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INSTRUMENTOS DE MEDICIÓN INDUSTRIAL

Medidor de actividad de agua modelo inteligente ND-HD6

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User Guides

Smart Water Activity Meter

Model: HD--6

Operating instruction for Water Activity Meter

I. Technical indicators and function

1. Work environment: Temperature $-10^{\circ}\text{C}\sim 50^{\circ}\text{C}$
Relative humidity $0\sim 95\%\text{RH}$
2. Display mode: Large-screen LCD $128\times 64\text{DOTS}$
3. Measuring range: Temperature $-10^{\circ}\text{C}\sim 50^{\circ}\text{C}$ Water activity $0\sim 1.000\text{aw}$
4. Measurement accuracy: Temperature $\pm 0.5^{\circ}\text{C}$
Water activity ± 0.012 ($@23^{\circ}\text{C}\pm 5^{\circ}\text{C}$)
5. Repeatability: $\leq 0.008\text{aw}$
6. Measurement time: ① $5\sim 40\text{min}$
② automatic measurement
7. Resolution: Water activity: 0.001aw Temperature: 0.1C
8. Data processing:
 - ① The special software can be operated after connected with the computer. It is applicable to the Windows operation system
 - ② The computer controlled measurement can display the measured data, curve, and save the data
 - ③ The computer controlled measurement can automatically save the result data according to the set product name
9. It can circularly record 5,000 sets of measured data
10. Correction mode: multi-point joint calibration, single-point calibration
11. Measurement points: $1\sim 4$
12. Interface: RS232 interface or USB interface
13. Configuration: data cable、micro printer (option)
14. Print function: a. Print at the end of the measurement
b. Real-time print
15. Supply voltage: $100\sim 230\text{VAC}\pm 10\%$ $50\text{Hz}/60\text{Hz}$
16. Power consumption: $\leq 10\text{W}$



Figure 1

II. Installation of the Instrument

1. Putting the plug of WSC-4 water activity sensor into the sensor's socket which is on the back panel of the instrument (Please connect the sensor according to the sequence of 1-4# socket.). It should be pushed by aiming at the plug's notch, and tighten the nut. Do not pull out the plug by pulling the meter's wire, or by rotating the plug

2. One end of the printer wire should be connected to signal control receptacle which is on the back panel of the instrument. Then, connecting the another end of printer wire with the printer. Connecting the printer power wire with the corresponding socket on the back panel of the meter. Notice: Plugging the RED plug into the RED socket, Plugging the BLACK plug with the BLACK socket.

3. Connect the extension line with the data cable, then insert one end (D type plug) of the communication data cable into the communication port of the instrument, and the other end (USB plug) into the USB port of the computer.

4. Before plug in the AC power line of the instrument, please make sure the power switch of the instrument is in "off" state. Note: **good grounding should be provided for the power.**

Please refer to the file " **Instrument installation.PDF** "

