VAMP 50 series

with native IEC 61850 and arc flash protection

VAMP 50 family – low and mid range relay series with IEC 61850

The VAMP 50 series protection relay family is based on proven technology concept developed in close cooperation with customers. User-friendliness describe VAMP products, the feature which receives a good grade in customer satisfaction day after another.

The first product in the new series is VAMP 50 overcurrent and earth fault protection relay developed to cover basic protection needs for OEM, utility, and industrial applications. Thanks to its cost-effective and flexible design, the VAMP 50 will provide an excellent alternative for various protection applications.

The VAMP 51 offers enhanced control functionality like an auto-recloser, VAMP 52 combined protection functions for feeders, motors and directional earth fault.

The arc option for the VAMP 50 series is designed to enable the extremely rapid exchange of light and current information with other VAMP devices or a VAMP 221 arc flash protection system via a modular interstation bus located between the relays. It will be possible to connect up to three supervised arc point sensors to the arc option module, giving trip contact activation in less than 7 ms from the occurrence of an arc flash fault.

Robust and flexible hardware

- Modular design with versatile option offering for communication, arc protection and DI/DO extension
- Automatic adaptation of new / removed hardware

Common technology to gain volume benefits

- New powerful CPU supporting native IEC 61850
- Utilazation of other Vamp platform accessories

High user frendliness and functionality

- Same software platform as used in VAMP 200 series
- Active functions visible only for the operator
- Using the USB connection the relay configuration is faster than using serial interface

Modern Human Machine Interface (HMI)

- Mid-size and clear LCD display
- Single line diagram with control, indication and live measurements
- Programmable function keys and LEDs
- USB port in front with standard cable

Ease of use

User-friendliness has always been a feature of Vamp products, and the VAMP 50 series is no exception. A great deal of effort has gone into the design of the operational aspects of the new products.

The rapid relay setting parameter up and downloading with an unique VAMPSET setting tool lifts usability of the product now to another dimension. Unicode support allows the menu view and setting tool translation to mostly used languages including fonts like Russian and Chinese. The informative human machine interface show all the required messages to the user with support of customized legend texts.

VAMP 50 family HMI interface

Navigation push buttons

Function buttons

- CB contol
- Protection setting group selection
- User configurable legend texts
- Freely programmable

128 x 64 LCD dot matrix display

- Single line diagram and freely assignable analogue values
- Unicode language support

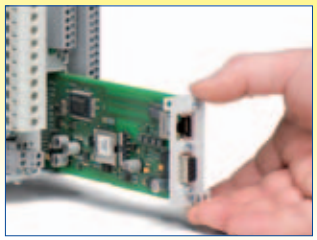
Local port

- USB interface

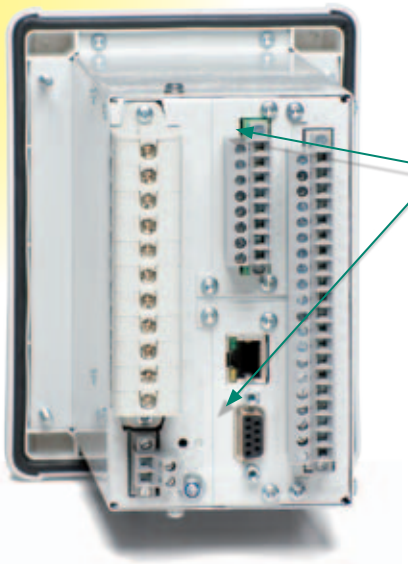
Programmable LEDs

- User configurable legend texts
- 12 LEDs, 2 fixed (power, error) and 8 freely programmable (2 for push buttons)

The template for user legend texts is a part of the product documentation. The texts printed on the transparency film allow customization of the relay.



The optional DI/DO, arc connection and communication modules can be added to the basic relay later on in order to extend the functionality of the relay during it's life time.



Two optional module slots

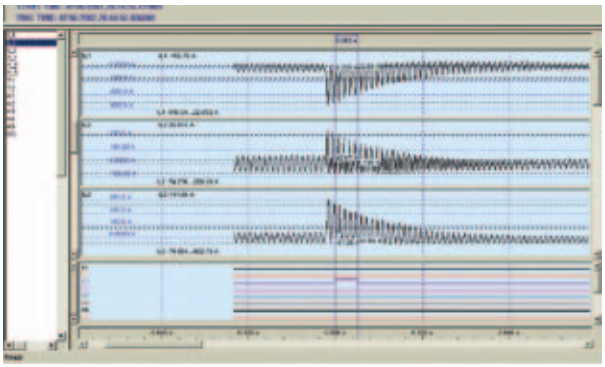
- Extends the functionality of the relay
- Remote port, RS485, RS232 & Ethernet (RJ-45 or fiber)
- Arc, DI/DO

VAMPSET Setting and Configuration Tool

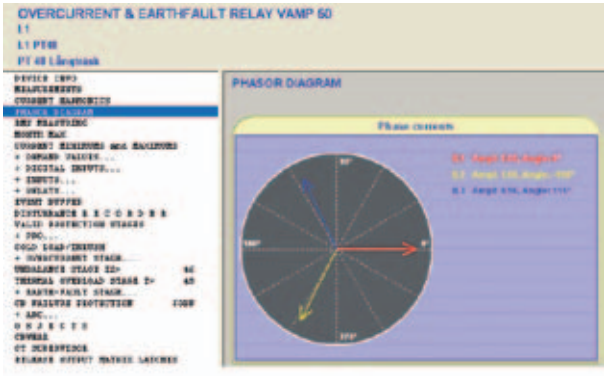
VAMPSET is a user-friendly, free-of-charge relay management software for setting, parameterising and configuring of VAMP relays. Via the VAMPSET software relay parameters, configurations and recorded relay data can be swapped between the operator's PC and the VAMP relays. Supporting the COMTRADE format VAMPSET also incorporates tools for analyzing relay events, waveforms and trends from data recorded by the relays, e.g. during a network fault situation.

Using a standard USB cable the PC running VAMPSET connects to the front port of the VAMP 50 series relays. The VAMPSET software also supports TCP/IP communication via an optional RJ-45 connection. Featuring true multi-language support the software runs on Windows Vista/XP/2000/NT and Windows 98/95 without any need for configuration of the PC. The VAMPSET software is future-safe supporting coming updates and new VAMP products.

The USB connection is about five times faster than serial communication. Standard USB communication cable is not manufacturer dependent.



