iGrid T&D

THYTRONIC GROUP

iGW

Smart and adaptable protocol conversion for highly efficient gateway solutions.

- **Adaptable** and **modular** communication units suitable for all energy environments
- Internal switch with 3 ETH ports and **RSTP/ PRP/ HSR** redundancy
- Up to **4 Ethernet** ports, **4 serial** ports
- **Full range of protocols (DNP3.0, IEC 61850, IEC 60870-5...)** for many kinds of electrical applications to communicate with all devices and control centers

IEC 61850 compliant

This gateway was designed to provide particularly strong protocol conversion, network redundancy and SCADA automation (incl. IEC 61850) functionalities. It is thus the perfect choice to set up, automize or retrofit generation plants, substations and other control networks requiring data conversion between several protocols, as for instance Modbus to Ethernet or IEC 61850 to DNP3.

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, whilst managing a microseconds timestamp resolution via NTP or PTP. Further, the iGW can also process and transfer the data to one or multiple control centers or SCADA master stations using upstream protocols such as IEC 104, IEC 101, IEC 61850-90-2, DNP3.0, and Modbus RTU/TCP.

An architecture based on iGWs 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.

COMMUNICATION PORTS

The iGW comes with 2 independent 10/100 BaseTX Ethernet ports (two different MAC addresses, RJ45 connector) and an internal Ethernet switch with (2) 10/100BaseTX, (2) fiber optic FX100 sensors with ST, SC o SFP connectors, and PRP/HSR redundancy.

Additionally, the iGW carries 4 software configurable serial ports: 1 full RS-232/RS-485/RS-422 + 2 basic RS-232/RS-485/RS-422 & 1 RS-422/RS-485 port (EXP422) to connect iRTUe models.

COMMUNICATION PROTOCOLS

The iGW 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.**

HOT-STANDBY REDUNDANCY

In a hot-standby architecture, the active iGW continuously feeds the recorded data to the redundant standby iGW to ensure that the newly active iGW has all the historical information (no data loss) when the switchover occurs.

If the active RTU detects that any IED is not able to communicate, it tries to access the IED via the hot-standby RTU, which (in the case there was a connection problem) can pass the data to the active RTU, acting as a serial server.

IP NETWORKING

The iGW is equipped with transparent TCP bridging and configurable IP routing to tunnel any serial protocol (such as *Modbus*) over a TCP/IP connection and facilitate the data transfer through complex IP networks.

Its VLAN and VPN support allow to improve the network's performance, simplifying its traffic management, design and deployment and also helping to secure communications through particularly hazardous networks.

IEC61131-3 PLC AUTOMATION

Thanks to its internal PLC based on *IEC 61131-3,* the iGW 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 iGW has a high execution speed – a 2000 ST line program takes less than 3ms.

CYBER SECURITY – IEC 62351

iGrid enforces several layers of security measures guided by the propositions of the IEC 62531 standard to protect its devices from all kinds of threats.

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

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

Even smaller, but just as smart.

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) .

More specifications on the back

iGW B 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)
(1) USB port to connect peripheral devices
(1) MGMT port (MiniUSB connector) for local maintenance
(1) internal MicroSD slot for up to 32 Gb of data storage

iGW S SERIES

The S Series carries the B0 ports and an embedded Ethernet switch (connected to one of the two independent Ethernet ports), which provides:

S#01 – (3) 10/100BaseTX RJ connectors
(2) FX100 ports with HSR/PRP redundancy and SC, ST or SFP connectors

