

USER MANUAL

MANIFOLDS

Si-RM350 / Si-RM450

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1. Safety instructions

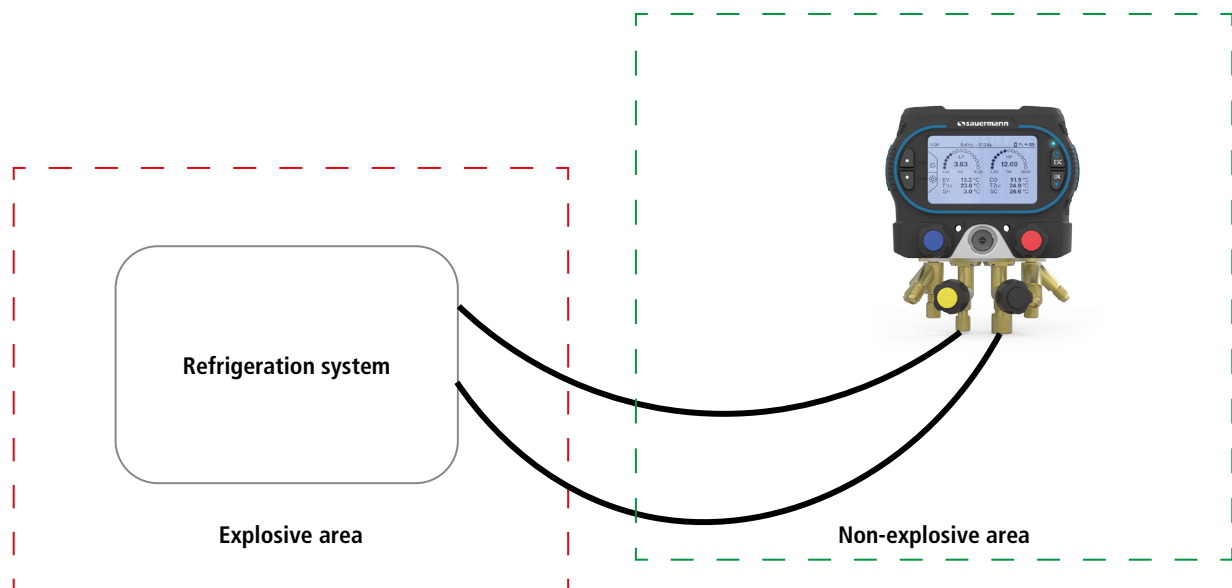
Before using the device, please read carefully this user manual. It delivers important information about the device operations, maintenance and storage.

1.1 General warnings about the device

- Interior and exterior use.
- Respect the measuring ranges of the probes and hoses connected to the device.
- This device has been developed and produced to be sold exclusively to trained and qualified HVACR technicians and engineers. Appropriate training might be necessary in order to ensure safe use of this instrument. Sauermann is not responsible for any possible accident during its use.
- Please always use the device in accordance with its intended use and within parameters described in the technical features in order not to compromise the protection ensured by the device.
- When using the device, the safety of the system integrating the device is the responsibility of the system assembler.
- This device can pose a risk for pacemaker wearers. Respect a distance of at least 10 cm (4") between the device and the wearer.
- Respect a safety distance with other electronic devices like computers, credit cards, computer or TV screens which could be damaged by the magnetic field of the apparel.
- Only the accessories provided with the device or available as an option must be used.
- Do not use the device if it is damaged or if it operates abnormally. Inspect the device before every use. In case of doubt, please contact Sauermann's After-sales service.
- Do not authorize pressures beyond the device limits. Please refer to the technical features described in this user manual.
- The device must not be exposed to rain or any other humid environments (> 85 %RH) without using a proper protection.
- Do not use the device next to explosive and corrosives gases, vapours or dust.
- Do not place your fingers in movable zones of the device (articulations).
- The device must not be used in ATEX zones according to applicable standards.
- Do not store the device with solvents. Do not use desiccants. Do not use isopropanol.
- During use, keep inspecting the device and accessories for effective operation and your own safety.
- Do not give this product to a child.
- If the device falls or in case of similar inconveniences, or if an irregular malfunction appears, please send back the device to Sauermann's After-sales service for a technical check and to ensure your own safety.

1.2 Warnings about the manifolds

Refrigeration systems using flammable gases (A2L, A2 and A3 categories) are expected to be in hazardous and explosive areas. The manifold must be operated outside of designated, recognizable or assumed explosion hazard areas (according to IEC 60079-10-1).



- The manifold should be used in a well ventilated area.
- Respect the pressure measuring range (-1 to 60 bar / -14 to 870 psi), especially for systems with refrigerant R744, as these are often operated at higher pressures.
- Overload pressure maximum: 65 bar (943 psi). The device must not be used with ammoniac refrigerant gas (NH3 / R717).
- Open and close valves on the manifold in the correct sequence to avoid any leakage of refrigerant from the system throughout the commissioning, maintenance and repair period.
- This device has been developed to measure simultaneous parameters including pressure, vacuum and temperature measurements. It must not be used in any other purpose.
- Always use the hook to attach the manifold to prevent it from falling (risk of breakage) before applying pressure
- Before each measurement, check that the refrigerant hoses are intact and correctly connected. Do not use any tools to connect the hoses, only hand-tighten the hoses (**max torque: ??**)
- The user of the manifold shall be protected against electrostatic discharges and discharge from static electricity from its body by being in contact with grounded metallic object or by using an anti-ESD equipment.
- Always wear protective glasses and gloves when using the device in order to protect your eyes and skin when operating refrigerant gases. The vapours of refrigerant gases are extremely cold. Do not expose your skin to these vapours.



1.3 Environment protection

Send back the device at its end of working life for waste collection center of electrical and electronic components (according to local regulations), or send it back to Sauermann to ensure a required waste collection in the respect of the environment.

Refrigerant gases can harm the environment. Please comply with current legislation on refrigerant gases about environment protection.

1.4 Symbols used

For your safety and in order to avoid any damage of the device, please follow the procedure described in this user manual and read carefully the notes preceded by the following symbol:



The following symbol will also be used in this user manual:

Please read carefully the information notes indicated after this symbol.

2. Conformity and standard

The manifold complies with 2015/863 EU (RoHS 3). Document available on request.

Hereby, Sauermann Industrie SAS declares that the radio equipment types Si-RM350 and Si-RM450 is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: sauermanngroup.com.

2.1 FCC rules

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's 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.

Changes or modifications not expressly approved by Sauermann could voice the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

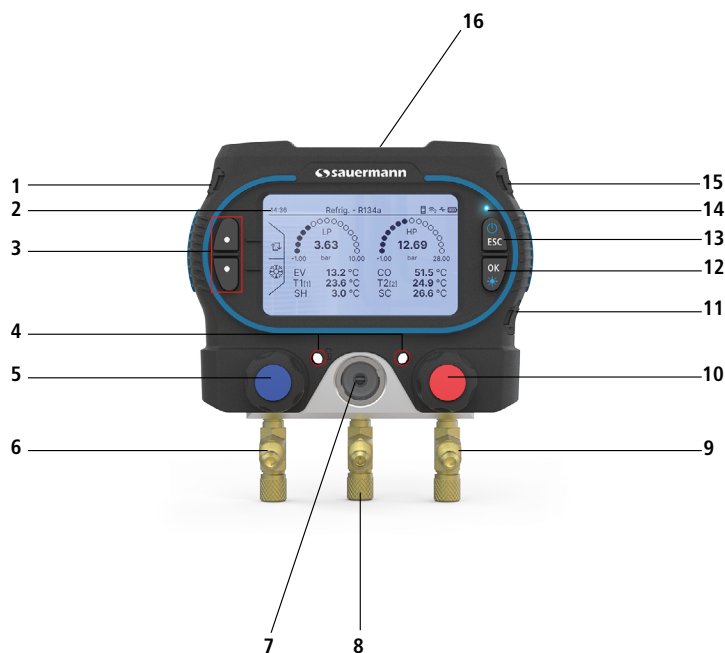
2.2 Canadian standard

This device contains licence-exempt transmitter(s)/receiver(s) that comply with innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference
2. This device must accept any interference, including interference that may cause undesired operation of the device.

