Your Global Automation Partner

TURCK

IM18-CCM51-12I Current Measurement Module

Instructions for Use

Contents

Contents

1 About These Instructions

These instructions for use describe the structure, functions and the use of the product and will help you to operate the product as intended. Read these instructions carefully before using the product. This is to avoid possible damage to persons, property or the device. Retain the instructions for future use during the service life of the product. If the product is passed on, pass on these instructions as well.

1.1 Target groups

These instructions are aimed at qualified personal and must be carefully read by anyone mounting, commissioning, operating, maintaining, dismantling or disposing of the device.

1.2 Explanation of symbols used

The following symbols are used in these instructions:

	**DANGER** DANGER indicates a dangerous situation with high risk of death or severe injury if not avoided.
	**WARNING** WARNING indicates a dangerous situation with medium risk of death or severe injury if not avoided.
	**CAUTION** CAUTION indicates a dangerous situation of medium risk which may result in minor or moderate injury if not avoided.
	**NOTICE** NOTICE indicates a situation which may lead to property damage if not avoided.
	**NOTE** NOTE indicates tips, recommendations and useful information on specific actions and facts. The notes simplify your work and help you to avoid additional work.
▶	**CALL TO ACTION** This symbol denotes actions that the user must carry out.
⇨	**RESULTS OF ACTION** This symbol denotes relevant results of actions.

1.3 Other documents

Besides this document the following material can be found on the Internet at **www.turck.com**:

- Data sheet
- Quick Start Guide
- EU Declaration of Conformity (current version)

1.4 Feedback about these instructions

We make every effort to ensure that these instructions are as informative and as clear as possible. If you have any suggestions for improving the design or if some information is missing in the document, please send your suggestions to **techdoc@turck.com**.

2 Notes on the Product

2.1 Product identification

These instructions apply to the following current measurement module:

- IM18-CCM51-12I

2.2 Scope of delivery

The scope of delivery includes:

- Current measurement module
- 2 backplane bus connectors
- Quick Start Guide

2.3 Legal requirements

The device is subject to the following EC directives:

- 2014/30/EU (electromagnetic compatibility)
- 2011/65/EU (RoHS Directive)

2.4 Turck service

Turck supports you with your projects, from initial analysis to the commissioning of your application. The Turck product database under www.turck.com contains software tools for programming, configuration or commissioning, data sheets and CAD files in numerous export formats.

The contact details of Turck subsidiaries worldwide can be found on p. [▷ 18].

3 For Your Safety

The product is designed according to state-of-the-art technology. However, residual risks still exist. Observe the following warnings and safety notices to prevent damage to persons and property. Turck accepts no liability for damage caused by failure to observe these warning and safety notices.

3.1 Intended use

These devices are designed solely for use in industrial areas.

The IM18-CCM51-12I current measurement module is an additional module for freely programmable cabinet guards of the IM18-CCM50… series. Up to twelve split core ferrite AC current sensors of the CCT series can be connected to the current measurement module. The device processes current sensors with a measurement range of 30…600 A and measures the signal frequency of the sensors.

The devices may only be used as described in these instructions. Any other use is not in accordance with the intended use. Turck accepts no liability for any resulting damage.

3.2 Obvious misuse

- The device is not a safety component and must not be used for the protection of persons and property.

3.3 General safety instructions

- The device only meets the EMC requirements for industrial areas and is not suitable for use in residential areas.
- The device may only be assembled, installed, operated, parameterized and maintained by professionally-trained personnel.
- The device may only be used in accordance with applicable national and international regulations, standards and laws.
- The device must only be used in enclosed housing or control cabinets.

4 Product Description

The IM18-CCM51-12I current measurement module is contained in an 18 mm plastic housing with protection to IP20. The housing can be mounted on a DIN rail. Operation is only possible with the IM18-CCM50… cabinet guard.

