MICRODAM

New Digital Manifold

MDM008A

www.microdam.co.kr

SUNGSHIN HASCO

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Head Office

Gyeongsan Factory : 65, Gongdan 7-ro, Jillyang-eup, Gyeongsan-si, Gyeongbuk, Korea, 38465

Gimpo Factory : 21, Hagunsandan 2-ro, Yangchon-eup, Gimpo-si,Gyeonggi-do, 10049

Tel. +82-53-853-8826, 8827 **Fax.** +82-53-853-8828

MICRODAM

New Digital Manifold
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User Instruction Manual

※ Please read and fully understand the User Instruction Manual before installation, operation and maintenance of this equipment.
※ This product is a model made for use in the Republic of Korea only.

New Digital Manifold
NEW MDM008A

New Digital Manifold Case

SUNGSHIN HASCO ISO 9001:2015 CE Certified

New Digital Manifold

MDM008A

Contents of the User Instruction Manual

K-type temperature sensor clamp

2. Product Specifications

2.1 Technical data

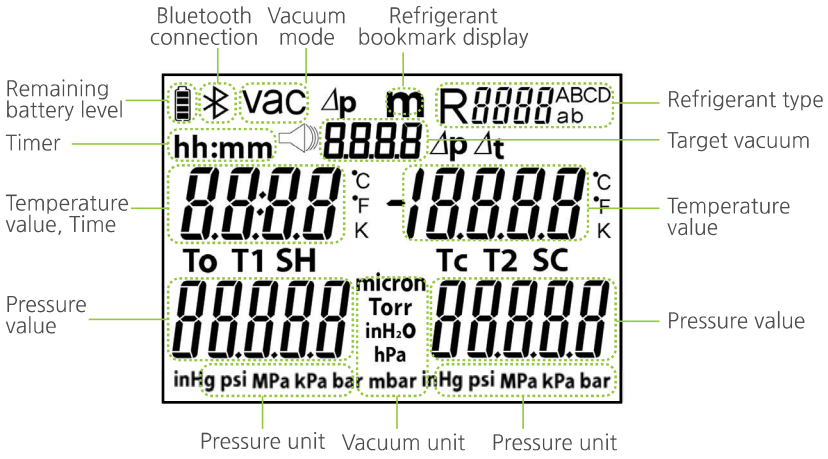
Item	Descriptions
Unit of measure	• Pressure : Kpa/Mpa/bar/psi • Temperature : °C/°F/K • Vacuum : hpa/Torr/inH20/Micron/mbar/inHg
Sensor	• Pressure : Pressure sensor × 2 • Temperature : K-type × 2 • Vacuum : Vacuum sensor × 1
Pressure medium	• FCKW, FKW, N, H2O
Measuring cycle	• 0.75 second
Measuring channel	• 4 channels
Interface	• Pressure : 7/16" UNF × 3, 5/8" UNF × 1 • Temperature : K-type socket
Measuring range	• Pressure measuring range HP/LP(rel) : -1~50 bar(rel) / -14.7~730 psi(rel) 100~5000 Kpa(rel) / 0.1~5Mpa(rel) • Temperature measuring range : -50 ~ 150°C
Accuracy (at 22°C/71.6°F)	• Pressure : ±0.75%fs (±1 digit) • Vacuum : ±1%fs (±1 digit) • Temperature : ±0.5K (±1 digit)
Ambient conditions	• Operating temperature : - 10 ~ 50°C • Storage temperature : -20 ~ 60°C
Power supply	• 1.5V AA batteries × 4 units • Battery life: about 100 hours (without display light)
Display	• Type : illuminated LCD • Response time : 0.1 second
Selectable refrigerants	R11, R12, R13, R21, R22, R32, R113, R114, R123, R124 R134A, R152A ,R290, R401A, R401B, R402A, R402B R403B, R404A, R406A, R407A, R407B, R407C, R408A R409A, R410A, R410B, R414B, R414A, R416A, R417A R500, R501 ,R502, R503, R504, R507, R507A, R600, R600A
Warranty period	1year

