

Medium Voltage Relay MVR 200 series



MVR 210 series



MVR 250 series

General description

The MVR 200 series provides optimal performance for medium- and high-voltage protection, control, measurement, and monitoring of applications.

The MVR is designed for use as stand-alone protection and measuring unit or as a component in larger applications, connected through IEC 61850 GOOSE messages in three-phase electrical power networks that require marine approval.

The MVR wide frequency tracking algorithm ensures stable measurement and protection from 6 to 75 Hz, where variable frequency is present, such as marine applications and generators running in island mode.

The MVR measures and calculates values for AC voltage, AC current, active/reactive power, power factor, frequency, THD and harmonics (up to 31st). All values can be seen on the display.

A 5 ms scan time ensures that faults are quickly registered.

A 64 samples/cycle fault record function measures data for up to 100 faults for 10 seconds each. This function can be configured to create records *before* the error, making it easier to understand the causes of the error and prevent it from re-occurring.

Series	Display	Free option slots
MVR 210	4" monochrome	3 to 5
MVR 250	7" colour	9 to 11

Main features

- Robust design for maritime usage
- Separate processors for HMI and communication
- Programmable logic
- 6 to 75 Hz patented frequency-tracking algorithm
- Fast and easy-to-use software for setup and commissioning
- 64 samples/cycle
- Password-protected user levels
- Individual voltage and current harmonics up to 31st
- TCP/IP Ethernet
- Ethernet port on the front for easy commissioning and service
- RS-485 communication
- Compliant with IEC 61850 GOOSE
- System fault output relay
- On-site replaceable spare part card
- Class 0.2S power and energy measurement (optional)
- Marine approval by major class societies: DNV/GL, LR, BV, ABS, CCS, CNK, KR, RS

Protections and functions

Feeder protections

Protection	IEC	ANSI
Three phase over-current	I> to I>>>>	50/51
(Sensitive) Earth fault	I0> to I0>>>>	50N/51N(S)
Harmonic over-current/inrush blocking	IXH> to IXH>>>>	50/51h/68
Cold-load pick-up block	CLPU	68
Current unbalance	I2 (I2/I1)	46/46R/46L
Thermal overload (line)	T>	49L
Restricted earth fault (low-imp)	I0D>	87N
Cable-end differential	-	87N
Directional three-phase over-current	IDIR> to IDIR>>>>	67
Directional (sensitive) residual over-current	I0DIR> to I0DIR>>>>	67N
Intermittent earth fault	I0INT>	67NT
Fault locator	-	21FL
Over-voltage	U> to U>>>>	59
Under-voltage	U< to U<<<<	27
Positive sequence under/over-voltage	U1</> (4)	59P/27P/47
Residual voltage	U0> to U0>>>>	59N
Frequency	F >/ F < (8)	81 O/U
Rate of change of frequency	df/dt (8)	81R
Vector jump	-	78
Reverse/under-/over-power	P</> (4)	32
Synchrocheck	DV/DA/DF	25
Auto-reclose	0 -> 1	79
Fuse failure	VTS	60
CT supervision	CTS	-
Switch onto fault logic	SOTF	-
Breaker failure	CBFP	50BF
Programmable stage	-	99

Machine protections

Protection	IEC	ANSI
Three phase over-current	I> to I>>>>	50/51
(Sensitive) Earth fault	I0> to I0>>>>	50N/51N(S)
Harmonic over-current/inrush blocking	IXH> to IXH>>>>	50/51h/68
Current unbalance	I2 (I2/I1)	46/46R/46L
Restricted earth fault (low-imp)	I0D>	87N
Cable-end differential	-	87N
Directional three-phase over-current	IDIR> to IDIR>>>>	67
Directional (sensitive) residual over-current	I0DIR> to I0DIR>>>>	67N
Over-voltage	U> to U>>>>	59
Under-voltage	U< to U<<<<	27
Positive sequence under/over-voltage	U1</> (4)	59P/27P/47
Residual voltage	U0> to U0>>>>	59N
Frequency	F >/ F < (8)	81 O/U
Rate of change of frequency	df/dt (8)	81R
Vector jump	-	78
Reverse/under-/over-power	P</> (4)	32
Transformer, motor or generator differential, 2-winding	IDX>, IDX>>	87T/G/M