4.1 Device overview

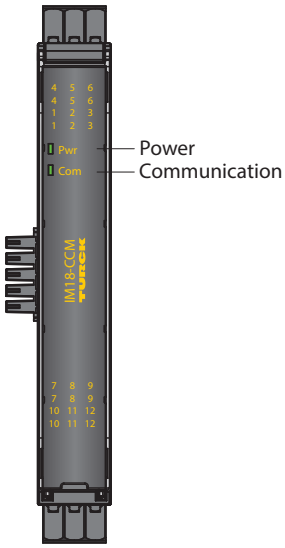

Fig. 1: Front view

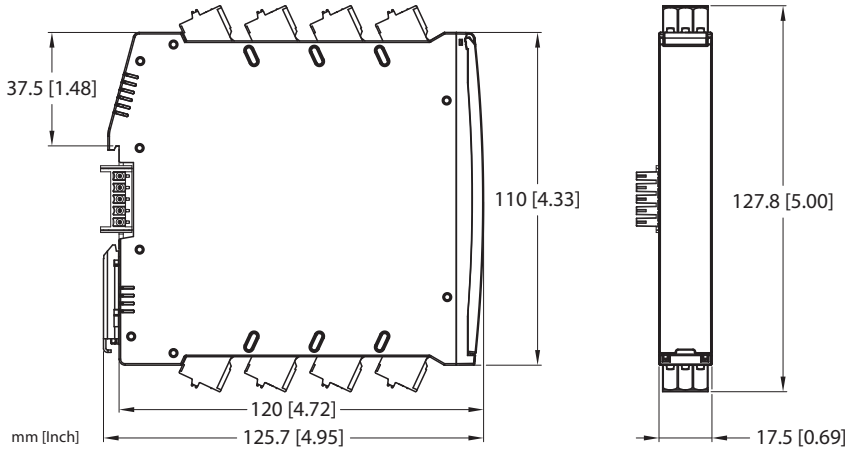

Fig. 2: Dimensions

4.2 Properties and features

- Connection of up to twelve AC current sensors, e.g. current transformers of the CCT series from manufacturers TDK
- Evaluation of current sensors for the 30…600 A measuring range
- Operation only possible in conjunction with IM18-CCM50… series programmable cabinet guards
- Communication and power supply via backplane bus
- DIN rail mounting in accordance with DIN Rail EN 60715

4.3 Operating principle

The expansion module measures the currents of the connected current sensors and outputs the signals preprocessed to a cabinet guard.

4.4 Functions and operating modes

The device processes the signals of up to twelve AC current sensors and measures the signal frequency of the sensors. The information is transferred to the IM18-CCM50… cabinet guard via the backplane bus. The power supply of the device is also implemented via the backplane bus connector. The configuration of the measurement channels is saved internally and is also retained after the power supply is interrupted.

4.4.1 Current measurement

The current value is shown as an RMS value. The duration of a period is calculated from the configured or measured frequency of the channel. All channels are measured in sequence from channel 1 to channel 12. Channels that are switched off are skipped.

Each current measured value is output with a time stamp in ms. The maximum value of the time stamp is 59999 ms.

Measurement duration

A measurement starts at a zero crossing of the input signal and lasts for a full period. If a zero crossing is not detected, the device ends the measurement after max. 112.5 % of the previous period duration.

The maximum duration of a measurement is $0.5 \times T + 1.125 \times T = 1.625 \times T$.

4.4.2 Frequency measurement

The device makes it possible to measure the frequency of the measured signal. This requires the reference frequency to be set in the device. The frequency is measured if the measured frequency signal is above or below the reference frequency by a maximum of 12.5 %. The measured frequency is used as a time base for the current measurement. If a valid frequency is not measured, the device outputs a value of 0 Hz.

5 Installing

The device can be mounted on a DIN rail according to EN 60715 (TH35). Two backplane bus connectors are required for mounting on a DIN rail.

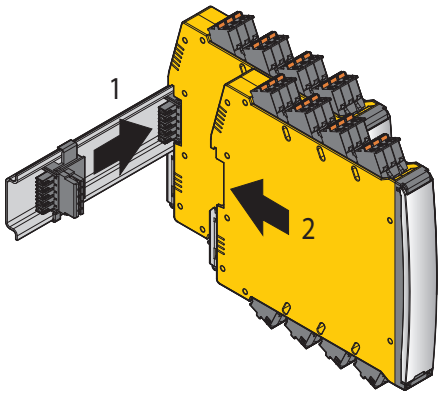

Fig. 3: DIN rail mounting

- Disconnect the cabinet guard from the power supply.
- Push two backplane bus connectors into the guide of the DIN rail and connect them together.
- Plug the cabinet guard and the current measurement module onto the backplane bus connectors.

6 Connection

The device is provided with spring-loaded terminals for connecting the current sensors. The removable terminal blocks are coded.

- Only use cables (rigid or flexible) with a cross section of 0.2…2.5 mm².
- When using stranded wire: Secure the wire ends with ferrules.
- Prise open the spring-loaded terminals using a screwdriver.
- Insert the stripped cable ends into the guides of the spring-loaded terminals.
- Remove the screwdriver.

