XDI-XDIwin – 15/30J

SEMICONDUCTOR SENSOR

Set-up Procedure: 292 D7C Issue Bv3

Technical Sheet
ref C1519B

- NEW SENSORS ARE SUPPLIED READY TO CONNECT AND GO BUT NEED 15 MINUTES POWER STABILISATION. The following procedure is for full set up using a PC but onsite calibration without PC/LCD requires only sections 18 & 19.

Note: If a new cell is fitted then full calibration is required.

PC setup

This sensor will linearise 2 points, zero and mid-scale with an optional full scale point when using a PC.

Gas values below the mid-scale point are not as accurate because the sensor is none linear.

The Zero adjust is continuous during power up inhibit time and PCB fault LED flashes to indicate this, do not apply any gas at this time because Zero adjust will try to offset the measurement. Thereafter Zero adjusts 1 second every minute. D1 flickers orange at the zero point.

Voltage measurements are made wrt AG unless otherwise specified.

1. Insert jumpers J20 and J6 position SO for 4-20mA source output
2. Turn sensor voltage potentiometer RV4 fully anticlockwise (minimum voltage)
3. Connect sensor to J2 terminal (W) white (P) pink (Y) yellow
4. Connect 24v + and 0V to J10, short the 4~20mA terminal by inserting test link at J9
5. Set the sensor voltage to 5.0V (4.0 for NH_3)measured at SV and 0V, adjust by turning RV4 clockwise
   DO NOT EXCEED THE REQUIRED VOLTAGE OTHERWISE PERMANENT DAMAGE WILL OCCUR
6. Insert jumper G2 for a nominal gain value (G1 is lowest gain, G5 is highest or a combination G1 to G5)
7. Connect a PC to J3 with and RS232 Combi adaptor (part no. 160510 and lead part no. 160515) and Hyperterminal 4800/1stop/8bit and initialise the sensor using (C) calibration mode, then shift + ($) command from the keyboard. The default gas is Ammonia 1000 ppm
8. The typical Hyperterminal display is (also see appendix 1)
   27 Ammonia 1000.0ppm
   O H L D F I
   ^ ^ ^
   - - - - - - PPM= 0 A=80 R=80 Adj=497 PInh=52 adj=4 CG=314.0 CGADC=385

PPM	is the gas value
A	is the processor raw measurement (0 to 1000)
R	is the zero point of the sensor (100 +/-2)
Adj	is the adjustment value to autozero 0 to 1000 but 500 is ideal.
Pinh	is the number of seconds left of powerup inhibit (autozero is active during this time)
adj	is the number of seconds until a 1 second autozero will occur.
CG	is the calibration gas value PPM.
CGADC	is the number A must reach to display the value CG as the correct PPM gas reading

9. Sensor Zero is true when D1 flashes orange and potentiometer VR2 is adjusted to ensure Adj is between 400 and 600. VR2 clockwise will increase Adj. (Note pressing (R) or J28 short will reset sensor and give 1 min adj time)
10. Press F to adjust the 4mA output by measuring the mV across TP8 and TP9. Press H and L to set and then press SPACE to exit.
11. Press T to adjust the 20mA output by measuring the mV across TP8 and TP9. Press H and L to set and then press SPACE to exit.
12. Before using span gas, ensure that an Autozero is not about to take place, indicated by the fault LED not flashing. The fault led on the PCB will flash during Power up but also when there is less than 30 seconds to an autozero.
13. Apply a test gas to the sensor (mid-range 500ppm is preferred) for 2 minutes at a flow rate of 1 litre/min. Use the UP and DOWN buttons on the PCB to give correct 4-20mA level. (ie 12mA for 500ppm). Remove gas and wait 5 minutes. If a maximum range gas is available, apply for 2 minutes and note the value of A. This can then be entered using Hyperterminal using the M command giving better accuracy above the mid calibration gas level. Remove gas and wait 5 minutes.
14. Connect the sensor to a Combi alarm panel and ensure that it reports in correctly.
    Note: Fit the end of line (EOL) link J1 if the sensor is to be installed at the end of the sensor cable.
15. If front panel display board is fitted via connector J5 and U12 adjust VR1 for LCD contrast.
16. Remove J9 test link for normal operation.
17. Ensure J29 address link is removed (this is only used when changing address from a Panel)

