NACHI

Standard Hydraulic Equipment
~ General Industries ~

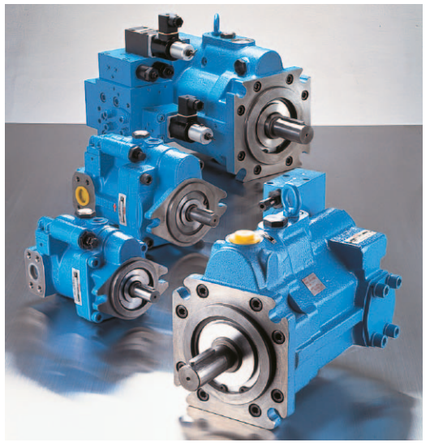
	Name	Max. operation pressure MPa {kgf/cm²}	Max. flow rate ℓ/rev. 1 2 5 10 20 50 100 200 500 1000 2000 5000	Page
Pump	PVS Series Variable Volume Piston Pump	25{255}		2
	PZS Series Variable Volume Piston Pump	28{286}		2
	PZ Series Load Sensitive Variable Piston Pump	21{214}		2
	VDC Series High-Pressure Type	14{143}		2
	VDS Series Small Variable Volume Vane Pump	7{71.4}		3
	VDR Series Variable Volume Vane Pump	14{143}		3
	IPH Series IP Pump	30{306}		3
	IPH Series Double IP Pump	30{306}		3

	Name	Max. operation pressure MPa {kgf/cm²}	Max. flow rate ℓ/rev. 1 2 5 10 20 50 100 200 500 1000 2000 5000	Page
Uni-Pump	PVS Series Uni-Pump	21{214}	50 60Hz	4
	VDC Series Uni-Pump	7{71.4}		4
	VDC Series Double Uni-Pump	7{71.4}		4
	VDS Series Uni-Pump	7{71.4}		5
	VDR Series Uni-Pump	7{71.4}		5
	UVN Series Uni-Pump	8{81.6}	24 29	5

	Name	Max. operation pressure MPa {kgf/cm²}	Max. flow rate ℓ/rev. 1 2 5 10 20 50 100 200 500 1000 2000 5000	Page
Modular Valve	Modular Valve	35{357}	01 03 04	6-7
Electro Proportional Valve	Electro-hydraulic Proportional Pilot Relief Valve	28{286}	01	9
	Electro-hydraulic Proportional Relief Valve	35{357}	03 06	9
	Electro-hydraulic Proportional Relief and Reducing Valve	25{255}	03 06	9
	Electro-hydraulic Proportional Flow Control Valve	21{214}	02 03 06 10	9
	Load response Electro-hydraulic Proportional Relief and Flow Valve	25{255}	03 06 10	10
	Electro-hydraulic Proportional Flow and Direction Control Valve	25{255}	01 03 04 06 10	10
	Modular Type Electro-hydraulic Proportional Reducing Valve	25{255}	01	10
	Modular Type Electro-hydraulic Proportional Flow Control Valve	21{214}	01	10
	High response Proportional Flow Control Valve	32{327}	01 03 04 06	11
	Electro-hydraulic Servo Valve Driver Servo Amplifier	—	—	12

	Name	Max. operation pressure MPa {kgf/cm²}	Max. flow rate ℓ/min. 1 2 5 10 20 50 100 200 500 1000 2000 5000	Page
Directional Control Valve	SS (SA) Series Wet type solenoid valve	35{357}	01 03	13
	SL Series Wet type solenoid valve	7{71.4}	01	14
	DSS Type Solenoid controlled valve	32{326}	04 06	14
	Non-Leak Type Solenoid controlled valve	35{357}	01:AR, HQ 01:AK 02 04 06	15
	Right angle check valve/ In-line check valve	21{214}	03 06 10	16
	Pilot check valve	21{214}	03 06 10	16
	DMA Type manual valve	25{255}	01 03	16
	Gauge cock	35{357}	—	16
Pressure Control Valve	Relief valve	25{255}	03 06 10	17
	RI Series relief valve	35{357}	03 06	17
	Remote controlled relief valve	21{214}	RC RCD	17
	Solenoid controlled relief valve	35{357}	03 06	17
	Pressure reducing valve	21{214}	03 06 10	18
	Balancing valve	21{214}	01 03	18
	Pressure control valve	21{214}	03 06 10	18
Flow Control Valve	Throttle valve	21{214}	03 06 10	19
	FT type flow control valve	21{214}	02 03	19
	F type flow control valve	21{214}	06 10	19
	TN type flow control valve	10.5{107}	02	19
	TS type flow control valve	10.5{107}	01	19
	TL (TLT) type feed control valve	7{71.4}	03•04	19
Hydro-logic valve	Composite valve series logic valve	32{326}	06 10 16 24	20

Pump



Nachi Fujikoshi hydraulic pumps are finished by high-grade, precision machining technology unique to the comprehensive manufacturer Nachi Fujikoshi using carefully selected materials and traditional heat treatment technology. High performance and quality are assured with all models of:

- Noise has been thoroughly reduced on hydraulic pumps, a general source of noise on machinery and equipment. All models such as the low noise type IP series can be operated quietly with little noise.
- Attention has been paid to surface treatment and selection of materials in NACHI hydraulic pumps so that they can be applied extensively with fire-resistant hydraulic operating fluid.

PVS Series Variable Volume Piston Pump

- A NACHI proprietary semi circular barrel swash plate that receives pressure on its surface ensures a stable discharge volume at all times. This eliminates excess discharge volume and enables the effective use of power corresponding to the load cycle

- Pressure adjustment range: 1~21MPa{10.2~214kgf/cm²}
- Maximum Flow: 8~45cm³/rev
- Rotation: 500~2000min⁻¹

PVS-1 B-16 N 2- (※)-12

- Design No. 30: PVS-0* 12: PVS-1*, PVS-2* 20: PVS-2*-45N3 only
- Auxiliary symbol: None: Side port type Z: Axial port type (PVS-1*, PVS-2*)
- Pressure adjustment range
- Variable control mechanism
- Max. pump capacity (cm³/rev). Nominal: 8, 16, 22, 35, 45
- Mounting method. B: Mounting flange type; A: Mounting foot type
- Pump size: 0, 1, 2
- PVS series variable piston pump

PZS Series Variable Volume Piston Pump

- Low noise, low vibration operation. The semi-cylindrical swash plate of the PVS Series provides high support and rigidity, making it possible to increase the Number of pistons (from 9 to 11) and equip optimal valve plates, all of which
- These pumps deliver the perfect combination of high pressure (28 MPa {286 kgf/cm²} maximum and high reliability

- Pressure adjustment range: 2~28MPa{20.4~286kgf/cm²}
- Maximum Flow: 70~220cm³/rev
- Rotation: 500~1800min⁻¹

PZS-3 B-70 N 3-10

- Design No.
- Pressure adjustment range
  1: 2 to 7MPa {20.4 to 71.4kgf/cm²}
  3: 2 to 21MPa {20.4 to 214kgf/cm²}
  4: 2 to 28MPa {20.4 to 286kgf/cm²}
  Note: PZS-5B/6B max. 25MPa {255kgf/cm²}
- Variable Control Mechanisms
  N: Pressure compensation control
- Pump capacity (cm³/rev.) 70, 100, 130, 180, 220
- Mounting method
  B: Flange type mounting
  A: Foot type mounting
- Pump size: 3, 4, 5, 6
- PZS series variable volume piston pump

PZ Series Load Sensitive Variable Piston Pump

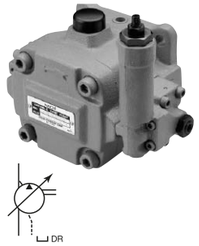
- q –The PZ Series load sensitive variable piston pump employs the semi
- Cylindrical swash plat that is part of the basic technology used by the PVS series variable piston pump
- e – The electro-hydraulic proportional control valve uses the proven force feedback system for improved hysteresis, repeatability and response.

- Pressure adjustment range: 2~21MPa
- Maximum Flow: (1800min⁻¹60~410R/min
- Rotation: 600~1800min⁻¹

PZ-3 B-10-70 E 2 A-10

- Design number
  11: PZ-2B, 2A
  10: PZ-3B to 5B
  20: PZ-6B
- Auxiliary symbol
- Pressure adjustment range
  1: 2 to 7MPa {20.4 to 71.4kgf/cm²}
  2: 2 to 14MPa {20.4 to 143.4kgf/cm²}
  3: 2 to 21MPa {20.4 to 214.4kgf/cm²}
- Control mechanism EA: Load response control
- Variable pump capacity (cm³/rev.) 35, 45, 70, 100, 130, 180, 220
- Fixed discharge pump capacity (cm³/rev.) 3.5 to 64
- Mounting medhod B: Flange type mounting A: Foot type mountine
- Pump size: 2, 3, 4, 5, 6
- PZ series piston pump

VDC Series High-Pressure Type Variable Volume Vane Pump



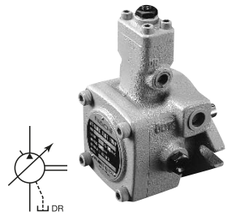
- Innovative pressure control and pressure balance mechanisms combine with an original 3-point ring support system dramatically improves high-pressure operation
- The result is outstanding performance at high pressures up to 14 MPa

- Pressure adjustment range: 1.5~14MPa{15.3~143kgf/cm²}
- Maximum Flow: (1800min⁻¹) 30~120R/min
- Rotation: 800~1800min⁻¹

VDC-2 A -1A 2-20

- Design number
- Pressure adjustment range
  2: 1.5 to 3.5MPa {15.3 to 35.7kgf/cm²}
  3: 2 to 7MPa {20.4 to 71.4kgf/cm²}
  4: 5 to 10.5MPa {51 to 107kgf/cm²}
  5: 7 to 14MPa {71.4 to 143kgf/cm²}
  Note: Ring size: In case of 2, max. setting pressure is 7MPa (71.4kgf/cm²)
- Flow characteristics A: Constant discharge type
- Ring size
  VDC-1: 1 = 30l/min, 2 = 40l/min at 1800min⁻¹
  VDC-2: 1 = 54l/min, 2 = 70l/min at 1800min⁻¹
  VDC-3: 1 = 120l/min at 1800min⁻¹
- Mounting Method A: Foot type mounting B: Flange type mounting
- Pump size: 1, 2, 3
- VDC Series High-pressure variable discharge rate vane pump

