



iRTUe

Versatile and modular I/O extensions transforming any master unit into an I/O powerhouse



- > **IEC 61850 GOOSE communication** with a processing time under 3ms
- > Flexible configuration of two I/O cards per unit with **digital & analog inputs** and **relays**
- > State-of-the-art technology for **advanced automation functionalities** like load shedding
- > **Serial (EXP422)** or **double Ethernet** port (copper or fiber) to connect to iRTUs/iGWs or any other third party master unit



Simple IEC 61850

iRTUe units communicate with IEC 61850 GOOSE, allowing to extend and distribute the acquisition and command capabilities of any master device. We offer flexible I/O board configurations to fulfill any application requirement, making the iRTUe the perfect choice to both set-up and retrofit electrical communication networks.

Contemporary substation automation calls for advanced I/O modules to provide modern services such as interlocking or load shedding. These functionalities rely on state-of-the-art characteristics, which cannot be realised with serial communication media and old protocols. For this reason, the iRTUe handles IEC 61850 GOOSE messaging (with a processing time under 3ms) for newer projects but also Modbus with events buffer and timestamping for older substations/ master units.

They connect via double Ethernet (RJ45, ST or SC) or serial (EXP422) port and are time synchronized to ensure optimal time accuracy. This allows the iRTUe to communicate with any other equipment in the network: for instance RTUs, gateways, other iRTUe modules and third-party IEDs on the substation process bus.



STANDARDS AND COMPLIANCE

The diverse backgrounds of our partners and clients from all over the world have helped us gather state-of-the-art know-how and firsthand experience in a great variety of energy applications.

This joined knowledge is the foundation of our optimized iRTUe family, which has a proven track record of being particularly effective and resistant for a diverse range of applications and harsh environments belonging to the energy industry. As a result, the iRTUe meets the requirements of extensive standards, such as IEC61850-3, IEC60870-2-1 & IEC60255-26



IEC 61850 GOOSE I

GOOSE communication operates with enhanced retransmission mechanisms on a publisher/subscriber basis, allowing P2P communication between iRTUe and IEDs with a processing time under 3ms (performance class P2). IEC 61850 GOOSE also features strong VLAN and priority tagging functionalities via IEEE 802.1Q to send messages efficiently across complex physical networks. Combined with a substation-wide Ethernet LAN, it enables flexible and sophisticated logic schemes for substation protection and automation, such as interlocking and load shedding.



