

VPhase VX1 Installation Instructions

This product must be installed by a competent person in accordance with the 17th Edition or later IEE Wiring Regulations (BS 7671) and Building Regulations. Ensure the electrical supply is disconnected before installation or removing the cover.



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1 Product Description

The VPhase VX1 *Smart Voltage Management* device is designed for use in domestic and light commercial environments. The VX1 is designed to be fed from the consumer unit (fuse box) at the property and the output is fed back to a group of circuits within the same consumer unit (The regulated circuits). The unit is not for any other purpose or type of installation other than that defined in this document.

2 Warning

IT MUST BE NOTED THAT ONCE INSTALLED, THE UNIT HAS A LIVE (230V) MAINS SUPPLY INSIDE THE DEVICE. THIS 230V MAINS SUPPLY COULD BE LIVE, IRRESPECTIVE OF ANY INDICATOR LAMP STATUS. THE COVER MUST NOT BE REMOVED UNTIL THE VX1 SUPPLY IS ISOLATED AT THE CONSUMER UNIT.

3 Safety

Extreme care must be taken when working with any electrical equipment. All relevant supplies **must** be isolated before commencing work.

The VX1 **must** be installed by a competent and qualified electrician.

The VX1 **must** be installed in accordance with current national legislation, guidance or codes of practice. In the UK the 17th Edition Wiring Regulations BS7671 is the current standard.

The VX1 is maintenance free. There are **no** user serviceable parts in the VX1.

In a domestic installation the VX1 device **must** be fed from a supply that is protected by a 100A (or lower) rated fuse link complying with Type II of BS1361.

In a commercial installation the VX1 device **must** be fed from a supply that is protected by a BS60269 100A fuse link.

4 Introduction

The VPhase VX1 is a Smart Voltage Management Device. The VX1 reduces and regulates the voltage supplied to appropriate circuits, to a set level of 220V, a level where many devices operate more efficiently. The VX1 is designed to be connected to the consumer unit (fuse box) in the property and wired to supply the appropriate circuits where energy savings can be made.

VX1 is thermally controlled. During periods of high continuous load VX1 will switch into by-pass mode and voltage reduction and regulation will cease. Voltage regulation will restart automatically when the load current reduces. The VX1 is designed so that in a typical home the unit rarely enters the by-pass mode ensuring maximum energy saving potential. There are no user operational controls. VX1 starts automatically when the electricity supply is connected and restarts automatically following any supply interruption.

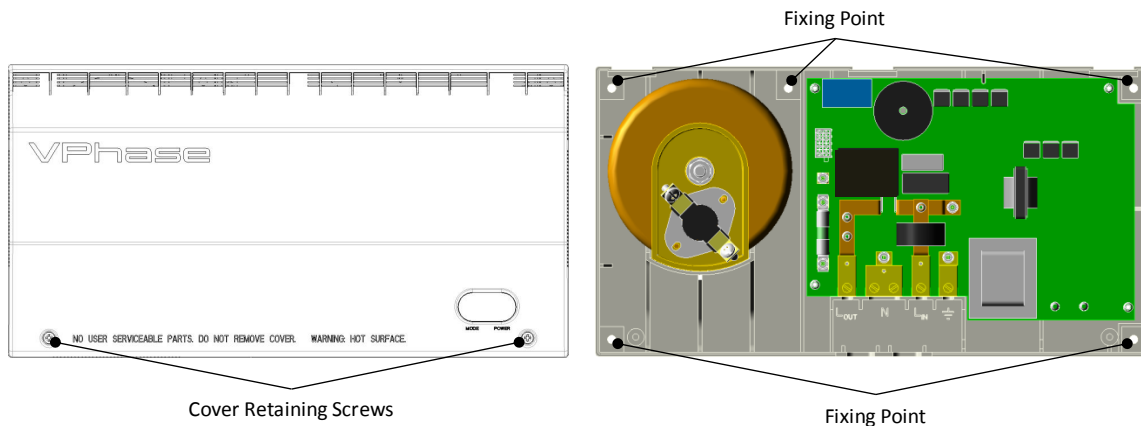
5 Mounting the VX1

Carefully remove the transit packing cardboard from under the heatsink before installation.

