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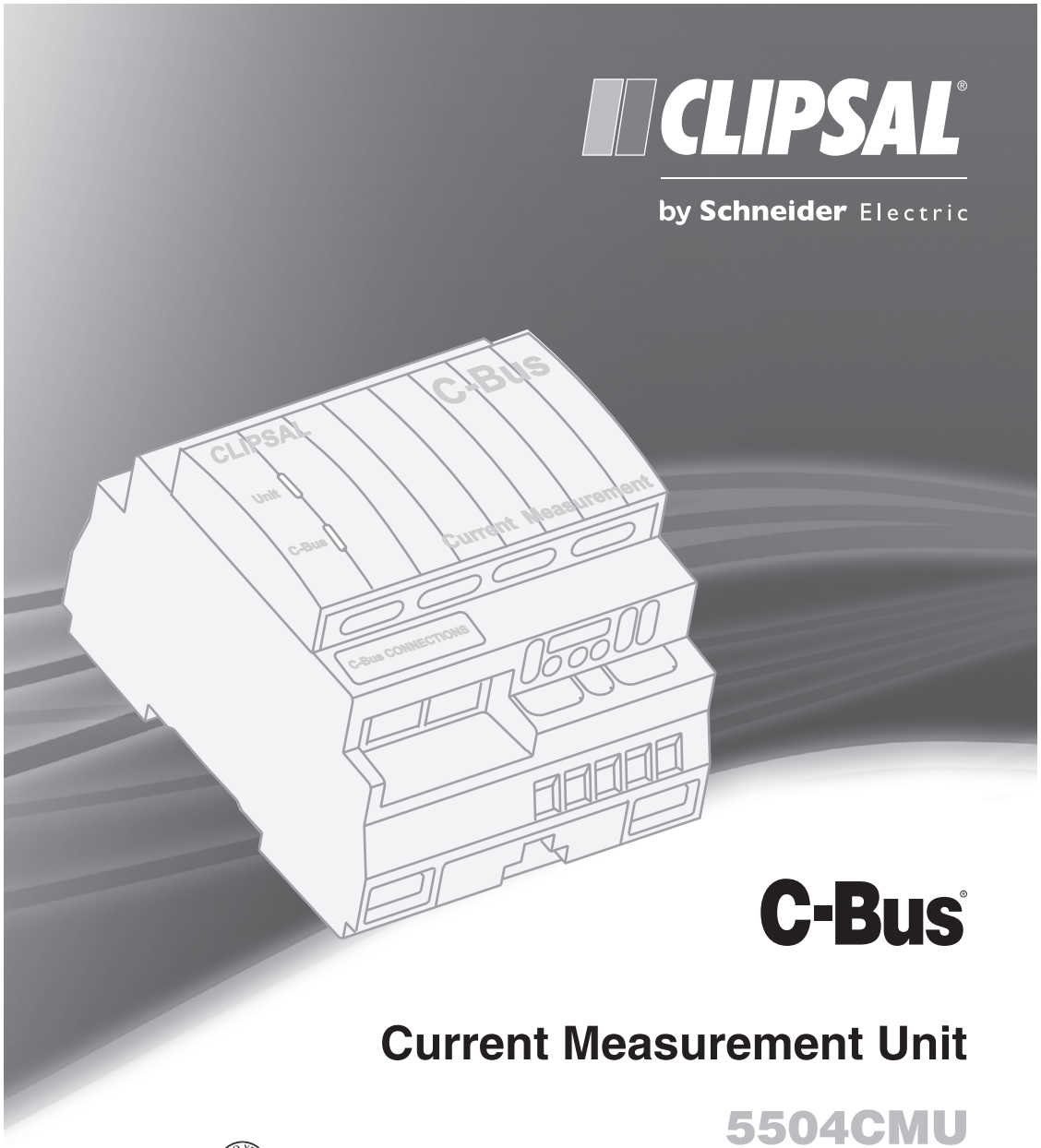
by Schneider Electric



C-Bus®

Current Measurement Unit

5504CMU

TWO YEAR WARRANTY

Installation Instructions

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Contents

February 2017

1 Introduction

The *Installation Instructions* provides basic setup information for the C-Bus Current Measurement Unit (CMU). For additional information and tutorials refer to C-Bus Toolkit software Help. For further information, contact your local Clipsal or Schneider Electric sales representative.

