Third-party device integration

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Contents

1 Overview

Information such as temperature, humidity, CO2 level, irradiance, flow rate, and many more values can be recorded on the eGauge main unit. The eGauge can request this data over an Ethernet TCP/IP network from compatible devices.

External sensor data read by the eGauge is stored in registers, the same way as power calculations are recorded on the eGauge, so utilizing third party devices will require the use of allotted storage space on the device.

Most supported remote devices are fully configurable. Any device using the RS-485/Ethernet adapter must have specific attributes set appropriately- *the installing party should be familiar with how to configure the remote device*. eGauge Systems cannot provide support with the programming or configuration of third-party devices.

To configure the eGauge to read from remote devices, please refer to the eGauge Configuration Guide 1.3 Remote Devices (http://www.egauge.net/docs/config-guide.pdf).

2 Compatible devices and protocols

2.1 Supported device protocols

Protocol	Description
Remote eGauge	Another eGauge main unit, communicating via UDP or TCP
Power-One Aurora	Power-One Aurora Inverters. **Obsolete, use RS485**
ControlByWeb	ControlByWeb products such as X-320
Temperature @lert	Temperature Alert WiFi edition
Alpha-Innotec Luxtronik 2	Alpha-Innotec heat pump controller
RS485 (see below)	RS-485 serial devices. Requires BF-430 Ethernet-to-Serial converter

RS-485 bus protocol	Description
sma[1]	SMA-brand devices (Sunny Sensorbox, SMA inverters, etc)
po	Power-One Aurora inverters
modbus[2]	Modbus/RTU devices

[1] Only the RS-485 serial communication module by SMA is supported. Recently, SMA has released the WEBCONNECT module, using RJ-45 plugs and Ethernet media- this module is not compatible with eGauge.

[2] See section 2.2 for supported Modbus/RTU devices.

2.2 Supported Modbus RTU devices

Device name	Description
badger3050	Badger 3050 Series BTU (thermal energy) monitor
cdi5200sc	CDI-5200 series flow-meters
datanab	Datanab MBus-iO3 temperature/humidity sensor
datanab_3in1	Datanab MBusAO_RTH_CO2_LCD_Wall CO2/Humidity/Temperature 3 in 1 Sensor
set_sunergy	Sustainable Energy Technology Sunergy inverters
weatherhawk	Weatherhawk weather stations
elkor_wattson	Elkor Wattson meter
wattnode	Continental Control Systems Wattnode
nowire	Submeter Solution's NoWire 1100 Wireless input / pulse input
temco_co2_e	TEMCO CO2-Temperature-Humidity sensor (with Ethernet port)

2.3 RS-485 to Ethernet converter

The Chiyu BF-430 is an RS-485/RS-232 to Ethernet converter. This is required with most third-party devices when collecting remote values with the eGauge.

Figure 1: *Chiyu BF-430*

The BF-430 is powered by 9–30Vdc, either through the power terminals on the left side, or through a standard plug on the right.

The Chiyu BF-430 contains an embedded web server that is used for configuration and diagnostics. The most common attributes that must be adjusted on the BF-430 are:

- Baud rate
- Data Bits
- Stop Bits
- Parity Check

These attributes can be adjusted from the **Serial Type** menu under **Advanced Setup**. eGauge Systems can pre-set the BF-430 for specified devices before shipping.

Some troubleshooting and verification can be done on the web interface of the BF-430. For example, verification of the correct serial settings from the **Serial Type** menu, and verification of communication on the serial port from the **System Status** menu.

The full manual for the Chiyu BF-430 can be found at
http://www.egauge.net/docs/BF430_manual.pdf

3 Modbus RTU

The eGauge main unit can record data from devices that output the Modbus RTU format, not to be mistaken with Modbus TCP. This requires the use of the Chiyu BF-430 Ethernet-to-Serial converter. The converter can be purchased from eGauge Systems. More information about the Chiyu BF-430 can be found in section 2.3.

3.1 Can I use a Modbus RTU-enabled device not in the supported list?

If you have a Modbus RTU enabled device that is not listed in our supported remote devices list, you have two options:

1. Manually enter the remote device's Modbus register data as a remote device. This is done by using Modbus in-line definitions (section 3.2).[3]
2. Submit a request to support@egauge.net with Modbus device information including make and model, manual, Modbus RTU map and any available supporting technical documentation.

Device implementation by eGauge Systems is not guaranteed, and implementation time will vary.

