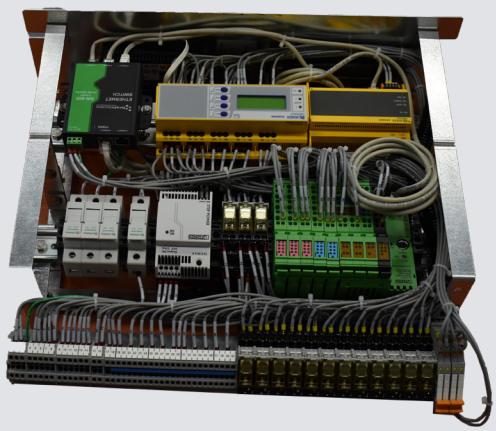
RFB-700 DSP DSA Retrofit

Replacement Kit Datasheet



History

Federal Pioneer Limited was originally incorporated as Pioneer Electric Limited in 1946. The company was engaged in the manufacture of electrical equipment primarily used in power distribution; one of their main lines included switchgear and low voltage distribution equipment. In 1990 the company was sold to Schneider Electric, who went on to sell the ground fault protection line of products to a third-party.

As a leading supplier of ground-fault protection products at the time, Federal Pioneer introduced the DSP-MKII (Delta System Protection) in the late 1970s, and later released the DSA (Delta System Alarm) as a variant of this system in 1981.

These items were eventually discontinued. Taking advantage of Bender's long history of innovation in ground-fault protection and MegaResistors solid NGR manufacturing experience the retrofit packages offer more advanced product based on new technologies with enhanced functionality, guaranteed reliability, and longevity. Contact your local Bender sales representative or Bender technical support found on the last page.

DSA VS. DSP-MKII VS. REPLACEMENT KIT - SYSTEM COMPARISON

The DSP-MK II system was designed to monitor multiple feeders and signal a ground-fault alarm, indicating the faulted feeder. In the event of a second ground fault on a different feeder, it would selectively trip the lower-priority feeder. The DSA system functioned in much the same way, but it did not perform selective tripping in the event of a second ground fault; it provided feeder-level and system-wide ground-fault alarms.

Category	Sub-category	DSA	DSP-MKII	Replacement Kit
Specs	Grounding Type	Ungrounded or high-resistance grounded	Ungrounded or high-resistance grounded	Ungrounded or high-resistance grounded
	System voltage	Up to 13.8 kV	Up to 13.8 kV	Up to 13.8 kV
	System power	Single phase 120VAC	Single phase 120VAC	Single phase 120VAC
Required Accessories	Potential transformers	> 600V	> 600V	> 600V
	Alarm resistors	DDR2	DDR2	> 600V only
	Artificial neutrals	Zig-zag for delta and wye systems	Zig-zag for delta and wye systems	Zig-zag for delta only
	Grounding resistors	Optional	Optional	Optional
	Zero sequence current transformers	T3A / T6A / T9A	T3A / T6A / T9A	CTAC and CTUB101/102 series CT's T3A/T6A/T9A with special considerations (consult with technical support)
Alarm	Accuracy	+/- 10%	+/- 10%	+/- 1%
	Time Delay	0.5 seconds +/- 10%	0.5 seconds +/- 10%	0 to 60 seconds
	Level	50% of NGR current	50% of NGR current	10 to 90% I_{NGR}
	Silence option	Via push buttons	Via push buttons	Via HMI
	Reset option	Via push buttons	Via push buttons	Via HMI
Feeder Protection and Priority	Second fault trip speed	No tripping	> 200 ms	< 100 ms
	Second fault trip level	No tripping	80A +/- 20A	< 20A
	SIFT – selective instantaneous feeder trip	No tripping	16 numbered priorities	99 numbered priorities

