

## Water-Glycol Type Operating Fluid Hydraulic Devices

### Water-Glycol Type Operating Fluid Hydraulic Pump Specifications

Use the following tables to select the appropriate type of pump when using a water-glycol type hydraulic operating fluid.

#### 1. PVS, PZS Series Variable Piston Pump

W/G Pump Type	Rated Voltage MPa{kgf/cm <sup>2</sup> }	Maximum Working Pressure MPa{kgf/cm <sup>2</sup> }	Maximum Revolution Speed min <sup>-1</sup>	Suction Pressure MPa{kgf/cm <sup>2</sup> }
W-PVS-0B - 8N*-30	14 {143}	14 {143}	1200	-0.01{-0.1} or larger
W-PVS-1B - 16N*-12 - 22N*-	14 {143} 10.5{107}	14 {143} 10.5{107}	1200	-0.01{-0.1} or larger
W-PVS-2B - 35N*-12 - 45N*-	14 {143} 10.5{107}	14 {143} 10.5{107}	1200	-0.01{-0.1} or larger
W-PZS-3B - 70N*-10	14 {143}	14 {143}	1200	-0.01{-0.1} or larger
W-PZS-4B -100N*-10	14 {143}	14 {143}	1200	-0.01{-0.1} or larger
W-PZS-5B -130N*-10	14 {143}	14 {143}	1200	-0.01{-0.1} or larger

Note) Keep oil temperature between 10 and 50°C when operating.

#### 2. VDR22 Design Series Variable Vane Pump

W/G Pump Type	Rated Voltage MPa{kgf/cm <sup>2</sup> }	Maximum Working Pressure MPa{kgf/cm <sup>2</sup> }	Maximum Revolution Speed min <sup>-1</sup>	Suction Pressure MPa{kgf/cm <sup>2</sup> }
W-VDR-1* -1A2-22 -1A3- -2A2- -2A3-	3.5{35.7} 7 {71.4} 3.5{35.7} 5 {51 }	3.5{35.7} 7 {71.4} 3.5{35.7} 5 {51 }	1800	-0.015 to +0.03 {-0.15 to +0.3}

Note) Keep oil temperature between 15 and 55°C when operating.

#### 3. VDC Series Variable Vane Pump

W/G Pump Type	Rated Voltage MPa{kgf/cm <sup>2</sup> }	Maximum Working Pressure MPa{kgf/cm <sup>2</sup> }	Maximum Revolution Speed min <sup>-1</sup>	Suction Pressure MPa{kgf/cm <sup>2</sup> }
W-VDC-1* -1A2-20 -1A3- -2A2- -2A3-	3.5{35.7} 7 {71.4} 3.5{35.7} 5 {51 }	3.5{35.7} 7 {71.4} 3.5{35.7} 5 {51 }	1800	-0.015 to +0.03 {-0.15 to +0.3}
W-VDC-2* -1A2-20 -1A3- -2A2- -2A3-	3.5{35.7} 7 {71.4} 3.5{35.7} 5 {51 }	3.5{35.7} 7 {71.4} 3.5{35.7} 5 {51 }	1800	-0.015 to +0.03 {-0.15 to +0.3}
W-VDC-3* -1A2-20 -1A3-	3.5{35.7} 7 {71.4}	3.5{35.7} 7 {71.4}	1800	-0.015 to +0.03 {-0.15 to +0.3}

Note) Keep oil temperature between 15 and 55°C when operating.

#### 4. IPH Series IP Pump

W/G Pump Type	Rated Voltage MPa{kgf/cm <sup>2</sup> }	Maximum Working Pressure MPa{kgf/cm <sup>2</sup> }	Maximum Revolution Speed min <sup>-1</sup>	Suction Pressure MPa{kgf/cm <sup>2</sup> }
W-IPH-2*-*-11	21{214}	25 {255}	1200	-0.015 to +0.03{-0.15 to +0.3}
W-IPH-3*-*-20	21{214}	25 {255}	1200	-0.015 to +0.03{-0.15 to +0.3}
W-IPH-4*-*-20	21{214}	25 {255}	1200	-0.015 to +0.03{-0.15 to +0.3}
W-IPH-5*-*-21(11)	21{214}	25 {255}	1200	-0.015 to +0.03{-0.15 to +0.3}
W-IPH-6*-*-21(11)	21{214}	25 {255}	1200	-0.015 to +0.03{-0.15 to +0.3}

Note) • Use the air bleed off valve to bleed air during test running.  
CAB-T02\*-\*-11 maximum operating pressure 25MPa (255kgf/cm<sup>2</sup>)  
• Keep oil temperature between 15 and 55°C when operating.