The VX1 is designed to be mounted close to the consumer unit orientated in the vertical plane. **The unit must be mounted the correct way up with the cover retaining screws at the bottom.**

It is designed to allow cable runs that may be exiting the consumer unit to run behind the VX1 device if required. **The VX1 should be mounted so that the ventilation grills are not obstructed.**

VX1 has five fixing points that are accessed by first removing the two retaining screws from the top cover and then removing the top cover by hinging the top cover upwards and off. The fixing points are then accessed as shown:



The VX1 is designed to be attached to a level wall or board using No. 8 screws. Care should be taken when mounting the unit so that the components are not damaged. It is recommended to mark the positions of the holes, and then remove the VX1 unit before drilling the wall or board. Do not drill through the VX1 mounting holes. Following installation the cover should be replaced by hooking on the clips and hinging the cover down before securing with the two recessed screws. Take care not to over-tighten the screws.

6 Connection to the Consumer Unit

The VX1 should be fed from a suitably rated MCB in the domestic consumer unit. In addition in a domestic installation the VX1 device must be fed from a supply that is protected upstream (before the consumer unit) by a 100A (or lower) rated fuse link complying with Type II of BS1361. This is the fuse installed by the electricity provider before the electricity meter in a domestic property. In a commercial installation the VX1 device must be fed from a supply that is protected upstream by a BS60269 100A fuse link in addition to the lower rated MCB directly protecting the VX1.

It is recommended that the supply to the VX1 unit is not RCD protected but the regulated circuits fed by the VX1 are protected by RCDs or RCBOs. The VX1 unit can be supplied from a RCD protected circuit if required.

Typically the use of a 50A type B MCB within the consumer unit to protect the supply to VX1 allows cable with a current carrying conductor cross sectional area of 10mm² to be used for both the power supply (Source) and power output (Load) to and from the VX1.

The output of the VX1 unit is fed back to the consumer unit to supply the regulated circuits.

Many appliances used in the home will show energy savings when supplied by the VX1 however there is one class of appliance that will not benefit. Closed loop (thermostatically controlled) heating will show no energy savings and should not be supplied from the VX1.

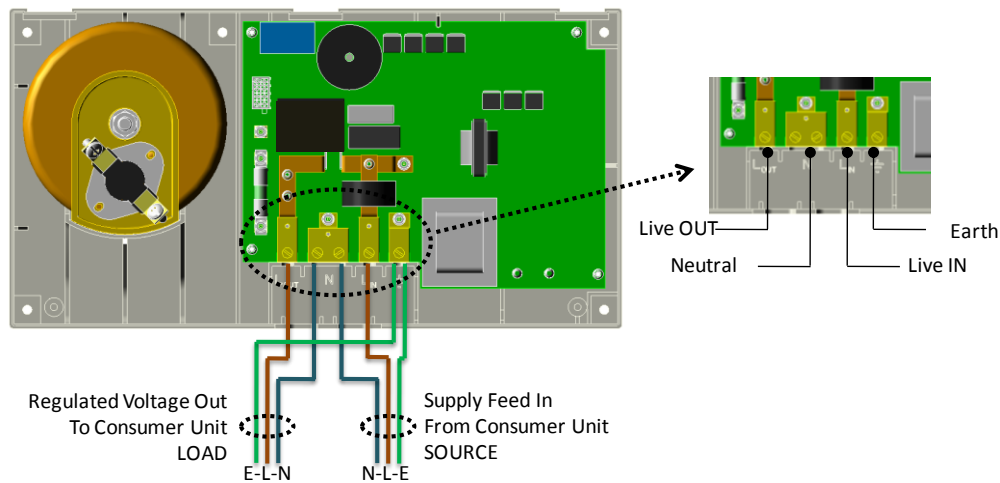
The VX1 must NOT be connected to circuits containing embedded generation, e.g. solar PV or micro-CHP.

<p>Circuits that <u>CAN</u> be connected to the VX1:</p> <ul style="list-style-type: none"> • Socket outlets (Ring and Radial circuits.) • Lighting circuits. • Kitchen circuits. • Dedicated fridge / freezer circuits. • Garage / shed sub distribution circuit. • Alarm circuits. 	<p>Circuits that must <u>NOT</u> be connected to the VX1:</p> <ul style="list-style-type: none"> • Electric shower circuit. • Immersion heater. • Dedicated electric cooker circuit. • Circuits feeding high power tools. • Circuits where individual loads exceeding 13A rating will be connected.
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Example consumer unit configurations are shown in Annex A.

