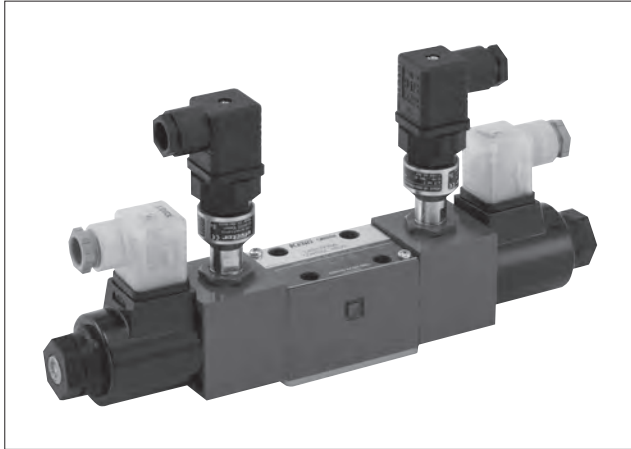


Solenoid operated directional control valves with spool position monitoring DG4V-3-SW



- 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-3-2A(L)-M-SW-P2-T-7-(P08)-54

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
3: ISO 4401-03
- 3 Spool type
See page E13-2 to E13-3
- 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	KU
A type/AL type	○	○	○
B type/BL type	○	○	○
C type	×	○	○

- : Electrical wiring method that can be selected
×: 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)
2: With indicator lamp (AC standard)
4: With surge suppressor (electrical wiring KU, slow solenoid deenergize)

- 7: With indicator lamp and surge suppressor (DC standard)
9: ADC solenoid rectifier (fast solenoid deenergization), indicator lamp and surge suppressor
12: ADC solenoid rectifier (slow solenoid deenergization), indicator lamp and surge suppressor

Table of electrical accessories which can be selected

Electrical Wiring System	Solenoid Power Supply	Electrical Accessories						
		Omitted	1	2	4	7	9	12
P	AC	○	×	◎	×	○	×	×
	DC	○	×	○	×	◎	×	×
	AC/DC conversion	×	×	×	×	×	○	○
U	AC	○	○	○	×	○	×	×
	DC	○	○	×	×	○	×	×
	AC/DC conversion	×	×	×	×	×	×	○
KU	DC	○	×	×	○	×	×	×

- ◎: Standard
○: Electrical accessory which can be selected
×: Electrical accessory which cannot be selected

- 9 Solenoid voltage
See page E2-2
- 10 Allowable T port back pressure
7: 20.6 MPa
- 11 Port orifice (option)
Omit: no port orifices (standard)
Port orifices
<Example 1> P08 (8.0 mm orifice in P port)
└┬┘ Orifice diameter
Port (A, B, P and T)
<Example 2> B12 (1.2 mm orifice in B port)
<Example 3> 2 port combinations
Combination sequence, PTAB
P10T12, P08B10

- 12 Design no.

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-3-SW	35	See Pressure-Flow Characteristics	20.6	300	300	120	AC	DC	AC	DC
							1.8	1.9	3.3	3.5

Solenoid Specifications

Solenoid specifications are same as DG4V-3. See page E2-2.

Spool Types and Pressure-Flow Characteristics

AC Solenoid (applied voltage is 90% of rated, frequency is 60 Hz)

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 -	7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa	
0		DG4V-3-0C-SW 	DG4V-3-0B-SW 	DG4V-3-0BL-SW 	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
2		DG4V-3-2C-SW 	DG4V-3-2B-SW 	DG4V-3-2BL-SW 	100	100	100	100	100	80	32	20	15	10	80	32	20	15	10
6		DG4V-3-6C-SW 	DG4V-3-6B-SW 	DG4V-3-6BL-SW 	80	80	80	80	80	80	34	23	16	10	80	34	23	16	10
7		DG4V-3-7C-SW 	DG4V-3-7B-SW 	DG4V-3-7BL-SW 	100	100	100	100	100	70	21	14	12	10	70	21	14	12	10

Spool Transient Condition	Model Code, Functional Symbol		Max. Flow L/min															
	2 Position		A, AL					A					AL					
	Spring Offset, A Type		P → A (B port block)					P → A (B port block)					P → B (A port block)					
	- A -	- AL -	7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa	
0		DG4V-3-0A-SW 	DG4V-3-0AL-SW 	80	80	80	80	80	60	60	60	60	60	80	80	80	80	80
2		DG4V-3-2A-SW 	DG4V-3-2AL-SW 	80	80	80	63	60	50	15	10	10	10	80	40	26	22	20

Note: Max. flow refers to limit flow without valve malfunction for valve switching.

