REFMATE

4688001 4688129

- Instruction manual
 Digital manifold
- Bedienungsanleitung
 Digitale Monteurhilfe
- **Manuel d'utilisation**By-pass digital
- IT Istruzione d'uso
 Gruppo manometrico digitale
- Manual de instrucciones
 Analizador digital

Acknowledged globally



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1 Introduction

Congratulations on your purchase of this device.

Latest manual is available on www.refco.ch

2 General information

Before you start working with the manifold, please read the operating instructions carefully. They contain important information for the successful operation, maintenance and disposal of the manifold.

Conformity

CE	This device complies with the relevant European directives. The Declaration of Conformity is available from the specified contact details or on the REFCO website.	
	This device complies with Part 15 of the FCC Rules. It should be operated under the following conditions:	
FC	 (1) This device may not cause harmful interference, and (2) This device must be able to withstand interference, including interference that may result in errors during operation. 	
	FCC ID: XPYNINAB1	
	This device complies with Industry Canada's licence-exempt RSS standards.	
	It should be operated under the following conditions:	
IC	 (1) This device may not cause harmful interference, and (2) This device must be able to withstand interference, including interference that may result in errors during operation. 	
	IC ID: 8595A-NINAB1	

A	RCM: Regulatory Compliance Mark
	This device complies with the requirements of the RCM regulations.
	RoHS: Restriction of Hazardous Substances
	This device meets the requirements of the RoHS EU directive.
RoHS	RoHs 2011/65/EU including 2015/863/EU
	The device does not contain any prohibited substances above the maximum permissible values.
DEACH	In accordance with article 33 of REACH Regulation 1907/2006, we confirm that this device and its packaging complies with article 57 of REACH Regulation 1907/2006.
REACH	This device and its packaging do not contain any of the SVHC specified in the current candidate list (Article 59) at concentrations above 0.1%.

Important safety instructions

Please read and follow all safety instructions carefully.

Explanation of symbols:

Warning!



... indicates a potentially hazardous situation which, if not avoided, may result in serious injury.

Danger!



... indicates an electrical hazard. Failure to observe the safety instructions may result in serious or fatal injury.

Safety instructions:



The manifold may not be used for other purposes outside the air-conditioning and refrigeration sector.



The manifold must not be used for pressures higher than 60 bar / 870 psi / 6000 kPa / 6 MPa.



Under no circumstances should the manifold be used as a pressure reducing valve, especially when nitrogen N_2 is used.



The manifold must not be used with the refrigerant ammonia $(NH_3 / R717)$ and not in EX zones.



The manifold must not be exposed to rain or used in damp or wet environments.



Always wear protective goggles and gloves when working with the manifold.







REFCO products have been specially designed and manufactured for use by trained refrigeration technicians. Due to the high pressures and chemical and physical gases used in refrigeration systems, REFCO disclaims all responsibility and liability for accidents, injuries and death.



REFCO expressly points out that the products should only be used by professionally trained specialists.

Intended use

The manifold has been developed for measuring and regulating the pressure and temperature conditions in mobile and stationary refrigeration systems and heat pumps as well. Only trained refrigeration technicians are permitted to use this REFCO product.

3 Specifications

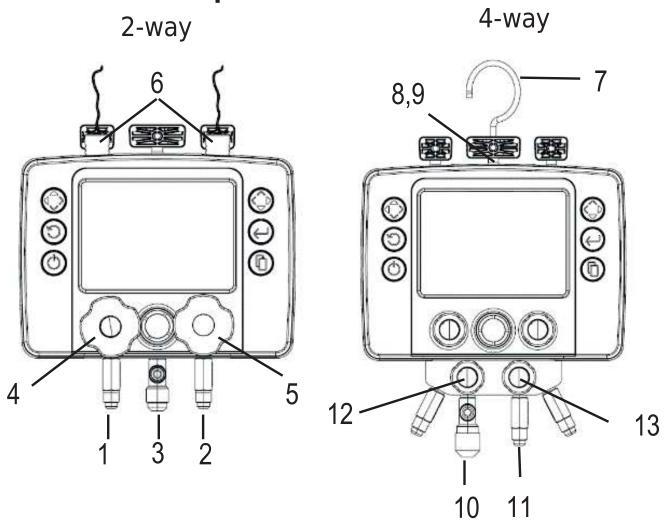
Property	Value			
Pressure range	-0.95 to 60 bar			
Max. overpressure	80 bar	80 bar		
Pressure accuracy	±0.5 (class 0.5)	±0.5 (class 0.5)		
Pressure units	bar / psi / kPa / MPa / kg/	cm²		
Pressure resolution	0.01 bar / 0.5 psi / 1 kPa 0.01 kg/cm ²	0.01 bar / 0.5 psi / 1 kPa / 0.001 MPa / 0.01 kg/cm ²		
External temperature sensor	Temperature range	-40°C to +125°C / -40°F to +257°F		
	Connector	K-type		
	Temperature accuracy	+/- 1 K		
	Resolution	0.1°C / 0.1°F		
Temperature clamp	Temperature range	-40°C to +125°C / -40°F to +257°F		
	Connector	K-type		
	Temperature accuracy	+/- 1 K		
	Resolution	0.1°C / 0.1°F		
	Tube diameters temperature clamp	6 mm to 38 mm 1/4" to 1 1/2"		
	Tube diameters wireless temp. clamp	6 mm to 42 mm 1/4" to 1 5/8"		
Ambient temperature	-20°C to +50°C / -4°F to	-20°C to +50°C / -4°F to +122°F		
Power supply	4 x 1.5 V AA/Mignon/LR6	4 x 1.5 V AA/Mignon/LR6 or USB		
Storage temperature	- 20°C to + 60°C / -4°F to	- 20°C to + 60°C / -4°F to +140°F		