Category	Sub-category	DSA	DSP-MKII	Replacement Kit
Feeder protection and priority (continued)	In-field programming of second fault trip priority on feeders	No tripping	Via toggle switches	User programmable by PLC HMI
	Memory of fault on phase and feeder indicator	Yes	Yes	Yes
	Simultaneous monitoring of all feeder and NGR currents	No	No	Yes
	Maximum feeders	152	35	240
General Features	Nuisance tripping prevention	0.5 second delay to reduce probability	0.5 second delay to reduce probability	Advanced harmonics filtering
	Measurements	Leakage current only	Leakage current only	Voltage, resistance, current
	Blown fuse indicator	Lamp & alarm	Lamp & alarm	Optional
	Measurement of system or individual feeder leakage current	Yes	Yes	Yes
	NGR continuity monitoring	No	No	Open and short protection (CEC 2018 compliant)
	Communications	No	No	RS-485 and Ethernet, wireless optional
	Current monitoring	No	AC only	AC standard, AC/DC optional
	Feeder current transformer monitoring	No	No	Open and short
	Select non-latching alarms	No	No	Yes
	Harmonics analysis and filtering	No	No	Yes
	Built in test capability	Only for alarm and indication functions	Only for alarm and indication functions	Complete system testing
Setup and Interface	Language	English	English	English, French, Spanish, German
	Password protection	No	No	Yes
	Interface	Toggle switches and push buttons	Toggle switches and push buttons	HMI touch screen
	Faulted phase indicator	Phase lamp	Phase lamp	Alarm and communications
	Faulted feeder indicator	Alarm	Alarm	Alarm and communications
	Meter calibration	Via toggle switches	Via toggle switches	Via HMI

NGRM700

LINETRAXX® NGRM700

Device features

- Determination of R_{NGR} with passive and active measurement methods
- Continuous monitoring of the R_{NGR} even if the installation is de-energised;
- Alarm or trip on ground fault
- Monitoring of the current I_{NGR}
- Monitoring of the voltage U_{NGR}
- Phase-to-ground fault indication (optional; up to 690 V direct coupling, otherwise via potential transformers)
- Ethernet communication
- Web server
- Language selection (German, English GB and US, Spanish, French)
- Test button (internal, external) with/without tripping
- FFT analysis of the measuring signals
- Pulser for manual ground fault location
- Relay for detection of ground faults and resistor faults
- Relay for shutdown of the installation after a configurable time
- Can be combined with RCMS... for automatic shutdown of feeders
- Graphical user interface
- Wide supply voltage range (24 to 240 Vac/Vdc)
- Range of use up to 5000 m AMSL
- Fault/History memory
- Analogue output of measured values (0...10 V, 4...20 mA, etc., selectable parameters)
- Detachable HMI for door mounting
- Password protection
- Tripping on RMS, fundamental component signal or harmonics
- Detection of AC and DC ground faults

Product description

The NGRM700 is only intended for use in high-resistance grounded systems.
In these systems, the NGRM700 monitors

- the current through the neutral-grounding resistor (NGR),
- the voltage between the star point of the transformer and earth (voltage drop across the NGR),
- the condition of the NGR,
- line-to-line and line-to-earth voltages.

Systems with a high-resistance grounded star point can be used when **an interruption of the power supply would involve excessive costs due to production stoppage** (e.g. automotive production, chemical industry). The ground fault that occurs between a phase and earth does not lead to a failure of the power supply in these systems.
A ground fault must be detected and eliminated as quickly as possible, since the occurrence of another ground fault in a second phase would lead to a tripping of the overcurrent protective device.

In order to meet the requirements of applicable standards, the equipment must be adjusted to local equipment and operating conditions by means of customised parameter settings. Please heed the limits of the range of application indicated in the technical data.

Any other use than that described in this manual is regarded as improper. Intended use includes following all the instructions in the operating manual.

Function

The NGRM700 monitors NGR resistance R_{NGR}, neutral voltage U_{NGR} and current I_{NGR}.
NGR resistance is monitored using an active and a passive procedure:

active — The device generates an active test pulse and measures R_{NGR} even if the installation is de-energised.

passive — Only for energised installations: The resistance R_{NGR} is determined when I_{NGR} or U_{NGR} exceeds an internal threshold. The device measures the existing current and voltage and calculates R_{NGR}.

In the case of the “auto” method, monitoring switches automatically between “active” and “passive” when the measured value exceeds or falls below the internal threshold.

The threshold is 15 % of the nominal value and can be adjusted by Bender service if required. A short circuit or interruption of the NGR is reliably detected in an energised as well as a de-energised installation with the active measurement method.

When the “passive” method is selected, no switching of the monitoring takes place. No monitoring of the NGR occurs while the installation is de-energised.

The NGR relay switches from alarm state to operating state when the measured resistance R_{NGR} is within the configured thresholds.

