

## MCC2 Gateway

### - IEC 61850 / DNP3

#### Operating Instructions

AEG Power Solutions GmbH, Warstein-Belecke

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## 1. GENERAL

IEC 61850 is a standard defining an internationally standardised communications protocol for building control systems. The protocol uses TCP/IP as the basic transmission protocol and is designed as conventional client–server communication.

The DNP3 (Distributed Network Protocol) communications protocol is a communications standard for remote control technology. It is used as a transmission protocol between control systems and remote control terminals. DNP3 over IP is integrated in this gateway. The DNP3 protocol uses TCP/IP as the basic transmission protocol.

The IEC 61850/DNP3 gateway is an interface for connecting Protect 8 series power supplies to SCADA systems with IEC 61850/DNP3 communication. The gateway is based on the SYNC241 communications module from Kalkitech.

The gateway cyclically polls instantaneous values from the power supply unit and translates the data into the IEC 61850/DNP3 model. The gateway works as a server in the network and provides all connected clients with current status messages, alarms and relevant measured values from the power supply unit. For safety reasons, control via IEC 61850/DNP3 is not possible.

### **Package content:**

- 1 x IEC 61850 gateway
- 1 x Fixing material
- 1 x Operating instructions

### **Prerequisites...**

#### **for personnel:**

The “Design”, “Installation” and “Configuration” chapters assume technical qualifications as an electrician. These qualifications may take the form of a completed professional training course in an electrical profession or an additional qualification as an “Elektrofachkraft für festgelegte Tätigkeiten” (“Skilled person for defined electrical work”) offered by a Chamber of Industry and Commerce (CIC).

#### **for the power supply system:**

- 1 x Protect 8 series power supply unit
- 1 x Connection to an Ethernet network
- 1 x Configuration files  
(can be downloaded from <https://www.aegps.de/>)

#### **on site:**

- 1 x Wired Ethernet network structure with free RJ45 port

## 2. TECHNICAL DATA

### 2.1 IEC 61850 / DNP3 – Gateway

#### **Hardware Data**

Data rate:	10/100 Mbps
Mode:	Full duplex
	Auto negotiation
	Auto crossover
Connector:	Wired RJ45

#### **Performance**

Data refresh time for the whole system: 5000 ms

#### **Factory setting**

##### IEC 61850 / DNP3:

IP address:	192.168.0.121
Subnet mask:	255.255.255.0
Default gateway:	192.168.0.1
Time zone:	UTC+0h

##### DNP3:

Master address:	1
Slave address:	4

The gateway is an option for which position A27 is provided.

### 3. DESIGN

#### 3.1 Structure of the Assembly

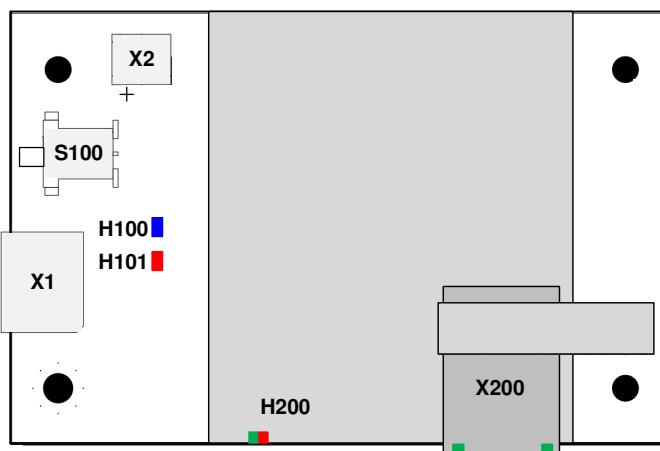


Figure 1 IEC 61850 – gateway (top view)

##### **Configuration switch:**

**S100:** Pos1: Power supply via connector X1 (standard)  
Pos2: Power supply via connector X2

##### **Connections:**

**X1:** Connection to MCC (A29.1), internal communication and power supply  
**X2:** Optional power supply (5–36 Vdc)  
**X100:** IEC 61850 RJ45 Ethernet

##### **LED signals:**

**H100 blue on:** Power supply is OK  
**H101 red on:** IEC 61850 module error

**H200 red on:** Module power supply is OK

#### 3.2 Structure of the Wiring

The IEC 61850 gateway requires an HDMI cable (type A ⇔ mini type C) to the MCC (A29.1).

## 4. INSTALLATION

The IEC 61850/DNP3 gateway can be installed while the device is switched on. **Position A27** is reserved for the gateway. This position is located on the pivot plate, directly behind the cabinet door.

Figure 2 shows a typical cubicle design. Please refer to the operating instructions for your device for the exact position.

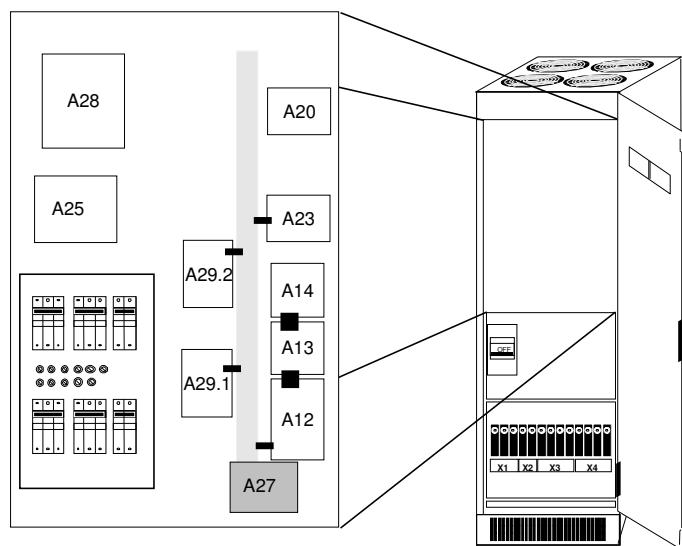


Figure 2 System/pivot plate arrangement of the UPS (example)

**A29.1:** MultiCom interface

**A27:** IEC 61850 / DNP3 gateway

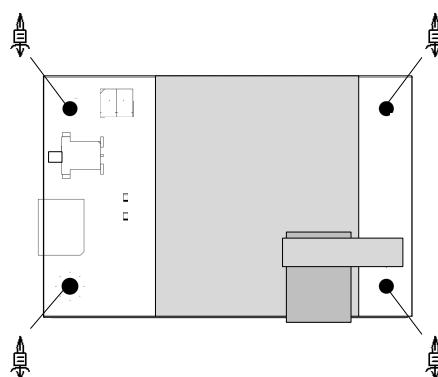


Figure 3 Printed circuit board attachments (top view)

- Insert the 4 plastic printed circuit board holders into the holes at position A30.
- Attach assembly A30 to the printed circuit board holders. When doing this, make sure connector X2 is pointing towards the cable duct.
- Connect the assembly to the MCC (gateway X1 ↔ MCC X3) using an HDMI cable.
- Fasten the connection cable using cable tie holders.
- The installation is now complete.

## 5. CONFIGURATION

### 5.1 Configuration Tool

The gateway is configured using the “**EasyConnect**” program from Kalkitech. If you have not yet installed the program, install it and copy the file “IED1\_MCC2.csv” into the EasyConnect path “C:\Kalkitech\EasyConnect\MB\_IED\_REG\_CONFMY\_IEDS”.

Connect your PC to the gateway using an Ethernet patch cable. You need the IP address of the gateway to be able to perform configurations on the gateway.

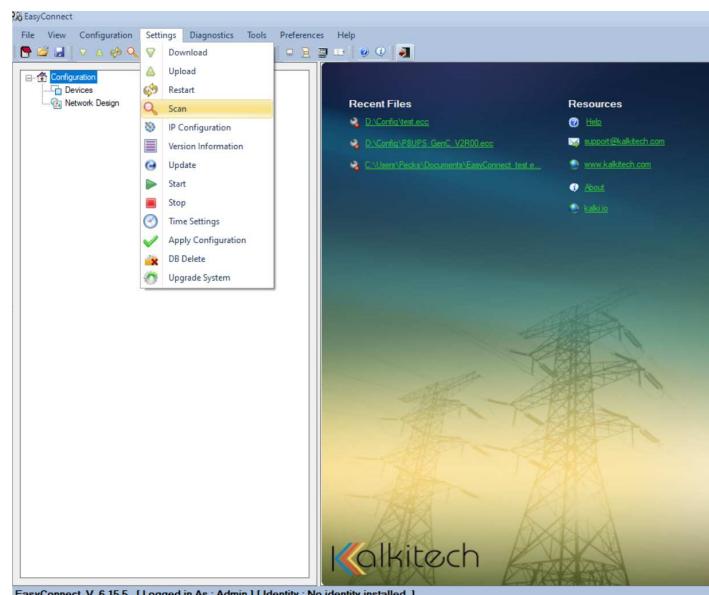
The gateway is delivered with the **standard IP address:** **192.168.0.121**. If the gateway has been assigned a different address, you can search for it in the network:

1. Start **EasyConnect** and log in using your account details:

User ID: Admin  
Password: \*\*\*\*\*



2. Search for gateways in the network to find your gateway's IP address.



3. All available gateways in the network are shown. If no gateways are found, check your PC's connection and deactivate the firewall.

Serial No	Model Name	Interface Name	IP Address	Net Mask	Mac Address	Product Key	Status
02410	SYNC241-M3	eth0	192.168.0.121	255.255.255.0	00-25-97-01-14-0f	0241009KA2111	None

< >

Refresh OK

Make a note of the IP address, as you will need it for all configuration steps.

## 5.2 Data Model

The IEC 61850 / DNP3 TCP gateway is designed for the Protect 8 family and must be loaded with the device-specific configuration. If it was not loaded with the right configuration file at the factory, the relevant device type will need to be loaded. There is a selection of configuration files (\*.ecc) available for this. The .ecc files contain the corresponding \*.icd file.

The following configuration files and data models are provided:

### Protect 8 3x: Three/single-phase output UPS

- IEC 61850 model. .... P8UPS\_v2r00.icd
- Gateway configuration file: ..... P8UPS\_GenC\_v2r00.ecc

### Protect 8 INVx: Three/single-phase output inverter

- IEC 61850 model. .... P8INV\_v2r00.icd
- Gateway configuration file: ..... P8INV\_GenC\_v2r00.ecc

### Protect 8 CNVx: Three/single-phase output converter

- IEC 61850 model. .... P8CNV\_v2r00.icd
- Gateway configuration file: ..... P8CNV\_GenC\_v2r00.ecc

### Protect 8 REC: Rectifier

- IEC 61850 model. .... P8REC\_v2r00.icd
- Gateway configuration file: ..... P8REC\_GenC\_v2r00.ecc

### General gateway-specific configuration:

- MCC2 interface configuration.... IED1\_MCC2.csv

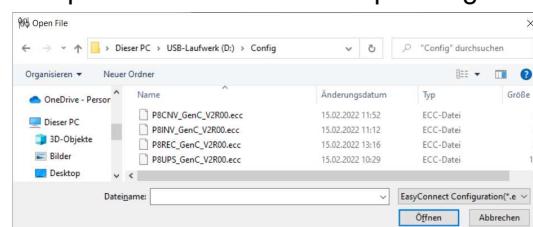
#### 1. Start **EasyConnect** and log in using your account details:

User ID: Admin

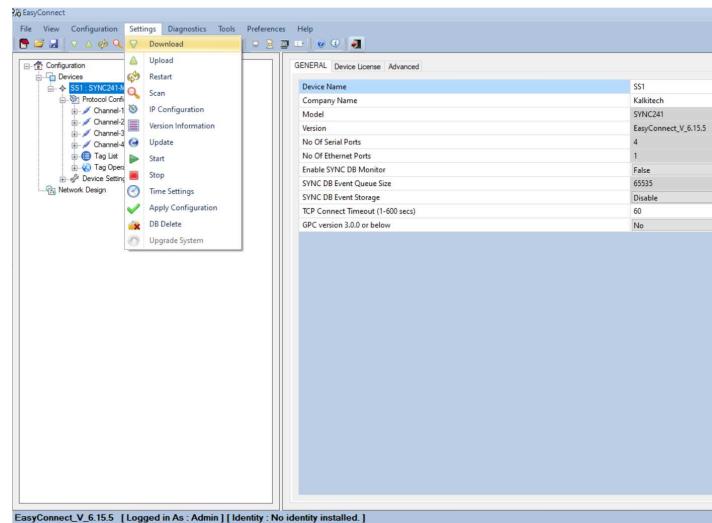
Password: \*\*\*\*\*



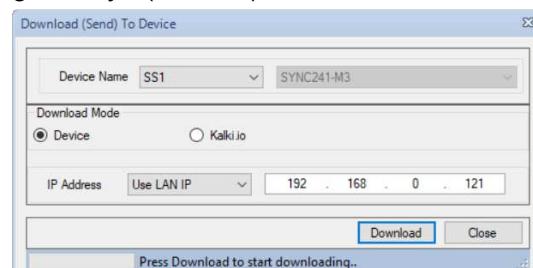
#### 2. Open the \*.ecc file corresponding to the device type



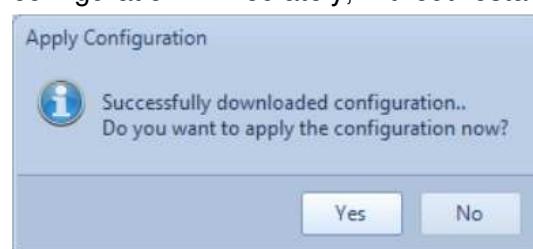
3. Select the SS1 device and load the configuration into the gateway via **Settings->Download**.



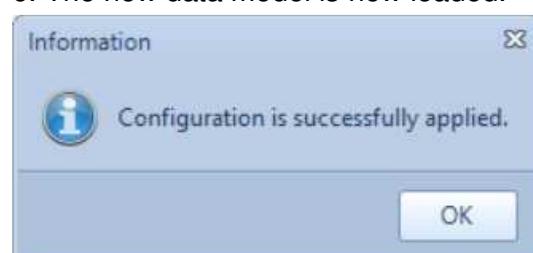
4. You will need to enter the **IP address** of the gateway to be able to complete the download. If you do not have the address available, you will need to search the network for available gateways (see 4.1).



5. Once the download is complete, you can apply the new configuration immediately, without restarting.



6. The new data model is now loaded.



## 5.3 IEC 61850 / DNP3 – Server

The “IP address”, “subnet” and “gateway” must be set in order for your gateway to work on the network.

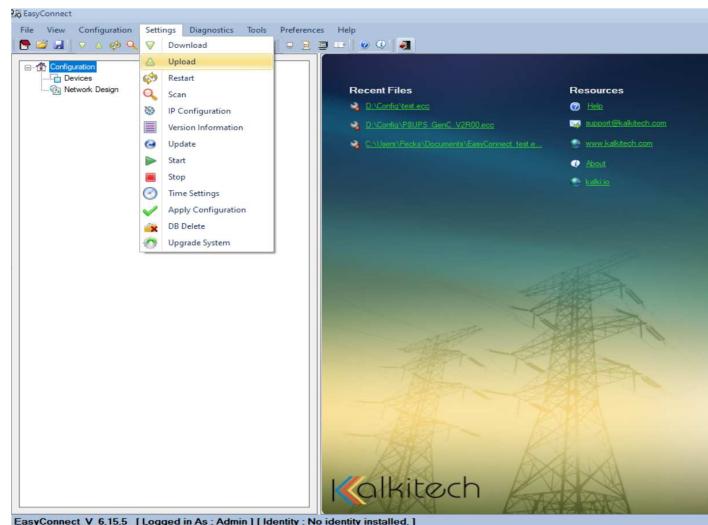
Configuration is completed using the “**EasyConnect**” program from Kalkitech.

1. Start **EasyConnect** and log in using your account details:

User ID: Admin  
Password: \*\*\*\*\*



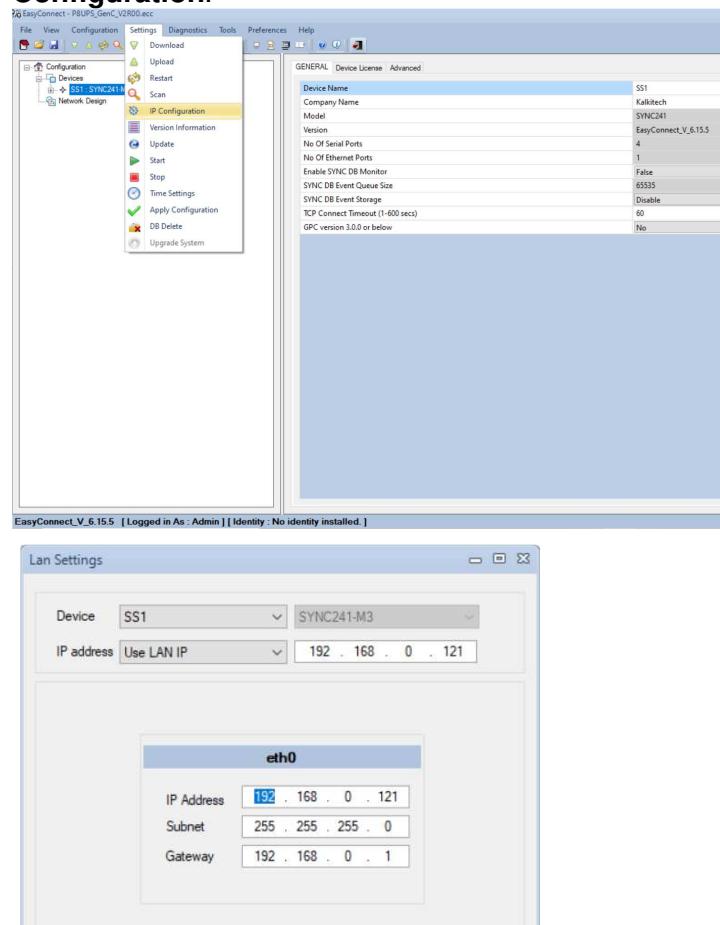
2. First import the current configuration of the gateway via **Settings->Upload**.



