VAMP 300G

Modular IED for generator and block transformer protection

The VAMP 300 IED is modular and fully supervised unit that can be adapted for a wide range of applications. Within VAMP 300 family the VAMP 300G is dedicated for protection of power genaration equipment.

The VAMP 300G is based on the proven technology of VAMP protection relays. Besides a comprehensive range of standard protection functions the VAMP relays also offers temperature measurement with external RTD input module. Further, the VAMP relays incorporate power quality assessment based on fast Fourier transform. Following a network or transformer fault, the relays support fault analysis by providing event sequence recordings, fault value registration and disturbance recorder capability.

The modularity of the VAMP 300 IED also allows a wide selection of communication protocols, including IEC 61850, Profibus DP, Modbus TCP, Modbus RTU, DNP 3.0, DeviceNet, IEC 60870-5-101, 60870-5-103, DNP TCP, IEC 60870-5-101 TCP and SPA-Bus.

m.vamp.fi

Life Is On Schneider Electric

VAMP 300G

We can supply a protection IED tailored to your application

Customer specific configuration is obtained by freely configurable mimic display and logic programming using the easy-to-use VAMPSET software.

VAMP 300G at a glance

- VAMP 300G has all necessary generator, generator-block-transformer and transformer protection functionalities in one device.
- VAMP 300G is designed for medium sized generators up-to 150 MW.
- Interface to external VIO 12A RTD input module for twelve Pt, Ni or Cu temperature sensors. The external module enables the sensor connection point to be close to the transformer, minimising sensor cable lengths. Measurements are transferred to the relay via RS485 or optical interface for the required protection stages, logic or measurements.
- Two alternative display options

  128 x 128 LCD matrix

  128 x 128 LCD matrix (detachable)
- Power quality measurements and disturbance recorder enable capture of quick network phenomena
- Wide range of communication protocols i.e. IEC61850, Profibus DP to Modbus TCP to name the most important ones.

User benefits

- Pre-selectable amount of digital inputs ranging from 0 to 40 and outputs from 5 to 22 enable large amount of signals being interfaced with the power generation process.
- Bay mimic and control for quick detection of power process status
- Proven Vamp's flexible and simple to use solution
- User friendly multilingual HMI for customised messaging
- Free of cost VAMPSET configuration and setting tool with USB connection
- Text pocket for customised alarm legend indications

Flexible protection solutions

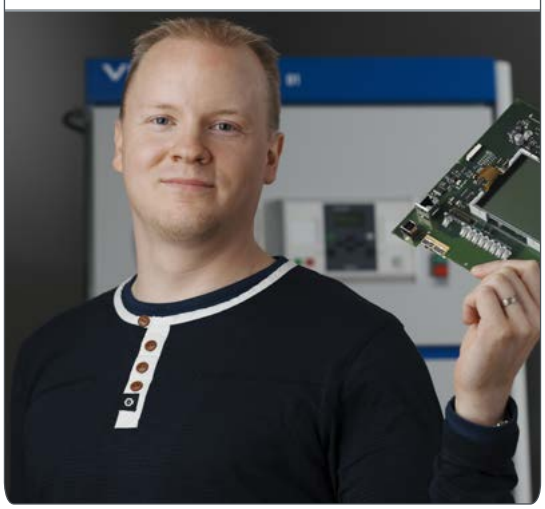
Benefits of modular design

- **A modular IED for different applications:**
  VAMP 300 IED features a modular design that allows user-defined protection to both new and existing power distribution systems.

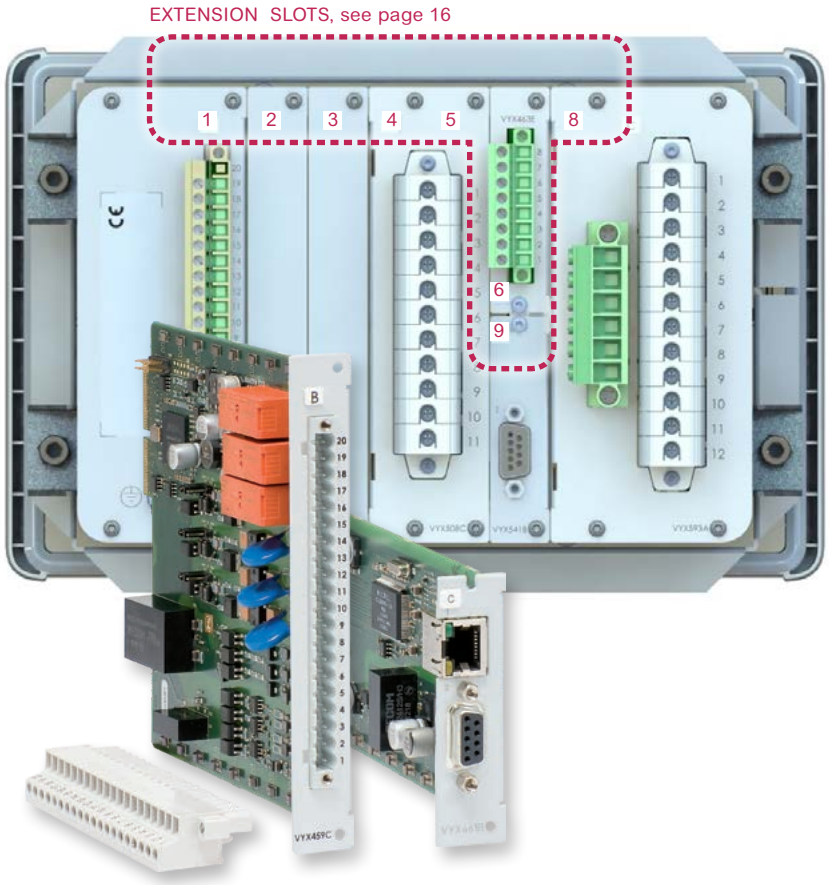
- **VIO 12 RTD input module**
  VIO 12 RTD module is used for extending the measuring quantities of VAMP transformer protection relays. The VIO 12 module has channels for RTD sensors, mA inputs and outputs and PTC input.

- **Local push buttons for object control:**
  New password protected and easy to use control buttons for breaker controlling.

User may decide the hardware of the unit



Build your own protection IED suitable to your application



Quick selection tables

Input and output alternatives

Modularity ensures a wide range of DI / DO combination as per customer demand. The table shows number of DI / DO for few optional module combinations.

Amount of inputs and outputs							
Without differential connection module							
DI (pcs)	31	30	26	22	18	16	12
DO (pcs)	14	10	10	14	18	10	14
With differential connection module							
DI (pcs)	0	6	12	16	20		
DO (pcs)	5	9	13	9	5		

Protection functions

Coming now, generator protection include necessary protection functions and modern control features for basic and demanding applications.

