

# CIBANO 500

## Getting Started



## CIBANO 500 Getting Started

Manual Version: ENU 1007 03 04

© OMICRON electronics GmbH 2017. All rights reserved.

This manual is a publication of OMICRON electronics GmbH.

All rights including translation reserved. Reproduction of any kind, for example, photocopying, microfilming, optical character recognition and/or storage in electronic data processing systems, requires the explicit consent of OMICRON. Reprinting, wholly or in part, is not permitted.

The product information, specifications, and technical data embodied in this manual represent the technical status at the time of writing and are subject to change without prior notice.

We have done our best to ensure that the information given in this manual is useful, accurate and entirely reliable. However, OMICRON does not assume responsibility for any inaccuracies which may be present.

The user is responsible for every application that makes use of an OMICRON product.

OMICRON translates this manual from the source language English into a number of other languages. Any translation of this manual is done for local requirements, and in the event of a dispute between the English and a non-English version, the English version of this manual shall govern.

# 1 Safety instructions

## 1.1 Operator qualifications

Working on high-voltage assets can be extremely dangerous. Consequently, only personnel qualified, skilled and authorized in electrical engineering and trained by OMICRON are allowed to operate *CIBANO 500* and its accessories. Before starting to work, clearly establish the responsibilities.

Personnel receiving training, instructions, directions, or education on *CIBANO 500* must be under constant supervision of an experienced operator while working with the equipment. The operator is responsible for the safety requirements during the whole test.

Maintenance and repair of *CIBANO 500* and its accessories is only permitted by qualified experts at OMICRON service centers except for hardware update options delivered with the relevant Supplementary Sheet.

## 1.2 Safety standards and rules

### 1.2.1 Safety standards

Testing with *CIBANO 500* must comply with the internal safety instructions and additional safety-relevant documents.

In addition, observe the following safety standards, if applicable:

- EN 50191 (VDE 0104) "Erection and Operation of Electrical Test Equipment"
- EN 50110-1 (VDE 0105 Part 100) "Operation of Electrical Installations"
- IEEE 510 "IEEE Recommended Practices for Safety in High-Voltage and High-Power Testing"

Moreover, observe all applicable regulations for accident prevention in the country and at the site of operation.

Before operating *CIBANO 500* and its accessories, read the safety instructions in this Getting Started carefully.

Do not turn on *CIBANO 500* and do not operate *CIBANO 500* without understanding the safety information in this manual. If you do not understand some safety instructions, contact OMICRON before proceeding.

Maintenance and repair of *CIBANO 500* and its accessories is only permitted by qualified experts at OMICRON service centers (see "Support" on page 20).

### 1.2.2 Safety rules

Always observe the five safety rules:

- ▶ Disconnect completely.
- ▶ Secure against re-connection.
- ▶ Verify that the installation is dead.
- ▶ Carry out grounding and short-circuiting.
- ▶ Provide protection against adjacent live parts.

## 1.3 Safe operation

When operating the *CIBANO 500* test system and its accessories, observe the following safety instructions.

### 1.3.1 Test equipment integrity

- ▶ Do not modify, extend, or adapt *CIBANO 500* and its accessories.
- ▶ Use only the *CIBANO 500* original accessories and cables and only use the OMICRON accessories together with OMICRON devices as described in this manual.
- ▶ Operate *CIBANO 500* and its accessories only under ambient conditions specified in "Technical data" in the *CIBANO 500* User Manual.

### 1.3.2 *CIBANO 500*

- ▶ Use only adequately rated power cords.
- ▶ Supply *CIBANO 500* only from a power outlet with protective earth (PE).
- ▶ To run *CIBANO 500* at the maximum power level, we recommend mains overcurrent protection with a 16 A automatic circuit breaker.
- ▶ Position the measurement setup so that you can easily disconnect *CIBANO 500* from mains.
- ▶ Do not use extension cables on a cable reel to prevent overheating of the cord. Instead, run out the extension cord.
- ▶ Do not operate *CIBANO 500* without a solid connection to ground of at least 6 mm<sup>2</sup> cross-section. Ground *CIBANO 500* as close as possible to the operator.
- ▶ The warning symbol on the side panel of *CIBANO 500* (see 3.2.2 "Side panel" on page 11) indicates dangerous voltage on one of the *CIBANO 500* sockets, either from an internal source or from an external one, for example, from the station battery.
- ▶ After booting *CIBANO 500* either the red or the green warning light on the front panel should be on. If after booting both warning lights are on or off, *CIBANO 500* might be defective. In this case, do not use *CIBANO 500* and contact your regional OMICRON service center.
- ▶ Do not operate *CIBANO 500* and its accessories in the presence of explosives, dangerous gases or vapors.
- ▶ If *CIBANO 500* or its accessories do not seem to function properly, stop using them and contact your regional OMICRON service center.



## Support

When you are working with our products we want to provide you with the greatest possible benefits. If you need any support, we are here to assist you!



### 24/7 Technical support – get support

[www.omicronenergy.com/support](http://www.omicronenergy.com/support)

At our technical support hotline, you can reach well-educated technicians for all of your questions. Around the clock – competent and free of charge.