Manual calibration (without PC or LCD)

Auto zero is operating

18. Zero - with no gas applied, auto zero is in operation and LED D should be flashing orange. Check the voltage between Ag and S16 to be 450mv approx. With J9 test link inserted the 4-20mA output signal measured at TP8 to TP9 should be 4mV.
19. Span - ensure that auto zero is not within 30 seconds indicated by the MPV LED short flash, then apply test gas (typically 50%) for 2 minutes and use the UP and DOWN buttons to adjust the 4-20mA output current to the correct value, eg 50% gas would give 12mv. Remove gas and ensure output current falls to 4mA. Note this may take some time as the semiconductor returns to normal. Remove test link J9.

Using magnets (set up)

WIN versions of the sensor have an LCD display which shows the Gas and range together with the sensor address and a display of the number of seconds until an autozero will occur.
Also incorporated are 3 reed switches which can be activated using external magnets through the glass window of the flameproof XDIwin enclosure. These magnets do not act instantly and have to be in close proximity to L, M and R on the front display for a few seconds to activate a software setup function.

The right magnet allows the CAN address of the sensor to be changed. When the address menu is displayed with a prompt to remove the magnet, and then the display shows the address and that the right magnet will decreases it whilst the left magnet will increase it. This is then stored in internal non-volatile memory and the display will automatically revert to normal operation.

The centre magnet is used to inhibit the sensor. As with the left and right magnet functions the display requests that you remove the magnet and then the state of inhibit appears on the LCD. The left magnet then puts the sensor into inhibit whilst the right magnet removes it. The amber LED on the front panel under the LCD flashes when the sensor is inhibited. When all magnets are

removed, the display will revert to normal operation. The direction of the alarms is displayed as ^ for rising and v for falling but these can be changed using left and right magnets together.

The left and right magnets together allow the calibration menu to be used. Removing both magnets as instructed on the LCD presents the first part of this multi menu which is ZERO. With no gas present the display shows the PPM value but also typically [0.02] This number between the square brackets shows how close the autozero has achieved. [0.00] is definite zero and the PCB led D1 will be flickering orange.

A 15 second timer is displayed and is reset back each time a magnet is near. Waiting till timeout is acceptable but this timeout can be speeded up by placing a magnet near to the centre position.

SPAN is the next part of the menu and gas should be applied to the sensor at this time. A 2 minute counter is displayed before the next part of span is displayed. The left magnet now increases the PPM reading and the right magnet reduces. The actual sensor value can be seen on the display to rise or fall respectively. The magnets are the equivalent of the PCB UP and DOWN push buttons.

LOW ALARM is the next menu and left and right magnets increase and decrease this value.

HIGH ALARM is next followed by OVER RANGE alarm.

The direction of the alarms is displayed as ^ for rising and v for falling but these can be changed using left and right magnets together.

Appendix 1

Hyperterminal Display **OHLDFI**

- **O H** and **L** represent the Over Range, High and Low alarms respectively ^ ^ v shows the direction of alarms
- **D** indicates if a duplicate address is detected
- **F** indicates a fault
- **I** indicates alarms inhibited

Pressing **(R)** when in normal runtime display causes a sensor reset to occur. Gas type with address and serial number are then output to the PC together with alarms and calibration date, etc.
This also starts 1 minute autozero, which is useful when adjusting VR2 zero potentiometer.