7 Electrical connections

There are separate terminals in the VX1 unit for Source Live IN (L_{IN}), Load Live OUT (L_{OUT}), Neutral (N) and Earth (\perp). The location of the terminals is shown:



8 User Indications

The VX1 has two user indications. A GREEN light is illuminated to show that the VX1 circuit board is functioning. If there is a fault a RED light will illuminate. The RED light also flashes for a brief period when the unit is first turned on. The VX1 is maintenance free. There are no user serviceable parts.

WARNING: IF NO LIGHTS ARE ILLUMINATED, THERE COULD STILL BE MAINS VOLTAGE PRESENT INSIDE THE VX1. ISOLATE THE SUPPLY TO THE VX1 AT THE CONSUMER UNIT BEFORE REMOVING THE COVER.

9 Commissioning the VX1

To avoid false readings, and the risk of damage to the electronics, the VX1 should be isolated before insulation resistance testing is carried out.

The VX1 unit supplies power to circuits via a transformer. You must ensure that the VX1 device is active and regulating before undertaking Earth Loop Impedance Testing. In the active and regulating mode the green light will be on, the red light will be off, the output voltage will be 220V and the input voltage will be higher than 220V.

After completing the installation the supply feed to the VX1 and the VX1 output supplied circuits should be energised in the following sequence:

1. Ensure MCB in the supply to the VX1 and the MCBs protecting VX1 supplied loads are in the OFF position.
2. Switch on the main incoming power isolator at the consumer unit.
3. Switch on the MCB feeding the VX1 input.
4. The RED light on the VX1 will flash for a period. This is normal.
5. **While the RED light is flashing** sequentially switch on the MCBs protecting the regulated circuits supplied by the VX1.
6. Installation is now complete.

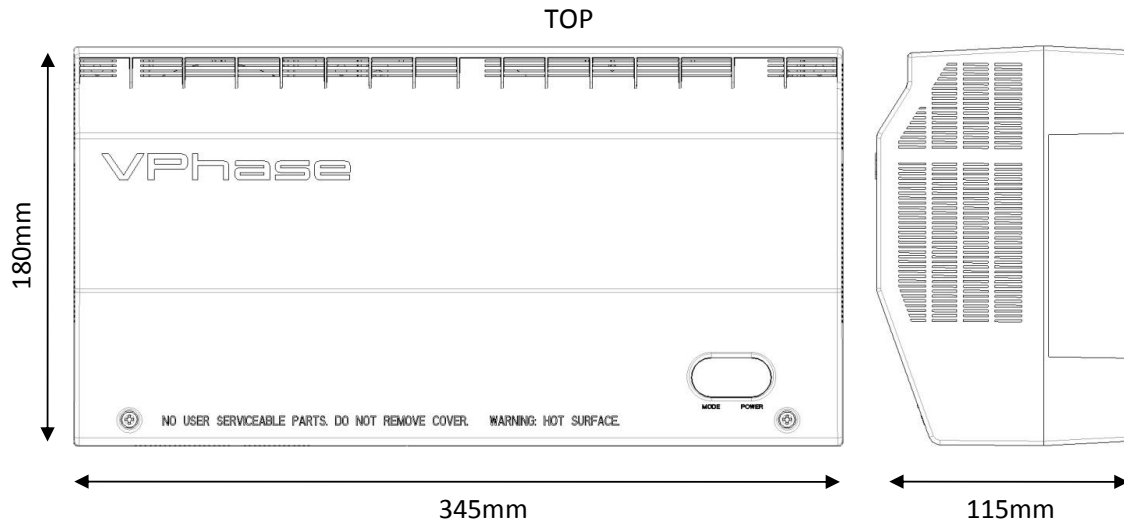
10 Product removal

Should product removal be required then this can easily be achieved by simply looping back the VX1 power supply cable to directly feed the VX1 supplied circuits. No re-organisation of the consumer unit should be required.

