

- ▶ Power factor measurement (PF) in 1- or 3-phase mains
- ▶ Recognition of inductive / capacitive consumers resp. generators
- ▶ Detection of additional measurement parameters (P, S, Q, $U_{\lambda, \text{eff}}$, I_{eff})
- ▶ 2 Measurement ranges 1.2kW and 4.8kW
- ▶ Suitable for VFI (10-100Hz)
- ▶ Range adjustment by Central Unit
- ▶ Reinforced insulation of the measuring circuit
- ▶ Measured value transmitting via standard bus
- ▶ Modular monitoring system
- ▶ Width 22.5mm
- ▶ Industrial design



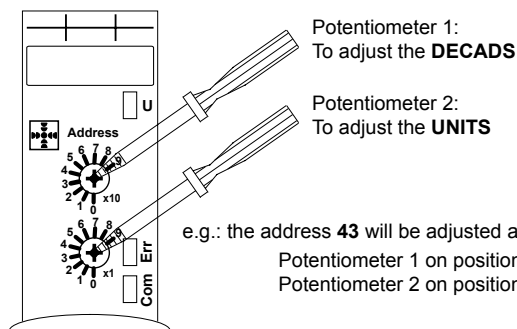
Technical data

1. Functions

WatchDog pro Modul for power factor measurement (PF) in 1- or symmetric 3-phase mains, recognition of inductive or capacitive consumers respectively generators and detection of additional measurement parameters (P, S, Q, $U_{\lambda, \text{eff}}$, I_{eff}).

2. Address adjustment

Address range: 1-99
Deactivation (Off): address 0



3. Indicators

Green LED U ON: module is supplied via local interface
Yellow LED Com ON / flashes: data exchange over standard bus is in progress
Red LED Err ON: indication of failure

4. Mechanical design

Self-extinguishing plastic housing, IP rating IP20
Mounted on DIN-rail TS 35 according to EN 60715
Mounting position: any
Shockproof terminal connection according to VBG 4 (PZ1 required), IP rating IP20
Tightening torque: max. 1Nm
Terminal capacity:
1 x 0.5 to 2.5mm² with/without multicore cable end
1 x 4mm² without multicore cable end
2 x 0.5 to 1.5mm² with/without multicore cable end
2 x 2.5mm² flexible without multicore cable end

5. Supply

Rated voltage: 24V DC from local interface
Tolerance: -17.5% to +16.5%
Rated consumption: 1.2W
Rated current: 48mA
Max. supply current: 50mA
Ripple and noise: < 150mV_{PP}
Duty cycle: 100%
Start-up time: 2.2s typ.
Drop-out voltage: > 60% of supply voltage

6. Businterface

Standard bus:
Data link: RS485; yellow LED Com ON
Interface parameter: 115.2kBd, 9 bits data

Number of extension modules:
Local interface: 24* (width 22.5mm)

* dependent on the max. permissible current through local interface of the Central Unit (CU); (additional extension is possible by the remote bus!)

7. Isolation

Fusing: max. 20A
Overvoltage category: III (in accordance with IEC 60664-1)
Rated surge voltage: 6kV between voltage measuring circuit and local interface
6kV between current measuring circuit and local interface

8. Measuring circuit

Measured values: PF, P, S, Q, $U_{\lambda, \text{eff}}$, I_{eff}
The $\cos \varphi$ has the same value like the PF using sinusoidal quantities!
Measuring range P_N : 1.2 and 4.8kW selectable
Wave form:
AC Sinus: 10 to 400Hz
Sinus weighted PWM: 10 to 100Hz
Measuring input voltage (U_{Meas}): terminals L1-L2-L3
1-phase mains: 0 ... 230V AC
3-phase mains: 0 ... 415/240V AC
Overload capacity:
1-phase mains: 0 ... 300V AC
3-phase mains: 0 ... 500/289V AC
Input resistance: 2M Ω
Measuring input current: Klemmen i-k
Measuring range 1.2kW: 0 ... 6A
Measuring range 4.8kW: 0 ... 12A
Overload capacity: 12A permanent
The distance between the devices must be greater than 5mm if $I > 8A!$
Input resistance: < 10m Ω

9. Accuracy

Base accuracy PF: $\pm 2\%$
Base accuracy P, S: $\pm 2\%$ of upper range value
Base accuracy $U_{\lambda, \text{eff}}$, I_{eff} : $\pm 2\%$ of upper range value
Frequency response: $\pm 0.025\%$ / Hz
Repetition accuracy: $\pm 2\%$
Voltage influence: -
Temperature influence: $\leq 0.1\%$ / °C

10. Ambient temperature

Ambient temperature: -25 to +55°C (in accordance with IEC 60068-1)
-25 to +40°C (in accordance with UL 508)
Storage temperature: -25 to +70°C
Transport temperature: -25 to +70°C
Relative humidity: 15% to 85%
(in accordance with IEC 60721-3-3 class 3K3)
1g to 25g H₂O/m³
(in accordance with IEC 60721-3-3 class 3K3)
Pollution degree: 2 (in accordance with IEC 60664-1)
Vibration resistance: 10 to 55Hz 0.35mm
(in accordance with IEC 60068-2-6)
Shock resistance: 15g 11ms (in accordance with IEC 60068-2-27)

Operator accessibility of clamps and connectors

The table shows which terminals and connectors can be touched by the operator during normal operation.