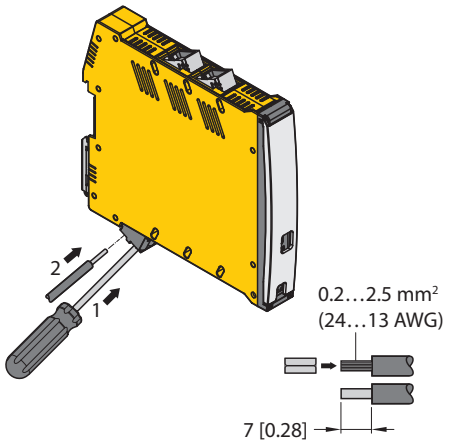

Fig. 4: Connecting the power supply via spring-loaded terminals

6.1 Wiring diagram

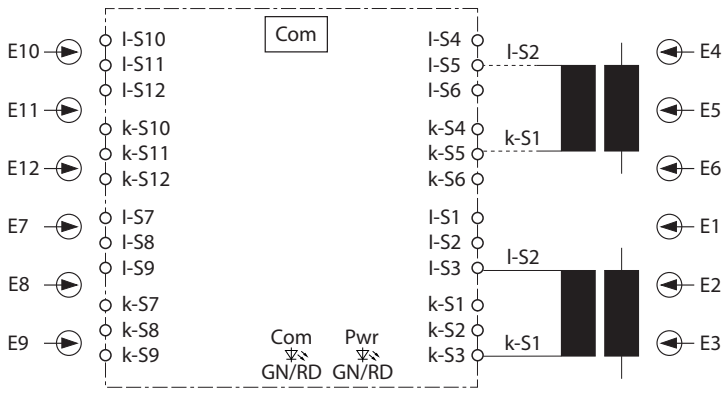

Fig. 5: Block diagram

7 Commissioning

After connecting and switching on the power supply, the device is automatically ready for operation.

8 Setting and Parameterization

The current measurement module can be parameterized via the IM18-CCM50… cabinet guard. A library of parameters for the setting current measurement module is available as a free download from www.turck.com.

The library enables direct access to the device. An additional bus address for the current measurement module is not required.

8.1 Setting measurement channels

The measurement channels of the current measurement module can be switched on and off separately. Deactivated channels are skipped during the measurement.

The frequency of the measured signal must also be defined for each channel. The set frequency is used as the standard value for scanning the signal if no signal frequency can be determined by the device. The measured frequency must not exceed max. ± 12.5 % of the configured frequency.

8.2 Settable parameters

The following parameters can be set via the library:

- Switching the measurement channel on and off
- Signal frequency of the measured channel
- Resetting the fault memory

Further information on the settable parameters can be found in the description of the library.

8.3 Measured data and status information

The device provides the following status information:

Designation	Possible values	Meaning
Current of the measurement channel	0…1638 A	Increments: ■ < 9 A: 25 mA ■ 9…90 A: 250 mA ■ >90 A: 2.5 A
Time stamp of the current measurement	0…59999 ms	Overflow every 60 s
Frequency of the measurement channel	10…1000 Hz	Measured value is 0 as long no frequency was detected that corresponds to ± 12.5 % of the configured frequency
Number of errors	0…65535	
Error memory	0…224	Error with time and error code
Operating hours counter	0…65535 days	Total operating hours of the device in days, hours, and minutes
Serial number	0…2^{32}	Serial number of the device
Product number (individual device number)	0…65535	

9 Operation

9.1 LED indications

LED	Indication	Meaning
Pwr	Green	Device is operational
	Green flashing (2 Hz)	Device waiting to be assigned a bus address
	Green flashing (4 Hz)	Bus address is assigned
	Red	Device error
Com	Green flashing (4 Hz)	Communication via the backplane bus active
	Red flashing (4 Hz)	Invalid data packet received

9.2 Reading the memory

The device is provided with an internal memory in order to retain the data even in the event of a power supply interruption. The following values are stored:

- Channel configuration (channel on/off, set signal frequency)
- Operating hours counter
- Number of accumulated errors (the last 224 accumulated errors and operating hours). Refer to the library for a list of error codes.

The data is stored automatically in the device after 30 minutes in the event of configuration changes or errors.

In normal operation, the operating hours counter is backed up automatically every 30 minutes. In the event of power supply interruptions, the counter is automatically reset to the last backed up state.

10 Troubleshooting

If the device does not function as expected, first check whether ambient interference is present. If there is no ambient interference present, check the connections of the device for faults.

If there are no faults, there is a device malfunction. In this case, decommission the device and replace it with a new device of the same type.

11 Maintenance

Ensure that the plug connections and cables are always in good condition.

The devices are maintenance-free, clean dry if required.

12 Repair

The device must not be repaired by the user. The device must be decommissioned if it is faulty. Observe our return acceptance conditions when returning the device to Turck.

12.1 Returning devices

Returns to Turck can only be accepted if the device has been equipped with a Decontamination declaration enclosed. The decontamination declaration can be downloaded from
https://www.turck.de/en/retoure-service-6079.php
and must be completely filled in, and affixed securely and weather-proof to the outside of the packaging.

13 Disposal

The devices must be disposed of correctly and must not be included in general household garbage.

