flow rate does not become zero even if the handle is fully turned.
- 3 There is no pressure or temperature compensation mechanism.
- 4 Bi-directional restriction is possible when there is no check valve.
- 5 Use the table to the right for specification when a sub plate is required.
- 6 See the table to the right for installation hex socket bolts. However, bolts are not included for a screw mounting type.

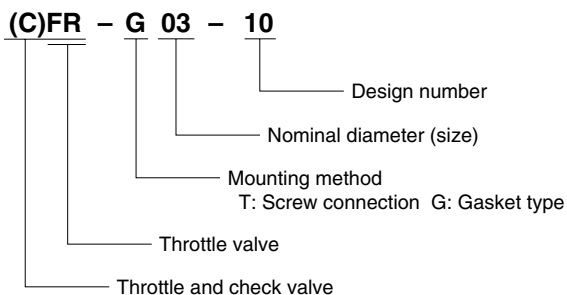
Applicable Pump Model	Bolt Size	Q'ty	Tightening Torque m{kgf·cm}
(C)FR-G03-10	M8 × 65 ℓ	4	20 to 25{ 205 to 255}
(C)FR-G06-10	M12 × 75 ℓ	4	75 to 95{ 765 to 969}
(C)FR-G10-10	M14 × 90 ℓ	4	120 to 150{1220 to 1530}

Note)For mounting bolts, use 12T or equivalent.

● Sub Plate

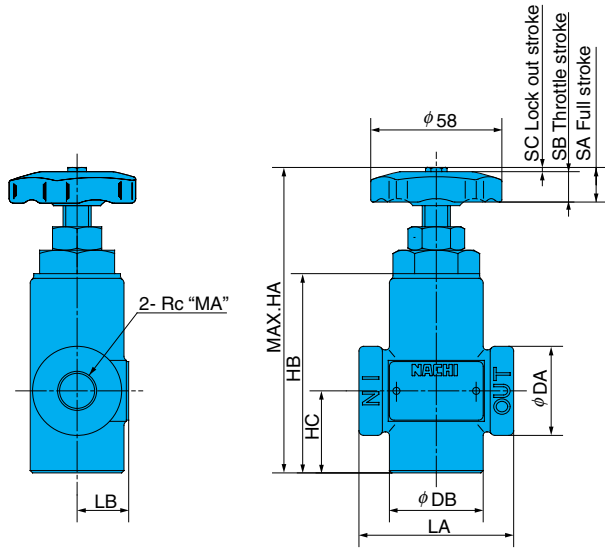
Model No.	Pipe Diameter	Recommended Flow Rate ℓ /min	Weight kg	Applicable Valve Type
MFR-03-10	3/8	30	1.0	(C)FR-G03-10
MFR-06-10	3/4	75	2.2	(C)FR-G06-10
MFR-10-10	1 1/4	190	4.1	(C)FR-G10-10

Understanding Model Numbers



Installation Dimension Drawings

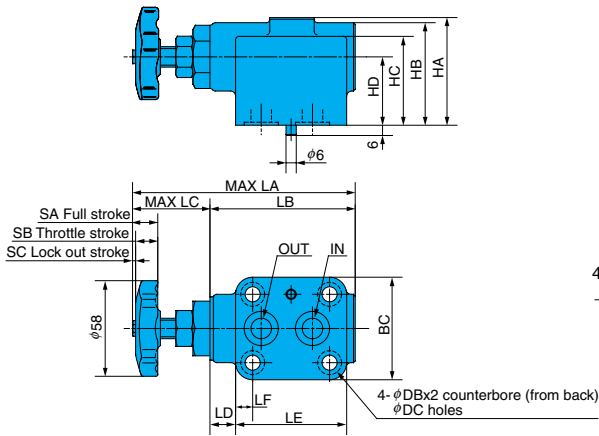
(C)FR-T**-10 (Screw Mounting)



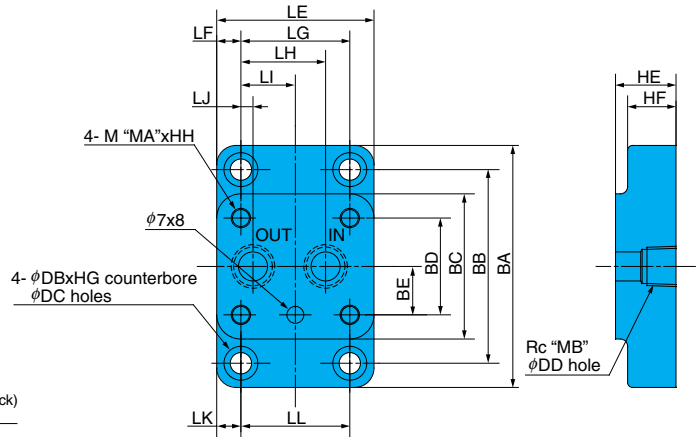
Model No.	LA	LB	DA	DB
(C)FR-T03-10	66	21.5	38	40
(C)FR-T06-10	95	30.5	55	55
(C)FR-T10-10	130	38.5	74	70

HA	HB	HC	SA	SB	SC	MA
130.5	85	35	7	6	1	3/8
175.5	123	55	10	9	1	3/4
206.5	150	70	14	12	2	1 1/4

(C)FR-G**-10 (Gasket Mounting)



Sub Plate MFR**-10



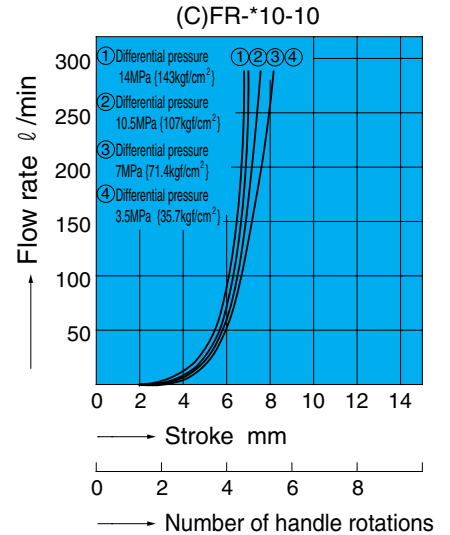
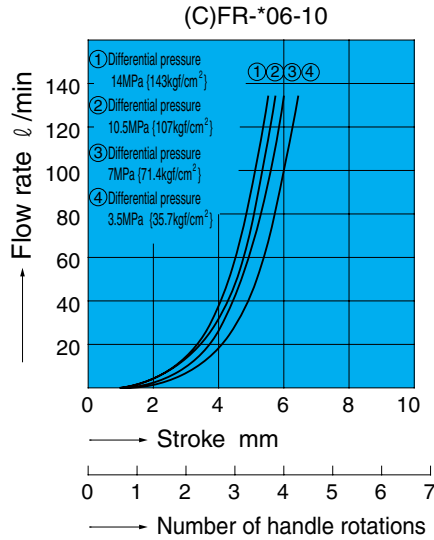
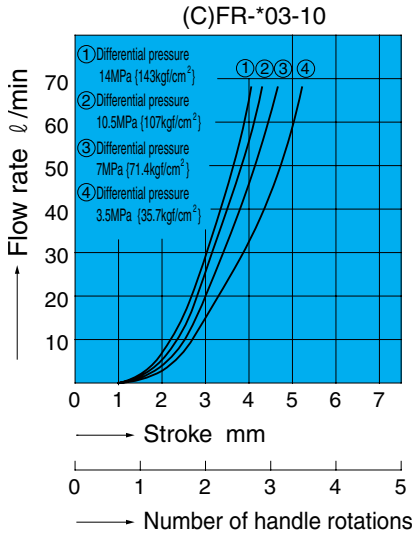
DB	DC	DD	MA	MB	SA	SB	SC
14	8.8	12	8	3/8	7	6	1
20	13	20	12	3/4	10	9	1
23	15	30	14	1 1/4	14	12	2

Model Number	LA	LB	LC	LD	LE	LF	LG	LH	LI	LJ	LK	LL	BA	BB	BC	BD	BE	HA	HB	HC	HD	HE	HF	HG	HH
(C)FR-G03-10	130.5	85	45	15	65	10	45	35	22.5	5	10	45	100	80	60	40	20	63	60	52	40	25	20	8.6	18
(C)FR-G06-10	175.5	123	52	14	96	13	70	55	35	15	14	68	132	106	80	54	27	71	68	57	40	30	25	13	20
(C)FR-G10-10	206.5	150	56	14	120	15	90	72.5	45	17.5	16	88	154	122	90	60	30	83	80	68	45	40	35	15.2	25

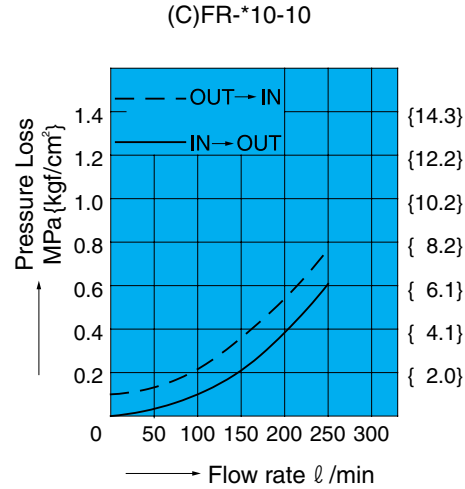
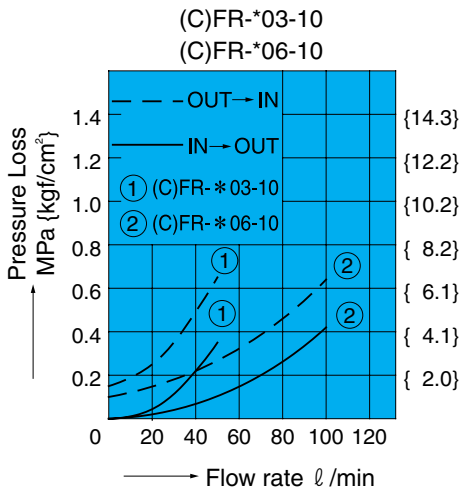
Performance Curves

