

Instructions manual

Series TM Turbine flowmeter





The art of measuring

PREFACE

Thank you for choosing a product from Tecfluid S.A.

This instruction manual allows the installation, configuration, programming and maintenance. It is recommended to read it before using the equipment.

WARNINGS

- This document shall not be copied or disclosed in whole or in any part by any means, without the written permission of Tecfluid S.A.
- Tecfluid S.A. reserve the right to make changes as deemed necessary at any time and without notice, in order to improve the quality and safety, with no obligation to update this manual.
- Make sure this manual goes to the end user.
- Keep this manual in a place where you can find it when you need it.
- In case of loss, ask for a new manual or download it directly from our website <u>www.tecfluid.com</u> Downloads section.
- Any deviation from the procedures described in this instruction manual, may cause user safety risks, damage of the unit or cause errors in the equipment performance.
- Do not modify the equipment without permission. Tecfluid S.A. are not responsible for any problems caused by a change not allowed. If you need to modify the equipment for any reason, please contact us in advance.

TABLE OF CONTENTS

SERIES TM

1	WORKING PRINCIPLE								
2	RECEPTION								
	2.1 Unpacking	4							
	2.2 Storage temperature 4								
З	INSTALLATION	4							
	3.1 Filter	5							
	3.2 Open discharge	5							
	3.3 Position	5							
	3.4 Straight pipe sections	5							
	3.5 Valves	6							
	3.6 Pumps	6							
	3.7 Electrical connection	7							
4	MAINTENANCE	8							
	4.1 Disassembly								
	4.2 Cleaning								
	4.3 Mounting								
	4.4 Pickup								
	4.5 Replacing the pickup								
5	PART LIST	10							
6	TECHNICAL CHARACTERISTICS	11							
7	SAFETY INSTRUCTIONS	12							
	7.1 Pressure equipment directive	12							
	7.2 Certificate of conformity TR CU (EAC marking)	12							
8	ADDITIONAL INSTRUCTIONS FOR THE ATEX VERSION	13							
	8.1 Intrinsic safety	13							
	8.2 Flameproof enclosure	13							
	8.2.1 Surface temperature	13							
	8.2.2 Connecting conductive parts to earth	13							
	8.2.3 Maintenance	14							
	8.2.4 Technical characteristics for the ATEX version	14							
	8.2.5 Marking	14							
9	DIMENSIONS AND WEIGHTS	15							
10	k FACTOR (PULSES / LITRE)	20							
11	TROUBLESHOOTING	20							
12	ATEX CERTIFICATE	21							
13	ATEX DECLARATIONS OF CONFORMITY	25							

1 WORKING PRINCIPLE

One helicoidal rotor turns freely inside a cylindrical tube.

The working liquid pushes the rotor blades, making them turn at a flow speed which is proportional to the flow rate.

A pickup coil mounted externally receives the propeller turns and generates an electrical signal which, once treated by the different electronic converters, can provide flow rate indication, total or partial volume, digital and analog outputs.



2 RECEPTION

The TM turbine flowmeters are supplied individually packed for protection during transport and storage including their corresponding instructions manual, for their installation and use.

All the flowmeters have been verified in our flow rigs, obtaining the k factor for each device.

2.1 Unpacking

Unpack the instrument carefully, removing any remains of the packing from the inside of the sensor.

2.2 Storage temperature

-20°C ... +60°C

3 INSTALLATION

The installation must be made in a point that ensures that the pipe is completely full of liquid.

Highest points in the installation as well as downwards pipes must be avoided, since air pockets or vacuums might occur.

In installations where air can be present, a degasser must be installed before the flowmeter.

Partially full pipe can involve important measurement errors.

3.1 Filter

A filter should be installed before the turbine to guarantee correct working and avoid expensive damage. The filter should have a mesh size of maximum of 200 μ m to avoid larger particles that may block the turbine propeller.

3.2 Open discharge

When the flow measurement is to be made before an open discharge, it is necessary to install the flowmeter in a section of pipe with a trap which avoids the presence of air inside the meter.



3.3 Position

The installation and position of the turbine flowmeter can be either vertical, horizontal or inclined. Make sure that the flow direction is as marked by the arrow on the turbine body.

3.4 Straight pipe sections

To obtain good readings, turbulences must be avoided. For this it is necessary to have straight sections of pipe upstream and downstream of the turbine. The straight pipe sections must be of the same internal diameter as the turbine and the minimum lengths must be the following:

Upstream	10 DN
Downstream	7 DN

These sections must be free of deviations or disturbing elements (valves, etc.).



