INSTRUCTIONS

HVAC/R
Service Products

REFCO

DIGIMON-SE
DIGIMON4

Installation and operating guide
Digital Manifold

Instruction manual
2-way and 4-way digital manifolds

DIGIMON4

1. Low pressure anchor ¼“ SAE
2. High pressure anchor ¼“ SAE
3. Vacuum anchor ¼“ SAE or 3/8“
4. Refrigerants anchor ¼“ SAE
5. Low pressure valve (blue)
6. High pressure valve (red)
7. Vacuum valve (yellow)
8. Refrigerants valve (black)
9. 2 external K-type thermocouples
10. Clamp thermocouple K-type (optional) P/N 4681466
11. External vacuum sensor DIGIMON-VAC (optional) P/N 4686713

Contents

Important safety notice 3
Purpose and use 3
Scope of delivery 4
Transport 4
Important note 4
Technical description 4
Key functions 6
Battery charge level indicator 6
Application 7
Connecting the manifold 12
Evacuating the system 12
Filling the system 13
Measuring using the Superheat / Subcool modes 14
Maintenance work on the manifold 14
Guarantee 14
Environmental issues 15
Replacement parts and accessories 15
Resetting pressure sensors 16
Factory settings 16
Resetting the external vacuum sensor 16
Calibrating pressure sensors 17
Calibrating the temperature display 18

Important safety notice

⚠ **Before working with the manifold, please read the instruction manual carefully. This manual provides important information regarding the smooth operation, maintenance and disposal of the manifold.**

Purpose and use

The manifold has been developed for measuring and adjusting pressure and temperature in both mobile and stationary refrigeration equipment.

⚠ The manifold **must not** be used for anything other than the above-stated purposes.

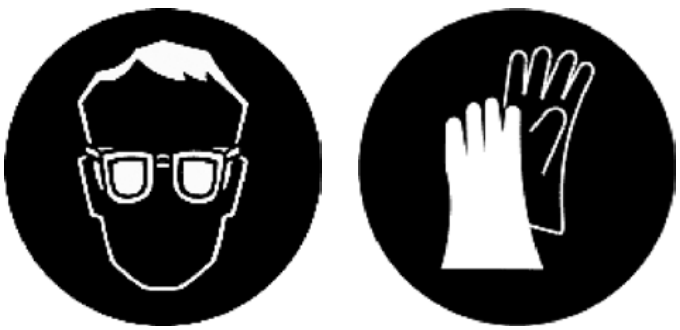
⚠ The manifold **must not** be used with pressures higher than 60bar / 870psi / 6000kPa / 6MPa.

⚠ **Under no circumstances** should the manifold be used as a pressure regulator, especially not when using nitrogen N_2.

⚠ The manifold **must not** be used with the refrigerant ammonia (NH_3 / R717).

⚠ The manifold **should not** be exposed to rain or used in damp or wet environments.

⚠ Protective goggles and gloves must **always** be worn when using the manifold.



⚠ REFCO products have been specially designed and manufactured for use by trained refrigeration and air-conditioning service engineers only. Due to the high pressures and the physical and chemical gases used in refrigeration systems, REFCO cannot be held liable or responsible for any accidents, injuries or deaths arising during use of the manifold. REFCO explicitly states that their products must only be sold to professionally trained experts.

Scope of delivery

Information about the various models and variations of our products can be found in the REFCO catalogue or at www.refco.ch.

Transport

The manifolds are delivered from the factory in a plastic box, with or without filling hoses. Manifolds are high-grade instruments and should always be transported and stored in a box.

Important note:

Remove refrigerants from the manifold and the hoses after use.

The hose connectors hanging freely from the manifold (screw joints / system side) can be screwed onto the Y-connectors and to the central T-piece, when not in use. This serves to protect the thread from contamination and damage.

