VACUUM METER
Model : VC-9200

Your purchase of this VACUUM METER marks a step forward for you into the field of precision measurement. Although this METER is a complex and delicate instrument, its durable structure developed. Please read the following instructions carefully and always keep this manual within easy reach.

OPERATION MANUAL

TABLE OF CONTENTS

1. FEATURES

* Absolute vacuum & absolute pressure measurement.
* Wide measure range from 1 to 1500 mbar.
* Overload protection up to 2000 mbar max.
* Separate probe, easy operation.
* Application : Automobile, Industrial, laboratory, heating, ventilation, medical hospital.....
* Heavy duty sensor used for air, oil gas, liquid.
* 8 kind display units (torr, mm Hg, micron, mbar, KPa, Pa, inch Hg, psi) select by push button on the front panel.
* Auto shut off saves battery life.
* Microprocessor circuit assures maximum possible accuracy, provides special functions and features,
* Records maximum & minimum readings with recall.
* Data Hold function for stored the desired value on display.
* Built-in low battery indicator.
* RS232 PC serial interface, can match the personal computer used as the Data Logger, Recorder....

2. TYPICAL APPLICATION

* Measure pneumatic pressures.
* Measure automobile engine pressures.
* Pressure for super heat measurements.
* Hydraulic servo controls.
* Refrigeration.
* Air conditioning.
* Food processing.

3. SPECIFICATIONS

3-1 General Specifications

Display	61 mm x 34 mm supper large LCD display. 15 mm (0.6") digit size.
Display units	8 kind display units : torr, mm Hg, micron, mbar, KPa, Pa, inch Hg, psi.
Circuit	Microprocessor LSI circuit.
Function	Data hold, memory (max., min.)
Sensor probe	* Separate probe, easy operation. * Heavy duty sensor used for vacuum measurement of air, oil gas, liquid.
Data hold	By push button.
Data record	Record maximum & minimum readings.
Data output	RS 232 PC serial interface.
Sampling time	Approx. 0.8 second.
Power off	Auto shut off, saves battery life, or manual off by push button.
Operating temperature	0 to 50 ℃ (32 to 122 ℉).
Operating humidity	Less than 80% R.H.

Power supply	006P DC 9V battery(heavy duty).
Power current	Approx. DC 7.1 mA.

Vacuum sensor port Connector	*1/4" NPT or 1/4" PS*
	  * *Included one adapter connector that convert*
	   the 1/4" NPT to 1/4 " PS.

Weight	Instrument :
	  220 g/0.48 LB.
	Sensor probe :
	  183 g/0.4 LB.

Dimension	Meter :
	  180 x 78 x 34 mm
	  (7.1 x 3.1 x 1.4 inch)
	Sensor probe :
	  102 mm x 30 mm Dia.
	  (4.02 inch x 1.2 inch Dia.)

Accessories included	* Vacuum sensor probe............... 1 PC. * Instruction manual.................. 1 PC. * Hard carrying case.................. 1 PC.

Optional accessories	* Data acquisition software
	  (Windows version),
	  SW-U801-WIN.
	* RS232 cable, UPCB-01
	* Data logger, DL-9601A.
	* SD Data logger, DL-9602SD.

3-2 Electrical Specifications

Unit	Max. range	Resolution	Accuracy
mbar	1500 mbar	1 mbar	
KPa	150.0 KPa	0.1 KPa	± 1 % F. S.
Pa	150,000 Pa	100 Pa	(23± 5 ℃)
torr	1125 torr	1 torr	*Note :*
mm Hg	1125 mm Hg	1 mm Hg	*Included linearity,*
micron	1125,000 micron	1000 micron	*hysteresis and*
inch Hg	44.30 inch Hg	0.02 inch Hg	*repeatability*
psi	21.75 psi	0.01 psi	F.S.: Full Scale

