

SOLENOID OPERATED DIRECTIONAL VALVES - DSG-01 70 / 7090 SERIES



1/8" Sub-plate mounting. Mounting surface: ISO 4401-03-02-0-94, CETOP 3. NFPA-D01

■ FEATURE HIGHLIGHTS AND COMPARISON

	7090 Design	6090 Design (old)	
High Pressure	5075 PSI	4570 PSI	Port P, A, B
High Back Pressure	3045 PSI	2320 PSI	Port T
High Flow Rate	26.4 GPM	16.6 GPM	Both AC & DC
Low Pressure Drop	130 PSI	145 PSI	15.8 GPM, P to A
Power Consumption	29 W	29 W	DC Solenoid
Overall Length	8.05 inch	8.27 inch	DC Solenoid
Mass	4.1 lb	4.9 lb	Double Solenoid
Protection	IP65	IP64	
Approval	UL, CSA, CE	UL, CSA, CE	

AVAILABLE IN THE FOLLOWING TYPES

Standard Type	DSG-01
Low Energy Consumption	L-DSG-01
Soft Shift Type	S-DSG-01
Electrical Relay Inc. Type	T-DSG-01

■ FEATURES

These Solenoid Operated Directional Valves feature high pressure, high flow, high speed, low energy consumption and low pressure drop. These features are achieved using powerful, wet pin type solenoids and state-of-the-art flow channel designs.

- **Standard type:** Useable at high pressure: 5075 PSI and high flow: 26.4 U.S.GPM
- **Soft Shift type:** Noise at spool changeover and vibration in piping is reduced to a minimum.

Stable operation

With a strong magnet and spring force, the valves are tough against contamination and ensure a stable operation.

Solenoids

• AC Solenoids

50 to 60 Hz common service solenoids do not require rewiring when frequency is changed.

• DC Solenoids

These DC solenoids have incorporated surge absorbers. Advantages are:

- ⇒ Surge voltage can be controlled at a very low figure and electronic control devices, such as a computer, can be used without any noise interference.
- ⇒ Sparkless contacts extend the life of the relay.
- ⇒ Time lag for spool return after de-energization of the solenoid is very short.

• R Type Solenoids

These are rectifier and surge absorber incorporated direct

current solenoids which can be used by connecting directly to the AC power source. They have, like other DC solenoids, such advantages that the sound in on-off operation is quite low and the coils are rarely burnt out even if the spool is stuck at the half way point of its changeover. Moreover, they can be used almost permanently without being affected by a surge voltage from the outside. Thus, they are the solenoids of high reliability and durability.

- **Solenoid Insulation Class:** Class H

• Solenoid Connectors

⇒ (DIN connector)

The solenoid connectors conform to the international standard ISO 4400 (Three-pin electrical plug connectors). All valves with this option come standard with the DIN connectors included.

⇒ Terminal Box Connection

The terminal box connection incorporates the use of removable coils that connect to a terminal strip within the electrical conduit box via two sealed pins molded into the coils. This allows for easy removal of the coils without requiring re-wiring of the terminals. The terminal strip includes internal grounds that may be used to reduce wiring. All valves with the terminal box option come standard with indicator lights and dual 1/2" NPT ports to allow for conduit connections to the terminal box.

⇒ Lead Wire Connection

The lead wire connection uses a pair of 20 gauge wires per coil, each 15.7 inches in length.



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■ RATINGS

Valve Type	Model Numbers	Max. Flow (US GPM)	Max. Oper. Press. (PSI)	Max T-Line Back Press. (PSI)	Max Change Over Frequency Cyc./min.	Approx. Mass (Lb)	Protection IEC 529
Standard Type	(F)-DSG-01-3C*-*-7090	26.1*	5075	3045	300	4.1	IP65
	(F)-DSG-01-2D2*-*-7090					3.1	
	(F)-DSG-01-2B*-*-7090					4.1	
Soft Shift Type	(F)-S-DSG-01-3C*-*-7090	16.6*	3625		120	4.1	
	(F)-S-DSG-01-2B*-*-7090					3.1	

*The maximum flow depends on the type of spool and the operating condition. Refer to the list of spool functions Maximum Flow Rate tables for details.

