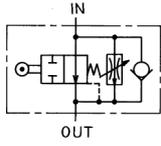
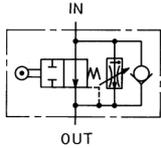


● Internal Drain Type

With Pressure Compensation



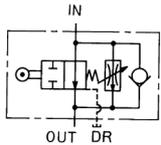
With Pressure and Temperature Compensation



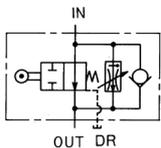
	Nominal Size	Max. Operating Pressure (MPa)	Free Flow (L/min)	Pressing-down Force (N)	Flow Adjustment Range (L/min)	Model
With Pressure Compensation	02	7	12	110	0.1 to 1	HFD1-PG1K-1M-02
					0.1 to 2	HFD1-PG2K-1M-02
					0.2 to 4	HFD1-PG4K-1M-02
With Pressure Compensation	03	7	30	125	0.1 to 1	HFD1-PG1K-1M-03A
					0.1 to 2	HFD1-PG2K-1M-03A
					0.2 to 8	HFD1-PG8K-1M-03A
With Pressure and Temperature Compensation	02	7	12	110	0.1 to 1	HFD1-KG1K-1M-02
					0.1 to 2	HFD1-KG2K-1M-02
					0.2 to 4	HFD1-KG4K-1M-02
	03	7	30	125	0.1 to 2	HFD1-KG2K-1M-03
					0.2 to 8	HFD1-KG8K-1M-03
					0.1 to 1	HFD2-KG1K-1M-04A
04	7	50	180	0.1 to 2	HFD2-KG2K-1M-04A	
				0.4 to 16	HFD2-KG16K-1M-04A	

● External Drain Type

With Pressure Compensation



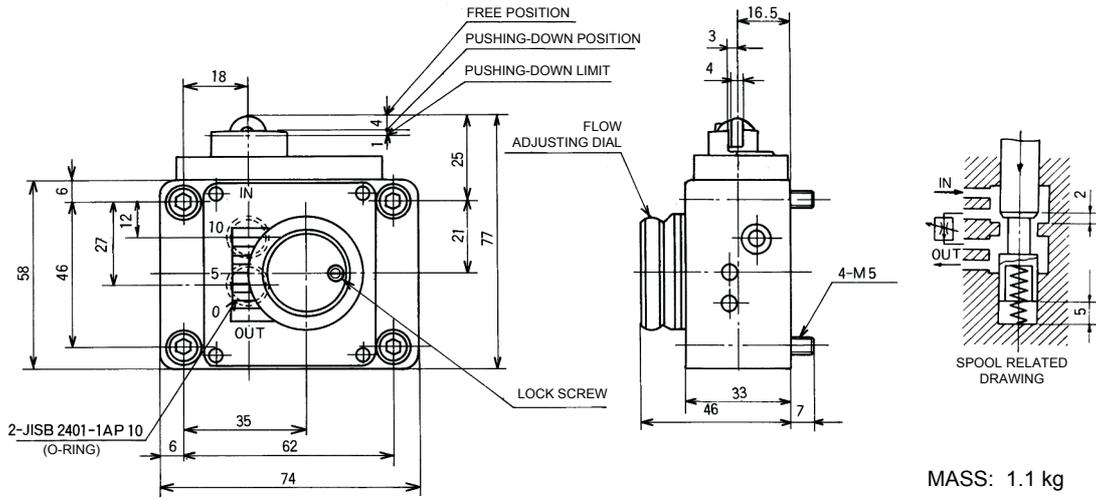
With Pressure and Temperature Compensation



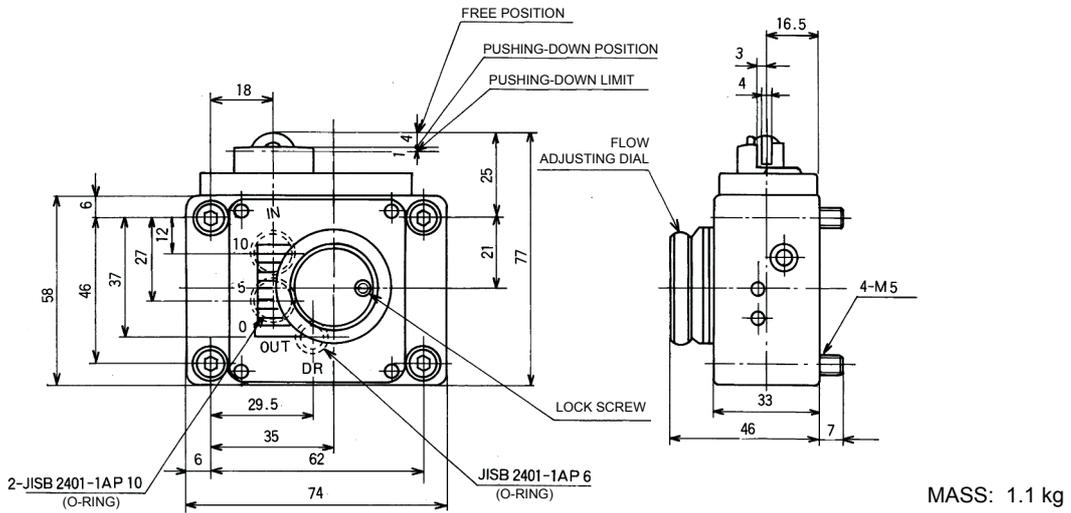
	Nominal Size	Max. Operating Pressure (MPa)	Free Flow (L/min)	Pressing-down Force (N)	Flow Adjustment Range (L/min)	Model
With Pressure Compensation	02	7	12	110	0.1 to 1	HFD1-PG1K-3M-02
					0.1 to 2	HFD1-PG2K-3M-02
					0.2 to 4	HFD1-PG4K-3M-02
	03		30	125	0.1 to 1	HFD1-PG1K-3M-03A
					0.1 to 2	HFD1-PG2K-3M-03A
					0.2 to 8	HFD1-PG8K-3M-03A
With Pressure and Temperature Compensation	02	7	12	110	0.1 to 1	HFD1-KG1K-3M-02
					0.1 to 2	HFD1-KG2K-3M-02
					0.2 to 4	HFD1-KG4K-3M-02
	03		30	125	0.1 to 2	HFD1-KG2K-3M-03
					0.2 to 8	HFD1-KG8K-3M-03
					0.1 to 1	HFD2-KG1K-3M-04A
04	14	50	180	0.1 to 2	HFD2-KG2K-3M-04A	
				0.4 to 16	HFD2-KG16K-3M-04A	