4 Product and part description

The following parts are included in the delivery:

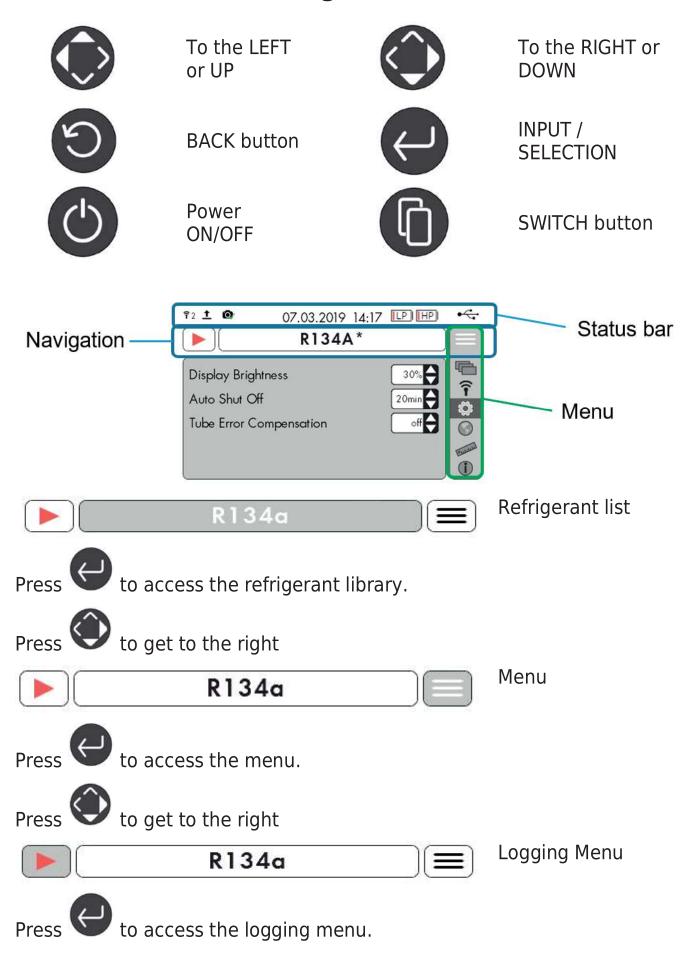
Included in standard version	Other accessories
Digital manifold	2 K-type temperature clamps
2 K-type temperature sensors with	with 1.5 m-long cable
1.5 m-long cable	2 K-type wireless temperature clamps
5 filling hoses	Clamps
4 x AA batteries	
Micro SD card 8 GB (inserted in device)	
Plastic case	
Operating instructions	
Calibration record	
USB-Cable 1.8 m	

4.1 Part description



1.	Low pressure connector 1/4" SAE	To connect a hose
2.	High pressure connector 1/4" SAE	To connect a hose
3.	Refrigerant / vacuum connector 1/4" SAE	To connect a hose
4.	Low pressure valve (blue)	Turn to the left to open or turn clockwise to close
5.	High pressure valve (red)	Turn to the left to open or turn clockwise to close
6.	K-type socket	Socket for temperature sensor or temperature clamp
7.	Hook	To hang the device
8.	Micro USB connector	Slot for micro USB cable to connect to a computer
9.	SD card connector	SD card slot
10.	Vacuum connector 3/8" SAE	To connect a hose
11.	Refrigerant connector	To connect a hose
	1/4" SAE	
12.		Turn to the left to open or turn clockwise to close

