

Piston Pumps

ARL1 Series Variable Displacement Piston Pumps

The ARL1 series piston pumps are compact, low noise, and high efficiency pressure compensator type piston pumps based on the proven technology and reliability of Yuken's "A series/AR series" piston pumps. These pumps cover the small displacement range from 6.2 to 16.3 cm³ /rev.



AR Series Variable Displacement Piston Pumps

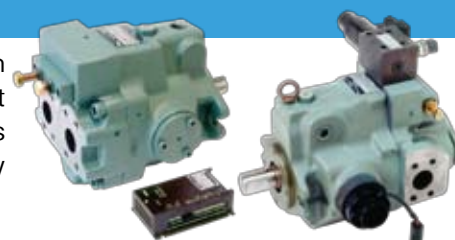
These AR series pumps have been developed on the basis of the same design concept as A series pumps which are renowned for high efficiency and low noise level.

Using an aluminum body, the size of the pump is more compact and the mass is considerably reduced. The noise level has also been reduced.



A Series Variable Displacement Piston Pumps

The A series variable displacement piston pumps are high efficiency swash plate type piston pumps developed using Yuken's unique technology to meet customers' needs for energy efficient and low noise solutions. These pumps support a wide variety of displacement sizes and control types and are widely used in various hydraulic systems.



A3H Series Variable Displacement Piston Pumps

These A3H Series variable displacement piston pump offer high pressure, high efficiency, high speed and low noise features. This pump series has been developed using Yuken's unique design concept and cumulative technologies.

They are suitable for use with construction machinery and various industrial machinery ranging from presses to injection moulding machines.



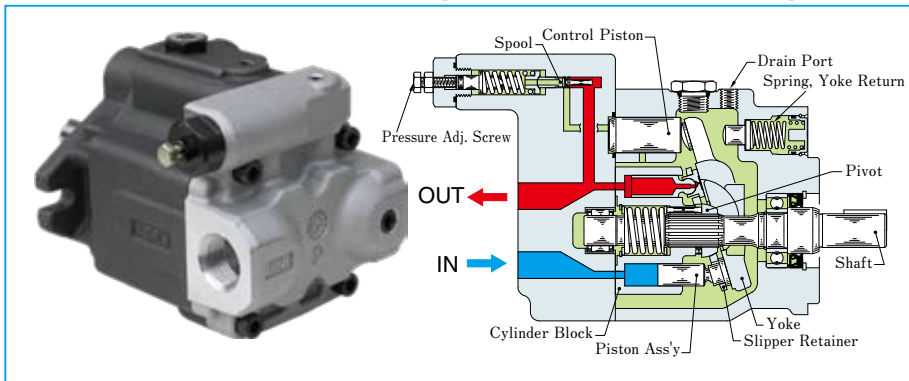
A7H Series Variable Displacement Piston Pumps

The A7H series variable displacement piston pumps offer a displacement of 180,270 cm³/rev with a rated pressure of 35 MPa and a maximum pressure of 40 MPa, supporting high pressure / high flow applications. The non-drive side of these pumps can be connected to an additional pump with SAE connection to provide a combined pump.



Pump Type	Maximum Operating Pressure MPa	Geometric Displacement cm ³ /rev													
		1	2	5	10	20	50	100	200	300					
"ARL1" Series Piston Pumps	7			ARL1-6	ARL1-8	ARL1-12	ARL1-16								
"AR" Series Variable Displacement Piston Pumps	16				AR16	AR22									
"A" Series Variable Displacement Piston Pumps	21		A10		A16										
	16				A22										
	21					A37	A45	A56							
	28						A70		A90	A100	A145				
											A220				
	Double Pumps	28				A16	A22	A37	A56						
Variable / Fixed Double Pumps	28				A16	A22	A37	A56	A70	A90	A145				Inboard Pump (Driven End)
						PV2R1	PV2R2								Inboard Pump (Driven End)
"A3H" Series Variable Displacement Piston Pumps	35				A3H16	A3H37	A3H56	A3H71	A3H100	A3H145	A3H180				
"A7H" Series Variable Displacement Piston Pumps	40										A7H180				A7H265