VDS Series Small Variable Volume Vane Pump



- All the performance of the original new VDR series mechanisms combines with precision machining for a pump that minimizes power loss, especially at full cut off
- Compact and quiet VDS Series Variable Vane pumps are economical and easy to handle. A simple design allows us in a wide range of hydraulic systems

- Pressure adjustment range: 1~7MPa{10.2~71.4kgf/cm²}
- Maximum Flow: (1800min⁻¹) 15R/min
- Rotation: 800~1800min⁻¹

VDS-0※-1 A ※-10

- Design number
- Pressure adjustment range
  1: 1 to 2MPa {10.2 to 20.4kgf/cm²}
  2: 1.5 to 3.5MPa {15.3 to 35.7kgf/cm²}
  3: 3 to 7MPa {30.6 to 71.4kgf/cm²}
- Flow rate characteristics A: Constant discharge rate type
- Ring size
  1: 15l/min at (1800min⁻¹, no load)
- Mounting method A: Foot type mounting B: Flange type mountin
- Pump size: 0
- VDS Series compact variable vane pump

VDR Design Series Variable Volume Vane Pump

13 Design

22 Design

- A biased piston that minimizes ring vibration and leak-free pressure balance construction enables highly efficient high-pressure operation and very stable performance up to 14 MPa

13 Design
- Pressure adjustment range: 1~6MPa{10.2~61.2kgf/cm²}
- Maximum Flow: (1800min⁻¹) 20~45R/min
- Rotation: 800~1800min⁻¹

22 Design
- Pressure adjustment range: 1.5~14MPa{15.3~143kgf/cm²}
- Maximum Flow: (1800min⁻¹) 30~40R/min
- Rotation: 800~1800min⁻¹

VDR-1A-1A2-13

- Design number
- Pressure adjustment range
  2: 1.5 to 3.5MPa {15.3 to 35.7kgf/cm²}
  3: 3 to 7MPa {30.6 to 71.4kgf/cm²}
  4: 6.5 to 10.5MPa {66.3 to 107kgf/cm²}
  5: 9 to 14MPa {91.8 to 143kgf/cm²}
  Note: Ring size: In the case of 2, max. setting pressure is 7MPa (71kgf/cm²)
- Flow rate characteristics A: constant discharge rate type
- Ring size
  1 = 30l/min at 1800min⁻¹
  2 = 40l/min at 1800min⁻¹
- Mounting method A: Foot type mounting B: Flange type mounting
- Pump size: 1
- VDR series variable discharge rate vane pump

IPH Series IP Pump (High Pressure Internal Gear Pump)

- A patented axial and radial pressure loading system provides high efficiency and generates pressure up to 30MPa {306kgf/cm²}
- A modified in volute short-tooth gear enables internal gearing for greatly reduced pulsation and noise and exceptionally quiet operation a simple structure makes

- Pressure adjustment range: 30MPa{306kgf/cm²}
- Maximum Flow: 3.6~125.9cm³/rev
- Rotation: 300~2000min⁻¹

IPH-4B-25-LT-20

- Design number
  11: 2A (B), 5B, 6B
  20: 3A (B), 4A (B)
  21: 5A, 6A
- Auxiliary symbol: None: Clockwise (viewed from shaft end)
  L: Counter clockwise (viewed from shaft end)
  T: with screw in type flange kit
  E: with welded type flange kit
  Auxiliary symbol must be provided in alphabetic order
- Capacity (cm³/rev.)
- Mounting method A: Foot type mounting B: Flange type mounting
- Size: 2, 3, 4, 5, 6
- IPH Series IP Pump

IPH Series Double IP Pump

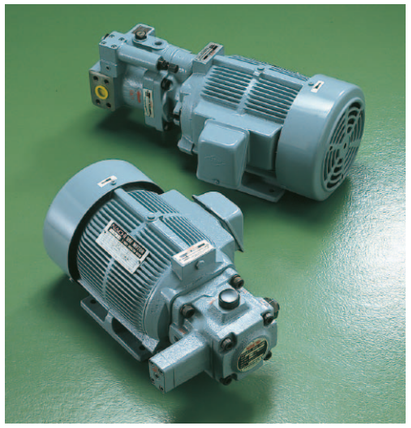
- Configured with the high-pressure, low-noise IPH Series and IP pumps, these double pumps greatly expand the range of application for the IP pump
- A wide selection of pump combinations provides options that are perfect for just about any type of application imaginable

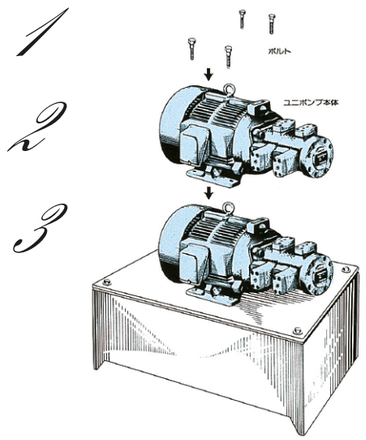
- Pressure adjustment range: 30MPa{306kgf/cm²}
- Maximum Flow: 3.6-3.6~125.9-125.9cm³/rev
- Rotation: 300~2000min⁻¹

IPH-46B-20-125-LT-10

- Design number
- Auxiliary symbol: None: Clockwise (viewed from shaft end)
  L: Counter clockwise (viewed from shaft end)
  T: includes screw in flange kit (for shared IN port)
  TT: includes screw in flange kit (for individual IN port)
  E: includes welded flange kit (for shared IN port)
  EE: includes welded flange kit (for individual IN port)
  Auxiliary symbol must be provided in alphabetic order
- Shaft side pump capacity (cm³/rev.)
- Head side pump capacity (cm³/rev.)
- Mounting method
  B: Flange type mounting
- Shaft side pump size (2 to 6)
- Head side pump size (2 to 6)
- IPH Series IP Pump

Uni-ump – Direct Couple Motor and Pump, easy installation Unit





Uni-pumps are compact pump/motor units, which have a motor directly coupled to the hydraulic pump. They can be easily installed and be achieved economically.

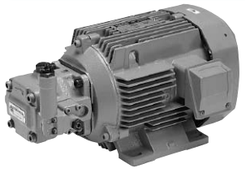
PVS Series Uni-ump

Model no.	MPa{kgf/cm²}	Discharge vol. (ℓ/min)	
UPV-0A-8	21 {214}	12.0	14.4
UPV-1A-16	21 {214}	24.7	29.7
UPV-1A-22	21 {214}	33.0	39.6
UPV-2A-35	21 {214}	52.5	63.0
UPV-2A-45	14 {143}	67.5	81.0

UPV-1A-16N1-1.5※-4-※-17

- Design number
  20: PVS-1B 0.75 – 5.5kW; PVS-2B 3.7 – 7.5kW
  40: PVS-0B 0.75 – 3.7kW
- Auxiliary symbol: None: side port type
  Z: axial port type (PVS-1B, 2B)
- Number of motor poles 4: 4 poles
- Motor terminal: None: right side viewed from pump side
  A: Left side viewed from pump side
- Motor output: 0.7: 0.75kW / 3.7: 3.7kW; 1.5: 1.5kW / 5.5: 5.5kW; 2.2: 2.2kW / 7.5: 7.5kW
  Note: UPV-0A(1A) is 0.75 – 5.5kW; UPV-2A is 3.7 – 7.5kW
- Pressure adjustment range
  0: 2 - 3.5MPa {20.4 – 35.7kgf/cm²}
  1: 2 – 7MPa {20.4 – 71.4kgf/cm²}
  2: 3 – 14MPa {30.6 – 143kgf/cm²}
  3. 3 – 21MPa {30.6 – 214kgf/cm²}
  Note: not available at 45cm³/rev.
- Variable control mechanism
  N = pressure compensation type
  Note: control option is also standard on the PVS pump
- Max. pump capacity (cm³/rev.]
  Nominal: 8, 16, 22, 35, 45
- Motor mounting method
- Mounting foot type
- Pump size
  0: PVS-0B
  1: PVS-1B
  2: PVS-2B

VDC Series Uni-Pump

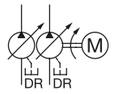


UVC - 1A - A2 - 0.75 - 4 - 26

- Design number
- Number of motor poles: 4 poles
- Motor output (kW)
  0.75, 1.5, 2.2, 3.7
- Pressure adjustment range
  2: 1.5 – 3.5MPa {15.3 – 35.7kgf/cm²}
  3: 2.0 – 7.0MPa {20.4 – 71.4kgf/cm²}
- Flow characteristics A: constant discharge type
- A: Foot type mounting
- Pump size 1: VDC-1B [20D]
- VDC Series uni pump

- Maximum working pressure: 7MPa{71.4kgf/cm²}
- Maximum flow rate: (50Hz) 25l/min, (60Hz) 30l/min

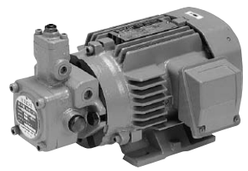
PVS Series Uni-Pump Double



UVC - 11A - A2 - A2 - 1.5 - 4 - 26

- Design number
- Number of motor poles: 4 poles
- Motor output (kW): 1.5, 2.2, 3.7
- Shaft side pump pressure adjustment
  2: 1.5 – 3.5MPa {15.3 – 35.7kgf/cm²}; 3: 2.0 – 7.0MPa {20.4 – 71.4kgf/cm²}
- Shaft side pump flow rate characteristics: A: constant discharge type
- Shaft side pump ring size: None = 30l/min at 1800min⁻¹
  2 = 40l/min at 1800min⁻¹
- Head side pump pressure adjustment range: Same as the shaft side pump
- Head side pump flow rate characteristics: A: constant discharge type
- Head side pump ring size: None = 30l/min at 1800min⁻¹; 2 = 40l/min at 1800min⁻¹
- A: Foot type mounting
  Pump size 11: VDC-11B[20D]
  VDC Series uni pump (double pump)

VDS Series Uni-Pump

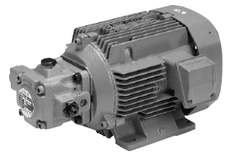


UVS - OA - A1 - 0.4 - 4 - 13

- Design number
- Number of motor poles: 4 poles
- Motor output (kW): 0.4, 0.75, 1.5
- Pressure adjustment range
  1: 1.0 – 2.0MPa {10.2 - 20.4kgf/cm²}
  2: 1.5 – 3.5MPa {15.3 – 35.7kgf/cm²}
  3: 3.0 – 7.0MPa {30.6 – 71.4kgf/cm²}
- Flow characteristics A: constant discharge type
- Motor mounting method A: Foot type mounting
- Pump size 0: VDS-0B
- VDS Series uni pump