Machine thermal overload	T>	49M
Motor start-up supervision element	IST>	14/48
Power factor	-	55
Restart inhibit/frequent starts	N>	66/86
Under-current monitor	I<	37
Load jam monitor	IM>	51m
Synchrocheck	DV/DA/DF	25
Under-impedance	Z<	21
Voltage-controlled/-dependent over-current	IV>	51V
Loss of field	X<	40
Over-excitation	V/Hz	24
100 % stator earth fault	U0F3<	64F3
Out-of-step	-	78
Inadvertent energising	-	50/27
Fuse failure	VTS	60
CT supervision	CTS	-
Breaker failure	CBFP	50BF
Programmable stage	-	99

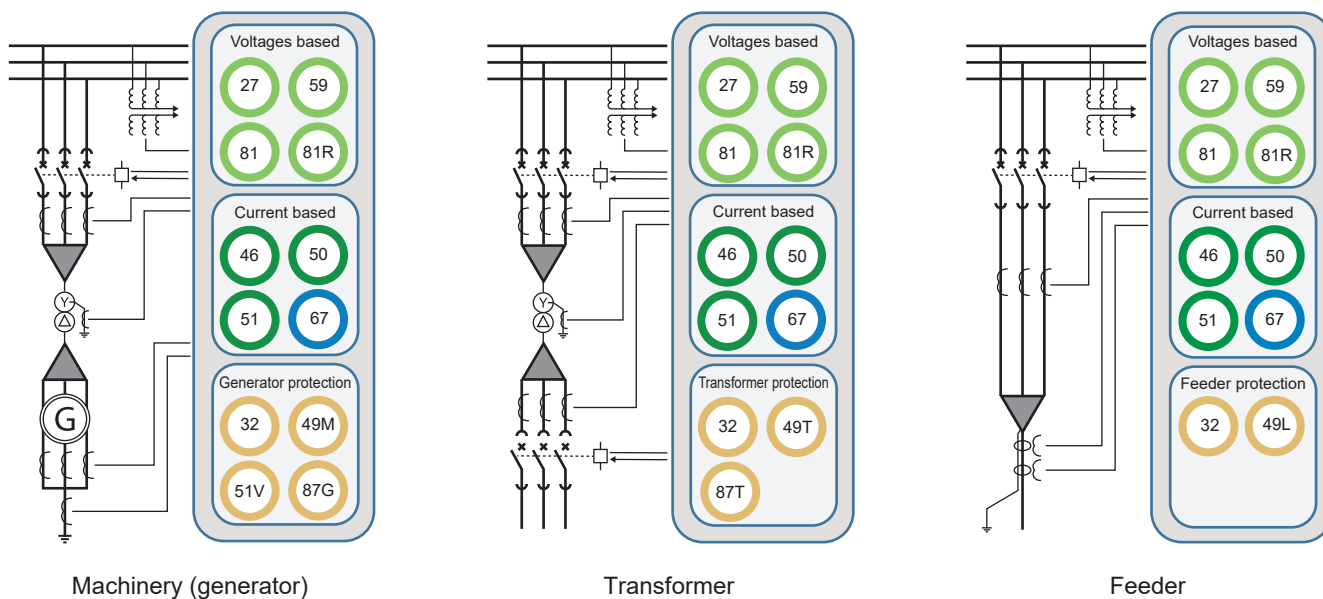
Transformer and busbar protections

Protection	IEC	ANSI
Three phase over-current	I> to I>>>>	50/51
(Sensitive) Earth fault	I0> to I0>>>>	50N/51N(S)
Harmonic over-current/inrush blocking	IXH> to IXH>>>>	50/51h/68
Cold-load pick-up block	CLPU	68
Current unbalance	I2 (I2/I1)	46/46R/46L
Restricted earth fault (low-imp)	I0D>	87N
