

VAMP 40

Feeder / Motor Protection Relay



Besides a comprehensive range of standard protection functions the Vamp 40 also offers measurement, primary circuit monitoring and communication functionality.

A unique feature of VAMP relays is the arc fault protection system integrated into the relays. The extremely fast arc fault protection (optional) adds a new dimension to the total safety of the installation and the reliability of the motor protection system.

Customer specific configuration is programmed from the inbuilt keypad or by using the VAMPSET software.

Following a network fault, the relays support a subsequent fault analysis by providing event sequence recordings (200 events), fault, value registration and disturbance recorder capability.



Thanks to its functionality and a comprehensive set of supported communication protocols, VAMP 40 is an outstanding choice for power system protection and control.

Vamp 40 protection relays are designed for the selective protection of overhead line feeders, cable feeders, motor feeders, capacitor banks, reactors and busbars. It can easily be applied in distribution substations, power plants, industrial power systems, marine and offshore installations.



CUSTOMER BENEFITS

- **Complete protection for motors**

Comprehensive selection of protection functions for distribution network overhead line feeders, cable feeders, motor feeders including large motors, capacitor banks and reactors.

- **Comprehensive measurements**

Wide range of measurement functions including phase and residual currents, residual, line or phase voltage, frequency, current imbalance, maximum demand, negative phase sequence current, active and reactive power and energy related to the primary connection.

- **Power quality assessment**

Power quality assessment and analysis including supervision of harmonics up to the 15th order, Total Harmonic Distortion (THD) of currents and voltage.

- **Ultra-fast arc flash protection**

Unique integrated arc flash protection functionality for enhanced safety of personnel and switchgear or substation assets.

- **Extensive communication**

Large number of supported communication protocols including IEC 60870-5-101, IEC 60870-5-103, Modbus TCP, Modbus RTU, Profibus DP, TCP/IP, SPA-bus, DNP 3.0 and IEC 61850 .

- **Easy to use and manage**

Simple configuration, commissioning and operation of the relays supported by the straight-forward VAMPSET relay management software.

- **Limited installation dimensions**

The slimline case gives a possibility to install this this relay in secondary equipment compartments which have limited installation depth or space.

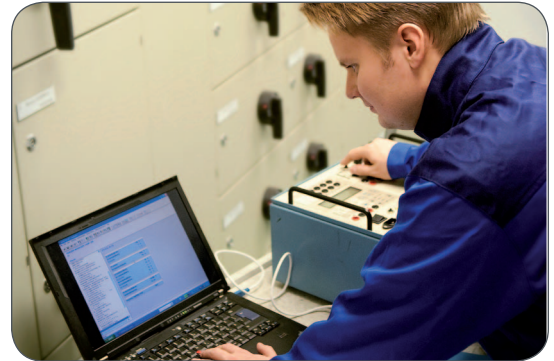
- **Universal auxiliary power supply**

The wide auxiliary power supply, 19-265 V ac/dc, 50/60 Hz makes this relay suitable for every installation.

Measurement and monitoring functions

The VAMP 40 offers a complete set of measurement functions to replace conventional metering functions in traditional switchgear and control gear installations. The measurement functions provide currents, residual or phase to phase or phase to earth voltages. The voltage measurements vary according to the connected voltage used, either residual voltage (U0), phase to earth voltage (UL1) or phase to phase voltage (U12) connection. The measured information can be read on the inbuilt LCD display, or via the communication bus.

In addition, Vamp 40 also encompasses a set of system supervision functions. All current circuits are continuously supervised, as are the trip circuits from the relay to the circuit breaker trip coils. The wear and tear of the circuit breaker is also continuously monitored, providing an alarm when the circuit breaker needs maintenance due to wear.

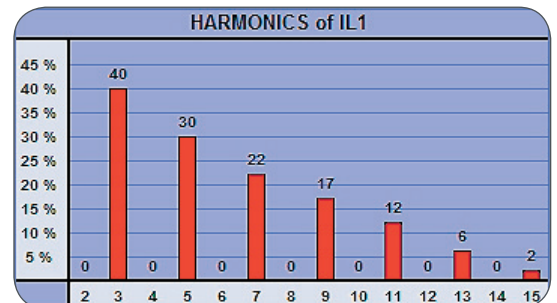


Many functions in modern society rely heavily on electric energy and therefore the quality of the energy supply is gaining increased importance

Power quality assessment

The power quality of electrical networks has become increasingly important in modern society. Sophisticated loads, such as computers and automation systems, require an uninterrupted supply of “clean” electricity.

The VAMP 40 feeder and motor protection relay provides integrated power quality measurement and analysis functions, which help to identify variations in the quality of the distributed power. The relay supervises harmonics of phase currents and one voltage from the 2nd to 15th order and the THD (Total Harmonic Distortion).



Example of harmonics content obtained from a VAMP 40 relay.