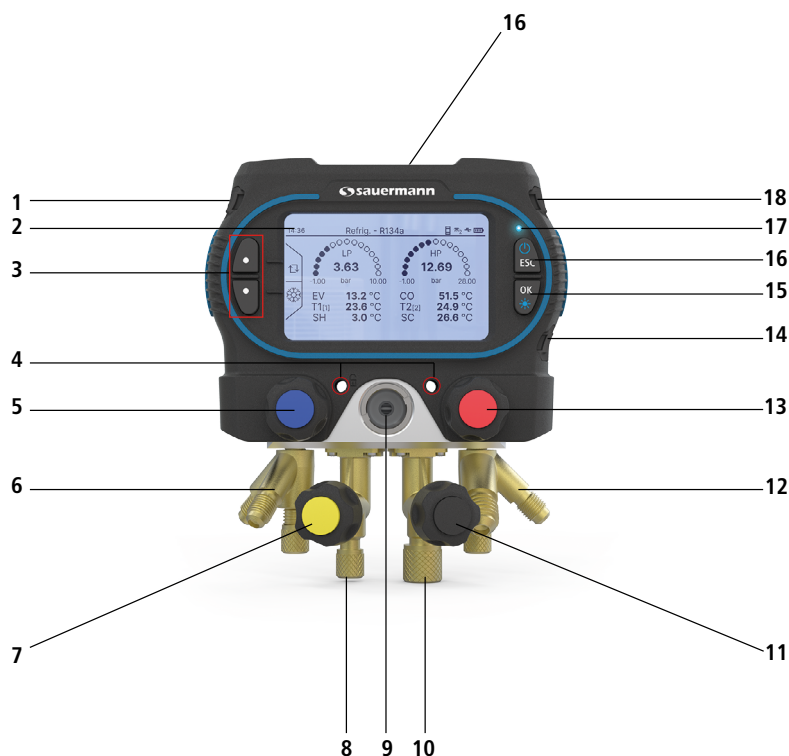
3.1 Description of the device

3.1.1 Si-RM350 Overall description



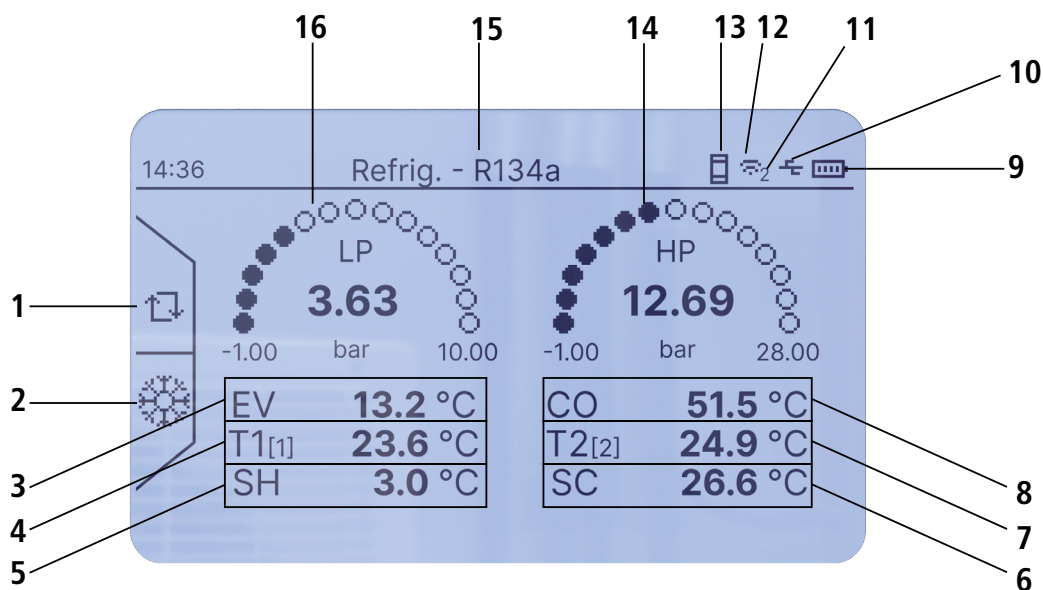
- 01. T1 port
- 02. Screen
- 03. Selection buttons
- 04. Anti-theft device slot
- 05. Low pressure valve
- 06. Y connector 1/8 NPT 1/4 SAE
- 07. Indicator glass
- 08. Y connector 1/8 NPT 1/4 SAE with Schrader® valve
- 09. Y connector 1/8 NPT 1/4 SAE
- 10. High pressure valve
- 11. USB-C port
- 12. OK/Backlight button
- 13. On/Off/Esc button
- 14. Wireless communication LED
- 15. T2 port
- 16. Fixing hook

3.1.2 Si-RM450 Overall description



- 01. T1 port
- 02. Screen
- 03. Selection buttons
- 04. Anti-theft device slot
- 05. Low pressure valve
- 06. Pressure hose connector 1/4 SAE
- 07. Indicator glass
- 08. Hose connector 3/8 SAE
- 09. Vacuum valve
- 10. Pressure hose support 1/4 SAE
- 11. High pressure valve
- 12. USB-C port
- 13. OK/Backlight button
- 14. On/Off/Esc button
- 15. Wireless communication LED
- 16. T2 port
- 17. Fixing hook

3.1.3 Screen description







- | | |
|-------------------------------|---|
| 01. Autozero | 09. Battery level |
| 02. Refrigerant selection | 10. USB connection |
| 03. Evaporation temperature | 11. Port number of wireless communication |
| 04. T1 Temperature | 12. Wireless communication |
| 05. Superheat temperature | 13. Manifold connection |
| 06. Subcooling temperature | 14. High pressure measured |
| 07. T2 temperature | 15. Current refrigerant used |
| 08. Condensation temperature? | 16. Low pressure measured |

3.2 Connections description



3.3 Keys description

	Navigation key. Can also be used to access other manifold functions (autozero, stop, alarm config)
	Navigation key. Can also be used to access other manifold functions (refrigerant list, start)
	Long press: Switch On/Off the manifold. Short press: Back to previous menu.
	Short press: Validate selection. Long press: On/Off backlight.

5. Features

5.1 General features

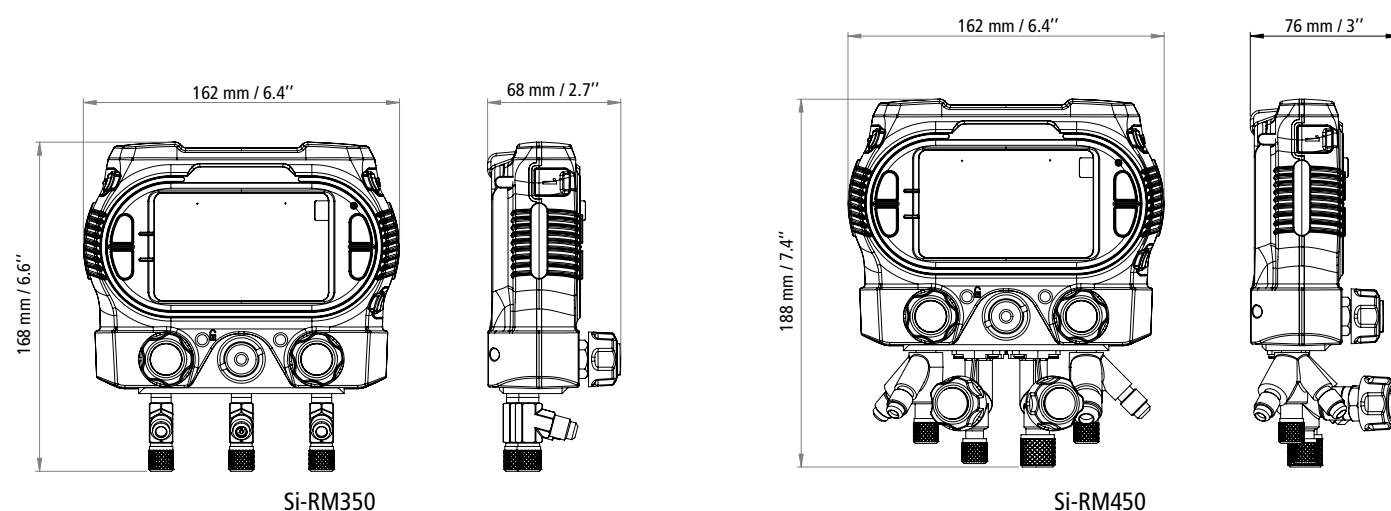
Power supply	4 × LR6 or AA 1.5 V batteries. Alternative power supply: USB-C
Battery life	300 hours*
Memory	Up to 3 days of recording
Display	Graphic screen; 240 x 128 px
Languages	English, French, Spanish, Italian, German, Chinese, Portuguese, Romanian, Hungarian, Polish, Dutch
Pressure connectors	Si-RM350: 3x 1/4 MFL male Si-RM450: 3x 1/4 MFL male + 1x 3/8 MFL male
Temperature connectors	2x wired jack (NTC)
Wireless frequency	Range frequency from 2402 MHz to 2480 MHz with a transmission power of 8 dBm.
Wireless range	Range between manifold and wireless probes up to 100 m (328 ft). App connection: depends on smartphone radio strength, range up to 100 m (328 ft).
Compatibility	Smartphone minimum required versions: Android 11.0, iOS 15, BLE 5.0**
Port	USB-C
Superheat and subcooling	Automatically calculated by the device
Environmental conditions of use	In non-condensing condition Altitude: from 0 to 2000 m (0 to 6561 ft) Non-corrosive gases
Operating temperature	From -20 to 50°C (-4 to 122°F)
Storage temperature	-20 to 50°C (-4 to 122°F)
European directives	2014/53/EU (RED) - 2015/863 EU (RoHS 3) - 2012/19/EU WEEE

*At 20°C without backlight and wireless communication. ** Can work with BLE4.0 but the wireless range will be downgraded

5.2 Features of the housing

Control	4 keys (Up / Down / OK / Esc)
Hook	High strength aluminum
Material	Plastic parts in polyamide reinforced with 30% of glass fiber (PA 6.6 + 30 GF)
Protection	IP54, suitable for A2L and A3 refrigerants
Weight	Si-RM350: 0.980 Kg (2.16 lb) Si-RM450: 1.330 Kg (2.93 lb)

5.3 Dimensions



5.4 Parameters features

5.4.1 Pressure

Pressure is measured by flexible hoses connected to the Si-RM350 or the Si-RM450.

Pressure valves	3 valves (Si-RM350) / 4 valves (Si-RM450)
Measuring range	From -1 to 60 bar (-14 to 870 psi)
Pressure sensing accuracy*	±0.50% of full scale
Available units	bar, psi, kPa, MPa
Resolution	0.01 bar / 0.1 psi / 1 kPa / 0.001 MPa
Overload	65 bar (943 psi)
Burst pressure	150 bar (2175 psi)
Max pressure hose	55 bar (800 psi)

The Si-RP4 probe is also available for pressure measurement.

