

testo 557 · Digital manifold

Instruction manual



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2 Safety and the environment

2.1. About this document

Use

- > Please read this documentation carefully and familiarize yourself with the product before putting it to use. Pay particular attention to the safety instructions and warning advice in order to prevent injuries and damage to the product.

Symbols and writing standards

Representation	Explanation
	Warning advice, risk level according to the signal word: Warning! Serious physical injury may occur. Caution! Slight physical injury or damage to the equipment may occur. > Implement the specified precautionary measures.
Menu	Elements of the instrument, the instrument display or the program interface.
[OK]	Control keys of the instrument or buttons of the program interface.

2.2. Ensure safety

- > Do not operate the instrument if there are signs of damage at the housing, mains unit or hoses.
- > Do not store the product together with solvents. Do not use any desiccants.
- > Carry out only the maintenance and repair work on this instrument that is described in the documentation.
- > Dangers may also arise from the refrigeration systems being measured or the measuring environment: Note the safety regulations valid in your area when performing the measurements.

- > If the manifold falls or another comparable mechanical load occurs, the pipe sections of the refrigerant hoses may break. The valve stem shutoff may also be damaged, whereby further damage to the interior of the manifold may occur that cannot be identified from the outside. The refrigerant hoses must therefore be replaced with new, undamaged refrigerant hoses every time the manifold falls or following any other comparable mechanical load. Send the manifold to Testo Customer Service for a technical check for your own safety.
- > To prevent damage from ESD (electro-static discharge) or transient voltage spikes make sure that your refrigeration system is properly grounded, as otherwise the manifold might get damaged.

2.3. Protecting the environment

- > Dispose of spent batteries in accordance with the valid legal specifications.
- > At the end of its useful life, send the product to the separate collection for electric and electronic devices (observe local regulations) or return the product to Testo for disposal.
- > Refrigerant gases can harm the environment. Please note the applicable environmental regulations.

3 Product description

3.1. Use

Testo 549 and testo 550 are digital manifolds for maintenance and service work on refrigeration systems and heat pumps. They are intended for use by qualified personnel only.

The functions of the testo 549 and testo 550 are designed to replace analog manifolds, thermometers and pressure/temperature charts. Pressures and temperatures can be applied, adapted, tested and monitored.

Testo 549 and testo 550 are compatible with most non-corrosive refrigerants, water and glycol. Testo 549 and testo 550 are not compatible with refrigerants containing ammonia.

The instruments must not be used in explosive environments!

3.2. Overview

Display and control elements



- 1 Front connection for external vacuum probe
- 2 Mini-DIN probe socket for NTC temperature probe, with socket cover
- 3 Foldable hanging hook (on rear)

4 Display. Instrument status icons:

Icon	Meaning
	Battery status
	Bluetooth®
	Select measuring mode

5 Battery compartment. The rechargeable batteries cannot be charged inside the instrument!

6 Control keys:

Key	Function
[Set]	Set units
[R, ►, ■]	Select refrigerant / Start-Stop leak test
[Mode]	Switch between measuring modes
[Min/Max/Mean]	Display min, max, mean values
[▲]	Up-key: Scroll through menu.
[P=0]	Pressure zeroing
Esc	Switches to the measurement/home view.
[▼]	Down-key: Scroll through menu.
	Switching the instrument on/off Switching display illumination on/off.

7 Sight glass for refrigerant flow.

8 4 x valve stem shutoff

9 4 x hose holders for refrigerant hoses

10 2 x Connection 1/4" SAE, brass.

High pressure, for refrigerant hoses with quick release screw fitting, passage for valve actuator lockable.

11 Connection 3/8" SAE, brass, for vacuum pump

12 Connection 1/4" SAE, brass, for e.g. refrigerant cylinders

13 Mini-USB connection for firmware update, inside the battery compartment.

4 First steps

Inserting batteries/rechargeable batteries

- 1. Fold out the hanging hook and open the battery compartment by squeezing the clip lock.
 - 2. Insert batteries (included in delivery) or rechargeable batteries (4x 1.5 V, type AA/Mignon/LR6) in the battery compartment. Observe the polarity!
 - 3. Close the battery compartment.
- After inserting the batteries, the instrument switches on automatically and goes into the settings menu.

