

The **IKI-55** Feeder Control Unit can be used in load switchgear for directional fault detection, load flow measurement, and control of load and ground switches. Likewise, a number of automation and monitoring functions are available with the **IKI-55**. The **IKI-55** is network-capable in its basic version and can communicate with the control station and other remote stations via various communication protocols. It can also be used as a Modbus master. The **IKI-55 M** is a Modbus-only variant. In addition to the functions of the **IKI-55**, the **IKI-55 T PQ** offers the possibility to monitor voltage measured values for **power quality (PQ)**. Based on DIN EN 50160, the following measured values are evaluated and reported: Frequency, voltage dips, voltage swells, voltage interruptions and fast voltage changes, each according to IEC 61000-4-30. In addition, sensors with integrated temperature sensor for **temperature compensation** of the measured values can be connected to the **IKI-55 T PQ**, such as the SIBushing (Siemens). The maximum measurement deviation with temperature compensation is equal or less than 1 % for voltage and current measurement.



### Properties

The **IKI-55** is designed for the connection of small-signal current transformers according to IEC 61869-10 as well as small-signal voltage transformers according to IEC 61869-11. In conjunction with a **sensor adapter**, conventional conversion transformers for current measurement as well as capacitive and precision dividers can be connected.

### Fault detection

- Directional short-circuit detection
- Directional ground short-circuit detection
- Directional ground fault detection with static and transient fault detection
- Ground fault detection via pulse locating
- Suitable for all neutral point treatments
- No summing transformer required
- Fault recording with export as Comtrade file

### Early fault detection

- Detection of transient faults (Intermittent ground faults)
- In conjunction with a CAPDIS- S2\_55 (R5): Detection of partial discharges and their frequency and trend

### Load flow measurement

- Voltages, currents, powers, frequencies, cos phi
- Momentary and average values
- Cross calibration (With additional adapter)
- Phase comparison function for voltages (With additional adapter)

### Comprehensive control and monitoring functions

- Control of motor controllers for switching load and ground switches
- Free programmable logic functions
- Automatic Transfer Switch (ATS)
- Limit value monitoring

### Simple operation of the unit

- Additional LEDs to indicate the fault direction
- Self-explanatory operation via direction keys

### Extended safety features

- User roles safety concept, password protected
- Remote firmware update via REST interface (deactivable)
- USB interface deactivable

### Communication protocols

- IEC 60870-5-104 for communication with control center
- MQTT, REST for communication with databases or management systems
- Modbus RTU (Master)

### PT100 input for temperature compensation of sensors

- E.g. for Siemens SIBushing sensors
- Maximum measurement deviation with temperature compensation is equal or less than 1 % for voltage and current measurement.

### Power-Quality

- Monitoring of voltage quality according DIN EN 50160 and IEC 61000-4-30:2016-01(Frequency, voltage dips, voltage swells, voltage interruptions, rapid voltage changes)



### Technical Data

#### Device data

|                           |   |
|---------------------------|---|
| Article number            | 2502400_H104  |
| Quantity unit             | Piece   |
| Product designation       | Grid-Controller IKI-55 T PQ   Networkable Feeder Control Unit   Power-Quality   For SIBushing |
| Number of feeders         | 1   |
| Parameterization software | KriesConfig   |
| Configuration             | Via HMI and display (limited), Via software Kries-Config (download at kries.com)              |

#### Operating elements and display

|                |  |
|----------------|--|
| Front display  | LC-Display and LEDs                                |
| Direction keys | 1 - 4 for navigation in menu                       |
| Red LED (1)    | Error event detected                               |
| Yellow LED (2) | Device warnings                                    |
| Green LED (3)  | Status message device state                        |
| Yellow LED (4) | Fault detected in the direction of the busbar      |
| Red LED (5)    | Error event detected in the direction of the cable |

#### Dimensions and installation instructions

|                             |                       |
|-----------------------------|-----------------------|
| Case height x width x depth | 48 x 96 x 110 mm      |
| Cutout height x width       | 45 x 92 mm            |
| Norm cutout dimensions      | DIN IEC 61554:2002-08 |
| Installation type           | Panel mounting        |

#### Operating conditions

|                             |                            |
|-----------------------------|----------------------------|
| Operating temperature       | -40°C ... 70°C             |
| Storage temperature         | -40°C ... 80°C             |
| Protection class front side | IP54                       |
| Protection class            | IP40 / Front IP54          |
| System frequency            | 50 Hz / 60 Hz (selectable) |

#### Fault detection and failure forecast

|                 |  |
|-----------------|--|
| Fault detection | Individually selectable, any combinations possible |
|-----------------|--|



