

Series **300**

NDIR Gas Analyzer

Operation & Maintenance Manual



100 Park Avenue
League City, TX 77573 USA

Phone: (281) 338-1388
<http://www.starinstruments.com>

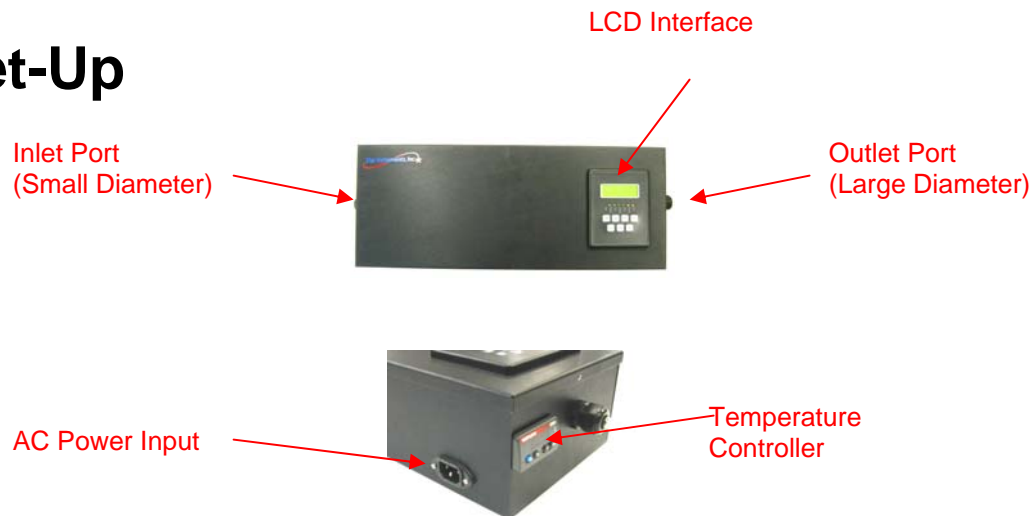
Introduction

The Star Instruments Series 300 NDIR Gas Detector has a compact, easy-to-use design combined with powerful features to aid the operator in acquiring reliable, accurate measurements.

Using a temperature-compensated housing, the detector is unaffected by environmental changes. The unique solid-state design ensures trouble-free operation and *no moving parts*. Maximum sensitivity is complemented with a very robust design, capable of handling some of the most demanding samples.

With standard RS-232 communications, this unit is perfect for the laboratory, or in the field. Optional 0-5 VDC or 4-20 mA analog outputs are available as well. The RS-232 communication protocol is simple and straight-forward. Data can be streamed, or requested on a one-time basis.

Set-Up



The unit comes prepared and assembled, so no calibration or assembly are required. After unpacking the NDIR, simply attach the inlet to your sample gas line, and the outlet to your vent.

The Series 300 is not flow-dependent, and can be operated with flow-ranges of 50cc/min to 300 cc/min.

After gas lines are attached, connect the unit to a 110V, 50/60Hz AC power source, and allow the temperature to stabilize (50°C, as indicated by the temperature controller).

After the unit has stabilized, measurements can be taken.

RS-232 Connection

The RS-232 parameters are as follows:

Port Type: DB-9 Female
Baud Rate: 19,200 bps
Parity: None
Data Bits: 8
Stop Bits: 1
Flow Control: None

The unit should be connected via a straight-through cable, as no null modem adapter is necessary.

Advanced Control

Data output is a comma delimited string of four values:

(NDIR A, Linearized), (NDIR B Linearized), (NDIR A Unlinearized), (NDIR B Unlinearized)

When interpreting the data output, it is important to remember that NDIR A has a full scale of 1.0% CO₂, and NDIR B has a full scale of 0.1% CO₂.

The scale of each sensor is 0-10000 steps, so a value of 0 = 0% CO₂. A value of 10000 = 1.0% or 0.1% CO₂, respective to the NDIR being read.

All commands should be followed with a carriage return (cr) and are CASE SENSITIVE. An uppercase "L" and a lower case "l" are different.

ACTION	COMMAND	RESPONSE
Initiate streaming data output.	ld(cr)	#####,#####,#####,#####(cr) #####,#####,#####,#####(cr) #####,#####,#####,#####(cr) (continuously streaming...)
Discontinue data streaming.	ID(cr)	Data streaming will cease.

