Power factor monitoring (cosφ) in 1- or 3-phase mains

G2CM400V10AL20

Loadmonitors - GAMMA series

Multifunction

Fault latch

Recognition of disconnected consumers

Suitable for VFI (10 to 100Hz)

Supply voltage selectable via power modules

2 change-over contacts

Width 22.5mm

Industrial design



Technical data

1. Functions
Load monitoring (cosφ) in 1- or 3-phase mains with adjustable thresholds, timing for start-up supression and tripping delay separately adjustable and the following functions which are selected by means of rotary switch:

OVER	Overload monitoring
OVER+LATCH	Overload monitoring with fault latch
UNDER	Underload monitoring
UNDER+LATCH	Underload monitoring with fault latch
WIN	Monitoring the window between Min and Max
WIN+LATCH	Monitoring the window between Min and Max with fault latch

2. Time ranges

	Adjustment range	
Start-up suppression time:	1s	100s
Tripping delay:	0.1s	40s

3. Indicators

Green LED ON:	indication of supply voltage
Green LED flashes:	indication of start-up supression time
Yellow LED R ON/OFF:	indication of relay output
Yellow LED I=0 ON/OFF:	indication of disconnected consumers
Red LED ON/OFF:	indication of failure of the corresponding threshold
Red LED flashes:	indication of tripping delay of the corresponding threshold

4. Mechanical design
Self-extinguishing plastic housing, IP rating IP40
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. Input circuit

Supply voltage:	
12 to 400V a.c.	terminals A1-A2 (galvanically separated) selectable via power modules TR2
Tolerance:	according to specification of power module
Rated frequency:	according to specification of power module
Rated consumption:	2VA (1.5W)
Duration of operation:	100%
Reset time:	500ms
Residual ripple for d.c.:	-
Drop-out voltage:	>30% of the supply voltage
Overvoltage category:	III (in accordance with IEC 60664-1)
Rated surge voltage:	4kV

6. Output circuit
2 potential free change-over contacts

Rated voltage:	250V a.c.
Switching capacity:	750VA (3A / 250V a.c.)
If the distance between the devices is less than 5mm.	
Switching capacity:	1250VA (5A / 250V a.c.)
If the distance between the devices is greater than 5mm.	
Fusing:	5A fast acting
Mechanical life:	20 x 10^6 operations
Electrical life:	2 x 10^5 operations at 1000VA resistive load
Switching frequency:	max. 60/min at 100VA resistive load max. 6/min at 1000VA resistive load (in accordance with IEC 60947-5-1)
Overvoltage category:	III (in accordance with IEC 60664-1)
Rated surge voltage:	4kV

7. Measuring circuit

Measured variable:	a.c. Sinus (10 to 400Hz)
Measuring input voltage:	
1-phase mains	40 to 415V a.c. (300V against ground) terminals L1i-L2/L3
3-phase mains	3~ 40/23V to 415/240V, terminals L1i-L2-L3
Overload capacity:	
1-phase mains	500V
3-phase mains	3~ 500/289V
Input resistance:	≥1MΩ
Measuring input current:	0.5 to 10A, terminals L1i-L1k (I>8A distance >5mm)
Overload capacity:	11A permanently
Input resistance:	5mΩ
Switching threshold cosφ	
Max:	0.2 to 1.0
Min:	0.1 to 0.99
Overvoltage category:	III (in accordance with IEC 60664-1)
Rated surge voltage:	4kV

9. Accuracy

Base accuracy:	±5° (equivalent to 5% at cosφ =0.8)
Frequency response:	-
Adjustment accuracy:	≤5% (at cosφ =0.8)
Repetition accuracy:	±1.8° (equivalent to 1.8% at cosφ =0.8)
Voltage influence:	-
Temperature influence:	≤0.1% / °C

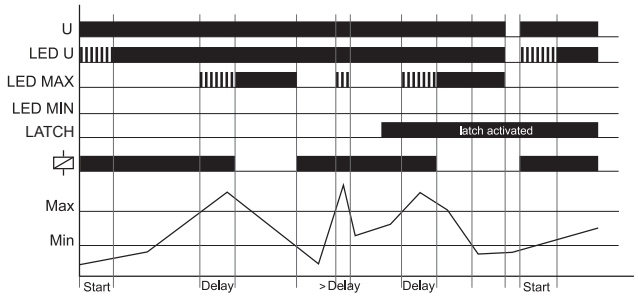
9. Ambient conditions

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)
Pollution degree:	3 (in accordance with IEC 60664-1)
Vibration resistance:	10 bis 55Hz 0.35mm (in accordance with IEC 60068-2-6)
Shock resistance:	15g 11ms (in accordance with IEC 60068-2-27)

