

# ***Trace Moisture Transmitter DewPro<sup>®</sup> MMY31***

## **Installation and Operation Manual**



*GE Infrastructure Sensing*

*GE General Eastern*

**General Notes**

Caution! Caution!  
Before installation please read all instructions.

Safety Safety  
- The DewPro is designed to be mounted to pressurized systems. Take necessary precautions when mounting or removing the DewPro.

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If you should have questions regarding the product described in this document, or need further assistance, please contact your local GE General Eastern Sales Centre

Version: FGE/ 220304/MMY31

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## 1.0 General System Information

### 1.1 Unpacking and Inspection

Upon receipt of the DewPro MMY 31, examine the shipping carton for broken or open packing, distortion, or any other evidence of mishandling. If inspection indicates damage to the unit or any of its components, notify the carrier (within 15 days of delivery) and request an inspection.

Move the carton to a clean work area and unpack. The carton you receive should contain:

- DewPro MMY 31
- Installation and Operation Manual

Compare the model number (on the product label) with product structure (see below) to ensure you have received everything you ordered.

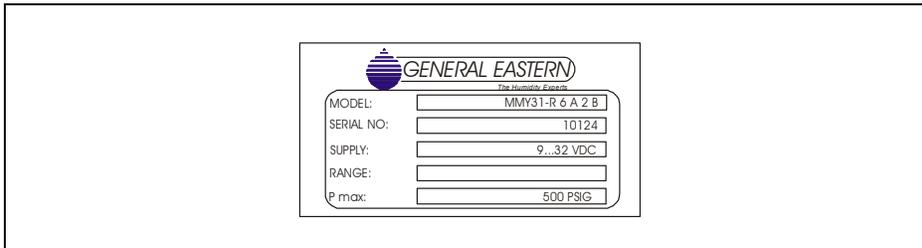


Fig. 1

#### Product Structure MMY31

#### Check Model Number

#### Certification/Approvals:

- R Standard (not certified)
- Y Other

#### Process Connection

- 1 3" diameter galvanized floor flange with 12,7 mm (1/2" MNPT) compression fitting
- 3 1/2" M NPT compression fitting
- 6 No mounting hardware
- 8 G 1/2 compression fitting (Male thread), gasket, SS ferrule
- 9 Other

#### Protective Cap:

- A Standard with 100 micron sintered filter
- B Without 100 u filter

#### Enclosure Conduit:

- 1 1/2" FNPT with cable gland and plug
- 2 PG 16 (Female) with cable gland and plug

#### Output Configuration/Dewpoint Range:

- A Output 4-20 mA -90 ... +10 °C dewpoint, no display, fault status 22 mA
- B Output 4-20 mA -90 ... +10 °C dewpoint, no display, fault status Hold
- C Output 4-20 mA -90 ... +10 °C dewpoint, no display, fault status 3,6 mA
- D Output 0 ... 100 ppm-v, 1 bar, no displ, error 22 mA
- E Output 0 ... 100 ppm-v, 1 bar, no displ, error Hold
- F Output 0 ... 100 ppm-v, 1 bar, no displ, error 3,6 mA
- G With integral display, user interface; free programmable

R 6 A 1 B

## 1.2 Introduction

### Unit description

The DewPro MMY 31 is a loop powered dew point transmitter for the trace moisture range. The transmitter includes an aluminum oxide planar sensor element, a stainless steel probe, a weather proof enclosure, and microprocessor electronics. It is designed to be installed "in-line". Various mounting hardware such as flange and compression fittings, are available for mounting into a process chamber, process pipe, etc. The DewPro MMY31 measures dew point temperature in °C or °F.

