



HECAPO®



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DIGITAL MANIFOLDS

INSTRUCTION



DIGITAL GAUGE INTRODUCTION

 **HECAPO** Digital manifold adopt intelligent computer chips, high accuracy pressure & temperature sensors. High resolution LCD can show actual temperature, sub cooling, superheat, vacuum. They are programmed with 88 refrigerant pressure and saturated temperature data taken from the latest NIST database which can measure sub cooling and superheat accurately and help you analysis usage amount of refrigerants.

THANKS FOR USING OUR PRODUCTS!

FEATURES

- ★ Switch between refrigerant pressure and vacuum.
- ★ Programmed with 88 refrigerant pressure and saturated temperature data taken from the latest NIST database.
- ★ Measuring Vacuum and shown in percentage.
- ★ Low battery indicator. Long battery life of 30 hours.
- ★ Show actual temperature, sub cooling, superheat, vacuum.
- ★ High resolution LCD with background lamp.
- ★ Low voltage DC 6V design.
- ★ 2 way aluminum alloy manifold with diaphragm design.
- ★ Sensors: 2 pressure sensors and 2 temperature sensors.

PARTS AND ACCESSORY

1. Manifold: 1 set
2. Red, yellow, blue charging hoses 1pcs each.
3. Clamp thermal temperature sensors: 2 pcs
4. 1.5V AA alkaline batteries: 4 pcs
5. INSTRUCTION MANUAL
6. Carrying case 1 pcs

GENERIC TARGET SUPERHEAT & SUBCOOLING CHARTS*

*The required superheat chart is an example of a generic superheat chart of a typical fixed orifice, split residential system. The required sub cooling chart is an example of a typical chart for a TXV, split residential system. These charts should not be used for charging. They are only examples to show what the manufacturer's charts may look like. Follow all manufacturer's indications, instructions and warnings above those in this manual.

REQUIRED SUB COOLING WET BULB TEMPERATURE

DRY BULB TEMPERATURE	57	59	61	63	65	67	69	71	73
75	25	24	23	22	21	20	19	18	17
80	24	23	22	21	20	19	18	17	15
85	23	22	21	20	19	18	16	15	14
90	22	21	20	19	18	16	15	14	12
95	21	20	19	18	17	15	13	12	10
100	20	19	18	17	15	13	12	10	8
105	19	18	17	16	14	12	10	8	6
110	17	16	15	13	12	10	8	6	4
115	15	14	13	12	10	8	6	4	

REQUIRED SUPERHEAT WET BULB TEMPERATURE

DRY BULB TEMPERATURE	50	52	54	56	58	60	62	64	66	68	70	72	74	76
55	9	12	14	17	20	23	26	29	32	35	37	40	42	45
60	7	10	12	15	18	21	24	27	30	33	35	38	40	43
65		6	10	13	16	19	21	24	27	30	33	36	38	41
70			7	10	13	16	19	21	24	27	30	33	36	39
75				6	9	12	15	19	21	24	28	31	34	37
80					5	8	12	15	18	21	25	28	31	35
85							8	12	15	19	22	26	30	33
90							5	8	13	16	20	24	27	31
95								5	10	14	18	22	25	29
100									8	12	15	20	23	27
105									5	9	13	17	22	26
110										6	11	15	20	25
115											8	14	18	23

The indoor wet bulb measurement should be taken as close to the evaporator coil inlet as possible. The outdoor dry bulb reading should be taken as close to the condenser air inlet as possible.

SPECIFICATION

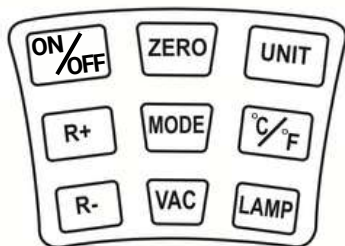
1. Pressure units: KPA, INHg, KgF/cm2, PSI, Bar
2. Vacuum units: Torr, mmHg, Micron, %
4. Power: 1.5V AA X 4 = 6V
5. Pressure measuring: actual pressure.
6. Temperature units: °F, °C
7. Measuring range: Vacuum: -101 Kpa~0 Kpa

Proof pressure: 0 MPa~6MPa

Refrigerant pressure: 0 MPa~4MPa

8. Sensor resolution: 1 KPa
9. Sensor accuracy: ±0.5%
10. Overload limit: 100Bar,10Mpa
11. Operating temperature: -20°C~+60°C
12. Battery life: 30 hours
13. Sensor temperature range: -50°C-150°C (-58F- 302F)
14. Temperature accuracy: <50C (+/-0.1C), >50-100C (+/-0.2C),
>100C (+/- 1C)
15. Auto-off: 15 min with disabling capability.

