



# UNIDADES DE POTENCIA HIDRÁULICA

PAQUETE DE SERVIÇO  
ACCIONAMIENTO HIDRÁULICO  
INTELIGENTE



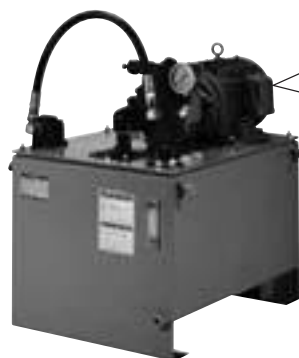
油研工業株式会社



## ■ Energy-Saving Hydraulic Units and Controllers

**Substantial energy saving of hydraulic units has been achieved by the inverter drive.**

Hydraulic units equipped with variable displacement pumps feature greater energy-saving than those with fixed displacement pumps. Yuken's energy-saving hydraulic units and controllers utilize rotational frequency control with an inverter. This innovative configuration solves the problem of efficiency losses suffered by induction motors operating at light loads and ensures significant energy savings.



### Efficiency Characteristics of Induction Motor

- At Rated Output: Maximum Efficiency
- At Light-load: Significant Efficiency loss

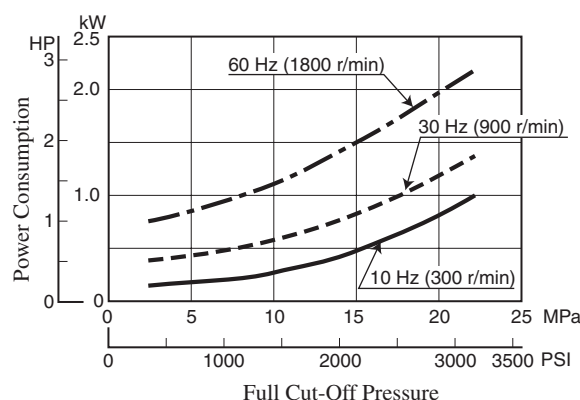
### Rotational frequency control is effective for reducing power loss.

Extensive energy saving is possible by detecting a load pressure with the pressure sensor and keeping the motor rotation at the optimum level required for pressure holding. Based on the concept above, the following three different types of inverter-driven system and packages have been developed.

- **Energy-saving control system for hydraulic units (Energy saving controller)**  
For modification of existing hydraulic units to energy-saving type
- **Equipped with the variable displacement vane pump <YM-e Pack>**
- **Equipped with the variable displacement piston pump <YA-e Pack>**

### ● Example of reduction of power consumption with rotational frequency control

Combination of the A37 piston pump and 7.5 kW (10 HP) motor



## Features of YUKEN energy-saving units / controllers

- **Extremely easy operation and maintenance**  
Adjustment and maintenance works are very easy as basically the conventional power unit is used.
- **Significant reduction of power consumption**  
With rotational frequency control, more than 40% of power consumption at pressure holding is possible compared to conventional hydraulic units.
- **Low Noise**  
Especially the noise level at the full-cutoff is reduced.
- **Discharge volume can be set to a certain volume at 50/60 Hz.**  
Regardless the power supply frequency, the rotation speed at the maximum discharge volume can be set by the inverter within the range from 1500 to 1800 r/min.
- **Continuous operation is possible even at breakdown of the pressure sensor or the inverter.**  
Operation at a certain rotation speed is possible even without receiving a signal from the pressure sensor due to breaking of wire or malfunction of the pressure sensor. In case of malfunction of the inverter itself, the same operation mentioned above is possible by reconnecting of the primary power supply to the electric motor.

## 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 cm <sup>3</sup> /rev (cu. in./rev)	Maximum Shaft Speed r/min	Thrust Output and Cylinder bore	Reservoir Capacity cm <sup>3</sup> (cu. in.)	Oil Level Variations cm <sup>3</sup> (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 cm <sup>3</sup> /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.

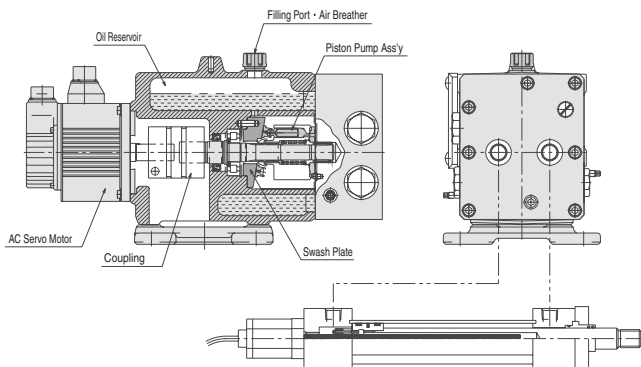
## Model Number Designation

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 cm <sup>3</sup> /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		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)	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	—	—	—	—	10	
YSD2	F: Flange Mtg. B: Foot Mtg.	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)	A: Upwards B: Downwards R: Right L: Left None: Without Servo Motor	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)	R: Rod Side B: Both Sides None: Without pressure sensor	H: Head Side R: Rod Side B: Both Sides None: Without Counter-balance Valve	B: * - 7 (* - 1020) None: Without Head Side Counter-balance Valve 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 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	Refer to ★
YSD3		N: Without Servo Motor 55: 5.5 kW (7.4 HP) 75: 7.5 kW (10.1 HP)	Without Servo Motor	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	

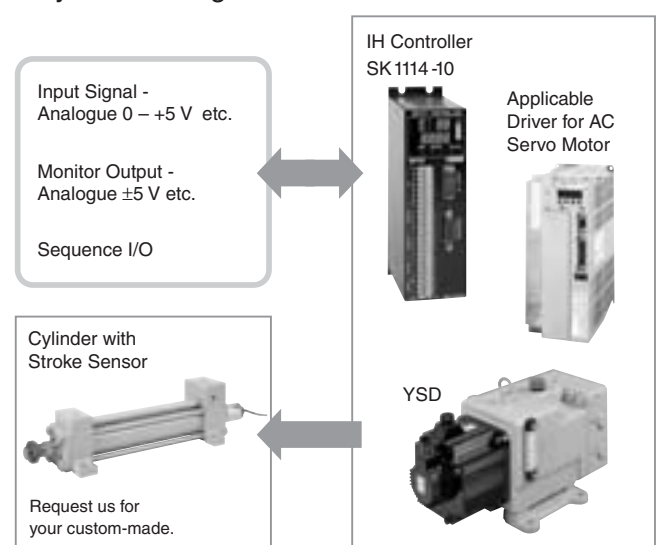
★. Design Standards: None ..... Japanese Standard "JIS"  
80 ..... European Design Standard  
950 ..... N. American Design Standard

## 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.





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