Arc flash protection

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

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



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

The VAMP 40 protection relay with integrated arc protection also provides a cost efficient high-speed MV busbar protection.

Functionality

Protection functions		
IEC no	IEC symbol	Function name
50/51	$3I>, 3I>>, 3I>>>$	Overcurrent protection
50N/51N	$I_0>, I_0>>, I_0>>>, I_0>>>>$	Earth fault protection
67N	$I_{0\phi}>, I_{0\phi}>>$	Directional earth fault protection ⁽¹⁾
67NT	$I_{0T}>$	Intermittent transient earth fault protection ⁽¹⁾
87N	I_{0REF}	Restricted earth fault protection
46R	$I_2 / I_1>$	Broken line protection
46	$I_2>$	Current imbalance protection
47	$I_2>>$	Incorrect phase sequence protection
48	$I_{st}>$	Stall protection
66	N>	Frequent start protection
37	k	Undercurrent protection
49	T>	Thermal overload protection
32	P	Reverse power, 1 phase
59C	$U_c>$	Capacitor overvoltage protection
59N	$U_0>, U_0>>$	Zero sequence voltage protection ⁽¹⁾
59	$U>, U>>, U>>>$	Overvoltage protection, 1-phase ⁽²⁾
27	$U<, U<<, U<<<$	Undervoltage protection, 1-phase ⁽²⁾
68	$I_{2f}>$	Inrush and cold load detection
79		Autoreclose function
50BF	CBFP	Circuit-breaker failure protection
50ARC	Arc I>	Arc fault protection ⁽³⁾
50NARC	Arc $I_0>, Arc I_{02}>$	Arc fault protection ⁽³⁾
		Capacitor bank imbalance protection
86		Latched trip
99		Programmable stages 1 ... 8

Measurement and monitoring functions	
IEC symbol	Function name
3I	Three-phase current
I_0	Neutral current
I_2	Current imbalance
I_L	Average and maximum demand current
U_0	Residual voltage
U_{L1} / U_{12}	Phase to earth and phase to phase voltages ⁽²⁾
P	Active power ⁽²⁾
Q	Reactive power ⁽²⁾
S	Apparent power ⁽²⁾
E+, E-	Active energy, exported / imported ⁽²⁾
Eq+, Eq-	Reactive energy, exported / imported ⁽²⁾
PF	Power factor
f	System frequency
	Phasor diagram views of currents, zero sequence ⁽¹⁾ or phase or line voltages ⁽²⁾
	2 nd to 15 th harmonics and THD of currents
	Condition monitoring CB wear
	Condition monitoring CT supervision
	Trip Circuit Supervision (TCS)
	Disturbance recorder
	Temperature
	CB control

Communication
IEC 60870-5-101
IEC 60870-5-103
Modbus TCP
Modbus RTU
Profibus DP
SPA-bus
DNP 3.0
DNP 3.0 TCP
IEC 61850
Human Machine Interface, display
Human Machine Interface, PC

Hardware	
Number of phase current CT's	3
Number of residual current CT's	2
Number of voltage input VT's	1
Number of digital inputs	2
Number of trip outputs	4
Number of alarm outputs	1
Internal Failure, IF (NO/NC)	1
RTD inputs	4-16 ⁽³⁾

Notes:

¹⁾ with zero sequence voltage connection

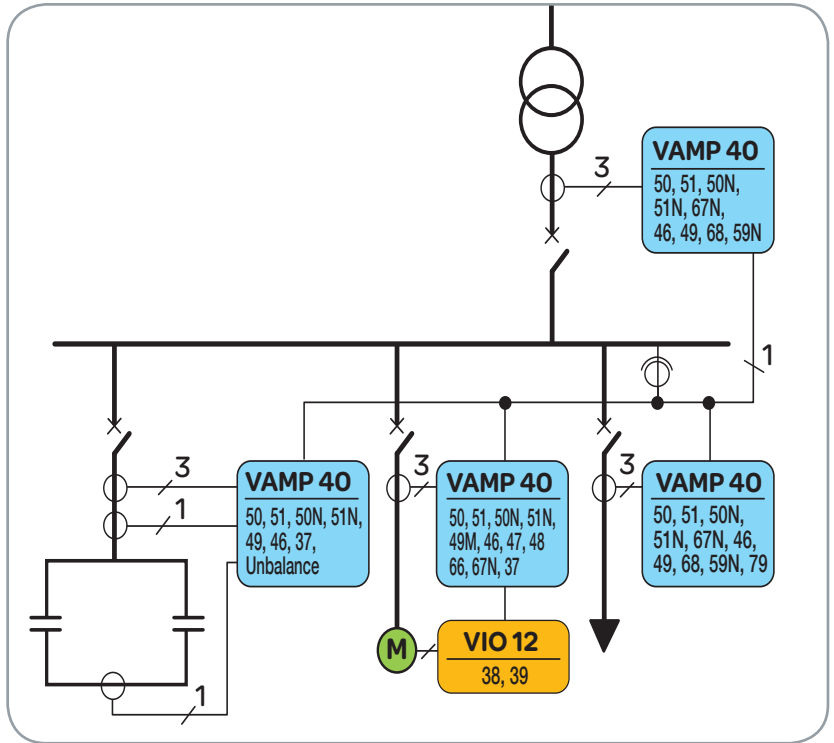
²⁾ with phase to phase or phase to earth voltage connection