Make use of our 24/7 technical support hotlines:

**Americas:** +1 713 830-4660 or +1 800-OMICRON

**Asia-Pacific:** +852 3767 5500

**Europe / Middle East / Africa:** +43 59495 4444

Additionally, you can find our Service Center or Sales Partner closest to you at [www.omicronenergy.com](http://www.omicronenergy.com).



### Customer area – stay informed

[www.omicronenergy.com/customer](http://www.omicronenergy.com/customer)

The customer area on our website is an international knowledge exchange platform. Download the latest software updates for all products and share your own experiences in our user forum.

Browse through the knowledge library and find application notes, conference papers, articles about daily working experiences, user manuals and much more.



### OMICRON Academy – learn more

[www.omicronenergy.com/academy](http://www.omicronenergy.com/academy)

Learn more about your product in one of the training courses offered by the OMICRON Academy.

### 1.3.3 Obey the safe area

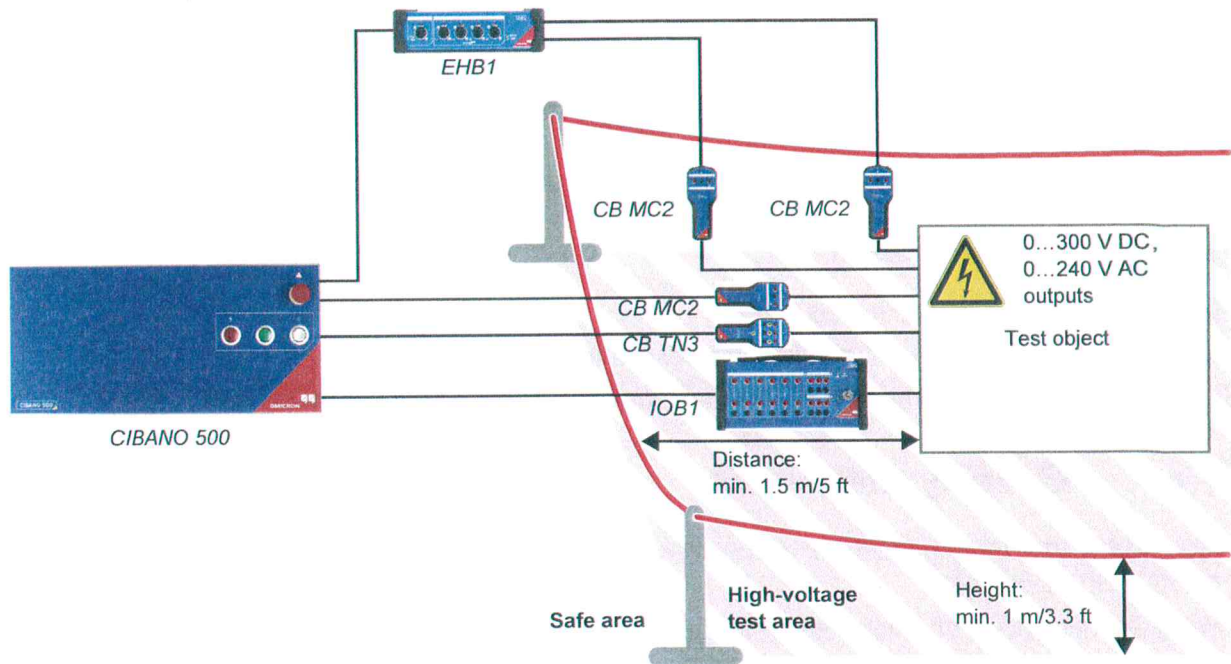


Figure 1-1: Example of the separation of the safe and high-voltage test areas

- ▶ Always stay in the safe area during test.
- ▶ Prior operation make sure that the test equipment is not mounted within the motion path of the circuit breaker. If needed, perform an operation prior mounting of test equipment (for example, motion sensors).
- ▶ For defining the appropriate high-voltage test area, consider any potential falling equipment (for example, the *CB MC2* modules or clamps) as well as wrong connected motion equipment.
- ▶ Position the test equipment on dry and solid surface.

### 1.3.4 De-energize the switchgear

- ▶ Identify your test object and make sure that you are using the corresponding wiring diagram.
- ▶ Disable any charging mechanism (for example, the motor).
- ▶ Ensure that the control circuit of the circuit breaker is de-energized (for example, the spring is discharged).
- ▶ Make sure that the circuit breaker cannot be tripped or closed remotely and locally (for example, use manual controls or distance orders).
- ▶ If you have to make connections to the auxiliary circuit (for example, to the trip or close coils):
  - ▶ Switch off or disconnect the test object from the station supply.
  - ▶ Apply the five safety rules.
  - ▶ Use terminal adapters to connect the test leads.
  - ▶ Only if required for testing, turn the supply back on.

### 1.3.5 Measurement setup

- ▶ Only use test leads and tools which provide full protection against direct contact.
- ▶ Always insert connectors completely and use the interlock mechanism.
- ▶ Press the **Emergency Stop** button on the *CIBANO 500* front panel while connecting the test leads to the test object.
- ▶ Do not insert objects (for example, screwdrivers) into any input/output socket.

### 1.3.6 Perform tests

- ▶ Stay in the safe area during test.
- ▶ Make sure that nobody is within the high-voltage test area.
- ▶ Warn people prior any operation to make them aware of any possible disturbances.