“ARL1” Series Variable Displacement Piston Pumps



Control Type

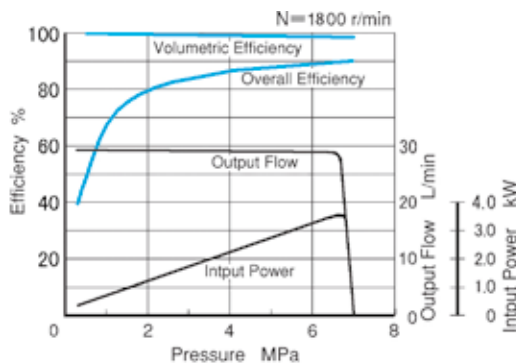
Control Type	Graphic Symbols
“01” Pressure Compensator Type	
	Performance Characteristics

Features

- Compact size

The “ARL1” series variable displacement piston pumps are designed to offer 40% reduction in weight and capacity and significantly smaller in size and lighter in mass compared with the “AR” series piston pumps.

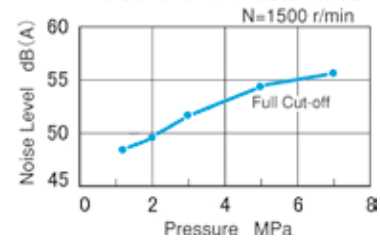
“ARL1-16” type performance characteristics



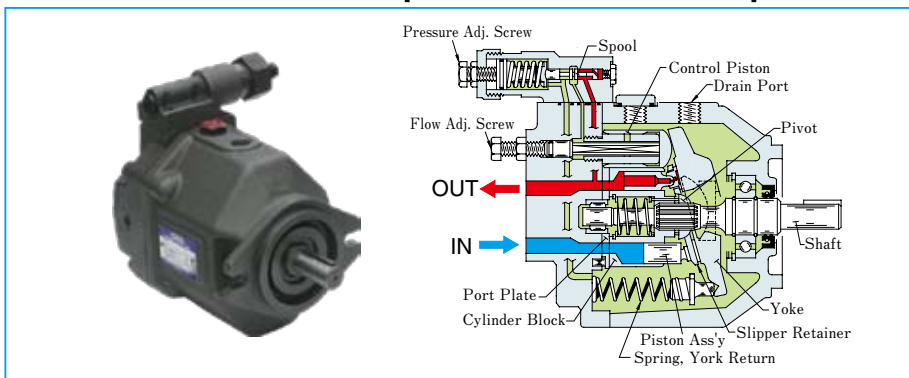
- Low noise level

The noise level of the ARL1 pump is as low as 55dB(A) [at 7MPa full cut-off pressure and 1500r/min] measured one metre horizontally away from the pump head cover.

noise level characteristics



“AR” Series Variable Displacement Piston Pumps



Control Type

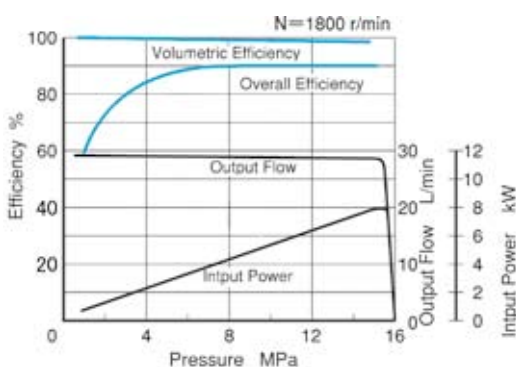
Control Type	Graphic Symbols
“01” Pressure Compensator Type	
	Performance Characteristics

Features

- High efficiency

At 16MPa loaded pressure and 1800 r/min rotating speed, volumetric efficiency is over 98% and overall efficiency is more than 90%.

