



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!

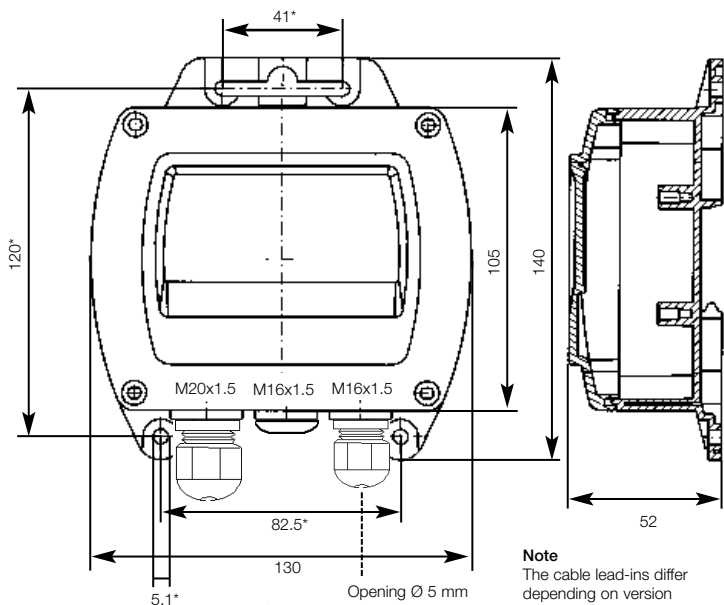
Observe sensor measuring ranges!
The probes may be damaged if overheated.

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



* Mounting dimensions

Description of functions

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

D: Duct

P: Probe

Part no. for hygrotest 600 product series:

Example:

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

H:

Humidity

T:

Temperature

-20/+70 °C:

Standard scaling -20/+70 °C

0555.0600

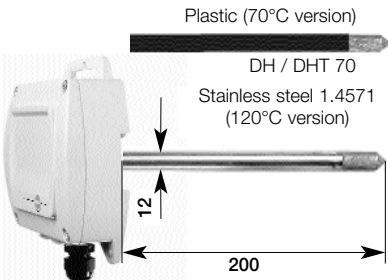


hygrotest 600 WH hygrotest 600 WHT -20/+70 °C

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)



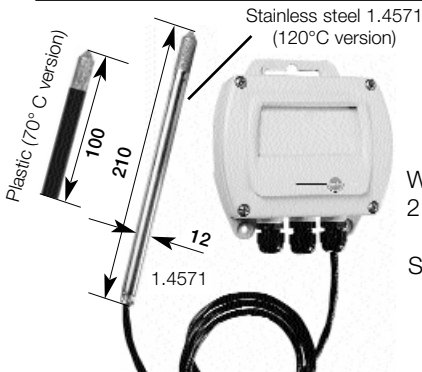
hygrotest 600 DH hygrotest 600 DHT -20/+70 °C hygrotest 600 DHT -20/+120 °C

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

Order Codes										
H 6	Display double-spaced with 2x2 limit signal outputs - analog outputs possible									
H 7	Simple display single-space - loop feed with maximum load 50 Ohm									
	Scaling									
K 1	Standard scaling channel 1 (4 to 20 mA = 0 to 100 %RH)									
K 2	Special scaling channel 1 (4 to 20 mA = choosen unit out of "L"									
	Note: please specify the scaling range									
L 1	Relative humidity (%RH)									
L 2	Dewpoint (°Ctd)									
L 3	Dewpoint (°Ftd)									
M 1	Standard scaling channel 2 (4 to 20 mA = temperature scaling (°C)									
M 2	Special scaling channel 2 (4 to 20 mA = choosen unit out of "N"									
	Note: please specify the scaling ranges									
N 1	Temperature (°C)									
N 2	Temperature (°F)									
	600 PHT -20/120	<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"/>
	600 PHT 20/70	<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"/>
	600 DHT 20/120	<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"/>
	600 DHT -20/70	<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"/>
	600 DH	<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"/>
	600 WHT -20/70	<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"/>
	600 WH	<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"/>

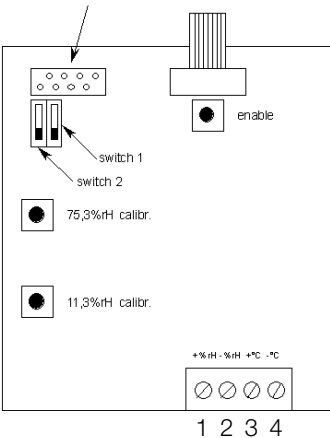
■ - standard ☐ - optional

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

3 + °C } 2 wire techn. 4 to 20mA $\hat{=}$ -20 to +70 °C
4 - °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.

