

# XGB U

## Programmable Logic Controller

- Dual port Ethernet
- 1 channel RS232 port
- 1 channel RS485 port
- Built-In web-server and FTP
- Data log in 16GB SD card
- Built-In USB port
- 8 channel high speed counter
- Built-In Email and SMTP
- Versions available with Built-In analog and positioning options



### Technical Specifications

| Item                  | Description  |                            |                  | Standard                             |
|-----------------------|--|----------------------------|------------------|--------------------------------------|
| Ambient Temperature   | 0 ~ 55°C   |                            |                  |                                      |
| Storage Temperature   | -25 ~ +70°C  |                            |                  |                                      |
| Ambient Humidity      | 5 ~ 95%RH (Non-condensing)   |                            |                  |                                      |
| Storage Humidity      | 5 ~ 95%RH (Non-condensing)   |                            |                  |                                      |
| Vibration Resistance  | Continuous Vibration   |                            |                  | 10 times each direction (X, Y and Z) |
|                       | Frequency  | Acceleration               | Pulse Width      |                                      |
|                       | 10 ≤ f < 57Hz  | -                          | 0.075mm          |                                      |
|                       | 57 ≤ f ≤ 150Hz   | 9.8m/s <sup>2</sup> (1G)   | -                |                                      |
|                       | Continuous Vibration   |                            |                  |                                      |
|                       | Frequency  | Acceleration               | Pulse Width      |                                      |
|                       | 10 ≤ f < 57Hz  | -                          | 0.035mm          |                                      |
|                       | 57 ≤ f ≤ 150Hz   | 4.9m/s <sup>2</sup> (0.5G) | -                |                                      |
| Shock Resistance      | •Peak acceleration: 147m/s <sup>2</sup> (15G)    •Duration: 11ms<br>•Pulse waveform: Half-sine, 3 times each direction per each axis |                            |                  | IEC61131-2                           |
| Noise Resistance      | Square wave impulse noise  | ±500 V                     |                  | IMO Standard                         |
|                       | Electrostatic Discharge  | 4kV                        |                  | IEC61131-2<br>IEC61000-4-3           |
|                       | Radiated electromagnetic field noise   | 80 ~ 1000MHz, 10V/m        |                  | IEC61131-2<br>IEC61000-4-3           |
|                       | Fast transient/Burst noise   | Main Unit                  | Expansion Module |                                      |
| 2kV                   |  | 1kV                        |                  |                                      |
| Operating Environment | Free from corrosive gases and excessive dust   |                            |                  |                                      |
| Altitude              | up to 2,000m   |                            |                  |                                      |
| Pollution Level*1     | Less than 2  |                            |                  |                                      |
| Cooling               | Air-cooling  |                            |                  |                                      |

\*1) Pollution level indicates the degree to which conductive material is generated in the environment where the equipment is used. Pollution level 2 is the condition that only non-conductive pollution occurred but temporary conductivity may be produced due to condensing.

