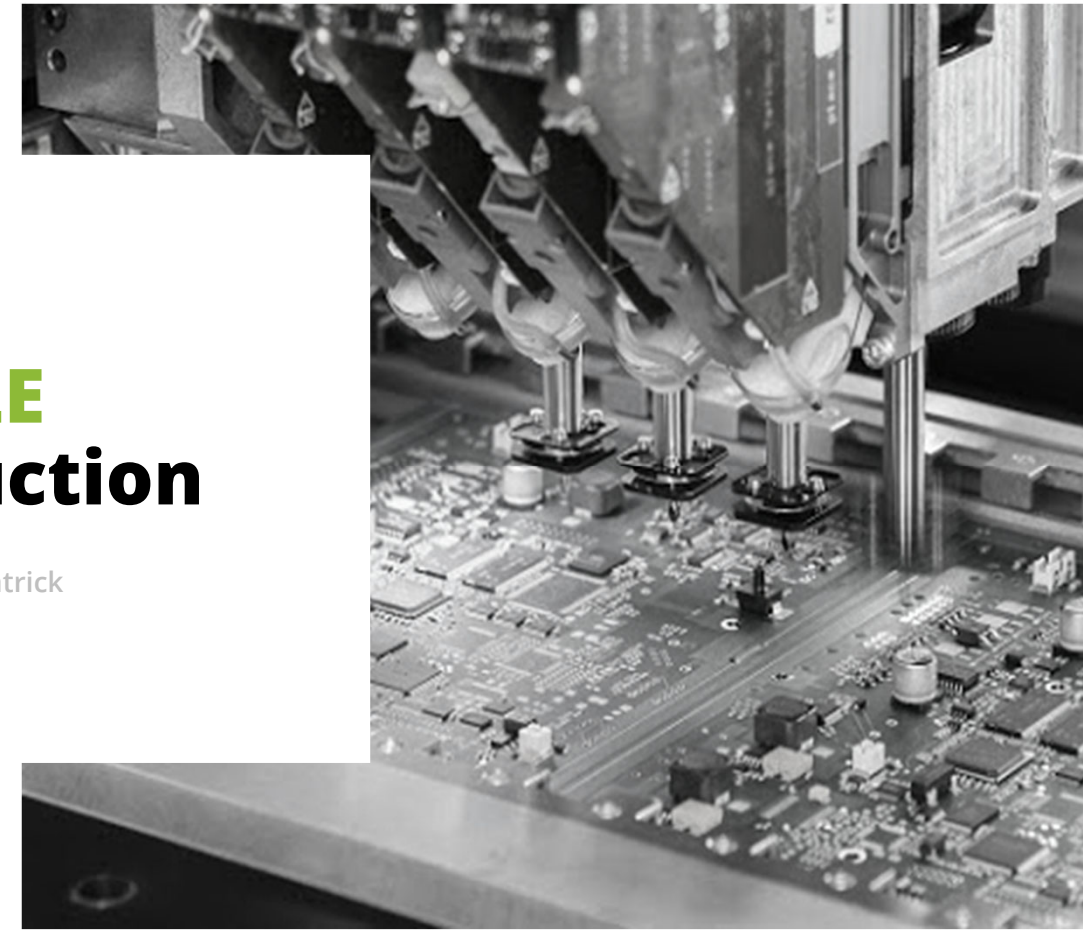


WE MAKE THE WORLD A BETTER PLACE



TELE
Introduction

Lucas & Patrick





Philipp Sassmann
Customer Success DE/Export



Stephanie Windhager
Key Account



Adam Marei
Export Sales



Markus Gruber
Research & Development



Lucas Guillaume
Apprentice



Neil Isherwood
Export Sales



Laura Pater
Customer Success AT/OEM



Yannick Pollek
Direct Sales Austria



Patrick Huber
Technical Sales Support

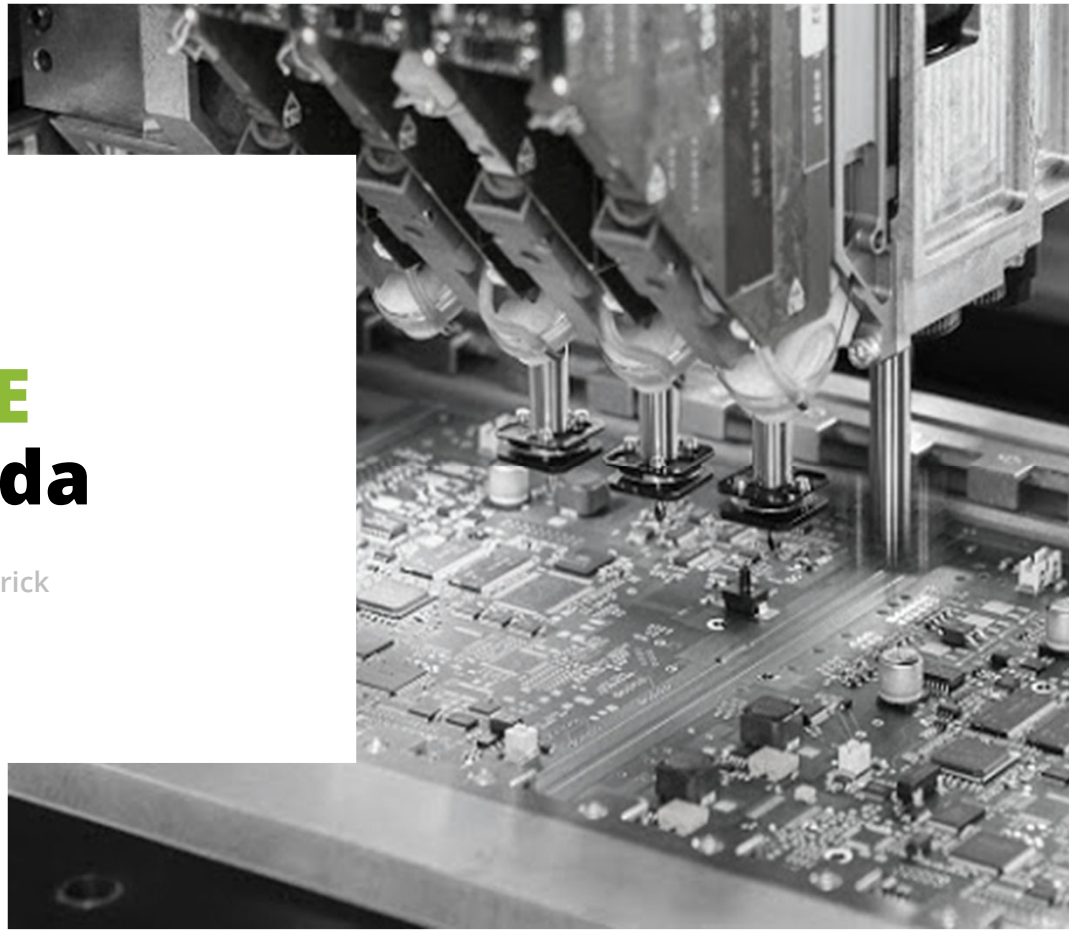


James Milne
Export Sales



TELE
Agenda

Lucas & Patrick



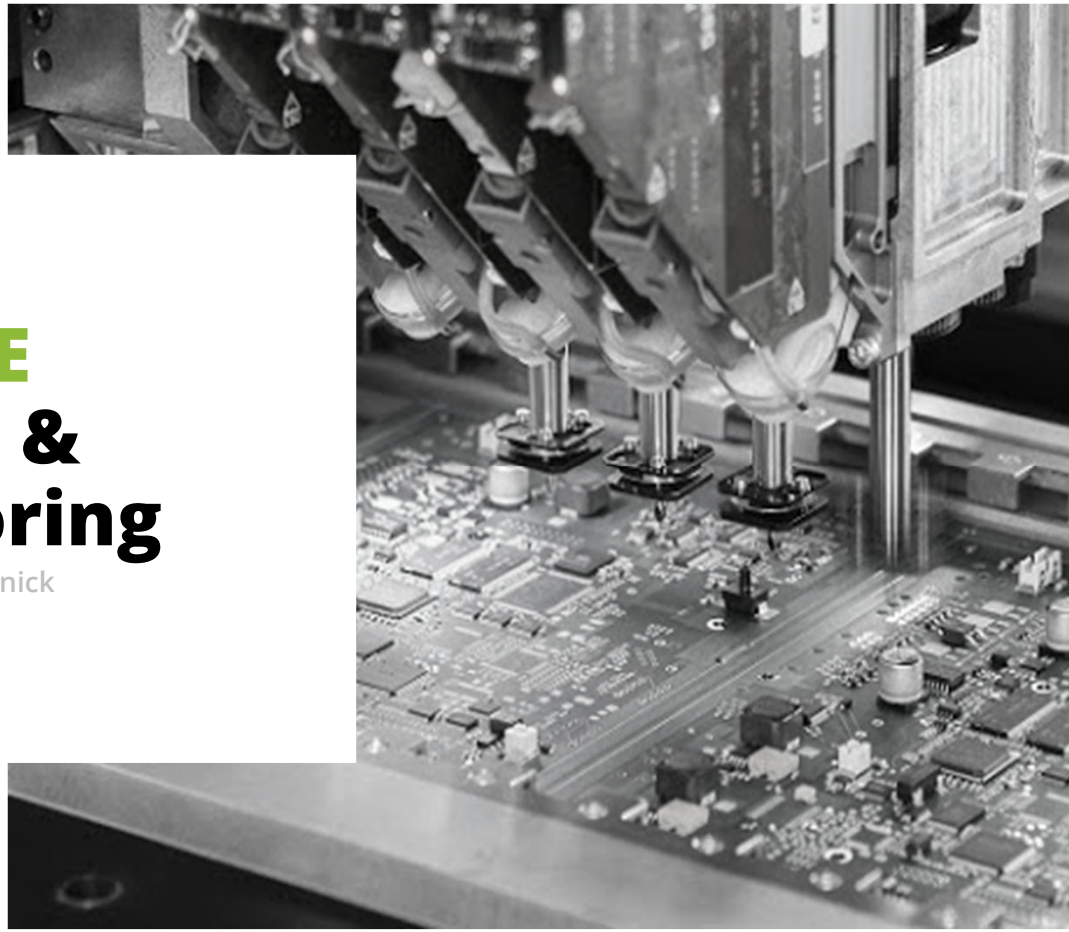


Topic	Presenter
Time & Monitoring	Yannick & Lucas
Power Monitoring	Neil & Philipp
Grid & System Protection	Stephanie & Markus
Current Transducer(V4IA)	Neil & Patrick
Pump and Level Monitoring	Patrick & Adam
eCap	Laura & James



TELE
Time & Monitoring

Lucas & Yannick



SERIES

ENYA



- Most economical series
- Focus on building technology
- Simple functions



GAMMA

- Industrial series
- For control cabinet and plant engineering
- Compact and space-saving design

SERIES

KAPPA

- 11-pin socket required
- Compact and space-saving design
- No wiring necessary



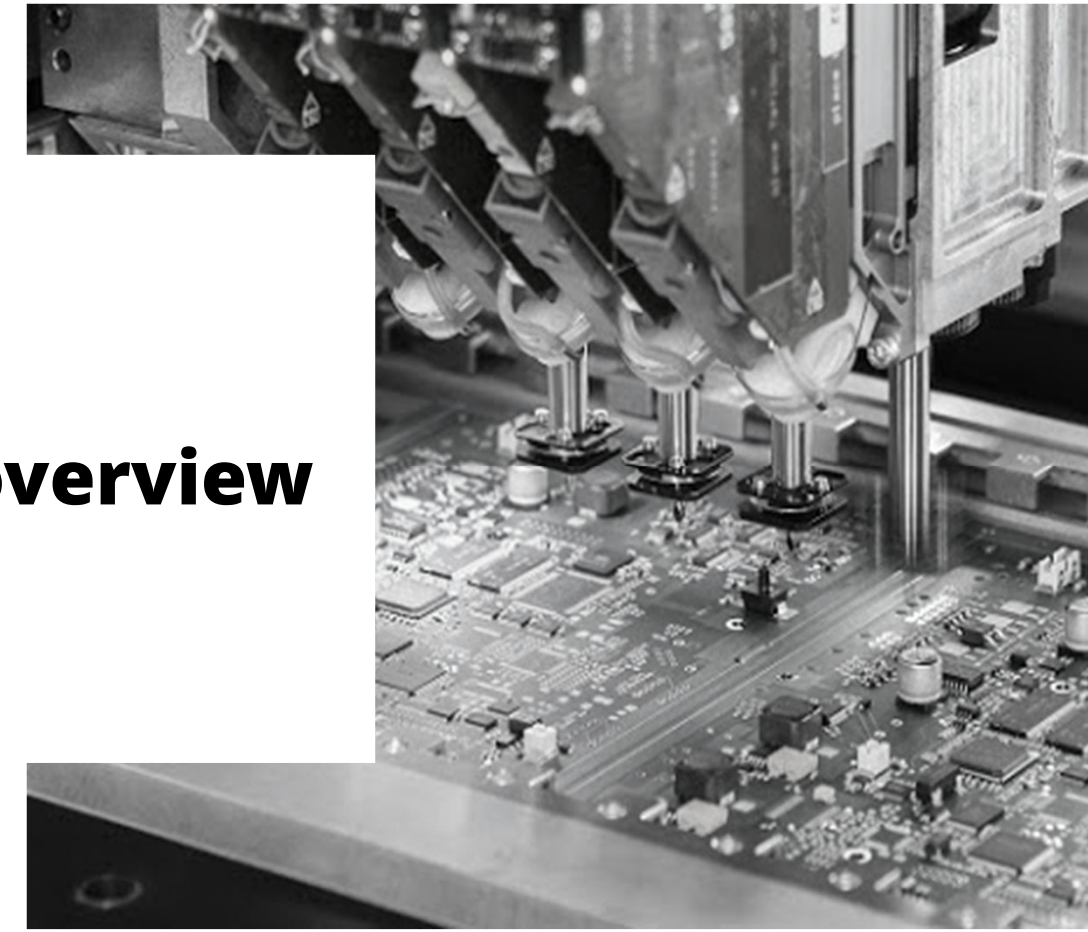


VEO

- Hybrid – the best from all series
- Compact design
- Increased temperature range available



Product overview



Product overview

Timing relays



- Purpose: to make processes in machines and plants more efficient
- Installation type
- Supply voltage: 12 or 24-240V AC/DC
- Field of application: Building services engineering
- Top-hat rail mounting/plug-in socket mounting
- Screw connection

Product overview

Monitoring relays



- Purpose: Measure and monitor current, voltage, temperature, frequency and liquids
- Installation type (Enya), industrial type
- Voltage monitoring: 230/400V or 240/480V as well as special industrial networks with 277V - 400V - 480V - 575V - 690 V
- Field of application: machines and plant engineering
- Top hat rail mounting
- Screw connection



Product highlights

With applications



Product Highlights

V2ZQ10 24-240V AC/DC



- ***Precise and reliable switching and control in industrial and commercial applications***
- ***Supply voltage 24-240 V AC/DC***
- ***Multifunction - 4 functions***
- ***Compact industrial design***

- Application: Baking time control
- Task: Pre-baked but frozen pastries are baked in an oven ready for consumption.
- Solution: The time relay is set to a specific baking time. The time is the same for all baked goods. The "switch-off delayed" function is activated with the control input. When the time has elapsed, the relay switches off and the pastry is ready.
- Benefit/added value: The time relay is operated in a very hot environmentThe device regularly operates above the recommended operating temperatureThe Tele time relay has the longest durability in this harsh environment.

Product Highlights

E1ZM10 12-240V AC/DC



- *Precise and reliable switching and control in industrial and commercial applications*
- *Supply voltage 12-240 V AC/DC*
- *Multifunction - 7 functions*
- *Installation type design*

- Application: Vine pest control
- Task: For pest control, a mechanical switch is operated on each vine. It is then to operate the sprayer for a certain time in order to spray the respective agent onto the vine.
- Solution: On the TELE time relay E1ZM10 12-240V AC/DC, the time can be set in the function "switch-off wiping with control contact" depending on the quantity of the spray agent. This ensures that the quantity applied per vine can be adjusted to the speed of the vehicle.
- Benefit/added value: Universal voltage (vehicle electrics). Easy adjustment for the user. Operating displays.

Product Highlights

E3YF400VT02 0.85



- ***Compact and reliable measurement of voltage, current, cosine phi, temperature or levels.***
- ***Supply voltage 400V AC***
- ***Test – Function (The test function enables manual disconnection of the output relay)***
- ***Installation type design***

- Application: Emergency power supply
- Task: In a building, it must be ensured that the emergency supply is switched on within 30ms in the event of a mains voltage failure of the lighting.
- Solution: By monitoring the mains voltage, the emergency supply is activated within 20ms in the event of a power failure. Our E3YF400V02 is used to monitor the emergency lighting system.
- Benefit/added value: Fulfillment of legal requirements through fast switching to emergency power supply.

Product highlights

G2PF400VS02



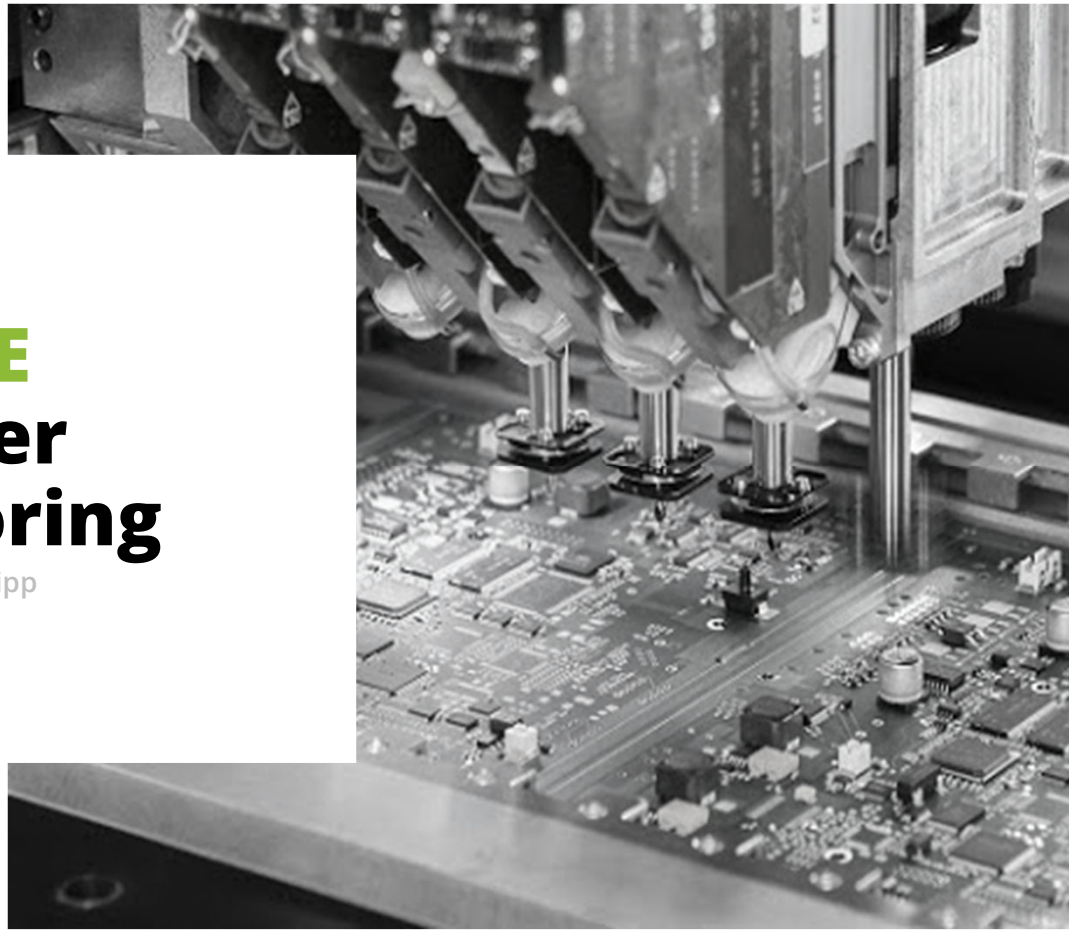
- ***Compact and reliable measurement of voltage, current, cosine phi, temperature or levels.***
- ***Supply voltage 400V AC***
- ***Phase sequence monitoring / Phase failure monitoring***
- ***Industrial design***

- Application: Natural gas plant monitoring
- Task: In a natural gas plant, a plant malfunction due to network faults is to be prevented.
- Solution: The G2PF400VS02 monitors the applied mains voltage of all three phases in the control cabinet. In order to avoid undefined operating states, the natural gas plant is switched off in the event of a phase failure and a service technician is informed of the fault via GSM modem.
- Benefit/added value: Timely detection of plant malfunctions and thus avoidance of possibly dangerous undefined operating states.



