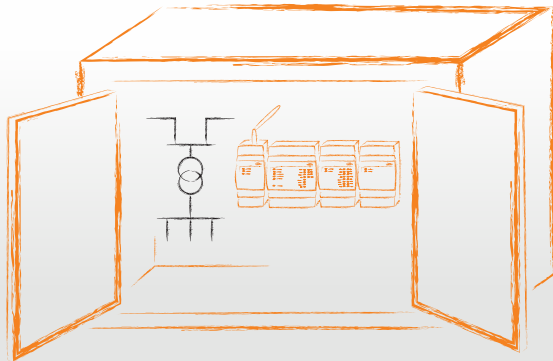


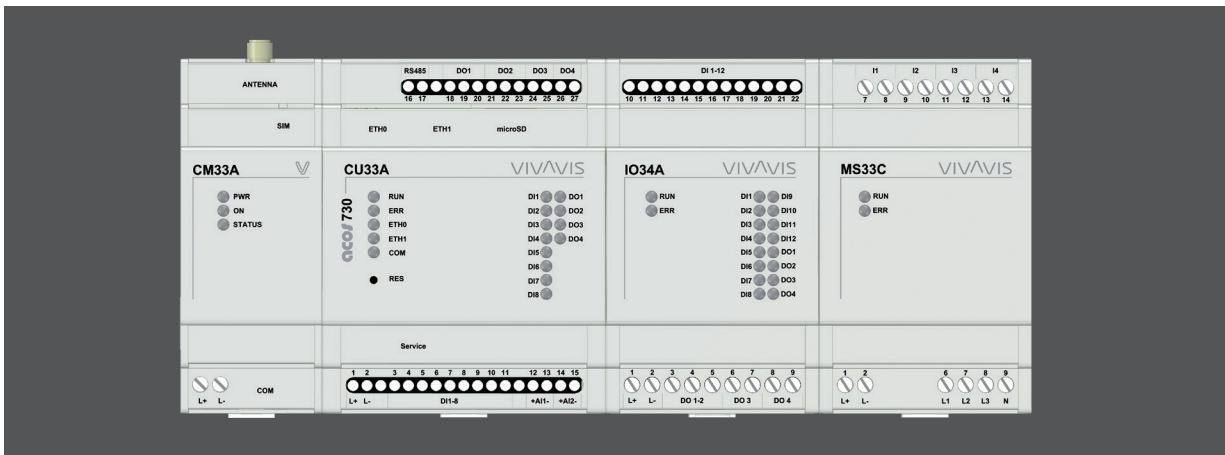
VIVAVIS

DECODING THE FUTURE



Ready-To-Connect: Solutions for Smart Transformer Substations

Operation and monitoring of transformer substations is not only sensible but absolutely necessary



Tell Us What You Need – We Provide the Solution!

What is important for you?

- **No copper, please!**
I want my grids to be economical and flexible!
- **Innovative – proactive!**
I want to be prepared for the increasing number of renewable power supplies and controllable loads, as well as the ongoing development of e-mobility.
- **Speed is of the essence!**
I want to reduce power recovery times and prevent power losses in MV grids.
- **Safety first!**
The increasing decentralization means that I need better protection of my assets and equipment. This also includes the continuous monitoring of cable load.
- **Always one step ahead!**
I want to remain competitive: Therefore I must be flexible and ready for changes and prepare myself in time for new requirements and decentralization.
- **Better safe than sorry!**
I want to further develop and coordinate my activities and processes for system stabilization.

The Basic

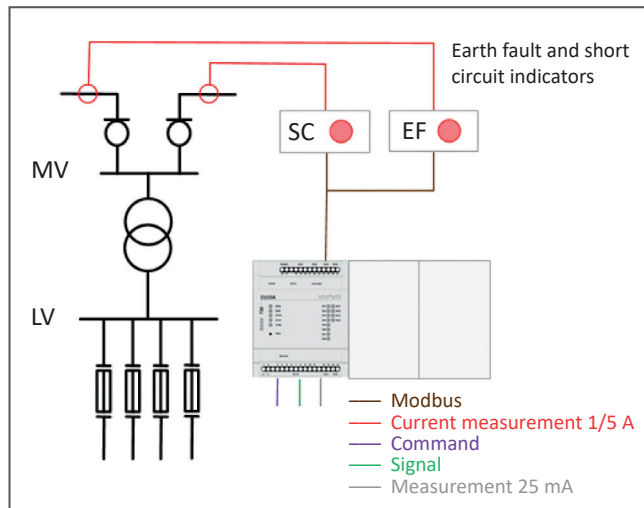
Monitor your stations for MV faults, restrictions or damage.