# XGB U

## Programmable Logic Controller

### Performance Specifications - XBC U

| Item                                 | Specifications  |   |               |            |               |            | Remark               |
|--------------------------------------|---|---|---------------|------------|---------------|------------|----------------------|
|                                      | XBC-DN(P)32U  | XBC-DR28U                                     | XBC-DN(P)32UA | XBC-DR28UA | XBC-DN(P)32UP | XBC-DR28UP |                      |
| Program Control Method               | Cyclic execution of stored program, Time-driven interrupt, Process-driven interrupt     |   |               |            |               |            |                      |
| I/O Control Method                   | Batch processing by simultaneous scan (Refresh method), Directed by program instruction |   |               |            |               |            |                      |
| Program Language                     | Ladder Diagram  |   |               |            |               |            |                      |
| Number of Instructions               | Basic   | 28  |               |            |               |            |                      |
|                                      | Application   | 677   |               |            |               |            |                      |
| Processing Speed (Basic Instruction) | 60ns/step   |   |               |            |               |            |                      |
| Program Capacity                     | 32Kstep   |   |               |            |               |            |                      |
| Max. I/O Points                      | 352points   | 348points                                     | 352points     | 348points  | 352points     | 348points  | Main + 10 expansions |
| Data Area                            | P   | P00000 ~ P2047F (32,768 point)                |               |            |               |            | Input/Output         |
|                                      | M   | M00000 ~ M2047F (32,768 point)                |               |            |               |            |                      |
|                                      | K   | K00000 ~ K8191F (131,072 point)               |               |            |               |            |                      |
|                                      | L   | L00000 ~ L4095F (65,536 point)                |               |            |               |            | Link                 |
|                                      | F   | F00000 ~ F2047F (32,768 point)                |               |            |               |            | Flag                 |
|                                      | T   | 100ms, 10ms, 1ms: T0000 ~ T2047 (2,048 point) |               |            |               |            | Timer                |
|                                      | C   | C000 ~ C2047 (2,048 point)                    |               |            |               |            | Counter              |
|                                      | S   | S00.00 ~ S127.99                              |               |            |               |            | Step                 |
|                                      | D   | D00000 ~ D19999 (20,000 word)                 |               |            |               |            | Data Register        |
|                                      | U   | U00.00 ~ U0B.31 (384 word)                    |               |            |               |            | Analog Data          |
|                                      | Z   | Z000 ~ Z127 (128 word)                        |               |            |               |            |                      |
|                                      | N   | N0000 ~ N10239 (10,240 word)                  |               |            |               |            |                      |
| File Register                        | R   | RAM area 2 block (R0 ~ R16,383)               |               |            |               |            |                      |
|                                      |   | FLASH area : 4 block (128Kbyte)               |               |            |               |            |                      |
| Total Program                        | 256   |   |               |            |               |            |                      |
| Initial Task                         | Initial Task  | 1   |               |            |               |            |                      |
|                                      | Cyclic Task   | Max 16  |               |            |               |            |                      |
|                                      | I/O Task  | Max 8   |               |            |               |            |                      |
|                                      | Internal Device Task  | Max 16  |               |            |               |            |                      |
|                                      | High Speed Counter Task   | Max 8   |               |            |               |            |                      |
| Operation Mode                       | RUN, STOP, DEBUG  |   |               |            |               |            |                      |
| Self-Diagnosis Function              | Detects errors of scan time, memory, I/O and power supply                               |   |               |            |               |            |                      |
| Program Port                         | USB 1 channel, Ethernet   |   |               |            |               |            |                      |
| Retain Data at Power Failure         | Latch area setting in basic parameter   |   |               |            |               |            |                      |
| Current Consumption                  | 700mA   | 990mA   | 780mA         | 1,040mA    | 1,250mA       | 1,550mA    |                      |
| Voltage                              | 100-240 VAC*  |   |               |            |               |            |                      |
| Weight                               | 571g  | 630g  | 683g          | 732g       | 673g          | 722g       |                      |

\* 24VDC models are available. The DC part numbers will be the same as above with additional suffix "/DC". E.g. XBC-DN32U/DC

