



# Operation Manual

## PRODUCT NAME

Air Management System

## MODEL/ Series/ Product Number

*AMS20*

*AMS30*

*AMS40*

*AMS60*

**SMC Corporation**

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# Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "Caution", "Warning" or "Danger". They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)\*1), and other safety regulations.

\*1) ISO 4414: Pneumatic fluid power -- General rules relating to systems.

ISO 4413: Hydraulic fluid power -- General rules relating to systems.

IEC 60204-1: Safety of machinery -- Electrical equipment of machines. (Part 1: General requirements)

ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.

etc.



## Caution

**Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.



## Warning

**Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.



## Danger

**Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

## Warning

### **1. The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**

Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results.

The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product.

This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

### **2. Only personnel with appropriate training should operate machinery and equipment.**

The product specified here may become unsafe if handled incorrectly.

The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

### **3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**

1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.

2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.

3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

### **4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**

1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.

2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.

3. An application which could have negative effects on people, property, or animals requiring special safety analysis.

4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.





# Safety Instructions

## Caution

### **1. The product is provided for use in manufacturing industries.**

The product herein described is basically provided for peaceful use in manufacturing industries. If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.  
If anything is unclear, contact your nearest sales branch.

## **Limited warranty and Disclaimer/Compliance Requirements**

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".

Read and accept them before using the product.

### **Limited warranty and Disclaimer**

#### **1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first. \*2)**

**Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.**

#### **2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.**

**This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.**

#### **3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.**

**\*2) Vacuum pads are excluded from this 1 year warranty.**

**A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.**

**Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.**

### **Compliance Requirements**

#### **1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.**

#### **2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulation of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.**

## Caution

### **SMC products are not intended for use as instruments for legal metrology.**

Products that SMC manufactures or sells are not measurement instruments that are qualified by pattern approval tests relating to the measurement laws of each country.  
Therefore, SMC products cannot be used for business or certification ordained by the measurement laws of each country.


■Operator

◆This Operation Manual is intended for those who have knowledge of machinery using pneumatic equipment, and have sufficient knowledge of assembly, operation and maintenance of such equipment.

Only those persons are allowed to perform assembly, operation and maintenance.

◆Read and understand this Operation Manual carefully before assembling, operating or providing maintenance to the product.

■Safety Instructions

 **Warning**

■Do not disassemble, modify (including the replacement of printed circuit boards) or repair.  
Otherwise, an injury or failure can result.

■Do not operate the product outside of the specifications.  
Do not use the product with flammable or harmful fluids.  
Fire, malfunction, or damage to the product may result.  
Check the specifications before use.

■Do not use in an environment where flammable, explosive or corrosive gases are present.  
Otherwise, fire, explosion or corrosion may occur.  
The product is not designed to be explosion proof.

■Do not use the product with flammable fluid  
Fire or an explosion may result.  
Only air is an applicable fluid.

■Do not use the product in a place where static electricity is a problem.  
Otherwise failure or malfunction of the system can result.

■If using the product in an interlocking circuit  
•Provide a double interlocking system, for example a mechanical system.  
•Check the product regularly for proper operation.  
Otherwise malfunction can result, causing an accident.

■The following instructions must be followed during maintenance  
•Turn off the power supply.  
•Stop the air supply, exhaust the residual pressure in piping and verify that the air is released before performing maintenance work.  
Otherwise an injury can result.

## Caution

- Do not touch the terminals and connectors while the power is on.  
Otherwise electric shock, malfunction and damage to the product can result.
- After maintenance is complete, perform appropriate functional inspections and leak test.  
Stop operation if the equipment does not function properly or there is leakage of fluid.  
When leakage occurs from parts other than the piping, the product itself may be damaged.  
Cut off the power supply and stop the fluid supply.  
Do not apply fluid if the system is leaking.  
Otherwise, an unexpected malfunction may occur and it will become impossible to ensure safety.

### ■ Handling Precautions

- Follow the instructions given below for selecting and handling.
  - The instructions on design and selection (installation, wiring, environment, adjustment, operation, maintenance, etc.) described below must be followed.
    - \*Product specifications
      - The power is supplied from the circuit reinforced or double-insulated from MAINS.
      - The direct current power supply used should be UL approved as follows.  
UL1310 Class 2 power supply unit or UL61010-1 LIM (Limited Energy Circuit).
      - All external circuits should also be connected to a circuit that is reinforced or double-insulated from the MAINS and free from risk of electric shock and fire hazard.
      - If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
      - Do not mount the product with the display facing upward.
      - Use only the specified voltage.  
Otherwise failure or malfunction can result.  
Insufficient supply voltage may not drive a load due to a voltage drop inside the product.  
Check the operating voltage of the load before use.
      - Do not apply a load that exceeds the max. load voltage or current.  
This may cause damage or shorten the lifetime of the product.
      - Data stored by the product is not deleted, even if the power supply is disconnected.  
(Limit to rewrite: 1,500,000 times)
      - The applicable fluids for this product is dry air.  
The operating fluid temperature range is 0 to 50 °C.
      - Before designing piping confirm the pressure loss (Characteristic data) at the sensor from the pressure loss graph. Confirm pressure loss of the sensor from the characteristics data.
      - For details of the compressed air quality, refer to JIS B 8392: 2012[4: 6: -] or ISO8573-1:2010[4:6:-].
      - Use within the specified measurement flow rate and operating pressure.  
Otherwise it will not be able to perform proper measurement due to delivery delay of the fluid.
      - Allow space for maintenance.  
Design the system allowing the required space for maintenance.
      - Do not remove any nameplates or labels.  
This can lead to incorrect maintenance, or misreading of the operation manual, which could cause damage or malfunction to the product. It may also result in non-conformity to safety standards.
      - Beware of the inrush current when the power supply is turned ON.  
Some connected loads can apply an initial charge current which will activate the over current protection function, causing the unit to malfunction.

●Product handling

\*Mounting

- Do not drop, hit or apply excessive shock to the product.  
Otherwise damage to the product can result, causing malfunctions.
- Do not install the product in areas of high humidity or temperature.  
Operation outside of the product specification range may cause damage to the product or operation failure or shorten the product life.
- Connect the product ensuring the direction of "1" (IN) and "2" (OUT) for air direction by following the arrow indicated on the product.  
Incorrect connections may cause malfunction.
- Install with adequate space for maintenance around the product.  
Refer to the dimensional drawings for necessary space.
- Tighten the two set screws on the spacer with bracket and spacer evenly.  
Tighten them to the recommended tightening torque. Insufficient tightening may cause loosening or sealing failure, and excessive tightening may cause damage to the screws.

Recommended tightening torque

Unit: N•m

Applicable models	AMS20	AMS30	AMS40	AMS60
Part No. of spacer with bracket	Y200T-2-D	Y300T-2-D	Y400T-1-D	Y600T-2-D
Part No. of spacer	Y200-D	Y300-D	Y400-D	Y600-D
Tightening torque	0.36±0.036	1.2±0.05	1.2±0.05	2.0±0.1

- When the air management system is fixed on a wall with hexagon socket head cap screws, a hexagonal driver is recommended as a tool.  
Tighten screws with the corresponding applicable screw size to the recommended tightening torque shown in the table below.

Applicable model	Applicable screw size	Tightening torque
AMS20	M6	2.6±0.26 N•m
AMS30	M6	2.6±0.26 N•m
AMS40	M8	6.2±0.62 N•m
AMS60	M10	12.5±1.25 N•m

- Ground the pipes and brackets.  
Do not share the connected grounding with a component that generate strong electromagnetic noise, a component that generates high frequency, or the like.
- Before piping is connected, the product should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and solid foreign material from inside the piping.  
Contamination of piping may cause damage or malfunction.
- When screwing together pipes and fittings, etc., be certain that chips from the pipe threads and sealant do not get inside the pipe. When a sealant tape is used, leave 1.5 to 2 threads exposed.
- Connect piping/fittings using the recommended torque while holding the female thread side tightly.  
Insufficient tightening torque leads to loosening or sealing failure, and excessive tightening leads to damage of the threads. Tightening without holding the female thread applies an excessive force to the piping bracket directly, leading to damage.

Recommended tightening torque

Unit: N•m

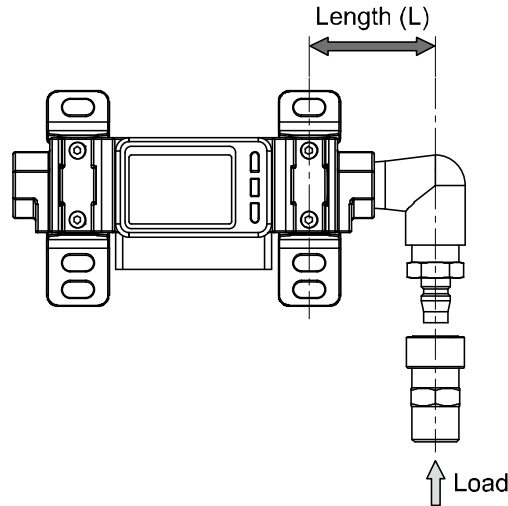
Thread size	1/8	1/4	3/8	1/2	3/4	1
Tightening torque	3 to 5	8 to 12	15 to 20	20 to 25	28 to 30	36 to 38

- Do not apply torsion or bending moment other than the weight of the product itself.

External piping needs to be supported separately as it may cause damage.

If moment applied to the equipment is unavoidable during operation, the moment should be lower than the maximum moment shown below.

Non-flexible piping like steel tube is susceptible to excessive moment load or vibration. Insert flexible tubes to prevent this.



Body size	20	30	40	60
Max. Moment (M) N•m	14.5	16	19.5	28

Max. Moment (M) = Length (L) x Load (F)

- If a commercially available switching power supply is used, be sure to connect the frame ground (FG) terminal to ground.
- Do not drop, hit or apply excessive shock to the product.  
Otherwise damage to the internal components may result, causing malfunction.
- Do not pull the lead wire forcefully or lift the product by the lead wire.  
(Tensile strength 49 N or less)  
Hold the product by the body when handling to prevent damage.
- Do not mount the product with the display facing upward.  
Retention of air can cause an inability to measure accurately.
- Do not insert metal wires or other foreign matter into the flow path.  
This can damage the sensor causing failure or malfunction
- Never mount the product in a place that will be used as a foothold during piping.  
The product may be damaged if excessive force is applied by stepping or climbing onto it.
- If there is a risk of foreign matter entering the fluid, install a filter or mist separator at the inlet to avoid failure and malfunction.  
Otherwise it can cause damage or malfunction. Or the flow switch will become unable to measure accurately.
- If the fluid flow on the IN side (entry side) of the product is unstable, correct measurement will not be possible.  
If a valve is used on the IN side (entry side) of the product, the fluid may be unstable due to the change of the effective area, and there may be an error in the flow measurement results.
- Avoid installing a lubricator on the inlet side of the digital flow switch as it may cause oil inflow and damage internal parts.

\*Wiring (Including connecting/ disconnecting of the connectors)

- Do not pull hard on the lead wire. Especially never lift the product equipped with fitting and piping by holding the lead wires.

Damage to the connector, circuit board, cover or internal components may result, causing failure or malfunction.

- Avoid repeatedly bending, stretching or applying excessive force to the lead wire.

Repetitive bending stress or tensile stress can cause the sheath of the wire to peel off, or damage of the wire.

If the lead wire can move, secure it close to the body of the product.

The recommended bend radius of the lead wire is 6 times the outside diameter of the sheath, or 33 times the outside diameter of the insulation material, whichever is larger.

Replace a damaged lead wire with a new one.

- Wire correctly.

Incorrect wiring may cause malfunction or damage to the product.

- Do not perform wiring while the power is on.

Otherwise damage to the internal components may result, causing malfunction.

- Do not route wires and cables together with power or high voltage cables.

Route the wires of the product separately from power or high voltage cables to prevent noise and surge from entering the product.

- Confirm correct insulation of wiring.

Poor insulation (interference with other circuits, poor insulation between terminals etc.) can apply excessive voltage or current to the product causing damage.

- Keep wiring as short as possible to prevent interference from electromagnetic noise and surge voltage.

Do not use a cable longer than 20 m.

Wire the DC(-) line (blue) as close as possible to the power supply.

- Take appropriate measures against noise, such as using a noise filter, when the Air Management System is incorporated into equipment.

Otherwise noise can cause malfunction.

\*Operating environment

- Do not use the product in an environment where the product is constantly exposed to water splashes. Otherwise failure or malfunction can result. Take measures such as using a cover.
- Do not use the product in an environment where corrosive gases or fluids splashes can occur. Otherwise damage to the internal parts can result, causing malfunction.
- Do not use the product in a place where the product could be splashed by oil or chemicals. If the product is to be used in an environment containing oils or chemicals such as coolant or cleaning solvent, even for a short time, it may be adversely affected (damage, malfunction, or hardening of the lead wires).
- Do not use in an area where surges are generated. When there are machines or equipment that generate large surges near the product (magnetic type lifter, high frequency inductive furnace, motor, etc.), this can result in deterioration and damage of the internal components. Take protective measures to isolate the surge sources, and prevent the lines from coming into close contact.
- Do not use a load which generates a surge voltage. When a surge-generating load such as a relay or solenoid is directly driven, use the product with built in surge protection.
- The product is CE/UKCA marked, but not immune to lightning strikes. Take measures against lightning strikes in the system.
- Mount the product in a location that is not affected by vibration or impact. Otherwise it can cause damage or malfunction.
- Do not use the product in the presence of a magnetic field. Malfunction can result.
- Do not let foreign matter, such as wire debris, get inside the product. Otherwise it can cause damage or malfunction.
- Do not use the product in an environment that is exposed to temperature cycle. Heat cycles other than ordinary changes in temperature can adversely affect the internal components of the product.
- Do not expose the product to direct sunlight. If using in a location directly exposed to sunlight, protect the product from the sunlight. Failure or malfunction may occur.
- Keep the product within the specified ambient temperature range. The ambient temperature range is 0 to 50 °C. Operation under low temperature may lead to damage or operation failure due to frozen moisture in the fluid or air. Protection against freezing is necessary. Mounting of an air dryer is recommended for elimination of drainage and water. Avoid abrupt temperature changes even within the specified temperature range.
- Do not operate close to a heat source, or in a location exposed to radiant heat. Insufficient air quality may cause operation failure.

#### \*Adjustment and Operation

- Perform settings suitable for the operating conditions. Incorrect setting can cause operation failure.
- Please refer to the PLC manufacturer's manual etc. for details of programming and addresses. For the PLC protocol and programming refer to the relevant manufacturer's documentation.

- Connect the load before turning the power supply on.
- Do not short-circuit the load.

Although an error is displayed when the product load has a short circuit, the generated over current may lead to damage to the product.

- Do not press the setting buttons with a sharp pointed object.

This may damage the setting buttons.

- Supply power under no flow conditions.
- If using the product to detect very small flow differences, warm up the product for 10 to 15 minutes before use.

There will be a drift on the display of approx. 2 to 3% for 10 minutes after the power supply is turned on.

- Perform settings suitable for the operating conditions.

Incorrect setting can cause operation failure.

- During the initial setting, the product will switch the measurement output according to the condition before setting.

Check the effect on the equipment before setting.

Stop the control system for setting, if necessary.

- Do not touch the LCD during operation.

The display can vary due to static electricity.

#### \*Maintenance

- Perform regular maintenance and inspections.

There is a risk of unexpected failure of components due to the malfunction of equipment and machinery.

- Before performing maintenance, turn off the power supply, stop the air supply, exhaust the residual compressed air in the piping, and verify the release of air.

Otherwise, unintended malfunction of system components can result.

- Maintenance and checks should be carried out according to the procedure in this operation manual. Incorrect handling of the product may cause damage or operation failure of the equipment or device.

- Remove the condensate periodically.

If condensate enters the secondary side, it can cause operation failure of pneumatic equipment.

- Do not use solvents such as benzene, thinner etc. to clean the product.

This may damage the surface of the body or erase the markings on the body.

Use a soft cloth to remove stains.

For heavy stains, use a damp cloth that has been soaked with diluted neutral detergent and fully squeezed, then wipe the stains again with a dry cloth.



# Model Indication and How to Order

## Air Management System (Standby E/P regulator type)

AMS **40** A- **F** **04** **C** - **PN** - **M** L **G**

Body size

Symbol	Content
20	5 to 500 L/min
30	10 to 1000 L/min
40	20 to 2000 L/min
60	40 to 4000 L/min

Thread type

Symbol	Content
R	Rc
N	NPT
F	G
H	Without attachments

Port size

Symbol	Port size	Body size			
		20	30	40	60
01	1/8	●	-	-	-
02	1/4	●	●	-	-
03	3/8	-	●	●	-
04	1/2	-	-	●	-
06	3/4	-	-	-	●
10	1	-	-	-	●
00	Without attachments*1	●	●	●	●

\*1: When thread type "H" selected, port size shall be "00".

NO/NC

Symbol	Content
C	NC (Normal close)
D	NO (Normal open)

Manual

Symbol	Content
G	Non-locking push type
E	Push-turn locking type (manual)

Unit specification

Symbol	Content
K*2	EX/ITV: With units selection function
M	EX/ITV: Fixed SI unit

\*2: This product will not be sold for use in Japan.

Protocol

Symbol	Content
SA	Standalone (When wireless adapter is connected: Wireless remote)
PN	PROFINET, OPC UA (When wireless adapter is connected: Wireless base)
EN	EtherNet/IP™, OPC UA (When wireless adapter is connected: Wireless base)
EC	EtherCAT (When wireless adapter is connected: Wireless base)

**Air Management System (Standby regulator type)**

AMS **40** B - **F** **04** **C** - **PN** - **M** L **G**

Body size

Symbol	Content
20	5 to 500 L/min
30	10 to 1000 L/min
40	20 to 2000 L/min
60	40 to 4000 L/min

Thread type

Symbol	Content
R	Rc
N	NPT
F	G

Port size

Symbol	Port size	Body size			
		20	30	40	60
01	1/8	●	-	-	-
02	1/4	●	●	-	-
03	3/8	-	●	●	-
04	1/2	-	-	●	-
06	3/4	-	-	-	●
10	1	-	-	-	●
00	Without attachments*1	●	●	●	●

\*1: If the port size is "00", specify the thread type of the standby regulator (ARS).

NO/NC

Symbol	Content
C	NC (Normal close)
D	NO (Normal open)

Manual

Symbol	Content
G	Non-locking push type
E	Push-turn locking type (manual)

Unit specification

Symbol	Content
K*2	Unit on product label: MPa/psi dual scale EX: With units selection function
M	Unit on product label: MPa EX: Fixed SI unit

\*2: This product will not be sold for use in Japan.

Protocol

Symbol	Content
SA	Standalone (When wireless adapter is connected: Wireless remote)
PN	PROFINET, OPC UA (When wireless adapter is connected: Wireless base)
EN	EtherNet/IPTM, OPC UA (When wireless adapter is connected: Wireless base)
EC	EtherCAT (When wireless adapter is connected: Wireless base)

## Air Management Hub

EXA1 - **20** - **SA** - **K** L

Body size (Applicable AC size)

Symbol	Content
20	5 to 500 L/min
30	10 to 1000 L/min
40	20 to 2000 L/min
60	40 to 4000 L/min

Unit specification

Symbol	Content
K <sup>*1</sup>	With units selection function
M	Fixed SI unit

\*1: This product will not be sold for use in Japan.

Protocol

Symbol	Content
SA	Standalone (When wireless adapter is connected: Wireless remote)
PN	PROFINET, OPC UA (When wireless adapter is connected: Wireless base)
EN	EtherNet/IPTM, OPC UA (When wireless adapter is connected: Wireless base)
EC	EtherCAT (When wireless adapter is connected: Wireless base)

## Optional Parts numbers

If an accessory is required for maintenance purposes, order the following parts number.

Product name	Parts number	Note
Spacer with bracket	Y200T-2-D	For body size 20
	Y300T-2-D	For body size 30
	Y400T-1-D	For body size 40
	Y600T-2-D	For body size 60
Piping adapter	E200-##-D <sup>*1</sup>	For body size 20
	E300-##-D <sup>*1</sup>	For body size 30
	E400-##-D <sup>*1</sup>	For body size 40
	E600-##-D <sup>*1</sup>	For body size 60
Wireless adapter	EXW1-A11N-X1	For wireless system
M12 connector cable (320 mm) <sup>*2</sup>	EXA1-AC1	For wiring Hub to each device
M12 connector cable (220 mm) <sup>*2</sup>	EXA1-AC2	For wiring Hub to each device

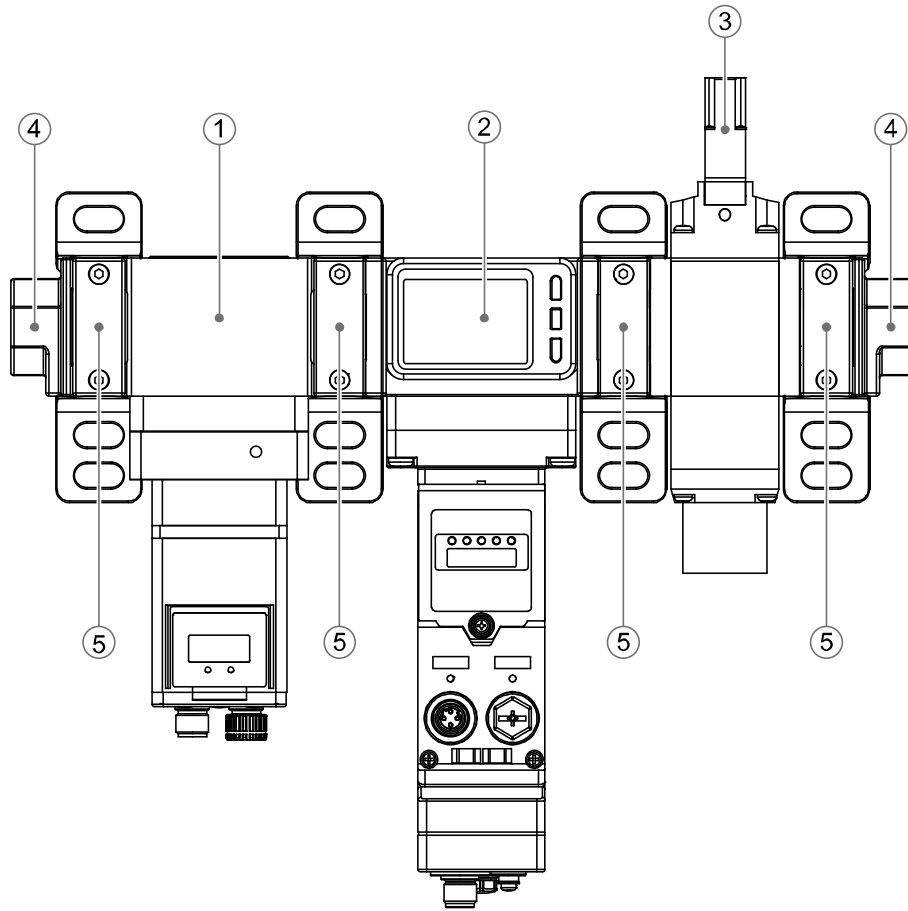
\*1: "#" is required to complete the thread and piping specification. Please refer to AC-D series catalogue for details.

\*2: Please refer to the following table for recommended combination.

Body size	Standby E/P regulator	Standby regulator	Residual Pressure Relief valve
20	EXA1-AC1	EXA1-AC2	EXA1-AC2
30			
40			
60			EXA1-AC1

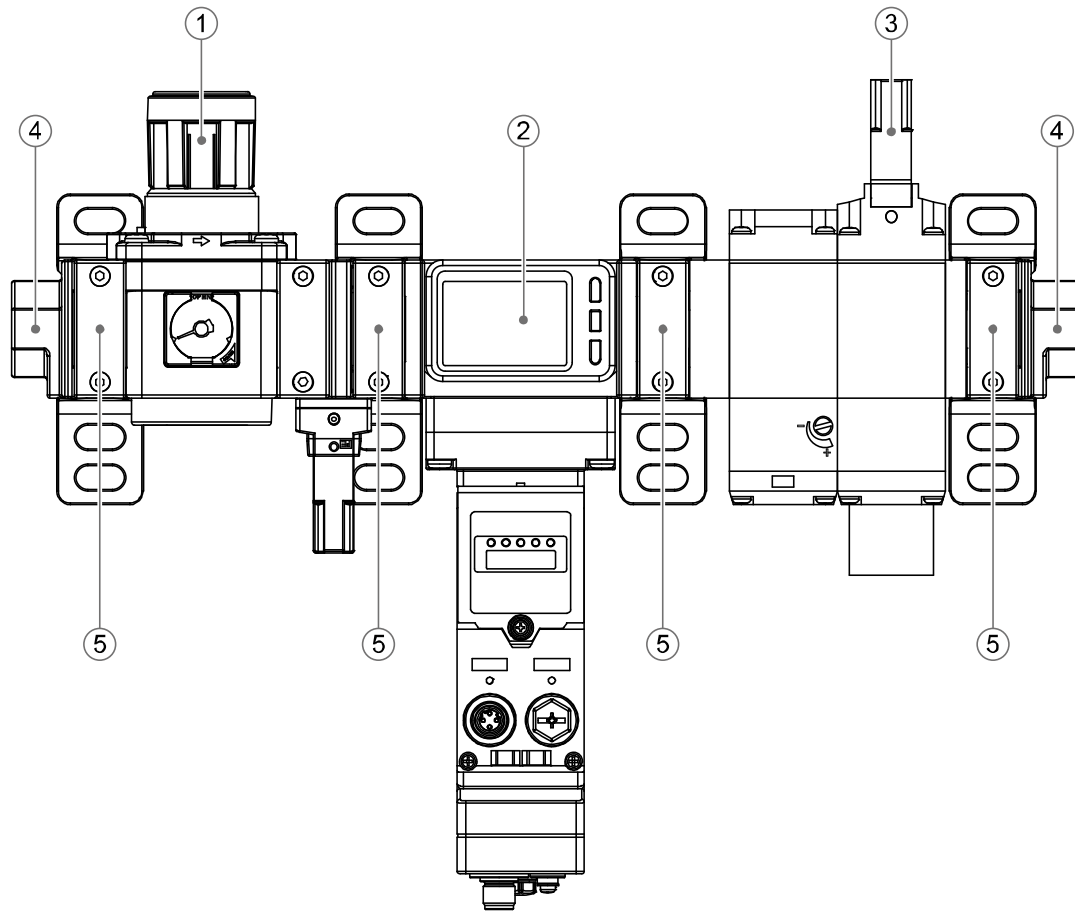
## Names and Functions of Individual Parts

### Air Management System (Standby E/P regulator type)



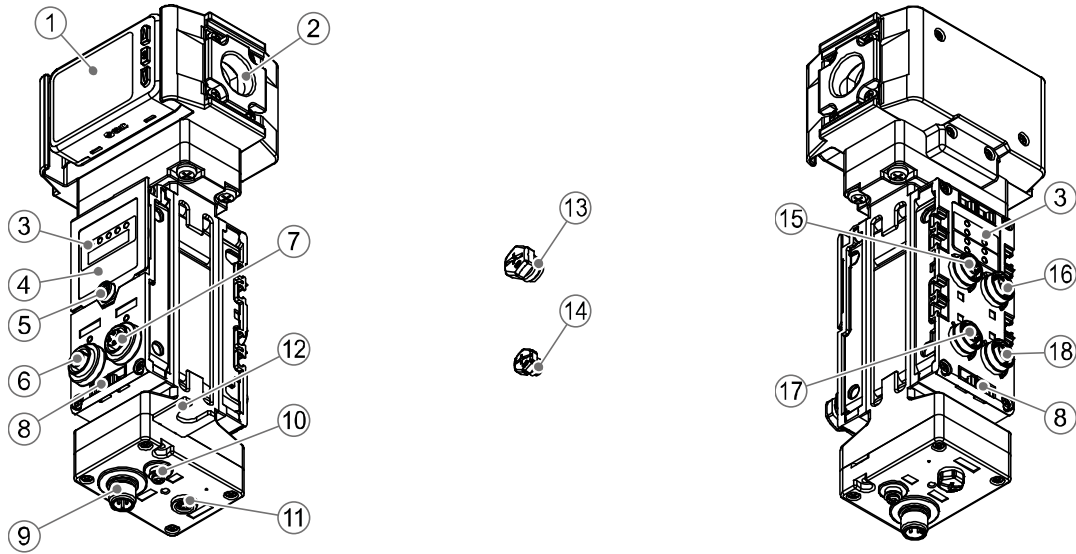
No.	Name	Function
1	Standby E/P regulator	Control air pressure according to electrical signals from the Air Management Hub.
2	Air Management Hub	Manage overall Air Management System devices, communication to upper layer and digital input module for signal from external devices.
3	Residual Pressure Relief Valve	According to orders from the Air Management Hub, stop providing pressure and exhaust outlet pressure.
4	Piping adapter	Adapters for piping connection.
5	Spacer with bracket	Bracket that connects each module of the air management system and for installing to a wall.

## Air Management System (Standby regulator type)



No.	Name	Function
1	Standby regulator	Control air pressure manually.
2	Air Management Hub	Manage overall Air Management System devices, communication to upper layer and digital input module for signal from external devices.
3	Residual Pressure Relief Valve	According to orders from the Air Management Hub, stop providing pressure and exhaust outlet pressure. Soft start feature: a module for the valve is used to gradually raise the initial pressure in an air system, starting with low-speed air.
4	Piping adapter	Adapter for piping connection.
5	Spacer with bracket	Bracket that connects each module of the air management system and for installing to a wall.

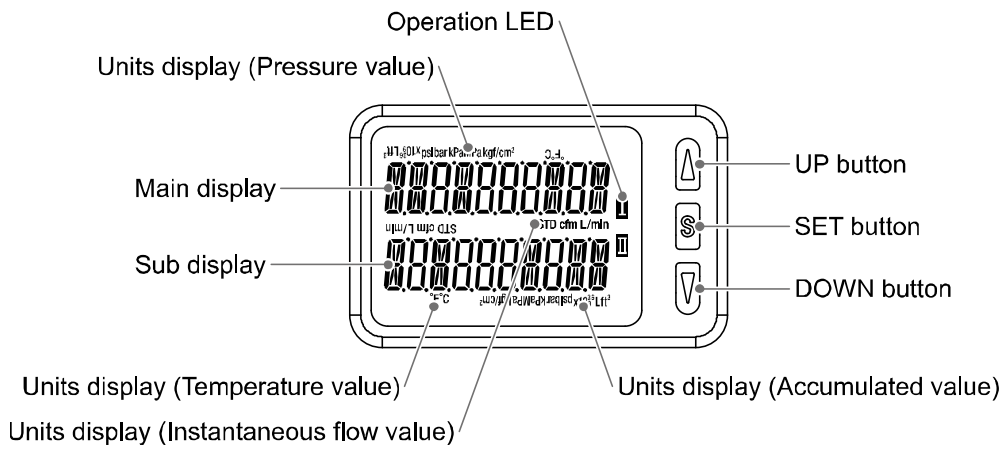
## Air Management Hub



No.	Part	Description
1	Display	Please refer to the following page for details.
2	Piping port	For piping connections.
3	LED display	Displays the Air Management Hub status.
4	Display cover	Display cover for switch setting.
5	Display cover screw	Screw to secure the display cover.
6	Connector PORT1 (IN*)	Connector for Industrial Ethernet input.
7	Connector PORT2 (OUT*)	Connector for Industrial Ethernet output
8	Marker groove	Groove for identification marker such as input/output signal name or unit address.
9	Connector (Power)	Connector for power supply.
10	FE terminal	Terminal to connect FE to Ground.
11	Wireless adapter connector	To connect Wireless adapter.
12	Wireless adapter bracket (Included parts)	To mount wireless adapter.
13	Seal cap (1 pc.)	For all unused M12 connectors.
14	Seal cap (1 pc.)	For M8 connector when not used.
15	Connector (PORT1)	Connector for Residual Pressure Relief Valve.
16	Connector (PORT2)	Connector for Standby E/P regulator or Standby regulator.
17	Connector (PORT3)	Connector for Standby/Isolation signal.
18	Connector (PORT4)	Connector for external I/O device or IO-Link device.

\*: For EtherCAT

## Display



Part	Description
Main display	Displays the instantaneous flow rate, pressure value and error codes. (2 colour display)
Operation LED	Indicates the output status of OUT. When the output is ON: LED is ON.
Sub display	Displays the accumulated flow, temperature value, set value, and peak/ bottom value when in measurement mode.
UP button	Selects the mode and the display shown on the Sub display, or increases the set point.
SET button	Press this button to change the mode and to set a value.
DOWN button	Selects the mode and the display shown on the Sub display, or decrease the set point.
Unit display (Instantaneous flow rate)	Indicates the flow measurement units currently selected.
Unit display (Accumulated value)	Indicates the flow measurement units currently selected.
Unit display (Pressure value)	Indicates the pressure units currently selected.
Unit display (Temperature value)	Indicates the temperature units currently selected.

■ Definition and terminology

	Term	Definition
A	Accumulated flow	The total amount of fluid that has passed through the device. If an instantaneous flow of 100 L/min lasts for 5 minutes, the accumulated flow will be 5 x 100 = 500 L.
	Accumulated-value hold time	A function to store the cumulative flow value in the product's internal memory at certain time intervals. Reads the memory data when power is supplied. Accumulation of data begins with the value read at the moment power is supplied. The time interval for memorizing can be selected from 2 or 5 minutes.
	AMS	Air Management System.
B	Base	A unit which establishes wireless communication of input or output data to the remote. It is connected to a PLC to establish communication of input or output data.
	Bottom value display (mode)	Shows the min. from when the power was supplied to the current time.
	Broken line detection	A broken wire to the input or output equipment has been detected by the diagnostic function.
C	Chattering	The problem of the switch output turning ON and OFF repeatedly around the set point value at high frequency due to the effect of pulsation.
	Current consumption	Current which is necessary to operate each unit.
D	Delay time	<ul style="list-style-type: none"> <li>•Standby ON Delay The setting time from when the measured flow rate under standby flow rate(threshold) to the set duration. If the standby input signal received and Standby ON Delay time reached, the AMS change to standby mode.</li> <li>•Standby OFF Delay The setting time from when the measured flow rate exceeds standby flow rate(threshold) to the set duration. When the AMS returns to Operation mode, AMS shall be back to Standby mode without waiting for Standby ON Delay time.</li> </ul>
	DHCP	A protocol that automatically allocates information, necessary to be registered to use the network, such as an IP address, to individual devices connected to the TCP/IP network.
	Digital filter	Function to add digital filtering to the fluctuation of the measured value. Smooth the fluctuation of displayed value for sharp start up or fall of the flow and pressure. When the function is valid, digital filtering is reflected to the ON/OFF of the switch output. The response time indicates when the set value is 90% in relation to the step input. Output chattering or flicker in the measurement mode display can be reduced by setting the digital filter.
	Display accuracy	Indicates the max. deviation between the displayed pressure value and the true value.
	Display colour	Indicates the color of the digital display.
	Display value fine adjustment (function)	Displayed pressure value can be adjusted within the range of $\pm 5\%$ R.D. ( $\pm 5\%$ of displayed value). It is used if the true pressure value is known, or to eliminate differences between the displayed values of different instruments that are measuring the same pressure.
E	Enclosure (IP)	Abbreviation of International Protection. Standard related to protection against extraneous matter, such as hand, steel ball, steel wire, dust particle or water, applied to the product.
	Error displayed	The error code number displayed, to identify the error detected by the self-diagnostic function of the Air Management Hub. Refer to the "Error display" on page 120 for details.



	Term	Definition
F	FE	Abbreviation of functional earth. The word "earth" refers to functional earth.
	F.S. (full span/full scale)	Abbreviation of full span or full scale; difference between the min. and max. rated pressure values. means the max. fluctuation range of the pressure switch rated value. For example, when the rated pressure range is 0 to 1.000 [MPa]: F.S. = 1.000 - 0 = 1 [MPa] (Reference: 1%F.S. = 1 x 0.01 = 0.01 [MPa])
	FSU	Fast Start Up. Function to shorten the time from initial operation of the equipment after supplying power to start communication.
	Full duplex	Communication system that can send and receive data at the same time bi-directionally
	Function selection mode	A mode in which setting of functions is performed. It is a separate menu from the switch setting. If any function settings need to be changed from the factory default, each setting can be selected with "F*". The setting items are: output mode, display colour, digital filter, display reverse, zero cut-off display on/off, display value fine adjustment, use of display OFF mode, and use of security code.
G	GSDML file	File to describes the product base data.
H	Half-duplex	Communication method that can send and receive data reciprocally in bi-directional communication.
	Hysteresis	The difference between ON and OFF points used to prevent chattering. Hysteresis can be effective in avoiding the effects of pulsation.
I	Industrial Ethernet	Network protocol to establish digital communication between an automated industrial system such as a measurement tool or manipulation tool and a PLC.
	Instantaneous flow	The flow passing per unit of time. If it is 10 L/min, there is a flow of 10 L passing through the device in 1 minute.
	Insulation resistance	Insulation resistance of the product. The resistance between the electrical circuit and the case.
	IP address	A 32 bit digit sequence which is assigned to identify devices which are connected to the network.
	Isolation input	Trigger input signal to change status to Isolation mode.
	Isolation mode	The mode that Residual Pressure Relief Valve exhaust outlet pressure is intended to use during the machine stopped state.
K	Key-lock function	Function that prevents changes to the settings of the Air Management Hub (disables button operation).
M	MAC address	A unique number inherent to all devices connected to an PROFINET network.
	Max. load current	The max. current that can flow to the output (output line) of the switch output.
	Measurement mode	Operating condition in which flow rate, pressure and temperature is detected and displayed, and the switch function is operating.
	MRP	Media Redundancy Protocol. Performs fast switching to a redundant communication route, when a problem occurs within a Ring network.

	Term	Definition
N	Normal condition	The flow which is converted into the volume at 0 °C and 101.3 kPa (absolute pressure). <nor> indicates that the product is in normal condition.
O	Operating fluid temperature	Range of fluid temperature that can be measured by the product.
	Operating humidity range	Humidity range in which the product can operate.
	Operating temperature range	Ambient temperature range in which the product can operate.
	Operation mode	Provide air pressure for the machine to operate.
	Output light	A light that turns on when the switch output is ON.
P	Paring	Registration of the PID (Product ID) of the remote to be connected to the base. Registration occurs at the initial setting, then the wireless system will activate.
	Peak value display (mode)	Shows the max. value from when the power was supplied to the current time.
	PID	Product ID. A 32 bit digit sequence which is assigned to identify the wireless unit (base/remote).
	PLC	Programmable Logic Controller. A digital computer used for automation of electromechanical processes.
	PNP input	Accepts a sensor output that uses a PNP transistor output signal.
	PNP output	The output type that uses a PNP transistor to operate an output device. This is also known as a negative common type since a negative potential is applied to the power supply line.
	Pressure characteristics	Indicates the change in the display value when the fluid pressure changes.
	Pressure ramp up duration	Sets time to reach the setting pressure from isolation mode or standby mode to operation mode.
	Proof pressure	Pressure limit that if exceeded will result in mechanical and/or electrical damage to the product.
R	Rated flow range	The flow range within which the product will meet all published specifications. Values outside of this range can be set as long as they are within the set flow range, but the specifications cannot be guaranteed.
	Rated pressure range	The pressure range within which the product will meet all published specifications. Values outside of this range can be set as long as they are within the set pressure range, but the specifications cannot be guaranteed.
	Rated temperature range	The temperature range within which the product will meet all published specifications. Values outside of this range can be set as long as they are within the set temperature range, but the specifications cannot be guaranteed.
	Remote	A unit which establishes wireless communication of input or output data to the base.
	Repeatability	Reproducibility of the display value, when the measured quantity is repeatedly increased and decreased.
	R.D.	Current read value For example, when the display value is 1.000 [MPa], $\pm 5\%$ R.D. is $\pm 5\%$ of 1.000 [MPa], which becomes $\pm 0.05$ [MPa]. When the display value is 0.800 [MPa], $\pm 5\%$ R.D. is $\pm 5\%$ of 0.800 [MPa], which becomes $\pm 0.04$ [MPa].

	Term	Definition
S	Short circuit detection	Diagnostic function which detects generation of an over current due to a short circuit between the output and the positive power supply line or the ground line.
	Short circuit protection	Function which protects from damage to the internal circuit when over current is generated due to short circuit between the output and the positive power supply line or the ground line.
	Smallest settable increment	The resolution of set and display values. If the min. setting unit is 2 L/min, the display will change in 2 L/min steps, e.g. 30.....32.....34 L/min.
	Standard condition	The flow which is converted to the volume at 20 °C and 101.3 kPa (absolute pressure). <Std> indicates that the product is in standard condition.
	Standby input	Trigger input signal to change status to Standby mode.
	Standby mode	Air pressure controlled by a standby regulator during a machine stopped state.
T	Temperature characteristics	Indicates the change in the display value caused by ambient temperature changes.
U	Units selection function	A function to select display units other than the international unit (SI unit) specified in the new Japanese measurement law. The product is not equipped with this function.
W	Wetted part	A part that comes into physical contact with the fluid.
	WiFi	Wireless Fidelity. Brand name which indicates the wireless LAN equipment is compliant to an international standard.
	Wireless adapter	The antenna to communicate among AMS devices by wireless communication.
	Wireless channel	Identification number of the remote connected to the base.
	Wireless system	This is a general term for the network including base and remote.
	Wireless unit	A unit which establishes wireless communication. This is a generic name of the base and remote.
	Withstand voltage	A measure of the product's resistance to a voltage applied between the electrical circuit and case. Durability in withstanding voltage. The product may be damaged if a voltage above this value is applied. (The withstand voltage is not the supply voltage used to power the product.)
Z	Zero-clear function	This function is used to adjust the displayed pressure to zero.

