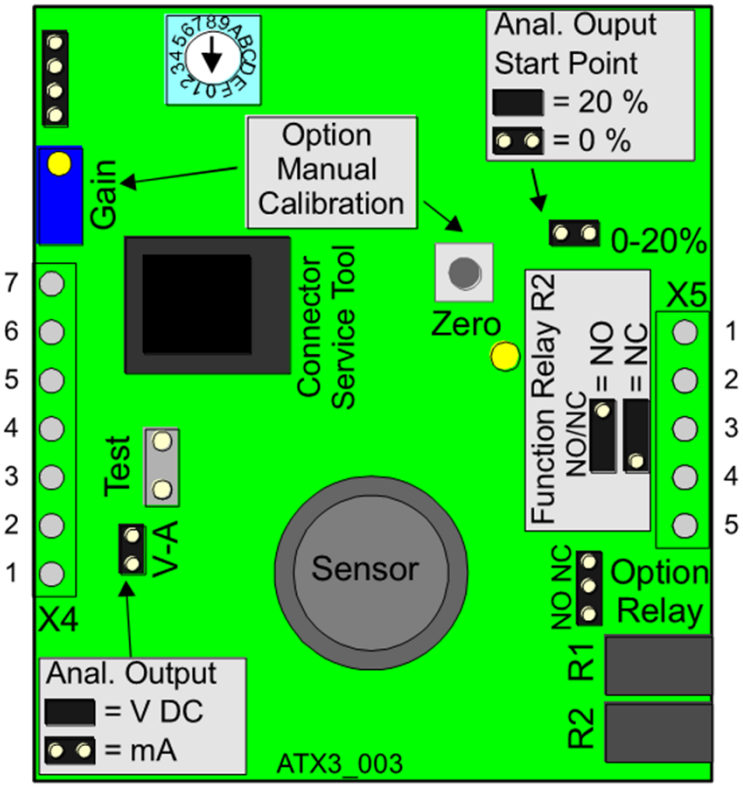
Calibration of MSR Infra-red & Electrochemical Sensors

Step 1: Engage Service mode (To inhibit alarm when calibration gas is applied)
Step 2: Apply multi-meter to Test Pins
Step 3: Apply Zero calibration gas to sensor (wait 30 seconds)
Step 4: Check multi-meter reading. At Zero gas value it should read 40mv. If it requires adjusting Pull board out and plug back in. Hit the zero button multiple times until the multi-meter is reading 40mv.
Step 5: Remove zero calibration gas and apply Gain calibration gas (wait 30 seconds, Consult datasheet for t90 to decide on appropriate waiting time)
Step 6: Adjust gain calibration pot till given value is equivalent in mv to the following equation.

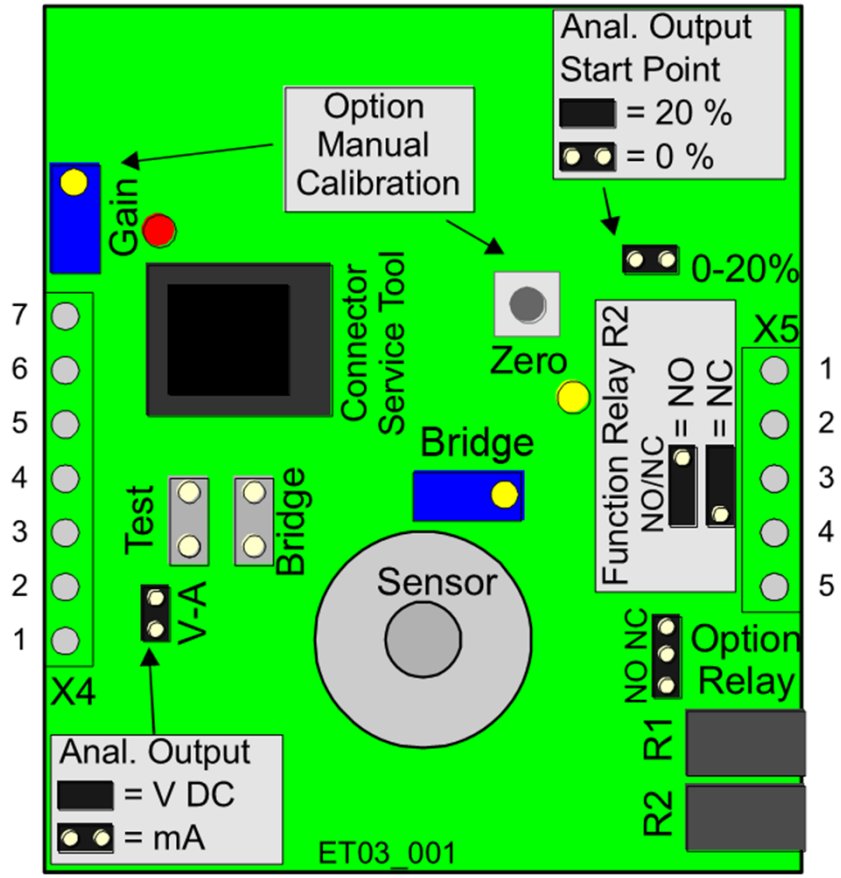
$$Test\ Pin\ Voltage = \left[\frac{Gain\ gas\ concentration}{Sensor\ Range}\ \text{x}\ 160\right] + 40$$