## 1.4 Orderly measures

The *CIBANO 500 Getting Started* or alternatively the e-book has always to be available on the site where *CIBANO 500* is operated.

The users of *CIBANO 500* must read this manual before operating *CIBANO 500* and observe the safety, installation, and operation instructions therein.

*CIBANO 500* and its accessories may be used only as described in this Getting Started. Any other use is not in accordance with the regulations. The manufacturer and the distributor are not liable for damage resulting from improper usage. The user alone assumes all responsibility and risk.

Following the instructions provided in this Getting Started is also considered part of being in accordance with the regulations.

Opening *CIBANO 500* or its accessories invalidates all warranty claims.

## 1.5 Disclaimer

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



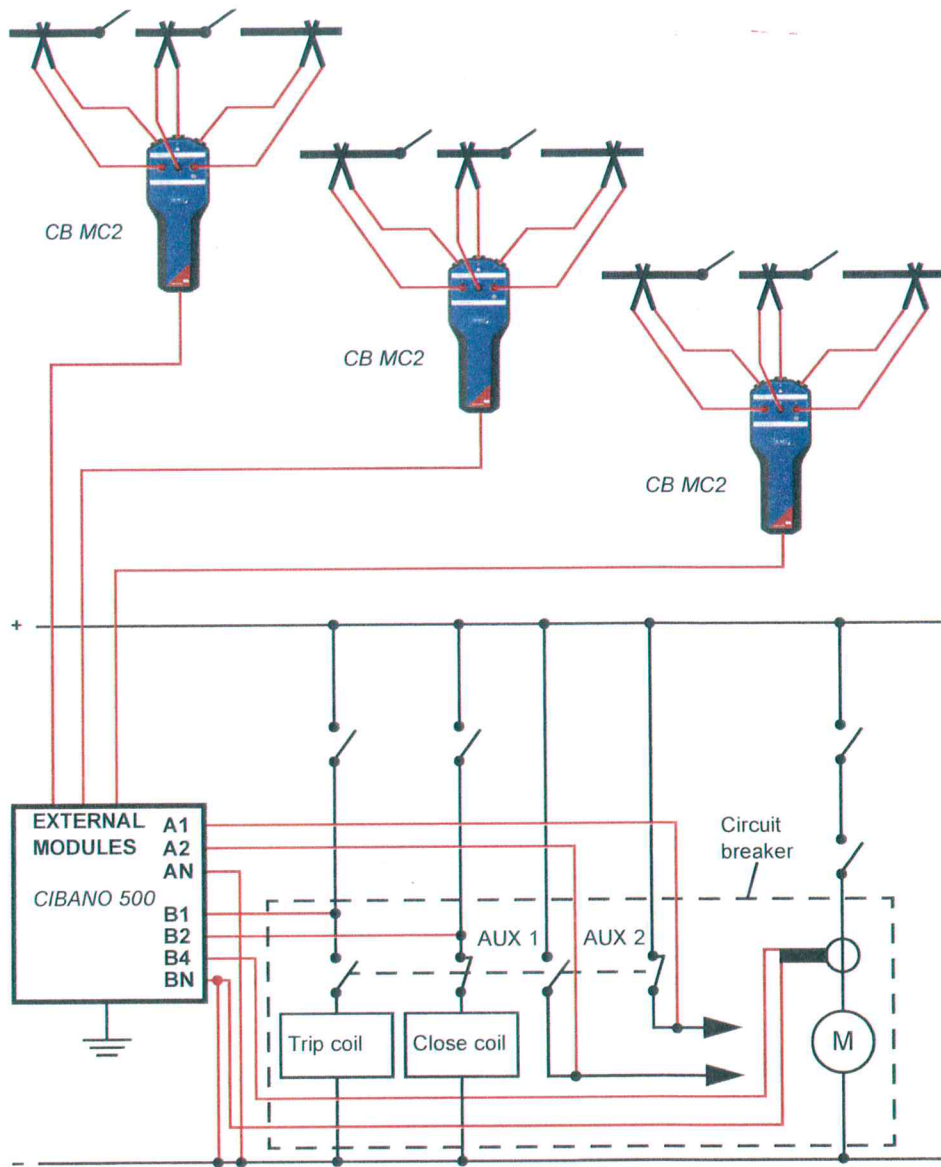


Figure 4-5: Typical measurement setup for testing high-voltage circuit breakers

## CIBANO 500 Getting Started

### 2. Do one of the following:

- ▶ Assure that the points of connection carry no voltage. Voltage on the connection points can impact the safety of the operator but poses no danger to the test set. Clamp *CIBANO 500* to the circuit breaker's trip and close coils without disconnecting other parts of the station. The advantage of this method is that you do not need to modify the wiring of the circuit breaker to the station. The disadvantage is that it is difficult to ensure that there is no voltage on the points of connection. Connecting *CIBANO 500* while voltage is present on the connection point requires special safety precautions depending on the company and national standards and is explicitly not recommended by OMICRON.
- ▶ Disconnect the circuit breaker at the points marked by the red crosses completely from the substations. Then clamp *CIBANO 500* to the circuit breaker's trip and close coils. You can often do it easily on medium-voltage breakers by removing a single plug and therefore recommended for maximum safety.

