



Digitalization in the distribution grid

Transmission of alarms and measured values from
Local network stations with MFW two-wire



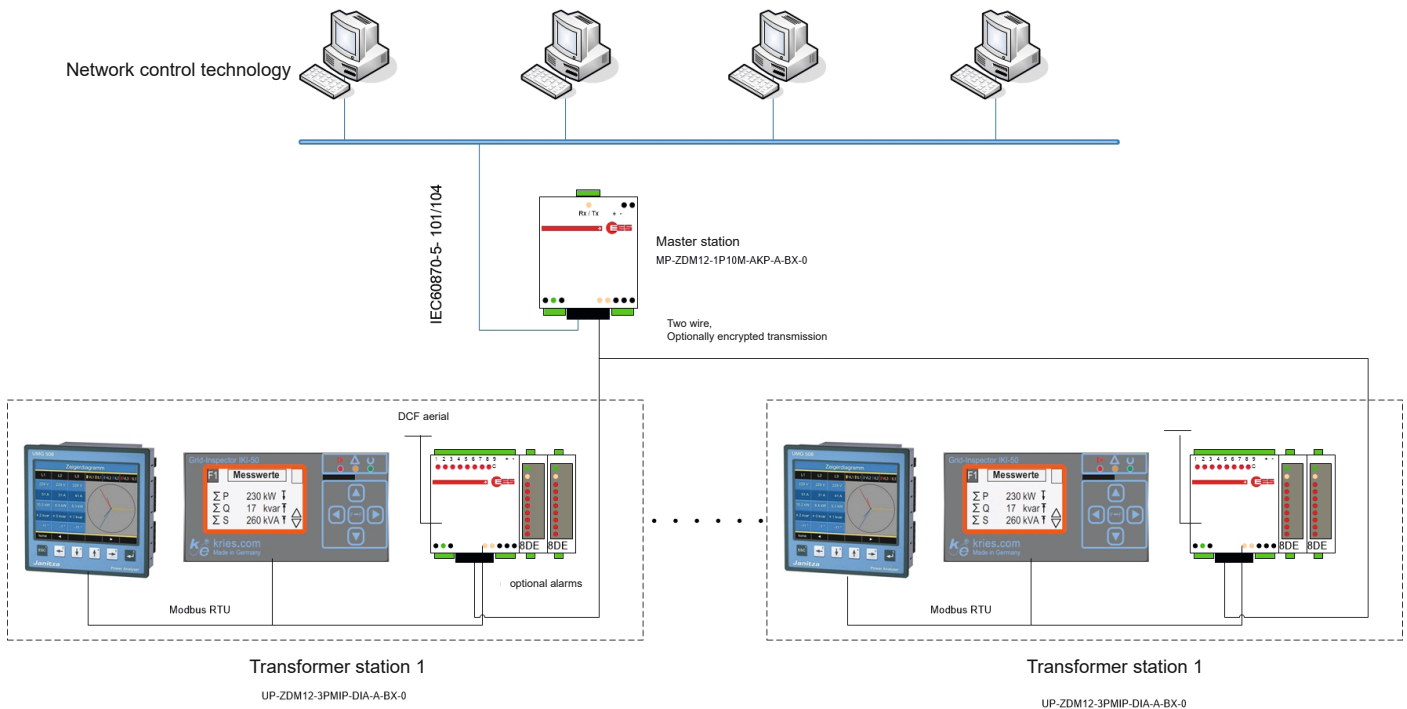
Fault indicators are often used in the local network to ensure that faults are localized quickly in the event of failures, thereby reducing downtimes. If short-circuits and earth faults occur in the distribution grid, it is a great advantage if these are reported directly to the control system and the fault location can therefore be narrowed down before troubleshooting.

The connection of renewable energies and the use of storage systems, heat pumps and wallboxes for e-mobility are changing the conditions in the low-voltage grid. Changes in load flows and intermittent feeders such as solar systems are increasing the demands on the low-voltage grid. As a result, the distribution grid must be optimized, expanded and made more transparent. These additional requirements and new legal regulations are increasing the need for continuous data and statuses from the low-voltage grid.

ASSIGNMENT

The local network stations of a southern German municipal utility distributed throughout the city are equipped with short-circuit indicators. The short-circuit indicators are not yet connected to a control system, as these local network stations do not have the equipment for a telecontrol connection. However, signal lines are available. In addition to the fault indicators, network analysis devices are installed in the low-voltage outgoing circuits. Both device types have a Modbus RTU interface. The task is to read out both device types in parallel via the interface and to transmit the preselected measured values to a master station via the existing 2-wire signal line. In addition, object protection alarms and values from the system monitoring are to be transmitted. The alarms and measured values from the substations are transmitted from the two-wire master to a central control system using the IEC 60870-5-104 protocol.

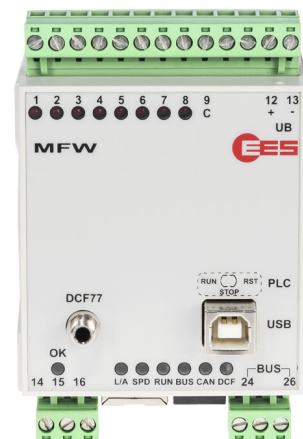
SOLUTION: EES MFW TWO-WIRE WITH IEC MASTER AND MODBUS SUBSTATIONS



The modular telecontrol system MFW is used for communication on two-wire lines. The robust and highly interference-resistant signal transmission (carrier frequency method with Hamming distance > 6) ensures that the data from the local network stations in the urban area is reliably transmitted in encrypted form over a distance of up to 20 km. The statuses and measured values of the fault indicators and network analysis devices are transmitted cyclically via two-wire connections from the MFW substations installed on site with switchable RS232/RS485 Modbus interface to the MFW master station in the control center. To do this, the master polls its substations and monitors the connections. By using digital and analog inputs, object protection signals and actual values from the systems are recorded and also transmitted. In this way, the master station receives current data from the medium and low voltage at all times and transmits it to the control system via IEC 60870-5-104. Up to 31 substations can be managed by one master station.

BENEFITS AT ON GLANCE

- No costly expansion of the data network necessary
- High transmission interference immunity
- Encrypted data transmission using AES128
- Data transfer to the control system via IEC protocol
- Security through use of own network, data remains with the customer
- Connection of any device manufacturer or device type via Modbus TCP / RTU
- Independent of device manufacturers or device types
- Independent of external service providers (mobile communications, cloud, etc.) and therefore no additional costs



CONCLUSION

The EES MFW two-wire solution via existing signal lines enables a cost-effective, independent and secure connection of local network stations to a control system. The system can be used independently of manufacturers and devices, which simplifies the digitalization of the distribution network.

