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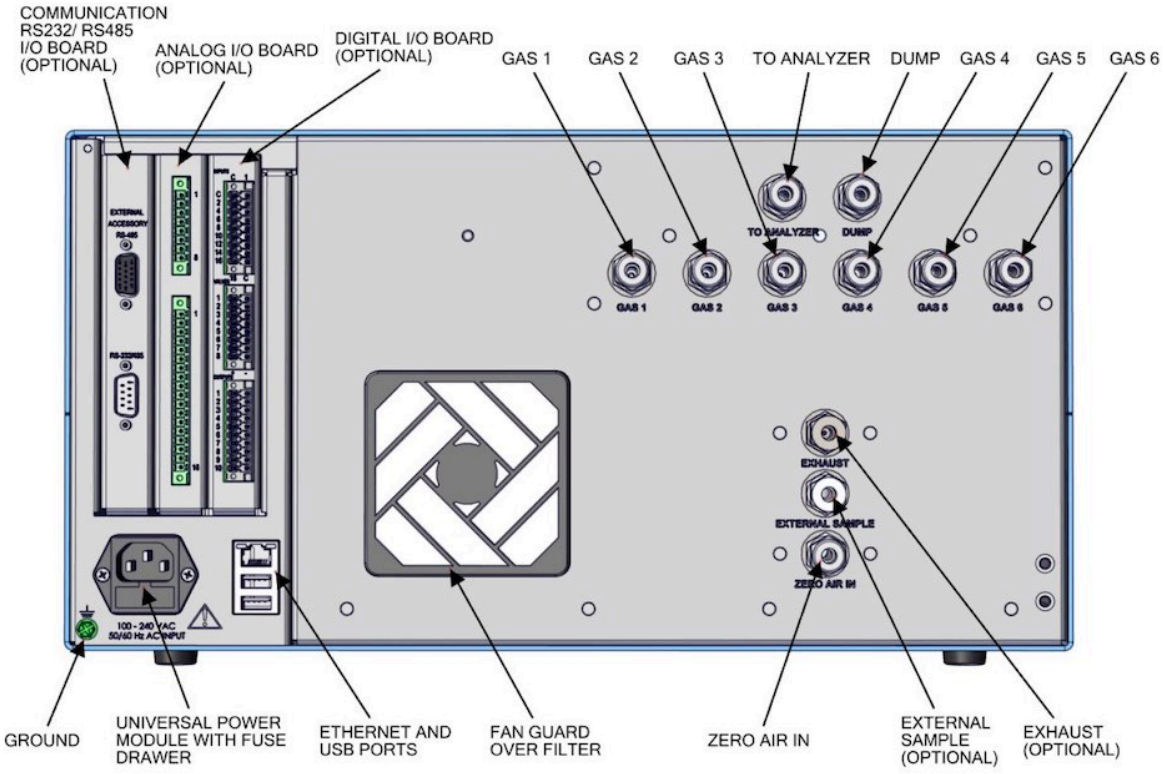
# Thermo 146iQ Calibrator Setup

1. Connect the Zero Air to the “Zero Air In” port on the back of the calibrator. Connect your high concentration gas cylinders to the Gas 1 to Gas 6 ports on the back of the calibrator. If you have a cylinder containing NO, and you wish to do GPT, connect it to the Gas 6 port. Set all pressures between 20 and 30 psi.




2. Go to Home Screen > Settings > Cylinder Setup. Enter cylinder name, concentration, gas balance and expiry date. Enter NO cylinder on Solenoid 6 if GPT is to be used. Choose NO from drop-down list.