EXTERNAL DIMENSIONS

● HFD1-PG*K-1M-02

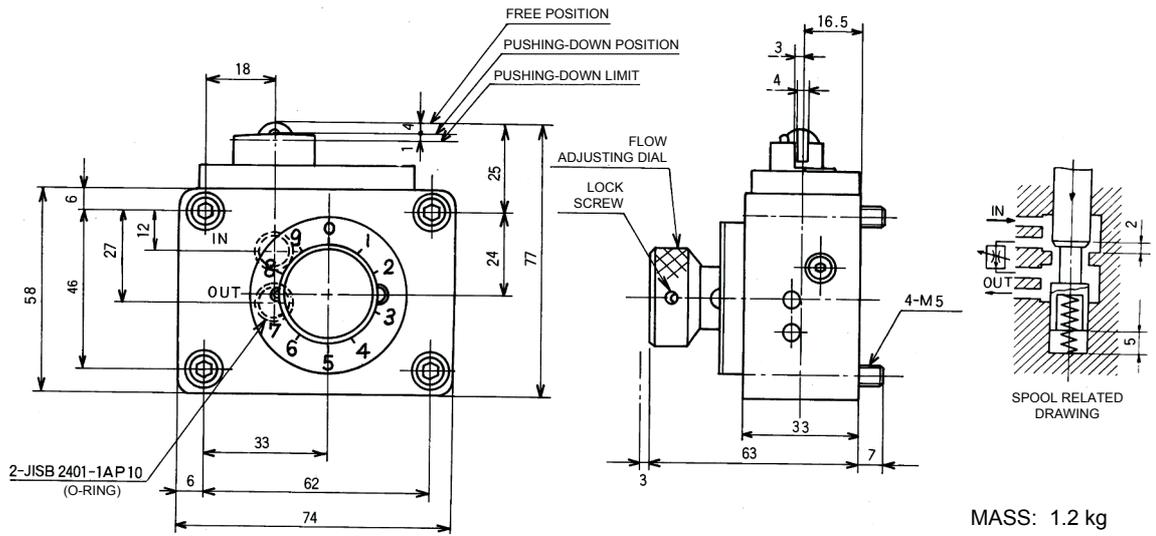


● HFD1-PG*K-3M-02

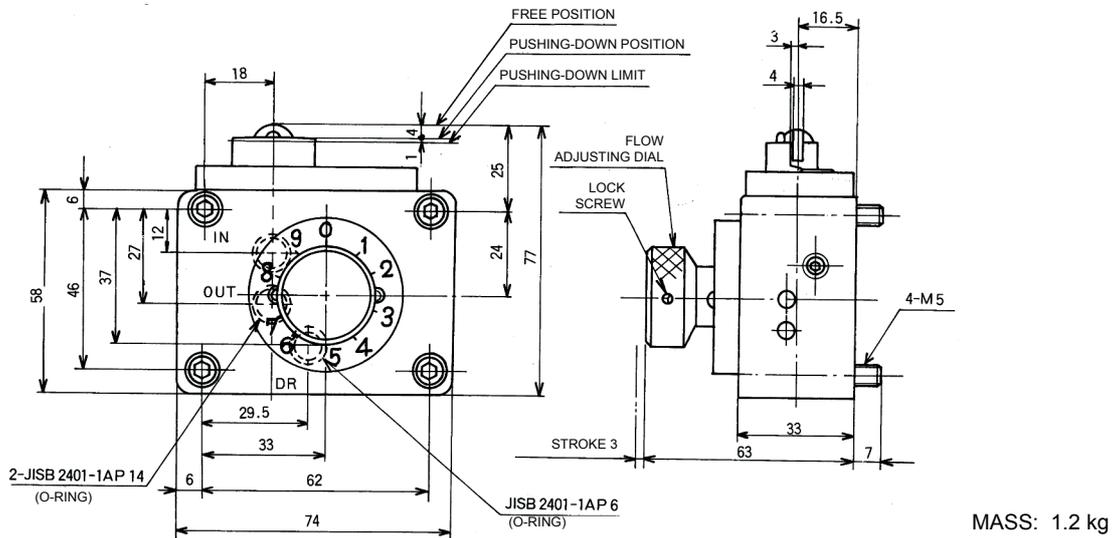


EXTERNAL DIMENSIONS

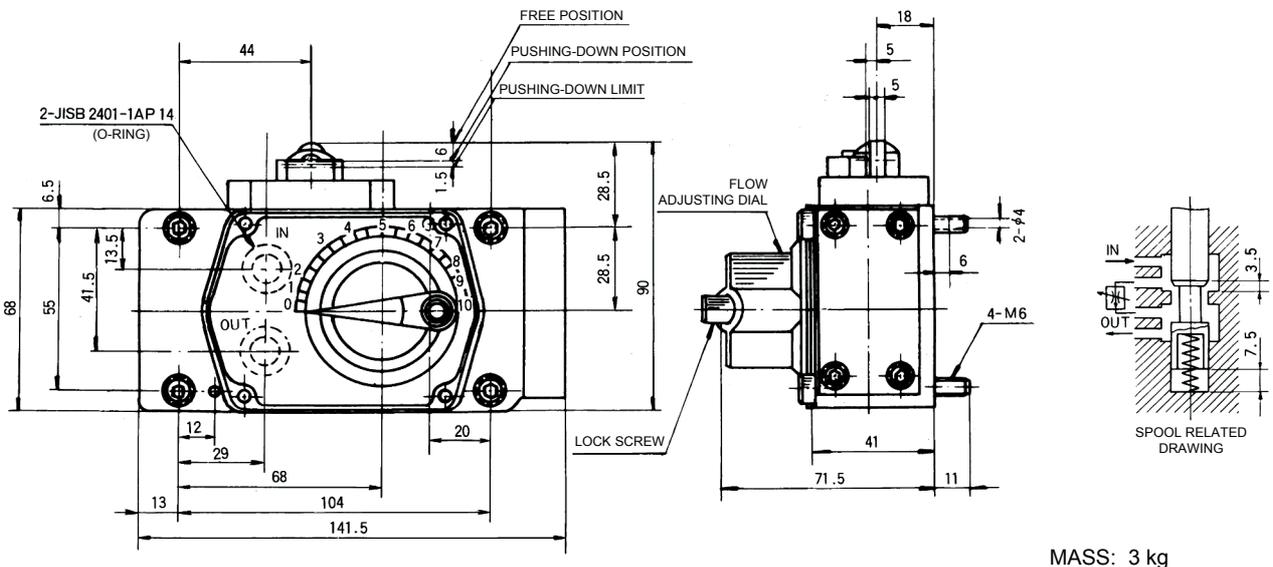
● HFD1-KG*K-K-1M-02



● HFD1-KG*K-K-3M-02