Cable-end differential	-	87N
Directional three-phase over-current	IDIR> to IDIR>>>>	67
Directional (sensitive) residual over-current	I0DIR> to I0DIR>>>>	67N
Over-voltage	U> to U>>>>	59
Under-voltage	U< to U<<<<	27
Positive sequence under/over-voltage	U1</> (4)	59P/27P/47
Residual voltage	U0> to U0>>>>	59N
Frequency	F >/ F < (8)	81 O/U
Rate of change of frequency	df/dt (8)	81R
Vector jump	-	78
Reverse/under-/over-power	P</> (4)	32
Transformer, motor or generator differential, 2-winding	IDX>, IDX>>	87T/G/M
Transformer thermal overload	T>	49T
Automatic voltage regulator	AVR	90
Synchrocheck	DV/DA/DF	25
Under-impedance	Z<	21
Over-excitation	V/Hz	24
Fuse failure	VTS	60
CT supervision	CTS	-
Switch onto fault logic	SOTF	-
Breaker failure	CBFP	50BF
Programmable stage	-	99

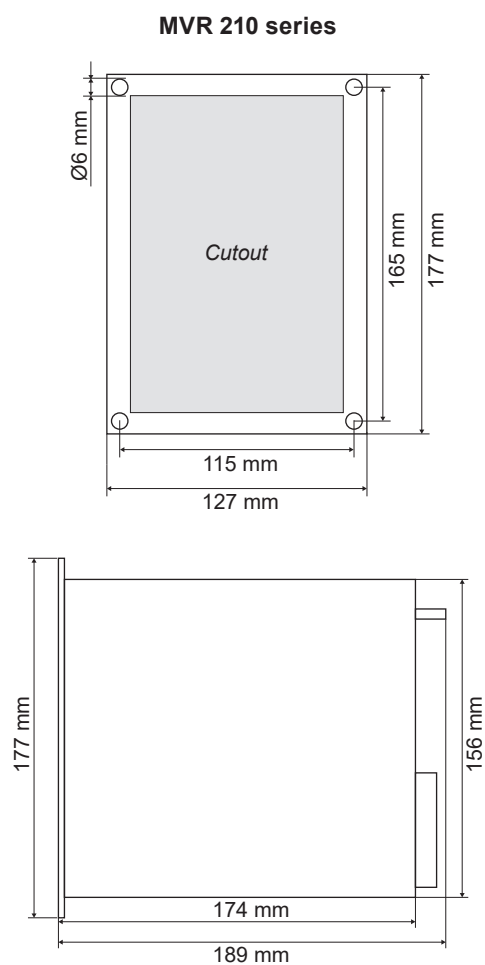
More information on protections can be found in the data sheet.

