

# ENT 7

## Capacitance Level Switch ATEX Certified



- + Read guide before use!
- + Observe all safety information!
- + Keep guide for future use!

**If In Doubt ASK !**

**+44(0)1293 658360**  
**techoffice@eurogauge.co.uk**



### About this User Guide

This guide is part of the device installation.

Read this guide before using the device.

Keep this guide during the entire service life of the device and always have it readily available for reference.

Always hand this guide over to future owners or users of the device.

### Contents

2	Warning terms General installation and wiring requirements General troubleshooting
3	General safety General handling and storage
4	Staff qualification Modification Warranty Spare parts Recycling Limit of liability Copyright Customer satisfaction Contact Afriso Eurogauge
5	Application Mechanical installation Electrical installation
6	Electrical wiring diagram Commissioning Maintenance
7	Outline drawing
8	Specification
9	Part numbers and descriptions
10	Declaration of conformity Declaration of origin

## WARNING TERMS

The type and source of danger associated with this device is shown here.

Precautions to take in order to avoid the danger are shown here.  
There are three different levels of warning:



**DANGER**

Imminent danger!

Failure to observe the information will result in death or serious injuries.

**WARNING**

Possible imminent danger!

Failure to observe the information may result in death or serious injuries.

**CAUTION**

Dangerous situation!

Failure to observe the information may result in minor or serious injuries and damage to property or device not working as expected.

## General Installation and Wiring requirements

The device must be installed in accordance with the details given later in this guide.

All wiring must be in suitable cable for the application conditions and must comply with the relevant regulations of the electrical supply authority concerned, together with any other statutory requirements which may affect the complete installation.

It is recommended that cable with polyethylene or PVC insulation with a conductor size of at least 1.0mm<sup>2</sup> is used.

**CAUTION**

**ATEX installations may only be carried out by qualified and trained personnel in accordance with ATEX specific requirements.**



**MICC cable (Pyro) must never be used under any circumstances**

Signal cables should be run separately from any cables carrying mains voltages.

If signal cables are to be run through areas of high electrical interference it is recommended that screened cable is used with the screens being terminated only to the device earth terminal or as specified.

Specific terminal connection information may be found on identification label(s) on the device unless otherwise advised..

Refer to separately supplied installation guides for information regarding external components of the system such as level sensors, sounders and beacons etc.

**CAUTION**



Electrical systems may be impacted and the device switching contact (if fitted) may be destroyed by voltage peaks when inductive loads are switched off.

Use commercially available standard RC combinations such as 0.1µF/100Ω for inductive load switching.

## Troubleshooting

Repairs and fault finding may only be performed by Afriso Eurogauge personnel or qualified personnel under Afriso Eurogauge instruction.

Refer to separately supplied installation guides for information regarding fault finding and repairs on external components.

## Safety

### Intended use

The level switch device may only be used for continuous level monitoring in metal containers, silos and tanks for the storage of the following media, provided such media can be detected with a capacitance probe.

Granulated materials

Powdered materials

Any use other than the application explicitly permitted in this guide or authorised by Afriso Eurogauge is not permitted.

### Predictable incorrect application

The device must never be used in the following cases:

Hazardous area (ATEX zones 0, 1 & 2) only for Dust hazardous areas

### Safe handling

This product represents state-of-the-art technology and is made according to the pertinent safety regulations. Each device is subjected to a function and safety test prior to shipping.

Operate the device only when it is in perfect condition. Always observe the operating instructions, all pertinent local and national directives and guidelines as well as the applicable safety regulations and directives concerning the prevention of accidents.

### WARNING

#### Severe burns or death caused by mains voltage (110/230 VAC, 50/60Hz) in the device



Do not expose the control unit to water.

Interrupt the mains voltage supply before opening the device or before performing maintenance and cleaning work and make sure it cannot be switched on by accident.

Do not tamper with or modify the device in any way whatsoever.

### Transport and storage

#### CAUTION Damage to the device due to improper transport.



Do not throw or drop the device.

Protect from wetness, humidity, dirt and dust.

#### CAUTION Damage to the device due to improper storage.



Protect from wetness, humidity, dirt and dust.

Store the device in a clean and dry environment.

Only store the device within the permissible temperature range.

---

---

### **Staff Qualification**

The device may only be mounted, commissioned, operated, maintained, shut down and disposed of by trained staff. Electrical work may only be performed by trained electricians and in compliance with all applicable local and national directives.