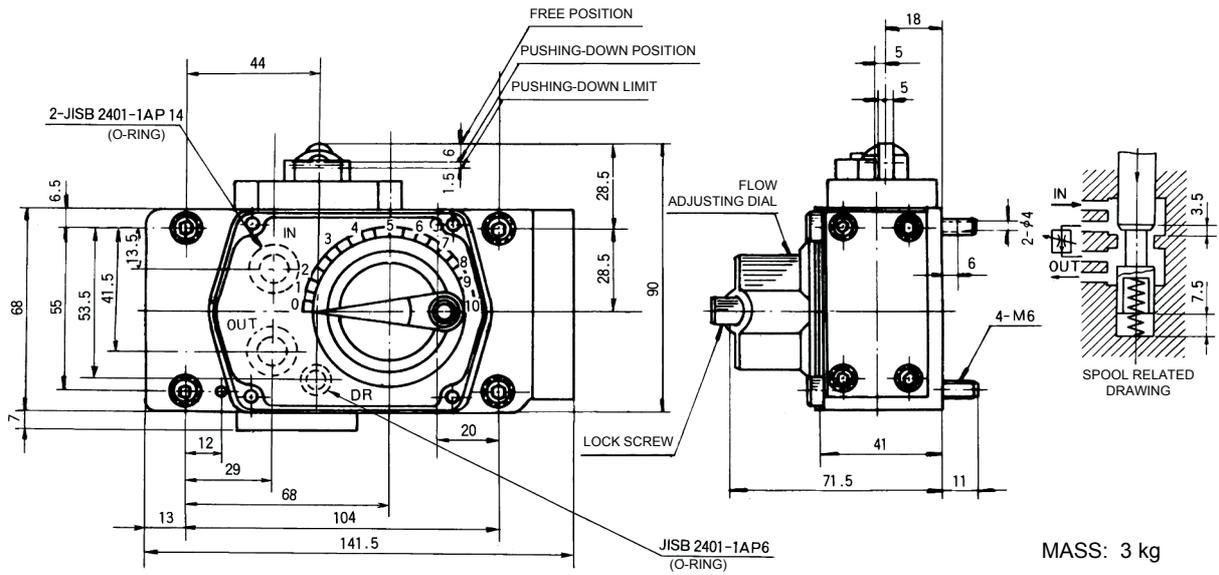


● HFD1-PG*K-K-1M-03A

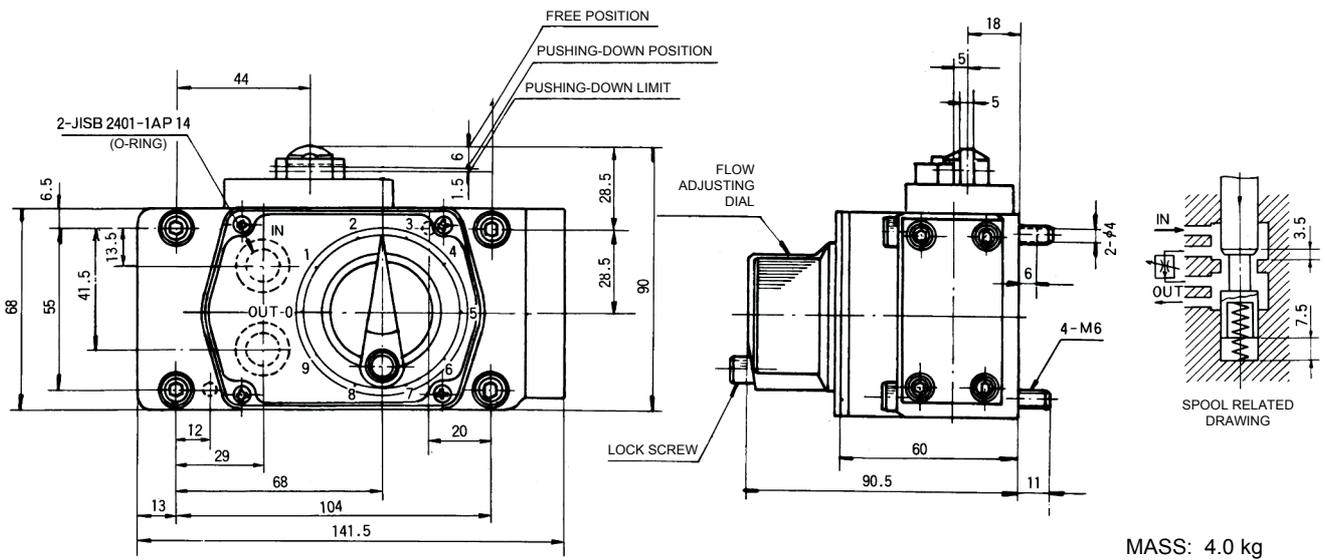


EXTERNAL DIMENSIONS

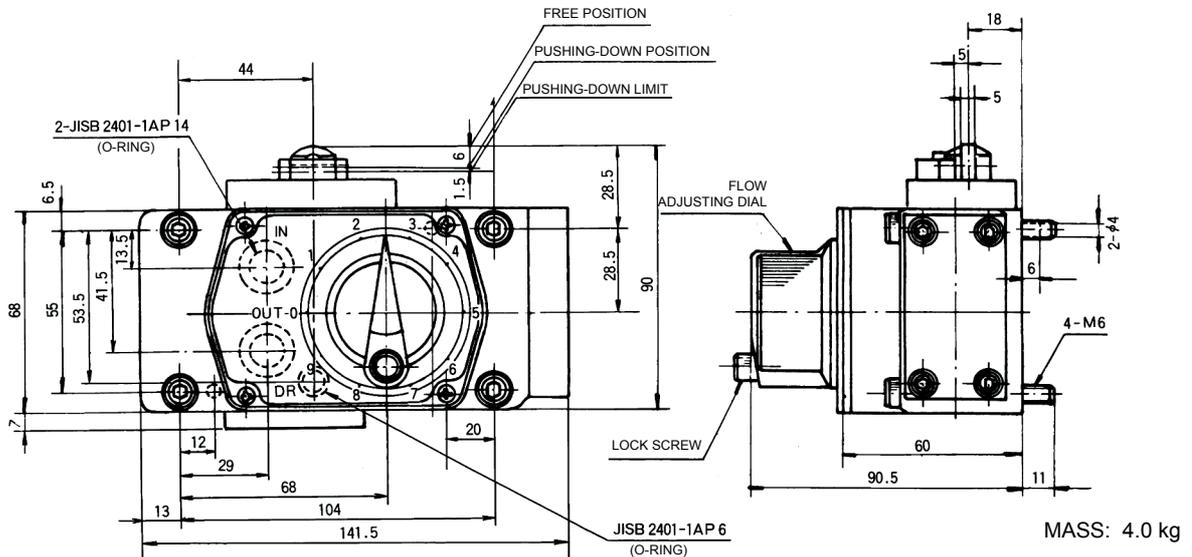
● HFD1-PG*K-K-3M-03A



● HFD1-KG*K-K-1M-03

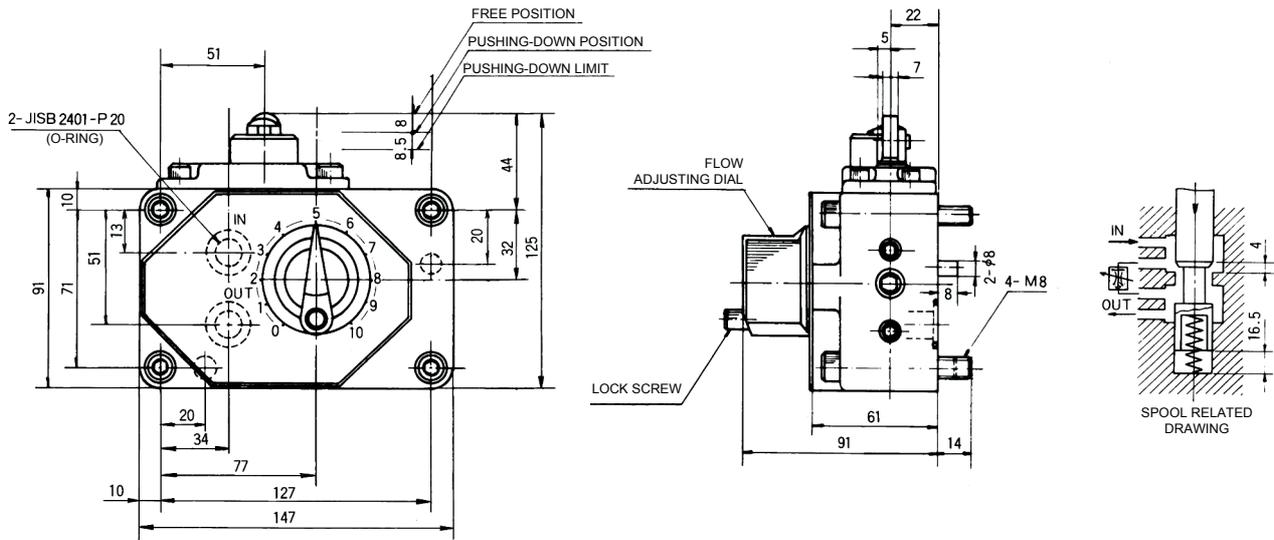


