



Operating Manual

MCT150

Monitor Calibration Tool

English

743-600-G1

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2. MCT150

The instrument consists of two parts, a base unit with display, batteries, and an interchangeable sensor module.

The sensor modules are available for various gases and ranges. The sensor module is factory calibrated and has an expiry date.

MCT150 is an instrument to be used with:

- Detectors type LDM150
- Monitoring unit type LDM150R

MCT150 Instrument can be used as follows:

- Determine the environment of the actual detector.

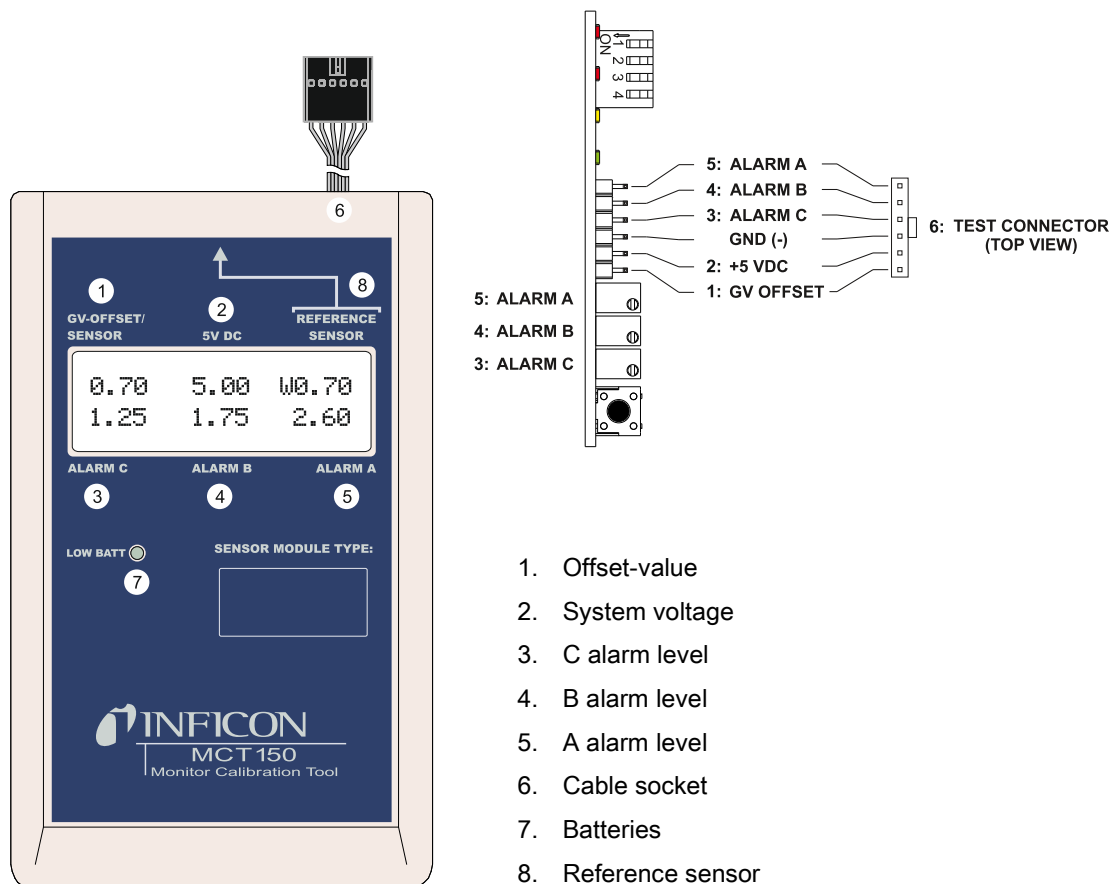
Units with SC-sensors only.

- Verify offset-value when changing sensor head

Units with SC-sensors only.

- Measure sensor signal during "bump-test", or when using reference gas

- Check of alarm thresholds



3. Cautions and Warnings



WARNING

Altering of set point, and adjustments shall be carried out by trained personnel only, who has adequate knowledge of the products. Incorrect handling may cause that the system becomes inoperative.

4. Specifications

Display	Alphanumeric LCD display, LED indicator of battery level.
Measurements	WxHxD: 100x165x44mm
Weight	365g (inclusive batteries)
Power supply	4 x AA alkalis (8h) or chargeable Ni-MH (10h) batteries

5. Sensor modules

Code	Model	Details
743-703-G1	Sensor module, NH ₃ , MCT150	Sensor for ammonia (NH ₃) - 4000
743-706-G1	Sensor module, MCT150	Sensor for refrigerant gases (HFC / HFO / Propane)

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6. Start of MCT150

The instrument is switched on via the on/off button on the left side of the unit. At start up the letter “W” will be flashing on the left side of “Ref sensor” value. The letter “W” indicates that the sensor is warming up. Check that this “Ref-value” is stabilized before to use the instrument. No adjustment is to be carried out before that the indication has extinct.