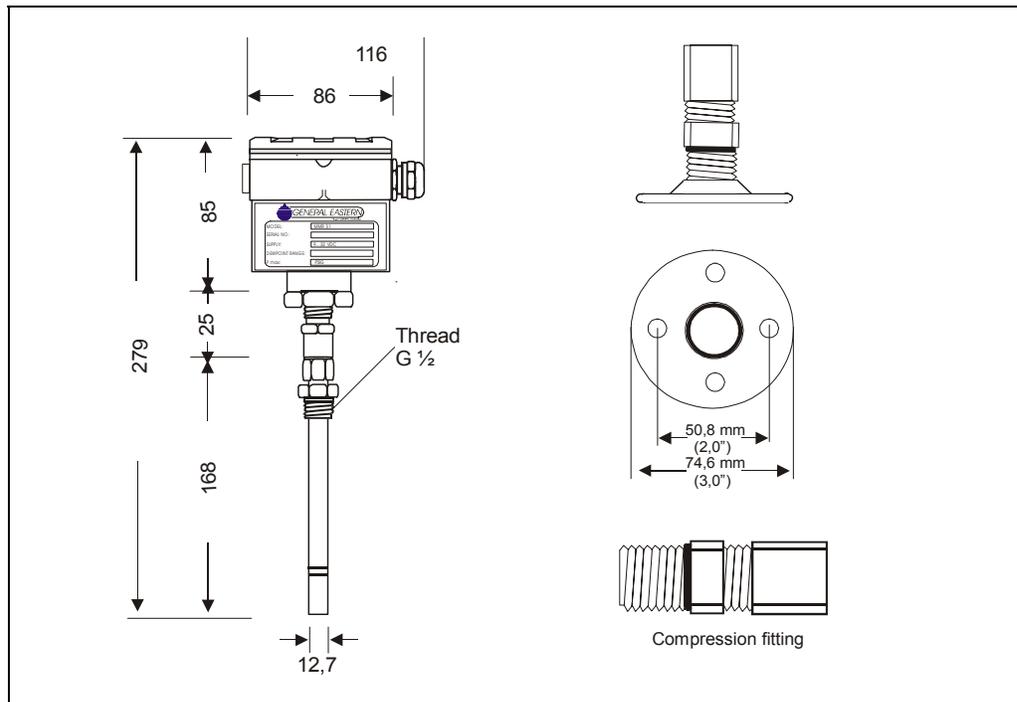


Fig. 2

## 1.3 Theory of Operation

### 4 to 20 mA Loop

The DewPro MMY 31 microprocessor controlled electronics operate with a voltage supply of 12 to 32 V DC. At the nominal 24 V DC supply, the maximum loop resistance is 750 Ohm. The signal is represented by the 4 to 20 mA loop current and is directly proportional to the dew point temperature range of -90 °C to +10 °C (-130 °F to +50 °F).

### Planar Sensor

The heart of the MMY31 is the newest Planar sensor element. It incorporates a new, superior aluminum oxide sensor that provides longer calibration stability, improved corrosion resistance, and faster speed of response. The sensor, mounted on a ceramic substrate, also has a reduced temperature coefficient.

### Calibration

Each DewPro is factory calibrated against precise NIST certified moisture references and has an accuracy of +/- 2 °C dew point. Recalibration should be performed approximately once a year, depending on application and the required accuracy. GE General Eastern has multiple calibration facilities world wide providing trace ability to national and international standards.

## 2.0 Installation Guidelines

### 2.1 Mounting the Probe

Preferably, mount the probe vertically such that the sensor tip points down. Mount the probe in a G 1/2 thread connection or with a flange. Be certain that the tip of the probe does not touch the inside wall of the pipe.

Adjust the ferrule (nylon or stainless steel\*) for a probe insertion length of 1" (minimum) and tighten the compression fitting as follows:

- Hand-tighten the nut. Then, using a wrench, tighten the nut one and one-half turns.
- Now the fitting is tight and can withstand pressure to 17 bar (250 psi) (provided a stainless steel ferrule is used)