Spool Types and Pressure-Flow Characteristics

DC, AC-DC Rectifier Solenoid (applied voltage 90% of rated)

Spool Center Position	Model Code, Functional Symbol			Max. Flow L/min															
	3 Position	2 Position																	
	Spring Centered	Spring Offset, B Type																	
	- C -	- B -	- BL -	7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa	
0	 DG4V-3-0C-SW 	 DG4V-3-0B-SW 	 DG4V-3-0BL-SW 	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
2	 DG4V-3-2C-SW 	 DG4V-3-2B-SW 	 DG4V-3-2BL-SW 	100	100	100	100	100	80	45	30	23	19	80	45	30	23	19	
6	 DG4V-3-6C-SW 	 DG4V-3-6B-SW 	 DG4V-3-6BL-SW 	80	80	80	52	42	80	60	38	27	23	80	60	38	27	23	
7	 DG4V-3-7C-SW 	 DG4V-3-7B-SW 	 DG4V-3-7BL-SW 	100	100	100	100	100	70	21	14	12	10	70	21	14	12	10	

Spool Transient Condition	Model Code, Functional Symbol		Max. Flow L/min																				
	2 Position																						
	Spring Offset, A Type																						
	- A -	- AL -	7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa	7MPa	14MPa	21MPa	28MPa	35MPa	
0	 DG4V-3-0A-SW 	 DG4V-3-0AL-SW 	80	80	80	80	80	60	60	60	60	60	80	80	80	80	80	80	80	80	80	80	80
2	 DG4V-3-2A-SW 	 DG4V-3-2AL-SW 	80	80	80	63	60	50	15	10	10	10	80	40	26	22	20						

Note: • Max. flow refers to limit flow without valve malfunction for valve switching.
 • For KU4 coil, it may differ from this table.

Characteristics Curve

Pressure Drop Characteristics

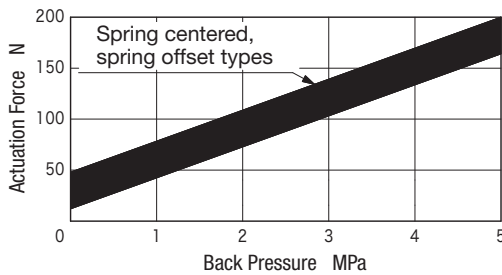
Pressure drop characteristics are the same as DG4V-3 (see page E2-8).

Switching Times

Switching times are the same as DG4V-3 (see page E2-8).

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
Side Piping	DGSM-01X-10-JA-M	3/8
Bottom Piping	DGSM-01Y-10-JA-M	

- 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.

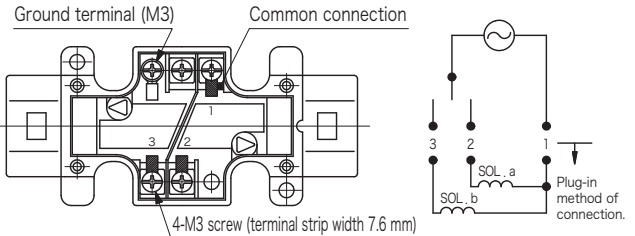
Mounting Bolts (JIS B 1176, Strength Class 12.9)

Hex Socket Bolts	Qty
M5 × 50	4

- Mounting bolts must be ordered separately.
- Tightening torque of mounting bolts: 7 to 8 N·m

- **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.

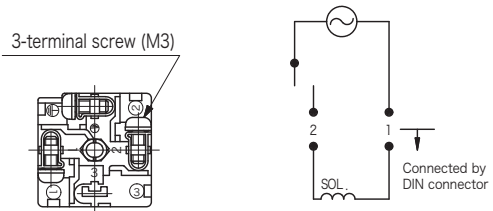
P type



* The electrical wiring has no polarities.

U type

(DIN connector)

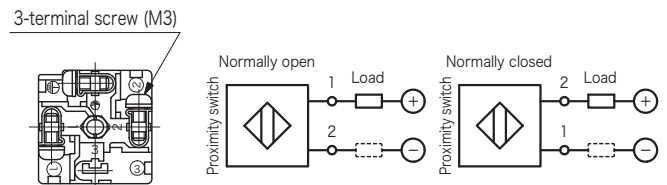


* Terminals 1 and 2 have no polarities.

- **Proximity sensor wiring method**

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

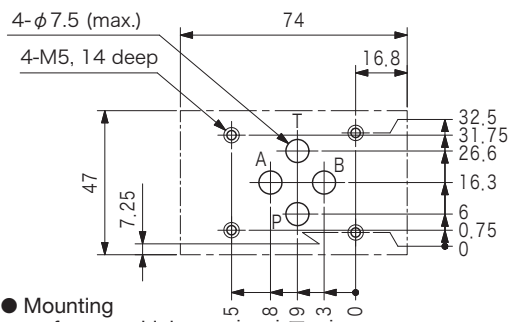
(DIN connector)



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 100 mA (output shorting protection circuit provided)
Supply Voltage	DC 10 to 30 V

