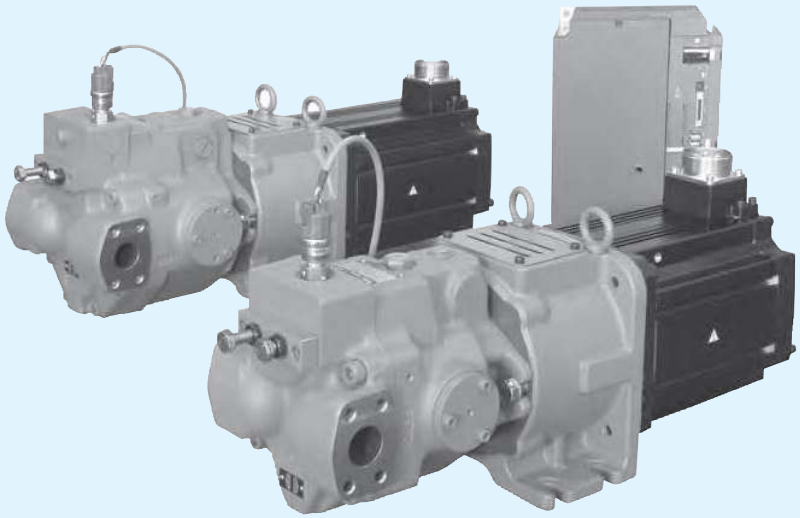
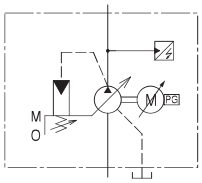
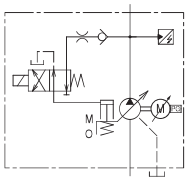
ASR Series
AC Servo Motor Driven Pumps



"ASR" Series AC Servo Motor Driven Pumps

Pump Type	Graphic Symbols	Geometric Displacement cm³/rev (0 2 5 10 20 50 100 150)	Maximum Operating Pressure MPa	Page
ASR Series AC Servo Motor Driven Pumps	 Single Displacement Type	ASR1	21	A-214
		ASR2	16	
	 Dual Displacement Type	ASR3	21	
		ASR5		
		ASR10		

■ AMSR Controller ····· A-226

Hydraulic Fluids

Hydraulic Fluids

Use clean petroleum base oils equivalent to ISO VG32 or 46. The recommended viscosity range is from 20 to 400 mm^2/s and temperature range is from 0 to 60 °C, both of which have to be satisfied for the use of the above hydraulic oils.

Control of Contamination

Due caution must be paid to maintaining control over contamination of the operating oil which can otherwise lead to breakdowns and shorten the life of the unit. Please maintain the degree of contamination within NAS class 9.
The suction port must be equipped with at least 100 μm (150 mesh) reservoir type filter and the return line must have a line type filter of under 10 μm.

Instructions

Transportation

For transportation, use the lifting rings on the pump. Do not use lifting cables at places other than the lifting rings.

Mounting

When installing the pump, the filling port should be positioned upwards.

Suction Pressure

Permissible suction pressure at the inlet port of the pump is between -16.7 and +50 kPa. For piping to the suction port, use pipes of the nominal diameters shown below. Make sure that the height of the pump suction port is lower than the oil level in the reservoir.

Model	Nominal Dia.
ASR1/ASR2	$^3/_4$
ASR3/ASR5	$1\ ^1/_4$
ASR10	2

Hints on Piping

When using steel pipes for the suction or discharge ports, excessive load from the piping to the pump generates excessive noise. Whenever there is fear of excessive load, please use rubber hoses.

Drain Piping

Install drain piping according to the chart and ensure that pressure within the pump housing should be maintained at a nominal pressure of less than 0.1 MPa and surge pressure of less than 0.5 MPa.
The length of piping should be less than 1 m. Instead of joining the drain pipe to other return lines, run it independently. The pipe end should be submerged in oil.

[Recommended Drain Piping Size]

Model	Fitting Size	Inside Dia. of Pipe
ASR1/ASR2	3/8 (Inside Dia. 8.5 mm or more)	10 mm or more
ASR3	1/2 (Inside Dia. 12 mm or more)	12 mm or more
ASR5/ASR10	3/4 (Inside Dia. 16 mm or more)	19 mm or more

Starting

Before first starting, fill the pump case with clean operating oil via the filling port. In order to avoid air blockage when first starting, adjust the control valves so that the discharged oil from the pump is returned directly to the reservoir or the actuator moves in a free load.

[Volume of Pre-fill Oil Required]

Model	Volume cm³
ASR1/ASR2	600
ASR3/ASR5	1200
ASR10	2500

Bleeding Air

It may be necessary to bleed air from the pump case and lines to remove causes of vibration. An air bleed valve (Model Number: ST1004-*-10*, Page A-259) in the outlet line is recommended. For air bleeding with an air bleed valve installed, run the pump at a rotational speed that provides a flow rate equal to/higher than the valve's flow rate to reseating.

Setting Safety Valve (Pressure) and Delivery

At the time of shipment, the unit has been preset to the delivery rate shown below; the safety valve has been set to 21 MPa (19.5 MPa for ASR2). Adjust the preset delivery and safety valve (pressure) to meet your system requirements.

[Default Setting of Delivery]

Model Numbers	Single Displacement Type "X"cm³/rev	Dual Displacement Type "W"cm³/rev	
		Large Displacement	Small Displacement
ASR1	15.8	15.8	8
ASR2	22.2	22.2	8
ASR3	36.9	36.9	10
ASR5	56.2	56.2	14
ASR10	100	100	20

Adjustment of Delivery

Turning the flow adjustment screw for the single displacement type or the large displacement side flow adjustment screw for the dual displacement type clockwise decreases delivery. Turning the small displacement side flow adjustment screw for the dual displacement type clockwise increases delivery.

[Volume adjusted by each full turn of the flow adjustment screw]

Model Numbers	Single Displacement Type "X"cm³/rev	Dual Displacement Type "W"cm³/rev	
		Large Displacement	Small Displacement
ASR1	1.4	1.4	1.5
ASR2	2.0	2.0	2.1
ASR3	2.9	2.9	2.8
ASR5	3.9	3.9	3.7
ASR10	5.4	5.4	7.9

★ For the relationship between the flow adjustment screw position and flow adjustment, see pages A-217 and A-218.

Adjustment of Safety Valve (Pressure)

・Single Displacement Type

Turning the pressure adjustment screw clockwise increases pressure.
See the chart for the pressure change per turn of the adjustment screw. After adjustment, be sure to tighten the lock nut.

Model Numbers	Pressure Change Per Turn MPa	Max. Setting Value MPa	Min. Setting Value MPa
ASR1/ASR3/ASR5-**-HX	4.4	24.8	8
ASR10-**-HX			2
ASR2-*C-CX		19.5	2

★ For the relationship between the pressure adjustment screw position and pressure adjustment, see page A-217.

・Dual Displacement Type

The dual displacement type does not support the full cut-off function. Provide a safety valve on the pump discharge side. Set the safety valve at a value of the maximum operating pressure + 3 to 3.5 MPa.

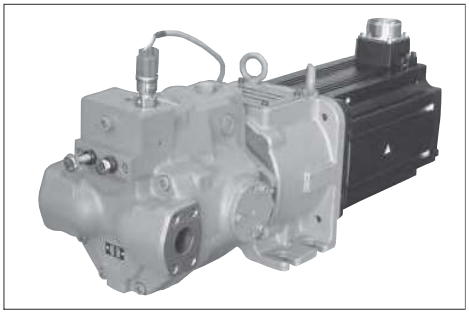
Precautions During Operation

During and for a period after operation, the surface temperature of the AC servo motor and the pump will be hot. Prevent hands and other body parts from coming into contact with them.

Providing flexible flow/pressure control !

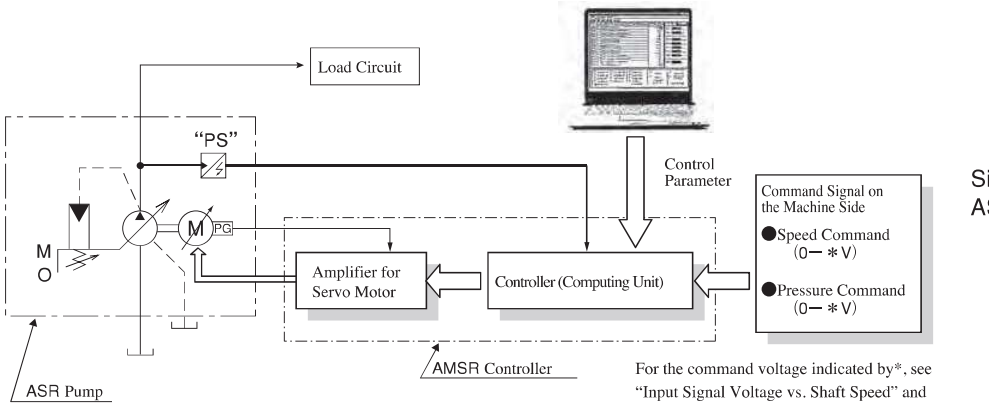
ASR Series AC Servo Motor Driven Pumps

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 precise control of flow/pressure by using a dedicated AMSR controller. It also offers excellent response and repeatability.



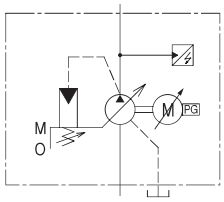
System Configuration

A feedback loop is formed 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.

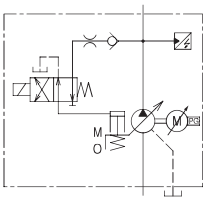


For the command voltage indicated by*, see "Input Signal Voltage vs. Shaft Speed" and "Input Signal Voltage vs. Pressure" on page A-217.

Graphic Symbols



Single Displacement Type
ASR*–**–*X*–

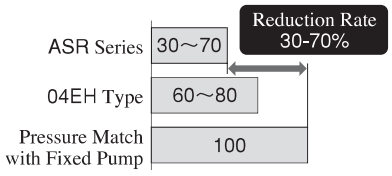


Dual Displacement Type
ASR*–**–*W*–

Energy saving with low heat generation

These pumps run at a rotational speed suitable for mechanical requirements, eliminating unnecessary power loss. They minimize heat generation in the fluid and allow the use of a significantly smaller reservoir.

Example of Power Consumption by Pump Control Type



Low noise

The motor operates at near-zero speed during unloaded operation or pressure control, keeping the noise level extremely low.

High performance

The AC servo motor, which directly controls the pump speed, improves response and stability at low pressures and speeds.

Digital AMSR controller that saves space and wiring

The integration of the amplifier for the servo motor and the controller saves space and wiring. The parameters can be digitally adjusted in an easy and repeatable way.

Dual displacement type for a wider operation range

The dual displacement type has a solenoid operated directional valve to switch between large and small swash plate angles. A single pump unit of the dual displacement type can operate both with low pressure/large flow and with high pressure/small flow. Thus, in comparison to the single displacement type with the same motor capacity, the dual displacement type covers a significantly wider range of operating pressures and flow rates.

Large flow

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

Specifications

Descriptions \ Model Numbers			ASR1-	ASR2-	ASR3-		ASR5-		ASR10-	
Power Capacity			C	C	E	G		J		M
Pump	Flow Control	Max. Flow	39.5 L/min	55.5 L/min	92.3 L/min		129 L/min		200 L/min	
		Min. Adj. Flow	1%							
		Hysteresis	1% or less							
		Repeatability	1% or less							
		Input Signal Voltage	31.6 L/min / 5V	44.4 L/min / 5V	73.8 L/min / 5V		112.4 L/min / 5V		200 L/min / 5V	
		Max. Permissible Input Signal Voltage★	39.5 L/min / 6.25V	55.5 L/min / 6.25V	92.3 L/min / 6.25V		129 L/min / 5.75V			
	Pres. Control	Max. Operating Pres.	21 MPa	16 MPa	21 MPa					
		Min. Adj. Pres.	0.1 MPa							
		Hysteresis	1% or less							
		Repeatability	1% or less							
		Input Signal Voltage	17.5 MPa / 5V	16 MPa / 4.57V	17.5 MPa / 5V					
		Max. Permissible Input Signal Voltage★	21 MPa / 6V		21 MPa / 6V					
AC Servo Motor Specifications	Rated Output		4.5 kW		6 kW	8 kW		11 kW		15 kW
	Insulation Class		Class F							
	Cooling System		Totally-enclosed Self-cooling					Totally-enclosed Fan-cooling		
		Cooling Fan Power Consumption	—					62W (50Hz) / 76W (60Hz)		
	Environmental Condition	Ambient Temperature	0 - +40 °C (No Freezing)							
		Ambient Humidity	80 %RH or less (No Condensation)							
Mass	Single Displacement Type		54 kg	54 kg	80 kg	87 kg	94 kg	175.5 kg	213 kg	233 kg
	Dual Displacement Type		55 kg	55 kg	82 kg	89 kg	96 kg	177.5 kg	214 kg	234 kg
Applicable Controller Model Number			AMSR-＊C-＊00-10		AMSR-2DE-＊00-10	AMSR-＊FGI-＊00-10		AMSR-＊HJL-＊00-10		AMSR-＊KMO-＊00-10

★By adjusting the controller, the maximum flow rate/5 V (39.5 L/min/5 V) and the maximum operating pressure/5 V (21 MPa/5 V) can be set.

Model Number Designation

The model numbers below indicate packages each containing an AC servo motor driven pump, AMSR controller, and Regeneration Resisters.

ASR3	-4	G	-H	X	S	A100	N	-A	00	-12
★1 Series Number	Power Supply Voltage	★2 Power Capacity	Max. Operating Pres.	Flow Setting	Port Direction	★4 ★5 Coil Type for Solenoid Operated Directional Valve	★4 ★5 ★6 Electrical Conduit Connection for Solenoid Operated Directional Valve	Function Selection	Parameter Number	Design Number
ASR1	None : 200 V AC 4 : 400 V AC	C	H : 21 MPa	X : Single Displacement Type W : Dual Displacement Type	S : Side None : Axial A:Horizontal B:Vertical	AC A100 :100 V AC A120 :120 V AC A200 :200 V AC A240 :240 V AC DC None :24 V DC D12 :12 V DC D48 :48 V DC D100 :100 V DC D110 :110 V AC D200 :200 V DC D220 :220 V DC AC (AC <-> DC) R100 :100 V AC R110 :110 V AC R200 :200 V AC R220 :220 V AC	None: Terminal Box N:DIN Plug-in Connector (Optional)	A: Single B: Combination★7 (Single Operation Allowed)	00: Standard	12
ASR2		C	C : 16 MPa							12
ASR3		E★3, G	H : 21 MPa							12
ASR5		G, J								12
ASR10		J, M								12

★1. To order an AC servo motor driven pump separately for spare use, prefix "N-" to the model number and omit the Function Selection and Parameter Number.

Example) N-ASR3-4G-HXSA100N-12

★2. For the relationship between the power capacity and the pressure/flow in terms of specification limits, see charts on pages A-219 and A-220.

★3. When selecting the power capacity "E", only an input voltage of 200 V AC is available.

★4. Types shown in the shaded areas are optional. Check the delivery date before selecting them.

★5. This is applicable only when "W" is selected for flow setting.

★6. The following symbol is added the column of electrical wiring system of solenoid valves. (except for ASR2)

M : Terminal Box Type (without manual actuator)

P : Plug-in Connector Type (without manual actuator)

★7. For combination operation, consult us separately regarding the types of hydraulic circuits, components, and electric cables.

Solenoid Ratings

Please see the solenoid ratings on page A-51.

Pipe Flange Kit

No pipe flange kit is included with the pump. The pipe flange kits below are available if required. For the details of the pipe flange kits, see pages A-258 and A-259.

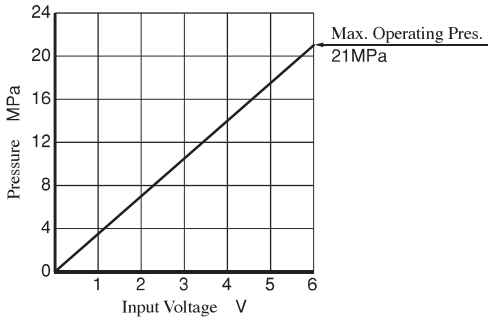
Pump Model Numbers	Name of Port	Pipe Flange Kit Numbers		
		Threaded Connection	Socket Welding★	Butt Welding
ASR1 ASR2	Suction	F5-06-A-10	F5-06-B-10	F5-06-C-10
	Discharge	F5-06-A-10	F5-06-B-10	F5-06-C-10
ASR3 ASR5	Suction	F5-10-A-10	F5-10-B-10	F5-10-C-10
	Discharge	F5-10-A-10	F5-10-B-10	F5-10-C-10
ASR10	Suction	F5-16-A-10	F5-16-B-10	F5-16-C-10
	Discharge	F5-10-A-10	F5-10-B-10	F5-10-C-10

★ For the socket welding type F5-06-B-10 or F5-10-B-10, the operating pressure may be limited due to the flange strength.

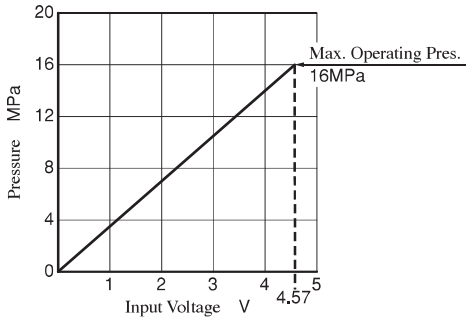
Characteristics of Single Displacement Type

Input Signal Voltage vs. Pressure

● ASR1/ASR3/ASR5/ASR10-＊＊-HX

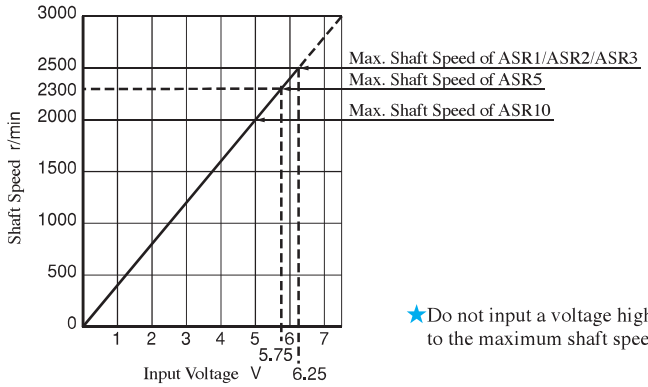


● ASR2-＊C-CX



★Do not input a voltage higher than the level corresponding to the maximum operating pressure.

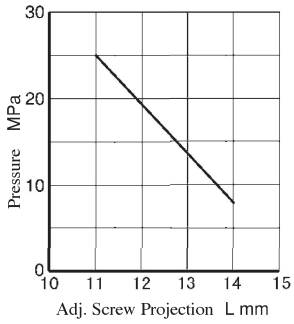
Input Signal Voltage vs. Shaft Speed



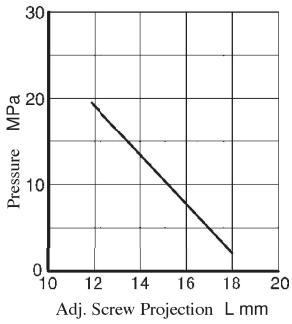
★Do not input a voltage higher than the level corresponding to the maximum shaft speed.

Safety Valve Pressure Adjustment Screw Projection and Safety Valve Setting Pressure

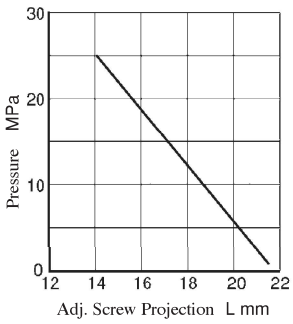
● ASR1/ASR3/ASR5-＊＊-HX

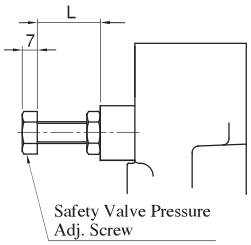


● ASR2-＊C-CX

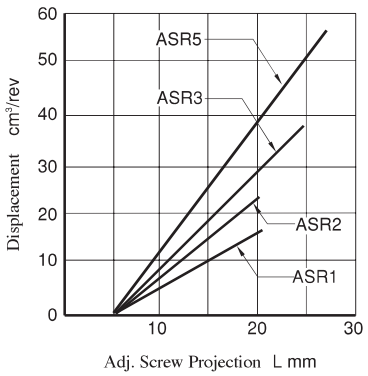


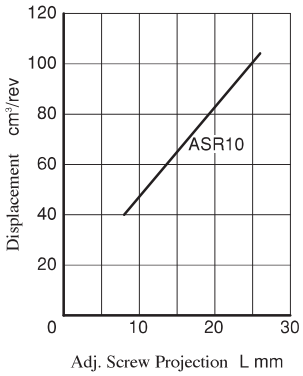
● ASR10-＊＊-HX

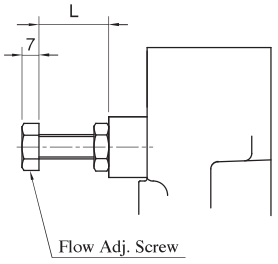




Flow Adjustment Screw Projection and Geometric Displacement







Characteristics of Dual Displacement Type

Input Signal Voltage vs. Pressure

See “Characteristics of Single Displacement Type” (page A-217).

Input Signal Voltage vs. Shaft Speed

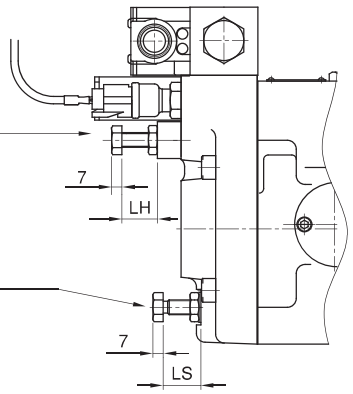
See “Characteristics of Single Displacement Type” (page A-217).

Flow Adjustment Screw Projection and Geometric Displacement

Large Displacement Side Flow Adj. Screw (Check operation with the solenoid operated directional valve “off”.)

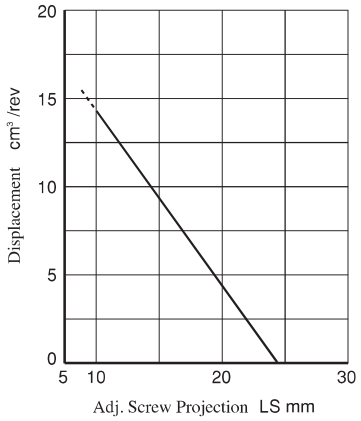
This is the same as the single displacement type. See “Characteristics of Single Displacement Type” (page A-217).
Note that the value cannot be set below the level set by the small displacement side adjustment screw.

Small Displacement Side Flow Adj. Screw
(Check operation with the solenoid operated directional valve “on” and at a load pressure of 3 MPa or more.)

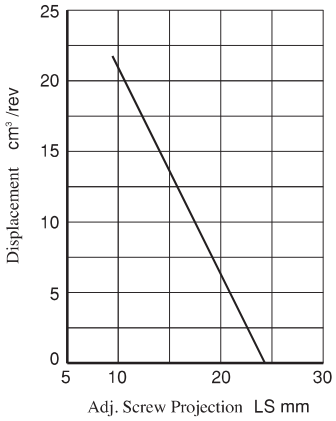


【Small Displacement】

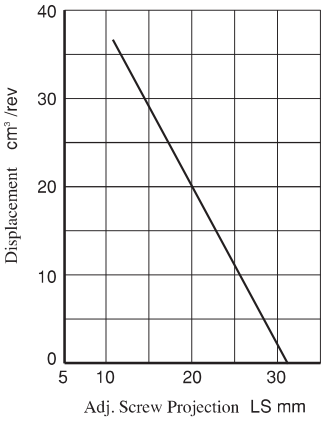
● ASR1-＊C-HW



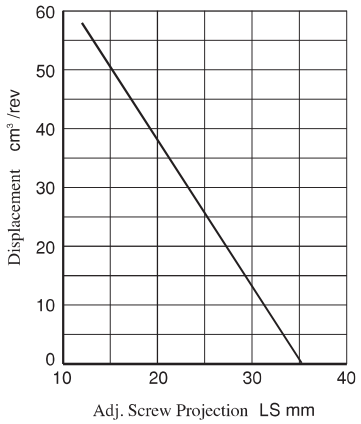
● ASR2-＊C-CW



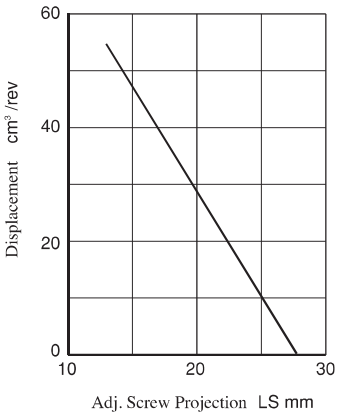
● ASR3-＊＊-HW



● ASR5-＊＊-HW



● ASR10-＊＊-HW

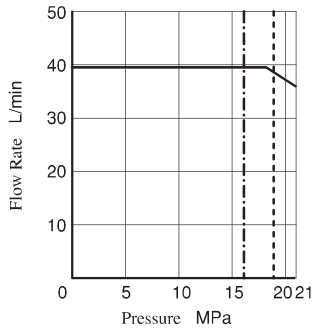


Pressure vs. Discharge Flow (Single Displacement Type "W")(Reference)

-·-·-·-·- Max Continuous Operation Time:100 sec.
---------- Max Continuous Operation Time: 30 sec.

