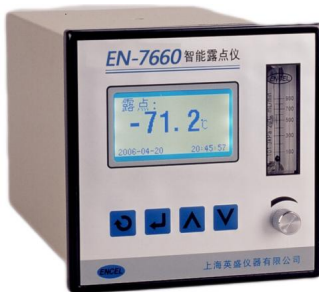


EN-7660 dewpoint instrument

Instruction Manual



ENCEL Instrument Co.Ltd

PREFACE

We are grateful for your purchase of ENCEL's Gas Analyzer.

- First read this instruction manual carefully until an adequate understanding is acquired, and then proceed to installation, operation and maintenance of the gas analyzer. Wrong handling may cause an accident or injury.
- The specifications of this gas analyzer are subject to change without prior notice for further product improvement.
- Modification of this gas analyzer is strictly prohibited unless a written approval is obtained from the manufacturer. Encel will not bear any responsibility for a trouble caused by such a modification.
- This instruction manual shall be stored by the person who actually uses the gas analyzer.
- After reading the manual, be sure to store it at a place easier to access.
- This instruction manual should be delivered to the end user without fail.

Manufacturer: Encel Instrumentation Co., Ltd.

Type: Described in Encel's company nameplate on
main frame

Date of manufacture: Described in Encel's company nameplate on
main frame

Product nationality: China

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Warnings:

- Read the instruction manual carefully before use;
- Inlet pressure must be not more than 0.2 MPa

1 OVERVIEW

Model EN-7660 dewpoint instrument adopt high performance of dewpoint measurement transmitter and microprocessor technology. With LCD display, functions of upper and lower limit alarm, standard signal output, as well as relay contact alarm output etc. It can be used in continuously measuring normal pressure dewpoint and absolutely humidity (ppm).

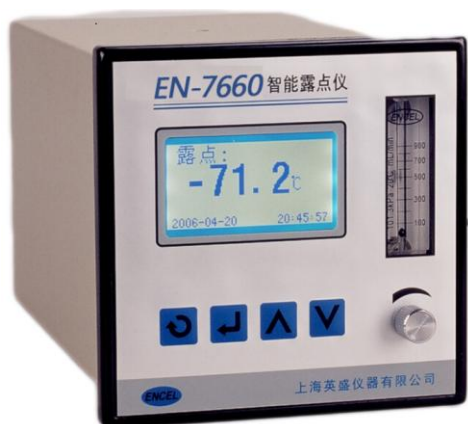


Fig. 1 Contour of the instrument

Features:

- Very excellent long-term performance
- Auto-calibration procedure for low dewpoint measurement
- Long calibration interval saves maintenance costs
- Withstands condensation, dust, dirt and splashed water
- With dewpoint value or ppm for display unit
- English menu, easy to operate
- Big screen liquid crystal display to indicate normal pressure dewpoint temperature, data, time etc.
- Upper and lower limit alarm point to be set freely within whole measuring range.
- With record function without paper, automatic record of changing curve of dewpoint temperature.
- Automatic data storage function, time interval for storing data is set by the user.
- 0 – 10 or 4 – 20mA isolated signal output.
- RS485 and RS232C communication interface, it can be connected to series printer or computer to realize bi-directional communication.

2 DESCRIPTION OF EACH PART

2.1 Description of each unit



Fig.2 Front panel of analyzer

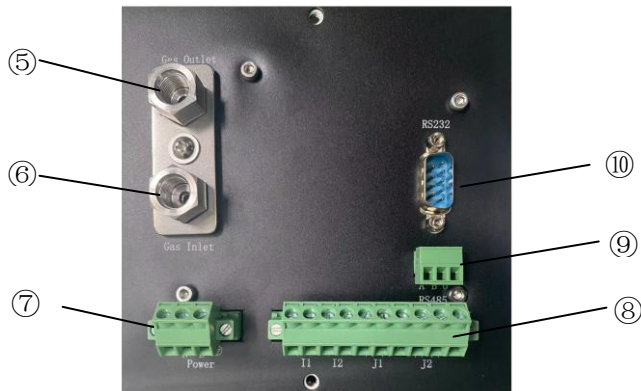


Fig.3 Rear panel of analyzer

Name	Description
① Display	The measurement screen and the setting items are displayed
② Operation panel	Keys for various operational settings
③ Flow meter	Used to indicate sample gas flow rate
④ Needle valve	Used to adjust sample gas flow rate
⑤ Sampling gas outlet	Port for connecting the pipe for discharging the gas after analysis.
⑥ Sampling gas inlet	Port for connecting the sample gas injection pipe
⑦ Power terminal block	Connect (90-220)VAC power supply
⑧ Output terminal block	Measured value output and alarm relay output terminals
⑨ RS 485 interface	RS-485 communication interface
⑩ RS 232 interface	RS-232 communication interface

2.2 Structure of the analyzer

The analyzer is integration construction. It consists of the dewpoint detector, microprocessor-controlled circuit and gas flow system etc. and it is assembled in one case.

3. PRINCIPLE OF OPERATION

Water molecule is very absorbent. The dewpoint sensor is a humidity-sensitive parallel capacitor which is made of the high polymer thin film material.

The capacitance between two parallel plate electrodes can be expressed as follows

$$C = \epsilon_0 \epsilon_r \frac{A}{d}$$

In formula: C – Capacitance

ϵ_0 – Vacuum dielectric constant

ϵ_r – Relative dielectric constant

A – Electrode area

d – Gap between two electrode plates

According to the above formula, when the electrode area (A) and gap between two electrode plates (d) is not variable, the humidity variation in the measured gas will cause ϵ_r to change, so that its capacitance also change, its capacitance change is positive ratio to relative humidity.. So ϵ_r variation can be converted to the trace humidity concentration of the measured gas by micro-processor calculating and temperature compensation.

4. INSTALLATION

4.1 Selection of installation site



DANGER

This unit is not explosion-proof type. Do not use it in a place with explosive gases to prevent explosion, fire or other serious accidents.



CAUTION

- This unit should be installed in a place which conforms to the conditions noted in the instruction manual.
- During installation work, care should be taken to keep the unit free from cable chips or other foreign objects. Otherwise, it may cause fire, trouble or malfunction of the unit.

