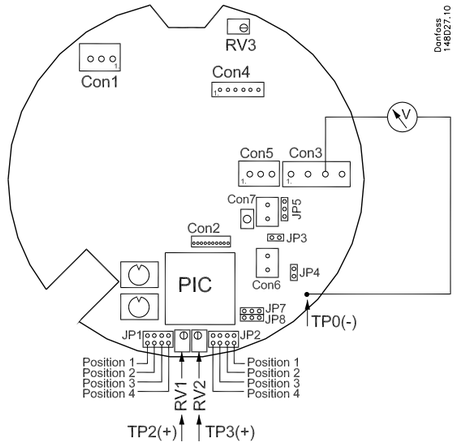
Appendix 1

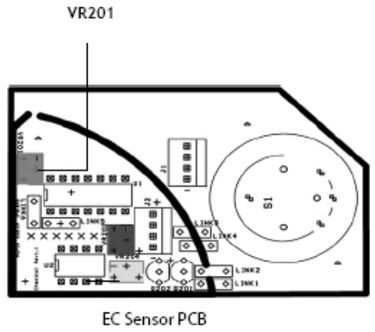
Checking the zero. (0.0 V output)



EC sensor
To adjust the zero, Pot VR201 must be operated. It is located on the Sensor PCB

Connect a voltmeter to TP0 on the mother PCB and Con3, pin 3 on the mother PCB

Pot VR201 (on the Sensor PCB) is used to adjust the zero of the range (span). Measure the Voltage output between TP0 (negative) and Con3 pin 3 (positive) at the 0V signal and adjust the Pot to 0.0 V or slightly positive (0.01 V is acceptable).

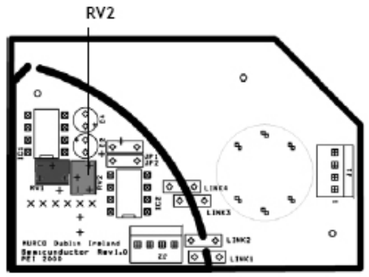


EC Sensor PCB

SC sensor
To adjust the zero, Pot RV2 must be operated. It is located on the Sensor PCB.

Connect a voltmeter to TP0 on the mother PCB and Con3, pin 3 on the mother PCB (see fig. A1)

Pot RV2 (on the Sensor PCB) is used to adjust the zero of the range (span). Measure the Voltage output between TP0 (negative) and Con3 pin 3 (positive) at the 0V signal and adjust the Pot to 0.0 V or slightly positive (0.01 V is acceptable).

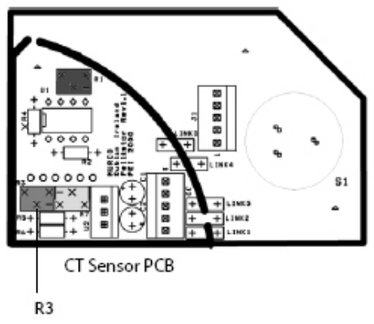


SC Sensor PCB

CT sensor
To adjust the zero, Pot R3 must be operated. It is located on the Sensor PCB.

Connect a voltmeter to TP0 on the mother PCB and Con3, pin 3 on the mother PCB (see fig. A1).

Pot R3 (on the Sensor PCB) is used to adjust the zero of the range (span). Measure the Voltage output between TP0 (negative) and Con3 pin 3 (positive) at the 0V signal and adjust the Pot to 0.0 V or slightly positive (0.01 V is acceptable).



CT Sensor PCB

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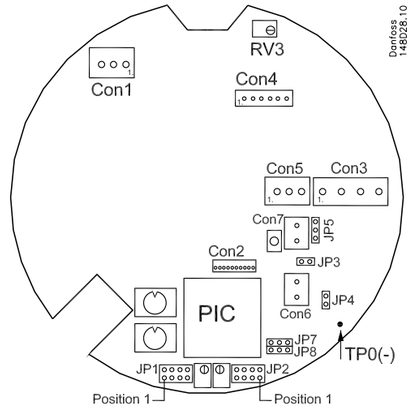
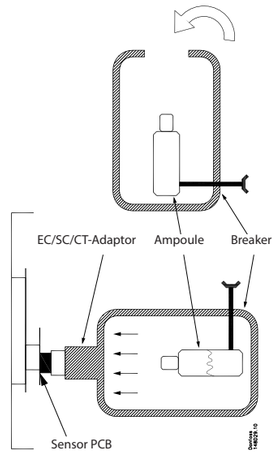
Installation Guide