For remote troubleshooting and new implementation, the Modbus enabled device should be installed, configured correctly, and accessible remotely and with the BF-430. To expedite the implementation of the a new third-party device, an eGauge with a functional in-line definition to at least one register on the desired device should be online and available to support.

[3]Modbus In-line definitions are not recommended to be used permanently. If a functional Modbus in-line definition has been developed and tested, it is suggested to provide it with product information to support@egauge.net.

3.2 Modbus in-line definitions

Modbus remote devices are defined by the address:

```
modbus://DEVTYPE.SLAVE_ADDR[@ADDR[:PORT]]
```

where:

DEVTYPE	Uses in-line syntax to define the following elements: name=addr,[!]type[+offset][*scale][,unit]; where: name — is the register name addr — is the register address ! — indicates a read-only register type — is the register type (e.g., s16, u16, u64, or double) offset — is the additive offset, and scale — is the multiplicative scale value unit — is the physical unit
SLAVE_ADDR	Is the Modbus address (0-255) of the device
ADDR	Is the RS485/Ethernet adapter's IP address or hostname
PORT	Is the port-number of the RS485/Ethernet adapter

For example:

```
modbus://Temperature=101,s16+32,degC;Rate=185,u16.200@000ee3026a50

modbus://flow_rate=2,!float+20*0.00006309016,m3/s.5@000ee3026a50

modbus://volume=101,u32,m3.1@000ee3026a50:50000
```

4 Available device attributes

The following subsections contain remote device's attributes that may be polled. If a remote device is not broadcasting or allowing access to particular attributes or registers, that particular value would not be available to the eGauge. This may be the case, for example, with self-discovering registers, or if the device's Modbus address map has been modified from the default settings.

4.1 Remote eGauge

Any physical register may be pulled from a slave eGauge and stored in the master eGauge.

4.2 ControlByWeb

Any reading on the ControlByWeb may be pulled and stored in the eGauge.

4.3 Temperature @lert

Any temperature or humidity probe reading on the Temperature Alert may be pulled and stored in the eGauge.

4.4 PO (Power-One)

Register name	Unit	Description
String1_Voltage	V	String 1 DC Voltage
String1_Current	A	String 1 DC Amperage
String1_DC_power	W	String 1 DC Power
String1_AC_power	W	String 1 AC Power
String2_Voltage	V	String 2 DC Voltage
String2_Current	A	String 2 DC Amperage
String2_DC_power	W	String 2 DC Power
String2_AC_power	W	String 2 AC Power
Grid_Voltage	V	Grid Voltage
Grid_Current	A	Grid Amperage
Grid_Power	W	Grid Power
Grid_Frequency	Hz	Grid Frequency
Leak_current_DC_DC	A	DC Amperage Leakage
Leak_current_Inverter	A	Inverter Amperage Leakage
Temperature_inverter	°C	Internal Inverter Temperature
Temperature_environment	°C	Environmental Temperature
Isolation_Resistance	MΩ	Isolation Resistance

4.5 sma

SMA registers are self-discovering. That is, the eGauge does not know what registers to look for until the SMA device provides a list. Therefore, the available registers and data points will vary from device to device.

4.5.1 SMA Sunny Sensorbox

This table is liable to change, and is not guaranteed to be accurate due to the self-discovering nature of the SMA protocol.

Register name	Unit	Description
SMA-h-On		Hours on
Dummy		UNUSED
ExlSolIrr		UNUSED
IntSolIrr	W/m^2	Irradiance
TmpMdul_C	°C	Module Temperature
TmpAmb_C	°C	Ambient Temperature (requires external probe)
WindVel_m/s	m/s	Wind Velocity (requires external probe)

4.6 Alpha-Innotec Luxtronik 2

Register name	Unit	Description
Temperatur_TVL	°C	Heating Water in
Temperatur_RVL	°C	Heating Water out
Temperatur_TA	°C	Outdoor Temperature
Temperatur_TWE	°C	Geo Heating Temperature in
Temperatur_TWA	°C	Geo Heating Temperature out
WMZ_Heizung	W	Power Delivered for Space Heating
WMZ_Brauchwasser	W	Power Deliviered for Domestic Hot Water
WMZ_Schwimmbad	W	Power Delivered for Pool Heating
WMZ_Durchfluss	kg/s	Water Flow
Geo Heating	kWh	Heating Energy
Geo Cooling	kWh	Cooling Energy

4.7 badger3050

Register name	Unit	Description
Flow_rate	m^3/s	Flow 1 Rate
Temp1	°C	Temperature 1
Temp2	°C	Temperature 2

