CS – 4001/127
TMC – 4001/63

Capacity Test Equipment

Manual

CONTENT

- We reserve the right to make alterations and changes in the said system and to make changes in the information included in this manual without notice.
- We do not accept responsibility for damages of any type occurring in the use of the test system and/or occurring due to the fact that employment purposes could not be performed. The manufacturer can, in no case, be held responsible for direct damages, indirect damages or subsequent damages which occur to the customer by employment or non-employment possibilities of the product.

1. Safety precautions

Before you begin to deal more deeply with the device itself we would like to give you a few safety hints in advance.

⚠ Please observe the respective DIN/VDE/EN/IEC/ANSI-guidelines, the rules and regulations for local operators and the instructions of the battery manufacturer.

⚠ While preparing and performing a discharge/capacity test it may happen under certain circumstances that a cell/block can explode which can damage any equipment next to it and/or harm personnel. For that reason **never run a discharge test unattended**. Which means in return **never run the discharge test equipment such as CS/TMC-4001, load units etc. unattended**.

⚠ Battery systems are electrical equipment systems having high short-circuit currents. Avoid short-circuits which can cause current interruption, damage to the battery, station equipment and/or harm to personnel. **Be sure to think about possible short-circuit dangers which can be caused by incorrectly connected shunts!**

⚠ Electrical conducting parts (Poles, Connectors, etc.) are only allowed to be touched with safety voltage probes or safety connection clamps.

⚠ The CS/TMC-4001, the safety measuring leads and the accessories should only be employed for those purposes described here. Incorrect use can cause damage to the measuring system. Damage or used components must be immediately replaced. Do not use force in plugging the components together.

⚠ **CS/TMC4001** must only be connected to the, on the unit stated, mains voltage and frequency.

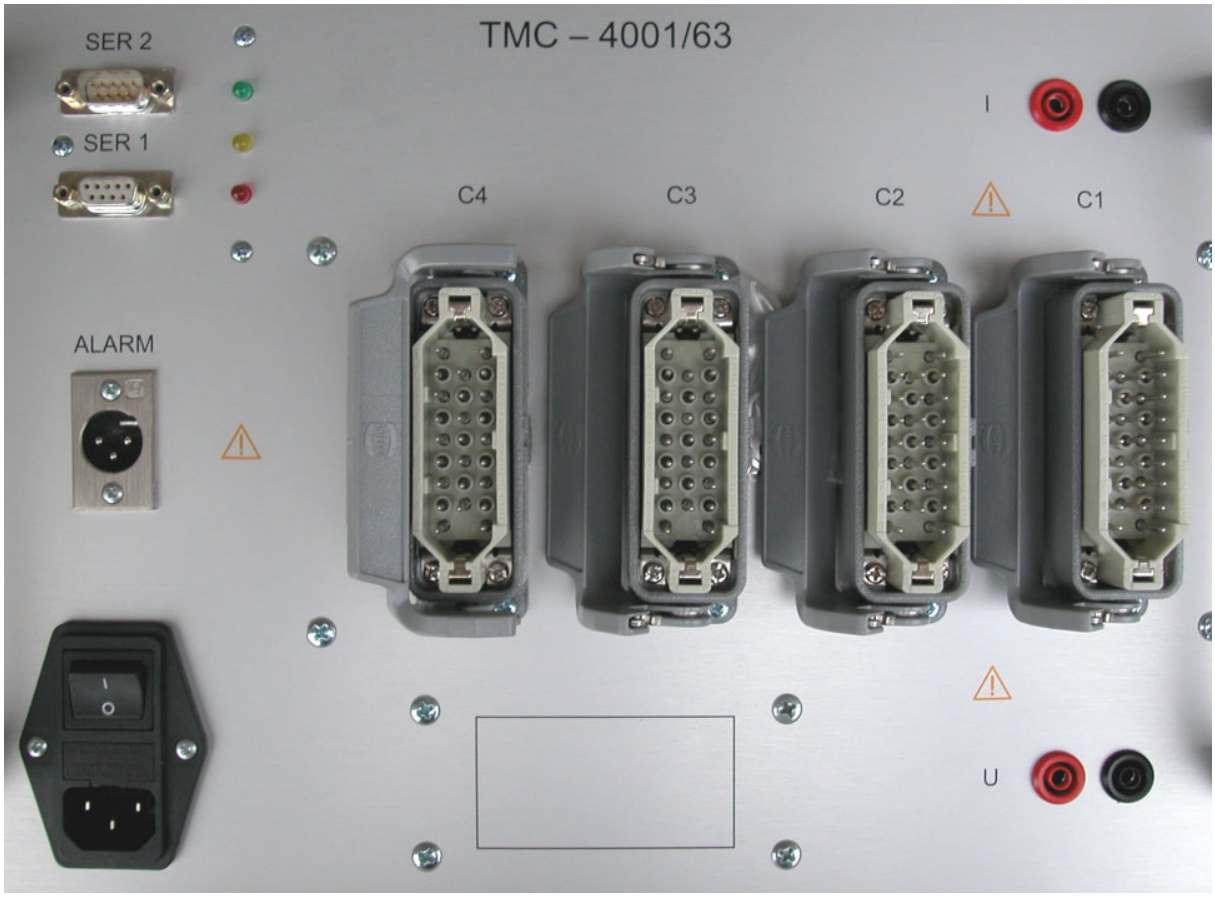
⚠ **Data transfer and output may only take place using the data transfer cable included in the delivery. Please be sure that you do not use data-cables from older versions of the TMC**. The use of connection cables originating from other manufactures can lead to destruction of the measuring device, as well as, the follow-up data device.