## Water-Glycol Type Operating Fluid Hydraulic Valve Specifications

Use the following tables to select the appropriate type of hydraulic valves when using a water-glycol type hydraulic operating fluid.

### 1. Pressure Control Valves

Name	W/G Valve Type	Specifications	
		Maximum Working Pressure	Maximum Flow Rate
Relief valve	R-03- <sup>*</sup> -12 R-06- <sup>*</sup> -20 R-10- <sup>*</sup> -20	21MPa{214kgf/cm <sup>2</sup> }	(Note) 30(20) l /min 150 340
Relief valve	RI-G03- <sup>*</sup> -20 RI-G06- <sup>*</sup> -20	21MPa{214kgf/cm <sup>2</sup> }	(Note) 120(30) l /min 260
Remote Control Relief Valve	RCD-T02- <sup>*</sup> -11 RC-T02- <sup>*</sup> -12 RC-G02- <sup>*</sup> -21	21MPa{214kgf/cm <sup>2</sup> }	15 l /min 2 2
Solenoid Controlled Relief Valve	RSA-03- <sup>***</sup> -15 RSA-06- <sup>***</sup> -23 RSA-10- <sup>***</sup> -23 RSS-03- <sup>***</sup> -15 RSS-06- <sup>***</sup> -23 RSS-010- <sup>***</sup> -23	21MPa{214kgf/cm <sup>2</sup> }	30 l /min 150 340 30 150 340
Solenoid Controlled Relief Valve	RIS-G03- <sup>***</sup> -21 RIS-G06- <sup>***</sup> -21	21MPa{214kgf/cm <sup>2</sup> }	120 l /min 260
Pressure Reducing (and Check) Valve	W-(C)G-03- <sup>*</sup> -21 W-(C)G-06- <sup>*</sup> -21 W-(C)G-10- <sup>*</sup> -21	21MPa{214kgf/cm <sup>2</sup> }	(Note) 40(20) l /min 100 250
Balancing Valve	GR-G01-A <sup>*</sup> -20 GR-G03-A <sup>*</sup> (B)-20	14MPa{143kgf/cm <sup>2</sup> }	20 l /min 40
Pressure Control (and Check) Valve	(C)Q-03- <sup>**</sup> -21 (C)Q-06- <sup>**</sup> -21 (C)Q-10- <sup>**</sup> -21	21MPa{214kgf/cm <sup>2</sup> }	40 l /min 100 250

Note) Flow rate values in parentheses are for when the pressure adjusting range field indicated by the asterisk (\*) is A, B, or C.

### 2. Direction Control Valves

Name	W/G Valve Type	Specifications	
		Maximum Working Pressure	Maximum Flow Rate
Right Angle Check Valve	CA-03- <sup>*</sup> -20 CA-06- <sup>*</sup> -20 CA-10- <sup>*</sup> -20	21MPa{214kgf/cm <sup>2</sup> }	40 l /min 110 320
In-line Check Valve	CN-T03- <sup>*</sup> -11 CN-T06- <sup>*</sup> -11 CN-T10- <sup>*</sup> -11	21MPa{214kgf/cm <sup>2</sup> }	30 l /min 75 190
Pilot Check Valve	CP-03- <sup>*</sup> -20 CP-06- <sup>*</sup> -20 CP-10- <sup>*</sup> -20	21MPa{214kgf/cm <sup>2</sup> }	40 l /min 110 320
DMA Type Manual Valve	W-DMA-G01- <sup>***</sup> -20 W-DMA-G03- <sup>***</sup> -20	21MPa{214kgf/cm <sup>2</sup> }	35 l /min 65
SA Wet Type Solenoid Valve	SA-G01- <sup>**</sup> -31 SA-G03- <sup>**</sup> (J)21 DSA-G04- <sup>**</sup> -22 DSA-G06- <sup>**</sup> -22	28MPa{286kgf/cm <sup>2</sup> }	Note1) 85 l /min 250 500
SS Wet Type Solenoid Valve	SS-G01- <sup>**</sup> -31 SS-G03- <sup>**</sup> (J)22 DSS-G04- <sup>**</sup> -22 DSS-G06- <sup>**</sup> -22	28MPa{286kgf/cm <sup>2</sup> }	Note1) 85 l /min 110 250 500
	SS-G01- <sup>**</sup> -FR- <sup>**</sup> -31 SS-G03- <sup>**</sup> -FR- <sup>**</sup> (J)22	21MPa{214kgf/cm <sup>2</sup> }	Note1) 45 l /min 65
Fine Solenoid Valve	W-SF-G01- <sup>**</sup> -10	14MPa{143kgf/cm <sup>2</sup> }	Note1) 34 l /min
Non-leak Type Solenoid Valve	SNH-G01- <sup>**</sup> -11 SNH-G03- <sup>**</sup> -10 SNH-G04- <sup>**</sup> -10 SNH-G06- <sup>**</sup> -10	31.5MPa{321kgf/cm <sup>2</sup> }	Note1) 17 l /min 34 50 85
Gauge cock	K2-02-10 K2-03/04-10	21MPa{214kgf/cm <sup>2</sup> }	–
		35MPa{357kgf/cm <sup>2</sup> }	–

