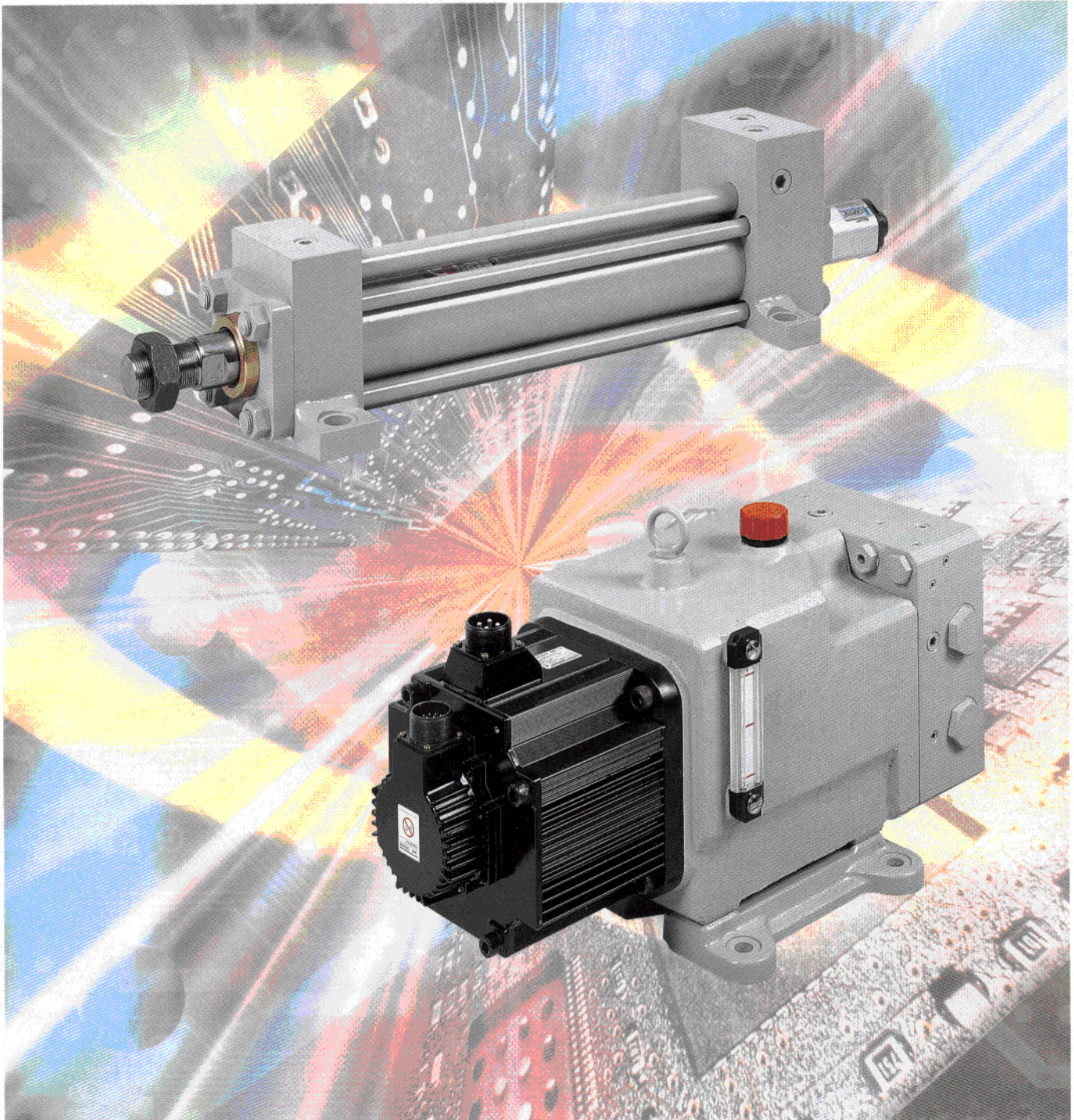




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Intelligent Hydraulic Servo Drive Pack



AC Servo Motor-Driven Hydraulic Pump Control System

Intelligent Hydraulic Servo Drive Pack

The IH (intelligent hydraulic) servo drive pack is a compact energy-saving and low-noise hydraulic device which is combined as one with the AC servo motor, piston pump, reservoir and hydraulic control circuit. This device controls the number of revolutions of a motor to adjust the discharge amount and discharge pressure of the pump. This device can be combined with the sensor-equipped cylinder and dedicated controller to facilitate the configuration of a position, speed and pressure control system.