MDM008A New Digital Manifold

3. Product Information

3.1 Overview (Display and control elements)

1. K-type temperature probe socket
2. Foldable fixing device
3. Marked content on the display



Name		Description
△t	SH	Degree of superheat, Evaporation pressure
	SC	Degree of supercooling, Condensing pressure
To	Ev	Refrigerant evaporation temperature
Tc	Co	Refrigerant condensing temperature
T1	T1	Evaporator measurement temperature (external probe)
T2	T2	Evaporator measurement temperature (external probe)

4 Battery compartment: 1.5V battery × 4 units (AA type)
5 Operation keys

Button configuration

Power	Power on/off	◀ | ▶	Moving unit, Moving between menus
Refrigerant	Setting refrigerant	Setting	Setting unit, Setting auto-on/off
Pressure	Pressure measuring mode	Refrigerant bookmark	Registering & selecting frequently used refrigerant
Pressure tightness	Testing pressure tightness	Connection	Pairing Bluetooth with smartphone
Target vacuum	Setting the target vacuum level	Zero-point	Setting the zero-point
Vacuum	Vacuum measuring mode	Temperature	Temperature measuring mode
Vacuum tightness	Testing the vacuum tightness	☀	LCD backlight on/off

5 Sight glass: Checking the refrigerant flow and condition
6 Valve handle × 4
7 Refrigerant hose hanger × 6
8 Installing the screw for the connection part 7/16" UNF × 3, connection part 5/8" UNF × 1, left/right, low/high pressure refrigerant hose
9 Filter replacement bolt

4. First Step

Inserting the battery / rechargeable battery

1. Unfold the foldable fixing device and open the battery cover.
2. Insert the batteries (included in this product) or rechargeable batteries (4×1, 5V, AA type)
3. Close the battery compartment.

! When not using for a long time, remove the batteries / rechargeable batteries.
! Fully charge the rechargeable batteries before using the gauge.

Power on

- Press and hold **Power** for about 2 seconds.
  - Initial setup phase : All display segments are displayed. (For 1 second)
  - Measurement view opens.

Performing setup

1. Press the **Setting** button.
   - Each time setting button is pressed, the setting screen of (Pressure Unit)- (Vacuum Unit)- (Temperature Unit)- (Auto Off/On) is changed sequentially.
2. Setting parameters

Key function	Description
◀ ▶	Changing the unit or value within each setting screen
Setting	When the selection value of each setting screen is confirmed, press the [Setting] button to confirm and move to the next setting screen.

Performing unit setup & auto off setup

Display	Description	Button
Kpa/Mpa/Bar/psi	Setting the pressure unit	[Setting] 1 time + Arrow
Hpa/Torr/inH2O Micron/mbar	Setting the vacuum unit	[Setting] 2 times + Arrow
℃/℉/K	Setting the temperature unit	[Setting] 3 times + Arrow
“Auto Off” on or “Auto Off” off	Turning on/off the auto-off function When the auto-off function is turned on, the equipment is automatically turned off after 30 minutes of operation.	[Setting] 4 times + Arrow
The screen returns to the pressure measuring screen.		[Setting] 5 times + Arrow

※The final selection value is applied to the setting.

Selecting refrigerant

1. Press the **Refrigerant** button.
2. After selecting the refrigerant to be used with the arrow buttons, press the [Refrigerant] button again.

How to register refrigerant as a bookmark

1. Press the [Refrigerant] button.
2. After selecting the refrigerant to be used with the arrow button, press the **Refrigerant bookmark** button
3. Check that the character "m" is displayed next to the refrigerant name.
   (When canceling the bookmark, press the [Refrigerant bookmark] button to make the character "m" disappear.)
4. Press the **Refrigerant** button.

※ Totally 5 refrigerant bookmarks can be registered.

How to directly select the refrigerant registered in bookmark

1. Press the **Refrigerant bookmark** button
2. After selecting the refrigerant to be used with the arrow button, press the [Refrigerant bookmark] button again.