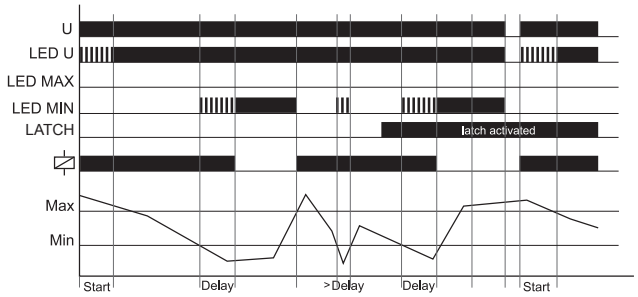
Functions

When the supply voltage U is applied, the output relays switch into on-position (yellow LED R and LED I=0 illuminated) and the set interval of the start-up suppression (START) begins (green LED U flashes). Changes of the measured power factor (cosφ) during this period do not affect the state of the output relay. After the interval has expired the green LED is illuminated steadily. For all the functions the LEDs MIN and MAX are flashing alternating, when the minimum value for the measured power factor was chosen to be greater than the maximum value.

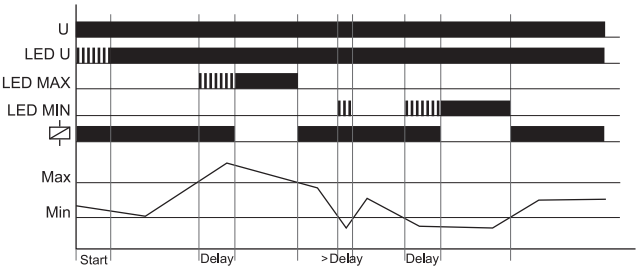
Overload monitoring (OVER, OVER+LATCH)
When the measured power factor exceeds the value adjusted at the MAX-regulator, the set interval of the tripping delay (DELAY) begins (red LED MAX flashes). After the interval has expired (red LED MAX illuminated), the output relays switch into off-position (yellow LED R not illuminated). The output relays again switch into on-position (yellow LED R illuminated), when the measured power factor falls below the value adjusted at the MIN-regulator (red LED MAX not illuminated). If the fault latch is activated (OVER+LATCH) and the measured power factor remains above the MAX-value longer than the set interval of the tripping delay, the output relays remain in the off-position even if the measured power factor falls below the value adjusted at the MIN-regulator. After resetting the failure (interrupting and re-applying the supply voltage), the output relays switch into on-position and a new measuring cycle begins with the set interval of the start-up suppression (START).



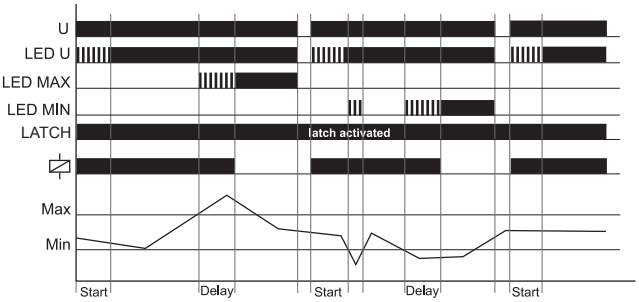
Underload monitoring (UNDER, UNDER+LATCH)
When the measured power factor falls below the value adjusted at the MIN-regulator, the set interval of the tripping delay (DELAY) begins (red LED MIN flashes). After the interval has expired (red LED MIN illuminated), the output relays switch into off-position (yellow LED R not illuminated). The output relays again switch into on-position (yellow LED R illuminated), when the measured power factor exceeds the value adjusted at the MAX-regulator. If the fault latch is activated (UNDER+LATCH) and the measured power factor remains below the MIN-value longer than the set interval of the tripping delay, the output relays remain in the off-position even if the measured power factor exceeds the value adjusted at the MAX-regulator. After resetting the failure (interrupting and re-applying the supply voltage), the output relays switch into on-position and a new measuring cycle begins with the set interval of the start-up suppression (START).