Mounting dimensions



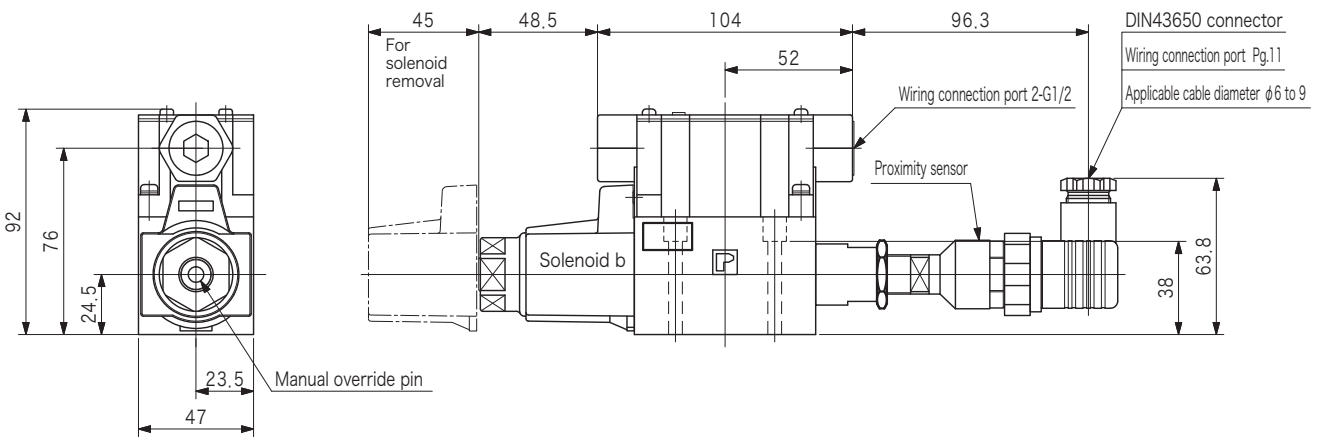
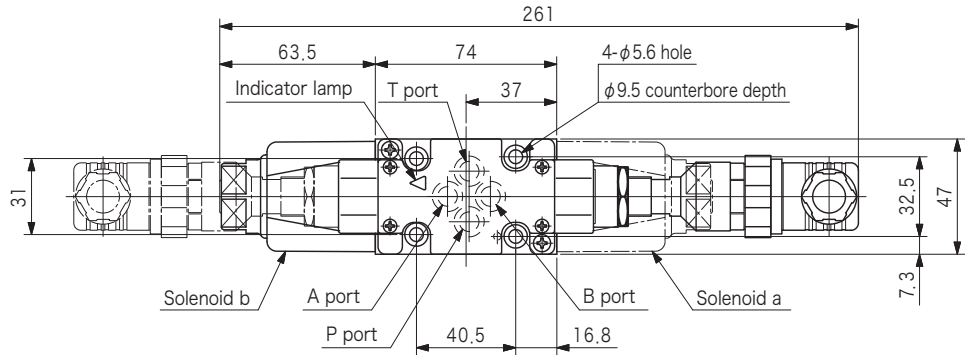
Mounting surface machining accuracy

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

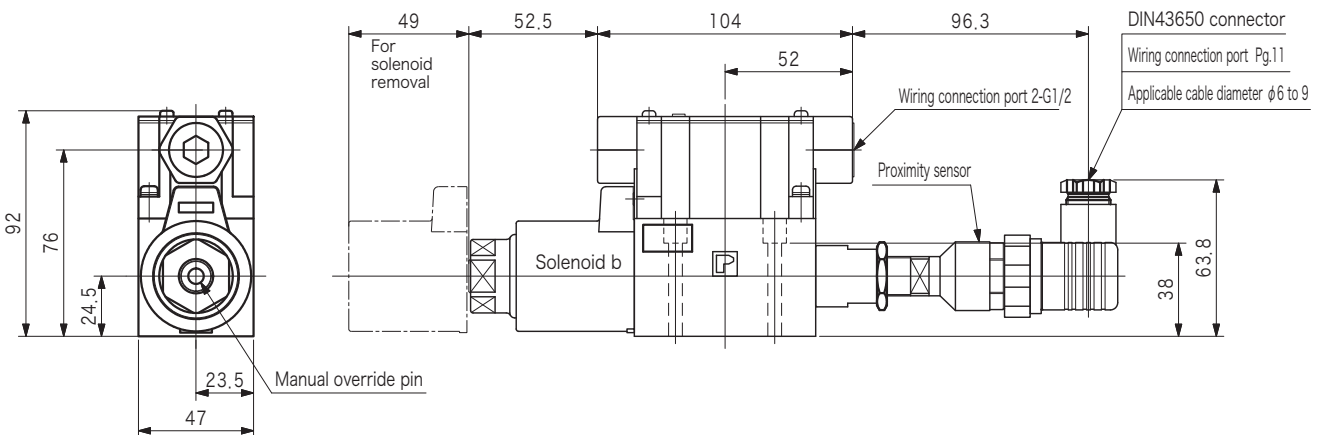
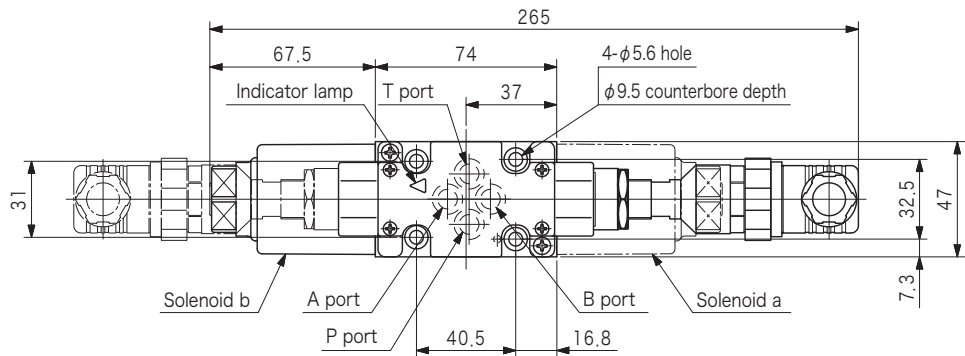
Dimensions

■ P Type Electrical Wiring

- AC Solenoid
 - Spring Offset DG4V-3-*A/B-M-SW-P* (solid line)
 - Spring Offset DG4V-3-*AL/BL-M-SW-P* (dashed line)