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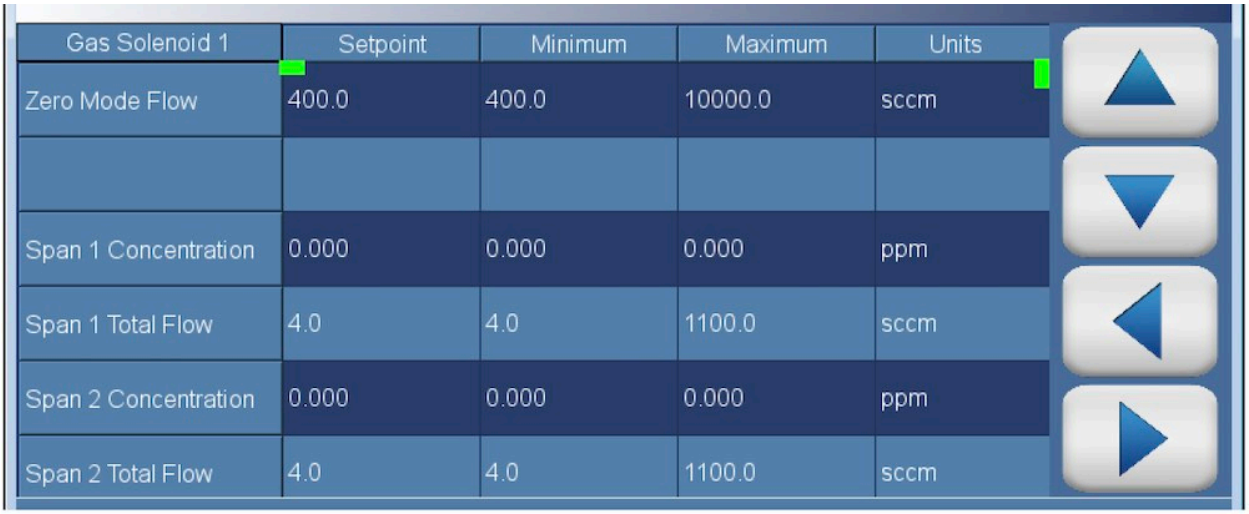
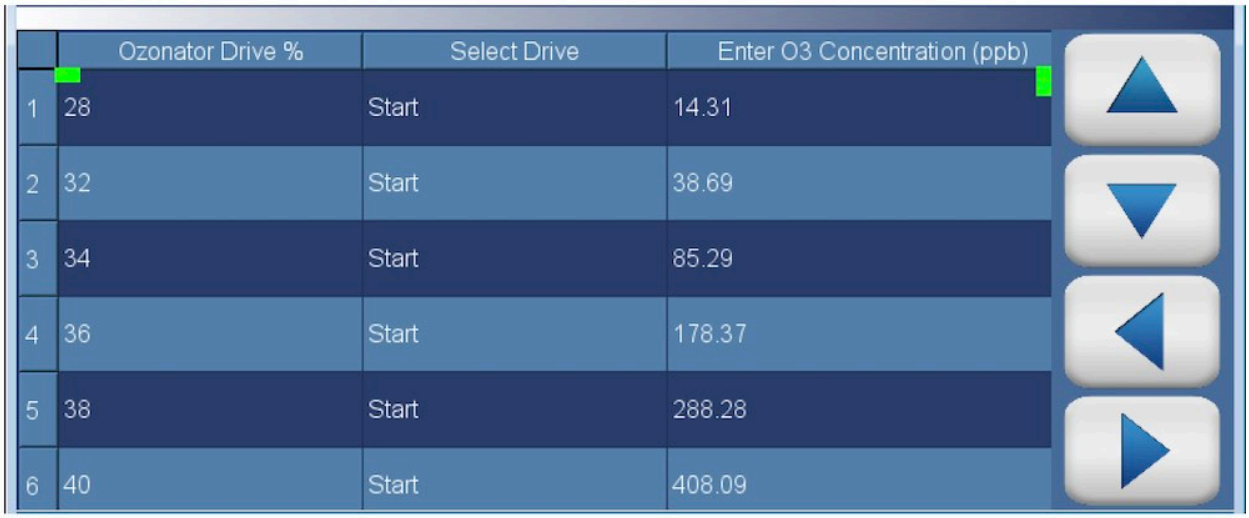
| Gas Solenoid | Gas Name | Tank Conc. (ppm) | Tank Balance Gas | Tank Exp. Month |
|---|---|---|---|---|
| 1 | CH4 | 1000.0 | Air | January |
| 2 | CO | 100.0 | N2 | June |
| 3 | CO2 | 100000.0 | Air | January |
| 4 | SO2 | 150.0 | Air | March |
| 5 | NO2 | 10.0 | N2 | November |
| 6 | NO | 40.0 | N2 | December |

