



1 **EC TYPE-EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: **Sira 04ATEX1125X** Issue: **2**

4 Equipment: **TF Series Liquid Level Switch**

5 Applicant: **Hycontrol Limited**

6 Address: **Larchwood House
Orchard Street
Redditch
Worcestershire B98 7DP
UK**

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 14.2.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 60079-0:2009 EN 60079-1:2007 EN 60079-26:2007 EN 60079-31:2009

The above list of documents may detail standards that do not appear on the UKAS Scope of Accreditation, but have been added through Sira's flexible scope of accreditation, which is available on request.

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:



II 1/2 G D
Ex d IIC T6...T2 Ga/Gb
Ex tb IIIC T85°C...T265°C Db

(See special conditions for safe use for the temperature class and maximum surface temperature for dust (T***°C) that are applicable to the relevant ambient and process temperatures)

A C Smith
Certification Manager

Project Number 28646

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13 DESCRIPTION OF EQUIPMENT

The TF Series Switch is a vibrating fork liquid level switch designed using the principle of a tuning fork. By using piezo-crystals, the fork is forced to resonate constantly at its natural frequency. When installed, a liquid will come into contact with the forks and dampen them, thus changing the natural resonant frequency. As a result of this change, the electronics modify the output of the TF Series Liquid Level Switch.

The TF Series Switch terminal head is constructed from Aluminium Alloy ASTM B26 356-T6 and is in two parts, a main body and lid. The body and lid are fixed together via a 3 5/8"-12 UN 2B ANSI B.1 thread, which is secured by a lid retention bracket. The body is machined with two M20 x 1.5 cable entries and a 3/4"-14 NPT thread for connection of the vibrating fork probe, which is secured with a M4 grub screw. The terminal head contains either a rectangular or 'D' shaped electronics unit, which is mounted onto the probe output.

The probe is constructed from 316 stainless steel and hastelloy, and is of welded construction. The probes are filled with Perlite to prevent pressure piling. There are numerous options of probe as summarised below and illustrated on the relevant drawing number.

- Machined fitting/fork probe
- Machined fitting with 1/2" NB tube with maximum length of 3000 mm and fork fitted
- Machined fitting with 1/2" NB tube with maximum length of 3000 mm, flange and fork fitted
- Machined fitting with 3/4" NB tube with maximum length of 3000 mm and fork fitted
- Machined fitting with 3/4" NB tube with maximum length of 3000 mm, flange and fork fitted

Electrical characteristics: U = 20 – 264 Vac (50/60 Hz) or 20 – 60 Vdc
Maximum power dissipation = 2 W

Process characteristics: Maximum pressure = 100 bar
Maximum temperature = 150°C

Standard length probes:-

HYCATF-XX (wetside material)

- XX (process connection)
- X (electronics module)
- X (surface finish)
- XX (approval & housing)
- A (std. length probe)

Mid range temperature version would be prefixed HYCATFM-XX etc

High temperature version would be prefixed HYCATFH-XX etc

Extended length probes:-

HYC-TF-XX (wetside material)

- XX (process connection)
- X (electronics module)
- X (surface finish)
- XX (approval & housing)
- XXXX (fork length)

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Sira Certification Service

Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900

Fax: +44 (0) 1244 681330

Email: info@siracertification.com

Web: www.siracertification.com



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Mid range temperature version would be prefixed HYC-TFM-XX etc
High temperature version would be prefixed HYC-TFH-XX etc

Variation 1 - This variation introduced the following change:

- i. The amendment of drawing alterations are detailed below:
 - The addition of two new tube dimensions - 1.125"OD x 0.120" wall
- 28.0 mm OD x 2.0 mm wall
 - The change of the flamepath identifier from **[3]** to **[C]**
 - The illustration of a blank plug in the cable entry
- ii. The recognition of minor changes to drawing number 71097/999.
- iii. The definition of the product label material to become "metal (<6% magnesium)".
- iv. The introduction of an alternative, cover and body enclosure housing design that is manufactured from either aluminium or stainless steel.
- v. The use of an alternative grade of enclosure material was recognised.
- vi. An increase in length for the sensor assembly was allowed.
- vii. Following appropriate re-assessment to demonstrate compliance with the requirements of the EN 60079 and EN 61241 series of standards, the documents originally listed in section 9, EN 50014:1997 (amendments A1 to A2), EN 50018:2000, EN 50281-1-1:1998 and EN 50284:1999, were replaced by EN 60079-0:2006, EN 60079-1:2007, EN 61241-0:2006, EN 61241-1:2004 and EN 60079-26:2004, the markings in section 12 were updated accordingly.
- viii. The use of alternative electronic modules was permitted.
- ix. The product marking was changed to allow a special condition for safe use to define the temperature classes and the maximum surface temperatures for dust, T***°C, that are applicable to these products.
- x. An additional, alternative welded design was recognised.
- xi. The pressure of hastelloy unit was allowed to be increased to a maximum of 115 bar.
- xii. The recognition of alternative designations, HYC*TF-*****EG**, HYC*TF-*****EJ**, HYC*TFH-*****EG** and HYC*TFH-*****EJ** the types HYC*TFH-*****EG** and HYC*TFH-*****EJ** are for use with process temperatures up to 260°C.
- xiii. The routine pressure test requirements were changed, originally 20.4 bar now 17.0 bar.
- xiv. The introduction of a new mid-temperature version of the TF series switch designated HYC*TFM-*****EG**, HYC*TFM-*****EJ**, the special condition for safe use was modified to recognise the new version.
- xv. The recognition of an alternative flame proof path.
- xvi. The specification of the materials used to construct the Body, Fitting, Flange/Fitting, Tube and Fork has amended.
- xvii. Following appropriate re-assessment to demonstrate compliance with the requirements of the EN 60079 series of standards, the documents previously listed in section 9, EN 60079-0:2006 EN 60079-1:2007, EN 61241-0:2006, EN 61241-1:2004 and EN 60079-26:2004, were replaced by those currently listed, the markings in section 12 were updated accordingly.
- xviii. The introduction of alternative tube dimensions for the fork probe was recognised.

