



## FEATURES

- THE INPUT HAS EXTREMELY HIGH IMPEDANCE, PROTECTED UP TO +/-100 VDC
- THE INPUT ACCEPTS pH OR ORP (-1.0V TO + 1.0 V)
- INPUT FOR Pt1000 RTD FOR TEMPERATURE COMPENSATION. OR THE COMPENSATION CAN BE DISABLED
- FACTORY CALIBRATION OR CHANGE GAIN AND OFFSET WITH 2 TRIMMERS
- RS485 TWO WIRE MODBUS RTU PORT
- THE POWER IS ISOLATED FROM BOTH INPUT AND RS485 PORT
- THE INPUT IS ISOLATED FROM THE RS485 PORT
- HIGH ACCURACY AND RESOLUTION
- ALL CONFIGURATIONS ARE DONE OVER THE RS485 COMMUNICATION
- HIGH PROTECTION ON BOTH INPUT AND COMMUNICATION PORT
- ISOLATION VOLTAGE > 1000 VDC
- ISOLATION RESISTANCE > 100 Mohm @ 500 VDC
- NEEDS 21.6 – 26.4V DC POWER
- QUICK AND SIMPLE WIRING
- LxWxH = 90x17.5x56 mm (3.55"x0.69"x2.21")
- WEIGHT = 55 g (1.9 oz)

## APPLICATIONS

- INDUSTRIAL SIGNALS ISOLATION
- INDUSTRIAL CONTROL
- MEASUREMENT APPLICATIONS
- SCADA



## 1. DESCRIPTION

GpH141-MB is an isolated pH/REDOX/ORP transmitter. The input accepts pH or -1.0 V to +1.0 V to measure ORP or any other voltage within this range. It has extremely high impedance and it is protected up to +/- 100 VDC.

The RS485 port is isolated and powered by 5V to provide strong and immune signal for communication over a two wire MODBUS RTU network.

A Pt1000 RTD input can provide temperature compensation. The compensation can also be disabled.

Two trimmers can help adjust and recalibrate old or lower quality probes. The trimmers can also be disabled so the factory calibration be used.

All configurations changes are done over the RS485 port.

The power is isolated from the input and from the RS485 port. It has to be 21.6 – 26.4V DC.

With its high accuracy, DIN rail mounting, very small size, slim design, high isolation and functionality GpH141-MB is an excellent choice for isolating and accurate measurement of pH, ORP and other sensor signals.



## 2. ABSOLUTE MAXIMUM RATINGS \*

Power	26.4V DC
Operating temperature	0 to 50 °C
Voltage to the input	100 VDC both polarities

**\* NOTE: Stresses above those ratings may cause permanent damage to the device.**

## 3. CHARACTERISTICS

Parameter	Conditions	Min	Typical	Max	Units
<b>Power</b>					
Voltage	24V DC regulated and filtered is strongly recommended	21.6	24	26.4	V DC
Consumption	24.0 V DC, RS485 receiving		10		mA
<b>Input</b>					
Input voltage range	0 to 50 °C	-1.1		1.1	V DC
Resolution, voltage			0.1		mV
Error, voltage			0.03		% FS
Resolution, pH			0.01		pH
Error, pH			0.02		pH
Input impedance	0 to 50 Hz	1.00E+12			ohm
<b>RS485 port</b>					
	Isolated, 5 V, 2 wire, 1/8 load				
<b>Temp. Comp. Input</b>					
	If temp. comp. is disabled this input can be left open				
Sensor	Pt1000 RTD with alpha 0.00385, two wire				
Error	Wires resistance less than 0.5 ohm total		0.3		°C
<b>Isolation voltage</b>	Input to RS485, input to power, RS485 to power	1000			VDC
<b>Isolation resistance</b>	Input to RS485, input to power, RS485 to power, @500 VDC	100			Mohm

## 4. APPLICATION

### 4.1. MECHANICAL

Mounting GpH141-MB on the DIN rail requires an area of 98 x 17.5 mm (3.86" x 0.69").