Calibration of MSR Pellistor sensors

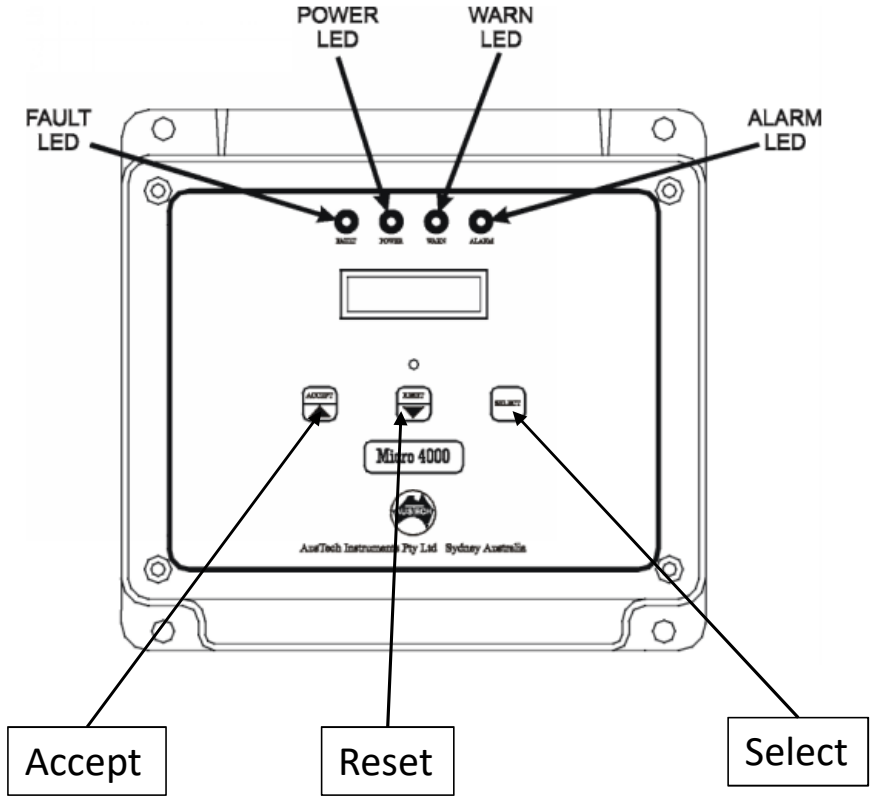
- **Step 1**: Engage Service mode (To inhibit alarm when calibration gas is applied)
- **Step 2**: Apply multi-meter to Bridge Pins
- **Step 3**: Apply Zero calibration gas to sensor (wait 1 minute for sensor reading to stabilize).
- **Step 4**: Adjust Bridge Voltage to 0 mv (slightly above 0 mv is recommended ~0.1mv).
- **Step 5**: Apply multi-meter to test pins.
- **Step 6**: At Zero gas value it should read 40mv. If it requires adjusting Pull board out and plug back in. Hit the zero button multiple times until the multi-meter is reading 40mv.
- **Step 7**: Remove zero calibration gas and apply Gain calibration gas
- **Step 8**: Adjust gain calibration pot till given value is equivalent in mv to the following equation.

$$Test\ Pin\ Voltage = \left[\frac{Gain\ gas\ concentration}{Sensor\ Range}\ \text{x}\ 160\right] + 40$$