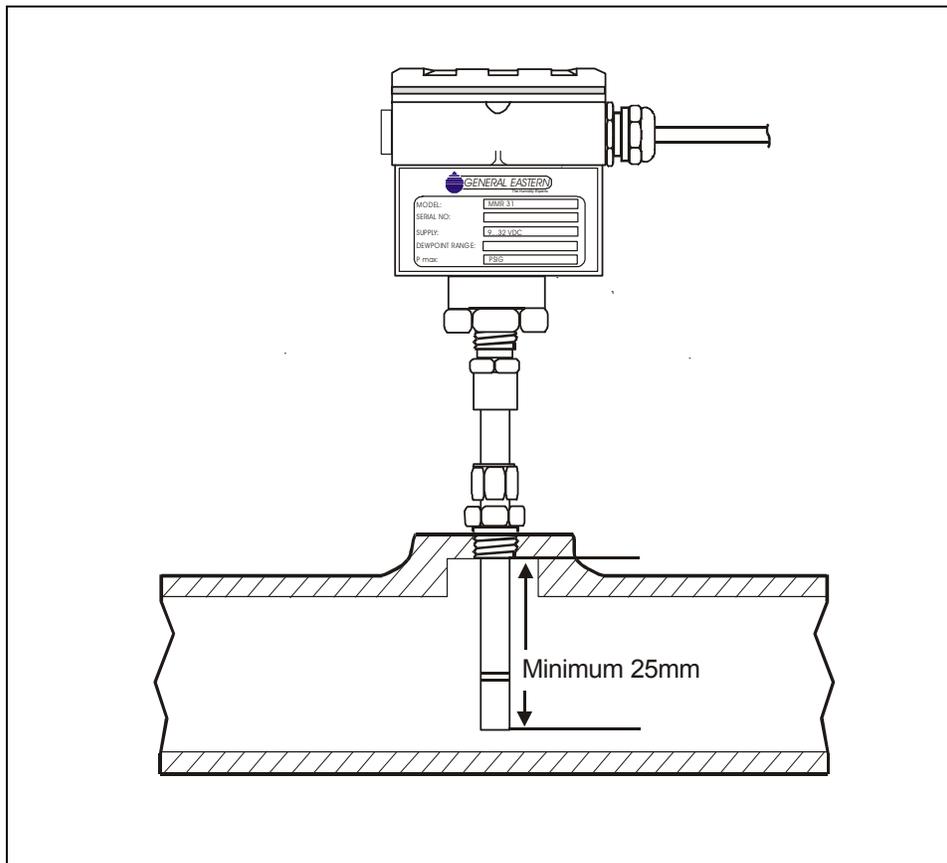


Fig. 3

## 3.0 Wiring

### 3.1 Wiring, General Guidelines

#### Caution!

#### Caution!

The DewPro system contains electronic components that are susceptible to damage by static electricity. Proper handling procedures must be observed during the removal, installation, or other handling of internal boards.

### 3.2 System Configuration, Various

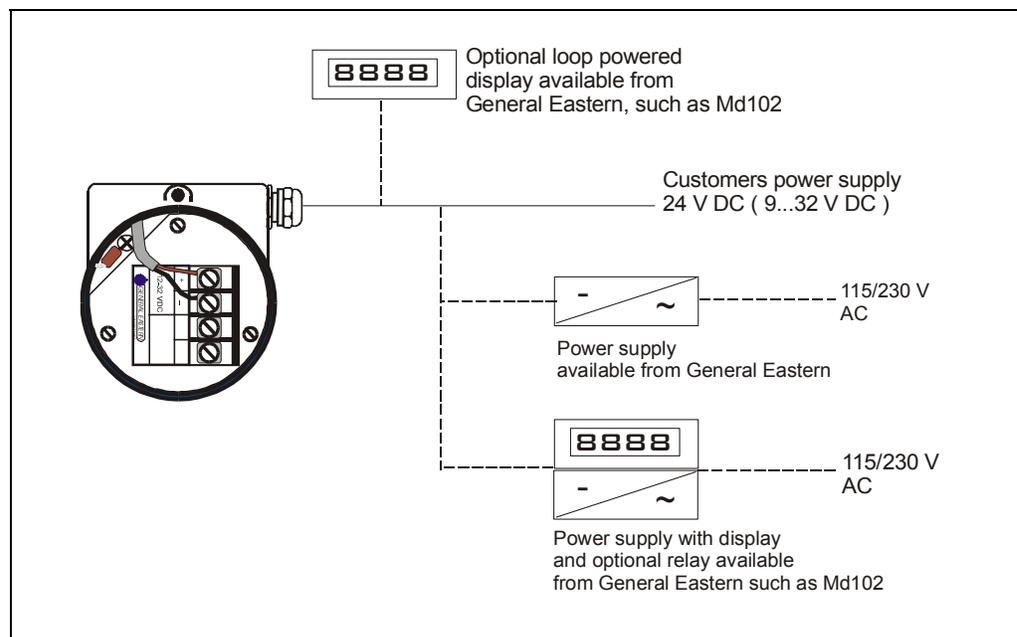


Fig. 4

**NOTE:** The voltage across the +/- terminal of the DewPro should not fall below 9 V DC. The maximum loop resistance is an important measure for selection of the supply voltage. Each device connected to the loop causes a voltage drop. For instance, using a loop-powered display with an input impedance of 50 Ohm will cause a voltage drop of 1 V DC at 20 mA following Ohm's law. Connecting the loop to a PLC will cause a voltage drop across its input.

When designing your loop, add up all voltage losses across the devices connected to the loop and add 12 V. The sum will be the minimum supply voltage required from the power supply. Calculate with a 20% safety factor.

If a display is used, configure it to the proper range: -90 °C to +10 °C (- 130 °F to + 50 °F) for dewpoint corresponding to 4 to 20 mA.

