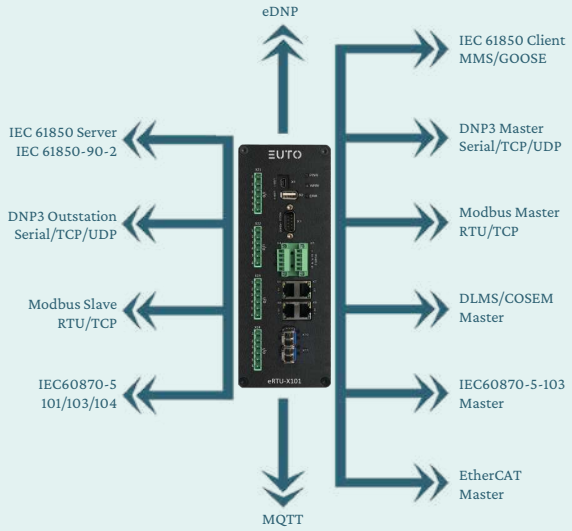
eRTU-X101
Technical Information

IEC 61850 compliant RTU/Gateway

Protocol gateway

Convert any protocol/s, one-to-one or multiple-to-multiple simultaneously

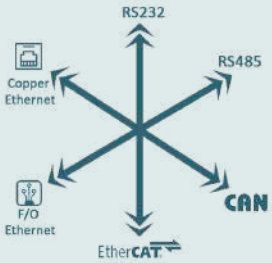


EtherCAT

Gateway to/from any protocol from/to EtherCAT master in order to control and monitor time critical applications integrated into the whole system.

Media conversion

Communication media between different stages of applications can be converted efficiently, one-to-one or multiple-to-multiple simultaneously



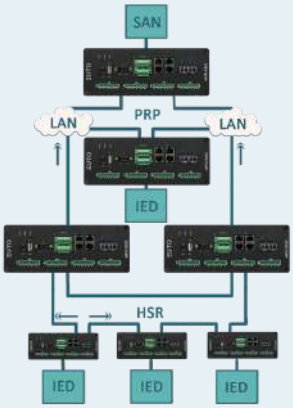
Automation

IEC 61131-3 and LUA based logic programs can be run on the device with precise execution times.

Redundancy

HSR/PRP can be applied from configured F/O and copper ethernet ports to supply **zero recovery time** on networks faults.

Hardware level RSTP can also be available to provide recovery on regular ring networks.



Sequence of events

Historical records with precise timestamps can be saved on non-volatile memory to allow analysis of critical events later.

Internal Battery Back-up

Back-up battery can be integrated optionally to keep the device open up to 2 hours while power cuts in order to avoid critical data loss.

Modular design

There are 2 slots on the main board to integrate 3 different **on-board module** options:

- 3G/4G Modem or WiFi
- *8 digital inputs*
- *6 digital outputs*
- *1 analog input, 2 digital inputs, 3 digital outputs*

External analog/digital I/O and current/voltage measurement modules can be controlled in real-time from EtherCAT bus:

- *eXIO-D100*
- *eXIO-M100*
- *eCVM-P100*

Wireless Connection

3G/4G Modem or WiFi communication module can be integrated into the device which allows access to the complete data model via secure VPN connections.

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eRTU-X101
Specifications

Hardware Specifications

CPU features	*:1GHz Arm Cortex-A9 Processor, 1GB RAM*
Storage	***:4GB eMMC Flash, Optional SD CARD***
RTC	*:High accuracy real-time clock powered by external battery*
Power	***:24-260 V AC/DC 2 kVrms isolation power consumption <8 W***
Compliance	*:IEC 61850-3*
Battery back-up	***:3000 mAH Li-ion battery with smart battery management unit***
Mechanical	*:(WxDxH) 88x141x210 mm (width is 44 mm without I/O) DIN-RAIL, rack and wall-mounting options IP65*
Environmental	***:Operating temperature -25 ºC to +70 ºC with BBV2, -25 ºC to +55 ºC***