1.OPERATION INSTRUCTION



1.KEYPAD FUNCTIONS

Item	Keypad	Function
1	ON/OFF	Turns the manifold on/off
2	ZERO	Zero out(use it after the manifold is turned on)
3	UNIT	Select pressure units
4	R+	Select refrigerant (scroll upward)
5	MODE	Switch saturated/actual temperature mode and sub cooling/superheat mode
6	°C/°F	Select temperature units
7	R-	Select refrigerant (scroll downward)
8	VAC	Vacuum mode
9	LAMP	LCD background lamp on/off

WARNING: **ZERO** press and hold this key for 3 sec to zero out the reading only when the manifold is turned on and the reading is NOT zero. (DO NOT press this key when the manifold is start to work)

Superheat is the difference between the actual temperature (sensor temperature) of the refrigerant (gas) as it leaves the evaporator and the boiling point temperature of the refrigerant in the evaporator coil (saturated temperature). After boiling, the refrigerant continues to warm up. The number of degrees that "warmed up" after boiling is called the superheat. Under worst-case conditions (low load for fixed orifice systems), the refrigerant in the evaporator boils off near the end of the evaporator coil. To make sure liquid doesn't enter the compressor under the worst case condition, the AC manufacturers publish charts. The charts indicate what the superheat should be at a given indoor wet bulb measurement and outdoor air temperature. Measuring superheat is your best indication on a fixed orifice system of the proper refrigerant charge and operating conditions. If everything else is working properly and the actual superheat is too high, add refrigerant. If it's too low, remove refrigerant.

Sub cooling is the difference between the boiling point of the refrigerant in the condenser (saturated temperature) and the actual temperature (sensor temperature) of the refrigerant as it leaves the condenser. The degrees that the refrigerant "cools down" below the boiling point is the sub-cooling. Under worst case scenario low load for thermostatic expansion valve systems (TXV) the sub cooling will continue to rise. If the sub cooling rises too high, liquid may be backed into the compressor causing damage and failure.

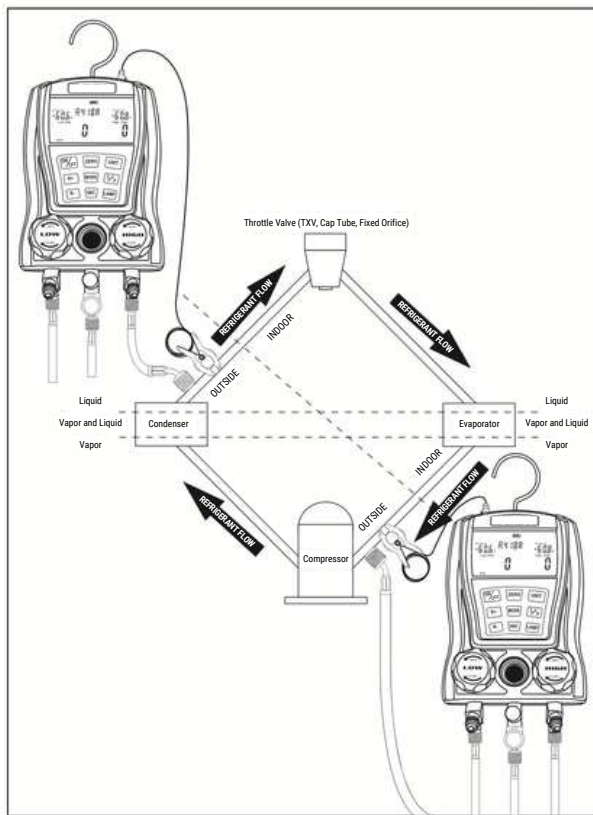
On TXV systems, the subcooling is the best indication of the state of the charge in the refrigerant system since these systems are designed to maintain constant superheat. Properly charging a system ensures maximum efficiency and longer equipment life.

⚠ Use caution whenever working with electricity and high-pressure liquid or gas. Always wear safety glasses.

TARGET SUPERHEAT AND SUBCOOLING

Follow all equipment manufacturer's specifications, warnings and suggestions. To determine the target superheat (fixed orifice system) or sub cooling (charts vary dramatically from one system to another), you will typically need three things. Outdoor dry bulb (outdoor air temperature), indoor wet bulb, and the manufacturers target superheat chart or sub cooling chart.

