GROUP TERMINAL

YUKEN

Authorized Distributor

Terminal Group

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TERMINALSEAL AND SERVICE CO., LTD.

TMW
บริษัท เทอร์มินอล แมชชีนเวิร์ค จำกัด
TERMINAL MACHINE WORK CO., LTD.

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T.M.G. RUBBERPART CO., LTD.

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YUKEN SEA CO., LTD
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Wattana, Bangkok 10110
TEL:+66(0)2259-2802 FAX:+66(0)2259-2803 WEB:www.yuken.co.jp

AUTHORIZATION LETTER OF DISTRIBUTORSHIP

To whom it may concerned,

We hereby certify the following company,

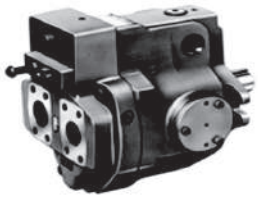
TERMINAL MACHINEWORK CO., LTD
49/151 M.12 pradithmanutham Rd,Klongkum,
Bungkum, Bangkok 10230

as one of our official Distributors in Thailand for the sale, installation, maintenance and after-sales service of YUKEN SEA CO., LTD Hydraulic components can be made in Japan, Taiwan and China.

Yoichi Shigemoto
Managing Director

YUKEN
บริษัท ยูเค็น เอสอีเอ จำกัด
YUKEN SEA COMPANY LIMITED

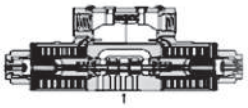
PISTON PUMPS



VANE PUMPS

PROPORTIONAL CONTROLS

DIRECTINAL CONTROLS



MODULAR VALVES

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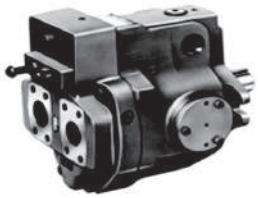
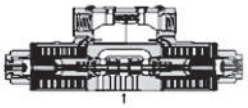
PISTON PUMPS



VANE PUMPS

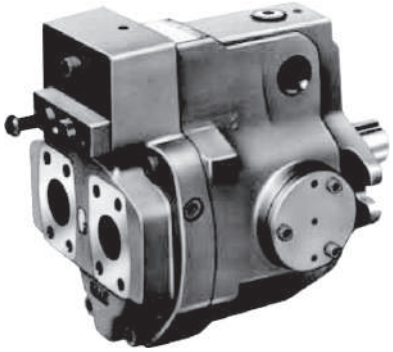
PROPORTIONAL CONTROLS

DIRECTINAL CONTROLS

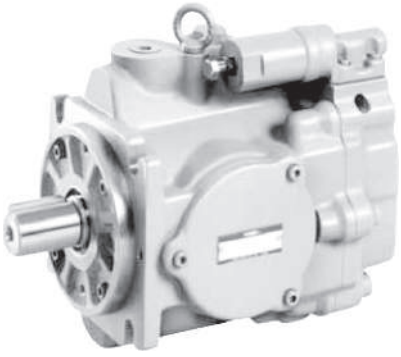


MODULAR VALVES

" AR " Series Variable Displacement Piston Pumps



" A " Series Variable Displacement Piston Pumps



" A3H " Series Variable Displacement Piston Pumps

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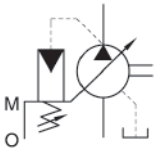
tmw@terminalseal.com

PISTON PUMPS

" AR " Series Variable Displacement Piston Pumps - Single Pump, Pressure Compensator Type

Graphic Symbol



Specifications

Model Numbers	Geometric Displacement cm^3/rev (cu.in./rev)	Operating Pressure MPa (PSI)		Shaft Speed Range r/min.		Approx. Mass kg (lbs.)
		Rated	Intermittent *	Max.	Min.	
AR16-FR01*-20/2080/20950	15.8 (.964)	16 (2320)		1800	600	9.8 (21.6)
AR22-FR01*-20/2080/20950	22.2 (1.355)			1800	600	

★ When setting the pressure, make sure the full cut-off pressure never exceeds the maximum intermittent pressure.

Model Number Designation

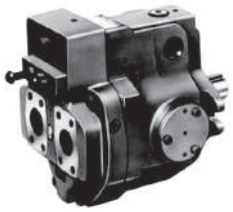
AR16	-F	R	01	B	S	-20	*
Series Number	Mounting	Direction of Rotation	Control Type	Pres. Adj. Range MPa (PSI)	Port Position	Design Number	Design Std.
AR16 (15.8 cm^3/rev)	**F:** Flange Mtg.	(Viewed from Shaft End) **R:** ★1 Clockwise (Normal)	**01:** Pressure Compensator Type	**B:** 1.2 - 7 {170 - 1020} **C:** 2.0 - 16 {290 - 2320}	**None:** Axial Port **S:** Side Port	**20**	Refer to ★2
AR22 (22.2 cm^3/rev)						**20**	

★1. Available to supply pump with anti-clockwise rotation. Consult Yuken for details.

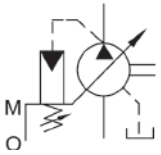
★2. Design Standards:
None.....Japanese Standard "JIS"
80.....European Design Standard
950.....N. American Design Standard

PISTON PUMPS

" A " Series Variable Displacement Piston Pumps - Single Pump, Pressure Compensator Type



Graphic Symbol



Specifications

Model Numbers	Geometric Displacement cm^3/rev (cu. in. /rev)	Minimum Adj. Flow cm^3/rev (cu. in. /rev)	Operating Presure MPa (PSI)		Shaft Speed Range r/min		Approx. Mass kg (lbs.)	
			Rated ★2	Intermittent ★1	Max.	Min.	Flange Mtg.	Foot Mtg.
A10-FR01B-12*	10.0 (.610)	2 (.122)	16 (2320)	21 (3050)	1800	600	5.1 (11.2)	—
A10-FR01C/H-12*							8.5 (18.7)	
A16-*-R-01-*-*-K-32*	15.8 (.964)	4 (.244)	16 (2320)	21 (3050)	1800	600	16.5 (36.4)	18.7 (41.2)
A22-*-R-01-*-*-K-32*	22.2 (1.355)	6 (.366)	16 (2320)	16 (2320)	1800	600	16.5 (36.4)	18.7 (41.2)
A37-*-R-01-*-*-K-32*	36.9 (2.25)	10 (.610)	16 (2320)	21 (3050)	1800	600	28.0 (61.7)	32.3 (71.2)
A56-*-R-01-*-*-K-32*	56.2 (3.43)	12 (.732)	16 (2320)	21 (3050)	1800	600	35.0 (77.2)	39.3 (86.7)
A70-*R01*S-60*	70.0 (4.27)	30 (1.83)	25 (3630)	28 (4060)	1800	600	58.5 (129)	70.5 (155)
A90-*R01*S-60*	91.0 (5.55)	56 (3.42)	25 (3630)	28 (4060)	1800	600	72.5 (160)	93 (205)
A145-*R01*S-60*	145 (8.85)	83 (5.06)	25 (3630)	28 (4060)	1800	600	92.5 (204)	117.5 (259)

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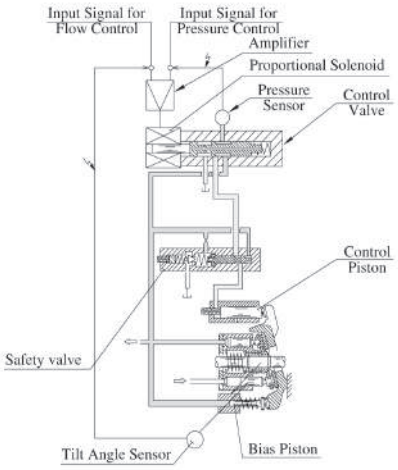
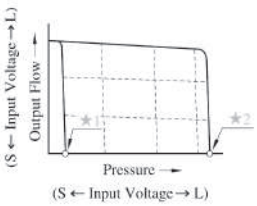
YUKEN

" A " Series Variable Displacement Piston Pumps - Single Pump, Electro-Hydraulic Proportional pressure & Flow Control Type



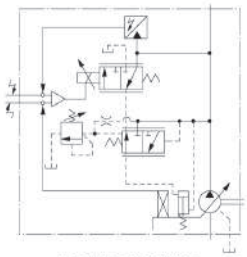
Performance Characteristics



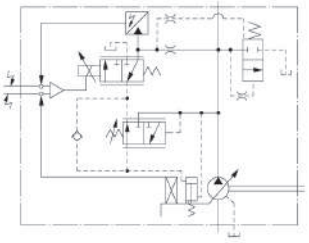
★1. Unloading pressure when input signal is 0 V.

★2. Safety valve setting pressure

Graphic Symbols



A16/A22/A37/A56



A70/A90/A145

PISTON PUMPS

Model Number Designation

A70	-F	R	04E	16	M	A	-60	-60	*
Series Number	Mounting	Direction of Rotation	Control Type	Control Pressure at Input Signal is 5 V	Unit of Control Pressure	Type of Outboard Pump ★2	Compensation Number ★3	Design Number	Design Std.
A16 (15.8 cm³/rev)	**F:** Flange Mtg.	(Viewed from Shaft End)	**04E:** Proportional Pressure & Flow Control Type	Use the same measure of the control pressure as shown on the right, 6.9 MPa specify within the range of maximum operating pressure	**M:** MPa **P:** PSI	—	06	42	Refer to ★4
A22 (22.2 cm³/rev)							11	42	
A37 (36.9 cm³/rev)						**None** ★2	01	42	
A56 (56.2 cm³/rev)							02	42	
A70 (70.0 cm³/rev)	**L:** Foot Mtg.	**R:** Clockwise (Normal) ★1				**A:** ★2 **B:** ★2	60	60	
A90 (91.0 cm³/rev)							60	60	
A145 (145.0 cm³/rev)							60	60	

★1. Available to supply pump with anti-clockwise rotation. Consult Yuken for details.

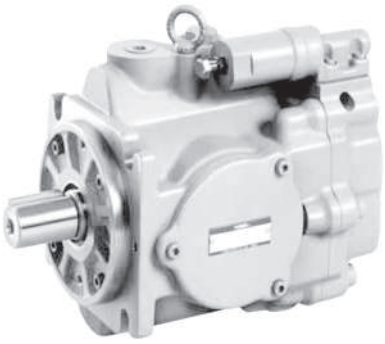
★2. These pumps, except A16 and A22 types, can be connected to outboard pumps.
- A37/A56 type (outboard pump connection symbol: **None**): spigot diameter: 82.55 mm (3.250 in.) (A16, A22, and PV2R1).
- A70/A90/A145 type (outboard pump connection symbol: **"A"**): spigot diameter:82.55 mm (3.250 in.) (A16, A22, and PV2R1).
- A70/A90/A145 type (outboard pump connection symbol: **"B"**): spigot diameter:101.6 mm (4.000 in.)(A37 and PV2R2).

★3. Amplifier Compensation Number may differ according to the main machine conditions. Consult Yuken for detail.

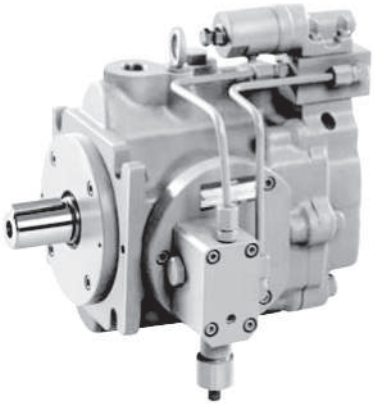
★4. Design Standards: None ..... Japanese Standard "JIS"
80 ..... European Design Standard

• Consult Yuken when "N. American Design Standard" is required.

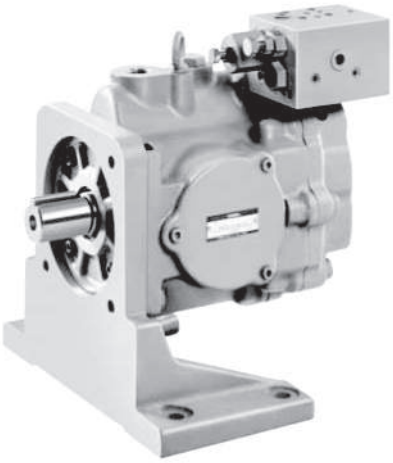
"A3H" Series Variable Displacement Piston Pumps



Pressure Compensator Type



Constant Power (Torque) Control Type



Load Sensing Type

■ "A3H" Series Variable Displacement Piston Pumps

Pump Type	Graphic Symbol	Geometric Displacement (cu. in./rev: .1 .2 .5 1 2 5 10 15 / cm³/rev: 1 2 5 10 20 50 100 200 300)	Maximum Operating Pressure MPa (PSI)	Page
Single Pump		A3H16 A3H37 A3H56 A3H71 A3H100 A3H145 A3H180	35 (5080)	120

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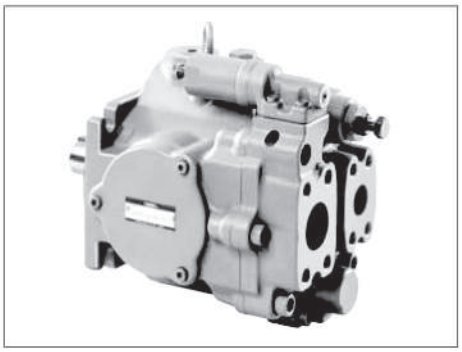
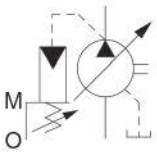
YUKEN

" A " Series Variable Displacement Piston Pumps - Single Pump, Pressure Compensator Type



Graphic Symbol



Specifications

Model Numbers	Geometric Displacement cm^3/rev (cu.in./rev)	Minimum Adj. Flow cm^3/rev (cu.in./rev)	Operating Pressure MPa (PSI)		Shaft Speed Range r/min		Approx. Mass kg (lbs.)	
			Rated ★1	Intermittent	Max. ★2	Min.	Flange Mtg.	Foot Mtg.
A3H 16-*R01KK-10*	16.3 (.995)	8.0 (.488)	28 (4060)	35 (5080)	3600	600	14.5 (32.0)	23.4 (51.6)
A3H 37-*R01KK-10*	37.1 (2.26)	16.0 (.976)			2700	600	19.5 (43.0)	27.0 (59.5)
A3H 56-*R01KK-10*	56.3 (3.44)	35.0 (2.14)			2500	600	25.7 (56.7)	33.2 (73.2)
A3H 71-*R01KK-10*	70.7 (4.31)	45.0 (2.75)			2300	600	35.0 (77.2)	42.5 (93.7)
A3H100-*R01KK-10*	100.5 (6.13)	63.0 (3.84)			2100	600	44.6 (98.3)	72.6 (160)
A3H145-*R01KK-10*	145.2 (8.86)	95.0 (5.80)			1800	600	60.0 (132)	88.0 (194)
A3H180-*R01KK-10*	180.7 (11.03)	125.0 (7.63)			1800	600	70.4 (155)	98.4 (217)

★1. Consult Yuken when pump is used over rated pressure because there is a restriction on operating condition.
★2. The maximum shaft speeds shown in the above table are at suction pressure 0 kPa (0 PSIG).
★3. The table above shows specifications for using petroleum based oils.
Pumps (customized design) for special fluids are also available. Their operating pressure and maximum shaft speed however differ from the values in the table above depending on the fluid type.
Range of operating temperature and viscosities may differ from those of petroleum based oils due to their characteristics.

Specifications and Design numbers for Special Fluids

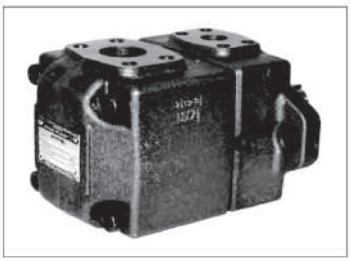
Type of Fluids	Operating Pressure MPa (PSI)		Allowable Maximum Shaft Speed r/min		Temperature Range °C (°F)	Viscosity Range mm^2/s (SSU)	Design Numbers for Special Fluid (Occasion of Japanese Std. "JIS") ★2
	Rated	Intermittent	Rated	Max.			
Water-Glycols	21 (3050)	21 (3050)	1200	(1800) ★1	0 - 50 (32 - 104)	20 - 200 (98 - 927)	1030
Phosphate Ester Type	21 (3050)	21 (3050)	1200	(1800) ★1	0 - 60 (32 - 140)		1006
Polyol Ester Type	21 (3050)	25 (3630)	1200	1800	0 - 60 (32 - 140)	20 - 200 (98 - 927)	10450

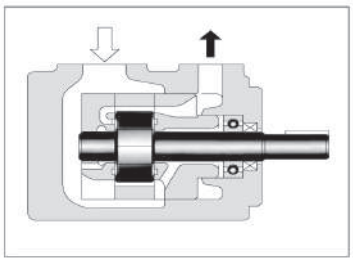
★1. As the specific gravities of water-glycol fluids and phosphate ester type fluids are higher than one, an overhead reservoir is required when pumps are operated at 1500 r/min or more.
★2. For the design numbers of pumps for European Design and North American Design Standards, please contact us.

VANE PUMPS

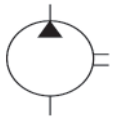
" PV2R " Series Single Vane Pumps

These pumps are of high pressure and high performance, which have been developed especially for low noise operation. To comply with a variety of applications including injection moulding machines, PV2R series single pumps provide the output flow of such a wide range as from 5.8 to 237 cm^3/rev (.354 to 14.46 cu.in./rev).
The intergral driving parts of the pumps are combined into a kit form and available for supply as a cartridge kit. Therefore, the replacement of the driving parts can be done easily.





Graphic Symbol



Model Number Designation

F-	PV2R1	-6	-L	-R	A	A	-42	-*
Special Seals	Series Number	Nominal Displacement cm^3/rev	Type of Mounting	Shaft Rotation	Discharge Port Position	Suction Port Position	Design Number	Design Standards
F: For phosphate ester type fluids (Omit if not required)	PV2R1	6, 8, 10, 12 14, 17, 19 23, 25, 31	L: Foot Mounting F: Flange Mounting	(Viewed from Shaft End) R: Clockwise ★1 (Normal)	A: Upwards (Normal)	A: Upwards (Normal)	42	Refer to ★2
	PV2R2	41, 47, 53 59, 65					41	
	PV2R3	76, 94, 116					31	
	PV2R4	136, 153, 184 200, 237					30	

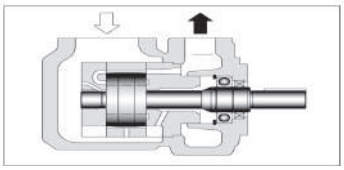
★1. Available to supply pump with anti-clockwise rotation. Consult Yuken for details.

★2. Design Standards: None.....Japanese Standard "JIS"
80.....European Design Standard
90.....N. American Design Standard

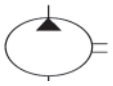
VANE PUMPS

" PV2R4A " Series Single Vane Pumps

These high pressure, high performance pumps have been developed to meet space-saving requirements. These pumps are a very compact version of the PV2R4, a vane pump series that has proven to exhibit outstanding low noise characteristics.



Graphic Symbol



Specifications

Model Numbers	Geometric Displacement cm^3/rev (cu.in./rev)	Max. Operating Pressure MPa (PSI)						Output Flow & Input Power	Shaft Speed Range r/min	
		Petroleum Base Oils		Water Containing Fluids			Synthetic Fluids			
		Anti-Wear Type	R & O Type	Anti-Wear* Type Water-Glycols	Water Glycols	Water in Oil Emulsions	Phosphate Esters		Max.	Min.
PV2R4A-138	138.5 (8.45)	17.2 (2500)	14 (2030)	16 (2320)	7 (1020)	7 (1020)	14 (2030)	Refer to Pages 179 & 180	1800 (1200) ★1	600
PV2R4A-162	162.6 (9.92)									
PV2R4A-193	194.4 (11.86)								1800 ★2 (1200) ★3	

★1. For the brands of anti-wear type water-glycols , see the item of "Hydraulic Fluids" on page 160.
★2. If PV2R4A-193 is used at speed above 1700 r/min, the suction pressure is limited to 0 kPa (0 in. Hg.).
★3. If phosphate ester or water containing fluids are used, the maximum speed is limited to 1200 r/min.

Model Number Designation

F-	PV2R4A	-138	-L	-R	A	A	-10	-*
Special Seals	Series Number	Nominal Displacement cm^3/rev	Type of Mounting	Shaft Rotation	Discharge Port Position	Suction Port Position	Design Number	Design Standards
F: For phosphate ester type fluids (Omit if not required)	PV2R4A	138, 162, 193	L: Foot Mounting F: Flange Mounting	(Viewed from Shaft End) R: Clockwise ★1 (Normal)	A: Upwards (Normal)	A: Upwards (Normal)	10	Refer to ★2

★1. Available to supply pump with anti-clockwise rotation. Consult Yuken for details.

★2. Design Standards: None.....Japanese Standard "JIS"
80.....European Design Standard
90.....N. American Design Standard

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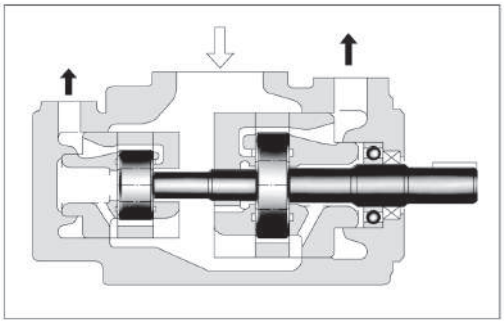
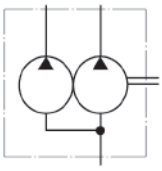
tmw@terminalseal.com

" PV 2R " Series Double Vane Pumps

These double pumps consist of two PV2R seires single pumps combined in tandem within a single housing and driven by a common shaft. A Single suction port and two discharge ports are provided so that the output flow can be supplied to separate circuits.