To install the analyzer for optimum performance, select a location that meets the following conditions;

- (1) A place where the equipment does not receive direct sunshine, draft/rain or radiation from hot substances. If such a place cannot be found, a roof or cover should be prepared for protection.
- (2) A vibration-free place
- (3) A place which is clean around the analyzer.
- (4) Rated operation condition

Power supply : 90V to 265V AC 50/60 Hz

Power consumption : Approx. 20 VA

Ambient temperature : 0 to 40°C

Ambient humidity : 90% RH or less, no condensation

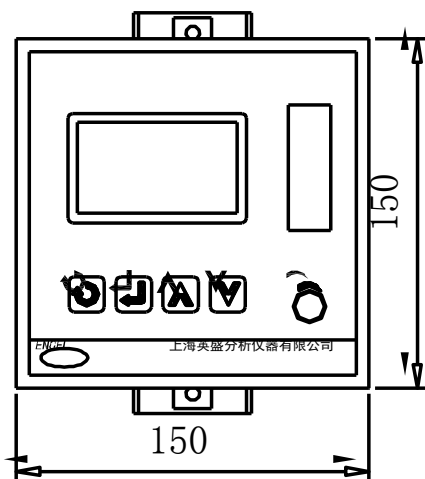
(5) Storage conditions

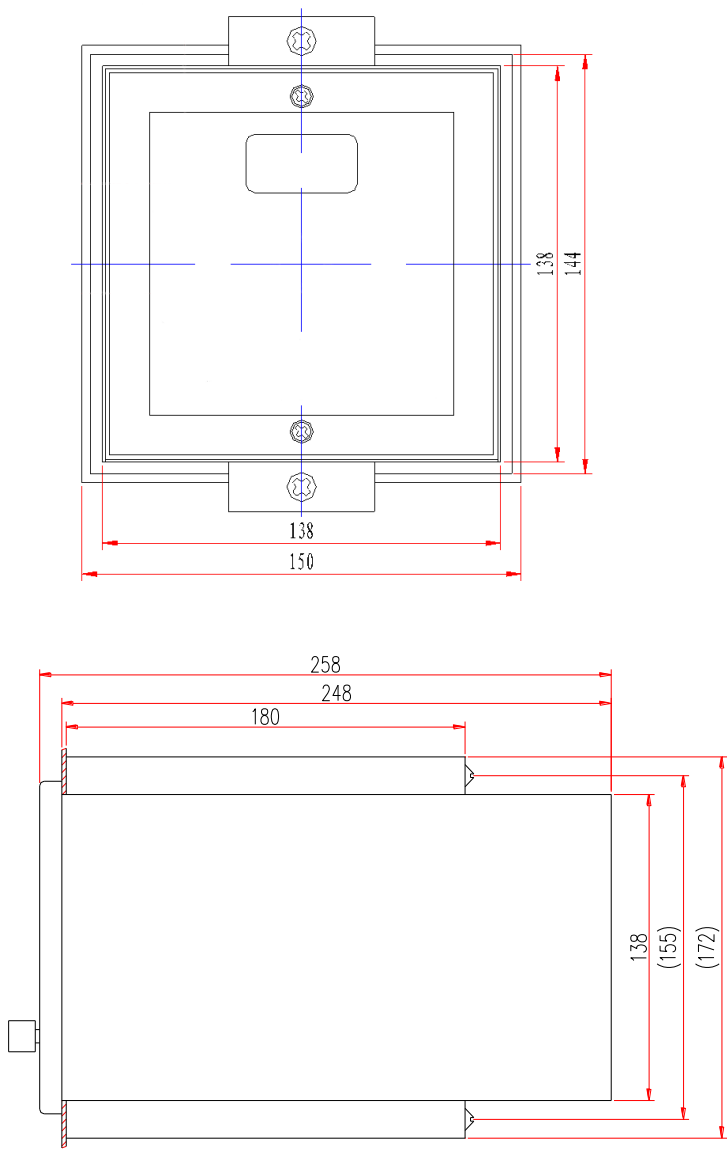
Ambient temperature : -20 to 55°C

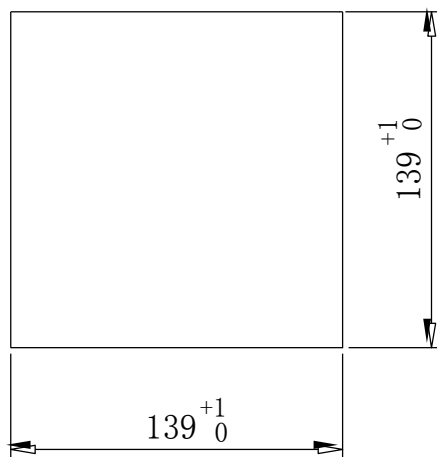
Ambient humidity : 95% RH or less, no condensation

4.2 Mounting method

Panel flush mounting







Panel cutout

- ① Open a square hole: $139^{+1} \times 139^{+1}$ mm.
- ② Insert the analyzer into the panel cutout.
- ③ Fix the fittings on the analyzer from the rear panel and secure it to the panel by screws.

4.3 Piping



DANGER

In piping, the following precautions should be observed.

- Sampling pipes must be made of stainless steel, if want to measure the dewpoint value below -60°C
- There must have no leakage within all sampling pipelines connectors and valves
- Exhaust can be vented directly without connecting outlet pipe
- Exhaust should be led outdoors if a toxic component or combustible gas is contained in measured gas.

Observe the following when connecting the gas pipes.

- The pipes should be connected to the gas inlet and outlet at the rear panel of the analyzer, respectively.
- Sampling pipes connected to the analyzer shall be made of stainless steel and rubber hoses must not be used because the analyzer indication may become inaccurate due to the adsorption of water.
- Piping connections are $\Phi 6\text{mm}$ (outside diameter) pipe with the special sealing O-ring and gland. Pipe of $\Phi 3\text{mm}$ (outside diameter) is also option.
- Outlet of the analyzer usually not be connected and exhaust can vent directly. However, if the measured gas is toxic or flammable gas, must use the pipe leads to the outdoor, and must ensure the smooth exhaust, no resistance and while pipe

is the longer, exhaust pipe diameter should be bigger, otherwise it will produce extra the measurement error due to the pressure generated from gas pipe resistance.

- If dust or gas with high oil content enters into the analyzer, malfunction may result. To prevent this, be sure to use clean pipes and joints, and remove high dust or oil by filter.

