YUKEN

Doc. No.	Pub. EM-0146-8
Date of issue	July 17, 2013
Products Publicity Section, Sales Administration Dept.	

Instruction Manual

ASE Series AC Servo Motor-Driven Pumps

Model: ASE3 -*AA-G 80*-B00-31

: ASE5 -*BZ-G130*-B00-31

: ASE10-4CE-G200*-B00-21

- To ensure safe and correct use of the product -

- To ensure proper handling of the product, read this manual thoroughly before use.
- Be sure to follow the instructions described in the Safety Precautions section and the main body of this manual.
- Keep this manual at hand for future reference.
- When creating instruction manuals for systems equipped with the product, be sure to reflect the contents of this manual in such documents.

YUKEN KOGYO CO., LTD.

————————About this manual————————

- **Some figures and illustrations in this manual are simplified and may not be an exact representation of the product.**

- **The contents of this manual are subject to change without prior notice as improvements are made to the product.**

- **Although this manual has been prepared with great care, please contact the place of purchase or our customer support if you find any ambiguous explanations, errors, or omissions.**

- **If there are missing pages or erratic pagination in this manual, please contact our customer support. We will replace the manual.**

- **Reprint, reproduction, or modification of this manual without the permission of YUKEN KOGYO CO., LTD. is prohibited.**

■ Safety Precautions

- **This manual is intended for users of the product with adequate knowledge of electrics and hydraulics.**
- **The product should be handled by users having equivalent knowledge as stated above or under the supervision of such personnel.**
- **Be sure to provide end-users with the instructions, warnings, and cautions described in this manual.**
- **Be sure to attach this manual when transferring or reselling the product.**
- **Do not use this product in a residential area.**

In this manual, safety precautions are classified into three levels: “DANGER,” “WARNING,” and “CAUTION.” Be sure to read and understand the safety precautions before reading the main body of this manual.
Symbols and definitions for safety precautions in this manual are as follows.

DANGER	**Indicates an imminent danger that is very likely to cause death or severe injury if the instructions are ignored.**
WARNING	**Indicates a potential danger that may cause death or severe injury if the instructions are ignored.**
CAUTION	**Indicates a potential danger that may cause injury or property damage if the instructions are ignored.**

Safety precautions labeled “CAUTION” may result in serious consequences depending on the situation. Regardless of their classification, all safety precautions contain important instructions. Be sure to follow them.

YUKEN KOGYO CO., LTD. assumes no liability for any accident or damage arising from the use or operation of the product in a manner other than specified in this manual.

■ Always follow the safety precautions

⚠ DANGER

- Never use the product in an explosive atmosphere where flammable gases or explosives are handled. Doing so may result in a fatal accident, such as fire or explosion.
- Never perform wiring, assembly, or maintenance/inspection work with the product powered on. Doing so may cause electric shock, resulting in a fatal accident.
- Before wiring, installation, relocation, or inspection, shut off the power supply and wait 15 minutes or more. When the CHARGE lamp of the AMSE controller turns off, perform a voltage check using a tester and then conduct the work.

⚠ WARNING

- Do not use an input power supply not specified. Doing so may cause overheat, resulting in fire.
- Do not modify or disassemble the product. Doing so may impair safe operation.
- Install the AMSE controller and regenerative resistors on nonflammable objects. Any flammable object near them may be heated, causing fire.
- Be sure to connect the ground wire as a precaution against electric shock in the event of earth leakage. Never connect the ground wire to the following.
  - Gas pipe - Lightning rod - Water pipe/faucet - Telephone line ground
- Handling of emergencies
  - ● If the product begins to smoke
    The continuous use of the product under abnormal conditions, such as smoking or unusual odors, may result in fire or electric shock. Immediately shut off the power supply and contact your local customer service after checking that the smoke has stopped. The repair of the product by users is dangerous. The users should never attempt repairs.
  - ● If the product is broken
    If the product is dropped or pulled down, immediately shut off the power supply and contact your local customer service. Continuous use without taking corrective measures may result in fire or electric shock.
  - ● If water gets into the product
    If water gets into the product, immediately shut off the power supply and contact your local customer service. Continuous use without taking corrective measures may result in fire or electric shock.

⚠ CAUTION

- Do not put any object in the pump. Doing so may damage the pump's internal parts during operation.
- During operation or for some time after a power-off, the motor frame temperature is high. Prevent hands or other body parts from contacting the frame in order to avoid burn.
- Do not step on or put any heavy object on the product. Doing so may result in damage to the product/equipment or injury from collapse/falling.

■ Table of Contents

1. Introduction

1.1 Intended users of the product

The product should be handled by users with adequate knowledge of electrics and hydraulics or under the supervision of such personnel.

1.2 Intended purpose

The product is a motor-driven pump unit for hydraulic equipment. It generates and supplies hydraulic pressure, mainly as a hydraulic power source for hydraulic equipment.

1.3 Product check

Check the following points upon delivery of the product.
A packaged set of product components is delivered. Be sure to use them as a set.
Please write down and keep their model numbers and serial numbers. This information is important for making inquiries about the product, maintenance, or requesting spare parts.
If there are any questions or problems, please contact the place of purchase or our local customer support.

- Check if the model is correct.
  Check the model number marked on the nameplate (refer to “2.4 Model number designation”).
- Check for any damage to the product and/or loose screws.

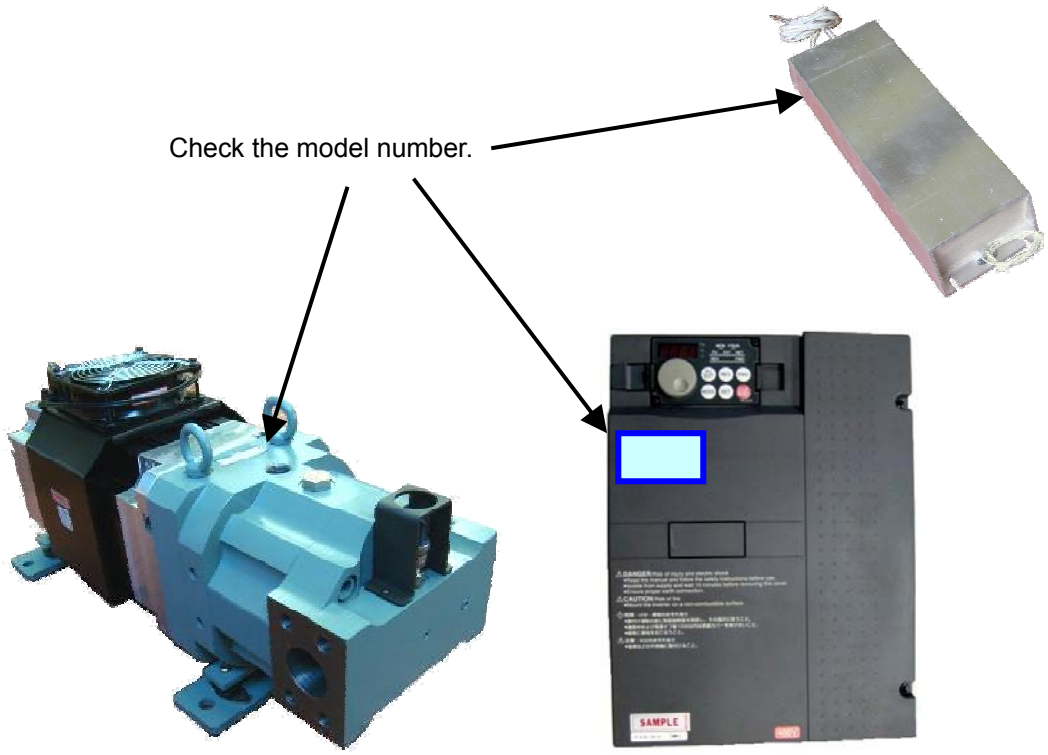


Fig. 1.3a Product Check

2. About the product

2.1 Basic structure and components

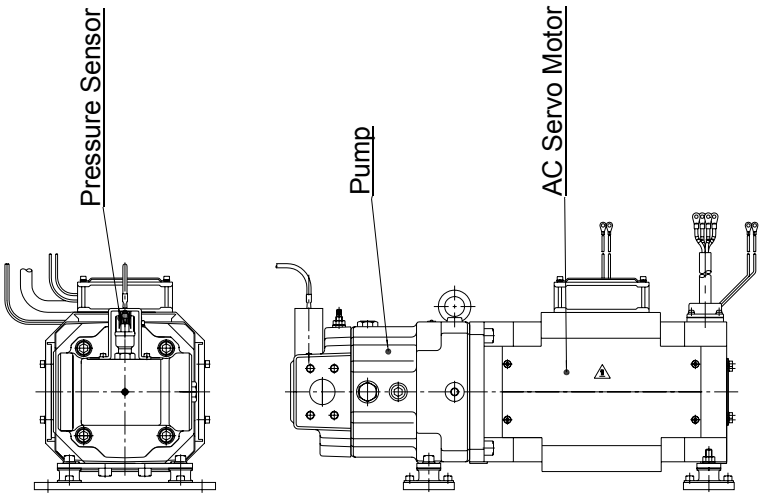


Fig. 2.1a ASE*-**-**S-B00-*

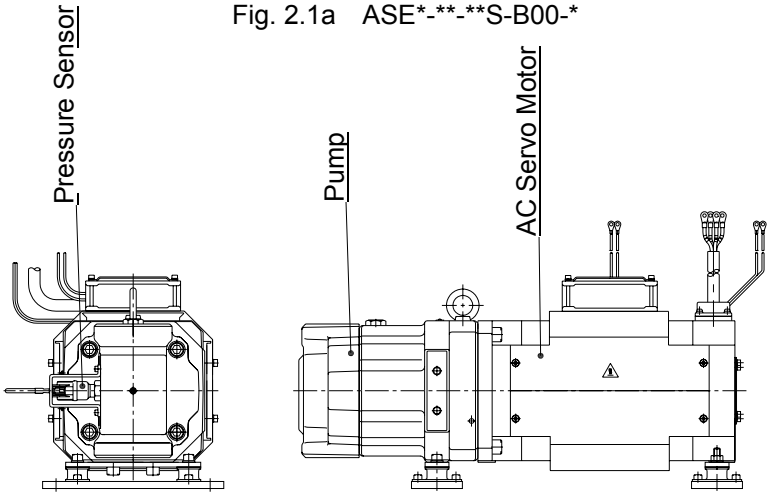


Fig. 2.1b ASE*-**-**B-B00-*

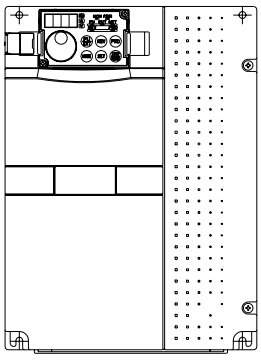


Fig. 2.1c AMSE-**-B00-* (Attached)

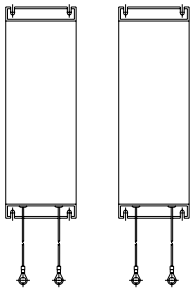


Fig. 2.1d Regenerative Resistor (Attached)

2.2 Basic system configuration

The product is a compact and energy-saving hydraulic device comprised of an AC servo motor and a piston pump. This unit can be combined with the dedicated controller to facilitate the configuration of a speed and pressure control system.

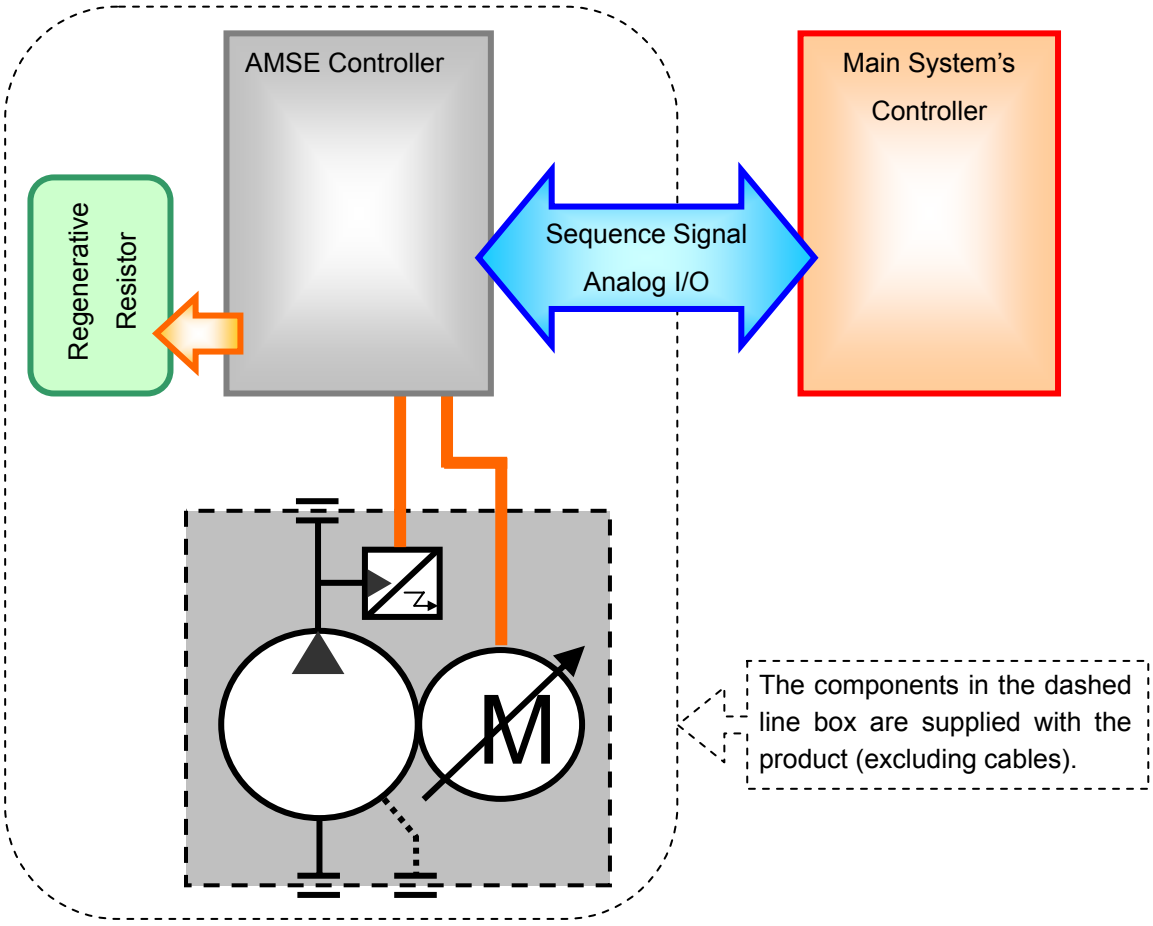


Fig. 2.2a Basic System Configuration

2.3 Control system

The control system provides the variable control of pump discharge pressure and flow by controlling the AC servo motor speed according to externally input pressure and flow commands. Pressure control is based on closed-loop control with the feedback of signals from the pressure sensor built in the pump unit.

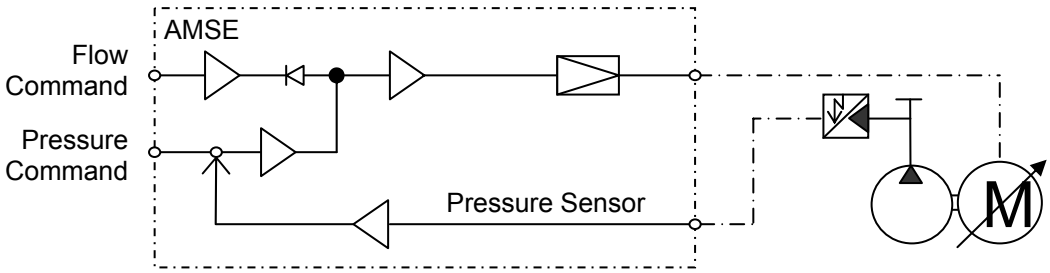
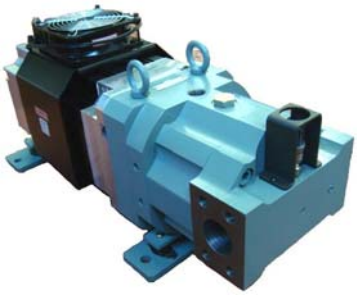


Fig. 2.3a Control System

2.4 Model number designation

2.4.1 ASE model



ASE3-4 AA –G 80 S -B 00-31

Series No.
ASE3: CA37-Z406
ASE5: CA56-Z406
ASE10: CA100-Z406

Input Voltage
4: AC 400 V
No symbol: AC 200 V

Power Capacity
AA: 11 kW (AMSE-*AA-: 15 kW)
BZ: 20 kW (AMSE-*BB-: 22 kW)
CE: 35 kW (AMSE-*DE-: 45 kW)

Max. Operating Press
G: 17.5 MPa

Max. Flow
80: 80.8 L/min
130: 132.7 L/min
200: 205.4 L/min

Port Direction
S: Horizontal B: Vertical

Function Selection
B: Combination use (Single Use Allowed)

Parameter No.
00: Standard

Design No.
ASE3/5: 31 ASE10: 21

Fig. 2.4a Model Number Designation for ASE

2.4.2 Components

Table 2.4a Combination of Components

Model		AMSE Controller Model	Brake Unit	Regenerative Resistor Model
ASE3-	4AA-	AMSE-4AE-B00-10	—	FR-ABR-H15K (indicated on the package) FR-ABR-15K (indicated on the body)
	2AA-	AMSE-2AE-B00-10	—	FR-ABR-15K
ASE5-	4BZ-	AMSE-4BB-B00-11	—	FR-ABR-H22K × 2
	2BZ-	AMSE-2BB-B00-11	—	FR-ABR-22K × 2
ASE10-	4CE-	AMSE-4DE-B00-10	FR-BU2-H30K-04	FR-ABR-H11K-03 × 3

2.5 Specifications

Table 2.5a Specifications

Model		ASE3-*AA-G80*-	ASE5-*BZ-G130*-	ASE10-4CE-G200*-
Flow Control	Max. Flow L/min	80.8	132.7	205.4
	Min. Controlled Flow	2 %		
	Hysteresis	1 % or less		
	Repeatability	1 % or less		
	Input Signal Voltage *1	0 to 6.25 V	0 to 5.75V	0 to 5.00V
Pres. Control	Pres. Adj. Range MPa	0.1 to 17.5		
	Hysteresis	1 % or less *2		
	Repeatability	1 % or less *2		
	Input Signal Voltage *1	0 to 5.0 V		
Atmosphere		Indoors (no direct sunlight) No corrosive gas, flammable gas, oil mist, or dust.		
Altitude		1000 m or less above sea level		
Storage *3	Ambient Temp.	0 to 40 °C (no freezing)		
	Ambient Humidity	80 %RH or less (no condensation)		

*1 Default value (allowable maximum input signal voltage: up to 10 V).
*2 Pressure control accuracy depends on system tuning; this value is for reference.
*3 The storage temperature is different from the ambient temperature during operation.

Table 2.5b ASE (Pump) Specifications

Model	ASE*-**-***-
Operating Pres.	0.1 to 17.5 MPa
Rotational Direction	Clockwise when viewed from the servo motor
Hydraulic Fluid	Petroleum based fluid equivalent to ISO VG32 or 46
Viscosity	20 to 400 mm^2/s
Fluid Temp.	0 to 60 °C

Table 2.5c AC Servo Motor Specifications

Model		ASE*-**-***-
Insulation Class		Class F
Cooling System		Totally-enclosed forced-cooling
Environmental Condition	Protection	IP44 (except for the shaft through portion)
	Ambient Temp.	0 to 40 °C (no freezing)
	Ambient Humidity	80 %RH or less (no condensation)
	Vibration	24.5 m/s^2 or less(When the motor stops, reduce the allowable value to less than one-half.)
Fan Power Voltage/Frequency		Single-phase, AC 180 to 220 V, 50/60 Hz

Table 2.5d AMSE Controller Specifications

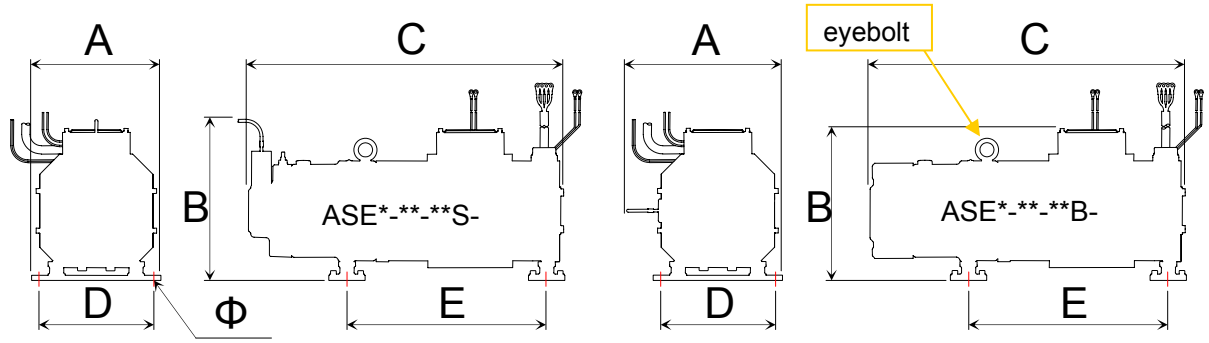
Model			AMSE-4AE- (AMSE-2AE-)	AMSE-4BB- (AMSE-2BB-)	AMSE-4DE-
Main Circuit Power	Voltage		3-phase, AC 380 to 480 V, 50/60 Hz (3-phase, AC 200 to 220 V/50 Hz, AC 200 to 240 V/60 Hz)		
	Permissible Voltage Fluctuation		3-phase, AC 323 to 528 V, 50/60 Hz (3-phase, AC 170 to 242 V/50 Hz, AC 170 to 264 V/60 Hz)		
	Permissible Frequency Fluctuation		± 5 % or less		
Interface	Command Signal Input Voltage		0 to 10 V DC (Pressure/flow command input)		
	Command Signal Input Impedance		10 kΩ		
	Monitor Output Voltage		1ch. 0 to 10 V DC (The output can be changed by parameters.)		
	Sequence Input Signal		12chs. Photocoupler input (current limiting resistance: 4.7 KΩ) Power voltage: DC 21 to 27 V, short-circuited current: 4 to 6 mA		
	Sequence Output Signal		2chs. Relay output (contact capacity: AC 230 or DC 30 V, 0.3 A)		
			5chs. Open collector output (permissible load: DC 24 V, 0.1 A)		
Cooling System			Forced fan cooling, enclosed (IP20)		
Environmental Condition		Ambient Temp.	0 to 50 °C (no freezing)		
		Ambient Humidity	90 %RH or less (no condensation)		
		Vibration	5.9 m/s^2 or less		
Protective Functions			□Overcurrent □Regenerative overvoltage □AMSE controller overload □Motor overload □Fin overheat □Instantaneous power failure □Undervoltage □Input open-phase □Output open-phase □Stall prevention □Ground fault overcurrent on the output side □Communication option error □Parameter memory device error □CPU error □Operation panel power short circuit □DC 24 power output short circuit □Inrush current limiting circuit error □Analog input error □Fan fault □Electronic thermal pre-alarm □Dynamic brake pre-alarm □PU stop □Brake transistor error □Parameter write error □Copy operation error □Operation panel lock □Parameter copy alarm □Communication error □USB communication error □Internal circuit error □Maintenance signal output □Error □Hydraulic control board error □Hydraulic control board warning		

Table 2.5e Facilities

Model	ASE3-		ASE5-		ASE10-
	4AA-	AA-	4BZ-	BZ-	CE-
Power Capacity	27 kVA	28 kVA	41 kVA		80 kVA
Current Breaker	100 A frame /60 A	225 A frame /125 A	100 A frame /100 A	225 A frame /175 A	225 A frame /175 A
Electromagnetic Switch	N25	N50	N30	N80	N80

2.6 External dimensions and mass

Table 2.6a Dimensions and Mass of the Motor-Driven Pump



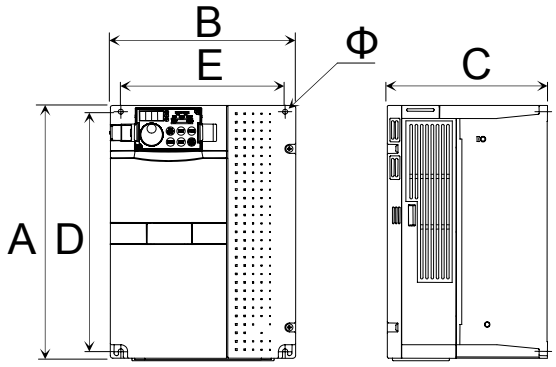
Model			A	B	C	D	E	Φ	Mass kg
ASE3-	4AA-G80	S-	228	284	574.5	194	352.5	Φ14	79
		B-	275	269					
	AA--G80	S-	228	284	597.5		352.5		75
		B-	275	291					
ASE5-	4BZ-G130	S-	268	326	670	220	407.5		116
		B-	295						
	BZ-G130	S-	268	378	790		479.5		123
		B-	295						
ASE10-4CE-G200		S-	340	402	991	296	621	Φ22	190
		B-							

Unit (ABCDEΦ): mm

*Attention: Use the eyebolt, when the transportation of the product.

