



## Safety Instructions – CGR (Cat 3GD)



## Centurion Guided Radar HAWK CGR SERIES

### ATEX Category 3GD

Intrinsically Safe probe / Flameproof enclosure

 II 3G Ex ia/d IIC T6... T2 Gc

 II 3D Ex ia tb IIIC T85°C... T255°C Dc

T<sub>amb</sub> = - 40°C to +60°C

IP 66, NEMA 4X

### Equipment types:

**CGR2** 2 wire Centurion Guided Radar

**CGR4** 4 wire Centurion Guided Radar

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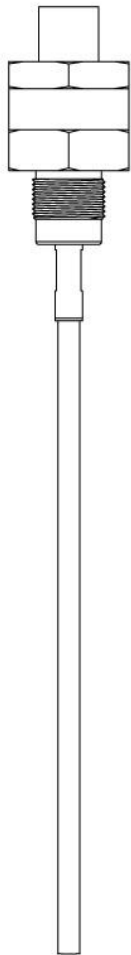
## NOTES:

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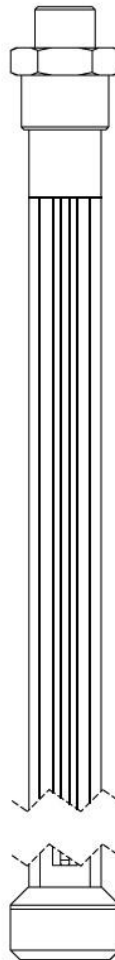
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Flexi cable



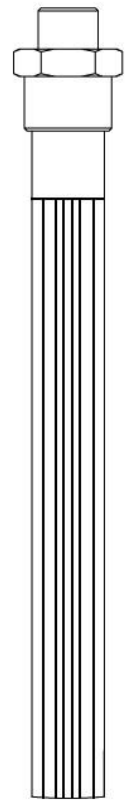
Rigid Probe



Coaxial  
Model 1



Coaxial  
Model 2



Coaxial  
Model 3

## 1. General

This document provides instructions for the safe installation of HAWK Centurion Guided Radar (CGR) series equipment, which is a process transmitter consisting of a sensing probe attached to an electronic control amplifier.

HAWK CGR series equipment is a continuous Level and Interface Measurement unit. It uses low power high frequency RF pulses based on the TDR principle to measure liquids and solids in contact with the sensing probe.

These units are usually mounted directly at the level measurement point – at the top of a storage vessel – with the probe directed downwards in contact with the material product surface. Refer to Installation Guide in the User Manual.

HAWK CGR units are available with either 2 wire loop power or 4 wire option. User interface controls shall be accessed only when an explosive atmosphere is not present.

## 2. Hazardous Areas

The HAWK CGR has been assessed to harmonized standards for installation into Category 3 hazardous Gas and Dust locations according to EU Declaration of Conformity shown in Section 16.

The HAWK CGR enclosure has a dual compartment with segregated Ex d and cable connection sections. The amplifier is located inside the flameproof (Ex d) compartment and the user connections are terminated in the rear compartment, whereas the sensing probe is protected using the Intrinsic Safe (Ex ia) method, where the energy supplied from the amplifier is limited to a safe level according to the standards.

If sensing probe is mounted across the boundary of zones, it acts as a seal across the partition wall. Probe Seal comprises of SS316L, PEEK, PTFE+GF25 and O-rings (NBR, Viton, EPDM, Silicone, FFKM (MARKEZ), etc.)

When HAWK CGR equipment is installed and mounted in hazardous areas, these User Manual, Safety and Operating Instructions, the general Ex installation regulations and the general installation regulations for electrical equipment must all be observed.

Installation of Ex instruments should only be made by suitably trained personnel.

### **ATEX Category 3G areas**

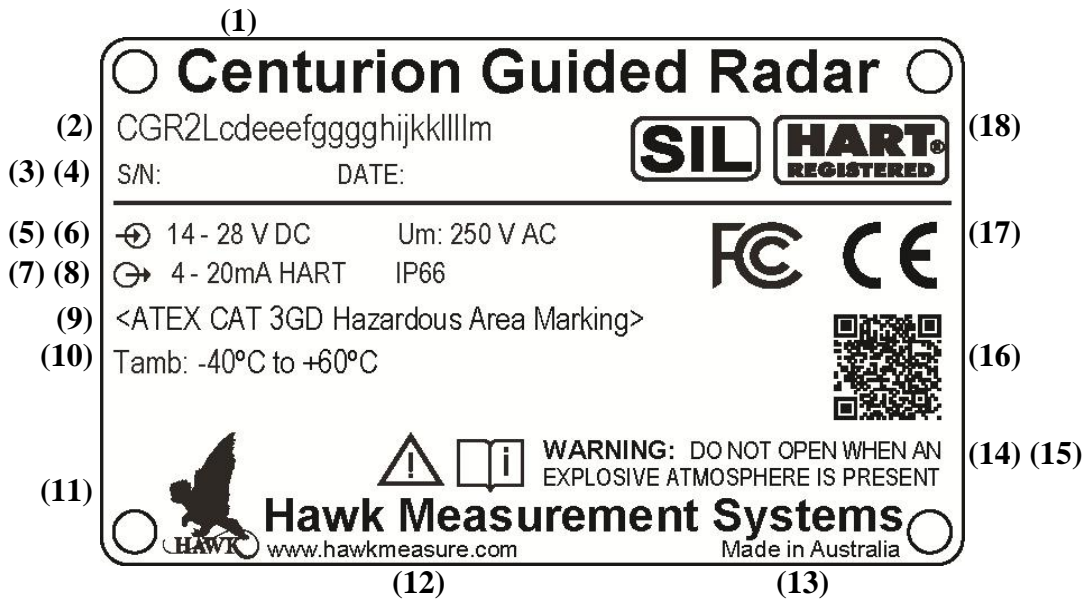
Both sensing probe and amplifier enclosure can be installed into hazardous gas area Category 3G, which is EPL Gc, equivalent to Zone 2.

### **ATEX Category 3D areas**

Both sensing probe and amplifier enclosure can be installed into hazardous dust area Category 3D, which is EPL Dc, equivalent to Zone 22.