### 4.2. ELECTRICAL

Here are the terminals of GpH141-MB

**Power:**  
 1 is NC (no connect)  
 2 is 24V DC "+"  
 3 is 24V DC "-"

**Use regulated 24V DC power. The voltage must be between 21.6 and 26.4V DC.**

**Input:** BNC connector

**RS485:** 10 is A (D+)

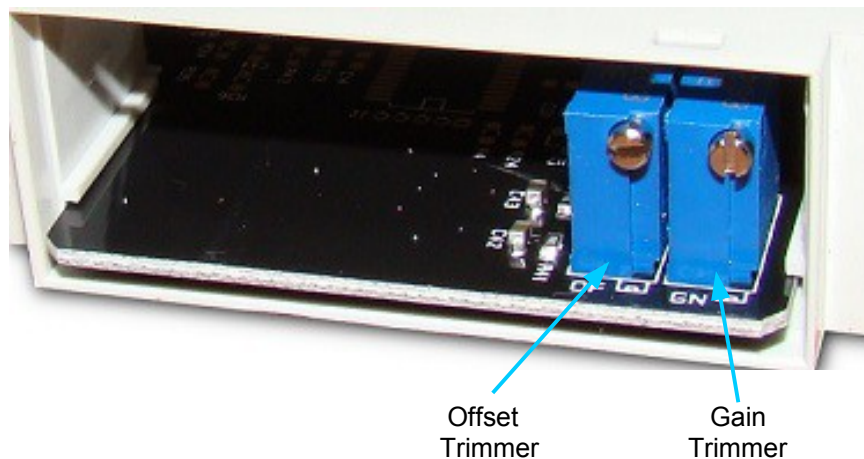
11 is RS485 ground (isolated from all other grounds)  
12 is B (D-)

**NOTE: Use 3 wire connection, preferably STP**

**Pt1000 RTD:** 7 and 8. Keep the wires as thick and short as possible

## 4.2.1. TRIMMERS

There are 2 trimmers on this device under the small cover on the top of the enclosure. When the factory calibration (default) is programmed, these trimmers do not matter. If the trimmers are programmed they can change the gain and the offset of the input circuit. This way you can do your own calibrations or adjust the reading to compensate a probe for its aging.



## 4.3. COMMUNICATION

GpH141-MB has a two wire isolated RS485 MODBUS RTU communication port. All programming is available through this port. It can be connected to a lap top or a PC through a USB to RS485 converter or to a PLC through RS232 to RS485 converter.

The settings are:

- The baud rate is 9600 or 19 200, programmable. Default is 19 200.
- The character is 8 bit
- The parity is none, odd or even, programmable. Default is even.
- Stop bits are 1 or 2, not programmable. MODBUS standard requires 1 stop bit with odd or even parity and 2 stop bits with no parity.
- No handshaking.

MODBUS address is programmable from 1 to 247. Default is 1.

The protocol for communication is MODBUS RTU. Functions 0x03 (read holding registers), 0x04 (read input registers) and 0x06 (write single register) are implemented. GCT20K-MB handles exceptions 1, 2 and 3.

Here are the registers used:



<b>Register address</b>	<b>Register Type</b>	<b>Read/Write</b>	<b>Description</b>	<b>Format</b>
19	Input	R	Input voltage in 0.1 mV steps, not compensated for temperature, <b>NOTE 1</b> -1.000 V to +1.000 V = -10 000 to +10 000	7456 = 745.6 mV
20	Input	R	pH in 0.01 steps, compensated, 0.00 to 14.00 = 0 to 1400	710 = 7.10 pH
21	Input	R	Temperature , <b>NOTE 1</b> -200 to +1200 = -20.0 °C to +120 °C	538 = 53.8 °C
1010	Holding	R/W	Factory Calibration or trimmers 0 = factory cal, 1 = trimmers	default is 0 = factory calibration
1011	Holding	R/W	Temperature compensation 0 = disabled, 1 = connect Pt1000 RTD	default is 0 = disabled
1053	Holding	W	Baud Rate: 0 = 19 200, 1 = 9 600, <b>NOTE 2</b>	default is 0 = 19 200
1054	Holding	W	Parity: 0 = even, 1 = odd, 2 = none, <b>NOTE 2</b>	default is 0 = even
1200	Holding	W	MODBUS address , 1 to 247	default is 1

**NOTE 1:** This is a signed 16 bit integer

**NOTE 2:** When changing the baud rate, the MODBUS address or the parity, GpH141-MB will first do the change and then reply to the master with the new setting already in effect.

**TIP:** After changing the MODBUS address, or the baud rate or the parity, write down the new setting on the white label on GpH141-MB

## 5. ORDERING

For ordering please use the G Instruments part number 30535.



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