### **Modifications to the device**

Changes or modifications made to the device by unauthorised persons may lead to malfunctions and are prohibited for safety reasons unless specifically instructed by the manufacturer.

### **Use of spare parts and accessories**

Use of unsuitable spare parts and accessories may cause damage to the device. Use only genuine manufacturer spare parts and accessories.

### **Liability information**

The manufacturer shall not be liable in any form whatsoever for direct or consequential damage resulting from failure to observe the technical instructions, guidelines and recommendations given in this guide or ancillary documents.

The manufacturer or sales agent shall not be liable for costs or damages incurred by the user or by third parties in the usage or application of this panel, in particular in case of improper use of the device, misuse or malfunction of the connection, malfunction of the device or of connected devices.

The manufacturer or sales agent shall not be liable for damage whatsoever resulting from any use other than the use explicitly permitted in this guide or ancillary documents.

The manufacturer shall not be liable for misprints.

### **Disposal and Recycling**

Switch off the supply voltage and disconnect from device.

Disconnect all other terminals and remove wiring from device.

Dismount the device.

To protect the environment, this device must **not** be disposed together with normal household waste

Dispose of the device according to local directives and guidelines.

This device consists of materials that can be recycled.

Electronic inserts can be easily separated and the device consists of recyclable materials.

Where it is not possible to dispose of the device locally in accordance with environmental regulations please contact us for return or disposal instructions.

### **Warranty**

The manufacturer's warranty for this device is 24 months after the date of purchase.

This warranty shall be good in all countries this device is sold by the manufacturer or its authorised dealers or agents.

Refer to separately supplied installation guides for information regarding warranty on external components.

### **Copyright**

The manufacturer retains the copyright to this device. This guide or any separately supplied installation guide may not be reprinted, translated, copied in part or in whole without prior written consent.

We reserve the right to make technical modifications with reference to the specifications in this guide without notice.

### **Customer Satisfaction**

Customer satisfaction is our prime objective.

Please get in touch with us if you have any questions, suggestions or problems concerning the device or external components.

### **Contact**

Afriso Eurogauge Ltd  
Unit 4, Satellite Business Village  
Fleming Way, Crawley  
West Sussex. RH10 9NE

Tel: +44(0) 1293 658360 Fax: +44(0)1293 528270

email: [techoffice@eurogauge.co.uk](mailto:techoffice@eurogauge.co.uk)

Web: [www.eurogauge.co.uk](http://www.eurogauge.co.uk)

## APPLICATION

The ENT 7 capacitance level switch (ATEX version) is intended for high or low level detection of free-flowing powders and granular materials in silos, tanks, etc where explosive dusts may be present.

The choice of electrode configuration makes the ENT 7 equally useful with conducting as well as non conducting products.

The device is completely self-contained, requiring only a supply voltage and having a set of independent voltage-free changeover contacts for connection to external control equipment or alarms.

## Operation

The device operates on the principle of a changing electric field caused by the presence or absence of material around the electrode. This change, after amplification, is used to operate the output relay.

An internal Failsafe Switch offers the option of failsafe facilities for either high or low level alarms, LED indicators show the state of the output relay.

A multi-turn Sensitivity Control allows accurate adjustment of the switch point.

## INSTALLATION

Check that the electrode and the insulation is correct for the application, if in doubt, consult the Afriso Eurogauge Technical Department for advice.

## Mechanical

### CAUTION



The device must be mounted in such a position that the maximum permissible ambient (external) temperature of 40°C is not exceeded. When the device is mounted into the side of the vessel ensure that the cable entries point downwards.

Mounting is by either a 1", 1½" BSP parallel or 1½" BSP taper thread. Flanges are available as an option. When fitting the device into the mounting boss, use a 'C' spanner on the metal boss. **DO NOT** use the housing to turn the device into the boss.

Make certain that the rubber sealing ring is in place before securing the cover and that the four cover screws are securely tightened down.