MEMO

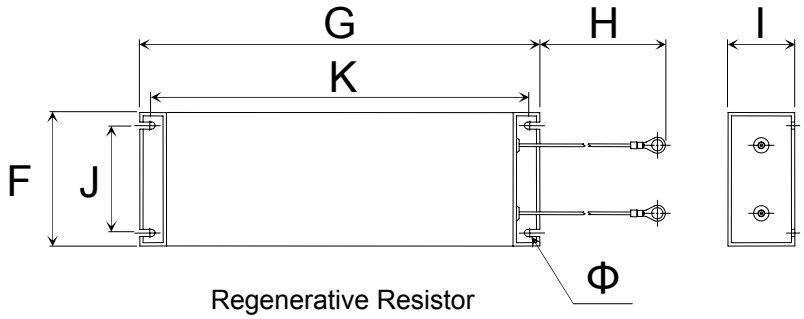
Table 2.6b Dimensions and Mass of
the AMSE Controller and Regenerative Resistor



AMSE Controller

Model	A	B	C	D	E	Φ	Mass kg
AMSE-4AE-	300	220	190	285	195	Φ6	7.5
AMSE-2AE-	400	250	190	380	230	Φ10	14.0
AMSE-4BB-							13.0
AMSE-2BB-							
AMSE-4DE-	550	435	250	525	380	Φ12	35.0

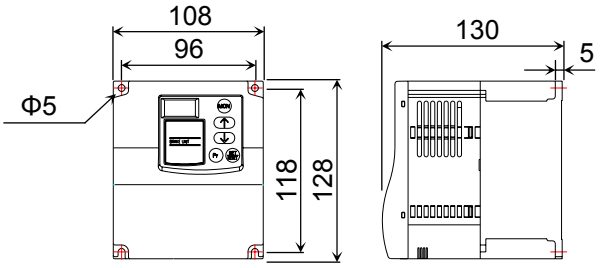
Unit (ABCDEΦ): mm



Regenerative Resistor

Regenerative Resistor	F	G	H	I	J	K	Φ	Mass kg
FR-ABR-15K	100	300	700	50	80.5	285	Φ5.3	2.2/piece
FR-ABR-H22K		450				435		3.6/piece
FR-ABR-H11K-03		400				385		3.2/piece
FR-ABR-22K		400						3.0/piece

Unit (FGHIJKΦ): mm



Brake Unit

* ASE10-4CE- Attached

Unit: mm

2.7 Interface

2.7.1 Parts of the AMSE controller (with the cover installed)

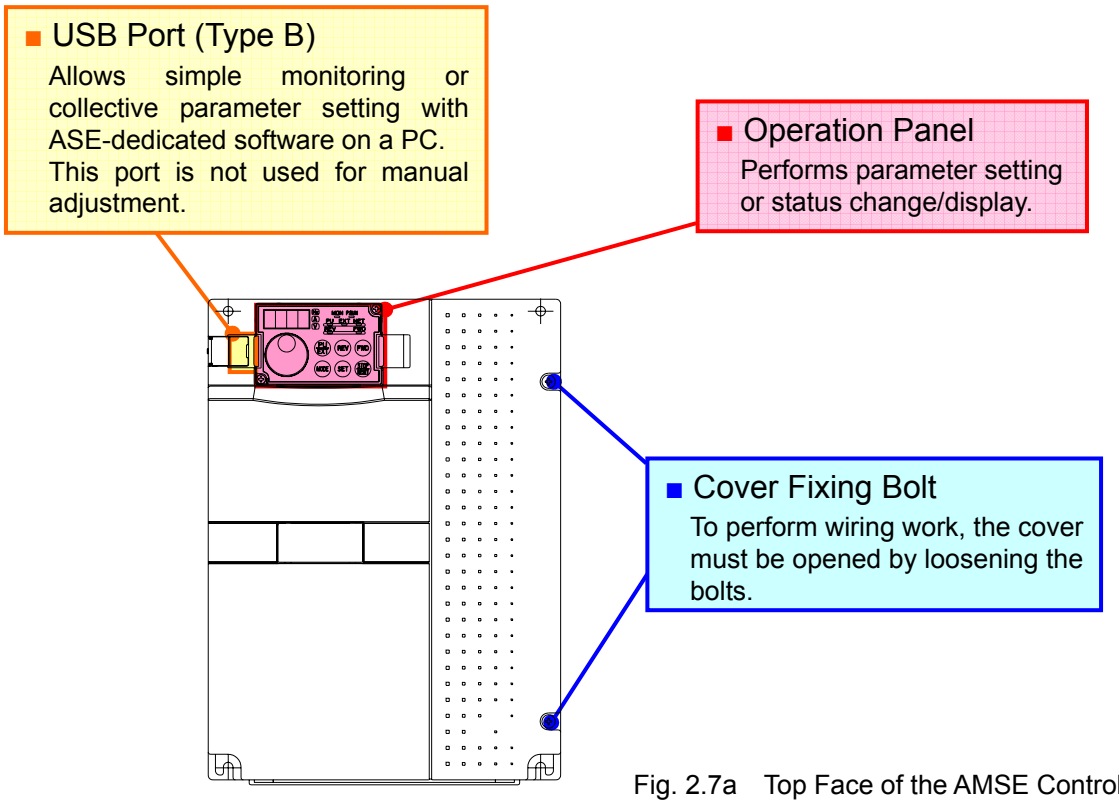


Fig. 2.7a Top Face of the AMSE Controller

2.7.2 Removal of the AMSE controller cover

Note) It is dangerous to remove the cover with the controller powered on. Double-check that the controller power is turned off. Before starting wiring work, remove the cover in the following steps. When mounting the cover, take the reverse steps.

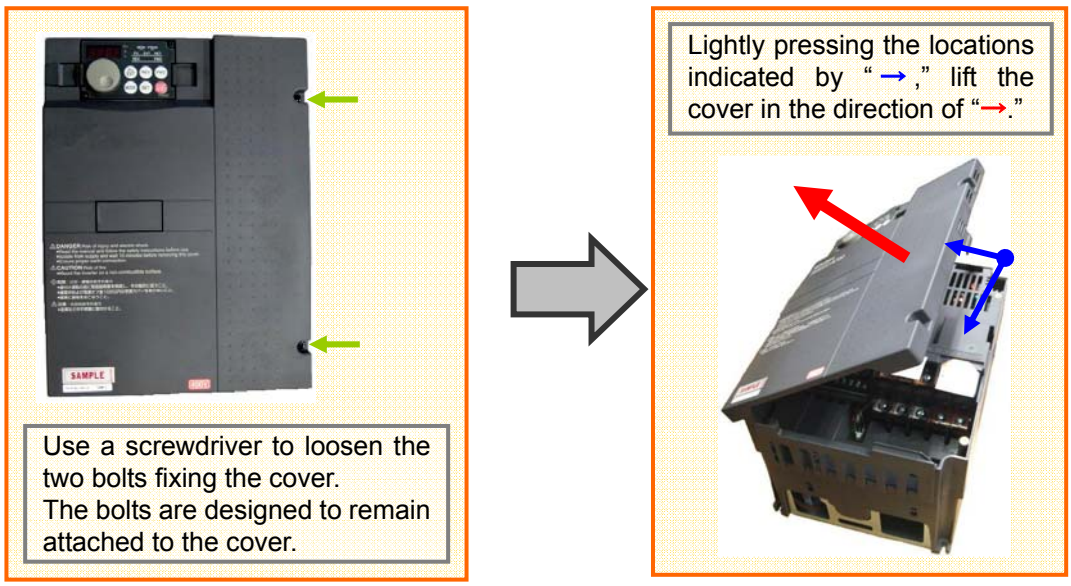


Fig. 2.7b Removal of the Cover

2.7.3 Parts of the AMSE controller (internal parts)

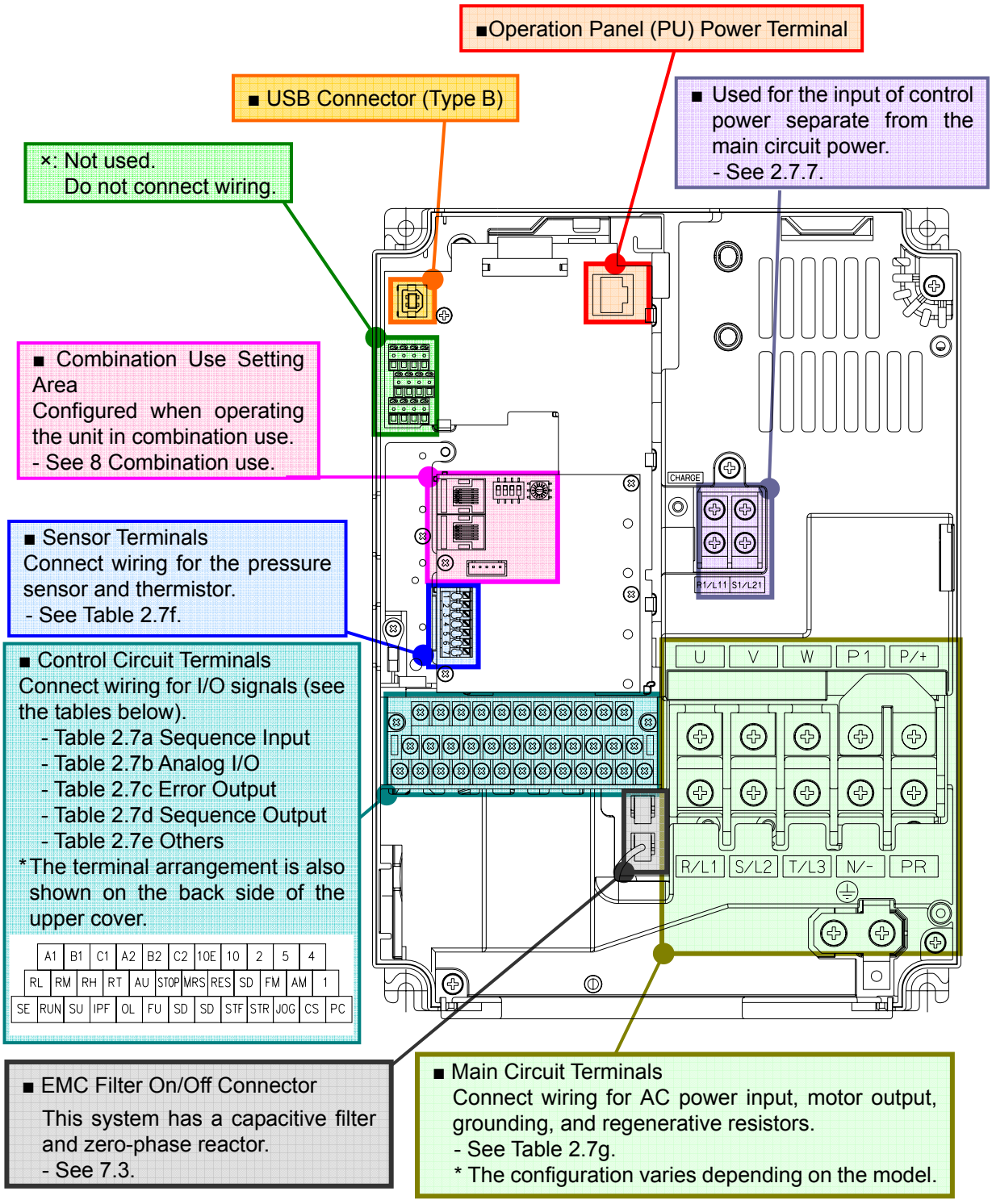


Fig. 2.7c Parts of the AMSE Controller

2.7.4 Control circuit terminals

Table 2.7a Sequence Input

<table>
<tr><th>Type</th><th>Symbol</th><th>Name</th><th>Function/Use</th><th>Rating</th></tr>
<tr><td rowspan="12">Contact Input</td><td>STF</td><td>Forward Rotation Start (Servo-on)</td><td>“ON”: Forward rotation command
“OFF”: Stop command</td><td rowspan="11">Input resistance:
4.7 KΩ

Open-circuit voltage:
DC 21 to 27 V

Short-circuit voltage:
DC 4 to 6 mA</td></tr>
<tr><td>STR</td><td>Reverse Rotation Start</td><td><Not used.>
“ON”: Reverse rotation command
“OFF”: Stop command</td></tr>
<tr><td>STOP</td><td>Reserved</td><td>Disabled.</td></tr>
<tr><td>RH</td><td>Control Code x 1</td><td rowspan="2">Switches the gain according to the load condition variable for each process.
<table>
<tr><th colspan="2">Input Signal</th><th rowspan="2">Control Code</th></tr>
<tr><th>RH</th><th>RM</th></tr>
<tr><td>OFF</td><td>OFF</td><td>No. 0 control parameter</td></tr>
<tr><td>ON</td><td>OFF</td><td>No. 1 control parameter</td></tr>
<tr><td>OFF</td><td>ON</td><td>No. 2L control parameter</td></tr>
<tr><td>ON</td><td>ON</td><td>No. 3 control parameter</td></tr>
</table></td></tr>
<tr><td>RM</td><td>Control Code x 2</td></tr>
<tr><td>JOG</td><td>Reserved</td><td>Disabled.</td></tr>
<tr><td>RT</td><td>Reserved</td><td>Disabled.</td></tr>
<tr><td>MRS</td><td>Emergency Stop</td><td>“OFF”: Emergency stop
“ON”: Emergency stop reset</td></tr>
<tr><td>RES</td><td>Reset</td><td>Resets an alarm.</td></tr>
<tr><td>AU</td><td>Reserved</td><td>Disabled.</td></tr>
<tr><td>CS</td><td>Reserved</td><td>Disabled.</td></tr>
<tr><td>SD</td><td>Contact Input Common</td><td>Common terminal for contact input terminals.
Note) This terminal is insulated from Terminals “5” and “SE.”</td><td>-</td></tr>
<tr><td>PC</td><td>DC 24 V Power Output</td><td>This terminal can be used to supply DC 24 V, 0.1 A power.</td><td>Power voltage range:
DC 20 to 28 V
Permissible load current:
100 mA</td></tr>
</table>

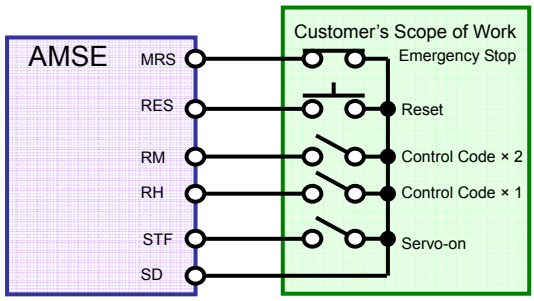


Fig. 2.7d Simplified Wiring Diagram

⚠ WARNING

- When the servo is turned "ON", there is a possibility that the device moves spontaneously. Therefore, the preventive measure is required to secure the servo is not turned "ON" until confirm the safety of device. If the device moves spontaneously, there is a a risk of human death or severe injury.

Table 2.7b Analog I/O

<table>
<tr><th>Type</th><th>Symbol</th><th>Name</th><th>Function/Use</th><th>Rating</th></tr>
<tr><td rowspan="8">Flow/Pressure Setting</td><td>10E</td><td>DC 10 V Power Output</td><td>This terminal can be used to supply DC 10 V, 10 mA power.</td><td>DC 10 ± 0.4 V
Permissible load current: 10mA</td></tr>
<tr><td>10</td><td>DC 5 V Power Output</td><td>This terminal can be used to supply DC 5 V, 10 mA power.</td><td>DC 5.2 ± 0.2 V
Permissible load current: 10 mA</td></tr>
<tr><td>2</td><td>Pressure Command Voltage</td><td>A voltage of DC 0 to + 5 V (max. 10 V) is applied between Terminals “2” and “5.” The span of the command voltage is set by the parameter below.
<table><tr><th>Parameter No.</th><th>Rated Pressure</th></tr><tr><td>P460</td><td>Default: 175 [× 0.1 MPa/5 V]</td></tr></table>* See “Table 6.7n” for setting.</td><td rowspan="2">Input resistance: 10 ± 1 kΩ
Permissible voltage: DC 20 V</td></tr>
<tr><td>4</td><td>Flow Command Voltage</td><td>A voltage of DC 0 to + 5 V (max. 10 V) is applied between Terminals “4” and “5.” The span of the command voltage is set by the parameter below.
<table><tr><th>Parameter No.</th><th>Rated Flow Rate</th></tr><tr><td>P461</td><td>Default: 2000 [rpm/5 V]</td></tr></table>* See “Table 6.7n” for setting.</td></tr>
<tr><td>5</td><td>Control Common</td><td>Common terminal for command voltage and monitoring voltage.</td><td>-</td></tr>
<tr><td>1</td><td>Reserved</td><td>Not used. Do not connect wiring.</td><td>-</td></tr>
<tr><td>AM</td><td>General Monitor</td><td>Selects and outputs monitoring items.
The setting parameter “P463: AM Monitoring Output Item Selection” can be used to check the output of the following items.
<table><tr><th>Setting</th><th>Output Name</th><th>Symbol</th></tr><tr><td>0</td><td>Motor Speed Command</td><td>Vref</td></tr><tr><td>1</td><td>Pressure Command</td><td>PIN</td></tr><tr><td>2</td><td>Flow Command</td><td>QIN</td></tr><tr><td>3</td><td>Pressure Sensor Monitor</td><td>SMP</td></tr><tr><td>4</td><td>Motor Speed Monitor (Calculated Value)</td><td>SMN</td></tr><tr><td>5</td><td>Motor Torque</td><td>TRQ</td></tr><tr><td>6</td><td>Electronic Thermal Load Factor</td><td>SMF</td></tr></table></td><td>Output signal: DC 0 to 10 V
Permissible load current: 1 mA

Load impedance: 10 kΩ or more

Resolution: 8 bits</td></tr>
</table>

Table 2.7c Error Output

<table>
<tr><th>Type</th><th>Symbol</th><th>Name</th><th>Function/Use</th><th>Rating</th></tr>
<tr><td rowspan="6">Relay Contact Output</td><td>A1</td><td>Warning Output - Contact B</td><td rowspan="3">This contact output indicates that the AMSE controller’s warning function is activated.
Warning: Continuity between B and C (discontinuity between A and C)
Normal: Discontinuity between B and C (continuity between A and C)</td><td rowspan="6">Contact capacity:
AC 230 V, 0.3 A
DC 30 V, 0.3 A</td></tr>
<tr><td>B1</td><td>Warning Output - Contact A</td></tr>
<tr><td>C1</td><td>Warning Output - Common</td></tr>
<tr><td>A2</td><td>Alarm Output - Contact B</td><td rowspan="3">This contact output indicates that the AMSE controller’s alarm function is activated to stop the output.
Warning: Continuity between B and C (discontinuity between A and C)
Normal: Discontinuity between B and C (continuity between A and C)</td></tr>
<tr><td>B2</td><td>Alarm Output - Contact A</td></tr>
<tr><td>C2</td><td>Alarm Output - Common</td></tr>
</table>

Table 2.7d Sequence Output

<table>
<tr><th>Type</th><th>Symbol</th><th>Name</th><th>Function/Use</th><th>Rating</th></tr>
<tr><td rowspan="11">Open Collector Output</td><td>RUN</td><td>Operation Ready</td><td>Turned “on” when STF/STR is “on” and the unit is ready to run with a flow/pressure command.</td><td rowspan="11">Permissible load:
DC 24 V, 0.1 A (max. DC 27 V)

* Max. voltage drop with “on”: 2.8 V</td></tr>
<tr><td>0L</td><td>Swash Plate Angle Large</td><td>Not used.</td></tr>
<tr><td>IPF</td><td>Alarm Code - 0</td><td rowspan="9">Outputs a 3-bit code to describe an alarm when the AMSE controller’s protection function is activated to stop the output.
<table>
<tr><th colspan="3">Output Terminal Symbol</th><th rowspan="2">Description</th></tr>
<tr><th>FU</th><th>SU</th><th>IPF</th></tr>
<tr><td>OFF</td><td>OFF</td><td>OFF</td><td>□ Parameter memory device error
□ CPU error
□ Inrush current limiting circuit error
□ Analog input error
□ Option error
□ Communication error
□ Internal circuit error
□ DC 24 power output short circuit
□ Operation panel power short circuit
□ USB communication error
□ Hydraulic control board error</td></tr>
<tr><td>OFF</td><td>OFF</td><td>ON</td><td>□ Regenerative overvoltage
□ Brake transistor error detection</td></tr>
<tr><td>OFF</td><td>ON</td><td>OFF</td><td>□ Undervoltage
□ Instantaneous power failure</td></tr>
<tr><td>OFF</td><td>ON</td><td>ON</td><td>□ AMSE controller overload
□ Motor overload
□ Fin overheat
□ Stall prevention</td></tr>
<tr><td>ON</td><td>OFF</td><td>OFF</td><td>□ Overcurrent
□ Ground fault overcurrent on the output side</td></tr>
<tr><td>ON</td><td>ON</td><td>ON</td><td>□ Input open-phase
□ Output open-phase
□ PU disconnection</td></tr>
</table></td></tr>
<tr><td>SU</td><td>Alarm Code - 1</td></tr>
<tr><td>FU</td><td>Alarm Code - 2</td></tr>
<tr><td>SE</td><td>Open Collector Output Common</td><td>Common terminals for RUN, OL, IPF, SU, and FU.</td><td>-</td></tr>
</table>

Table 2.7e Others

Type	Symbol	Name	Function/Use	Rating
	FM	-	Not used. Do not connect wiring.	-

2.7.5 Sensor terminals

Table 2.7f Pressure Sensor/Thermistor Terminals

Type	Symbol	Name	Function/Use
Analog I/O Terminal	1	Pressure Sensor Power Supply	Supplies DC 4.9 to 5.2 V power to the pressure sensor.
	2	Pressure Sensor Input	Receives the output voltage of the pressure sensor. (0.5 to 4.5 V = 0 to 35 MPa)
	3	Pressure Sensor Common	Common terminal for the pressure sensor.
	4	Pressure Sensor Shield	Wiring for a measure against radiated noise.
	5	Thermistor Input - 1	Receives the output voltage of the sensor for monitoring the motor's internal temperature.
	6	Thermistor Input - 2	
	7	Reserved	

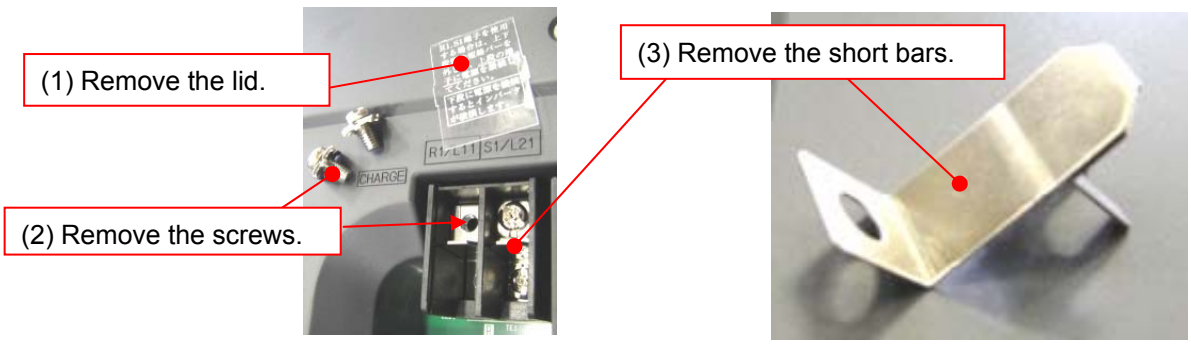
2.7.6 Main circuit terminals

Table 2.7g Main Circuit Terminals

Type	Symbol	Name	Function/Use
High Voltage Power Cable	R/L1 S/L2 T/L3	AC Power Input	Connects to a commercial power supply - AMSE-4**-**-* : 3-phase AC 380 to 480 V - AMSE-**-**-* : 3-phase AC 200 to 220 V / 50Hz : 3-phase AC 200 to 240 V / 60Hz
	U V W	Motor Output	Connects to the motor. Note) Match the U, V, and W phases for cable connection.
	N/-	Not connected	Connection is not required.
	P1	Not connected	Short-circuited to P/+. Do not remove the short bar.
	P/+	Regenerative Resistor Connection	Connects to the attached regenerative resistor. * The wiring method (series or parallel) varies depending on the models.
	PR	Regenerative Resistor Connection	
	⏚	Ground	Be sure to connect the ground wire.