Sampling gas inlet: Connect the pipe so that clean measured gas or zero/span calibration standard gas is supplied properly. The gas flow rate should be kept constant within the range of 1.2L/min to 1.5L/min.

- ① The ferrule fittings and the O-sealing ring (accessories) are sequentially placed into $\Phi 6\text{mm}$ (or $\Phi 3\text{mm}$) sampling pipe and connect to "Gas Inlet" at the rear of the analyzer.
- ② Tighten the ferrule fittings with the wrench.

Sampling gas outlet: Measured gas is exhausted after measurement.

Generally, it can vent directly without connecting outlet pipe in most situations. If measured gas is combustible or toxic gas, it is necessary to connect the pipe so that the gas may escape through the gas outlet into the atmosphere or equivalent. In this case, extra pressure is not allowed due to longer pipe.

4.4 Sampling

(1) Conditions of sample gas

- ① The dust contained in sample gas should be eliminated completely with filters. The filter at the final stage should be capable of eliminating dust of 0.3 micron.
- ② If SO_3 mist is contained in sample gas, the mist should be eliminated with a mist filter, cooler, etc. Eliminate other mist in the same way.
- ③ If a large amount of highly corrosive gas such as Cl_2 、 F_2 、 HCL 、 SO_2 、 H_2S 、 SiO_2 is contained in sample gas, the service life of analyzer will be shortened. So, avoid such gases.
- ④ Sample gas temperature is allowed within a range from 0 to 50°C . Pay attention not to flow hot gas directly into the analyzer. If the temperature is too high, you can appropriately increase the length of sampling lines, so that sample gas will be moderately cooling, and then into the analyzer.
- ⑤ The pressure of sample gas should be constant and must be less than 0.2MPa. If the pressure is too high, a pressure regulator must be used and 0.01Mpa is recommendable.



CAUTION

All additional devices connected to sampling lines must be no leakage and the sampling pipes must using metal material pipes, otherwise it will cause leakage due to air has a high moisture content and the reading of analyzer will be high.

(2) Pressure at sampling gas

Pressure at the sampling gas inlet must be set to no more than 0.2Mpa;

Pressure at the sampling gas outlet should be set to atmospheric pressure or equivalent.

(3) Sampling gas flow rate

A flow rate of sampling gas must be (1.2-1.5)L/min.

A flow meter has been provided in the front panel of analyzer.

(4) Pressure at sampling gas outlet

Pressure at the sampling gas outlet should be set to atmospheric pressure or equivalent.

4.5 Wiring method**CAUTION**

- Wiring work must be performed without the main power.
- Enforce construction of grounding wire by all means.
- Wires should be the proper one meeting the ratings of the analyzer.
- Be sure to use a power supply of correct rating.

The terminal block is provided on the rear panel of the analyzer.

See the following figure 4.

Wire each terminal by referring to (1) to (4).

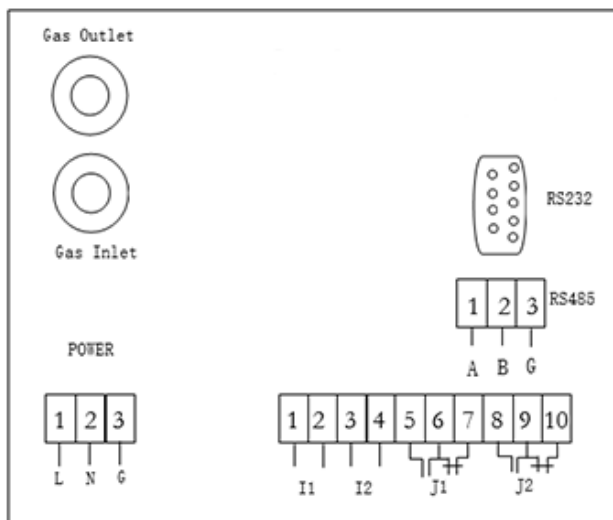


Fig.4 Wiring of analyzer

(1) Power supply terminals block (220VAC/50Hz)

- Pin 1 (L) connect to the phase line of power
- Pin 2 (N) connect to the center line of power
- Pin 3 (G) connect to the ground line of power cable

(2) Output terminals block (Pin① – Pin⑩)

① Measured value output signal (Pin ① –④)

Output signal : 4 -20 mADC, or 0-10 mA, 0-20 mADC

(Can be set by user) isolated output

Allowable load : 4 -20 or 0-20 mADC, 800Ω or less

0 to 10 mADC, 1600Ω or less

- **Pin1 (I1)** connect to positive of output current 1
- **Pin2 (I1)** connect to negative of output current 1
- **Pin3 (I2)** connect to positive of output current 2
- **Pin4 (I2)** connect to negative of output current 2

② **Relay alarm contact output (Pin ⑤ – ⑩)**

Relay contact capacity: 250V AC/1A resistive load

- **Pin5 (J1)** connect to normal open (n/o) of output alarm 1
- **Pin6 (J1)** connect to common contact (c)of output alarm 1
- **Pin7 (J1)** connect to normal closed (n/c) of output alarm 1
- **Pin8 (J2)** connect to normal open (n/o) of output alarm 2
- **Pin9 (J2)** connect to common contact (c) of output alarm 2
- **Pin10 (J2)** connect to normal closed (n/c) of output alarm 2

CAUTION !

To eliminate the effect of external interference, separate the power cable from the measured value output signal cable and alarm contact signal cable.

(3) “RS485”

Connect to computer RS-485 communication interface.

- Pin 1 (A) connect to PIN A of RS485 serial port
- Pin 2(B) connect to PIN B of RS485 serial port
- Pin 3 (G) connect to PIN GNG of RS485 serial port

(4) “RS232”

DB9 serial data communication port, which can be shared with RS485. The two serial ports are not isolated.

- Pin 2 connect to RXD of RS232
- Pin 3 connect to TXD of RS232
- Pin 4 connect to A of RS485
- Pin 5 connect to GND
- Pin 7 connect to B of RS485

SUGGESTION !

For increasing the capability of barrage jamming, an isolator of RS232 series connection is used between RS232 outport of the analyzer and RS232 interface of the computer.

