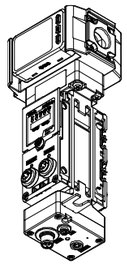
ORIGINAL INSTRUCTIONS

Instruction Manual
Air Management Hub
EXA1



The intended use of the Air Management Hub is to monitor and display flow, pressure and temperature information and also to control Air Management System.

1 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: Manipulating industrial robots -Safety. etc.

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.
- This product is class A equipment intended for use in an industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted or radiated disturbances.

⚠ **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

- **Always ensure compliance with relevant safety laws and standards.**
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.
- **Do not disassemble, modify (including changing the printed circuit board) or repair.**
  An injury or failure can result.
- **Do not operate the product outside of the specifications.**
  Fire, malfunction or damage to the product can result.
- **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 can result.
- **If using the product in an interlocking circuit:**
  Provide a double interlocking system, for example a mechanical system.
- **Check the product for correct operation.**
  Otherwise malfunction can result, causing an accident.
- **Do not touch the terminals and connectors while the power is on.**
  Otherwise electric shock, malfunction or product damage can result.
- To obtain information about this product, please contact SMC.

2 Specifications

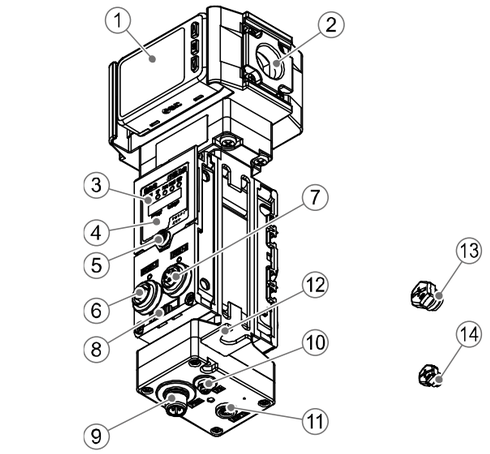
Model			EXA1-20	EXA1-30	EXA1-40	EXA1-60
Applicable fluid			Air			
Operating fluid temperature			0 to 50 °C			
Flow	Rated flow range		5 to 500 L/min	10 to 1000 L/min	20 to 2000 L/min	40 to 4000 L/min
	Accumulated flow		0 to 9,999,999,990 L			
	Min. resolution	Instantaneous flow	1 L/min		2 L/min	
		Accumulated flow	10 L			
Pressure	Rated pressure range		0.000 to 1.000 MPa			
	Min. resolution		0.001 MPa			
	Proof pressure		1.5 MPa			
Temperature	Rated temperature range		0.0 to 50.0 °C			
	Display temperature range		-10.0 to 60.0 °C			
	Min. resolution		0.1 °C			
Electrical	Power supply voltage		24 VDC ±10%			
	Power consumption		9.6 W			
	Protection		Reverse protection Current Limit			
Accuracy	Flow rate		±3.0% F.S.			
	Pressure		±3.0% F.S.			
	Temperature		±2.5 °C (at 10% to 100% of flow range)			
	Repeatability (flow rate/pressure)		±1.0% F.S.			
	Temperature characteristics (flow rate/pressure)		±5.0% F.S. (Ambient Temperature 0 to 50 °C, 25 °C standard)			
	Pressure Characteristics (flow rate)		±5.0% F.S. (0 to 1.0 MPa, 0.5 MPa standard)			
IO	User configurable port	Number of free ports	1			
		Configuration	2 x Digital Input Digital Input and Output IO-Link and Digital Input			
	Port Specifications	IO-Link Communication Speed	COM1 (4.8 kBaud) COM2 (38.4 kBaud) COM3 (230.4 kBaud) Automatically switches depending on the connected device			
		IO-Link Max. supply current	0.3 A			
		Input type	PNP			
		Input Rated input current	Pin2: 2.5 mA typ. Pin4: 5.8 mA typ.			
		Input ON voltage	13 V or more			
		Input OFF voltage	8 V or less			
		Output type	PNP			
		Output Max. load current	0.25 A			
	Output for Air Management System function		IO-Link / PNP Input / PNP output			
Indicator			LED, LCD			
Units	Instantaneous flow		L/min, CFM (ft³/min)			
	Accumulated flow		L, ft³			
	Pressure		MPa, KPa, kgf/cm², bar, psi			
	Temperature		°C, °F			