TELE
Power Monitoring

Neil & Philipp



Power Monitoring

OVERVIEW



- Conclusions about the condition of drives, machines and systems through power factor or active power measurement of motors.
- Reduction of maintenance effort as well as costs for service and downtimes.
- Measured variables such as power factor (cos φ) and active power in simple or multifunctional design.
- Measuring voltages in conventional supply networks with 230/400V or 240/415 V as well as in special industrial networks with 400/690 V
- Single-phase and three-phase loads
- Direct measurement up to 16 amps without transducer
- Robust design with large terminal compartment throughout ensures high suitability for use and installation.

Power Monitoring

BASIC

active power measurement of electric motors and easy to use monitoring of drives, machinery and systems.

Available just in GAMMA Series

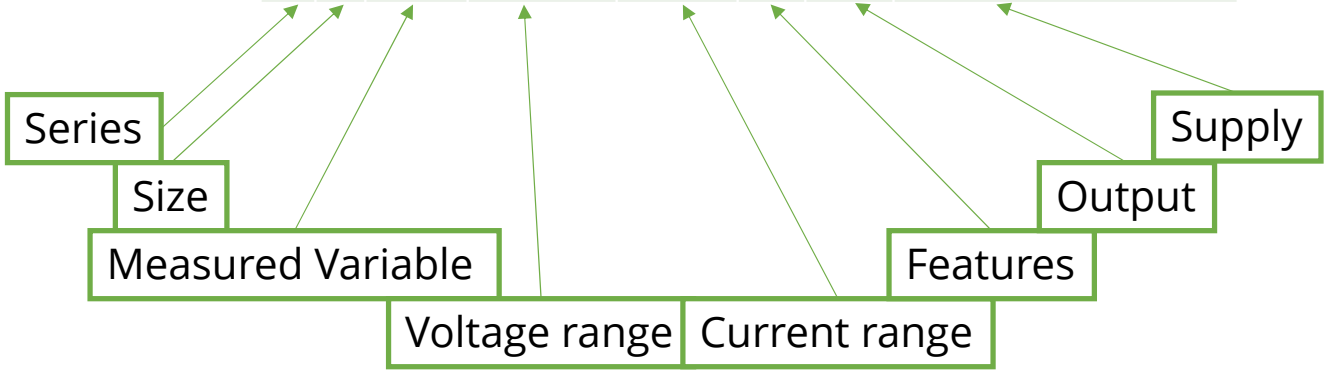


- The reliable solution for power factor and active power monitoring in industrial environments.
- different connection variants for the control contact and the power supply
- remote potentiometer
- Clearly structured operating elements guarantee easy handling.
- Recognition of disconnected consumers

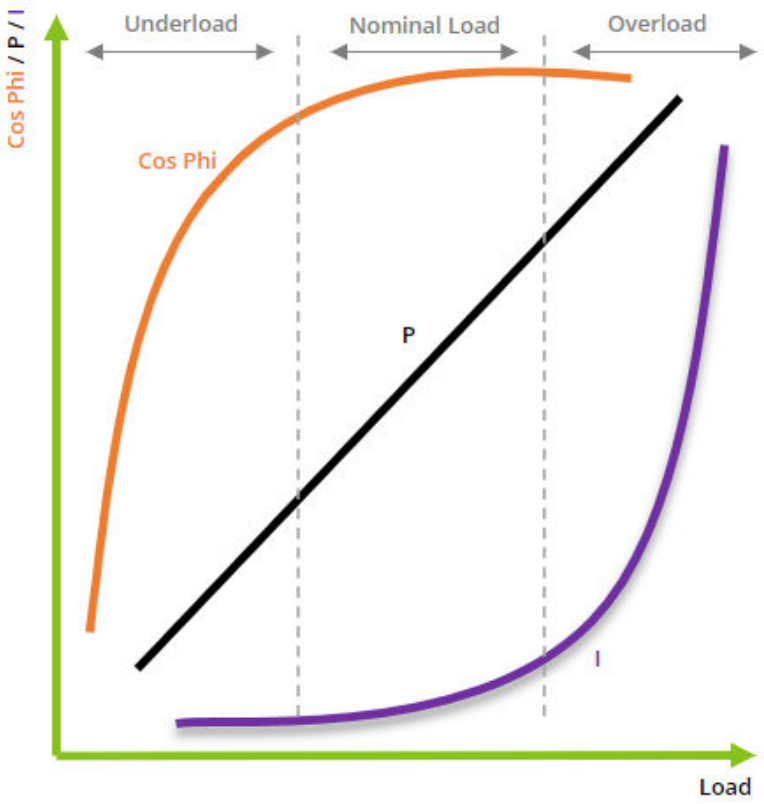
Power Monitoring

NAMING

G	2	BM	400V	2A	D	10	230V
	4	CM	480V	10A	F	20	24-240V AC/DC
		CU	690V	12A	T		
				16A	L		



BASIC Which method makes sense when



Current Monitoring (A):

- Ideal for OVERLOAD Monitoring of Drives
- Exponential Increase if Load is **bigger** than related load

Power Factor (CosPhi):

- Ideal for UNDERLOAD Monitoring of Drives/V-Belts/Pumps
- Exponential Increase if Load is **smaller** than related load

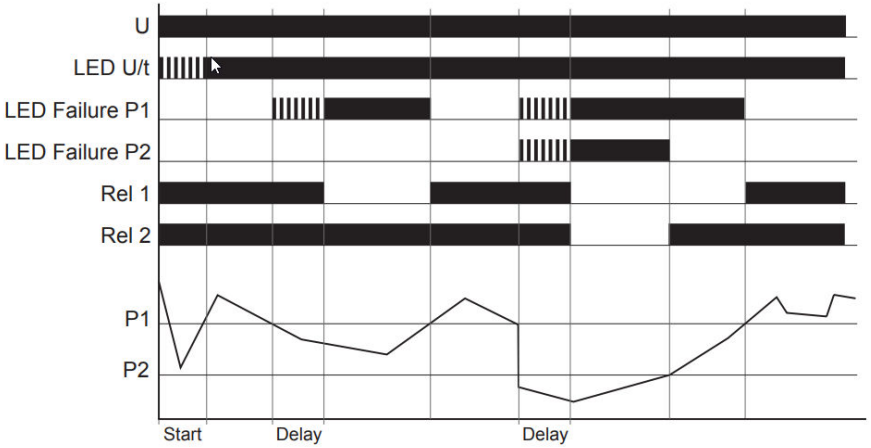
Real Power Monitoring (kW):

- Ideal for LINEAR Monitoring of drives & for sudden changes in power consumption
- Linear increase over whole power range

FUNCTIONS

2MIN

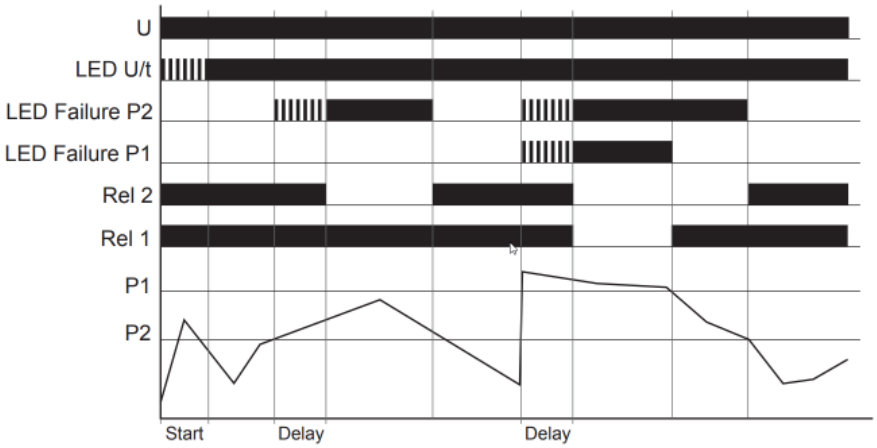
The adjusted threshold for P1 must be greater than the adjusted threshold for P2. When the measured true power falls below the value adjusted at the P1-regulator, the set interval of the tripping delay (Delay) begins (red LED Failure of the corresponding threshold P1 flashes). After the interval has expired (red LED Failure of the corresponding threshold P1 illuminated), the output relay Rel 1 switches into offposition (yellow LED Rel 1 not illuminated). When the measured true power exceeds the value adjusted at the P2-regulator, the set interval of the tripping delay (Delay) begins (red LED Failure of the corresponding threshold P2 flashes). After the interval has expired (red LED Failure of the corresponding threshold P2 illuminated), the output relay Rel 2 switches into off-position (yellow LED Rel 2 not illuminated). As soon as the measured true power exceeds the adjusted value at the corresponding regulator P1 or P2 (red LED Failure of the corresponding threshold P1 or P2 not illuminated), the output relay Rel 1 or Rel 2 switches into on-position again (yellow LED Rel 1 or Rel 2 illuminated).



FUNCTIONS

2MAX

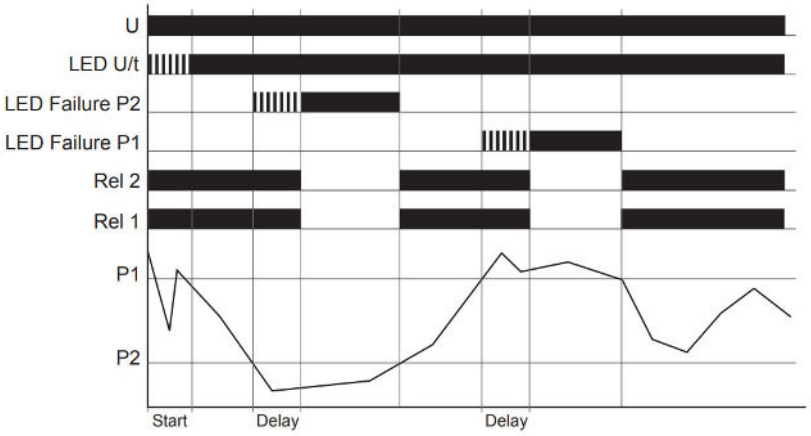
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FUNCTIONS

WIN

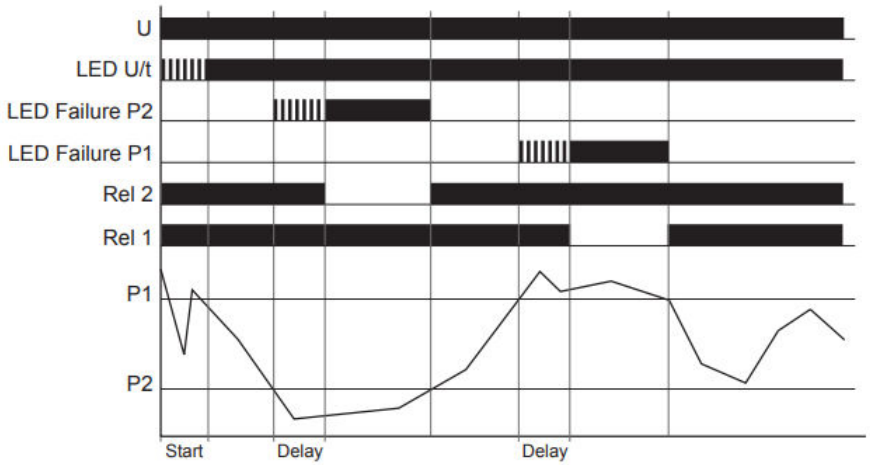
The adjusted threshold for P1 must be greater than the adjusted threshold for P2. When the measured true power falls below the value adjusted at the P2-regulator, the set interval of the tripping delay (Delay) begins (red LED Failure of the corresponding threshold P2 flashes). After the interval has expired (red LED Failure of the corresponding threshold P2 illuminated), the output relays Rel 1 and Rel 2 switches into off-position (yellow LED Rel 1 and Rel 2 not illuminated). The output relays Rel 1 and Rel 2 switches into on-position again (yellow LED Rel 1 and Rel 2 illuminated), as soon as the the measured true power exceeds the adjusted value at the P2-regulator (red LED Failure of the corresponding threshold P2 not illuminated). When the measured true power exceeds the value adjusted at the P1-regulator, the set interval of the tripping delay (Delay) begins (red LED Failure of the corresponding threshold P1 flashes). After the interval has expired (red LED Failure of the corresponding threshold P1 illuminated), the output relays Rel 1 and Rel 2 switches into off-position (yellow LED Rel 1 and Rel 2 not illuminated). As soon as the measured true power falls below the value adjusted at the P1-regulator (red LED Failure of the corresponding threshold P1 not illuminated) the output relays Rel 1 and Rel 2 switches into on-position again (yellow LED Rel 1 and Rel 2 illuminated).



FUNCTIONS

MIN/MAX

The adjusted threshold for P1 must be greater than the adjusted threshold for P2. When the measured true power falls below the value adjusted at the P2-regulator, the set interval of the tripping delay (Delay) begins (red LED Failure of the corresponding threshold P2 flashes). After the interval has expired (red LED Failure of the corresponding threshold P2 illuminated), the output relay Rel 2 switches into offposition (yellow LED Rel 2 not illuminated). The output relay Rel 2 switches into on-position again (yellow LED Rel 2 illuminated), as soon as the the measured true power exceeds the adjusted value at the P2-regulator (red LED Failure of the corresponding threshold P2 not illuminated). When the measured true power exceeds the value adjusted at the P1-regulator, the set interval of the tripping delay (Delay) begins (red LED Failure of the corresponding threshold P1 flashes). After the interval has expired (red LED Failure of the corresponding threshold P1 illuminated), the output relay Rel 1 switches into off-position (yellow LED Rel 1 not illuminated). As soon as the measured true power falls below the value adjusted at the P1-regulator (red LED Failure of the corresponding threshold P1 not illuminated) the output relay Rel 1 switches into on-position again (yellow LED Rel 1 illuminated).





Product Highlights



Product Highlights

G2IM10AL20 24-240V AC/DC



Current monitoring, 1-Phase

Multifunctional

3 measuring ranges(100mA-1A-10A),
changeable with different connections

No power module needed, Supply: 24-240V AC/DC

Optional Latch

2 changeover contact

Product Highlights

G2CM400V10AL20



Power factor monitoring, 1- and 3-Phase

Multifunctional

Measuring voltage: 3x 400V AC,

Up to 10A, extendable with CT

Supply selectable via power module

Optional Latch

FU Suitable

2 changeover contact

Product Highlights

G4BM480V12ATL20



Active power detection, 1- and 3-Phase

Multifunctional

Temperature monitoring of the motor winding

Reset button

Off-Load detection

Measuring voltage: 3x 400V AC,

Up to 10A
Supply selectable via power module

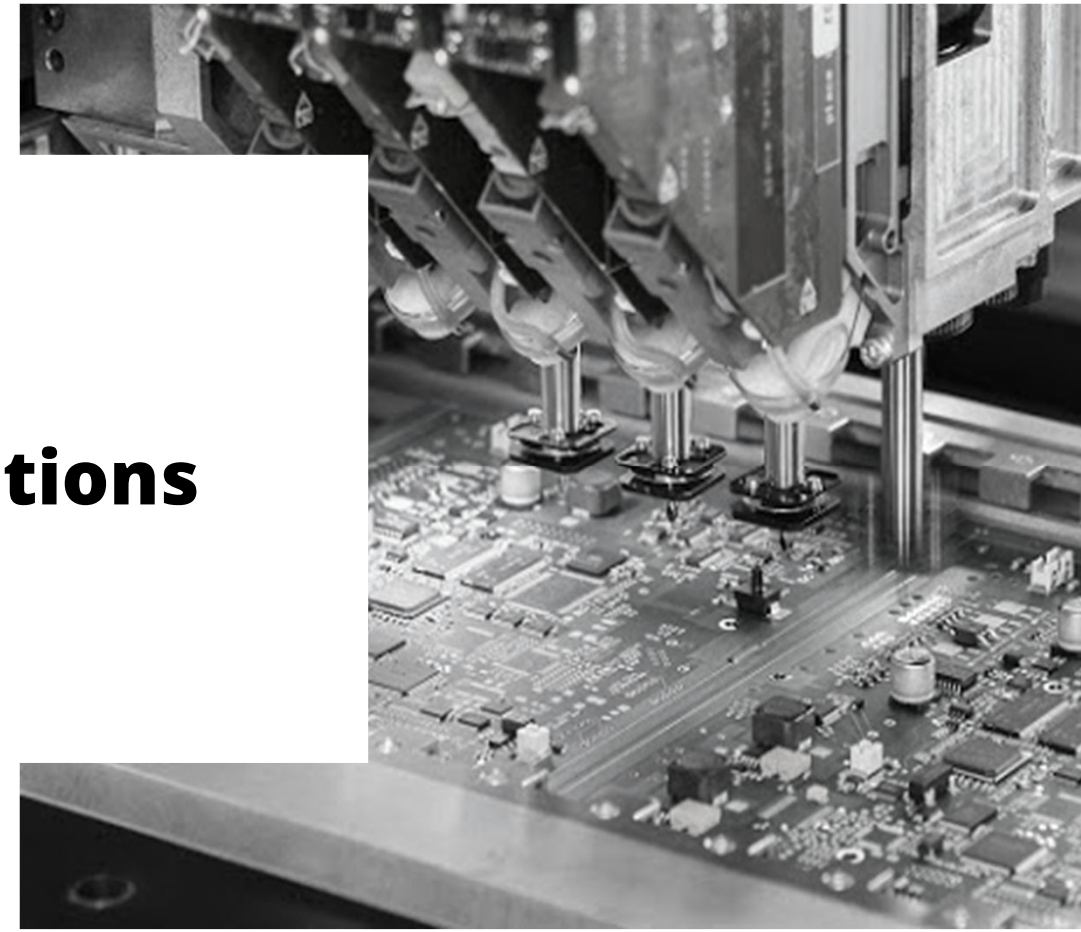
Optional Latch

FU Suitable

2 changeover contact



Applications



Application – Power factor

EXHAUST FAN

Task:
Monitoring of the operating state of the exhaust fan. The fan has ahigh starting current. This may not influence the monitoring and may not lead to a shutdown.

Solution:
The correct functioning of the exhaust fan is monitoring with the "under" function (underload monitoring) of the **G2CM400V10AL20**. When the exhaust duct is clogged, the power factor worsens. The device reads this metric. In addition, a high starting current must be bridged for a short time and may not lead to a shutdown.

Benefit:
•Configurable start-up suppression
•Reliable shutdown prevents filter blockage
•Start-up suppression and monitoring possible with one device

Application – Real Power

CONVEYOR BELT MONITORING

Task:
A conveyor belt must be stopped rapidly in the event of a blockage with small packages. However, unnecessary downtime must be avoided if possible.

Solution:
The **G2BM400V12AFL10** load monitor monitors the power consumption of the drive motor to monitor the conveyor belt without any additional sensors and reacts exactly as soon as the configured threshold is exceeded, preventing damage to the packages.

Benefit:
•Prevention of blockages and production downtime
•In the event of minor blockages, the conveyor belt can continue to run because the package can turn
•The effective power can be measured directly, without a current transformer
•Rapid startup
•Low-cost device
•Reliable monitoring even with voltage fluctuations in the power supply

Application – Power Factor

SENSORLESS PUMP MONITORING

Task:
Three operating conditions should be monitored for a chemical pump:
- Dry running
- Mislaid input filter or no intake
- Lower density through heating of the medium

Solution:
The **G4CM690V16ATL20** reliably measures the power factor of the motor and switches the control output when it falls below a predefined level. A second switch value can be used as advance warning in order to prevent a fault.

