IKI-50_1F R2

Universal Feeder Control Units for Intelligent Distribution Network Stations

The universal Feeder Control Unit **IKI-50_1F R2** is the appropriate solution for intelligent distribution network stations and offers distribution network operators a high level of transparency and cost-effectiveness. The **IKI-50_1F R2** includes all algorithms for selective fault detection. It is suitable for all neutral point treatments. Switching commands for load switch control can be fed to the **IKI-50_1F R2** via communication bus and executed field-related with 1.5-pole switching safety.

Properties

Fault detection

- directional short-circuit detection
- directional earth fault detection, directional static earth fault detection (wattmetric method), directional transient earth fault detection (wiper method), earth fault detection via pulse locating
- suitable for all neutral point treatments
- no summing transformer required

fault early detection

- fault early detection by detection of transient disturbances
- partial discharge trend detection together with CAPDIS-S2_55 (R5)

load flow measurement

- voltages, Currents, powers, frequencies, cos-phi, . ..
- Momentary and average values
- Limit value monitoring

Remote control and network automation

- selective control of up to two motors
- extensive logic functions freely programmable with PC software KriesConfig

IKI- 50_F1 R2 is maintenance-free

- no battery
- unlimited data retention
- error indication in case of power failure over 6 hours

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precise voltage measurement with precision dividers

- optional voltage measurement with precision dividers, z. E.g. resistive sensors
- two voltage inputs: 1x capacitive, 1x resistive
- patented method for voltage calibration via a reference measurement from another feeder

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Technical Data

Device data

Article number	2502352
Product designation	IKI-50_1F R2
Number of feeders	1
Parameterization software	KriesConfig
Configuration	Via software Kries-Config (download at kries.com), Via HMI and display (limited)

Operating elements and display

Front display	LC-Display and LEDs
Direction keys	Operation via four direction keys
Red LED (1)	Error event detected | internal energy storage empty
Yellow LED (2)	Slave Test | Primary Test | Device Warnings
Dreen LED (3)	Status message device state
Buffer of power supply	Capacitor (6h)

Dimensions and installation instructions

Case height x width x depth	49 x 96 x 108 mm
Cutout height x width	45 x 92 mm
Norm cutout dimensions	DIN IEC 61554:2002-08
Installation type	Panel mounting
Sheet thickness	1.5 ... 2.5 mm

Operating conditions

Operating temperature	-25°C ... 55°C
Storage temperature	-25°C ... 70°C
Humidity	max. 95 % relative humidity at 40° C
Protection class	IP54 (Front)

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Fault detection and failure forecast

Fault detection	Individually selectable, any combinations possible
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>>	100 A ... 1,000 A (adjustable in steps)
Threshold time short-circuit detection I>>	40 ms ... 1,600 ms (adjustable in steps)
Earth short-circuit detection Ie>>	✓
Directional earth short-circuit detection Ie>>	✓
Threshold current earth short-circuit detection Ie>>	40 A ... 1,000 A (adjustable in steps)
Threshold time earth short-circuit detection Ie>>	40 ms ... 1,600 ms (adjustable in steps)
Directional static earth fault detection Ie>;	✓
Threshold current static earth fault detection Ie>	2 A ... 30 A (adjustable in steps)
Directional transient earth fault detection Ie>	✓
Threshold current transient earth fault detection 3I0	1 A ... 1,000 A (freely adjustable)
Threshold voltage transient earth fault detection 3U0	1 kV ... 300 kV (freely adjustable)
Earth fault detection via pulse locating	✓
Pulse length of pulse locating	symmetrical / asymmetrical
Transient fault detection IIe>	✓
TE trend monitoring	• in conjunction with CAPDIS-S2_55 (R5) • Indication on the display, transmission via Modbus-RTU • Partial discharge trend via frequency distribution; integration over 24h, trend over 72h
Fault reset	Auto, Manually on the device, After time (1 h ... 8 h, configurable)
Event log	The last 20 fault events are stored with event number, date, time, name of the triggering fault detection, fault direction, phase and fault current value.
Earth fault transient detection	✓
Directional earth short-circuit detection	✓

Interfaces and communication

USB interface	Mini-USB
Modbus-RTU	✓
Modbus-RTU Slave	✓
Modbus transmission rates [kBd]	9600, 19200, 38400, 57600, 115200
Slave test	✓

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Interfaces and communication

Digital Inputs	6
Potential-free digital inputs	4
Digital Outputs	4
Digital outputs for 1.5 pole switching	2
Digital IOs configurable	Yes
Switching functions feeder control unit	Switching of up to two load switches 1.5-pole switching
Connection cable cross section	Max. 2,5 mm
Switching capacity relay	AC: max. 62,5 VA max. 2A; max. 250 VAC DC: max. 2A @ 40 VDC
Relay outputs	6
Voltage inputs	2 (1x LRM/CAPDIS, 1x precision 3.25V)
Current transformer	3