As a regular feature of the VAMP relays standard COMTRADE type disturbance recording files can be uploaded for subsequent evaluation of any network event recorded.



The phase sequences for currents and voltages can be read on-line from the clear and explicit screen windows for easy commissioning of the relay system.

Input/Output options for VAMP 50 series

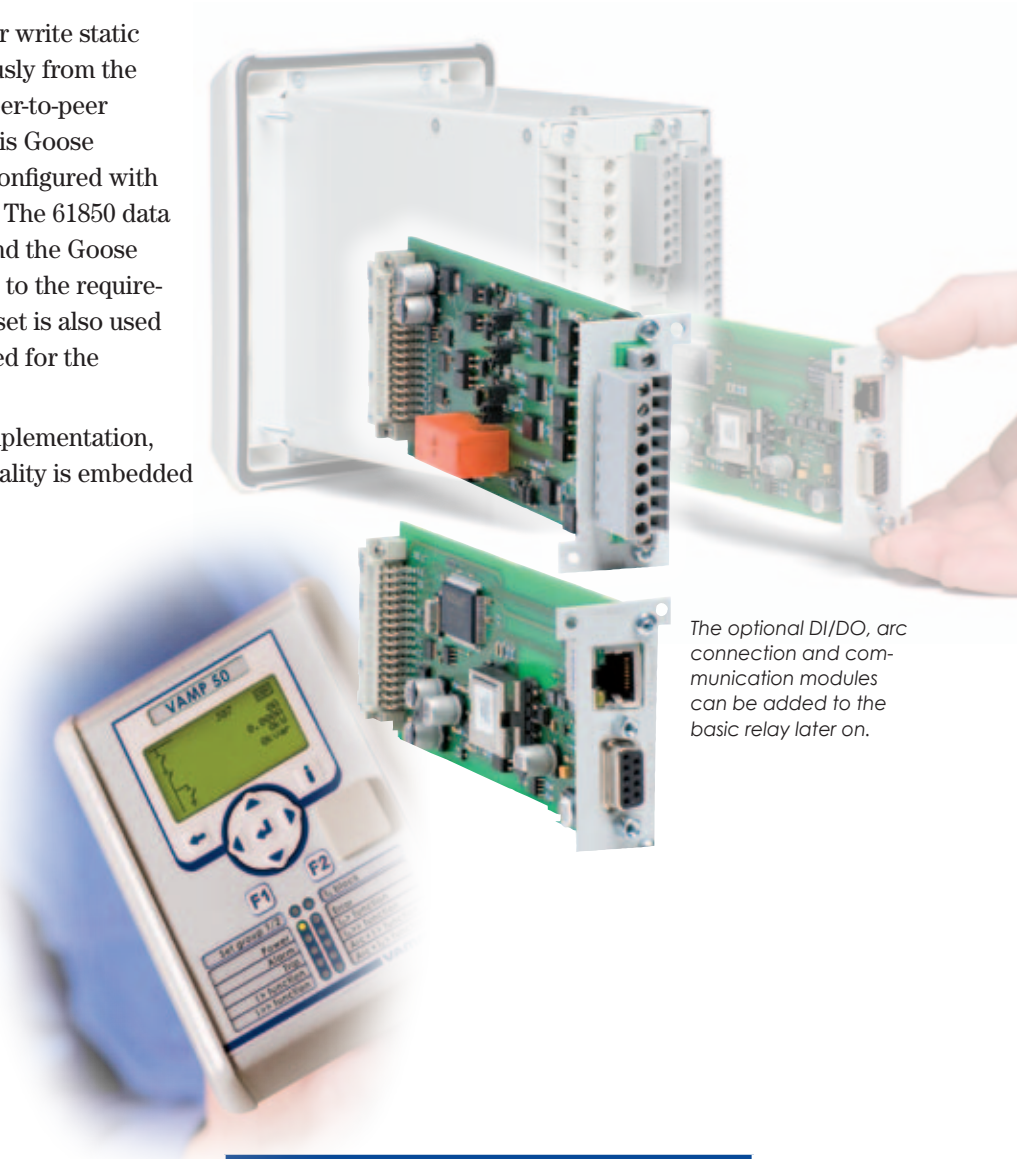
The VAMP 50 series host various option modules in order to up-grade the relay functionality from the basic protection unit to a more advanced protection relay.

	VAMP 50	VAMP 51	VAMP 52
Analog inputs	3 x I 1 x Io	3 x I 1 x Io	3 x I 1 x Io, 1 x U
Digital inputs	2 (6)	2 (6)	2 (6)
Trip relays	4 (5)	4 (5)	4 (5)
Control relays	2	2	2
mA output	Option	Option	Option
Arc protection	Option	Option	Option
Front port	USB	USB	USB
Optional rear port	RS 485/RS 232/ Fibre/Ethernet	RS 485/RS 232/ Fibre/Ethernet	RS 485/RS 232/ Fibre/Ethernet
External RTD input module	Option	Option	Option

Native IEC 61850

The 61850 protocol can be used to read or write static data or to receive events sent spontaneously from the relay. In addition, the interface allows peer-to-peer communication between the relays - this is Goose communication. The 61850 interface is configured with familiar, user-friendly Vampset software. The 61850 data model, data-sets, report control blocks and the Goose communication are configured according to the requirements of the system configuration. Vampset is also used to produce ICD files, which may be needed for the substation RTU configuration.

The VAMP 50 series contains native implementation, which means that the IEC 61850 functionality is embedded in the software.



The optional DI/DO, arc connection and communication modules can be added to the basic relay later on.

Communication

Vamp is a communication expert with a wide experience in interfacing with different system integrators' and SCADA suppliers' RTU's, PLC's, gateways etc. using different protocols. Flexible adaptation of the communication protocols together with powerful and easy to use software tools are the key of successful integration. VAMP 50 series and the VAMPSET tool provide access to practically any power system information you may need.

