

CROWCON

Instructions

Part No C01455
TXgard-HS
 (Formerly EXD90/SU)

Flameproof Hydrogen Sulphide Gas Detector

1. INTRODUCTION

1.1 Product overview

TXgard-HS is designed to detect hydrogen sulphide present in ambient air, in the range 0-100 ppm. It is a flameproof gas detector suitable for use in zone 1 or 2 hazardous areas. TXgard-HS is powered by 24 V dc (nominally) and provides a 4-20 mA signal (sink or source) proportional to the gas concentration:

1.2 Product description

TXgard-HS comprises three main parts; a sensor housing, amplifier and junction box.

Two sensor housings are available, the D18 and 96HD. Both are manufactured from 316 stainless steel. The D18 is disposable, whilst the 96HD allows the sulphistor sensors to be replaced. The assemblies are certified Ex d IIC T6 and EEx d IIC T6 respectively and both screw into the junction box.

The amplifier is mounted in the junction box. All electrical connections to the detector are made via the terminal block on the amplifier. The amplifier provides power to the sensor and converts the gas reading into a 4-20 mA signal for connection to a control panel.

The junction box is manufactured from galvanised cast iron and is certified EEx d IIC T6. The junction box is supplied with 1 x M20 cable entry for customer use. Alternative cable entries may be provided or suitable cable adaptors can be used (see Section 4).

Diagrams 1 and 2 show the D18 and 96HD assembled detectors, with junction box covers removed to show amplifier and wiring detail.

