EX500-TFK41GB-A

Installation & Maintenance Manual
EtherNet/IP™ Compatible GW Unit
Type EX500-GEN1

CE

1 Safety Instructions

- This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.
- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of "DANGER", "WARNING" or "CAUTION", followed by important safety information which must be carefully followed.
- To ensure safety of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.

⚠ **WARNING**	If instructions are not followed there is a possibility of serious injury or loss of life.
⚠ **CAUTION**	If instructions are not followed there is a possibility of injury or equipment damage.

⚠ WARNING

- **Do not disassemble, modify (including change of printed circuit board) or repair the product.**
  An injury or product failure may result.
- **Do not operate the product beyond the specification range.**
  Fire, malfunction or equipment damage may result. Use the product only after confirming the specifications.
- **Do not use the product in the presence of flammable, explosive or corrosive gas.**
  Fire, explosion or corrosion may result. This product does not have an explosion proof construction.
- **When using the product as part of an interlocking system:**
  1) Provide a double interlocking system, for example a mechanical system.
  2) Check the product regularly to ensure proper operation.
- **Before performing maintenance, be sure of the following:**
  1) Turn off the power supply.
  2) Stop the air supply, exhaust the residual pressure and verify the release of air from the system.

⚠ CAUTION

- **Always perform a system check after maintenance.**
  Do not use the product if any error occurs.
  Safety cannot be assured if caused by un-intentional malfunction.
- **Provide grounding to ensure correct operation and to improve noise resistance of the product.**
  This product should be individually grounded using a short cable.
- **Follow the instructions given below when handling the product. Failing to do so may result in product damage.**
  - Maintenance space should always be provided around the product.
  - Do not remove labels from the product.
  - Do not drop, hit or apply excessive shock to the product.
  - Follow all specified tightening torques.

1 Safety Instructions (continued)

- Do not bend, apply tensile force, or apply force by placing heavy loads, on the cables.
- Connect wires and cables correctly, and do not connect while the power is ON.
- Do not route wires and cables together with power or high-voltage cables.
- Check the insulation of wires and cables.
- Take proper measures against noise, such as noise filters, when the product is incorporated in equipment or devices.
- Select the required protection (IP) rating according to the environment of operation.
- Take sufficient shielding measures when the product is to be used in the following conditions:
  (1) where noise due to static electricity is generated.
  (2) where electro-magnetic field strength is high.
  (3) where radioactivity is present.
  (4) where power lines are located.
- Do not use the product in a place where electric surges are generated.
- Use suitable surge protection when a surge generating load such as a solenoid valve are to be directly driven.
- Prevent any foreign matter from entering this product.
- Do not expose the product to vibration or impact.
- Use the product within the specified ambient temperature range.
- Do not expose the product to any heat radiation.
- Use a precision screwdriver with flat blade to adjust the DIP switch.
- Close the cover over the switches before power is applied.
- Do not clean the product with chemicals such as benzene or thinners.

• Power Supply selection

A UL approved direct current (DC) power supply should be used with this product, as follows:

1. A limited voltage / current supply in accordance with UL508.
   A circuit from which power is supplied by the secondary coil of a transformer according to the following:

Maximum voltage (no load) : Less than 30Vrms (42.4V peak)
Maximum current : (1) Less than 8A (including when short circuited)
(2) Limited by circuit protection (such as a fuse) with the following rating.

No load voltage (V peak)	Max. current (A)
0 to 20 [V]	5.0
20 to 30 [V]	100 / peak voltage

2. A Class 2 power supply unit in accordance with UL1310, or a power supply circuit of maximum 30Vrms (42.4V peak) or less, using a Class 2 transformer in accordance with UL1585 as power source.

2 Specifications

Basic specifications

Rated voltage	24VDC
Range of power supply voltage	Power supply for input and controlling GW/SI : 24VDC ± 10% Power supply for output : 24VDC+10%/-5% (Voltage drop warning at around 20V)
Rated current	Power supply for input and controlling GW/SI : 3.0A (@ Inside GW unit : 0.2A @ Input device and SI control section : 2.8A) Power supply for solenoid valves and output : 3A
Number of input/ output points	Input point : Max. 64/Output point : Max. 64

Higher-level bus

Protocol		Ethernet (IEEE802.3)
	Media	100BASE-TX
	Communication speed	10M/100Mbps (Automatic selection or manual setting)
	Max. segment length	100m (328ft)
	Max. transceiver number	2 (per segment)
	Communication method	Full duplex/Half duplex (automatic selection or manual setting)
Fieldbus protocol		EtherNet/IP™ Release1.0
	I/O message	Input : 16 byte (assembly instance : 100) Output : 16 byte (assembly instance : 150)
	Port No.	44818 (0xAF12)
IP address setting range		192.168.0.1 to 192.168.0.254 (Setting by an internal switch) Or optional setting by the DHCP server
Device information		Vendor ID : 7 (SMC Corp.) Product type : 12 (communication adapter) Product code : 104