5. DISPLAY AND PANEL

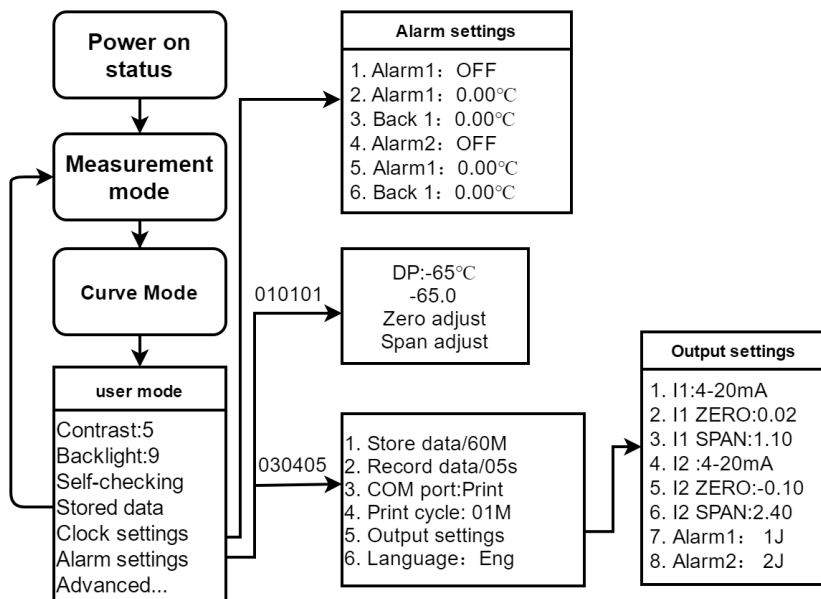
This section describes the display and operation panel of the gas analyzer.

5.1 Name and description of operation panel



Name	Description
 Roll key	Used to move the cursor
 Entry key	Used for confirmation of selected items or values, and for execution of quitting.
 Up key	Used to change the selected item and to increase numeral value.
 Down key	Used to change the selected item and to decrease numeral value.

5.2 Overview of display and operation panel



5.3 Overview of display screen

(1) Starting display screen

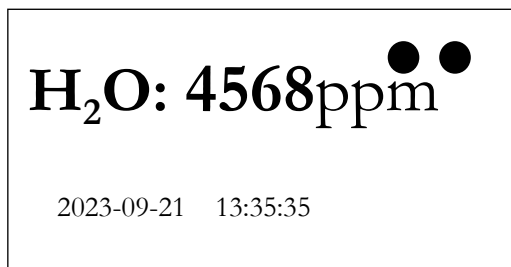
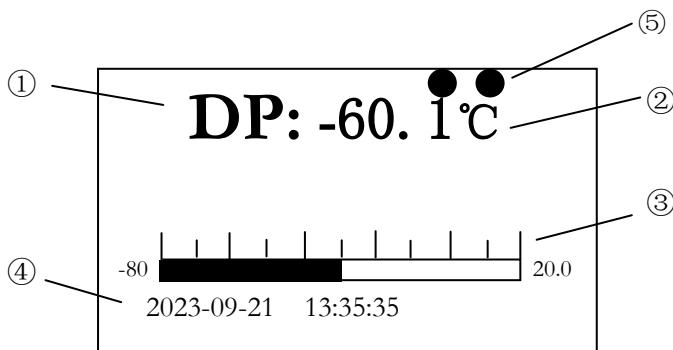
Turning on the switch displays the screen as shown below for a few seconds.



- ① Manufacturer's brand
- ② Manufacturer's website
- ③ Service hotline: sales@encel.net
- ④ Serial number

(2) Measurement mode screen

Turning on the power supply displays the screen as shown below.



- ① Component display

DP: Atmospheric dew point.

② Concentration display

Displays measured concentration value in °C or ppm.

③ Bar graph

Measured concentration values are displayed in a bar graph. The scale of the bar graph shows the measuring range of this analyzer. e.g. -80~20°C

④ Date and time display

Displays the current date and time.

⑤ Alarm message

Displays an alarm message and outputs as alarm contact output when measured concentration value falls within the alarm range.

“ ● Alarm 1”: Stands for the first group alarm open and an alarm occurs

“ ● Alarm 2”: Stands for the second group alarm open and an alarm occurs

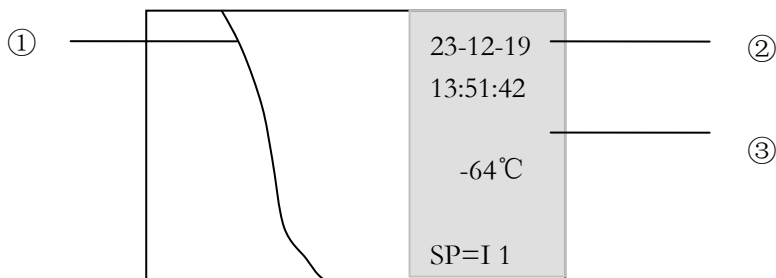
“ ○ Alarm 1”: Stands for the first group alarm open and no alarm occurs

“ ○ Alarm 2”: Stands for the second group alarm open and no alarm occurs

“No dot” Stands for the alarm function off

(3) Curve display screen

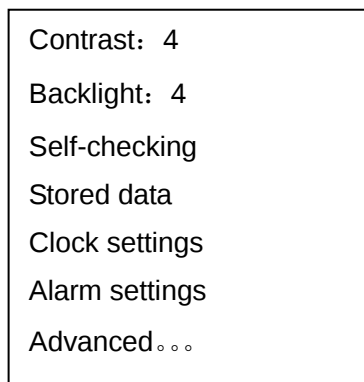
The curve display screen is configured as shown below:



- ① Curve diagram of dew point along with the time
- ② The current date and time
- ③ Measured dew point value at the current right time

(4) User mode screen

The user mode screen is configured as shown below:

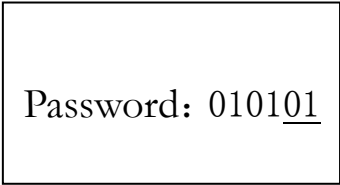


Clock setting, Alarm settings do not need the password, enters their respective menu directly.

Advanced settings need to select different password for entering the respective menu:

- **Calibration mode screen**

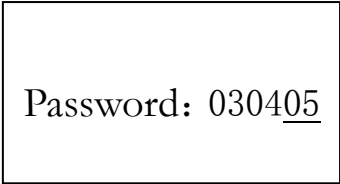
The calibration screen is configured as shown below:



Password: 010101

- **Parameter setting mode screen**

The setting/selection screen is configured as shown below:



Password: 030405

6 OPERATION

Operation procedure

- ① Turn ON the power supply

In one or two seconds, the measurement screen will appear at the front panel.