Hydraulic Operating Fluid Viscosity 32mm²/s

Stroke – Flow Rate Characteristics

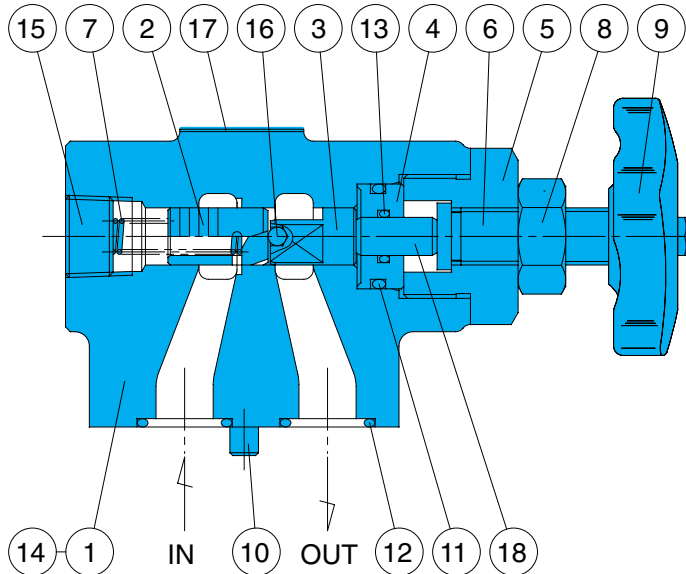


Pressure Loss Characteristics



Cross-sectional Drawing

CFR-G**-10



Part No.	Part Name
1	Body
2	Poppet
3	Piston
4	Bracket
5	Stopper
6	Screw
7	Spring
8	Nut
9	Handle
10	Pin
11	O-ring
12	O-ring
13	O-ring
14	Plug
15	Plug
16	Ball
17	Plate
18	Rod

Seal Part List (Kit Model Number FSS-***)

Part No.	Part Name	CFR-G03-10		CFR-G06-10		CFR-G10-10	
		Part Number	Q'ty	Part Number	Q'ty	Part Number	Q'ty
11	O-ring	IB-P18	1	IB-G25	1	IB-G25	1
12	O-ring	IB-P16	2	IB-G25	2	IB-G35	2
13	O-ring	IB-P8	1	IB-P8	1	IB-P8	1

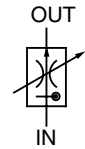
Note) O-ring 1B-** refers to JIS B2401-1B-**. *** in the kit number is used for specification of the valve size (G03, T06, etc.)



Flow Control Valve



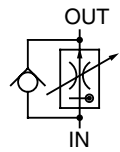
FT-G0*-**-22



FT Type Flow Control (and Check) Valve (With Pressure and Temperature Compensation)

0.05 to 106 ℓ /min
21MPa

CFT-G02*-**-22



Features

- ① Pressure compensation and temperature compensation mechanisms provide a stable control flow rate, even when fluid temperature fluctuates.
- ② A wider control flow rate range as well as easier minute flow rate adjustability than previous products.

Specifications

Model No.	Nominal Diameter (Size)	Volume control flow rate ℓ /min	Maximum Working Pressure MPa{kgf/cm ² }	Reverse Flow Rate ℓ /min	Cracking pressure MPa{kgf/cm ² }	Weight kg	Gasket Surface Dimensions
(C)FT-G02-8-22 30-22	1/4	0.05 to 8 0.1 to 30	21{214}	50	0.1{1.0}	3.7	ISO 6263-AK-06-2-A
FT-G03-42-22 106-22	3/8	0.1 to 42 0.2 to 106		*120		7.9	ISO 6263-AM-07-2-A

Asterisk (*) indicates values for auxiliary plate with check valve.

● Handling

- ① In the temperature range of 20°C to 60°C, flow rate fluctuation is within ±5% of the standard flow rate at 40°C.
- ② In the pressure range of 1.0 to 21MPa {10.2 to 214kgf/cm²}, flow rate fluctuation is within ±5% of the setting flow rate.
- ③ Note that flow rate fluctuation exceeds the rated fluctuation amount slightly in the vicinity of the minimum control flow rate, due to changes in operating temperature and hydraulic fluid viscosity.
- ④ When controlling flow rates that are less than 0.2 ℓ /min, use with a filter that does not exceed 10μm.
- ⑤ For flow rate control, make sure that the pressure differential between the input port and output port is at least 1MPa {10.2kgf/cm²}.
- ⑥ The control flow rate is increased by clockwise (rightward) rotation of the control handle.

⑦ See the table below for installation hex socket bolts.

⑧ Use the following table for specification when a sub plate is required.

● Sub Plate and Auxiliary Plate Application Table

Name	Model No.	Pipe Diameter	Recommended Flow Rate ℓ /min	Weight kg	Applicable Valve Type	Use With Sub Plate		
Sub Plate	MF-02X-10	3/8	30	2.2	(C)FT-G02*-**-22	-		
	MF-02Y-20	1/2	50					
Sub Plate	MF-03-10	3/8	42	3.3	FT-G03*-**-22	-		
	MF-03Y-20	3/4	75					
	MF-03Z-20	1	120					
Sub Plate with Check Valve	MF-03Y-C-22	3/4	75	5.7				
	MF-03Z-C-22	1	120	5.6				
Auxiliary Plate A with Check Valve	MCF-03-A-22	φ23	120	3.2				MF-03*-**

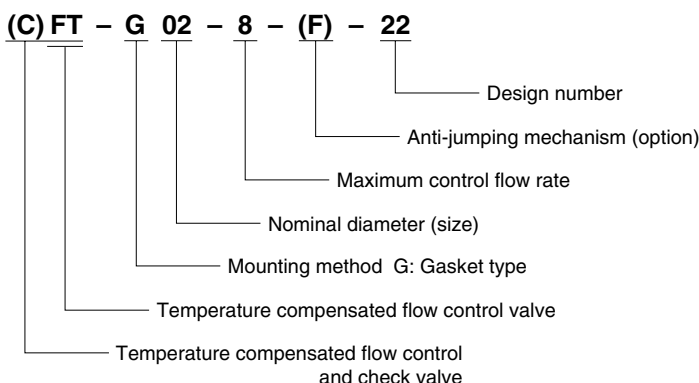
⑨ Though FT-G03 does not have a built-in check valve, a sub plate with check valve and auxiliary plate with check valve is used

in addition to the normal sub-plate. (Use the auxiliary plate in combination with the sub plate.)

Applicable Model	Bolt Size	Q'ty	Tightening Torque N·m{kgf·cm}
(G)FT-G02*-**-22	M8 × 55 ℓ	4	20 to 25{205 to 255}
FT-G03*-**-22	M10 × 75 ℓ	4	45 to 55{460 to 560}
With FT-G03 Auxiliary Plate	M10 × 110 ℓ	4	45 to 55{460 to 560}

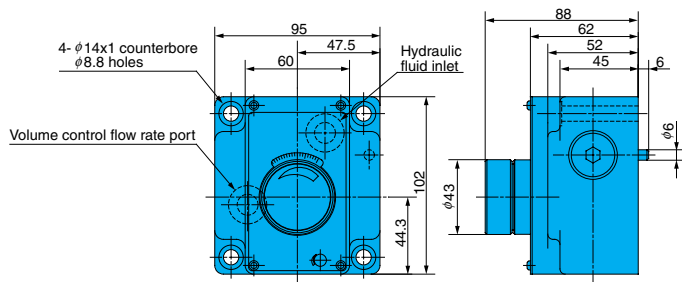
Note)For mounting bolts, use 12T or equivalent.

Understanding Model Numbers

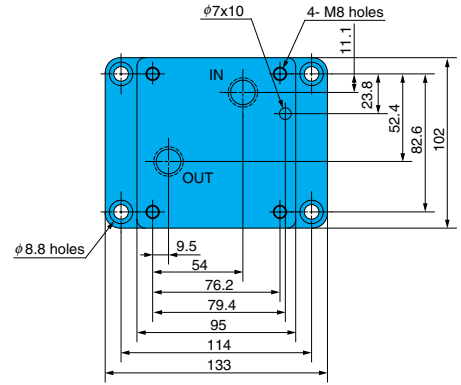


Installation Dimension Drawings

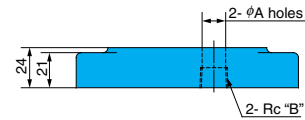
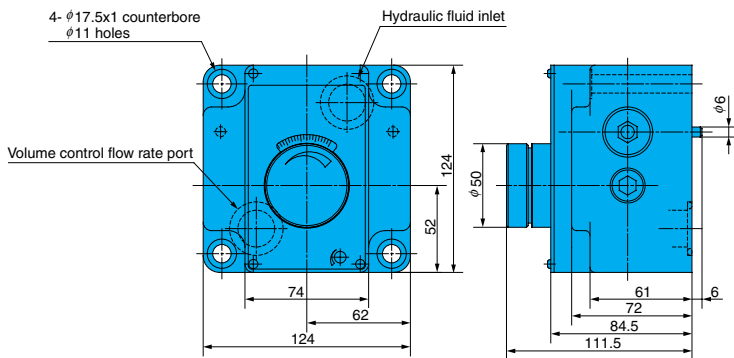
(C)FT-G02-**-22



Sub Plate MF-02*-*



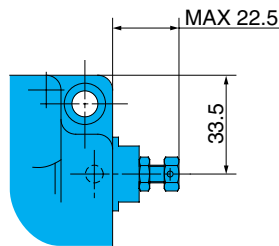
FT-G03-***-22



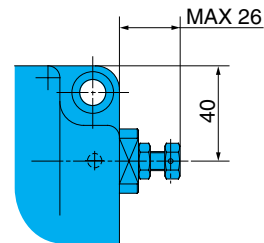
Sub Plate	A	B
MF-02X-10	14.7	3/8
MF-02Y-20	17	1/2

