Hygrotest 650

Instruction manual

en

WHT -20/+70 °C / DHT -20/+120 °C
PHT -40/+80 °C / PHT -40/+120 °C
PHT-20/+180 °C

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Overview instruction manuals for Hygrotest

Instruction manual	With which products	Contentrotest 500
Hygrotest 500 **Hygrotest 600** **Hygrotest 650 W/D/P** **Hygrotest 650 HP**	Corresponding to Hygrotest type	Wiring of one Hygrotest, adjustment with reference handheld **testo 400/650** and salt solution pots, maintenance Hygrotest
Display for Hygrotest	All hygrotests with display H1 to H6	Local operating with display menues, wiring display, wiring of several Hygrotest
Display H8 for hygrotest	All hygrotests with display H8	Operation display menu, electrical connection display, electrical connection of several hygrotests
Software Comsoft 3 for transmitter Hygrotest	With ComSoft 3 package for Hygrotest	Wiring RS485 networks, using ComSoft with Hygrotest driver
Scaling adapter	Together with scaling adapter	Descripton of menues of service tool (scaling, change units, calibration,...)

Preface

Dear Testo customer,

Congratulations for choosing a Testo product. We hope that you will enjoy many years of using the product and that it will help you in your work.

Please read these operating instructions carefully and familiarise yourself with the operation of the unit before putting it to use.

If problems should occur which you cannot rectify yourself, please consult our service department or your dealer. We will endeavour to provide fast and competent assistance to save you long periods out of operation.

General notes

Assembly, electrical installation and commissioning should only be carried out by suitably trained specialists.

You must always comply with the regulations applicable in your country to the opening and repair of electrical equipment.

Warnings and particularly important information which you must note when handling the product are identified in this instruction manual as follows:

Pictograms

Warnings are identified by means of a warning triangle. The relevant **signal word!** indicates the degree of risk:

Signal word!

Warning! means: Serious physical injury could occur if you do not take the precautionary measures indicated.

Caution! means: Slight physical injury or material damage could occur if you do not take the precautionary measures indicated.

Pay particular attention to warnings and take the precautionary measures indicated in order to avoid danger.

! Notes on special cases and peculiarities in the handling of your unit are indicated by an exclamation mark.

Standards / Tests

CE As declared in the certificate of conformity, this unit fulfils the guidelines of 2004 / 108 / EEC.

Contents

1. Fundamental safety instructions

Please read the following safety instructions with care:

Avoid electrical hazards:

- Never make measurements with the unit and its external probes on or near live components unless the unit is expressly approved for current and voltage measurements.
- Damaged mains cables must only be replaced by authorised personnel.
- The transmitter should be wired when disconnected.
- You must always comply with the regulations applicable in your country to the opening and repair of electrical equipment.

Protect the device:

- Note the measuring ranges of the sensor! Overheating will destroy the probes.
- Keep to the admissible storage and transport temperature and the permitted operating temperature!

Product safety / preserving warranty claims:

- Operate the unit only within the parameters specified in the technical data.
- Handle the unit properly and according to its intended purpose.
- Never apply force.
- Transmitter cannot be used for control purposes if in operation or undergoing service.
- Open the unit only when this is expressly described in the instruction manual for maintenance purposes.
- Carry out only the maintenance and repair work that is described in the instruction manual. Follow the prescribed steps exactly. For safety reasons, use only original spare parts from Testo.

  Any further or additional work must only be carried out by authorised personnel. Testo will otherwise refuse to accept responsibility for the proper functioning of the device after repair and for the validity of certifications.

  Installation, setting and calibration work must only be carried out by qualified personnel.

Ensure correct disposal:

- Send the unit directly to us at the end of its life cycle. We will ensure that it is disposed of in an environmentally friendly manner.

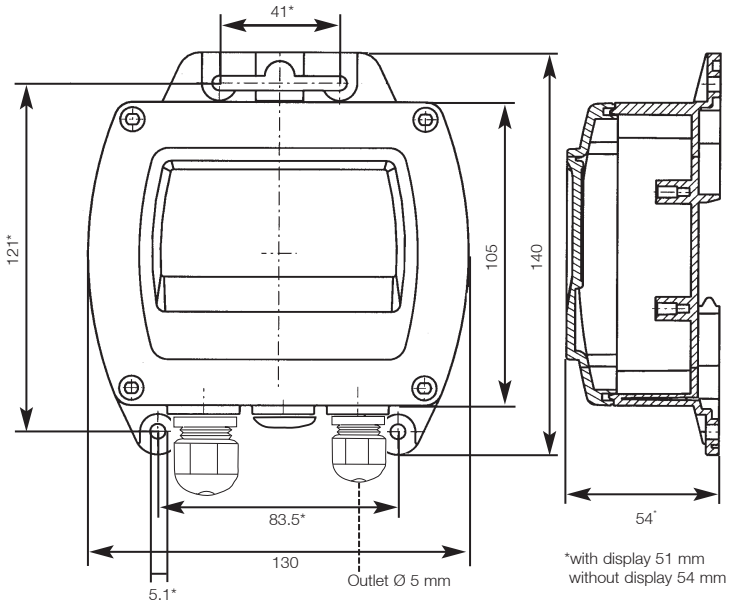
2. Intended purpose

The reliable and ultra-precise measuring and regulation of humidity and temperature is essential in many industrial processes.
Testo has developed a new range of industrial humidity and temperature transmitters specifically for these demanding applications. The integrated microprocessor performs the linearisation and neutralisation of humidity across the entire temperature range from -40 to +180°C (depending on version).

This guarantees highest accuracy up to **±1%RH (optional)**. In addition to relative humidity (%rh) and temperature (°C or °F), other variables can also be calculated: dewpoint temperature (°Cdp or °Fdp), humidity degree (g/kg), absolute humidity (g/m^3) and wet-bulb temperature.
Variable line lengths of up to 10 m (between probe tip and housing) and other practical accessories enable simple and rapid assembly and installation. The optional LED display ensures good readability and straightforward operation.