- Maximum working pressure: 7MPa{71.4kgf/cm²}
- Maximum flow rate: (50Hz) 12.5l/min, (60Hz) 15l/min

VDR Series Uni-Pump



UVD - 1A - A1 - 0.75 - 4 - 16 (26)

- Design number
- Number of motor poles: 4 poles
- Motor output (kW): 0.75, 1.5, 2.2, 3.7
- Pressure adjustment range
  1: 1.0 – 2.0MPa {10.2 - 20.4kgf/cm²}
  2: 1.5 – 3.5MPa {15.3 – 35.7kgf/cm²}
  3: 3.0 – 6.0MPa {30.6 – 61.2kgf/cm²}
- Flow characteristics A: constant discharge type
- A: Foot type mounting
- Pump size 1: VDR-1B, 2: VDR-2B
- VDR [13D] Series uni pump

- Maximum working pressure: 7MPa{71.4kgf/cm²}
- Maximum flow rate: (50Hz) 21~38l/min, (60Hz) 25~45l/min

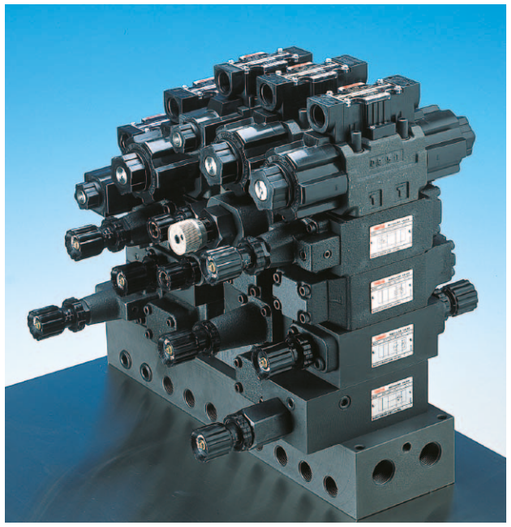
UVN Series Uni-Pump

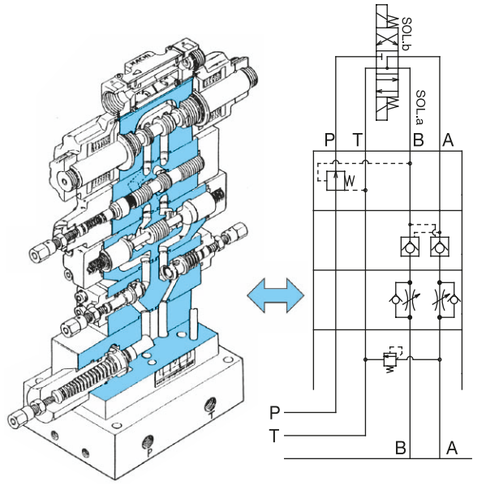
UVN-1A-1A4-1.5-4-11

- Design number
- Number of motor poles: 4 poles
- Motor output (kW): 0.7: 0.75kW, 1.5: 1.5kW, 2.2: 2.2kW
  Power supply: AC200V-50/60Hz, AC220V-60Hz
- Pressure adjustment range
  2: 1.5 – 4.0MPa {15.3-40.8kgf/cm²}
  3: 3.5 – 6.0MPa {35.7-61.2kgf/cm²}
  4: 5.5 – 8.0MPa {56.1–81.6kgf/cm²}
- Flow characteristics A: Constant discharge type
- Discharge rate (at N=1800min⁻¹)
  0=14.5l/min (max); 1= 29l/min (max)
- A: Foot type mounting
- Pump size 1: VDN-1B
- UVN Series uni pump

- Maximum working pressure: 8MPa{81.6kgf/cm²}
- Maximum flow rate: (50Hz) 12~24l/min, (60Hz) 14.5~29l/min

Modular Valve Series





Integrated Structural Diagram

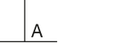
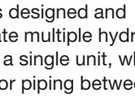
Integrated Circuit Diagram

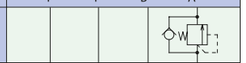
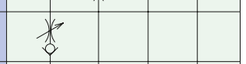
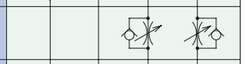
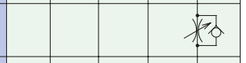
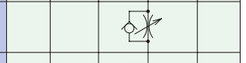
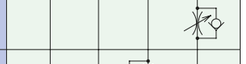
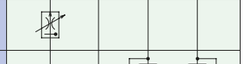
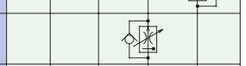
The Modular Valve is designed and engineered to integrate multiple hydraulic valve operations into a single unit, which eliminates the need for piping between valves and enables configuration of a circuit using a single Modular Valve.

he result is an innovative valve system whose energy and materials efficiency provide advantages in terms of compact configuration, reliability and more. The illustrations below show one example of a circuit configuration using this system.

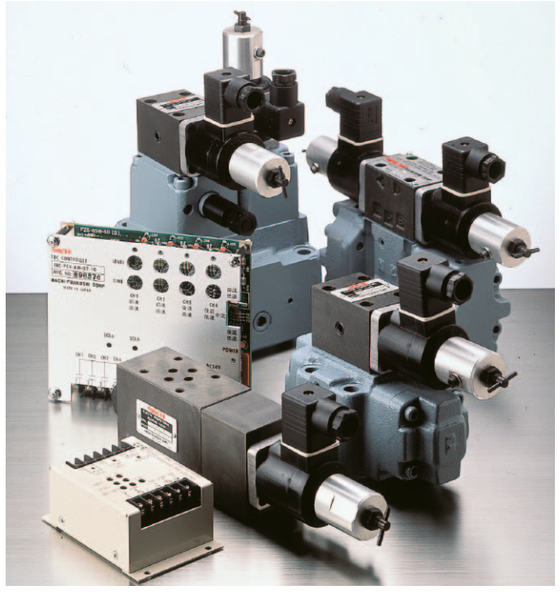
	MPa {kgf/cm²}	Maximum flow rate (ℓ/min)
01 Series	25 {255}	50
03 Series	25 {255}	100
04 Series	35 {357}	300

Modular Valve Series list

Type	Name	01 Series	03 Series	04 Series	JIS Symbol
Pressure Control Valves	Relief Valves	OR-G01-P※-20	OR-G03-P※-J50	ORH-G04-P※-10	
		OR-G01-W※-20	OR-G03-W※-J50		
		OR-G01-A※-21	OR-G03-A※-J50		
		OR-G01-B※-21	OR-G03-B※-J50		
	Control Valves / Brake Valves	ORO-G01-W/A/B※-20	ORO-G03-W/A/B※-J50		
	Direct Relief Valves	ORD-G01-W※-20	ORD-G03-W※-J50	ORH-G04-DW※-10	
		ORD-G01-A※-20	ORD-G03-A※-J50	ORH-G04-DA※-10	
		ORD-G01-B※-20	ORD-G03-B※-J50	ORH-G04-DB※-10	
	Reducing Valves 	OG-G01-P※-21	OG-G03-P※-(B)-J51	OGH-G04-P※-(B)-10	
		OG-G01-A※-21	OG-G03-A※-(B)-J51	OGH-G04-A※-(B)-10	
		OG-G01-B※-21	OG-G03-B※-(B)-J51	OGH-G04-B※-(B)-10	
	Pressure Control Valves 	OQ-G01-P2※-20	OQ-G03-P2※-J50		

Type	Name	Valve model 01 Series	03 Series	04 Series	JIS Symbol
Pressure Control Valves	Pressure Control Valves 	OCQ-G01-AI※-20	OCQ-G03-AI※-J50	OQH-G04-AI※-10	
		OCQ-G01-BI※-20	OCQ-G03-BI※-J50	OQH-G04-BI※-10	
	Pressure Switches 	OW－G01-P※-R-※※-30			
		OW－G01-W※-R-※※-30			
		OW－G01-A※-R-※※-30			
		OW－G01-B※-R-※※-30			
Flow Control Valves	Flow Regulator Valves , Flow Regulator Valves with check 	OY-G01-T-20			
		OCY-G01-P-20	OCY-G03-P-J50	OYH-G04-P-10	
	Meter-out Flow Regulator Valves	OCY-G01-W-Y-20	OCY-G03-W-Y-J51	OYH-G04-W-Y-10	
		OCY-G01-A-Y-20	OCY-G03-A-Y-J51	OYH-G04-A-Y-10	
		OCY-G01-B-Y-20	OCY-G03-B-Y-J51	OYH-G04-B-Y-10	
		OCY-G01-W-X-20	OCY-G03-W-X-J51	OYH-G04-W-X-10	
	Meter-out Flow Control Valves	OCY-G01-A-X-20	OCY-G03-A-X-J51	OYH-G04-A-X-10	
		OCY-G01-B-X-20	OCY-G03-B-X-J51	OYH-G04-B-X-10	
	Flow Control Valves	OF-G01-P20-20	OF-G03-P60-J50		
	Meter-out Flow Control Valves 	OCF-G01-W40-Y-30	OCF-G03-W60-Y-J50	OFH-G04-W200-Y-10	
		OCF-G01-A40-Y-30	OCF-G03-A60-Y-J50	OFH-G04-A200-Y-10	
		OCF-G01-B40-Y-30	OCF-G03-B60-Y-J50	OFH-G04-B200-Y-10	
	Meter-in Flow Control Valves	OCF-G01-W40-X-30	OCF-G03-W60-X-J50	OFH-G04-W200-X-10	
		OCF-G01-A40-X-30	OCF-G03-A60-X-J50	OFH-G04-A200-X-10	
		OCF-G01-B40-X-30	OCF-G03-B60-X-J50	OFH-G04-B200-X-10	
Direction Control Valves	Check Valves	OC-G01-P※-20	OC-G03-P※-J50	OCH-G04-P※-10	
		OC-G01-T※-20	OC-G03-T※-J50	OCH-G04-T※-10	
		OC-G01-A※-20	OC-G03-A※-J50	OCH-G04-A※-10	
		OC-G01-AP※-20	OC-G03-AP※-J50	OCH-G04-AP※-10	
	Vacuum Check Valves	OCV-G01-W-20	OCV-G03-W-J50	OVH-G04-W-10	
	Pilot Check Valves	OCP-G01-W※-(F)-21	OCP-G03-W※-(D)-J50	OPH-G04-W※-(D)-10	
		OCP-G01-A※-(F)-21	OCP-G03-A※-(D)-J50	OPH-G04-A※-(D)-10	
		OCP-G01-B※-(F)-21	OCP-G03-B※-(D)-J50	OPH-G04-B※-(D)-10	
Composite Valves	Pressure Reducing Valves	OGS-G01-P※※-K-※※-22			

Electro-hydraulic Proportional Valve Series



Today's hydraulic systems demand high levels of automation, power efficiency and energy efficiency, which is why the use of electro-hydraulic proportional valves is on rise. Built in electronic components deliver outstanding response and fluid pressure that allows high output, as well as superior operation and control. The NACHI Electro-hydraulic Proportional Valve Series includes the pressure control valves, flow control valves and direction control valves that make it easy to meet these needs.