● HFD1-KG*K-K-3M-03



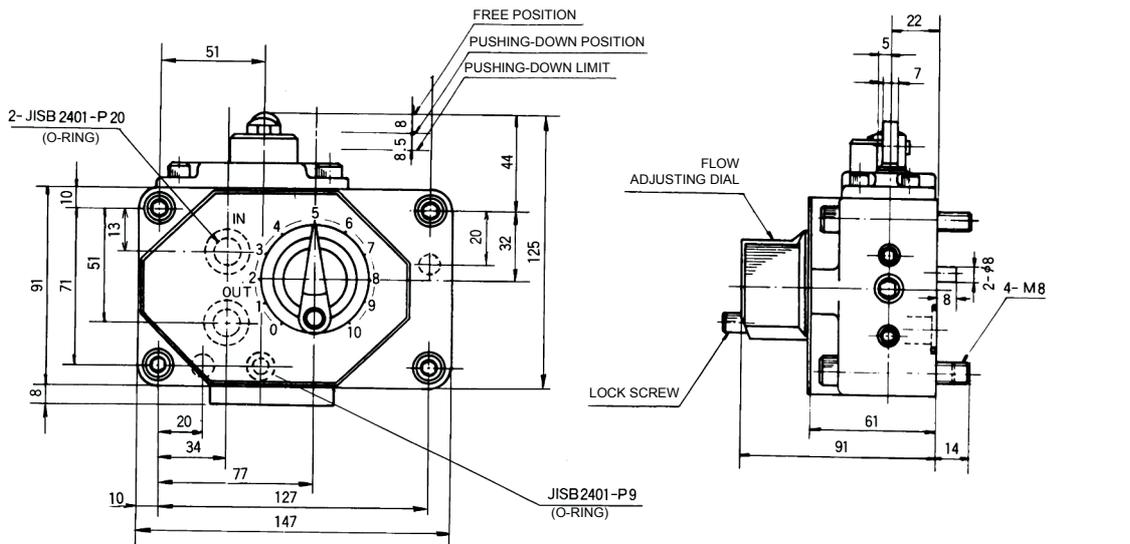
EXTERNAL DIMENSIONS

● HFD2-KG*K-1M-04A



MASS: 6.5 kg

● HFD2-KG*K-3M-04A



MASS: 6.5 kg

2-STEP FLOW CONTROL VALVE WITH SHUT-OFF VALVE (HFDF) (WITH PRESSURE AND TEMPERATURE COMPENSATION)