Modules

M8DV2
8 wide-range digital inputs
20-265V AC/DC

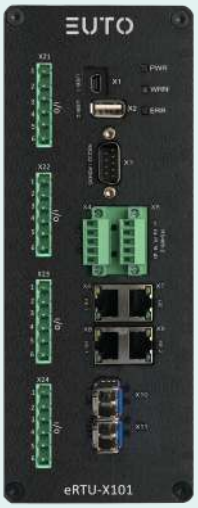
M60V2
6 digital outputs
N/O 8A relay contacts

M1A3O2DV2
1 4-20mA analog input
3 digital relay outputs (8A N/O)
2 wide-range digital inputs

M4GV2
3G/4G Modem
WiFi

There are 2 slots to choose to integrate any combination of modules above.

BBV2
Internal Battery back-up BBV2 module is placed on different slot completely covered in the enclosure and can be integrated or not optionally.



Interfaces

1 USB
USB-Mini, OTG, used for management

1 USB
A-type, device mode

1 RS232/RS485
DB9

2 RS485/RS422
Terminal, Full/Half duplex

1 10/100/1000BaseTx
RJ45

3 10/100BaseTx
RJ45

2 10/100BaseFx
Fiber optic, SFP Module

Protocols

IEC 61850	*MMS Client / Server* *GOOSE Subscriber / Publisher* *IEC 61850-90-2 Substation - Control Center*	**DNP3**	***Master / Slave*** ***Serial, UDP, TCP***
Modbus	***TCP Server / Client*** ***RTU Master / Slave***	IEC 60870	*IEC 60870-5-101 Master / Slave* *IEC 60870-5-104 Client / Server* *IEC60870-5-103 Master / Slave* *IEC60870-5-102 Master*
EtherCAT	*Master*	**DLMS/Cosem**	***Master***
eDNP	***EUTO Custom Distributed Protocol***	MQTT	*Server / Client*

Management

Web GUI	*:Built-in configuration and monitoring interface, no installation needed, no-code*
CLI	***:For users to configure/manage devices in command-line***
Dual image	*:Multiple concurrent images for easy recovery and fail-safe upgrade*
SNMP	***:SNMP version 1, 2c and 3 with support for traps, user-based security models***
Firmware Upgrade	*:Upgrade from Web GUI, USB Stick and SFTP*

Networking & Security & Synchronization

Ethernet switch	*:(2) 10/100BaseTX and (2) 10/100BaseFX ports are drived by ethernet switch. L2 switching, STP (802.1) and RSTP (802.1w) protocols can be enabled in hardware level by configuration. Supports port-based VLAN and 802.1q tag-based VLAN.*
HSR/PRP	***:Redundant protocols can be enabled on copper and F/O ethernet ports by configuration Performs close to fast ethernet speed.***
Security	*:IEC 62351-3, IEC 62351-5 are supported. Connection via TLS/SSL, SSH and VPN*
Synchronization	***:NTP, PTP, IEC 60870-4-101/103/104, DNP3, DLMS Server and client***

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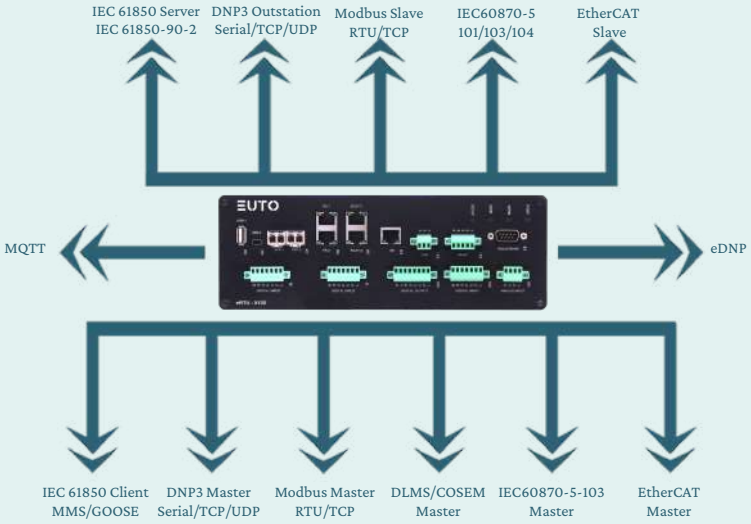
eRTU-X100
Technical Information