3. Instrument dimensions

in mm



* fixing dimensions

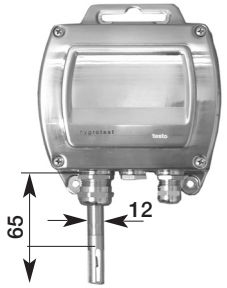
*with display 51 mm
without display 54 mm

Note
The cable lead-ins differ depending on version.

Codes

W:	Wall version	H:	Humidity (output)
D:	Duct version	T:	Temperature (output)
P:	Probe (version with probe)	-20/70:	Temperature scaling

Part No. for hygrotest 650 product series: 0555.0650
Example:
Hygrotest 650 PHT-20/180 (cable version with external probe, with humidity and temperature output, temperature scaling -20 to +180 °C).

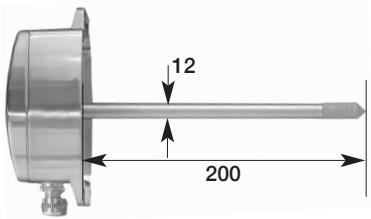


hygrotest 650 WHT -20/70

For monitoring room temperature, with **external** humidity and temperature probe.

- Scaling 4...20 mA ≙ 0...100 %RH
  Standard 4...20 mA ≙ -20...+70 °C

Display optional



hygrotest 650 DHT -20/120

For duct measurement in compact form, with **external** humidity and temperature probe.
Scaling standard
4...20 mA ≙ -20...+120 °C
4...20 mA ≙ 0...100 %RH
Display optional

hygrotest 650 PHT -40/80
hygrotest 650 PHT -40/120
hygrotest 650 PHT -20/180

With **external** humidity and temperature probe.
Cable length (to tip of probe) 2 m

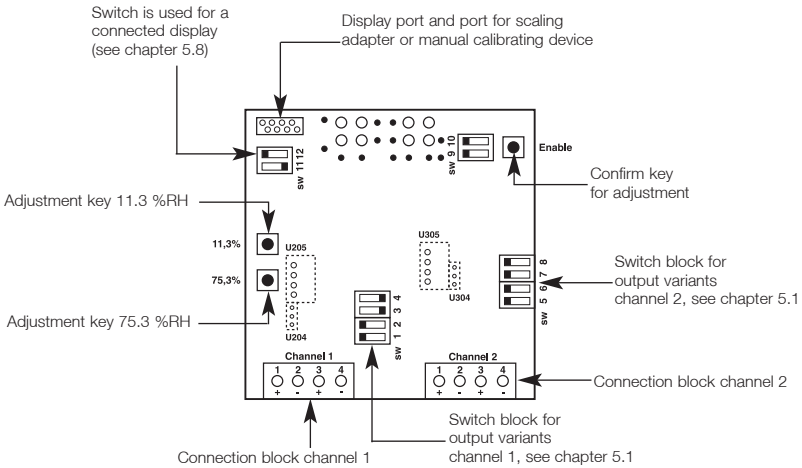
Scaling standard for **hygrotest 650 PHT -40/80**:
4...20mA ≙ 0...100%RH; 4...20mA ≙ -40...+80°C

Scaling standard for **hygrotest 650 PHT -40/120**:
4...20mA ≙ 0...100%RH; 4...20mA ≙ -40...+120°C

Scaling standard for **hygrotest 650 PHT -20/180**:
4...20mA ≙ 0...100%RH; 4...20mA ≙ -40...+120°C

Display optional

5. Connection



Notes

To prevent the loss of adjustment values, only press adjustment keys when the adjustment container is screwed on.

Channel 1 is the default humidity output and channel 2 the default temperature output.

Scaling modifications and an alternative channel assignment of the measuring variables are performed via an optional display or scaling adapter and software.

The default settings are:
- channel 1 %RH: scaled 0...100 %RH ≙ 4...20 mA
- channel 2 °C : scaled according to version ≙ 4...20 mA

5. Connection

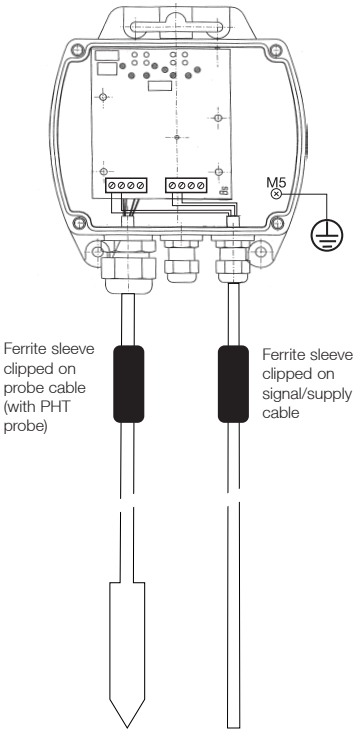
5.1 output variants

The dip switches sw1 to sw10 are used for factory setting of analog output type (4...20mA / 0...20mA / 0...1V / 0...10V). Please order the relevant type (B1 to B4) (see table)!

Warning

Changing the dip switch position may damage the transmitter. This operation is not permitted.

Option code	Output variants	Channel 1 sw x Switch 1	2	3	4	9	Channel 2 sw x Switch 5	6	7	8	10	Output configuration
B1	4...20 mA	1	1	0	0	0	1	1	0	0	0	2-wire system at terminal 1 + 2 each channel
B2	0...1 V	0	1	1	0	1	0	1	1	0	1	4-wire system: Supply 1 + 2 active output to 3 + 4 each channel
B3	0...10 V	1	0	1	0	1	1	0	1	0	1	4-wire system: Supply 1 + 2 active output to 3 + 4 each channel
B4	0...20 mA	0	0	1	0	1	0	0	1	0	1	4-wire system: Supply 1 + 2 active output to 3 + 4 each channel



5.2 Attaching ferrite sleeve

Note

To comply to EMC rules, all outside cables have to carry ferrite sleeves. These sleeves are delivered with the instrument. Please insert the anlog output signal cable of each channel through one of the sleeves (outside the housing).