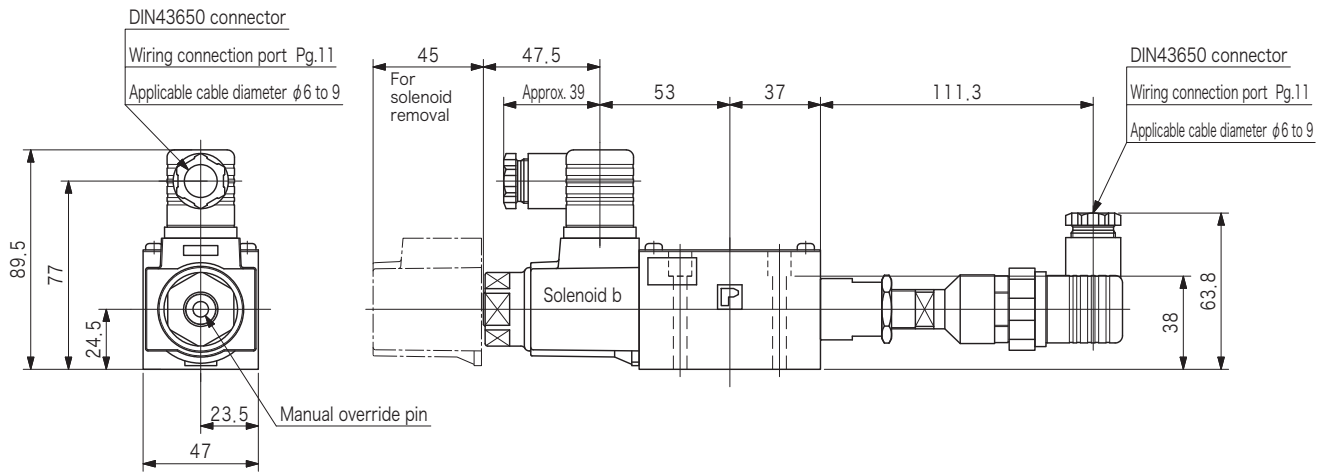
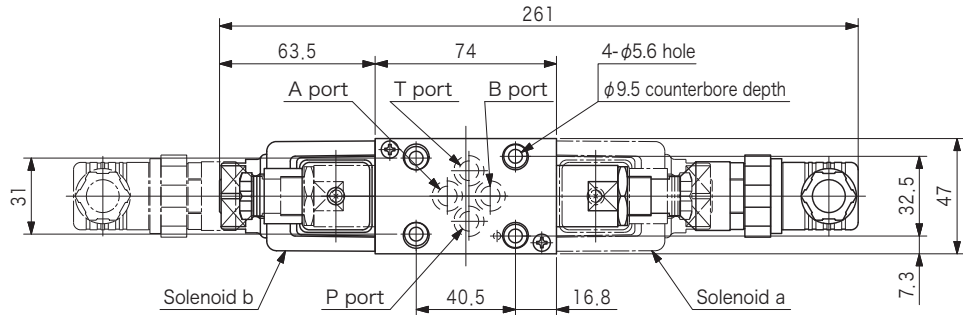
- DC Solenoid
 - Spring Offset DG4V-3-*A/B-M-SW-P* (solid line)
 - Spring Offset DG4V-3-*AL/BL-M-SW-P* (dashed line)



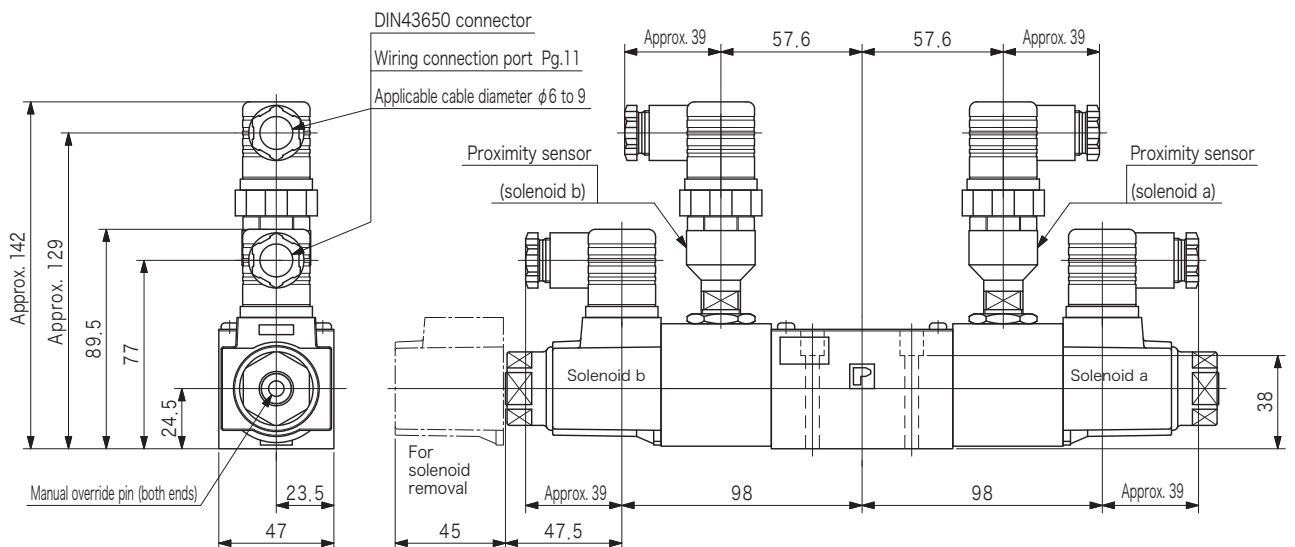
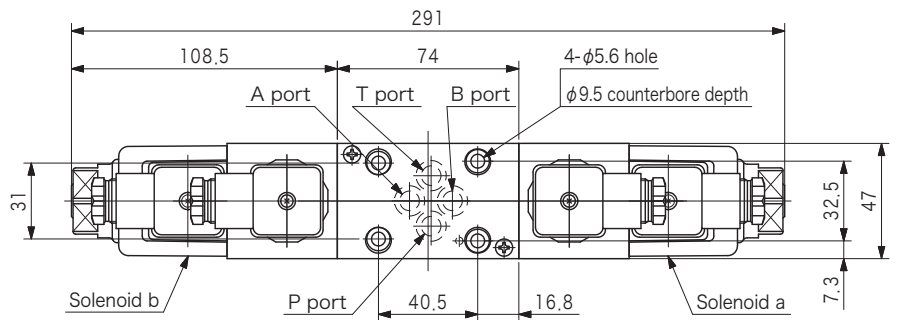
Dimensions

