iRTU Compact

The most compact all-in-one RTU providing a full solution for MV applications at a competitive price.

> Specially suited for **renewable plants** and **distribution feeder automation**

> **All capabilities** required for the control of Photovoltaic plants

> Multiple communication options incl. **internal Ethernet switches, 4G/3G/GPRS modems, I/Os** and multiple **serial ports**

> Control any device through **any protocol common** in the industry.

IEC Supports IEC 61850

The iRTUcompact is an all-in-one device with integrated I/O and numerous communication ports to collect data from any protection relay or switchgear controller, making it the ideal solution for MV and generation applications, specifically Feeder RTU (FRTU) and PV projects.

Our secure and scalable RTUs are equipped with an advanced communication core to manage, convert and transfer multiple protocols on serial, wireless and Ethernet networks at once. They are also capable of providing all required networking, redundancy and time synchonization functions, allowing to automate substations with fewer equipment, in a less complex and more affordable way.

The data collection from meters, protection relays, and other IEDs can be performed using any protocol, inlcuding IEC 60870-5, IEC 61850 (MMS/GOOSE), DNP3, DLMS, Modbus or Procome, with a microsecond timestamp resolution via NTP or PTP.

An architecture based on the iRTUcompact is open, efficient and scalable, as it allows to integrate coming generations of devices (IEDs, sensors, routers etc.) and adapt to any kind of network changes, saving you lots of time and money. With its integrated digital and analog I/Os, it can autonomosly report a high number of data points from several devices to upstream masters and control centers.

COMMUNICATION CAPABILITIES

Despite its small size, the iRTUcompact **B model** comes with 2 independent 10/100 BaseTX Ethernet ports (two different MAC addresses, RJ45 connector) and 3 software configurable **RS422/RS485/RS232 serial ports**. The **S model** provides **three additional Ethernet ports** by replacing one of the conventional Ethernet interfaces with a switch.

The devices also carry 2 USB ports for configurations and other purposes. Optionally, one of the serial ports can be replaced with an internal 4G(LTE), 3G and GPRS modem.

COMMUNICATION PROTOCOLS

The iRTUcompact was designed to use a high number of protocols and communicate with several control centers at once.

The stack includes newer protocols such as IEC 61850 MMS or GOOSE (A-level certified by DNV-KEMA), but also older standard and proprietary protocols e.g. ModbusRTU/TCP, Profibus, SpaBus, Mlink or Procome. Other supported downstream protocols for meters and protection relays are IEC 60870-5-102/-103, IEC 62056-21 and DLMS, while upstream **protocols for control centers also include IEC 60870-5-101/-104 or DNP3.0 serial/TCP.**

IEC 61850 MMS

The iRTUcompact can be used as a simple link between serially connected physical devices and logical IEC 61850 devices, as it can map any signal from many kinds of data models and structures onto IEC 61850 logical nodes, whilst also providing IEEE1588 / PTP time synchronization.

Thanks to its full iGrid protocol stack, it can convert any standard or legacy protocol such as IEC 60870-5-103, SPAbus, Modbus, DLMS to IEC61850, allowing it to communicate with hundreds of vendors.

DIGITAL & ANALOG IN-/OUTPUTS

The iRTUcompact provides 24 digital inputs (available in 4 voltage levels) with 2.5kVrms isolation and a 1 ms timestamp accuracy as well as 4 high accuracy (0.15%) analog inputs (+/-20mA), two of which can be replaced with 2 PT100 temperature sensors. Each input can be defined as input or counter and provide a configurable debounce filter.

On the output side, it provides 8 dry contact electro-mechanical relay outputs with an isolation of 6kV.

IEC61131-3 PLC AUTOMATION

Thanks to its internal PLC based on *IEC 61131-3*, the iRTUcompact can provide powerful automation and control functionalities. For example, you can easily reuse programs on different projects, run multiple PLC instances simultaneously or use triggered variables for control commands and set points. It also allows to run hot program updates, stop PLC executions depending on the quality of selected PLC inputs and debug PLCs online, either cycle-by-cycle or step-by-step.

The iRTUcompact has a high execution speed – a 2000 ST line program takes less than 3ms.

CYBER SECURITY – IEC 62531

iGrid enforces several layers of security measures guided by the propositions of the IEC 62351 standard to protect its devices from all kinds of threats.

The iRTUcompact is a hardened device featuring Role Based Access Control (RBAC) to avoid intrinsic risks such as security holes and unauthorized actions by authenticated users.

In addition to encryptions via TSL/SSL, HTTPS, SSH and VPN support (i.e. OpenVPN), its communication can also be secured with network control methods such as firewalls, IP filters, ACL or TCP port blocks.