Read data one time only (no streaming).	lr(cr)	#####,#####,#####,#####(cr)
Span NDIR A	ls(cr)	'A' for Accepted 'N' for Not Accepted
Span NDIR B	lS(cr)	'A' for Accepted 'N' for Not Accepted
Zero NDIR A	lz(cr)	'A' for Accepted 'N' for Not Accepted
Zero NDIR B	lZ(cr)	'A' for Accepted 'N' for Not Accepted

Alternately, the zero and span functions can be accessed via the on-board LCD interface by following the on-screen instructions.

Calibration

**Note: Although the assembly can be calibrated from the LCD interface by following the onscreen instructions, it is not necessary to access this menu to calibrate via RS-232.*

To calibrate your sensor assembly, first introduce oxygen or “zero air” into the inlet port and allow a few minutes for the readings to stabilize.

Once stable, zero one or both sensors by either pressing the key indicated on the LCD, or by issuing the appropriate RS-232 command.

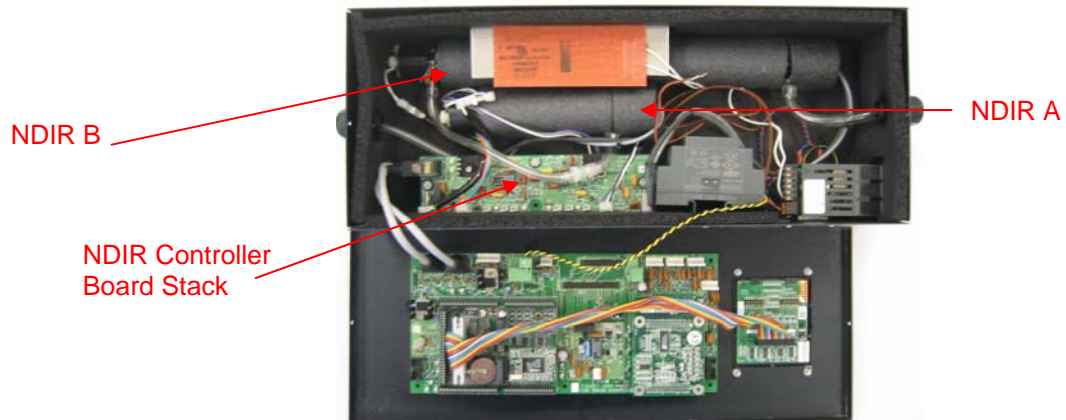
Introduce span gas for the sensor you are calibrating. After stabilization, span the sensor by using the LCD once again, or issuing the RS-232 command. Introduce span gas for other NDIR if calibrating and span using same procedure.

Maintenance

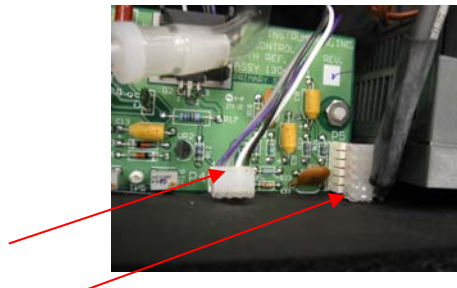
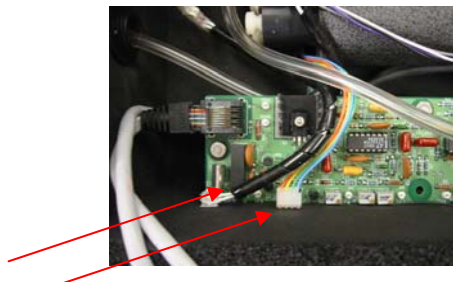
Inside of each NDIR, a sapphire window protects the solid-state electronics from corrosive compounds. Should this window need to be cleaned, follow these procedures:

Remove the two screws on either end of the sensor box lid to gain access to the interior.

