



Instruction Manual

Gateway unit – PROFIBUS DP compatible

Series EX500-GPR1A-X8



The intended use of the Gateway unit is for connection to SI units and input devices 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) ^{*)}, and other safety regulations.

- ^{*)} 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

General specifications

| Item | Specifications |
|-----------------------------|-------------------------------|
| Ambient temperature | 5 to 45 °C |
| Ambient humidity | 35 to 85% RH (no condensate) |
| Ambient storage temperature | -25 to +70 °C |
| Withstand voltage | 1000 VAC applied for 1 minute |
| Insulation resistance | 500 VDC, 2 MΩ or more |
| Weight | 470 g |

Electrical specifications

| Item | Specifications |
|------------------------------------|----------------------------------------------------------------------------|
| Power supply for control and input | 24.0 VDC ±10%, 3.0 A |
| Power supply for solenoid valves | 24.0 VDC +10%/-5%, 3.0 A |
| Current consumption | Input device and SI unit control: 2.8 A Gateway internal circuit: 0.2 A |
| No. of Inputs / Outputs | 64 Inputs / 64 Outputs |

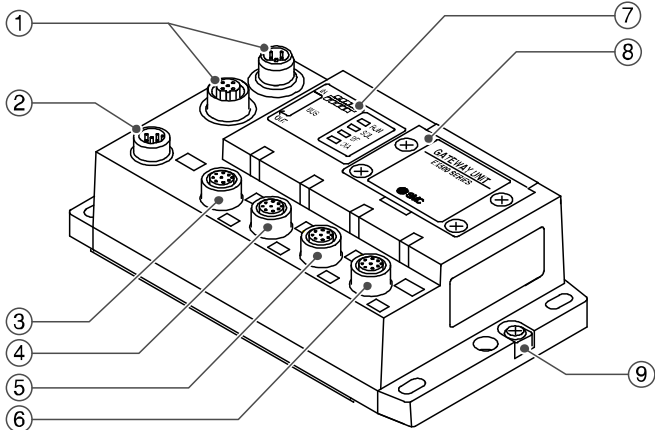
Communication specifications

| Item | Specifications |
|---------------------|----------------------------------------------------------------------------|
| Protocol | PROFIBUS DP (EN 50170) |
| Bus interface | EIA RS-485 |
| Device type | Slave |
| Communication speed | 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 kbps 1.5 / 3.0 / 6.0 / 12 Mbps |
| Occupied area | 64 inputs / 64 outputs max. |
| Configuration file | GSD file |
| ID number | 140C (Hex) |

Low level bus specifications

| Item | Specifications |
|-----------------------------|------------------------------------------------------------------------------------|
| No. of branches for inputs | 4 branches for input (8 per branch) |
| No. of branches for outputs | 4 branches for output (16 per branch) |
| Communication method | Dedicated protocol for SMC, 750 kbps |
| Branch current for inputs | 0.7 A max. per branch |
| Branch current for outputs | 0.65 A max. per branch (for EX500-S001) 0.75 A max. per branch (for EX500-Q#01) |
| Branch cable length | 5 m max. per branch (10 m total max.) |

3 Name and function of parts

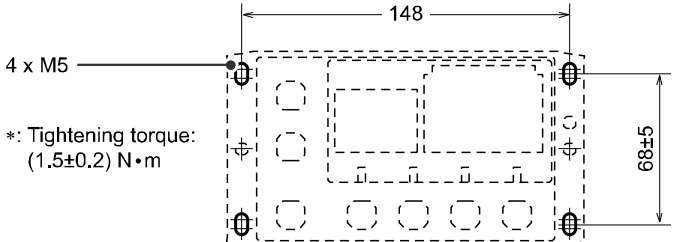


| No | Part | Description |
|----|------------------------|------------------------------------------------------------------------------|
| 1 | Fieldbus connector | Connection to PROFIBUS DP |
| 2 | Power supply connector | Connection for power supply. |
| 3 | Connector (COM A) | Connection to SI units (manifold valve) or input units using a branch cable. |
| 4 | Connector (COM B) | |
| 5 | Connector (COM C) | |
| 6 | Connector (COM D) | |
| 7 | LED Display | Displays the unit status. |
| 8 | Switch cover | Set the address and bus terminator switches under the cover. |
| 9 | FE terminal (M3) | Functional Earth (FE). |

4 Installation

4.1 Direct mounting

Secure in position using 4 x M5 screws, 15 mm minimum thread length.



4.2 Wiring connections

• Communication Connector

Select the appropriate cables to mate with the connectors on the SI unit. The PROFIBUS DP connection has 2 ports, BUS IN and BUS OUT, and both ports can be used for connection.

M12 5-pin Plug / Socket (B-coded)

| Connector | | Pin No. | Signal name |
|-----------|---------|---------|-------------|
| BUS IN | BUS OUT | | |
| | | 1 | N.C. |
| | | 2 | RxD/TxD-N |
| | | 3 | N.C. |
| | | 4 | RxD/TxD-P |
| | | 5 | Shield |

• Power Supply Connector

Connect the power supply to the power supply connector on the Gateway unit. With this cable, power is supplied to the output devices (such as solenoid valve) and the input devices and for control.