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14 **DESCRIPTIVE DOCUMENTS**

14.1 **Drawings**

Refer to Certificate Annexe.

14.2 **Associated Sira Reports and Certificate History**

Issue	Date	Report number	Comment
0	7 July 2004	R52V11787A.	The release of the prime certificate.
1	17 August 2005	N/A	Re-issued to correct typographical errors
2	29 January 2013	R28646A/00	This Issue covers the following changes: <ul style="list-style-type: none"> All previously issued certification was rationalised into a single certificate, Issue 2, Issues 0 to 1 referenced above are only intended to reflect the history of the previous certification and have not been issued as documents in this format. The introduction of Variation 1, a special condition for safe use was introduced by this variation and therefore an 'X' suffix was added to the certificate number.

14.3 Certificate number Sira 01ATEX1263X Issue 10

15 **SPECIAL CONDITIONS FOR SAFE USE** (denoted by X after the certificate number)

15.1 The temperature class and the maximum surface temperature for dust (T**°C) are defined by the appropriate ambient temperature and process temperature and are given in the chart below:

HYC*TF-*****EG**, HYC*TF-*****EJ**

Temperature Class (T Dust)	Max. ambient air temperature (Ta)	Max. process temperature (Tp)
T6 (T85°C)	-40°C to +75°C	-40°C to +75°C
T5 (T100°C)	-40°C to +70°C	-40°C to +90°C
T4 (T135°C)	-40°C to +65°C	-40°C to +125°C
T3 (T160°C)	-40°C to +50°C	-40°C to +150°C

HYC*TFM-*****EG**, HYC*TFM-*****EJ**

Temperature Class (T Dust)	Max. ambient air temperature (Ta)	Max. process temperature (Tp)
T6 (T85°C)	- 40°C to 75°C	- 40°C to 75°C
T5 (T100°C)	- 40°C to 70°C	- 40°C to 90°C
T4 (T135°C)	- 40°C to 65°C	- 40°C to 125°C
T3 (T160°C)	- 40°C to 50°C	- 40°C to 180°C

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HYC*TFH-*****EG**, HYC*TFH-*****EJ**

Temperature Class (T Dust)	Max. ambient air temperature (Ta)	Max. process temperature (Tp)
T6 (T85°C)	-40°C to +75°C	-70°C to +80°C
T5 (T100°C)	-40°C to +74°C	-70°C to +95°C
T4 (T120°C)	-40°C to +73°C	-70°C to +115°C
T3 (T190°C)	-40°C to +69°C	-70°C to +185°C
T2 (T265°C)	-40°C to +65°C	-70°C to +260°C

16 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in the reports listed in Section 14.2.

17 CONDITIONS OF CERTIFICATION

- 17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.
- 17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.
- 17.3 This product shall be uniquely marked with the label identified in the annexe of this certificate.
- 17.4 Each welded probe enclosure shall be subjected to a routine overpressure test of 17 bar for at least 10 s as required by clause 16.1 of EN 60079-1:2007. There shall be no permanent deformation or damage to the enclosure.

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Certificate Annexe

Certificate Number: Sira 04ATEX1125X
Equipment: TF Series Liquid Level Switch
Applicant: Hycontrol Limited



Issue 0

Drawing No	Sheets	Rev	Date (Sira stamp)	Title
71097/1101	1 of 1	3	18 Jun 04	Labels Flp Hyc (ATEX)

Issue 1 No new drawings were introduced.

Issue 2

Drawing No.	Sheets	Rev.	Date (Sira stamp)	Title
71097/1101	1 of 1	5	02 Oct 12	Certification Labels FLP (ATEX)
71097/1330	1 of 1	3	29 Jan 13	TF Series Ex d Temperature Class

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