Software manual
for
HUMY/SCS 3000

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Disclaimer

We have checked the content of the printed document for compliance with the described hardware and software. Nevertheless, deviations cannot be excluded and consequently we cannot assume any guarantee for complete accordance. The data in this printed document are checked regularly. Corrections and additions are made in the following version in each case. We would be grateful for any suggestions for improvement.

Important!

HUMY 3000 is an **on-line** moisture analyzer system. The sensor has to be installed **within** the production flow. It is important to provide a constant product flow. System calibration is performed during **running process**. Correct interpretation of the measurement result is only possible during running process.

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1.0 INTRODUCTION

1.1 Moisture Analyzer HUMY 3000
Moisture Analyzer HUMY 3000 i (EExib II)

The on-line moisture analyzer HUMY 3000 is available for general applications as well as for intrinsic safe installations. The system allows for measurement of unbound water in plastic granulates, powder, sand, soil, mulch, coffee, cocoa, flour, sugar, fruit-chips, hop, tobacco, margarine, and others. The FMS-400 sensor digitally transmits the measurement values to the control unit. Utilizing digital technology allows for interference free transmission of signals. The sensor features a build-in temperature measurement and self-monitoring function. Power consumption is very low which allows for a cable length between sensor and control unit of up to 1,000 m (3,300 ft).
Measurement values are shown in digital and analogue form on the color LCD display which features a resolution of 320 x 240 pixels. The display offers a graphical interface with soft key support. The application memory allows storage of standard parameters for up to 24 products. Optional, memory can be upgraded to support 99 standard parameters. Besides recording of real-time measurement values, limit values can be recorded, analogue measurement values can be exported for setting-up a controller, past values can be stored and displayed. In addition to the analogue outputs and the RS-232 interface front socket, a RS-485 is available. For post-processing of analogue values the unit offers isolated mA-outputs for moisture and.

1.2 Sensor

A stainless steel housing protects the FMS 400 sensor resistant against caustic solutions, acid and solvents. The interior of the sensor is embedded into a special gel which protects the circuitry against shock and water. Electrical connection is via an integrated 3-pin (IP 67 protected) connector. The correspondent connector for the cable is part of the delivery package. The electro-magnetic field penetrates approx. 20 to 200 mm depending on the product. Product conductivity, pH-value or color has no effect on the measurement. Important: the sensor surface needs protection against extended mechanical force!

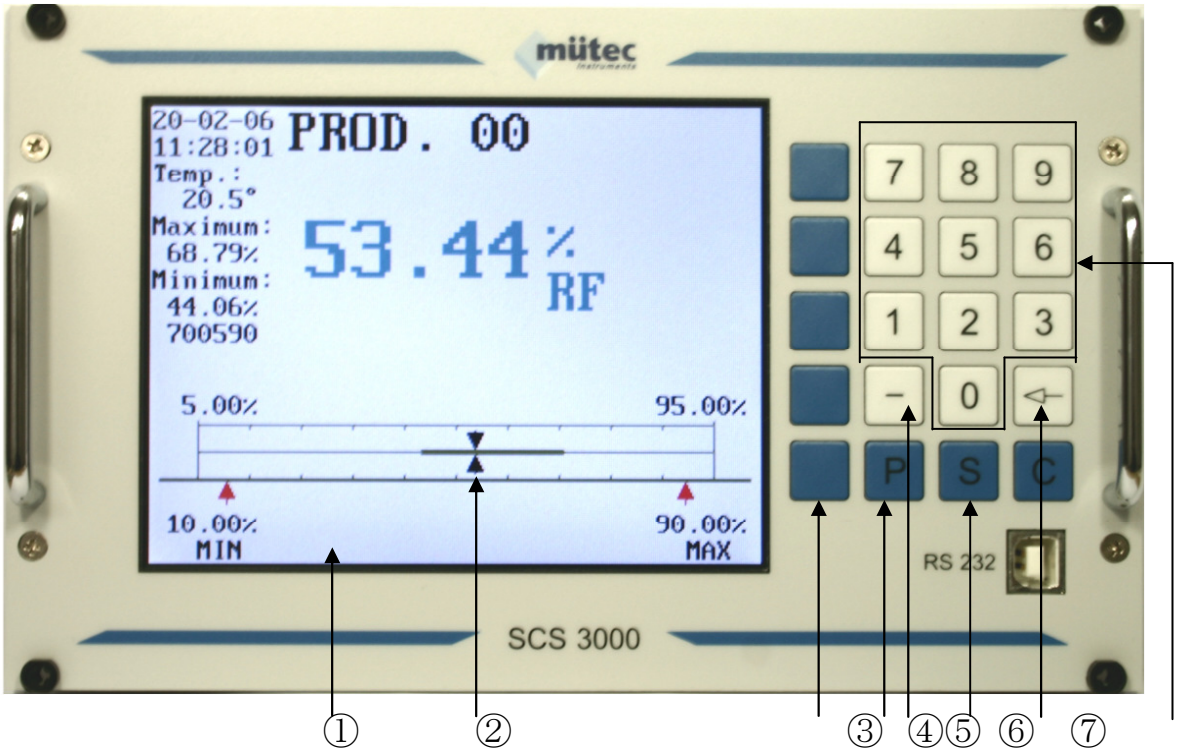
1.3 Quality control

Moisture content in solids is an indication for storage capability, consistency, aroma and specific weight of the product. With an on-line moisture measurement this criteria can be supervised and controlled accordingly. Besides optimization of product quality the HUMY 3000 will drastically reduce energy costs caused by inefficient utilization of dryers.

1.4 Product highlights

- High sensitivity even with difficult products
- ON-LINE measurement, high accuracy even with fast moving products
- User-friendly, simple installation with minimal mechanical requirements
- Self-monitoring of sensor against wire break and temperature overload
- Impact proof and water-resistant sensor
- Cost-effective in procurement and installation
- High sampling rate
- Easy operation with menu driven LCD display

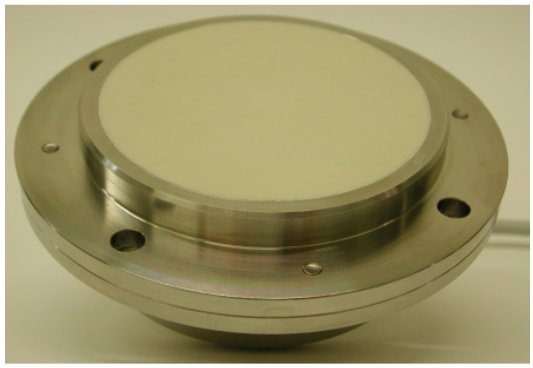
2.0 OPERATING INSTRUCTIONS



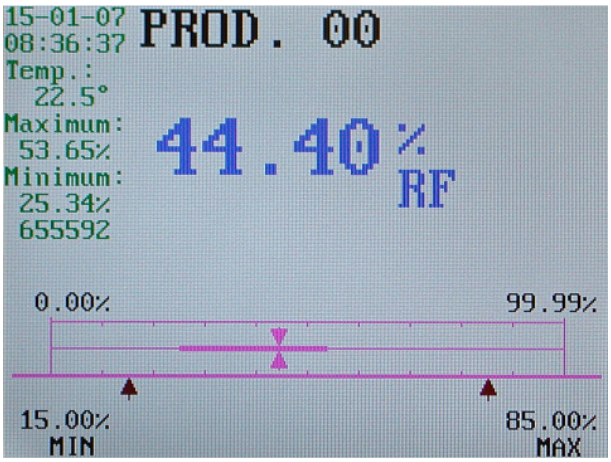
1 LC - display
2 Analog display with Min-/ Max- indication
3 Soft keys
4 Programming key
5 +/- - sign
6 SET - key
7 RESET - key
8 Numerical block
9 Moisture sensor

⑨ Moisture sensor with connection cable

⑨ Sensor surface



Operating instructions valid for HUMY - Software V 1.61 (12.09.1997) and higher.
Connectors shown valid for intrinsic safe version from March 1995 or later and standard version from October 1997 and later.



Picture 1: DISPLAY MODE
Display of all values such as date, time, product name, product temperature, moisture value, MIN/MAX value, analogue bar graph with measurement value and limit values.

2.1 ELASTOMER KEYPAD

The front foil is made from Autotext 2.
Autotext 2 is a polyester foil which is highly resistant against solvents. Autotext 2 is stronger and has an extremely long lifecycle over most commonly used other foils. Keys have a lifespan of over 1 Million strokes.

2.1.1 Numeral keys 0 to 9

The keys ⑧ are used for input of numerical values like time, date, code numbers, alarm values, measuring ranges, sample values and filter times.

2.1.2 Soft keys

Soft keys are coded in „blue“ and have no label ③. They are used to navigate through different user levels or for selection of appropriate functions. The correspondent meaning of the dynamic soft key is shown on the LCD display directly next to the soft key

2.1.3 — - key

The — - key ⑤ sets the minus sign. For instance to set an offset value.