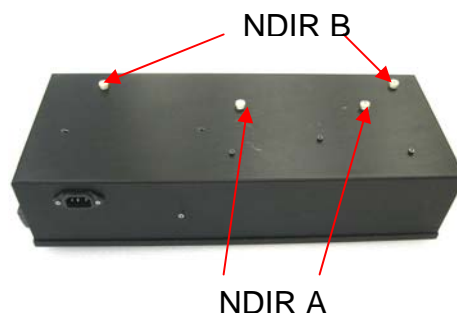
After lifting off the lid, remove the tubing from the NDIR which will be replaced.



Gain access to the NDIR controller board for the sensor you will be working with. For NDIR A, you will use the top board. For NDIR B, it will be necessary to remove the nuts holding the top board and lift the board out, to gain access to the bottom one.



Remove the wires from the board.



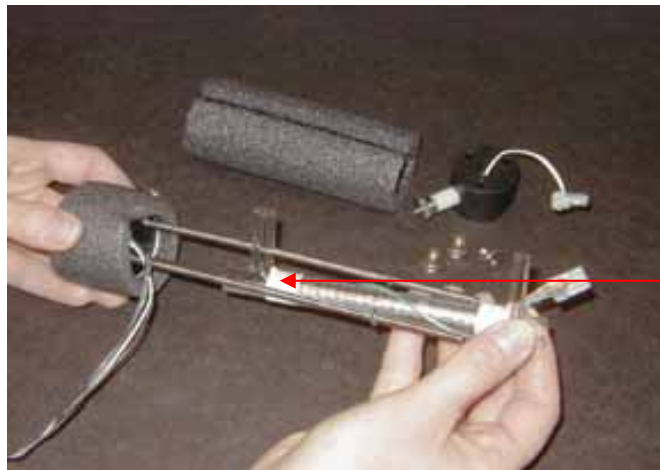
On the bottom of the box, remove the white thumb nuts holding the NDIR cell you wish to remove. Then, carefully turn the box over and remove the NDIR cell.



- Remove insulation from IR Cell.
- Remove lock-tight from three thumbnuts and remove.



- Slide out and remove Source Assembly.



- Remove IR Cell Assembly



Note:

- a. 'O'-Rings in each of Detector Assembly (left) and Source Assembly (right).
- b. Sapphire windows located under 'O'-Rings



- *Remove 'O'-Ring and Sapphire window taking care to avoid scratching Sapphire window.

*Recommend using toothpick.

- Clean Sapphire Windows with a soft, lint-less tissue (use DI water, if necessary).

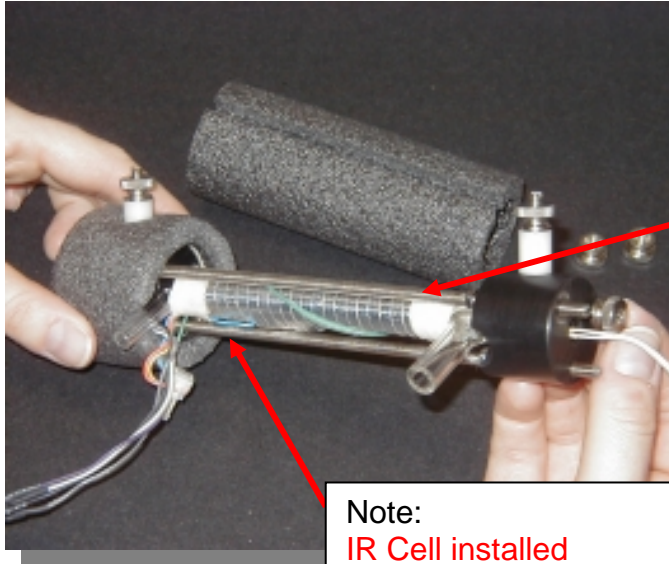


To Reassemble

- Install IR Cell.
- Install Source Assembly end piece.

Note:

Large outlet port goes into Detector Assembly (left)



- Tighten three thumbnuts until Source Assembly bottoms out on squeeze nuts.

Recommend:
Use alternate tightening sequence

Note:
IR Cell installed
incorrectly. Large outlet
port **MUST** go into

- Insert lock-tight on three thumbnuts to prevent back-off.
- Install insulation. Replace assembly as before.
- Recalibrate NDIR (see above).

Support

If you should require any additional support, or help with your application, please call us and one of our support staff will be happy to assist you. Our telephone number is (281) 338-1388, or email us at support@starinstruments.com.