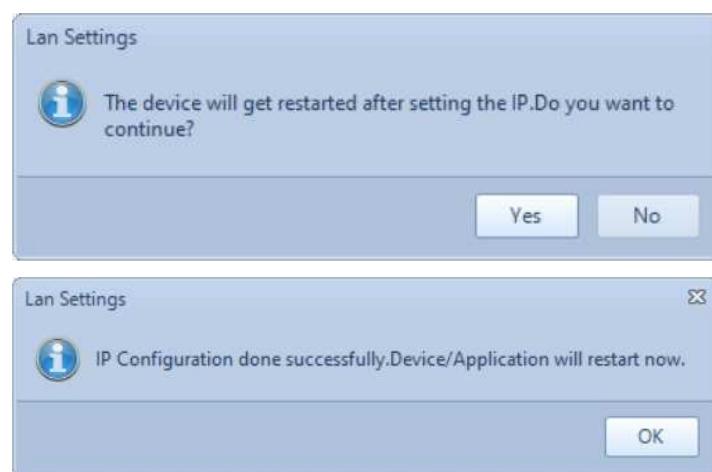
3. You will need to enter the **IP address** of the gateway to be able to complete the upload. If you do not have the address available, you will need to search the network for available gateways (see 4.1).



**4. You can configure the network data via **Settings->IP Configuration.****



**5. The gateway must be restarted for the new network parameters to be adopted.**



**Caution:** It may take up to a minute for the gateway to be ready and found in the network again.

## 5.4 DNP3 – Addresses

In addition to the network data, the source and destination addresses must also be correctly set in order for your DNP3 gateway to work on the network. Configuration is completed using the “**EasyConnect**” program from Kalkitech.

### Default setting:

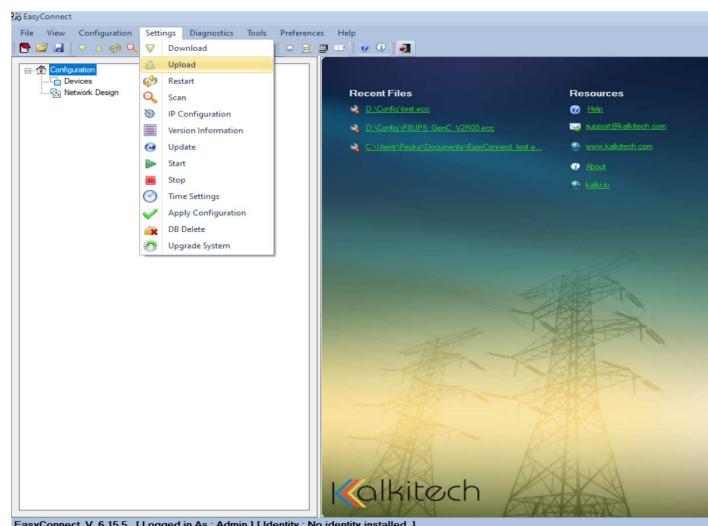
Source address (server): 4  
Destination address (client): 1

### 1. Start **EasyConnect** and log in using your account details:

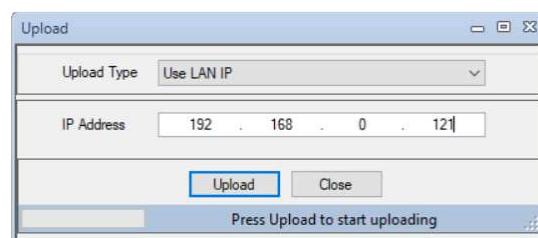
User ID: Admin  
Password: \*\*\*\*\*



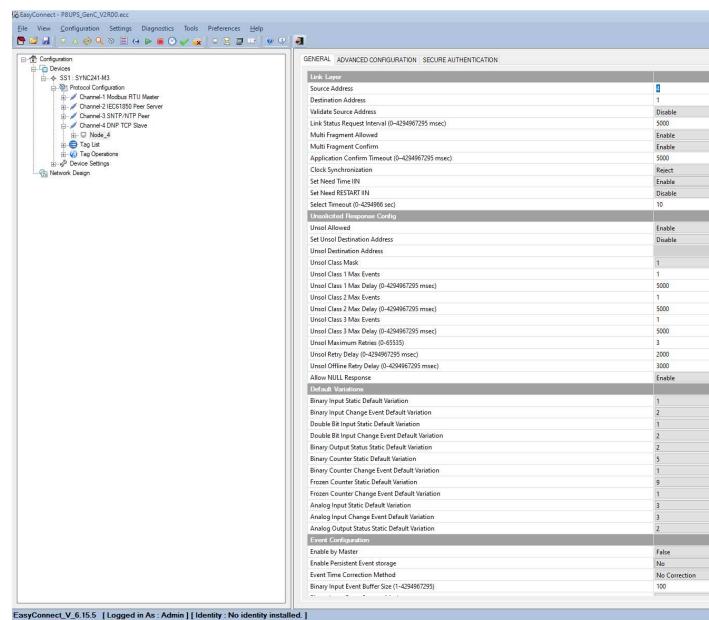
### 2. First import the current configuration of the gateway via **Settings->Upload**.



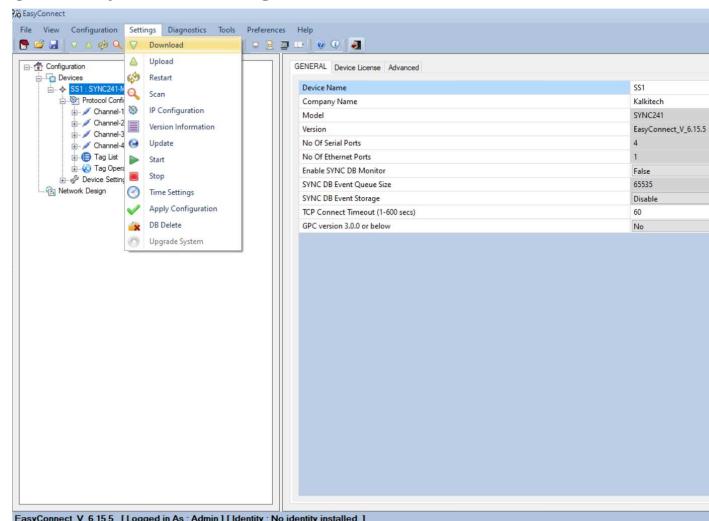
### 3. You will need to enter the **IP address** of the gateway to be able to complete the upload. If you do not have the address available, you will need to search the network for available gateways (see 4.1).



4. Once you have imported the configuration, you can configure the DNP3 server data via **Channel-4 DNP TCP Slave**. The source and destination addresses can be modified here.



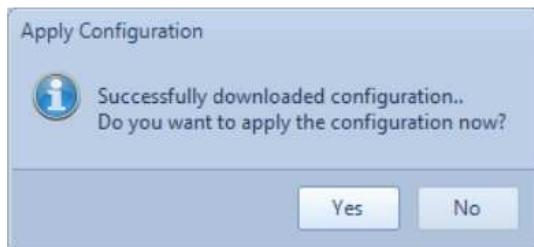
5. Select the SS1 device and load the new configuration into the gateway via **Settings->Download**.



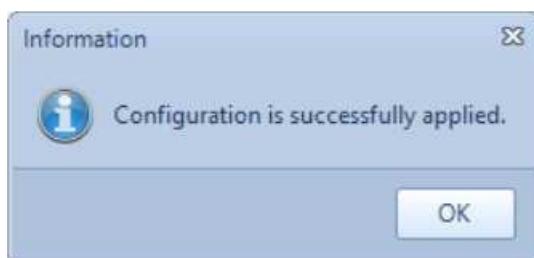
6. You will need to enter the **IP address** of the gateway to be able to complete the download. If you do not have the address available, you will need to search the network for available gateways (see 4.1).



7. Once the download is complete, you can apply the new configuration immediately, without restarting.



8. The new data model is now loaded.



## 5.5 Real-time Synchronisation

### 5.5.1 Time Server

The gateway can synchronise its internal date and time via an SNTP server. The SNTP server data will need to be configured. If there is no SNTP server available, the gateway will retrieve the date and time from the connected power supply unit on start-up. During operation, the gateway synchronises the date and time with the connected power supply unit once an hour. Correctly setting the UTC time zone is important for the synchronisation. The time zone is set to UTC+0h by default.

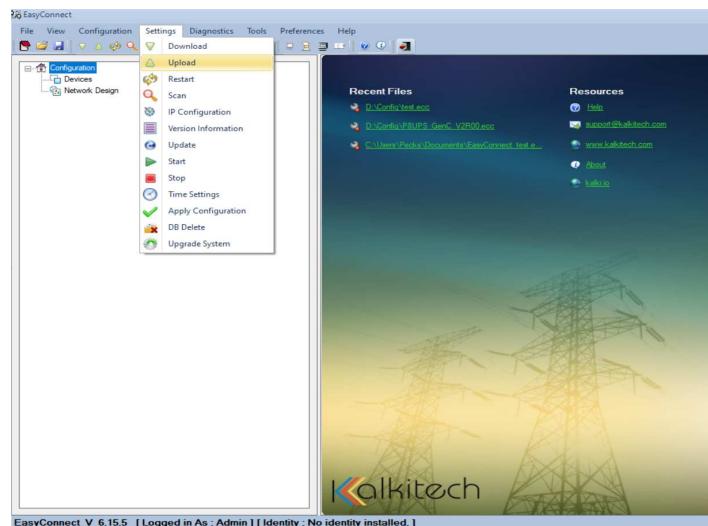
The SNTP server data needs to be configured using the “**EasyConnect**” program from Kalkitech.

1. Start **EasyConnect** and log in using your account details:

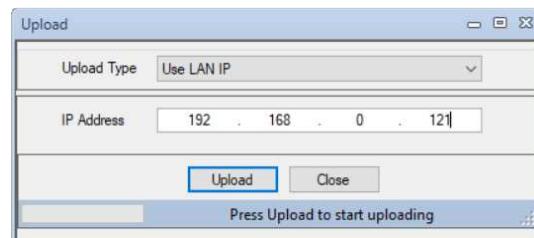
User ID: Admin  
Password: \*\*\*\*\*



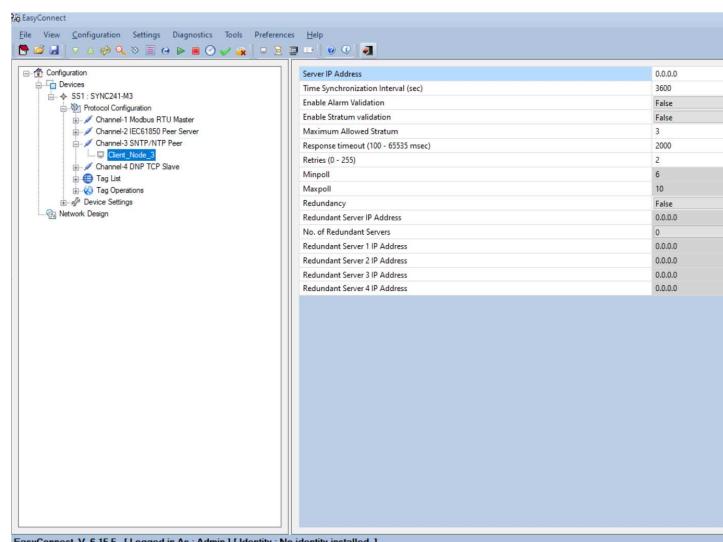
2. First import the current configuration of the gateway via **Settings->Upload**.



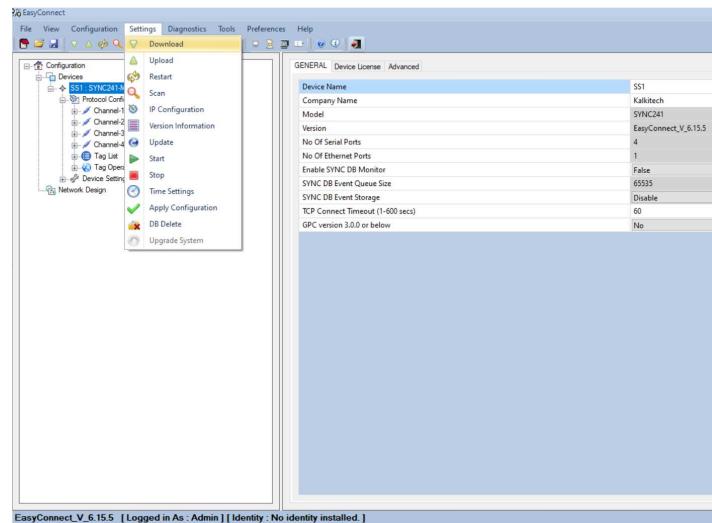
3. You will need to enter the **IP address** of the gateway to be able to complete the upload. If you do not have the address available, you will need to search the network for available gateways (see 4.1).



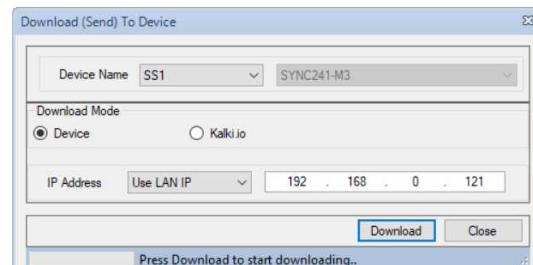
4. Once you have imported the configuration, you can configure the SNTP server data via **Channel-3 SNTP/NTP Peer**.



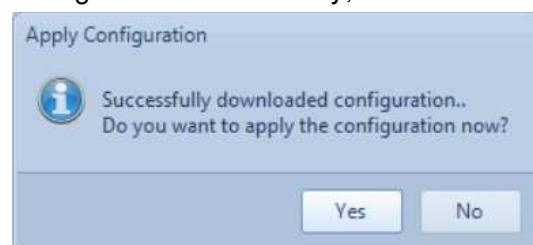
5. Select the SS1 device and load the new configuration into the gateway via **Settings->Download**.



6. You will need to enter the **IP address** of the gateway to be able to complete the download. If you do not have the address available, you will need to search the network for available gateways (see 4.1).



7. Once the download is complete, you can apply the new configuration immediately, without restarting.



8. The new data model is now loaded.



## 5.5.2 Time Zone

Correctly setting the time zone is important for the synchronisation of the date and time. The time zone is set to UTC+0h by default.

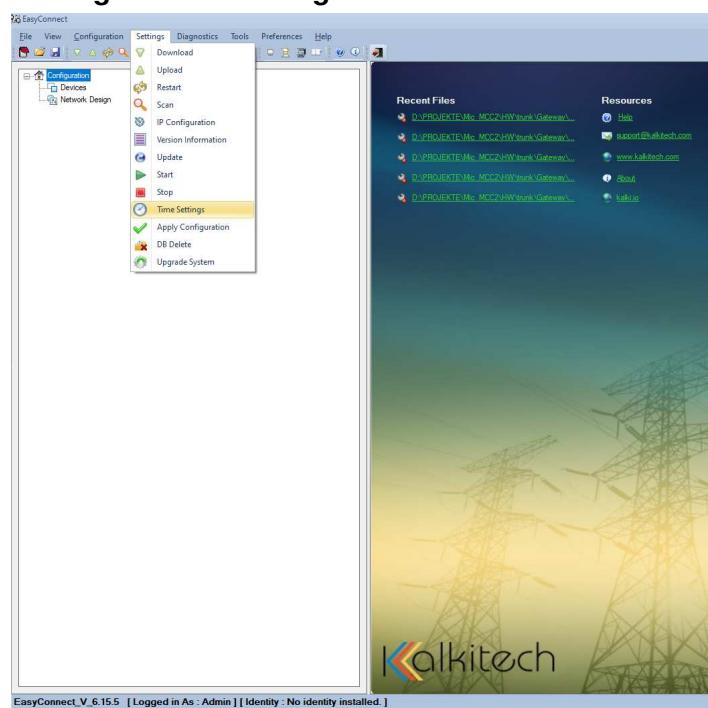
The time zone needs to be configured using the “**EasyConnect**” program from Kalkitech.