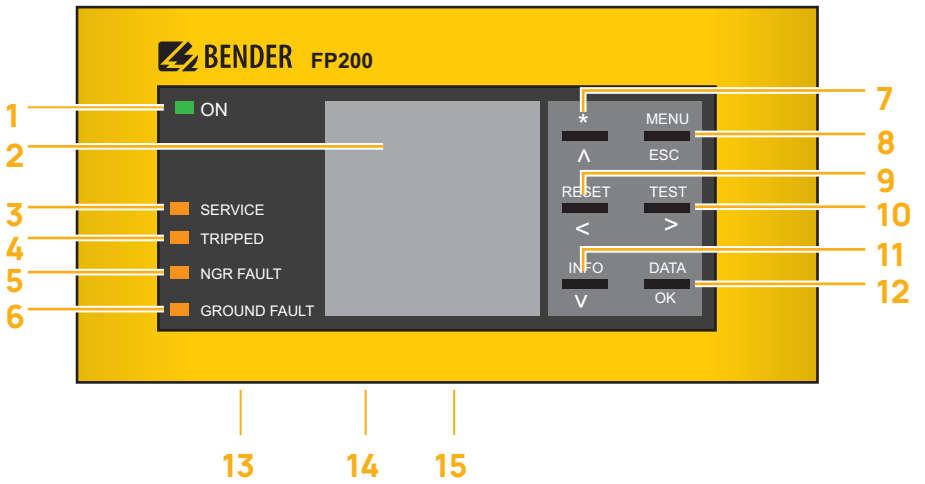
A ground fault is signalled via the corresponding ground-fault relay when I_{NGR} or U_{NGR} exceeds the selectable thresholds. After the adjustable delay time has elapsed, the installation can be shut down by means of the trip relay.

A connection to installations ranging from 400 V...25 kV is possible via the appropriate CD-series coupling device.
The I_{NGR} is measured via (universal) measuring current transformers for 5 A or 50 mA secondary. With the conversion ratio of the used measuring current transformer the current measurement is internally set in such a way that it adjusts best to I_{NGR}.

The phase-voltage monitoring function can be used to indicate which phase has the ground fault. Direct coupling is possible up to a system voltage of 690 V. For higher voltages use potential transformers (PT). The conversion ratio is adjustable.

Certifications

User interface FP200-NGRM



Display elements

1 -	ON	Operation LED, green; on when power supply is available
2 -		The LC display shows device and measurement information.
3 -	SERVICE	The LED is on when there is either a device fault or a connection fault, and when the device is in maintenance mode.
4 -	TRIPPED	The LED is on when the trip relay has been tripped due to an NGR fault, ground fault or a system error.
5 -	NGR FAULT	The LED flashes in case of a prewarning: NGR fault detected, NGR relay has tripped, trip relay has not tripped yet ($t_{NGR\ trip}$ elapses). The LED is on when an NGR fault has been detected. Trip relay and NGR relay have tripped.
6 -	GROUND FAULT	The LED flashes in case of a prewarning: ground fault detected, ground-fault relay has tripped, trip relay has not tripped yet ($t_{GF\ trip}$ elapses). The LED is on: ground fault detected, trip relay has tripped, installation has not been shut down yet.

Device buttons

7 -	Λ	Navigates up in a list or increases a value.
8 -	MENU	Opens the device menu.
	ESC	Cancels the current process or navigates one step back in the device menu.
9 -	RESET	Resets alarms.
	<	Navigates backwards (e.g. to the previous setting step) or selects parameter.
10 -	TEST	Starts the device self test.
	>	Navigates forwards (e.g. to the next setting step) or selects parameter.
11 -	INFO	Shows information.
	V	Navigates down in a list or reduces a value.
12 -	DATA	Indicates data and values.
	OK	Confirms an action or a selection.
13 -	X1	Interface X1
14 -	ETH	Ethernet interface
15 -	R on/off	Terminating resistor for A/B (Modbus RTU)
Buzzer		Active in case of alarm and/or test