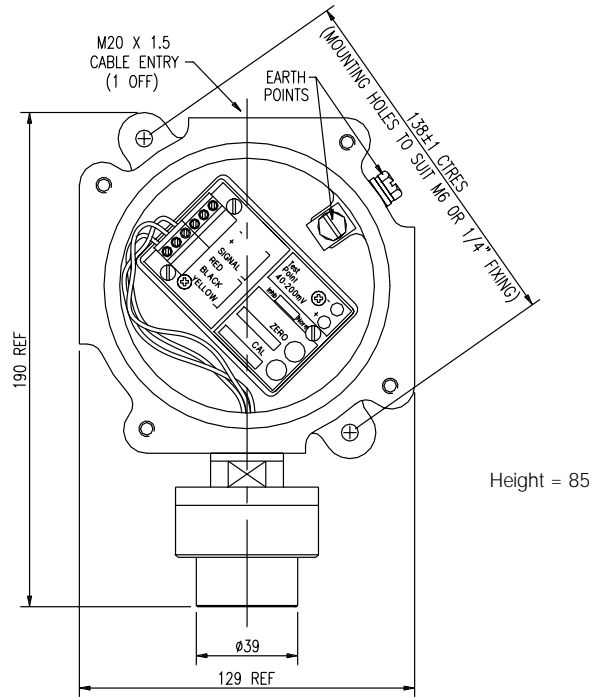


Diagram 2: TXgard-HS fitted with 96HD type sensor housing

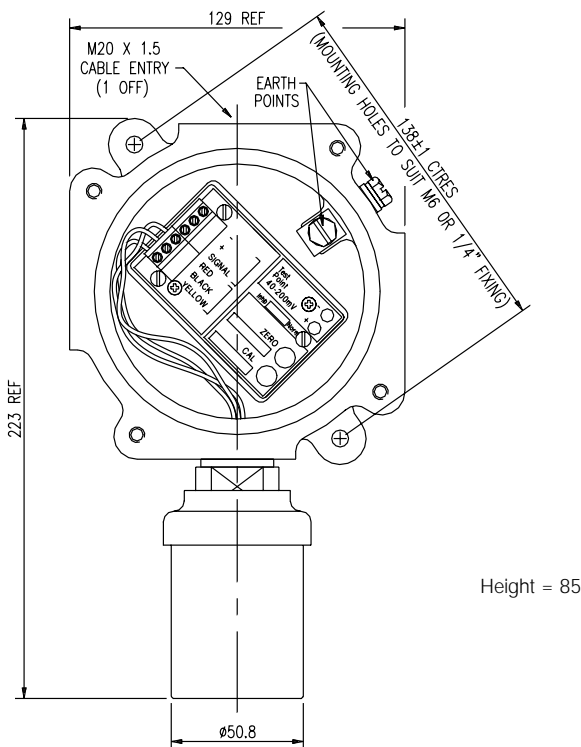


Diagram 1: TXgard-HS fitted with D18 type sensor housing

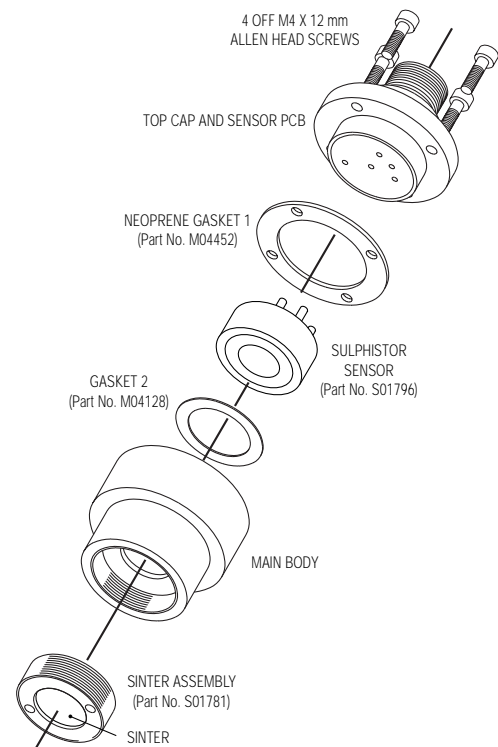


Diagram 3: 96HD sensor housing

2. INSTALLATION

WARNING

TXgard-HS is designed for use in Zone 1 and 2 hazardous areas. Installation must be in accordance with the recognised standards of the appropriate authority in the country concerned. For further information please contact Crowcon.

Prior to carrying out any installation work ensure local regulations and site procedures are followed.

2.1 Location

Hydrogen sulphide is a toxic gas with a similar density to air. In practice the detector should be placed at head height throughout the area to be protected. The following points should also be noted when locating hydrogen sulphide gas detectors:

- Consider the possible damage caused by natural events eg. rain or flooding. For detectors mounted outdoors Crowcon recommend the use of a weatherproof cap
- Consider ease of access for functional testing and servicing.
- Consider sources of escaping gas and how it may behave due to natural or forced air currents. Mount detectors in ventilation ducts if appropriate.
- Consider the process conditions. Gas released from a process line which is at an elevated temperature and/or under pressure may rise rather than fall even if it is heavier than air.

The placement of sensors should be determined following advice of experts having specialist knowledge of gas dispersion, the plant processing equipment as well as safety and engineering issues. **The agreement reached on the locations of sensors should be recorded.** Crowcon would be pleased to assist in the selection and siting of gas detectors.

2.2 Mounting

The mounting detail of TXgard-HS is given in Diagrams 1 and 2. TXgard-HS should be installed at the designated location with the detector pointing down. This ensures that dust or water will not collect on the sinter and stop gas entering the detector. A Swivel Mounting Bracket is available from Crowcon to assist in the mounting of the detector if required (Part No. C01340).

2.3 Cabling requirement

Cabling to TXgard-HS must be in accordance with the recognised standards of the appropriate authority in the country concerned and meet the electrical requirements of the detector. Crowcon recommend the use of steel wire armoured (SWA) cable and suitable explosion proof glands must be used. Alternative cabling techniques, such as steel conduit, may be acceptable provided appropriate standards are met.

TXgard-HS requires a DC supply of 10-30 volts at up to 350 mA. Care should be taken to ensure the minimum DC supply of 10 volts is observed at the detector taking into account the voltage drop due to cable resistance.

For example, a nominal DC supply at the control panel of 24 volts has a guaranteed minimum supply of 18 volts. The maximum voltage drop is therefore 8 volts. TXgard-HS can demand up to 350 mA and so the maximum loop resistance allowed is 22 Ohms. A 1.5mm² cable will typically allow cable runs up to 900 m. Table 1 shows maximum cable distances given typical cable parameters. The acceptable cross sectional area of cable used is 0.5 to 2.5 mm². The table is provided for guidance only, actual cable parameters for each application should be used to calculate maximum cable distances.