Technical description

The DIGIMON can be used with the following refrigerants:
R11, R113, R114, R12, R123, R124, R13, R134a, R13B1, R22, R227, R23, R290, R32
R401A(Liq), R401A(Vap), R401B(Liq), R401B(Vap), R402A(Liq), R402A(Vap),
R402B(Liq), R402B(Vap), R403B(Liq), R403B(Vap), R404A, R406A (Liq), R406A(Vap),
R407A(Liq), R407A(Vap), R407C(Liq), R407C(Vap), R407F(Liq), R407F(Vap),
R408A(Liq), R408A(Vap), R409A(Liq), R409A(Vap), R410A, R413A(Liq), R413A(Vap),
R414B(Liq), R414B(Vap), R416A, R417A(Liq), R417A(Vap), R420A, R422A(Liq),
R422A(Vap), R422B(Liq), R422B(Vap), R422C(Liq), R422C(Vap), R422D(Liq),
R422D(Vap), R427A(Liq), R427A(Vap), R437A, R438A(Liq), R438A(Vap), R500,
R502, R503, R507, R508A, R508B, R600A, R744, R1234yf, R1234ze

(Liq) = liquid / bubble point, (Vap) = vapour / dew point

Property	**Value**	
Maximum working pressure:	Low pressure: 60bar */ 870psi / 6000kPa / 6MPa* High pressure : 60bar */ 870psi / 6000kPa / 6MPa*	
Pressure resolution:	0.01 bar */ 0.5psi / 1kPa / 0.001MPa*	
Pressure units:	bar */ psi / kPa / MPa*	
Positive pressure display:	0 to 60bar, *up to 870psi, up to 6000kPa, up to 6MPa*	
Negative pressure display:	0 to -0.95bar, *0 to -13.7psi, 0 to -95kPa, 0 to -0.095MPa*	
Accuracy class:	Class 1.0	
External thermocouple:	Temperature range:	-40°C to +125°C */ -40°F to +257°F*
	Plug:	K-type
	Accuracy of measurement:	+/- 1°K
	Resolution:	0.1°C */ 0.1°F*
Optional clamp thermocouple K-type	Temperature range:	-40°C to +125°C */ -40°F to +257°F*
	For pipe diameters of:	6mm to 38mm */ ¼“ to 1 ½“*
	Plug:	K-type
	Accuracy of measurement:	+/- 1°K
	Resolution:	0.1°C */ 0.1°F*
Ambient temperature:	0°C to +50°C */ +32°F to +122°*	
Power supply:	4 x 1.5 V AA / Mignon / LR6 batteries Service life of approx. 50 hours when used continuously.	
Storage temperature:	- 20°C to + 60°C / *-4°F to 140°F*	

Vacuum display without vacuum sensor

Property	**Value**	
Vacuum display:	Bar diagram display	1 bar ca. 0 to -300mbar 2 bars ca. -300 to -380mbar 3 bars ca. -380 to -460mbar 4 bars ca. -460 to -540mbar 5 bars ca. -540 to -620mbar 6 bars ca. -620 to -700mbar 7 bars ca. -700 to -780mbar 8 bars ca. -780 to -860mbar 9 bars ca. -860 to -920mbar 10 bars ca. -920 to ultimate vacuum

Vacuum display with external vacuum sensor

Property	Value
Range:	0 to 10000 Microns
Resolution:	0.1Pa / 1Micron / 0.001mbar / 0.001Torr / 1mTorr / 0.0001psi / 0.0001inHg
Units:	Pa / Micron / mbar / Torr / mTorr / psi / inHg
Accuracy of measurement:	up to 100 Microns +/- 10 Microns
	up to 101 - 750 Microns +/- 45 Microns

Key functions

ON/OFF	Power supply ON/OFF
LP/HP	Switch pressure display function
VAC	Switch vacuum display function
LIGHT	Switch LCD light on/off (switches off automatically after 1 minute)
R +	Select refrigerant, search forwards (select pressure unit)
R -	Select refrigerant, search backwards (select temperature unit)
SUPERH SUBC00L	Switch function ON or OFF
SET	Confirm function / selection

Battery charge level indicator

If the battery is empty, the indicator will display an entirely white battery symbol. The batteries must then be replaced in order to guarantee full function.

Application

Set-up

- Insert 4 batteries in the battery compartment at the back of the device.