IEC 61850 compliant RTU/Gateway with Integrated **CAN** *and* **EtherCAT** *Slave*

Protocol gateway

Convert any protocol/s, one-to-one or multiple-to-multiple simultaneously



EtherCAT

Gateway to/from any protocol from/to EtherCAT

- **Slave** to supply critical data to the upper layer of the system
- **Master** in order to control and monitor time-critical applications integrated into the whole system.

Automation

IEC 61131-3 and LUA based logic programs can be run on the device with precise execution times.

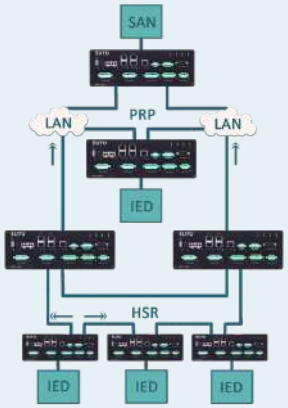
Sequence of events

Historical records with precise timestamps can be saved on non-volatile memory to allow analysis of critical events later.

Redundancy

HSR/PRP can be applied from configured F/O and copper ethernet ports to supply **zero recovery time** on networks faults.

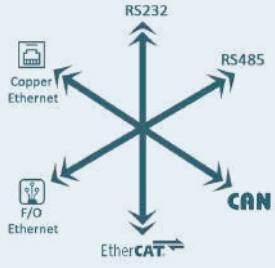
Hardware level RSTP can also be available to provide recovery on regular ring networks.



Internal Battery Back-up

Back-up battery can be integrated optionally to keep the device open up to 2 hours while power cuts in order to avoid critical data loss.

Media conversion



Communication media between different stages of applications can be converted efficiently, one-to-one or multiple-to-multiple simultaneously

Modular design

There are 2 slots on the main board to integrate 3 different **on-board module** options:

- *12 digital inputs*
- *2 analog input, 6 digital inputs, 4 digital outputs*
- *Wide-range power supply*
- *Battery back-up*

External analog/digital I/O and current/voltage measurement modules can be controlled in real-time from EtherCAT bus:

- *eXIO-D100*
- *eXIO-M100*
- *eCVM-P100*

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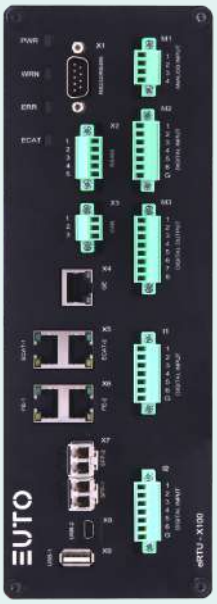
eRTU-X100
Specifications

Hardware Specifications

CPU features	*:1GHz Arm Cortex-A9 Processor, 1GB RAM*
Storage	***:4GB eMMC Flash, Optional SD CARD***
RTC	*:High accuracy real-time clock powered by external battery*
Power	***: 9-36 V DC or 18-75 V DC on main board Wide-range 24-265 V AC/DC with MWP 2 kVrms isolation power consumption <8 W***
Compliance	*:IEC 61850-3*
Battery back-up	***:3000 mAH Li-ion battery with smart battery management unit***
Mechanical	*:(WxDxH) 88x160x250.6 mm (width is 44 mm without module) DIN Rail, rack and wall-mounting options IP65*
Environmental	***:Operating temperature -25 ºC to +70 ºC with Battery Back-up, -25 ºC to +55 ºC***