### 3.3 Mounting in Normal Environment

- A standard two-wire, stranded cable can be used to interconnect the DewPro with the power source

Standard

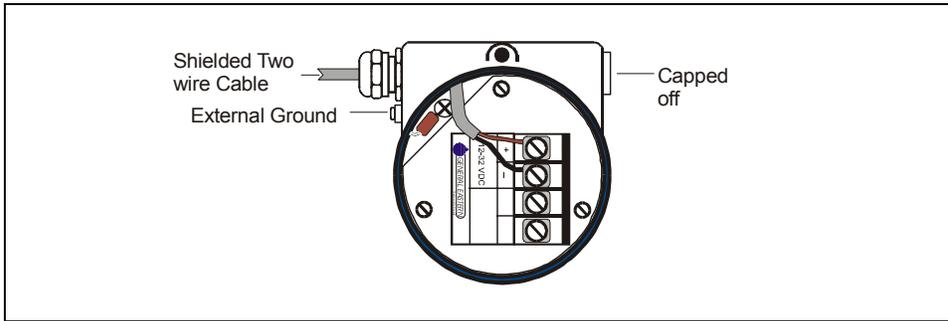


Fig. 5

### 3.4 Mounting in Environments with Severe Electrical Noise

- In areas where EMI/RFI interference is likely, a shielded signal cable is to be used for full protection. The DewPro MMY31 meets requirements of IEC 801-1 through 6 (EN 50081-1, 50082-2) when properly shielded cable is used

EMI/RFI

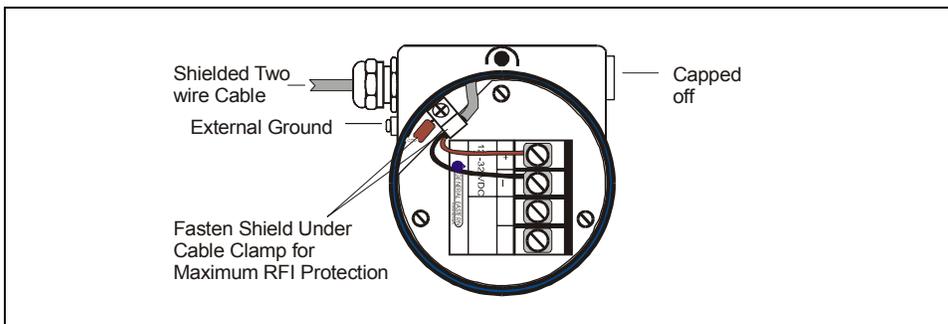
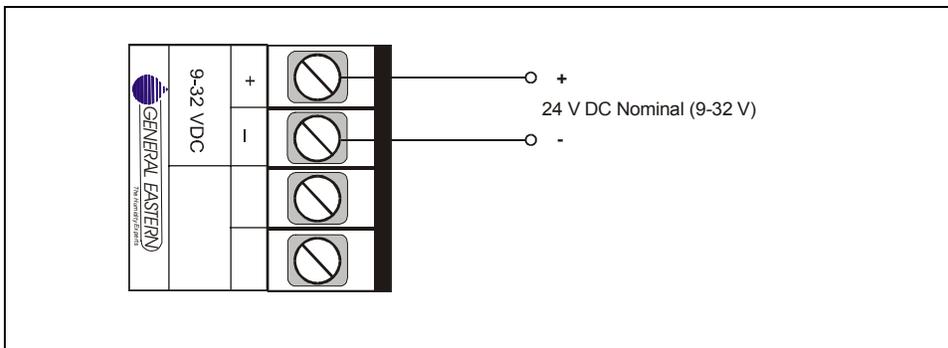


Fig. 6

### 3.5 Electrical Connection



Electrical Connection

Fig. 7

### 3.6 General Wiring Instructions

1. Unscrew the cap on top of the unit.
2. Loosen the gray cable gland located on the side of the unit.
3. Feed the cable through the conduit opening.

**NOTE:** Use a standard signal cable size.

4. Retighten the gray cable gland to meet IP 67 and to relieve the wire and protect the electronics from dust and moisture.
5. Supply 9 to 32 V DC power to the terminals marked + and -.

**NOTE:** This is the voltage that appears across the DewPro terminals. It is not necessarily the supply voltage due to voltage loss in wire length, displays, indicators, etc.

6. If the enclosure is ordered with a 1/2" FNPT conduit connection, the cable gland can be removed to connect the conduit.

## 4.0 Optional Display/User Interface

### 4.1 Installation

If the DewPro is equipped with an optional display / user interface follow the procedure below to access the terminals prior to applying power. Please use Figure 18 below as a reference when removing any parts from the DewPro.