ACOS 730 - Basic Function

The basic function serves to record general RTU signals and read out information from earth fault and short-circuit indicators via Modbus.

All data are recorded by the CU33A central processing unit. Apart from recording the error direction from earth fault and short-circuit indicators, the CU33A also enables the recording and transmission of measured values.

The device is ready for the activation of several standard signals. Further signals are available as reserve. Furthermore, two digital outputs and two analog inputs are available.



Ready for Installation

We provide your selected configuration in the form of a **ready-to-connect solution in a plastic housing** for direct installation in the transformer substation.

The device comes to you **preconfigured**. You can adjust and expand the parameterization any time, according to your requirements. The connection of process data and power supply is done via terminals that are integrated into the housing.

If you wish to use the integrated GSM/LTE modem, the antenna cable can be connected by a coupler on the outside of the housing.

Communication

Communication with the superordinate network control level takes place either directly

- via IEC 60870-5-104 by means of existing IP-based communication paths
- using the 2/4 G mobile radio controller CM33A via the GSM or LTE network
- via SHDSL modem.

Voltage Supply

The solution described here is suitable for direct connection to an existing 24 V DC supply.

If no secure voltage supply is available in the transformer substation, it is possible to integrate a short-term 230 V AC UPS (uninterruptible power supply). It enables the transmission of signals acquired by the earth fault and short-circuit indicators, even in the event of a power supply failure. For this purpose, we offer a version with 230 V AC.

In addition, we can also offer an UPS for the entire transformer substation (e.g. for control of MV switch-disconnectors following a power failure). Please get in touch – we are happy to help you!

Functional Expansion

Basic Function

Connection of two earth fault and short-circuit indicators and recording of station signals

Expansion A

Control of / feedback from two MV load-break switches

Expansion B

Measurement of power injections (LV) (3-phase)

Expansion C

C3: Measurement of outgoing circuits (LV)(3 x 1-phase)

C6: Measurement of outgoing circuits (LV)(6 x 1-phase)

C9: Measurement of outgoing circuits (LV)(9 x 1-phase)

Supplement 1

Mobile radio controller 2/4G (GSM/LTE)

Supplement 5

Injection of 230 V AC with voltage buffer

Supplement 2

SHDSL modem

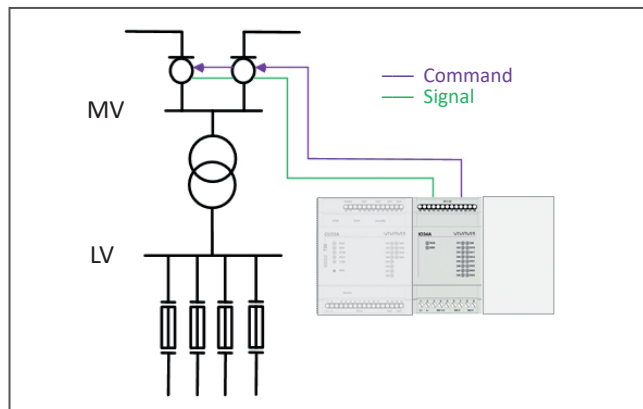
Supplement 6

Injection of 230 V AC without voltage back-up

Expansion A: Control and feedback signals from MV load-break switches

You can reduce power recovery times by means of a remote-controlled connection of the faulty point and by shifting the sectionalizer.

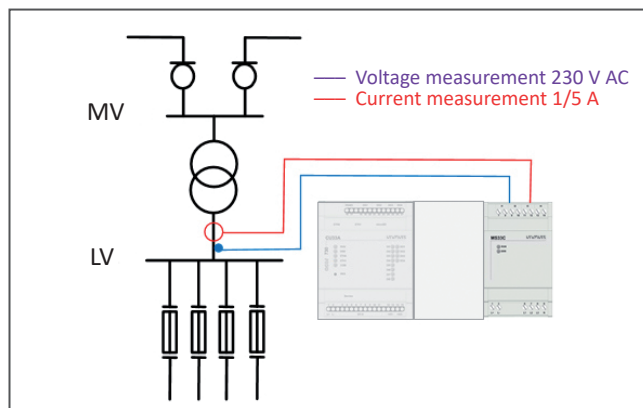
This option enables the operation and monitoring of electrically driven MV load-break switches. For this purpose, the I/O module IO34A can be included into the system.