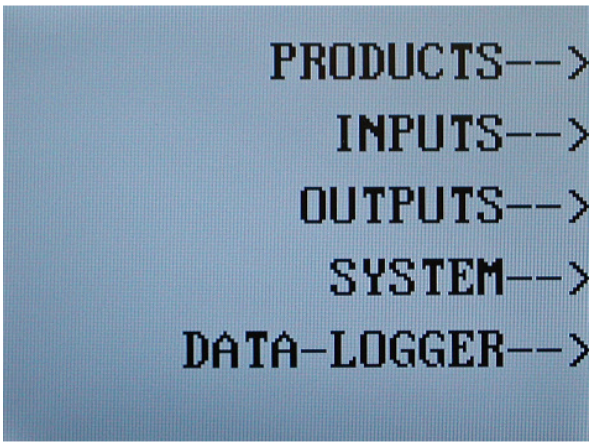
2.1.4 ← - key

The ← - key ⑦ is used to reset MIN-/MAX-values, or to delete incorrect numerical values.

2.1.5 P - key

The **P - key** ④ has multiple functions:

a) Advance to next display
b) Return to previous display
c) Terminate calibration
d) Stores new parameter values (only when pressed together with **S** - key) as shown in picture 10, paragraph 2.7.3



Picture 2: PARAMETER MENU
From here you can reach the parameter menus which allows for changing products, alarms, inputs, outputs, and system defaults. Saving of changes must be confirmed by pressing the **P** and **S** key **simultaneously**.

2.1.6 S - key

The **S** ⑥ key has the following functions:

a) Before a new value is being entered the **S** key must be pressed.
b) Setting a newly entered value
c) Saving a new parameter value (only when keys **P** and **S** are pressed together simultaneously in parameter selection menu) as shown in picture 10, position 2.7.3.

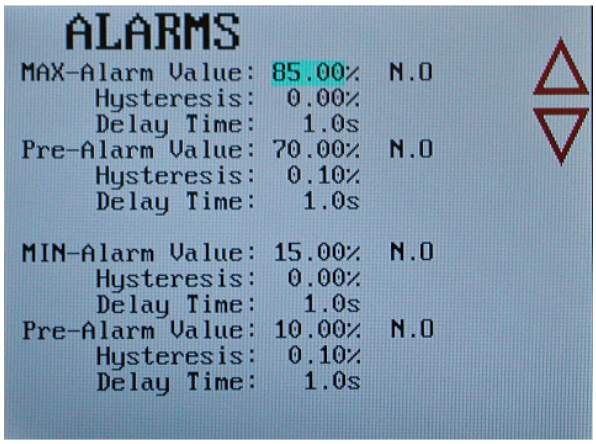
2.2 ALARM SETTINGS

2.2.1 Option 1:

HUMY 3000 is in modus - Display measurement values - (Picture 1)

a) Press the ↵ key.
b) Press soft key „**ALARM S**“
c) Press either soft key „**MAXIMUM**“ or „**MINIMUM**“ for changing the upper or lower alarm value .
d) In order to change alarm values press either the soft key △ or ▽.
e) Press the **S** key for confirmation after selection of a new alarm value.

2.2.2 Option 2:



Picture 3: ALARMS
In this menu the parameters for alarm value, dead time and MAX-, MIN-, and pre-alarms are being set. All alarm outputs can be set as open circuit or closed circuit.

HUMY 3000 is in modus - Display measurement values - (Picture 1)

a) Press the **P** key.
b) Press soft key „**PARAM.** ↳ “, which will open the parameter menu (Picture 2).
c) Press soft key „**INPUT/OUTPUT-->**“. Then press soft key „**ALARMS-->**“.
This will open the display for ALARMS (Picture 3).
d) In order to change alarm values press either the soft key △ or ▽.▽.

2.2.3 MAX-Alarm Value

For MAX-alarm 2 relay outputs are available (1 normally closed contact and 1 normally open contact).
a) MAX-Alarm - values (right, next to value:) is displayed inversely. Alarm value can be entered directly with the numeric keys. In order to change an incorrect entry press the ← key.
b) After the new value is being entered press the **S** key for confirmation.
c) Press the soft key ▽. Relay output NO (open circuit principle) or NC (closed circuit principle) is displayed inversely.
d) Press the **S** key.
e) Changing form NO to NC and vise versa by pressing the soft key △ or ▽.
f) After selection of operating principle press the **S** key for confirmation.
g) Continue with soft key ▽.

2.2.4 Hysteresis

The hysteresis value (right, next to **Hysteresis:**) is displayed inversely.
a) The hysteresis value can be entered directly with the numeric keys.
After the new value is being entered press the **S** key for confirmation.
b) Continue with soft key ▽.

2.2.5 Dead time

The dea time value in seconds (right, next to **Dead time:**) is displayed inversely.
a) The dead time value can be entered directly with the numeric keys.
After the new value is being entered press the **S** key for confirmation.
b) Continue with soft key ▽.

2.2.6 Pre-alarm

The pre-alarm for the MAX-alarm has a 24 VDC-signal output. For input of the pre-alarm value please see position 2.2.3 to 2.2.5.

2.2.7 MIN-Alarm value:

For MIN-alarm 2 relay outputs are available (1 normally closed contact and 1 normally open contact).
For input of the pre-alarm value please see position 2.2.3 a) to g).

2.2.8 Hysteresis

The hysteresis value (right, next to **Hysteresis:**) is displayed inversely.
a) The hysteresis value can be entered directly with the numeric keys.
After the new value is being entered press the **S** key for confirmation.
b) Continue with soft key ▽.

2.2.9 Dead time

The dead time value in seconds (right, next to **Dead time:**) is displayed inversely.

a) The dead time value can be entered directly with the numeric keys.
After the new value is being entered press the **S** key for confirmation.
b) Continue with soft key ▽.

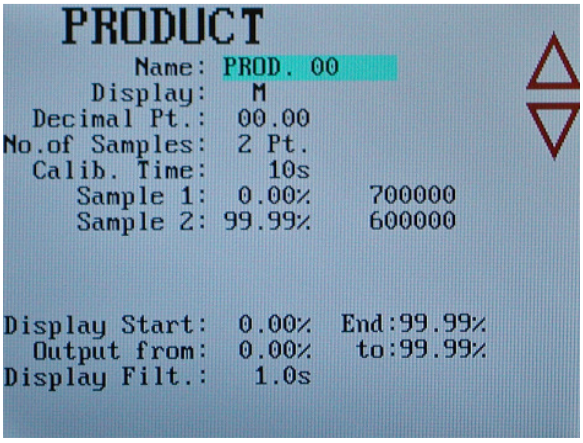
2.2.10 Pre-alarm

The pre-alarm for the MIN-alarm has a 24 VDC-signal output. For input of the pre-alarm value please see position 2.2.3 to 2.2.5.

2.2.11 Saving of adjusted values

After entering the parameters press the **P** key. The parameter selection menu is displayed (picture 2) . Press the **P** and **S** key **simultaneously**. Only then, the adjusted values are being stored in the
HUMY 3000. Afterwards the device will switch into display mode automatically.

2.3 PRODUCT PARAMETERS



Picture 4: PRODUCTS
This menu allows selection of all parameters for a selected product. The following parameters can be changed: product name, display of values in H_2O, remaining moisture (RF) or dehydrated substance (TS),
decimal point, calibration values, calibration time, laboratory determined measurement values for sample 1 and 2 (low and high range of measurement), display start, display end, and display filter time.

2.3.1 Selection of product display

Factory default is that the HUMY 3000 can store parameters for 8 products.
They are named „PRODUCT 1“ through „PRODUCT 8“.

HUMY 3000 is in modus - Display measurement values - (Picture 1)
a) Press the **P** key.
b) Press soft key „**PARAM.** ↳ “, which will open the parameter menu (Picture 2).
c) Press soft key „**PRODUCTS -->**“, which will open the product selection menu.
d) Press soft key △ and ▽ until the desired product is being selected.
e) Press soft key „**SELECT** ↳ “, which will open the parameter menu (Picture 2).
f) Press the **P** and **S** key **simultaneously**. Only then, the adjusted values are being stored in the HUMY 3000. Afterwards the device will switch into display mode automatically.

2.3.2 Adjustment of product parameters

HUMY 3000 is in modus - Display measurement values - (Picture 1)
a) Press the **P** key.
b) Press soft key „**PARAM.** ↳ “, which will open the parameter menu (Picture 2).
c) Press soft key „**PRODUCTS -->**“, which will open the product selection menu.
d) Press soft key △ and ▽ until the desired product is being selected.
e) Press soft key „**EDIT** ↳“, which will open the product menu (Picture 4).
From here all product parameters can be edited.
Press soft key △ and ▽ for selection of parameters to be edited.

2.3.3 Product Name

The product name is displayed inversely. Press the **S** key. A blinking cursor shows the position of the character to be entered. Selection of character and special character by pressing the soft key △ and ▽.
The position of the cursor can be changed via the soft key ▷ and ◁. After entering the product name press the **S** key for confirmation.