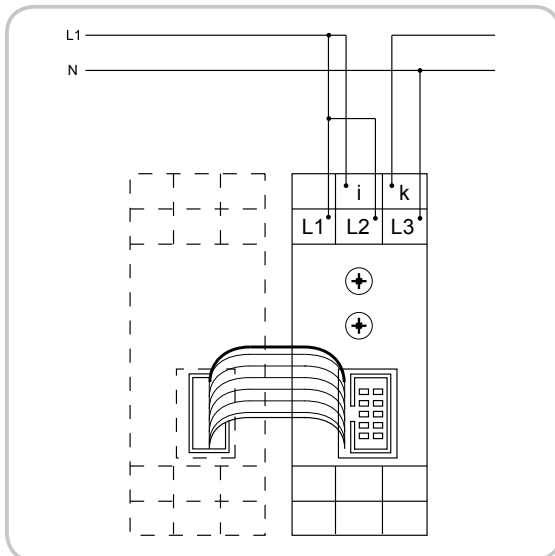
Nr.	Type	Terminal	Touchable
1	AI	Communication interface for local input-/output-extension device	YES
2	Ar	Communication interface for remote input-/output unit	YES
3	Be	Open communication interface, open to external devices as well	YES
4	Bi	Internal communication interface for peripheral modules	NO
5	C	Interface for digital and analog input signals	NO
6	D	Interface for digital and analog output signals	NO
7	E	Serial or parallel communication interface for data communication with external devices	YES
8	F	Terminal for line power supply	NO
9	H	Functional Earth terminal	YES
10	J	Input-/output interface for power supply of sensors and actuators	NO
11	K	Interface for auxiliary supply output and auxiliary supply input	NO

Power factor measurement in 1- or 3-phase mains : G2C11 400V12A - Definition of circuits:

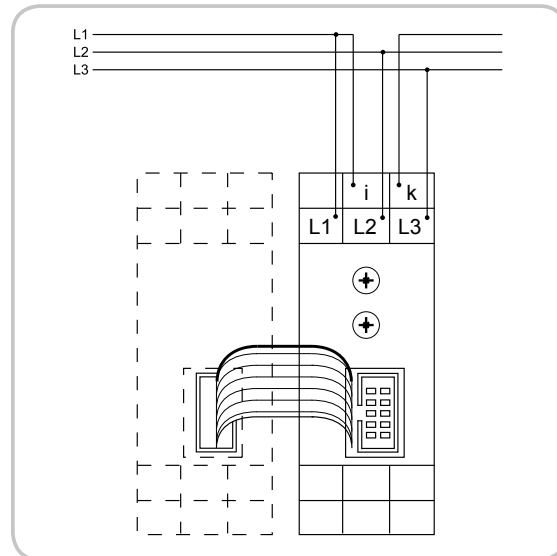
Name	Type	Nr.	Terminals related to the Circuit
Voltage inputs	C	5	L1, L2, L3
Current inputs	C	5	i, k
Local interface	AI	1	L1 Box header; L1 plug connector with ribbon cable

Connections

G2C11 400V12A in 1-phase mains



G2C11 400V12A in 3-phase mains without current transformer



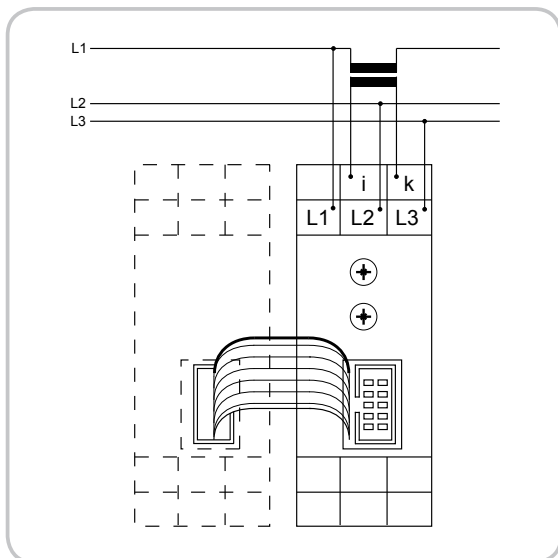
Note:

In this case, the actual voltage U is calculated as follows:

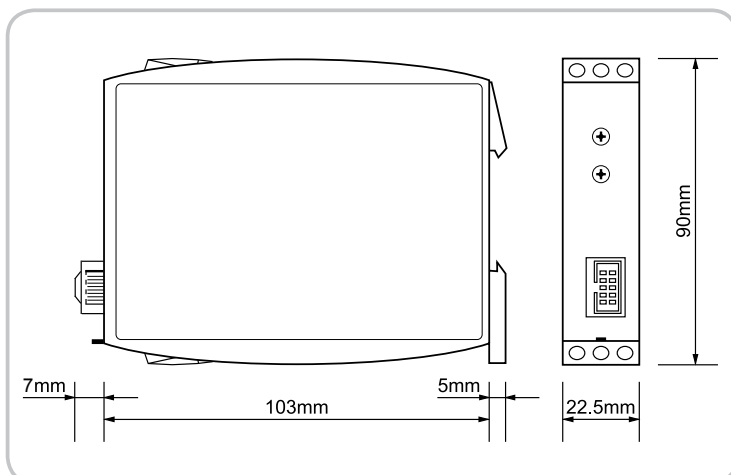
$$U = U_{Meas} \times 3$$

Connections

G2CI1 400V12A in 3-phase mains with current transformer



Dimensions



Ordering information

Type	Address range	LEDs	Part Nr. (PQ 1)
G2CI1 400V12A	1 to 99	U, Err, Com	2500450