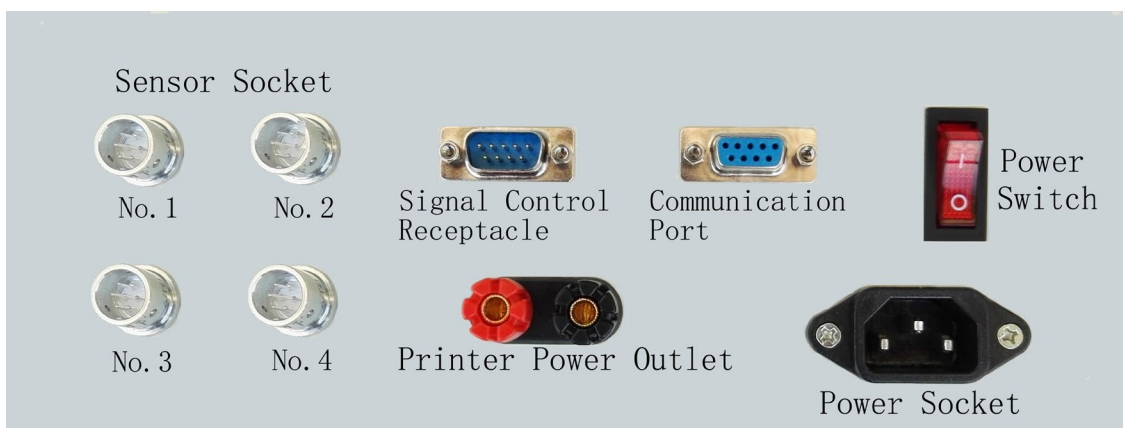


Figure 2

III. Usage of the Instrument

1. Keyboard function

Select key: mainly used to select the item during the process of implementation

Confirm key: mainly used to implement the selected item;

+/- key: it is mainly used for modifying the time, measuring time, measuring points, and query serial number.

Fast key: it is mainly used for accelerating the query speed during query.

2. Operation

Supply power, press the power switch, the instrument will display the "Measurement", "Calibration", "Setting" and "Query" functions in the home page. User may select the function by clicking the "Select" key (the selected item will be displayed in black).

a. Measurement: First, put the measured object in the plastic utensil (as shown in Drawing 3, crush the measured object, Can't crush the sample with the crusher, this will affect the measurement results. The sample volume shall be over 60% of the plastic utensil capacity; during measuring, it is not allowed to tighten the plastic cover of the plastic utensil), then put it into the water activity sensor, and cover the sensor (as shown in Drawing 4).



Figure 3



Figure 4

Click the "**Select**" key to select the measurement function, click the "**confirm**" key to enable the water activity tester. The measuring time is the set measuring time; during measuring, the instrument will display the water activity value, temperature value, measuring time and printing option. The printing option includes printing (it means to print the measuring result after measuring), not printing (it means not to print the measuring result after measuring) and Exit the measurement; this option can be selected by clicking the "**Select**" key. After measuring, water activity tester will display the final measuring result prompt with beep, and print the measuring result (if printing is selected). Under this state, press the "**confirm**" key to return to the home page, and prepare for the next measurement.

b. Calibration: this function is set for correcting the measurement accuracy of the instrument. Under normal conditions, when the operating environment doesn't change seriously, single-point calibration shall be operated once every two months for the instrument. Multi-point correct shall be operated once every half a year. HD-6 type adopts measuring point 1 as the reference probe, therefore, when correcting, corresponding saturated salt solution must be put at measuring point 1, the same saturated salt solution shall be put at other measuring points in sequence

The usage of the calibration function is shown as below:

Click the "**Select**" key to select the correction function, click the "**confirm**" key to enter into the next menu.

1. Select the single-point calibration, after confirming, enter into the next page, this page will display two saturated salts for correction. Click the "**Select**" key to select the suitable saturated salt, put the plastic utensil with the saturated salt solution in the base of the water activity sensor (shown in Drawing 3, the plastic cover of the plastic utensil shall not be tightened during correction), cover the sensor, press the "**confirm**" key, the instrument will enter into correction state to correct the measurement accuracy of the instrument. The calibration time is 10-40min (this time is the same as the measuring time which is over 10min). During correction, the instrument will display the water activity value, temperature value, correction time and one exit correction function item. After correction, the instrument will prompt with beep, click the "**confirm**" key to return to the home page. To exit correction, click the "**confirm**" key, then the instrument will prompt "**Exit calibration Yes or Not**". To Exit calibration, click the "**Select**" key to select the "**Yes**", press the "**confirm**" key to stop correction and return to the back page. For not stopping correction, click the "**Select**" key to select the "No", press the "**confirm**" key to continue the instrument correction.

Under normal condition, single-point calibration adopts sodium chloride saturated solution for correction because it is easy to prepare sodium chloride saturated solution, and it is convenient to save the solution.