Benefit:
•Minimization of outages of the pumps through prompt shutdown
•Recognition of mislaid/worn filters
•Recognition that the medium is becoming warmer (density)
•No additional sensors needed
•Simple wiring and simple settings
•Easy to retrofit
•Economical monitoring of aggressive, hot, explosive media

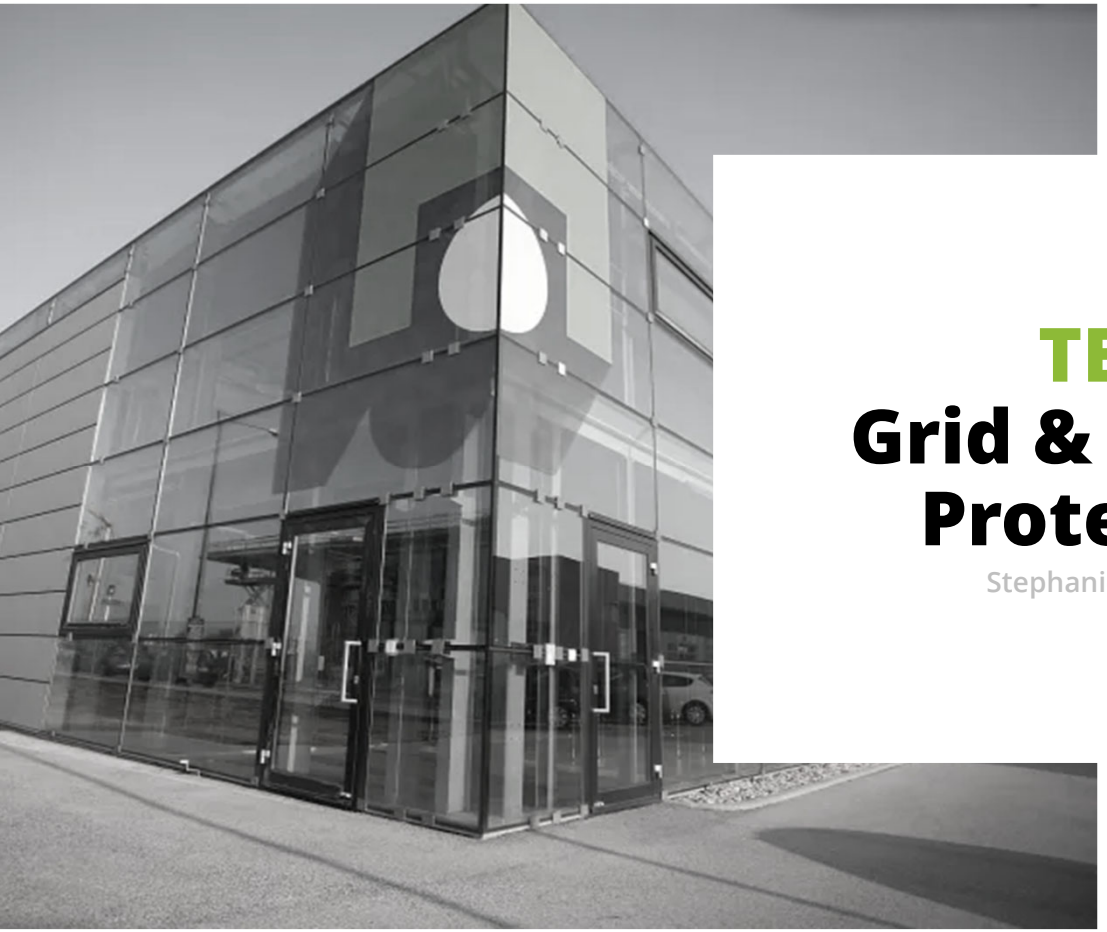
Application – Real Power

CHIPPER

Task:
Chipper blockage should be recognised quickly. Monitoring of 2 overload thresholds: threshold 1 = reverse, threshold 2 = shutdown

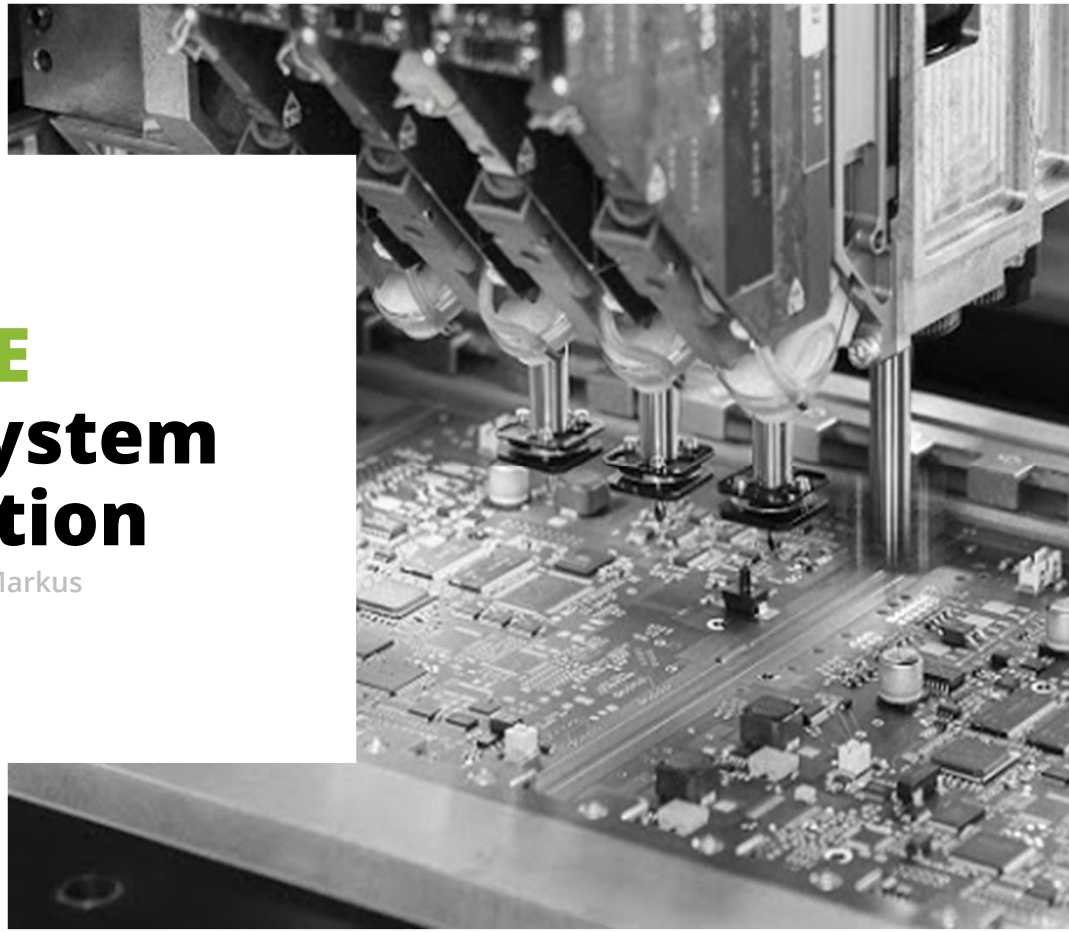
Solution:
Power monitoring for the electric motor of a chipper with the double "over" function from the **G4BM480V12ADTL20**. As soon as the effective power leaves the permitted range and exceeds the first overload threshold, relay output 1 is tripped and the machine is reversed. When the second overload threshold is exceeded, relay output 2 is tripped, the motor contact is switched off, and the system is shut down.

Benefit:
•Rapid shutdown in the event of blockage
•Monitoring of 2 separate overload thresholds
•Motor protection
•Minimisation and prevention of downtime



TELE
Grid & System Protection

Stephanie & Markus



NA003-M64(.COM)

WHY – GRID & SYSTEM PROTECTION?



- Autonomously working isolation unit for electrical energy producers (EEG)
- Mandatory legal requirements – external grid & system protection for systems >30kVA or depending on country-specific specifications
- Feeding into the public grid
- Immediate switch-off in case of grid shutdown or disconnection
- Protects people and equipment
- Network stability

NA003-M64(.COM)

ABOUT ME



- Type code **NA003-M64 / NA003-M64.COM**

  NA003 grid and system protection device, 3. generation

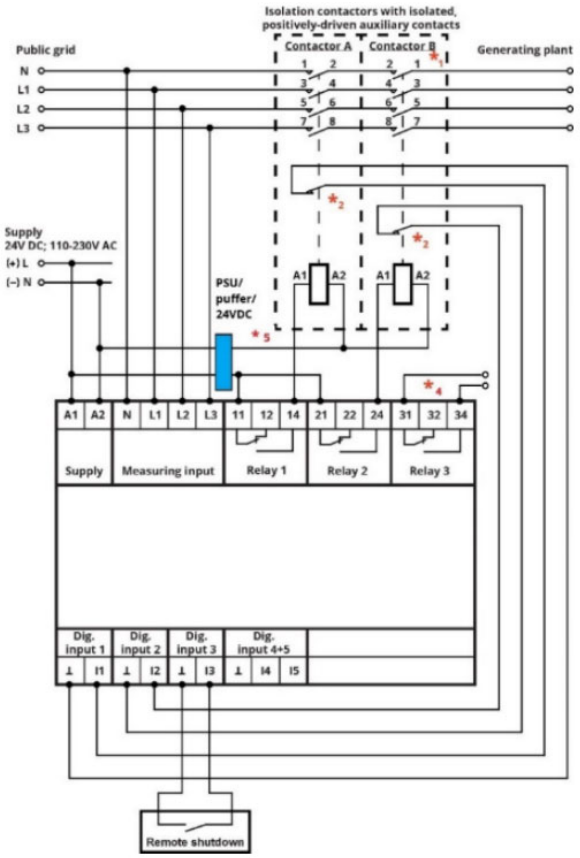
  M64 memory, describes hold of different parameter sets

  .COM with Modbus RTU interface

- Developed and manufactured from TELE
- MADE IN AUSTRIA
- Universally usable
- Part number NA003-M64: 2700100x
- Part number NA003-M64.COM: 2700200x
- Quarterly launch of a new version – index change by integrating new parameter sets

NA003-M64(.COM)

WHAT CAN I DO?



- Monitoring relays for voltage (1ph, 3ph) & frequency
- Safe measurement with 2 redundant fast measuring systems (safety concept)
- Predefined "country-specific" measuring & monitoring parameters
- Can hold more than 64 different parameter sets
- Adjust these parameters within allowed limits to comply with local regulations
- Parameter setting can be secured with a seal or password on request
- Optimised for mounting in control cabinets and on top-hat rails

NA003-M64(.COM)

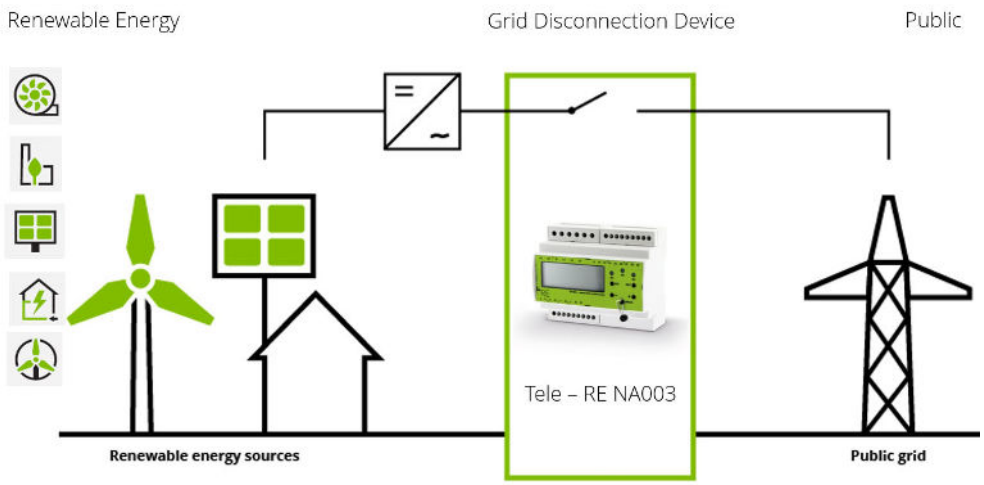
MY BENEFITS FOR YOU

- Best price/performance ratio on the market
- Meet all local monitoring criteria for a grid & system protection relay
- Perfectly suitable for worldwide export and use, as all international standards are implemented
- Work universally with 24V DC & 110-230V AC
- Clear and concise operation and readability thanks to digital display
- Settings can be done manually or via interface – MB/RTU
- Read and Write functionality
- Value transmission to MB-Master via MB/RTU
- 24/7 adjustment via MB interface
- Top TELE quality and highest availability for a very long time
- Downward compatible for former standards/devices

NA003-M64(.COM)

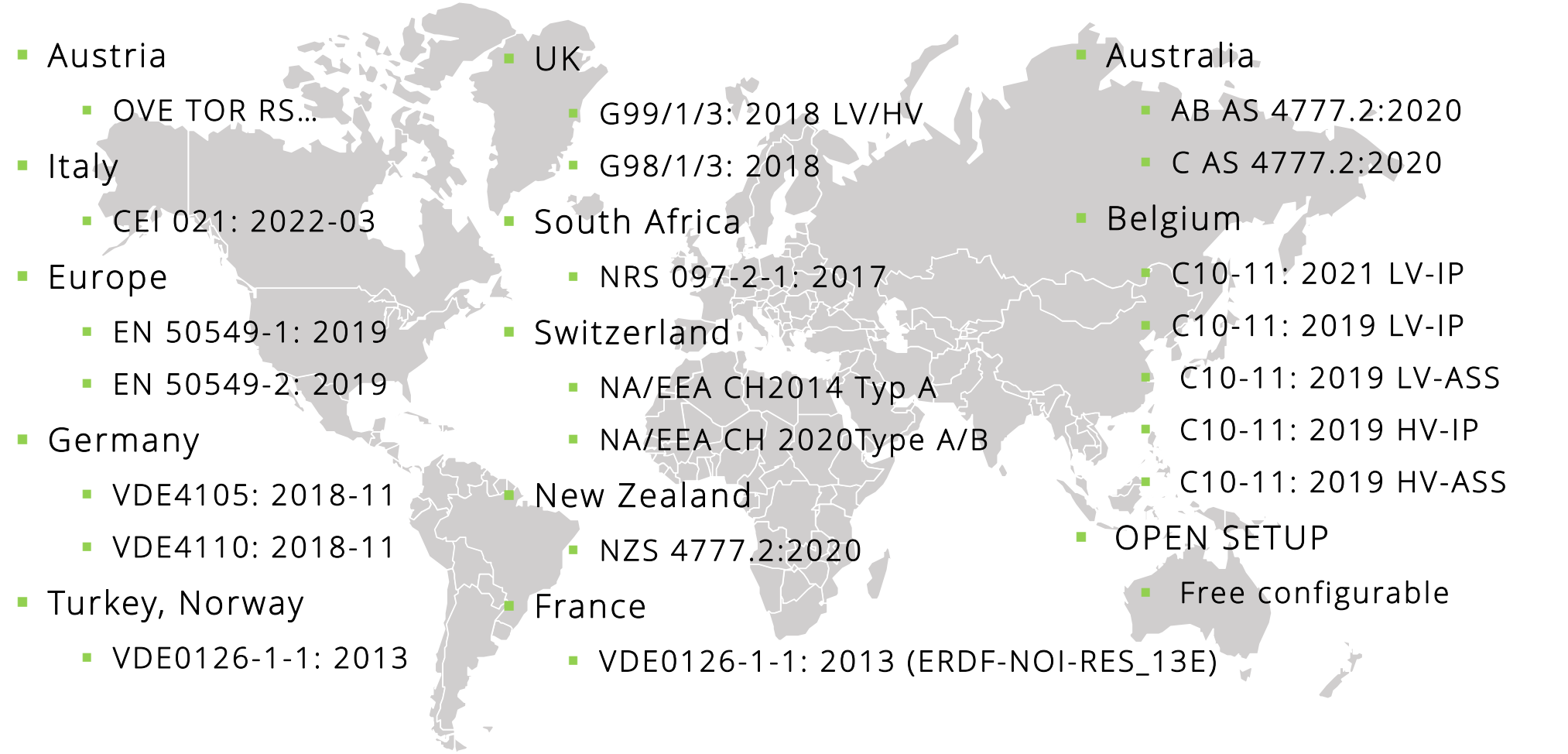
MY BENEFITS FOR YOUR CUSTOMERS

- Control the feed-in of energy into the grid
- Protect the grid, if feeding is not allowed
- Protect the energy generation plant, if the grid does not comply with specified values
- Control the contactor / circuit breaker & monitor them for proper function
- Stabilise the net when short load peaks occur (FRT)
- Generate an error list for later analysis
- Display live measured values
- Suitable for low and medium voltage systems
- Can be modified for special customer requirements



NA003-M64(.COM)

INTEGRATED COUNTRY STANDARDS



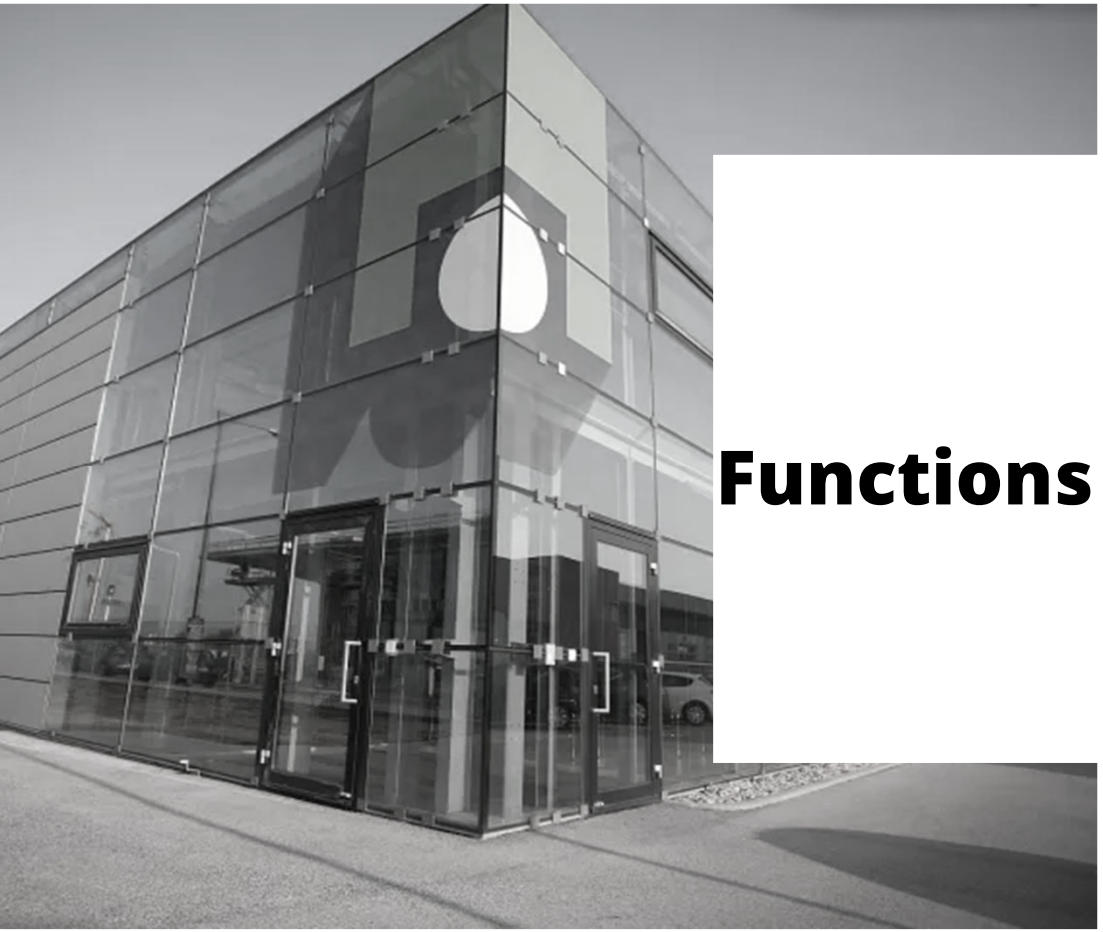
- Austria
  - OVE TOR RS...
- Italy
  - CEI 021: 2022-03
- Europe
  - EN 50549-1: 2019
  - EN 50549-2: 2019
- Germany
  - VDE4105: 2018-11
  - VDE4110: 2018-11
- Turkey, Norway
  - VDE0126-1-1: 2013
- UK
  - G99/1/3: 2018 LV/HV
  - G98/1/3: 2018
- South Africa
  - NRS 097-2-1: 2017
- Switzerland
  - NA/EEA CH2014 Typ A
  - NA/EEA CH 2020Type A/B
- New Zealand
  - NZS 4777.2:2020
- France
  - VDE0126-1-1: 2013 (ERDF-NOI-RES_13E)
- Australia
  - AB AS 4777.2:2020
  - C AS 4777.2:2020
- Belgium
  - C10-11: 2021 LV-IP
  - C10-11: 2019 LV-IP
  - C10-11: 2019 LV-ASS
  - C10-11: 2019 HV-IP
  - C10-11: 2019 HV-ASS
- OPEN SETUP
  - Free configurable

NA003-M64(.COM)

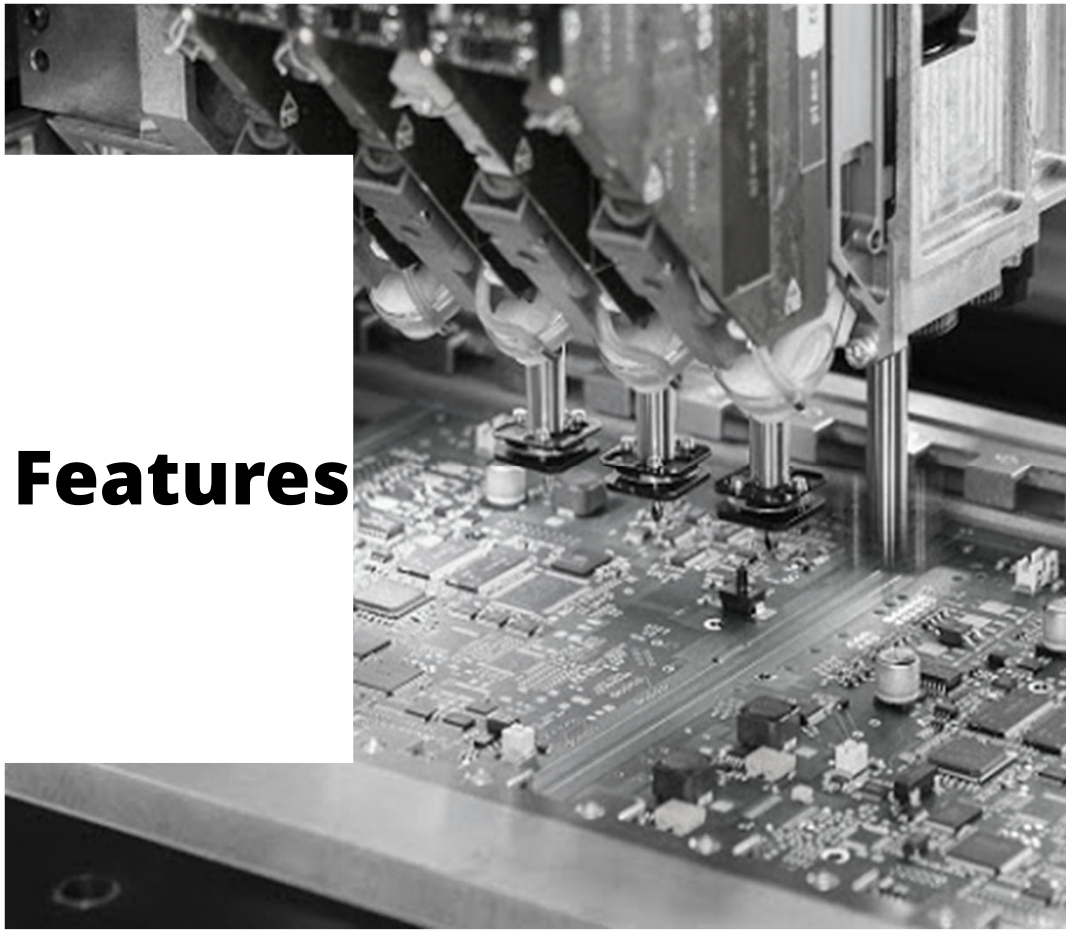
WHERE AND BY WHOM AM I USED?