4. FRONT PANEL DESCRIPTION

Fig. 1

4-1 Display
4-2 Power Button
4-3 Data Hold Button
4-4 " Max./Min. " Button
4-5 Unit Button
4-6 Battery Compartment/
    Cover
4-7 Sensor Input Socket
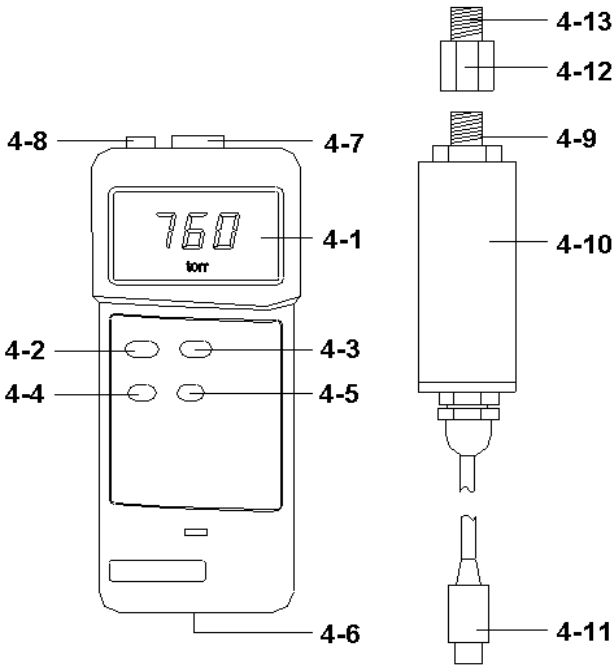
4-8 RS-232 Output Terminal
4-9 Port Connector (1/4" NPT)
4-10 Vacuum Sensor Main body
4-11 Plug of Vacuum Sensor
4-12 Adapter connector that
    convert 1/4" NPT to 1/4" PS
4-13 Port Connector (1/4" PS)

5. MEASURING PROCEDURE

1) Plug the " Plug of Vacuum Sensor " (4-11, Fig. 1) into meter's " Sensor Input Socket " (4-7, Fig. 1).
2) Power on the meter by pressing the " Power Button " (4-2, Fig. 1).
3) To select different measuring unit by pressing the " Unit Button " (4-5, Fig. 1). There are eight units for your choice.
4) Connect the " Port Connector of Vacuum Sensor " (4-9, or 4-13, Fig. 1) to the equipment that intend to be measured the vacuum value.
5) Apply the equipment and the vacuum meter will show the vacuum value.
6) Data Hold

   During the measurement, pushing the " Data Hold Button " (4-3, Fig. 1) will freeze the measured value on display and there will indicate a " HOLD " symbol.
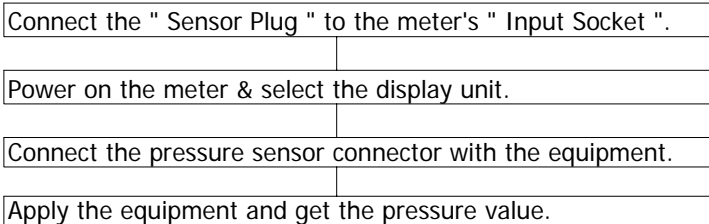   * Push the "Data Hold Button" again to exit the data hold function.
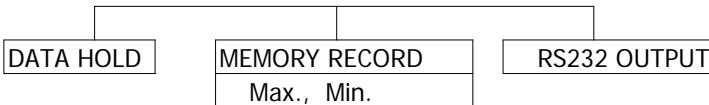7) Data Record (Maximum, Minimum reading)
   * The DATA RECORD function displays the maximum and minimum readings. To start the DATA RECORD function, press the " Max./Min. Button " (4-4, Fig. 1) once. " REC " symbol will appear on the LCD display.
   * With the " REC " symbol on the display :
   a) Push the " Max./Min. Button " (4-4, Fig. 1) once, the " Max " symbol along with the maximum value will appear on the display.
   b) Push the " Max./Min. Button " again, the " Min " symbol along with the minimum value will appear on the display.
   c) To exit the memory record function, push the " Max./Min. " button continuously for around 2 seconds. The display will revert back to the current reading.

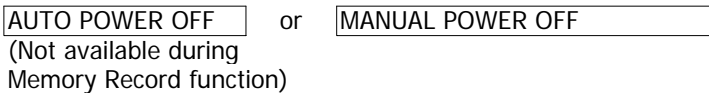8) For quick measurement, follow the procedures
    shown below :

Main procedures :

Connect the " Sensor Plug " to the meter's " Input Socket ".