When not in use for long period: Remove batteries / rechargeable batteries.

Units / Parameter selection

- 1. Press **[Set]** to confirm or change unit parameter settings
 - 2. Press **[▲]** or **[▼]** to change the units / parameters.
- The settings will be accepted once the last selection has been made.

Key Functions	Description
[▲] or [▼]	Change parameters and select units
[Set]	Confirm units / parameters
Selectable parameters	Description
°C, °F	Temperature unit
bar, kPa, MPa, psi	Unit for pressure.
Pabs, Prel or psig	Switch between absolute and relative pressure display
micron, inHg, Pa, hPa, mTorr,Torr, inH2O, mbar	Unit for vacuum pressure.
 /  / 	Select measuring mode: heat pump / cooling / or Auto

Selectable parameters	Description
AUTO OFF	Activate or deactivate Automatic power-off. Instrument switches off after 30 minutes if no temperature probe is connected and there is no pressure apart from ambient pressure
T_{fac}	Activate or deactivate surface temperature compensation factor, icon is shown on the display if the function is deactivated

- Settings will be applied following the final selection.

Operating the valve stem shutoffs

The digital manifold acts like a conventional two-way manifold with regard to the refrigerant path: The passages are opened by opening the valves. The adjacent pressure is measured with valves closed as well as with them open.

> Open valve: Turn valve positioner counterclockwise.

> Close valve: Turn valve positioner clockwise.

 WARNING
Over tightening the valve stem shutoffs may cause: - Damage to the PTFE seal. - Mechanical deformation of the valve piston leading to the PTFE seal falling out. - Damage to the thread of the threaded spindle and the valve screw. - valve knobs to brake. Lightly tighten the valve knob. Do not use tools to tighten the valve stem shutoffs.

5 Using the manifold

5.1. Preparing for measurement

5.1.1. Switching the instrument on

> Press .

Zero the pressure sensors before every measurement.

✓ All connections must be at ambient pressure.

> Press **[P=0]** key for 3 seconds to execute zeroing.

Connecting the refrigerant hoses

Before each measurement check whether the refrigerant hoses are in flawless condition.

✓ Make sure the valve stem shutoffs are closed.

1. Connect the refrigerant hoses to the low-pressure side (blue) and high-pressure side (red).
2. Connect the refrigerant hoses to the AC/R system.

WARNING

Dropping this instrument or any other comparable mechanical shock can damage the refrigerant pipes and hoses. The valve actuators may also suffer damage, which in turn could result in further damage inside the instrument and may not be detectable from outside.

- > For your own safety you should return the manifold to the Testo Service Department for technical inspection.
- > You should therefore always replace the refrigerant hoses with new ones after an accidental drop has occurred or after any visible wear and tear.

Choosing the refrigerant

1. Press **[R, ►, ■]**.
 - It activates the refrigerant menu and the currently selected refrigerant flashes.
2. Setting the refrigerant:

Key functions	Description
[▲] or [▼]	Selecting another refrigerant
[R, ►, ■]	Confirm the selection and exit the refrigerant menu

Available refrigerants

Representation	Description
R...	Refrigerant number of refrigerant acc. to ISO 817
---	no refrigerant selected.

Example: Setting refrigerant R401B

1. Press [R, ►, ■] to activate refrigerant menu.
2. Press [▲] or [▼] several times, until **R401B** flashes.
3. Press [R, ►, ■] to confirm the setting.

Exiting the refrigerant selection

- > Press [R, ►, ■] or automatically after 30 s, if no other key has been pressed.

5.1.2. Connecting the temperature sensor

Surface temperature sensor

At least one NTC temperature probe must be connected to measure the pipe temperature, for automatic calculation of superheating and subcooling.