■ SOLENOID RATINGS

Electrical Source	Coil Type	Freq. Hz	Voltage (V)		Current and Power				
			Source Rating	Serviceable Range	Inrush (A)	Holding (A)	Power (W)		
AC	A100	50	100	80~110	2.42	0.51	-		
			100	90~120	2.14	0.37			
			110		2.35	0.44			
	A120	60	50	96~132	2.02	0.42			
			120	108~144	1.78	0.31			
	A200	50	200	160~220	1.21	0.25			
			200	180~240	1.07	0.19			
			220		1.18	0.22			
	A240	50	240	192~264	1.01	0.21			
			60	216~288	0.89	0.15			
	DC			12	10.8~13.2	-		2.45	29
				24	21.6~26.4			1.23	
48				43.2~52.8	0.61				
100				90~110	0.296				
110				99~121	0.27				
200				180~220	0.149				
220				198~242	0.135				
AC to DC Rectified	50 / 60	R100	100	90~110	-	0.33	29		
		R110	110	99~121		0.30			
		R200	200	180~220		0.16			
		R220	220	198~242		0.15			

■ Insulation class: H

■ ORIFICES

Orifices can be inserted in either P, A, B or T ports. However, in such cases, differential pressure at the orifice should be set less than 3050 PSI.

In cases where an orifice is inserted in the T-port, tank line pressure in the valve should be less than the specified maximum T-line back pressure.

In the event that differential pressure at the orifice exceeds 3050 PSI, consult Yuken for specific design valve which has threaded P, A, & B ports.

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MODEL NUMBER DESIGNATION

F	S	DSG	-01	-2	B	2	A	-D24	-C	-N	-P10	-70	90	-L
Special Seals	Valve Type	Series Number	Valve Size	Number of Valve Positions	Spool Spring Arrangement	Spool Type (See page 5 & 7 for available spool types)	Special Two position valve (Omit if not required)	Coil Type	Manual Override	Electrical connection	Port Orifice ⁴	Design Number	Design Standard	Models with Reverse Mounting of Sol.
F: For phosphate ester type fluids (omit if not required)	None: Standard Type S: Soft Shift Type	DSG: Solenoid operated oil valve	01	3: Three position	C: Spring Centered	2, 3, 4, 40, 60, 9, 10, 11, 12	A ¹ B	AC: A100 A120 A200 A240 DC D12 D24 D100 R: R100 R110	None: Manual Override Pin C: Push Button & Lock Assy P: Flush Pin with Rubber Dust Cover	None: Terminal Box Type None: 15.7 in. lead wire type (See design standard) N: Plug-in Connector Type (DIN) N1 ² : Plug-in Connector Type with Indicator Light BH: 3 or 5 pin Mini Plug-in Connector ³	None: No Orifice A ^{**} B ^{**} Or P ^{**}	70	None: Japanese Standard 90: North American Standard 905: CSA Approval 912: 15.7 in. lead wire option	L
				2: Two position	D: No Spring Detented B: Spring Offset	2								
3: Three position	C: Spring Centered	2, 4, 40, 60	A ¹ B	DC D12 D24 D100 R: R100 R110	C: Spring Centered B: Spring Offset	2, 3, 8	A ¹ B	None: Terminal Box Type None: 15.7 in. lead wire type (See design standard) N: Plug-in Connector Type (DIN) N1 ² : Plug-in Connector Type with Indicator Light BH: 3 or 5 pin Mini Plug-in Connector ³	None: No Orifice A ^{**} B ^{**} Or P ^{**}	70	None: Japanese Standard 90: North American Standard 905: CSA Approval 912: 15.7 in. lead wire option	L		
2: Two position	B: Spring Offset	2											A ¹ B	DC D12 D24 D100 R: R100 R110

1 Special two position spools are available. Refer to "Valves with Center Position and one offset position" for details.
 2 N1 is not available for R type solenoids.
 3 Mini Plug-in connector. 3-Pin for Single Solenoid, 5-Pin for Double Solenoid. See page 11 for details.
 4 A for "A" Port, B for "B" Port, & P for "P" Port Orifice. Indicate orifice size in millimeters.