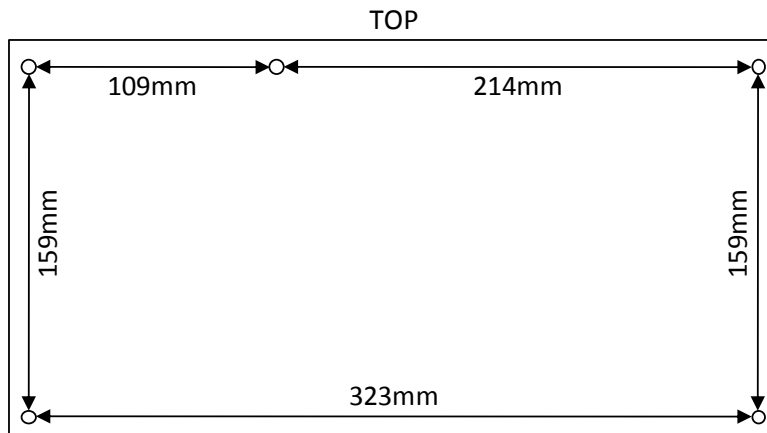
Retain the original packaging and cardboard transportation packing inserts. If the product needs to be returned then the original packaging or alternative packaging offering similar protection must be used.

11 Casing Dimensions

External Dimensions:



Mounting Hole Centres:



12 Specifications

VX1 Input:	Nominal input voltage 230V (+/-10%) 50Hz, 1 phase AC Maximum input voltage 264V 50Hz, 1 phase AC
VX1 Output – Active Mode:	220V (+/-1.8%) 50Hz, 1 phase AC Limited to a maximum of 30V below the supply voltage
VX1 Output – Bypass Mode:	Output directly connected to input (Thermal bypass mode automatically resets to Active mode as load reduces)
VX1 maximum current	80A bypass mode 20A short term active mode 8A continuous active mode (typical – thermally controlled)
VX1 mass:	4.30kg (excluding cardboard packaging)
Operating temperature range:	-5°C to + 40°C
Storage temperature range:	-5°C to + 40°C
Low Voltage Directive 2006/95/EC:	EN60730-1:2001 + Amd's A11(3/02), A12 (9/03), A1 (9/04), A13 (9/04), A14 (1/05), A15 (1/07), A16 (4/07)
EMC Directive 2004/108/EC:	
EMC Standards specifically determined in EN 60730-1. Sections H23/H26 and Annex ZF	
Emissions – CISPR 14-1 Pt1	EN55014-1
Emissions – CISPR 22 Class B	EN55022
Harmonic current emissions (Up to 16A/Phase)	EN61000-3-2
Voltage fluctuations and flicker	EN61000-3-3
ESD Electrostatic discharge pulse	EN61000-4-2
Immunity to radiated EM fields	EN61000-4-3
Electrical fast transients/Burst immunity test	EN61000-4-4
Electrical surges	EN61000-4-5
Immunity to conducted disturbances	EN61000-4-6
Voltage dips, short interruptions and voltage variations immunity test	EN61000-4-11

Product development is continuous and VPhase plc reserves the right to make alterations to specification and manufacture without notice.

CE RoHS 

13 Disposal (WEEE Directive)



The VPhase VX1 is fully compliant with the RoHS directive and contains no harmful products as defined within the RoHS directive. The unit should be disposed of in a responsible manner via an electrical equipment official disposal centre.

Appendix A: Typical installation configurations

In this Appendix three different example consumer unit configurations are presented. For these examples the following typical circuits are assumed:

Circuit Number	Function
1	VPhase VX1 Supply (SOURCE)
2	Fire alarm panel etc.
3, 4	Electric heating e.g. shower, immersion heater, storage heaters, cooker
5, 6, 7	Socket outlets e.g. ring circuits
8	Lighting circuit, e.g. downstairs lights
9	Lighting circuit, e.g. upstairs lights Separate residual current breaker to segregate lighting (Wiring regulation 314.1)

Example A1 – House with dedicated electric heating

In this typical installation there are socket outlets (circuits 5, 6 and 7) and lighting circuits (8 and 9) that are supplied via the VPhase VX1.

There are also electric heating circuits (3 and 4) that are not supplied via the VPhase VX1.