GV-OFFSET/ SENSOR	5V DC	REFERENCE SENSOR
0.70	5.00	W0.70
1.25	1.75	2.60
ALARM C	ALARM B	ALARM A

7. Control of the Ref-sensor offset (Sensor module)

To control the status of the Ref-sensor, one should start the instrument in a possible clean environment, e.g. outside.

- The “zero”-value of the sensor is defined as the signal (VDC) when in clean air

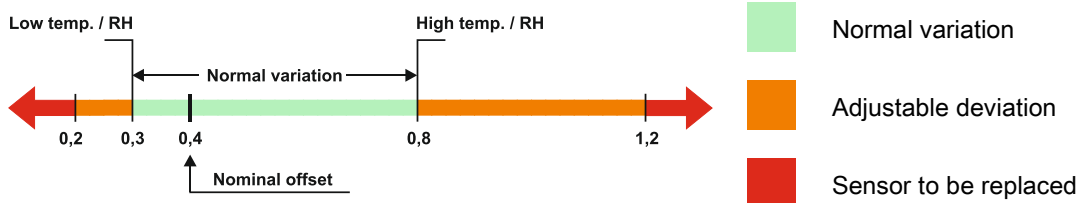
By that, it is normal that the signal varies in various environments, and also due to temperature and humidity. The output is normally higher during summer than winter.

The acceptable variation is given in the data sheet of the specific sensor. The factory set sensor module, does normally not require any adjustment. Although, a small “drift” can occur due to environment and the frequency of use.

- If the value shown in the display is within the green area , no adjustments is required
- If the value shown in the display is within the orange area, the value should be adjusted
- If the value shown in the display is within the red area, the sensor has to be replaced
-



If the value in the display increases when entering a plant room e.g., this indicates that there are substances present that effects the sensor. This value is to be the reference value for the detectors within this perimeter.



English

8. Adjustment of the reference sensor offset (Sensor module)

Always start the procedure by checking the due date of the sensor module. (See label on the module).



If due date is passed, the sensor module shall be replaced without delay. Sensors is a perishable item that is affected by dust, dirt and can be “poisoned” by various substances such as, aerosols, paint, solvent fumes, glue and similar.

- Before adjustment, the unit should be active in a stable environment for at least one hour.

At the sensor module there is a potentiometer that is accessible by the hole in the end of the housing of the instrument:



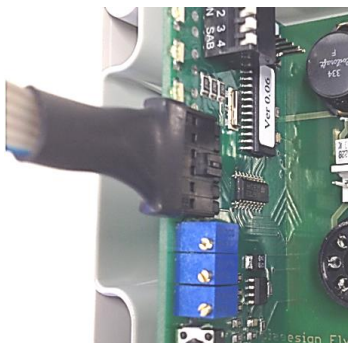
Carefully adjust by using a small screwdriver. When the offset value passes from the orange area to the green area, called (normal variation) of the sensor, the task is completed.

The instrument is now ready for use.

English

9. Connect the instrument to the test-socket of the detector

The small guide at the cable-socket should be pointing to the right, when the three potentiometers for alarm threshold adjustment of the actual unit, are located underneath the test terminal socket:



10. Check the system voltage of the detector

The system voltage of the detector shall be 5 VDC $\pm$ 0,15V

If the deviation is larger, check the power supply of the detector.

11. Check the detector output



Make sure that the sensor head of the sensor module and the detector are identical.

- The detector has to be powered for at least one hour before control is carried out, and it should not be exposed to draft.

The sensor output of the connected detector is visualized at the very left of the upper row of digits. This value is to be compared with the value of the reference sensor within the MCT150. Adjust the value of the detector via the potentiometer, marked "GV-offset pot" (see picture, page 2) to reach the similar value as of the ref-sensor. See the instruction of the specific detector.



At large deviations, $> \pm 0,5\text{VDC}$, the sensor head is probably damaged/poisoned, and shall be replaced.

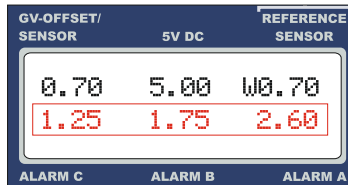
GV-OFFSET/ SENSOR	5V DC	REFERENCE SENSOR
0.70	5.00	0.70
1.25	1.75	2.60
ALARM C	ALARM B	ALARM A



Monitoring units and detectors has built in "fail safe" circuit that enables un failure indication in case of sensor error. The same alarm occurs in case of the sensor signal reaches below 0,1 VDC due to an incorrect adjusted GV-offset e.g.