This New Digital Manifold Gauge is the same as the conventional 2-way Manifold Gauge for the refrigerant path. The passage opens when the valve is opened. Adjacent pressure is measured even in case that the valve is either closed or open.

▶ Opening the valve: Turn the valve positioner counterclockwise.
▶ Closing the valve: Turn the valve positioner clockwise.

Warning	Be sure to close the valve positioner by hand! If you use other tools when turning to close, the threads could be damaged.

5. Product Use

5.1 Preparation for measurement

5.1.1 Connecting the temperature probe

In order to measure the difference between the pipe temperature and the optimum temperature, be sure to connect the K-type temperature probe (accessory).

5.1.2 Turning on gauge

- Press and hold **Power** for about 2 seconds.

● Zero adjustment of the pressure sensor

Before measuring, be sure to carry out zero adjustment of the pressure sensor.

1. Be sure to depressurize the connections of low and high pressure. (ambient pressure)
2. Press and hold the **Zero** button for about 2 seconds to perform zero adjustment.

● Connecting the refrigerant hoses

Close the valve positioner.

1. Connect refrigerant hoses for the low-pressure side (blue) and the high-pressure side (red) to the measuring instrument.
2. Connect the refrigerant hose to the system.

Warning	If the gauge has been dropped or a serious machine problem has occurred, it is possible that the pipe area of the refrigerant hose has been damaged. The valve positioner can also be damaged, and it is difficult to identify in appearance the inside damage of the gauge.

5.2 Measurement

Warning	Pay attention to the risks of injury caused by high pressure, high temperature, stagnation temperature, or toxic refrigerant. • Wear safety goggles and protective gloves. • Before applying pressure to the gauge, always fix the gauge to the suspension device to avoid dropping it. (Prevention of the damage risk) • At the time of each measurement, check whether the refrigerant hose is damaged and/or correctly connected. In connecting the refrigerant hose, never use any tool other than your hand. Only turn it by hand. • Take measures against occurrence of danger.

5.2.1 Pressure measurement

● The steps described in “Preparation for Measurement” have been completed.

1. Press the **Pressure** button.
   - Turn on the power, and then the pressure measurement screen appears by default. In case of not being the pressure measurement screen, press the [Pressure] button to display the pressure measurement screen.
2. Apply pressure to the gauge. 3. Read the measured value.

● Measured value and display light flash in the following cases:

1. The maximum allowable pressure of 60 bar has been exceeded;
2. In case that the measurable pressure range is exceeded, “HHHH” is displayed on the screen; and
3. If a pressure below the measurable pressure range is entered, “LLLL” is displayed on the screen.

5.2.2 Pressure measurement using the temperature probe

1. Press the **Temperature** button.
   - The real-time temperature value measured by the temperature probe is displayed.
2. By the left/right arrow button, the temperature display screen is switched sequentially in the following order.
   - (Optimum temperature)-(Real-time temperature measurement)-(Difference between optimum temperature and real-time measurement value)
   - • [◀]or[▶] : Changing the measurement value display.

Display 1. Displaying the optimum temperature
(displayed by default all the time on the pressure measurement screen)

Evaporating pressure / optimum temperature (refrigerant evaporation temperature): To	Condensing pressure / optimum temperature (refrigerant condensing temperature): Tc

Display 2. Displaying the real-time measured temperature
(displayed if pressing the [Temperature] button when connecting the temperature probe)

Evaporation pressure / measured temperature: T1	Condensing pressure / measured temperature: T2

Display 3. Display of the difference between the optimum temperature and the measured temperature (when connecting the temperature probe)

Evaporation pressure / temperature difference (superheat): Δt	Condensing pressure / temperature difference (supercooling): Δt

5.2.3 Vacuum measurement

1. Press the **Vacuum** button to enter the vacuum measurement mode.
2. Check the hose connection and read the measured vacuum value being displayed.