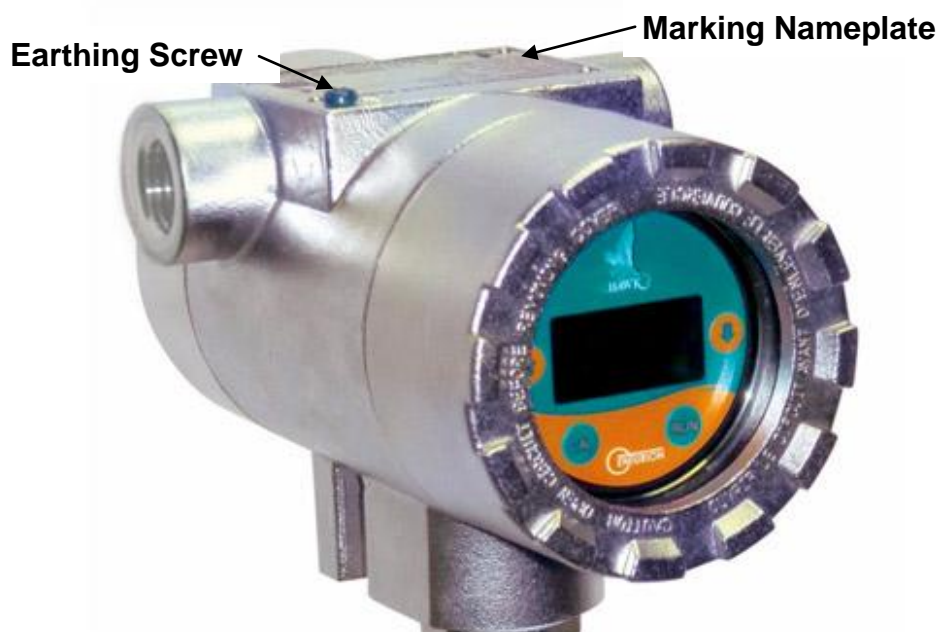
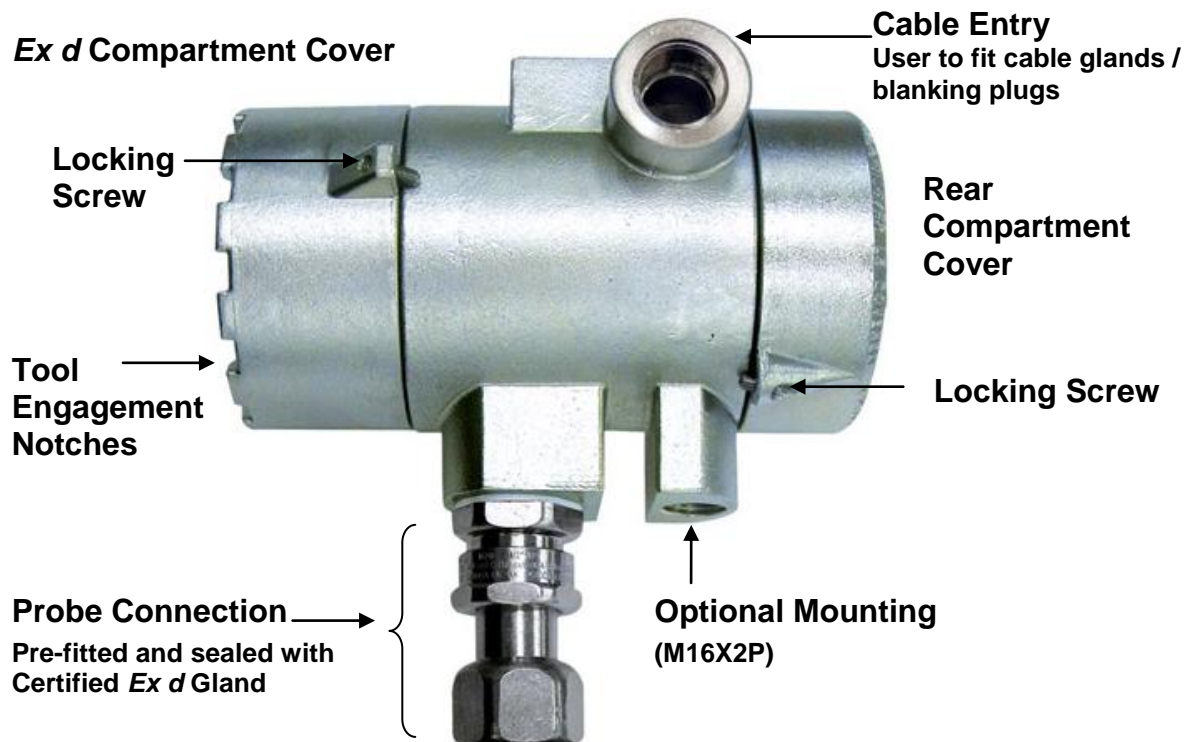
### 3. Equipment Identification

An image of the ATEX marking nameplate is shown below.



- (1) Product Name
- (2) Part Number (*Refer Sect.18 – Part Structure and Sect.12.b. – Application Condition/Temperature for max permitted process temperature and/or temperature class*)
- (3) Serial Number
- (4) Manufacture Date
- (5) Input supply voltage range
- (6) Maximum value of  $U_m$  applied to non intrinsically safe circuits
- (7) Output current and communications protocol
- (8) Ingress Protection rating
- (9) ATEX Category 3 Hazardous Location Marking code  
for Gas Areas:  $\text{Ex}$  II 3G Ex ia/d IIC T6... T2 Gc  
for Dust Areas:  $\text{Ex}$  II 3D Ex ia tb IIIC T85°C... T255°C Dc
- (10) Ambient Temperature Range
- (11) Manufacturer Logo and Name
- (12) Manufacturer Web Address
- (13) Manufacturer Country
- (14) Warning symbol and Symbol for Reference to written instructions
- (15) Warning message
- (16) Quick Reference code
- (17) FCC and CE marking symbols
- (18) SIL Certification and HART Registered Symbols

## 4. Dual Compartment Enclosure



## 5. Putting Into Service

To put a HAWK CGR unit safely into service, the following steps must be taken:

- a) Follow the instructions in **Typical Installations** and **Installation Guide**.
- b) All CGR series models are fitted with an Ex d cable gland between enclosure port and the sensing probe. This gland must not be tampered with and it must remain tensioned as it was during manufacture. **Install the unit from the Process Fitting only.** (see also Pg.12)  
Do not rotate by grasping the enclosure.
- c) Cables coming into the CGR unit shall be sealed using certified Ex d / Ex tD cable glands and all unused cable entry points shall be sealed using certified Ex d / Ex tD blanking plugs. **These cable glands and blanking plugs should be certified to same or higher EPL and IP rating as CGR unit and fitted by the qualified technician.**
- d) Correct wiring.