The following figures show typical *CIBANO 500* measurement setups for testing medium-voltage and high-voltage circuit breakers. Depending on the *Primary Test Manager* settings, many other configurations are possible.

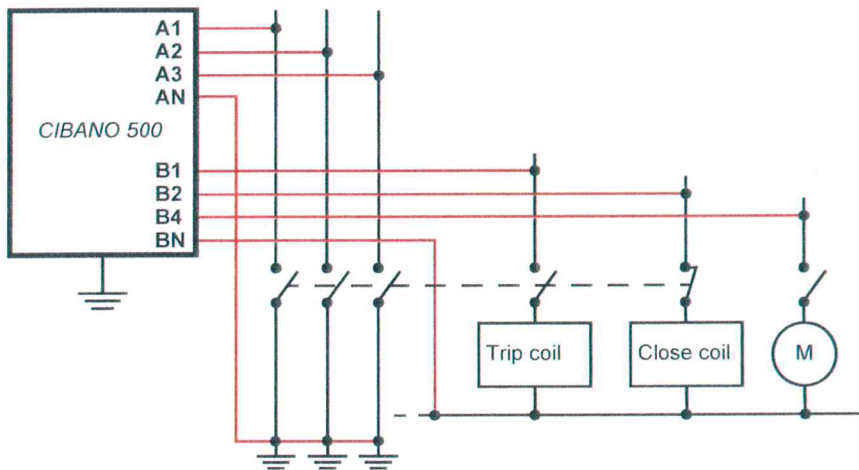


Figure 4-4: Typical measurement setup for the Timing test on medium-voltage circuit breakers with complete disconnection from the station

## 1.6 Compliance statement

### Declaration of conformity (EU)

The equipment adheres to the guidelines of the council of the European Community for meeting the requirements of the member states regarding the electromagnetic compatibility (EMC) directive, the low voltage directive (LVD) and the RoHS directive.

### FCC compliance (USA)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### Declaration of compliance (Canada)

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

## 1.7 Recycling



**This test set (including all accessories) is not intended for household use. At the end of its service life, do not dispose of the test set with household waste!**

### For customers in EU countries (incl. European Economic Area)

OMICRON test sets are subject to the EU Waste Electrical and Electronic Equipment Directive 2012/19/EU (WEEE directive). As part of our legal obligations under this legislation, OMICRON offers to take back the test set and ensure that it is disposed of by authorized recycling agents.

### For customers outside the European Economic Area

Please contact the authorities in charge for the relevant environmental regulations in your country and dispose the OMICRON test set only in accordance with your local legal requirements.

## 2 System requirements

Table 2-1: Primary Test Manager system requirements

Characteristic	Requirement (*recommended)
Operating system	<b>Windows 10 64-bit*</b> <b>Windows 8.1 64-bit*</b> , <b>Windows 8 64-bit*</b> , <b>Windows 7 SP1 64-bit*</b> and 32-bit
CPU	<b>Multicore system with 2 GHz or faster*</b> , single-core system with 2 GHz or faster
RAM	min. 2 GB ( <b>4 GB*</b> )
Hard disk	min. 4 GB of available space
Storage device	DVD-ROM drive
Graphics adapter	Super VGA (1280×768) or higher-resolution video adapter and monitor <sup>1</sup>
Interface	Ethernet NIC <sup>2</sup> , USB 2.0 <sup>3</sup>
Installed software required for the optional Microsoft Office interface functions	<b>Microsoft Office 2016*</b> , Office 2013, Office 2010, Office 2007

1. We recommend graphics adapter supporting Microsoft DirectX 9.0 or later.

2. For testing with *TESTRANO 600*, *CPC 100* and *CIBANO 500*. NIC = Network Interface Card. *TESTRANO 600*, *CPC 100* and *CIBANO 500* can be connected with RJ-45 connectors either directly to the computer or to the local network, for example, by using an Ethernet hub.

3. For testing with *FRANEO 800*

### 4.4.3 Open the device web interface

On the device website, you can upgrade the device embedded software, get log files, roll back software images, reboot the device and manage license files.

To open the device web interface:

1. In the home view, select the device from the list.
2. Click **More** beneath the **Connect** button, and then click **Open device web interface**.  
A website with the IP address of the device opens in the default web browser.

## 4.5 Connect CIBANO 500 to the test object

### WARNING



#### Death or severe injury caused by high voltage or current possible

- ▶ Do not connect *CIBANO 500* to a test object before isolating the test object according to the five safety rules.
- ▶ Always obey the five safety rules (see 1.2.2 "Safety rules" on page 3) and all additional relevant laws and internal safety standards when connecting *CIBANO 500* to a test object.

You can connect *CIBANO 500* to the test object without disconnecting other parts of the station or with complete disconnection from the station as shown in the following figure.