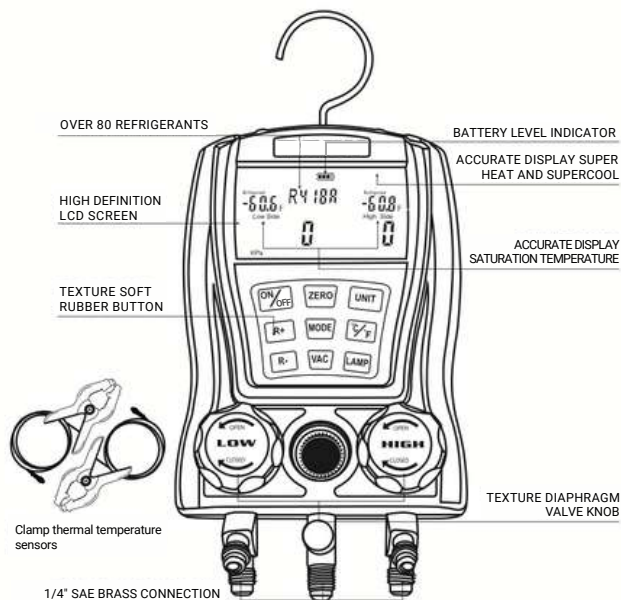
Measuring actual sub cooling & superheat



2. OPERATION INSTRUCTION

- ①. Turn the manifold on/off: press 'ON/OFF' key.
- ②. Zero out the reading: press 'ZERO' key to zero out the reading of pressure.
- ③. Select units: press 'UNIT' key to select pressure units.
Press '°C/°F' key to switch temperature units.
- ④. Select refrigerant: press 'R+' / 'R-' to select refrigerant.
For fast selection, press and hold the key.
- ⑤. Background lamp: press 'LAMP' key to turn on/off the lamp.
- ⑥. Measuring Vacuum: press 'VAC' key to enter into vacuum mode.
- ⑦. Measuring temperature: when temperature sensors are connected, a actual temperature reading will be shown on LCD. If the sensors are disconnected, the reading will not be shown anymore.
- ⑧. When measuring temperature (temperature sensors attached), press 'MODE' key to select display refrigerant temperature or sub cooling, superheat.

3.MANIFOLD DIAGRAM



HIGH ACCURACY
SUPER SHOCK PROOF

Refrigerant technical parameter

Following refrigerants:Liq=Liquid Vap=Vapor

Unit	Refrigerant	Refrigerant	Unit	Refrigerant	Refrigerant
1	R11	R11	45	R409A-LIQ	R409A-VAP
2	R113	R113	46	R409B-LIQ	R409B-VAP
3	R114	R114	47	R41	R41
4	R115	R115	48	R410A-LIQ	R410A-VAP
5	R116	R116	49	R410B-LIQ	R410B-VAP
6	R12	R12	50	R411A-LIQ	R411A-VAP
7	R123	R123	51	R411B-LIQ	R411B-VAP
8	R124	R124	52	R412A-LIQ	R412A-VAP
9	R125	R125	53	R413A-LIQ	R413A-VAP
10	R1270	R1270	54	R414A-LIQ	R414A-VAP
11	R13	R13	55	R414B-LIQ	R414B-VAP
12	R134A	R134A	56	R415A-LIQ	R415A-VAP
13	R14	R14	57	R415B-LIQ	R415B-VAP
14	R141B	R141B	58	R416A-LIQ	R416A-VAP
15	R142B	R142B	59	R417A-LIQ	R417A-VAP
16	R143A	R143A	60	R418A-LIQ	R418A-VAP
17	R152A	R152A	61	R419A-LIQ	R419A-VAP
18	R170	R170	62	R420A-LIQ	R420A-VAP
19	R21	R21	63	R421A-LIQ	R421A-VAP
20	R218	R218	64	R421B-LIQ	R421B-VAP
21	R22	R22	65	R422A-LIQ	R422A-VAP
22	R227EA	R227EA	66	R422B-LIQ	R422B-VAP
23	R23	R23	67	R422C-LIQ	R422C-VAP
24	R236EA	R236EA	68	R422D-LIQ	R422D-VAP
25	R245CA	R245CA	69	R423A-LIQ	R423A-VAP
26	R245FA	R245FA	70	R424A-LIQ	R424A-VAP
27	R290	R290	71	R425A-LIQ	R425A-VAP
28	R32	R32	72	R426A-LIQ	R426A-VAP
29	R401A-LIQ	R401A-VAP	73	R427A-LIQ	R427A-VAP
30	R401B-LIQ	R401B-VAP	74	R428A-LIQ	R428A-VAP
31	R401C-LIQ	R401C-VAP	75	R50	R50
32	R402A-LIQ	R402A-VAP	76	R500-LIQ	R500-VAP
33	R402B-LIQ	R402B-VAP	77	R501-LIQ	R501-VAP
34	R403A-LIQ	R403A-VAP	78	R502-LIQ	R502-VAP
35	R403B-LIQ	R403B-VAP	79	R503-LIQ	R503-VAP
36	R404A-LIQ	R404A-VAP	80	R504-LIQ	R504-VAP
37	R405A-LIQ	R405A-VAP	81	R507A-LIQ	R507A-VAP
38	R406A-LIQ	R406A-VAP	82	R508A-LIQ	R508A-VAP
39	R407A-LIQ	R407A-VAP	83	R508B-LIQ	R508B-VAP
40	R407B-LIQ	R407B-VAP	84	R509A-LIQ	R509A-VAP
41	R407C-LIQ	R407C-VAP	85	R600	R600
42	R407D-LIQ	R407D-VAP	86	R600A	R600A
43	R407E-LIQ	R407E-VAP	87	R717	R717
44	R408A-LIQ	R408A-VAP	88	R744	R744