2.7.7 Control power terminals

The main circuit terminals R/L1 and S/L2 are internally connected with R1/L11 and S1/L21 (control power terminals in the lower low). By default, the lower terminal block is connected with the upper terminal block (control power terminals) via short bars; the control power is turned on at the same time as the main circuit power is turned on. To keep the control power active at the time of error detection, remove both short bars (shown below) and provide the control power separately.



3. Installation of the ASE pump unit

3.1 Tools for installation

Prepare the tool listed below.

Table 3.1a Tool for Pump Installation

Model	Tool (Size)
ASE3/5-	Wrench (width across flats: 19 mm)
ASE10-	Wrench (width across flats: 22 mm)

Table 3.1b Tool for Suction Pipe Flange Connection

Model	Tool (Size)
ASE3/5/10-	Allen wrench (width across flats: 10 mm)

Table 3.1c Tool for Discharge Pipe Flange Connection

Model	Tool (Size)
ASE3/5/10-	Allen wrench (width across flats: 8 mm)

Table 3.1d Filling Port

Model	Tool (Size)
ASE3/5/10-	Wrench (width across flats: 22 mm)

3.2 Relocation of the ASE pump unit

Take great care not to drop, knock over, or damage the product during transport.

⚠ CAUTION

- Never lift or carry the product in an incorrect posture. Pinching of hands or backache may occur depending on the product mass or the posture of the worker.
- Do not step on or put any heavy object on the product. Doing so may result in damage to the product/equipment or injury from slipping/falling.

3.3 Preparation for installation

a) Before starting installation work, clean and dust the working area, hands, and clothing to prevent foreign matter from entering the product/equipment.

b) Remove the protective plug from the port and the protective plates from the port flange mounting surface. When removing the plates, be careful not to damage the mounting surface.

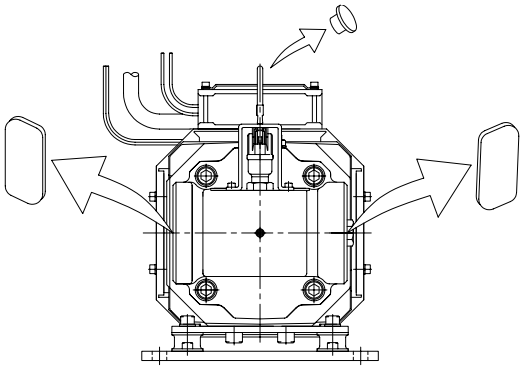


Fig. 3.3a Removal of the Protective Plug and Plates

c) Check for critical scratches on the O-ring sealing surface of each port and the port flange mounting surface. If any scratch is found, eliminate it by mending the mounting surface. If a critical scratch that cannot be mended is found, contact our customer support.

⚠ CAUTION

- Any critical scratch on the mounting surface may cause fluid leakage, resulting in a major accident.

d) Clean the O-ring sealing surface of each port and the port flange mounting surface to ensure that there is no foreign matter, such as metal debris and lint from waste cloth.

e) Check for critical scratches on the O-ring mounting surface of the pipe flange and check that the O-ring is properly mounted in the groove. If required, mount it in the groove correctly.

⚠ CAUTION

- Improper mounting of the O-rings may cause damage to them or outflow of hydraulic fluid, resulting in a major accident.

3.4 Installation of the ASE pump unit

3.4.1 Installation position

- Install the unit with the filling port facing upward.
- Bolt the unit securely using the mounting holes on the bracket.

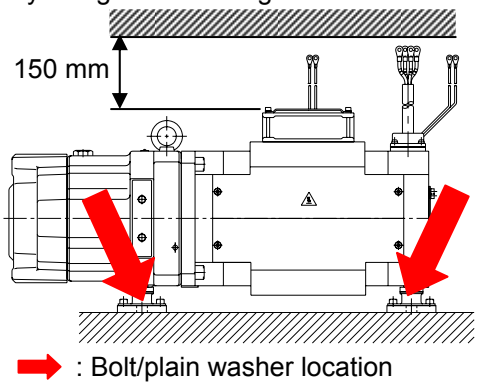


Fig. 3.4a Installation Example

⚠ CAUTION

◆ Improper mounting condition of foot blacket, may increase noise level during operation.In such case, use the anti-vibration rubber or acoustic absorbent to cover the foot blacket and take apporpriate measures.Continuing the operation under such condition may result in human injury.

3.4.2 Bolting

Screw in the bolts listed below gradually and evenly.

Note) Use the washers to prevent the bolts from loosening.

Table 3.4a Bolt Size and Tightening Torque

Model	Bolt Size	Quantity	Tightening Torque N•m
ASE3/5-	JIS B1180 Hexagon Head Bolt M12 (Strength Grade: 6.8 or more)	4	50 to 55
ASE10-	JIS B 1180 Hexagon Head Bolt M20 (Strength Grade: 6.8 or more)	4	232 to 256

⚠ WARNING

◆ Use the specified number of bolts of the same material/strength grade and apply the specified tightening torque. Failure to do so may cause damage to the bolts or outflow of hydraulic fluid, resulting in a major accident.

3.5 Piping

3.5.1 Drain piping

- For piping, see the table below.
- Be sure that the pipe end is submerged in fluid.
- Do not join the drain pipe to other return lines. Run it independently.

Table 3.5a Drain Pipe Size

Model	Joint Size	Pipe Bore	Pipe Length
ASE3/5-	1/2 (Bore: Φ12 or more)	Φ12 or more	1000 mm or less
ASE10-	3/4 (Bore: Φ19 or more)	Φ19 or more	

Even when the condition above is met, install the piping in such a way that the steady state pressure in the housing is 0.1 MPa or less.

3.5.2 Suction piping

- For suction piping, use pipes of the following sizes.

Table 3.5b Suction Pipe Size

Model	Nominal Diameter
ASE3-	1 1/4
ASE5-	1 1/2
ASE10-	2 1/2

- Position the suction port 1 m or less above the fluid level.
- When installing the pump in a position higher than the fluid level, avoid placing the suction pipe and filter at a position higher than the pump port to prevent air accumulation in the suction line.
- Keep the suction pressure at the pump inlet between - 16.7 kPa and + 50 kPa.
  When the suction pressure exceeds the prescribed value, abnormal noise/vibration may occur.

MEMO

3.5.3 Pipe tightening

The pipe tightening torque is shown in Table 3.5c.

⚠ WARNING

- Apply the pipe tightening torque as specified. Failure to do so may cause damage to the screws or outflow of hydraulic fluid, resulting in a major accident.

Table 3.5c Screw Size and Tightening Torque

	Model	Screw Size	Tightening Torque[Nm]
Discharge Pipe	ASE3/5/10-	Port Flange Screw: JIS B1176 Hexagon Socket Head Cap Screw M10 (Strength Grade: 12.9)	61 to 74
Suction Pipe	ASE3/5/10-	Port Flange Screw: JIS B1176 Hexagon Socket Head Cap Screw M12 (Strength Grade: 12.9)	104 to 127
Drain Pipe	ASE3/5-	Rc1/2	52 to 95
	ASE10-	Rc3/4	90 to 165

When using four screws for the suction pipe flange, tighten them gradually and evenly in the order shown by the numbers 1 to 4 in Fig. 3.5a and repeat this cycle two or three times.

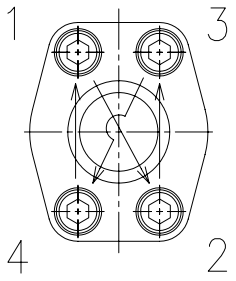


Fig. 3.5a Screw Tightening

⚠ WARNING

- Do not tighten the screws with the O-rings mounted improperly. Doing so may cause damage to the O-rings or outflow of hydraulic fluid, resulting in a major accident.

When using steel pipes, they may place excessive load on the motor-driven pump unit, resulting in noise. If there is a possibility that steel pipes may place such load on the unit, use rubber hoses.

4. Installation of the AMSE controller

4.1 Preparation for installation

⚠ CAUTION

- The AMSE controller is fan-cooled. Be sure to observe the following installation standards and pay attention to the circulation of air.

4.1.1 Installation standards (the values below indicate minimum clearances.)

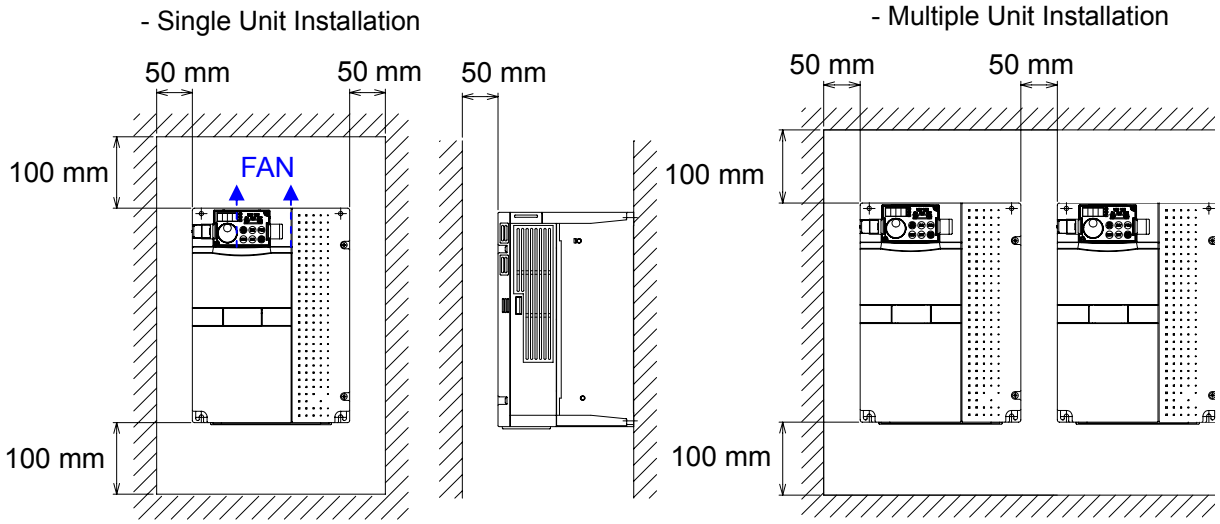


Fig. 4.1a Installation Standards

4.1.2 Installation orientation

Install the AMSE controller vertically on the wall with its front face (with the operator panel) facing toward the operator.

4.1.3 Cooling

With reference to Fig. 4.1a, leave enough space around the AMSE controller to allow cooling by the fan and natural convection.

The cooling fan is required to keep the temperature in the control panel uniform so that the ambient temperature around the AMSE controller does not locally increase.

4.1.4 Environmental condition in the control panel

Ambient temperature around the AMSE controller: 0 to 50 °C

Humidity: 90 %RH (relative humidity) or less

Vibration: 5.9 m/s^2 or less

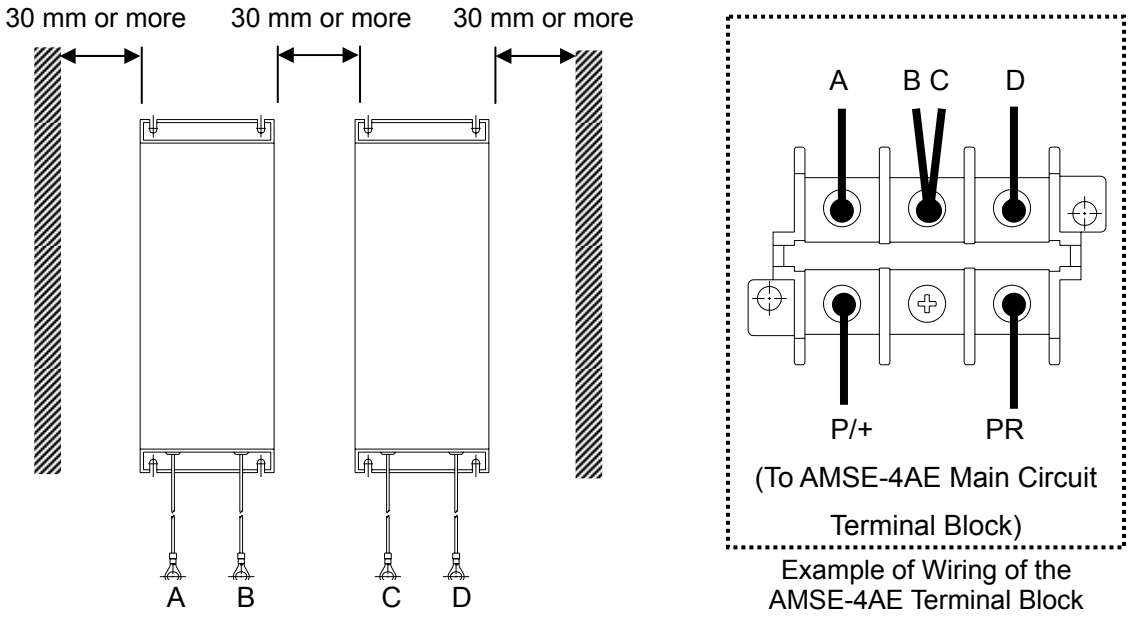
No freezing or condensation is permitted. Operation at an ambient temperature of 45 °C or less is recommended to ensure operational reliability for a long term.

4.1.5 Installation of regenerative resistors

* Double-check the model and quantity of regenerative resistors prior to installation.
* Be sure to use all regenerative resistors supplied with the unit.
* Regenerative resistors may be excessively heated. Use heat-resistant and fireproof wires and avoid their contact with the resistors.
* If the regeneration capacity exceeding the standard specification level is required, regenerative resistors must be exchanged. Consult us separately.
* Pay attention to the installation standards below (Fig. 4.1b).

Table 4.1a Regenerative Resistor

Applicable Model		Regenerative Resistor Model		Capacity W	Mass kg	Supplied Quantity
		Indicated on the package	Indicated on the body			
AMSE-	4AE-	FR-ABR-H15K	FR-ABR-15K	402/piece	2.2/piece	2
	2AE-	FR-ABR-15K				
AMSE-	4BB-	FR-ABR-H22K		530/piece	3.6/piece	
	2BB-	FR-ABR-22K		560/piece	3.0/piece	
AMSE-4DE-		FR-ABR-11K-03		560/piece	3.2/piece	3



Example of Wiring of the AMSE-4AE Terminal Block

Fig. 4.1b Regenerative Resistor Installation Standards

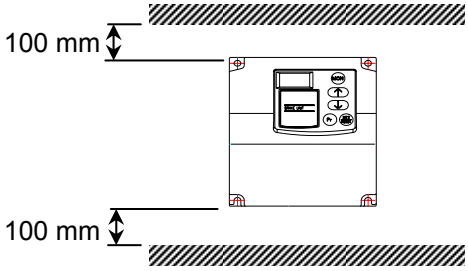


Fig. 4.1c Brake Unit Installation Standards (ASE10-4CE- Attached)

4.2 Terminal wiring diagram

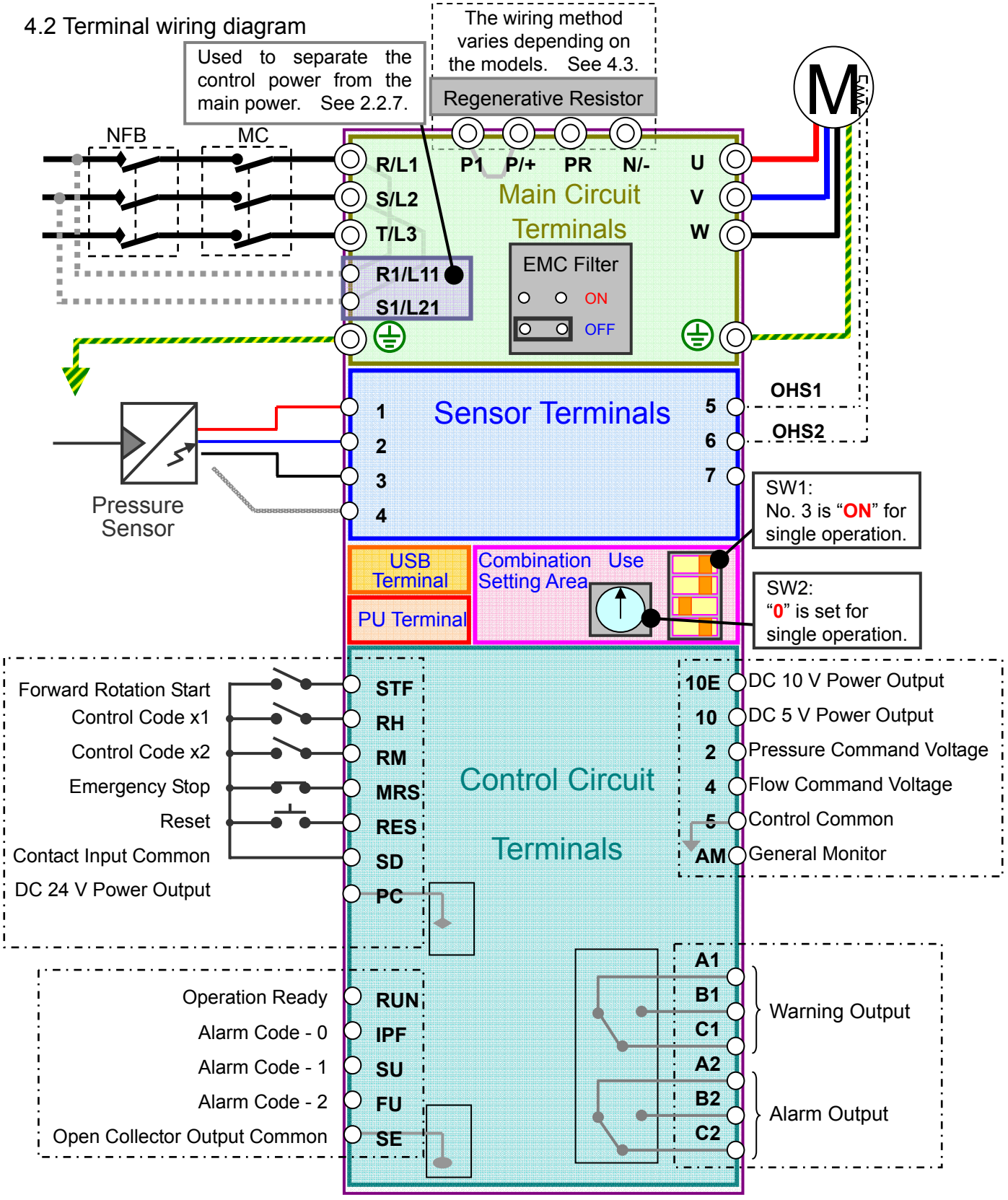


Fig. 4.2a Wiring Diagram

4.3 Wiring of regenerative resistors

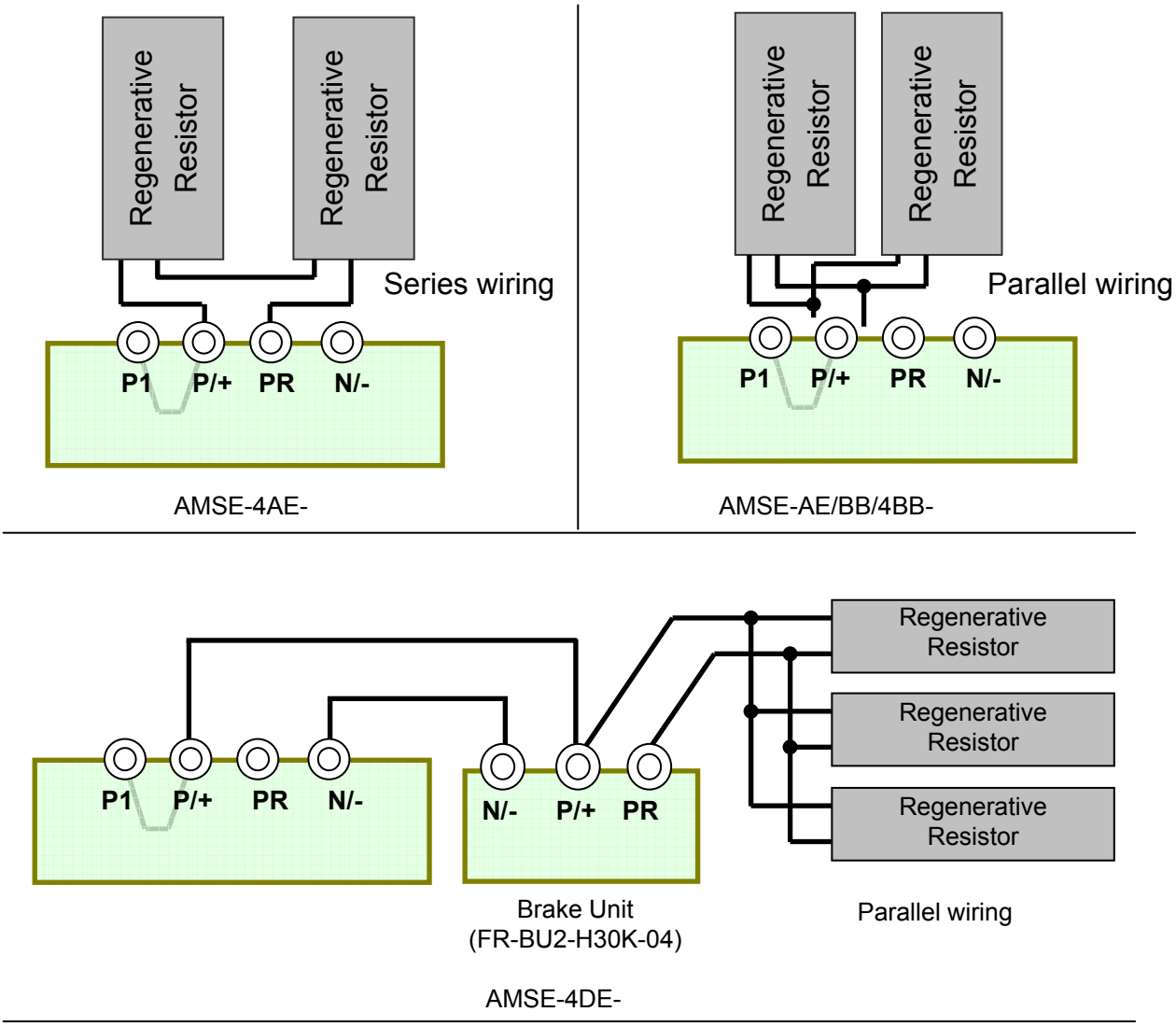


Fig. 4.3a Wiring Diagram of Regenerative Resistors

4.4 Wiring type

Table 4.4a Main Circuit Terminal Wiring Types

AMSE-	Item	Main Circuit Terminal Block			
		AC Power Input (R/L1, S/L2, T/L3)	Motor Output (U, V, W)	Ground Wire	Regenerative Resistor (P/+, N/-, -PR)
4AE-	Wire (mm^2)	8 (AWG8)			2.1 (AWG14)
	Screw Size	M5			
	Tightening Torque	2.5 N▪m			
2AE-	Wire (mm^2)	22 (AWG4)		14 (AWG6)	2.1 (AWG14)
	Screw Size	M6			
	Tightening Torque	4.4 N▪m			
4BB-	Wire (mm^2)	14 (AWG6)			2.1 (AWG14)
	Screw Size	M6			
	Tightening Torque	4.4 N▪m			
2BB-	Wire (mm^2)	38 (AWG2)		22 (AWG2)	2.1 (AWG14)
	Screw Size	M8			
	Tightening Torque	7.8 N▪m			
4DE	Wire (mm^2)	38 (AWG1)	38 (AWG2)		3.5 (AWG12)
	Screw Size	M8			
	Tightening Torque	7.8 N▪m			
FR-BU2 -H30K-0 4	Wire (mm^2)	-			3.5 (AWG12)
	Screw Size	-			M4
	Tightening Torque	-			1.5 N▪m

Table 4.4b Control Circuit Terminal/Sensor Terminal Wiring Types

	Item	Control Circuit Terminal Block	Sensor Terminal Block
AMSE-	Wire (mm^2)	0.75 to 2.1 (AWG18 to 14)	0.5 to 1.3 (AWG20 to 16)
	Screw Size	M3.5	Push lock type
	Tightening Torque	1.2 N▪m	-

MEMO

---

5. Preparation for operation

5.1 Operating environment

Use the product as a hydraulic power source for hydraulic equipment.
Operate it under the conditions below. Operation in other conditions may result in malfunction.