Follow the instructions in the **Wiring Diagram** sections. Wiring should be in accordance with relevant installation standards for hazardous area equipment or other local codes of practice.

- e) Safe temperature

When installed in hazardous gas *or* dust application areas, the ambient temperature must not exceed the temperature limits shown on the marking nameplate (see Pg.6).

Maximum permissible process temperatures for CGR unit depend on Probe model, O-ring material and Temperature class.

Temperatures should not exceed those specified in the table listed in **Application Conditions**:

- Section 12. f. for Hazardous Gas Area,
- Section 12. g for Hazardous Dust Area.

- f) Safe Pressure.

Process pressure subjected to the sensing probe in EPL Gc as well as EPL Dc hazardous areas must be between the limits of 80 to 110 kPa. (0.8 bar to 1.1 bar)

- g) Safe power supply.

Power supply values must be according to those stated in the **Specifications**.

- h) Probe Tensile Force (Flexi cable models)

Probe Type	Tensile Force
Stainless steel rope, 4 mm @ 20°C	5 kN
Stainless steel rope, 6 mm @ 20°C	10 kN
Stainless steel rope, 8 mm @ 20°C	40 kN

- i) Probe Lateral Force (Rigid and Coaxial models)

Probe Type	Lateral Force
Rod, 4 mm	1 Nm
Rod, 6 mm	3 Nm
Rod, 8 mm	8 Nm

- j) Do not put into service where there is a possibility of contact with acetic acid.



## 6. Conditions of Safe Use

The instructions for safe use of the CGR unit are as follows:

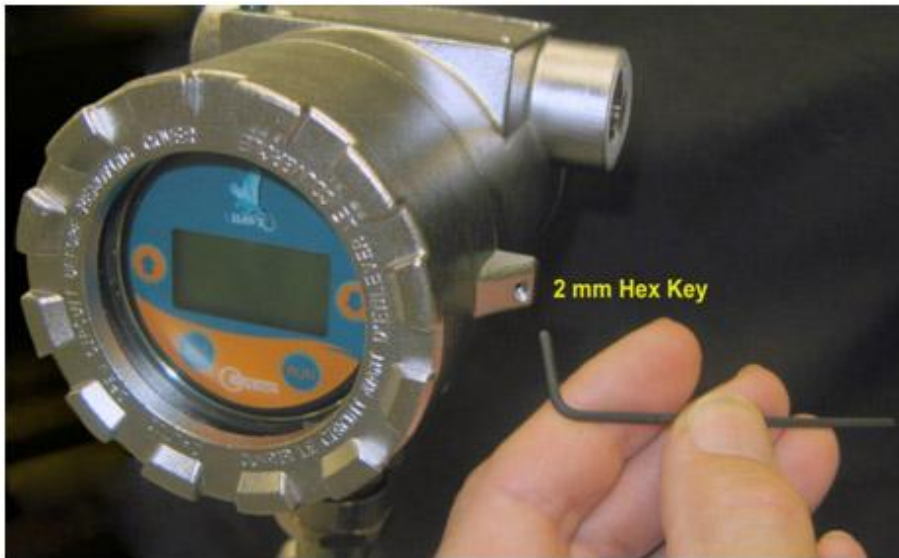
- a) The CGR equipment must be put into service safely. (see **Putting Into Service**, above).
- b) Warning: **Do not open the enclosure when an explosive atmosphere is present.**
- c) The User Manual must be read and understood by any person involved with this unit.
- d) Environment and installation conditions should be checked regularly.
- e) Process temperatures, selection of materials, use of extensions and ambient temperature ranges must be in accordance with following:
  - Section 12. f) for Hazardous Gas Area
  - Section 12. g) for Hazardous Dust Area
  - Part Structure under Section 18.
- f) When opening the cover of any CGR unit, prevent dust, liquids or chemical substances from getting inside the unit. Do not leave any cover open in rain or snow conditions.
- g) The LCD display on the CGR series transmitter is visible through the clear window.
- h) Before making any wiring or hardware configuration changes, it is important to disconnect power from the equipment.
- i) The enclosure has a non-conducting coating and may generate an ignition-capable level of electrostatic charge under certain extreme conditions. The user shall ensure that the equipment is not installed in a location where it may be subjected to external conditions (such as high-pressure steam) which might cause a build-up of electrostatic charges on non-conducting surfaces. Additionally, cleaning of the equipment should be done only with a damp cloth.
- j) Hawk CGR units must not be installed in areas with direct and continuous vibration.

## 7. Assembling and dismantling (Front & Rear covers only)

Only the front and rear covers of the Ex d enclosure are able to be removed in CGR series models, and only if an explosive atmosphere is not present.

*It is absolutely essential that this procedure is not done if an explosive atmosphere is present.*

The user interface controls and the rear terminal cover are able to be accessed by loosening a set screw then unscrewing the top cover with the aid of a suitable hand tool which does not cause any damage to the equipment.



**WARNING !**

**DO NOT OPEN  
WHEN AN  
EXPLOSIVE  
ATMOSPHERE  
IS PRESENT**



## 8. Maintenance and Repair

For Maintenance, refer to the **User Manual**.

For Repair, please return the product/goods to the factory.

## 9. Installation and Wiring

Carefully follow **Typical Installations, Installation Guide** and **Wiring Diagram** section in the User Manual. Follow all points listed in **Putting Into Service**, above.

Tighten at process fitting (Pg.12)

Wiring should be in accordance with relevant installation standards for hazardous area equipment (eg, EN 60079-14) and any other local codes of practice.

## 10. Adjustment

### a) Software Adjustment:

For software adjustment of CGR unit parameter adjustment and data entry, refer to relevant instructions in user manual.

