

# TRIME-HD

## User manual



A triumphal technology



**IMKO**   
MICROMODULTECHNIK GMBH

**Thank you for buying IMKO.**

Should you have any queries please don't hesitate to contact your local distributor or address directly to:

**IMKO Micromodultechnik GmbH**

Im Stoeck 2  
D-76275 Ettlingen  
Germany

Phone: +49-7243-5921-0  
Fax: +49-7243-90856  
e-mail: info@imko.de  
internet: http://www.imko.de

as of October 6<sup>th</sup>, 2006

**Table of contents**

<b>1</b>	<b>Functional description of the TRIME-HD handheld display device</b>	<b>3</b>
1.1	Manual operation	3
1.2	Probe connection	3
1.3	Display functions / error messages	3
1.4	Battery operation	3
1.5	Battery charger	4
1.6	External power supply	4
1.7	Parallel analogue output	4
1.8	PC-connection via RS232	4
1.9	Technical data	4
<b>2</b>	<b>Interfaces</b>	<b>5</b>
2.1	Mounting of the connectors	6
2.2	Water tightness of connectors	6
<b>3</b>	<b>Operating instructions ACS-series</b>	<b>8</b>
3.1	Use of the charger	8
3.2	Features	8
3.3	LEDs	8
3.4	Operating elements	8
3.5	Caution	8
3.6	Operation	8
3.7	Use in motor vehicles and trucks ( only ACS 410 mobile)	9
3.8	Environmental reference	9

# 1 Functional description of the TRIME-HD handheld display device

The TRIME-HD is a portable handheld display instrument, which has been developed for mobile field use. It can additionally be supplied with an external power supply. It is connectable to a data logger or a PC for automated data logging.

## 1.1 Manual operation

The manual operation is very easy. Pressing the START-button switches on the TRIME-HD and starts the measurement. For the time of measurement the green LED is switched on. The instrument switches off about two minutes after the last operation, in order to save battery power.

## 1.2 Probe connection

TRIME-HD can be connected to any 'intelligent' TRIME probe (TRIME-IT/-ITC/-EZ/-EZC/-IPH) with analogue output 0..1V. To screw the probe connector on is only necessary if the instrument is exposed to the weather.

## 1.3 Display functions / error messages

The LC-display of the TRIME-HD has 1 line with 5 characters. In case of failure reading a moisture >100% is displayed:

error-Nr.	voltage 0-1V	display values	error cause
1 – 29	1,01-1,29 V	101–129%	internal error
30	1,30 V	130%	TDR electronic or probe cable defective
31	1,31 V	131%	TDR level searching lasted too long, may occur with bad signal quality due to conductive soil or material
33	1,33 V	133%	Electrical conductivity of soil/material too high
34	1,34 V	134%	Data in probe connector not plausible or probe connector defective
35	1,35 V	135%	Power too low

## 1.4 Battery operation

The internal chargeable battery has a capacity of 600 mAh, which allows about 300 measurements. This is only an approximate value and dependent on a lot of influences, like ambient temperature, pauses between the measurements, measured material and age of the battery.

If the battery capacity is not sufficient or battery operation is not desired, at all, an external battery or power supply may be connected via the RS232 connector.

**Attention: Charging is only allowed with the supplied ACS charger!**

## 1.5 Battery charger

The micro controlled charging method of the ACS charger guarantees an optimised battery lifetime.

1. Regarding the battery lifetime the “discharging“ mode is most favourable. It is started by pressing the yellow button. However, it is not harmful for the battery to use the “charging“ mode if the charging shall be carried out fast, i. e. in up to 4 hours. The “discharging“ mode lasts between 6 and 7 hours.

The charger can remain connected as long as one likes. The battery can not be damaged by it.

**Please refer to the charger operating instructions on page 8.**

## 1.6 External power supply

An external power supply (9..15V/300mA) can be connected via the RS232-cable. In this case the internal battery is disconnected and the instrument is supplied by the external power only. It doesn't switch off then, but remains on as long as the external voltage is connected. Therefore the PC and data logger operation requires an external power supply.

It is also possible to connect an external battery if the capacity of the internal battery is not sufficient.

## 1.7 Parallel analogue output

The TRIME-HD offers a parallel analogue output 0..1V on the left side interface at pin 3 and 4. A 2m analogue cable is available as accessory. Analogue data logging requires external power supply and setting the operation mode from B (single measurement) to C (cyclic measurement) with the software TRIME WinCal (support version: under parameter / measure mode).

## 1.8 PC-connection via RS232

The TRIME-HD can be connected to a PC via the RS232 connector and the appropriate cable, in order to carry out data logging, changing the operating mode, or calibration (software TRIME WinMonitor, TRIME WinCal). External power supply is required, see 1.6.

