be energy SG

Smart Grid Interface Module: Increased reliability for smart energy supply

Smart Grid Ready
SGIM
Smart Grid Interface Module

VHP READY
Virtual Heat & Power

Enhanced grid stability

The requirements for energy distribution in terms of usage, functionality and structures are ever changing. Power grids are subject to the severe deviations in energy flow caused by renewable sources. In the future, grids will also be challenged by electric vehicles drawing power at charging stations.



Transparent energy flows are a prerequisite for the stability of smart grids. Accordingly, actual grid states must be combined in a smart manner in order to match supply and demand. This is essential in order to balance the strongly fluctuating energy flows caused by volatile power sources on the one hand and consumption peaks caused by the steadily increasing number of electric vehicles drawing power for recharging on the other hand.

To allow grid operators to ensure the reliability of the distribution grid and to make costeffi-cient adjustments to the infrastructure, it is necessary to continuously measure and monitor the dynamic loads in the distribution grids. With the BeEnergy SG Smart Grid Interface Module, metering points can be implemented at strategic points in distribution grids, easily and at low costs.



Compact and modular

In the future, grid operators, industrial enterprises and facility management units will depend on the continuous availability of measurement values and data regarding the loads on their distribution grids to ensure reliable operation. This data must be provided in nearly real-time so that control measures can be taken, especially at hot-spots such as local grid stations.

Meeting this challenge calls for tested and proven solutions: Simple assembly into existing systems without interruption of power, flexibility in terms of the number of measuring points as well as a hardware that can be handled without extensive prior training. With the Smart Grid Interface Module (SGIM), BeEnergy SG has developed a modular system for the collection of electric and other physical parameters in distribution cabinets and wiring distributors.

Flexible and extendable

Further to power adapter and CPU, other functions can be configured as options. Up to 7 measuring modules for 3-phase monitoring and for up to 14 low-voltage connections can be fitted to the snap-in module body. In addition, three plug-in slots are provided for universal modules such as GSM or OFC interfaces or I/O-modules with floating contacts.

Compact and accurate

Rogowski coils have significant benefits when space for current measuring is limited. The compact dimensions and simple attachment by means of tie-wraps to the power lines or busbars dramatically reduce time and effort when retrofitting. Since Rogowski coils show no saturation effects, a wide primary current range can be measured without compromising accuracy. The coils comply with accuracy class 1 according to EN 61869, thereby eliminating the need for coil and measuring module calibration.

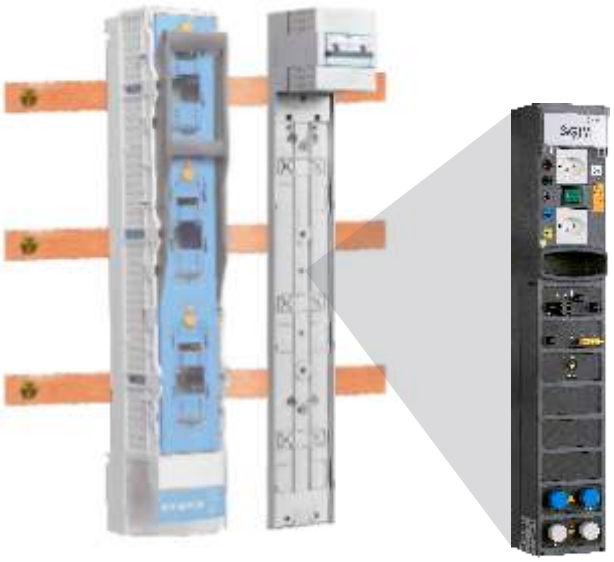
Smart assembly

For upgrading existing systems, the Smart Grid Interface Module clearly outrivals conventional systems due to its easy assembly and installation.

The SGIM can be mounted to live busbars without any risk of accidental contact. Simply attach the installation base to the busbars. No need to power down the system.

Simple installation

Thanks to its installation base, the Smart Grid Interface Module can be easily retrofitted into existing distribution cabinets or new systems to ensure that the equipment is fit for future demands. The module body containing the modular measuring electronics can easily be snapped into the installation base and also be removed with little effort.



Installation done the smart way

With a width of only 100 mm, the Smart Grid Interface Module has the same installation width and dimensions as an NH vertical fuse-switch of size 1 to 3.

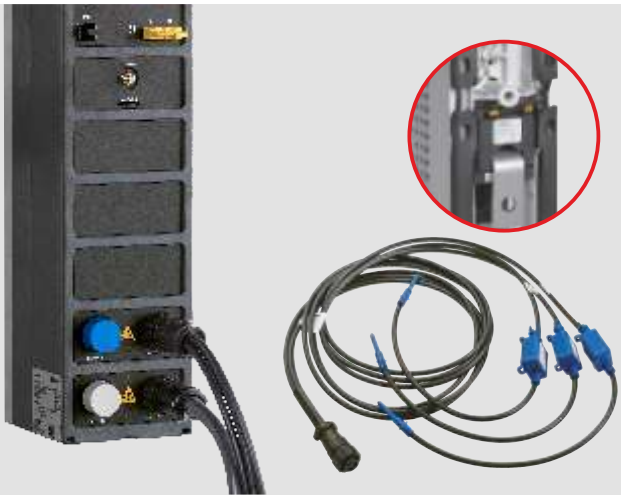
It is installed to live 185-mm busbar systems without prior powering-down. The module can also be installed in distribution systems without busbars. The voltages required for measuring are easily connected to the module body using a plug-type connector.