Anti-jumping mechanism

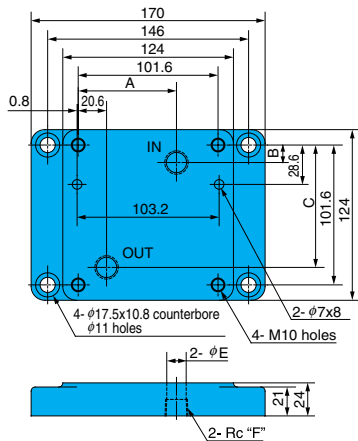
(C)FT-G02-**-F-22



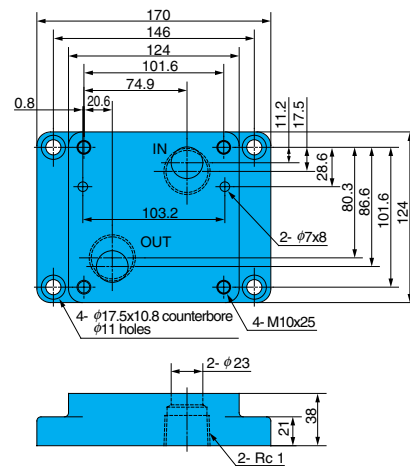
(C)FT-G03-**-F-22



Sub Plate MF-03-10
MF-03Y-20

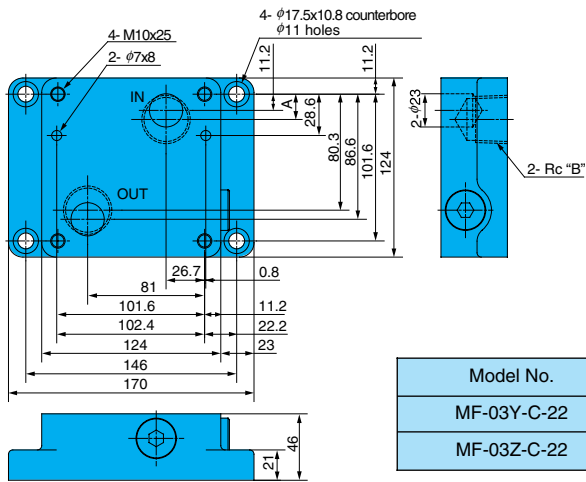


MF-03Z-20

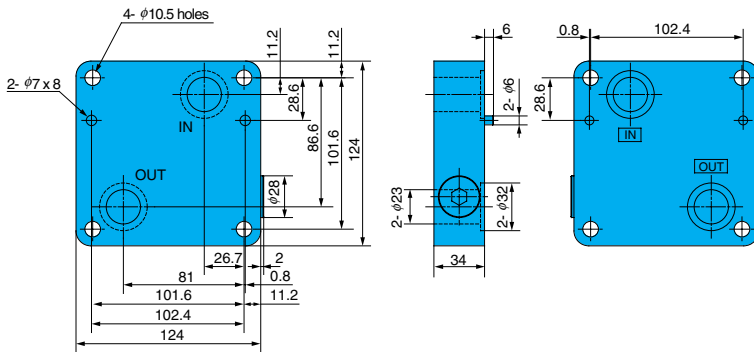


Sub Plate	A	B	C	E	F
MF-03-10	71.4	12.7	88.9	14.7	3/8
MF-03Y-20	74.9	11.2	86.6	23.0	3/4

Sub Plate with Check Valve MF-03*-C-22



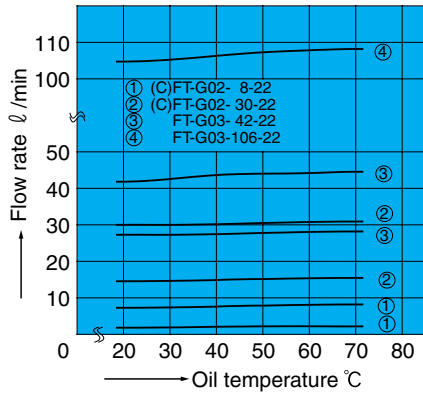
Auxiliary Plate with Check Valve MCF-03-A-22



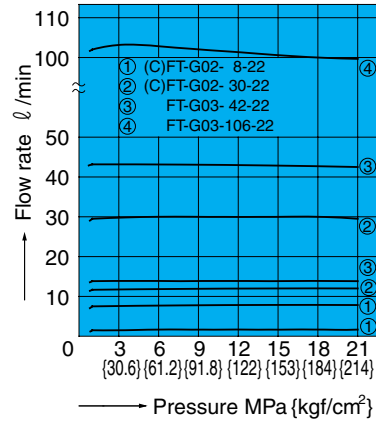
Performance Curves

Hydraulic Operating Fluid Viscosity 32mm²/s

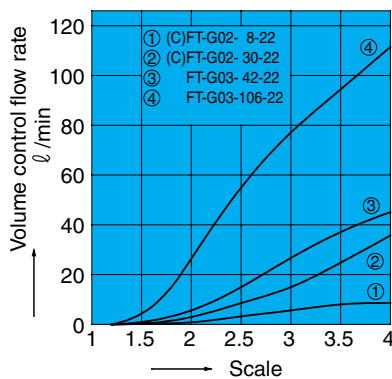
Fluid Temperature – Control Flow Rate Characteristics



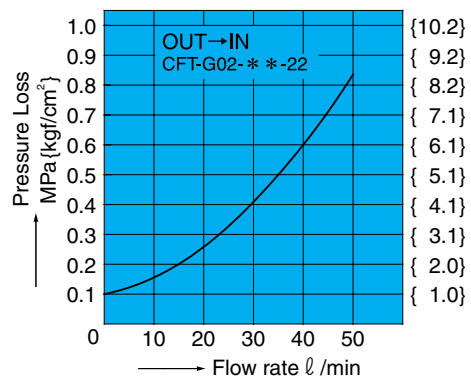
Pressure – Control Flow Rate Characteristics



Scale – Control Flow Rate Characteristics



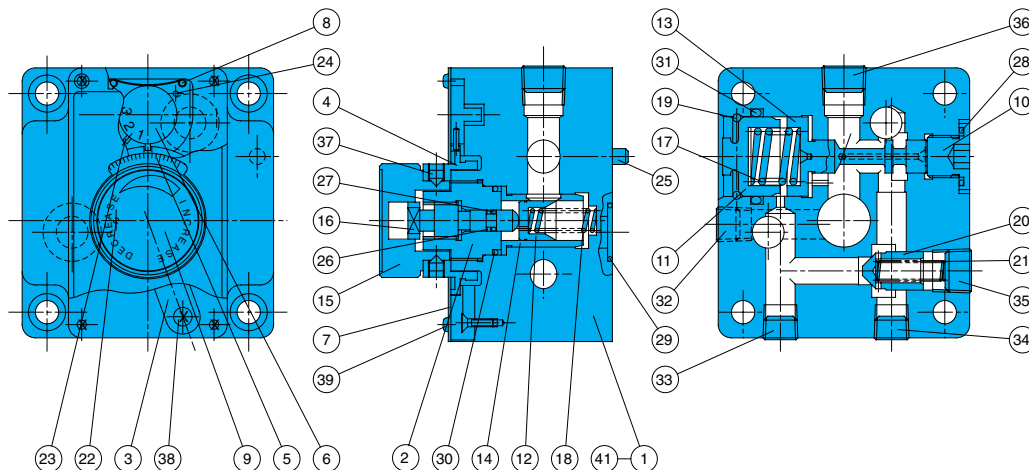
Pressure Loss Characteristics



Cross-sectional Drawing

Note) O-ring 1A/B-** refers to JIS B2401-1A/B.

CFT-G02-*-22



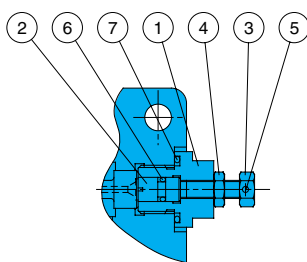
Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
1	Body	15	Knob	29	O-ring
2	Retainer	16	Screw	30	O-ring
3	Stopper	17	Spring	31	O-ring
4	Dial	18	Spring	32	Plug
5	Plate	19	Snap ring	33	Plug
6	Plate	20	Poppet	34	Plug
7	Plate	21	Spring	35	Plug
8	Spring	22	Pin	36	Plug
9	Plate	23	Pin	37	Screw
10	Plug	24	Pin	38	Screw
11	Plug	25	Pin	39	Screw
12	Throttle	26	Backup ring	40	Washer
13	Piston	27	O-ring	41	O-ring
14	Sleeve	28	O-ring		

Seal Part List (Kit Model Number FBBS-***)

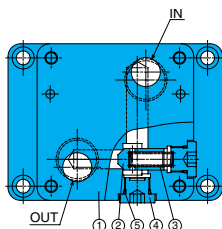
Part No.	Part Name	(C)FT-G02-*-22		FT-G03-*-22	
		Part Number	Q'ty	Part Number	Q'ty
26	Backup ring	T2-P5	1	T2-P5	1
27	O-ring	IB-P5	1	IB-P5	1
28	O-ring	IB-P18	1	IB-P20	1
29	O-ring	IB-P18	2	IB-P26	2
30	O-ring	IB-P22	1	IB-P26	1
31	O-ring	IB-P30	1	IB-P38	1
41	O-ring	-	-	IB-P20	1
Seal Kit Number		FBBS-G02-1A		FBBS-G03	

Note) 1.O-ring 1B-** refers to JIS B2401-1B-**. 2.Backup ring indicates JIS B2407-T2**.

Anti-jumping mechanism (C)FT-G02-*-F-22



Sub Plate MF-03*-C-22

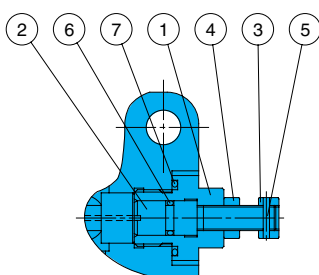


Part No.	Part Name	Part No.	Part Name
1	Sub Plate	4	Plug
2	Poppet	5	O-ring
3	Spring		

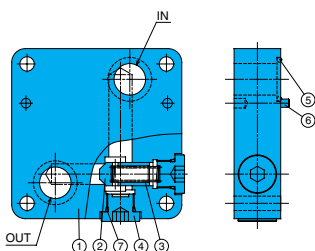
List of Sealing Parts

Part No.	Part Name	Part Number	Q'ty
5	O-ring	1B-P18	2

(C)FT-G03-*-22



MCF-03-A-22



Part No.	Part Name
1	Sub Plate
2	Poppet
3	Spring
4	Plug
5	O-ring
6	Pin
7	O-ring
8	Screw

List of Sealing Parts

Part No.	Part Name	Part Number	Q'ty
5	O-ring	1B-P26	2
7	O-ring	1B-P18	2

Anti-jumping mechanism

Part No.	Part Name
1	Retainer
2	Bolt
3	Nut
4	Nut
5	Spring pin
6	O-ring
7	O-ring

List of Sealing Parts

Part No.	Part Name	(C)FT-G02-*-22		FT-G03-*-22	
		Part Number	Q'ty	Part Number	Q'ty
6	O-ring	IB-P5	1	IB-P8	1
7	O-ring	IB-P18	1	IB-P20	1

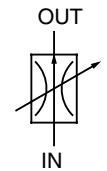
Note) 1.O-ring 1B-** refers to JIS B2401-1B-**. 2.#7 O-ring and #29 O-ring are interchangeable.