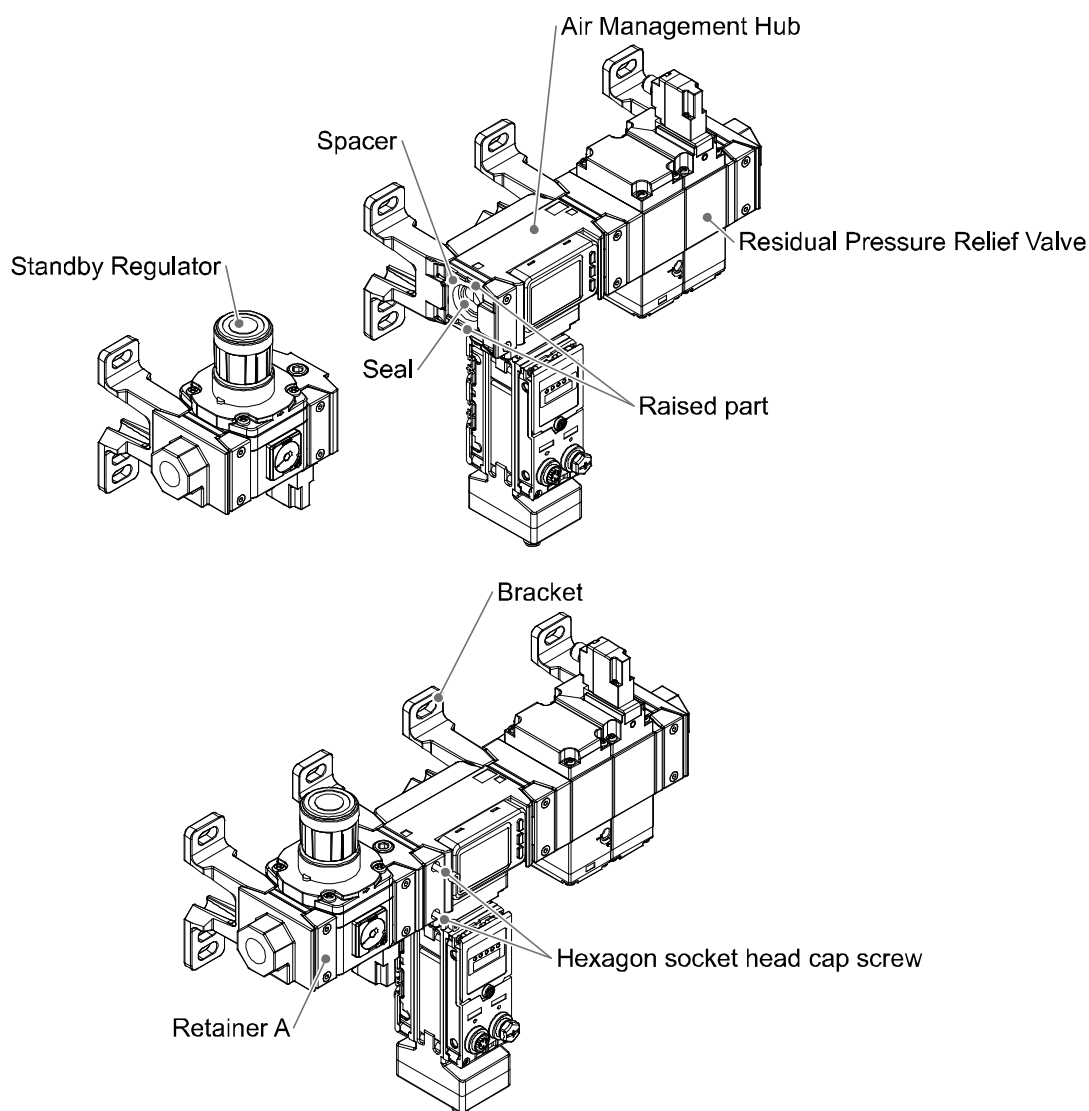
# Mounting and Installation

## ■Piping

### ⚠ Caution

- Before piping is connected, the product should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and solid foreign material from inside the piping.
- When screwing together pipes and fittings, etc., be certain that chips from the pipe threads and sealant do not get inside the piping.
- Fit the raised part of the spacer to the recessed part (groove for the raised part) of the product.
- Tighten the retainer A with two hexagon socket head cap screws temporarily.
- Tighten the two hexagon socket head cap screws evenly using a hexagonal wrench.
- Refer to the table below for the tightening torque for the screws.

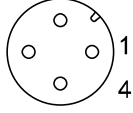
Applicable model	Hexagonal wrench socket size nominal value	Tightening torque
AMS20	2 mm	0.36±0.036 N•m
AMS30	3 mm	1.2±0.05 N•m
AMS40		
AMS60	4 mm	2.0±0.1 N•m

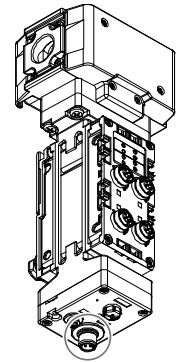


## ■Wiring

### (1) Power

M12 4-pin A-coded (Plug) connector is used for the connection between the Air Management Hub and the power supply.

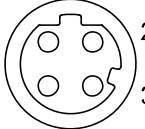
Connector	Pin No.	Signal	Details
	1	DC(+)	24 VDC
	2	NC	Not connected
	3	DC(-)	0 V
	4	NC	Not connected

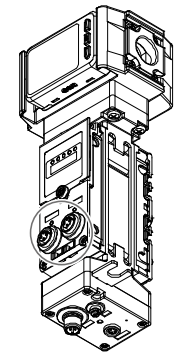


### (2) Communication line M12 4-pin D-coded (Socket)

Use this port for Industrial Ethernet communication or access to integrated Web server.

\*: Standalone type doesn't have the connector.

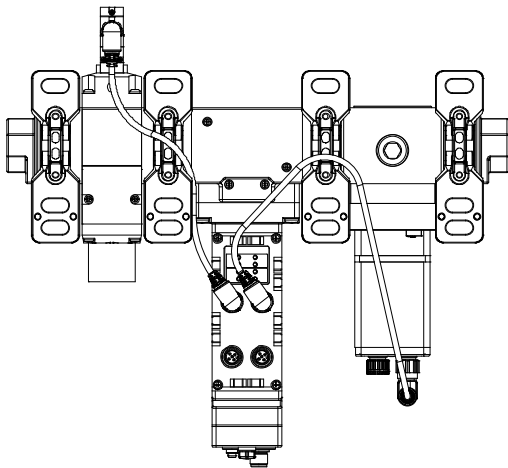
Connector	Pin No.	Signal
PORT1/PORT2		
	1	TX+
	2	RX+
	3	TX-
	4	RX-



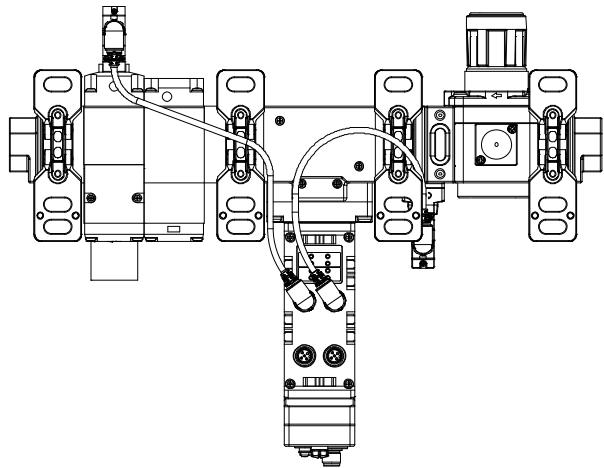
(3) Connection to each device

Refer to the following instructions when device maintenance/replacement is required. AMS components and signals connect to the four connectors on the rear of the Air Management Hub. All connections are M12 A-coded. The following table shows the functions of each port.

Port	Function
1	Connection to Residual Pressure Relief Valve
2	Connection to standby regulator
3	Digital input signals for standby and isolation
4	User configurable port (IO-Link or DIO)



AMS##A Series



AMS##B Series

•Connection to Residual Pressure Relief Valve (VP)

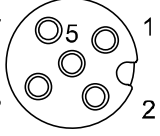
Hub side: M12 5-pin A-coded (Socket)

Connector	Pin No.	Signal	Details
	1	NC	Not connected
	2	NC	Not connected
	3	0 V	0 V
	4	Output	Output
	5	NC	Not connected

VP side: M12 3-pin A-coded (Plug)

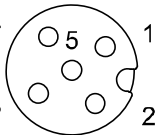
Connector	Pin No.	Signal	Details
	3	0 V	0 V
	4	+	Input
	5	FE	Ground

•Connection to Standby regulator  
Hub side M12 5-pin A-coded (Socket)

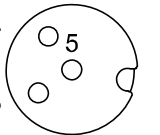
Connector	Pin No.	Signal	Details
	1	24 V	24 VDC: Output *
	2	NC	Not connected
	3	0 V	0 V
	4	C/Q	ITV: IO-Link ARS: Output
	5	NC	Not connected

\*: Do not turn on the power supply.

Standby E/P regulator (ITV) side M12 5-pin A-coded (Plug)

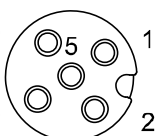
Connector	Pin No.	Signal	Details
	1	24 V	24 VDC: INPUT
	2	NC	Not connected
	3	0 V	0 V
	4	C/Q	IO-Link
	5	NC	Not connected

Standby regulator (ARS) side M12 3-pin A-coded (Plug)

Connector	Pin No.	Signal	Details
	3	0 V	0 V
	4	C/Q	Input
	5	NC	Not connected

- Digital input signal for Standby or Isolation mode  
This port is for an input signal to control Standby mode and Isolation mode.  
The connection required is according to user's equipment.

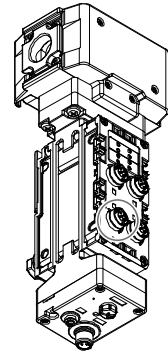
M12 5-pin A-coded (Socket)

Connector	Pin No.	Signal	Details
	1	24 V	24 VDC: Output *1
	2	IN2	Input for Isolation *2
	3	0 V	0 V
	4	IN1	Input for Standby
	5	NC	Not connected

\*1: Do not turn on the power supply.

\*2: Details of inputs for isolation.

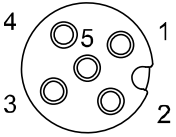
NO/NC	Input	Status
NC	24 V	Supply
	0 V	Exhaust
NO	24 V	Exhaust
	0 V	Supply



•User configurable port

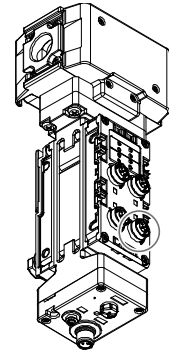
This port can be configurable by users for digital input/ output/ IO-Link master.

M12 5-pin A-coded (Socket)

Connector	Pin No.	Signal	Details
	1	24 V	24VDC: Output *
	2	I/Q	Digital Input
	3	0 V	0V
	4	C/Q	IO-Link Digital Input (PNP) Digital Output (PNP) *1
	5	NC	Not Connected

\*1: Do not turn on the power supply.

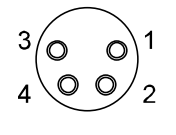
\*2: Can be changed by setting parameters.



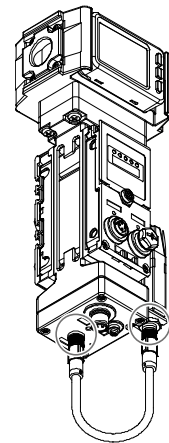
•Connection to wireless adapter

Connect wireless adapter if wireless system required.

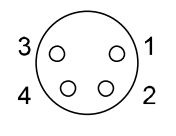
Hub/wireless adapter: M8 4-pin A-coded (Socket)

Connector	Pin No.	Signal	Details
	1	24 V	24 VDC (US1): OUTPUT *
	2	Internal Bus B	Internal Bus B
	3	0 V	0 V (US1)
	4	Internal Bus A	Internal Bus A

\*: Do not turn on the power supply.



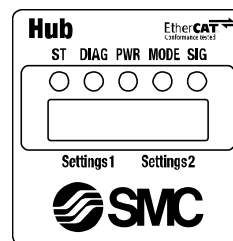
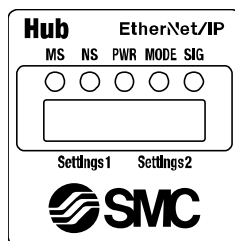
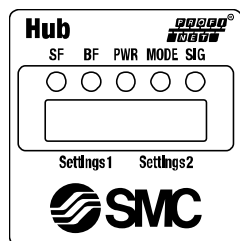
Wireless adapter side connector: M8 4-pin A-coded (Plug)

Connector	Pin No.	Signal	Details
	1	24 V	24 VDC (US1): INPUT
	2	Internal Bus B	Internal Bus B
	3	0 V	0 V (US1)
	4	Internal Bus A	Internal Bus A

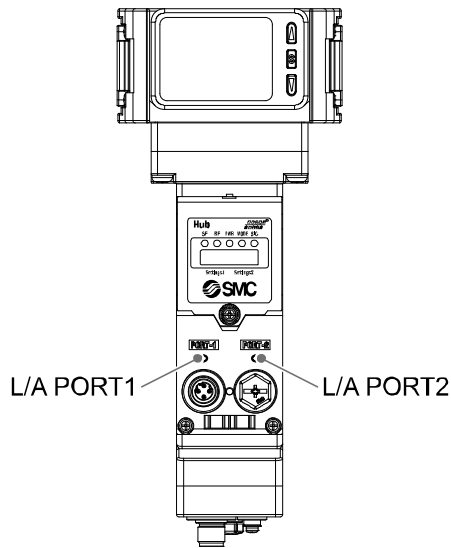


# LED indicator

## Air Management Hub (Base type)

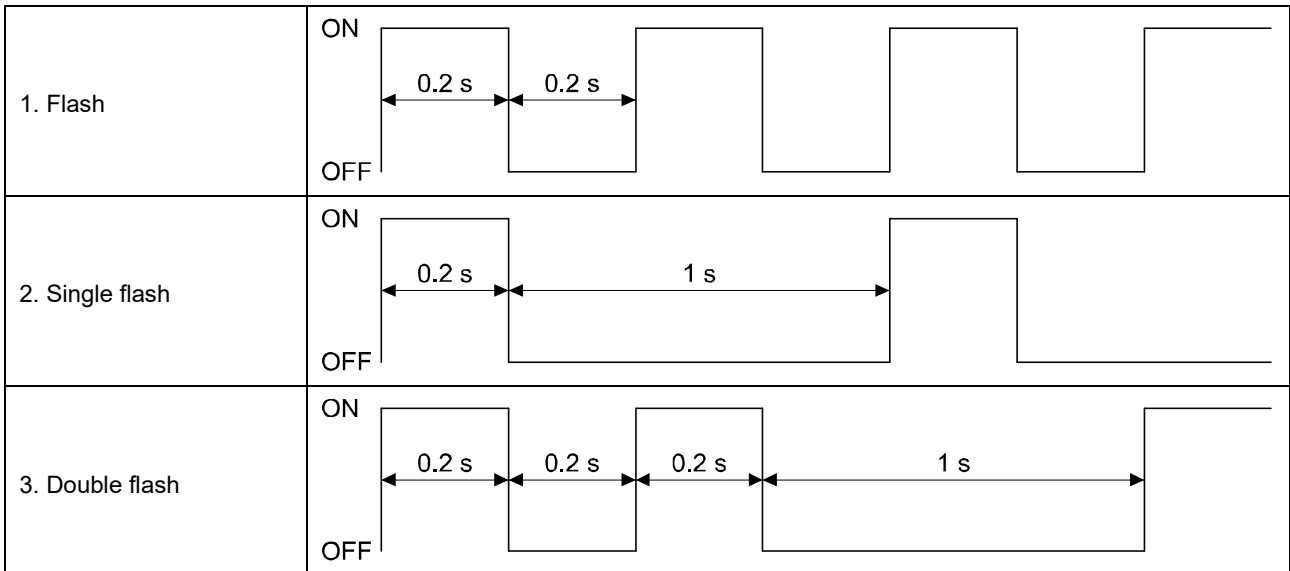


LED	LED colour	PROFINET	EtherNet/IP™	EtherCAT
SF MS ST	OFF	Normal operation or the power supply is OFF.	Power supply is OFF.	EtherCAT communication "INIT" state or power OFF.
	Orange flashing	<ul style="list-style-type: none"> <li>Node flashing test command received.</li> <li>Internal communication error in wireless adapter.</li> </ul>	-	-
	Green ON	-	Normal operation.	EtherCAT communication "OPERATIONAL" state.
	Green flashing	<ul style="list-style-type: none"> <li>Power supply voltage is abnormal.</li> <li>Short circuit of power supply in input or output port.</li> <li>Excessive I/O setting inputs/outputs.</li> </ul>	EtherNet/IP™ connection is not established.	1. EtherCAT communication "PRE-OPERATIONAL" state. 2. EtherCAT communication "SAFE-OPERATIONAL" state. *: Refer to the table below for the LED state.
	Red flashing	Pairing mode. (synchronized with BF)	<ul style="list-style-type: none"> <li>Power supply voltage is abnormal.</li> <li>Short circuit of power supply in input or output port.</li> <li>Excessive I/O setting inputs/outputs.</li> <li>Internal communication error in wireless adapter.</li> <li>Pairing mode. (synchronized with NS)</li> </ul>	1. Communication setup error or invalid configuration. 2. EtherCAT state changed locally in Base unit due to error. 3. Communication error. (application watchdog timeout) *: Refer to the table below for the LED state. Pairing mode. (synchronized with DIAG)
	Red ON	Non-restorable error is detected. (e.g. Hardware failure)		
BF NS DIAG	OFF	PROFINET communication established.	-	No communication error.
	Green ON	OPC UA mode operating.	EtherNet/IP™ communication is established.	-
	Green flashing	-	EtherNet/IP™ communication is not established.	<ul style="list-style-type: none"> <li>Power supply voltage is abnormal.</li> <li>Short circuit of power supply in input or output port.</li> <li>Excessive I/O setting inputs/outputs.</li> </ul>
	Red flashing	Pairing mode. (synchronized with SF)	<ul style="list-style-type: none"> <li>EtherNet/IP™ communication timeout.</li> <li>Pairing mode. (synchronized with MS)</li> </ul>	Pairing mode. (synchronized with ST)
	Red ON	<ul style="list-style-type: none"> <li>Cable not connected between PLC and AMS Hub.</li> <li>Wrong device name on PROFINET.</li> <li>Wrong IP address or not configured.</li> <li>Wrong GSDML file.</li> <li>Configuration mismatch between PLC and actual connection.</li> </ul>	Duplicated IP addresses are detected.	Non-restorable error is detected. (e.g. Hardware failure)
PWR	OFF	No power supplied.		
	Green flashing	Power supply voltage is abnormal.		
	Green ON	Power supply voltage is in the specification.		
MODE	OFF	During initialization.		
	Green ON	Operation mode.		
	Green flashing	Waiting for standby signal.		
	Orange ON	Standby mode.		
	Orange flashing	Isolation mode.		
SIG	OFF	No signal received.		
	Green flashing	Input port short circuit.		
	Green ON	Standby input signal ON.		
	Orange flashing	Isolation input signal ON.		
	Orange ON	Standby input and Isolation input are both ON.		

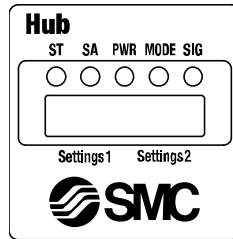


LED	LED colour	Operation
L/A PORT1	OFF	PORT1: No Link, No Activity
	Green ON	PORT1: Link, No Activity
	Green Flashing	PORT1: Link, Activity
L/A PORT2	OFF	PORT2: No Link, No Activity
	Green ON	PORT2: Link, No Activity
	Green Flashing	PORT2: Link, Activity

•LED state table for EtherCAT

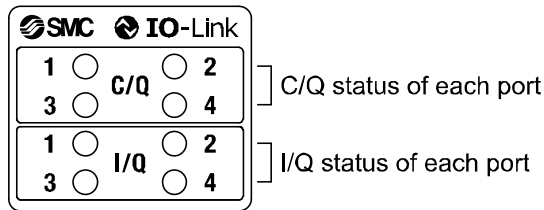


## Air Management Hub (Remote type)



LED	LED colour	Operation
ST	OFF	Normal operation or the power supply is OFF.
	Green flashing	<ul style="list-style-type: none"> <li>•Power supply voltage is abnormal.</li> <li>•Short circuit of output ports of 24 V port.</li> </ul>
	Red flashing	Pairing mode. (synchronized with SA)
	Red ON	Component failure inside the AMS Hub.
	Orange flashing	Internal communication error in wireless adapter.
SA	OFF	Standalone mode.
	Green ON	Wireless mode.
	Red flashing	Pairing mode. (synchronized with ST)
PWR	OFF	Power not supplied.
	Green flashing	Power supply voltage is abnormal.
	Green ON	Power supply voltage is in the specification.
MODE	OFF	During initialization.
	Green ON	Operation mode.
	Green flashing	Waiting for standby signal.
	Orange ON	Standby mode.
	Orange flashing	Isolation mode.
SIG	OFF	No signal received.
	Green flashing	Input port short circuit.
	Green ON	Standby input ON.
	Orange flashing	Isolation input ON.
	Orange ON	Standby input and Isolation input are both ON.

## Air Management Hub (Port status)



### Port1(VP)

LED	LED colour	Operation
VP (CQ_1)	OFF	Output signal OFF.
	Orange ON	Output signal ON.
	Red ON	Short circuit detected.

### Port2(ITV/ARS)

LED	LED colour	Operation
ITV/ARS (CQ_2)	OFF	Output signal OFF.
	Orange ON	Output signal ON. (ARS)
	Green flashing (1 Hz)	IO-Link device not connected.
	Green flashing (2 Hz)	<ul style="list-style-type: none"> <li>•Connected device matching error.</li> <li>•Device process data mapping error.</li> <li>•Data storage writing error.</li> </ul>
	Green ON	IO-Link device in communication.
	Red ON	Short circuit detected. (24 V or C/Q)

### Port3(Standby signal)

LED	LED colour	Operation
Standby signal (CQ_3)	OFF	Input signal OFF.
	Orange ON	Input signal ON.
	Red ON	Short circuit detected. (24 V)

### Port3(Isolation signal)

LED	LED colour	Operation
Isolation signal (IQ_3)	OFF	Input signal OFF.
	Orange ON	Input signal ON.

#### Port4(IO-Link)

The C/Q\_4 LED status varies depending on the setting of Pin No.4 (disabled, IO-Link communication, digital I/O) of port 4.

Pin function	LED colour	Operation
Deactivated (Port disabled)	OFF	Port disabled.
	Red ON	Short circuit detected. (24 V)
IO-Link (IO-Link communication)	Green flashing (1 Hz)	IO-Link device disconnected.
	Green flashing (2 Hz)	•Connected device matching error. •Device process data mapping error.
	Green ON	IO-Link device communicating.
	Red ON	Short circuit detected. (24 V of C/Q)
DI (Digital Input)	OFF	Input signal OFF.
	Orange ON	Input signal ON.
	Red ON	Short circuit detected. (24 V)
DO (Digital Output)	OFF	Output signal OFF.
	Orange ON	Output signal ON.
	Red ON	Short circuit detected. (24 V or C/Q)

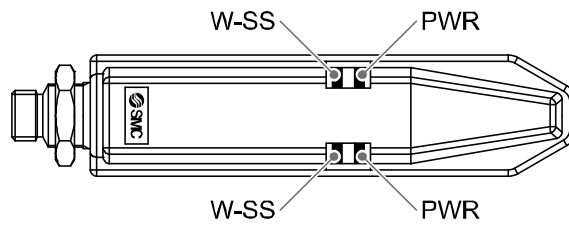
The I/Q\_4 LED displays the status of Pin No.2 (Digital input) of each IO-Link port of port 4.

Pin function	LED colour	Operation
DI (Digital Input)	OFF	Input signal OFF.
	Orange ON	Input signal ON.

#### C/Q\_4、I/Q\_4 common

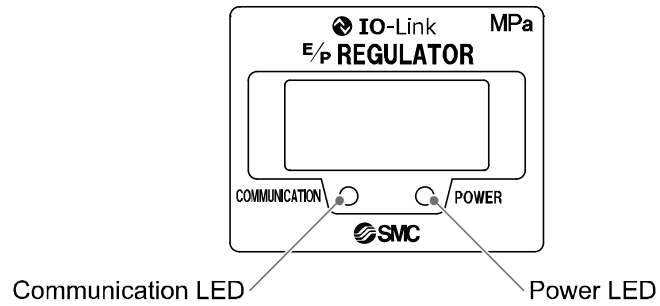
Pin function	LED colour	Operation
Condition of all pins	Red/Green flashing alternately	Internal memory error.

## Wireless adapter



LED	LED colour	Operation
PWR	Green ON	Power US1 (Control) ON.
	Red ON	Unrecoverable error is detected.
	OFF	US1 (for control) power supply is OFF.
W-SS	Green ON	The level of received radio wave power is 3.
	Green flashing (1 Hz)	The level of received radio wave power is 2.
	Green flashing (2 Hz)	The level of received radio wave power is 1.
	Orange flashing	No Remotes are connected.

## Standby E/P regulator



LED	LED colour	Operation
Power LED	Green ON	Normal operation.
	Green flashing	Communication system error.
	OFF	Internal memory error/No power supplied.
Communication LED	Green ON	IO-Link communication not established.
	Green flashing	IO-Link communication established.
	OFF	No power supplied.

## System overview

The AMS consists of three base components.

- Standby E/P regulator or Standby regulator: Electrical or manual adjustment of standby pressure. Standby pressure is activated by electrical signal from the Air Management Hub.
- Air Management Hub: Measures flow rate, pressure and temperature, manages network communication and controls the composed devices.
- Residual Pressure Relief Valve: Exhaust the downstream pressure and is connected to the AMS Hub.

The AMS components are compatible with SMC's modular AC-D F.R.L. system and can be combined with existing installations.

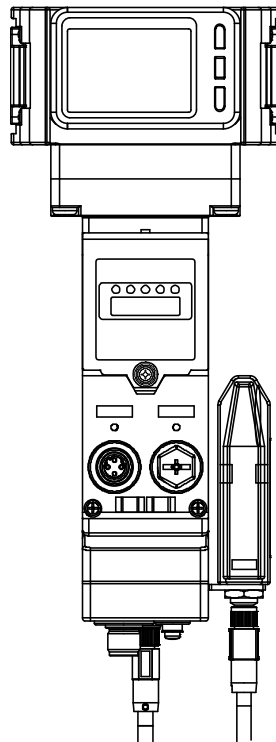
Two versions of the Air Management Hub are available, base type and remote type.

These can be combined to create a wireless network of up to 11 Air Management Hubs (1 wireless base + 10 wireless remotes). Data for all connected AMS wireless remotes is available on the network via the AMS wired/base using Fieldbus and OPC UA.

### 1. Air Management Hub: Base type (EXA1-##-PN/EXA1-##-EN/EXA1-##-EC)

The Air Management Hub wired/base version comes with Industrial Ethernet and OPC UA (except for EXA1-##-EC) for data communication and webserver for parameter setting.

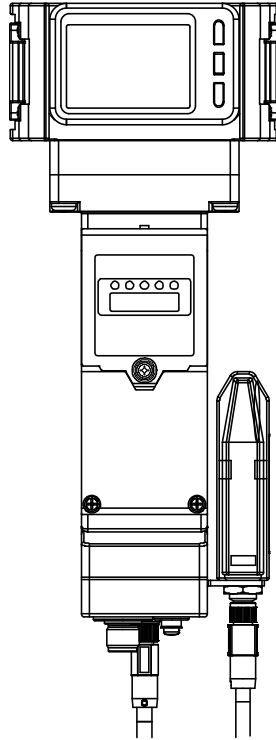
A wireless adapter can be connected to use the Air Management Hub as a wireless base. AMS wireless remotes can then be paired to the AMS wireless base.





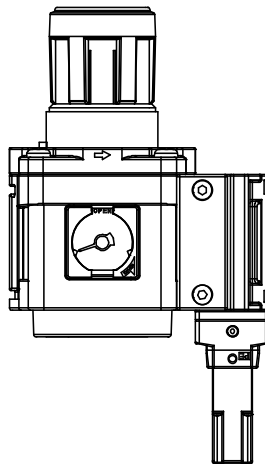
## 2. Air Management Hub: Remote type (EXA1-##-SA)

The Air Management Hub remote type comes with no data communication. It could be used as standalone. Optionally a wireless adapter can be connected to use the Air Management Hub as a wireless remote.



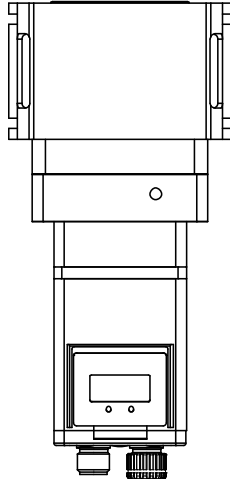
## 3. Standby regulator: manual pressure setting type (ARS)

The manual pressure setting type uses an ARS module to set the standby pressure.



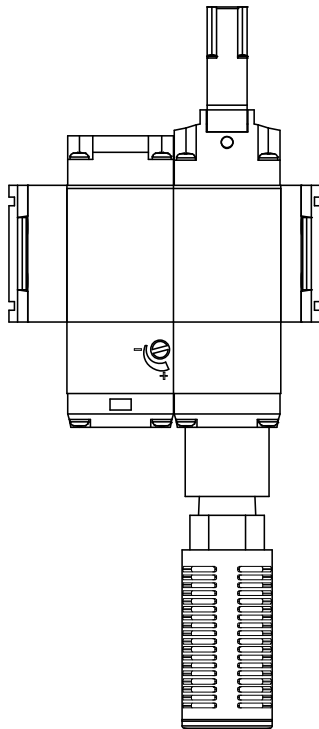
#### 4. Standby E/P regulator: Electrical pressure setting type (ITV)

The electrical pressure setting type uses an ITV module to set the operation pressure and standby pressure.



#### 5. Residual Pressure Relief Valve (VP)

A VP valve module can be used for isolation mode with an optional soft start function. The silencer is not included and therefore should be ordered separately.



## 6. User configurable port

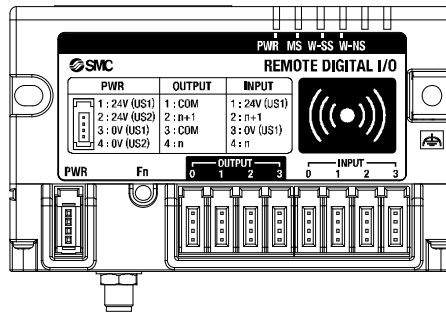
Each Air Management Hub has one spare port which can be configured to be either:

- 1 × DI & IO-Link
- 1 × DI & 1 × DO
- 2 × DI

Use the IO-Link Device Tool (IO-Link Device Tool V5.1 PE) for IO-Link device settings.

## 7. User configurable port

Additional compact wireless remotes (EXW1-RD#) can be paired to an AMS wireless base to provide extra digital IO (maximum of 10 wireless remotes per AMS wireless base).

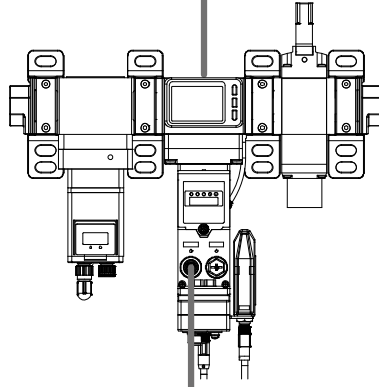


<PLC>



"Industrial ethernet"

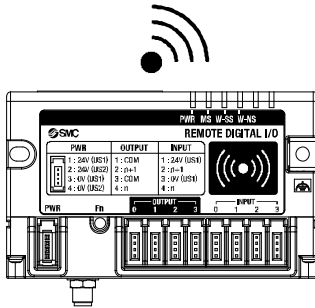
<AMS##A base>



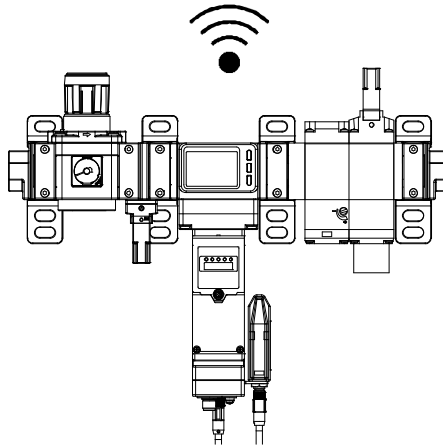
Industrial ethernet, OPC UA & Webserver



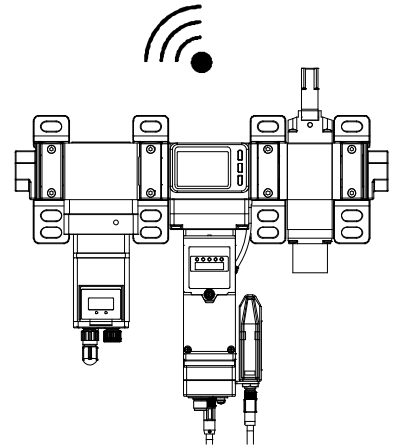
<EXW1 remote>



<AMS##B remote>



<AMS##A remote>



### o Working Principle

The Air Management System (AMS) functions in three modes: Operation, Standby and Isolation.

When the measured flow rate is below a set flow value "1. Standby flow rate (Threshold)" for longer than a set time "2. Standby ON delay" and "3. Standby input signal" is ON (24 VDC by digital input or logic high by PLC or OPC UA), the AMS output pressure will be reduced from the operation pressure down to the user specified "4. Standby pressure". AMS is the non relief construction hence air consumption is required to drop pressure to the standby pressure.

While in standby mode, and if enabled "5. Auto isolation", after a set time "6. Isolation delay" the Residual Pressure Relief Valve will close, and the downstream pressure will be exhausted.

While in Standby Mode or Isolation Mode, if the "3. Standby input signal" switches OFF (0 V and logic Low), the AMS output pressure will increase back to the operation pressure. If the "3. Standby input signal" is ON (24 VDC/High) again within the set time "7. Standby OFF delay" after returning to operation mode, the AMS will immediately return to Standby Mode.

If at any point the "8. Isolation input signal" is OFF (0 V/Low), the AMS will be forced into isolation mode. Hysteresis can also be set for the standby flow rate threshold with parameter "9. Standby flow rate (Hysteresis)".

\*: The above describes the behaviour for the normally closed (NC) type. For normally open (NO) type, the isolation input signal "8. Isolation input signal" is inverted.

- AMS##A series can be set the time to reach operation pressure with the "10. Pressure ramp up duration".
- AMS##B series have a "11. Soft start function" when it back from isolation mode to operation mode.

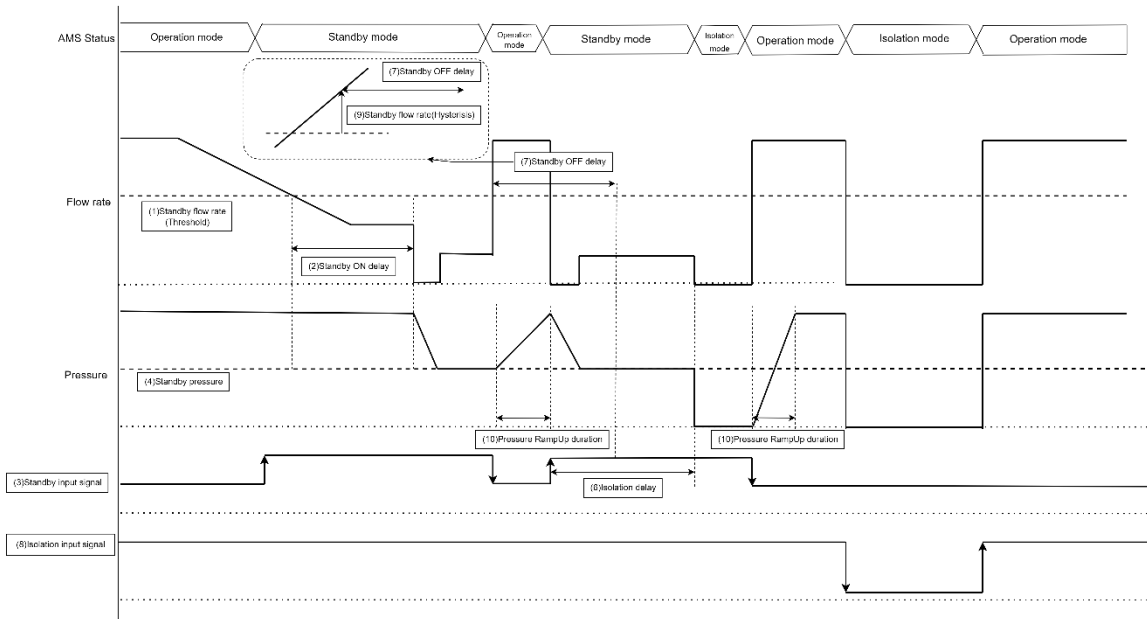
The table below summarizes the AMS inputs and parameters.

Item	Name	Type
1	Standby flow rate (Threshold)	Configurable parameter. (Refer to page 127)
2	Standby ON delay	Configurable parameter. (Refer to page 127)
3	Standby input signal	Process Data or Digital Input.
4	Standby pressure	AMS##A: Configurable parameter. (Refer to page 127) AMS##B: Hand adjustable.
5	Auto isolation	Configurable parameter. (Refer to page 127)
6	Isolation delay	Configurable parameter. (Refer to page 127)
7	Standby OFF delay	Configurable parameter. (Refer to page 127)
8	Isolation input signal	Process Data or Digital Input.
9	Standby flow rate (Hysteresis)	Configurable parameter. (Refer to page 127)
10	Pressure ramp up duration	Configurable parameter. (Refer to page 127)
11	Soft start function	Mechanical, configurable by an adjusting screw on the product.

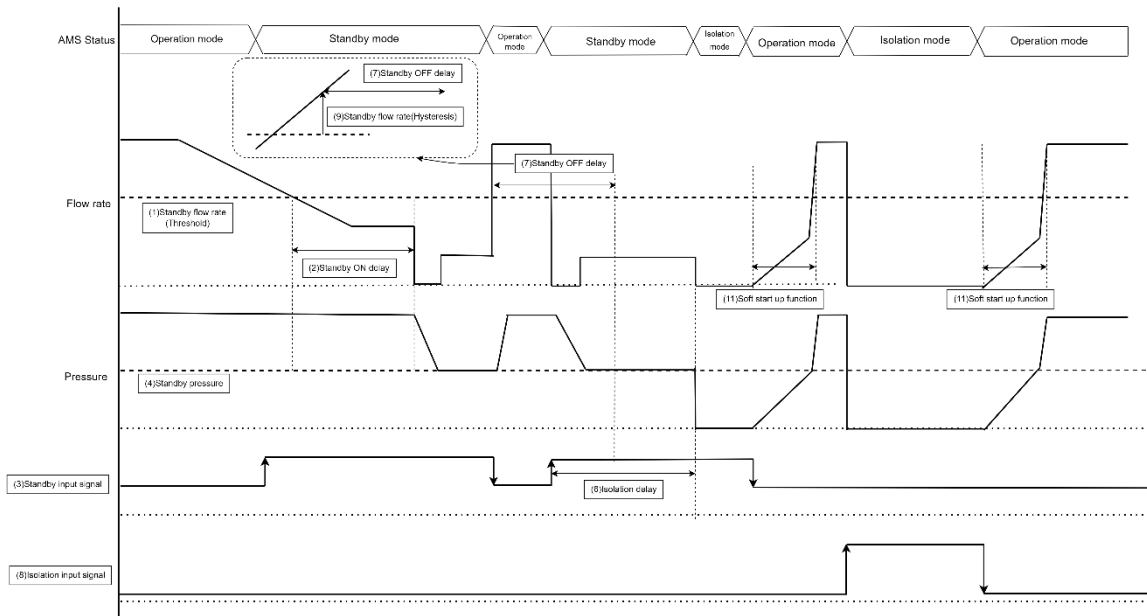
○ Timing Chart

The following figure shows an example timing diagram for the NC type AMS##A and NO type AMS##B. This timing chart is for reference only, the actual behaviour depends on the machine volume connected to the AMS outlet side.

•AMS##A: NC type



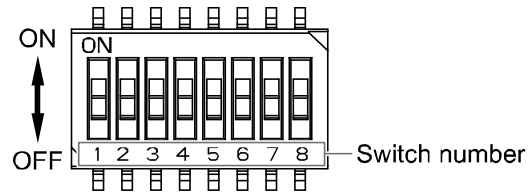
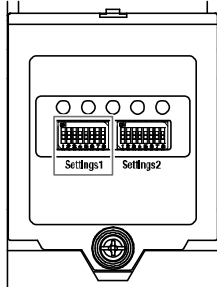
•AMS##B: NO type



## Initial Configuration

### ○DIP Switch setting

The hardware setting of the Air Management Hub is configured using Setting 1 DIP switch No.1 to 4. Loosen the display cover screw and open the display cover using a flat head screwdriver.



Refer to the flowing table to set the DIP switches.

AMS	Switch Position	Switch Number			
		1	2	3	4
		Communication Method	Regulation Type	NO/NC	Wireless Pairing Mode
Base type	OFF	Industrial Ethernet	ARS	NC	Refer to Wireless Network Configuration (page 45)
	ON	OPC UA *1	ITV *2	NO	
Remote type	OFF	Wireless Remote	ARS	NC	
	ON	Standalone	ITV *2	NO	

\*1: Not applicable to EXA1-##-EC.

\*2: If ITV#050-IL#-##-X399 is not connected, wireless communication and product do not work.

\*2: Switch Numbers 1 to 3 must be set with the power supply OFF.

\*3: Use an insulated flat-blade screwdriver.

AMS functions depending on the DIP switch 1 is as follows.

AMS Base type		Machine to AMS control					Monitor Data		Industrial Ethernet disconnection error
		Via Digital Input	Via Industrial Ethernet		OPC UA		Fieldbus	OPC UA	
Switch No.1 Position	Communication Method	Standby and Isolation control	Standby and Isolation control	IO or IO-Link Setting (User configurable Port)	Standby and Isolation control	IO or IO-Link Setting (User configurable Port)			
OFF	Industrial Ethernet	Available	Available	Available	Not available	Not available	Available	Available	Available
ON	OPC UA	Available	Not Available	Not available	Available	Available	Available	Available	Available

AMS Standalone • Remote type		Machine to AMS control			Monitor Data	
		Via Digital Input	Via AMS Base		Via AMS Base	
Switch No.1 Position	Communication method	Standby and Isolation control	Standby and Isolation control	IO or IO-Link Setting (User configurable Port)	Standby and Isolation control	IO or IO-Link Setting (User configurable Port)
OFF	Wireless	Available	Available	Available	Available	Available
ON	Standalone	Available	Not Available	Not Available	Not Available	Not Available

DIP Switch configuration example for AMS40A-F04C-PN-MLG

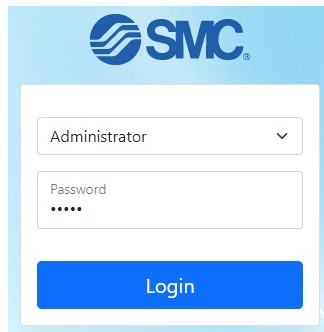
	Switch No.		
	1	2	3
	Communication method	Regulation type	NO/NC
Switch position	Depends on the application ON or OFF	ON	OFF
Description	OFF when AMS is controlled by Fieldbus. ON when AMS is controlled by OPC UA.	"A" from parts number means Standby E/P regulator.	"C" from parts number means NC type.