Rear side

REMOTE	RJ45 port for connection of FP200-NGRM to enclosure
X3	Without function

Technical Data

Insulation coordination according to IEC 60664-1/IEC 60664-3/DIN EN 50187

Definitions	
Measuring circuit 1 (IC1)	(L1, L2, L3)
Supply circuit (IC2)	(A1, A2)
Measuring circuit/Control circuit (IC3)	(RS, E, CT), (X1, Ethernet)
Output circuit 1 (IC4)	(11, 12, 14)
Output circuit 2 (IC5)	(21, 22, 24)
Output circuit 3 (IC6)	(31, 32, 34)
Rated voltage	690 V
Overvoltage category	III
Rated impulse voltage	
IC1/(IC2…6)	8 kV
IC2/(IC3…6)	4 kV
IC3/(IC4…6)	4 kV
IC4/(IC5…6)	4 kV
IC5/(IC6)	4 kV
Rated insulation voltage	
IC1/(IC2…6)	800 V
IC2/(IC3…6)	250 V
IC3/(IC4…6)	250 V
IC4/(IC5…6)	250 V
IC5/(IC6)	250 V
Pollution degree exterior	3
Safe isolation (reinforced insulation) between	
IC1/(IC2…6)	overvoltage category III, 800 V
IC2/(IC3…6)	overvoltage category III, 300 V
IC3/(IC4…6)	overvoltage category III, 300 V
IC4/(IC5…6)	overvoltage category III, 300 V
IC5/(IC6)	overvoltage category III, 300 V
Voltage tests (routine test) acc. to IEC 61010-1	
IC2/(IC3…6)	AC 2.2 kV
IC3/(IC4…6)	AC 2.2 kV
IC4/(IC5…6)	AC 2.2 kV
IC5/(IC6)	AC 2.2 kV

Supply voltage

Nominal supply voltage U_s	
≤ 2000 m	AC/DC, 24…240 V
≤ 2000 m (for UL applications)	AC/DC, 48…240 V
≤ 2000 m (for AS/NZS 2081)	AC/DC, 48…230 V
> 2000…≤ 5000 m	AC/DC, 24…120 V
> 2000…≤ 5000 m (for UL applications, AS/NZS 2081)	AC/DC, 48…120 V
Tolerance U_s	±15 %
Tolerance U_s (for UL applications)	-50…+15 %
Tolerance U_s (for AS/NZS 2081)	-25…+20 %
Frequency range –	DC, 40…70 Hz
Power consumption (typ. 50/60 Hz)	≤ 6.5 W/13 VA

Phase monitoring

Nominal measuring voltage U_n	3 AC 100…690 V, CAT III
Measuring range	1.2 x U_n
Measurement accuracy	±1 % of U_n
Power consumption per phase	≤ 0.5 W
Overload capacity	2 x U_n continuous
Input resistance	1,76 MΩ
PT ratio primary	1…10,000
PT ratio secondary	1…10,000
Measuring range with PT	100 V…25 kV

Monitoring R_{NGR}

Measuring input R_S	< 33 V RMS
Measuring range NGR (with R_S = 20 kΩ) active	0…10 kΩ
Measurement uncertainty for T = 0…+40 °C	±20 Ω
Measurement uncertainty for T = -40…+70 °C	±40 Ω
Measuring range NGR (with R_S = 100 kΩ) active	0…10 kΩ
Measurement uncertainty for T = 0…+40 °C	±30 Ω
Measurement uncertainty for T = -40…+70 °C	±80 Ω
Setting range $R_{NGR\,nom}$	15 Ω…5 kΩ
Response value $R_{NGR\,nom}$	10…90 % $R_{NGR\,nom}$
	110…200 % $R_{NGR\,nom}$
Response delay NGR relay	7 s (±2.5 s)
Response delay trip relay	0…60 s

Monitoring I_{NGR}

Measuring circuit 5 A	
Nominal measuring current I_n	DC/50/60 Hz/50…3200 Hz 5 A
Maximum continuous current	2 x I_n
Overload capacity	10 x I_n for 2 s
Measurement accuracy	±2 % of I_n
Load	10 mΩ
Measuring circuit 50 mA	
Nominal measuring current I_n	DC/50/60 Hz/50…3200 Hz 50 mA
Maximum continuous current	2 x I_n
Overload capacity	10 x I_n for 2 s
Measurement accuracy	±2 % of I_n
Load	68 Ω
Measuring circuits 5 A and 50 mA	
Response value I_{NGR}	10…90 % $I_{NGR\,nom}$
Response delay ground-fault relay	≤ 40 ms (±10 ms)
Response delay trip relay (configurable)	100 ms…24 h, ∞
Tolerance t_{trip} when set to	
RMS	-20…0 ms
Fundamental	0…+150 ms (filter time)
Harmonics	0…+150 ms (filter time)
Measuring current transformer ratio primary	1…10,000
Measuring current transformer ratio secondary	1…10,000
Measuring range	2 x $I_{NGR\,nom}$

Coupling

R_S for U_{sys} ≤ 4.3 kV	CD1000, CD1000-2, CD5000 (20 kΩ)
R_S for U_{sys} > 4.3 kV	CD14400, CD25000 (100 kΩ)