Interfaces

RS232/RS485 *DB9*	1
RS485/RS422 *Terminal, Full/Half duplex*	1
CAN *Terminal*	1
10/100/1000BaseTx *RJ45*	1
EtherCAT Slave *10/100BaseTx, RJ45*	2
10/100BaseTx *RJ45*	3
10/100BaseFx *Fiber optic, SFP Module*	2
USB *USB-Mini, OTG, used for management*	1
USB *A-type, device mode*	1



Modules

M12D
12 wide-range digital inputs 20-265V AC/DC

M2A4O6D
2 4-20mA analog input
4 digital relay outputs (8A N/O)
6 wide-range digital inputs

MWP
Wide-range power supply Battery back-up feature can be placed on MWP module

There are 2 slots to choose to integrate any combination of M12D and M2A4O6D modules. MWP can be integrated without allocating those 2 slots on purpose.

Protocols

IEC 61850	*MMS Client / Server* *GOOSE Subscriber / Publisher* *IEC 61850-90-2 Substation - Control Center*
Modbus	***TCP Server / Client*** ***RTU Master / Slave***
EtherCAT	*Master / Slave*
eDNP	***EUTO Custom Distributed Protocol***
DNP3	***Master / Slave*** ***Serial, UDP, TCP***
IEC 60870	*IEC 60870-5-101 Master / Slave* *IEC 60870-5-104 Client / Server* *IEC60870-5-103 Master / Slave* *IEC60870-5-102 Master*
DLMS/Cosem	***Master***
MQTT	*Server / Client*

Management

Web GUI	*:Built-in configuration and monitoring interface, no installation needed, no-code*
CLI	***:For users to configure/manage devices in command-line***
Dual image	*:Multiple concurrent images for easy recovery and fail-safe upgrade*
SNMP	***:SNMP version 1, 2c and 3 with support for traps, user-based security models***
Firmware Upgrade	*:Upgrade from Web GUI, USB Stick and SFTP*

Networking & Security & Synchronization

Ethernet switch	*:(2) 10/100BaseTX and (2) 10/100BaseFX ports are drived by ethernet switch. L2 switching, STP (802.1) and RSTP (802.1w) protocols can be enabled in hardware level by configuration. Supports port-based VLAN and 802.1q tag-based VLAN.*
HSR/PRP	***:Redundant protocols can be enabled on copper and F/O ethernet ports by configuration Performs close to fast ethernet speed.***
Security	*:IEC 62351-3, IEC 62351-5 are supported. Connection via TLS/SSL, SSH and VPN*
Synchronization	***:NTP, PTP, IEC 60870-4-101/103/104, DNP3, DLMS Server and client***
FSoE	*:Safety over EtherCAT*

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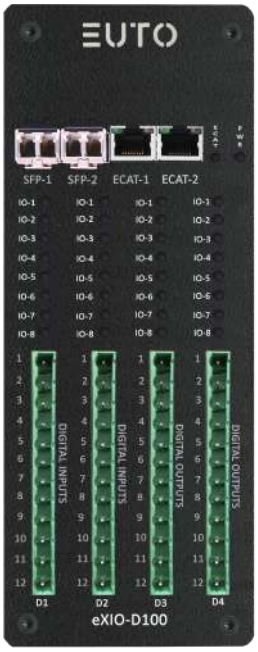
eXIO-D100
Technical Information



Modular Digital Input/Output Unit over EtherCAT bus

Modular Design

There are 4 slots on the main board to integrate 2 different types of digital I/O boards.
Up-to 32 digital inputs/outputs can be configured.

Board types:

- **Digital input board**
  Consisting 8 wide-range digital inputs
- **Digital output board**
  Consisting 8 dry contact relay outputs

LED Indications

- **I/O**
  Each input and output status shown with a single dedicated LED on the front side of the device.
- **Power**
  Power on/off state shown on the front side of the device.
- **EtherCAT**
  State of EtherCAT protocol is shown on the front side of the device.
- **Communication Ports**
  Each RJ45 and SFP ports have link and activity LED indications.