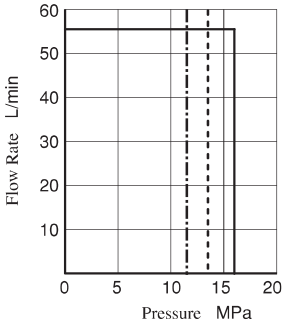
ASR1-＊C-HX＊

Maximum Displacement Range (15.8 cm³/rev)



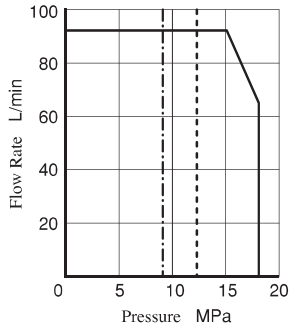
ASR2-＊C-CX＊

Maximum Displacement Range (22.2 cm³/rev)



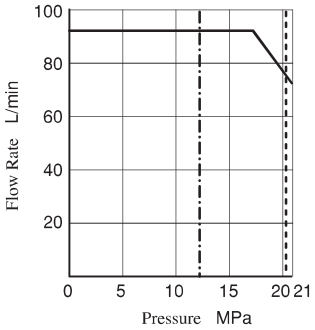
ASR3-E-HX＊

Maximum Displacement Range (36.9 cm³/rev)



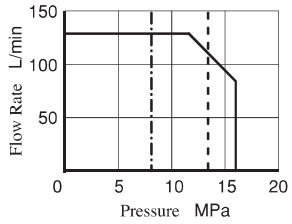
ASR3-＊G-HX＊

Maximum Displacement Range (36.9 cm³/rev)



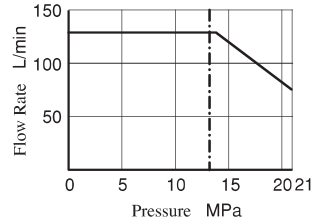
ASR5-＊G-HX＊

Maximum Displacement Range (56.2 cm³/rev)



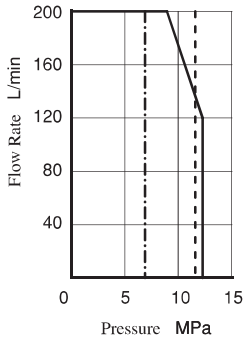
ASR5-＊J-HX＊

Maximum Displacement Range (56.2 cm³/rev)



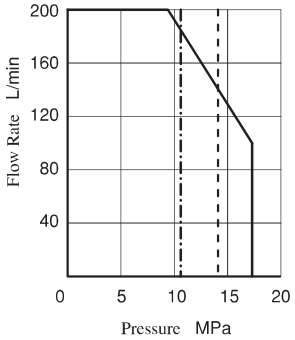
ASR10-＊J-HX＊

Maximum Displacement Range (100.0 cm³/rev)



ASR10-＊M-HX＊

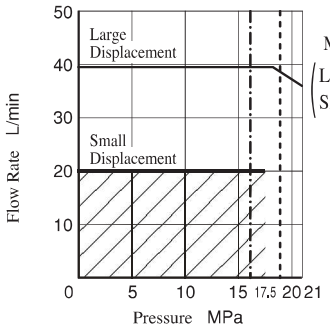
Maximum Displacement Range (100.0 cm³/rev)



Pressure vs. Discharge Flow (Single Displacement Type "W")(Reference)

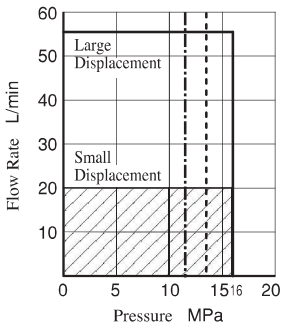
-·-·-·- Large Displacement : Max. Continuous Operation Time : 100 sec.
---------- Large Displacement : Max. Continuous Operation Time : 30 sec.
▨ Small Displacement : Max. Continuous Operation Time

ASR1-＊C-HW＊



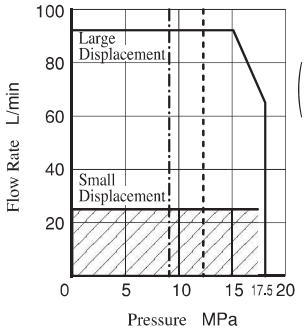
Maximum Displacement Range
Large Displacement:15.8 cm³/rev
Small Displacement:8.0 cm³/rev

ASR2-＊C-CW＊



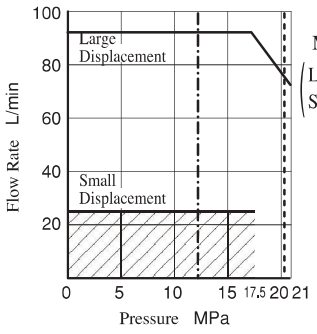
Maximum Displacement Range
Large Displacement:22.2 cm³/rev
Small Displacement:8.0 cm³/rev

ASR3-E-HW＊



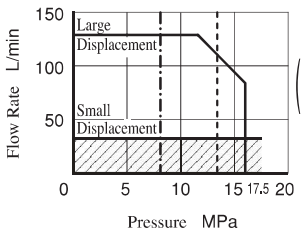
Maximum Displacement Range
Large Displacement:36.9 cm³/rev
Small Displacement:10.0 cm³/rev

ASR3-＊G-HW＊



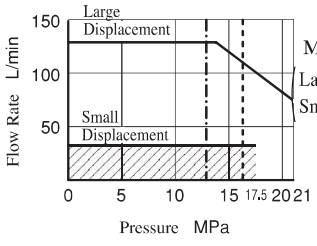
Maximum Displacement Range
Large Displacement:36.9 cm³/rev
Small Displacement:10.0 cm³/rev

ASR5-＊G-HW＊



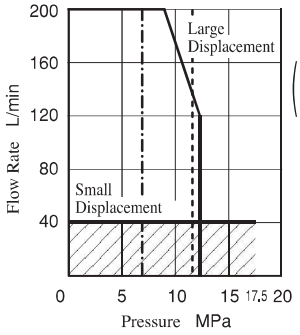
Maximum Displacement Range
Large Displacement:56.2 cm³/rev
Small Displacement:14.0 cm³/rev

ASR5-＊J-HW＊



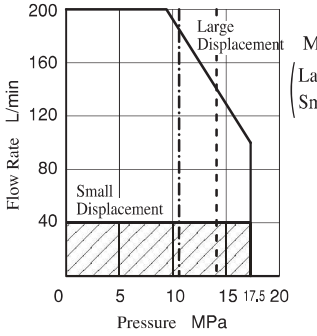
Maximum Displacement Range
Large Displacement:56.2 cm³/rev
Small Displacement:14.0 cm³/rev

ASR10-＊J-HW＊



Maximum Displacement Range
Large Displacement:100 cm³/rev
Small Displacement:20.0 cm³/rev

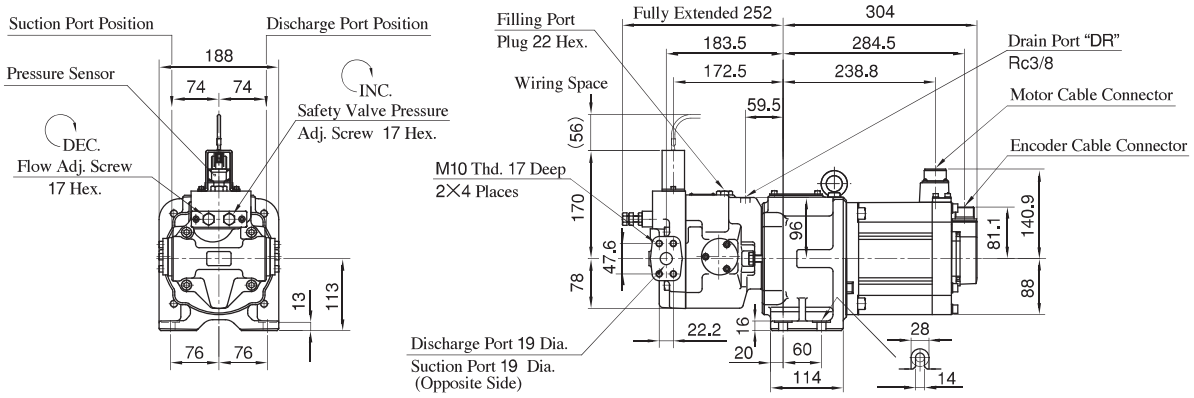
ASR10-＊M-HW＊



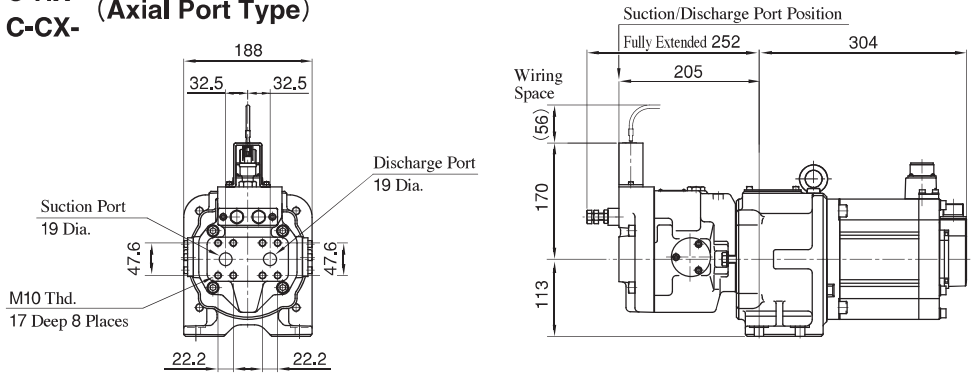
Maximum Displacement Range
Large Displacement:100 cm³/rev
Small Displacement:20.0 cm³/rev

Single Displacement Type

ASR1-＊C-HXS-
ASR2-＊C-CXS- (Side Port Type)



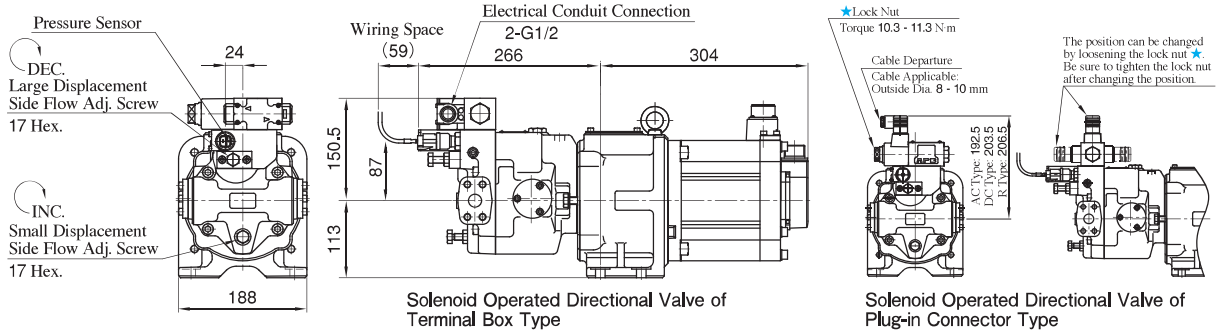
ASR1-＊C-HX-
ASR2-＊C-CX- (Axial Port Type)



● For other dimensions, see the figure for the side port type.

Dual Displacement Type

ASR1-＊C-HWS-
ASR2-＊C-CWS- (Side Port Type)

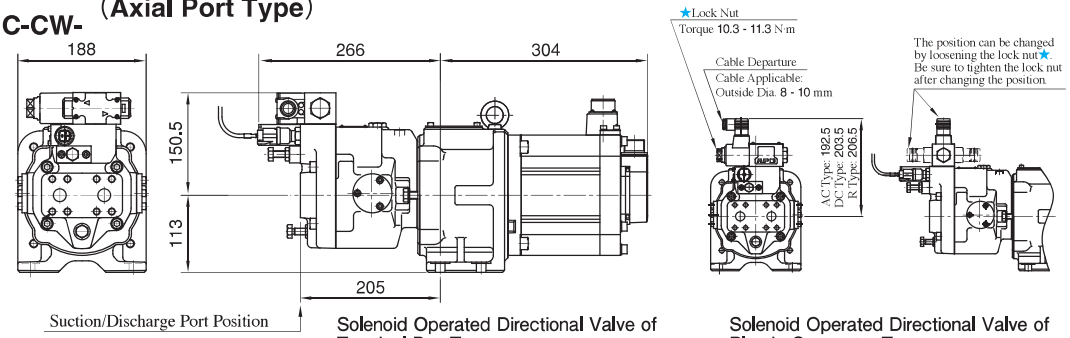


Solenoid Operated Directional Valve of Terminal Box Type

Solenoid Operated Directional Valve of Plug-in Connector Type

● For other dimensions, see the figure for the single displacement type.

ASR1-＊C-HW-
ASR2-＊C-CW- (Axial Port Type)



Solenoid Operated Directional Valve of Terminal Box Type

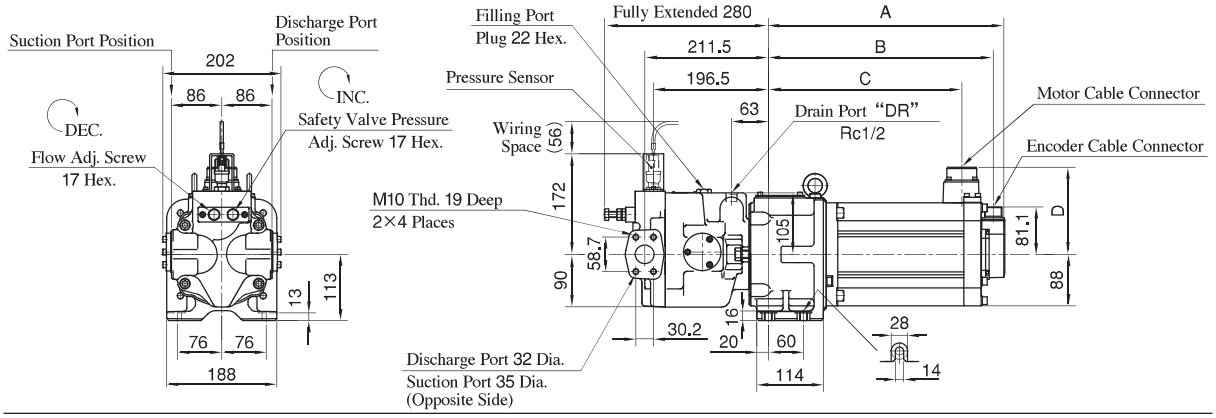
Solenoid Operated Directional Valve of Plug-in Connector Type

● For other dimensions, see the figure for the single displacement type.

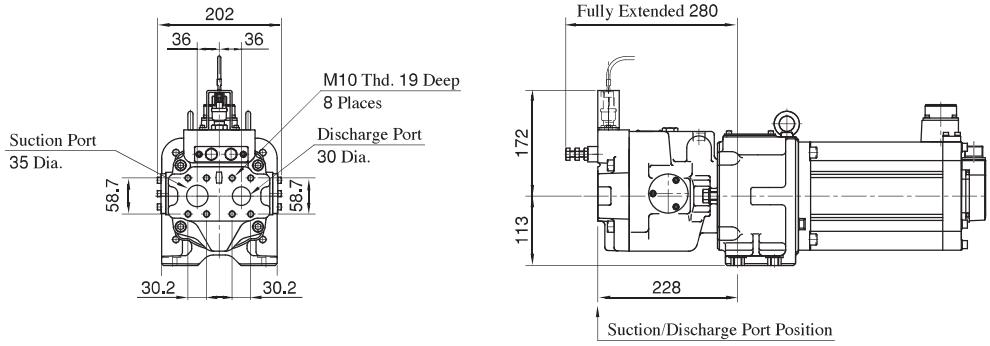
Single Displacement Type

ASR3-＊＊-HXS-（Side Port Type）

Model Numbers	A	B	C	D
ASR3-E-H＊S-	364	344.5	290.8	149.1
ASR3-＊G-H＊S-	404	384.5	330.8	149.1



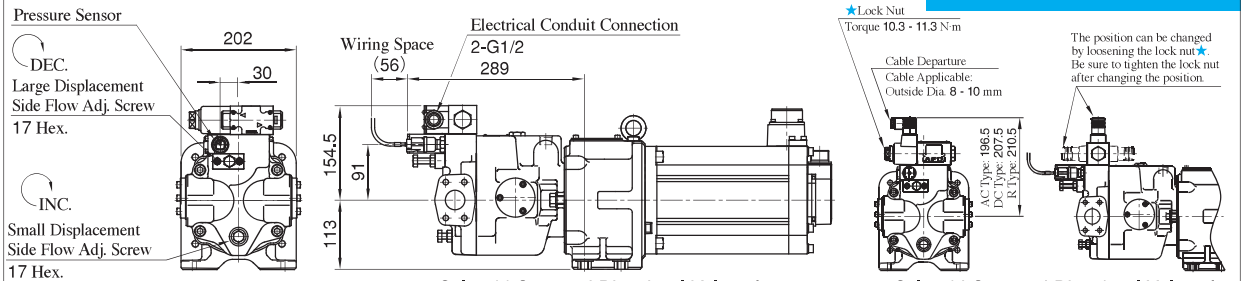
ASR3-＊＊-HX-（Axial Port Type）



● For other dimensions, see the figure for the side port type.

Dual Displacement Type

ASR3-＊＊-HWS-（Side Port Type）

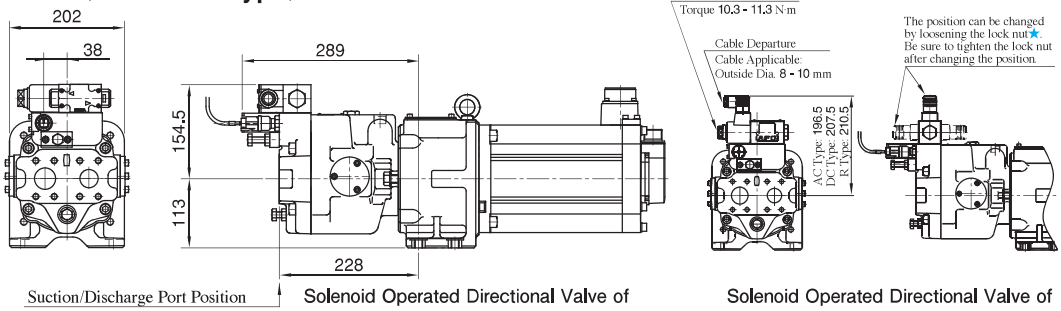


Solenoid Operated Directional Valve of Terminal Box Type

Solenoid Operated Directional Valve of Plug-in Connector Type

● For other dimensions, see the figure for the single displacement type.

ASR3-＊＊-HW-（Axial Port Type）



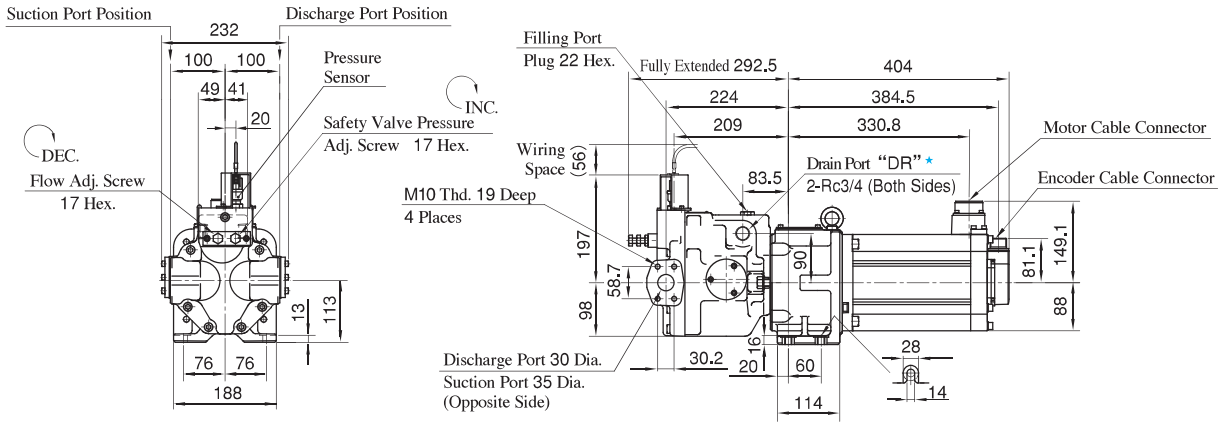
Solenoid Operated Directional Valve of Terminal Box Type

Solenoid Operated Directional Valve of Plug-in Connector Type

● For other dimensions, see the figures for the single displacement type and the dual displacement side port type.

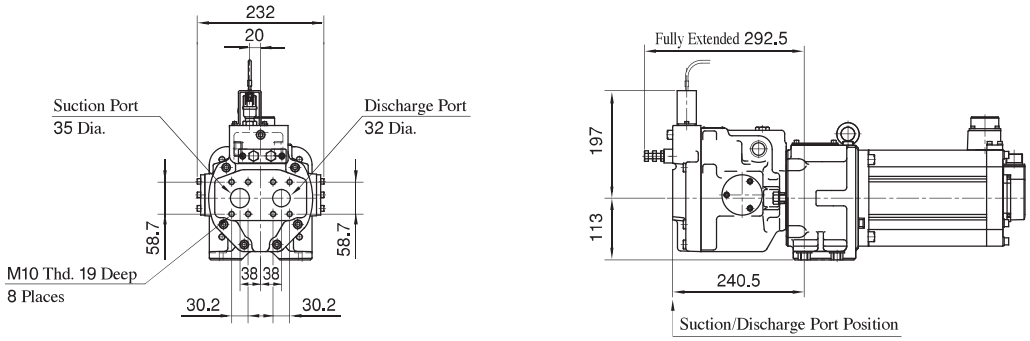
Single Displacement Type

ASR5-＊G-HXS-（Side Port Type）



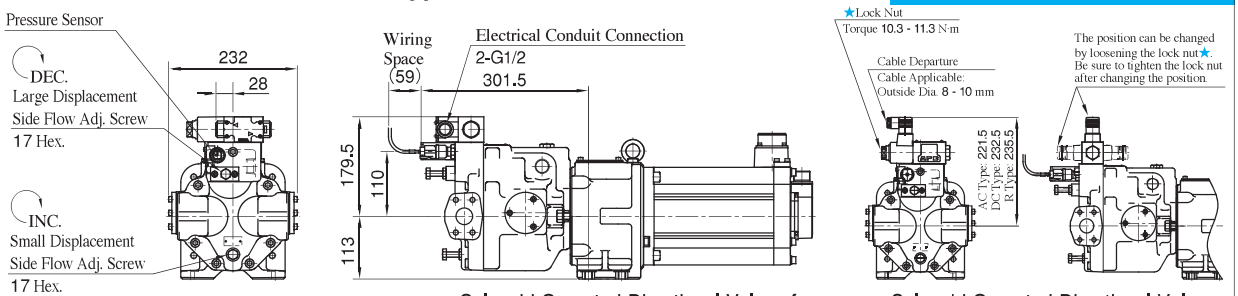
★Use either of two drain ports at your option. Keep the unused port plugged.

ASR5-＊G-HX-（Axial Port Type）



Dual Displacement Type

ASR5-＊G-HWS-（Side Port Type）

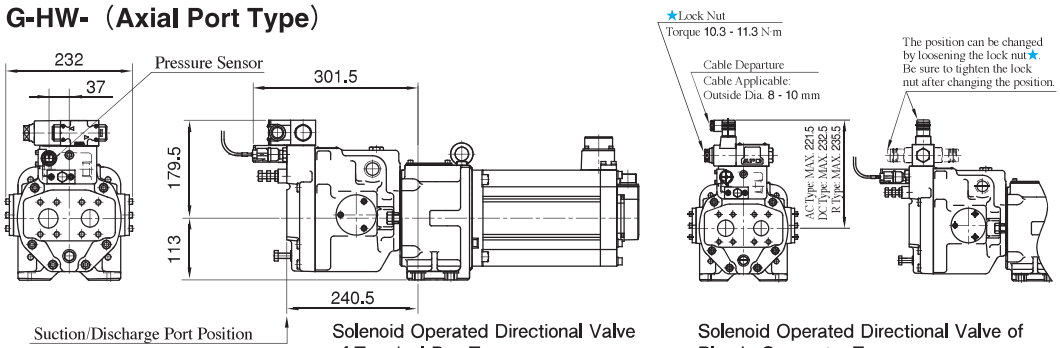


Solenoid Operated Directional Valve of Terminal Box Type

Solenoid Operated Directional Valve of Plug-in Connector Type

● For other dimensions, see the figure for the single displacement type.

