

# TEA-K30

## TERMINAL UNIT FOR HANDHELD USE IN INDUSTRY

### User's Manual for Display Model TEA-K30



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The manufacturer (Visilab Oy) grants a guarantee of two years for the buyer of IRMA-7-TE moisture meter from the date of purchase. The guarantee covers all faults and misalignment which are in the equipment at the moment of purchase including those which appear during the guarantee period. The manufacturer is liable of repairing the instrument without cost to the buyer. The manufacturer can ship a new instrument of equivalent value and status if considered as a better solution than repairing. The buyer is liable of paying the freight costs to the factory of the faulty unit. The unit must not be sent to the manufacturer without a permission from the manufacturer. Units sent without a permission will be repaired at the cost of the buyer.

The guarantee does not cover wearing parts, like batteries, lamps or motors. The guarantee does not cover faults caused by errors or neglects of the user nor those faults which are caused by deliberate breaking. The guarantee does not cover faults caused by incorrectly installed cables or conductors. The guarantee does not cover any damages to the user or to any third party independently of the way how the instrument has been used. The guarantee does not cover faults caused by natural phenomena like lightnings or floods, nor user errors like dropping the unit. The guarantee is void if the unit is sold to any third party. All faults which are not covered will be repaired at the cost of the buyer.

*If opening of the instrument has been attempted at those parts which are not intended for the user, the manufacturer can refuse to repair or service the instrument. Then the instrument will be shipped back to the buyer at the cost of the buyer. Such parts are the light source, the optical head and parts on the electronics board. The instrument can be opened only strictly according to the instructions in this manual and should not be disassembled unnecessarily.*

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The manufacturer is not responsible for any casualties, damages or accidents which the user has caused directly or indirectly with this IRMA-7-TE instrument, either to himself or to any third party.

**Especially this applies to accidents while doing measurements in paper mills in press or dryer sections. The whole responsibility of operating this meter safely belongs to the user.**

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## 1. Introduction and Taking into Use

This document instructs you on how to use the display unit model TE for **IRMA-7** moisture meter family. Refer first to your existing **IRMA-7 model D** operating manuals for other instrument features not mentioned in this document.

### General

Display model **TEA-K30** is a handheld terminal for managing your **IRMA-7** moisture meters model **D** and its derivatives as also for many other products made by Visilab. It can be used with many other products requiring a simple ANSI terminal. It is designed for handheld measurements operating with external power. The moisture meter operates in Keyboard mode all the time when this terminal is used. All equipment settings can be done with it, the autotimer can be started manually, the resulting data series can be analyzed statistically and edited in the menu system as described in the model D manuals. In these operations, the display unit works as a plain terminal with no intelligence of its own; most of the work is done by the moisture meter itself. The display unit can be used connected to either RS232 with a standard D9 male connector and a three-wire cable. The terminal unit can be used for other simple terminal (ANSI) applications where plain text information is to be received and some key presses are to be sent to the device. Note then the pin ordering of the RS232 connector which depends on it being a DTE or a DCE equipment (receive and transmit lines interchanged). If your system required a switched pin ordering, open the cable connector box and swap the wires with a soldering iron.

The unit has also one switch with which one can manage powering of the terminal unit, refer to figures 1 and 2.

*When operating handheld in paper mills near paper machines or like, there is always the risk of losing the instrumentation. That risk exists when measuring near fast rotating rollers in difficult conditions. The moisture meter, parts of it or the terminal unit may be dropped to the web or it may become entangled into the web or machinery. Visilab takes no responsibility of lost equipment or damaged paper machines. The responsibility of working at such positions is fully on the user's side. One should have proper insurances before operating any handheld instruments there and should always have extra caution. An assistant is recommended for increased safety.*

