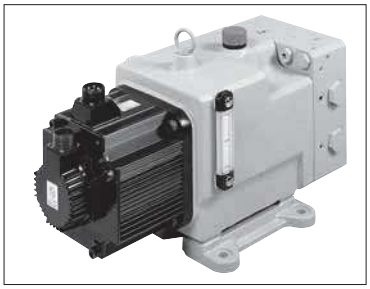
AC Servo Motor Driven Hydraulic Pump Control System

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 combination can control the number of revolutions of the servo motor and adjust the discharge and 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.

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.

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.

Specifications

Model Numbers	Geometric Displacement of Pump cm³/rev (cu. in./rev)	Maximum Shaft Speed r/min	Thrust Output and Cylinder bore	Reservoir Capacity cm³ (cu. in.)	Oil Level Variations cm³ (cu. in.)
YSD1–✻–09 YSD1–✻–13	6 (.366) 10 (.610)	2000 Note) It may vary according to AC servo motor output and operating pressure.	20 – 30 kN (45 – 67.4 lbs.) Cyl. Bore 63 mm (2.48 in.)	2500 (152.6)	1500 (91.5)
YSD2–✻–18 YSD2–✻–29 YSD2–✻–44	6 (.366) 10 (.610) 16 (.976)		50 – 60 kN (112 – 135 lbs.) Cyl. Bore 80 mm (3.15 in.)	4200 (256.3)	2500 (152.6)
YSD3–✻–55 YSD3–✻–75	10 (.610) 16 (.976) 30 (1.831)		100 kN (225 lbs.) Cyl. Bore 100 mm (3.94 in.)	5800 (353.9)	3500 (213.6)

AC Servo Motor Output and Operating Pressure (for reference)

Continuous Operating Short Time Operating

Model Numbers	AC Servo Motor		Geometric Displacement cm³/rev (cu. in./rev)	Max. Operating Pres. MPa (PSI)					
	Output kW (HP)	Rated Torque Nm (in. lbs.)		3.5 (510)	7.0 (1020)	10.5 (1525)	14.0 (2030)	17.5 (2540)	21.0 (3.50)
YSD1–✻–09	0.85 (1.14)	5.39 (44.7)	6 (.366)						
			10 (.610)						
YSD1–✻–13	1.3 (1.74)	8.34 (73.8)	6 (.366)						
			10 (.610)						
YSD2–✻–18	1.8 (2.4)	11.5 (101.8)	6 (.366)						
			10 (.610)						
			16 (.976)						
YSD2–✻–29	2.9 (3.9)	18.6 (165)	10 (.610)						
			16 (.976)						
YSD2–✻–44	4.4 (5.9)	28.4 (251)	10 (.610)						
			16 (.976)						
YSD3–✻–55	5.5 (7.4)	35 (310)	16 (.976)						
			30 (1.831)						
YSD3–✻–75	7.5 (10.1)	48 (425)	16 (.976)						
			30 (1.831)						

Note: The above table is guidance for model selection. It is required to take operating condition of hydraulic power unit such as cycle time in consideration when selecting the AC servo motor. Please contact us for more details.