There is also a non-RCD protected load at circuit 2 (e.g. fire alarm present).

Example A2 – House without dedicated electric heating

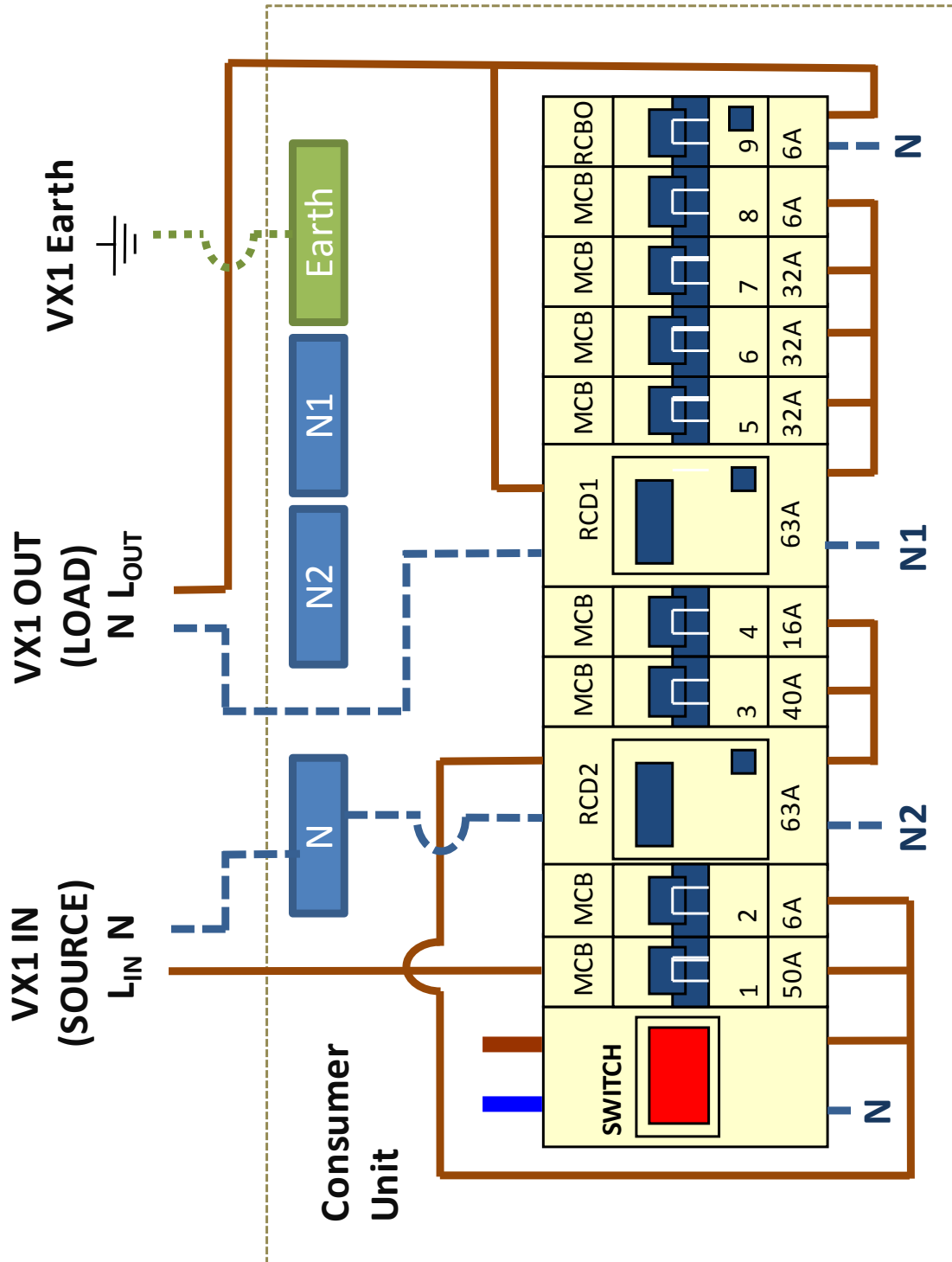
In this typical installation no electric heating is present (i.e. circuits 3 and 4 are absent). Such a home may have gas space and water heating.