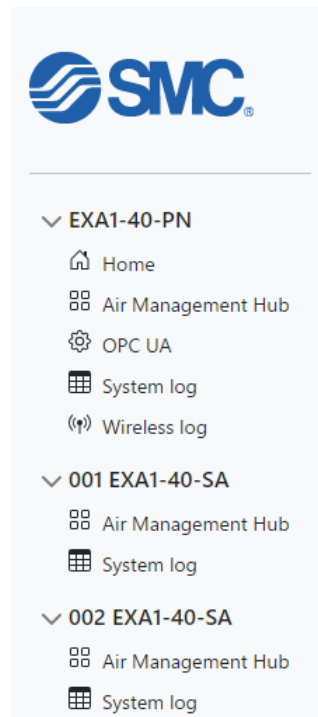
o Web Server connection

The Air Management Hub base type has a web server which is used for configuration and maintenance. To access the web server, connect a PC to the network and enter the Air Management Hub IP address into a web browser. Ensure that the Air Management Hub and PC are on the same IP subnet. After the hardware configuration (EtherCAT) is conducted, the web server becomes usable. The PLC/controller must also be supported EoE (Ethernet over EtherCAT). (Refer to page 68) For IP address setting, download the IP Address Setting Tool (EX9-ZSW-IPC1) from our website (URL <https://www.smcworld.com>) and configure settings. The default login credentials are:

Username = "Administrator"  
Password = "admin"

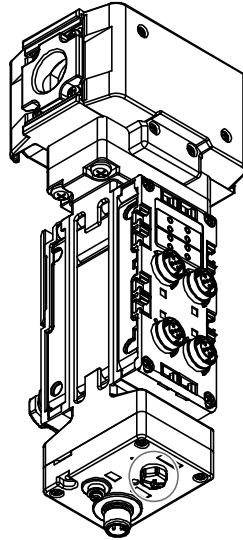


Details for each Air Management Hub can be viewed by clicking the relevant AMS in the navigation panel.



oWireless Network Configuration


The Air Management Hub can be configured to make a wireless network. Connecting a wireless adapter (EXW1-A11N-X1) to the M8 "ADPTR" port of the AMS will allow wireless communication.



ADPTR port

Each of the AMS devices need to be set to pairing mode. Starting with DIP switch 4 of SW 1 in the OFF position, perform the sequence ON >> OFF >> ON. The SF/MS/ST and BF/NS/DIAG/SA LEDs of each device will flash red.

Connect to the webserver. The available remote devices will appear in the "FREE REMOTE" section. Using the ↕ symbol, click and drag the remote devices up to the "SYSTEM CONFIGURATION" section. Click "Write Configuration" to pair the devices and then set DIP switch 4 of SW 1 to OFF on the Air Management Hub Base.



- Remote pairing
- System
  - Setting
  - Logout
- Link

### REMOTE PAIRING

#### Remote registration

Wireless Ch	Unit name	Product ID	Input size	Output size	Pairing status	
↕↑	001	EXA1-30-SA	11111111	36byte	18byte	Paired

#### Free remote

Wireless Ch	Unit name	Product ID	Input size	Output size	Pairing status	
↕↑	-	EXA1-30-SA	08D14030	36byte	18byte	Wait pairing
↕↑	-	EXA1-40-SA	08D14031	36byte	18byte	Wait pairing
↕↑	-	EXA1-60-SA	08D14032	36byte	18byte	Wait pairing
↕↑	-	EXA1-20-SA	08D14033	36byte	18byte	Wait pairing
↕↑	-	EXA1-30-SA	08D14034	36byte	18byte	Wait pairing
↕↑	-	EXA1-40-SA	08D14035	36byte	18byte	Wait pairing
↕↑	-	EXA1-30-SA	08D14036	36byte	18byte	Wait pairing
↕↑	-	EXA1-40-SA	08D14037	36byte	18byte	Wait pairing
↕↑	-	EXA1-30-SA	08D14038	36byte	18byte	Wait pairing
↕↑	-	EXA1-40-SA	08D14039	36byte	18byte	Wait pairing

Export pairing
Write pairing

# AMS Operation Setting

## o Web server setting parameters

Item		Definition	Setting range	Default settings	Effective range
Setting target	Parameter				
System parameter	Overwriting parameter by record data	PROFINET GSDML setting is prioritized. (Refer to page 55)	Enable/Disable	Disable	Base
	Module parameter overwrite	The setting possessed by the wireless base is prioritized. (Refer to page 55)	Enable/Disable	Enable	Remote
	Under voltage	When the power voltage drops, an error occurs.	Enable/Disable	Enable	Common
	Short circuit detection	When the input/output device detects short-circuiting, diagnosis is generated.	Enable/Disable	Enable	Common
	Power supply for E/P regulator	Turns ON/OFF the power supply for electro-pneumatic regulator.	ON/OFF	ON	Common
	Power supply for input signal	Turns ON/OFF the power supply for input signal.	ON/OFF	ON	Common
	Power supply for IO-Link device	Turns ON/OFF the power supply for IO-Link device.	ON/OFF	ON	Common
	Force AMS mode	Forces the operating mode to be set. (Refer to page 49)	AMS/Operation/Standby/Isolation	AMS	Common
	Analogue input refresh time	Sets the data update time of the analog input unit connected to the Wireless Remote.	0.1 s/0.2 s/0.5 s/1 s/2 s/5 s/10 s/30 s/60 s	0.5 s	Remote
	Communication failure	Specifies the output action to be taken when the fieldbus communication or wireless communication is disconnected.	Clear/Hold	Hold	Common
	Communication failure for wireless input	Specifies the input information in case the wireless communication is disconnected.	Clear/Hold	Hold	Base
	Wireless communication timeout	If wireless communication (including retries) does not succeed due to obstacles or for other reasons, it is judged to have failed after the set time has elapsed, and then disconnected. Afterward, the base and the remote are reconnected.	0.1 s/0.2 s/0.5 s/1 s/2 s/5 s	500 ms	Base

Item		Definition	Setting range	Default settings	Effective range
Setting target	Parameter				
Sensor	Standby flow rate (Threshold)	Sets the standby flow rate (threshold value). (Refer to page 40, 41)	[EXA1-20] 5 to 525 L/min	[EXA1-20] 25 L/min	Common
			[EXA1-30] 10 to 1050 L/min	[EXA1-30] 50 L/min	Common
			[EXA1-40] 20 to 2100 L/min	[EXA1-40] 100 L/min	Common
			[EXA1-60] 40 to 4200 L/min	[EXA1-60] 200 L/min	Common
	Standby flow rate (Hysteresis)	Sets the standby flow rate (hysteresis). (Refer to page 40, 41)	[EXA1-20] 0 to 520 L/min	[EXA1-20] 50 L/min	Common
			[EXA1-30] 0 to 1040 L/min	[EXA1-30] 100 L/min	Common
			[EXA1-40] 0 to 2080 L/min	[EXA1-40] 200 L/min	Common
			[EXA1-60] 0 to 4160 L/min	[EXA1-60] 400 L/min	Common
	Standby ON delay	Sets the standby ON delay. (Refer to page 40, 41)	0 to 9999s	600s	Common
	Standby OFF delay	Sets the standby OFF delay. (Refer to page 40, 41)	0 to 9999s	0s	Common
Auto isolation	Sets enabling/disabling of automatic isolation. (Refer to page 40, 41)	Enable/Disable	Disable	Common	
Isolation delay	Sets isolation delay. (Refer to page 40, 41)	0 to 9999s	3600s	Common	
Pin (Security code used/not used)	Sets whether it is necessary to input the security code or not.	Unused/Used	Unused	Common	
Pin code (Security code setting)	Allows you to change the security code setting.	000 to 999	000	Common	
Device access locks	Sets enabling/disabling of button operation and enabling/disabling of data storage.	Key lock release, DS unlock Key lock release, DS lock Key lock, DS unlock Key lock, DS lock	Key lock release, DS unlock	Common	
Standby E/P regulator	Operation pressure	Sets the pressure in the operation mode.	0 to 1050 kPa	400 kPa	Common
	Standby pressure	Sets the pressure in the standby mode. (Refer to page 40, 41)	0 to 1050 kPa	200 kPa	Common
	Pressure ramp up duration	Sets the pressure in the standby mode. (Refer to page 40, 41)	0 to 1500 x 0.1 s	0.0 s	Common
	Device access locks	Sets enabling/disabling of button operation and enabling/disabling of data storage.	Key lock release, DS unlock Key lock release, DS lock Key lock, DS unlock Key lock, DS lock	Key lock release, DS unlock	Common

Item		Definition	Setting range	Default settings	Effective range
Setting target	Parameter				
General IO-Link port	Process data byte swap	Swaps the byte order of the process data, which is sent and received in the fieldbus communication and IO-Link communication.	Direct (No swap) Swap 16 bit Swap 32 bit Swap All	Direct (No swap)	Common
	IO-Link port mode	Configures IO-Link port operation mode setting.	Deactivated Autostart Manual DI DO	Autostart	Common
	IO-Link device matching/data storage function	Sets the function of the collation function (collation between vendor ID and device ID) of the connected device and the data storage (DS) function.	No Device Check Type compatible Device V1.0 Type compatible Device V1.1 Type compatible Device V1.1, Backup+Restore Type compatible Device V1.1, Restore	No Device Check	Common
	Vendor ID registration	Sets the vendor ID which is collated when the IO-Link device collation function is enabled.	0 to 65535	0	Common
	Device ID registration	Sets the device ID which is collated when the IO-Link device collation function is enabled.	0 to ~1677215	0	Common

○ Force AMS mode

During configuration it may be necessary to force the AMS into operation mode standby mode or isolation mode. This can be done using the Air Management Hub display and buttons or via the webserver. Refer to [F41] Force AMS Mode setting to set parameter via buttons. (page 102)

The following example shows the parameter set via the Web server.

Navigate to the "System Parameter" tab of the AMS which will be forced.

Select the "Force AMS mode" option to be forced and click "Write parameter".

System parameter   Sensor   Standby E/P regulator   General IO-Link port

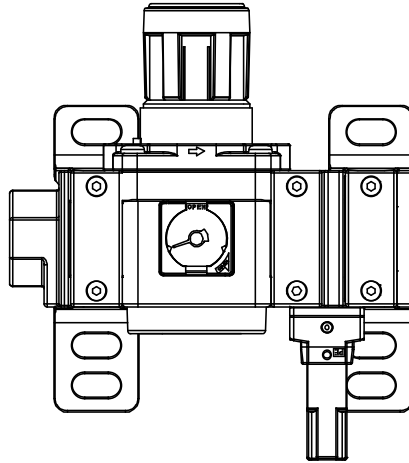
**Parameter**

Items	Status	Value
Overwriting parameter by record data	Disable	<input type="text"/>
Under voltage	Disable	<input type="text"/>
Short circuit detection	Disable	<input type="text"/>
Power supply for E/P regulator	ON	<input type="text"/>
Power supply for input signal	ON	<input type="text"/>
Power supply for IO-Link device	ON	<input type="text"/>
Force AMS mode	AMS	<input type="text"/>
Communication failure	Clear	<input type="text"/>
Communication failure for wireless input	Clear	<input type="text"/>
Wireless communication timeout	100ms	<input type="text"/>

To finish forcing, set the "Energy saving mode" to "AMS".

○Standby regulator pressure setting

For the ARS type AMS, the operation pressure is the same as the AMS supply pressure. To set the standby pressure, the AMS must first be forced into standby mode. When in standby mode, set the standby pressure by turning the handle on the regulator module. Or, change to the standby mode via ARS manual operation, and then set the pressure in the standby mode.



○ Standby E/P regulator pressure setting

For the ITV type AMS, the operation pressure and standby pressure are set using the webserver, ITV buttons or via Fieldbus.

• Setting via Webserver

To change the operating pressure, Standby Pressure, or pressure ramp up duration, navigate to the "Standby E/P regulator" tab of the AMS.

Diagnostic : No error  
Port status : PD and Data Storage valid

**Parameter**

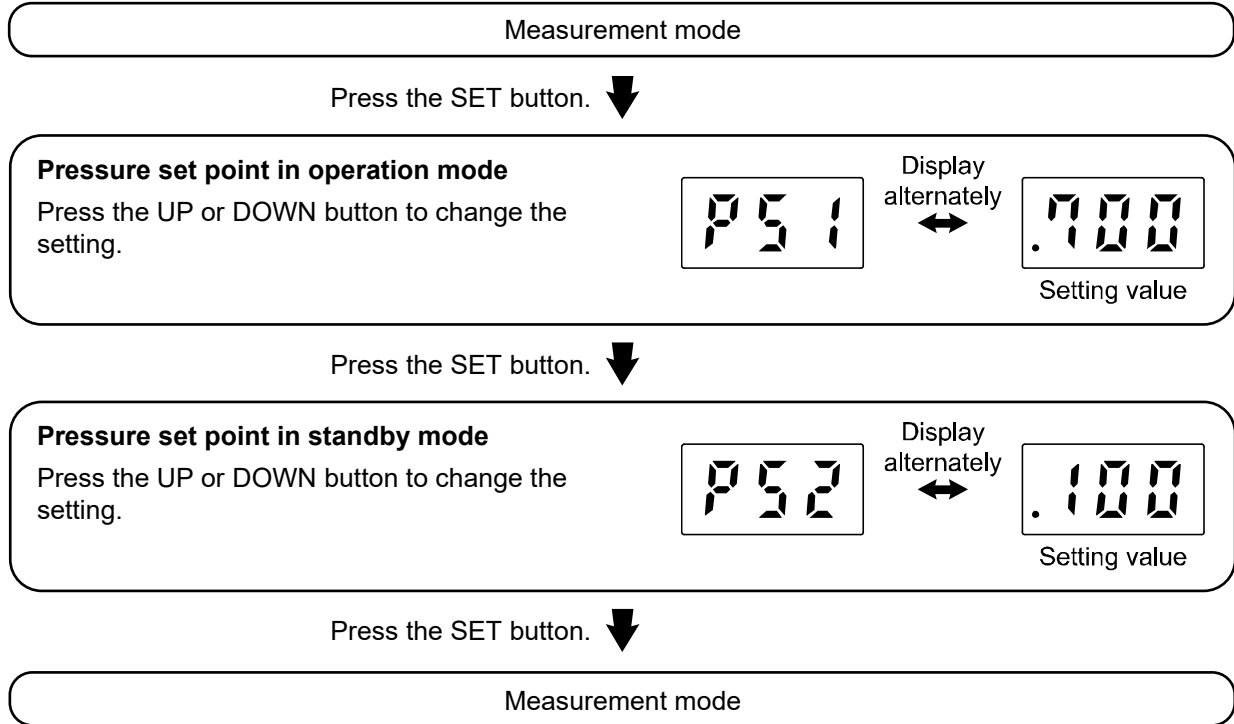
Items	Status	Value
Operation pressure		<input type="text"/>
Standby pressure		<input type="text"/>
Pressure ramp up duration		<input type="text"/>
Device access locks		<input type="text"/>

**Process data**



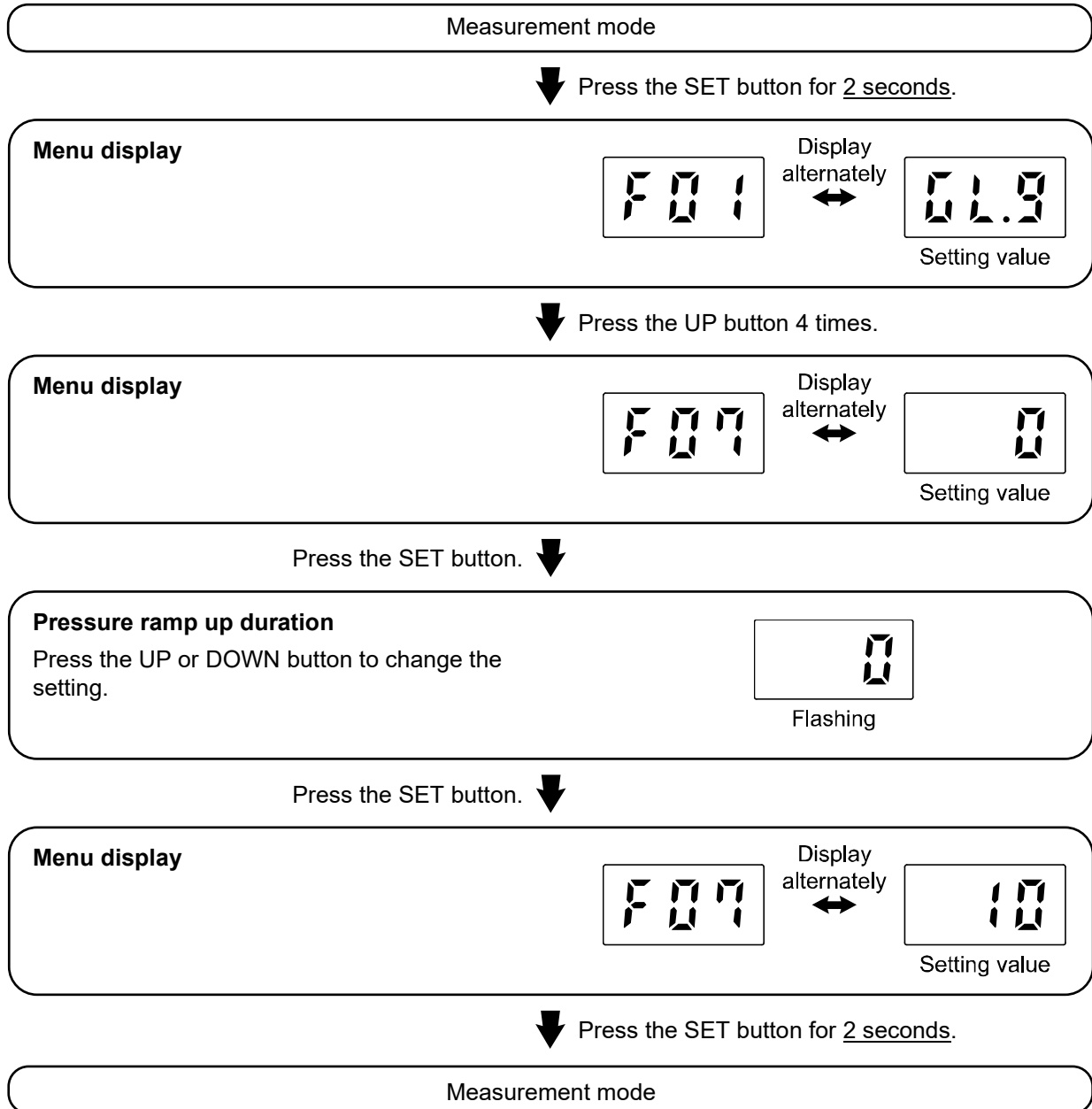
•Setting via buttons

To set the operation and standby pressure, press the "S" button once on the ITV, then use the up and down arrows to select PS1 (operation pressure) or PS2 (standby pressure). Press the "S" button again to allow editing and use the arrows to modify the value. Press the "S" button to set the value.



\*: Refer to Operation Manual for "ITV#050-IL#-##-X399".

To configure the pressure ramp up duration, hold the "S" button on the ITV until the display shows "F01" and use the up and down arrows to select "F07". Press the "S" button once and edit the value. The value displayed on the screen is seconds x10. Once the correct value has been selected press the "S" button to set it.



\*: Refer to Operation Manual for "ITV#050-IL#-##-X399".

•Parameter setting for Standby mode/Isolation mode.

The parameters can be set by Webserver, display buttons on the Air Management Hub or via Industrial Ethernet.

Refer to [F40] Standby function setting to set parameter using the buttons. (page 99)

**Setting via Webserver**

Navigate to the "Sensor" tab of the AMS webserver. Modify the values and click "Write parameter".

System parameter   **Sensor**   Standby E/P regulator   General IO-Link port

---

**Process data**

Accumulated flow : 80000L

Instantaneous flow : 500L/min

Fluid temperature : 25.0°C

Pressure : 0.400MPa

Diagnostic : No error

AMS status : Operating

Port status : Operate

Reset accumulated flow :

**Parameter**

Items	Status	Value
Standby flow rate (Threshold)	100L/min	<input type="text"/> L/min
Standby flow rate (Hysteresis)	100L/min	<input type="text"/> L/min
Standby ON delay	0s	<input type="text"/> s
Standby OFF delay	100s	<input type="text"/> s
Auto isolation	Disable	<input type="text"/> ▾
Isolation delay	10s	<input type="text"/> s
Pin(Security code used/not used)	Unused	<input type="text"/> ▾
Pin code(Security code setting)	000	<input type="text"/>
Device access locks	Key lock release, DS unlock	<input type="text"/> ▾

•Parameter Setting Priority

The Air Management Hub Base parameter "Overwriting parameter by Record Data" controls the priority for the parameter setting. If enabled, the PROFINET GSDML settings will overwrite the webserver settings. In the webserver, go to the "System Parameter" section of the Air Management Hub Base to change this setting.

System parameter    Sensor    Standby E/P regulator    General IO-Link port

---

### Parameter

Items	Status
Overwriting parameter by record data	Disable

The Air Management Hub Remote parameter "Module parameter overwrite" controls the priority for the parameter setting. If Disable, the parameters set using the buttons are prioritised over the parameter AMS base. This means that the remote parameters will not be overwritten by base parameters when the system is power cycled or wireless communication is re connected. In the webserver, go to the "System Parameter" section of the Air Management Hub Remote to change this setting.

System parameter    Sensor    Standby E/P regulator    General IO-Link port

---

### Parameter

Items	Status
Module parameter overwrite	Disable

# OPC UA Setting

## ○ OPC UA

The Wireless base provides the data from connected remotes via OPC UA. Depending on the OPC UA client used, the AMS Base may require an OPC UA certificate to be installed.

## ○ Communication Specifications

Refer to the following table for the AMS OPC UA communication limits.

Parameter	Value
MaxMonitoredItemsPerCall	100
MaxNodesPerBrowse	20
MaxNodesPerMethodCall	5
MaxNodesPerNodeManagement	0
MaxNodesPerRead	100
MaxNodesPerRegisterNodes	1
MaxNodesPerTranslateBrowsePathsToNodeIds	20
MaxNodesPerWrite	30
MinsupportedSampleRate	1000 ms
Max OPC UA Clients	2

## ○ OPC UA Configuration

The OPC UA parameters can be changed in the webserver by selecting the "OPC UA" section of the Air Management Hub base.

An OPC UA discovery server address can be provided. The Air Management Hub Base will connect to the discovery server to obtain the correct timestamp.

**NETWORK**

⚠ Network settings have been changed. Please reset system to apply settings.

Items	Status	Value
IP Address	0.0.0.0	<input type="text"/>
Subnet mask	0.0.0.0	<input type="text"/>
MAC Address	00:23:C6:6C:06:DF	
Port 1	100Mbit Full duplex	
Port 2	No link	

[Write value](#)

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OOPC UA nodes are user configurable and can be imported and exported via a csv file. Refer to the Process data map to configure user nodes.

The "Write Enable" check box enables outputs to be written to by OPC UA.

The "Buffer Enable" check box enables buffering of the selected node.

Import OPC-UA Tag File :  No file chosen

Tag Count (Up to 255): 12

Tag Total Size (Up to 1800 bytes): 1746 byte OK

Ch	Tag Name	I/O Type	Offset [byte]	Size [bit]	Position [bit]	Data Type	Endian	Write Enable	Buffer Enable	
↓↑ -	Machine01_Flow	In	15	16	0	UINT16	Big	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Remove
↓↑ -	Machine01_Pressure	In	19	16	0	UINT16	Big	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Remove
↓↑ -	Machine01_Standby	Out	0	1	0	BOOL	Big	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Remove
↓↑ -	Machine01_Isolation	Out	0	1	2	BOOL	Big	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Remove
↓↑ 1	Machine02_Flow	In	51	16	0	UINT16	Big	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Remove
↓↑ 1	Machine02_Pressure	In	55	16	0	UINT16	Big	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Remove
↓↑ 1	Machine02_Standby	Out	18	1	0	BOOL	Big	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Remove

An adjustable data buffer is available via OPC UA for up to 1800 bytes of data and a sampling rate of 100 ms or longer.

Parameters	Description
Data buffer Enable or Disable	The data buffer array can be enabled or disabled for each OPC UA node.
Historical Data Buffer Sampling Cycle	Sampling cycle time for the buffer. The parameter is applicable for all nodes which enabled the data buffer.
Number of data blocks	The number of points stored in the buffer. The parameter is applicable for all nodes with the data buffer enabled.

The time stamp is LDAP/Win32 format. To convert from the buffer data to a time, the bytes must first be combined. The resulting decimal value is the number of 100 ns passed since January 1st, 1601.

The example is shown in the following table.

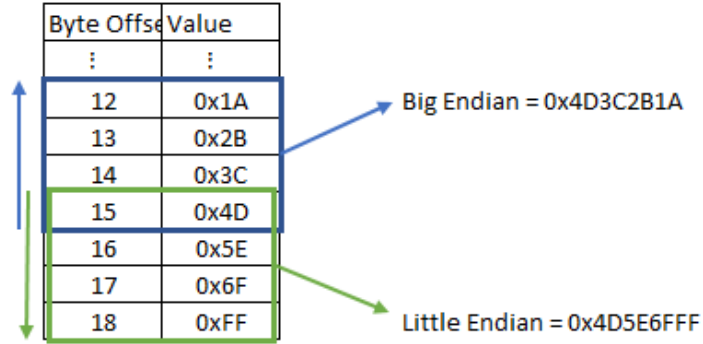
	Data [0]	Data [1]	Data [2]	Data [3]
Dec	472	38370	12261	55367
Hex	1D8	95E2	2FE5	D847
Combine	1D895E22FE5D847			
DEC	133020987706169000			

The endian can be changed between big and little. The figure below shows an example of how the process data is mapped for big and little endian.

**Example**

Byte Offset = 15

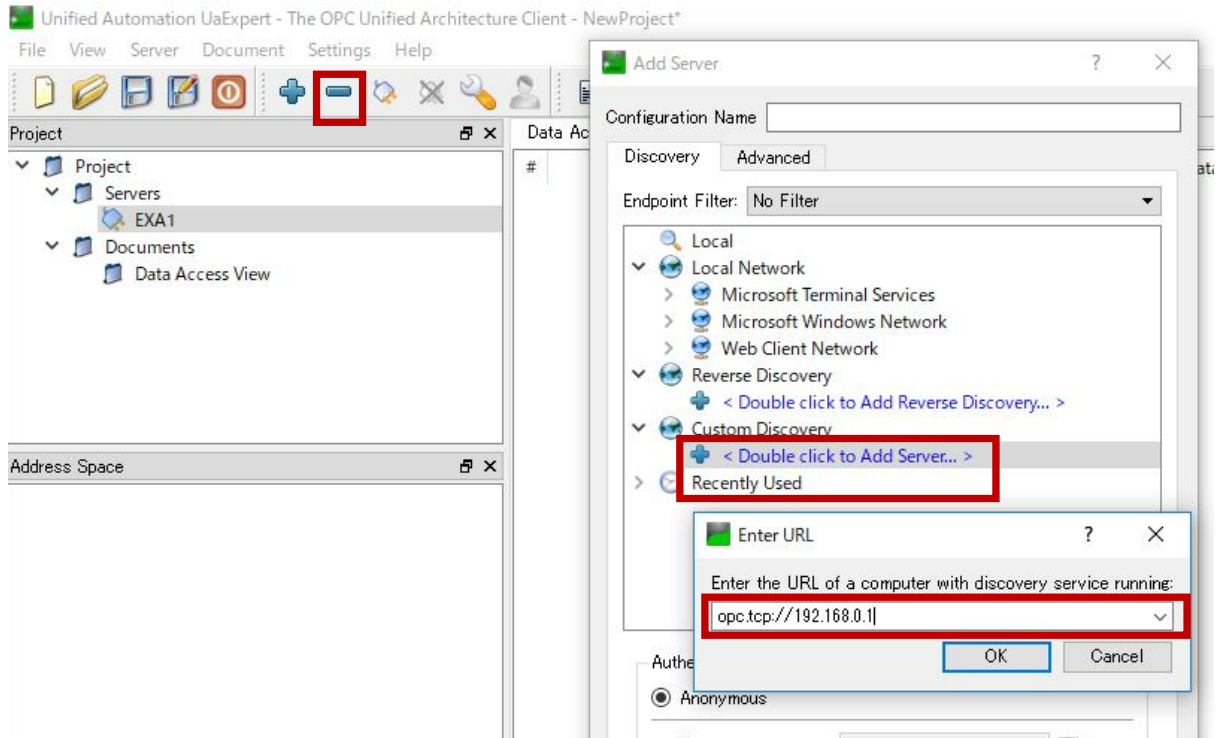
Size = 4 Bytes



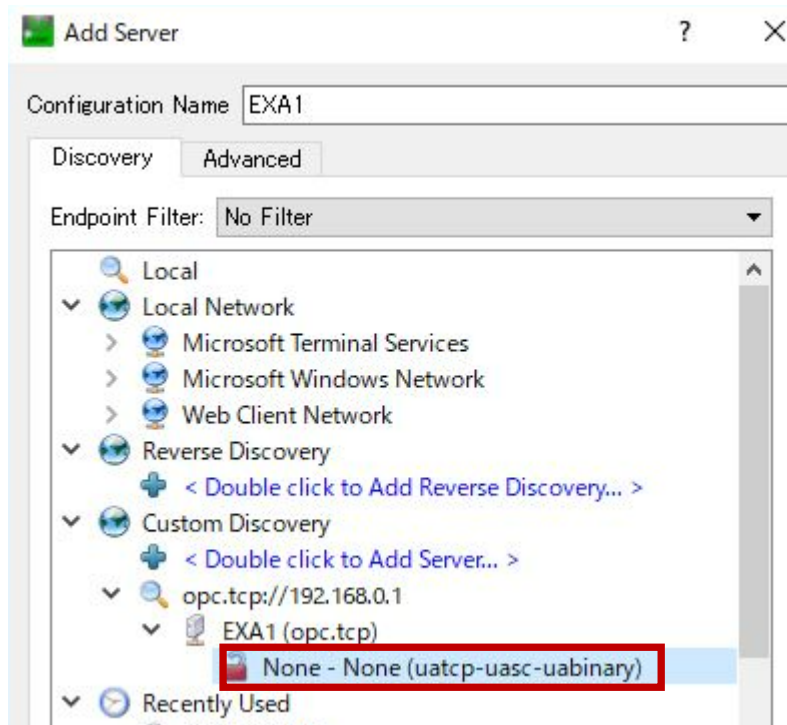
Comparison of big endian and little endian

**•UaExpert Connection**

The example below uses the OPC UA client UaExpert to connect the wireless base OPC UA server. Click the plus symbol and then add a "custom discovery" server. Enter the IP address of the AMS.

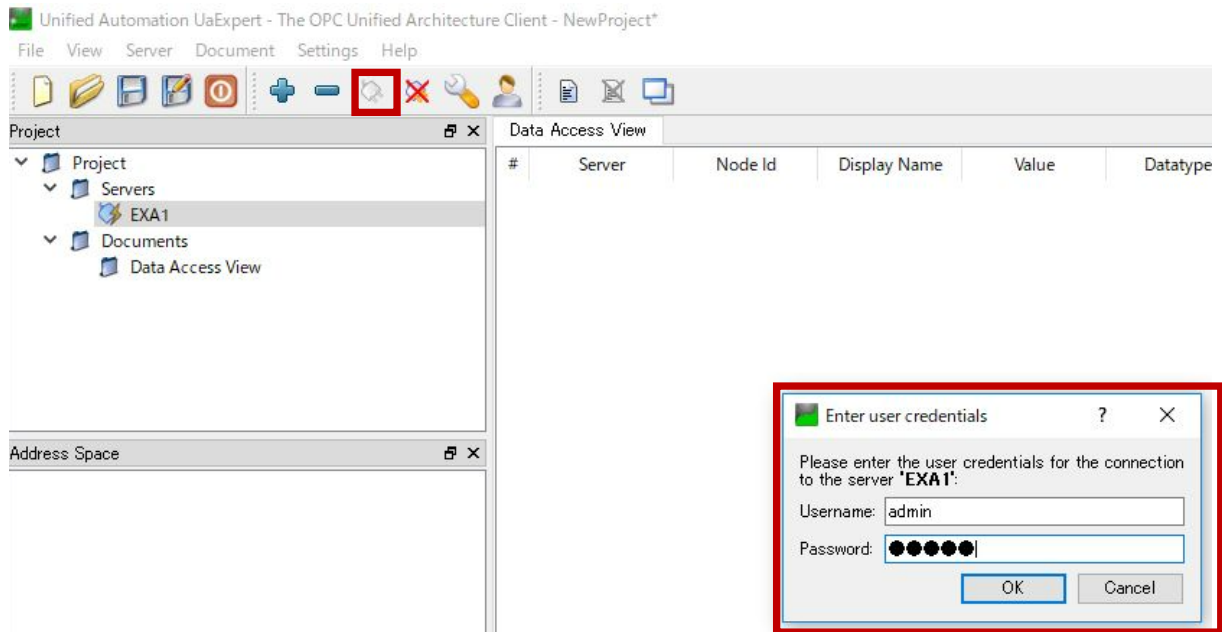


Expand the AMS server and select the "None" security option.



OPC UA security type

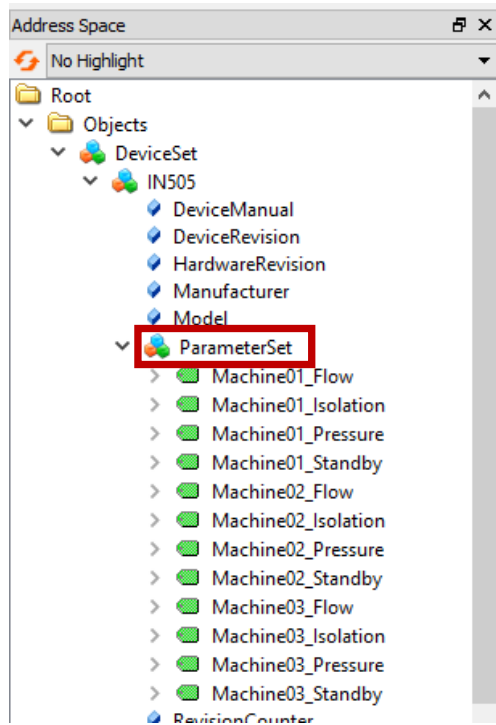
Click the "Connect" button and enter the username and password for the AMS (both are "admin").



OPC UA login



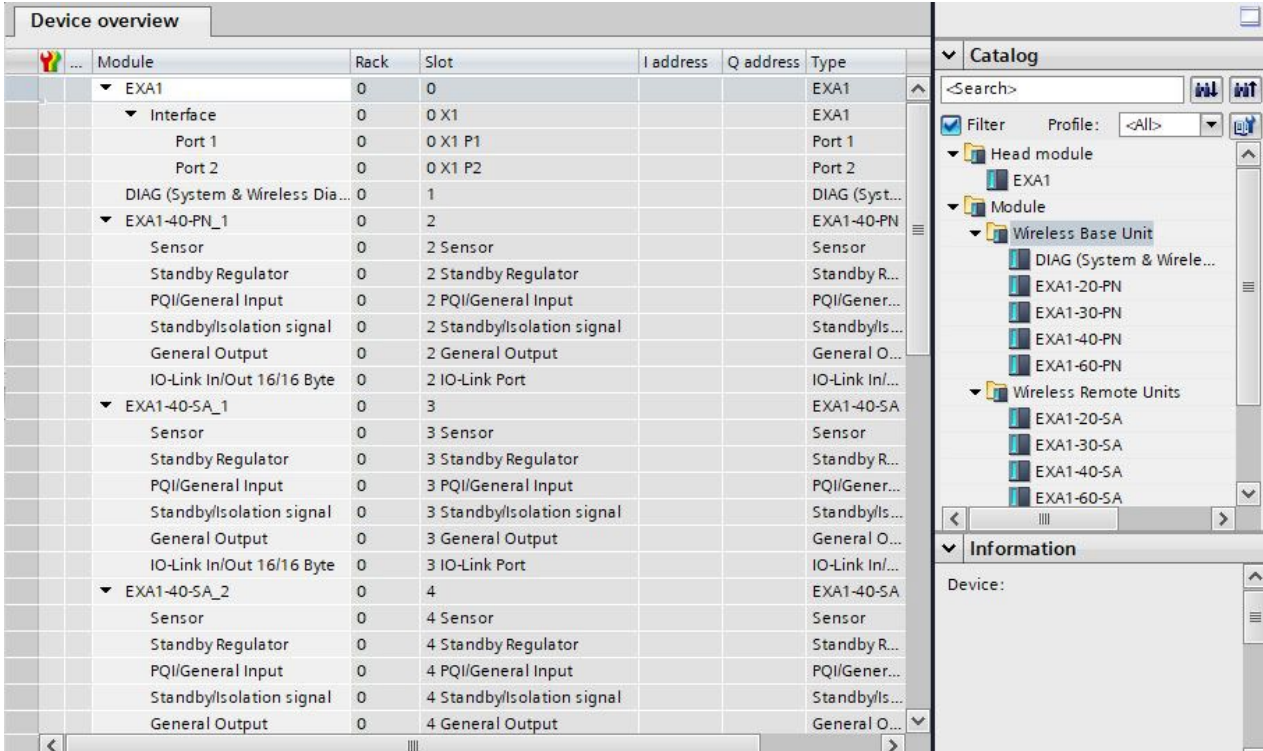
Navigate in the Address Space to the "ParameterSet" and expand it to see all the configured nodes available on the AMS.



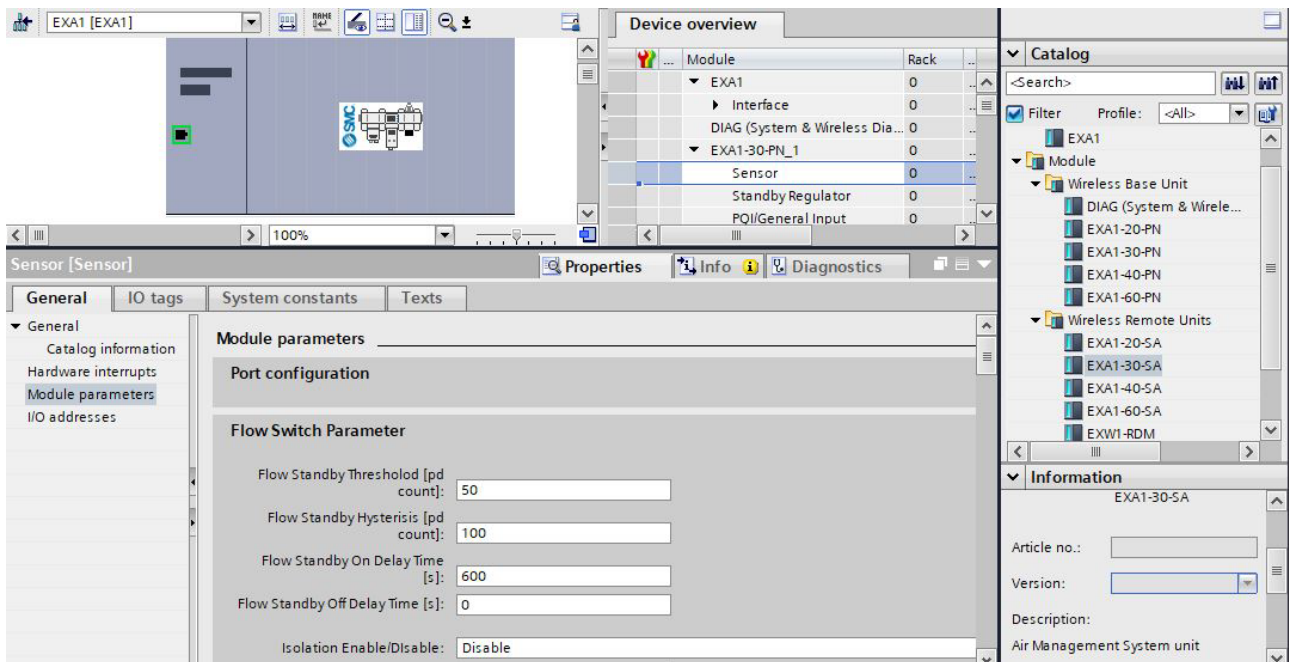
Server address base

# PROFINET

The figure below shows an example AMS configuration in TIA Portal. Select the diagnostic data to use and the wireless base type then add any additional remote units. This example shows a system with full diagnostics, one AMS Base and two AMS remotes.



Each AMS component can be configured in Device Overview. Select the component and view the properties tab to modify the AMS parameters. GSDML settings will only be written if the record data parameter is set to enabled.



# Hardware Configuration (EtherNet/IP™)

## ■ EDS file and icon

The EDS file can be used to configure the EXA1. Furthermore, icons are necessary for the display icon of the EXA1 on the configuration.