Energy Saving

The operation at the number of revolutions meeting the machine requirements (flow rate and pressure) reduces useless power losses and provides energy savings.

The pressure oil line from the pump without a control valve minimizes pressure losses and substantially reduces the heat generation of hydraulic fluid.

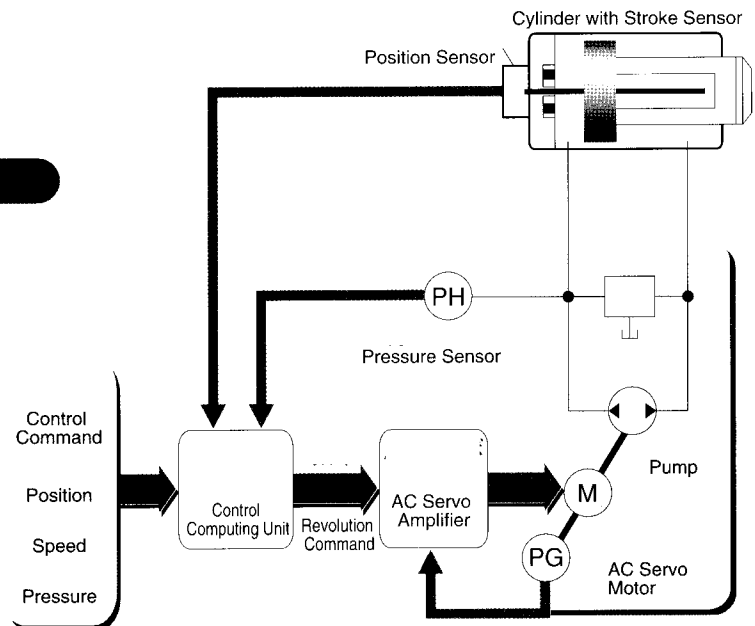
Low Noise

During pressure control, the pump rotation compensating for the internal leakage of oil pressure provides low revolutions with almost no noise.

During flow control, the number of revolutions meeting the machine requirements ensures lower noise generation than conventional devices.

Description of Operation

The bidirectional-rotating pump is driven by the AC servo motor that the pump can supply pressured oil in a bidirection. This results in a simple hydraulic control system where the load cylinder is just connected to both outlet ports. The pump sucks in oil by supplying oil from the cylinder return line and by using the self-support valve to compensate for the excessive and deficient quantity of oil in the area difference of the cylinder. The control deviation of the control signals and sensor signals from the host is sent to the servo drive to drive the AC servo motor, consequently forming a feedback loop.



