

[Protection]

VAMP 57

Multipurpose feeder and motor protection relay



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The VAMP 57 protection relay family is based on proven technology concepts developed in close cooperation with customers. VAMP products have been designed around user-friendliness, a feature which is proven in our customer reports day after day.

The VAMP 57 feeder manager has been developed to cover basic protection needs for OEMs, utilities and industrial applications. Thanks to its cost-effective and flexible design, the VAMP 57 provides an excellent alternative for various protection applications.

VAMP 57 combines further protection functions such as directional earth fault for feeder and motor protection.



The VAMP 57 comprises dedicated circuit breaker control push buttons.



CUSTOMER BENEFITS

Robust hardware

- Used selectable Ethernet or RS485 based communication interface
- Designed for demanding industrial conditions

Common technology for cost efficiency

- Powerful CPU supporting native IEC 61850

User-friendly and high functionality

- Common firmware platform with other VAMP range protection devices
- Standard USB connection (type B) for setting software (VAMPSET)

Modern Human Machine Interface (HMI)

- Clear LCD display for alarms and events
- Single line diagram mimic with control, indication and live measurements
- Programmable function keys and LEDs
- Circuit breaker ON / OFF control

VAMP 57: Medium range relay with IEC 61850

EASE OF USE

User-friendliness has always been a feature of VAMP products, and the VAMP 57 is no exception. A great deal of effort has gone into the design of the operational aspects of the new products.

The rapid setting and download/upload is achieved with the unique VAMPSET setting software which dramatically improves usability. Unicode support allows the menu text and settings to be translated into various international languages including for example Russian and Chinese. The informative human machine interface shows all of the required information for the user with support of customised legend texts.



VAMP 50 FAMILY HMI INTERFACE

Navigation push buttons

Function buttons with:

- User configurable legend texts
- Object control
- Protection setting group selection
- Freely programmable

Programmable LEDs

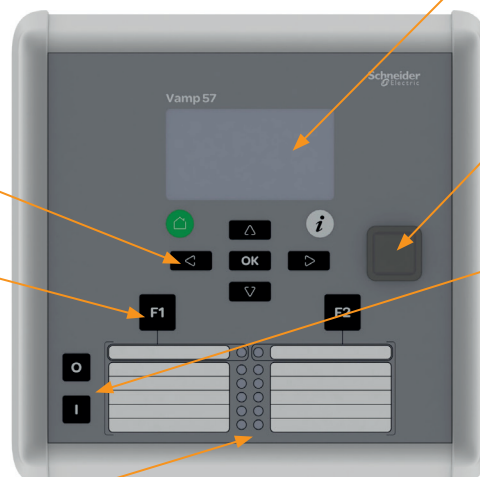
- User configurable legend texts
- 12 LEDs, 2 fixed (power, self-diagnostic) and 8 freely programmable (2 for push buttons)

Analog interface

- 4 x CT
- 1 x U
- Auxiliary power supply

Analog interface and DI/DO

- 3 x U
- 3 x trip relay
- 6 x DI



128 x 64 LCD

dot matrix display

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

Local port

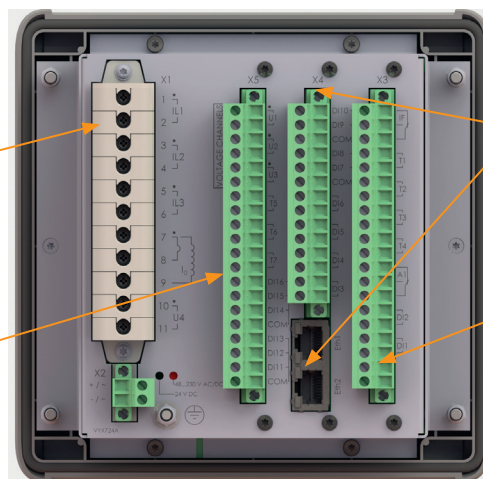
- USB interface

Control buttons

- Direct or select-execute CB control
- Possibility for password protection

The template for user legend texts is a part of the product documentation.

The texts are printed on a transparent film allowing customisation of the relay.



Combined DI and communication interface card

- 8 x DI
- Remote port: RS485 or Ethernet (RJ-45 redundant)

Inputs and outputs

- 2 x DI
- 4 x trip relay
- 1 x alarm relay

Enhanced usability

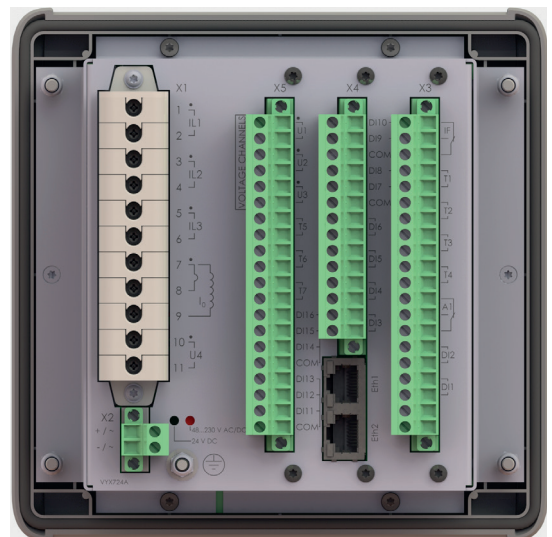
The VAMP 57 protection relay concept has been extended with a number of features that make installation and testing of the relays even more efficient and user-friendly.



Communication

VAMP is an expert in communication with vast experience in interfacing different system integrators, SCADA, RTUs, PLCs and gateways using a large number of supported protocols. Flexible adaptation of the communication protocols together with powerful and easy to use software tools are the key to successful integration. VAMP 57 and the VAMPSET tool provide access to practically any power system information you may need.

The I/O and communication option module, C = 2xRJ45 + 8DI, has double RSTP Ethernet communication interface. This card is typically used for IEC 61850, Modbus TCP and DNP 3.0 communication protocols.



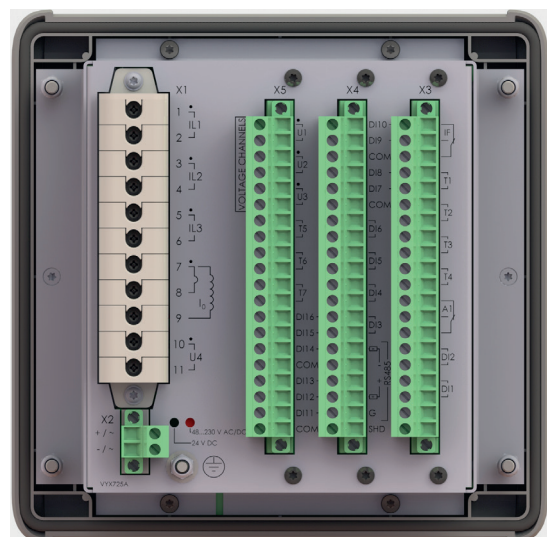
NATIVE IEC 61850

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

The I/O and communication option module, B = RS-485 + 8DI, has two-wire serial communication interface. This card is typically used for IEC 60870-5-101, IEC 60870-5-103, Modbus RTU and SPA communication.

