



## Flue gas analyser troubleshooting



### Abstract

In most cases Microplan test benches come with a predisposition for the connection of an external Flue Gas Analyser FGA (see an example in the picture). To this purpose the test bench is equipped - from its origin - with 4-20 mA AI channels already wired and tested prior to the shipment of the test bench. With this configuration the customer is just requested to wire his own analyser in the designated terminal board inside the electrical cabinet of the test bench, usually at the bottom.

The following FAQ might help in case of problems with the connection of a flue gas analyser to a Microplan test bench.

Possible reason	Possible solution
<b>Wiring error</b>	<p>A red led on the I/O module - Wago, Beckhoff, National Instruments - associated to the reading of flue analyser signals, is a symptom of a wrong wiring. In such event:</p> <ul style="list-style-type: none"> <li>Use the diagnostic program of the test bench and check the "Electric" and "Real" values of the flue analyser. Most used sensors give a 4-20 mA output signal; in this case you should get a value around 4 (mA) under "Electric" and a value around zero under "Real".</li> <li>Open the door of the electric cabinet of Microplan test bench and use a voltmeter to measure the current of the channels dedicated to this measurement.</li> </ul>
<b>Problem with the flue gas analyser</b>	<ul style="list-style-type: none"> <li>Add an optoisolator to the flue gas analyser in case its output signals are not independent or in case of ground return.</li> <li>Unwire the flue analyser and wire different active instruments - again with 4-20 mA output signal - (or use a 4-20 mA generator) to check the correct operations of the channels where the flue analyser is designed to be connected. Afterwards repeat the very first point here above "Use the diagnostic...".</li> <li>(When applicable) Cross check the value shown on the diagnostic program of the test bench against the value shown on the display of the flue analyser.</li> <li>(When applicable) Disable the auto-scale (auto-range) function on the flue analyser</li> </ul>
<b>Microplan software show different values compared to flue analyser display</b>	<ul style="list-style-type: none"> <li>Ensure settings of fume analyser match with settings of test bench calibration editor (usually Caled, read <a href="#">more</a>). For instance, in case of Siemens Ultramat, its common settings could be 4-20mA output for both CO and CO<sub>2</sub>, fixed scale (no auto-range), measuring range 0-1000 ppm for CO and 0-20% for CO<sub>2</sub>. In the given example you should enter for CO the value zero at 4 mA and the value 1000 at 20 mA, and so on.</li> <li>Keep the fumes sampling line is as short as possible (pipe lenght between boiler fumes outlet and flue analyser inlet)</li> </ul>
<b>Wrong reading measurement</b>	<p>In case the measurement of the flue analyser is different from what expected, probably it requires a <a href="#">calibration with gas bottles</a>. Usually the calibration procedure consists of two phases: zero and span.</p>



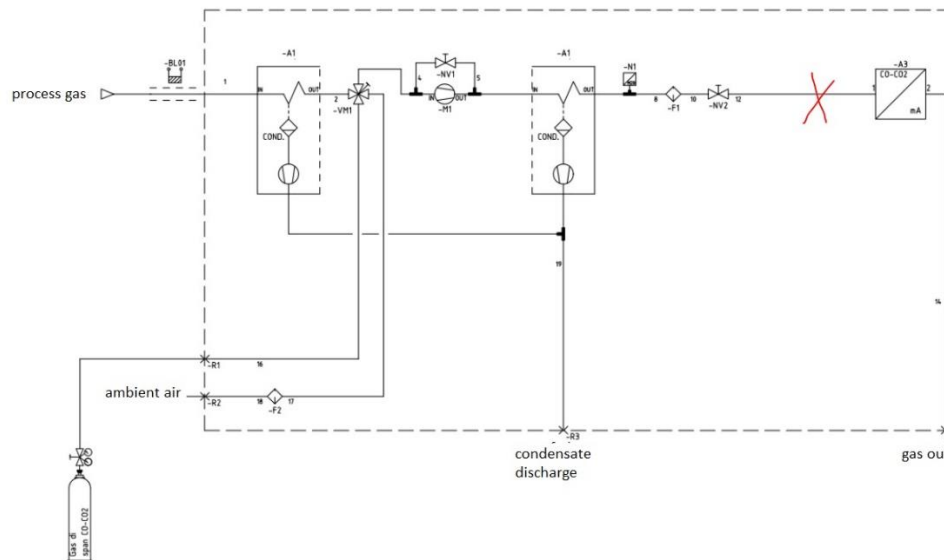
Possible reason	Possible solution
-----------------	-------------------

- The zero point calibration can be done using ambient air, however calibration with azote bottle ensure more accurate results. For Siemens Ultramat flue gas analyser this calibration is performed every time it is energised and it is repeated every 6 hours (as default parameter)
- Calibrate the flue gas analyser (span calibration) using a bottle of the same gas you're expected to measure, CO2 for example, and enter the calibration points into the calibration editor of the test bench (read [more](#))

### Alarm from moisture detector in the cabinet

The "Alarm from moisture detector" ON means there's too much condensate in the pipes that convey the flue gases to the flue gas analyser. This can cause the block of the circuit external pump; to troubleshoot this issue:

- disconnect the pipes that connect the flue gas analyser to the other parts of the circuit, so that the flue gas analyser is completely isolated (red cross in the following diagram).

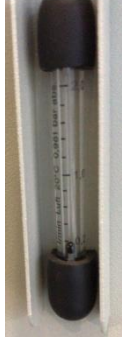


Following the hydraulic diagram, disconnect one by one the pipes of the circuit, and dry them by inflating compressed air. When done, reconnect all the pipes in their original position.

- disassemble the condensate sensor, dry accurately the internal transducer with a piece of cloth and reassemble it.





Possible reason	Possible solution
<b>CO-CO2 analyzer alarm</b>	<p>The “CO-CO2 analyser alarm” is a general alarm. In case of Siemens Ultramat flue gas analyser, use the menu to identify the specific errors:</p> <ul style="list-style-type: none"> <li>press the ENTER key. Select “Status” row and press ENTER. Select “Logbook/Faults” row and press ENTER. Insert the password (default is “111”). Display all recorded faults in succession using the right arrow key. Delete the currently displayed fault message using the ENTER key. Press ESC key to exit the menu and go back to the measuring screen. If letters “C” and “N” blink on the display, press the MEAS key. Deleting the fault message does not eliminate the cause of the fault. If the alarm is still ON, it means the error cause is persisting.</li> </ul>
<b>Low air flow rate in the Ultramat flow meter</b>	<p>If the visual flow meter of the flue gas analyser measures less than 1l/min, it may be that the external pump is not working. A possible reason is the activation of one of the alarms on the cabinet.</p> 
<b>I/O module problem</b>	<p>Depending on the kind of hardware (I/O electronic modules):</p> <ul style="list-style-type: none"> <li>Check the status of the led on the I/O electronic modules inside the electric cabinet</li> <li>Read <a href="#">Compact Field Point electronic I/O modules troubleshooting</a></li> <li>Read <a href="#">Beckhoff bus coupler (BK9050) troubleshooting</a></li> <li>Read <a href="#">Wago and Beckhoff electronic modules troubleshooting</a></li> <li>Read <a href="#">cDAQ electronic modules troubleshooting</a></li> </ul>