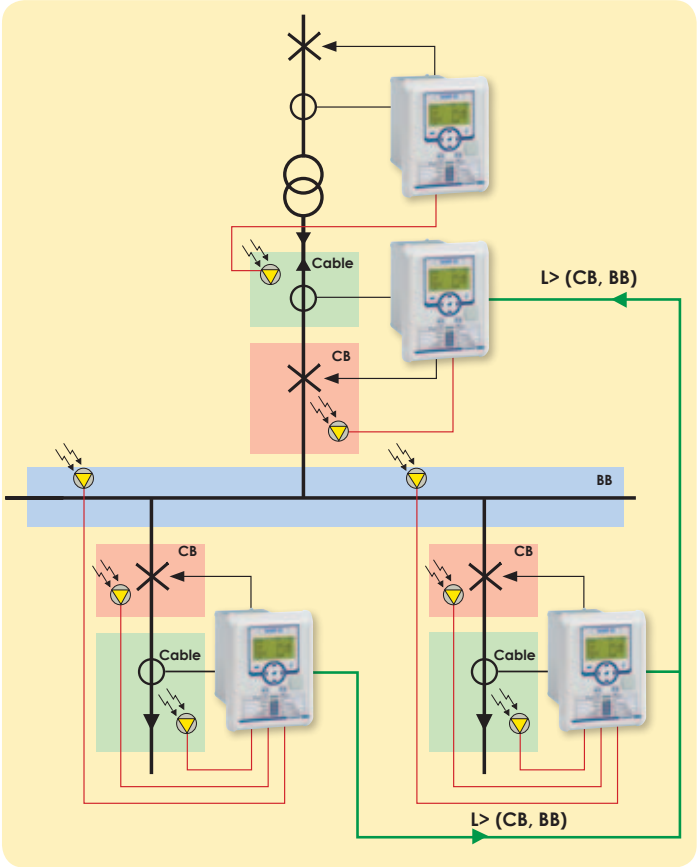
Communication protocols available in VAMP 50 series relays
IEC 60870-5-101
IEC 60870-5-103
Modbus TCP
Modbus RTU
Profibus DP
DNP 3.0
SPA-bus communication
IEC 61850
DeviceNet
Human-Machine-Communication, display
Human-Machine-Communication, PC

Arc flash protection

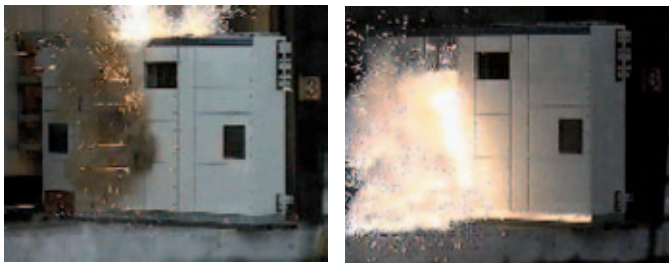
Whether the time-grading or blocking based protection coordination principle is used, the traditional protection systems may not provide fast enough protection of substation faults. Further, high-impedance type of earth-faults may cause prolonged operation times of earth-fault relays leading to the significant release of the arcing energy. These facts pose a considerable risk to human beings and economical assets. By applying a modern, high-speed arc protection system the damage may be considerably reduced. Such an arc protection system is an optional feature incorporatable in all current measuring VAMP relays.

The VAMP relays measure the fault current. If the arc protection option is selected the relays also monitor light via arc sensor channels monitoring the whole switchgear. Should an arcing fault occur in the switchgear the arc protection system provides an extremely fast tripping of the circuit breaker. The fault will be prevented from spreading and quickly isolated, which may save human lives and valuable economical assets.

Arc flash protection, incorporating continuous self supervision for the sensors, is optional in VAMP 50 series current measuring relays.



An arc flash protection integrated in VAMP relay enable station level ultra-fast arc protection system set-up using protection relay hardware and separate arc sensors. Possible arc flash fault in the cable compartment is selectively cleared by the feeder protection relay where as the fault in the circuit breaker or bus bar compartment is tripped by the incoming circuit breaker. The exact location of the arc flash will be detected by the arc flash and relay protection system.



Traditional protection relay systems do not provide fast enough protection in an arc-fault situations.

Protection stages

The user frendlines is built in feature in protection stages also. Setting views are graphical in relay and Vampset HMI. Protection stages taken out of use are hidden from the menu in order to show operator only the required information. Protection stages come with two setting groups to enable automatic transfer from main setting to alternative setting. This change can be universal for the entire relay or protection function based. The relay has large number of standard inverse curves to adopt various protection requirements. Should the application or machine characteristic require an unique protection curve the user can program his / her own curve.

				Feeder protection			Motor protection
Type of fault	IEEE Device No.	IEC Symbol	Protection function/measurement	VAMP 50	VAMP 51	VAMP 52	VAMP 52
Short circuit	50/51	3I >	Three-phase non-directional overcurrent, low-set stage, definite or inverse time	■	■	■	■
	50/51	3I >>	Three-phase non-directional overcurrent, high-set stage, definite time	■	■	■	■
	50/51	3I >>>	Three-phase non-directional overcurrent, high-set stage, definite time	■	■	■	■
Earth-fault	50N/51N	I_0 >/ SEF	Non-directional earth-fault, low-set stage, sensitive, definite or inverse time	■	■	■	■
	50N/51N	I_0 >>	Non-directional earth-fault, high-set stage, definite time	■	■	■	■
	50N/51N	I_0 >>>	Non-directional earth-fault,high-set stage, definite time	■	■	■	■
	50N/51N	I_0 >>>>	Non-directional earth-fault, high-set stage, definite time	■	■	■	■
	67N or 50N/51N	$I_{0\varphi}$ >/ SEF	Directional or non dir. earth-fault, low-set stage, sensitive, definite or inverse time			■	■
	67N or 50N/51N	$I_{0\varphi}$ >>	Directional or non dir. earth-fault, high-set stage, definite or inverse time			■	■
	59N	U_0>	Residual overvoltage, low-set stage			■	■
	59N	U_0>>	Residual overvoltage, high-set stage			■	■
Overload	49M	T>					■
	49F	T>	Three-phase thermal overload (feeders & cables)	■	■	■	
Voltage	59	1U>	One-phase overvoltage, low-set stage			■	■
	59	1U>>	One-phase overvoltage, high-set stage			■	■
	59	1U>>>	One-phase overvoltage, high-set stage			■	■
	27	1U<	One-phase undervoltage, low-set stage			■	■
	27	1U<<	One-phase undervoltage, high-set stage			■	■
	27	1U<<<	One--phase undervoltage, instantaneous stage			■	■
Arc flash protection	50ARC/50NARC	3 I> / I_0>, L>	Electrical arc flash protection stage, point sensors, optional	■	■	■	■
Other functions	79	O –> I	Auto-reclosure		■	■	
	68	I_{f2} >	Inrush and cold load detection	■	■	■	■
	46R	I_2/I_1 >	Phase unbalance / discontinuity protection (broken conductor)	■	■	■	
	46	I_2 >	Phase unbalance protection				■
	47	I_2 >>	Phase sequence / reversal protection				■
	48	I_{st} >	Stall protection				■
	37	3I<	Loss of load / under current protection			■	■
	86		Latched trip	■	■	■	■
	66	N>	Frequent start protection				■
	50BF	CBFP	Circuit breaker failure protection	■	■	■	■
			8 Programmable stages		■	■	■
		DR	Disturbance recorder	■	■	■	■