The IEC 61850 datamodel, data-sets, report control blocks and 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 integration.

The VAMP 57 IEC61850 implementation is native, which means the functionality is integral to the product design and software, providing fast and efficient operation.



VAMP 57 COMMUNICATION PROTOCOLS

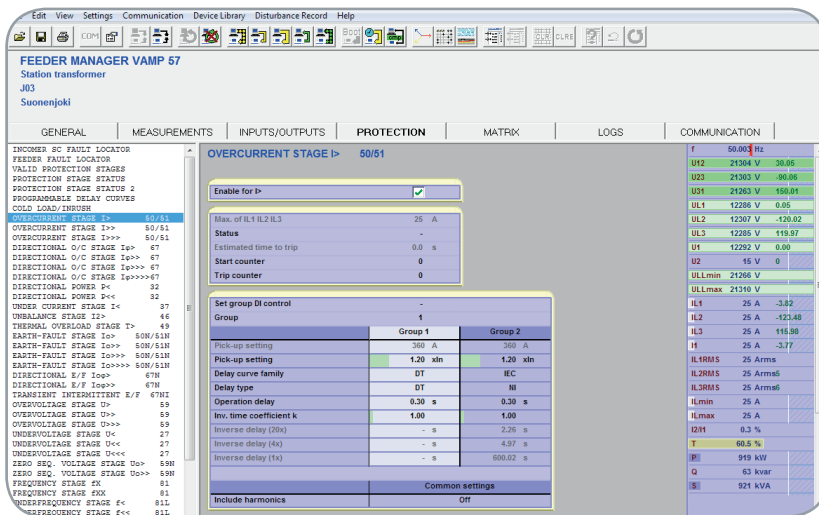
- IEC 60870-5-101
- IEC 60870-5-103
- Modbus TCP
- Modbus RTU
- DNP 3.0
- SPA-bus communication
- IEC 61850
- Human-Machine-Communication, display
- Human-Machine-Communication, PC

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.

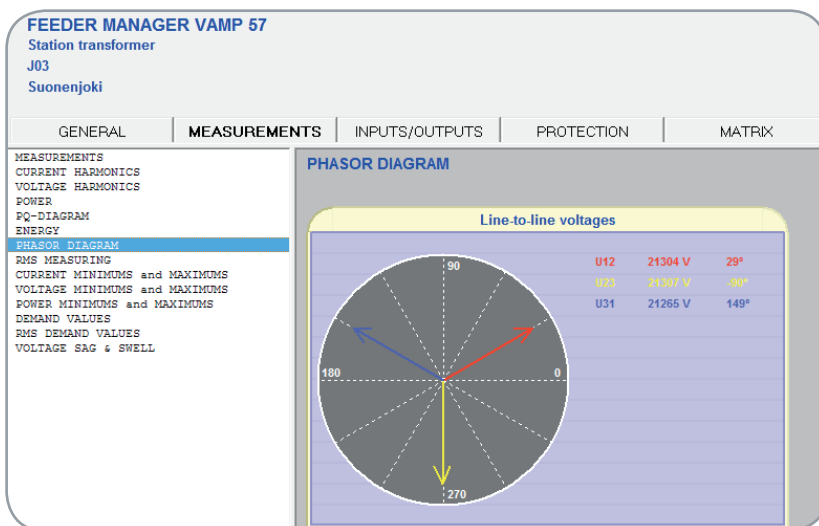


Standard USB communication cable can be used.



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.

Using a standard serial cable the PC running VAMPSET connects to the front port of the VAMP relays. The VAMPSET software also supports TCP/IP communication via an optional port. Featuring true multi-language support the software runs on Windows environment without any need for configuration of the PC.



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.

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


INPUTS / OUTPUTS

The VAMP 57 host various optional modules in order to upgrade the relay functionality from basic to more advanced applications.

| | VAMP 57 |
|--------------------|------------------------------------|
| Analog inputs | 3 x I 1 x I ₀ 4xU |
| Digital inputs | 16 |
| Trip relays | 7 |
| Alarm relays | 1 |
| Self-diagnostic | 1 |
| Front port | USB |
| Optional rear port | RS485/Ethernet |

Measurements and condition monitoring

The VAMP 57 offers a complete set of measurement functions to replace the conventional metering functions of switchgear and controlgear installations. The measurement functions cover phase, line and residual currents, current imbalance, system frequency and harmonics from phase currents. Condition monitoring continuously monitors trip circuits, breaker wear and current transformers.

| Type of measurement | IEC Symbol | Protection function / measurement |
|-----------------------|---|---|
| Primary current | 3I | Three-phase current |
| | I_0 | Zero sequence current |
| | I_1 | Positive sequence current |
| | I_2 | Negative sequence current |
| | I_2 / I_1 | Ratio of negative and positive current |
| | IL | Average and maximum demand current |
| Primary voltage | 3U | Phase-to-earth, phase-to-phase voltages |
| | U_0 | Zero sequence voltage |
| | U_1 | Positive sequence voltage |
| | U_2 | Negative sequence voltage |
| | U_2 / U_1 | Ratio of negative and positive voltage |
| | Xfault | Short-circuit fault reactance, Fault location |
| | Xfault | Earth-fault reactance, Fault location |
| Frequency | f | System frequency |
| Power | P | Active power |
| | P_{rms} | RMS Active power |
| | Q | Reactive power |
| | Q_{rms} | RMS Reactive power |
| | S | Apparent power |
| | S_{rms} | RMS Apparent power |
| | E+, E- | Active Energy, exported / imported |
| | Eq+, Eq- | Reactive Energy, exported / imported |
| | CosPhi | Cosine Phi |
| | TanPhi | Tan Phi |
| | | Power Angle |
| | PF | Power factor |
| | | Phasor diagram view of voltages |
| | Phasor diagram view of currents | |
| Harmonics | I | 2nd to 15th harmonics and THD of currents |
| | U | 2nd to 15th harmonics and THD of voltages |
| | | Condition monitoring CB wear |
| | | Condition monitoring CT supervision |
| | | Trip Circuit Supervision (TCS) |
| | | Voltage interruptions |
| Voltage sags / swells | U | Voltage sags / swells |
| |  | Disturbance recorder |

Protection stages

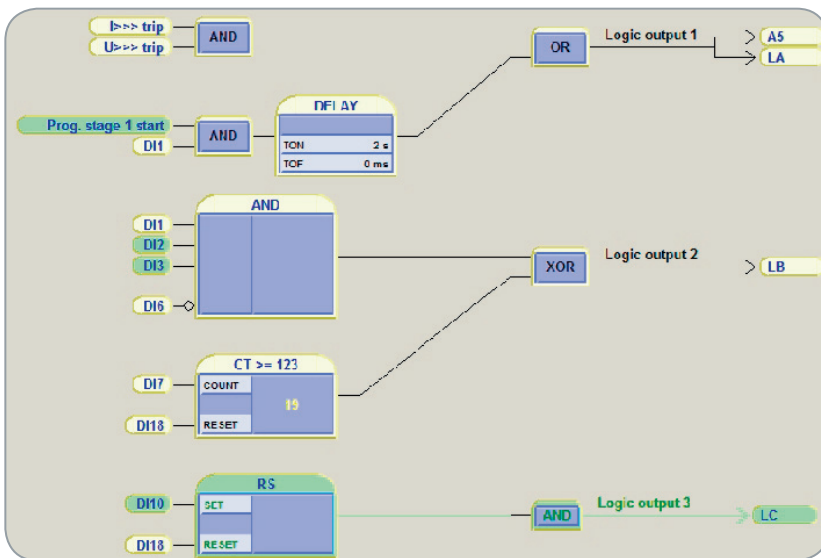
User-friendliness is also a built-in feature of protection stages, where setting views are graphically displayed in the relay and VAMPSET HMI. Disabled protection stages are hidden from the menu in order to display only the necessary information. Protection stages come with two setting groups to enable automatic transfer from main setting to alternative setting. This change can be universal for the entire relay or or based on protection function.