The C-Bus CMU and attached Split-Core Current Transformers (CTs) are part of an intelligent energy management system that provides power consumption information and generates messages for optimising energy use in a C-Bus installation. The installer sets up the measurement criteria using C-Bus Toolkit software. The C-Bus measurement readings and messages are then available to the customer's measurement software applications, such as HomeGate, Schedule Plus, devices with logic and most C-Bus touchscreens. The CMU is programmed using Toolkit software that is downloaded free from the Clipsal CIS Website.

Description

The DIN rail mounted CMU can support up to four CTs, one per two-wire screw terminal block. The CT is a passive inductive probe installed on one or more a.c. mains conductor wires near the DIN rail mounted CMU unit.

NOTICE Risk of equipment damage.
Do not connect the CTs in parallel or in series; only one CT is to be connected to a terminal block.

Catalogue Number	Description
5504CMU	C-Bus Current Measurement Unit, DIN rail mounted, provides 4 inputs for split-core current transformers that report the a.c. current present on electrical wiring. The CMU has two measurement ranges: 0 – 40 A and 0 – 80 A, software selectable.
Accessory Item (sold separately)	
5100CT80	Current transformer, split core, with 0 – 40 A or 0 – 80 A range capacity, two-wire, double insulated (the range is software selectable)

Table 1. Product catalogue number and description

The split-core current transformer (CT) is inductively coupled to the circuit or circuits being measured. The CT is hinged and clips around the wire or wires to be measured without disconnecting circuits, or disturbing the insulation on the circuits to be measured. The CT can be quickly removed from one circuit and placed on a different circuit, as needed.

IMPORTANT NOTE: DO NOT clip the CT around both the active and neutral wires of the circuit to be measured. If you do this, the current flowing in the active and neutral wires will cancel each other and will result in incorrect readings. See the additional rules in Section 3, Wiring.

DANGER Electrical Shock Hazard
During installation, maintenance and moving of CT's to the different circuits, power to the switchboard needs to be isolated to minimise the likelihood of electric shock, burn, or explosion. It is highly recommended that shorting blocks be installed together with the CT's.

The 5100CT80 can be used for a.c. current ranges from 0 - 40 A or 0 - 80 A. C-Bus Toolkit software allows the installer to select the range that is appropriate for the circuits being measured. If the current in the measured conductor rises above the selected range limit, it will not damage either the CT or the CMU.

The CMU and CT are calibrated at the factory. When proper installation techniques and software setup are performed, the accuracy of current and power measurement will meet the specifications provided in this instruction.

In low current applications, you can use multiple turns to increase the strength of the signal sent to the CMU from the CT. The software supports this configuration.

The CMU monitors the RMS current in up to four electrical circuits and uses the C-Bus interface to:

- Broadcast information to measurement applications such as Home Gate, Schedule Plus, devices with logic and most C-Bus touchscreens.
- Send C-Bus warnings or alarms on primary or secondary lighting and trigger control applications.
- Report current or power for the monitored circuits.

The CMU sends messages to other devices via the C-Bus Measurement Application. This allows the software to react to threshold and over-current conditions and take appropriate action, such as turning off appliances or lights.

The CMU can be configured to react to the current exceeding a set value or falling below a threshold value. The signals sent can raise over-current alarms or initiate load shedding.

The CMU is powered by the C-Bus network and does not require a mains connection or external power supply. The unit has two status indicator LEDs labelled 'Unit' and 'C-Bus.' The CMU is internally protected in the event that current levels exceed the range limit. The CMU is calibrated at the factory and does not require any regular maintenance.

Calculating Power Usage

The CMU can be programmed to report *current* (Amperes) or *power* (Watts or KWatts). The CMU measures the current in a conductor. It does not measure line voltage or the Power Factor (PF); the installer must enter these. Toolkit configures an internal calculator in the CMU that uses the supply voltage and a power factor to derive the power being used in the circuits that are being measured.