Caution: **Ensure the batteries are inserted observing the correct polarities. Do not leave empty batteries in the battery compartment. If you will not be using the DIGIMON for a longer period of time, remove the batteries from the battery compartment.**

- Press the ON/OFF button, the device is now switched on.
- Check battery charge level indicator.

Illuminating the display

Press the LIGHT button to switch the display light on or off. The light switches off automatically after 1 minute.

Automatic shut-off

The DIGIMON switches off automatically approximately 15 minutes after the last measurement or after the last button has been pressed.

Resetting pressure sensors

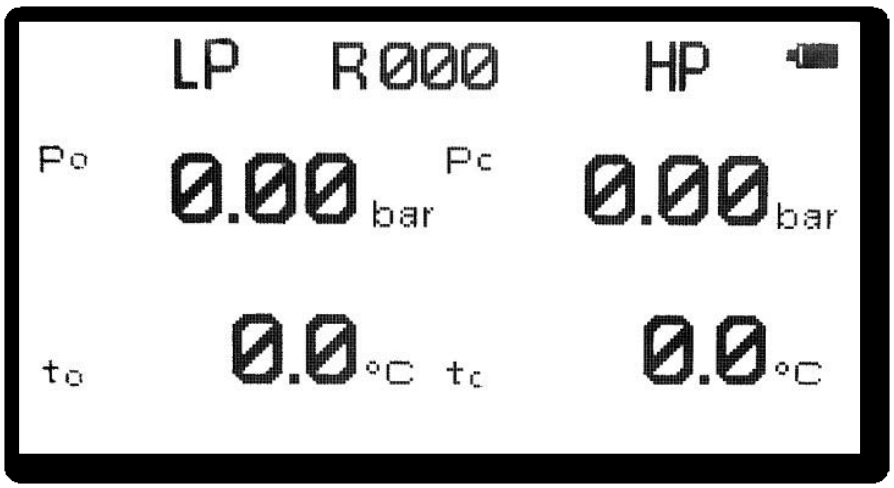
By pressing the SET and LIGHT buttons the DIGIMON pressure displays are reset to zero, in order to avoid incorrect measurement values.

Important note:

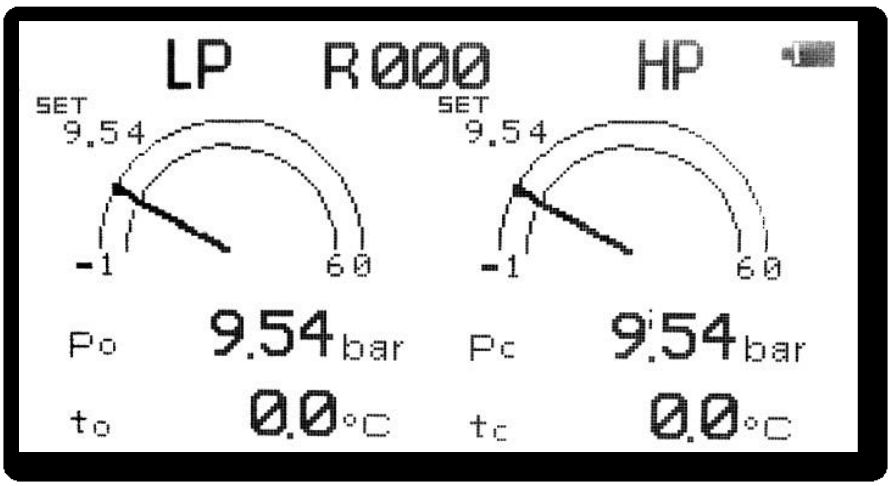
- Depressurise the DIGIMON (remove hoses).
- Open the blue and red valves.

⚠ **To obtain a correct measurement value on the display, the DIGIMON should not be reset when pressurised or under a vacuum.**

Digital display



Analogue display with memory function



Select refrigerant

Press the R + or R - buttons to select the desired refrigerant from the list. During selection, you will see a flashing "R" on the display.

Press the SET button to confirm selection of the desired refrigerant. The "R" no longer flashes on the display.

Important note:

If the refrigerant selection is not confirmed with SET, the previously selected refrigerant will remain active.

Select pressure unit

Hold down the SET button. Use R + to select the desired unit. Release both buttons.

