



Hygrotest 600

Instruction manual

en

WH / WHT -20/+70 °C  
DH / DHT -20/+70 °C / DHT -20/+120 °C  
PHT -20/+70 °C / PHT -20/+120 °C



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## Introduction

Dear Customer

Thank you for purchasing a Testo product. We hope you will enjoy the benefits of this product for a long time to come and that it will aid you with your work.

Please read this instruction manual carefully and familiarise yourself with the operation of the instrument before putting it to use.

If problems should occur which you cannot rectify yourself, please consult our Customer Service Department or your nearest distributor. We will do our best to help you quickly and competently to avoid downtimes.

EMC according to guideline 2004/108/EEC

# Handling instructions



## Please read prior to operation!

Do not measure on live parts!

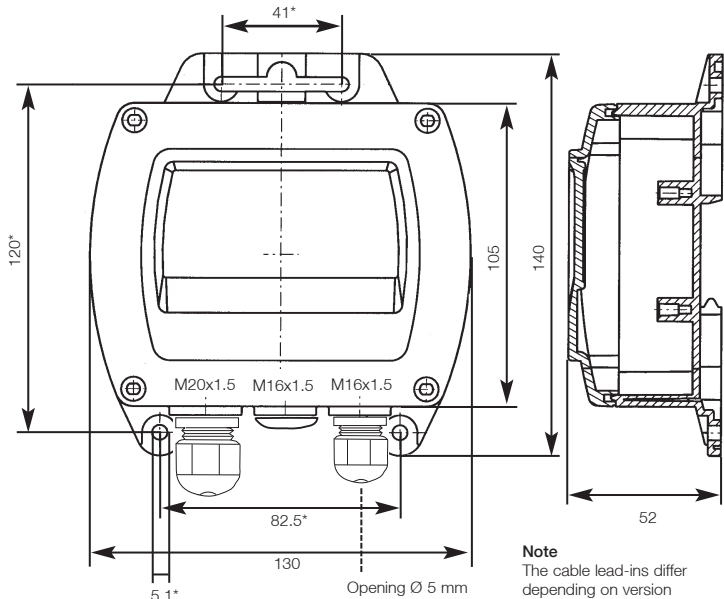
Observe sensor measuring ranges!  
The probes may be damaged if overheated.

Observe maximum storage and transport temperature  
as well as maximum operating temperature  
(e.g. protect instrument from direct sunlight).

The warranty is invalid if inexpertly handled or force is  
used !

Installation, adjustment and calibration work should only  
be carried out by trained professionals.

## Dimensions of instrument in mm



# Description of functions

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The affordable transmitters from the **hygrotest 600** series have been developed for a wide variety of HVAC applications but also for industrial drying processes, for example. Depending on design the modular design facilitates wall assembly, duct assembly as well as measurements at inaccessible points (probe can be attached to pipe).

The transmitters can be easily calibrated and adjusted on-site via a control and adjustment set (see adjustment guidelines). The user saves time and money when assembling and installing thanks to the industrial standard 4 to 20mA in 2 wire technology and the variable assembly options (rail, wall, duct, separate probes).

## Advantages of **hygrotest 600**

Ideal price/performance ratio:

- Electronics immune to interference thanks to reverse battery protection, overvoltage protection, EMC compliance to industrial standards
- Electrical isolation
- Low installation and assembly costs thanks to industrial 4 to 20 mA 2 wire technology
- Easy on site calibration and adjustment for humidity and temperature via adjustment set
- LED display (optional)
- RS 485 Interface (optional)

# Standard versions

## Terms

W:	Wall	H:	Humidity
D:	Duct	T:	Temperature
P:	Probe	-20/+70 °C:	Standard scaling -20/+70 °C
Part no. for hygrotest 600 product series:		0555.0600	

Example:

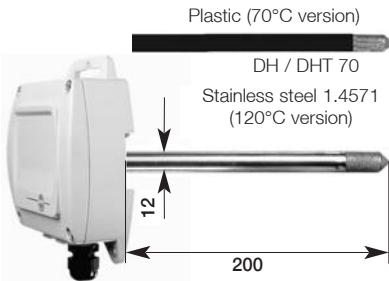
hygrotest 600 PHT / -20/+70 (cable version with external probe, with humidity and temperature measurement up to + 70 °C)



## hygrotest 600 WH hygrotest 600 WHT -20/+70 °C

For monitoring ambient air conditions using an **external** humidity and temperature probe (temperature output only in Hygrotest 600 WHT).