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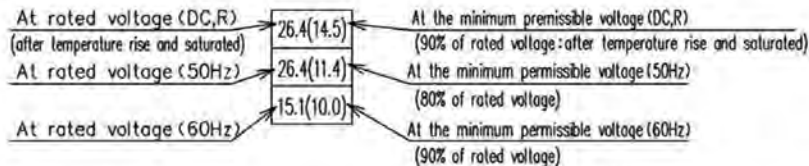
■ MAXIMUM FLOW RATES FOR STANDARD VALVES

Number of Valve Position Spool-Spring Arrangement	Spool Functions Graphic Symbols	Maximum Flow Rate U.S.GPM																			
		P→A (B) →B (A) →T					P→A					P→B									
		Operating Pressure PSI					Operating Pressure PSI					Operating Pressure PSI									
		1450	2320	3625	4570	5075	1450	2320	3625	4570	5075	1450	2320	3625	4570	5075					
Three Positions Spring Centred	3C2 	26.4	26.4	26.4	26.4	26.4	26.4(14.5)	11.9(9.2)	7.4(6.1)	6.6(5.0)	5.8(4.5)	26.4(14.5)	11.9(9.2)	7.4(6.1)	6.6(5.0)	5.8(4.5)	26.4(14.5)	11.9(9.2)	7.4(6.1)	6.6(5.0)	5.8(4.5)
		26.4	26.4	26.4	26.4	26.4	26.4(11.4)	26.4(10.8)	21.1(5.5)	15.9(4.5)	10.0(4.0)	26.4(11.4)	26.4(10.8)	21.1(5.5)	15.9(4.5)	10.0(4.0)	26.4(11.4)	26.4(10.8)	21.1(5.5)	15.9(4.5)	10.0(4.0)
	3C3 	26.4(21.1)	26.4(21.1)	26.4(21.1)	26.4(21.1)	26.4(21.1)	20.6(18.5)	20.6(18.5)	20.6(18.5)	20.6(18.5)	19.8(18.5)	20.6(18.5)	20.6(18.5)	20.6(18.5)	20.6(18.5)	19.8(18.5)	20.6(18.5)	20.6(18.5)	20.6(18.5)	20.6(18.5)	19.8(18.5)
		23.8(16.6)	23.8(16.6)	23.8(16.6)	23.8(16.6)	23.8(16.6)	11.9(7.9)	11.9(7.9)	11.9(7.9)	11.9(7.9)	11.9(7.9)	11.9(7.9)	11.9(7.9)	11.9(7.9)	11.9(7.9)	11.9(7.9)	11.9(7.9)	11.9(7.9)	11.9(7.9)	11.9(7.9)	11.9(7.9)
	3C4 	23.8	23.8	23.8	23.8	23.8	26.4(16.4)	15.3(12.7)	10.0(7.9)	8.2(6.6)	7.7(6.1)	26.4(16.4)	15.3(12.7)	10.0(7.9)	8.2(6.6)	7.7(6.1)	26.4(16.4)	15.3(12.7)	10.0(7.9)	8.2(6.6)	7.7(6.1)
		23.8	23.8	23.8	23.8	23.8	26.4(10.0)	20.1(7.4)	17.7(4.0)	15.1(2.6)	9.2(1.8)	26.4(10.0)	20.1(7.4)	17.7(4.0)	15.1(2.6)	9.2(1.8)	26.4(10.0)	20.1(7.4)	17.7(4.0)	15.1(2.6)	9.2(1.8)
	3C40 	22.5	22.5	22.5	22.5	22.5	26.4(10.6)	22.5(9.2)	22.5(9.2)	15.9(4.2)	14.5(3.2)	22.5(10.6)	22.5(9.2)	22.5(9.2)	15.9(4.2)	14.5(3.2)	22.5(10.6)	22.5(9.2)	22.5(9.2)	15.9(4.2)	14.5(3.2)
		21.1	21.1	21.1	21.1	21.1	16.8(4.0)	6.6(2.6)	18.5(6.9)	13.2(6.3)	8.5(4.2)	16.8(4.0)	6.6(2.6)	18.5(6.9)	13.2(6.3)	8.5(4.2)	16.8(4.0)	6.6(2.6)	18.5(6.9)	13.2(6.3)	8.5(4.2)