### Installation

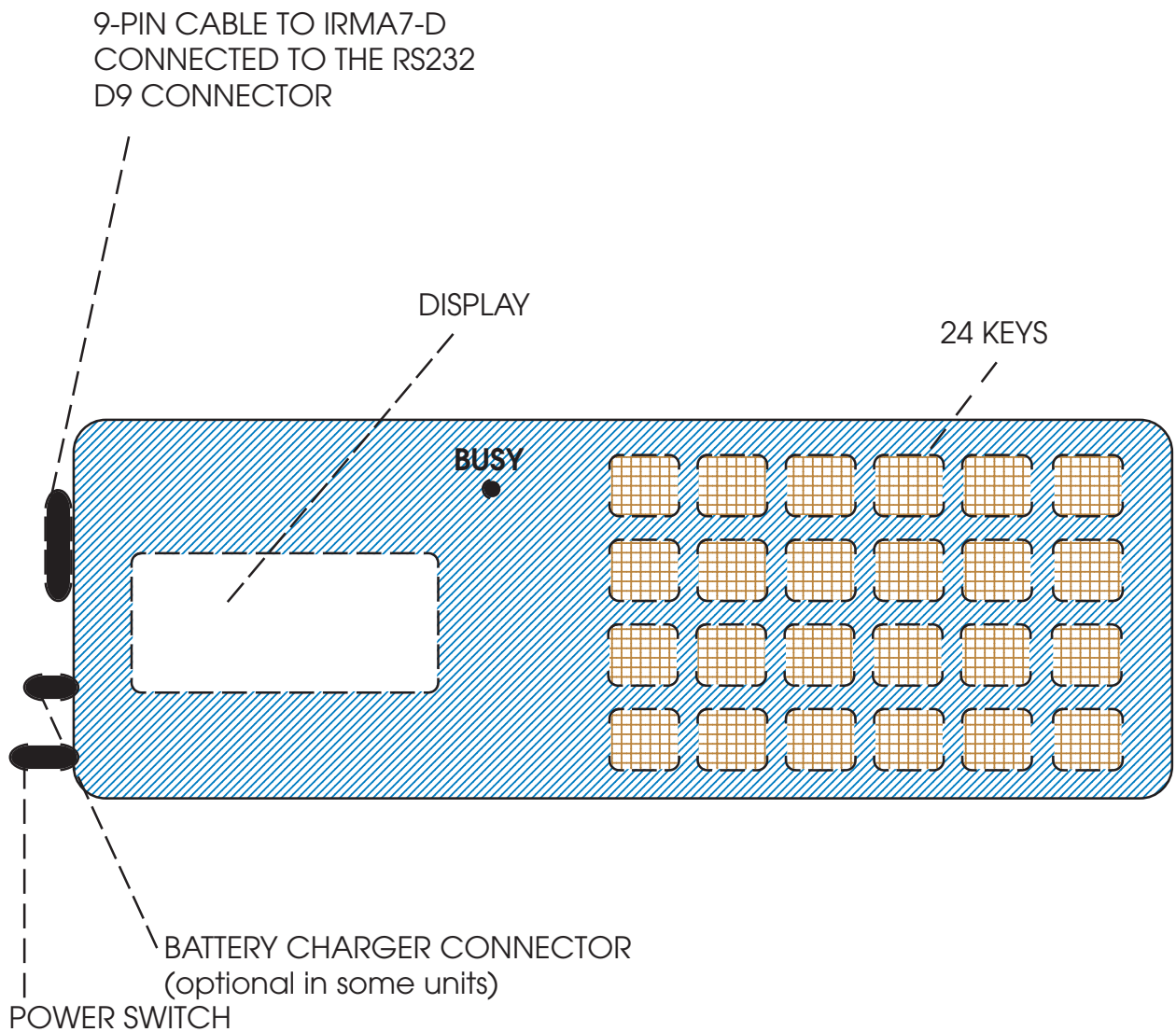
For installing and configuring the **TEA-K30** successfully, the following items should be available:

1. User's manual (this) and other manuals enclosed with the moisture meter model **D**
2. The **TEA-K30** unit itself
3. Serial connection cable for RS232.
4. Other accessories of the moisture meter **IRMA-7-D** or any derivative of it
5. Power supply 12V 1.0A for the unit **TEA-K30** unless ordered with a supply connection through the serial port.

### Connecting the Cables

The cabling is the same as in standard model D without a PC. Do not apply power yet! Connect the cables as shown in Figure 2, for portable or for fixed use. Connect first the cable from the meter's power supply -PS to the **IRMA-7-D**. Connect the air tubing to the moisture meter. It is not advised to operate without the cooling air in difficult or warm conditions, else you put at risk your measuring results and your instrumentation. If the external temperature exceeds +35C you should *always* use air purge. Also, if there is a strong water vapor flying around the web where you intend to measure,

use air always. Else water condensation may appear on the optical surfaces affecting strongly the results. Plug in the D9 male connector to the RS232/485 connector on the -PS.