2. Select 2 points for calibration, after confirming, enter into the next page, put the plastic utensil with sodium chloride saturated salt solution in the base of the water activity sensor (shown in Drawing 3, the plastic cover of the plastic utensil shall not be tightened during correction), cover the sensor, press the "**confirm**" key to calibrate sodium chloride, the screen displays "next" and prompt with beep. Then, please take out the sodium chloride saturated salt, put the magnesium chloride saturated solution into the base, press the "**confirm**" key, the instrument will calibrate the magnesium chloride, after calibration, it will prompt with beep, after calibration, click the "**confirm**" to return to the home page. To stop correction process, click the "**confirm**" key, then the instrument will prompt "**Exit Calibration Yes or Not**". To exit calibration, click the "**Select**" key and select the "**Yes**", press the "**confirm**" key to stop correction and return to the back page. For not stopping correction, click the "**Select**" key to select the "No", press the "**confirm**" key to continue the instrument correction.

c. Setting: The instrument parameters can be modified in the computer (the instrument shall display the home page). To directly set related parameters in the instrument, please click the "**Select**" key to select the "**Setting**" function, click the "**confirm**" key and then the "**Select**" key to select the measuring point, time and measuring time, after confirming, click the "+/-" key to set the measuring point and time (year, month, date, hour, minute), after confirming the measuring time, select the measuring time as timing measurement or automatic measurement, if timing measurement is selected, click the "+/-" to set the measuring time within the range of 5-40min. When automatic is selected, the automatic state displays "ON" (under this state, when measuring, the instrument will automatically identify the measuring time, but the error will be a bit higher), after setting, click the "confirm" key to return to the home page, if it is not set, select the "**return**", after confirming, it will return to the home page. Change the measuring points (1-4 for HD-6 type), and select the required measuring points. The measuring time modification function is set for adapting different users. 10min measuring time, under normal conditions, can ensure the measurement accuracy. If balanced time is required for the sample (the time of reaching stable measured data) is a bit long, the measuring time can be prolonged moderately,

but the longest time shall not exceed 40min.

d. Query: this option is used for checking the previous measuring results. In the computer, click the “Query” key to check the previous measuring results. If it is directly checked in the instrument, select the query and enter into the next interface, select to query according to the serial number query and exit, select the exit, click the “+”/“-” key to check the serial number of the data, after confirming, the screen will display the data time, water activity value and temperature. Under this state, click the “+”/“-” to modify the serial number, check the required data. Hold down the “+”/“-” for over 3 seconds, the serial number will change 20 per second, hold down the “+”/“-” and “**Fast**” key for over 3 seconds, serial number will change 40 per second.

HD-6 type water activity tester is capable of saving 5000 sets of measured data. Each set of data is capable of recording the time, water activity value, temperature of the measuring result. After it is filled with data, the new measured data will override the previous measured data by turn.

IV. Installation and Use of Software in Computer

Installation of software, before using the USB converter, the attached USB drive must be installed in the computer, and the communication program must be set.

1. Ensure that it is not connected with USB converter. If it is connected, please remove the USB converter

2. Insert the attached U disk into the UBS port of the computer

3. Open the UPort1110/ Software folder, select corresponding UPort1110 type moxa usb to serial port drive of the computer operation system, and install the drive.

Note: It is possible that the GHOST version Windows system Uport 1110 drive can't be installed.

4. After installing the drive, connect the USB cable with the USB port of computer. The computer will detect the new device, and automatically use this drive.

5. The installation program has kept one COM port for the cable. The port kept for UPort1110 will be displayed in the “Port” of “Device Manager” of the Windows system.

6. Connect the UPort1110 with the computer, and insert the plug of the extension line into the D type socket of the instrument

7. Install the special software “WaterSetup1.001”, double click the “WaterSetup1.001” and install the program according to the prompt. This software is only applicable to Windows operation system. Users who use Win10 shall install the software with the status of administrator.

8. Communication Setting: open the “Communication Program” to select the UPort1110 corresponding COM port (correct port must be used in the communication program) in the choice box of serial port. If the correct COM port is selected, the color of the indicator on the right of the serial port choice box will change into red. The software will be automatically connected with the instrument, and read the settings of the instrument, then prompt successful communication. If the COM port is not correctly chosen, the software will prompt you to select the correct COM port. After changing the serial port, it requires selecting of the COM port again.