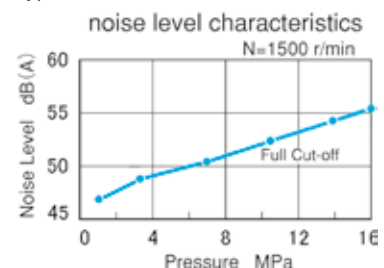
“AR16” type performance characteristics



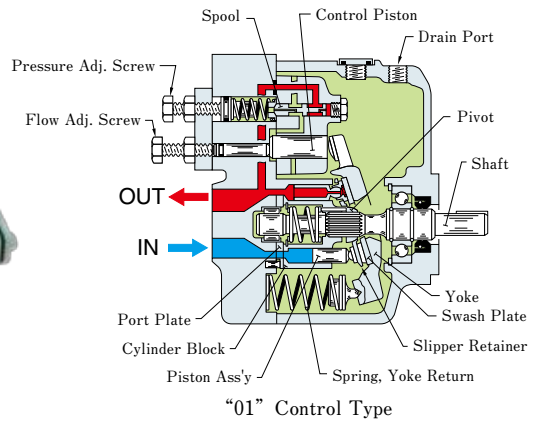
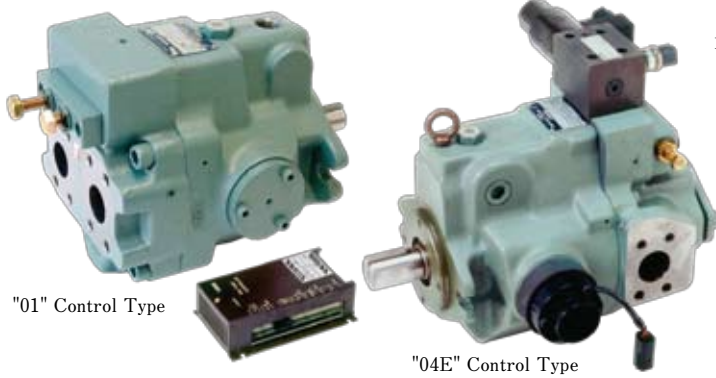
- Low noise level

The noise level of the ARL1 pump is as low as 55dB(A) [at 7MPa full cut-off pressure and 1500r/min] measured one metre horizontally away from the pump head cover.

“AR16” type



"A" Series Variable Displacement Piston Pumps

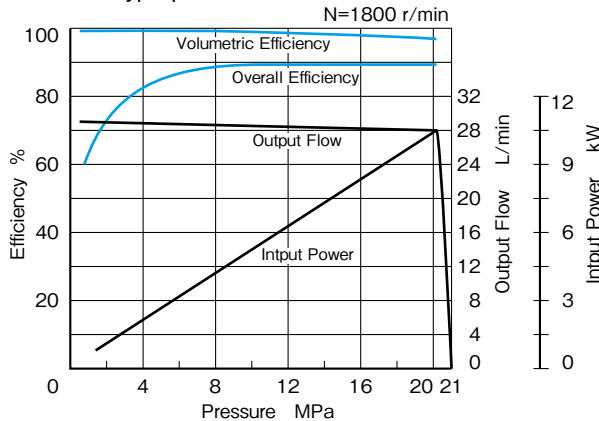


Features

● High efficiency

At 16MPa loaded pressure and 1800 r/min rotating speed, volumetric efficiency is over 98% and overall efficiency is more than 90%.

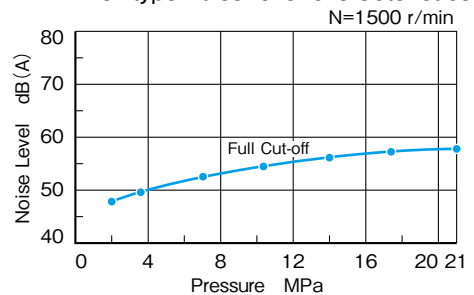
"A16" type performance characteristics



● Low noise level

The noise level of the A16 pump is as low as 57.3dB(A) [at 21MPa full cut-off pressure and 1500r/min] measured one metre horizontally away from the pump head cover.