U Type Electrical Wiring

- AC Solenoid
 - Spring Offset DDG4V-3-*A/B-M-SW-U* (solid line)
 - Spring Offset DG4V-3-*AL/BL-M-SW-U* (dashed line)



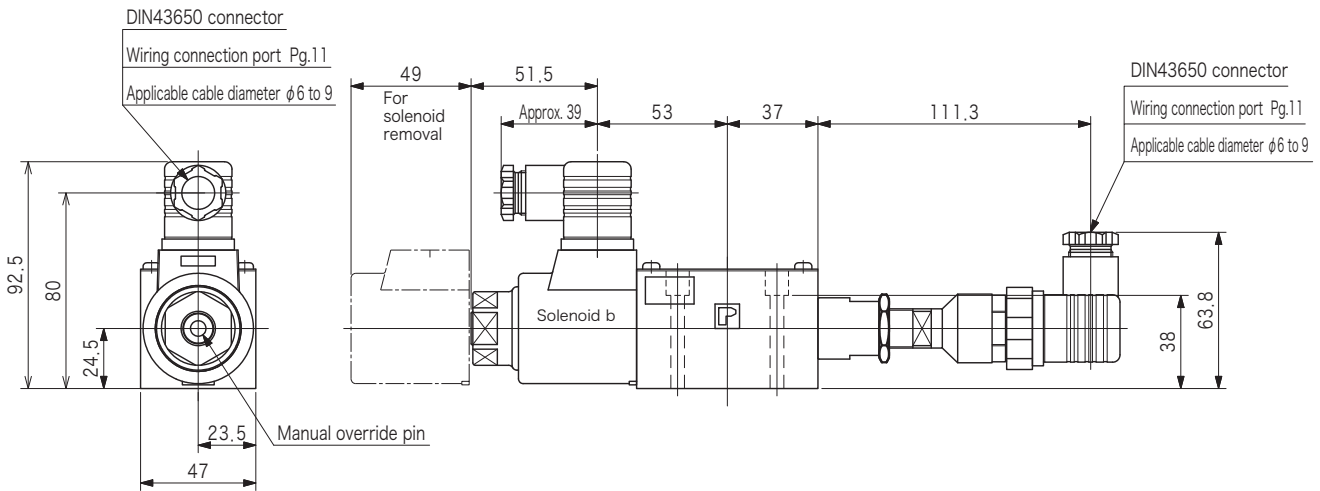
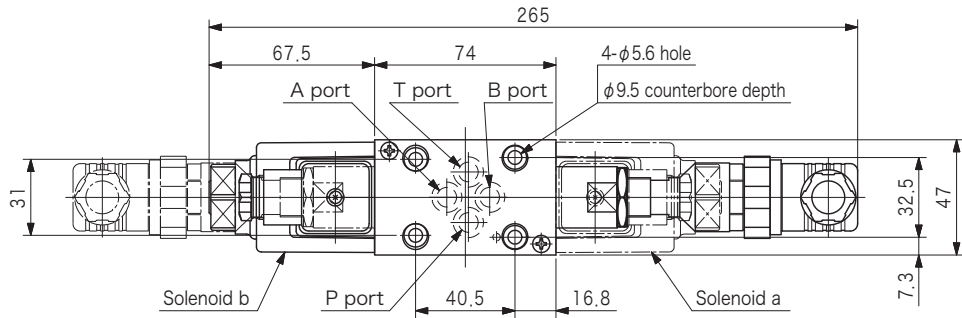
Spring Centered DG4V-3-*C-M-SW-U*



