



# 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



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.

## IEC 61850 GOOSE I

GOOSE communication works with enhanced re-transmission 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.

## 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

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%.

## DIGITAL INPUTS & 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.

## 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 iRTU 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 iRTU meets the requirements of extensive standards, such as IEC61850-3, IEC60870-2-1 & IEC60255-26.

## SIMPLE CONFIGURATION

iRTUe addresses, in both Modbus and GOOSE, can be easily configured using the side microswitches. For GOOSE, the default multicast group is set to zero (modifiable with iConf).

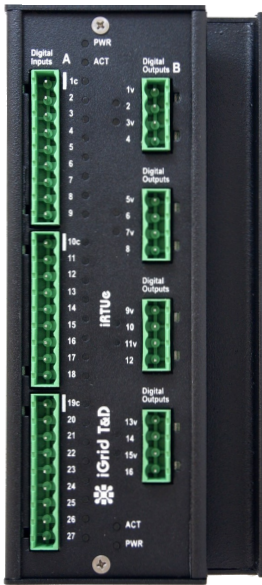


## The iRTU – A Scalable Protocol Converter with Internal I/Os

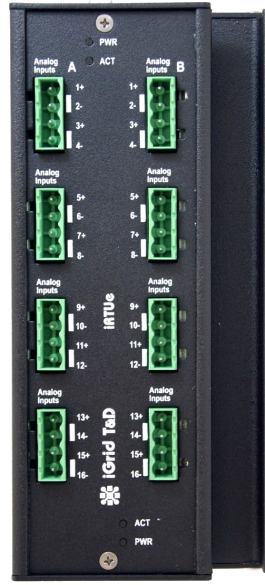
iRTUs (B/M/S) carry 4 serial ports, up to 4 Ethernet ports with HSR/PRP redundancy and a configurable I/O board with relay outputs, AIs and DIs at several voltages. They also offer high precision (<1ms) timestamping with NTP/PTP.

The iGrid protocol stack allows them to act as bay controllers, collecting and processing data from old and new (61850) IEDs and reporting directly to the control center (e.g. via IEC 60870-5-104/101 or DNP3.0) and also as substation gateways, mapping old serial IEDs to IEC 61850 logical nodes.