4.2 Buttons and navigation



Important notice		
Guarantee date is set within 5 minutes	A one-off extension of the guarantee from the date of initial operation is granted. This date is set the first time the unit is used for more than 5 minutes. This can also be done for presentation purposes at the point of sale and cannot be corrected afterwards!	
Remove AA batteries from REFMATE after use	The leakage of chemicals from batteries will destroy the REFMATE. If the device is not going to be used for a longer period of time, the AA batteries must be removed from the REFMATE. The leakage of chemicals is not covered by the guarantee.	
Leave SD card in the REFMATE	We recommend leaving the SD card in the REFMATE to prevent the loss of the card!	

5 Transport, packaging and storage

5.1 Transport

The digital manifold comes with a plastic case to protect the parts. The plastic case protects against vibrations during transport and handling. Always use the plastic case to protect the manifold and accessories and secure it to the cargo area during transport. The storage conditions must also be maintained during transport.

5.2 Packaging

The plastic case is made of polyethylene and protects the digital manifold from drop damage. It also has room for accessories, which comprise the temperature sensors included in the delivery as well as the temperature clamps, wireless temperature clamps and a vacuum sensor.

5.3 Storage

The storage temperatures must be maintained and the packaging must be closed.

6 Commissioning and functions

6.1 Commissioning

Preparation for commissioning

Insert 4 batteries into the battery compartment on the back. Observe the correct polarity of the batteries. If you will not be using the REFMATE for a longer period of time, remove the batteries from the battery compartment.

Remove the protective film from the display



Start device



After a few seconds, the device will be ready.

Check the battery status

Note: The date and time cannot be changed during the very first 5 minutes.



Zeroing the pressure sensors

Press and hold

The pressure display shows zero







Select refrigerant

Press to access the refrigerant library.

Select the desired refrigerant by

pressing or . To confirm

the selection, press .

Refrigerant favourites

By pressing and holding for at least 3 seconds, you can select favourites.

Favourites are marked with * and appear at the top of the list.

Remove favorite by pressing and

holding for at least 3 seconds.

6.1.1 Analogue display



Superheat and Subcool

By pressing ①

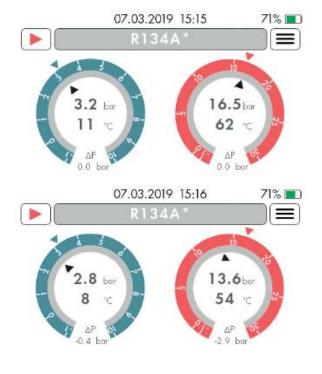
you can switch between the digital and analogue displays.



Slave pointer

The pointer remains in the outer ring of the analogue display at the highest pressure reached.

	No reading/value
OOR	Out of range
ОСР	Over critical point
no cal.	Device not calibrated



Set reference pressure

To set a reference pressure, press

and hold for 3 seconds.

The pressure difference is also displayed.

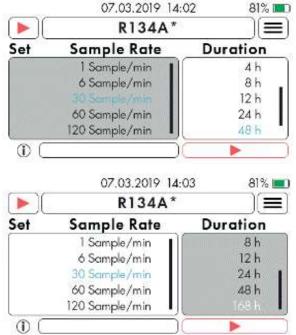
To delete the reference pressure,

press and hold for 3 seconds.

The two above-mentioned functions are only available in the analogue display.

6.1.2 Logging data







Logging data

Make sure that there is an SD card in the designated slot.

In the navigation, go with







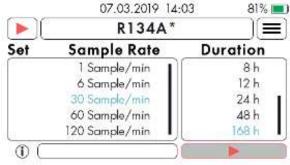
and press . Select the

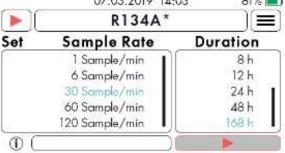
sampling rate by pressing **C**:



Values between 1-120 sample/min

(Sample/min = measuring points / minute)





07.03.2019 14:04

R134A

0.00 bar

-26.2 °C



81%

0.00 per

-26.2



Values between 15 min-168 h

Start recording with

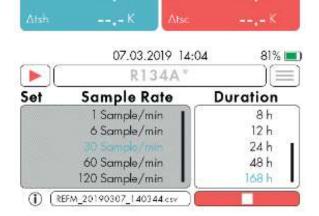




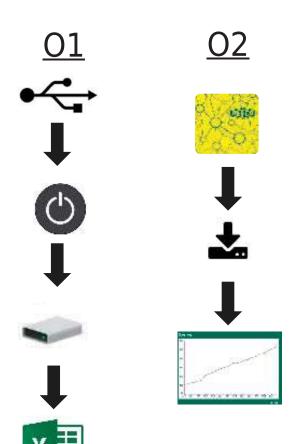


The file name is automatically created and displayed.