# XGB U

## Programmable Logic Controller

### Performance Specifications - XEC U

| Item                                 |                         | Specifications   |                                 |               |            |               |            | Remark               |                          |
|--------------------------------------|-------------------------|--|---------------------------------|---------------|------------|---------------|------------|----------------------|--------------------------|
|                                      |                         | XEC-DN(P)32U   | XEC-DR28U                       | XEC-DN(P)32UA | XEC-DR28UA | XEC-DN(P)32UP | XEC-DR28UP |                      |                          |
| Program Control Method               |                         | Cyclic execution of stored program, Time-driven interrupt, Process-driven interrupt        |                                 |               |            |               |            |                      |                          |
| I/O Control Method                   |                         | Batch processing by simultaneous scan (Refresh method),<br>Directed by program instruction |                                 |               |            |               |            |                      |                          |
| Program Language                     |                         | Ladder Diagram, SFC, ST  |                                 |               |            |               |            |                      |                          |
| Number of Instructions               | Operator                | 18   |                                 |               |            |               |            |                      |                          |
|                                      | Basic Function          | 136 + Floating-point Arithmetic Functions  |                                 |               |            |               |            |                      |                          |
|                                      | Basic Function Block    | 43   |                                 |               |            |               |            |                      |                          |
|                                      | Special Function Block  | Each special module has own special function blocks  |                                 |               |            |               |            |                      |                          |
| Processing Speed (Basic Instruction) |                         | 60ns/step  |                                 |               |            |               |            |                      |                          |
| Program Memory                       |                         | 384Kbyte   |                                 |               |            |               |            |                      |                          |
| Max. I/O Points                      |                         | 352points  | 348points                       | 352points     | 348points  | 352points     | 348points  | Main + 10 expansions |                          |
| Data Area                            | Symbolic Variable (A)   | 64KB (Retain setting available)  |                                 |               |            |               |            |                      |                          |
|                                      | Input Variable (I)      | 2KB  |                                 |               |            |               |            |                      |                          |
|                                      | Output Variable (Q)     | 2KB  |                                 |               |            |               |            |                      |                          |
|                                      | Direct Variable         | M  | 32KB (Retain setting available) |               |            |               |            |                      |                          |
|                                      |                         | R  | 32KB * 2blocks                  |               |            |               |            |                      |                          |
|                                      |                         | W  | 64KB                            |               |            |               |            |                      | Same area with R         |
|                                      | Flag Variable           | F  | 4KB                             |               |            |               |            |                      | System Flag              |
|                                      |                         | K  | 16KB                            |               |            |               |            |                      | Keep Relay               |
|                                      |                         | L  | 8KB                             |               |            |               |            |                      | Link Relay               |
|                                      |                         | U  | 768 Byte                        |               |            |               |            |                      | Analog Data Refresh area |
| N                                    |                         | 20KB   |                                 |               |            |               |            | P2P Parameter        |                          |
| Flash Area                           |                         | 4blocks (128Kbyte)   |                                 |               |            |               |            | Using R Device       |                          |
| Timer                                |                         | No limit in points (Time range: 0.001 ~ 4,294,967.295)                                     |                                 |               |            |               |            |                      |                          |
| Counter                              |                         | No limit in points (Counter range: 64 bit range)   |                                 |               |            |               |            |                      |                          |
| Total Program                        |                         | 256  |                                 |               |            |               |            |                      |                          |
| Initial Task                         | Initial Task            | 1  |                                 |               |            |               |            |                      |                          |
|                                      | Cyclic Task             | Max 16   |                                 |               |            |               |            |                      |                          |
|                                      | Initial Task            | 1  |                                 |               |            |               |            |                      |                          |
|                                      | Cyclic Task             | Max 16   |                                 |               |            |               |            |                      |                          |
|                                      | I/O Task                | Max 8  |                                 |               |            |               |            |                      |                          |
|                                      | Internal Device Task    | Max 16   |                                 |               |            |               |            |                      |                          |
|                                      | High Speed Counter Task | Max 8  |                                 |               |            |               |            |                      |                          |
| Operation Mode                       |                         | RUN, STOP, DEBUG   |                                 |               |            |               |            |                      |                          |
| Self-Diagnosis Function              |                         | Detects errors of scan time, memory, I/O and power supply                                  |                                 |               |            |               |            |                      |                          |
| Program Port                         |                         | USB 1 channel, Ethernet  |                                 |               |            |               |            |                      |                          |
| Retain Data at Power Failure         |                         | Latch area setting in basic parameter  |                                 |               |            |               |            |                      |                          |
| Current Consumption                  |                         | 700mA  | 990mA                           | 780mA         | 1,040mA    | 1,250mA       | 1,550mA    |                      |                          |
| Voltage                              |                         | 100-240 VAC  |                                 |               |            |               |            |                      |                          |
| Weight                               |                         | 571g   | 630g                            | 683g          | 732g       | 673g          | 722g       |                      |                          |

\* 24VDC models are available. The DC part numbers will be the same as above with additional suffix "/DC". E.g. XEC-DN32U/DC

