

Universal Overcurrent Protection Relay

VAMP 11F

Technical Manual ref no:	V11F/EN M v 3.1
Safety Guide ref no:	SFTY/5L M/J11-S
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Quick Start

THIS DOCUMENT DOES NOT REPLACE TECHNICAL MANUAL AND SAFETY GUIDE.

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PLEASE NOTE:



Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. Personnel should have skills and knowledge related to the construction and operation of electrical equipment and the installation, and has received safety training to recognize and avoid the hazards involved. No responsibility of Schneider Electric for any consequences arising out of the use of this equipment and associated references.



Before carrying out any work on the equipment, the user should be familiar with the contents of the safety guide SFTY/5L M/J11-S or later issue, or the safety and technical data section of the technical manual and also the ratings on the equipment rating label.

For safety reasons, no work must be carried out on the V11F until all power sources to the unit have been disconnected.



During testing of relay operation time, the injection current must be two times greater than the set value.

1. RECEIPT OF RELAYS

Upon receipt, relays should be examined immediately to ensure no external damage has been sustained in transit. If damage has been sustained, a claim should be made to the transport contractor and Schneider Electric Energy should be promptly notified.

Relays that are supplied unmounted and not intended for immediate installation should be returned to their protective polythene bags and delivery cartons. Section 3 of Installation Manual (Technical Manual V11F/EN M) gives more information about the storage of relays.

2. HANDLING OF ELECTRONIC EQUIPMENT

A person's normal movements can easily generate electrostatic potentials of several thousand volts. Discharge of these voltages into semi-conductor devices, when handling electronic circuits, can cause serious damage that, although not always immediately apparent can reduce the reliability of the circuit. The relay's electronic circuits are protected from electrostatic discharge when housed in the case. Do not expose them to risk by removing the front panel or printed circuit boards unnecessarily.

Each printed circuit board incorporates the highest practicable protection for its semi-conductor devices. However, if it becomes necessary to remove a printed circuit board, the following precautions should be taken to preserve the high reliability and long life for which the relay has been designed and manufactured.

Before removing a printed circuit board, ensure that you are at the same electrostatic potential as the equipment by touching the case.

Handle analog input modules by the front panel, frame or edges of the circuit boards. Printed circuit boards should only be handled by their edges. Avoid touching the electronic components, printed circuit tracks or connectors.

Do not pass the module to another person without first ensuring you are both at the same electrostatic potential. Equipotential might be achieved by shaking hands, for instance.

Place the module on an anti-static surface or on a conducting surface that is at the same potential as you.

If it is necessary to store or transport printed circuit boards removed from the case, place them individually in electrically conducting anti-static bags.

In the unlikely event that you are making measurements on the internal electronic circuitry of a relay in service, it is preferable that you are earthed to the case with a conductive wrist strap. Wrist straps should have a resistance to ground between 500 k Ω and 10 M Ω . If a wrist strap is not available you should maintain regular contact with the case to prevent a build-up of electrostatic potential. Instrumentation which may be used for making measurements should also be earthed to the case whenever possible.

More information on safe working procedures for all electronic equipment can be found in BS EN 100015: Part 1:1992. It is strongly recommended that detailed investigations on electronic circuitry or modification work should be carried out in a special handling area such as described in the British Standard document (BS EN 100015: Part 1:1992).

3. STORAGE

If relays are not to be installed immediately upon receipt, they should be stored in a place free from dust and moisture in their original cartons. Where de-humidifier bags have been included in the packing they should be retained.

Care should be taken on subsequent unpacking that any dust, which has collected on the carton, does not fall inside. In locations of high humidity the carton and packing may become impregnated with moisture and the de-humidifier crystals will lose their efficiency.

Prior to installation, relays should be stored at a temperature of between -25°C to $+70^{\circ}\text{C}$ (-13°F to $+158^{\circ}\text{F}$).

4. UNPACKING

Care must be taken when unpacking and installing the relays so that none of the parts are damaged and additional components are not accidentally left in the packing or lost. Ensure that Safety Guide is not missing as it should accompany the relay to the substation.

Relays must only be handled by qualified persons.

The site, where the relay is unpacked, should be well lit, clean, dry and reasonably free from dust and excessive vibration.

5. RELAY MOUNTING

Individual relays are normally supplied with an outline diagram showing the dimensions. This information can also be found in the product publication.

The relays are designed for indoor use only and can be flush or wall mounted (option available with use of optional Wall Mounting Case Adaptor - ordering number: REL10030).

5.1 Flush mounted relay

Make a cut-out in mounting plate as per Figure 1. Insert the relay into the cut-out. Fit the fastener elements into the slots in the sides of the housing, and keep turning the fastening screws until the relay is securely fixed to the plate.

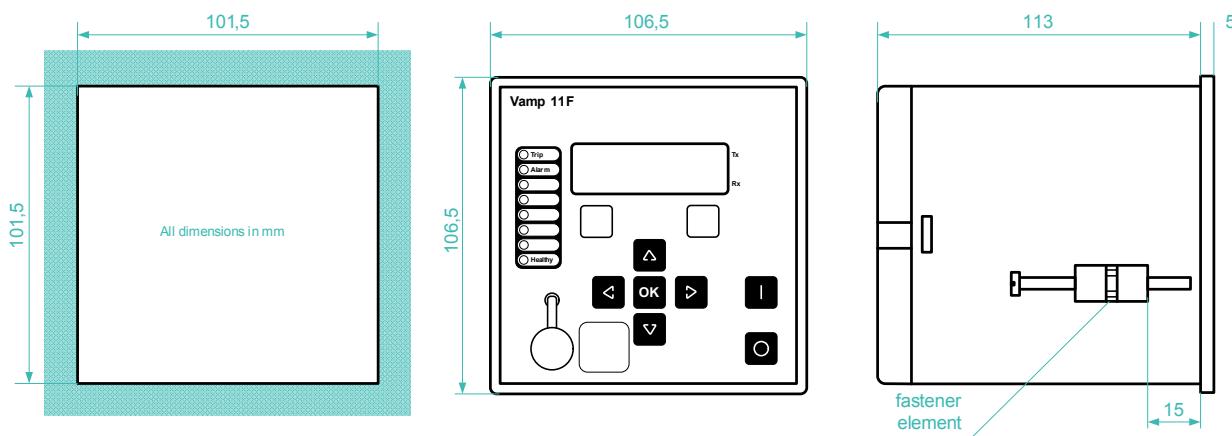


Figure 1. V11F Dimensions

To remove the relay undo the screws, so that the fastening element could be taken out, and then the relay could be withdrawn from the cut-out in the mounting plate.

Relays can be equipped with additional transparent (see-through) front cover (safeguard cover) from unauthorised access (option available on request, ordering number: REL10031, Figure 2).