1. Start **EasyConnect** and log in using your account details:

User ID: Admin  
Password: \*\*\*\*\*

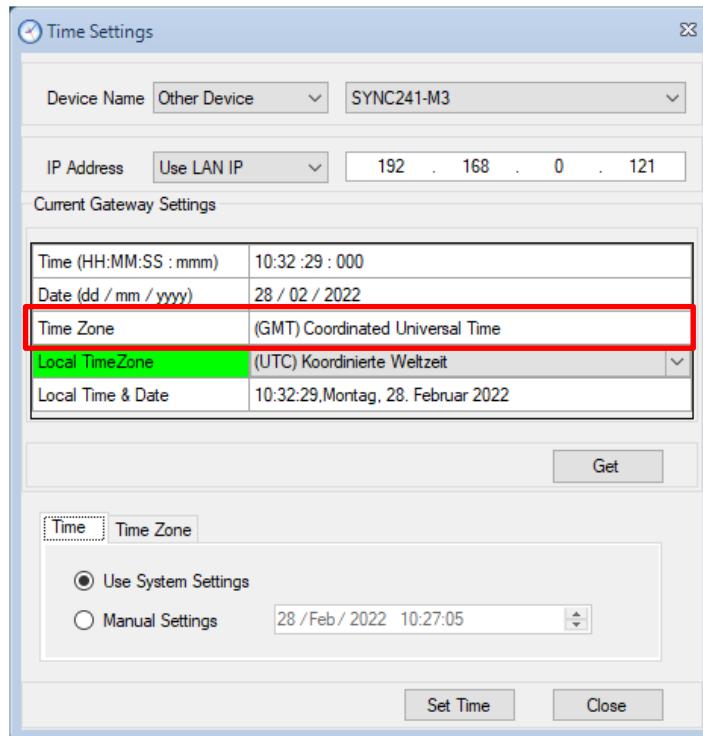


2. First import the current time configuration of the gateway via **Settings->Time Settings**.

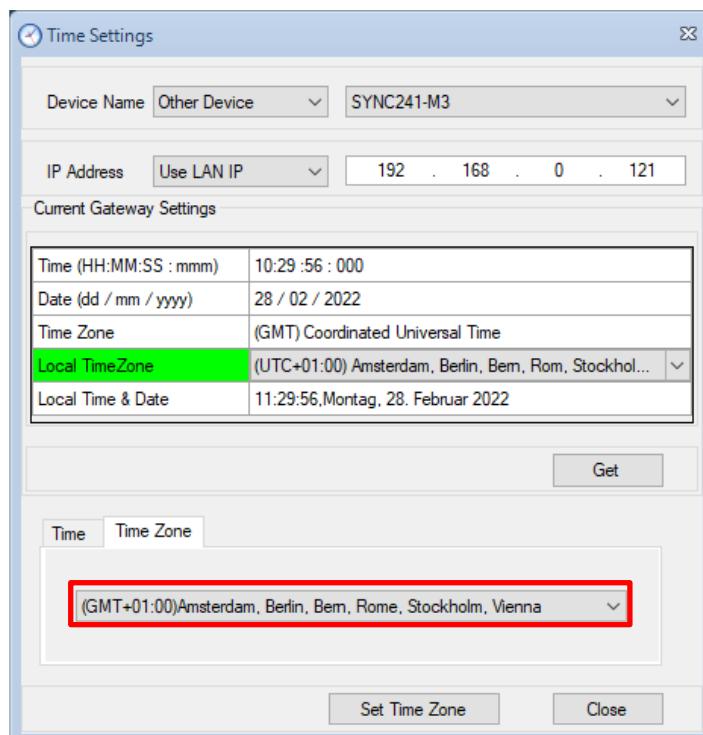


3. Enter the device type “SYNC221-M3” and the IP address of the gateway. If you do not have the address available, you will need to search the network for available gateways (see 4.1).

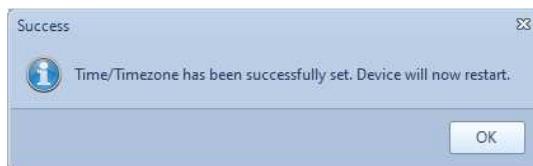
Start the import process by clicking **Get**. The time zone currently set is shown under “Time Zone”; “Local TimeZone” is not relevant (GMT=UTC).



4. Select your time zone and save the change by clicking **Set Time Zone**.



5. Confirm the gateway restart by clicking **OK**.



### 5.5.3 Device Synchronisation

By default, if no time server is configured, the gateway reads the date and time from the connected device. If a time server is configured, the gateway synchronises with the time server.

The gateway synchronises the date and time with the connected device once an hour. Correctly configuring the time zone and time server is important for the synchronisation. Synchronisation works on the basis of UTC time; UTC+0h is used by default. There is no automatic summertime/wintertime switchover built in.

Synchronisation of the connected device with the gateway can be switched off.

If synchronisation is switched off and no time server is configured, the gateway is initialised with the default date 01/01/1970 00:00 and then runs with this time.

If synchronisation is switched off and there is a time server configured that can be accessed, the gateway time is initialised with the time server time and then runs with this time.

The gateway date/time is not synchronised with the device in either of these cases.

Synchronisation needs to be configured using the “**EasyConnect**” program from Kalkitech.

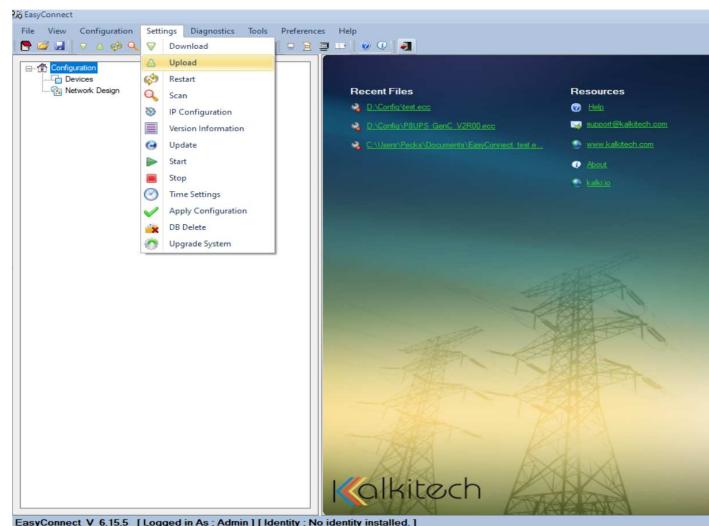
1. Start **EasyConnect** and log in using your account details:

User ID: Admin

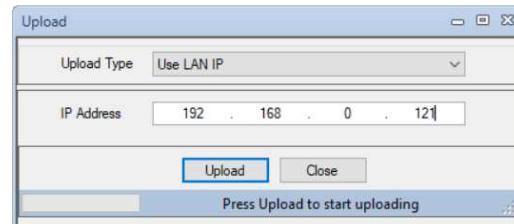
Password: \*\*\*\*\*



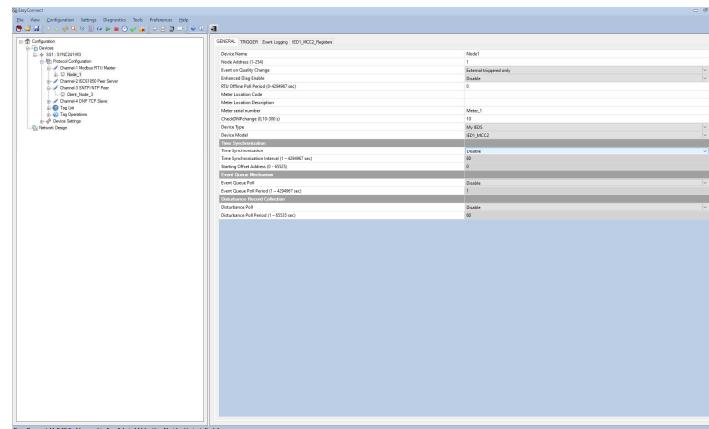
2. First import the current configuration of the gateway via **Settings->Upload**.



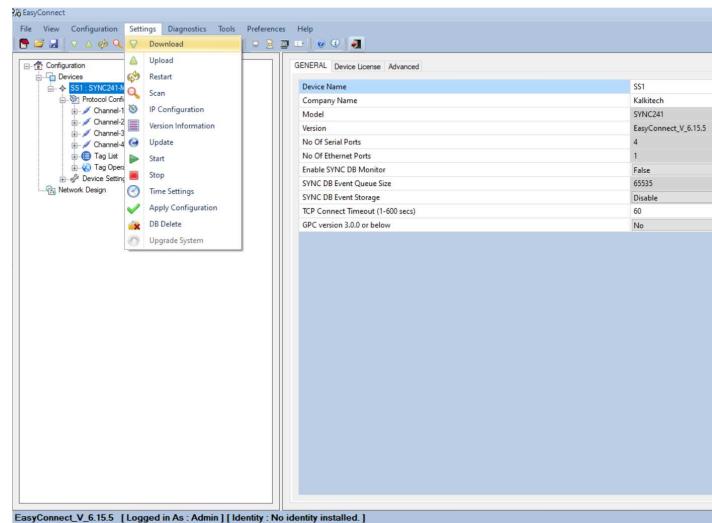
3. You will need to enter the **IP address** of the gateway to be able to complete the upload. If you do not have the address available, you will need to search the network for available gateways (see 4.1).



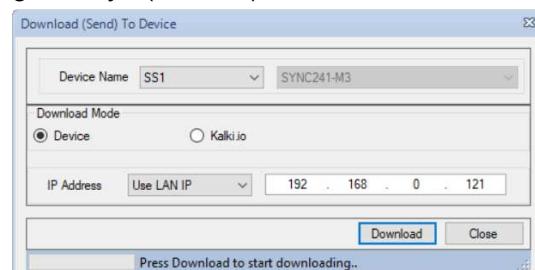
4. Once you have imported the configuration, you can switch off (disable) the time synchronisation via **Channel-1 Modbus RTU Master – Node\_1** under **Time Synchronization**. By default, synchronisation is switched on (enabled) every 60 seconds internally within the gateway and every 1 hour to the device.



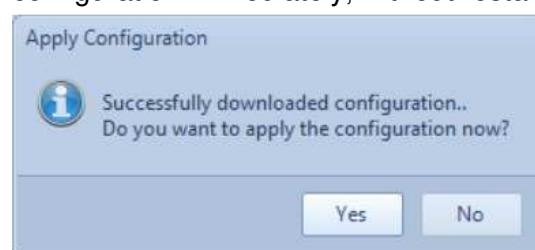
5. Select the SS1 device and load the new configuration into the gateway via **Settings->Download**.



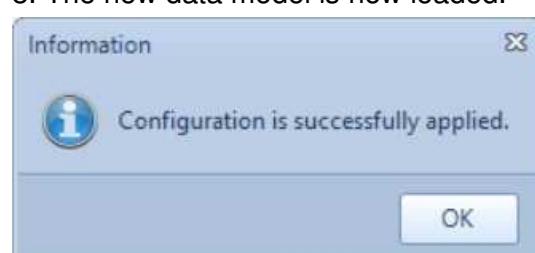
6. You will need to enter the **IP address** of the gateway to be able to complete the download. If you do not have the address available, you will need to search the network for available gateways (see 4.1).



7. Once the download is complete, you can apply the new configuration immediately, without restarting.



8. The new data model is now loaded.



## 6. IEC 61850 DEVICE PROFILES

### 6.1 General

The IEC 61850 gateway server supports the following logical nodes in accordance with IEC 61850:

#### L: System Logical Nodes

Name	Description	Supported
LPHD	Physical device information	Yes
LN	Common logical node	Yes
LLN0	Logical node zero	Yes

#### G: Generic Functions Reference

Name	Description	Supported
GGIO	Generic process I/O	Yes

The functionality of the Protect device area was modelled in accordance with the definition in IEC 61850.

IEC 61850-7-3 Common data classes.

IEC 61850-7-4 Compatible logical node classes and data object classes.

#### Logical Nodes (LN):

##### LN: COMMON LOGICAL NODE – CLN

DO name	DO type	Supported	Description
Mod	INC	Yes	Mode
Beh	INS	Yes	Behaviour
Health	INS	Yes	Health
NamPlt	LPL	Yes	Name plate

##### LN: LPHD – Physical Device Information

DO name	DO type	Supported	Description
NamPlt	DPL	Yes	Physical device name plate
PhyHealth	INS	Yes	Physical device health
Proxy	SPS	Yes	Indicates if this LN is a proxy

**LN: LLN0 – Logical Node Zero**

DO name	DO type	Supported	Description
Mod	INC	Yes	Mode (inherited from CLN class)
Beh	INS	Yes	Behaviour (inherited from CLN class)
Health	INS	Yes	Health (inherited from CLN class)
NamPlt	LPL	Yes	Name plate (inherited from CLN class)

**LN: GGI01**

DO name	CDC	Supported	Description
Mod	ENC	Yes	Mode (inherited from CLN class)
Beh	ENS	Yes	Behaviour (inherited from CLN class)
Health	ENS	Yes	Health (inherited from CLN class)
NamPlt	LPL	Yes	Name plate (inherited from CLN class)

## 6.2 Device-specific

### 6.2.1 UPS

#### Logical Nodes

##### LN: GGIO1

DO name	CDC	Supported	Description	MMS tag	Range
IntIn1	INS	Yes	UPS status	GGIO1\$ST\$IntIn1\$stVal	1: Normal operation 2: Bypass operation 3: Battery operation 4: Ecomode “O” 6: Deactivation is imminent 7: Off
IntIn2	INS	Yes	Mode	GGIO1\$ST\$IntIn2\$stVal	0: OFF 1: Equalising charge 2: Charge 3: Trickle charge 4: GenSetOperation 6: Discharge 7: Battery test 16: No battery
Alm01	SPS	Yes	W: Non-critical fault (collective warning)	GGIO1\$ST\$Alm01\$stVal	True, False (True = Alarm ON)
Alm02	SPS	Yes	W: DOU CAN fault	GGIO1\$ST\$Alm02\$stVal	True, False (True = Alarm ON)
Alm03	SPS	Yes	W: Mains fault (rectifier or SBS mains)	GGIO1\$ST\$Alm03\$stVal	True, False (True = Alarm ON)
Alm04	SPS	Yes	W: Rectifier warning	GGIO1\$ST\$Alm04\$stVal	True, False (True = Alarm ON)
Alm05	SPS	Yes	W: Inverter warning	GGIO1\$ST\$Alm05\$stVal	True, False (True = Alarm ON)
Alm06	SPS	Yes	W: Bypass warning	GGIO1\$ST\$Alm06\$stVal	True, False (True = Alarm ON)
Alm07	SPS	Yes	W: Battery temp. sensor fault “O”	GGIO1\$ST\$Alm07\$stVal	True, False (True = Alarm ON)
Alm08	SPS	Yes	W: Battery temp. too high “O”	GGIO1\$ST\$Alm08\$stVal	True, False (True = Alarm ON)
Alm09	SPS	Yes	W: Circuit-breaker tripped “O”	GGIO1\$ST\$Alm09\$stVal	True, False (True = Alarm ON)
Alm10	SPS	Yes	W: Battery warning	GGIO1\$ST\$Alm10\$stVal	True, False (True = Alarm ON)
Alm11	SPS	Yes	W: Battery low (batt. undervoltage)	GGIO1\$ST\$Alm11\$stVal	True, False (True = Alarm ON)
Alm12	SPS	Yes	W: Inverter overload	GGIO1\$ST\$Alm12\$stVal	True, False (True = Alarm ON)
Alm13	SPS	Yes	W: Fan fault	GGIO1\$ST\$Alm13\$stVal	True, False (True = Alarm ON)
Alm14	SPS	Yes	W: SBS mains fault	GGIO1\$ST\$Alm14\$stVal	True, False (True = Alarm ON)
Alm15	SPS	Yes	W: SBS blocked	GGIO1\$ST\$Alm15\$stVal	True, False (True = Alarm ON)
Alm16	SPS	Yes	A: Critical fault (collective alarm)	GGIO1\$ST\$Alm16\$stVal	True, False (True = Alarm ON)
Alm17	SPS	Yes	A: Emergency Switch off “O”	GGIO1\$ST\$Alm17\$stVal	True, False (True = Alarm ON)
Alm18	SPS	Yes	A: Rectifier fault	GGIO1\$ST\$Alm18\$stVal	True, False (True = Alarm ON)
Alm19	SPS	Yes	A: Battery fault	GGIO1\$ST\$Alm19\$stVal	True, False (True = Alarm ON)
Alm20	SPS	Yes	A: Inverter fault	GGIO1\$ST\$Alm20\$stVal	True, False (True = Alarm ON)
Alm21	SPS	Yes	A: SBS fault	GGIO1\$ST\$Alm21\$stVal	True, False (True = Alarm ON)
Alm22	SPS	Yes	A: Inverter overload	GGIO1\$ST\$Alm22\$stVal	True, False (True = Alarm ON)
Alm23	SPS	Yes	A: Inverter short-circuit	GGIO1\$ST\$Alm23\$stVal	True, False (True = Alarm ON)
Alm24	SPS	Yes	A: Inverter DC undervoltage	GGIO1\$ST\$Alm24\$stVal	True, False (True = Alarm ON)
Alm25	SPS	Yes	A: Inverter DC overvoltage	GGIO1\$ST\$Alm25\$stVal	True, False (True = Alarm ON)
Alm26	SPS	Yes	A: Inverter stack fault	GGIO1\$ST\$Alm26\$stVal	True, False (True = Alarm ON)
Ind01	SPS	Yes	Input1 active	GGIO1\$ST\$Ind01\$stVal	False, True
Ind02	SPS	Yes	Input2 active	GGIO1\$ST\$Ind02\$stVal	False, True
Ind03	SPS	Yes	Input3 active	GGIO1\$ST\$Ind03\$stVal	False, True
Ind04	SPS	Yes	SBS ready	GGIO1\$ST\$Ind04\$stVal	False, True
Ind05	SPS	Yes	Rectifier on	GGIO1\$ST\$Ind05\$stVal	False, True
Ind06	SPS	Yes	Inverter on	GGIO1\$ST\$Ind06\$stVal	False, True