When you don't need integrated I/Os

The iGWlite is a special device for protocol conversion and other gateway functionalities. It almost takes no space on a DIN-Rail but still employs the full iGrid protocol stack. It carries 1 Ethernet & 1 RS485/RS422 port and can be equipped with an optional RS-232 port (copper or fiber) or a 2G/3G/4G modem.

It is the first gateway worldwide to handle TASE 2.0 to directly connect smaller generation plants with transmission control centers.

DEVICE OVERVIEW

iGW B0 SERIES

4 software configurable serial ports with LEDs:
  1 Full RS-232/ RS-422/ RS-485 serial port
  2 Basic RS-232/ RS-422/ RS-485 serial ports
  1 RS-422/ RS-485 serial port (EXP-422 port)
2 10/100BaseTX Ethernet ports (RJ45 connector)

iGW S SERIES

The S Series carries the B0 ports and an embedded Ethernet switch for three additional ethernet ports.

iRTU B0 & S SERIES

Same configuration as iGW series + 1 internal I/O boards with up to 24 DI, or a mix of 8 DI, 4 relays and 2 DC analog inputs.

IRTUCOMPACT B#01 SERIES

2 Ethernet 10/100BaseTX interfaces (RJ45 connector)
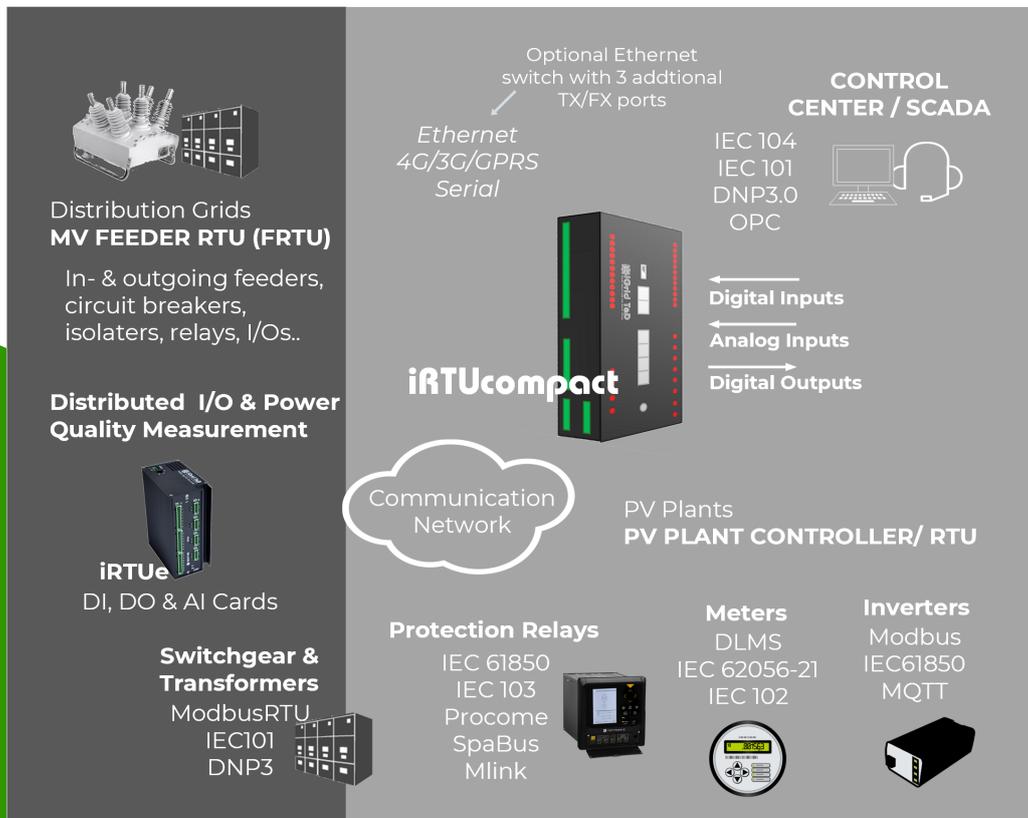**3** Serial ports, selectable by software between (RS422/ RS485/RS232)

IRTUCOMPACT S#31 SERIES

2 Ethernet ports with independent MAC addresses
· **ETH1**: 10/100BaseTX with RJ45
· **ETH0**: with (**2**) 10/100BaseTX with RJ45 and (**2**) FX100 ports with RSTP redundancy
3 serial ports, selectable by software

I/O CONFIGURATIONS

K1 : 24 Digital Inputs, 8 relays and 4 DC analog inputs (+/-20mA and +-/10Vdc)

K2 : 24 Digital Inputs and 8 relays

K3 : 24 Digital Inputs, 8 relays, 2 DC analog inputs (+/-20mA and +-/10Vdc) and 2 PT100 temperature sensors

K4 : 16 Digital Inputs, 4 relays, 3 AC voltage inputs (110Vac), 3 AC current inputs (1-5A)

SCHEMA WITH iRTUCOMPACT AS PV PLANT CONTROLLER AND FRTU

Optional Ethernet switch with 3 addtional TX/FX ports

CONTROL CENTER / SCADA

IEC 104
IEC 101
DNP3.0
OPC

Ethernet 4G/3G/GPRS Serial

Distribution Grids
MV FEEDER RTU (FRTU)

In- & outgoing feeders, circuit breakers, isolaters, relays, I/Os..