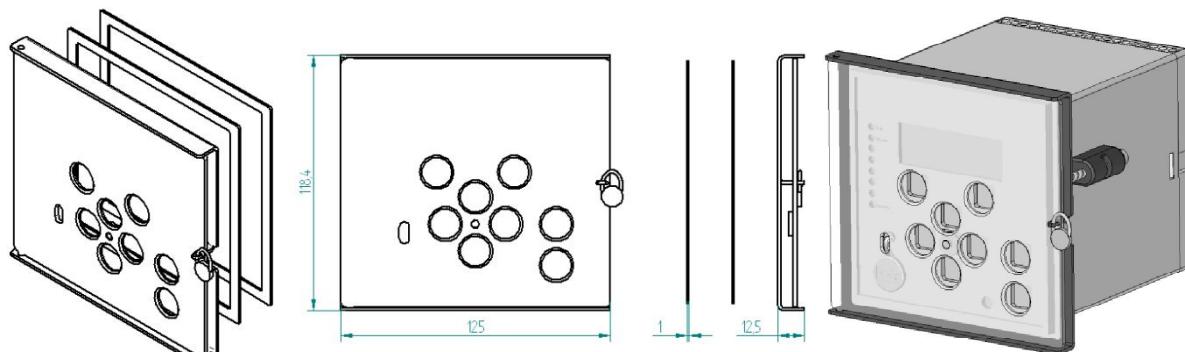


Figure 2. Front panel cover

The cover consists of front panel with frame and 2 seals. The cover can be locked with lead seal. It is dedicated to flush mounted relay.

5.2 Wall mounted relay

Flush mounting case of V11F can be mounted on the wall by using optional Wall Mounting Case Adaptor (Figure 3).

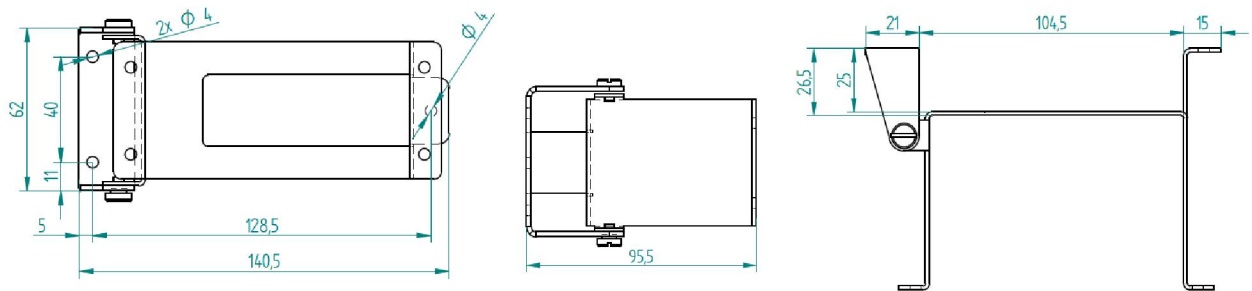


Figure 3. V11F Wall Mounting Case Adaptor Dimensions

Tighten the Adaptor Case in the required place with four M5 screws or equivalent. Then insert the relay into wall mounting adaptor. Fit fastener elements into the slots in the sides of the housing, and keep turning the fastening screws until the relay is securely fixed to the wall mounting adaptor (Figure 4).

The adaptor is of a swing type to enable easy access for relay wiring.

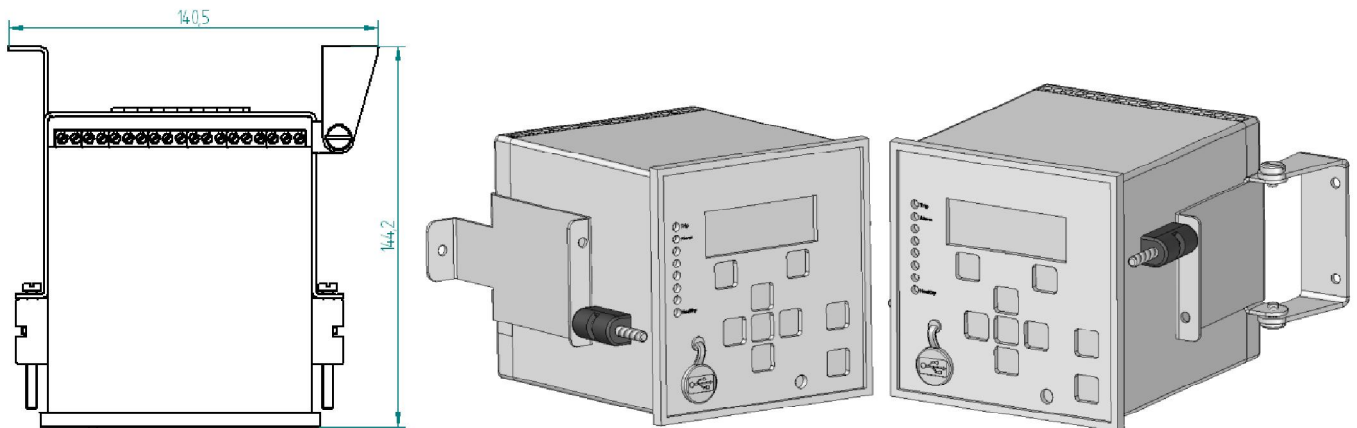


Figure 4. Wall Mounting Case Adaptor with fastener element

To remove the relay undo the screws, so that the fastening element could be taken out, and then the relay could be withdrawn from the wall mounting adaptor.

6. RELAY WIRING



Before carrying out any work on the equipment, the user should be familiar with the contents of the safety guide SFTY/5L M/E11-S or later issue, or the safety and technical data section of the technical manual and also the ratings on the equipment rating label. For safety reasons, no work must be carried out on the V11F until all power sources to the unit have been disconnected.

The measuring current inputs of the V11F should be connected to the secondary wires of the power system CTs as shown in the connection diagrams in section 9 "External Connection Diagrams" of this document.

It is important to check whether the VAMP 11F relay is adapted to a given CT. Calculation methods for CT requirements are defined in details in section 3 of Application Notes (Technical Manual V11F/EN M).

To guarantee good accuracy at low current levels, the magnetizing current of the CT must be low (i.e. the input voltage of the relay must be sufficiently low compared with the knee-point voltage V_k of the CT).

The characteristics of a protection relay CT are based on:

- Its rated output burden expressed in VA, its relevant accuracy class (5P or 10P) and the accuracy limit current (5 In, 10 In, 15 In, 20 In). The accuracy limit factor is the ratio between the precision limit current and the nominal current rating.
- Naturally, the transformation ratio of the CT is to be added to this. This ratio is the ratio of the primary current to the secondary current. The secondary current rating is generally 1 A or 5 A.
- Other characteristics such as the insulating voltage or the thermal behaviour are also taken into account.