If *GosHawk II* software is to be used for parameter adjustment and data entering from a lap-top computer, etc, the user must first read and fully understand the information in the *GosHawk II Manual* either supplied with the equipment or downloaded free from the HAWK web-site: <http://www.hawkmeasure.com>

Basic parameter adjustments to CGR units with HART communications option can be remotely adjusted using a standard HART calibrator.

*Note: Computing equipment and mobile phones should not be used in a hazardous area.*

### b) Hardware Adjustment:

The only hardware adjustment allowed is shortening of the Hawk supplied Flexible and Rigid probe length to suit the measuring span on site.


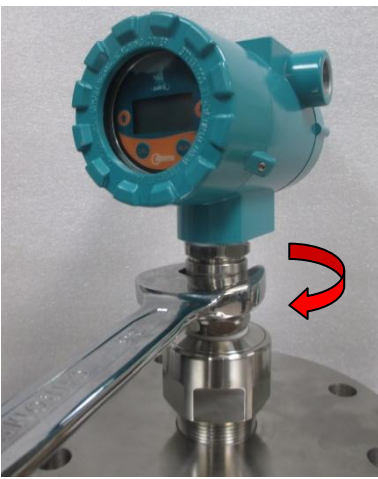
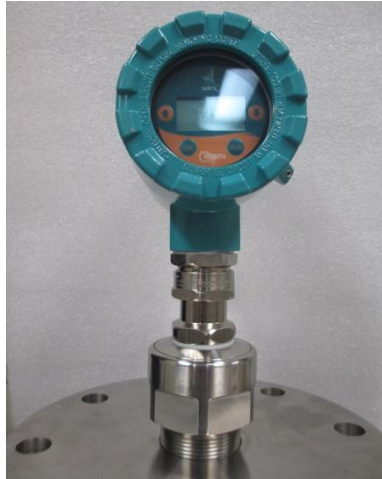
*Refer to user manual for more information*

## 11. Enclosure (LCD) Orientation (for Vertically Mounted Unit)

*The Ex d gland which couples the sensing probe to the flameproof enclosure provides a critical sealing function for the enclosure. Internal wires are passed through this gland and the high integrity seal. This gland incorporates a Union Joint which is designed to rotate.*

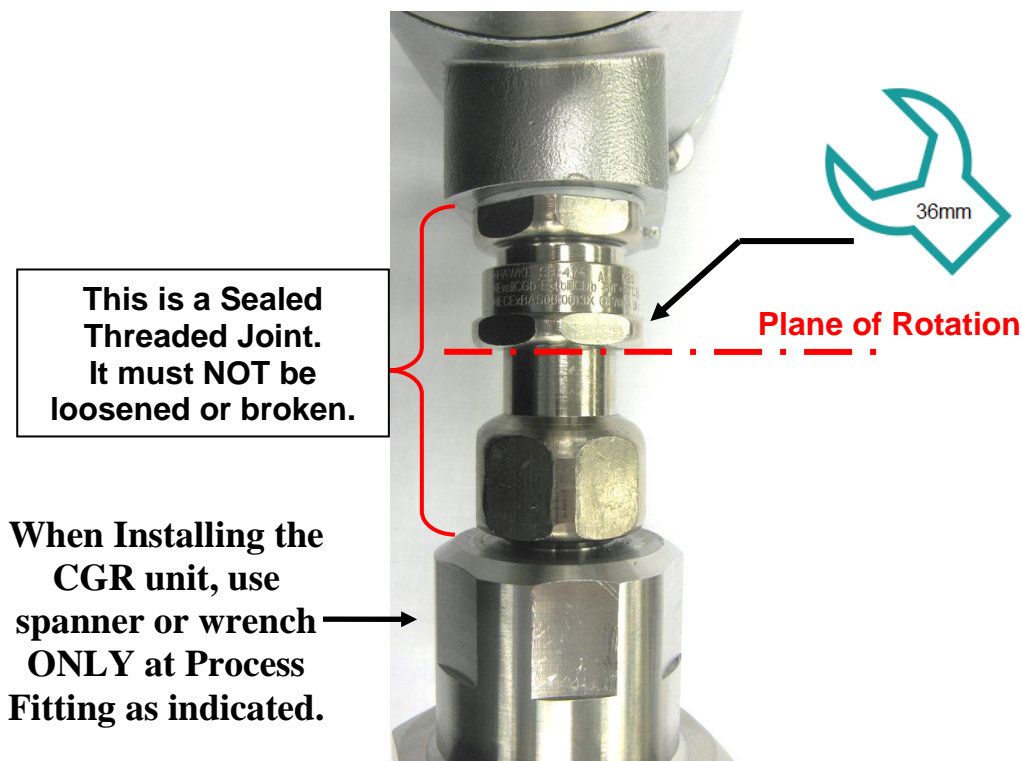
*However this rotation is limited to one-time adjustment of Display orientation after installation on site, as shown below:*

ONLY one 36mm spanner applied to the Hex of Union Joint to rotate enclosure to desired orientation as allowed. *DO NOT* hold the enclosure during this procedure.

		
<p>As Installed, but LCD display not visible.</p>	<p>Rotation at Union Joint <b>Max 360° allowable one-time rotation in either direction.</b></p>	<p>Desired Orientation.</p>

### Note:

- Rotation beyond these strict limits can damage the internal cables
- Ensure Enclosure follows the spanner rotation and assembly integrity is not compromised



## 12. Application Conditions

### a) Voltage Supply:

Must be according to the voltage supplies given in **Specifications**

$U = 14 \dots 28 \text{ V DC}$  Peak voltage that can be applied to the equipment without invalidating the type of protection.

$U_m = 250 \text{ V AC}$  Maximum voltage that can be applied to the non intrinsically safe connection of associated equipment without invalidating the type of protection.

### b) Cable Connection:

Cables and wiring must be installed according to the appropriate standards.

Cable connection compartment must be sealed using appropriate glands and blanking plugs (Refer to Section 5.c of Putting Into Service).

If extending the cable, it must be protected in a junction box and terminated in an enclosure suitable for the environment.

Refer to User Manual Wiring Diagrams.

### c) Earthing:

HAWK CGR equipment should be earthed via a resistance of less than 1 MegOhm to the Earthing Screw to reduce the possibility of electrostatic discharge.

### d) Electrostatic Discharge:

**Warning: Avoid Electrostatic Discharge**

Do not rub the non-metallic surface of this equipment with a dry cloth.