Scaling: 4 to 20mA  $\hat{=}$  0 to 100% RH  
4 to 20mA  $\hat{=}$  -20 to +70 °C (WHT -20/+70 °C)



## hygrotest 600 DH hygrotest 600 DHT -20/+70 °C hygrotest 600 DHT -20/+120 °C

For duct measurement in compact design using an **external** humidity and temperature probe.

Scaling: 4 to 20mA  $\hat{=}$  0 to 100% RH  
4 to 20mA  $\hat{=}$  -20 to +70 °C (DHT -20/+70 °C)  
4 to 20mA  $\hat{=}$  -20 to +120 °C (DHT -20/+120 °C)



## hygrotest 600 PHT -20/+70 °C hygrotest 600 PHT -20/+120 °C

With an **external** humidity and temperature probe, 2 m long cable, maximum

Scaling: 4 to 20mA  $\hat{=}$  0 to 100% RH  
4 to 20mA  $\hat{=}$  -20 to +70 °C (PHT -20/+70 °C)  
4 to 20mA  $\hat{=}$  -20 to +120 °C (PHT -20/+120 °C)

# Version options

Order Code															
<b>B 1</b>	<b>Analog output</b>	4 to 20 mA (2-wire-technology)	<input type="checkbox"/>	<input type="checkbox"/>											
	<b>Probe</b>		<input type="checkbox"/>	<input type="checkbox"/>											
	Probe material stainless steel 1.4571		<input type="checkbox"/>	<input type="checkbox"/>											
	Probe material plastic		<input type="checkbox"/>	<input type="checkbox"/>											
<b>C 1</b>	Standard probe length incl. sensor protection filter		<input type="checkbox"/>	<input type="checkbox"/>	200	200	210								
<b>C 2</b>	Special probe length, stainless steel incl. sensor protection cap..... DH -20/+120°C; min 100mm; PHT -20/+120°C; min. 150mm; max. 800mm		<input type="checkbox"/>	<input type="checkbox"/>											
<b>C 3</b>	Special probe length, plastic, 100 mm, incl. sensor protection cap		<input type="checkbox"/>	<input type="checkbox"/>	200	200	100								
	<b>Cable</b>		<input type="checkbox"/>	<input type="checkbox"/>											
<b>D 1</b>	Standard cable length 2 m		<input type="checkbox"/>	<input type="checkbox"/>	200	200	100								
<b>D 2</b>	Special cable length up to tip of probe .....m (min. 250 mm; max.2 m)		<input type="checkbox"/>	<input type="checkbox"/>											
	<b>Adjustment</b>		<input type="checkbox"/>	<input type="checkbox"/>											
<b>F 1</b>	Humidity inaccuracy ±2 %RH		<input type="checkbox"/>	<input type="checkbox"/>											
	<b>Sensor protection caps</b>		<input type="checkbox"/>	<input type="checkbox"/>											
<b>G 1</b>	Stainless steel sintered cap		<input type="checkbox"/>	<input type="checkbox"/>											
<b>G 2</b>	Wire mesh filter		<input type="checkbox"/>	<input type="checkbox"/>											
<b>G 3</b>	PTFE sintered filter		<input type="checkbox"/>	<input type="checkbox"/>											
<b>G 4</b>	Slid metal filter		<input type="checkbox"/>	<input type="checkbox"/>											
<b>G 5</b>	ABS-cap slit		<input type="checkbox"/>	<input type="checkbox"/>											
	<b>Displays</b>		<input type="checkbox"/>	<input type="checkbox"/>											
<b>H 1</b>	Display double-spaced - loop feed with maximum load 50 Ohm		<input type="checkbox"/>	<input type="checkbox"/>											
<b>H 2</b>	Display double-spaced - external supply with max. load 500 Ohm		<input type="checkbox"/>	<input type="checkbox"/>											
<b>H 3</b>	Display double-spaced - with RS485 - no analog outputs possible		<input type="checkbox"/>	<input type="checkbox"/>											
<b>H 4</b>	Display double-spaced - with RS485 -analog output possible		<input type="checkbox"/>	<input type="checkbox"/>											
<b>H 5</b>	Display double-spaced with RS485 and 2x2 limit signal outputs - analog outputs possible		<input type="checkbox"/>	<input type="checkbox"/>											