### Fault detection and failure forecast

|   |   |
|---|---|
| Star point types                                      | Short-term low-ohmic terminated neutral, Low-ohmic terminated neutral, Inductive terminated neutral, Isolated neutral   |
| Short circuit detection I>>                           | ✓   |
| Directional short-circuit detection I>>               | ✓   |
| Threshold current short-circuit detection I>>         | 50 A – 1,000 A  |
| Threshold time short-circuit detection I>>            | 40 ms – 5 s   |
| Earth short-circuit detection Ie>>                    | ✓   |
| Directional earth short-circuit detection Ie>>        | ✓   |
| Threshold current earth short-circuit detection Ie>>  | 10 A – 1,000 A  |
| Threshold time earth short-circuit detection Ie>>     | 40 ms – 5 s   |
| Directional static earth fault detection Ie>;         | ✓   |
| Threshold current static earth fault detection Ie>    | 2 A – 30 A  |
| Threshold time static earth fault detection Ie>       | 200 ms – 2 s  |
| Directional transient earth fault detection Ie>       | ✓   |
| Threshold current transient earth fault detection 3I0 | 1 A – 1,000 A   |
| Threshold voltage transient earth fault detection 3U0 | 0.1 kV – 100 kV   |
| Earth fault detection via pulse locating              | ✓   |
| Pulse length of pulse locating                        | symmetrical / asymmetrical  |
| Transient fault detection IIe>                        | ✓   |
| TE trend monitoring                                   | <ul style="list-style-type: none"> <li>• In conjunction with CAPDIS-S2_55 (R5)</li> <li>• Indication on the display, transmission via Modbus-RTU</li> <li>• Partial discharge trend via frequency distribution; integration over 24 h, trend over 72 h</li> </ul> |
| Fault reset   | Auto, Manually on the device, After time (1 h ... 8 h, configurable)  |
| Reset setting   | Time: 1 - 1 h; manual, auto   |
| Event log   | 20 events   |
| Fault recorder  | ✓   |
| Fault record - formats                                | Comtrade  |
| Fault record - number                                 | 20  |
| Fault record - recording duration                     | 2,5 s at 50 Hz   2,09 s at 60 Hz  |
| Fault record - Frequency                              | 6,4 kHz at 50 Hz   7,68kHz at 60 Hz   |
| Fault record - Pretrigger                             | 0,31 s at 50 Hz   0,258 s at 60 Hz  |
| Earth fault transient detection                       | ✓   |
| Directional earth short-circuit detection             | ✓   |

### Interfaces and transmission protocols

|  |  |
|--|--|
| USB interface                          | Mini-USB   |
| Transmission protocols                 | MQTT, REST, IEC 60870-5-104, Modbus-RTU  |
| Modbus-RTU                             | ✓  |
| Modbus RTU Master                      | ✓  |
| Modbus-RTU Slave                       | ✓  |
| Modbus transmission rates [kBd]        | 9600, 19200, 38400, 57600, 115200  |
| MQTT                                   | ✓  |
| REST API                               | ✓  |
| IEC 60870-5-104 Slave                  | ✓  |
| LAN connection                         | ✓  |
| Slave test                             | ✓  |
| Digital Inputs                         | 6  |
| Digital inputs - connections           | Push-In, Connection of solid and stranded conductors: 0.08 to 0.5 mm <sup>2</sup>   Connection of stranded conductors with ferrule: 0.25 to 0.34 mm <sup>2</sup> |
| Digital inputs - switching thresholds  | ON > 19 VDC / OFF < 10 VDC   |
| Digital inputs - voltage ranges        | 24 DC to 60 VDC  |
| Digital inputs - current consumption   | Max. 6 mA  |
| Digital Outputs                        | 6  |
| Digital outputs for 1.5 pole switching | 2  |
| Digital outputs - connections          | Push-In, Connection of solid and stranded conductors: 0.08 to 0.5 mm <sup>2</sup>   Connection of stranded conductors with ferrule: 0.25 to 0.34 mm <sup>2</sup> |
| Digital outputs - variants             | Floating   |
| Digital outputs - switching capacity   | 1 A at 30 VDC  |
| Digital outputs - dielectric strength  | Max. 80V   |
| Voltage input Input impedance          | 2 MOhm, 50 pF  |
| Voltage input Input range              | 0,4 V – 4,1 V  |
| Voltage input measurement accuracy     | 1%   |
| Voltage input transformation ratio     | 10000:1 (settable)   |
| Voltage input standard                 | IEC 61869-11   |
| Current input Version                  | Rogowski current sensor  |
| Current input Input impedance          | 10 MOhm, 50 pF   |
| Current input Measuring range          | 0,1 A up to 2000 A   |
| Current input Measuring accuracy       | 1%, +/- 0.5 A  |
| Current input Ratio                    | 50 A / 22,5 mV (50Hz) (settable)   |
| Current input standard                 | IEC 61869-10   |