5.3 Description of the 2-wire system

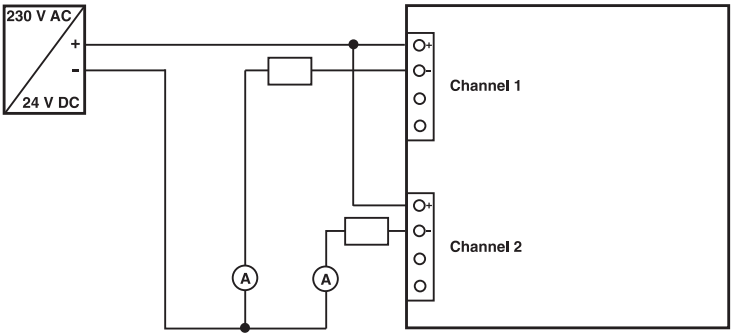
Two-wire transmitters are used to transform non-electric parameters such as temperature, pressure, relative humidity etc. into a standardised electric signal of 4...20 mA.
The transmitters are connected to a direct voltage source by just two lines. The current consumption of the transmitters from the direct voltage source varies in the range from 4...20 mA as a function of the parameter to be measured.
The advantages of the two-wire system are the extremely low installation expense and the ease of connection. The length of the lines has no effect on the measuring signal. A further advantage lies in what is called the “live-zero” signal, i.e. parameter 0 corresponds to a current of 4 mA. This means that the value is transmitted unambiguously and cannot be confused with a system that is switched off, for example.

5. Connection

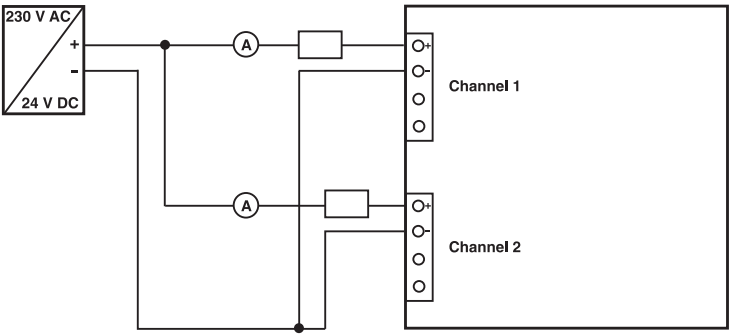
5.4 Current measurement with the 2-wire system (4...20 mA output)

Output circuit

Option 1:



Option 2:



The Hygrotest 650 is supplied via the humidity connections. The temperature output only functions if the humidity circuit has a 24V DC connection.

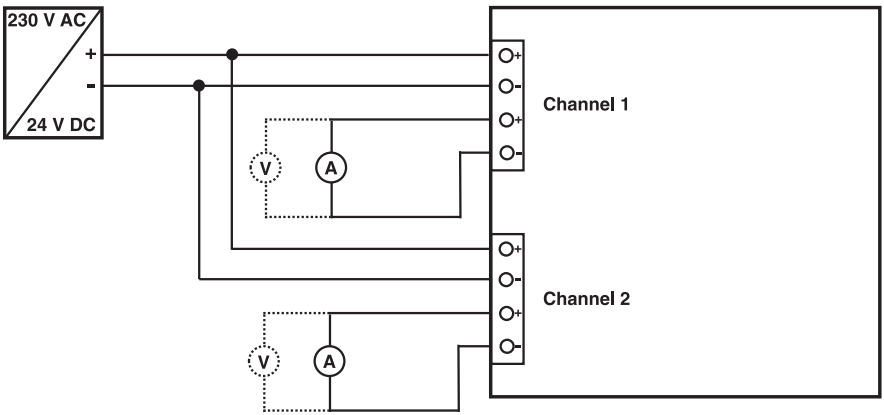
5.5 Description of the 4-wire system

The output variants B4 = 0...20 mA, B2 = 0...1 V and B3 = 0...10 V are only possible using the 4-wire system. A 4-wire system means that 2 supply lines (1 and 2) and 2 lines for the output signal (3 and 4) are required for each channel.

Warning

A change of output type is not permitted, see chapter 5.1. Please order the relevant type (B2 to B4).

5.6 Current measurement with the 4-wire system



Ⓐ for B4 (0 to 20mA)

Ⓥ for B2 (0 to 1V)
for B3(0 to 10V)

5. Connection

5.7 Fitting a digital display

These steps are essential if a display is to be retrofitted.

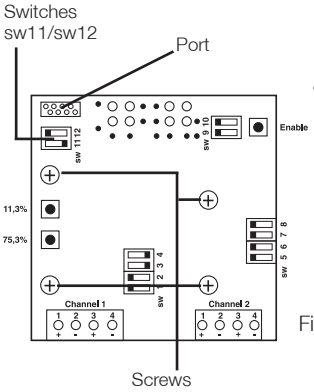


Fig. 1

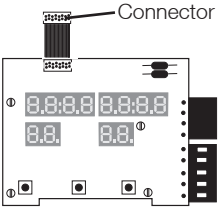


Fig. 2

Caution!

Before opening the transmitter:
- interrupt the control circuit of the transmitter;
- de-energise the transmitter.

Read the **"Display for hygrotest"** instruction manual, especially concerning electrical connection of the display.

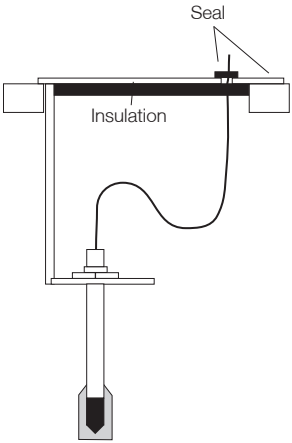
Max. load 50 Ω for a loop-fed display variant (H1).
With types H2, H4, H5, H6, H8 a max. load of 500 Ohm is allowed.

- Remove the cover of the **hygrotest 650** housing.
- Set the slide switches (sw11 and sw12) - see "Slide switch positions" table below.
- Remove the 4 screws from the device board (Fig. 1).
- Screw distance bolts to the device board.
- Connect the connector strip of the display (Fig. 2) to the port (note the guide pin).
- Mount display board on spacer pins using screws.
- Connect the power supply of the Hygrotest transmitter and of the display, if required (types H2, H4, H5, H6, H8).
- Screw the housing cover with window back on.