- ② Setting of various set values

Set required set values according to Chapter 7, "Calibration and Setting".

- ③ Introduction and measurement of measured gas

Start measurement by introducing measured gas into the analyzer.

6.1 Preparation for operation

(1) Check of gas sampling pipe, exhaust pipe

Check that the pipes are correctly connected to the gas sampling port and drain port.

(2) Check of wiring

Check that the analyzer is correctly wired as specified.

(3) Check of sample gas

Check that the sample gas must be clean, its temperature lower than 50°C, and the pressure of sample gas no more than 0.2Mpa.

6.2 Starting

Turning on the power supply displays the screen as shown below for a few seconds.

ENCEL

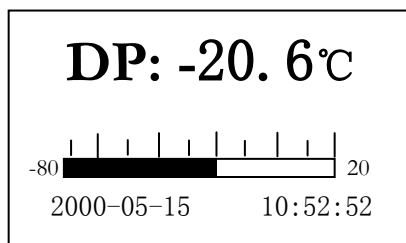
www.encel.net

sales@encel.net

S/N: 503310073

6.3 Measurement

About ten seconds later, the analyzer comes into measurement mode. The measured concentration value is displayed numerically. The contents of the display are as follows.



6.3.1 Setting of various set values

Set required set values according to Chapter 7, “ Calibration and Setting”, especially setting the span required to measure.

6.3.2 Controlling flow rate

Flow rate is adjusted within about (1.2~1.5)L/min by turning the needle valve of the analyzer.

6.3.3 Measurement of measured gas

The measured concentration value is displayed numerically on the LCD.

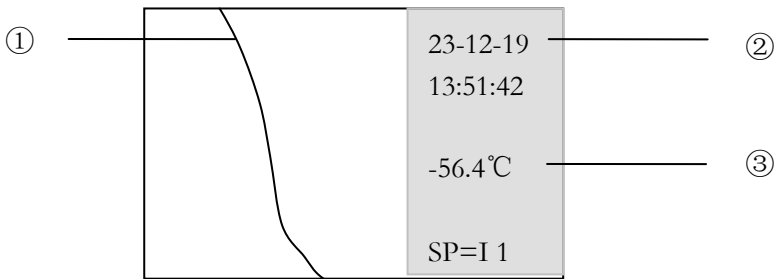
6.4 Curve

In measurement mode, the measured concentration value is displayed numerically. And curve diagram of DP content along with the time is also displayed by pressing the “↵” key.

6.4.1 Current curve display

Press the “↵” key, the current curve diagram of dewpoint value along with the time is configured as shown below:

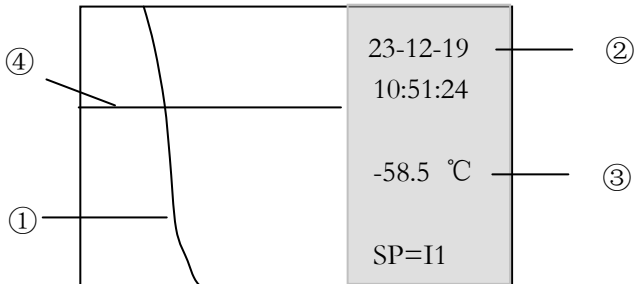
The curve display screen is configured as shown below:



- ① Curve diagram of dew point along with the time
- ② The current date and time
- ③ Measured dew point value at the current right time

6.4.2 Previous curve display

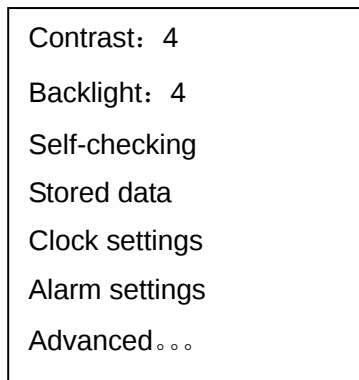
Press the “▼” key to check over the previous data. The previous curve diagram of dewpoint value along with the period of past time will be configured as shown below:



- ① Curve diagram of dew point along with the time
- ② The date and time of the displayed previous curve
- ③ Measured value of dew point at the previous right time
- ④ Lookup the previous right time required

6.5 User mode

Press key “↵” again to enter into user mode menu.



In user mode, the user setting menu is displayed. It allows you to carry out the items checking and setting such as LCD contrast, time, alarm, etc., as required. Items are as follows:

- Contrast: 4 : Adjust LCD contrast.
- Backlight: 4 : Adjust LCD backlight
- Self-checking:
- Stored data : Check the previous measured data.
- Clock settings: Set correct date and time.
- Alarm settings: Set the method of alarm and alarm value to provide an alarm output during measurement.
- Advanced Settings: Enter into calibration or parameter setting menu.

6.5.1 LCD contrast setting

- ① Point the cursor to “ Contrast ” by pressing the “” key
- ② Adjust LCD contrast for the right brightness and the more clear show by pressing the key “” or “” from 0 to 9 level.
- ③ Press key “” to quit menu and return to measurement mode.

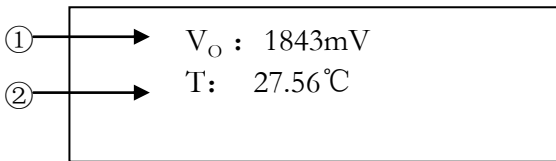
6.5.2 LCD backlight setting

- ① Point the cursor to “ Backlight ” by pressing the “” key

- ② Adjust LCD backlight for the right brightness and the more clear show by pressing the key “▼” or “▲” from 0 to 9 level.
- ③ Press key “↵” to quit menu and return to measurement mode.

6.5.3 Self-checking check

Point the cursor to “Self-checking ” by pressing the “↻” key, and then press key “↵” to display the working parameter of the analyzer.



① Output of DP transmitter (0~2000mV)

② Temperature of DP sensor (0-40℃)

6.5.4 Stored data check

Point the cursor to “Stored data ” by pressing the “↻” key, and then press key “↵” to display the previous measured data in the period of past time.

6.5.5 Clock settings

The instrument has clock circuit, which is calibrated before leaving the factory. If errors, it can enter into menu to calibrate it.