Select temperature unit

Hold down the SET button. Use R - to choose between °C and °F. Release both buttons.

Important note:

The device will save the last pressure and temperature units selected.

Memory function of the analogue pressure display:

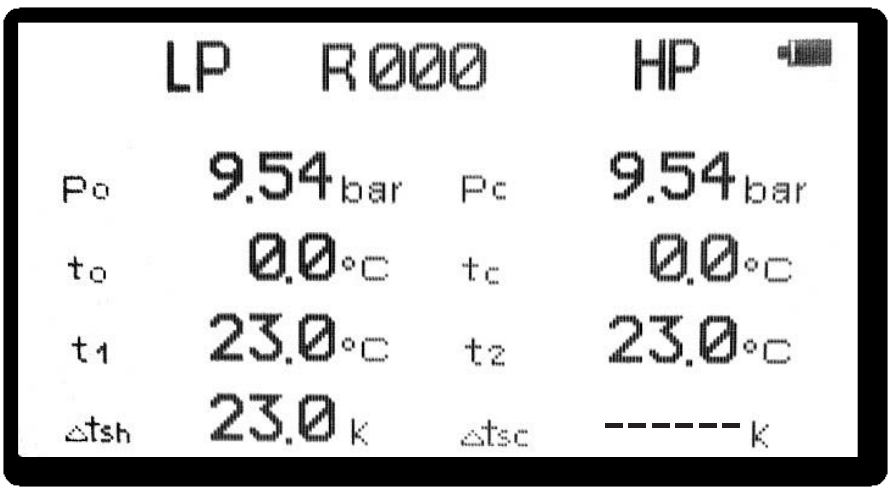
Save value (current measurement value): press the SET and LP/HP buttons at the same time

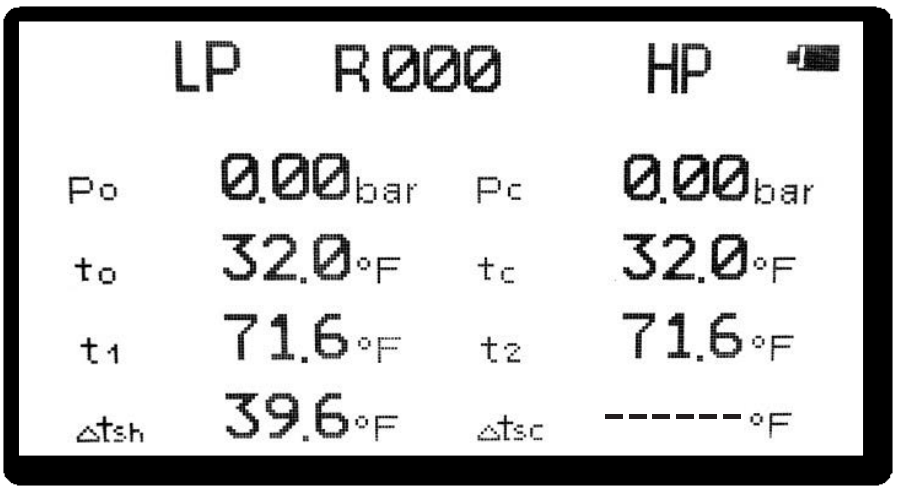
Retrieve memory value: press the LP/HP button for 3 seconds (display freezes)

Clear display: press the LP/HP button for 3 seconds □ saved value is no longer visible