- Installation location: Indoor environment free of combustible/corrosive/flammable gas or mist that meets the following requirements.
  - Ambient environment: See Sections 2.5 (Specifications), 3 (Installation of the ASE pump unit), and 4 (Installation of the AMSE controller).
  - No obstruction that may prevent ventilation or make the nameplate invisible.
  - The product is not waterproof and must not be used in water.

⚠ DANGER

♦ Never use the product in an explosive atmosphere, including locations where flammable gases or explosives are handled. Doing so may result in fire, explosion, or any other serious and fatal accident.

5.2 Hydraulic fluid

⚠ CAUTION

♦ Use proper hydraulic fluid within the specified ranges of fluid temperature, viscosity, and contamination level. Failure to do so may result in malfunction or fluid leakage, causing fire.

5.2.1 Fluid type

- Petroleum based hydraulic fluid: Use a hydraulic fluid equivalent to ISO VG32 or 46.

  Note) To use a hydraulic fluid other than petroleum based one (synthetic fluid, water based fluid, etc.), consult us separately.

5.2.2 Fluid viscosity and temperature

Meet the following requirements for fluid viscosity and temperature during operation.

Viscosity: 20 to 400 mm^2/s

Fluid temperature: 0 to 60 °C

5.2.3 Prevention of foreign matter invasion

Foreign matter entering hydraulic fluid may result in a shorter service life or failure of the pump. Always keep the fluid clean (contamination level: JIS B9933 (ISO 4406) 20/18/14 or NAS 9 or better).

5.3 Operation of the ASE pump unit

⚠ WARNING

- Never fail to check fixation of units and piping before starting the motor-driven pump unit. Failure to do so may cause damage to the parts or outflow of hydraulic fluid, resulting in a major accident.
- When any abnormal condition (noise, fluid leakage, smoke, etc.) occurs, immediately stop operation and take appropriate measures. Continuing the operation under such conditions may result in an accident.

⚠ CAUTION

- Use the product as specified in the catalog, drawings, and specifications. Failure to do so may result in malfunction of or damage to the product, causing injury.
- Perform adjustment work while ensuring safety, e.g. keeping people away from the moving parts of equipment.

Note) - Do not join the drain line to other return lines. Doing so may result in malfunction or failure.
- Long-time operation with reverse rotation may cause pump seizing or damage to the parts.
- Do not increase the pressure setting before the unit starts normal operation. Doing so may result in pressure oscillation or abnormal noise.

MEMO

5.3.1 Initial operation

⚠ CAUTION

♦ Upon initial operation, check in advance that the hydraulic circuit and electric wiring have been correctly installed and that fastened parts are not loose.

a) Pour clean hydraulic fluid through the filling port into the pump.
Failure to do so may cause seizing of or damage to the parts.

Table 5.3a Fluid Filling Quantity for Each Model

Model	Filling Quantity
ASE3-*AA-	600 cm^3
ASE5-*BZ-	
ASE10-*CE	900 cm^3

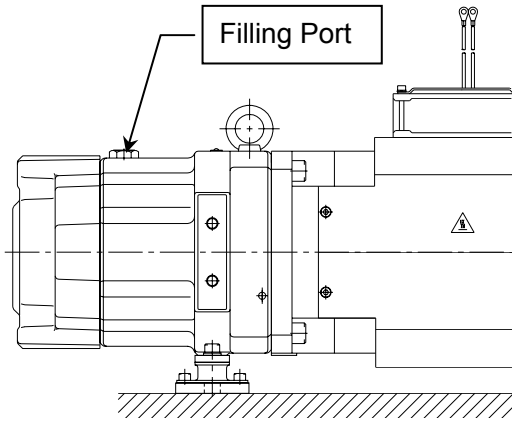


Fig. 5.3a Hydraulic Fluid Filling

b) Adjust the control valves so that the pump discharge fluid circulates directly into the tank or so that the actuator runs with no load.
Note) Do not start the pump with its discharge blocked.

c) Operate the pump under the following recommended conditions and check the points below.
<Power-on procedure>
Start and run the ASE pump unit as follows.
Turn “on” the main circuit power and wait three seconds -> Turn “on” the servo (“on” between the terminals STF and SD).
* Turning on the servo within three seconds after turning on the main circuit power may cause malfunction. Follow the specified procedures to avoid a possibility of causing human suffering.

<Recommended operating conditions>
Motor speed: 1000 r/min or less
Pressure: 5 MPa or less

<Check items>
Check if the pump sucks fluid normally.
Be aware that the motor may rotate in the reverse direction due to wrong wiring of the U, V, and W phases between the AMSE controller and the motor.

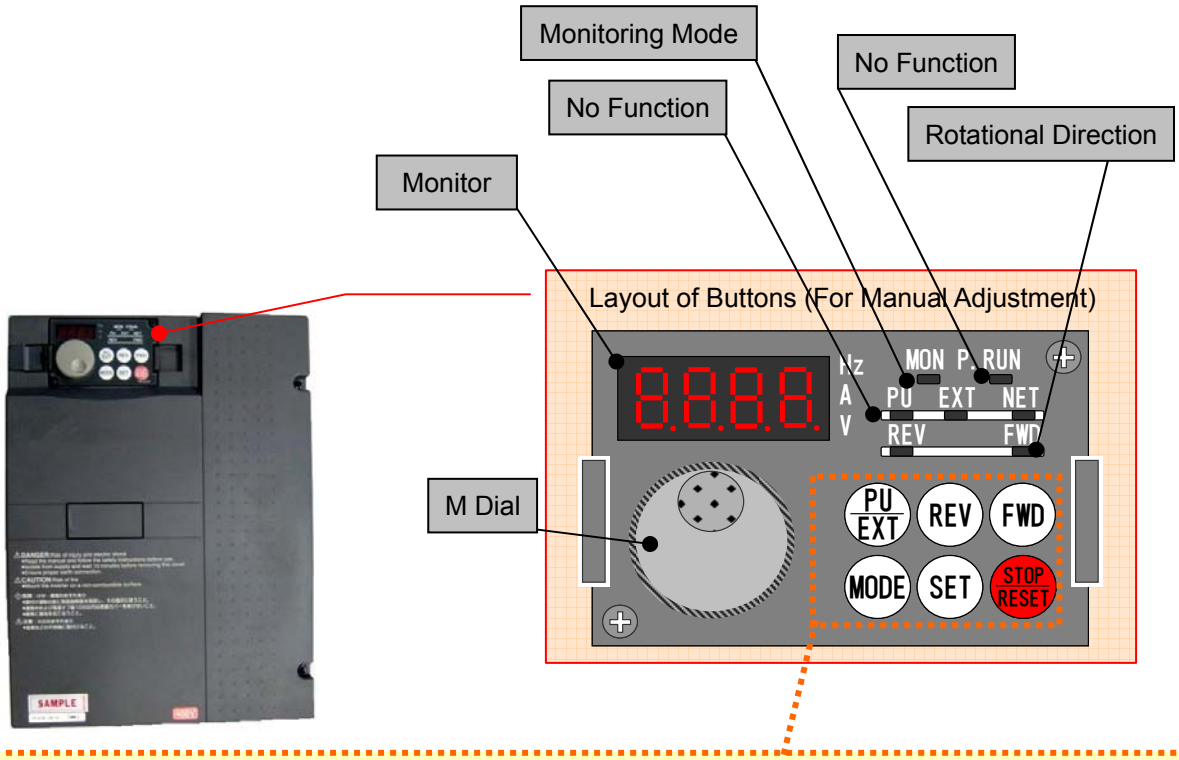
d) After checking that there is no problem in Step c), perform the test run and air-bleed the system.
Note) Upon pump startup, air enters hydraulic fluid and causes noise, but this phenomenon is not an indication of failure. If the noise is not eliminated, air-bleed the circuit.

6. Operation adjustment

6.1 Display and operation buttons

The AMSE controller allows status display and parameter setting for the ASE pump unit.

It has a 4-digit LED display to facilitate checking the output and parameters.



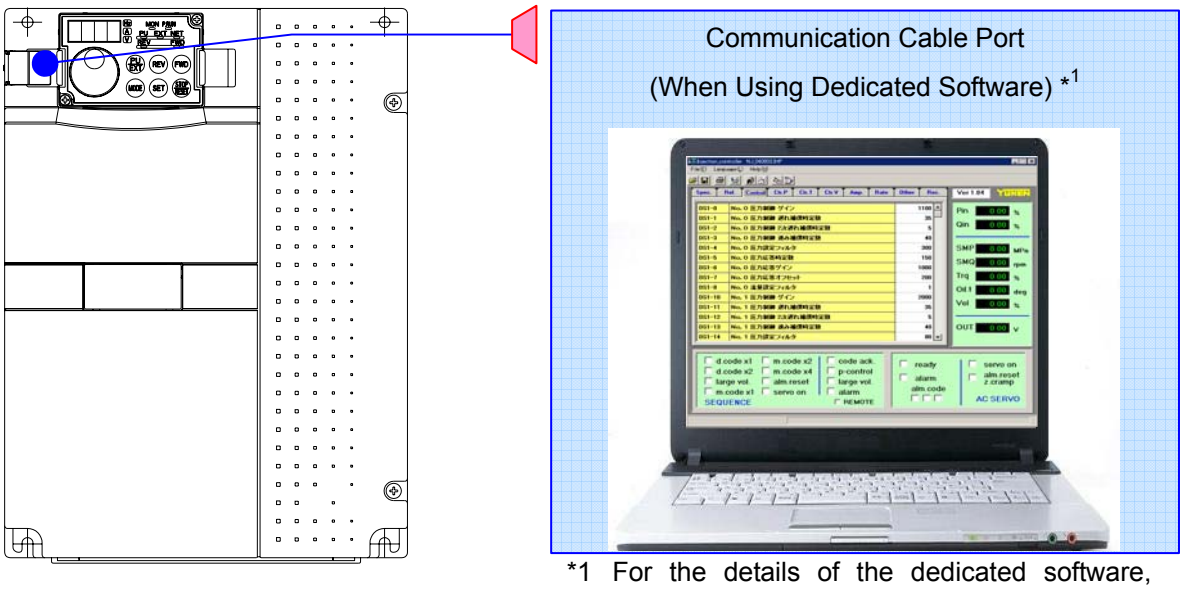
Setting Buttons

Symbol	Use	Description
PU/EXT	<Not Used>	Operating these buttons has no effect.
REV	<Not Used>	
FWD	<Not Used>	
MODE	Mode Switching	Switches between the setting modes.
SET	Setting Confirmation	Confirms settings. Pressing this button during operation switches the monitor display as follows. “Motor Speed” -> “Output Current” -> “Output Voltage”
STOP/RESET	Alarm Reset	Resets alarms. When the setting of the setting parameter “P_75” is changed, “STOP” (Motor Stop) is enabled.

Fig. 6.1a Display and Operation Buttons

6.2 Communication cable <for setup by the manufacturer>

- “USB2.0 Cable (Type AB)” is used as a communication cable.
- For the ASE pump unit, monitoring and parameter adjustment can be performed by using ASE-dedicated software. Manual parameter adjustment is unnecessary.



*1 For the details of the dedicated software, consult us separately.

Fig. 6.2a Communication Cable Port

MEMO

6.3 Display transitions

- At the time of power-on, the display appears as shown in Fig. 6.3a.
- By default, the motor speed is displayed.

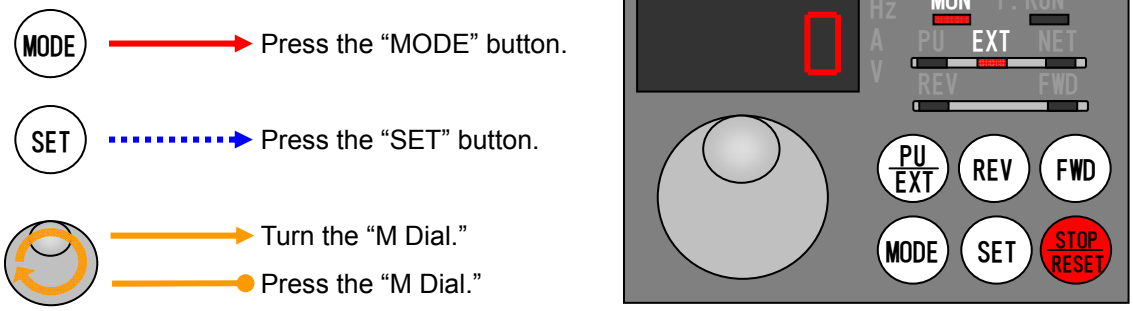


Fig. 6.3a Operation Panel

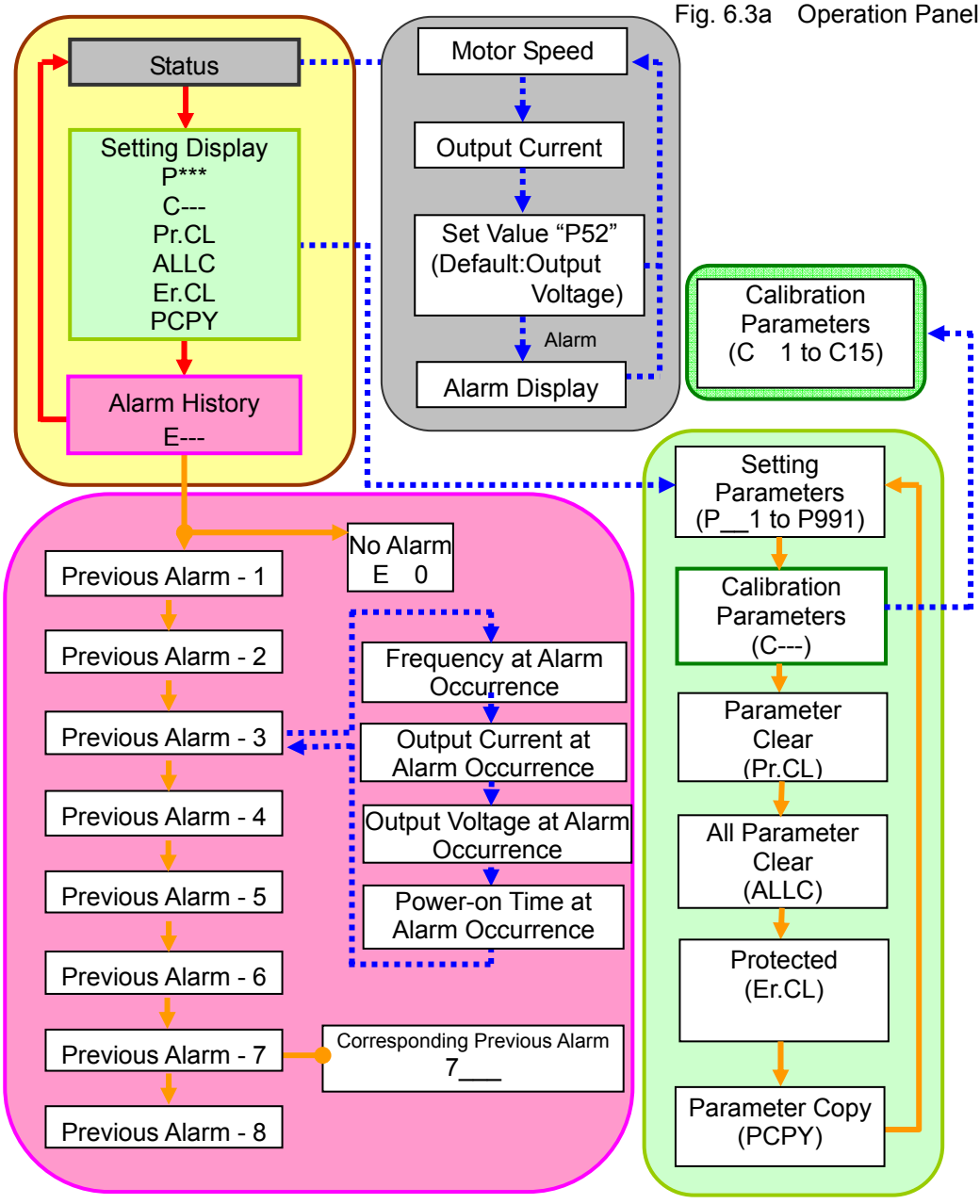


Fig. 6.3b Display Transition Chart

6.4 Display items

Table 6.4a Display Items

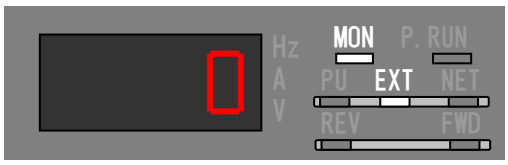
Note) "*" represents a number, and "□" represents a code.

Code	Name	Description	Reference
P***	Setting Parameters	Changes settings.	Tables 6.6a to c: Setting Parameters
C **	Calibration Parameters	Calibrates signals.	Table 6.6d: Setting Parameters
Pr.CL	Parameter Clear	Initializes a parameter.	Table 6.6c: Setting Parameters
ALLC	All Parameter Clear	Initializes all parameters.	
Er.CL	<Alarm Clear> (Manufacturer-controlled)	<Alarm History Clear> (manufacturer-controlled).	
PCPY	Parameter Copy	Copies setting parameter data when using multiple AMSE controllers.	
E.□□□	Alarms	Error detection.	Table 7.1a: Alarm Codes
OL	Stall Prevention (Overcurrent)	Warnings.	Table 7.1b: Warnings
Rb	Dynamic Brake Pre-alarm		
ΓH	Electronic Thermal Pre-alarm		
PS	PU Stop		
CP	Parameter Copy		
Fn	Fan Fault		
oP	Hydraulic Control Board Warning		
HOLD	Operation Panel Lock	Operation errors.	Table 7.1c: Error Messages
Er *	Warnings		
rE * Err	Error Messages		
P 5	Operation Panel Command Stopped	Indicates that operation has been stopped by the "STOP/RESET" button on the operation panel.	Table 7.1d: Status Display
ЕПG	Emergency Stop	Indicates that operation has been stopped by the emergency stop procedure.	

MEMO

6.5 Changing parameter settings

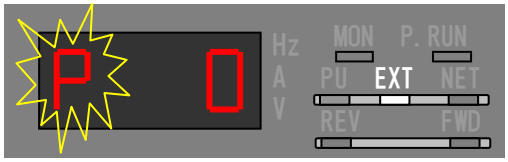
1) Turn on the power (the motor speed is displayed).



2) Enable the parameter setting mode.

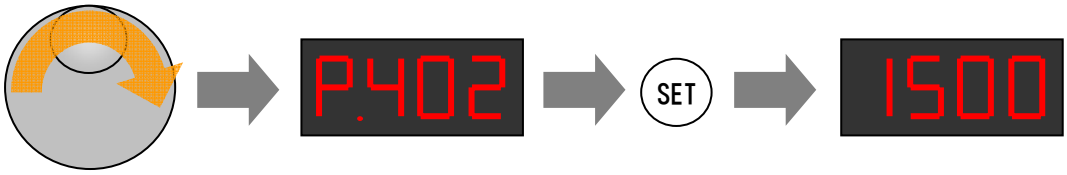
A) Press the “MODE” button.

B) Check that “P” appears on the monitor.

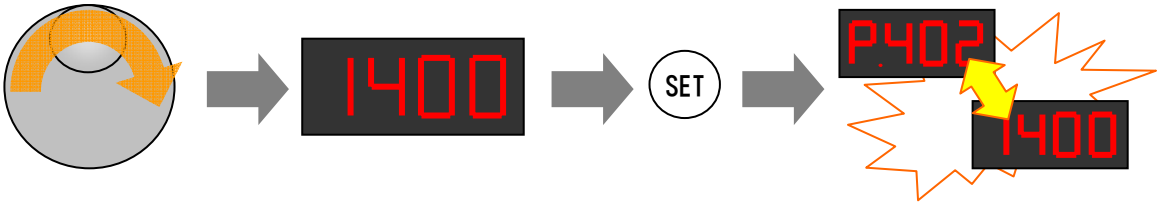


When “P” is not displayed, turn the “M Dial” until “P” appears.

C) Turn the “M Dial” to display the target parameter No, and then press the “SET” button. The currently set value is displayed.



D) Turn the “M Dial” to change the value, and then press the “SET” button. The parameter No. and the set value are displayed alternately to indicate that the setting has been confirmed.



E) Press the “MODE” button twice to return to the initial display.

6.6 Parameters

Note) Never change the settings of manufacturer-controlled parameters.