Internal Wide-Range Power Input

24-265V AC/DC inputs are accepted in single hardware configuration.

Management

All configuration is done directly from EtherCAT master over the communication bus without physically access.

Media Support

2 ports 10/100BaseTx **copper** ethernet supported for regular applications.

2 ports 10/100BaseFx **fiber optic** interface via SFP module connection supported for long distance communication or the environments with high EMI noise.

EtherCAT®

2 ports EtherCAT Slave connection for data exchange.

All inputs and outputs are directly drived by dedicated EtherCAT slave controller ASIC, which allows very high speed data exchange with the main controller units such as eRTU-X101.

Thanks to EtherCAT protocol, I/Os can be accessed from the master unit in microseconds, even when hundreds of devices are connected on the bus.

Network topologies

Wide range of network topologies can be supported according to the requirements of the application.

Compatibility

eXIO-D100 can be used fully compatible with other products from EtherCAT bus familiy:

- *eRTU-X100 / eRTU-X101*
- *eXIO-M100*
- *eCVM-P100*

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eXIO-D100
Specifications

Hardware Specifications

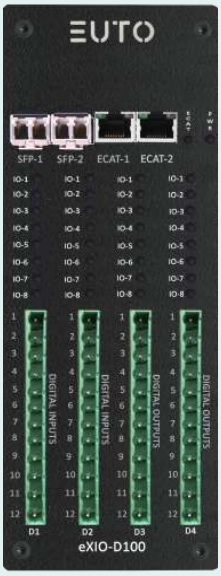
Processor	*:EtherCAT slave controller ASIC*
Power	***: 24-265 V AC/DC 2 kVrms isolation power consumption <12 W***
Compliance	*:IEC 61850-3*
Mechanical	***:(WxDxH) 88x141x210 mm DIN Rail mounting IP65 enclosure***
Environmental	*:Operating temperature -25 ºC to +70 ºC*

Interfaces

10/100BaseTx **2**
EtherCAT Slave

10/100BaseFx **2**
Fiber optic, SFP Module
Ethercat Slave

I/O **4**
12-pin Terminal (5.08)



Options

There are 2 ports drived by the controller.

Each port can be selected as copper or fiber optic independently.

(8) Digital input board
(8) Digital output board

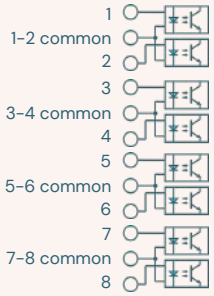
There are 4 slots to choose to integrate any combination of Digital Input and Digital Output boards.

Up-to 32 digital inputs/outputs can be used.

Not every slot necessarily be used.

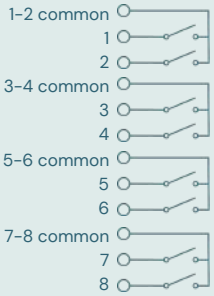
Digital Inputs

Voltage Range	*:20-265 V AC/DC in single hardware configuration (standard)* *Other voltage ranges can be applied on request.*
Isolation	***:2 kVrms opto-isolation***
Connection	*:Each two inputs have common return line*
Connector	***:12 pins terminal, pin distance 5.08 mm***
Indication	*:Each input has dedicated LED indicator which shows activity status*



Digital Outputs

Contact	*:Electromechanical dry contact relay*
Isolation	***:5 kVrms***
Connection	*:Normally-open contacts* *Each two outputs have common GND*
Connector	***:12 pins terminal, pin distance 5.08 mm***
Breaking capacity	*:8 A at 220 VAC*
Indication	***:Each output has dedicated LED indicator which shows activity status***