Making Bump test on Danfoss gas detecting sensors, types GDA and GDC

148R9544



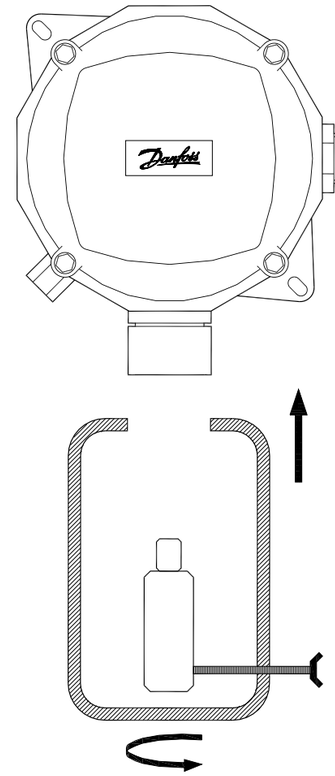
1



2

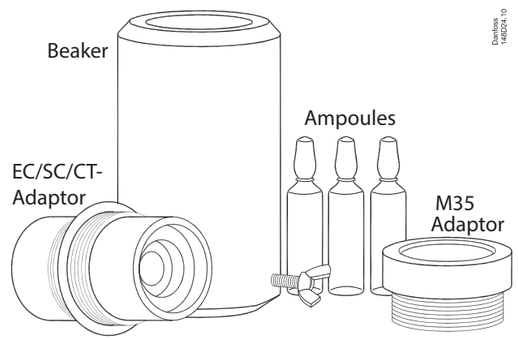
Bump test on a wall mounted CO_2 detector

3



4

BUMP TEST equipment



5

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Table 1 - Bump Test

	Models / Sensor	Pass test criteria: Requirement for sensor response to pass Bump Test. Measure Voltage Output on Con3,(mother PCB) pin 1 and 3	Standard Basic	Standard Basic with LCD display	IP 65 for High RH and Fast response	IP 56 enclosure	IP 56 enclosure Low Temperature	EExd model	EExd model Low Temperature	IP 66 enclosure 5 m remote IP 65 sensor	IP 66 enclosure 5 m remote IP 65 EExd sensor
1	GDA EC 100	>= 5 .0 V	Beaker + EC/SC/CT-Adaptor		Beaker	Beaker + EC/SC/CT-Adaptor		Beaker			
	GDA EC 300	>= 1.67 V									
	Bump test method		100 ppm Ammonia Ampoule								
2	GDA EC 1000	>= 5 V	Beaker + EC/SC/CT-Adaptor		Beaker	Beaker + EC/SC/CT-Adaptor		Beaker			
	Bump test method		1000 ppm Ammonia Ampoule								
3	GDA SC 1000	>= 5 .0 V	Beaker + EC/SC/CT-Adaptor		Beaker	Beaker + EC/SC/CT-Adaptor		Beaker + M35 Adaptor		Beaker	Beaker + M35 Adaptor
	Bump test method		1000 ppm Ammonia Ampoule								
4	GDA SC 10000	>= 0.5 V	Beaker + EC/SC/CT-Adaptor		Beaker	Beaker + EC/SC/CT-Adaptor		Beaker + M35 Adaptor		Beaker	Beaker + M35 Adaptor
	Bump test method		1000 ppm Ammonia Ampoule								
5	GDA CT 30000	>= 5 .0 V	Beaker + EC/SC/CT-Adaptor		Beaker + M35 Adaptor	Beaker + EC/SC/CT-Adaptor		Beaker + M35 Adaptor			
	Bump test method		App. 5-8 % Ammonia water in a cloth [1])								
6	GDC IR 10000	>= 1.0 V	Beaker	Beaker	not available	Beaker	Beaker	Beaker	Beaker	not available	not available
	Bump test method		2000 ppm CO_2 Ampoule								

[1]) *Drop a cloth to the bottom of the beaker, hold it at the bottom with the screw. Moisten the cloth (5-10 drops) with 5-8 % ammonia water.*

Restricted bump test

	Models / Sensor	Requirement for sensor response to pass Bump Test. Measure Voltage Output on Con3,(mother PCB) pin 1 and 3	Standard Basic	Standard Basic with LCD display	IP 65 for High RH and Fast response	IP 56 enclosure	IP 56 enclosure Low Temperature	EExd model	EExd model Low Temperature	IP 66 enclosure 5 m remote IP 65 sensor	IP 66 enclosure 5 m remote IP 65 EExd sensor
7	GDC IR 20000	>= 2 .0 V	Sensor is self calibrating. Breathe on sensor to see response								
	GDC IR 40000	>= 2 .0 V									
	Bump test method										
8	GDHC SC 1000	>= 5 V	Long life sensor. Use a cigarette lighter to see response								
	GDHF SC 1000	>= 5 V									
	GDHF-R3 SC 1000	>= 5 V									
	Bump test method										
9	GDH SC 5000	>= 5 .0 V	Long life sensor. Use a cigarette lighter to see response								
	Bump test method										