Graphic Symbol



Model Number Designation

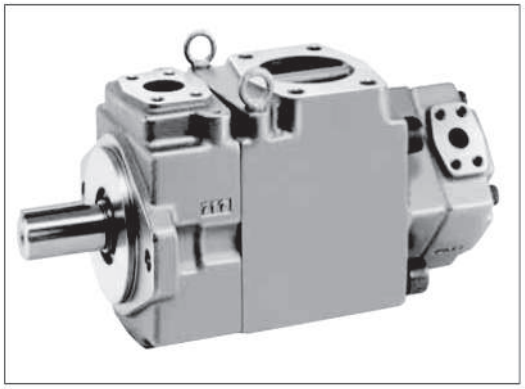
F-	PV2R13	-6	-76	-L	-R	A	A	A	-40	*
Special Seals	Series Number	Small Volume Pump Nominal Displacement cm^3/rev	Large Volume Pump Nominal Displacement cm^3/rev	Mounting	Direction of Rotation	Small Volume Pump Discharge Port Position	Large Volume Pump Discharge Port Position	Suction Port Position	Design Number	Design Standards
						(Viewed from Shaft End)				
	PV2R12	6, 8 10, 12 14, 17 19, 23 25, 31	26, 33 41, 47 53, 59 65			E: Left 45° Upwards (Normal)			42	
	PV2R13	6, 8 10, 12 14, 17 19, 23 25, 31	76, 94 116	L: Foot Mtg.		A: Upwards (Normal)			42	
F: Special seals for phosphate ester type fluids (Omit if not required)	PV2R23	41, 47 53, 59 65	52, 60 66, 76 94, 116		R: ★1 Clockwise (Normal)	E: Left 45° Upwards (Normal)	A: Upwards (Normal)	A: Upwards (Normal)	41	Refer to ★2
	PV2R33	76, 94 116	76, 94 116	F: Flange Mtg.		A: Upwards (Normal)			31	
	PV2R14	6, 8 10, 12 14, 17 19, 23	136, 153 184, 200 237			A: Upwards (Normal)			32	
	PV2R24	26, 33 41, 47							31	
	PV2R34	52, 60 66, 76 94, 116				E: Left 45° Upwards (Normal)			31	

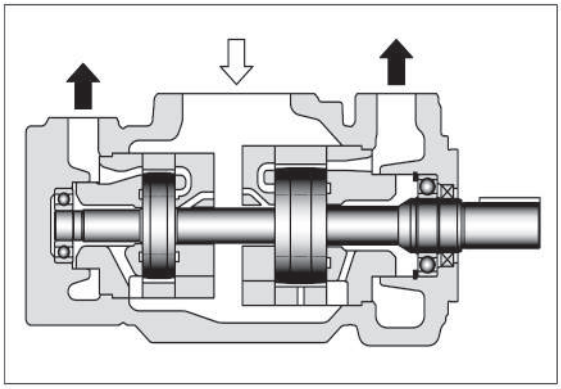
★1. Available to supply pump with anti-clockwise rotation.
Consult Yuken for details.
★2. Design Standards: None ..... Japanese Standard "JIS" and European Design Standard

YUKEN

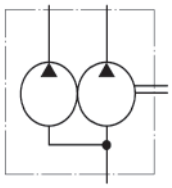
" PV2R24A/34A " Series Double Vane Pumps

These double pumps incorporate the new PV2R4A series pumps for the large volume side, a feature that permits discharge to separate circuits.





Graphic Symbol



Model Number Designation

F-	PV2R24A	-26	-193	-L	-R	E	A	A	-10	*
Special Seals	Series Number	Small Volume Pump Nominal Displacement cm^3/rev	Large Volume Pump Nominal Displacement cm^3/rev	Mounting	Direction of Rotation	Small Volume Pump Discharge Port Position	Large Volume Pump Discharge Port Position	Suction Port Position	Design Number	Design Standards
						(Viewed from Shaft End)				
F: Special seals for phosphate ester type fluids (Omit if not required)	**PV2R24A**	**26, 33 41, 47 53, 59 65**	**138, 162 193**	**L:** Foot Mtg. **F:** Flange Mtg.	**R:** ★1 Clockwise (Normal)	**E:** Left 45° Upwards (Normal)	**A:** Upwards (Normal)	**A:** Upwards (Normal)	**10**	Refer to ★2
	PV2R34A	**76, 94 116**				**A:** Upwards (Normal)			**10**	

★1. Available to supply pump with anti-clockwise rotation.
Consult Yuken for details.

★2. Design Standards: None ..... Japanese Standard "JIS" and European Design Standard
90 ..... N. American Design Standard

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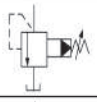
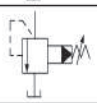
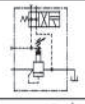
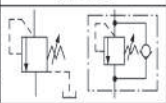
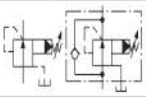
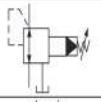
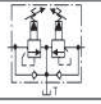
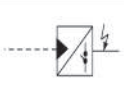
PRESSURE CONTROLS

Valve Type	Graphic Symbols	Maximum Operating Pressure MPa (PSI)	Maximum Flow U.S.GPM: .5 1 2 5 10 20 50 100 200 500 / L/min: 1 2 3 5 10 20 30 50 100 200 300 500 1000 2000
Remote Cont. Relief Valves		25 (3630)	DT DG 01
Direct Type Relief Valves		21 (3050)	DT/DG 02
Pilot Operated Relief Valves		25 (3630)	BT/BG 03 06
Low Noise Type Pilot Operated Relief Valves		25 (3630)	S-BG 03 06 10
Sol. Cont. Relief Valves		25 (3630)	BST/BSG 03 06 10
Low Noise Type Sol. Cont. Relief Valves		25 (3630)	S-BSG 03 06 10
H TypePress. Cont. Valves / HC TypePress. Cont. Valves		21 (3050)	HT/HG HCT/HCG 03 06 10 HF HCF 16
Press. Reducing Valves / Press. Reducing & Check Valves		21 (3050)	RT/RG RCT/RCG 03 06 10 RF RCF 16
Pres. Reducing & Relieving Valves		03 : 14(2030) 06 : 25(3630)	RBG 03 06
Unloading Relief Valves		21 (3050)	BUCG 06 10
Brake Valves		25 (3630)	UBGR 03 06 10
Semiconductor Type Pressure Switches		35 (5080)	JT-02
Pressure Monitoring System	——	20(2900) 35(5080)	

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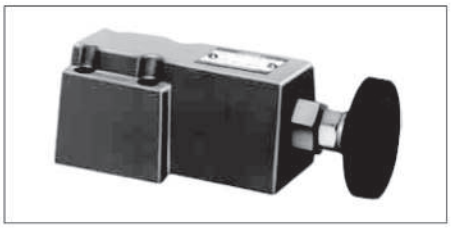
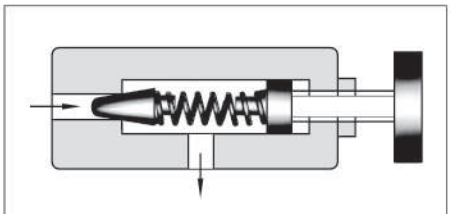
tmw@terminalseal.com

Remote Control Relief Valves

This valve is used as a remote control valve for pilot operated type pressure control valves.





Specifications

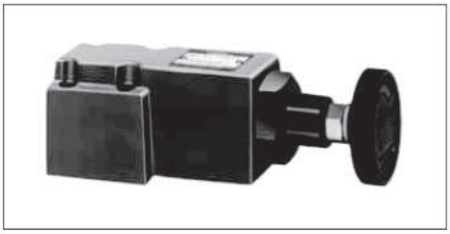
Model Numbers		Max. Operating Pres. MPa (PSI)	Approx. Mass kg (lbs.)	
Threaded Connection	Sub-plate Mounting		DT type	DG type
DT-01-22*	DG-01-22*	25 (3630)	1.6 (3.5)	1.4 (3.1)

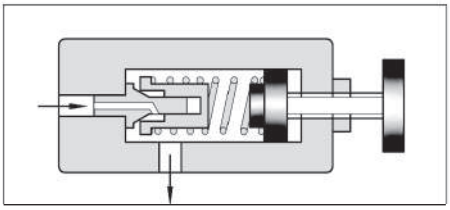
Model Number Designation

F-	D	T	-01	-22	*
Special Seals	Series Number	Type of Mounting	Valve Size	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	**D:** Remote Control Relief Valves	**T:** Threaded Connection	01	22	**None:** Japanese Std. "JIS" **80:** European Design Std. **90:** N. American Design Std.
		G: Sub-plate Mounting		22	**None:** Japanese Std. "JIS" and European Design Std. **90:** N. American Design Std.

Direct Type Relief Valves

This valve is used in a hydraulic circuit to prevent damage due to over pressure and to adjust the maximum circuit pressure of small capacity.





Specifications

Model Numbers		Max. Operating Pressure MPa (PSI)	Pres. Adj. Range MPa (PSI)	Max. Flow L/min (U.S.GPM)	Approx. Mass kg (lbs.)	
Threaded Connection	Sub-plate Mounting				DT type	DG type
DT-02-*-22*	DG-02-*-22*	21 (3050)	Note)	16 (4.23)	1.5 (3.3)	1.5 (3.3)

Note: Refer to the Model Number Designation.

Model Number Designation

F-	D	T	-02	-B	-22	*
Special Seals	Series Number	Type of Mounting	Valve Size	Pres. Adj. Range MPa (PSI)	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	**D:** Direct Type Relief Valves	**T:** Threaded Connection	02	**B:** ★-7 (★-1020) **C:** 3.5-14 (510-2030) **H:** 7-21 (1020-3050)	22	**None:** Japanese Std. "JIS" **80:** European Design Std. **90:** N. American Design Std.
		G: Sub-plate Mounting			22	**None:** Japanese Std. "JIS" and European Design Std. **90:** N. American Design Std.

★ Refer to the Minimum Adjustment Pressure Characteristics.

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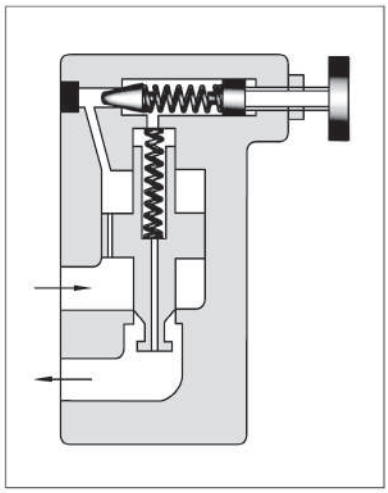
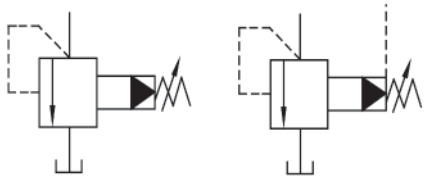
Pilol Operated Relief Valves

These valves protect the hydraulic system from excessive pressure, and can be used to maintain constant pressure in a hydraulic system. Remote control and unloading are permitted by using vent circuits.



Graphic Symbols



Vent Connection

Specifications

Model Numbers		Max. Operating Pressure MPa (PSI)	Pres. Adj. Range MPa (PSI)	Max. Flow L/min (U.S.GPM)	Approx. Mass kg (lbs.)	
Threaded Connection	Sub-plate Mounting				BT type	BG type
BT-03-*-32*	BG-03-*-32*	25 (3630)	Note) ★-25 (★-3630)	100 (26.4)	5.0 (11.0)	4.7 (10.4)
BT-06-*-32*	BG-06-*-32*			200 (52.8)	5.0 (11.0)	5.6 (12.3)
BT-10-*-32*	BG-10-*-32*			400 (106)	8.5 (18.7)	8.7 (19.2)

Model Number Designation

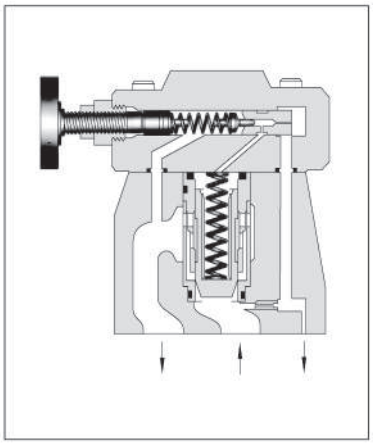
F-	B	T	-03	-V	-32	*
Special Seals	Series Number	Type of Mounting	Valve Size	High Venting★ Pres. Feature	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	**B:** Pilot Operated Relief Valves	**T:** Threaded Connection	03	**V:** For High Venting Pressure Feature (Omit if not required)	32	**None:** Japanese Std. "JIS"
			06		32	**80:** European Design Std.
			10		32	**90:** N. American Design Std.
		G: Sub-plate Mounting	03		32	**None:** Japanese Std. "JIS" and European Design Std.
			06		32	
			10		32	**90:** N. American Design Std.

★ Use high venting pressure type to reduce the response time from unload to onload.

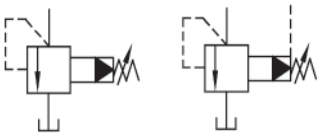
YUKEN

Low Noise Type Pilot Operated Relief Valves

Pilot operated relief valves here have been particularly developed as low-noise types. Able to protect pumps and control valves against excessive pressures, they are used to control the pressure in the hydraulic system to a constant level. Remote control and unloading are permitted by using vent circuits.



Graphic Symbols



Vent Connection

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Pres. Adj. Range MPa (PSI)	Max. Flow L/min (U.S.GPM)	Approx. Mass kg (lbs.)
S-BG-03-*-*-40*	25 (3630)	Note) ★-25 (★-3630)	100 (26.4)	4.1 (9.0)
S-BG-06-*-*-40*			200 (52.8)	5.0 (11.0)
S-BG-10-*-40*			400 (106)	10.5 (23.2)

Model Number Designation

F-	S-	B	G	-03	-V	-L	-40	*
Special Seals	Low Noise Type	Series Number	Type of Mounting	Valve Size	High Venting Pres. Feature ★1	Direction of Handle	Design Number	Design Std.
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	**S:** Low Noise Type	**B:** Pilot Operated Relief Valves	**G:** Sub-plate Mounting	03	**V:** For High Venting Pressure Feature (Omit if not required)	(Viewed from pressure gauge connection) **L:** Left (Normal) **R:** Right	40	Refer to ★2
				06			40	
				10		———	40	

★1. Use the high venting pressure type where it is necessary to reduce the response time from unloading to onloading.

★2. Design Standards: None ..... Japanese Standard "JIS" and European Design Standard
90 ..... N. American Design Standard

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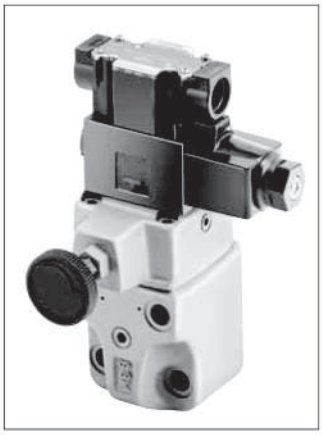
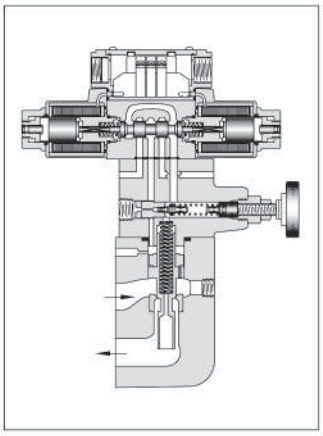
YUKEN

Solenoid Controlled Relief Valves

These valves are a combination of a pilot operated relief valve and a solenoid operated directional valve. Piping between the two is eliminated as the solenoid valve is directly mounted on the relief valve and connected with the relief valve vent. Pump pressure may be unloaded remotely by an electrical signal to the solenoid, or by connecting pilot relief valves to the solenoid valve ports.





Specifications

Model Numbers		Max. Operating Pressure MPa (PSI)	Pressure Adj. Range MPa (PSI)	Max. Flow L/min (U.S.GPM)	Approx. Mass kg (lbs.)		
					Double Sol.	Single Sol.	With Vent Restrictor
Threaded Connection	BST-03-*-*-*-*-48*	25 (3630)	Note) ★-25 (★-3630)	100 (26.4)	7.1 (15.7)	6.6 (14.6)	7.6 (16.8)
	BST-06-*-*-*-*-48*			200 (52.8)	7.1 (15.7)	6.6 (14.6)	7.6 (16.8)
	BST-10-*-*-*-*-48*			400 (106)	10.8 (23.8)	10.3 (22.7)	11.3 (24.9)
Sub-plate Mounting	BSG-03-*-*-*-*-48*	25 (3630)	Note) ★-25 (★-3630)	100 (26.4)	6.8 (15.0)	6.3 (13.9)	7.3 (16.1)
	BSG-06-*-*-*-*-48*			200 (52.8)	7.7 (17.0)	7.2 (15.9)	8.2 (18.1)
	BSG-10-*-*-*-*-48*			400 (106)	11.0 (24.3)	10.5 (23.2)	11.5 (25.4)

Model Number Designation

F-	A-	BS	T	-03	-V	-2B3A	-A100	-N	-48	*
Special Seals	With Vent Restrictor	Series Number	Type of Mounting	Valve Size	High Venting Pres. Feature	Vent Type	Coil Type *3	Type of Electrical Con.	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	**A:** With Vent Restrictor *1 (Option-Omit if not required)	**BS:** Solenoid Controlled Relief Valves	**T:** Threaded Connection **G:** Sub-plate Mounting	**03** **06** **10**	**V:** For High Venting Pressure Feature *2 (Omit if not required)	**2B3A** *3 **2B3B** **2B2B** **2B2** **3C2** **3C3**	AC: **A100, A120** **A200, A240** DC: **D12, D24** **D48** AC→DC: **R100, R200**	**None:** Terminal Box Type **N:** With Plug-in Connector (DIN)	**48**	**None:** Japanese Std. "JIS" **90:** N. American Design Std. **80:** European Design Std.
								N: With Plug-in Connector (DIN)		

H/HC Type Pressure Control Valves

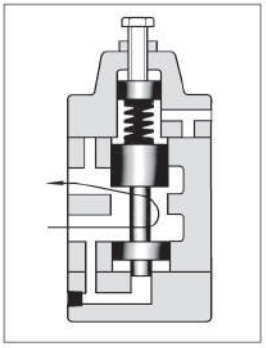
These valves are hydraulically damped, direct operated, pressure control valves which can be actuated by internal or external pilot pressure.

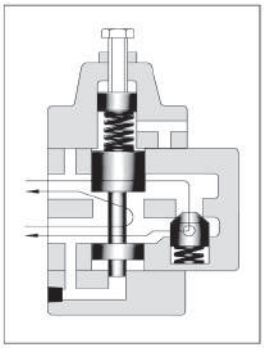
H Type Pressure Control Valves

There are various types of valve including sequence, unloading and low pressure relief valves, all of which are operated by a pressure rise in the circuit, sensed either internally or remotely.

HC Type Pressure Control Valves

They are available with integral check valves for use when free reverse flow from secondary port to the primary port is desired. There are various types of valve including sequence and counterbalance valves, all of which are operated by a pressure rise in the circuit, sensed either internally or remotely.



Specifications

Series	Model Numbers		Max. Operating Pres. MPa (PSI)	Max. Flow L/min (U.S.GPM)	Approx. Mass kg (lbs.)	
	Threaded Connection	Sub-plate Mounting			Threaded Connection	Sub-plate Mounting
H Type Pressure Control Valves	HT-03-**-*-22/2280/2290	HG-03-**-*-22/2290	21(3050)	50 (13.2)	3.7 (8.2)	4.0 (8.8)
	HT-06-**-*-22/2280/2290	HG-06-**-*-22/2290		125 (33)	6.2 (13.7)	6.1 (13.5)
	HT-10-**-*-22/2280/2290	HG-10-**-*-22/2290		250 (66)	12.0 (26.5)	11.0 (24.3)
HC Type Pressure Control Valves	HCT-03-**-*-22/2280/2290	HCG-03-**-*-22/2290	21(3050)	50 (13.2)	4.1 (9.0)	4.8 (10.6)
	HCT-06-**-*-22/2280/2290	HCG-06-**-*-22/2290		125 (33)	7.1 (15.7)	7.4 (16.3)
	HCT-10-**-*-22/2280/2290	HCG-10-**-*-22/2290		250 (66)	13.8 (30.4)	13.8 (30.4)

Model Number Designation

F-	H	T	-03	-C	3	-P	-22	*
Special Seals	Series Number	Type of Mounting	Valve Size	Pres. Adj. Range MPa (PSI)	Valve Type ★1	With Auxiliary Pilot Pressure	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	H: H Type Pressure Control Valves	T: Threaded Connection	03	L: 0.25 - 0.45 (36 - 65) M: 0.45 - 0.9 (65 - 130) N: 0.9 - 1.8 (130 - 260) A: 1.8 - 3.5 (260 - 510) B: 3.5 - 7.0 (510 - 1020) C: 7.0 - 14 (1020 - 2030)	1 ★2 2 3 4	P: With Auxiliary Pilot Pressure ★3	22	None: Japanese Std. "JIS" 80: European Design Std. 90: N. American Design Std.
			06				22	
			10				22	
		G: Sub-plate Mounting	03				22	None: Japanese Std. "JIS" & European Design Std. 90: N. American Design Std.
			06				22	
			10				22	
	HC: HC Type Pressure Control Valves	T: Threaded Connection	03		1 2 3 4		22	None: Japanese Std. "JIS" 80: European Design Std. 90: N. American Design Std.
			06				22	
			10				22	
		G: Sub-plate Mounting	03				22	None: Japanese Std. "JIS" & European Design Std. 90: N. American Design Std.
			06				22	
			10				22	

★1. For the details of valve types, see the following page.
★2. Type 1 is only possible for pressure adjustment ranges L and M.
★3. Models with auxiliary pilots are used where valves must be operated under a lower external pilot pressure than the adjusted pressure (types N, A, and B: about 1/8 of adjusted pressure; type C: about 1/16). This does not apply to pressure adjustment ranges L and M and valve type 1.

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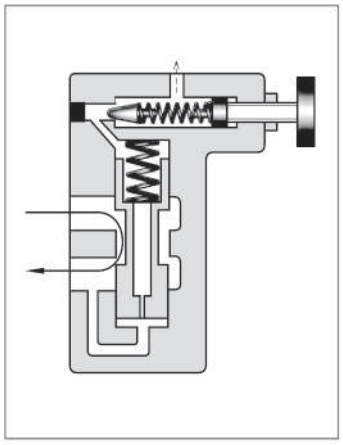
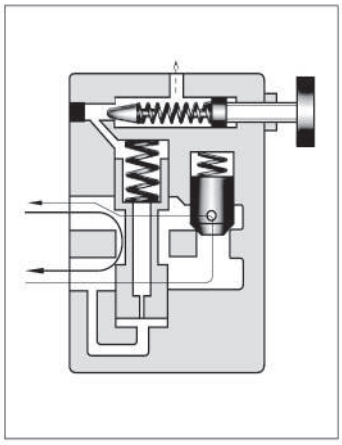
Pressure Reducing Valves / Pressure Reducing and Check Valves

Pressure reducing valves are used to set the pressure of a hydraulic circuit below that of the main circuit. In addition, operation under remote control is possible by using the remote control port. Pressure reducing and check valves have check valves, which allow a free flow from the secondary side to the primary.