5.8Slide switch position for display type

Order code	H1	H2	H3	H4	H5	H6	H8	ohne Display
Part number	0460 0603	0460 0604	0460 0601	0460 0602	0460 0605	0460 0606	0460 6508	
hygrotest 650	SW11 OFF SW12 OFF	SW11 OFF SW12 ON	SW11 OFF SW12 ON	SW11 OFF SW12 ON	SW11 OFF SW12 ON	SW11 OFF SW12 ON	SW11 OFF SW12 ON	SW11 OFF SW12 ON

6. Advice on use



The **hygrotest 650** humidity and temperature transmitter is employed in a wide variety of industrial applications. Some advice which can lead to better measuring results is given below.

General
The better the process air flows past the probe, the sooner the transmitter will display the correct temperature and humidity.

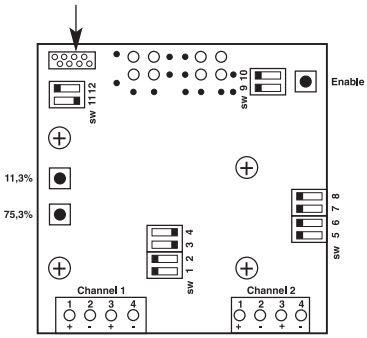
- **Low flow rate and uncontaminated atmosphere**
  Use slotted sensor caps (0554.0755) to achieve a faster response time.
- **Atmosphere containing dust or particles**
  Use a PTFE sintered cap (0554.0756) to protect the sensor against contamination.
- **Strong flow rates up to 10 m/s with few particles**
  Use a sintered stainless steel cap (0554.0647).
- **Flow rates >10 m/s or lots of particles**
  Fit a deflector in the direction of flow and mount the probe away from the wind with a suitable sintered cap.
- **Applications in which drips may form**
  Install the probe in such a way that condensate can run off. Use dew protection (0554.0166). You may need to use a PTFE sintered cap with a drill hole (0554.0756).
- **Measuring humidity in pressurised atmospheres**
  Probe with stainless steel tube is pressure-tight from the front up to +10 bar. Use a suitable pressure-tight fitting means. Do not bring the complete probe (incl. cable) into the pressurised area.
- **Measuring humidity in chemical gases**
  Gas concentrations deviating from the natural ambient atmosphere may have an influence on the readings or damage the humidity sensor.
  For more information, please contact your local Testo partner

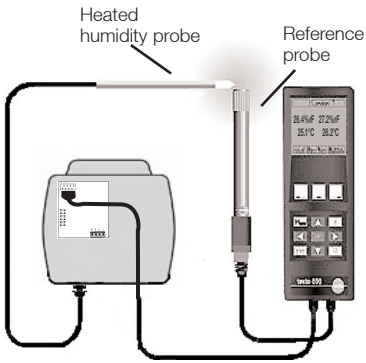
7. Adjustment

Two options are available for adjustment:

1. Adjustment with the reference instrument and precision humidity probe from **testo**.
2. Adjustment with reusable saturated salt solutions 11.3 %RH and 75.3 %RH (control and adjustment set).

Micromatch connection
Display port and port for scaling adapter or handheld instrument for adjustment. Protection pin on right





7.1 Adjustment with testo 650/400

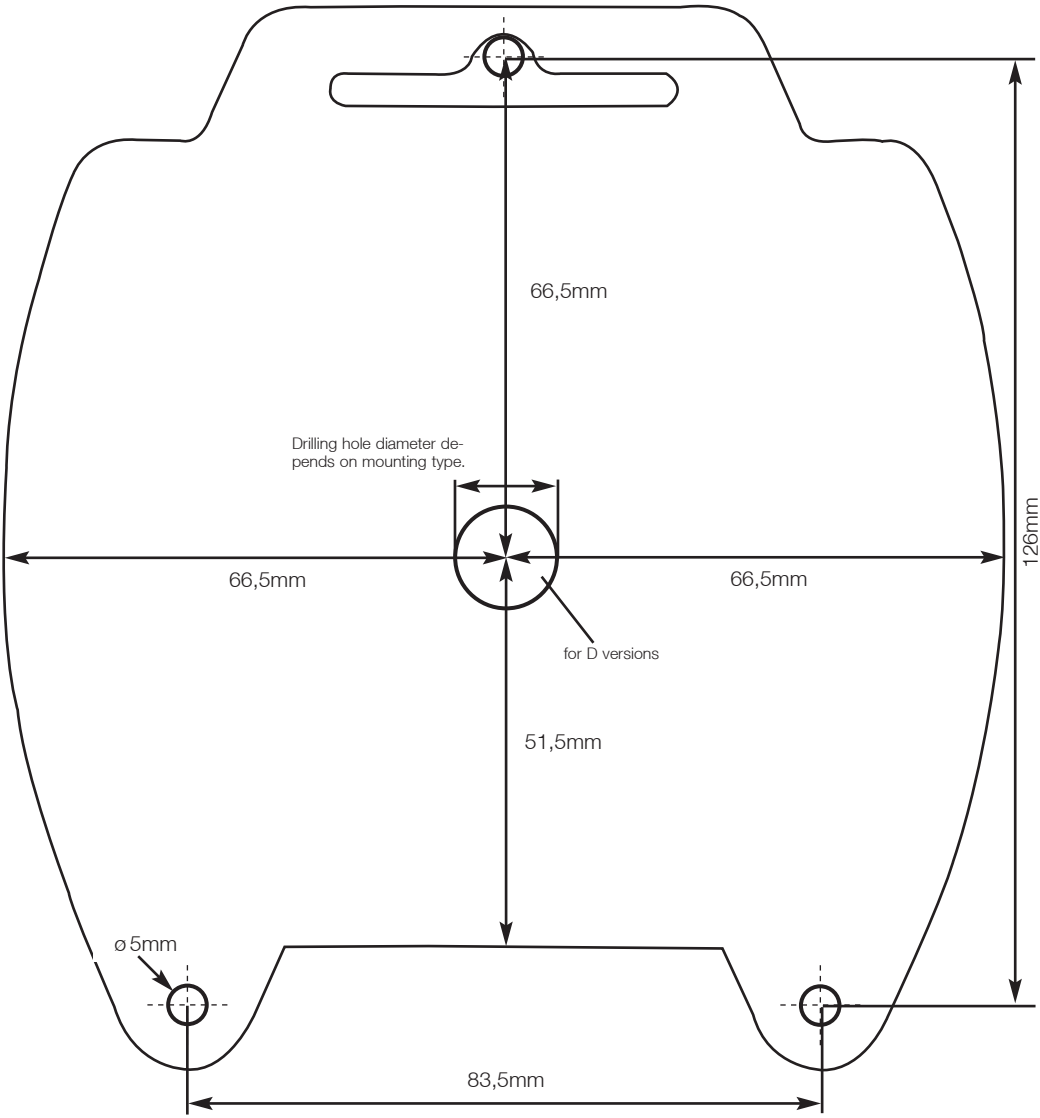
Calibrate the **hygrotest 650** using the reference set, Part. no. 0699.3656/20. If the **testo 400** is used for adjustment, you will also need the cable, Part no. 0409.0214 and precision humidity probe 0636.9741.