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### Built-In Function

| Item               |                | Specifications  |               |                   |                |                   | Remark                                     |
|--------------------|----------------|---|---------------|-------------------|----------------|-------------------|--|
|                    |                | XBC/XEC-DN(P)32U  | XBC/XEC-DR28U | XBC/XEC-DN(P)32UA | XBC/XEC-DR28UA | XBC/XEC-DN(P)32UP |  |
| PID Control        |                | Control by instruction, auto-tuning, PWM output, Forced output, Operation scan time setting, Antiwindup, Delta MV, PV tracking, Hybrid operation, Cascade operation   |               |                   |                |                   |  |
| Serial             | Protocol       | Dedicated protocol, Modbus protocol, User defined protocol  |               |                   |                |                   | Embedded00<br>P2P:01                       |
|                    | Channel        | 1 port RS-232C and 1 port RS-485  |               |                   |                |                   |  |
| Ethernet           | Transfer Spec  | Cable: 100Base-TX<br>Speed: 100Mbps<br>Auto-MDIX *1<br>IEEE 802.3   |               |                   |                |                   | Embedded01<br>P2P:02<br>High-speed link:01 |
|                    | Topology       | Line, star  |               |                   |                |                   |  |
|                    | Diagnosis      | Module information, service condition   |               |                   |                |                   |  |
|                    | Protocol       | XGT dedicated Modbus TCP/IP user define frame   |               |                   |                |                   |  |
|                    | Service        | P2P, High Speed link, Remote connection   |               |                   |                |                   |  |
| Datalog            | Group          | Max 10 group  |               |                   |                |                   |  |
|                    | Data Set       | 32 per group  |               |                   |                |                   |  |
|                    | Extension      | csv file  |               |                   |                |                   |  |
|                    | File Size      | Max 16MB  |               |                   |                |                   |  |
|                    | SD Memory Type | SD,SDHC type (Recommended: SanDisk / Transcend)   |               |                   |                |                   |  |
|                    | Memory Size    | Max 16GB  |               |                   |                |                   |  |
|                    | File System    | FAT32   |               |                   |                |                   |  |
| High Speed Counter | Performance    | 1-phase : 100KHz 8 channels<br>2-phase : 50KHz 4 channel  |               |                   |                |                   |  |
|                    | Counter Mode   | <ul style="list-style-type: none"> <li>• 4 counter modes are supported based on input pulse and INC/DEC method                             <ul style="list-style-type: none"> <li>• 1 pulse operation Mode : INC/DEC count by program</li> <li>• 1 pulse operation Mode : INC/DEC count by phase B pulse input</li> <li>• 2 pulse operation Mode : INC/DEC count by input pulse</li> <li>• 2 pulse operation Mode : INC/DEC count by difference of phase</li> </ul> </li> </ul> |               |                   |                |                   |  |
|                    | Function       | <ul style="list-style-type: none"> <li>• Internal/external preset</li> <li>• Latch counter</li> <li>• Compare output</li> <li>• No. of rotation per unit time</li> </ul>  |               |                   |                |                   |  |

\*1) Auto-MDIX (Automatic medium-dependent interface crossover) :

It is the function to automatically detect whether the cable connected to the Ethernet port is peer-to-peer (straight) or cross cable

# XGB U

## Programmable Logic Controller

### XBC/XEC U Built-In Positioning Function

| Item             | Specifications  | Remark                       |
|------------------|---|------------------------------|
| Basic Function   | No. of control axis: 4 axis<br>Control Method: Position, Speed, Speed/Position, Feed Control<br>Control Unit: Pulse, mm, inch, degree<br>Positioning Data: Each axis can have up to 400 data (Step number: 1~400)<br>Operation pattern: End, Keep, Continuous<br>Operation method: Singular, Repeat | Available Only<br>On UP Type |
| Interpolation    | 2/3/4 axis linear interpolation<br>2 axis circular interpolation<br>3 axis helical interpolation  |                              |
| Positioning      | Method: Absolute/Incremental method<br>Address range: 2,147,483,648~2,147,483,647<br>Speed: Max 2Mpps(1~2,000,000pps)<br>Acc /Dec process: Trapezoid type, S-type   |                              |
| Homing Method    | DOG+HOME(Off), DOG+HOME(On),<br>Upper limit + HOME, DOG, High speed,<br>Upper/Lower limit, HOME   |                              |
| Manual Operation | Jog operation, MPG operation, Inching operation   |                              |
| Encoder Input    | Line drive (RS-422A) input<br>1Channel (Max 200kpps)  |                              |

