ORIGINAL INSTRUCTIONS

Instruction Manual
Fieldbus device – Digital Input / Output units
EX600-DX## / EX600-DY## / EX600-DM##

The intended use of the digital input and output unit is to connect I/O devices to an SI unit for the control of pneumatic valves.

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.

⚠ **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.

2 Specifications

2.1 General specifications

Model		DX#B / DX#C / DX#D	DX#E / DX#F	DY#B / DY#E / DY#F
			DM#E / DM#F	
Power supply	Control + input	24 VDC, 2.0 A max.		
	Outputs	24 VDC, 2.0 A max.		
Rated input current		9 mA max.	5 mA max.	-
Max. load current		-		500 mA max.
Operating temperature		-10 to +50 °C		
Storage temperature		-20 to +60 °C		
Ambient humidity		35 to 85% RH (no condensate)		
Withstand voltage		500 VAC applied for 1 minute		
Insulation resistance		500 VDC, 10 MΩ or more		
Enclosure rating (manifold assembled)		IP67 (EX600-D##B / D##C / D##D) IP40 (EX600-D##E / D##F)		
Weight		300 g approx.		

3 Name and function of parts

EX600-DX#B (input unit)

EX600-DX#C# (input unit)

EX600-DX#D (input unit)

EX600-DX#E (input unit)

EX600-DX#F (input unit)

EX600-DY#B (output unit)

EX600-DY#E (output unit)

EX600-DY#F (output unit)

EX600-DM#E (input/output unit)

EX600-DM#F (input/output unit)

No.	Part	Description
1	LED display	Displays the status of the unit.
2	Connector	Connector for Inputs / Outputs. M12 connector, M8 connector, D-sub connector or Terminal block.
3	Marker groove	Groove for identification marker.
4	Lock screw	D-sub connector screw lock (4-40 UNC).
5	Joint bracket	Bracket for joining adjacent units.
6	Unit connector	Connector for signal/power to next unit.

4 Assembly

4.1 Assembling the unit

⚠ Warning

Do not install the product unless the safety instructions have been read and understood.

(1) Connect an I/O unit to the end plate. Digital and analogue units can be connected in any order. Joint bracket screw tightening torque: 1.5 to 1.6 N•m.

(2) Add more I/O units. Up to 9 I/O units can be connected to one manifold.

(3) Connect the SI unit. After connecting the required I/O units, connect the SI unit. The connection method is as above.

(4) Mount the valve plate (EX600-ZMV#) to the valve manifold using the valve screws (M3 x 8) supplied. (Tightening torque: 0.6 to 0.7 N•m).

(5) Connect the SI unit assembly to the valve manifold.
Insert the valve plate into the valve plate mounting groove.

Then fix using the valve plate mounting screws (M4 x 6) supplied (Tightening torque: 0.7 to 0.8 N•m).

5 Installation

5.1 Direct mounting

(1) When assembling six or more units, the middle part of the assembly must be fitted with an intermediate reinforcing brace (EX600-ZMB1) before mounting using 2-M4x5 screws (Tightening torque: 0.7 to 0.8 N•m).

(2) Mount and tighten the end plate at one end of the unit and mount the intermediate reinforcing brace if required using M4 screws (Tightening torque: 0.7 to 0.8 N•m).
Fix the end plate at the valve side while referring to the operation manual for the applicable valve series.

5.2 DIN rail mounting

(1) When assembling six or more units, the middle part of the complete assembly must be fitted with an intermediate reinforcing brace for DIN rail mounting (EX600-ZMB2), using 2-M4 x 6 screws. (Tightening torque: 0.7 to 0.8 N•m).

5 Installation (continued)

(2) Mount the end plate bracket (EX600-ZMA2) to the end plate using 2-M4 x 14 screws (Tightening torque: 0.7 to 0.8 N•m). For the SY series, use end plate bracket (EX600-ZMA3).

(3) Hook the DIN rail mounting groove on to the DIN rail.
(4) Press the manifold using its side hooked to the DIN rail as a fulcrum until the manifold is locked onto the DIL rail.
(5) Fix the manifold by tightening the DIN rail fixing screws (M4 x 20) on the end plate bracket (Tightening torque: 0.7 to 0.8 N•m).