9. System Information

- a. System reset: click the “System Reset” key, the computer will reset the instrument, the instrument name, software version, manufacturer and website, current date and time will be displayed in the communication message
- b. Display boot information: click the “Display Boot Information”, the instrument name, software version, website will be displayed in the communication message
- c. Serial number of the instrument: the manufacturing No. of the instrument.
- d. Measuring points: modify according to the actual requirement.
- e. Measuring time: modify according to the actual requirement, at least 5min, at most 40min.
- f. Date: click the “Date” key to display the current date of the instrument. Click

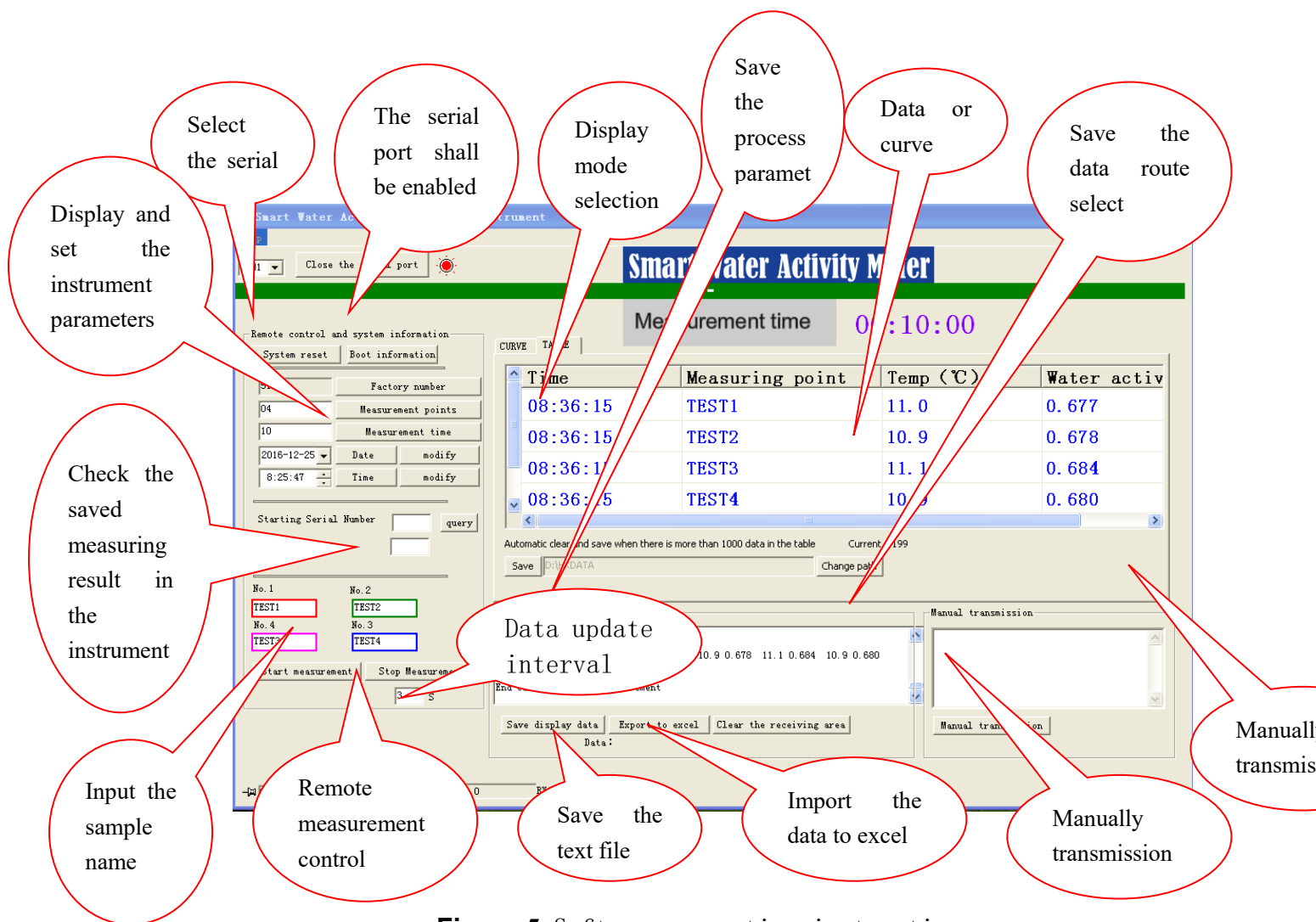


Figure 5 Software operating instructions

- g. Time: Click the “Time” key to display the current time of the instrument. Click the “▲”/“▼” key to modify the time, click the “Modify” key to finish modification. The modified time will be displayed in the communication message.
- h. Check the saved measuring result in the instrument: input the query starting

serial number in the space behind the “Starting Serial Number”, for example: “1”. Input the query amount in the space behind the “Query Number”, for example: “100”. Click the “Query” key, the instrument will display the 1-100 measuring results in the communication message. Click the “Export to EXCEL” key to save the query result in EXCEL file. Click the “Save the Display Data” to save the query result in text file.

10. Remote control measurement

a. Measuring point and sample name: before starting computer controlled measurement, input the sample name in the box below 4 measuring points, if it is bread in the first measuring point, then input “Bread” in the box below the measuring point, if it is cake in the second measuring point, then input Cake in the box below the measuring point, and so forth. If measurement has started, the sample name can also be modified, but it requires clicking the corresponding measuring point in the display box after inputting the name.

b. Start measurement: click the “Start Measurement” key, the computer starts to remotely control the measurement (the instrument display must be kept at the home page, otherwise, it may cause measurement error)