Order Codes											
H 6	Display double-spaced with 2x2 limit signal outputs - analog outputs possible	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H 7	Simple display single-space - loop feed with maximum load 50 Ohm	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Scaling</b>											
K 1	Standard scaling channel 1 (4 to 20 mA = 0 to 100 %RH)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K 2	Special scaling channel 1 (4 to 20 mA = ..... choosen unit out of "L" <b>Note:</b> please specify the scaling range	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L 1	Relative humidity (%RH)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L 2	Dewpoint (°Ctd)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
L 3	Dewpoint (°Ftd)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M 1	Standard scaling channel 2 (4 to 20 mA = temperature scaling (°C)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M 2	Special scaling channel 2 (4 to 20 mA = ..... choosen unit out of "N" <b>Note:</b> please specify the scaling ranges	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N 1	Temperature (°C)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N 2	Temperature (°F)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

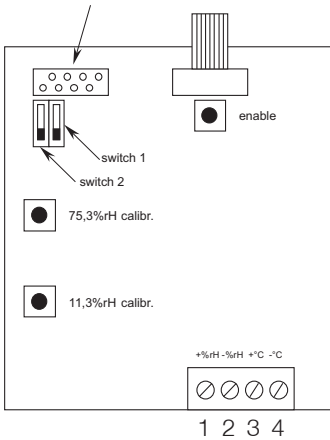
■ - standard    □ - optional

# Connection assignment

Connection socket for scaling adapter or **testo 400/650** instrument for 1-point adjustment



In order to avoid losing the adjustment values, adjustment buttons should only be activated if the adjustment container is screwed on (see page 10, adjustment with control and adjustment set).



1 + RH }  
2 - RH } 2 wire techn. 4 to 20 mA = 0 to 100 %RH,

3 + °C }  
4 - °C } 2 wire techn. 4 to 20mA  $\hat{=}$  -20 to +70 °C  
(with WHT -20/70 / DHT -20/70 / PHT -20/70)  
2 wire technology 4 to 20 mA  $\hat{=}$  -20 to +120°C  
(with DHT -20/120 / PHT -20/120)

## Description of 2 wire technology

2 wire transmitters are used to convert non-electrical parameters, e.g. temperature, pressure, relative humidity etc. to an electrical standard signal of 4 to 20 mA.

The transmitters are connected to a d.c. voltage source by means of 2 cables. The power consumption of the transmitter from the d.c. current source changes linearly in the range from 4 to 20 mA, depending on the parameter being measured.

The advantages of the two wire system are easy installment and problem-free connection. The length of the cables does not influence the measured signal. A further additional advantage is the so-called "live zero" signal i.e. 0 parameter corresponds to a current of 4 mA. In this way, this value is also clearly transmitted and cannot be confused, for example, with a system which is switched off or an uninterrupted line.

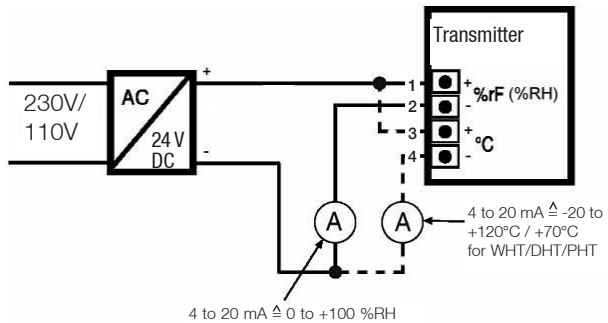


# Connection suggestions

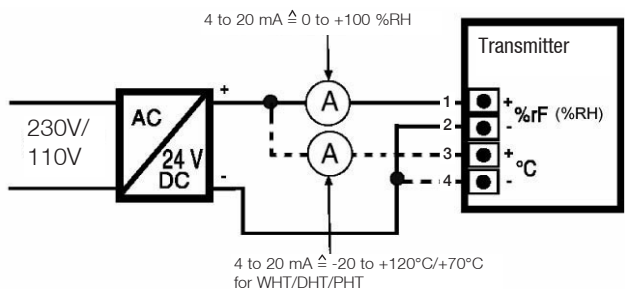
## for 2 wire technology

### Current measurement

#### Option 1:



#### Option 2:



**hygrotest 600** with displays H1, H3, H7 is supplied via the humidity connections. The temperature output, if available, can only function if a humidity circuit with 24 V is connected. This also applies in combination with all displays.