Networking & Security & Synchronization

Protocol	*:EtherCAT slave* *eXIO-D100 I/Os are polled continuously every milliseconds*
Synchronization	***:Thanks to EtherCAT protocol, the delay between main controller unit and eXIO-D100 device is very low.***
FSoE	*:Safety over EtherCAT*

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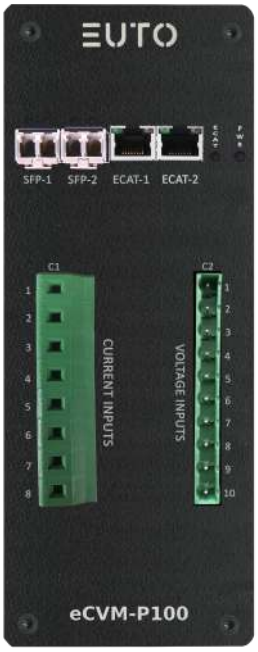
eCVM-P100
Technical Information



Current and Voltage Measurement Unit over EtherCAT bus

Modular Design

There are 4 slots on the main board to integrate 2 different types of measurement boards:

- **Current measurement board**
  Consisting 4 isolated current inputs
- **Voltage measurement board**
  Consisting 5 isolated voltage inputs

Different board combinations might be available on request with analog/digital I/O boards from eXIO-M100.

LED Indications

- **Power**
  Power on/off state shown on the front side of the device.
- **EtherCAT**
  State of EtherCAT protocol is shown on the front side of the device.
- **Communication Ports**
  Each RJ45 and SFP ports have link and activity LED indications.

Internal Wide-Range Power Input

24-265V AC/DC inputs are accepted in single hardware configuration.

Management

All configuration is done directly from EtherCAT master over the communication bus without physically access.

Media Support

2 ports 10/100BaseTx **copper** ethernet supported for regular applications.

2 ports 10/100BaseFx **fiber optic** interface via SFP module connection supported for long distance communication or the environments with high EMI noise.

EtherCAT®

2 ports EtherCAT Slave connection for data exchange.

All voltage and current channels are measured and processed by dedicated real-time processors. Data to monitor and control are directly drived by the CPU which is only dedicated to EtherCAT slave controller ASIC, which allows very high speed data exchange with the main controller units such as eRTU-X101.

Thanks to EtherCAT protocol, I/Os can be accessed from the master unit in microseconds, even when hundreds of devices are connected on the bus.

Network topologies

Wide range of network topologies can be supported according to the requirements of the application.

Compatibility

eCVM-P100 can be used fully compatible with other products from EtherCAT bus familiy:

- *eRTU-X100 / eRTU-X101*
- *eXIO-M100*
- *eXIO-D100*

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Contact: **info@eutoenergy.com**

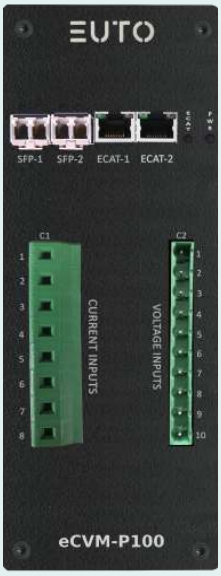
eCVM-P100
Specifications

Hardware Specifications

Processor	*:ARM M7 500MHz processor* *16MB RAM, 16MB Flash* *EtherCAT slave controller ASIC*
Power	***: 24-265 V AC/DC*** ***2 kVrms isolation*** ***power consumption <10 W***
Compliance	*:IEC 61850-3* *IEC 60255-27*
Mechanical	***:(WxDxH) 88x141x210 mm*** ***DIN Rail mounting*** ***IP65 enclosure***
Environmental	*:Operating temperature -25 ºC to +70 ºC*

Interfaces

10/100BaseTx *EtherCAT Slave*	2
10/100BaseFx *Fiber optic, SFP Module* *Ethercat Slave*	2
Current Inputs *8-pin Terminal (10 mm)*	1
Voltage Inputs *10-pin Terminal (7.62 mm)*	1



Options

There are 2 ports drived by the controller.