Expansion B: Measurement of power injections in LV grids

You can record all measured electrical parameters on the transformer's LV side to enable continuous monitoring of capacity utilization.

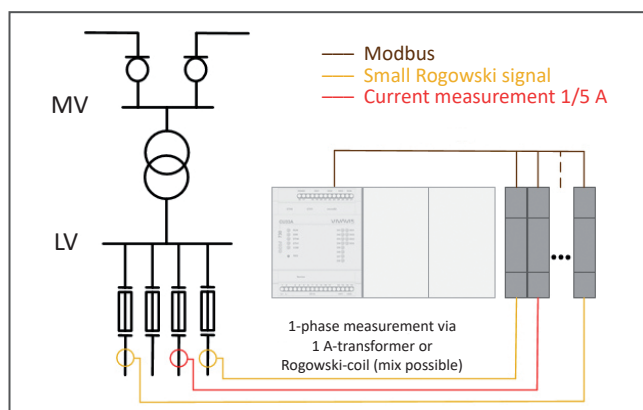
For this purpose, the ACOS 730 RTU is supplemented by the MS33C measuring system module. This module enables a 3-phase recording of currents (1/5 A) and voltages (230 V AC) through a direct injection of measured variables.



Expansion C: Measurement of outgoing circuits in LV grids

This option enables measuring of the currents of the LV circuits (1-phase) for the continuous monitoring of the cable load.

Metering of currents of the l.v. circuits are 1-phase measurements and is done through connecting the measured variables (1/5 A and/or Rogowski) to expansion modules. These modules provide the recorded information via Modbus and transmit it to the CU33A central processing unit.



Intelligent Solutions for a Secure Future

Solutions instead of Products

Since 2020, energy suppliers are planning the installation of 75,000 public charging stations in Germany. Additionally, the number of renewable energy producers, decentralized power storages and private charging stations is increasing steadily. As a consequence, the load on medium-voltage (MV) and low-voltage (LV) grids is continually raising. That makes grid behaviour ever more unpredictable.

The first and foremost objective is to make sure that – despite the new risks and interference factors – the owners of power grids are able to guarantee fast troubleshooting, short power recovery times and secure monitoring of assets and equipment.

This can only be realized through an intelligent and economical development of transformer substations.

Compared to grid expansion by means of copper cables, intelligent solutions do not only help you to save money but offer more possibilities and flexibility!

Toolbox for Transformer Substations

Changing requirements demand flexible solutions. Therefore we offer you a toolbox system for transformer substations with the necessary secondary technology. Based on our ACOS 730 RTU we offer a variety of different solutions for your individual requirements.

For this purpose, the ACOS 730 RTU as the centerpiece, is expanded by the required functions and modules.

Our complete solution for intelligent transformer substations features the following functions and expansions:

- **Basic function:** serves for the recording of general RTU signals and for indication of short circuits and earth faults.
- **Expansion A:** control and feedback of load-break switches in MV grids.
- **Expansion B:** measuring power injections in LV grids.
- **Expansion C:** measuring outgoing circuits in LV grids.

The above functionalities can be easily combined as required.

Moreover, we offer the following supplements:

- Integrated GSM/LTE modem
- Integrated SHDSL modem
- Power supply for 230 V AC (with and without voltage buffer)

IT-Security

To ensure the necessary degree of IT security, we have implemented the following functions, in accordance with the demands on secure control and communication systems from the BDEW white paper:

- Secure access for parameterization and servicing
- Integrity check of the device parameterization
- Authentication via user name and password
- Support of different user roles and rights
- Dynamic firewall
- Encrypted transmission acc. to IEC 62351-3 (TLS) or IPsec using certificate-based authentication
- Port authentication IEEE 802.1X
- Logging based on Syslog



Strong Together – with Our Partners



DEHN+SÖHNE GmbH&Co. KG is an family-owned electrical engineering company. With 1,700 employees worldwide it is active all over the globe, offering innovative products and solutions as well as comprehensive services for lightning and overvoltage protection.

DEHN provides individual protection concepts and components to protect sensitive electronic equipment in intelligent local transformer stations against lightning and overvoltages, thereby ensuring their availability and preventing costly and time-consuming maintenance works.



