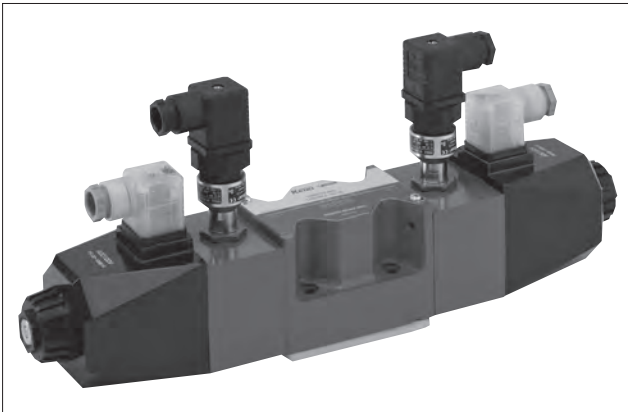


# Solenoid operated directional control valves with spool position monitoring

## DG4V-5-SW



- These solenoid operated directional control valves come with a proximity sensor for monitoring the spool switching status.
- By comparing the sensor output with the command sent to the solenoid operated directional control valve, the operation of the solenoid directional control valve can be monitored.

### Model Code

DG4V-5-2A(L)-M-SW-P7L-T-6-40-(P10)

1 2 3 4 5 6 7 8 9 10 11 12

- 1 Solenoid operated directional control valve (gasket mounting)  
Wet armature type
- 2 Mounting dimensions  
5: ISO 4401-AC-05-4-A
- 3 Spool type  
See page E14-2
- 4 Spool/spring arrangement  
A: Spring offset, A type (2 position, single solenoid)  
B: Spring offset, B type (2 position, single solenoid)  
C: Spring centered type (3 position, double solenoid)
- 5 Solenoid assembly configuration (for spring sets, type A and B)  
Omit: standard (energized: P to B, A to T)  
L: Left hand build (energized: P to A, B to T)
- 6 Proximity sensor provided
- 7 Electrical wiring system  
P: Plug-in solenoids, conduit box, G 1/2 (for spring sets, type A and B)  
U: DIN43650 connectors, Pg. 11  
KU: Flying leads (standard lead wire length 350 mm, DC 12 V, 24 V only)

Table of electrical wiring methods that can be selected

Spool/Spring Arrangement	Electrical Wiring System		
	P	U	K U
A type/AL type	○	○	○
B type/BL type	○	○	○
C type	x	○	○

○: Electrical wiring method that can be selected  
x: Electrical wiring method that cannot be selected

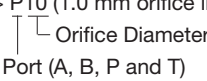
- 8 Electrical accessories  
Omit: no accessories (electrical wiring P, KU) and for no connectors (electrical wiring U)
- 1: Connectors without accessories (electrical wiring U)
- 4: With surge suppressor (with diodes) (electrical wiring KU, slow solenoid deenergize)
- 7L: With indicator lamp and surge suppressor
- 9L: ADC solenoid rectifier (fast solenoid deenergization) and indicator lamp (electrical wiring P)

- 12: ADC solenoid rectifier (slow solenoid deenergization), indicator lamp and surge suppressor (electrical wiring U)

Table of electrical accessories which can be selected

Electrical Wiring System	Solenoid Power Supply	Electrical Accessories					
		Omitted	1	4	7L	9L	12L
P	AC	x	x	x	○	x	x
	DC	x	x	x	○	x	x
	AC/DC conversion	x	x	x	x	○	x
U	AC	○	○	x	○	x	x
	DC	○	○	x	○	x	x
	AC/DC conversion	x	x	x	x	x	○
KU	DC	○	x	○	x	x	x

◎: Standard  
○: Electrical accessory which can be selected  
x: Electrical accessory which cannot be selected

- 9 Solenoid voltage  
See page E3-4
- 10 Allowable T port back pressure  
6: 15.7 MPa (for AC solenoids)  
7: 20.6 MPa (for DC, AC-DC rectifier solenoids)
- 11 Design no.
- 12 Port orifice (option)  
Omit: no port orifices (standard)  
Port orifices  
<Example 1> P10 (1.0 mm orifice in P port)  
  
 <Example 2> B12 (1.2 mm orifice in B port)  
 <Example 3> 2 port combinations  
 Combination sequence, PTAB  
 P10T12, P08B10

- Note: • T port orifice is used in T port on A port side.  
 • When using T port orifice, make sure that surge pressures do not exceed allowed back pressure.  
 • When using port orifices, keep circuit pressure below 21 MPa.  
 • When using in stacked module assemblies, consult Tokyo Keiki regarding use of port orifices.

# Specifications

Model Code	Max. Working Pressure MPa	Max. Flow L/min	Allowable Tank Port Back Pressure MPa	Max. Switching Frequency (cycles/min)			Weight kg			
				AC	DC	AC/DC Conversion	Single Solenoids		Double Solenoids	
DG4V-5-SW	31.5	See Pressure-Flow Characteristics	15.7 (AC solenoid) 20.6 (DC solenoid)	240	180	120	AC	DC	AC	DC
							4.0	4.8	8.0	9.5

## Spool Types and Pressure-Flow Characteristics

Spool Center Position	Model Code, Functional Symbol			Max. Flow L/min														
	3 Position	2 Position		P → A ( B port block )					P → B ( A port block )									
	Spring Centered	Spring Offset, B Type		P → A ( B port block )					P → B ( A port block )									
	- C -	- B -	- BL -	PI TT					PI TT					PI TT				
				7 MPa	14 MPa	21 MPa	28 MPa	31.5 MPa	7 MPa	14 MPa	21 MPa	28 MPa	31.5 MPa	7 MPa	14 MPa	21 MPa	28 MPa	31.5 MPa
0	DG4V-5-0C-SW 	DG4V-5-0B-SW 	DG4V-5-0BL-SW 	*160	*160	*160	*160	*160	160	160	160	160	160	160	160	160	160	160
2	DG4V-5-2C-SW 	DG4V-5-2B-SW 	DG4V-5-2BL-SW 	160	160	160	160	160	160	160	110	100	95	160	160	110	100	95
6	DG4V-5-6C-SW 	DG4V-5-6B-SW 	DG4V-5-6BL-SW 	160	160	160	120	110	160	160	110	100	95	160	160	110	100	95
7	DG4V-5-7C-SW 	DG4V-5-7B-SW 	DG4V-5-7BL-SW 	160	160	160	160	160	120	35	30	25	20	100	40	30	30	30
8	DG4V-5-8C-SW 	DG4V-5-8B-SW 	DG4V-5-8BL-SW 	*160	*70	*55	*50	*50	160	70	55	50	50	160	70	55	50	50
					*55	*45	*40	*40			55	45	40			55	45	40