Measurements and condition monitoring

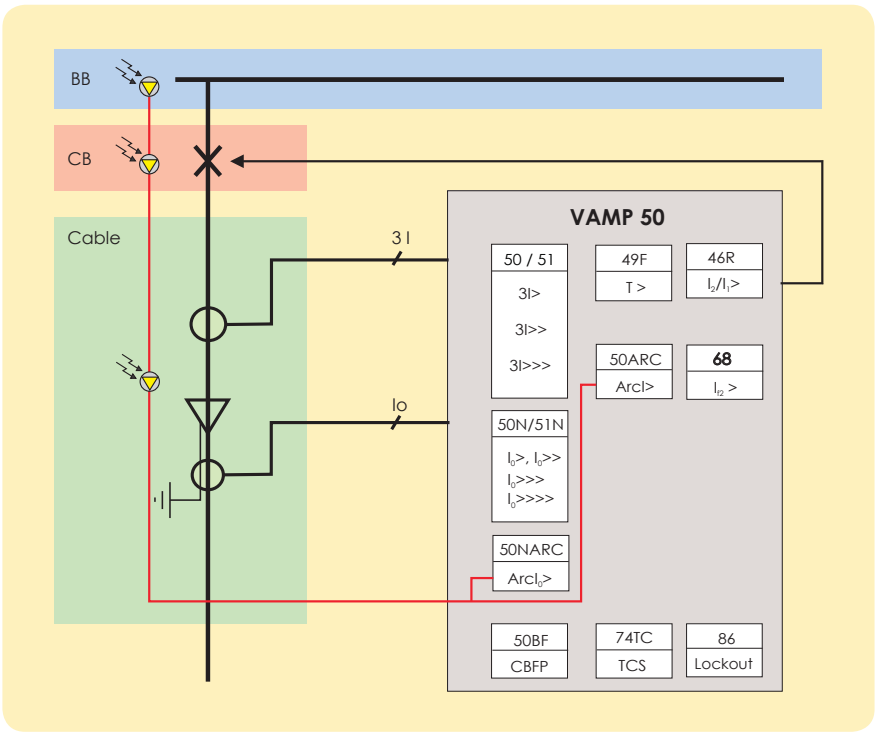
The VAMP 50 offers a complete set of measurement functions to replace the conventional metering functions of traditional switchgear and and controlgear installations. The measurement functions cover line and residual currents, current unbalance, system frequency and harmonics from phase currents. Condition monitoring continuously monitors trip circuits, breaker wear and current transformers.

			Feeder protection			Motor protection
Type of measurement	IEC Symbol	Protection function/measurement	VAMP 50	VAMP 51	VAMP 52	VAMP 52
Primary current	3I	Three-phase current	■	■	■	■
	I_0	Neutral current	■	■	■	■
	I_2	Current unbalance	■	■	■	■
	IL	Average and maximum demand current	■	■	■	■
Primary voltage	U	One-phase and line voltage			■	■
	U_0	Residual voltage			■	■
Frequency	f	System frequency	■	■	■	■
Harmonics	I	2nd to 15th and THD of phase currents	■	■	■	■
Analog mA output, 1 channel	AO	Any measured or calculated value, freely scalable	■	■	■	■
Control						
Digital inputs		Number of digital inputs (max)	6	6	6	6
Output relays		Number of trip relays (max)	5	5	5	5
		Number of control relays (max)	2	2	2	2
Object status indication		Single line diagram, 8 objects	■	■	■	■
Local and remote control		Number of controllable objects	3	3	3	3
Interlocking and logic		Configurable	■	■	■	■
Condition monitoring						
Trip circuit	TCS	Trip Circuit Supervision	■	■	■	■
	TCS	Trip Circuit Supervision with DI for T5 (optional)	■	■	■	■
CT Supervision		CT Supervision	■	■	■	■
CB Wear		Breaker wear	■	■	■	■