5.2.4 Setting the target vacuum

1. Press the **Target Vacuum** button.
2. Select the target vacuum value using the [Arrow] button.
   Ex) In case of Torr unit, the following value changes sequentially each time the arrow button is pressed.
3. Press the **Target Vacuum** button to confirm the value and exit to the previous screen.
4. At the time of the vacuum operation, if the vacuum level reaches the target vacuum value, the machine beeps and sounds an alarm.
5. When the alarm is sounding, press the left/right arrow button to stop the alarm.

5.2.5 Measurement of pressure tightness & vacuum tightness

1. Press the **Pressure tightness** or **Vacuum tightness** button to enter the airtightness measurement mode.
   - Test timer and ΔP are displayed.
2. Press either the left or the right arrow button to start the air tightness test.
   - Time is measured in minutes while ":" of the timer blinks.
   - The initial pressure value is displayed on the left side of the screen, and the real-time measured value is displayed on the right side.
   - The difference (ΔP) between the initial pressure and the real-time measured value is displayed on the upper right of the screen.
   - Press the left or right arrow button during measurement, and then ":" of the timer stops blinking and measurement is paused. Press the arrow button again to resume measurement.
3. Press the [Pressure] or other function button to end the airtightness measurement mode and enter the function screen of the relevant button.

6. How to Use Bluetooth

Connection to the smartphone

This equipment can be connected to the smartphone which makes the measured value checked, saved and sent to the outside.
For this, you need to install an application (the app) on your smartphone.
(Android smartphone: Google Player Store, Apple iPhone: App Store)

6.1 Installation of smartphone application (app)

Install the MICRODAM MDi app on Google Player Store of the Android phone and App Store of Apple iPhone
(Store search term : MICRODAM MDi)

MICRODAM MDi

6.2 Connection of manifold gauge to the smartphone

6.2.1 Prepare for the Bluetooth connection by pressing the Connect button on the manifold gauge.

1. If you press the Connect button, the Bluetooth mark on the top of the LCD blinks, making the equipment ready to be connected to the smartphone.
2. When the equipment is connected to a smartphone, the Bluetooth mark stops blinking.

Display	Description	Button
[Bluetooth mark] blinking	Ready for getting connected to the smartphone	[Connect] button (Bluetooth function ON/OFF)
[Bluetooth mark] ON	Connected to the smartphone	
[Bluetooth mark] OFF	Connection to the smartphone ended	[Connect] button (Bluetooth function ON/OFF)

6.2.2 Turn on the Bluetooth function of the smartphone.

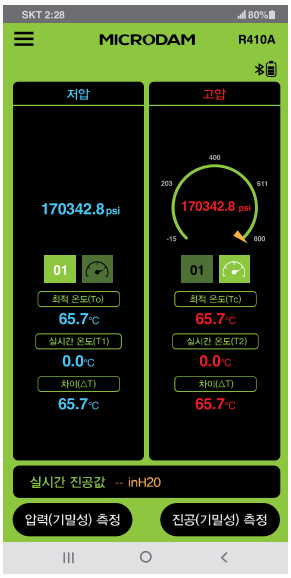
6.2.3 Implement the MICRODAM MDi app on your smartphone.

6.2.4 Connecting the manifold gauge to the smartphone.

1. When you implement the app, the list of manifold gauges that can be connected automatically is displayed on the screen in green.
2. Touch the manifold gauge marked in green on the device list, and then the manifold gauge will be connected to the app.

- Selecting the manifold gauge to connect

- When connected, the pressure measurement screen is displayed.



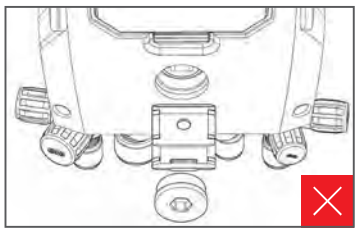
7.1 Replacing the sensor protection filter

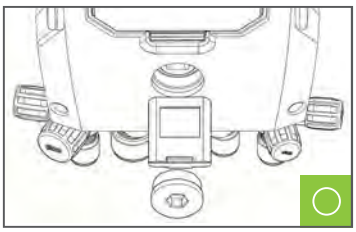
This apparatus is equipped with a sensor protection filter for preventing contamination of the sensor caused by residual refrigerant or oil during use. As the sensor protection filter is a consumable, it should be replaced periodically. If contamination is cumulated in the sensor protection filter, the precision of the measured value decreases and the sensor can be damaged.