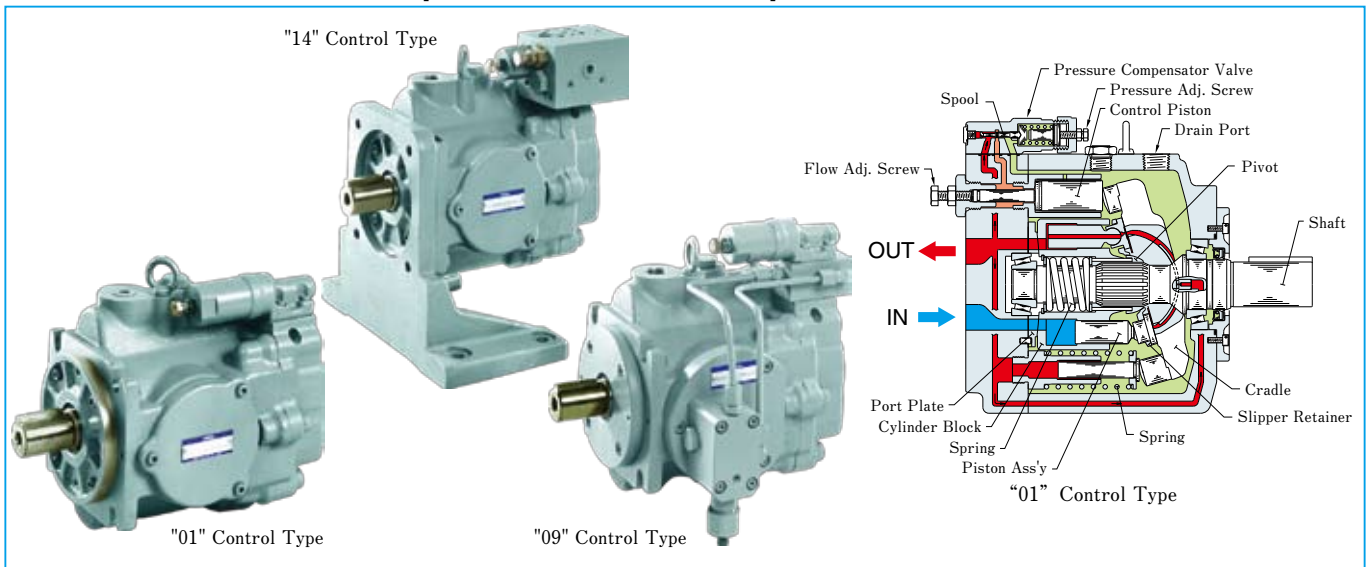
"A16" type noise level characteristics



Control Type

Control Type	Graphic Symbols	Performance Characteristics	Control Type	Graphic Symbols	Performance Characteristics
"01" Pressure Compensator Type			"05" Two-Pressure Two-Flow Control Type by System Pres.		
"02" Solenoid - two Pressure Control Type			"06" Two-Pressure Two-Flow Control Type with Solenoid Valve		
"03" Pressure Compensator with Unloading Type			"07" Pilot Pressure Control Type Pressure Compensator		
"04" Proportional Electro - Hydraulic Load Sensing Type			"09" Constant Power Control Type		
"04E" Electro - Hydraulic Proportional Pressure & Flow Control Type			Simple Two-Pressure Two-Flow Control Type		
"04EH" Electro - Hydraulic Proportional Pressure & Flow Control Type (OBE Type)					

"A3H" Series Variable Displacement Piston Pumps

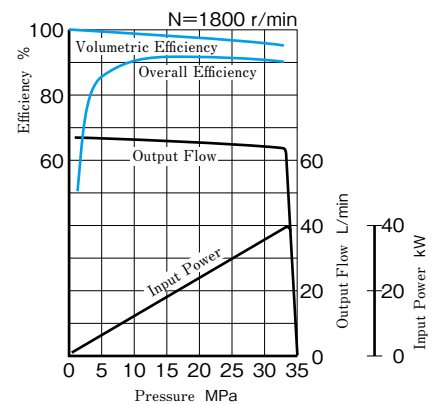


Control Type

Control Type	Graphic Symbols	Performance Characteristics
"01" Pressure Compensator Type		
"09" Constant Power (Torque) Control Type		
"14" Load Sensing Type		
"55" Simple Two-Pressure Two-Flow Control Type		

Features

- High performance at maximum pressure 35MPa
Volumetric efficiency is over 95% and overall efficiency is more than 90% at 1800 r/min.



- Compact size
A3H series are compact in size because output / mass ratio is large.

Specifications

Model Numbers	Geometric Displacement cm ³ / rev	Minimum Adj. Flow cm ³ / rev	Operating Pres. MPa		Shaft Speed Range r/min		Mass kg (01 Control type)	
			Rated	Intermittent	Max.	Min.	Flange Mtg.	Foot Mtg.
A3H16-※R※KK ⁽¹⁾	16.3	8	28	35	3600	600	14.5	23.4
A3H37-※R※KK	37.1	16			2700	600	19.5	27.0
A3H56-※R※KK	56.3	35			2500	600	25.7	33.2
A3H71-※R※KK	70.7	45			2300	600	35.0	42.5
A3H100-※R※KK	100.5	63			2100	600	44.6	72.6
A3H145-※R※KK	145.2	95			1800	600	60.0	88.0
A3H180-※R※KK	180.7	125			1800	600	70.4	98.4

(1) The "A3H16" model does not support the "09" control type.

A through drive type to which a driven pump can be connected is also available. Contact us for details.