These distances can be reduced by installing a flow straightener upstream of the turbine at a distance equivalent to 5 DN.

3.5 Valves

Regulating or shut-off valves must always be installed after the turbine, in order to assure that pipe is full of liquid.



3.6 Pumps

Pumps must always be installed before the turbine in order to avoid cavitation.

This way the presence of air pockets in the flowmeter is avoided, which could cause unbalance of the propeller which could damage the turbine.





Note: To avoid cavitation the pressure at the outlet of the turbine should be higher than twice the pressure loss of the turbine (see table N° 2) plus 1.25 times the vapour pressure of the liquid or its most volatile component.

3.7 Electrical connection



It is important to keep the connecting cable between the flowmeter and the auxiliary electronics away from mains or power supply cables, in order to avoid interferences. In any case, those should be separated at least 5 cm.

The turbine flowmeter has an IP65 connector fastened to the counter by means of 4 screws. The connector consists of 3 parts joined by threaded nuts. (See figure).



Loosening the larger nut in the middle of the connector allows us to withdraw the half where the cable will be later soldered.

The other half of the connector is fixed to the counter and should not be removed, except when servicing the detector (See point 4.5 of the MAINTENANCE section).

The removable part of the connector consists of the cable gland at the top and the electrical connection protector housing.

Before starting the installation, check that the cable gland is the right size for the cable to be used. This will guarantee the instrument will stay watertight. The cable gland used has a PG11 thread and is for cables with outer diameters between 6 mm and 10 mm.

The electrical connection protector housing is dismounted by loosening the second nut.

When this is removed, the three connector terminals are visible.

The terminals are numbered 1 to 3 and the connection is as follows:

 N° 1:
 Ground

 N° 2:
 Coil

 N° 3:
 Coil

Before soldering the connections, unscrew the cable gland and feed it, together with the electrical connection protector housing, over the cable.

The joint between the cable and the connector should always be soldered, and should be tidy and without short circuits between terminals.

Peel the outside insulation to free the inner cables. It is recommended to tin the ends of the wires to avoid loose ends.

Once the connections have been made, the housing should be mounted screwing it on and then the cable gland should be tightened to avoid entry of any liquid or humidity.

Once assembled the half of the connector, the mounting in the base has only one position defined by the keyway between the two parts.

Check that the rubber seal is in its position inside the connector base. If this is the case, introduce the connector half in the base, positioning by the keyway, and screw on the nut until the end of the thread is reached.

4 MAINTENANCE

The simple construction of the TM turbine results in a long life in normal working conditions.

The life of the parts depends mainly on the abrasive characteristics of the product to be measured and the maximum flow rate.

The combination of these two factors make it difficult to estimate the life of the components in good working conditions.

If the maximum flow rates given for each DN in the following table are exceeded the life is considerably reduced.

DN	Flow rate scales m³/h water	k factor (pulses / litre) approx.	ΔP at Qmax mbar
15	0,3-3	730	750
20	0,6-6	500	750
25	0,9-13,6	220	700
40	1,9-30	60	560
50	5-50	20	280
65	9-90	10	240
80	15-150	5	310
100	28-280	3	450
125	45-450	1.5	240
150	65-650	0.8	250

Flow ranges

The only parts that may need periodical maintenance are the propeller shaft and bearing.

The rest of the pieces will only need maintenance when there is chemical attack or abrasion by the fluid being measured.

It has been confirmed that the life of these parts under normal working conditions is longer than 20.000 hours.

4.1 Disassembly

The numbering of the different elements corresponds to the table and drawing in the "Parts List" section on Page 10.

Inside the metering tube (1) the deflectors (2) (4) and the propeller (3) are located. The inlet deflector (2) has a stop inserted and the outlet deflector (4) has a shaft.

The deflectors are dismounted by withdrawing the circlips (5) which hold them in. They are mounted at about 5 mm from the ends of the metering tube and are easily removed with a screwdriver.

Remove the circlip of the outlet deflector. Place the turbine in a horizontal position and withdraw the deflector. The propeller assembly will come out together with the deflector.

Remove the circlip at the other end and withdraw the inlet deflector.

4.2 Cleaning

The propeller assembly contains the bearing and the tungsten disk. These must not be disassembled.

To clean the inside of the bearing use a cloth or soft paper wrapped around a fine shaft; do not use abrasive elements. Cleaning liquids can be used to help remove dirt or grease.

To clean the propeller shaft use a cloth soaked in alcohol, soapy water or solvent. The propeller should rotate freely on the shaft but should not be loose. It should not have a play of more than 1 part in 50 of the shaft diameter.

The rest of the pieces can be cleaned with the same products.

