If the output current from the tester is outside the acceptable range then the tester may still operate the RCD trip but the 150mA LED will not light. If this happens the test result obtained (the displayed disconnection time) is not valid as the tester has failed to supply the indicated test current.
The MP-CB400 automatically resets ready to test after a period of around 4 seconds when the LED goes out.
• The instrument is then set to the 5 × I∆n 150mA setting at 180º and the above test repeated.

½ × I∆n (15mA)

• The instrument under test is then set to the ½ × I∆n 15mA setting at 0º.
• The test is then carried out at the instrument.
• The illumination of the 15mA LED on the MP-CB400 indicates that the test has been carried out and the instrument output current is acceptable.
• The MP-CB400 automatically resets ready to test after a period of around 4 seconds when the LED goes out.
• The reading obtained on the test instrument should indicate that the trip did not occur in the 2 second time period. (The reading shown will depend upon the test instrument being used as this varies according to the manufacturer.)
If the output current from the tester is outside the acceptable range then the tester may still indicate that the trip did not occur in the 2 second time period but the 15mA LED will not light. If this happens the test result obtained is not valid as the tester has failed to supply the indicated test current.
If satisfactory press the phase selection switch to change the test phase angle to 180º and repeat above tests.

Ongoing accuracy record

The procedure given above for the site check may also be used to provide a record of ongoing accuracy for the RCD test instrument.
This is possible because the test of the RCD instrument is carried out within the MP-CB400 unit and is independent of any external influence.
The test should be carried out at regular intervals and the results recorded on the ongoing accuracy record sheet for the instrument.
Refer to section 6.5 for examples of how to apply tolerances.

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06-MP-CB400_V01

MEET Professional

Advanced 'No-Trip' 17th Edition Professional Checkbox

Operating Instructions

MP-CB400

www.meetprofessional.com sales@meet.com.hk

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- ½ ×I∆n test at 15mA
- 1 × I∆n test at 30mA
- 5 ×I∆n test at 150mA

can be carried out at the MP-CB400 test socket.
The MP-CB400 checks both the accuracy of the displayed disconnection time and the accuracy of the tester's output current.
Note: The MP-CB400 function for the 1 ×I∆n and the 5 × I∆n test has a set operation time of 38ms ± 1ms. So the instrument being checked should display a value, subject to the instrument manufacturer's tolerance, of 37–39ms.

Site Check

The connection to the MP-CB400 is made using the instrument test lead which is fitted with a BS 1363 (13A) plug into the test socket. The selection switch is set to the RCD position and the test instrument plugged into the MP-CB400 .

1 ×I∆n (30mA)

- The instrument is set to the 30mA and the 1× I∆n (30mA) setting at 0°.
- The test is then carried out at the instrument.

The reading obtained on the test instrument should be between 37ms and 39ms subject to the manufacturer's tolerances.
The illumination of the test current LED on the MP-CB400 indicates that the test has been carried out and the instrument output current is acceptable.
If the output current from the tester is outside the acceptable range then the tester may still operate the RCD trip but the LED will not light. If this happens the test result obtained (the displayed disconnection time) is not valid as the tester has failed to supply the indicated test current.
The MP-CB400 automatically resets ready to test after a period of around 4 seconds when the LED goes out.

- The instrument is then set to the 30mA and the 1 ×I∆n (30mA) setting at 180° and the above test repeated.

5 ×I∆n (150mA)

- The instrument under test is then set to the 5 ×I∆n 150mA setting at 0°.
- The test is then carried out at the instrument.

The reading obtained on the test instrument should be between 37ms and 39ms subject to the manufacturer's tolerances.
The illumination of the 150mA LED on the MP-CB400 indicates that the test has been carried out and the instrument output current is acceptable.

• Use the cursor to select +100Ω position.
• The instrument is then switched on or plugged back into the MP-CB400
• The earth fault loop impedance test is then carried out in the usual way. The measured value is recorded on the instrument record sheet.

Comparing the 'local loop' value and the '+100Ω' value should show the increase of 100Ω (or more accurately the calibrated value for the 100Ω setting), within the manufacturer's tolerance.
Refer to section 6.5 for examples of how to apply tolerances.

