
INTEGRAL UNIVERSAL SUBSTATION PROCESSOR

DATA SHEET



·:BITHOUSE:·
every bit matters

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About the Document

Document Scope

This document describes the **Integral Universal Substation Processor** and its modules.

Safety information

Intended use

The product is intended for building automation and light industrial use.

Only appropriately trained people are authorized to work on and with this product. They must be familiar with applicable standards and regulations.

The product must be used in accordance with all applicable safety requirements, regulations and instructions provided in the product documentation, including this data sheet.

Only recommended conductors/cables and accessories/equipment may be used with the product.

Environmental Specifications

PARAMETER	VALUE	NOTE
Operating temperature	0–50°C	
Humidity	<95 % (non-condensing)	

Disposal / Recycling

WEEE business products reception points:

<https://www.elker.fi/en/reception-points-for-business-products/>

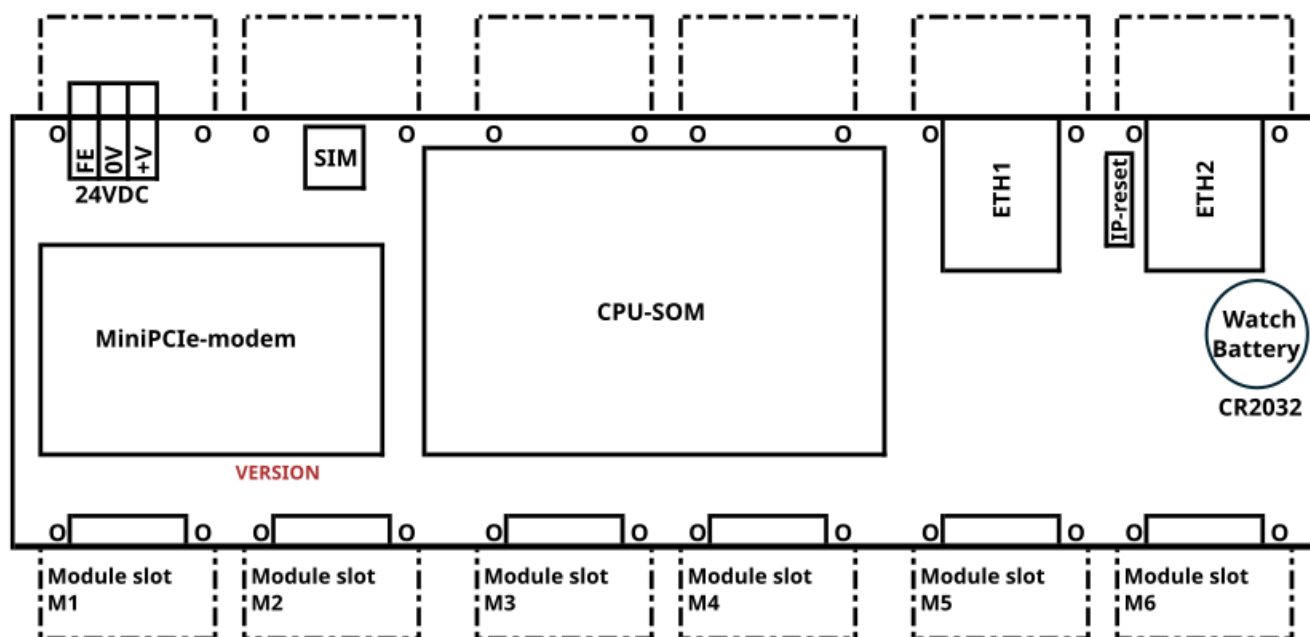
About the product

Product Overview

Integral Universal Substation Processor is a modular logic controller and communication gateway. The base unit includes the main processor, an integrated slot for a 4G modem, and two Ethernet ports. In addition, the modular section provides six slots for **Integral Modules**, allowing flexible configuration for different types of communication.

- Six module slots
- 4G modem ready
- Two 10/100 Mbps Ethernet RJ45 ports
- Web interface Actiweb9

Connectors and components



SYMBOL	PART	DESCRIPTION
FE	Connector	Functional Earth
0V	Connector	0 V _{DC}
+V	Connector	24 V _{DC} power supply
ETH1	Connector	Ethernet ports (identical)
ETH2		
CPU-SOM	Processor	Various options
MiniPCIe	Modem	Optional
SIM	SIM-card	
IP-reset	Button	IP-address reset
Watch Battery	Battery	CR2032
Module slots M1-M6	Integral Module	As ordered

Technical Specifications

Dimensions

PARAMETER	VALUE	NOTE
Width	213 mm	12 DIN modules
Height	91 mm	
Depth	60 mm	
Depth with display	71 mm	
Display size	42 x 87 mm	