Measurement values and functions

Voltage measurement	✓
Measuring range voltage	Capacitive (Input F1), Precision divider with an output signal of 3.25 V/sqrt(3) in nominal operation (input UF2)
Phase-to-ground voltages	✓
Phase to phase voltages	✓
Measuring range voltage	0.02 kV ... 92 kV | Start of voltage measuring range: 2% of Un
Precision voltage measurement	Yes
Accuracy voltage measurement	Input UF1 (capacitive): 3 % of measurement value after on-site calibration Input UF2 (resistive): 0.5 % of measurement value
Cross calibration	✓
Current measurement	✓
Measuring range current	0.5 A ... 1,158 A (with current transformer IKI-LUM)
Zero-sequence current	✓
Accuracy current measurement	3 % of measurement value, optionally 1% of measurement value
Conductor currents	✓
Active power	✓
Reactive power	✓
Apparent power	✓
Rotary field detection	✓

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Measurement values and functions	
Frequency measurement	✓
Mean value determination	✓
Min-max value determination	✓
Phase position	✓
Phase shift cos-phi	✓
Limit value monitoring	Voltage, current, frequency, reactive power and voltage
Logic functions programmable	A total of 32 logic rules can be programmed.

Power supply	
Auxiliary power supply	24...230 VAC/DC (jeweils 15 %)
Power consumption	2 W
Insulation voltage	2 kV, 1 min
CT-supplied	-
Display buffer for fault indication	Unlimited data retention (independent of auxiliary power and buffer power); Error display after power failure (depending on adjustable follow-up time): • with overrun time 12 seconds: 6 hours • with run-on time 60 seconds: 4.5 hours

Compatible current transformers

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

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Accessories

Article number	Product designation
2500484	Y-cable IKI to CAPDIS | 0.4 m | 2 x system plug
2500486_H002	Y-Cable IKI to CAPDIS | 0.4 m | Sx blade plug to system plug, decoupled
2500487	Y-cable IKI to CAPDIS | 0.4 m | 2 x Sx blade plug to system plug
2500484_S999	Y-cable CAPDIS to IKI; Lengths and connector combinations on request

Comparison of products

	IKI-50_1F R2 2502352	**IKI-50_1F R2e 2502461**
Level of digitalisation	2	1
Short circuit detection I>>	✓	✓
Directional short-circuit detection I>>	✓	✓
Earth short-circuit detection Ie>>	✓	✓
Directional earth short-circuit detection Ie>>	✓	✓
Earth fault transient detection	✓	✓
Pulsation detection	✓	✓
Directional static earth fault detection Ie>;	✓	✓
Slave test	✓	✓
Relay outputs	6	4
Modbus-RTU	✓	✓
Modbus-RTU Slave	✓	✓
CT-supplied	-	-
Auxiliary power supply	24...230 VAC/DC (jeweils 15 %)	24...230 VAC/DC (jeweils 15 %)
Buffer of power supply	Capacitor (6h)	Capacitor (6h)
USB interface	Mini-USB	Mini-USB
Digital Inputs	6	4
Digital Outputs	4	4
Digital IOs configurable	Yes	Yes
Switching functions feeder control unit	Switching of up to two load switches 1.5-pole switching	--
Digital outputs for 1.5 pole switching	2	
Voltage inputs	2 (1x LRM/CAPDIS, 1x precision 3.25V)	1 (LRM/CAPDIS)

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	IKI-50_1F R2 **2502352**	**IKI-50_1F R2e** **2502461**
Voltage measurement	✓	✓
Precision voltage measurement	Yes	
Measuring range voltage	Capacitive (Input F1), Precision divider with an output signal of 3.25 V/sqrt(3) in nominal operation (input UF2)	
Cross calibration	✓	-
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	-	-
Compatible CTs	IKI-LUM_d92 Split-Core Transducer with cable tie (set) | Ø 92mm (2512106_H001) IKI-LUM_d92 Split-Core Transducer for C-Cone-Bushings (set) | Ø 92mm (2512106_H003) IKI-LUM_d92 Split-Core Transducer for SIEMENS-Bushings (set) | Ø 92mm (2512106_H004)	IKI-LUM_d92 Split-Core Transducer with cable tie (set) | Ø 92mm (2512106_H001) IKI-LUM_d92 Split-Core Transducer for C-Cone-Bushings (set) | Ø 92mm (2512106_H003) IKI-LUM_d92 Split-Core Transducer for SIEMENS-Bushings (set) | Ø 92mm (2512106_H004)