3 How to Order

EX500 – GEN1

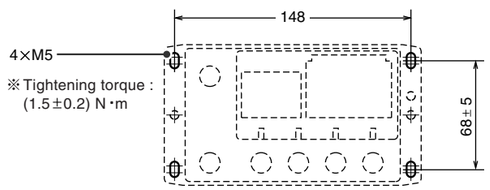
● Communication protocol

EN1	EtherNet/IP

4 Installation

Thread mounting

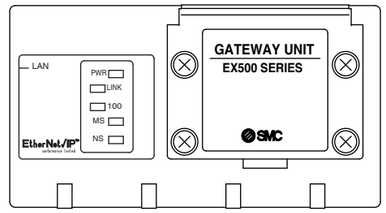
Secure at four positions with screws with head diameter of 5.2 or more and thread length of 15mm or more.



Cutout Dimensions for Mounting (Tolerance : ±0.2)

5 Display / Setting

Display



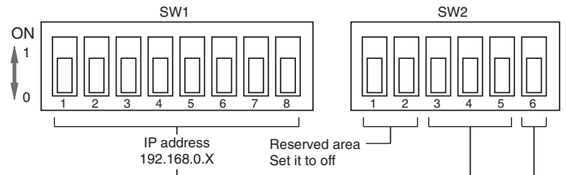
Display	Contents	
PWR	OFF	The power supply for solenoids is insufficient
	Green light ON	The power supply for solenoids is normal
LINK	OFF	The power supply is OFF/initialized
	Green light ON	Ethernet communication established
	Green flashing	Data sent/received
100	OFF	Communication at 10Mbps
	Green light ON	Communication at 100Mbps
MS	OFF	The power supply is OFF
	Green light ON	Operating normally
	Green flashing	Setting error
	Red flashing	Recoverable internal error
	Red light ON	Unrecoverable internal error
NS	OFF	The power supply is OFF/IP address not set
	Green flashing	EtherNet/IP-level communication not established
	Green light ON	Multiple EtherNet/IP-level communications established
	Red flashing	Multiple EtherNet/IP-level communications time out
	Red light ON	IP address duplicated
COM A	OFF	No input data
	Green light ON	Input data received
COM B	OFF	No input data
	Green light ON	Input data received
COM C	OFF	No input data
	Green light ON	Input data received
COM D	OFF	No input data
	Green light ON	Input data received

NOTE
When connecting manifold valve only without connecting Input unit manifold, LEDs of COM A to D do not light. To make them light, connect a terminal plug to the unused connector of SI unit ("C1" or "0").

5 Display / Setting (continued)

Switch setting

Open the station number switch protective cover and set the switches with a sharp-pointed watchmakers screwdriver etc.



SW1								X
1	2	3	4	5	6	7	8	
0	0	0	0	0	0	0	0	Remote control *1
1	0	0	0	0	0	0	0	1
0	1	0	0	0	0	0	0	2
1	1	0	0	0	0	0	0	3
·	·	·	·	·	·	·	·	·
0	1	1	1	1	1	1	1	254
1	1	1	1	1	1	1	1	DHCP mode *2

SW2			Item	Contents
3	4	5		
0	-	-	Communication setting	AUTO : The communication setting is automatically selected.
1	-	-		MANUAL : The communication setting follows the setting result by the switch No. 4 and 5.
1	0	-	Communication speed	Communicated at 10Mbps
1	1	-		Communicated at 100Mbps
1	-	0	Communication method	Communicated at half duplex
1	-	1		Communicated at full duplex

SW2	Contents
6	
0	The output signal is cleared when the communication error occurs.
1	The output signal is held when the communication error occurs.

NOTE

1. Be sure to turn off the power before setting the switches.
2. Be sure to set these switches before use.
3. After opening and closing the station number switch protective cover, tighten the screws to the specified tightening torque. (Tightening torque : 0.6N･m)

*1 : Remote control (SW1 all dip-switches off)

SMC's EX500 GW Unit will respond to the following Rockwell Automation BOOTP/DHCP Server commands.

Enable DHCP

Selecting this function will enable the EX500 GW Unit to retrieve its boot information from the BOOTP/DHCP Server. If DHCP is enabled the EX500 GW Unit will retrieve its boot information during the next power up.