### iRTUe D1R1



### iRTUe A1A1

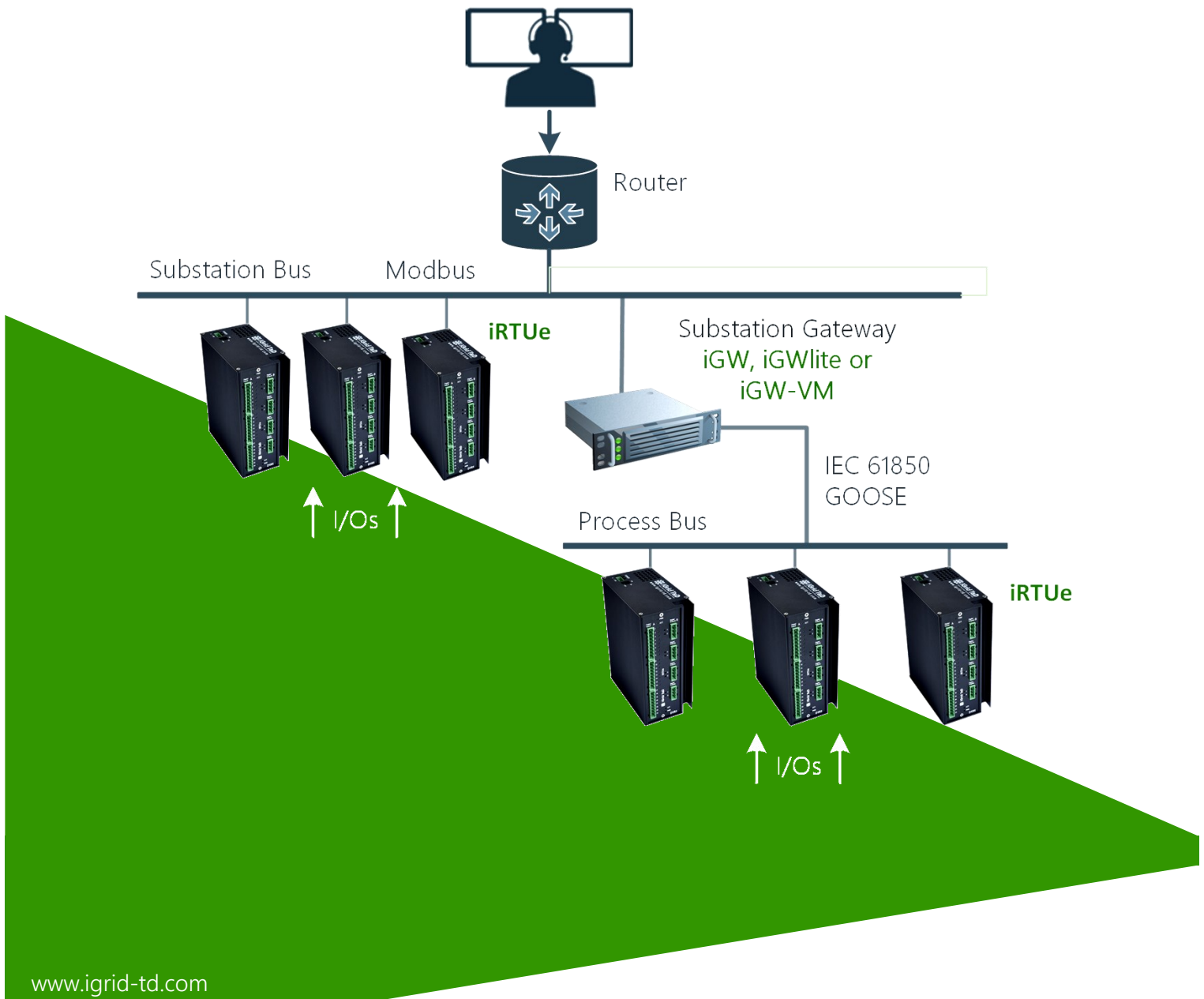


### iRTUe CONFIGURATIONS

The iRTUe can be ordered in 8 different configurations

- iRTUe#D1D1: 48 Digital Inputs
- iRTUe#R1R1: 16 Relay Outputs
- iRTUe#A1A1: 16 Analog Inputs (0-20mA)
- iRTUe#D1R1: 24 Digital Inputs + 8 Relay Outputs
- iRTUe#D1A1: 24 Digital Inputs + 8 Analog Inputs
- iRTUe#R1A1: 24 Digital Inputs + 8 Analog Inputs

*Other configurations upon request*





## COMMUNICATION FEATURES

**Serial** (1) RS-422 port to connect to iRTU&iGW devices with ModbusRTU

**Ethernet** (2) 10/100BaseTX ports, RJ45 or FX100 fiber optics with ST or SC connectors

**Time Synchronization** NTP and EXP422 client

**Protocols** IEC 61850 GOOSE messaging or serial proprietary EXP422

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

**Time response** under 3ms following the performance test in IEC 61850 (type 1A class P2)

## DIGITAL INPUTS

**Isolation** 2.5 kVrms

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

**Connectors** MVSTBR 2,5 9 pins - grouping digital inputs in isolated blocks of 8 inputs and one common terminal

## RELAY OUTPUTS

**Isolation** 6 kVrms

**Contact** Dry

**Connectors** MVSTBR 2,5 4 pins - grouping relay outputs in blocks of 2

**Breaking Capacity** 8A @ 220Vac - 8/0.3/0.12A @ 30/110/220Vdc

## EMC STANDARDS

IEC 60950-1, IEC 60255-5:2000, EC 60255-22:2000, EN 55022, IEC 61000-6-4, IEC 61000-6-5, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-9, IEC 61000-4-10, IEC 61000-4-12, IEC 61000-4-16, IEC 61000-4-17, IEC 61000-4-18, IEC 61000-4-29

## GENERAL CHARACTERISTICS

**Power supply** **W** : wide range, 32 - 250Vdc (2.5kVrms isolation) **24** : 19.5-60Vdc (2.5kVrms isolation)

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

**Environmental** Operating temperature : -25°C to +70°C  
IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-3, IEC 60068-2-14, IEC 60068-2-30, IEC 60068-2-38

**Vibration & shock test** IEC 60068-2-6, IEC 60068-2-7

**Physical** external dimensions: 173 x 78.4 x 137 mm (HxWxD)  
IP30 enclosure with DIN Rail mounting

**Configuration** simple configuration with iConf tool

**CPU** 32 bits microcontroller @ 40MHZ

## ANALOG INPUTS

**Isolation** 2.5 kVrms

**Accuracy** 0.15% after calibration

**Connectors** MVSTBR 2,5 4 pins - grouping analog inputs in blocks of 2

**Ranges** 4-20mA (+/-20% tolerance), +/-10Vdc

## ORDERING INFORMATION

iRTUe#iioovvwwmc

### I/O BOARD #1

**DI** 24 digital inputs  
**RI** 8 relays  
**AI** 8 4-20mA DC analog inputs

### I/O BOARD #2

**DI** 24 digital inputs  
**RI** 8 relays  
**AI** 8 4-20mA DC analog inputs

### POWER SUPPLY

**24** 19.2-60 Vdc  
**WV** 32-250 Vdc

### 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

### DIGITAL INPUTS VOLTAGE

**000** No digital inputs  
**024** 24Vdc digital inputs  
**048** 48Vdc digital inputs  
**125** 125Vdc digital inputs