Do not install this equipment in areas where nonconductive materials could flow onto the enclosure surface.

### e) Industrial Conditions:

This equipment is designed for use in normal industrial conditions relating to humidity, vibration, etc. If the user intends to operate the equipment in more severe environmental conditions, the manufacturer or local distributor should be consulted for advice.

## f) Max Process Temperature and Pressure Range for Haz Gas Application

Temperature Class	Process Temperature Range	Requirement for extension	Probe Model	O-ring material	CGR part code for letters "h" and "i"	Maximum Process Pressure
T6	-40°C to +80°C	With or without extension	X8	NBR	B1 or BA	40 bar
				EPDM	E1 or EA	
				VITON	V1 or VA	
				SILICON	S1 or SA	
			X6 X4	NBR	B1 or BA	100 bar
				EPDM	E1 or EA	
				VITON	V1 or VA	
				SILICON	S1 or SA	
T6	-10 °C to +80 °C	With or without extension	X6 X4	MARKEZ (FFKM)	M1 or MA	100 bar
T5	-40 °C to +95 °C	Minimum Ø34x50 mm extension	X8	EPDM	E2 or EB	6 bar
				SILICON	S2 or SB	40 bar
				VITON	V2 or VB	
			X6	EPDM	E2 or EB	100 bar
				VITON	V2 or VB	
			X4	EPDM	E2 or EB	100 bar
				VITON	V2 or VB	
				SILICON	S2 or SB	6 bar
T5	-10 °C to +95 °C	Minimum Ø34x50 mm extension	X6 X4	MARKEZ (FFKM)	M2 or MB	100 bar
T4	-40 °C to +130 °C	Minimum Ø34x50 mm extension	X8	EPDM	E3 or EC	6 bar
				SILICON	S3 or SC	
				VITON	V3 or VC	40 bar
			X6	EPDM	E3 or EC	100 bar
				VITON	V3 or VC	
			X4	EPDM	E3 or EC	100 bar
				VITON	V3 or VC	
				SILICON	S3 or SC	6 bar
T4	-10 °C to +130 °C	Minimum Ø34x50 mm extension	X6 X4	MARKEZ (FFKM)	M3 or MC	100 bar
T3	-40 °C to +150 °C	Minimum Ø34x95 mm extension	X6; X4	VITON	V4 or VD	100 bar
T3	-10 °C to +150 °C	Minimum Ø34x95 mm extension	X6 X4	MARKEZ (FFKM)	M4 or MD	100 bar
T3	-10 °C to +195 °C	Minimum Ø34x95 mm extension	X6; X4	MARKEZ (FFKM)	M5 or ME	100 bar
T2	-5 °C to +250 °C	Minimum Ø34x95 mm extension	X6; X4	MARKEZ (FFKM)	M6 or MF	40 bar

**Note:** O-ring selection also depends on O-ring material suitability with respect to process medium.

### g) Max Process Temperature Range for Haz Dust Application

Maximum Surface Temperature	Process Temperature Range	Requirement for extension	Probe Model	O-ring material	CGR part code for letters "h" and "i"
T85 °C	-40 °C to +80 °C	With or without extension	X8 X6 X4	NBR	B1 or BA
				EPDM	E1 or EA
				VITON	V1 or VA
				SILICON	S1 or SA
T85 °C	-10 °C to +80 °C	With or without extension	X6 X4	MARKEZ (FFKM)	M1 or MA
T100 °C	-40 °C to +95 °C	Minimum Ø34x50 mm extension	X8 X6 X4	EPDM	E2 or EB
				VITON	V2 or VB
			X8 X4	SILICON	S2 or SB
T100 °C	-10 °C to +95 °C	Minimum Ø34x50 mm extension	X6 X4	MARKEZ (FFKM)	M2 or MB
T135 °C	-40 °C to +130 °C	Minimum Ø34x50 mm extension	X8 X6 X4	EPDM	E3 or EC
				VITON	V3 or VC
			X8 X4	SILICON	S3 or SC
T135 °C	-10 °C to +130 °C	Minimum Ø34x50 mm extension	X6 X4	MARKEZ (FFKM)	M3 or MC
T155 °C	-40 °C to +150 °C	Minimum Ø34x95 mm extension	X6 X4	VITON	V4 or VD
T155 °C	-10 °C to +150 °C	Minimum Ø34x95 mm extension	X6 X4	MARKEZ (FFKM)	M4 or MD
T200 °C	-10 °C to +195 °C	Minimum Ø34x95 mm extension	X6 X4	MARKEZ (FFKM)	M5 or ME
T255 °C	-5 °C to +250 °C	Minimum Ø34x95 mm extension	X6 X4	MARKEZ (FFKM)	M6 or MF

**Note:** O-ring selection also depends on O-ring material suitability with respect to process medium.

### **13. List of ATEX Cat 3GD equipment types**

2 wire Centurion Guided Radar – CGR2 series  
4 wire Centurion Guided Radar – CGR4 series

Probe, Flange and Accessory selection in any combination.

### **14. Wiring configuration drawings**

Refer to User Manual Wiring Diagrams.

Note: All equipment in Hazardous Areas must have appropriate certification.

### **15. Standards**

Standards listed in the EU Declaration of Conformity specify test requirements at standard temperature, pressure and oxygen content. Additional consideration and/or testing may be required for equipment operating outside these limits.



## 16. EU Declaration of Conformity



A higher level of performance

# EU DECLARATION OF CONFORMITY

Manufacturer's Name: HAWK MEASUREMENT SYSTEMS PTY LTD

Manufacturer's Address: 15-17 Maurice Court  
Nunawading, Vic.  
Australia 3131

declares that the product Centurion Guided Radar Series

models with part no series CGRabcdeeeffggghijklklm

conform to the following product specifications:

Low Voltage Directive: 2014/35/EU  
EMC Directive: 2014/30/EU  
ATEX Directive: 2014/34/EU

Standards in whole or in part to which conformity is declared:

Normative Documents:	EN 61326-1: 2012	
	EN 61000-4-2: 2009	EN 60079-0:2012
	EN 61000-4-3: 2006	EN 60079-1:2014
	EN 61000-4-4: 2012	EN 60079-11:2012
	EN 61000-4-5: 2014	EN 60079-26:2015
	EN 61000-4-6: 2010	EN 60079-31:2014

Standards: CISPR 16-1: 2006  
CISPR 16-2: 2006  
CISPR 16-1-4: 2008  
CISPR 11: 2009

Supplementary Information:

These products comply with the requirements of Low Voltage Directive 2014/35/EU and EMC Directive 2014/30/EU and ATEX Directive 2014/34/EU and carry the CE-marking accordingly.