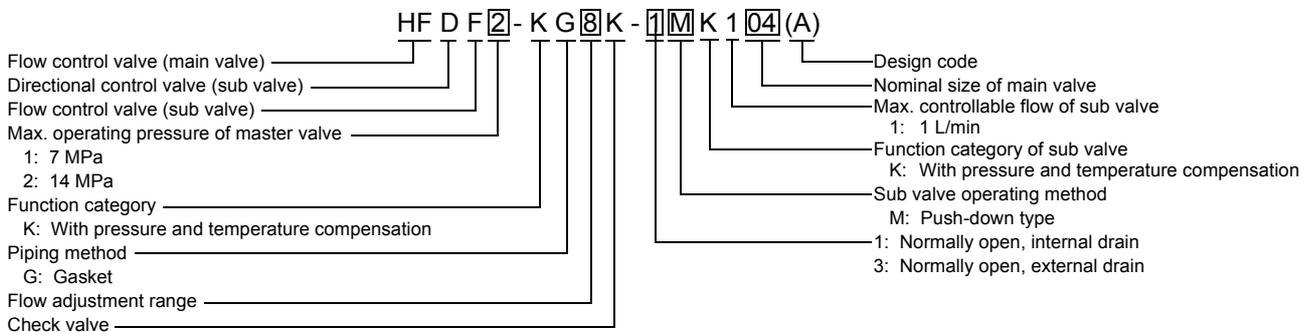
This is a compound valve built by assembling a throttle valve and a 1-step flow control valve with shut-off valve.

It is used to control the feed operation (rapid feed → semi-rapid feed → slow feed → a rapid return) of machine tools, etc.

FEATURES

1. The valve is compactly designed and is appropriate for feed control of single-purpose machine tools and automatics.
2. Since the valve incorporates a pressure compensation mechanism, it keeps controlled flow constant regardless of the pressure variation at the IN and OUT ports and the viscosity variation due to temperature change.
3. The flow is controlled almost in direct proportion to the division of the flow adjusting dial.

MODEL DESIGNATION

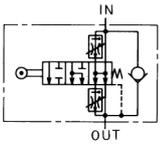


- To achieve good pressure compensation performance, the pressure difference between the IN and OUT ports must be maintained at 0.6 MPa or larger.
- The valve mounting face must be finished to the same surface finish ($\frac{3.2}{\sqrt{R}}$) as the valve face.
- The edge angle of the dog (cam) must be 30 deg. or smaller. The roller must have a hardness in the range HRC48 to HRC52.
- When controlling slow feed a rapid feed in feed operation, it is necessary to apply a back pressure of approximately 0.35 MPa at the OUT port for the internal drain type or at the DR port for the external drain type.
- The pressing-down force varies according to the back pressure as shown in the table to the right.
- If the circuit is configured so that the back pressure (OUT port pressure) becomes high with the internal drain type, the back pressure must be 4 MPa or lower since high back pressure will shorten the life of the roller and the pin.
- When connecting the external drain using the Rc thread, specify “-901” (male thread connection) or “-903” (female thread connection) at the end of the external drain code.

Nominal Size	Pressing-down Force (N)
03	250 × Back pressure (MPa) + 125
04	310 × Back pressure (MPa) + 180

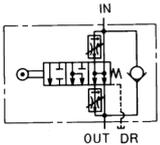
NOTE: The pressing-down force value in the specification table indicates the value when the back pressure is “0”.

● Internal Drain Type



Nominal Size	Max. Operating Pressure (MPa)	Free Flow (L/min)	Pressing-down Force (N)	Flow Adjustment Range (L/min)		Model
				1st Step Feed	2nd Step Feed	
03	7	30	125	0.2 to 2	0.1 to 1	HFDF1-KG2K-1M-K1-03
				0.2 to 8	0.1 to 1	HFDF1-KG8K-1M-K1-03
04	14	50	180	0.2 to 2	0.1 to 1	HFDF2-KG2K-1M-K1-04A
				0.2 to 8	0.1 to 1	HFDF2-KG8K-1M-K1-04A