"A7H" Series Variable Displacement Piston Pumps

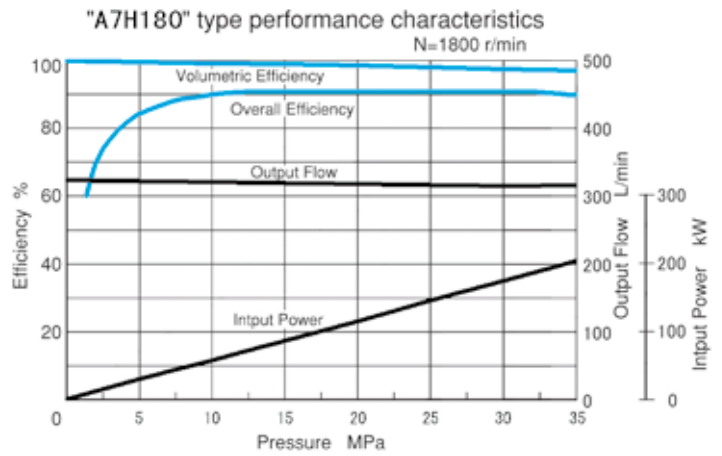


■ Features

- **High Pressure–Large Volume Displacement**
Adding to current A3H series, 180 + 270 cm³/rev displacement with rated pres. 35 MPa, Max. pres. 40 MPa pumps are now available.
- **Optional Through Drive**
Optional through drive allow an auxiliary or outboard pump (SAE Standard) to be directly mounted.
- **Fire-Resistant Fluids**
Water-Glycols and Polyol Ester Type are applicable under certain condition.
- **High performance at maximum pressure 40 MPa**
Volumetric efficiency is over 95% and overall efficiency more than 90% at 1800 r/min.

■ Control Type

Control Type	Graphic Symbols	Performance Characteristics
"01" Pressure Compensator Type		
"09" Constant Power Control Type		
"09R" Constant Power Control Type with External Pilot		



■ Specifications

Series Numbers	Geometric Displacement cm ³ /rev	Operating Pressure MPa		Shaft Speed Range r/min		Temperature Range °C	Viscosity Range mm ² /s	Approx Mass kg	
		Rated	Intermittent	Rated	Max.			Flange Mtg.	Foot Mtg.
A7H180	180	35	40	1800	1900	-20 - +80	10-1000	150 "01"	220 "01"
								154 "09"	224 "09"
A7H265	270	35	40	1200	1600			220 "01"	310 "01"
								224 "09"	314 "09"

■ Specifications for Special Fluids

Type of Fluids	Series Number	Operating Pressure MPa		Shaft Speed Range r/min		Temperature Range °C	Viscosity Range mm ² /s
		Rated	Intermittent	Rated	Max.		
Water-Glycols	M-A7H180	21	25	1800	1800	10-50	20-1000
	M-A7H265			1200	1200		
Polyol ester Type	P-A7H180	35	40	1800	1900	10-70	10-1000
	P-A7H265			1200	1600		

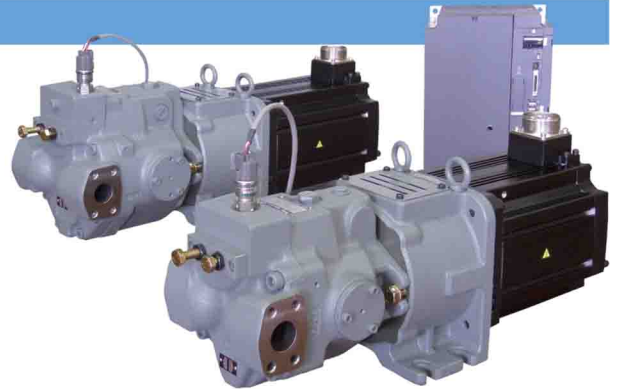
Friendly, Intelligent, Powerful

AC Servo Motor Driven Pumps

Revolution
Control System

ASR Series AC Servo Motor Driven Pumps

The ASR series provides variable flow by driving a piston pump directly with an AC servo motor and controlling the rotational speed in a range from zero to the maximum level. This series allows for precise control of flow / pressure by using a dedicated AMSR controller. It also offers excellent response and repeatability.



ASE Series AC Servo Motor Driven Pumps

The ASE series pumps inherit the basic concept of the shaft speed control from the ASR series pumps and offer high cost performance.

The pumps of this series offer easy shaft speed control for systems that do not require as much precision, response, or repeatability as the ASR series pumps offer.

With the output flow and the discharge pressure controlled by a dedicated AMSE controller, precision, response and repeatability of systems using the ASE series pumps have been improved compared with those using conventional variable displacement piston pumps.