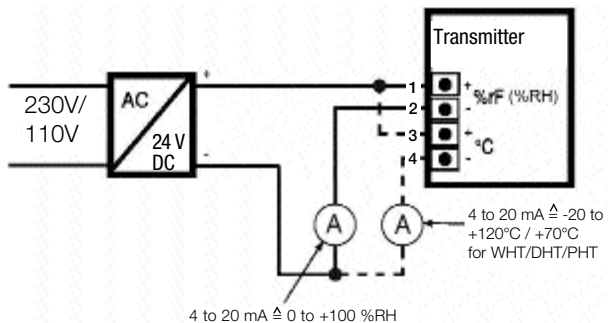
The advantages of the two wire system are easy installment and problem-free connection. The length of the cables does not influence the measured signal. A further additional advantage is the so-called “live zero” signal i.e. 0 parameter corresponds to a current of 4 mA. In this way, this value is also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

Connection suggestions

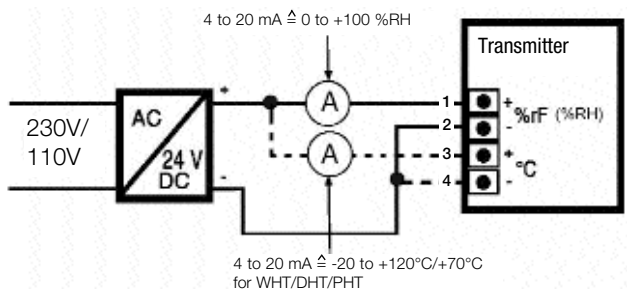
for 2 wire technology

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).

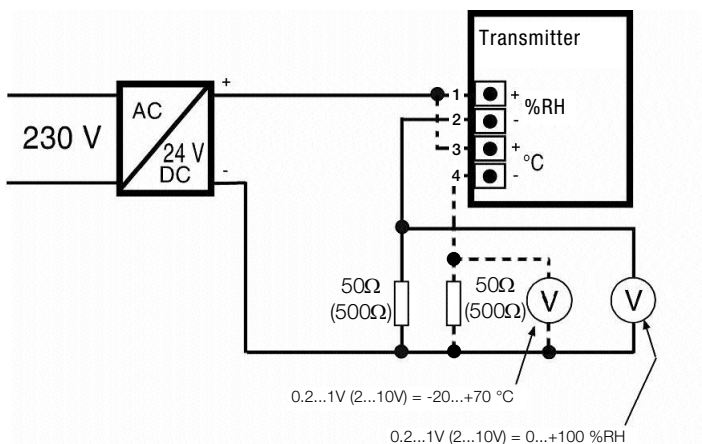
Shunt resistances between $50\ \Omega$ or $500\ \Omega$ ($50\ \Omega$: 0.2 to 1 V, $500\ \Omega$: 2 to 10 V) are parallel connected to the multimeter, controller etc. when measuring voltage (0.2 to 1 V, 2 to 10 V) (see Figure).