6.1 Terminal Block

AC Voltage Input Terminals - threaded M3 screw-type plug-in terminals, with wire protection for conductor cross-section:

(i) 0.2 - 6 mm² single-core

(ii) 0.2 - 4 mm² finely stranded

General Input/Output Terminals – (power supply, binary and contact inputs, output contacts and COM for rear communications) threaded M3 screw-type plug-in terminals, with wire protection for conductor cross-section:

(i) 0.2 - 4 mm² single-core

(ii) 0.2 - 2.5 mm² finely stranded



Connections to the equipment must only be made using single strand wire or stranded wire with the use of insulated crimp terminals to maintain insulation requirements.

Use of standard ratings of between 6 A and 16 A is recommended. Low voltage fuse links, rated at 250 V minimum and compliant with IEC 60269-2 general application type gG, with high rupturing capacity are acceptable.

Below recommendation for advisory limits on relays connected per fused spur. This applies to the MiCOM V11F, as these have inrush current limitation on switch-on, to conserve the fuse-link.

Maximum Number of V11F Relays Recommended Per Fuse

Battery Nominal Voltage	6 A	10 A	15 or 16 A Fuse	Fuse Rating > 16 A
24 to 60 Vac/dc	2	4	6	Not permitted
90 to 240 Vac/ 90 to 250 Vdc	6	10	16	Not permitted

Alternatively, miniature circuit breakers (MCB) may be used to protect the auxiliary supply circuits.

The protective fuse(s) should be located as close to the unit as possible.

6.2 USB Port

Connection to the USB port can be made by means of an USB cable (refers to A, B, E, N models). The USB port allows the user to download settings or fault records from the V11F or change I/O configuration.

Note: Model N is not supplied via USB port.

To access this port it is necessary to remove the cover plate on the V11F front panel.

A typical cable should be of USB 2 type (minimum 1P*28AWG/2C*24AWG, max length 2m) with connectors: PC ⇔ A male type V11F ⇔ mini B 5-pin male type.

Communication software: MiCOM S1 Studio (5.1.0 or higher). The virtual COM port for USB communications should be set in as follows:

Address: 1
 Baud rate: 115 200 bits/s
 Data bit: 8
 Stop bit: 1
 Parity: None

6.3 Rear Communications Port (in Model L optional)

Standard: signal levels, two wire EIA(RS)485. RS485 connections located on A18-A19 terminals, M3 screw.

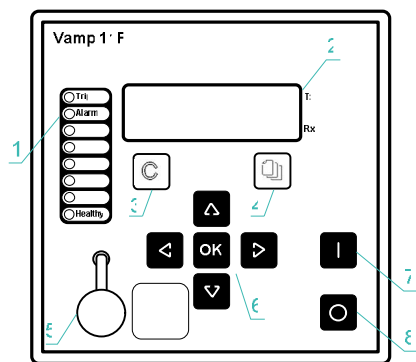


Please note! Applying accidentally voltage $\geq 5V$ to A18-A19 terminals results in permanent damage of RS485.

Recommended distance for multi-endpoint link: $\leq 100m$. Screened twisted pair cable to be bridged. For Modbus RTU or IEC-103 protocol; Isolation to SELV level.

7. Local HMI

V11F has 8 LED indicators on the front panel (Figure 5). Two LEDs are on fixed position: 1st from the top - Trip (red colour) and 1st from the bottom - Healthy (green colour). Alarm LED (yellow colour) is described by default on 2nd position from the top but can be redefined (as it is not configured by default).












- 1 – LED indicators
- 2 – LCD
- 3 – Cancel push-button
- 4 – Read push-button
- 5 – USB port for local connection
- 6 – Navigation push-buttons
- 7, 8 – Control push-buttons

Figure 5. V11F front panel

The LCD informs the user about settings, measurements & faults with a pull-down menu structure allowing easy and quick access to any data.

Push-buttons available on the front panel:

-  enter
-  (up)  (down)  (left)  (right) navigation push-bottoms used for navigation within V11F menu
-  cancel push-button used for cancelling, and reset of latched LED indicators and relay output
-  read push-button used to move to records (fault alarms, ect.)
-  CB close
-  CB open

For user convenience there is a self-adhesive pocket for LED captions. The pocket is delivered together with replay (Figure 6).

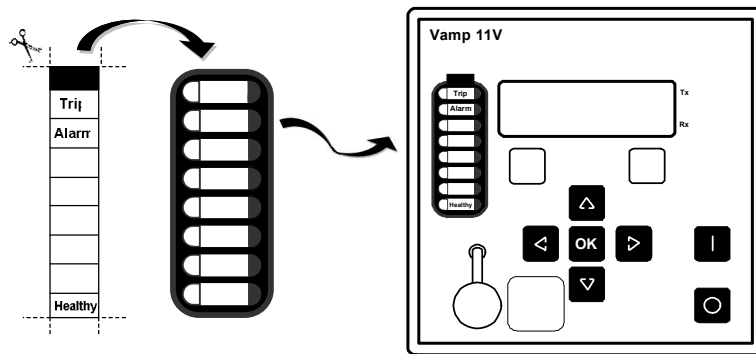


Figure 6. Pocket for LED captions

The caption template can be printed based on file available on web site: www.m.vamp.fi

V11F is configurable from HMI menu by using navigation push-buttons. Figure 7 shows configuration of the relay based on the example of overvoltage protection function. In order to configure correctly this function, the parameters in the three columns of the menu must be set. Below please find the details.

Within main menu, look for **GLOBAL SETTINGS** column by using navigation push-buttons: and . Than go to global settings sub-menu by pressing . Next look for **CT RATIO** cell, enter the column by using . In **Line CT primary** and **Line CT Sec** cells set the nominal current values for primary and secondary side of CT. For example to change the value of **Line CT primary** it is necessary to press (the LEDs from 3 to 8 flash one by one – it means that relay is in edit mode) than by using and set the required value of primary side. Apply the settings by pressing . Similarly proceed with **Line CT Sec** cell.

Each time when it is required to go back to main menu, press several times

From the main menu by using and look for **SETTING GROUP 1** tab. Go to the sub-menu by pressing and choose **PROTECTION G1** column. Go to sub-menu **PHASE O/C G1 [50/51]** by pressing . In this column it is possible to set the following settings: **|>?** – operating mode (with logic or/and, with/ without CB status), **|>Threshold** – threshold value, **Delay Type |>** – delay type (DMT, IDMT), **tL>** – delay time or TMS/TD value, **Reset Delay Type** –reset/realise characteristic type (DMT, IDMT), **DMT tReset** – reset time or RTD/RTMS value.

With so set relay it remains to assign trip signal to any relay output dedicated in configuration for sending the trip signal to CB coil. In order to do this choose from menu **SETTING GROUP 1** tab and go to sub-menu **OUTPUT RELAYS CONFIGURATION G1**. In **Protect. Trip** cell assign general trip commend to any relay output, for example RL1.

For final approval of relay settings press combination of two push-buttons: and and then .