Caution!
Before opening the transmitter:
- interrupt the control circuit of the transmitter;

1. Remove the cover of the transmitter.
2. Supply transmitter (see page 10).
3. Plug the connecting cable into the micromatch connection on the transmitter board or display board (see diagram). At first (if display is used) you must interrupt communication between the display and the transmitter. To do this, press the ◀ key for at least 3 seconds. Communication of the display is interrupted and the display unit shows dashes (**- - - -**).
4. Plug the precision humidity probe into the right port and the connecting cable into the left port of the **testo 650** or **testo 400** reference instrument.
5. Attach the precision humidity probe immediately adjacent to the probe of the transmitter in order to obtain comparable values.
6. Switch the instrument **testo 650/400** on. The two-part display will show the values of the transmitter on the left, and the values of the reference instrument on the right.

Notes
The compensation period is at least 60 minutes at a constant temperature of 25 °C.

Drilling template for the transmitter hygrotest 650



7. Push on OK button of the **testo 400/650**. Choose menu ”probe”. Press OK again and choose menu ”Adjustment”. After a further push of the OK button the humidity and temperature value of the **testo 400/650** is sent to Hygrotest. Humidity adjustment in the transmitter is cancelled via ”**Probe Reset**” and set back to previous values.
   Now take off the cable between testo 400/650 and the Hygrotest transmitter.

Notes
The temperature adjustment cannot be reset.

8. If you are using a display, reestablish communication between the display and the transmitter by pressing the ◀ key briefly.
9. Reestablish connections and close the transmitter.

Notes
To ensure accuracy, use a regularly calibrated reference instrument and precision humidity probe to carry out the adjustment.

Notes
Adjustment of the transmitter is possible from firmware version 1.22 in the **testo 650** or **testo 400**.

7.2 Adjustment with control and adjustment set

A 2-point humidity adjustment of the transmitter can be performed using the control and adjustment set.
For other adjustment instructions, please refer to the **“Control and adjustment set”** instruction manual.

1. Remove the sintered cap.
2. Note the immersion depth of the probe.
3. Screw the humidity container to the probe with a suitable adapter.
4. Perform the adjustment at a constant temperature of 25 °C.
5. Wait to the end of the compensation period (recommended: >6 h)
6. Carry out adjustment. To do this, press the key for the corresponding values (11.3 %RH or 75.3 %RH) and the **“Enable”** key at the same time.

Notes
The compensation period is at least 180 minutes at a constant temperature of 25 °C.

Notes
For the adjustment process if a display is connected (H1, H2, H3, H4, H5 or H6 or H8), please refer to the “Display for hygrotest” or “Display H8 for hygrotest”. instruction manual.

8. Maintenance

8.1 Replacing a 4-wire transmitter with a 2-wire transmitter

It is easy to replace a 4-wire transmitter with a 2-wire transmitter. The existing cables can remain in place, only the additional wiring work has to be carried out.