## 1.9 Technical data

Power supply:	7V..15V-DC, 600 mA/h battery capacity
Supply current:	8mA standby 200mA while 10..15sec. measuring time
Resolution:	0,1%
Repeating accuracy:	±0,3%
Measurement range	0-100%
Temperature range:	-15°C...50°C, expanded temperature ranges on request
Temperature caused value drift:	max. ±0,5%
Standard interface:	analogue output 0..1V or 0(4)..20mA, RS232/V24, IMP232 MICRONET
Calibration:	calibrated for mineral soils, but individually adaptable per software
Case:	weatherproof, robust aluminium die-cast (IP65)

The measuring accuracy and -range as well as the tolerable range of bulk electrical conductivity depends on the corresponding probe.

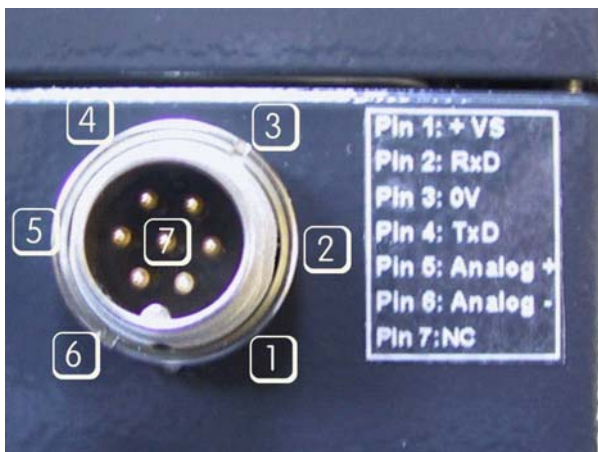
## 2 Interfaces



left side: battery charger / analogue output cable interface

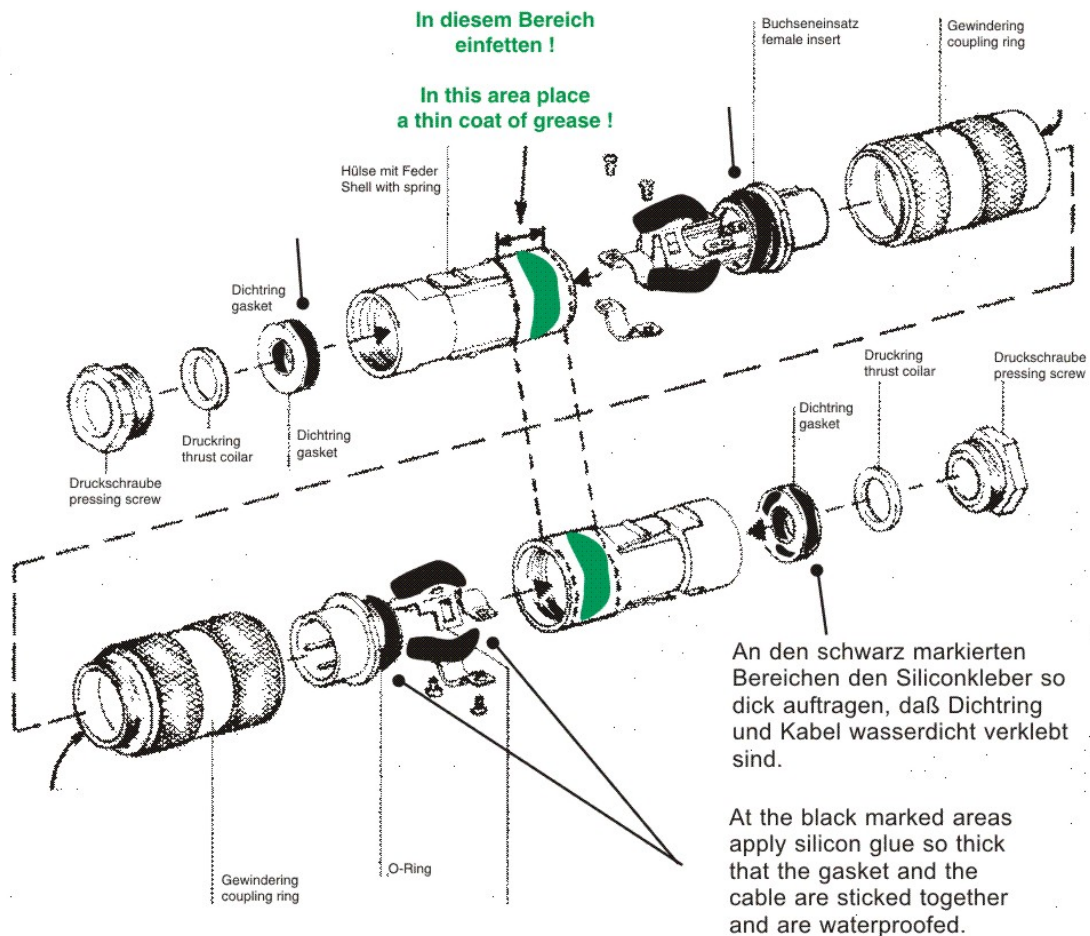


bottom side: RS232 / V24 power supply interface



top side: probe interface  
(TRIME-EZ/-EZC/-IT/-ITC/-IPH)