There are socket outlets (circuits 5, 6 and 7) and lighting circuits (8 and 9) that are supplied via the VPhase VX1.

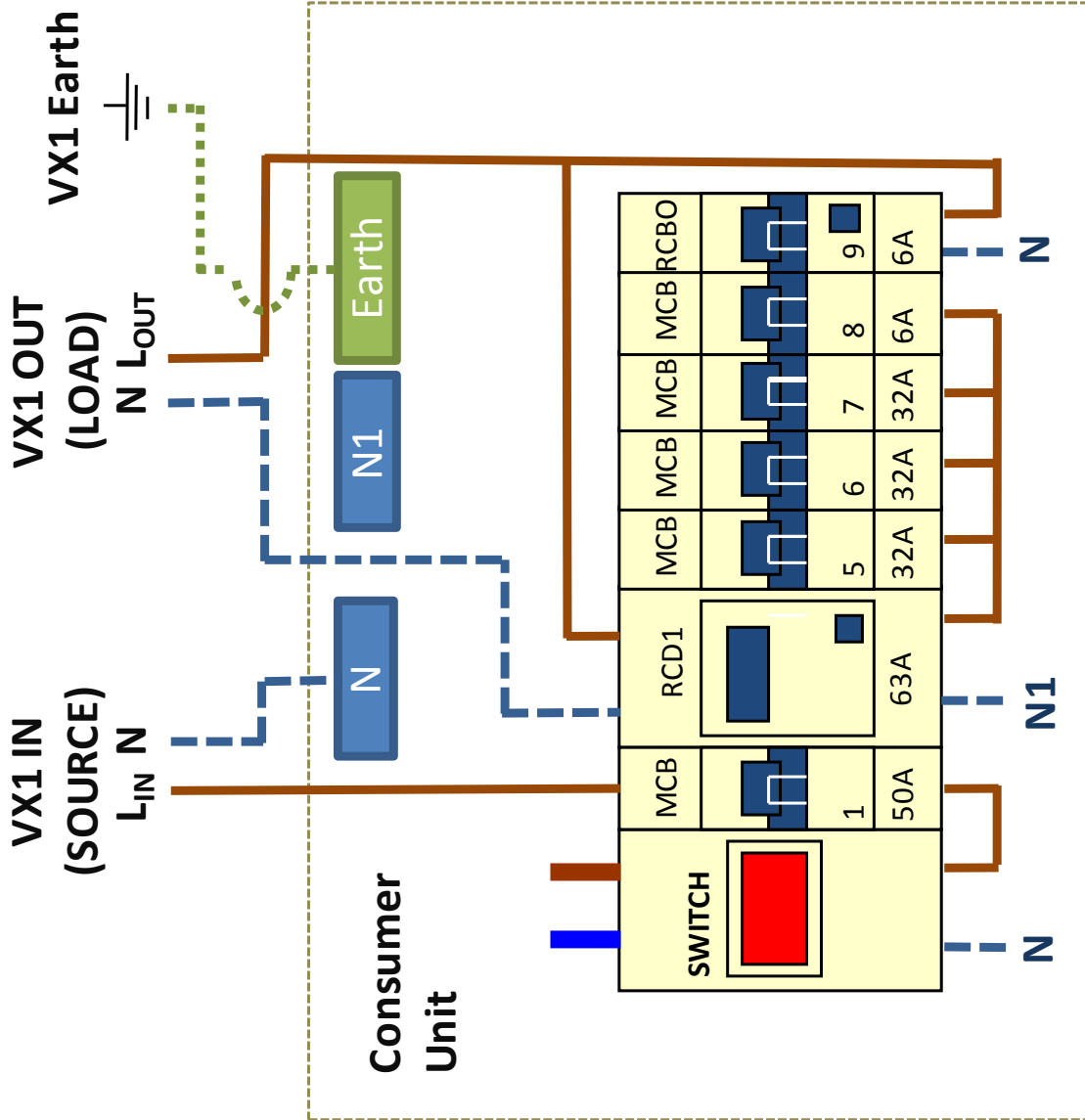
Example A3 – Use of RCBO protection for the majority of circuits.