Compactness

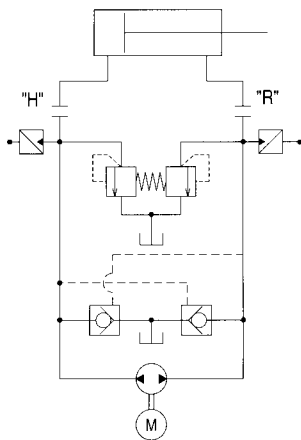
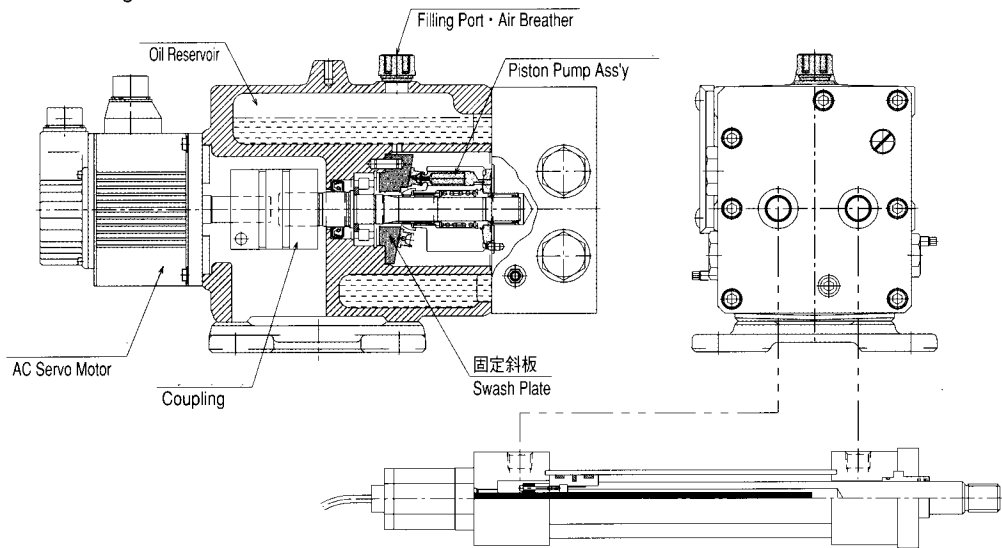
A substantial reduction in heat generation enables the operation with a minimum amount of fluid oil for cylinder operation in addition something extra oil. This results in a combination of the servo motor, piston pump, reservoir and hydraulic control circuit in one, providing energy savings. Incorporation into an integral part of the machine is also possible.

Digital Control

Software control of the dedicated controller allows a system to have a great deal of versatility because of making use of a CPU. Digital control parameter setting facilitates to operate the system and its maintenance, furthermore the analog input/output ports provide as standard for user interface.

Structure of Hydraulic Circuit

The IH Servo Drive Pack pump is a bidirectional revolution piston pump which offers high performance in a wide range of very low to high revolutions. The hydraulic control circuit simply consists of safety valves and check valves, without a control valve in the pump discharge line and the series line between cylinders. The reservoir is made compact by using space around the pump. With the oil supply port of hydraulic fluid doubling as an air breather and the side-mounted oil level gauge, the pump is well equipped as a hydraulic driving force.



Energy-Saving Hydraulic System by Revolution Control

In energy saving by hydraulic control, with respect to required (output) = (pressure) \times (flow rate), load pressure is detected to control, and the amount of oil not to be discharged excessively. Because of (flow rate) = (revolutions) \times (pump displacement), the piston pump changes the angle of a swash plate to control displacement.

In energy saving by revolution control, on the other hand, the number of revolutions of a motor is controlled. In this case, the pressure sensor detects load pressure to exert electrical feedback control to configure an energy-saving system.



The conventional system where the pump makes constant revolution at high speed produces electrical losses produced due to the internal leakage of hydraulic components and the efficiency reduced when the induction motor is under low load conditions. It can be said that the revolution control system where the motor rotates to supply the amount of flow only when needed is superior as an energy-saving system.

Specifications

Model Numbers	Geometric Displacement (cm ³ /rev)	Max. Operating Pres. (MPa)	Max. Shaft Speed (r/min)	Thrust Output & Size (kN)	Reservoir Capacity (cm ³)	Oil Level Variations (r/min)	YSD Dimensions	Servo Driver Dimensions
YSD1-* -05 -09 -13	6, 10	B: 7 C: 16 H: 21	2000 <small>Note) It may vary according to AC servo motor output & operating pres.</small>	20~30kN (Cylinder bore 63 mm)	2500	1500	Fig.1	Fig.4 Fig.5
YSD2-* -20 -30 -44	6, 10, 16			50~60kN (Cylinder bore 80 mm)	4200	2500	Fig.2	Fig.6 Fig.7
YSD3-* -55 -75	10, 16, 30			100kN (Cylinder bore 100 mm)	5800	3500	Fig.3	Fig.8