Supply voltage x Current x Power factor = Power being used

2 Safety

The following safety information is essential when working with mains voltage circuits that are found inside the service enclosure. To prevent death or serious injury, follow these Warnings.

DANGER Electrical Shock Hazard
Electrical Shock can cause death or serious injury. Do not touch any exposed electrical connections inside the service enclosure. Only licenced electricians should access the circuits inside the enclosure.

WARNING Use only the correct CT type with this unit.
Do not use CTs from any other source; they might not have adequate insulation ratings. You could create a dangerous condition that may result in injury or property damage.

Additional Safety Information

- Never connect mains voltages to the CMU or CTs.
- Never use the CMU and CT to determine whether power is applied to a circuit.
- Do not place the CT on bare wires or wires with cracked or broken insulation.
- Do not operate the CMU and transformers at ambient temperatures higher than 50° C or use CTs on conductors that are hot to the touch.
- It is highly recommended that shorting blocks be installed together with the CT's.

Installation Requirements

To avoid installation errors that could cause false or inaccurate readings follow these guidelines:

- Do not coil the CT return leads or wrap them around mains wiring.
- Do not extend the CT leads. You may shorten the leads, if necessary.
- Place the CT away from sources of electrical interference, such as electric motors.
- The CT is for use only with the C-Bus CMU. Do not connect it to any other device.
- Do not wire the CTs in parallel or in series. Connect only one CT to a terminal block.

3 Wiring

The Current Measurement Unit (CMU) derives its power from the C-Bus network connection. Do not connect the CMU or the CTs to any other electrical circuit. The CMU and CTs are calibrated at the factory. A maximum torque of 1.4 N·m should be applied to the screw terminals.

3.1 Current Transformers

WARNING Use only the correct CT type
ONLY the 5100CT80 CTs may be connected to the CMU. Using any other type could cause a dangerous condition and network damage.

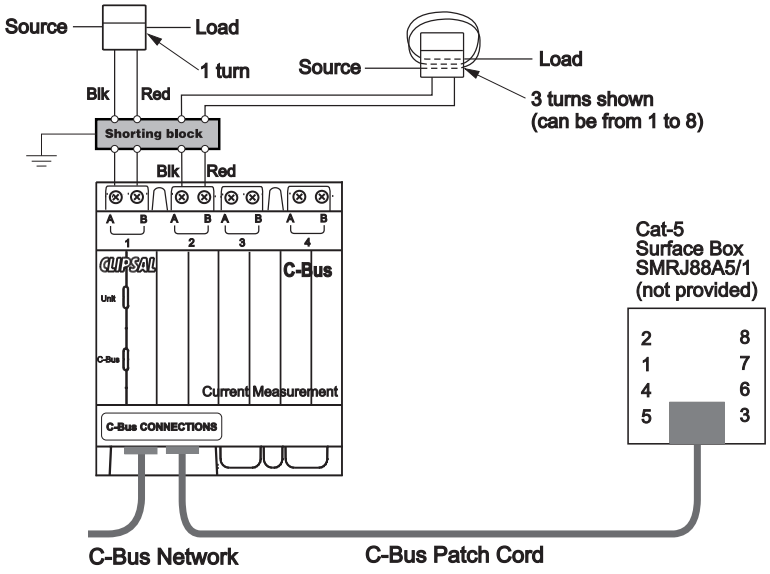


Figure 1. Wiring diagram

Current transformers (CT's) can produce very high voltage potentials at their secondary terminals if disconnected when primary current flow is present. It is therefore highly recommended that shorting blocks be installed together with the CT's as shown in Figure 1.

Clip the CT on the line or neutral conductor, not both.

If you clip the CT on multiple conductors (separate circuits) you must:

- Clip together only circuits on the same power phase.
- Clip together either line or neutral conductors, not a combination of both.
- Ensure that current flows in the same direction in all of the conductors that are clipped together.

3.2 C-Bus Network

Two RJ45 connectors are provided for upstream and downstream network attachment. The C-Bus network uses pink Cat.5e, polarised 15-36 Volt, twisted-pair cable, catalogue number 5005C305B (solid) and 5005C305BST (stranded).