- Solar & renewable energy generation systems
- Cogeneration plant manufacturers
- Small hydropower plant manufacturers
- Large switchgear manufacturers for power generation plants
- Switchgear manufacturers
- Planning/Design offices
- Manufacturers/ wholesalers of battery storage systems
- Manufacturers/ wholesalers of inverters
- Specialist manufacturers of grid & system protection equipment



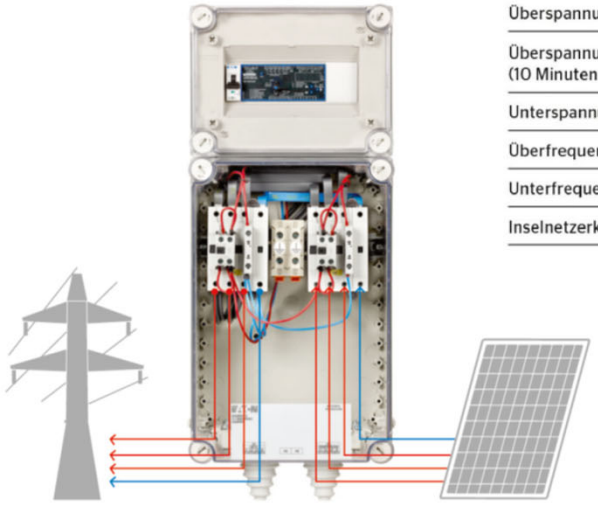
Functions & Features



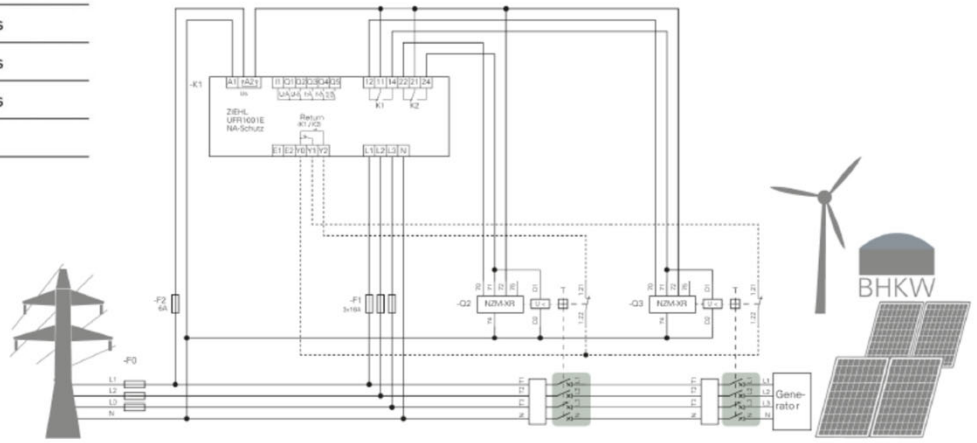
NA003-M64(.COM)

HOW DO I PROTECT?

- NA003-M64 measures voltage and frequency in the so-called PARALLEL MODE. In case of deviations from standard values, it disconnects the power generation system from the grid.
- Criteria for disconnection are voltage ranges, frequency ranges and rates of change (RoCoF) of frequency and voltage.



Schutzfunktion		Einstellwert	Auslösezeit
Überspannungsschutz	1 U >	1,15 U_N	< 200 ms
Überspannungsschutz (10 Minuten Mittelwert)	2 U >>	1,10 U_N	< 200 ms
Unterspannungsschutz	U <	0,8 U_N	< 200 ms
Überfrequenzschutz	f >	51,5 Hz	< 200 ms
Unterfrequenzschutz	f <	47,5 Hz	< 200 ms
Inselnetzerkennung			< 5 s



PARAMETER STRUCTURE

3.5.10 ÖVE TOR R25 NS ASYNC [ID 803] Typ A/B low voltage asynchr. generators

Connection Mode			Conformity Range	Possible Range
ID		Default		
.003	Connection	4-wire (LN)	4-wire (LN)	2-wire, 3-wire, 4-wire (LN), 4-wire (LN+LL)

Nominal Voltage					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.005	ULN/LL nom	Unom Y	V	230.0	57.5	230.0	28.8	241.4
		Unom Δ	V	400.0	100.0	400.0	50.0	420.0

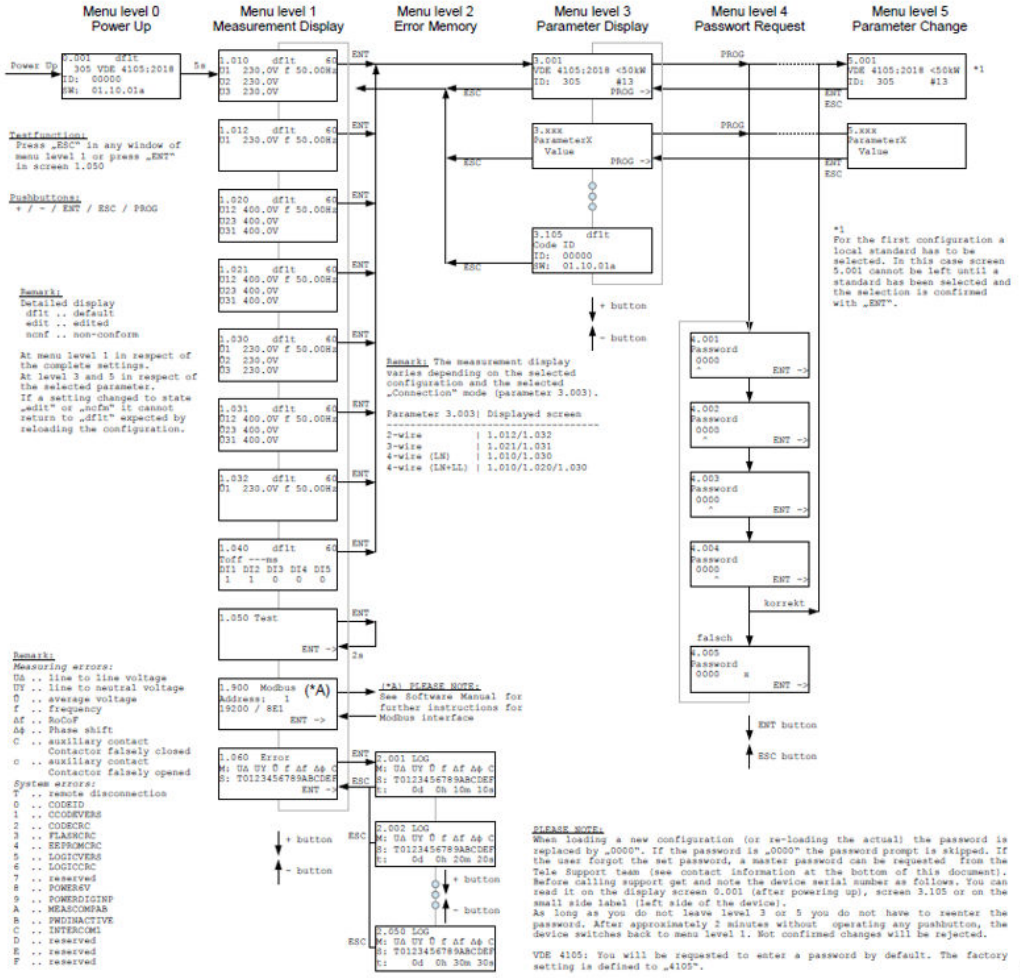
Overvoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.018	Ueff >	Enable function		on	on / off		on /off	
.019	Ueff > off	U_{THR} OFF	%Unom	111	100	130	100	135
.020	Ueff > on	U_{THR} ON	%Unom	108	100	108	100	135
.021	T Ueff >	Time OFF	ms	60000	50	180000	50	180000
Comment:		Ueff > on has a fixed offset of 0.5% U_{NOM} subtracted from the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL)						

Undervoltage1 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max
.023	Ueff < off	U_{THR} OFF	%Unom	80	10	100	10	100
.024	Ueff < on	U_{THR} ON	%Unom	90	86	100	10	100
.025	T Ueff <	Time OFF	ms	1500	50	180000	50	180000
Comment:		Ueff < on has a fixed offset of 0.5% U_{NOM} added to the displayed value						
Only active for:		Connection Modes: 2-wire, 4-wire (LN), 4-wire (LN+LL))						

Overvoltage2 Line to Neutral					Conformity Range		Possible Range	
ID				Default	Min	Max	Min	Max

- For each parameter there‘s always a:
  - Function explanation
  - Standard value (default)
  - Conformity range
  - Possible range
- If the default value is adjusted, but is in the compliant range, the parameter in the display shows "edit".
- If the default value is adjusted, but is outside the conforming range, the display shows "ncnF" (i.e. non conform).
  This means that the device no longer meets the tested specifications.

PARAMETER STRUCTURE



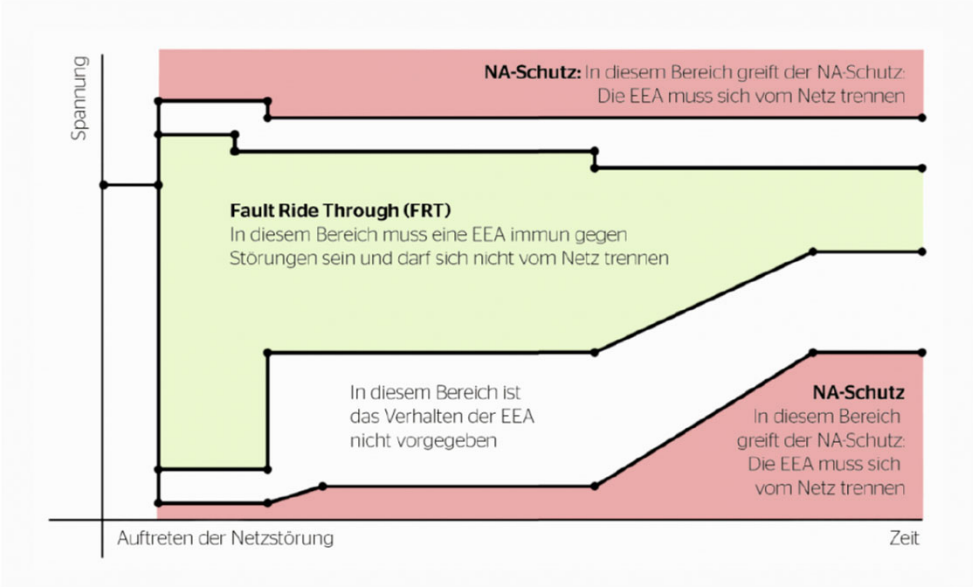
NA003-M64(.COM)

HOW DO I STABILIZE THE GRID?

- In the past, the situation was simpler. Large power plants were responsible for grid stability and power generation plants (EEA) were tolerated but had to subordinate themselves. If the grid frequency changed above 50.2Hz or below 49.5Hz, the EEA had to disconnect from the grid (VDE 0126-1-1 (2002).

- To ensure system stability of the interconnected grid EEA's requirements not to disconnect from the grid during short grid disturbances are even more important than grid & system protection.

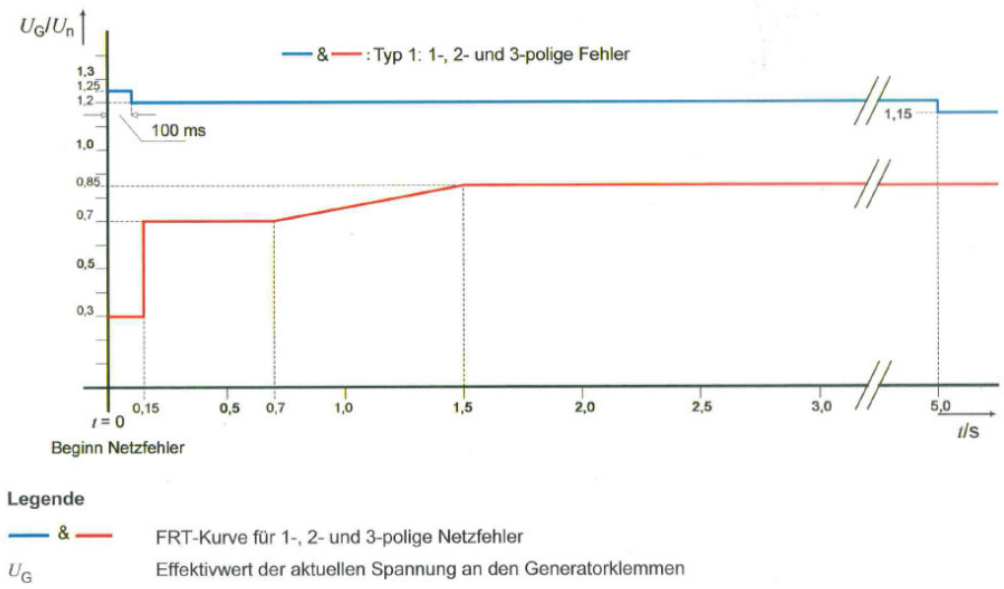
- These requirements are generally referred to as FRT (Fault Ride Through).



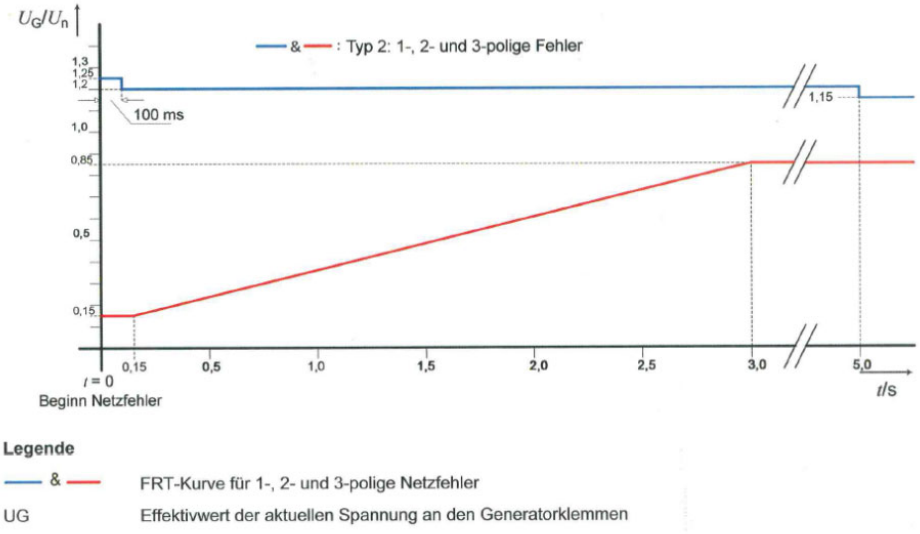
HOW DO I STABILIZE THE GRID?

- FRT requirements from VDE-A-N-4105: 2018

FRT Profile Type 1 – synchronous generators



FRT Profile Type 2 – converters and others



(FRT profile according to VDE-AR-N 4105:2018 Type2- converter and others)

HOW DO I STABILIZE THE GRID?

- FRT capability must be considered separately for the different components of a power generation system.
  - Contactor / Circuit breaker – own buffering
  - Attention, the installer must ensure that the requirements for FRT and undervoltage protection do not influence each other.

- If the NA003 is connected on the supply side (A1/A2) to the main power supply (not supplied separately from the measuring circuit), the NA protection can bridge <580ms at 230V AC and <200ms at 110V AC, i.e. no reset of the NA protection nor do the relays R1/R2 drop off.

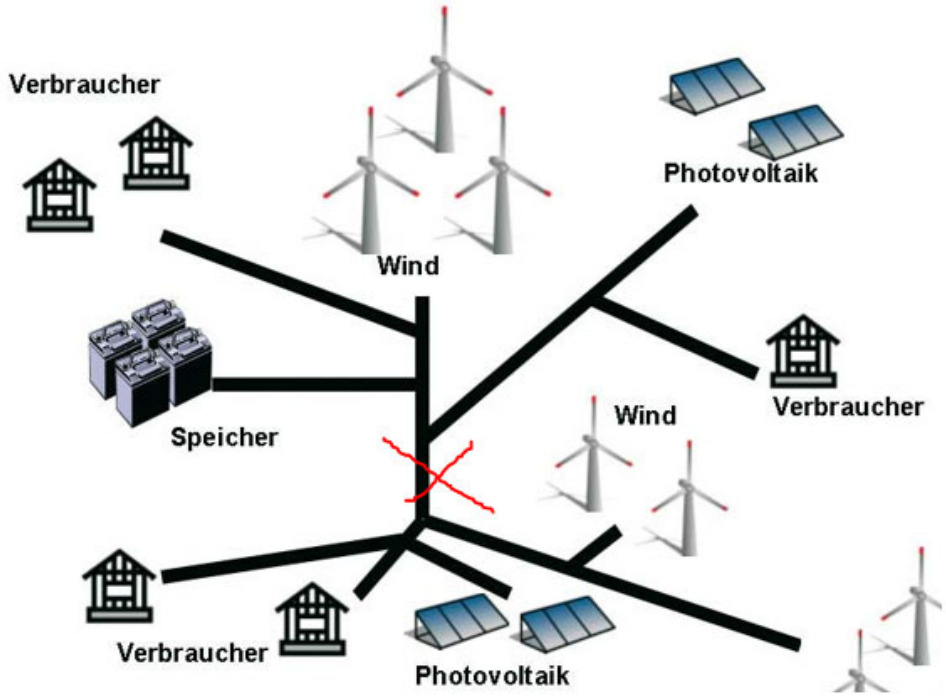
- With 24V DC supply, sufficient buffering must be available, since the internal power supply of the grid & system protection can only bridge 70ms max.