³⁾ option

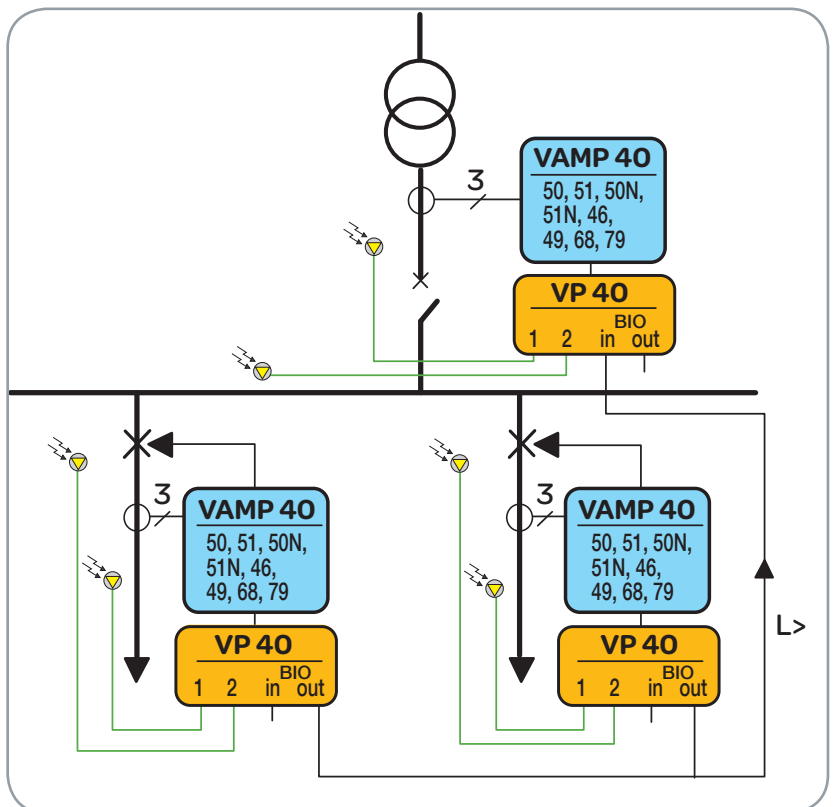
Typical applications



VAMP 40 Typical application



VAMP 40 Typical application with integrated arc flash protection



The optional integrated arc protection system may extend the lifetime of the switchgear.



