

# Operating Manual



## MH-LVE

### ● Note

The insert with the electronical limiting value contacts is a built in option for devices of the MH series. This operating manual describes only the electronical limiting value contacts and the connection of the HART current loop. For the device of the MH series please refer to the belonging to operating manual.

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## ● Safety warnings



When mounting, initiating and operating this limiting value insert the safety precautions and regulations have to be observed. Only staff with a corresponding qualification should work with the insert. A non-observance of the safety regulations may cause serious injuries and/or damages. Check before initial operation the suitability of the limiting value insert for this area of application. The technical data of this manual have to be followed.

## ● Technical data

### Input

Current loop: 4...20 mA HART  
Input resistance Ri : approx. 160 ohms (U= 3,2 V)

### Accuracy

Resolution: -999...+9999 digit  
Measuring fault:  $\pm 0,2\%$  of measuring range,  $\pm 1$  digit  
Temperature drift: 100 ppm/K

### Indication

Display: 7 segments, 8 mm red, 4 digits  
Time of indication: 0,1 s - 1 s - 10 s (adjustable)  
Memory: minimum / maximum values  
Overflow/underflow: to HI / to LO

### Electronical limit contacts

2 open collectors: 36 VDC, 150 mA  
leakage current: approx. 0,1 mA  
Indication: limit value reached: LED red / limit value not reached: LED green  
Adjustment: with 3 keys  
Fail-safe function: voltage supply "ON" = contacts active

### Ambient conditions

Operating temperature: 0...+80°C  
Storing temperature: -20...+80°C

### Supply

Current loop: 4...20 mA  
Voltage supply: 24 VDC  $\pm 5\%$  (maximum 50 mA)  
(for additional load, without galvanical insulation)

### Mechanics

Connection: plug-in terminal strip 2x 4-pole, 1x 3-pole, 1x 2-pole, up to 1,5 mm<sup>2</sup>  
PCB: dimension: 60 x 48 x 33 mm  
Fastening: plugable, 2 mounting holes  
Weight: approx. 35 g  
Protection: IP 20

### Programmable features

range of indication / refresh display / decimal point / (unit (°C/°F) / stabilisation zero point / limit value 1 + 2: trigger value, reset value, delay times / locking of programming / calibration points / TAG number

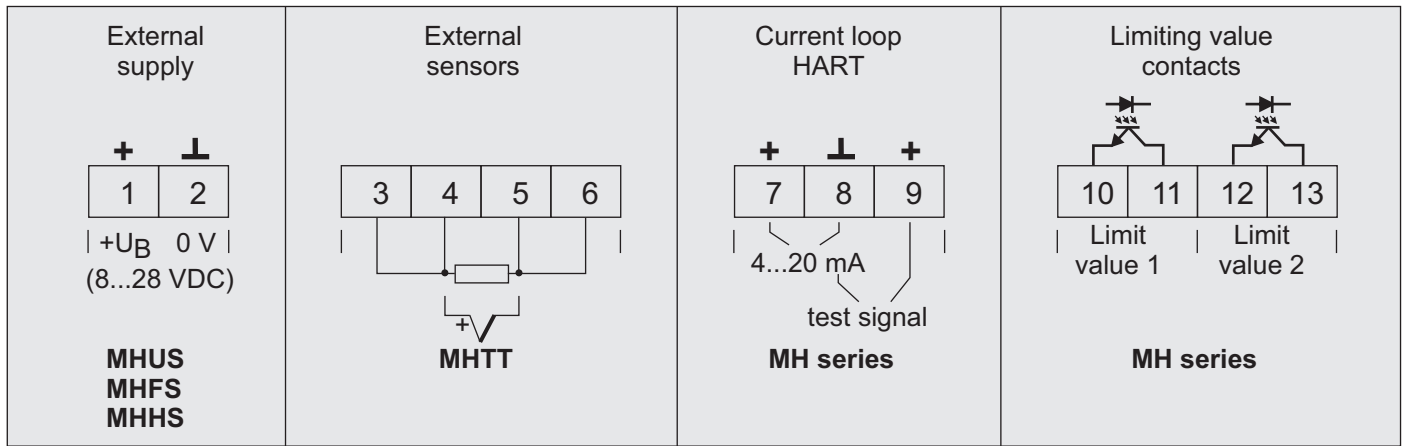
### Possibilities of indication

Programming the decimal point and unit the following scope of representation is possible: xxxx / xxx.x / xx.xx / x.xxx / (xxx°C / xxx°F)