**Please note: This unit can be delivered without the small power supply and its connector. Instead, the power is fed for it via the serial cable.**

Figure 1. General view of TEA-K30. The drawing is not to scale.

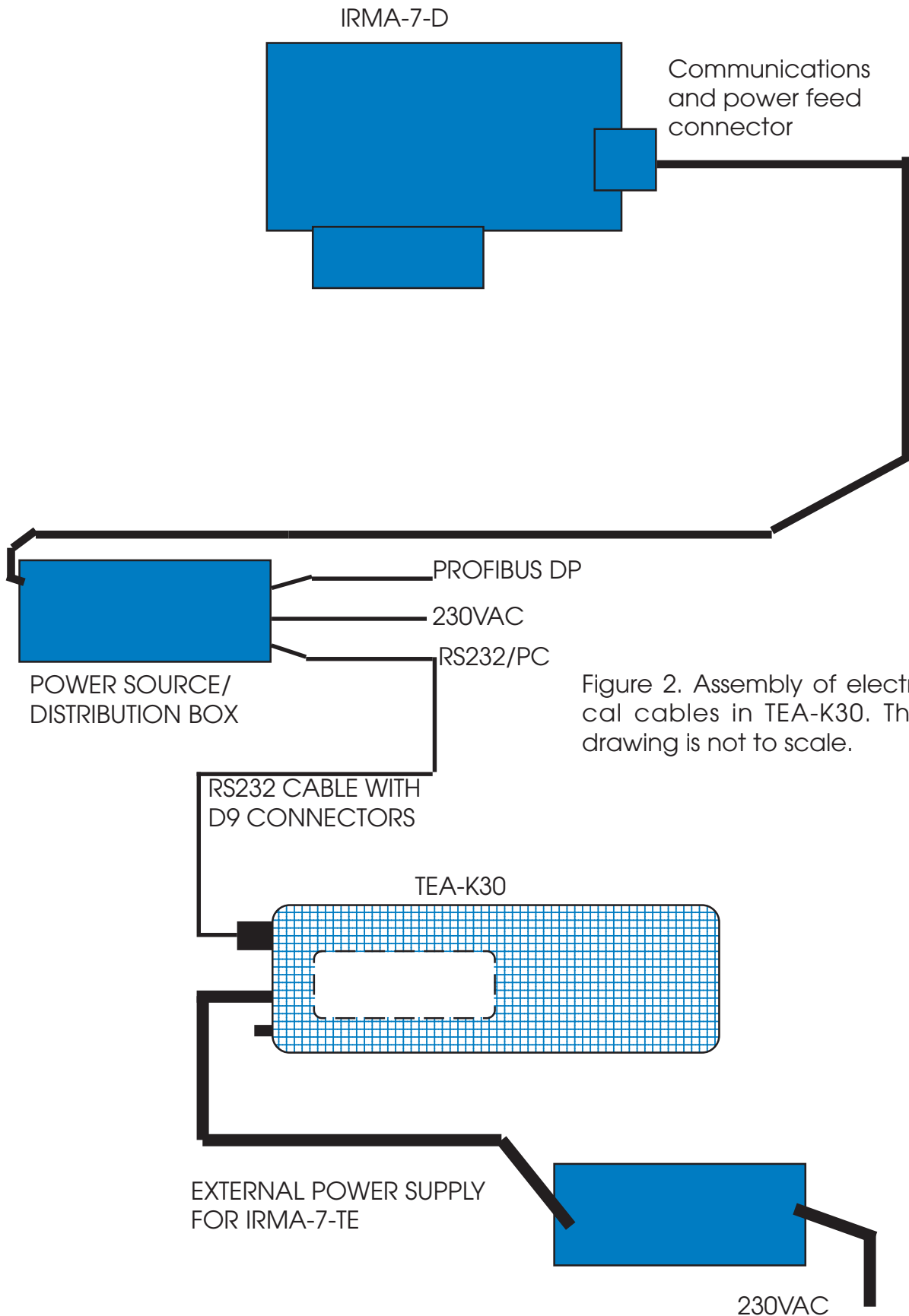


Figure 2. Assembly of electrical cables in TEA-K30. The drawing is not to scale.