During recording, refrigerant selection and settings are locked.



To stop the recording prematurely, go to and press



Evaluating data

Option 1

Connect the device to a computer using a USB cable.

Switch on your REFMATE.

The device is displayed as a USB drive.

The data is available as Excel files in csv format.

Option 2

Data transfer to the app:

Open the app and select Transfer

logged data . Select the desired file.

View the time elapsed.

6.1.3 Menu **(≡**







Field calibration with reference pressure

In the navigation, go with to and press .

Use the tab to carry out the field calibration of the pressure sensors.

To start the calibration, enter the PIN.

The PIN is 0-0-0-9

The device must not be pressurised at this time!

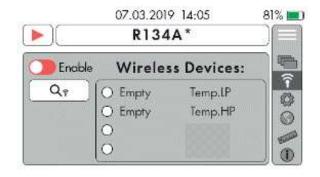
Press 🔽

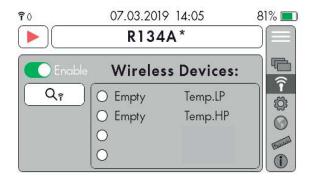
Connect the device to a system with a defined pressure.

Pressure range: 10-60 bar, 150-850 psi

The higher the calibration pressure, the more accurate the calibration!

Wait until the calibration pressure corrensponds to the reference pressure. By clicking the respective pressure sensor is calibrated.











Connections

See the tab for the available wireless connections.

Under "Enable" you can activate the connection.

Use to search for connections and connect automatically.

To connect to Wireless
Temperature Clamps, choose in
the Clamps the Clamp names T1
for LP and T2 for HP.

Once connected, devices are stored and automatically connected when the wireless function is switched on.

The number of connected devices is shown at the top left of the display. An additional battery indicator will appear if the wireless temperature clamp requires a battery change.

Meaning of the colour display:

Green: Device connected

Yellow: Wireless clamp connected and temperature sensor plugged in.

The plugged-in sensor has priority and is displayed.

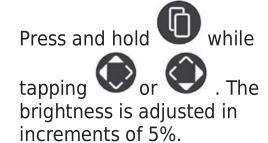
Red: Stored device not connected.

General settings

Use the tab for various setting options.

The display brightness can be adjusted as required.

Quick function:

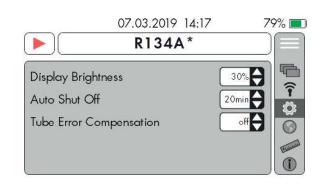


The time to auto power off is set under Auto Shut Off. This function can be deactivated.

Setting options: 1-60 min and off

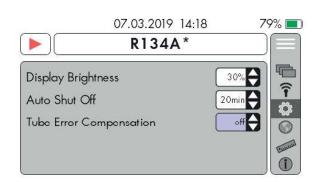
Tube Error Compensation is a temperature correction function that offsets the measurement error from the tube to the refrigerant.

This function can be switched "On" or "Off".

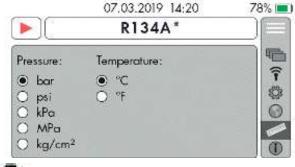
















Time and language settings

The tab offers various country-specific settings.

You can select time, date and language.

The default language is English.

Unit settings

See the tab for the pressure and temperature units.

Print screen quick function

By pressing and holding for 5 seconds, a screenshot of any screen can be created.

The file is stored on the SD card as a bitmap.

Screenshot successful

Screenshot not successful

The files can be used as described in the Evaluating data section.

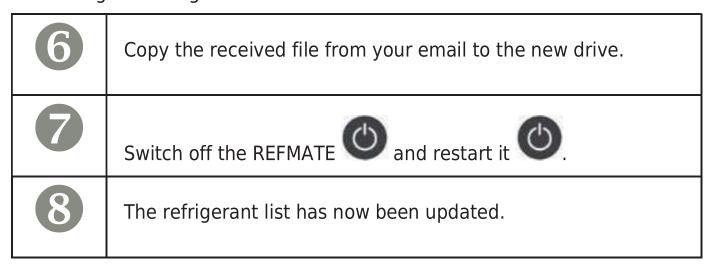
7 Maintenance

The digital manifold requires maintenance work when used regularly:

- Clean the screen and the housing surface with a cloth and cleaning agent.
- Do not use corrosive cleaning agents or solvents to clean the unit. Weak household cleaners and soap suds may be used.
- The connectors and filling hoses must be visually inspected for mechanical damage before each use and replaced if damaged.
- The seals of a manifold are naturally subject to mechanical and ageing-related wear and tear. The manifold must therefore be checked regularly by the user for leaks.
- If any valves are leaking, the piston must be replaced (M4-6-04-R/10).
- The REFCO special tool M4-6-11-T must be used to change the sight glass on the manifold.