Monitoring U_{NGR}

U_{NGR} with R_S = 20 kΩ	DC/50/60 Hz/50…3200 Hz; (400/√3) … ≤ (4300/√3) V
U_{NGR} with R_S = 100 kΩ	DC/50/60 Hz/50…3200 Hz; > (4.3 /√3) … (25/√3) kV
Measuring range	1.2 x $U_{NGR\,nom}$
Overload capacity	2 x U_{NGR} for 10 s
Measurement accuracy	2 % of $U_{NGR\,nom}$ with $U_{NGR\,nom}$ = ($U_{sys\,(L-L)}$/√3)
Voltage response value	0…100 % $U_{NGR\,nom}$
Response delay ground-fault relay	≤ 40 ms (±10 ms)
Response delay trip relay (configurable)	100 ms…24 h, ∞
Tolerance t_{trip} when set to	
RMS	-20…0 ms
Fundamental	0…+150 ms (filter time)
Harmonics	0…+150 ms (filter time)
PT ratio primary	1…10,000
PT ratio secondary	1…10,000
DC immunity in case of active R_{NGR} measurement	
with R_S = 20 kΩ	DC ±12 V
with R_S = 100 kΩ	DC ±60 V

Digital inputs

Galvanic separation	no
Length connecting cables	max. 10 m
U_{in}	DC 0 V, 24 V
Overload capacity	-5…32 V

Digital outputs

Galvanic separation	no
Length connecting cables	max. 10 m
Currents (sink) for each output	max. 300 mA
Voltage	24 V
Overload capacity	-5…32 V

Analogue output (M+)

Operating mode	Linear
Functions	I_{NGR}, R_{NGR}
Current 0…20 mA (≤ 600 Ω), 4…20 mA (≤ 600 Ω), 0…400 µA (≤ 4 kΩ)	
Voltage	0…10 V (≥ 1 kΩ), 2…10 V (≥ 1 kΩ)
Tolerance related to the current/voltage end value	±20 %

Ground-fault, NGR, trip relay

Switching elements	changeover contacts
Operating mode	configurable fail-safe/non-fail-safe
Electrical endurance, number of cycles	10,000
Switching capacity	2000 VA/150 W
Contact data acc. to IEC 60947-5-1	
Rated operational voltage AC	250 V/250 V
Utilisation category	AC-13/AC-14
Rated operational current AC	5 A/3 A
Rated operational current AC (for UL applications)	3 A/3 A
Rated operational voltage DC	220/110/24 V
Utilisation category	DC12
Rated operational current DC	0.1/0.2/1 A
Minimum current	1 mA at AC/DC > 10 V

Environment/EMC

EMC immunity (IEC6100-6-2/IEC 60255-26 Ed. 3.0)	DIN EN 61000-6-2
EMC emission (IEC6100-6-2/IEC 60255-26 Ed. 3.0)	DIN EN 61000-6-4
Operating temperature	-40…+70 °C -40…+60 °C (for UL applications)
Humidity	≤ 98 %
Classification of climatic conditions acc. to IEC 60721	
Stationary use (IEC 60721-3-3)	3K5 (except condensation and formation of ice)
Transport (IEC 60721-3-2)	2K3 (-40…+85 °C) (except condensation and formation of ice)
Long-term storage (IEC 60721-3-1)	1K4 (-40…+70 °C) (except condensation and formation of ice)
Classification of mechanical conditions acc. to IEC 60721/IEC 60255-21/DIN EN 60068-2-6	
Stationary use	3M7
Transport	2M2
Long-term storage	1M3

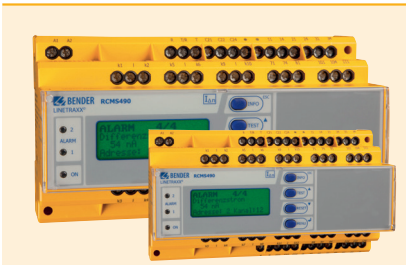
Connection

Screw-type terminals	
Tightening torque	0.5…0.6 Nm (5…7 lb-in)
Conductor sizes	AWG 24-12
Stripping length	7 mm
rigid/flexible	0.2…2.5 mm²
flexible with ferrule with/without plastic sleeve	0.25…2.5 mm²
Multiple conductor, rigid	0.2…1 mm²
Multiple conductor flexible	0.2…1.5 mm²
Multiple conductor flexible with ferrule without plastic sleeve 0.25…1 mm²	
Multiple conductor, flexible with TWIN ferrule with plastic sleeve 0.5…1.5 mm²	
Push-wire terminals X1	
Conductor sizes	AWG 24-16
Stripping length	10 mm
rigid/flexible	0.2…1.5 mm²
flexible with ferrule without plastic sleeve	0.25…1.5 mm²
flexible with ferrule with plastic sleeve	0.25…0.75 mm²