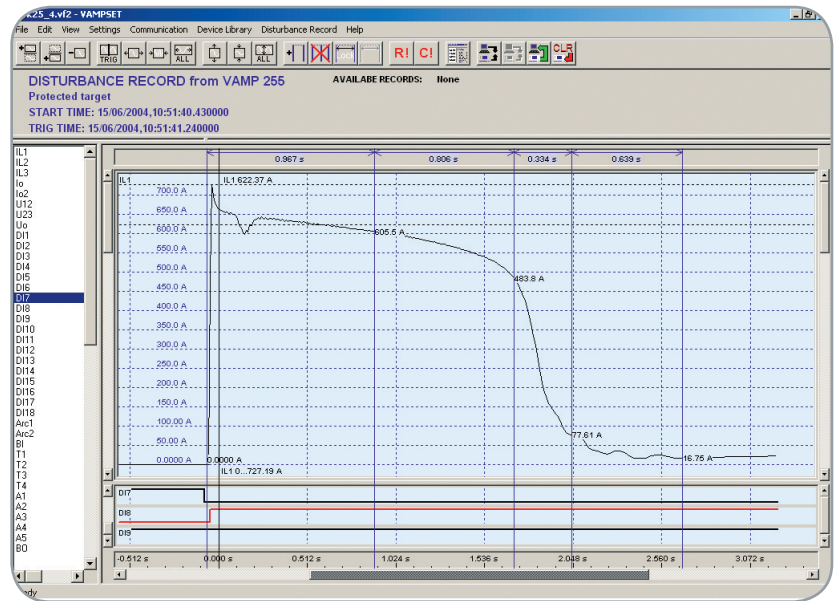
VAMPSET Setting and Configuration Tool

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

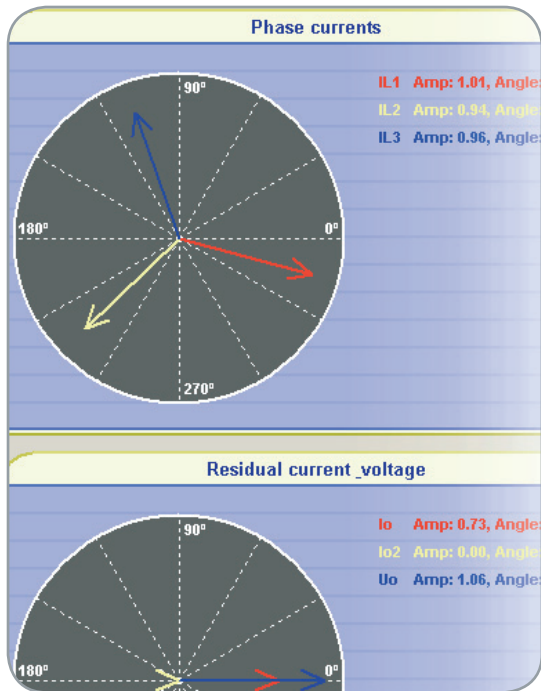
Using a standard serial cable the PC running VAMPSET connects to the front or rear port of the VAMP relays. The VAMPSET software also supports TCP/IP communication via an optional 10Base-T connection.

Featuring true multi-language support the software runs on Windows 7 / Vista / XP / 2000 / NT and Windows 98 / 95 without any need for configuration of the PC.

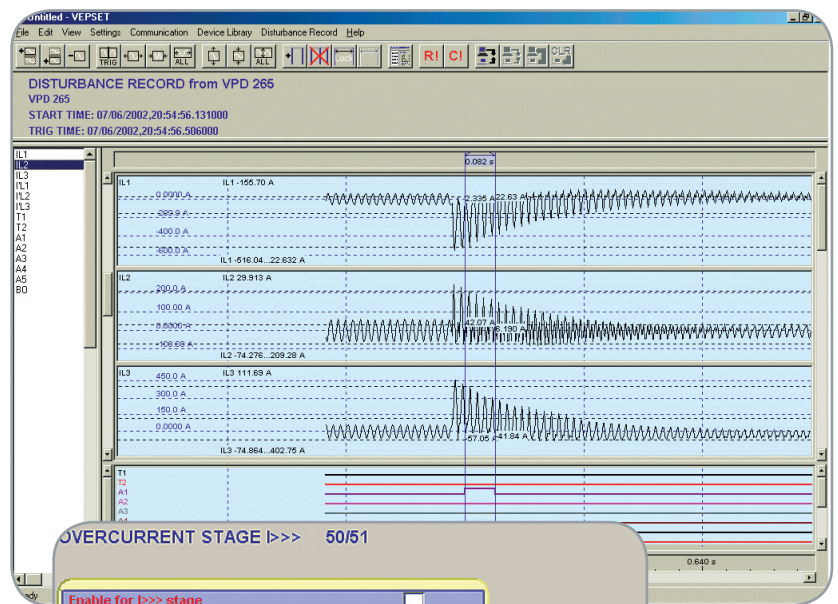
The motor start-up register stores the motor start-up values (start current, duration etc.) significantly facilitating the correct setting of the relay even if critical motor data are unavailable from the manufacturer.