Spool Transient Condition	Model Code, Functional Symbol		Max. Flow L/min														
	2 Position		A, AL					A		AL		A		AL			
	Spring Offset, A Type		P → A ( B port block )					P → A ( B port block )		P → B ( A port block )		P → B ( A port block )		P → A ( B port block )			
	- A -	- AL -	PI TT					PI TT		PI TT		PI TT		PI TT			
			7 MPa	14 MPa	21 MPa	28 MPa	31.5 MPa	7 MPa	14 MPa	21 MPa	28 MPa	31.5 MPa	7 MPa	14 MPa	21 MPa	28 MPa	31.5 MPa
2	DG4V-5-2A-SW 	DG4V-5-2AL-SW 	160	160	90	60	50	120	40	30	30	20	160	140	100	75	70
					160	90	90	160	40	30	30	30		30	20	20	20
						100	40	20						30	20	20	20

Note: • Max. flow refers to limit flow without valve malfunction for valve switching.  
 • Max. flow - 2nd and 3rd level values: upper level DC 90%V, middle level AC 50Hz85%V, lower level AC 60Hz90%V.



- Max. flow value for \* is with A port and B port blocked.
- For KU4 coil, it may differ from this table.

## Characteristics Curve

### Pressure Drop Characteristics

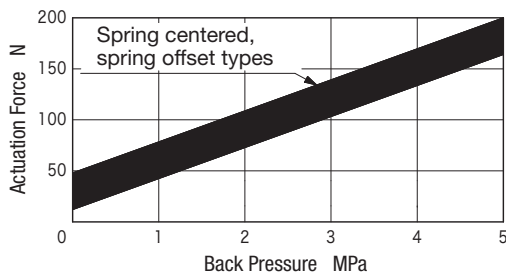
Pressure drop characteristics are the same as DG4V-5 (see page E3-4).

## Switching Times

Switching times are the same as DG4V-5 (see page E3-5).

## Notes on Operation

- Mounting orientation  
No restrictions on valve mounting orientation.
- Solenoid energization  
Always ensure that one side of solenoid is deenergized before energizing the opposite side. For spring centered and spring offset valves, solenoid should be continuously energized during circuit switching. Deenergization of solenoid will cause spool to return to prescribed position by spring force.
- T (tank) port piping  
Prevent abnormal pressure surges above the allowable back pressure rating from being generated in T port. Valve is wet armature type so ensure that valve is always filled with oil.
- Using valves as two-way and three-way  
Valve is designed as four-way and max. flow is limited when using as two or three-way valves. Consult Tokyo Keiki for details.
- Long periods of solenoid energization  
Care should be paid as long periods of solenoid energization at high pressure may cause spool sticking and switching malfunction.
- Malfunctions due to surge pressure  
Avoid combining flows of tank lines prone to surge pressures. Surge pressures in T port may lead to spool malfunctions.
- Manual operation  
For manual switching, push the manual override pin. Be aware that actuation force increases with higher back pressure. (See graph)

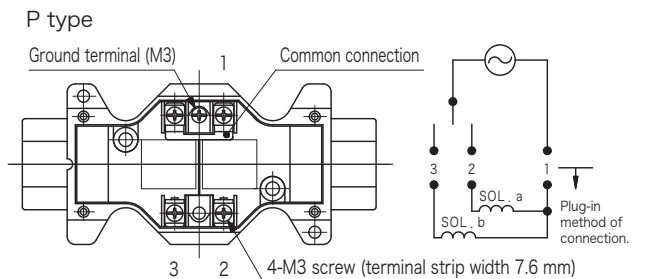


## Subplate

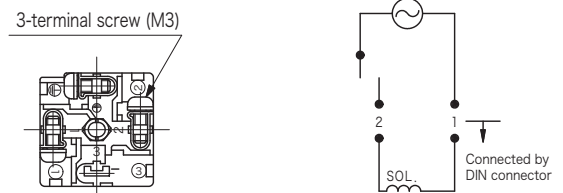
Subplate	Connection Port Dia. Rc
DGSM-01X-10-JA-M	3/8
DGSM-01Y-10-JA-M	1/2

- Subplate and bolts must be ordered separately.
- See page R6-7 for dimensions.
- See page R6-7 for plural mount subplates.
- Max. working pressure is 21 MPa. For higher pressures, valve should be mounted on manifold block.

- Solenoid indicator lamp  
For valves with indicator lamps, the lamps will light when current flows to the solenoid.
- Conduit box wiring  
Solenoid and conduit box are pre-wired. Refer to below diagrams for wiring from power source to conduit box and DIN connectors.



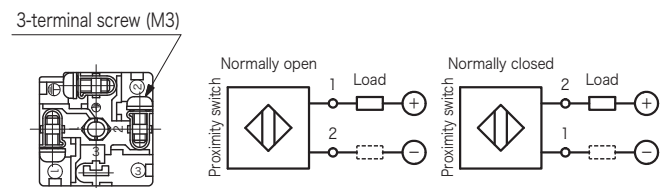
U type (DIN connector) \* The electrical wiring has no polarities.



\* Terminals 1 and 2 have no polarities.

- Proximity sensor wiring method  
For the electrical wiring of the proximity sensor, refer to the figure below, and connect to the DIN connector.