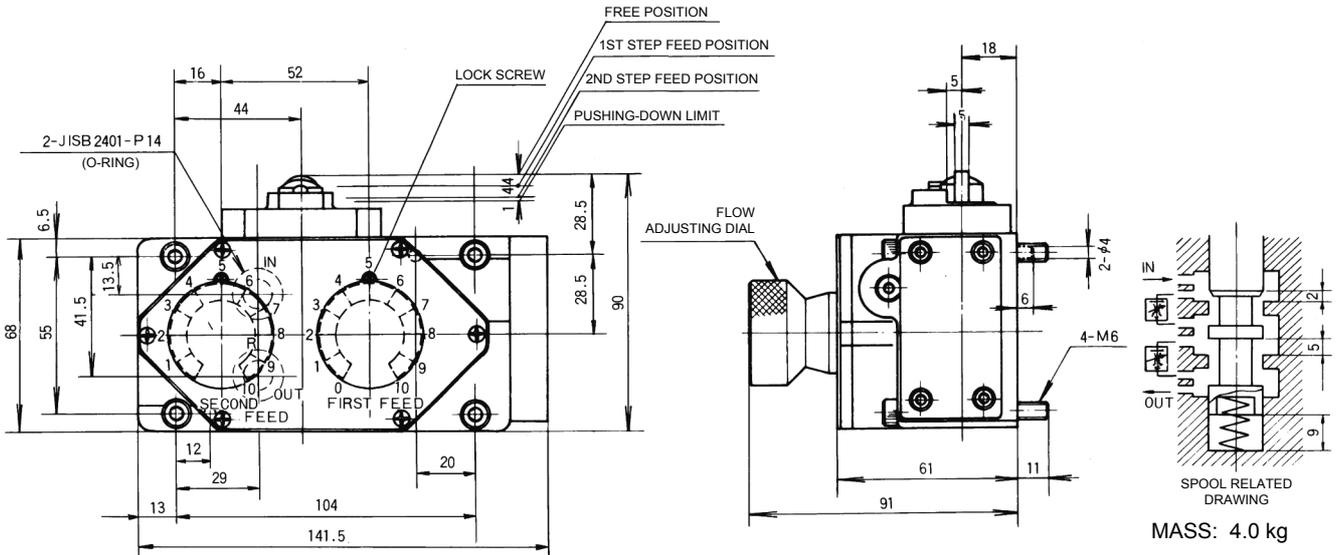
● External Drain Type



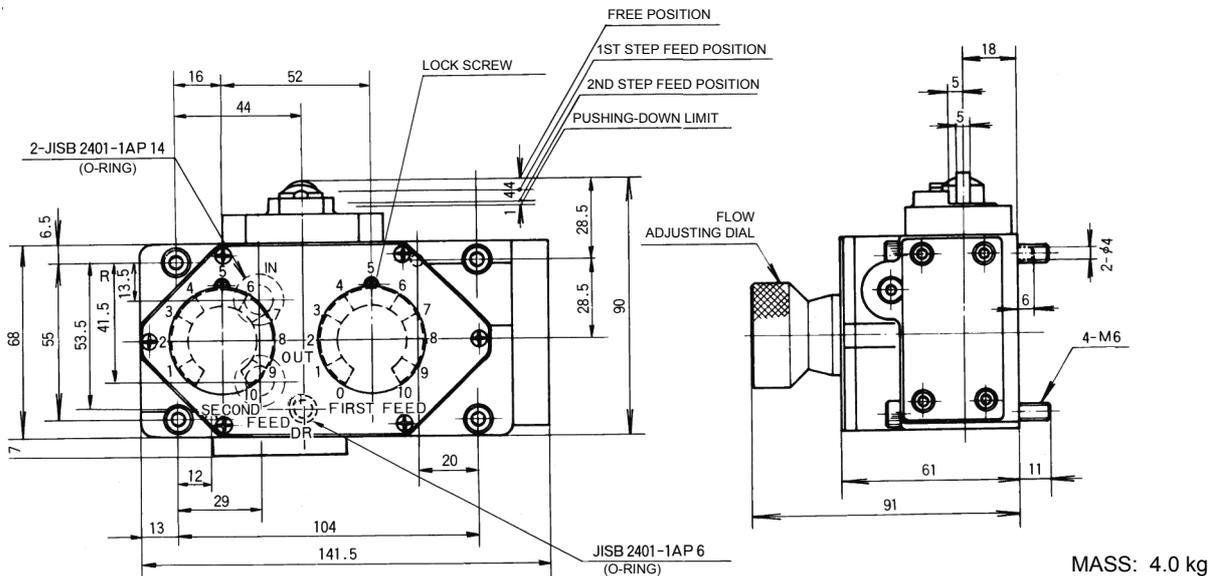
Nominal Size	Max. Operating Pressure (MPa)	Free Flow (L/min)	Pressing-down Force (N)	Flow Adjustment Range (L/min)		Model
				1st Step Feed	2nd Step Feed	
03	7	30	125	0.2 to 2	0.1 to 1	HFDF1-KG2K-3M-K1-03
				0.2 to 8	0.1 to 1	HFDF1-KG8K-3M-K1-03
04	14	50	180	0.2 to 2	0.1 to 1	HFDF2-KG2K-3M-K1-04A
				0.2 to 8	0.1 to 1	HFDF2-KG8K-3M-K1-04A