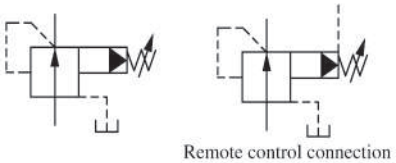
Specifications

Valve Name	Model Numbers		Max. Operating Pressure	Max. Flow ★1		Drain Flow ★2	Approx. Mass kg (lbs.)	
	Threaded Connection	Sub-plate Mounting	MPa (PSI)	Setting Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)	L/min (U.S.GPM)	Threaded Connection	Sub-plate Mounting
Pressure Reducing Valve	RT-03-*-22*	RG-03-*-22*	21 (3050)	0.7 - 1.0 (102 - 145)	40 (10.6)	0.8 - 1.0 (.21 - .26)	4.3 (9.5)	4.5 (9.9)
				1.0 - 20.5 (145 - 2970)	50 (13.2)			
	RT-06-*-22*	RG-06-*-22*	21 (3050)	0.7 - 1.0 (102 - 145)	50 (13.2)	0.8 - 1.1 (.21 - .29)	6.9 (15.2)	6.8 (15.0)
				1.0 - 1.5 (145 - 220)	100 (26.4)			
				1.5 - 20.5 (220 - 2970)	125 (33.0)			
	RT-10-*-22*	RG-10-*-22*	21 (3050)	0.7 - 1.0 (102 - 145)	130 (34.3)	1.2 - 1.5 (.32 - .40)	12.0 (26.5)	11.0 (24.3)
				1.0 - 1.5 (145 - 220)	180 (47.6)			
				1.5 - 10.5 (220 - 1520)	220 (58.1)			
				10.5 - 20.5 (1520 - 2970)	250 (66.0)			
Pressure Reducing and Check Valve	RCT-03-*-22*	RCG-03-*-22*	21 (3050)	0.7 - 1.0 (102 - 145)	40 (10.6)	0.8 - 1.0 (.21 - .26)	4.8 (10.6)	5.4 (11.9)
				1.0 - 20.5 (145 - 2970)	50 (13.2)			
	RCT-06-*-22*	RCG-06-*-22*	21 (3050)	0.7 - 1.0 (102 - 145)	50 (13.2)	0.8 - 1.1 (.21 - .29)	7.8 (17.2)	8.1 (17.9)
				1.0 - 1.5 (145 - 220)	100 (26.4)			
				1.5 - 20.5 (220 - 2970)	125 (33.0)			
	RCT-10-*-22*	RCG-10-*-22*	21 (3050)	0.7 - 1.0 (102 - 145)	130 (34.3)	1.2 - 1.5 (.32 - .40)	13.8 (30.4)	13.8 (30.4)
				1.0 - 1.5 (145 - 220)	180 (47.6)			
				1.5 - 10.5 (220 - 1520)	220 (58.1)			
				10.5 - 20.5 (1520 - 2970)	250 (66.0)			

★1. The max. flow rates are those shown at the primary pressure at 21 MPa (3050 PSI).
★2. The drain flow rates are equal to pilot flow rates when differential pressure between primary and secondary pressure is at 20.5 MPa (2970 PSI).

Graphic Symbols

● RT / RG

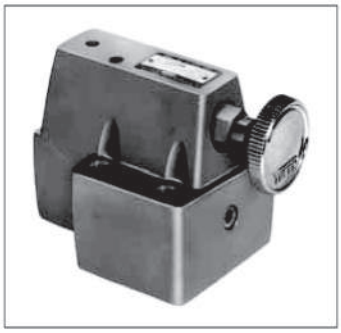


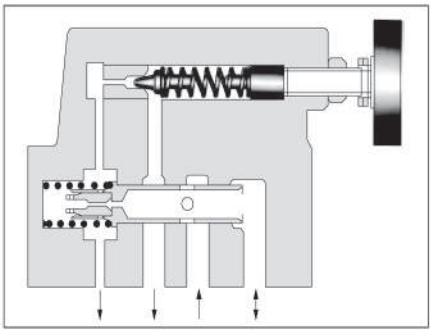
● RCT / RCG

YUKEN

Pressure Reducing and Relieving Valves

Pressure reducing and relieving valves are composite pressure control valves having pressure reducing and counterbalancing functions developed for hydraulic balancing circuits.





Specifications

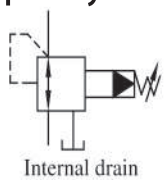
Model Numbers	Max. Operating Pressure MPa (PSI)	Pres. Adj. Range MPa (PSI)	Max. Flow L/min (U.S.GPM)	Relieving Flow L/min (U.S.GPM)	Drain Flow L/min (U.S.GPM)	Approx. Mass kg (lbs.)
RBG-03-*-10*	14 (2030)	0.6-13.5 (90-1960)	50 (13.2)	50 (13.2)	0.6-1 (.16-.26)	4.2 (9.3)
RBG-06-*-10*	25 (3630)	0.8-24.5 (120-3550)	125 (33)	125 (33)	1.5-2 (.40-.53)	11 (24.3)

Model Number Designation

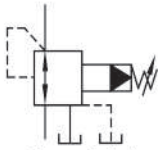
F-	RB	G	-03	-R	-10	*
Special Seals	Series Number	Type of Mounting	Valve Size	Drain Type	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	**RB:** Pressure Reducing and Relieving Valves	**G:** Sub-plate Mounting	**03**	**None:** Internal Drain	**10**	Refer to ★
			06	**R:** External Drain	**10**	

★ Design Standards: None ..... Japanese Standard "JIS"
80 ..... European Design Standard
90 ..... N. American Design Standard

Graphic Symbol



Internal drain



External drain

Attachment

Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw (4 pcs.)	
	Japanese Standard "JIS" European Design Standard	N. American Design Standard
RBG-03	M10 × 65 Lg.	3/8-16 UNC × 2-1/2 Lg.
RBG-06	M10 × 70 Lg.	3/8-16 UNC × 2-3/4 Lg.

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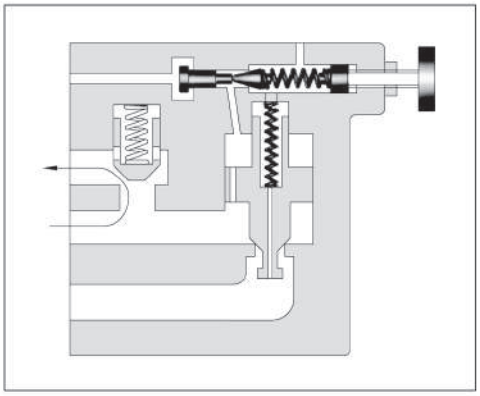
Unloading Relief Valves

These valves are used to operate the pumps with minimum load in accumulator circuits or in high-low pump circuits.
In accumulator circuits, when the system pressure reaches to a cut out pressure (adjusted maximum), the valve acts to divert the pump delivery to the reservoir at low pressure, thus the pump is unloaded automatically.
to the accumulator and hydraulic
When the accumulator pressure drops to the cut in pressure
the valve directs the pump delivery
system.
to the accumulator and hydraulic system.
An integral check valve prevents reverse flow through the valve from the accumulator.
In high-low pump circuits, the valve acts to unload the large volume pump with the same manner as described above during load operation of the small volume pump.



Specifications

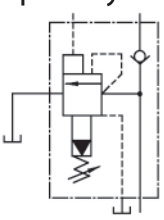
Model Numbers	Max. Operating Pres. MPa (PSI)	Max. Flow L/min (U.S.GPM)	Approx. Mass kg(1bs.)
BUCG-06-**-30/3080/3090	21 (3050)	125 (33)	12 (26.5)
BUCG-10-**-25/2580/2590		250 (66)	21.5 (47.4)

Model Number Designation

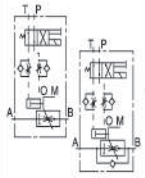
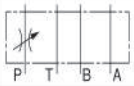
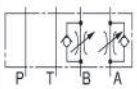
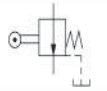
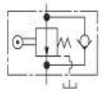
F-	BUC	G	-06	-B	V	-30	*
Special Seals	Series Number	Type of Mounting	Valve Size	Cut-out Pres. Adj. Range MPa (PSI)	High Venting Pres. Feature ★	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	**BUC:** Unloading Relief Valve	**G:** Sub-plate Mounting	**06**	**B:** 2.5-7.0 (360-1020) **C:** 3.5-14 (510-2030) **H:** 7.0-21 (1020-3050)	**V:** For High Venting Pressure Feature (Omit if not required)	**30**	**None:** Japanese Std. "JIS" **80:** European Design Std. **90:** N. American Design Std.
			10			**25**	

★ Use the high-venting-pressure type to reduce the shift time from unloading to onloading.

Graphic Symbols



FLOW CONTROLS

Valve Type	Graphic Symbols	Maximum Operating Pressure MPa (PSI)	Maximum Flow U.S.GPM: 1 5 10 50 100 500 1000 / L/min: 1 2 3 5 10 20 30 50 100 200 300 500 1000 2000 3000 5000
Flow Control Valves		21 (3050)	FG 01 02 03 06 10
Flow Control and Check Valves		21 (3050)	FCG 01 02 03 06 10
Pilot Operated Flow Control Valves		21 (3050)	FHG 02 03 06 10
Pilot Operated Flow Control and Check Valves		21 (3050)	FHCG 02 03 06 10
Restrictors		25 (3630)	SRT/SRG 03 06 10 SRF-16 (Rated Flow)★
One Way Restrictors		25 (3630)	SRCT/SRCG 03 06 10 SRCF-16 (Rated Flow)★
Throttle Modules		25 (3630)	TC1G 01 03
Throttle & Check Modules		25 (3630)	TC2G 01 03
Deceleration Valves		21 (3050)	ZT/ZG 03 06 10
Deceleration & Check Valves		21 (3050)	ZCT/ZCG 03 06 10
Feed Control Valves		14 (2030)	UCF1G/UCF2G 01 03 04
Needle Valves		35 (5080)	GCT/GCTR 02

★Rated flow stands for approximate flow rate when the pressure drop between inlet and outlet ports of the valve in fully opened condition becomes 0.3 MPa (44 PSI) maximum at fluid's specific gravity of 0.85 and kinematic viscosity of 20 mm²/s (98 SSU).

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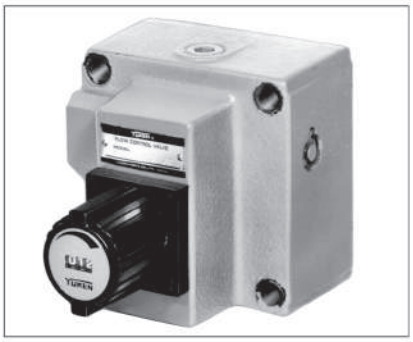
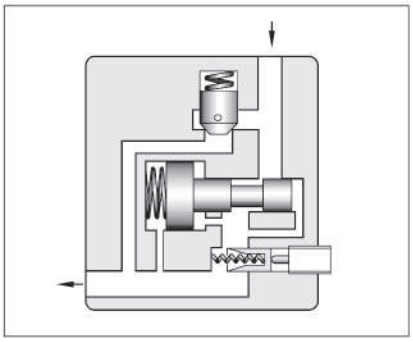
Flow Control Valves / Flow Control and Check Valves

These valves are pressure and temperature compensating type valves and maintain a constant flow rate independent of change in system pressure (load) and temperature (viscosity of the fluid). They control flow rate of the hydraulic circuit and eventually control speed of the actuator precisely.
Valves with an integral check valve allow a controlled flow and reverse free flow. Repeated resetting can be made easily with a digital readout.





Specifications

Model Numbers	Max. Metred Flow Capacity L/min (U.S.GPM)	Min. Metred Flow Capacity L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Approx. Mass kg (lbs.)
FG / FCG -01-$\frac{4}{8}$-*-11*	4(1.06) 8(2.1)	0.02(.005) {0.04 (.011)}★	14 (2030)	1.3 (2.9)
FG / FCG -02-30-*-30*	30(7.9)	0.05 (.013)	21 (3050)	3.8 (8.4)
FG / FCG -03-125-*-30*	125(33)	0.2 (.053)		7.9 (17.4)
FG / FCG -06-250-*-30*	250(66)	2 (.53)		23 (50.7)
FG / FCG -10-500-*-30*	500(132)	4 (1.06)		52 (115)

★ The figures in the brace are for pressures above 7 MPa (1020 PSI).

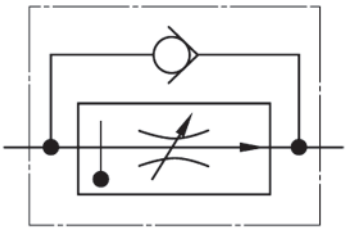
Model Number Designation

F-	FC	G	-01	-8	-N	-11	*
Special Seals	Series Number	Type of Mounting	Valve Size	Max. Metred Flow Capacity L/min (U.S.GPM)	Pres. Compensator Stroke Adjustment	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	**F:** Flow Control Valves **FC:** Flow Control and Check Valves	**G:** Sub-plate Mounting	**01**	**4** : 4 (1.06) **8** : 8 (2.1)	**N:** Applicable only for Pres. Compensator Stroke Adjustment (Option - Omit if not required)	**11**	Refer to ★
			02	**30** : 30 (7.9)		**30**	
			03	**125** : 125 (33)		**30**	
			06	**250** : 250 (66)		**30**	
			10	**500** : 500 (132)		**30**	

★ Design Standards: None.....Japanese Standard "JIS" and European Design Standard
90.....N. American Design Standard

Graphic Symbols

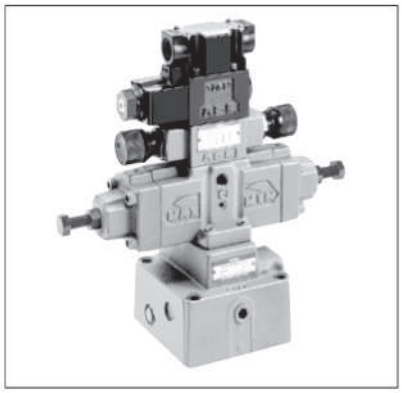
FG

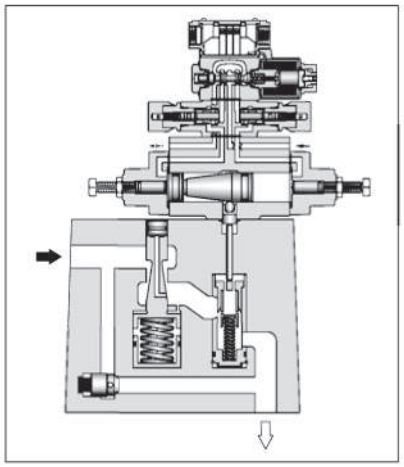


FCG

Pilot Operated Flow Control Valves / Pilot Operated Flow Control and Check Valves

Flow control of these valves is continuously made by a hydraulically operated pilot piston mechanism which controls opening area of the orifice of the valve. With the use of these valves, shockless operation either in acceleratio or deceleration can be obtained. With the compensator for the pressure and temperature, stable flow control can be obtained regardless of the changes in the pressure (load) and temperature (oil viscosity).

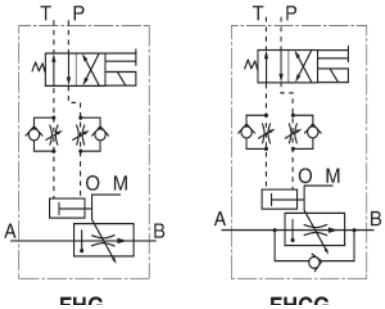




Specifications

Model Numbers	Max. Metred Flow Capacity L/min (U.S.GPM)	Min. Metred Flow Capacity L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Min. Pilot Pressure MPa (PSI)	Approx. Mass kg (lbs.)
FHG/FHCG-02-30-∗-13∗	30 (7.9)	0.05 (.013)	21 (3050)	1.5 (220)	13 (28.7)
FHG/FHCG-03-125-∗-13∗	125 (33)	0.2 (.053)			17 (37.5)
FHG/FHCG-06-250-∗-13∗	250 (66)	2 (.53)			32 (70.6)
FHG/FHCG-10-500-∗-13∗	500 (132)	4 (1.06)			61 (135)

Graphic Symbols



FHC FHCG

Model Number Designation

F-	FHC	G	-02	-30	-N	-O	-A100	-N	-13	∗
Special Seals	Series Number	Type of Mounting	Valve Size	Max. Metred Flow L/min (U.S.GPM)	Pressure Compensator Stroke Adj. ∗3	With No Pilot Valve ∗1	Coil ∗2 Type	Type of Electrical Connections	Design Number	Design Standards
F: Special Seals for Phos-phate Ester Type Fluids (Omit if not re-quired)	**FH:** Pilot Operated Flow Control Valves **FHC:** Pilot Operated Flow Cont. & Check Valves	**G:** Sub-plate Mounting	**02**	**30:** 30 (7.9)	**N:** Applicable only for Pres. Compensator Stroke Adjustment (Option - Omit if not required)	**O:** Applicable only for Without Pilot Valve	**AC:** A100 A120 A200 A240 **DC:** D12 D24 D48 **AC →DC:** R100 R200	**None:** Terminal Box Type **N:** With Plug-in Connector (Din)	13	**None:** Japanese Std. "JIS" **90:** N.American Design Std. **80:** European Design Std.
			03	**125:** 125 (33)					13	
			06	**250:** 250 (66)					13	
			10	**500:** 500 (132)				**N:** With Plug-in Connector (Din)	13	

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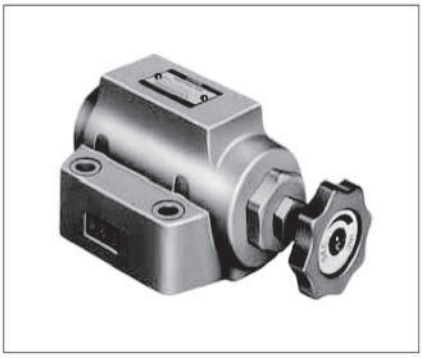
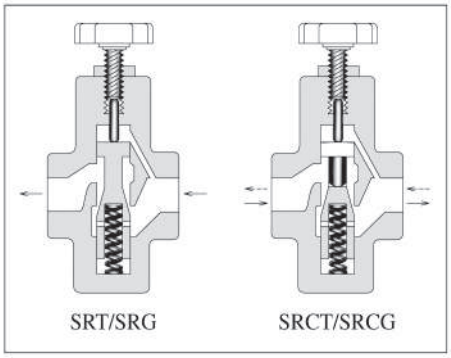
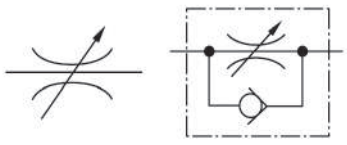
Restrictors / One Way Restrictors

This valve is used to regulate an actuator speed in a circuit where line pressure is almost steady and small fluctuation of oil flow due to pressure changes is permitted. Integrated check valve allows reversed free flow from outlet to inlet port. Pressure balanced construction provides less effort in adjustment at high pressure.



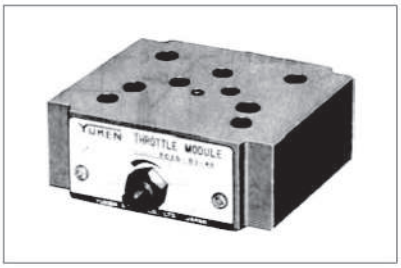


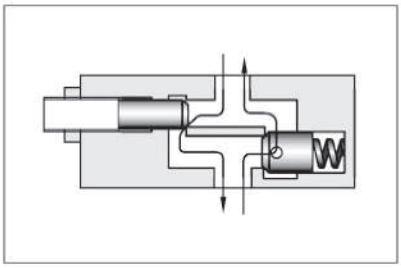
Graphic Symbols



Throttle Modules / Throttle and Cheak Modules

Used as pilot choke valves for solenoid controlled pilot operated directional valves and pilot operated directional valves.



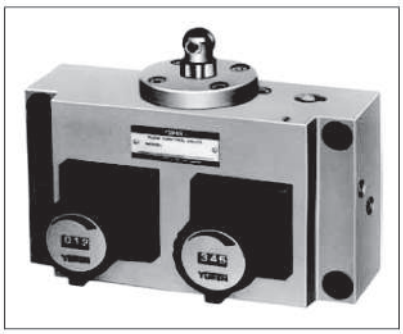


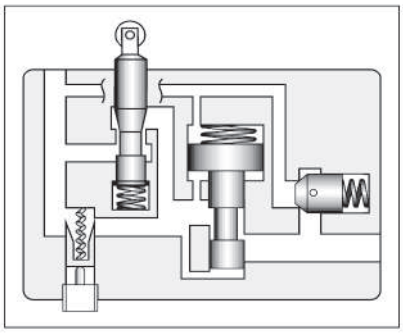
Graphic Symbols

Valve Size	Throttle Modules		Throttle and Check Modules	
	Standard Type	With Check	Standard (Metre-out) Type	Metre-in Type
01	Solenoid Operated Directional Valve P A B T TC1G-01	———	Solenoid Operated Directional Valve P A B T TC2G-01	———
03	Solenoid Operated Directional Valve P A B T TC1G-03	Solenoid Operated Directional Valve P A B T TC1G-03-C	Solenoid Operated Directional Valve P A B T TC2G-03	Solenoid Operated Directional Valve P A B T TC2G-03-A

Feed Control Valves

These valves are the combination of flow control valve, a deceleration valve and a check valve and used mainly for controlling rapid traverse and feed cycles machine tools. Switching from rapid traverse to feed is made by a cam operation, and fine feed control is accomplished by dial rotation regardless of pressure and oil temperature variation. Rapid return is free of cam actuation.





Specifications

Model Numbers	Max. Flow L/min (U.S.GPM) *1	Metred Flow Range L/min (U.S.GPM)		Max. Reversed Free Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Approx. Mass kg (lbs.)
		Feed	Fine Feed			
UCF1G-01-4-A-*-11*	16 [12] (4.2 [3.2])	0.03-4 (.008-1.06) {0.05-4} *2 ({.013-1.06})	—	20 (5.3)	14 (2030)	1.6 (3.5)
UCF1G-01-4-B-*-11*	12 [8] (3.2 [2.1])					
UCF1G-01-4-C-*-11*	8 [4] (2.1 [1.06])					
UCF1G-01-8-A-*-11*	20 [12] (5.3 [3.2])	0.03-8 (.008-2.1) {0.05-8} *2 ({.013-2.1})	—			
UCF1G-01-8-B-*-11*	16 [8] (4.2 [2.1])					
UCF1G-01-8-C-*-11*	12 [4] (3.2 [1.06])					
UCF1G-03-4-*-10*	40 [40] (10.6 [10.6])	0.05-4 (.013-1.06)	—	40 (10.6)		2.6 (5.7)
UCF1G-03-8-*-10*		0.05-8 (.013-2.1)	—			
UCF2G-03-4-*-10*	40 [40] (10.6 [10.6])	0.1-4 (.026-1.06)	0.05-4 (.013-1.06)	40 (10.6)		2.7 (6.0)
UCF2G-03-8-*-10*		0.1-8 (.026-2.1)	0.05-4 (.013-1.06)			
UCF1G-04-30-30*	80 [40] (21.1 [10.6])	0.1-22 (.026-5.8)	—	80 (21.1)		6.5 (14.3)
UCF2G-04-30-30*		0.1-22 (.026-5.8)	0.1-17 (.026-4.5)			9.2 (20.3)

Needle Valves

Used as stop valves for pressure gauge lines and small-capacity line. Also can be used as restrictors for regulating flow rates in pilot lines.