2.3.4 Display

Display of measurement value either in remaining moisture „**RF**“, dehydrated substance „**TS**“ or „**H_2O**“.
Press the **S** key. Pressing the soft key △ and ▽ will change the display to the desired option.
Press the **S** key for confirmation.

2.3.5 Decimal point

For selection of decimal point see position 2.6.3 (keys **S** , △ , ▽ and **S**).

2.3.6 Calibration (see Appendix K 0.1, page 36)

Factory default is a 2-point calibration (low and high measurement range). If desired a 3-point, 4-point or
5-point calibration can be selected.

2.3.7 Calibration time

Determines the time interval for which the HUMY 3000 calculates the average of the sampling.
For conveyor belts a time interval between 20 and 30 seconds should be selected, for screw conveyors a time interval of 50 to 100 seconds is appropriate. The value next to „**Calibration time:**“ is displayed inversely.

a) Enter calibration time with numeric keypad.
b) Press the **S** key for confirmation
c) Continue with soft key ▽.

2.3.8 Sampling (Calibration of sensor)

Saving of sampling 1: The product should be as dry as possible (low end of range).

a) Press soft key △ and ▽ to select **Sample 1:**.
b) During running process press the **S** key to start calibration. At the same time take several samples for laboratory determination of actual moisture content. The HUMY 3000 will now save the **measurement value for sample 1** (see position 2.7.2, picture 9).
Wait until the calibration has stopped.
c) Press the **P** key, which will open the parameter menu (picture 2). Now, press the **P** and **S** **simultaneously** to store the new values.
Afterwards the device will switch into measurement mode automatically.
d) Select the menu **PRODUCTS** as described in position 2.3.2.
e) Press the soft key △ and ▽ to select the value next to „**Sample 1**:“.
f) Enter the laboratory value of your samples via the numeric keys.
g) Press the **S** key for confirmation.
h) Press the **P** key, which will open the parameter menu (picture 2). Press the **P** and **S** simultaneously to store the new values. The calibration values are being assigned to the laboratory values. Afterwards the device will switch into measurement mode automatically.

Saving of sampling 2: The product should be as moist as possible (high end of range)

Repeat steps as described in position 2.3.8 a) to h).

For additional information see position 7.1.

2.3.9 Display start

Setting the low end of measurement range. The value next to „**START:**“ is displayed inversely.

a) Enter the display start (e.g. 0.0%) with the numeric keys.
b) Press the **S** key for confirmation.
c) Continue with soft key ▽.

2.3.10 Display end

Setting the high end of measurement range. The value next to „**STOP:**“ is displayed inversely.

a) Enter the display end (e.g. 10.0%) with the numeric keys.
b) Press the **S** key for confirmation.
c) Continue with soft key ▽.

2.3.11 Display filter

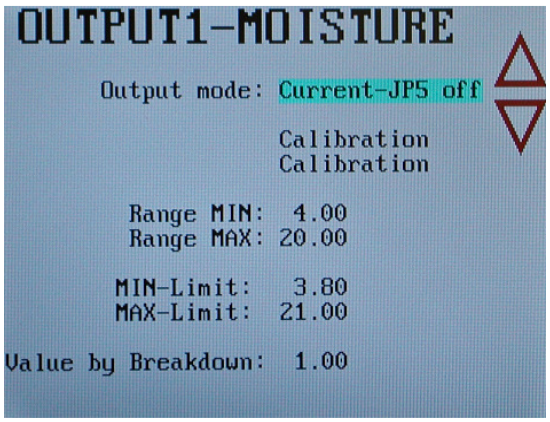
A filter time from 0 to 999 seconds can be entered. In every second 4 measurements are being taken.
If a display filter of 20 seconds is entered a total of 80 measurements are taken for calculation of average.
The value next to „**DISPLAY FILTER**:“ is displayed inversely.

a) Enter the desired value with the numeric keys
b) Press the **S** key for confirmation.

2.3.12 Saving of adjusted values

After selection of parameters press the **P** key, which will open the parameter menu (picture 2).
Now, press the keys **P** and **S** **simultaneously**. Only then, the adjusted values are being stored in the
HUMY 3000. Afterwards the device will switch into display mode automatically

2.4 OUTPUTS



Picture 5: OUTPUTS
This menu allows for setting parameters for the analog outputs
REMAINING MOISTURE and TEMPERATURE:
Calibration: Start,
Calibration: End,
Range from .... to ....,
MIN/MAX Range: Start / End
Value in case of error.

2.4.1 Outputs

HUMY 3000 is in modus - Display measurement values - (Picture 1)

a) Press the **P** key.
b) Press the soft key „**PARAM.** ↳“.
c) Press the soft key „**INPUTS/OUTPUTS**“ in the parameter menu.
Select with the soft key „**OUTPUTS-->**“ the display „**OUTPUTS**“.

2.4.2 Output 1: (Moisture)

The analog output for moisture can be set from 0 to 20 mA. For adjustment connect a mA-multimeter
to the moisture output (see paragraph 4.0 Connections).

a) The word „**START**“ is displayed inversely. Press the **S** key. The message „Set output“ is being displayed as shown in picture 11 in paragraph 2.7.4.
b) Set the mA-value for the start value of the analog output with the soft key △ and ▽ (e.g. 0 or 4 mA). Connect a multimeter to confirm the correct value.
c) After entering the values press the **S** key for confirmation. Press soft key ▽ to continue.
d) The word „**END**“ is displayed inversely. Press the **S** key. The message „Set output“ is being displayed as shown in picture 11 in paragraph 2.7.4.
e) Set the mA-value for the end value of the analog output with the soft key △ and ▽ (e.g. 20 mA). Connect a multimeter to confirm the correct value.
f) Press the **S** key for confirmation.
g) Continue with soft key ▽.

2.4.3 Range from .... to .... :

The analog output can be set from 0 to 100%, e.g.: **measuring range 5 to 20% RF:**

Analog output:	5% RF equals 4 mA
	20% RF equals 20 mA
or	10% RF equals 4 mA
	15% RF equals 20 mA

a) The value next to „**Range from:**“ is displayed inversely. Enter the desired value with the numeric keys.
b) Press the **S** key. Then press the soft key ▽ to continue.
c) The value next to „**Range to:**“ is displayed inversely. Enter the desired value with the numeric keys.
d) Press the **S** key for confirmation.
e) Continue with soft key ▽.

2.4.4 Limiter

The analog output can be limited against under-range and over-range. For adjustment connect a mA-multimeter to the moisture output (see paragraph 4.0 Connections).

a) The word „**START**“ is displayed inversely. Press the **S** key. The message „Set output“ is being displayed as shown in picture 11 in paragraph 2.7.4.
b) Set the low mA-value for the limiter of the analog output with the soft key △ and ▽ (e.g. 3.9 mA). Connect a multimeter to confirm the correct value.
c) After entering the values press the **S** key for confirmation. Press soft key ▽ to continue.
d) The word „**END**“ is displayed inversely. Press the **S** key. The message „Set output“ is being displayed as shown in picture 11 in paragraph 2.7.4.
e) Set the high mA-value for the limiter of the analog output with the soft key △ and ▽ (e.g. 20.3 mA). Connect a multimeter to confirm the correct value.
f) Press the **S** key for confirmation.
g) Continue with soft key ▽.

2.4.5 Value in case of error

The value of the analog output can be set to a fixed value in case of an error. The value must be within the measurement range.

a) The value next to „**ERROR**“ is displayed inversely.
b) Enter desired value with numeric keys.
c) Press the **S** key for confirmation.
d) Continue with soft key ▽.

2.4.6 Output 2: (Temperature)

Follow the instructions as listed under paragraph 2.4.2.

2.4.7 Range from .... to .... :

Follow the instructions as listed under paragraph 2.4.3.

2.4.8 Limiter

Follow the instructions as listed under paragraph 2.4.4.

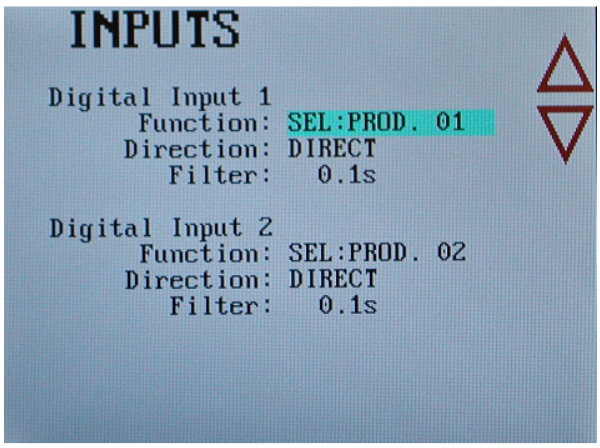
2.4.9 Value in case of error

Follow the instructions as listed under paragraph 2.4.5.