AC Servo Motor Output & Operating Pressure (for reference)

Model Numbers	AC Servo Motor (kW)	Rated Torque (N·m)	Geometric Displacement (cm ³ /rev)					
			Max. Operating Pres. (MPa)					
			3.5	7.0	10.5	14.0	17.5	21.0
YSD1-* -05 -09 -13	0.45	2.84	6					
	0.85	5.39	10	6				
	1.3	8.34	10	6	6			
YSD2-* -20 -30 -44	1.8	11.5	16	10	10	6		
	2.9	18.6	16	16	10	10	10	
	4.4	28.4	16	16	16	16	10	10
YSD3-* -55 -75	5.5	35	30	30	30	16	16	
	7.5	48	30	30	30	30	16	16

*注 Note
 : Short Time Operating
 : Continuous Operating

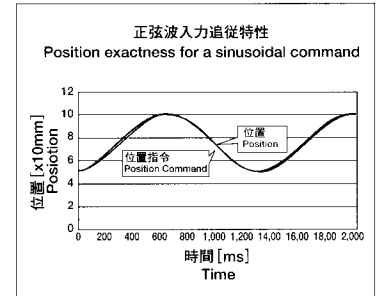
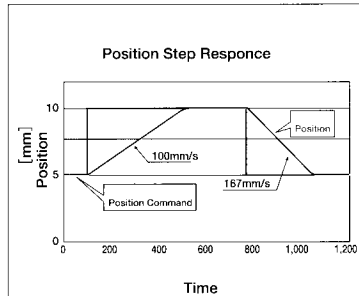
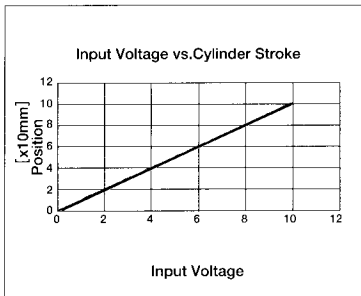
Typical Performance Characteristics

● These characteristics have been obtained by measuring each IH pack. (Therefore, they may vary according to a hydraulic system to be used.)

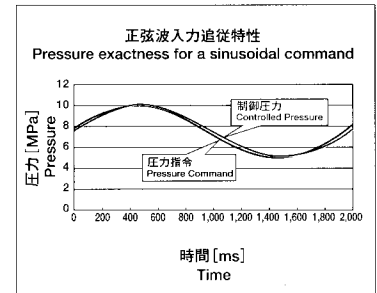
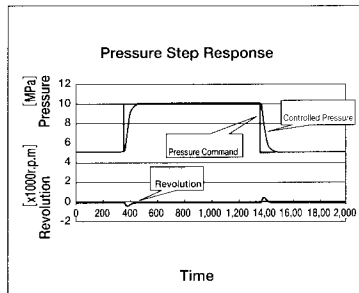
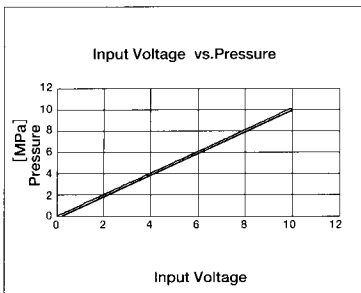
$\phi 80 \times 45 \times 250 \text{st}$ YSD2-F-16

Example: Cylinder - Bore 80 x 45 x 250 st / YSD2-F-16 is used.