Ind07	SPS	Yes	SBS on	GGIO1\$ST\$Ind07\$stVal	False, True
Ind08	SPS	Yes	Life check	GGIO1\$ST\$Ind08\$stVal	False, True

Ind9	SPS	Yes	User-defined signal 1 from rectifier “O”	GGIO1\$ST\$Ind09\$stVal	False, True
Ind10	SPS	Yes	User-defined signal 2 from rectifier “O”	GGIO1\$ST\$Ind10\$stVal	False, True
Ind11	SPS	Yes	User-defined signal 3 from rectifier “O”	GGIO1\$ST\$Ind11\$stVal	False, True
Ind12	SPS	Yes	User-defined signal 4 from rectifier “O”	GGIO1\$ST\$Ind12\$stVal	False, True
Ind13	SPS	Yes	User-defined signal 5 from rectifier “O”	GGIO1\$ST\$Ind13\$stVal	False, True
Ind14	SPS	Yes	User-defined signal 6 from rectifier “O”	GGIO1\$ST\$Ind14\$stVal	False, True
Ind15	SPS	Yes	User-defined signal 7 from rectifier “O”	GGIO1\$ST\$Ind15\$stVal	False, True
Ind16	SPS	Yes	User-defined signal 1 from inverter “O”	GGIO1\$ST\$Ind16\$stVal	False, True
Ind17	SPS	Yes	User-defined signal 2 from inverter “O”	GGIO1\$ST\$Ind17\$stVal	False, True
Ind18	SPS	Yes	User-defined signal 3 from inverter “O”	GGIO1\$ST\$Ind18\$stVal	False, True
Ind19	SPS	Yes	User-defined signal 4 from inverter “O”	GGIO1\$ST\$Ind19\$stVal	False, True
Ind20	SPS	Yes	User-defined signal 5 from inverter “O”	GGIO1\$ST\$Ind20\$stVal	False, True
Ind21	SPS	Yes	User-defined signal 6 from inverter “O”	GGIO1\$ST\$Ind21\$stVal	False, True
Ind22	SPS	Yes	User-defined signal 7 from inverter “O”	GGIO1\$ST\$Ind22\$stVal	False, True
Ind23	SPS	Yes	User-defined signal 1 from bypass “O”	GGIO1\$ST\$Ind23\$stVal	False, True
Ind24	SPS	Yes	User-defined signal 2 from bypass “O”	GGIO1\$ST\$Ind24\$stVal	False, True
Ind25	SPS	Yes	User-defined signal 3 from bypass “O”	GGIO1\$ST\$Ind25\$stVal	False, True
Ind26	SPS	Yes	User-defined signal 4 from bypass “O”	GGIO1\$ST\$Ind26\$stVal	False, True
Ind27	SPS	Yes	User-defined signal 5 from bypass “O”	GGIO1\$ST\$Ind27\$stVal	False, True
Ind28	SPS	Yes	User-defined signal 6 from bypass “O”	GGIO1\$ST\$Ind28\$stVal	False, True
Ind29	SPS	Yes	User-defined signal 7 from bypass “O”	GGIO1\$ST\$Ind29\$stVal	False, True

**Note:** “O” = Option, “W” = Warning, “A” = Alarm.

DO name	CDC	Supported	Description	MMS tag	Range
AnIn01	MV	Yes	Rectifier mains frequency	GGIO1\$MX\$AnIn01\$mag\$i	0.0 – 99.9 Hz (Hz/10)
AnIn02	MV	Yes	Rectifier mains voltage L1	GGIO1\$MX\$AnIn02\$mag\$i	0 – 999 V
AnIn03	MV	Yes	Rectifier mains voltage L2	GGIO1\$MX\$AnIn03\$mag\$i	0 – 999 V
AnIn04	MV	Yes	Rectifier mains voltage L3	GGIO1\$MX\$AnIn04\$mag\$i	0 – 999 V
AnIn05	MV	Yes	SBS mains frequency	GGIO1\$MX\$AnIn05\$mag\$i	0.0 – 99.9 Hz (Hz/10)
AnIn06	MV	Yes	SBS mains voltage L1	GGIO1\$MX\$AnIn06\$mag\$i	0 – 999 V
AnIn07	MV	Yes	SBS mains voltage L2 °	GGIO1\$MX\$AnIn07\$mag\$i	0 – 999 V
AnIn08	MV	Yes	SBS Mains Voltage L3 °	GGIO1\$MX\$AnIn08\$mag\$i	0 – 999 V
AnIn09	MV	Yes	Battery voltage	GGIO1\$MX\$AnIn09\$mag\$i	0 – 999 V
AnIn10	MV	Yes	Battery current	GGIO1\$MX\$AnIn10\$mag\$i	+/- 0.0 – 3000.0A (A/10)
AnIn11	MV	Yes	Autonomy time	GGIO1\$MX\$AnIn11\$mag\$i	0.0 – 999.0 min (min/10)
AnIn12	MV	Yes	Battery capacity	GGIO1\$MX\$AnIn12\$mag\$i	0 – 100%
AnIn13	MV	Yes	Battery temperature “O”	GGIO1\$MX\$AnIn13\$mag\$i	+/- 0.0 – 99.9°C (°C/10)
AnIn14	MV	Yes	Output frequency	GGIO1\$MX\$AnIn14\$mag\$i	0.0 – 99.9 Hz (Hz/10)

AnIn15	MV	Yes	Output voltage L1	GGIO1\$MX\$AnIn15\$mag\$i	0 – 999 V
AnIn16	MV	Yes	Output load L1	GGIO1\$MX\$AnIn16\$mag\$i	0 – 100%
AnIn17	MV	Yes	Output current L1	GGIO1\$MX\$AnIn17\$mag\$i	0 – 9999 A
AnIn18	MV	Yes	Output power L1 °	GGIO1\$MX\$AnIn18\$mag\$i	0.0 – 1000.0 kW (kW/10)
AnIn19	MV	Yes	Output voltage L2 °	GGIO1\$MX\$AnIn19\$mag\$i	0 – 999 V
AnIn20	MV	Yes	Output load L2 °	GGIO1\$MX\$AnIn20\$mag\$i	0 – 100%
AnIn21	MV	Yes	Output current L2 °	GGIO1\$MX\$AnIn21\$mag\$i	0 – 9999 A
AnIn22	MV	Yes	Output power L2 °	GGIO1\$MX\$AnIn22\$mag\$i	0.0 – 1000.0 kW (kW/10)
AnIn23	MV	Yes	Output voltage L3 °	GGIO1\$MX\$AnIn23\$mag\$i	0 – 999 V
AnIn24	MV	Yes	Output load L3 °	GGIO1\$MX\$AnIn24\$mag\$i	0 – 100%
AnIn25	MV	Yes	Output current L3 °	GGIO1\$MX\$AnIn25\$mag\$i	0 – 9999 A
AnIn26	MV	Yes	Output power L3 °	GGIO1\$MX\$AnIn26\$mag\$i	0.0 – 1000.0 kW (kW/10)

**Note:** ° = These values are not relevant in 1-phase systems and set to 0

## Data records

### STATUS DATASET

DO name	CDC	MMS tag	Description	Range
IntIn1	INS	GGIO1\$ST\$IntIn1\$stVal	UPS status	1: Normal operation 2: Bypass operation 3: Battery operation 4: Ecomode “O” 6: Deactivation is imminent 7: Off
IntIn2	INS	GGIO1\$ST\$IntIn2\$stVal	Mode	0: OFF 1: Equalising charge 2: Charge 3: Trickle charge 4: GenSetOperation 6: Discharge 7: Battery test 16: No battery
Alm01	SPS	GGIO1\$ST\$Alm01\$stVal	W: Non-critical fault (collective warning)	True, False (True = Alarm ON)
Alm02	SPS	GGIO1\$ST\$Alm02\$stVal	W: DOU CAN fault	True, False (True = Alarm ON)
Alm03	SPS	GGIO1\$ST\$Alm03\$stVal	W: Mains fault (rectifier or SBS mains)	True, False (True = Alarm ON)
Alm04	SPS	GGIO1\$ST\$Alm04\$stVal	W: Rectifier warning	True, False (True = Alarm ON)
Alm05	SPS	GGIO1\$ST\$Alm05\$stVal	W: Inverter warning	True, False (True = Alarm ON)
Alm06	SPS	GGIO1\$ST\$Alm06\$stVal	W: Bypass warning	True, False (True = Alarm ON)
Alm07	SPS	GGIO1\$ST\$Alm07\$stVal	W: Battery temp. sensor fault “O”	True, False (True = Alarm ON)
Alm08	SPS	GGIO1\$ST\$Alm08\$stVal	W: Battery temp. too high “O”	True, False (True = Alarm ON)
Alm09	SPS	GGIO1\$ST\$Alm09\$stVal	W: Circuit-breaker tripped “O”	True, False (True = Alarm ON)
Alm10	SPS	GGIO1\$ST\$Alm10\$stVal	W: Battery warning	True, False (True = Alarm ON)
Alm11	SPS	GGIO1\$ST\$Alm11\$stVal	W: Battery low (batt. undervoltage)	True, False (True = Alarm ON)
Alm12	SPS	GGIO1\$ST\$Alm12\$stVal	W: Inverter overload	True, False (True = Alarm ON)
Alm13	SPS	GGIO1\$ST\$Alm13\$stVal	W: Fan fault	True, False (True = Alarm ON)
Alm14	SPS	GGIO1\$ST\$Alm14\$stVal	W: SBS mains fault	True, False (True = Alarm ON)
Alm15	SPS	GGIO1\$ST\$Alm15\$stVal	W: SBS blocked	True, False (True = Alarm ON)
Alm16	SPS	GGIO1\$ST\$Alm16\$stVal	A: Critical fault (collective alarm)	True, False (True = Alarm ON)
Alm17	SPS	GGIO1\$ST\$Alm17\$stVal	A: Emergency Switch off “O”	True, False (True = Alarm ON)
Alm18	SPS	GGIO1\$ST\$Alm18\$stVal	A: Rectifier fault	True, False (True = Alarm ON)
Alm19	SPS	GGIO1\$ST\$Alm19\$stVal	A: Battery fault	True, False (True = Alarm ON)
Alm20	SPS	GGIO1\$ST\$Alm20\$stVal	A: Inverter fault	True, False (True = Alarm ON)
Alm21	SPS	GGIO1\$ST\$Alm21\$stVal	A: SBS fault	True, False (True = Alarm ON)

Alm22	SPS	GGIO1\$ST\$Alm22\$stVal	A: Inverter overload	True, False (True = Alarm ON)
Alm23	SPS	GGIO1\$ST\$Alm23\$stVal	A: Inverter short-circuit	True, False (True = Alarm ON)
Alm24	SPS	GGIO1\$ST\$Alm24\$stVal	A: Inverter DC undervoltage	True, False (True = Alarm ON)
Alm25	SPS	GGIO1\$ST\$Alm25\$stVal	A: Inverter DC overvoltage	True, False (True = Alarm ON)
Alm26	SPS	GGIO1\$ST\$Alm26\$stVal	A: Inverter stack fault	True, False (True = Alarm ON)
Ind01	SPS	GGIO1\$ST\$Ind01\$stVal	Input1 active	False, True
Ind02	SPS	GGIO1\$ST\$Ind02\$stVal	Input2 active	False, True
Ind03	SPS	GGIO1\$ST\$Ind03\$stVal	Input3 active	False, True
Ind04	SPS	GGIO1\$ST\$Ind04\$stVal	SBS ready	False, True
Ind05	SPS	GGIO1\$ST\$Ind05\$stVal	Rectifier on	False, True
Ind06	SPS	GGIO1\$ST\$Ind06\$stVal	Inverter on	False, True
Ind07	SPS	GGIO1\$ST\$Ind07\$stVal	SBS on	False, True
Ind08	SPS	GGIO1\$ST\$Ind08\$stVal	Life check	False, True

**Note:** “O” = Option, “W” = Warning, “A” = Alarm. The affected part is switched off

## MEASURES DATASET

DO name	CDC	MMS tag	Description	Range
AnIn01	MV	GGIO1\$MX\$AnIn01\$mag\$i	Rectifier mains frequency	0.0 – 99.9 Hz (Hz/10)
AnIn02	MV	GGIO1\$MX\$AnIn02\$mag\$i	Rectifier mains voltage L1	0 – 999 V
AnIn03	MV	GGIO1\$MX\$AnIn03\$mag\$i	Rectifier mains voltage L2	0 – 999 V
AnIn04	MV	GGIO1\$MX\$AnIn04\$mag\$i	Rectifier mains voltage L3	0 – 999 V
AnIn05	MV	GGIO1\$MX\$AnIn05\$mag\$i	SBS mains frequency	0.0 – 99.9 Hz (Hz/10)
AnIn06	MV	GGIO1\$MX\$AnIn06\$mag\$i	SBS mains voltage L1	0 – 999 V
AnIn07	MV	GGIO1\$MX\$AnIn07\$mag\$i	SBS mains voltage L2 °	0 – 999 V
AnIn08	MV	GGIO1\$MX\$AnIn08\$mag\$i	SBS Mains Voltage L3 °	0 – 999 V
AnIn09	MV	GGIO1\$MX\$AnIn09\$mag\$i	Battery voltage	0 – 999 V
AnIn10	MV	GGIO1\$MX\$AnIn10\$mag\$i	Battery current	+/- 0.0 – 3000.0 A (A/10)
AnIn11	MV	GGIO1\$MX\$AnIn11\$mag\$i	Autonomy time	0.0 – 999.0 min (min/10)
AnIn12	MV	GGIO1\$MX\$AnIn12\$mag\$i	Battery capacity	0 – 100%
AnIn13	MV	GGIO1\$MX\$AnIn13\$mag\$i	Battery temperature “O”	+/- 0.0 – 99.9°C (°C/10)
AnIn14	MV	GGIO1\$MX\$AnIn14\$mag\$i	Output frequency	0.0 – 99.9 Hz (Hz/10)
AnIn15	MV	GGIO1\$MX\$AnIn15\$mag\$i	Output voltage L1	0 – 999 V
AnIn16	MV	GGIO1\$MX\$AnIn16\$mag\$i	Output load L1	0 – 100%
AnIn17	MV	GGIO1\$MX\$AnIn17\$mag\$i	Output current L1	0 – 9999 A
AnIn18	MV	GGIO1\$MX\$AnIn18\$mag\$i	Output power L1	0.0 – 1000.0 kW (kW/10)
AnIn19	MV	GGIO1\$MX\$AnIn19\$mag\$i	Output voltage L2 °	0 – 999 V
AnIn20	MV	GGIO1\$MX\$AnIn20\$mag\$i	Output load L2 °	0 – 100%
AnIn21	MV	GGIO1\$MX\$AnIn21\$mag\$i	Output current L2 °	0 – 9999 A
AnIn22	MV	GGIO1\$MX\$AnIn22\$mag\$i	Output power L2 °	0.0 – 1000.0 kW (kW/10)
AnIn23	MV	GGIO1\$MX\$AnIn23\$mag\$i	Output voltage L3 °	0 – 999 V
AnIn24	MV	GGIO1\$MX\$AnIn24\$mag\$i	Output load L3 °	0 – 100%
AnIn25	MV	GGIO1\$MX\$AnIn25\$mag\$i	Output current L3 °	0 – 9999 A
AnIn26	MV	GGIO1\$MX\$AnIn26\$mag\$i	Output power L3 °	0.0 – 1000.0 kW (kW/10)

**Note:** ° = These values are not relevant in 1-phase systems and set to 0

## STATUS AuxSignals DATASET

DO name	CDC	MMS tag	Description	Range
Ind09	SPS	GGIO1\$ST\$Ind09\$stVal	User-defined signal 1 from rectifier “O”	False, True
Ind10	SPS	GGIO1\$ST\$Ind10\$stVal	User-defined signal 2 from rectifier “O”	False, True
Ind11	SPS	GGIO1\$ST\$Ind11\$stVal	User-defined signal 3 from rectifier “O”	False, True
Ind12	SPS	GGIO1\$ST\$Ind12\$stVal	User-defined signal 4 from rectifier “O”	False, True
Ind13	SPS	GGIO1\$ST\$Ind13\$stVal	User-defined signal 5 from rectifier “O”	False, True
Ind14	SPS	GGIO1\$ST\$Ind14\$stVal	User-defined signal 6 from rectifier “O”	False, True
Ind15	SPS	GGIO1\$ST\$Ind15\$stVal	User-defined signal 7 from rectifier “O”	False, True
Ind16	SPS	GGIO1\$ST\$Ind16\$stVal	User-defined signal 1 from inverter “O”	False, True
Ind17	SPS	GGIO1\$ST\$Ind17\$stVal	User-defined signal 2 from inverter “O”	False, True
Ind18	SPS	GGIO1\$ST\$Ind18\$stVal	User-defined signal 3 from inverter “O”	False, True
Ind19	SPS	GGIO1\$ST\$Ind19\$stVal	User-defined signal 4 from inverter “O”	False, True
Ind20	SPS	GGIO1\$ST\$Ind20\$stVal	User-defined signal 5 from inverter “O”	False, True
Ind21	SPS	GGIO1\$ST\$Ind21\$stVal	User-defined signal 6 from inverter “O”	False, True
Ind22	SPS	GGIO1\$ST\$Ind22\$stVal	User-defined signal 7 from inverter “O”	False, True
Ind23	SPS	GGIO1\$ST\$Ind23\$stVal	User-defined signal 1 from bypass “O”	False, True
Ind24	SPS	GGIO1\$ST\$Ind24\$stVal	User-defined signal 2 from bypass “O”	False, True
Ind25	SPS	GGIO1\$ST\$Ind25\$stVal	User-defined signal 3 from bypass “O”	False, True
Ind26	SPS	GGIO1\$ST\$Ind26\$stVal	User-defined signal 4 from bypass “O”	False, True
Ind27	SPS	GGIO1\$ST\$Ind27\$stVal	User-defined signal 5 from bypass “O”	False, True
Ind28	SPS	GGIO1\$ST\$Ind28\$stVal	User-defined signal 6 from bypass “O”	False, True
Ind29	SPS	GGIO1\$ST\$Ind29\$stVal	User-defined signal 7 from bypass “O”	False, True