2.4.10 Saving of adjusted values

After selection of parameters press the **P** key, which will open the parameter menu (picture 2). Now, press the keys **P** and **S** **simultaneously**. Only then, the adjusted values are being stored in the HUMY 3000. Afterwards the device will switch into display mode automatically

2.5 INPUTS



Picture 6: INPUTS

Factory default, the HUMY 3000 offers two (2) digital inputs (D1 and D2) which can be triggered by an active signal (18-24 VDC).
The standard configuration is for the functions: MEASURING STOP, PRODUCT SELECT, FILTER RESET and BATCH - Mode. See paragraph 2.7.5, 2.7.6 picture 12 and 13.
Optional, other configurations are available upon request.

2.5.1 Digital Input 1 (Function)

HUMY 3000 is in modus - Display measurement values

a) Press the **P** key.
b) Press the soft key „**PARAM.** ↳“.
c) Press the soft key „**INPUTS/OUTPUTS**“ in the parameter menu. Select with the soft key „**INPUTS-->**“
the display „**INPUTS**“.
d) The function mode next to „**Function:**“ is displayed inversely.
e) Press the **S** key for confirmation.
f) Press soft key △ and ▽ to select desired function.
g) Press the **S** key for confirmation.
h) Continue with soft key ▽.

2.5.2 Digital Input 1 (Direction)

a) The word next to „**Direction:**“ is displayed inversely.
b) Press the soft key △ or ▽ to toggle the control function ON/OFF.
INVERT: For a positive control signal the function as described in paragraph 2.5.1 is active. (ON)
DIRECT : For a positive control signal the function as described in paragraph 2.5.1 is inactive. (OFF)
c) Press the **S** key for confirmation.
d) Continue with soft key ▽.

2.5.3 Digital Input 1 (Filter)

a) The word next to „**Filter:**“ is displayed inversely.
b) Enter the desired filter time with numeric keys.
c) Press the **S** key for confirmation.
d) Continue with soft key ▽.

.

2.5.4 Digital Input 2

Follow the instructions as listed under paragraph 2.5.1 to 2.5.3.

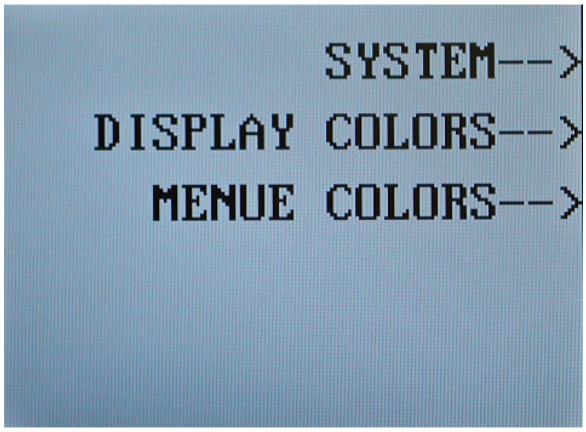
2.5.5 Temperature - Offset

In case the displayed product temperature is different from the actual product temperature an offset can be entered. For a negative offset the minus sign has to be set.

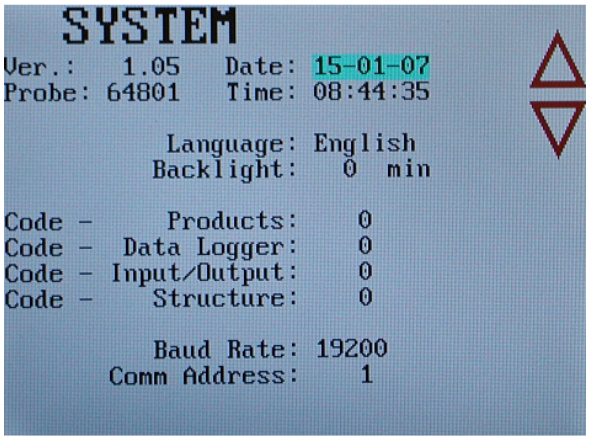
2.5.6 Saving of adjusted values

After selection of parameters press the **P** key, which will open the parameter menu (picture 2). Now, press the keys **P** and **S** **simultaneously**. Only then, the adjusted values are being stored
in the HUMY 3000. Afterwards the device will switch into display mode automatically

2.6 BASIC PARAMETERS



Picture 7: System selection
The Basic Parameter menu is selected via the parameter menu as shown in picture 2.
From here display colors and menu colors can be selected.



Picture 8: SYSTEM
In the menu SYSTEM the system parameters can be set:
- Date, time,
- Code product,
- Code alarm,
- Code input/output,
- Code structure,
- Display mode,
- Display illumination,
- baud rate and port address.

Displayed is also the software revision and serial number of the sensor.

2.6.1 Date

HUMY 3000 is in modus - Display measurement values

a) Press the **P** key.
b) Press the soft key „**PARAM.** ↳“.
c) Press the soft key „**SYSTEM -->**“ in the parameter menu, which will open the „**Structure“** display.
Press soft key △ and ▽ to select desired function.
d) The function mode next to „**Date:**“ is displayed inversely.
e) Enter the desired date with numeric keys.
f) Press the **S** key for confirmation.
g) Continue with soft key ▽.

.

2.6.2 Time

The function mode next to „**Time:**“ is displayed inversely.

a) Enter the desired time with numeric keys.
b) Press the **S** key for confirmation.
c) Continue with soft key ▽.

2.6.3 Display

The visual mode of the display can be set to „NORMAL“ or „INVERSE“.
The word next to „**Display:**“ is displayed inversely.

a) Press the **S** key for confirmation.
b) Press soft key △ and ▽ to select display function „NORMAL“ or „INVERSE“
c) Press the **S** key for confirmation.
d) Continue with soft key ▽.

2.6.4 Code-Products

A 4-digit code number can be entered to limit access to product parameters.
The value next to „**CODE-PRODUCTS:**“ is displayed inversely.

a) Enter desired code number (maximum of 4 digits) with numeric keys.
b) Press the **S** key for confirmation.
c) Continue with soft key ▽.

ATTENTION: It is important to write down your personal code number and store it in a secure place.

2.6.5 Code-Alarms

Follow the instructions as listed under paragraph 2.6.4.

2.6.6 Code-Inputs/Outputs

Follow the instructions as listed under paragraph 2.6.4.

2.6.7 Code-Structure

Follow the instructions as listed under paragraph 2.6.4.

2.6.8 Display illumination

Display illumination is being shut off after a selectable, pre-determined time automatically.
Switching off display illumination increases life cycle of mini-fluorescent lights.
The value next to „**Display illumination:**“ is displayed inversely.

a) Enter the desired illumination interval (1 to 10 min.).
b) Press the **S** key for confirmation.
c) Continue with soft key ▽.

2.6.9 Baud rate

a) Press the **S** key for confirmation.
b) Press soft key △ and ▽ to select desired baud rate.
c) Press the **S** key for confirmation.
d) Continue with soft key ▽.

2.6.10 COM - Address

A COM-address between 1 and 31 can be set for communication with a connected computer system.

The value next to „**COM-address:**“ is displayed inversely.

a) Enter desired COM-address with numeric keys.

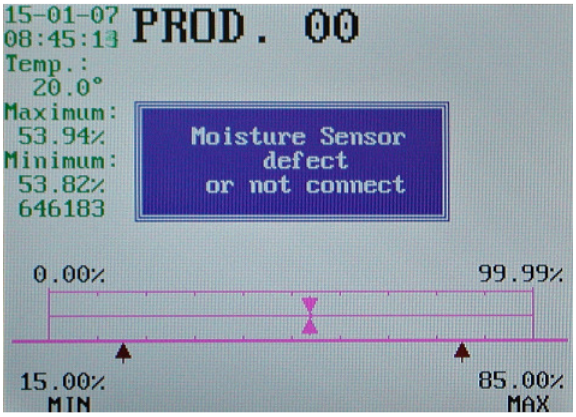
b) Press the **S** key for confirmation.

2.6.11 Saving of adjusted values

After selection of parameters press the **P** key, which will open the parameter menu (picture 2). Now, press the keys **P** and **S** **simultaneously**. Only then, the adjusted values are being stored in the HUMY 3000. Afterwards the device will switch into display mode automatically

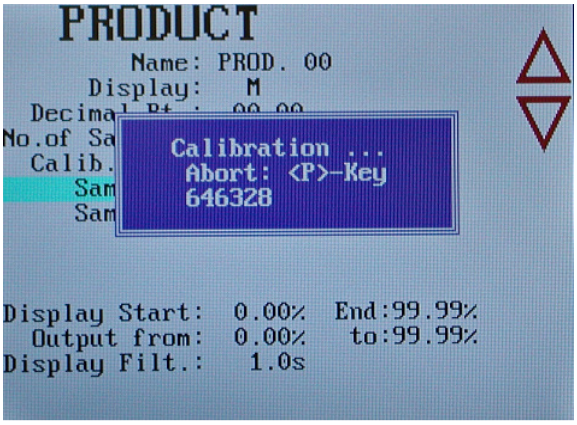
2.7 HUMY 3000 POWERING UP

2.7.1



Picture 9: Status message for sensor
In case the FMS 400 sensor is not connected correctly, not connected at all of defective the following message is being displayed.