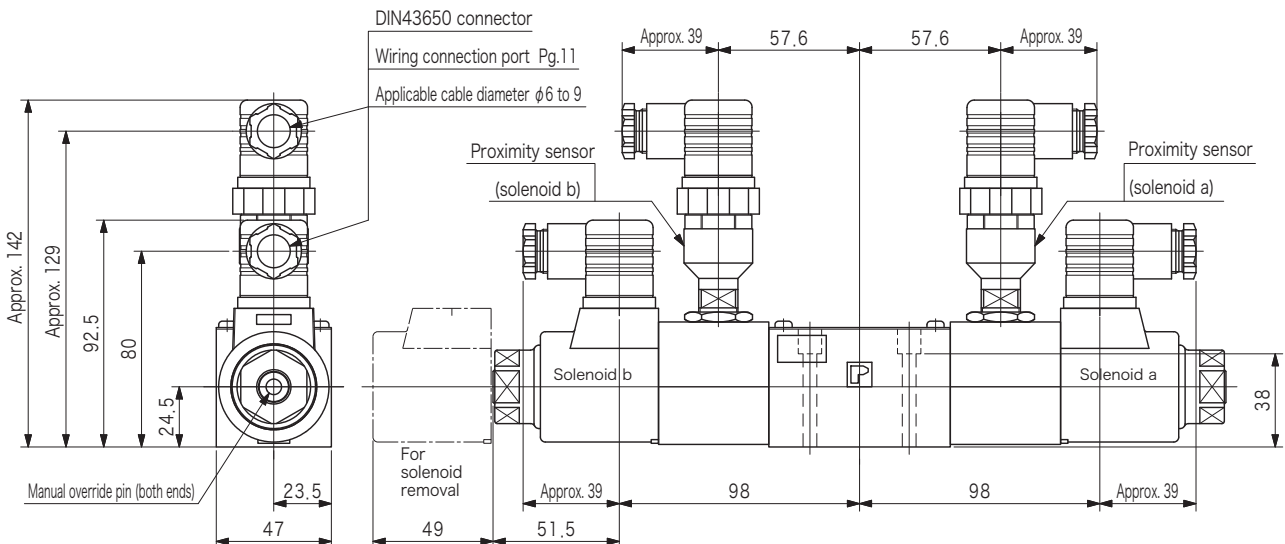
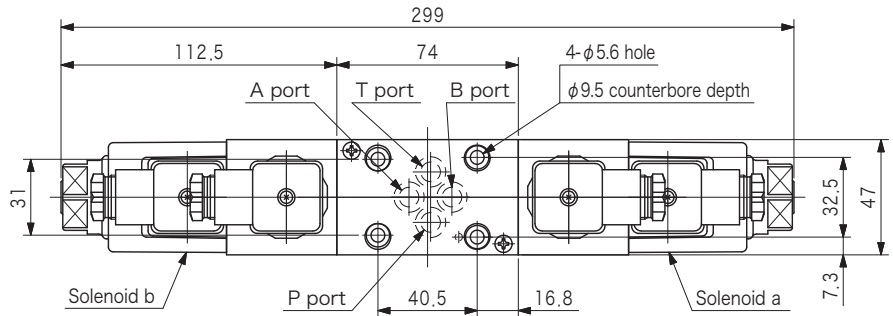
Dimensions

U Type Electrical Wiring

- DC Solenoid
- Spring Offset DG4V-3-*A/B-M-SW-U* (solid line)
- Spring Offset DG4V-3-*AL/BL-M-SW-U* (dashed line)