Protection functions of VAMP 300G
Phase overcurrent (50/51)
Directional phase overcurrent (67)
SOTF Switch on to fault (50 HS)
Voltage restrained/controlled phase overcurrent (51V)
Current unbalance (46)
Thermal overload (49)
Earth fault (50N/51N)
Directional earth fault (67N)
Differential overcurrent (87)
Undervoltage (27)
Undervoltage (27P)
Overvoltage (59)
Volts/hertz over-excitation (24)
Zero sequence voltage protection (59N)
100 % stator earth fault (64F3)
Pole slip (78)
Frequency (81)
Rate of change of frequency (81R)
Underimpedance (21)
Under-excitation (40)
Under-reactance and loss of excitation (40)
Reverse power and under-power (32)
Magnetising inrush (68F2)
Transformer over-excitation (68F5)
Circuit breaker failure (50BF)
Cold load pick-up and magnetising inrush
Programmable stages (99)

User-friendliness has always been a feature of VAMP products, and the transformer protection is no exception. hf

Circuit breaker control

ON / OFF buttons

The most advanced circuit breaker controlling is to use dedicated ON / OFF control buttons for the object. Two different operational modes may be chosen:

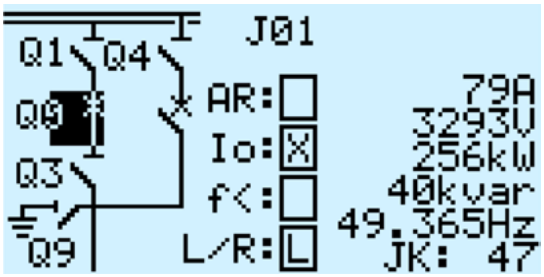
- Selective: Once a control button is pressed a dedicated Control view with pre-determined timeout asks confirmation for the control.

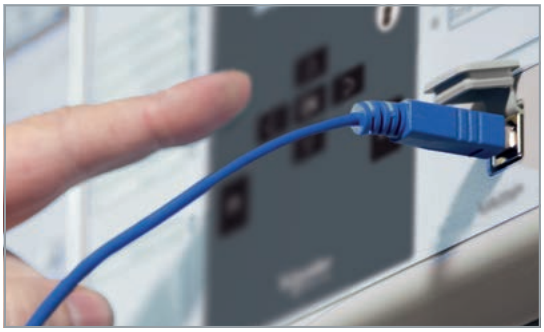
- Direct: Using this mode the control of the circuit breaker is immediate. This mode is practical for instance during the commissioning stage.

Customized interlocking is checked before output of the controlling will become active.

Control through HMI

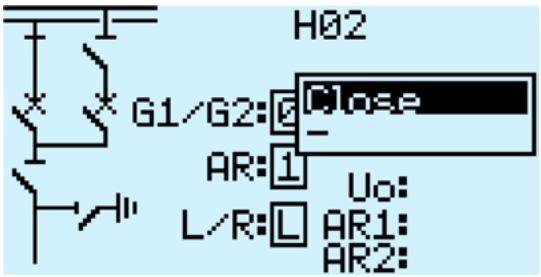
A third possibility to control circuit breakers and isolators is to use the Mimic view of the IED. User selects wanted object in the single line diagram and executes the control with dedicated Info view instructions.





F1 / F2 buttons

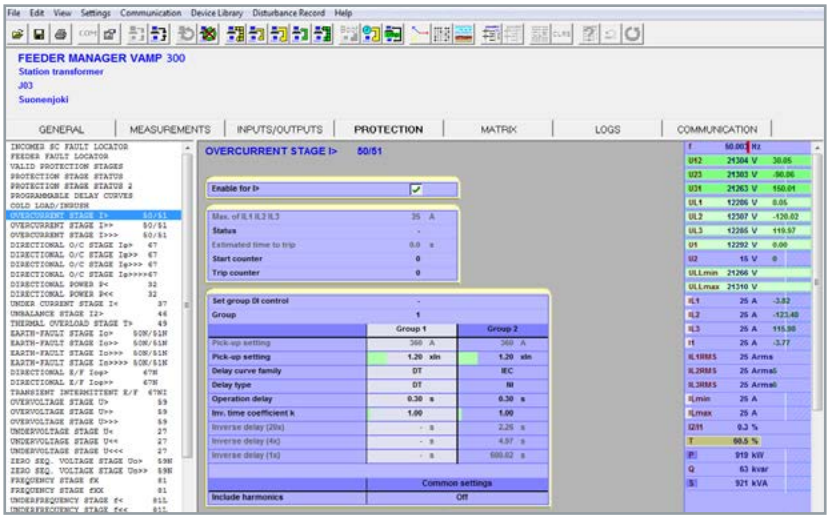
Another way to control circuit breaker or isolators is to program Function button F1 and F2 to execute the control command. Once programmed F1 could be the close and F2 open operand. A dedicated info view appears on the HMI requesting confirmation or de-selection of the action.



VAMPSET

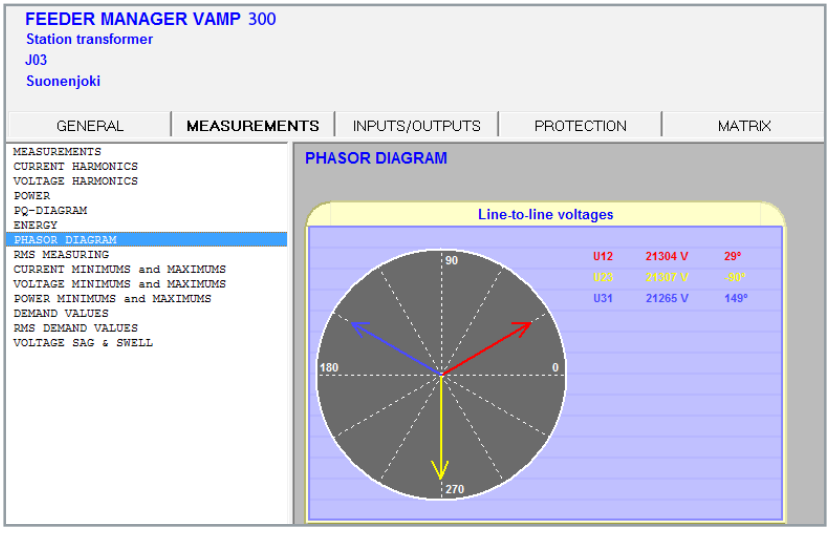
Setting and Configuration Tool

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 intcorporates tools for analysing relay events, waveforms and trends from data recorded by the relays, e.g. during a network fault situation.