Deactivating the surface compensation factor for insertion and air temperature sensor

A surface compensation factor has been set in the measuring instrument to improve the measuring accuracy of surface temperature readings.

If the manifold is used in combination with insertion or air temperature probe (optional), this factor must be deactivated:

1. Press [Set] repeatedly until **T_{fac}** is displayed.
 2. Press [▲] or [▼] to set **T_{fac}** to Off.
 3. Press [Set] to continue through the settings menu until the measurement/home view is displayed.
- **T_{fac}** is shown on the display if **T_{fac}** is disabled.

5.1.3. **Connecting the vacuum probe**

- > Open the front cover of the connector and connect up the vacuum probe.

5.1.4. **Switching Bluetooth® on and off**

In order to to establish a connection via Bluetooth, on an Android or iOS device, the Testo App Refrigeration must be already installed.

You can get the App for iOS instruments in the App Store or for Android instruments in the Play Store.

Information about compatibility can be found in the relevant app store.

1. To turn on the Bluetooth press  and  simultaneously and hold down for 3 seconds.
 - Once the Bluetooth icon is shown on the display, Bluetooth is switched on.

Display	Description
 flashes	There is no Bluetooth connection, or a potential connection is being searched for.
 is permanently displayed	There is a Bluetooth connection.
 is not displayed	Bluetooth is disabled.

2. To turn off the Bluetooth press  and  simultaneously and hold down for 3 seconds.
 - Once the Bluetooth icon is no longer shown on the display, Bluetooth is switched off.

5.1.5. **Measuring mode**

Display	Mode	Function
	Refrigeration system	Normal function of the digital manifold
	Heat pump	Normal function of the digital manifold

Display	Mode	Function
	Automatic mode	If the automatic mode is activated, the testo 557 digital manifold automatically changes the display of the high and low pressure. This automatic change occurs when the pressure on the low-pressure side is 1 bar (15 psi) higher than the pressure on the high-pressure side. During the change, Load (2 s) is shown in the display. This mode is especially suited to air conditioning systems which cool and heat (heat pumps).

5.2. Performing the measurement

WARNING

Risk of injury caused by refrigerant that is at high pressure, hot, cold, or poisonous!

- > Wear safety goggles and protective gloves..
- > Before pressurizing the measuring instrument: Always fasten the measuring instrument at the hanging hook in order to prevent it from falling (risk of breakage)
- > Check if the refrigerant hoses are intact and connected correctly before each measurement. Do not use a tool to connect the hoses. Only tighten the hoses by hand (max. torque 5.0 Nm/3.7 ft*lb).
- > Do not exceed the permissible measuring range (0 to 870 psi / 0 to 60 bar). Pay particular attention with systems with refrigerant R744, as these are often operated with higher pressures.

Measuring

1. Connect and apply pressure to the manifold.
2. See readings.

Note: With refrigerants that have a temperature **glide**, “Zeotropes” the evaporation temperature $E_{v/to}$ and

condensation temperature Co/tc are displayed after evaporation and condensation are complete.

Zeotropes (refrigerants blends mix together) can separate from each other, unlike azeotropes which mix together to become one. Zeotropes often blend refrigerants with different boiling points (saturation temps), where one will change from liquid to vapor before the other as they go through the evaporator. The **glide** is the difference between the lowest boiling point and the highest boiling point. If they are 3 degrees apart, for example, the blend has a 3 degree glide..

- The display illumination will flash if:
- The critical pressure of the refrigerant is within 15 psi (1 bar) of the highest pressure (and temperature) where the refrigerant can still condense.
 - The maximum permissible pressure of 870 psi (60 bar) is exceeded.