## 2. Operating

### General

This product is designed specifically to make measuring at paper mills with **IRMA-7-D** easier if no PC is available or carrying a PC is not practical. One can perform measurements with the meter itself plus the distribution box with a power source if you have some kind of trigger switch connected to the box. However, you have then no direct way of confirming a successful measurement as you can not see the results immediately. Of course, changing any of the configuration settings is impossible without any terminal or PC. The connection to Profibus DP fieldbus is an option too but requires some high-level programming with the master module.

### Setting Meter Features

The web running at high speed poses great requirements to the quality of the signal handling to keep out all unwanted noise components and simultaneously to be able to make transient-like measurements of moisture. These problems have been solved by using a very high light chopping frequency (400 Hz). **IRMA-7** model D and its derivatives are actually capable of measuring moisture even at this speed. This high speed can be employed in collecting data to data series for recording moisture transients. There are six different digital filter settings (NONE, FAST, MEDIUM, SLOW, SPECIAL and BOX) for filtering out various noise components. The filters differ in filtering capability and in their response times as well: The better the filtering, the slower the response time. One should gain some experience with selecting proper filtering before doing any important measurements.

### Setting Up the Display Unit

Turn the -PS power switch on for the **TEA-K30**. There should appear a momentary message on the display and thereafter the main menu should be visible. It is however, possible that the meter operates in a quiet boot mode where no messages are sent after bootup. In that case, you need to press a key to activate sending messages to the display (press "1"). It might look something like this:

```

Series          23C
      4.8%
1 Uncoated 200 g
333333333-----
    
```

Perform the same checks as described in the model D manual. If everything works all right, you can proceed. Leave the moisture meter into Keyboard mode.

### Keyboard Mode

Keyboard mode is the one you need to operate the meter at all times when the TEA-K30 is connected. As you may have noticed from the meter's manual, the Keyboard mode is very important for setting up a network of several meters and each meter has its own address. There has to be some way of communicating with the meter if the address is unknown. Therefore, the Keyboard mode is always in use for about half a minute after bootup in every meter to listen to any attempts of interrupting this phase. If any character is received, the Keyboard mode stays. Else, the meter will restore the last mode it used when powered. That might be either the Keyboard mode or the Packet protocol mode which is mainly used for communications, RS232 for PC or RS485 for LAN. **TEA-K30** cannot itself directly place the meter into Keyboard mode but the meter has to be powered up

again to do it and the initial period of listening has to be interrupted. Thereafter, the meter recalls that it was using the Keyboard mode earlier and stays there always after bootup. The meter's address has no significance in Keyboard mode.

In other words: To force the meter to go into Keyboard mode, turn off the power source of the meter for a moment. When the meter is booting up, pressing any key on the **TEA-K30** keyboard, like the **Menu** key will force the meter to *remain* in that mode until specifically set into Packet protocol mode (refer to User's Guide and PC Program User's Guide of the moisture meter for more details). If more time has elapsed after bootup than about 30 seconds, the meter may have gone to the Packet protocol mode and you have to repeat this to get to the Keyboard mode. To keep the meter in the Keyboard mode in the future, turn the power off in Keyboard mode. The meter will always switch to that mode it was working in the last time.

### Making Measurements

Connect the cables, turn the power switches on for the **IRMA-7-D** and **TEA-K30**. There should appear a momentary messages on the display. The text messages familiar in model D measuring state (moisture values, temperature etc.) should be visible. If not, then the meter is either off or it has switched to Packet protocol mode. See above to recover the Keyboard mode. Now you should see the aforementioned messages. If the display is cluttered, press '9' to restore it. If you wish to make any changes in meter settings or other configurations (like to the autotimer), press the Menu key. The main menu should appear. You can return back from any menu by pressing the ESC key repeatedly. Make sure your autotimer settings are correct (Batch/Normal modes, interval, Batch size, memory bank, materials selection etc.). Then you can return to the measuring state and prepare for placing the optical head close to the web. You can also prepare and set the BURST mode of the meter.

For best accuracy, turn the meter on for 10 minutes before you actually start measuring. That is especially important if your meter has been transported in cold weather and it takes some time for its internal temperature differences to settle.