Relay's setting views are organised to several folders in the VAMPSET setting tool views in order to conveniently find right data for parameterisation of the IED. The setting tool displays on-line measurements in each folder view.

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



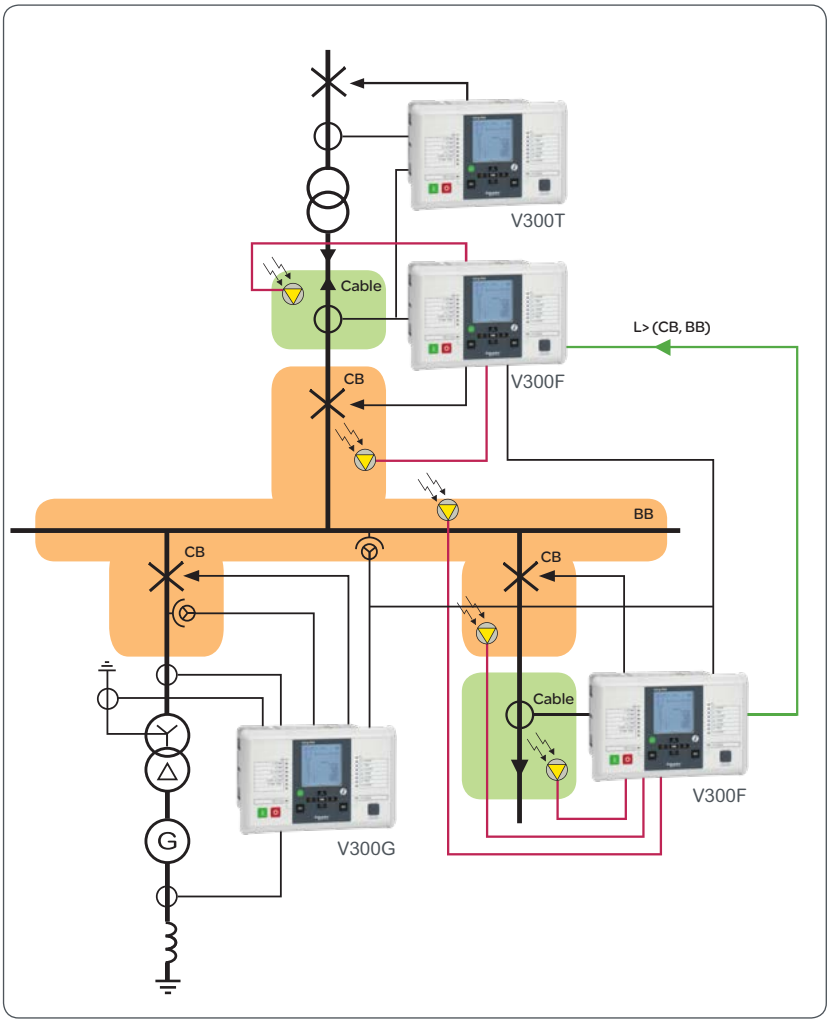
The phase sequences for currents and voltages can be read on-line from the clear and explicit phasor diagram screen for easy commissioning of the relay .

Arc flash protection

Generator protection VAMP 300G does not comprise arc flash protection as it is typically used for protection of outdoor power transformer.

Even tough VAMP 300 series feeder and motor protection IED can optionally measure fault current and with optional arc protection, also measure light via arc sensor channels, which provide monitoring for the whole switchgear. Should an arc fault occur in the switchgear the arc protection system provides extremely fast tripping of the circuit breaker. The fault will be prevented from spreading and quickly isolated, which may save valuable assets.

Alternatively the arc flash protection for the indoor switchgear can be implemented using dedicated arc flash protection units from VAMP's product family.



VAMP - pioneer in arc flash protection

Arc sensors for V300F and V300M models used for feeder and protection

- Easy installation and replacement
- Enables fault location indication
- Surface mounting
- Tube mounting
- Continuous self-supervision

int sensor
1EH-x (pipe)

Point sensor
VA1DA-x (surface)

Communication

VAMP is a communication expert with a wide experience in interfacing with different system integrators' and SCADA suppliers' RTUs, PLCs, gateways etc. using many different protocols. Flexible adaptation of the communication protocols together with powerful and easy to use software tools are the key of successful integration.

VAMP 300 IED and the VAMPSET tool provide access to practically any power system information you may need.

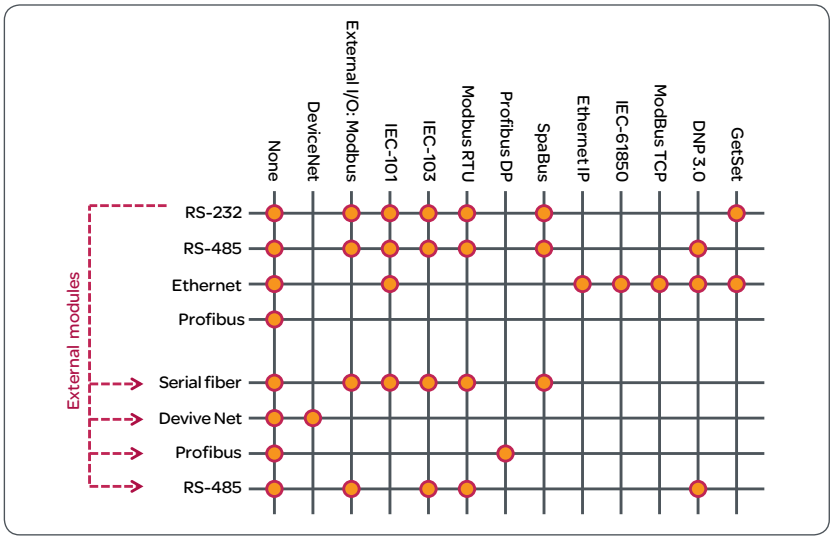
IEC 61850

The IEC 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, called GOOSE communication. The IEC 61850 interface is configured with familiar, user-friendly VAMPSET software.

The IEC 61850 datamodel, 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

Communication matrix

Communication matrix shows which physical interface matches with supported protocols.



Connections

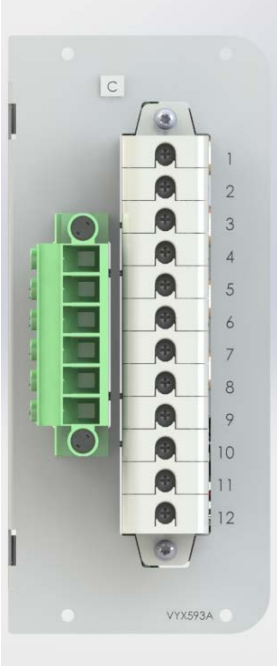
Analog interface modules

The slot 8 can accommodate three different analog measurement cards. Modules C, D and W have 3 phase currents, 2 residual currents and 4 voltage channels. Transformer protection requires use of T option card in slot 4-5 in order to form differential connection for the application.