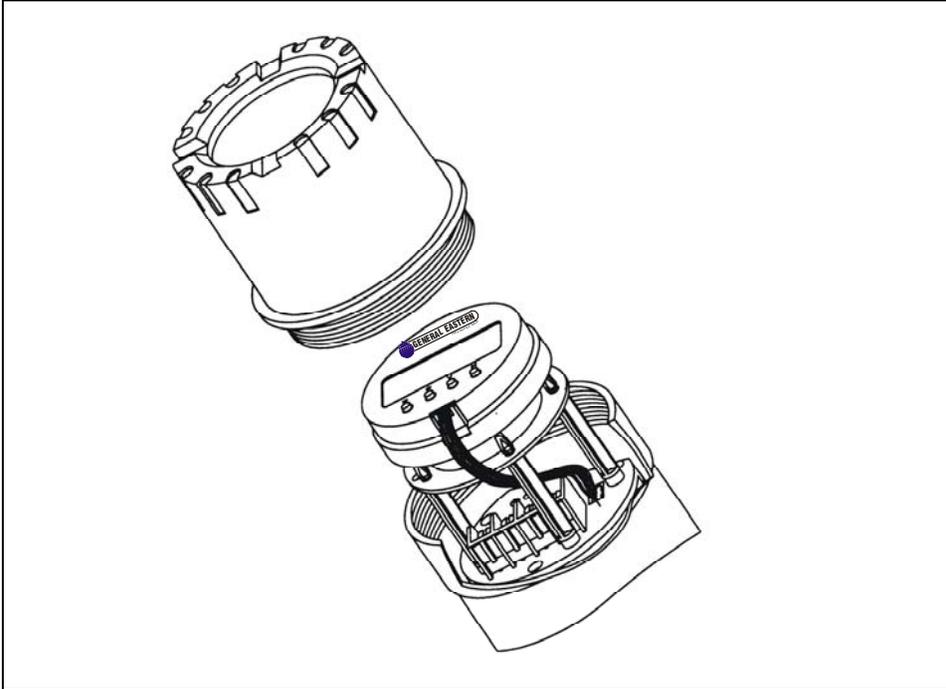


Fig. 18

1. Unscrew and remove the protective lid from the top of the DewPro, exposing the display module below
2. Unplug the display from the lower terminal board.
3. Carefully grasp the display bracket and pull straight up.
4. Follow the procedure outlined in Section 3.0, pages 8-10.
5. To replace the display module, locate the six holes on the underside of the display bracket. The MMY 31 uses the holes with the additional markings next to them.
6. Align the display bracket with the standoffs and snap the display bracket onto the three standoffs.
7. Carefully rotate the display module on the display bracket until properly aligned for readability.
8. Reconnect the display to the lower terminal board observing the key on the plug and socket.

**NOTE:** When the display module is installed it takes over control, superseding the rotary switch functions illustrated under Section 5.4 on page 16. Only the calibration buttons on the printed circuit board remain active.

### 4.2 Description of the DewPro MMY31 Programming Matrix

In the DewPro mid-range moisture transmitter with display option, a matrix-style input is used for programming the unit of measure, measuring range, error status of output, and output adjustment. For users of other General Eastern equipment, this 'GEI matrix' format is familiar. The following describes the features and usage of the various matrix location as they apply to the MMY 31.

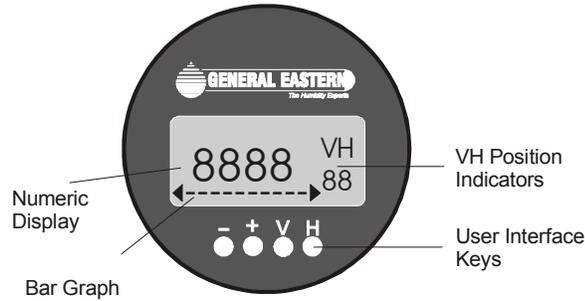


Fig. 19

The display of the DewPro MMY 31 continuously shows the current matrix location using the vertical (V) and horizontal (H) coordinates to designate the row and column, respectively. The bar graph represents the output current in an analogue fashion (refer to Figure 19). See the Appendix for an enlarged overview of the matrix.

MMY 31		H0	H1	H2	H3	H4	H5	H6	H7	H8	H9
Moisture Unit	V0	Display Moisture Value	Select Moisture Unit see table below						Loop 1 at Fault 0=-10%, 2=Hold	Loop 1 Raw Reading	
Loop Range	V1	Dewpoint °C 4 mA	Dewpoint °C 20 mA	ppm, mA							
	V2										
Constant; Loop Hardware Calibration	V3	Pressure Constant for ppmv comp. (bar)								Loop 1 D/A Calibration Low	Loop 1 D/A Calibration High
	V4										
	V5										
	V6										
	V7										
Access Key	V8										Input Locking 50 = Unlock
Misc. Setup	V9	Display Present Error	Display Previous Error	Unit ID	Software Version		Reset To Defaults 50 = Reset				System Reset 50 = Reset

Fig. 20

Movement through the matrix is accomplished by using the "V" and "H" buttons to move to another row or column. For example, beginning at VH 00 and successively pressing "V", leads the user to VH 10, VH 20, VH 30, VH 40, VH 50, VH 60, VH 70, VH 80, VH 90 and back to VH 00. At any location where a value may be changed by the user, the desired value is programmed using the "+" and "-" buttons.