Point the cursor to “Clock settings ” by pressing the “” key, and then press key “” to display the clock setting menu as following:

Clock settings:

20-01-15 18:30

- ① Select the parameters to be set (year, month, date, hour, minute) respectively by pressing key“”,and then set the right date and time by pressing key “”or“”.
- ② Press key “” to quit menu and return to measurement mode.

6.5.6 Alarm settings

There are two groups of alarm in the analyzer, which are called “Alarm1” and “Alarm 2”.

Point the cursor to “Alarm settings ” by pressing the “” key, and then press key “” to display the alarm setting menu as following:

1. Alarm 1: HIGH
2. Alarm 1: -58.2℃
3. Back 1: -1.0℃
4. Alarm 2: LOW
5. Alarm 2: -31.0℃
6. Back 2: -1.0℃

- ① Point the cursor to “1. Alarm 1” by pressing the “” key, and then set the method of alarm 1 by pressing key “” or “”, “HIGH” expressing way of upper limit alarm, “LOW” expressing way of lower limit alarm, “OFF” expressing close alarm.
- ② Point the cursor to “ 2.Alarm 1” by pressing the “” key, and then set the alarm value of DP by pressing key “” or “”.
- ③ Point the cursor to “ 3. Back 1” by pressing the “” key, and then set the hysteresis error of alarm value by pressing key “” or “”.
- ④ Just do as above setting steps for Alarm 2.
- ⑤ Press key “” to quit menu and return to measurement mode.

6.5.7 Calibration menu

In calibration mode screen, the calibrating menu is displayed by pressing the “” key. It allows you to carry out the calibrating analyzer by standard gas, as required. Items are as follows:

- DP Zero: Calibrate zero point for zero calibration gas.
- DP Span: Calibrate span point for span calibration gas.

6.5.8 Parameter setting menu

In parameter setting mode screen, the parameter setting

menu is displayed by pressing the “↵” key. It allows you to carry out the parameter setting, as required. Items are as follows:

- Stored data/60M : Set the interval of automatic storage data.
- Record data/05S: Set the interval of automatic record curve.
- Comm. Addr.: Set communication address.
- Print cycle: Set the interval of automatic printing data.
- Output: Set current output as 4~20mA. or 0~10/20mA
- Span: Set measuring span.
- Language: Set language for display.

More details for the setting method refer to 7. CALIBRATION AND SETTING.

7. CALIBRATION AND SETTING

7.1 Calibration

Encel feels that the interval between calibrations should be dictated by the customer's application. If the instrument were being used to certify the water content of a product for delivery, then a calibration prior to certification would certainly be in order. If, on the other hand, the instrument is being used to monitor or guard a sample, the evidence provided by the analyzer will determine when a calibration check is in order.

CAUTION !

Liquid water is not allowed to enter the analyzer. The longer the analyzer is exposed to high moisture concentrations, the longer it takes to get back to its working ppm range.

Overview of calibration procedure

- ① Introduce standard gas into the analyzer..
- ② Set standard gas values of span or zero, if required according to Chapter 7, “ Calibration and Setting”.

7.1.1 How to enter the calibration menu

- ① During measurement mode, press the “” key twice.
- ② Point the cursor to “Avanced。。。 ” by pressing the “” key, and then press key “” to display the calibration mode.
- ③ Input password: “ 01 01 01 ”respectively by pressing key “”or “” and then press key “” to enter into calibration menu.

Password: 01 01 01

DP: -61.4°C

-61.4

Zero calibrate.

Span calibrate.

7.1.2 Zero calibration

It is used for zero adjustment. Lead the concentration of “zero” standard gas or high purity nitrogen used at the time of calibration.

- ① Point the cursor to “ five-digit ” by pressing the “↺” key.
- ② Press key “▼” or “▲” to set the value to equals to the value of zero standard gas (e.g. -61.4℃).
- ③ Point the cursor to “ Zero calibrate ” by pressing the “↺” key and press the key “↵” while the data is stable.
- ④ Point the cursor to “five-digit ” position by pressing the “↺” key and press the key “↵” to return to measurement mode.

7.1.3 Span calibration

It is used for span adjustment. Use the span standard gas with a concentration of 90% range.

- ① Point the cursor to “five-digit” position by pressing the “↺” key.
- ② Press key “▼” or “▲” to adjust the value to equal to the value of span standard gas (e.g. +10℃).
- ③ Point the cursor to “Span calibrate” by pressing the “↺” key and press the key “↵” while the data is stable.
- ④ Point the cursor to “five-digit ” position by pressing the “↺” key and press the key “↵” to return to measurement

7.2 Parameter setting

7.2.1 How to enter the parameter setting menu

- ① During measurement mode, press the “↵” key twice.
- ② Point the cursor to “Advanced ” by pressing the “↻” key, and then press key “↵” to display the calibration mode.
- ③ Input password: “ 03 04 05 ” respectively by pressing key “▼” or “▲” and then press key “↵” to enter into parameter setting menu.

Password: 03 04 05

Store data/ 60M
Record data/05S
COM port: Comm.
Comm. adder. : 01
Output settings
Language: Eng.

7.2.2 Setting of store data interval

- ① Point the cursor to “Store data” by pressing the “↻” key.
- ② Press key “▼” or “▲” to select the interval 60, 30, 20, 10, 05, 02, 01 minutes or off for closing store.
- ③ Press the key “↵” to return to measurement mod.

The analyzer will store the data of measured DP content along with the setting interval. The longer setting interval is , the more data

storage. If the setting interval of store is 60 minutes, for example, the measured data for 40 days will be stored continuously.

7.2.3 Setting of record curve interval

- ① Point the cursor to “Record data” by pressing the “” key.
- ② Press key “” or “” to select the interval 05, 10, 15, 20, 30, 60 seconds.
- ③ Press the key “” to return to measurement mode.

The analyzer will record the curve of measured dewpoint content along with the setting interval. The bigger setting interval is, the longer curve record. If the setting interval of record is 60 seconds, for example, the measured curve for 5 days will be recorded continuously.

7.2.4 Setting of communication or printing

- ① Point the cursor to “COM port” by pressing the “” key.
- ② Press key “” to set “comm.” for communication, and then go to **7.2.4.1**
- ③ Press key “” to set “print” for printer, and then go to **7.2.4.2**
- ④ Press key “” to show the communication parameter menu as below

➡ 1.Bps: 9600

2.Data: 8/N/1

Bps: baud rate, six for option
 9600、14400、19200、38400、57600、115200
Data: Data format, six for option
 8/N/1、8/N/2、8/O/1、8/E/1、8/S/1、8/M/1

- A. Press key “↶” to move cursor to “1.Bps: 9600”, and then press key “▲” or key “▼” to select the appropriate baud rate .
- B. Press key “↶” to move cursor to “2.Data: 8/N/1”, and then press key “▲” or key “▼” to select the appropriate data format.