Slot 8: C = 3L (5A)+4U+2Io (5+1A)
Slot 8: D = 3L (5A)+2Io (1+0.2A)
Slot 8: W = 3L(1A)+4U+2Io (5+1A)
Slot 4-5: T = 3xI (5/1A) + Io (5/1A)

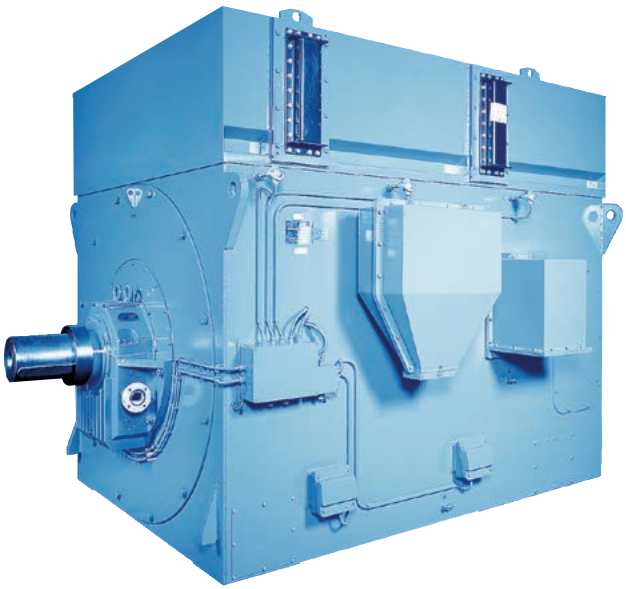
Voltage connection mode

The C, D and W analogue interface modules

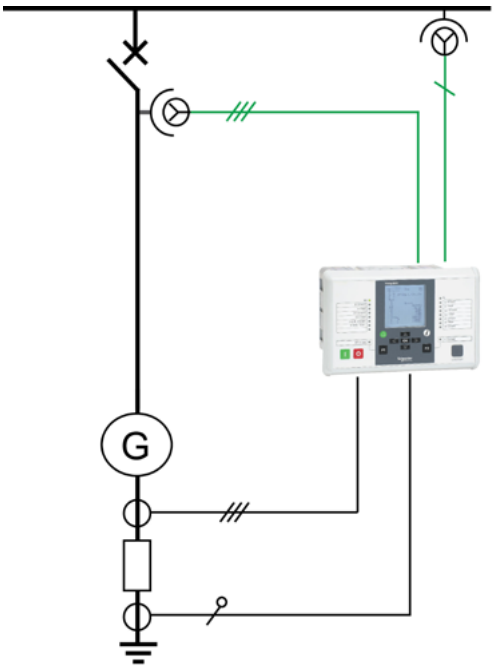


Terminal	8/C/2, 8/D/2 and 8/W/2						8/C/1, 8/D/1 and 8/W/1	
	1	2	3	4	5	6	11	12
Voltage channel	U1		U2		U3		U4	
Mode / Used voltage								
3LN	UL1		UL2		UL3		Not in use	
3LN+U_0							Uo	
3LN+LLy							LLy	
3LN+LNy							LNy	
2LL+U_0	U12		U23		Uo		Not in use	
2LL+U_0+LLy							LLy	
2LL+U_0+LNy							LNy	
LL+U_0+LLy+LLz			U12y				L12z	
LN+U_0+LNy+LNz	UL12		U11y				UL1z	

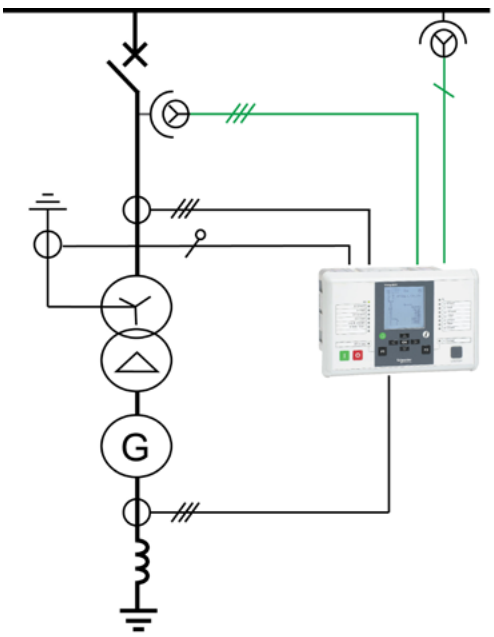
Correlation between voltage measuring mode, physical voltage input and available voltages in terminals 8/C/1, 8/D/1, 8/W/1 and 8/C/2, 8/D/2, 8/W/2.



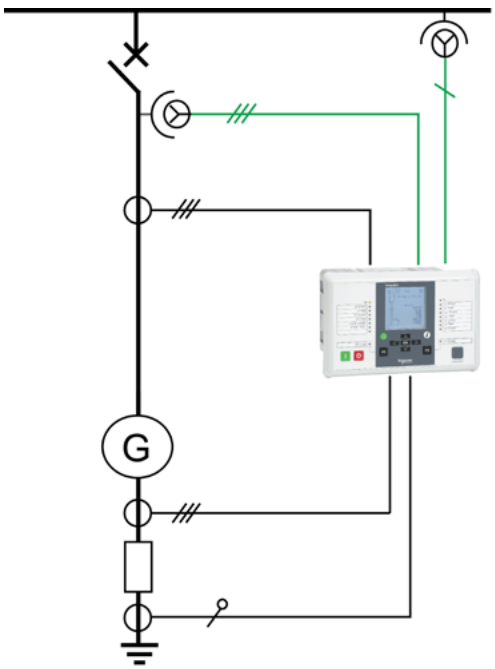
Connection examples



Connection principle of V300G applied for generator unit protection.