Specifications

Model Numbers		Max. Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Approx. Mass kg (lbs.)
In-Line Type	Angle Type			
GCT-02-32*	GCTR-02-32*	★	35 (5080)	0.34 (.75)

★ Depends on allowable pressure drops. See Flow vs. Adjustment Revolutions characteristics and Pressure Drop at Full Open characteristics.

Model Number Designation

F-	GCT	-02	-32	*
Special Seals	Series Number	Valve Size	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	GCT : In-line Type Needle Valve, Threaded Connection GCTR : Angle Type Needle Valve, Threaded Connection	02	32	Refer to *

Graphic Symbols

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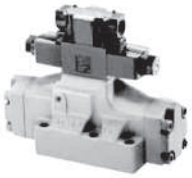
YUKEN

Directional Valves

These valve are used for shifting oil flow direction of hydraulic circuit and for actuator starting/stopping as well as the operating direction shifting of actuator.

Solenoid Operated Directional Valves

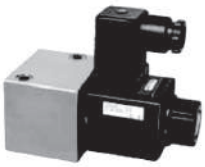
Solenoid Controlled Pilot Operated Directional Valves



"G" Series Shockless Type Directional Valves

Pilot/Manually/Mechanically Operated Directional Valves

Poppet Type Directional Valves



Check/Pilot Controlled Check Valves

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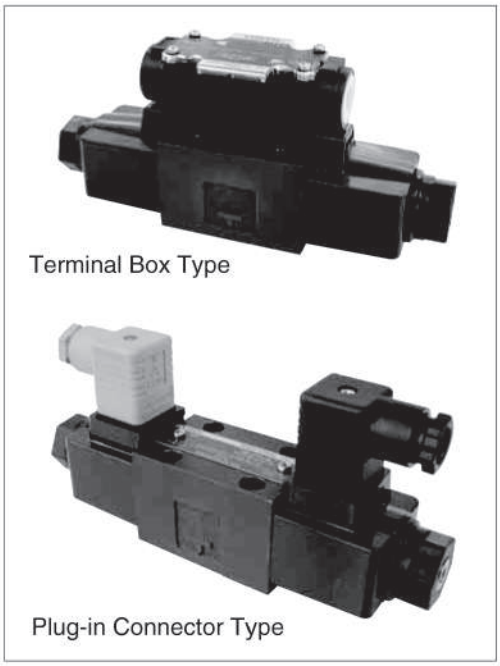
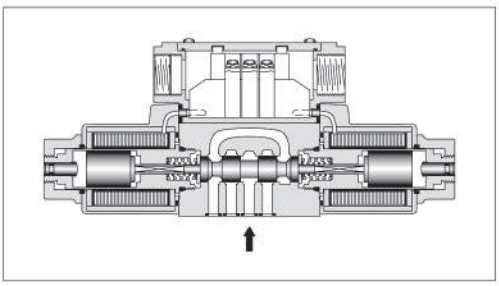
E-mail : terminalseal@terminalseal.com
tmw@terminalseal.com

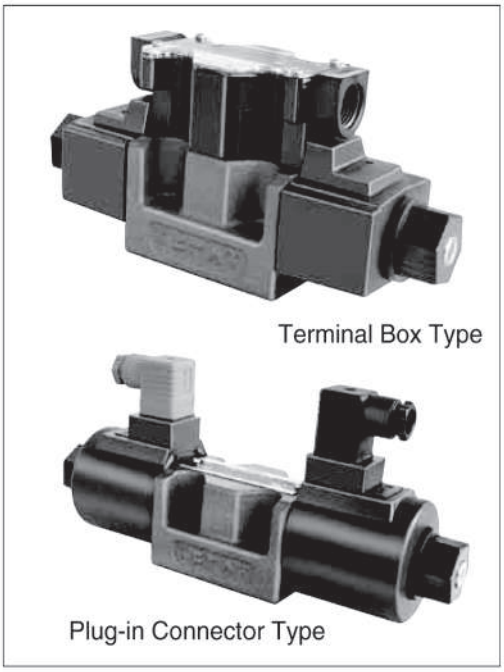
1/8 Solenoid Operated Directional Valves, DSG-01 Series

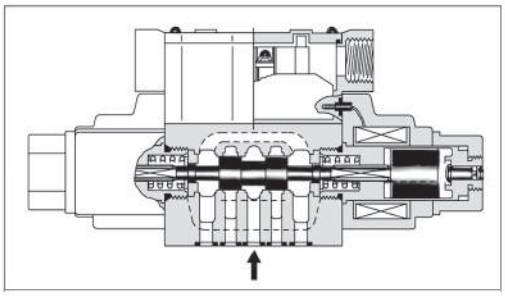




CE UL CSA

1/8 Solenoid Operated Directional Valves, DSG-01 Series





CE UL CSA

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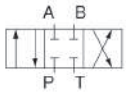
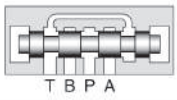
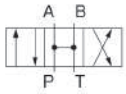
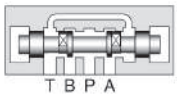
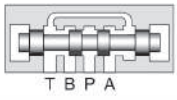
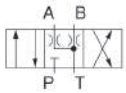
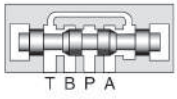
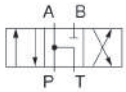
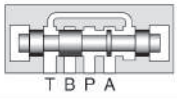
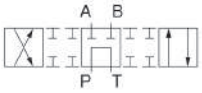
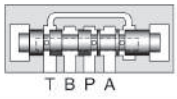
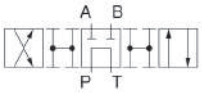
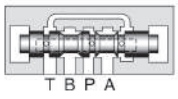
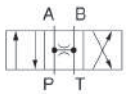
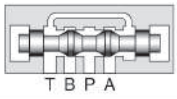
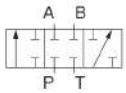
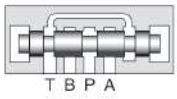
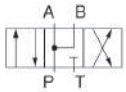
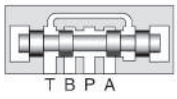
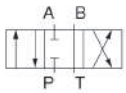
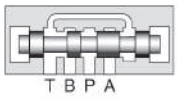
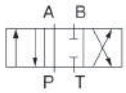
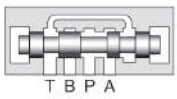
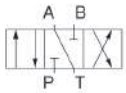
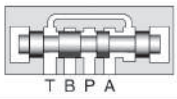
Spool Types

Spool types are classified to the condition of flow at the neutral position.

Spool Type	Graphic Symbols	Schematic Drawing (Centre Position)	Functions and Applications
2 (Closed Centre All Ports)			Holds pump pressure and cylinder position at neutral. Care should be paid if used as a 2-position type because shock occurs when each port is blocked in transit.
3 (Open Centre All Ports)			Pump can be unloaded and actuator is floating at neutral. If a 2-position type is used, shock is reduced as each ports is released to tank in transit.
4 (Open Centre A, B&T)			Pump pressure is held and actuator is floated at neutral. 2-position type is used when system pressure is required to be held in transit. Shock during transit is less compared to spool type "2".
40 (Open Centre A, B&T Restricted Flow)			In a variation of spool type "4", a restrictor is provided in A-T and B-T ports. Making it faster at stopping the actuator.
5 (Open Centre P, A&T)			It can be used when a pump is unloading at neutral and actuator is halted at one way flow.
6 (Open Centre P&T Closed Crossover)			Pump is unloading and actuator position held at neutral. Suitable for series operation.
60 (Open Centre P&T Open Crossover)			It is a variation of spool type "6". Shock is reduced as each port is released to tank on transit.
7 (Open Centre All Ports Restricted Flow)			Mainly used as a 2-position type. Shock is reduced on transit.
8 (2-Way)			Pump pressure and cylinder position is held at neutral in the same way as spool type "2". It is used as 2 way type.
9 (Open Centre P, A&B)			Regenerative circuit is provided at neutral.
10 (Open Centre B&T)			Prevent actuator from one direction drift by leakage of P port at neutral.
11 (Open Centre P&A)			Halt actuator movement positively at B, T ports blocked P, A ports connected at neutral.
12 (Open Centre A&T)			Prevent actuator from one direction drift by leakage of P port at neutral.

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Model Number Designation

F-	S-	DSG	- 01	-2	B	2	A	-D24	-C	-N	-70	*	-L
Special Seals	Shockless Type	Series Number	Valve Size	Number of Valve Positions	Spool-Spring Arrangement	Spool Type	Special Two Position Valve (Omit if not required)	Coil Type	Manual Override	Electrical Conduit Connection	Design Number	Design Standard	Models with Reverse Mtg. of Solenoid (Omit if not required)
F: For Phosphate Ester Type Fluids (Omit if not required	None: Standard Type	DSG: Solenoid Operated Directional Valve	01	3: Three Positions	C: Spring Centred	2, 3, 4, 40, 60, 9, 10, 11, 12	—	AC: A100, A120, A200, A240	None: Manual Override Pin	None: Terminal Box Type	70	None: Japanese Std. "JIS"	—
				2: Two Positions	D: No-Spring Detented	2	—	DC: D12, D24, D48	C: Push Button and Lock Nut (Option)	N: Plug-in Connector Type		90: N.American Design Std.	
					B: Spring Offset	2, 3, 8	A*1, B*1	R: (AC→DC) R100, R200		N1*2: Plug-in Connector Type with Indicator Light (Option)		None: Japanese Std. "JIS" and European Design Std.	L
	S: Shockless Type			3: Three Positions	C: Spring Centred	2, 4	—	DC: D12, D24, D48				90: N. American Design Std.	—
				2: Two Positions	B: Spring Offset	2		R: (AC→DC) R100, R200					L

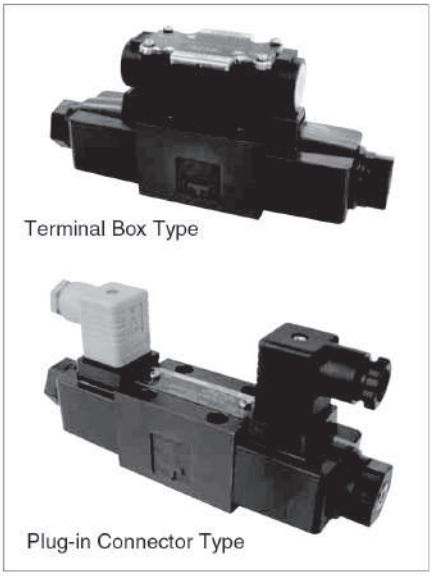
Model Number Designation

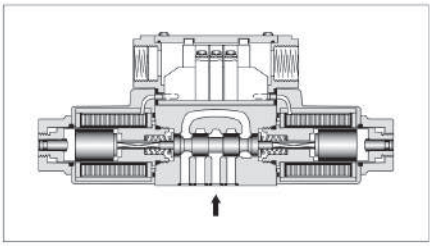
F-	S-	DSG	-03	-2	B	2	A	-D24	-C	-N	-50	*	-L
Special Seals	Shockles Type	Series Number	Valve Size	Number of Valve Positions	Spool-Spring Arrangement	Spool Type	Special Two Position Valve (Omit if not required)	Coil Type	Manual Override	Electrical Conduit Connection	Design Number	Design Standard	Models with Reverse Mtg. of Solenoid (Omit if not required)
F: For Phosphate Ester Type Fluids (Omit if not required)	None: Standard Type	DSG: Solenoid Operated Directional Valve	03	3: Three Positions	C: Spring Centred	2, 3, 4, 40, 5, 60, 9, 10, 11, 12	—	AC: A100, A120, A200, A240 DC: D12, D24, D100 R: (AC→DC) R100, R200 RQ: (AC→DC) RQ100	None: Manual Override Pin	None: Terminal Box Type	50	None: Japanese Std. "JIS"	—
				2: Two Positions	D: No-Spring Detented	2	—		C: Push Button and Lock Nut (Option)	N*2: Plug-in Connector Type		90: N.American Design Std.	L
					B: Spring Offset	2, 3, 8	A*1, B*1			N1*3: Plug-in Connector Type with Indicator Light (Option)		None: Japanese Std. "JIS" and European Design Std.	—
	S: Shockles Type			3: Three Positions	C: Spring Centred	2, 4	—	DC: D12, D24, D100 R: (AC DC) R100, R200 RQ: (AC DC) RQ100				90: N.American Design Std.	L
				2: Two Positions	B: Spring Offset	2	A*1, B*1						

YUKEN

1/8 Solenoid Operated Directional Valves, DSG-01 Series

These are Solenoid Operated Directional Valves of high pressure, high flow and low pressure drop, the features of which can be materialized by employing a powerful wet type solenoid and the rational flow channel design.





- **High Pressure & High Flow Rate**
  In comparison to our existing lines, both the pressure and flow of these valves are much increased.
  - Max. Operating Pressure: approx. 10 % increased [31.5→35 MPa (4570 →5080 PSI)]
  - Max. T-Line Back Pressure: approx. 30 % increased [16→21 MPa (2320 →3050 PSI)]
  - Max. Flow Rate: approx. 60 % increased [63→100 L/min (16.64 →26.42 U.S.GPM)]
- **Low Pressure Drop**
  The pressure drop of these valves is reduced by 10 % from 1.0 to 0.9 MPa (145 to 131 PSI), in comparison to our existing lines*; the valves effectively reduce the energy consumption of the unit.
  {* At Flow Rate: 60 L/min (15.9 U.S.GPM), Spool Type: 3C2 (P→A)}
- **Compact & Small Mass**
  Despite of high pressure, high flow and low pressure drop, these valve bodies are compact and lightweight with DC double solenoids; the overall length and mass are reduced from 210 to 205 mm (8.26 to 8.07 inch) and from 2.2 to 1.85 kg (4.85 to 4.08 lbs), respectively.
- **Shockless type available**
  In addition to the standard valves for high pressure and high flow, a shockless type capable of minimizing noise and vibration in piping during spool changeover is also available.
- **Stable Operation**
  Due to the powerful magnetic and spring force of the solenoids, these valves exhibit a high tolerance to contaminants and especially stable operation.
- **IP65-equivalent high dust- and water-proof**
  These valves demonstrate excellent dust- and water-proof characteristics, in compliance with I. E. C. Pub. 529. IP65 and JIS C 0920 IP65 (dust- and jet-proof type).
- **Usable in products of various standards**
  These standard valves are CE certified for installation in equipment overseas. UL/CSA certified products are also available.

Specifications

Valve Type	Model Numbers	Max. Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Max. T-Line Back Pressure MPa (PSI)	Max. Changeover Frequency Cycle/min {min⁻¹}	Mass kg (lbs.)
Standard Type	DSG-01-3C∗-∗-70/7090	100 (26.4)	35 (5080)	21 (3050)	300 (R Type Sol. Only) 120	1.85 (4.08)
	DSG-01-2D2-∗-70/7090					
	DSG-01-2B∗-∗-70/7090					1.4(3.09)
Shockless Type	S-DSG-01-3C∗-∗-70/7090	63 (16.6)	25 (3630)	21 (3050)	120	1.85(4.08)
	S-DSG-01-2B2-∗-70/7090					1.4(3.09)
Low Wattage(14W) Type	L-DSG-01-3C∗-∗-70/7090	40 (10.6)	16 (2320)	16 (2320)	300 (R Type Sol. Only) 120	1.85 (4.08)
	L-DSG-01-2D2-∗-70/7090					
	L-DSG-01-2N∗-∗-70/7090					
	L-DSG-01-2B∗∗-∗-70/7090					1.4(3.09)

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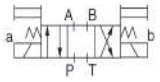
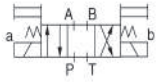
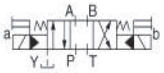
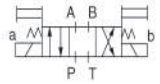
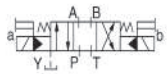
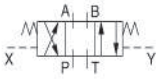
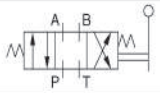
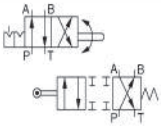
TERMINAL GROUP

Valve Type	Graphic Symbols	Max. Operating Pressure MPa (PSI)	Maximum Flow U.S.GPM: .3 .5 1 2 5 10 20 50 100 200 500 1000 / L/min: 1 2 5 10 20 50 100 200 500 1000 2000 5000
Solenoid Operated Directional Valves		25 (3600)	DSG-005
		16 (2320)	L-DSG-01
		25 (3600)	S-DSG-01
		35 (5080)	DSG-01
		16 (2320)	L-DSG-03
		25 (3600)	S-DSG-03
		31.5 (4580)	DSG-03
Low Wattage (5W) Type Dolenoid Operated Directional Valves		16 (2320)	E-DSG-01
			E-DSG-03
Electronic Relay Incorporated Solenoid Operated Directional Valves		25 (3600)	T-S-DSG-01
		35 (5080)	T-DSG-01
		25 (3600)	T-S-DSG-03
		31.5 (4580)	T-DSG-03
Solenoid Controlled Pilot Operated Directional Valve		21 (3050)	DSHG-01
		25 (3600)	DSHG-03
		31.5 (4580)	DSHG-04/S-DSHG-04
			DSHG-06/S-DSHG-06
			DSHG-10/S-DSHG-10
"G" Series Shockless Type Solenoid Operated Directional Valves		25 (3600)	G-DSG-01
			G-DSG-03
"G" Series Shockless Type Solenoid Controlled Pilot Operated Directional Valves		25 (3600)	G-DSHG-04
			G-DSHG-06
Pilot Operated Directional Valves		31.5 (4580)	DHG-04 06 10
Manually Operated Directional Valves		21 (3050)	Threaded Connection (DMT) 03 06 10
		31.5 (4580)	Sub-plate connection (DMG) 01 03 04 06 10
Mechanically Operated Directional Valves		7 (1020)	Rotary (DR^{T}_{G}) 02
		25 (3600)	Cam Operated (DC^{T}_{G}) 01 03

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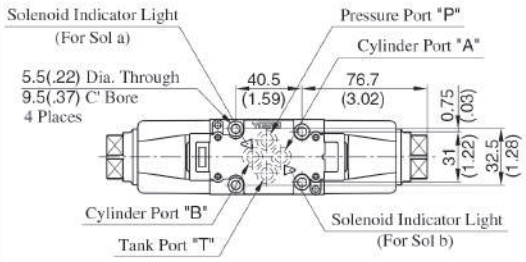
Mounting surface: ISO 4401-AB-03-4-A

TERMINAL BOX TYPE

■ Models with AC Solenoids

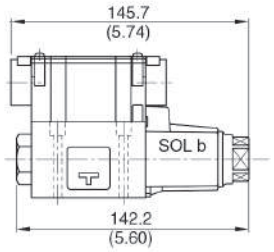
● Double Solenoid: Spring Centred & No-Spring Detented

DSG-01- $\frac{3C*}{2D2}$ -A*-70/7090

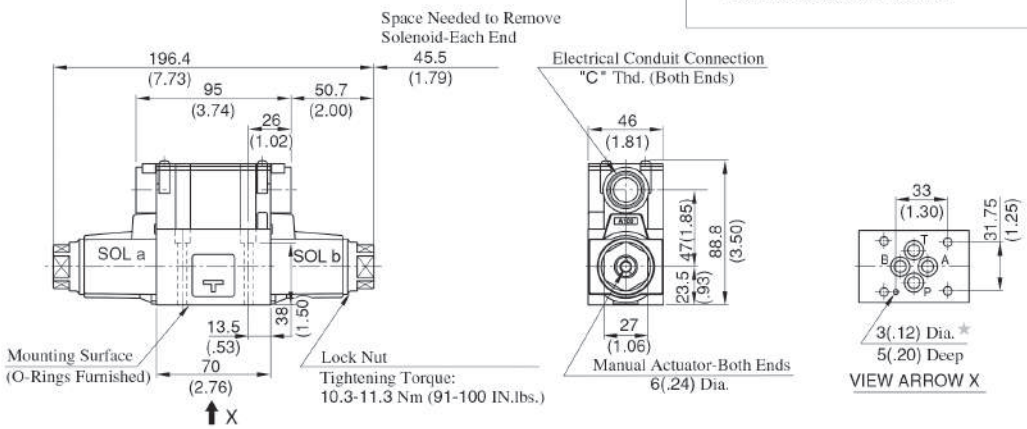


● Single Solenoid: Spring Offset

DSG-01-2B*-A*-70/7090



- For other dimensions, refer to "spring Centred and No-Spring Detented" models.
- Solenoid being mounted in the reverse position SOL a side is also available.



Model Numbers	"C" Thd.
DSG-01-***-A*-70	G 1/2
DSG-01-***-A*-7090	1/2 NPT

★ Locating pin can be fitted to this hole to conform with ISO4401-03-02-94. However, locating pin is not provided to standard design valve. When ordering valve with a locating pin, please consult Yuken.

DIMENSIONS IN MILLIMETRES (INCHES)

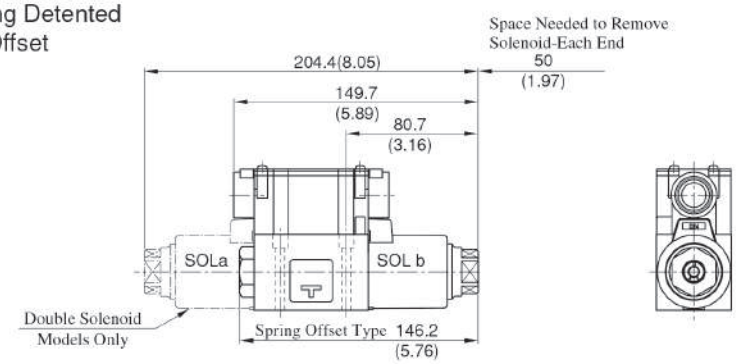
■ Models with DC Solenoids: (S-)DSG-01-***-D*-70/7090

■ Models with R Type Solenoids: (S-)DSG-01-*** -R* -70/7090

● Spring Centred

● No-Spring Detented

● Spring Offset

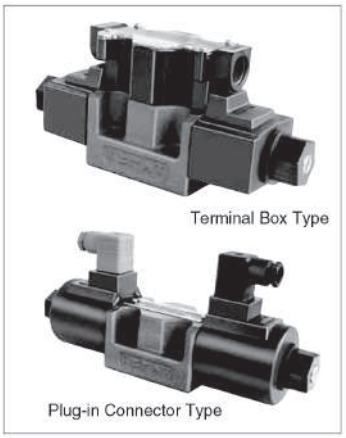


- For other dimensions, refer to models with AC solenoids.

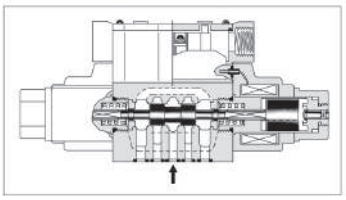
3/8 Solenoid Operated Directional Valves, DSG-03 Series

These are epoch-making solenoid operated valves of high pressure, high flow which have been developed incorporating a unique design concept into every part of the valve including the solenoid. With wet type solenoids, these valves ensure the low noise and the long life, moreover, ensure no leakage of oil outside of the valves.