Other

Operating mode	continuous operation
Mounting	display-oriented
Altitude	5000 m AMSL
Degree of protection, internal components (DIN EN 60529)	IP30
Flammability class	UL 94V-0
Protective coating measurement equipment	SL1307, UL file E80315
Documentation number	D00292
Weight	1050 g

LINETRAXX®
RCMS460-D/-L – RCMS490-D/-L



LINETRAXX® RCMS460-D and RCMS490-L

Device features

- Optional AC, pulsed DC or AC/DC sensitive measurement by selecting the respective measuring current transformer for each channel
- True r.m.s. value measurement
- 12 measuring channels per device for residual current measurement or digital input
- Up to 90 RCMS… monitors, up to1080 measuring channels in the system
- Fast parallel scanning for all channels
- Response ranges:
  10 mA…10 A (0…2000 Hz),
  6 mA…20 A (42…2000 Hz),
  100 mA…125 A (42…2000 Hz) RCMS…-D4
- Preset function
- Adjustable time delays
- The frequency response characteristics can be set for the protection of persons, fire and plant protection
- History memory with date and time stamp for 300 data records
- Data logger for 300 data records/channel
- Analysis of the harmonics, DC, THF
- Two alarm relays with one changeover contact each
- Device version RCMS490 with one alarm contact per channel
- N/O or N/C operation and fault memory selectable
- Connection external test/reset button
- Backlit graphical display
  (7-segment display) and alarm LEDs
- Data exchange via BMS bus
- Password protection for device setting
- Continuous CT connection monitoring
- RoHS compliant

Approvals

Product description RCMS460-D…/-L… and RCMS490-D…/-L…

The RCMS system consists of one or more RCMS460-D/-L or RCMS490-D/-L residual current monitors, which are able to detect and evaluate fault, residual and operating currents in earthed power supplies via the related measuring current transformers. The maximum voltage of the system to be monitored depends on the nominal insulation voltage of the measuring current transformer used in the case of busbar systems, resp. depend on the cables or conductors that are routed through.

Closed W…AB series measuring current transformers are required to measure AC/DC sensitive residual currents (according to IEC/TR 60755: Type B). Six W…AB series measuring current transformers require one AN420 or AN110 power supply unit. W (closed), WR (rectangular), WS (split-core) and WF… (flexible) series measuring current transformers are used for alternating and pulsating currents (according to IEC/TR 60755: Type A).

Any combination of the various measuring current transformer series can be connected to the monitor measuring channels. Each RCMS460-D/-L and RCMS490-D/-L has 12 measuring channels. Up to 90 residual current monitors can be connected via a BMS bus (RS-485 interface with BMS protocol), thereby up to 1080 measuring channels (sub-circuits) can be monitored.

If this product is to be used for personnel, fire or plant protection, the frequency response can be set accordingly. The measured currents can be analysed for harmonics.

Typical applications

Measuring and evaluating residual, fault and rated currents of loads and installations in the frequency range of 0…2000 Hz (W…AB series measuring current transformers), 42…2000 Hz (W, WR, WS WF series measuring current transformers).

- Monitoring of currents regarded as fire hazards in flammable atmospheres
- EMC monitoring of TN-S systems for “stray currents” and additional N-PE connections.
- Monitoring of N conductors for overload caused by harmonics
- Monitoring of PE and equipotential bonding conductors to ensure they are free of current
- Residual current monitoring of stationary electrical equipment and systems to determine test intervals which meet practical requirements in compliance with the accident prevention regulations DGUV V3 (Germany).
- Personnel and fire protection due to rapid disconnection
- Monitoring of digital inputs

Function

The currents are detected and evaluated as true r.m.s. values in the frequency range of 0 (42)…2000 Hz. All channels are scanned simultaneously so that the maximum scanning time for all channels is 180 ms if 1x the response value is exceeded and 30 ms if 5x the response value is exceeded.

The current values of all channels are indicated on the LC display in bar graph format. If one of both values falls below or exceeds the set response value, the response delay t_{on} begins. Once the response delay has expired, the common alarm relays “K1/K2” switch and the alarm LEDs 1/2 light up.

Two response values/common alarm relays, which can be set separately, allow a distinction to be made between prewarning and alarm. The faulty channel(s) and the associated measured value are indicated on the LC display. If the current exceeds or falls below the release value (response value plus hysteresis), the delay on release toff begins. Once the delay has expired, the common alarm relays return to their initial position.