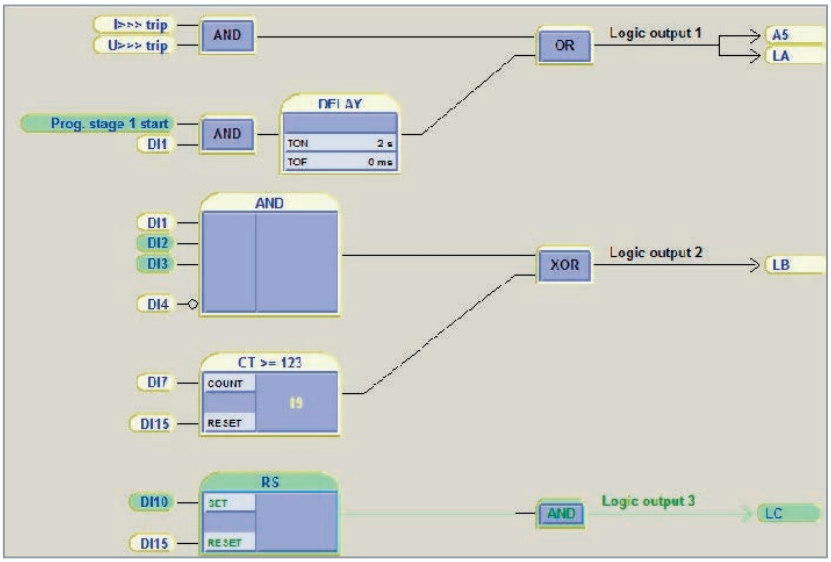
Connection principle of V300G applied for generator and generator-block-transformer protection.



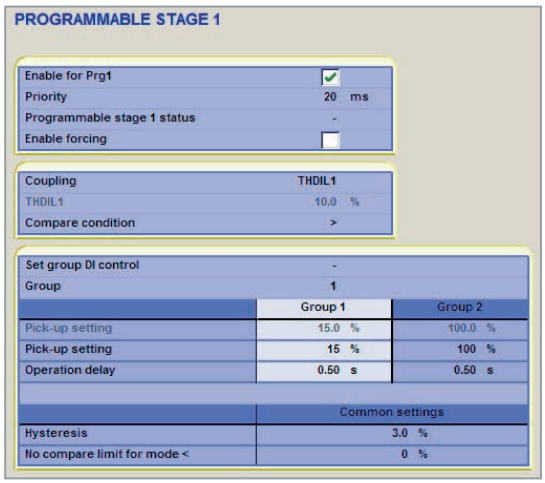
Connection principle of V300G applied for generator and generator differential protection

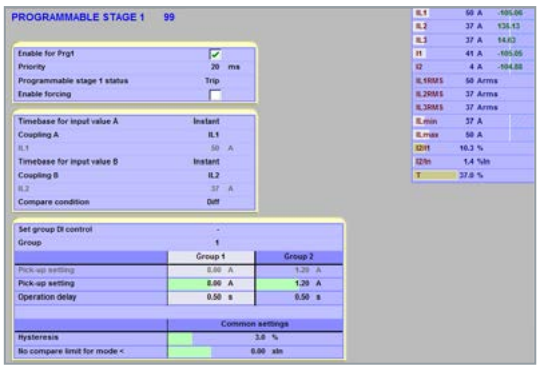
Programmable stages

There are eight programmable stages available to use with various applications. Each stage can monitor any analogue (measured or calculated) signal and issue start and trip signals. Programmable stages extend the protection functionality of the manager series to a new level. For example, if four stages of frequency are not enough, with programmable stages, the maximum of 12 can be reached. Other examples are using the stages to issue an alarm when there are a lot of harmonics (THD) or indicating reverse power condition



Programmable logic: The logic editor has colours to enable viewing of active statuses. Furthermore, each input status can be also seen on-line in VAMPSET view .





Programmable stage has a possibility to compare two freely selectable signals between each other. Using this feature the user can create compare function using relay's own measured or calculated signals. One or both of the signals can be connected to comparison function over GOOSE.

Mounting options

Order options provide two alternative mounting principles to VAMP 321 IED. Both options have its own advantages.

Panel mounting

The conventional mounting technique has always been installing the IED on the secondary compartment's door. Limitation in this approach could be that the door construction is not strong enough for the IED's weight and suitability to wire large amount of secondary and communication cabling could be challenging.

Projection mounting

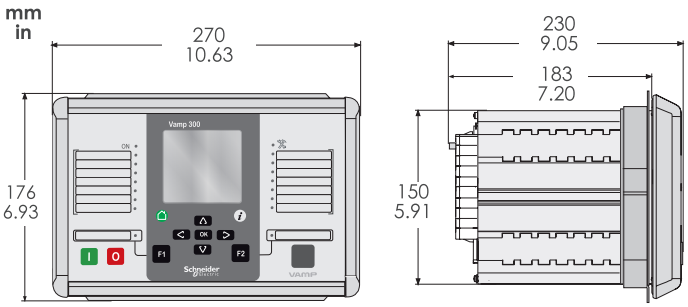
In case the depth dimension behind the compartment door is limited, the IED can be equipped with frame around the collar. This arrangement reduces depth inside compartment by 45 mm.

Wall mounting with detachable HMI brings more flexibility

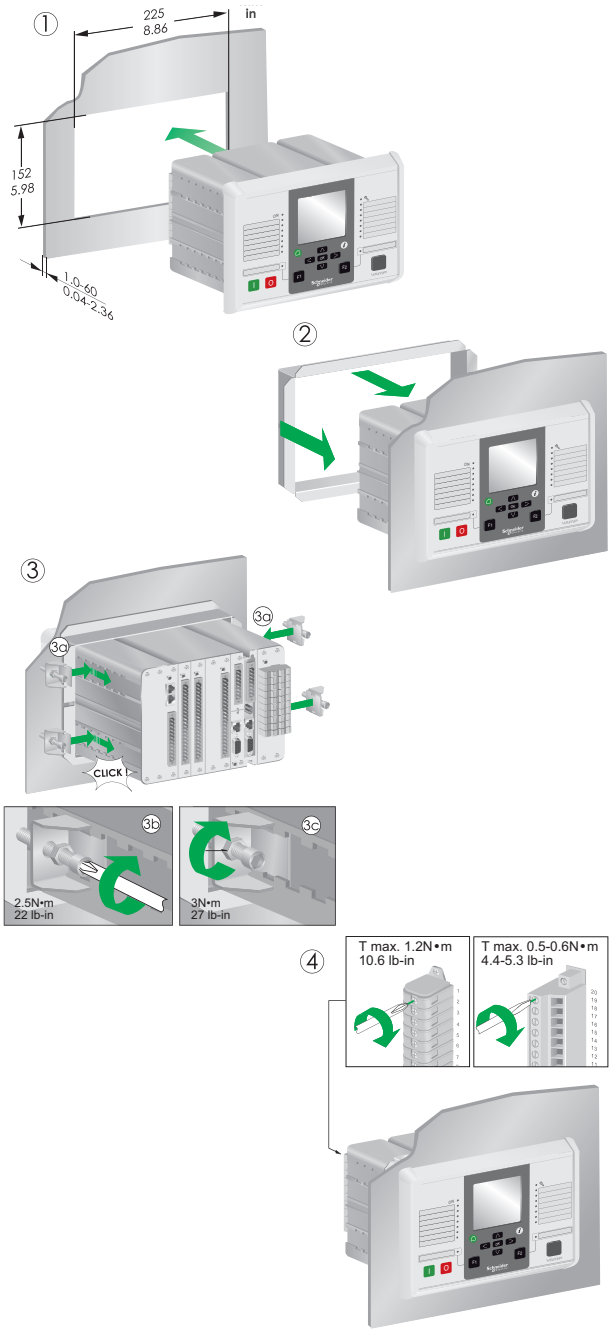
This mounting technique allows door being lighter as the relays frame is installed in the back of the secondary compartment. Communication, DI and DO cabling cabling is easier, too, as the door movement does not need to be considered. In this case, only the communication between IED base and display has to be wired.