•URL: <https://www.smcworld.com>

Products Document → Instruction Manual → Setting file (SMC-EtherNet\_IP.zip)

•Content of SMC-EtherNet_IP.zip	EDS file	exa1_en_v10.eds
	Icon	exa1.ico

## ■ Setting using Logix Designer™

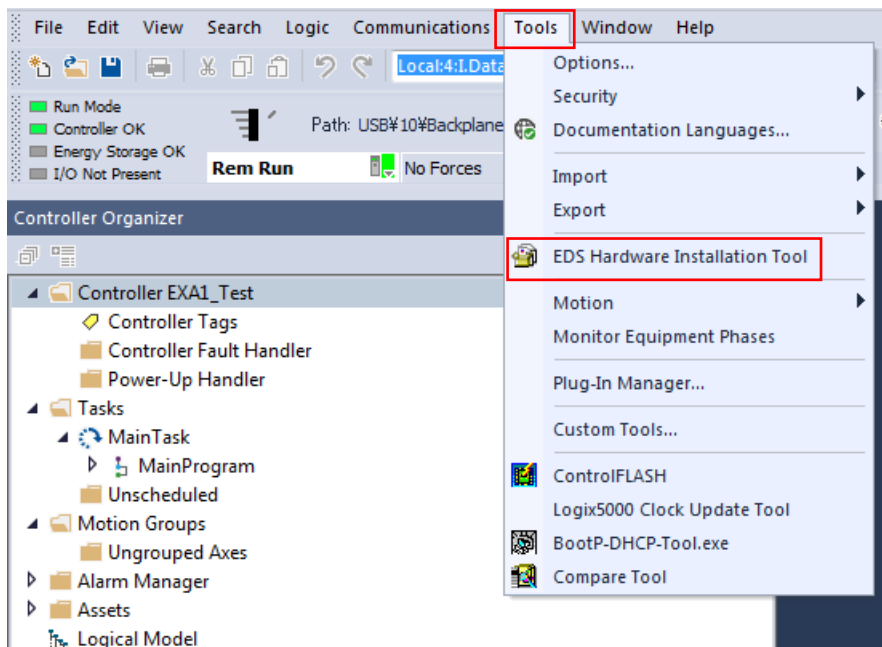
When connecting the EXA1 series, use Logix Designer™ software by Rockwell Automation.

Refer to the manual of Logix Designer™ for a detailed manner of operation.

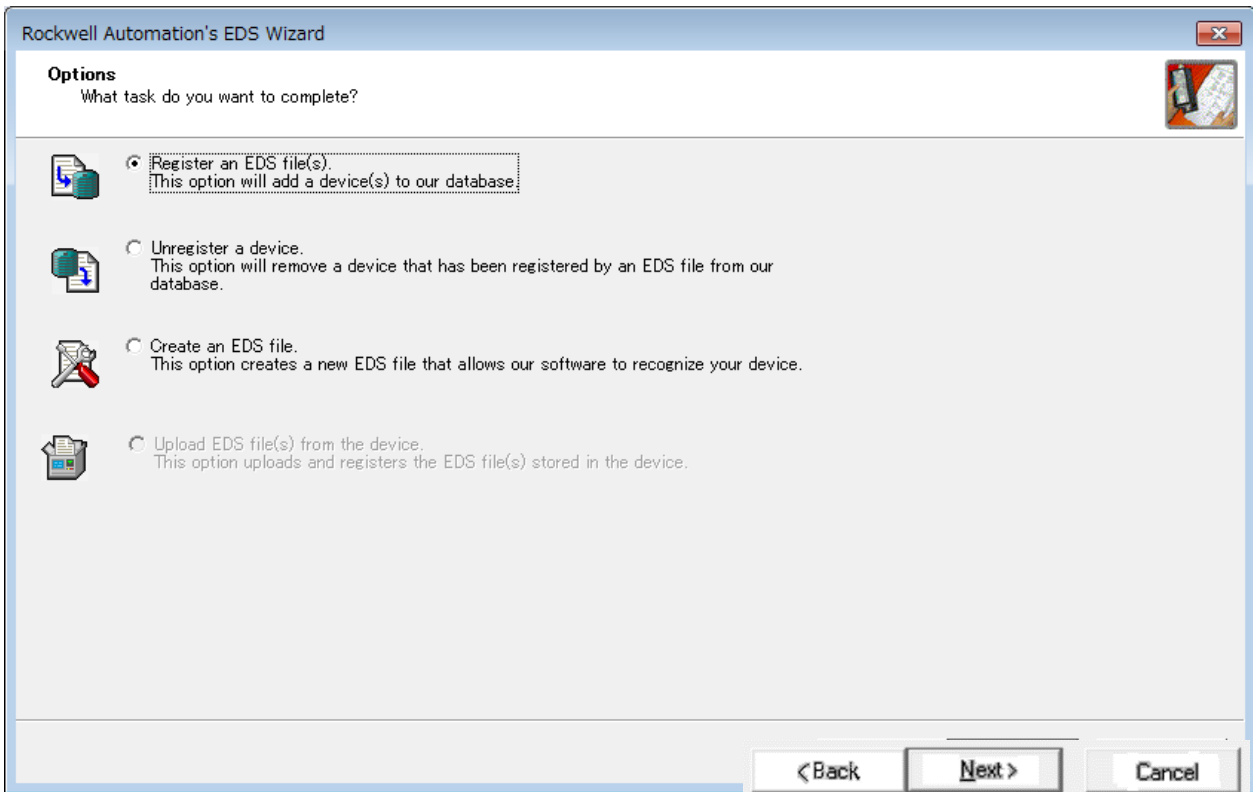
The following examples show the case of using EDS file and the case of Generic Ethernet Module, respectively.

### 1. Example of setting using EDS file

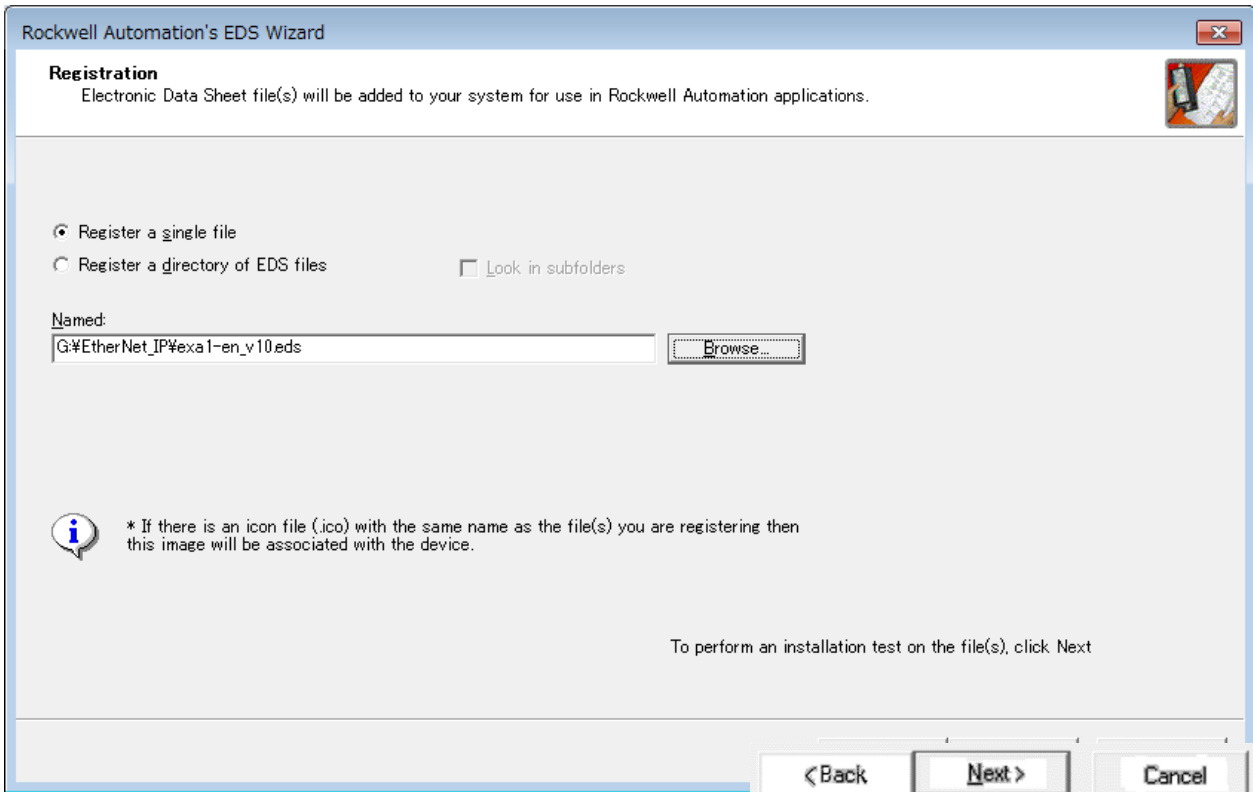
- Select [EDS Hardware Installation Tool] from the [Tools] menu.



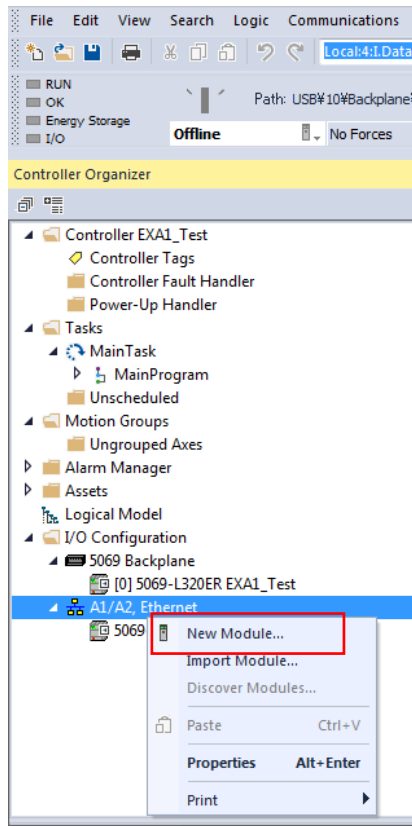
- Select [Register an EDS file(s)] from the [Options] menu. Then Select [Next].



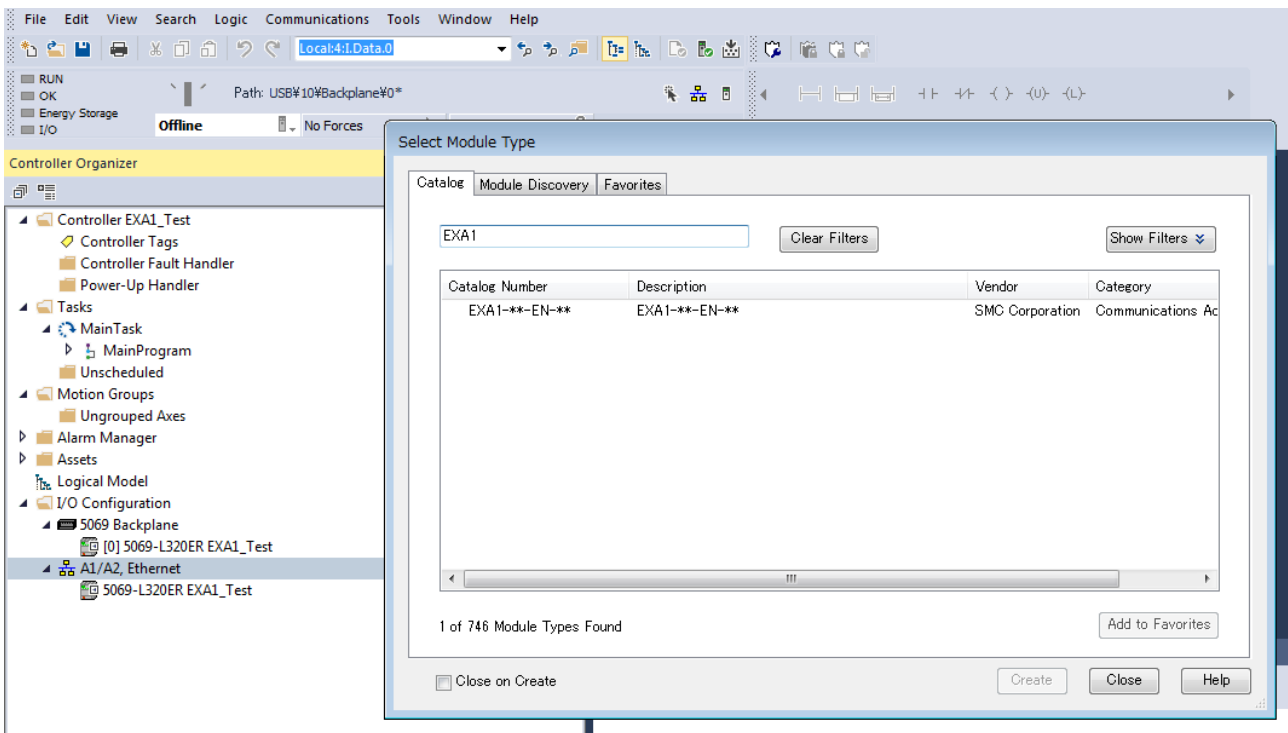
- Select the EDS file to be installed, and select [Next].



- Right-click on the selection [A1/A2, Ethernet] in the [I/O Configuration] folder, and select [New Module].



- The [Select Module Type] screen is displayed. Select [EXA1-\*\*-EN-\*\*] and select [Create].



•When the [New Module] screen is displayed, input the information below.

(1) Name: Enter the required name.

(2) Module Description: Input/Output data size which is actually configured when the [Change] button is pressed.

\*: When connecting to a Rockwell Automation PLC, the maximum Input/Output size is as follows

•Input: 500 bytes, Output: 496 bytes

When using PLCs other than those manufactured by Rockwell Automation, please contact the PLC manufacturer for the maximum input/output size.

(3) IP Address: The IP address setting for the AMS Hub.

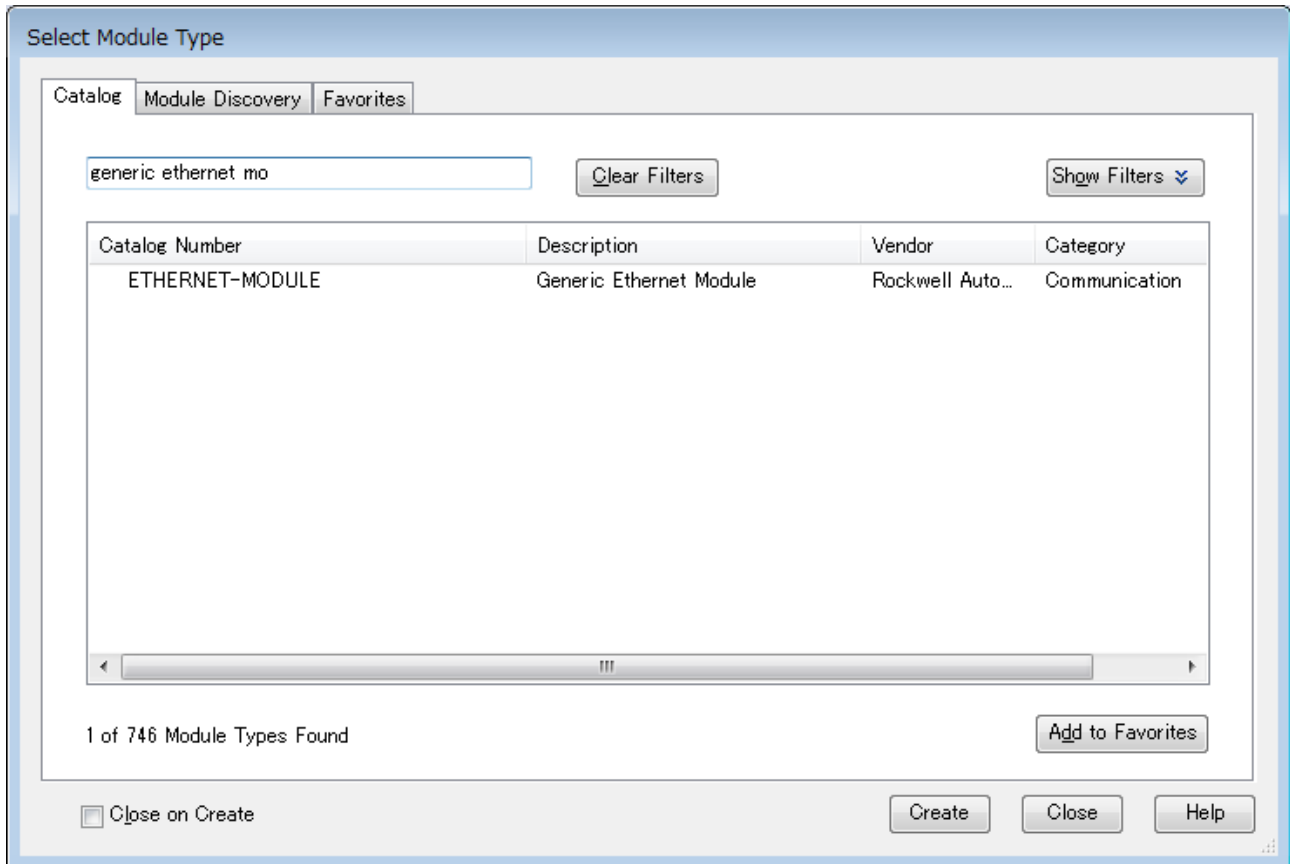
(1) Name: Enter the required name.

(2) Module Description: Input/Output data size which is actually configured when the [Change] button is pressed.

(3) IP Address: The IP address setting for the AMS Hub.

## 2. Example of setting using the Generic Ethernet Module

- Right-click on the selection [Ethernet] in the [I/O Configuration] folder, and select [New Module].
- The [Select Module Type] screen is displayed. Select [Generic Ethernet Module] and select [Create].



•The [Module Properties] screen is displayed, to perform setup.

- (1) Name: Enter the required name.
- (2) Select the data format of Comm: Connection Parameters.
- (3) IP Address: Enter the IP address setting for the AMS Hub.
- (4) Assembly Instance: Perform setting as shown below.

Description	Decimal	
Common Format	"Data-INT"	"Data-SINT"
Input	100	100
Output	150	150
Configuration	105	105

(5) Size: Perform setting as shown below.

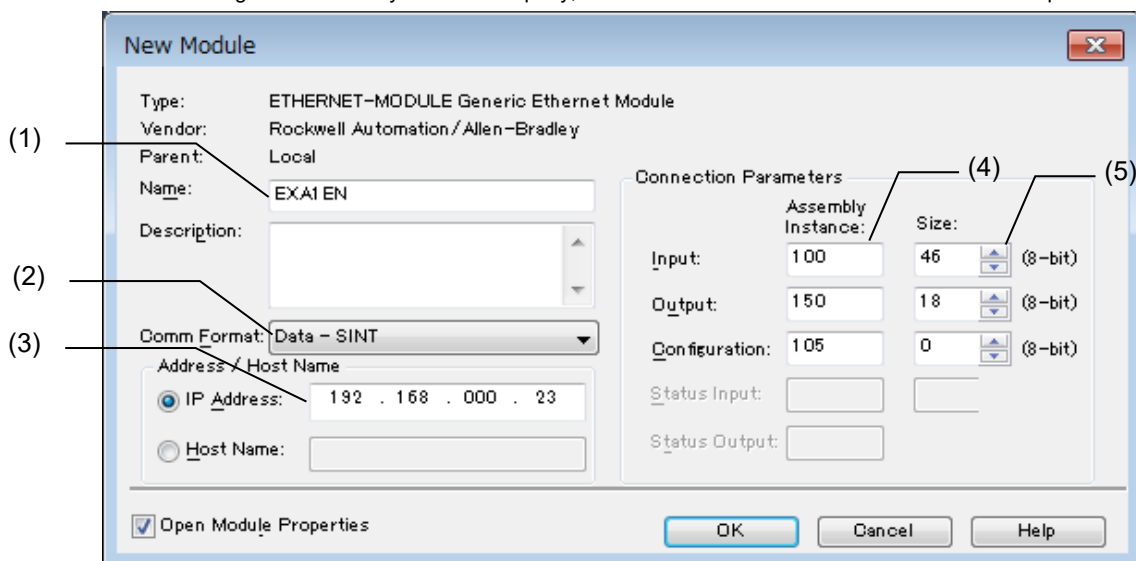
Description	Decimal	
Common Format	"Data-INT"	"Data-SINT"
Input *	MIN. 1 word MAX. 250 words	MIN. 2 byte MAX. 500 byte
Output *	MIN. 1 word MAX. 248 words	MIN. 2 byte MAX. 496 byte
Configuration	0	

\*: Select the setting according to the system configuration (number of paired remote).

\*: When the EXA1 connects to the PLC made by Rockwell Automation, Inc., the maximum size of input and output are as follows.

- Input: 500 bytes
- Output 496 bytes

In the case of using a PLC made by another company, contact the PLC maker about maximum size of input and output.





## Hardware Configuration (EtherCAT)

The address is automatically recognized and allocated to the EtherCAT product during configuration.  
(There is no need for the user to set an address)  
Make sure to use the ESI file for EXA1 to perform configuration.

### ■ ESI file

The ESI file is required to configure the EXA1.  
The file can be downloaded from the SMC website.

•URL: <https://www.smcworld.com>

Product Document → Instruction Manual

### ■ Setting using TwinCAT® System Manager

The following describes how to connect the EXA1 to a PC with TwinCAT® System Manager installed.  
Refer to the manual of TwinCAT® System Manager for details of the operating method.

#### • ESI file installation

(1) Copy the ESI file for the EX600 to the following folder.

C:\TwinCAT\IO\EtherCAT

(\*: This path is valid only when the folder for TwinCAT® System Manager is installed in the default folder location.)

(2) Start up the TwinCAT® System Manager.

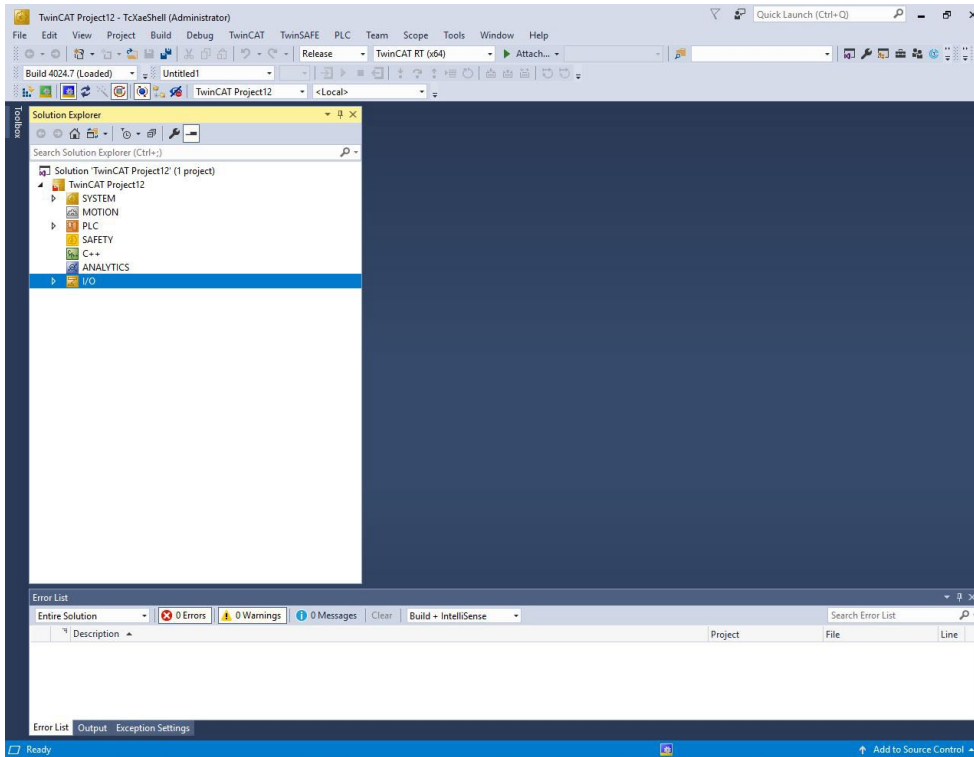
#### • Registration to the network

When registering the EXA1 on the network, there are two methods available, as follows.

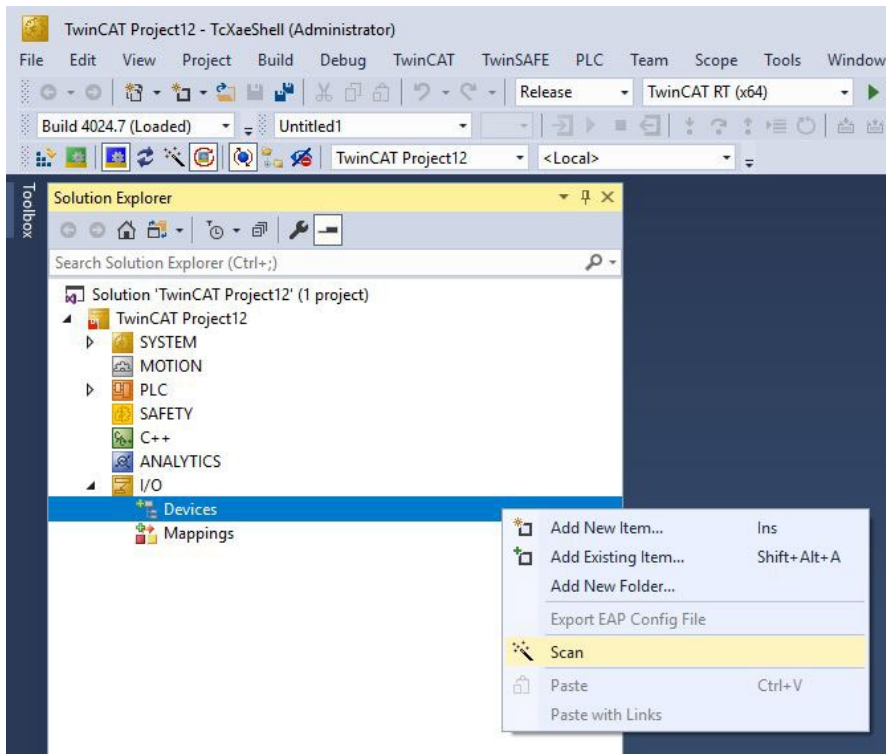
•On-line Auto Configuration

•Off-line Manual Configuration

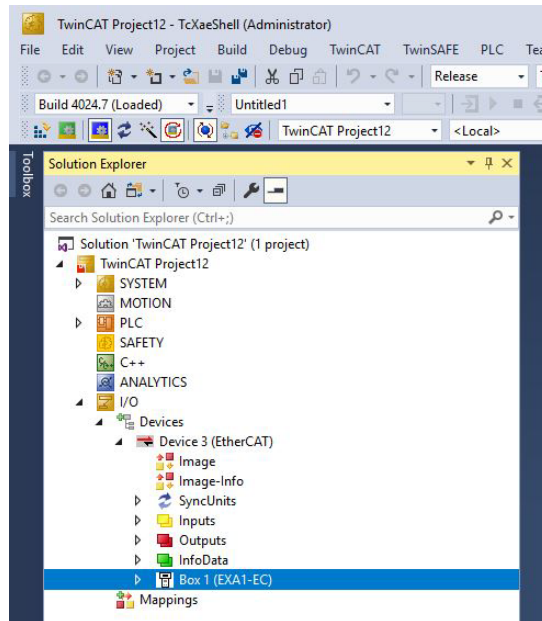
- On-line Auto Configuration
- Start the TwinCAT® System Manager. The following screen is then displayed.



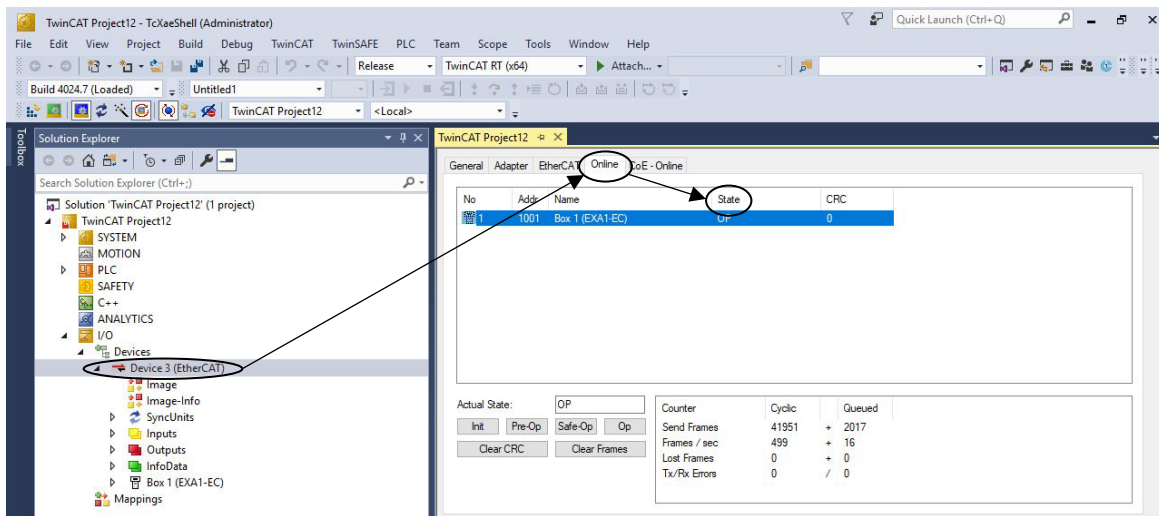
- Connect the unit to the network and supply the power.
- Right click the [Devices] file, and then left click the [Scan] file from the pop up menu.



- Once the scan is successfully completed, [Box 1 (EXA1-EC)] is displayed as shown in the screen below. (example for when only one EXA1-EC is connected to the network.)



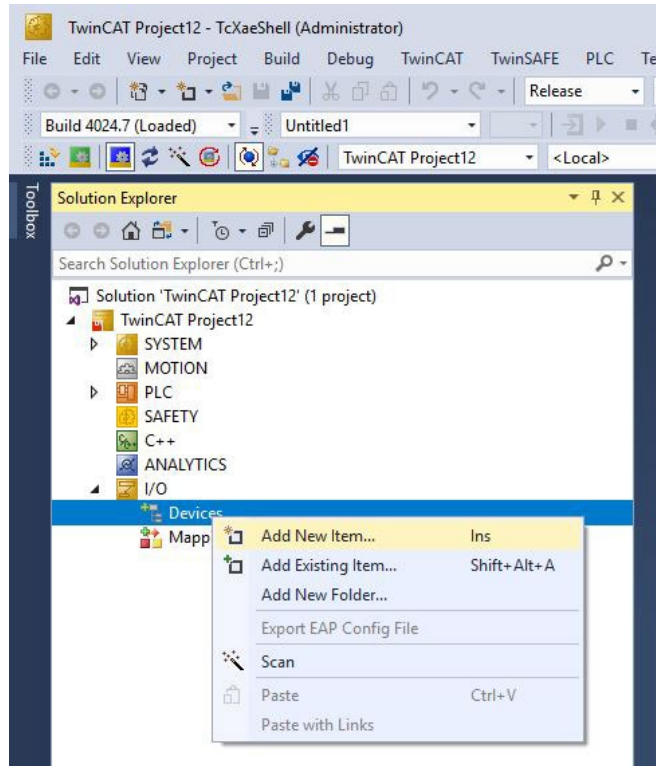
- The communication status can be checked under [State] in [Online] by selecting [Device3(EtherCat)].



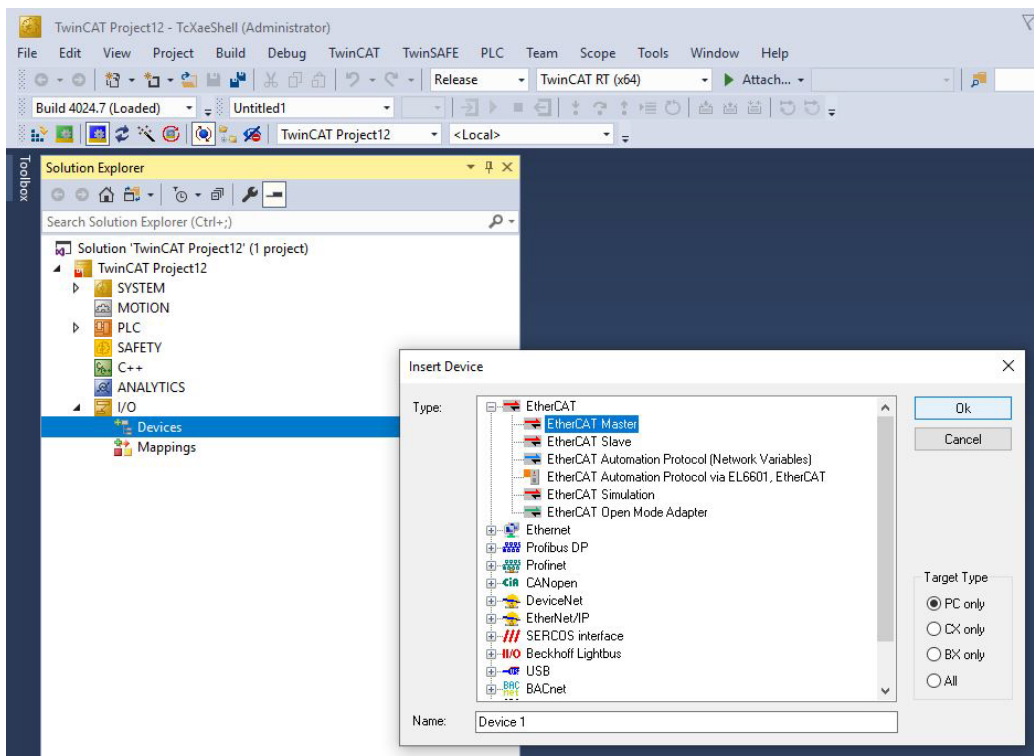
- The LED indications for normal communication are as follows.

Device	Display	Operation
EXA1-#-EC-#L	ST	Green ON
	DIAG	OFF
	PWR	Green ON
	MODE	Depends on operating mode
	SIG	Depends on input signal
	L/A1 L/A2	Green flicking (when communication cable is connected)
TwinCAT® System Manager	State	OP (Operational mode)

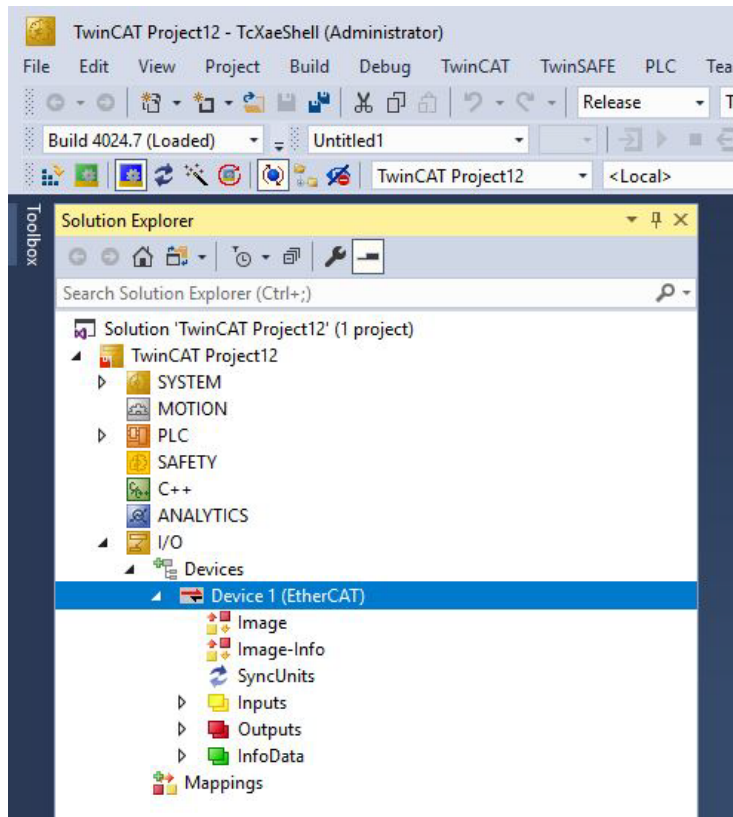
- Off-line manual configuration method
- Right click the [Devices] file in [I/O], and then left click [Add New Item] from the pop up menu.



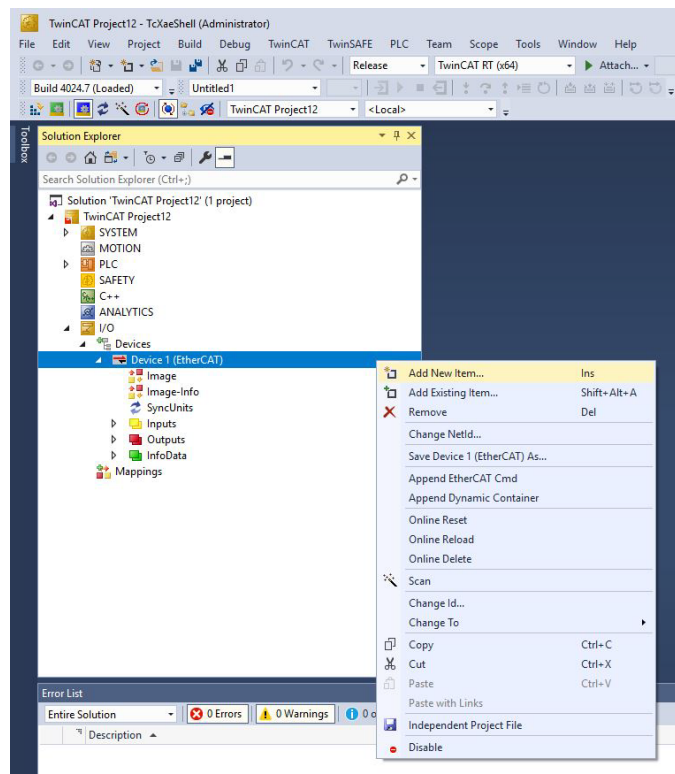
- The [Insert Device] window will be displayed. Left click the [+] button of the [EtherCAT] file, then left click the newly displayed [EtherCAT Master] file, and left click the [OK] button.



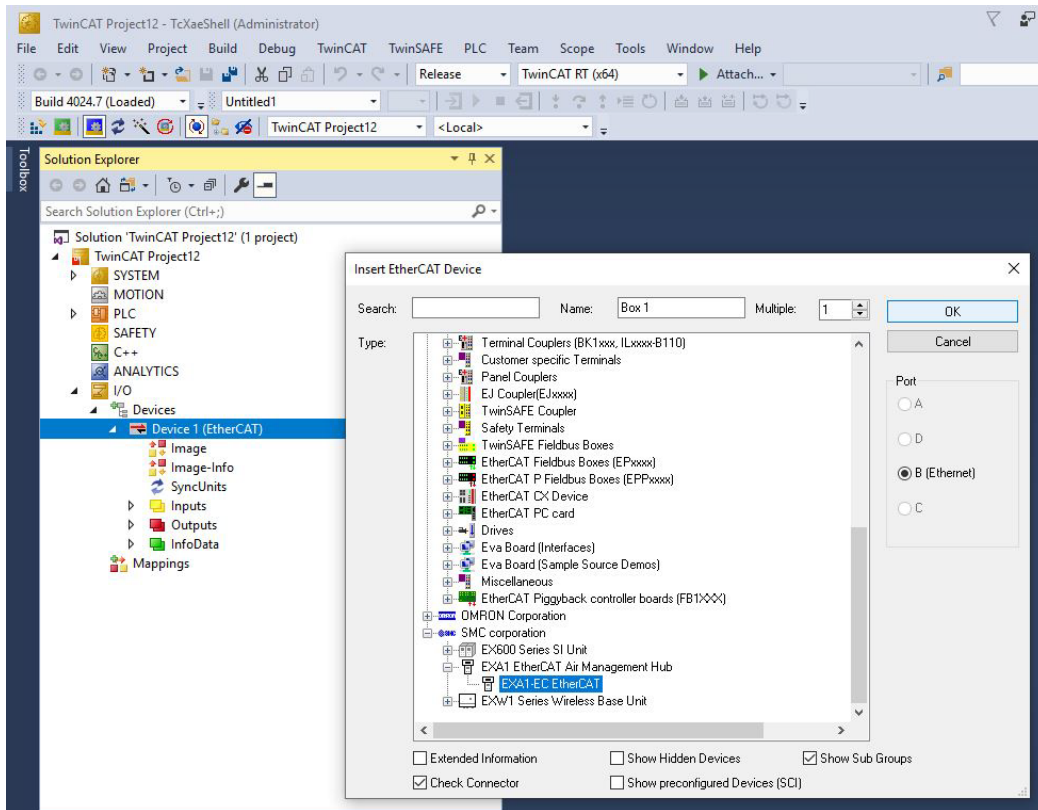
- [Device1(EtherCAT)] file will be added under the [I/O Devices].



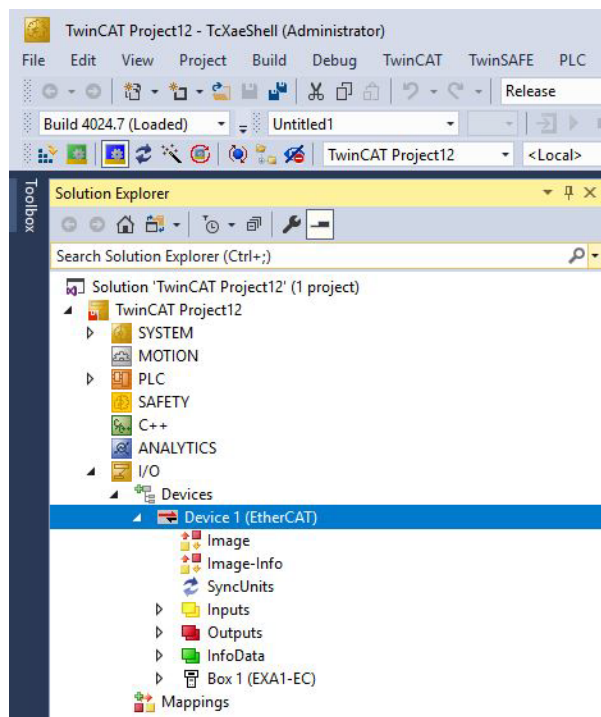
- Right click the [Device1(EtherCAT)] file, and then left click the [Add New Item] file from the pop up menu.