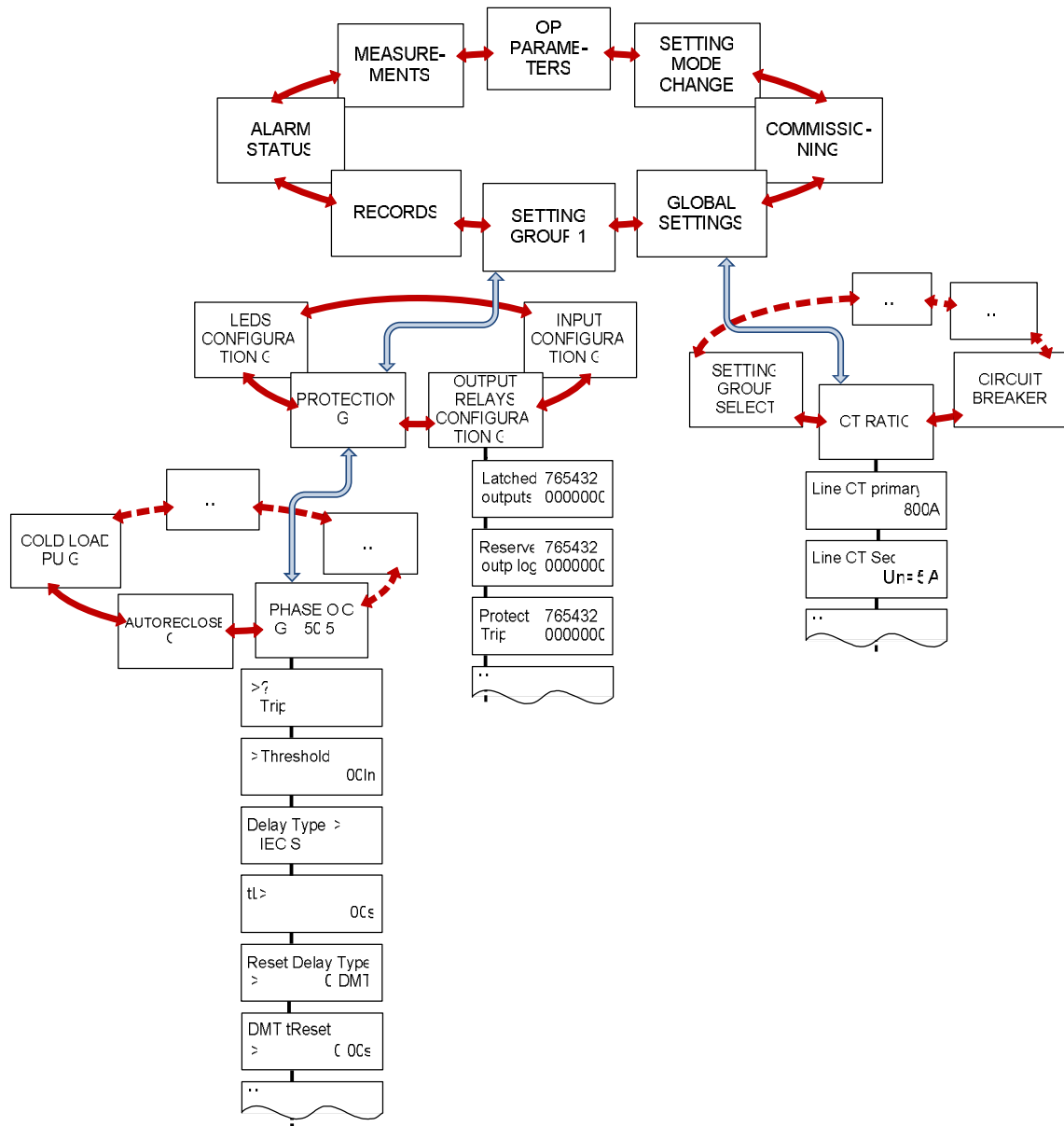


Figure 7. V11F partial menu structure (NAVIGATION MENU)

8. MiCOM S1 Studio 5.1.0 (or newer) at glance

MiCOM S1 Studio is software tool for setting and configuring the VAMP replay. The program has a graphical interface, and the created documents can be saved and printed out for later use.

The latest MiCOM S1 Studio can be downloaded from WEB site: www.schneider-electric.com. Software includes all drivers therefore no additional action is needed.

To use the software, you need PC with Windows XP (or newer) operating system installed, experience in using the Windows operating system, USB cable. Communications can be established between a PC and a device fitted with a USB port (Figure 8).



Before connection cable to USB socket it is necessary discharge static electricity from the body by touching a metal grounded object (such as an unpainted metal surface) to prevent against ESD damage.

This section is intended as a quick start to using the software and assumes that the user have a copy of software installed on PC. For more detailed information one have to refer to User Manuals MiCOM S1 Studio – step by step” www.schneider-electric.com

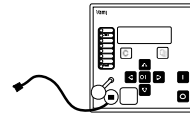
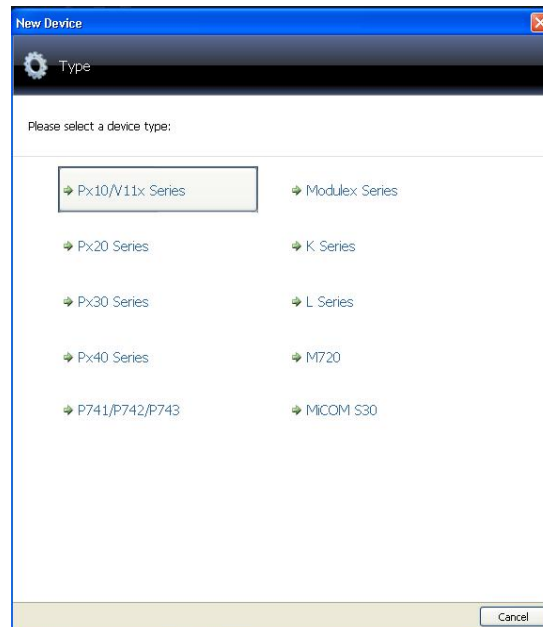


Figure 8. Connection relay to PC

For proper operation of the software, please install only appropriate data models. For this purpose, you must use an application Data Model Manager, which is available in the installation folder (MiCOM S1 Studio/Data Model Manager). You should only download these data models that are needed. Downloading too many databases will result in slowing down the installation process and start of the program.

To start Quick Connection of MiCOM S1 Studio, click on Start icon and select Schneider Electric MiCOM S1Studio form programs. Quick Connect button at the top left of the application's window and select Px10/V11x Series from the presented options:



To create the structure of the system and start working with devices, you must choose New System from File menu. The system will be visible in the Explorer window. The name of the system you can change depending on your needs and create the structure of the station (options available with right mouse button click).

Devices can be added in off- and on-line mode. In off-line mode one creates a system configuration without having to connect to the relay. In on-line mode one must connect cable with PC security with MiCOM S1 Studio.