Key functions

> Press [▲] or [▼] to change the reading in the display.
Possible display combinations:

Refrigerant evaporation temperature Ev/to (°F/°C) Evaporation pressure (psi/bar)	Refrigerant condensation temperature Co/tc (°F/°C) Condensation pressure (psi/bar)
Measured temperature T1 /t _{oh} (°F/°C) Evaporation pressure (psi/bar)	Measured temperature T2 /t _{cu} (°F/°C) Condensation pressure (psi/bar)
Superheating SH /Δt _{oh} (°F/°C) Evaporation pressure (psi/bar)	Subcooling SC /Δt _{cu} (°F/°C) Condensation pressure (psi/bar)

Changeable

- Evaporation Temperature (Ev)
- Measured Temperature (T1)
- Superheating (SH)

Evaporation pressure

**Changeable**

- Condensation Temperature (Co)
- Measured Temperature (T2)
- Subcooling (SC)

Condensation pressure

With both NTC temperature probes connected, Δt is also shown.

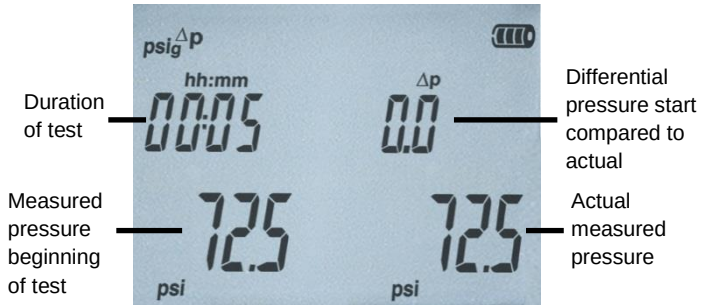
- > Press **[Mean/Min/Max]**: to display min. / max. readings and mean values.

Leak test / pressure drop test

Systems can be tested for tightness with the temperature-compensated leak test. The system pressure and the ambient temperature are measured over a defined period of time, typically with an inert gas such as Nitrogen. A temperature probe can be connected that measures the ambient temperature. : Optional air temperature probe, part. no. 0613 1712) is recommended.

Measurement data of the temperature-compensated differential pressure and temperature, from start to the end of the test, is displayed. It is possible to perform a leak test without connecting a temperature probe.

1. Press **[Mode]** ΔP is displayed.
2. Start the leak test: Press **[R, ►, ■]**. ΔP is now flashing and hh:mm timer is on.
3. End the leak test: Press **[R, ►, ■]**. ΔP stops flashing and hh:mm timer stops.
 - Result is displayed. Note: Leak test time duration and ΔP value
4. Confirm the message: Press **[Mode]** to exit leak mode.



Vacuum measurement

- ✓ The vacuum probe is plugged into the front connection of the manifold and connected to the system.

1. Press **[Mode]** the vacuum mode is displayed.

If ambient pressure is applied to the vacuum probe, then **oooo** is shown on the display.

2. Start the vacuum pump.

- Once the measuring range 0 to 20,000 microns is reached, the current vacuum value is shown on the instrument display. The instrument also displays the current ambient temperature, the water evaporation temperature, which corresponds to the vacuum reading, and the delta between these two temperatures.

3. To leave vacuum mode, remove the vacuum probe from the testo 557 or switch to the standard measurement view using the **[Mode]** button.

6 Technical data

6.1.1. Bluetooth Modul

The Bluetooth® option may only be operated in countries in which it is type approved.

Feature	Values
Bluetooth	Range >20 m (free field)
Bluetooth type	LSD Science & Technology Co., Ltd L Series BLE Module (08 Mai 2013) based on TI CC254X chip
Qualified Design ID	B016552
Bluetooth radio class	Class 3
Bluetooth company	10274

European Union

Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

EFTA countries

Island, Suisse, Norway, Lichtenstein.

Other countries

USA, Canada, Turkey, Hong Kong, Australia, New Zealand.

Information from the FCC (Federal Communications Commission)

This device complies with part 15 of the FCC Rules. Its commissioning is subject to the two following conditions: (1) This instrument must not cause any harmful interference and (2) this instrument must be able to cope with interference, even if this has undesirable effects on operation.

Changes

The FCC demands that the user be informed that any changes or modifications to the instrument that are not explicitly approved by Testo AG may void the user's right to use this instrument.