## 2.1 Mounting of the connectors



## 2.2 Water tightness of connectors

Water tightness of the sensor modules (IP65) and the connectors (IP67) can only be guaranteed by observing the following:

1. In case of carrying out the cabling of the distribution modules by yourself, please make sure that the cable seals fit tightly. Only cables with a sheath diameter of 5 to 8mm should be used. In case of smaller diameters water may enter the connector, the distribution box or the measurement device and may alter measurements or even destroy the equipment. IMKO supplies special seals.
2. All unused connectors have to be protected by blind covers. IMKO supplies all equipment respectively all open connecting terminals protected by blind covers. Additional ones can be obtained by IMKO.
3. When installing the connectors, special attention has to be paid to the connectors being threaded with care. The threads have to be aligned correctly to ensure efficient tightness. In addition, the connector should only be hand-screwed, i.e. without use of tools (e.g. pliers).

A thin coating of grease should be applied to the threads of the threaded ring and to the connector socket in order to ensure easy removal even after long periods of use.

## 3 Operating instructions ACS-series

### 3.1 Use of the charger

Automatic charger / discharger for 4-10 cells nickel-cadmium and nickel-metalhydrid battery packs (4,8-12,0 V) with a capacity of 500–5000 mAh (ACS 410p traveller 800-9.000 mAh).

### 3.2 Features

- Micro controller controlled charging
- Test phase at the beginning of the charging in order to recognize and indicate defect battery packs
- Short circuit detection and electronic protection against reversed battery
- Battery condition at the beginning of the charging is of no importance for the battery packs
- Supervision of the charging condition by a micro controller during the whole charging time
- safety stages like voltage gradient supervision and -delta U switch off as well as a safety timer are integrated
- possibility of discharging of the battery packs before use by pressing the button; after that, automatic switching over to the charging
- automatic switching over to trickle charge
- state indication through illuminated display

### 3.3 LEDs

**Illuminated display red (1):** the flashing of the red illuminated display can have different meanings:

1. it signs the perfect contact of the battery packs during the test phase (about 10 seconds).
2. it signs that the battery pack is not connected properly with regard to the pole
3. it signs the defect battery pack or unsuitable amount of cells
4. it signs the discharging after pressing the PRESS button

Permanent light signs the charging of the battery packs.

**Illuminated display green (2):** battery pack fully charged, trickle charge

### 3.4 Operating elements

**Discharging button (3):** the discharging is started by pressing the PRESS button (for about two seconds).

### 3.5 Caution



#### **ATTENTION**

*Only charge rechargeable Ni-Cd / Ni-MH battery packs.*

*By using other batteries there is **DANGER OF EXPLOSION!***

Keep your charger in a dry place (indoor use only). The charger should be disconnected from the mains when not in use. Do not plug in the charger in case of damaged cabinet or power plug

### 3.6 Operation

The charger starts charging automatically as soon as a battery pack is installed and the charger is plugged in. Usually, the battery packs are brought into contact by the plugs which are enclosed the supply. If the red LED after the test phase (about 10 seconds) still keeps flashing, check the polarity of the battery pack. Please gather the changing of the polarity (+/-) of the battery pack out of illustration No. 5. If the red LED is flashing again after the test phase and does not switch over to permanent light for charging, either the battery pack is defect or the battery pack might also not have the right number of cells (less than 4 cells (4,8V) or more than 10 cells (12,0 V)). The test phase is followed by the charging procedure (red LED is permanent on). After the charging procedure, the charger switches

automatically over to trickle charge (green LED is flashing; red LED is off). The starting of the discharging procedure occurs by pressing ( about 2 seconds) the button for discharging (3). However, this discharging procedure should only take place after the test phase. After discharging, which can in individual cases last for several hours, the charger automatically switches over to charging.

### **3.7 Use in motor vehicles and trucks ( only ACS 410 mobile)**

The ACS 410 mobile can be plugged into a 12-32 V DC outlet. If you use it on DC you have to connect the provided DC cable to the cigarette lighter.

Note!! In passenger cars (12-16 V DC) only 4 to 6 cells battery packs (4.8-7.2 V) can be charged. In trucks (24-32 V DC) you can charge 4 to 10 cells battery packs (4.8-12 V).

### **3.8 Environmental reference**

Rechargeable batteries are not to be disposed in domestic waste. Surrender used batteries to your dealer or rather to the battery collecting point