ASR5-＊G-HW-（Axial Port Type）



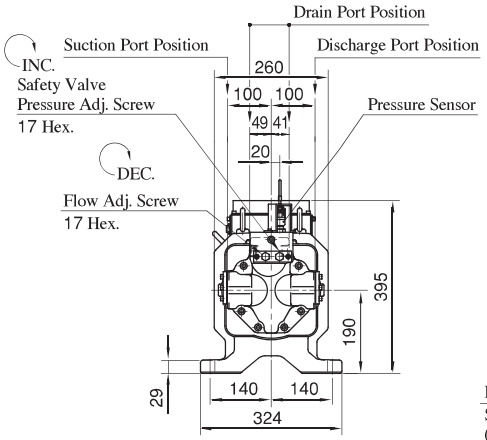
Solenoid Operated Directional Valve of Terminal Box Type

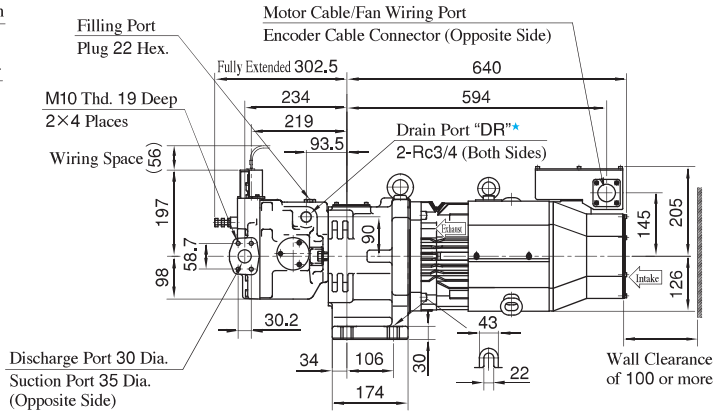
Solenoid Operated Directional Valve of Plug-in Connector Type

● For other dimensions, see the figures for the single displacement type and the dual displacement side port type.

ASR5-＊J-HXS-（Side Port Type）

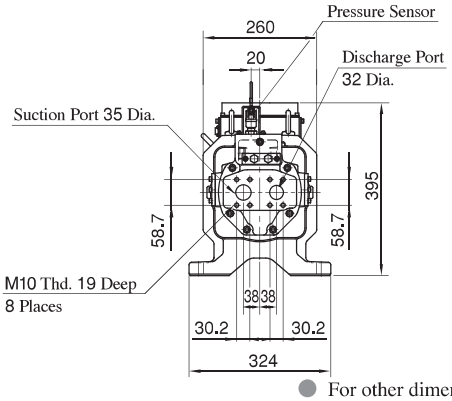
Single Displacement Type

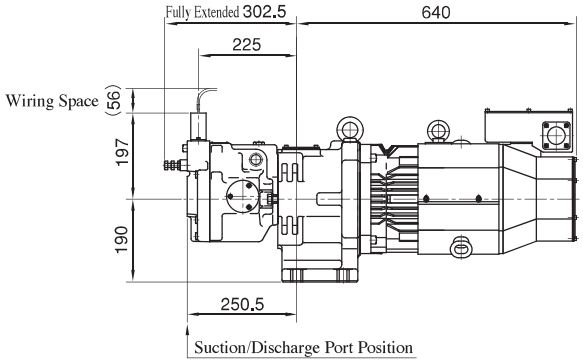




★Use either of two drain ports at your option. Keep the unused port plugged.

ASR5-＊J-HX-（Axial Port Type）

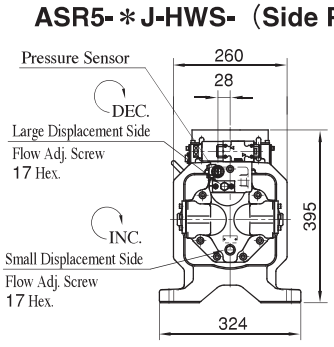


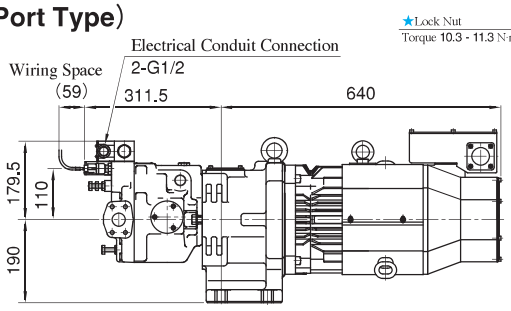


● For other dimensions, see the figure for the side port type.

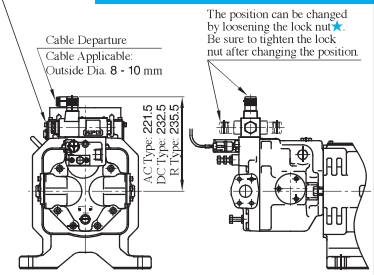
ASR5-＊J-HWS-（Side Port Type）

Dual Displacement Type





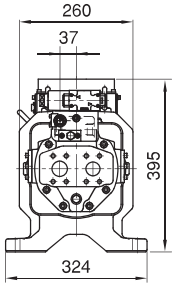
Solenoid Operated Directional Valve of Terminal Box Type

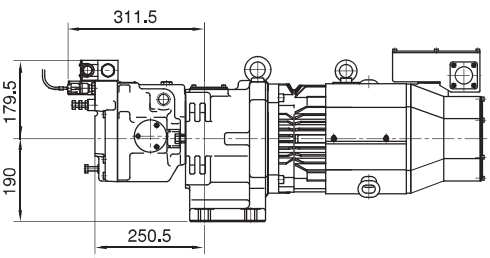


Solenoid Operated Directional Valve of Plug-in Connector Type

● For other dimensions, see the figure for the single displacement type.

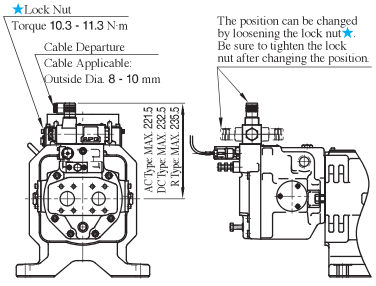
ASR5-＊J-HW-（Axial Port Type）





Suction/Discharge Port Position

Solenoid Operated Directional Valve of Terminal Box Type

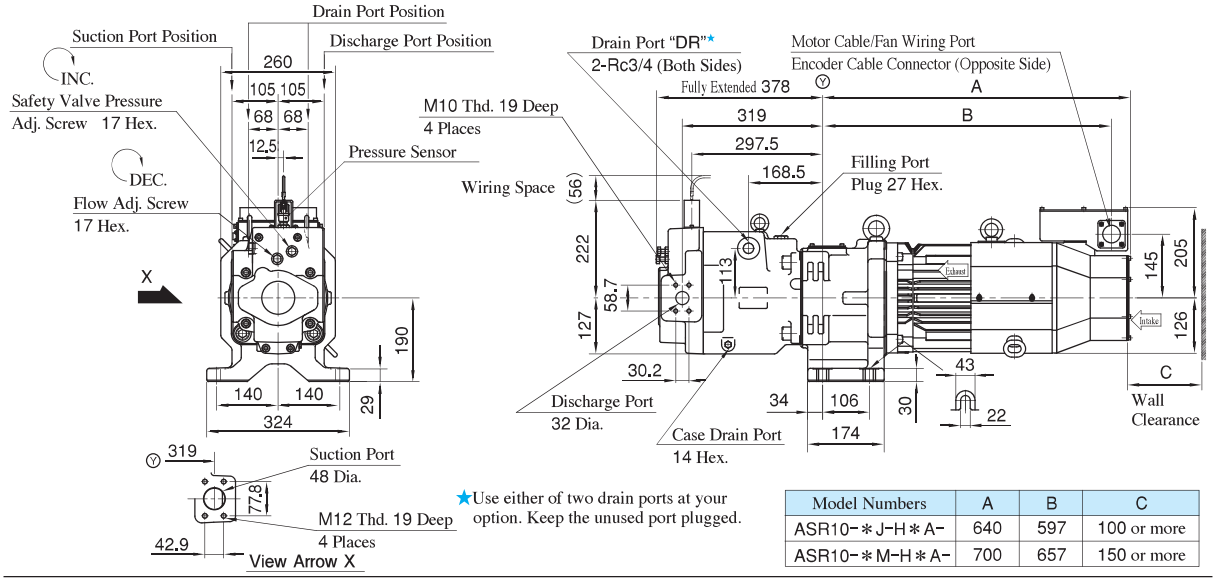


Solenoid Operated Directional Valve of Plug-in Connector Type

● For other dimensions, see the figures for the single displacement type and the dual displacement side port type.

Single Displacement Type

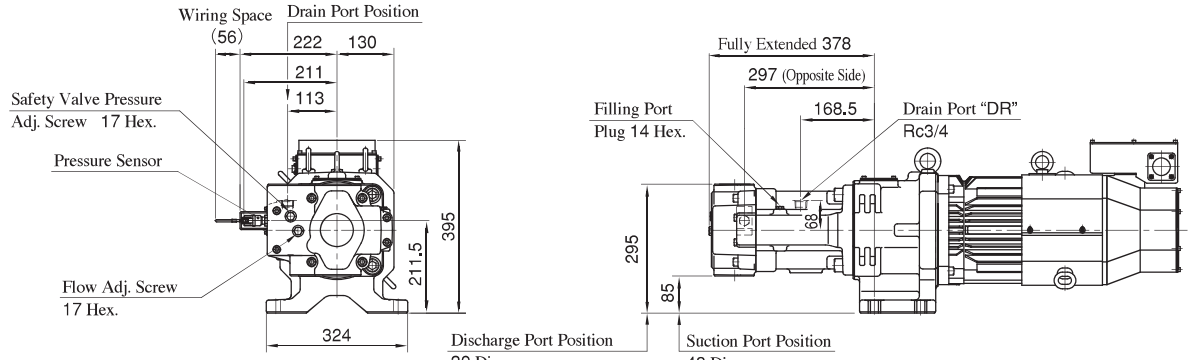
ASR10-＊＊-HXA-（Horizontal Type）



★Use either of two drain ports at your option. Keep the unused port plugged.

Model Numbers	A	B	C
ASR10-＊J-H＊A-	640	597	100 or more
ASR10-＊M-H＊A-	700	657	150 or more

ASR10-＊＊-HXB-（Vertical Type）

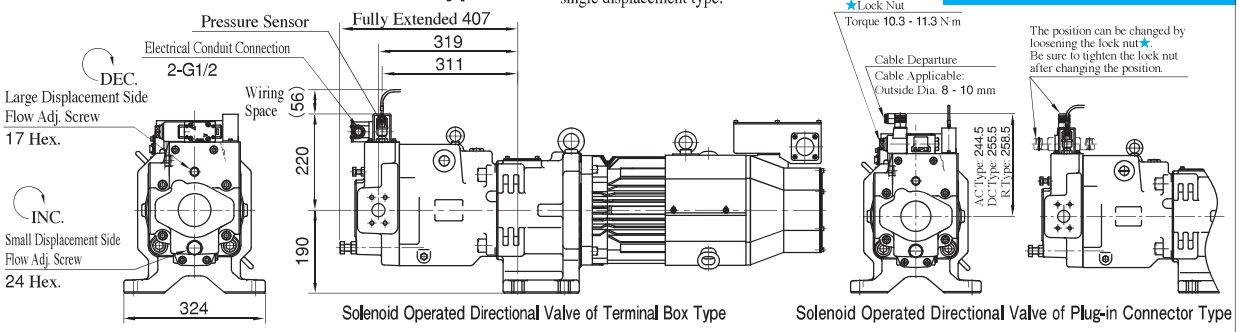


● For other dimensions, see the figure for the horizontal type.

Dual Displacement Type

ASR10-＊＊-HWA-（Horizontal Type）

● For other dimensions, see the figure for the single displacement type.

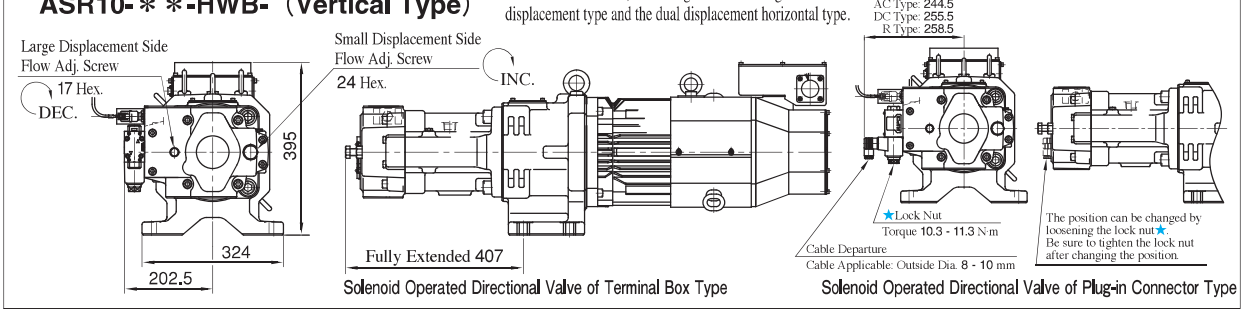


Solenoid Operated Directional Valve of Terminal Box Type

Solenoid Operated Directional Valve of Plug-in Connector Type

ASR10-＊＊-HWB-（Vertical Type）

● For other dimensions, see the figures for the single displacement type and the dual displacement horizontal type.



Solenoid Operated Directional Valve of Terminal Box Type

Solenoid Operated Directional Valve of Plug-in Connector Type

AMSR Controller

The AMSR controller is used to drive ASR series AC servo motor driven pumps. With an optimal design for the ASR pumps, the controller can maximize the pump performance. The AMSR controller is included with the ASR series pumps.



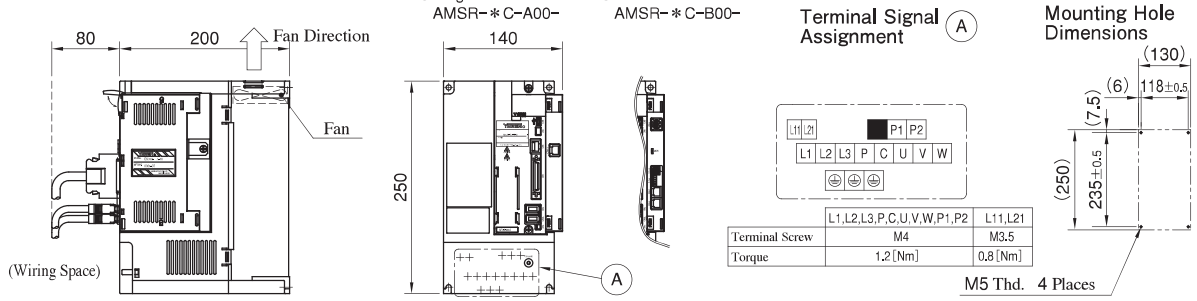
Specifications

Model Numbers			AMSR-＊C-＊00-10	AMSR-2DE-＊00-10	AMSR-＊FGI-＊00-10	AMSR-＊HJL-＊00-10	AMSR-＊KMO-＊00-10
Control Unit Specifications	Command Signal Input Voltage		0 - +10 V DC				
	Command Signal Input Impedance		10 kΩ				
	Monitor Output Voltage		0 - +10 V DC				
	Sequence Input Signal		Photocoupler Input 8ch				
	Sequence Output Signal		Open Collector Output 6ch				
Main Circuit Power	Voltage/Frequency	200 V	200 to 230 V AC, 50/60 Hz, 3-Phase				
		400 V	380 to 480 V AC, 50/60 Hz, 3-Phase				
	Permissible Voltage Fluctuation	200 V	170 to 253 V AC, 3-Phase				
		400 V	323 to 528 V AC, 3-Phase				
	Permissible Frequency Fluctuation		Within ±5%				
	Power Supply Capacity		6.8 kVA	8.6 kVA	12 kVA	16 kVA	22 kVA
Regeneration Resister (Dynamic Brake)			Built-in		External Option		
Cooling System			Fan-cooling, Open (IP 00)				
Environmental Condition	Ambient Temperature		0 - +50 °C (No Freezing)				
	Ambient Humidity		90 %RH or less (No Condensation)				
Protective Functions			・Overcurrent Shutdown ・Servo Motor Overheat Protection ・Undervoltage Protection ・Excess Error Protection		・Regenerative Overvoltage Shutdown ・Encoder Malfunction Protection ・Instantaneous Power Failure Protection		・Overload Shutdown ・Regeneration Malfunction Protection ・Overspeed Protection
Mass kg			4.6	6.2	18		19
Applicable Pump			ASR1-＊C ASR2-＊C	ASR3-E	ASR3-＊G ASR5-＊G	ASR5-＊J ASR10-＊J	ASR10-＊M

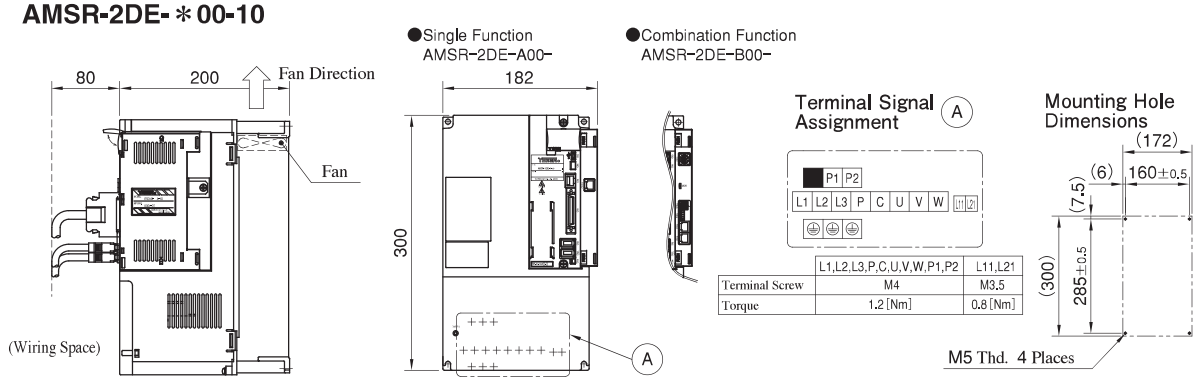
Model Number Designation

AMSR	-2	C	-A	00	-10
Series Numbers	Power Supply Voltage	Amplifier Capacity kW	Function Selection	Parameter Number	Design Number
AMSR： AMSR Controller	2：200 V AC	DE：7.0	A：Single B：Combination (Single Operation Allowed)	00：Standard	10
	2：200 V AC 4：400 V AC	C：5.0 FGI：11.0 HJL：15.0 KMO：22.0			

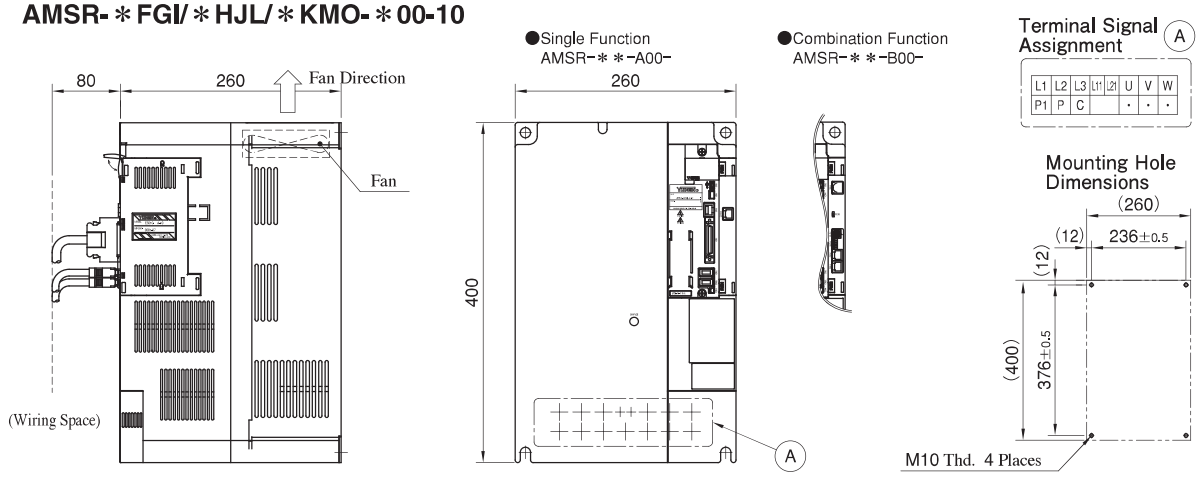
AMSR-＊C-＊00-10



AMSR-2DE-＊00-10



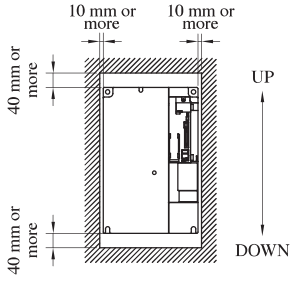
AMSR-＊FGI/＊HJL/＊KMO-＊00-10



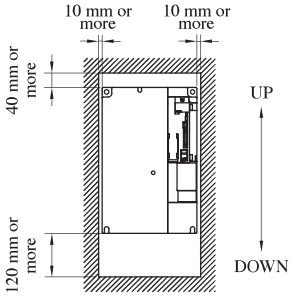
Terminal Symbol		L1-L3, U, V, W, P1, P, C	L11, L12
Terminal Screw Size/ Torque	AMSR-＊FGI/＊HJL-＊00-10	M6/3.0	M4/1.2
	AMSR-＊-KMO-＊00-10	M8/6.0	

Installation Standard

AMSR-＊C/2DE-＊00-10



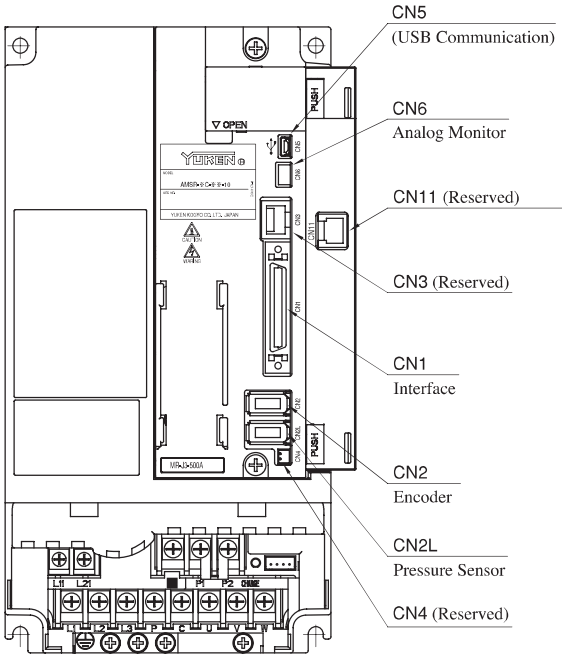
AMSR-＊FGI/＊HJL/＊KMO-＊00-10



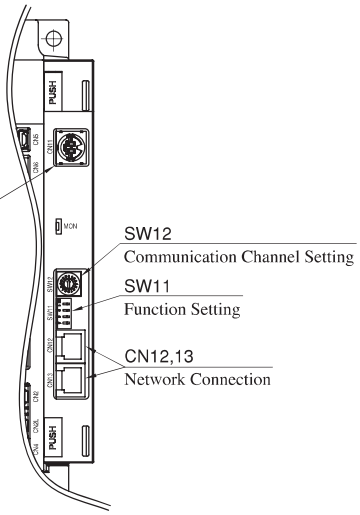
★ Consult us when installing multiple controllers next to each other.

Terminal Names/Appearance

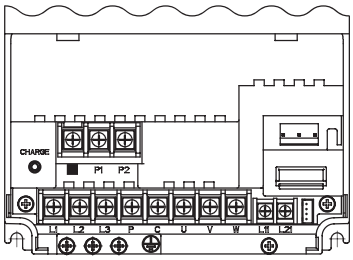
AMSR-＊C-A00- Single Function



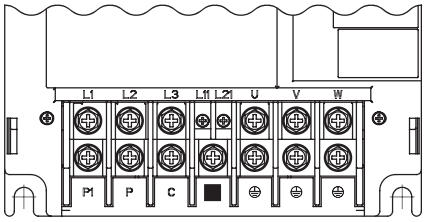
AMSR-＊C-B00- Combination Function



AMSR-2DE-



AMSR-＊FGI/＊HJL/＊KMO-



Function	Symbol	Terminal Name	Terminal Channel	Description
Single/ Combination	CN5	USB Communication	—	With the USB communication function, servo operation, parameter change, and monitor function can be performed on a PC. Recommended Cable USB Cable: Mini B Type
Combination	SW11	Function Selection	1	For the manufacturer's setting. : Always OFF.
			2	Reserved.
			3	For switching single and combination operations. OFF: Combination, ON: Single
			4	For network termination setting. OFF: None, ON: 150 Ω
	SW12	Communication Channel Selection	0	Master station
			1～F	Slave station
	CN12, CN13	Network Connection	—	For connection to the network based on the AMSR controller. Recommended Cable TFL-FST-＊S（SANWA） MJ-FS＊（ELECOM）

Terminal Block

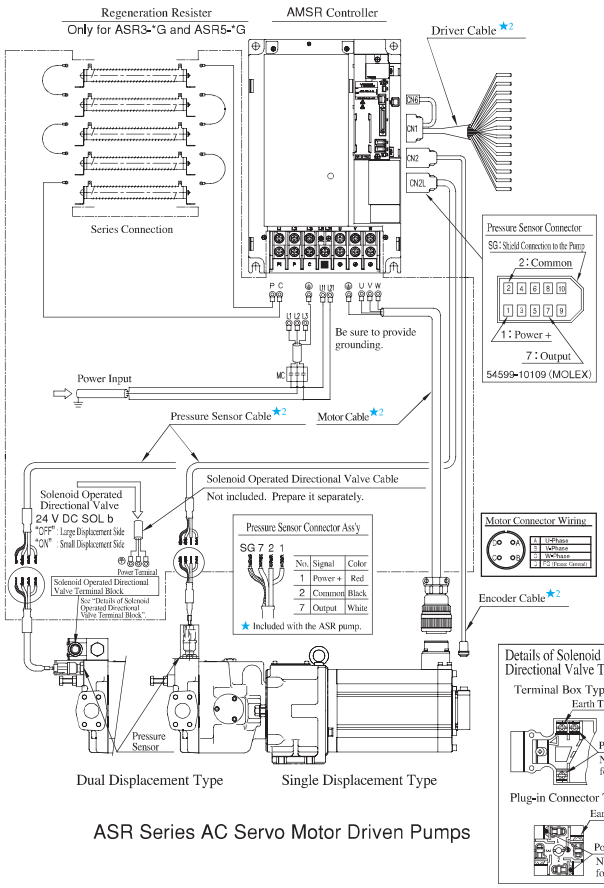
Connection (Use)	Signal Name	Description	
		AMSR-2C/2DE/ 2FGI/2HJL/2KMO	AMSR-4C/4FGI/ 4HJL/4KMO
DC Reactor for Power Factor Improvement	P1	P1 - P2 is short-circuited by default (the DC reactor cannot be used).★1	
	P2		
Regenerative Converter Brake Unit	N	Not connected.★1	

★1 Contact us when connecting the units.