4.3 Mounting

Before starting to mount the turbine make sure that all the pieces are completely dry, with this we can prevent the propeller shaft from seizing.

The turbine should be mounted as follows:

Slide the inlet deflector (2) in its place (use the flow direction arrow to determine the correct end) and fix it with a circlip (5).

Fit the propeller assembly (3) on the shaft of the outlet deflector (4).

With the metering tube (1) in a horizontal plane introduce the outlet deflector assembly and fix it with a circlip (5).

Check that the assembly is not loosen and that the two circlips are correctly seated. There should only be about 0.5 mm axial play of the propeller assembly on its shaft.

The turbine is ready for installation and operation.

4.4 Pickup

To determine if the pickup group is working properly, the impedance between terminals 2 and 3 of the base connector (10) has to be measured with a multimeter. The value should be between 1500 and 2500 Ohm.

4.5 Replacing the pickup

The female plug (8) can be removed from the base (10) by unscrewing the larger nut. The male connector base is fixed to the pickup support (6).

Unscrew the female connector in order to separate the cable and after that unscrew the pickup support (6) from the turbine metering tube (1), by loosening the screw (11) with a 3 mm Allen key .

To insert a new pickup group, follow the inverse process.

5 PART LIST



N°	Description	Material
1	Measuring tube	EN 1.4404
2	Inlet deflector	EN 1.4404 + Tungsten carbide
3	Propeller	EN 1.4460 * / EN 1.4016 ** + Tungsten carbide + Graphite
4	Outlet deflector	EN 1.4404 + Tungsten carbide
5	Circlip	EN 1.4310
6	Pickup support	EN 1.4305
7	Gasket	NBR
8	Connector	Aluminium alloy
9	Cable gland	Plastic
10	Screw DIN 7985 M3 x 8	EN 1.4301
11	Screw DIN 913 M4 x 8	EN 1.4301

* up to DN100 included ** DN125 / DN150

6 TECHNICAL CHARACTERISTICS

Accuracy

± 0.5% measured value

Repeatability

± 0.1%

Temperature

Process temperature: -50°C ... +170°C Ambient temperature: -20°C ... +60°C

Connections

EN 1092-1 or ASME B16.5 flanges. Other flange standards on request. BSP or NPT threaded connections Sanitary couplings according to ISO 2852, SMS 1145, DIN 11851, TRI-CLAMP®

Materials

Body: EN 1.4404 (AISI 316L) Propeller: EN 1.4460 (AISI 329) up to DN100 EN 1.4016 (AISI 430) DN125 / DN150 Shaft / Bearings: Tungsten carbide / Graphite

Working pressure

DN15 ... DN50: PN40 DN65 ... DN150: PN16

Others on request

Electrical connection

By means of IP65 connector.

Signal amplitude

> 15 mV, proportional to flow rate

Recommended cable

Shielded bifilar up to 30 m length.

NOTE: For distances up to 100 m the DFD420 amplifier shall be used.

Associated electronics

CIP II: Battery powered volumetric counter.

CP ... CH420: 2-wire analog transmitter with flow rate and volume indication.

HART protocol available in CH420 model. The signal of the analog loop can reach up to 3000 m.

MT03F: Flow rate and volume indicator with preset for batching and flow rate alarms. DFD420: Pulse divider and 2-wire analog transmitter. The signal of the analog loop can reach up to 3000 m.

7 SAFETY INSTRUCTIONS

The series TM flowmeters are in conformity with all essential requirements of all EC directives applicable to them:

2014/68/EU Pressure equipment directive (PED)

Limit switches :

2014/30/EU	Electromagnetic compatibility directive (EMC)						
2012/19/EU	Waste electric and electronic equipment (WEEE).						
2011/65/EU	Restriction of the use of certain hazardous substances in electrical and electronic equipment (ROHS).						
2014/35/EU	Low voltage directive (LV)						

Equipment for hazardous areas:

2014/34/EU Equipment and protective systems intended for use in potentially explosive atmospheres (ATEX).

In the last sections of this manual the EC type certificate and the declarations of conformity according to the ATEX directive are attached.

Other EU declarations of conformity can be downloaded from the section "Download" of the Tecfluid S.A. website. www.tecfluid.com

7.1 Pressure equipment directive

Tecfluid S.A. have subjected the series TM of flowmeters to a conformity assessment method for the pressure equipment directive, specifically according to module H (full quality assurance).

Conformity with the directive is reflected by the CE marking in each pressure equipment and by the written declaration of conformity. The CE marking is accompanied by the identification number of the notified body involved at the production control phase.