(DIN connector)



### Proximity sensor unit specifications

Output	Selection system: Normally open output or normally closed output
Working pressure	Max. 20.6 MPa
Internal current consumption	Less than 0.8 mA
Internal voltage drop	Less than 4.6 V (under maximum load conditions)
Output current	5 to 100mA (output shorting protection circuit provided)
Supply Voltage	DC 10 to 30 V

## Mounting Bolts (JIS B 1176, Strength Class 12.9)

Hex Socket Bolts	Qty
M6 × 40	4

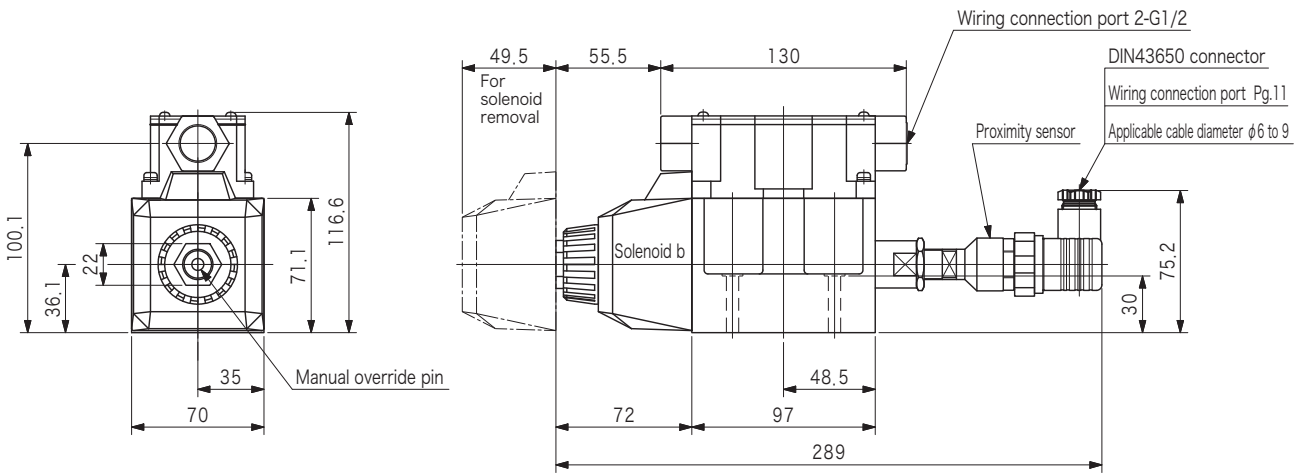
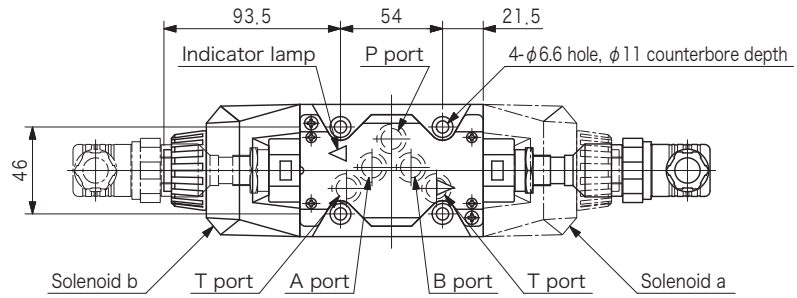
- Mounting bolts must be ordered separately.
- Tightening torque of mounting bolts: 12 to 15 N·m

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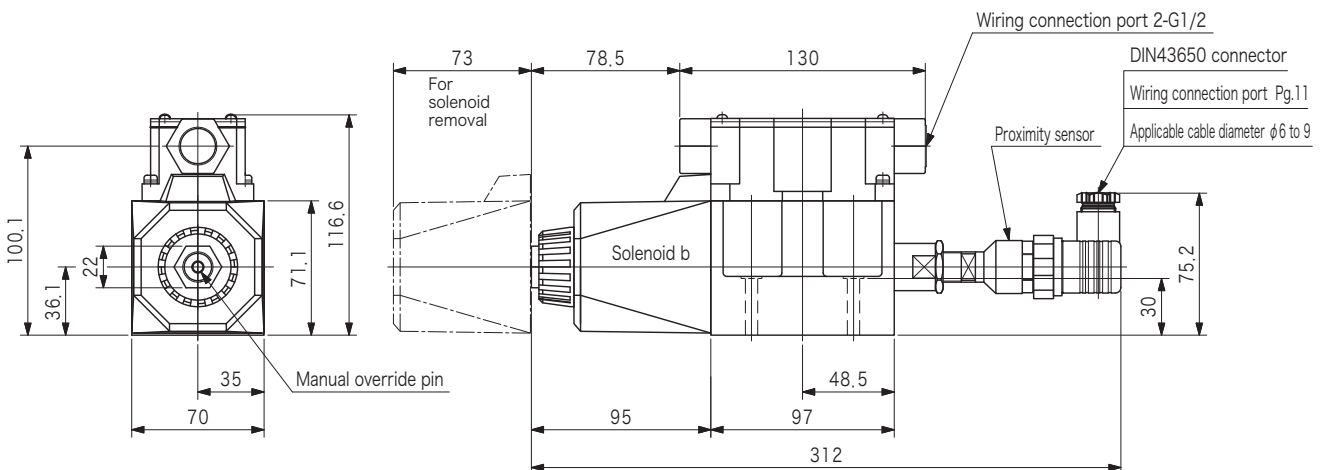
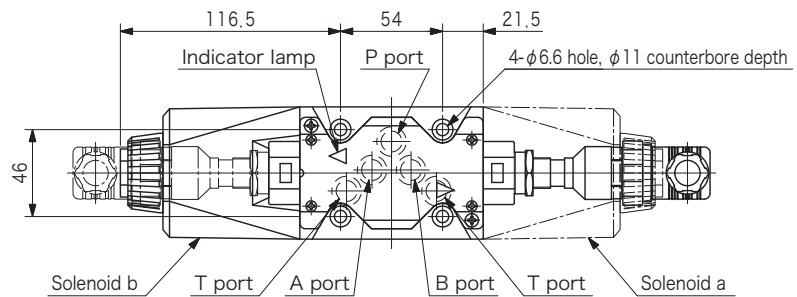
# Dimensions

## ■ P Type Electrical Wiring

- AC Solenoid
  - Spring Offset DG4V-5-\*A/B-M-SW-P\*-\*-6-40 (solid line)
  - Spring Offset DG4V-5-\*AL/BL-M-SW-P\*-\*-6-40 (dashed line)