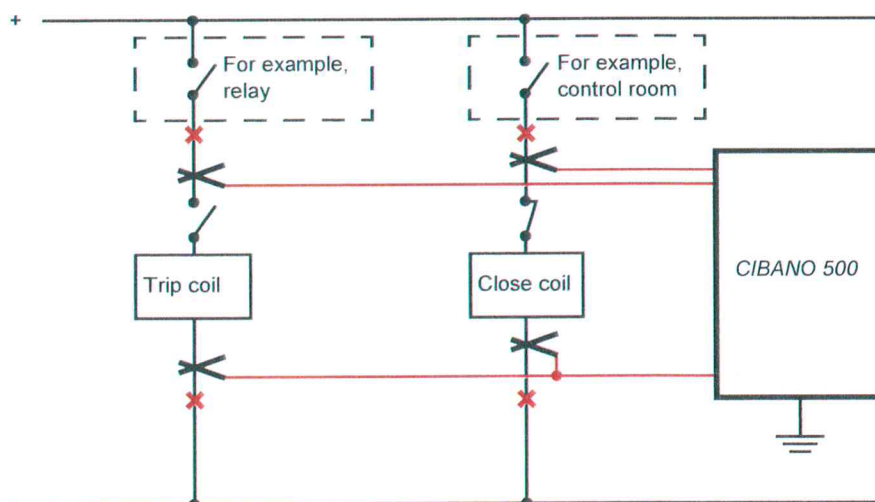


Figure 4-3: Principal connection of *CIBANO 500* to the test object

To connect *CIBANO 500* to the test object:

1. Connect the equipotential ground terminal of *CIBANO 500* (see 3.2.2 "Side panel" on page 11) to ground as close as possible to the operator.

## CIBANO 500 Getting Started

If you could not connect to your *CIBANO 500* device and the green light is permanently on, wait a few seconds, and then do one of the following:

- ▶ Click **More** beneath the **Connect** button, and then click **Refresh**.
- ▶ Press F5.

If the *CIBANO 500* device to which you want to connect is not displayed in the list of available devices, proceed as described in "Troubleshooting" in the *CIBANO 500 PTM User Manual*.

Alternatively, you can manage the connection to *CIBANO 500* in the *Primary Test Manager* status bar (see "Status bar" in the *CIBANO 500 PTM User Manual*).

There is embedded software and firmware in *CIBANO 500* and firmware in each of the *CB MC2*, *CB TN3* and *IOB1* modules. The embedded software upgrade requires a special procedure, all other upgrades can be done during normal operation.

### 4.4.1 Upgrade the *CIBANO 500* embedded software

The *CIBANO 500* embedded software must be compatible with *Primary Test Manager*. You can upgrade the *CIBANO 500* embedded software in the *Primary Test Manager* home view (see "Home view" in the *CIBANO 500 PTM User Manual*).

- ▶ To upgrade the *CIBANO 500* embedded software, select the device you want to upgrade from the list, and then click **Connect**. *Primary Test Manager* will prompt you to upgrade the *CIBANO 500* embedded software, if necessary.

Alternatively, you can proceed as follows:

1. In the home view, select the device you want to upgrade from the list.
2. Click **More** beneath the **Connect** button, and then click **Update device software**.
3. In the **Select CIBANO Update Image** dialog box, double-click the embeddedImage.tar file.

If you encounter problems when upgrading the *CIBANO 500* embedded software, proceed as described in "Troubleshooting" in the *CIBANO 500 PTM User Manual*.

### 4.4.2 Upgrade the *CIBANO 500* firmware

After upgrading the *CIBANO 500* embedded software, you might need to upgrade also the firmware of *CIBANO 500* or the firmware of the *CB MC2*, *CB TN3* and *IOB1* modules. If a firmware upgrade is necessary, the following notification bar appears after you selected a test.



Figure 4-2: Upgrading the firmware of *CIBANO 500* and connected external modules

- ▶ To upgrade the *CIBANO 500* firmware, click **Start firmware update**.

## 3 Introduction

### 3.1 Designated use

*CIBANO 500*, in conjunction with its accessories or as stand-alone unit, is a test system for commissioning and maintenance of circuit breakers. The following tests can be performed using *CIBANO 500* according to IEC and ANSI standards:

- Main contact resistance measurement ( $\mu\Omega$  meter)
- Minimum pick-up voltage measurement of trip and close coils
- Motor current and voltage
- Main and resistive contact timing measurement
- Sending trip and close commands to perform different operations:
  - Open (O)
  - Close (C)
  - Reclose (OC)
  - Trip-free (CO)
  - Autoreclose (O-CO)
  - CO-CO
  - O-CO-CO
- Main contact dynamic resistance measurement enabling users to perform the operations listed earlier in this section
- Along with timing and dynamic resistance measurements, the following measurements can be included:
  - Trip and close coil current and voltage
  - Test of under voltage trip function
  - Main contact travel

*CIBANO 500* operates only when connected to an external computer through an Ethernet connection. By using the *Primary Test Manager* software, you can define, parametrize, and execute various, partly automated tests.

### 3.2 Connections and operating controls

*CIBANO 500* is available with two interface modules:

- EtherCAT<sup>®1</sup> module providing 4×EtherCAT<sup>®</sup> interfaces
- Auxiliary module providing 1×EtherCAT<sup>®</sup>, 3×AUX interfaces

The following figures describe the connections and operating controls of *CIBANO 500*.