EXTERNAL DIMENSIONS

● HFDF1-KG*K-1M-K1-03

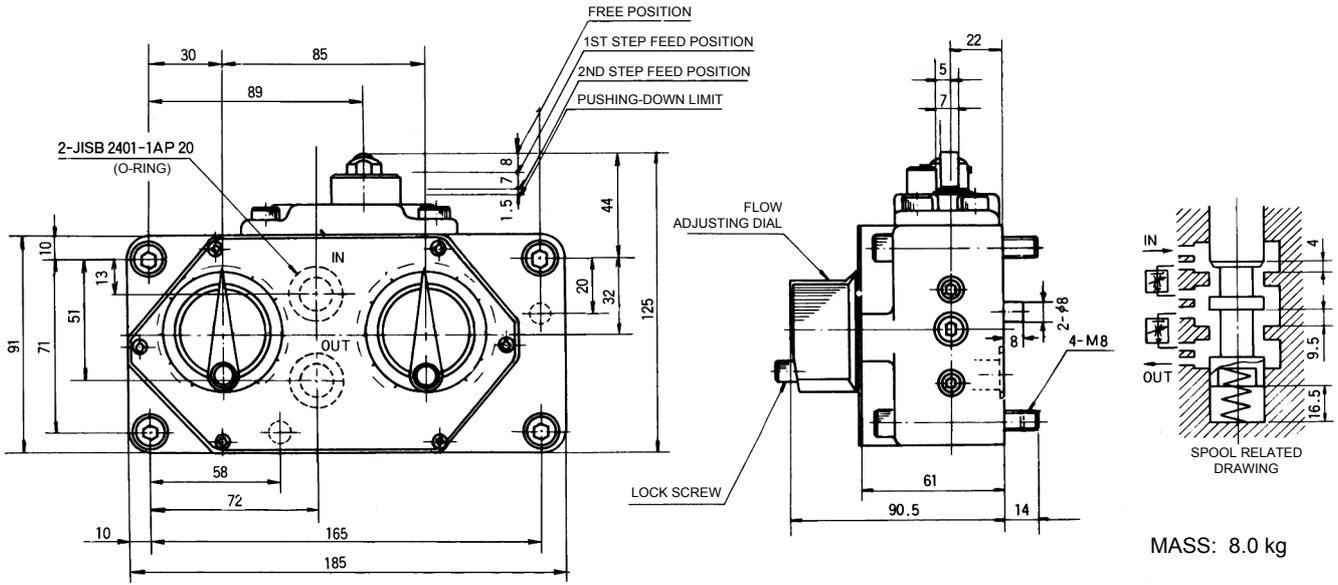


● HFDF1-KG*K-3M-K1-03

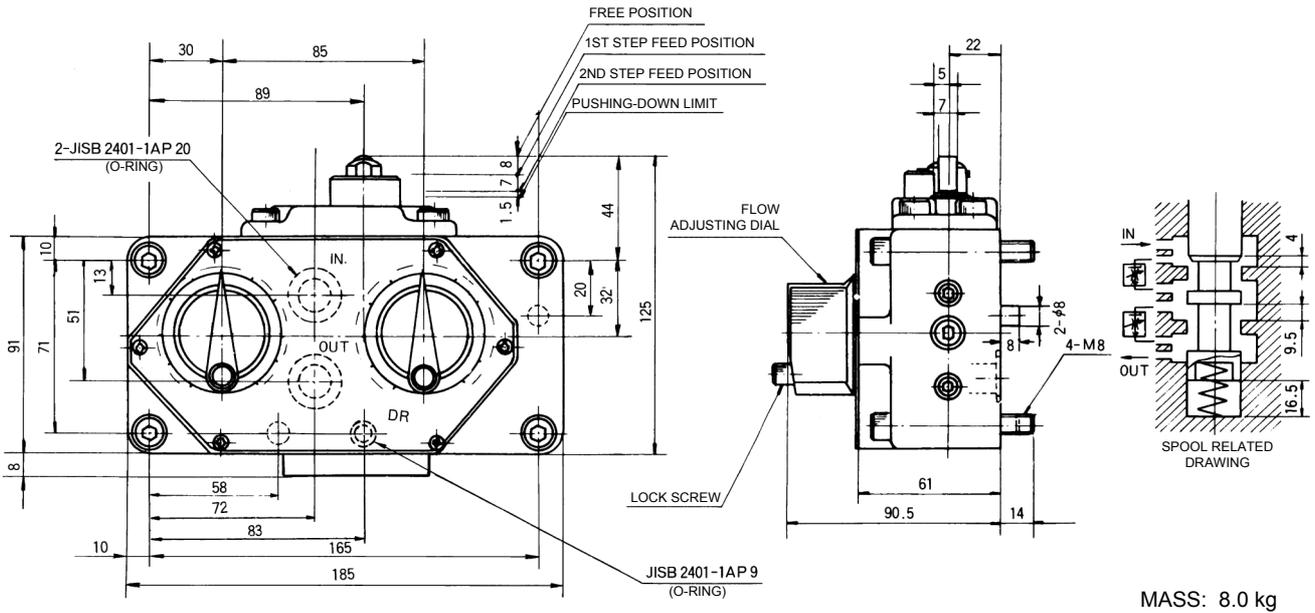


EXTERNAL DIMENSIONS

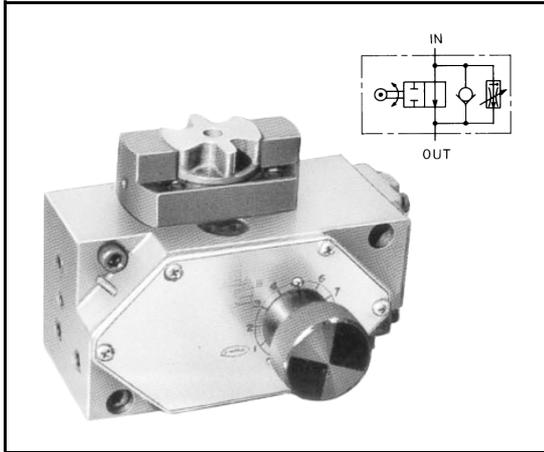
● HFDF2-KG*K-1M-K1-04A



● HFDF2-KG*K-3M-K1-04A



1-STEP FLOW CONTROL VALVE WITH ROTARY TYPE SHUT-OFF VALVE (HFD) (WITH PRESSURE AND TEMPERATURE COMPENSATION)



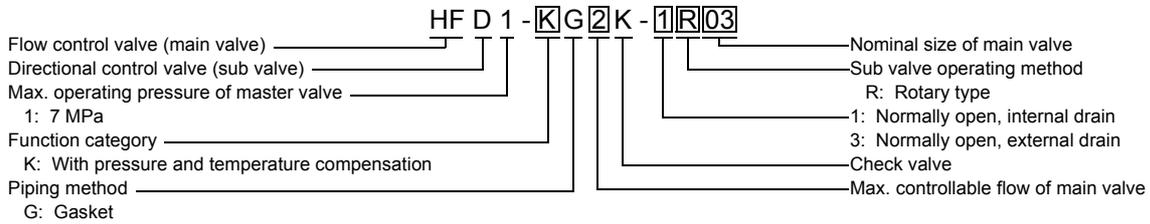
This is a compound valve built by assembling a flow control valve with pressure compensation, a shut off valve and a check valve.

It is used to control the feed operation (rapid feed → slow feed → rapid return) of machine tools, etc.

FEATURES

1. The switching mechanism for the shut-off valve has been changed from the conventional spool forcing down type to the spool rotation type.
 2. The dog pressing force can be lightened since the spool rotating force does not change even if the OUT port pressure (back pressure) varies.
 3. This valve can also be used for light bed feed control since it can control rapid feed → 1st step feed simply.
- To achieve good pressure compensation performance, the pressure difference between the IN and OUT ports must be maintained at 0.6 MPa or larger.
 - The valve mounting face must be finished to the same surface finish ($\sqrt{0.25}$) as the valve face.
 - The dog section pin ($\phi 9 \pm 0.1$ mm) must have a hardness in the range HRC34 to HRC44.