Refer to the Operation Manual for the applicable valve series on the SMC website (URL: https://www.smcworld.com) for the mounting method of the valve manifold.

5.3 Identification marker

The signal name of the input or output devices and unit address can be written on the marker and can be installed on each unit.
Mount a marker (EX600-ZT1) into the marker groove as required.

5.4 Environment

⚠ Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- 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.

6 Wiring

6.1 M12 and M8 wiring connection

Select the appropriate cables to mate with the connectors on the unit.

- Digital Input unit

Connector		Pin No.	Signal name
56-EX600-DX#B 56-EX600-DX#D	56-EX600-DX#C		
		1	24 V (control and input)
		2	Input 2
		3	24 V (control and input)
		4	Input 1
M12 5-pin	M8 3-pin	5	FE

- Digital Output unit

Connector	Pin No.	Signal name	
56-EX600-DY#B		56-EX600-DYPB	56-EX600-DYNB
	1	N.C.	24 V (output)
	2	Output 2	Output 2
	3	0 V (output)	N.C.
	4	Output 1	Output 1
M12 5-pin	5	FE	FE

The M12 connector cable for fieldbus and power supply connections has two types, Standard M12 and SPEEDCON compatible. If both plug and socket have SPEEDCON connectors, the cable can be inserted and connected by turning it a 1/2 rotation.
A standard connector can be connected to a SPEEDCON connector.

⚠ Warning

- Be sure to fit a seal cap EX9-AWTS (for M12) or EX9-AWES (for M8) on any unused connectors. Proper use of the seal cap enables the enclosure to maintain IP67 specification.

6.2 D-sub socket connection

- Align the D-sub plug connector with the D-sub socket on the unit.
- Insert the connector vertically, taking care not to use excessive force or bend the pins.
- Secure the connector using 2 x locking screws (4-40 UNC). Maximum tightening torque is 0.6 N•m.

EX600-DX#E (Digital Input unit)

Configuration	Pin number	Signal name
	1	Input 0
	2	Input 2
	3	Input 4
	4	Input 6
	5	Input 8
	6	Input 10
	7	Input 12
	8	Input 14
	9	NC
	10	24 V (Control and input)
	11	0 V (Control and input)
	12	0 V (Control and input)
	13	FE
	14	Input 1
	15	Input 3
	16	Input 5
	17	Input 7
	18	Input 9
	19	Input 11
	20	Input 13
	21	Input 15
	22	24 V (Control and input)
	23	24 V (Control and input)
	24	0 V (Control and input)
	25	FE

6 Wiring (continued)

EX600-DY#E (Digital Output unit)

Configuration	Pin number	Signal name	
		EX600-DYPE	EX600-DYPE
	1	Output 0	
	2	Output 2	
	3	Output 4	
	4	Output 6	
	5	Output 8	
	6	Output 10	
	7	Output 12	
	8	Output 14	
	9	NC	
	10	NC	
	11	NC	
	12	NC	
	13	0 V (Output)	24 V (Output)
	14	Output 1	
	15	Output 3	
	16	Output 5	
	17	Output 7	
	18	Output 9	
	19	Output 11	
	20	Output 13	
	21	Output 15	
	22	NC	
	23	NC	
	24	NC	
	25	0 V (Output)	24 V (Output)

EX600-DM#E (Digital Input / output unit)

Configuration	Pin number	Signal name
	1	Input 0
	2	Input 1
	3	Input 2
	4	Input 3
	5	Input 4
	6	Input 5
	7	Input 6
	8	Input 7
	9	24 V (Control and input)
	10	24 V (Control and input)
	11	0 V (Control and input)
	12	0 V (Control and input)
	13	FE
	14	Output 0
	15	Output 1
	16	Output 2
	17	Output 3
	18	Output 4
	19	Output 5
	20	Output 6
	21	Output 7
	22	0 V (Output) 0 V (Output)
	23	0 V (Output) 0 V (Output)
	24	0 V (Output) 0 V (Output)
	25	FE

6.3 Terminal Block connection

- The spring type terminal connection method is explained below.