DIGITAL INPUTS AND OUTPUTS

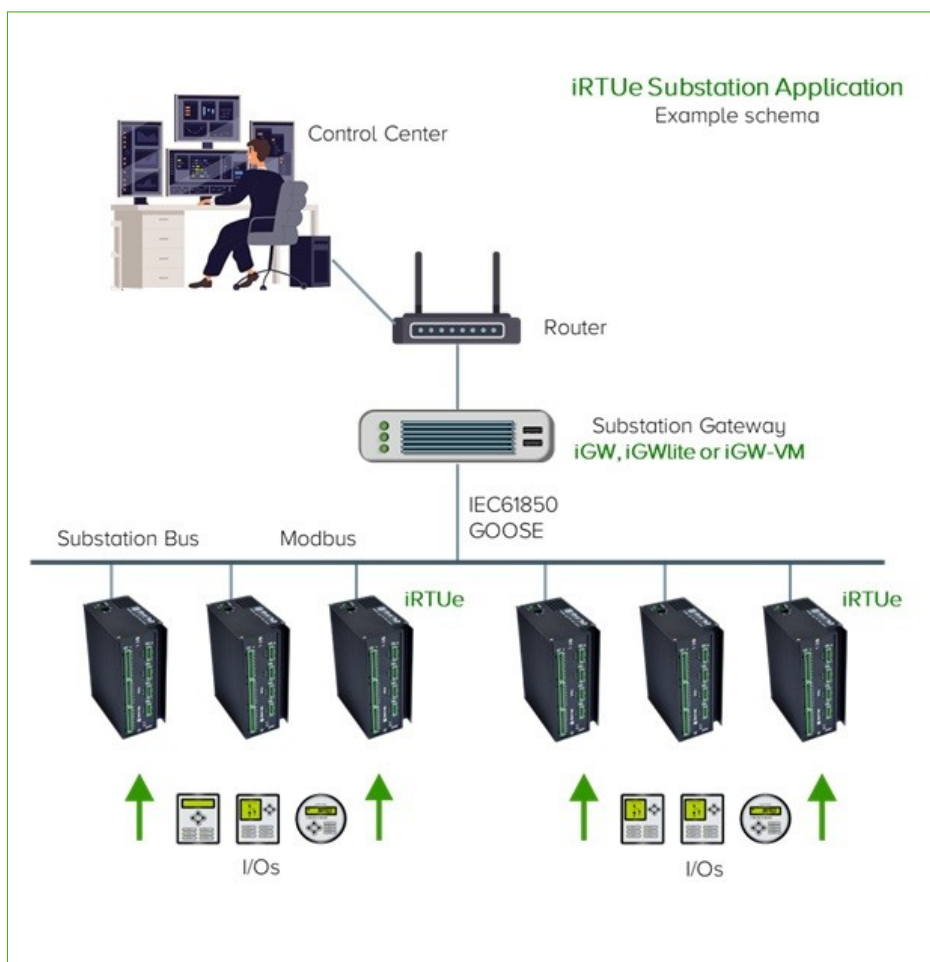
Each input can be defined as input or as a counter and have an individually configured debounce filter. One iRTUe unit can provide up to 48 isolated digital inputs with a 2.5kVrms isolation and a 1 ms timestamp accuracy. The units come in standard input voltages of 24, 48, 125 or 220 Vdc. On the output side, one unit can provide up to 16 dry contact electromechanical relay outputs.

Their maximum breaking capacity 8A at 220Vac and 8, 0.3 and 0.12A at 30, 110 and 220Vdc respectively. Grouping relay outputs in blocks of 2. Isolation between solenoid and contacts: 6 kV.



IEC 61850 GOOSE II

Since these systems are based on software configurations rather than hardwired signal paths, they are more cost-effective, easily extendable and on demand reconfigurable, making them highly adaptive to changing substation configurations and network topologies. The operational reliability of these schemes is significantly enhanced by GOOSE's continuous and inherent supervision of the communication and the message's data integrity. With its strong IEC 61850 GOOSE capabilities, the iRTUe is the perfect I/O extension to employ these advantages.



ANALOG INPUTS

ANALOG DC INPUTS One iRTUe unit can provide up to 16 analog inputs with an isolation of 2.5kVrms. They are offered with a range of 4-20 mA and have an accuracy of 0.15%.

ANALOG AC INPUTS Three AC current and voltage inputs can be connected to iRTUe to measure voltages, currents, phases, frequency and harmonics.

SIMPLE CONFIGURATION

iRTUe addresses, in both Modbus and GOOSE, can be easily configured using the side micro-switches.

For GOOSE, the default multicast group is set to zero (modifiable with iConf).





iRTUe CONFIGURATIONS

GENERAL

Serial (1) RS-422 port for connection to iRTU & iGW devices via Modbus RTU

Ethernet (2) 10/100Base-TX ports with RJ45 connectors, or 100Base-FX fiber optic with ST/SC connectors

INTERNAL I/O CONFIGURATIONS

Lateral Mounting

iRTUe#D1: 24 Digital Inputs

iRTUe#A1: 8 Analog Inputs (0-20mA)

iRTUe#R1: 8 Relay Outputs

iRTUe#D1D1: 48 Digital Inputs

iRTUe#A1A1: 16 Analog Inputs (0-20mA)

iRTUe#R1R1: 16 Relay Outputs

iRTUe#D1A1: 24 Digital Inputs + 8 Analog Inputs

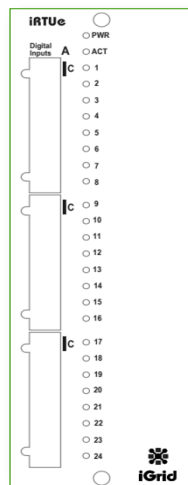
iRTUe#D1R1: 24 Digital Inputs + 8 Relay Outputs