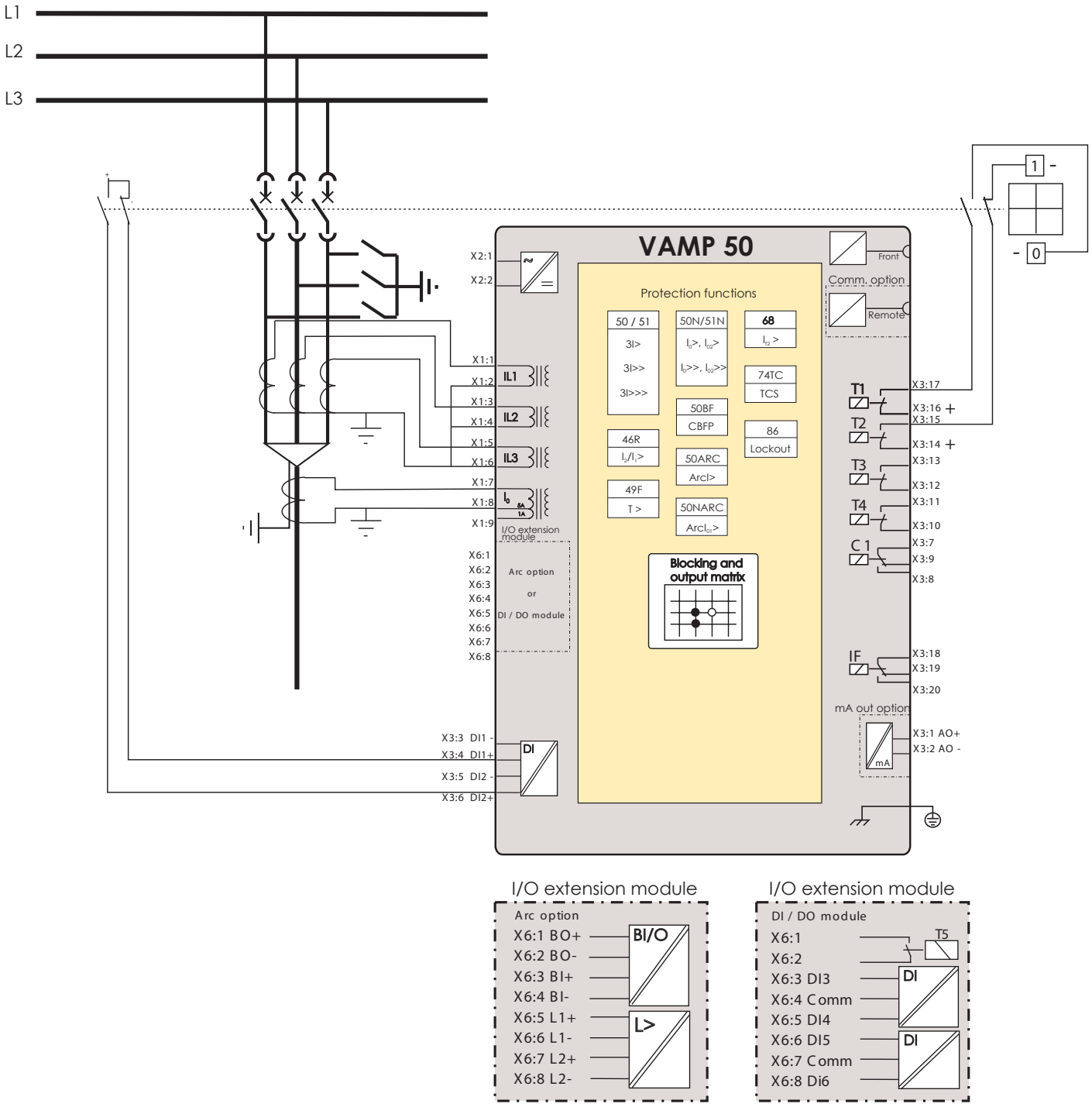
VAMP 50 overcurrent & earth fault relay

VAMP 50 is a basic protection relay used for LV and MV feeders in industrial and utility applications as well as for back-up protection. Limited amount of protection functions make this unit cost efficient, user friendly and simple to use. The hardware design allow easy addition of integrated optional modules like arc sensor interface, extension of DI / DO channels and various communication module adapters.