In this typical installation the majority of the circuits are fed by RCBO devices. The circuits are grouped into two banks: Circuits 1, 2, 3 and 4 are supplied directly from the main isolator and circuits 5, 6, 7, 8 and 9 are supplied via the VPhase VX1.

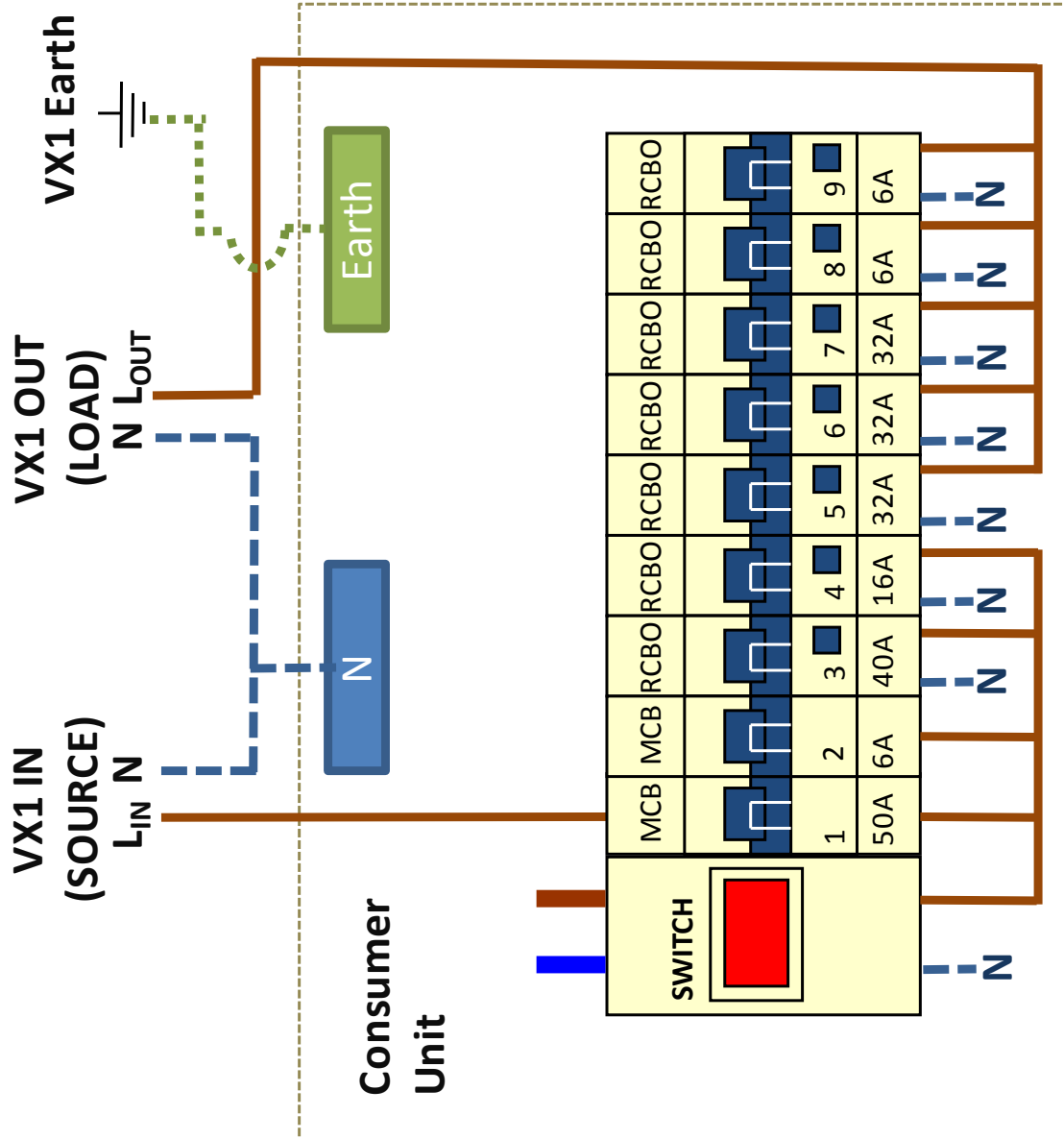
Example A1 – House with dedicated electric heating



Example A2 – House without dedicated electric heating



Example A3 – Use of RCBO protection for the majority of circuits.



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