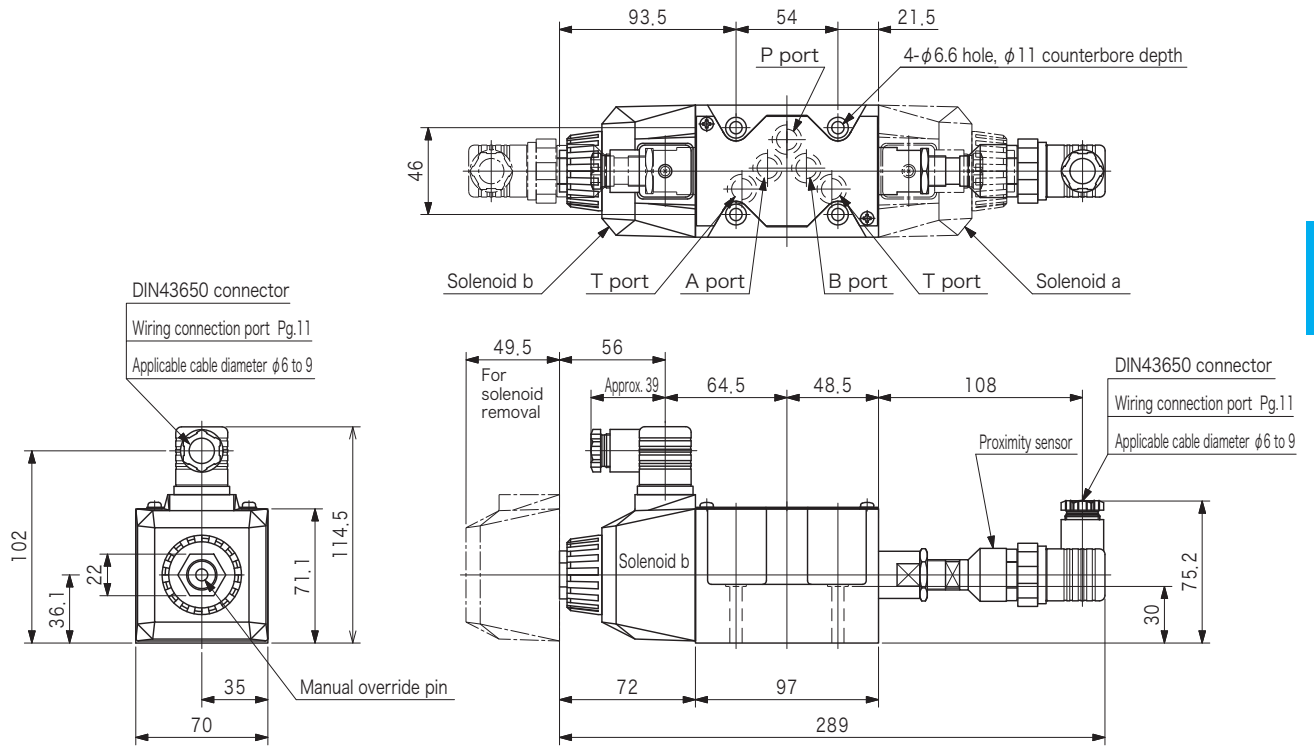
- DC Solenoid
  - Spring Offset DG4V-5-\*A/B-M-SW-P\*-\*-7-40 (solid line)
  - Spring Offset DG4V-5-\*AL/BL-M-SW-P\*-\*-7-40 (dashed line)



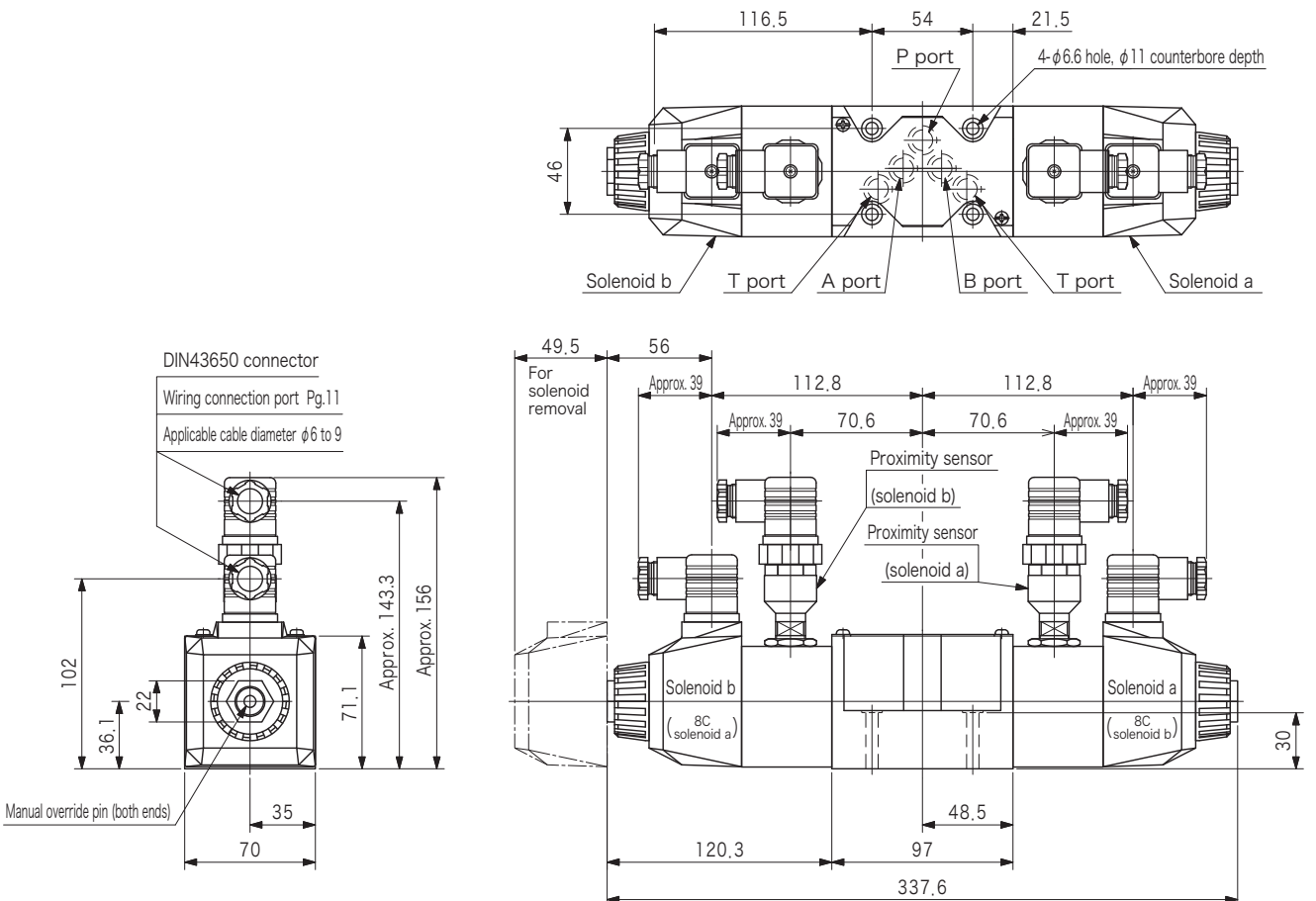
# Dimensions

## U Type Electrical Wiring

- AC Solenoid
- Spring Offset DG4V-5-\*A/B-M-SW-U\*-\*-6-40 (solid line)
- Spring Offset G4V-5-\*AL/BL-M-SW-U\*-\*-6-40 (dashed line)