### XBC/XEC U Analog

|               | Item   | Specifications                         | Remark                       |  |                                   |
|---------------|--|--|------------------------------|--|-----------------------------------|
| Analog Input  | Channels   | 4 channels (current/voltage)           | Available Only<br>On UA Type |  |                                   |
|               | Specification  | Input Range                            |                              | Voltage: 1~5V, 0~5V, 0~10V, -10~+10V, Current: 4~20mA, 0~20mA                                |                                   |
|               |  |  |                              | Current input or Voltage input can be selected through the external terminal wiring setting. |                                   |
|               |  | Input Resistance                       |                              | 1MΩ or more (voltage input), 250 Ω (current input)   |                                   |
|               |  | Max Resolution                         |                              | 1/16000  |                                   |
|               |  |  |                              | 0.250mV (1~5V), 0.3125mV (0~5V)<br>0.625mV (0~10V), 1.250mV (±10V)                           | 1.0μA (4~20mA)<br>1.25μA (0~20mA) |
| Accuracy      | ±0.2% or less (When ambient temperature is 25°C)<br>±0.3% or less (When ambient temperature is 0~55°C) |  |                              |  |                                   |
| Analog Output | Channels   | Voltage 2 channels, Current 2 channels | Available Only<br>On UA Type |  |                                   |
|               | Specification  | Output Range                           |                              | Voltage: 1~5V, 0~5V, 0~10V, -10~+10V, Current: 4~20mA, 0~20mA                                |                                   |
|               |  |  |                              | Output ranges are set in user program or I/O parameter per each channel.                     |                                   |
|               |  | Load Resistance                        |                              | 1MΩ or more (voltage output), 600 Ω or less (current output)                                 |                                   |
|               |  | Max Resolution                         |                              | 1/16000  |                                   |
|               |  |  |                              | 0.250mV (1~5V), 0.3125mV (0~5V)<br>0.625mV (0~10V), 1.250mV (±10V)                           | 1.0μA (4~20mA)<br>1.25μA (0~20mA) |
| Accuracy      | ±0.2% or less (When ambient temperature is 25°C)<br>±0.3% or less (When ambient temperature is 0~55°C) |  |                              |  |                                   |

# XGB U

## Programmable Logic Controller

### Input Specification U Type Input Specification

| Item                       |          | XEC-DN32U/XEC-DN32UP/XEC-DN32UA<br>XEC-DR28U/XEC-DR28UP/XEC-DR28UA |
|----------------------------|----------|--|
| Input Point                |          | 16 point   |
| Insulation Method          |          | Photo coupler insulation   |
| Rated Input Voltage        |          | 24VDC  |
| Rated Input Current        |          | About 4mA (Contact point 0~3: about 7mA)                           |
| Operation Voltage Range    |          | 20.4~28.8VDC (within ripple rate 5%)                               |
| On Voltage / On Current    |          | 19VDC or higher / 3mA or higher                                    |
| Off Voltage / Off Current  |          | 6VDC or lower / 1mA or lower                                       |
| Input Resistance           |          | About 5.6kΩ (P00~P07: about 4.7kΩ)                                 |
| Response Time              | Off → On | 1/3/5/10/20/70/100ms (Set by I/O parameter) Default: 3ms           |
|                            | On → Off |  |
| Insulation Pressure        |          | AC560Vrms/3 cycle (altitude 2000m)                                 |
| Insulation Resistance      |          | 10ms or more by MegOhmMeter  |
| Common Method              |          | 16 point/COM   |
| Cable Size                 |          | 0.3~0.75mm <sup>2</sup>  |
| Operation Indicator        |          | LED On when Input On   |
| External Connection Method |          | 8 point terminal block + 10 point terminal connector               |

### Output Specification U Type Transistor Output Specification

| Item                         |          | XEC-DN32U/XEC-DN32UP/XEC-DN32UA   |
|------------------------------|----------|---|
| Output Point                 |          | 16 point  |
| Insulation Method            |          | Photo coupler insulation  |
| Rated Load Voltage           |          | 12/24VDC  |
| Operation Load Voltage Range |          | 10.2 ~ 26.4VDC  |
| Max. Load Current            |          | 0.5A/1 point, 2A/1 COM  |
| Off Leakage Current          |          | 0.1mA or less   |
| Max. Inrush Current          |          | 4A/10ms or less   |
| Max. Voltage Drop When On    |          | 0.4VDC or less  |
| Surge Absorber               |          | Zener diode   |
| Response Time                | Off → On | 1ms or less   |
|                              | On → Off |   |
| Common Method                |          | 16 point/COM  |
| Proper Cable Size            |          | Stranded wire 0.3~0.75mm <sup>2</sup> (external diameter 2.8mm or less) |
| External Power               | Voltage  | 12/24VDC ± 10% (Ripple voltage 4 Vp-p or less)                          |
|                              | Current  | 10mA or less @ 24VDC  |
| Operation Indicator          |          | LED On when Output On   |
| External Connection Method   |          | 8 point terminal block connector + 10 point terminal block connector    |