Please keep in mind to set language options at the beginning of the work with the software.

When needed, you can add a new file to factory settings or download the file from the device (click right mouse button on the node settings). The program creates an archives with setting changes by adding another to the list under a new name (000, 001, etc.). There is a possibility of files conversion to another data model within the same device type.

Before reading the measurements you need to create a new file (measurements node, new file option). In the dialog window, measuring parameters should be defined (read/cycle/clear).

The program also allows to read events and disturbances. This option is available when you select the Download event files in a Event node. Each file is saved with the name you defined as the date and time. Records can be downloaded by selecting the Download records interference at node Records. You can also upload all the data (settings, events, disturbances) through an option Retrieve all entries.

There is possibility to control the relay from program level with Control the IED command (select option on relay node).

9. EXTERNAL CONNECTION DIAGRAMS

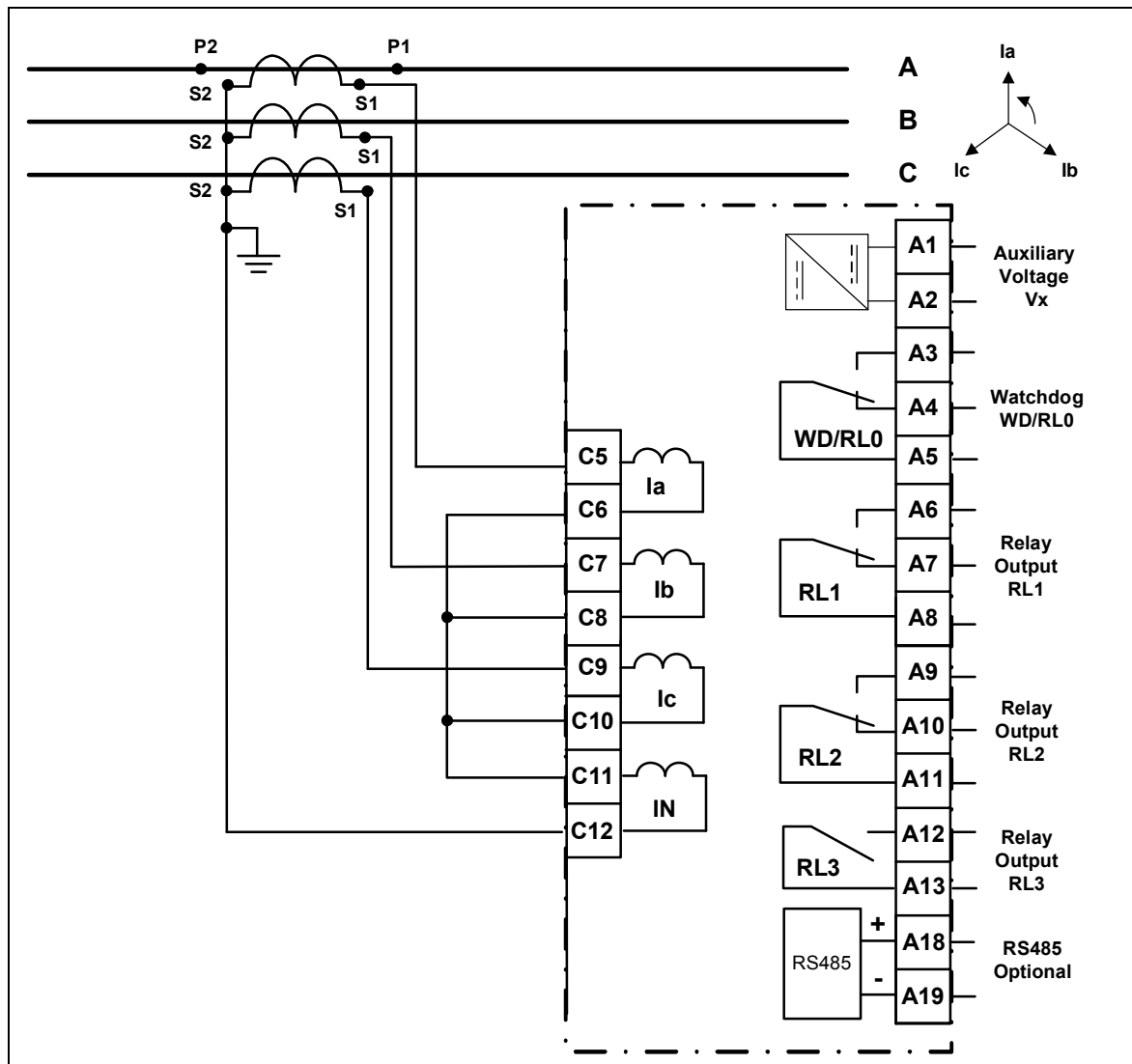


Figure 9. Model L

List of functions available in L model:

IEEE/ANSI Code	IEC Symbol	Function name
50BF	I<, IN<	Circuit breaker failure
50/51	I>, I>>, I>>>	Three-phase non directional overcurrent 3 independent thresholds (20 groups of IDMT curves)
		Cold Load Pick-Up
50N/51N	IN>, IN>>	Phase-earth non directional overcurrent 2 independent thresholds (20 groups of IDMT curves)
86		Output relay latching