Spring Centered DG4V-5-\*C-M-SW-U\*-\*-6-40



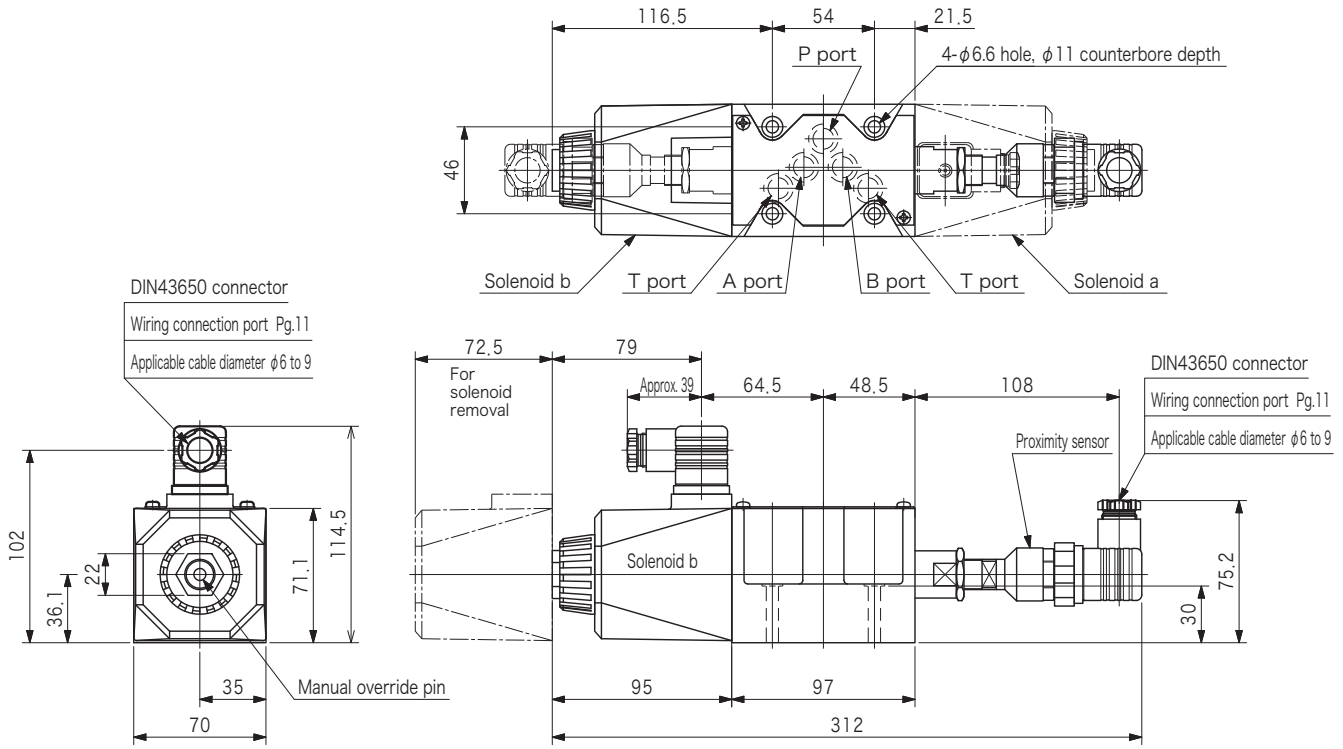
# Dimensions

## U Type Electrical Wiring

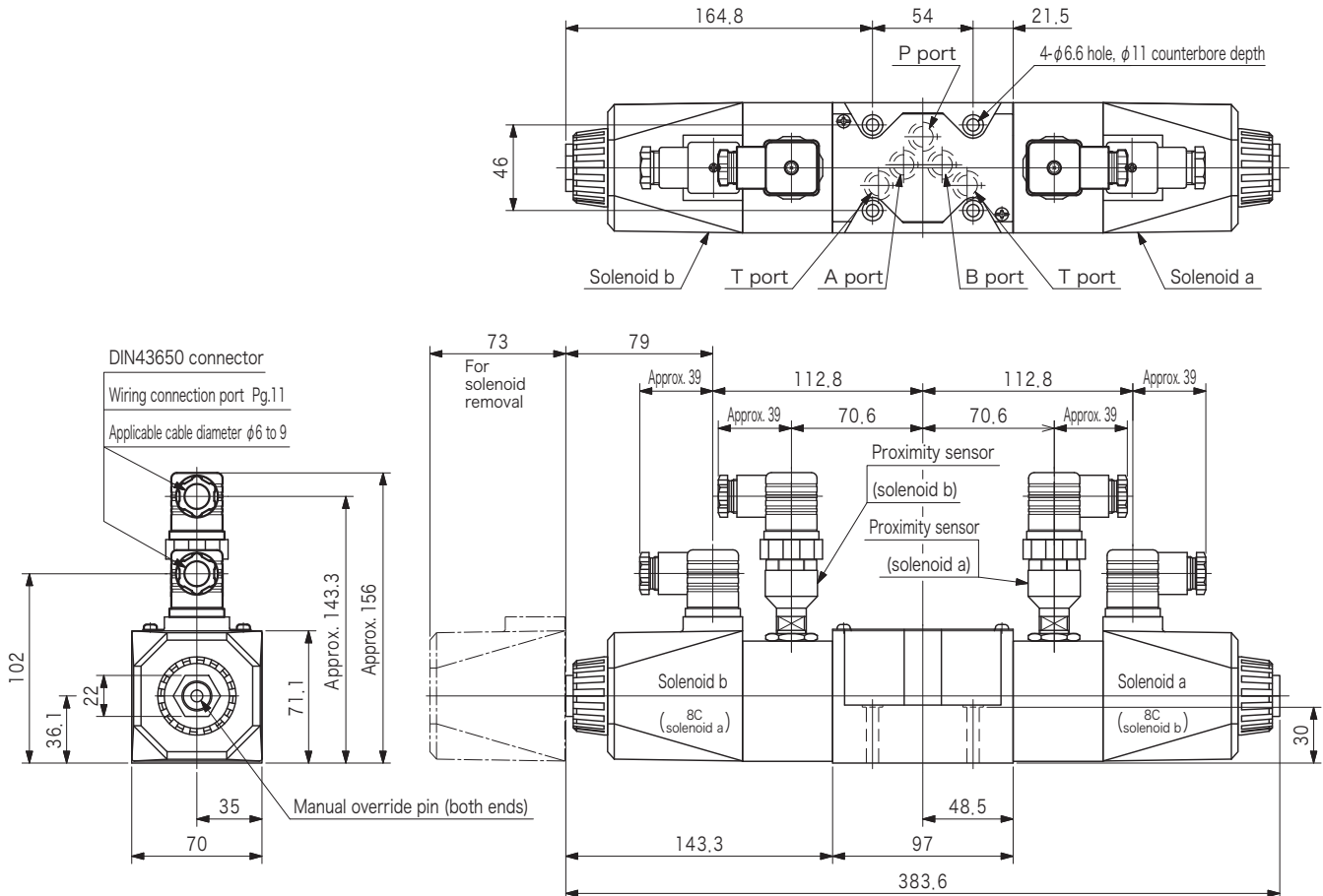
- DC Solenoid
- Spring Offset DG4V-5-\*A/B-M-SW-U\*-\*-7-40 (solid line)
- Spring Offset DG4V-5-\*AL/BL-M-SW-U\*-\*-7-40 (dashed line)