7.2.4.1 Setting of communication address

- ① Press key “↶” to move cursor to “Comm. addre.”
- ② Press key “▲” or key “▼” to set the appropriate address from 1 to 247.
- ③ Press the key “↵” to return to measurement mod.

It is realized that one computer can communicate with more analyzers.

7.2.4.2 Setting of printing period

- ① Press key “↶” to move cursor to “Print cycle”
- ② Press key “▲” or key “▼” to set the interval of printing in 01, 02, 05, 10, 20, 30 or 60 minutes.
- ③ Press the key “↵” to return to measurement mod.

The analyzer will print out DP content data automatically in the setting interval. For example: Select 60 minutes, and the printer will print the measurement data every 60 minutes.

CAUTION !

The printer with serial interface is only used here!

7.2.5 Setting of output

Point the cursor to “Output settings ” by pressing the “” key, and then press key “” to display the output setting menu as following:

1. I 1: 4-20mA
2. I 1 ZERO: 0.01
3. I 1 SPAN: 0.01
4. I 2: 4-20mA
5. I 2 ZERO: 0.01
6. I 2 SPAN: 0.01
7. Alarm1J: J1
8. Alarm2J: J2

7.2.5.1 Setting of output current (I1)

- ① Point the cursor to “1. I1 : 4-20mA ” by pressing the “” key.
- ② Press key “” key“ or ” key to select 4-20mA , 0-10mA , or 0-20mA for output.

- ③ Press key “” to quit menu and return to last menu.

7.2.5.2 Setting of output current (I1) zero

- ① Point the cursor to “2. I1 ZERO ” by pressing the “” key.
- ② Press key “” key “ or ” key to adjust current zero of 4-20mA , 0-10mA , or 0-20mA. (4.00 or 0.00)
- ③ Press key “” to quit menu and return to last menu.

7.2.5.3 Setting of output current (I1) span

- ① Point the cursor to “3. I1 SPAN ” by pressing the “” key.
- ② Press key “” key “ or ” key to adjust current range of 4-20mA , 0-10mA , or 0-20mA. (20.00 or 10.00)
- ③ Press key “” to quit menu and return to last menu.

7.2.5.4 Setting of output current (I2)

- ① Point the cursor to “4. I2 :4-20mA ” by pressing the “” key.
- ② Press key “” key “ or ” key to select 4-20mA , 0-10mA , or 0-20mA for output.
- ③ Press key “” to quit menu and return to last menu.

7.2.5.5 Setting of output current (I2) zero

- ① Point the cursor to “5. I2 ZERO ” by pressing the “” key.
- ② Press key “” key “ or ” key to adjust current zero of 4-20mA , 0-10mA , or 0-20mA. (4.00 or 0.00)
- ③ Press key “” to quit menu and return to last menu.

7.2.5.6 Setting of output current (I2) range

- ① Point the cursor to "6. I2 SPAN " by pressing the "↻" key.
- ② Press key "▼" key" or ▲" key to adjust current range of 4-20mA , 0-10mA , or 0-20mA. (20.00 or 10.00)
- ③ Press key "↵" to quit menu and return to last menu.

7.2.5.7 Setting of alarm 1 relay

- ① Point the cursor to "7.Alarm1 1J" by pressing the "↻" key.
- ② Press key "▼" or "▲" to select J1,J2,J3,J4,or OFF (close the function of alarm1) as function of alarm1
- ③ Press key "↵" to quit menu and return to last menu.

7.2.5.8 Setting of alarm 2 relay

- ① Point the cursor to "8.Alarm1 2J" by pressing the "↻" key.
- ② Press key "▼" or "▲" to select J1,J2,J3,J4,or OFF (close the function of alarm2) as function of alarm2
- ③ Press key "↵" to quit menu and return to last menu.

7.2.6 Setting of language for display

- ① Point the cursor to "Language: Eng." by pressing the "↻" key.
- ② Press key "▲" to set "English" and "Russian" or press key "▼" to set "中文" (Chinese) .
- ③ Press the key "↵" to return to measurement mode.

8 TROUBLESHOOTING AND REMEDY

8.1 Dewpoint value to be measured is high side

There are some reasons as below:

- Gas pipe sealing does not accord with requirements
- Performance of dewpoint detector comes down
- Lower flow rate of sample gas

8.1.1 Gas pipe sealing does not accord with requirements

Focus on checking if there is any leak as below:

- ① Check that the connection of inlet port is correctly connected without any leak.
- ② Check that the connection of outlet port is correctly connected without any leak.
- ③ Check that the connection of sampling preconditioning system is correctly connected without any leak.

8.1.2 Performance of dewpoint detector comes down

After a period of use, the sensitivity of the dewpoint detector will decrease, especially when there are corrosive gases in the sample gas, such as Cl_2 、 F_2 、 HCL 、 SO_2 、 H_2S 、 SiO_2 , the service life of the detector of the analyzer will be shortened.

The dewpoint detector is maintenance-free and can not be repaired by the user. Once the sensitivity of the detector drops to the point that it cannot meet the measurement requirements, a new one should be replaced.

8.1.3 Lower flow rate of sample gas

When measuring low dewpoint water in sample gas, bigger or smaller of the flow will affect measuring value. When the flow rate is increased, the dew point value will vary lower; when the flow rate is decreased, the dew point value will vary higher, indicating that there is leakage in the gas path. The dew point value can be normal only if the leakage is eliminated

8.2 Maintenance

Owing to adopt new technology of maintenance-free dewpoint detector, the analyzer need not daily maintain in normal operation.

But it should notice:

- The sample gas must be clear.
- The sample gas flow rate should be constant in 1.2 – 1.5L/min.
- The EN-7660 is fully calibrated and adjusted as shipped from factory. Typical calibration interval is about 2 years. Calibration should be done always when there is a reason to believe that device is not within the accuracy specifications.

9. STORAGE AND WARRANTY

9.1 Storage

Keep its packing case well when the analyzer is placed in storehouse. The ambient temperature: -25 - +55℃, relative

humidity: <95% and without corrosive gas around.