Place the **IRMA-7-D** so that the optical head is pointing at the web at the position you want to measure. It is preferred that you fix it there with some temporary holder. The distance to the web should be set according to the meter specifications (120 or 150 mm typically) and the working angles (both typically zero degrees longitudinal and latitudinal) as expressed in documentation about calibrations. Other angles may be used if glossy materials are to be measured. There should be some whining noise at the optical head when the light source chopper starts operating (unless it is in low-power mode). A visible but dim white light should be observed at the web surface.

When done, you may start the autotimer by pressing '+' or by using the trigger input line (close it momentarily to the isolated ground). The duration of the autotimer operation is dictated by the Batch size (Batch mode) or manually by you (Normal mode). The sample counter is increasing while sampling. When done, the text Auto or Batch disappears from the display. You can now calculate statistics by pressing '\*'. If you press twice '1' the data will be cleared, else it will be kept. You can later download the data to a PC. Use the memory banks for separating smaller sampled series. The frequency analysis features are available in the PC program only.

You can switch to another material table by pressing the arrow keys UP or DOWN. The arrow keys to the left and right can be used for scaling the bar display on the fourth line as usual. Refer to PC Program User's Guide for more details of the available commands in the measuring state.

If you have some tripod available and you wish to make measurements with longer duration and increased safety, assemble the optical head securely to the tripod. Bring the tripod close to the paper machine where you intend to measure. Prepare the meter to make data collection. Place the head into the correct position and distance with the aid of the tripod adjustments and lock it. Do not leave the tripod alone! Someone might trip on the cables on the floor and cause an accident.



## EC Declaration of Conformity

**We**

**Visilab Signal Technologies Oy  
Keskustie 15  
FI-07560 Pukkila  
FINLAND**

**declare that the**

**IRMA-7-D Process Moisture Logger, model D**

**meets the intent of the EMC directive 89/336/EEC. Compliance is based on the following harmonized standards:**

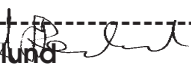
**Emissions:**

**EN 50 081 part 2 (industrial environment):1993 referring to :  
EN 55 011 radiated, Class A, Group 1  
EN 55 011 conducted, Class A, Group 1**

**Immunity:**

**EN 50 082 part 2 (industrial environment):1992 referring to (both radiated and  
conducted fields):  
EN 61000-4  
IEC 1000-4  
ENV 50140  
ENV 50141  
ENV 50204**

**I certify that the apparatus identified above conforms to the requirements of Council Directive 89/336/EEC.**

-----  
  
**Henrik Stenlund  
managing director  
5th May 1997**



Note for users:

When the apparatus identified above is connected by someone to become a part of an industrial control system, he is also responsible for the EMC compatibility of the resulting system. He is also liable of providing the necessary optical or galvanic isolations for signals and transient absorbers for other lines to conform to the EMC directives. This declaration covers also models DL, Di and WAND as they are identical in all electrical respects to the model D. The expansion modules to be attached to the meter electrically and mechanically are designed and implemented in the same fashion and are claimed to be compatible with the EMC directive without individual testing.

The meters and the power source apparatus have been individually tested according to DIN VDE0701 and DIN VDE0702 for electrical safety.

## EC Declaration of Conformity

We

Visilab Signal Technologies Oy  
Keskustie 15  
FI-07560 Pukkila  
FINLAND

declare that the products which are put on the EU market:

IRMA-7 Portable Surface Moisture Logger, model A and its derivatives

IRMA-7 On-line Moisture Logger, model D and its derivatives

meet the intent of the RoHS directive 2002/95/EC and the WEEE directive 2002/96/EC. Compliance is based on the following.

The instruments belong to Category 9 "Monitoring and Control Instruments" of the WEEE directive and thus are not required to fulfill the said directives.

I certify that the apparatus identified above conforms to the requirements of Council Directives 2002/95/EC and 2002/96/EC.



-----

**Henrik Stenlund**  
managing director  
3rd February 2006

Note:

In spite of the fact that the products are not required to fulfill the directives, we make every effort to comply with the directives in practice. When the Category 9 is moved to be covered the same requirements as other categories do, we are ready to certify that these products comply with the directives.

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