M12 5-pin Socket (A-coded)

| Connector | Pin No. | Signal name |
|-----------|---------|--------------------------|
| | 1 | 0 V (solenoid valves) |
| | 2 | 24 V (solenoid valves) |
| | 3 | 0 V (control and input) |
| | 4 | 24 V (control and input) |
| | 5 | 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.

- Both single and two power supply systems can be adopted, however the wiring should be made separately (for solenoid valves / outputs and for input and control) for either system.

• Branch Connector

Connect SI units (solenoid valves) and input devices to the communication connectors (COM A - D) using an M12 (8-pin) connector cable (EX500-AC###-S#P#). As each cable contains power supply wiring, there is no need to supply power to the SI unit (solenoid valves) or input devices separately.

Warning

- Be sure to fit a seal cap (EX9-AWTS) on any unused connectors. Proper use of the seal cap enables the enclosure to maintain IP65 specification. Tightening torque: 0.1 N·m.

4.3 Ground Connection

- Connect the FE terminal (M3) to ground.
- Individual grounding should be provided close to the product with a short cable to assure the safety and noise resistance of the system.
- Resistance to ground should be 100 Ω or less.

4 Installation (continued)

4.4 Environment

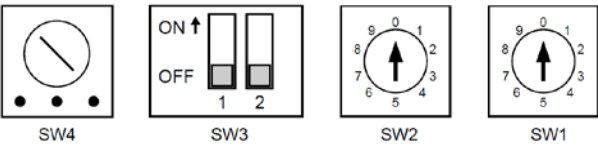
Warning

- 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.

5 Setting

5.1 Switch setting

- The switches should only be set with the power supply turned OFF.
- Open the switch protection cover and set the switches with a small flat blade screwdriver.
- Be sure to set the switches before use.
- After setting the switches close the protective cover and tighten the screws with the specified tightening torque of 0.6 N·m.



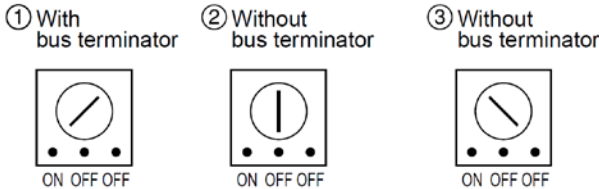
• Address setting

| SW3 (x100) | | SW2 | SW1 | Node Address |
|------------|---|-----|-----|--------------|
| 1 | 2 | x10 | x1 | |
| N.C. | 0 | 0 | 0 | 0 (default) |
| | | 0 | 1 | 1 |
| | | 0 | 2 | 2 |
| | | : | : | : |
| | | 9 | 8 | 98 |
| | 1 | 9 | 9 | 99 |
| | | 0 | 0 | 100 |
| | | 0 | 1 | 101 |
| | | : | : | : |
| | | 2 | 5 | 125 |

- The node address can be set in the range 0 – 125.
- The number of available nodes is up to 32 stations per branch, or 126 stations with a repeater.

• Bus terminator switch (SW4)

A bus terminator is required at both ends of the PROFIBUS DP bus segment. Switch SW4 ON if the Gateway unit is at the end of the bus segment.



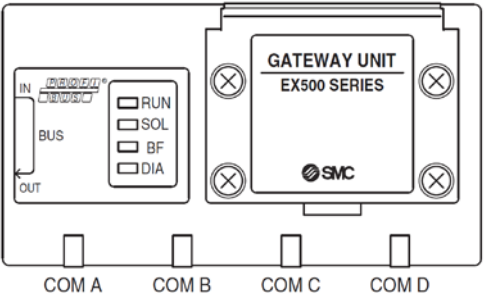
5.2 Configuration

An applicable GSD file is required to configure the Gateway unit for the PROFIBUS DP network. Download the latest GSD file from the SMC website (URL: <https://www.smcworld.com>).

| Product number | GSD files |
|----------------|--------------|
| EX500-GPR1A-X8 | Smc_140C.gsd |

Technical documentation giving detailed configuration information can be found on the SMC website (URL: <https://www.smcworld.com>).

6 LED Display



- Gateway unit status

| LED | | Description |
|-------|----------|-------------------------------------------------------------------------|
| RUN | Green ON | Power for control and input is ON. |
| | OFF | Power for control and input is not supplied. |
| SOL | Green ON | Power for SI units (solenoid valves) is ON. |
| | OFF | Power is not supplied to SI units (solenoid valves), or voltage < 20 V. |
| BF | Red ON | PROFIBUS DP communication is abnormal. |
| | OFF | PROFIBUS DP communication is normal. |
| DIA | Red ON | DIA is abnormal. |
| | OFF | DIA is normal. |
| COM A | Green ON | COM A is receiving data. |
| | OFF | COM A is not receiving data. |
| COM B | Green ON | COM B is receiving data. |
| | OFF | COM B is not receiving data. |
| COM C | Green ON | COM C is receiving data. |
| | OFF | COM C is not receiving data. |
| COM D | Green ON | COM D is receiving data. |
| | OFF | COM D is not receiving data. |

7 Outline Dimensions (mm)

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

8 How to Order

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

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
- Stop operation if the product does not function correctly.

10 Limitations of Use

10.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

11 Product Disposal

This product shall 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

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)
SMC Corporation, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan
Specifications are subject to change without prior notice from the manufacturer.
© 2021 SMC Corporation All Rights Reserved.
Template DKP50047-F-085M