Cylinder Stroke



Pressure Controls



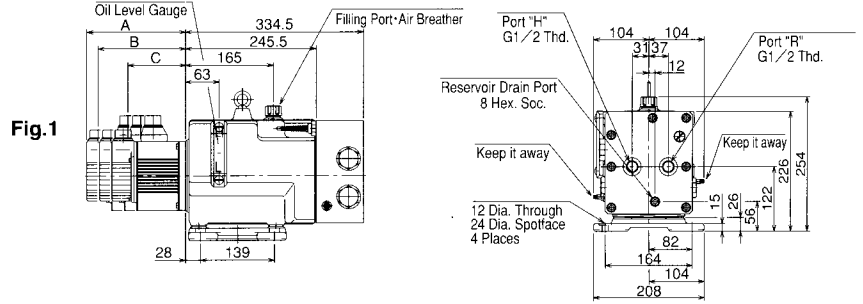
Installation Drawing

YSD1 - * - 05

- 09

- 13

	A	B	C
05	138	117	65
09	161	140	88
13	185	164	112

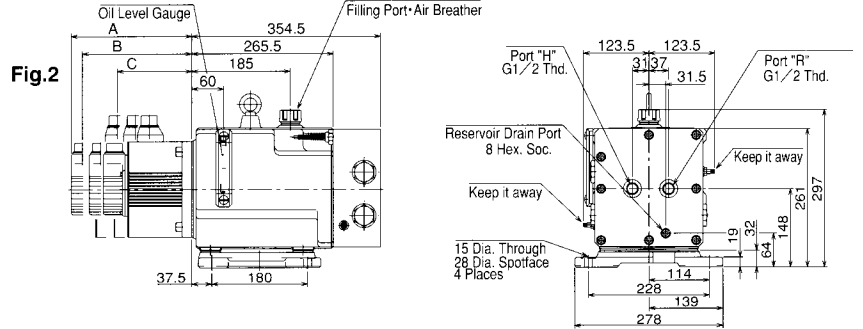


YSD2 - * - 20

- 30

- 44

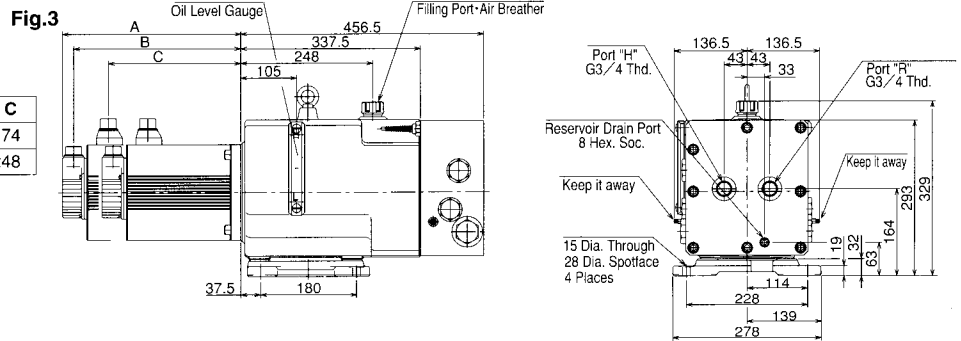
	A	B	C
20	166	145	89
30	192	171	115
44	226	205	149