Ongoing accuracy record

To give a more exact indication of the instrument accuracy it is strongly recommended that **the same dedicated power outlet is used each time for the checks**. This will allow the instrument to be compared with the:

• Actual local loop value
• MP-CB400 'local loop' value at that socket
• MP-CB400 'local loop + 1Ω' value
and
• MP-CB400 'local loop + 100Ω' value

This process will give a reference against three Reference Values and provide a more precise indication of the instrument accuracy.
The earth fault loop impedance tester is used to

1. Test and record the actual loop impedance from the dedicated socket outlet.
2. Test and record the MP-CB400 'local loop' value.
3. Test and record the 'local loop + 1Ω value.
4. Test and record the 'local loop + 100Ω value.

Each of the above tests is repeated three times and the average value recorded as the Reference Value for each test.
The Reference values obtained for tests 1, 2, 3 and 4 above (socket loop, local loop, local loop +1Ω and local loop + 100Ω) then provide four reference points with which to compare the instrument accuracy.

9: Residual Current Device Checks

The MP-CB400 provides a facility to check the accuracy of residual current device test instruments relative to the testing of 30mA and 100mA RCDs, the most common types used for additional protection.

1: What's in the box

- MP - CB400 Professional Checkbox
- Mains power lead 13A to IEC connector
- 1 pair 4mm safety plug test leads
- Calibration certificate

2: Functions & Specifications

The MP-CB400 provides a quick and simple method of checking the accuracy of 17th edition electrical installation test instruments.
It does not replace the requirement for formal calibration but depending upon the instrument manufacturer it may allow extended periods between formal calibration and provides a ready check on instrument accuracy helping to minimise incorrect certification and costly revisits to confirm installation compliance.
It can be used for recording ongoing accuracy checks to monitor the performance of instruments over a period of time or as an on - site portable device to confirm the correct operation of an instrument when faced with an unusual reading.
The MP-CB400 provides accuracy checks at up to 9 test points for test instruments used to measure:

• Continuity
• Insulation resistance
• Earth fault loop impedance
• Operation of residual current devices.

Specifications

Function	Check Values	Accuracy	Rating
Insulation Test	0.25MΩ	1%	Up to 1000V
	0.5MΩ	1%	Up to 1000V
	1.0MΩ	1%	Up to 1000V
	2.0MΩ	1%	Up to 1000V
	10MΩ	1%	Up to 1000V
	200MΩ	2%	Up to 1000V
Output Voltage	250V @ 0.25MΩ		
3 bands	500V @ 0.5MΩ		
	1000V @ 1.0MΩ		
Continuity Test	Null	1% ±20mΩ	Current rating: 1A
	0.5Ω	1% ±20mΩ	Current rating: 1A
	1.0Ω	1% ±20mΩ	Current rating: 1A
	2.0Ω	1% ±20mΩ	Current rating: 1A
	100Ω	1%	Current rating: 250mA
	2000Ω	1%	Current rating: 25mA
Loop Test	Local	–	Current rating: 25A (pulsed)
	Additional 1Ω	1% ±20mΩ	10ms pulses
	Additional 100Ω	1%	
RCD Test	30mA (× 1)	5%	30mA AC type
	30mA (× 5)	5%	30mA AC type
	30mA (× ½)	5%	30mA AC type
	100mA (× 1)	5%	100mA AC type
	100mA (× ½)	5%	100mA AC and ACS type
Current break time	38ms ± 1ms		
LED for Current accuracy	> 200mA @ 2 ohm	1%	
Case size: 328 × 230 × 125 mm			
Safety: Complies with IEC EN 61010			
Weight without leads: 2.42kg			

3: Connecting the Checkbox

The MP-CB400 requires a 230V mains supply for operation. Connect the supplied mains lead to a 13A socket and the 'mains input' connector on the MP-CB400.

The MP-CB400 incorporates a unique "No Trip" circuit to enable the safe check of RCD Testers and high current loop testers without the risk of tripping the supply RCD.

The 'local loop' is the value measured at the MP-CB400 test socket without any additional resistance switched into the circuit.
As the MP-CB400 internal circuit provides some additional resistance the 'local loop' value from the MP-CB400 test socket will be slightly higher than the loop value measured directly from the actual supply socket.
As the MP-CB400 will be used to check the accuracy of the instrument it is strongly advised that:

• both of the plugs (13A and IEC) used to connect the MP-CB400 to the mains supply and both ends of the test lead used to connect the instrument to the MP-CB400 socket are each inserted and removed several times before undertaking the accuracy check. This process will help to reduce any additional resistance which may be caused by tarnishing of the pins or socket tubes.