Power Supply

ATTRIBUTE	VALUE	NOTE
Operating voltage	24 V _{DC} (±10%)	
24 V _{DC} fuse for modules	10 A	Mini blade fuse 11x4 mm
24 V _{DC} CPU fuse	2 A	Auto-resetting
CPU power consumption	80 mA	0 % load
	150 mA	100 % load
mPCIe modem current consumption	Approx. 100 mA	
Theoretical max consumption (1,6 A peak current)	1,3 A	Including mPCIe but not the modules or actuators.
Module power consumption	30 mA / module	Typically (for specifics, see: Modules)
Display current consumption		
Recommended power supply	1 A (24 W)	
Through-fed current	≤6 A / module	24 V _{DC}
	≤10 A / module	0 V _{DC}
Grounding	1 MΩ	between 0V _{DC} – FE connectors
		⚠ Must be connected to a PELV system
		0V _{DC} and 0V _{AC} must be connected
Supply conductors / torque	≤ 2,5mm ² / 0,5 Nm	

Performance

MODEL	PROCESSOR	COMPONENT	VALUE	MAX. DATA POINTS
Integral D630	Verdin AM62 Dual 1GB ET	CPU	2 cores	600
		Storage	4 GB	
		RAM	1 GB	
Integral D650	Verdin AM62 Quad 2GB WB IT / Verdin iMX8MM Q 2GB IT	CPU	4 cores	1000
		Storage	16 GB	
		RAM	2 GB	
Integral D670	Verdin iMX8M Plus Quad 8GB WB IT	CPU	4 cores	2000
		Storage	32 GB	
		RAM	8 GB	

Software

A customized version of the Ubuntu 22.04 LTS operating system is installed on the device. The device automatically installs official security updates released by Canonical Ltd.

Actiweb9 software platform is installed in addition to the operating system. The control and process applications run on Actiweb9.

IM-Modules

- Modules are factory-installed as ordered.
- Width of each module: 2 DIN modules (33,1 mm).

IM-IO816

- 16 I/O channels

IM-RS485-2P

- 2 RS485 buses. Typically Modbus

IM-MBUS-10

- Meter-Bus, max. 10 devices

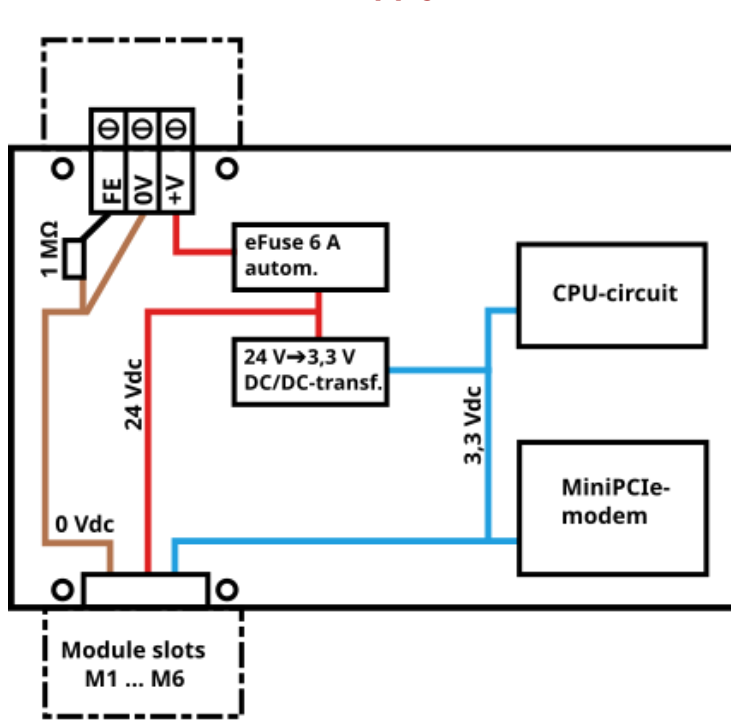
IM-MBUS-250

- Meter-Bus, max 250 devices

IM-USB-C-4P

- 4 USB-C connections

Module Power Supply



Through-fed +24 V_{DC} in the modules: ≤ 3 A. GND (0 V_{DC}): ≤ 6 A.

The CPU board supplies the modules with two voltages: **24 V_{DC} (≤ 3 A)** and **3.3 V_{DC} (≤ 500 mA)**. The total power consumed by these together forms the **24 V_{DC} rated current**.

The module's **3.3 V_{DC} power supply** passes through a **USB power switch**, which limits the current to **500 mA**. The voltage can be switched off in software, allowing the module to be rebooted (the module always receives 24 V_{DC}).