Flow Control Valve



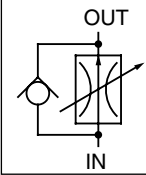
F-G***-20



F Type Flow Control (and Check) Valve (With Pressure Compensation)

9 to 373 ℓ /min
21MPa

CF-G***-20



Features

- ① Wide control flow rate range. there is pressure fluctuation.
- ② A pressure compensation mechanism ensures that the control flow rate does not change, even when

Specifications

Model No.	Nominal Diameter (Size)	Volume control flow rate ℓ /min	Maximum Working Pressure MPa{kgf/cm ² }	Cracking pressure MPa{kgf/cm ² }	Weight kg	Gasket Surface Dimensions
(C)F-G06-170-20	3/4	9 to 170	21{214}	0.1{1.0}	20.5	ISO 6263-AP-08-2-A
(C)F-G10-373-20	1 1/4	20 to 373			43.1	-

● Handling

- ① In the pressure range of 1.0 to 21MPa {10.2 to 214kgf/cm²}, flow rate fluctuation is within ±5% of the setting flow rate.
- ② For flow rate control, make sure that the pressure differential between the input port and output port is at least 1MPa {10.2kgf/cm²}.
- ③ The control flow rate is increased by clockwise (rightward) rotation of the control handle.

④ See the table below for installation hex socket bolts.

⑤ Use the following table for specification when a sub plate is required.

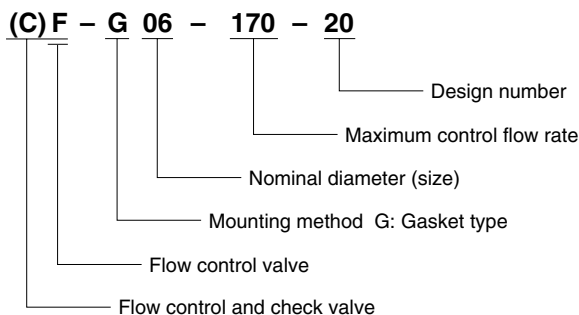
Sub Plate Application Table

Model No.	Pipe Diameter	Recommended Flow Rate ℓ /min	Weight kg	Applicable Valve Type
MF-06-10	3/4	106	6.3	(C)F-G06-170-20
MF-06X-20	1	170	9.7	
MF-10-10	1 1/4	246	21.1	(C)F-G10-373-20
MF-10X-20	1	170	9.7	
MF-10X-20	1	170	9.7	

Applicable Model	Bolt Size	Q'ty	Tightening Torque N·m{kgf·cm}
(C)F-G06	M16 × 100 ℓ	4	190 to 235{1940 to 2400}
(C)F-G10	M20 × 115 ℓ	4	370 to 460{3770 to 4690}

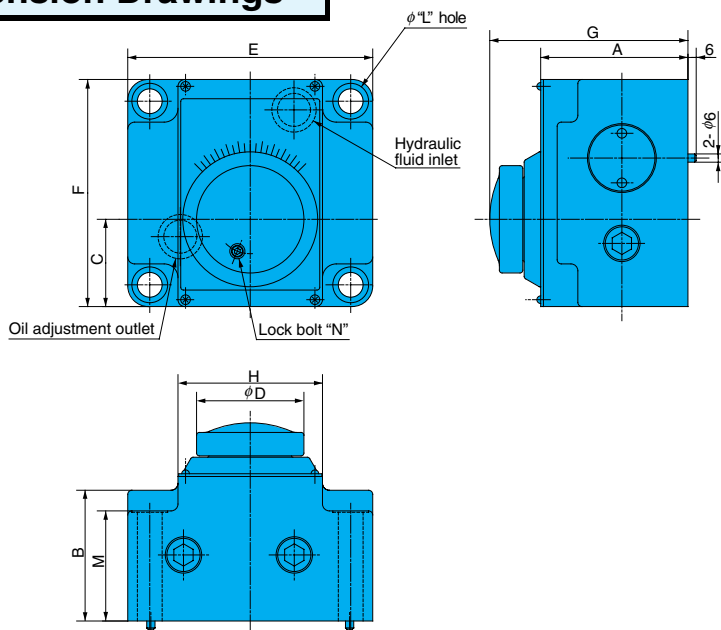
Note) For mounting bolts, use 12T or equivalent.

Understanding Model Numbers



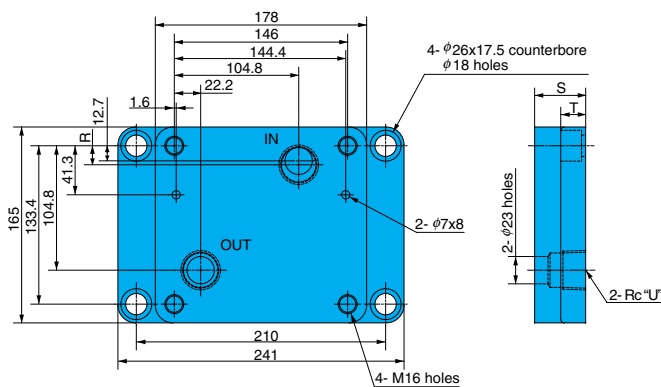
Installation Dimension Drawings

(C)F-G**-*-20



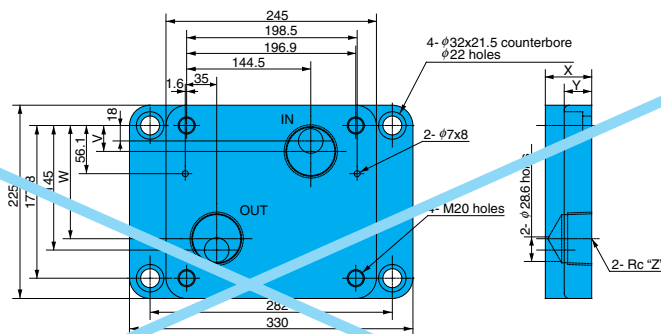
Model No.	Dimensions mm												
	A	B	C	D	E	F	G	H	J	K	L	M	N
(C)F-G06-*-20	107	95	63.4	80	178	165	144.5	105	26	1	18	80	M5
(C)F-G10-*-20	124	108	81.8	90	245	225	169.5	140	32	1	22	89	M6

Sub Plate MF-06*-20



Sub Plate	Dimensions mm			
	R	S	T	U
MF-06-20	12.7	25	22	3/4
MF-06X-20	16	43	21	1

~~Sub Plate MF-10*-**~~



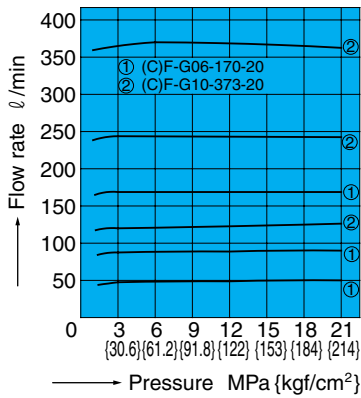
Sub Plate	Dimensions mm				
	V	W	X	Y	Z
MF-10-10	18	145	46	40	1/4
MF-10X-20	24	145	54	32	1/4
MF-10Y-20	30.2	131.8	54	32	2



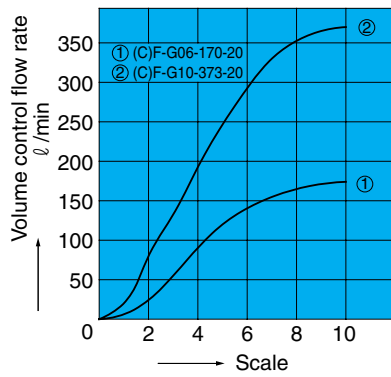
Performance Curves

Hydraulic Operating Fluid Viscosity 32mm²/s

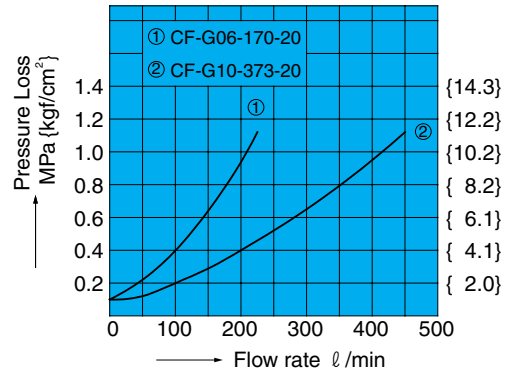
Pressure – Control Flow Rate Characteristics



Scale – Control Flow Rate Characteristics

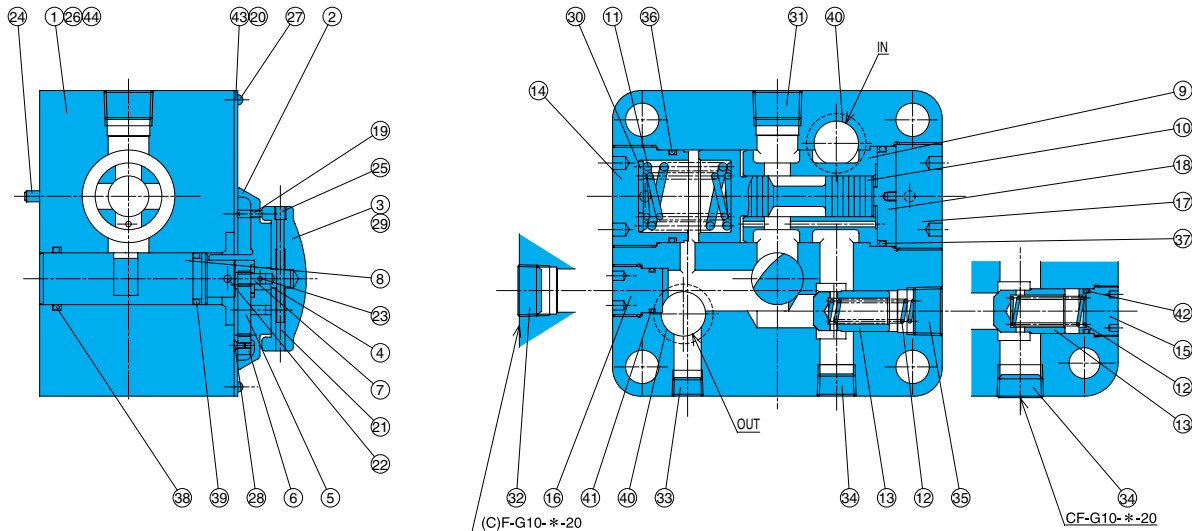


Pressure Loss Characteristics



Cross-sectional Drawing

CF-G**-**-20

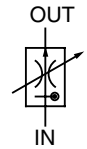


Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
1	Body	16	Plug	31	Plug
2	Cover	17	Plug	32	Plug
3	Knob	18	Retainer	33	Plug
4	Gear	19	Stopper	34	Plug
5	Gea	20	Pin	35	Plug
6	Gear	21	Pin	36	O-ring
7	Bushing	22	Pin	37	O-ring
8	Throttle	23	Pin	38	O-ring
9	Sleeve	24	Pin	39	O-ring
10	Piston	25	Screw	40	O-ring
11	Spring	26	Screw	41	O-ring
12	Spring	27	Screw	42	O-ring
13	Poppet	28	Screw	43	Plate
14	Plug	29	Screw	44	Screw
15	Plug	30	Washer		