Note: Where the instrument being checked does not have an inbuilt on/off switch the instrument must be unplugged from the MP-CB400 when changing the earth fault loop settings with the cursor key.

Site Check

The MP-CB400 provides a fast check option for the earth fault loop impedance tester. This enables the instrument to be checked on site to confirm the accuracy of the instrument measurement. This site check consists of a measurement of the MP-CB400 local loop and then measurement with 1 Ω resistance added and finally with 100 Ω resistance added. This will identify whether the instrument is accurately measuring the 1 Ω and 100 Ω increase. This check may be carried out at any suitable socket outlet.

• The MP-CB400 should be plugged into a suitable power socket and set to the 'local' setting.
• The earth fault loop impedance tester is then plugged into the MP-CB400 test socket and the tester operated. The measured value is recorded.
• The test instrument is then switched off or disconnected from the MP-CB400 for a period of 5 seconds. If the tester has an on/off switch it should be used in preference to disconnection.
• Use the cursor to select +1.0Ω position.
• The instrument is then switched on or plugged back into the MP-CB400.
The earth fault loop impedance test is then carried out. The measured value is recorded on the instrument record sheet.
Comparing the 'local loop' value and the '+1.0Ω' value should show the increase of 1 Ω (or more accurately the calibrated value for the 1Ω setting) within the manufacturer's tolerance.
• The test instrument is then switched off or unplugged from the MP-CB400 for a period of 5 seconds.

If the instrument tolerance is 2% and 20mΩ then the measured value should be within 2% and 20mΩ of the reference value. So if the reference value is 0.5Ω the measured value should be between 0.53Ω and 0.47Ω.

7: Insulation Resistance Checks

There is no requirement to null the test leads for insulation resistance test checks. The MP-CB400 can be used to check insulation resistance testers across the voltage range. This enables the test instrument to be checked on the 250V, 500V and 1000V settings.

• Select the appropriate resistance scale and test voltage on the instrument being checked.
• The insulation resistance tester is then operated in the normal way.
• The measured value obtained is recorded on the test instrument record sheet.
• The same procedure is followed for the each of the check points on the MP-CB400 insulation range.
• These same tests may then be repeated for each test voltage if required.

The measured values obtained are compared with the Reference Values to assess the performance of the instrument over time.
If the measured values are found to be within the manufacturer's tolerance then the instrument is suitable for continued use.
If any of the measured values are outside the manufacturer's tolerance then the instrument will need to be returned for calibration.
Refer to section 6.5 for examples of how to apply tolerances.

Confirmation of correct voltage output

The MP-CB400 also includes an important function that checks the output voltage at one point on each range.
The voltage check point is at 0.25MΩ for the 250V range, 0.5MΩ for the 500V range and 1.0MΩ for the 1000V range. When testing at these points the appropriate LED in the section at the right hand side of the insulation range will light if the test voltage is correct.

8: Earth Fault Loop Impedance Checks

The MP-CB400 provides a facility to check the accuracy of earth fault loop impedance testers.
The MP-CB400 provides tests of:

• MP-CB400 'local' earth fault loop impedance
• MP-CB400 'local' earth fault loop with an additional 1Ω included.
• MP-CB400 'local' earth fault loop with an additional 100Ω included.

For checking insulation or continuity functions you can use your own instrument's test leads to connect your instrument to the corresponding 4mm input terminals on the face of the MP-CB400 if they terminate in a 4mm plug. Alternatively you can use the supplied pair of red and black leads.

For checking loop or RCD functions plug your tester into the 13A style test socket labelled 'LOOP OR RCD TESTER'.

When you connect the check box to the mains supply it will select the Insulation 0.25M Ω test position by default. Use the cursor keys to select the appropriate function and value for the instrument to be tested.

4: Recording reference values for ongoing accuracy records

When using the MP-CB400 to check an instrument for the first time it should be in current calibration.

When the first set of tests for any instrument are undertaken:

• A separate test record sheet should be kept for each test instrument.
• Each test should be repeated 3 times to establish the initial test value for each particular instrument.
• The value obtained over the three tests should be similar and within the instrument manufacturer's tolerances.
• The average value over the three tests should be recorded on the instrument test record as the Reference Value.
• It is this Reference Value which will be used for future accuracy checks on the instrument.