If it is selected to display table (default in the software), the current measuring time, measuring point, temperature, water activity value of the measured data will be displayed in the data display box of the software interface. The measured data will be updated constantly, and the updating speed depends on the set time in the measurement control part, in the space behind the “Stop Measurement” key, the default value of the software is “3”, which means to update the date once every 3 seconds. User may modify according to own requirement (setting function is only available under non measuring state).

If it is selected to display in curve (click the “Curve” key at the upper left corner of the display box), the data display box will display the changing curve of the sample water activity value.

After measuring, the software will automatically save the measuring result in the EXCEL file of designated folder (the default in software is HD-6 type D:\HKDATE\LastResult0000), user may also modify the folder of saving the file by clicking the “Modify Route” key below the data display box. LastResult0000 can't be modified, if it is needed, the data can be copied to other EXCEL files.

Click the “Save” key below the data display box, the software will save each set of data, and provide the max value, minimum value and average value during the measurement process in EXCEL file.

c. To stop the measurement, clicking the “Stop Measurement” key, then the software will stop the current measurement.

11. Communication message: This display box is used for displaying the process of software executing command and the data uploaded from the instrument, it can be saved by clicking the “Save the Display Data” key. “Export to EXCEL” key can only be used for saving the measuring result data which is uploaded by the instrument by clicking the “Query”. “Clear the Receiving Area” is used for clearing the contents in this display box.

12. Manual transmission: input the following command in the blank area and click the “Manual transmission” to check the state and data of the instrument in the communication message, the specific commands are shown as below:

a. **LOGO**: display Boot Information command.

d. **ID**: the serial number command of the instrument.

e. **GETD MMMM NNNN**: query command. MMMM means the query starting serial number, for example: 0001 means the first one. NNNN means the query number, for example: 0009 means the query 9 pieces. After transmission, it displays query data.

f. **RESET**: system reset command

g. **INTV**: the measuring time command of the instrument.

- h. MENO:** the measuring points command of the instrument.
- i. TEST:** the real time measured data display command.