Delete memory value: press the SET and LIGHT buttons at the same time

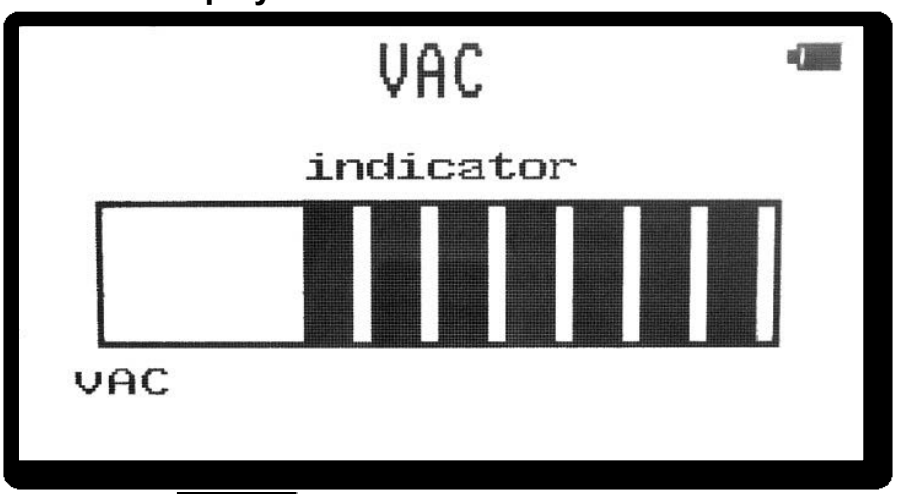
Superheat/Subcool mode





SUPERH
SUBC00L displays the difference "K" (F) between the temperature according to the vapour pressure table (to, tc) and the measured temperature (t1, t2) of the external thermocouples (9) or the clamp thermocouples (10).

Vacuum display



Press the VAC button to bring up the vacuum display.

Vacuum display values

When evacuating the device, a maximum of 10 bars will be displayed. When the display remains stable, the ultimate vacuum has been reached and the evacuation time begins. The display of the ultimate vacuum (10 bars) depends on the vacuum pump's performance and the atmospheric pressure.

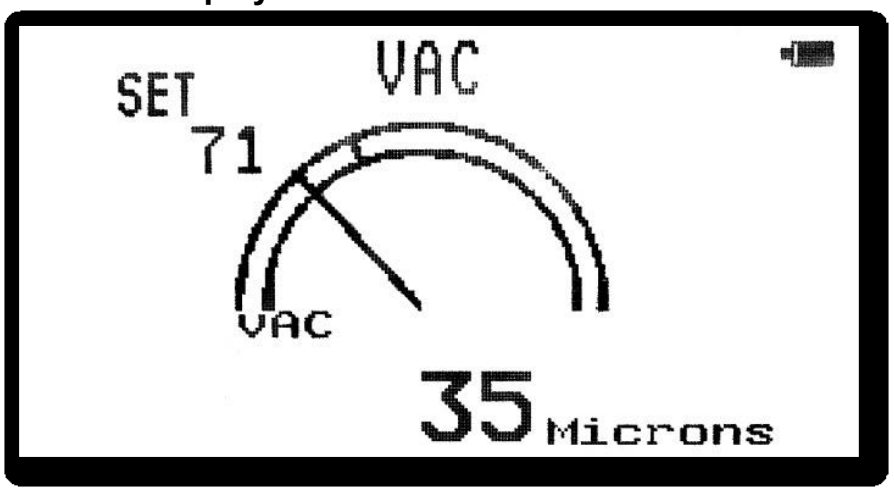
Important note:

The DIGIMON manifold must be switched on before commissioning the attached vacuum pump. The manifold must be switched on during evacuation.

External vacuum sensor (optional)

The external vacuum sensor should be used to measure exact vacuum values. The sensor should be connected to the system.

Vacuum display



Select pressure unit

Hold down the SET button. Use the R + button to select the desired unit. Release both buttons.

Save value (current measurement value): press the SET and VAC buttons at the same time

Retrieve memory value: press the VAC button for 3 seconds (display freezes)

Clear display: press the VAC button for 3 seconds → saved value is no longer visible

Delete memory value: press the SET and LIGHT buttons at the same time.

Connecting the manifold

a) with DIGIMON-SE

- Connect blue hose (1) ⇨ to suction pressure side of system
- Connect red hose (2) ⇨ to high pressure side of system
- Connect yellow hose (3) ⇨ to vacuum pump
- Close both valves (5+6)

b) with DIGIMON4

- *Connect blue hose (1)* ⇨ *to suction pressure side of system*
- *Connect red hose (2)* ⇨ *to high pressure side of system*
- *Connect yellow hose 3/8“ (3)* ⇨ *to vacuum pump*
- *Connect yellow hose 1/4“ (4)* ⇨ *to refrigerant cylinder*
- *Close both valves (5+6)*

Evacuating the system

- Switch on the manifold
- Press the VAC button
- Connect the hoses
- Switch on vacuum pump
- Open all valves
- Check vacuum display
- When the ultimate vacuum is achieved, close all valves.
- Press the LP/HP button to exit vacuum mode.