14-6

Directional Control Valves



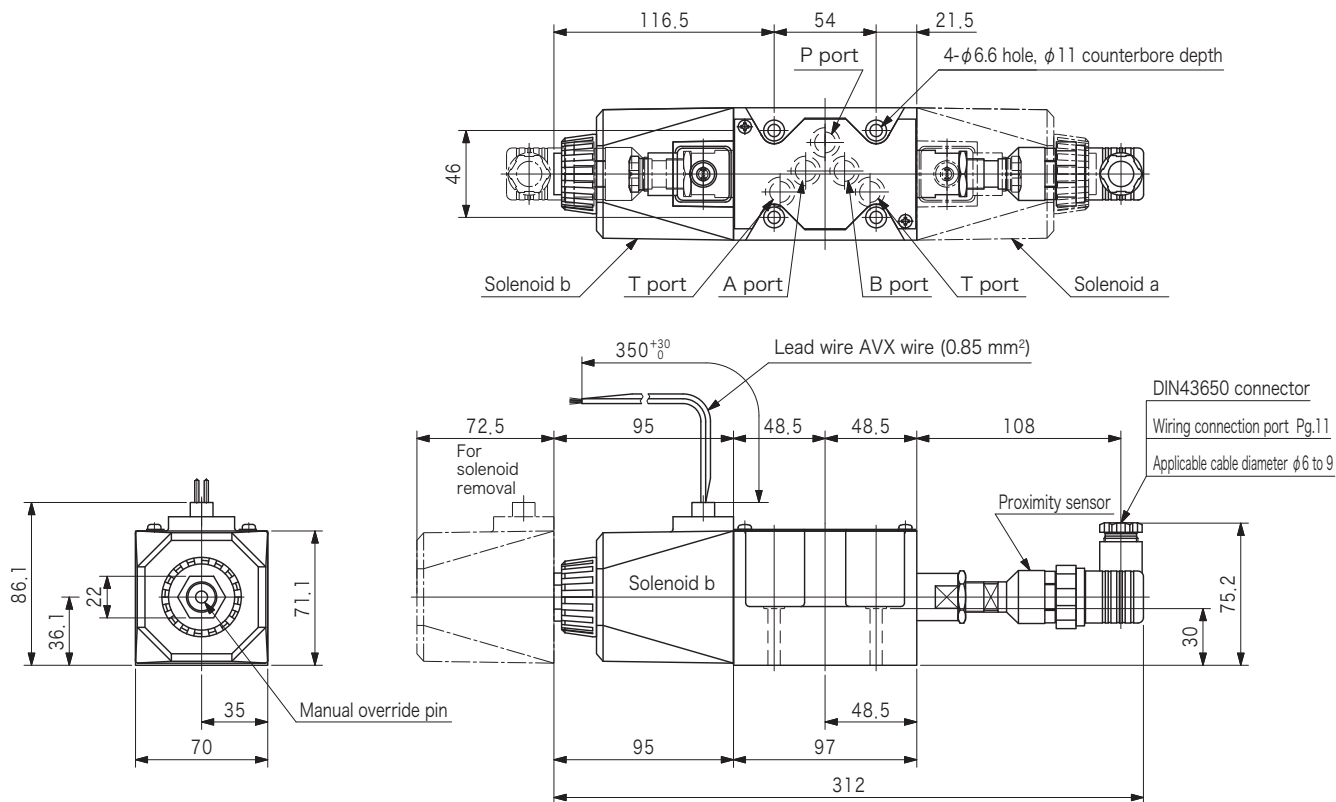
Spring Centered DG4V-5-\*C-M-SW-U\*-\*-7-40