# Connection suggestions

## for 2 wire technology

### Voltage measurement

Long signal paths can be a problem when transmitting voltage signals (cable resistance, interference etc.). It is advisable to use current signals for safe transmission (4 to 20 mA).

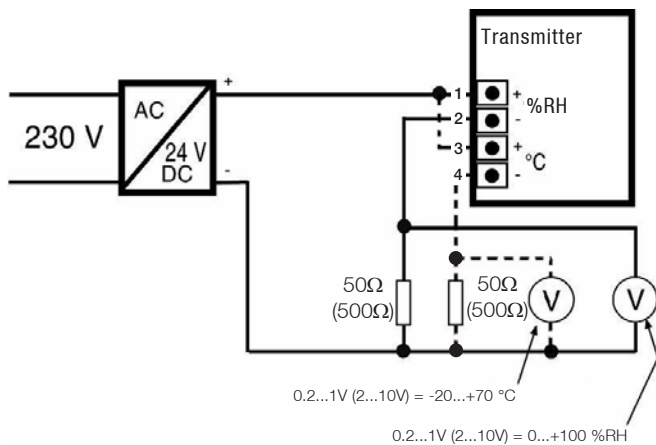
Shunt resistances between  $50\ \Omega$  or  $500\ \Omega$  ( $50\ \Omega$ : 0.2 to 1 V,  $500\ \Omega$ : 2 to 10 V) are parallel connected to the multimeter, controller etc. when measuring voltage (0.2 to 1 V, 2 to 10 V) (see Figure).

Advantage

- Reliable signal due to power transmission
- Recognises disconnected cable ("live zero")



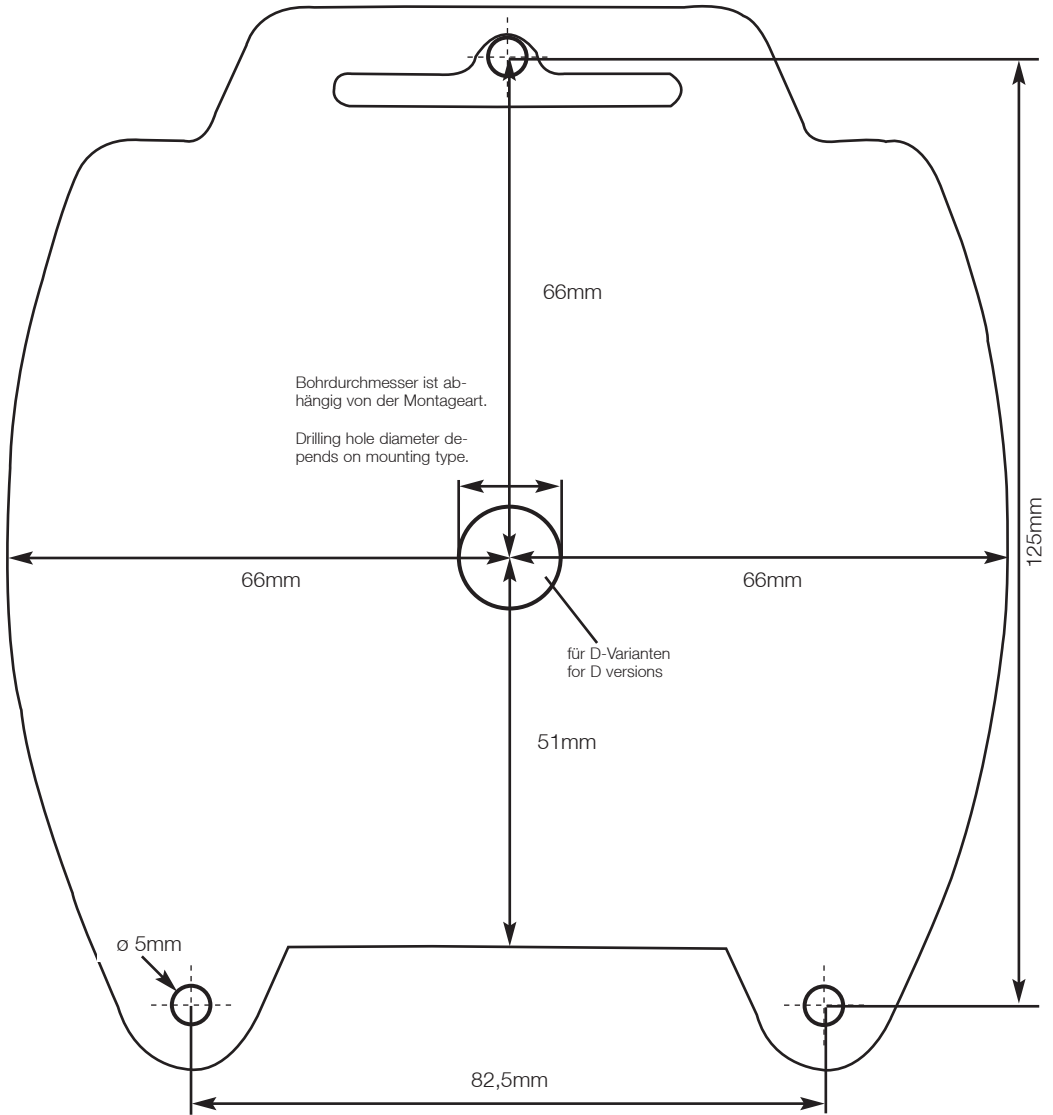
Voltage measurement from 2 to 10 V or 2 to 10 V is not possible in instruments with displays H1, H3, H7 since they are loop-fed.