The marking of the equipment takes into account the fluid type, the group of fluid and the category, for example: G1 CATI

G Gases and vapours

1 Group of fluids 1

CATI Category I

Devices that, due to their size, are rated as Category I are not within the scope of the directive and therefore they have not the CE mark according to pressure directive. These devices are subject to applicable sound engineering practice (SEP).



This equipment is considered as being a pressure accessory and **NOT** a safety accessory as defined in the 2014/68/EU directive, Article 2, paragraph 4.

7.2 Certificate of conformity TR CU (EAC marking)

Tecfluid S.A. have subjected the series TM of flowmeters to a certification procedure according to the technical regulations of the Customs Union of the Eurasian Economic Union (EEU).



This Certificate is an official document confirming the guality of production with the standards on the territory of the Customs Union, particularly regarding safety requirements and electromagnetic compatibility.





8 ADDITIONAL INSTRUCTIONS FOR THE ATEX VERSION

This chapter only applies to equipment intended for use in explosive atmospheres.

8.1 Intrinsic safety

The flowmeters of series TM, when include just the pickup sensor and the connector, can be considered simple apparatus as defined in the EN 60079-11 standard. In these cases they can be installed in hazardous areas provided that they are connected to a zener barrier or to an intrinsic safety isolator. Please consult factory for the recommended models.

8.2 Flameproof enclosure

These equipment conform with the directive 2014/34/UE (Equipment and protective systems intended for use in potentially explosive atmospheres) as indicated in the EC-type examination certificate LOM 14ATEX2008 X and its marking.

Given that this instrument belongs to group II, it is intended for use in places likely to become endangered by explosive atmospheres, but not in mines.

The category is 2GD, that is, it is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours, mists or air/dust mixtures are likely to occur.

8.2.1 Surface temperature

Equipment is certified as Exd IIC T6.

The maximum possible surface temperature is 85°C.

8.2.2 Connecting conductive parts to earth

When the instrument is not grounded securely through the connection process, it should be grounded through the housing screw, as shown in the figure.



8.2.3 Maintenance



NOTE: When the flameproof enclosure contains an electronics model CIP II, **it should never** be opened in presence of explosive atmosphere.

For the rest of models, before any maintenance that involves opening the flameproof enclosure, **make sure there is no voltage in any of internal components**.

The is no special maintenance for the ATEX version.

8.2.4 Technical characteristics for the ATEX version

Temperature

Ambient temperature: -20°C ... +60°C

Electrical connection

Inside the flameproof enclosure.

Recommended cable

The standard thread supplied for the cable gland connection is 3/4" NPT.

ATEX cable glands for non-armoured or armoured cables can be placed.

Cable glands can be supplied on demand.

The outer diameter of the cables that fits the ¾" NPT cable glands is between 6 and 21 mm.

Associated electronics

CIP II: Battery powered volumetric counter.

CP ... CH420: 2-wire analog transmitter with flow rate and volume indication.

HART protocol available in CH420 model.

DFD420: 2-wire analog transmitter and pulse divider.

The rest of characteristics are the same as in the point 6.

8.2.5 Marking





DN	PN (flanges)	D	b	к	g	l x n⁰	L	Н	Weight (kg)
15	40	95	16	65	45	14 x 4	100	115	2
20	40	105	18.5	75	58	14 x 4	100	115	2.5
25	40	115	18	85	68	14 x 4	130	120	3.5
40	40	150	18.5	110	88	18 x 4	150	125	5
50	40	165	20	125	102	18 x 4	150	130	7
65	16	185	18	145	122	18 x 8	160	140	10
80	16	200	20	160	138	18 x 8	160	145	12
100	16	220	20	180	158	18 x 8	180	155	17
125	16	250	20.5	210	188	18 x 8	200	170	21
150	16	285	21	240	212	22 x 8	220	180	27



DN	PN (flanges)	D	b	к	g	l x n⁰	L	HC	Weight (kg)
15	40	95	16	65	45	14 x 4	100	140	2.2
20	40	105	18.5	75	58	14 x 4	100	140	2.7
25	40	115	18	85	68	14 x 4	130	145	3.7
40	40	150	18.5	110	88	18 x 4	150	150	5.2
50	40	165	20	125	102	18 x 4	150	155	7.2
65	16	185	18	145	122	18 x 8	160	165	10.2
80	16	200	20	160	138	18 x 8	160	170	12.2
100	16	220	20	180	158	18 x 8	180	180	17.2
125	16	250	20.5	210	188	18 x 8	200	195	21.2
150	16	285	21	240	212	22 x 8	220	205	27.2