Power Amplifiers

EMA Series: Amplifier Type
EMC Series: Controller Type
A current feedback amplifier system is used to virtually eliminate output current fluctuation, the same power supply specifications apply to all types.

Compact Power Amplifiers

EBA Series: Amplifier Type
The highly efficient PWM control system of this new series ensures high reliability in a compact configuration.

Compact Multi-Function Power Amplifiers

EDA Series Amplifier Type: This compact amplifier can drive two solenoids with a single DC input.
EDC Series Amplifier Controller Type: A choice of inputs, 6-contact or DC2 input/4-contact.

Pressure Control Valves Series

EPR Series: Small volume direct driver type pilot relief valve.
ER Series: Large-volume balanced piston type relief valve.
EGB Series: Large-volume balanced piston type pressure reduction valve with relief function.
The pressure control section uses a poppet structure, which is virtually impervious to the effects of dirt in the operation fluid for outstanding pressure stability.

Flow Control Valve Series

ES Series: This 3-directional valve provides proportional flow control in accordance with input current.
ESR Series: With a built in rod sensing function – this 3-way valve is fo ruse in low-energy circuits.
A force feedback mechanism is used for main spool positioning and amplification is performed.

Direction Flow control Valve Series

ESD Series: This electro-hydraulic proportional valve provides both direction control functions. Mounting methods are the same as those for standards switching valves, which allows simple structuring and maintenance.
ESH Frequency response equivalent to an electro-hydraulic servo valve.

Modular Type Control Valve Series

EOG-G01: This reduction valve with relief function can be used in ganged configuration.
EOF-G01: This flow control valve combines a restrictor valve with a pressure compensation valve.
This dual configuration provides easy installation along with dramatically reduced space requirements.

Name	Max. Working Pressure	Rated flow rate (ℓ/min) 1 2 10 50 100 200 300 400 500
Electro-hydraulic Proportional Valve (EPR)	35{357}	01 Size
Electro-hydraulic Proportional Valve (ER)	35{357}	03 06
Electro-hydraulic proportional Relief Reducing Valve (EGB)	25{255}	03 06
Electro-hydraulic Proportional Flow Control Valve (ES)	21{214}	02 03 06 10
Load Sensitive Electro-hydraulic Proportional Relief and Flow Control Valve (ESR)	25{255}	03 06 10
Electro-hydraulic Proportional Flow Control Valve (ESD)	25{255}	01 03 04 06
Modular Type Electro-hydraulic Proportional Reducing Valve (EOG)	25{255}	01
Modular Type Electro-hydraulic Flow Control Valve (EOF)	21{214}	01
Electro-hydraulic Proportional Relief and Flow Control Valve (ESH)	G01、G04、G06 32{327} G03 28{286}	01 03 04 06

Electro-hydraulic Proportional Pilot Relief Valve (EPR)

A NACHI proprietary semi circular barrel swash plate that receives pressure on its surface ensures a stable discharge volume at all times. This eliminates excess discharge volume and enables the effective use of power corresponding to the load cycle.

- Maximum Flow: 1.2 l /min
- Pressure Control Range:
  B: 0.3 – 2.5MPa {3.1 - 25.5kgf/cm²}
  1: 0.7 – 7MPa {7.1 – 71kgf/cm²}
  2: 1.0 – 14MPa {10 – 143kgf/cm²}
  3: 1.5 – 21MPa {15.3 – 214kgf/cm²}
  4: 1.5 – 28MPa {15.3 – 286kgf/cm²}
  5: 2.0 – 35MPa {20 – 357kgf/cm²}

EPR-G01

EPR-G01-2-（※※※※S）-12
- Design number
- Plunger orifice symbol
  None: no orifice
  S: with orifice
- Tank port orifice symbol, orifice diameter:
  00: None
  08: orifice diameter: 0,8
  09: orifice diameter: 0,9
  10: orifice diameter: 1,0
  11: orifice diameter: 1,1
  12: orifice diameter: 1,2
  13: orifice diameter: 1,3
- Pressure port orifice symbol
- Pressure port control range:
  B, 1, 2, 3, 4, 5
- Nominal diameter 01
- Mounting method G: Gasket type
- Electro-hydraulic proportional pilot relief valve

Electro-hydraulic Proportional Relief Valve (ER)

This valve combines a compact, high performance electro-hydraulic proportional pilot relief valve and balanced piston type relief valve to provide pressure control in proportion to input current. Throughout volume and fluid temperature, fluctuation has little effect on control pressure, so this valve provides open loop control of even complex pressures (forces).

- Maximum Flow: ER-G03-*-21:
  150 l/min; ER-G06-*-21: 320 l/min
- Pressure Control Range:
  B: 0.3 – 2.5MPa {3.1 - 25.5kgf/cm²}
  (Note: G03-type only flow rate: 40l/min)
  1: 0.7 – 7MPa {7.1 – 71kgf/cm²}
  2: 1.0 – 14MPa {10 – 143kgf/cm²}
  3: 1.5 – 21MPa {15.3 – 214kgf/cm²}
  4: 1.5 – 28MPa {15.3 – 286kgf/cm²}
  5: 2.0 – 35MPa {20 – 357kgf/cm²}

ER-G06

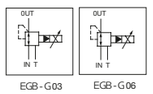
ER-G03-3-21
- Design number
- Pressure control range:
  B, 1, 2, 3, 4, 5
- Nominal diameter 03, 06
- Mounting method G: Gasket type
- Electro-hydraulic proportional relief valve

Electro-hydraulic Proportional Relief and Reducing Valve (EGB)

This valve combines a compact high-performance electro-hydraulic pilot relief valve and a reducing and relief valve for low-pressure control of pressure with a hydraulic system in proportion to input current. Since this valve includes a relief function. OUT side, pressure can be maintained at a virtually fixed level, even when the valve's OUT side is used as reaction force. This valve also provides outstanding response as pressure drops.

- Maximum Flow EGB-G03-*-11:
  50 l/min; EGB-G06-*-11: 100 l/min
- Pressure Control Range:
  B: 0.3 – 2.5MPa {3.1 - 25.5kgf/cm²}
  (Note: G03-type only flow rate: 20l/min)
  1: 0.7 – 7MPa {7.1 – 71kgf/cm²}
  2: 1.0 – 14MPa {10 – 143kgf/cm²}
  3: 1.5 – 21MPa {15.3 – 214kgf/cm²}

EGB-G03



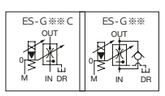
EGB-G03-2-10
- Design number
- Pressure control range:
  B, 1, 2, 3
- Nominal diameter 03, 06
- Mounting method G: Gasket type
- Electro-hydraulic proportional relief and reducing valve

Electro-hydraulic Proportional Flow Control Valve (ES)

This valve controls actuator speed in response to the size of input current. Pressure and control fluid temperature fluctuation has little effect on setting pressure, which enables high precision speed control. This valve is perfect choice for actuator acceleration and deceleration control and remote control.

- Flow Control Range:
  [C]ES-G02-10-(F)-12: 0.5 – 10 l/min
  [C]ES-G02-30-(F)-12: 0.5 – 30 l/min
  ES-G03-60-(F)-12: 2 – 60 l/min
  ES-G03-125-(F)-12: 2 – 125l/min
  [C] ES-G03-250-11: 5 – 250l/min
  ES-G10-500-(F)-11: 15 – 500l/min
  1.0 MPa {10kgf/cm²}
  1.3 MPa {13.3kgf/cm²}
  1.5 MPa {15.3kgf/cm²}
  2.0 MPa {20.4kgf/cm²}
- Minimum Allowable Valve Pressure Differential

ES-G02



(C) ES-G-02-30-(F)- 11
- Design number
- Auxiliary symbol F: with pressure compensation piston opening adjustment screw
  Note: nominal diameters 02, 03,10 only available
- Rated flow rate
- Nominal diameter: 02, 03, 06, 10
- Mounting method G: Gasket type
- CES: Electro-hydraulic proportional flow control valve with check valve 02, 06 only
  ES: Electro-hydraulic proportional flow control valve

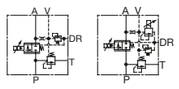
Load response Electro-hydraulic Proportional Relief and Flow Valve (ESR)

The load sensing function of this meter in flow control valve makes it possible to control pump discharge pressure automatically in accordance with the size of the load pressure. Using this valve suppresses wasteful pump pressure rises and makes it possible to configure and energy-efficient circuit.

- Maximum Flow: ESR-G03-125: 125 l/min; ESR-G06-250: 250 l/min; ESR-G10-500: 500 /min
- Pressure Control Range:
  R1 : 1.2 - 7MPa {12.2 to 71kgf/cm²}
  R2 : 1.4 - 14MPa {14.3 to 143kgf/cm²}
  R3 : 1.6 – 21 MPa {16.3 to 214kgf/cm²}
  R4 : 1.6 – 25 MPa {16.3 to 255kgf/cm²}

ESR-G03

ESR-G※※ ESR-G※※-R※



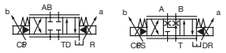
ESR-G06-250(※※) -11
- Design number: 12: for 03, 06 size; 11: for 10 size
- Pressure control function: None: without electro-hydraulic proportional pilot relief valve (available with G03, G08); R*: with electro-hydraulic proportional pilot relief valve
- Rated flow rate
- Nominal diameter 03, 06, 10
- Mounting method G: Gasket type
- ESR: Load sensitive electro-hydraulic proportional relief and flow control valve

Electro-hydraulic Proportional Flow and Direction Control Valve (ESD)

This valve uses a DC solenoid in a traditional 4-way solenoid valve to create a solenoid valve capable of both direction switching and high-speed control. The line-up consists of the direct system 01 size and the pilot system 03, 04 and 06 sizes. Direction control is performed by supplying input current to one of the two proportional solenoid valves and the size of the flow rate is controlled in accordance with the size of the input current. This type of valve can be used for remote control and shock less acceleration and deceleration control and for simple configuration of hydraulic circuits.