Pressure	
Measuring range	From -1 to 60 bar (-14 to 870 psi)
Pressure sensing accuracy*	±0.5% of full scale
Available units	bar, psi, kPa, MPa
Resolution	0.01 bar / 0.1 psi / 1 kPa / 0.001 MPa
Overload	65 bar (943 psi)
Burst pressure	150 bar (2175 psi)
Device	
Operating temperature	From -10 to 50°C (-4 to 122°F)
Storage temperature	From -20 to 50°C (-4 to 122°F)
Power supply	3x LR03 AAA 1.5 V alkaline batteries
Battery life	150 h @ 20°C / 68°F
Wireless frequency	Range frequency from 2402 MHz to 2480 MHz with a transmission power of 8 dBm.
Wireless range	Range between manifold and wireless probes up to 100 m (328 ft). App connection: depends on smartphone radio strength, range up to 100 m (328 ft).
Compatibility	Smartphone minimum required versions: Android 11.0, iOS 15, BLE 5.0**
Connections	1x 1/4 FFL female
Environmental conditions of use	In non-condensing condition Altitude: from 0 to 2000 m (0 to 6561') Non-corrosive gases
European directives	2011/65/EU RoHS II; 2012/19/EU WEEE; 2014/53/EU RED

*All accuracies specified in this document were conducted under laboratory conditions & can be guaranteed for measurement carried out in the same conditions, or carried out with calibration compensation. **Can work with BLE4.0 but the wireless range will be downgraded

5.4.2 Temperature

Pipe temperature can be measured by wired temperature clamp (Si-RT2), wireless temperature clamp (Si-RT7) or wired self-gripping probe (Si-RT5).

- **Si-RT2 probe**

Temperature sensors	NTC
Temperature sensor range	-50 to 120°C (-58 to 248°F)
Temperature accuracy*	From -20 to 85°C (-4 to 185°F): ±1°C (±1.8°F)

Maximum operating temperatures	Jaws: 150°C (302°F) - Handle: 90°C (194°F)
Available units	°C, °F
Resolution	0.1°C, 0.1°F
Pipes diameter	6 to 42 mm (0.2" to 1.7")
Cable	2 m (6 ft) length with strengthened 3-point jack connector, Ø3.2 mm, in PVC, max. temperature 105°C (221°F)
Storage temperature	From -20 to 50°C (-4 to 122°F)
• Si-RT5 probe	
Temperature sensors	NTC
Temperature sensor range	-20 to 85°C (-4 to 185°F)
Temperature accuracy*	-20°C to 70°C (-4 to 158°F): ±0.3°C (±0.6°F) 70°C to 85°C (158 to 185°F): ±0.5°C (±0.9°F)
Available units	°C, °F
Resolution	0.1°C, 0.1°F
Pipes diameter	max 100 mm (max. 3.9")
Cable	2 m (6 ft) length with strengthened 3-point jack connector, Ø3.2 mm, in PVC, max. temperature 105°C (221°F)
Storage temperature	From -20 to 50°C (-4 to 122°F)
• Si-RT7 probe	
Temperature	
Temperature sensors	NTC
Temperature sensor range	-20 to 85°C (-4 to 185°F)
Temperature accuracy*	±1°C (±1.8°F)
Maximum operating temperatures	Jaws: 85°C (185°F) - Handle: 50°C (122°F)
Available units	°C, °F
Resolution	0.1°C, 0.1°F
Pipes diameter	6 to 42 mm (0.2" to 1.7")
Device	
Power supply	3x LR03 AAA 1.5 V alkaline batteries
Battery life	150 h @ 20°C / 68°F
Wireless frequency	Range frequency from 2402 MHz to 2480 MHz with a transmission power of 8 dBm.
Wireless range	Range between manifold and wireless probes up to 100 m (328 ft). App connection: depends on smartphone radio strength, range up to 100 m (328 ft).
Compatibility	Smartphone minimum required versions: Android 11.0, iOS 15, BLE 5.0**
Connections	1x 1/4 FFL female
Storage temperature	From -20 to 50°C (-4 to 122°F)
Environmental conditions of use	In non-condensing condition Altitude: from 0 to 2000 m (0 to 6561') Non-corrosive gases
European directives	2011/65/EU RoHS II; 2012/19/EU WEEE; 2014/30/EU EMC; 2014/53/EU RED

5.5 List of refrigerant gases

The following refrigerants are currently supported in the Si-RM350 and Si-RM450 manifolds. As more refrigerants are made available they can easily be added in the manifold internal memory with a firmware update using the Sauermann Pilot APP.

R11	R161	R407A	R419B	R444A	R503
R113	R170	R407B	R420A	R444B	R504
R114	R218	R407C	R421A	R445A	R507A
R115	R22	R407D	R421B	R446A	R508A
R1150	R227	R407E	R422A	R447A	R508B
R116	R23	R407F	R422B	R448A	R509A
R12	R236ea	R407H	R422C	R449A	R511A
R123	R236fa	R408A	R422D	R450A	R513A
R1233zd(E)	R245ca	R409A	R422E	R452A	R600
R1234yf	R245fa	R409B	R423A	R452B	R600a
R1234zeE	R290	R410A	R424A	R453A	R601
R1234zeZ	R32	R410B	R425A	R454A	R601a
R124	R41	R411A	R426A	R454B	R718
R125	R401A	R411B	R427A	R454C	R744
R1270	R401B	R412A	R428A	R455A	R744a
R13	R401C	R414A	R434A	R456A	
R134a	R402A	R414B	R437A	R458A	
R13b1	R402B	R416A	R438A	R466A	
R14	R403A	R417A	R439A	R469A	
R141b	R403B	R417B	R440A	R50	
R142b	R404A	R417C	R441A	R500	
R143a	R405A	R418A	R442A	R501	
R152a	R406A	R419A	R443A	R502	

4. Start with the manifold

4.1 Power supply

Before starting-up the manifold, please insert the batteries.

- Open the battery cover.
- Insert the 4 LR6 AA 1.5 V batteries.




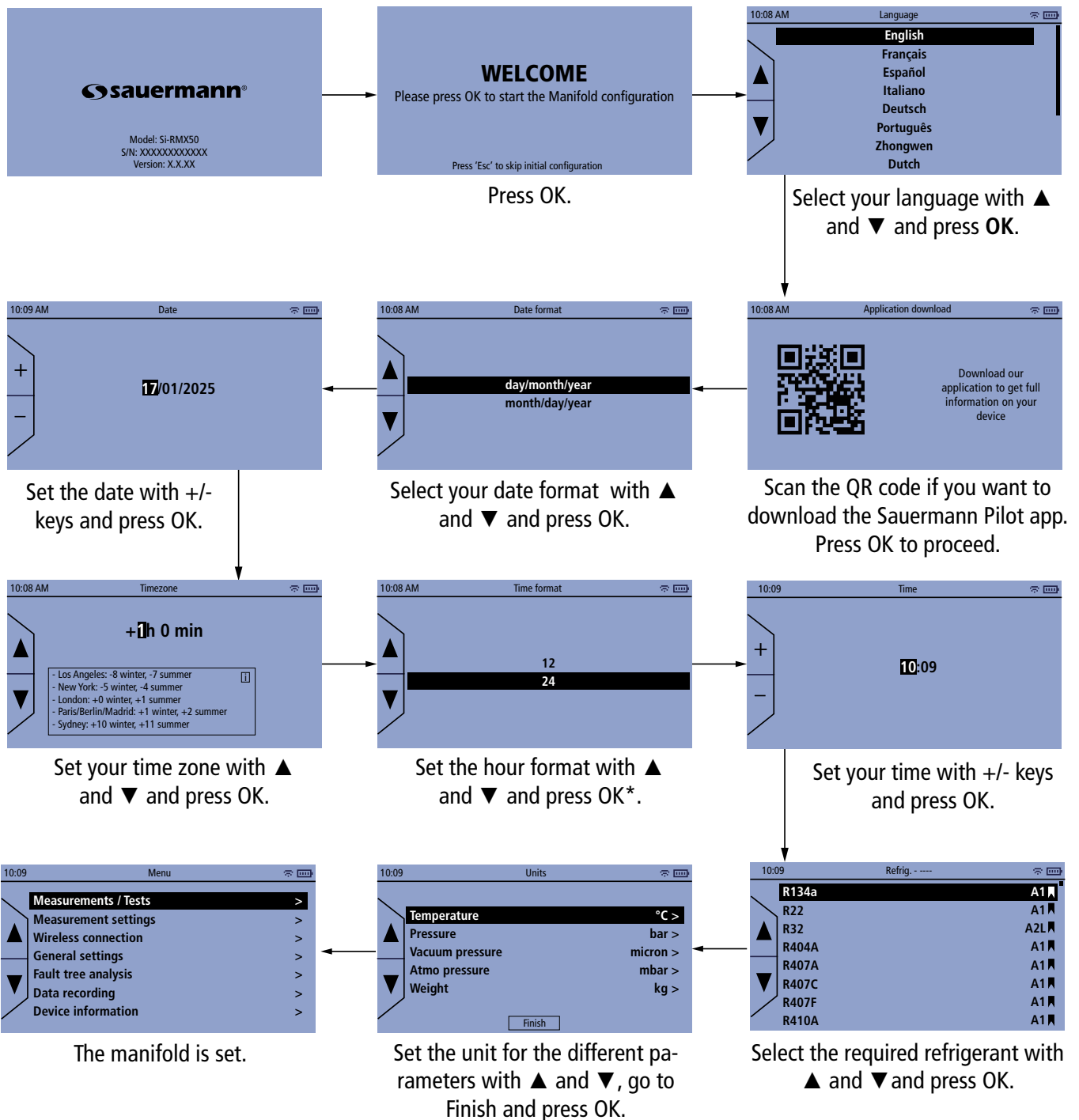
Respect the polarity.