DN	PN (flanges)	D	b	к	g	l x n⁰	L	HA1	Weight (kg)
15	40	95	16	65	45	14 x 4	100	160	2.5
20	40	105	18.5	75	58	14 x 4	100	160	3.0
25	40	115	18	85	68	14 x 4	130	165	4.0
40	40	150	18.5	110	88	18 x 4	150	170	5.5
50	40	165	20	125	102	18 x 4	150	175	7.5
65	16	185	18	145	122	18 x 8	160	185	10.5
80	16	200	20	160	138	18 x 8	160	190	12.5
100	16	220	20	180	158	18 x 8	180	200	17.5
125	16	250	20.5	210	188	18 x 8	200	215	21.5
150	16	285	21	240	212	22 x 8	220	225	27.5



DN	PN (flanges)	D	b	к	g	l x n⁰	L	HA2	Weight (kg)
15	40	95	16	65	45	14 x 4	100	205	3.5
20	40	105	18.5	75	58	14 x 4	100	205	4.0
25	40	115	18	85	68	14 x 4	130	210	5.0
40	40	150	18.5	110	88	18 x 4	150	215	6.5
50	40	165	20	125	102	18 x 4	150	220	8.5
65	16	185	18	145	122	18 x 8	160	230	11.5
80	16	200	20	160	138	18 x 8	160	235	13.5
100	16	220	20	180	158	18 x 8	180	245	18.5
125	16	250	20.5	210	188	18 x 8	200	260	22.5
150	16	285	21	240	212	22 x 8	220	270	28.5



DN	PN (flanges)	D	b	к	g	l x n⁰	L	HA3	Weight (kg)
15	40	95	16	65	45	14 x 4	100	170	3.5
20	40	105	18.5	75	58	14 x 4	100	170	4.0
25	40	115	18	85	68	14 x 4	130	175	5.0
40	40	150	18.5	110	88	18 x 4	150	180	6.5
50	40	165	20	125	102	18 x 4	150	185	8.5
65	16	185	18	145	122	18 x 8	160	195	11.5
80	16	200	20	160	138	18 x 8	160	200	13.5
100	16	220	20	180	158	18 x 8	180	210	18.5
125	16	250	20.5	210	188	18 x 8	200	225	22.5
150	16	285	21	240	212	22 x 8	220	235	28.5

10 k FACTOR (PULSES / LITRE)

DN	Pulses / litre ± 10%	cm³ / pulse ± 10%
15	730	1.28
20	500	2
25	220	4,5
40	60	16
50	20	50
65	10	100
80	5	200
100	3	333
125	1.5	666
150	0.8	1250

Measured values for water at 20°C

11 TROUBLESHOOTING

Problem	Probable cause	Solution	
The associated	Blockage or friction of the turbine propeller by particles	Install a filter according to specification (maximum mesh size = 200 µm).	
electronics does not totalize or there is no	Damaged pickup	Change the pickup	
signal from the pickup	Disconnected cables between the turbine and the associated electronics	Check the cable connection	
The associated electronics totalizes less	Blockage or friction of the turbine propeller by particles	Install a filter according to specification (maximum mesh = 200 µm).	
than the actual volume	Incorrect value of k factor or bad programmed	Program the k factor indicated on the label	
The associated	Presence of air pockets	Control the minimum tank level. Provide an air degasser upstream	
electronics totalizes more than the actual volume	Excessive emptying of storage tanks	of the turbine if air intakes can be expected.	
	Incorrect value of k factor or bad programmed	Program the k factor indicated on the label	
The flow rate indicated by the associated equipment	The pipe is not completely full	Make sure that the pipe is completely full, for example, installing the flowmeter in a vertical pipe with upwards flow	
is unstable	Straight pipe sections before and after the flowmeter have not been kept	Check that there are enough straight pipe sections as indicated in point 3.4.	