All models are safe for operation in Category 3 hazardous gas (Zone 2) and dust locations (Zone 22) with ATEX marking codes  $\text{Ex}$  II 3G Ex ia/d IIC T6... T2 Gc  $\text{Ex}$  II 3D Ex ia tb IIIC T85°C...T255°C Dc  
 $T_{\text{amb}} = -40^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$  IP 66, NEMA 4X.

Signature:

Name: Colin Prohasky  
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Date: 29 June 2018  
Place: Melbourne, Australia.

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CE-DoC-CGR 3GD.docx

## 17. Manufacturer Contact Information

### **Hawk Measurement Systems**

#### **Head Office**

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Email: [info@hawkmeasure.com](mailto:info@hawkmeasure.com)

Web: <http://www.hawkmeasure.com>

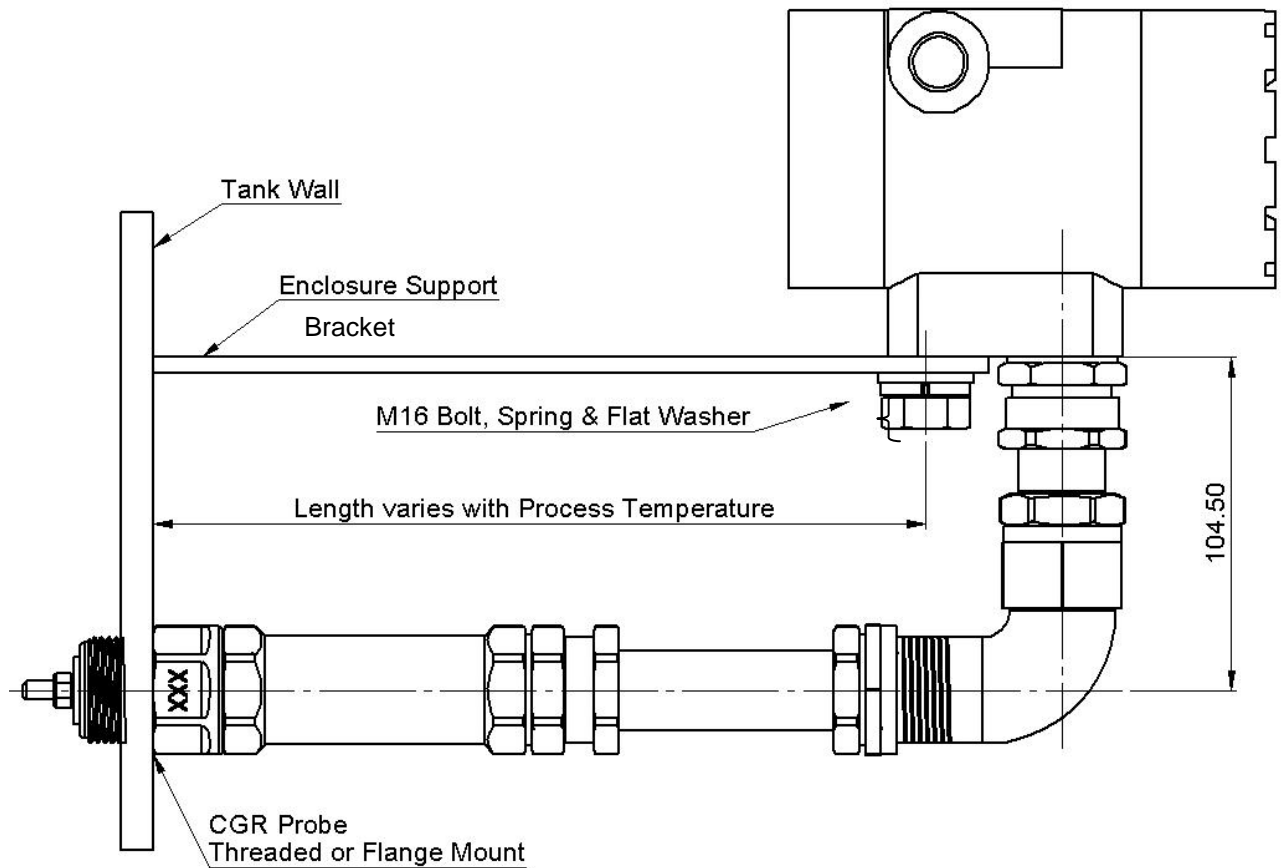
# 18. CGR Part Structure

CGR	a	b	c	d	eee	f	gggg	h	i	j	kk	llll	(m)
													<b>(m) OEM Company Code</b>
													<b>(llll) Probe length (in cms)</b>
													<b>(kk) Approvals</b>
													kk = Approval Coding
													<b>3A: ATEX II 3G Ex ia/d IIC T6...T2 Gc Tamb -40°C to 60°C</b>
													<b>6A: ATEX II 3D Ex ia tb IIC T85°C... T255°C Dc Tamb -40°C to +60°C</b>
													<b>(j) Process Pressure</b>
													j = 1 – 9 Process Pressure coding
													<b>(i) Temperature Class / Maximum Process Temperature / Enclosure Extension</b>
													i = 1 – 9 or A – Z Temp Class / Max Process / Temp / Enclosure Extension coding
													1: Temperature Class: T6 / Max Process Temperature: +80°C / No Extension
													2: Temperature Class: T5 / Max Process Temperature: +95°C / 50mm Extension
													3: Temperature Class: T4 / Max Process Temperature: +130°C / 50mm Extension
													4: Temperature Class: T3 / Max Process Temperature: +150°C / 95mm Extension
													5: Temperature Class: T2 / Max Process Temperature: +195°C / 95mm Extension
													6: Temperature Class: T2 / Max Process Temperature: +250°C / 95mm Extension
													A: Temperature Class: T6 / Max Process Temperature: +80°C / 500mm Extension
													B: Temperature Class: T5 / Max Process Temperature: +95°C / 500mm Extension
													C: Temperature Class: T4 / Max Process Temperature: +130°C / 500mm Extension