2 Specifications (continued)

Model		EXA1-20	EXA1-30	EXA1-40	EXA1-60
Environmental	Protection	IP65			
	Operating temperature range	Operation: 0 to 50 °C, Storage: -10 to 60 °C (no condensation or freezing)			
Functions		IO-Link Unit Pressure detection Flow detection Temperature detection Air Management System functions -Auto Standby [Logic] -Auto Isolation [Logic] -Machine Input signal			
Connectors		PSU (M12, A-coded) IO-Link (M12, A-coded) Wireless Adaptor (M8) * PROFINET/ EtherNet/IP™ (M12, D-coded)			

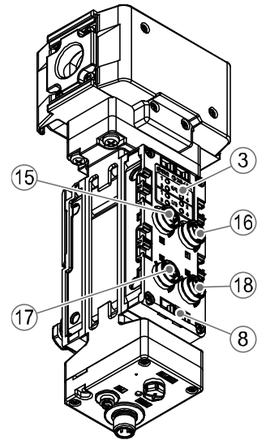
*: Not compatible with EX600-W series when wireless adaptor is connected.

3 Names of Individual parts



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)	Connector for Industrial Ethernet input.
7	Connector (PORT2)	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 adaptor connector	To connect Wireless adaptor.
12	Wireless adaptor bracket	To mount wireless adaptor.
13	Seal cap (1 pc.)	For all unused M12 connectors.
14	Seal cap (1 pc.)	For M8 connector when not used.

3 Names of Individual parts (continued)



No	Part	Description
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.

4 Installation

4.1 Installation

⚠ Warning

- Do not install the product unless the safety instructions have been read and understood.
- Use the product within the specified operating pressure and temperature range.

4.2 Environment

⚠ Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product’s specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product’s specifications.

4.3 Mounting

- Never mount the product in a location where it will be used as a mechanical support.
- Mount the product so that the fluid flows in the direction indicated by the arrow on the side of the body.
- Avoid mounting the product with the display facing upward.
- Do not mount the product upside down.
- The monitor with integrated display can be rotated. Rotating the display with excessive force will damage the end stop.

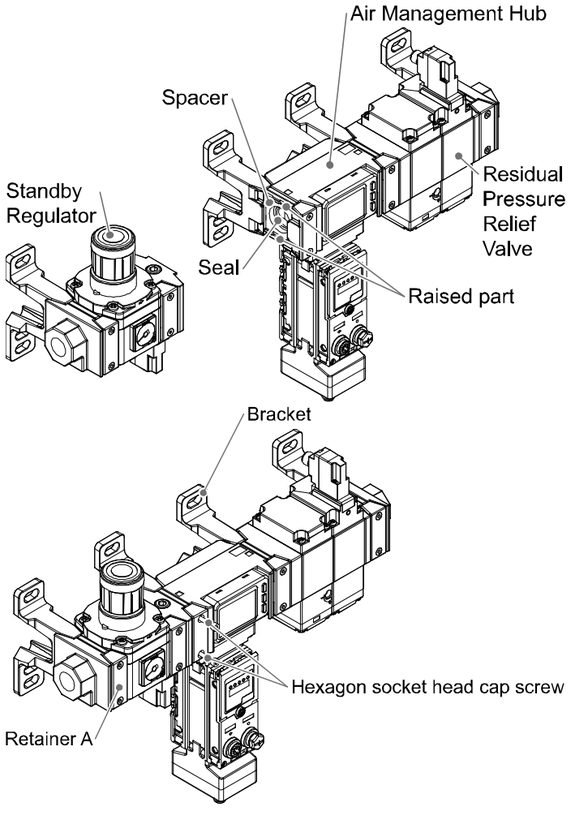
4 Installation (continued)

4.4 Piping

⚠ Caution

- Before connecting piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material does not enter inside the port.
- Fit the raised part of the spacer to the recessed part (groove for the raised part) of the product.
- Temporarily tighten the retainer A with two hexagon socket head cap screws.
- Tighten the two hexagon socket head cap screws evenly with a hexagonal wrench.
- Refer to the table below for the screw tightening torque.

Applicable model	Hexagonal wrench socket size nominal value	Tightening torque
EXA1-20	2 mm	0.36±0.036 N•m
EXA1-30	3 mm	1.2±0.05 N•m
EXA1-40		
EXA1-60	4 mm	2.0±0.1 N•m



- If an accessory is required for maintenance purposes, order the following parts number. They must be separately prepared by the user.