Each port can be selected as copper or fiber optic independently.

(4) Current input board
(5) Voltage input board

There are 4 slots to choose to integrate current and voltage input boards.

There might be different combination limited by board size limits. Some combinations:
- 1 Voltage Input, 1 Current Input
- 2 Voltage Input boards
- 2 Current Input boards

Additionally, further combinations can be made with analog/digital I/O boards from eXIO-M100 device. Those combinations are evaluated on request.

Current Inputs

Measuring Range	*:0.01-40 x In (In: rated current might be 1 A or 5 A)*
Accuracy	***:0.5% (at rated current)***
Number of lines	*:4 lines (3 phase + 1 notr)*
Isolation	***:4.5 kVrms Current Transformer***
Connection	*:Each current measuring line has separate 2 (input and return) connections.*
Connector	***:8 pins terminal, pin distance 10 mm, not pluggable***
Burden	*:at 1 A <0.02 VA, at 5 A <0.3 VA*

Voltage Inputs

Measuring Range	*:0-270 V*
Accuracy	***:0.5% (at rated voltage)***
Number of lines	*:5 lines*
Isolation	***:4 kVrms Voltage Transformer***
Connection	*:Each voltage measuring line has separate 2 (input and return) connections.*
Connector	***:10 pins terminal, pin distance 7.62 mm, pluggable***
Burden	*:<0.05 VA*

Networking & Security & Synchronization

Protocol	*:EtherCAT slave* *eXIO-D100 I/Os are polled continuously every milliseconds*
Synchronization	***:Thanks to EtherCAT protocol, the delay between main controller unit and eCVM-P100 device is very low.***
FSoE	*:Safety over EtherCAT*

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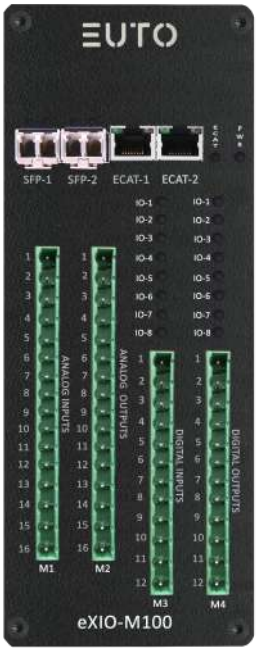
eXIO-M100
Technical Information



Modular Analog/Digital Input/Output Unit over EtherCAT bus

Modular Design

There are 4 slots on the main board to integrate 4 different types of analog/digital I/O boards:

- **Analog input board**
  4 differential or 8 single-ended ±10 V voltage inputs
  4 single-ended 0-20 mA current inputs
- **Analog output board**
  4 or 8 configurable current or voltage analog outputs
- **Digital input board**
  Consisting 8 wide-range digital inputs
- **Digital output board**
  Consisting 8 dry contact relay outputs

LED Indications

- **I/O**
  Each digital input and output status shown with a single dedicated LED on the front side of the device.
- **Power**
  Power on/off state shown on the front side of the device.
- **EtherCAT**
  State of EtherCAT protocol is shown on the front side of the device.
- **Communication Ports**
  Each RJ45 and SFP ports have link and activity LED indications.

Internal Wide-Range Power Input

24-265V AC/DC inputs are accepted in single hardware configuration.

Management

All configuration is done directly from EtherCAT master over the communication bus without physically access.

Media Support

2 ports 10/100BaseTx **copper** ethernet supported for regular applications.

2 ports 10/100BaseFx **fiber optic** interface via SFP module connection supported for long distance communication or the environments with high EMI noise.

EtherCAT

2 ports EtherCAT Slave connection for data exchange.

All inputs and outputs are directly drived by the CPU which is only dedicated to EtherCAT slave controller ASIC, which allows very high speed data exchange with the main controller units such as eRTU-X101.

Thanks to EtherCAT protocol, I/Os can be accessed from the master unit in microseconds, even when hundreds of devices are connected on the bus.

