



1 **EC TYPE-EXAMINATION CERTIFICATE**

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

3 Certificate Number: **Sira 03ATEX2285X** Issue: **6**

4 Equipment: **78** Series Liquid Density Transducer**

5 Applicant: **Mobrey Limited**

6 Address: **158 Edinburgh Avenue
Slough
Berkshire
SL1 4UE
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 60079-0:2006 EN 60079-11:2007 EN 60079-26:2007

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 G

Ex ia IIC T6 Ga (Ta = -40°C to +40°C)

Ex ia IIC T4 Ga (Ta = -40°C to +70°C)

D R Stubbings BA MIET
Certification Manager

Project Number 19928
C. Index 13

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Sira Certification Service

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13 DESCRIPTION OF EQUIPMENT

The 7835 Series Liquid Density Transducer is designed to provide electrical signals proportional to density and temperature of a liquid flowing in a pipeline. The apparatus comprises a platinum resistance thermometer, a drive coil, a pick-up coil, a vibrating tube and bellows housed in a metallic tube fitted with metallic flanges. Welded to the metallic tube is a metallic box containing an encapsulated signal amplifier circuit and two terminal blocks. External electrical connections are made via terminals 1 to 6 on one of the terminal blocks. Access for the cabling is provided by cable glands fitted into the side of the metallic box adjacent to terminals 1 to 6.

The 78** Series Liquid Density Transducer comprises the following models:

- 7835 Liquid Density Transducer
- 7836 Liquid Density Transducer
- 7845 Liquid Density Transducer
- 7846 Liquid Density Transducer
- 7847 Liquid Density Transducer

The Models are identical in appearance and differ only in the metal of the vibrating tube and the sensitivity of the coils in each transducer to provide differing ranges and accuracy of measurement.

Input Parameters			
Terminal 1, 2 wrt ground	Terminal 3 wrt 6	Terminal 4 wrt 6	Terminal 5 wrt 6
$U_i = 28\text{ V}$ $I_i = 93\text{ mA}$ $P_i = 0.65\text{ W}$ $C_i = 42.24\text{ nF}$ $L_i = 0.18\text{ mH}$	$U_i = 10\text{ V}$ $I_i = 200\text{ mA}$ $P_i = 0.50\text{ W}$ $C_i = 0$ $L_i = 0$	$U_i = 15\text{ V}$ $I_i = 15\text{ mA}$ $P_i = 56\text{ mW}$ $C_i = 0$ $L_i = 0$	$U_i = 15\text{ V}$ $I_i = 15\text{ mA}$ $P_i = 56\text{ mW}$ $C_i = 0$ $L_i = 0$
Supply Voltage			
Terminals 1 and 2 with no ground			
$U_i = 28\text{ V}$ $I_i = 93\text{ mA}$ $P_i = 0.65\text{ W}$ $C_i = 0$ $L_i = 0$			

Notes: Terminals 3 to 6 are intended for connection to the platinum resistance thermometer (PRT).
 Terminals 3 and 6 are the supply Terminals to the PRT.
 Terminals 4 and 5 are the signal Terminals from the PRT.
 Terminal 3 is connected internally to Terminal 4.
 Terminal 5 is connected internally to Terminal 6.

Variation 1 - This variation introduced the following changes:

- i. Zener diode D8 was removed and the value of zener diode D7 was increased.
- ii. The trackwork on the Amplifier PCB was removed.
- iii. The driver and pick-up coil was altered to give the values of 15 mH and 95 ohms as an alternative to the original 18 mH and 90 ohms.

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Variation 2 - This variation introduced the following changes:

- i. The voltage withstand specification for the thermocouple wiring was added.
- ii. The specification of the thickness of the insulation covering the wiring was changed.
- iii. Drawing number 78355005 was redrawn.

Variation 3 - This variation introduced the following changes:

- i. Following appropriate re-assessment to demonstrate compliance with the requirements of the EN 60079 series of standards, the documents originally listed in section 9, EN 50014:1997 (amendments 1 and 2), EN 50020:2002 and EN 50284:1999, were replaced by those currently listed, the markings in section 12 were updated accordingly.
- ii. To recognise the inclusion of a filter comprising inductor T1, and capacitors C10 and C11, the main PCB track layout is amended to reflect this.
- iii. To recognise the addition of the IECEx marking to the certification label.
- iv. The recognition of modifications to the safety parameters.

14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report/File no.	Comment
0	18 August 2003	R52A9957A	The release of the prime certificate.
1	8 March 2006	R51A13857A	The company name was changed. From: Solatron Mobrey Limited To: Mobrey Limited
2	14 May 2007	R51A16605A	The Mobrey Logo on the product nameplate was replaced with the "Micro Motion" Logo.
3	10 August 2007	R52A16871A	The introduction of Variation 1.
4	5 February 2009	R52A18839A	This Issue covers the following changes: <ul style="list-style-type: none">• All previously issued certification was rationalised into a single certificate, Issue 4, Issues 0 to 3 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 2.
5	30 March 2010	R19928A/00	The introduction of Variation 3.
6	27 August 2010	R19928A/01	Re-issued to allow report R19928A/01 to replace report R19928A/00

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- 15 **SPECIAL CONDITIONS FOR SAFE USE** (denoted by X after the certificate number)
- 15.1 The supplies to the Platinum Resistance Thermometer (PRT) and to the Signal Amplifier shall be installed as separate circuits.
- 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.

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Certificate Annexe

Certificate Number: Sira 03ATEX2285X
Equipment: 78** Series Liquid Density Transducer
Applicant: Mobrey Limited



Issue 0

Drawing No.	Sheet	Rev.	Date	Description
78355006	1 of 1	8	08 Jul 03	General Assembly with Alternative PRT
78355069	1 of 1	2	08 Jul 03	Circuit details, amplifier board
78355070	1 of 1	2	08 Jul 03	PCB details, amplifier board
78355005	1 of 1	7	08 Jul 03	Composite drawing of PCB and coils
78355071	1 of 1	2	08 Jul 03	Label

Issue 1

No drawings were introduced.

Issue 2

No drawings were introduced.

Issue 3

Drawing No.	Sheet	Rev.	Date	Description
78355069	1 of 1	3	08 Mar 07	7835 Liquid Density Circuit
78355070	1 of 1	3	22 Sep 03	7835 Amplifier Board

Issue 4

Drawing No.	Sheet	Rev.	Date (Sira Stamp)	Description
78355006	1 of 1	10	30 Jan 09	General Assembly with Alternative PRT
78355005	1 of 1	9	30 Jan 09	Composite drawing of PCB and coils

Issue 5

Drawing No.	Sheets	Rev.	Date (Sira Stamp)	Title
78355069	1 of 1	7	18 Mar 10	Certified drawing 7835 Liquid Density Circuit
78355070	1 of 1	6	18 Mar 10	Certified drawing 7835 Amplifier Board
78355071	1 of 1	5	18 Mar 10	Certification Marking

Issue 6 No new drawings were introduced.

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