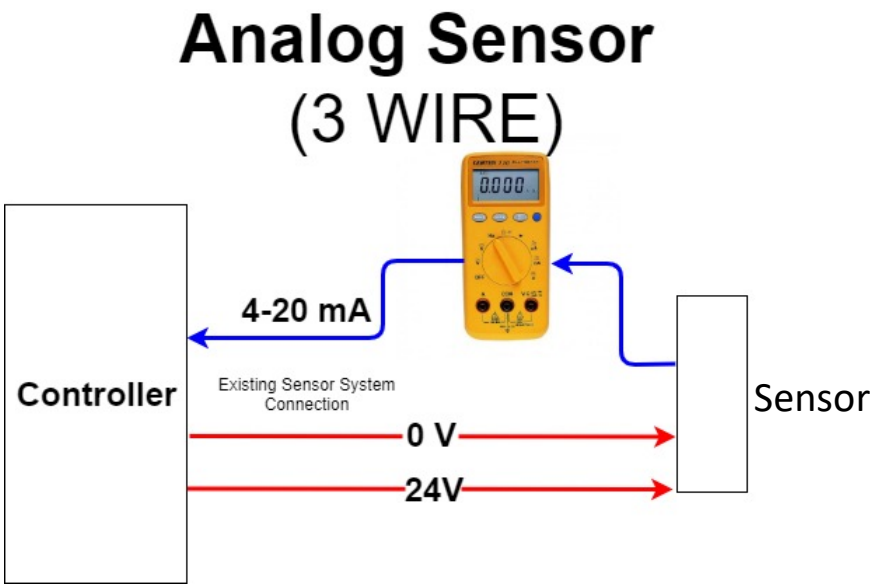


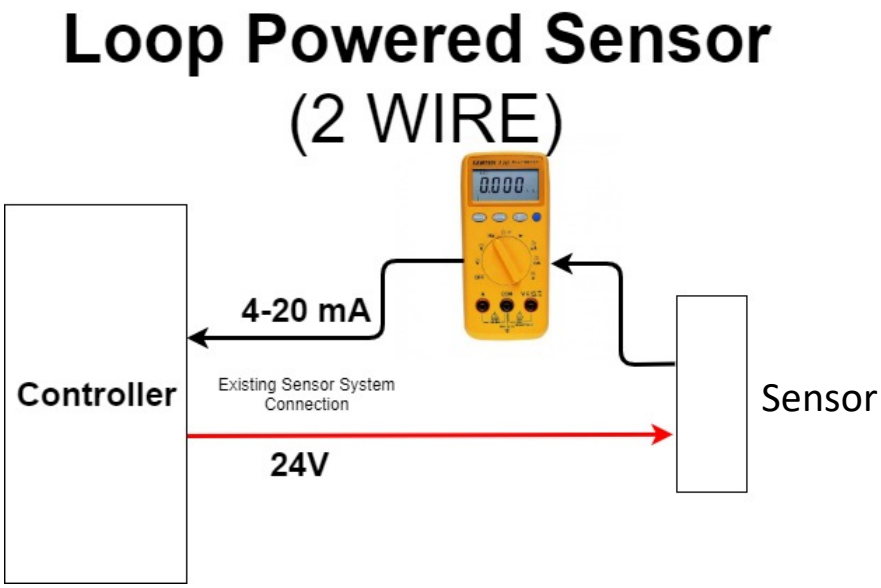
Adjustment of AUSTECH Sensor System

- **Step 1**: Cycle to sensor to be calibrated
- **Step 2**: Apply zero gas
- **Step 3**: Enter Calibration mode by using the Accept and Select Buttons together for 5 seconds. (Countdown shown shall be CAL 5, 4, 3… 1 if LCD displays SET, abort and ensure accept and select buttons are used.)
- **Step 4**: Adjust sensor reading on LCD to 0 reading.
- **Step 5**: Apply gain gas
- **Step 6**: Adjust sensor reading on LCD screen to match the gain calibration gas concentration.



Calibration of AUSTECH Sensor System

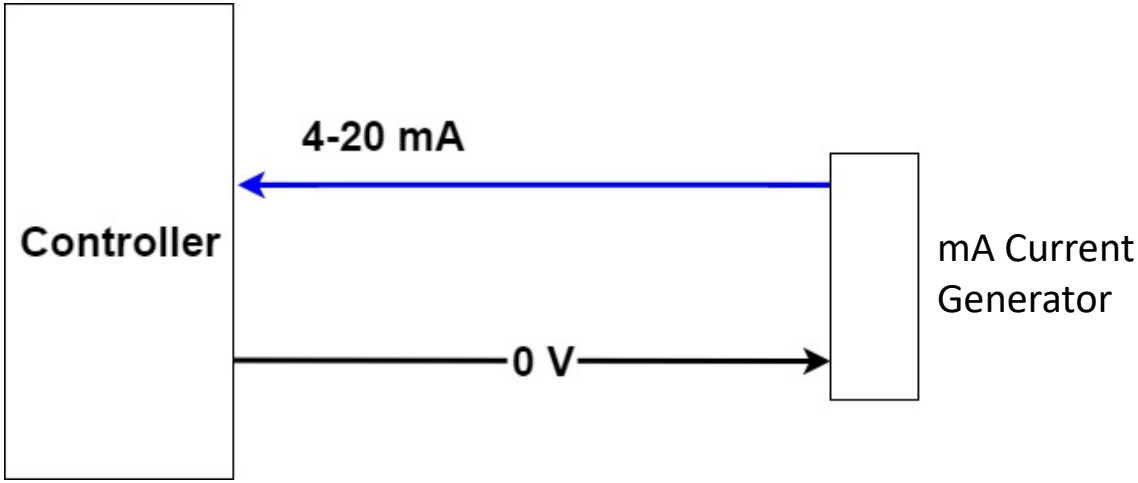




Step 1: Apply zero gas and adjust sensor output using zero pot
Step 2: Apply gain gas and adjust sensor output using gain pot