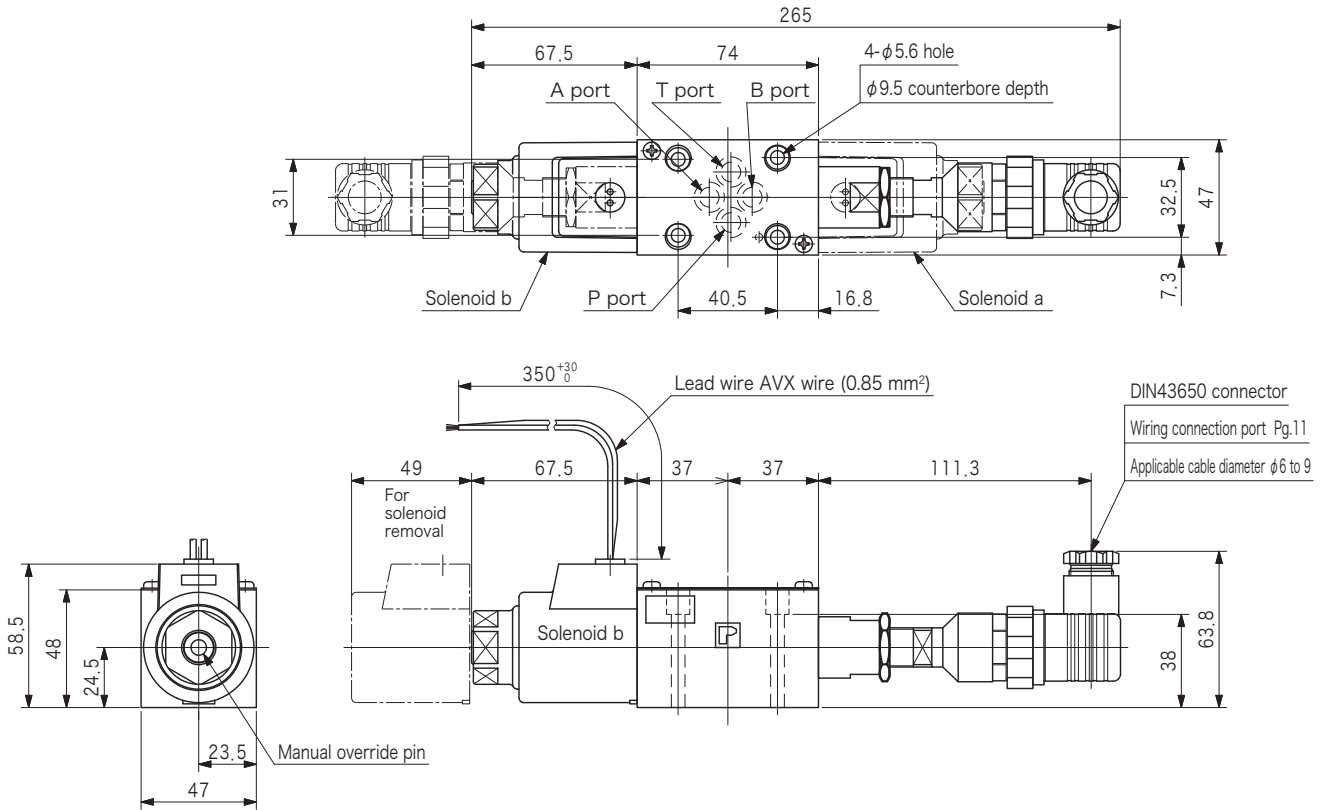
Spring Centered DG4V-3-*C-M-SW-U*



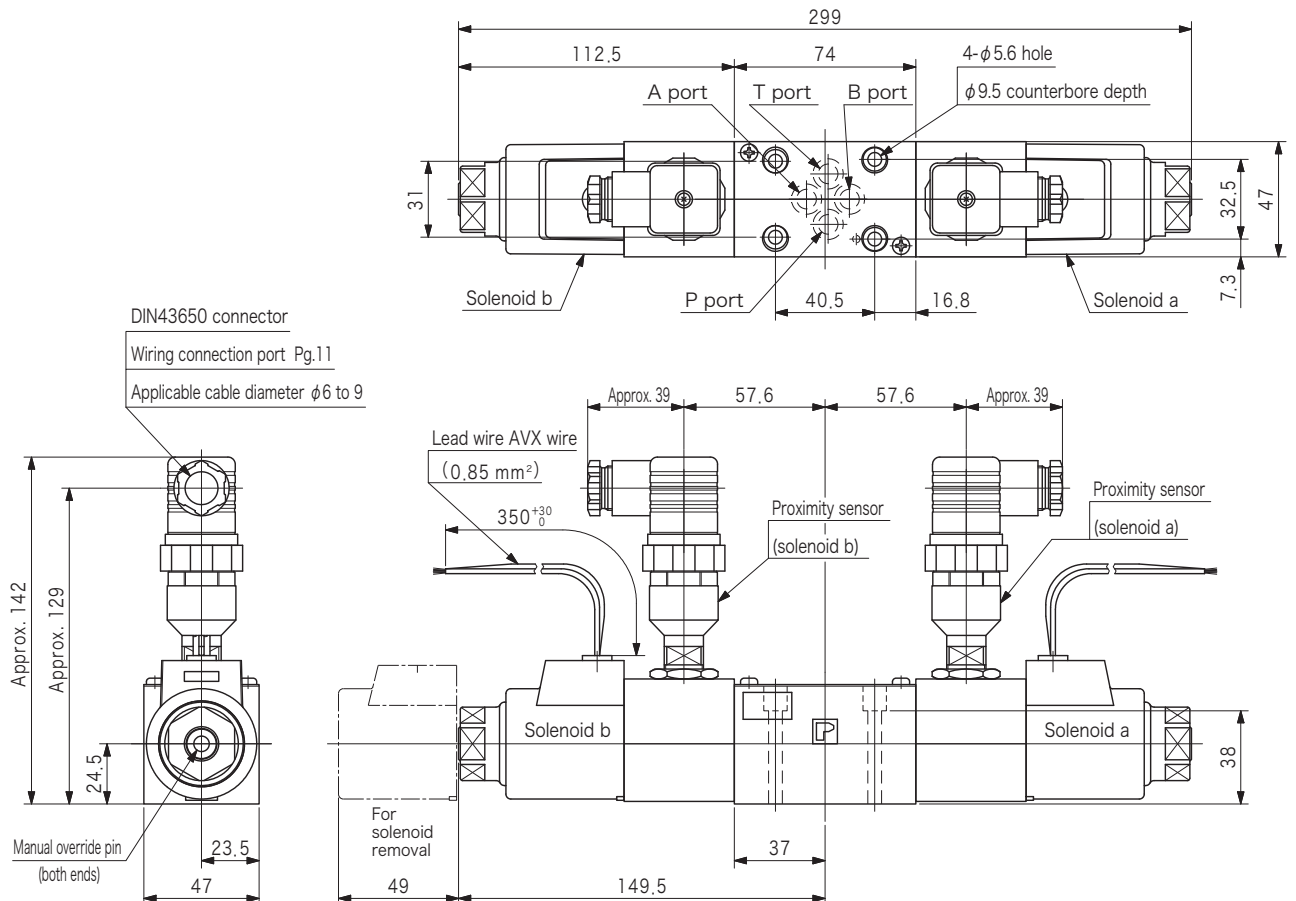
Dimensions

KU Type Electrical Wiring

- DC Solenoid
Spring Offset DG4V-3-*A/B-M-SW-KU* (solid line)
Spring Offset DG4V-3-*AL/BL-M-SW-KU* (dashed line)