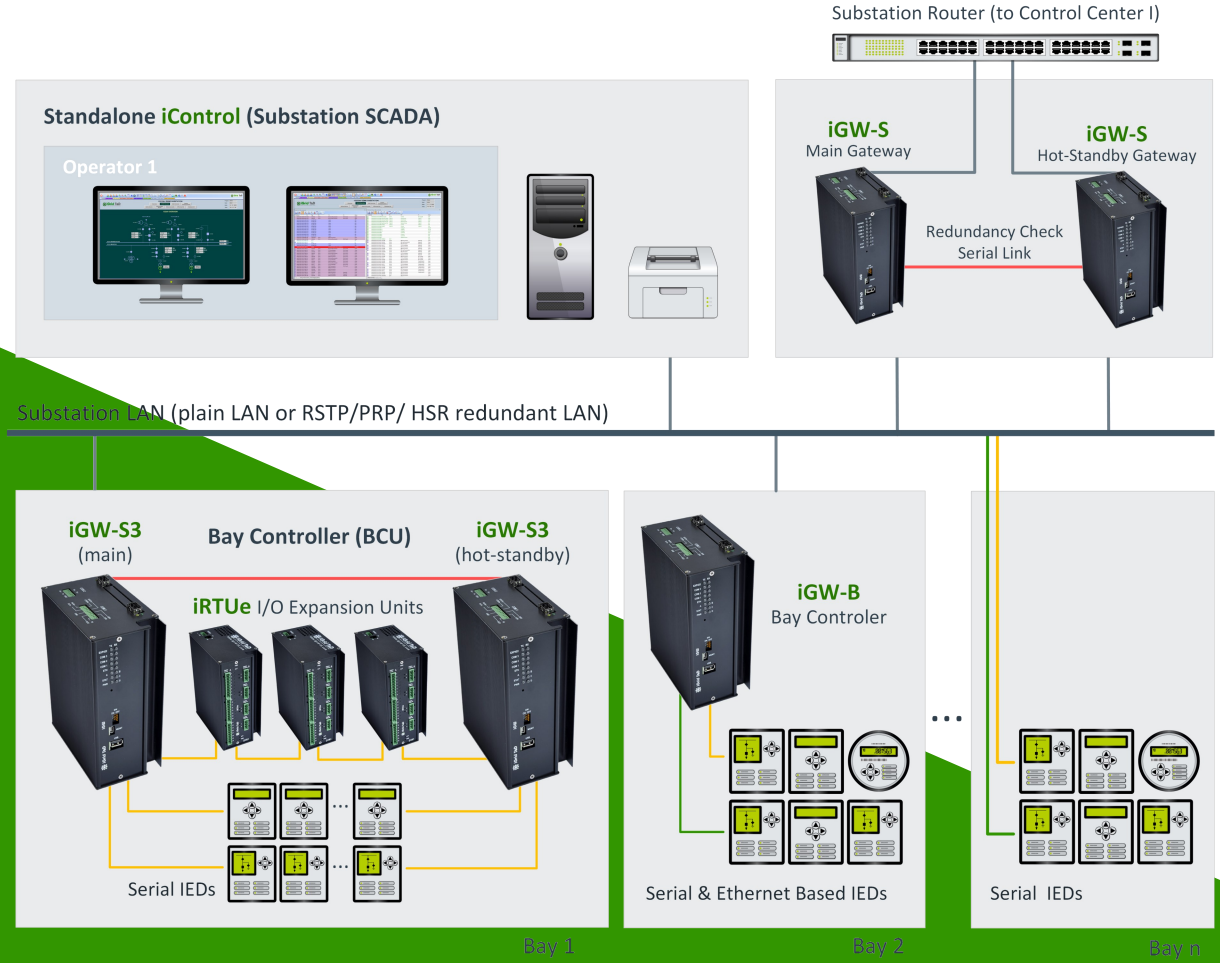
S#31 – (2) 10/100BaseTX RJ connectors and (2) FX100 ports with RSTP redundancy and SC, ST or SFP connectors

iRTUE – REMOTE I/O EXPANSIONS

The iGWlite can be freely extended with I/Os by connecting several iRTUe.

They are IEC **61850 (GOOSE)** compliant and come in many configurations such as 48 DI, 16 relays, 16 AI, 24 DI + 8 relays, 24 DI + 8 AI or 8 relays + 8 AI.

SCHEMA SHOWING iGW IN HOT-STANDBY REDUNDANCY MODE



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 up to 4 software configurable ports with RS232/RS485/RS422

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

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

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

RTC & TIME SYNCHRONIZATION

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

Client IEEE 1588(PTP), SNTP, IEC 60870-5-101, IEC 60870-5-104, DNP3.0

Server IEEE 1588(PTP), NTP, 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

EASY CONFIGURATION W/ iCONF

iConf has been specifically developed for electrical applications, saving you lots of time and money throughout the control system set-up and maintenance tasks, whilst also minimizing your project risks. **Upload** and **download** your configurations, import or scan **SCL files** (**IEC 61850**) and create your own **templates.**

ORDERING INFORMATION

iGW-b#bbvvfs

MAIN BOARD & COMMUNICATIONS

B#01	(2) 10/100BaseTX RJ45 Ethernet + (4) serial RS232/RS485/RS422 ports
S#01	PRP/HSR switch with (4) 10/100BaseTX and (2) FX100 Ethernet + (4) serial RS232/RS485/RS422 ports
S#31	RSTP switch with (3) 10/100BaseTX and (2) FX100 Ethernet + (4) serial RS232/RS485/RS422 ports

POWER SUPPLY

24	19.2-60 Vdcigital inputs
WV	32-250Vdc

SD CARD

S	Internal 16 GB microSD card

FIBER OPTICS (S MODELS)

0	No fiber optic connectors
T	ST connectors
C	SC connectors
F	SFP interface

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