C.S.A. (mm ²)	Resistance (Ohms per km)		Max. Distance (m)
	Cable	Loop	
1.0	18.1	36.2	600
1.5	12.1	24.2	900
2.5	7.4	14.8	1400

Table 1: Maximum cable distances for typical cables

2.4 Electrical connections

All connections are made via the 6 way terminal block mounted on the amplifier in the junction box. The 3 wires from the sensor housing are colour coded and should be terminated in the corresponding colour coded terminal. The remaining terminals marked '+', '-' and 'Signal' are connected to the control equipment. TXgard-HS is factory set as a 4-20 mA source device unless specified otherwise when ordering. This is set via an internal switch in the amplifier and may be changed to 'Sink' on-site if necessary. Diagram 4 summarises the electrical connections.

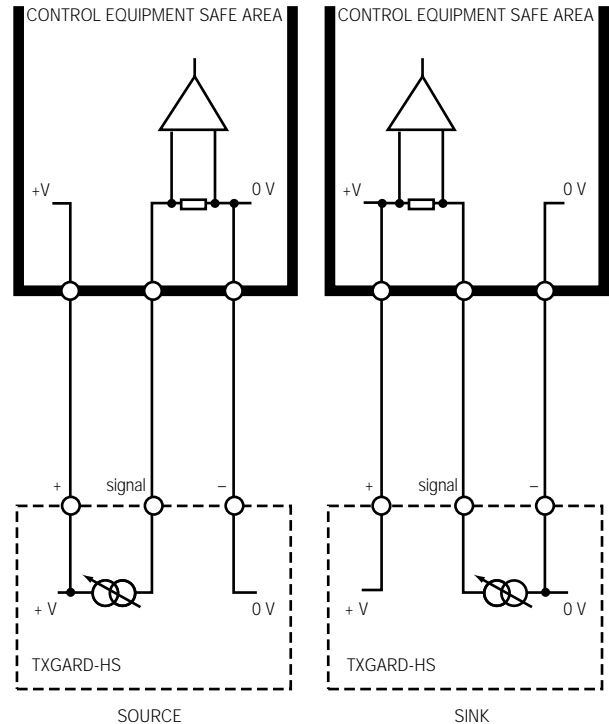


Diagram 4: Electrical connections

Note: The junction box and cable armour must be earthed at the detector and control panel to limit the effects of radio frequency interference and to maintain electrical safety.

3. OPERATION

WARNING

Prior to carrying out any work ensure local regulations and site procedures are followed. Never attempt to open the detector or junction box when flammable gas is present. Ensure the associated control panel is inhibited to prevent false alarms.

3.1 Commissioning procedure

Note: An inhibit switch is fitted to the amplifier. In the NORM position the 4-20 mA signal tracks the gas reading. When switched to INHIBIT the 4-20 mA signal is forced to either 2 or 4 mA (set by an internal switch on the amplifier to 2 mA as standard). This allows routine testing/calibration to be carried out without causing false alarms at the control panel. Remember to switch to NORM after testing/calibration.

- Open the junction box of the detector by removing the 4 x M6 Allen head screws.
- Check that all electrical connections have been made and are correct as per Diagram 4.
- Apply power to the detector and ensure the minimum supply voltage of 10 Vdc is available at the detector across terminal '+', and '-'.
- Leave the detector to stabilise for 1-2 days before carrying out calibration and commissioning procedures.

- e Switch the inhibit switch to the INHIBIT position.
- f Connect a digital volt meter (DVM) to the test points on the amplifier in the junction box. Note: The test points read 40 mV = 4 mA = zero up to 200 mV = 20 mA = 100 ppm gas. There is a current clamp of 24 mA on the 4-20 mA output.
- g With no hydrogen sulphide gas present at the detector adjust the 'ZERO' pot on the amplifier until the DVM reads 40 mV.
- h Apply calibration gas to the detector at a flow rate of 0.5 litre/minute. Crowcon recommend 50 ppm hydrogen sulphide in AIR for calibration purposes (contact Crowcon for the supply of calibration gas).
- i Allow the gas reading to stabilise and adjust the 'CAL' pot until the DVM reads the appropriate reading (120 mV = 50 ppm if used).
- j If the control equipment display requires adjustment consult the operating manual for the equipment (this can only be done with the inhibit switch set to NORM).
- k Remove the calibration gas and set the inhibit switch to NORM.
- l Close the junction box of the detector ensuring the 4 x M6 Allen head screws are securely fastened.
- m The detector is now operational.