⚠ **Evacuation time varies depending on the size of the system. A small to medium-sized system requires a minimum evacuation time of 20 minutes.**

Filling the system

a) with DIGIMON-SE manifold

- Disconnect the yellow hose from the vacuum pump and screw it onto the refrigerant bottle or cylinder.
- Open the valve on the refrigerant bottle or cylinder.
- Open the blue valve (5) (low pressure side) and let the required amount of refrigerant to flow in. If the required amount of refrigerant does not flow into the system, the compressor must be switched on.
- After the system has been filled with the desired amount, close the valve on the refrigerant bottle or cylinder.
- Close the blue valve (5).
- Check the system's pressure and temperature!
- Remove the hoses from the system.
- Open valves (5+6).

b) with DIGIMON4 manifold

- Disconnect the yellow hose (3/8“) from the vacuum pump and the DIGIMON4 (3) and screw the caps onto the 3/8“ SAE thread.
- Open the black valve (8).
- Open the valve on the refrigerant bottle or cylinder. Then open the blue valve (5) and allow the required amount of refrigerant to flow in. If the required amount of refrigerant does not flow into the system, the compressor must be switched on.
- After the system has been filled with the desired amount, close the black valve (8).
- Close the valve on the refrigerant bottle or cylinder.
- Open the red valve (6). Check the pressure and temperature on the high and low pressure sides of the system! If all pressures are in order, close all valves.
- Remove the hoses from the system.
- Open all valves.

Measuring using the Superheat / Subcool mode

- See section "Connecting the DIGIMON manifold".
- Plug the K-Type plug of the external thermocouples (9) or the clamp thermocouple (10) into the DIGIMON (sockets on the right (t1) and left (t2) side of the housing).
- Fix the external thermocouple (9) or the clamp thermocouple (10) with adhesive tape to the required measuring point on the high pressure or suction pressure side of the system.
- Set the appropriate refrigerant (see section "Select refrigerant").
- Switch on the temperature difference display: press SUPERHEAT/ SUBCOOL.

Maintenance work on the manifold

- A visual inspection of the connections and filling hoses must be carried out before each use, to check for mechanical damage.
- Do not use aggressive cleaning agents or solvents to clean the device. Gentle household cleaners and soapy water should be used instead.
- Manifold seals are subject to mechanical and age-related wear. Therefore, the manifold should be regularly tested by the user for leaks.
- In case of leaky valves, the piston should be replaced (M4-6-04-R/4).
- The special REFCO M4-6-11-T tool should be used to change the sight glass on the manifold.

 **The manifold should be checked after the replacement of seals to ensure there are no leaks.**

Guarantee

Your new DIGIMON has been developed in accordance with the latest occupational health and ergonomic requirements and reflects the latest state-of-the-art technology. REFCO Manufacturing Ltd has been certified in accordance with 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. Damages arising from obvious maltreatment or wear are excluded from the guarantee.

Environmental issues

The DIGIMON manifold has been developed for long term use. REFCO takes energy saving and environmental impact into consideration when procuring materials and manufacturing its products. REFCO Manufacturing Ltd feels responsible for all of its products throughout their entire lifespan and has therefore been certified in accordance with **DIN EN ISO 14001 : 2004.** When decommissioning the device, users should observe the disposal regulations applicable in their country.

Replacement parts and accessories

Description	Identifier	P/N
Control knob set	M4-7-SET-B+N+R+Y	4687094
Complete valve set	M2-10-95-R/4	4687105
Valve piston	M4-6-04-R/4	4687093
Sight glass set MS	M4-6-11	4491018
Battery compartment cover 2-way	DIGIMON-SE-BATTERY-COVER	4686772
Battery compartment cover 4-way	DIGIMON4-BATTERY-COVER	4686749
Tool for sight glass assembly	M4-6-11-T	4493169
Plastic case	DIGIMON-SE-CASE	4676730
External K-type thermocouple	DIGIMON-SENSOR-K-TYPE	4681394
Clamp thermocouple K-type	DIGIMON CLAMP	4681466
External vacuum sensor	DIGIMON-VAC	4686713

Resetting pressure sensors

By pressing the SET and LIGHT buttons the DIGIMON pressure displays are reset to zero, in order to avoid incorrect measurement values.