⚠ The device should not be exposed to direct sunshine or temperatures exceeding 45 degrees Celsius (e.g. laying onto heating units, radiators, etc.).

2. Panel CS-4001/127

Connector	Usage
C1 – C8	Measuring leads, Multi-cable
U1	Battery 1, total voltage
I1	Battery 1, current
T1	Temperature sensor 1
U2	Battery 2, total voltage
I2	Battery 2, current
T2	Temperature sensor 2
SER	Serial port to PC
AUX	Serial port to TORKEL
LED	**LED indication**
Red	Unit is powered up
Yellow	Unit measures
Green	Data transmission in progress

3. Panel CS/TMC-4001/63 and /31



Connector	Usage
C1 – C4	Measuring leads, Multi-cable
U	Battery, total voltage
I	Battery, current
ALARM	Alarm output contact
SER 1	Serial port to PC
SER 2	Serial port to TORKEL
LED	**LED indication**
Red	Unit is powered up
Yellow	Unit measures
Green	Data transmission in progress

4. Connection of the battery to CS/TMC-4001

⚠ Attention!
The measuring cables must be connected to the TMC-4001 first, BEFORE being connected to the battery!

1) Power-up the CS/TMC-4001 and start the TMC95 or TMC4001-Light Software on your computer.
2) Connect the first measuring cable (multi-cable) to the connector **C1** of the CS/TMC-4001.
3) Take the first crocodile–clamp (labelled with **"1")** and connect it to the **electrical minus pole of the battery**. Continue connecting the remaining clamps in ascending order of numbering (from low voltage to high voltage) to the plus pole of each cell. If you need more than one multi-cable, connect them analogue to the first cable to the connectors **C2** to **C8** (TMC4001/63 to **C4**).
4) Connect the shunt voltage cable to the **I**-connectors of the TMC4001 (**I1**-connectors on CS-4001/127). Observe the correct polarity!
5) Connect the total voltage cable to the **U-**connectors of the TMC4001 (**U1**-connectors on CS-4001/127).
   If you are using a temperature sensor connect it to the **T**-connector (**T1** on CS-4001/127).

Test of two batteries in parallel

When testing two batteries in parallel (CS-4001/127 only) proceed as follows:
Connect the first battery to the connectors **C1 to C4**, but **not more than 62 cells**. Connect the second battery to the connectors **C5 to C8**. Connect the shunt voltage cables and the total voltage cables to the specific connectors (**I1**, **U1** and **T1** = batterie1; **I2**, **U2** and **T2** = battery2) on the TMC4001.