For the details of CN1, CN2L, and CN6, consult us separately.

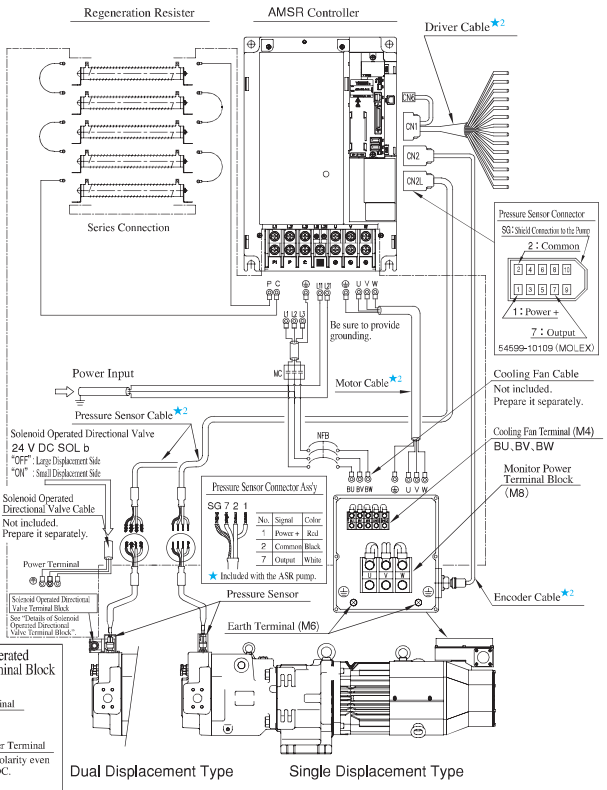
Wire Connection Diagram

ASR1-＊C-H＊＊-A00-12, ASR2-＊C-C＊＊-A00-12
ASR3-E/＊G-H＊＊-A00-12, ASR5-＊G-H＊＊-A00-12



ASR Series AC Servo Motor Driven Pumps

ASR5-＊J-H＊S-A00-12, ASR10-＊J/M-H＊S-A00-12



ASR Series AC Servo Motor Driven Pumps

★1 Wiring within the dashed line will be performed by the customer.
★2 The cables are not included with the pumps. If required, place an order by referring to page A-230.
★3 For the combination function (ASR*-**-***-B00-), modular cables are added to the wiring. When using the pump as a slave, the pressure sensor cable and driver cable are unnecessary.

Connectors

		CN1	CN2L	CN6
Housing		10150-3000VE (3M)	54599-1019 (MOLEX)	51004-0300 (MOLEX)
Terminal		―――――		―――――
Case		10350-52F0-008 (3M)		50011-8100 (MOLEX)
Cable	Core Size	AWG＃24―＃30	AWG＃18―＃28	AWG＃24―＃34
	Covered Dia.	1.2-1.5 Dia.	MAX 1.6 Dia.	0.8-1.4 Dia.
	Strip Length	2.0―2.5mm	1.5―2.4mm	1.2―2.0mm

Motor Cable Plug/Cable Clamp

Model Numbers	Motor Cable Plug		Cable Clamp
	Straight	L-shaped	
ASR 1/ASR 2	MS3106B22-22S	MS3108B22-22S	MS3057-12A
ASR 3- ＊ G	MS3106B32-17S	MS3108B32-17S	MS3057-20A

DDK Ltd.

Wiring Types

Common Wiring

Terminals and Cables	Wiring mm²
L11・L21	1.25 (AWG16) ★
Pressure Sensor Cable	0.5 (AWG20)

Regeneration Resister

Wiring : 5.5mm² (AWG10) ★

Power Classification

Electric Source	Model Numbers	Wiring mm²	
		Power Input L1, L2, L3 ★ ⏚	Motor Cable U, V, W ★ ⏚
200 V AC 3-Phase	ASR1/ASR2/ASR3-C	5.5 (AWG10)	5.5 (AWG10)
	ASR3-E	8 (AWG8)	8 (AWG8)
	ASR3/ASR5-G	14 (AWG6)	22 (AWG4)
	ASR5/ASR10-J	22 (AWG4)	22 (AWG4)
	ASR10-M	50 (AWG1/0)	30 (AWG2)
400 V AC 3-Phase	ASR1/ASR2/ASR3-4C	5.5 (AWG10)	5.5 (AWG10)
	ASR3/ASR5-4G	8 (AWG8)	8 (AWG8)
	ASR5/ASR10-4J	14 (AWG6)	8 (AWG8)
	ASR10-4M	14 (AWG6)	22 (AWG4)

★ Use a 600 V vinyl-insulated cable.

Cable Numbers

The cables are not included with the ASR pumps. If required, place an order by referring to the list below. The cables other than the motor cable are common for all models.

Motor Cable

ASR Pump Model Numbers	Cable Model Numbers	Remarks
ASR 1-＊C-H＊ ＊-＊00-12	YSDC-M1-29-☆-★-10	☆：Plug Type S：Straight, L：L-shaped ★：Cable Length 03：3 m 05：5 m 10：10 m 15：15 m 20：20 m 30：30 m N：Plug and cable clamp only
ASR 2-＊C-C＊ ＊-＊00-12		
ASR 3-E-H＊ ＊-＊00-12	YSDC-M1-44S-☆-★-10	
ASR 3-G-H＊ ＊-＊00-12	YSDC-M1-1A-☆-★-10	
ASR 3-4G-H＊ ＊-＊00-12	YSDC-M1-44S-☆-★-10	
ASR 5-G-H＊ ＊-＊00-12	YSDC-M1-1A-☆-★-10	
ASR 5-4G-H＊ ＊-＊00-12	YSDC-M1-44S-☆-★-10	

Driver Cable/Encoder Cable/Pressure Sensor Cable

Cable Type	Cable Model Numbers	Remarks
Driver Cable	YSDC-D14-00-★-10	★：Cable Length 01：1 m 02：2 m 03：3 m 05：5 m 10：10 m 20：20 m
Encoder Cable	YSDC-E7-S-★-10	★：Cable Length 02：2 m 05：5 m 10：10 m
Pressure Sensor Cable	Consult us separately.	

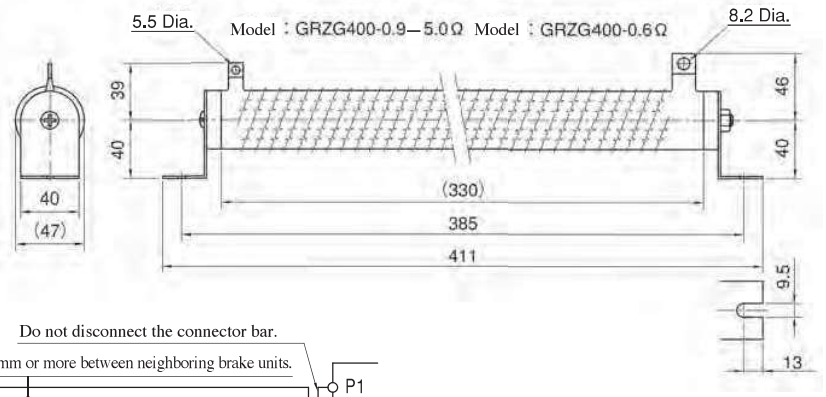
Regeneration Resister

Specifications

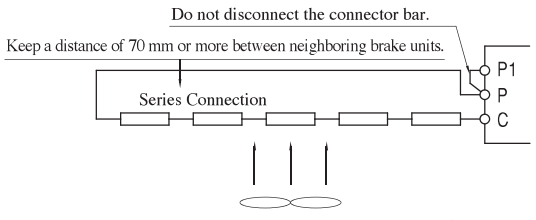
AMSR Controller Model Numbers	Regeneration Resister Model	Qty.	Permissible Regeneration W	Regeneration with Fan W	Resistance Ω	Mass kg
AMSR-2FGI-	GRZG400-1.5Ω	4	500	800	6 (1.5Ω×4)	3.2 (0.8kg×4)
AMSR-2HJL-	GRZG400-0.9Ω	5	850	1300	4.5 (0.9Ω×5)	4.0 (0.8kg×5)
AMSR-2KMO-	GRZG400-0.6Ω				3 (0.6Ω×5)	
AMSR-4FGI-	GRZG400-5.0Ω	4	500	800	20 (5.0Ω×4)	3.2 (0.8kg×4)
AMSR-4HJL-	GRZG400-2.5Ω	5	850	1300	12.5 (2.5Ω×5)	4.0 (0.8kg×5)
AMSR-4KMO-	GRZG400-2.0Ω				10 (2.0Ω×5)	

★1. Regeneration Resisters are included with the ASR pumps.

★2. Regeneration Resisters may become excessively heated. Use heat-resistant and fireproof wires and avoid their contact with the brakes.

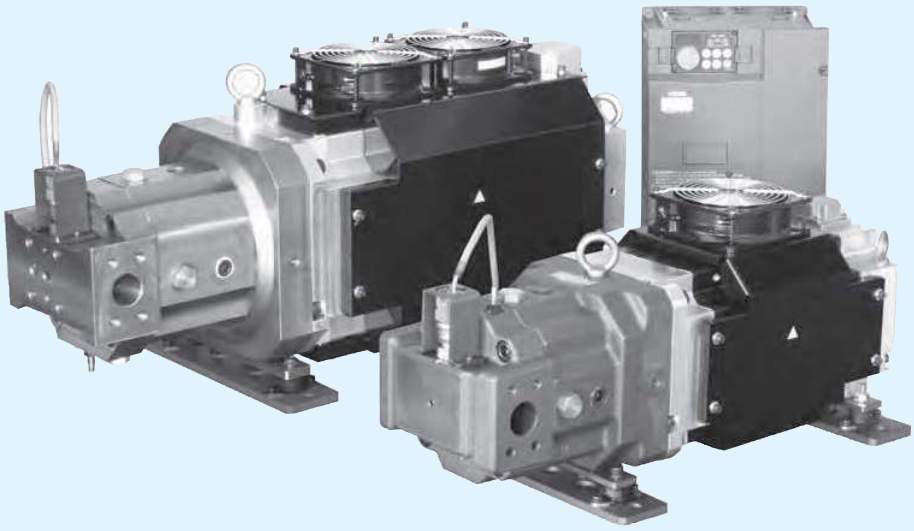


Connection



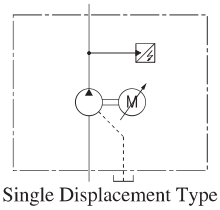
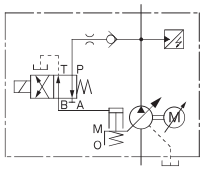
★Recommended fan capacity for fan cooling. In this case, change the setting of parameter No. PA02 from "0000" to "00FA".

ASE Series
AC Servo Motor Driven Pumps



This product is exclusively use for foreign countries outside of Japan.

"ASE" Series AC Servo Motor Driven Pumps

Pump Type	Graphic Symbols	Geometric Displacement cm^3/rev (0 2 5 10 20 50 100 150)	Maximum Operating Pressure MPa	Page
ASE Series AC Servo Motor Driven Pumps	 Single Displacement Type	ASE3	17.5	A-234
		ASE5		
		ASE10		
	 Dual Displacement Type	ASE10W	21	
		ASE15W		

AMSE Controller A-244

Hydraulic Fluids

Hydraulic Fluids

Use clean petroleum base oils equivalent to ISO VG32 or 46. The recommended viscosity range is from 20 to 400 mm^2/s and temperature range is from 0 to 60 °C, both of which have to be satisfied for the use of the above hydraulic oils.

Control of Contamination

Due caution must be paid to maintaining control over contamination of the operating oil which can otherwise lead to breakdowns and shorten the life of the unit. Please maintain the degree of contamination within NAS class 9.
The suction port must be equipped with at least 100 μm (150 mesh) reservoir type filter and the return line must have a line type filter of under 10 μm.

Instructions

Transportation

For transportation, use the lifting rings on the pump. Do not use lifting cables at places other than the lifting rings.

Mounting

When installing the pump, the filling port should be positioned upwards.

Suction Pressure

Permissible suction pressure at the inlet port of the pump is between -16.7 and +50 kPa. For piping to the suction port, use pipes of the nominal diameters shown below. Make sure that the height of the pump suction port is lower than the oil level in the reservoir.

Model	Nominal Dia.
ASE3/ASE5	1 1/2
ASE10	2 1/2
ASE10W	2
ASE15W	3

Hints on Piping

When using steel pipes for the suction or discharge ports, excessive load from the piping to the pump generates excessive noise. Whenever there is fear of excessive load, please use rubber hoses.

Drain Piping

Install drain piping according to the chart and ensure that pressure within the pump housing should be maintained at a nominal pressure of less than 0.1 MPa and surge pressure of less than 0.5 MPa.
The length of piping should be less than 1 m. Instead of joining the drain pipe to other return lines, run it independently. The pipe end should be submerged in oil.

[Recommended Drain Piping Size]

Model	Fitting Size	Inside Dia. of Pipe
ASE3/ASE5	1/2 (Inside Dia. 12 mm or more)	12 mm or more
ASE10/ASE10W/ASE15W	3/4 (Inside Dia. 16 mm or more)	19 mm or more

Precautions

This pump does not have a full cut-off function.
Be sure to install an external relief valve for setting the PH pressure (maximum circuit pressure) in the pump discharge line.

Starting

Before first starting, fill the pump case with clean operating oil via the filling port. In order to avoid air blockage when first starting, adjust the control valves so that the discharged oil from the pump is returned directly to the reservoir or the actuator moves in a free load.

[Volume of Pre-fill Oil Required]

Model	Volume cm³
ASE3/ASE5	600
ASE10	900
ASE10W	2200
ASE15W	3100

Bleeding Air

It may be necessary to bleed air from the pump case and lines to remove causes of vibration. An air bleed valve (Model Number: ST1004, Page A-259) in the outlet line is recommended.
For air bleeding with an air bleed valve installed, run the pump at a rotational speed that provides a flow rate equal to/higher than the valve's flow rate to reseating.

Setting Delivery

At the time of shipment, the unit has been preset to the delivery rate shown below.

[Default Setting of Delivery]

Model Numbers	Single Displacement Type cm³/rev	Dual Displacement Type "W"cm³/rev	
		Large Displacement	Small Displacement
ASE3	32.3	—	
ASE5	57.7	—	
ASE10	102.7	—	
ASE10W	—	100	58
ASE15W	—	151	100

Adjustment of Delivery

There is no flow adjustment screw for the single displacement type. Tuning the large displacement side flow adjustment screw for the dual displacement type clockwise decreases the delivery. Turning the small displacement side flow adjustment screw for the dual displacement type clockwise increases the delivery.

[Volume adjusted by each full turn of the flow adjustment screw]

Model Numbers	Dual Displacement Type "W"cm³/rev	
	Large Displacement	Small Displacement
ASE10W	5.3	7.4
ASE15W	7.2	9.6

★ For the relationship between the flow adjustment screw position and flow adjustment, see pages A-237.

Precautions During Operation

During and for a period after operation, the surface temperature of the AC servo motor and the pump will be hot. Prevent hands and other body parts from coming into contact with them.

Providing flexible flow/pressure control !

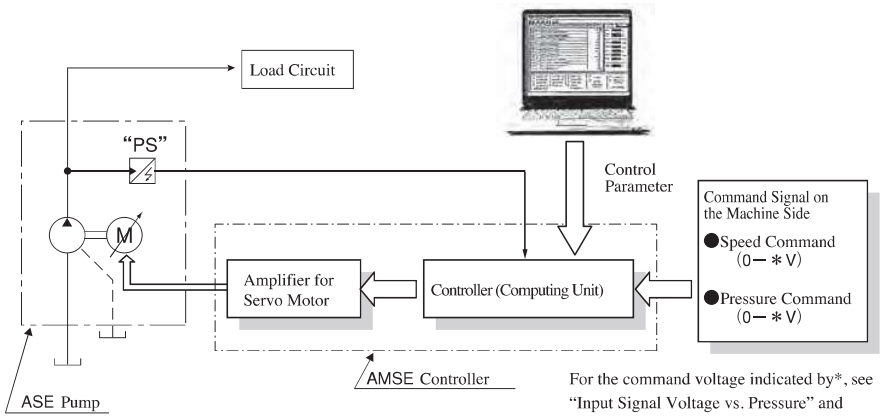
ASE Series AC Servo Motor Driven Pumps

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.



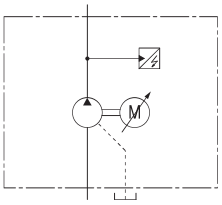
System Configuration

A feedback loop is formed 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.

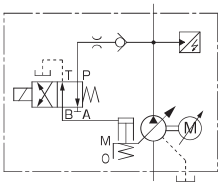


For the command voltage indicated by∗, see "Input Signal Voltage vs. Pressure" and "Input Signal Voltage vs. Shaft Speed" on page A-237.

Graphic Symbols



Single Displacement Type
ASE∗



Dual Displacement Type
ASE∗W

● Energy saving with low heat generation

These pumps run at a rotational speed suitable for mechanical requirements, eliminating unnecessary power loss. They minimize heat generation in the fluid and allow the use of a significantly smaller reservoir.

● Low noise

Noise reduction insulation included as standard.

● Less wiring / high reliability

Uses sensor-less rotational speed control.

● Digital AMSE controller that saves space and wiring

The integration of the amplifier for the servo motor and the controller saves space and wiring. The parameters can be digitally adjusted in an easy and repeatable way.

● Dual displacement type for a wider operation range

The dual displacement type has a solenoid operated directional valve to switch between large and small swash plate angles. A single pump unit of the dual displacement type can operate both with low pressure/large flow and with high pressure/small flow. Thus, in comparison to the single displacement type with the same motor capacity, the dual displacement type covers a significantly wider range of operating pressures and flow rates.

● Large flow

The AMSE controller has a combination function that supports operation with large flow up to 4800 L/min (ASE15W × 16 units).

Specifications

Descriptions \ Model Numbers			ASE3	ASE5	ASE10	ASE10W	ASE15W
Power Capacity			AA	BZ	CE	BZ	CE
Pump	Flow Control	Max. Flow	80.8 L/min	132.7 L/min	205.4 L/min	200 L/min	302 L/min
		Min. Adj. Flow	2 %				
		Hysteresis	1 % or less				
		Repeatability	1 % or less				
		Input Signal Voltage	64.6 L/min/5V	115.4 L/min/5V	205.4 L/min/5V	200 L/min/5V	302 L/min/5V
		Max. Permissible Input Signal Voltage★1	80.8 L/min/6.25V	132.7 L/min/5.75V			
	Pres. Control	Max. Operating Pres.	17.5 MPa			17.5 MPa (21 MPa)★2	
		Min. Adj. Pres.	0.1 MPa				
		Hysteresis	1 % or less				
		Repeatability	1 % or less				
		Input Signal Voltage	17.5 MPa/5V			17.5 MPa/5V	
		Max. Permissible Input Signal Voltage★1				21 MPa/6V	
AC Servo Motor Specifications		Rated Output	11 kW	20 kW	35 kW	20 kW	35 kW
		Insulation Class	Class F				
		Cooling System	Totally-enclosed Fan-cooling				
		Cooling Fan Power Consumption	20W(50Hz)/18W(60Hz)	40W(50Hz)/36W(60Hz)	60W(50Hz)/54W(60Hz)	40W(50Hz)/36W(60Hz)	60W(50Hz)/54W(60Hz)
	Environmental Condition	Ambient Temperature	0 - +40 °C (No Freezing)				
		Ambient Humidity	80 %RH or less (No Condensation)				
Mass		200 V AC Type	75 kg	123 kg	185 kg	180 kg	—
		400 V AC Type	79 kg	116 kg	180 kg	173 kg	231.5 kg
Applicable Controller Model Number			AMSE-∗AE-∗∗-10	AMSE-∗BB-∗∗-11	AMSE-∗DE-∗∗-10	AMSE-∗BB-∗∗-11	AMSE-∗DE-∗∗-10

★1. By adjusting the controller, the maximum flow rate/5 V (80.8 L/min/5 V) and the maximum operating pressure/5 V (21 MPa/5 V) can be set.
★2. Depending on the value of geometric displacement.

Model Number Designation

The model numbers below indicate packages each containing an AC servo motor driven pump, AMSE controller, and Regeneration Resisters.

ASE10W	-4	BZ	-G	W	S	A100	N	-B	00	-20
Series Number ★1	Power Supply Voltage	Power Capacity ★2	Max. Operating Pres.	Max. Flow	Port Direction	Coil Type for Solenoid Operated Directional Valve	Electrical Conduit Connection for Solenoid Operated Directional Valve	Function Selection	Parameter Number	Design Number
ASE3	None: 200 V AC 4: 400 V AC	AA	G:17.5 MPa (21 MPa) ★3	80: 80.8 L/min	S:Horizontal B:Vertical	—	—	B: Combination (Single Use Allowed)★4	00: Standard	40
ASE5		BZ		130: 132.7 L/min						40
ASE10		CE		200: 205.4 L/min						30
ASE10W		BZ		W:User Setting "100/58★5" Large Flow (Sol OFF) 100 cm³/rev (200 L/min) Small Flow (Sol ON)★6 58 cm³/rev (133 L/min)		AC A100:100 V AC A120:120 V AC A200:200 V AC A240:240 V AC DC None:24 V DC D12:12 V DC D48:48 V DC D100:100 V DC D110:110 V DC D200:200 V DC D220:220 V DC AC(AC⇔DC) R100:100 V AC R110:110 V AC R200:200 V AC R220:220 V AC	None: Terminal Box N: DIN Plug-in Connector			20
ASE15W	4:400 V	CE		W:User Setting "151/100★5" Large Flow (Sol OFF) 151 cm³/rev (302 L/min) Small Flow (Sol ON) 100 cm³/rev (200 L/min)						20

★1. To order an AC servo motor driven pump separately for spare use, prefix "N-" to the model number and omit the Function Selection and Parameter Number.
Example) N-ASE10W-4BZ-GWSA100N-20
★2. For the relationship between the power capacity and the pressure/flow in terms of specification limits, see charts on page A-238.
★3. For the models ASE10W/ASE15W, it depends on the value of geometric displacement.
★4. For combination operation, consult us separately regarding the types of hydraulic circuits, components, and electric cables.
★5. Ex. The factory-adjusted value can be set to 70/40.[70: 70 cm³/rev (Large Flow) and 40: 40cm³/rev. (Small Flow)]
★6. The maximum revolutions can reach to 2300 r/min if the pump capacity is set to less than 60 cm³/rev.

Solenoid Ratings

See Solenoid Ratings (page A-51).

Pipe Flange Kit

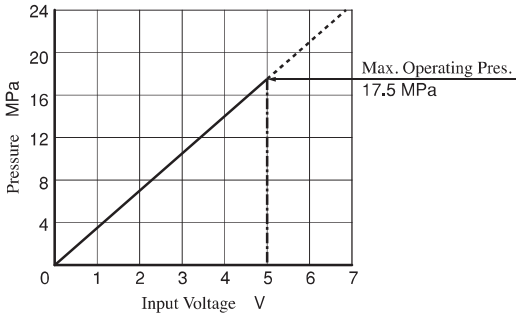
No pipe flange kit is included with the pump. The pipe flange kits below are available if required. For the details of the pipe flange kits, see pages A-258 and A-259.