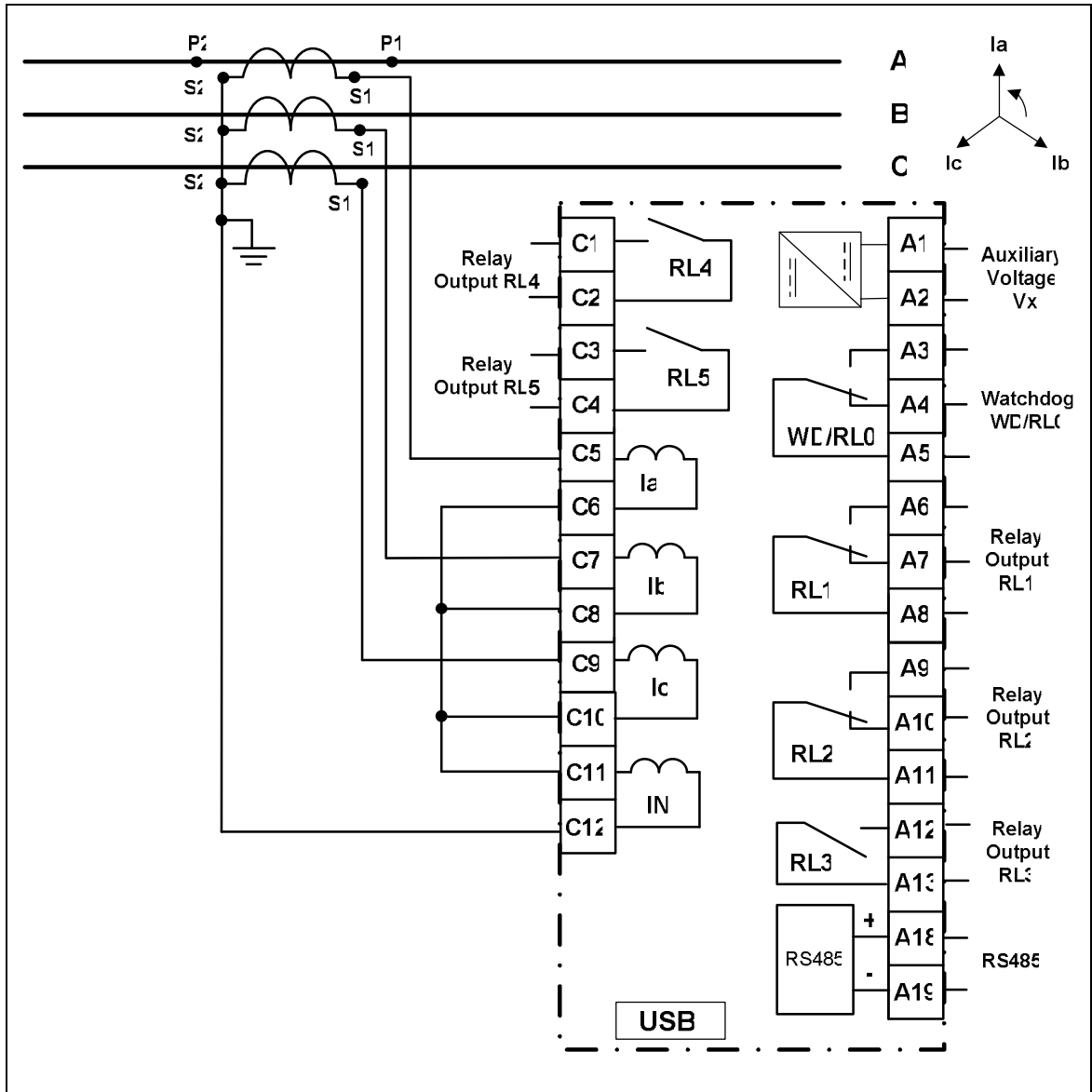


Figure 10. Model N

List of functions available in N model:

IEEE/ANSI Code	IEC Symbol	Function name
49	ltherm	Thermal overload (true RMS) 2 independent thresholds (Alarm, Trip)
50BF	I<, IN<	Circuit breaker failure
50/51	I>, I>>, I>>>	Three-phase non directional overcurrent 3 independent thresholds (20 groups of IDMT curves)
		Cold Load Pick-Up
50N/51N	IN>, IN>>	Phase-earth non directional overcurrent 2 independent thresholds (20 groups of IDMT curves)
86		Output relay latching

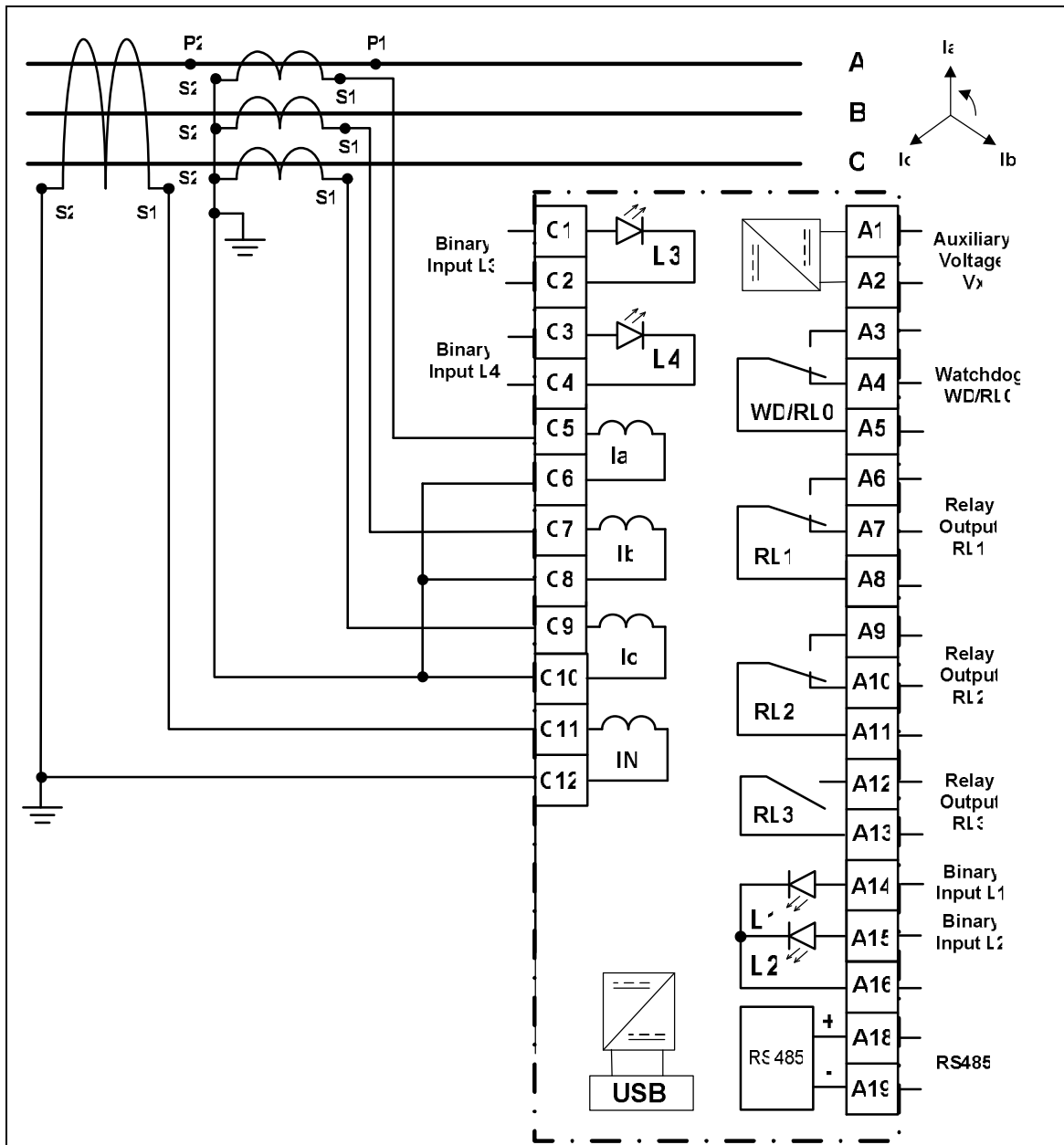


Figure 11. Model B

List of functions available in B model:

IEEE/ANSI Code	IEC Symbol	Function name
49	I _{therm}	Thermal overload (true RMS) 2 independent thresholds (Alarm, Trip)
50BF	I _{<} , I _{N<}	Circuit breaker failure
50/51	I _{>} , I _{>>} , I _{>>>}	Three-phase non directional overcurrent 3 independent thresholds (20 groups of IDMT curves)
		Switch on to fault (SOTF)
		Blocking logic
		Cold Load Pick-Up
50N/51N	I _{N>} , I _{N>>}	Phase-earth non directional overcurrent 2 independent thresholds (20 groups of IDMT curves)
86		Output relay latching

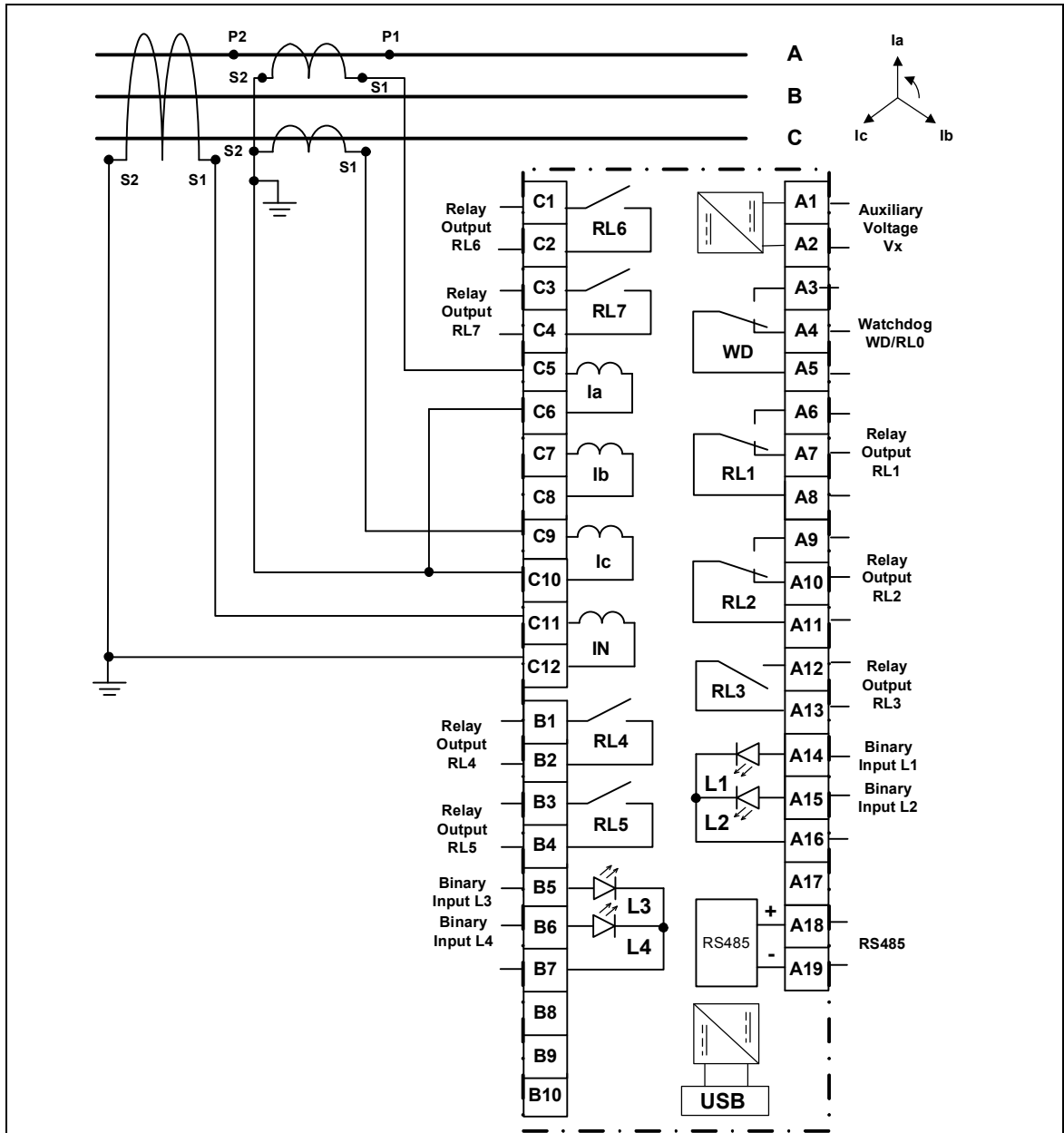


Figure 12. Model A

List of functions available in A model:

IEEE/ANSI Code	IEC Symbol	Function name
49	ltherm	Thermal overload (true RMS) 2 independent thresholds (Alarm, Trip)
50BF	I<, IN<	Circuit breaker failure
50/51	I>, I>>, I>>>	Three-phase non directional overcurrent 3 independent thresholds (20 groups of IDMT curves)
		Switch on to fault (SOTF)
		Inrush blocking
		Blocking logic
50N/51N	IN>, IN>>	Cold Load Pick-Up
		Phase-earth non directional overcurrent 2 independent thresholds (20 groups of IDMT curves)
86		Output relay latching
		Circuit breaker supervision
		Trip circuit supervision