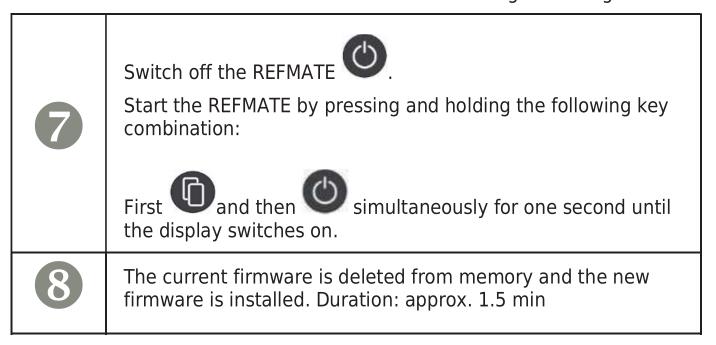
7.1 Refrigerant update

1	Log in to the App and go to the device upda	ate section.
2	Under refrigerants you will find the latest refrigerant versions.	
3	Select the latest refrigerants and email them to yo	ourself.
4	Connect the REFMATE to your PC via USB cable.	•<
5	When the REFMATE is turned on, a new drive appears in the explorer.	•



7.2 Firmware update

1	Log in to the App and go to the device update section.
2	See firmware for the latest version.
3	Select the latest firmware and email it to yourself.
4	Connect the REFMATE to your PC via USB cable.
5	When the REFMATE is turned on, a new drive appears in the explorer.
6	Copy the received file from your email to the new drive.



8 Troubleshooting

	Problem	Action
	No temperature is	Measuring range exceeded
	displayed	Change area of application or replace the temperature sensors
ing	Pressure is displayed incorrectly and can no longer be set to 0 in atmosphere	Calibrate the pressure sensors
Measuring	Battery life is not sufficient for testing	Power the device via USB with a power bank or power supply unit with USB connection
	No recording is displayed	No memory inserted
		Micro SD card must be inserted before switching on
		Micro SD card memory is full
Logging	SD card is not being read	Use a high-quality industrial SD card. Support will be given to: • SDSC bis 2GB • SDHC 2GB-32GB • SDXC 32GB-2TB

	Logging-file is not opened correctly in Excel	Set the settings for the list separator to semicolon ';'. You find it in the system control in the settings for the number format.
ıt	Screenshot could not be created	No memory inserted
		Micro SD card must be inserted before switching on
Print		Micro SD card memory is full
	Bluetooth connections to wireless temperature clamp not possible	Enable Bluetooth on the temperature clamp, enable Bluetooth on the REFMATE
Connect		Test in free field conditions without interference from radio obstructions
		Set the temperature clamp to T1 and T2
Mechanics	Hook falls out	Push hook back in again
	Knobs are not fix anymore	Replace the knobs, see spare parts
	Flexible hoses cannot be attached anymore	Is the thread broken at the flange, replace the flange, see spare parts
Other	Program freezes	Remove the battery, put it back and restart the REFMATE
	It takes a long time to start the device	Delete the firmware and new refrigerant from SD card

9 Guarantee

Your new, state-of-the-art REFMATE has been developed in accordance with the latest findings in occupational physiology and ergonomics. REFCO Manufacturing Ltd has been certified according to DIN EN ISO 9001:2008. Regular quality control checks as well as an accurate manufacturing process guarantee reliable functionality and are the basis for the REFCO guarantee, in accordance with the General Terms and Conditions of Sale and Delivery applicable on the day of delivery. Excluded from the guarantee are damages caused by obvious maltreatment and wear and tear.

10 Return and disposal

The REFMATE manifold has been developed for long-term use. Attention was paid to energy saving and environmental compatibility at the material procurement and production stages. REFCO Manufacturing Ltd feels responsible for its products throughout their entire lifespan and has therefore been certified in accordance with DIN EN ISO 14001:2004. When decommissioning the device, the user should observe their country's applicable disposal regulations.



The housing is made of ABS and TPE, the pressure-bearing metals are aluminium and brass. The plastic case is made of PE.