Seal Part List (Kit Model Number FBBS-***)

Part No.	Part Name	CF-G06-170-20		CF-G10-373-20	
		Part Number	Q'ty	Part Number	Q'ty
36	O-ring	IB-G45	1	IB-G60	1
37	O-ring	IB-P48	1	IB-G65	1
38	O-ring	IB-P28	1	IB-P45	1
39	O-ring	IB-P22A	1	IB-P39	1
40	O-ring	IB-P29	2	IB-P32	2
41	O-ring	IB-P20	1	-	-
42	O-ring	-	-	IB-P26	1

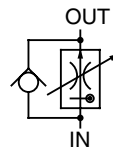
Note) O-ring 1B-** refers to JIS B2401-1B-**. For the *** part of the kit number, specify the valve size (G06, G10).



TN Type Flow Control (and Check) Valve

0.03 to 8 ℓ /min
10.5MPa

(Fine Adjustment Type With Pressure and Temperature Compensation)



Features

- ① With a very compact, lightweight configuration, the intelligent design of this valve makes it a low-cost option.
- ② Minute flow rate control from 30cm³.
- ③ Stable control of each setting flow rate, even as pressure and fluid temperature are fluctuating.
- ④ Dial markings are proportional to flow rate for simple and accurate control flow rate adjustment.

Specifications

Model No.	Nominal Diameter (Size)	Volume control flow rate ℓ /min	Maximum Working Pressure MPa{kgf/cm ² }	Reverse Flow Rate ℓ /min	Cracking pressure MPa{kgf/cm ² }	Weight kg
(C)TN-G02-2-11 8-11	1/4	0.03 to 2 0.05 to 8	10.5{107}	35	0.1{1.0}	2.2

● Handling

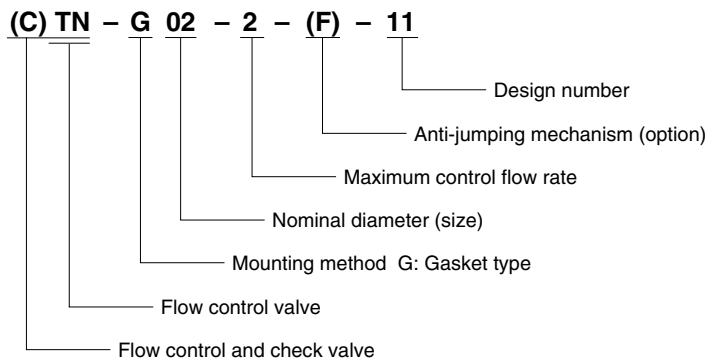
- ① In the temperature range of 20°C to 60°C, flow rate fluctuation is within ±5% of the standard flow rate at 40°C.
- ② In the pressure range of 1.0 to 10.5MPa {10.2 to 107kgf/cm²}, flow rate fluctuation is within ±5% of the setting flow rate.
- ③ Note that flow rate fluctuation exceeds the rated flow rate fluctuation amount slightly in the vicinity of the minimum control flow rate, due to changes in operating temperature and hydraulic fluid viscosity.
- ④ When controlling flow rates that are less than 0.2 ℓ /min, use with a filter that does not exceed 10μm.
- ⑤ Make sure that the pressure differential between the inlet port and outlet is at least 0.6MPa {6.1kgf/cm²} at 4 ℓ /min or less, and at least 1.0MPa {10.2kgf/cm²} at 4 ℓ /min or greater.
- ⑥ The control flow rate is increased by clockwise (rightward) rotation of the adjustment handle.
- ⑦ For connection to piping, normally connect to the sub plate. Valve mounting is gasket type, using an O-ring. When a screw in connection is required, seal the gasket surface, remove the side plug, and create a screw in connection directly to the valve unit. In this case, remove all seal material affixed to the plug.
- ⑧ Use the following table for specification when a sub plate is required.

Model No	Pipe Diameter	Recommended Flow Rate ℓ /min	Weight kg
MTL-03-10	3/8	35	1.3

⑨ Bundled Accessories: Hex Socket Bolts M8 x 60 ℓ , (four)

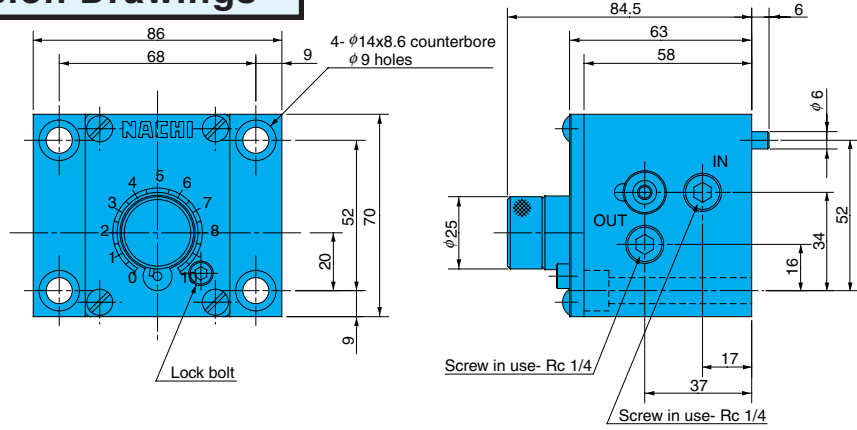
Note) 1.For mounting bolts, use 12T or equivalent.
2.Tightening torque is 20 to 25N·m {205 to 255kgf·cm}.

Understanding Model Numbers

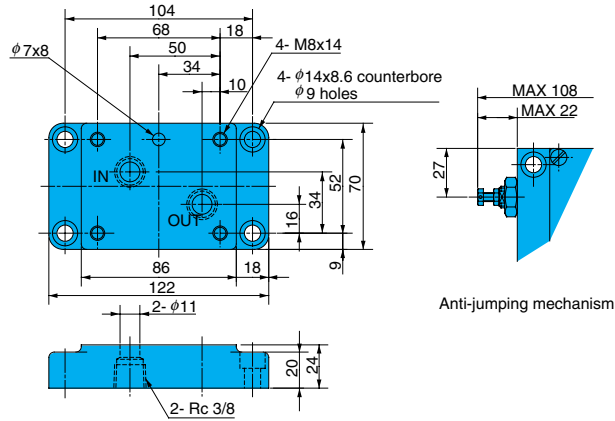


Installation Dimension Drawings

(C)TN-G02-**-11



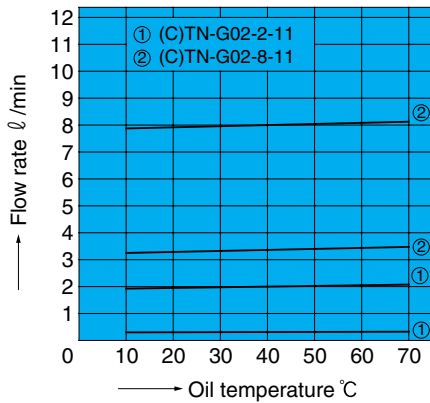
Sub Plate MTL-03-10



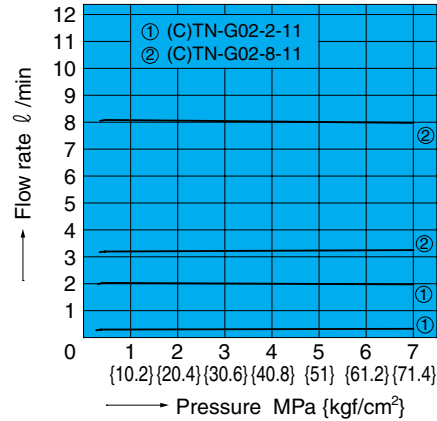
Performance Curves

Hydraulic Operating Fluid Viscosity 32mm²/s

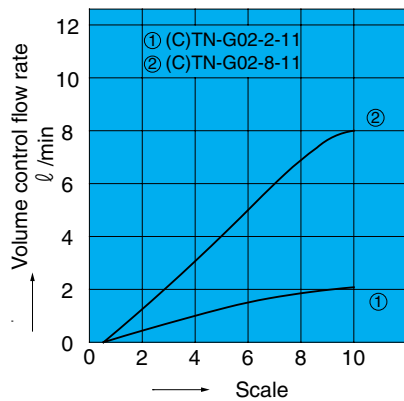
Fluid Temperature – Control Flow Rate Characteristics



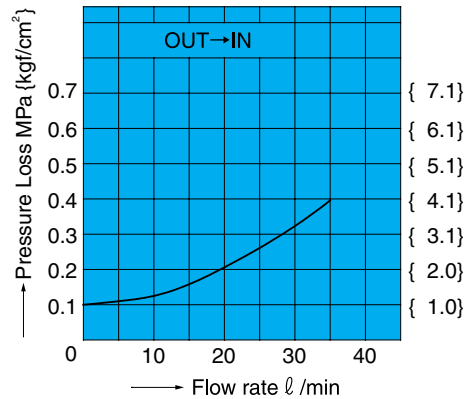
Pressure – Control Flow Rate Characteristics