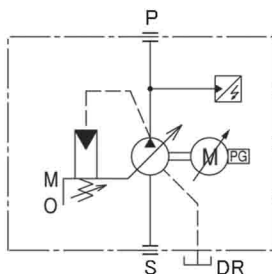


Specifications

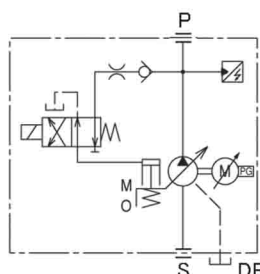
*) depends on pump displacement

Model	ASR1-C	ASR2-C	ASR3-E, G	ASR5-G, J	ASR10-J, M	ASE3	ASE5	ASE10	ASE15W
Max. Flow L/min	39.5	55.5	92.3	129	200	80.8	132.7	205.4	302
Max. Operating Pres. MPa	21	16	21	21	21	17.5	17.5	17.5	17.5 (21*)
Min. Adj. Pres. MPa	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Motor Output kW	4.5	4.5	6 to 8	8 to 11	11 to 15	11	20	35	35
Mass (Pump + Motor) kg	54	54	80 to 89	94 to 177.5	213 to 233	75	123	190	241.5
Input Signal Voltage	0 to + 10V DC (Max.)								
Monitor Output Voltage	0 to + 10V DC								
Sequence I/O	Photo Coupler Input 8ch/Open Collector Output 6ch					Photo Coupler Input 8ch/Open Collector Output 5ch			
Power Supply	3-Phase AC 200 to 230 V/3-Phase AC 380 to 480 V, 50/60 Hz						3-Phase AC 380 to 480 V 50/60 Hz		

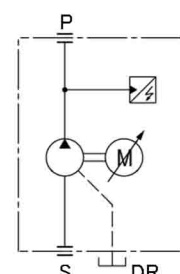
Graphic Symbols



ASR
Single Displacement Type



ASR
Dual Displacement Type



ASE

“ASR” Series AC Servo Motor Driven Pumps

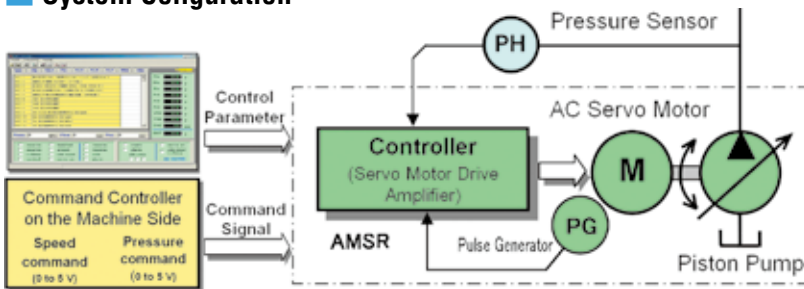


Features

- **High Performance**
Special high power servo motor (SPM) and variable displacement piston pump → Improved ultralow speed molding & continuous pressure holding performance and excellent repeatability.
- **High response**
Ultra precise molding by high response injection with a high-efficiency piston pump.
- **Energy saving**
Powerconsumption less than half that of hydraulic machines and equivalent to that of full electric machines, with reduced standby power consumption
→ Dual displacement models allow more compact system designs.
- **Less wiring**
Wire saving and miswiring prevention through the integration of the controller/driver and the use of special cables.
- **Large flow**

The AMSR controller has a combination function that supports operation with large flow up to 3200 L/min (ASR10 × 16 units).

System Configuration

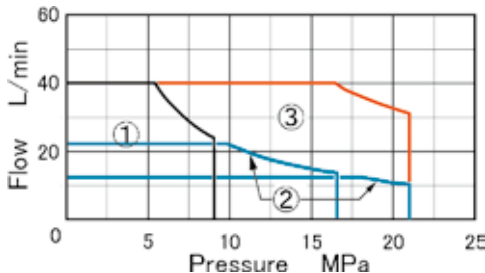


A feedback loop is by the AMSR controller that computes deviations between control signals from the machine side (speed and pressure commands) and sensor signals to drive the AC servo motor accordingly. Control parameters can be set digitally by using dedicated software.