Power on the meter & select the display unit.

Connect the pressure sensor connector with the equipment.

Apply the equipment and get the pressure value.

Optional measuring procedures :

DATA HOLD	MEMORY RECORD	RS232 OUTPUT
	Max., Min.	

Power management :

AUTO POWER OFF	or	MANUAL POWER OFF

(Not available during
Memory Record function)

9) Measuring considerations :
  * *The sensor diaphragm can be damaged by solid or
    sharp objects. Never insert any object into the inlet port.*
  * *The vacuum sensor is compatible with industrial gases
    & liquid that are compatible with ceramic material. To
    determine the compatibility of a liquid or gas, refer to
    manufacture's specification.*

6. AUTO POWER OFF DISABLE

The instrument has built-in " Auto Power Off " in order to prolong battery life. The meter will switch off automatically if no buttons are pressed for around 10 minutes.
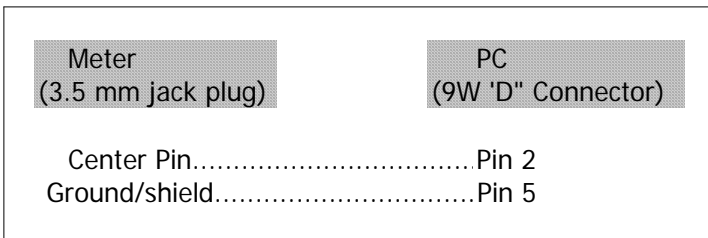
To inactivate this feature by pressing the " Max./Min. " button (4-4, fig. 1) to get into the memory record function during the measurement.

7. RS232 PC SERIAL INTERFACE

The instrument features an RS232 output via 3.5 mm Terminal (4-8, Fig. 1).

The connector output is a 16 digit data stream which can be utilized to the user's specific application.

An RS232 lead with the following connection will be required to link the instrument with the PC serial input.

Meter (3.5 mm jack plug)	PC (9W 'D" Connector)
Center Pin.................................Pin 2	
Ground/shield..............................Pin 5	

The 16 digit data stream will be displayed in the following format :

D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0

**Each digit indicate the following status :**

D0	End Word
D1 & D8	Display reading, D1 = LSD, D8 = MSD For example : *If the display reading is 1234, then D8 to D1 is :* *00001234*
D9	Decimal Point(DP), position from right to the left 0 = No DP, 1= 1 DP, 2 = 2 DP, 3 = 3 DP
D10	Polarity 0 = Positive 1 = Negative
D11 & D12	Annunciator for Display
	Psi = 23	mm/Hg = 78	inch/Hg = 80
	mbar = 86	Pa = 87	K Pa = 88
	u Hg = 89	torr = 90	
D13	1
D14	4
D15	Start word

RS232 FORMAT : 9600, N, 8, 1

Baud rate	9600
Parity	No parity
Data bit no.	8 Data bits
Stop bit	1 Stop bit

8. BATTERY REPLACEMENT

1) When the left corner of LCD display show "   ┌─┬─┐ ",
   it is necessary to replace the battery. However,
   in-spec measurement may still be made for several
   hours after low battery indicator appears before the
   instrument become inaccurate.
2) Slide the " Battery Cover " (4-6, Fig. 1) away from the
   instrument and remove the battery.
3) Install a 9 V battery (heavy duty) and replace the cover.

9. OPTIONAL PRESSURE SENSOR

RS-232 cable, Model : UPCB-01	RS-232 cable, used for connecting the pressure meter & the computer.
Application Software (Window version) Model : SW-U801-WIN	After setup whole hardware *Pressure meter + RS-232 cable + Computer + software (SW-U801-WIN)* whole system can execute as a data logger, data recorder.... record data can be retrieved for EXCEL.....
Data logger, Model : DL-9601A	Real time data logger, after logging the data, then it can send out all data to the computer.
SD Data logger, Model : DL-9602SD	Innovation and easy operation, computer is not need to setup extra software, after execute datalogger, just take away the SD card from the meter and plug in the SD card into the computer, it can down load the measured value with the time information (year/month/date/ hour/minute/second) to the Excel directly, then user can make the further data or graphic analysis by themselves.

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