If the fault memory is enabled, the common alarm relays remain in the alarm state until the reset button is pressed or a reset command is sent via the BMS bus. The device function can be tested using the test button. Parameters are assigned to the device via the LCD and the control buttons on the front of one of the connected RCMS…-D devices or via connected panels and protocol converters (e.g. COM465IP). The preset function allows the response values to be set for all channels considering the currently measured value for each channel.

Digital input

Each individual channel can be used for one of the following monitoring functions:
as digital input using a potential-free contact 1/0 or for current or residual current monitoring in combination with measuring current transformers.

History memory in RCMS460-D, RCMS490-D

The device utilises a history memory for failsafe storing of up to 300 data records (date, time, channel, event code, measured value), so that all data about an outgoing circuit or an area can be traced back at any time (what happened when).

Analysis of harmonics

The analysis of the harmonics of the measured currents can be selected via a menu item in RCMS460-D, RCMS490-D. There, the DC component, the THF and the current value of the harmonics (1…40 at 50/60 Hz, 1…5 at 400 Hz) is displayed numerically and graphically.

Device variants

RCMS residual current monitoring systems differ in the type of residual current evaluator used. RCMS460… or RCMS490… are available as an option.

RCMS460-D

Device version RCMS460-D utilises a backlit graphical display. This version is applied when detailed information about all devices in the switchboard cabinet, connected to the bus, are to be displayed locally. This device is capable of assigning parameters to all RCMS devices connected to the BMS bus and displaying all measurement details. Several RCMS-D devices can be used in one system.

RCMS460-L

Device version RCMS460-L utilises a two-digit 7-segment display where the address of this device is displayed within the BMS bus. The alarm LEDs indicate in which measuring channel the response value has been exceeded. Parameter assignment can be carried out via an RCMS-D… or the protocol converter COM465IP.

RCMS490-D/RCMS490-L

The function of the device versions RCMS490-D/RCMS490-L corresponds to the function described above. In addition, a galvanically isolated alarm contact (N/O contact) is provided, for example, to trigger a circuit breaker in this sub-circuit when a response value has been exceeded or the value has fallen below the set response value.

RCMS…-D4/RCMS…-L4

The function of device version RCMS…-D4/RCMS…-L4 corresponds to the function described before. The functions of measuring channels k9…k12 vary from those described before. They are exclusively designed for current measurements with Type A measuring current transformers (measuring range 100 mA…125 A). For that reason, the measuring channels k9…k12 cannot be used in combination with W… AB series measuring current transformers or as digital inputs.

Standards

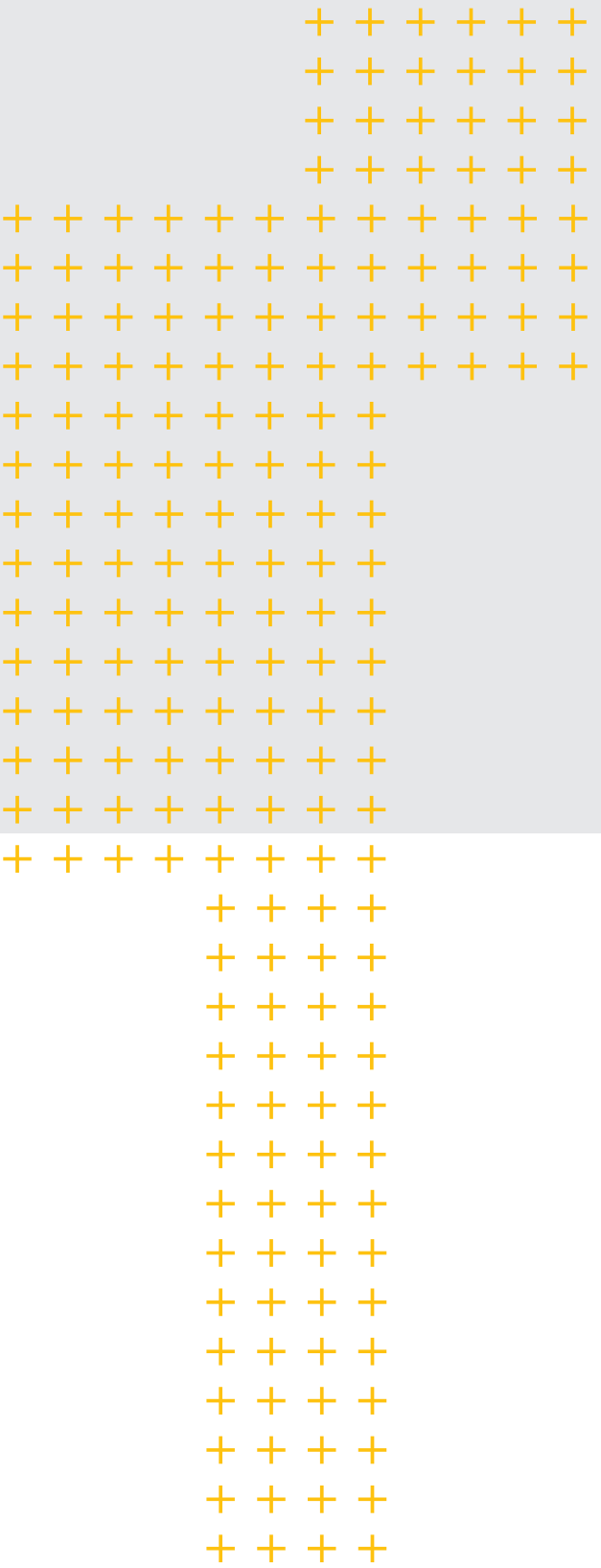
The LINETRAXX® RCMS460/490 series complies with the requirements of the device standards: DIN EN 62020 (VDE 0663) and IEC 62020.