The relay has a large number of standard inverse curves to adopt various protection requirements. Unique protection curves can be applied when standard IEC or IEEE curves do not provide required protection selectivity.

| Type of fault. | IEEE Device No. | IEC Symbol | Protection function / measurement | Feeder Protection | Motor Protection |
|----------------------|-----------------|--|-----------------------------------|-------------------|------------------|
| Short circuit | 50/51 | $3I >, 3I >>, 3I >>>$ | Overcurrent | ● | ● |
| Earth-fault | 50N/51N | $I_0 >, I_0 >>, I_0 >>>$ | Earth-fault | ● | ● |
| | 67 | $I_{q>}, I_{q>>}, I_{q>>>}, I_{q>>>>}$ | Directional overcurrent | ● | ● |
| | 67N | $I_{0q>}, I_{0q>>}$ | Directional earth fault | ● | ● |
| | 46R | $I_2 / I_1 >$ | Broken line | ● | |
| Motor | 46 | $I_2 >$ | Current unbalance | | ● |
| | 47 | $I_2 >>$ | Incorrect phase sequence | | ● |
| | 48 | $I_{ST} >>$ | Stall | | ● |
| | 66 | $N >$ | Frequent start | | ● |
| | 37 | $I <$ | Undercurrent | | ● |
| Overload | 49 | $T >$ | Thermal overload | ● | ● |
| Voltage | 59N | $U_0 >, U_0 >>$ | Zero sequence voltage | ● | ● |
| | 59 | $U >, U >>, U >>>$ | Overvoltage | ● | ● |
| | 27 | $U <, U <<, U <<<$ | Undervoltage | ● | ● |
| Frequency | 81H/81L | $f ><, f >><<$ | Overfrequency and underfrequency | ● | ● |
| | 81L | $f <, f <<$ | Underfrequency | ● | ● |
| | 81R | df/dt | Rate of change of frequency | ● | ● |
| | 68F2 | $I_{r2} >$ | Magnetizing inrush | ● | ● |
| Other | 68F5 | $I_{r5} >$ | Over excitation | ● | ● |
| | 32 | $P <, P <<$ | Reverse power | ● | ● |
| | 79 | | Auto reclose function | ● | |
| | 50BF | CBFP | Circuit-breaker failure | ● | ● |
| | 25 | | Synchrocheck | ● | ● |
| | 86 | | Latched trip | ● | ● |
| | 99 | Pgr1-8 | Programmable stages | ● | ● |

Programmable stages

There are now eight 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.

Synchrocheck

VAMP 57 includes a function that will check synchronism when the circuit-breaker is closed. The function will monitor voltage amplitude, frequency and phase angle difference between two voltages. Since there are two stages available, it is possible to monitor three voltages. The voltages can be busbar and line or busbar and busbar (bus coupler). Furthermore, the voltage check functionality is included.

PROGRAMMABLE STAGE 1

Enable for Prgt1

Priority 20 ms

Programmable stage 1 status -

Enable forcing

Coupling THDIL1

THDIL1 100.0 %

Compare condition >

Set group DI control -

Group 1

| | Group 1 | Group 2 |
|-----------------|---------|---------|
| Pick-up setting | 15.0 % | 100.0 % |
| Pick-up setting | 15 % | 100 % |
| Operation delay | 0.50 s | 0.50 s |

Common settings

Hysteresis 0 %

No compare limit for mode < 0 %

PROGRAMMABLE STAGE 1 99

Enable for Prgt1

Priority 20 ms

Programmable stage 1 status Trip

Enable forcing

Timebase for input value A Instant

Coupling A IL1

IL1 50 A

Timebase for input value B Instant

Coupling B IL2

IL2 37 A

Compare condition Diff

Set group DI control -

Group 1

| | Group 1 | Group 2 |
|-----------------|---------|---------|
| Pick-up setting | 0.00 A | 1.20 A |
| Pick-up setting | 0.00 A | 1.20 A |
| Operation delay | 0.50 s | 0.50 s |

Common settings

Hysteresis 3.0 %

No compare limit for mode < 0.00 xIn

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.

SYNCHROCHECK 1 25

Enable for Sync1

Voltage input U12/U12y

| | Frequency | Voltage | Angle |
|---------|-----------|----------|--------|
| Side 1: | 49.675 Hz | 45.3 %Un | 30.0 ° |
| Side 2: | 49.675 Hz | 47.5 %Un | 30.8 ° |
| Diff: | 0.000 Hz | 2.2 %Un | 0.9 ° |

STATUS

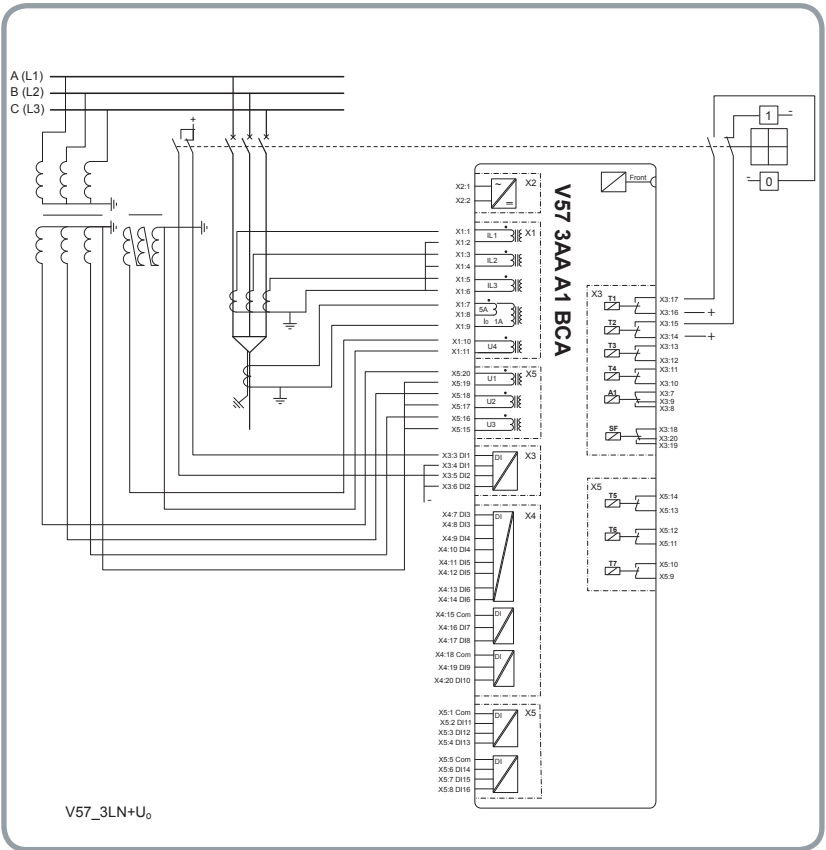
| | |
|---------------------|----|
| Voltage status | LL |
| Sync status | No |
| Request time status | - |
| Sync requests | 0 |
| Sync counter | 0 |
| Fail counter | 0 |