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# Bohrvorlage für Messwertumformer hygrottest 600

## Drilling template for the transmitter hygrottest 600



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# Attaching ferrite sleeve


## for 2 wire technology

### Note

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

## Installing a digital display

 Max. load 50 Ω with displays H1, H3, H7

- Remove housing cover from **hygrotest 600**.
-  Disconnect electrical supply.
- In displays H1, H7 move right slide switch (SW11) from the bottom position to the upper **OFF** position (Fig. 1). In displays H2, H3, H4, H5, H6 switch remains on **ON** position.

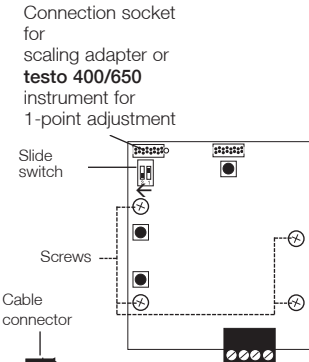
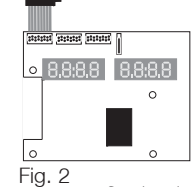
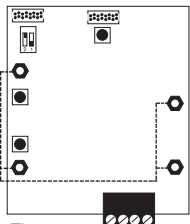


Fig. 1



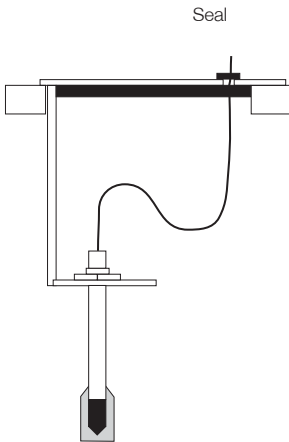
Spacing pins



- Remove 4 screws from the instrument board (Fig.1).
- Attach cable connector (Fig. 2) of display (watch out for guide pin) to connection socket (Fig. 1).
- Screw in spacing pins on instrument board (Fig. 3).
- Mount display board with screws on spacing pins.
- Perform electrical connection.
- Screw on new housing cover (with window)

## Advice on use

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The **hygrotest 600** 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 (0554.0647) to protect the sensor against contamination.

#### - Strong flow rates up to 10 m/s with few particles

Use a stainless steel sintered 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)(see drawing). You may need to use a PTFE sintered cap with a drill hole (0554.9913).

#### - Measuring humidity in chemical gases

Gas concentrations deviating from the natural ambient atmosphere may have an influence on the values or damage the humidity sensor.