### 4.3 Special Functions of the Push buttons

1. Reset to "Normal" Display: Pressing the 'V' and "H" buttons simultaneously returns the user to VH 00 (normal display).
2. Display Only: Note that eight (6) matrix locations me for display only and may not be changed by the user (refer to Figure 20 or Appendix). The 'display only' fields are as follows:
  - VH 00 = normal display (in dewpoint oC)
  - VH 08 = indicates digitized moisture signal
  - VH 90 = during a system alarm, displays the error code for the fault encountered
  - VH 91 = during normal operation, the previous error code is displayed for reference
  - VH 92 = displays the factory issued identification number
  - VH 93 = displays the factory issued reference number designating the device type and software version
3. Default Values  
A default value is assigned to each programmable matrix field. The values are present after a reset to factory programmed data has been executed (see VH 95).

### 4.4 Functions of the Matrix (Refer to Figure 16 or Appendix

This section describes the functions available to the user through the matrix. grouped by common function areas. The function is accessed by positioning to the specified location within the matrix

#### DISPLAY AND OUTPUT MODE

##### 1. Dewpoint display

Location in Matrix	Description of Function
VH 00	This is the normal display of the transmitter when in operation. The dewpoint is shown in oC or oF, or ppm-v as selected under VH 01.

##### 2. Selecting the Device Unit

Location in Matrix	Description of Function
VH 01	Selects units to be displayed. Changing from oC to oF does not change the current loop. Changing from dewpoint to ppm-v does change the current loop. <b>NOTE:</b> When switching to ppm-v, the display may indicate an error " 3" if the dewpoint reading is above -20 oC. (For example, the DewPro is exposed to ambient air.)

### 3. Loop at Fault

Location in Matrix	Description of Function
VH 07	If any fault malfunction occurs, the loop can be set to either "-10%" (=3.6 mA), to "110%" (=22 mA) or "Hold" (stays at last valid value).

### 4. Selecting the Analogue Output Offset (4 mA)

Location in Matrix	Description of Function
VH 10	The dewpoint value corresponding to the analogue output offset (4 mA) is entered here. <b>Caution!</b> Ensure this is always at least 20 OC below the value assigned to 20 mA. Default: -90 oC

### 5. Selecting the Analogue Output Span (20 mA)

Location in Matrix	Description of Function
VH 11	The dewpoint value corresponding to the analogue output span (20 mA) is entered here. <b>Caution!</b> Ensure this is always at least 20 oC above the value assigned to 4 mA. Default: + 10 oC

### 6. Setting the Span Value for the ppm-v Range

Location in Matrix	Description of Function
VH 12	Selection of this field sets the span value for the ppm-v range. NOTE: The offset is always 0 ppm-v. Do not exceed 1000 ppm-v Default: 100

**SPECIAL CALIBRATION****7. Adjusting the pressure constant**

Location in Matrix	Description of Function
VH 30	<p>The process pressure constant is entered in bar (absolute), which is used to calculate ppmv. The moisture unit ppmv is the ratio of water vapor pressure to the total process pressure and is, therefore, independent of the process pressure. The reason is that when compressing a gas (process pressure) all partial pressures increase by the same factor (Daiton's Law).</p> <p>The gold/aluminum oxide sensor is selective to water vapour pressure monitoring a higher vapor pressure when the total pressure (process pressure) increases. The formula utilized by the analyser refers to the total pressure of 1 bar. An elevated pressure of the process has to be corrected by programming the actual process pressure to the matrix field VH 30.</p> <p>The system should be designed to maintain a constant pressure, for instance, by using a pressure regulator in a bypass system.</p> <p>Default: 1 bar (absolute)</p>

**8. Adjusting the Current Loop at 4 mA**

Location in Matrix	Description of Function
VH 38	<p>By connecting a mA-meter in the loop, the correct current (4 mA) can be adjusted by increasing or decreasing the displayed digits. NOTE: If the matrix input is locked (VH89), the calibration values are displayed but the current output is unaffected. To enable adjustments, VH89 has to be unlocked by entering "50" into this field.</p>

**9. Adjusting the Current Loop at 20 mA**

Location in Matrix	Description of Function
VH 39	<p>Selection of this field assists during calibration generating a nominal 20 mA signal, but the actual value must be 21,92 mA, an over range to a dewpoint of 22 oC.</p> <p>By connecting a ma-meter in the loop, the correct current (21.92 mA) can be adjusted by increasing or decreasing the displayed digits.</p> <p>NOTE: If the matrix input is locked (VH89), the calibration values are displayed but the current output is unaffected. To enable adjustments, VH89 has to be unlocked by entering "50" into this field.</p>

**MODE OF OPERATION****10. Input locking**

Location in Matrix	Description of Function
VH 89	Any number other than "50" will lock the instrument settings from inadvertent or unauthorized changes. (The instrument is only unlocked at "50".)