6.1.2. General technical data

Feature	Values
Parameters	Pressure: psi / kPa / MPa / bar Temperature: °F / °C / K Vacuum: micron / inHg / inH ₂ O / hPa / mbar / mTorr / Torr / Pa
Sensors	2 Pressure: sensors, 2 Temperature (NTC Thermistors)
Measuring cycle	0.5 s
Interfaces	Pressure connections: 3 x 1/4" SAE, 1x 3/8" SAE NTC measurement External vacuum probe
Measuring ranges	Pressure measurement range HP/LP: -14.7...870 psi / -100...6000 kPa / -0.1...6 MPa / -1...60 bar (rel) Temperature measurement range: -58...302 °F / -50...+150 °C Measurement range vacuum (abs): 0 ... 20.000 micron
Overload	940 psi, 65 bar, 6500 kPa, 6.5 MPa
Resolution	Resolution pressure: 0.1 psi / 0.01 bar / 1 kPa / 0.001 MPa Resolution temperature: 0.1 °F / 0.1 °C / 0.1 K Vacuum resolution: 1 micron (from 0 to 1000 micron) 10 micron (from 1000 to 2000 micron) 100 micron (from 2000 to 5000 micron) 500 micron (from 5000 to 10000 micron) 5000 micron (from 10000 to 20.000 micron)
Accuracy (nominal temperature 71.6 °F / 22 °C)	Pressure: ±0.5% FS (±1 digit) Temperature: -58 to 302°F (0.9°F ± 1 digit) / -50 to 150°C (±0.5 °C ±1 digit) Vacuum: ±10% +10 micron
No. of refrigerants	60

Feature	Values
Selectable refrigerants	No refrigerant, R11, R12, R22, R123, R1234ze, R125, R13B1, R134a, R14, R142B, R152a, R161, R23, R227, R290, R32, R401A, R401B, R401C, R402A, R402B, R404A, R406A, R407A, R407B, R407C, R407D, R407F, R408A, R409A, R410A, R411A, R412A, R413A, R414B, R416A, R417A, R420A, R421A, R421B, R422A, R422B, R422C, R422D, R424A, R426A, R427A, R434A, R437A, R438A, R502, R503, R507, R508A, R508B, R600, R600a, R718 (H ₂ O), R744 (CO ₂) (only in permissible measurement range up to 60 bar), R1234yf
Measurable media	All refrigerants that are stored in the testo 557 Ammonia (R717) and other refrigerants which contain ammonia will damage the manifold
Ambient conditions	Operating temperature: -4...122°F / -20...50°C Storage temperature: -4...140°F / -20...60°C Humidity in area of use: 10... 90%rF
Bluetooth	Range >20 m / 65 ft (unobstructed field)
Housing	Material: ABS / PA / TPE Dimensions approx. 280 x 135 x 75 mm Weight: approx. 1200 g (without batteries)
IP-class	42
Power supply	4 x 1.5 V, type AA/mignon/LR6 rechargeable or standard batteries Battery life: approx. 250h (display light off, Bluetooth off, vacuum probe not connected)
Display	Type: Illuminated LCD Response time: 0.5 s
Directives, standards and tests	EC Directive: 2014/30/EC

Feature	Values
Warranty	Duration: 2 years Terms of warranty: see website www.testo.com/warranty

7

Maintaining the product

Cleaning the instrument

Do not use harsh cleaning agents or solvents! Mild soap and water may be used.

- > Clean instrument using a damp cloth.

Keeping connections clean

- > Keep screw connections clean and free of grease and other deposits, clean with a moist cloth as required.

Removing oil residues

- > Carefully blow out oil residues in valve block using compressed air.

To ensure measuring accuracy

- > Check instrument regularly for leaks (recommended: annually). Keep to the permissible pressure range!
- > Calibrate instrument regularly (recommended: annually).

Changing batteries/rechargeable batteries

- ✓ Instrument is switched off.