Advantage

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

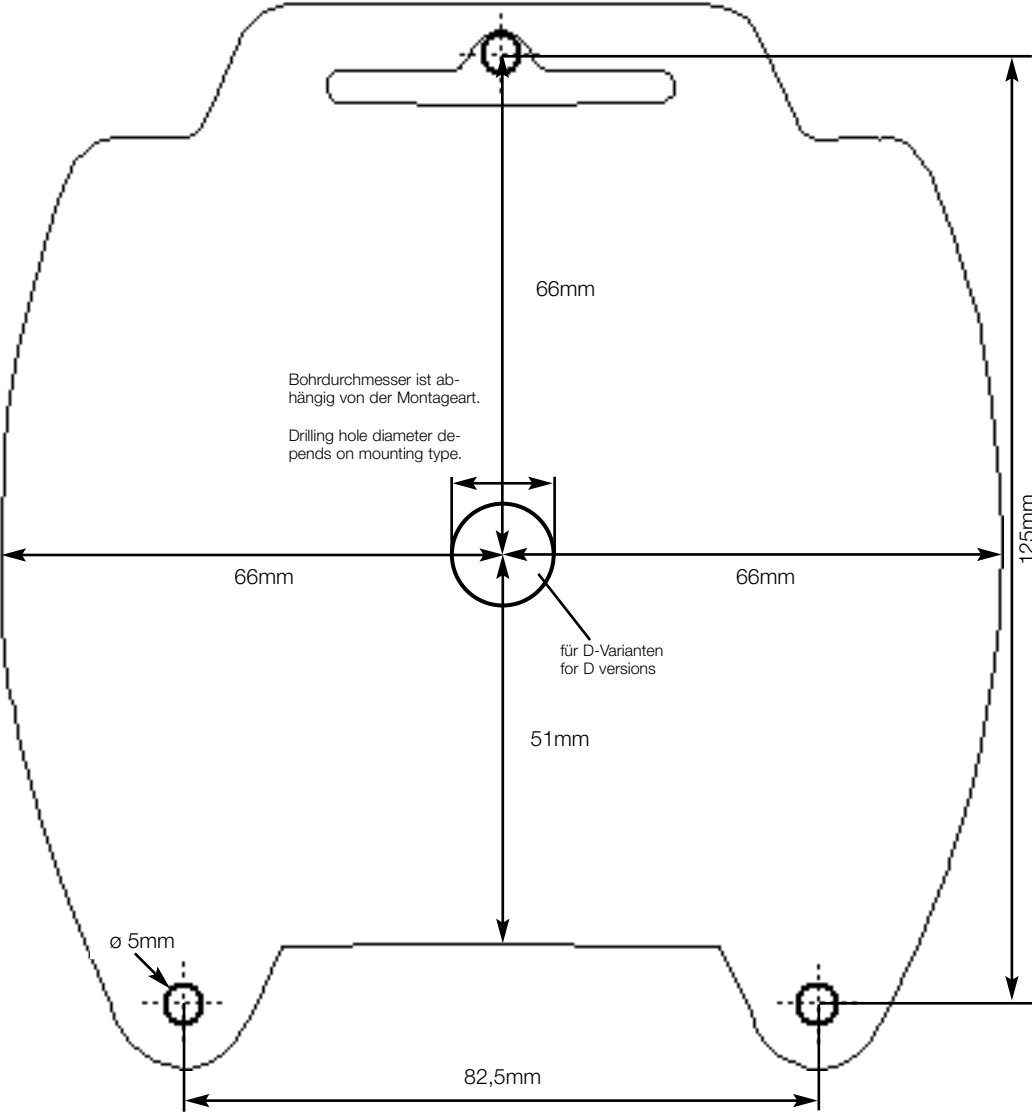


Voltage measurement from 2 to 10 V or 2 to 10 V is not possible in instruments with displays H1, H3, H7 since they are loop-fed.



Bohrvorlage für Messwertumformer hygrotest 600

Drilling template for the transmitter hygrotest 600



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

- 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)

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

Slide switch

Screws

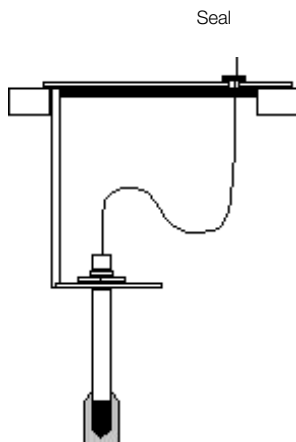
Cable connector

Fig. 2

Spacing pins

Fig. 3

Advice on use



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.