**11. Displaying the present Error Code**

Location in Matrix	Description of Function																
VH 90	<p>In the event of a system fault, this field displays the diagnostic error code for the fault encountered.</p> <table border="1"> <thead> <tr> <th>Error Code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>No error</td> </tr> <tr> <td>1</td> <td>Dewpoint underrange. The current output has fallen below the 4.00 mA point.</td> </tr> <tr> <td>2</td> <td>Dewpoint overrange. The current output has exceeded the 21.92 mA level.</td> </tr> <tr> <td>3</td> <td>The instrument is no longer reading between -90 and -20 °C dewpoint while in ppm-v mode and has fallen off of the internal vapor pressure table.</td> </tr> <tr> <td>4</td> <td>ppm-v overrange. The current output has exceeded the 20 mA level. Re-range the ppm-v upper scaling limit to keep this error from occurring.</td> </tr> <tr> <td>5</td> <td>Sensor is shorted.</td> </tr> <tr> <td>7</td> <td>Sensor is open.</td> </tr> </tbody> </table>	Error Code	Description	0	No error	1	Dewpoint underrange. The current output has fallen below the 4.00 mA point.	2	Dewpoint overrange. The current output has exceeded the 21.92 mA level.	3	The instrument is no longer reading between -90 and -20 °C dewpoint while in ppm-v mode and has fallen off of the internal vapor pressure table.	4	ppm-v overrange. The current output has exceeded the 20 mA level. Re-range the ppm-v upper scaling limit to keep this error from occurring.	5	Sensor is shorted.	7	Sensor is open.
Error Code	Description																
0	No error																
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4	ppm-v overrange. The current output has exceeded the 20 mA level. Re-range the ppm-v upper scaling limit to keep this error from occurring.																
5	Sensor is shorted.																
7	Sensor is open.																

**12. Displaying the previous Error Code**

Location in Matrix	Description of Function
VH 91	When a system fault condition is cleared, the value of the error code is stored in this location. That is, during normal operation, the most recent error code is displayed for reference.

**13. Instrumentation Identification number**

Location in Matrix	Description of Function
VH 92	The instrumentation identification number should always read "100".

**14. Identification Field**

Location in Matrix	Description of Function
VH 93	This field indicates the software version (ie. version 2.02 or higher).

**15. Set to Default Values**

Location in Matrix	Description of Function
VH 94	This field sets all factory defaults  NOTE: Anything that has been calibrated will not be reset.

**16. Resetting the Device**

Location in Matrix	Description of Function
VH 94	The device is reset in this field.  <b>Note: Reset the device only after field calibration using the DewComp MCY 40 calibrator.</b>

## 5.0 Troubleshooting

### 5.1 General Problems

1. The loop current is outside the range of 4-20 mA, as shown on display or current meter.

**SOLUTION:** The process dewpoint is out of range. If the dewpoint is above +22 °C (+ 77 °F), the current will go to the fault current specified on the order or in the matrix field VH 07. Apply dry air for a few minutes. If the dewpoint doesn't decrease, consult factory.

**SOLUTION:** If the dewpoint is below -90 °C (-130°F), the current will go to the fault current specified on the order or in the matrix field VH 07. Move the sensor into a wetter environment for a few minutes. If the dewpoint doesn't increase, the cause may be a defective sensor assembly or an electronics malfunction. Consult factory.

2. There is no current.

**SOLUTION:** Check voltage and polarity across +/- terminals with a DC voltmeter. If the voltage is within 12-32 V DC, consult the factory.

## 6.0 Technical Specifications

Sensor element	: Gold/aluminum oxide, capacitance principle
Measuring range(s)	: -90°C to +20°C dew point temperature; 0 to 10 ppm-v, 0 to 100 ppm-v or 0 to 1000 ppm-v (adjustable with integrated display)
Recommended calibration cycle	: 6 to 24 months, depending on the application and the required accuracy
Calibration accuracy	: $\pm 2^{\circ}\text{C}$ dewpoint
Repeatability	: $\pm 1^{\circ}\text{C}$ dewpoint
Maximum RH	: 50% at dew point $> 0^{\circ}\text{C}$
Temperature coefficient	: $< 0,2^{\circ}\text{C}/^{\circ}\text{C}$
Operating and storage temperature	: $-40^{\circ}\text{C}$ to $+60^{\circ}\text{C}$
Max. operating pressure	: 120 bar (1750 psig)
Helium leak rate	: $< 10^{-6}$ mbar l/s
Temperature coefficient	: $T_d / T < 0,2^{\circ}\text{C}/^{\circ}\text{C}$
Signal output	: 4 - 20 mA, 16 $\mu\text{A}$ resolution
Process connection	: 1/2" (12,7 mm) x G 1/2" (DIN ISO 228) or 1/2" (12,7 mm) tube x 1/2" MNPT compression fittings
Probe Tube:	: Stainless steel 1.4571, 1/2" (12,7) diameter, insertion length 2" (50 mm) to 3,5" (90 mm)
Sensor protection	: Sintered filter 100 micron
Electronics	: Microprocessor-controlled
Power supply	: 24 VDC nominal, 12 to 30 VDC range
Protection	: NEMA 4X (IP 67)
Weight	: 1,5 kg (3.2 lb)