iRTUe#A1R1: 8 Analog Inputs + 8 Relay Outputs

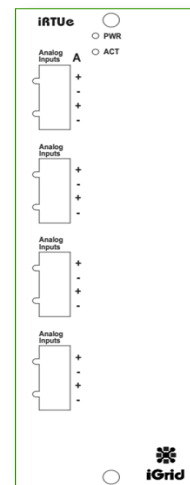
POWER QUALITY ANALYZER & I/O EXPANSION UNIT

- High-accuracy 3-phase measurements
- 3 Current Inputs
- 3 Voltage Inputs
- Frequency and Power factor measurements
- Optional I/O card configurations
- EXP-422 serial connection
- iRTUeQ2: 3 combined inputs, using RJ45 connector, for passive smart sensors based on IEC 60044-7/8

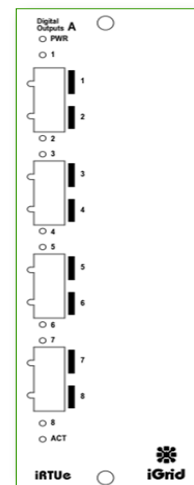
D1



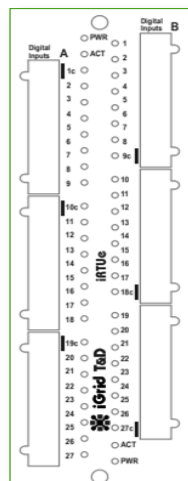
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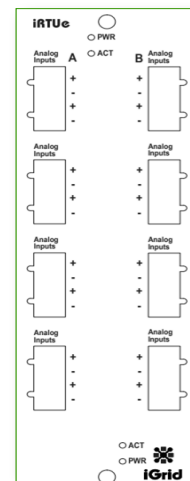
R1



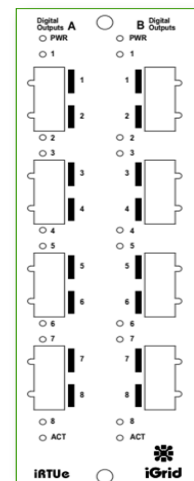
D1D1



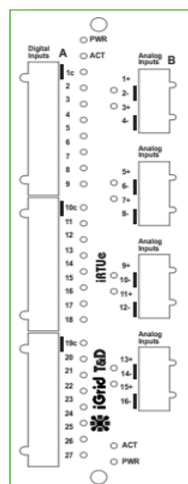
A1A1



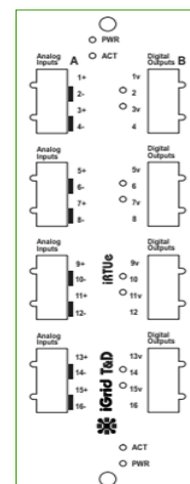
R1R1



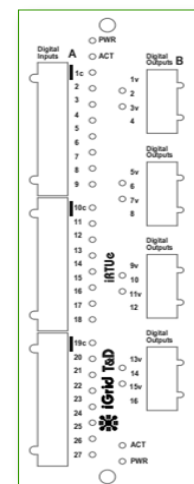
D1A1



A1R1



D1R1





COMMUNICATION PORTS & CPU

Serial (1) RS-422 port for connection to iRTU & iGW devices via Modbus RTU

Ethernet (2) 10/100Base-TX ports with RJ45 connectors, or 100Base-FX fiber optic with ST/SC connectors

Time Synchronization via NTP and EXP422 client

Protocols IEC 61850 GOOSE messaging or proprietary EXP422 serial protocol

IEC 61850 Logical Nodes GGIO predefined (future firmware upgrades will allow any SCL file)

Time response under 3ms following the performance test in IEC 61850 (Type 1A, Class P2)

CPU 32 bits microcontroller @ 40MHz

DIGITAL INPUTS

Isolation 2.5 KVrms

Activation ON when $V_i > 85\% V_n$ | OFF when $V_i < 60\% V_n$ | other levels available upon request

Connectors MVSTBR 2.5, 9-pin connectors for grouping digital inputs: 8 isolated inputs + 1 common terminal

ANALOG INPUTS

Isolation 2.5 KVrms

Connectors MVSTBR 2.5, 4-pin connectors for grouping analog inputs: 2-input blocks

DC Ranges 4-20mA (+/-20% tolerance), +/-10Vdc, with 0.15% accuracy after calibration

AC Ranges 1-5 A and 110Vac, current accuracy < 0.2%, voltage accuracy < 0.5%.