**Note:** “O” = Option.

## 6.2.2 Inverter

### Logical Nodes

#### LN: GGPIO1

DO name	CDC	Supported	Description	MMS tag	Range
IntIn1	INS	Yes	Inverter status	GGIO1\$ST\$IntIn1\$stVal	1: Normal operation 2: Bypass operation 4: Ecomode “O” 7: Off
Alm01	SPS	Yes	W: Non-critical fault (collective warning)	GGIO1\$ST\$Alm01\$stVal	True, False (True = Alarm ON)
Alm02	SPS	Yes	W: DOU CAN fault	GGIO1\$ST\$Alm02\$stVal	True, False (True = Alarm ON)
Alm05	SPS	Yes	W: Inverter warning	GGIO1\$ST\$Alm05\$stVal	True, False (True = Alarm ON)
Alm06	SPS	Yes	W: Bypass warning	GGIO1\$ST\$Alm06\$stVal	True, False (True = Alarm ON)
Alm11	SPS	Yes	W: DC undervoltage	GGIO1\$ST\$Alm11\$stVal	True, False (True = Alarm ON)
Alm12	SPS	Yes	W: Inverter overload	GGIO1\$ST\$Alm12\$stVal	True, False (True = Alarm ON)
Alm13	SPS	Yes	W: Fan fault	GGIO1\$ST\$Alm13\$stVal	True, False (True = Alarm ON)
Alm14	SPS	Yes	W: SBS mains fault	GGIO1\$ST\$Alm14\$stVal	True, False (True = Alarm ON)
Alm15	SPS	Yes	W: SBS blocked	GGIO1\$ST\$Alm15\$stVal	True, False (True = Alarm ON)
Alm16	SPS	Yes	A: Critical fault (collective alarm)	GGIO1\$ST\$Alm16\$stVal	True, False (True = Alarm ON)
Alm17	SPS	Yes	A: Emergency Switch off “O”	GGIO1\$ST\$Alm17\$stVal	True, False (True = Alarm ON)
Alm20	SPS	Yes	A: Inverter fault	GGIO1\$ST\$Alm20\$stVal	True, False (True = Alarm ON)
Alm21	SPS	Yes	A: SBS fault	GGIO1\$ST\$Alm21\$stVal	True, False (True = Alarm ON)
Alm22	SPS	Yes	A: Inverter overload	GGIO1\$ST\$Alm22\$stVal	True, False (True = Alarm ON)
Alm23	SPS	Yes	A: Inverter short-circuit	GGIO1\$ST\$Alm23\$stVal	True, False (True = Alarm ON)
Alm24	SPS	Yes	A: Inverter DC undervoltage	GGIO1\$ST\$Alm24\$stVal	True, False (True = Alarm ON)
Alm25	SPS	Yes	A: Inverter DC overvoltage	GGIO1\$ST\$Alm25\$stVal	True, False (True = Alarm ON)
Alm26	SPS	Yes	A: Inverter stack fault	GGIO1\$ST\$Alm26\$stVal	True, False (True = Alarm ON)
Ind01	SPS	Yes	Input1 active	GGIO1\$ST\$Ind01\$stVal	False, True
Ind02	SPS	Yes	Input2 active	GGIO1\$ST\$Ind02\$stVal	False, True
Ind03	SPS	Yes	Input3 active	GGIO1\$ST\$Ind03\$stVal	False, True
Ind04	SPS	Yes	SBS ready	GGIO1\$ST\$Ind04\$stVal	False, True
Ind06	SPS	Yes	Inverter on	GGIO1\$ST\$Ind06\$stVal	False, True
Ind07	SPS	Yes	SBS on	GGIO1\$ST\$Ind07\$stVal	False, True
Ind08	SPS	Yes	Life check	GGIO1\$ST\$Ind08\$stVal	False, True
Ind16	SPS	Yes	User-defined signal 1 from inverter “O”	GGIO1\$ST\$Ind16\$stVal	False, True
Ind17	SPS	Yes	User-defined signal 2 from inverter “O”	GGIO1\$ST\$Ind17\$stVal	False, True
Ind18	SPS	Yes	User-defined signal 3 from inverter “O”	GGIO1\$ST\$Ind18\$stVal	False, True
Ind19	SPS	Yes	User-defined signal 4 from inverter “O”	GGIO1\$ST\$Ind19\$stVal	False, True
Ind20	SPS	Yes	User-defined signal 5 from inverter “O”	GGIO1\$ST\$Ind20\$stVal	False, True
Ind21	SPS	Yes	User-defined signal 6 from inverter “O”	GGIO1\$ST\$Ind21\$stVal	False, True
Ind22	SPS	Yes	User-defined signal 7 from inverter “O”	GGIO1\$ST\$Ind22\$stVal	False, True
Ind23	SPS	Yes	User-defined signal 1 from bypass “O”	GGIO1\$ST\$Ind23\$stVal	False, True
Ind24	SPS	Yes	User-defined signal 2 from bypass “O”	GGIO1\$ST\$Ind24\$stVal	False, True
Ind25	SPS	Yes	User-defined signal 3 from bypass “O”	GGIO1\$ST\$Ind25\$stVal	False, True
Ind26	SPS	Yes	User-defined signal 4 from bypass “O”	GGIO1\$ST\$Ind26\$stVal	False, True
Ind27	SPS	Yes	User-defined signal 5 from bypass “O”	GGIO1\$ST\$Ind27\$stVal	False, True

Ind28	SPS	Yes	User-defined signal 6 from bypass “O”	GGIO1\$ST\$Ind28\$stVal	False, True
Ind29	SPS	Yes	User-defined signal 7 from bypass “O”	GGIO1\$ST\$Ind29\$stVal	False, True

**Note:** “O” = Option, “W” = Warning, “A” = Alarm.

DO name	CDC	Supported	Description	MMS tag	Range
AnIn05	MV	Yes	SBS mains frequency	GGIO1\$MX\$AnIn05\$mag\$i	0.0 – 99.9 Hz (Hz/10)
AnIn06	MV	Yes	SBS mains voltage L1	GGIO1\$MX\$AnIn06\$mag\$i	0 – 999 V
AnIn07	MV	Yes	SBS mains voltage L2 °	GGIO1\$MX\$AnIn07\$mag\$i	0 – 999 V
AnIn08	MV	Yes	SBS Mains Voltage L3 °	GGIO1\$MX\$AnIn08\$mag\$i	0 – 999 V
AnIn09	MV	Yes	DC voltage	GGIO1\$MX\$AnIn09\$mag\$i	0 – 999 V
AnIn14	MV	Yes	Output frequency	GGIO1\$MX\$AnIn14\$mag\$i	0.0 – 99.9 Hz (Hz/10)
AnIn15	MV	Yes	Output voltage L1	GGIO1\$MX\$AnIn15\$mag\$i	0 – 999 V
AnIn16	MV	Yes	Output load L1	GGIO1\$MX\$AnIn16\$mag\$i	0 – 100%
AnIn17	MV	Yes	Output current L1	GGIO1\$MX\$AnIn17\$mag\$i	0 – 9999 A
AnIn18	MV	Yes	Output power L1	GGIO1\$MX\$AnIn18\$mag\$i	0.0 – 1000.0 kW (kW/10)
AnIn19	MV	Yes	Output voltage L2 °	GGIO1\$MX\$AnIn19\$mag\$i	0 – 999 V
AnIn20	MV	Yes	Output load L2 °	GGIO1\$MX\$AnIn20\$mag\$i	0 – 100%
AnIn21	MV	Yes	Output current L2 °	GGIO1\$MX\$AnIn21\$mag\$i	0 – 9999 A
AnIn22	MV	Yes	Output power L2 °	GGIO1\$MX\$AnIn22\$mag\$i	0.0 – 1000.0 kW (kW/10)
AnIn23	MV	Yes	Output voltage L3 °	GGIO1\$MX\$AnIn23\$mag\$i	0 – 999 V
AnIn24	MV	Yes	Output load L3 °	GGIO1\$MX\$AnIn24\$mag\$i	0 – 100%
AnIn25	MV	Yes	Output current L3 °	GGIO1\$MX\$AnIn25\$mag\$i	0 – 9999 A
AnIn26	MV	Yes	Output power L3 °	GGIO1\$MX\$AnIn26\$mag\$i	0.0 – 1000.0 kW (kW/10)

**Note:** ° = These values are not relevant in 1-phase systems and set to 0

## Data records

### STATUS DATASET

DO name	CDC	MMS tag	Description	Range
IntIn1	INS	GGIO1\$ST\$IntIn1\$stVal	Inverter status	1: Normal operation 2: Bypass operation 4: Ecomode “O” 7: Off
Alm01	SPS	GGIO1\$ST\$Alm01\$stVal	W: Non-critical fault (collective warning)	True, False (True = Alarm ON)
Alm02	SPS	GGIO1\$ST\$Alm02\$stVal	W: DOU CAN fault	True, False (True = Alarm ON)
Alm05	SPS	GGIO1\$ST\$Alm05\$stVal	W: Inverter warning	True, False (True = Alarm ON)
Alm06	SPS	GGIO1\$ST\$Alm06\$stVal	W: Bypass warning	True, False (True = Alarm ON)
Alm11	SPS	GGIO1\$ST\$Alm11\$stVal	W: DC undervoltage	True, False (True = Alarm ON)
Alm12	SPS	GGIO1\$ST\$Alm12\$stVal	W: Inverter overload	True, False (True = Alarm ON)
Alm13	SPS	GGIO1\$ST\$Alm13\$stVal	W: Fan fault	True, False (True = Alarm ON)
Alm14	SPS	GGIO1\$ST\$Alm14\$stVal	W: SBS mains fault	True, False (True = Alarm ON)
Alm15	SPS	GGIO1\$ST\$Alm15\$stVal	W: SBS blocked	True, False (True = Alarm ON)
Alm16	SPS	GGIO1\$ST\$Alm16\$stVal	A: Critical fault (collective alarm)	True, False (True = Alarm ON)
Alm17	SPS	GGIO1\$ST\$Alm17\$stVal	A: Emergency Switch off “O”	True, False (True = Alarm ON)
Alm20	SPS	GGIO1\$ST\$Alm20\$stVal	A: Inverter fault	True, False (True = Alarm ON)

Alm21	SPS	GGIO1\$ST\$Alm21\$stVal	A: SBS fault	True, False (True = Alarm ON)
Alm22	SPS	GGIO1\$ST\$Alm22\$stVal	A: Inverter overload	True, False (True = Alarm ON)
Alm23	SPS	GGIO1\$ST\$Alm23\$stVal	A: Inverter short-circuit	True, False (True = Alarm ON)
Alm24	SPS	GGIO1\$ST\$Alm24\$stVal	A: Inverter DC undervoltage	True, False (True = Alarm ON)
Alm25	SPS	GGIO1\$ST\$Alm25\$stVal	A: Inverter DC overvoltage	True, False (True = Alarm ON)
Alm26	SPS	GGIO1\$ST\$Alm26\$stVal	A: Inverter stack fault	True, False (True = Alarm ON)
Ind01	SPS	GGIO1\$ST\$Ind01\$stVal	Input1 active	False, True
Ind02	SPS	GGIO1\$ST\$Ind02\$stVal	Input2 active	False, True
Ind03	SPS	GGIO1\$ST\$Ind03\$stVal	Input3 active	False, True
Ind04	SPS	GGIO1\$ST\$Ind04\$stVal	SBS ready	False, True
Ind06	SPS	GGIO1\$ST\$Ind06\$stVal	Inverter on	False, True
Ind07	SPS	GGIO1\$ST\$Ind07\$stVal	SBS on	False, True
Ind08	SPS	GGIO1\$ST\$Ind08\$stVal	Life check	False, True

**Note:** “O” = Option, “W” = Warning, “A” = Alarm. The affected part is switched off

## MEASURES DATASET

DO name	CDC	MMS tag	Description	Range
AnIn05	MV	GGIO1\$MX\$AnIn05\$mag\$i	SBS mains frequency	0.0 – 99.9 Hz (Hz/10)
AnIn06	MV	GGIO1\$MX\$AnIn06\$mag\$i	SBS mains voltage L1	0 – 999 V
AnIn07	MV	GGIO1\$MX\$AnIn07\$mag\$i	SBS mains voltage L2 °	0 – 999 V
AnIn08	MV	GGIO1\$MX\$AnIn08\$mag\$i	SBS Mains Voltage L3 °	0 – 999 V
AnIn09	MV	GGIO1\$MX\$AnIn09\$mag\$i	DC voltage	0 – 999 V
AnIn14	MV	GGIO1\$MX\$AnIn14\$mag\$i	Output frequency	0.0 – 99.9 Hz (Hz/10)
AnIn15	MV	GGIO1\$MX\$AnIn15\$mag\$i	Output voltage L1	0 – 999 V
AnIn16	MV	GGIO1\$MX\$AnIn16\$mag\$i	Output load L1	0 – 100%
AnIn17	MV	GGIO1\$MX\$AnIn17\$mag\$i	Output current L1	0 – 9999 A
AnIn18	MV	GGIO1\$MX\$AnIn18\$mag\$i	Output power L1	0.0 – 1000.0 kW (kW/10)
AnIn19	MV	GGIO1\$MX\$AnIn19\$mag\$i	Output voltage L2 °	0 – 999 V
AnIn20	MV	GGIO1\$MX\$AnIn20\$mag\$i	Output load L2 °	0 – 100%
AnIn21	MV	GGIO1\$MX\$AnIn21\$mag\$i	Output current L2 °	0 – 9999 A
AnIn22	MV	GGIO1\$MX\$AnIn22\$mag\$i	Output power L2 °	0.0 – 1000.0 kW (kW/10)
AnIn23	MV	GGIO1\$MX\$AnIn23\$mag\$i	Output voltage L3 °	0 – 999 V
AnIn24	MV	GGIO1\$MX\$AnIn24\$mag\$i	Output load L3 °	0 – 100%
AnIn25	MV	GGIO1\$MX\$AnIn25\$mag\$i	Output current L3 °	0 – 9999 A
AnIn26	MV	GGIO1\$MX\$AnIn26\$mag\$i	Output power L3 °	0.0 – 1000.0 kW (kW/10)

**Note:** ° = These values are not relevant in 1-phase systems and set to 0

## STATUS AuxSignals DATASET

DO name	CDC	MMS tag	Description	Range
Ind16	SPS	GGIO1\$ST\$Ind16\$stVal	User-defined signal 1 from inverter “O”	False, True
Ind17	SPS	GGIO1\$ST\$Ind17\$stVal	User-defined signal 2 from inverter “O”	False, True
Ind18	SPS	GGIO1\$ST\$Ind18\$stVal	User-defined signal 3 from inverter “O”	False, True
Ind19	SPS	GGIO1\$ST\$Ind19\$stVal	User-defined signal 4 from inverter “O”	False, True
Ind20	SPS	GGIO1\$ST\$Ind20\$stVal	User-defined signal 5 from inverter “O”	False, True
Ind21	SPS	GGIO1\$ST\$Ind21\$stVal	User-defined signal 6 from inverter “O”	False, True

Ind22	SPS	GGIO1\$ST\$Ind22\$stVal	User-defined signal 7 from inverter “O”	False, True
Ind23	SPS	GGIO1\$ST\$Ind23\$stVal	User-defined signal 1 from bypass “O”	False, True
Ind24	SPS	GGIO1\$ST\$Ind24\$stVal	User-defined signal 2 from bypass “O”	False, True
Ind25	SPS	GGIO1\$ST\$Ind25\$stVal	User-defined signal 3 from bypass “O”	False, True
Ind26	SPS	GGIO1\$ST\$Ind26\$stVal	User-defined signal 4 from bypass “O”	False, True
Ind27	SPS	GGIO1\$ST\$Ind27\$stVal	User-defined signal 5 from bypass “O”	False, True
Ind28	SPS	GGIO1\$ST\$Ind28\$stVal	User-defined signal 6 from bypass “O”	False, True
Ind29	SPS	GGIO1\$ST\$Ind29\$stVal	User-defined signal 7 from bypass “O”	False, True