Disable BOOTP/DHCP

Selecting this function will disable the EX500 to retrieve its boot information from the BOOTP/DHCP Server, and causes the EX500 to retain its current configuration during the next power up.

*2 : DHCP Mode (SW1 all dip-switches on)

The IP address is acquired via DHCP Server. The IP address is not saved and lost if the power to the EX500 unit is cycled.

*3 : Hardware Addressing

The IP address range is 192.168.0.1-192.168.0.254.

Default settings

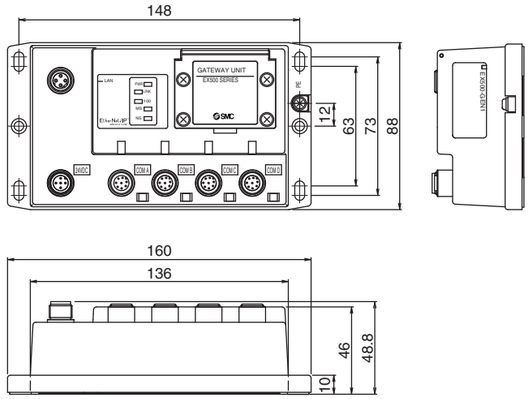
At the time of factory shipment, the product is in "Remote Control Mode" and set to "Enable DHCP".

NOTE

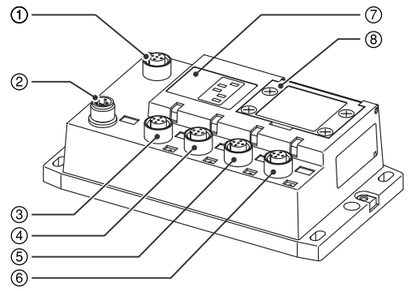
If the stored IP address of an EX500 is not known, please go to the "DHCP Mode" section.

6 Outline dimensions (mm)

GW Unit body



7 Names / Functions of Individual Parts



No.	Part names	Application
1	Communication connector	Connect with EtherNet/IP line.
2	Power supply connector	Supply power for output devices such as solenoid valve, for input devices such as sensor, and for controlling GW/SI by using power supply connector cable.
3	Communication port A (COM A)	Connect SI unit (manifold valve) or Input unit by using branch cable with M12 connectors.
4	Communication port B (COM B)	
5	Communication port C (COM C)	
6	Communication port D (COM D)	
7	Display	Display the power supply status and communication status with PLC.
8	Station number switch protective cover	Set IP address and communication method by using the switches under this cover.

8 Wiring

Communication wiring

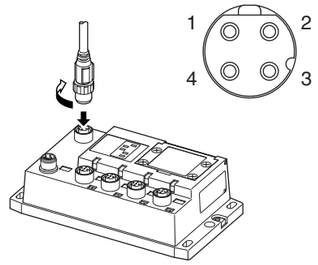
Connect the cable with Ethernet communication connector to the communication connector of GW unit.

Cable connection

(1) Aligning the key groove with the communication connector (4-pin, socket) of GW unit, plug the Ethernet communication cable (plug).

(2) Tighten the lock nut on cable side by turning it clockwise by hand.

(3) Confirm that the connector portion does not move.



Power supply wiring

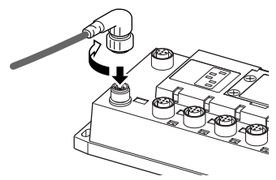
Connect the power supply connector cable to the power supply connector of GW unit. There are two types of cables different in connector shape — straight type and angle type. With this cable, the power is supplied to the output devices such as solenoid valve, and the input devices such as sensor, and for controlling GW/SI. Therefore, there is no need to supply power to other units individually.

Cable connection

(1) Aligning the key groove with the power supply connector (plug) of GW unit, plug the power supply cable (socket).

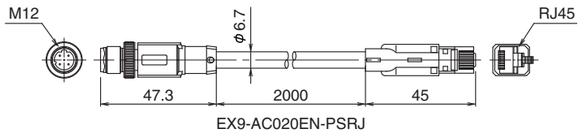
(2) Tighten the lock nut on cable side by turning it clockwise by hand.

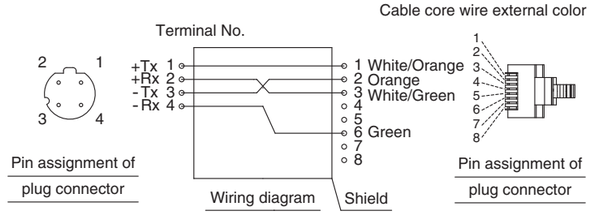
(3) Confirm that the connector portion does not move.



Pin layout and connection diagram of Ethernet Communication Cable

Connect the communication cable with socket-type M12 connector to the communication connector of GW unit.