	3C60 	11.4(6.1)	11.4(6.1)	11.1(6.1)	11.1(6.1)	11.1(6.1)	14.2(8.4)	14.2(8.4)	13.7(8.4)	13.7(8.4)	13.7(8.4)	14.2(8.4)	14.2(8.4)	14.2(8.4)	13.7(8.4)	13.7(8.4)	14.2(8.4)	13.7(8.4)	13.7(8.4)	13.7(8.4)	13.7(8.4)
		10.6(6.1)	10.6(6.1)	10.0(6.1)	9.5(6.1)	9.2(6.1)	12.7(7.9)	12.4(7.9)	12.4(7.9)	12.4(7.9)	12.4(7.9)	12.7(7.9)	12.4(7.9)	12.4(7.9)	12.4(7.9)	12.4(7.9)	12.7(7.9)	12.4(7.9)	12.4(7.9)	12.4(7.9)	12.4(7.9)
	3C9 	26.4	26.4	26.4	26.4	26.4	5.3	4.0	2.6	2.6	2.1	5.3	4.0	2.6	2.6	2.1	5.3	4.0	2.6	2.6	2.1
		26.4	26.4	26.4	26.4	26.4	5.3	4.0	2.6	2.6	2.1	5.3	4.0	2.6	2.6	2.1	5.3	4.0	2.6	2.6	2.1
3C10 	22.5	22.5	22.5	22.5	22.5	10.6(5.3)	26.4(18.6)	14.8(11.4)	9.5(7.4)	7.4(5.3)	6.3(5.0)	26.4(18.6)	14.8(11.4)	9.5(7.4)	7.4(5.3)	6.3(5.0)	26.4(18.6)	14.8(11.4)	9.5(7.4)	7.4(5.3)	
	26.4	26.4	26.4	26.4	26.4	26.4(16.6)	26.4(8.7)	26.4(13.2)	26.4(9.8)	26.4(5.3)	20.6(4.2)	16.4(3.4)	26.4(13.2)	26.4(9.8)	26.4(5.3)	20.6(4.2)	16.4(3.4)	26.4(13.2)	26.4(9.8)	26.4(5.3)	
3C11 	26.4	26.4	26.4	26.4	26.4	6.1	5.3	3.4	2.6	1.3	26.4(22.5)	15.9(12.2)	10.6(8.5)	9.5(7.4)	8.5(6.3)	26.4(22.5)	15.9(12.2)	10.6(8.5)	9.5(7.4)	8.5(6.3)	
	26.4	26.4	26.4	26.4	26.4	6.1	5.3	3.4	2.6	1.3	26.4(17.2)	22.5(13.7)	19.0(11.9)	17.2(9.0)	15.9(7.1)	26.4(17.2)	22.5(13.7)	19.0(11.9)	17.2(9.0)	15.9(7.1)	
3C12 	22.5	22.5	22.5	22.5	22.5	10.6(5.3)	26.4(18.6)	14.8(11.4)	9.5(7.4)	7.4(5.3)	6.3(5.0)	26.4(18.6)	14.8(11.4)	9.5(7.4)	7.4(5.3)	6.3(5.0)	26.4(18.6)	14.8(11.4)	9.5(7.4)	7.4(5.3)	
	26.4	26.4	26.4	26.4	26.4	26.4(16.6)	26.4(8.7)	26.4(13.2)	26.4(9.8)	26.4(5.3)	20.6(4.2)	16.4(3.4)	26.4(13.2)	26.4(9.8)	26.4(5.3)	20.6(4.2)	16.4(3.4)	26.4(13.2)	26.4(9.8)	26.4(5.3)	
Two Positions Spring Offset	2D2 	19.8(18.5)	19.8(18.5)	19.8(18.5)	19.8(18.5)	19.8(18.5)	11.9	11.9	10.6(7.9)	7.9(6.6)	7.1(5.8)	13.2	13.2(11.9)	13.2(11.1)	11.9(10.6)	11.9(10.6)	13.2	13.2(11.9)	13.2(11.1)	11.9(10.6)	11.9(10.6)