5.LCD display

1.Vacuum measuring LCD display



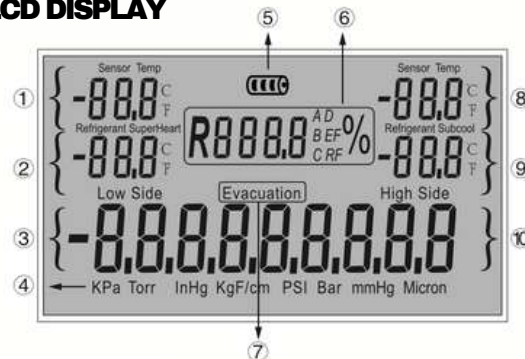
2.Pressure measuring LCD display (refrigerant temperature)



3.Pressure measuring LCD display (sub cooling & superheat)



4.LCD DISPLAY



LCD display instruction

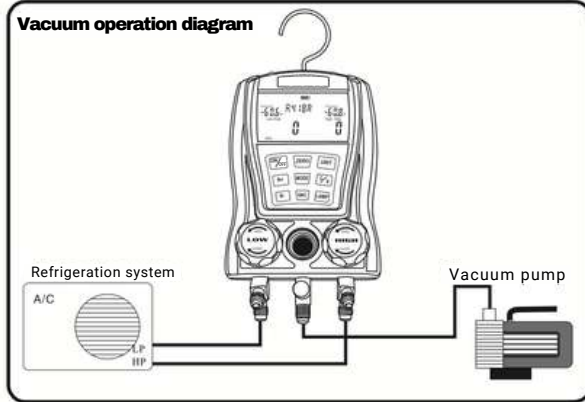
S/N	Function
①	Low pressure actual temperature
②	Saturated temperature or superheat
③	Saturated temperature (low pressure)
④	Select units
⑤	Battery indication
⑥	Refrigerant and vacuum percentage
⑦	Vacuum indicate
⑧	High pressure actual temperature
⑨	Saturated temperature or sub cooling
⑩	Saturated temperature (high pressure)

VACUUM OPERATION AND CHARGING:

1.VACUUM OPERATION IN REFRIGERATION SYSTEM

1. Press "**ON/OFF**" key to turn the manifold, if necessary, press "**LAMP**" key to turn background lamp on.
2. Press "**VAC**" key to enter into vacuum mode.
3. Connect A/C system, digital manifold and vacuum pump as shown below.
4. Press "**ZERO**" key to zero out the reading on LCD.
5. Turn on the vacuum pump and start vacuum operation. NOTE: according to testing result of 13L cylinder, after 3~5 min of vacuum operation, "URE97%" or "URE98%" will be shown on LCD. Higher percent mean higher vacuum.
6. Checking system pressure leaks. If the reading on manifold keep still, it means no leak in system. NOTE: if system pressure reading is drift higher, it means leak in system or connections, you need to find the leak points and mend the system.
7. When vacuum operation is finished, close the valves on manifold first and then close the vacuum pump. At last, press "**ON/OFF**" key to turn off the manifold.

Vacuum operation diagram



2.Refrigerant charging operation after vacuum operation:

1. As shown below, connect cylinder, A/C system and manifold.
2. Press "**ON/OFF**" key to turn the manifold on. Press and hold "**LAMP**" key to turn the background lamp on.
3. Press "**R+**" or "**R-**" key to choose a refrigerant which will be charged. Make sure you chose same refrigerant on both low and high side gauges. NOTE: Press and hold "**R+**" or "**R-**" key for fast selection.
4. Press "**UNIT**" and "**°C/°F**" key to select pressure and temperature unit.
5. Press "**ZERO**" key to zero out the reading.
6. Open the valve on left of manifold (BLUE), open the valve on cylinder, then turn on the refrigeration system.
7. After refrigerant charging operation is finished, close the valve on cylinder.
8. Open the valve on right of manifold (RED), test the system pressure.
9. If refrigeration system is work normally, close the both valve on manifold (RED and BLUE) and then turn off the refrigeration system. Press "**ON/OFF**" key to turn off the manifold. Refrigerant charging operation is finished.

Refrigerant charging operation diagram