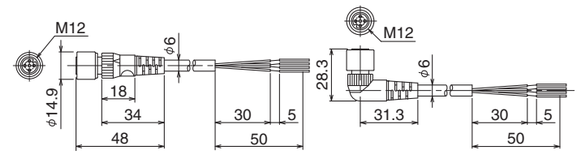




Cable specifications	
Core wire	AWG 26
Sheath colour	Blue green

Pin layout and connection diagram of power supply connector (unit : mm)

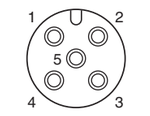
(Pin layout and connection diagram are common to all cables.)



Straight connector type
EX500-AP□ -S

Angle connector type
EX500-AP□ -A

Pin No.	Cable colour : Signal name
1	Brown : 0V (for solenoid valves/output)
2	White : 24VDC +10%/-5% (for solenoid valves/output)
3	Blue : 0V (for input and controlling GW/SI)
4	Black : 24VDC ± 10% (power supply for input and controlling GW/SI)
5	Grey : Ground (PE)



Socket Connector
Pin Layout

NOTE

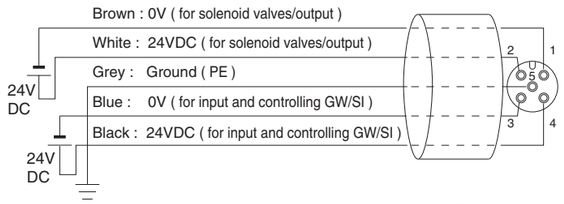
Connect a ground cable of 100 Ω or less to PE terminal.

8 Wiring (continued)

Separate wiring for power supply for solenoid valves/output and for input and control of GW/SI

Both single power supply and two power supply systems can be adopted, however, the wiring shall be made separately (for solenoid valves/output and for input and controlling GW/SI) for either system.

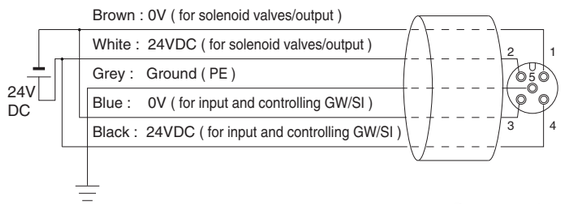
A. Two power supplies



Cable Part No. : EX500-AP □ - □

Power supply connector

B. Single power supply



Cable Part No. : EX500-AP □ - □

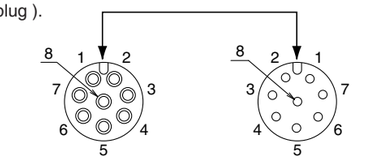
Power supply connector

Branch wiring

For wiring with solenoid valves or input devices, connect the branch cable with M12connector to communication ports A to D.
There are two types of cables different in connector shape — straight type and angle type. As each cable contains power supply wire, there is no need to supply power to solenoid valves or input devices individually.

Cable connection

(1) Aligning the key groove with the connector (socket) of GW unit, plug in the cable (plug).

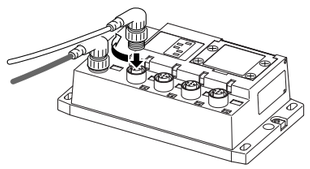


Socket Connector Pin Layout

Plug Connector Pin Layout

(2) Tighten the lock nut on cable side by turning it clockwise by hand.

(3) Confirm that the connector portion does not move.



NOTE
Mount a waterproof cap on each unused connector of GW unit. The proper use of waterproof caps can achieve IP65 Enclosure.
(Tightening torque : 0.1Nm for M12)

9 Contact

AUSTRIA	(43) 2262 62280	NETHERLANDS	(31) 20 531 8888
BELGIUM	(32) 3 355 1464	NORWAY	(47) 67 12 90 20
CZECH REP.	(420) 541 424 611	POLAND	(48) 22 211 9600
DENMARK	(45) 7025 2900	PORTUGAL	(351) 21 471 1880
FINLAND	(358) 207 513513	SLOVAKIA	(421) 2 444 56725
FRANCE	(33) 1 6476 1000	SLOVENIA	(386) 73 885 412
GERMANY	(49) 6103 4020	SPAIN	(34) 945 184 100
GREECE	(30) 210 271 7265	SWEDEN	(46) 8 603 1200
HUNGARY	(36) 23 511 390	SWITZERLAND	(41) 52 396 3131
IRELAND	(353) 1 403 9000	UNITED KINGDOM	(44) 1908 563888
ITALY	(39) 02 92711		

SMC Corporation
URL http://www.smcworld.com (Global) http://www.smceu.com (Europe)