---

1. EtherCAT<sup>®</sup> is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

### 3.2.1 Front panel

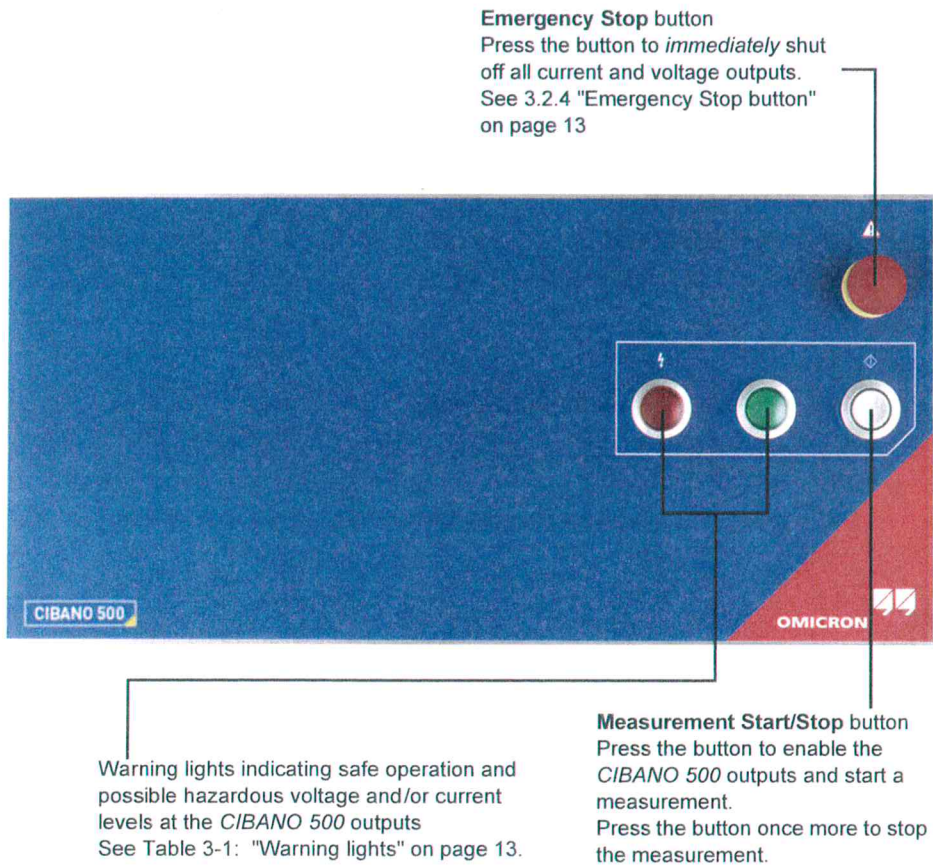


Figure 3-1: Front view of *CIBANO 500*

**WARNING**



**Death or severe injury caused by high voltage or current possible**

- ▶ Do not cover the warning lights (for example, with a computer) since the warning lights indicate possible hazards.
- ▶ Always observe the warning lights while working with *CIBANO 500*.



## 4 Installation

This section describes how to put the *CIBANO 500* test system into operation. The *CIBANO 500* operation is controlled by the *Primary Test Manager* software. Consequently, before operating *CIBANO 500*, you must install *Primary Test Manager* and connect *CIBANO 500* to a computer.

### 4.1 Connect *CIBANO 500* to the computer

*CIBANO 500* communicates with the computer through Ethernet interface. To connect *CIBANO 500* to the computer:

1. Connect the delivered Ethernet cable to the **NETWORK** socket on the *CIBANO 500* side panel.
2. Connect the other end of the Ethernet cable to the Ethernet connector of your computer.
3. Check whether the safety dongles shipped with *CIBANO 500* are plugged in and locked in the **SAFETY** connectors on the side panel (see 3.2.2 "Side panel" on page 11).

### 4.2 Power up *CIBANO 500*

To power up *CIBANO 500*:

1. Connect the equipotential ground terminal of *CIBANO 500* (see 3.2.2 "Side panel" on page 11) to ground as close as possible to the operator.
2. Plug the power cable into the power socket on the *CIBANO 500* side panel.
3. Plug the mains plug of the power cable into the power outlet.
4. Press the power switch on the *CIBANO 500* side panel.

### 4.3 Install *Primary Test Manager*

For the minimum requirements your computer needs to run *Primary Test Manager*, see 2 "System requirements" on page 8.

- ▶ To install *Primary Test Manager*, put the delivered *Primary Test Manager* DVD in the DVD drive of your computer and follow the instructions on the screen.

### 4.4 Start *Primary Test Manager* and connect to *CIBANO 500*


- ▶ To start *Primary Test Manager*, click **Start** on the task bar, and then click **OMICRON Primary Test Manager**, or double-click the **OMICRON Primary Test Manager** icon  on the desktop.
- ▶ To connect to *CIBANO 500*, select the device from the list, and then click **Connect**.



Figure 4-1: Connecting to *CIBANO 500*

### 3.3 Primary Test Manager

*Primary Test Manager* is a control software for testing high-voltage assets with OMICRON test systems. *Primary Test Manager* provides a computer interface to the test set and assists you with the hardware configuration and test assessment.