For long term measurements, it's possible to connect the manifold to main supply with the USB-C cable.

4.2 First start-up

- Starts the device pressing  , parameters of the manifold must be set.



*if "12" is selected, the "PM" or "AM" selection screen will be displayed.

6. Connect a probe

6.1 Wired probe

The device has two inputs allowing the connection of wired temperature probes:

- Si-RT2 temperature clamp
- Si-RT5 temperature probe with hook-and-loop fastene



6.2 Wireless probe

The following wireless probes are available:

- Si-RT7 temperature clamp
- Si-TH4 temperature and humidity probe
- Si-RP4 pressure probe
- Si-RV4 vacuum probe

When using a wireless probe for the first time, you must scan the probe before using it.

6.2.1 Scan a probe

The main menu is displayed.

- Turn on the wireless probe.

The wireless indicator turns on blue and is fixed.

- Press OK on **"Wireless connection"** line.
- Press OK on **"Scan devices"** line.

The probe name (e.g. Si-RT7) are displayed and its serial number are displayed.

- Press OK.

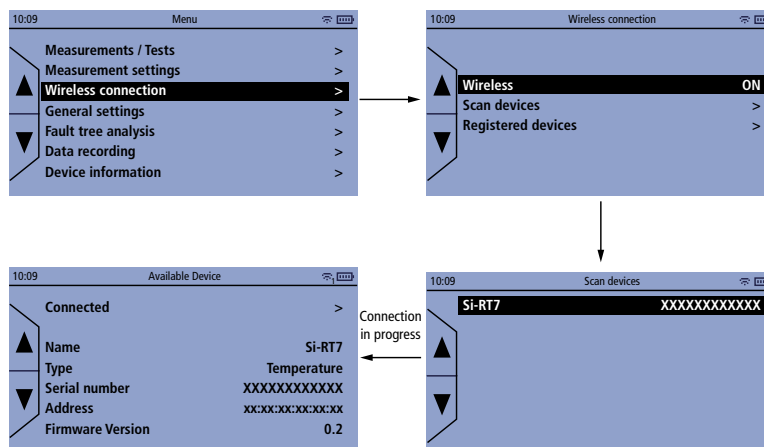
The connection is in progress then the probe is connected:

- the blue wireless indicator on the probe blinks.
- probe name, type of probe, serial number, address and firmware version of the probe are displayed.



Once a probe is scanned, you can perform your measurements.

You can turn off the probe then turn it on. It will be recognized by the manifold, there's no need to scan it again



6.2.2 Information about probes

Once a probe is scanned, it is registered in the manifold with its features.

"**Wireless connection**" menu is displayed.

- Press OK on "**Registered devices**" line.

Probes registered in the manifold are displayed:

- Press OK on the line of the required probe.

Probe name, type of probe, serial number, address and firmware version of the probe are displayed.



In case of a trouble with your probe and when contacting the after-sale service or the hotline, this information will be useful.

From this screen, it is possible to delete the probe:

- Press OK twice to remove it.

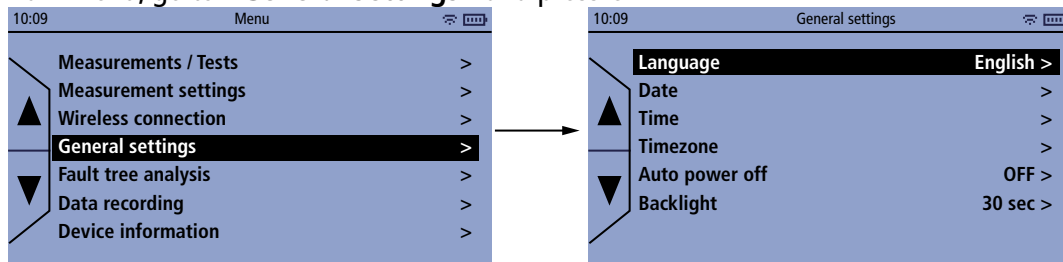
7. Set the device

"General Settings" menu allows to set the following items for the manifold:

- Language
- Date
- Time
- Timezone
- Autopower off
- Backlight

To access to this menu:


- From the main menu, go to **"General settings"** and press OK.



7.1 Set the language

"General settings" menu is displayed.

- Press OK on **"Language"** line.
- Press OK on the requested language line.

 Available languages: English, French, Spanish, Italian, German, Portuguese, Chinese, Dutch, Hungarian, Polish and Romanian.

7.2 Set the date format

"General settings" menu is displayed.

- Press OK on **"Date"** line.
- Select the date format: day/month/year or month/day/year with ▲ and ▼ and press OK.

7.3 Set the time format

"General settings" menu is displayed.

- Press OK on **"Time"** line.
- Select the time format: 12 or 24 with ▲ and ▼ and press OK.

7.4 Set the timezone

"General settings" menu is displayed.

- Press OK on **"Timezone"** line.
- Adjust the timezone with ▲ and ▼ and press OK.

7.5 Set the autopower off

- Press OK on **"Autopower off"** line.
- Press OK to enable: ON or disable: OFF the autopower off.
- If ON is selected: press OK on **"Value"** line to set the duration in minutes: 5/10/15/30/45/60 min.

7.6 Set the backlight

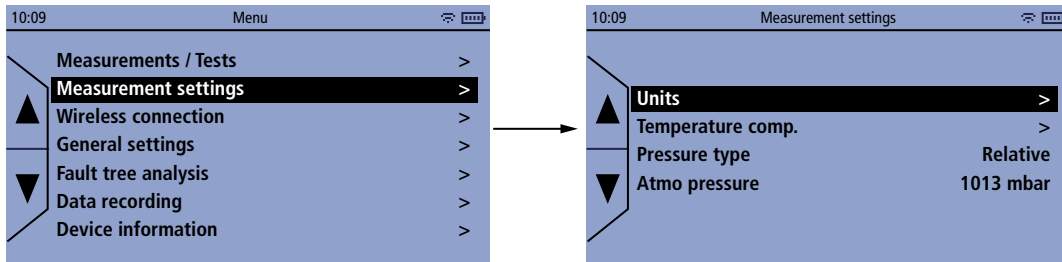
- Press OK on **"Backlight"** line.
- Select the duration of the backlight: 10/30/60 s or always with ▲ and ▼ and press OK.

8. Set the measurement parameters

"Measurement settings" menu allows to set units, temperature compensation pressure type and atmospheric pressure.

To access to this menu:

- From the main menu, go to **"Measurement settings"** and press OK.



8.1 Set the units

The following units can be set for these different parameters:

- Temperature: °C, °F
- Pressure: bar, psi, Mpa, Kpa
- Vacuum pressure: micron, Pa, hPa, mbar, mTorr, mmHg, inH2O, inHG, Torr
- Atmospheric pressure: mbar, hPa, inHg, bar, psi
- Weight: kg, lb, oz

"Measurement settings" menu is displayed.

- Press OK on **"Units line"** line.
- Press OK on the required parameter line.
The list of available units is displayed.
- Select the unit with with ▲ and ▼ and press OK.

8.2 Set the temperature compensation

It is possible to modify the compensation temperature value. Indeed, the measured value depends on the ambient temperature. It is required to enter the operating temperature in order to get more accurate results. The ambient temperature can be retrieved from the wired temperature probe connected to port 1 or port 2.

"Measurement settings" menu is displayed.

- Press OK on **"Temperature comp."** line.
- Press OK on "Temperature compensation" line to switch between ON and OFF.
- Select the probe to be used for the temperature compensation:
 - Press OK on **"Wired Port 1"** or **"Wired Port 2"**.
 - Press OK on **"Velcro"** or **"Clamp"**.

--> pas de possibilité de sélectionner "---" pour un des deux ports ?

8.3 Set the pressure type

"Measurement settings" menu is displayed.

- Press OK on **"Pressure type"** line to switch between "Relative" and "Absolute".

8.4 Set the atmospheric pressure

"Measurement settings" menu is displayed.




- Press OK on **"Atmo pressure"** line.
- Define the atmospheric pressure value in mbar with + and - and press OK.