Günther Spelsberg + Co. KG is an internationally leading manufacturer in the electronics sector, with particular emphasis on electrical installations and housings. For more than 100 years, Spelsberg has been synonymous with security, high quality and technical performance.

We also offer intelligent local transformer station as turn-key complete solution through cooperation with further competent partners.

ACOS 730 ONS - Technical Data

Basic Function – Connection of two short-circuit and earth fault indicators and recording of station signals

Plastic housing with integrated terminal strip – housing size: 300 x 300 x 209 mm (WxHxD)

Connection of short-circuit and earth fault indicators via Modbus RTU

6 digital inputs 24 V DC

2 digital outputs (2 x changeover contacts) 24 V DC, 1 A

2 analog inputs ± 25 mA, 16 Bit

Voltage supply 24 V DC (± 10 %)

including prepared standard parameterization which can be adapted by the customer if required

Note: Ambient conditions -20...65 °C, rel. air humidity <95 % (non-condensing)*

Extension A – Control and checkback signal from two m.v. switch disconnectors

4 digital inputs 24 V DC

4 digital outputs (4 x closer) 24 V DC, 4 A

Extension B – Measurement of I.v. injection (3-phase)

4 current inputs, TRMS, sampling frequency 8 kHz, accuracy ± 0.2 %
0...1/5 A, overload max. 25 A (1 s), resolution 1 mA

3 voltage inputs, TRMS, sampling frequency 8 kHz, accuracy ± 0.2 %
0...100 / 230 V AC ULN, resolution 0.01 V

Frequency measurement 45...65 Hz, accuracy ± 0.1 %, resolution 0.01 Hz

Calculated values ULL, reactive, active and apparent power, power factor, THD, accuracy ± 0.5 %

Extension C3 - Measurement of I.v. feeders (3 x 1-phase)

3 current inputs RMS, sampling frequency 6.4 kHz, accuracy ± 0.5 % (5...100 % I_n)
0...1/5 A, overload max. 40 A (0.5 s)

3 inputs for Rogowski coils, accuracy depending on which type of Rogowski coil is used

Note: Adapted housing size 450 x 300 x 209 mm (WxHxD)

Note: Adapted ambient conditions -10...55 °C, rel. air humidity <90 % (non-condensing)*

** The indicated permissible ambient conditions are given here in a simplified version and shall only serve for orientation purposes. A detailed calculation of individual configurations can be provided upon request.*

ACOS 730 ONS - Technical Data

Extension C6 - Measurement of l.v. feeders (6 x 1-phase)

Note: Not available in connection with Extensions C3 or C9

Extension C9 - Measurement of l.v. feeders (9 x 1-phase)

Note: Not available in connection with Extensions C3 or C6

Supplement 1 – Mobile Radio Controller 2/4G (GSM/LTE) | Type : IDS CM33A

Including magnetic base antenna, line length 3m

Note: When using an outdoor antenna, the customer must provide suitable lightning protection

Note: Not in connection with Supplement 2

Supplement 2 – SHDSL Modem | Type: Kapsch MF-PAM-RAIL2N-2Eth-24 V,V1 (extended temperature range)

Note: Not in connection with Supplement 1

Note: Configuration of the modem to be done by customer or as part of separately quoted services

Supplement 5 – Injection of 230 V AC with voltage backup

Voltage supply 115 ... 230 V AC ($\pm 15\%$)

Voltage backup approx. 60 s (max. configuration)

Note: Adapted housing size 450 x 300 x 209 mm (WxHxD)

Note: Adapted ambient conditions -20...50 °C, rel. air humidity <95 % (non-condensing)*

Note: Not in connection with Supplement 6

Supplement 6 – Injection of 230 V AC without voltage backup

Voltage supply 100...240 V AC

Note: Adapted housing size 450 x 300 x 209 mm (WxHxD)

Note: Not in connection with Supplement 5

Special design

Without housing (delivered completely wired on mounting plate)

Individual housing size

Customer-specific solution

Accessories

Rogowski coil type MFC190, 333 mV/ 1 kA/ 50 Hz, accuracy < 1 %, 10 % without calibration

Coil length 30 cm, connection length 6 m

** The indicated permissible ambient conditions are given here in a simplified version and shall only serve for orientation purposes. A detailed calculation of individual configurations can be provided upon request.*