5: Check box calibration values

Important: As there are always very slight differences between the values of components used, the actual check values of each check box are likely to vary slightly from the nominal values shown on the check box face label.

Each MP-CB400 is calibrated and the actual values of your individual MP-CB400 are shown on the calibration summary label inside the lid. It is this calibrated value rather than the nominal value shown on the panel label that should be used when comparing measured readings to an instrument manufacturer's specification.

6: Checking Continuity performance

6.1: What is meant by 'nulling' test leads and why is it important

Continuity measurements are often made on circuits with very low resistances with values of less than 1Ω. Most measuring instruments measure the total resistance value between the instrument terminals including the resistance of all connected test leads, whereas the required result is that for the circuit without the test leads. It is therefore necessary to measure the resistance of the test leads and deduct this value from the overall result; this is known as lead nulling.
Many continuity testers have a 'Lead null' function that after an initial measurement of lead resistance, will automatically deduct this value from subsequent readings until reset. When using continuity testers without a 'lead null' function it is necessary to measure the value of lead resistance and manually deduct it from all measurements.
It is essential to either null the leads or deduct the lead resistance from the measured value so that the check on the accuracy of the instrument is not affected by the test leads used. This is because the resistance of the leads may vary with use or the leads may be replaced during the lifetime of the instrument.
The MP-CB400 includes a 'lead null' position for the continuity test range. This can be used either to null the leads if the test instrument being checked includes a lead null function or to measure the lead resistance for instruments without this function.
Follow section 6.3 or 6.4 as appropriate for your instrument.

6.2: Confirmation of correct test current

EN 1557 requires that continuity testers should be capable of at least 200mA test current. The MP-CB400. conducts this important check at the 2.0Ω check point. If the output current is correct the 'output current correct' LED at the far end of the Continuity scale will illuminate when testing at the 2.0Ω check point.

6.3: Instruments with a Lead Null function
6.3.1: nulling

• The leads should be connected between the instrument and the 4mm terminals on MP-CB400.
• Use the cursor to select the 'NULL' function on the continuity range. This provides a direct link between the two leads and allows them to be nulled.
• Null the leads according to the instrument manufacturer's instructions.
Once the leads have been nulled and providing the instrument is not switched off, there will be no need to subtract the test lead values from the measured values as the instrument should automatically deduct the resistance value of the test leads from any further measurements.
If the instrument is switched off the null process will need to be repeated.

6.3.2 Continuity check

• The instrument to be checked should be set to the most appropriate scale and the continuity test carried out at each of the check points on the MP-CB400
• The value obtained should be recorded on the test instrument record sheet.
• The recorded values are compared with the reference values to assess the performance of the instrument over time, or compared to the manufacturer's specification to confirm that the instrument is still within calibration.
• If the measured values are found to be within the manufacturer's specification and tolerance then the instrument is suitable for continued use.
• If any of the measured values are outside the manufacturer's tolerance then the instrument will need to be returned for calibration.

6.4 Instruments without Lead Null function
6.4.1 Measuring resistance

Where there is no lead null option on the instrument to be checked the null position can be used to establish the resistance of the test leads.
• With the NULL position selected the instrument should be set to the lowest resistance scale and operated in the normal way.
• The value measured by the instrument will be the resistance of the test leads. Make a note of this value as it must be subtracted from the check values obtained when checking at the other five check points.

6.4.2 Continuity check

• The instrument to be checked should be set to the most appropriate scale and the continuity test carried out at each of the check points on the MP-CB400.
• Subtract the resistance value of the leads that you previously measured from the instrument reading. The value obtained should be recorded on the test instrument record sheet.
• The same procedure should be followed using the other five check points on the MP-CB400.
• The recorded values are compared with the reference values to assess the performance of the instrument over time.
• If the measured values are found to be within the manufacturer's tolerance then the instrument is suitable for continued use.
• If any of the measured values are outside the manufacturer's tolerance then the instrument will need to be returned for calibration.

6.5 Tolerance examples

If the instrument tolerance is 2% then the measured value should be within ± 2% of the calibration check value shown on the lid label. So if the reference value is 0.5 Ω the measured value should be between 0.51 Ω and 0.49 Ω.