RJ45 pin	Signal name	Wire Colour
1	Remote ON	green & white
2	Remote ON	green
3	C-Bus negative (—)	orange & white
4	C-Bus positive (+)	blue
5	C-Bus negative (—)	blue & white
6	C-Bus positive (+)	orange
7	Remote OFF	brown & white
8	Remote OFF	brown

Table 2. C-Bus network wiring colour codes

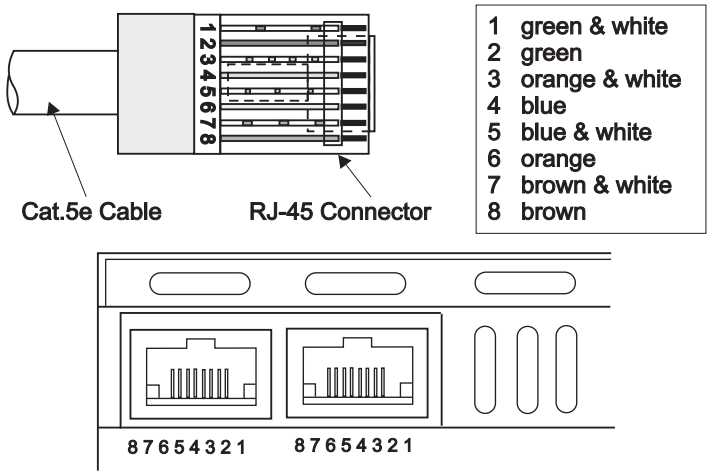


Figure 3. RJ45 pin assignments for plugs and sockets

A rubber plug is supplied for closing off an unused RJ45 socket. The plug stops foreign bodies and dust from entering the unit. If you do not use the plug, please dispose of it in an environmentally friendly manner.

4 Setup and Configuration

C-Bus Toolkit software runs on a PC connected to the C-Bus network. After the CMU is attached to the network, you can use the GUI to do the following:

- Set the network parameters such as applications and addresses and save them to the CMU's non-volatile memory.
- Set up the measurement and reporting parameters for each connected CT (based on the wiring configuration).

Refer to Toolkit Help for definitions, examples and tutorials. Toolkit software can be freely downloaded from the Clipsal CIS website: http://www.clipsal.com/cis/technical select Downloads.

If you have difficulty accessing the CMU with the Toolkit GUI, check the status indicator LEDs on the CMU (see Section 5).

5 Status LEDs

The CMU has two LEDs (Unit and C-Bus) that operate independently.

Unit LED

The orange Unit LED shows the status of the individual unit. When C-Bus is connected, the indicator stays illuminated.

Unit LED Mode	Meaning
Off	Not connected to C-Bus
On	C-Bus connected

Table 3. Unit indicator meanings

C-Bus LED

The orange C-Bus LED shows the status of the C-Bus network at the unit. If sufficient network voltage (20V d.c. to 36V d.c.) and a valid network clock are present, the indicator stays illuminated. If the network voltage is marginal, the indicator flashes.

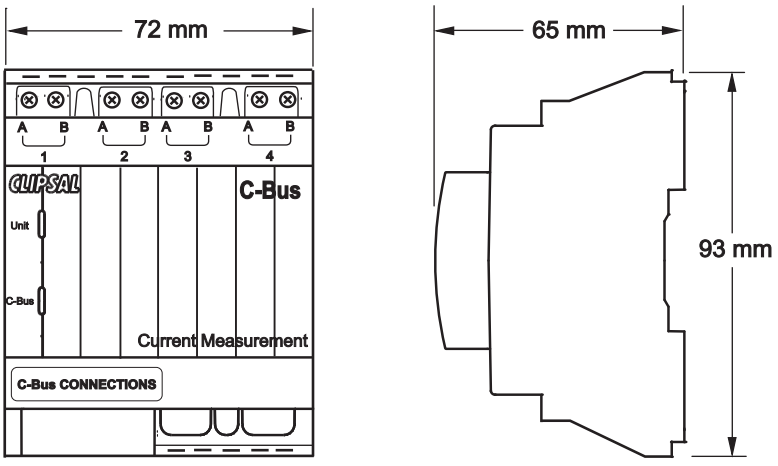
C-Bus LED Mode	Meaning
Off	No network clock signal is present and/or no power is present.
On	Power is on and C-Bus network clock is present.
Flashing at a steady rate	The C-Bus network voltage is low (15 V d.c. < voltage < 20 V d.c.) and a power supply might be required.