2.7.2

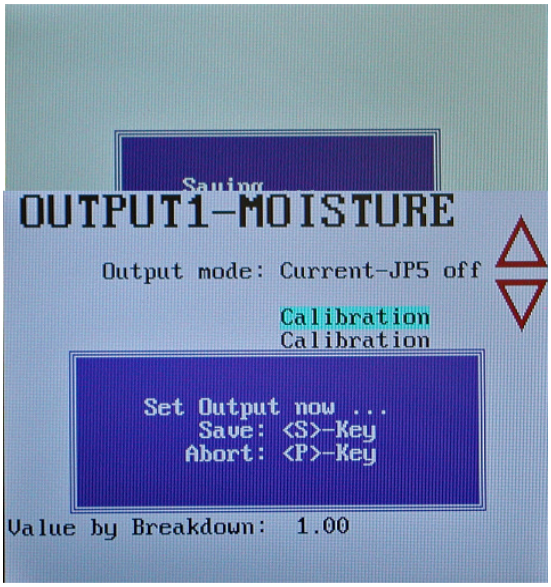


Picture 10: Calibration
The following display is being shown during calibration. The calibration process can be terminated by pressing the **P** key at any time.

Picture 11: Saving of entered values
After selection of parameter values press the **P** key, which will open the parameter menu.

Press the **P** and **S** simultaneously to store any changes into the HUMY 3000 system. Afterwards the device will switch into measuring mode automatically.

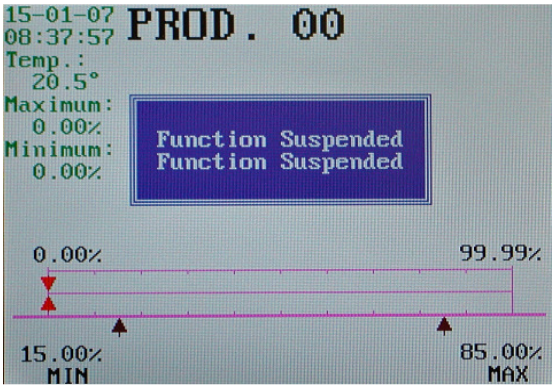
2.7.3



2.7.4

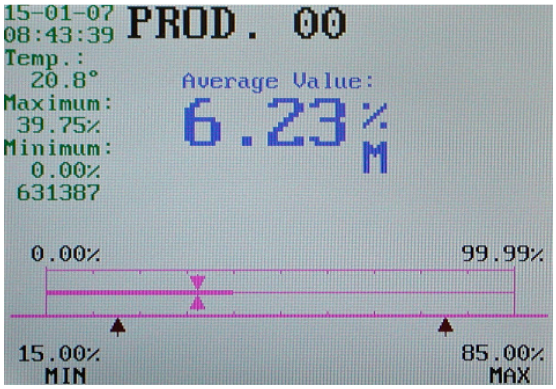
Picture 12: Set outputs
During calibration of analog outputs the following display is shown.
Press the △ and ▽ keys for changing the output signal.

2.7.5



Picture 13: Function: Measurement STOP
A digital input can be utilized to terminate a measurement. This function is useful in case of interruption of the process or during batch processing.

2.7.6



Picture 14: Function : Batch - Mode
A digital input can be utilized for display of an average value after terminating the batch process..

2.8 INITIALIZATION

Initialization is re-setting of internal parameters of the device to 0 (factory default) or a pre-determined value.
HUMY 3000 features 3 levels of initialization, identified by code number 10, 11 and 12:

Code 10 >> Reset Parameters
Code number **10** resets all parameters (alarm values, measuring range, date, etc.) to 0 or a pre-determined value.

Code 11 >> Reset Access Code
Code number **11** resets access code to the following menus: PRODUCTS, INPUTS/OUTPUTS,
SYSTEM and DATA-LOGGER.

Code 12 >> Reset MC-Block
Code 12 resets the MC–Block. MC-Block is a protected memory area which contains the measurement values for the data-logger.

2.8.1 Initialization of moisture analyzer HUMY 3000

a) Turn the device off. (power off).
b) Press and hold the „0“ key of the numeric keypad while powering on the device.
c) The display will show the „?“ sign. Press the **S** key within 1 second.
The display will show **CODE:_** . Enter code number 10, 11 or 12.
d) Press the **S** key for confirmation. The device will ask for confirmation to execute initialization.
Press the **P** and **S** key **simultaneously**.
e) HUMY 3000 will switch into display mode automatically.
f) Press the **P** key.
g) Press the soft key „**PARAM.** ↳“, which will open the parameter menu (picture 2).
h) Press the **P** and **S** key **simultaneously**.

This finalizes initialization.

Picture 15: Initialization
Typical display during initialization.
The LCD-display shows white characters on black background (display inversed).

3.0 DATA - LOGGER

Optional, a data-logger function is available for HUMY 3000 and SCS 3000. This allows for permanent storage of computed measurements for moisture and temperature. Both, on-line data and archived data can be viewed for interpretation. A separately available Windows based download program allows transfer of data to a connected personal computer. Data can be viewed and analyzed with the Windows program Excel.

The following chart shows the maximum available time interval for data acquisition depending from the flash memory installed in the data-logger (triggering interval 5 sec.).

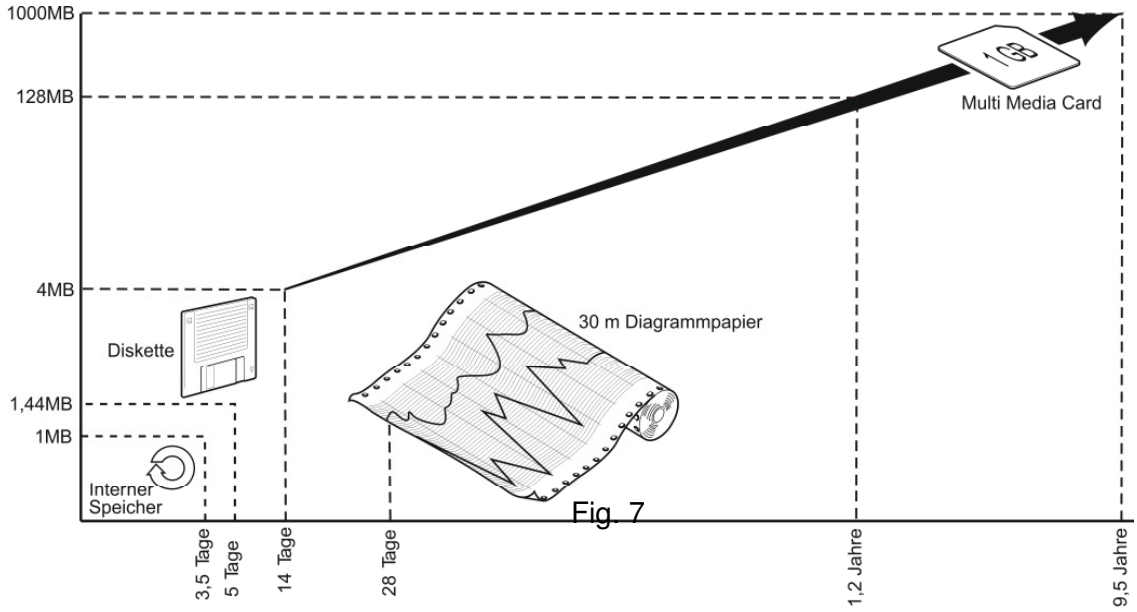
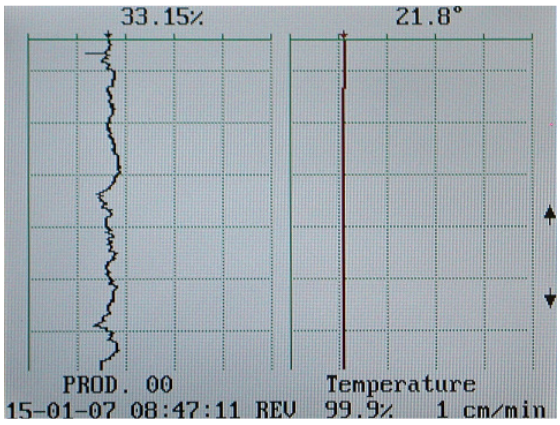


Fig. 7

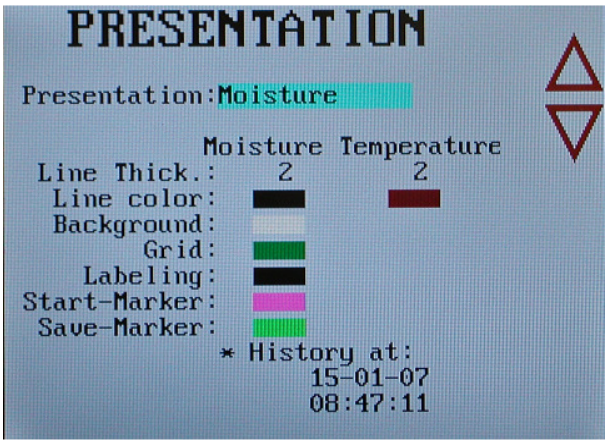


Picture 15:
2-channel data-logger for display of free memory, chart speed and arrows up/down for scrolling of screen.