- Flow Rate:
  ESD-G01-10: 10 l/min
  ESD-G01-20: 20 l/min
  ESD-G03-40: 40 l/min
  ESD-G03-80: 80 l/min
  ESD-G04-140: 140 l/min
  ESD-G06-250: 250 l/min
- Response Time:
  At pressure of 14MPa {143kgf/cm²} – fluid temperature at 40°C
  ESD-G01-10 / ESD-G01-20: = 0,04 s
  ESD-G03-40 / ESD-G03-80: = 0,05 s
  ESD-G04-140: = 0,08 s
  ESD-G06-250: = 0,1 s
- Pilot Pressure: Indicates differential between the pilot port and tank port or drain port.
  At least 1.0MPa {10kgf/cm²}

ESD-G01



ESD-G03-C580-(※※) -12
- Design number
- Auxiliary symbol (can be combined in alphabetic sequence, for G03, G04, G06 sizes only): None: Internal pilot, external drain (standard); A: Internal pilot, internal drain; E: External pilot, external drain; A E: External pilot, internal drain; G: Modular pilot with pressure reducing valve (OG-G01-P1-21)
- Rated flow rate
- Spool type
- Nominal diameter: 01, 03, 04, 06
- Mounting method G: Gasket type
- ESD: Electro-hydraulic proportional flow and directional control valve

Modular Type Electro-hydraulic Proportional Reducing Valve (EOG)

This valve incorporates the ease-o fuse principles of the modular valve into an Electro-hydraulic Proportional reducing valve to provide reduction control of hydraulic system pressure in proportion to input current. This valve is perfect for a small-scale hydraulic system, such as those used for continuous proportional control of lathe chuck pressure. A relief function ensures outstanding pressure response characteristics.

- Maximum Flow: 30 l/min
- Pressure Control Range:
  B: 0.3 – 2.5MPa {3.1 – 25.5kgf/cm²}
- 1: 0.4 – 7MPa {4 – 71kgf/cm²}
- 2: 0.6 – 14MPa {6 – 143kgf/cm²}

EOG-G01

EOG-G01

EOG-G01-P1-11
- Design number
- Pressure control range: B, 1, 2
- Control port: P port
- Nominal diameter 01
- Mounting method G: Gasket type
- Modular type electro-hydraulic proportional reducing valve

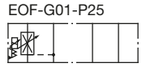
Modular Type Electro-hydraulic proportional Flow Control Valve (EOF)

An Electro-hydraulic proportional restrictor valve and pressure compensation valve are combined into a modular configuration, available as one of two types: the meter in control EOF-G01-P and meter out control EOF-G01-T. The pressure fluctuations have little influence on the setting flow rate making this valve perfect for electro-hydraulic proportional control of small hydraulic systems used for machine tool APC and ATC high-speed shock less control, remote control, etc.

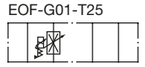
- Flow Control Range: 0.3 to 25 l/min
- Response Time: 0.05 s

EOF-G01

EOF-G01-P25



EOF-G01-T25



EOF-G01-P25-11
- Design number
- Rated flow rate
- Control port: P, T
- Nominal diameter 01
- Mounting method G: Gasket type
- Modular type electro-hydraulic proportional flow control valve

High-response Proportional Flow Control Valve (ESH)

Frequency response equivalent to an electro-hydraulic servo valve. Recovery of all port block positions following amp. Power off or wiring disconnection (failsafe function).

- Rated Flow:
  ESH-G01-H510A : 10 l/min
  ESH-G01-H520A : 20 l/min
  ESH-G01-H540A : 35 l/min
- Step response ms: 16 max.
  At pressure of 7MPa {71kgf/cm²} and fluid temperature: 40°C

ESH-G01-H520 A-10
- Design number
- Center valve position lap value: A: 0.5% max. (zero lap)
- Rated flow rate: 10, 20, 35 l/min (Valve pressure drop 7MPa {76kgf/cm²}
- Relieve position flow path: 5: all ports blocked
- Operation method: H (spring offset type)
- Nominal diameter: 01 (01 size)
- Mounting method G: Gasket type
- High-response proportional flow control valve

Power Amplifier Series for Electro-hydraulic Proportional Valve drive (EMA, EMC)

This special amplifier is for driving Electro-hydraulic Proportional Pressure control valves, Electro-hydraulic Proportional Direction Control Valves. It comes in a choice of two different types: an amplifier type and a controller type. Basically the amplifier type converts 0 to 10 V DC range command voltage to a DC current of in the range of 0 to 900 mA, which is then supplied to the control valve. The control type performs multi-stage control of output current in accordance with the ON-OFF signal of external contacts.

Amplifier Type: EMA-PD5-N-20 (closed loop)
- Max. output current: 900mA
- Number of input: 5 DC Input
- Input Voltage: 0 ~+10V DC 50/60Hz
- Power Supply Voltage: AC100, 200V

- Controller Type: EMC-PC6-A-20
- Max. output current: 900mA
- Numbers of channels: 6
- Channel time lag: 0.3 ~ 3 sec.

EMA-PD5-N-□-20
- Design number
- Auxiliary Symbol (up to six characters can be combined in alphabetic sequence) C: 4-20mA input (R1, RT3); D: adjustment by 10-rotation potentiometer; K: Moisture resistance; T1: T-UP, T-Down : 0.1 – 1 sec; T5: T-UP, T-Down : 0.5 – 5 sec; T10: T-UP, T-Down: 1 – 10 sec
- Input amplifier
- D5, DC 5 input
- Mounting method: Panel type
- Electro-hydraulic proportional valve amplifier

EMC-PC6-A-□-20
- Design number
- Auxiliary Symbol (up to five characters can be combined in alphabetic sequence) D: adjustment by 10-rotation potentiometer; K: Moisture resistance; T1: T-UP, T-Down: 0.1 – 1 sec; T5: T-UP, T-Down: 0.5 – 5 sec; T10: T-UP, T-Down: 1 – 10 sec
- Externally variable channel time lag
- C6, 6 channel
- Mounting method: Panel type
- Electro-hydraulic proportional valve controller

Small type Power Amplifier Series for Electro-hydraulic Proportional Valve Drive (EBA)

This power amplifier provides high efficiency and reliability in a compact configuration. Lightweight and compact design – the configuration of this amplifier is 1/3 the weight and 1/2 the volume of existing models. High efficiency – a PWM control system enables a highly efficient design with little heat generation. High reliability – all functions are integrated onto a single circuit board for a highly reliable design with no internal wiring.
Amplifier type, small type power amplifier, type classification, auxiliary symbol, voltage symbol, design number.

EBA-PD1-NWZ-D2-10
- Design number
- Voltage symbol: C1: AC100, 110V ±10% (50/60Hz); D2: DC24V
- Auxiliary symbol: N: open loop with one output (SOL a); NW: open loop with two outputs (SOL a, SOL b); Z: with case (can be used with voltage symbol D2 only)
- Type classification: D1, DC1 input
- Small type power amplifier

Small type Multi-function Power Amplifier (EDA, EDC)

This compact multi-function power amplifier uses advanced hybrid integrated circuits (HIC). Compact design less than half the size of previous models high reliability circuit board configuration estimates the need for wiring. Multifunction, simultaneous driving of two valves, controller with built-in amplifier (EDC-PC6-AWZ-D2-20) dither frequency selection function (from designs 11, 20).

EDA Series, function classification, auxiliary symbol, voltage symbol, design number.

EDC Series, function classification, auxiliary symbol, voltage symbol, design number.

EDA-PD1-NWZ-D2-11

- Design number
- Voltage symbol D2: DC24V
- Auxiliary symbol: None: 1-rotation adjustor knob; D: 3-rotation adjustor knob (1-rotation trimmer for dither)
- Z: with case
  W: 4-direction valve drive possible
  N: Standard type
- Number of inputs 1: 1 input
  D: Amp DC input
  P: Panel type
  A: Amp type
  ED: Small type, multi-function power amp

EDC-PC6-AWZ-D2-20

- Design number
- Voltage symbol D2: DC24V
- Auxiliary symbol (up to four characters can be combined in alphabetic sequence.
  None: 1-rotation adjustor knob
  Variable TIMER Range:
  0.1 to 2 sec
  D: 3-rotation trimmer for controller block LEVEL, TIME, TOFF only
  E: 3-rotation for amp block GAIN, NULL, OFFSET, LAG only
  F: 3-rotation for controller/amp block LEVEL, TIME,TOFF, GAIN, NULL, OFFSET, LAG
  T5: Variable TIMER Range:
  0.5 to 5 sec.
  T10: Variable TIMER Range:
  1 to 10 sec.
- Z: with case
  W: 4-direction valve drive possible
  A: with acceleration timer
- Number of inputs 6: 6 input
  C: Controller type contact input
  P: Panel type
  C: Controller type
  ED: Small type, multi-function power amp

High speed Response Proportional Control valve Amplifier (EHA)

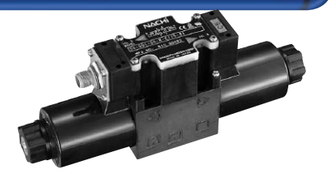
- Coil current feedback and spool position feedback amplification for stable high-speed spool positioning.
- Built-in check connector ICS simplifies maintenance.
- A single printed circuit board allows separation of connectors and the terminal box.
- Servo ready and servo ON interfaces.
- Power supply and current control switching system for improved efficiency.

EHA-PD2-0501-D2-10

- Design number
- Amp power supply voltage symbol D2: DC24V
- Driver valve size
  01: nominal diameter 01
  03: nominal diameter 03
  04: nominal diameter 04
  06: nominal diameter 06
- Input voltage: 05: 0 to ± 5V
  10: 0 to ± 10V
- Number of input terminals
  2: 2 inputs
- Input type D: DC voltage
- Mounting method P: panel type
- Ambient humidity A: Amp
- High-response proportional valve digital devise (note: select an amp that matches the valve size)

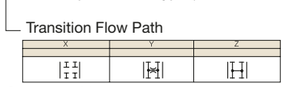
SS (SA) Series Wet Type Solenoid Valve

- **Global Support**
  Recognized by reliable overseas safety standards such as CE (Europe), UL (U.S.A.) and CSA (Canada).
- **Easy use**
  An expanded wiring space ensures easy wiring.
  – Use of a 4-pin M12 connector (IEC60947-5-2) permits one-touch connection of wires. (Compatible with special parts)
  – Re-designed terminal
- **Low power consumption**
  – The power consumption of the DC solenoid (D※and E※) is reduced, with high voltage and heavy current kept unchanged. This will further promote your energy saving policy.
- **Reliable switching**
  – An innovative fluid reaction compensating mechanism assures reliable valve switching (patent pending).