ISLAND DETECTION

- A Microgrid is a locally defined electricity main that consists of only one or a few electric generators, supplying only a small area and is no longer connected to other electric grids

- 2 methods of island detection
  - **Active methods**
  - **Passive methods**

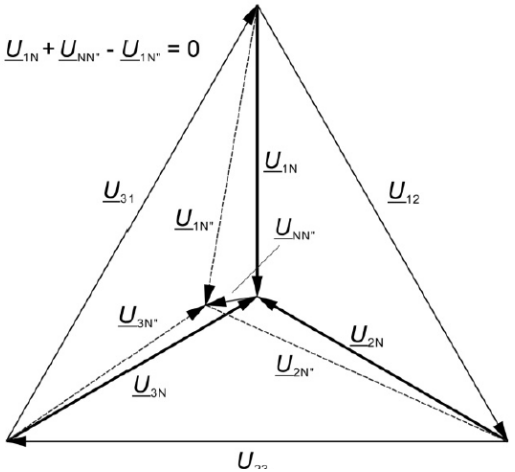
- **Active methods**
  - Only be possible with converters



ISLAND DETECTION

- **Passive method**
  - **Loss Of Mains via voltage measurement**
    - 3-phase voltage monitoring (line to line)
  - **Loss Of Mains via RoCoF**
    - Based on frequency measurement and triggers in the event of lasting frequency changes over multiple periods (df/dt limit is specified and set in mHz/s)
  - **Loss Of Mains via Vector Shift**
    - Detected via time measurements of the half-waves and the comparison with previous measurements. … occur due to a sudden load change or shortcuts in the superordinate mains (specified and set in degrees (0,1 etc.)

ZERO SEQUENCE PROTECTION (U_{ZERO})



- The detection of the zero sequence (Uzero) in the three-phase system forms a further supplement to the protection functions. Zero sequence can be used, for example, to detect short circuits in the superordinate medium power grid. For this purpose, the three line-to-neutral voltages L1, L2 and L3, which are normally shifted by 120°, both the magnitude and the phase position are added to each other. The magnitude of the voltage difference (without angle) to the neutral conductor is determined and divided by three. If all line-to-neutral voltages have the same magnitude and are shifted exactly 120° to each other, the zero sequence is 0VAC. In the currently valid

NA003-M64(.COM)

MODBUS INTERFACE

The Add-On NA003.COM implements a Modbus RTU (RS485 standard) interface.
It is possible to read and to overwrite values like voltages, frequencies, parameter sets, etc.

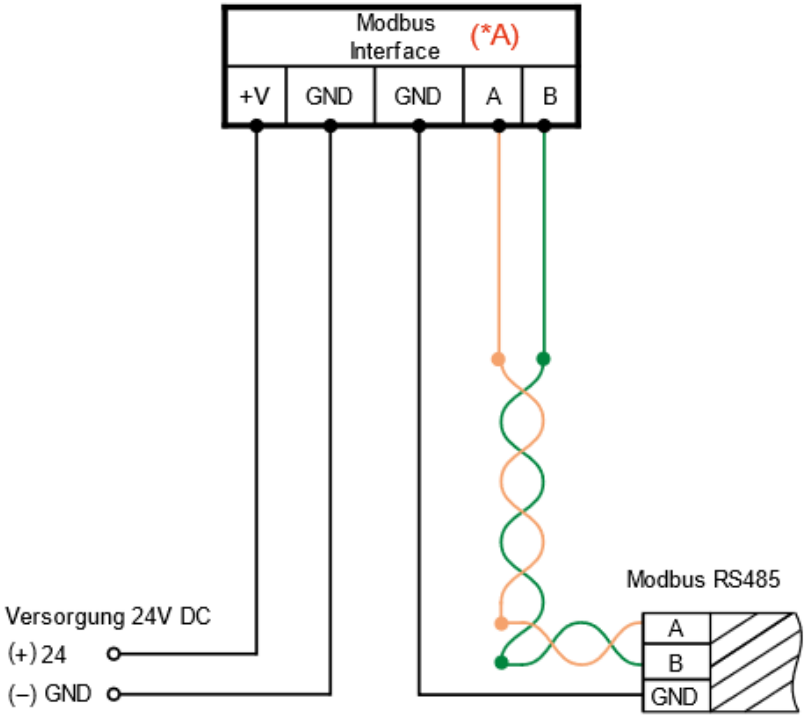
Basic Data Modbus Interface

Type	Modbus RTU/RS485, 5V Transceiver
Supply	24V d.c.
Tolerance of the supply voltage	± 15%
Nominal consumption interface (ca.)	0,2W @ 24V d.c.
Terminals	V+, GND, GND, A, B
Baudrate	9k6 = 9600 baud / 19k2 = 19200 baud (Default: 19200 baud)
Startbit	1
Data length	8 bits
Parity bit	E - even / O - odd / N - none (8N1 none conform)
Number of stopbits	1 or 2
Modbus register / configuration	See software manual (website: www.tele.com)
Protection against electrical shock	Protective separation by reinforced insulation across RS485 interface and Sensor Inputs.
Cable management communication:	Must be installed in-building and with no connection to earth. Length of cables <10m.

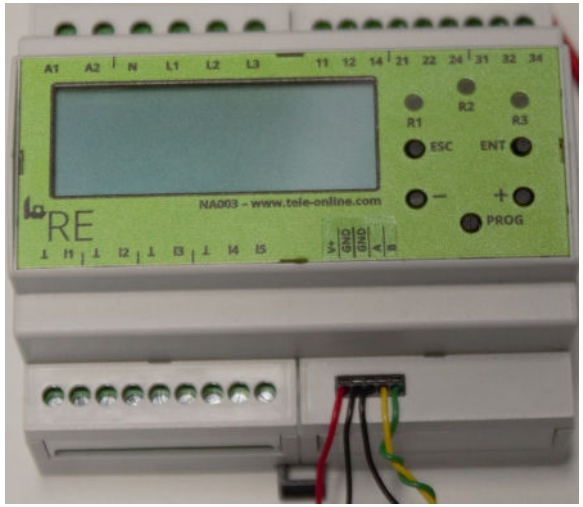
NA003-M64(.COM)

MODBUS INTERFACE CONNECTION

Modbus RS485 standard including RTU cable and 5V transceiver are necessary. We recommend a USB-to-RS485 adapter at this pointto establish a stable serial connection between the slave (NA003.COM) and the master (user PC, etc.).







MODBUS POLL ©

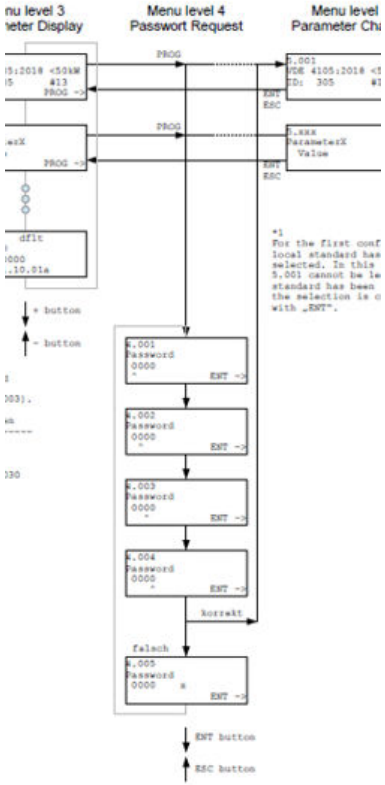
All relevant information about software can be found in the document "Software Manual NA003.COM" as an appendix or at www.tele-online.com.

In the document you will find all Modbus register entries, the adapted menu structure, and the handling with "Modbus Poll ©", which we recommend as Modbus configuration software, as Modbus Poll was also used in the use case in the software manual.

The Modbus Poll program is available online and can be downloaded free on:
https://www.modbustools.com/

NA003-M64(.COM)

MY PROTECTION FOR PARAMETER SETTINGS



There are 2 ways to protect unintended parameter changes:

- Seal on the PROG button
- Password protection in parameter menu



NA003-M64(.COM)

OPEN SETUP

Open Setup, freely configurable and without restrictions

- A setting option that does not exist otherwise
- Parameter setting - individually and according to customer's wishes/needs
- Free configuration by the user based on all available parameters
- Cross-country use through free configuration even with non-country-specific requirements or different specifications
- Multifunctional monitoring relay and not only for grid & system protection

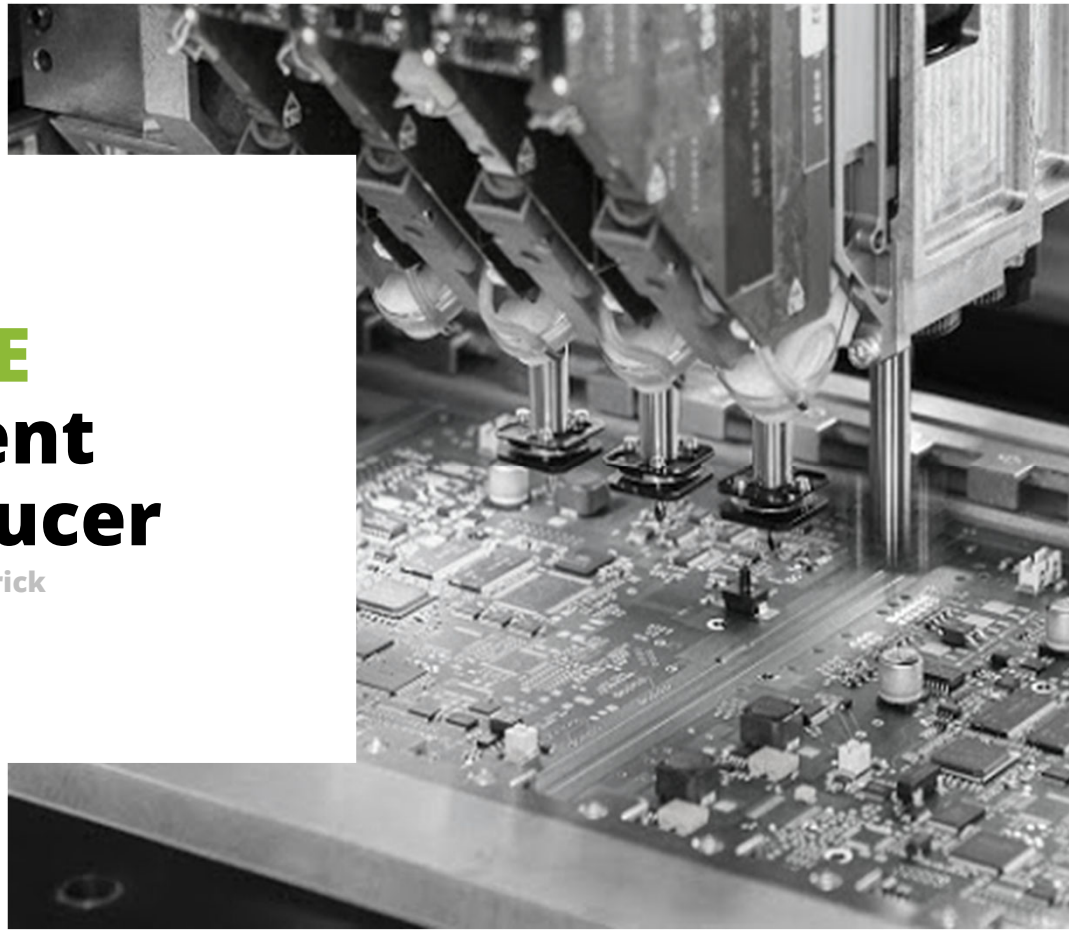
NEXT STEPS

- Mid of April: Launch and serial start of **NA003-M64.COM = 2700200H**
- Mid of May: Launch of new version/index **I** = **2700100I**
  - Includes roughly 22 new parameter sets
    - Australia, Eastern Europe, Southern Ireland, …
- Q4 2023: Launch of project **working title 3.5**
  - New SW base – new controllers and features will be implemented
- Q4 2023: Project start of **working title 3.7**
  - new operating system; implementation of TCP/IP (HW modification); new tooling, … implementation of new features and maybe also Bluetooth but this is a question mark.
  - Scheduled for mid of 2024



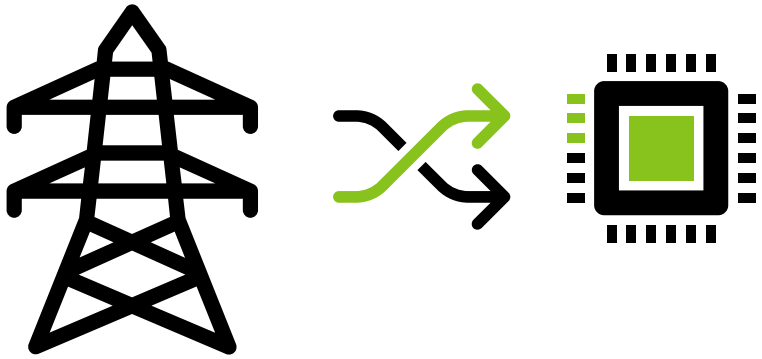
TELE
Current Transducer

Neil & Patrick



Current Tranducer

STATE OF THE INDUSTRY ANALOG

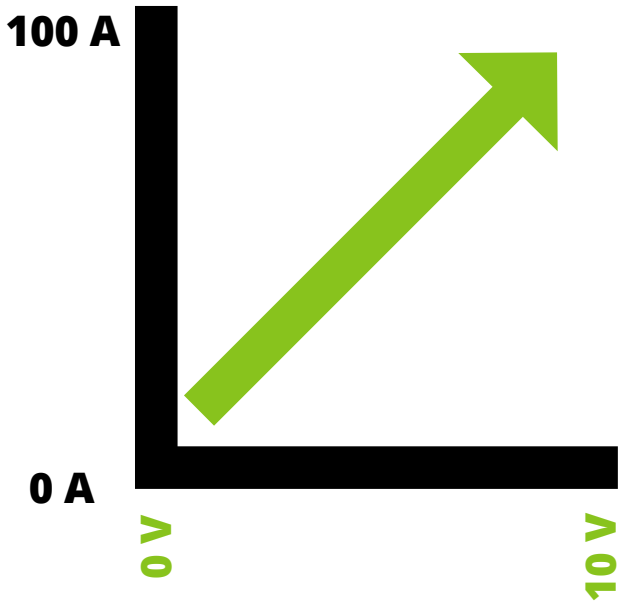


- Converts a (high) current AC/DC signal to a low current or voltage process value
  - LINEAR ANALOG OUTPUT
- Serves as Isolation Module to prevent damage of highly sensitive equipment
- Defined current Input range is converted to a defined analog output.
- Different Variations of Designs for different purposes

Current Tranducer

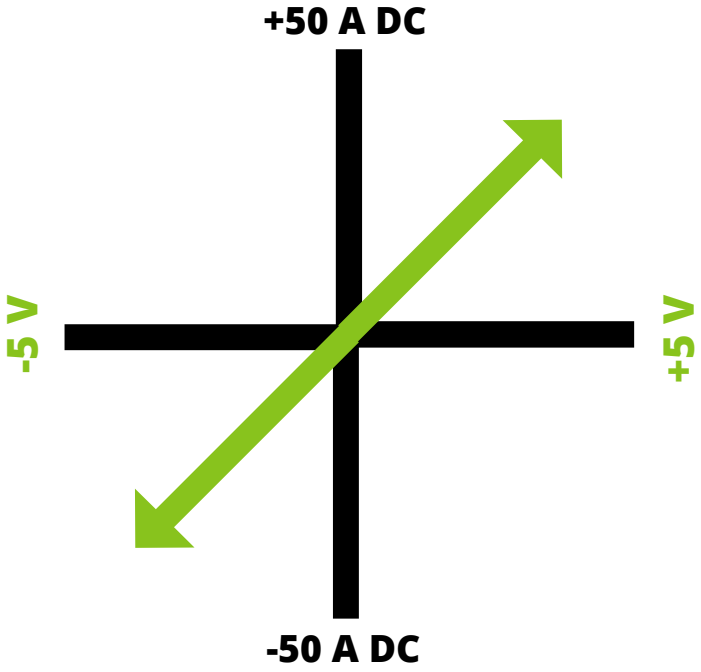
COMMON ANALOG OUTPUTS

UNIPOLAR OUTPUTS



0...10V | 4...20mA | 0...20mA

BIPOLAR OUTPUTS



5V ± 5V | 10mA ± 10 mA | 12mA ± 8mA

Current Tranducer

WHAT'S ON THE MARKET

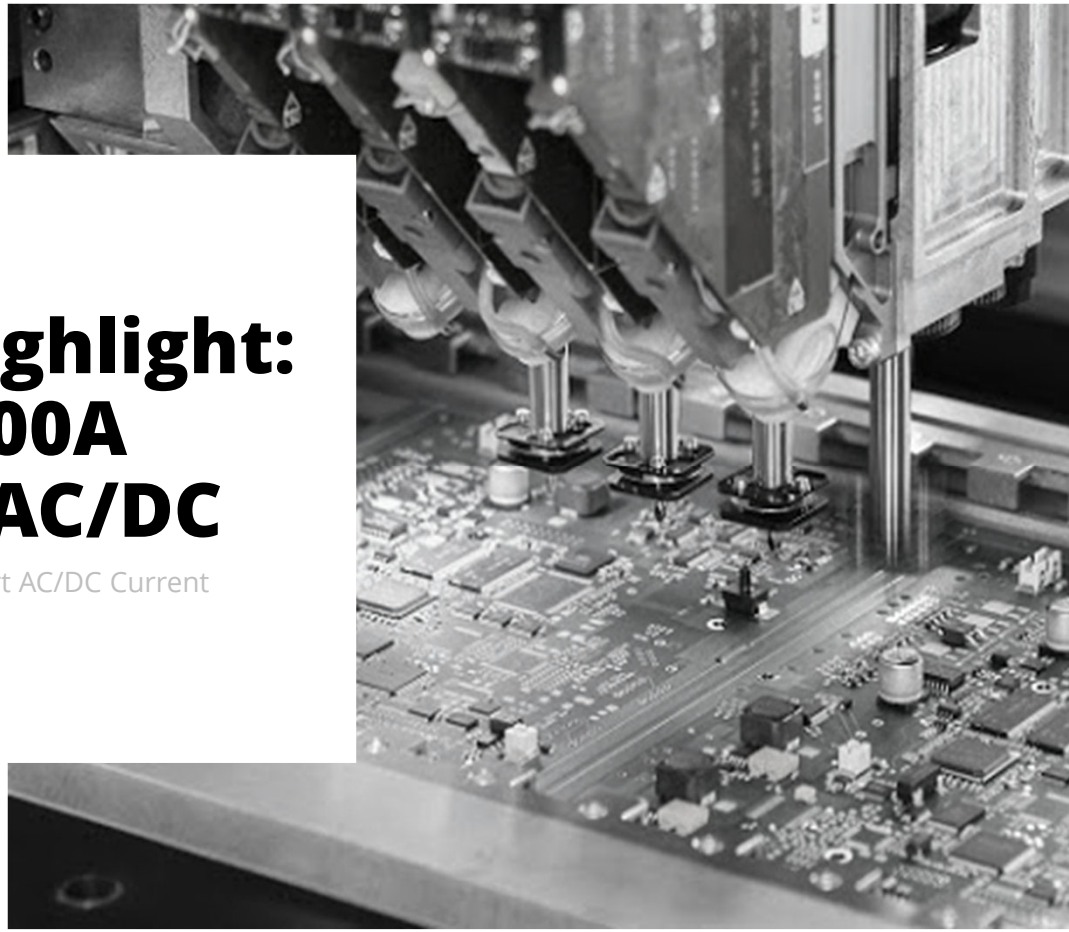


- Connection via open wire or contact-less
- Loop-Powered or auxiliary power
- Solutions for 5, 10, 15, 50 or 300A end Range
- Current Range extendable via external 5A CTs
- Different Variations of Designs
- E.g. 15A input, 0…10V signal is required -> Additional converter necessary to convert mA to V



Product Highlight: V4IA100A 24-240V AC/DC

A modern way to convert AC/DC Current



Product Highlight

V4IA100A 24-240V AC/DC



Current Transducer with selectable input ranges 25A, 50A, 75A and 100A and output ranges in Volts and mA.

Measures directly with the integrated hall sensor.

Gives a linear and isolated low level output signal. Detects the (DC) current flow direction (with shifted Zero)

Additional zoom function to offset the zero point and increase resolution within measuring range.