CONTROL SETTINGS

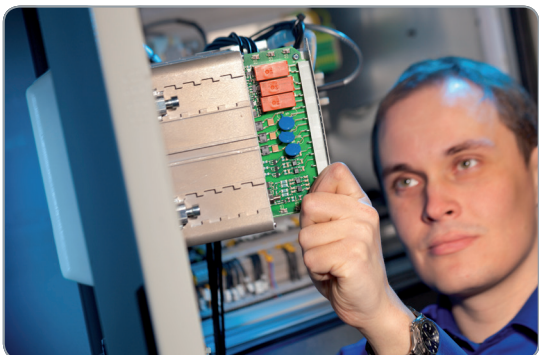
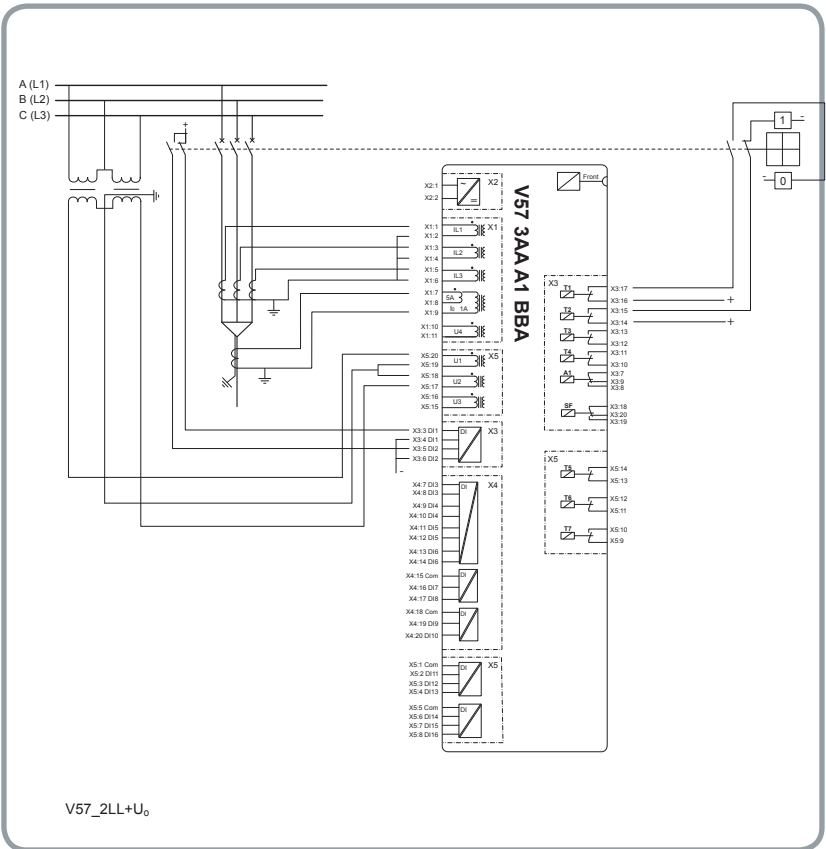
| | |
|-----------------------------|-------------------------------------|
| CB object | Obj1 |
| Sync mode | Sync |
| Voltage check mode | LD |
| CB close time | 0.10 s |
| Bypass DI | - |
| Bypass | 0 |
| CB CONTROL | - |
| Sync info for mimic display | <input checked="" type="checkbox"/> |

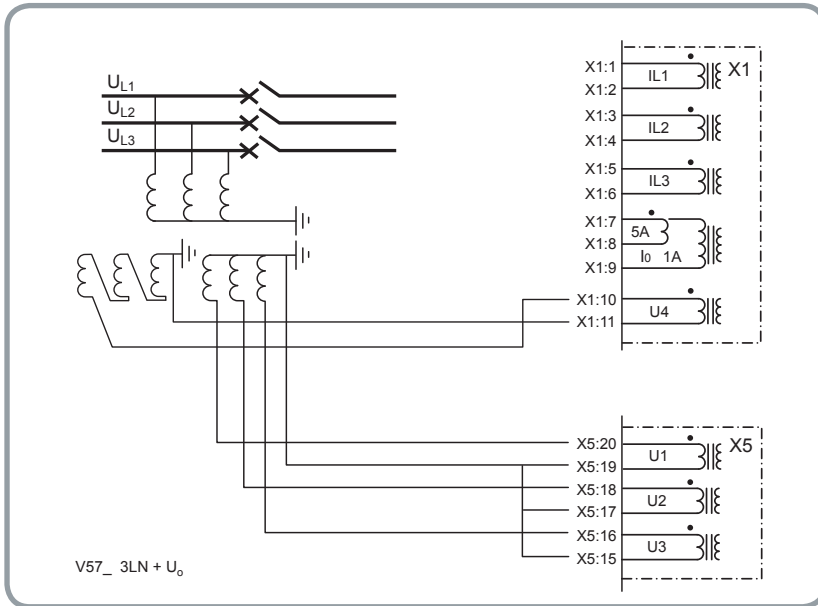
VAMP 57 connections

| Connection diagram: V57_3LN + U ₀ | |
|--|---------------------------------|
| Voltage scaling mode | 3LN + U ₀ |
| Voltages measured by VTs | UL1, UL2, UL3, U ₀ |
| Values calculated | U12, U23, U31, U1, U2, U2/U1, f |
| Protection functions not available | 25 |