14 Technical Data

Technical data	IM18-CCM51-12I
ID	100027058
Power supply	10…30 VDC
Power consumption	624 mW at 24 V
Sensor input – current	Max. 350 mA_{rms}
Division factor of current transformer	3000:1
Measuring accuracy	0…9 A: 2 % (9 A, 50/60 Hz) 9…90 A: 2 % (90 A, 50/60 Hz) 9…600 A: 2 % (600 A, 50/60 Hz)
Operating temperature	0…70 °C
Storage temperature	-25…+75 °C
Humidity	10…90 % non-condensing
Dimensions (H × W × D)	125 × 110 × 18 mm

15 Turck Subsidiaries - Contact Information

Germany	Hans Turck GmbH & Co. KG Witzlebenstraße 7, 45472 Mülheim an der Ruhr **www.turck.de**
Australia	Turck Australia Pty Ltd Building 4, 19-25 Duerdin Street, Notting Hill, 3168 Victoria **www.turck.com.au**
Belgium	TURCK MULTIPROX Lion d'Orweg 12, B-9300 Aalst **www.multiprox.be**
Brazil	Turck do Brasil Automação Ltda. Rua Anjo Custódio Nr. 42, Jardim Anália Franco, CEP 03358-040 São Paulo **www.turck.com.br**
China	Turck (Tianjin) Sensor Co. Ltd. 18,4th Xinghuazhi Road, Xiqing Economic Development Area, 300381 Tianjin **www.turck.com.cn**
France	TURCK BANNER S.A.S. 11 rue de Courtalin Bat C, Magny Le Hongre, F-77703 MARNE LA VALLEE Cedex 4 **www.turckbanner.fr**
Great Britain	TURCK BANNER LIMITED Blenheim House, Hurricane Way, GB-SS11 8YT Wickford, Essex **www.turckbanner.co.uk**
India	TURCK India Automation Pvt. Ltd. 401-403 Aurum Avenue, Survey. No 109 /4, Near Cummins Complex, Baner-Balewadi Link Rd., 411045 Pune - Maharashtra **www.turck.co.in**
Italy	TURCK BANNER S.R.L. Via San Domenico 5, IT-20008 Bareggio (MI) **www.turckbanner.it**
Japan	TURCK Japan Corporation Syuuhou Bldg. 6F, 2-13-12, Kanda-Sudacho, Chiyoda-ku, 101-0041 Tokyo **www.turck.jp**
Canada	Turck Canada Inc. 140 Duffield Drive, CDN-Markham, Ontario L6G 1B5 **www.turck.ca**
Korea	Turck Korea Co, Ltd. B-509 Gwangmyeong Technopark, 60 Haan-ro, Gwangmyeong-si, 14322 Gyeonggi-Do **www.turck.kr**
Malaysia	Turck Banner Malaysia Sdn Bhd Unit A-23A-08, Tower A, Pinnacle Petaling Jaya, Jalan Utara C, 46200 Petaling Jaya Selangor **www.turckbanner.my**

Mexico	Turck Comercial, S. de RL de CV Blvd. Campestre No. 100, Parque Industrial SERVER, C.P. 25350 Arteaga, Coahuila **www.turck.com.mx**
Netherlands	Turck B. V. Ruiterlaan 7, NL-8019 BN Zwolle **www.turck.nl**
Austria	Turck GmbH Graumanngasse 7/A5-1, A-1150 Wien **www.turck.at**
Poland	TURCK sp.z.o.o. Wroclawska 115, PL-45-836 Opole **www.turck.pl**
Romania	Turck Automation Romania SRL Str. Siriului nr. 6-8, Sector 1, RO-014354 Bucuresti **www.turck.ro**
Russian Federation	TURCK RUS OOO 2-nd Pryadilnaya Street, 1, 105037 Moscow **www.turck.ru**
Sweden	Turck Sweden Office Fabriksstråket 9, 433 76 Jonsered **www.turck.se**
Singapore	TURCK BANNER Singapore Pte. Ltd. 25 International Business Park, #04-75/77 (West Wing) German Centre, 609916 Singapore **www.turckbanner.sg**
South Africa	Turck Banner (Pty) Ltd Boeing Road East, Bedfordview, ZA-2007 Johannesburg **www.turckbanner.co.za**
Czech Republic	TURCK s.r.o. Na Brne 2065, CZ-500 06 Hradec Králové **www.turck.cz**
Turkey	Turck Otomasyon Ticaret Limited Sirketi Inönü mah. Kayisdagi c., Yesil Konak Evleri No: 178, A Blok D:4, 34755 Kadiköy/ Istanbul **www.turck.com.tr**
Hungary	TURCK Hungary kft. Árpád fejedelem útja 26-28., Óbuda Gate, 2. em., H-1023 Budapest **www.turck.hu**
USA	Turck Inc. 3000 Campus Drive, USA-MN 55441 Minneapolis **www.turck.us**

TURCK

Over 30 subsidiaries and over
60 representations worldwide!

100029418 | 2021/06

www.turck.com