Typical application



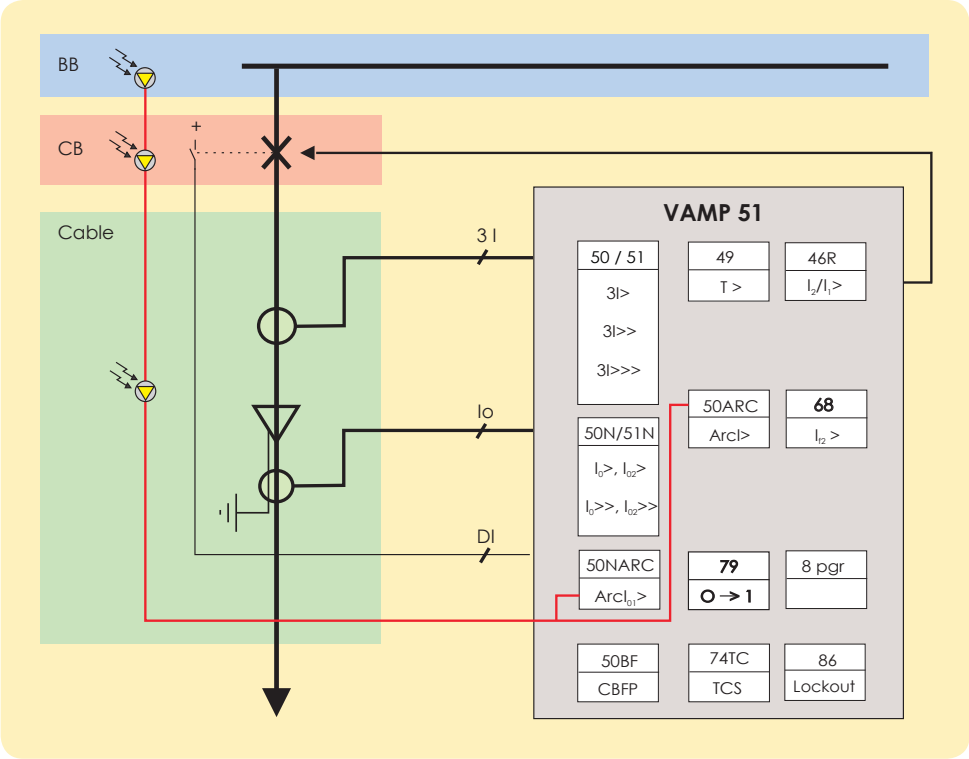
VAMP 50 connection diagram



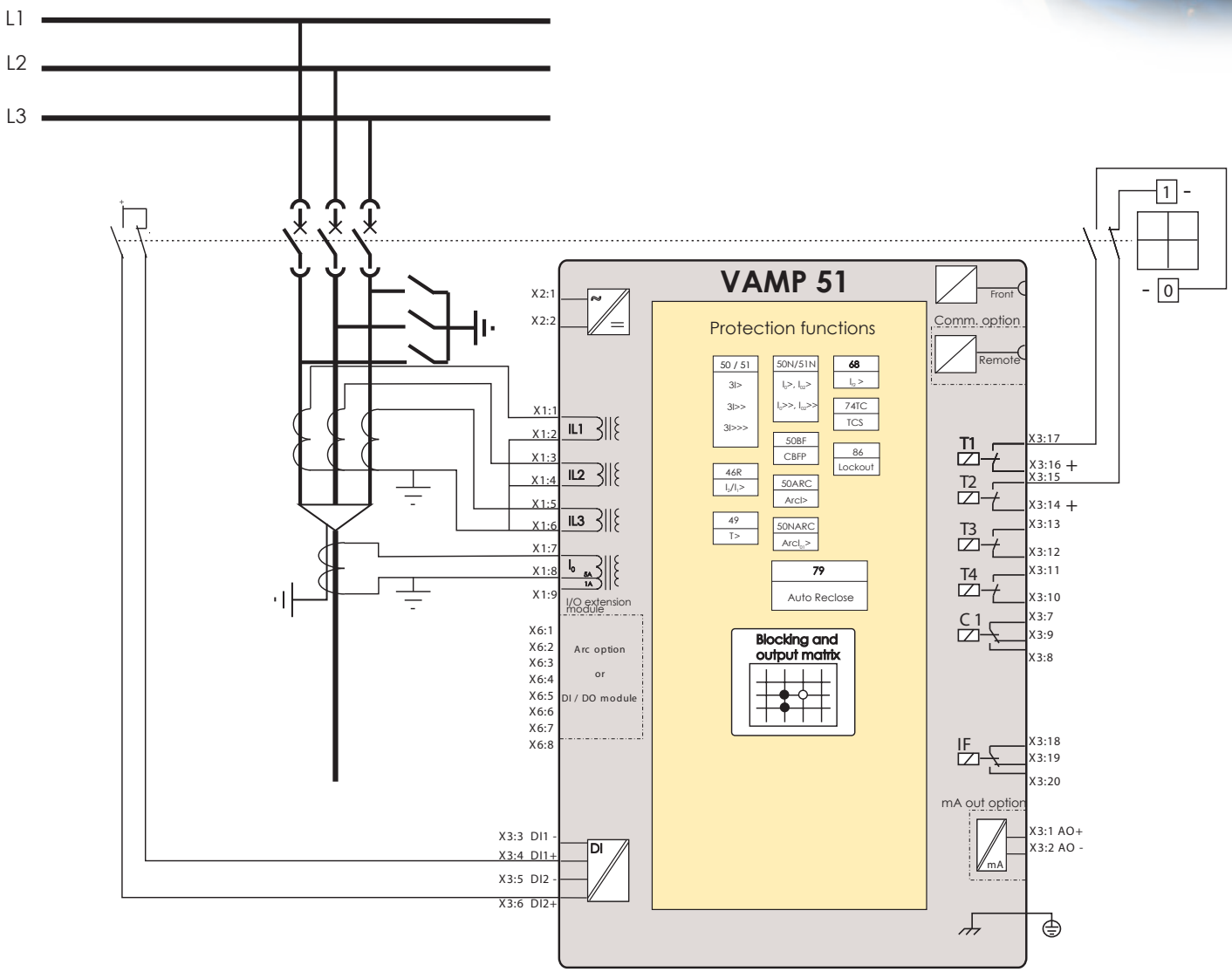
VAMP 51 overcurrent & earth fault relay

VAMP 51 is a basic protection relay used for MV feeders in utility applications as well as for back-up protection. Autorecloser function extends the protection application to overhead line feeder protection in substation or secondary substation systems where the network is low-impedance or rigidly earthed. Programable stages enable user configuring new protection elements and creating new triggering conditions to the disturbance recorder. Additional amount of protection functions make this unit flexible, user friendly and simple to use. The hardware design allow easy addition of integrated optional modules like arc sensor interface, extension of DI / DO channels and various communication module adapters.

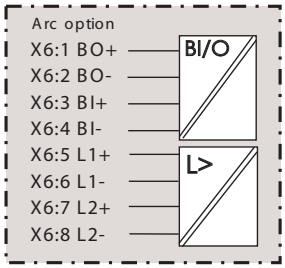
Typical application, feeder mode with auto-reclose



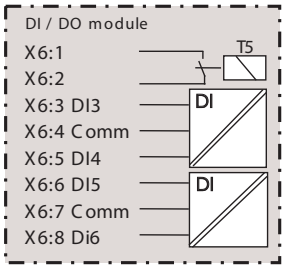
VAMP 51 connection diagram



I/O extension module



I/O extension module

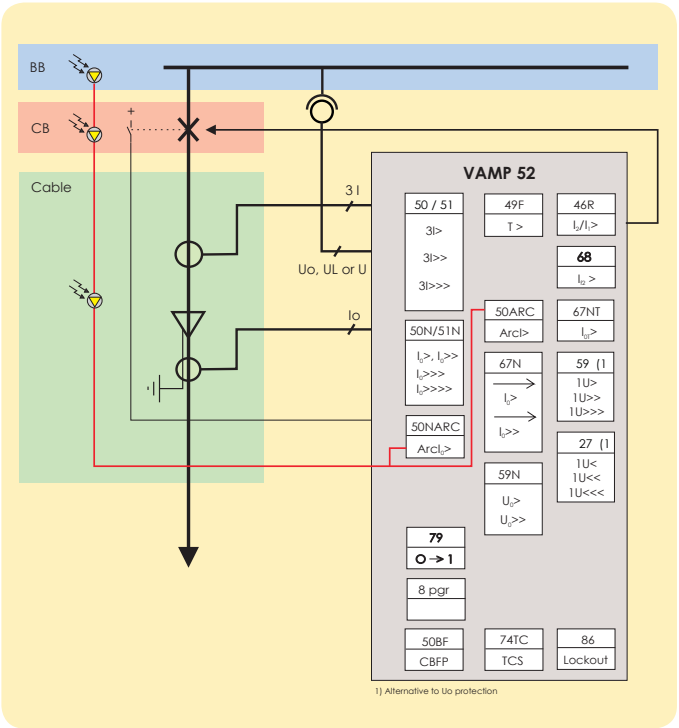


VAMP 52 feeder and motor protection relay

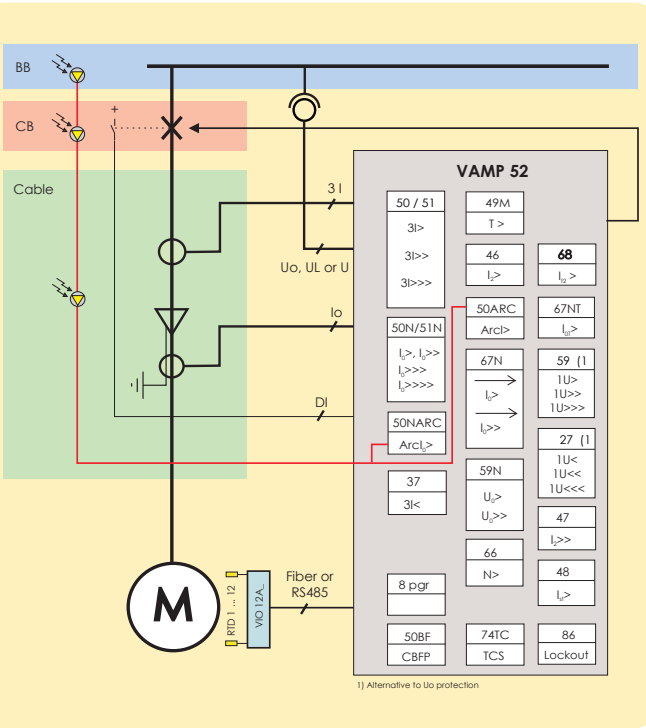
VAMP 52 is a multi protection relay used for LV and MV feeders in industrial or utility applications. Extensive thermal protection functions make this relay optimal for low and medium sized asynchronous motors. Directional earth fault protection in association with an auto-recloser makes this relay cost effective for the feeder protection applications where automatic fault clearance is needed. This relay is flexible, user friendly and simple to use. The hardware design allow easy addition of integrated optional modules like arc sensor interface, extension of DI / DO channels and various communication module adapters.v