Overview of device types

Distinctive device features			RCMS460-D…	RCMS460-L	RCMS490 -D…	RCMS490-L…
	Parameter setting function		■	–	■	–
	Master/Slave		■	■	■	■
	Address range		1…90	1…90	1…90	1…90
Measuring circuit	Measuring channels per device		12	12	12	12
	W…, WR…, WS…, W…AB, W…F series measuring current transformers		■	■	■	■
	CT monitoring		■	■	■	■
	Rated residual operating current $I_{\Delta n2}$ (Alarm)	AC/DC sensitive 0…2000 Hz (Type B)	10 mA…10 A	10 mA…10 A	10 mA…10 A	10 mA…10 A
		pulsed DC sensitive 42…2000 Hz (Type A)	6 mA…20 A	6 mA…20 A	6 mA…20 A	6 mA…20 A
		pulsed DC sensitive 42…2000 Hz (Type A) for the channels 9…12 (RCMS4x0-D4/-L4)	100 mA…125 A	100 mA…125 A	100 mA…125 A	100 mA…125 A
	Rated residual operating current $I_{\Delta n1}$ (prewarning)		10…100 %, min. 5 mA	10…100 %, min. 5 mA	10…100 %, min. 5 mA	10…100 %, min. 5 mA
	Function selectable per channel off, <, >, I/O		■	■	■	■
	Cut-off frequency adjustable for personnel, plant and fire protection		■	*	■	*
	Preset function for $I_{\Delta n2}$ and I/O		■	■	■	■
	Hysteresis		2…40 %	2…40 %	2…40 %	2…40 %
	Factor for additional CT		■	■	■	■
Switching elements	Common alarm relay for all channels		2 x 1 changeover contact	2 x 1 changeover contact	2 x 1 changeover contact	2 x 1 changeover contact
	Alarm relay per channel		–	–	12 x 1 N/O contact	12 x 1 N/O contact
Time response	Start-up delay 0…99 s		■	■	■	■
	Response delay tv, adjustable 0…999 s		■	■	■	■
	Operating time at	$I_{\Delta n} = 1 \times I_{\Delta n2}$: ≤ 180 ms	■	■	■	■
		$I_{\Delta n} = 5 \times I_{\Delta n2}$: ≤ 30ms	■	■	■	■
Displays, memory	Analysis of the harmonics (IΔ, DC, THF)		■	*	■	*
	History memory 300 data records		■	–	■	––
	Data logger for 300 data records/ channel		■	–	■	–
	Internal clock		■	–	■	–
	Password		■	–	■	–
	Language English, German, French, Swedish		■	–	■	–
	Backlit graphics LC display		■	–	■	–
	7-segment display and LED line		–	■	–	■

* only in conjunction with RCMS4xx-D, MK2430 or COM465IP

benderinc.com



Bender Inc.

420 Eagleview Blvd.
Exton, PA
19341

Tel.: 610-383-9200
www.benderinc.com

Bender Canada Inc.

5810 Ambler Drive Unit 1
Mississauga, ON
L4W 4J5

Tel.: 905-602-9990
www.benderinc.com

Revised August 2023

14.9i.REV.2

BENDER