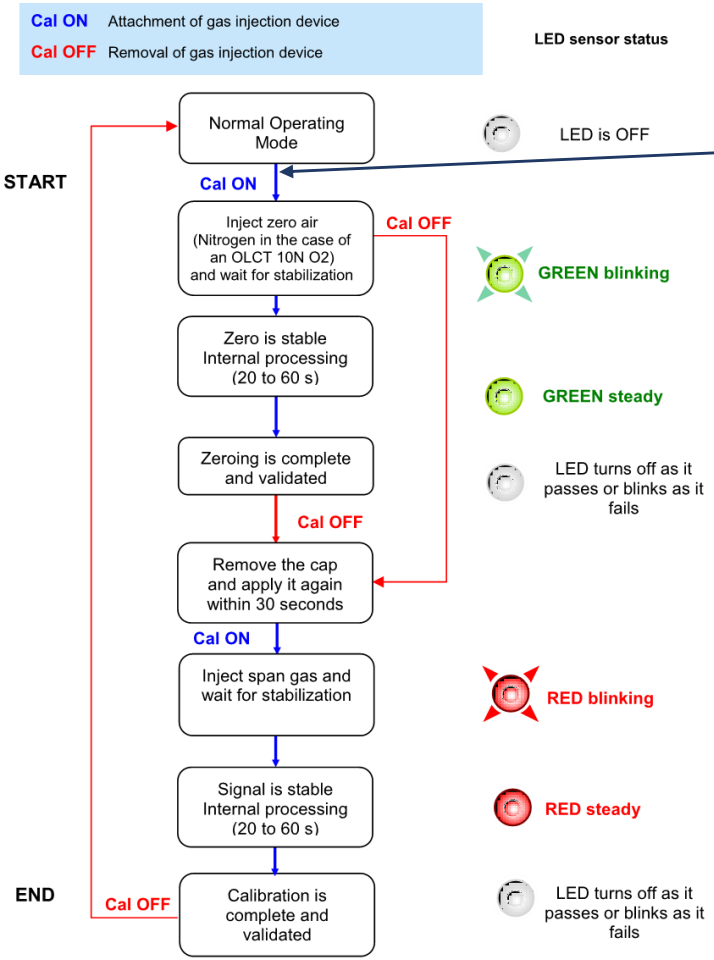
Calibration of AUSTECH Sensor System Continued…

- **Step 1**: Apply 4ma through the current generator
- **Step 2**: Scroll to sensor being calibrated and hold down “Accept” and “Select” buttons
- **Step 3**: Adjust sensor reading to 0
- **Step 4**: Apply 20 ma through the current generator
- **Step 5**: Adjust sensor reading to full range (ie. 25% for oxygen or 100% LEL for methane)

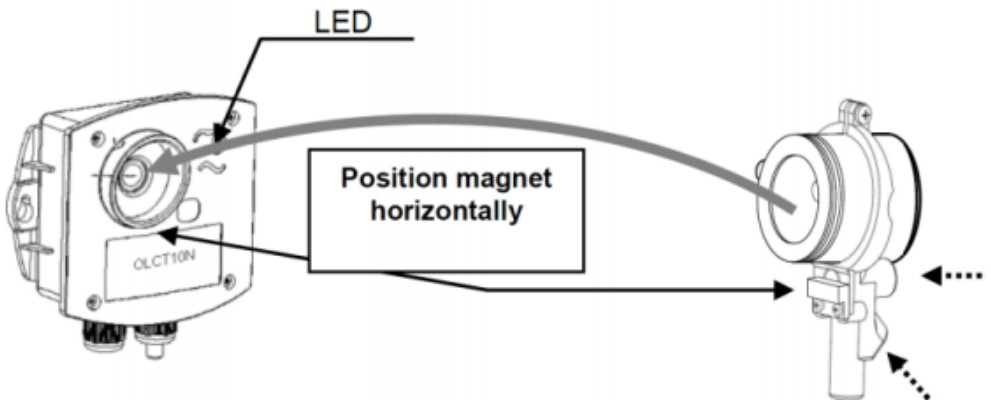


Note: Find the connection points on HOSLAB Server – “L:\Manuals\Austech\”

OLDHAM OLCT-10N Auto-Calibration



Cal ON refers to applying the calibration cap below



OLDHAM OLCT-10N Auto Calibration – Cont.