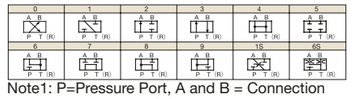


SS (SA) - G03-A3X- ※ R-C2-J21

- Design number
  21: SS (SA) 03 size for mounting bolt M8
  J21: SS (SA) 03 size for mounting bolt M6
  31: SS (SA) 01 size
- Power Supply
  C: AC (50/60Hz), C1=AC100V, C2=AC200V
  D: DC, D1=DC12V, D2=DC24V
  E: AC (built-in rectifier, 50/60Hz), E1=AC100V, E2=AC200V
- With indicator light
- Auxiliary Symbol (can be combined in alphabetic sequence)
  F: Shock less Type (Available with power supply D*, E*)
  G: Surge less Type (Available with power supply C*, D*)
  N: with manual push-button
  Q: quick return type (Available with power supply E*)
- Transition Flow Path

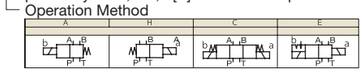


- Center position



Note1: P=Pressure Port, A and B = Connection port to cylinder, etc; T[R] = connection port to tank

- Operation Method



- Nominal Diameter
  01 size
  03 size
- Mounting Method
  G: Cascade mounting

SS: wet type solenoid operated directional control valve
SA: wet type solenoid operated directional control valve with DIN connector

Max. working pressure MPa (kgf/cm²)

		SS-G01	SS-G03
P, A, B ports		35{357}	32{326}
T port (max. allowable backpressure)		25{255}	
		21MPa {214kgf/cm²}	16MPa {163kgf/cm²}
Max. flow rate l/min		100 (50) R /min	160 (130) R /min
Holding power	DC	26W	31～36W
	DC with built in rectifier	24～27W	34～37W
	AC 100V/200V	22W (60Hz) 25W (50Hz)	34W (60Hz) 36W (50Hz)

Specifications

Model No.		Maximum Flow Rate (ℓ/min)		
JIS Symbol	Operation Symbol	SS (SA)-G01	SS-G03	
	-A2X-	30 (30)	40 (85)	85 (20)
	-H2X-			
	-E2X-		85 (85)	
	-A5-	100 (50)	130 (130)	160 (130)
	-H5-			
	-E3X-			
	-C2-			
	-C5-			
	-C9-			
	-C1S-			
	-C6S-			
	-A3X-	80 (50)		
	-H3X-			
	-A3Z-	65 (50)		
	-H3Z-			
	-E3Z-			
	-C1-	AC65 DC80 (50)		
	-C6-			
	-C4-	50 (40)		
	-C7Y-		70 (85)	100 (85)
	-C8-			

Model No.		Maximum Flow Rate (ℓ/min)		
JIS Symbol	Operation Symbol	SA-G01	SA-G03	SAH-G03
	-A2X-	30	40	130
	-H2X-			
	-E2X-		85	
	-A5-	100	130	
	-H5-			
	-A3X- -A3Z-	80 65		
	-H3X- -H3Z-			
	-E3X- -E3Z-	100 65		
	-C-	AC65 DC80		

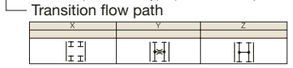
Model No.		Maximum Flow Rate (ℓ/min)			
JIS Symbol	Operation Symbol	SA-G01		SA-G03	SAH-G03
	-C2-	100	50	130	130
	-C4-	50			
	-C5-	100			
	-C6-	AC65 DC100			
	-C9-	100			
	-C1S-				
	-C6S-				
	-C7Y-	50	40	70	
	-C8-				

SL Series Lower Power Solenoid Valve

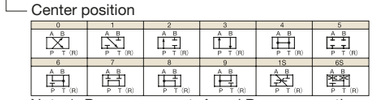
- **Global Support**
  Recognized by reliable overseas safety standards such as CE (Europe), UL (U.S.A.) and CSA (Canada).
- **Easy use**
  An expanded wiring space ensures easy wiring.
  – Use of a 4-pin M12 connector (IEC60947-5-2) permits one-touch connection of wires. (Compatible with special parts)
  – Re-designed terminal
- **Low power consumption**
  – The power consumption of the DC solenoid (D※and E※) is reduced, with high voltage and heavy current kept unchanged. This will further promote your energy saving policy.
- **Reliable switching**
  – An innovative fluid reaction compensating mechanism assures reliable valve switching (patent pending).

SL- G01- A3X- ※R- C2- 31

- Design number
- Power supply
  C: AC (50/60Hz), C1=AC 100V, C2=AC200V
  D: for DC, D2=DC24V
  E: AC (built-in rectifier, 50/60Hz), E1=AC100V
- With indicator light
- Auxiliary symbol (can be combined in alphabetic sequence.)
  G: Surge less type (Power Supply C*, D2 applicable)
  N: with manual push-button (available with power supply D2, E1)
  Q: quick return type (acailable with power supply E1)
- Transition flow path

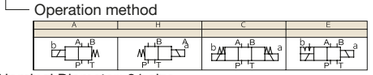


- Center position



Note 1. P=pressure port, A and B are connection ports to cylinder; T[R] shows the connection port to the tank

- Operation method



- Nominal Diameter: 01 size
- Mounting Method: Gasket Type
- Machine Type: SL Series wet magnetic switching valve (with DIN connector = SLD-series)

		SL-G01-※-30
Max. working pressure: P, A, B ports		7MPa {71.4kgf/cm²}
T port (max. allowable backpressure)		7MPa {71.4kgf/cm²}
Max. flow rate l/min		30R /min
Holding power	DC	10W (DC24V)
	DC with built in rectifier	10W (AC100V)
	AC 100V/200V	9.6W (60Hz) 12.0W (50Hz)

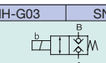
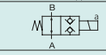
JIS Symbol	Operation Symbol	Max. Flow Rate (ℓ/min)
	-A5-	20-30
	-H5-	
	-A3X-	
	-H3X-	
	-E3X-	
	-C1-	
	-C2-	
	-C4-	
	-C5-	
	-C6-	
	-C9-	
	-C6S-	
	-C7Y-	15-15

Non-leak type Solenoid Valve

- A poppet structure minimizes internal leaks from low pressures to as high as 35MPa {357kgf/cm²}. Enhanced hydraulic circuit efficiency reduces energy needs.
- An original fluid reaction force suppression mechanism is provided for all sizes. Though compact, this valves provides the highest level switching capacity for its class.
- Since a wet type solenoid valve is used, the movable iron core remains immersed in oil as it moves, which minimizes switching noise and ensures reliable operation.
- A wet type valve also provides superior water resistance and longer life than a dry type valve.
- This valve can be ganged together with a modular valve, enabling simple configuration of circuits and an overall compact device configuration.

SNH-G01-AR-※-D2-11

- Design number
  11: 01 size
  10: 03, 04, 06 size
- Power Supply
  D: DC, D1=DC12V, D2=DC24V
  E: AC, (built-in rectifier, 50/60Hz)
  E1: AC100V and E115=AC115V (only with 01 and 03 sizes)
  E2= AC200V and E230=AC230V (only with 01 and 03 sizes)
- Auxiliary Symbol (can be combined in alphabetic sequence)
  M: with manual switching pin
  N: with manual switching push button (with lock mechanism)
  R: with indicator light (excluding 06 size)
  GR: Surge less type with indicator (except for 06 size or 01, 03, 04 size power supply type E*)
- Operation Symbol
  AR: 2-port normal close
  HQ: 2-port normal open
  A2K: 3-port (01 size)
- Nominal pipe diameter: 01, 03, 04 size
- Mounting method G: Gasket type
- SNH: non-leak type solenoid valve

Model No.		SNH-G01	SNH-G03	SNH-G04	SNH-G06
JIS Symbol	AR				
	HQ				
	A2K		——		
Max. working pressure MPa {kgf/cm²} P, A, B ports		35 {357}			
Rated flow rate – Max. flow rate l/min		AR、HQ：10-20 A2K：5-20	20-40	40-60	60-100
Max. changeover Frequency (per min)		120			
Operating Environment	Dust resistance / Water resistance rank	JIS C 0920 IP65			IP64
	Ambient Temperature	−20～50°C			
	Temperature range	−20～70°C			
	Viscosity range	15～300 mm²/s			
	Filtration (microns or less)	25			
Weight AR/HQ (A2K) Kg		1.8 (2.2)	5.2	5.5	6.9

DSS Type Solenoid Control Valve

- Long-life operation is ensured by use of the high-performance, renowned SS (SA)-G01 wet solenoid valve as the pilot valve.
- Internal modification of the pilot and drain can be accomplished without removing the valve by simply connecting and disconnecting plugs.

Valve size	G04	G06
• Max. working pressure MPa {kgf/cm²}	35MPa{357kgf/cm²}	32MPa{326kgf/cm²}
• Rated flow rate	150 ℓ/min	300 ℓ/min
• Maximum flow rate	300 ℓ/min	600 ℓ/min
• Connecting pipe diameter	1/2	3/4

DSS-G06-A3X- ※※-C2-22

- Design number
- Power Supply
  C1: AC100V – 50/60Hz
  C2: AC200V – 50/60Hz
  D1: DC12V
  D2: DC24V
  E1: AC100V – 50/60Hz
  E2: AC200V – 50/60Hz
- Auxiliary symbol (for multiple specifications, use alphabetic sequence)
  A: Internal drain
  R: with indicator light
  E: External pilot
  L: Spool stroke limiter
  N: with manual lock
  Y: with meter-out flow regulator valve
- Transition flow path
  X: closed; Y: restrictor open
  Z: open
- Center valve position flow path
- Operation method
  A: Spring offset; E: No-spring detent;
  C: Spring center; D: Pressure center
- Nominal diameter 04 size, 06 size
- Mounting method G: Gasket type
- DSS: Central terminal box solenoid control valve

JIS Symbol	Operation symbol	Model number
	-A3Z-	DSS-※※※-A3Z-(L)-※※-21
	-A3X-	DSS-※※※-A3X-(L)-※※-21
	-A3Y-	DSS-※※※-A3Y-(L)-※※-21
	-E3Z-	DSS-※※※E3Z-(L)-※※-21
	-E3X-	DSS-※※※-E3X-(L)-※※-21
	-E3Y-	DSS-※※※-E3Y-(L)-※※-21
	-C4-	DSS-※※※-C4-(L)-※※-21
	-D4-	DSS-※※※-D4-※※-21
	-C5-	DSS-※※※-C5-(L)-※※-21
	-D5-	DSS-※※※-D5-※※-21
	-C6-	DSS-※※※-C6-(L)-※※-21
	-D6-	DSS-※※※-D6-※※-21

JIS Symbol	Operation symbol	Model number
	-C7X-	DSS-※※※-C7X-(L)-※※-21
	-C7Y-	DSS-※※※-C7Y-(L)-※※-21
	-D7X-	DSS-※※※-D7X-※※-21
	-D7Y-	DSS-※※※-D7Y-※※-21
	-C8-	DSS-※※※-C8-(L)-※※-21
	-D8-	DSS-※※※-D8-(L)-※※-21
	-C4S-	DSS-※※※-C4S-(L)-※※-21
	-D4S-	DSS-※※※-D4S-※※-21
	-C1-	DSS-※※※-C1-(L)-※※-21
	-D1-	DSS-※※※-D1-※※-21
	-C2-	DSS-※※※-C2-(L)-※※-21
	-D2-	DSS-※※※-D2-※※-21
	-C6S-	DSS-※※※-C6S-(L)-※※-21
	-D6S-	DSS-※※※-D6S-※※-21

Directional Control Valve

Right angle check valve in-line check valve

- The right angle type check valve changes the flow direction of fluid 90 degrees, while the in-line check valve allows only axial direction flow.
- The cracking pressures of these valves are fixed, so fluid passes freely in one direction, but is restricted from flowing in the opposite direction.