## Electrical

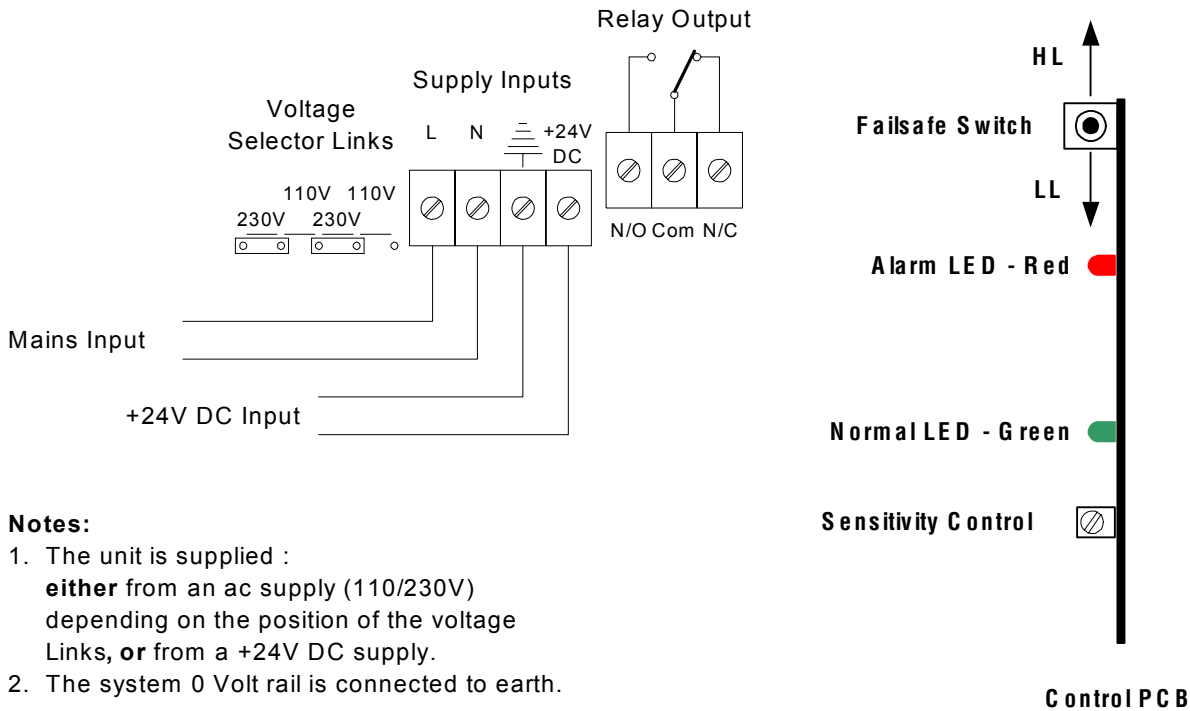
The supply and relay output connections are entirely isolated and may be used separately.

Connect the supply to the appropriate terminals on the 'SUPPLY' terminal block; the connectors are removable.

The compression glands are for cables with an outer diameter of 5-8mm and must be securely tightened to prevent the ingress of dust or moisture and to ensure compliance with the IP67 physical protection.

The internal earth is connected to the mounting boss and must also be connected to a suitable external earth.

## Wiring Connections



### Notes:

1. The unit is supplied :  
**either** from an ac supply (110/230V)  
depending on the position of the voltage  
Links, **or** from a +24V DC supply.
2. The system 0 Volt rail is connected to earth.

## Commissioning

Set the fail-safe switch to high or low level as required by the application.

With the vessel **EMPTY**, use the trim tool provided on the inside of the instrument lid, or a small instrument screwdriver to adjust the multi-turn switchpoint control potentiometer.

### High Level (HL)

If the red alarm LED is on - turn the control clockwise until the green LED comes on, then turn the control clockwise one more turn.

If the green normal LED is on - turn the control anti-clockwise until the red LED comes on, then turn the control clockwise until the green LED comes on again and then turn the control clockwise for one more turn.

### Low Level (LL)

If the green normal LED is on - turn the control clockwise until the red LED comes on, then turn the control clockwise one more turn.