⚠ **To obtain a correct measurement value on the display, the DIGIMON should not be reset when pressurised or under a vacuum.**

Factory settings

- Set the DIGIMON to the "**Digital display"** screen.
- Press the LIGHT and VAC buttons at the same time for 5 seconds.
  ⇨ Display shows - - - - - - - -
- Press the SET button to exit.

Resetting the external vacuum sensor

- Switch off the DIGIMON
- Connect vacuum sensor
- Hold down the VAC button and switch on the device using the ON/OFF button.
  ⇨ Display shows **VAC-ZERO**
- Press the SET button to exit □ display shows **End.**
- The device can be switched on using the ON/OFF button and is ready for operation once again.

Calibrating pressure sensors

⚠ **A correct calibration requires a certified monitor.**
(e.g. REF-CLASS-GAUGE P/N 4682293)

1. Switch off the DIGIMON
2. Press down the LIGHT button and switch on the device using the ON/OFF button.

⇨ The display shows "**Password**" **000**

3. Press the R + / R - button to select Code **009**.
4. Press the SET button to exit.

⇨ The display shows **"P-call"**

5. Press the R - button and then the SET button to calibrate.

⇨ **400 psi** should be displayed on the LP side display

⚠ **For a correct calibration, there should be no pressure or vacuum in the DIGIMON.**

6. Press the R + button to select the low pressure side's calibration pressure (400psi).
7. Press the SET button to exit.
8. Wait 3-5 seconds until the pressure is stable and press the SET button again.

⇨ The display shows **"0000"**

9. Pressurise the DIGIMON with a calibration pressure of 400psi (27.58 bar).
   When the pressure is stable, press the SET button to confirm.

⇨ The display shows **"LP End"**

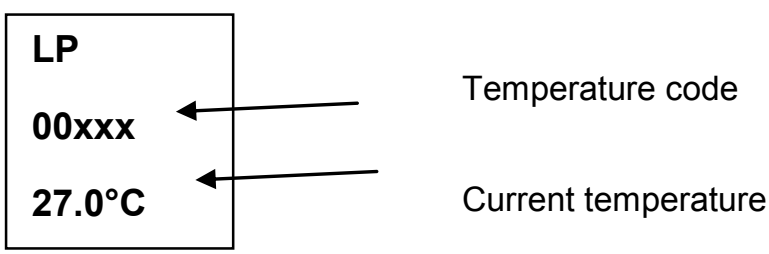
10. The calibration of the low pressure side has been completed.
11. Press the R - button to calibrate the high pressure side (HP) □Repeat from Point 6 or press the ON/OFF button to end the calibration.

Calibrating the K-Type sensors (using room temperature)

1. Switch off the DIGIMON
2. Plug in the thermocouples (K-type).
   Room and measurement temperatures must remain constant at 25 +/-3°C and be stable for at least 20 minutes. The thermocouple cables must be straight (unwound).

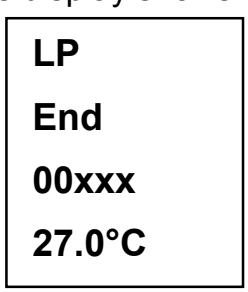
⚠ **During calibration, you should neither touch the cables nor the plugs.**

3. While holding down the LIGHT button continuously, switch on the device by pressing the ON/OFF button once. Continue holding down the Light button until the display shows, "Password" **000**
4. Press the R + / R - buttons to scroll to code **018**.
5. Press the SET button once.
   ⇨ Display shows **"T-call"**
6. Press the R - button once and then the SET button once to enter temperature sensor/clamp calibration mode.
7. During calibration, ensure that both thermocouples are well connected to the DIGIMON.
   ⇨ The display shows (low pressure side)