Network topologies

Wide range of network topologies can be supported according to the requirements of the application.

Compatibility

eXIO-M100 can be used fully compatible with other products from EtherCAT bus familiy:

- *eRTU-X100 / eRTU-X101*
- *eXIO-D100*
- *eCVM-P100*

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eXIO-M100
Specifications

Hardware Specifications

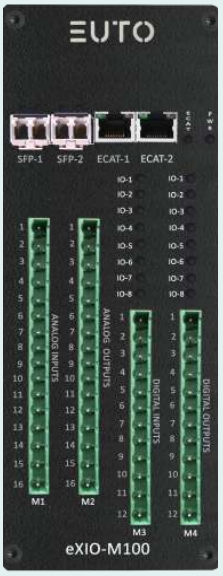
Processor	*:ARM M7 500MHz processor 16MB RAM, 16MB Flash EtherCAT slave controller ASIC*
Power	***: 24-265 V AC/DC 2 kVrms isolation power consumption <12 W***
Compliance	*:IEC 61850-3*
Mechanical	***:(WxDxH) 88x141x210 mm DIN Rail mounting IP65 enclosure***
Environmental	*:Operating temperature -25 ºC to +70 ºC*

Interfaces

10/100BaseTx **2**
EtherCAT Slave

10/100BaseFx **2**
Fiber optic, SFP Module
Ethercat Slave

I/O **4**
12-pin Terminal (5.08)



Options

There are 2 ports drived by the controller.

Each port can be selected as copper or fiber optic independently.

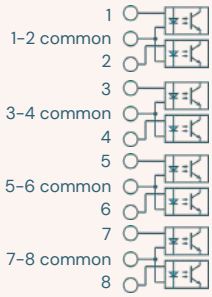
Analog input board
Analog output board
Digital input board
Digital output board

There are 4 slots to choose to integrate any combination of Analog Input, Analog Output, Digital Input and Digital Output boards.

Not every slot necessarily be used.

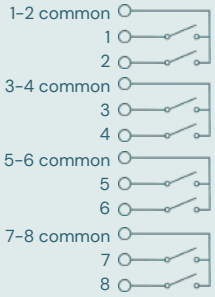
Digital Inputs

Voltage Range	*:20-265V AC/DC in single hardware configuration (standard) Other voltage ranges can be applied on request.*
Isolation	***:2 kVrms opto-isolation***
Connection	*:Each two inputs have common return line*
Connector	***:12 pins terminal, pin distance 5.08 mm***
Indication	*:Each input has dedicated LED indicator which shows activity status*



Digital Outputs

Contact	*:Electromechanical dry contact relay*
Isolation	***:5 kVrms***
Connection	*:Normally-open contacts Each two outputs have common GND*
Connector	***:12 pins terminal, pin distance 5.08 mm***
Breaking capacity	*:8 A at 220 VAC*
Indication	***:Each output has dedicated LED indicator which shows activity status***



Analog Inputs

Voltage Inputs	*:±10 V inputs can be configured as 4 differential or 8 single-ended*
Current Inputs	***:0-20 mA inputs, 4 single-ended***
Isolation	*:3 kVrms*
Connector	***:16 pins terminal pin distance 5.08 mm***

Analog Outputs

Voltage Outputs	*:0-5 V, 0-10 V, ±5 V, ±10 V outputs can be configured as differential*
Current Outputs	***:0-20 mA, 4-20 mA, 0-24 mA current outputs can be configured***
Isolation	*:3 kVrms*
Connector	***:16 pins terminal pin distance 5.08 mm***

Networking & Security & Synchronization

Protocol	*:EtherCAT slave eXIO-D100 I/Os are polled continuously every milliseconds*
Synchronization	***:Thanks to EtherCAT protocol, the delay between main controller unit and eXIO-M100 device is very low.***
FSoE	*:Safety over EtherCAT*

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