(1) Insert a flat blade screwdriver inclined to the left into the operation port (right side hole) of the 2 holes as shown.

(2) Incline the screwdriver to the right as indicated by the arrow.
When the screwdriver is pushed downwards until it stops, the cable inlet will open.

(3) Insert the cable.

(4) The spring will capture the cable when the flat blade screwdriver is pulled out. This completes the connection.

6 Wiring (continued)

EX600-DX#F (Digital Input unit)

Configuration	Group	Number	Signal name
	0	1	24 V (Control and input) X0
		2	Input 0
		3	Input 1
		4	0 V (Control and input) X0
	1	1	24 V (Control and input) X1
		2	Input 2
		3	Input 3
		4	0 V (Control and input) X1
	2	1	24 V (Control and input) X2
		2	Input 4
		3	Input 5
		4	0 V (Control and input) X2
	3	1	24 V (Control and input) X3
		2	Input 6
		3	Input 7
		4	0 V (Control and input) X3
	4	1	24 V (Control and input) X4
		2	Input 8
		3	Input 9
		4	0 V (Control and input) X4
	5	1	24 V (Control and input) X5
		2	Input 10
		3	Input 11
		4	0 V (Control and input) X5
	6	1	24 V (Control and input) X6
		2	Input 12
		3	Input 13
		4	0 V (Control and input) X6
	7	1	24 V (Control and input) X7
		2	Input 14
		3	Input 15
		4	0 V (Control and input) X7

EX600-DY#F (Digital Output unit)

Configuration	Group	Number	Signal name	
			EX600-DYPF	EX600-DYNF
	0	1	0 V (Output)	24 V (Output)
		2	Output 0	
		3	0 V (Output)	24 V (Output)
		4	Output 1	
	1	1	0 V (Output)	24 V (Output)
		2	Output 2	
		3	0 V (Output)	24 V (Output)
		4	Output 3	
	2	1	0 V (Output)	24 V (Output)
		2	Output 4	
		3	0 V (Output)	24 V (Output)
		4	Output 5	
	3	1	0 V (Output)	24 V (Output)
		2	Output 6	
		3	0 V (Output)	24 V (Output)
		4	Output 7	
	4	1	0 V (Output)	24 V (Output)
		2	Output 8	
		3	0 V (Output)	24 V (Output)
		4	Output 9	
	5	1	0 V (Output)	24 V (Output)
		2	Output 10	
		3	0 V (Output)	24 V (Output)
		4	Output 11	
	6	1	0 V (Output)	24 V (Output)
		2	Output 12	
		3	0 V (Output)	24 V (Output)
		4	Output 13	
	7	1	0 V (Output)	24 V (Output)
		2	Output 14	
		3	0 V (Output)	24 V (Output)
		4	Output 15	

6 Wiring (continued)

EX600-DM#F (Digital Input / Output unit)

Configuration	Group	Number	Signal name	
			EX600-DMPF	EX600-DMNF
	0	1	24 V (Control and input) X0	
		2	Input 0	
		3	Input 1	
		4	0 V (Control and input) X0	
	1	1	24 V (Control and input) X1	
		2	Input 2	
		3	Input 3	
		4	0 V (Control and input) X1	
	2	1	24 V (Control and input) X2	
		2	Input 4	
		3	Input 5	
		4	0 V (Control and input) X2	
	3	1	24 V (Control and input) X3	
		2	Input 6	
		3	Input 7	
		4	0 V Control and input) X3	
	4	1	0 V (Output)	24 V (Output)
		2	Output 0	
		3	0 V (Output)	24 V (Output)
		4	Output 1	
	5	1	0 V (Output)	24 V (Output)
		2	Output 2	
		3	0 V (Output)	24 V (Output)
		4	Output 3	
	6	1	0 V (Output)	24 V (Output)
		2	Output 4	
		3	0 V (Output)	24 V (Output)
		4	Output 5	
	7	1	0 V (Output)	24 V (Output)
		2	Output 6	
		3	0 V (Output)	24 V (Output)
		4	Output 7	

7 LED Display

7.1 Digital Input unit

EX600-DX#B / EX600-DX#C# / EX600-DX#D

LED	Description
OFF	Power supply for control and input or the input device is OFF.
Green LED ON	The input device is ON.
Red LED ON	• The power supply of the input device or LED has a short circuit. • The input device power supply has a short circuit (only for EX600-DX#C1).
Red LED flashing	• The input device ON/OFF counter has exceeded the set value. • The input device is open circuit (only for EX600-DX#C1).