Pump Model Numbers	Name of Port	Pipe Flange Kit Numbers		
		Threaded Connection	Socket Welding	Butt Welding
ASE3 ASE5	Suction	F5-12-A-10	F5-12-B-10	F5-12-C-10
	Discharge	F5-10-A-10	—	F5-10-C-10
ASE10	Suction	F5-20-A-10	F5-20-B-10	F5-20-C-10
	Discharge	F5-10-A-10	—	F5-10-C-10
ASE10W	Suction	F5-16-A-10	F5-16-B-10	F5-16-C-10
	Discharge	F5-10-A-10	—	F5-10-C-10
ASE15W	Suction	F5-24-A-10	F5-24-B-10	F5-24-C-10
	Discharge	F5-12-A-10	—	F5-12-C-10

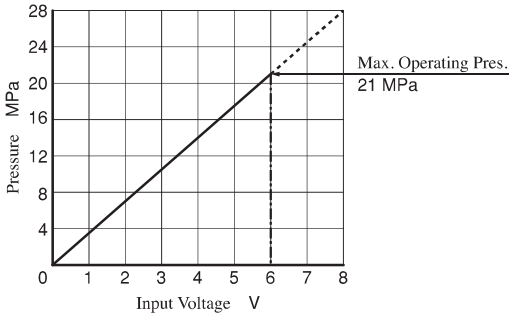
Characteristics of Single Displacement Type

Input Signal Voltage vs. Pressure

● ASE3/ASE5/ASE10

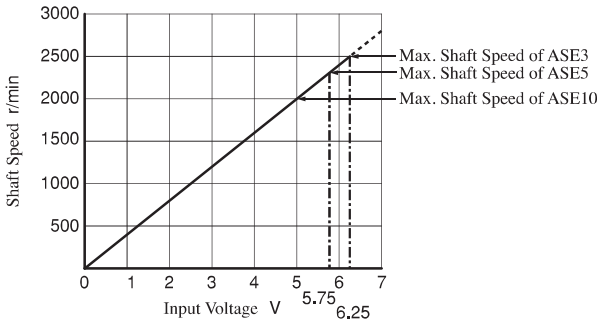


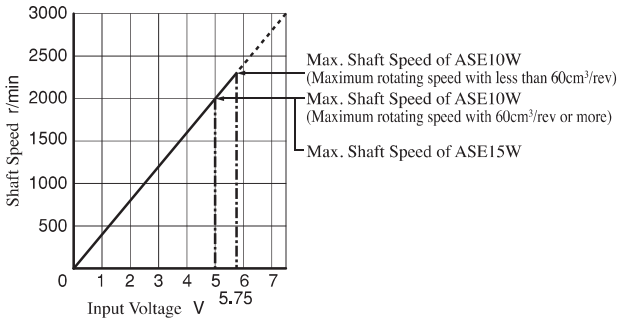
● ASE10W/ASE15W



★Do not input a voltage higher than the level corresponding to the maximum operating pressure.

Input Signal Voltage vs. Shaft Speed



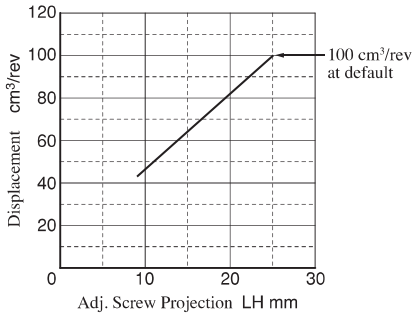


★Do not input a voltage higher than the level corresponding to the maximum shaft speed.

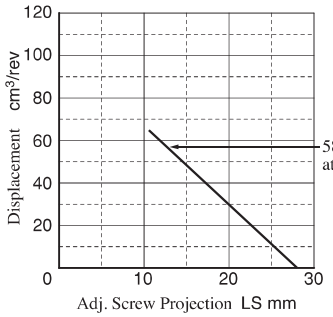
Flow Adjustment Screw Projection and Geometric Displacement

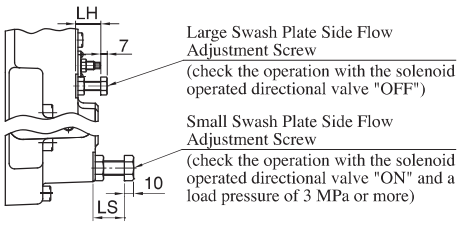
● ASE10W

Large displacement (SOL:OFF)



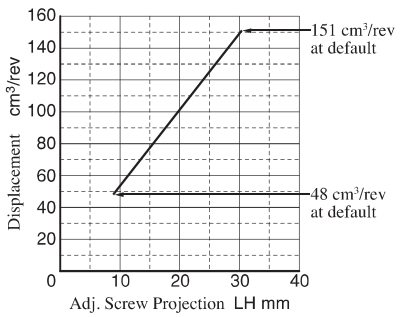
Small displacement (SOL:ON)



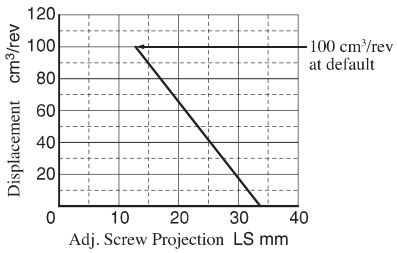


● ASE15W

Large displacement (SOL:OFF)



Small displacement (SOL:ON)

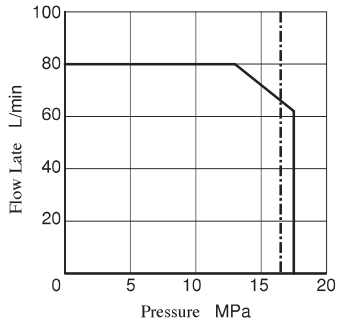


Pressure vs. Discharge Flow (Reference)

-·-·-·-·-·- Max Continuous Operation Time: 60 sec.

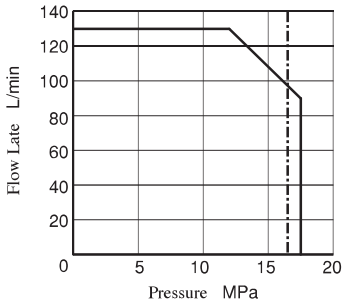
ASE3-＊AA-G80＊-

Pressure enabling continuous operation: 11 MPa or less



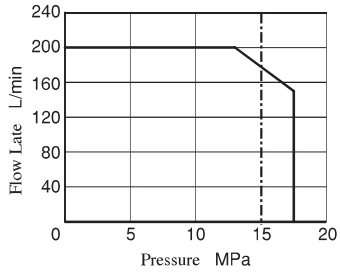
ASE5-＊BZ-G130＊-

Pressure enabling continuous operation: 11 MPa or less



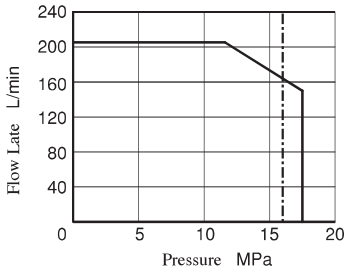
ASE10-CE-G200＊-

Pressure enabling continuous operation: 10 MPa or less



ASE10-4CE-G200＊-

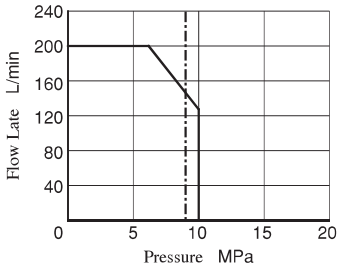
Pressure enabling continuous operation: 11 MPa or less



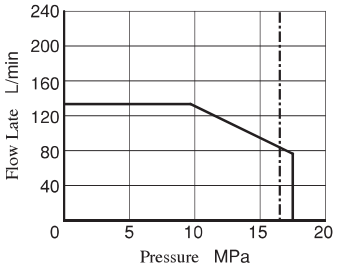
ASE10W-＊BZ-G＊＊＊＊-

Pressure vs. delivery characteristics with 100cm³/rev at the large swash plate side and 58cm³/rev at the small swash plate side
Pressure enabling continuous operation is 6 MPa for the large swash plate side and 11 MPa for the small swash plate side.

100cm³/rev at the large swash plate side



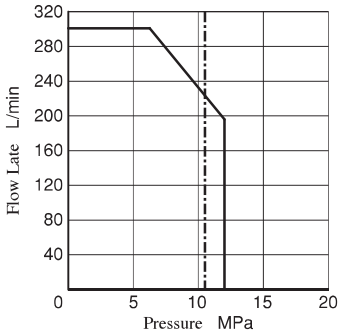
58cm³/rev at the small swash plate side



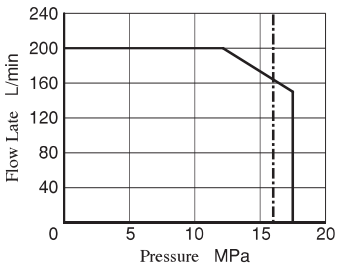
ASE15W-4CE-G＊＊＊＊-

Pressure vs. delivery characteristics with 151cm³/rev at the large swash plate side and 100cm³/rev at the small swash plate side
Pressure enabling continuous operation is 7 MPa for the large swash plate side and 11 MPa for the small swash plate side.

151cm³/rev at the large swash plate side

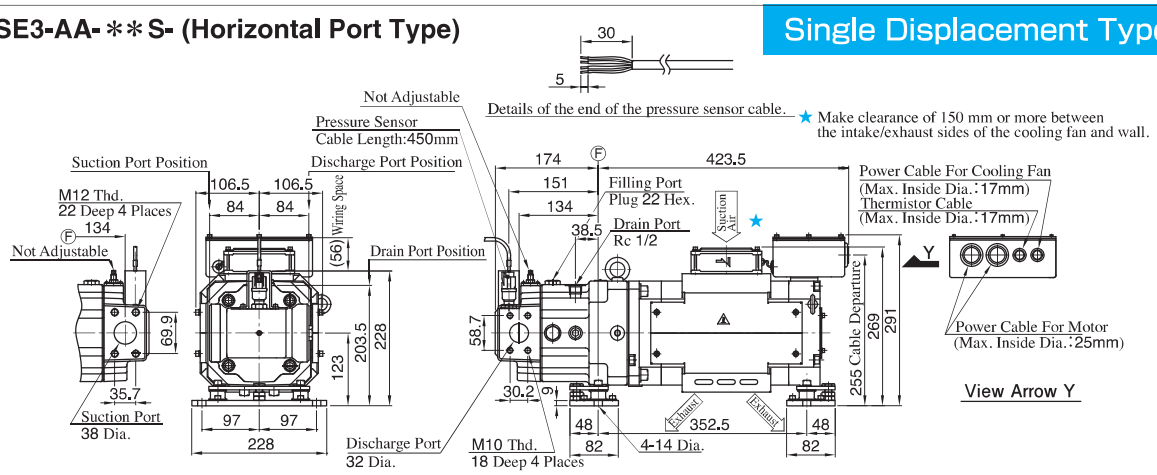


100cm³/rev at the small swash plate side

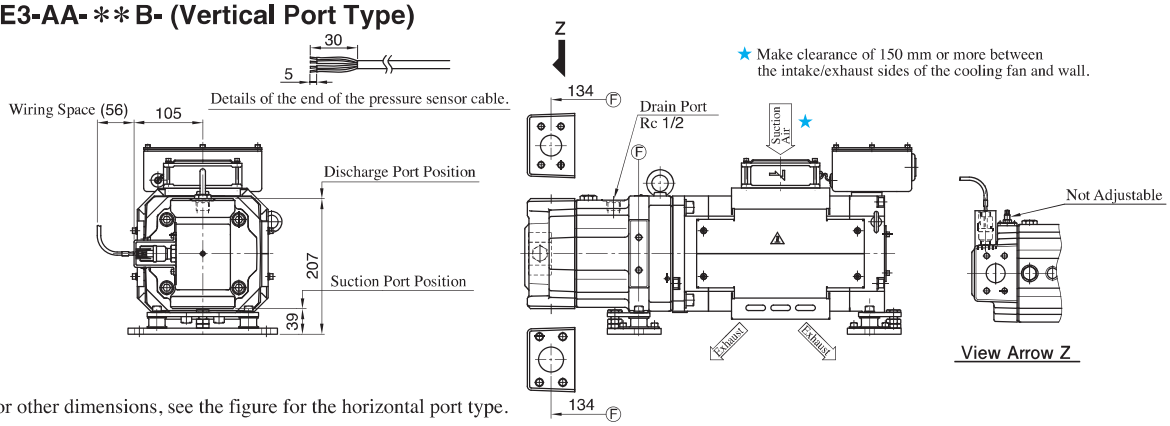


Single Displacement Type

ASE3-AA-＊＊S- (Horizontal Port Type)

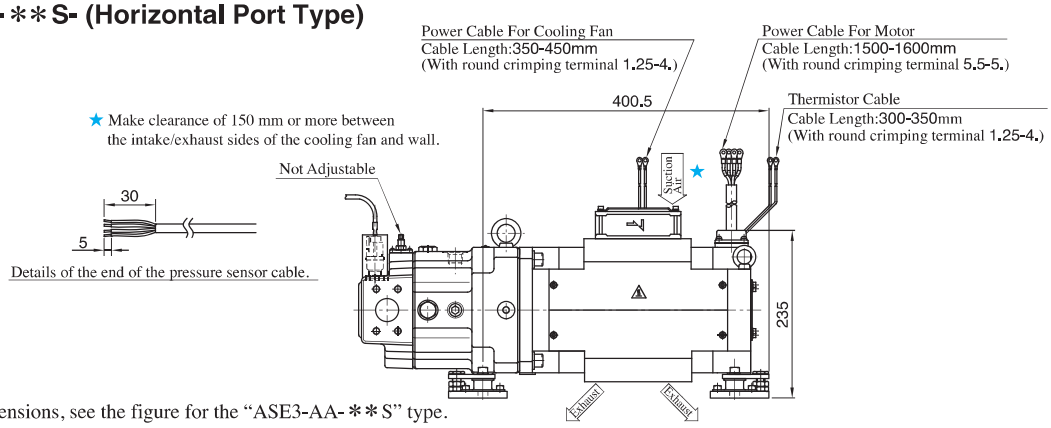


ASE3-AA-＊＊B- (Vertical Port Type)



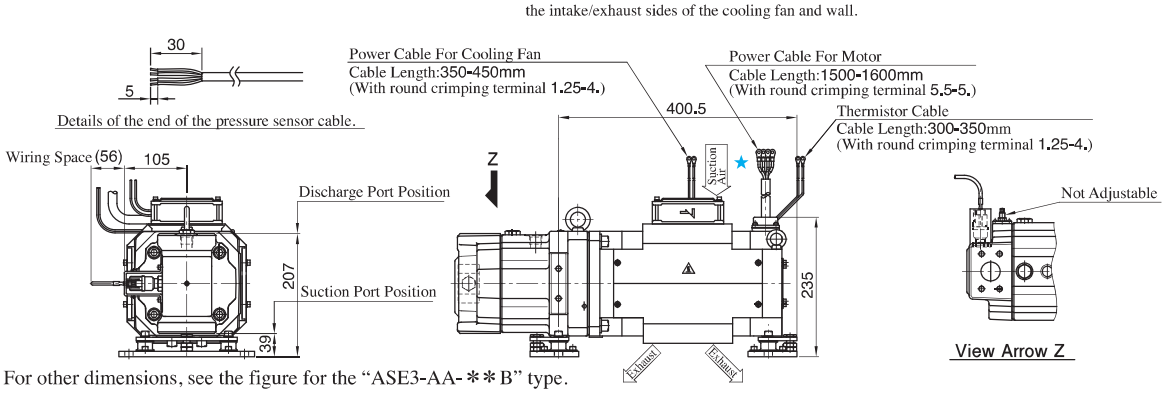
● For other dimensions, see the figure for the horizontal port type.

ASE3-4AA-＊＊S- (Horizontal Port Type)



● For other dimensions, see the figure for the "ASE3-AA-＊＊S" type.

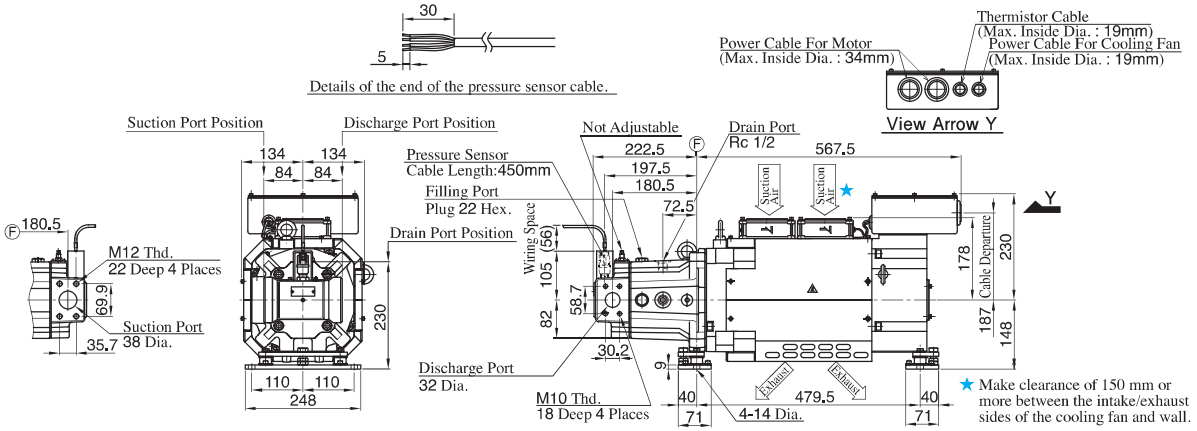
ASE3-4AA-＊＊B- (Vertical Port Type)



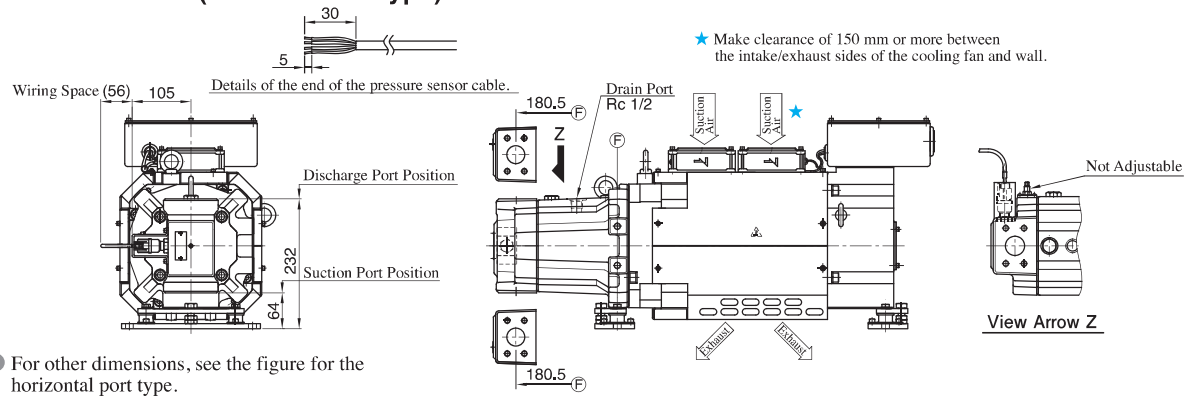
● For other dimensions, see the figure for the "ASE3-AA-＊＊B" type.

Single Displacement Type

ASE5-BZ-＊＊S- (Horizontal Port Type)

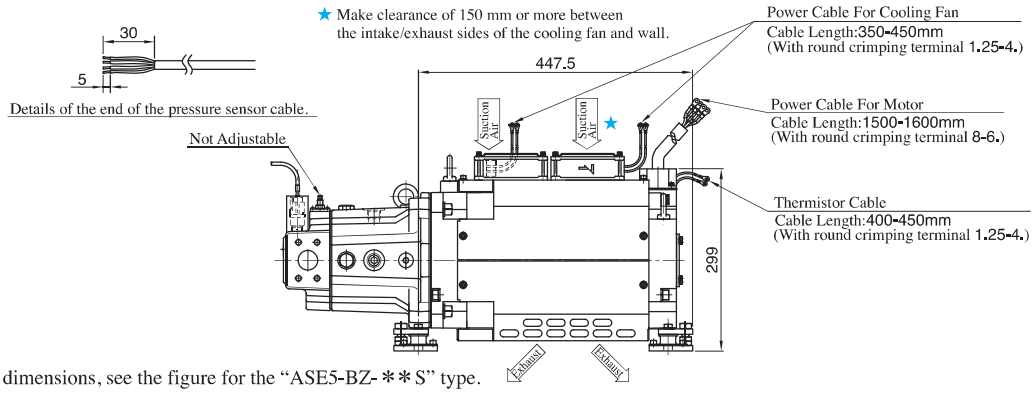


ASE5-BZ-＊＊B- (Vertical Port Type)



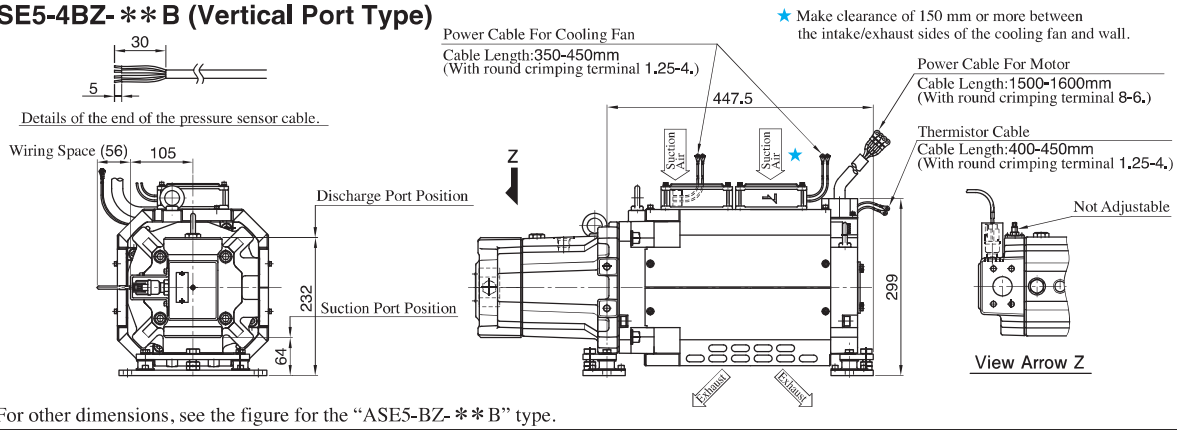
● For other dimensions, see the figure for the horizontal port type.

ASE5-4BZ-＊＊S- (Horizontal Port Type)



● For other dimensions, see the figure for the "ASE5-BZ-＊＊S" type.

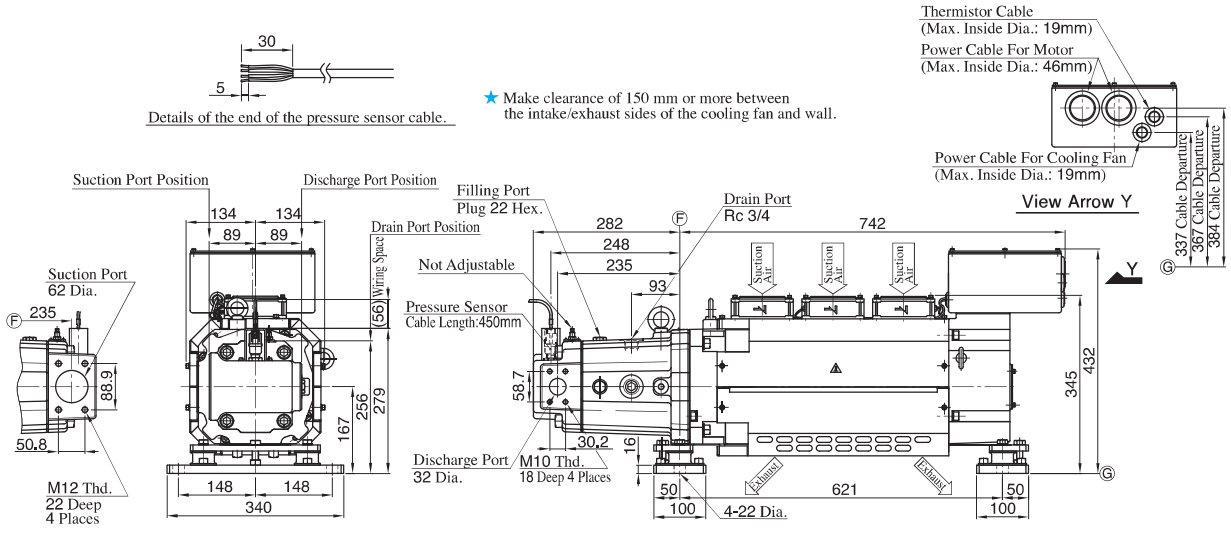
ASE5-4BZ-＊＊B (Vertical Port Type)



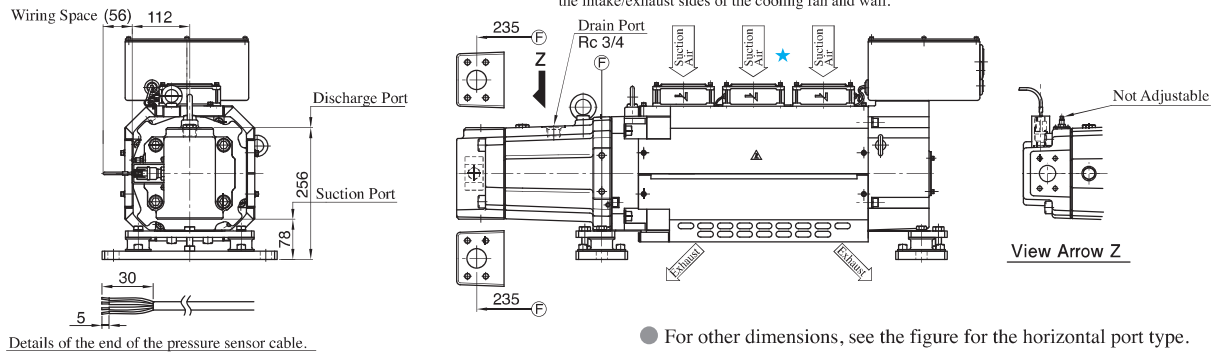
● For other dimensions, see the figure for the "ASE5-BZ-＊＊B" type.