4.8 cdi5200sc

Register name	Unit	Description
Flow	m^3/s	Flow rate
Usage	m^3	Total usage

4.9 datanab

Register name	Unit	Description
Temperature	°C	Internal temperature
Probe_Temperature	°C	External Probe Temperature
Ser_Baud_Rate		Serial Baud Rate

4.10 datanab_3in1

Register name	Unit	Description
CO2	ppm	CO2 level
Temperature	°C	Temperature
Humidity	%	Relative Humidity

4.11 set_sunergy

Register name	Unit	Description
Inv_State		Inverter State
Inv_Permissive		Inverter Permissive
Inv_Permissive_Data		Inverter Permissive Data
Time_Connected		Time connected
Input_Vdc	V	DC Input Voltage
Input_Idc	A	DC Input Amperage
Output_Vac	V	AC Output Voltage
Output_Iac	A	AC Output Amperage
Grid_F	Hz	Grid frequency
Grid_Vac_L1	V	Grid L1 Voltage
Grid_Vac_L2	V	Grid L2 Voltage
Internal_GFDI		Ground Fault Detection and Interruption Status
Internal_Temp	°C	Inverter internal temperature
Daily_kWh	kWh	Daily production
GFDI_Type		GFDI Type

4.12 weatherhawk

Register name	Unit	Description
BatVolt	V	Battery Voltage
Solar	W/m^2	Irradiance
AirTemp	°C	Air Temperature
RelHumid	%	Relative Humidity
Barometer	kPa	Atmospheric Pressure
WindSpeed	m/s	Wind Speed
WindDirect	°	Wind Direction
RainYearly	mm	Yearly Rainfall

4.13 wattson

Register name	Unit	Description
Tot_E	kWh	Total kWh
Tot_E	W	Total W
Tot_Q	VAr	Total Reactive Power
Tot_S	VA	Total Apparent Power
Avg_V_LN	V	Average Voltage Line-N
Avg_V_LL	V	Average Voltage Line-Line
Avg_I	A	Average Amperage
Tot_PF		Power Factor, Total
Freq	Hz	Frequency
V_AN	V	Voltage A-N
V_BN	V	Voltage A-N
V_CN	V	Voltage A-N
V_AB	V	Voltage A-B
V_BC	B	Voltage B-C
V_AC	V	Voltage A-C
I_A	A	Amperage, Line A
I_B	A	Amperage, Line B
I_C	A	Amperage, Line C
P_A	W	Real Power, Line A
P_B	W	Real Power, Line B
P_C	W	Real Power, Line C
Q_A	VAr	Reactive Power, Line A
Q_B	VAr	Reactive Power, Line B
Q_C	VAr	Reactive Power, Line C
S_A	VA	Apparent Power, Line A
S_B	VA	Apparent Power, Line B
S_C	VA	Apparent Power, Line C
PF_A		Power Factor, Line A
PF_B		Power Factor, Line B
PF_C		Power Factor, Line C
Import_E_A	Wh	Import Energy, Line A
Import_E_B	Wh	Import Energy, Line B
Import_E_C	Wh	Import Energy, Line C
Import_E_Tot	Wh	Import Energy, Total (A+B+C)
Export_E_A	Wh	Export Energy, Line A
Export_E_B	Wh	Import Energy, Line B
Export_E_C	Wh	Import Energy, Line C
Export_E_Tot	Wh	Import Energy, Total (A+B+C)
Net_Tot_E_A	Wh	Net Total Energy, Line A
Net_Tot_E_B	Wh	Net Total Energy, Line B
Net_Tot_E_C	Wh	Net Total Energy, Line C
CONTINUED BELOW		

...**wattson** *continued*

Register	Unit	Description
Inductive_E_A	VArh	Inductive Energy, Line A
Inductive_E_B	VArh	Inductive Energy, Line B
Inductive_E_C	VArh	Inductive Energy, Line C
Inductive_E_Tot	VArh	Inductive Energy, Total (A+B+C)
Cap_E_A	VArh	Capacitive Energy, Line A
Cap_E_B	VArh	Capacitive Energy, Line B
Cap_E_C	VArh	Capacitive Energy, Line C
Cap_E_Tot	VArh	Capacitive Energy, Total (A+B+C)
Net_Tot_VArh_A	VArh	Net Total Reactive Power Hours, Line A
Net_Tot_VArh_B	VArh	Net Total Reactive Power Hours, Line B
Net_Tot_VArh_C	VArh	Net Total Reactive Power Hours, Line C
Net_Tot_VArh_All	VArh	Net Total Reactive Power Hours, Total (A+B+C)
Apparent_E_A	VAh	Apparent Energy, Line A
Apparent_E_B	VAh	Apparent Energy, Line B
Apparent_E_C	VAh	Apparent Energy, Line C
Apparent_E_Tot	VAh	Apparent Energy, Total (A+B+C)