Typical applications

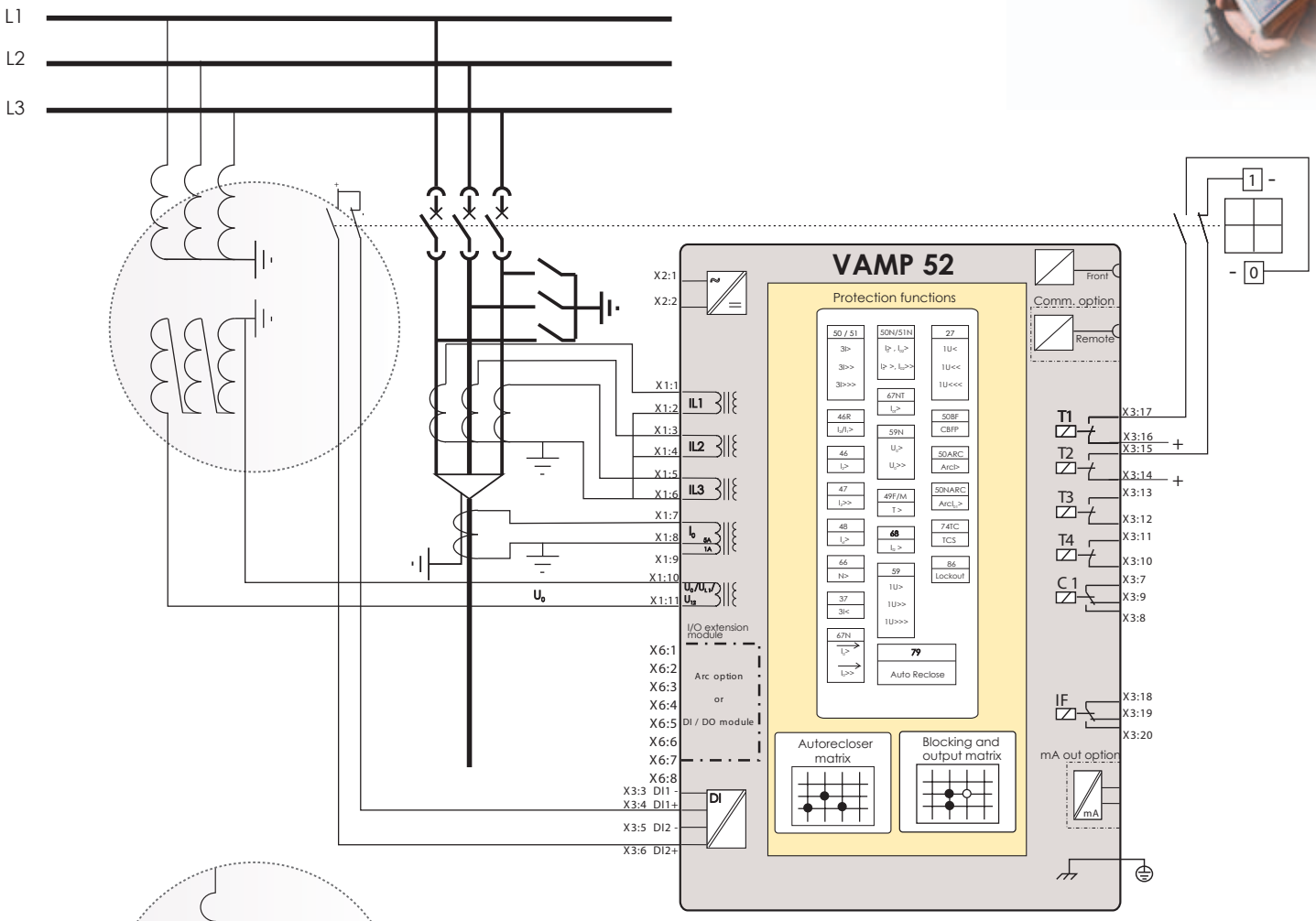
Feeder mode with auto-reclose

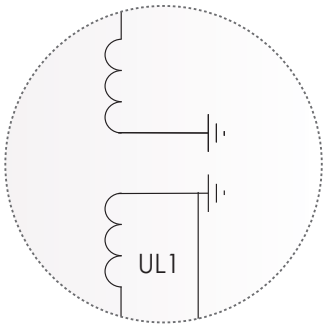


Motor mode

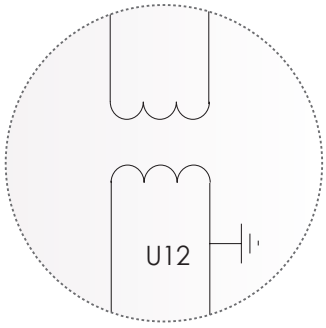


VAMP 52 connection diagram



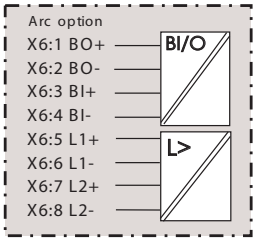


When the voltage transformer is connected to transform the phase to ground voltage, the voltage measuring mode shall be 1LN

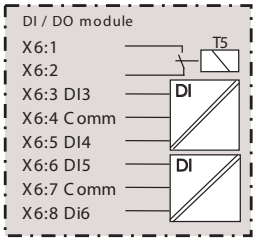


Should the voltage transformer connection be phase to phase the voltage measuring mode is selected 1LL

I/O extension module



I/O extension module



Order Codes

VAMP 5 [ ] - 3 [ ] [ ] [ ] [ ] [ ] [ ] [ ]

Relay type
- **0** = Overcurrent & earth fault relay
- **1** = Overcurrent & earth fault relay
- **2** = Feeder and motor protection relay

Phase current inputs [A]
- *3 = 1A / 5A*

Earth-fault current input [A]
- *A = 1A / 5A*
- *B = 0.2A /1A*

Supply Voltage [V]
- *A = 40.. 265Vac/dc*

mA output option
- *A = None*
- *B = mA output*

DI threshold voltage
- *1 = 24 VDC*
- *2 = 110 VDC*
- *3 = 220 VDC*

Optional I/O extension modules
- *A = None*
- *B = DI/DO (4 x DI + 1 x DO)*
- *C = Arc Protection; 2xSensor, BIO*