Single Displacement Type

ASE10-CE-＊＊S- (Horizontal Port Type)

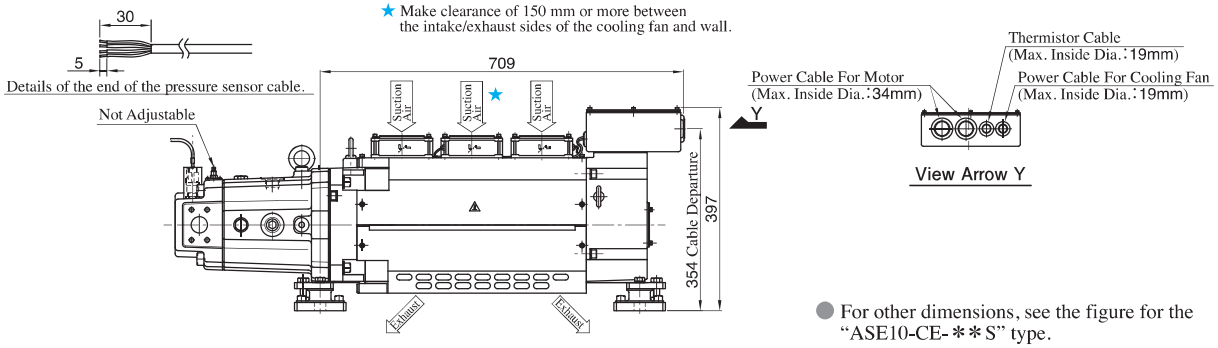


ASE10-CE-＊＊B- (Vertical Port Type)



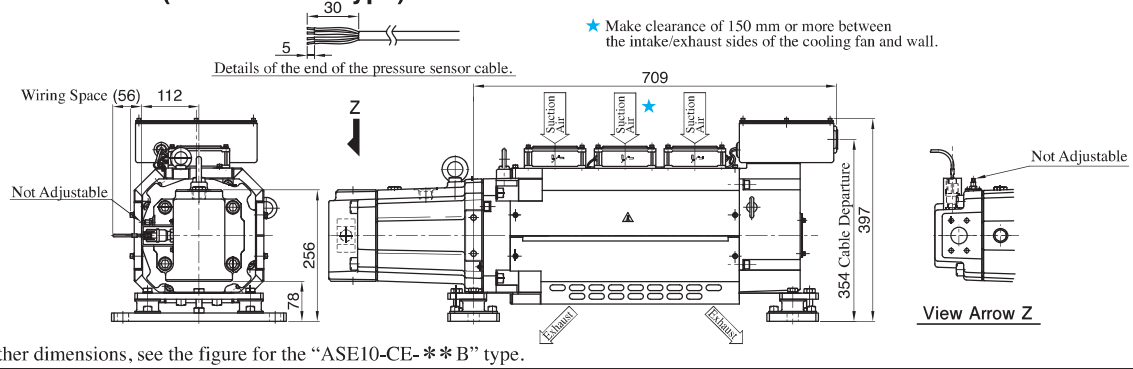
● For other dimensions, see the figure for the horizontal port type.

ASE10-4CE-＊＊S- (Horizontal Port Type)



● For other dimensions, see the figure for the "ASE10-CE-＊＊S" type.

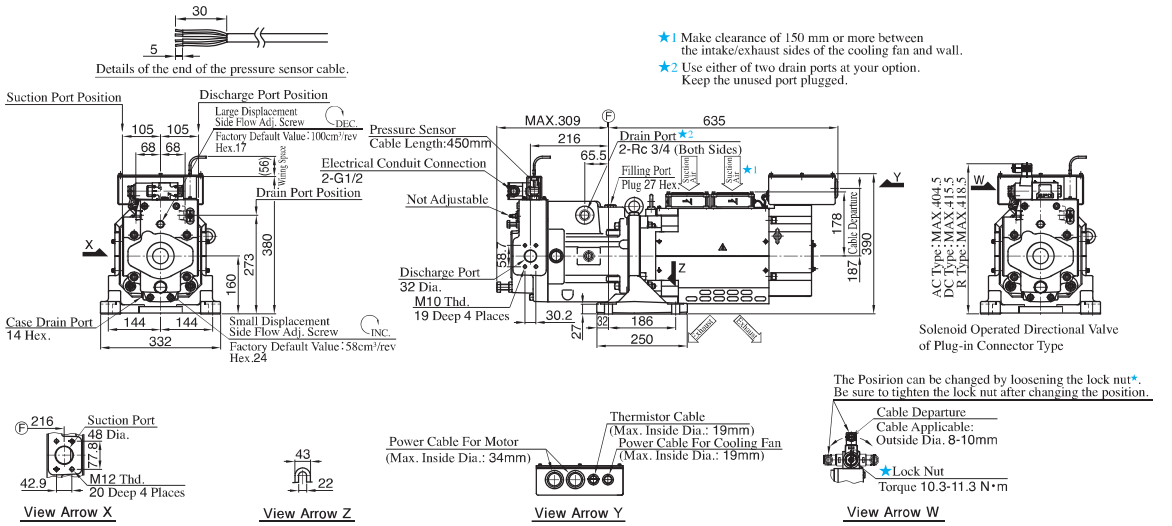
ASE10-4CE-＊＊B (Vertical Port Type)



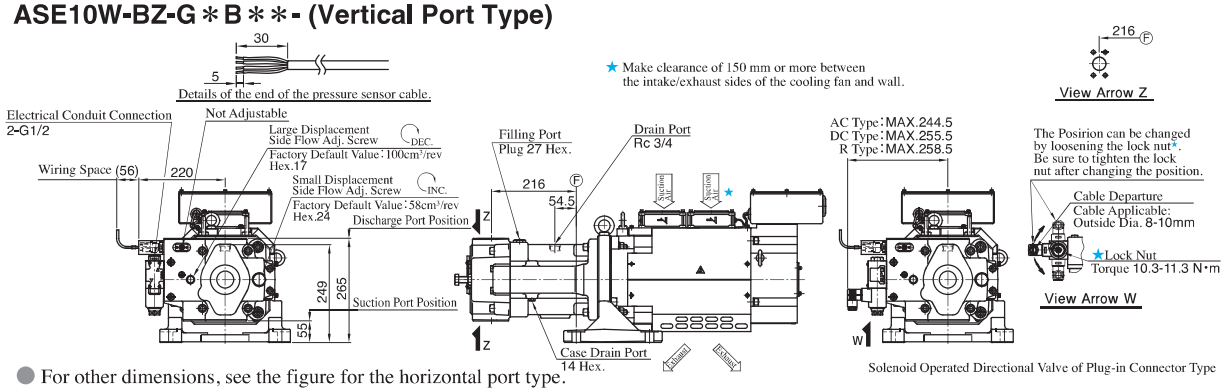
● For other dimensions, see the figure for the "ASE10-CE-＊＊B" type.

Dual Displacement Type

ASE10W-BZ-G＊S＊＊- (Horizontal Port Type)

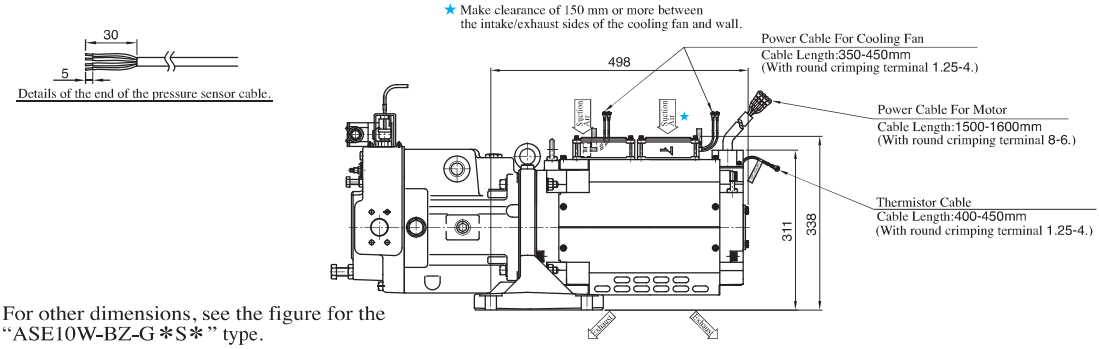


ASE10W-BZ-G＊B＊＊- (Vertical Port Type)



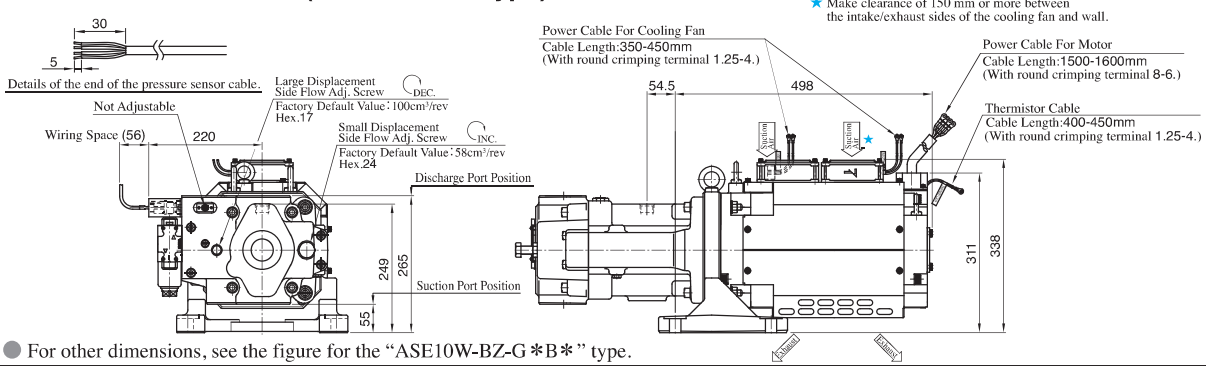
● For other dimensions, see the figure for the horizontal port type.

ASE10W-4BZ-G＊S＊＊- (Horizontal Port Type)



● For other dimensions, see the figure for the "ASE10W-BZ-G＊S＊" type.

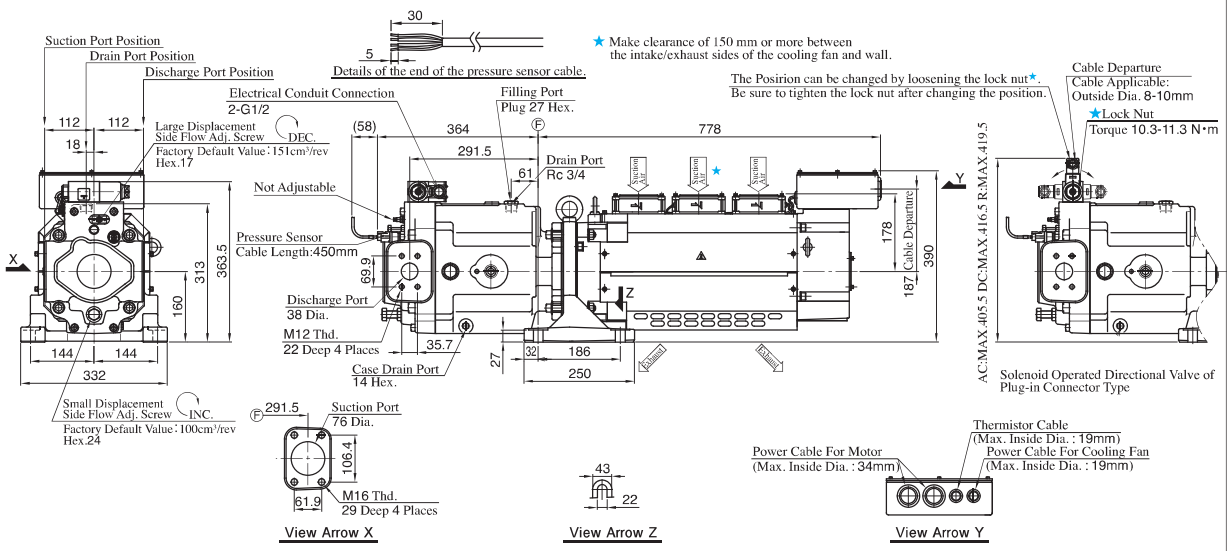
ASE10W-4BZ-G＊B＊＊- (Vertical Port Type)



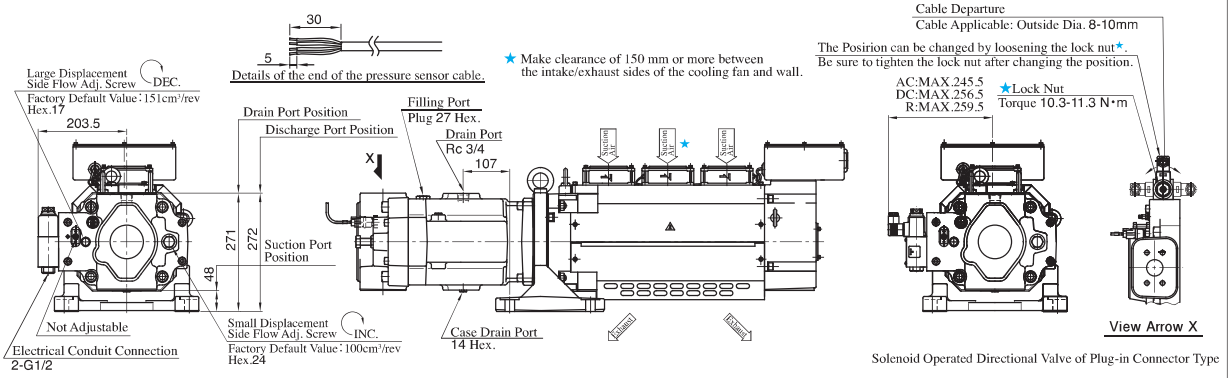
● For other dimensions, see the figure for the "ASE10W-BZ-G＊B＊" type.

ASE15W-4CE-G＊S＊＊- (Horizontal Port Type)

Dual Displacement Type



ASE15W-4CE-G＊B＊＊- (Vertical Port Type)



● For other dimensions, see the figure for the horizontal port type.

AMSE Controller

The AMSE controller is used to drive ASE series AC servo motor driven pumps. With an optimal design for the ASE pumps, the controller can maximize the pump performance. The AMSE controller is included with the ASE series pumps.



Specifications

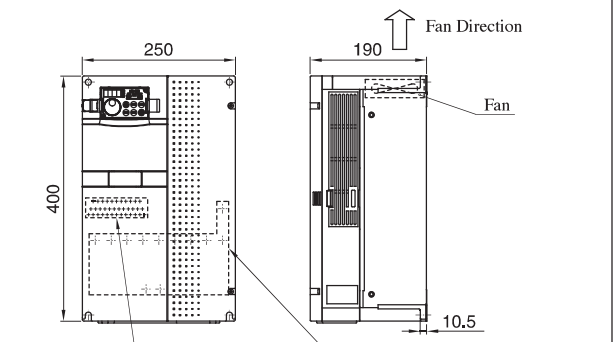
Model Numbers		AMSE-＊AE-＊＊-10		AMSE-＊BB-＊＊-11		AMSE-＊DE-＊＊-10	
		2AE	4AE	2BB	4BB	2DE	4DE
Command Signal Input Voltage		0 - +5 V DC/RATED (MAX. 0 - +10 V)					
Control Method		Vector Control					
		Sensorless					
Monitor Output Voltage		1ch, 0 - +10 V DC					
Digital Monitor		1ch,(FM or Open Collector)					
Sequence Input Signal		12ch,Photo Coupler (Input Resistance : 4.7kΩ) Logic switching is possible by the internal jumper connector (Initial : Sink)					
	Voltage At Opening	21-27 V DC					
	Short-Circuited	4-6 mA					
Sequence Output Signal	Reray	2ch, Contact Capacity : 230 V AC or 30 V DC, 0.3 A					
	Open Collector	5ch, Permissible Load : 24 V DC (Max.27 V DC), 0.1 A					
Voltage/Frequency		200-220 V AC : 50Hz 200-240 V AC : 60Hz 3-Phase	380-480 V AC : 50/60Hz 3-Phase	200-220 V AC : 50Hz 200-240 V AC : 60Hz 3-Phase	380-480 V AC : 50/60Hz 3-Phase	200-220 V AC : 50Hz 200-240 V AC : 60Hz 3-Phase	380-480 V AC : 50/60Hz 3-Phase
Permissible Voltage Fluctuation		170-242 V AC : 50Hz 170-264 V AC : 60Hz 3-Phase	323-528 V AC : 50/60Hz 3-Phase	170-242 V AC : 50Hz 170-264 V AC : 60Hz 3-Phase	323-528 V AC : 50/60Hz 3-Phase	170-242 V AC : 50Hz 170-264 V AC : 60Hz 3-Phase	323-528 V AC : 50/60Hz 3-Phase
Permissible Frequency Fluctuation		Within ±5 %					
Power Supply Capacity★1		28 kVA	27 kVA	41 kVA		80 kVA	
Regeneration Resister (Dynamic Brake)		External Option					
Protection, Cooling		Enclosed Type (IP20), Forced Air Cooling				Open Type (IP00), Forced Air Cooling	
Environmental condition	Ambient Temperature	0 - +50°C (Non-Freezing)					
	Ambient Humidity	90%RH Maximam (No Condensing)					
	Atmosphere	Indoors (Without Corrosive GAS, Flammable GAS, Oil Mist, Dust and Dirt etc.)					
	Altitude	Maximum 1000m Above Sea Level For Standard Operation					
	Vibration	5.9 m/s² or Less					
Protective/Warning Functions		Overcurrent・Overvoltage・Inverter Protection Thermal・Motor Protection Thermal・Heatsink Overheat・Instantaneous Power Failure Occurrence・Undervoltage・Input Phase Loss・Motor Overload・Output Side Earth Fault Overcurrent・Output Phase Loss・CPU Fault・Option Fault・Parameter Error・Power Supply Short Ciruit・Inrush Current Limit Circuit Fault・Communication Fault・Analog Input Fault・Fan Fault・Overcurrent Stall Prevention・Electronic Thermal Relay Function Prealarm・Regenerative Brake Prealarm・Pu Stop・Brake Transistor Alarm・Parameter Write Error・Copyoperation Error・Operation Panel Lock・Parameter Copy Alarm・Pressure Sensor Disconnection・Network Alarm					
Additional Function		-	Resolver Signal Fault・Overspeed・Speed Deviation Large・Z-Phase Tunning Incomplete	-	Resolver Signal Fault・Overspeed・Speed Deviation Large・Z-Phase Tunning Incomplete	-	Resolver Signal Fault・Overspeed・Speed Deviation Large・Z-Phase Tunning Incomplete
Mass		13kg	7.5kg	14kg	13kg	35kg	
Applicable Pump		ASE3-＊AA		ASE5-＊BZ ASE10W-＊BZ		ASE10-＊CE ASE15W-4CE	

★1 The power supply capacity varies with the value of the power supply side inverter impedance (including those of the input reactor and cables).

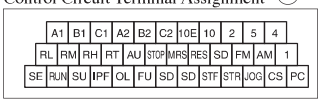
Model Number Designation

AMSE	-2	AE	-B	00	-10
Series Number	Power Supply Voltage	Amplifier Capacity kW	Function Selection	Parameter Number	Design Number
AMSE： AMSE Controller	2：200 V AC 4：400 V AC	AE：15.0	B：Combination (Single Operation Allowed)	00：Standard	10
		BB：22.0			11
		DE：45.0			10

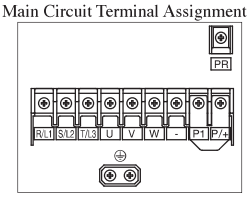
AMSE-2AE-B00-10



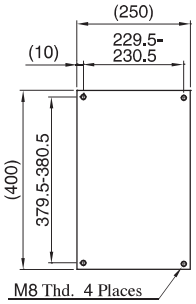
Control Circuit Terminal Assignment Ⓐ



Main Circuit Terminal Assignment Ⓑ



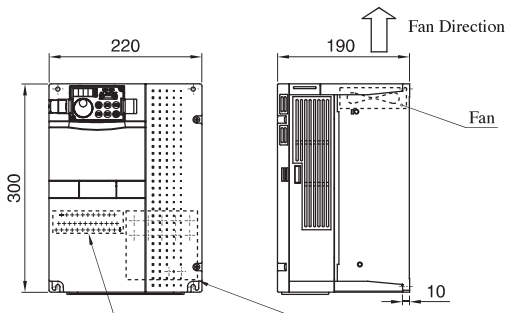
Mountain Hole Dimensions



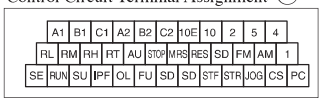
	Main Circuit Terminal R/L1, S/L2, T/L3 U, V, W, P/+, PR, ⏚	Control Circuit Terminal
Terminal Screw	M6	M3.5
Torque [N·m]	4.4	1.2

* Note) Do not connect wiring to the terminals "P1" and "-".

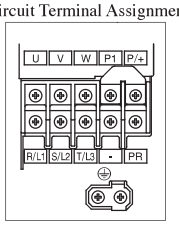
AMSE-4AE-B00-10



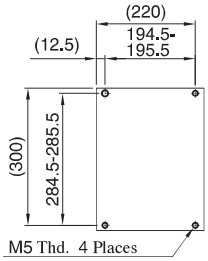
Control Circuit Terminal Assignment Ⓐ



Main Circuit Terminal Assignment Ⓑ



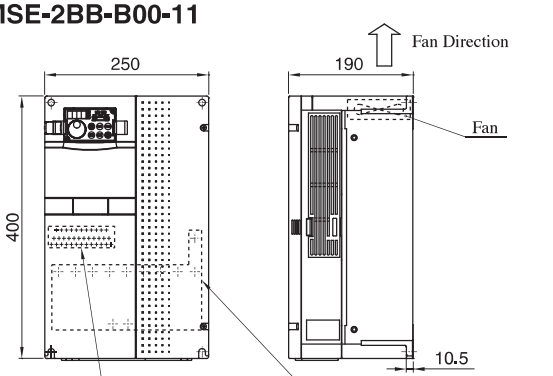
Mountain Hole Dimensions



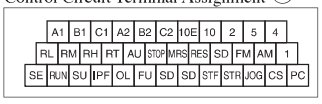
	Main Circuit Terminal U, V, W, P/+, R/L1 S/L2, T/L3, PR, ⏚	Control Circuit Terminal
Terminal Screw	M5	M3.5
Torque [N·m]	2.5	1.2

* Note) Do not connect wiring to the terminals "P1" and "-".

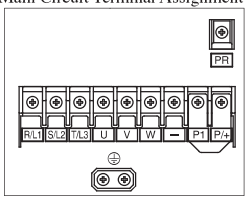
AMSE-2BB-B00-11



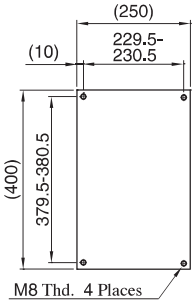
Control Circuit Terminal Assignment Ⓐ



Main Circuit Terminal Assignment Ⓑ



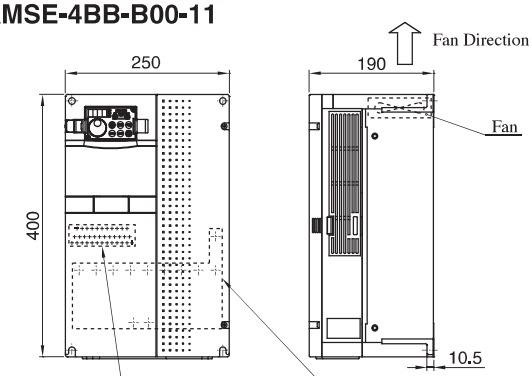
Mountain Hole Dimensions



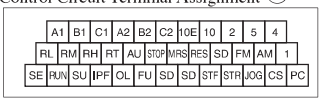
	Main Circuit Terminal R/L1, S/L2, T/L3, U, V, W, P/+, PR,	⏚	Control Circuit Terminal
Terminal Screw	M8	M6	M3.5
Torque [N·m]	7.8	4.4	1.2

* Note) Do not connect wiring to the terminals "P1" and "-".

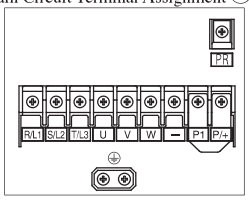
AMSE-4BB-B00-11



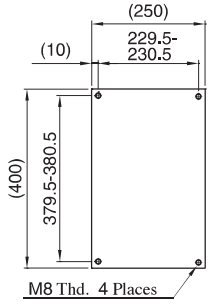
Control Circuit Terminal Assignment Ⓐ



Main Circuit Terminal Assignment Ⓑ



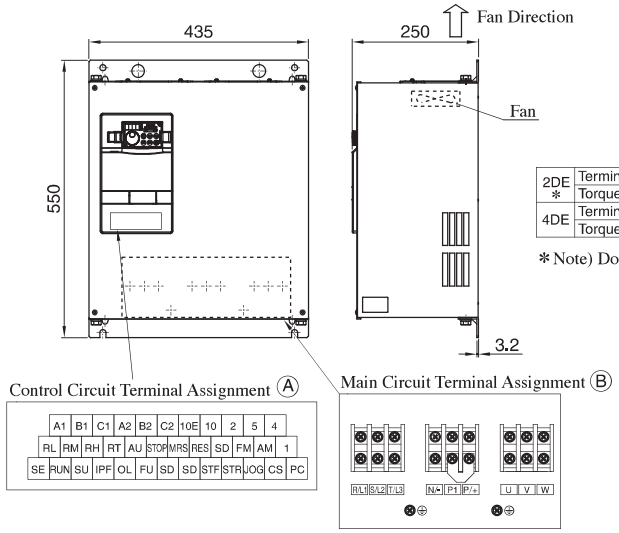
Mountain Hole Dimensions



	Main Circuit Terminal R/L1, S/L2, T/L3, U, V, W, P/+, PR, ⏚	Control Circuit Terminal
Terminal Screw	M6	M3.5
Torque [N·m]	4.4	1.2

* Note) Do not connect wiring to the terminals "P1" and "-".