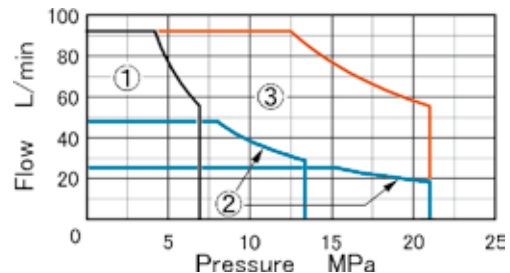
The AC servo motor is selected according to the torque and shaft speed required to drive the hydraulic pump. The selection of an appropriate motor for the load condition is important.

Sample of Pressure–Flow Diagram

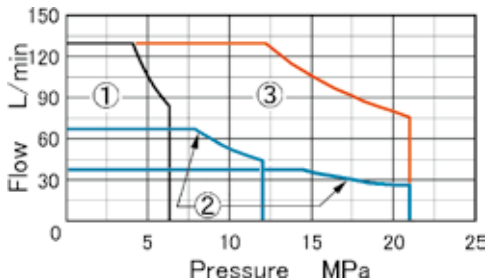
ASR1-C



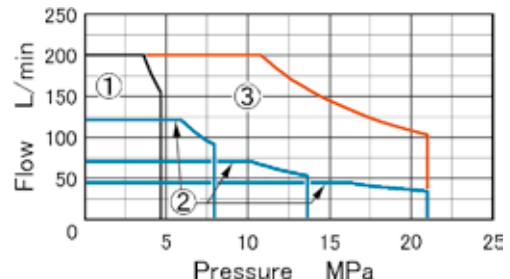
ASR3-G



ASR5-J



ASR10-M

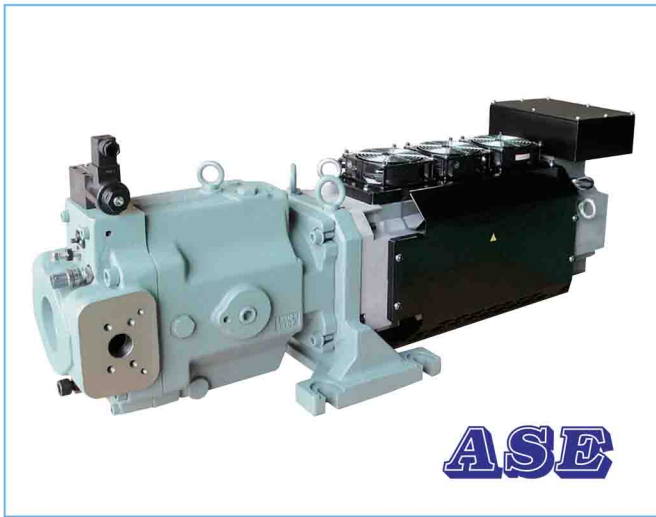


Model Number Designation

ASR3	—4	G	—H	X	S	A100*1	N*1	—A	00	—11
Series Numbers	Power Supply Voltage	Power Capacity	Max. Operating Pres.	Flow Setting	Port Direction	Coil Type for Solenoid Operated Directional Valve	Electrical Conduit Connection for Solenoid Operated Directional Valve	Function Selection	Parameter Number	Design Number
ASR1	None: AC200V 4: AC400V	C	H: 21 MPa	X: Single Displacement Type W: Dual Displacement Type	S: Side None: Axial	AC A100: AC100V A120: AC120V A200: AC200V A240: AC240V DC None: DC24V D12: DC12V D48: DC48V AC (AC → DC) R100: AC100V R200: AC200V	None: Terminal Box N: Plug-in Connector (Optional)	A: Single B: Combination (Single Operation Allowed)	00: Standard	11
ASR2		C	C: 16 MPa							11
ASR3		E, G	H: 21 MPa							11
ASR5		G, J	H: 21 MPa							11
ASR10		J, M	H: 21 MPa							12

*1 Apply to only Flow Setting "W".

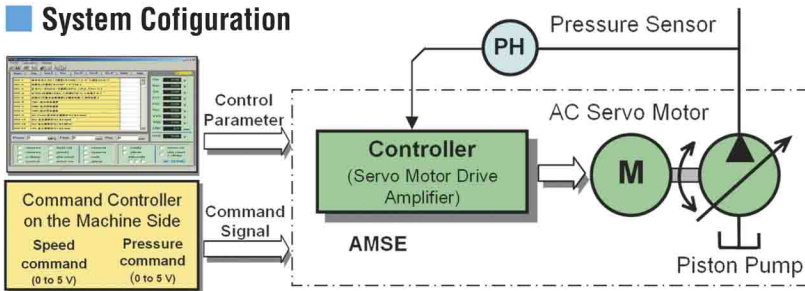
“ASE” Series AC Servo Motor Driven Pumps



Features

- Less wiring/high reliability
Uses sensor-less rotational speed control.
- Space saving/compactness
Integrated motor pump unit.
- Larger motor output
(compared with other products in the same flow capacity range)
Max. motor output is 11 to 35 kW (@ASE15W).
- Easy maintenance
Adopting a cartridge fan and desorption terminals.
- Reduced electrical noise
Using environmentally friendly EMC filter.
- Large flow
Up to 4800 L/min with AMSE combination function and 16 units of ASE15W.