		21.1	21.1	21.1	21.1	21.1	11.9	11.9	11.9(5.5)	11.9(4.2)	10.0(3.4)	13.2	13.2(11.9)	13.2(11.1)	11.9(10.6)	11.9(10.6)	13.2	13.2(11.9)	13.2(11.1)	11.9(10.6)	11.9(10.6)
2B2 	22.5	22.5	22.5	22.5	22.5	5.3	4.2	4.2	4.0	3.4	22.5(16.6)	21.1(13.2)	16.6(10.6)	11.6(8.5)	11.6(8.5)	22.5(16.6)	21.1(13.2)	16.6(10.6)	11.6(8.5)	11.6(8.5)	
	22.5	22.5	22.5	22.5	22.5	5.3	4.2	4.2	4.0	3.4	22.5(7.9)	15.9(8.7)	13.2(7.4)	10.6(7.4)	10.6(7.4)	22.5(7.9)	15.9(8.7)	13.2(7.4)	10.6(7.4)	10.6(7.4)	
2B3 	18.5	18.5	18.5	18.5	18.5	13.2	13.2	13.2	13.2	13.2	19.8(17.2)	19.8(17.2)	19.8(17.2)	19.8(17.2)	19.8(17.2)	19.8(17.2)	19.8(17.2)	19.8(17.2)	19.8(17.2)	19.8(17.2)	
	18.5	18.5	18.5	18.5	18.5	13.2	13.2	13.2	13.2	13.2	21.1(18.5)	21.1(18.5)	21.1(18.5)	21.1(18.5)	21.1(18.5)	21.1(18.5)	21.1(18.5)	21.1(18.5)	21.1(18.5)	21.1(18.5)	
2B8 	18.5	18.5	18.5	18.5	18.5	13.2	13.2	13.2	13.2	13.2	18.5(12.7)	18.5(12.7)	18.5(12.7)	18.5(12.7)	18.5(12.7)	18.5(12.7)	18.5(12.7)	18.5(12.7)	18.5(12.7)	18.5(12.7)	
	-	-	-	-	-	6.9	4.5	3.4	2.9	2.6	14.0(9.2)	9.2(7.9)	6.1(4.5)	5.0(3.4)	4.5(3.2)	14.0(9.2)	9.2(7.9)	6.1(4.5)	5.0(3.4)	4.5(3.2)	
		-	-	-	-	6.9	4.5	3.4	2.9	2.6	21.1(13.2)	18.5(10.6)	15.9(5.3)	11.9(2.6)	7.9(2.6)	21.1(13.2)	18.5(10.6)	15.9(5.3)	11.9(2.6)	7.9(2.6)	
		-	-	-	-	6.9	4.5	3.4	2.9	2.6	9.2(5.3)	6.1(4.0)	4.0(2.1)	2.6(1.3)	1.8(1.3)	9.2(5.3)	6.1(4.0)	4.0(2.1)	2.6(1.3)	1.8(1.3)	

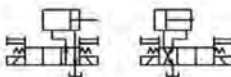
Note 1. Maximum flow rate and applied current.

- Upper : DC,R
 - Middle : AC,50Hz
 - Lower : AC,60Hz
- () is added to the case where maximum flow rate differs to voltage.
The figure outside () is at rated voltage and inside () is at the minimum permissible solenoid voltage.

Example)



2. In spool type 60, P→T (Centre By-Pass) flow rates are limited as shown on the column at right side. Described maximum flow rates are regardless voltage within serviceable voltage range.



例

Spool Function	Max. Flow Rate U.S.GPM				
	Operating Pressure PSI	1450	2320	3625	4570
3C60	14.6	11.7	7.9	6.9	5.8