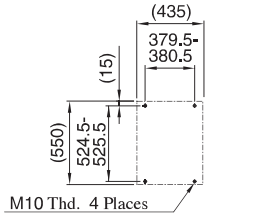
AMSE-＊DE-B00-10



		Main Circuit Terminal U, V, W, P/+, N/- R/L1 , S/L2 , T/L3	⊕	Control Circuit Terminal
2DE＊	Terminal Screw	M10	M8	M3.5
	Torque [N･m]	14.7	7.8	1.2
4DE	Terminal Screw	M8		M3.5
	Torque [N･m]	7.8		1.2

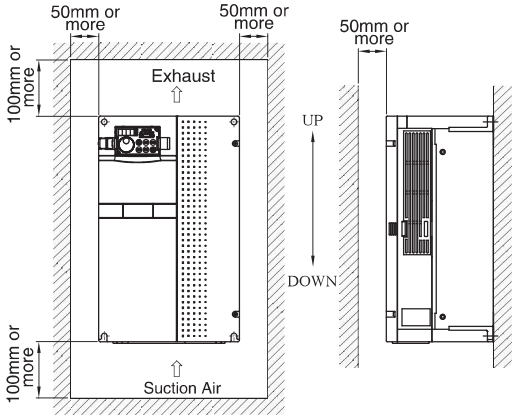
＊Note) Do not connect wiring to the terminals “P1”.

Mountain Hole Dimensions

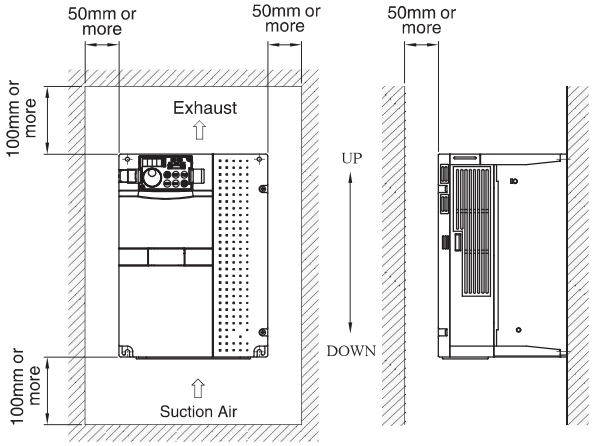


Installation Standard

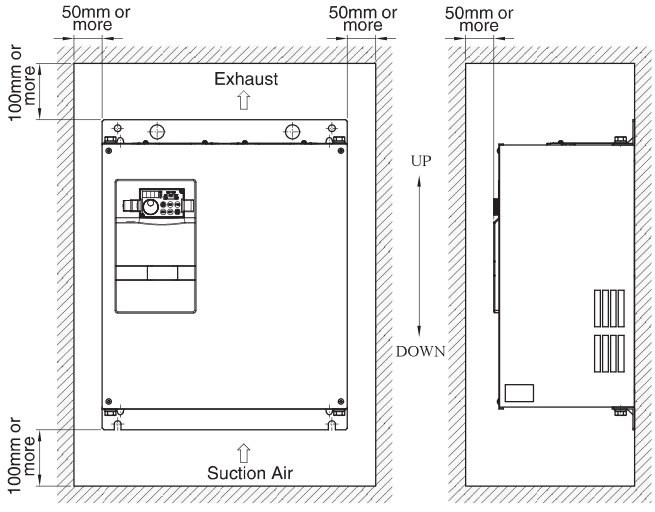
AMSE-2AE＊BB-B00-＊＊



AMSE-4AE-B00-10



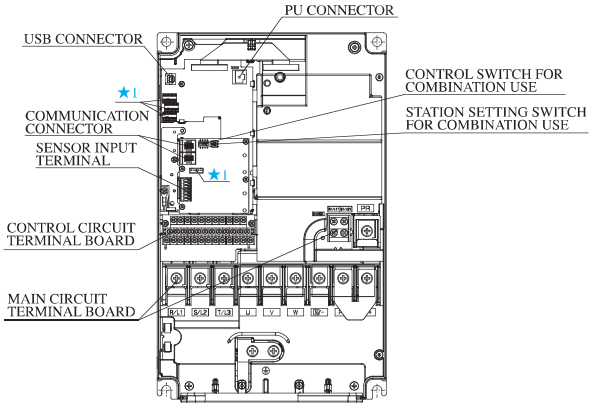
AMSE-＊DE-B00-10



★Consult us when installing multiple controllers next to each other.

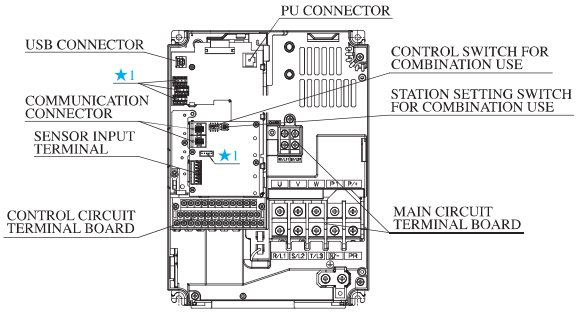
Terminal Names/Appearance

● AMSE-2AE -B00-10
● AMSE-＊BB-B00-11



★1 These are not used in this system.

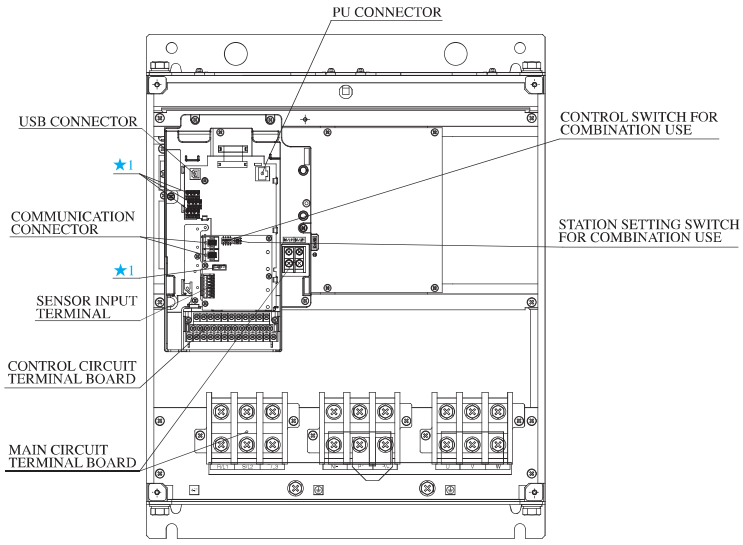
● AMSE-4AE -B00-10



★1 These are not used in this system.

Function	Terminal Name	Terminal Channel	Description
Combination (Single Operation Allowed)	USB Connector (Type:USB B)	-	By using the serial communication function of USB, such as change of parameter, operation of monitor function is possible.
	Control Switch	1	For the manufacturer's setting. : Always OFF.
		2	Reserved.
		3	For switching single and combination operations. OFF: Combination, ON: Single
		4	Network terminal resistance OFF:None, ON:Resistance
	Station Setting Switch	0	Master station
		1-F	Slave station
	Communication Connector	-	Connect this to the network of the ASE controller. Recommended cable: TEL-FST-＊S (SANWA) or MJ-FS＊(ELECOM)

● AMSE-＊DE-B00-10



★1 These are not used in this system.

For the details of PU connector, sensor input terminal, consult us separately.

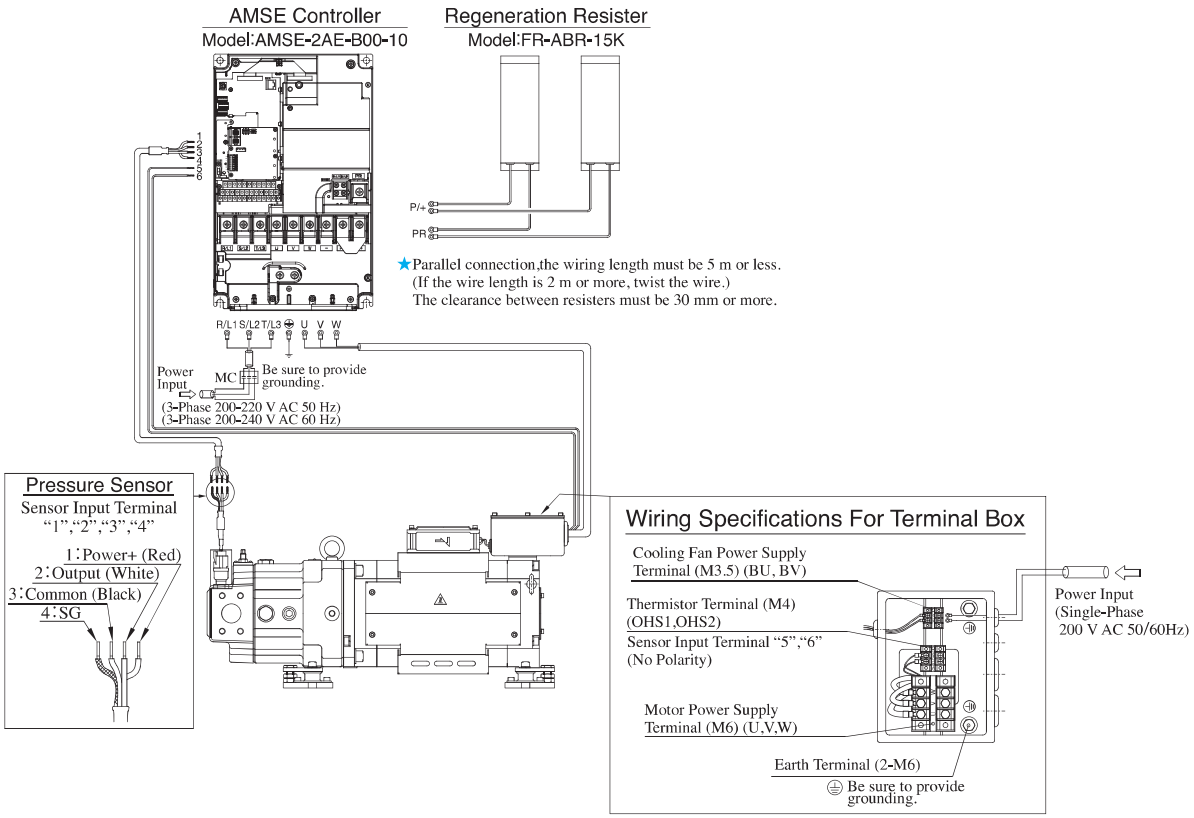
Terminal Block

Connection (Use)	Signal Name	Description		
		AMSE-＊AE/＊BB-B00	AMSE-2DE-B00	AMSE-4DE-B00
DC Reactor for Power Factor Improvement	P1	No Connection★2		
Brake Unit	N/-	No Connection★2	FR-BU2-30K-04★2	FR-BU2-H30K-04★2

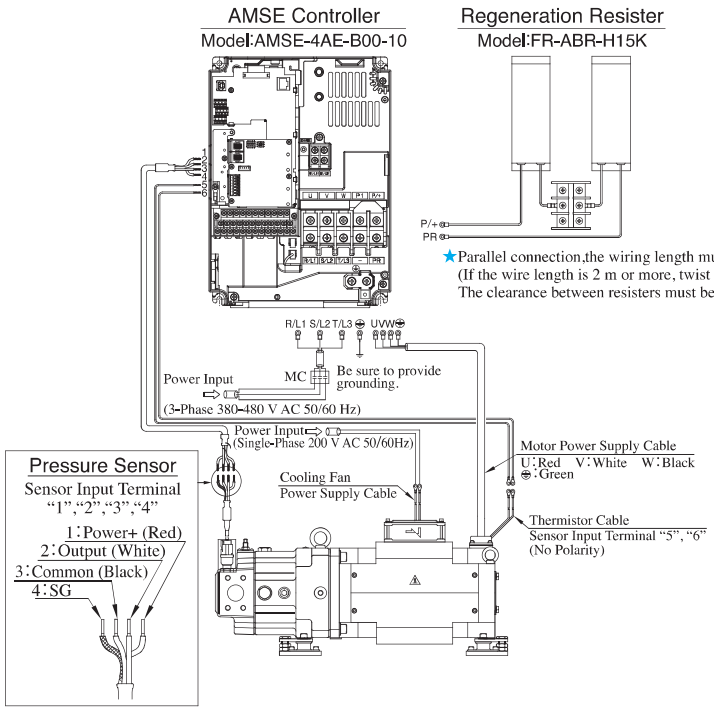
★2 Please contact Yuken, when you connect each unit or connect a DC reactor.