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



OVERCURRENT STAGE >>> 50/51

Enable for >>> stage

Max. of IL1 IL2 IL3 0 A

I>>> status -

Start counter 0

Trip counter 0

Set group DI control -

Active group 1

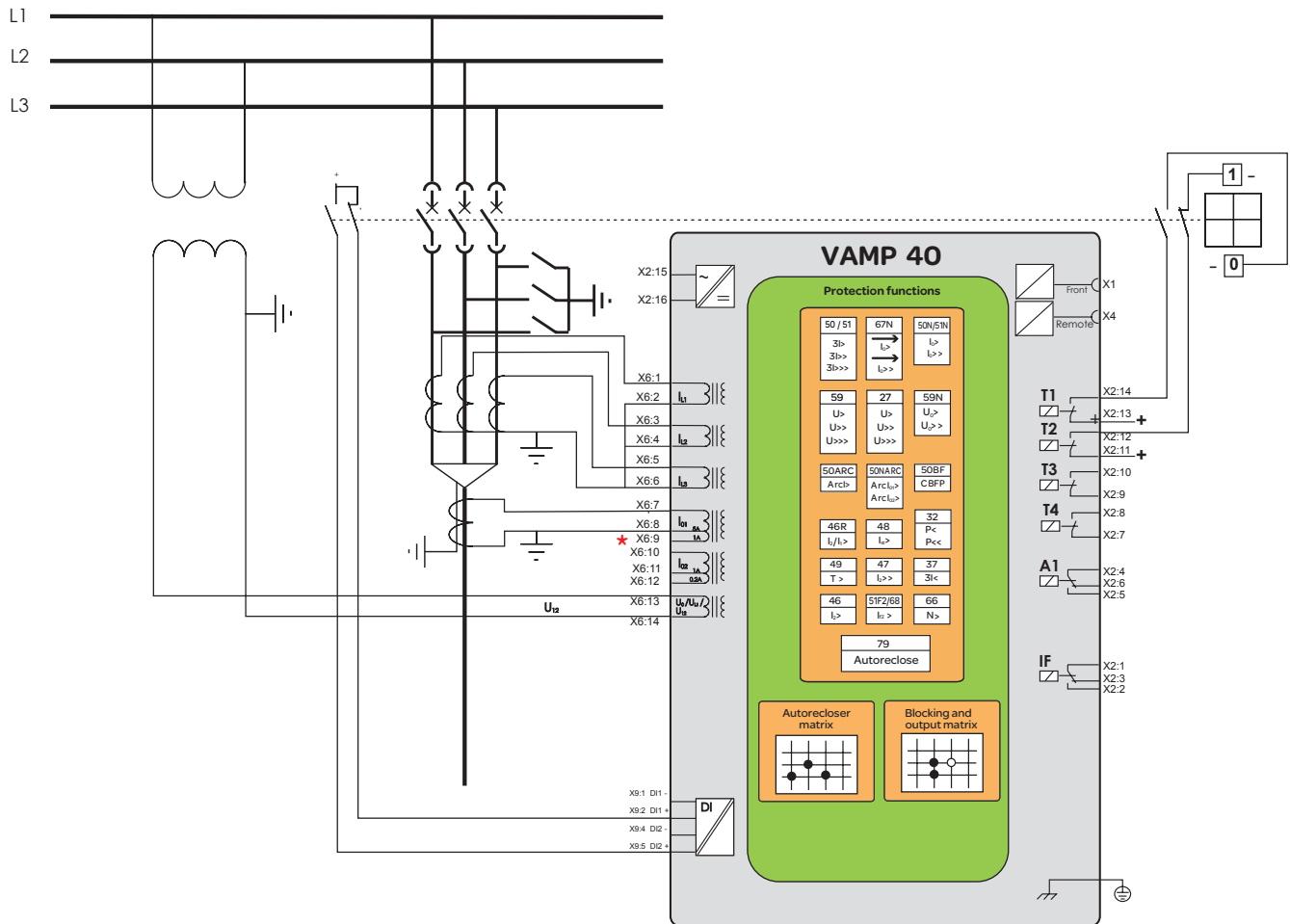
	Group 1	Group 2
Pick-up setting	2500 A	2500 A
Pick-up setting	5.00 xIn	5.00 xIn
Operation delay	0.10 s	0.10 s

Protection setting example

The VAMPSET software is future-proof, supporting future updates and new VAMP products