Mounting with detachable HMI: the base unit of the IED and display are connected using VAMP's VX001 cabling.

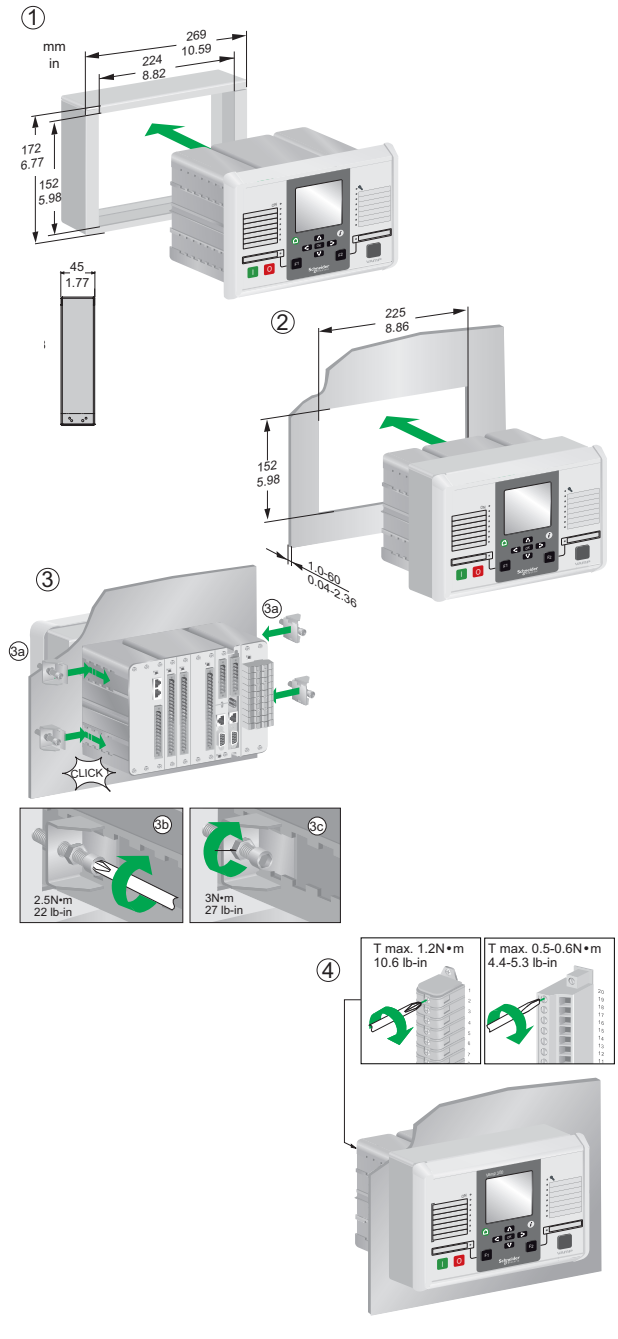
Dimensional drawings



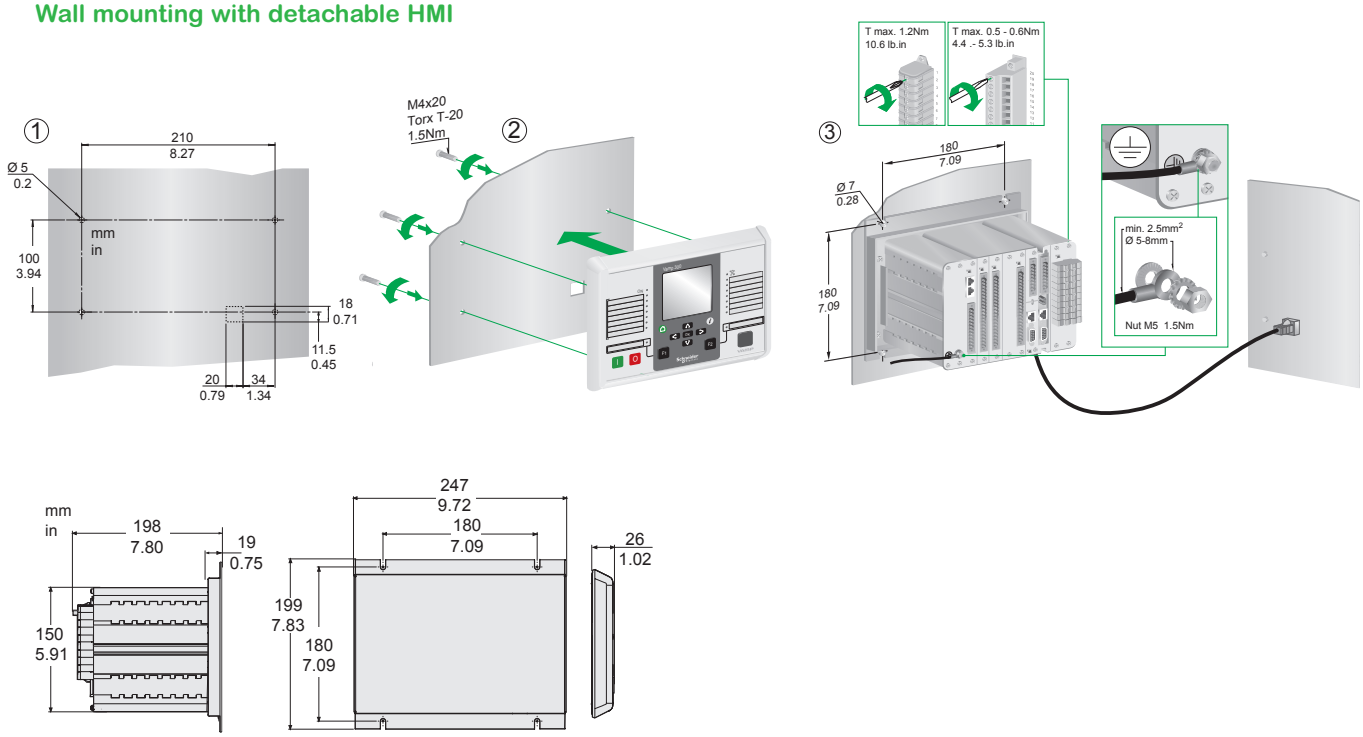
Panel mounting



Projection mounting



Wall mounting with detachable HMI

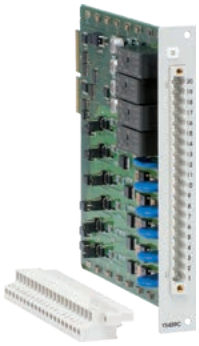


The VAMP 300 Series is designed with user-friendliness in mind.