Table 6.6a Setting Parameters “P***”

No.	Name	Setting Range	Minimum Setting Unit	Default	Reference
P 1	Upper Limit Frequency	0 to 3000 r/min	1 r/min	(Depends on the model)	Table 6.7a
P 2	Manufacturer-controlled	-	-	0	
P 7	Acceleration Time	0 to 15 s	0.01 s	0.04	
P 8	Deceleration Time	0 to 15 s	0.01 s	0.04	
P 9	Manufacturer-controlled	-	-	(Depends on the model)	
P 10	Manufacturer-controlled	-	-	8	
P 13	Manufacturer-controlled	-	-	0	
P 17	MRS Input Selection	0, 2	1	2	
P 20	Manufacturer-controlled	-	-	1500	
P 22	Manufacturer-controlled	-	-	200.0	
P 30	Manufacturer-controlled	-	-	1	
P 52	DU/PU Main Display Data Selection	0, 5 to 14, 17, 20, 23, 25, 55, 81 to 86, 100	1	0	Table 6.7b
P 54	Manufacturer-controlled	-	-	1	
P 55	Manufacturer-controlled	-	-	2250	Table 6.7c
P 56	Manufacturer-controlled	-	-	(Depends on the model)	
P 70	Manufacturer-controlled	-	-	6.0	
P 71	Manufacturer-controlled	-	-	150	
P 72	Manufacturer-controlled	-	-	6	
P 75	Reset/PU Disconnection/PU Stop Selection	0 to 3, 14 to 17	1	1	
P 77	Parameter Write Selection	0, 1, 2	1	2	
P 79	Manufacturer-controlled	-	-	2	
P 80	Manufacturer-controlled	-	-	(Depends on the model)	
P 81	Manufacturer-controlled	-	-	8	Table 6.7d
P144	Manufacturer-controlled	-	-	108	
P145	Manufacturer-controlled	-	-	0	
P161	Button Lock Operation Selection	0, 1, 10, 11	1	10	
P168	(Read-only, write-protected)			-	
P169				-	
P240	Manufacturer-controlled	-	-	0	
P244	Cooling Fan Operation Selection	0, 1	1	1	
P251	Manufacturer-controlled	-	-	1	Table 6.7e
P255	Life Warning Status Display	(0 to 15), read-only	1	0	
P256	Inrush Current Limiting Circuit Life Display	(0 to 100), read-only	1 %	100	
P257	Control Circuit Capacitor Life Display	(0 to 100), read-only	1 %	100	
P258	Main Circuit Capacitor Life Display	(0 to 100), read-only	1 %	100	
P259	Main Circuit Capacitor Life Measurement	0, 1 (2, 3, 8, 9)	1	0	
P331	Manufacturer-controlled	-	-	0	
P332	Manufacturer-controlled	-	-	96	
P333	Manufacturer-controlled	-	-	1	
P334	Manufacturer-controlled	-	-	2	
P335	Manufacturer-controlled	-	-	1	
P336	Manufacturer-controlled	-	-	0.0	
P337	Manufacturer-controlled	-	-	9999	
P338	Manufacturer-controlled	-	-	0	
P339	Manufacturer-controlled	-	-	0	

Table 6.6b Setting Parameters “P***”

No.	Name	Setting Range	Minimum Setting Unit	Default	Reference
P340	Manufacturer-controlled	-	-	0	-
P341	Manufacturer-controlled	-	-	1	
P342	Manufacturer-controlled	-	-	0	
P402	No. 0 Rise Time Gain	0 to 9999	1	1500	Table 6.7h
P403	No. 0 Fall Time Gain	0 to 9999	1	1500	
P404	No. 0 Lag Compensation	1 to 2000	1	70	Table 6.7i
P405	No. 0 Lead Compensation	1 to 2000	1	60	
P406	No. 0 Rise Time Pressure Command Filter	1 to 2000	1	300	Table 6.7j
P407	No. 0 Fall Time Pressure Command Filter	1 to 2000	1	300	
P408	No. 0 Pressure Response Sensitivity	1 to 2000	1	200	Table 6.7k
P409	No. 1 Rise Time Gain	0 to 9999	1	1500	Table 6.7h
P410	No. 1 Fall Time Gain	0 to 9999	1	1500	
P411	No. 1 Lag Compensation	1 to 2000	1	70	Table 6.7i
P412	No. 1 Lead Compensation	1 to 2000	1	60	
P413	No. 1 Rise Time Pressure Command Filter	1 to 2000	1	300	Table 6.7j
P414	No. 1 Fall Time Pressure Command Filter	1 to 2000	1	300	
P415	No. 1 Pressure Response Sensitivity	1 to 2000	1	200	Table 6.7k
P416	No. 2 Rise Time Gain	0 to 9999	1	1500	Table 6.7h
P417	No. 2 Fall Time Gain	0 to 9999	1	1500	
P418	No. 2 Lag Compensation	1 to 2000	1	70	Table 6.7i
P419	No. 2 Lead Compensation	1 to 2000	1	60	
P420	No. 2 Rise Time Pressure Command Filter	1 to 2000	1	300	Table 6.7j
P421	No. 2 Fall Time Pressure Command Filter	1 to 2000	1	300	
P422	No. 2 Pressure Response Sensitivity	1 to 2000	1	200	Table 6.7k
P423	No. 3 Rise Time Gain	0 to 9999	1	1500	Table 6.7h
P424	No. 3 Fall Time Gain	0 to 9999	1	1500	
P425	No. 3 Lag Compensation	1 to 2000	1	70	Table 6.7i
P426	No. 3 Lead Compensation	1 to 2000	1	60	
P427	N0. 3 Rise Time Pressure Command Filter	1 to 2000	1	300	Table 6.7j
P428	No. 3 Fall Time Pressure Command Filter	1 to 2000	1	300	
P429	No. 3 Pressure Response Sensitivity	1 to 2000	1	200	Table 6.7k
P430	Manufacturer-controlled	-	-	0	-
P431	Manufacturer-controlled	-	-	0	-
P432	Manufacturer-controlled	-	-	0	-
P433	Manufacturer-controlled	-	-	0	-
P434	Manufacturer-controlled	-	-	0	-
P435	Manufacturer-controlled	-	-	0	-
P436	Manufacturer-controlled	-	-	0	-
P437	Pressure Response Gain	0 to 9999	1	300	Table 6.7k
P438	Pressure Response Offset	0 to 9999	1	100	
P439	Pressure Proportional Gain	0 to 9999	1	0	Table 6.7l
P440	Pressure Feedforward Gain	0 to 9999	1	0	
P441	Pressure Feedforward Filter	1 to 2000	1	1	
P442	Pressure Feedforward Function Selection	0 to 3	1	0	
P443	Q-damping Gain	- 999 to 9999	1	0	Table 6.7m
P444	Q-damping Filter	1 to 2000	1	1	
P445	Manufacturer-controlled	-	-	0	
P446	Manufacturer-controlled	-	-	0	
P447	Manufacturer-controlled	-	-	0	

Table 6.6c Setting Parameters “P***”

No.	Name	Setting Range	Minimum Setting Unit	Default	Reference
P448	Manufacturer-controlled	-	-	45	Table 6.7m
P449	Number of Combined Units	1 to 16	1	1	
P450	QIN Mini	0 to 1000	1 (0.1 %)	10	
P451	PIN Mini	0 to 1000	1 (0.1 %)	10	Table 6.7n
P452	Q-COMP	0 to 2000	1	1000	
P453	Manufacturer-controlled	-	-	0	-
P454	Flow Command Voltage (QIN) Span	0 to 9999	1 (0.1 %)	(1000)*	Table 6.7o
P455	Flow Command Voltage (QIN) Zero	- 999 to 9999	1mV	(0)*	
P456	Pressure Command Voltage (PIN) Span	0 to 9999	1 (0.1 %)	(1000)*	
P457	Pressure Command Voltage (PIN) Zero	- 999 to 9999	1mV	(0)*	
P458	Pressure Sensor Voltage Span	0 to 9999	1 (0.1 %)	(1250)*	Table 6.7p
P459	Pressure Sensor Voltage Zero	- 999 to 9999	1 mV	(500)*	
P460	Rated Pressure	1 to 300	1 (0.1 MPa)	175	
P461	Rated Motor Speed	1 to 2800	1 r/min	2000	
P462	Pressure Sensor Rated Value	1 to 400	1 (0.1 MPa)	350	Table 6.7q
P463	AM Monitor Output Item Selection	0 to 99	1	3	
P464	Manufacturer-controlled	-	-	0	
P488	Manufacturer-controlled	-	-	120.0	
P490	Manufacturer-controlled	-	-	15	-
P491	Manufacturer-controlled	-	-	30	
P492	Manufacturer-controlled	-	-	100.0	
P493	Manufacturer-controlled	-	-	45	
P499	Manufacturer-controlled	-	-	0	
P547	Manufacturer-controlled	-	-	0	
P548	Manufacturer-controlled	-	-	9999	
P800	Manufacturer-controlled	-	-	30	
P818	Manufacturer-controlled	-	-	2	
P819	Manufacturer-controlled	-	-	0	
P820	Manufacturer-controlled	-	-	(Depends on the model)	
P821	Manufacturer-controlled	-	-	0.050	
P828	Manufacturer-controlled	-	-	150	
P862	Manufacturer-controlled	-	-	0	Table 6.7s
P863	Manufacturer-controlled	-	-	0	
P866	Manufacturer-controlled	-	-	200.0	
P867	Manufacturer-controlled	-	-	0.01	
P872	Manufacturer-controlled	-	-	1	
P877	Manufacturer-controlled	-	-	2	
P879	Manufacturer-controlled	-	-	150.0	
P880	Manufacturer-controlled	-	-	0.3	
P989	Manufacturer-controlled	-	-	10	
P990	Manufacturer-controlled	-	-	1	
P991	Manufacturer-controlled	-	-	58	
C---	Calibration Parameters	Pressing the “SET” button displays the parameters in “Table 6.6d.”			
PrCL	Parameter Clear	0, 1	1	0	
ALLC	All Parameter Clear	0, 1	1	0	
ErCL	Manufacturer-controlled	-	-	0	
PCPY	Parameter Copy	0, 1, 2, 3	1	0	Table 6.7t

*) Default values set by YUKEN. The values differ depending on the ASE model. The values in parentheses are reference values.

Table 6.6d Setting Parameters “C_**”

No.	Name	Setting Range	Minimum Setting Unit	Default	Reference
C 0	Manufacturer-controlled	-	-	-	Table 6.7v
C 1	AM Terminal Calibration	-	-	-	
C 12	Manufacturer-controlled	-	-	0	
C 13	Manufacturer-controlled	-	-	0.0	
C 14	Manufacturer-controlled	-	-	900	
C 15	Manufacturer-controlled	-	-	100.0 (0)*	

*) By operating the “M Dial” with “0” displayed, the setting value (“100”) can be seen.

MEMO

6.7 Parameter functions

Table 6.7a Parameter Functions

<table>
<tr><th>No.</th><th>Name</th><th>Function/Use</th><th>Default</th><th>Setting Range</th></tr>
<tr><td>P 1</td><td>Upper Limit Frequency</td><td>Sets the upper limit of the motor output speed.<table><tr><th>Model</th><th>Default</th></tr><tr><td>ASE3</td><td>3000</td></tr><tr><td>ASE5</td><td>2500</td></tr><tr><td>ASE10</td><td>2200</td></tr></table></td><td>See the table on the left.</td><td>0 to 3000 r/min</td></tr>
<tr><td>P 7</td><td>Acceleration Time</td><td>Sets the motor acceleration time.
Note) Do not set this value to less than 0.04.</td><td>0.04</td><td>0 to 15 s</td></tr>
<tr><td>P 8</td><td>Deceleration Time</td><td>Sets the motor deceleration time.
Note) Do not set this value to less than 0.04.</td><td>0.04</td><td>0 to 15 s</td></tr>
<tr><td>P 9</td><td>Manufacturer-controlled</td><td>* The setting value differs depending on the model.<table><tr><th>Model</th><th>Default</th></tr><tr><td>ASE3-4AA</td><td>26.50</td></tr><tr><td>ASE3-AA</td><td>51.40</td></tr><tr><td>ASE5-4BZ</td><td>44.00</td></tr><tr><td>ASE5-BZ</td><td>84.00</td></tr><tr><td>ASE10</td><td>75.00</td></tr></table></td><td>See the table on the left.</td><td>0 to 500 A</td></tr>
<tr><td>P 17</td><td>MRS Input Selection</td><td>Shuts off the output by a MRS signal.<table><tr><th>Setting Value</th><th>Description</th></tr><tr><td>0</td><td>Normally open input</td></tr><tr><td>2</td><td>Normally closed input (Contact b input)</td></tr></table></td><td>2</td><td>0, 2</td></tr>
</table>

MEMO

Table 6.7b Parameter Functions

No.	Name	Function/Use	Default	Setting Range
P 52	Operation Panel Display Data Selection	Selects a monitoring item to be displayed on the operation panel and a monitoring item to be output to the terminal FM. * See “Table 6.7b-1” below.	0/ (100)	0, 5 to 14, 17, 20, 23, 25, 55, 81 to 86, 100

Table 6.7b-1 Operation Panel Display Data Selection

Monitoring Item	Setting Value	Unit	Description
Output Voltage	0/100	V	Output voltage supplied to the motor side.
Rotation Command	5	1 r/min	Speed command.
Motor Speed	6	1 r/min	Motor speed.
Motor Torque	7	0.1 %	Torque value with the rated motor torque taken as 100 %.
Converter Output Voltage	8	0.1 V	DC bus voltage value.
Dynamic Brake Utilization	9	0.1 %	Rate of dynamic brake utilization set by the setting parameters “P_30” and “P_70.”
Electronic Thermal Load Factor	10	0.1 %	Accumulative value of motor thermal load with the electronic thermal triggering level taken as 100 %.
Output Current Peak	11	0.1 A	Retains the peak value for output current monitoring (memory is reset every time the unit starts up).
Converter Output Voltage Peak	12	0.1 V	Retains the peak value of DC bus voltage (memory is reset every time the unit starts up).
Input Voltage	13	0.01 kW	Voltage on the AMSE controller input side.
Output Voltage	14	0.01 kW	Voltage on the AMSE controller output side.
Load Meter	17	0.1 %	Displays the torque current with the set value of “P_56” taken as 100 %.
Accumulative Power-on Time	20	1 h	Accumulates the power-on time (0.001 = 1h: the value returns to 0 h after reaching 65,535 h (max.)).
Actual Operating Time	23	1 h	Accumulates the operating time (0.001 = 1 h: the value returns to 0 h after reaching 65,535 h (max.).
Accumulative Power Consumption	25	0.01 kW	Displays the accumulative power consumption based on the monitored output voltage.
Input Terminal Status	55	-	Displays the “ON/OFF” status of the control circuit input terminals on the operation panel. See “Fig. 6.7a” below for display details.
Output Terminal Status		-	Displays the “ON/OFF” status of the control circuit output terminals on the operation panel. See “Fig. 6.7a” below for display details.
Pressure Input Command	81	0.01 V	Pressure command voltage.
Flow Input Command	82	0.01 V	Flow command voltage
AM Terminal Output	83	0.01 V	Outputs an item selected by the setting parameter “P463.”
Manufacturer-controlled	-	-	An output value is invalid.
Manufacturer-controlled	-	-	An output value is invalid.
Manufacturer-controlled	-	-	An output value is invalid.

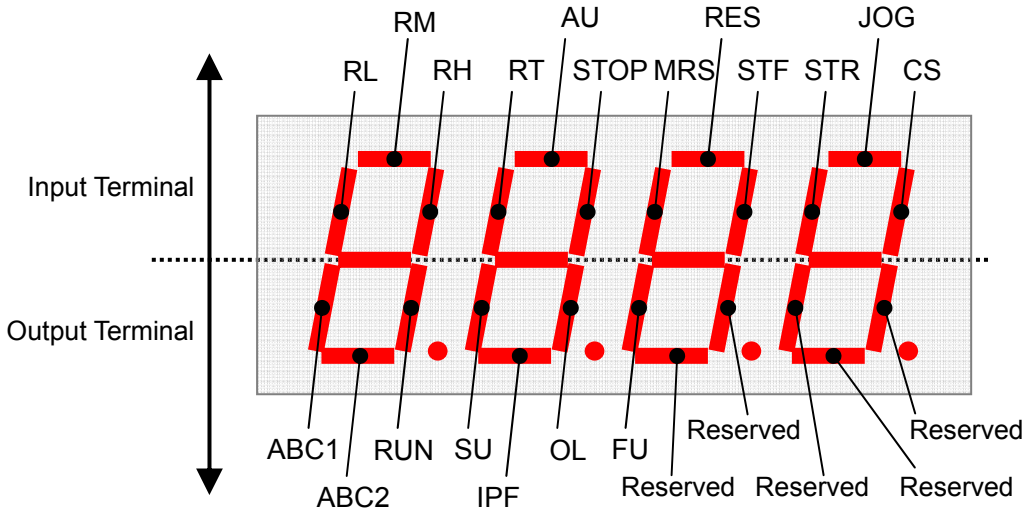


Fig. 6.7a Status of Input/Output Terminals

Table 6.7c Parameter Functions

<table>
<tr><th>No.</th><th>Name</th><th>Function/Use</th><th>Default</th><th>Setting Range</th></tr>
<tr><td>P 56</td><td>Manufacturer-controlled</td><td>* The setting value differs depending on the model.
<table>
<tr><th>Model</th><th>Default</th></tr>
<tr><td>ASE3-4AA</td><td>26.50</td></tr>
<tr><td>ASE3-AA</td><td>51.40</td></tr>
<tr><td>ASE5-4BZ</td><td>44.00</td></tr>
<tr><td>ASE5-BZ</td><td>84.00</td></tr>
<tr><td>ASE10</td><td>75.00</td></tr>
</table></td><td>See the table on the left.</td><td>0 to 500 A</td></tr>
<tr><td>P 75</td><td>Reset/
PU Disconnection/
PU Stop Selection</td><td>Selects functions for reset input reception, operation panel connector disconnection (PU disconnection), and stop via the “STOP/RESET” button on the operation panel.
<table>
<tr><th>Setting Range</th><th>Reset Function Selection</th><th>Operation Panel Disconnection</th><th>Stop via the STOP/RESET Button</th></tr>
<tr><td>0</td><td>Always allowed.</td><td rowspan="4">Operation continues when the operation panel is disconnected.</td><td rowspan="4">“STOP” is disabled.</td></tr>
<tr><td>1</td><td>Allowed when the protection function is active.</td></tr>
<tr><td>2</td><td>Always allowed.</td></tr>
<tr><td>3</td><td>Allowed when the protection function is active.</td></tr>
<tr><td>14</td><td>Always allowed.</td><td rowspan="4">Operation stops when the operation panel is disconnected.</td><td rowspan="4">“STOP” is always enabled.</td></tr>
<tr><td>15</td><td>Allowed when the protection function is active.</td></tr>
<tr><td>16</td><td>Always allowed.</td></tr>
<tr><td>17</td><td>Allowed when the protection function is active.</td></tr>
</table></td><td>1</td><td>0 to 3, 14 to 17</td></tr>
<tr><td>P 77</td><td>Parameter Write Selection</td><td>Enables/disables write protection for parameters.
This function can be used to prevent the parameters from being overwritten by mistake.
<table>
<tr><th>Setting Range</th><th>Description</th></tr>
<tr><td>0</td><td>Writable only during stop.</td></tr>
<tr><td>1</td><td>Write-protected.</td></tr>
<tr><td>2</td><td>Writable regardless of the operation status.</td></tr>
</table></td><td>2</td><td>0, 1, 2</td></tr>
<tr><td>P 80</td><td>Manufacturer-controlled</td><td>* The setting value differs depending on the model.
<table>
<tr><th>Model</th><th>Default</th></tr>
<tr><td>ASE3</td><td>11.00</td></tr>
<tr><td>ASE5</td><td>20.00</td></tr>
<tr><td>ASE10</td><td>35.00</td></tr>
</table></td><td>See the table on the left.</td><td>0.40 to 55.00</td></tr>
</table>

Table 6.7d Parameter Functions

<table>
<tr><th>No.</th><th>Name</th><th>Function/Use</th><th>Default</th><th>Setting Range</th></tr>
<tr><td>P161</td><td>Button Lock Operation Selection</td><td>Enables/disables button operation on the operation panel.
Enabling the “button lock mode” and pressing the “MODE” button on the operation panel for 2 seconds disables button operation.
When button operation is disabled, “HOLd” is displayed on the operation panel.
To enable button operation, press the “MODE” button for 2 seconds to cancel the button lock mode.
<table>
<tr><th>Setting Range</th><th colspan="2">Description</th></tr>
<tr><td>0</td><td>Puts the M dial into the motor speed setting mode.</td><td rowspan="2">Button lock disabled</td></tr>
<tr><td>1</td><td>Puts the M dial into the volume mode.</td></tr>
<tr><td>10</td><td>Puts the M dial into the motor speed setting mode</td><td rowspan="2">Button lock enabled</td></tr>
<tr><td>11</td><td>Puts the M dial into the volume mode.</td></tr>
</table></td><td>10</td><td>0, 1, 10, 11</td></tr>
<tr><td>P244</td><td>Cooling Fan Operation Selection</td><td>Controls the operation of the cooling fan built in the inverter.
<table>
<tr><th>Setting Range</th><th>Description</th></tr>
<tr><td>0</td><td>Starts the cooling fan when the power is turned “on.” The fan stays “on” while the power is “on.”</td></tr>
<tr><td>1</td><td>The cooling fan stays “on” during inverter operation. With the inverter stopped, the fan turns “on/off” according to the monitored inverter temperature.</td></tr>
</table></td><td>1</td><td>0, 1</td></tr>
</table>

Table 6.7e Parameter Functions

<table>
<tr><th>No.</th><th>Name</th><th>Function/Use</th><th>Default</th><th>Setting Range</th></tr>
<tr><td>P255</td><td>Life Warning Status Display</td><td>If the inrush current limiting circuit, control circuit capacitor, or main circuit capacitor reaches the life expiration warning level, the parameter value is displayed as follows.
<table>
<tr><th>Display</th><th>Inrush current limiting circuit</th><th>Cooling fan</th><th>Main circuit capacitor</th><th>Control circuit capacitor</th></tr>
<tr><td>15</td><td>○</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>14</td><td>○</td><td>○</td><td>○</td><td>×</td></tr>
<tr><td>13</td><td>○</td><td>○</td><td>×</td><td>○</td></tr>
<tr><td>12</td><td>○</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>11</td><td>○</td><td>×</td><td>○</td><td>○</td></tr>
<tr><td>10</td><td>○</td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>9</td><td>○</td><td>×</td><td>×</td><td>○</td></tr>
<tr><td>8</td><td>○</td><td>×</td><td>×</td><td>×</td></tr>
<tr><td>7</td><td>×</td><td>○</td><td>○</td><td>○</td></tr>
<tr><td>6</td><td>×</td><td>○</td><td>○</td><td>×</td></tr>
<tr><td>5</td><td>×</td><td>○</td><td>×</td><td>○</td></tr>
<tr><td>4</td><td>×</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>3</td><td>×</td><td>×</td><td>○</td><td>○</td></tr>
<tr><td>2</td><td>×</td><td>×</td><td>○</td><td>×</td></tr>
<tr><td>1</td><td>×</td><td>×</td><td>×</td><td>○</td></tr>
<tr><td>0</td><td>×</td><td>×</td><td>×</td><td>×</td></tr>
</table>
* ○: With warning, ×: Without warning</td><td>(0)</td><td>(0 to 15)</td></tr>
<tr><td>P256</td><td>Inrush Current Limiting Circuit Life Display</td><td>Counts the number of times of a contact (relay, contactor, or thyristor) turning “on” and performs a countdown from 100 % (1000,000 times) by 1 % per 10,000 times. When the count reaches 10 % (900,000), a life expiration warning is issued.</td><td>(100)</td><td>(0 to 100)</td></tr>
<tr><td>P257</td><td>Control Circuit Capacitor Life Display</td><td>Calculates the remaining service life of the control circuit capacitor based on the power-on time and humidity and performs a countdown from 100 %. When the count falls below 10 %, a life expiration warning is issued.</td><td>(100)</td><td>(0 to 100)</td></tr>
<tr><td>P258</td><td>Main Circuit Capacitor Life Display</td><td>Issues a life expiration warning when the measured capacity of the main circuit capacitor falls below 85 %, with the default capacity level taken as 100 %.
* The measurement is not performed automatically. The measurement must be performed by using P259.</td><td>(100)</td><td>(0 to 100)</td></tr>
<tr><td>P259</td><td>Main Circuit Capacitor Life Measurement</td><td>Measures the capacity of the main circuit capacitor as follows.
(1) Connect the motor and place the unit in the emergency stop state.
(2) Set “P259” to “1.”
(3) Power “off” the AMSE controller. In 5 seconds, power it “on.”
(4) After checking that P259 indicates “3” (Complete), read the measured value by using P258.
<table>
<tr><th>Display</th><th>Description</th><th>Remark</th></tr>
<tr><td>0</td><td>None</td><td>Default</td></tr>
<tr><td>1</td><td>Start</td><td>Measurement starts when the power is turned “off.”</td></tr>
<tr><td>2</td><td>Measuring</td><td rowspan="2"></td></tr>
<tr><td>3</td><td>Complete</td></tr>
<tr><td>8</td><td>Forced Termination</td><td rowspan="2">Issued when the wiring is improper.</td></tr>
<tr><td>9</td><td>Error</td></tr>
</table></td><td>0</td><td>0, 1 (2, 3, 8, 9)</td></tr>
</table>

Table 6.7h Parameter Functions

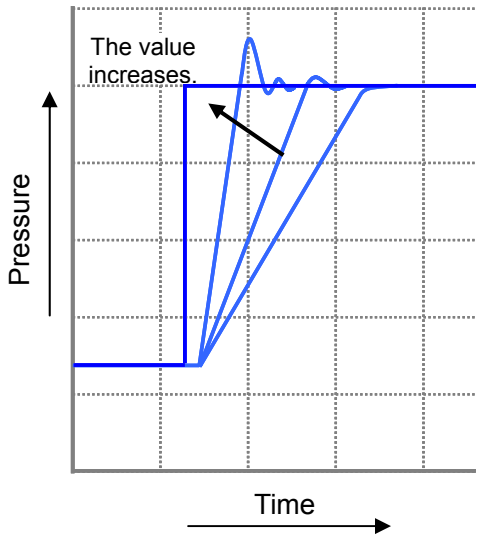
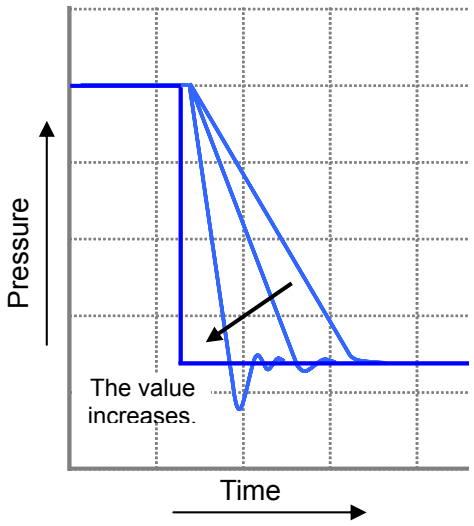
No.	Name	Function/Use	Default	Setting Range
P402 P409 P416 P423	No. 0 Rise Time Gain No. 1 Rise Time Gain No. 2 Rise Time Gain No. 3 Rise Time Gain	Sets the pressure control gain at the pressure rise time. Increasing the setting value improves the response, but an excessively high value may result in vibrations.  	1500	0 to 9999
P403 P410 P417 P424	No. 0 Fall Time Gain No. 1 Fall Time Gain No. 2 Fall Time Gain No. 3 Fall Time Gain	Sets the pressure control gain at the pressure fall time. Increasing the setting value improves the response, but an excessively high value may result in vibrations.  	1500	0 to 9999