EX600-DX#E / EX600-DX#F

LED	Description
‘ST’ LED is OFF	Power supply for control and input is OFF.
‘ST’ Green LED ON	The product is operating normally.
‘ST’ Red LED ON	The power supply of an input device has a short circuit (each input 0 to 15).
‘ST’ Red LED flashing	The input device ON/OFF count has exceeded the set value (each input 0 to 15).
‘0 to 15’ LED’s OFF	The input device is OFF. (LED display number corresponds to input 0 to 15).
‘0 to 15’ LED’s ON	The input device is ON. (LED display number corresponds to input 0 to 15).

7 LED Display (continued)

7.2 Digital Output unit

EX600-DY#B

LED	Description
OFF	Power supply for control and input or the output device is OFF.
Green LED ON	The output device is ON.
Red LED ON	The output device has a short circuit.
Red LED flashing	• The output device ON/OFF counter has exceeded the set value. • The output device is open circuit

EX600-DY#E / EX600-DY#F

LED	Description
'ST' LED is OFF	Power supply for control and input is OFF.
'ST' Green LED ON	The product is operating normally.
'ST' Red LED ON	The output device has a short circuit (each output 0 to 15).
'ST' Red LED flashing	Either of the following conditions: • The output device ON/OFF counter has exceeded the set value (each output 0 to 15). • The output device is open circuit (each output 0 to 15).
'0 to 15' LED's OFF	The output device is OFF. (LED display number corresponds to input 0 to 15).
'0 to 15' LED's ON	The output device is ON. (LED display number corresponds to input 0 to 15).

7.3 Digital Input / Output unit

EX600-DM#E / EX600-DM#F

LED	Description
'ST(I)' and 'ST(O)' LED is OFF	Power supply for control and input is OFF.
'ST(I)' and 'ST(O)' Green LED ON	The product is operating normally.
'ST(I)' Red LED ON	The power supply of an input device has a short circuit (each input 0 to 7).
'ST(O)' Red LED ON	The output device has a short circuit (each output 0 to 7).
'ST(I)' Red LED flashing	The input device ON/OFF count has exceeded the set value (each input 0 to 7).
'ST(O)' Red LED flashing	Either of the following conditions: • The output device ON/OFF counter has exceeded the set value (each output 0 to 7). • The output device is open circuit (each output 0 to 7).
Input '0 to 7' and Output '0 to 7' LED's OFF	The input device and the output device are OFF. (LED display number corresponds to input 0 to 7 and output 0 to 7).
Input '0 to 7' Green LED's ON	The input device is ON. (LED display number corresponds to input 0 to 7).
Output '0 to 7' Green LED's ON	The output device is ON. (LED display number corresponds to output 0 to 7).

- Refer to the Troubleshooting section of the SI unit Operation Manual of the protocol used, on the SMC website (URL: https://www.smcworld.com), for further details of countermeasures.

8 How to Order

Refer to the operation manual or catalogue on the SMC website (URL: https://www.smcworld.com) for How to order information.

9 Outline Dimensions (mm)

Refer to the operation manual or catalogue on the SMC website (URL: https://www.smcworld.com) for outline dimensions.

10 Maintenance

10.1 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
- Stop operation if the product does not function correctly.

11 Limitations of Use

11.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

12 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.

13 Contacts

Refer to www.smcworld.com or www.smc.eu for your local distributor / importer.

SMC Corporation

URL: https://www.smcworld.com (Global) https://www.smc.eu (Europe)
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