9.2 Warranty

Under the circumstance of normally keeping and using the analyzer, the factory will be in charge of maintenance or replacement some parts free of charge within 12 months from the goods to be delivered due to the problem of workmanship or quality problem.

10. SPECIFICATIONS

10.1 General Specifications

1. Measuring principle: Measurement of thin film capacitive
2. Measurable range: -80℃~+20℃
3. Display unit: LCD with backlight
Display of measured value: Max. 4 digits
Display language: English or Chinese
4. Power supply : 90VAC~265VAC, 50/60Hz
Power consumption: Approx. 20 VA
5. Ambient temperature: -5 to +45℃
6. Ambient humidity: Less than 90% RH (condensation unallowable)
7. Storage conditions: -25 to +55℃, less than 95% RH (condensation unallowable)
8. Mounting: Flush mounting on panel
Dimension of the hole opened: 139⁺¹ x 139⁺¹mm
External dimensions: 150 x 150 x 335 mm (W x H x D)

9. Mass: Approx. 4 kg
10. Housing: Steel-plate case, indoor use type
11. Material of gas-contacting parts: Stainless steel
12. Gas inlet/outlet port: $\Phi 6\text{mm}$ tube
13. External output connection terminal: M3 screw terminal (10-pin connector for current output and alarm output)

10.2 Main Performance

1. Accuracy: $\pm 3\text{ }^{\circ}\text{C DP}$
2. Repeatability: $\pm 0.5^{\circ}\text{C}$
3. Resolution of display: 0.1°C , or 0.01ppm
4. Display unit: $^{\circ}\text{C}$ (atmospheric dew point), or
ppm (absolute humidity)
5. Response time (90% response): within 60 sec (typical)
6. Output signal (isolated): 4 to 20 mA DC or 0 to 10/20 mA DC
Allowable load resistance:
800 Ω max. (in 4 to 20 mA DC output)
1600 Ω max. (in 0 to 10 mA DC output)
7. Relay contact output: 2 sets SPST relay contact output
Relay contact capacity: 250 V AC/1 A
9. Communicating function: RS485 and RS-232C
Protocol: Modbus-RUT
Communication content: concentration value measured

10.3 Sample Gas Measurement Conditions

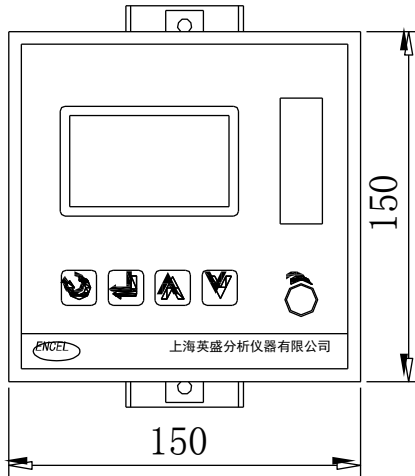
1. Sample gas inlet temperature: 0 to $+45^{\circ}\text{C}$
2. Sample gas flow rate: Constant at (1.2-1.5) L/min

3. Sample gas inlet pressure: ≤ 0.2 MPa
4. Dust: Less than 100 $\mu\text{g}/\text{Nm}^3$ with a particle size of 0.3 μm max
5. Mist: Unallowable
6. Corrosive gas: Unallowable
7. Standard gases for calibration:
 - Zero gas : High pure N_2
 - Span gas : Concentration within 90 to 100% of measuring scale.

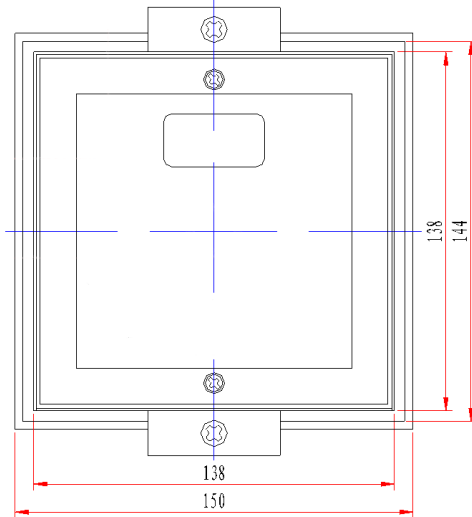
10.4 Installation Conditions

1. The analyzer should not be exposed to direct sunlight or radiation from a hot object.
2. A place subjected to heavy vibrations should be avoided.
A location with clean atmosphere should be selected.
3. A place subjected to strong electromagnetic field disturbance should be avoided.

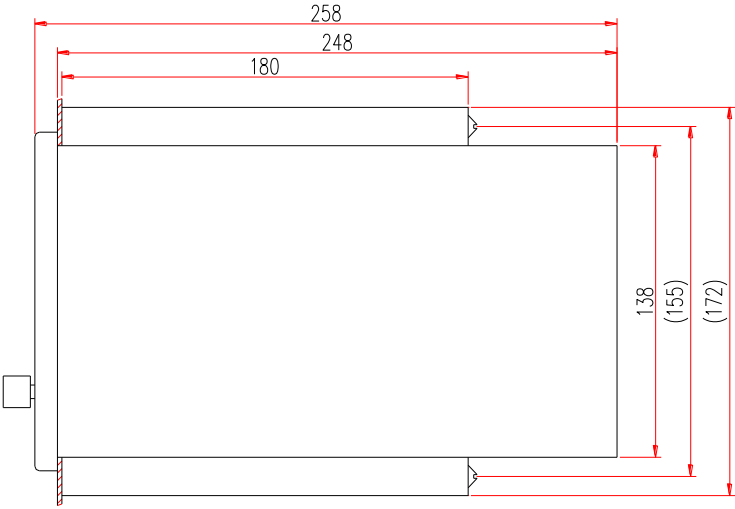
10.5 Outline diagram (unit : mm)



Front view

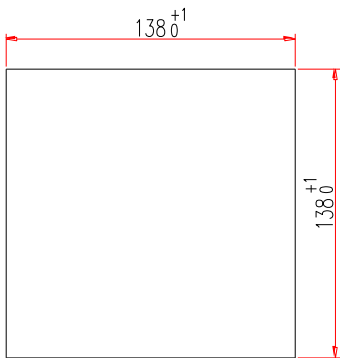


Rear view



Mounting brackets

Side view



Panel cutout