12 ATEX CERTIFICATE

	LABORATORIO OFICIAL J. M. MADARIAGA			
(1)	EC-TYPE EXAMINATION CERTIFICATE			
(2)	Equipment or protective system intended for use in potentially explosive atmospheres Directive 94/9/EC			
(3)	EC-Type Examination Certificate nr LOM 14ATEX2008 X			
(4)	Equipment or protection system Turbine flowmeters Type TM			
(5)	Manufacturer TECFLUID, S.A.			
(6)	Address Narcis Monturiol, 33 08960 Sant Just Desvern (Barcelona) SPAIN			
(7)	This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.			
(8)	Laboratorio Oficial J.M. Madariaga (LOM), notified body number 0163 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive. The examination and test results are recorded in a confidential tepot rule. LOM 13.344 GP			
(9)	Compliance with the Essential Health and Safety Requirements has been assured by compliance with:			
	- Standards EN 60079-0:2009 EN 60079-1:2007 EN 60079-31:2009			
(10)	If the sign X is placed after the certificate number, it indicates that the equipment or protective system 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 this specified equipment or protective system in accordance with the Directive 94/9/EC. Further requirements of the Directive apply to the manufacture and supply of this equipment or protective system. These are not covered by this certificate.			
(12)	The marking of the equipment or protective system shall include the following:			
	$\begin{array}{c} \left\langle E_X \right\rangle \stackrel{II 2G}{\underset{II 2D}{\text{ Ex tb IIIC T85 °C Db}} \end{array}$			
	Getafe, 2014-02-03			
	A			
	Carlos Fernández Ramón			
	Responsible of the Certification Committee			
ON LON	This Certificate is a translation from the original in Spanish. The LOM liability applies only on the Spanish text			
OM LON	(This document may only be reproduced in its entirety and without any change) Page 1/2			
RCT	CER 07.32 UNIVERSIDAD POLITÉCNICA DE MADRID			



LABORATORIO OFICIAL J. M. MADARIAGA

(AI)		DM LOM LOW LOW L	DM LON LON	TOR THE TOR THE	0		
(A2)	EC-Type Examination	Certificate nr: LON	1 14ATEX2	2008 X	0		
(A3)	Description of equipment or protective system						
	Turbine flowmeters for includes the mechanical The assembly of the end	liquids based in a l pieces of the coun closure and the mag	propeller, an ter, an enclos netic sensor a	d used in closed pipes. The equipment consists of a main body which ure containing the electronics and magnetic sensor into a union piece: are part of a flameproof enclosure or with protection by enclosure.	2 2 2 2 2		
	There are three types of enclosure containing electronic circuits depending on the device model:						
	- Only with terminal strip						
	This enclosure can be t internal terminal strip th	ype either C30 or (at allows connection	C31from Coo	per Crouse-Hinds. The sensor terminals are directly connected to an de.	0.0		
	- CIP or CIP2 totalizer			LOW	-		
	This enclosure can be t flow rate totalization an	type either C30 or d LCD display. The	EFS-72 from	Cooper Crouse-Hinds. The enclosure includes electronic circuits for powered by an internal 3.3V, 560 mA battery.	0		
	- CP420 or CH420 trans	smitters	DH LON LON	LON			
	This enclosure can be the determining the flow r between 12 and 36 V co	type either C30 or ate and volume as pmes from the 4-20	well as sign mA current l	Cooper Crouse-Hinds. The enclosure includes electronic circuits for hal transmission and local LCD display. The external power supply poop, optionally with HART protocol.	0.000		
(A4)	Test report nr. LOM 13	.344 GP		CAN LONE LONE LONE LONE LONE LONE LONE LON	8 8 8		
(A5)	Special conditions for safe use 100 100 100 100 100 100 100 100 100 10		6.0				
	- CIP/CIP2 variants,	which include inte	rnal battery, o	annot be opened when there is an explosive atmosphere present.	.01		
(A6)	Individual tests			LON	0		
	- Equipment is exclu	ided from individua	l tests to be o	vercome overpressure type tests at 4 times the reference pressure.	.01		
(A7)	Essential Health and Sa	fety Requirements		LON	0.0		
	Explosion safe requiren	ients are covered by	application	of the standards indicated in the first page of this certificate.	.01		
(A8)	Descriptive documents			LOW	.01		
	Tashniad dossiar nr	P. ET. TLATEY	Rev.	Date	01		
	- reclinical dossier in.	R-EI-HAIEA		CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR	.01		
	- Drawings nr.: 249	110015	0	2013-09-30 ou tou tou tou tou tou tou tou tou tou	-		
	261	910111	0	2013-09-30 cm tom tom tom tom tom tom tom tom tom to	2		
	AD	F/C30	0	2013-11-29	6		
	AD	F/EFS72	0	2013-11-29 ON LON LON LON LON LON LON LON LON LON			
	TM	44/ADF/C30	0	2013-11-19	5		
	LOW LOW LOW LOW LOT	44/ADF/C31	0	2013-11-19 CON LON LON LON LON LON LON LON LON LON L	-		
				LON	-		
				LOW			
				LOW	.01		
				LONE LONE LONE LONE LONE LONE LONE LONE	0		
	TON FOR FOR FOR FOR F			TON			
AND LODGE				the state when the state when the state when the state state states			