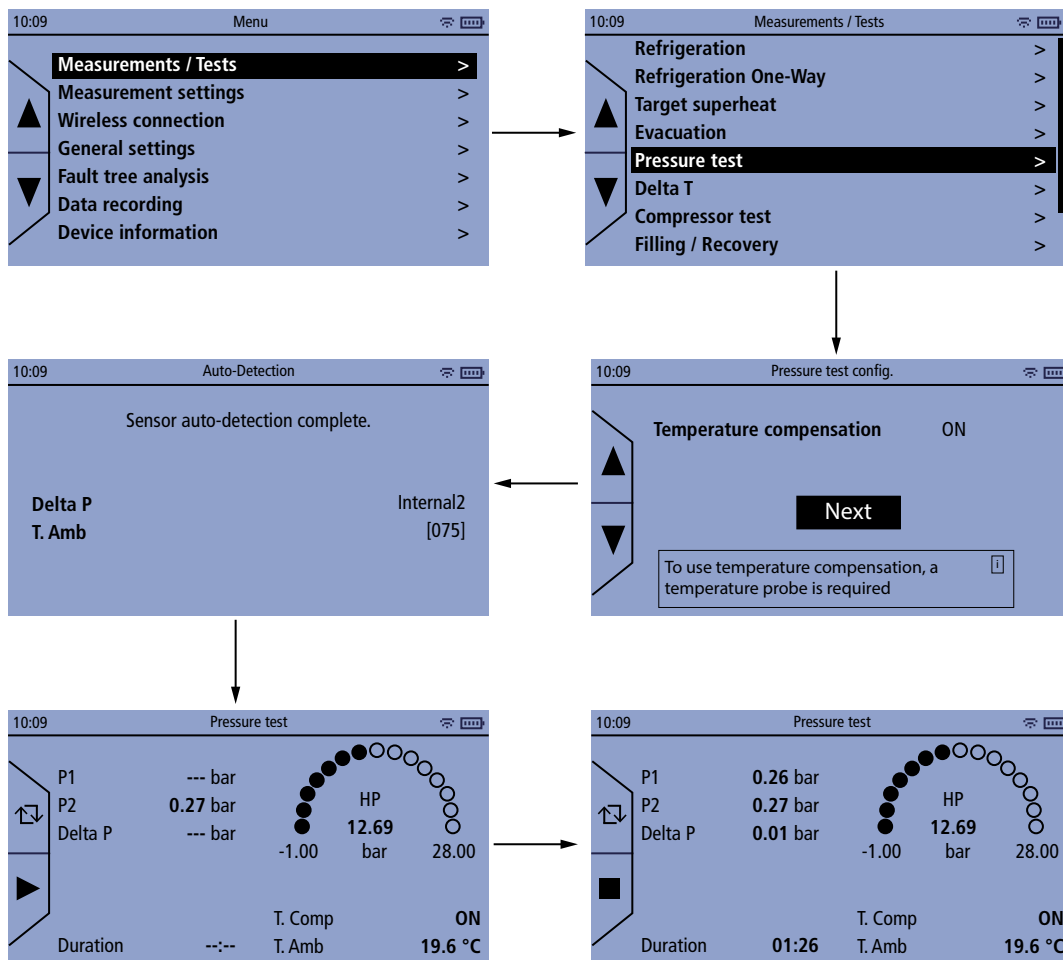


The atmospheric pressure value must be between 400 and 1200 mbar.

9. Perform a pressure test



The pressure test allows to check if there are any leaks in the system. To perform this test, the system pressure and the ambient temperature will be measured over a period of time.

- Close the refrigeration system valves.
 - Close the manifold valves.
 - Connect the hose between the refrigeration system and the manifold (usually on the high-pressure side).
 - Turn ON the temperature probe.
 - Turn ON the manifold.
 - Press OK on "**Measurements / Tests**" line.
 - Press OK on "**Pressure test**" line.
 - Press OK on "**Next**" button.
 - Press OK once the manifold has complete the auto-detection.
 - Open the valve on the system.
 - Open the valve on the manifold.
 - Perform an autozero pressing .
 - Press  to start the test.
- The pressure test starts.*
- Once the required duration for the test is over, press .



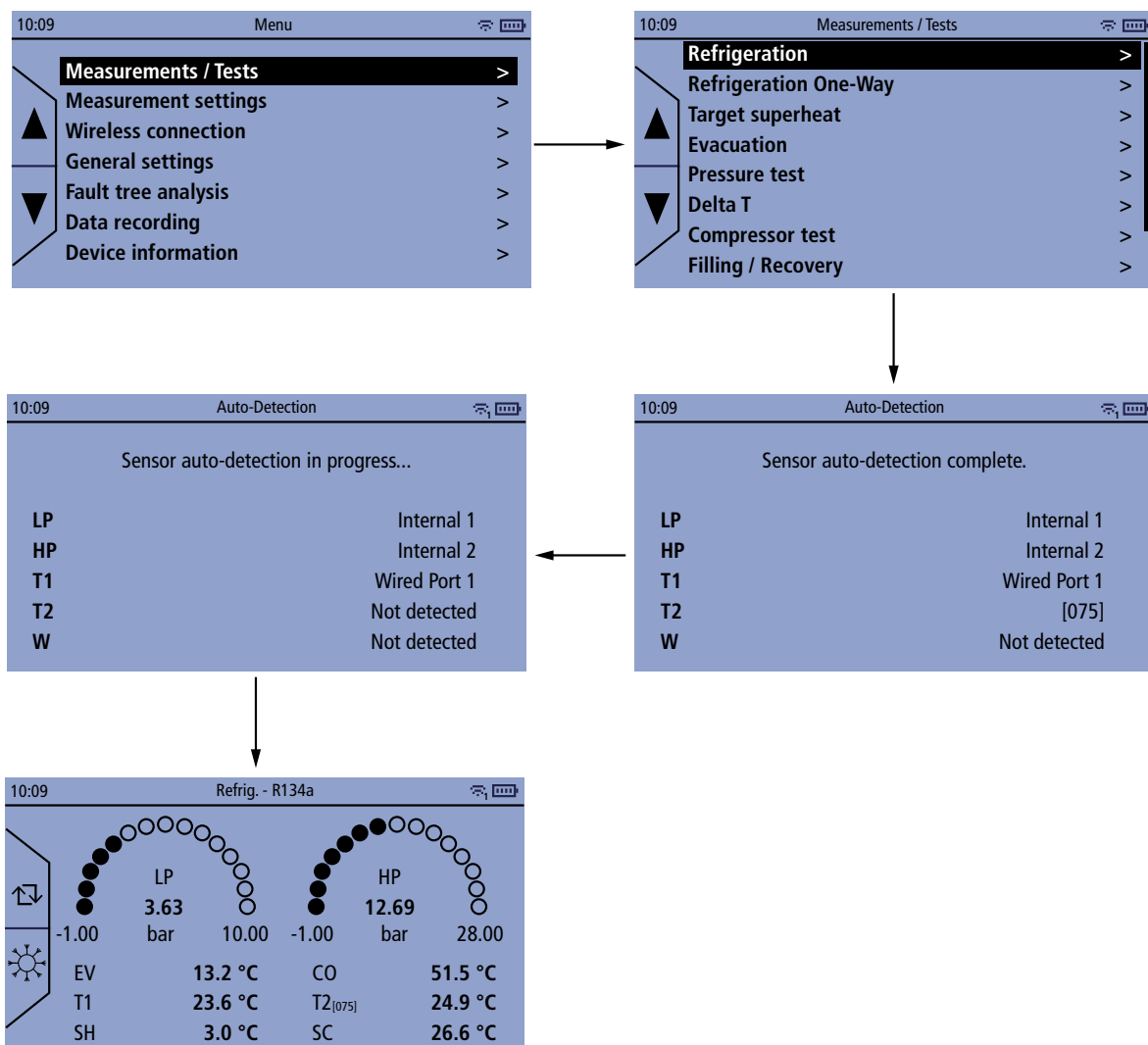
10. Perform a refrigeration test

The refrigeration test allows to measure and calculate the following parameters:

- Low pressure / High pressure
 - Refrigerant evaporation temperature
 - Pipes temperatures
 - Superheating temperature
 - Subcooling temperature
 - Refrigerant condensation temperature
- Close all the valves on the manifold.
 - Connect the low pressure hose (blue one) to the manifold and to the system.
 - Connect the high pressure hose (red one) to the manifold and to the system.
 - Turn ON the temperature probes.
 - Turn ON the manifold.
 - Press OK on "**Measurements / Tests**" line.
 - Press OK on "**Refrigeration**" line.
 - Press OK once the manifold has complete the auto-detection.
 - Select the refrigerant pressing  if needed (see page 14 for the refrigerant list).
 - Open the valves on the system.
 - Open the valves on the manifold.
 - Perform an autozero pressing .
- The manifold displays the values.*



It is advisable to vacuum the manifold before carrying out the test.