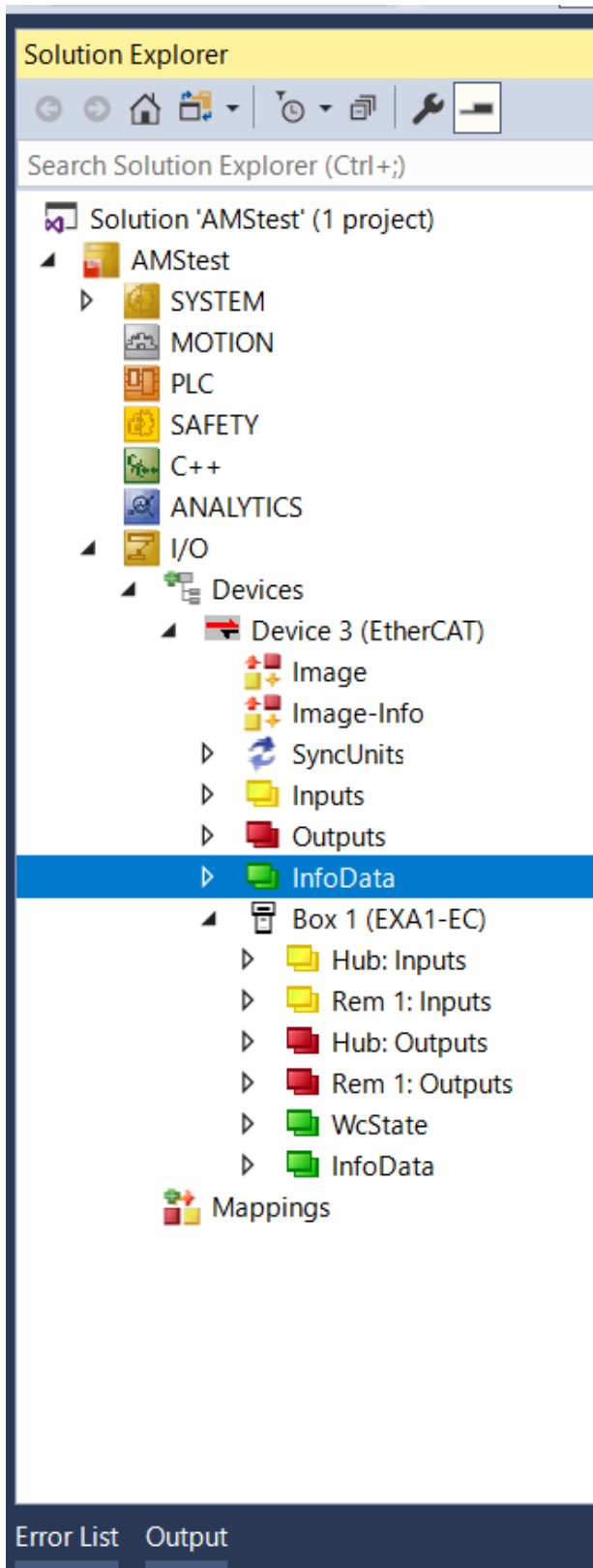
- The [Insert EtherCAT Device] window will be displayed.  
Left click the [+] button of the [SMC Corporation] file, left click the [+] button of the [EXA1 EtherCAT Air Management Hub], left click the [EXA1-EC EtherCAT] file, and then left click the [OK] button.



- [Box1(EXA1-EC)] file will be added under the [Device1(EtherCAT)] file.



- Left click the [▶] button of the [Box1 (EXA1-EC)] file.





•Left click the [>] button of the [Hub: Inputs] file.

Screenshot of Solution Explorer showing the file structure for Box 1 (EXA1-EC) under Hub: Inputs. The files are grouped into three categories: SYSDIAG, Hub\_0: Air Management, and Hub\_1: IO-Link. Brackets on the right side of the list point to three callout boxes explaining the byte ranges for each group.

These correspond to Byte0 to Byte9 listed in the input map AMS base of the IO map.

These correspond to Byte10 to Byte29 listed in the input map AMS base of the IO map.

These correspond to Byte30 to Byte45 listed in the input map AMS base of the IO map.  
\*: Hub\_1: IO-Link Byte0 to Byte15 are displayed here.

\*: Refer to page 79 for IO map.



- Left click the [>] button of the [Hub: Outputs] file.

The screenshot shows the Solution Explorer window with the following tree structure:

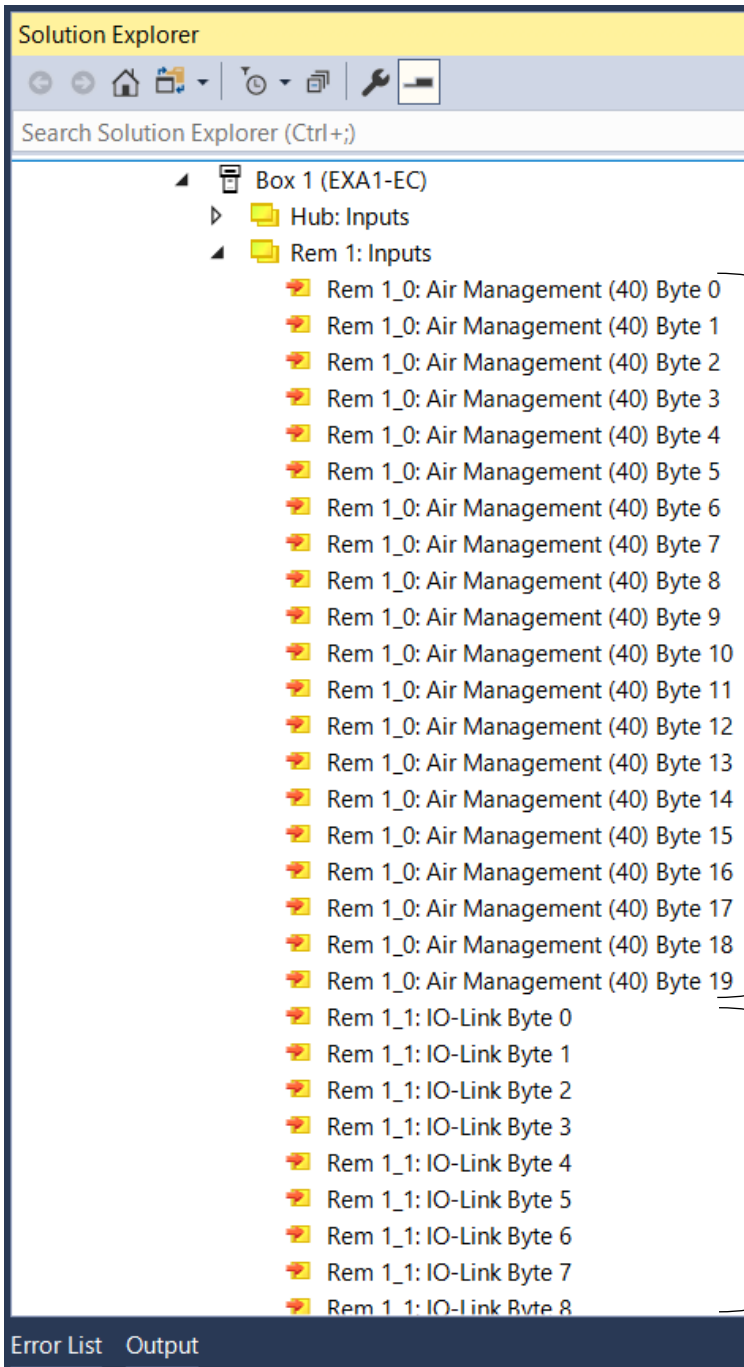
- Image-Info
- SyncUnits
- Inputs
- Outputs
- InfoData
- Box 1 (EXA1-EC)
  - Hub: Inputs
  - Rem 1: Inputs
  - Hub: Outputs
    - Hub\_0: Air Management (30) Byte 0
    - Hub\_0: Air Management (30) Byte 1
    - Hub\_1: IO-Link Byte 0
    - Hub\_1: IO-Link Byte 1
    - Hub\_1: IO-Link Byte 2
    - Hub\_1: IO-Link Byte 3
    - Hub\_1: IO-Link Byte 4
    - Hub\_1: IO-Link Byte 5
    - Hub\_1: IO-Link Byte 6
    - Hub\_1: IO-Link Byte 7
    - Hub\_1: IO-Link Byte 8
    - Hub\_1: IO-Link Byte 9
    - Hub\_1: IO-Link Byte 10
    - Hub\_1: IO-Link Byte 11
    - Hub\_1: IO-Link Byte 12
    - Hub\_1: IO-Link Byte 13
    - Hub\_1: IO-Link Byte 14
    - Hub\_1: IO-Link Byte 15
  - Rem 1: Outputs
  - WcState
  - InfoData
- Mappings

Two callout boxes provide context for the 'Hub: Outputs' files:

- The first box, pointing to 'Hub\_0: Air Management (30) Byte 0' and 'Hub\_0: Air Management (30) Byte 1', states: "These correspond to Byte0 to Byte1 listed in the output map AMS base of the IO map."
- The second box, pointing to the 'Hub\_1: IO-Link Byte' files from 0 to 15, states: "These correspond to Byte2 to Byte17 listed in the output map AMS base of the IO map."

\*: Refer to page 79 for IO map.

•If AMS Hub (remote type) is paired, left click the [▶] button of the [Rem1: Inputs] file.



These correspond to Byte0 to Byte19 listed in the input map AMS remote of the IO map.

These correspond to Byte20 to Byte35 listed in the input map AMS remote of the IO map.  
 \*: Rem1\_1: IO-Link Byte0 to Byte15 are displayed here.

\*: Refer to page 79 for IO map.

•If AMS Hub (remote type) is paired, left click the [▶] button of the [Rem1: Outputs] file.

Solution Explorer

Search Solution Explorer (Ctrl+;)

- Image-Info
- SyncUnits
- Inputs
- Outputs
- InfoData
- Box 1 (EXA1-EC)
  - Hub: Inputs
  - Rem 1: Inputs
  - Hub: Outputs
  - Rem 1: Outputs
    - Rem 1\_0: Air Management (40) Byte 0
    - Rem 1\_0: Air Management (40) Byte 1
    - Rem 1\_1: IO-Link Byte 0
    - Rem 1\_1: IO-Link Byte 1
    - Rem 1\_1: IO-Link Byte 2
    - Rem 1\_1: IO-Link Byte 3
    - Rem 1\_1: IO-Link Byte 4
    - Rem 1\_1: IO-Link Byte 5
    - Rem 1\_1: IO-Link Byte 6
    - Rem 1\_1: IO-Link Byte 7
    - Rem 1\_1: IO-Link Byte 8
    - Rem 1\_1: IO-Link Byte 9
    - Rem 1\_1: IO-Link Byte 10
    - Rem 1\_1: IO-Link Byte 11
    - Rem 1\_1: IO-Link Byte 12
    - Rem 1\_1: IO-Link Byte 13
    - Rem 1\_1: IO-Link Byte 14
    - Rem 1\_1: IO-Link Byte 15
  - WcState
  - InfoData
- Mappings

Error List Output

These correspond to Byte0 to Byte1 listed in the output map AMS remote of the IO map.

These correspond to Byte2 to Byte17 listed in the output map AMS remote of the IO map.

\*: Refer to page 79 for IO map.

## I/O map

### ○ Input map

#### • AMS Base

Byte	Bit								Note
	7	6	5	4	3	2	1	0	
0	System diagnostic information 1								Refer to Standard EX600-W system diagnostics
1	System diagnostic information 2								
2	System diagnostic information 3								
3	System diagnostic information 4								
4	Remote connection information 1								
5	Remote connection information 2								
6	Remote diagnostic information 1								
7	Remote diagnostic information 2								
8	Remote registration information 1								
9	Remote registration information 2								
10	Accumulated flow [high word]								Unit: 10 L or ft <sup>3</sup>
11									
12	Accumulated flow [low word]								
13									
14	Instantaneous flow [high byte]								Unit: L/min
15	Instantaneous flow [low byte]								
16	Fluid temperature [high byte]								Unit: 0.1 °C
17	Fluid temperature [low byte]								
18	Pressure [high byte]								Unit: kPa
19	Pressure [low byte]								
20	System error	Error	Forced output	Pressure diagnostic	Temperature diagnostic	Flow rate diagnostic	Flow reference condition	Accumulated flow unit	

Byte	Bit								Note
	7	6	5	4	3	2	1	0	
21	AMS status								00HEX: Initialising 01HEX: Operation mode 11HEX: Forced Operation mode from button 02HEX: Waiting for standby signal 03HEX: Standby mode 13HEX: Forced Standby mode from button/OPC UA 23HEX: Force Standby mode from PLC/OPC UA 04HEX: Isolation mode 14HEX: Force Isolation from button/web 24HEX: Force isolation mode from PLC/OPC UA/Digital Input
22	ITV control pressure measurement value [high byte]								Unit : kPa
23	ITV control pressure measurement value [low byte]								
24	ITV diagnostic data [high byte]								
25	ITV diagnostic data [low byte]								
26	Reserved				Port 3 short circuit	VP short circuit	Air Management Hub internal error 2	Air Management Hub internal error 1	
27	ITV-PQI								
28	Port 4 PQI								
29	X2 (Port 4 input)	X4 (Port 4 input)	Isolation input signal (Port 3)	Standby input signal (Port 3)	Reserved				
30 to 45	Port 4 IO-Link process data								
46	Remote 1 data								
:	:								
:	:								
:	Remote 10 data								

### •Byte 20 Details

Bit	Description	Value
0	Accumulated flow unit	0: L 1: ft <sup>3</sup>
1	Flow Reference Condition	0: STD 1: NOR
2	Flow rate diagnostic	0: Normal 1: HHH
3	Temperature diagnostic	0: Normal 1: HHH/LLL
4	Pressure diagnostic	0: Normal 1: HHH/LLL
5	Force AMS mode	0: No forced 1: Forced
6	Error	0: Normal 1: Abnormal
7	System error	0: Normal 1: Abnormal

• Byte 24 and 25 Details

Bit	Description	Value
0	SSC1	1: Output pressure value is within $\pm 10\%$ of the target value. 0: Other than the above case.
1	Reserved	
2		
3	Notification of the accumulated energizing time	1: The accumulated energizing time reaches the set value. 0: Other than the above case.
4	Residual pressure error	1: The output pressure value exceeds the specified value at the time of zero-clear. 0: Other than the above case.
5	Target vale over range	1: The target value exceeds the specified value. 0: Other than the above case.
6	Pressure value under range (LLL)	1: The output pressure value is below the specified value. 0: Other than the above case.
7	Pressure value over range (HHH)	1: The output pressure value exceeds the specified value. 0: Other than the above case.
8	Decline in the power supply voltage	1: The power supply voltage is below the specified value. 0: Other than the above case.
9	Excessive power supply voltage	1: The power supply voltage exceeds the specified value. 0: Other than the above case.
10	Alarm generation	1: Any one of bits 4 to 9 is "1". 0: Bit 4 to 9 of the Bit offset are "0".
11	Internal communication error	1: Error 0: No error
12	Built-in solenoid valve error	1: Error 0: No error
13	Internal system error	1: Error 0: No error
14	EEPROM error	1: EEPROM error 0: No error
15	Error	1: Any one of bits 11 to 14 is "1". 0: Bit 11 to 14 of the Bit offset are "0".

### •Byte 26 Details

Bit	Description	Details	Value
0	Air Management Hub internal error 1	L+ short circuit or P24 short circuit	0: No short circuit 1: Short circuited
1	Air Management Hub internal error 1	Port communication status	0: Device not connected 1: Operate or Pre-operate
2	VP short circuit	VP short circuit detection	0: No short circuit 1: Short circuited
3	Reserved		
4			
5			
6			
7			

### •Byte 27 and 28 Details

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Description	PQ	Dev-Err	Dev-Com	DSSstatus	CQ-Short	Pwr-Short	PDmapping-Mismatch	ID-Mismatch

Bit	Description	Details	Value
0	ID-Mismatch	Connection device matching error	0: Match 1: Mismatch
1	Pdmapping-Mismatch	Process data mapping size error	0: In size 1: Exceeding size
2	PwrShort	L+ short circuit or P24 short circuit	0: No short circuit 1: Short circuited
3	CQShort	C/Q short circuit	0: No short circuit 1: Short circuited
4	DSSstatus	Data storage (DS) save status	0: DS saved data error, no DS data 1: DS saved data is valid
5	DevCom	Port communication status	0: Device not connected 1: Operate or Pre-operate
6	DevErr	Event status (Device or master event status)	0: No event or notification 1: Warning or Error
7	PQ	Received input process data Valid (normal)/invalid (abnormal)	0: Invalid (abnormal) 1: Valid (normal)



•AMS Remote

Byte	Bit								Note
	7	6	5	4	3	2	1	0	
0	Accumulated flow [high word]								Unit: 10 L
1									
2	Accumulated flow [low word]								
3									
4	Instantaneous flow [high byte]								Unit: L/min
5	Instantaneous flow [low byte]								
6	Fluid temperature [high byte]								Unit: 0.1 °C
7	Fluid temperature [low byte]								
8	Pressure [high byte]								Unit: kPa
9	Pressure [low byte]								
10	System error	Error	Forced output	Pressure diagnostic	Temperature diagnostic	Flow rate diagnostic	Flow reference Condition	Accumulated flow unit	
11	AMS status								00HEX: Initialising 01HEX: Operation mode 11HEX: Forced Operation mode from button 02HEX: Waiting for standby signal 03HEX: Standby mode 13HEX: Forced Standby mode from button/OPC UA 23HEX: Force Standby mode from PLC/OPC UA 04HEX: Isolation mode 14HEX: Force Isolation from button/web 24HEX: Force isolation mode from PLC/OPC UA/Digital Input

Byte	Bit								Note
	7	6	5	4	3	2	1	0	
12	ITV control pressure measurement value [high byte]								Unit: kPa
13	ITV control pressure measurement value [low byte]								
14	ITV diagnostic data [high byte]								
15	ITV diagnostic data [low byte]								
16	Reserved				Port 3 short circuit	VP short circuit	Air Management Hub internal error 2	Air Management Hub internal error1	
17	ITV-PQI								
18	Port 4 PQI								
19	X2 (Port4 input)	X4 (Port 4 input)	Isolation input signal (Port 3)	Standby input signal (Port 3)	Reserved				
20 to 35	Port 4 IO-Link process data								

○Output mapping

•AMS Base

Byte	Bit							
	7	6	5	4	3	2	1	0
0	Reserved				Isolation input signal for NO system	Isolation input signal for NC system	F-Standby	Standby
1	Reserved	Port 4 Digital Output	Reserved					
2	Port 4 IO-Link process data							
:								
17								
18	Wireless Remote 1							
:	:							
:	Wireless Remote 10							

•Byte 0 Details

Bit	Description	Details	Value
0	Standby	Standby signal	0: Standby signal OFF 1: Standby signal ON
1	F-Standby	Forced standby signal	0: Forced standby signal OFF 1: Forced standby signal ON
2	Isolation input signal for NC system	Manual Isolation for NC System Available only if DIP switch configured as NC.	0: Exhaust air (ITV and VP_OFF) 1: Supply Air (ITV_ON and VP_ON)
3	Isolation input signal for NO system	Manual Isolation for NO System Available only if DIP switch configured as NO.	0: Supply Air (ITV_ON and VP_OFF) 1: Exhaust air (ITV_OFF and VP_ON)
4	Reserved		
5			
6			
7			

•AMS Remote

Byte	Bit							
	7	6	5	4	3	2	1	0
0	reserved				Isolation input signal for NO system	Isolation input signal for NC system	F-Standby	Standby
1	Reserved	Port 4 Digital Output	Reserved					
2	Port 4 IO-Link process data							
:								
17								

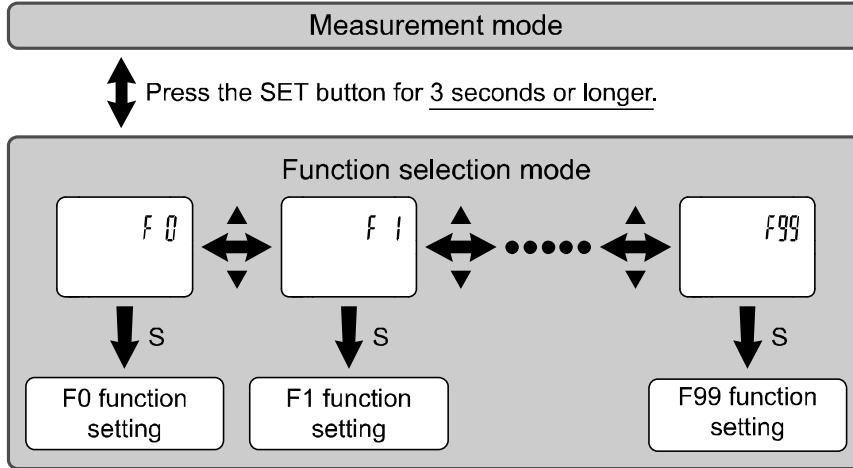
## Function Setting on Hub Display

### ■ Function selection mode

In this mode, each function setting can be changed separately.

**In measurement mode, press the SET button for 3 seconds or longer to display [F 0].**

Press the UP or DOWN button to select the function to be changed.



Press the SET button for 2 seconds or longer to return to measurement mode.

## ■Default setting

Function			Default Settings Sub display (Right)	Applicable Page
Main display (Right)	Main display (Left)	Sub display (Left)		
[F 0]	FLoW	[rEF ] Select display units	[ Std] Standard condition	Page 89
	FLoW	[Unit] Units selection function *1	[ L] L/min	
	tEMP		[ C] °C	
	PrES		[ MPA] MPa	
[F 1]	[SW1 ] Not Applicable on this product.			
[F 2]	[SW2 ] Not Applicable on this product.			
[F 3]	FLoW	[FIL ] Select digital filter	[ 1.0] 1 second	Page 91
	PrES		[0.10] 0.1 second	
[F 6]	PrES	[FSC ] Display value fine adjustment	[ 0.0] 0%	Page 92
[F13]	-	[rEv ] Select reverse display	[ oFF] Reverse display OFF	Page 93
[F14]	FLoW	[CUt ] Select Zero cut-off setting	[ 1.0] 1%F.S. cut	Page 94
	PrES		[ 0.0] 0%	
[F16]	PrES	[MES ] Measurement display setting	[diSP] Display	Page 97
	tEMP		[diSP] Display	
	AC		[diSP] Display	
[F30]	AC	[SAVe] Accumulated value hold	[ oFF] Not stored	Page 98
[F33]	[Po_E] Not Applicable on this product.			
[F40]	-	[FrTE] Standby flow rate (Threshold)	[25] AMS series [50] AMS30 series [100] AMS40 series [200] AMS60 series	Page 99
	-	[FHYS] Standby flow rate (Hysteresis)	[100] AMS20 series [200] AMS30 series [300] AMS40 series [400] AMS60 series	
	-	[t_on] Standby ON delay	[600] 600 seconds	
	-	[t_oFF] Standby OFF delay	[0] 0 second	
	-	[iSoL] Auto isolation	[OFF] Auto isolation OFF	
	-	[t_iSo] Isolation delay	[3600] 3600 seconds	
[F41]	-	[SEt] Force AMS mode	[AMS] No Forced [oP] Forced Operation mode [Sb] Forced Standby mode [iSoL] Forced Isolation mode	Page 102
[F80]	-	[diSP] Display OFF mode	[ on] Display ON	Page 103
[F81]		[Pin ] Security code	[ oFF] Not used	Page 104
[F90]		[ALL ] Setting of all functions	[ oFF] Not used	Page 106
[F96]		[CYCL] Check of cycle time	[- - - -] No input signal	Page 107
[F98]		[tEST] Setting of output check	[ n] Normal output	Page 108
[F99]		[ini ] Reset to the default settings	[ oFF] Not used	Page 112

\*1 : Setting is only possible for models with the units selection function.

## ■[F 0] Reference condition/Units selection function

### **Reference condition**

Standard condition or normal condition can be selected.

Standard condition and normal condition are defined as follows:

- Standard condition: Displayed flow rate which is converted to volume at 20 °C, 101.3 kPa (absolute pressure).
- Normal condition: Displayed flow rate which is converted to volume at 0 °C, 101.3 kPa (absolute pressure).

### **Units selection function**

This setting is only available for models with the units selection function.

\*: kPa/MPa can be selected if the product does not have the unit selection function.

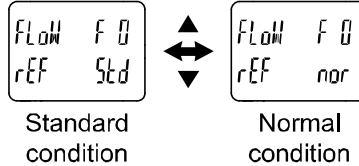
**<Operation>**

Display [F 0] by pressing the UP or DOWN button in function selection mode.

Press the SET button. ↓ Move on to the reference condition.

**Reference condition**

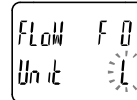
Press the UP or DOWN button to select the reference condition.



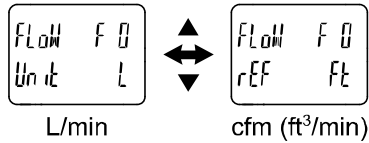
Press the SET button to set. ↓ Move on to the units selection function.  
(For units selection type)

**Units selection function**

Press the UP or DOWN button to select the display units.

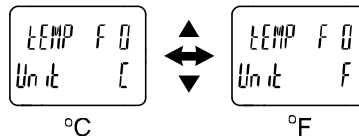


1) Flow rate



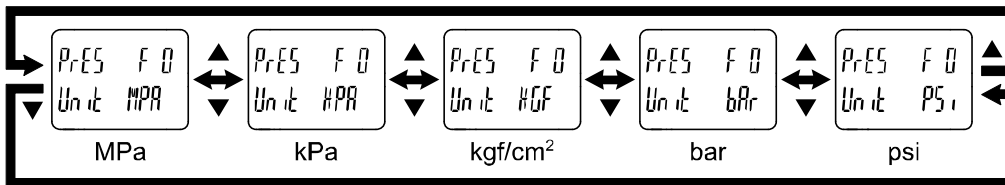
Press the SET button to set. ↓

2) Temperature



Press the SET button to set. ↓

3) Pressure



Press the SET button to set. ↓ Move on to switch output function.

[F 0] Reference condition/Units selection function is completed

## ■[F 3] Select digital filter

The digital filter can be selected to filter the flow rate and pressure measurement.  
Output chattering or display flicker in measurement mode can be reduced by setting the digital filter.

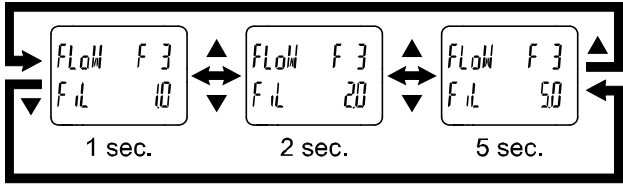
### <Operation>

Display [F 3] by pressing the UP or DOWN button in function selection mode.

Press the SET button. ↓ Move on to the select digital filter (flow rate).

**Select digital filter (flow rate)**

Press the UP or DOWN button to select the flow rate digital filter.

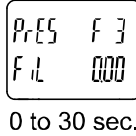


1 sec.      2 sec.      5 sec.

Press the SET button to set. ↓ Move on to the select digital filter (pressure).

**Select digital filter (pressure)**

Press the UP or DOWN button to select the pressure digital filter.  
Digital filter set range: 0.00 to 30.00 [s]



0 to 30 sec.

Press the SET button to set. ↓ Return to function selection mode.

[F 3] Digital filter setting is completed

- \*: Each set value is a guideline for 90% response time.
- \*: Both the switch output and flow display are affected.



## ■[F 6] Fine adjustment of display value

This function is used to manually perform a fine adjustment of the displayed pressure value. Pressure can be adjusted in the following range of  $\pm 5\%$ R.D.

### <Operation>

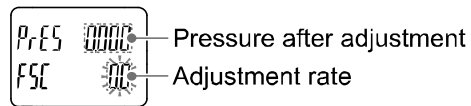
Display [F 6] by pressing the UP or DOWN button in function selection mode.

Press the SET button. ↓ Move on to the fine adjustment of display value.

#### Fine adjustment of display value

Press the UP or DOWN button to change adjustment rate.

When the adjustment rate is changed, the pressure value after the adjustment will be displayed on the main screen.



Press the SET button to set. ↓ Return to function selection mode.

[F 6] Fine adjustment of display value is completed

## ■[F13] Setting for reversed display mode

This function is used to rotate the display upside down.

It is used to correct the display when it is upside down due to installation of the product.

When the reversed display function is ON, the function of the UP/DOWN buttons are reversed.

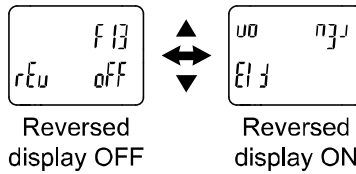
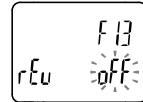
### <Operation>

Display [F13] by pressing the UP or DOWN button in function selection mode.

Press the SET button. ↓ Move on to the select reversed display.

#### Select reversed display

Press the UP or DOWN button to select reversed display.



Press the SET button to set. ↓ Return to function selection mode.

[F13] Setting for reversed display mode is completed

\*: When the reversed display function is ON, the characters of the sub display appear upside down.

## ■[F14] Zero cut-off setting

When the flow rate and pressure is close to zero, this function forces the display to zero.  
The zero cut-off range is 0.0 to 10.0%F.S., and can be set in 1.0%F.S. increments.

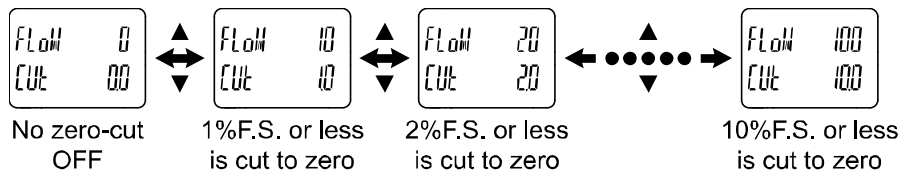
### <Operation>

Display [F14] by pressing the UP or DOWN button in function selection mode.

Press the SET button. ↓ Move on to the select zero cut-off setting (flow rate).

#### Select zero cut-off setting (flow rate)

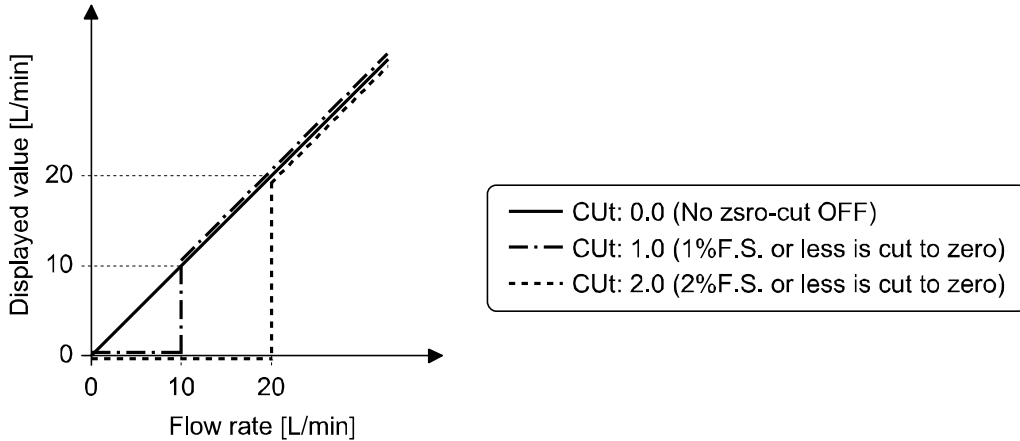
Press the UP or DOWN button to select the value of zero cut-off.



\*: The display above is an example of when [L] is selected for the PF3A801H (1000 L/min type) with the unit switching function.

\*: If the flow rate does not reach the above value, the display will be zero.

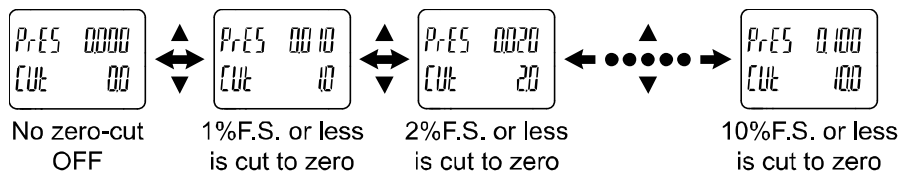
Example: PF3A801H (1000 L/min type)



Press the SET button to set. ↓ Move on to the select the zero cut-off setting (pressure).

#### Select zero cut-off setting (pressure)

Press the UP or DOWN button to select the value of Zero cut-off.



Press the SET button to set. ↓ Return to function selection mode.

[F14] Zero cut-off setting is completed

●Displayable flow rate range

Zero cut-off set	Zero cut-off range	Displayable flow range			
		AMS20	AMS30	AMS40	AMS60
0.0 *	0%F.S.	0 to 525 L/min	0 to 1050 L/min	0 to 2100 L/min	0 to 4200 L/min
1.0	0 to 1%F.S.	5 to 525 L/min (Displays 0 when the value is below 5 L/min)	10 to 1050 L/min (Displays 0 when the value is below 10 L/min)	20 to 2100 L/min (Displays 0 when the value is below 20 L/min)	40 to 4200 L/min (Displays 0 when the value is below 40 L/min)
2.0	0 to 2%F.S.	10 to 525 L/min (Displays 0 when the value is below 10 L/min)	20 to 1050 L/min (Displays 0 when the value is below 20 L/min)	40 to 2100 L/min (Displays 0 when the value is below 40 L/min)	80 to 4200 L/min (Displays 0 when the value is below 80 L/min)
3.0	0 to 3%F.S.	15 to 525 L/min (Displays 0 when the value is below 15 L/min)	30 to 1050 L/min (Displays 0 when the value is below 30 L/min)	60 to 2100 L/min (Displays 0 when the value is below 60 L/min)	120 to 4200 L/min (Displays 0 when the value is below 120 L/min)
4.0	0 to 4%F.S.	20 to 525 L/min (Displays 0 when the value is below 20 L/min)	40 to 1050 L/min (Displays 0 when the value is below 40 L/min)	80 to 2100 L/min (Displays 0 when the value is below 80 L/min)	160 to 4200 L/min (Displays 0 when the value is below 160 L/min)
5.0	0 to 5%F.S.	25 to 525 L/min (Displays 0 when the value is below 25 L/min)	50 to 1050 L/min (Displays 0 when the value is below 50 L/min)	100 to 2100 L/min (Displays 0 when the value is below 100 L/min)	200 to 4200 L/min (Displays 0 when the value is below 200 L/min)
6.0	0 to 6%F.S.	30 to 525 L/min (Displays 0 when the value is below 30 L/min)	60 to 1050 L/min (Displays 0 when the value is below 60 L/min)	120 to 2100 L/min (Displays 0 when the value is below 120 L/min)	240 to 4200 L/min (Displays 0 when the value is below 240 L/min)
7.0	0 to 7%F.S.	35 to 525 L/min (Displays 0 when the value is below 35 L/min)	70 to 1050 L/min (Displays 0 when the value is below 70 L/min)	140 to 2100 L/min (Displays 0 when the value is below 140 L/min)	280 to 4200 L/min (Displays 0 when the value is below 280 L/min)
8.0	0 to 8%F.S.	40 to 525 L/min (Displays 0 when the value is below 40 L/min)	80 to 1050 L/min (Displays 0 when the value is below 80 L/min)	160 to 2100 L/min (Displays 0 when the value is below 160 L/min)	320 to 4200 L/min (Displays 0 when the value is below 320 L/min)
9.0	0 to 9%F.S.	45 to 525 L/min (Displays 0 when the value is below 45 L/min)	90 to 1050 L/min (Displays 0 when the value is below 90 L/min)	180 to 2100 L/min (Displays 0 when the value is below 180 L/min)	360 to 4200 L/min (Displays 400 when the value is below 10 L/min)
10.0	0 to 10%F.S.	50 to 525 L/min (Displays 0 when the value is below 50 L/min)	100 to 1050 L/min (Displays 0 when the value is below 100 L/min)	200 to 2100 L/min (Displays 0 when the value is below 200 L/min)	400 to 4200 L/min (Displays 0 when the value is below 10 L/min)

\*: The zero-cut-off range of the accumulated value should be 1%F.S. or more. However, please note that if the zero-cut-off set value is 0.0, any value below 1%F.S. will be cut.

●Displayable pressure range

Zero cut-off set value	Zero cut-off range	Displayable pressure range
0.0	0%F.S.	-0.050 to 1.050 MPa
1.0	0 to 1%F.S.	-0.050 to -0.010 MPa 0.010 to 1.050 MPa (Displays 0 when the value is -0.009 to 0.009 MPa)
2.0	0 to 2%F.S.	-0.050 to -0.020 MPa 0.020 to 1.050 MPa (Displays 0 when the value is -0.019 to 0.019 MPa)
3.0	0 to 3%F.S.	-0.050 to -0.030 MPa 0.030 to 1.050 MPa (Displays 0 when the value is -0.029 to 0.029 MPa)
4.0	0 to 4%F.S.	-0.050 to -0.040 MPa 0.040 to 1.050 MPa (Displays 0 when the value is -0.039 to 0.039 MPa)
5.0	0 to 5%F.S.	-0.050 MPa 0.050 to 1.050 MPa (Displays 0 when the value is -0.049 to 0.049 MPa)
6.0	0 to 6%F.S.	0.060 to 1.050 MPa (Displays 0 when the value is below 0.060 MPa)
7.0	0 to 7%F.S.	0.070 to 1.050 MPa (Displays 0 when the value is below 0.070 MPa)
8.0	0 to 8%F.S.	0.080 to 1.050 MPa (Displays 0 when the value is below 0.080 MPa)
9.0	0 to 9%F.S.	0.090 to 1.050 MPa (Displays 0 when the value is below 0.090 MPa)
10.0	0 to 10%F.S.	0.100 to 1.050 MPa (Displays 0 when the value is below 0.100 MPa)

## ■[F16] Measurement display setting

Display/hide the measured accumulated flow rate, pressure, and temperature can be set.

### <Operation>

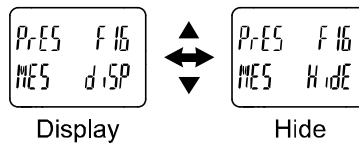
Display [F16] by pressing the UP or DOWN button in function selection mode.

Press the SET button. ↓ Move on to the measurement display setting.

#### Measurement display setting

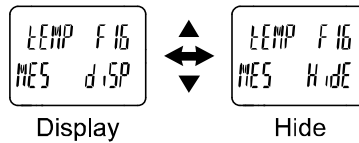
Press the UP or DOWN button to select the measurement display setting.

##### 1) Pressure



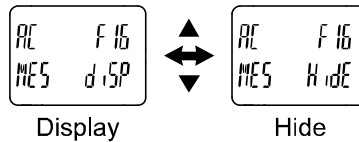
Press the SET button to set. ↓

##### 2) Temperature



Press the SET button to set. ↓

##### 3) Accumulated flow



Press the SET button to set. ↓ Return to function selection mode.

[F16] Setting of measurement display is completed

\*: When the temperature is set to "hide" and the integrated flow rate is set to "display", the maximum number of display digits for the accumulated flow rate is 9 digits.

## ■[F30] Setting of accumulated value hold

In the default setting, the accumulated flow value is not held when the power supply is turned off. This function enables the accumulated flow value to be stored in permanent memory every 2 or 5 minutes.

\*: When using the accumulated value hold function, calculate the product life from the operating conditions, and use the product within its life. Maximum updating time of the accumulated value is 1.5 million times.

If the product is operated 24 hours per day, the product life will be as follows.

- Data memorized every 5 minutes: 5 minutes x 1.5 million times = 7.5 million minutes = 14.3 years
- Data memorized every 2 minutes: 2 minutes x 1.5 million times = 3 million minutes = 5.7 years

If the accumulated flow external reset is repeatedly used, the product life will be shorter than calculated life.

### <Operation>

Display [F30] by pressing the UP or DOWN button in function selection mode.

Press the SET button. ↓ Move on to the select accumulated value hold.

**Select accumulated value hold**

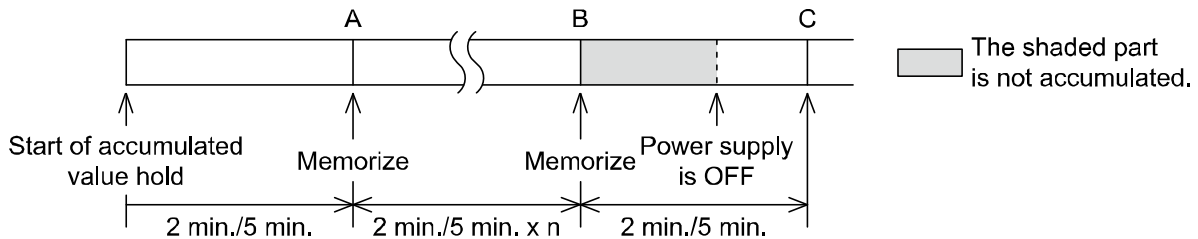
Press the UP or DOWN button to select the accumulate value hold.

Press the SET button to set. ↓ Return to function selection mode.

[F30] Setting of accumulated value hold is completed

\*: The value is stored in memory every 2 or 5 minutes. If the power supply is turned off, the accumulated flow since the last time it was stored will be lost.

\*: When the power supply is turned on again, the accumulated flow count will start from the last value recorded at B.



## ■[F40] Setting for standby/auto isolation function

This is the function to set the parameters for standby mode.

### <Operation>

Display [F40] by pressing the UP or DOWN button in function selection mode.

Press the SET button. ↓ Move on to the standby flow rate (Threshold)

#### Setting of standby flow rate (Threshold)

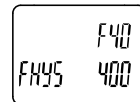
Set the value based on the setting method on page 101.  
For the parameter setting range, refer to page 127.



Press the SET button. ↓ Move on to the standby flow rate (Hysteresis)

#### Setting of standby flow rate (Hysteresis)

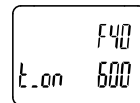
Set the value based on the setting method on page 101.  
For the parameter setting range, refer to page 127.



Press the SET button. ↓ Move on to the standby ON delay

#### Setting of standby ON delay

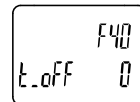
Set the value based on the setting method on page 101.  
For the parameter setting range, refer to page 127.



Press the SET button. ↓ Move on to the standby OFF delay

#### Setting of standby OFF delay

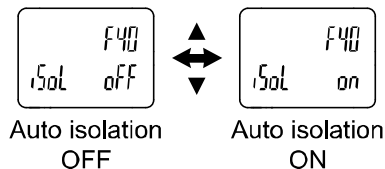
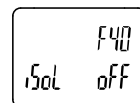
Set the value based on the setting method on page 101.  
For the parameter setting range, refer to page 127.



Press the SET button. ↓ Move on to the auto isolation

#### Setting of auto isolation

Select auto isolation OFF or ON with UP or DOWN button.



Auto isolation OFF  
Press the SET button to set.  
Return to function selection mode.