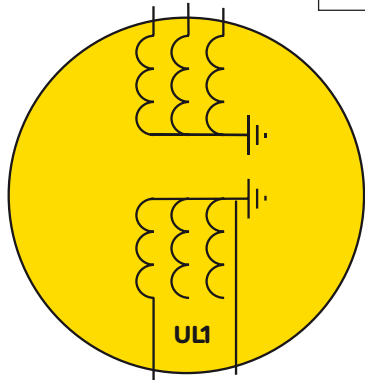
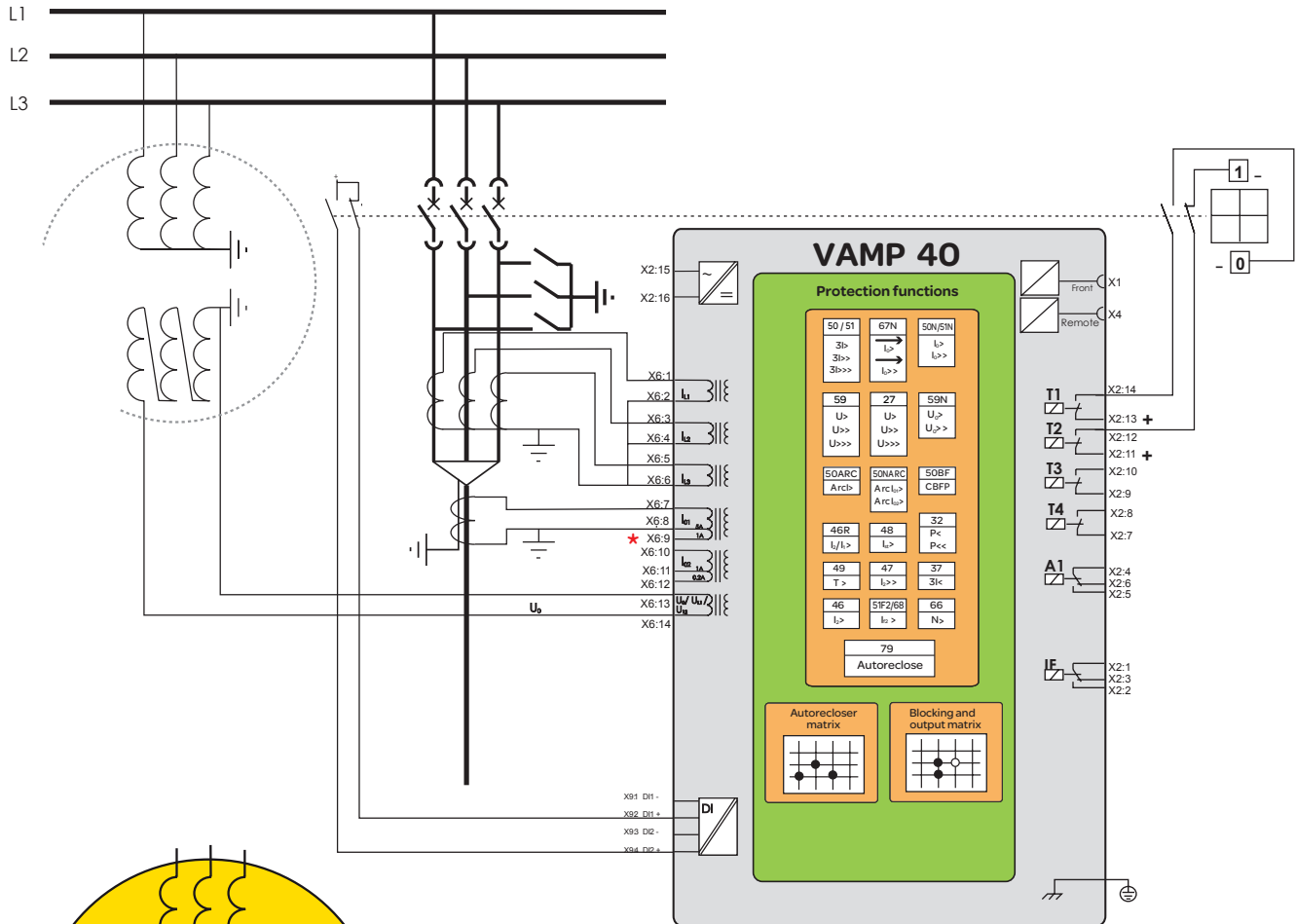
Connection diagrams

Connection for overcurrent, earth fault and phase-to-phase voltage protection



★) The residual current can be derived from three phase CTs connected in parallel, from a core balance cable CT or it can be calculated from the three phase currents.

Connection for overcurrent, phase to phase or phase to earth voltage protection

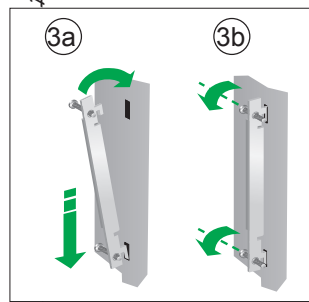
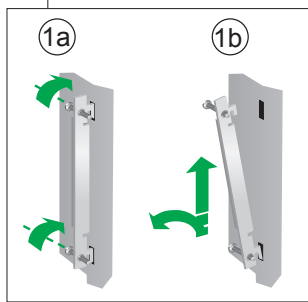
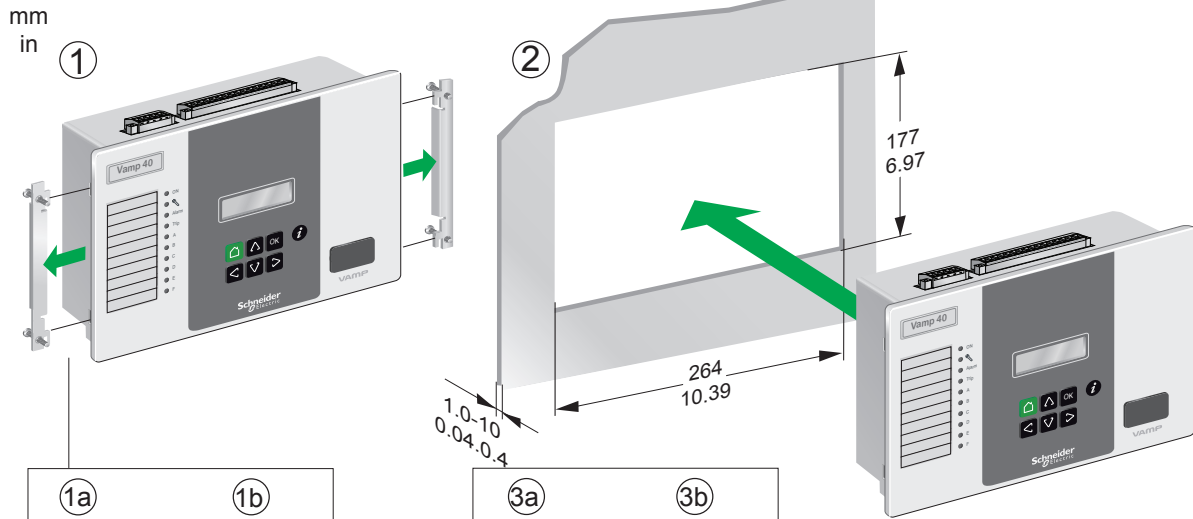


Connection for phase to earth voltage, at voltage transformer secondary.