3.2 Routine maintenance

The operational life of the sensor depends on the application for which it is being used. Crowcon expect that such a device will work satisfactorily for up to 5 years in ideal conditions. Site practices dictate the frequency with which detectors are tested. We recommend detectors be gas tested at least every 6 months and re-calibrated as necessary. To re-calibrate a detector follow steps 3.1 (a.), (e.) to (m.), above.

3.3 Sensor replacement/servicing of detectors

TXgard-HS uses two types of sensor housing. The 96HD type allows the user to replace the sulphistor sensors, gaskets and sinter if necessary. An exploded view of the 96HD sensor is shown in diagram 3. **The following procedure may be followed when servicing a TXgard-HS detector fitted with a 96HD sensor housing.**

WARNING

This work should be carried out by Crowcon or an approved service centre unless suitable training has been received.

- a Switch off and isolate power to the detector requiring attention.
- b Open detector junction box by removing 4 x M6 Allen head screws.
- c Disconnect the 3 sensor wires from the amplifier terminal block.
- d Unscrew the complete sensor housing from the junction box.
- e Open the 96HD sensor housing by removing the four Allen head screws from the Top Cap with a 3mm Allen key
- f Remove the sensor from the Top Cap PCB.
- g Fit the replacement sensor checking the part number is correct. This part number is labelled on the main body of the detector. Observe pin alignment with PCB.
- h Inspect the gaskets and replace if necessary.
- i The sinter assembly will only need to be replaced if it has become blocked by dust or oil. This causes the response time of the detector to be slow and may affect sensitivity. To remove the sinter a removal tool (**Part No. M01614**) is required. Loctite No 243 must be used on the sinter assembly threads to maintain certification.
- j Re-assemble the 96HD housing taking time to ensure that the four Allen head screws are securely fixed into position.
- k Fit the sensor housing to the junction box ensuring that the colour coded wires are terminated correctly.
- l Remove the amplifier fixing screws and rear lid to gain access to the amplifier electronics.
- m Connect a DVM between test points Y and R on the amplifier PCB
- n Switch on power and adjust the 'ZERO' preset until DVM reads 0 mV.
- o Re-assemble the amplifier.
- p Follow the Commissioning Procedure given in 3.1 above.

If a spare 96HD sensor housing complete with new sensor is available, ignore steps (e.) to (j.) and return the old 96HD to Crowcon or an approved service centre for repair.

For the DI8 sensor housing, Crowcon recommend the fitting of a new sensor housing complete with sensor as per the procedure in 3.3, steps (a.) to (d.) and (k.) to (p.).

4. SPARE PARTS AND ACCESSORIES

Description	Part Number
M20 to 1/2" NPTF adaptor	M02125
M20 to 3/4" NPTF adaptor	M02281
DI8 weatherproof cap	M04253
96HD weatherproof cap	C01442
Swivel mounting bracket	C01340
DI8 sensor housing complete with sensor	S01505
96HD sensor housing complete with sensor	S01794
96HD replacement sulphistor sensor	S01796
Sinter removal tool	M01614
Loctite No 243	
Sinter assembly	S01781
Gasket 1	M04452
Gasket 2	M04128
Calibration gas	Contact Crowcon

5. SPECIFICATION

Dimensions:	
DI8 type	223 x 129 x 85 mm (8.8 x 5 x 3.4 inches)
96HD type	190 x 129 x 85 mm (7.5 x 5 x 3.4 inches)
Weight	4.0 kg (8.8 lbs)
Operating voltage	10-30 V dc
Operating temperature	-10-55°C (14-131°F)
Humidity	0-99% RH, non condensing
Cable loop resistance	36 Ohms @ 22 V +ve terminal (power) 600 Ohms @ 22 V signal terminal (4-20 mA) Common 0 V
Degree of protection	IP66 (when fitted with weatherproof cap)
Explosion protection	Flameproof
Approval code	EEx d IIC T6 BASEEFA (Exd IIC T6 with DI8)
Safety certification no.	BAS Ex 98D1103
Standards	EN50014, EN50018, SFA3009
Zones	1 or 2
Gas groups	IIA, IIB, IIC
Detector output	4-20 mA source or sink

This product has been tested and found to comply with the European Directive on EMC 89/336/EEC



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