System Configuration

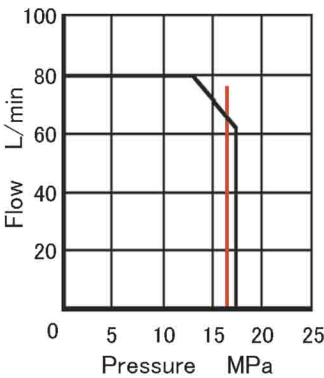


A feedback loop is by the AMSE controller that computes deviations between control signals from the machine side (speed and pressure commands) and sensor signals to drive the AC servo motor accordingly. Control parameters can be set digitally by using dedicated software. The AC servo motor is selected according to the torque and shaft speed required to drive the hydraulic pump. The selection of an appropriate motor for the load condition is important.

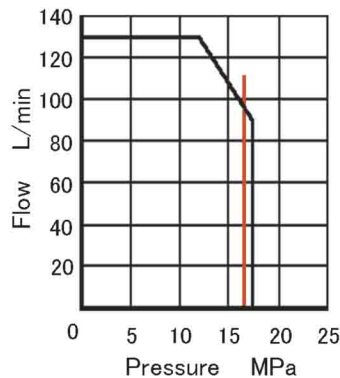
Sample of Pressure-Flow Diagram

- ① Allowable continuous operating pressure: 11 MPa or less
- ② —Max. continuous operating time: 60 s

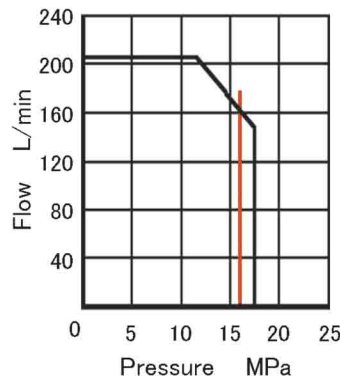
● ASE3-4AA-G80



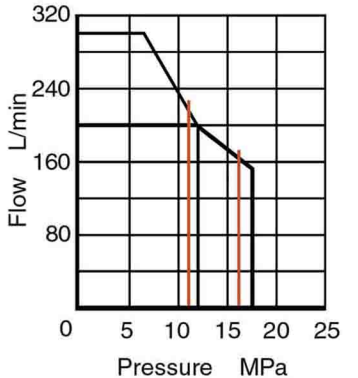
● ASE5-4BZ-G130



● ASE10-4CE-G200



● ASE15W-4CE-G150/100



Model Number Designation

ASE3	-4	AA	-G	80	S	A100*2	N*2	-A	00	31
Series Numbers	Power Supply	Power Capacity	Max. Operating Pres.	Max. Flow	Port Position	Coil Type for Solenoid Operated Directional Valve	Electrical Conduit Connection for Solenoid Operated Directional Valve	Function Selection	Parameter Number	Design Number
ASE3	None: AC200V 4: AC400V	AA	G: 17.5 MPa	80: 80.8 L/min*1	S: Horizontal B: Vertical	AC A100: AC100V A120: AC120V A200: AC200V A240: AC240V DC None: DC24V D12: DC12V D48: DC48V AC (AC → DC) R100: AC100V R200: AC200V	None: Terminal Box N: Plug-in Connector (Optional)	A: Single B: Combination (Single Use Allowed)	00: Standard	31
ASE5		BZ		130: 132.7 L/min*1						31
ASE10	CE	200: 205.4 L/min*1		21						
ASE15W	4: AC400V	CE		W: User Setting 120/90: Large Flow (Sol OFF) 120 cm ³ /rev Small Flow (Sol ON) 90 cm ³ /rev				B: Combination (Single Use Allowed)	10	

*1 In case of Max. Operating Revolution.

*2 Apply to only Series Numbers "ASE15W".