Auto isolation ON  
Press the SET button to set.  
Move on to the auto isolation delay.



**Setting of auto isolation delay**

Set the value based on the setting method on page 101.  
For the parameter setting range, refer to page 127.

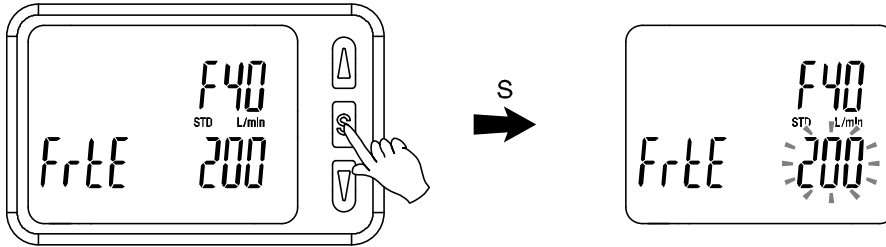


Press the SET button to set. ↓ Return to function selection mode.

[F40] Setting for standby/auto isolation function is completed

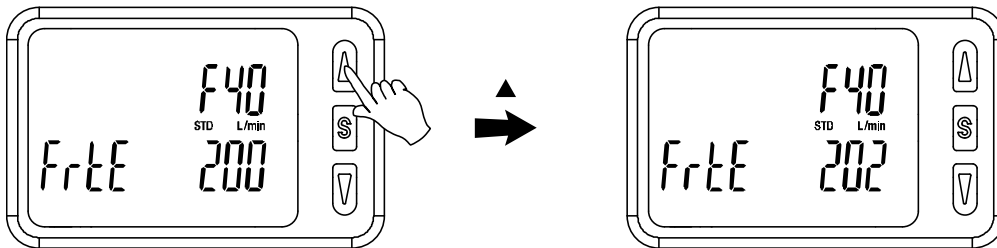
•How to set the value with buttons.

- (1) Press the SET button once when the item to be changed is displayed on the display.  
The set value on the sub display (right) will start flashing.

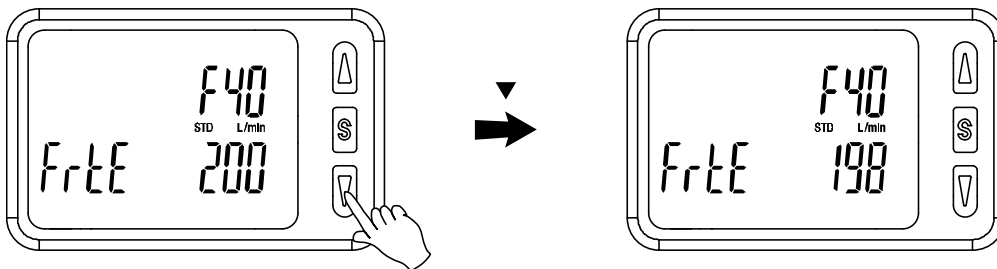


- (2) Press the UP or DOWN button to change the set value.  
The UP button is to increase and the DOWN button is to decrease the set value.

•Press the UP button once to increase the value by one digit, press and hold to continuously increase.



•Press the DOWN button once to reduce the value by one digit, press and hold to continuously reduce.



- (3) Press the SET button to complete the setting.

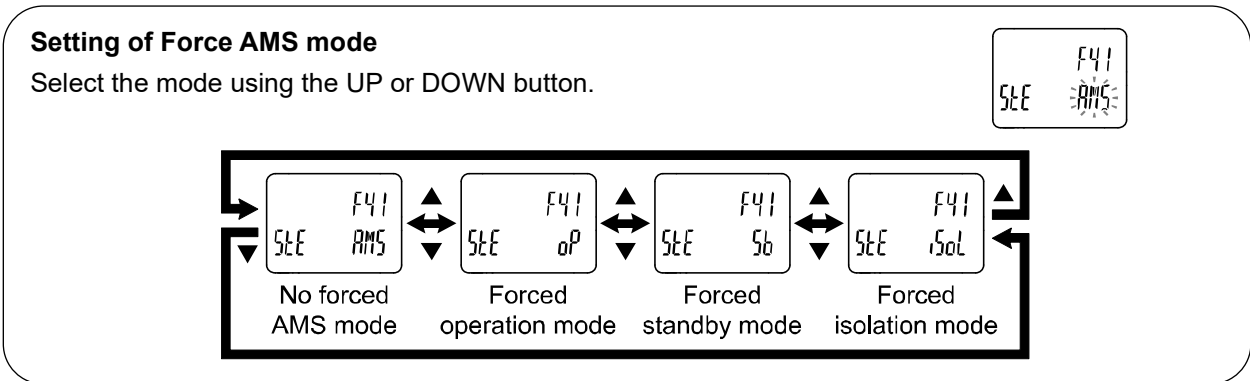
## ■[F41] Setting of Force AMS mode

Regardless of the conditions and parameters, this function will force the AMS into the selected mode.

### <Operation>

Display [F41] by pressing the UP or DOWN button in function selection mode.

Press the SET button. ↓ Move on to the setting of Force AMS mode.



Press the SET button to set. ↓ Return to function selection mode.

[F41] Setting of Force AMS mode is completed

## ■[F80] Setting of display OFF mode

This function will turn the display OFF if no buttons are pressed for 30 seconds.

### <Operation>

Display [F80] by pressing the UP or DOWN button in function selection mode.

Press the SET button. ↓ Move on to the select display OFF mode.

#### Select display OFF mode

Press the UP or DOWN button to select display OFF function.



Display ON



Display OFF

Press the SET button to set. ↓ Return to function selection mode.

[F80] Setting of display OFF mode is completed

- \*: In display OFF mode, the under bar of the sub display flashes.
- \*: When any button is activated, the display will turn on. If no button operation is performed within 30 seconds, the display will turn off again.



## ■[F81] Security code

The security code can be turned on and off and the security code can be changed when unlocked.

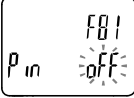
### <Operation>

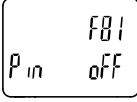
Display [F81] by pressing the UP or DOWN button in function selection mode.

Press the SET button. ↓ Move on to the select security code.


**Select security code**

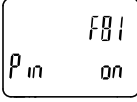
Press the UP or DOWN button to select security code.





Not used





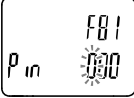
Used

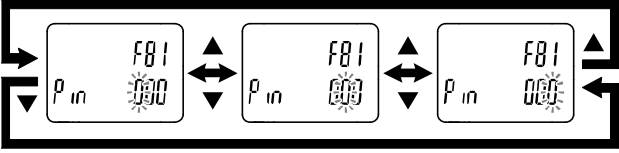
[oFF] is selected.  
Press the SET button to return to function selection mode.

[on] is selected.  
Press the SET button to set. ↓ Move on to the check the setting of security code.

**Check of the setting of security code**

Press the UP or DOWN button to change the value.  
Press the SET button to move to the digit to the right.  
(The default setting is [000])





Press the SET button for 1 second or longer.

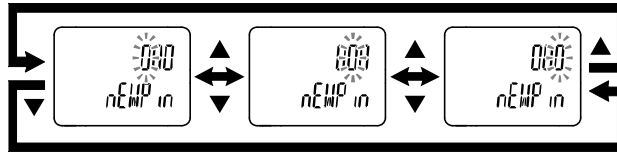
- When the security code is correct, move on to the security code setting.
- If the security code entered is incorrect, [FAL] will be displayed, and the security code must be entered again.

If the wrong security code is entered 3 times, [nG] is displayed on the main display and the device returns to function selection mode.

↓ Move on to the changing of security code.

**Changing of security code.**

New security code is displayed on the main display.  
Press the UP or DOWN button to change the value.  
Press the SET button to move on to input the next digit.



After entry, the changed security code will flash by pressing the SET button for 1 second or longer.  
(At this point, the changing of the security code is not completed)  
Press the UP or DOWN button to return to setting step.



Press the SET button to set. ↓ Return to function selection mode.

[F81] Setting of security code is completed

If the security code function is enabled, it is necessary to input a security code to release the key lock.

\*: If a key is not pressed for 30 seconds while entering the security code, function selection mode will return.

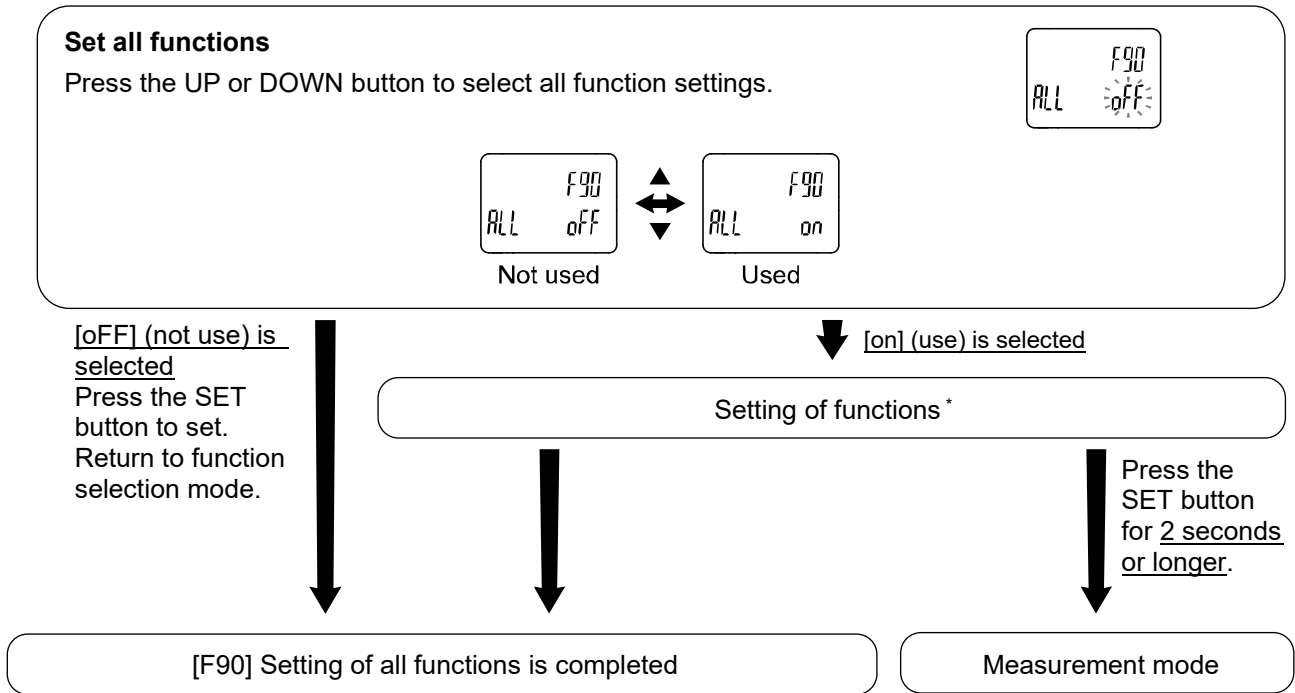
## ■[F90] Setting of all functions

Each time the SET button is pressed, the function steps in the order shown in the following table.

### <Operation>

Display [F90] by pressing the UP or DOWN button in function selection mode.

Press the SET button. ↓ Move on to the set all functions.



\*: Setting of each function

Every time the SET button is pressed, the display moves to the next function in "Order of function settings".

Set by pressing UP and DOWN button.

For details of how to set each function, refer to the relevant setting of function section in this manual.

### ●Order of function settings

Order	Function	Applicable model
F0	Reference condition	All models
	Unit selection function	Model with units selection function
F3	Select response time	All models
F6	Fine adjustment of display value	All models
F13	Setting for reverse display mode	All models
F14	Zero cut-off setting	All models
F16	Measurement display setting	All models
F30	Setting of accumulated value hold	All models
F40	Setting of standby function	All models
F41	Setting of Force AMS mode	All models
F80	Set display OFF mode	All models
F81	Security code	All models

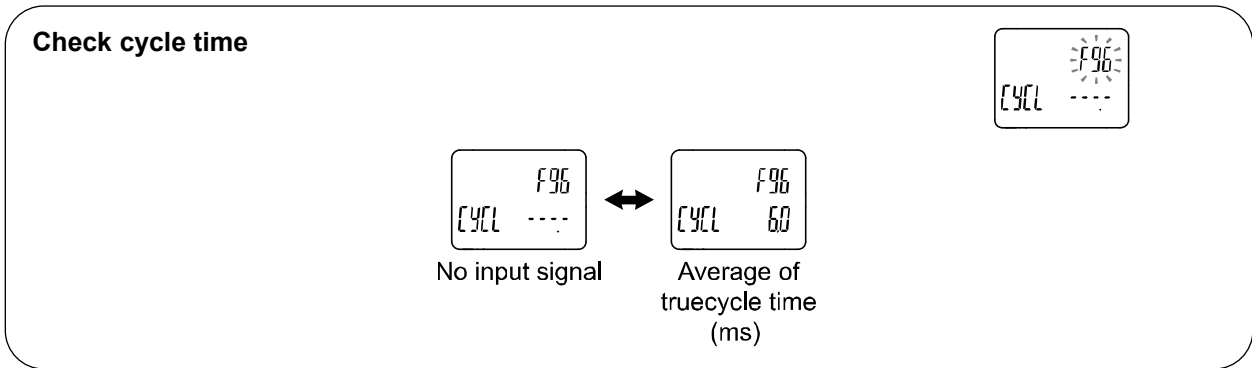
## ■[F96] Check cycle time

The average cycle time of the internal bus of the Air Management Hub can be checked.

### <Operation>

Display [F96] by pressing the UP or DOWN button in function selection mode.

Press the SET button. ↓ Move on to the check cycle time.



Press the SET button to set. ↓ Return to function selection mode.

[F96] Setting of check cycle time is completed



## ■[F98] Setting of output check

By forcibly switching the output ON/OFF operation using the button operation, the operation of the system can be checked regardless of the measured value. This function can be checked on Byte20 for Base type or Byte10 for Remote type, please refer to the IO map.


### <Operation>

Display [F98] by pressing the UP or DOWN button in function selection mode.

Press the SET button. ↓ Move on to the select output check.

**Select output check**

Press the UP or DOWN button to select the output check.



F98

TEST n

↕

F98

TEST F

Normal output  
(Output not checked)

Forced output  
(Output is checked)

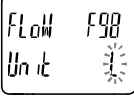
[n] (Normal output) is selected.

Press the SET button to set.  
Return to function selection mode.

[F] (Forced output) is selected  
Press the SET button to set. ↓ Move on to the flow rate unit bit check.

**Flow rate unit bit check**

Select the flow rate unit bit check by pressing the UP or DOWN button.



Flow F98

Unit L

↕

Flow F98

Unit Ft

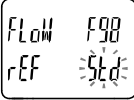
Flow rate unit  
bit 0

Flow rate unit  
bit 1

Press the SET button to set. ↓ Move on to the flow rate criteria bit check.

**Flow rate criteria bit check**

Select the flow rate criteria bit check by pressing the UP or DOWN button.



Flow F98

rEF Std

↕

Flow F98

rEF nor

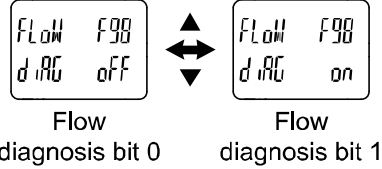
Flow rate criteria  
bit 0

Flow rate criteria  
bit 1

Press the SET button to set. ↓ Move on to the flow rate diagnosis bit check.

**Flow rate diagnostic bit check**

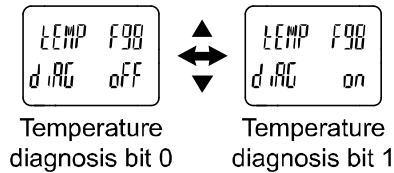
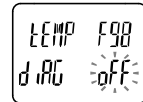
Select the flow rate diagnostic bit check by pressing the UP or DOWN button.



Press the SET button to set. ↓ Move on to the temperature diagnostic bit check.

**Temperature diagnostic bit check**

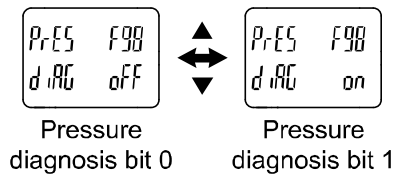
Select the temperature diagnostic bit check by pressing the UP or DOWN button.



Press the SET button to set. ↓ Move on to the pressure diagnostic bit check.

**Pressure diagnostic bit check**

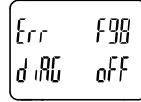
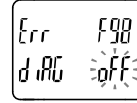
Select the pressure diagnostic bit check by pressing the UP or DOWN button.



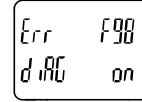
Press the SET button to set. ↓ Move on to the error diagnostic bit check.

**Error diagnostic bit check**

Select the error diagnostic bit check by pressing the UP or DOWN button.



Error  
diagnosis bit 0



Error  
diagnosis bit 1

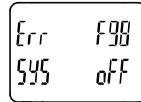
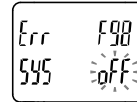
Press the SET button to set.



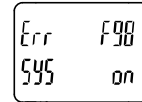
Move on to the system error diagnostic bit check.

**System error diagnostic bit check**

Select the system error diagnostic bit check by pressing the UP or DOWN button.



System error  
diagnosis bit 0



System error  
diagnosis bit 1

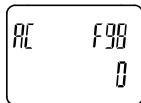
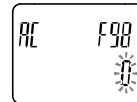
Press the SET button to set.



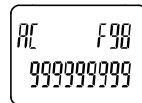
Move on to the accumulated value check.

**Accumulated value check**

Press the UP or DOWN button to select the accumulate value check.



Accumulated  
value lower limit



Accumulated  
value upper limit

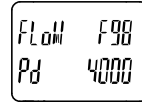
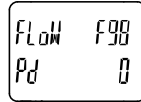
Press the SET button to set.



Move on to the flow rate check.

**Flow rate check**

Press the UP or DOWN button to select the flow rate check.



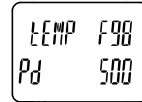
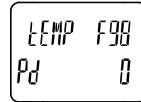
Flow rate  
lower limit

Flow rate  
upper limit

Press the SET button to set. ↓ Move on to the temperature check.

**Temperature check**

Press the UP or DOWN button to select the temperature check.



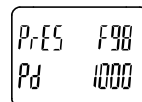
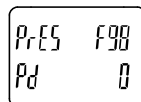
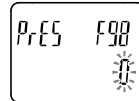
Temperature  
lower limit

Temperature  
upper limit

Press the SET button to set. ↓ Move on to the pressure check.

**Pressure check**

Press the UP or DOWN button to select the pressure check.



Pressure  
lower limit

Pressure  
upper limit

Press the SET button to set. ↓ Return to function selection mode.

[F98] Setting of output check is completed

\*: Measurement mode can return from any setting item by pressing the SET button for 2 seconds or longer.

\*: An increase or decrease in flow rate, temperature or pressure will have no effect on the output while the output operation is being performed.

## ■[F99] Reset to the default settings

If the flow switch settings are uncertain, the default values can be restored.

\*: Only the settings for settable buttons can be reverted to the state at the time of shipment.

\*: If the setting is only reverted to the state at the time of shipment, turning on the power supply again returns the setting to that as of before change.

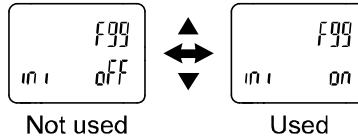
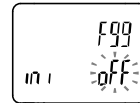
### <Operation>

Display [F99] by pressing the UP or DOWN button in function selection mode.

Press the SET button. ↓ Move on to the reset to factory default settings.

#### Rest to factory default settings.

Press the UP or DOWN button to display [ON], then press the SET and DOWN buttons simultaneously for 5 seconds or longer.



[OFF] (not use) is selected  
Press the SET button to set.  
Return to function selection mode.

All settings are returned to the default values.  
Return to function selection mode.

[F99] Reset to the default settings is completed

## Other Settings

### ○Reset operation

The accumulated flow, peak value, and bottom value can be reset.

To reset the accumulated value, press the DOWN and SET buttons simultaneously for 1 second or longer. Resetting the accumulated flow is possible only when the accumulated flow is displayed.

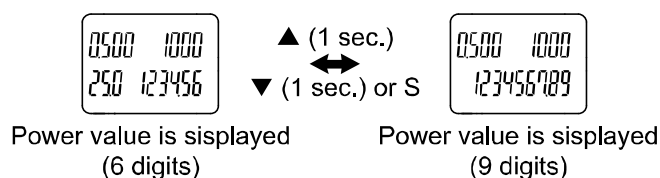
Resetting the peak value and bottom value is effective for the measurement target displayed in the peak display or bottom display.

### ○Display select function

The number of accumulated flow rate display digits can be temporarily switched when the temperature and accumulated flow rate are set in the measurement display settings.

The normal accumulated display consists of the mantissa part (maximum 6 digits) and [Power value display] indicated by the index part displayed by  $\times 10^6$  or  $\times 10^3$ .

If the DOWN button is pressed for 1 second, the mantissa part will be displayed in 9 digits and the power value will be displayed as  $\times 10^3$ .



\*: If there is no button operation for 30 seconds while the 9-digit power is displayed, the number of displayed powers will return to 6 digits.

\*: When the temperature is set to "hide", the displayed power value is fixed at 9 digits.

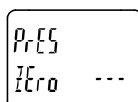
### ○Zero-clear function

When the pressure is displayed in the measurement display setting, the displayed value can be adjusted to zero within the range of  $\pm 7\%$  F.S. from the factory default value.

(The zero clear range varies by  $\pm 1\%$  F.S. due to variation between individual products.)

When the UP and DOWN buttons are pressed simultaneously for 1 second or longer in measurement mode, the image below is displayed and the displayed value is reset to zero.

The display returns to measurement mode automatically.



Zero-clear

○Key-lock function

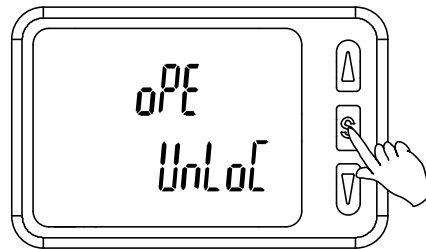
The key lock function is used to prevent errors occurring due to unintentional changes of the set values. If the SET button is pressed while the keys are locked, [LoC] is displayed on the sub display (left) for approximately 1 second.

(Each setting and peak/ bottom values are displayed using the UP and DOWN buttons.)

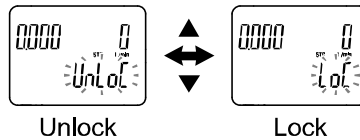
**<Operation – Without security code input>**

(1) Press the SET button for 5 seconds or longer in measurement mode. When [oPE] is displayed on the main display, release the button. The current setting [LoC] or [UnLoC] will be displayed on the sub display.

(To release the key-lock repeat the above operation)



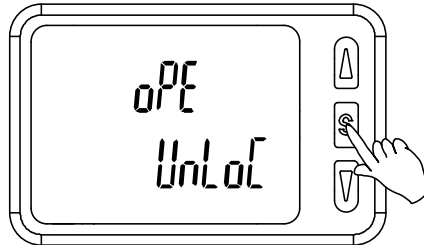
(2) Select the key locking/un-locking using the UP or DOWN button and press the SET button to set.



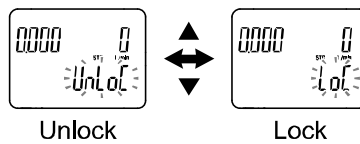
<Operation – Without security code input>

•Locking

- (1) Press the SET button for 5 seconds or longer in measurement mode. When [oPE] is displayed on the main display, release the button. The current setting [LoC] or [UnLoC] will be displayed on the sub display.

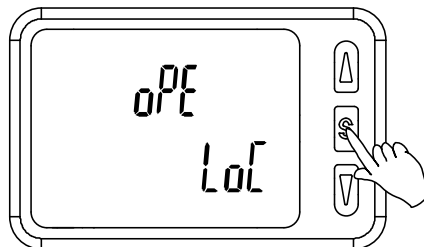


- (2) Select the key locking/ un-locking using the UP or DOWN button and press the SET button to set.

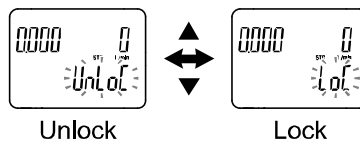


•Unlocking

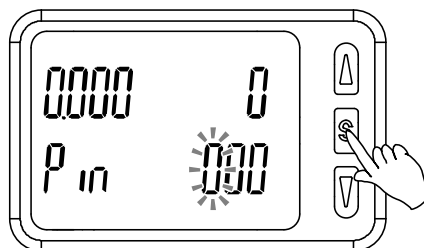
- (1) Press the SET button for 5 seconds or longer in measurement mode. When [oPE] is displayed on the main display, release the button. The current setting [LoC] or [UnLoC] will be displayed on the sub display.



- (2) Select the un-locking [UnL] using the UP or DOWN button. Setting is recognized by pressing the SET button, then the security code is required. When the security code is set, select the un-lock [UnLoC] using the UP or DOWN button. Setting is recognized by pressing the SET button, then the security code is required. If the security code is not set, select the un-lock [UnLoC]. Locking is released by pressing the SET button.



- (3) For the input method, refer to [F81] Security code (checking of the setting of security code) (page 104).



- (4) If the security code entered is correct, the indication of the main display changes to [UnLoC], and pressing one of the UP, SET or DOWN buttons releases the key lock and the measurement mode returns. If the security code entered is incorrect, [FAL] will be displayed on the main screen, and the security code must be entered again. If an incorrect security code is entered 3 times, [LoC] will be displayed on the main screen and the device will return to measurement mode.



## Maintenance

### **How to reset the product after a power loss or when the power has been unexpectedly removed**

The settings for the product are retained in memory prior to the power loss or de-energizing of the product. The output condition is also recoverable to that prior to the power loss or de-energizing. However, this may change depending on the operating environment. Therefore, check the safety of the whole installation before operating the product.

If the installation is using accurate control, wait until the product has warmed up (approximately 10 to 15 minutes) before operation.

## Forgotten the Security Code

If you have forgotten your security code, please contact SMC directly.

## Troubleshooting

If an operation failure of the product occurs, please confirm the cause of the problem using the following table.

If the cause applicable to the problem cannot be identified and normal operation can be recovered by replacement with a new product, this indicates that the product itself was faulty. Problems with the product may be due to the operating environment (network configuration etc). Please consult SMC.

- Troubleshooting list

- Troubleshooting with Air Management Hub display

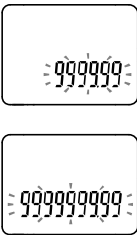
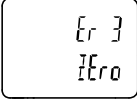
Error indication	Problem Possible causes	Investigation method	Countermeasure
<ul style="list-style-type: none"> <li>• System error (Er0, 4 to 16, 40) is displayed</li> <li>• "HHH", "LLL" is displayed</li> <li>• Hardware error (Er1, 2) is displayed</li> </ul>	Incorrect internal data processing of the product (Er0, 4 to 16, 40)	(1) Check if there is noise interference (such as static electricity). Check if there is a noise source nearby. (2) Check if the power supply voltage is in the range 24 VDC $\pm$ 10%.	(1) Remove the noise and the noise source (or take measures to prevent noise interference) and reset the product (or turn off and then turn back on the power supply). (2) Check that the Power supply voltage is within 24 VDC $\pm$ 10%.
	The measured value exceeds the upper limit (HHH) or lower limit (LLL)	(1) Check if the value exceeds the upper or lower limit of the set range. (2) Check if foreign matter has entered the piping.	(1) Return the value to within the set range. (2) Take measures to prevent foreign matter from entering the piping.
	Product failure (Er1, 2)		Replace the product
The display is unstable.	Incorrect power supply	Check if the power supply voltage is in the range 24 VDC $\pm$ 10%.	Power supply voltage shall be within 24 VDC $\pm$ 10%.
	Incorrect wiring	Check the power supply wiring Check if the brown and blue wires are connected to DC(+) and DC(-) respectively, and if the wiring is secure	Check and correct the wiring.
	Factory line pressure is not stable	Check if the factory line pressure is changing.	Setting of the response time may improve the condition.

Error indication	Problem Possible causes	Investigation method	Countermeasure
<ul style="list-style-type: none"> <li>•The display turns off.</li> <li>•Part of the display is missing.</li> </ul>	Incorrect power supply	Check if the power supply voltage is within 24 VDC $\pm$ 10%.	Power supply voltage shall be within 24 VDC $\pm$ 10%.
	Incorrect wiring	Check the power supply wiring Check if the brown and blue wires are connected to DC(+) and DC(-) respectively, and if the wiring is secure	Check and correct the wiring.
	Display off mode	Check if display off mode is selected.	Select the required display off mode again.
	Product failure		Replace the product
Display flashes	Incorrect wiring	(1) Check the power supply wiring. (2) Check if there is bending stress applied to any part of the lead wire.	(1) Check and correct the wiring. (2) Correct the wiring (bend radius and stress).
The display accuracy does not meet the specifications.	Foreign matter entered	Confirmed foreign matter entry or sticking to the piping port.	Use a filter to prevent foreign matter from entering or sticking. Discharge the condensate of the filter periodically.
	Air leakage	Check if air is leaking from the piping.	Rework the piping. If the tightening torque is exceeded, the mounting screws, brackets and the flow switch may be damaged.
	Warming up time inadequate	Check if the product satisfies the specified accuracy 10 minutes after supplying power.	After energizing, the display and output can drift. Allow the product to warm up for 10 to 15 minutes.
	Product failure		Replace the product
Display measurement unit cannot be changed.	Model Selection (model selected does not have unit selection function)	Check if the product number printed on the product indicates with Unit selection function type.	Unit selection function is not available for products Fixed to SI units. *: The unit selection function is not for use in Japan due to a new measurement law. *: Unit fixed to SI: L/min
	Product failure		Check the key-lock function.
Buttons do not work	Key-lock mode is activated.	Check if the key-lock function is turned on.	Replace the product
	Product failure		Replace the product
There is noise.	Air leakage	Check if air is leaking from the piping.	Rework the piping. If the tightening torque is exceeded, the mounting screws and the switch may be damaged.
	Product failure		Replace the product.

Error indication	Problem Possible causes	Investigation method	Countermeasure
The operation is unstable. (chattering)	The hysteresis is small and is affected by the fluctuations in the original pressure, etc.	Check the set value (hysteresis).	Check the settings
	Incorrect wiring/ broken lead wire	(1) Check the power supply wiring. (2) Check if there is bending stress applied to any part of the lead wire. (bending radius, tensile force to the lead wire)	(1) Check and correct the wiring. (2) Correct the wiring. (Reduce the tensile force or increase the bending radius.)
	Product failure		Replace the product

## ■ Error display

Error name	Error display	Description	Measures
Instantaneous flow error		Flow rate exceeding the upper limit of the settable flow range is applied.	Reset the applied flow rate to a level within the settable flow range.
Pressure error		Pressure exceeding the upper limit of the set pressure range is applied.	Reset the applied pressure to a level within the set pressure range.
		Pressure below the lower limit of the set pressure range is applied.	
Temperature error		Temperature exceeding the upper limit of the set temperature range is applied.	Reset the applied temperature to a level within the settable temperature range.
		Temperature below the lower limit of the set temperature range is applied.	
Hardware error	 	Internal hardware error detected.	Power cycle. If the display still shows an error, contact SMC.
System error		An internal data error has occurred.	Turn the power off and on again. If the failure cannot be solved, contact SMC.

Error name	Error display	Description	Measures
Accumulated flow error		The accumulated value has exceeded the accumulated flow range. (For accumulated increment)	Reset the accumulated flow. (Press the DOWN and SET buttons simultaneously for <u>1 second or longer</u> )
Zero clear error		A pressure of 7%F.S. or more is applied during the zero clear operation. (Return to measurement mode in <u>1 second</u> )	Adjust the pressure and try the zero clear operation again.

\*: If the error cannot be reset after the above measures are taken, or errors other than above are displayed, please contact SMC.

•Troubleshooting with AMS Hub (Base type) LED's

Error indication	Possible cause	Investigation and countermeasures
PWR: OFF	Power has not been supplied.	Supply a voltage of 24 VDC $\pm$ 10% to the product.
PWR: Green LED flashing	Power supply voltage is abnormal.	Check that a voltage of 24 VDC $\pm$ 10% is applied.
SF: Green flashing	Short circuit on input or output ports.	Check for a short circuit on the devices connected to the Air Management Hub rear side.
SF: Red ON	Component failure.	Replace the product.
BF: Red ON	Communication error with PLC.	Check the connection to the PLC.
	PLC configuration mismatch.	Check the PLC configuration and make sure the actual configuration matches on the PLC.
L/A IN or L/A OUT LED is OFF.	LINK has not yet been established.	Check the following and restart. (1) Check the PLC condition and run the PLC. (2) Check that the communication connector is not loose and there are no broken wires. (3) Keep noise sources away from the communication cable. *: The L/A OUT LED will be OFF if the BUS OUT connector is not used.
L/A IN or L/A OUT Green LED is ON.	LINK is established but data has not been received.	Check the following and restart. (1) Check the PLC condition and run the PLC. (2) Check that the communication connector is not loose and there are no broken wires. (3) Keep noise sources away from the communication cable.

•Troubleshooting with AMS Hub (Remote type) LED's

Error indication	Possible cause	Investigation and countermeasures
PWR: OFF	Power has not been supplied.	Supply a voltage of 24 VDC $\pm$ 10% to the product.
PWR: Green flashing	Power supply voltage is abnormal.	Check that a voltage of 24 VDC $\pm$ 10% is applied.
ST: Green flashing	Power supply voltage is abnormal.	Check that a voltage of 24 VDC $\pm$ 10% is applied.
	Short circuit on input or output ports.	Check for a short circuit on the devices connected to the Air Management Hub rear side.
ST: Red ON	Component failure.	Replace the product

•When air leak is found on piping

Trouble	Possible cause	Countermeasure
Air leakage (Air leaks from where the products are connected)	Seal is damaged.	Replace the seal with a new one.
	Screws for retainer are loose.	Tighten screws to the specified torque.

\*: For individual product, refer to the operation manual of each product.

# Specifications

## Air Management System (AMS##A Series)

Parts number		AMS20A	AMS30A	AMS40A	AMS60A
Components	Standby E/P regulator	ITV2050-20	ITV2050-30	ITV3050-40	ITV3050-60
	Air Management Hub	EXA1-20	EXA1-30	EXA1-40	EXA1-60
	Residual Pressure Relief Valve	VP346E	VP546E	VP746E	VP946E
Piping ports		1/8, 1/4	1/4, 3/8	3/8, 1/2	3/4, 1
Applicable fluid		Air			
Rated flow range		5 to 500 L/min	10 to 1000 L/min	20 to 2000 L/min	40 to 4000 L/min
Operating fluid temperature		0 to 50 °C			
Proof pressure		1.0 MPa			
Rated max. pressure		0.8 MPa			
Supply pressure range		0.3 to 0.8 MPa			
Setting pressure range		0.2 to 0.7 MPa			
Standby pressure range		0.2 to 0.4 MPa			
Power supply voltage		24 VDC ±10%			
Current consumption		500 mA max.			
Input and Output		DI x 2 DI, DO IO-Link, DI			
Enclosure (IP rating)		IP65 (Only applicable for electrical part)			



### Air Management System (AMS#B Series)

Parts number		AMS20B	AMS30B	AMS40B	AMS60B
Components	Standby regulator	AR20S-D	AR30S-D	AR40S-D	AR50S-D
	AMS Hub	EXA1-20	EXA1-30	EXA1-40	EXA1-60
	Residual Pressure Relief Valve	VP346E	VP546E	VP746E	VP946E
Piping ports		1/8, 1/4	1/4, 3/8	3/8, 1/2	3/4, 1
Applicable fluid		Air			
Rated flow range		5 to 500 L/min	10 to 1000 L/min	20 to 2000 L/min	40 to 4000 L/min
Operating fluid temperature		0 to 50 °C			
Proof pressure		1.0 MPa			
Rated maximum pressure		0.7 MPa			
Supply pressure range		0.3 to 0.7 MPa			
Setting pressure range		0.2 to 0.4 MPa			
Power supply voltage		24 VDC ±10%			
Current consumption		400 mA max.			
Input and Output		DI x 2 DI, DO IO-Link, DI			
Enclosure (IP rating)		IP65 (Only applicable for electrical part)			

## Air Management Hub

Model		EXA1-20	EXA1-30	EXA1-40	EXA1-60	
Fluid	Applicable fluid	Air *1				
	Operating fluid temperature	0 to 50 °C				
Electrical	Power supply voltage	24 VDC ±10%				
	Protection	Reverse Protection, Current Limit				
	Current consumption	400 mA or less				
	Indicator	LED & LCD				
Environment	Operating temperature	0 to 50 °C (No condensation & freezing)				
	Storage temperature	-10 to 60 °C (No condensation & freezing)				
	Ambient humidity	35 to 85%RH				
	Altitude	Up to 3000 m				
	Pollution degree	3				
	Installation place	Indoor				
	Enclosure (IP rating)	IP65 (Electrical equipment part only) (Conforms to IEC60529)				
	Standard	CE/UKCA marked, UL (CSA)				
Flow	Rated flow range	5 to 500 L/min	10 to 1000 L/min	20 to 2000 L/min	40 to 4000 L/min	
	Accumulated flow range	0 to 9,999,999,990 L				
	Smallest settable increment	Instantaneous flow	1 L/min		2 L/min	
		Accumulated flow	10 L			
	Accuracy	±3.0%F.S.				
	Repeatability	±1.0%F.S.				
	Pressure characteristics	±5.0%F.S. (0 to 1.0 MPa, 0.5 MPa standard)				
	Temperature characteristics	±5.0%F.S. (Ambient temp. 0 to 50 °C, 25 °C standard)				
Units	L/min, CFM (ft <sup>3</sup> /min)					
Pressure	Rated pressure range	0 to 1.0 MPa				
	Proof pressure	1.5 MPa				
	Accuracy	±3.0%F.S.				
	Repeatability	±1.0%F.S.				
	Temperature characteristics	±5.0%F.S. (Ambient temp. 0 to 50 °C, 25 °C standard)				
	Unit	MPa, kPa, kgf/cm <sup>2</sup> , bar, psi				
Temperature	Rated Temperature range	0 to 50 °C				
	Accuracy *2	±2.5 °C (Flow range: 10 to 100%)				
	Unit	°C, °F				

Model		EXA1-20	EXA1-30	EXA1-40	EXA1-60		
Input/Output	User configurable port	Number of free ports		1			
		Configuration		Digital Input (x2), Digital Input and Output, IO-link and Digital Input			
		Port specification	IO-Link	Version	V1.1		
				Port class	Class A		
				Communication Speed	COM1 (4.8 kbps) COM2 (38.4 kbps) COM3 (230.4 kbps) Automatically switches depending on the connected device.		
			Max. process data size	Input: 16 byte/Output: 16 byte (per port)			
			Max. supply current	0.3 A			
			Input	Input type	PNP input		
		Rated input current		Pin2: 2.5 mA typ., Pin4: 5.8 mA typ.			
		ON Voltage		13 V or more			
		OFF Voltage		8 V or less			
		Output	Output type	PNP output			
			Max. load current	0.25 A			
			Communication error	HOLD/CLEAR			
	Input/Output for AMS function	Input/Output for standby E/P regulator		IO-Link			
		Output for standby regulator Output for Residual Pressure Relief Valve		PNP output			
		Input for standby Input for isolation	Input type	PNP input			
			Rated input current	Pin2: 2.5 mA typ., Pin4: 5.8 mA typ.			
			ON voltage	13 V or more			
			OFF voltage	8 V or less			
Max. supply current	0.3 A						

## Communication Specification

Model	EXA1-##-PN	EXA1-##-EN	EXA1-##-EC
Number of communication ports	2 ports		
Protocol	PROFINET IO (Conformance Class C)	EtherNet/IP™ (Conformance version: Composite11)	EtherCAT® (Conformance test record V.2.3.0)
Communication Speed	100 Mbps		
Communication method	-	Full duplex/Half- duplex	-
Configuration file	GSDML file *3	EDS file *3	ESI file *3
Occupation area (Number of inputs/outputs)	Max. (406 byte/198 byte)		
IP address setting range	-	Through DHCP server: Optional address	-
Device information	-	Vendor ID: 7 (SMC Corporation) Device type: 12 (Communication Adapter) Product code: 263	-
Web server	Support		Support (Using EoE) *4
OPC UA	Support		Not supported

\*1: Air quality grade is ISO 8573-1:2010 [4:6:-].

\*2: When the flow range is less than 10%, the temperature accuracy is -2.5 to 7.5 °C.

\*3: The configuration file can be downloaded from the SMC website (<https://www.smcworld.com>).

\*4: EtherCAT communication is established and the PLC/controller must also be supported EoE (Ethernet over EtherCAT).

## Parameter set range list

Item	Model	Setting range			
		AMS20	AMS30	AMS40	AMS60
Standby flow rate (Threshld)	EXA1-##-#L	5 to 525 L/min	10 to 1050 L/min	20 to 2100 L/min	40 to 4200 L/min
Standby flow rate (Hysteresis)	EXA1-##-#L	0 to 520 L/min	1 to 1040 L/min	0 to 2080 L/min	0 to 4160 L/min
Standby ON delay	EXA1-##-#L	0 to 9999 sec.			
Standby OFF delay	EXA1-##-#L	0 to 9999 sec.			
Isolation delay	EXA1-##-#L	0 to 9999 sec.			
Operation mode pressure	ITV#050-IL#-##-X399	0 to 1050 kPa			
Standby mode pressure	ITV#050-IL#-##-X399	0 to 1050 kPa			
Pressure ramp up duration *1	ITV#050-IL#-##-X399	0 to F00 (0 to 150) sec.			

\*: Only the third digit of the LED display is displayed in hexadecimal.