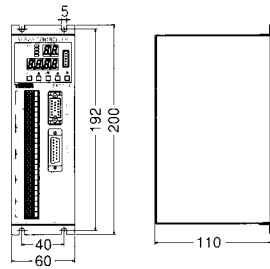
YSD3 - * - 55

- 75

	A	B	C
55	260	239	174
75	334	313	248

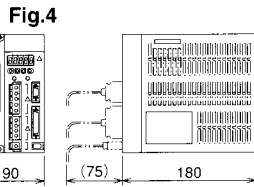


Controller

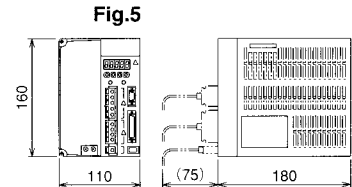


SK1114-10

Servo Amplifier

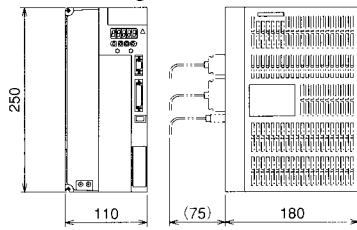


YSD1 - * - 05, - 09
Mass : 1.7kg



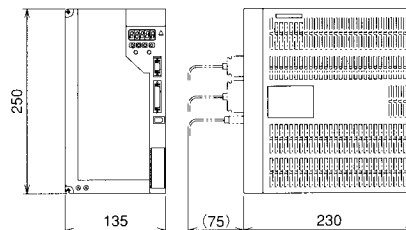
YSD1 - * - 13
Mass : 2.8kg

6 Fig.6



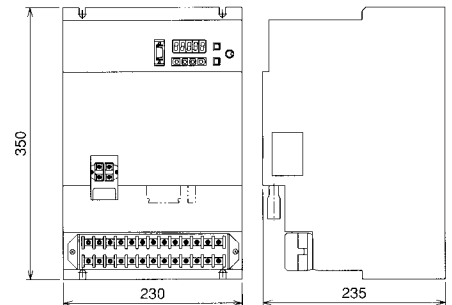
YSD2 - * - 20, - 30 用
Mass : 3.8kg

Fig.7



YSD2 - * - 44
Mass : 5.8kg

Fig.8



YSD3 - * - 55, 75
Mass : 15kg

System Configuration & Model Number

Intelligent Hydraulic Servo Drive Pack

System Configuration

Checking the specifications:

Control System: Positioning / Pressure / Stroke Speed

Electrical Interface specifications:

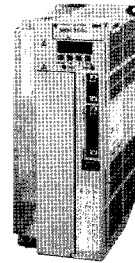
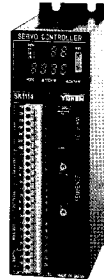
Input Signal - Analogue 10V etc.

Monitor Output - Analogue 10V etc.

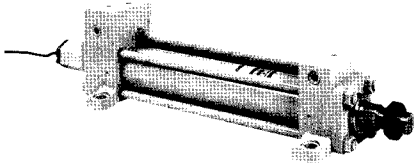
Sequence I/O

Model No. of IH Controller
SK1114-10

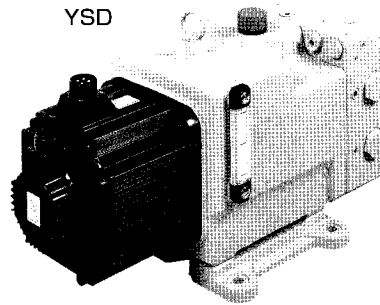
Applicable Driver for AC Servo Motor



Cylinder with Stroke Sensor



YSD

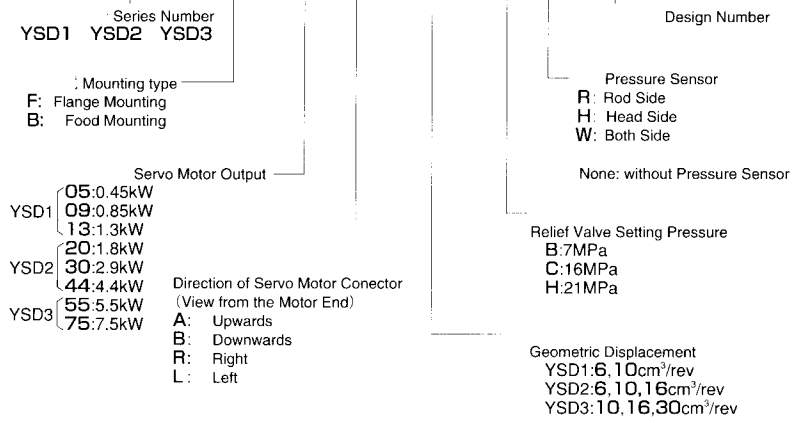


Request us for your custom-made

Model Number Designation

IH Servo Drive Pack-Model Number

YSD1 - F - 09 A - 10 - B R - 10



AC Servo Drivers are applicable to each Servo Motor size.
For a connecting cable, contact us.

Applications

Applicable Fields

Press Machine, Steel & Iron, Metal Processing, and any other Manufacturers