Pressing **(C)** on the PC will list the available commands

(V) Allows a view of the gas log taken at one minute intervals over 48 hours

(A) To set the sensor address

(G) Select gas type Select the gas type from a list

(Z) Prompts to use the zero potentiometer

(S) Prompts to use the PCB buttons

($) Initialise the sensor

(%) Clear the log of sensor readings, (this takes a minute to perform)

(U) Alarm directions, Rising or falling

(D) Enter calibration date

(R) Enter the range of the gas x 10

(F) Set 4mA level Use H and L and space

(T) Set 20mA level Use H and L and space

(O) (H) (L) set over, high and low alarm levels x 10

(M) Set the value of full range raw processor measurement value when maximum gas was applied

(E) Allows the editing of the 8 character user gas description

(X) Exit to normal display

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SEMICONDUCTOR SENSOR – AMMONIA

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Appendix 2

The semiconductor sensor can react to gas flow and humidity. When gas is removed from the sensor, the displayed PPM gas value may rise and take some time to return to normal. Autozero is therefore delayed by 2 minutes after the reading has fallen below 5% of range.

Figure 1

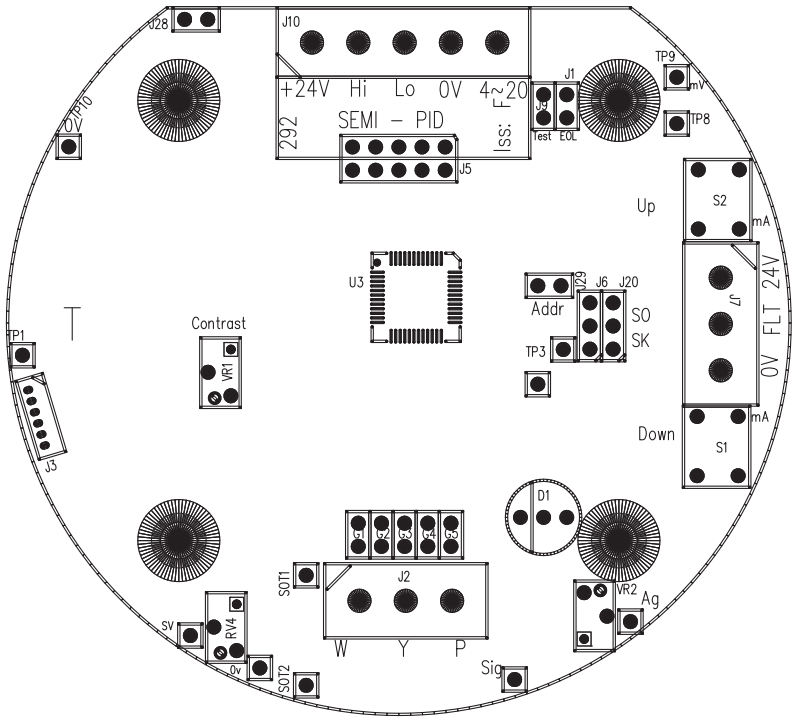


Figure 2

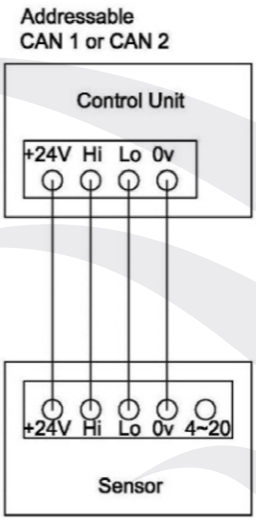
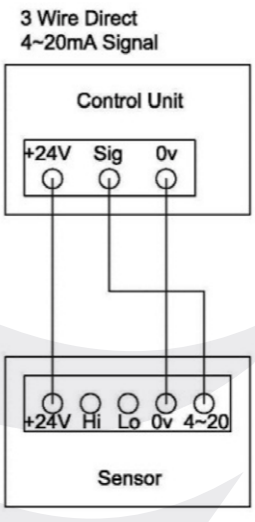


Figure 3



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