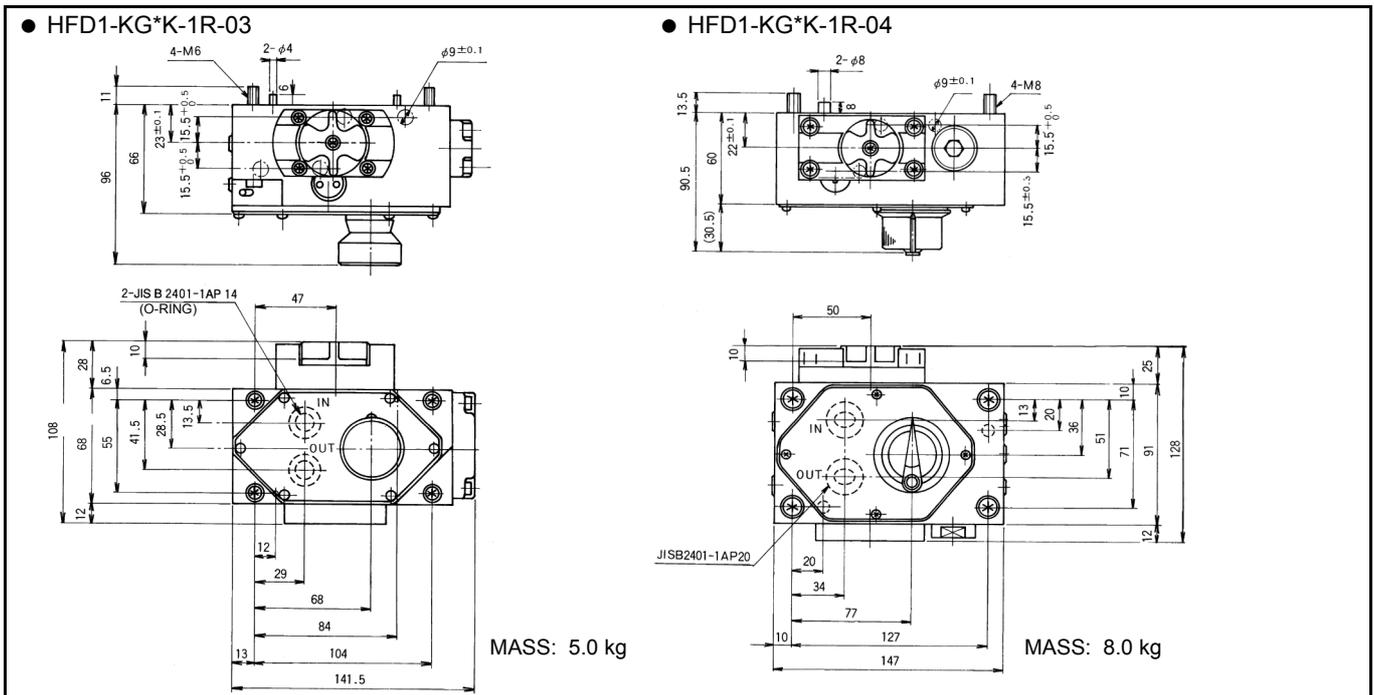
MODEL DESIGNATION



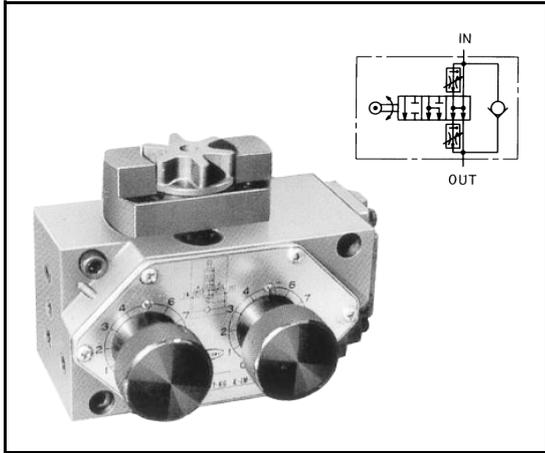
SPECIFICATIONS

Nominal Size	Max. Operating Pressure (MPa)	Free Flow (L/min)	Rotating Torque (N-m)	Flow Adjustment Range (L/min)	Model
03	7	30	1	0.2 to 2	HFD1-KG 2K-1R-03
				0.2 to 8	HFD1-KG 8K-1R-03
50		1.3	0.1 to 1	HFD1-KG 1K-1R-04	
			0.2 to 2	HFD1-KG 2K-1R-04	
04				0.4 to 16	HFD1-KG16K-1R-04

EXTERNAL DIMENSIONS



2-STEP FLOW CONTROL VALVE WITH ROTARY TYPE SHUT-OFF VALVE (HFDF) (WITH PRESSURE AND TEMPERATURE COMPENSATION)



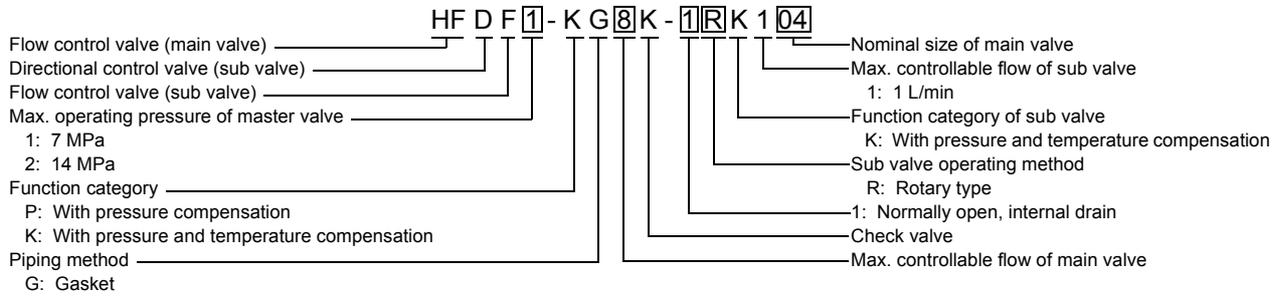
This is a compound valve built by assembling a flow control valve with pressure compensation, a shut-off valve and a check valve.

It is used to control feed operation (rapid feed → semi-rapid feed → slow feed → rapid return) of machine tools, etc.

FEATURES

1. The switching mechanism for the shut off valve has been changed from the conventional spool forcing down type to the spool rotation type.
 2. The dog pressing force can be lightened since the spool rotating force does not change even if the OUT port pressure (back pressure) varies.
 3. The valve can also be used for light bed feed control since it can control rapid feed → 1st step feed → 2nd step feed simply.
- To achieve good pressure compensation performance, the pressure difference between the IN and OUT ports must be maintained at 0.6 MPa or larger.
 - The valve mounting face must be finished to the same surface finish ($\sqrt{0.25}$) as the valve face.
 - The dog section pin ($\phi 9 \pm 0.1$ mm) must have a hardness in the range HRC34 to HRC44.

MODEL DESIGNATION



SPECIFICATIONS

Nominal Size	Max. Operating Pressure (MPa)	Free Flow (L/min)	Rotating Torque (N-m)	Flow Adjustment Range (L/min)		Model
				1st Step Feed	2nd Step Feed	
03	7	30	1	0.2 to 2	0.1 to 1	HFDF1-KG2K-1R-K1-03
				0.2 to 8		HFDF1-KG8K-1R-K1-03
04	7	50	1.3	0.2 to 2	0.1 to 1	HFDF1-KG2K-1R-K1-04
				0.2 to 8		HFDF1-KG8K-1R-K1-04

EXTERNAL DIMENSIONS