6) Connect the **SER**-connector of the CS/TMC-4001 to the serial port of your computer. When you are using a TORKEL for testing connect it to the **AUX**–connector of the CS/TMC-4001.
7) Start the capacity test from the software.

5. Removing the connections from CS/TMC-4001

⚠ **First** you **must** disconnect all crocodile-clamps from the battery.

⚠ **Next** you can remove the connections C1 to C8 from CS/TMC-4001.

⚠ You must not switch off the **CS/TMC-4001** before all connections are removed from the battery.

6. Technical Data

No. of measuring inputs

	CS-4001/127	TMC-4001/63
Cell/Block voltage	127	63
Total voltage	2	1
Current	2	1
Temperature	2	none

Accuracy

Input	Range DC	Resolution	Accuracy	Input impedance
Cell/Block voltage	3V	1,00 mV	±0,05% ±2 Digits	≥ 1 MΩ
	15V	1,00 mV	±0,05% ±2 Digits	
Total voltage	75V	10,0 mV	±0,10% ±2 Digits	
	600V	100 mV	±0,10% ±2 Digits	
Current (shunt-voltage)	60mV	0,01 mV	±0,10% ±2 Digits	≥ 900 kΩ
	1000mV	0,10 mV	±0,10% ±2 Digits	

600V CAT II

Measuring multi-cables

If not otherwise specified (when ordering), CS/TMC-4001 instruments are equipped with standard measuring multi-cables (Type MKB16/250) specified for 250V. Measuring multi-cables specified for 500 V (Type MKB16/500) are also available on request.

Others

Mains supply	85-264V~, 47-63Hz
Operating temperature	+10°C – 35°C
Storage temperature	+5°C – 50°C

7. Trouble shooting

The display does not show the "START WINDOW" after power up.	You may have the USB-cable connected to the device, before the CS-4001 has been powered up. Remove the USB-cable and power up the CS-4001 again.
All measuring cables are connected, but when scanning only about –0.100V or negative voltages are displayed.	You have **MISCONNECTED** the battery to **CS/TMC4001.** Make sure that the first measuring cable (Connector **C1**) is **ALWAYS** connected to the electrical minus pole of the battery.
All measuring cables are connected, but when scanning only voltages about 3,1V are displayed, though higher voltage is applied.	In the test data you've entered wrong limits for the cell voltage. **CS/TMC4001** has two cell voltage ranges: **3V** and **15V** which are automatically set according to the entered limits.
All voltages are displayed correctly, but the order of the cells in the matrix is upside down.	In the test data you've entered a wrong cell number direction (**+ to -**) or (**- to +**). Correct this setting **BEFORE** the final measurement.
All voltages values are correct, but they are all displayed in red colour.	In the test data you've entered wrong limits for the cell voltage. Please check and correct if necessary.
The total voltage cables are connected, but when scanning only voltage about 78V is displayed, though higher voltage is applied.	In the test data you've entered wrong limits for the total voltage. **CS/TMC4001** has two total voltage ranges: **75V** and **600V** which are automatically set according to the entered limits.
The shunt–cables are connected, but too less current is displayed.	In the test data you've entered a wrong shunt values. **CS/TMC4001** has two ranges : **60mV** and **1000mV** which are automatically set according to the entered limits. The mV-value is responsible for the range setting. F. e. do enter 10A/10mV for shunt voltages up to 60mV, or do enter 100A/100mV (1000A/1000mV) for shunt voltages greater than 60mV.
Two cell voltages are not measured – only values about 0V are displayed.	One measuring wire has no contact to the battery connector or the corresponding fuse is blown. Please check that wire and it's fuse.

8. The new DISPLAY PANEL

The CS-4001/127 is equipped with our new LINUX board with TFT-Display and advanced communication facilities.
The menu functions can be selected by turning the rotary button. The selected function is activated by pushing down the rotary button.

The full function of this user interface will be implemented with our new CS-Manager software, which will be available around October 2006.

Please use at the moment the “REMOTE SERIAL” function under:

START MEASUREMENT -> STAND ALONE -> REMOTE SERIAL