Distributed I/O & Power Quality Measurement

iRTUe
DI, DO & AI Cards

Digital Inputs
Analog Inputs
Digital Outputs

iRTUcompact

Communication Network

PV Plants
PV PLANT CONTROLLER/ RTU

Switchgear & Transformers
ModbusRTU
IEC101
DNP3

Protection Relays
IEC 61850
IEC 103
Procome
SpaBus
Mlink

Meters
DLMS
IEC 62056-21
IEC 102

Inverters
Modbus
IEC61850
MQTT

iGCOMMS PROTOCOL STACK

Master/Slave IEC 60870-5-101	Master/Slave IEC 60870-5-104
Master/Slave Modbus TCP/UDP and JBUS (master)	Master/Slave ModbusRTU
Master/Slave DNP3.0 (serial, UDP, TCP)	Master IEC 60870-5-103
Master IEC 60870-5-102	Master DLMS
Master Profibus DP	Master Spabus, Mlink, Procome
Master IEC 62056-21	SNMP Agent/Manager
IEC 61850 MMS Client/Server	**IEC 61850 GOOSE Publisher/Subscriber**

iGCOMMS SOFTWARE APPLICATION

Redundancy deployable on a hot-standby configuration, optional redundant power supply

Security IEC 62351-3 and IEC 62351-5 support, including TLS/SSL, SSH and VPN connections

IEC61131-3 automation logic and PLC programming, with LD, FBD, ST and SFC editor

LUA language can be used to create simple and complex logic and mathematical expressions

COMMUNICATION PORTS & CPU

Serial 3 software configurable ports with RS232/RS485/RS422

Ethernet (2) 10/100BaseTX ports with independent MAC addresses

Wireless full internal 4G(LTE), 3G and GPRS modem (optional)

Ethernet switch (S series) up to (4) 10/100BaseTX ports with RJ45 connection and (2) FX100 with ST, SC connectors or SFP interface, and supporting RSTP, HSR and PRP configurations

CPU ARM Cortex-A7 @ 528MHz, with 128 MBytes Flash and 256MBytes RAM

EMC STANDARDS

IEC 60950-1, IEC 60255-5:2000, IEC 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

THYTRONIC GROUP

Power supply W : wide range, 32 - 250Vdc (2.5kVrms isolation)
24 : 19.5-60Vdc (2.5kVrms isolation)Consumption under 6W

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 for horizontal mounting : 120 x 240 x 50 mm (HxWxD), or in vertical 240x120x50 (HxWxD)
IP30 enclosure with DIN Rail mounting

RTC & TIME SYNCHRONIZATION

Real-time Clock (RTC) with 1.5 ppm drift and microsecond resolution timestamp

Server NTP, IEC 60870-5-101, IEC 60870-5-104, DNP3.0, PTP

Client IEEE1588(PTP), SNTP, IEC 60870-5-101, IEC 60870-5-102, IEC 60870-5-103, IEC 60870-5-104 DNP3.0, DLMS, Spabus, Mlink, Procome and Profibus DP

CONFIGURATION & MAINTENANCE

Easy configuration with iConf tool

Internal web server, allowing real time monitoring of the system and all its internal parameters

Command console with full information on packet exchanges, with all available protocols

Local or remote maintenance via USB or Ethernet port

Optional **Watchdog relay** to signal the correct status of the device

ORDERING INFORMATION

iRTUcompact-x#bbccvvwwwz0

MAIN BOARD & COMMUNICATIONS

B#01 (2) 10/100BaseTX RJ45 ETH + (3) serial RS232/RS485/RS422 ports
S#31 RSTP switch with (3) 10/100BaseTX and (2) FX100 Ethernet + (3) serial RS232/RS485/RS422 ports

I/O CONFIGURATION

K1 24 Digital Inputs, 4 DC analog inputs and 8 relays
K2 24 Digital Inputs and 8 relays
K3 24 Digital Inputs, 2 DC analog inputs, 8 relays and 2 PT100 sensors
K4 16 Digital Inputs, 4 relays , 3 AC voltage and 3 AC current

POWER SUPPLY

24 19.2-60 Vdc
WV 32-250Vdc

INTERNAL SD MEMORY

0 No SD memory
S 16 GB internal memory

ETH CONNECTOR FOR S#31

T ST Connector
C SC Connector
F SFP Connector
0 No SFP Connector

DIGITAL INPUT VOLTAGES

024 24 Vdc
048 48v Vdc

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