Body size	Spacer with bracket	Pipe adaptor
20	Y200T-2-D	E200-##-D*
30	Y300T-2-D	E300-##-D*
40	Y400T-1-D	E400-##-D*
60	Y600T-2-D	E600-##-D*

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

4 Installation (continued)

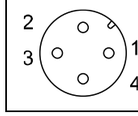
4.5 Wiring

⚠ Caution

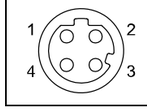
- **Do not perform wiring while the power supply is ON.**
- **Confirm proper insulation of wiring.**
- **Do not route wires and cables together with power or high voltage cables.**
  The product can malfunction due to interference of noise and surge voltage from power and high voltage cables. Route the wires of the product separately from power or high voltage cables.
- If a commercially available switching power supply is used, be sure to connect the Functional Earth (FE) terminal to Ground. If the product is connected to the commercially available switching power supply, switching noise will be superimposed and the product specifications will not be satisfied. In that case, insert a noise filter such as a line noise filter/ ferrite between the switching power supplies or change the switching power supply to the series power supply.

- **Power Connection – M12 4-pin A-coded plug**
  This is the connector (Power) described in section 3 item 9.

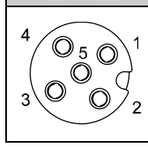
When used as switch output device

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

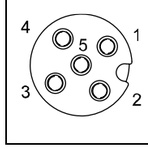
- **Communication Connection – M12 4-pin socket (D-coded)**
  Select the appropriate cables to mate with the connectors on the Air Management Hub. The PROFINET connection port pin layout is as shown below.
  This is the connector (Port) described in section 3 item 6 and 7.

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

- **Functional Connection – M12 5-pin socket (A-coded)**
  Select the appropriate cables to mate with the connectors on the Air Management Hub.
- Port1 (VP) – Connector (Port1) described in section 3 item 15.

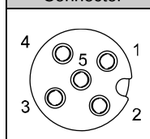
Connector	Pin No.	Signal	Details
	1	NC	Not connected
	2	NC	Not connected
	3	0 V	0 V
	4	Output	Output
	5	NC	Not connected

- Port2 (ITV / AR) – Connector (Port2) described in section 3 item 16.

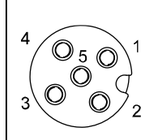
Connector	Pin No.	Signal	Details
	1	24 V	24 VDC
	2	NC	Not Connected
	3	0 V	0 V
	4	C/Q	ITV IO-Link ARS Output
	5	NC	Not Connected

4 Installation (continued)

- Port3 (Standby / Isolation Signal) – Connector (Port3) described in section 3 item 17.

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

- Port4 (IO-Link) – Connector (Port4) described in section 3 item 18.

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

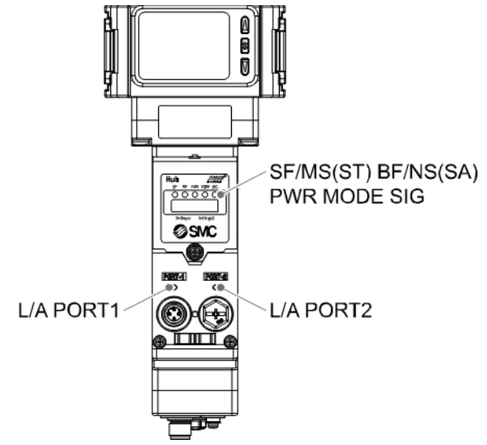
*: Can be changed using parameters.

5 Setting

5.1 Configuration

To obtain information about this product, please contact SMC.

6 LED Display

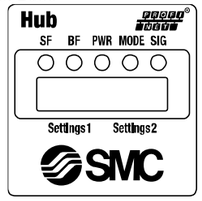


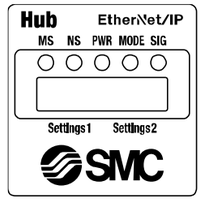
This is the LED display for Air Management Hub status described in section 3 item 3.

Display	Description
SF/MS	Air Management System error. Pairing mode.
ST	Air Management System error. Pairing mode.
BF/NS	Status of the Fieldbus connection. Pairing mode.
SA	Product mode (Standalone or Wireless). Pairing mode.
PWR	Displays the status of the power supply voltage.
MODE	Air Management System status.
SIG	Standby / Isolation input status.
L/A PORT1	Displays the communication status of PORT 1.
L/A PORT2	Displays the communication status of PORT 2.

6 LED Display (continued)

Case: Base





This is the LED display for Air Management Hub status described in section 3 item 3.