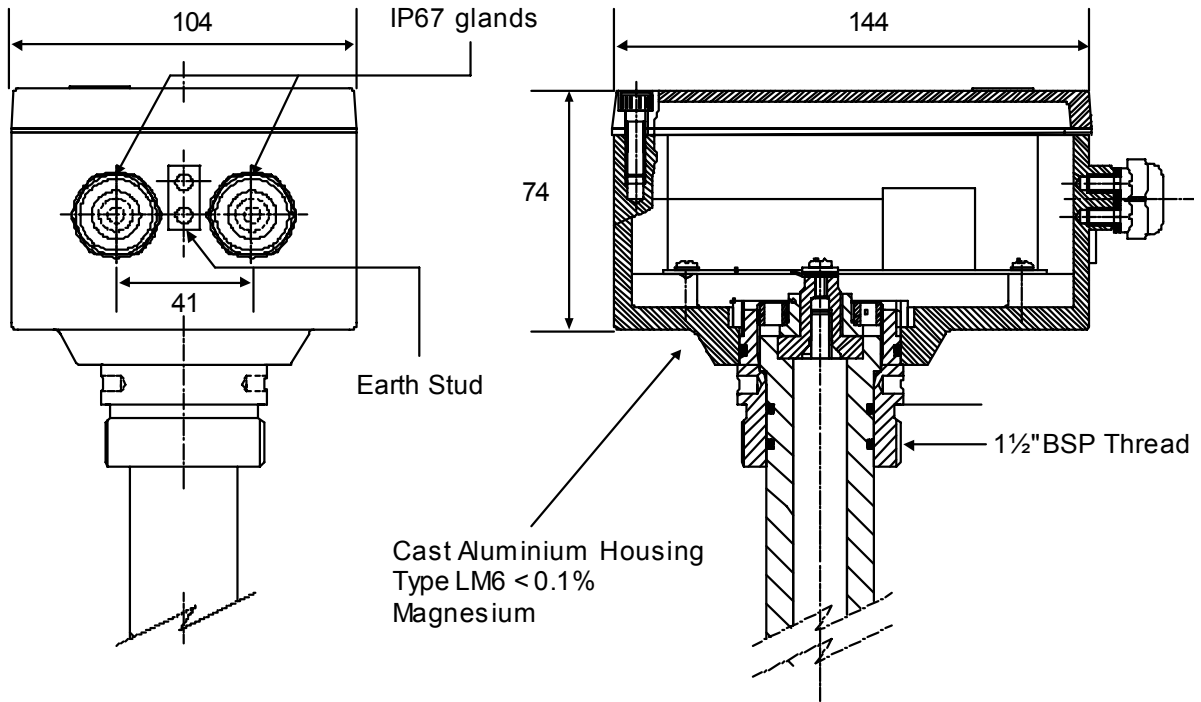
If the red alarm LED is on - turn the control anti-clockwise until the green LED comes on, then turn the control clockwise until the red LED comes on again and then turn the control clockwise for one more turn.

For maximum sensitivity the control may be turned by half a turn only and not one turn as described above.

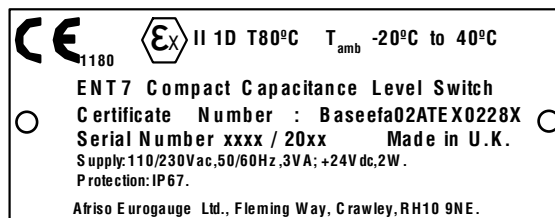
## Maintenance

No maintenance is normally required. However, it is advisable that the electrode is checked for any signs of damage or wear at intervals when the installation is cleaned.

Basic Outline and Dimensions



Certification Label



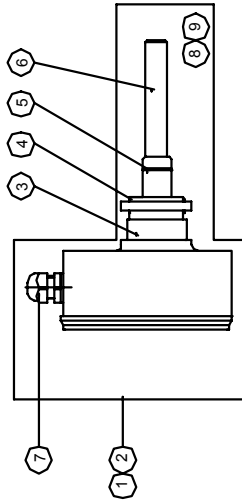
## Specification

<b>Supply</b>	110-120Vac(range 95-130Vac), 50/60Hz, 4VA . 220-240Vac (range 190-260Vac) set by internal voltage links on PCB. 24Vdc (20 - 28Vdc), 4 Watts.
<b>Part Numbers</b>	See Part number reference chart - 5400 00 0000 ATEX on page 9.
<b>Capacitance Range</b>	200pF $\Delta C$ , [100pF $\Delta C$ with 'H' setting - factory option only].
<b>Sensitivity</b>	<0.25pF @ Co = 10pF, <1.0pF @ Co = 100pF. Adjustable by multi-turn control - 10pF/turn.
<b>Application</b>	High or low level detection of free-flowing powders and granular materials in silos, tanks, sumps and pipelines.
<b>Output Relay</b>	Single pole changeover contacts - voltage-free. Rating - 250V @ 4A max, 500 VA @ Cos $\Phi$ = 0.7, 100 Watts dc
<b>Indicators</b>	Green LED (normal) On when output relay energised. Red LED (alarm) On when output relay de-energised.
<b>Failsafe</b>	High or low level failsafe selection by internal switch.  High Level (maximum failsafe) - Electrode uncovered - relay energised - green LED on. Low Level (minimum failsafe) - Electrode covered - relay energised - green LED on.
<b>Temperature</b>	Ambient -20°.... 40°C. Electrode -20°.... 80°C.
<b>Terminals</b>	4 way and 3 way plug-in terminal blocks for supply and relay outputs - for 1mm <sup>2</sup> conductor
<b>Cable Entry</b>	2 x Pg11 cable glands for 5-8mm diameter cable fitted as standard.  Cable entries must comply with IP67 protection rating to meet certification requirements.
<b>Housing</b>	Gravity cast aluminium type LM6 (< 0.1% magnesium).
<b>Protection</b>	IP67 (BS5490 / IEC529).
<b>Mounting Boss</b>	1½" BSP parallel thread.
<b>Weight</b>	2 to 10kg depending on electrode configuration.