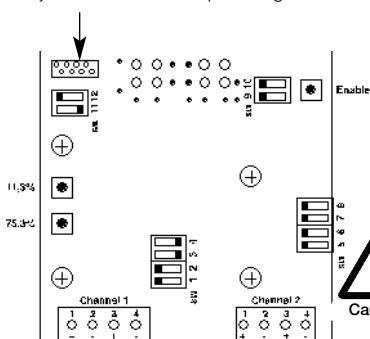
- For installation support please contact your local testo partner.

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).

Micromatch connection

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



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).

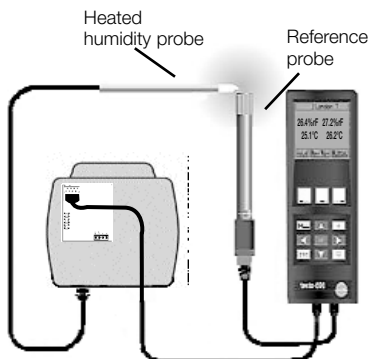
Before opening the transmitter:

- 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.



Adjustment

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:		Outputs can be scaled
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	Pressure tightness of probe: 4 bar (DHT –20/120 / PHT –20/120), at +10 to +40°C
Temp. sensor	NTC plugged in with: DHT –20/+120°C and PHT –20/+120°C With other types the sensor is soldered	Vacuum–tightness of probe: Approx. –0.5 bar (DHT –20/120 / PHT –20/120) The other types are designed for atmospheric conditions.
Screw connections:	2 x M 16 x 1.5	Electrically isolated outputs: Humidity and temperature (WHT, DHT, PHT only)
Ambient temp.:	0 to +70 °C	Power supply: 24 V DC (10 to 30 V DC)
Storage temp.:	–40 to +80 °C	Max. load without display: At 10 V, 100 Ohm At 18 to 30 V, 500 Ohm
Protection class:	IP 65	Max. load with display H1: 20 to 30 V, 50 Ohm
Measuring ranges:		Power supply with display H1: At least 20 V
Humidity:	0 to 100% RH	Reaction time: t90 approx. 10 to 20 s We recommend an
Temperature:	–20 to +70 °C (WHT –20/70/ DHT –20/70 / PHT –20/70 –20 to +120 °C (DHT –20/120 /PHT –20/120) 0.05%RH/°C for temp.	integration time of 1 s in the case of very quick analog recorders or PLC inputs.
Temp. coefficient: deviating from 25°C		
Accuracy		
Humidity:	±2% RH (0 to 90 %RH) ±3% RH (90 to 100 %RH)	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)
Accuracy		EMC: according Guidline 89/336 EEC
Temperature:	±0.3 °C (–20 to +50 °C) 1.5% of reading >50 °C	Probe material: Polycarbonate(PC) except with DHT –20/120 / PHT –20/120, here 1.4571 stainless steel is used.
Analog outputs:		All data referring to a rated temperature +25°C.
<u>Humidity</u>		Warranty 2 years
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)	

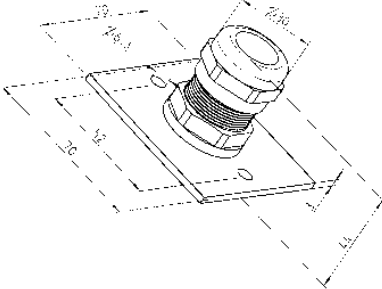
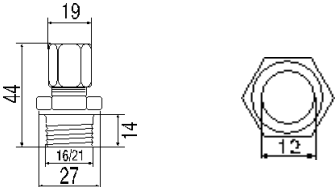
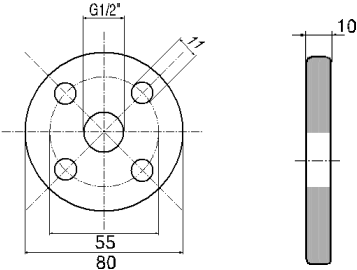
Ordering data

Accessories for hygrotest 600

[illegible]

Ordering data

Accessories for hygrotest 600

Designation	Part. No.
Duct screw-on connection for DHT/PHT (not pressure tight)	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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