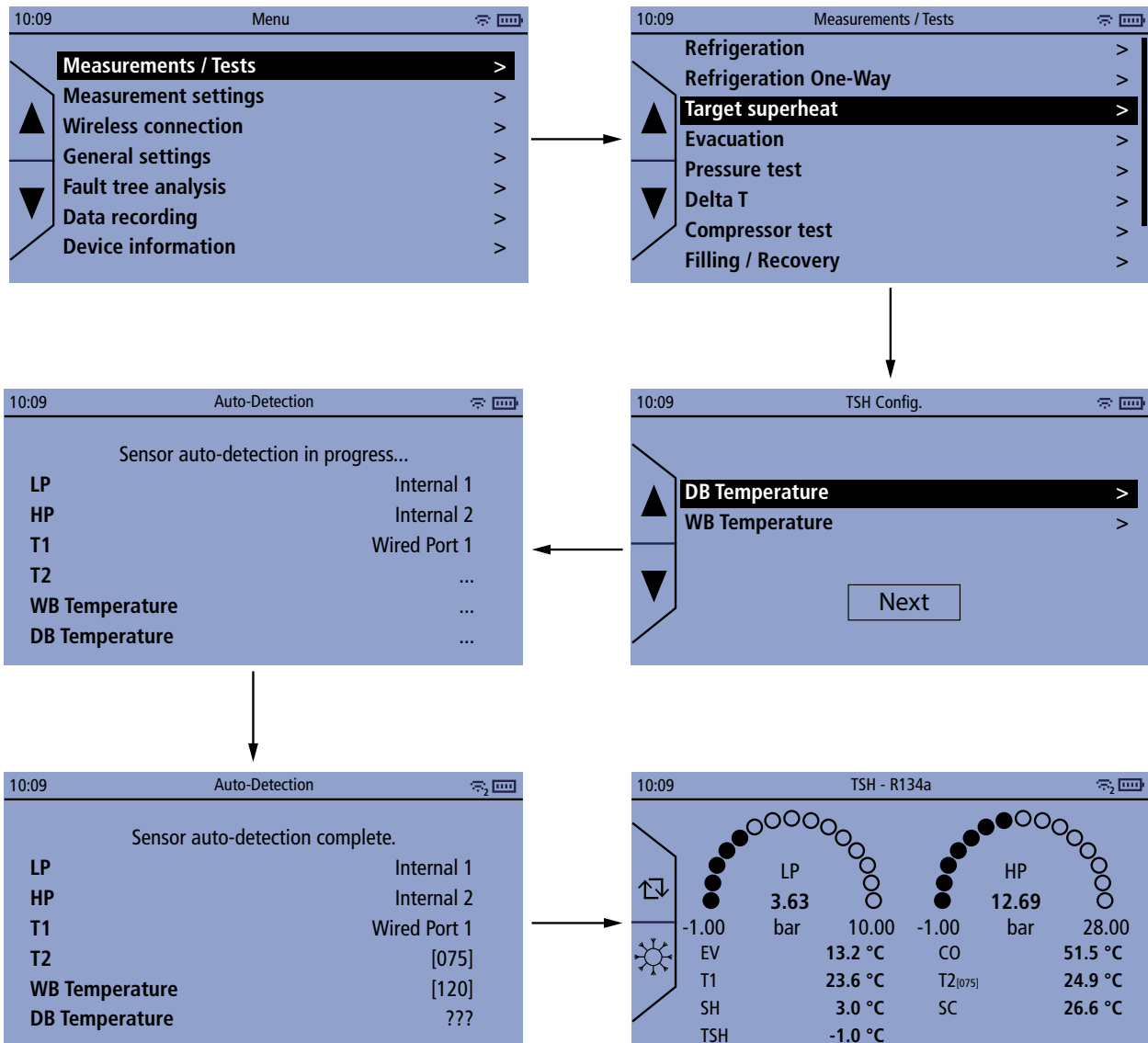
11. Target superheat

The manifold allows to calculate the target superheat.



To calculate this value, dry bulb temperature and wet bulb temperature can be manually entered or measured by temperature probes.

Two temperature probes such as Si-R2, Si-RT5 or Si-RT7 and two temperature/hygrometry probes such as Si-TH4 are needed.



"Measurements / Tests" menu is displayed.

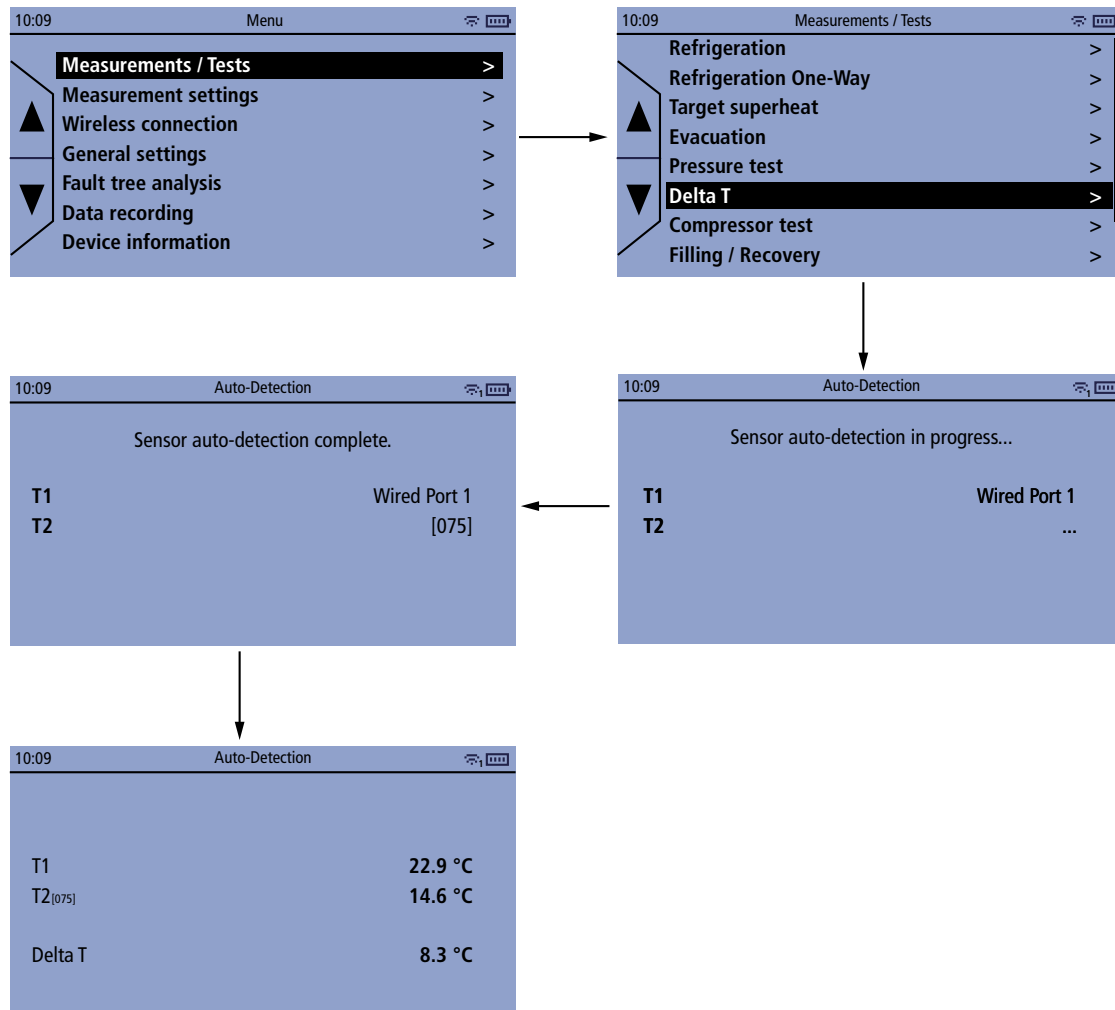
- Press OK on "Target superheat" line.
- DB temperature and WB temperatures lines are displayed.
 - Press OK to select "Auto" or to enter manually the value.
- Press OK on "NEXT".
- Press OK once the manifold has complete the auto-detection.

12. Perform a delta T measurement

The delta T measurement allows to measure the temperature difference between T1 and T2.



Two temperature probes are needed to perform this measurement. We recommend using Si-RT2, Si-RT5 and/ or Si-RT7 temperature probes.



"Measurements / Tests" menu is displayed.

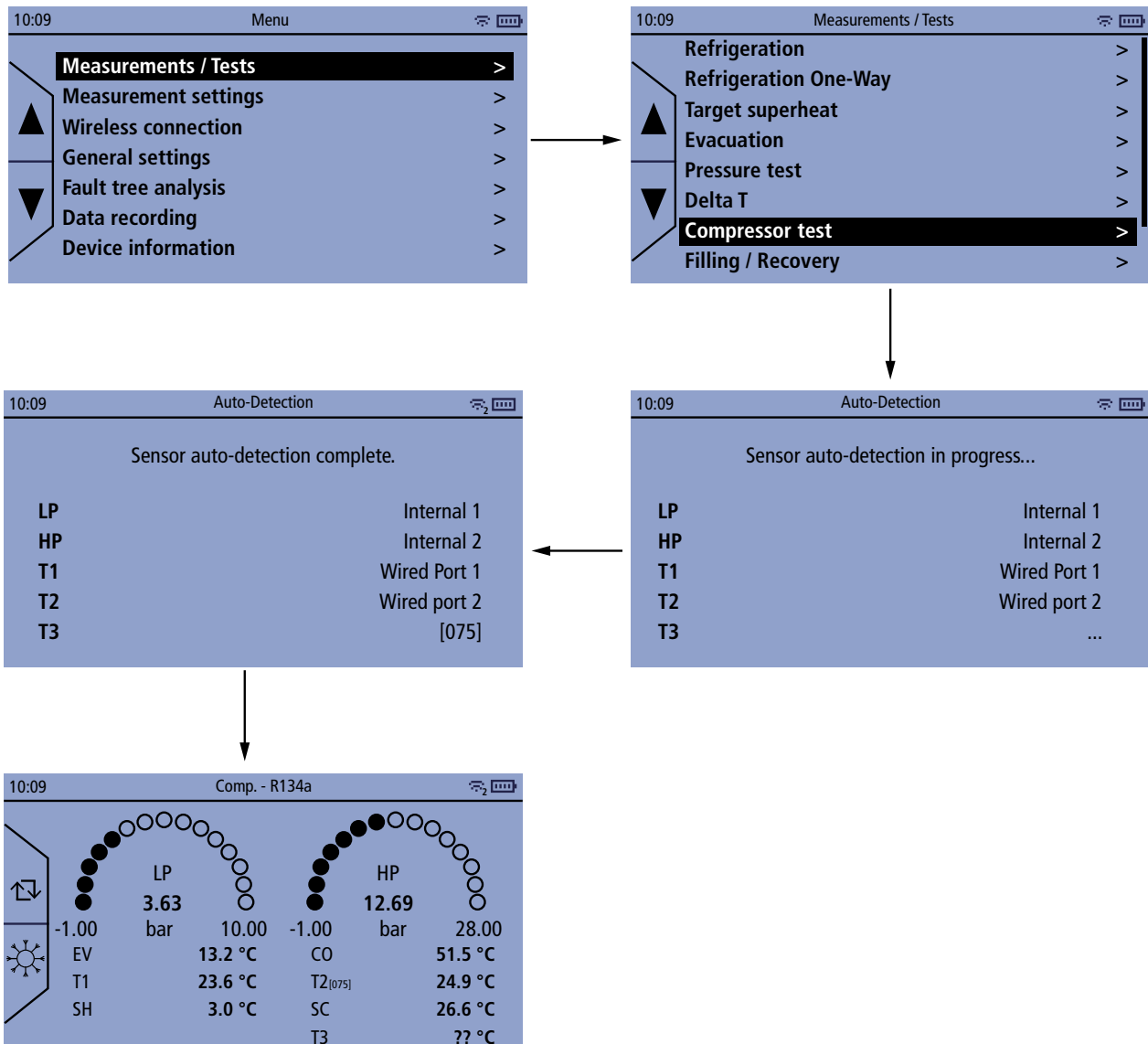
- Press OK on "Delta T" line.
- Press OK on "Next" button.
- Press OK once the manifold has complete the auto-detection.
- Temperatures are displayed:
 - T1 temperature
 - T2 temperature
 - Delta T: T1 - T2

13. Compressor test

The compressor test function allows to check that the compressor of the refrigeration system is operating correctly (depending on the inlet and outlet temperatures).