RELAY OUTPUTS

Isolation 5 KVrms (between contact and coil)

Contact Dry

Connectors MVSTBR 2.5, 4-pin connectors for grouping 2 outputs blocks

Breaking Capacity 8A @ 220Vac – 8/8/1/0.4A @ 24/48/125/220Vdc

GENERAL CHARACTERISTICS

Power supply **24** : 19.5-60 Vdc (2.5kVrms isolation)

Power supply **W** : wide range, 32 - 250 Vdc (2.5kVrms isolation) / 80-230 Vac

MTBF 177,000h (one hundred seventy-seven thousand hours)

Physical External dimensions: 173 x 78.4 x 137 mm (H x W x D)
IP30 enclosure with DIN Rail mounting

Operating temperature : -25°C to +70°C

EMC STANDARDS

- | | | |
|-----------------|------------------|------------------|
| • IEC 61000-4-2 | • IEC 61000-4-8 | • IEC 61000-4-17 |
| • IEC 61000-4-3 | • IEC 61000-4-9 | • IEC 61000-4-18 |
| • IEC 61000-4-4 | • IEC 61000-4-10 | • IEC 61000-4-29 |
| • IEC 61000-4-5 | • IEC 61000-4-12 | • CISPR 32 |
| • IEC 61000-4-6 | • IEC 61000-4-16 | |

ENVIRONMENTAL STANDARDS

- | | |
|------------------|------------------|
| • IEC 60068-2-1 | • IEC 60068-2-30 |
| • IEC 60068-2-2 | • IEC 60068-2-38 |
| • IEC 60068-2-14 | • IEC 60068-2-78 |

VIBRATION & SHOCK TEST STANDARDS

- | | |
|-----------------|-----------------|
| • IEC 60068-2-6 | • EN 60255-21-1 |
| • EN 60068-2-27 | • EN 60255-21-2 |
| • EN 60068-2-64 | |

SAFETY STANDARDS

- IEC 60255-27

CONFIGURATION & MAINTENANCE

Easy configuration with iConf tool

ORDERING INFORMATION

iRTUe#ii00vvwwwmc

I/O BOARD #1

- | | |
|-----------|---------------------------|
| D1 | 24 digital inputs |
| R1 | 8 relays |
| A1 | 8 4-20mA DC analog inputs |
| 00 | None |

I/O BOARD #2

- | | |
|-----------|-------------------------------|
| D1 | 24 digital inputs |
| R1 | 8 relays |
| A1 | 8 4-20mA DC analog inputs |
| Q1 | AC current and voltage inputs |
| 00 | None |

POWER SUPPLY

- | | |
|-----------|----------------------------|
| 24 | 19.2-60 Vdc digital inputs |
| WV | 32-250 Vdc / 80-230 Vac |

COMMUNICATION PROTOCOL

- | | |
|----------|-------------------------------|
| M | Serial communication (EXP422) |
| G | IEC 61850 GOOSE |

COMMUNICATION MEDIA

- | | |
|----------|---------------------------------------|
| B | RS422 serial bus (only with Modbus) |
| J | Dual 10/100BaseTX Ethernet with RJ45 |
| T | Dual FX100 Ethernet with ST connector |
| C | Dual FX100 Ethernet with SC connector |

DIGITAL INPUTS VOLTAGE

- | | |
|------------|------------------------|
| 000 | No digital inputs |
| 024 | 24 Vdc digital inputs |
| 048 | 48 Vdc digital inputs |
| 125 | 125 Vdc digital inputs |
| 220 | 220 Vdc digital inputs |