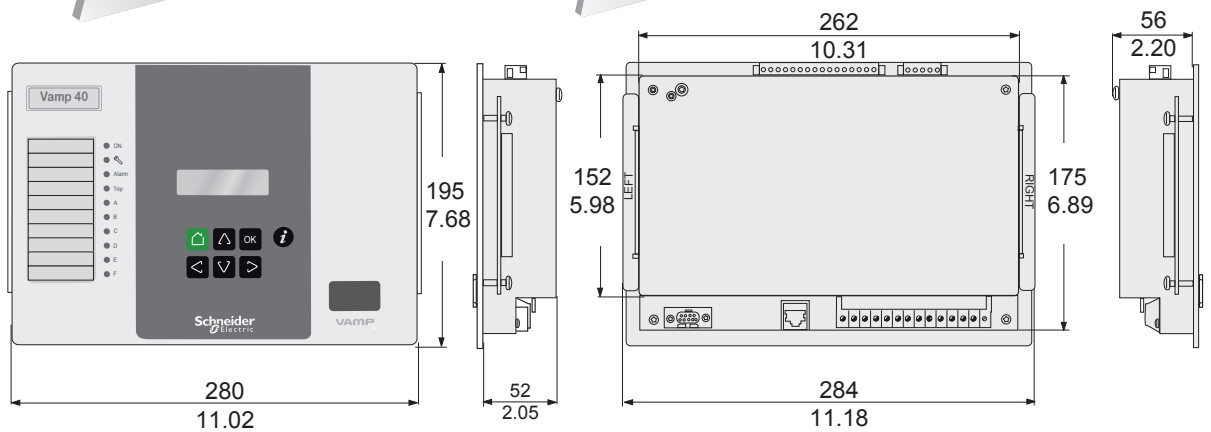
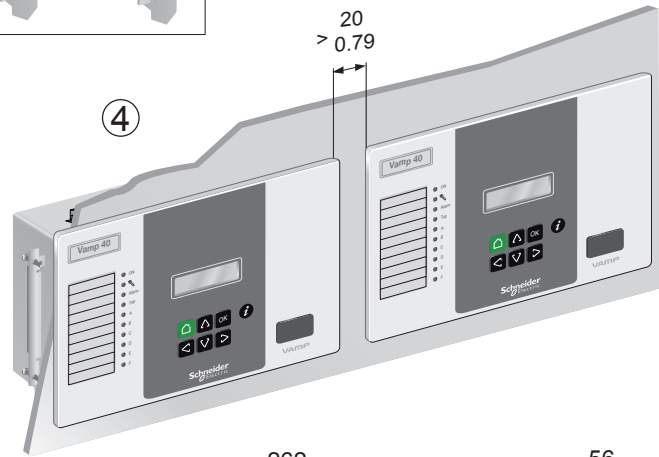
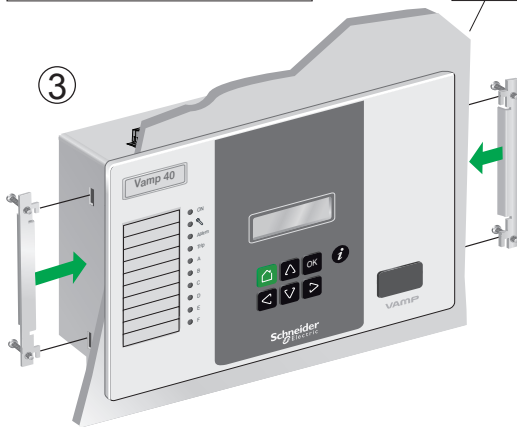
★) The residual current can be derived from three phase CTs connected in parallel, from a core balance cable CT or it can be calculated from the three phase currents.

Dimensional drawings

Panel mounting VAMP40



The slimline casing gives a possibility to install this relay to the secondary equipment compartment which has limited space.