Wiring diagram for a 4-wire transmitter

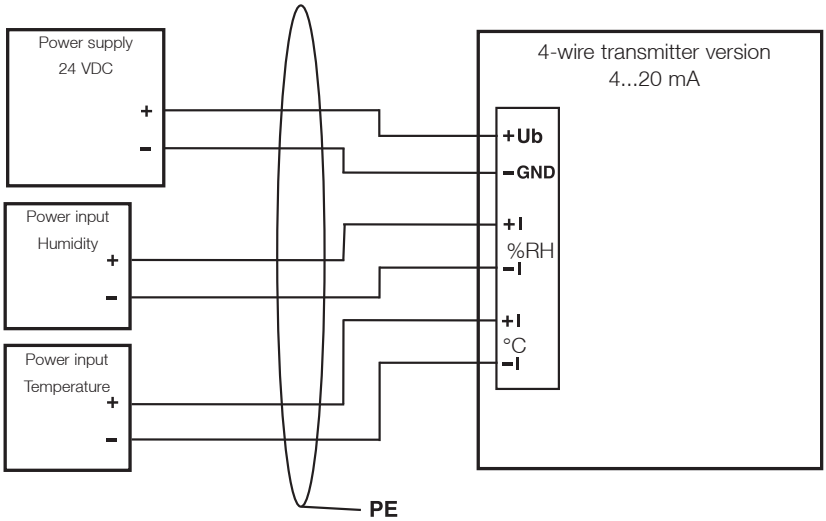
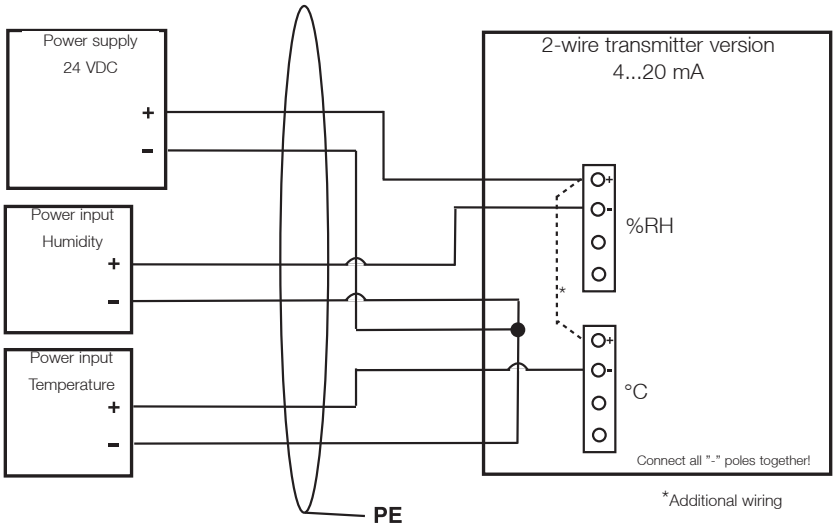
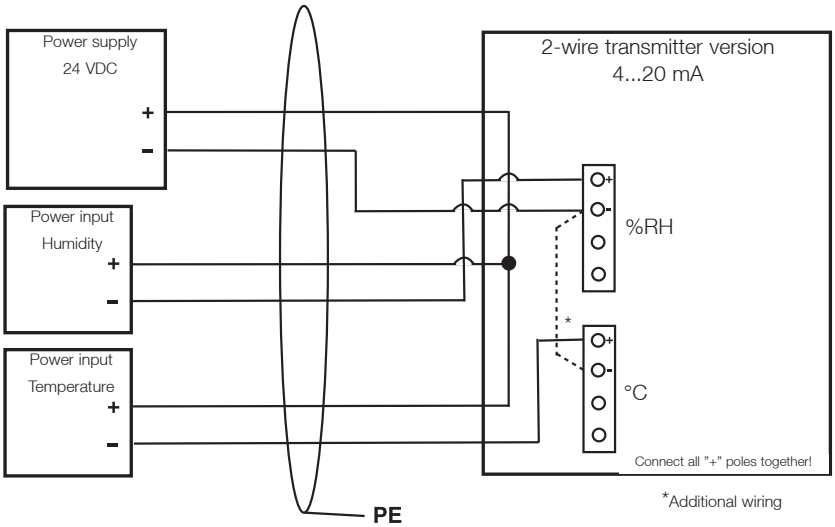


Diagram for replacing a 4-wire transmitter with a 2-wire transmitter (common -)



8.1 Replacing a 4-wire transmitter with a 2-wire transmitter

Diagram for replacing a 4-wire transmitter with a 2-wire transmitter (common +)

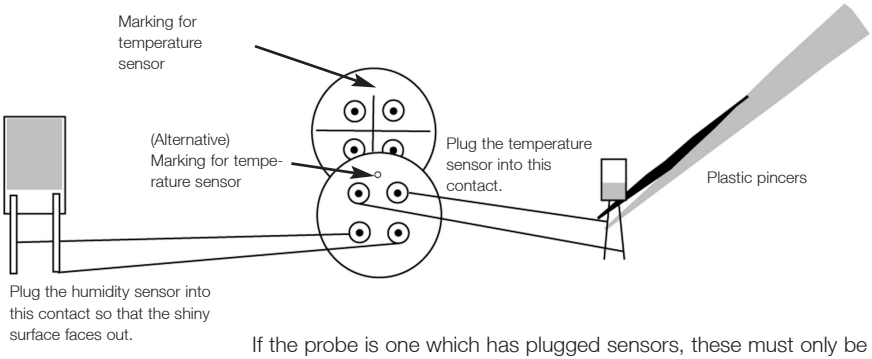


8. Maintenance

8.2 Fitting sensors

Arrangement of the sensors

Unscrew the protective cap of the sensor.



If the probe is one which has plugged sensors, these must only be replaced using pincers (hold at the base!). Soldering is not required.

It is essential that the sensors are positioned correctly!

Plug-in of the sensors

Never touch the sensors with your hand - you must always use suitable pincers (preferably made of plastic) to hold them at the connecting wires or the contact points!

Humidity adjustment must be performed after sensors have been exchanged, compare chapter 7..

8.3 Cleaning the humidity sensor

For cleaning the humidity sensor isopropanol should be used. Not suitable is spirit, as spirit contains small tracks of oil.

Rinse the humidity sensor in isopropanol until no dirt is visible anymore. Afterwards wash up the humidity sensor with distilled water.

Do not towel the sensor with a cloth, as the lid electrode could be damaged.

8.4 Troubleshooting

If faults occur which are not described here, please consult Testo's customer service department.

Faults when switching on:

Fault	Possible causes	Remedy
Currents < 3.8 mA (for 4...20 mA version)	Sensor breaks	Have sensor replaced by testo
Currents > 21 mA (for 4...20 mA version)	Sensor faulty, it becomes conductive	Have sensor replaced by testo
Non–existing analog signal	Incorrect slide switch position	▶ Check slide switch position (see page 8)

9. Technical data

General

Housing:

Material:	Diecast zinc
Colour:	Chrome–plated and brushed
Size:	130 x 140 x 54 mm

Screw connections:	M 16 x 1.5
Electrical connections	2 x 4–pole screwed plug–in connector
Ambient temp.:	–20...+70 °C
Storage temperature:	–40...+80 °C
Protection class:	IP 65
Measuring range:	Humidity: 0...100 %RH
Range of use:	–40...+180 °C (probe and cable)

Uncertainty

Humidity:	±2 %RH (standard)
on request:	±1 %RH (within range 10...90 %RH, +15...+30 °C)
Temp. coefficient:	±0.05 %RH/°C (at temperatures deviating from 25 °C)
Temperature:	±0.2 °C at 25 °C as per DIN EN60751; Cl. A