													D: Temperature Class: T3 / Max Process Temperature: +150°C / 500mm Extension
													E: Temperature Class: T2 / Max Process Temperature: +195°C / 500mm Extension
													F: Temperature Class: T2 / Max Process Temperature: +250°C / 500mm Extension
													J: Temperature Class: T3 / Max Process Temperature: +150°C / 90° Orientation
													<b>(h) Process O-ring Seal / Rated Temperature</b>
													B: NBR / -40°C to +80°C
													E: EPDM / -40°C to +130°C
													S: SILICONE / -40°C to +130°C
													V: FKM (VITON) / -40°C to +150°C
													M: FFKM (MARKEZ) / -10°C to +200°C / -5°C to +250°C
													<b>(gggg) Mounting</b>
													gggg = Mounting option coding for threads and flanges
													<b>(f) Probe Variant/material</b>
													f = A – Z probe material coding
													<b>(eee) Probe Type</b>
													AXX: Flexible Probe ; where X = 0.1 to 70mm diameter
													BXX: Rigid Probe ; where X = 0.1 to 70mm diameter
													CXX: Coaxial Probe ; where X = 0.1 to 70mm diameter
													DXX: Dual Probe ; where X = 0.1 to 70mm diameter
													EXX: Parallel Rigid Probe ; where X = 0.1 to 70mm diameter
													FXX: Parallel Flexible Probe ; where X = 0.1 to 70mm diameter
													JXX: Detached Flexible Probe; where X = 0.1 to 70mm diameter
													KXX: Detached Rigid Probe; where X = 0.1 to 70mm diameter
													<b>(d) Gland Entry</b>
													1: ½" NPT Cable Gland entry
													2: ¾" NPT Cable Gland entry
													3: M20x1.5 Cable Gland entry
													4: M25x1.5 Cable Gland entry
													5-9: Other Sizes
													<b>(c) Housing</b>
													Housing material code (0-5)
													<b>(b) Communication</b>
													B = communication option from A – Z
													<b>(a) Model Type</b>
													A = 1-9 or A-Z for number of wires and/or software variation for CGR

# APPENDIX – I

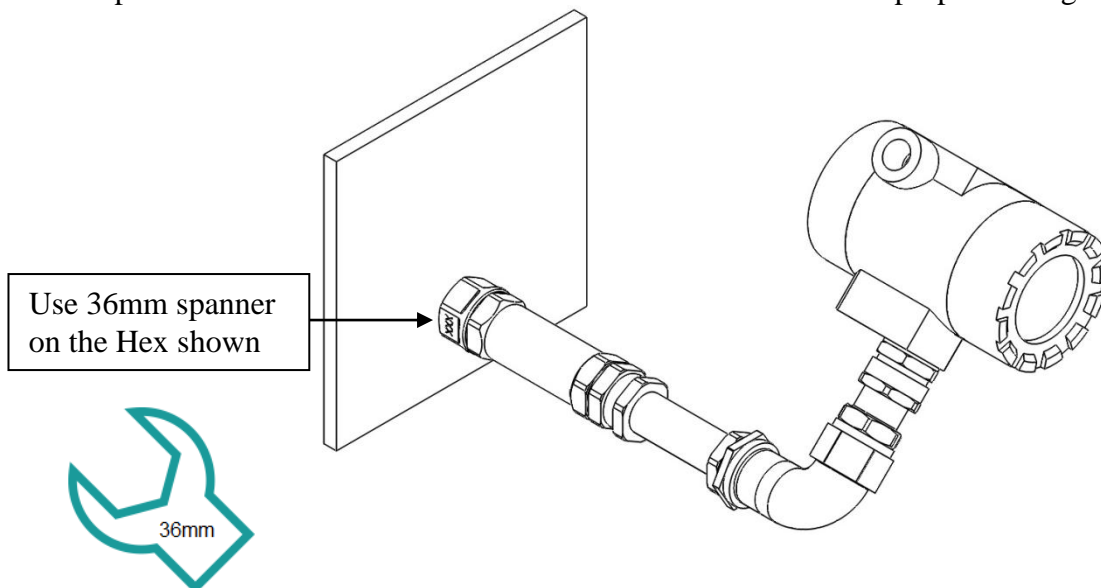
## Installation of CGR Units with 90° Bend

### Typical 90° Bend Installation



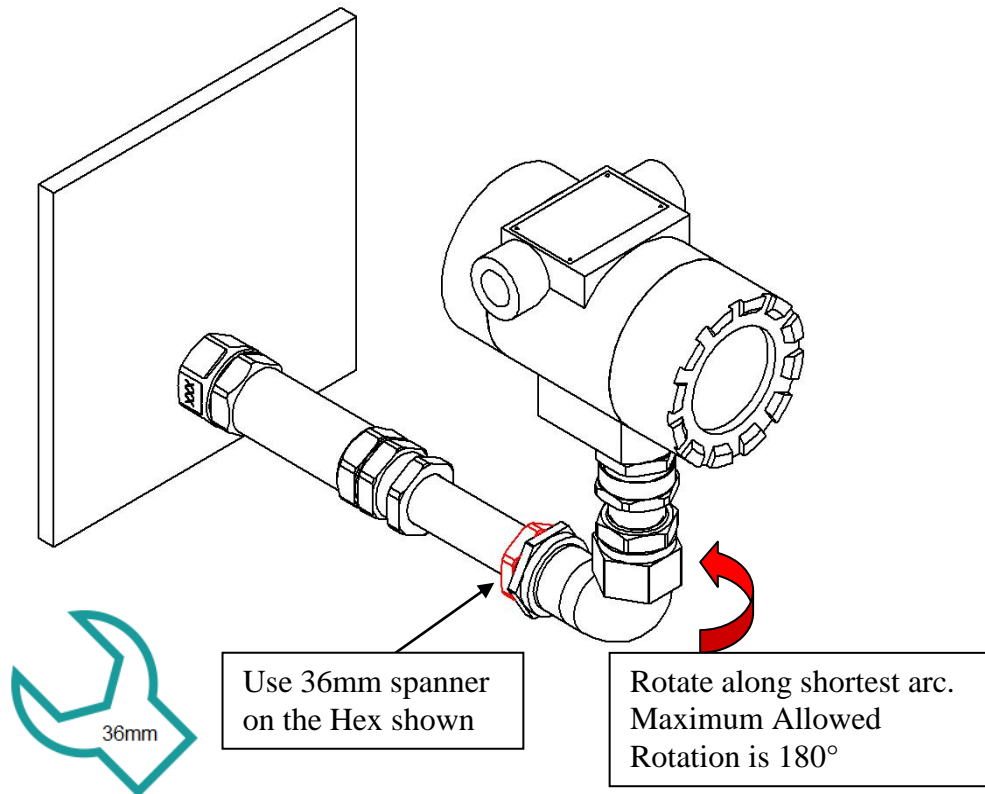
### Thread Mount Installation Procedure

Step 1: Screw in the CGR Probe on to the Tank threads. Ensure proper sealing methods are applied.