Table 6.7i Parameter Functions

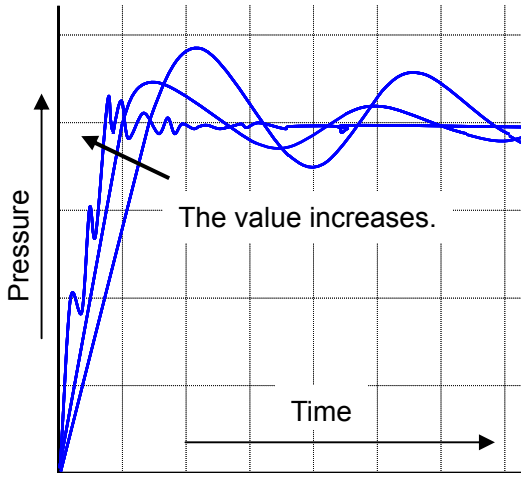
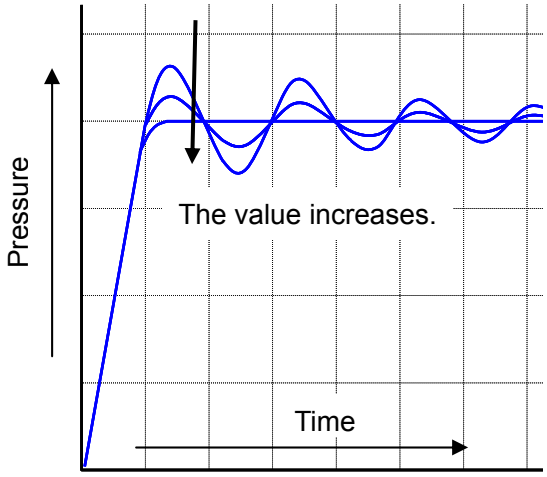
No.	Name	Function/Use	Default	Setting Range
P404 P411 P418 P425	No. 0 Lag Compensation No. 1 Lag Compensation No. 2 Lag Compensation No. 3 Lag Compensation	Sets the pressure control lag time constant. Lag compensation is used when the control gain cannot be increased, and the operation is not stabilized. It can prevent oscillations in a frequency band of several Hz. Excessively increasing the value deteriorates the response and overshoot characteristics; it is recommended to adjust it in combination with lead compensation.  	70	1 to 2000
P405 P412 P419 P426	No. 0 Lead Compensation No. 1 Lead Compensation No. 2 Lead Compensation No. 3 Lead Compensation	Sets the pressure control lead time constant. Lead compensation is used to improve the damping characteristics by preventing overshooting. Excessively increasing the value may result in oscillations in a high frequency band.  	60	1 to 2000

Table 6.7j Parameter Functions

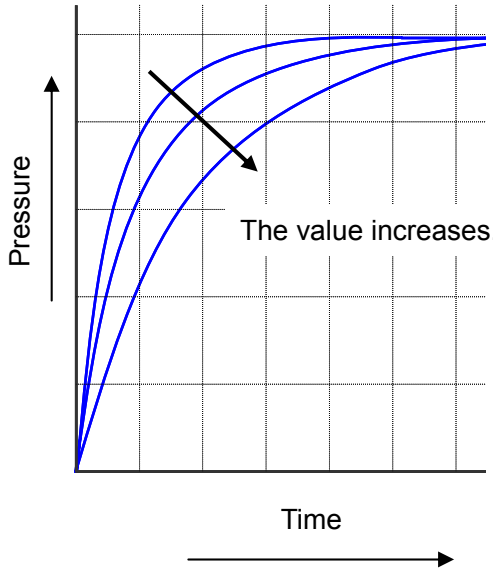
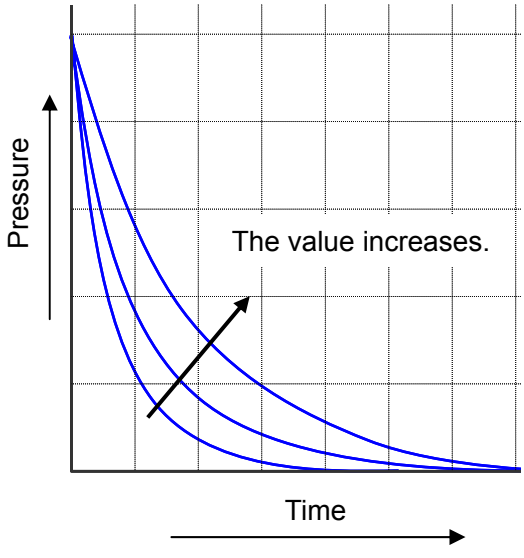
No.	Name	Function/Use	Default	Setting Range
P406 P413 P420 P427	No. 0 Rise Time Pressure Command Filter No. 1 Rise Time Pressure Command Filter No. 2 Rise Time Pressure Command Filter No. 3 Rise Time Pressure Command Filter	Sets the first-order lag filter for pressure command input. It can be set at the pressure rise time. It prevents overshooting in the case of stepped changes in pressure command voltage.  	300	1 to 2000
P407 P414 P421 P428	No. 0 Fall Time Pressure Command Filter No. 1 Fall Time Pressure Command Filter No. 2 Fall Time Pressure Command Filter No. 3 Fall Time Pressure Command Filter	Sets the first-order lag filter for pressure command input. It can be set at the pressure fall time. It prevents undershooting in the case of stepped changes in pressure command voltage.  	300	1 to 2000

Table 6.7k Parameter Functions

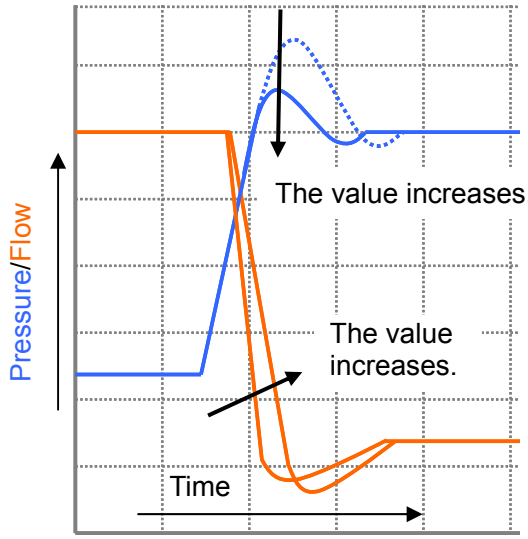
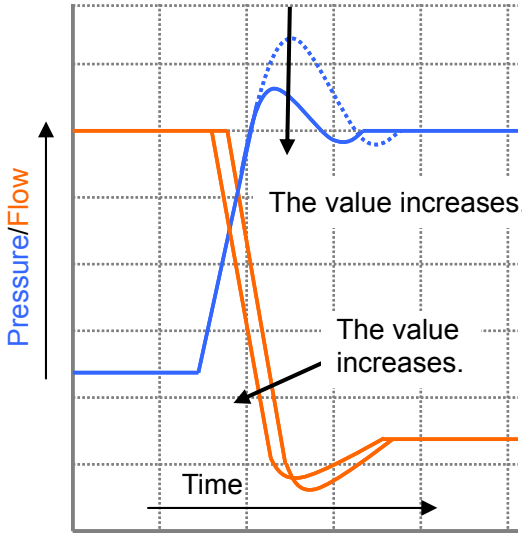
No.	Name	Function/Use	Default	Setting Range
P408 P415 P422 P429	No. 0 Pressure Response Sensitivity No. 1 Pressure Response Sensitivity No. 2 Pressure Response Sensitivity No. 3 Pressure Response Sensitivity	Sets the pressure response sensitivity for switching from flow control to pressure control. Increasing the value reduces the surge upon switching to pressure control but deteriorates the override characteristics. 	200	1 to 2000
P437	Pressure Response Gain	Sets the pressure response gain for the above deviation.	300	0 to 9999
P438	Pressure Response Offset	Sets the pressure deviation for switching from flow control to pressure control. The timing of switching from flow control to pressure control is changed to reduce the surge pressure. Note that the parameter also affects the override characteristics. 	100	0 to 9999

Table 6.7l Parameter Functions

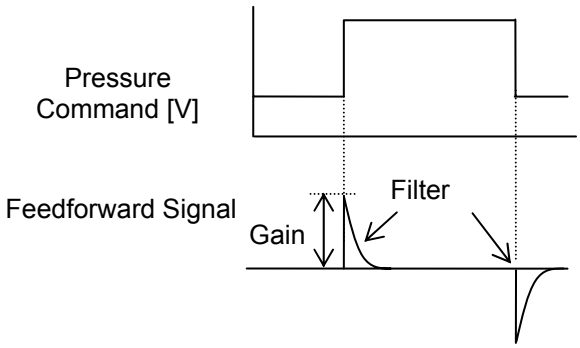
No.	Name	Function/Use	Default	Setting Range
P439	Pressure Proportional Gain	This proportional gain is independent of control compensation, unlike the rise or fall time gain. It improves the response and minimizes disturbance. Since the response is not regulated by control compensation, an excessively high value may result in oscillations.	0	0 to 9999
P440	Pressure Feedforward Gain	Performs the feedforward control of changes in pressure command voltage (derivative) to improve the pressure wave response. - Feedforward Gain: Sets the sensitivity added to pressure control in relation to the change described above. - Feedforward Filter: Filters the return of feedforward signals to keep the function effective against sudden changes. - Feedforward Function Selection: Selects the method of adding feedforward signals. 0: Adding to pressure control at both the pressure rise and fall times. 1: Adding to pressure control at the pressure rise time only. 2: Adding to flow control at both the pressure rise and fall times. 3: Adding to flow control at the pressure rise time only.  	0	0 to 9999
P441	Pressure Feedforward Filter		1	1 to 2000
P442	Pressure Feedforward Function Selection		0	0, 1, 2, 3

Table 6.7m Parameter Functions

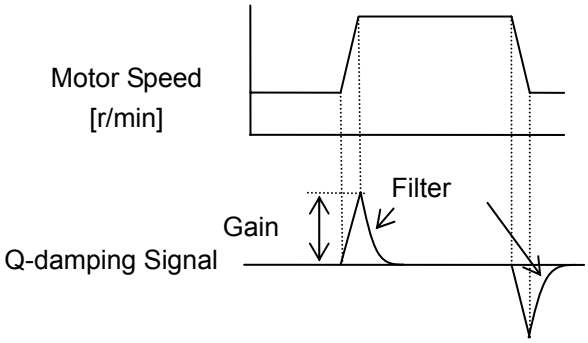
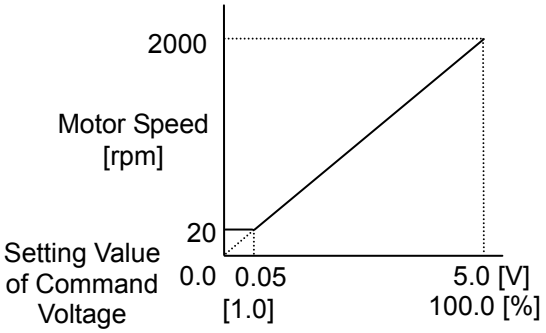
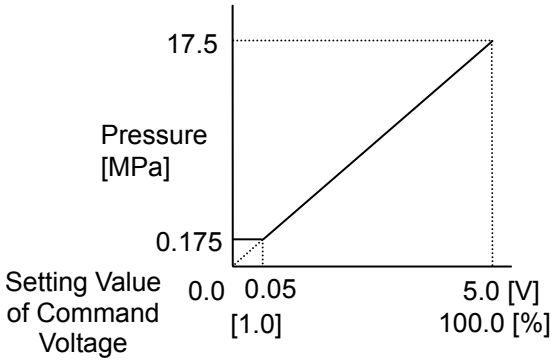
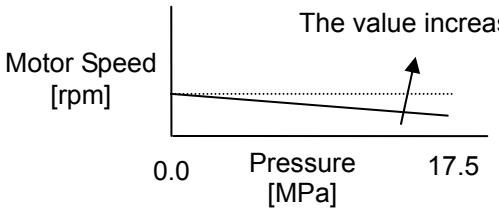
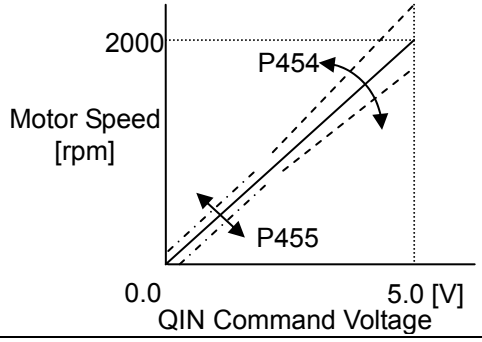
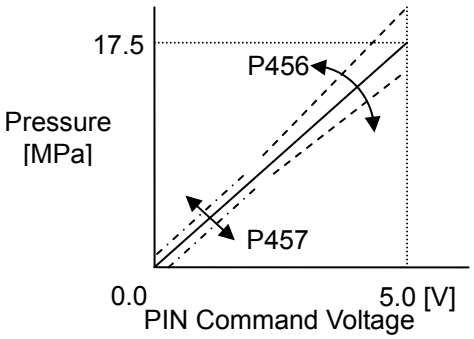
No.	Name	Function/Use	Default	Setting Range
P443	Q-damping Gain	Detects the motor speed during pressure control and adds its derivative to pressure control. This function is effective when the pressure trackability is not good due to a large compression volume on the load side. - Q-damping Gain: Sets the sensitivity added to pressure control in relation to the change described above. - Q-damping Filter: Filters the return of Q-damping control signals to keep the function effective against sudden changes. 	0	- 999 to 9999
P444	Q-damping filter		1	1 to 2000
P449	Number of Combined Units	Inputs the required number of units for combination use.	1	1 to 16
P450	QIN Mini	Sets the lower limit of the motor speed in relation to flow (motor speed) command voltage. It prevents reverse rotation of the pump due to command voltage variations caused by noise or due to improper operation/input. e.g.) If the parameter is set to 10 (1.0 %) with a rated motor speed of 2000 rpm, the minimum motor speed is 20 rpm. 	10	0 to 1000 × 0.1 %

Table 6.7n Parameter Functions

No.	Name	Function/Use	Default	Setting Range
P451	PIN Mini	Sets the lower limit of the pressure in relation to pressure command voltage. It prevents reverse rotation of the pump due to command voltage variations caused by noise or due to improper operation/input. e.g.) If the parameter is set to 10 (1.0 %) with a rated pressure of 17.5 MPa, the minimum pressure is 0.175 MPa (calculated value). 	10	0 to 1000 × 0.1 %
P452	Q-COMP	Compensates for leakage inside the pump in relation to load pressure. As load pressure increases, the leakage level in the pump rises, resulting in lower flow. To prevent this problem, a compensation value proportional to load pressure is added to the flow command. 	1000	0 to 2000

MEMO

Table 6.7o Parameter Functions

No.	Name	Function/Use	Default	Setting Range
P454	Flow Command Voltage Span	Adjusts the span of flow (motor speed) command voltage. This parameter provides the variable control of pump motor speed in relation to command voltage. At the default value, or 1000 (100.0 %), the rated motor speed is achieved with the input of a command voltage of 5 V. The zero point of command voltage is adjusted by “P455.” e.g.) When the command at the output side is zero and the terminal block voltage (between 4 and 5) is 50 mv, input +50.  	1000	0 to 9999 × 0.1 %
P455	Flow Command Voltage Zero		0	- 999 to 9999 × 0.1 %
P456	Pressure Command Voltage Span	Adjusts the span of pressure command voltage. This parameter provides the variable control of pressure in relation to command voltage. At the default value, or 1000 (100.0 %), the rated pressure is achieved with the input of a command voltage of 5 V. The zero point of command voltage is adjusted by “P457.” e.g.) When the command at the output side is zero and the terminal block voltage (between 2 and 5) is 50 mv, input +50.  	1000	0 to 9999 × 0.1 %
P457	Pressure Command Voltage Zero		0	- 999 to 9999 × 0.1 %

MEMO

Table 6.7p Parameter Functions

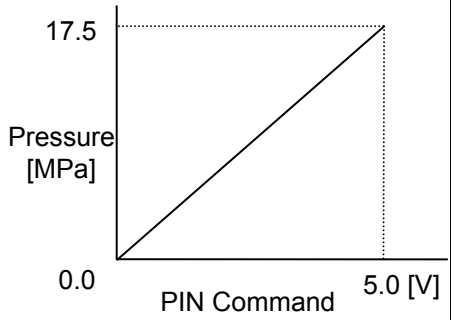
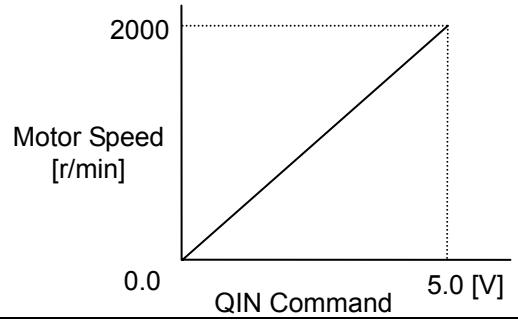
<table>
<tr><th>No.</th><th>Name</th><th>Function/Use</th><th>Default</th><th>Setting Range</th></tr>
<tr><td>P458</td><td>Pressure Sensor Span</td><td rowspan="2">Adjusts the zero point/span of pressure sensor input voltage.
According to the output voltage specification of the pressure sensor, set the parameters as follows.
<table><tr><th rowspan="2">Pressure Sensor Output Voltage</th><th>Pressure Sensor Zero</th><th>Pressure Sensor Span</th></tr><tr><th>P459</th><th>P458</th></tr><tr><td>0.5 to 4.5 V</td><td>500</td><td>1250</td></tr><tr><td>0 to 5 V</td><td>0</td><td>1000</td></tr><tr><td>1 to 5 V</td><td>1000</td><td>1250</td></tr></table>* By default, the values for 0.5 to 4.5 V are set.</td><td>1250</td><td>0 to 9999 × 0.1 %</td></tr>
<tr><td>P459</td><td>Pressure Sensor Zero</td><td>500</td><td>- 999 to 9999
Mv</td></tr>
<tr><td>P460</td><td>Rated Pressure</td><td>Sets the pressure at a pressure command voltage of DC + 5 V.
This parameter is used to change the rated pressure without changing the pressure command voltage.
When pressure monitoring (SMP) is selected for AM monitoring output, the set pressure is output at DC + 5 V.
 
</td><td>175</td><td>1 to 300
× 0.1 MPa</td></tr>
<tr><td>P461</td><td>Rated Motor Speed</td><td>Sets the motor speed at a flow command voltage of DC + 5 V.
This parameter is used to change the rated motor speed without changing the flow command voltage.
When motor speed monitoring (SMN) is selected for AM monitoring output, the set motor speed is output at DC + 5 V.
 
</td><td>2000</td><td>1 to 3000
r/min</td></tr>
</table>

Table 6.7q Parameter Functions

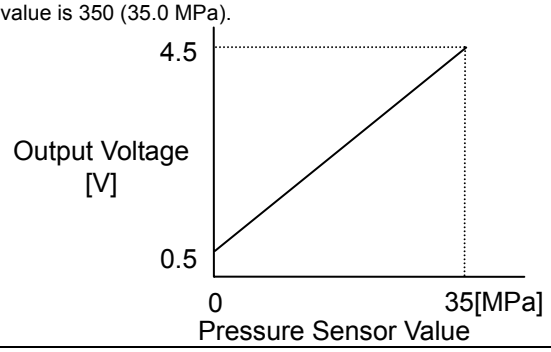
<table>
<tr><th>No.</th><th>Name</th><th>Function/Use</th><th>Default</th><th>Setting Range</th></tr>
<tr><td>P462</td><td>Pressure Sensor Rated Value</td><td>Sets the rated pressure for the pressure sensor.
The rated output of the pressure sensor for the ASE pump system is obtained at DC 0.5 to 4.5 V/0 to 35 MPa. Thus, the rated value is 350 (35.0 MPa).
 
</td><td>350</td><td>1 to 400 × 0.1 MPa</td></tr>
<tr><td>P463</td><td>AM Monitoring Output Item Selection</td><td>Parameter Selection Items
<table>
<tr><th>Setting Value</th><th>Name</th><th>Code</th></tr>
<tr><td>0</td><td>Motor Speed Command</td><td>2.5±2.5V/ 0 ± Rated Motor Speed(Set Value P461)</td></tr>
<tr><td>1</td><td>Pressure Command</td><td>2.5-5V / 0 -Command Voltage at Rated Pressure</td></tr>
<tr><td>2</td><td>Flow Command</td><td>2.5-5V / 0 -Command Voltage at Rated Motor Speed</td></tr>
<tr><td>3</td><td>Pressure Sensor Monitor</td><td>2.5±2.5V / 0 ±Rated Pressure(Set Value P462)</td></tr>
<tr><td>4</td><td>Motor Speed Monitor (Calculated Value)</td><td>2.5±2.5V/ 0 ± Rated Motor Speed(Set Value P461)</td></tr>
<tr><td>5</td><td>Torque</td><td>2.5-5V / 0-250%</td></tr>
<tr><td>6</td><td>Load Factor</td><td>2.5-5V / 0-250%</td></tr>
</table></td><td>3</td><td>0 to 99</td></tr>
<tr><td>P820</td><td>Manufacturer-controlled</td><td>* The setting value varies depending on the models.
<table>
<tr><th>Model</th><th>Default</th></tr>
<tr><td>ASE3-4AA</td><td>60</td></tr>
<tr><td>ASE3- AA</td><td>60</td></tr>
<tr><td>ASE5-4BZ</td><td>60</td></tr>
<tr><td>ASE5- BZ</td><td>40</td></tr>
<tr><td>ASE10</td><td>60</td></tr>
</table></td><td>See the table on the left.</td><td>-</td></tr>
</table>

Table 6.7s Parameter Functions

<table>
<tr><th>No.</th><th>Name</th><th>Function/Use</th><th>Default</th><th>Setting Range</th></tr>
<tr><td>C___</td><td>Calibration Parameters</td><td>Automatically calibrates the input/output of each terminal.
* See “Table 6.7v” for details.</td><td>-</td><td>-</td></tr>
<tr><td>PrCL</td><td>Parameter Clear</td><td>Initializes a parameter.
* Calibration parameters are not initialized.
* Parameters are not initialized when “P_77” is set to “1.”
<table><tr><th>Setting Range</th><th>Description</th></tr><tr><td>0</td><td>Not initialize</td></tr><tr><td>1</td><td>Initialize</td></tr></table></td><td>0</td><td>0, 1</td></tr>
<tr><td>ALLC</td><td>All Parameter Clear</td><td><Do not use this parameter unless under special circumstances.>
Initializes all parameters.
* Parameters are not initialized when “P_77” is set to “1.”
<table><tr><th>Setting Range</th><th>Description</th></tr><tr><td>0</td><td>Not initialize</td></tr><tr><td>1</td><td>Initialize all parameters</td></tr></table></td><td>0</td><td>0, 1</td></tr>
<tr><td>Ercl</td><td>Manufacturer-controlled</td><td>Protected.</td><td>0</td><td>-</td></tr>
</table>

Table 6.7t Parameter Functions

<table>
<tr><th>No.</th><th>Name</th><th>Function/Use</th><th>Default</th><th>Setting Range</th></tr>
<tr><td>PCPY</td><td>Parameter Copy</td><td>Copies setting parameter data when using multiple AMSE controllers.
<table><tr><th>Setting Range</th><th>Description</th></tr><tr><td>0</td><td>Cancel.</td></tr><tr><td>1</td><td>Copies the original data of parameters to the operation panel.</td></tr><tr><td>2</td><td>Writes the copied setting parameter data to the destination AMSE controller.</td></tr><tr><td>3</td><td>Cross checks the setting parameter data written to the destination AMSE controller against the data on the operation panel.</td></tr></table>
Setting method
Note) Do not perform this work during operation.

1) Copy the original data of setting parameters to the operation panel.
1. Display the setting parameter “PCPY” and press the “SET” button.
2. Turn the “M Dial” to change from “0: Default” to “1.”
3. Then, press the “SET” button. After the display flickers for about 30 seconds, “PCPY” appears to indicate the completion of the copy.