## 7.0 Accessories

### 7.1 Available Accessories

#### Accessory Description

Single power supply

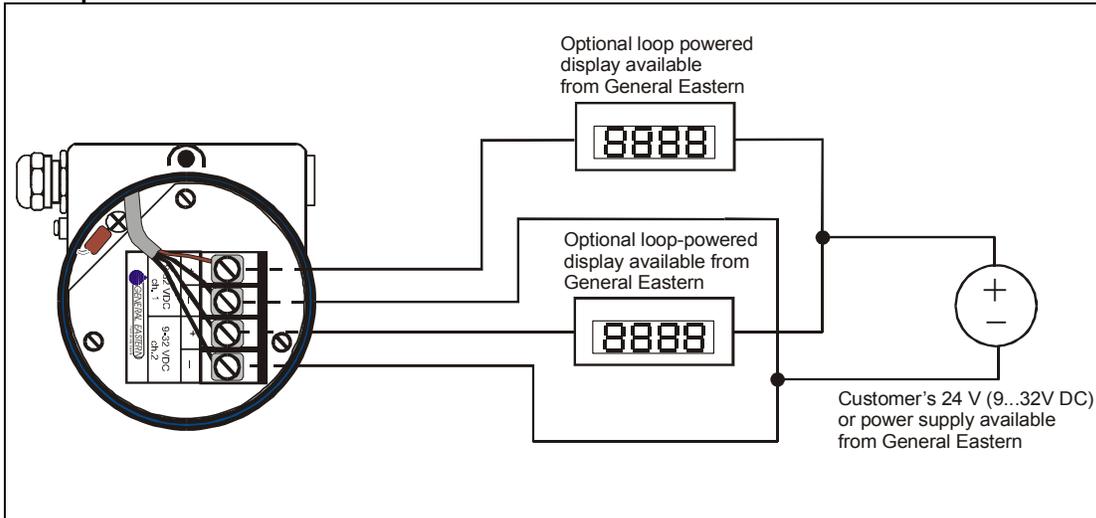
Panel mount display, power supply, no relays

Panel mount display, power supply, two alarms

Panel mount display, power supply, two alarms. 4 to 20 repeating output

#### Consult GE General Eastern

Example



Example

Fig. 22

## 8.0 Addresses

For More information, please contact one of the following GE General Eastern offices:

### **USA**

GE General Eastern Instruments  
500 Research Drive  
Wilmington, MA  
Tel. +1 978 203 1900  
Fax. +1 978 203 1903

### **Germany**

GE General Eastern  
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Bergische Strasse 10  
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Tel. +49 2129 558 10  
Fax. +49 2129 558 110

### **Netherlands**

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PO Box 49  
NL - 1400 AA Bussum  
Tel. +31 (0)35 698 2700  
Fax. +31 (0)35 698 2699

### **United Kingdom**

GE-TEC  
General Eastern – Technical Centre  
Unit 6, Block 3 Vestry Estate  
Otford, Seven Oaks  
Kent TN14 5EL  
Tel. +44 (0) 1732 468100  
Fax. +44 (0) 1732 468101

[www.generaleastern.net](http://www.generaleastern.net)

APPENDIX

MMY 31		H0	H1	H2	H3	H4	H5	H6	H7	H8	H9
Moisture Unit	V0	Display Moisture Value	Select Moisture Unit see table below						Loop 1 at Fault 0=-10%, 1=110%, 2=Hold	Loop 1 Raw Reading	
Loop Range	V1	Dewpoint °C 4 mA	Dewpoint °C 20 mA	ppm, mA							
	V2										
Constant; Loop Hardware Calibration	V3	Pressure Constant for ppmv comp. (bar)								Loop 1 D/A Calibration Low	Loop 1 D/A Calibration High
	V4										
	V5										
	V6										
	V7										
Access Key	V8										Input Locking 50 = Unlock
Misc. Setup	V9	Display Present Error	Display Previous Error	Unit ID	Software Version		Reset To Defaults 50 = Reset				System Reset 50 = Reset