With *Primary Test Manager*, you can create new jobs, execute prepared jobs, manage objects, create new manual tests, open existing manual tests, and perform tests. For a specified test, you can make measurements by just pressing the **Measurement Start/Stop** button on the front panel of the *CIBANO 500* test system. After you have performed a test, you can generate exhaustive test reports. *Primary Test Manager* runs on a computer and communicates with *CIBANO 500* through Ethernet interface.

For detailed information about *Primary Test Manager*, see the relevant chapters in the *CIBANO 500 PTM User Manual*.

### 3.4 Cleaning

#### WARNING



#### Death or severe injury caused by high voltage or current possible

- ▶ Do not clean the *CIBANO 500* test set when connected to the test object.
- ▶ Before cleaning *CIBANO 500* and its accessories, always disconnect the test object, accessories and connection cables.

To clean *CIBANO 500* and its accessories, use a cloth dampened with isopropanol alcohol.

### 3.2.2 Side panel

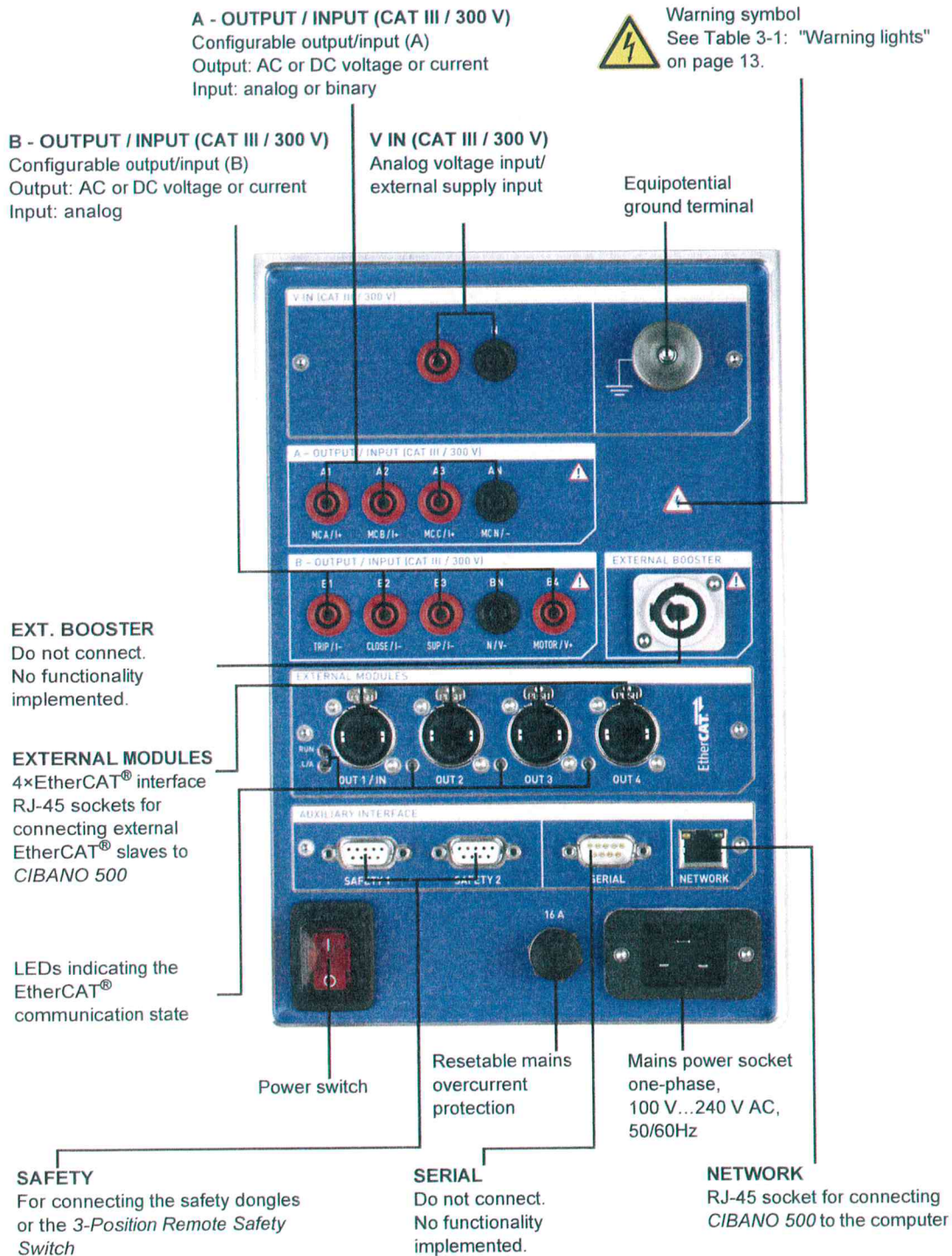


Figure 3-2: Side view of CIBANO 500 with the EtherCAT® module

# CIBANO 500 Getting Started

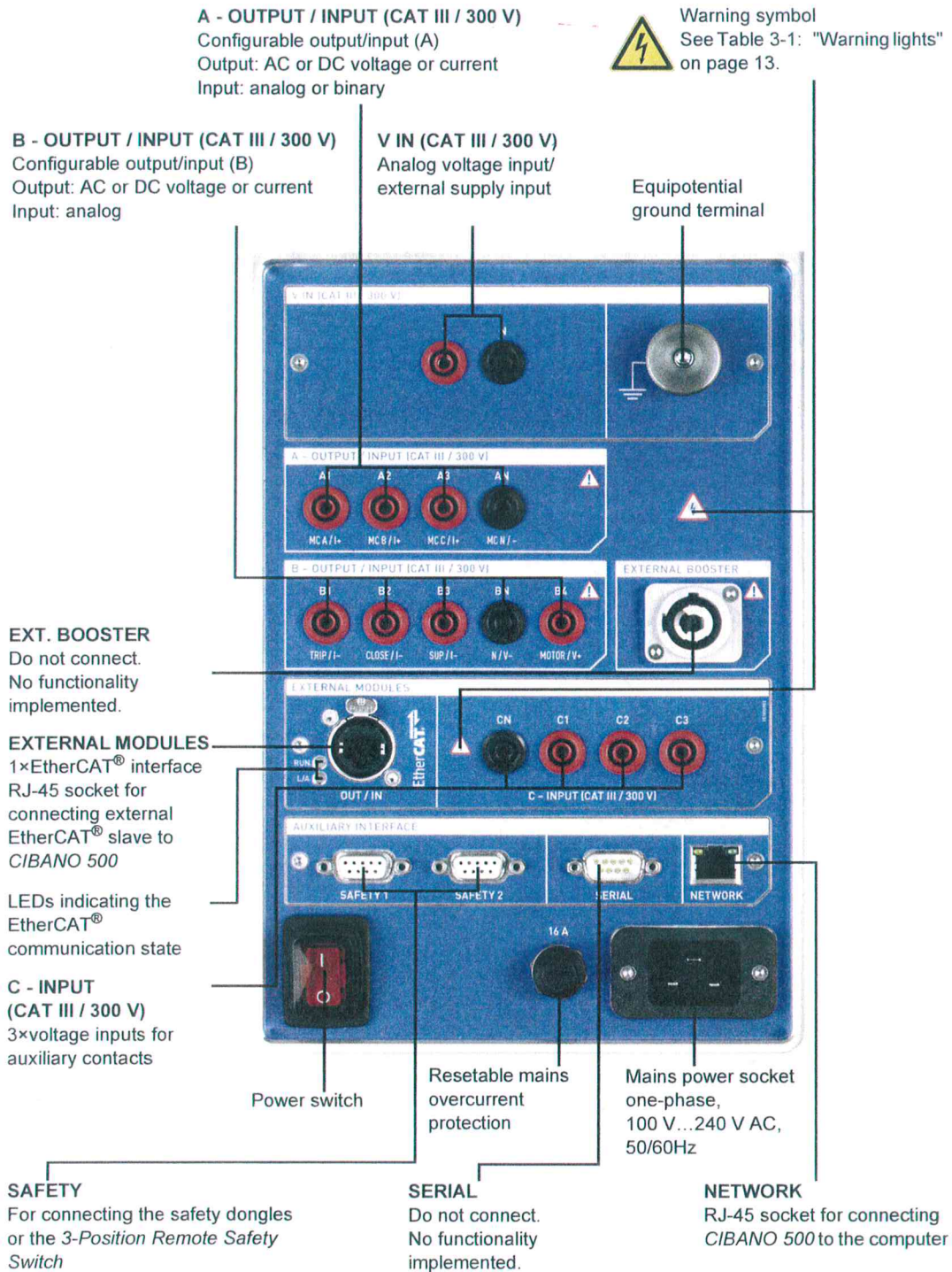










Figure 3-3: Side view of CIBANO 500 with the Auxiliary module

### 3.2.3 Warning lights

*CIBANO 500* provides the following warning lights to indicate safe operation and possible hazards.

Table 3-1: Warning lights

Warning light	Description	<i>CIBANO 500</i> state	Operating condition