Note) 1. Maximum flow rate depends on the flow path. Use a maximum flow rate that is within 85% of the standard valve.  
2. Wet type solenoid valves other than those noted above cannot be used with W/G.

### 3. Flow Control Valves

Name	W/G Valve Type	Specifications	
		Maximum Working Pressure	Maximum Flow Rate
Throttle (and Check) Valve	(C)FR-03-10 (C)FR-06-10 (C)FR-10-10	21MPa{214kgf/cm <sup>2</sup> }	30 ℓ /min 75 190
FT Type Flow Control (and Check) Valve	(C)FT-G02-**-22 FT-G03-**-22	21MPa{214kgf/cm <sup>2</sup> }	(Note)
F Type Flow Control (and Check) Valve	(C)F-G06-170-20 (C)F-G10-373-20	21MPa{214kgf/cm <sup>2</sup> }	
TN Type Flow Control (and Check) Valve	(C)TN-G02-2-11 (C)TN-G02-8-11	10.5MPa{107kgf/cm <sup>2</sup> }	
TS Type Flow Control (and Check) Valve	(C)TS-G01-2-11	10.5MPa{107kgf/cm <sup>2</sup> }	
TL (TLT) Type Feed Control Valve	W-TL-G03-*-11 W-TL-G04-*-11 W-TLT-G04-*-11	7MPa{71kgf/cm <sup>2</sup> }	

Note) Due to the hydraulic fluid gravity differential, maximum flow rate is about 15% less than standard.