Spring Centered DG4V-3-*C-M-SW-KU*

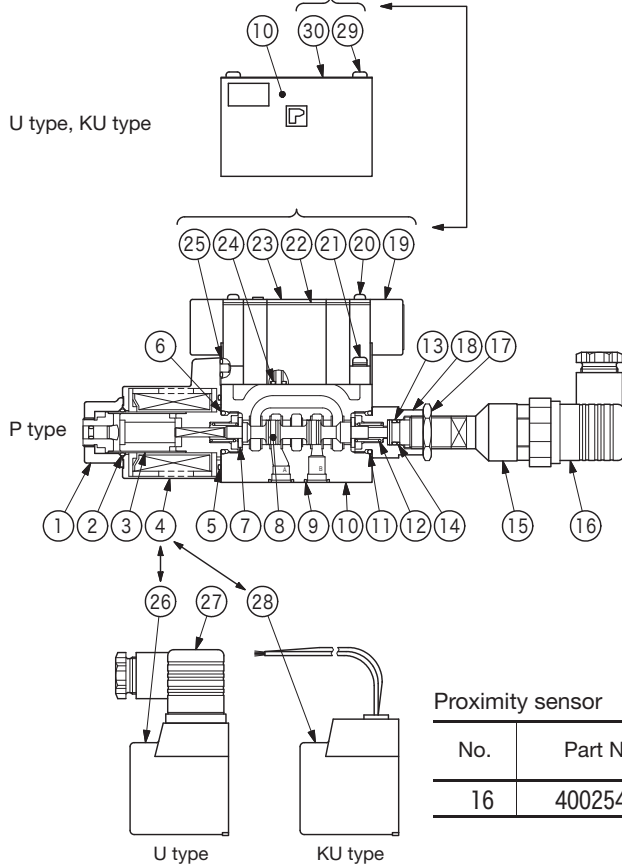


Construction

O-ring and backup ring

No.	Part No.	Standard	Qty
			A/B
2	008001817	JIS B 2401 1A-P20	1
5	007902617	AS568-026 NBR, Hs70	1
6	007911429	AS568-114 FKM, Hs90	1
9	007901219	AS568-012 NBR, Hs90	4
11	007911419	AS568-114 NBR, Hs90	1
13	007901219	AS568-012 NBR, Hs90	1
14	48197570	MS28774-012	1
24	007900817	AS568-008 NBR, Hs70	1
25	008000217	JIS B 2401 1A-P4	2

Spring Offset



Solenoid coil (P type)

No.	Voltage Code	Part No.
4	T	40078310
	B	40078311
	V	40078312
	D	40078313
	G	40078304
	H	40078305
	R	40078307
	TR	40078308
	BR	40078307
VR	40078309	

Solenoid coil (U type)

No.	Voltage Code	Part No.
26	T	40078320
	B	40078321
	V	40078322
	D	40078323
	G	40078314
	H	40078315
	R	40078317
	TR	40078318
	BR	40078317
VR	40078319	

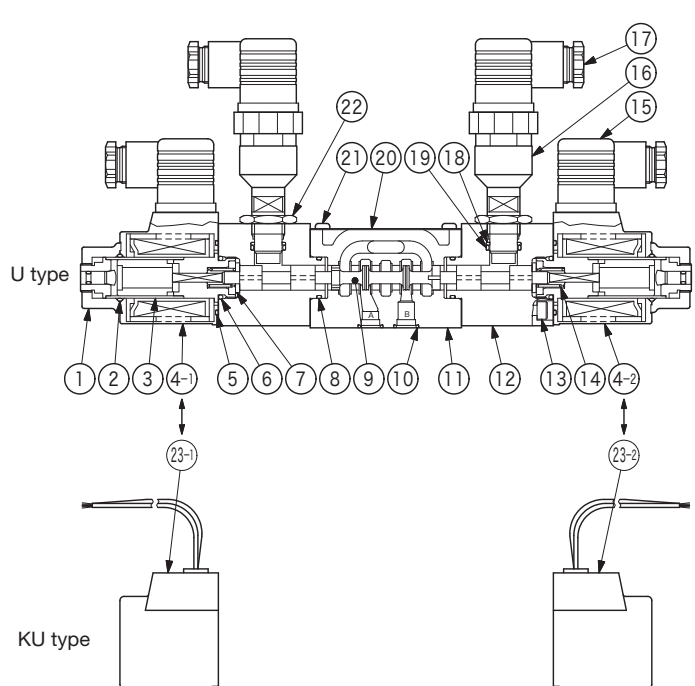
Solenoid coil (KU type)

No.	Voltage Code	Part No.
28	KU-G	40078324
	KU-H	40078325
	KU4-G	40078326
	KU4-H	40078327

O-ring and backup ring

No.	Part No.	Standard	Qty
			C
2	008001817	JIS B 2401 1A-P20	2
5	007902617	AS568-026 NBR, Hs70	2
6	007911429	AS568-114 FKM, Hs90	2
8	007901719	AS568-017 NBR, Hs90	2
10	007901219	AS568-012 NBR, Hs90	4
18	VP197573	-	2
19	007901519	AS568-015 NBR, Hs90	2

Spring Centered



Solenoid coil (U type)

No.	Voltage Code	Part No.
4	T	40078320
	B	40078321
	V	40078322
	D	40078323
	G	40078314
	H	40078315
	R	40078317
	TR	40078318
	BR	40078317
VR	40078319	

Solenoid coil (KU type)

No.	Voltage Code	Part No.
23	KU-G	40078324
	KU-H	40078325
	KU4-G	40078326
	KU4-H	40078327

Proximity sensor

No.	Part No.
16	40021069