Gas	Range	Calibration gas concentration
Methane (CH_4)	0-100% LEL (5% vol.) 0-100% LEL (4.4% vol.)	2.5% CH_4/Air (50% LEL) 2.2% CH_4/Air (50% LEL)
Hydrogen (H_2)	0-100% LEL	2.0% H_2/Air (50% LEL)
Butane (C_4H_{10})	0-100% LEL	0.9% C_4H_{10}/Air (60% LEL)
Propane (C_3H_8)	0-100% LEL	1.1% C_3H_8/Air (55% LEL)
Oxygen (O_2)	0-30% vol.	20.9% O_2
Carbone monoxide (CO)	0-300 ppm 0-1000 ppm	100 ppm CO 300 ppm CO
Carbone dioxide (CO_2)	0-5000 ppm 0-5% vol. 0-100% vol.	3000 ppm CO_2 2.5% CO_2 50% CO_2
Hydrogen sulfide (H_2S)	0-30 ppm 0-100 ppm	25 ppm H_2S 25 ppm H_2S
Nitrogen monoxide (NO)	0-100 ppm 0-300 ppm	50 ppm NO 50 ppm NO
Nitrogen dioxide (NO_2)	0-10 ppm 0-30 ppm	10 ppm NO_2 10 ppm NO_2
Ammonia (NH_3)	0-100 ppm 0-1000 ppm	100 ppm NH_3 1000 ppm NH_3

Calibration Gas Concentration can't be adjusted. If you don't have the correct gain gas perform manual calibration (bit more effort)

Common Sensor Replacements (Suitable types):

- Alphasense O2-A2 only work for this
- If LEL sensor, replace the entire sensor as no replacement sensor cell available

OLDHAM OLCT-10N Sensor Replacement

Step 1

To change the sensor:

1. Remove the detector cover
2. Push and hold down the sensor replacement button (1) for 5 seconds until the solid green

LED (2) is on.

3. Release the button
4. Replace the sensor and conduct both manual and automatic calibrations (This is a mandatory step)

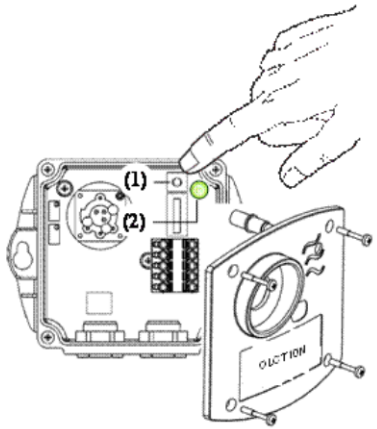
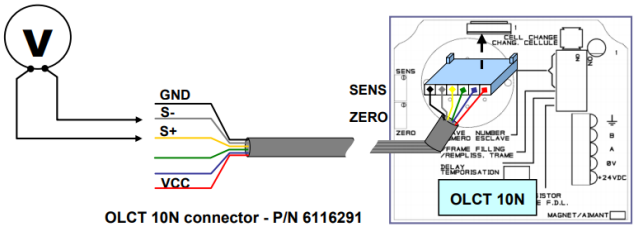


Figure 6: Sensor replacement

Step 2



OLCT 10N connector - P/N 6116291

Cable in cal kit – 2x bought by Hoslab.

Step 3

Apply zero gas. Adjust Pot labelled ZERO until multi-meter reads 0 mv. **DON'T USE THE MAGNETIC CAP FOR THIS!!**