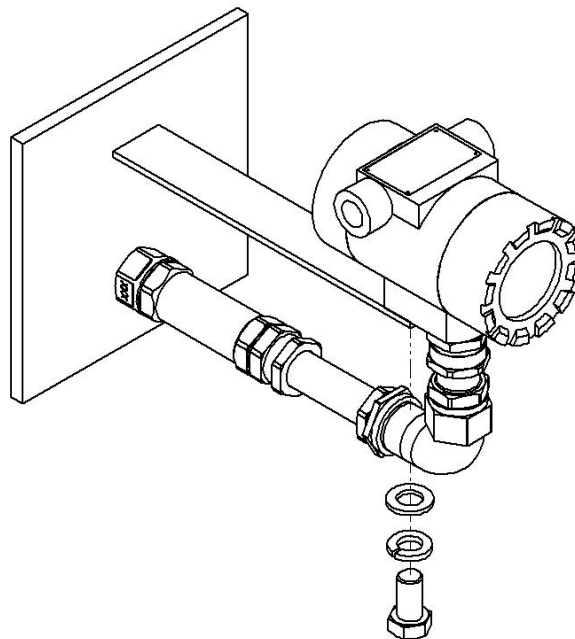
**Note: The Enclosure may be angled at any position**

Step 2: Rotate the setup to have Enclosure at 90° to horizontal axis



**Note: DO NOT apply spanner at any other Hex.**

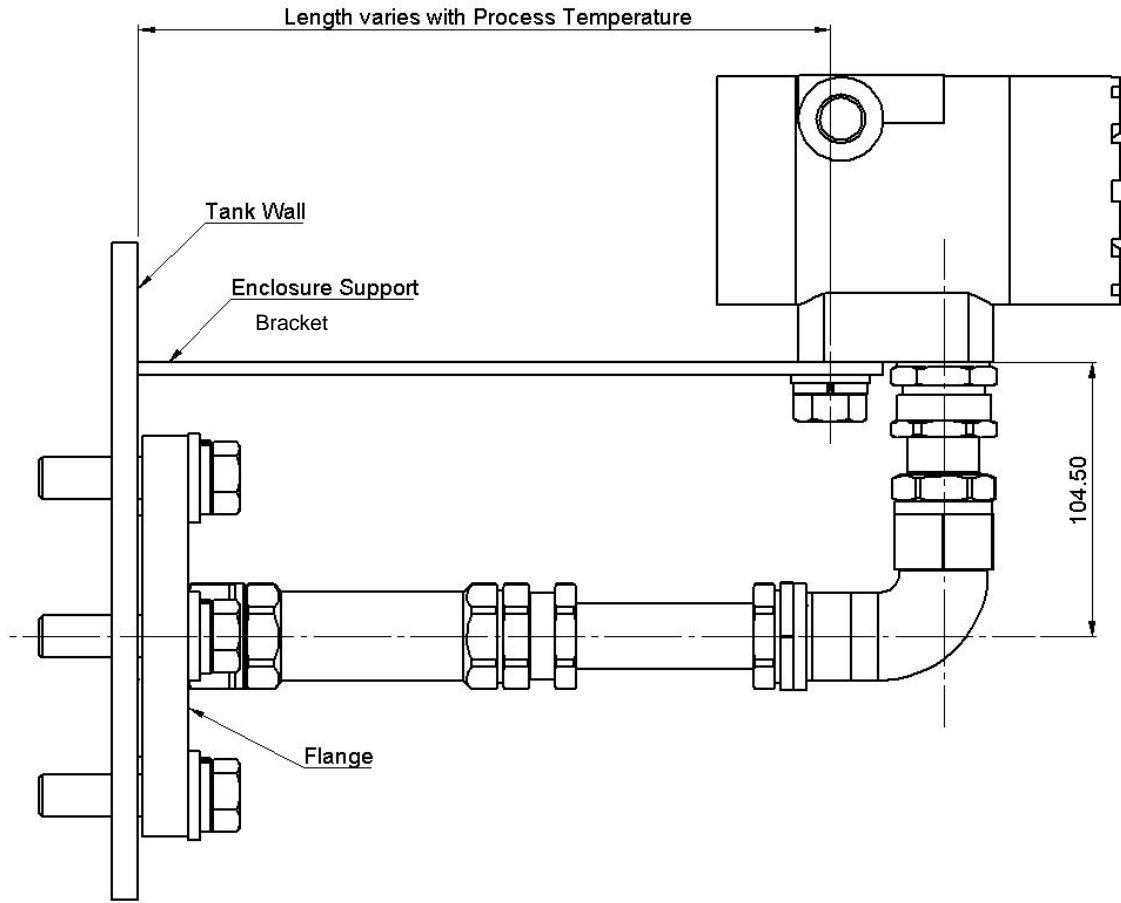
Step 3: End User to install Enclosure Support Bracket by SS316 M16 Bolt, Spring Washer and Flat Washer



Note:

- End User to fabricate support plate in order to support the weight of the enclosure as well as to avoid rotation.
- Support Bracket to be made from SS316 or any other corrosion resistant material.
- Support Bracket to have 40mm minimum width and a 16.5mm thru hole at 20mm from one end to pick M16 hole on the Enclosure.
- End user to maintain Ambient Temperature of maximum +60°C at the Enclosure by taking into consideration any heat transfer through the support plate.

# Flange Mount Installation Procedure



## NOTES:

Technical data is subject to change without notice.  
Images shown may differ from equipment supplied.