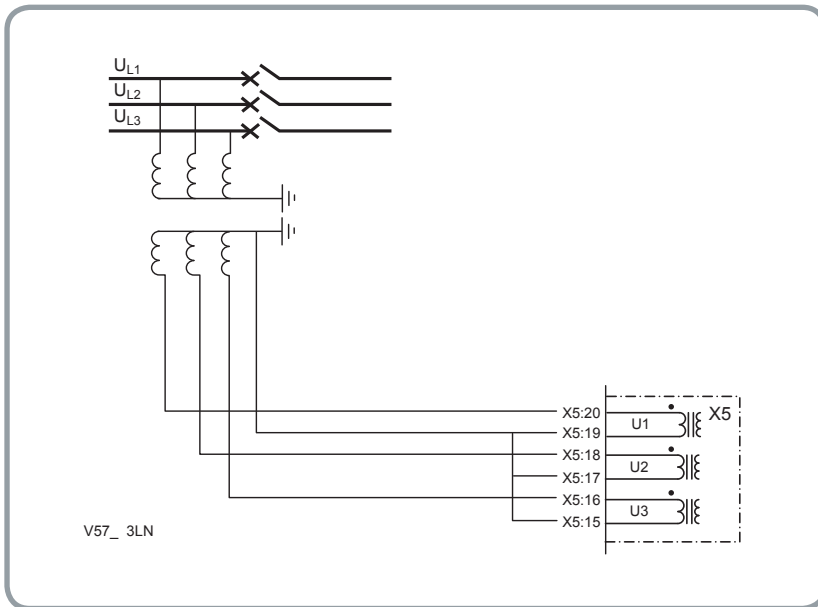
| Connection diagram: V57_2LL + U ₀ | |
|--|-------------------------------|
| Voltage scaling mode | 2LL + U ₀ |
| Voltages measured by VTs | U12 and U23 |
| Values calculated | UL1, UL2, UL3, U31, U1, U2, f |
| Protection functions not available | 67NI, 25 |





Connection diagram: V57_3LN + U_o

| | |
|------------------------------------|------------------------------------|
| Voltage scaling mode | 3LN + U _o |
| Voltages measured by VTs | UL1, UL2, UL3, U _o |
| Values calculated | UL12, UL23, UL31, U1, U2, U2/U1, f |
| Protection functions not available | 25 |

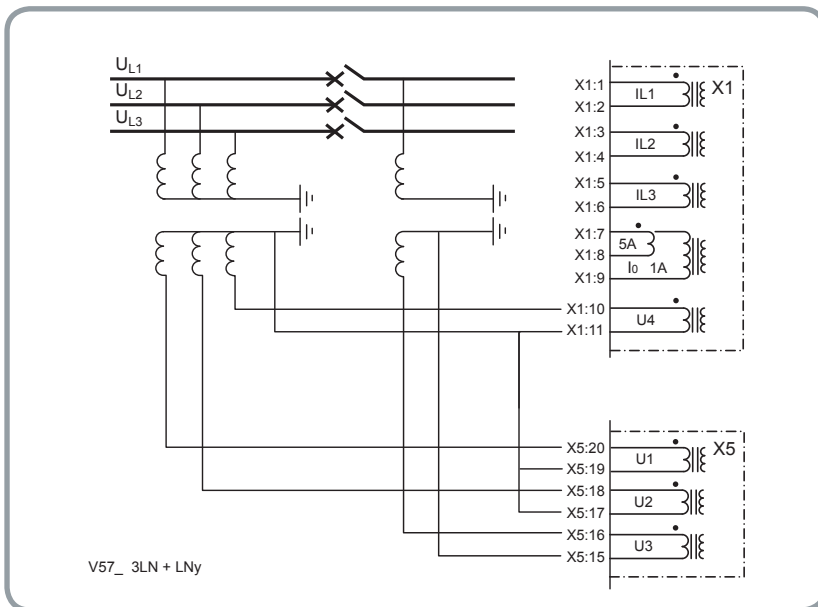


Connection diagram: V57_3LN

| | |
|------------------------------------|--|
| Voltage scaling mode | 3LN |
| Voltages measured by VTs | UL1, UL2, UL3 |
| Values calculated | UL12, UL23, UL31, U1, U2, U2/U1, f, U _o |
| Protection functions not available | 67NI, 25 |

Above measuring modes are typically used for feeder and motor protection schemes.

3LN connection is similar to 3LN+U_o. Open delta connection is missing in this mode but U_o is calculated.



Connection diagram: V57_3LN+LN_y

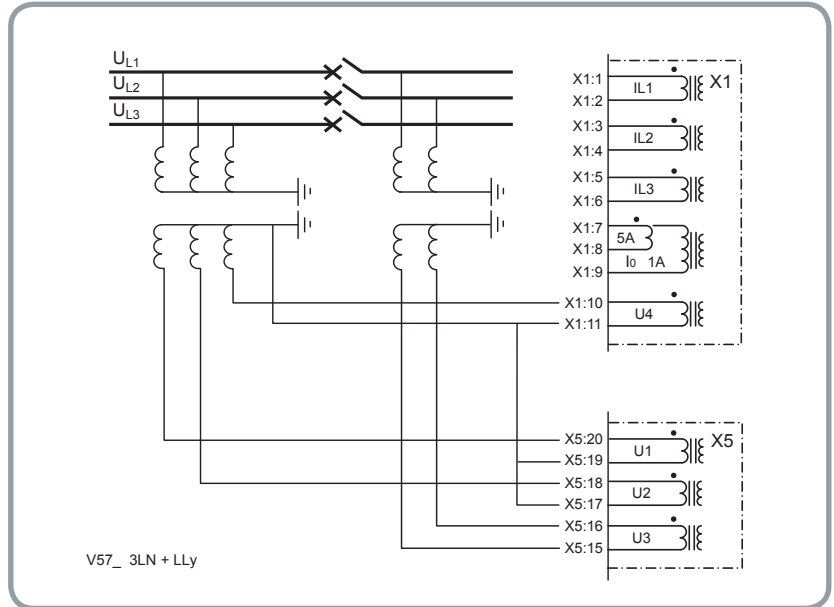
| | |
|------------------------------------|---|
| Voltage scaling mode | 3LN+LN _y |
| Voltages measured by VTs | UL1, UL2, UL3, UL1 _y |
| Values calculated | UL12, UL23, UL31, U _o , U1, U2, U2/U1, f, f _y |
| Protection functions not available | 67NI |

This connection is typically used for feeder protection scheme where line-to-neutral voltage is required for synchrocheck application.

Connection diagram: V57_3LN+LLy

| | |
|------------------------------------|--|
| Voltage scaling mode | 3LN+LLy |
| Voltages measured by VTs | UL1, UL2, UL3, UL12y |
| Values calculated | U12, U23, U31, U _o , U1, U2, U2/U1, f, fy |
| Protection functions not available | 67NI |

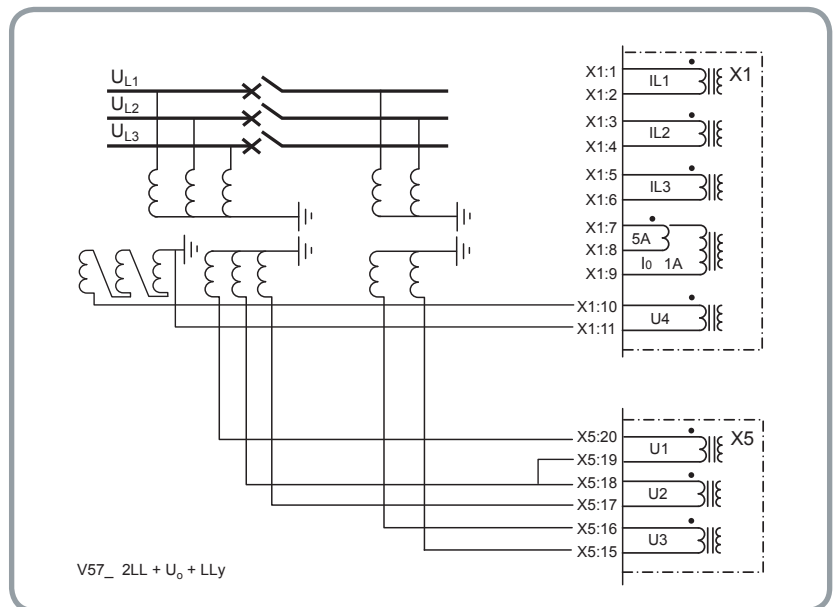
Connection of voltage transformers for synchrocheck application. The other side of the CB has line-to-line connection for reference voltage.