Integration done the easy way

Thanks to its compact dimensions and width of only 100 mm, the Smart Grid Interface Module can be retrofitted into blank slots in wiring distribution cabinets with little effort and at low costs. Measurements are made by Rogowski coil sensors connected to the measuring module by plug-type connectors. Existing current transformers fitted in NH fuse-switches can be connected to the measuring module as well.

Connection done the simple way

To facilitate measuring, Rogowski coils can be quickly retrofitted into existing systems without interrupting running processes. All you need to do is to loop the flexible sensor ring around the conductor to be measured. It is not necessary to open the conductor and interrupt the power flow. Just plug the wiring kit for three-phase measuring into the Rogowski measuring module and you are all set!



Measuring done the easy way

Rogowski coils consist of a flexible sensor ring that is simply looped around the conductor to be measured and that is then closed by a twist lock. This measuring method is well suited for currents between 10 and 1,000 Amps. To make installation really easy, the SGIM's Rogowski sensors for the measuring of three-phase power connections are preassembled and ready to connect.

Smart Energy Management

Effective communication

GSM communication
The GSM module facilitates bi-directional data transmission via the cellular network. The network can also be used for configuring the Smart Grid Interface Module.

Fiber optic module
A fiber optic module is available to connect the device to the internet via a fiber optic connection. The fiber optic module of the Smart Grid Interface Module supports the E2000 standard (Diamond).

Grid Analysis Integrated
The Smart Grid Interface Module includes a three-phase voltage tap for mobile grid analysts. Measurements are done via fully insulated connection sockets protected by residual current devices.

Data visualization

Once installed, the Smart Grid Interface Module is enabled at the data server. The measuring module then provides data according to IEC 60870-5-104 and IEC 61850 for existing management systems. The data is then immediately accessible using a PC or mobile device via the user interface in the SCADA function of the web portal. Measurement data and their representation can be configured here as well. Warnings and alerts can be sent via SMS or email when thresholds are reached or exceeded.

The innovative and secure IoT connection also permits write-access. This data exchange can be used for example to trigger switching operations in transformer stations or perform analog control procedures.

System features

- 3-phase monitoring of up to 14 low-voltage connections
  - Voltage, current, grid frequency, phase angle
  - Active, reactive and apparent power, current metering
- Monitoring of switchgear cabinet temperature and humidity
- Internet connection via LAN, OFC, UMTS
- Availability of measurement data on portal server
- DIN-compliant mounting to 185 mm busbar system of a distribution enclosure or to a mounting panel
- Industrial standard solution for comprehensive roll-out
- Installation in live systems and plug-&-play commissioning
- Modular design for maximum flexibility
  - Installation slots for measuring sensors
  - Installation slots for universal IOs
- Investment protection thanks to upgradable features

Metering of voltage, current and performance values

Data logs acc. to IEC 60870-5-104

Integrated current transformer connection

Configuration and data evaluation via web tool

Integrated mobile communications gateway for uncomplicated data transfer

Customer-specific alerts via SMS or email

Electric specification

Power supply

Input:	1x 230V (L1) (100..240V) 50Hz, CAT IV
Power consumption:	<25VA

Measurement

Voltage

Method	L_x – N
Resolution	0.1 V
Value types	average, minimum, maximum
Sensor range	max 300V
Min. averaging time	60 s
Accuracy	class 0,5

Current Rogowski

with SGIM-Rogowski sensor set

Resolution	0.1 A
Sensor range	to 15kA
Value types	average, minimum, maximum
Min. averaging time	60 s
Accuracy	class 0.5 + RC accuray class 1.0 with SGIM Rogowski set

Current Transformer

Resolution	depending on CT (0,1mA x D)
Secondary rated current	1A
Sensor range	1,2 x $CT_{Current}$
Value types	average, minimum, maximum
Min. averaging time	60 s
Accuracy	class 0.5 + CT accuracy

Grid frequency

Resolution	0.01 Hz
Value types	average, minimum, maximum
Min. averaging time	60 s

Power

Active, reactive, apparent power

Value types	average, minimum, maximum
Min. averaging time	60 s active power 900 s (reactive-, apparent power)

Energy (electric work)

reactive, active and apparent power	consumption and supply
Value types	average, minimum, maximum
Min. averaging time	900 s

Power quality

THD voltage, THD current

Value types	average, minimum, maximum
Min. averaging time	900 s

Additional specifications

Power supply for external devices

Voltage	+12V or +24V
Max. power	5 W

Sensor for temperature and humidity

IO Module [1]

2 x relay contact

Contact voltage	250VAC CAT II
Max. contact current	3A

8 x NPN digital input (sourcing input)

UH_{max}	+12V
UH_{min}	+5V9
UL_{max}	+3V9
I_{max}	5 mA

[1] only if optional modules are installed

Norms and standards

SGIM conformity to EU regulations

- EMC Regulation 2014/30/EU
- Low Voltage Regulation 2014/35/EU
- Radio Equipment Directive (RED) 2014/53/EU
- Restriction of Hazardous Substances (RoHS 2) Directive 2011/65/EU

Measurement and monitoring according to EN 61557-12

- active power (P) and active energy (E)
- reactive power (S) and reactive energy (E)
- apparent power (Q) and apparent energy (E)
- grid frequency (f)
- effective value (RMS) of line current (I) and neutral line current (measured and calculated)
- effective value (RMS) of voltage (U)

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MADE IN GERMANY

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