4.14 wattnode

EnergySum	kWh	Total True Net Energy
EnergyPosSum	kWh	Total True Positive Energy
EnergySumNR	kWh	Total Net Energy, Non-Resettable
EnergyPosSumNR	kWh	Total Net Energy, Non-Resettable
PowerSum	W	Total Power (A+B+C)
PowerA	W	Power for Line A
PowerB	W	Power for Line B
PowerC	W	Power for Line C
VoltAvgLN	V	Average Voltage (A+B+C)
VoltA	V	RMS Voltage, Line A-N
VoltB	V	RMS Voltage, Line B-N
VoltC	V	RMS Voltage, Line C-N
VoltAvgLL	V	Average Voltage Line to Line
VoltAB	V	RMS Voltage Line A-Line B
VoltBC	V	RMS Voltage Line B-Line C
VoltAC	V	RMS Voltage Line A-Line C
CONTINUED BELOW		

...**wattnode** *continued*

Freq	Hz	Line Frequency
EnergyA	kWh	Line A Energy, Resettable
EnergyB	kWh	Line B Energy, Resettable
EnergyC	kWh	Line C Energy, Resettable
EnergyPosA	kWh	Line A Positive Energy, Resettable
EnergyPosB	kWh	Line B Positive Energy, Resettable
EnergyPosC	kWh	Line C Positive Energy, Resettable
PowerNegSum	kWh	Negative Energy, Sum of Active Phases
PowerNegSumNR	kWh	Negative Energy, Sum of Active Phases, Non-Resettable
EnergyNegA	kWh	Negative Energy, Line A
EnergyNegB	kWh	Negative Energy, Line B
EnergyNegC	kWh	Negative Energy, Line C
EnergyReacSum	kVArh	Reactive Energy All Lines (A+B+C)
EnergyReacA	kVArh	Reactive Energy Line A
EnergyReacB	kVArh	Reactive Energy Line B
EnergyReacC	kVArh	Reactive Energy Line C
EnergyAppSum	kVArh	Apparent Energy All Lines (A+B+C)
EnergyAppA	kVAh	Apparent Energy Line A
EnergyAppB	kVAh	Apparent Energy Line B
EnergyAppC	kVAh	Apparent Energy Line C
PowerFactorAvg		Average Power Factor for all Lines
PowerFactorA		Power Factor, Line A
PowerFactorB		Power Factor, Line B
PowerFactorC		Power Factor, Line C
PowerReacSum	VAr	Total Reactive Power
PowerReacA	VAr	Reactive Power, Line A
PowerReacB	VAr	Reactive Power, Line B
PowerReacC	VAr	Reactive Power, Line C
PowerAppSum	VA	Total Apparent Power
PowerAppA	VA	Apparent Power, Line A
PowerAppB	VA	Apparent Power, Line B
PowerAppC	VA	Apparent Power, Line C
CurrentA	A	RMS Amperage, Line A
CurrentB	B	RMS Amperage, Line B
CurrentC	C	RMS Amperage, Line C

4.15 nowire

Register name	Unit	Description	Notes
WI_**x**_count		Wireless Input **x** count	**x** = 1 to 32
PI_**x**_count		Physical Input **x** count	**x** = 1 to 4
WI_**x**_status		Wireless Input **x** Status	**x** = 1 to 32
WI_**x**_status		Physical Input **x** Status	**x** = 1 to 4
FW_version			In hex, 0xAABB, AA = major rev, BB = minor rev example: 268 = 0x010C = 1.12

4.16 temco_co2_e

*NOTE: The TEMCO's Ethernet port is **not** used for Modbus RTU.*

Register name	Unit	Description
ser_baud		Serial Baud rate
temp_in	°C	Internal Temperature
temp_ex	°C	External Temperature
rel_humid	%	Relative Humidity
co2_ppm	ppm	CO2 concentration
rtl_sec		Internal clock seconds

Revision History

2014-06-04	Added TEMCO CO2-E information
2014-05-20	Added NoWire information; linked remote device list to available parameter section
2014-03-31	Initial Release