	Green light on the front panel is on.	<i>CIBANO 500</i> is up and running in the stand-by mode.	Safe operating condition as long as no voltage is applied from outside (As long as the warning symbol on the side panel is off.)
	Blue ring on the <b>Measurement Start/Stop</b> button is on.	A test is prepared and ready to start.	
	Blue ring on the <b>Measurement Start/Stop</b> button is flashing.	A test is starting. Possibly there are hazardous voltage and/or current levels at the <i>CIBANO 500</i> outputs.	 <b>Dangerous operating condition</b>
	Red light on the front panel is flashing.	A test is running. Possibly there are hazardous voltage and/or current levels at the <i>CIBANO 500</i> outputs.	 <b>Dangerous operating condition</b>
	Warning symbol on the side panel is flashing.	There are hazardous voltage levels (> 42 V) at the <i>CIBANO 500</i> inputs/outputs independent of the measurement state.	 <b>Dangerous operating condition</b>

### 3.2.4 Emergency Stop button

Pressing the **Emergency Stop** button *immediately* shuts off all *CIBANO 500* outputs and stops the running measurement. After pressing the **Emergency Stop** button, *Primary Test Manager* does not allow starting a measurement.

To restart the measurement after the reason for the emergency stop has been resolved, release the **Emergency Stop** button by carefully turning it, click the **Start** button in *Primary Test Manager*, and then press the **Measurement Start/Stop** button.

For information about the *CIBANO 500* accessories, see "Accessories" in the *CIBANO 500 PTM User Manual*.