### Interfaces and transmission protocols

|                |  |
|----------------|--|
| Voltage inputs | 1 (With additional adapter 2: 2x LRM/CAPDIS or 1x LRM/CADPIS + 1x precision 3.25V) |
|----------------|--|

### Measurement values and functions

|                               |  |
|-------------------------------|--|
| Voltage measurement           | ✓  |
| Phase-to-ground voltages      | ✓  |
| Phase to phase voltages       | ✓  |
| Precision voltage measurement | Yes  |
| Current measurement           | ✓  |
| Active power                  | ✓  |
| Reactive power                | ✓  |
| Apparent power                | ✓  |
| Rotary field detection        | ✓  |
| Frequency measurement         | ✓  |
| Limit value monitoring        | Parameterizable                              |
| Logic functions programmable  | A total of 32 logic rules can be programmed. |

### Power-Quality

|   |   |
|---|---|
| Power Quality according to DIN EN 50160 | Frequency IEC 61000-4-30 cl. 5.1<br>Voltage dips IEC 61000-4-30 cl. 5.4<br>Voltage swells IEC 61000-4-30 cl. 5.4<br>Voltage interruptions IEC 61000-4-30 cl. 5.5<br>Rapid voltage changes IEC 61000-4-30 cl. 5.11 |
|---|---|

### Power supply

|                                  |  |
|----------------------------------|--|
| Auxiliary power supply           | 24 VDC/AC +/-20%   |
| Power input - power consumption  | 0.5 A  |
| Power supply input - connections | Connection of solid and stranded conductors: 0.2 to 2.5 mm <sup>2</sup> / Connection of stranded conductors with ferrule: 0.25 to 1.5 mm <sup>2</sup> / Connection of stranded conductors with ferrule without plastic collar: up to 2.5 mm <sup>2</sup> |
| CT-supplied                      | -  |

### Current transformers in connection with IKI small signal / sensor adapter

| Article number | Product designation   |
|----------------|---|
| 2512106_H001   | IKI-LUM_d92 Split-Core Transducer with cable tie (set)   Ø 92mm       |
| 2512106_H003   | IKI-LUM_d92 Split-Core Transducer for C-Cone-Bushings (set)   Ø 92mm  |
| 2512106_H004   | IKI-LUM_d92 Split-Core Transducer for SIEMENS-Bushings (set)   Ø 92mm |

### Connecting cables CTs

| Article number | Product designation                                   |
|----------------|---|
| 3503118_S      | Connecting cable set   pluggable   Length = 3,0m      |
| 3503135_S      | Connecting cable set   pluggable   Length = 5,0m      |
| 3503135_S999   | Connecting cable set   pluggable   Lengths on request |

### Accessories

| Article number | Product designation  |
|----------------|--|
| 2502466_H001   | Small-Signal Sensor-Adapter<br>Interfaces: IKI-LUM, U-LRM, U-LRM |
| 2502466_H002   | Small-Signal Sensor-Adapter<br>Interfaces: IKI-LUM, U-LRM, U-DIV |
| 2502403        | CT-Adapter<br>Interfaces: Current x/1A, Voltage x/100V           |

### Comparison of products

|   | IKI-55 T PQ<br>2502400_H104 | IKI-55<br>2502400_H003 |
|---|-----------------------------|------------------------|
| Level of digitalisation                 | 2                           | 2                      |
| Short circuit detection I>>             | ✓                           | ✓                      |
| Directional short-circuit detection I>> | ✓                           | ✓                      |
| Earth short-circuit detection Ie>>      | ✓                           | ✓                      |