1	2002
	San P
	ГШМ

LABORATORIO OFICIAL J. M. MADARIAGA

LON LON	NO LON LON LON LON LON LON LON LON						
13	ANEXO						
100 10	i (da lon						
14	Supplementary EU-Type Examination Certificate Number LOM 14ATEX2008X/1						
15	Description of the variation to the Product						
		DAR LONE LONE LONE L	VD ID		and the side of the state of a state		
LON LON	0047U.	ng an enclosure ty	pe XD-AD of	Limatherm Cor	nponents, with certificate F1ZU 03 ATEX		
LON LON	IN TON TON TON TON TON TON TON TO	IN LOW LOW LOW		LOW LOW LOW L	ON LON LON LON LON LON LON LON LON LON		
LON LON	A new signal transmitter with curr consumption of this module is 0.8	W and power sup	-20 mA and in oply from 12	n pulses with opt V to 36.	ical isolation is also used. The maximum		
LOW LOW	IN LOW COM LOW LOW LOW LOW LOW LOW	IN LOW LOW LOW	LON LON LON				
16	Report Number 17.799P	Report Number 17.799P					
	W LOW CON LOW LOW CON LOW LOW LO						
17	Specific Conditions of Use						
	NE LONE LONE LONE LONE LONE LONE LONE LO						
LON LO	None						
18	Essential Health and Safety Requi	irements					
LON LON	No changes						
19	Documents and drawings						
LON LON	N LOW CON LOW LOW CON LOW LOW LO	Der LOH LOW LOW 1	LON LOW LOW	LON LOW LOW L	ON LOW LOW LOW LOW LOW LOW LOW LOW LOW		
	Number	Sheets	Issue	Date	Description		
				2017 07 10	The stand of the standard standa		
LON LOS	R-EI-TIATEX R-MI-TM	9 21	3	2017-05-18	Safety instructions		
LON LON	R-HI-TIATEX R-MI-TM	9 21	3	2017-05-18	Technical description Safety instructions		
LONE LON LONE LON LONE LON	R-EI-ITATEX R-MI-TM	21	3	2017-05-18	Technical description Safety instructions		
	R-EI-TIATEX R-MI-TM	21	104 13 104 104 13 104 104 104 104 104 104 104 104 104 104	2017-05-18	Technical description Safety instructions		
	R-EI-ITATEX R-MI-TM		3	2017-05-18	Technical description		
	R-BI-TIATEA R-MI-TM	Im COI COI COI COI Im COI COI COI COI COI Im COI	200 1.31 LON 200 1.31 LON 200 LON LON 200 LON LON 200 LON LON 200 LON LON 200 LON LON 200 LON LON	2017-05-18	Technical description Safety instructions		
	R-BI-HATEA R-MI-TM	Image: Color Color	100 1.31 1.00 100 1.31 1.00 100 1.33 1.00 100 1.00 1.00 100 1.00 1.00 100 1.00 1.00 100 1.00 1.00 100 1.00 1.00	2017-05-18	Technical description Safety instructions		
	R-EI-TIATEX R-MI-TM	9	100 1.31 1.00 100 1.30 100 1.00 100 1.00 100 1.00 100 1.00 100 1.00 100 1.00 100 1.00 100 1.00 100 1.00 100 1.00	2017-05-18	Technical description Safety instructions		
	R-BI-TIATEX R-MI-TM	9		2017-05-18	Technical description Safety instructions		
	R-BI-TIATEA R-MI-TM		1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000	2017-05-18	Technical description Safety instructions		
	R-BI-TIATEA R-MI-TM		1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000		Technical description Safety instructions		
	R-B1-TIATEX R-MI-TM	9	1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000	2017-05-18	Technical description Safety instructions		
	R-BI-TIATEA R-MI-TM		100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100	2017-05-18	Technical description Safety instructions		
	R-B1-11ATEA R-MI-TM		131 131 131 132 131 131		Technical description Safety instructions		
	R-B1-TIATEX R-MI-TM			2017-05-18	Technical description Safety instructions		
	R-BI-TIATEA R-MI-TM		Con Con Con		Technical description Safety instructions		
	R-BI-TIATEX R-MI-TM			2017-05-18	Technical description Safety instructions		
	R-BI-TIATEX R-MI-TM				Technical description Safety instructions		
	R-BI-TIATEA R-MI-TM				Technical description Safety instructions		
	R-BI-TIATEX R-MI-TM				Technical description Safety instructions		
	R-BI-TIATEA R-MI-TM				Technical description Safety instructions		
	R-BI-TIATEX R-MI-TM			2017-05-18	Technical description Safety instructions		
	R-BI-TIATEA R-MI-TM				Technical description Safety instructions		
	R-BI-TIATEA R-MI-TM		Low Low Low 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 101 <		Technical description Safety instructions		
	R-BI-TIATEX R-MI-TM				Technical description Safety instructions		
	R-BI-TIATEX R-MI-TM				Technical description Safety instructions		
	R-BI-TIATEA R-MI-TM				Technical description Safety instructions		