IV. Preparation of Saturated Salt Solution

The standard of saturated salt solution is used for instrument correction in the form of fixed point of water activity. These fixed points of water activity represent the constant water activity of different saturated salt solution under certain temperature. Two kinds of saturated salt solution are used for the correction standard for the instrument. The following paragraph is the detail method of preparation :

The saturated salt solution is prepared with salt (AR) (such as AR sodium chloride and AR magnesium chloride) and pure water or distilled water. The liquid part of the prepared saturated salt solution shall cover the undissolved AR salt. The volume of undissolved salt should be 50~90% in the total saturated solution. Also, the total volume of saturated solution should be more than 60% volume of the whole plastic container. To obtain uniform salt solution, the pure water or distilled water, the temperature of which is a little higher than ambient temperature, shall be added when the AR salt solution is prepared. Then, the saturated salt solution shall be placed under normal temperature ambient after it is covered, and it only can be used 12 hours after it reaches the ambient temperature. Since the water activity is closely related with ambient temperature, there are certain requirements to the stability of the saturated salt solution to temperature. Considering the thermal inertia of the saturated solution, sudden change of temperature should be avoided.

Prompt: The saturated about 15 g AR sodium chloride and 10 g water can be used to prepare the saturated sodium chloride solution, and about 18 g AR magnesium chloride and 3~4 g water can be used to prepare the saturated magnesium chloride solution.

How to keep the saturated salt solutions: Please cover the plastic container after finishing the process of correction, then put the plastic container into a closed container for the next process of correction.

V. Notice

1. Good grounding should be provided for the instrument.
2. Please keep the distance between the sensor and instrument more than 15cm. During the process of measuring, minimize the possibility of touching the sensor. Please keep the object and the instrument in the same temperature.
3. Please do not touch the shell of water activity sensor when the instrument is operating. Do not open the sensor's cover during measurement or correction, if not the veracity of measurement will be affected.
4. After finishing the process of measuring, please stagger the top and bottom cover (as shown in the figure 1), do not make it closed. In case after the ambient temperature went down(especially on winter nights), there will be condensation inside of the sensor. It will damage the sensitive element of the sensor.

5. If the number of the object's water activity's result is bigger than 0.82, please put the desiccant inside of the sensor immediately after the process of measuring, then make the instrument in the measuring status for 5 minutes or make it closed for one hour to avoid the damage to the sensitive element of sensor
6. Please put some desiccation in the sensor when you take the instrument from cold temperature into the room which turns on the heater inside, in case the condensation will destroy the sensitive element of the sensor. Also, please wait for 3 hours before you install and energize the instrument.
7. If the sensor will not be used in a long term, magnesium chloride or drying agent shall be put into it, so as to make the inner of the sensor in a stable and safe environment. Please make the cover of the sensor staggered for 24hours before you want to use it again.
8. Direct solar radiation shall be avoided. The instrument shall be stored and used in a cool and ventilated place.
9. When you pull out the plug, you should hold the plug rather than the wire, also you shouldn't rotate the plug. The plug is push-pull style, when you plug in, you should hold the knurling part . When you want to put off the plug, holding the cone part which at the end of the plug to aim the socket aperture.
10. Please make sure the sensor in a clean condition which can avoid the measurement deviation
11. Printer please use bracket to print paper
12. The sensor should not be placed as shown in Figure 7



Figure 6



Figure 7

VI. Display vocabulary comments

M	Express	Measurement
Exit M	Express	Exit Measurement
M time	Express	Measurement time
M Number	Express	Measurement Number
PR	Express	Print
NoPR	Express	No print
One-Point	Express	One-Point calibration
Two-Point	Express	Two-Point calibration

C	Express	Calibration
0-C	Express	One-Point calibration
T-C	Express	Two-Point calibration

VII. General Troubleshooting

If the instrument for patrol measurement works abnormally, it shall be turned off immediately. Then, check if the connection of the water activity detector is normal and if there is condensation inside the sensor, and pull it out and plug it again. Turn on the instrument again. If it still works abnormally, please contact our company.

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