|   | IKI-55 T PQ<br>2502400_H104   | IKI-55<br>2502400_H003   |
|---|---|--|
| Directional earth short-circuit detection le>>      | ✓   | ✓  |
| Earth fault transient detection                     | ✓   | ✓  |
| Pulsation detection                                 | ✓   | ✓  |
| Directional static earth fault detection le>;       | ✓   | ✓  |
| Slave test  | ✓   | ✓  |
| Modbus-RTU  | ✓   | ✓  |
| Modbus RTU Master                                   | ✓   | ✓  |
| Modbus-RTU Slave                                    | ✓   | ✓  |
| IEC 60870-5-104 Slave                               | ✓   | ✓  |
| MQTT  | ✓   | ✓  |
| REST API  | ✓   | ✓  |
| LAN connection                                      | ✓   | ✓  |
| Encryption of communication (LAN)                   | TLS   | TLS  |
| CT-supplied   | -   | -  |
| Auxiliary power supply                              | 24 VDC/AC +/-20%  | 24 VDC/AC +/-20%   |
| USB interface                                       | Mini-USB  | Mini-USB   |
| PT100 input for temperature compensation of sensors | ✓   | -  |
| Digital Inputs                                      | 6   | 6  |
| Digital Outputs                                     | 6   | 6  |
| Digital IOs configurable                            | Yes   | Yes  |
| Switching functions feeder control unit             | Switching of up to two load switches<br>1.5-pole switching  | Switching of up to two load switches<br>1.5-pole switching                         |
| Digital outputs for 1.5 pole switching              | 2   | 2  |
| Voltage inputs                                      | 1 (With additional adapter 2: 2x LRM/CAPDIS or 1x LRM/CADPIS + 1x precision 3.25V)  | 1 (With additional adapter 2: 2x LRM/CAPDIS or 1x LRM/CADPIS + 1x precision 3.25V) |
| Voltage measurement                                 | ✓   | ✓  |
| Precision voltage measurement                       | Yes   | Yes  |
| Power Quality according to DIN EN 50160             | Frequency IEC 61000-4-30 cl. 5.1<br>Voltage dips IEC 61000-4-30 cl. 5.4<br>Voltage swells IEC 61000-4-30 cl. 5.4<br>Voltage interruptions IEC 61000-4-30 cl. 5.5<br>Rapid voltage changes IEC 61000-4-30 cl. 5.11 |  |
| Current measurement                                 | ✓   | ✓  |
| Logic functions programmable                        | A total of 32 logic rules can be programmed.  | A total of 32 logic rules can be programmed.                                       |
| Balanced core CT optional                           | -   | -  |

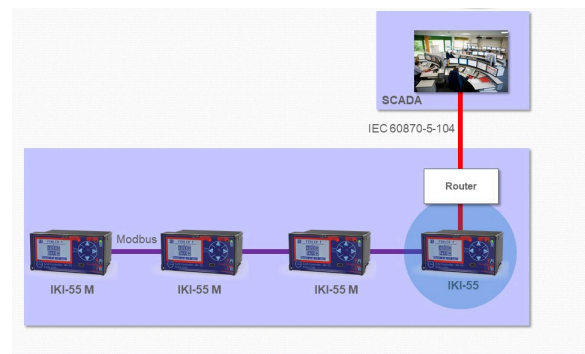
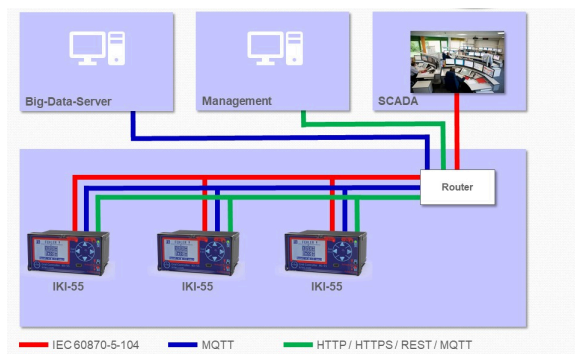


# IKI-55 T PQ

## Network-capable Feeder Control Units for Distribution Network Stations

|                | IKI-55 T PQ<br>2502400_H104  | IKI-55<br>2502400_H003   |
|----------------|--|--|
| Compatible CTs | IKI-LUM_d92 Split-Core Transducer with cable tie (set)   Ø 92mm (2512106_H001)<br>IKI-LUM_d92 Split-Core Transducer for C-Cone-Bushings (set)   Ø 92mm (2512106_H003)<br>IKI-LUM_d92 Split-Core Transducer for SIE-MENS-Bushings (set)   Ø 92mm (2512106_H004) | IKI-LUM_d92 Split-Core Transducer with cable tie (set)   Ø 92mm (2512106_H001)<br>IKI-LUM_d92 Split-Core Transducer for C-Cone-Bushings (set)   Ø 92mm (2512106_H003)<br>IKI-LUM_d92 Split-Core Transducer for SIE-MENS-Bushings (set)   Ø 92mm (2512106_H004) |

### Application examples



# IKI-55 T PQ

Network-capable Feeder Control Units for Distribution Network Stations

## Block diagram (Version IKI-55)