ENGLISH

Introduction

The frequency of testing or calibration is generally determined by local regulation or standards.
There are two concepts that need to be differentiated: bump test and calibration

Bump Test: This consists of exposing the sensor to a gas. The objective is to establish if the sensor is reacting to the gas and all the sensor outputs are working correctly. A qualified bump test is a test carried out using ampoules or cylinders of known concentration.

Calibration: This consists of exposing the sensor to a calibration gas setting the "zero" or "Standby voltage", the span or range, and checking/adjusting all the outputs, so that they are activated at a specified gas concentration.

Danfoss recommends annual checks by qualified bump test and replacement of the sensor PCB with a Danfoss pre-calibrated certified sensor PCB every two years. The mother PCB is at the same time tested with the GD tester.

The alternative to this is a full on site calibration. Sensor replacement should be more cost effective, eliminates end of life concerns, and constantly renews the detection system.

Procedures for bump test and calibration vary depending on the sensor technology used and the gas in question.

The GD is available in four sensor versions: Semiconductor (SC), Electrochemical (EC), Catalytic (CT), and Infrared (IR) for CO_2.

Before you carry out the test or calibration:

1. Advise occupants, plant operators, and supervisors.
2. Check if the relays (Con6 and Con7) are connected to external systems such as sprinkler systems, plant shut down, external sirens and beacons, ventilation, etc. and disconnect as appropriate.
3. Deactivate alarm delays with JP1 and JP2. See fig. 1. For this the GD must be powered off.
4. For Bump Test the GD should be powered up overnight.

NOTE:
If unit has been installed and running for about 24 hrs, and you need to power it off to set the delay at 0 min, then the warm-up is 2 min and you can begin the testing or calibration.

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Bump test (every year)

Ideally bump tests are conducted on site in a clean air atmosphere.

The bump test can be carried out on following types of GD
(see table 1)
GDA (qualified bump test)
GDC (qualified bump test/ restricted bump test)
GDHC (restricted bump test)
GDHF (restricted bump test)
GDHF-R3 (restricted bump test)

See table 1, to find the GD type and the corresponding Bump test method.

Checking the zero (0 Voltage output).
See Appendix 1. (not required for IR sensor)

1. Remove the cover of enclosure of the GD
2. Make sure that both the ampoules and the calibration beaker are clean and dry (see fig. 5).
3. Unscrew the beaker hold screw and place the ampoule so that is sits in the base of the beaker (see fig. 2).
4. Tighten on the screw ampoule without breaking it.
5. For the models:
   Standard Basic
   Standard Basic with LCD display
   IP 56 enclosure
   IP 56 enclosure Low Temperature
   Screw in:
   EC/SC/CT-Adaptor or M35-Adaptor into the Beaker according to table 1.
   Place the beaker with the EC/SC/CT-Adaptor over the sensor.
   It should be as tight fitting as possible to allow maximum exposure to the gas (see fig. 5).

   For the GDC (CO_2)models:
   Standard Basic
   Standard Basic with LCD display
   IP 56 enclosure
   IP 56 enclosure Low Temperature

   Place the beaker over the sensor in a 45° degree (see fig. 3). This allows gas to flow through the back of the sensor and through the calibration ports.

   For the models:
   IP 65 for High RH and Fast response
   EExd model
   EExd model Low Temperature
   IP 66 enclosure 5 m remote IP 65 sensor
   IP 66 enclosure 5 m remote IP 65 EExd sensor

   Screw/fit the beaker (possibly with M35 Adaptor) on the remote sensorhead (see fig. 4). It should be as tight fitting as possible to allow maximum exposure to the gas.
6. Connect volt meter to monitor sensor response.
   (Con3 pin 1 and 3 - see fig. 1).
7. Tighten on the ampoule until it shatters allowing the content to diffuse in the beaker. It should be left in place for approximately 5 min.
8. Voltage output will increase. This confirms that the sensor is responding. See Pass test criteria in table 1.
9. Carefully remove any ampoule remains from the gas detector, and reassemble the sensor enclosure.

Fill out the GD Bump Test Certificate.

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