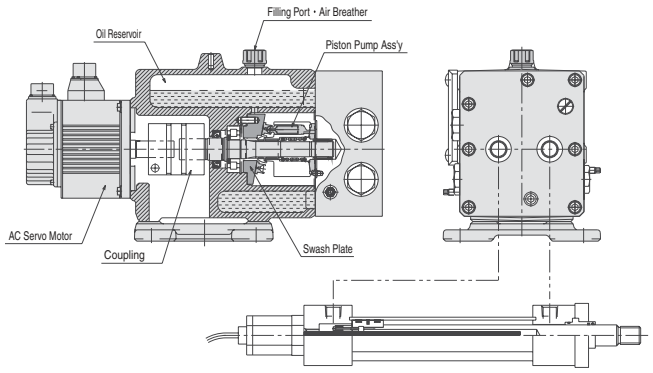
Model Number Designation

YSD3	- F	- 55	A	55	- 16	- H	R	- B	A	B	R	- 20	✻
Series No.	Mtg. Type	Servo Motor Output	Direction of Servo Motor Connection	Servo Pack	Geometric Displacement of Pump cm³/rev (cu. in./rev)	Relief Valve Setting Pres. MPa (PSI)	Location of Pressure Sensor	Location of Counter-balance Valve	Setting Pres. of Head Side Counter-balance Valve MPa (PSI)	Setting Pres. of Rod Side Counter-balance Valve MPa (PSI)	Location of Shut-off Valve	Design Number	Design Std.
YSD1	**F:** Flange Mtg. **B:** Foot Mtg.	**N1:** Without Servo Motor (for 0.85 kW) **N2:** Without Servo Motor (for 1.3 kW) **09:** 0.85 kW (1.14 HP) **13:** 1.3 kW (1.74 HP)	(Viewed from the Motor End) **A:** Upwards **B:** Downwards **R:** Right **L:** Left **None:** Without Servo Motor	**N:** Without Servo Pack **09:** 0.85 kW (1.14 HP) **13:** 1.3 kW (1.74 HP)	**6:** 6 (.366) **10:** 10 (.610)	**B:** 9.5 (1380) **C:** 18.5 (2680)	**H:** Head Side **R:** Rod Side **B:** Both Sides **None:** Without pressure Sensor	—	—	—	—	**10**	Refer to ★
YSD2		**N:** Without Servo Motor **18:** 1.8 kW (2.4 HP) **29:** 2.9 kW (3.9 HP) **44:** 4.4 kW (5.9 HP)		**N:** Without Servo Pack **18:** 1.8 kW (2.4 HP) **29:** 2.9 kW (3.9 HP) **44:** 4.4 kW (5.9 HP)	**6:** 6 (.366) **10:** 10 (.610) **16:** 16 (.976)	**B:** 9.5 (1380) **C:** 18.5 (2680) **H:** 23.5 (3410)		**H:** Head Side **R:** Rod Side **B:** Both Sides **None:** Without Counter-balance Valve	**B:** * - 7 (* - 1020) **None:** Without Head Side Counter-balance Valve **N:** * - 1.8 (* - 260) **A:** 1.8 - 3.5 (260 - 510) **B:** 3.5 - 7 (510 - 1020) **None:** Without Head Side Counter-balance Valve	**B:** * - 7 (* - 1020) **None:** Without Rod Side Counter-balance Valve **N:** * - 1.8 (* - 260) **A:** 1.8 - 3.5 (260 - 510) **B:** 3.5 - 7 (510 - 1020) **None:** Without Rod Side Counter-balance Valve	**H:** Head Side **R:** Rod Side **B:** Both Sides **None:** Without Shut-off Valve	**20**	
YSD3		**N:** Without Servo Motor **55:** 5.5 kW (7.4 HP) **75:** 7.5 kW (10.1 HP)		**N:** Without Servo Pack **55:** 5.5 kW (7.4 HP) **75:** 7.5 kW (10.1 HP)	**10:** 10 (.610) **16:** 16 (.976) **30:** 30 (1.831)							**20**	

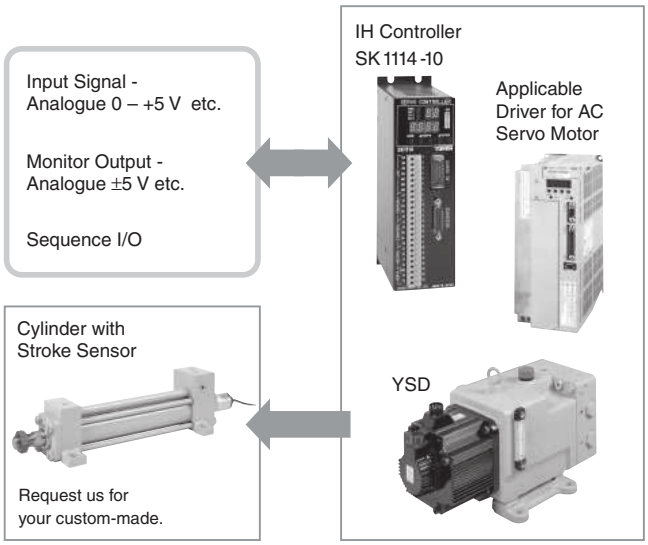
★. Design Standards: None ..... Japanese Standard "JIS"
80 ..... European Design Standard
950 ..... N. American Design Standard

Structure

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 self priming valve, 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.



System Configuration



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