Connection diagram: V57_2LL+U_o+LLy

| | |
|------------------------------------|------------------------------------|
| Voltage scaling mode | 2LL+U _o +LLy |
| Voltages measured by VTs | UL12, UL23, U _o , U12y |
| Values calculated | UL31, UL1, UL2, UL3, U1, U2, f, fy |
| Protection functions not available | |

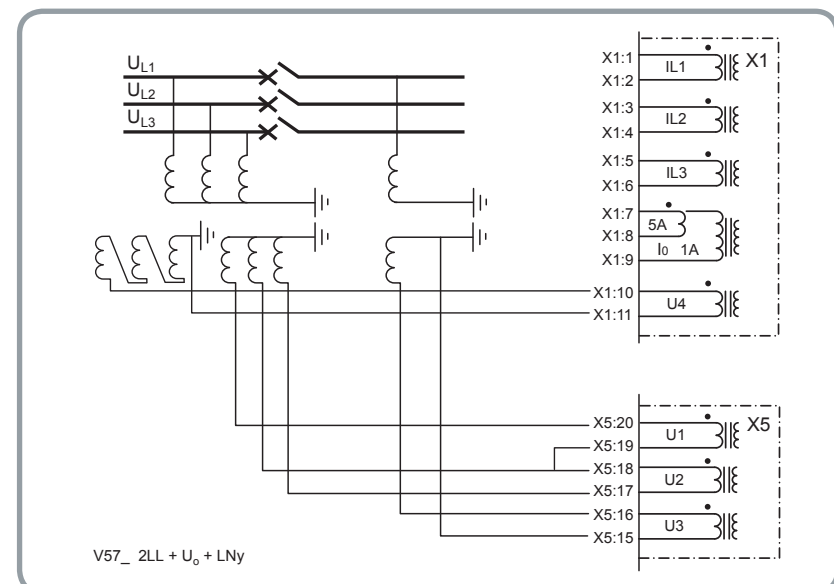
Connection of two line-to-line and residual voltage scheme. Line-to-line reference voltage is taken from other side of the CB for synchrocheck scheme.

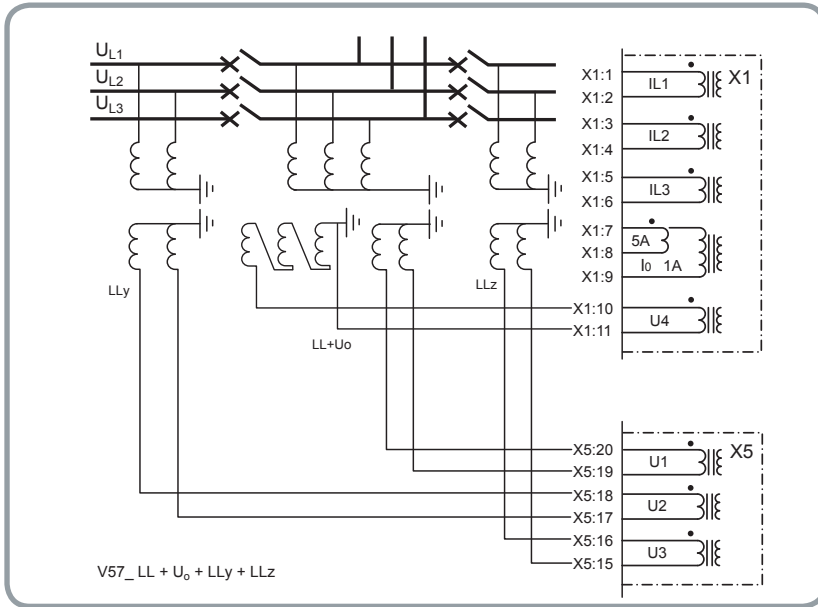


Connection diagram: V57_2LL+U_o+LNy

| | |
|------------------------------------|------------------------------------|
| Voltage scaling mode | 2LL+U _o +LNy |
| Voltages measured by VTs | UL12, UL23, U _o , UL1y |
| Values calculated | UL31, UL1, UL2, UL3, U1, U2, f, fy |
| Protection functions not available | |

Connection of two line-to-line and residual voltage scheme. The other side of the CB has phase-to-neutral connection for synchrocheck.

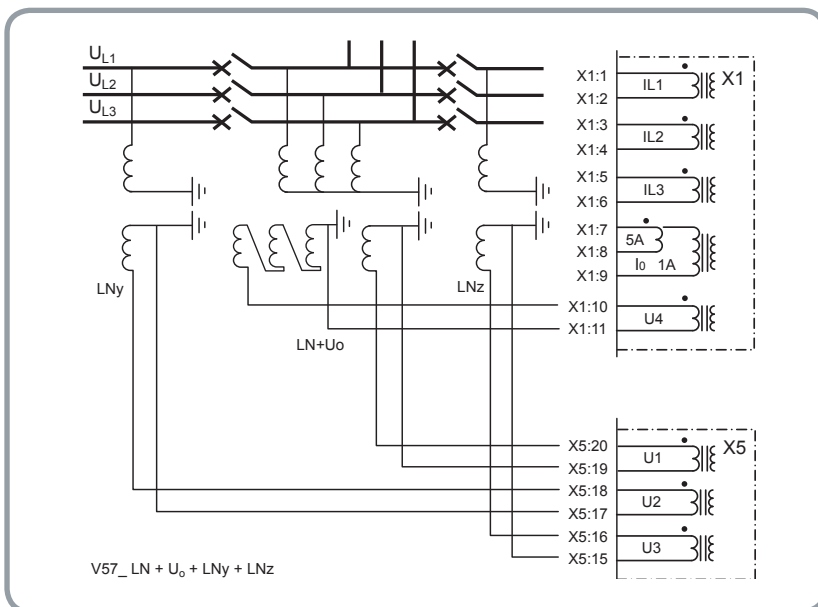




Connection diagram: V57_LL+U_o+LLy+LLz

| | |
|------------------------------------|------------------------------------|
| Voltage scaling mode | LL+U _o +LLy+LLz |
| Voltages measured by VTs | U12, U _o , U12y, U12z |
| Values calculated | UL1, UL2, UL3, U23, U31, f, fy, fz |
| Protection functions not available | Single phase voltage protection |

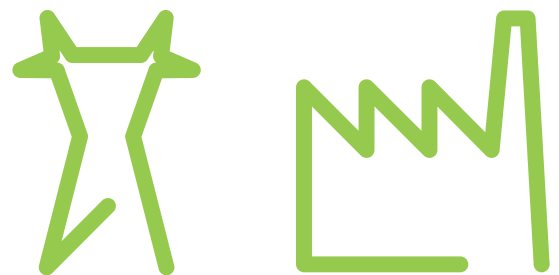
This scheme has two CBs to be synchronized. Left side of the bus bar has line-to-line and right side line-to-line connection for synchrocheck's reference voltages. In the middle system voltages are measured by phase-to-neutral and open delta connection.