Wire Connection Diagram

ASE3-AA-∗∗∗-B00-40

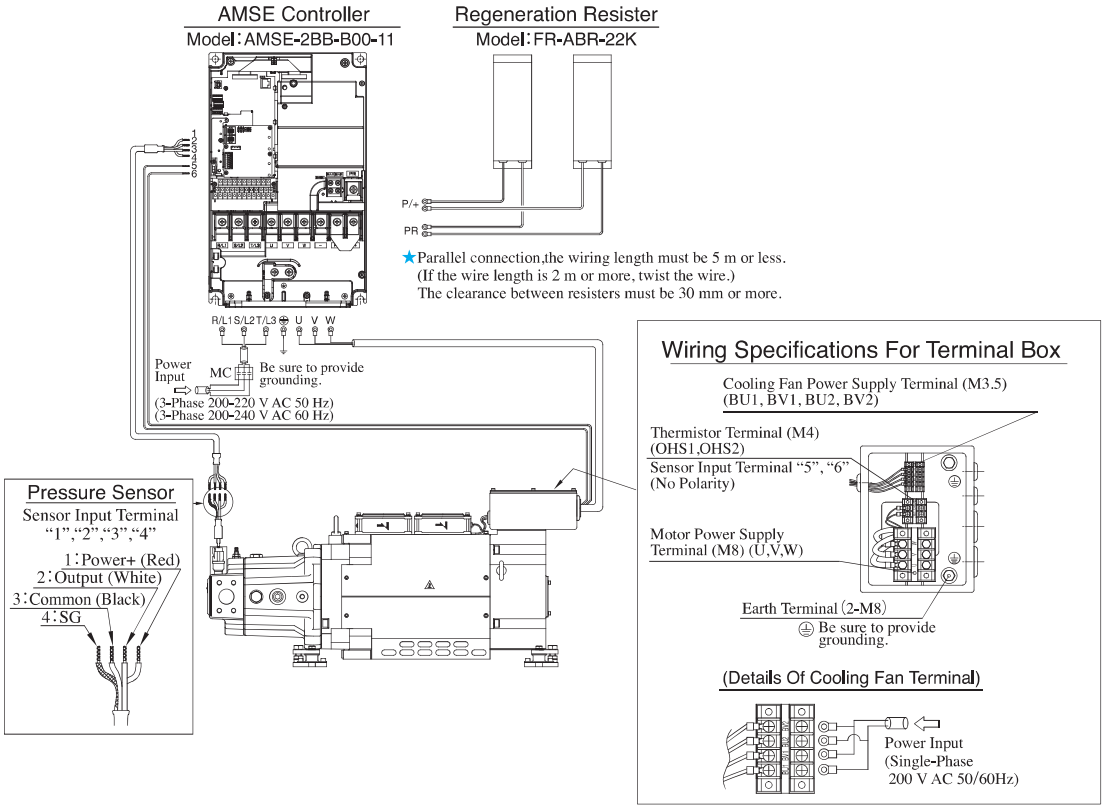


ASE3-4AA-∗∗∗-B00-40

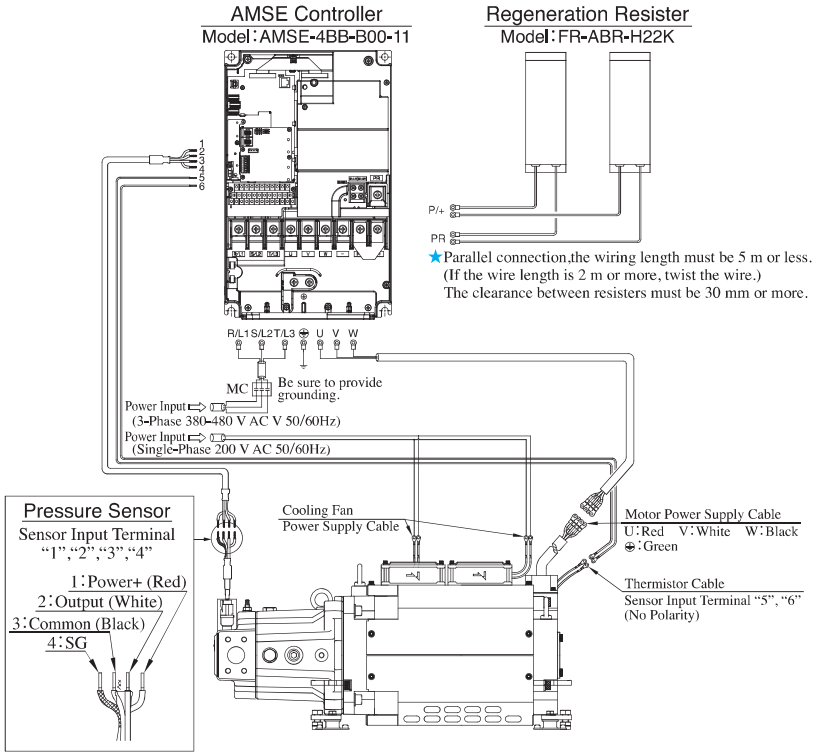


Wire Connection Diagram

ASE5-BZ-∗∗∗-B00-40

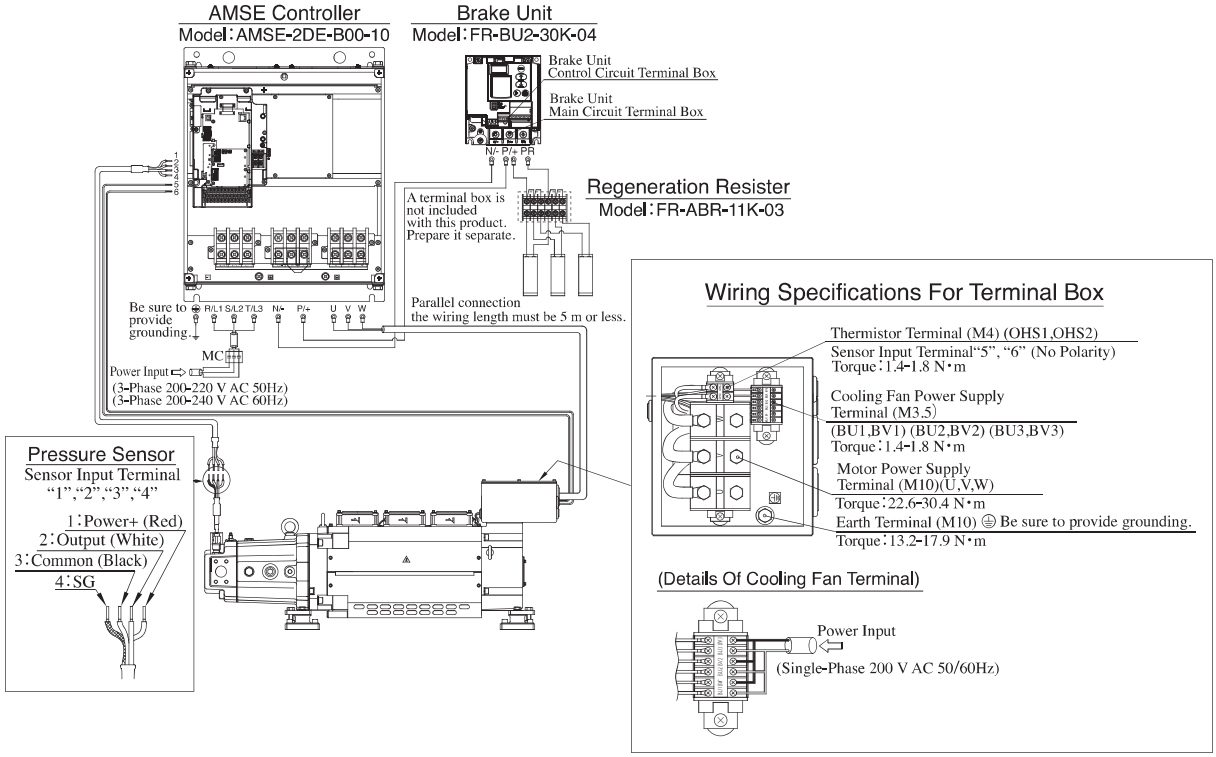


ASE5-4BZ-∗∗∗-B00-40

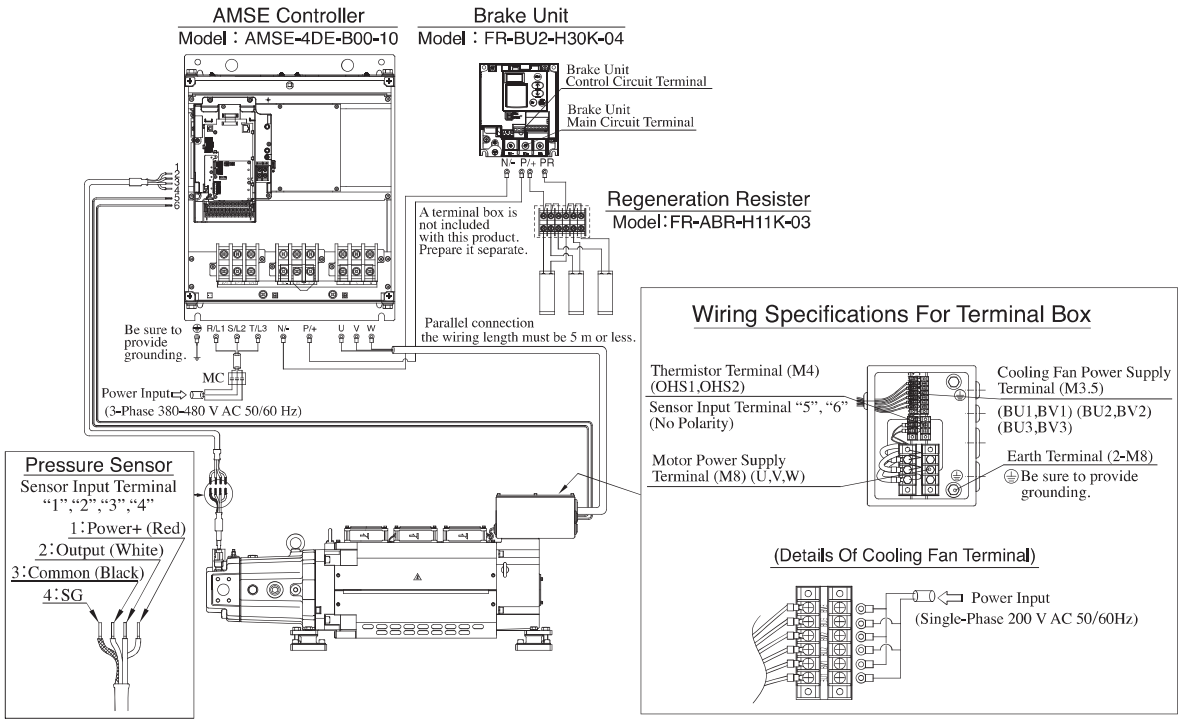


Wire Connection Diagram

ASE10-CE-＊＊＊-B00-30

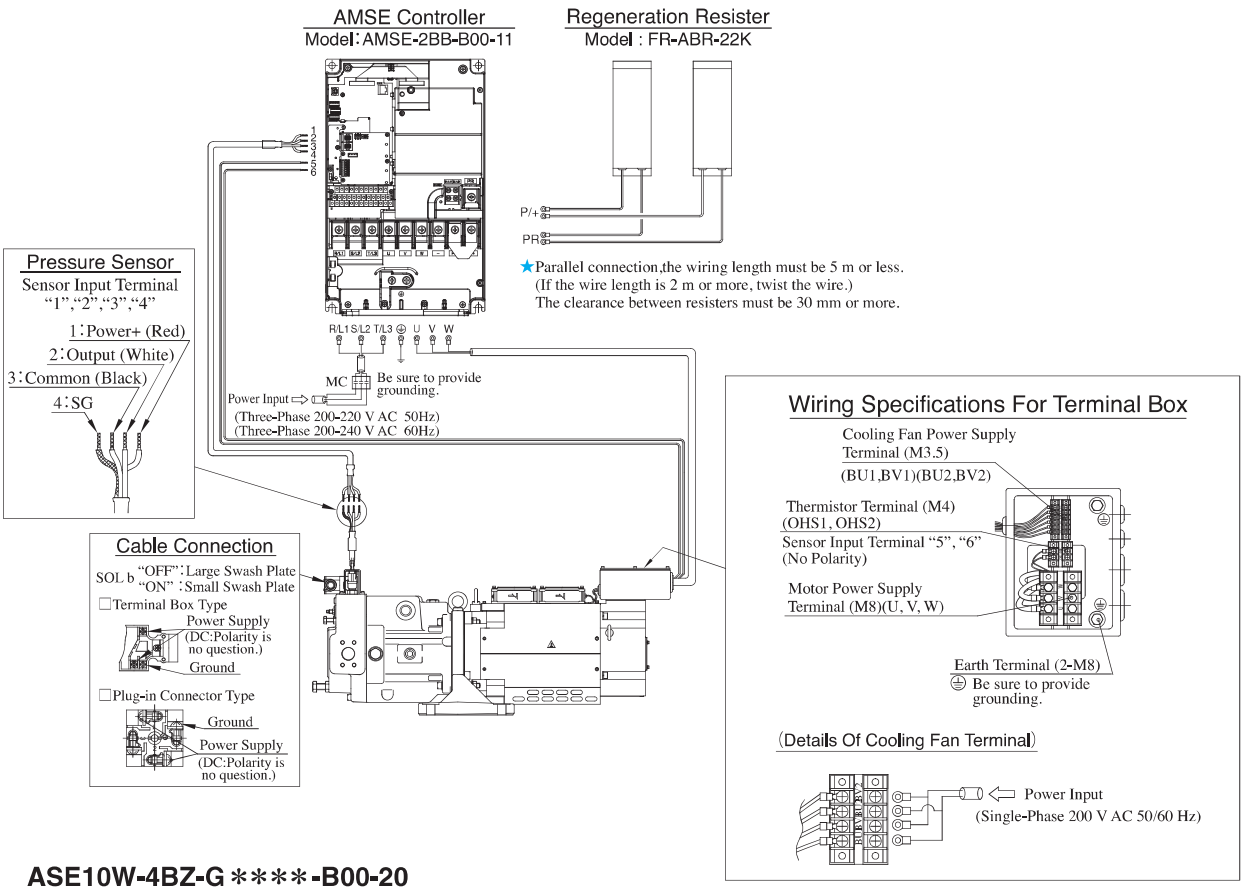


ASE10-4CE-＊＊＊-B00-30

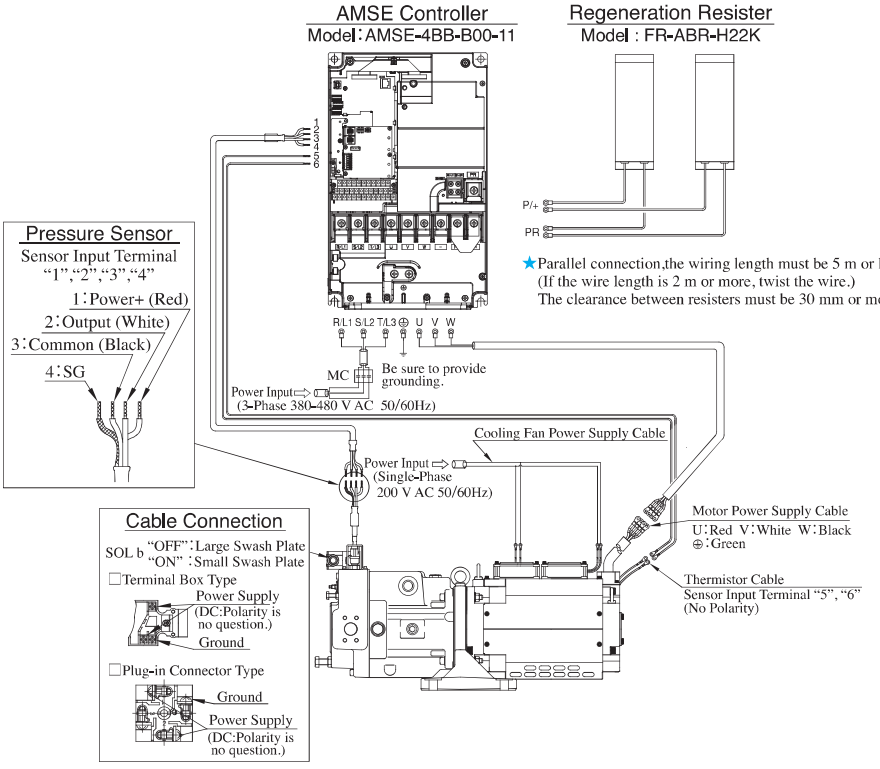


Wire Connection Diagram

ASE10W-BZ-G∗∗∗∗-B00-20

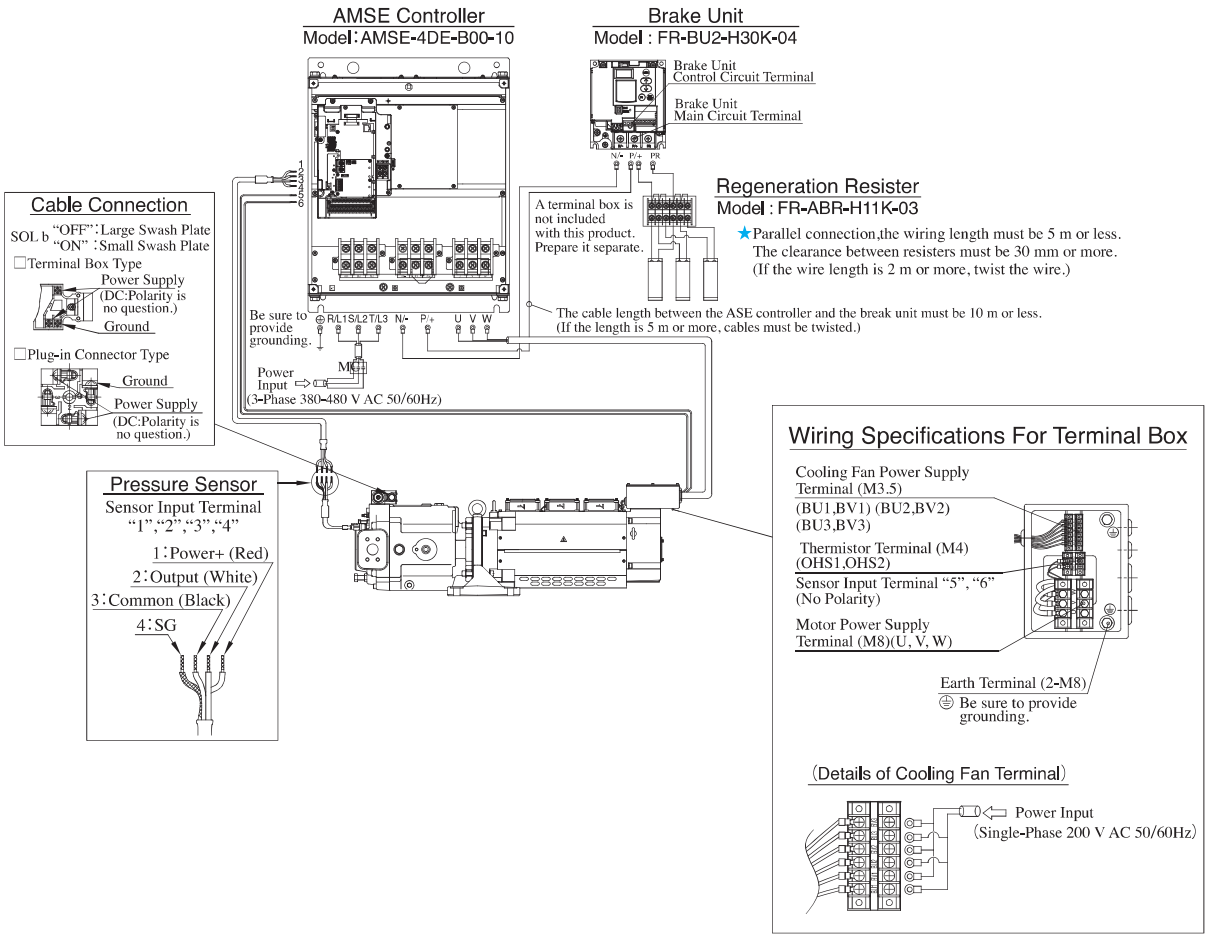


ASE10W-4BZ-G∗∗∗∗-B00-20



Wire Connection Diagram

ASE15W-4CE-G∗∗∗∗-B00-20



Connectors

Control Circuit Terminal

	Cable mm²
Control Circuit Terminal	0.75 (AWG18)

Sensor Input Terminal

	Cable mm²
Pressure Sensor Thermistor	0.5 - 1.3 (AWG20 - 16)

Cooling Fan

	Cable mm²
Cooling Fan Cable	2.0 (AWG14)

AMSE-2AE-＊＊-10

Main Circuit Terminal

	HIV Cable mm²	AWG	PVC Cable mm²
Main Circuit Power R/L1, S/L2, T/L3	22	4	25
Motor Output Power U, V, W	22	4	25
Regeneration Resister P/+, PR	2.1	14	2.5
Earth Wire ⏚	14	6	16

AMSE-4AE-＊＊-10

Main Circuit Terminal

	HIV Cable mm²	AWG	PVC Cable mm²
Main Circuit Power R/L1, S/L2, T/L3	8	8	10
Motor Output Power U, V, W	8	8	10
Regeneration Resister P/+, PR	2.1	14	2.5
Earth Wire ⏚	8	8	10

AMSE-2BB-＊＊-11

Main Circuit Terminal

	HIV Cable mm²	AWG	PVC Cable mm²
Main Circuit Power R/L1, S/L2, T/L3	38	2	35
Motor Output Power U, V, W	38	2	35
Regeneration Resister P/+, PR	2.1	14	2.5
Earth Wire ⏚	22	4	25

AMSE-4BB-＊＊-11

Main Circuit Terminal

	HIV Cable mm²	AWG	PVC Cable mm²
Main Circuit Power R/L1, S/L2, T/L3	14	6	16
Motor Output Power U, V, W	14	6	16
Regeneration Resister P/+, PR	2.1	14	2.5
Earth Wire ⏚	14	6	16

AMSE-2DE-＊＊-10

Main Circuit Terminal

	LMFC Cable mm²	HIV Cable mm²	AWG	PVC Cable mm²
Main Circuit Power R/L1, S/L2, T/L3	60	100	4/0	95
Motor Output Power U, V, W ⏚ (Earth Terminal)	★60			
Brake Unit Regeneration Resister P/+, N/- (PR)		5.5	10	6
Earth Wire ⏚	38	60	4	50

AMSE-4DE-＊＊-10

Main Circuit Terminal

	HIV Cable mm²	AWG	PVC Cable mm²
Main Circuit Power R/L1, S/L2, T/L3	38	1	50
Motor Output Power U, V, W	38	2	50
Brake Unit Regeneration Resister P/+, N/- (PR)	3.5	12	4
Earth Wire ⏚	22	4	25

★Select LMFC wire for motor connection.
Recommended wire: EM-LMFC (Flame-retardant cross-linked polyethylene insulated flexible lead wire) made by Furukawa Electric Industrial Cable Co.,Ltd

●Pressure Sensor Cable
Consult us separately.

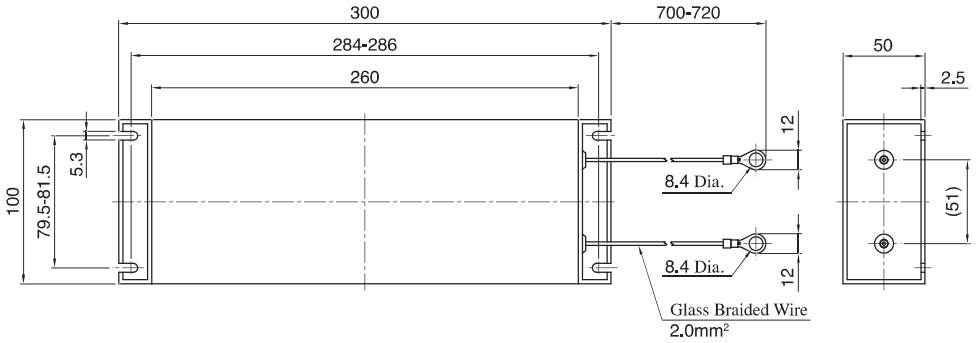
■ Regeneration Resister

●Specifications

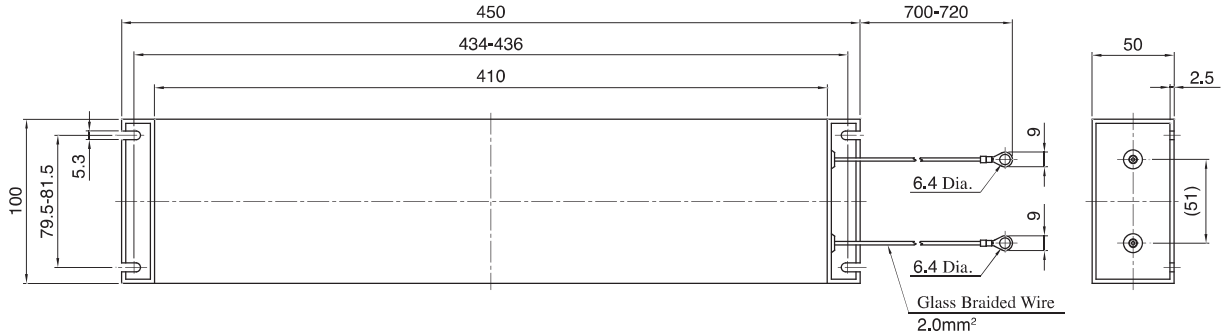
AMSE Controller Model Numbers	Regeneration Resister Model	Qty.	Brake Unit Model	Permissible Regeneration W	Resistance Ω	Mass kg
AMSE-2AE-B00-	FR-ABR-15K	2	-	805	9 (18Ω×2 Parallel)	4.4kg (2.2kg×2)
AMSE-4AE-B00-	FR-ABR-H15K			870	36 (18Ω×2 Series)	
AMSE-2BB-B00-	FR-ABR-22K	2		1120	6.5 (13Ω×2 Parallel)	6.6kg (3.3kg×2)
AMSE-4BB-B00-	FR-ABR-H22K			1060	26 (52Ω×2 Parallel)	7.2kg (3.6kg×2)
AMSE-2DE-B00-	FR-ABR-11K-03	3	FR-BU2-30K-04	1500	4.3 (13Ω×3 Parallel)	9.6kg (3.2kg×3)
AMSE-4DE-B00-	FR-ABR-H11K-03		FR-BU2-H30K-04	1500	17.3 (52Ω×3 Parallel)	

★1. Regeneration resisters are included with the AMSE.
★2. Regeneration resisters may become excessively heated. Use heat-resistant and fireproof wires and avoid their contact with the resisters.
★3. The power (W) stamped on the regeneration resister body is the rated value of the regeneration resister alone, not the permissible regenerations power (W) shown in the table above.

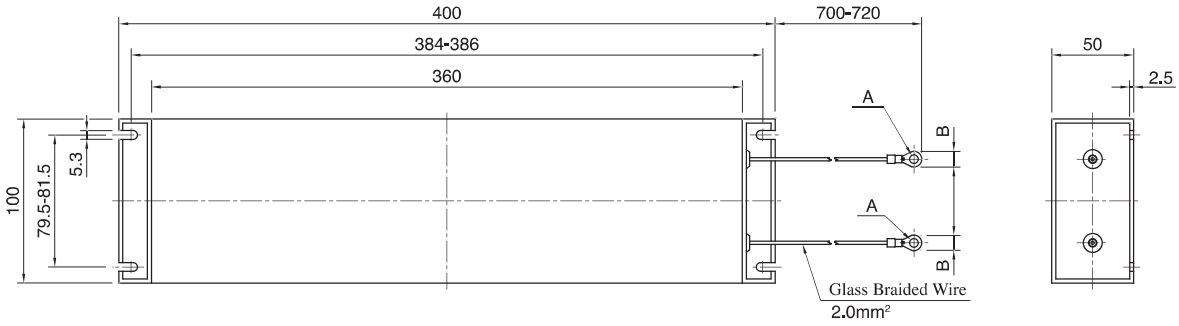
Model:FR-ABR-15K/H15K



Model:FR-ABR-H22K



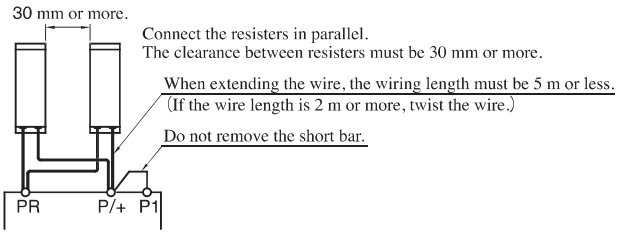
Model:FR-ABR-22K/11K-03/H11K-03



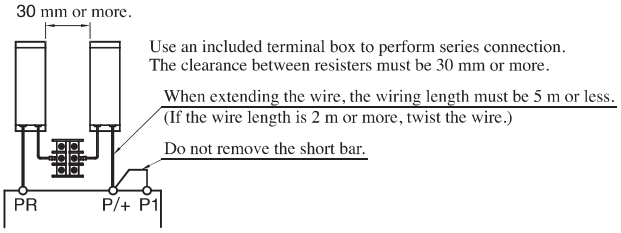
Model	A	B
FR-ABR-22K	8.4 Dia.	12
FR-ABR-11K-03/H11K-03	6.4 Dia.	9

●Customer Setting

FR-ABR-15K/22K/H22K

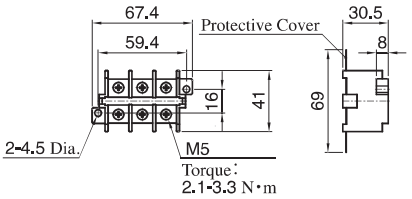


FR-ABR-H15K

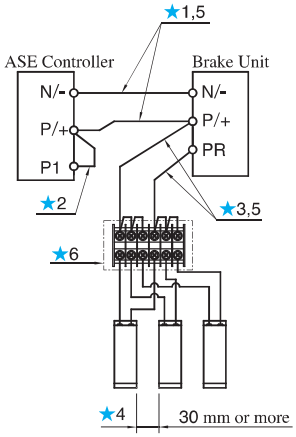


●Attachment

Terminal Box Outline Drawing

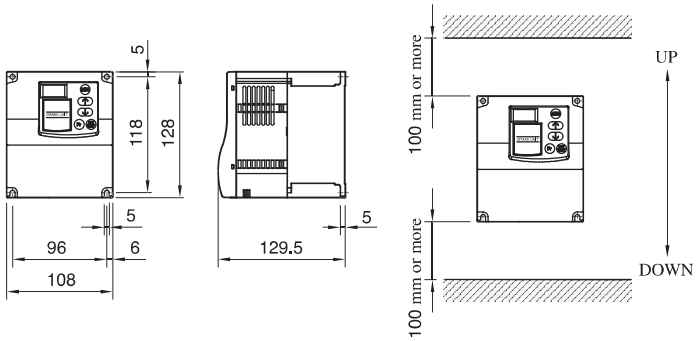


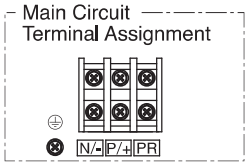
FR-ABR-11K-03
FR-ABR-H11K-03

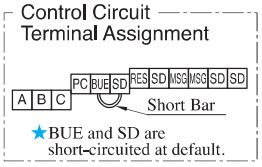


Brake Unit Outline Drawing

MODEL:FR-BU2-30K-04
FR-BU2-H30K-04







★1. The wiring length between the ASE controller and brake unit must be 10 m or less. (If it is 5 m or more, twist the wire.)
★2. Do not remove the short bar between terminals P1 and P/+ of the ASE controller.
★3. The wiring length between the brake unit and regenerative resister must be 5 m or less. (If the wire length is 2 m or more, twist the wire.)
★4. Connect the resisters in parallel. The clearance between resisters must be 30 mm or more.
★5. Use a wire with the size indicated below or larger.
HIV wires and the like: 5.5 mm² AWG-10, PVC wires and the like: 6 mm² [FR-BU2-30K-04]
HIV wires and the like: 3.5 mm² AWG-12, PVC wires and the like: 4 mm² [FR-BU2-H30K-04]
★6. A terminal box is not included with this product. Prepare it separate.

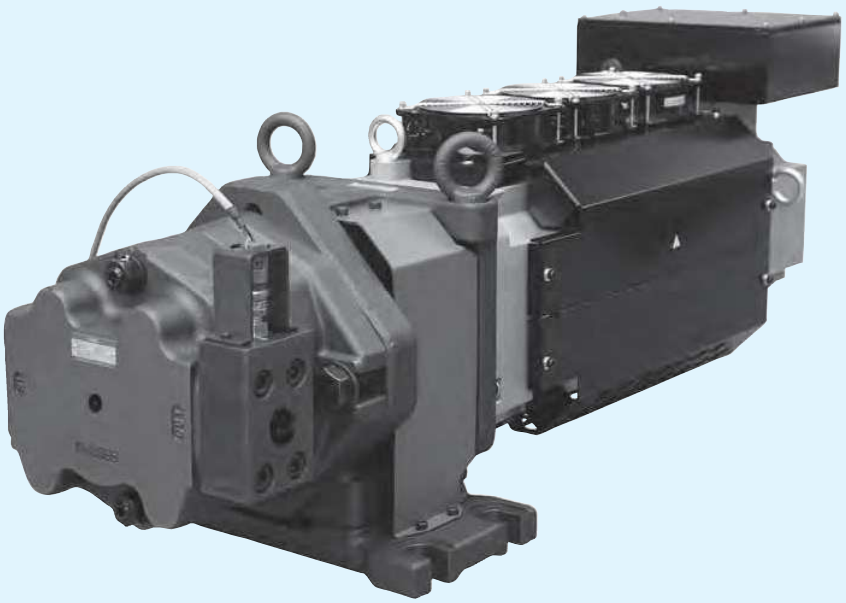
MODEL:FR-BU2-30K-04

	MAIN CIRCUIT TERMINAL P/+, N/-, PR, ⏚	CONTROL CIRCUIT TERMINAL
TERMINAL SCREW	M5	M3
TIGHTENING TORQUE	2.5 [N·m]	0.6 [N·m]

MODEL:FR-BU2-H30K-04

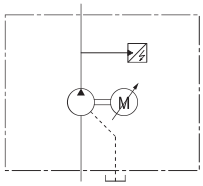
	MAIN CIRCUIT TERMINAL P/+, N/-, PR, ⏚	CONTROL CIRCUIT TERMINAL
TERMINAL SCREW	M4	M3
TIGHTENING TORQUE	1.5 [N·m]	0.6 [N·m]

ASU Series
AC Servo Motor Driven Pumps



This product is exclusively use for foreign countries outside of Japan.

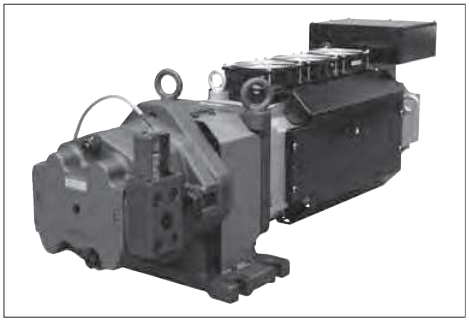
"ASU" Series AC Servo Motor Driven Pumps

Pump Type	Graphic Symbol	Geometric Displacement cm^3/rev (0, 2, 5, 10, 20, 5, 100, 150)	Maximum Operating Pressure MPa	Page
ASU Series AC Servo Motor Driven Pumps		ASU6 ASU8 ASU10 ASU13	17.5	A-257

● Consult Yuken for "ASU" Series AC Servo Motor Driven Pumps details.

ASU Series AC Servo Motor Driven Pumps

The ASU series follows the basic concept of the ASR series rotational speed control system and achieves low noise at high speeds. 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.



Features

Energy saving with low heat generation

These pumps run at a rotational speed suitable for mechanical requirements, eliminating unnecessary power loss. They minimize heat generation in the fluid and allow the use of a significantly smaller reservoir.

Low noise

The motor operates at near-zero speed during unloaded operation or pressure control, keeping the noise level extremely low. Noise at high speed is also reduced.

Less wiring / high reliability

Use sensor-less rotational speed control.

Digital AMSE controller that saves space and wiring

The integration of the amplifier for the servo motor and the controller saves space and wiring. The parameters can be digitally adjusted in an easy and repeatable way.

Large flow

The AMSE controller has a combination function that supports operation with large flow up to 4080 L/min (ASU13 × 16 units).

Specifications

Descriptions \ Series Number			ASU6	ASU8		ASU10	ASU13
Power Capacity			BZ	BZ	CE	CE	CE
Pump	Flow Control	Max. Flow	143.1 L/min	158.6 L/min		198.2 L/min	255 L/min
		Min. Adj. Flow	2 %				
		Hysteresis	2% or less				
		Repeatability	2% or less				
		Input Signal Voltage	124.4 L/min/5V	158.6 L/min/5V		198.2 L/min/5V	255 L/min/5V
		Max. Permissible Input Signal Voltage★	143.1 L/min/5.75V				
	Pres. Control	Max. Operating Pres.	17.5 MPa				
		Min. Adj. Pres.	0.1 MPa				
		Hysteresis	1% or less				
		Repeatability	1% or less				
		Input Signal Voltage	17.5 MPa/5V				
AC Servo Motor Specifications	Rated Output		20 kW	20 kW	35 kW	35 kW	
	Insulation Class		Class F				
	Cooling System		Totally-enclosed Fan-cooling				
		Cooling Fan Power Consumption	40W(50Hz)/36W(60)Hz	40W(50Hz) 36W(60Hz)	60W(50Hz) 54W(60Hz)	60W(50Hz)/54W(60Hz)	
	Environmental Condition	Ambient Temperature	0 - +40 °C (No Freezing)				
		Ambient Humidity	80%RH or less(No Condensation)				
Mass	200 V AC Type		171 kg	173 kg	227 kg	229 kg	231 kg
	400 V AC Type		164 kg	166 kg	222 kg	224 kg	226 kg
Applicable Controller Model Numbers			AMSE-＊BB	AMSE-＊BB	AMSE-＊DE	AMSE-＊DE	

★By adjusting the controller, the maximum flow rate/5 V (143.1 L/min/5 V) can be set.