**Note:** “O” = Option.

### 6.2.3 Converter

#### Logical Nodes

##### LN: GGPIO1

DO name	CDC	Supported	Description	MMS tag	Range
IntIn1	INS	Yes	Converter status	GGIO1\$ST\$IntIn1\$stVal	1: Normal operation 3: Battery operation 6: Deactivation is imminent 7: Off
IntIn2	INS	Yes	Mode	GGIO1\$ST\$IntIn2\$stVal	0: OFF 1: Equalising charge 2: Charge 3: Trickle charge 4: GenSetOperation 6: Discharge 7: Battery test 16: No battery
Alm01	SPS	Yes	W: Non-critical fault (collective warning)	GGIO1\$ST\$Alm01\$stVal	True, False (True = Alarm ON)
Alm02	SPS	Yes	W: DOU CAN fault	GGIO1\$ST\$Alm02\$stVal	True, False (True = Alarm ON)
Alm03	SPS	Yes	W: Mains fault	GGIO1\$ST\$Alm03\$stVal	True, False (True = Alarm ON)
Alm04	SPS	Yes	W: Rectifier warning	GGIO1\$ST\$Alm04\$stVal	True, False (True = Alarm ON)
Alm05	SPS	Yes	W: Inverter warning	GGIO1\$ST\$Alm05\$stVal	True, False (True = Alarm ON)
Alm07	SPS	Yes	W: Battery temp. sensor fault “O”	GGIO1\$ST\$Alm07\$stVal	True, False (True = Alarm ON)
Alm08	SPS	Yes	W: Battery temp. too high “O”	GGIO1\$ST\$Alm08\$stVal	True, False (True = Alarm ON)
Alm09	SPS	Yes	W: Circuit-breaker tripped “O”	GGIO1\$ST\$Alm09\$stVal	True, False (True = Alarm ON)
Alm10	SPS	Yes	W: Battery warning	GGIO1\$ST\$Alm10\$stVal	True, False (True = Alarm ON)
Alm11	SPS	Yes	W: Battery low (batt. undervoltage)	GGIO1\$ST\$Alm11\$stVal	True, False (True = Alarm ON)
Alm12	SPS	Yes	W: Inverter overload	GGIO1\$ST\$Alm12\$stVal	True, False (True = Alarm ON)
Alm13	SPS	Yes	W: Fan fault	GGIO1\$ST\$Alm13\$stVal	True, False (True = Alarm ON)
Alm16	SPS	Yes	A: Critical fault (collective alarm)	GGIO1\$ST\$Alm16\$stVal	True, False (True = Alarm ON)
Alm17	SPS	Yes	A: Emergency Switch off “O”	GGIO1\$ST\$Alm17\$stVal	True, False (True = Alarm ON)
Alm18	SPS	Yes	A: Rectifier fault	GGIO1\$ST\$Alm18\$stVal	True, False (True = Alarm ON)
Alm19	SPS	Yes	A: Battery fault	GGIO1\$ST\$Alm19\$stVal	True, False (True = Alarm ON)
Alm20	SPS	Yes	A: Inverter fault	GGIO1\$ST\$Alm20\$stVal	True, False (True = Alarm ON)
Alm22	SPS	Yes	A: Inverter overload	GGIO1\$ST\$Alm22\$stVal	True, False (True = Alarm ON)
Alm23	SPS	Yes	A: Inverter short-circuit	GGIO1\$ST\$Alm23\$stVal	True, False (True = Alarm ON)
Alm24	SPS	Yes	A: Inverter DC undervoltage	GGIO1\$ST\$Alm24\$stVal	True, False (True = Alarm ON)
Alm25	SPS	Yes	A: Inverter DC overvoltage	GGIO1\$ST\$Alm25\$stVal	True, False (True = Alarm ON)
Alm26	SPS	Yes	A: Inverter stack fault	GGIO1\$ST\$Alm26\$stVal	True, False (True = Alarm ON)
Ind01	SPS	Yes	Input1 active	GGIO1\$ST\$Ind01\$stVal	False, True
Ind02	SPS	Yes	Input2 active	GGIO1\$ST\$Ind02\$stVal	False, True
Ind03	SPS	Yes	Input3 active	GGIO1\$ST\$Ind03\$stVal	False, True
Ind05	SPS	Yes	Rectifier on	GGIO1\$ST\$Ind05\$stVal	False, True
Ind06	SPS	Yes	Inverter on	GGIO1\$ST\$Ind06\$stVal	False, True
Ind08	SPS	Yes	Life check	GGIO1\$ST\$Ind08\$stVal	False, True
Ind09	SPS	Yes	User-defined signal 1 from rectifier “O”	GGIO1\$ST\$Ind09\$stVal	False, True
Ind10	SPS	Yes	User-defined signal 2 from rectifier “O”	GGIO1\$ST\$Ind10\$stVal	False, True
Ind11	SPS	Yes	User-defined signal 3 from rectifier “O”	GGIO1\$ST\$Ind11\$stVal	False, True
Ind12	SPS	Yes	User-defined signal 4 from rectifier “O”	GGIO1\$ST\$Ind12\$stVal	False, True
Ind13	SPS	Yes	User-defined signal 5 from rectifier “O”	GGIO1\$ST\$Ind13\$stVal	False, True

Ind14	SPS	Yes	User-defined signal 6 from rectifier “O”	GGIO1\$ST\$Ind14\$stVal	False, True
Ind15	SPS	Yes	User-defined signal 7 from rectifier “O”	GGIO1\$ST\$Ind15\$stVal	False, True
Ind16	SPS	Yes	User-defined signal 1 from inverter “O”	GGIO1\$ST\$Ind16\$stVal	False, True
Ind17	SPS	Yes	User-defined signal 2 from inverter “O”	GGIO1\$ST\$Ind17\$stVal	False, True
Ind18	SPS	Yes	User-defined signal 3 from inverter “O”	GGIO1\$ST\$Ind18\$stVal	False, True
Ind19	SPS	Yes	User-defined signal 4 from inverter “O”	GGIO1\$ST\$Ind19\$stVal	False, True
Ind20	SPS	Yes	User-defined signal 5 from inverter “O”	GGIO1\$ST\$Ind20\$stVal	False, True
Ind21	SPS	Yes	User-defined signal 6 from inverter “O”	GGIO1\$ST\$Ind21\$stVal	False, True
Ind22	SPS	Yes	User-defined signal 7 from inverter “O”	GGIO1\$ST\$Ind22\$stVal	False, True

**Note:** “O” = Option, “W” = Warning, “A” = Alarm.

DO name	CDC	Supported	Description	MMS tag	Range
AnIn01	MV	Yes	Rectifier mains frequency	GGIO1\$MX\$AnIn01\$mag\$i	0.0 – 99.9 Hz (Hz/10)
AnIn02	MV	Yes	Rectifier mains voltage L1	GGIO1\$MX\$AnIn02\$mag\$i	0 – 999 V
AnIn03	MV	Yes	Rectifier mains voltage L2	GGIO1\$MX\$AnIn03\$mag\$i	0 – 999 V
AnIn04	MV	Yes	Rectifier mains voltage L3	GGIO1\$MX\$AnIn04\$mag\$i	0 – 999 V
AnIn09	MV	Yes	Battery voltage	GGIO1\$MX\$AnIn09\$mag\$i	0 – 999 V
AnIn10	MV	Yes	Battery current	GGIO1\$MX\$AnIn10\$mag\$i	+/- 0.0 – 3000.0 A (A/10)
AnIn11	MV	Yes	Autonomy time	GGIO1\$MX\$AnIn11\$mag\$i	0.0 – 999.0 min (min/10)
AnIn12	MV	Yes	Battery capacity	GGIO1\$MX\$AnIn12\$mag\$i	0 – 100%
AnIn13	MV	Yes	Battery temperature “O”	GGIO1\$MX\$AnIn13\$mag\$i	+/- 0.0 – 99.9°C (°C/10)
AnIn14	MV	Yes	Output frequency	GGIO1\$MX\$AnIn14\$mag\$i	0.0 – 99.9 Hz (Hz/10)
AnIn15	MV	Yes	Output voltage L1	GGIO1\$MX\$AnIn15\$mag\$i	0 – 999 V
AnIn16	MV	Yes	Output load L1	GGIO1\$MX\$AnIn16\$mag\$i	0 – 100%
AnIn17	MV	Yes	Output current L1	GGIO1\$MX\$AnIn17\$mag\$i	0 – 9999 A
AnIn18	MV	Yes	Output power L1 °	GGIO1\$MX\$AnIn18\$mag\$i	0.0 – 1000.0 kW (kW/10)
AnIn19	MV	Yes	Output voltage L2 °	GGIO1\$MX\$AnIn19\$mag\$i	0 – 999 V
AnIn20	MV	Yes	Output load L2 °	GGIO1\$MX\$AnIn20\$mag\$i	0 – 100%
AnIn21	MV	Yes	Output current L2 °	GGIO1\$MX\$AnIn21\$mag\$i	0 – 9999 A
AnIn22	MV	Yes	Output power L2 °	GGIO1\$MX\$AnIn22\$mag\$i	0.0 – 1000.0 kW (kW/10)
AnIn23	MV	Yes	Output voltage L3 °	GGIO1\$MX\$AnIn23\$mag\$i	0 – 999 V
AnIn24	MV	Yes	Output load L3 °	GGIO1\$MX\$AnIn24\$mag\$i	0 – 100%
AnIn25	MV	Yes	Output current L3 °	GGIO1\$MX\$AnIn25\$mag\$i	0 – 9999 A
AnIn26	MV	Yes	Output power L3 °	GGIO1\$MX\$AnIn26\$mag\$i	0.0 – 1000.0 kW (kW/10)

**Note:** ° = These values are not relevant in 1-phase systems and set to 0

## Data records

### STATUS DATASET

DO name	CDC	MMS tag	Description	Range
IntIn1	INS	GGIO1\$ST\$IntIn1\$stVal	Converter status	1: Normal operation 3: Battery operation 6: Deactivation is imminent 7: Off

IntIn2	INS	GGIO1\$ST\$IntIn2\$stVal	Mode	0: OFF 1: Equalising charge 2: Charge 3: Trickle charge 4: GenSetOperation 6: Discharge 7: Battery test 16: No battery
Alm01	SPS	GGIO1\$ST\$Alm01\$stVal	W: Non-critical fault (collective warning)	True, False (True = Alarm ON)
Alm02	SPS	GGIO1\$ST\$Alm02\$stVal	W: DOU CAN fault	True, False (True = Alarm ON)
Alm03	SPS	GGIO1\$ST\$Alm03\$stVal	W: Mains fault	True, False (True = Alarm ON)
Alm04	SPS	GGIO1\$ST\$Alm04\$stVal	W: Rectifier warning	True, False (True = Alarm ON)
Alm05	SPS	GGIO1\$ST\$Alm05\$stVal	W: Inverter warning	True, False (True = Alarm ON)
Alm07	SPS	GGIO1\$ST\$Alm07\$stVal	W: Battery temp. sensor fault “O”	True, False (True = Alarm ON)
Alm08	SPS	GGIO1\$ST\$Alm08\$stVal	W: Battery temp. too high “O”	True, False (True = Alarm ON)
Alm09	SPS	GGIO1\$ST\$Alm09\$stVal	W: Circuit-breaker tripped “O”	True, False (True = Alarm ON)
Alm10	SPS	GGIO1\$ST\$Alm10\$stVal	W: Battery warning	True, False (True = Alarm ON)
Alm11	SPS	GGIO1\$ST\$Alm11\$stVal	W: Battery low (batt. undervoltage)	True, False (True = Alarm ON)
Alm12	SPS	GGIO1\$ST\$Alm12\$stVal	W: Inverter overload	True, False (True = Alarm ON)
Alm13	SPS	GGIO1\$ST\$Alm13\$stVal	W: Fan fault	True, False (True = Alarm ON)
Alm16	SPS	GGIO1\$ST\$Alm16\$stVal	A: Critical fault (collective alarm)	True, False (True = Alarm ON)
Alm17	SPS	GGIO1\$ST\$Alm17\$stVal	A: Emergency Switch off “O”	True, False (True = Alarm ON)
Alm18	SPS	GGIO1\$ST\$Alm18\$stVal	A: Rectifier fault	True, False (True = Alarm ON)
Alm19	SPS	GGIO1\$ST\$Alm19\$stVal	A: Battery fault	True, False (True = Alarm ON)
Alm20	SPS	GGIO1\$ST\$Alm20\$stVal	A: Inverter fault	True, False (True = Alarm ON)
Alm22	SPS	GGIO1\$ST\$Alm22\$stVal	A: Inverter overload	True, False (True = Alarm ON)
Alm23	SPS	GGIO1\$ST\$Alm23\$stVal	A: Inverter short-circuit	True, False (True = Alarm ON)
Alm24	SPS	GGIO1\$ST\$Alm24\$stVal	A: Inverter DC undervoltage	True, False (True = Alarm ON)
Alm25	SPS	GGIO1\$ST\$Alm25\$stVal	A: Inverter DC overvoltage	True, False (True = Alarm ON)
Alm26	SPS	GGIO1\$ST\$Alm26\$stVal	A: Inverter stack fault	True, False (True = Alarm ON)
Ind01	SPS	GGIO1\$ST\$Ind01\$stVal	Input1 active	False, True
Ind02	SPS	GGIO1\$ST\$Ind02\$stVal	Input2 active	False, True
Ind03	SPS	GGIO1\$ST\$Ind03\$stVal	Input3 active	False, True
Ind05	SPS	GGIO1\$ST\$Ind05\$stVal	Rectifier on	False, True
Ind06	SPS	GGIO1\$ST\$Ind06\$stVal	Inverter on	False, True
Ind08	SPS	GGIO1\$ST\$Ind08\$stVal	Life check	False, True

Note: “O” = Option, “W” = Warning, “A” = Alarm. The affected part is switched off

## MEASURES DATASET

DO name	CDC	MMS tag	Description	Range
AnIn01	MV	GGIO1\$MX\$AnIn01\$mag\$i	Rectifier mains frequency	0.0 – 99.9 Hz (Hz/10)
AnIn02	MV	GGIO1\$MX\$AnIn02\$mag\$i	Rectifier mains voltage L1	0 – 999 V
AnIn03	MV	GGIO1\$MX\$AnIn03\$mag\$i	Rectifier mains voltage L2	0 – 999 V
AnIn04	MV	GGIO1\$MX\$AnIn04\$mag\$i	Rectifier mains voltage L3	0 – 999 V
AnIn09	MV	GGIO1\$MX\$AnIn09\$mag\$i	Battery voltage	0 – 999 V
AnIn10	MV	GGIO1\$MX\$AnIn10\$mag\$i	Battery current	+/- 0.0 – 3000.0A (A/10)
AnIn11	MV	GGIO1\$MX\$AnIn11\$mag\$i	Autonomy time	0.0 – 999.0 min (min/10)
AnIn12	MV	GGIO1\$MX\$AnIn12\$mag\$i	Battery capacity	0 – 100%
AnIn13	MV	GGIO1\$MX\$AnIn13\$mag\$i	Battery temperature “O”	+/- 0.0 – 99.9°C (°C/10)
AnIn14	MV	GGIO1\$MX\$AnIn14\$mag\$i	Output frequency	0.0 – 99.9 Hz (Hz/10)
AnIn15	MV	GGIO1\$MX\$AnIn15\$mag\$i	Output voltage L1	0 – 999 V

AnIn16	MV	GGIO1\$MX\$AnIn16\$mag\$i	Output load L1	0 – 100%
AnIn17	MV	GGIO1\$MX\$AnIn17\$mag\$i	Output current L1	0 – 9999 A
AnIn18	MV	GGIO1\$MX\$AnIn18\$mag\$i	Output power L1	0.0 – 1000.0 kW (kW/10)
AnIn19	MV	GGIO1\$MX\$AnIn19\$mag\$i	Output voltage L2 °	0 – 999 V
AnIn20	MV	GGIO1\$MX\$AnIn20\$mag\$i	Output load L2 °	0 – 100%
AnIn21	MV	GGIO1\$MX\$AnIn21\$mag\$i	Output current L2 °	0 – 9999 A
AnIn22	MV	GGIO1\$MX\$AnIn22\$mag\$i	Output power L2 °	0.0 – 1000.0 kW (kW/10)
AnIn23	MV	GGIO1\$MX\$AnIn23\$mag\$i	Output voltage L3 °	0 – 999 V
AnIn24	MV	GGIO1\$MX\$AnIn24\$mag\$i	Output load L3 °	0 – 100%
AnIn25	MV	GGIO1\$MX\$AnIn25\$mag\$i	Output current L3 °	0 – 9999 A
AnIn26	MV	GGIO1\$MX\$AnIn26\$mag\$i	Output power L3 °	0.0 – 1000.0 kW (kW/10)