Connection diagram: V57_LN+U_o+LNy+LNz

| | |
|--------------------------|------------------------------------|
| Voltage scaling mode | LN+U _o +LNy+LNz |
| Voltages measured by VTs | UL1, U _o , UL1y, UL1z |
| Values calculated | U12, U23, U31, UL2, UL3, f, fy, fz |

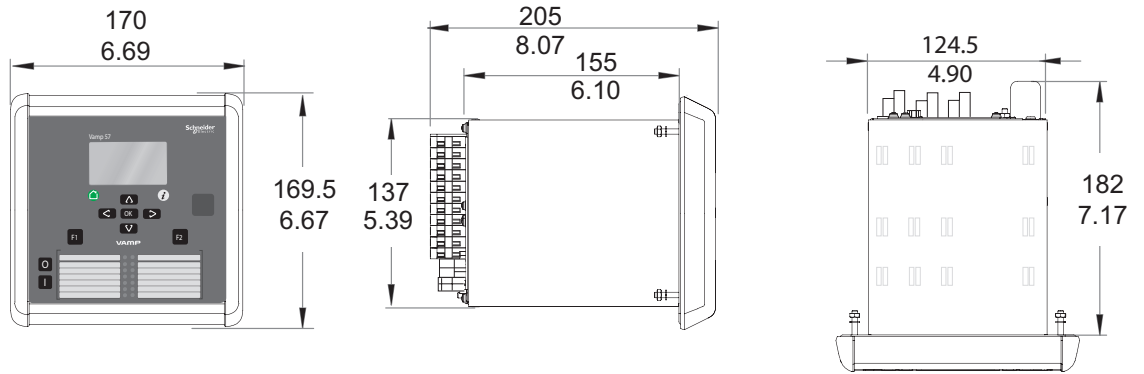
This scheme has two CBs to be synchronized. Left and right sides of the bus bar have line-to-neutral connections for synchrocheck's reference voltages. In the middle system voltages are measured by phase-to-neutral and open delta connection.



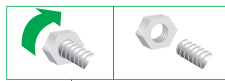
Dimensional drawings

PANEL MOUNTING VAMP 57

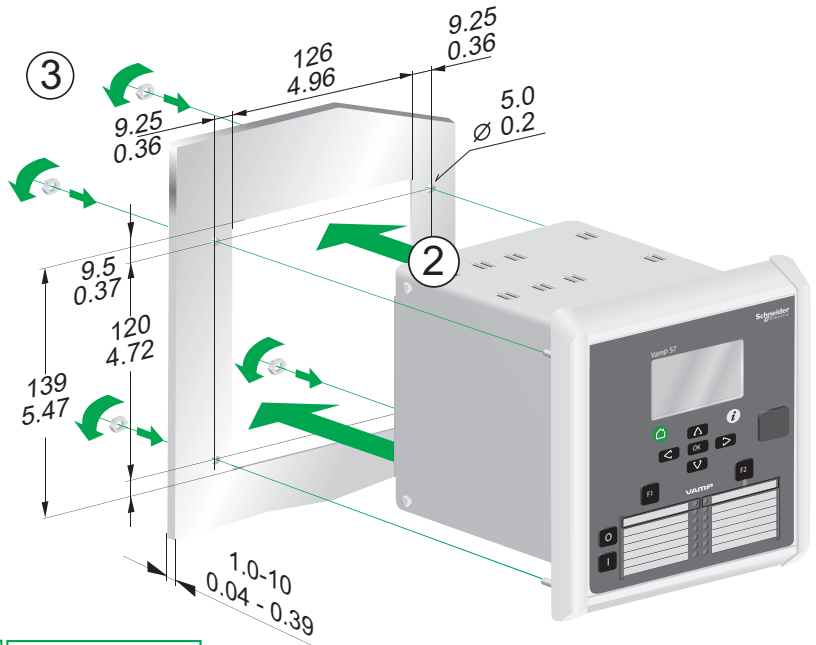
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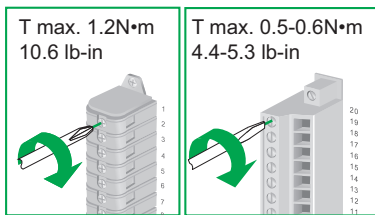
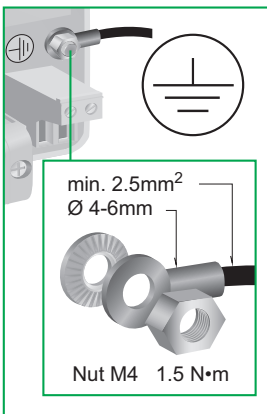
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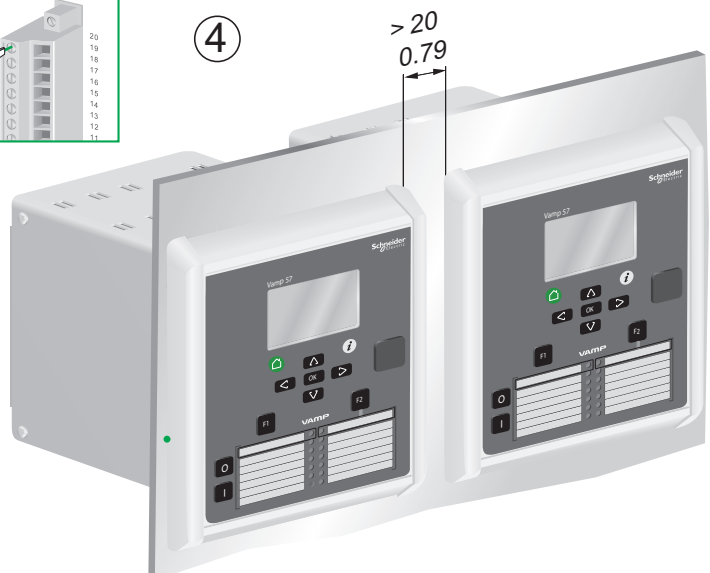
3



2



4



Order codes

V57 - 1



| |
|---|
| Application |
| F = Feeder |
| M = Motor |
| Phase currents & voltage input |
| 3 = 1A/5A & 1U (100/110V) |
| Earth-fault current input |
| A = 1 A / 5 A |
| Supply Voltage [V] |
| A = 40.. 265 Vac / dc |
| Future option |
| A = None |
| Future option |
| 1 = None |
| Voltage measurements + I/O |
| B = 3U (100/110V) + 6DI + 3DO |
| I/O with comms |
| B = RS-485 + 8DI |
| C = 2 x RJ-45 + 8DI |
| Future option |
| A = Future |