Wiring and Dimensions

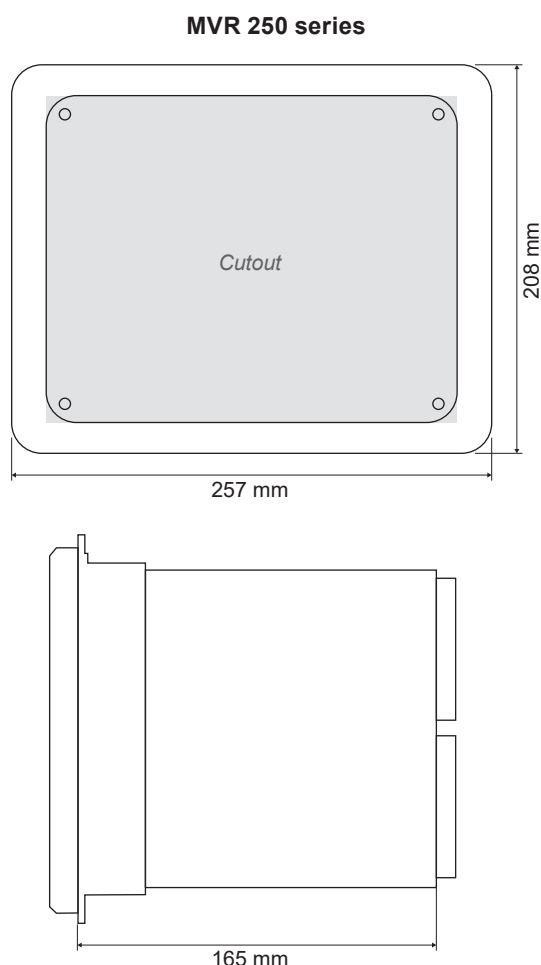
Application



Dimensions



Cutout: 160 x 106 mm ±3 mm



Cutout: 220 x 175 mm ±3 mm

Technical specifications

Power supply

Low DC supply	24/48 V +30/-25 %
High AC/DC supply	100 to 240 V DC ± 10 % 100 to 240 V AC, 50/60 Hz ± 10 %
Power consumption	210 series typically: 20 W 250 series typically: 30 W

Operation conditions

Operation temp.	-25 to +60 °C (-13 to +140 °F)
Storage temp.	-40 to +70 °C (-40 to +158 °F)

Environment

Altitude	0 to 2000 m
Humidity	55 °C at 93 % RH
Protection degree	IP54 (front) IP20 (back)
Over-voltage CAT	III

Measuring

Voltage range	0.5 to 480 V RMS
Thermal withstand	630 V RMS continuous
Accuracy	2 to 480 V ± 0.5 %
Current range	25 mA to 250 A (RMS)
Thermal withstand	25 A continuous 100 A for 10 s 500 A for 1 s 1250 A for 0.01 s
Accuracy	0.005 x I_n to 20 x I_n $< \pm 0.5$ % or $< \pm 15$ mA 20 x I_n to 50 x I_n $< \pm 1.0$ %
Frequency range	6 to 75 Hz, fundamental
Accuracy	10 mHz
Power P, Q and S	Frequency range 6 to 75 Hz
Accuracy	± 1 % of nominal / 3 VA of secondary
Energy & Power	Frequency range 6 to 75 Hz
Accuracy	IEC 62053-22 class 0.5 S (50/60Hz)

Digital inputs and outputs

PSU card (DI)	24 V, 110 V or 220 V
Pick-up threshold (fixed)	20 V, 90 V, 180 V
Release threshold (fixed)	10 V, 60 V, 120 V
PSU card (DO)	220 V AC, 3 A 220 V DC, 0.2 A
Thermal cont. rating at 50 °C	Max. continuous carry 4 A
Option B (DI)	10 to 200 V DC
Pick-up threshold (fixed)	16 to 200 V DC (1 V step)
Release threshold (fixed)	10 to 200 V DC (1 V step)
Option C (DO)	220 V AC, 3 A 220 V DC, 0.2 A
Thermal cont. rating at 50 °C	Max. continuous carry 4 A

Analogue inputs and outputs

Option F (RTD)	Pt100, Pt1000
Option I (AO)	0 to 24 mA outputs
Accuracy	0.5 % of full scale

Communication

RS-485, rear	Modbus
TCP/IP, rear	Ethernet (full access)
TCP/IP, front	Ethernet (service port)

Additional option cards

Option	Description
B	8 x Digital inputs
C	5 x Relay outputs (max. five cards)
D	Arc protection
F	2 x mA input and 8 x RTD input (max. two)
I	4 x Analogue output + 1 x Analogue input
J	Double LC 100 Mb Ethernet Redundant
L	Serial RS-232 - Serial fiber (PP)
M	Serial RS-232 - Serial fiber (PG)
N	Serial RS-232 - Serial fiber (GP)
O	Serial RS-232 - Serial fiber (GG)

For more information, please contact:

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