(This document may only be reproduced in its entirety and without any change)

Page 2/2

TECILUID						
EU Declaration of Conformity						
Manufacturer:	TECFLUID S.A. Narcís Monturiol, 33 E 08960 Sant Just Desvern					
Equipment:	Series TM of turbine counters					
Models:	TM, TM+CIP, TM+CIP2, TM+CP420, TM+CH420, TM+DFD420					
Certification:	LOM 14ATEX2008 X					
Group and category:	II 2G Ex d IIC T6 Gb II 2D Ex tb IIIC T85°C Db					
Standards to which co	onformity is declared:					
Directive ATEX 2014/3 EN60079-0:2009 EN6009-1:2007 EN60079-31:2009	4/EU Equipment. General requirements Equipment protection by flameproof enclosures "d" Equipment dust ignition protection by enclosure "t"					
Changes in the cur declaration of confo 14ATEX2008 X correst	rent standards regarding the standards mentioned in this rmity do not affect the EC-type examination certificate LOM ponding to this equipment					
For production, Tecfl 2014/34/EU, having 02ATEX9033, of the n J.M. Madariaga)	uid S.A. complies with the Module D (annex IV) of the directive the notification for production quality assurance n. LOM otified body with identification number 0163 (Laboratorio Oficial					
I, the undersigned, de essential requirement on the approximatio protective systems int	clare that the equipment stated above is in conformity with the is of the Directives of the European Parliament and the Council n of the laws of Member States concerning equipment and cended for use in potentially explosive atmospheres.					
In Sant Just Desvern Date: June 20, 2018	Æ					

Esteve Cusidó (R&D manager)



Declaration of Conformity

TECFLUID S.A.
Narcís Monturiol, 33
E 08960 Sant Just Desvern
Turbine
TM44

Standards to which conformity is declared:

Directive ATEX 2014/34/EU EN60079-0:2013 Equipment. General requirements EN6009-11:2013 Equipment protection by intrinsic safety "i"

Declaration:

This device is considered Simple apparatus according to EN60079-11:2013 standard, clause 5.7, since it does not have its own source of ignition, therefore it doesn't require certification by a notified body and it needs not be marked in conformity with the ATEX directive.

Characteristics:

Maximum ambient Temperature: 40 $^{\circ}$ C Li \leq 700 mH Ci \leq 30 pF Internal resistance: 1700 Ohm < R < 2200 Ohm Ui \leq 1.2 V

I, the undersigned, declare that the equipment stated above conforms with the essential requirements of the Directives of the European Parliament and the Council on the approximation of the laws of Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres.

In Sant Just Desvern Date: June 8, 2016

Esteve Cusidó (R&D manager)

WARRANTY

Tecfluid S.A. guarantee all the products for a period of 24 months from their sale, against all faulty materials, manufacturing or performance. This warranty does not cover failures which might be imputed to misuse, use in an application different to that specified in the order, the result of service or modification carried out by personnel not authorized by Tecfluid S.A., wrong handling or accident.

This warranty is limited to cover the replacement or repair of the defective parts which have not damaged due to misuse, being excluded all responsibility due to any other damage or the effects of wear caused by the normal use of the devices.

Any consignment of devices for repair must observe a procedure which can be consulted in the website www.tecfluid.com, "After-Sales" section.

All materials sent to our factory must be correctly packaged, clean and completely exempt of any liquid, grease or toxic substances.

The devices sent for repair must enclose the corresponding form, which can be filled in via website from the same "After-Sales" section.

Warranty for repaired or replaced components applies 6 months from repair or replacement date. Anyway, the warranty period will last at least until the initial supply warranty period is over.

TRANSPORTATION

All consignments from the Buyer to the Seller's installations for their credit, repair or replacement must always be done at freight cost paid unless previous agreement.

The Seller will not accept any responsibility for possible damages caused on the devices during transportation.



Tecfluid S.A. Narcís Monturiol 33 08960 Sant Just Desvern Barcelona Tel: +34 93 372 45 11 Fax: +34 93 473 08 54 tecfluid@tecfluid.com www.tecfluid.com



Quality Management System ISO 9001 certified by



Pressure Equipment Directive certified by

ATEX European Directive certified by



HART is a trademark of FieldComm Group ™

The technical data described in this manual is subject to modification without notification if the technical innovations in the manufacturing processes so require.