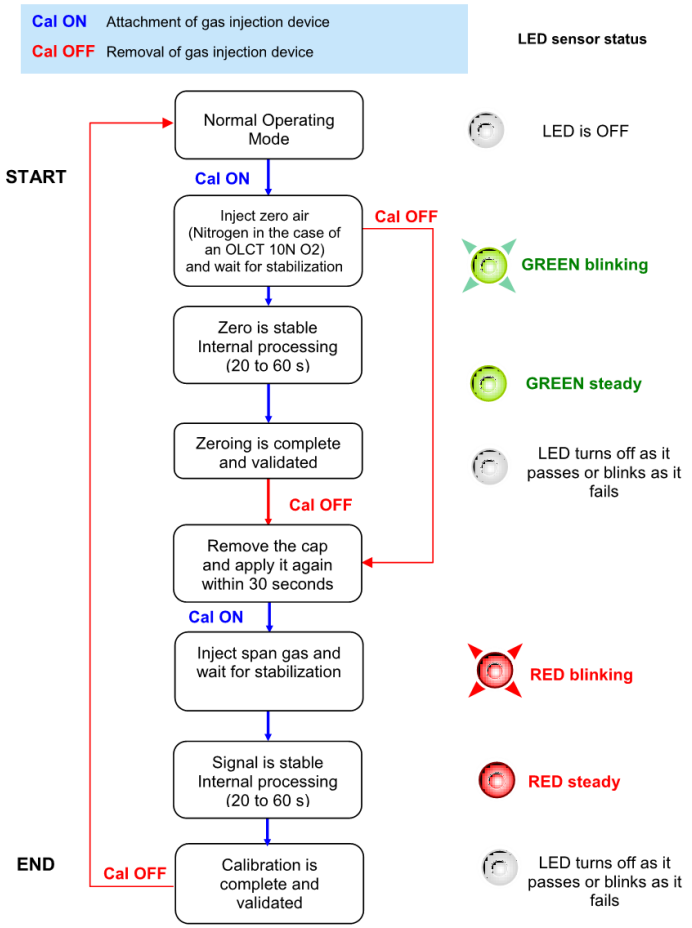
Step 4

Apply Gain gas. Adjust Pot labelled "SENS" until multi-meter reads the correct signal value in (mv) according to formula below. **DON'T USE THE MAGNETIC CAP FOR THIS!!**

$$Voltage\ (mv) = \frac{1600 \text{ x } Gain\ Gas\ Conc.}{Sensor\ Range}$$

Step 5

Perform Auto Calibration with magnetic Calibration cap!

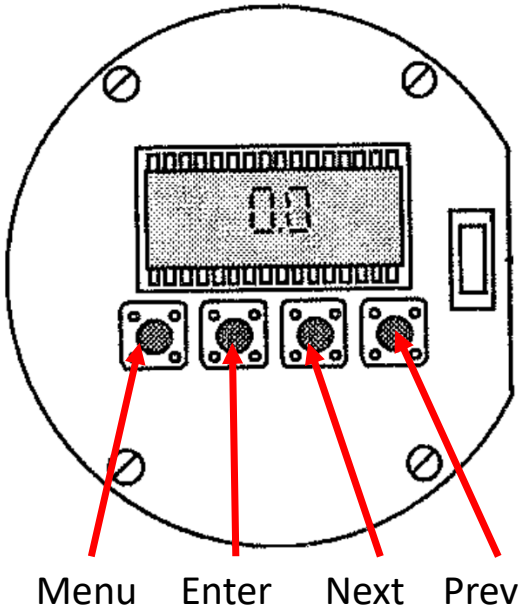


Dynament MSR Sensor

Negative / Positive zero suppression:

These sensors drift and therefore they require a suppression function which enables the sensor to output 0ppm until it crosses the set suppression threshold. For example if threshold set at 10 ppm, sensor will read 0 ppm from 0-10 ppm.

Negative suppression works similarly in that until it goes below say -10 ppm in output the sensor will show 0 ppm.



Error Codes flash on normal LCD screen replacing reading for 2 seconds.

Code #	Issue
2	Negative drift, adjust negative suppression
4	Zero the sensor as the sensor is too far outside of negative suppression
8	Sensor needs to be gain calibrated
16	Calibrate sensor, if error still occurs replace sensor cell if possible.
32	Calibrate sensor, if error still occurs replace sensor cell if possible.
64	Sensor signal too high, attempt calibration and replace if it doesn't work
99	Config. data corrupt, attempt power cycle and recalibration if possible

Dynament MSR Negative Suppression

Step 1:

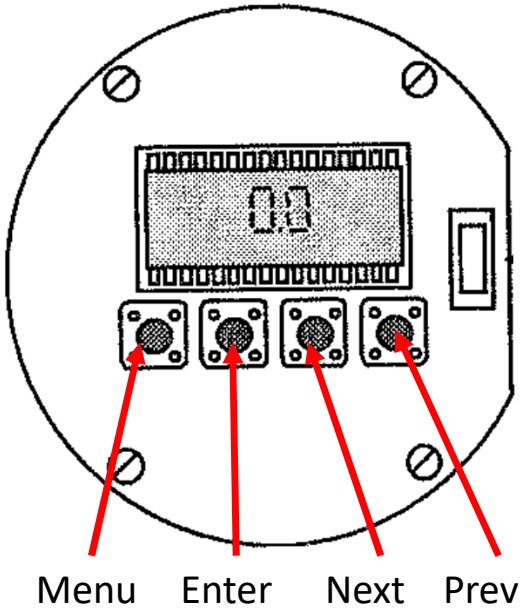
Press Menu key navigate to option E:20 using next /prev keys and press enter.

Step 2:

Use the next and prev keys to increase and decrease the negative suppression **(0-10% OF RANGE)**

Step 3:

Press enter to save the negative suppression value.