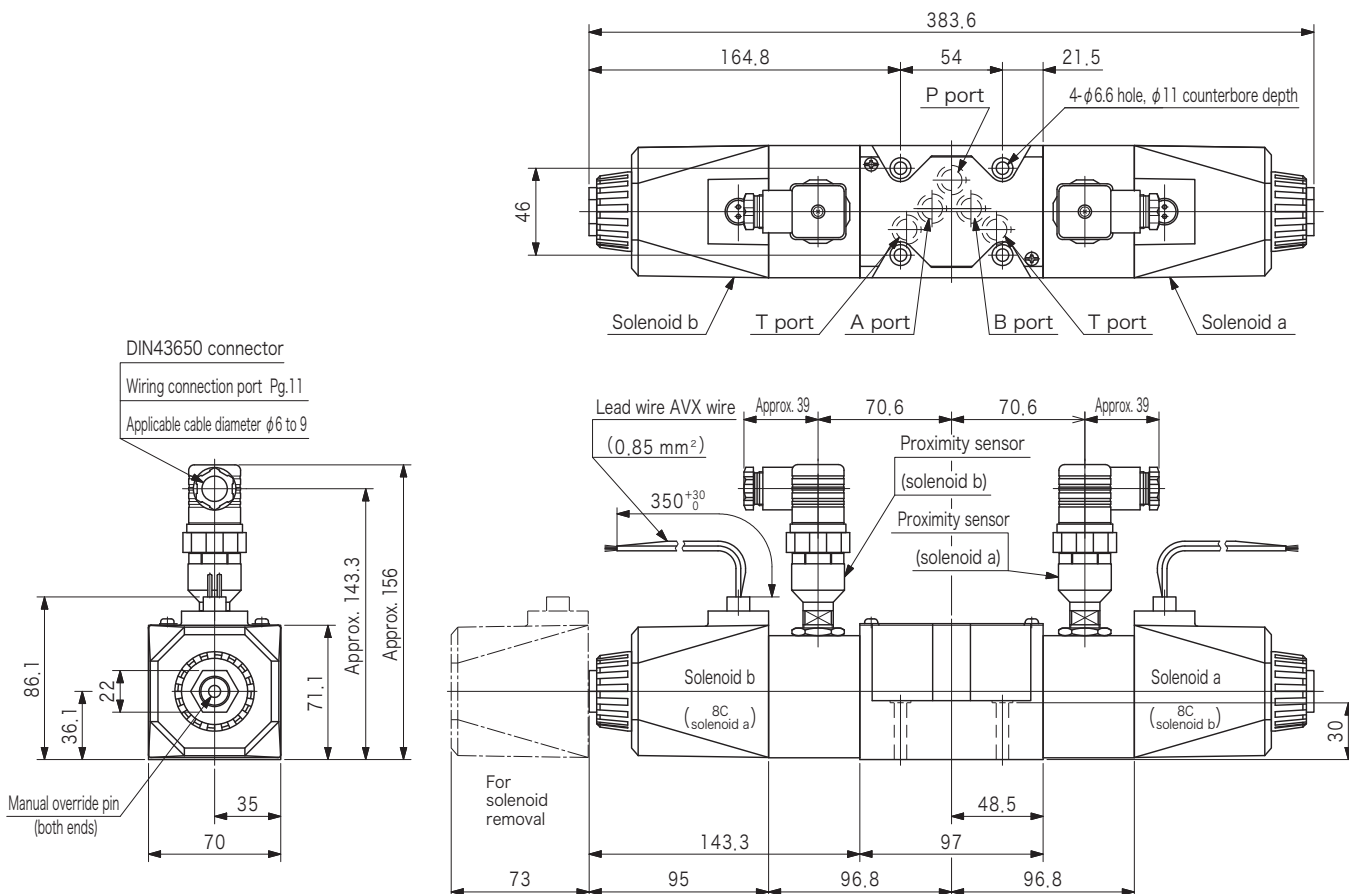
# Dimensions

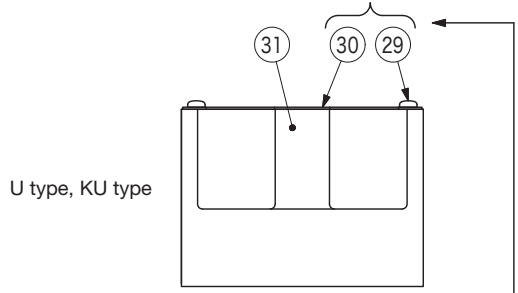
## ■ KU Type Electrical Wiring

- DC Solenoid  
Spring Offset DG4V-5-\*A/B-M-SW-KU\*-\*-7-40 (solid line)  
Spring Offset DG4V-5-\*AL/BL-M-SW-KU\*-\*-7-40 (dashed line)



Spring Centered DG4V-5-\*C-M-SW-KU\*-\*-7-40



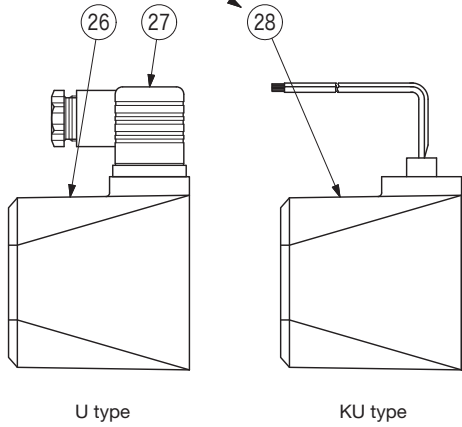
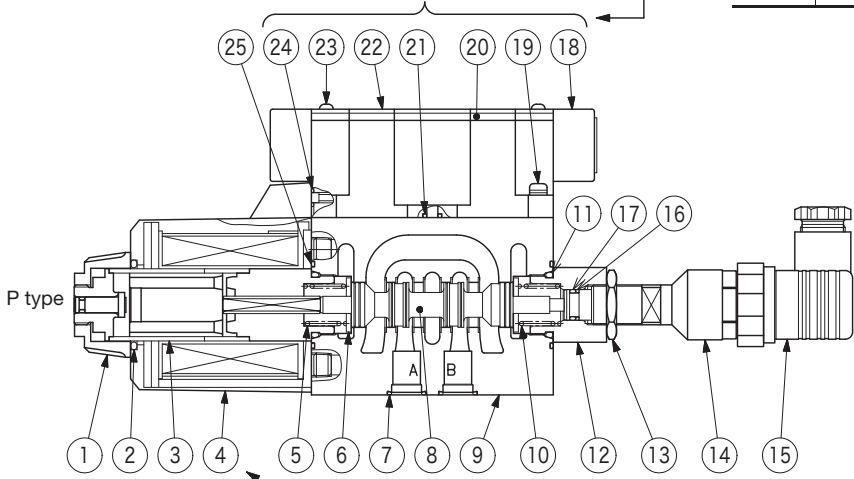