Table 4. C-Bus indicator meanings

6 Specifications

Parameter	Value
C-Bus input voltage	15-36 V d.c.
Current drawn	18 mA from the C-Bus network. The CMU does not provide power to the network.
C-Bus AC input impedance	90 kΩ at 1 kHz
Mounting type	DIN rail, 4M wide
Connections	C-Bus: 2 x RJ45 connectors Current Transformer: 4 x 2-screw terminals
Max number of CTs per CMU	4 x 5100CT80. No other CT type may be connected for safety reasons.
Current Measurement Range	0 – 40 A a.c. or 0 – 80 A a.c. 50/60 Hz, software selectable. See the Note below.
Accuracy	2.5 % across full scale, 0 – 40 A 2.5 % across full scale, 0 – 80 A
Line voltage and Power Factor	Not measured by the CMU. Defined by the user during software configuration.
System clock and burden	No clock. No burden.
Operating temperature	0° to 50° C
Humidity	10 to 95%, non condensing
Weight	127 grams

Dimensions



7 Standards Complied

Declarations of Conformity

Australian/New Zealand EMC & Electrical Safety Frameworks and Standards

Regulation	Standard	Title
EMC	IEC 61326-1	Electrical equipment for measurement, control and laboratory use – General EMC requirements

European Directives and Standards

European Council Directive	Standard	Title
EMC Directive 2004/108/EC	EN 61326-1	Electrical equipment for measurement, control and laboratory use – General EMC requirements
RoHS 2002/95/EC		Reduction of hazardous substances

International Directives and Standards

Regulation	Standard	Title
EMC	IEC 61326-1	Electrical equipment for measurement, control and laboratory use – General EMC requirements

U.S. FCC Regulations

FCC Title 47	Part 15, Class B Digital Device

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable operation.

Warning:

Any changes or modifications not expressively approved by Clipsal or Schneider Electric could void the user's authority to operate this equipment.

Underwriters Laboratories

Underwriters Laboratories	UL/cUL Listed UL 916 (PAZX / PAZX7) – Energy Management Equipment

8 Two-Year Warranty

The Current Measurement Unit and the Current Transformers carry a two-year warranty against manufacturing defects.

Warranty Statement

The benefits conferred herein are in addition to, and in no way shall be deemed to derogate; either expressly or by implication, any or all other rights and remedies in respect to the Clipsal product, which the consumer has in the location where the product is sold.

The warrantor is Clipsal by Schneider Electric.

This Clipsal product is guaranteed against faulty workmanship and materials for a period of two (2) years from the date of installation.

Clipsal Australia Pty Ltd reserves the right, at its discretion, to either repair free of parts and labour charges, replace or offer refund in respect to any article found to be faulty due to materials, parts or workmanship.

This warranty is expressly subject to the Clipsal product being installed, wired, tested, operated and used in accordance with the manufacturer's instructions. Any alterations or modifications made to the product without permission of Clipsal or Schneider Electric might void the warranty.

Clipsal shall meet all costs of a claim. However, should the product that is the subject of the claim be found to be in good working order, all such costs shall be met by the claimant.

When making a claim, the consumer shall forward the Clipsal product to the nearest Clipsal or Schneider Electric office. Provide adequate particulars of the defect within 28 days of the fault occurring. The product should be returned securely packed, complete with details of the date and place of purchase, description of load, and circumstances of malfunction.

For all warranty enquiries, contact your local Clipsal or Schneider Electric sales representative.

The address and contact number of your nearest sales office can be found at http://www.clipsal.com/locations or by telephoning Technical Support 1300 369 233 (CIS Technical Support Hotline for Australia only).

Technical Support

For further assistance in using this product, consult your nearest Clipsal Integrated Systems (CIS) or Schneider Electric Sales Representative or Technical Support Officer.

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