Scale – Control Flow Rate Characteristics



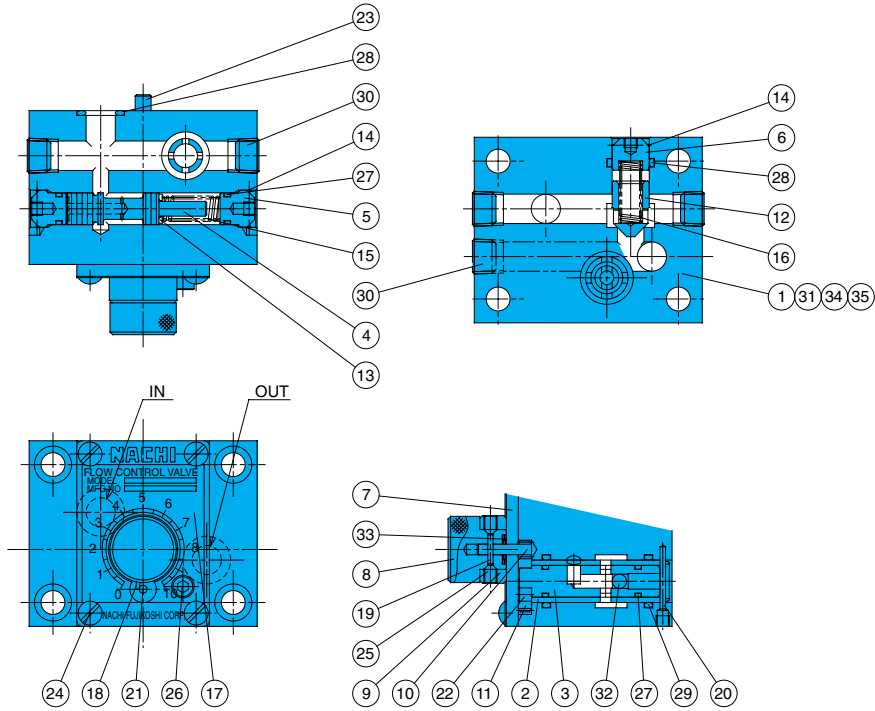
Pressure Loss Characteristics



Cross-sectional Drawing

Note) O-ring 1A-** refers to JIS B2401-1A-**.

CTN-G02-*-11



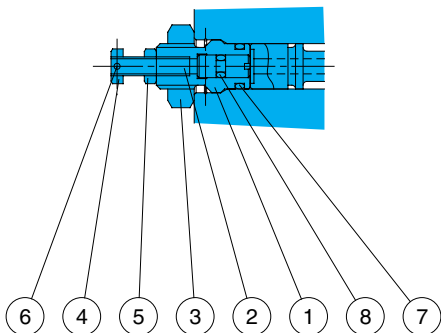
Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
1	Body	13	Spacer	25	Screw
2	Sleeve	14	Snap ring	26	Screw
3	Spool	15	Spring	27	O-ring
4	Piston	16	Spring	28	O-ring
5	Plug	17	Plate	29	O-ring
6	Plug	18	Pin	30	Plug
7	Plate	19	Pin	31	Ball
8	Knob	20	Pin	32	Ball
9	Ring	21	Pin	33	Washer
10	Gear	22	Pin	34	Screw
11	Gear	23	Pin	35	Plate
12	Poppet	24	Screw		

Seal Part List (Kit Model Number FNS-G02(C))

Part No.	Part Name	TN-G02-*-11		CTN-G02-*-11	
		Part Number	Q'ty	Part Number	Q'ty
27	O-ring	IA-P9	4	IA-P9	4
28	O-ring	IA-P14	2	IA-P14	3
29	O-ring	IA-P16	2	IA-P16	2

Note) Specify C at the end of the model number for the CTN kit.

Anti-jumping mechanism (C)TN-G02-*-F-11



Part No.	Part Name
1	Retainer
2	Bolt
3	Nut
4	Nut
5	Nut
6	Spring pin
7	O-ring
8	O-ring

Seal Part List

Part No.	Part Name	Part Number	Q'ty
7	O-ring	IA-P9	1
8	O-ring	IA-P3	1

Note) #7 O-ring and #27 O-ring are interchangeable.



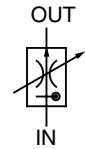
TS Type Flow Control (and Check) Valve

(Fine Adjustment Type With Pressure and Temperature Compensation)

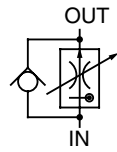
0.01 to 2 ℓ /min
10.5MPa



TS-G01-2-11



CTS-G01-2-11



Features

- ① Original compact, lightweight configuration.
- ② High-precision control up to minute flow rates of 10cm³.
- ③ Design allows large 20 ℓ /min reverse flow rate relative to control flow rate, which means there is no need to include an extra valve in the quick return circuit.
- ④ Stable control of each setting flow rate, even as pressure and fluid temperature are fluctuating.

Specifications

Model No.	Nominal Diameter (Size)	Volume control flow rate ℓ /min	Maximum Working Pressure MPa{kgf/cm ² }	Reverse Flow Rate ℓ /min	Cracking pressure MPa{kgf/cm ² }	Weight kg
(C)TS-G01-2-11	1/8	0.01 to 2	10.5{107}	20	0.08{0.8}	0.9

● Handling

- ① In the temperature range of 20°C to 60°C, flow rate fluctuation is within ±5% of the standard flow rate at 40°C.
- ② In the pressure range of 0.6 to 10.5MPa {6.1 to 107kgf/cm²}, flow rate fluctuation is within ±5% of the setting flow rate.
- ③ Note that flow rate fluctuation exceeds the rated fluctuation amount slightly in the vicinity of the minimum control flow rate, due to changes in operating temperature and hydraulic fluid viscosity.
- ④ When controlling flow rates that are less than 0.2 ℓ /min,
- ⑤ For flow rate control, make sure that the pressure differential between the input port and output port is at least 0.6MPa {6.1kgf/cm²}.
- ⑥ The control flow rate is increased by clockwise (rightward) rotation of the control handle.
- ⑦ Use the table to the right for specification when a sub plate is required.

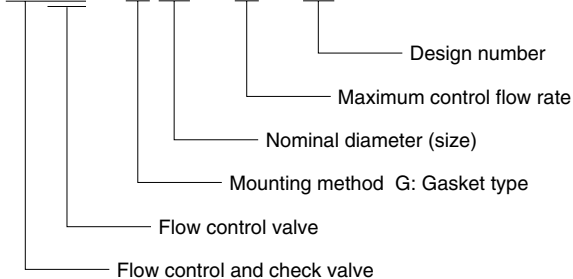
Model No.	Pipe Diameter	Recommended Flow Rate ℓ /min	Weight kg
MTS-01Y-10	3/8	20	0.8

⑧ Bundled Accessories: Hex Socket Bolts: M4 x 35 ℓ (four)

Note) 1.For mounting bolts, use 12T or equivalent.
2.Tightening torque is 2.6 to 3.3N·m {27 to 255kgf·cm}.

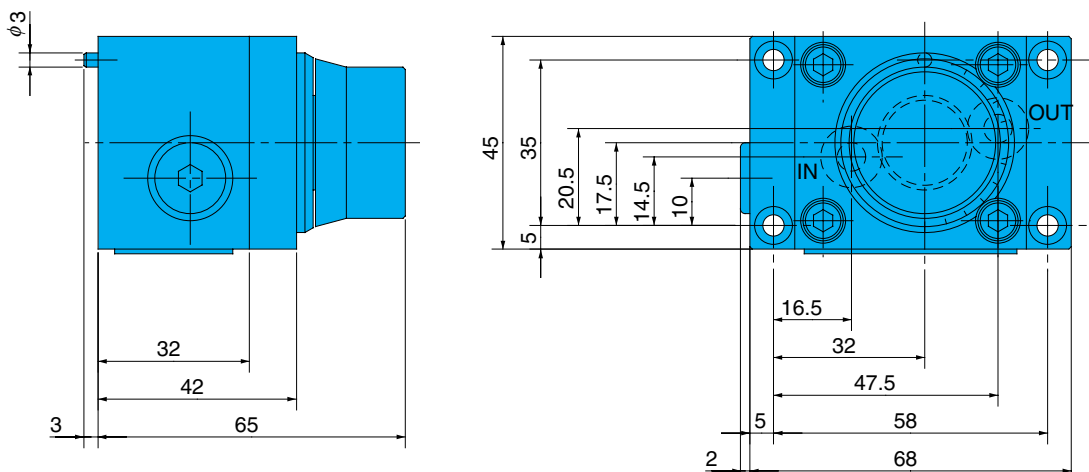
Understanding Model Numbers

(C) TS - G 01 - 2 - 11

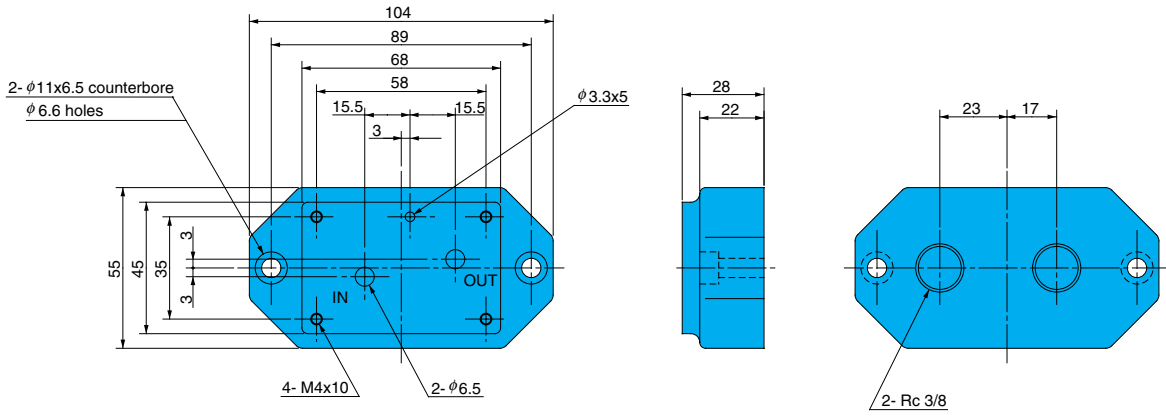


Installation Dimension Drawings

(C)TS-G01-2-11



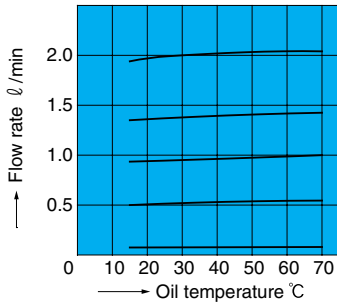
Sub Plate MTS-01Y-10



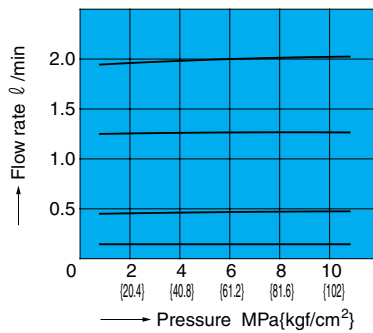
Performance Curves

Hydraulic Operating Fluid Viscosity 32mm²/s

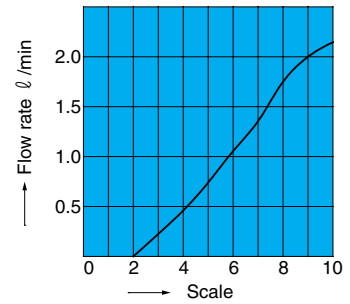
Fluid Temperature – Control Flow Rate Characteristics