Analog outputs

Humidity + temperature

Analog output	4...20 mA (2–wire system Standard 0...20 mA, optional 0...1 V, optional 0...10 V, optional
Digital output	RS 232 output RS 485 output, optional in conjunction with display
Resolution	5 µA (0...20 mA; 4...20 mA) 250 µV (0...1 V) 2.5 mV (0...10 V)
Accuracy	30 µA (0...20 mA; 4...20 mA) 1,5 mV + 0,1 % of m.v. (0...1V) 15 mV + 0,1 % of m.v. (0...10)
Drift (analog)	0.35 µA / K (0...20 mA; 4... 20 mA) 17.5 µV / K (0...1 V) 175 µV / K (0...10 V)
Zero displacement (analog)	30 µA (0...20 mA) none (4... 20 mA) 1,5 mV + 0,1 % of m.v. (0...1V) 15 mV + 0,1 % of m.v. (0...10)

Resolution of digital output	0.1 %RH and 0.1 °C
Scalable outputs, galvanically isolated	Humidity and temperature or 2 x humidity variables
Supply	24 VDC (12...30 VDC)
Max. load without display	500 Ω (0...20 mA)
With separately fed display	500 Ω (4...20 mA)
Max. load with loop–fed display	50 Ω (4...20 mA); supply voltage min. 20 VDC
Current consumption	Max. 2 x 21 mA (4...20 mA) Max. 2 x 22 mA (0...20 mA, 0...1V, 0...10V)
Response time t_{90}	10...20 s
Figures apply for nominal temperature	25 °C
EMC:	as per directive 89/336/EEC
Flow strength	30 m/s with sintered metal cap 2...3 m/s without sensor protection cap
2 x 2 limit signal outputs	optional in conjunction with displays H5/H6
Pressure range	–1...10 bar

Sensor

Humidity	Testo sensor, capacitive
Temperature	Pt 1000, class A

Hygrotest 650 WHT -20/70

Meas. range	0...100 %RH, –40...+80 °C
Scaling 4...20 mA	0...100 %RH, –20...+70 °C

Operating temperature

Electronics	–20...+70 °C
Probe	–40...+70 °C
Display	–20...+60 °C

Probe

Material/colour	1.4571 bright
Length	65 mm incl. protective cap
Diameter	12 mm
Sensor cap	Slotted stainless steel cap

Hygrotest 650 DHT -20/120

Meas. range	0...100 %RH, –40...+120 °C
Scaling 4...20 mA	0...100 %RH, –20...+120 °C

Operating temperature

Electronics	–20...+70 °C
Probe	–40...+120 °C
Display	–20...+60 °C

Probe

Material/colour	1.4571 bright
Length	200 mm incl. protective cap
Diameter	12 mm Pressure–tight
Sensor cap	Sintered stainless steel cap

Hygrotest 650 PHT -40/80

Meas. range	0...100 %RH, –40...+80 °C
Scaling 4...20 mA	0...100 %RH, –40...+80 °C

Operating temperature

Electronics	–20...+70 °C
Probe	–80...+80 °C
Display	–20...+60 °C

Probe

Material/colour	1.4571 bright
Length	210 mm inc. protective cap
Diameter	12 mm
Cable length	2 m to tip of probe (standard)
Sensor cap	Sintered stainless steel cap

Hygrotest 650 PHT -40/120

Meas. range	0...100 %RH, –40...+120 °C
Scaling 4...20 mA	0...100 %RH, –40...+120 °C

Operating temperature

Electronics	–20...+70 °C
Probe	–80...+120 °C
Display	–20...+60 °C

Probe

Material/colour	1.4571 bright
Length	210 mm incl. protective cap
Diameter	12 mm
Cable length	2 m to tip of probe (standard)
Sensor cap	Sintered stainless steel cap

Hygrotest 650 PHT -20/180

Meas. range	0...100 %RH, –40...+180 °C
Scaling 4...20 mA	0...100 %RH, –20...+180 °C

Operating temperature

Electronics	–20...+70 °C
Probe	–80...+180 °C
Display	–20...+60 °C

Probe

Material/colour	1.4571 bright
Length	210 mm incl. protective cap
Diameter	12 mm
Cable length	2 m to tip of probe (standard)
Sensor cap	Sintered stainless steel cap

Warranty	2 years

10. Version options

Order codes		650 WHT -20/70°C	650 DHT -20/120°C	650 PHT -40/80°C	650 PHT -40/120°C	650 PHT -20/180°C
	Analog output					
B 1	4...20 mA (2-wire system)[1]	■	■	■	■	■
B 2	0...1 V (4-wire system)[1]	❑	❑	❑	❑	❑
B 3	0...10 V (4-wire system)[1]	❑	❑	❑	❑	❑
B 4	0...20 mA (4-wire system)[1]	❑	❑	❑	❑	❑
	Probe					
	Probe material: stainless steel 1.4571	■	■	■	■	■
C 1	Probe length in mm incl. protective sensor cap	65	200	210	210	210
C 2	Special probe length ..... mm (min. 80 mm, max. 800 mm)		❑	❑	❑	❑
	Cable					
D 1	Cable length 2 m			■	■	■
D 2	Special cable length ..... mm (min. 250 mm; max. 10 m)			❑	❑	❑
	Adjustment					
F 1	Uncertainty 2 %RH	■	■	■	■	■
F 2	Uncertainty 1 %RH	❑	❑	❑	❑	❑
	Protective sensor caps					
G 1	Sintered stainless steel cap	❑	■	■	■	■
G 2	Cap with wire mesh filter	❑	❑	❑	❑	❑
G 3	PTFE sintered cap	❑	❑	❑	❑	❑
G 4	Metal protective cap, open	■	❑	❑	❑	❑
G 5	Plastic cap (ABS) open	❑	❑	❑	❑	❑
G 6	Sintered PTFE filter with drip hole, 1.5 mm	❑	❑	❑	❑	❑
G 7	Condens. prot. + sintered PTFE filter with drip hole, 1.5 mm	❑	❑	❑	❑	❑
G 8	H2O2 protection filter (only with display H8)	❑	❑	❑	❑	❑
H 1	Two lines - loop-fed with limited load	❑	❑	❑	❑	❑
H 2	Two lines - externally fed with maximum load	❑	❑	❑	❑	❑
H 3	Two lines with RS485 - no analog outputs possible	❑	❑	❑	❑	❑
H 4	Two lines with RS485 - analog outputs possible	❑	❑	❑	❑	❑
H 5	Two lines with RS485 and 2x2 limit signal outputs - analog outputs possible	❑	❑	❑	❑	❑
H 6	Two lines with 2x2 limit signal outputs - analog outputs possible	❑	❑	❑	❑	❑
H 8	Two-line with 3rd analog output (H2O2 mixture dewpoint and RS485)	❑	❑	❑	❑	❑