Two temperature probes are needed to perform this measurement. We recommend using Si-RT2, Si-RT5 and/or Si-RT7 temperature probes.



"Measurements / Tests" menu is displayed.

- Press OK on "**Compressor test**" line.
- Press OK once the manifold has complete the auto-detection.

14.1 Filling the refrigeration system



For the filling function, two temperature probes such as Si-RT2, Si-RT5 or Si-RT 7 and Si-RS1 scale are needed.

- Vacuum the refrigeration system.
- Close the valves of the refrigeration system.
- Connect the high pressure hose between the refrigeration system and the manifold.
- Connect the yellow hose between the gas bottle and the yellow valve of the manifold.

"Measurements / Tests" menu is displayed.

- Press OK on "**Filling / Recovery**" line.
- Press OK once the manifold has complete the auto-detection.
- Open the valve of the yellow hose and open the yellow valve of the manifold.
- Open the valve of the red hose and open the red valve of the manifold.

The gas should pass through the manifold indicator glass and the refrigeration system starts to be filled.

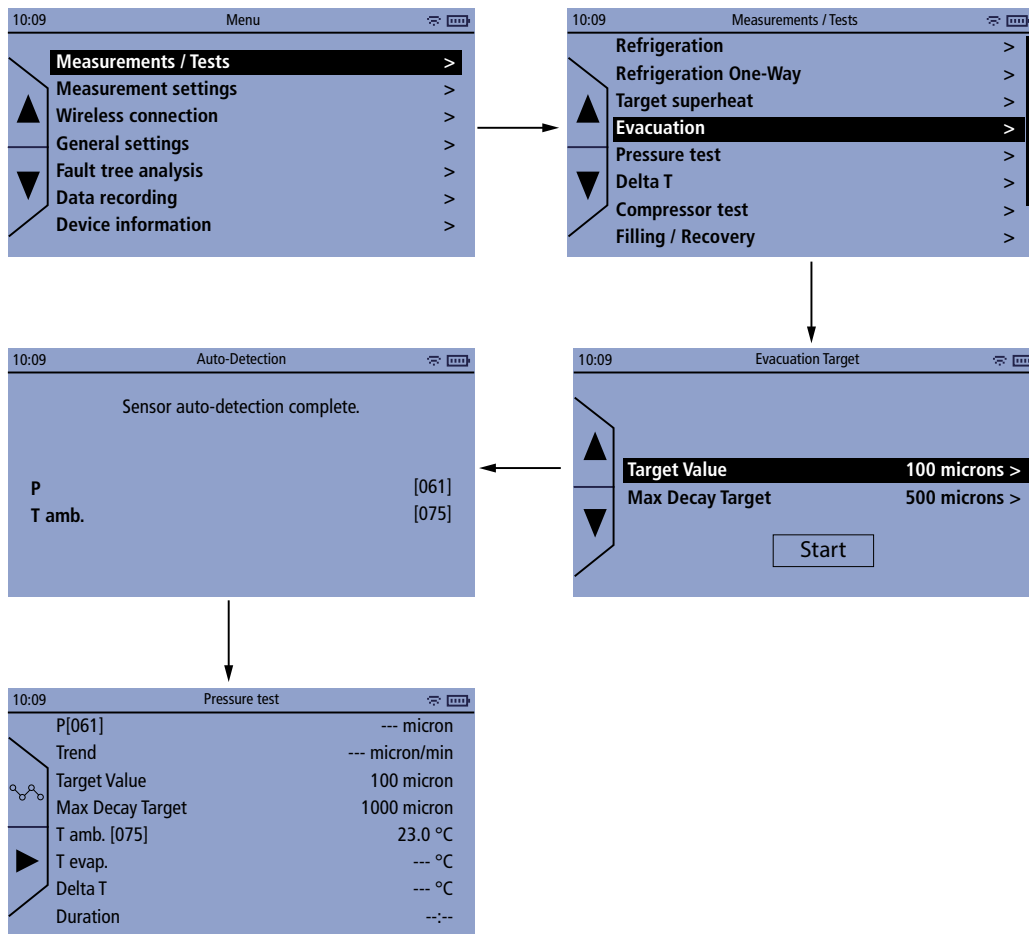
- Once the required gas weight is reached close the valves of the manifold and of the hoses.

15. Evacuation

The Evacuation function allows to eliminate other gases and humidity from the refrigeration circuit.



The Si-RV4 vacuum probe is recommended to perform this measurement.



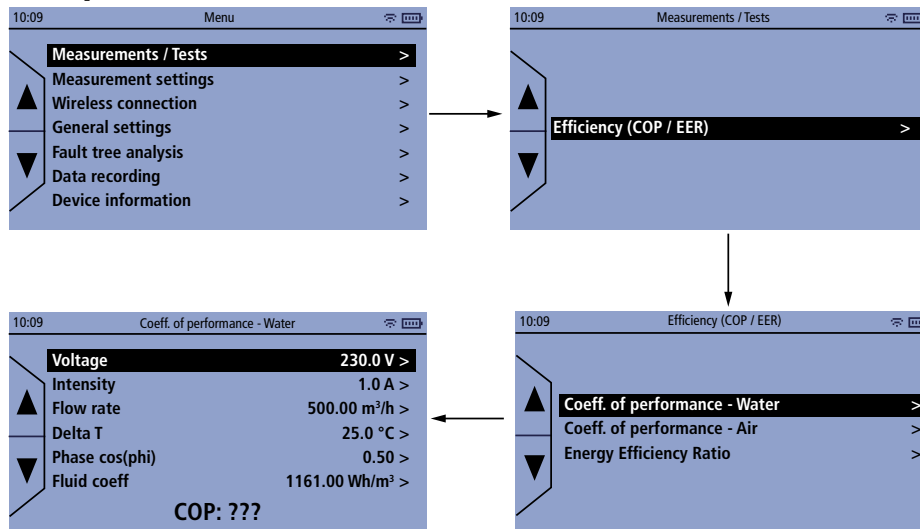
"Measurements / Tests" menu is displayed.

- Press OK on "Evacuation" line.
- Set the target value.
- Set the max decay target.
- Press OK on "Start" button.
- The manifold displays various parameters corresponding to evacuation:
 - Actual pressure
 - Trend
 - Target and max decay target values
 - Ambient and evaporation temperature
 - Delta T
- Press ► to start the evacuation.
The evacuation starts.
- Press to display the target and max decay target values as graph.
- Once the required duration for the evacuation is over, press ■ and results of the measurements are displayed.

16. Efficiency of the installation

The manifold allows to calculate the COP (coefficient of performance) for an installation using water or air and the EER (Energy Efficiency Ratio).

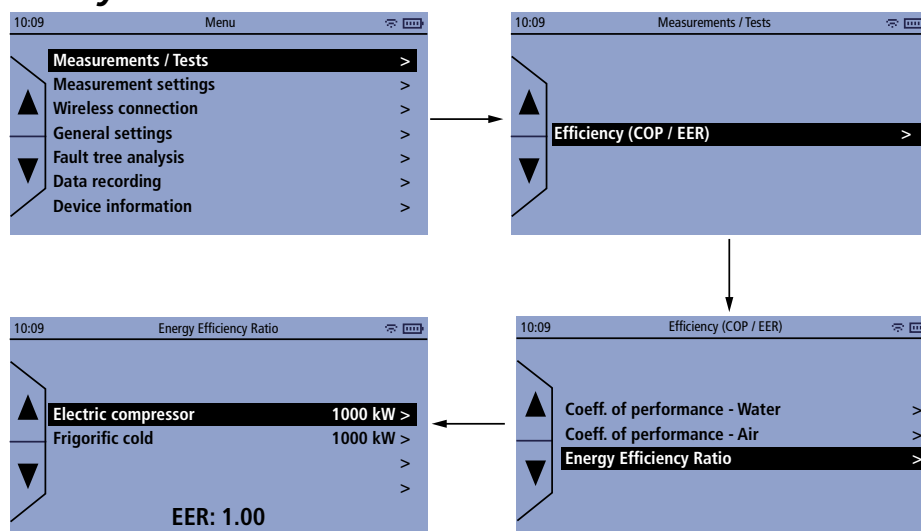
16.1 Coefficient of performance



"Measurements / Tests" menu is displayed.

- Press OK on "Efficiency (COP / EER)" line.
- Press OK on "Coeff. of performance - Water" or "Coeff. of performance - Air" line according to your need.
- Enter manually the following parameter to calculate the COP:
 - Voltage: between 0 and 1000 V
 - Intensity: between 0 and 1000 A
 - Flow rate: between 0 and 1000 m³/h
 - Delta T: between -200 and 200 °C (-328 to 392 °F)
 - Phase cos(phi): between 0 and 1
 - Fluid coeff (What does it mean?)