The integrated data-logger offers 2-channels – for moisture and temperature.
For archiving purposes START and STOP times can be configured by date and time.
Up to 40 days can be stored in the data-logger history. A search function allows for easy access to Archived information. Various parameters, like display type, line speed, and freely configurable START and STOP times make this 2-channel line recorder a highly useful tool for your data tracking and troubleshooting.

The line graphic as accessible by pressing the „S“ key from the display mode screen. Press the „S“ key again to return to the display mode screen.

3.1 PRESENTATION OF VALUES



Picture 16 :
The screen PRESENTATION allows for setting of parameters for moisture and temperature.
Line colors and thickness as well as START/STOP conditions are also accessible from this menu.

HUMY 3000 is in modus - Display measurement values (picture 1).

a) Press the **P** key.
b) Press the soft key „**PARAM.** ↳“, which will open the parameter menu (picture 2).
c) Press the soft key „**DATA-LOGGER -->**“ in the parameter menu, which will open the „**DATA-LOGGER“** display.
d) Press the soft key "**PRESENTATION-->"** to access the configuration menu for data-logger display settings.

3.1.1 Display of temperature, moisture or both:

Selection of measurement lines to be displayed. The words next to "**Display lines:**" are shown inversely.

a) Press the **S** key
b) Press the soft key △ and ▽ for desired selection (Moisture , Moisture+Temperature or Temperature).
c) Press the **S** key for confirmation.
d) Continue with soft key ▽.

3.1.2 Line thickness

Adjusts line thickness for display of moisture. The value next to „**Moisture:**" is shown inversely

a) Set line thickness (1 to 4).
b) Press the **S** key for confirmation.
c) Continue with soft key ▽.

Adjusts line thickness for display of temperature. The value next to „**Temp.:**" is shown inversely

d) Set line thickness (1 to 4).
e) Press the **S** key.

3.1.3 History

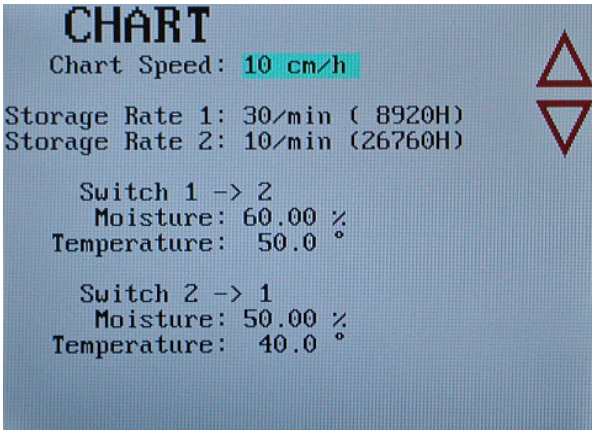
Access to archived data is achieved by entering date and time. The line display will start from the specified date and time.

a) Press the soft key ▽ until the date is being displayed. Enter desired date with numeric keys.
b) Press the **S** key.
c) Press the soft key ▽ until the time is being displayed. Enter desired time with numeric keys.
d) Press the **S** key
e) Press the soft key △ until "**History at:**" is being displayed.
f) Press the **S** key. A star is shown in front of "**History at:**".

3.1.4 Saving of adjusted values

After selection of parameters press the **P** key, which will open the parameter menu (picture 2). Now, press the keys **P** and **S** **simultaneously**. Only then, the adjusted values are being stored in the
HUMY 3000. Afterwards the device will switch into display mode automatically

3.2 CHART SPEED



Picture 17:
Display CHART SPEED
From here parameters for chart speed, memory rate 1 and 2 as well as criteria for switching from memory rate 1 to 2 and vise versa are being configured.

HUMY 3000 is in modus - Display measurement values - (Picture 1)

a) Press the **P** key.
b) Press soft key „**PARAM.** ↳ “, which will open the parameter menu (Picture 2).
c) Press the soft key „**DATA-LOGGER -->**“ in the parameter menu, which will open the „**DATA-LOGGER“** display.
d) Press the soft key "**CHART SPEED-->"** to access the configuration menu for chart speed settings.

3.2.1 Chart Speed

The chart speed can be set from 2 cm/min (120cm/h) to 0.1 cm/h.
The value next to „**Chart Speed:**“ is displayed inversely.

a) Press the **S** key.
b) Press the soft key △ and ▽ for desired selection
c) Press the **S** key for confirmation.
d) Continue with soft key ▽.

3.2.2 Memory rate 1

The memory rate can be set from 60/min to 1/h. In parenthesis, the available time interval for data storage is shown. For instance, selection of a memory rate of 10/min results in an interval for data storage of 98 hours (4 days, 2 hours).

The value next to „**Memory rate 1:**“ is displayed inversely.

a) Press the **S** key.
b) Press the soft key △ and ▽ for desired selection of memory rate.
c) Press the **S** key for confirmation.
d) Continue with soft key ▽.

3.2.3 Memory rate 2

Follow the instructions as listed under paragraph **3.2.2 Memory rate 1**.

3.2.4 Switching 1- > 2 or 2- > 1

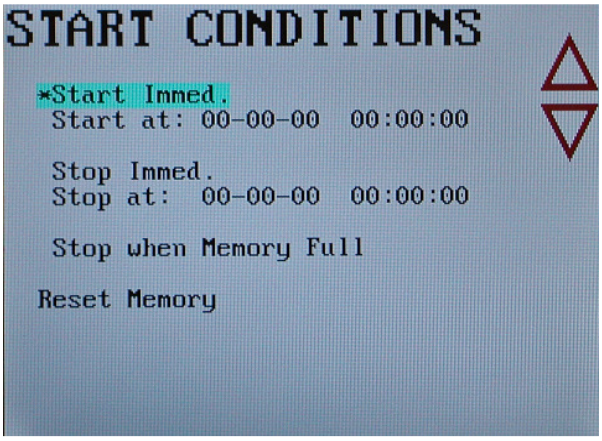
This function allows for optimal utilization of the available memory. For instance, a lower memory rate if moisture or temperature measurement is outside a specified range can be selected.
The switching values for moisture and temperature are freely configurable.

a) Press the soft key ▽ to select the desired value. Enter the new value with the numeric keys.
b) Press the **S** key.
c) Press the soft key ▽ to select the "%"-character.
d) Press the **S** key.
e) Press the soft key △ and ▽ for desired selection of %, %/min or %h.
f) Press the **S** key.

3.2.5 Saving of adjusted values

After selection of parameters press the **P** key, which will open the parameter menu (picture 2).
Now, press the keys **P** and **S** **simultaneously**. Only then, the adjusted values are being stored in the
HUMY 3000. Afterwards the device will switch into display mode automatically

3.3 START CONDITIONS



Picture 18:
Display START CONDITIONS:
From here parameters for start/stop conditions can be entered.

HUMY 3000 is in modus - Display measurement values - (Picture 1)

a) Press the **P** key.
b) Press soft key „**PARAM.** ↳ ", which will open the parameter menu (Picture 2).
c) Press the soft key „**DATA-LOGGER -->**" in the parameter menu, which will open the „**DATA-LOGGER**" display.
d) Press the soft key "**START CONDITIONS-->"** to access the configuration menu for start conditions.

3.3.1 Start instantly

This function starts storage/presentation of moisture data.
"Start instantly" is displayed inversely.

a) Press the **S** key. A star is shown in front of "Start instantly" (*)
b) Press the **P** key to enter the parameter menu (picture2).
c) Press the **P** and **S** key **simultaneously**.
Afterwards the device will switch into display mode automatically.

3.3.2 Start at...

If the HUMY 3000 should start storage/presentation of moisture data at a later time,

this time has to be entered.

a) "Start at:" is shown inversely. Press the **S** key. A star is shown in front of "Start at" (*)
b) Press the soft key ▽ to select the date field. The date is shown inversely. Enter the desired date with the numeric keys.
c) Press the **S** key.
d) Press the soft key ▽ to select the time field. The time is shown inversely. Enter the desired time with the numeric keys.
e) Press the **S** key.
f) Press the soft key ▽ to select „Stop at::"

3.3.3 Stop at...

If the HUMY 3000 should stop storage/presentation of moisture data at a later time, this time has to be entered.

a) "Stop at:" is shown inversely. Press the **S** key. A star is shown in front of "Stop at" (*)
b) Press the soft key ▽ to select the date field. The date is displayed inversely. Enter the desired date with the numeric keys.
c) Press the **S** key.
d) Press the soft key ▽ to select the time field. The time is displayed inversely. Enter the desired time with the numeric keys.
e) Press the **S** key.

3.3.4 Stop instantly

This function stops storage/presentation of moisture data.
"Stop instantly" is displayed inversely.

a) Press the **S** key. A star is shown in front of "Stop instantly" (*)
b) Press the **P** key to enter the parameter menu (picture 2).
c) Press the **P** and **S** key **simultaneously**.
Afterwards the device will switch into display mode automatically.