- **Wide Range of Models**
  Choose the optimum valve to meet your need from a large selection available. The DSG-03 50 design series solenoid operated directional valves are classified into the two basic models.
  - Standard type …. Useable at high pressure: 31.5 MPa (4570 PSI) and high flow: 120 L/min (31.7 U.S.GPM)
  - Shockless type …. A noise at spool changeover and a vibration in piping can be reduced to a minimum.
- **Stable Operation**
  With a strong magnet and spring force, the valves are tough against contamination and thus ensure a stable operation.
- **Usable in products of various standards**
  CE/UL/CSA certified products are available.


Terminal Box Type

Plug-in Connector Type



Specifications

Valve Type	Model Numbers	Max. Flow ★2 L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)	Max. T-Line Back Pres. MPa (PSI)	Max. Changeover Frequency min^{-1} (Cycles/Min)	Approx. Mass kg(1bs.) Type of Solenoid AC	DC, R, RQ
Standard Type	DSG-03-3C∗-∗-50/5090	120 (31.7)	31.5 (4570) {Spool Type 60 Only 25 (3630)}	16 (2320)	240 (R Type Sol. Only 120)	3.6 (7.9)	5 (11)
	DSG-03-2D2-∗-50/5090						
	DSG-03-2B∗-∗-50/5090					2.9 (6.4)	3.6 (7.9)
Shockless Type	S-DSG-03-3C∗-∗-50/5090	120 (31.7)	25 (3630)	16 (2320)	120	—	5 (11)
	S-DSG-03-2B2-∗-50/5090						3.6 (7.9)
Low Wattage (14W)Type ★1	L-DSG-03-3C∗-∗-50/5090	60 (15.9)	16 (2320)	16 (2320)	240 (R Type Sol. Only 120)	3.6 (7.9)	5 (11)
	L-DSG-03-2D2-∗-50/5090						
	L-DSG-03-2B∗-∗-50/5090					2.9 (6.4)	3.6 (7.9I

★1 For details of L-DSG-03, please contact us.
★2 The maximum flow means the limited flow without inducing any abnormality to the operation (changeover) of the valve. The maximum flow differs according to the spool type and operating conditions. For details, please refer to the "List of Standard Models and Maximum Flow"

Sub-plate

Piping Size	Japanese Standard "JIS" Sub-plate Model Numbers	Thread Size	European Design Standard Sub-plate Model Numbers	Thread Size	N.American Design Standard Sub-plate Model Numbers	Thread Size	Approx. Mass kg (lbs.)
3/8	DSGM-03-40	Rc 3/8	DSGM-03-2180	3/8 BSP.F	DSGM-03-2190	3/8 NPT	3.0 (6.6)
1/2	DSGM-03X-40	Rc 1/2	DSGM-03X-2180	1/2 BSP.F	DSGM-03X-2190	1/2 NPT	3.0 (6.6)
3/4	DSGM-03Y-40	Rc 3/4	DSGM-03Y-2180	3/4 BSP.F	DSGM-03Y-2190	3/4 NPT	4.7 (10.4)

- Sub-plates are available. Specify the sub-plate model number from the table above.
  When sub-plates are not used, the mounting surface should have a good machined finish.

Mounting Bolts

For socket head cap screws in the table below are included.

Descriptions	Soc. Hd. Cap Screw (4 pcs.)	Tightening Torque
Japanese Standard "JIS" European Design Standard	M6 ×35 Lg.	12 - 15 Nm (106 - 133 in. 1bs.)
N. American Design Standard	1/4-20 UNC × 1-1/2 Lg.	

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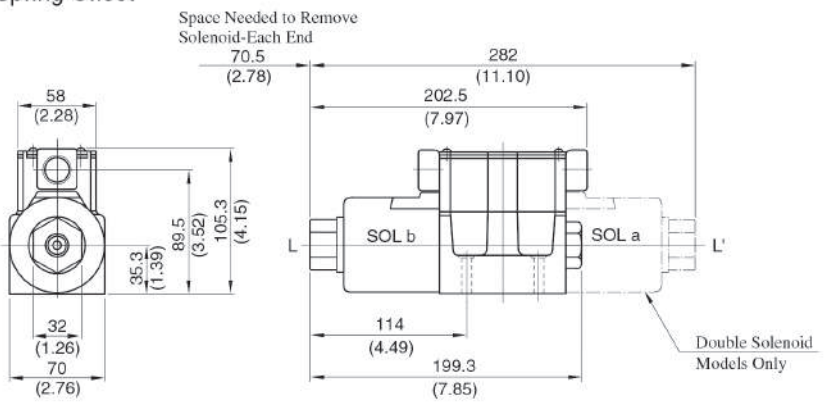
E-mail : terminalseal@terminalseal.com
tmw@terminalseal.com

Mounting surface: ISO 4401-AC-05-4-A

TERMINAL BOX TYPE

- Models with DC Solenoids : (S-)DSG-03- ***-D*-50/5090
- Models with R Type Solenoids : (S-)DSG-03-*** -R* -50/5090
- Models with RQ Type Solenoids : (S-)DSG-03-*** -RQ100-50/5090
- Double Solenoid: Spring Centred & No-Spring Detented
- Single Solenoid: Spring Offset

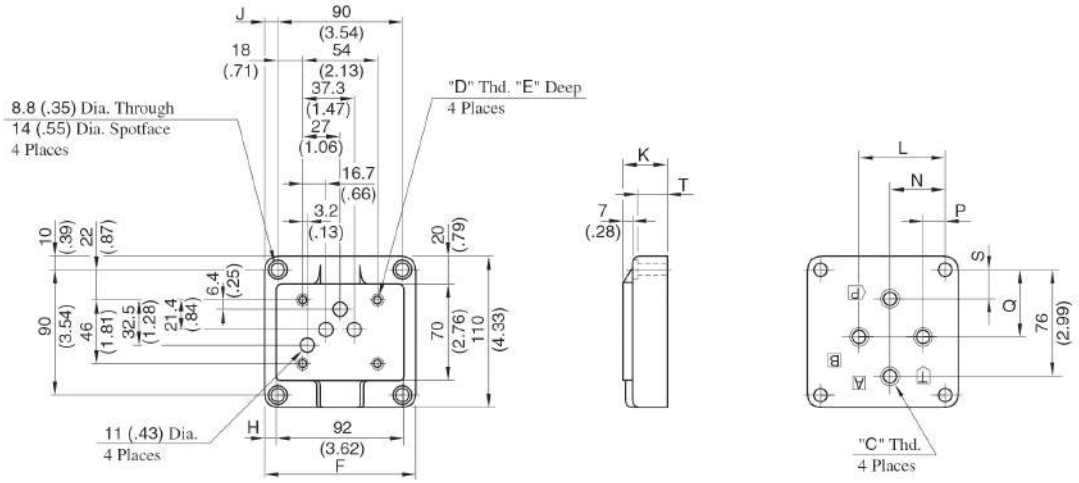


• For other dimensions, refer to Models with AC solenoids (Page 372).

DIMENSIONS IN MILLIMETRES (INCHES)

Sub- plates

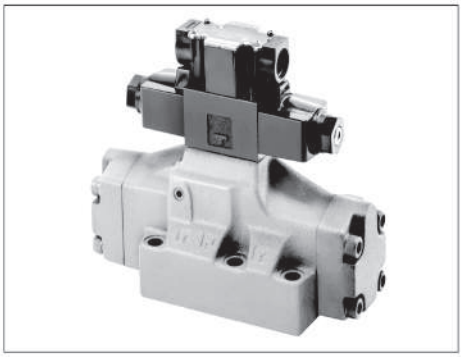
DSGM-03*-40/2180/2190

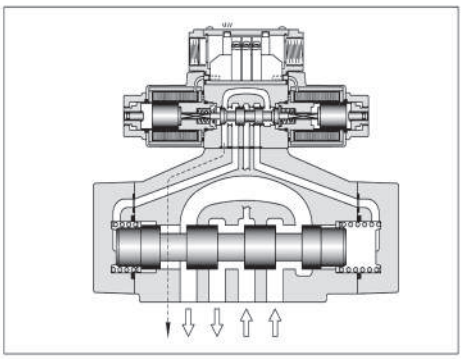


Sub-plate Model Numbers	Piping Size "C" Thd.	"D" Thd.	Dimensions mm (Inches)										
			E	F	H	J	K	L	N	P	Q	S	T
DSGM-03-40	Rc 3/8	M6	13 (.51)	110 (4.33)	9 (.35)	10 (.39)	32 (1.26)	62 (2.44)	40 (1.57)	16 (.63)	48 (1.89)	21 (.83)	24 (.94)
DSGM-03-2180	3/8 BSP.F												
DSGM-03-2190	3/8 NPT	1/4-20 UNC	15 (.59)										
DSGM-03X-40	Rc 1/2	M6	13 (.51)	110 (4.33)	9 (.35)	10 (.39)	32 (1.26)	62 (2.44)	40 (1.57)	16 (.63)	48 (1.89)	21 (.83)	24 (.94)
DSGM-03X-2180	1/2 BSP.F												
DSGM-03X-2190	1/2 NPT	1/4-20 UNC	15 (.59)										
DSGM-03Y-40	Rc 3/4	M6	13 (.51)	120 (4.72)	14 (.55)	15 (.59)	50 (1.97)	80 (3.15)	45 (1.77)	10 (.39)	47 (1.85)	16 (.63)	42 (1.65)
DSGM-03Y-2180	3/4 BSP.F												
DSGM-03Y-2190	3/4 NPT	1/4-20 UNC	15 (.59)										

Solenoid Controlled Pilot Operated Directional Valves

These valves are composed of a solenoid operated pilot valve and a pilot operated slave valve. When a solenoid is energised the pilot valve directs the flow to move the spool of the slave valve, thus changing the direction of flow in the hydraulic circuit.





- **High Pressure High Flow**
  High pressure [31.5 MPa (4570 PSI)] along which high flow means compact system design.

- **Lower Pressure Drop**
  System energy saving increased as pressure drop of each valve has been greatly reduced.

Specifications

Valve Type	Model Numbers	Max. Flow L/min (U.S.GPM) ★1	Max. Operating Pressure MPa (PSI)	Max. Pilot Pressure MPa (PSI)	Min. Required Pilot Pres. MPa (PSI) ★2	Max. T-Line Back Pressure MPa (PSI)		Max. Change-over Frequecy Cycles/Min {min⁻¹}			Mass kg (lbs.)
						Ext. Drain	Int. Drain	AC	DC	R	
Standard Type	DSHG-01-3C∗-∗-14/1480/1490	40 (10.6)	21 (3050)	21 (3050)	1.0 (145)	16 (2320)	16 (2320)	120	120	120	3.2 (7.1)
	DSHG-01-2B∗-∗-14/1480/1490										2.7 (6.0)
	DSHG-03-3C∗-∗-14/1490	160 (42.3)	25 (3630)	25 (3630)	0.7 (100)	16 (2320)	16 (2320)	120	120	120	6.9 (15.2)
	DSHG-03-2N∗-∗-14/1490										6.9 (15.2)
	DSHG-03-2B∗-∗-14/1490										6.4 (14.1)
	(S-)DSHG-04-3C∗-∗-52/5290	300 (79.3)	31.5 (4570)	25 (3630)	0.8 (120)	21 (3050)	16 (2320)	120	120	120	8.5 (18.7)
	(S-)DSHG-04-2N∗-∗-52/5290										8.5 (18.7)
	(S-)DSHG-04-2B∗-∗-52/5290										8.0 (17.6)
Shockless Type	(S-)DSHG-06-3C∗-∗-53/5390	500 (132)	31.5 (4570)	25 (3630)	0.8 (120) ★3	21 (3050)	16 (2320)	120	120	120	12.4 (27.3)
	(S-)DSHG-06-2N∗-∗-53/5390										12.4 (27.3)
	(S-)DSHG-06-2B∗-∗-53/5390										11.9 (26.2)
	(S-)DSHG-06-3H∗-∗-53/5390			21 (3050)	1.0 (145)			110	110	110	13.2 (29.1)
	(S-)DSHG-10-3C∗-∗-43/4390	1100 (291)	31.5 (4570)	25 (3630)	1.0 (145) ★3	21 (3050)	16 (2320)	120	120	100	45.0 (99.2)
	(S-)DSHG-10-2N∗-∗-43/4390							100	100	100	45.0 (99.2)
	(S-)DSHG-10-2B∗-∗-43/4390			21 (3050)				60	60	50	44.5 (98.1)
	(S-)DSHG-10-3H∗-∗-43/4390										52.9 (116.6)

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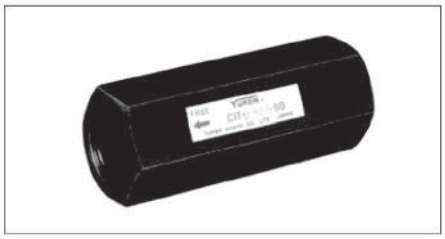
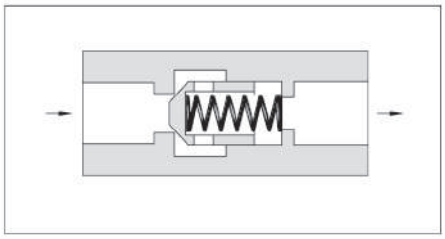
tmw@terminalseal.com

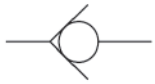
In-Line Check Valves

These valves allow free flow in one direction and prevent flow in the reverse direction. Cracking pressure specified is the pressure required to open the valve and allow free flow.





Graphic Symbols



Specifications

Model Numbers	Rated Flow* L/min (U.S.GPM)	Max. Operating Pres. MPa (PSI)	Cracking Pres. MPa (PSI)	Approx. Mass kg (lbs.)
CIT-02-*-50/5080/5090	16 (4.23)	25 (3630)	0.04 (6) 0.35 (50) 0.5 (70)	0.1 (.22)
CIT-03-*-50/5080/5090	30 (7.93)			0.3 (.66)
CIT-06-*-50/5080/5090	85 (22.5)			0.8 (1.8)
CIT-10-*-50/5080/5090	230 (60.8)			2.3 (5.1)

★ Rated flow is the approximate flow rate, when there is a free flow pressure drop of maximum 0.3 MPa (44 PSI), the fluid has a pecific gravity of 0.85 and a kinematic viscosity of 20 mm^2/s (98 SSU), and the cracking pressure is 0.04 MPa (6 PSI).

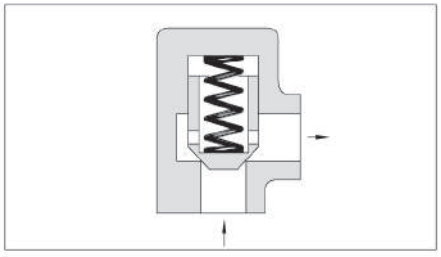
Model Number Designation

CI	T	-03	-04	-50	*
Series Number	Type of Connection	Valve Size	Cracking Pressure MPa (PSI)	Design Number	Design Standards
CI: In-Line Check Valve	**T**: Threaded Connection	**02**	**04**: 0.04 (6) **35**: 0.35 (50) **50**: 0.5 (70)	**50**	**None**: Japanese Std. "JIS" **80**: European Design Std. **90**: N. American Design Std.
		03		**50**	
		06		**50**	
		10		**50**	

Note: For In-Line Check Valves, standard type (for petroleum base oils) can be used phosphate ester type fluid.

Right Angle Check Valves

These valves allow free flow in one direction and prevent flow in the reverse direction. Cracking pressure specified is the pressure required to open the valve and allow free flow.



Graphic Symbols

Specifications

Type of Connection	Model Numbers	Rated Flow* L/min (U.S.GPM)	Max. Operating Pres. MPa (PSI)	Cracking Pres. MPa (PSI)	Approx. Mass kg (lbs.)
Threaded Connection	CRT-03-*-50/5080/5090	40 (10.6)	25 (3630)	0.04 (6)	0.9 (2.0)
	CRT-06-*-50/5080/5090	125 (33)		0.35 (50)	1.7 (3.7)
	CRT-10-*-50/5080/5090	250 (66)		0.5 (70)	5.6 (12.3)
Sub-plate Mounting	CRG-03-*-50/5090	40 (10.6)	25 (3630)	0.04 (6)	1.7 (3.7)
	CRG-06-*-50/5090	125 (33)		0.35 (50)	2.9 (6.4)
	CRG-10-*-50/5090	250 (66)		0.5 (70)	5.5 (12.1)

★ Rated flow is the approximate flow rate, when there is a free flow pressure drop of maximum 0.3 MPa (44 PSI), the fluid has a specific gravity of 0.85 and a kinematic viscosity of 20 mm^2/s (98 SSU), and the cracking pressure is 0.04 MPa (6 PSI).

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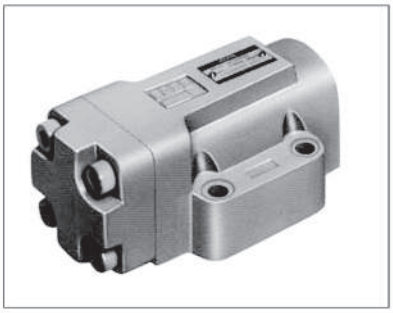
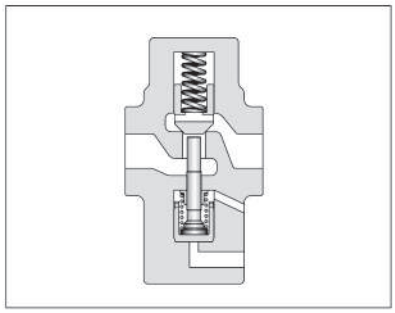
Pilot Operated Check Valves

These check valves allow flow in one direction and prevent flow in the reverse direction, until operated by pilot pressure to allow free reverse flow. The specified cracking pressure is required to open the valve to allow free flow direction.





Graphic Symbols

Internal Drain Type External Drain Type

Specifications

Type of Connection	Model Numbers	Rated Flow★ L/min (U.S.GPM)	Max. Operating Pres. MPa (PSI)	Cracking Pres. MPa (PSI)	Approx. Mass kg (lbs.)
Threaded Connection	CPT/CPDT-03-∗-∗-50∗	40 (10.6)	25 (3630)	0.04 (6) 0.2 (29) 0.35 (50) 0.5 (70)	3.0 (6.6)
	CPT/CPDT-06-∗-∗-50∗	125 (33)			5.5 (12.1)
	CPT/CPDT-10-∗-∗-50∗	250 (66)			9.6 (21.2)
Sub-plate Mounting	CPG/CPDG-03-∗-∗-50∗	40 (10.6)	25 (3630)	0.04 (6) 0.2 (29) 0.35 (50) 0.5 (70)	3.3 (7.3)
	CPG/CPDG-06-∗-∗-50∗	125 (33)			5.4 (11.9)
	CPG/CPDG-10-∗-∗-50∗	250 (66)			8.5 (18.7)

★ Rated flow is the approximate flow rate, when there is a free flow pressure drop of maximum 0.3 MPa (44 PSI), the fluid has a specific gravity of 0.85 and a kinematic viscosity of 20 mm^2/s (98 SSU), and the cracking pressure is 0.04 MPa (6 PSI).

Model Number Designatioin

F-	CP	T	03	-E	-04	-50	∗
Special Seals	Series Number	Type of Connection	Valve Size	Drain Connection	Cracking Pres. MPa (PSI)	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	**CP**: Pilot Operated Check Valve **CPD**: Decompression Type Pilot Operated Check Valve	**T**: Threaded Connection	**03**	**None**: Internal Drain	**04**:0.04 (6)	**50**	**None**: Japanese Std. "JIS"
			06		**20**:0.2 (29)	**50**	**80**: European Design Std.
			10		**35**:0.35 (50)	**50**	**90**: N. American Design Std.
		G: Sub-plate Mounting	**03**	**E**: External Drain	**50**:0.5 (70)	**50**	**None**: Japanese Std. "JIS" & European Design Std.
			06			**50**	**90**: N. American Design Std.
			10			**50**	

Mounting Bolts

Socket head cap screws in the table below are included.

Valve Model Numbers	Socket Head Cap Screw		Qty.
	Japanese Standard "JIS" & European Design Standard	N.American Design Standard	
CP∗G-03	M10 × 45 Lg.	3/8-16 UNC × 1-3/4 Lg.	4
CP∗G-06	M10 × 50 Lg.	3/8-16 UNC × 2 Lg.	4
CP∗G-10	M10 × 55 Lg.	3/8-16 UNC × 2-1/4 Lg.	6

Yuken can offer flanged connection valves described below.
For details, contact us.

Model Numbers	Rated Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)
CP∗F-10-∗-∗-50∗	250 (66)	25 (3630)
CP∗F-16-∗-∗-50∗	600 (159)	25 (3630)

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High Pressure, High Flow Rate Modular Valves

Features

1. Installation and mounting space can be minimized.
2. No special skill is required for assembly and any addition or alteration of the hydraulic circuit can be made quickly and easily.
3. Problems such as oil-leaks, vibration and noise which may be caused by piping are minimized, increasing the reliability of the hydraulic system.
4. Maintenance and system check-ups can be easily carried out as they are normally installed in stackable units.

Specifications

Series	Valve Size	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)	Number of Stack ★2
005 Series	—	25 (3630)	15 (3.96)	1 to 4 stackes
01 Series	1/8	31.5 (4570)	35 [60] ★1 (9.24 [15.9]) ★1	1 to 5 stackes ★3
03 Series	3/8	25 [31.5] ★4 (3630 [4570]) ★4	70 [120] ★1 (18.5 [31.7]) ★1	1 to 5 stackes
06 Series	3/4	25 (3630)	500 (132)	
10 Series	1-1/4	25 (3630)	800 (211)	

★1. The values in parentheses represent the max. flow rates for throttle modular valves (MSP) and throttle check modular valves (MSA/MSB/MSW).
★2. Solenoid operated directional valve is included in the number of stack.
★3. Solenoid operated directional valve is included in the number of stack. If the working pressure is above 25 MPa (3630 PSI), the maximum number of layers in a stack is 4 including the solenoid operated directional valve.
★4. The value range in parentheses represents the tightening torque requirements if the operating pressure is above 25 MPa (3630 PSI).

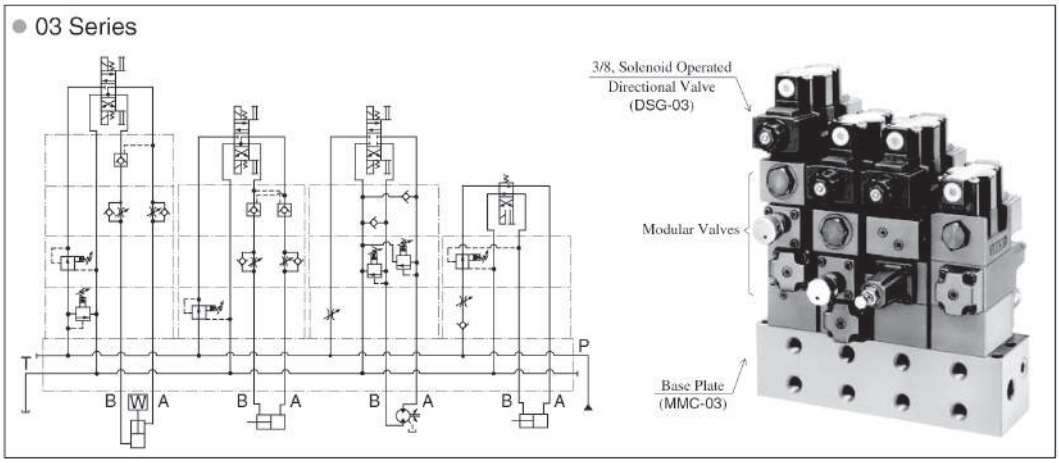
Mounting Surface

Mounting surface dimensions conform to ISO 4401 (Hydraulic fluid power four port directional control valves mounting surface) as listed in the table below.