Order codes

SLOT NUMBERS, see page 3

	1	2	3	4	5		6	7	8	9	10		
V300G -	☐	☐	☐	☐	☐	-	☐	A	☐	☐	A-	☐	☐



G = 6DI+4DO (6 x DI, 4 x DO)

C = RS232+RJ
(RS232 + Ethernet RJ-45 100 Mbs)

D = RS232+LC
(RS232 + Ethernet LC 100 Mbs)

Application
G = Generator
Supply voltage [V]
C = Power C 110 - 240 (80 - 265 Vac/dc, 5 x DO heavy duty, A1, SF)
D = Power D 24 - 48 (18 - 60Vdc, 5 x DO heavy duty, A1, SF)
I/O Card I
A = None
G = 6DI+4DO (6 x DI, 4 x DO)
H = 6DI+4DO (6 x DI, 4 x DO(NC))
I = 10DI (10 x DI)
I/O Card II
A = None
G = 6DI+4DO (6 x DI, 4 x DO)
H = 6DI+4DO (6 x DI, 4 x DO(NC))
I = 10DI (10 x DI)
I/O Card III
T = 3xI (5/1A) + Io (5/1A) for Generation differential, excludes I/O card in slot 5
I/O Card IV
A = None
Option card I
A = None
K = RS232 (RS232)
P = PP (Plastic / Plastic serial fibre)
R = GG (Glass / Glass serial fibre)
Future option
A = None
Analog measurement card
C = 3L (5 A)+4U+2Io (5+1 A)
D = 3L (5 A)+4U+2Io (1+0.2 A)
W = 3L(1 A)+4U+2Io (5+1 A)
Communication interface I
A = None
B = RS232 (RS232, IRIG-B)
C = RS232+RJ (RS232, IRIG-B + Ethernet RJ-45 100 Mbs)
D = RS232+LC (RS232, IRIG-B + Ethernet LC 100 Mbs)
N = 2xRJ (Ethernet RJ 100 Mbs, RSTP)
O = 2xLC (Ethernet LC 100 Mbs, RSTP)
P = PP (Plastic / Plastic serial fibre)
R = GG (Glass / Glass serial fibre)
Future option
A = None
Display type
B = 128 x 128 (128 x 128 LCD matrix)
C = 128 x 128Ext (128 x 128 LCD matrix, detachable, 2 m cable) (1
DI nominal voltage
1 = 24 Vdc/ac
2 = 110 Vdc/ac
3 = 220 Vdc/ac
A = 24 Vdc/ac, WITH conformal coating
B = 110 Vdc/ac, WITHconformal coating
C = 220 Vdc/ac, WITH conformal coating

Note 1: By default cable lenght is 2 m. In case other leght is needed order separately VX001-1, Vx001-3 or VX001-5 for 1 m, 3 m and 5 m respectively