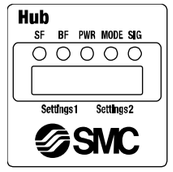
LED	LED colour	PROFINET	EtherNet/IP™
		Operation	
SF/ MS	OFF	Operating normally, or the power supply is OFF.	Power supply is OFF
	Orange flashing	Node flashing test command received. Internal communication error in wireless adaptor	-
	Green ON	-	Normal operation
	Green flashing	•Power supply voltage is abnormal. •Short circuit of output ports or 24 V port.	EtherNet/IP™ connection is not established.
	Red flashing	Pairing mode (synchronized with BF).	• Power supply voltage is abnormal. • Short circuit of power supply in input or output port. • Excessive I/O setting inputs/outputs • Internal communication error in wireless adaptor • Pairing mode (synchronized with NS)
	Red ON	Component failure inside the Air Management Hub.	
BF/ NS	OFF	PROFINET communication established.	-
	Green ON	OPC UA mode.	EtherNet/IP™ communication is established.
	Green flashing	-	EtherNet/IP™ communication is not established.
	Red flashing	Pairing mode (synchronized with BF).	•EtherNet/IP™ communication timeout. •Pairing mode (synchronized with MS)
	Red ON	• Cable not connected between PLC and Air Management Hub. • Wrong Device name on PROFINET. • Wrong IP address or not configured. • Wrong GSDML file. • Configuration mismatch between PLC and actual connection.	Duplicated IP addresses are detected

6 LED Display (continued)

LED	LED colour	PROFINET / EtherNet/IP™ Operation
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 ON.
	Orange flashing	Isolation input ON.
	Orange ON	Standby and VP inputs are both ON.

LED	LED colour	Operation
L/A PORT 1	OFF	PORT 1: No Link, No Activity.
	Green ON	PORT 1: Link, No Activity.
	Green flashing	PORT 1: Link, Activity.
L/A PORT 2	OFF	PORT 2: No Link, No Activity.
	Green ON	PORT 2: Link, No Activity.

Case: Remote



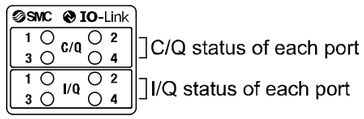
This is the LED display for Air Management Hub status described in section 3 item 3.

LED	LED colour	Operation
ST	OFF	Operating normally, or the power supply is OFF.
	Green flashing	Power supply voltage is abnormal. Short circuit of output ports or 24 V port.
	Red flashing	Pairing mode (synchronized with SA).
	Red ON	Component failure inside the Air Management Hub.
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.

6 LED Display (continued)

LED	LED colour	Operation
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.

The LED displays the status of Pin No.4 (C/Q) and Pin No.2 (I/Q) for each IO-Link port of the Air Management Hub.
The figures below show the status of each port.



This is the LED display for Air Management Hub status described in section 3 item 3.

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/AR (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)	Connected device matching error. Device process data mapping error. Data storage writing error.
	Green ON	IO-Link device in communication.
	Red ON	Short circuit detection (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 detection (24 V).

Port3 (Isolation signal)

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

6 LED Display (continued)

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 detection (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 detection (24 V or C/Q).
DI (Digital input)	OFF	Input signal OFF.
	Orange ON	Input signal ON.
	Red ON	Short circuit detection (24 V).
DO (Digital output)	OFF	Output signal OFF.
	Orange ON	Output signal ON.
	Red ON	Short circuit detection (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 and I/Q_4 common

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

7 How to Order

To obtain information about this product, please contact SMC.

8 Outline Dimensions (mm)

To obtain information about this product, please contact SMC.

9 Maintenance

9.1 General Maintenance

⚠ Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous.
- Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.
- Remove condensate periodically.
  If condensate enters the secondary side, it can cause operating 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 up the stains again with a dry cloth.
- How to reset the product after a power cut or when the power has been unexpectedly removed
  The settings of the product are retained from before the power cut or de-energizing.
  The output condition also recovers to that before the power cut or de-energizing, but may change depending on the operating environment. Therefore, check the safety of the whole system before operating the product.

10 Limitations of Use

10.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

11 Product disposal

This product should not be disposed of as municipal waste. Check your local regulations and guidelines to dispose of this product correctly, in order to reduce the impact on human health and the environment.

12 Contacts

To obtain information about this product, please contact SMC.

SMC Corporation

URL: https://www.smcworld.com (Global) https://www.smc.eu (Europe)
SMC Corporation, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan

Template DKP50047-F-085M