O-ring and backup ring

No.	Part No.	Standard	Qty
			A/B
2	007921617	AS568-216 NBR, Hs70	1
7	007901419	AS568-014 NBR, Hs90	5
11	007911729	AS568-117 FKM, Hs90	2
16	48197570	MS28774-012	1
17	007901219	AS568-012 NBR, Hs90	1
21	007900817	AS568-008 NBR, Hs70	1
24	008000217	JIS B 2401 1A-P4	2
25	007902617	AS568-026 NBR, Hs70	1

Solenoid coil (P type)

No.	Voltage Code	Part No.
4	T	40018923
	B	40018925
	OV	40018924
	D	40018926
	G	40018937
	H	40018938
	R	40018939
	TR	40018940
	BR	40028832
	VR	30018941



Solenoid coil (U type)

No.	Voltage Code	Part No.
26	T	40018974
	B	40018976
	OV	40018975
	D	40018977
	G	40018969
	H	40018970
	R	40018971
	TR	40028810
	BR	40018971
	VR	40028811

Solenoid coil (KU type)

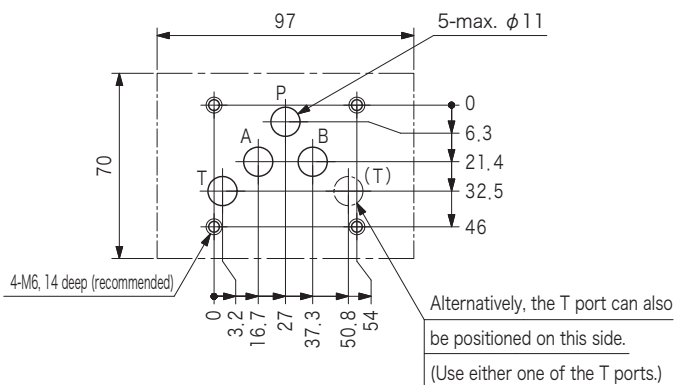
No.	Voltage Code	Part No.
28	KU-G	40028127
	KU-H	40028128
	KU4-G	40028311
	KU4-H	40028312

Proximity sensor

No.	Part No.
14	40025407

● Mounting dimensions

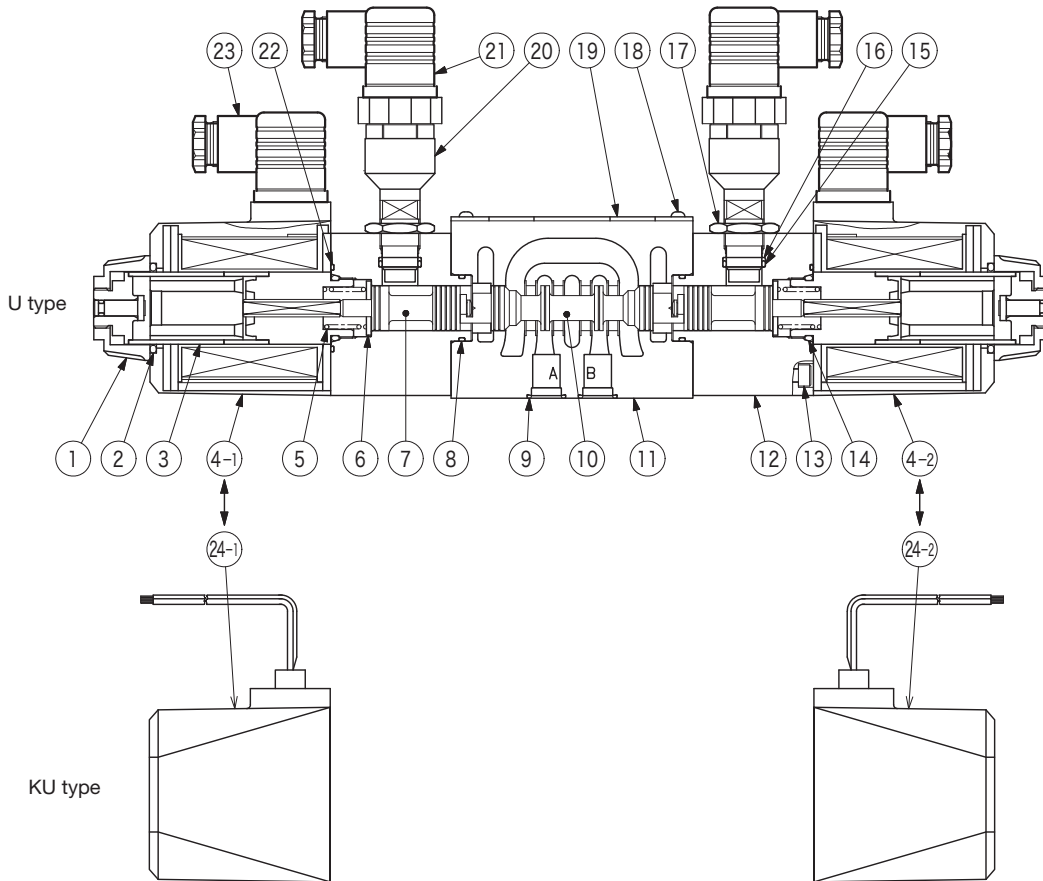
Conforming to ISO 4401-AC-05-4-A



● Mounting surface machining accuracy

Surface Roughness	1.6 μm Ra	
Flatness	Less than 0.01 (□ per 100 mm)	
Permissible Tolerance	Mounting bolt hole: ±0.1 Ports: ±0.2	





O-ring and backup ring

No.	Part No.	Standard	Qty
			C
2	007921617	AS568-216 NBR, Hs70	2
8	007902119	AS568-021 NBR, Hs90	2
9	007901419	AS568-014 NBR, Hs90	5
14	007911729	AS568-117 FKM, Hs90	2
15	007901519	AS568-015 NBR, Hs90	2
16	VP197573	-	2
22	007902617	AS568-026 NBR, Hs70	2

Solenoid coil (U type)

No.	Voltage Code	Part No.
4	T	40018974
	B	40018976
	OV	40018975
	D	40018977
	G	40018969
	H	40018970
	R	40018971
	TR	40028810
	BR	40018971
	VR	40028811

Solenoid coil (KU type)

No.	Voltage Code	Part No.
24	KU-G	40028127
	KU-H	40028128
	KU4-G	40028311
	KU4-H	40028312

Proximity sensor

No.	Part No.
20	40021069