- For installation support please contact your local testo partner.



Two options are available for adjustment:

1. Adjustment with the reference instrument testo 650/400 and precision humidity probe from testo.
2. Adjustment with reusable saturated salt solutions 11.3 %RH and 75.3 %RH (control and adjustment set).

## Adjustment with testo 650/400

If the **testo 650/400** is used for adjustment, you will also need the cable, Part no. 0409.0214 and precision humidity probe 0636.9741.

### Note


The following describes a 1-point adjustment. This is only advised if hygrotest 600 is operated close to the adjustment point (working point).

Before opening the transmitter:

- interrupt the control circuit of the transmitter;

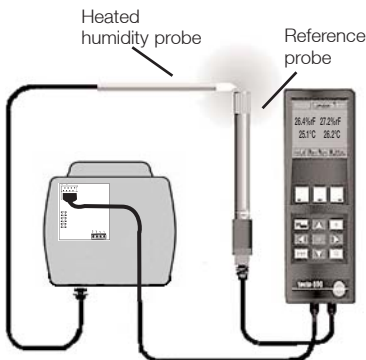
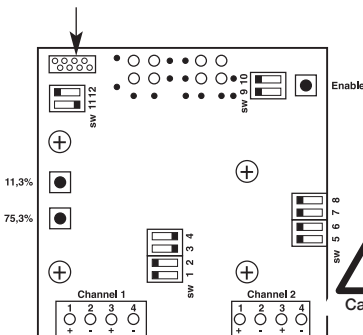


Caution!

1. Remove the cover of the transmitter.
2. Plug the connecting cable into the micromatch connection on the transmitter board or display board (see diagram).
3. Set up transmitter control circuit.  
If you are using a display, 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 on testo 650/400. The two-part display will show the values of the transmitter on the left, and the values of the reference instrument on the right.


Micromatch connection

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



# Adjustment

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

## Note

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

## Note

An adjustment period of at least 60 minutes is advised at a constant temperature of 25°C.

## Note

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

## 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.

## ! Note

For the adjustment process, if a display is connected (H1, H2, H3, H4, H5 or H6), please refer to the "Display" instruction manual.

1. Remove the sensor 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.
5. Wait to the end of the compensation period (recommended: >6h).
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 (see top drawing on page 13).

## ! Note

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



## Cleaning the 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.

# Technical data

## hygrotest 600

Housing:	
Material:	ABS, grey colour RAL 7035
Dimensions:	130 x 105 (140) x 52 mm
Humidity sensor:	Testo sensor plugged in with: DHT –20/+120°C and PHT –20/+120°C With other types the sensor is soldered
Temp. sensor	NTC plugged in with: DHT –20/+120°C and PHT –20/+120°C With other types the sensor is soldered
Screw connections:	2 x M 16 x 1.5
Ambient temp.:	–10 to +70 °C
Storage temp.:	–40 to +80 °C
Protection class:	IP 65
Measuring ranges:	
Humidity:	0 to 100% RH
Temperature:	–20 to +70 °C (WHT –20/70/ DHT –20/70 / PHT –20/70 –20 to +120 °C (DHT –20/120 /PHT –20/120)
Temp. coefficient: deviating from 25°C	0.05%RH/°C for temp.
Accuracy	
Humidity:	±2% RH (0 to 90 %RH) ±3% RH (90 to 100 %RH)
Accuracy	
Temperature:	±0.3 °C (–20 to +50 °C) 1.5% of reading >50 °C
Analog outputs:	
<u>Humidity</u>	
Resolution:	0.02 mA
Accuracy:	0.04 mA
Drift:	0.001 mA/°C
<u>Temperature</u>	
Resolution:	0.02 mA
Accuracy:	0.04 mA
Drift:	0.003 mA/°C
<u>Humidity and temperature:</u>	
	4 to 20 mA in 2 wire technology (WHT, DHT, PHT only)

Outputs can be scaled

Pressure tightness  
of probe: 4 bar (DHT –20/120 / PHT  
–20/120), at +10 to +40°C

Vacuum–tightness  
of probe: Approx. –0.5 bar (DHT –20/  
120 / PHT –20/120)

The other types are designed for atmospheric  
conditions.