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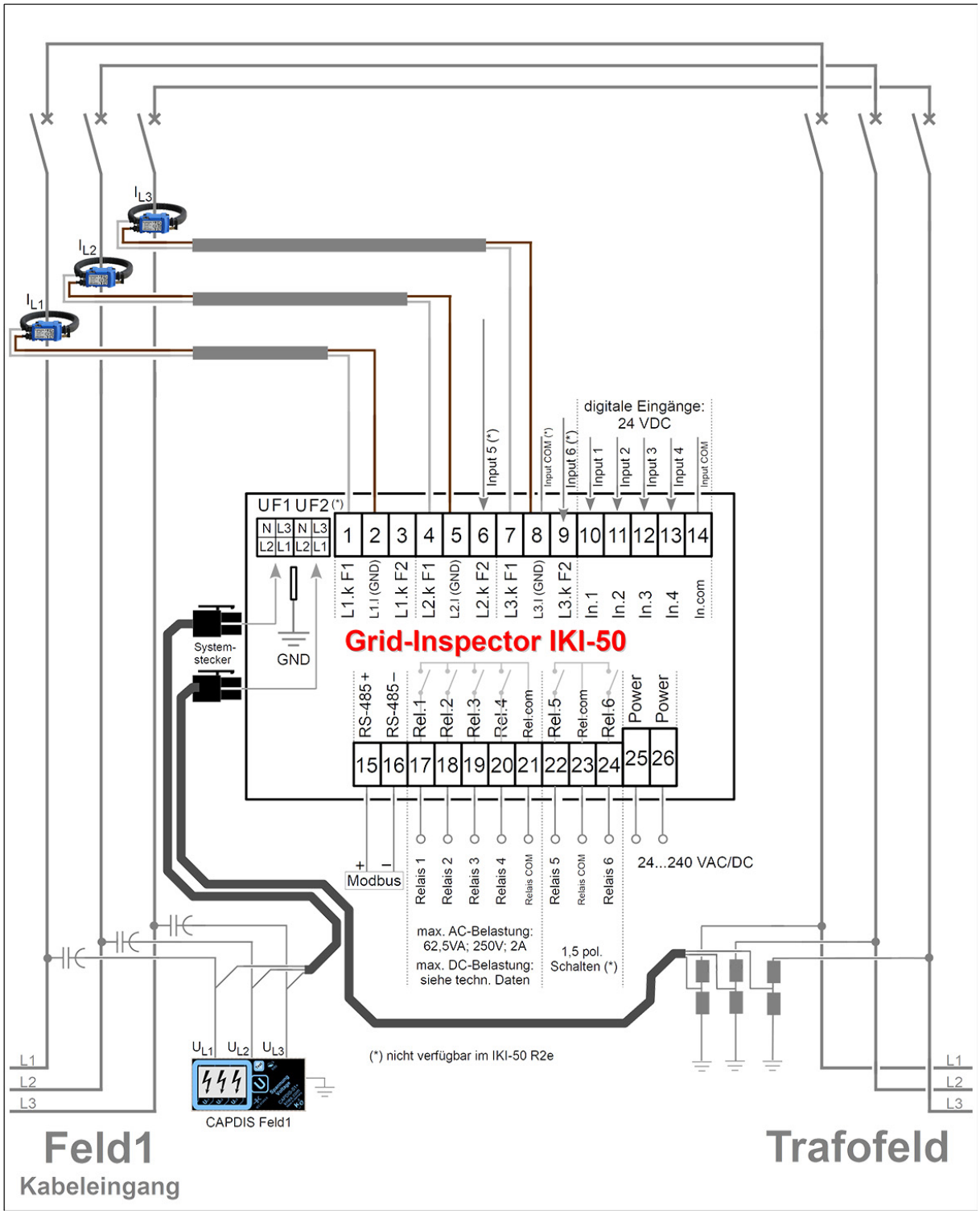
Wiring diagram



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Notes on the use of precision dividers

Precision dividers

Resistive or capacitive precision dividers with high accuracy can be connected to the voltage input UF2. These precision dividers are connected via shielded coaxial cables. Kries offers the following components for this purpose, please inquire separately:

- shielded coaxial cables in different lengths
- ohmic voltage dividers of type OAS for right-angle connectors with C-cones, symmetrical or asymmetrical
- ohmic voltage dividers of type OKE for air-insulated switchgears
- capacitive precision dividers for asymmetrical right-angle connectors with shortened C-cone (on request)

Cross calibration

Via a procedure patented by Kries, the exact voltage signal of the precision dividers can be determined from a feeder (e. e.g., the transformer feeder) can be used as the reference voltage for the other feeders. In the **IKI-50_1F R2**, an automated cross-calibration procedure is integrated for this purpose, with which this adjustment can be carried out manually or at specified time intervals. This makes it possible to realize a high degree of accuracy in voltage measurement for the entire distribution network station.

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