Pressure – Control Flow Rate Characteristics

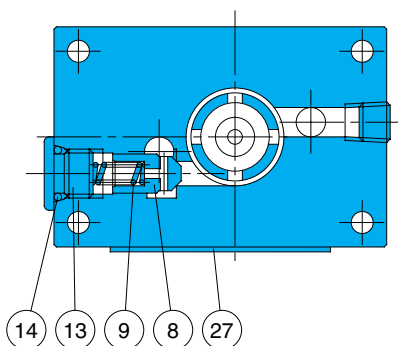
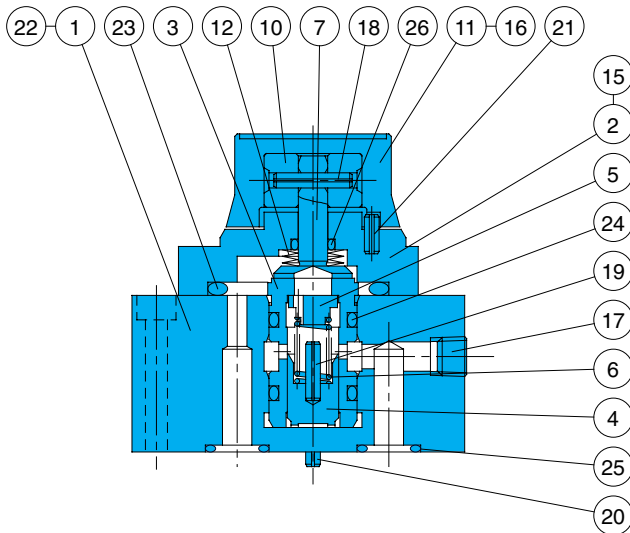


Scale – Control Flow Rate Characteristics

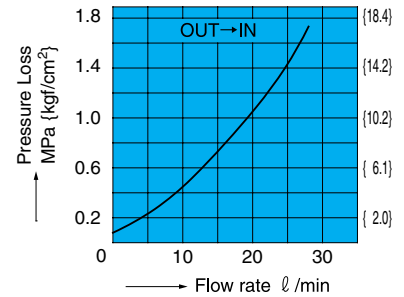


Cross-sectional Drawing

CTS-G01-2-11



Pressure Loss Characteristics



Part No.	Part Name	Part No.	Part Name
1	Body	14	O-ring
2	Cover	15	Screw
3	Sleeve	16	Screw
4	Piston	17	Plug
5	Guide	18	Spring pin
6	Spring pin	19	Spring pin
7	Throttle	20	Spring pin
8	Poppet	21	Spring pin
9	Spring	22	Spring pin
10	Spacer	23	O-ring
11	Knob	24	O-ring
12	Spring	25	O-ring
13	Plug	26	O-ring
		27	Nameplate

Seal Part List (Kit Model Number FKS-G01(C))

Part No.	Part Name	TS-G01-2-11		CTS-G01-2-11	
		Part Number	Q'ty	Part Number	Q'ty
14	O-ring	—	—	IB-P8	1
23	O-ring	IB-P31	1	IB-P31	1
24	O-ring	IB-P14	2	IB-P14	2
25	O-ring	IB-P10	2	IB-P10	2
26	O-ring	IB-P6	1	IB-P6	1

Note) O-ring 1B-** refers to JIS B2401-1B-**. Specify C at the end of the model number for the CTS kit.



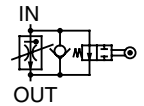
TL (TLT) Type Feed Control Valve

(Fine Control Type With Pressure Compensation)

0.08 to 8 ℓ /min
7MPa

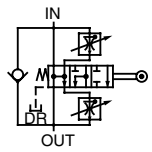


TL-G0^{*}-*-11



Note: 04 has DR

TLT-G04^{*}-*-11



Features

- ① Very compact, lightweight, and economically priced.
- ② Applicable for control of machine tool table operations.
For example, a single valve provides smooth control of: Fast Feed => Cutting Feed (2 stage) => Fast Return.
- ③ Stable control of each setting flow rate, even as pressure and fluid temperature are fluctuating.
- ④ Dial markings are proportional to flow rate for simple control flow rate adjustment.
- ⑤ Sealing the gasket surface allows as-is screw-in connection.

Specifications

Model No	Nominal Diameter (Size)	Volume control flow rate ℓ/min		Reverse Flow Rate ℓ/min	Maximum Working Pressure MPa(kgf/cm ²)	Cracking pressure MPa(kgf/cm ²)	Weight kg
		Feed 1	Feed 2				
TL-G03-2-11 8-11	3/8	0.08 to 2 0.1 to 8	-	35	7(71.4)	0.1{1.0}	2.2
TL-G04-2-11 8-11	1/2	0.08 to 2 0.1 to 8	-	53			7.0
TLT-G04-2-1.5-11 8-2-11		0.1 to 2 0.1 to 8	0.1 to 1.5 0.1 to 2				

• Handling

- ① In the temperature range of 20°C to 60°C, flow rate fluctuation is within ±5% of the standard flow rate at 40°C.
- ② In the pressure range of 1.0 to 7.0MPa {10.2 to 71.4kgf/cm²}, flow rate fluctuation is within ±5% of the setting flow rate.
- ③ Note that flow rate fluctuation exceeds the rated fluctuation amount slightly in the vicinity of the minimum control flow rate, due to changes in operating temperature and hydraulic fluid viscosity.
- ④ When controlling flow rates that are less than 0.2 ℓ /min, use with a line filter no greater than 10μm.
- ⑤ Make sure that the pressure differential between the inlet port and outlet is at least 0.6MPa {6.1kgf/cm²} at 4 ℓ /min or less, and at least 1.0MPa {10.2kgf/cm²} at 4 ℓ /min or greater.
- ⑥ The control flow rate is increased by clockwise (rightward) rotation of the control handle.
- ⑦ For connection to piping, normally connect to the sub plate. Valve mounting is gasket type, using an O-ring. When a screw in connection is required, seal the gasket surface, remove the side plug, and create a screw in connection directly to the valve unit. In this case, remove all seal material affixed to the plug.
- ⑧ See the table below for installation hex socket bolts.
- ⑨ Use the table to the right for specification when a sub plate is required.

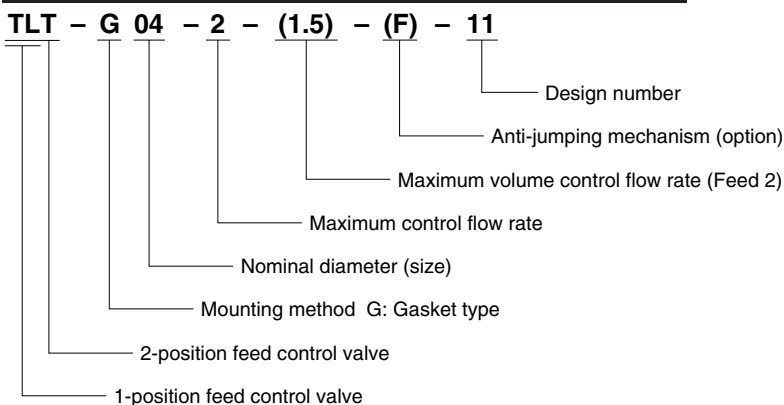
Model No.	Pipe Diameter	Recommended Flow Rate ℓ/min	Applicable Valve Type
MTL-03-10	3/8	35	TL-G03 [*] -11
MTL-04-10	1/2	53	TL(T)-G04 [*] -*-11

- ⑩ G03 does not require drain pipe connection.
- ⑪ Cam Down Force
TL-G03-11
Cam Down Force
120N {12.2kgf} minimum
TLT-G04^{*}-*-11
Feed 1 Cam Down Force
140N {14.3kgf} minimum
Feed 2 Cam Down Force
200N {20.4kgf} minimum
- ⑫ Make the cam angle no greater than 30 degrees.

Applicable Model	Bolt Size	Q'ty	Tightening Torque N·m(kgf·cm)
TL-G03 [*] -11	M8 × 60 ℓ	4	20 to 25{205 to 255}
TL(T)-G04 [*] -11	M10 × 75 ℓ	4	45 to 55{460 to 560}

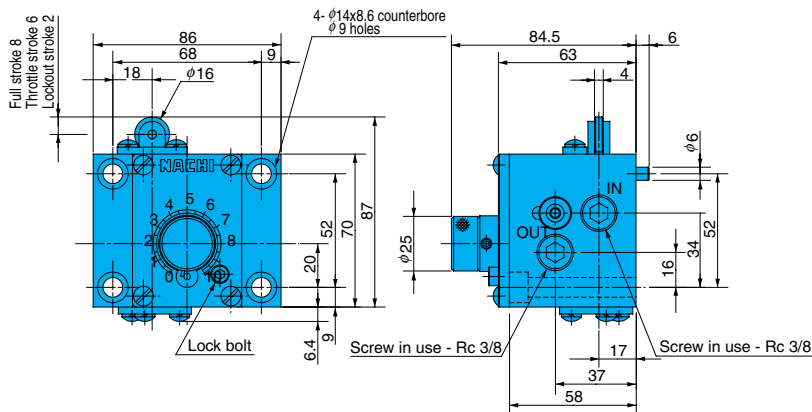
Note) For mounting bolts, use 12T or equivalent.