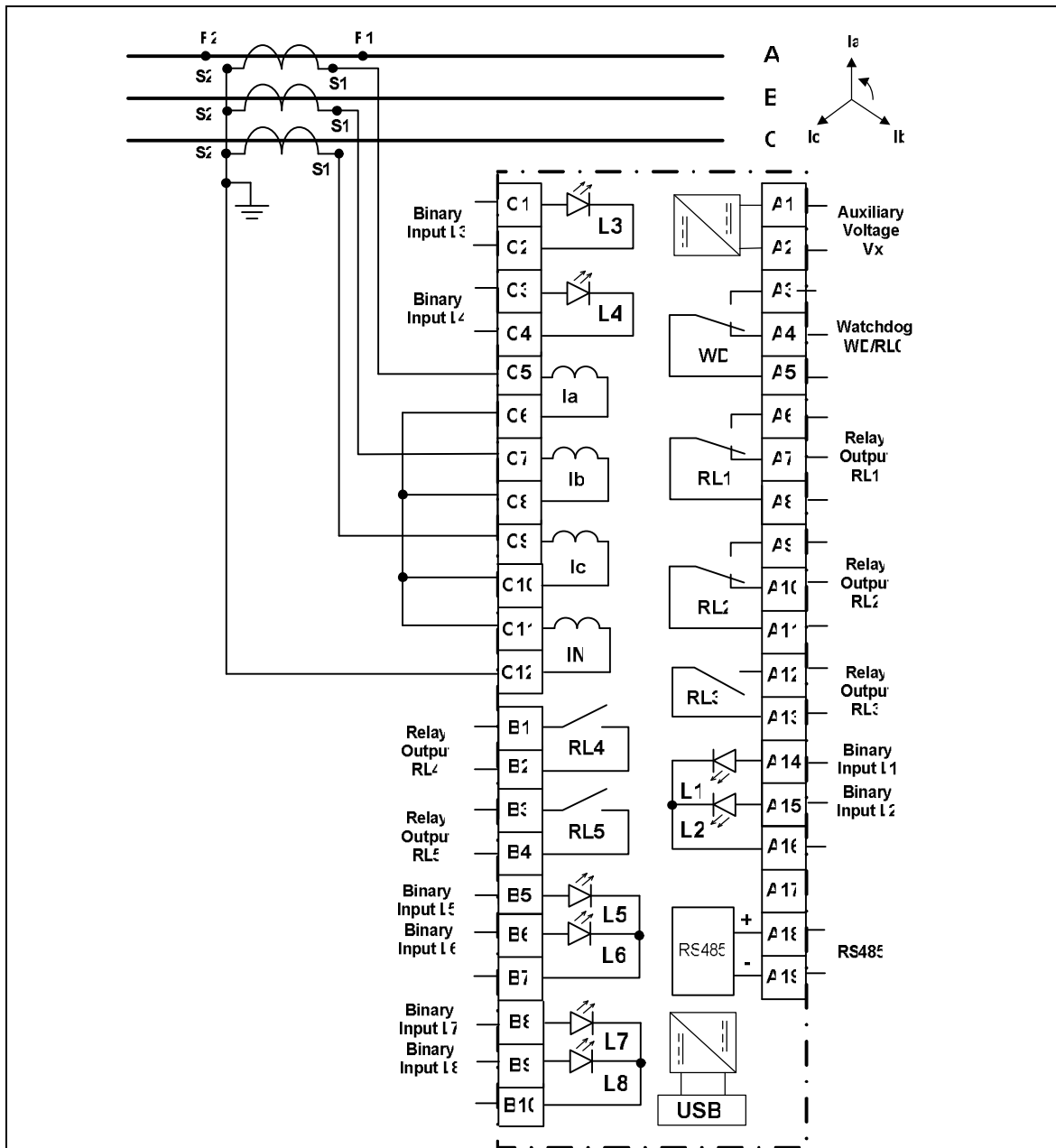


Figure 13. Model E

List of functions available in E model:

IEEE/ANSI Code	IEC Symbol	Function name
49	ltherm	Thermal overload (true RMS) 2 independent thresholds (Alarm, Trip)
50BF	I<, IN<	Circuit breaker failure
50/51	I>, I>>, I>>>	Three-phase non directional overcurrent 3 independent thresholds (20 groups of IDMT curves)
		Switch on to fault (SOTF)
		Inrush blocking
		Selective relay scheme logic
		Blocking logic
50N/51N	IN>, IN>>, IN>>>	Phase-earth non directional overcurrent 3 independent thresholds (20 groups of IDMT curves)
46	Is2>	Negative phase sequence overcurrent
46BC	Is2/Is1>	Broken conductor detection (I2 / I1)

79		Auto reclose (4 shots)
86		Output relay latching
		Circuit breaker supervision
		Trip circuit supervision

10. ORDERING CODES

Model L: 4 binary outputs, without binary inputs and communication

Cortec no.	Ion	Vx	Catalogue no.
V11FL1N0N92N0NN11N	Ion = 1A/5A ; (0.01-2)Ion	Vx = 24-240Vac/250Vdc	REL10000V
V11FL1N3N92N0NN11N	Ion = 1A/5A ; (0.05-12)Ion	Vx = 24-240Vac/250Vdc	REL10001V

Model L: 4 binary outputs, without binary inputs, rear RS485 port included

Cortec no.	Ion	Vx	Catalogue no.
V11FL1N0N92N1NN11N	Ion = 1A/5A ; (0.01-2)Ion	Vx = 24-240Vac/250Vdc	REL10002V
V11FL1N3N92N1NN11N	Ion = 1A/5A ; (0.05-12)Ion	Vx = 24-240Vac/250Vdc	REL10003V

Model N: 6 binary outputs, without binary inputs, rear RS485 and front USB port

Cortec no.	Ion	Vx	Catalogue no.
V11FN1N0N92N1NN11N	Ion = 1A/5A ; (0.01-2)Ion	Vx = 24-240Vac/250Vdc	REL10020V
V11FN1N3N92N1NN11N	Ion = 1A/5A ; (0.05-12)Ion	Vx = 24-240Vac/250Vdc	REL10021V

Model B: 4 binary inputs; 4 binary outputs, rear RS485 and front USB port including powering

Cortec no.	Ion	Vx	Catalogue no.
V11FB1N0N91N1NN11N	Ion = 1A/5A ; (0.01-2)Ion	Vx = 24-60Vac/Vdc	REL10040V
V11FB1N0N92N1NN11N	Ion = 1A/5A ; (0.01-2)Ion	Vx = 90-240Vac/250Vdc	REL10041V
V11FB1N3N91N1NN11N	Ion = 1A/5A ; (0.05-12)Ion	Vx = 24-60Vac/Vdc	REL10042V
V11FB1N3N92N1NN11N	Ion = 1A/5A ; (0.05-12)Ion	Vx = 90-240Vac/250Vdc	REL10043V

Model A: 4 binary inputs, 8 binary outputs, rear RS485, front USB with powering, disturbance recorder

Cortec no.	Ion	Vx	Catalogue no.
V11FA1N0N91N1NN11N	Ion = 1A/5A ; (0.01-2)Ion	Vx = 24-60Vac/Vdc	REL10010V
V11FA1N0N92N1NN11N	Ion = 1A/5A ; (0.01-2)Ion	Vx = 90-240Vac/250Vdc	REL10011V
V11FA1N3N91N1NN11N	Ion = 1A/5A ; (0.05-12)Ion	Vx = 24-60Vac/Vdc	REL10012V
V11FA1N3N92N1NN11N	Ion = 1A/5A ; (0.05-12)Ion	Vx = 90-240Vac/250Vdc	REL10013V

Model E: 8 binary inputs; 6 binary outputs, rear RS485, front USB with powering, disturbance rec., auto reclose

Cortec no.	Ion	Vx	Catalogue no.
V11FE1N0N91N1NN11N	Ion = 1A/5A ; (0.01-2)Ion	Vx = 24-60Vac/Vdc	REL10050V
V11FE1N0N92N1NN11N	Ion = 1A/5A ; (0.01-2)Ion	Vx = 90-240Vac/250Vdc	REL10051V
V11FE1N3N91N1NN11N	Ion = 1A/5A ; (0.05-12)Ion	Vx = 24-60Vac/Vdc	REL10052V
V11FE1N3N92N1NN11N	Ion = 1A/5A ; (0.05-12)Ion	Vx = 90-240Vac/250Vdc	REL10053V

Accessories for V11 series

Type	Catalogue no.
Adapter for V11 standard flush mounting case to allow mounting on the wall	REL10030
Front cover with sealing for V11 standard case preventing from unauthorised access	REL10031



Customers Care Center

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