Main technical data

Measuring circuitry	
Rated current I_N	5 A (configurable for CT secondaries 1 – 10 A)
Current measuring range	0.005...50 x I_N
Thermal withstand	4 x I_N (continuously)
	20 x I_N (for 10 s)
	100 x I_N (for 1 s)
Burden	< 0.2 VA
Rated current I_{ON}	1/5 A
Current measuring range	0.003...10 x I_N
Rated current I_{O2N}	0.2 / 1 A
Current measuring range	0.003...10 x I_N
Rated voltage U_{ON} / U_N	100 V (configurable for VT secondaries 50 – 120 V)
Voltage measuring range	0.5 - 175 V
Continuous voltage withstand	250 V
Burden	< 0.5V A
Rated frequency f_N	45 - 65 Hz
Frequency measuring range	16 - 75 Hz
Terminal block:	Maximum wire dimension:
Solid or stranded wire	4 mm ² (10-12 AWG)

Auxiliary voltage	
Rated voltage U_{AUX}	19 - 265 V ac/dc
For rated voltages	24 ... 240 V ac /dc
Power consumption	< 7 W (normal conditions)
	< 15 W (output relays activated)
Max. permitted interruption time	< 50 ms (110 V dc)
Terminal block:	Maximum wire dimension:
Phoenix MVSTBW or equivalent	2.5 mm ² (13-14 AWG)

Digital inputs	
Qty	2 pcs.
Rated voltage	18 - 265 Vdc

Digital outputs	
Trip relays	4 pcs.
Alarm relays	1 pc
Internal fault relay	1pc

Casing	
Dimensions (W x H x D)	280 x 195 x 55 mm
Degree of protection	IP 54
Weight	3 kg (terminal, package and manual)

Tests and environmental conditions

Disturbance tests

	Standard & Test class / level	Test value
Emission	EN 61000-6-4 / IEC 60255-26	
Conducted	EN55011 / IEC 60255-25 0.15	30 MHz
Emitted	EN55011 / IEC 60255-25 30	1000 MHz
Immunity	EN 61000-6-2 / IEC 60255-26	
Static discharge (ESD)	EN 61000-4-2 class IV / IEC 60255-22-2	8 kV contact discharge 15 kV air discharge
Fast transients (EFT)	EN 61000-4-4 class IV / IEC 60255-22-4, class A	4 kV, 5/50 ns, 2.5 / 5 kHz, +/-
Surge	EN 61000-4-5 class IV / IEC 60255-22-5	4 kV, 1.2/50 µs, line-to-earth 2 kV, 1.2/50 µs, line-to-line
Conducted HF field	EN 61000-4-6 class III / IEC 60255-22-6	0.15 - 80 MHz, 10 V
Emitted HF field	EN 61000-4-3 class III / IEC 60255-22-3	80 - 1000 MHz, 10 V/m

Tests voltages

	Standard & Test class / level	Test value
Insulation test voltage	IEC 60255-5	2 kV, 50 Hz, 1 min
Surge voltage	IEC 60255-5	5 kV, 1.2/50 µs, 0.5 J

Mechanical tests

	Standard & Test class / level
Vibration	IEC 60255-21-1, class I
Shock and pump	IEC 60255-21-2, class I

Environmental conditions

	Test value
Operating temperature	-10 to +65° C
Transport and storage temperature	-40 to +70° C
Relative humidity	< 75% (1 year, average value) < 90% (30 days per year, no condensation permitted)

Order codes

V40 Feeder / motor protection relay

ACCESSORIES

Order Code	Explanation	Note
VEA3CGi	External ethernet interface module	
VPA3CG	Profibus interface module	
VSE001PP	Fiber optic Interface Module (plastic - plastic)	
VSE004	RS485 Interface Module, Ext I/O interface	
VSE VM001	Digital input nominal activation voltage 110 V	
VSE VM002	Ethernet, RS485 interface module for VAMP 200 series	
VX003-3	RS232 programming cable (Vampset, VEA 3CGi)	Cable length 3m
VX028-3	Interface cable to VPA 3 CG (Profibus module)	Cable length 3m
VX030-3	Interface cable to VEA 3 CGi (Ethernet module)	Cable length 3m
VX032-3	Back panel programming cable	Cable length 3m
VYX 256A	Optional seal for IP 54	
VP 40	Arc option (2 sensors)	
VIO 12 AA	RTD Module, 12pcs RTD inputs, Optical Tx Communication (24-230 Vac/dc)	
VIO 12 AC	RTD/mA Module, 12pcs RTD inputs, PTC, mA inputs/outputs, RS232, RS485 and Optical Tx/Rx Communication (24 Vdc)	
VIO 12 AD	RTD/mA Module, 12pcs RTD inputs, PTC, mA inputs/outputs, RS232, RS485 and Optical Tx/Rx Communication (48-230 Vac/dc)	
VA 1DA-6	Arc Sensor	Cable length 6m





DEVICE TRACK RECORD

- Schneider Electric's VAMP range specialises 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 numerous applications, from overhead line feeders and substations to power plants and industrial power system. Their unique integrated arc flash fault protection functionality enhances the safety of both people and property and has made VAMP a leading product in arc flash protection worldwide. VAMP products meet the latest international standards and regulations.

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