Optional communication module 1
- *A = None*
- *B = RS 485 interface*
- *C = RS 232 interface*
- *H = Ethernet RJ-45, 10 Mbps interface*
- *K = IEC 61850 RJ-45, 10 Mbps interface*

Optional communication module 2
- *Further use*

Accessories

Order code	Description	Note
VPA 3CG	Profibus interface module	Requires external power supply
VSE 001	Fiber optic interface module	
VIO 12 AA	RTD module, 12 pcs RTD inputs, optical Tx communication	
VIO 12AB	RTD module, 12 pcs RTD inputs, RS485 communication	
VIO 12 AC	RTD module, 12 pcs RTD inputs, PTC, mA inputs/outputs, RS232, RS485 and optical Tx / Rx communication	
VX052	USB communication cable	Cable 3 m
VA1DA-6	Arc sensor	Cable 6m
VA1DA-20	Arc sensor	Cable 20m

Technical Data

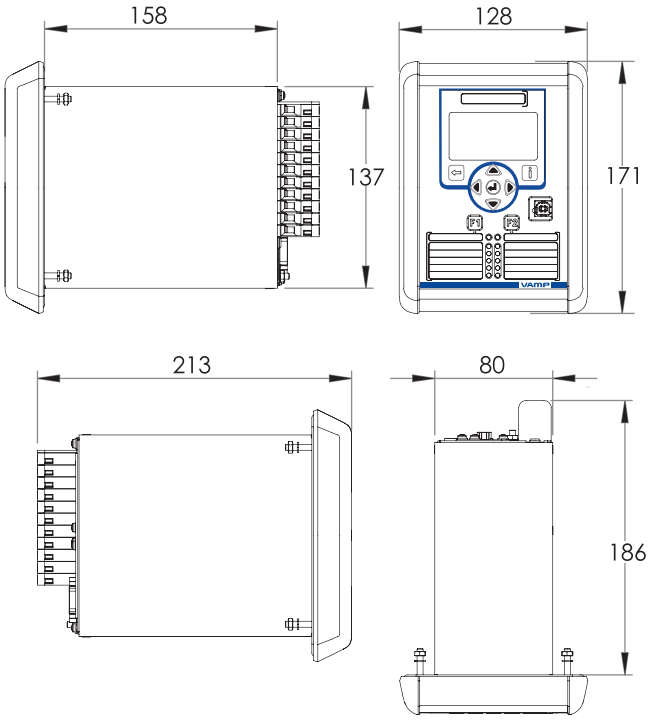
Main technical data

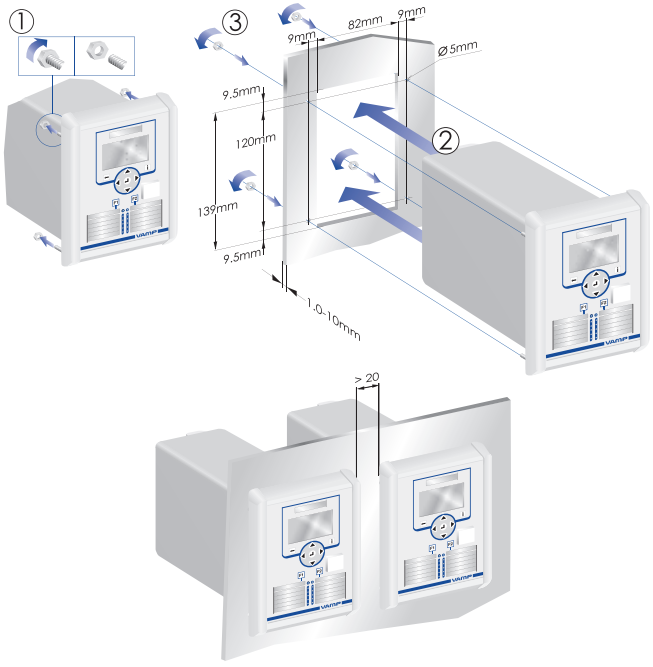
Auxiliary voltage, Uaux	40…265 V ac / dc
Rated phase current In	1A or 5A
- current measuring range	0…50 x In
Rated neutral current Ion	1A or 5A (optionally 0,2 A/1 A)
- current measuring range	0…10 x I_0
Thermal Withstand	4 x In (continuous), 100 x In (for 1 s)
Rate frequency fn	50 / 60 Hz (45…65 Hz)
Digital inputs (external voltage)	2 pcs
- selectable nominal voltage (treshold)	24/110/220 V dc
Trip contacts	4 pcs
Control contacts	2 pcs

Tests and environment

EMC emission tests:	EN 55011, IEC 60255-25
EMC immunity tests:	IEC 60255-11, EN 61000-4-11
	IEC 60255-22-1, IEC 60255-22-2
	EN 61000-4-2, IEC 60255-22-3
	EN 61000-4-3, IEC 60255-22-4
	EN 61000-4-4, IEC 60255-22-5
	EN 61000-4-5. IEC 60255-22-6
	EN 61000-4-6, IEC 60255-22-7
	EN 61000-4-8, EN 61000-4-9
Environmental tests:	IEC 60068-2-1 Ad
	IEC 60068-2-2 Bd
	IEC 60068-2-1 Ab
	IEC 60068-2-2 Bb
	IEC 60068-2-30 Db
Mechanical tests:	IEC 60255-21-1
	IEC 60255-21-2
	IEC 60255-21-3
Operating temperature	-10…+65° C
Relative humidity	<95 %, no condensation allowed
Degree of protection (IEC 60529)	IP54
Weight	2,0 kg
Dimension (w x h x d)	128 x 170 x 190 mm

Dimensional drawings





We keep electricity running

With its headquarters in Finland, Vamp Ltd specializes in protection relays, arc flash protection and measuring and monitoring units for power systems.

Vamp's medium-voltage and sub-transmission protection relays are used in a number of applications, from overhead line feeders and substations to power plants and industrial power system. Their unique integrated arc fault protection functionality enhances the safety of both people and property and has made Vamp a leading brand in arc protection worldwide. All Vamp products meet the latest international standards and regulations.

Our success is based on competitive standard products, constant development by our designers possessing experience from three protection relay generations, our long-term partnerships, flexibility and 24 hour care of the customers.

Our organization has been audited and found to be in accordance with the requirements of the ISO 9001:2000 management system.

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