Product Highlight

V4IA100A 24-240V AC/DC



- 4 Current Ranges in One Unit
- For AC and DC measurement
- Wide Range Supply Voltage of 24-240V AC/DC
- Integrated Hall Sensor
- 6 Selectable Analog Outputs
- SAVES SPACE – INVENTORY – MATERIAL COSTS

Product Highlights

V4IA100A 24-240V AC/DC

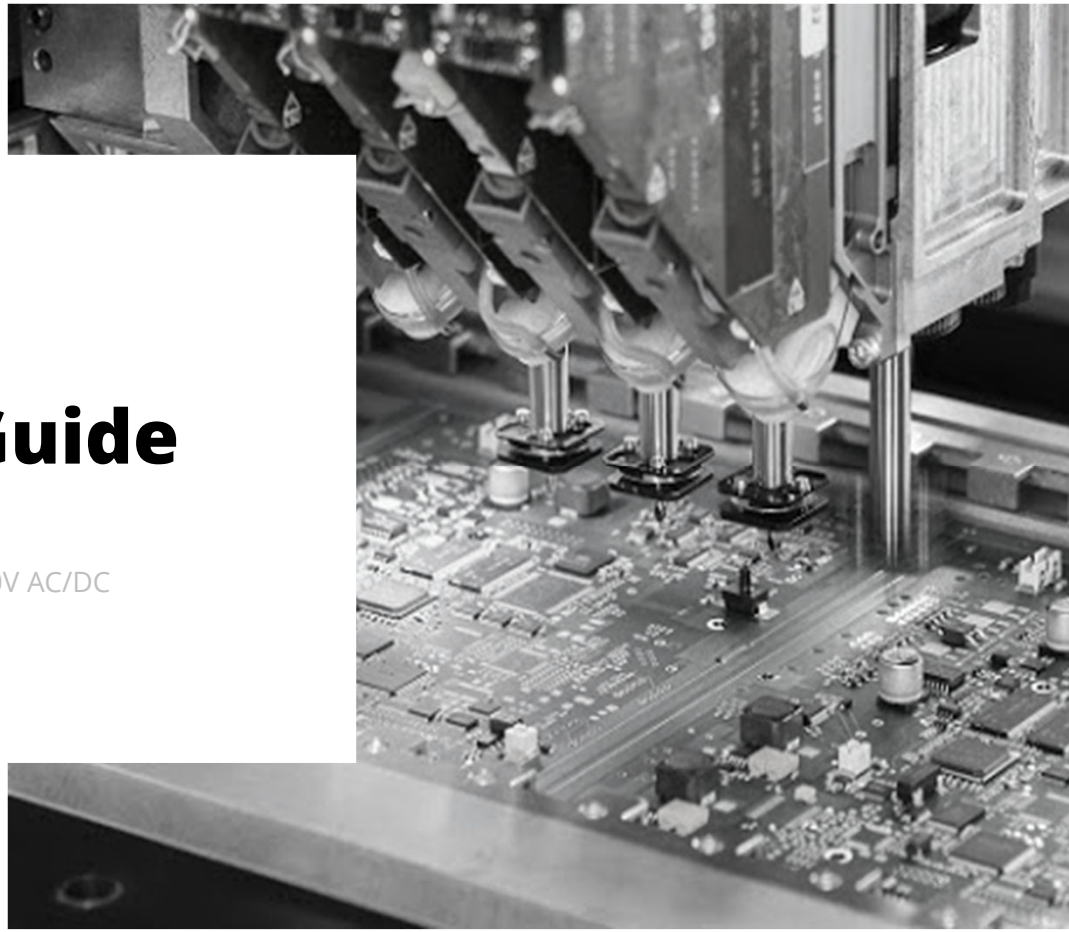


- Functions: 1ph AC and DC Current measurement
- Input Ranges: 25A, 50A, 75A, 100A AC and DC
- Analog Output: Galvanically Isolated, mA or V
- Indicators: 4 x LED (Power | ERR | Cout | Vout)
- Auxiliary supply: 24V - 240V AC/DC
- Hall Sensor: 15mm | .6” Diameter
- Mounting: DIN – Rail
- Certification: EAC, CE



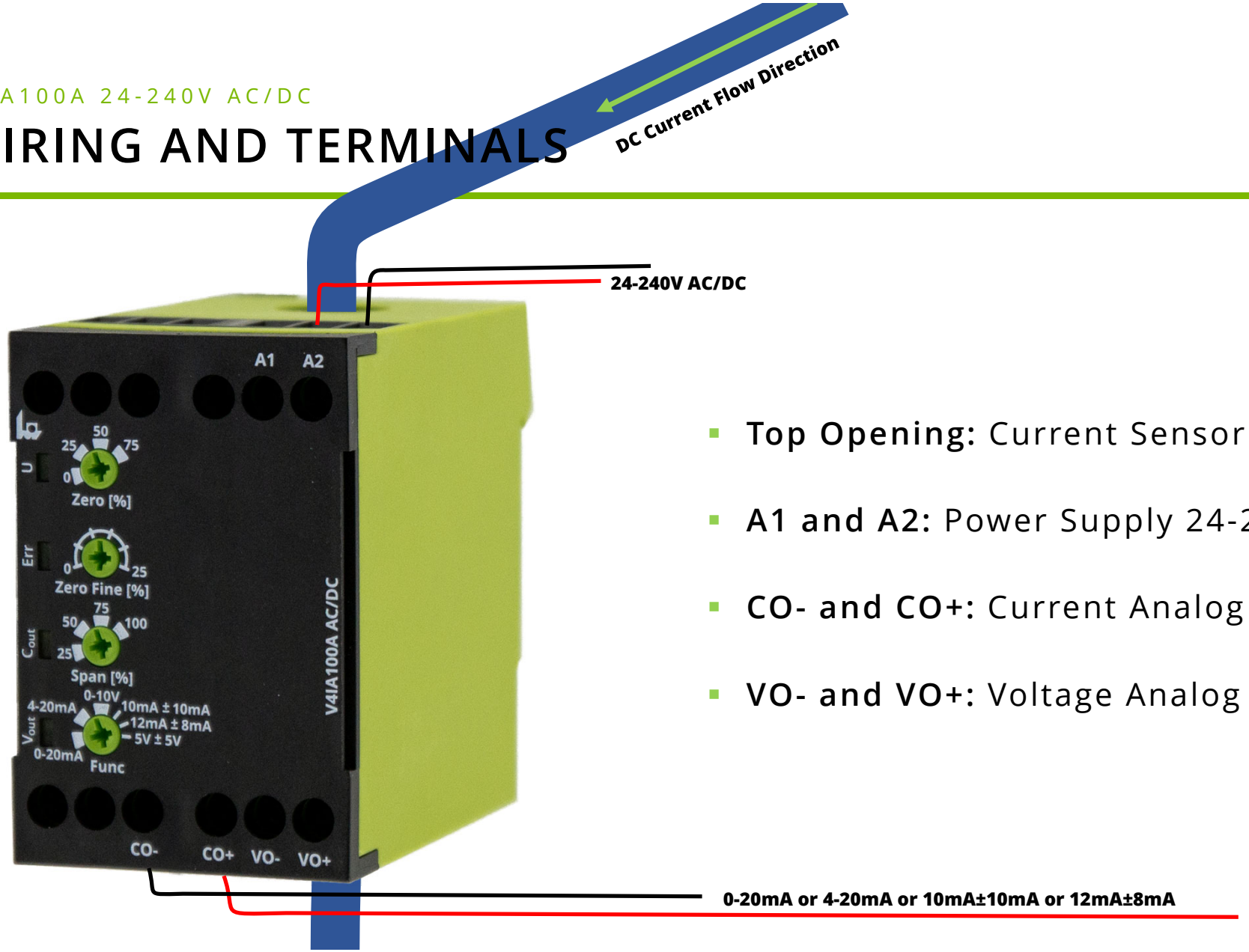
Setup Guide

V4IA100A 24-240V AC/DC



V4IA100A 24-240V AC/DC

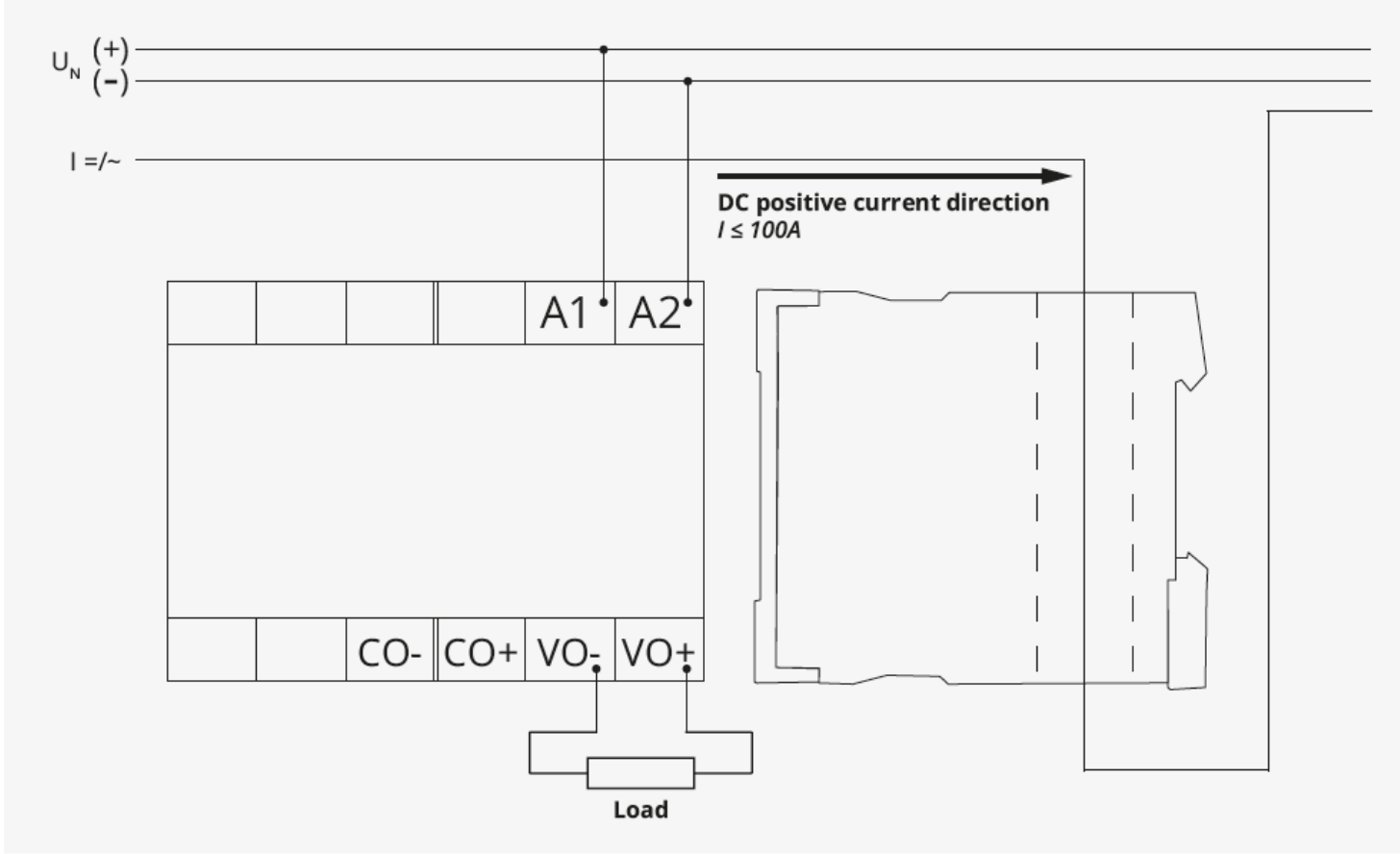
WIRING AND TERMINALS



- **Top Opening:** Current Sensor 0-100A AC or DC
- **A1 and A2:** Power Supply 24-240V AC/DC
- **CO- and CO+:** Current Analog Output
- **VO- and VO+:** Voltage Analog Output

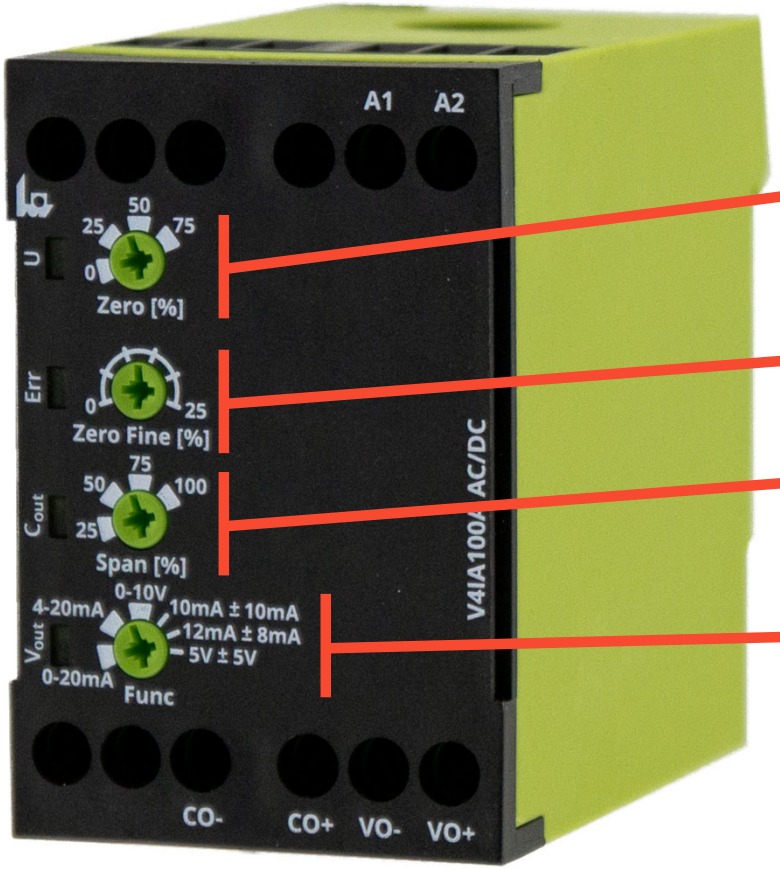
V4IA100A 24-240V AC/DC

WIRING AND TERMINALS



V4IA100A 24-240V AC/DC

SETTINGS



ZERO – Fine Adjustment of Zero Offset % of 100A AC/DC

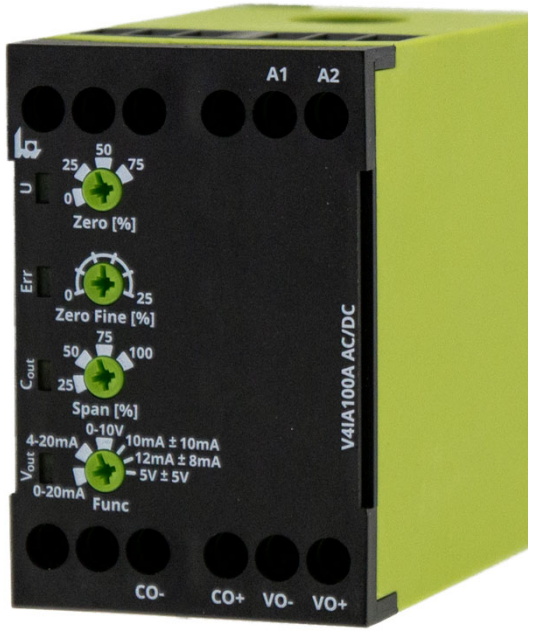
ZERO FINE – Fine Adjustment of Zero Offset

SPAN – Current Range in % of 100A AC/DC

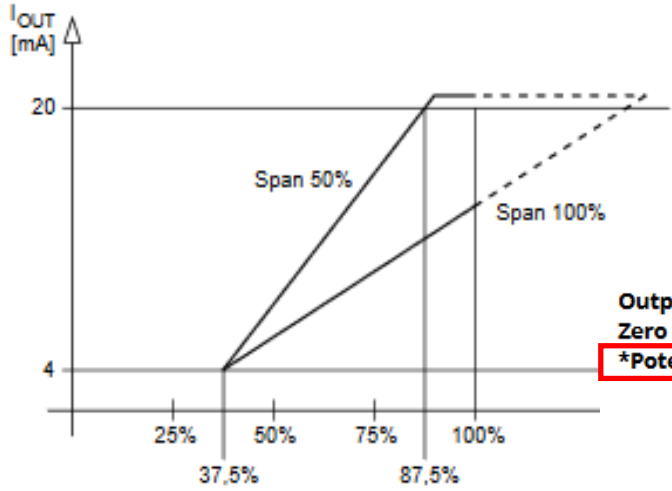
FUNC – Output Functions and Values

V4IA100A 24-240V AC/DC

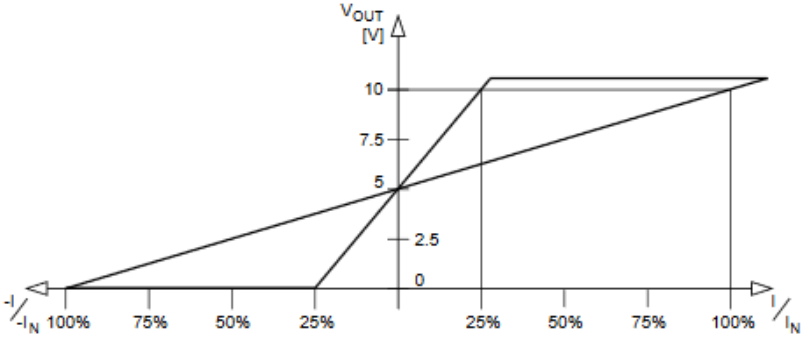
SPAN ARRANGEMENTS



Output: 4-20 mA
Zero = 37,5% / Span = 50% ; Zero = 37,5% / Span = 100%



Output: 5 V ±5 V
Zero = 0%* / Span = 25% ; Zero = 0%* / Span = 100%
***Potentiometers „Zero" and „Zero Fine" have no function**



V4IA100A 24-240V AC/DC

STATUS LED INDICATORS

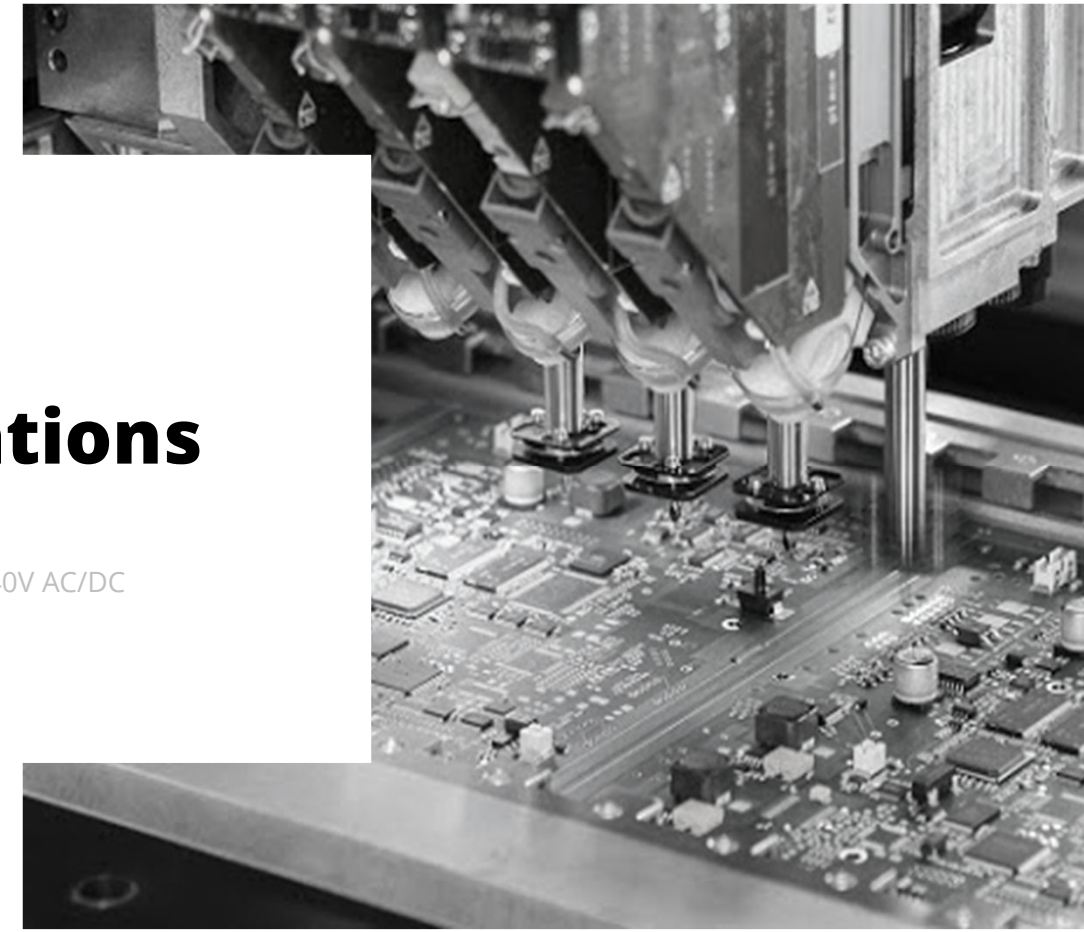
- LED “U” – Supply Voltage applied
- LED “ERR” – Output Load Indication
- LED “C out” – Current Output Status
- LED “V out” – Voltage Output Status





Applications

V4IA100A 24-240V AC/DC



V4IA100A 24-240V AC/DC

DC BATTERIES | CURRENT FLOW



ISOLATE AND MEASURE AT THE SME TIME

- Can be utilized to measure DC current for industrial battery storage systems, e.g. hospital backup power
- Deliver safe and highly accurate current flow values