Dynament MSR Positive Suppression

Step 1:

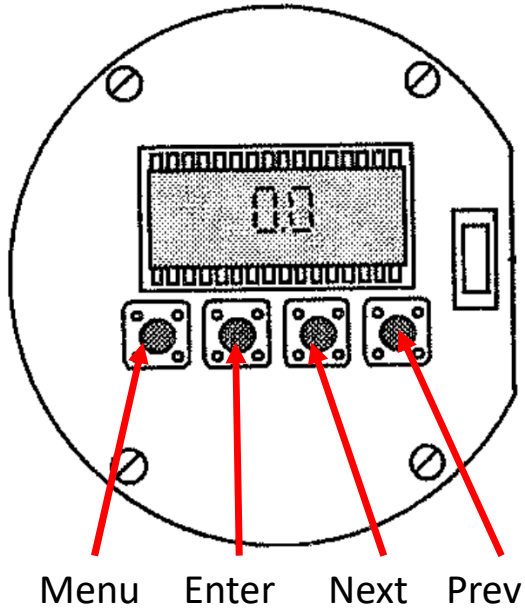
Press Menu key navigate to option E:19 using next /prev keys and press enter.

Step 2:

Use the next and prev keys to increase and decrease the negative suppression **(0-10 % OF RANGE)**

Step 3:

Press enter to save the negative suppression value.



Dynament MSR Calibration

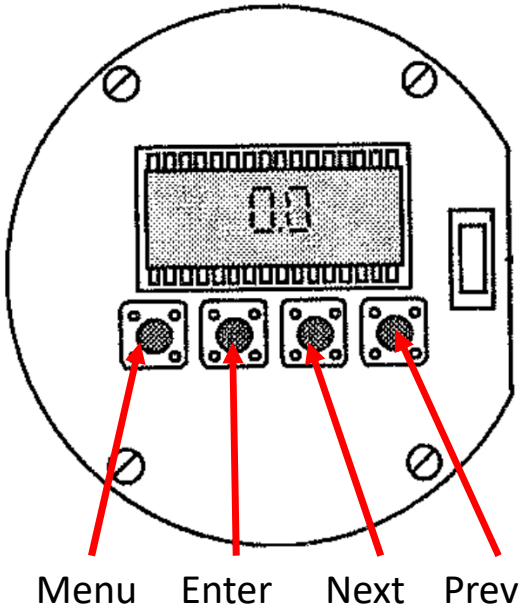
Step 1:

Press Menu key navigate to option E:1 using next/prev and press enter

Step 2:

Apply zero gas for 30sec to 1 min. Press enter to zero.

“- - - -” WILL BE DISPLAYED IF ZERO IS SUCCESSFUL



Dynament MSR Calibration cont.

Step 1:

Press Menu key navigate to option E:2 using next/prev and press enter

Step 2:

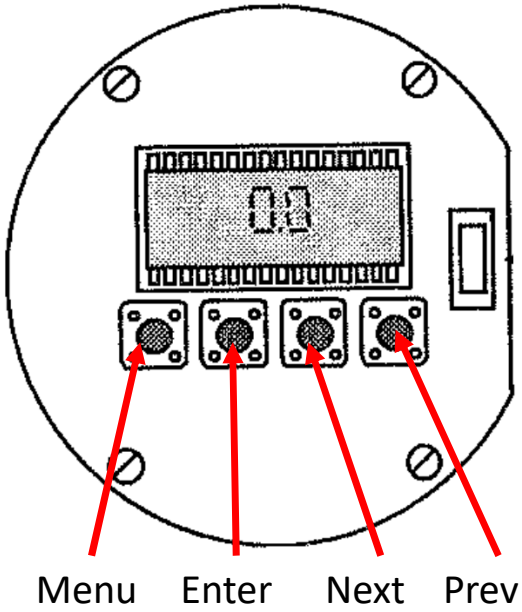
Apply gain gas for 30sec to 1 min.

Step 3:

Use next/ prev buttons to increase / decrease the reading till the concentration reaches the gain gas concentration.

Step 4:

Press enter to complete calibration.



<u>“- - - -” WILL BE DISPLAYED IF GAIN CALIBRATION IS SUCCESSFUL</u>

Sensor Info

SC2 sensors

Digital Sensors Require Laptop Tool or specific hand tool shown below.

MC2 sensors

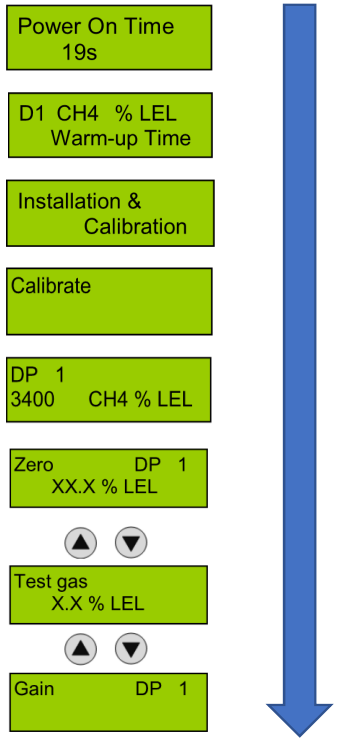
Analog Sensors Require a specific Handtool!