3. Go to Home Screen > Settings > Gas Setup. Select the Gas/Solenoid to be used. Enter the Concentration and Total Flow for Span 1 – 6. For linearity purposes it is advised to enter the same Total Flow for all concentrations, if possible.



| Gas Solenoid 1 | Setpoint | Minimum | Maximum | Units |
|---|---|---|---|---|
| Zero Mode Flow | 400.0 | 400.0 | 10000.0 | sccm |
| | | | | |
| Span 1 Concentration | 0.000 | 0.000 | 0.000 | ppm |
| Span 1 Total Flow | 4.0 | 4.0 | 1100.0 | sccm |
| Span 2 Concentration | 0.000 | 0.000 | 0.000 | ppm |
| Span 2 Total Flow | 4.0 | 4.0 | 1100.0 | sccm |

4. If your calibrator has a built-in Ozone Generator, then it needs to be calibrated. Connect a recently certified Ozone analyzer to the output. Got to Home Screen > Calibration > Manual Ozone Calibration. Run each point until the Ozone reading stabilizes, enter the concentration, then go to the next point. It is advised to run all 10 points.



| | Ozonator Drive % | Select Drive | Enter O3 Concentration (ppb) |
|---|---|---|---|
| 1 | 28 | Start | 14.31 |
| 2 | 32 | Start | 38.69 |
| 3 | 34 | Start | 85.29 |
| 4 | 36 | Start | 178.37 |
| 5 | 38 | Start | 288.28 |
| 6 | 40 | Start | 408.09 |

5. To generate a Gas Phase Titration (GPT) point for checking the convertor efficiency of a NOx analyzer, go to Home Screen > Settings > Ozonator Setup > GPT Setup > Continue.

   Set the NO2 Span 1 Concentration to the minimum, 0.002 ppm. For best results, set Total Flow to 2000 sccm, the same flow used in the Ozonator Calibration procedure. Set the Span 1 NO Target to 80% of the Full Scale Span, such as 0.400 ppm.

   Set the NO2 Span 2 Concentration to 80 – 90% of NO target, such as 0.350 ppm. Set the Total Flow and NO Target to the same values as Span 1 Concentration (such as 2000 sccm and 0.400 ppm).

   The NO and NOx readings measured by the NOx analyzer during Span 1 will be the NOinitial and NOxinitial. The NO and NOx readings measured by the NOx analyzer during Span 2 will be NOfinal and NOxfinal. Calculate the convertor efficiency using the formula:

   C.E. = 100% (1 – ((NOxinitial – NOxfinal)/(NOinitial – NOfinal))

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| NO2 Output | Setpoint | Minimum | Maximum | Units |
|---|---|---|---|---|
| NO2 Span 1 Concentration | 0.002 | 0.002 | 7.594 | ppm |
| NO2 Span 1 Total Flow | 2000.0 | 554.0 | 10250.0 | sccm |
| NO2 Span 1 NO Target | 0.400 | 0.000 | 2.525 | ppm |
| NO2 Span 2 Concentration | 0.350 | 0.002 | 7.594 | ppm |
| NO2 Span 2 Total Flow | 2000.0 | 554.0 | 10250.0 | sccm |
| NO2 Span 2 NO Target | 0.400 | 0.000 | 2.525 | ppm |