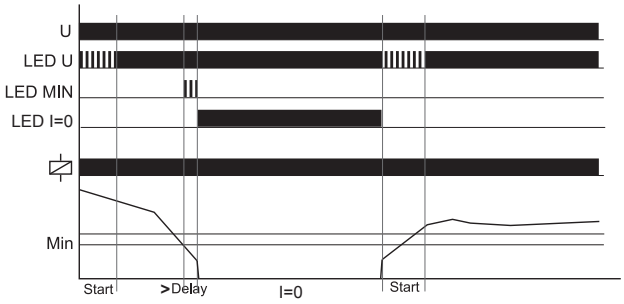
Window function (WIN, WIN+LATCH)
The output relays switch into on-position (yellow LED R illuminated) when the measured power factor exceeds the value adjusted at the MIN-regulator. When the measured power factor exceeds the value adjusted at the MAX-regulator, the set interval of the tripping delay (DELAY) begins (red LED MAX flashes). After the interval has expired (red LED MAX illuminated), the output relays switch into off-position (yellow LED R not illuminated). The output relays again switch into on-position (yellow LED R illuminated) when the measured power factor falls below the value adjusted at the MAX-regulator (red LED MAX not illuminated). When the measured power factor falls below the value adjusted at the MIN-regulator, the set interval of the tripping delay (DELAY) begins again (red LED MIN flashes). After the interval has expired (red LED MIN illuminated), the output relays switch into off-position (yellow LED R not illuminated).



If the fault latch is activated (WIN+LATCH) and the measured power factor remains below the MIN-value longer than the set interval of the tripping delay, the output relays remain in the off-position even if the measured power factor exceeds the value adjusted at the MIN-regulator. If the measured power factor remains above the MAX-value longer than the set interval of the tripping delay, the output relays remain in the off-position even if the measured power factor falls below the value adjusted at the MAX-regulator. After resetting the failure (interrupting and re-applying the supply voltage), the output relays switch into on-position and a new measuring cycle begins with the set interval of the start-up suppression (START).

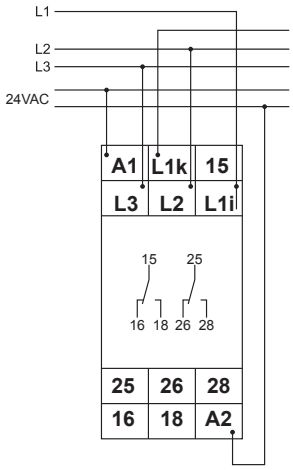


Recognition of disconnected consumers
When the current flow between L1i and L1k is interrupted (yellow LED I=0 illuminated) and no fault has been stored the output relays switch into on-position resp. remain in on-position (yellow LED R illuminated). When the current flow is restored, the measuring cycle is restarted with the set interval of the start-up suppression (START).

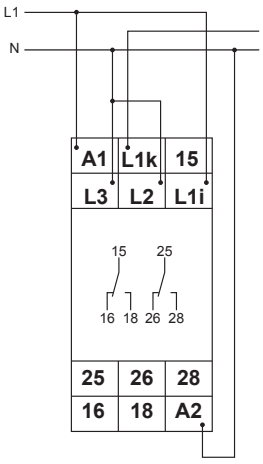


Connections

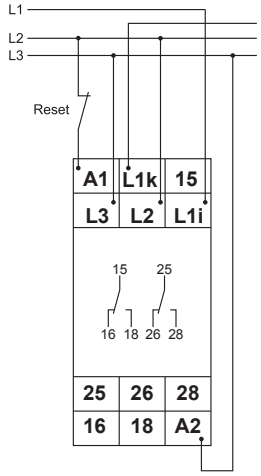
Connected to 3~ 400V mainswith power module 24V a.c. without fault latch
I_N<10A



Connected to 1~ 230V mains with power module 230V a.c. without fault latch
I_N<10A

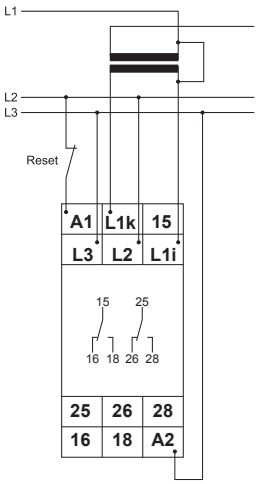


Connected to 3~ 400V mains with power module 400V a.c. and fault latch
I_N<10A

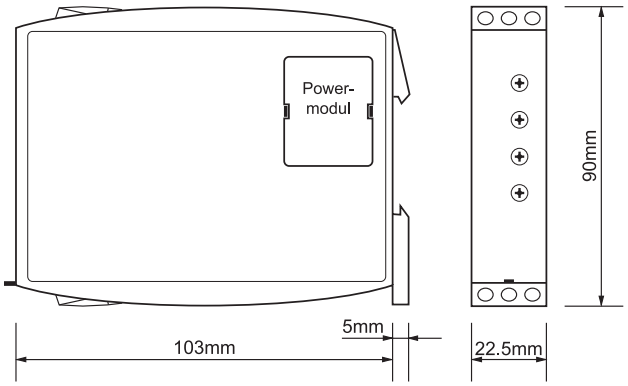


Connections

Connected to 3~ 400V mains with power module 400V a.c. and fault latch
I_N>10A



Dimensions



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Subject to alterations and errors

Technik Braucht Kontrolle