HOW WE MAKE YOUR EQUIPMENT OPERATE SAFELY

- Contact-less Current sensing via integrated HALL Sensor
- >6kV isolation voltage protects your control units and PC equipment
- Selectable output configurations adapt to every system

V4IA100A 24-240V AC/DC

MOTOR MONITORING | CONTINOUS OVERLOAD



NO MORE NON-COMPATIBLE CURRENT SENSORS

- For industrial AC motors
- With increasing load, current draw of motor increases significantly
- Timely action prevents overheated motors and bent mechanical parts, broken bearings and long-term wear

HOW WE MAKE SURE YOU KNOW WHAT'S GOING ON

- Flexible Analog Outs of our overload sensor connect with all PLCs with Analog Inputs
- No more additional current transducers required
- Explicitly zoom into power/load area of your interest

V4IA100A 24-240V AC/DC

CONDITION MONITORING | PEAK SHAVING



SEEING IS BELIEVING

- See where the current consumption of your production line, or control panel is coming from
- Analyze current flows in a SCADA or Controller
- See where consumers in your network have a higher current consumption than the average in your network

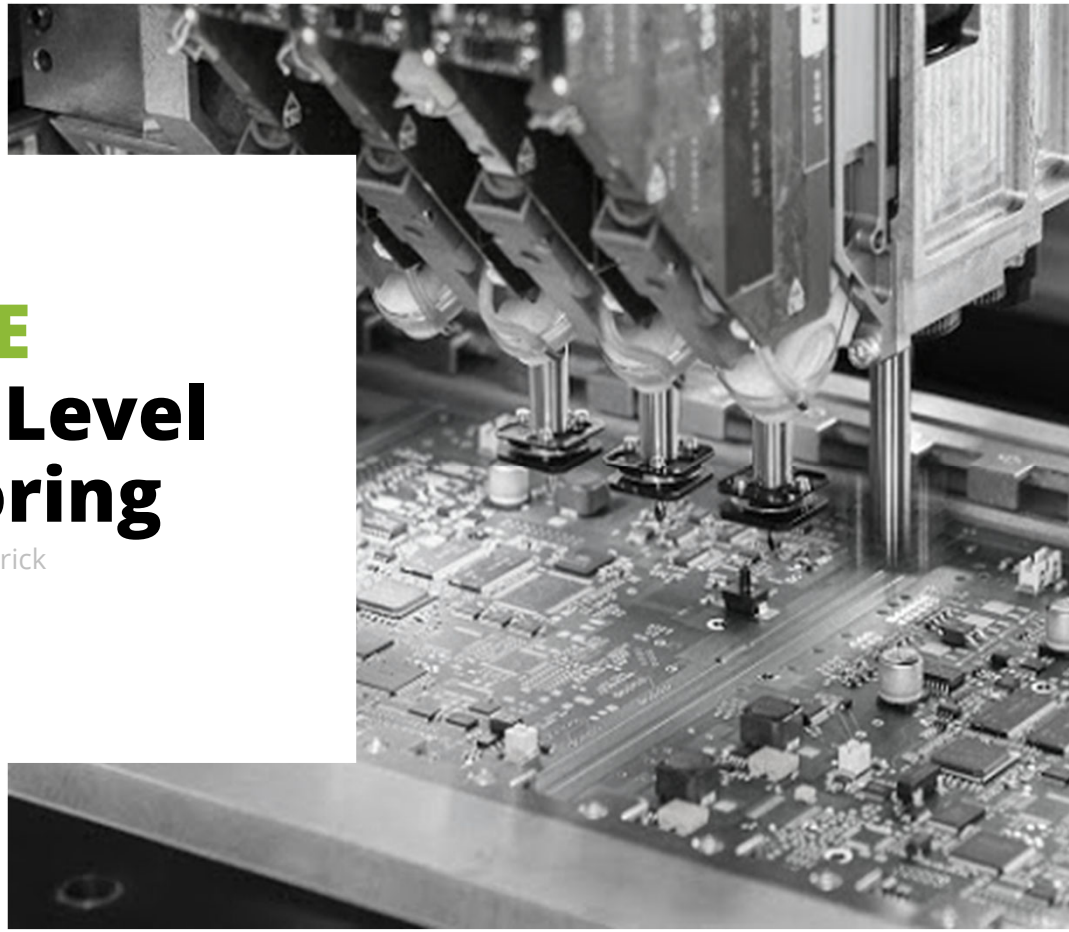
HOW WE MAKE SURE YOUR LOADS ARE DISTRIBUTED EVENLY

- Detect clogged filters of pumps, fans or broken mechanical parts of a motor
- See if lighting equipment is faulty (by having decreased current)
- React faster and adjust better to your customers control input
- No fear of inrush currents due to contactless sensor



TELE
Pump & Level Monitoring

Adam & Patrick



GENERAL



How does Level Monitoring works?

With Probes, the level of a conductive liquid is measured.
Depending on the set function the relay output is switching differently.

How does our Pump/Load Alternator works?

Depending on the function the working Load/Pump is changed.

Control input is optional

Basic

WHY PUMP & LEVEL MONITORING IS NECESSARY..



To prevent:

- dry running pumps
- Over capping tanks
- Uneven pump usage, to protect your gear and panels

Basic

PRODUCT RANGE



Pump Alternator:

E1ZMLA10 24-240V AC/DC

Level Monitor:

E3LC10 230V

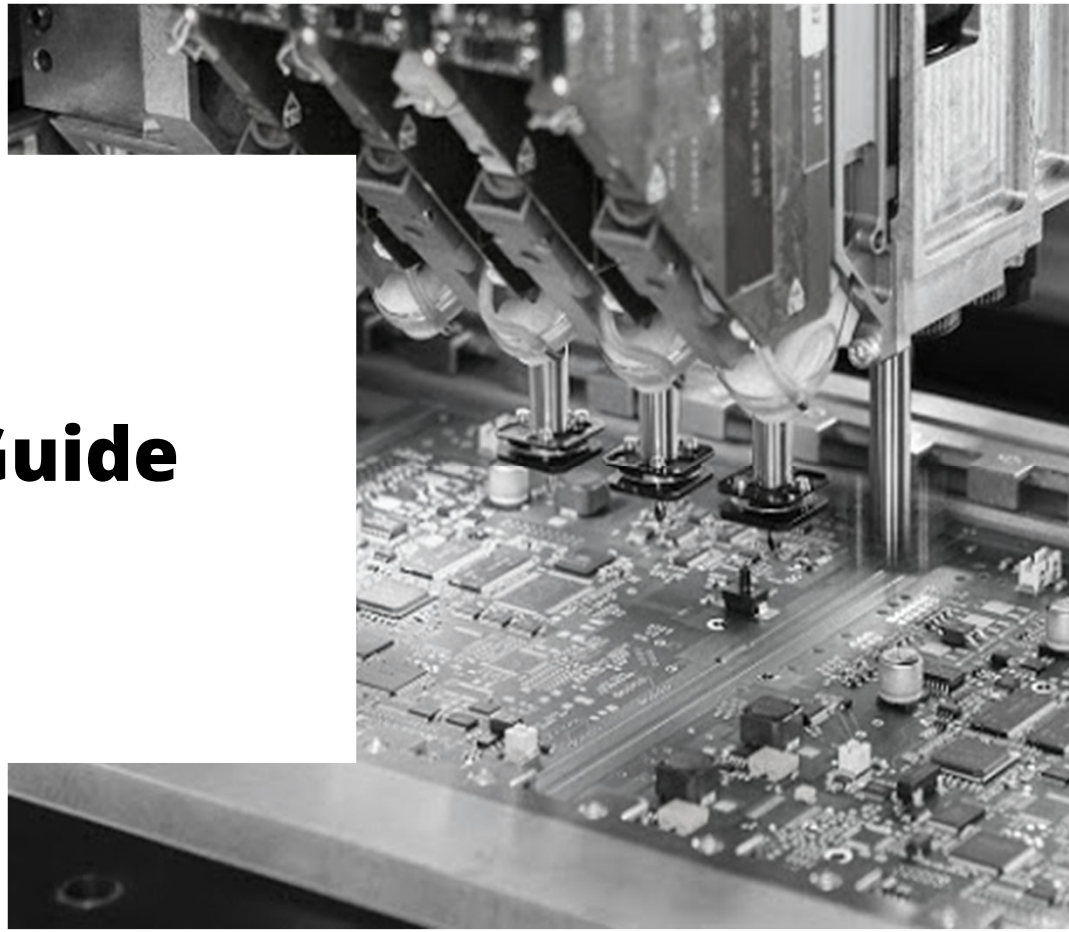
E3LM10 230V

G2LM20 24VAC/110VAC/230VAC

V4LM4S30 24-240V AC/DC

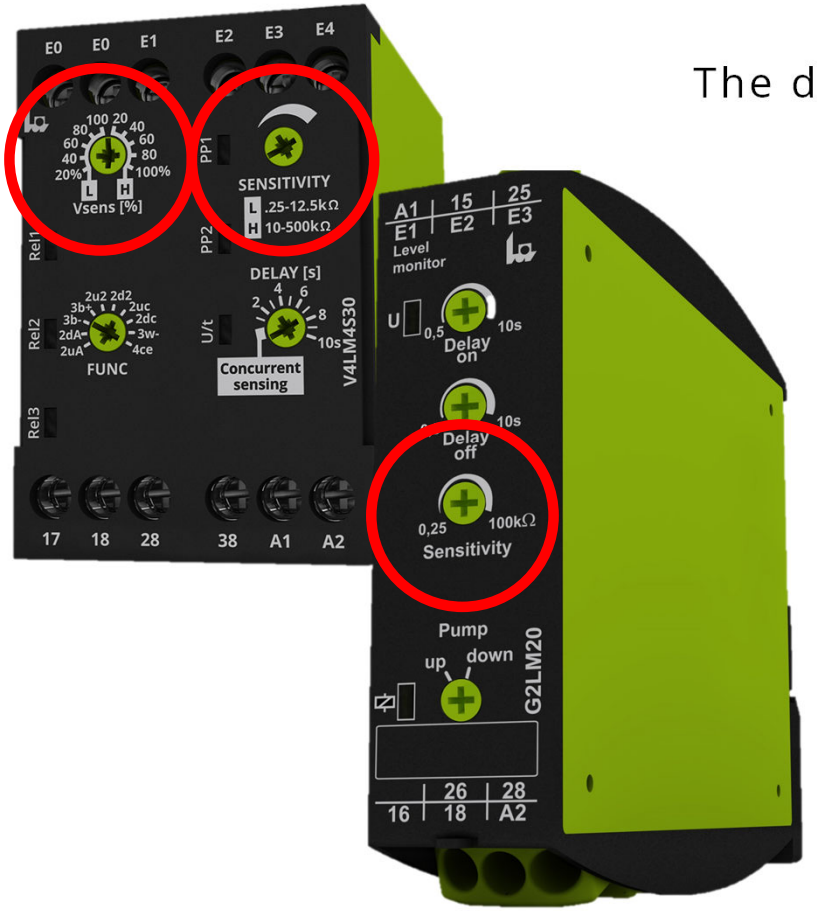


Setup Guide



Basic

PRODUCT RANGE

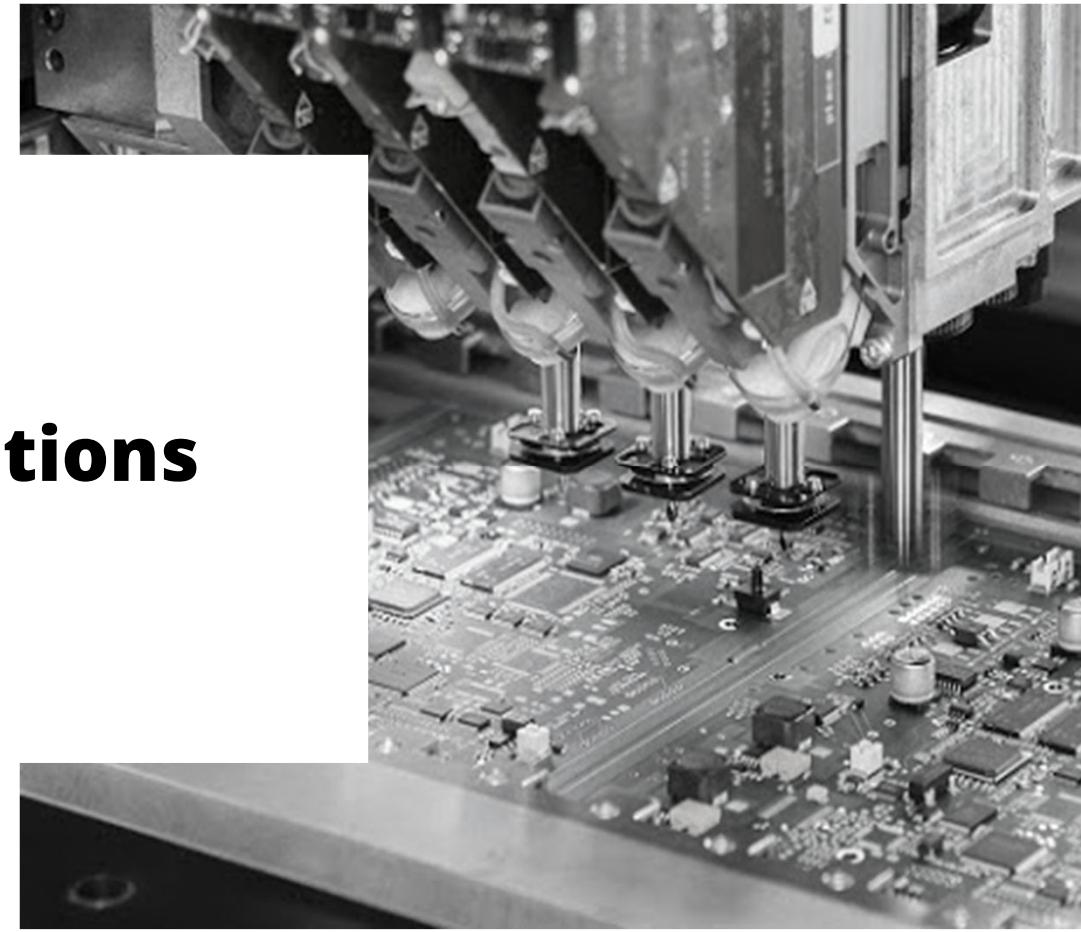


The difference to other monitoring/time relays is….

…the sensitivity.



Applications



APPLICATIONS

FILL LEVEL MONITORING

Task:
The Fill level must be monitored in a water reservoir, so the pump can be activated, when the waterlevel is to low.

Solution:
With the TELE **E3LM10** or the TELE **E3LC10**, the maximum and minimum fill level of the fountain is monitored.If waterlevel is below minimum, then the pump is being activated, if maximum level is exceeded the pump is being deactivated. Measurement through 3 Probes.

Benefit:
•Preventing damage from dry running pumps
•Preventing downtime
•Long cable length up to 1000m possible

APPLICATIONS

LEVEL MONITORING OF ELECTROPLATING TANKS

Task:
In electroplating, various electrolytes with different chemical characteristics are used. To produce high quality circuit boards, usually copper electrolyte based on sulfuric acid or cyanide is used. This liquids demand very low resistance measurement capability on the measurement circuit and high corrosion resistance of the level probes.

Solution:
The **G2LM20** measures the conductance of the electrolyte between the probes and the reference electrode. If the tank is made of electric conductive material, it can be used as reference probe. These are installed at the desired liquid levels in the tank, with two probes and the reference probe (not necessary for a conductive tank). Depending on the selected configuration, the level can now be maintained between the two probes or constantly around the level of a single probe. A selectable time delay prevents frequent switching of the pump in case of swellings of the liquid.

Benefit:
•Various modes of pump control selectable.
•Adjustable conductivity level, to adapt to the liquids used in the tanks.
•Two separate adjustable timers for pump delay and probe delay to prevent the system from frequent switching.

APPLICATIONS

LEAK DETECTION

Task:
Level for water and water-based liquids is an important process value in automation-based applications for PLC's. Facilities with a high risk for water damage from heavy rains, ground water, broken pipelines and damp walls needs to be monitored to prevent water damage.

Solution:
The TELE **V4LM4S30** level monitoring interface, with function 4ce is the solution and offers save and isolated signals for the PLC. The 3 relays are used to output probe states by means of coding. Up to 4 levels can be evaluated for one container. By connecting to the PLC individual application conditions can be considered.

Benefit:
•Adjustable sensitivity and scan rate
•4 probes selectable

APPLICATIONS

FLUTTER-FREE OPERATION OF WASTEWATER TANKS

Task:
In big basins of wastewater plants, a wave movement can occur due to the large surface area, which makes the float switch "flutter".

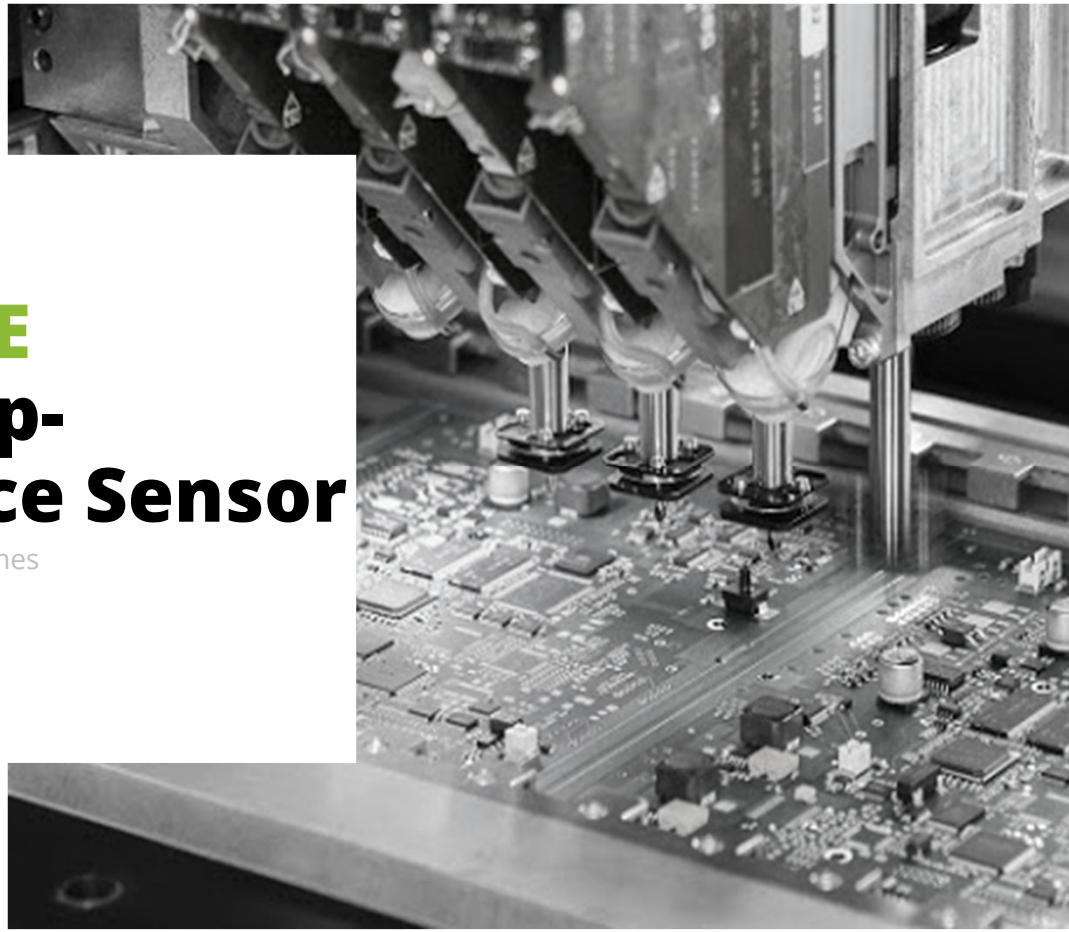
Solution:
With the TELE **E1ZMLA10** setting of function switch E (ON delay) the frequent switching off from the float switch is delayed again and again until a stable OFF state is reached. This stabilizes the switching behavior of the pump.