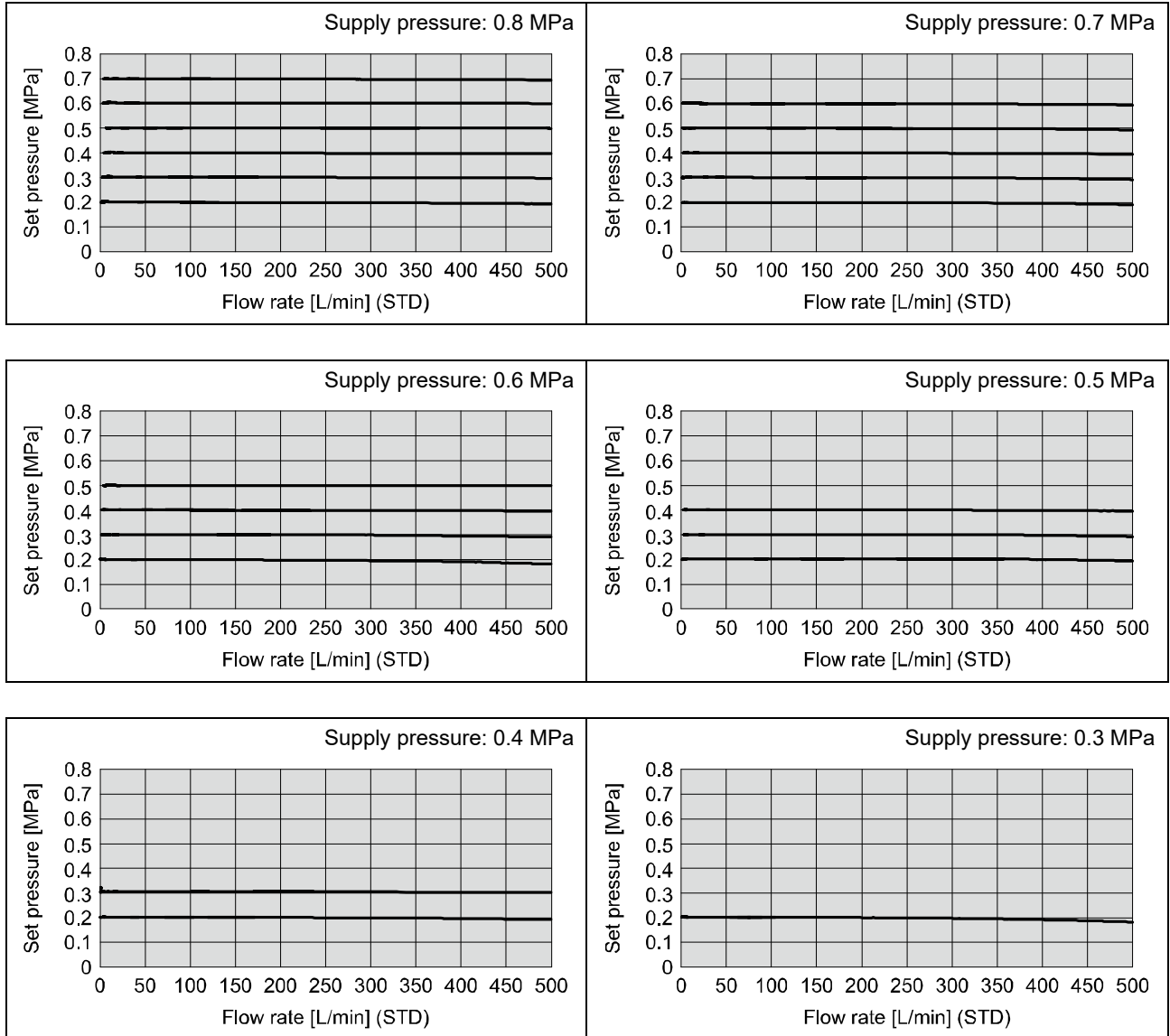
Therefore, "F00" represents "1500" in decimal, and the setting value is in units of 0.1 sec.

Pressure ramp up duration will be "150 sec.".

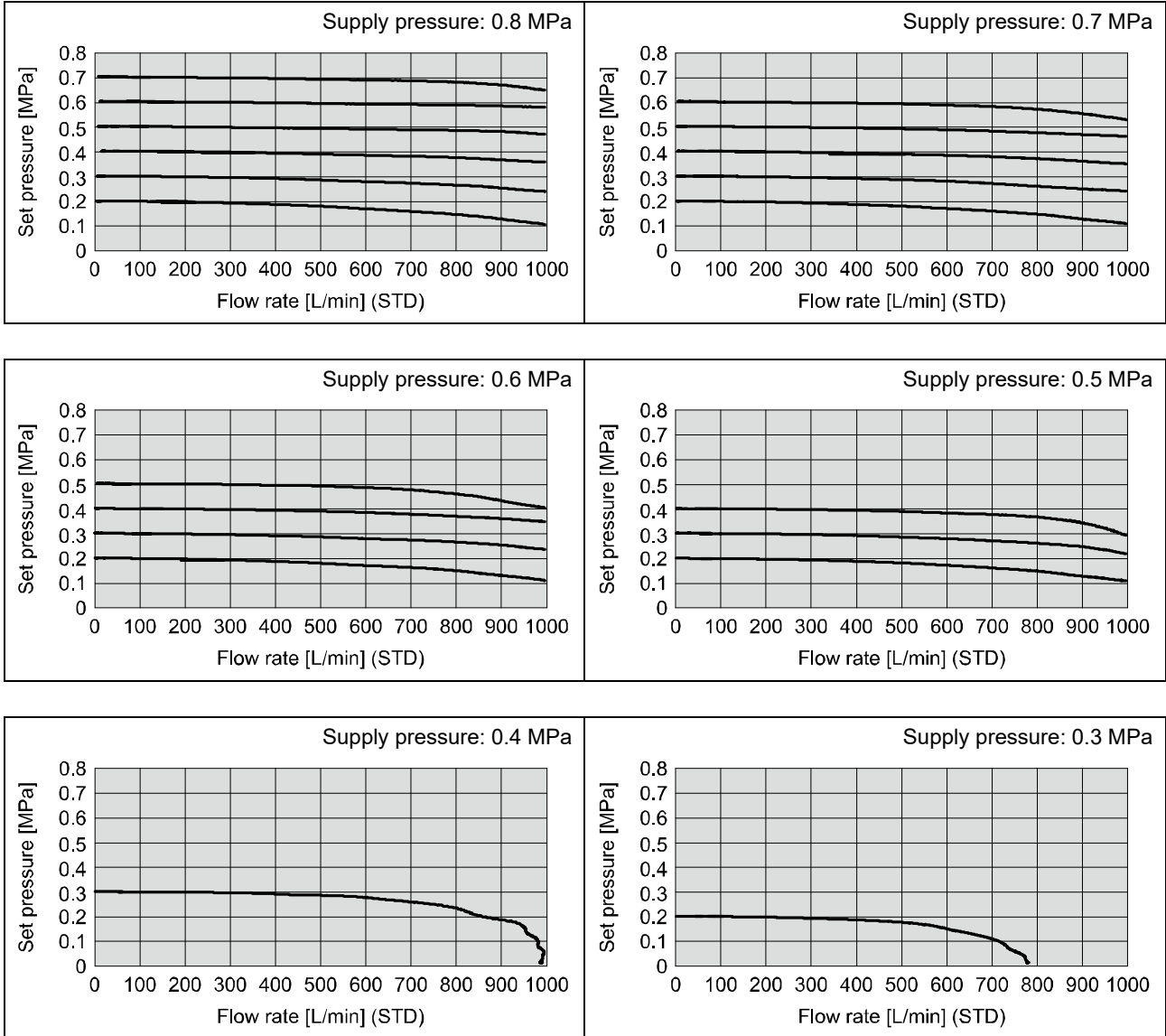
## ■ Characteristics data

- Flow characteristics (typical values)
- AMS##A: Standby E/P regulator type

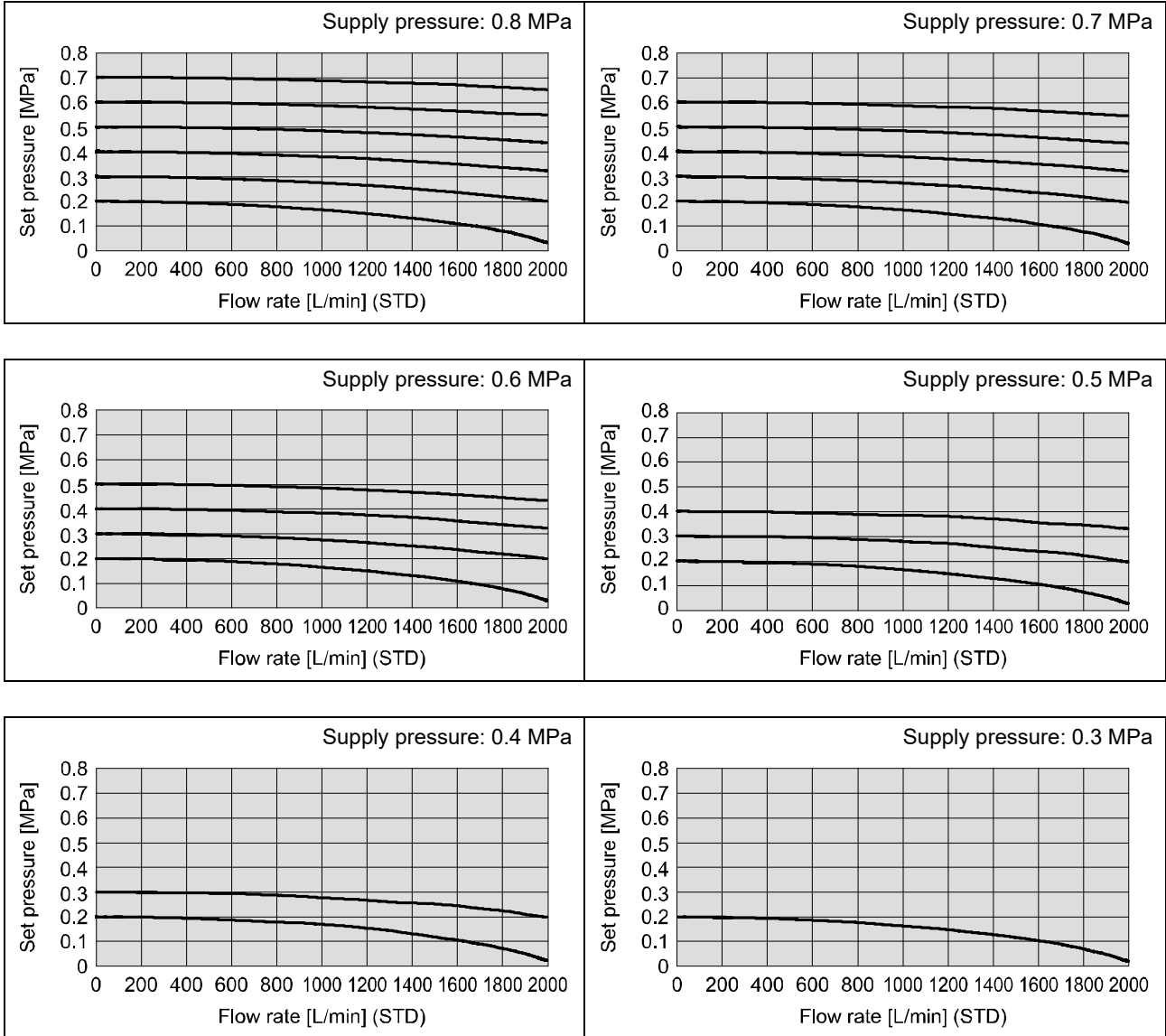
### AMS20A



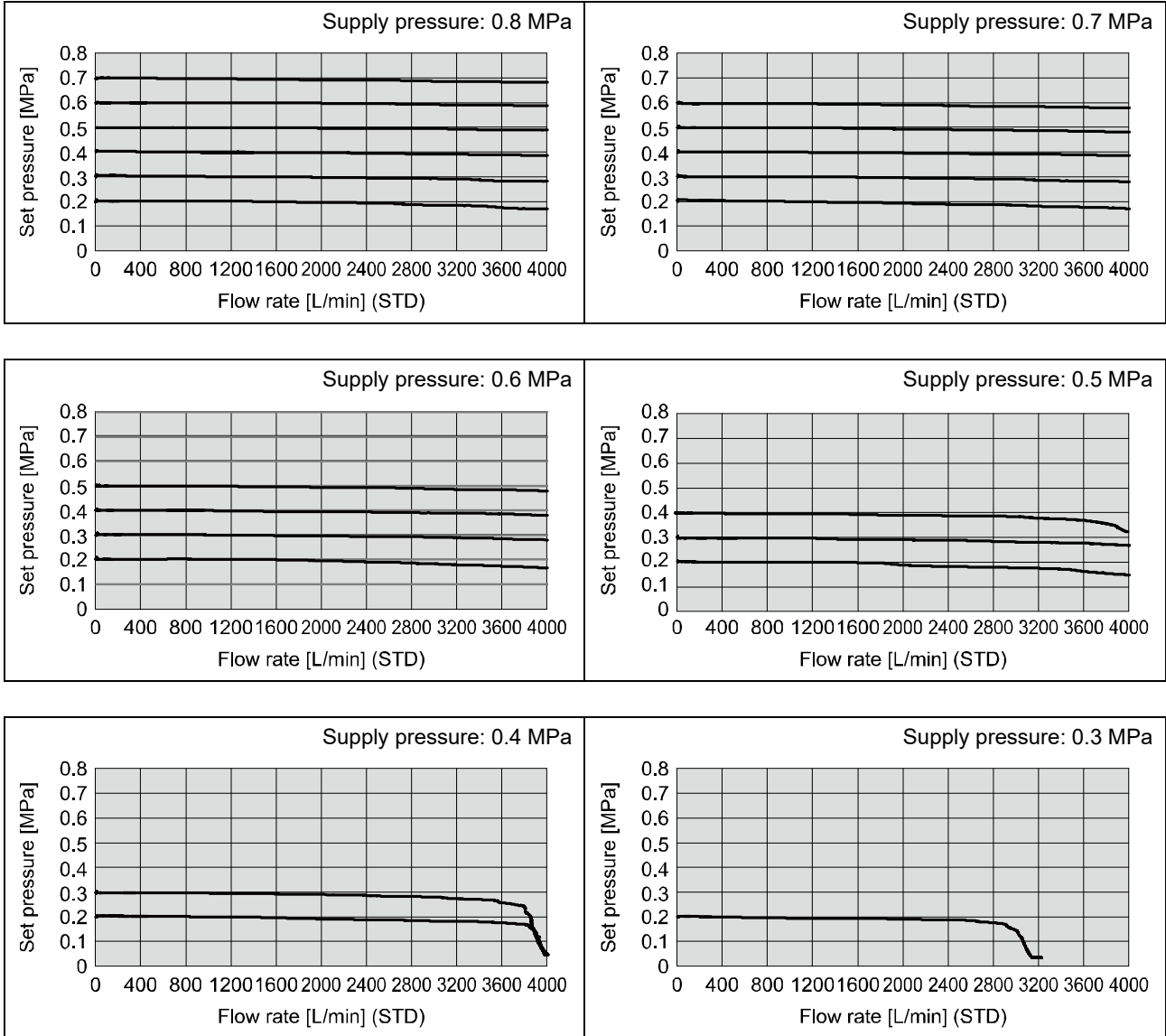
**AMS30A**



**AMS40A**



**AMS60A**

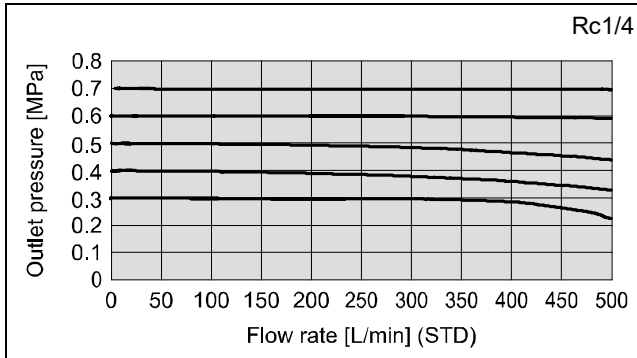




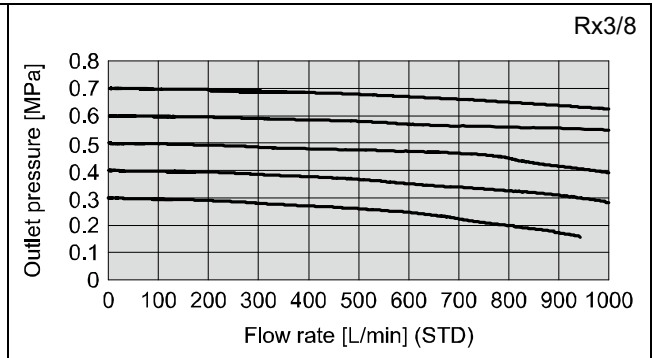
•AMS##B: Regulator type

Conditions: Supply pressure 0.3 to 0.7 MPa, Standby pressure 0.2 MPa, Operation mode

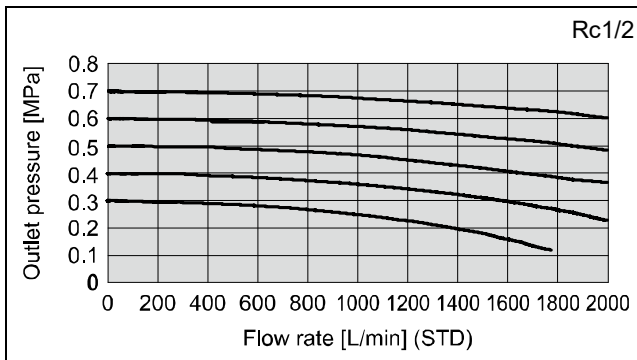
**AMS20B**



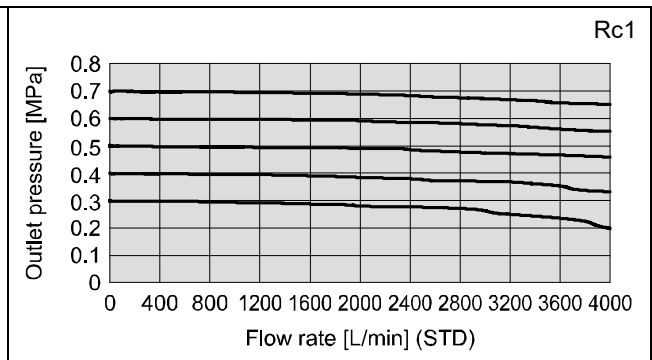
**AMS30B**



**AMS40B**

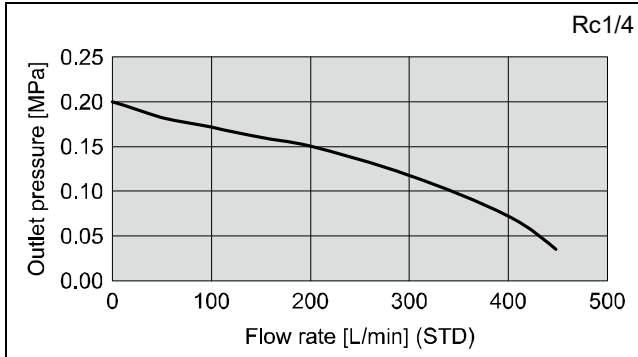


**AMS60B**

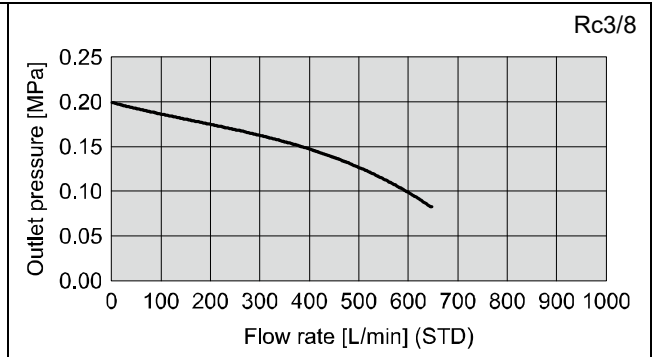


Conditions: Supply pressure 0.5 MPa, Standby pressure 0.2 MPa, Standby mode

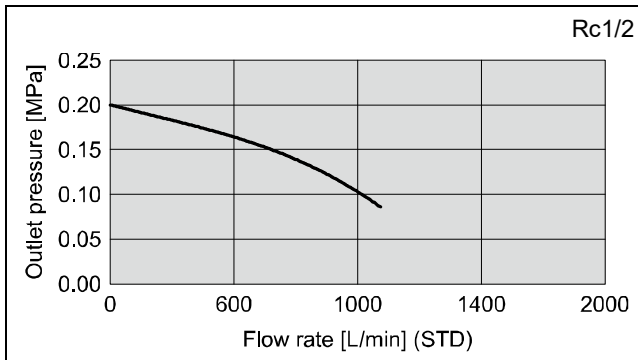
**AMS20B**



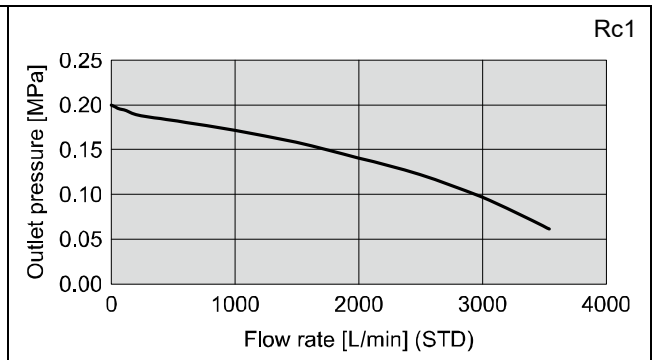
**AMS30B**



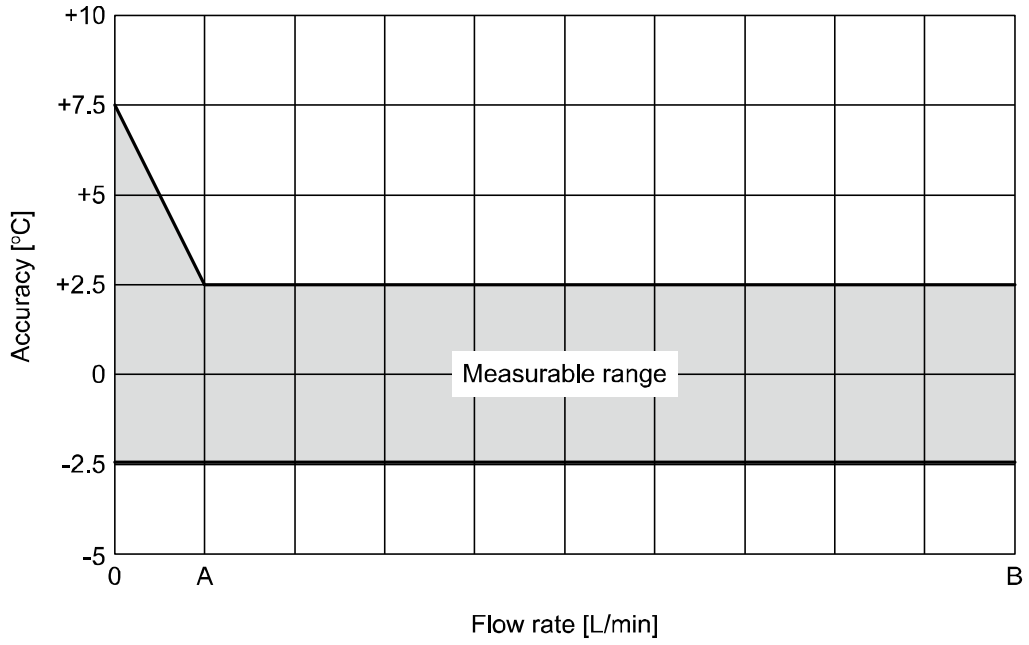
**AMS40B**



**AMS60B**



● Temperature Accuracy (reference value)

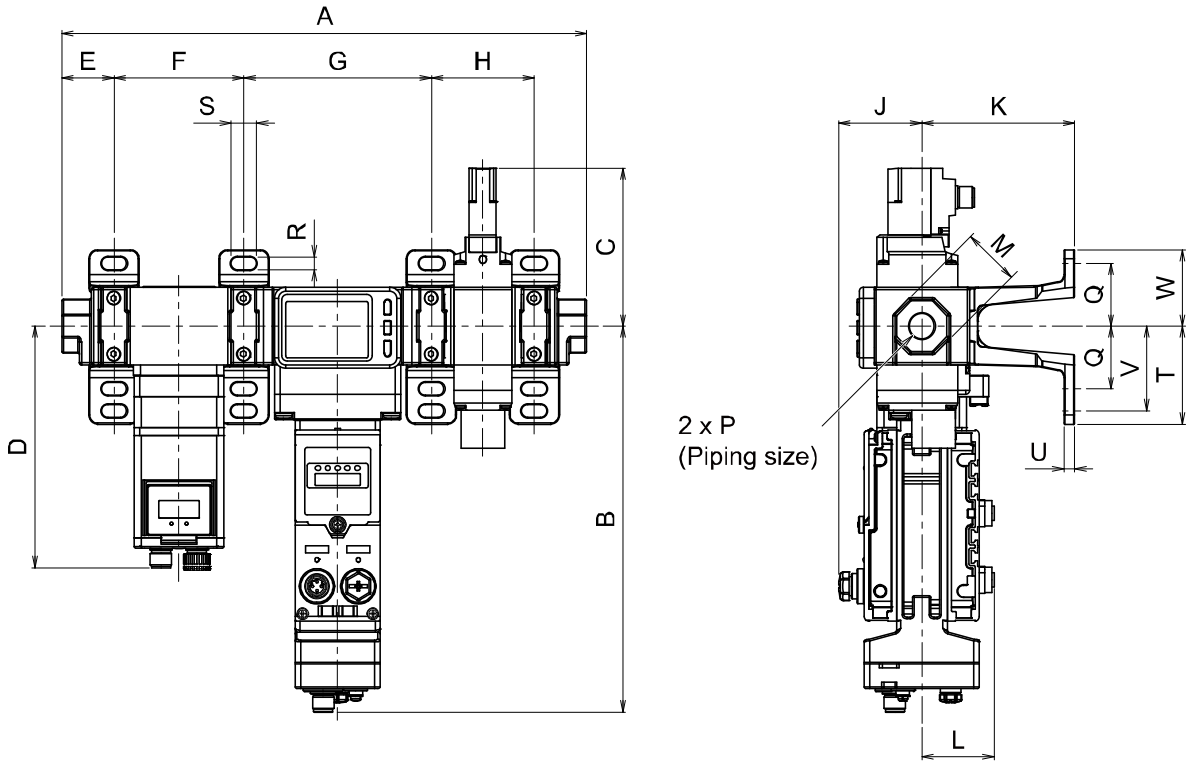


Models	A	B
AMS20	5 L/min	500 L/min
AMS30	10 L/min	1000 L/min
AMS40	20 L/min	2000 L/min
AMS60	40 L/min	4000 L/min

## ■ Dimensions

### Standby E/P regulator type NC Specification

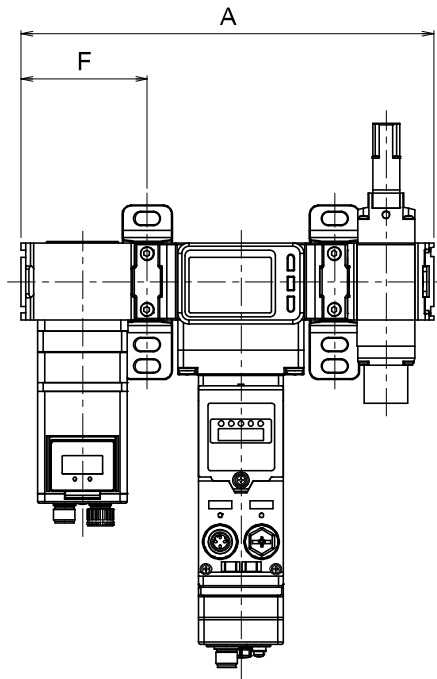
•AMS20/30/40/60A-R/N/F#C



Part number	P	A	B	C	D	E	J	M	L
AMS20A-#C	1/8 • 1/4	274.3	214.7	81.7	134.4	25.6	46.2	24	40.1
AMS30A-#C	1/4 • 3/8	291.8	214.7	87.9	134.4	29.1	46.2	30	40.1
AMS40A-#C	3/8 • 1/2	334.8	214.9	92.4	151.6	32.6	46.2	36	40.1
AMS60A-#C	3/4 • 1	401.8	214.8	93.7	151.6	42.1	46.2	46	40.1

Part number	Dimensions with bracket										
	K	F	G	H	Q	R	S	T	U	V	W
AMS20A-#C	85	70.2	103.2	49.7	35	7	14	54.5	6	47	42.5
AMS30A-#C	85	72.2	104.2	57.2	35	7	14	54.5	6	47	42.5
AMS40A-#C	85	89.2	105.2	75.2	40	9	18	65	7	55	50
AMS60A-#C	100	90.2	126.2	101.2	50	11	20	80	8	70	60

•AMS20/30/40/60A-H00C

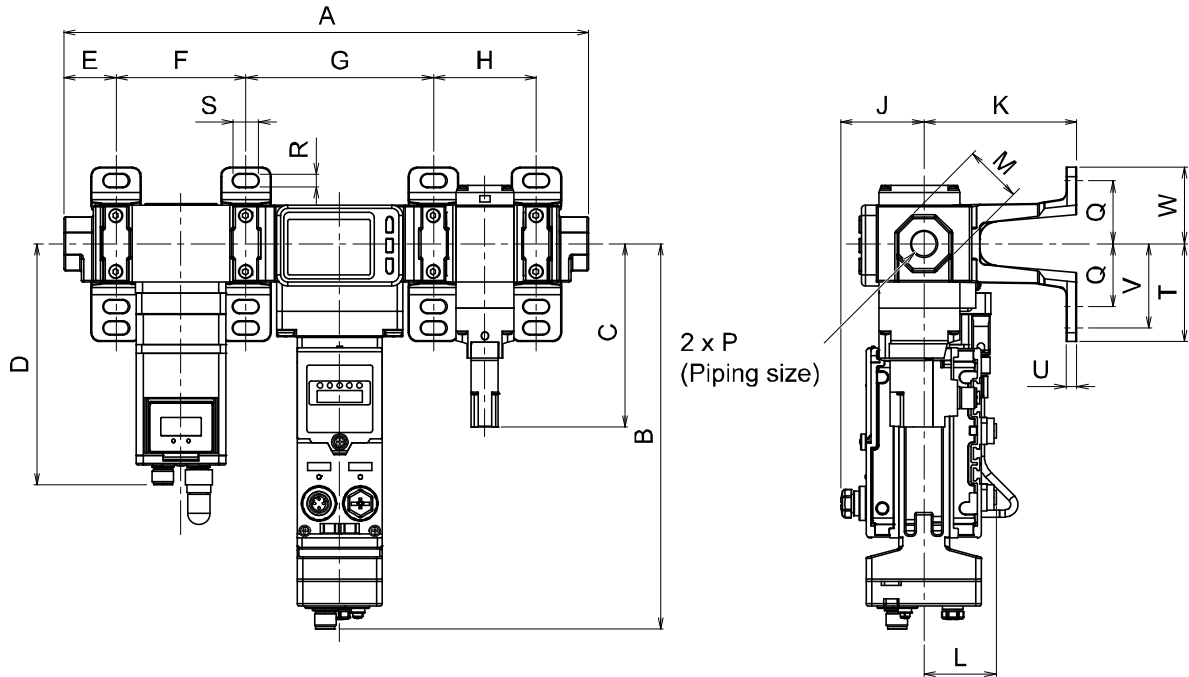


Part number	A	F
AMS20A-H00C	219.9	68.6
AMS30A-H00C	229.4	70.1
AMS40A-H00C	264.4	86.6
AMS60A-H00C	311.4	87.1

\*: Refer to "AMS20/30/40/60A-R/N/F#C" for dimensions other than "A" and "F". (page 135)

**Standby E/P regulator type  
NO Specification**

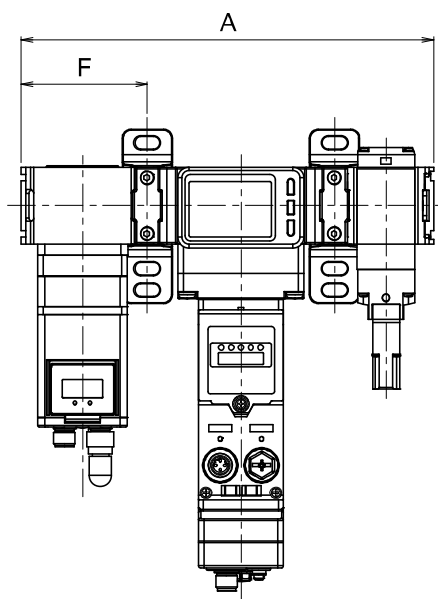
•AMS20/30/40/60A-R/N/F#D



Part number	P	A	B	C	D	E	J	M	L
AMS20A-#D	1/8 • 1/4	274.3	214.7	85.1	134.4	25.6	46.2	24	40.1
AMS30A-#D	1/4 • 3/8	291.8	214.7	102.1	134.4	29.1	46.2	30	40.1
AMS40A-#D	3/8 • 1/2	334.8	214.9	119.4	151.6	32.6	46.2	36	40.1
AMS60A-#D	3/4 • 1	401.8	214.8	117.7	151.6	42.1	46.2	46	40.1

Part number	Dimensions with bracket										
	K	F	G	H	Q	R	S	T	U	V	W
AMS20A-#D	85	70.2	103.2	49.7	35	7	14	54.5	6	47	42.5
AMS30A-#D	85	72.2	104.2	57.2	35	7	14	54.5	6	47	42.5
AMS40A-#D	85	89.2	105.2	75.2	40	9	18	65	7	55	50
AMS60A-#D	100	90.2	126.2	101.2	50	11	20	80	8	70	60

•AMS20/30/40/60A-H00D

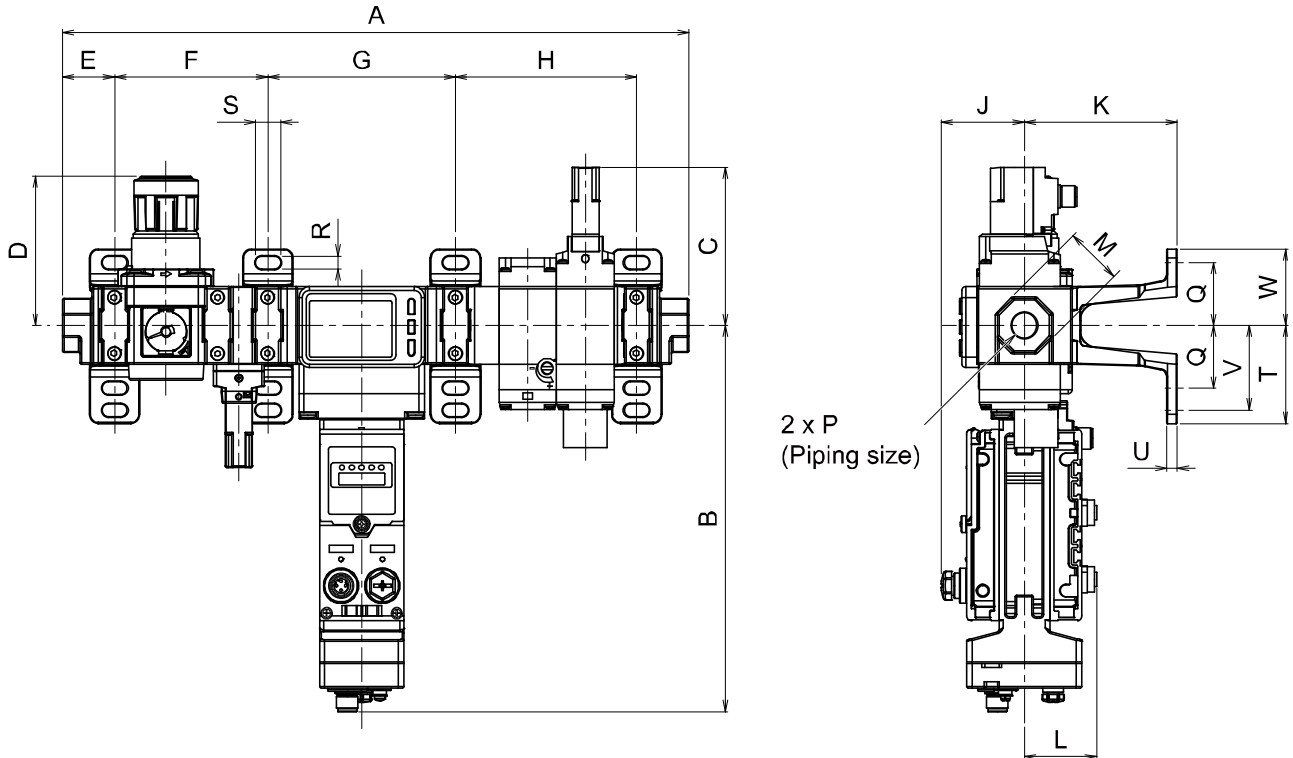


Part number	A	F
AMS20A-H00D	219.9	68.6
AMS30A-H00D	229.4	70.1
AMS40A-H00D	264.4	86.6
AMS60A-H00D	311.4	87.1

\*: Refer to "AMS20/30/40/60A-R/N/F#D" for dimensions other than "A" and "F". (page 137)

**Standby regulator type  
NC specification**

•AMS20/30/40/60B-R/N/F#C



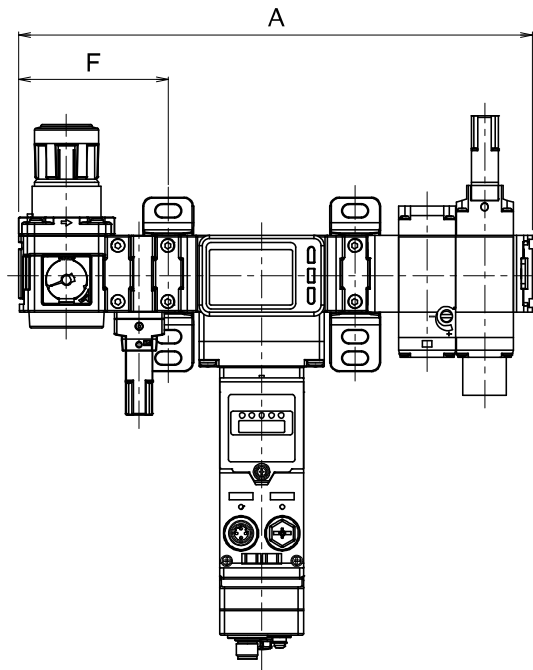
Part number	P	A	B	C	D*	E	J	M	L
AMS20B-#C	1/8 • 1/4	301.8	214.7	81.7	66.8	25.6	46.2	24	40.1
AMS30B-#C	1/4 • 3/8	348.3	214.7	87.9	86.5	29.1	46.2	30	40.1
AMS40B-#C	3/8 • 1/2	395.8	214.9	92.4	91.5	32.6	46.2	36	40.1
AMS60B-#C	3/4 • 1	491.8	214.8	93.4	125	42.1	46.2	46	40.1

\*: Dimension D is the dimension when the handle is unlocked.

Part number	Dimensions with bracket										
	K	F	G	H	Q	R	S	T	U	V	W
AMS20B-#C	85	71.2	103.2	76.2	35	7	14	54.5	6	47	42.5
AMS30B-#C	85	85.2	104.2	100.7	35	7	14	54.5	6	47	42.5
AMS40B-#C	85	103.2	105.2	122.2	40	9	18	65	7	55	50
AMS60B-#C	100	124.2	126.2	157.2	50	11	20	80	8	70	60



•AMS20/30/40/60B-#00C

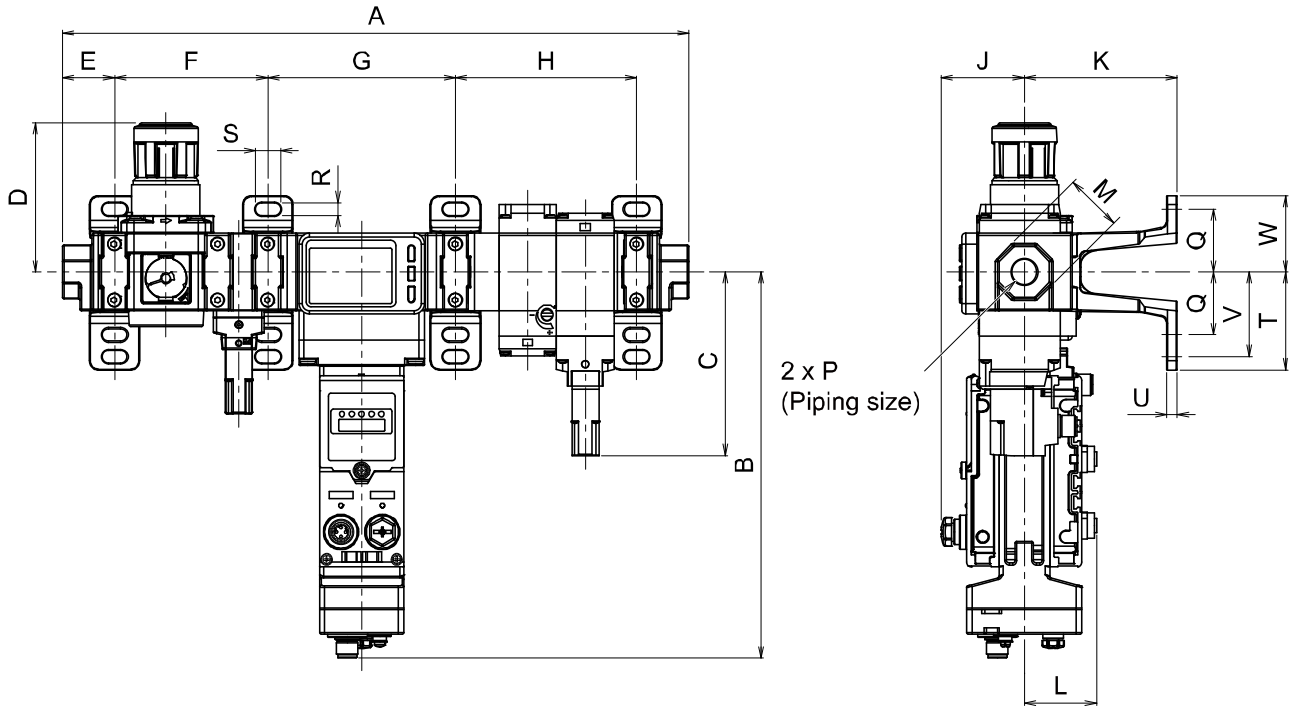


Part number	A	F
AMS20B-#00C	247.4	69.6
AMS30B-#00C	285.9	83.1
AMS40B-#00C	325.4	100.6
AMS60B-#00C	401.4	121.1

\*: Refer to "AMS20/30/40/60B-R/N/F#C" for dimensions other than "A" and "F". (page 139)

**Standby regulator type  
NO specification**

•AMS20/30/40/60B-R/N/F#D

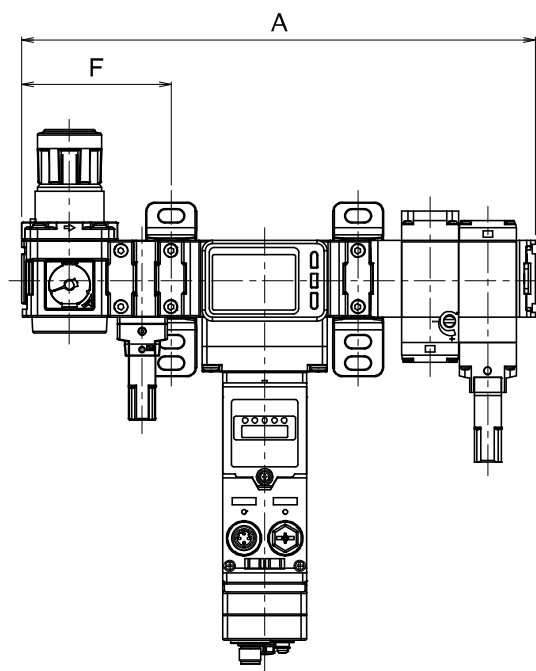


Part number	P	A	B	C	D*	E	J	M	L
AMS20B-#D	1/8 • 1/4	301.8	214.7	85.1	66.8	25.6	46.2	24	40.1
AMS30B-#D	1/4 • 3/8	348.3	214.7	102.1	86.5	29.1	46.2	30	40.1
AMS40B-#D	3/8 • 1/2	395.8	214.9	119.4	91.5	32.6	46.2	36	40.1
AMS60B-#D	3/4 • 1	491.8	214.8	118	125	42.1	46.2	46	40.1

\*: Dimension D is the dimension when the handle is unlocked.