3.3.5 Stop when memory is full

This function automatically stops storage/presentation of moisture data when memory is full. "Stop when memory is full" is displayed inversely.

a) Press the **S** key. A star is shown in front of "Stop when memory is full" (*)
b) Press the **P** key to enter the parameter menu (picture2).
c) Press the **P** and **S** key **simultaneously**.
Afterwards the device will switch into display mode automatically.

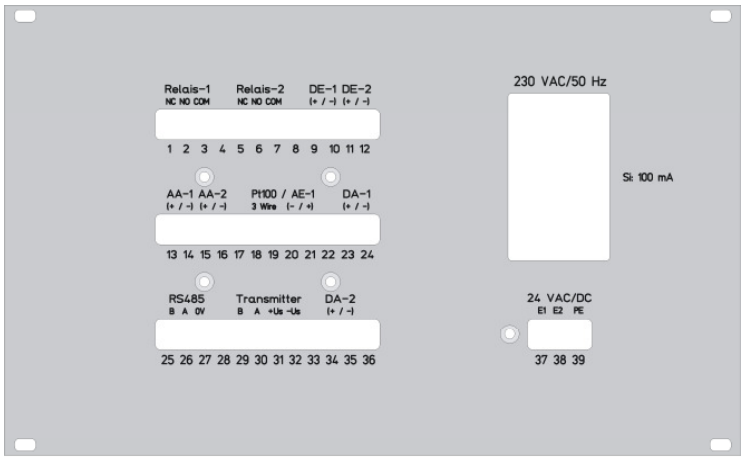
3.3.6 Reset memory

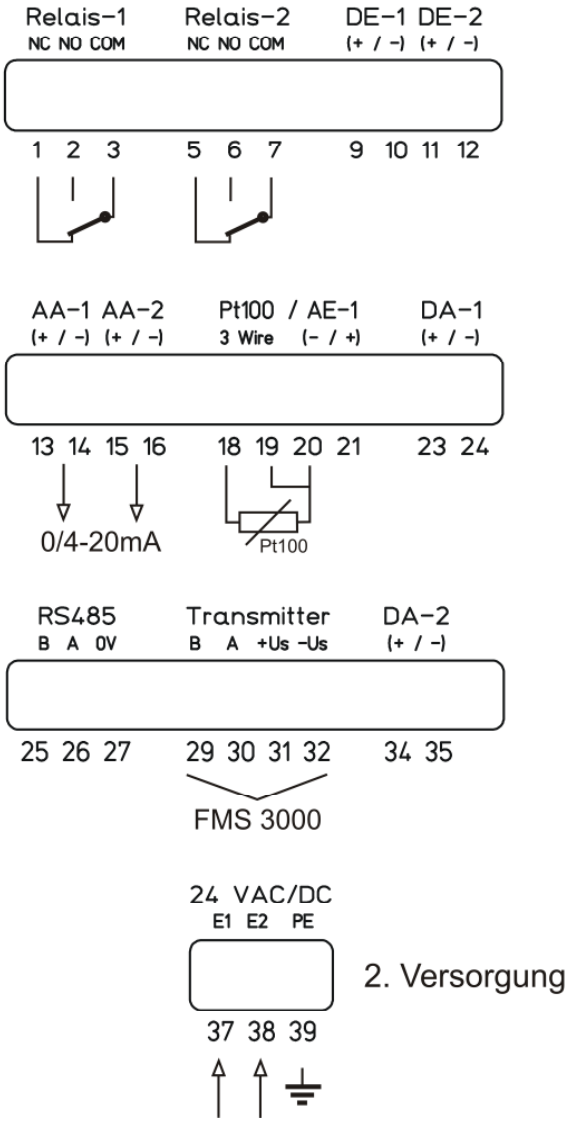
This function deletes existing data from memory. "Reset Memory" is shown inversely.

a) Press the **S** key. A message will be displayed "Are you sure?" and "**Confirm P + S**"
b) Press the **P** and **S** key **simultaneously**.
c) Data is deleted. Press the **P** key twice.
Afterwards the device will switch into display mode automatically.