2) Write the copied setting parameter data to the destination AMSE controller.
1. Connect the operation panel to the destination AMSE controller and power on the operation panel.
2. Display the setting parameter “PCPY” and press the “SET” button.
3. Turn the “M Dial” to change to “2.”
4. Then, press the “SET” button. After the display flickers for about 30 seconds, “PCPY” appears to indicate the completion of the write.
5. For the setting parameters to take effect, power “off” and then on the AMSE controller.

3) Cross check the setting parameter data.
1. Connect the operation panel retaining the setting parameter data to the destination AMSE controller and power on the operation panel.
2. Display the setting parameter “PCPY” and press the “SET” button.
3. Turn the “M Dial” to change to “3.”
4. Then, press the “SET” button. The setting parameter data is loaded from the destination AMSE controller in about 30 seconds.
5. If any difference is found, the related setting parameter No. and “rE_3” are displayed alternately.

Every time the “SET” button is pressed, the parameter No. and setting value are displayed alternately from one parameter in question to another. When all parameters in question are corrected, “3” is displayed.
* If there is no parameter in question, “PCPY” and “3” are displayed alternately.</td><td>0</td><td>0, 1, 2, 3</td></tr>
</table>

Table 6.7v Parameter Functions

No.	Name	Function/Use	Default	Setting Range
C__1	AM Terminal Calibration	Calibrates the scale of the meter connected to the control circuit terminal “AM.”	-	-

MEMO

7. Troubleshooting

7.1 Error indication

The ASE pump unit can issue “alarms” that are generated with the detection of system errors and stop system operation, “warnings” that are generated with the detection of system errors but allow continued system operation, and “error messages” generated by improper operation.
The monitor of the operation panel indicates a code for each error. The user can identify the error cause by referring to this manual.

7.1.1 Alarms

An alarm is displayed when significant failure occurs to the ASE pump unit. Take appropriate measures in the event of an alarm. Any alarm shuts off the output and stops system operation, while the AMSE controller outputs an alarm signal.
The operation panel displays the code for the alarm (see Table 7.1a below).
Reset the alarm after removing the error cause and then restart system operation.

Note) Alarms are output via relay contacts. For details, see “Table 2.7c: Alarm Output.”

Note) Alarm codes are output via the open collector. For details, see “Table 2.7d: Sequence Output.”

Table 7.1a Alarm Codes

Alarm	Alarm Code			Name	Reference	Alarm Reset
	FU	SU	IPF			
E. PE	OFF	OFF	OFF	Parameter Memory Device Error	Table 7.2a	1) To reset an alarm, press STOP RESET on the operation panel. 2) Turn “off” and the on the power. 3) Turn “on” RES (Reset Signal) for at least 0.1 second. Note) For details, see “Table 2.7a: Sequence Input.”
E. 6				CPU Error		
E. 7						
E.CPU						
E.IOH				Inrush Current Limiting Circuit Error		
E.AIE				Analog Input Error		
E.OPГ				Option Error		
E.SEr				Communication Error		
E. 13				Internal Circuit Error		
E.P24				DC 24 Power Output Short Circuit		
E.CГE				Operation Panel Power Short Circuit	Table 7.2b	
E.USb				USB Communication Error		
E.OP3				Hydraulic Control Board Error		
E. 3				Hydraulic Control Board Communication Error		
E.Ov3	OFF	OFF	ON	Regeneration Overvoltage		
E._bE				Brake Transistor Error Detection		
E.UuГ	OFF	ON	OFF	Undervoltage		
E.IPF				Instantaneous Power Failure		
E.ГHГ	OFF	ON	ON	AMSE Controller Overload		
E.ГHП				Motor Overload		
E.FIn				Fin Overheat	Table 7.2c	
E.OLГ				Stall Prevention		
E.OC3	ON	OFF	OFF	Overcurrent		
E. GF				Ground Fault Overcurrent on the Output Side		
E.ILF	ON	ON	ON	Input Phase Failure		
E. LF				Output Phase Failure		
E.PUE				PU Disconnection		

Note 1) After removing the error cause, wait about 30 minutes until the unit cools down.

7.1.2 Warnings

When the probability of the failure of the ASE pump unit is determined, warnings are displayed before alarm output.
Take appropriate measures in the event of a warning. While the system continues operation, the AMSE controller outputs a warning signal, and the operation panel displays the code for the warning.
When any warning is output, take measures to prevent the occurrence of serious failure.

Table 7.1b Warnings

Warning	Name	Reference
OL	Stall Prevention (Overcurrent)	Table 7.2d
Rb	Dynamic Brake Pre-alarm	
ΓH	Electronic Thermal Pre-alarm	
PS	PU Stop	
CP	Parameter Copy	
Fn	Fan Fault	
oP	Hydraulic Control Board Warning	

Note) Contact us when other warning codes are displayed.

7.1.3 Error messages

In the event of setting failure due to improper operation, an error code is displayed on the operation panel.
Set the relevant parameter properly by referring to this manual.

Table 7.1c Error Messages

Error Message	Name	Reference
HOLD	Operation Panel Lock	Table 7.2e
Er 1	Parameter Write Error - 1	
Er 2	Parameter Write Error - 2	
Er 3	Parameter Write Error - 3	
Er 4	Parameter Write Error - 4	
rE 1	Copy Operation Error - 1	
rE 2	Copy Operation Error - 2	
rE 3	Copy Operation Error - 3	
rE 4	Copy Operation Error - 4	
Err	Error	

7.1.4 Status display

During operation, the operation status code is displayed on the operation panel.

Table 7.1d Status Display

Status	Name	Reference
ЕПG	Emergency Stop	Table 7.2f

7.2 Measures against alarms (error indication)

⚠ CAUTION

- When an alarm occurs, remove its cause and ensure safety. Then, reset the alarm and restart system operation.
- When an alarm occurs, immediately turn "off" STF (Serve-on) and shut off the power supply.
- If any of the following alarms occurs, do not restart operation by resetting the alarm. Doing so may cause failure of the servo amplifier or motor. In such cases, remove the alarm cause and wait 30 minutes or more until the unit cools down. Then, restart operation:
  □E.IOH, □E.ГНГ, or □E.ГНП.

An alarm can be reset by powering off and then on the unit, pressing the "STOP/RESET" button on the operation panel, or turning on RES (Reset).

Table 7.2a Measures Against Alarms

Alarm	Name	Description	Cause	Remedy
E. PE	Parameter Memory Device Error	EEPROM failure (control board).	Excessive parameter write operations.	- Replace the AMSE controller
E. 6 E. 7 E.CPU	CPU Error	Communication error of the built-in CPU.	Noise.	- Take measures against devices producing excessive noise near the AMSE controller.
E.IOH	Inrush Current Limiting Circuit Error	The resistor of the inrush current limiting circuit has overheated.	Repeated power-on/off cycles.	Replace the circuit with the one that does not perform frequent power-on/off cycles.
E.AIE	Analog Input Error	Input of 30 mA or more or voltage input after changing the control circuit terminals "2" and "4" to the settings for current command specifications.	Change of the setting of the voltage/current switch.	Correct the setting of the voltage/current switch.
E.OPГ	Option Error	Communication circuit error of a communication option.	Failure of the hydraulic control board connector.	Check the connection of the hydraulic control board.
			Communication error due to a parameter setting change.	Initialize the setting parameter.
E.SEr	Communication Error	RS-485 communication error	The number of communication errors has exceeded the allowable threshold set by the setting parameter "335: RS-485 Communication Retry Count" (excluding "9999"). The communication downtime is longer than the threshold set by the setting parameter "336: RS-485 Communication Check Time Interval."	- Set the parameter with sufficient margin. - Modify the wiring to ensure the availability of RS-485 communication.
E. 13	Internal Circuit Error	Internal circuit error.	Failure.	Contact the place of purchase.
E.P24	DC 24 Power Output Short Circuit	Short circuit of DC 24 V power supplied from the control circuit terminal "PC."	Short circuit of the PC terminal.	Disconnect the wire from the PC terminal to check whether the error can be removed. Then, check whether the wire connected to the PC terminal is short-circuited.

Table 7.2b Measures Against Alarms

Alarm	Name	Description	Cause	Remedy
E.CГE	Operation Panel Power Short Circuit RS-485 Terminal Power Short Circuit	Short circuit of the operation panel power (PU connector). Short circuit of the RS-485 terminal power.	Short circuit of the power cable of each power supply.	Check the short-circuited part. Replace the operation panel.
E.USb	USB Communication Error	Interruption of USB communication.	Contact failure.	Check the cable.
E.OP3	Hydraulic Control Board Error	Pressure sensor output error. EEPROM error.	Disconnection of the pressure sensor. EEPROM read error.	Check the wiring. Replace the wiring. Replace the pressure sensor.
E. 3	Hydraulic Control Board Communication Error	Interruption of communication between the hydraulic control board and the driver.	Contact failure of the connector. Board failure.	Replace the AMSE controller.
E.Ov3	Regenerative overvoltage	Regeneration during deceleration/stop. Overvoltage shutdown.	Rapid deceleration.	Increase the deceleration time. Reduce the braking frequency. Use a brake unit/power regenerative converter, if required.
E. bE	Brake Transistor Error Detection	Damage to the brake transistor or brake circuit failure.	A large volume of released pressure. High braking frequency (the cycle time must be set with sufficient margin).	The replacement of the AMSE controller is required.
E.UuГ	Undervoltage	The primary power voltage applied to “R/L1,” “S/L2,” and “T/L3” of the main circuit terminal block is 300 V or less. The short bar between “P/+” and “P1” of the main circuit terminal block or DC reactor is connected.	Low power voltage. Any factor that reduces the main power voltage and causes the error (startup of a large-size motor, etc.).	Check the power facilities. If a DC reactor is in use, check the wiring.
E.IPF	Instantaneous Power Failure	Power failure lasting more than 15 ms. *1: This error is not output in the case of a power failure of more than 100 ms. *2: The operation continues in the event of an instantaneous power failure of 15 ms or less.	Interruption of power supply for more than 15 ms but less than 100 ms.	Remove the cause of instantaneous power failure. Prepare a backup power supply for instantaneous power failure.
E.ГНГ	AMSE Controller Overload Shutdown	When the rated output current is exceeded and if overcurrent shutdown does not occur, the electronic thermal with inverse time characteristics is activated for output transistor protection.	The motor’s rated load factor has been exceeded.	Reduce the load. - Reduce the pressure setting. - Reduce the cycle load by operating the system at intervals.
E.ГНП	Motor Overload Shutdown	The electronic thermal in the AMSE controller has detected a motor overheat caused by overload or reduced cooling capability during constant speed operation.	High overload factor of the motor. The set value of the setting parameter “71: Applicable Motor” is improper.	Modify the motor environment (ambient temperature). Check that the motor fan works normally.

Table 7.2c Measures Against Alarms

Alarm	Name	Description	Cause	Remedy
E.FIn	Fin Overheat	The cooling fin of the AMSE controller has overheated.	1) Ambient temperature around the AMSE controller is high. 2) The cooling fin has been clogged. 3) The cooling fan has stopped.	1) Check that the ambient temperature is as specified. 2) Clean the cooling fin. 3) Replace the cooling fan.
E.OLΓ	Stall Prevention	The operation has been stopped by the torque limiting function.	Overload.	Reduce the load.
E.OC3	Overcurrent	The current level has exceeded the specified current value.	Operation at zero rotation.	Avoid operating at near-zero rotation.
			Rapid deceleration.	Increase the deceleration time.
			Output short circuit.	Check the wiring.
E._GF	Ground Fault Overcurrent on the Output Side	A ground fault has occurred on the output side of the AMSE controller.		Restore the section where the ground fault has occurred.
E.ILF	Input Open-phase	One of the three input power phases has opened.	Disconnection of the 3-phase power cable.	Check the wiring.
E.PUE	PU Disconnection	Interruption of communication between the operation panel and the PU terminals.	Disconnection of the operation panel. Setting of the setting parameter “P_75: Reset” at “2,” “3,” “16,” or “17.”	Reset “P_75” to “0,” “1,” “14,” or “15” so that the operation continues when the operation panel is disconnected.

Table 7.2d Measures Against Warnings

Alarm	Name	Description	Cause	Remedy
OL	Stall Prevention (Overcurrent)	The threshold set by the setting parameter "P_22: Stall Prevention Operation Level" has been exceeded.	The load is too high.	Reduce the load. Increase the settings of "P__7: Acceleration Time" and "P__8: Deceleration Time." Check that the setting parameter "P_13" has been set to "0."
rb	Dynamic Brake Pre-alarm	The dynamic brake utilization has exceeded 85 % of the set value.	The frequency of the dynamic brake utilization is high.	Increase the setting of "P__8: Deceleration Time" (extend the deceleration time).
ΓH	Electronic Thermal Pre-alarm	The value has exceeded 85 % of the set value of "P__9: Electronic Thermal."	The load is too high. Too frequent rapid acceleration/ deceleration.	Reduce the load and operation frequency.
PS	PU Stop	The "STOP" button has been enabled by the setting parameter "P_75: Reset."	The operation has been stopped by the "STOP" button.	After turning off the servo, press the "STOP/RESET" button for recovery. Turn "on" the terminal "RES" for recovery.
CP	Parameter Copy	Parameter data has been copied between different AMSE controllers.		Initialize the setting parameter "P989: Parameter Copy Warning Reset."
Fn	Fan Fault	The fan in the AMSE controller has failed and stopped, or its rotational speed has decreased.	Fan failure.	Contact the place of purchase.
oP	Hydraulic Control Board Warning	Setting error.	Mismatch between the combination use setting area and the combination use setting parameter.	See "8: Combination use" to check the setting of combination/single use.

Table 7.2e Measures Against Error Messages

Alarm	Name	Description/Cause	Remedy
HOLD	Operation Panel Lock	The operation lock mode is active.	Press the “MODE” button on the operation panel for 2 seconds or more (to disable the operation lock).
Er 1	Write Protection Error	The setting parameter “P_77: Parameter Write Selection” has been set to “1.”	Change the setting of “P_77: Parameter Write Selection.”
		The operation panel has not been mounted to the AMSE controller properly.	Check the connection between the operation panel and the PU connector.
Er 2	Write During Operation	A write was performed during operation with STF (STR) - SD set to “on.”	Stop the operation. Change the setting of “P_77: Parameter Write Selection.”
Er 3	Modify the settings of the setting parameters (default settings are recommended).		
Er 4			
rE 1	Parameter Read Error	EEPROM failure on the operation panel side during work.	Perform the work again.
			Operation panel failure.
rE 2	Parameter Write Error	A write of copied parameter data was attempted during operation. EEPROM failure on the operation panel side during work.	Stop the operation and perform the work again.
			Operation panel failure.
rE 3	Parameter Cross Check Error	Inconsistency of data on the operation panel with data on the AMSE controller. EEPROM failure on the operation panel side during work.	Press the “SET” button to continue the cross check process. When the error indication remains on, operation panel failure should be suspected.
rE 4	Model Error	The AMSE controller model is different upon parameter copy, write, or cross check. Termination of parameter write after termination of parameter copy.	Check that the same model is used.
			Perform the work again.
Err	Error	The “RES” signal is “on.” Failure of communication between the operation panel and the AMSE controller. The main circuit power separate from the control circuit power has been turned “on.”	Turn “off” the “RES” signal.
			Check the connection between the operation panel and the AMSE controller.

Table 7.2f Status Display

EПG	Emergency Stop	The unit is in an emergency stop.	Reset the emergency stop state. For the setting for combination use, see “8: Combination use.”

7.3 Measures against noise

□ There are two types of noises: external noises causing malfunction of the AMSE controller and noises radiated by the AMSE controller and causing malfunction of peripheral devices. The AMSE controller is designed to be noise resistant; however, basic measures described in 7.3.1 are required because the AMSE controller is an electronic device handling weak signals. The AMSE controller chops output signals at high carrier frequencies and may generate noises. If such noises cause malfunction of peripheral devices, noise control measures must be taken. Measures slightly differ depending on the noise propagation path.

7.3.1 Basic measures

- For the AMSE controller's power cable (I/O cable) and signal cable, avoid running the cables in parallel or bundling them. Wire the cables separately.
- For control signal cable, use twisted pair shielded cables. Connect the outer conductor of the shielded cable to the terminal SD.
- Provide single point grounding for the "AMSE controller" and "motor."

7.3.2 Measures against external noises causing malfunction of the AMSE controller

□ Take the following measures if noise-generating devices (electromagnetic contactor, electromagnetic brake, and many relays) are installed near the AMSE controller and may cause malfunction of the controller.

- Provide surge suppressors to the noise-generating devices for noise reduction.
- Use a "ferrite core" for the signal cable.
- Use metallic cable clamps to attach the shield of the encoder connection cable and control signal cable.

7.3.3 Measures against noises radiated by the AMSE controller and causing malfunction of peripheral devices

□ Noises generated by the AMSE controller are roughly classified into three types: noises radiated from the cables connected to the AMSE controller and its main circuit (I/O), those electromagnetically or electrostatically induced in the signal cables of peripheral devices near the main circuit power cable, and those propagating through power lines.

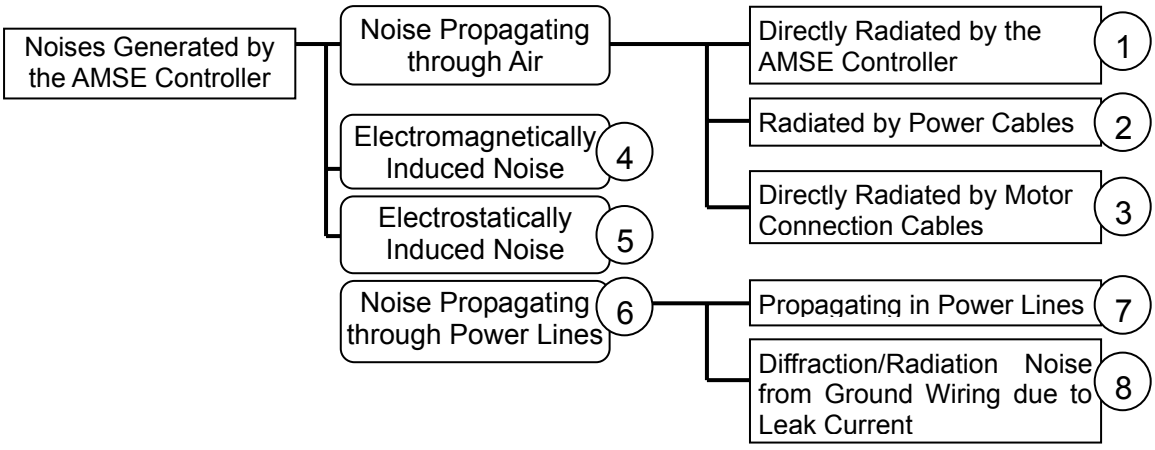


Fig. 7.3a Classification of Noise Types

Table 7.3b Measures Against Noises

Noise Path	Measures
(1), (2), (3)	If devices or signal cables that handle weak signals and are susceptible to noise (gauges, receivers, sensors, etc.) are housed together with the AMSE controller or installed near the controller, they may malfunction due to noise. Thus, the following measures must be taken. 1) Design the system so that noise-susceptible devices are away from the AMSE controller as far as possible. 2) Install noise-susceptible signal cables away from the AMSE controller and its I/O cable as far as possible. 3) Avoid running the signal cables and power cable (AMSE controller's I/O cable) in parallel or bundling them. 4) Turn "on" the EMC filter on/off connector of the AMSE controller. 5) Provide a line noise filter for output to suppress radiation noises from wires. 6) The use of shielded wires for signal and power cables or the housing of such cables in separate metal ducts is effective.
(4), (5), (6)	If a signal cable is run in parallel to the power cable or bundled with the power cable, electromagnetic or electrostatic noise may propagate through the signal cable, causing malfunction. Thus, the following measures must be taken. 1) Design the system so that noise-susceptible devices are away from the AMSE controller as far as possible. 2) Install noise-susceptible signal cables away from the AMSE controller and its I/O cable as far as possible. 3) Avoid running the signal cables and power cable (AMSE controller's I/O cable) in parallel or bundling them. 4) The use of shielded wires for signal and power cables or the housing of such cables in separate metal ducts is effective.
(7)	If peripheral devices are connected to the same power line as for the AMSE controller, noise generated by the AMSE controller propagates through the power cable, causing malfunction of the devices. Thus, the following measures must be taken. 1) Turn "on" the EMC filter on/off connector of the AMSE controller. 2) Provide a line noise filter for the power cable (output cable) of the AMSE controller.
(8)	If peripheral devices are wired to the AMSE controller to form a closed-loop circuit, leak current may flow through the ground wire of the AMSE controller, causing malfunction of the devices. In such cases, remove the ground wire of the devices to prevent malfunction.

Note) Turning "on" the EMC filter may cause the earth leakage circuit breaker to malfunction. Therefore, an earth leakage circuit breaker for high frequencies range must be used.

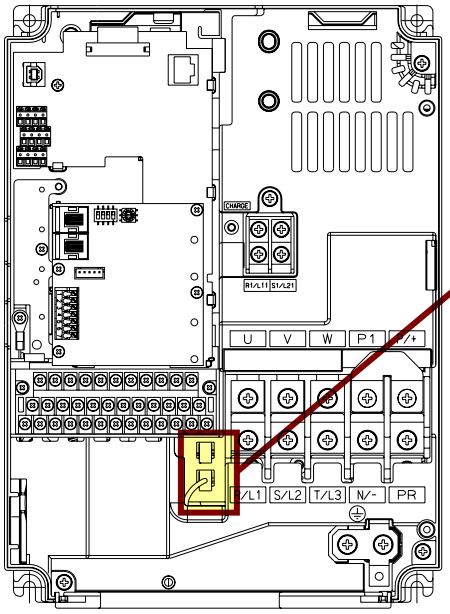


Fig. 7.3b EMC Filter Switch

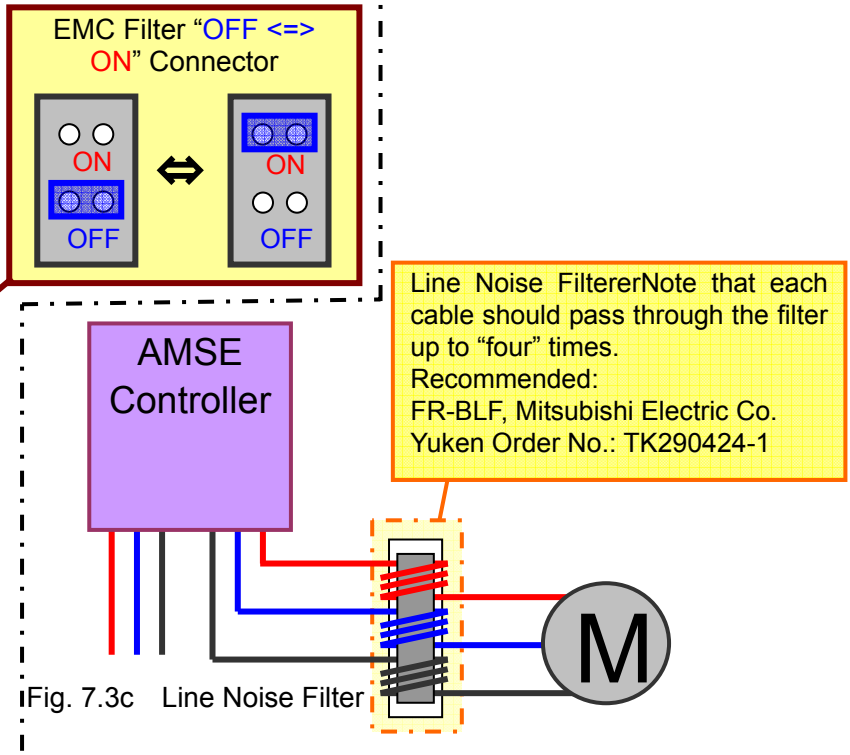


Fig. 7.3c Line Noise Filter

8. Combination use

8.1 Overview

The combination use of multiple ASE units can provide high flow with a system that requires high flow.

The control of combined pumps for combination use operation is performed by the “master ASE” unit, which allows combined “slave ASE” units following the master ASE unit to actualize the same operation (at the same speed). Therefore, it is only the master ASE unit that receives and processes pressure/flow commands and sequence signals. This mechanism can reduce the load of the main system’s sequence signals.

For the combination use operation, the communication network is configured so that the entire ASE system is urgently stop by the fail safe function when a failure occurs in a unit.

This control system is capable of controlling up to 16 combined units, or 3200-L/min flow (ASE10- × 16 units).

The controller can be used for both combination and single use operation; the operation mode can be switched by changing the settings.