Order codes	Scaling	650 WHT -20/+70°C	650 DHT -20/+120°C	650 PHT -40/+80°C	650 PHT -40/+120°C	650 PHT -20/+180°C
K 1	Standard scaling channel 1, output = 0...100 %RH	■	■	■	■	■
K 2	Special scaling channel 1, output = ...chosen unit under "L" **Important:** indicate the upper and lower scaling	❑	❑	❑	❑	❑
L 1	Relative humidity as %RH	■	■	■	■	■
L 2	Dew point in °Ctd*1	❑	❑	❑	❑	❑
L 3	Dew point in °Ftd*1	❑	❑	❑	❑	❑
L 4	Degree of humidity in g/kg*1	❑	❑	❑	❑	❑
L 5	Absolute humidity in g/m³*1	❑	❑	❑	❑	❑
L 6	Wet bulb temperature in °C*1	❑	❑	❑	❑	❑
L 7	Wet bulb temperature in °F*1	❑	❑	❑	❑	❑
M 1	Standard scaling channel 2, output = Temperature scaling in °C	-20/70	-20/70	-40/80	-40/120	-
40/180						
M 2	Special scaling channel 1, output = ...chosen unit under "N" **Important:** indicate the upper and lower scaling	❑	❑	❑	❑	❑
N 1	Temperature in °C	■	■	■	■	■
N 2	Temperature in °F	❑	❑	❑	❑	❑
N 3	Dew point in °C td *	❑	❑	❑	❑	❑
N 4	Dew point in °F td *	❑	❑	❑	❑	❑
N 5	Humidity degree in g/kg *	❑	❑	❑	❑	❑
N 6	Absolute humidity in g/m³ *	❑	❑	❑	❑	❑
N 7	Wet bulb temperature in °C * (max = 70°C)*	❑	❑	❑	❑	❑
N 8	Wet bulb temperature in °F * (max = 160°F)*	❑	❑	❑	❑	❑

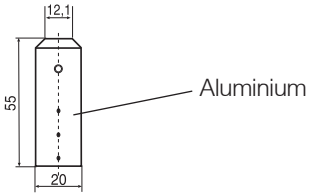
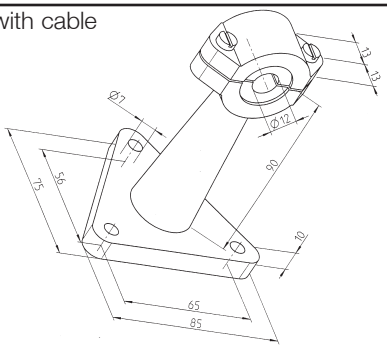
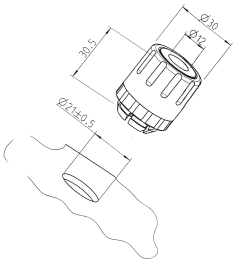
* Special humidity units are only possible on one channel.

① Please order output type as needed; a later change of output type is not permitted!

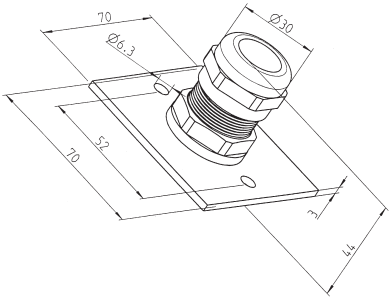
If we were unable to answer your question, please contact your distributor or Testo Customer Service. For contact data, see back of this document or web page www.testo.com/service-contact

■ - Standard ❑ - Optional

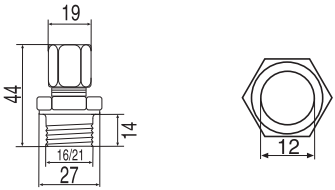
11. Accessories

Designation		Part. No.
Metal protection cage		0554.0755
Stainless steel sintered cap		0554.0647
Cap with wire mesh filter		0554.0757
PTFE sintered filter		0554.0759
Dew protection for PHT		0554.0166
Wall bracket for probe with cable for PHT/WHT		0554.1798
Single duct screw-on connection for PHT		0554.1793

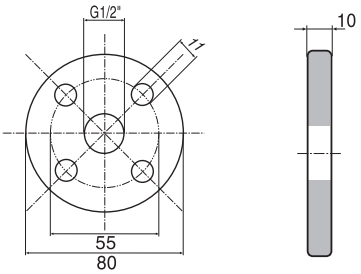
Designation	Part. No.
Duct screw-on connection for PHT	0554.1794



Pressure-tight stainless steel joint 1/2" with cutting ring up to 10 bar	0554.1795
Pressure-tight stainless steel joint 1/2" with PTFE ring, probe position adjustable when untightened, up to 6 bar for PHT	0554.1796



Flange for screw connections to DIN 2576, stainless steel (with pressure-tight screw connection)	0554.1797



Control and adjustment set 75.3 %	0554.0638
Control and adjustment set 11.3 % and 75.3 %	0554.0660
Mains unit 110 to 240V AC - 24V DC (desktop/wall version)	0554.1748
Mains unit 90 to 264V AC - 24V DC (DIN rail version)	0554.1749

11. Accessories

Designation	Art. No.
Connecting cable for manual unit **testo 650/400**, cable length 1.5 m	0409.0214
Reference set consisting of testo 650, 1 %RH humidity/temperature probe with certificate, connecting cables and service pack	0699.3556/20
Scaling adapter (= RS232-interface and service software to parametrize Hygrotest)	0554.9915

testo AG

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