# XGB U

## Programmable Logic Controller

### Input Wiring (16 point 24VDC input)

| Circuit Configuration | No. | Contact | No.  | Contact | Type |
|-----------------------|-----|---------|------|---------|------|
|                       | TB1 | 0       | TB1  | 8       |      |
|                       | TB2 | 1       | TB2  | 9       |      |
|                       | TB3 | 2       | TB3  | A       |      |
|                       | TB4 | 3       | TB4  | B       |      |
|                       | TB5 | 4       | TB5  | C       |      |
|                       | TB6 | 5       | TB6  | D       |      |
|                       | TB7 | 6       | TB7  | E       |      |
|                       | TB8 | 7       | TB8  | F       |      |
|                       |     |         | TB9  | COM     |      |
|                       |     |         | TB10 | COM     |      |

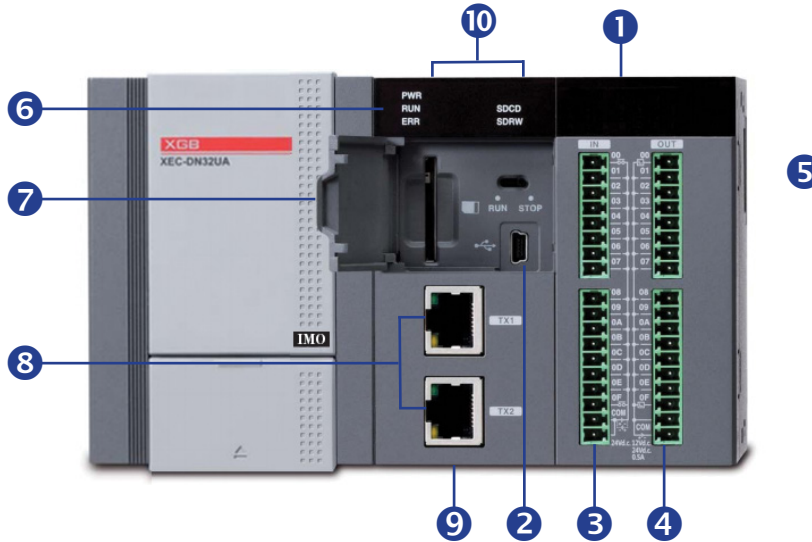
### XEC U Output Wiring XBC-DN32U 16 point transistor output (Sink type)

| Circuit Configuration | No.      | Contact | Type |
|-----------------------|----------|---------|------|
|                       | TB1      | 0       |      |
|                       | TB2      | 1       |      |
|                       | TB3      | 2       |      |
|                       | TB4      | 3       |      |
|                       | TB5      | 4       |      |
|                       | TB6      | 5       |      |
|                       | TB7      | 6       |      |
|                       | TB8      | 7       |      |
|                       | TB1      | 8       |      |
|                       | TB2      | 9       |      |
|                       | TB3      | A       |      |
|                       | TB4      | B       |      |
|                       | TB5      | C       |      |
|                       | TB6      | D       |      |
|                       | TB7      | E       |      |
|                       | TB8      | F       |      |
| TB9                   | DC12/24V |         |      |
| TB10                  | COM      |         |      |

# XGB U

## Programmable Logic Controller

**Names & Functions** Block Type Unit (U)



| No | Name   | Description  |
|----|--|--|
| 1  | LED for displaying input, output                   | Displays the On/Off status of input, output contacts   |
| 2  | Connector  | Connector (USB 1channel) to access to XG5000 Software  |
| 3  | Input terminal block                               | Terminal block receiving the actual input signal   |
| 4  | Output terminal block                              | Terminal block outputting the actual output signal   |
| 5  | RUN/STOP mode switch                               | Sets the basic unit's operation mode.<br>- STOP → RUN : Program's operation is executed.<br>- RUN → STOP : Program's operation is stopped.<br>(In case of STOP, the remote operation is available.)  |
| 6  | Status display LED                                 | Displays the basic unit's operation status.<br>- PWR (Red light On) : The power is supplied.<br>- RUN (Green light On) : During RUN mode<br>- ERR (Flickering red light) : Occurrence of errors during operation<br>- STATE (Red light On/flickering Red light): When the SD card is installed, the red light is turned On; when the SD card error occurs, the red light is flickering.<br>- RD/WR (Flickering red light) : During SD card Write |
| 7  | SD card connector                                  | Connector with the SD memory card  |
| 8  | Terminal block for the embedded Enet communication | Terminal block for the embedded Enet communication   |
| 9  | Terminal block for the embedded communication      | Terminal block (lower part of the product) for the embedded RS-232C/485 communication  |
| 10 | Battery holder                                     | Battery holder (upper part of the product)   |