Part number	Dimensions with bracket										
	K	F	G	H	Q	R	S	T	U	V	W
AMS20B-#D	85	71.2	103.2	76.2	35	7	14	54.5	6	47	42.5
AMS30B-#D	85	85.2	104.2	100.7	35	7	14	54.5	6	47	42.5
AMS40B-#D	85	103.2	105.2	122.2	40	9	18	65	7	55	50
AMS60B-#D	100	124.2	126.2	157.2	50	11	20	80	8	70	60

•AMS20/30/40/60B-#00D

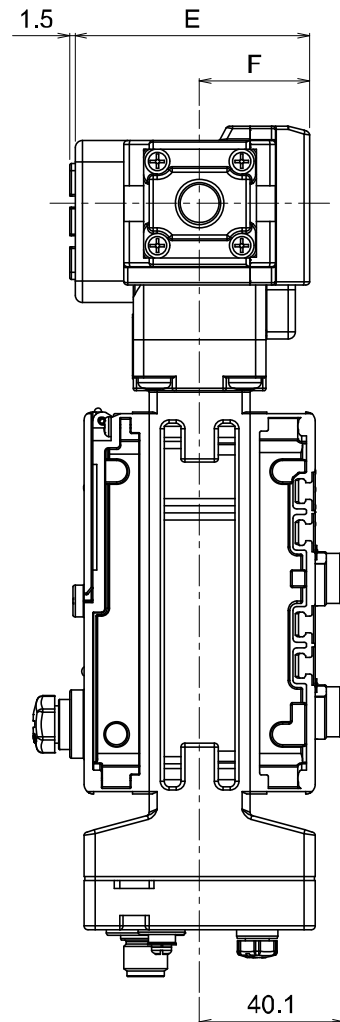
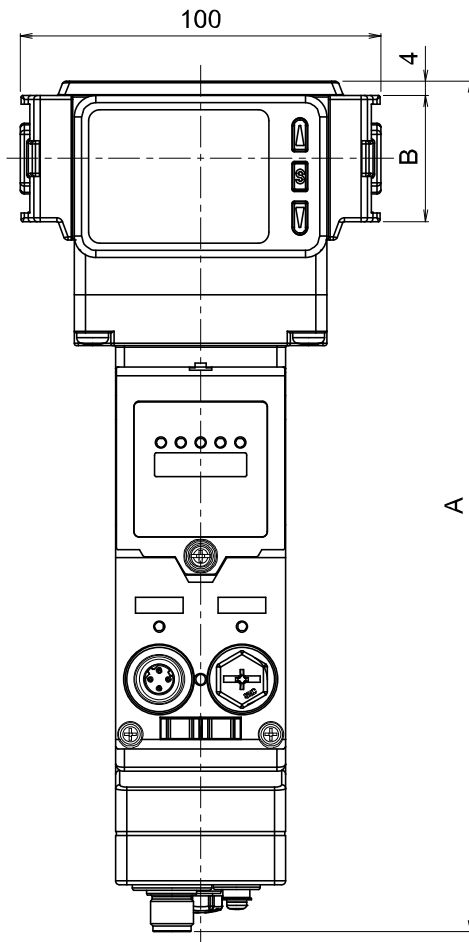
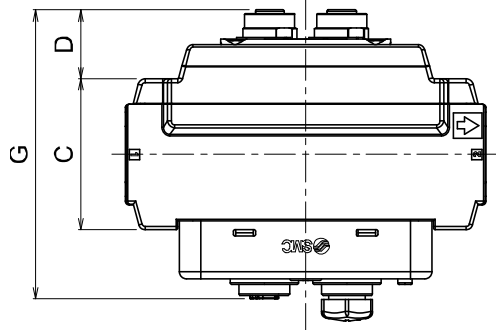


Part number	A	F
AMS20B-#00D	247.4	69.6
AMS30B-#00D	285.9	83.1
AMS40B-#00D	325.4	100.6
AMS60B-#00D	401.4	121.1

\*: Refer to "AMS20/30/40/60B-R/N/F#D" for dimensions other than "A" and "F". (page 141)

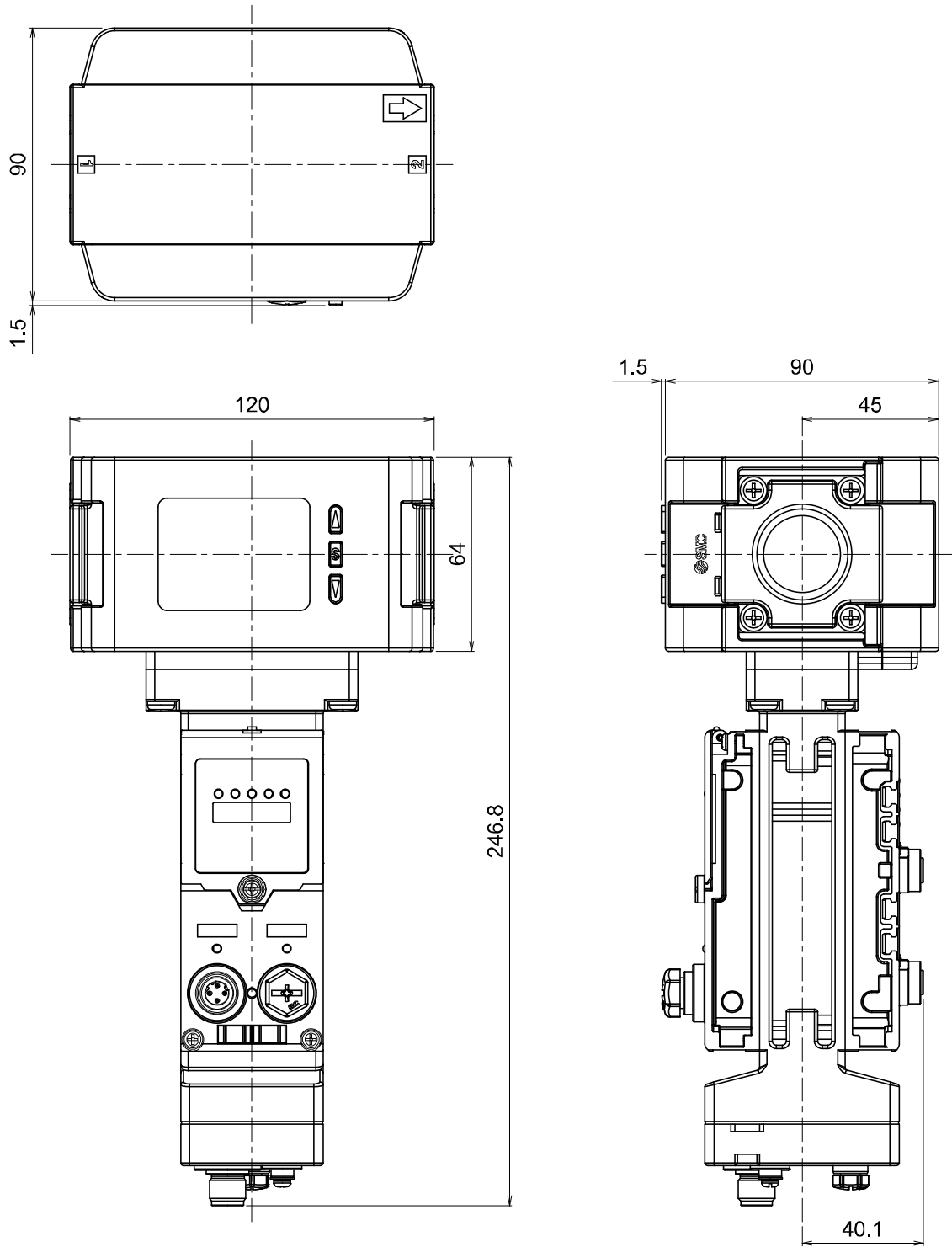
## Air Management Hub Base type

•EXA1-20/30/40-PN/EN/EC-#



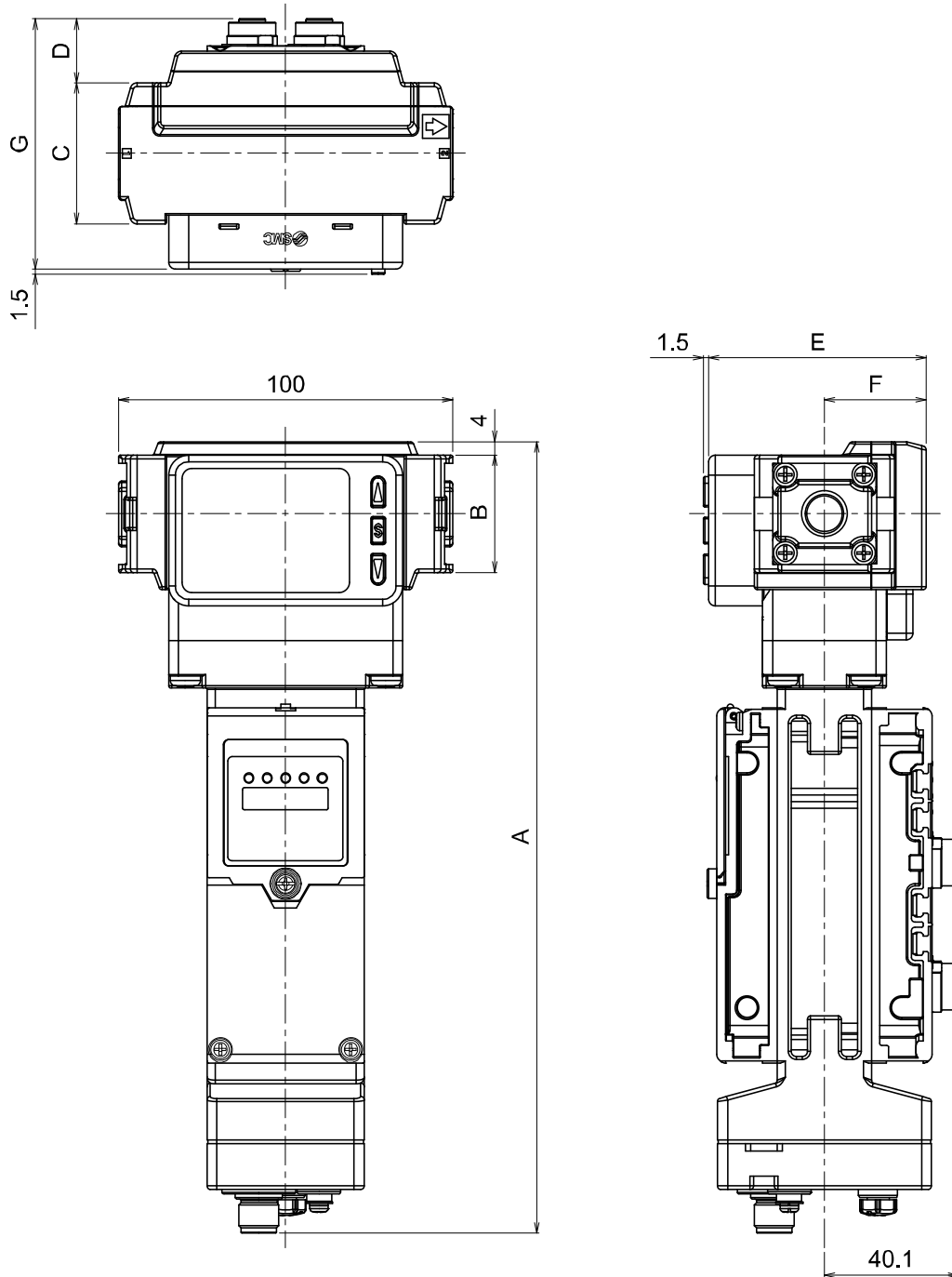
Model	A	B	C	D	E	F
EXA1-20	236.2	35	42	19.1	65.1	30.5
EXA1-30	236.2	43	53	13.6	65.1	30.5
EXA1-40	240.4	51	64.4	4.6	71	35.5

•EXA1-60-PN/EN/EC-#



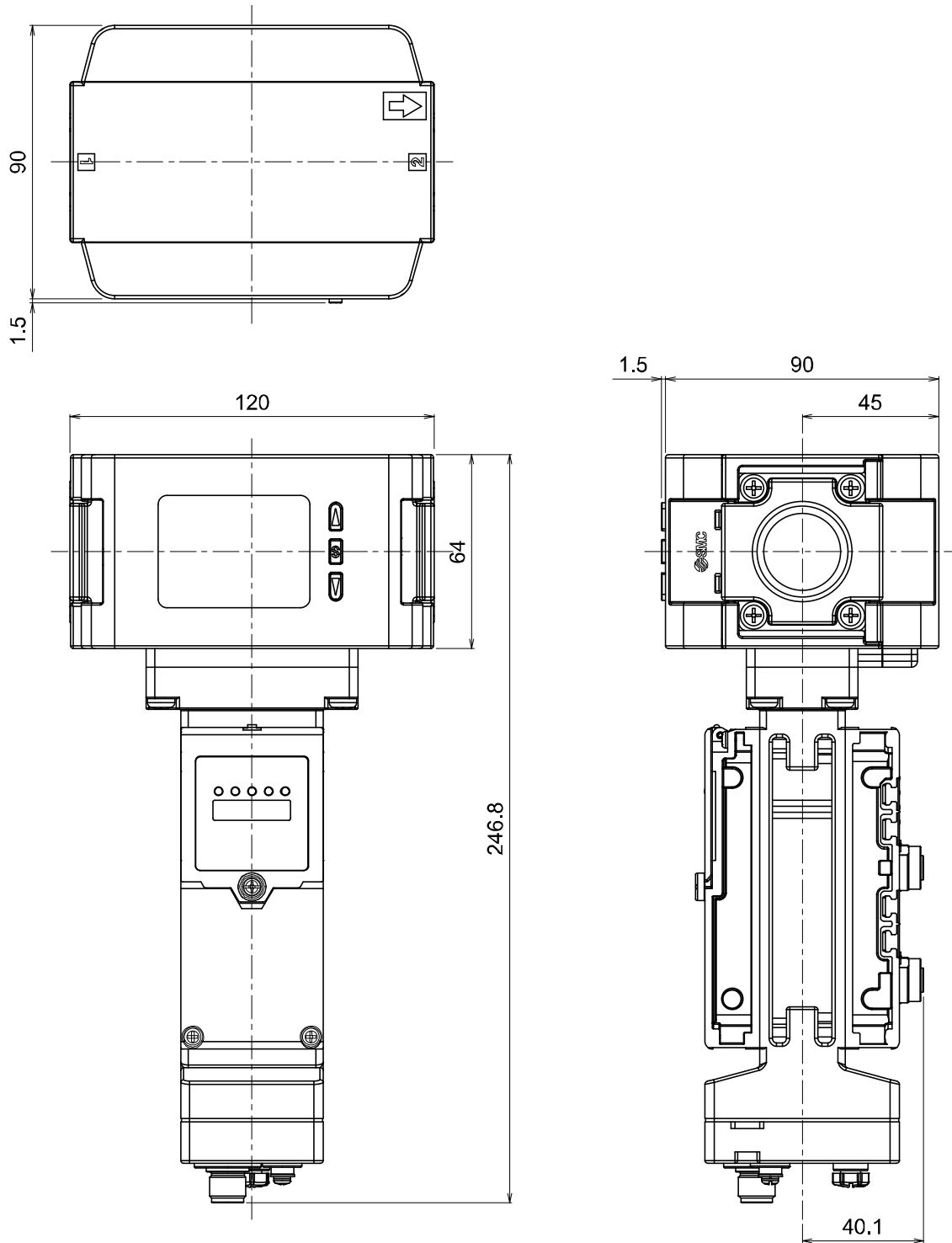
## Remote type

•EXA1-20/30/40-SA-#



Model	A	B	C	D	E	F	G
EXA1-20	236.2	35	42	19.1	65.1	30.5	74.7
EXA1-30	236.2	43	53	13.6	65.1	30.5	74.7
EXA1-40	240.4	51	64.4	4.6	71	35.5	75.6

•EXA1-60-SA-#



Refer to separate operation manuals for other AMS components.

## Accessories

### Seal cap (10 pcs.)

Be sure to mount a seal cap on any unused I/O connectors. Otherwise, the specified enclosure IP rating cannot be maintained.

#### EX9-AWES (For M8)



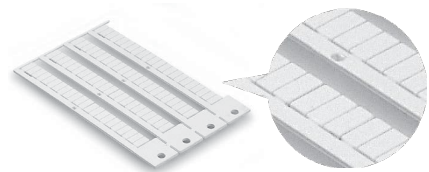
#### EX9-AWTS (For M12)



### Marker (1 sheet, 88 pcs.)

The signal name of the I/O device and each unit address can be entered and mounted on each unit.

#### EX600-ZT1



### Silencer

Connect a silencer to the exhaust port on the residual pressure relief valve. Recommended part numbers are shown below.

Part number	Silencer	Compact resin type			Metal body type		High noise reduction type				
		Part number	AN20-02	AN30-03	AN40-04	AN500-06	AN600-10	AN202-02	AN302-03	AN402-04	ANA1-06
	Piping size	1/4	3/8	1/2	3/4	1	1/4	3/8	1/2	3/4	1
AMA20#-##C-#-#L#	NC	○	-	-	-	-	○	-	-	-	-
AMA20#-##D-#-#L#	NO	○	-	-	-	-	-	-	-	-	-
AMA30#-##C-#-#L#	NC	-	○	-	-	-	-	○	-	-	-
AMA30#-##D-#-#L#	NO	-	○	-	-	-	-	-	-	-	-
AMA40#-##C-#-#L#	NC	-	-	○	-	-	-	-	○	-	-
AMA40#-##D-#-#L#	NO	-	○	-	-	-	-	-	-	-	-
AMA60#-##C-#-#L#	NC	-	-	-	-	○	-	-	-	-	○
AMA60#-##D-#-#L#	NO	-	-	-	○	-	-	-	-	○	-



Power Supply Cable (M12 connector, For EXA1)

EX500-AP **050** - **S**

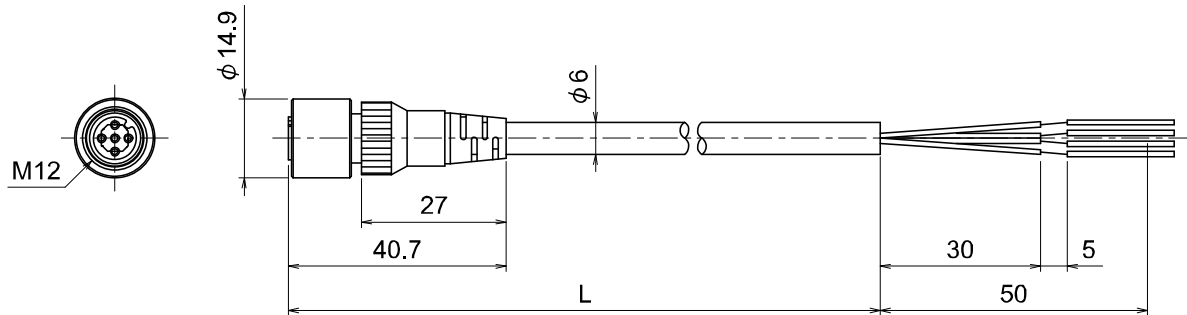
Cable length (L)

Symbol	Content
010	1000 mm
050	5000 mm

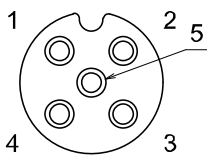
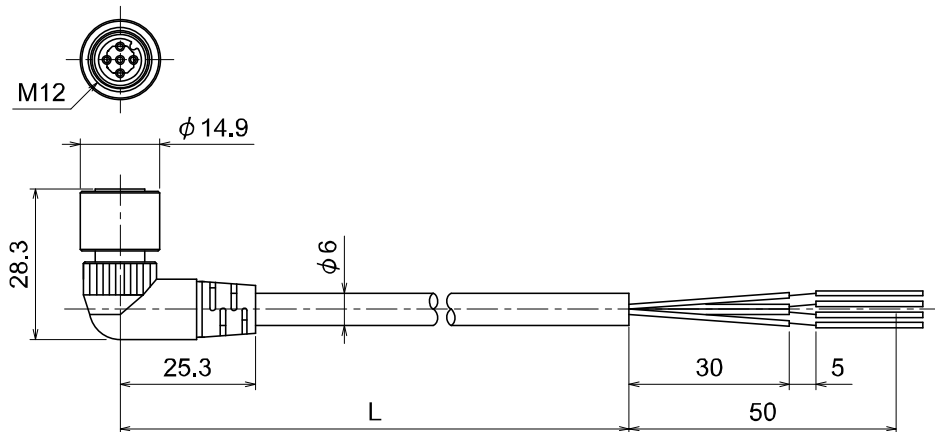
Connector specification

Symbol	Content
S	Straight
A	Right angle

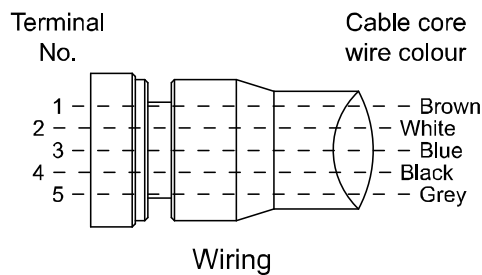
**Straight connector type**



**Angle connector type**



Socket connector pin arrangement  
A-coded  
(Normal key)



Item	Specifications
Cable O.D.	φ6 mm
Nominal cross section	0.3 mm <sup>2</sup> /AWG22
Wire diameter (Including insulator)	1.5 mm
Min. bending radius (Fixed)	40 mm

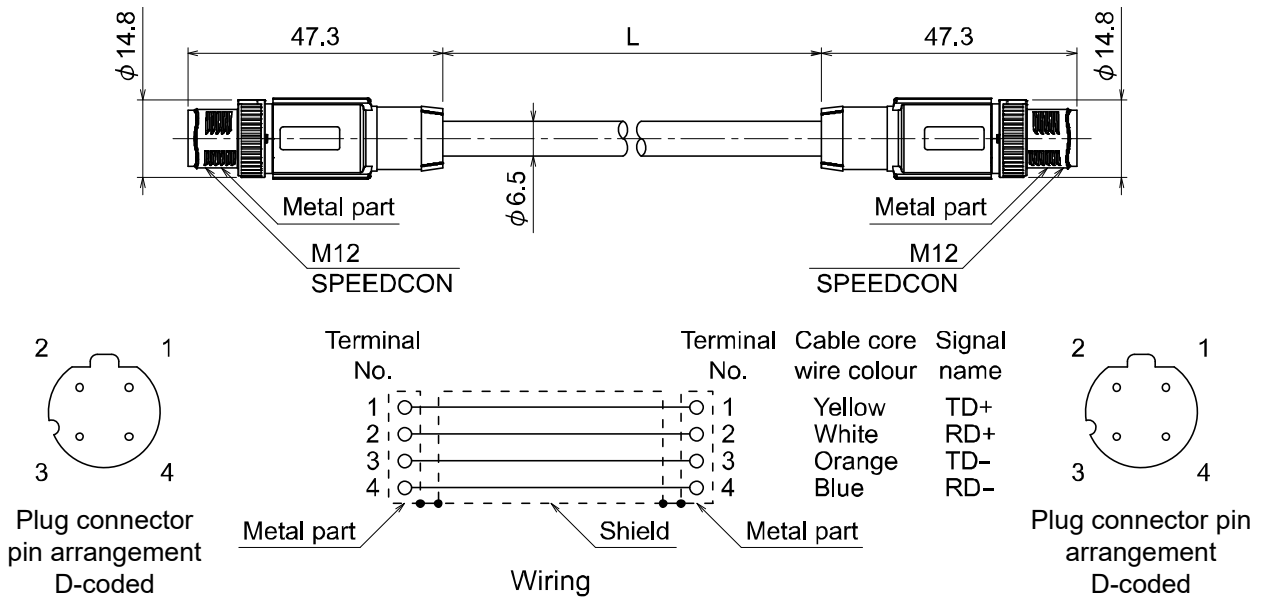
## Communication Cable/Communication Cable with Connector/Communication Connector

With connector on both sides (Plug/Plug)

EX9-AC **005** EN-PSPS

• Cable length (L)

Symbol	Content
005	500 mm
010	1000 mm
020	2000 mm
030	3000 mm
050	5000 mm
100	10000 mm



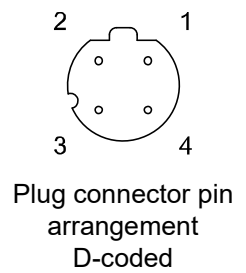
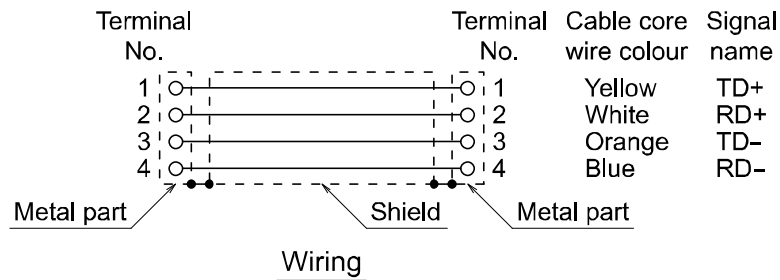
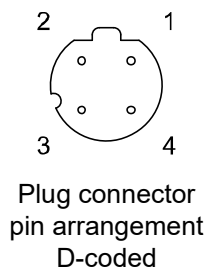
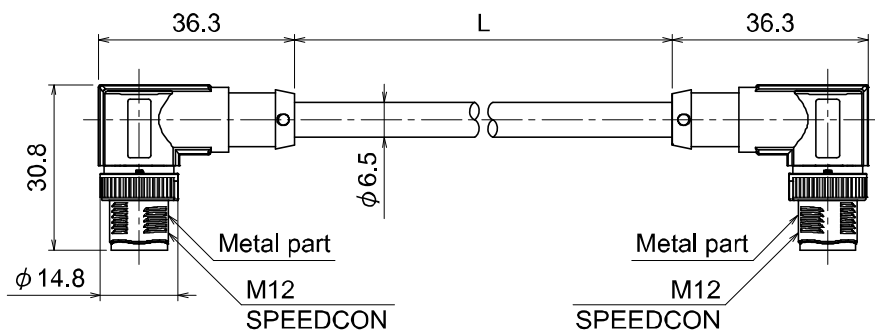
Item	Specifications
Cable O.D.	φ6.5 mm
Conductor nominal cross section	0.34 mm <sup>2</sup> /AWG22
Wire O.D. (Including insulator)	1.55 mm
Min. bending radius (Fixed)	19.5 mm

With angled connector on both sides (Plug/Plug)

## EX9-AC 005 EN-PAPA

• Cable length (L)

Symbol	Content
005	500 mm
010	1000 mm
020	2000 mm
030	3000 mm
050	5000 mm
100	10000 mm



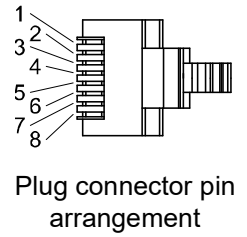
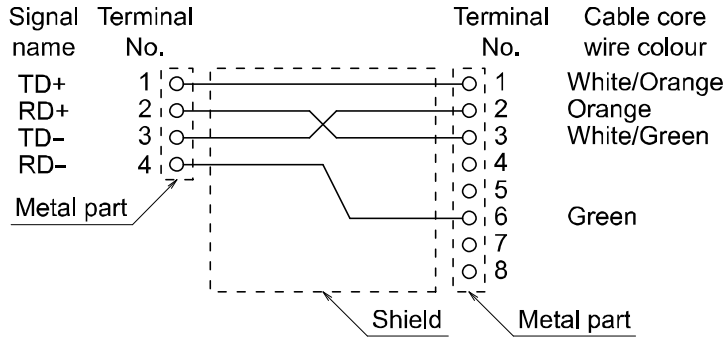
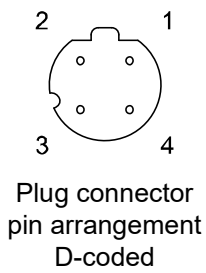
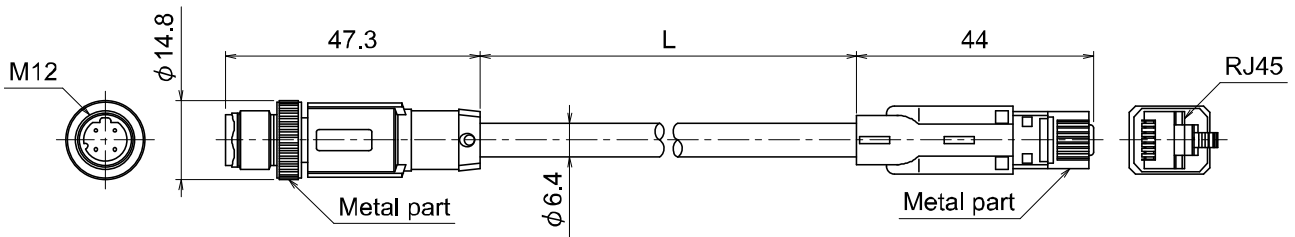
Item	Specifications
Cable O.D.	φ6.5 mm
Conductor nominal cross section	0.34 mm <sup>2</sup> /AWG22
Wire O.D. (Including insulator)	1.55 mm
Min. bending radius (Fixed)	19.5 mm

Cable with M12 ↔ RJ-45 connector (Plug/RJ-45 connector)

EX9-AC **020** EN-PSRJ

• Cable length (L)

Symbol	Content
010	1000 mm
020	2000 mm
030	3000 mm
050	5000 mm
100	10000 mm

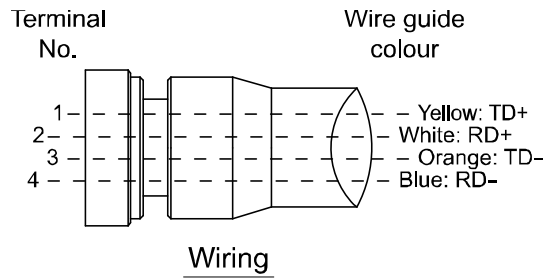
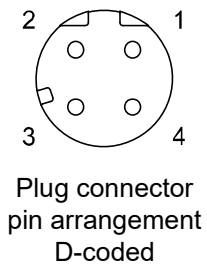
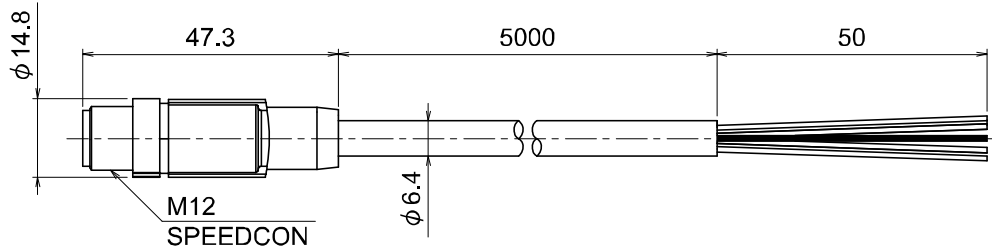


Wiring

Item	Specifications
Cable O.D.	φ6.4 mm
Nominal cross section	0.14 mm <sup>2</sup> /AWG26
Wire diameter	0.98 mm
Min. bending radius (Fixed)	26 mm

Cable with connector (Plug)

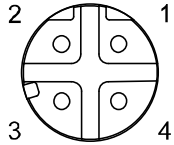
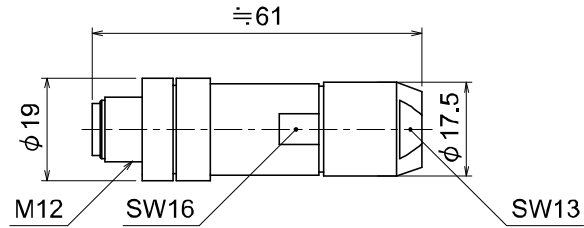
PCA-1446566



Item	Specifications
Cable O.D.	φ6.5 mm
Nominal cross section	AWG22
Wire diameter (Including insulator)	1.5 mm
Min. bending radius (Fixed)	45.5 mm

Field wireable connector

PCA-1446553



Plug connector  
pin arrangement  
D-coded

Terminal No.	Wire colours
1	Orange/White
2	Green/White
3	Orange
4	Green

Applicable Cable

Item	Specifications
Cable O.D.	4.0 to 8.0 mm
Wire gauge (Stranded wire cross section)	0.14 to 0.34 mm <sup>2</sup> / AWG26 to 22

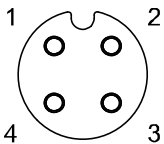
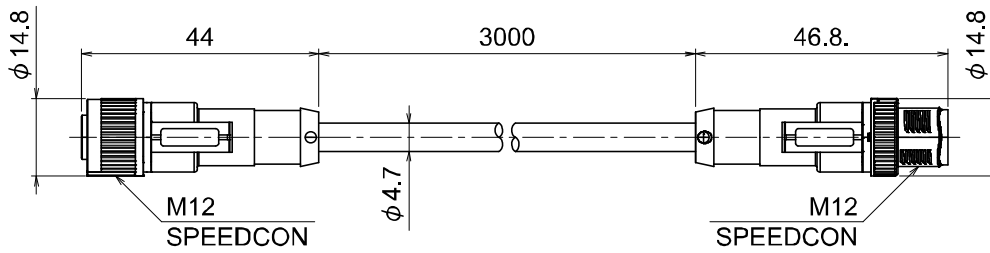
\*: The table above shows the specifications for the applicable cable.  
Adaptation for the connector may vary on account of the conductor construction of the electric wire.

**Power Supply Cable with M12 Connector (A-coded)**

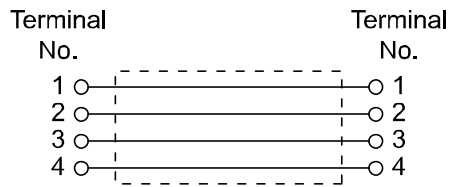
PCA-1557769

• Cable length (L)

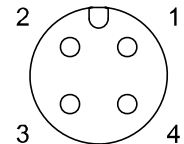
Symbol	Content
1557769	3000 mm



Socket connector  
pin arrangement  
A-coded  
(Normal key)

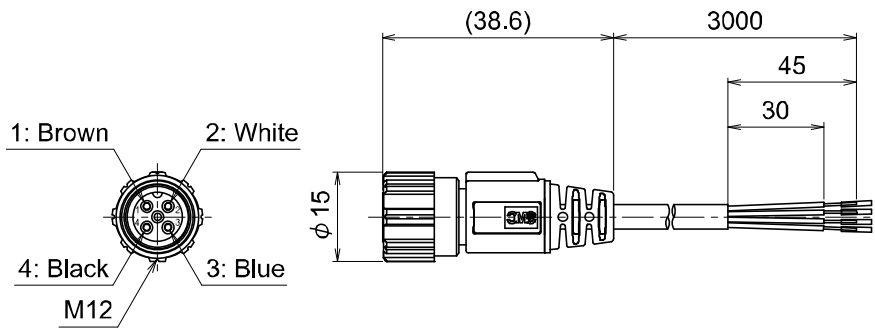


Wiring

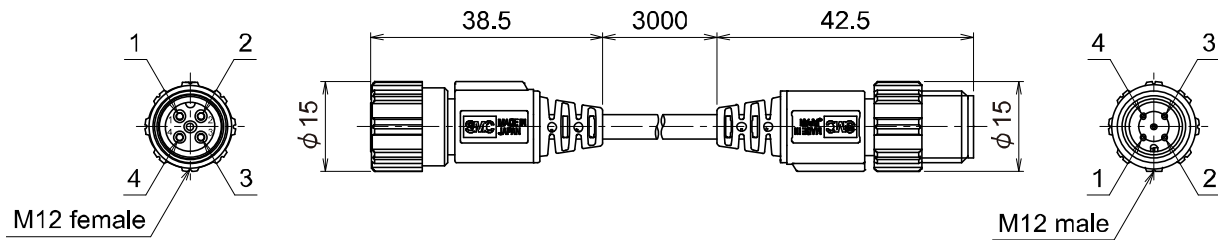


Plug connector  
pin arrangement  
A-coded  
(Normal key)

Lead wire with M12 connector (ZS-37-A)



Lead wire with M12 connector (ZS-49-A)

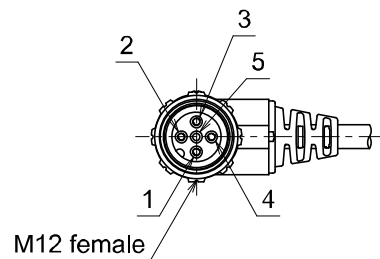
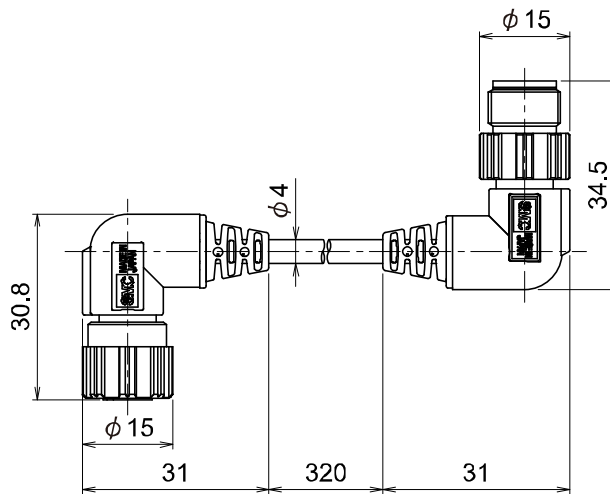
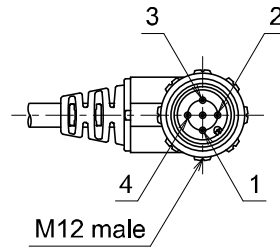


Cable specification for M12 connector and lead wire (ZS-37-A, ZS-49-A)

Item	Specifications	
Conductor	Nominal cross section	AWG23
Insulator	O.D.	Approx. 1.1 mm
	Clours	Brown, Blue, Black, White
Sheath	Cable O.D.	φ4



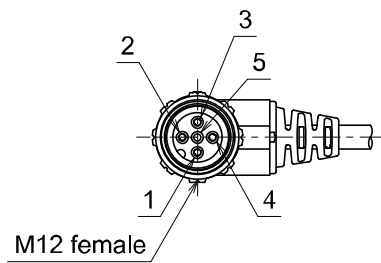
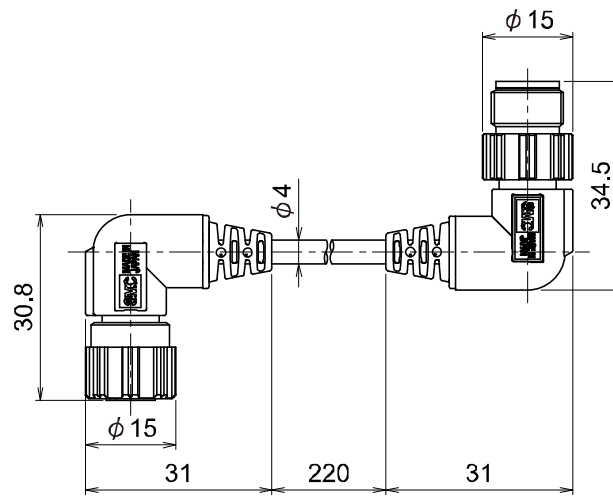
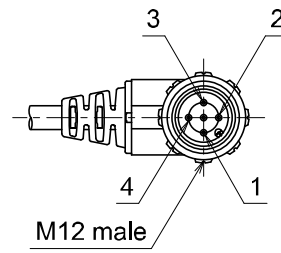
Connector cable for AMS components  
Lead wire with M12 connector (EXA1-AC1)



Cable specification for M12 connector and lead wire

Item		Specifications
Conductor	Nominal cross section	AWG23
Insulator	O.D.	Approx. 1.1 mm
Sheath	Cable O.D.	$\phi 4$

Lead wire with M12 connector (EXA1-AC2)



Cable specification for M12 connector and lead wire

Item		Specifications
Conductor	Nominal cross section	AWG23
Insulator	O.D.	Approx. 1.1 mm
Sheath	Cable O.D.	$\phi 4$

#### Revision history

A: Contents are added [March 2023]  
B: Contents revised in several places  
[April 2023]

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