8.2 Simplified diagram of the hydraulic circuit and wiring

- Directly connect all discharge lines.
- Only one pressure sensor mounted on the master ASE is used.
  (No pressure sensor of the slave ASE units is used.)
- Sequence signals received by one unit for combination use operation are used for all combined units.

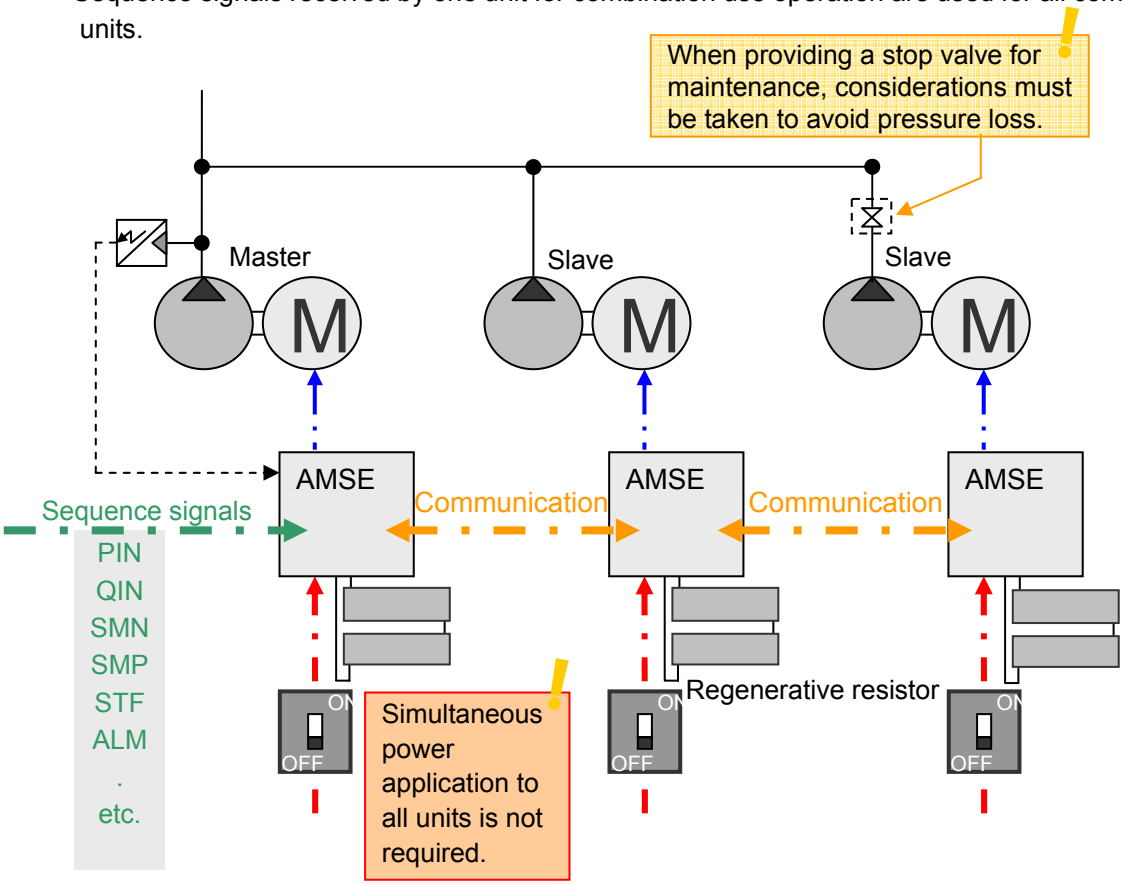


Fig. 8.2a Simplified Circuit Diagram for Combination Use

8.3 Component setting for combination use

* For components other than those shown below, see Section 4.

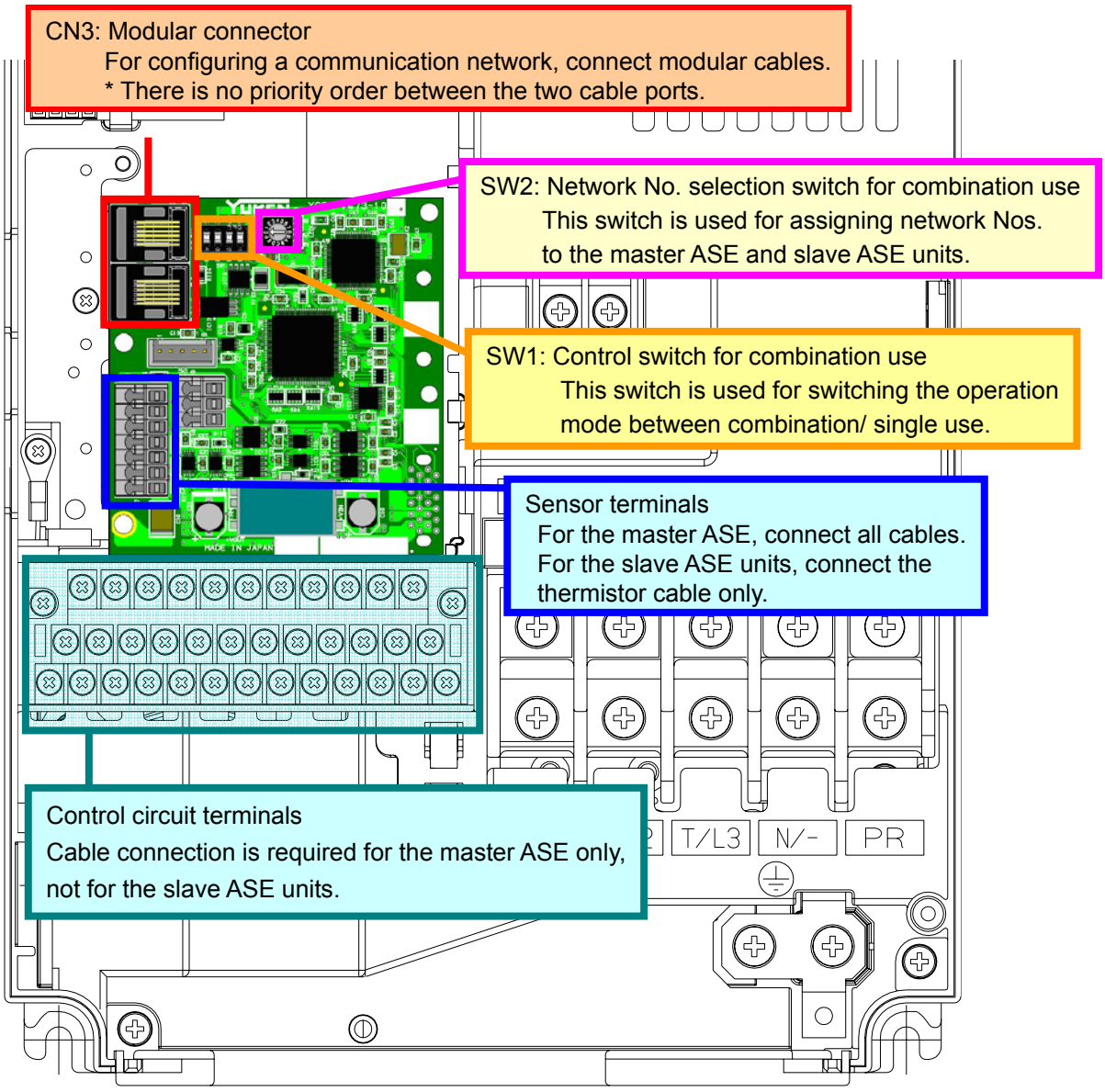


Fig. 8.3a Component Setting for Combination Use

8.4 Tools for setting

* The master ASE requires all cables.
* The slave ASE units require no cable connection to the control circuit/pressure sensor terminals.

Prepare a required number of “RJ11 modular cables” for configuring a communication network.

“Required number = Number of combined units – 1”

Our recommendation (for reference)

SANWA SUPPLY

Name: Modular cable with ferrite core

(sealed twisted pair)

Model: TEL-FST-*S

Do not tie network cables with high voltage power lines.

Fig. 8.4a Modular Cable

MEMO

8.5 Setting

> Settings selected by the switches described in this section are not reflected if they are changed during operation. To make settings valid, select settings by these switches while the main power is "off," then, turn it "on."

8.5.1 Network No. selection switch for combination use (SW2)

Set network Nos. to each AMSE controller according to the number of combined units. Referring to the table below, set Nos. and roles to each AMSE controller. The default setting is "0."
* Turn the switch so that the arrow points a desired No.

Fig. 8.5a Network No. Selection Switch for Combination Use

Table 8.5a

Number of combined units	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Role	M	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15

Note) Meaning of Role: M = Master ASE, S* = Slave ASE

* No. for the AMSE controller for the master ASE is "0."
* Set Nos. other than "0" for the AMSE controllers for the slave ASE units. Setting the same No. for different slave units displays a warning "oP," rendering the system inoperable.
* The switch turns 360 degrees clockwise and counterclockwise. Turn the switch so that the arrow points a desired No.

8.5.2 Control switch for combination use (SW1)

Select settings by switching each bit between ON and OFF.

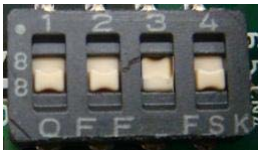


Fig. 8.5b
Control Switch for Combination Use

Table 8.5b

bit	Name	ON/OFF	Description	Default
1	Manufacturer-controlled	Changing the setting of "OFF" to "ON" is not allowed.		OFF
2	Reserved			
3	Switching combination/ single use operation	ON	Single use operation	ON
		OFF	Combination use operation	
4	Network termination resistor	ON	w/ termination resistor	OFF
		OFF	w/o termination resistor	

■ bit.1 (manufacturer-controlled)
* The default setting is "OFF."

Table 8.5c

ON/OFF	Mode
ON	Do not set to "ON."
OFF	Normal mode

■ bit.2 Reserved

This bit is reserved.

* The default setting is “OFF.”

■ bit.3 Switching combination/single use operation

This bit is used for a model with a controller for combination use to perform single use operation.

* Switching this switch alone does not allow single use operation.
  For details, see Section “8.9.”
* The default setting is “ON (single use operation mode).”

Table 8.5d

ON/OFF	Mode
ON	Single use operation
OFF	Combination use operation

■ bit.4 Network termination resistor

In the combination use operation of the ASE units connected by a communication network, only one modular cable is connected to each of the AMSE controllers at both ends.
For such AMSE controllers, of which only one port of the modular connector is used, set bit.4 Network termination resistor to “ON.” Failure to do so may cause communication errors.

* The default setting is “OFF (w/o termination resistor).”

Table 8.5e

ON/OFF	Mode
ON	w/ termination resistor
OFF	w/o termination resistor

<Example of termination resistor setting>

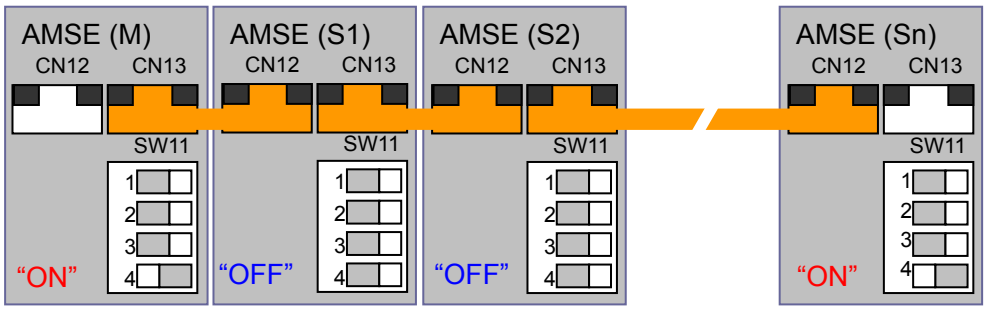
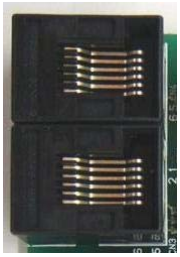


Fig. 8.5c Network Cable Connection

8.5.3 Modular connector (CN3)



This connector is used for connecting modular cables to configure a communication network connecting between the Master ASE and a slave ASE unit and between the slave ASE units.
Though, two cable ports are provided, there is no priority order between the two cable ports. When using only one cable, it can be connected to either port.
Connect cables, paying attention to the direction of the connector.

Fig. 8.5d Modular Connector

8.6 Changing parameters

⚠ CAUTION

This section describes adjustment with control power turned "on." Incorrect settings may result in a failure. Be sure to power "on" in Stand-by state, not in Servo On state.
Take a precaution, e.g. removing the "STF-SD" cable from the control circuit terminal of the AMSE controller for the master ASE, to ensure that Servo On does not start concurrently with main power application.

8.6.1 Number of combined units

Set the parameter for each of all combined AMSE controllers.

- Parameter No.: P449
- Parameter Name: Number of combined units

Set a value representing the "number of units to be combined."
* The default setting is "1." A value between 1 and 16 can be set.

8.6.2 MRS signal input selection

Servo emergency stop (EMG) can be deactivated. Set the parameter for all AMSE controllers for the slave ASE units, excluding that for the master ASE.

- Parameter No.: P 17
- Parameter Name: MRS signal input selection

Set "0."
* The default setting is "2." A value between 0 and 2 can be set.

MEMO

8.7 Before commissioning

⚠ CAUTION

Preparation for operation is assumed to be completed. However, a breakage accident in a system for combination use may cause major damage. Recheck the followings before commissioning.

8.7.1 Checking the hydraulic circuit

Check that all discharge hydraulic lines are connected directly to the discharge hydraulic circuit without valves.

⚠ DANGER

If any discharge port of the slave ASE units is connected to another line or blocked for some reason, abnormal pressure may occur.
When stop valves are provided in pump discharge hydraulic lines for maintenance purpose, be sure to "open" the stop valves.

8.7.2 Checking the installation standards

Check the installation standards for ASE pumps and AMSE controllers.
In particular, pay attention to the cooling (distance between the fan and the wall).

8.7.3 Checking the cable connection

Only the master ASE requires the same cable connection as in single use operation. The slave ASE units require no pressure sensor cable.

⚠ DANGER

Incorrect cable connection may cause damage to the system and result in a fatal accident.
Referring to this manual, recheck that the cable connection is correct.

8.7.4 Checking the setting of the controllers for combination use

1) Checking the network No. selection switch for combination use
   (1) For the AMSE controller for the master ASE, the setting should be "0."
   (2) For the AMSE controllers for the slave ASE units, the setting should be "1 to F."
   The same No. cannot be shared between the combined slave ASE units.
2) Control switch
   (1) For the controllers with one modular cable connected, only bit "4" should be set at "ON."
   (2) For the AMSE controllers for the slave ASE units with two modular cables connected, all bits should be set at "OFF."

⚠ WARNING

When bit "3" of the control switch is set at "ON," single unit operation may start. This may result in burnout of the AMSE controllers for other ASE units.

8.7.5 Checking the control parameter

* This involves powering on of all ASE units. Check that there is no incorrect cable connection.

(1) Power on the slave ASE units. There is no priority order between the units.
Note) This operation displays a warning “oP” but this does not matter.

(2) Check that the correct number of combined units is set for Parameter P449 (Number of combined units) of all the AMSE controllers for the slave ASE units.

(3) After checking the above (1) and (2), power on the master ASE.
Note) When Servo On starts concurrently with powering on, the system may start abruptly. Check the safety around the system before powering on.

(4) Power on the master ASE. After setting the parameter, the preparation is completed.

(5) After checking the safety around the system, start commissioning by applying Servo On signals.
Note) If the system does not start, see “8. 8 Troubleshooting during combination use operation.”

■ Setting procedure (for reference)
(1) Check that the AMSE controller is powered on.
(2) Display P*** by pressing “MODE” for several times.
(3) Display P449 or P 17 by turning the “M dial.”
(4) Keeping this setting, turn the “M dial” to display a desired value and press “SET.”
(5) When the parameter is properly set, the parameter No. and the set value blink alternately.
(6) After setting, power “off” the AMSE controller, and then, power it “on” again.
(7) The setting is completed.
* Repeat this procedure to all applicable AMSE controllers.
* If the parameters are set improperly, the unit may become inoperable.

MEMO

8.8 Troubleshooting during combination use operation

No alarm is displayed for the controllers for combination use.

When a setting error occurs, a warning “oP” is displayed on the operation panel.
While “oP” is displayed, the system becomes inoperable. The system remains inoperable until proper setting is achieved. If “oP” is displayed in Servo On state, be careful because the system starts as soon as “oP” is turned off after the error cause is removed.
For other alarms and warnings, see “7. Troubleshooting.”

The table below lists conditions where alarms are displayed.

Table 8.8a

Item	Condition
(1)	When power is not applied to all combined ASE units yet, the warning is displayed on the AMSE controllers for the ASE units with power already applied.
(2)	When the “network No. selection switch for combination use (SW2)” of the AMSE controller for the master ASE is set at a value other than “0,” the warning is displayed on all AMSE controllers.
(3)	When the same No. is set to the “network No. selection switch for combination use (SW2)” of different slave ASE units, the warning is displayed on all AMSE controllers.
(4)	When all ASE units are not connected with modular cables, the warning is displayed on all AMSE controllers.
(5)	When an alarm occurs in one of the combined ASE units, the warning is displayed on all AMSE controllers, excluding that for the unit generating the alarm.
(6)	When the set value for Parameter No. P449 is not consistent with the number of combined units in any one of the combined ASE units, the warning is displayed on all AMSE controllers.
(7)	During emergency stop, the warning is displayed on all AMSE controllers, excluding that for the master ASE (master “oP”).
(8)	“EПG” is displayed on the AMSR controllers for the slave ASE units for which “deactivation of servo emergency stop (EMG) (see Section 8, 6.2B)” is not set, while “oP” is displayed on the other AMSR controllers.

If a warning “oP” is displayed, the system returns to normal operation with the removal of the cause.
To prevent unexpected accidents, consider and check the safety around the system in its power-on state.

8.9 Returning the settings for combination use to single use

(1) With the AMSE controller powered “off,” set “bit 3” of “8.5.2 Control switch for combination use (SW1)” to “ON.”

(2) In Servo Off state, power “on” the AMSE controller.

(3) Change the setting of Parameter “P449 (Number of combined units)” to “1.”

(4) Change the setting of Parameter “P 17 (MRS signal input selection)” to “2.”

(5) After completing the above (1) to (4), power “off” the AMSE controller again.

(6) The new settings will be applied the next time the unit is powered on.

MEMO

9. Maintenance

This product requires no periodic overhaul during normal operation.

⚠ CAUTION

- Maintenance should be performed by a qualified person who has adequate knowledge of electrics and hydraulics (skilled worker equivalent to the 2nd grade Certified Skilled Worker of Hydraulic Device Assembly (Yuatsu Kiki Chosei Ginoshi) or higher or who has received our technical training).

9.1 Contamination control of hydraulic fluid

Foreign matter in hydraulic fluid often obstructs normal operation of the pump. It may cause failure or shorten the pump life. Keep hydraulic fluid clean (contamination level: JIS B9933 (ISO 4406) 20/18/14 or within NAS 9 class or better). Also, apply 100 μm (150 mesh) filters to the suction line and 10 μm or less filters to the discharge or return line.

9.2 Daily inspection

Perform daily inspections for the items in Table 9.2a.

The items listed below are standard check points after general hydraulic equipment has started steady operation. The frequency of inspection should be increased for a while after the initial operation. Taking into account the operational status/operating environment, perform maintenance, including maintenance of the actuator, as elaborately as possible.

Table 9.2a Daily Inspection Items

Inspection Place/Item	Frequency	Inspection Method and Measure
(1) Pump Noise	Once a day	When abnormal noise (differing from the normal sound of operation) occurs, stop operation and check the pump.
(2) Operating Condition of the Cylinder	Once a day	Check for any unstable phenomenon, including knocking. When detected, stop operation and check the cylinder.
(3) Rusty/Loose Joint	Once a day	Check that there is no looseness of or no dust/water entering the joints.
(4) Fluid Leakage	Once a day	Perform periodic inspection to prevent fluid leakage. When the fluid level is considerably lowered due to fluid leakage, pump performance may be degraded. Fluid leakage must be avoided to ensure against fire.

9.3 Inspection of the AC servo motor

Employing a brushless motor makes daily inspection of the AC servo motor easy. Use Table 9.3a for reference. Determine the appropriate inspection frequency in terms of the operational status/operating environment.

Table 9.3a Inspection of the AC Servo Motor

Inspection Place/Item	Frequency	Inspection Method and Measure
(1) Vibration and Acoustic Check	Once a day	Comparing to normal conditions, check that there is no increase in vibration and noise by touch and by listening.
(2) External Inspection	Depending on damage	Clean with cloth or air, if required.
(3) Overall Check	Once every 20000 hours or every 5 years	Contact the place of purchase or our customer support

9.4 Guideline for replacing the AC servo motor components

See Table 9.4a for component replacement intervals. The replacement period may vary depending on the condition of use or the operating environment. Replacement is required every time any failure is found. Contact the place of purchase or our customer support to request for component replacement. The requirement of component replacement will be determined after inspection.

Table 9.4a Component Replacement Intervals for the AC Servo Motor

Component	Replacement Interval	Remarks
(1) Bearing	20 thousand hours	When any failure is found, replacement is required even before the specified interval is reached.
(2) Cooling Fan	20 thousand hours	

9.5 Inspection of the AMSE controller

No daily inspection is required. Inspect the controller at least once a year.

Table 9.5a Inspection of the AMSE Controller

Inspection Place/Item	Interval	Inspection Method and Measure
(1) External Inspection	Once a year (at least)	Check that there is no dust, dirt, or oil contamination. If required, perform cleaning with cloth or air.
(2) Check for Loose Screws		Check for loose mounting screws for the terminal block or connectors. If required, retighten them.

9.6 Guideline for replacing the components of the AMSE controller

The electric or electronic components of the AMSE controller are subject to mechanical wear and aging. Periodically inspect them as part of preventive maintenance. Also, contact the place of purchase or our customer support according to Table 9.6a Component Replacement Intervals for the AMSE Controller. The requirement of component replacement will be determined after inspection. For the AMSE controller returned to/overhauled by us, parameter settings are reset to default values before shipment. Be sure to use the controller after setting the parameters appropriately.

Table 9.6a Component Replacement Intervals for the AMSE Controller

Component	Standard Replacement Interval	Remarks
(1) Cooling Fan	10 years	When any failure is found, replacement is required even before the specified interval is reached.
(2) Main circuit smoothing capacitor	10 years (assuming the annual average ambient temperature of 40 °C)	
(3) On-board smoothing capacitor	10 years	

10. Storage of unused units

Store and manage unused and spare units in a proper indoor storage place.

- Storage temperature range: 0 to 40 °C (no freezing)
- Storage humidity range: 80 % or less (no condensation)
- To avoid rust, corrosion, degradation of seals, etc., do not store the unit in the following and similar places.

a) Places potentially exposed to the direct influence of weather
b) Places where chemicals, such as organic solvents, acids, and alkalis, are present or the effect of vaporized gas potentially exists
c) Places where dew condensation potentially occurs due to substantial temperature fluctuations.

11. Disposal

This unit is categorized as industrial waste for the purpose of disposal. When disposing of the unit, its components, and hydraulic fluid, follow the procedures set out in the Waste Disposal and Public Cleansing Law and have them disposed of by an industrial waste disposal contractor.

12. Customer service

If there are requests regarding our products or if any services are required, please contact the place of purchase, our customer support, or the following sales department.

● YUKEN KOGYO CO., LTD.

International Sales Department
4-4-34, Kamitsuchidana-Naka, Ayase,
Kanagawa Pref. 252-1113, Japan
Phone +81-467-77-3111
Fax +81-467-77-3115

● YUKEN EUROPE LTD.

51 Spindus Road,Speke Hall
Industrial Estate, Liverpool L24 1YA,
United Kingdom
Phone +44-151-486-4696
Fax +44-151-486-3537

• History of Publication

ASE AC Servo Motor-Driven Pump Operation Manual

December 2009 First edition of the English version Pub. EM-0146

July 2013 9th edition of the English version Pub.EM-0146-8

• Published by:

• YUKEN KOGYO CO., LTD.
Products Publicity Section, Sales Administration Dept.

Hamamatsucho Seiwa Bldg., 4-8, Shiba-Daimon 1-Chome
Minato-ku, Tokyo 105-0012, Japan
Phone: +81-3-3432-2113 Fax: +81-3-3436-2344