16.2 Energy Efficiency Ratio



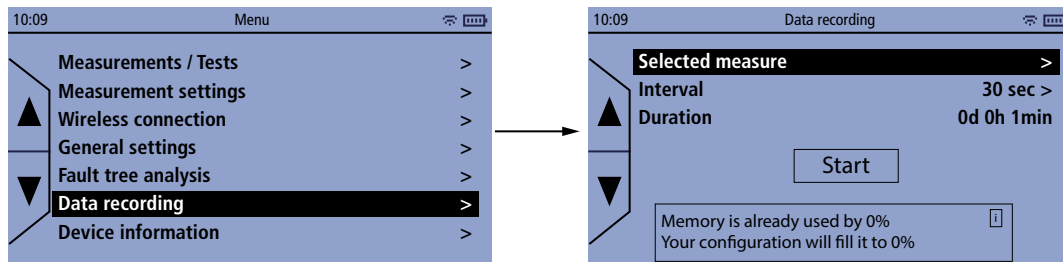
"Measurements / Tests" menu is displayed.

- Press OK on "Efficiency (COP / EER)" line.
- Press OK on "Energy Efficiency Ratio" line.
- Enter manually the following parameter to calculate the COP:
 - Electric compressor: between 0 and 10000 kW
 - Refrigeric cold: between 0 and 10000 kW

17. Data recording

The manifold allows to save measured data in its internal memory. Before starting a data recording features of this recording must be set:

- Selected measures: parameters to be recorded
- Interval: time interval between which the values will be recorded
- Duration: duration of the data recording



17.1 Set data recording features

17.1.1 Select channel to save

"Data recording" menu is displayed.

- Press OK on **"Selected measure"** line.
- Press OK to tick or untick the box corresponding to the channel to save.
- Press OK on **"Validate"**.

17.1.2 Set the measurement interval

"Data recording" menu is displayed.

- Press OK on **"Interval"** line.
- Set the measurement interval between 10 s and 3600 s with **+** and **-** and press OK.

17.1.3 Set the recording duration

"Data recording" menu is displayed.

- Press OK on **"Duration"** line.
- Set the recording duration in day/hour/minute with **+** and **-** and press OK.

17.2 Launch the data recording

Once data recording features have been set, it's possible to launch the recording.

"Data recording" menu is displayed.

- Press OK on **"Start"** line.
The manifold displays a screen showing the channel detection.
- Press OK.

Data recording starts. Measured and saved values are displayed. At the end of the recording, the manifold displays a message indicating the end of the recording.



Saved data can be imported in the Sauermann Pilot app and then exported. Please see the Sauerman Pilot app user manual for further details.



Data recording can be stopped at any time pressing Esc key.

--> si on arrête l'enregistrement en cours est-ce que les données déjà enregistrées peuvent être importées dans l'app?

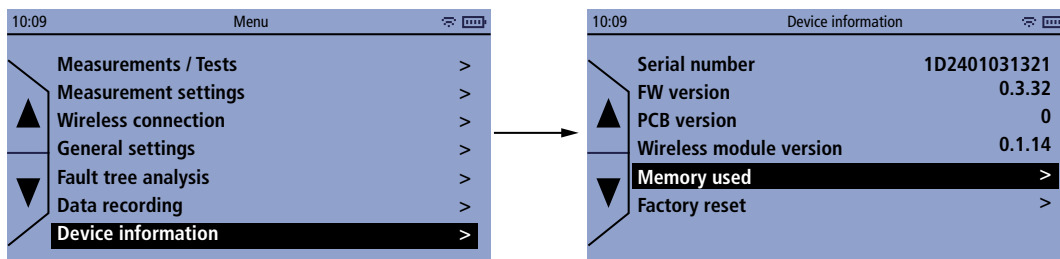
18. Device information


The device information menu allows to access various information about the manifold:

- Serial number
- Firmware version
- PCB version
- Wireless module version
- Memory used
- Factory reset

To access to this menu:

- From the main menu, go to **"Device information"** and press OK.



 In case of a trouble with your device and when contacting the after-sale service or the hotline, serial number, firmware version, PCB version and wireless module version will be useful.

18.1 Information about memory

"Device information" menu is displayed.

- Press OK on **"Memory used"** line.

Memory usage and date of last synchronization are displayed.

18.1.1 Erase memory

"Device information" menu is displayed.

- Press OK on **"Memory used"** line.
- Press OK twice.

The manifold displays a message asking if you really want to delete data.

- Press OK to confirm or Esc to cancel.



Erased data can not be recovered!

18.2 Reset instrument from factory settings

It's possible to reset the manifold to factory parameters.

"Device information" menu is displayed.

- Press OK on **"Factory reset"** line.

The manifold displays a message asking if you are sure to back to factory settings.

- Press OK to confirm or Esc to cancel.



The manifold will be reset to original delivery settings. All your configurations will be deleted.

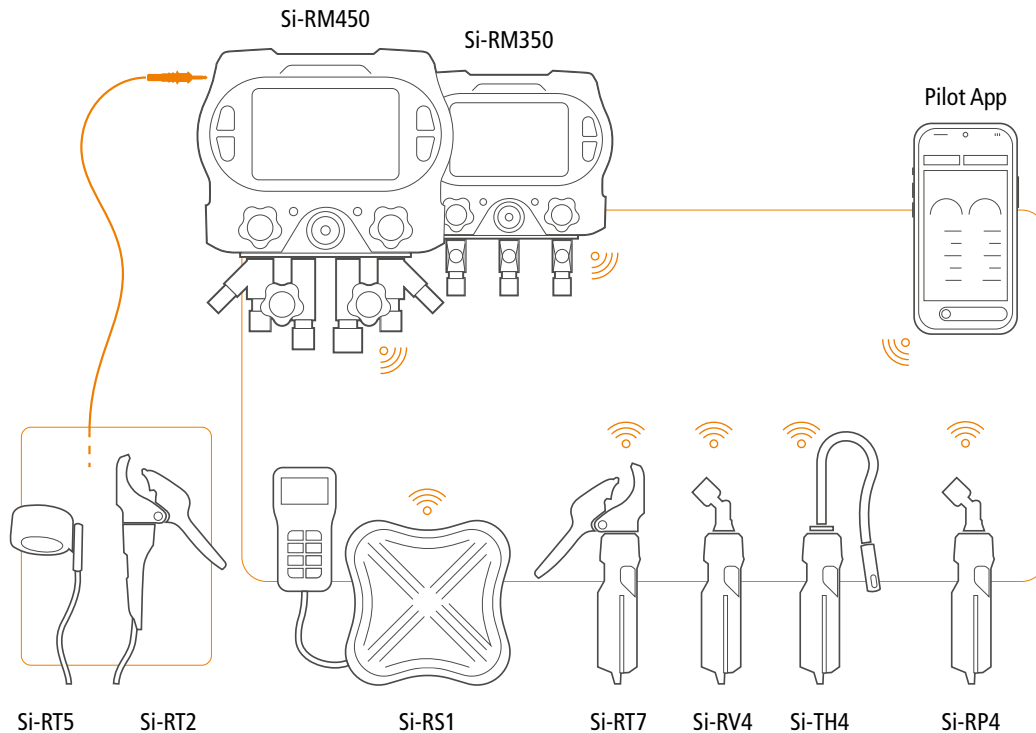
Units and values of measurement settings of the factory setting:

Feature	Default value
Language	English
Temperature compensation	Activated

Ambient temperature compensation T1	Clamp
Ambient temperature compensation T2	Clamp
Date format	day/month/year
Time format	AM/PM
Wireless communicaiton	Activated
Auto-power off	30 minutes
Backlight	30 seconds

19. Overview of the manifold range

19.1 Overview



19.2 Accessories

Designation	Sales reference	Description
ACC25830	25830	2x connectors for system with R410 and R32. 1/4" MFL to 5/16" FFL
Si-RM6	26141	Extension cable 5 meters length for temp clamp.
Si-RS1	28153	Scale. Measurement range up to 110 kg (243 lbs). Wired remote with display. Wireless connection to manifold. Supplied in hard plastic case.
Si-RVP1-220V	28154	220 V, 85 l/min vacuum pump. 2-stage. Refrigerants: A2L. Ultimate vacuum: 15 microns.
Si-RVP3-220V	28156	220 V, 170 l/min vacuum pump. 2-stage. Refrigerants: A2L & A3. Ultimate vacuum: 15 microns.
Si-RVP1-110V	28155	110 V, 3 CFM vacuum pump. 2-stage. A2L refrigerants. Ultimate vacuum: 15 microns.
Si-RVP2-110V	28157	110 V, 6 CFM vacuum pump. 2-stage. Suitable for A2L. Ultimate vacuum: 15 microns.

20. Maintenance and precautions for use

20.1 Maintenance

Please avoid any aggressive solvents. Please protect the manifold, its connections and the hoses from any cleaning product containing formalin, that may be used for cleaning rooms or ducts.

20.2 Cleaning

- If the manifold housing is dirty, use a damp cloth to clean it.
- The connections must be clean and free of grease and other residues. If needed, use a damp cloth to clean them.
- Check regularly that the valve inlets are not blocked by oil/fluid residues. If needed, remove these residues before using the manifold.

20.3 Precautions for use

Please always use the device in accordance with its intended use and within parameters described in the user manual in order not to compromise the protection ensured by the device.

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BE CAREFUL! Material damages can happen, so please apply the precautionary measures indicated.