**Note:** ° = These values are not relevant in 1-phase systems and set to 0

## STATUS AuxSignals DATASET

DO name	CDC	MMS tag	Description	Range
Ind09	SPS	GGIO1\$ST\$Ind09\$stVal	User-defined signal 1 from rectifier “O”	False, True
Ind10	SPS	GGIO1\$ST\$Ind10\$stVal	User-defined signal 2 from rectifier “O”	False, True
Ind11	SPS	GGIO1\$ST\$Ind11\$stVal	User-defined signal 3 from rectifier “O”	False, True
Ind12	SPS	GGIO1\$ST\$Ind12\$stVal	User-defined signal 4 from rectifier “O”	False, True
Ind13	SPS	GGIO1\$ST\$Ind13\$stVal	User-defined signal 5 from rectifier “O”	False, True
Ind14	SPS	GGIO1\$ST\$Ind14\$stVal	User-defined signal 6 from rectifier “O”	False, True
Ind15	SPS	GGIO1\$ST\$Ind15\$stVal	User-defined signal 7 from rectifier “O”	False, True
Ind16	SPS	GGIO1\$ST\$Ind16\$stVal	User-defined signal 1 from inverter “O”	False, True
Ind17	SPS	GGIO1\$ST\$Ind17\$stVal	User-defined signal 2 from inverter “O”	False, True
Ind18	SPS	GGIO1\$ST\$Ind18\$stVal	User-defined signal 3 from inverter “O”	False, True
Ind19	SPS	GGIO1\$ST\$Ind19\$stVal	User-defined signal 4 from inverter “O”	False, True
Ind20	SPS	GGIO1\$ST\$Ind20\$stVal	User-defined signal 5 from inverter “O”	False, True
Ind21	SPS	GGIO1\$ST\$Ind21\$stVal	User-defined signal 6 from inverter “O”	False, True
Ind22	SPS	GGIO1\$ST\$Ind22\$stVal	User-defined signal 7 from inverter “O”	False, True

**Note:** “O” = Option.

## 6.2.4 Rectifier

### Logical Nodes

#### LN: GGIO1

DO name	CDC	Supported	Description	MMS tag	Range
IntIn1	INS	Yes	Rectifier status	GGIO1\$ST\$IntIn1\$stVal	0: Off 1: Normal operation 2: Remote off
IntIn2	INS	Yes	Mode	GGIO1\$ST\$IntIn2\$stVal	0: OFF 1: Equalising charge 2: Charge 3: Trickle charge 4: GenSetOperation 6: Discharge 7: Battery test 16: No battery
Alm01	SPS	Yes	W: Non-critical fault (collective warning)	GGIO1\$ST\$Alm01\$stVal	True, False (True = Alarm ON)
Alm02	SPS	Yes	W: DOU CAN fault	GGIO1\$ST\$Alm02\$stVal	True, False (True = Alarm ON)
Alm03	SPS	Yes	W: Mains fault	GGIO1\$ST\$Alm03\$stVal	True, False (True = Alarm ON)
Alm04	SPS	Yes	W: Rectifier warning	GGIO1\$ST\$Alm04\$stVal	True, False (True = Alarm ON)
Alm05	SPS	Yes	W: DC earth fault	GGIO1\$ST\$Alm05\$stVal	True, False (True = Alarm ON)
Alm08	SPS	Yes	W: Battery temp. too high “O”	GGIO1\$ST\$Alm08\$stVal	True, False (True = Alarm ON)
Alm10	SPS	Yes	W: Battery warning	GGIO1\$ST\$Alm10\$stVal	True, False (True = Alarm ON)
Alm13	SPS	Yes	W: Fan fault	GGIO1\$ST\$Alm13\$stVal	True, False (True = Alarm ON)
Alm16	SPS	Yes	A: Critical fault (collective alarm)	GGIO1\$ST\$Alm16\$stVal	True, False (True = Alarm ON)
Alm18	SPS	Yes	A: Rectifier fault	GGIO1\$ST\$Alm18\$stVal	True, False (True = Alarm ON)
Alm19	SPS	Yes	A: Battery fault	GGIO1\$ST\$Alm19\$stVal	True, False (True = Alarm ON)
Alm26	SPS	Yes	A: Power stack fault	GGIO1\$ST\$Alm26\$stVal	True, False (True = Alarm ON)
Ind01	SPS	Yes	Input1 active	GGIO1\$ST\$Ind01\$stVal	False, True
Ind02	SPS	Yes	Input2 active	GGIO1\$ST\$Ind02\$stVal	False, True
Ind03	SPS	Yes	Input3 active	GGIO1\$ST\$Ind03\$stVal	False, True
Ind08	SPS	Yes	Life check	GGIO1\$ST\$Ind08\$stVal	False, True

Ind09	SPS	Yes	User-defined signal 1 from rectifier “O”	GGIO1\$ST\$Ind09\$stVal	False, True
Ind10	SPS	Yes	User-defined signal 2 from rectifier “O”	GGIO1\$ST\$Ind10\$stVal	False, True
Ind11	SPS	Yes	User-defined signal 3 from rectifier “O”	GGIO1\$ST\$Ind11\$stVal	False, True
Ind12	SPS	Yes	User-defined signal 4 from rectifier “O”	GGIO1\$ST\$Ind12\$stVal	False, True
Ind13	SPS	Yes	User-defined signal 5 from rectifier “O”	GGIO1\$ST\$Ind13\$stVal	False, True
Ind14	SPS	Yes	User-defined signal 6 from rectifier “O”	GGIO1\$ST\$Ind14\$stVal	False, True
Ind15	SPS	Yes	User-defined signal 7 from rectifier “O”	GGIO1\$ST\$Ind15\$stVal	False, True

Note: “O” = Option, “W” = Warning, “A” = Alarm.

DO name	CDC	Supported	Description	MMS tag	Range
AnIn01	MV	Yes	Rectifier mains frequency	GGIO1\$MX\$AnIn01\$mag\$i	0.0 – 99.9 Hz (Hz/10)
AnIn02	MV	Yes	Rectifier mains voltage L1	GGIO1\$MX\$AnIn02\$mag\$i	0 – 999 V
AnIn03	MV	Yes	Rectifier mains voltage L2	GGIO1\$MX\$AnIn03\$mag\$i	0 – 999 V
AnIn04	MV	Yes	Rectifier mains voltage L3	GGIO1\$MX\$AnIn04\$mag\$i	0 – 999 V

AnIn06	MV	Yes	Rectifier mains current L1	GGIO1\$MX\$AnIn06\$mag\$i	0 – 9999 A
AnIn07	MV	Yes	Rectifier mains current L2	GGIO1\$MX\$AnIn07\$mag\$i	0 – 9999 A
AnIn08	MV	Yes	Rectifier mains current L3	GGIO1\$MX\$AnIn08\$mag\$i	0 – 9999 A
AnIn09	MV	Yes	Battery voltage	GGIO1\$MX\$AnIn09\$mag\$i	0 – 999 V
AnIn10	MV	Yes	Battery current	GGIO1\$MX\$AnIn10\$mag\$i	+/- 0.0 – 3000.0A (A/10)
AnIn12	MV	Yes	Battery capacity	GGIO1\$MX\$AnIn12\$mag\$i	0 – 100%
AnIn13	MV	Yes	Battery temperature “O”	GGIO1\$MX\$AnIn13\$mag\$i	+/- 0.0 – 99.9°C (°C/10)
AnIn14	MV	Yes	Rectifier voltage	GGIO1\$MX\$AnIn14\$mag\$i	0 – 999 V
AnIn15	MV	Yes	Rectifier current	GGIO1\$MX\$AnIn15\$mag\$i	0 – 9999 A
AnIn16	MV	Yes	Rectifier power	GGIO1\$MX\$AnIn16\$mag\$i	0.0 – 1000.0 kW (kW/10)

## Data records

### STATUS DATASET

DO name	CDC	MMS tag	Description	Range
IntIn1	INS	GGIO1\$ST\$IntIn1\$stVal	Rectifier status	0: Off 1: Normal operation 2: Remote off
IntIn2	INS	GGIO1\$ST\$IntIn2\$stVal	Mode	0: OFF 1: Equalising charge 2: Charge 3: Trickle charge 4: GenSetOperation 6: Discharge 7: Battery test 16: No battery
Alm01	SPS	GGIO1\$ST\$Alm01\$stVal	W: Non-critical fault (collective warning)	True, False (True = Alarm ON)
Alm02	SPS	GGIO1\$ST\$Alm02\$stVal	W: DOU CAN fault	True, False (True = Alarm ON)
Alm03	SPS	GGIO1\$ST\$Alm03\$stVal	W: Mains fault (rectifier or SBS mains)	True, False (True = Alarm ON)
Alm04	SPS	GGIO1\$ST\$Alm04\$stVal	W: Rectifier warning	True, False (True = Alarm ON)
Alm05	SPS	GGIO1\$ST\$Alm05\$stVal	W: DC earth fault	True, False (True = Alarm ON)
Alm08	SPS	GGIO1\$ST\$Alm08\$stVal	W: Battery temp. too high “O”	True, False (True = Alarm ON)
Alm10	SPS	GGIO1\$ST\$Alm10\$stVal	W: Battery warning	True, False (True = Alarm ON)
Alm13	SPS	GGIO1\$ST\$Alm13\$stVal	W: Fan fault	True, False (True = Alarm ON)
Alm16	SPS	GGIO1\$ST\$Alm16\$stVal	A: Critical fault (collective alarm)	True, False (True = Alarm ON)
Alm18	SPS	GGIO1\$ST\$Alm18\$stVal	A: Rectifier fault	True, False (True = Alarm ON)
Alm19	SPS	GGIO1\$ST\$Alm19\$stVal	A: Battery fault	True, False (True = Alarm ON)
Alm26	SPS	GGIO1\$ST\$Alm26\$stVal	A: Power stack fault	True, False (True = Alarm ON)
Ind01	SPS	GGIO1\$ST\$Ind01\$stVal	Input1 active	False, True
Ind02	SPS	GGIO1\$ST\$Ind02\$stVal	Input2 active	False, True
Ind03	SPS	GGIO1\$ST\$Ind03\$stVal	Input3 active	False, True
Ind08	SPS	GGIO1\$ST\$Ind08\$stVal	Life check	False, True

Note: “O” = Option, “W” = Warning, “A” = Alarm. The affected part is switched off

### MEASURES DATASET

DO name	CDC	MMS tag	Description	Range
AnIn01	MV	GGIO1\$MX\$AnIn01\$mag\$i	Rectifier mains frequency	0.0 – 99.9 Hz (Hz/10)
AnIn02	MV	GGIO1\$MX\$AnIn02\$mag\$i	Rectifier mains voltage L1	0 – 999 V
AnIn03	MV	GGIO1\$MX\$AnIn03\$mag\$i	Rectifier mains voltage L2	0 – 999 V
AnIn04	MV	GGIO1\$MX\$AnIn04\$mag\$i	Rectifier mains voltage L3	0 – 999 V

AnIn06	MV	GGIO1\$MX\$AnIn06\$mag\$i	Rectifier mains current L1	0 – 9999 A
AnIn07	MV	GGIO1\$MX\$AnIn07\$mag\$i	Rectifier mains current L2	0 – 9999 A
AnIn08	MV	GGIO1\$MX\$AnIn08\$mag\$i	Rectifier mains current L3	0 – 9999 A
AnIn09	MV	GGIO1\$MX\$AnIn09\$mag\$i	Battery voltage	0 – 999 V
AnIn10	MV	GGIO1\$MX\$AnIn10\$mag\$i	Battery current	+/- 0.0 – 3000.0A (A/10)
AnIn12	MV	GGIO1\$MX\$AnIn12\$mag\$i	Battery capacity	0 – 100%
AnIn13	MV	GGIO1\$MX\$AnIn13\$mag\$i	Battery temperature “O”	+/- 0.0 – 99.9°C (°C/10)
AnIn14	MV	GGIO1\$MX\$AnIn14\$mag\$i	Rectifier voltage	0 – 999 V
AnIn15	MV	GGIO1\$MX\$AnIn15\$mag\$i	Rectifier current	0 – 9999 A
AnIn16	MV	GGIO1\$MX\$AnIn16\$mag\$i	Rectifier power	0.0 – 1000.0 kW (kW/10)

## STATUS AuxSignals DATASET

DO name	CDC	MMS tag	Description	Range
Ind09	SPS	GGIO1\$ST\$Ind09\$stVal	User-defined signal 1 from rectifier “O”	False, True
Ind10	SPS	GGIO1\$ST\$Ind10\$stVal	User-defined signal 2 from rectifier “O”	False, True
Ind11	SPS	GGIO1\$ST\$Ind11\$stVal	User-defined signal 3 from rectifier “O”	False, True
Ind12	SPS	GGIO1\$ST\$Ind12\$stVal	User-defined signal 4 from rectifier “O”	False, True
Ind13	SPS	GGIO1\$ST\$Ind13\$stVal	User-defined signal 5 from rectifier “O”	False, True
Ind14	SPS	GGIO1\$ST\$Ind14\$stVal	User-defined signal 6 from rectifier “O”	False, True
Ind15	SPS	GGIO1\$ST\$Ind15\$stVal	User-defined signal 7 from rectifier “O”	False, True

**Note:** “O” = Option.

## 6.3 Interoperability

For more information on the IEC 61850 protocol and interoperability, please refer to Kalkitech’s IEC 61850 Server Interface User Manual.

## 7. DNP3 DEVICE PROFILES

### 7.1 General

The IEC 61850/DNP3 gateway can operate as a DNP3 server via TCP/IP. The DNP3 protocol uses TCP/IP as the basic transmission protocol. All other DNP3 protocol data is still valid. As such, the source address (server = this gateway) and the destination address (client) must be set correctly.

Default setting:

Source address (server): 4

Destination address (client): 1

## 7.2 Device-specific

### 7.2.1 UPS

#### Data Objects

Index	Description	DNP3 Group ID	Range
0	I: Input1 active	BINARY_INPUT	False, True
1	I: Input2 active	BINARY_INPUT	False, True
2	I: Input3 active	BINARY_INPUT	False, True
3	I: SBS ready	BINARY_INPUT	False, True
4	I: Rectifier on	BINARY_INPUT	False, True
5	I: Inverter on	BINARY_INPUT	False, True
6	I: SBS on	BINARY_INPUT	False, True
7	I: Life check	BINARY_INPUT	False, True
8	W: Non-critical fault	BINARY_INPUT	False, True (= Warning ON)
9	W: DOU CAN fault	BINARY_INPUT	False, True (= Warning ON)
10	W: Mains fault	BINARY_INPUT	False, True (= Warning ON)
11	W: Rectifier warning	BINARY_INPUT	False, True (= Warning ON)
12	W: Inverter warning	BINARY_INPUT	False, True (= Warning ON)
13	W: SBS warning	BINARY_INPUT	False, True (= Warning ON)
14	W: Battery temperature sensor fault	BINARY_INPUT	False, True (= Warning ON)
15	W: Battery temp. too high "O"	BINARY_INPUT	False, True (= Warning ON)
16	W: Circuit-breaker tripped "O"	BINARY_INPUT	False, True (= Warning ON)
17	W: Battery warning	BINARY_INPUT	False, True (= Warning ON)
18	W: Battery low (batt. undervoltage)	BINARY_INPUT	False, True (= Warning ON)
19	W: Inverter overload	BINARY_INPUT	False, True (= Warning ON)
20	W: Fan fault	BINARY_INPUT	False, True (= Warning ON)
21	W: SBS mains fault	BINARY_INPUT	False, True (= Warning ON)
22	W: SBS blocked	BINARY_INPUT	False, True (= Warning ON)
23	A: Critical fault (collective alarm)	BINARY_INPUT	False, True (= Alarm ON)
24	A: Emergency Switch off "O"	BINARY_INPUT	False, True (= Alarm ON)
25	A: Rectifier fault	BINARY_INPUT	False, True (= Alarm ON)
26	A: Battery fault	BINARY_INPUT	False, True (= Alarm ON)
27	A: Inverter fault	BINARY_INPUT	False, True (= Alarm ON)
28	A: SBS fault	BINARY_INPUT	False, True (= Alarm ON)
29	A: Inverter overload	BINARY_INPUT	False, True (= Alarm ON)
30	A: Inverter short-circuit	BINARY_INPUT	False, True (= Alarm ON)
31	A: Inverter DC undervoltage	BINARY_INPUT	False, True (= Alarm ON)
32	A: Inverter DC overvoltage	BINARY_INPUT	False, True (= Alarm ON)
33	A: Inverter stack fault	BINARY_INPUT	False, True (= Alarm ON)
34	User-defined signal 1 from rectifier "O"	BINARY_INPUT	False, True
35	User-defined signal 2 from rectifier "O"	BINARY_INPUT	False, True
36	User-defined signal 3 from rectifier "O"	BINARY_INPUT	False, True
37	User-defined signal 4 from rectifier "O"	BINARY_INPUT	False, True
38	User-defined signal 5 from rectifier "O"	BINARY_INPUT	False, True
39	User-defined signal 6 from rectifier "O"	BINARY_INPUT	False, True
40	User-defined signal 7 from rectifier "O"	BINARY_INPUT	False, True
41	User-defined signal 1 from inverter "O"	BINARY_INPUT	False, True
42	User-defined signal 2 from inverter "O"	BINARY_INPUT	False, True

43	User-defined signal 3 from inverter "O"	BINARY_INPUT	False, True
44	User-defined signal 4 from inverter "O"	BINARY_INPUT	False, True
45	User-defined signal 5 from inverter "O"	BINARY_INPUT	False, True
46	User-defined signal 6 from inverter "O"	BINARY_INPUT	False, True
47	User-defined signal 7 from inverter "O"	BINARY_INPUT	False, True
48	User-defined signal 1 from bypass "O"	BINARY_INPUT	False, True
49	User-defined signal 2 from bypass "O"	BINARY_INPUT	False, True
50	User-defined signal 3 from bypass "O"	BINARY_INPUT	False, True
51	User-defined signal 4 from bypass "O"	BINARY_INPUT	False, True
52	User-defined signal 5 from bypass "O"	BINARY_INPUT	False, True
53	User-defined signal 6 from bypass "O"	BINARY_INPUT	False, True
54	User-defined signal 7 from bypass "O"	BINARY_INPUT	False, True