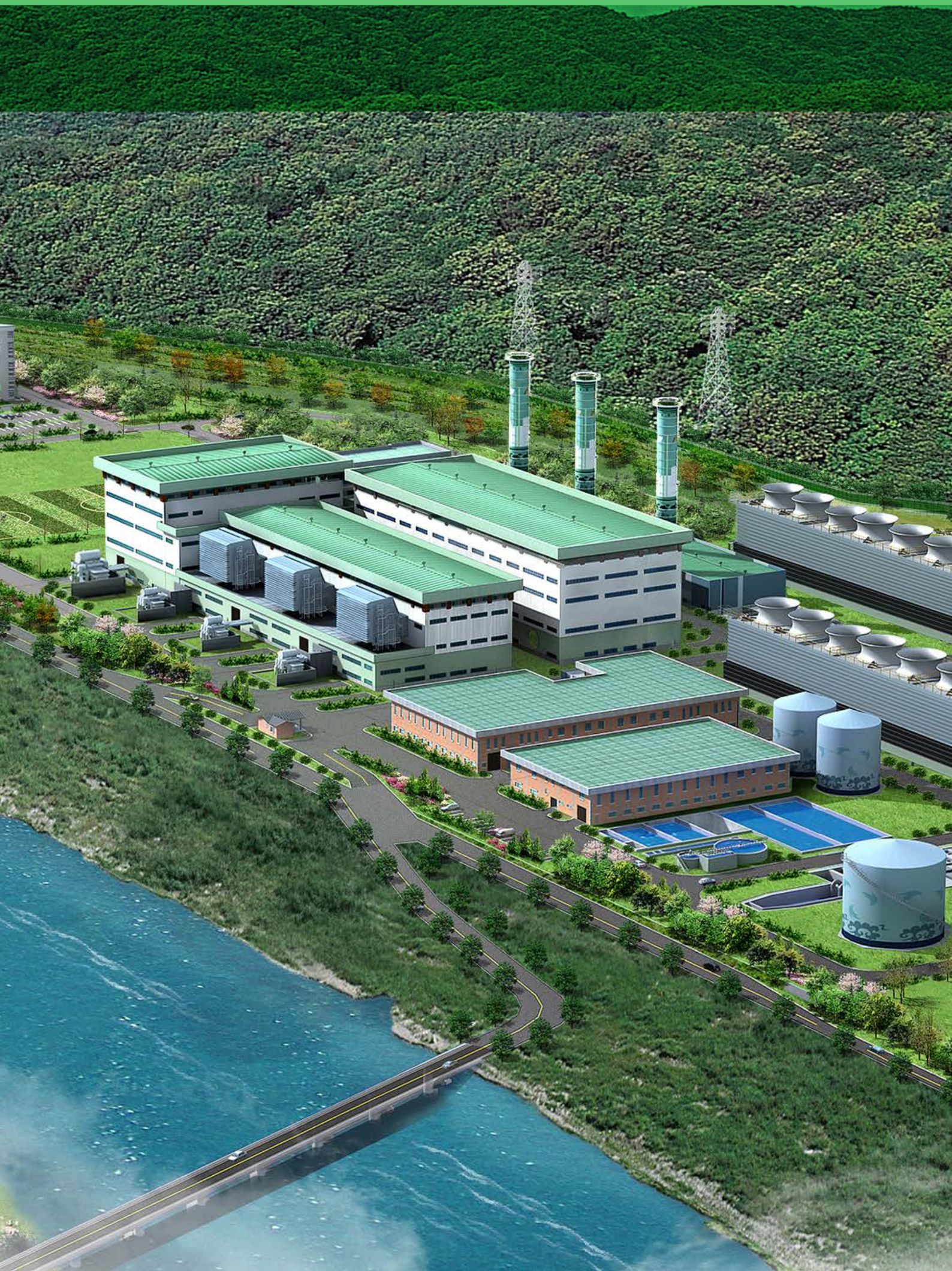
Accessories

Order code	Description	Note
VX052-3	USB programming cable (VAMPSET)	Cable length 3 m
VX067	VAMP 300/321 split cable for COM1-2 and COM 3-4 ports	Cable length 3 m
VSE001PP	Fiber optic interface module (plastic - plastic)	Max. distance 1 km
VSE001GG	Fiber optic interface module (glass - glass)	Max. distance 1 km
VSE001GP	Fiber optic Interface Module (glass - plastic)	Max. distance 1 km
VSE001PG	Fiber optic Interface Module (plastic - glass)	Max. distance 1 km
VSE002	RS485 module	
VSE009	DeviceNet module	
VPA3CG	Profibus DP fieldbus option module	
VX072	VAMP 300/321 profibus cable	Cable length 3m
VIO 12 AB	RTD module, 12 pcs RTD inputs, RS 485 communication (24-230 Vac/dc)	Always conformally coated
VIO 12 AC	RTD/mA Module, 12 pcs RTD inputs, PTC, mA inputs/outputs, RS232, RS485 and optical Tx/Rx communication (24 Vdc)	Always conformally coated
VIO 12 AD	RTD/mA module, 12 pcs RTD inputs, PTC, mA inputs/outputs, RS232, RS485 and optical Tx/Rx communication (48-230 Vac/dc)	Always conformally coated
VYX695	Projection for 300-series	Height 45 mm

Note 1. Fiber lengths 1, 5, 10, 15, 20, 25, 30, 35, 40, 50, 60 or 70 m

Tests and enviromental

Disturbance tests	Standard & Test class / level	Test value
Emission	EN 61000-6-4 / IEC 60255-26	
- Conducted	EN 55011, Class A / IEC 60255-25	0.15 – 30 MHz
- Emitted	EN 55011, Class A / IEC 60255-25 / CISPR 11	30 – 1 000 MHz
Immunity	EN 61000-6-2 / IEC 60255-26	
- 1Mhz damped oscillatory wave	IEC 60255-22-1	±2.5 kVp CM, ±2.5 kVp DM
- Static discharge (ESD)	EN 61000-4-2 Level 4 / IEC 60255-22-2 Class 4	± 8 kV contact, ± 15 kV air
- Emitted HF field	EN 61000-4-3 Level 3 / IEC 60255-22-3	80 - 2700 MHz, 10 V/m
- Fast transients (EFT)	EN 61000-4-4 Level 4 / IEC 60255-22-4 Class A	± 4 kV 5/50 ns, 5 kHz
- Surge	EN 61000-4-5 Level 4 / IEC 60255-22-5	± 4 kV, 1.2/50 µs, CM ± 2 kV, 1.2/50 µs, DM
- Conducted HF field	EN 61000-4-6 Level 3 / IEC 60255-22-6	0.15 - 80 MHz, 10 Vemf
- Power-frequency magnetic field	EN 61000-4-8	300 A/m (continuous), 1000 A/m 1–3 s
- Pulse magnetic field	EN 61000-4-9 Level 5	1000 A/m, 1.2/50 µs
- Voltage interruptions	EN 61000-4-29 / IEC 60255-11	30 %/1 s, 60 %/0.1 s, 100 %/0.05 s
- Voltage alternative component	EN 61000-4-17 / IEC 60255-11	12 % of operating voltage (DC) / 10 min
- Voltage dips and short interruptions	EN 61000-4-11	30 % / 10 ms, 100 % / 10 ms, 60 % / 100 ms, < 95 % / 5000 ms
Electrical safety tests		
- Impulse voltage withstand	EN 60255-5, Class III	5 kV, 1.2 / 50 µs
- Dielectric test	EN 60255-5, Class III	2 kV, 50 Hz
- Insulation resistance	EN 60255-5	> 100Mohm, 500 V / 100 V
- Protective bonding resistance	EN 60255-27	< 0.1 ohm
- Power supply burden	IEC 60255-1	> 20 W internal
Mechanical tests		
Device in operation		
- Vibrations	IEC 60255-21-1, Class II / IEC 60068-2-6, Fc	1Gn, 10Hz – 150 HZ
- Shocks	IEC 60255-21-2, Class II / IEC 60068-2-27, Ea	10Gn/11 ms
Device de-energized		
- Vibrations	IEC 60255-21-1, Class II / IEC 60068-2-6, Fc	2Gn, 10 Hz – 150 HZ
- Shocks	IEC 60255-21-2, Class II / IEC 60068-2-27, Ea	30Gn/11 ms
- Bump	IEC 60255-21-2, Class II / IEC 60068-2-27, Ea	20 Gn/16 ms
Environmental tests		
Device in operation		
- Dry heat	EN / IEC 60068-2-2, Bd	+70°C
- Cold	EN / IEC 60068-2-1, Ad	-40°C
- Damp heat, cyclic	EN / IEC 60068-2-30, Db	From +25°C to +55°C, From 93% RH to 98% RH, 6 days
- Damp heat, static	EN / IEC 60068-2-78, Cab	+40°C, 93% RH, 10 days
Device in storage		
- Dry heat	EN / IEC 60068-2-2, Bb	+70°C
- Cold	EN / IEC 60068-2-1, Ab	-40°C
Environmental conditions		
Ambient temperature, in-service	-40 – +60°C	
Ambient temperature, storage	-40 – +70 °C	
Relative humidity	< 95%, no condensation allowed	
Maximum operating altitude	2000 m	
Degree of protection (IEC 60529)	IP54 (from front when panel mounted)	
Weight	3.2 kg or higher (depends of options)	
Dimension (W x H x D)	270 x 176 x 230 mm	
Package		
Dimensions (W x H x D)	315 x 210 x 257 mm	
Weight (IED, Package and Manual)	5.2 kg or higher (depends of options)	



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 range in arc flash protection worldwide. VAMP products meet the latest international standards and regulations.

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