### 4. Modular Valve

Name	W/G Valve Type	Specifications	
		Maximum Working Pressure	Maximum Flow Rate
Modular Type Relief Valve	OR-G01-**-20(21) OR-G03-**-(J)50	21MPa{214kgf/cm <sup>2</sup> }	30 ℓ /min 65
Brake Modulator Valve	ORO-G01-**-20 ORO-G03-**-(J)50	21MPa{214kgf/cm <sup>2</sup> }	20 ℓ /min 30
Direct Relief Modular Valve	ORD-G01-**-20 ORD-G03-**-(J)50	21MPa{214kgf/cm <sup>2</sup> }	20 ℓ /min 30
Pressure Reducing Modular Valve	OG-G01-P*-21 OGB-G01-P*-20 W-OG-G03-P*-(J)51 W-OG-G03-PC-(J)51	21MPa{214kgf/cm <sup>2</sup> }	30 ℓ /min 30 65 45
	OGS-G01-P*C-22	21MPa{214kgf/cm <sup>2</sup> }	30 ℓ /min
Pressure Reducing (and Check) Modular Valve	OG-G01-**-21 OGB-G01-**-20 W-OG-G03-**-(J)51 OG-G03-*C-(J)51	21MPa{214kgf/cm <sup>2</sup> }	30 ℓ /min 30 65 45
Sequence Modular Valve	OQ-G01-P2-20 OQ-G03-P2*-(J)50	21MPa{214kgf/cm <sup>2</sup> }	30 ℓ /min 65
Counter Balance Modular Valve	OCQ-G01-*1*-20 OCQ-G03-*1*-(J)50	21MPa{214kgf/cm <sup>2</sup> }	30 ℓ /min 65
Flow Regulator Modular Valve	OY-G01-*-20 OCY-G01-P-20 OCY-G03-P-(J)50 OCY-G01-*-X/Y-20 OCY-G03-*-X/Y-(J)51	21MPa{214kgf/cm <sup>2</sup> }	30 ℓ /min 30 85 30 85
Flow Control Modular Valve	OF-G01-P20-20 OF-G03-P60-J50 OCF-G01-*40-X/Y-30 OCF-G03-*60-X/Y-(J)50	21MPa{214kgf/cm <sup>2</sup> }	(Note)
Check Modular Valve	OC-G01-**-20(21) OC-G03-**-(J)50	21MPa{214kgf/cm <sup>2</sup> }	30 ℓ /min 85
Vacuum Check Modular Valve	OCV-G01-W-20 OCV-G03-W-(J)-50	21MPa{214kgf/cm <sup>2</sup> }	30 ℓ /min 65
Pilot Operated Check Modular Valve	OCP-G01-**-F-21 OCP-G03-**-(J)50	21MPa{214kgf/cm <sup>2</sup> }	30 ℓ /min 85
04 Series Relief Modular Valve	ORH-G04-P*-10	31.5MPa{321kgf/cm <sup>2</sup> }	250 ℓ /min
04 Series Direct Relief Modular Valve	ORH-G04-D*-10	31.5MPa{321kgf/cm <sup>2</sup> }	40 ℓ /min
04 Series Reducing Modular Valve	OGH-G04-**-10	31.5MPa{321kgf/cm <sup>2</sup> }	250 ℓ /min
04 Series Counter Balance Modular Valve	OQH-G04-**-10	31.5MPa{321kgf/cm <sup>2</sup> }	250 ℓ /min
04 Series Flow Regulator Modular Valve	OYH-G04-**-10	31.5MPa{321kgf/cm <sup>2</sup> }	250 ℓ /min
04 Series Flow Control Modular Valve	OFH-G04-*200-X/Y-10	31.5MPa{321kgf/cm <sup>2</sup> }	(Note)
04 Series Check Modular Valve	OCH-G04-**-10	31.5MPa{321kgf/cm <sup>2</sup> }	250 ℓ /min
04 Series Vacuum Check Modular Valve	OVH-G04-W-10	31.5MPa{321kgf/cm <sup>2</sup> }	250 ℓ /min
04 Series Pilot Check Modular Valve	OPH-G04-**-10	31.5MPa{321kgf/cm <sup>2</sup> }	250 ℓ /min

Note) Due to the hydraulic fluid gravity differential, maximum flow rate is about 15% less than standard.

## 5. Electro-hydraulic Control Valves

Name	W/G Valve Type	Specifications	
		Maximum Working Pressure	Maximum Flow Rate
Pilot Relief Valve	EPR-G01-*-12	28MPa{286kgf/cm <sup>2</sup> }	1 ℓ /min
Relief Valve	ER-G03-*-21 ER-G06-*-21	25MPa{255kgf/cm <sup>2</sup> }	120 ℓ /min 260
Relief and Reducing Valve	W-EGB-G03-*-11 W-EGB-G06-*-11	25MPa{255kgf/cm <sup>2</sup> }	40 ℓ /min 80
Flow Control Valve	(C)ES-G02-*- (F)-12 ES-G03-*- (F)-12 (C)ES-G06-250-11 ES-G10-500-(F)-11	21MPa{214kgf/cm <sup>2</sup> }	(Note)
Load Sensing Flow Control Valve	ESR-G03-125-12 ESR-G03-125R*-12 ESR-G06-250-12 ESR-G06-250R*-12 ESR-G10-500-11 ESR-G10-500R*-11	25MPa{255kgf/cm <sup>2</sup> }	(Note)
Flow Direction Control Valve	ESD-G01-***-12 ESD-G03-***-12 ESD-G04-***-12 ESD-G06-***-13	25MPa{255kgf/cm <sup>2</sup> }	(Note)
Modular type reducing valve	EOG-G01-P*-11	25MPa{255kgf/cm <sup>2</sup> }	25 ℓ /min
Modular Type Flow Control Valve	EOF-G01-*25-11	21MPa{214kgf/cm <sup>2</sup> }	(Note)

- Note) 1. Due to the hydraulic fluid gravity differential, maximum flow rate is about 15% less than standard.  
 2. The ESH series high-speed response proportional valve does not support water or glycol-based hydraulic operating fluid.