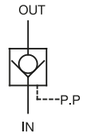
- Maximum working pressure MPa{kgf/cm²} : 21{214}
- Max. flow rate: CA-T03(G03) = 40 l/min; CA-T06 (G06) = 110 l/min; CA-T10(G10) = 320 l/min

CA-T03-1-20
- Design number 11: In-line type 20: right angle type
- Cracking pressure: 1, 2, 3
- Nominal diameter (size)
- Mounting method: T: Screw connection type G: Gasket type
- CA: Right angle check valve CH: In-line check valve

Pilot Check Valves

- Normally, fluid is allowed to flow in a single direction, just as with a standard check valve. Reverse flow can be enabled, however, when the check valve is pushed upwards by external pilot pressure.
- Very compact configuration.

- Maximum working pressure MPa{kgf/cm²} : 21{214}
- Max. flow rate: CP-T03(G03) = 40 l/min; CP-T06 (G06) = 110 l/min; CP-T10(G10) = 320 l/min



CP-G03-1-B-20
- Design number
- Auxiliary symbol None: Standard B: external drain type F: with anti-shock mechanism (decompression type) BF: witch external drain, with shock-resistant mechanism
- Cracking pressure: 1,2
- Nominal diameter (size)
- Mounted method: T: Screw connection type; G: Gasket type
- Pilot check valve

DMA Type Manual Valve

- The compact 01 and 03 sizes are perfect for small flow rate control: Since a balanced type valve is used, there is no need for drain piping and use with backpressures up to 16MPa (163kgf/cm²) is possible.
- Mounting methods are the same as SA-G01/G03 and the 01; 03-size modular valve can be used, so circuit configuration is quick and easy.

- Max. working pressure MPa {kgf/cm²}; 35 (25) {357 (255)}
- Max. flow rate: DMA-G01 : 40 l/min; DMA-G03 : 100 l/min

DMA-G01-A3X-20
- Design number 20: 01 size and 03 size for M8 mounting bolt J20: 03 size for M6 mounting bolt
- Transistion flow path (*3*, *7* only) X: closed; Y: restrictor open; Z: open
- Center valve position flow path 3, 4, 5, 6, 7, 8
- Operation method A: spring offset type C: spring center E, F: detent
- Nominal diameter 01, 03
- Mounting method G: Gasket type
- Manual valve DMA type

Gauge Cock

- Intelligent design packs plenty of function into a simple configuration.
- Maximum operating pressure of 35MPa {357kgf/cm²} allows operation across a wide range.

- Max. working pressure MPa {kgf/cm²}: K2-T02(F02) : 21 {214}; K2-T03(F03) : 35 {357}

K2-T 02-10
- Design number 10 11: for K2-T02, F02
- Nominal diameter (size)
- Mounting method T: Float type F: Flange type
- Gauge cock K2 : rotatable pressure gauge attachment

Pressure Control Valve

Relief Valve

- Balanced piston relief valve.
- Optimum pressure control for hydraulic circuit allows operation as a safety valve.
- A vent port enables remote control fo pressure and use of an unloading circuit.

- Max. working pressure MPa {kgf/cm²}: 21 {214} P, X (vent ports)
- Max. flow rate l/min: R-T03(G03)-A(B) = 20 l/min; R-T03(G03)-1(3) = 80 l/min; R-T06(G06)-1(3) = 170 l/min; R-T10(G10)-1(3) = 380 l/min

R-T06-1- (H) -20
- Design number
- Auxiliary symbol H: High vent (excluding 03 size)
- Pressure adjustment range: 1, 3, A, B
- Nominal diameter (size)
- Mounting method T: screw connection G: Gasket type
- Relief valve

RI Series Relief Valve

- High-pressure capacity balanced piston relief valve.
- Optimum pressure control for hydraulic circuit allows operation as a safety valve.
- A vent port enables remote control of pressure and use of an unloading circuit.

- Max. working pressure MPa {kgf/cm²}: 35 {357} P, X ports
- Max. flow rate l/min: RI-G03-C = 40 l/min; RI-G03-1(3,5) = 150 l/min; RI-G06-1(3,5) = 320 l/min

RI-G03-3-20
- Design number
- Pressure adjustment range C,1,3,5
- Nominal diameter (size)
- Mounting method G: Gasket type
- RI series relief valve

Remote Control Relief Valve

- Connecting a relief valve or reducing valve to the vent port of a balanced piston type pressure control valve provides simple remote control of pressure.
- Type can also be used as a direct type relief valve.

- Max. working pressure MPa {kgf/cm²}: 35 {357} P, X ports
- Max. flow rate l/min: RCD-T02-1(3) = 15 l/min; RC-T02 (G02)-1(3) = 2 l/min

RC (D) -G02-1- (K) -21
- Design number
- Adjusting bolt type (gasket type only)
- Pressure adjustment range 1, 3
- Nominal diameter (size)
- Mounting method T: screw connection type G: Gasket type
- Remote control relief valve

Solenoid Controlled Relief Valve

- This valve adds a wet type solenoid valve to a balanced type piston type relief valve to form a hydraulic device unload circuit.
- The shock less type has an internal structure that prevents shock generated during unloading.
- This valve can also be used in a pressure relief circuit and ahs a maximum adjustment time of three seconds.

- Max. working pressure MPa {kgf/cm²}: 35 {357} P, X ports
- Pressure adjustment range MPA {kgf/cm²}: Type 1: 0.8 – 7 {8,2 – 71.4}; Type 3: 3.5 – 25 {35.7 – 255}; Type 5: 3.5 – 35 {35.7 – 357}; Shock less type: Type 1: 0.8 – 7 {8,2 – 71.4}; Type 3: 3.5 – 25 {35.7 – 255}; Type 5: 3.5 – 35 {35.7 – 357

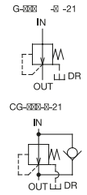
JIS Symbol

RIS
RSS (RSA) -G06- A Q 1- (H) -C1- 23
- Design number
- Voltage symbol C1: AC100V 50/60Hz D1: DC12V C2: AC200V 50/60Hz D2: DC24V E1: AC100V 50/60Hz E2: AC200V 50/60Hz
- Auxiliary symbol F: with shock canceller Other auxiliary symbols G, N, and Q can be used in alphabetic order if there are 2 or more
- Pressure adjustment range 1,3,5
- Stop position flow path Q: open R: blocked (not required with the shock less type)
- Operation method A: spring offset
- Nominal diameter (size)
- Mounting method G: Gasket type
- RSA: Solenoid controlled relief valve (with SA type solenoid valve) RSS: Solenoid controlled relief valve (with SS type solenoid valve)
- RIS: RI Series solenoid controlled relieve valve (with SS type solenoid valve

Pressure Reducing (and Check) Valve

- This valve is used when part of the circuit uses pressure that is lower than the main circuit.
- Even when pressure changes in the primary main circuit, the reduced secondary pressure is adjusted automatically and maintained at a constant level.
- Connecting a remote control valve to the vent port allows remote control of adjustment pressure.

- Max. working pressure MPa {kgf/cm²}: 21 {214} IN, OUT, Vent port
- Max. flow rate l/min: [C]-T03(G03)-A(B) = 20 l/min; [C]-T03(G03)-1(3) = 50 l/min; [C]-T06(G06)-1(3) = 120 l/min; [C]-T10(G10)-1(3) = 280 l/min



(C) G-T03-1-21
- Design number
- Pressure adjustment ranges 1, 3, A, B
- Nominal diameter (size)
- Mounting method T: Screw mounting G: Gasket type
- Reducing valve
- Reducing and check valve

Balancing Valve (Pressure Reducing and Relief Valve)

- This circuit control valve works as a sequence valve, unloading valve and counter balance valve.
- Maximum operating pressure is 21MPa {214kgf/cm²}.
- However, a direct type valve there is a little pressure override.

- Max. working pressure MPa {kgf/cm²}: 21 {214} P-port
- Max. flow rate l/min: GR-G01-A1(A2) = 30 l/min; GR-G03-A1(A2) = 50 l/min

GR-G03-A1- (B) -20
- Design number *
- Auxiliary symbol B: External drain (03 size only) K: with handle
- Pressure adjustment range 1, 2
- Control port: A port
- Nominal diameter (size)
- Mounting method G: Gasket type
- Balancing valve

* Note: For 03 size, relationship between mounting bolts and design number is indicated as J20: M6 / 20: M8

Pressure Control (and Check) Valve

- This circuit control valve works as a sequence valve, unloading valve and counter balance valve.
- Maximum operating pressure is 21MPa {214kgf/cm²}.
- However, a direct type valve there is a little pressure override.

- Max. working pressure MPa {kgf/cm²}: 21 {214} IN, OUT, PP-ports
- Max. flow rate l/min: [C]-T03(G03)-A(B,C,D,E) = 50 l/min; [C]-T06(G06)-A(B,C,D,E) = 120 l/min; [C]-T10(G10)-A(B,C,D,E) = 280 l/min

(C) Q-G10-1B-21
- Design number
- Pressure adjustment range A, B, C, D, E *
- Type 1, 2, 3, 4
- Nominal diameter (size)
- Mounting method T: screw connection G: Gasket type
- Pressure control valve
- Pressure control and check valve

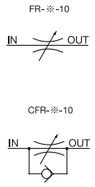
* Note: type E pressure adjustment is not available for Type 1

Flow Control Valve

Throttle (and Check) Valve

- Compact and lightweight, requires very little space for installation.
- Special needle valve configuration provides smooth flow rate control.
- Pressure is internally balanced for light handle operation, even at high pressure.