6 A fuse

The device's supply voltage is fed through a **6 A eFuse**. It disconnects power from both the modules and the CPU board. The fuse resets automatically, with no significant delay (milliseconds).

GND / 0 VDC current

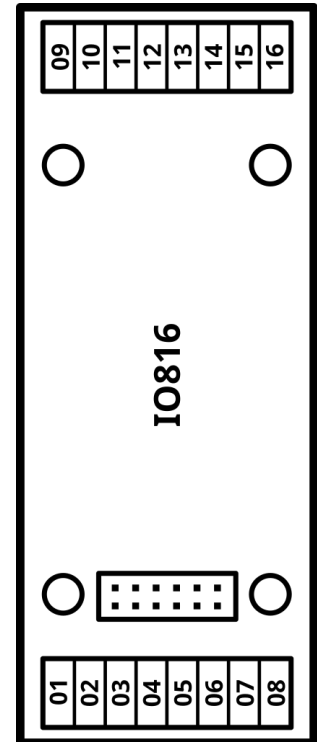
The maximum **return current** is **12 A**.

IM-IO816

- 16 universal I/O channels (analog measurements use two consecutive channels)
- Maximum current: 1 A per channel, 10 A per module
- Cable/tightening torque: $\leq 1,5 \text{ mm}^2 / 0,2 \text{ Nm}$
- For analog measurements over 10 m: use twisted pair cabling
- Module power consumption: 24 V_{DC} rated current 30 mA

Module connectors

SYMBOL	PART	DESCRIPTION
01-16	Connector	Analog mode: channels used in pairs (01-02, 03-04, 05-06, etc.)
		Digital mode: channels used individually



Supported Modes

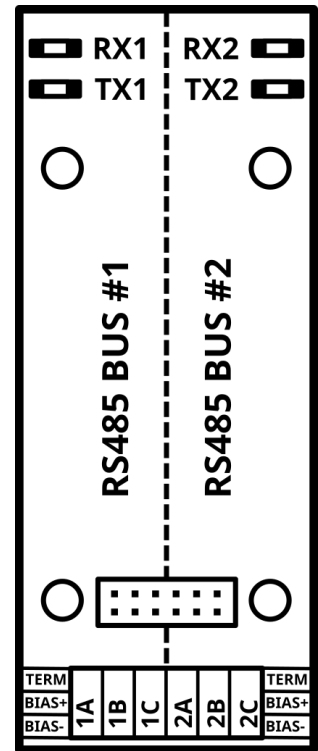
MODE	MEASUREMENT	DESCRIPTION
AI	Resistance	PT1000, NI1000, NI1000-LG, NTC10, 0–1 MΩ
AI/AO	Voltage	0–10 V, 2–10 V
AI	Current	0–20 mA, 4–20 mA, 0–1 A (less accurate at high range)
DI	Pulse counter	Counts when connected to GND, $\geq 25 \text{ ms}$ period (400 Hz)
DI		1 = ground, 0 = float
DI-EXT		1 = voltage > 7 V, 0 = voltage < 3 V No change to previous state = 3–7 V
DO		Open drain, connects to GND when active
GND		Permanent ground

IM-RS485-2P

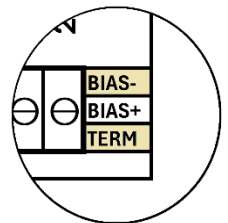
- 2 buses per module, typically used for Modbus RTU
- Configurable bus settings:
 - Master/Slave
 - 1200–115200 bps
 - Parity N/E/O
 - 8 data bits, 1-2 stop bits (often 19200 8E1)
- Terminals A/B tolerate misconnection to 24 V_{DC}
- Not galvanically isolated
- Cabling / Torque: ≤ 1.5 mm² / 0.2 Nm
- Twisted pair recommended (e.g. CAT 6)
- Power Consumption: 24 V_{DC} rated current 30 mA (with max 54 Ω load)

Module connectors and components

SYMBOL	PART	DESCRIPTION
1A, 1B	Connector	Bus 1. 1A negative, 1B positive
2A, 2B	Connector	Bus 2. 2A negative, 2B positive
1C, 2C	Connector	Ground (0 V _{DC}) via 100 Ω resistor
RX1, RX2	LED	Traffic on bus
TX1, TX2	LED	Outgoing traffic from module
BIAS+, BIAS-	Jumper	For bias resistors
TERM	Jumper	For 120 Ω termination



Note: The first production batch has different BIAS and TERM connections on Bus 2, marked separately on the housing.