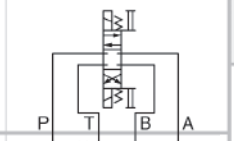
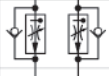
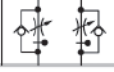
Name of Valve	ISO Mtg. Surface Code No.
01 Series Modular Valve	ISO 4401-AB-03-4-A
03 Series Modular Valve	ISO 4401-AC-05-4-A
06 Series Modular Valve	ISO 4401-AE-08-4-A
10 Series Modular Valve	ISO 4401-AF-10-4-A

Stacking Example

● 03 Series



Type of Modular Valve

Class	Model Numbers	Graphic Symbols
	Solenoid Operated Directional Valve (S-)DSG-01-***-*-70/7090 E-DSG-01-***-D*-60/6090 T-DSG-01-***-D24*-70/7090 G-DSG-01-***-*-50/5090	
Pressure Control Valves	Releif Valves (for "P-Line") MBP-01-*-30	
	Releif Valves (for "A-Line") MBA-01-*-30	
	Releif Valves (for "B-Line") MBB-01-*-30	
	Reducing Valves (for "P-Line") MRP-01-*-30/3090	
	Reducing Valves (for "A-Line") MRA-01-*-30/3090	
	Reducing Valves (for "B-Line") MRB-01-*-30/3090	
	Brake Valves MBR-01-*-30	
	Sequence Valves (for "P-Line") MHP-01-*-30	
	Counterbalance Valves (for "A-Line") MHA-01-*-30	
	Pressure Switch Valves (for "P-Line") MJP-01-*-*-10	
	Pressure Switch Valves (for "A-Line") MJA-01-*-*-10	
	Pressure Switch Valves (for "B-Line") MJB-01-*-*-10	
Flow Control Valves	Flow Control Valves (for "P-Line") MFP-01-10	
	Flow Control and Check Valves (for "A-Line", Metre-out) MFA-01-X-10	
	Flow Control and Check Valves (for "A-Line", Metre-in) MFA-01-Y-10	
	Flow Control and Check Valves (for "B-Line", Metre-out) MFB-01-X-10	
	Flow Control and Check Valves (for "B-Line", Metre-in) MFB-01-Y-10	
	Flow Control and Check Valves (for "A&B-Lines", Metre-out) MFW-01-X-10	
	Flow Control and Check Valves (for "A&B-Lines", Metre-in) MFW-01-Y-10	
	Temperature Compensated Throttle and Check Valves (for "A-Line", Metre-out) MSTA-01-X-10	
	Temperature Compensated Throttle and Check Valves (for "B-Line", Metre-out) MSTB-01-X-10	
	Temperature Compensated Throttle and Check Valves (for "A&B-Lines", Metre-out) MSTW-01-X-10	

Class	Model Numbers	Graphic Symbols
		P T B A
Flow Control Valves	Throttle Valves (for "P-Line") MSP-01-50	
	Check and Throttle Valves (for "P-Line") MSCP-01-30	
	Throttle and Check Valves (for "A-Line", Metre-out) MSA-01-X-50	
	Throttle and Check Valves (for "A-Line", Metre-in) MSA-01-Y-50	
	Throttle and Check Valves (for "B-Line", Metre-out) MSB-01-X-50	
	Throttle and Check Valves (for "B-Line", Metre-in) MSB-01-Y-50	
	Throttle and Check Valves (for "A&B-Lines", Metre-out) MSW-01-X-50	
	Throttle and Check Valves (for "A&B-Lines", Metre-in) MSW-01-Y-50	
	Throttle and Check Valves (for "A&B-Lines", Metre-out, Metre-in) MSW-01-XY-50	
	Throttle and Check Valves (for "A&B-Lines", Metre-in, Metre-out) MSW-01-YX-50	
Directional Control Valves	Check Valves (for "P-Line") MCP-01-*-30	
	Check Valves (for "T-Line") MCT-01-*-30	
	Anti-Cavitation Valves MAC-01-30	
	Pilot Operated Check Valves (for "A-Line") MPA-01-*-40/4001	
	Pilot Operated Check Valves (for "B-Line") MPB-01-*-40/4001	
	Pilot Operated Check Valves (for "A&B-Lines") MPW-01-*-40/4001	
Modular Plates and Mounting Bolts	End Plates (Blocking plates) MDC-01-A-30	
	End Plates (Bypass plates) MDC-01-B-30	
	Connecting Plates (for "P&A-Lines") MDS-01-PA-30/3090	
	Connecting Plates (for "P&B-Lines") MDS-01-PB-30/3090	
	Connecting Plates (for "A&T-Lines") MDS-01-AT-30/3090	
	Base Plates MMC-01-*-40/4080/4090	
	Bolt Kits MBK-01-*-30/3090	

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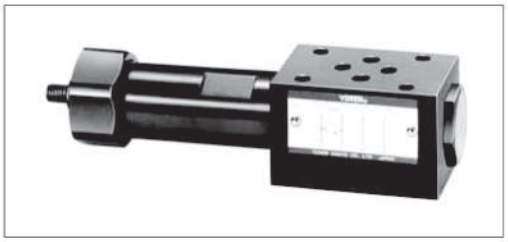
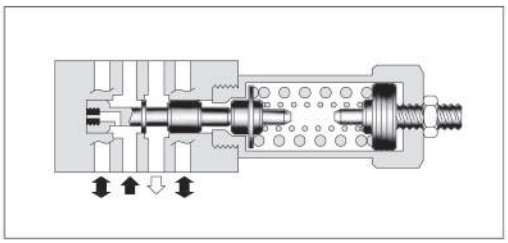
YUKEN

Relief Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MBP-01-*-30 MBA-01-*-30 MBB-01-*-30	21 (3050)	35 (9.25)





Model Number Designation

F-	MBP	-01	-C	-30	*
Special Seals	Series Number	Valve Size	Pres. Adj. Range MPa (PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	**MBP**: Relief Valve for P-Line **MBA**: Relief Valve for A-Line **MBB**: Relief Valve for B-Line	**01**	**C**: *-14 ★1 (*-2030) **H**: 7-21 (1020-3050)	**30**	Refer to ★2

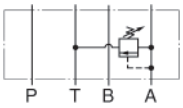
★1. See the "Minimum Adjustment Pressure" of the next page for the item marked *.
★2. Design Standards: None ..... Japanese Standard "JIS", European Design Standard and N. American Design Standard

Instructions

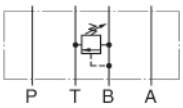
- The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of the next page. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular valve.
- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment screw clockwise or anti-clockwise. For an increase of pressure, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after making adjustment to the pressure.
- In case of a small flow, the setting pressure may become unstable. To avoid this, refer to the minimum flow characteristic curve of the next page and use the valve within a range as shown with .

Graphic Symbols

MBP-01



MBA-01



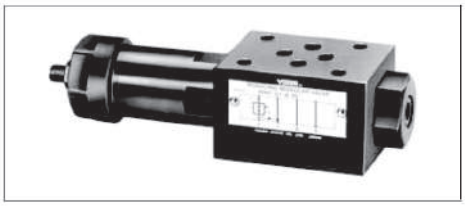
MBB-01

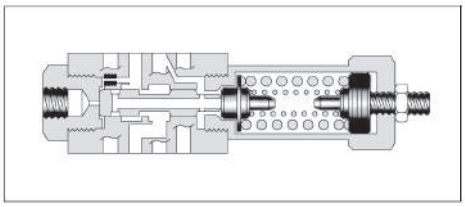
Reducing Modular Valves

Specifications

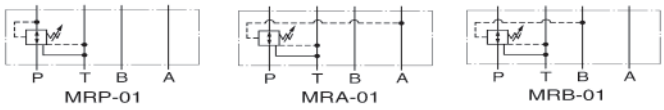
Model Numbers	Max. Operating Pressure MPa(PSI)	Max. Flow L/min (U.S.GPM)
MRP-01-*-30/3090 MRA-01-*-30/3090 MRB-01-*-30/3090	31.5 (4570)	35 (9.25) ★

★ If the pressure is set below 1.9 MPa (280 PSI), the maximum flow is limited. See the minimum adjustment pressure vs. maximum flow characteristics and during use, stay within the shaded zone on the graph.





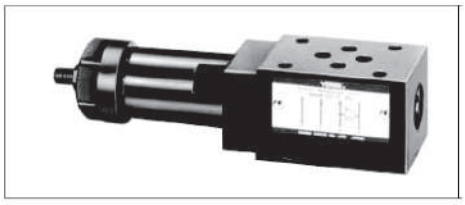
Graphic Symbols



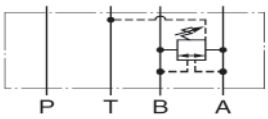
Brake Modular Valves

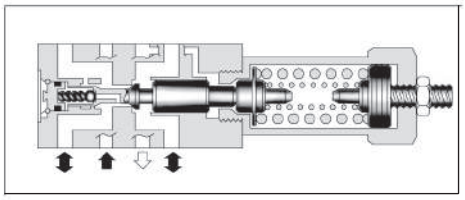
Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MBR-01-*-30	25 (3630)	35 (9.25)



Graphic Symbols

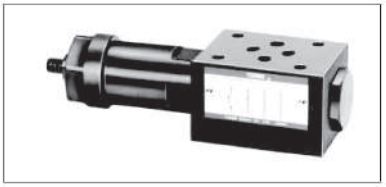




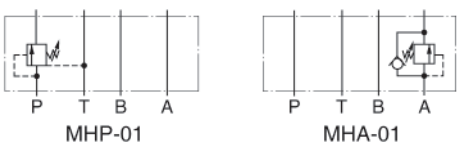
Sequence Modular Valves/Counterbalance Modular Valves

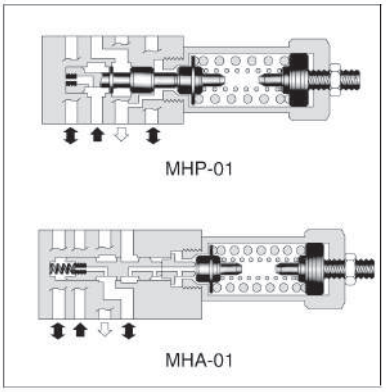
Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)	Free Flow L/min (U.S.GPM)
MHP-01-*-30	25 (3630)	35 (9.25)	——
MHA-01-*-30			35 (9.25)



Graphic Symbols





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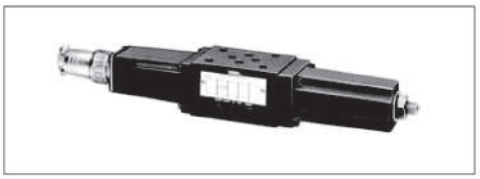
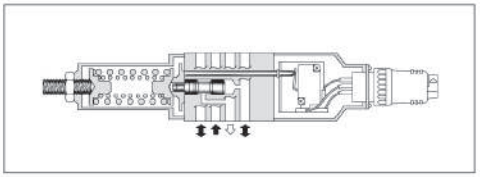
tmw@terminalseal.com

Pressure Switch Modular Valves

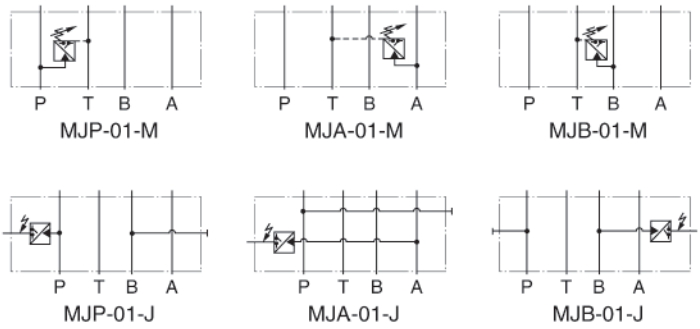
Specifications

Model Numbers	Max. Operating Pressure MPa(PSI)	Max. Flow L/min (U.S.GPM)
MJ*-01-M-*-*-10	31.5 (4570)	35 (9.25)
MJ*-01-J-35-10	10 (1450)	
MJ*-01-J-100-10	10 (1450)	
MJ*-01-J-200-10	20 (2900)	
MJ*-01-J-350-10	35 (5080)	





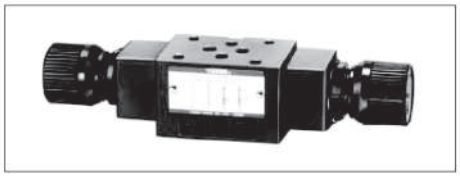
Graphic Symbols

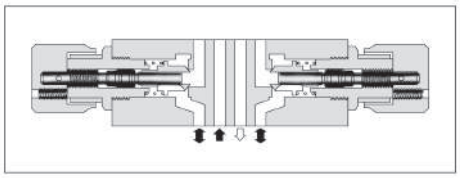


Temperature Compenated Throttleand Check Modular Valves

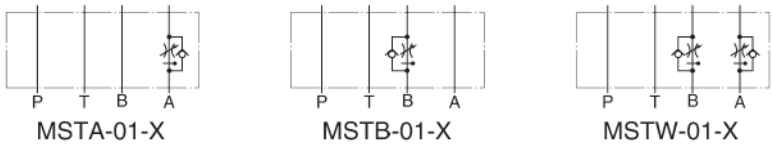
Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Differential Pressure MPa (PSI)	Max. Metred Flow L/min (U.S.GPM)	Min. Metred Flow L/min (U.S.GPM)	Max. Free Flow L/min (U.S.GPM)
MSTA-01-X-10 MSTB-01-X-10 MSTW-01-X-10	31.5 (4570)	14 (2030)	35 (9.25)	0.5 (.13)	35 (9.25)





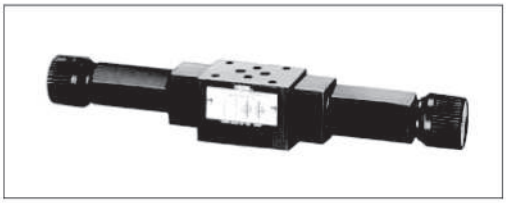
Graphic Symbols

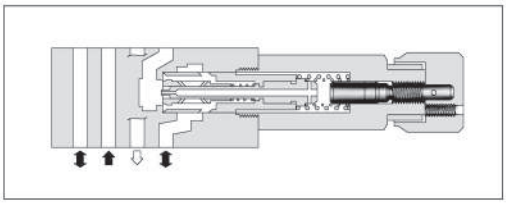


Pressure and Temperature Compensated Flow Control (and Check) Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Metred Flow L/min (U.S.GPM)	Max. Free Flow L/min (U.S.GPM)
MFP-01-10	16 (2320)	35 (9.25)	—
MFA-01-*-10 MFB-01-*-10 MFW-01-*-10			35 (9.25)



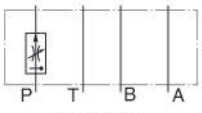


Model Number Designation

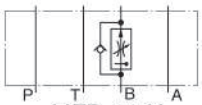
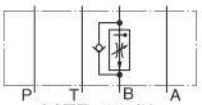
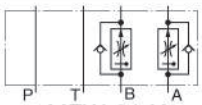
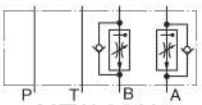
F-	MFA	-01	-X	-10	
Special Seals	Series Number	Valve Size	Direction of Flow	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	**MFP** : Flow Control Valve for P-Line	**01**	—	**10**	Refer to ★
	MFA : Flow Control and Check Valve for A-Line **MFB** : Flow Control and Check Valve for B-Line **MFW** : Flow Control and Check Valve for A&B-Lines		**X**: Metre-out **Y**: Metre-in	**10**	

★ Design Standards: None ..... Japanese Standard "JIS", European Design Standard and N. American Design Standard

Graphic Symbols



MFP-01

Metre-out	Metre-in
 MFA-01-X	 MFA-01-Y
 MFB-01-X	 MFB-01-Y
 MFW-01-X	 MFW-01-Y

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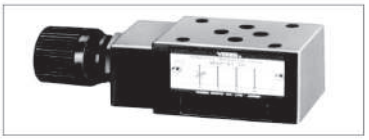
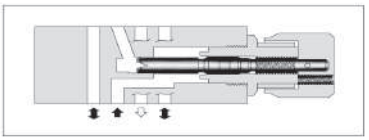
Throttle Modular Valves

Specifications

Model Number	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MSP-01-50	31.5 (4570)	60 (15.9) ★

★ At the low differential pressure, maximum flow is limited. See "Pressure Drop at Throttle Fully Open".





Model Number Designation

F-	MSCP	-01	-30	✻
Special Seals	Series Number	Valve Size	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MSCP : Check and Throttle Valve for P-Line	01	30	Refer to ★

★ Design Standards: None ..... Japanese Standard "JIS", European Design Standard and N. American Design Standard

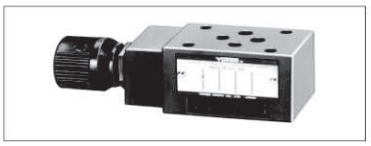
Graphic Symbols

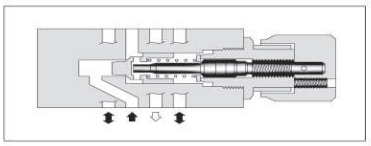
Check and Throttle Modular Valves

Specifications

Model Number	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MSCP-01-30	31.5 (4570)	35 (9.25) ★

★ At the low differential pressure, maximum flow is limited. See "Pressure Drop at Throttle Fully Open".



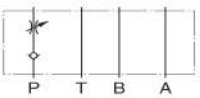


Model Number Designation

F-	MSCP	-01	-30	✻
Special Seals	Series Number	Valve Size	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	MSCP : Check and Throttle Valve for P-Line	01	30	Refer to ★

★ Design Standards: None ..... Japanese Standard "JIS", European Design Standard and N. American Design Standard

Graphic Symbols

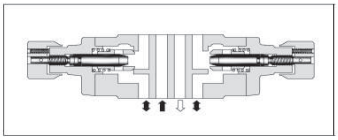


Throttle and Check Modular Valves

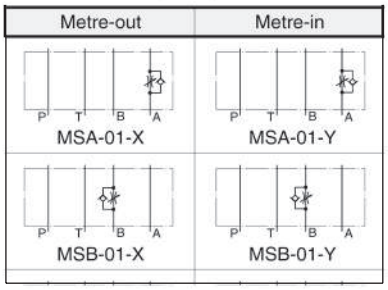
Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MSA-01-✻✻-50 MSB-01-✻✻-50 MSW-01-✻✻-50	31.5 (4570)	60 (15.9) ★

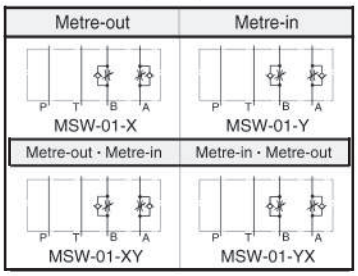
★ At the low differential pressure, maximum flow is limited. See "Pressure Drop at Throttle Fully Open" of the next page.



Graphic Symbols



Graphic Symbols



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Base Plates For Modular Valves

Specifications

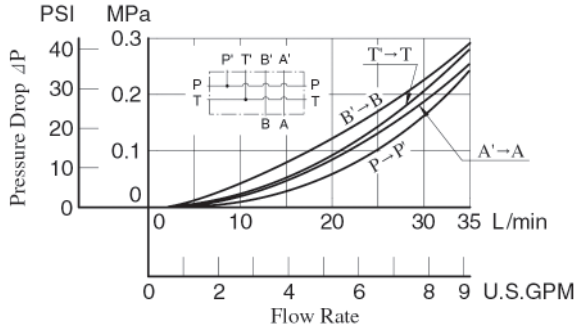
Max. Operating Pressure ---------- 25 MPa (3630 PSI)

Model Number Designation

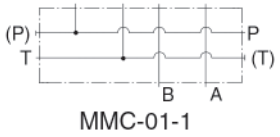
MMC	-01	-6	-40	*
Series Number	Plate Size	Number of Stations	Design Number	Design Standard
MMC: Base Plate	**01**	**1**: 1 Station **6**: 6 Stations **2**: 2 Stations **7**: 7 Stations **3**: 3 Stations **8**: 8 Stations **4**: 4 Stations **9**: 9 Stations **5**: 5 Stations **10**: 10 Stations	**40**	**None**: Japanese Standard "JIS" **80**: European Design Standard **90**: N.American Design Standard

Pressure Drop

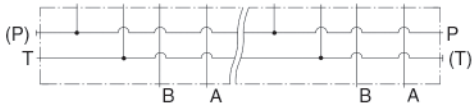
Hydraulic Fluid: Viscosity 35 mm^2/s (164 SSU),Specific Gravity 0.850



Graphic Symbols



MMC-01-1



MMC-01-2-10

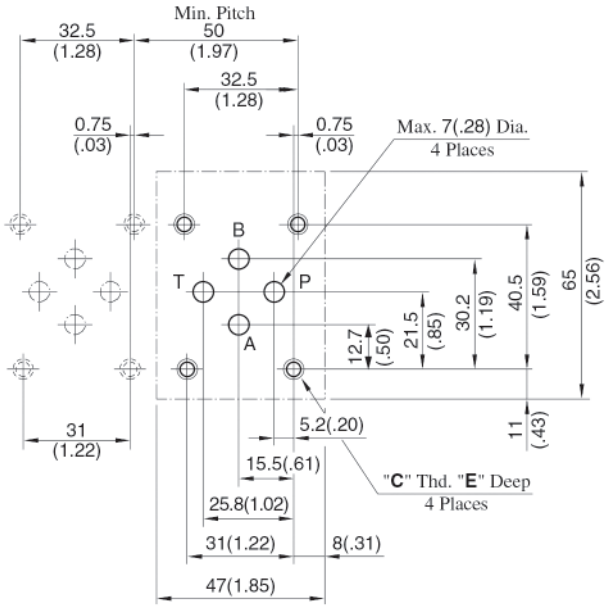
Instructions

- **Port Used**: Base plate has three (two, in case of 1 station type) **pressure port "P"**s and four **tank port "T"**s. Any one of these ports or two or more ports may be used. However, please note that the ports marked with (P) or (T) in the drawing are normally plugged. Remove the plugs when using such ports. Make sure that ports that are not currently used are properly plugged.

Interface Mounting Surface Dimensions for 1/8 Modular Valve

When standard base plates (MMC-01) are not used, the mounting surface described on right must be prepared. The mounting surface should have a good machined finish.