12. Control and altering of alarm thresholds

On the vertical PC-board of the i LDM150 / LDM150R units, there are three (3) potentiometers for adjustment of alarm thresholds for C, B and A alarm



Altering alarm thresholds:

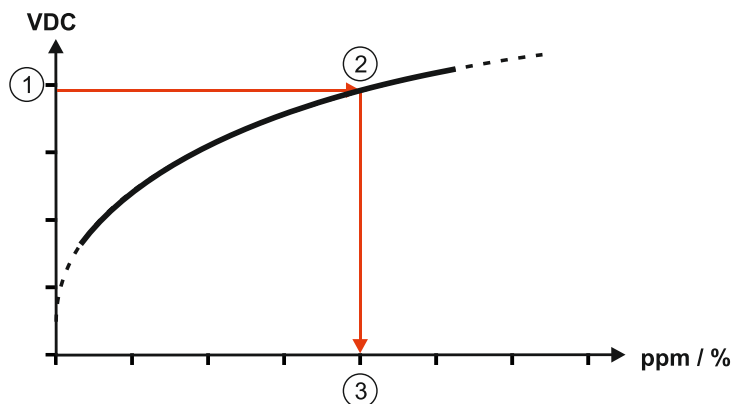
After connecting the instrument, the three actual thresholds of C, B & A alarms are visualized on the bottom row of digits. Adjust at the corresponding potentiometer, to reach desired value.

In the datasheet of the actual sensor head, the desired alarm levels can be read as PPM / % values and as a corresponding voltage value VDC. In order to check the corresponding PPM / % value for a threshold value in VDC, one starts by finding the VDC value at the vertical axel. Then following an imagined horizontal line until it reaches the graph, and thereafter following an imagined vertical line until it reaches the horizontal axel of the diagram.

On the horizontal axis the corresponding PPM / % value can be read. If one likes to find the corresponding VDC-value for a certain PPM / % value, the procedure is to be carried out in the opposite order. (See the picture below)



Alarm thresholds should be chosen within the area of the solid line of the graph. If values are chosen from the area of the dotted line, there are significant risks of distortion with false alarms or total absence of alarm consequently.



Example, sensor graph

13. Check of the response- and recovery time of the sensor by performing a "bump test"

After check and eventual adjustments of the sensor off-set, a function control is to be carried out. By exposing the sensor to a small amount of concentrated gas directly to the sensor head, the response- and recovery time can be checked. The sensor head shall be exposed, and eventual splash protection removed during the test.

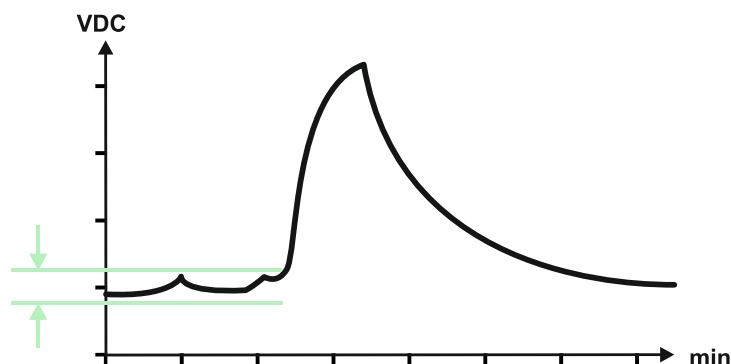
The comprehension is that the sensor signal is within the "normal" area when exposed to clean air (the green area of the sensor graph)

- Expose the sensor to the actual gas for 5 sec maximum, the sensor should react instantly and reach > 4VDC within 2-5 sec.
- The signal output should reach the start level within ~ 5 minutes after finished gas exposure. (see graphs below)



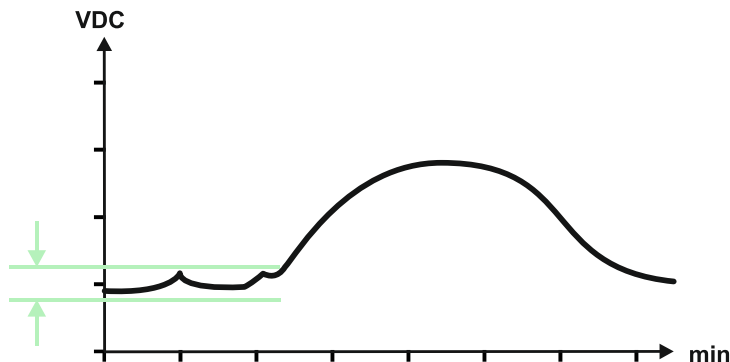
Most SC-sensors can be checked with Butane gas, as used in ordinary cigarette lighters.

The graph below shows the quick response- and recovery time for a healthy sensor



If the response- and recovery time is slow, or if the output signal does not reach the start value according to the suggested time frame, the sensor is probably contaminated and shall be replaced.

The graph below shows a slow response- and recovery time of a contaminated sensor.



14. Battery indication "low Batt"

The LED "Low Batt" will light up with a constant light when the batteries are close to empty. When the LED starts to flash, the batteries are to be replaced.

15. Troubleshooting

If the actual detector does not generate an alarm when exposed to gas. Check the following:

- GV-offset and sensor signal due to point 6 and 8
- Alarm threshold settings
- DIP-switches, settings of alarm delay
- That the detector is not in service mode



Storage of the instrument

It is of significant importance to the reliability of the instrument, that the storage conditions are such, that it is not exposed to substances that can contaminate or damaged the sensor head of the instrument.

This product is intended for use in the industrial area.

Technical specifications are subject to change