Note: We reserve the right to alter the design or specification of this product without prior notice.



## CODING AND CLASSIFICATION CHART - FOR ATEX CERTIFIED COMPACT CAPACITANCE LEVEL SWITCH



ORDERING INFORMATION FOR PROBE UNITS TYPE 5400 00 0000 ATEX SPECIFICATION  
 SEE SHEET 2 FOR MORE DETAILS OF PROBE ASSEMBLIES.

### CERTIFIED RELATED DRAWINGS

1 2 UNIT TYPE 5 4	3 HEAD MATERIAL 0	4 THREAD SIZE 0	5 INSULATION MATERIAL 0	6 ELECTRODE SIZE (Ø) 0	7 CABLE ENTRY 0	8 SPECIAL FEATURES 0	9 SPECIAL FEATURES 0	10 Stand Off 0
	1=Stainless Steel	2 = 1" BSP	2 = P.T.F.E. (P.I.) 3 = Polypropylene (P.I.)	2 = 20mm Ø		0= Standard Assembly 1 = Steel Weight/ Screen Tube. 2 = Crimped/Welded Weight		0=Standard Assembly
54=Compact Capacitance Level Switch								
						6 = St. Steel Rod & S/S High Sensitivity Adaptor	6 = Partially Screened Electrode.	
					7 = ATEX Certified Cable Gland			
			8 = PTFE (F.L.) SEENOTE 1.	8 = 6mm Ø Galv. St Cable Insulation Covered (8mm o.d.) 9 = 6mm Ø St. Steel Cable (Not covered)				
								S = Stand Off Screen Tube Head

ALL PROBE ASSEMBLY PART NUMBERS END WITH EX  
 NOTE 1 :- COVERS PART No, s 5413 82 1000 EX AND 5413 82 1160 EX ONLY  
 (PTFE INSULATION THICKNESS 8mm)



## Declaration of Conformity

### ENT 7 Intrinsically Safe Capacitance Level Switch

This is to certify that the above named product complies with the Equipment or Protective systems or Components intended for use in potentially Explosive Atmospheres Directive 94/9/EC, the Electromagnetic Compatibility Directive 89/336/EEC, the Low voltage Directive 73/23/EEC

Notification Number:- Baseefa02ATEX0228X  II 1 D T80°C T<sub>amb</sub> -20°C to 40°C

Notified Body: - Baseefa (1180), Buxton, Derbyshire, SK17 9JN.

And with the requirements of the normative sections of the following harmonised European Standards:-

- EN50081-1: Electromagnetic compatibility – Generic Emission Standard Part 1 : Residential, Commercial and Light Industry
- EN50082-2: Electromagnetic compatibility – Generic Immunity Standard Part 2 : Heavy Industry
- EN61010-1: Safety Requirements for electrical equipment for measurement, control and laboratory use.
- BS EN 50014: Electrical apparatus for potentially explosive atmospheres – General Requirements.
- BS EN 50020: Electrical apparatus for potentially explosive atmospheres – intrinsically safe 'I'.

Signed:  D C Ward Position: Technical Manager Date: 20/02/2007

This declaration applies to the following: Part number reference chart - 54xx-ATEX

## Declaration of Product Origin

### ENT 7 Intrinsically Safe Capacitance Level Switch

We confirm that the following product designs originate and have been wholly manufactured within the United Kingdom of Great Britain and Northern Ireland by:

Afriso Eurogauge Ltd.  
Unit 4, Satellite Business Village,  
Fleming Way, Crawley,  
West Sussex.  
RH10 9NE. United Kingdom.  
Tel: +44 (0)1293 658360  
Fax: +44 (0)1293 528270  
[sales@eurogauge.co.uk](mailto:sales@eurogauge.co.uk)  
[www.eurogauge.co.uk](http://www.eurogauge.co.uk)

Signed:  D C Ward Position: Technical Manager Date: 20/02/2007

This declaration applies to the following: Part number reference chart - 54xx-ATEX