1. Fold out the hook, loosen the clip and remove the cover of the battery compartment.

2. Remove discharged batteries/rechargeable batteries and insert new batteries/rechargeable batteries (4x 1.5 V, type AA, Mignon, LR6) in the battery compartment. Observe the polarity!
3. Set on and close cover of the battery compartment (clip must engage).
4. Switch the instrument on.

Changing the valve or valve stem shutoff

DO NOT ATTEMPT to change the valve stems. Changing the valve stem shutoff or valves themselves will void the warranty.

Send the measuring instrument to Testo Customer Service.

Cleaning the vacuum probe

Contaminants such as oil may impair the accuracy of the vacuum sensor.

CAUTION

Carrying out cleaning with the probe connected may result in damage to the probe!

- > Remove the vacuum probe from the testo 557!

CAUTION

Damage to the sensor due to sharp objects!

- > Do not insert any sharp objects into the probe!

1. Remove the vacuum probe from the testo 557.
2. Put a few drops of rubbing alcohol into the sensor opening.
3. Seal the opening by placing your finger on it and shake the vacuum probe briefly.
4. Remove all the alcohol from the probe.
5. Repeat this process at least twice.
6. Leave the probe to dry for at least 1 hour. To dry the sensor faster, you can connect the probe directly to a vacuum pump and draw vacuum.

8 Tips and assistance

8.1. Questions and answers

Question	Possible causes/solution
 flashes	Batteries are almost empty. > Change batteries.
The instrument switches off automatically.	Residual capacity of the batteries is too low. > Change batteries.
 lights up instead of the parameter display	The permissible measuring range has been undershot. > Keep to the permitted measuring range.
 lights up instead of the parameter display	The permissible measuring range has been exceeded. > Keep to the permitted measuring range.

8.2. Measurement parameters

Name		Description
bar, °C	psi, °F	
Δt_{oh}	SH	Superheating, evaporation pressure
Δt_{cu}	SC	Subcooling, condensation pressure
t_o	Ev	Refrigerant evaporation temperature
t_c	Co	Refrigerant condensation temperature
t_{oh}	T1	Measured temperature, evaporation
t_{cu}	T2	Measured temperature, condensation

8.3. Error reports

Question	Possible causes/solution
---- is lit up instead of measurement parameter display	Sensor or cable defective > Please contact your dealer or Testo Customer Service
Display EPP FAIL	Eeprom defective > Please contact your dealer or Testo Customer Service
Display BT ERR	No BT module connected or BT module defective. > Please contact your dealer or Testo Customer Service
Display ERR 1-5	Vac-Probe defect > Please contact your dealer or Testo Customer Service

8.4. Accessories and spare parts

Description	Article no.
Clamp probe for temperature measurement at pipes (1,5m)	0613 5505
Clamp probe for temperature measurement at pipes (5m)	0613 5506
Pipe wrap probe with Velcro tape for pipe diameters of up to max. 75 mm, Tmax. +75 °C, NTC	0613 4611
Watertight NTC surface probe	0613 1912
Precise, robust NTC air probe	0613 1712
External vacuum probe	Please contact Testo Service.

For a complete list of all accessories and spare parts, please refer to the product catalogues and brochures or look up our website at: www.testo.com

If you have any questions, please contact your dealer or Testo Customer Service. The contact details can be found on the back of this document or on the Internet at **www.testo.com/service-contact**.

Click onto your country's flag for local support.



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FCC statements:

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications or changes to this equipment. Such modifications or changes could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Industry Canada license-exempt RSS standard(s).

Operation is subject to the following two conditions:

this device may not cause interference, and

(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme avec Industrie Canada RSS exemptes de licence standard(s).

Son fonctionnement est soumis aux deux conditions suivantes:

(1) cet appareil ne peut pas provoquer d'interférences, et

(2) cet appareil doit accepter toute interférence, y compris celles pouvant causer un mauvais fonctionnement de l'appareil.

RF exposure information: The Maximum Permissible Exposure (MPE) level has been calculated based on a distance of $d=5\text{mm}$ between the device and the human body. To maintain compliance with RF exposure requirement, use product that maintain a 5mm distance between the device and human body.