- Cracking pressure MPa {kgf/cm²}: [C]FR-T03(G03): 0.15 {1.5}; [C]FR-T06(G06): 0.1 {1.0}; [C]FR-T10(G10): 0.1 {1.0}
- Max. working pressure MPa {kgf/cm²}: 21 {214}
- Max. flow rate l/min: [C]FR-T03(G03) = 30 l/min; [C]FR-T06(G06) = 75 l/min; [C]FR-T10(G10) = 190 l/min

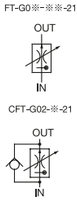


(C) FR-G03-10
- Design number
- Nominal diameter (size)
- Mounting method T: Screw connection G: Gasket type
- Throttle valve
- Throttle and check valve

FT type Flow Control (and Check) Valve

- Pressure compensation and temperature compensation mechanisms provide a stable control flow rate, even when fluid temperature fluctuates.
- A wider control flow rate range as well as easier minute flow rate adjustability then previous products.

- Max. working pressure MPa {kgf/cm²}: 21 {214}
- Reverse flow rate l/min: [C]FT-G02-8(30) = 50 l/min; [C]FT-G03-42(106) = 120 l/min
- Cracking pressure MPa {kgf/cm²}: 0.1 {1.0}

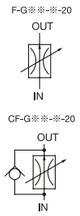


(C) FT-G02-8- (F) -22
- Design number
- Anti-jumping mechanism (option)
- Maximum control flow rate
- Nominal diameter (size)
- Mounting method G: Gasket type
- Temperature compensated flow control valve
- Temperature compensated flow control and check valve

F Type Flow Control (and Check) Valve

- Wide control flow rate range.
- A pressure compensation mechanism ensures that the control flow rate does not change, even when there is pressure fluctuation.

- Max. working pressure MPa {kgf/cm²}: 21 {214}
- Volume control flow rate l/min: [C]F-G06-170 = 9 – 170 l/min; [C]F-G10-373 = 20 – 373 l/min
- Cracking pressure MPa {kgf/cm²}: 0.1 {1.0}

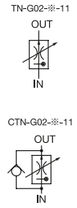


(C) F-G06-170-20
- Design number
- Maximum control flow rate
- Nominal diameter (size)
- Mounting method G: Gasket type
- Flow control valve
- Flow control and check valve

TN Type Flow Control (and Check) Valve

- With a very compact, lightweight configuration, the intelligent design of this valve makes it a low-cost option.
- Minute flow rate control form 30 cm³.
- Stable control of each setting flow rate, even as pressure and fluid temperature are fluctuating.
- Dial markings are proportional to flow rate for simple and accurate control flow rate adjustment.

- Max. working pressure MPa {kgf/cm²}: 10.5 {107}
- Volume control flow rate l/min: [C]TN-G02-2 = 0.03 – 2 l/min; [C]TN-G02-8 = 0.05 – 8 l/min
- Cracking pressure MPa {kgf/cm²}: 0.1 {1.0}

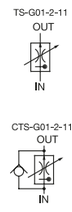


(C) TN-G02-2- (F) -11
- Design number
- Anti-jumping mechanism (option)
- Maximum control flow rate
- Nominal diameter (size)
- Mounting method G: Gasket type
- Flow control valve
- Flow control and check valve

TS Type Flow Control (and Check) Valve

- Original compact, lightweight configuration.
- High precision control up to minute flow rates of 10 cm³.
- Design allows large 20 r/min reverse flow rate relative to control flow rate, which means there is no need to include an extra valve in the quick return circuit.
- Stable control of each setting flow rate, even as pressure and fluid temperature are fluctuating.

- Max. working pressure MPa {kgf/cm²}: 10.5 {107}
- Volume control flow rate l/min: [C]TS-G01-2 = 0.01 – 2 l/min
- Cracking pressure MPa {kgf/cm²}: 0.08 {0.8}

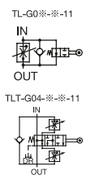


(C) TS-G01-2-11
- Design number
- Maximum control flow rate
- Nominal diameter (size)
- Mounting method G: Gasket type
- Flow control valve
- Flow control and check valve

TL (TLT) Type Feed Control Valve

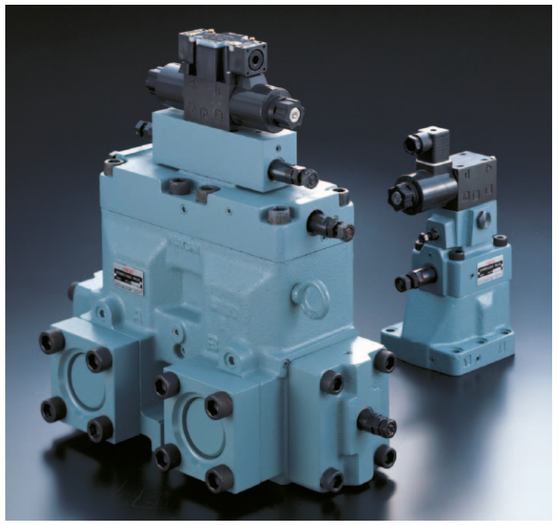
- Very compact, lightweight and economically priced.
- Applicable for control of machine tool table operations.
- For example, a single valve provides smooth control of: Fast Feed --> Cutting Feed (2 stage) --> Fast Return.
- Stable control of each setting flow rate, even as pressure and fluid temperature are fluctuating.
- Dial markings are proportional to flow rate for simple control flow rate adjustment.

- Max. working pressure MPa {kgf/cm²}: 7 {71.4}
- Cracking pressure MPa {kgf/cm²}: 0.1 {1.0}
- Reverse flow rate l/min: TL-G03-2(8) = 35 l/min; TL-G04-2(8) = 53 l/min; TLT-G04-2(8)-1.5(2) = 53 l/min



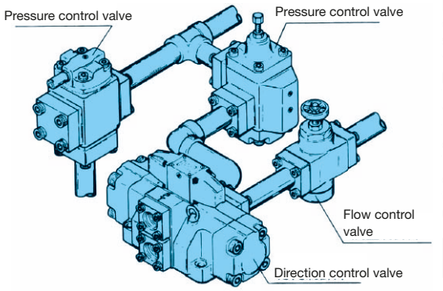
TLT-G04-2- (1.5) - (F) -11
- Design number
- Anti-jumping mechanism (option)
- Maximum volume control flow rate (feed 2)
- Maximum control flow rate
- Nominal diameter (size)
- Mounting method G: Gasket type
- 2-position feed control valve
- 1-position feed control valve

Composite Valve Series Logic Valve

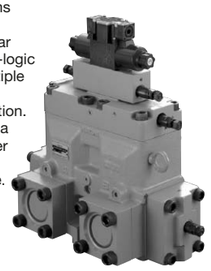


HYDRO-LOGIC composite valves revolutionize the structure of hydraulic control valves in a way that makes it possible to control multiple functions with a single valve. Unlike contemporary valves that limit each valve to a single function, the HYDRO-LOGIC control valve allows a tremendous reduction in overall equipment size and energy savings as well. In addition, a poppet structure delivers high response, low leakage and outstanding power.

These valves are made possible by fully applying technology of the proven cartridge logic valve. A gasket type and flange type logic valve series can be used with total confidence in a wide variety of hydraulic applications.



Multi-function in a compact design unlike single-valve systems where each valve performs a particular function, the hydro-logic valve provides multiple functions in a very compact configuration. The more complex a circuit is, the greater the advantages of using this type of valve.



2-Direction valves	4-Direction valves		Pipe Diameter (Nominal Diameter)	Max. working pressure MPa {kgf/cm²}	Max. flow rate ℓ/min
Gasket Mounting		Flange Mounting			
HT (S) -G06	HF (S) -G06	–	3/4B	28{286}	200 (*120)
HT (S) -G10	HF (S) -G10	HF (S) -F10	1-1/4B		500 (*300)
HT (S) -G16	–	HF (S) -F16	2B		1000 (*600)
–	–	HF (S) -F24	3B (4B)	32{326}	2300

Flow rates marked with an asterisk (*) apply to 2-direction model number 2G* (pressure reducing valve)

HT (S) - G06 - 4C1 - R - C1 - 12

- Design number
- Power supply: C: AC (50/60Hz), D: DC, E: AC (built-in rectifier, 50/60Hz)
  - C1 = AC100V, C115 = AC110V, C2 = AC200V, C230 = AC220V, D1 = DC12V
  - D2 = DC24V, E1 = AC100V, E115 = AC115V, E2 = AC200V, E230 = AC230V
- Auxiliary symbol (can be combined in alphabetic sequence: A: internal drain, E : external pilot, F : shock less type, H: high vent type, S: poppet with dumper)
  - R: with indicator light, J: G screw conversion adapter, G: surge less type
- Pressure adjustment range and cracking pressure
- Number of circuit
- Nominal diameter 06, 10, 16
- Mounting method G: Gasket type
- HT logic valve uses SA-Type solenoid valve; HTS logic valve uses SS-Type solenoid valve

- Multi-function composite valve to meet high-level hydraulic needs a single multi-function composite valve controls direction, pressure and flow.
- Makes Hydraulic equipment more compact since a single valve performs multiple functions, the number of required valves is reduced, which simplifies the hydraulic circuit and makes the overall design of the equipment more compact
- Fast switching with less shock a poppet valve is used for the basic structure, which eliminates overrun and reduces mass for very fast switching. A restrictor valve built into the pilot line makes it possible to freely set the open/close timing of each port and easily reduce shock.
- Less internal leaking than spool type valves poppet seal construction minimizes seat leaks, while a long slide length ensures much less internal leaking then a spool type valve.
- **Dramatically reduced hydraulic equipment production costs**
  A fewer valves not only means more compact designs, it also translates into much lower production costs.
- **Dimensions conform to international ISO standards**
  The 06, 10 sizes gasket type valve mounting dimensions conform to ISO standards for easy interchange ability with existing valves (except for 3-direction valves).
- **Simple mounting without modification**
  Unlike cartridge type valves that require drilling of holes in the block, gasket installation and flange connection of this type of valve is quick and simple.
- **A wide selection of valve models**
  An extensive selection of models includes size13 2-direction valves and size 2000 3-direction and 4-direction valves to meet a wide range of needs.

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