Design Std.	"C" Thd.	E
Japanese Standard "JIS" and European Design Standard	M5	10 (.39)
N.American Design Standard	No. 10-24 UNC	12 (.47)



DIMENSIONS IN MILLIMETRES (INCHES)

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tmw@terminalseal.com

Type of Modular Valve

Class	Model Numbers	Graphic Symbols
	Solenoid Operated Directional Valve (S-)DSG-03-✻✻✻-✻-50/5090 E-DSG-03-✻✻✻-D✻-50/5090 T-DSG-03-✻✻✻-D24✻-50/5090 G-DSG-03-✻✻✻-✻-50/5090	P T B A
Pressure Control Valves	Releif Valves (for "P-Line") MBP-03-✻-30	
	Releif Valves (for "A-Line") MBA-03-✻-30	
	Releif Valves (for "B-Line") MBB-03-✻-30	
	Releif Valves (for "A&B-Lines") MBW-03-✻-30	
	Reducing Valves (for "P-Line") MRP-03-✻-30/3090	
	Reducing Valves (for "A-Line") MRA-03-✻-30/3090	
	Reducing Valves (for "B-Line") MRB-03-✻-30/3090	
	Reducing Valves for Low Pressure Setting (for "P-Line") MRLP-03-10/1090	
	Reducing Valves for Low Pressure Setting (for "A-Line") MRLA-03-10/1090	
	Reducing Valves for Low Pressure Setting (for "B-Line") MRLB-03-10/1090	
	Sequence Valves (for "P-Line") MHP-03-✻-20	
	Counterbalance Valves (for "A-Line") MHA-03-✻-20	
	Counterbalance Valves (for "B-Line") MHB-03-✻-20	
Flow Control Valves	Flow Control Valves (for "P-Line") MFP-03-11	
	Flow Control and Check Valves (for "A-Line", Metre-out) MFA-03-X-11	
	Flow Control and Check Valves (for "A-Line", Metre-in) MFA-03-Y-11	
	Flow Control and Check Valves (for "B-Line", Metre-out) MFB-03-X-11	
	Flow Control and Check Valves (for "B-Line", Metre-in) MFB-03-Y-11	
	Flow Control and Check Valves (for "A&B-Lines", Metre-out) MFW-03-X-11	
	Flow Control and Check Valves (for "A&B-Lines", Metre-in) MFW-03-Y-11	
	Temperature Compensated Throttle and Check Valves (for "A-Line", Metre-out) MSTA-03-X-20	
	Temperature Compensated Throttle and Check Valves (for "B-Line", Metre-out) MSTB-03-X-20	

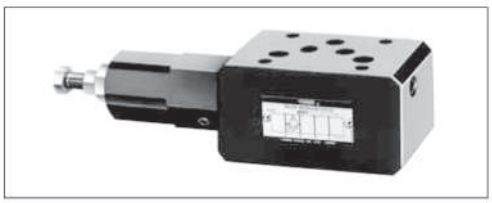
Class	Model Numbers	Graphic Symbols
		P T B A
Flow Control Valves	Temperature Compensated Throttle and Check Valves (for "A&B-Lines", Metre-out) MSTW-03-X-20	
	Throttle Valves (for "P-Line") MSP-03-30	
	Check and Throttle Valves (for "P-Line") MSCP-03-20	
	Throttle and Check Valves (for "A-Line", Metre-out) MSA-03-X-40	
	Throttle and Check Valves (for "A-Line", Metre-in) MSA-03-Y-40	
	Throttle and Check Valves (for "B-Line", Metre-out) MSB-03-X-40	
	Throttle and Check Valves (for "B-Line", Metre-in) MSB-03-Y-40	
	Throttle and Check Valves (for "A&B-Lines", Metre-out) MSW-03-X-40	
	Throttle and Check Valves (for "A&B-Lines", Metre-in) MSW-03-Y-40	
Directional Control Valves	Check Valves (for "P-Line") MCP-03-✻-10	
	Check Valves (for "A-Line") MCA-03-✻-20	
	Check Valves (for "B-Line") MCB-03-✻-20	
	Check Valves (for "T-Line") MCT-03-✻-10	
	Check Valves (for "P&T-Lines") MCPT-03-P✻-T✻-10	
	Anti-Cavitation Valves MAC-03-10	
	Pilot Operated Check Valves (for "A-Line") MPA-03-✻-20/2001	
	Pilot Operated Check Valves (for "B-Line") MPB-03-✻-20/2001	
	Pilot Operated Check Valves (for "A&B-Lines") MPW-03-✻-20/2001	
Modular Plates and Mounting Bolts	End Plates (Blocking Plates) MDC-03-A-10	
	End Plates (Bypass Plates) MDC-03-B-10	
	Connecting Plates MDS-03-10/1090	
	Base Plates MMC-03-T-✻-21/2180/2190	
	Bolt Kits MBK-03-✻-10/1090	

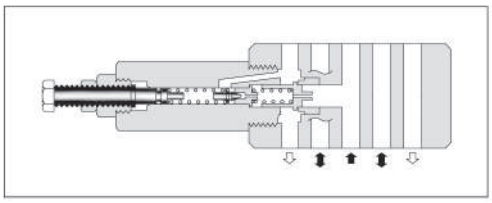
YUKEN

Relief Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MBP-03-*-30 MBA-03-*-30 MBB-03-*-30 MBW-03-*-30	31.5 (4570)	70 (18.5)





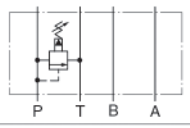
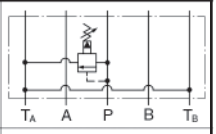
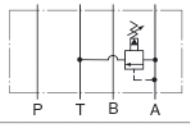
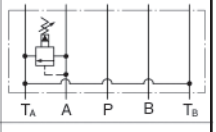
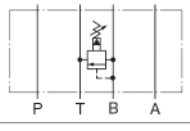
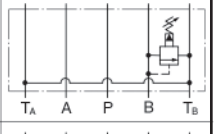
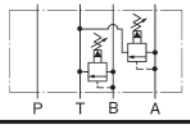
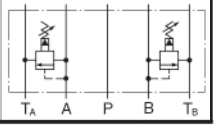
Model Number Designation

F-	MBA	-03	-B	-30	*
Special Seals	Series Number	Valve Size	Pres. Adj. Range MPa (PSI)	Design Number	Design Standard
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	**MBP** : Relief Valve for P-Line **MBA** : Relief Valve for A-Line **MBB** : Relief Valve for B-Line **MBW** : Relief Valve for A&B-Lines	**03**	**B**: *-7 ★1 (*-1020) **H**: 3.5-31.5 (510-4570)	**30**	Refer to ★2

★1. See the "Minimum Adjustment Pressure" of the next page for the item marked *.
★2. Design Standards: None ..... Japanese Standard "JIS", European Design Standard and N. American Design Standard

Instructions

- The minimum adjustment pressure equals the value obtained from the minimum adjustment pressure characteristics plus the tank line back pressure of the next page. This back pressure should include the value of the T-line pressure drop characteristics of the valves stacked to the base plate side of the modular valve.
- To make pressure adjustment, loosen the lock nut and turn the pressure adjustment screw clockwise or anti-clockwise. For an increase of pressure, turn the screw clockwise. Be sure to re-tighten the lock nut firmly after making adjustment to the pressure.
- In case of a small flow, the setting pressure may become unstable. To avoid this, refer to the minimum flow characteristic curve of the next page and use the valve within a range as shown with.

Model Numbers	Graphic Symbols	Detailed Graphic Symbols
MBP-03		
MBA-03		
MBB-03		
MBW-03		

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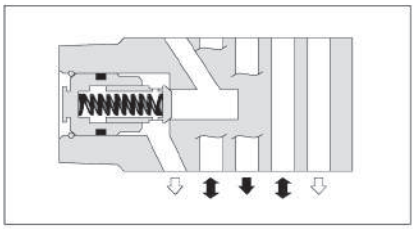
tmw@terminalseal.com

Check Modular Valves

Specifications

Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MCP-03-*-10 MCA-03-*-20 MCB-03-*-20 MCT-03-*-10	25 (3630)	70 (18.5)



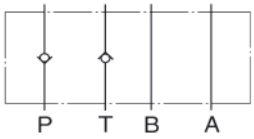
Model No.	Graphic Symbols	Detailed Graphic Symbols
MCP-03	P T B A	T_A A P B T_B
MCA-03	P T B A	T_A A P B T_B
MCB-03	P T B A	T_A A P B T_B
MCT-03	P T B A	T_A A P B T_B

Check Modular Valves For "P&T" Lines

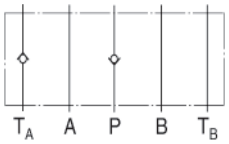
Specifications

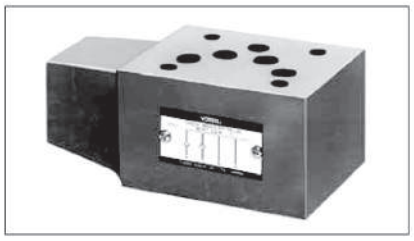
Model Numbers	Max. Operating Pressure MPa (PSI)	Max. Flow L/min (U.S.GPM)
MCPT-03-P*-T*-10	25 (3630)	70 (18.5)

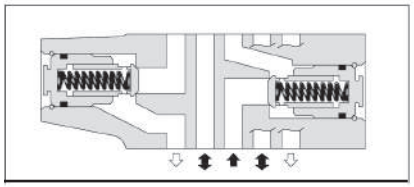
Graphic Symbols



Graphic Symbols







Base Plates For Modular Valves

Specifications

Max. Operating Pressure ---------- 25 MPa (3630 PSI)

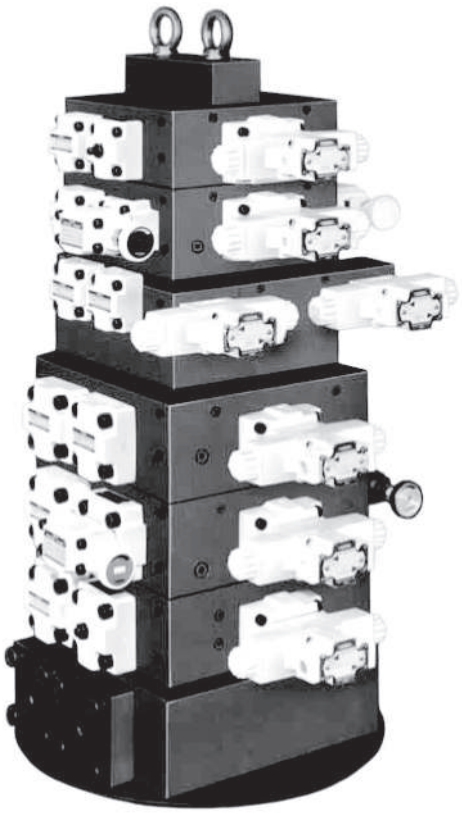
Model Number Designation

MMC	-03	-T	-6	-21	*
Series Number	Plate Size	Type of Connection	Number of Stations	Design Number	Design Standard
MMC : Base Plate	**03**	**T :** Threaded Connection	**1:** 1 Station **5:** 5 Stations **2:** 2 Stations **6:** 6 Stations **3:** 3 Stations **7:** 7 Stations **4:** 4 Stations	**21**	**None:** Japanese Standard "JIS" **80:** European Design Standard **90:** N.American Design Standard

YUKEN

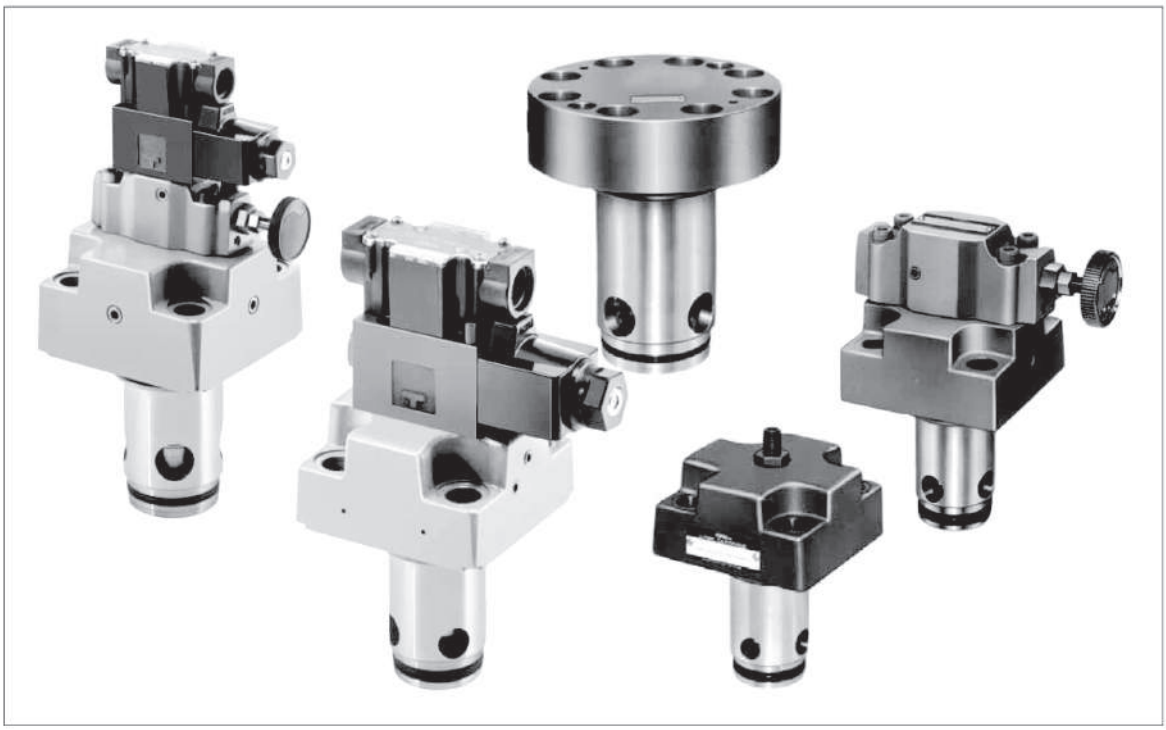
Logic Valves

Yuken Logic Valves comprise cartridge typed elements and covers with pilot passages. Various types may be combined for direction, flow rate and pressure control.
Yuken Logic Valves can be incorporated in manifold blocks to form optimum integrated hydraulic circuits and compact hydraulic power units. Being a poppet type, the elements permit high-pressure, high flow rates, high speed and shockless shifting with low pressure drop.
Typical applications include steel mill machines, injection moulding machines, machine tools and so on. In addition, Yuken Logic Valves cavity specifications conform to ISO standards.



Features

- Multifunction performance in terms of direction, flow and pressure can be obtained by combining elements and covers.
- Poppet-type elements virtually eliminate internal leakage and hydraulic locking. Because there are no overlaps, response times are very high, permitting high-speed shifting.
- For high pressure, large capacity systems, optimum performance is achieved with low pressure losses.
- Since the logic valves are directly incorporated in cavities provided in blocks, the system is free from problems related to piping such as oil leakage, vibration and noise, and higher reliability is achieved.
- Multi-function logic valves permit compact integrated hydraulic systems which reduce manifold dimensions and mass and achieve lower cost conventional types.



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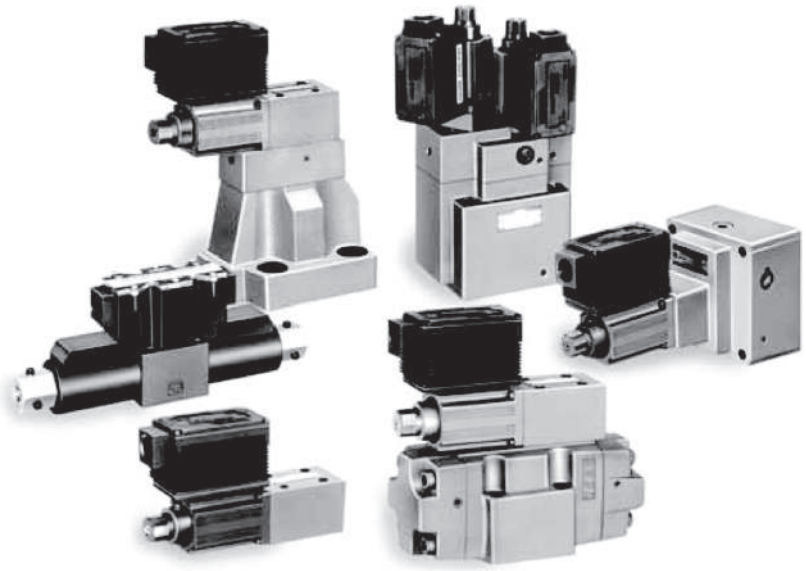
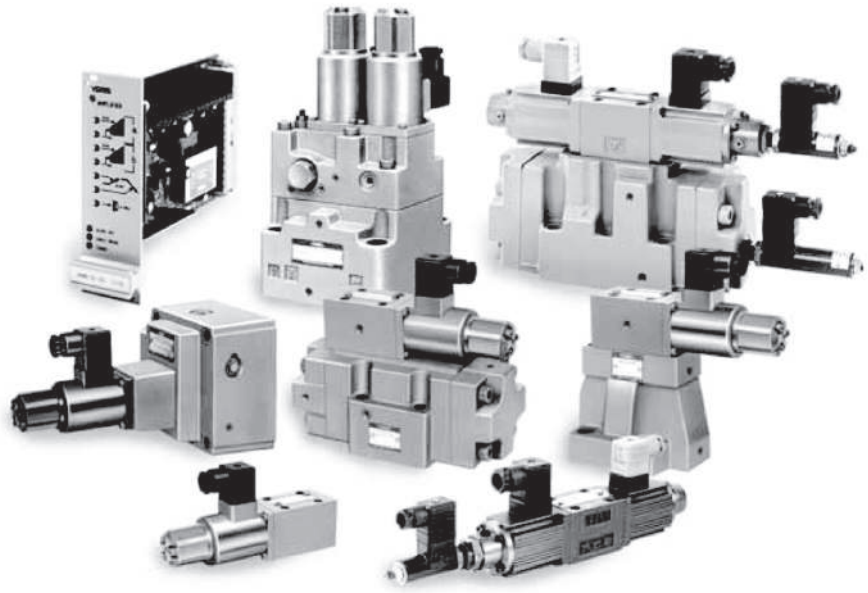
PROPORTIONAL ELECTRO-HYDRAULIC CONTOROLS

EH Series-Hybrid Components



E Series



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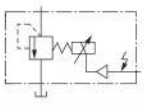
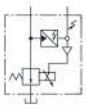
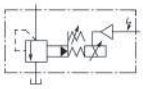
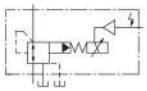
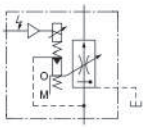
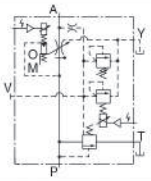
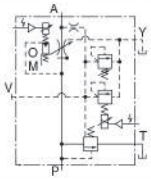
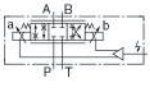
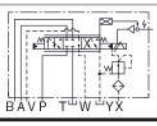
EH Series-Hybrid Components

Proportional Electro-Hydraulic Controls

Types	Graphic Symbols	Max. Operating Pressure MPa (PSI)	Maximum Flow U.S.GPM: .5 1 2 3 5 10 20 30 50 100 200 / L/min: 1 2 3 5 10 20 30 50 100 200 300 500 1000
Pilot Relief Valves		24.5 (3550)	EHDG 01
Pressure Control Valves		SB1110: 24.5(3550) SB1190: 7(1020)	SB1110 / SB1190
Relief Valves		24.5 (3550)	EHBG 03 06 10
Relieving and Reducing Valves		24.5 (3550)	EHRBG 06 10
Flow Control (and Check) Valves		03: 20.6 (2990) 06: 24.5 (3550)	EHFG EHFCG 03 06
Flow Control and Relief Valves		24.5 (3550)	EHFBG 03 06 10
High Flow Series Flow Control and Relief Valves		24.5 (3550)	EHFBG 03 06
Directional and Flow Control Valves		24.5 (3550)	EHDFG 01 03
High Respones Type Directional and Flow Control Valves		15.7 (2280)	EHDFG 04 06

Consult Yuken when detailed material such as dimensions figures is required.