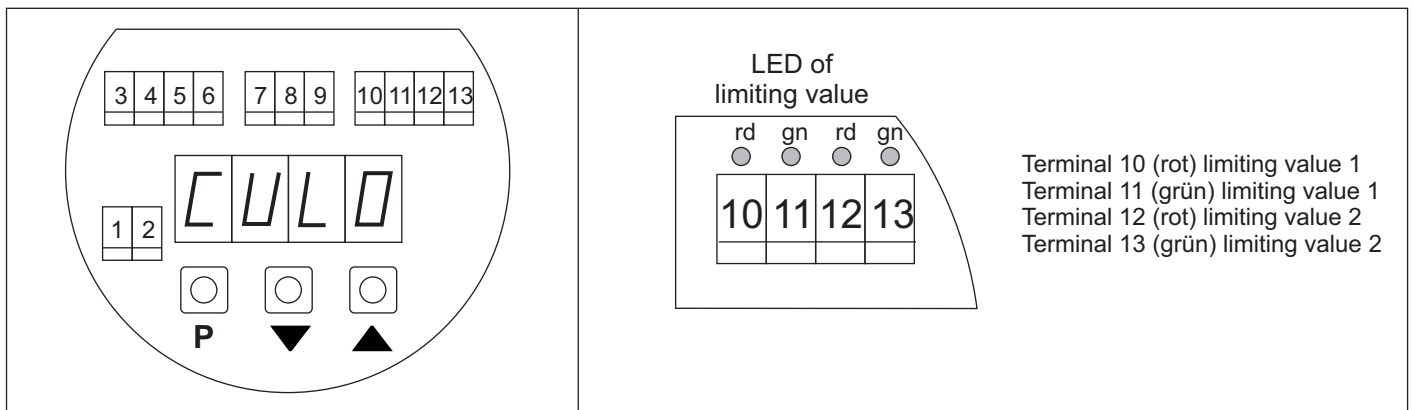
## ● Underflow/overflow

Standard input range: 4,00...20 mA  
Displayed standard input range: 3,90...20,10 mA  
Usable input range: 3,60...21,50 mA  
Warning underflow/overflow: 3,60...<3,9 mA / >20,10...21,50 mA  
Indication underflow/overflow: <3,60 mA / >21,50 mA  
On warning the indicator flashes: normal indication is changing with bars  
Values below 3,60 mA: a bar is changing with indication **undr**.  
Values above 21,50 mA: a bar is changing with indication **over**.

## ● Connection



## ● Terminals, keys, limiting value LED



## ● Programming

1. Connect the instrument according to the wiring diagram.
2. Switch on power supply of the instrument. This is followed by an initialisation and a segment test. Then **CULO** is indicated and afterwards the version of firmware (eg **F1.16**). Subsequent the limiting value insert is switching to the operation mode.
3. Press the **P** key. Indication of program number **P 0**.
4. Change the program number by simultaneous pressing of **P** & **▲** keys or **P** & **▼** keys.
5. With the desired program number being chosen, go to the stored value by pressing the **P** key.
6. Short pressing of **P** results in a change of digit. The value of the chosen digit is changed by pressing the **▼** or **▲** key.
7. Storing of the new settings is effected by pressing the **P** for approx. 2 sec. This procedure is acknowledged by transversal bars in the display.
8. If no other key is actuated, the unit switches to its operation mode after seven seconds.

### Additional key functions in standard mode for indication of min/max values

The **▲** key serves for indicating the value of the Max memory in the display for some seconds

The **▼** key serves for indicating the value of the Min memory in the display for some seconds

Simultaneous pressing of the **▲** and **▼** keys erases the values of the memory (minimum / maximum)

## ● Program table

PN	Description	Range	Delivered state <sup>1)</sup>
0	Calibration mode 0 = sensor calibration (with applied signal, factory configuration) 1 = programming (indicated value at 4/20 mA)	0/1	1
1	Final value (Programming the value at 20 mA, eg 600)	-999...9999	20.00
2	Initial value ( Programming the value at 4 mA, eg 100)	-999...9999	4.00
3	Selection of decimal point or unit (Programming a unit the indication shifts to the left)	0 0.0 0.00 0.000 °C °F	0.00
4	Time of average / refresh of display (in 1/10 seconds)	5...10	10
5 <sup>2)</sup>	Stabilisation zero (the +/- range where 0000 is indicated)	0...100	2
9	Switch off time of average (jump of input signal of x% of adjusted range of indication)	5...100	5
50 <sup>3)</sup>	Definition PIN-code for programming interlock (value >0000))	0000...9999	0000
51	Version of program		
52	Version of program day/month		
53	Version of program year		
54	Serial number manufacturer		
55	Serial number customer		
56	Day/month of delivery		
57	Year of delivery		
100	Number of calibration setpoints (calibration points for sensor calibration only, calibration points reduce the measuring rate)	0...30	0
101...130	Calibration points (the visible number of calibration points is fixed under PN100)	-999...9999	0
150 <sup>4)</sup>	Limit value 1: trigger value (mA)	-999...9999	12.00
151 <sup>4)</sup>	Limit value 1: reset value (hysteresis value) (mA)	-999...9999	11.00
152	Limit value 1: delay of trigger (x100 ms)	0...9000	0
153	Limit value 1: delay of reset (x100 ms)	0...9000	10
160 <sup>4)</sup>	Limit value 2: trigger value (mA)	-999...9999	16.00
161 <sup>4)</sup>	Limit value 2: reset value (hysteresis value) (mA)	-999...9999	18.00
162	Limit value 2: delay of trigger (x100 ms)	0...9000	0
163	Limit value 2: delay of reset (x100 ms)	0...9000	10
200	TAG number	0000....9999	0

1) With factory configuration

2) When programming a value >1 a hysteresis of 0,1% is activated. This avoids a jumping indication.

3) Optionally (if a PIN-code is not defined, PN50 is hidden). A PIN-code can be programmed via PC-interface only during factory settings. When there is a definition for a PIN-code (indication of **Pin** during segment test), for programming (after key **P** was pressed) the defined PIN-code of PN51 has to be input. This has to be confirmed by pressing the **P**-Key for 2 seconds. If no key is used for approx. 1 minute, the programming mode is blocked again.

When PN50 is selected to change an existing PIN-code, 5 times **Pin** is indicated before the changings can be started.

4) The difference between trigger value and reset value is the hysteresis.