Electrically isolated  
outputs: Humidity and temperature  
(WHT, DHT, PHT only )

Power supply: 24 V DC (10 to 30 V DC)

Max. load without  
display: At 10 V, 100 Ohm  
At 18 to 30 V, 500 Ohm

Max. load with  
display H1: 20 to 30 V, 50 Ohm

Power supply with  
display H1: At least 20 V

Reaction time: t90 approx. 10 to 20 s  
We recommend an

integration time of 1 s  
in the case of very quick  
analog recorders or PLC  
inputs.

Temperature resistance  
Probe and cable: 120 °C (DHT –20/120 /  
PHT –20/120)  
70 °C (WH, WHT –20/70,  
DH, DHT –20/70, PHT –20/70)

EMC: according Guidline 89/336  
EEC





Probe material: Polycarbonate(PC)  
except with DHT –20/120 /  
PHT –20/120, here 1.4571  
stainless steel is used.

All data referring to a rated temperature +25°C.

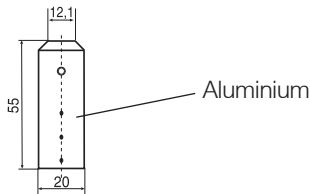
Warranty 2 years

# Ordering data

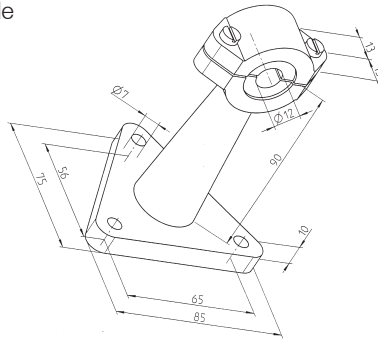
## Accessories for hygrotest 600

Designation		Part. No.
<b>Metal protection cage</b>		0554.0755
<b>Stainless steel sintered cap</b>		0554.0647
<b>Cap with wire mesh filter</b>		0554.0757
<b>PTFE sintered filter</b>		0554.0759

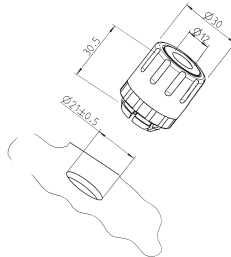
<b>Dew protection</b> for highest humidity		0554.0166
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<b>Wall bracket</b> for probe with cable for PHT		0554.1798
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<b>Single duct screw-on connection</b> for DH/DHT		0554.1793
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# Ordering data

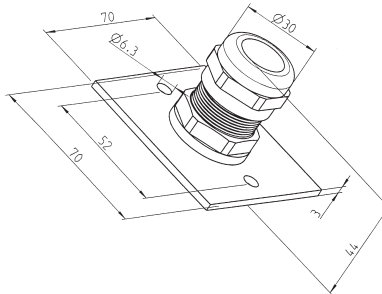
## Accessories for hygrotest 600

### Designation

**Duct screw-on connection**  
for DHT/PHT (not pressure tight)

### Part. No.

0554.1794

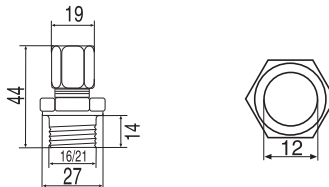


**Pressure-tight stainless steel fitting 1/2" with cutting ring up to 10 bar**

0554.1795

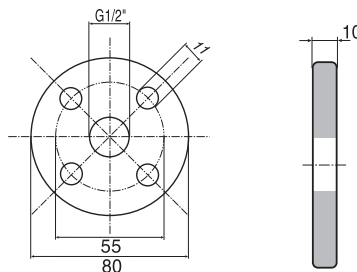
**Pressure-tight stainless steel fitting 1/2" with PTFE ring,**  
adjustable up to 6 bar  
for DH/DHT and PHT

0554.1796



**Flange** for screw connections to DIN 2576, stainless steel  
to be used in conjunction with pressure tight fitting.

0554.1797



**Control and adjustment set 75.3 %**

0554.0638

**Control and adjustment set 11.3 % and 75.3 %**

0554.0660

**Power supply 230 V - 24 V DC**

0554.1742

Connecting cable for reference hand-held unit **testo 400/650**,  
cable length 1.5 m

0409.0214





**testo AG**

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