ACCESSORIES

| Order code | Description | Note |
|------------|---|------------------|
| VX052-3 | USB programming cable (Vampset) | Cable length 3 m |
| VIO 12 AB | RTD Module, 12pcs RTD inputs, RS 485 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) | |

Main technical data

| Auxiliary voltage | |
|---|---|
| Voltage range | 40...265 V ac / dc |
| Measuring circuit | |
| Rated phase current I_N | 1A/5A |
| Current measuring range | 0.005...50 x I_N |
| Rated neutral current I_{0N} | 1 A or 5 A (optionally 0.2 A or 1 A) |
| Current measuring range | 0.003...10 x I_N |
| Thermal withstand | 4 x I_N (continuous) 100 x I_N (for 1 s) |
| Rated frequency f_N | 50 / 60 Hz (45...65 Hz) |
| Rated voltage Un | |
| | 100 V (configurable for VT secondaries 50-120 V) |
| Voltage measuring range | 0 - 160 V (100 V/110 V) |
| Continuous voltage withstand | 250 V |
| Burden | < 0.5V A |
| Digital inputs | |
| Digital inputs (external voltage max 265 V) | 16 |
| Threshold voltage for DI 3 - DI16 | 40 Vac / dc |
| Threshold for DI1 -2 | 12 Vac / dc |
| Trip outputs | |
| Rated voltage | 250 V ac / dc |
| Continuous carry | 5 A |
| Trip contacts | 8 |

Disturbance tests

| | Standard & Test class / level | Test value |
|--------------------------------|---|--|
| Emission | IEC/EN 60255-26 (ed3) | |
| Conducted | EN 55022, Class A & IEC 60255-25 & CISPR 22 | 0.15-80 MHz |
| Emitted | EN 55011, Class A & IEC 60255-25 & CISPR 11 | 30 - 1 000 MHz |
| Immunity | IEC/EN 60255-26 (ed3) | |
| 1Mhz damped oscillatory wave | IEC/EN 61000-4-18 & IEC 60255-22-1 | ± 2.5 kVp CM, ± 2.5 kVp DM |
| Static discharge (ESD) | IEC/EN 61000-4-2 Level 4 & IEC 60255-22-2 | ± 8 kV contact, 15 kV air |
| Fast transients (EFT) | IEC/EN 61000-4-4 Level 4 & IEC 60255-22-4 | ± 4kV, 5/50 ns, 5 kHz |
| Surge | IEC/EN 61000-4-5 Level 3 & IEC 60255-22-5 | ± 2 kV, 1.2/50 ms, CM ± 1 kV, 1.2/50 ms, DM |
| Conducted HF field | IEC/EN 61000-4-6 Level 3 & IEC 60255-22-6 | 0.15 - 80 MHz, 10 Vemf |
| Emitted HF field | IEC/EN 61000-4-3 Level 3 & IEC 60255-22-3 | 80-2700 MHz, 10 V/m |
| Voltage alternative component | IEC/EN 61000-4-17 | 15 % of operating voltage (DC) / 10 min |
| Voltage dips | IEC/EN 61000-4-29 & IEC/EN 61000-4-11 | 30 % / 1 s, 60 % / 0.1 s, 100 % / 0.05 s |
| Voltage short interruptions | IEC/EN 61000-4-29 & IEC/EN 61000-4-11 | 30 % / 10 ms, 100% / 10 ms, 60 % / 100 ms 100 % / 5000 ms |
| Power-frequency magnetic field | IEC/EN 61000-4-8 | 300 A/m (continuous), 1000 A/m 1-3 s |
| Pulse magnetic field | IEC/EN 61000-4-9 Level 5 | 1000 A/m, 1.2/50 μs |

Electrical safety tests

| | Standard & Test class / level | Test value |
|-------------------------------|---|------------------------|
| Impulse voltage withstand | IEC/EN 60255-27 & EN 60255-5, Class III | 5 kV, 1.2/50 μs, 0.5 J |
| Dielectric test | IEC/EN 60255-27 & EN 60255-5, Class III | 2 kV, 50 Hz |
| Insulation resistance | IEC/EN 60255-27 & EN 60255-5 | |
| Protective bonding resistance | IEC/EN 60255-27 | |
| Power supply burden | IEC/EN 60255-1 | |

Mechanical tests

| | Standard & Test class / level | Test value |
|----------------------------|--|--|
| Device in operation | | |
| Vibrations | IEC 60255-21-1, Class II/ IEC 60068-2-6, Fc | 1 Gn, 10 Hz – 150 HZ |
| Shocks | IEC 60255-21-2, Class II/ IEC 60068-2-27, Ea | 10 Gn/11 ms |
| Seismic | IEC 60255-21-3 Method A, Class II | 2 G horizontal / 1 G vertical , 1 Hz-35 Hz |
| Device de-energized | | |
| Vibrations | IEC 60255-21-1, Class II/ IEC 60068-2-6, Fc | 2 Gn, 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

| | Standard & Test class / level | Test value |
|----------------------------|-------------------------------|---|
| Device in operation | | |
| Dry heat | EN/IEC 60068-2-2, Bd | +65°C (149°F) |
| Cold | EN/IEC 60068-2-1, Ad | -40°C (-40°F) |
| Damp heat, cyclic | EN / IEC 60068-2-30, Db | <ul style="list-style-type: none"> • From 25°C (77°F) to 55°C (131°F) • From 93% RH to 98% RH • Testing duration: 6 days |
| Damp heat, static | EN/IEC 60068-2-78, Cab | <ul style="list-style-type: none"> • 40°C (104°F) • 93% RH • Testing duration: 10 days |
| Device in storage | | |
| Dry heat | EN / IEC 60068-2-2, Bb | +70°C (158°F) |
| Cold | EN / IEC 60068-2-1, Ad | -40°C (-40°F) |

Environmental conditions

| | Standard & Test class / level |
|---------------------------------|--------------------------------|
| Ambient temperature, in-service | -40-60°C (-40-140°F) |
| Ambient temperature, storage | -40-70°C (-40-158°F) |
| Relative humidity | < 95%, no condensation allowed |
| Maximum operating altitude | 2000 m (6561.68 ft) |

Casing

| | Standard & Test class / level |
|----------------------------------|--|
| Degree of protection (IEC 60529) | IP54 Front panel, IP20 rear side |
| Dimensions (W x H x D) | 165 x 165 x 200 mm / 6.49 x 6.49 x 7.87 in |
| Weight | 2.5 kg (5.519 lb) |

Package

| | Standard & Test class / level |
|---------------------------------------|--|
| Dimensions (W x H x D) | 260 x 210 x 300 mm / 10.23 x 8.26 x 11.81 in |
| Weight (Terminal, Package and Manual) | 3.2 kg (7.054 lb) |



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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