These two tools look the same, but are different. LOOK AT THE Tools provided and figure out why!

MSR MC2 “Analog” Sensor Calibration

- Step 1: Apply Service mode (Inhibit alarms on the controller)
- Step 2: Wait for power on time / warm-up Time to finish and navigate to

  “Installation & Calibration” -> “Calibrate” -> “DP 1”
- Step 3: Apply zero gas to sensor (wait 30 seconds) & go to “Zero calibration” menu.
- Step 4: Hit enter , if calibration is accepted “Saved” will appear on screen.
- Step 5: Navigate to “Test gas” and enter “Gain DP 1”
- Step 6: Hit enter , if calibration is accepted “Saved” will appear on screen.



MSR SC2 “Digital” Tool Operation

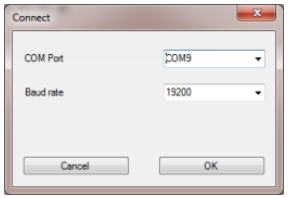
Plug the PC tool into your laptop.

USB drive should be detected, if not call ALVI / Sandeep for troubleshooting.

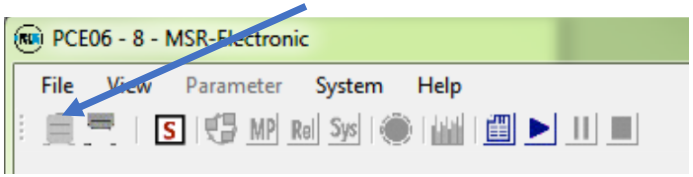
Open PCE06-XXX-XXXX.exe file

Enter Password for software **“8304”**

Select Comm port

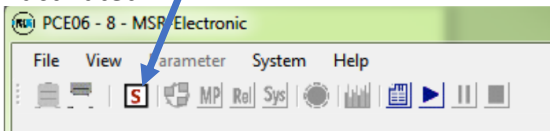


Click Connect

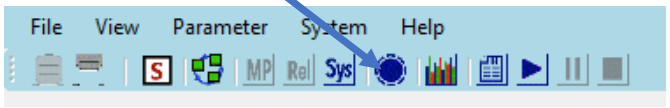


MSR SC2 “Digital” Sensor Calibration

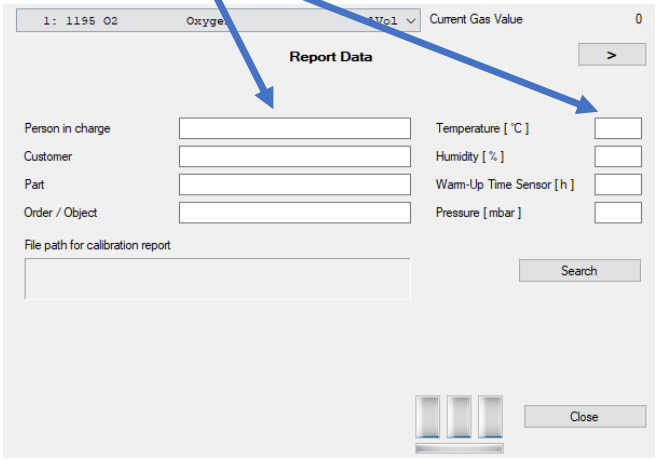
Step 1:
Before making any changes special mode or service mode must be activated



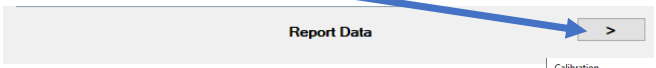
Step 2:
Engage Calibration Mode by clicking this icon.



Step 3:
Fill In Calibration Details and select sensor.

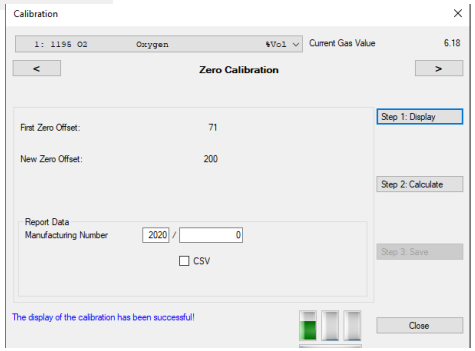


Step 4:
Hit the arrow key at top right corner



Start Zero Calibration:

- Apply zero cal gas
- Click Display
- Wait 30 seconds
- Click Calculate
- Click save once sensor reading has stabilised



MSR SC2 “Digital” Sensor Calibration cont.

Step 5:

Hit the arrow key at top right corner to progress on to gain calibration.

- Enter Bottle Gas Concentration.
- Apply gas
- Click Display -> Calculate -> Save
- Allow enough time for calculation, some sensors require upwards of 1 minute in order to complete