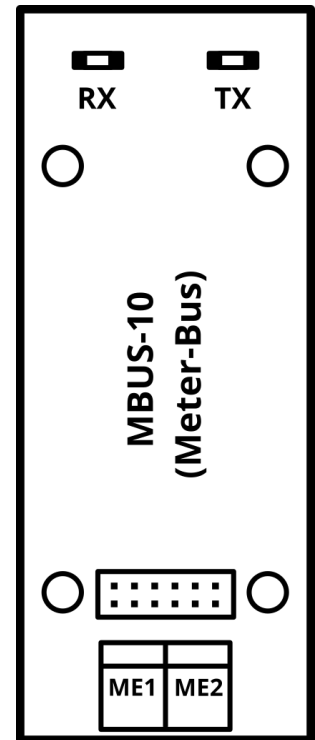
IM-MBUS-10

- M-Bus (Meter-Bus) level converter for up to 10 devices
- Bus polarity irrelevant; ME1↔ME2 can be swapped
- Cabling / Torque: $\leq 2.5 \text{ mm}^2 / 0.6 \text{ Nm}$
- Bus is not sensitive to cable type or twisted pairs
- Power Consumption:
 - 24 V_{DC} rated current 200 mA.

Module connectors and components

SYMBOL	PART	DESCRIPTION
ME1	Connector	Bus "negative" terminal (0 V)
ME2	Connector	Bus "positive" terminal (~35 V)
RX	LED	Receiving data
TX	LED	Transmitting data

Note: Not a Modbus module

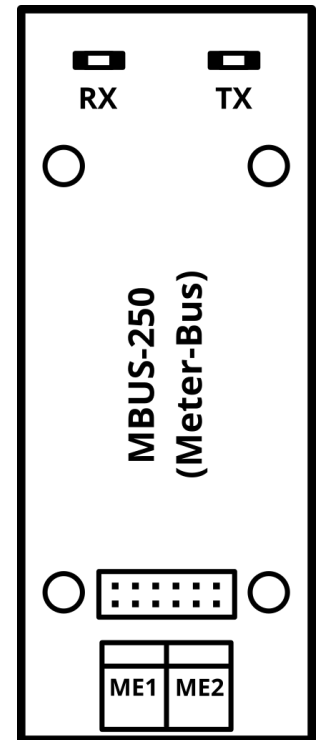


IM-MBUS-250

- M-Bus (Meter-Bus) level converter for up to 250 devices
- Bus polarity irrelevant; ME1↔ME2 can be swapped
- Cabling / Torque: $\leq 2.5 \text{ mm}^2 / 0.6 \text{ Nm}$
- Bus is not sensitive to cable type or twisted pairs
- Power Consumption:
 - 24 V_{DC} rated current 200 mA (0 devices)
 - 24 V_{DC} rated current 2 A (250 devices)
 - **Note:** Due to power consumption one Integral Universal Substation can only have four (4) IM-MBUS-250 modules

Module connectors and components

SYMBOL	PART	DESCRIPTION
ME1	Connector	Bus "negative" terminal (0 V)
ME2	Connector	Bus "positive" terminal (~35 V)
RX	LED	Receiving data
TX	LED	Transmitting data



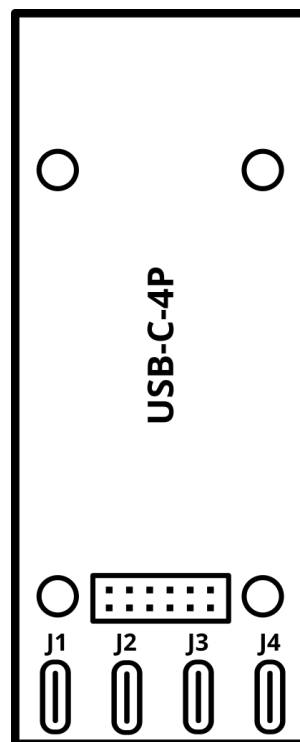
Note: Not a Modbus module

IM-USB-C-4P

- Module with four USB-C connections (USB 2.0)
- Power Consumption:
 - 24 V_{DC} rated current 30 mA (0 devices)
 - 24 V_{DC} rated current 2000 mA (4 devices; ~500 mA per device)

Module connectors and components

SYMBOL	PART	DESCRIPTION
J1...J4	Connector	USB-C



IP-address

- Default IP Address: 192.168.10.134 (Eth1)
 - Press and hold the IP-reset button under the top cover for ~5 seconds. Restores default IP settings (temporary; not saved to disk).
 - Models with display: IP-reset button is next to the display, under a dust cover.
 - Both Ethernet ports automatically obtain an address via DHCP when available.

DEFAULT IP SETTINGS	
IP-address	192.168.10.134
Subnet mask	255.255.255.0
Gateway	192.168.10.1
DNS	192.168.10.1

Related documents

Integral Universal Substation Processor manual

Contact information

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<https://www.bithouse.fi/en>