Therefore, for the sake of prevention, it is recommended to replace the sensor protection filter regularly.

7.1.2 How to replace the sensor protection filter

1. Remove the filter replacement bolt at the bottom of the back of the equipment using a hexagon wrench.
2. rasp the endpiece of filter cartridge with your fingertips or tweezers and pull it out.
3. Insert a new filter. (Please pay attention to the insertion direction.)
   - Make the sharp part of the filter cartridge facing downward.
   - Insert the filter cartridge with the square hole facing upward and the round hole facing downward.
   - Insert the filter cartridge to the end so that there is no protruding part.





4. Tighten the filter replacement bolt using a hexagon wrench.
   - Tighten the bolt to be matched with the rear case without any protruding surface.

7.2 Cleaning

If the housing of the gauge is dirty, wipe it cleanly with a damp cloth.
Never use permeable cleaning agent such as acetone and volatile solvents!
Use regular household detergent, water, or soapy water.

7.3 Cleaning the connection area

To Keep the screw connection area clean to prevent grease or other contaminants, wipe it cleanly with a damp cloth.

7.4 Replacing refrigerant hoses regularly

Warning	If the gauge has been dropped or a serious machine problem has occurred, it is possible that the pipe area of the refrigerant hose has been damaged. The valve positioner can also be damaged, and it is difficult to identify in appearance the inside damage of the gauge. • To check the technical problem of the gauge, please send it to the Customer Center of Sungshin Hasco. • Whenever the gauge is broken or damaged, the refrigerant hose should be replaced with a new one.

7.5 Removing oil residues

Carefully remove the oil residue on the valve block using the compressed air.

7.6 Securing measurement accuracy

Please contact **Sungshin Hasco Ltd.** to periodically check the followings.
- Periodic gauge calibration (recommended on annual basis)

7.7 Battery/ Rechargeable Battery Replacement

● Turn of the equipment.
1. Open the battery compartment cover.
2. Remove the used batteries/rechargeable batteries and insert new batteries / rechargeable batteries (4 × 1.5V, AA type) into the battery compartment. Pay attention to the polarity.
3. Close the battery cover.
4. Turn on the gauge.

7.8 Changing the valve or valve positioner handle

Warning	It is strongly recommended that the user do not replace the valve or the valve positioner by himself/herself. • Please send the gauge to Sungshin Hasco Ltd.

8.1 Q & A

Details of display	Possible causes and solutions
 Blinking, Lo blinking	The battery power level is low. • Replace the battery.
Gauge turns off by itself	The battery power level is low. • Replace the battery. The Auto Off function is turned ON in [Setting]. • Set the Auto Off function to OFF.
HHHH blinking	Pressure is higher than the measurable pressure. • Maintain the allowed measuring range. Check for any leakage in the vacuum measurement mode. • After removing the cause of the leakage, measure the pressure again.
LLLL blinking	Pressure is lower than the measurable pressure. • Maintain the allowed measuring range.
Err blinking	Pressure sensor is damaged. • Please contact the sales agent or Sungshin Hasco Ltd.

8.2 Measuring parameters

Name		Description
Δt	SH	Degree of superheat, Evaporation pressure
	SC	Degree of supercooling, Condensing pressure
To	Ev	Refrigerant evaporation temperature
Tc	Co	Refrigerant condensing temperature
T1	T1	Measured evaporator temperature (external probe)
T2	T2	Measured evaporator temperature (external probe)

FCC Information to User

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 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 con-nected.

• Consult the dealer or an experienced radio/TV technician for help.

Caution

Modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Compliance Information : 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

IMPORTANT NOTE:

FCC RF Radiation Exposure Statement:

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.