**Note:** "O" = Option, "I" = Information, "W" = Warning, "A" = Alarm.

Index	Description	DNP3 Group ID	Range
0	UPS status	ANALOG_INPUT	1: Normal operation 2: Bypass operation 3: Battery operation 4: Ecomode "O" 6: Deactivation is imminent 7: Off
1	Mode	ANALOG_INPUT	0: OFF 1: Equalising charge 2: Charge 3: Trickle charge 4: GenSetOperation 6: Discharge 7: Battery test 16: No battery
2	Rectifier mains frequency	ANALOG_INPUT	0.0 – 99.9 Hz (Hz/10)
3	Rectifier mains voltage L1	ANALOG_INPUT	0 – 999 V
4	Rectifier mains voltage L2	ANALOG_INPUT	0 – 999 V
5	Rectifier mains voltage L3	ANALOG_INPUT	0 – 999 V
6	SBS mains frequency	ANALOG_INPUT	0.0 – 99.9 Hz (Hz/10)
7	SBS mains voltage L1	ANALOG_INPUT	0 – 999 V
8	SBS mains voltage L2 °	ANALOG_INPUT	0 – 999 V
9	SBS Mains Voltage L3 °	ANALOG_INPUT	0 – 999 V
10	Battery voltage	ANALOG_INPUT	0 – 999 V
11	Battery current	ANALOG_INPUT	+/- 0.0 – 3000.0A (A/10)
12	Autonomy time	ANALOG_INPUT	0.0 – 999.0 min (min/10)
13	Battery capacity	ANALOG_INPUT	0 – 100%
14	Battery temperature "O"	ANALOG_INPUT	+/- 0.0 – 99.9°C (°C/10)
15	Output frequency	ANALOG_INPUT	0.0 – 99.9 Hz (Hz/10)
16	Output voltage L1	ANALOG_INPUT	0 – 999 V
17	Output load L1	ANALOG_INPUT	0 – 100%
18	Output current L1	ANALOG_INPUT	0 – 9999 A
19	Output power L1	ANALOG_INPUT	0.0 – 1000.0 kW (kW/10)
20	Output voltage L2 °	ANALOG_INPUT	0 – 999 V
21	Output load L2 °	ANALOG_INPUT	0 – 100%

22	Output current L2 °	ANALOG_INPUT	0 – 9999 A
23	Output power L2 °	ANALOG_INPUT	0.0 – 1000.0 kW (kW/10)
24	Output voltage L3 °	ANALOG_INPUT	0 – 999 V
25	Output load L3 °	ANALOG_INPUT	0 – 100%
26	Output current L3 °	ANALOG_INPUT	0 – 9999 A
27	Output power L3 °	ANALOG_INPUT	0.0 – 1000.0 kW (kW/10)

**Note:** ° = These values are not relevant in 1-phase systems and set to 0

## 7.2.2 Inverter

### Data Objects

Index	Description	DNP3 Group ID	Range
0	I: Input1 active	BINARY_INPUT	False, True
1	I: Input2 active	BINARY_INPUT	False, True
2	I: Input3 active	BINARY_INPUT	False, True
3	I: SBS ready	BINARY_INPUT	False, True
4	I: Inverter on	BINARY_INPUT	False, True
5	I: SBS on	BINARY_INPUT	False, True
6	I: Life check	BINARY_INPUT	False, True
7	W: Non-critical fault	BINARY_INPUT	False, True (= Warning ON)
8	W: DOU CAN fault	BINARY_INPUT	False, True (= Warning ON)
9	W: Inverter warning	BINARY_INPUT	False, True (= Warning ON)
10	W: SBS warning	BINARY_INPUT	False, True (= Warning ON)
11	W: DC undervoltage	BINARY_INPUT	False, True (= Warning ON)
12	W: Inverter overload	BINARY_INPUT	False, True (= Warning ON)
13	W: Fan fault	BINARY_INPUT	False, True (= Warning ON)
14	W: SBS mains fault	BINARY_INPUT	False, True (= Warning ON)
15	W: SBS blocked	BINARY_INPUT	False, True (= Warning ON)
16	A: Critical fault (collective alarm)	BINARY_INPUT	False, True (= Alarm ON)
17	A: Emergency Switch off “O”	BINARY_INPUT	False, True (= Alarm ON)
18	A: Inverter fault	BINARY_INPUT	False, True (= Alarm ON)
19	A: SBS fault	BINARY_INPUT	False, True (= Alarm ON)
20	A: Inverter overload	BINARY_INPUT	False, True (= Alarm ON)
21	A: Inverter short-circuit	BINARY_INPUT	False, True (= Alarm ON)
22	A: Inverter DC undervoltage	BINARY_INPUT	False, True (= Alarm ON)
23	A: Inverter DC overvoltage	BINARY_INPUT	False, True (= Alarm ON)
24	A: Inverter stack fault	BINARY_INPUT	False, True (= Alarm ON)
25	User-defined signal 1 from rectifier “O”	BINARY_INPUT	False, True
26	User-defined signal 1 from inverter “O”	BINARY_INPUT	False, True
27	User-defined signal 2 from inverter “O”	BINARY_INPUT	False, True
28	User-defined signal 3 from inverter “O”	BINARY_INPUT	False, True
29	User-defined signal 4 from inverter “O”	BINARY_INPUT	False, True
30	User-defined signal 5 from inverter “O”	BINARY_INPUT	False, True
31	User-defined signal 6 from inverter “O”	BINARY_INPUT	False, True
32	User-defined signal 7 from inverter “O”	BINARY_INPUT	False, True
33	User-defined signal 1 from bypass “O”	BINARY_INPUT	False, True
34	User-defined signal 2 from bypass “O”	BINARY_INPUT	False, True
35	User-defined signal 3 from bypass “O”	BINARY_INPUT	False, True
36	User-defined signal 4 from bypass “O”	BINARY_INPUT	False, True
37	User-defined signal 5 from bypass “O”	BINARY_INPUT	False, True
38	User-defined signal 6 from bypass “O”	BINARY_INPUT	False, True
39	User-defined signal 7 from bypass “O”	BINARY_INPUT	False, True

**Note:** “O” = Option, “I” = Information, “W” = Warning, “A” = Alarm.

Index	Description	DNP3 Group ID	Range
0	Inverter status	ANALOG_INPUT	1: Normal operation 2: Bypass operation 4: Ecomode "O" 7: Off
1	SBS mains frequency	ANALOG_INPUT	0.0 – 99.9 Hz (Hz/10)
2	SBS mains voltage L1	ANALOG_INPUT	0 – 999 V
3	SBS mains voltage L2 °	ANALOG_INPUT	0 – 999 V
4	SBS Mains Voltage L3 °	ANALOG_INPUT	0 – 999 V
5	DC voltage	ANALOG_INPUT	0 – 999 V
6	Output frequency	ANALOG_INPUT	0.0 – 99.9 Hz (Hz/10)
7	Output voltage L1	ANALOG_INPUT	0 – 999 V
8	Output load L1	ANALOG_INPUT	0 – 100%
9	Output current L1	ANALOG_INPUT	0 – 9999 A
10	Output power L1	ANALOG_INPUT	0.0 – 1000.0 kW (kW/10)
11	Output voltage L2 °	ANALOG_INPUT	0 – 999 V
12	Output load L2 °	ANALOG_INPUT	0 – 100%
13	Output current L2 °	ANALOG_INPUT	0 – 9999 A
14	Output power L2 °	ANALOG_INPUT	0.0 – 1000.0 kW (kW/10)
15	Output voltage L3 °	ANALOG_INPUT	0 – 999 V
16	Output load L3 °	ANALOG_INPUT	0 – 100%
17	Output current L3 °	ANALOG_INPUT	0 – 9999 A
18	Output power L3 °	ANALOG_INPUT	0.0 – 1000.0 kW (kW/10)

**Note:** ° = These values are not relevant in 1-phase systems and set to 0

### 7.2.3 Converter

#### Data Objects

Index	Description	DNP3 Group ID	Range
0	I: Input1 active	BINARY_INPUT	False, True
1	I: Input2 active	BINARY_INPUT	False, True
2	I: Input3 active	BINARY_INPUT	False, True
3	I: Rectifier on	BINARY_INPUT	False, True
4	I: Inverter on	BINARY_INPUT	False, True
5	I: Life check	BINARY_INPUT	False, True
6	W: Non-critical fault	BINARY_INPUT	False, True (= Warning ON)
7	W: DOU CAN fault	BINARY_INPUT	False, True (= Warning ON)
8	W: Mains fault	BINARY_INPUT	False, True (= Warning ON)
9	W: Rectifier warning	BINARY_INPUT	False, True (= Warning ON)
10	W: Inverter warning	BINARY_INPUT	False, True (= Warning ON)
11	W: Battery temperature sensor fault	BINARY_INPUT	False, True (= Warning ON)
12	W: Battery temp. too high “O”	BINARY_INPUT	False, True (= Warning ON)
13	W: Circuit-breaker tripped “O”	BINARY_INPUT	False, True (= Warning ON)
14	W: Battery warning	BINARY_INPUT	False, True (= Warning ON)
15	W: Battery low (batt. undervoltage)	BINARY_INPUT	False, True (= Warning ON)
16	W: Inverter overload	BINARY_INPUT	False, True (= Warning ON)
17	W: Fan fault	BINARY_INPUT	False, True (= Warning ON)
18	A: Critical fault (collective alarm)	BINARY_INPUT	False, True (= Alarm ON)
19	A: Emergency Switch off “O”	BINARY_INPUT	False, True (= Alarm ON)
20	A: Rectifier fault	BINARY_INPUT	False, True (= Alarm ON)
21	A: Battery fault	BINARY_INPUT	False, True (= Alarm ON)
22	A: Inverter fault	BINARY_INPUT	False, True (= Alarm ON)
23	A: Inverter overload	BINARY_INPUT	False, True (= Alarm ON)
24	A: Inverter short-circuit	BINARY_INPUT	False, True (= Alarm ON)
25	A: Inverter DC undervoltage	BINARY_INPUT	False, True (= Alarm ON)
26	A: Inverter DC overvoltage	BINARY_INPUT	False, True (= Alarm ON)
27	A: Inverter stack fault	BINARY_INPUT	False, True (= Alarm ON)
28	User-defined signal 1 from rectifier “O”	BINARY_INPUT	False, True
29	User-defined signal 2 from rectifier “O”	BINARY_INPUT	False, True
30	User-defined signal 3 from rectifier “O”	BINARY_INPUT	False, True
31	User-defined signal 4 from rectifier “O”	BINARY_INPUT	False, True
32	User-defined signal 5 from rectifier “O”	BINARY_INPUT	False, True
33	User-defined signal 6 from rectifier “O”	BINARY_INPUT	False, True
34	User-defined signal 7 from rectifier “O”	BINARY_INPUT	False, True
35	User-defined signal 1 from inverter “O”	BINARY_INPUT	False, True
36	User-defined signal 2 from inverter “O”	BINARY_INPUT	False, True
37	User-defined signal 3 from inverter “O”	BINARY_INPUT	False, True
38	User-defined signal 4 from inverter “O”	BINARY_INPUT	False, True
39	User-defined signal 5 from inverter “O”	BINARY_INPUT	False, True
40	User-defined signal 6 from inverter “O”	BINARY_INPUT	False, True
41	User-defined signal 7 from inverter “O”	BINARY_INPUT	False, True

**Note:** “O” = Option, “I” = Information, “W” = Warning, “A” = Alarm.

Index	Description	DNP3 Group ID	Range
0	Converter status	ANALOG_INPUT	1: Normal operation 3: Battery operation 6: Deactivation is imminent 7: Off
1	Mode	ANALOG_INPUT	0: OFF 1: Equalising charge 2: Charge 3: Trickle charge 4: GenSetOperation 6: Discharge 7: Battery test 16: No battery
2	Rectifier mains frequency	ANALOG_INPUT	0.0 – 99.9 Hz (Hz/10)
3	Rectifier mains voltage L1	ANALOG_INPUT	0 – 999 V
4	Rectifier mains voltage L2	ANALOG_INPUT	0 – 999 V
5	Rectifier mains voltage L3	ANALOG_INPUT	0 – 999 V
6	Battery voltage	ANALOG_INPUT	0 – 999 V
7	Battery current	ANALOG_INPUT	+/- 0.0 – 3000.0 A (A/10)
8	Autonomy time	ANALOG_INPUT	0.0 – 999.0 min (min/10)
9	Battery capacity	ANALOG_INPUT	0 – 100%
10	Battery temperature “O”	ANALOG_INPUT	+/- 0.0 – 99.9°C (°C/10)
11	Output frequency	ANALOG_INPUT	0.0 – 99.9 Hz (Hz/10)
12	Output voltage L1	ANALOG_INPUT	0 – 999 V
13	Output load L1	ANALOG_INPUT	0 – 100%
14	Output current L1	ANALOG_INPUT	0 – 9999 A
15	Output power L1	ANALOG_INPUT	0.0 – 1000.0 kW (kW/10)
16	Output voltage L2 °	ANALOG_INPUT	0 – 999 V
17	Output load L2 °	ANALOG_INPUT	0 – 100%
18	Output current L2 °	ANALOG_INPUT	0 – 9999 A
19	Output power L2 °	ANALOG_INPUT	0.0 – 1000.0 kW (kW/10)
20	Output voltage L3 °	ANALOG_INPUT	0 – 999 V
21	Output load L3 °	ANALOG_INPUT	0 – 100%
22	Output current L3 °	ANALOG_INPUT	0 – 9999 A
23	Output power L3 °	ANALOG_INPUT	0.0 – 1000.0 kW (kW/10)

**Note:** ° = These values are not relevant in 1-phase systems and set to 0

### 7.2.4 Rectifier

#### Data Objects

Index	Description	DNP3 Group ID	Range
0	I: Input1 active	BINARY_INPUT	False, True
1	I: Input2 active	BINARY_INPUT	False, True
2	I: Input3 active	BINARY_INPUT	False, True
3	I: Life check	BINARY_INPUT	False, True
4	W: Non-critical fault	BINARY_INPUT	False, True (= Warning ON)
5	W: DOU CAN fault	BINARY_INPUT	False, True (= Warning ON)
6	W: Mains fault	BINARY_INPUT	False, True (= Warning ON)
7	W: Rectifier warning	BINARY_INPUT	False, True (= Warning ON)
8	W: Inverter warning	BINARY_INPUT	False, True (= Warning ON)
9	W: Battery temp. too high “O”	BINARY_INPUT	False, True (= Warning ON)
10	W: Battery warning	BINARY_INPUT	False, True (= Warning ON)
11	W: Fan fault	BINARY_INPUT	False, True (= Warning ON)
12	A: Critical fault (collective alarm)	BINARY_INPUT	False, True (= Alarm ON)
13	A: Rectifier fault	BINARY_INPUT	False, True (= Alarm ON)
14	A: Battery fault	BINARY_INPUT	False, True (= Alarm ON)
15	A: Power stack fault	BINARY_INPUT	False, True (= Alarm ON)
16	User-defined signal 1 from rectifier “O”	BINARY_INPUT	False, True
17	User-defined signal 2 from rectifier “O”	BINARY_INPUT	False, True
18	User-defined signal 3 from rectifier “O”	BINARY_INPUT	False, True
19	User-defined signal 4 from rectifier “O”	BINARY_INPUT	False, True
20	User-defined signal 5 from rectifier “O”	BINARY_INPUT	False, True
21	User-defined signal 6 from rectifier “O”	BINARY_INPUT	False, True
22	User-defined signal 7 from rectifier “O”	BINARY_INPUT	False, True

**Note:** “O” = Option, “I” = Information, “W” = Warning, “A” = Alarm.

Index	Description	DNP3 Group ID	Range
0	Rectifier status	ANALOG_INPUT	0: Off 1: Normal operation 2: Remote off
1	Mode	ANALOG_INPUT	0: OFF 1: Equalising charge 2: Charge 3: Trickle charge 4: GenSetOperation 6: Discharge 7: Battery test 16: No battery
2	Rectifier mains frequency	ANALOG_INPUT	0.0 – 99.9 Hz (Hz/10)
3	Rectifier mains voltage L1	ANALOG_INPUT	0 – 999 V
4	Rectifier mains voltage L2	ANALOG_INPUT	0 – 999 V
5	Rectifier mains voltage L3	ANALOG_INPUT	0 – 999 V
6	Rectifier mains current L1	ANALOG_INPUT	0 – 9999 A
7	Rectifier mains current L2	ANALOG_INPUT	0 – 9999 A
8	Rectifier mains current L3	ANALOG_INPUT	0 – 9999 A
9	Battery voltage	ANALOG_INPUT	0 – 999 V
10	Battery current	ANALOG_INPUT	+/- 0.0 – 3000.0A (A/10)

11	Battery capacity	ANALOG_INPUT	0 – 100%
12	Battery temperature “O”	ANALOG_INPUT	+/- 0.0 – 99.9°C (°C/10)
13	Rectifier voltage	ANALOG_INPUT	0 – 999 V
14	Rectifier current	ANALOG_INPUT	0 – 9999 A
15	Rectifier power	ANALOG_INPUT	0.0 – 1000.0 kW (kW/10)