⚠ **The current temperature displayed on the DIGIMON should not deviate by more than +/-0.5°C from the room temperature.**

8. Press the SET button to confirm.
   ⇨ The display shows:



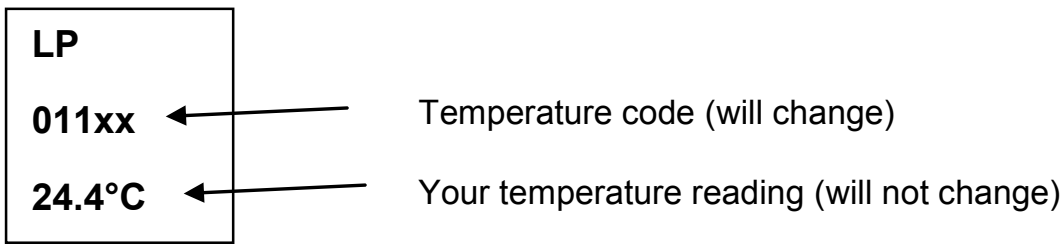
9. Press the R - button to calibrate the high pressure side (HP) ➔ Repeat from Point 6
10. Once both sensors are calibrated, press ON/OFF to exit the sensor calibration mode.

Calibrating the temperature sensors / clamps (0°C / 32°F ice water)

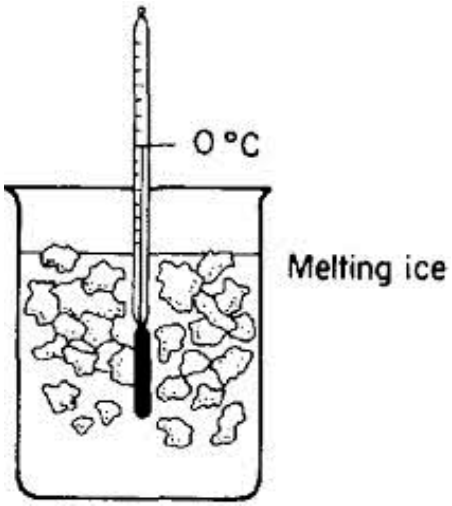
1. Switch **off** the DIGIMON
2. Plug in the thermocouples (K-type).
   The DIGIMON and the thermocouples must remain at a constant room temperature for at least 20 minutes. The thermocouple cables must be straight (unwound).
3. While holding down the LIGHT button continuously, switch on the device by pressing the ON/OFF button once. Continue holding down the Light button until the display shows, "Password" **000**
4. Press the R + / R - buttons to scroll to code number **020**.
5. Press the SET button once.

⇨ Display shows **“T-call0”**

6. Press the R - button once and then press the SET button once to enter temperature sensor/clamp calibration mode.
   During calibration, ensure that both thermocouples are well connected to the DIGIMON.
   ⇨ The display shows (low pressure side)



7. Put both K-Type thermocouples / clamps into (0°C /32°F ice water bath)



<u>Take your time</u>, use lots of ice and stir water often. It can take up to 15 minutes for the ice water temperature to settle exactly at 0.0°C / 32.0°F Use separate accurate thermometer to verify water temp.

For best results use an insulated cup, do not let the sensor tips touch any ice cubes, only the ice water in the top 2-3cm of the ice bath after +/- 15 min. Do not touch or hold the sensor wires.

8. Once the **temperature code** reading is steady press the SET to confirm.

⇨ The display shows:

LP

End

011xx

24.4°C

Please remember that all K-type thermocouples are only accurate to +/-1.0°C

9. Press the R - button to calibrate the high pressure side (HP) ➔ Repeat from Point 6
10. Once both sensors are calibrated, press ON/OFF to exit the sensor calibration mode.
11. Check your work. Turn on DIGIMON, press Superheat/Subcool button. Read T1 and T2 temperature readings with sensors in the same ice bath. They should be within +/- 1.0°C of 0.0°C

HVAC/R
Service Products

REFCO Manufacturing Ltd.
Industriestrasse 11
6285 Hitzkirch - Switzerland

Telefon +41 41 919 72 82
Telefax +41 41 919 72 83

info@refco.ch
www.refco.ch

4686731 - 0916