Understanding Model Numbers

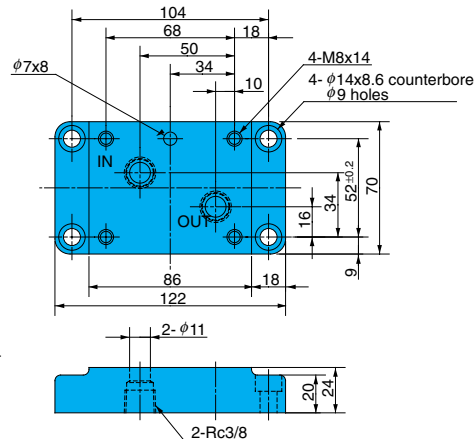


Installation Dimension Drawings

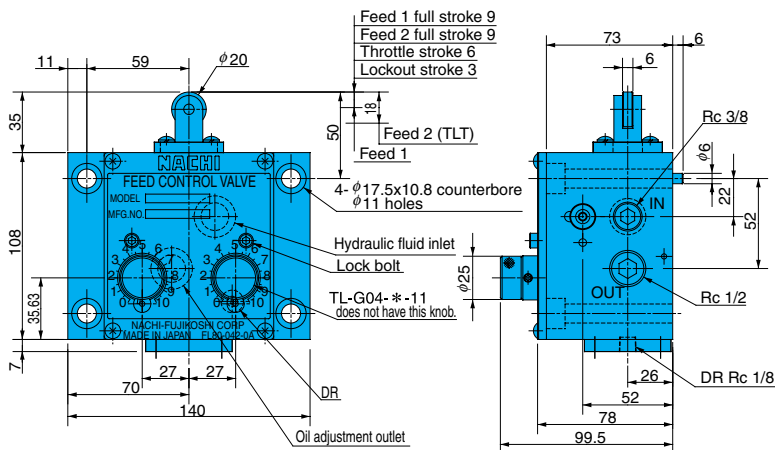
TL-G03-*-11



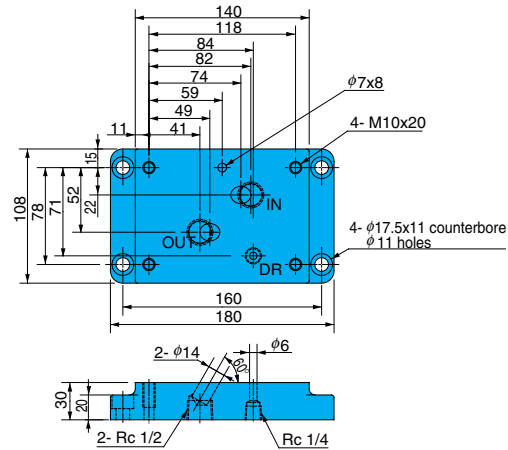
Sub Plate MTL-03-10



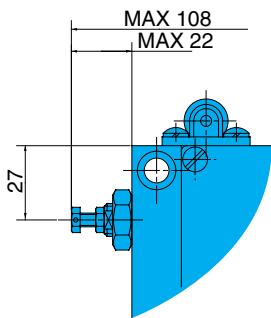
TL(T)-G04-*-11



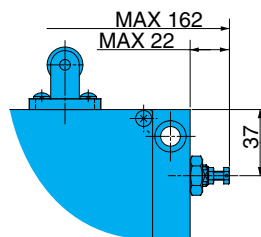
Sub Plate MTL-04-10



Anti-jumping Mechanism TL-G03-*-F-11



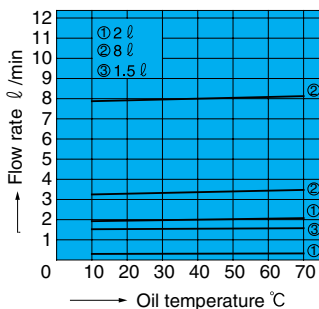
TL(T)-G04-*-F-11



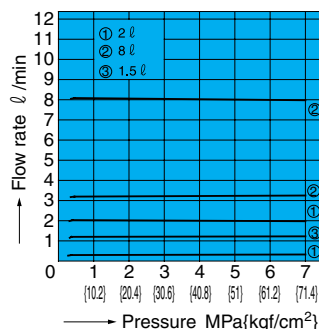
Performance Curves

Hydraulic Operating Fluid Viscosity 32mm²/s

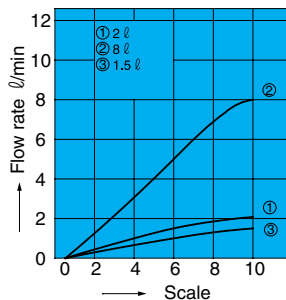
Fluid Temperature - Control Flow Rate Characteristics



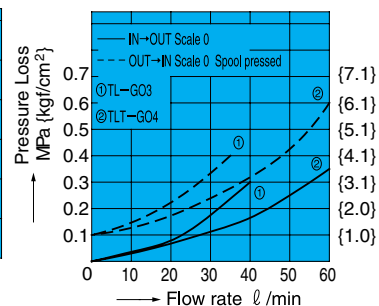
Pressure - Control Flow Rate Characteristics



Scale - Control Flow Rate Characteristics

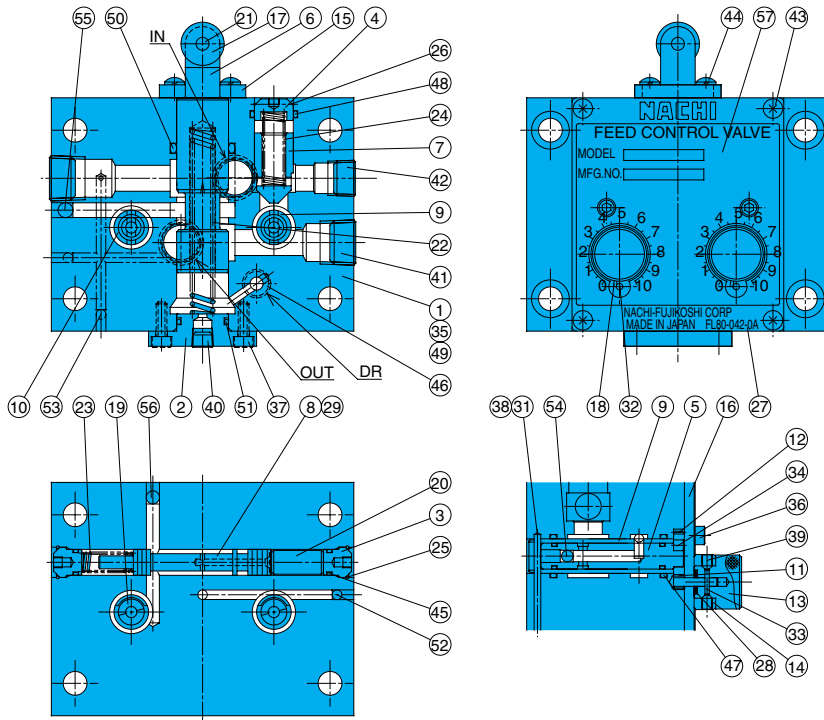


Pressure Loss Characteristics



Cross-sectional Drawing

TLT-G04-*-F-11

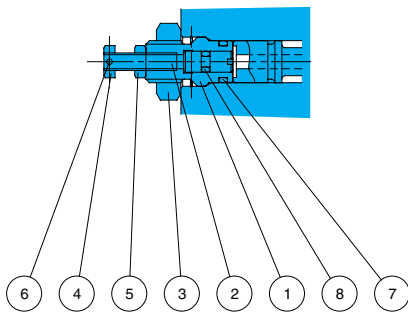


Note) The drawings on the left are TLT cross sections. In the case of TL, there is no knob on the right side.

Anti-jumping mechanism

TL-G03-*-F-11

TL(T)-G04-*-F-11



Part No.	Part Name
1	Retainer
2	Bolt
3	Nut
4	Nut
5	Nut
6	Spring pin
7	O-ring
8	O-ring

Seal Part List

Part No.	Part Name	Part Number	Q'ty
7	O-ring	IA-P9	1
8	O-ring	IA-P3	1

Note) 1.#7 O-ring and #45 O-ring are interchangeable.
2.O-ring 1A-** refers to JIS B2401-1A-**.

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
1	Body	20	Spacer	39	Screw
2	Cover	21	Pin	40	Plug
3	Plug	22	Spring	41	Plug
4	Plug	23	Spring	42	Plug
5	Throttle	24	Spring	43	Screw
6	Spool	25	Snap ring	44	Screw
7	Poppet	26	Snap ring	45	O-ring
8	Piston	27	Plate	46	O-ring
9	Sleeve	28	Washer	47	O-ring
10	Sleeve	29	Pin	48	O-ring
11	Gear	30	Pin	49	O-ring
12	Gear	31	Pin	50	O-ring
13	Knob	32	Pin	51	O-ring
14	Ring	33	Pin	52	Ball
15	Stopper	34	Pin	53	Ball
16	Plate	35	Pin	54	Ball
17	Roller	36	Screw	55	Ball
18	Pin	37	Screw	56	Ball
19	Spacer	38	Screw	57	Plate

Seal Part List (Kit Model Number FLS-***(2))

Part No.	Part Name	TL-G03-*-11		TL-G04-*-11		TLT-G04-*-F-11	
		Part Number	Q'ty	Part Number	Q'ty	Part Number	Q'ty
45	O-ring	IA-P9	4	IA-P9	4	IA-P9	6
46	O-ring	-	-	IA-P10	1	IA-P10	1
47	O-ring	IA-P16	2	IA-P16	2	IA-P16	4
48	O-ring	IA-P14	1	IA-P18	1	IA-P18	1
49	O-ring	IA-P14	2	IA-P20	2	IA-P20	2
50	O-ring	IA-P18	2	IA-P24	1	IA-P24	1
51	O-ring	-	-	IA-P20	1	IA-P20	1

Note) 1.*** in the kit number is used for specification of the valve size. To specify TLT, add 2 to the end.
2.O-ring 1A-** refers to JIS B2401-1A-**.