Benefit:
•minimization of accidental switching of the pump and of maintenance costs
•motor protection through reduced starts
•stable plant condition



TELE
-eCap-
Performance Sensor

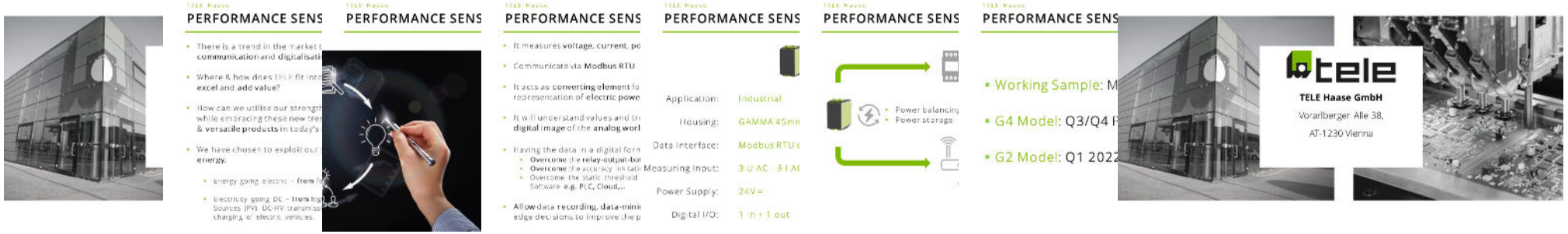
Laura & James





eCap Performance Sensor

RECAP OF THE ECAP

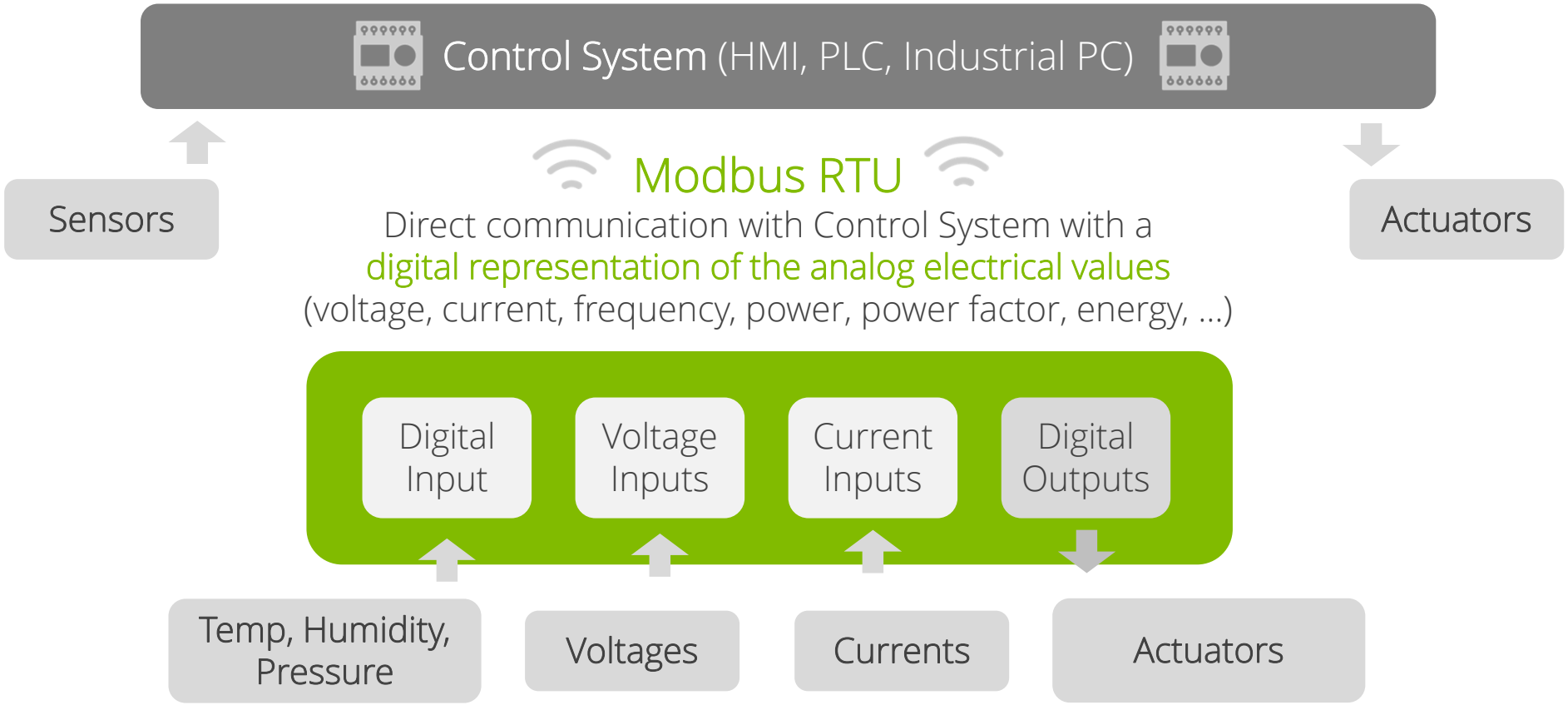






eCap Performance Sensor

DEFINITION OF SYSTEM & SENSOR



eCap Performance Sensor

MONITORING RELAY VS. PERFORMANCE SENSOR

New but familiar...

Monitoring **Relay**

Accurate measurement of analog electrical values and **comparing** them with an adjusted/**fixed threshold**

Binary information – is the threshold exceeded?



GAMMA Housing

Potentiometers for parameter setting

Measuring the same values, we have been experts in for 60 years



Performance **Sensor**

Accurate measurement of and **calculation** of analog electrical values

Accurate digital representation of analog electrical values (via **Modbus RTU**)

WHAT IS THE ECAP PERFORMANCE SENSOR?

- UNIVERSAL
- ACCURATE
- FAST
- RELIABLE

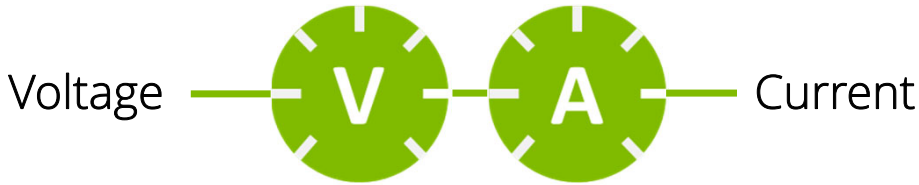
The eCap is a **reliable** and universally applicable **performance sensor** for **accurate measurements** of analog values and **fast data transmission** for digital data processing



eCap Performance Sensor

WHICH VALUES CAN BE MEASURED?

Measurement



Calculation



Reactive Power



Frequency

Active Energy



Power  Energy



Power Factor

Reactive Energy



Resistant Loads

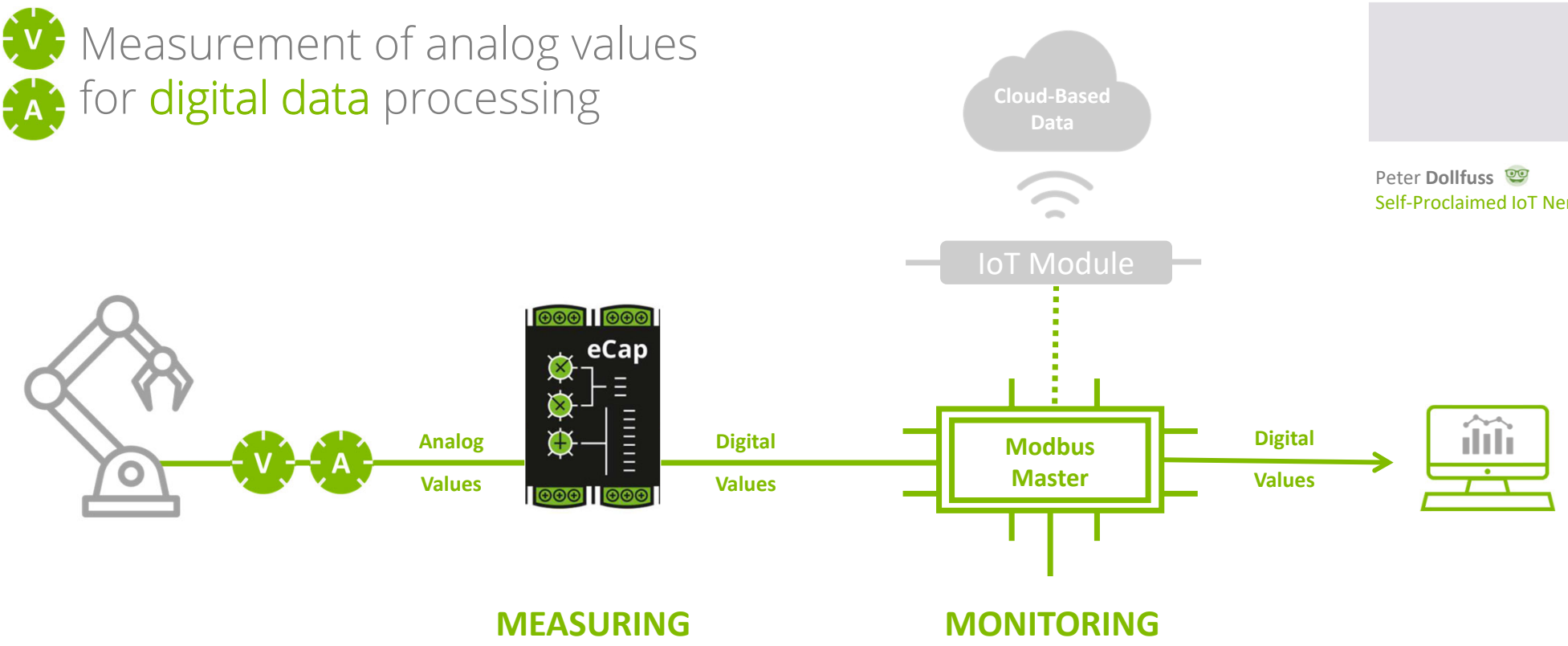
Consumed Energy



eCap Performance Sensor

HOW DOES THE ECAP WORK?

Measurement of analog values
for digital data processing

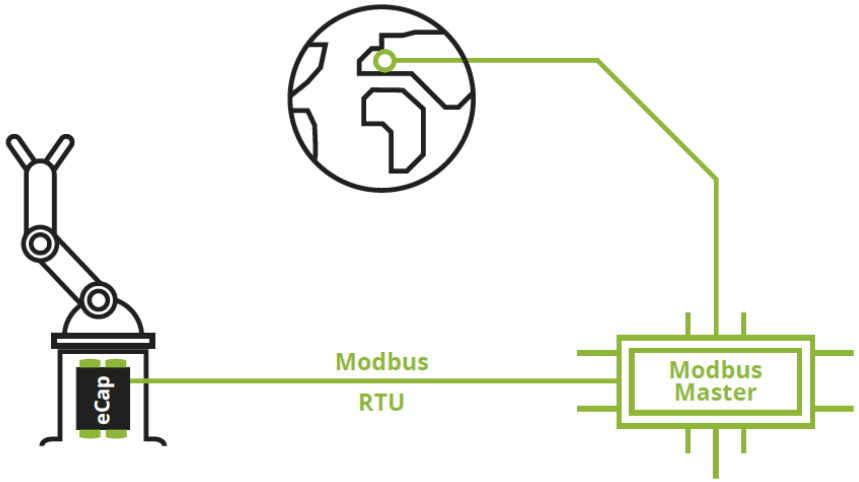


Peter **Dollfuss**
Self-Proclaimed IoT Nerd

eCap Performance Sensor

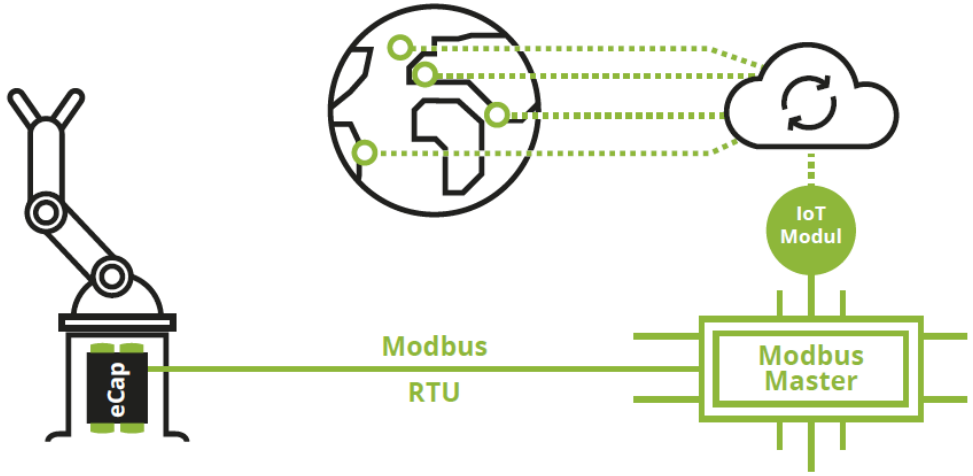
HOW DOES THE ECAP WORK?

eCap with programmable logic controller



Analog electrical data is read from your machine, motor or power supply, converted into digital values and transmitted via Modbus RTU to a Modbus master. With the obtained data your PLC or HMI can react to the trigger events of your machine in order to protect, prevent, act and alarm. This variant allows you to access the digital data directly on site.

eCap with IoT module



With the addition of an IoT module, the data collected from your machine is transferred to the cloud via internet connection. This way, you can access digital data with various devices from anywhere in the world.

eCap Performance Sensor

WHY DO WE NEED DATA?

"Without data you're just another person with an opinion" W. Edwards Deming, Statistician

1 Data

Collect data

2 Information

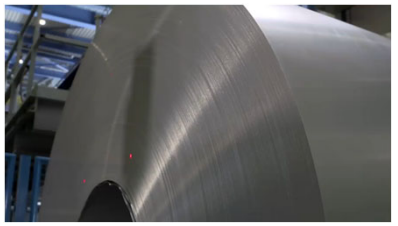
Enrich your data pool

3 Knowledge

Optimization of the system

Digital data for your **competitive advantage**

- ✓ **Production**
- ✓ **Operating** conditions
- ✓ **Equipment** conditions



eCap Performance Sensor

WHAT TO DO WITH THE DATA?



Process Monitoring

Progressive automation in the area of product manufacturing leads to an increase in process monitoring. With the eCap, this can be done automatically to ensure quality and safety. The digitally measured electrical values can be used to decide whether and how to intervene or optimize loads in manufacturing.

Increasing Energy Efficiency

The optimized use of energy is constantly gaining importance, and this also applies to industrial manufacturing for example. Minimizing energy consumption and adapting the energy required to operate your facilities to the actual workload required can be achieved through clever control using the data from the Performance Sensor eCap.



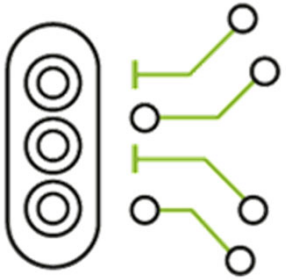


Predictive Maintenance

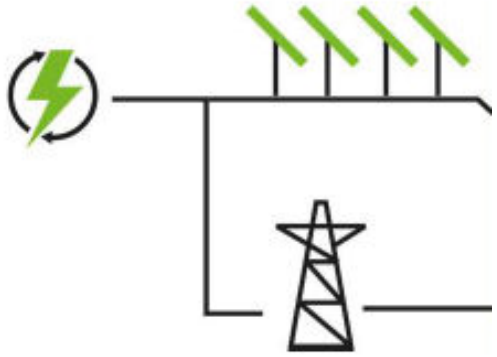
Monitoring machines during operation to detect any malfunctions or irregularities early on can prevent significant consequential damage to your system. The eCap provides you with accurate digital data for this purpose, enabling you to react quickly

Retrofitting Analog Technologies

Retrofitting your analog machines is an excellent substitute for costly new purchases and offers you a wide range of new optimization and control options through newly acquired electrical data.



WHAT TO DO WITH THE DATA?



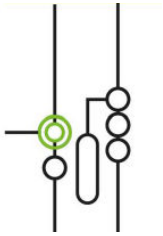


Load Balancing

Renewable energy sources, such as solar or wind, are dependent on weather or time-of-day conditions and thus feed into the power grid much more dynamically than conventional energy sources. At the same time, the number of electrical consumers, such as e-vehicles, who want to charge electricity economically as possible, is increasing. A crucial question is therefore how to best adapt the electricity output to the required demand. Here, the TELE Performance Sensor eCap can provide the relevant data for analysis and optimization directly from the plant.

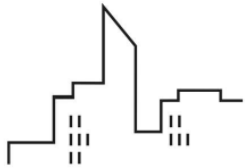
eCap Performance Sensor

WHAT TO DO WITH THE DATA?

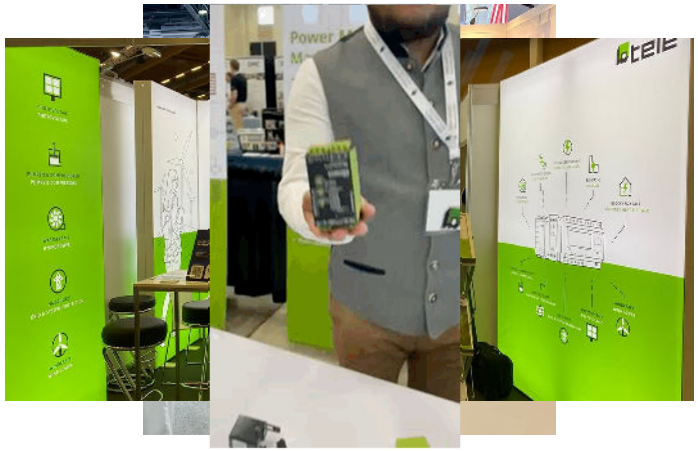


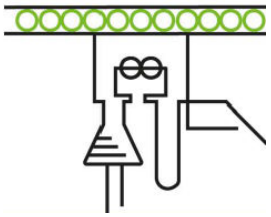
Industrial Automation





Energy Self-Sufficiency





Production Flow Monitoring



eCap Performance Sensor

USER CASES IN THE FIELD



South Korea

Energy Management System

Manufacturing Plants

Industrial HVAC

Packing Factories

Logistics Warehouses

Water Processing

Motor

Pump

Circuit Breaker

Data Acquisition Management

Energy Cost Management

Energy Performance Monitoring



Carbon Impact Tracking

Energy Insight & Analytics

Advanced Energy Optimisation

eCap Performance Sensor

ECAP AT THE HEART OF OUR IOT SERVICE









eCap Performance Sensor

ECAP AT THE HEART OF OUR IOT SERVICE



Software & Service





Igor Senjak



Peter Dollfuss

eCap Performance Sensor

BENEFITS OF THE ECAP

High performance



- Excellent sampling resolution: 24 bit
- Very high sensitivity: 1/100,000 full measurement range
- High sampling rate: 9,800 samples / second
- Very high accuracy: up to 0.01 %

Customization



- Possibility to implement customized functions
- Takes into account values, trends and customer requirements to communicate an accurate digital representation of the analog world
- Firmware update via Modbus RTU

eCap Performance Sensor

BENEFITS OF THE ECAP



Additional monitoring and switching functions

- ✓ Digital input for local integration of additional controls or interfaces
- ✓ Digital output for local activation of the device, e.g. a drive or protective relay



Compact size & ease of use

- ✓ Mounting width: 45 mm / 1.8 in
- ✓ All terminals accessible even when device is mounted



Super easy setup

- ✓ Setup of Modbus parameters via adjustment dials and screwdriver. Optionally via free configuration software.
- ✓ Currentless parametrization possible (unpack › front setting › connect › ready)
- ✓ Parameterization can be read from the front even in the de-energized state
- ✓ Fits perfectly into the installation sequence of the TELE Gamma series

eCap Performance Sensor

FUNCTIONS AT A GLANCE



Made in Austria

- **Resolution**: measures voltage and current with very high resolution (24 bits, 9,800 samples/s) and calculates many other values – power, power factor, frequency, consumed energy etc. that describe the condition of the electrical equipment very well.
- **Accuracy**: 0.01 % (f); 0.15 % (U); 0.25 % (I); 0.5 % (P,S,Q)
- **Modbus RTU (RS485) interface settings**: (9.6; 19.2 or 115.2 kBit/s)
- **Sensitivity**: FMR / 100,000
- **Voltage inputs**: 0-480 V DC
- **Current inputs**: 5 Amp
- **Power supply**: 12-48 V DC
- **Digital input**: 1
- **Digital outputs**: 2

eCap Performance Sensor

WHAT IS THE DIFFERENCE BETWEEN ECAP & SENSACT





Feature	eCap	SensAct
Sampling Rate	9.800 samples / second	6.400 samples / second
Sampling Resolution	24 bit	-
Accuracy U	0,15 %	0,5 %
Accuracy I	0,25 %	0,5 %
Accuracy f	<= 0,005Hz (typ. 0,001Hz, 45...63Hz) 0,01%	0,1Hz (40...70Hz)
Accuracy P,S	0,5 %	0,5 %


What is your favorite Product?


The TELE
Partner Portal
COMING SOON


WHAT IF I TOLD YOU
YOUR FEEDBACK COULD DETERMINE OUR FUTURE?
I WANT YOU
FOR FEEDBACK!
SCAN ME!!



Thank you!