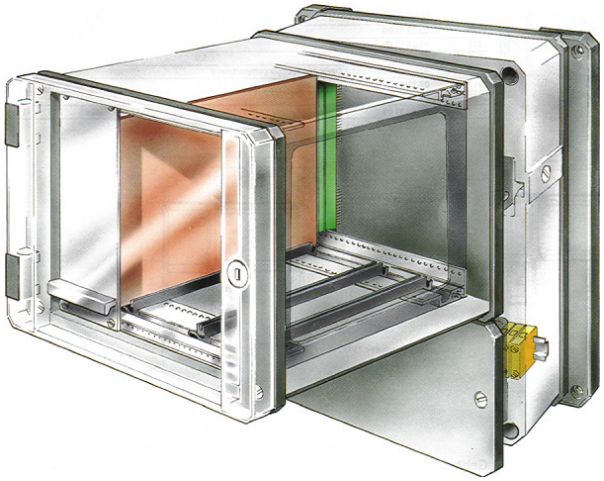
4.0 CONNECTIONS

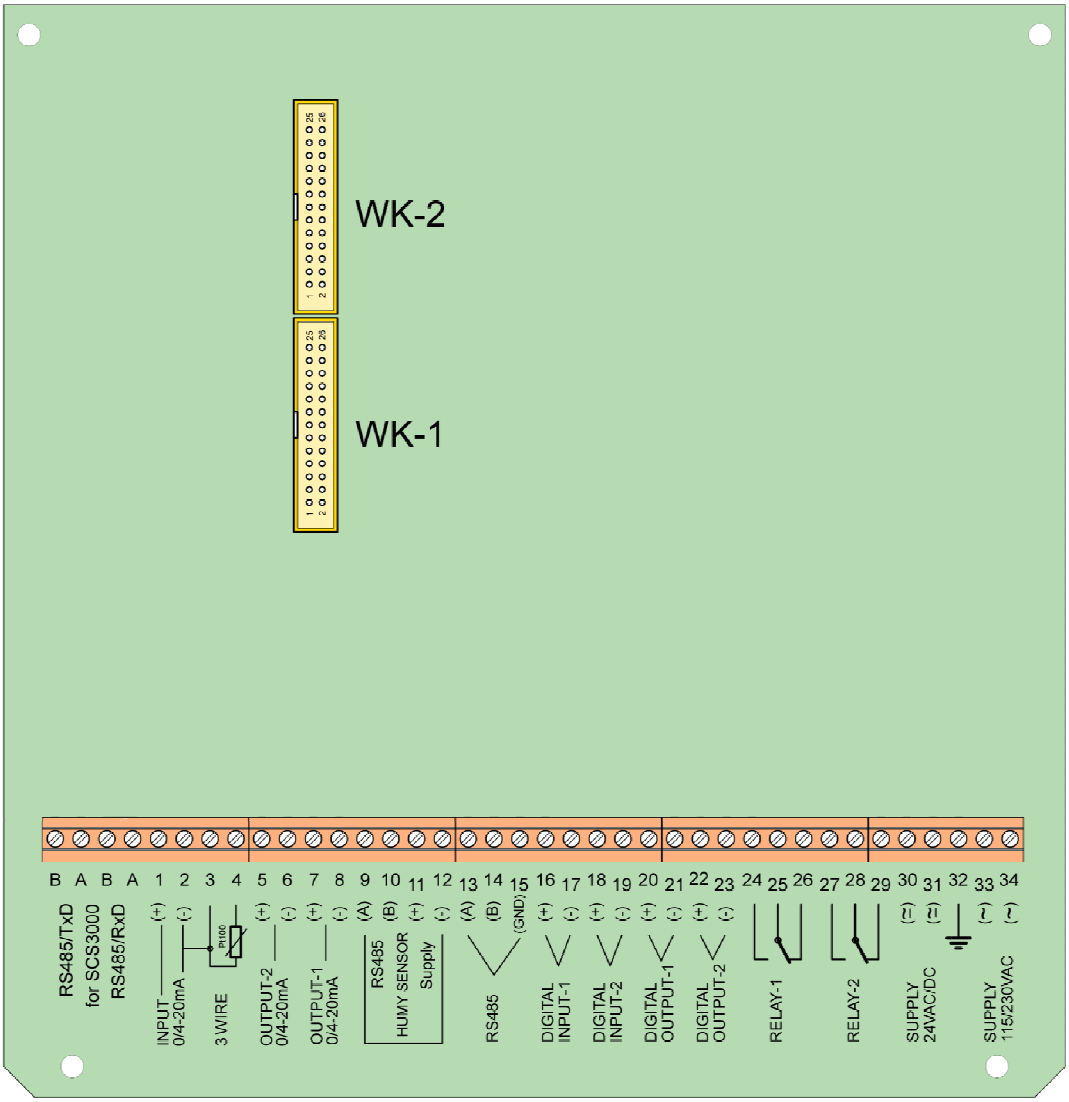
4.1 CONNECTIONS AT BACK OF TABLE TOP HOUSING





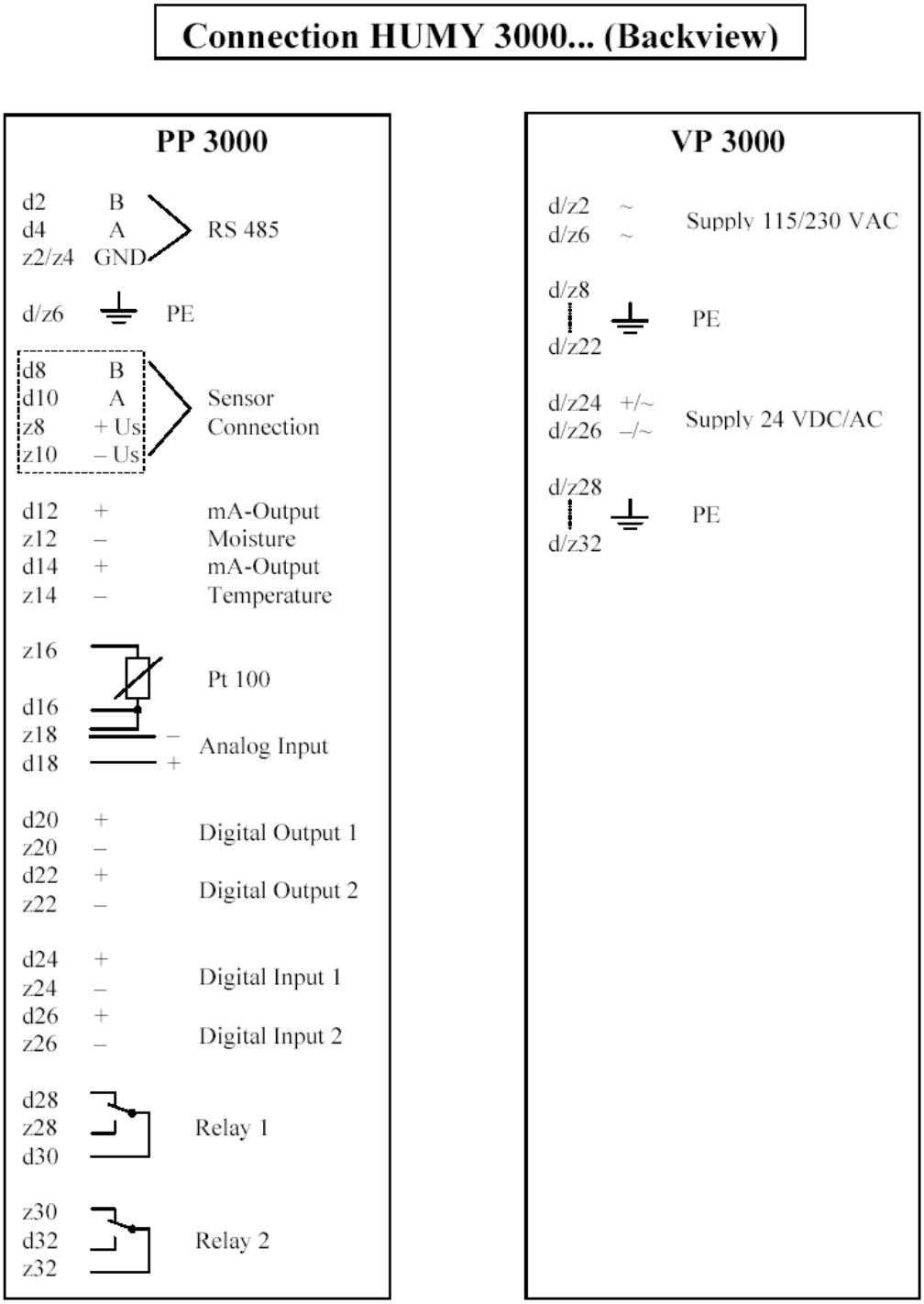
4.2 CONNECTIONS AT BACK OF FIELD HOUSING





4.3 CONNECTIONS AT BACK OF 19” version

4.3 Connection with the 19”-rack



5.0 APPENDIX

5.1 CALIBRATION

First step of calibration

There are 2 options on how to start calibration.

1. Press the SET-key at the HUMY 3000
2. External start (connection of a trigger at one of the digital inputs)

Second step of calibration

➪Sampling, several samples should be taken

Samples must be taken during calibration.
Samples must be taken near the sensor.
Samples must be taken after the sensor.

➪Determination of moisture content of samples in laboratory (calculate average moisture value).
➪After calibration has stopped ➪Return to main menu.
➪In main menu ➪Select change calibration values.
➪Press programming HUMY

After calibration has stopped a 6-digit number is displayed
Sample 1: Absolute value. This value is the calculated average value over all measurements during calibration. The calculated average value of the laboratory samples must be assigned to the absolute value.

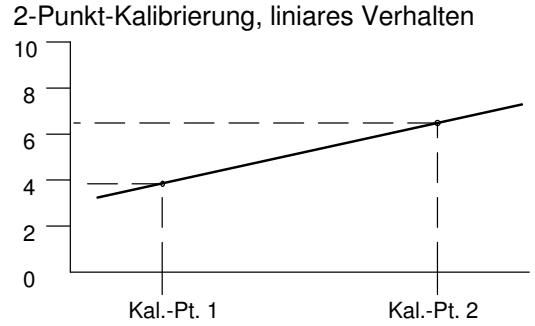
Third step of calibration

➪Configuration menu Products / Outputs.
➪Input of the calculated average value of the laboratory samples at Sample 1: Calibration value.
➪Return to main menu
➪In main menu ➪Select change calibration values.
➪Press programming HUMY

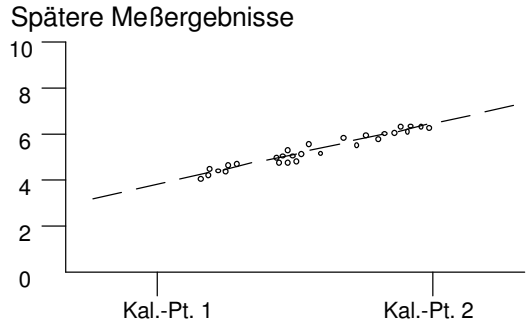
This stores the first calibration point. For determination of second calibration point please repeat the steps 1-3.
Enter the calculated average value of the laboratory samples at Sample 2: Calibration value.

Example of a 2-point calibration for linear product characteristics

Picture 27

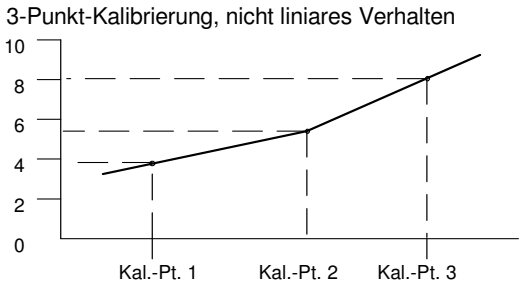


Picture 28

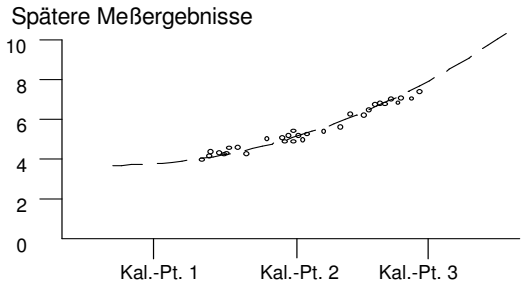


Example of a 3-point calibration for non-linear product characteristics

Picture 30



Picture 31



5.2 SAFETY INSTRUCTIONS

(a) Before turning on the device check the voltage settings on the back of the HUMY 3000 to match your available power outlet.

It is normal for the housing of the HUMY 3000 to slightly warm up during operation. Never cover the HUMY 3000 housing or operate it near a heating source or under direct sunlight.

(b) The instrument must be de-commissioned immediately and secured safely against unauthorized use in case a safe operation can't be guaranteed. Some reasons can be:

- Visible damage of the instrument
- Loose parts inside the instrument
- Instrument is malfunctioning

Before the instrument can be commissioned again a professional visual inspection according to DIN EN 61010, Part 1 must be performed. It is recommended to have the manufacturer perform such inspection.
Before the housing of the instrument is opened or closed the instrument must be disconnected from all power sources. In case, that a measurement or calibration of the instrument must be performed with an open housing only a trained and certified technician can perform such task.

B. Intended use:

The **HUMY 3000** instrument is designed for on-line moisture measurement of solids. Permissible ambient temperature for the instrument (rack-mount) is 0 °C to +60 °C and 0 °C to +80 °C for the sensor.

C. Installation and Commissioning:

All connections are clearly marked at the back of the HUMY 3000 housing. Installation, set-up, operation and de-commissioning is only permitted by trained and qualified technicians.
Always consult the instruction manual of the **HUMY 3000** system.
For installation all technical data and power ratings are to be observed.

D. Maintenance:

Never use any solvents to clean the Elastomer keypad. Just clean, dry cloth should be used.