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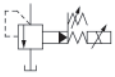
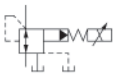
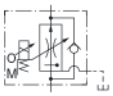
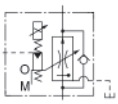
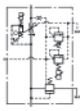
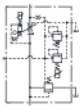
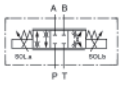
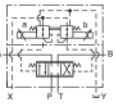
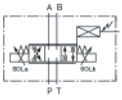
E Series Proportional Electro-Hydraulic Controls

Types	Graphic Symbols	Max. Operating Pressure MPa (PSI)	Maximum Flow U.S.GPM: .5 1 5 10 50 100 200 / L/min: 1 2 3 5 10 20 30 50 100 200 300 500 1000
Pilot Relief Valves		24.5 (3550)	EDG 01
Relief Valves		24.5 (3550)	EBG 03 06 10
Relieving and Reducing Valves		24.5 (3550)	ERBG 06 10
40 Ω Series Flow Control (and Check) Valves		20.6 (3000)	EFG EFCG 02 03 06 10
10 Ω Series Flow Control (and Check) Valves		03: 20.6 (3000) 06: 24.5 (3550)	EFG EFCG 03 06
40 Ω - 10 Ω Series Flow Control and Relief Valves		24.5 (3550)	EFBG 03 06 10
10 Ω - 10 Ω Series Flow Control and Relief Valves		24.5 (3550)	EFBG 03 06 10
High Flow Series Flow Control and Relief Valves		24.5 (3550)	EFBG 03 06 10
Shockless Type Directional and Flow Control Valves		25 (3630)	EDFG 01
Directional and Flow Control Valves		25 (3630)	EDFHG 03 04 06
High Respones Type Directional and Flow Control Valves		01/03: 31.5 (4570) 04/06: 35 (5080)	ELDFG 01 03 ELDFHG 04 06

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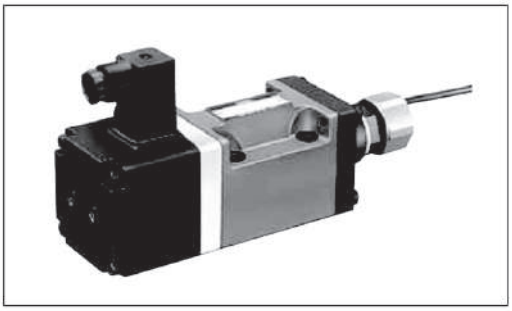
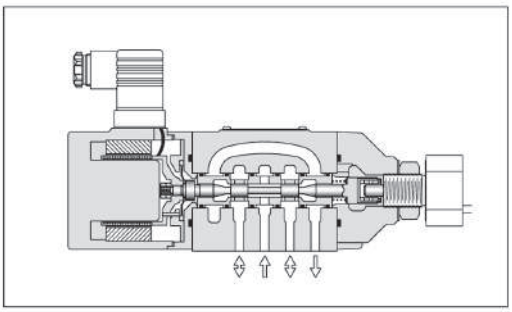
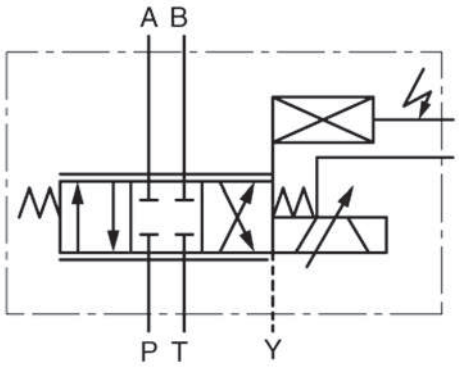
SERVO VALVES

Direct Type High Speed Linear Servo Valves

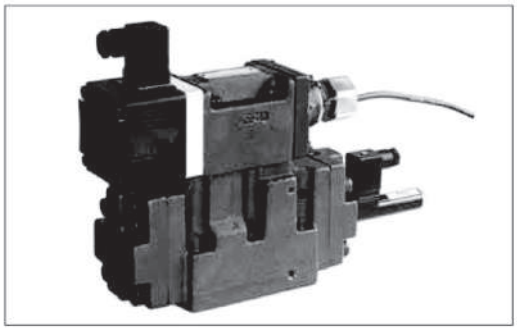


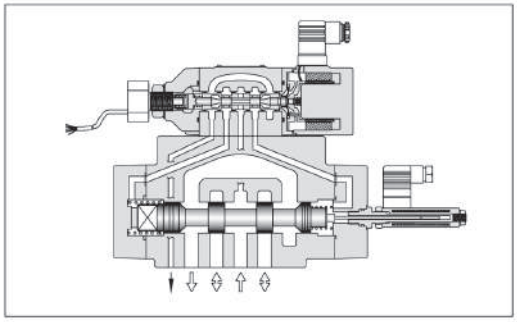


Graphic Symbol

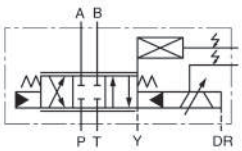


Two Stage Type High Speed Linear Servo Valves

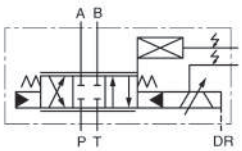




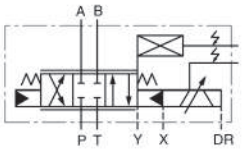
Graphic Symbol



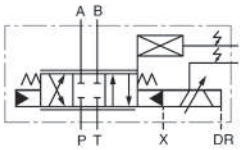
Int. Pilot – Ext. Drain



Int. Pilot – Int. Drain

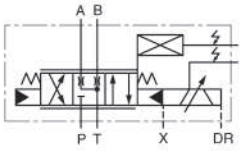


Ext. Pilot – Ext. Drain



Ext. Pilot – Int. Drain

Note) The symbols above indicate the spool types "2" and "2P". The graphic symbol of the spool type "40" is shown on the right (external pilot/ internal drain type).



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Linear Servo Amplifier

SERVO VALVES

OBE (On-Board Electronics) Type Linear Servo Valves

- **High accurate, simple and convenient — Ideal on-board electronics type linear servo valves**

Convenient

Fault diagnosis is esy to conduct with the alarm indication when the command signal and the spool position differ due to abnormality in the system.

Colour	Description of Alarm Indicator
Green	Indication of power supply (Normal operation)
Red	Deviation alarm for the pilot vlve
Yellow	Deviation alarm for the main vlve

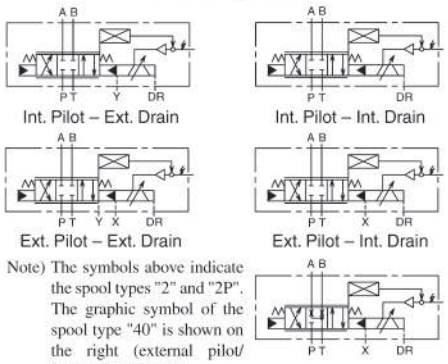
High Accuracy

Closed loop control by the combination of the position sensors for the polot valve and the main valve in the compact amplifiers ensures excellent linearity, hysteresis and stability on control.

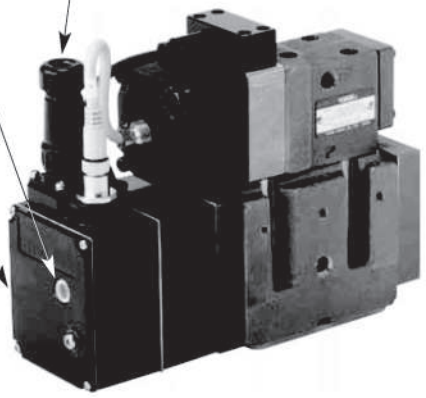
Simple

Highly accurate hydraulic control can be obtained only by supplying 24 V DC power and inputting a command signal.

Graphic Symbols

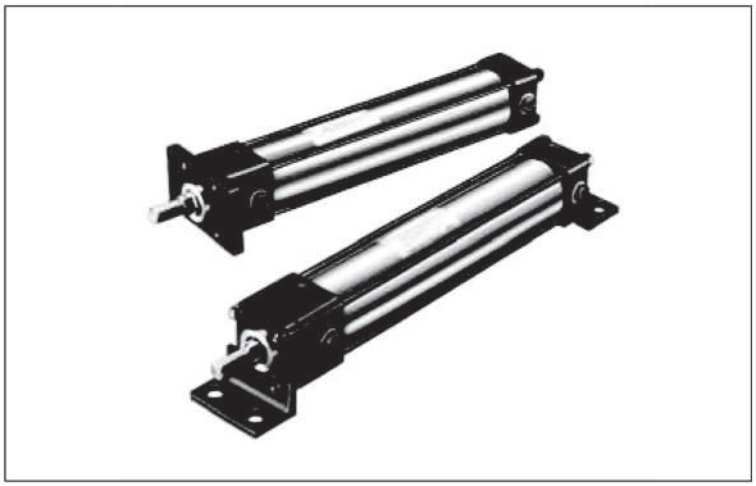


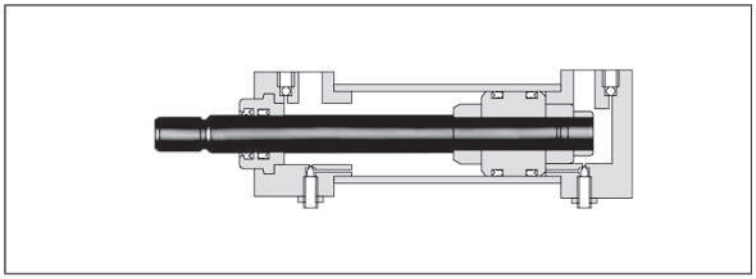
Note) The symbols above indicate the spool types "2" and "2P". The graphic symbol of the spool type "40" is shown on the right (external pilot/ internal drain type).



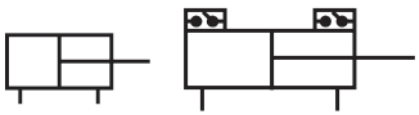
ACTUATORS

" CJT " Series Hydraulic Cylinders





Graphic Symbols



Std. Type Switch Set Type

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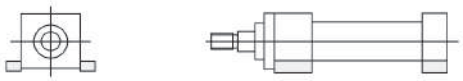
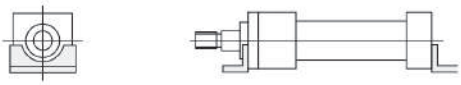
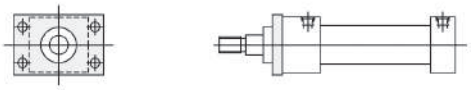
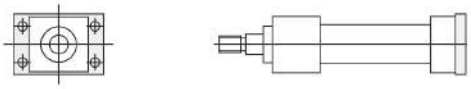
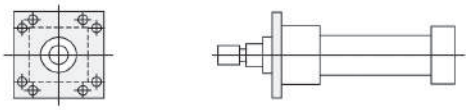
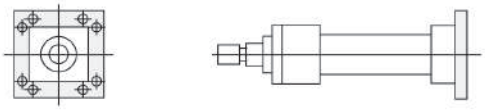
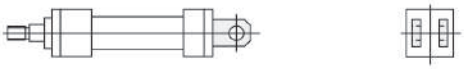
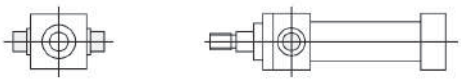
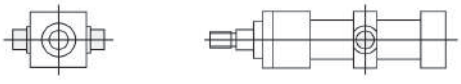
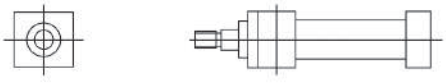
YUKEN

Mounting

Symbol	Name	Illustration of Mounting Type	CJT35 CJT35L	CJT70 CJT70L	CJT140 CJT140L	CJT210
LA	Foot Mounting Side Lugs		○	○	○	○
LB	Foot Mounting Side End Angles		○	○	○	
FA	Rod Rectangular Flange		○	○		○
FE				○	○	
FY				○	○	
FB	Head Rectangular Flange		○	○		○
FF				○	○	
FC	Rod Square Flange			○	○	
FD	Head Square Flange			○	○	
CA	Cap Detachable Eye		○	○	○	○
CB	Cap Detachable Clevis		○	○	○	
TA	Rod Trunnion		○	○	○	
TC	Intermediate Trunnion		○	○	○	○
SD	Basic Type		○	○	○	○

● The mark ○ in above chart show selectable Mounting Types.

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Standard Hydraulic Power Units
Power Packages

Energy-Saving Hydraulic Units and Controllers

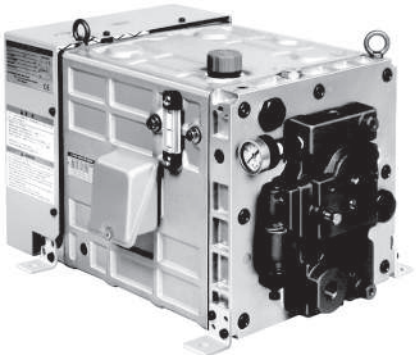
Energy-Saving Control System for Hydraulic Units (Energy-Saving Controller)

Equipped with the variable displacement vane pump <YM-e Pack>

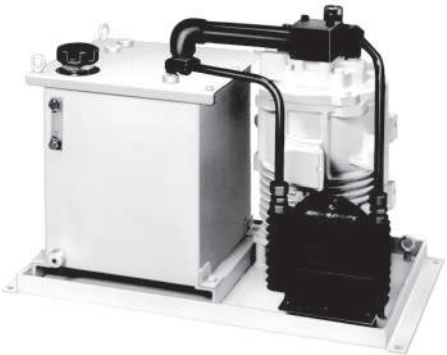
Equipped with the variable displacement piston pump <YA-e Pack>

Standard Hydraulic Power Units

Space-Saving & Low Noise <YF Pack>

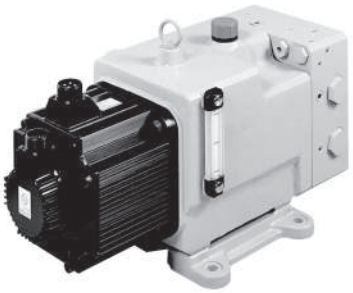


Low Noise & Small Type <YP Pack>



AC Servo Motor Driven Hydraulic Pump Control System

Intelligent Hydraulic Servo Drive Pack



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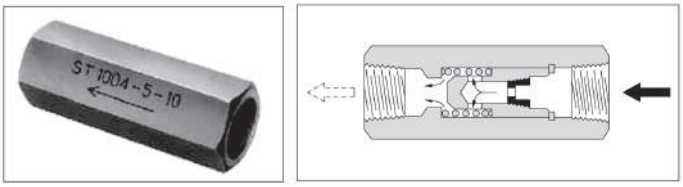
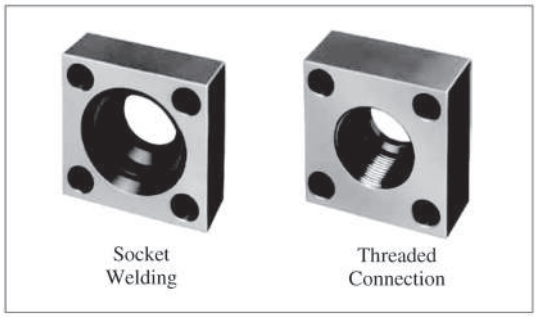
ACCESSORIES & OTHERS

Air Bleed Valves

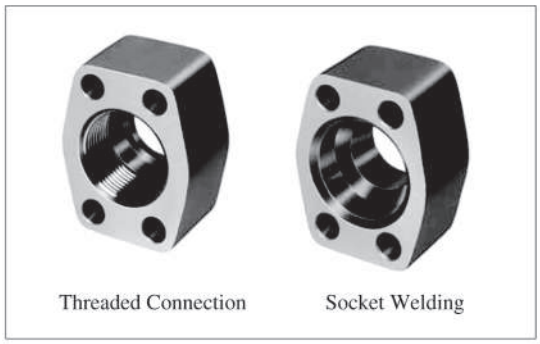


ACCESSORIES

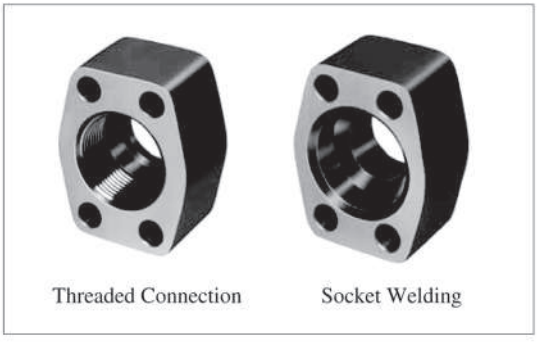
" F3 " Series Pipe Flange Kits



" F5 " Series Pipe Flange Kits



" F6 " Series Pipe Flange Kits



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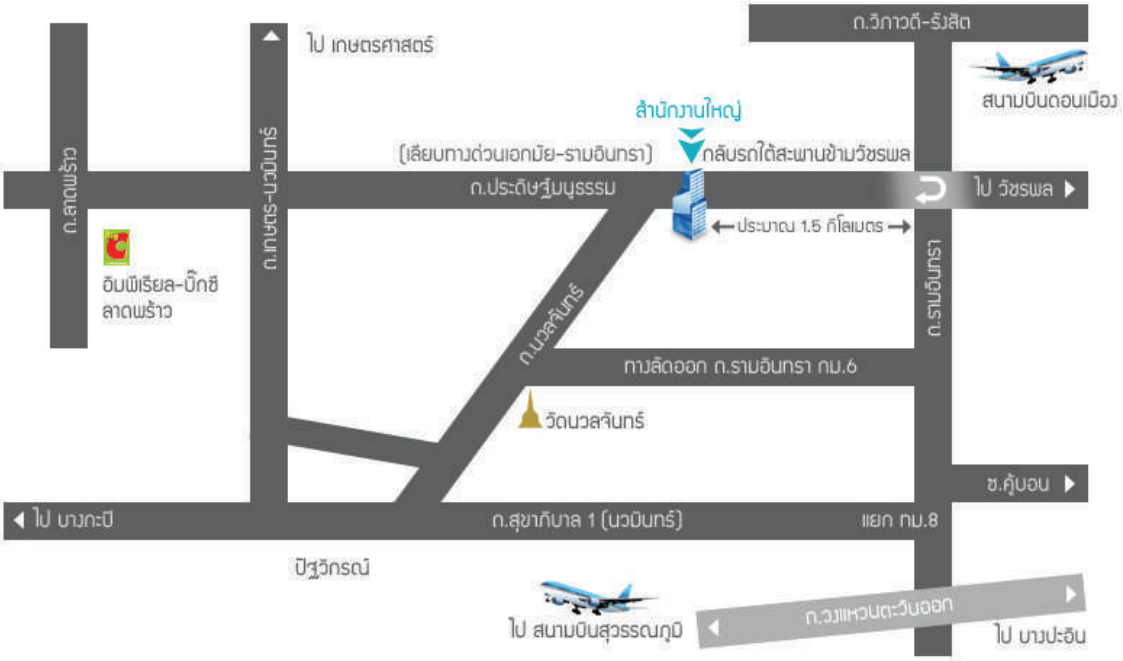

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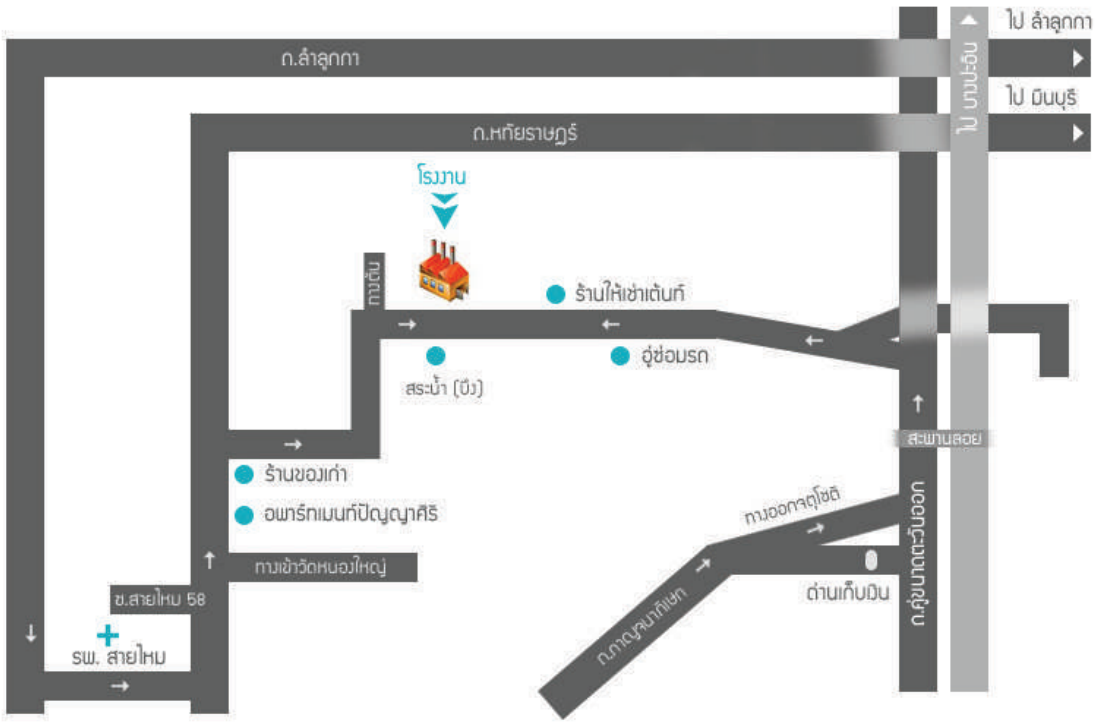

Terminal Group

TMS&S
บริษัท เทอร์มินอลซีล แอนด์ เซอร์วิส จำกัด
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TERMINAL GROUP consists of three companies;
Terminalseal and service Co., Ltd. ,
Terminal machinework Co.,Ltd.
and T.M.G. Rubber Parts Co., Ltd.
Terminal Group was founded in 1998.

- ✓ Produce customized and specialized seals ID 4-2000mm. by modern CNC lathing machine with the latest technology and high quality semi-finished materials from Europe.
- ✓ Import and distribute world-leading brands of seals, O-rings, O-Ring Kits, O-Ring equipments, seals installation tools, mechanical seals, seal kits for excavators, cylinder seal kits , worldwide with Japanese, European, and American standard.
- ✓ Build and repair custom-made industrial machines, power units, control units, hydraulic and pneumatic cylinders, X-lift and etc. , according to customer 's requirements with leading technology and excellent engineers to take care of every process of the production.
- ✓ Import and distribute hydraulic and pneumatic equipments, hoses, fittings, machinery parts in several world-leading brands from Japan, Europe, America, Asia-Pacific.
- ✓ We have consulting and overhaul services for systems and machinery maintenance, including maintenance for several machines made by other than Terminal Group.
- ✓ Produce varied forms of made-to-order products, molding parts with plastic and rubber materials by press and injection production process.

เทอร์มินอลกรุ๊ป ก่อตั้งเมื่อปี 2541 ประกอบด้วย
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บริษัท เทอร์มินอล แมชชีนเวิร์ค จำกัด และ
บริษัท ที.เอ็ม.จี. รับเบอร์พาร์ท จำกัด ดำเนินธุรกิจหลักดังนี้

- ✓ ผู้ผลิตซีลด่วนสั่งทำ ซีลสเปเชียลขนาด ID 4-2000mm ด้วยเครื่อง CNC ผลิตซีล ซึ่งเป็นเทคโนโลยีใหม่ล่าสุด และวัตถุดิบกึ่งสำเร็จรูปคุณภาพสูงจากยุโรป
- ✓ ผู้นำเข้าและจำหน่ายซีล โอริง โอริงคิดส์ อุปกรณ์เกี่ยวกับโอริง อุปกรณ์เกี่ยวกับซีล เมคคานิคอลซีล ซีลชุดสำหรับรถขุด-รถตัก ซีลชุดสำหรับกระบอกสูบ หลากหลายแบรนด์ชั้นนำจากทั่วโลก มาตรฐาน ญี่ปุ่น ยุโรปและอเมริกา
- ✓ ผู้สร้างเครื่องจักรอุตสาหกรรม ชุดต้นกำลัง (พาวเวอร์ยูนิต) ชุดคอนโทรล กระบอกไฮดรอลิก-นิวแมติก เอ็กซลิฟท์ ฯลฯ ตามความต้องการของลูกค้า รวมทั้งรับซ่อม เราทำการผลิตด้วยเทคโนโลยีชั้นนำและทีมวิศวกรชั้นแนวหน้า ที่จะคอยดูแลอย่างใกล้ชิดทุกขั้นตอนการผลิต
- ✓ ผู้นำเข้าและจำหน่าย อุปกรณ์ไฮดรอลิก-นิวแมติก สายไฮดรอลิก-สายลม ฟิตติ้งส์ อุปกรณ์เครื่องจักรกลโรงงาน หลากหลายแบรนด์ชั้นนำระดับโลก ทั้งจากญี่ปุ่น ยุโรป อเมริกา เอเชีย-แปซิฟิก
- ✓ บริการให้คำปรึกษาระบบ เปลี่ยนอุปกรณ์ และซ่อมบำรุงรักษา เครื่องจักรไม่ว่าเครื่องจักรนั้นจะผลิตจากที่ใดก็ตาม
- ✓ ผู้ผลิตและให้บริการชิ้นงานสั่งทำ งานโมลด์ งานพลาสติก งานยาง รูปแบบต่างๆตามความต้องการของลูกค้า โดยใช้กรรมวิธีการผลิตแบบเพรสและอินเจ็คชั่น

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