Instructions manual

Series LD

Models LD ... R
Vibrating fork level switch with relay output

The art of measuring

R-MI-LD6XR Rev.: 2 English version

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 www.tecfluid.com 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

1 INTRODUCTION

The LD6XR level switches are used in tanks and silos to detect when a liquid or a solid reaches the level at which the switch is installed.

Detection causes a change in the status of the integrated relay outputs.

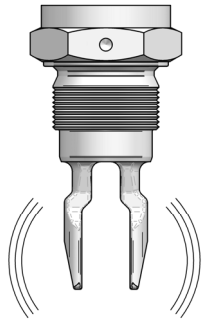
2 WORKING PRINCIPLE

Liquid detection is based on the variation of the resonance frequency of a system comprising two vibrating flaps forming a fork.

The fork is continuously vibrating at the resonance frequency of the system. When it contacts a liquid, the frequency shifts and the internal electronic circuit detects this change. Then it determines the state of the relay outputs.

Solid detection is based on the variation of the amplitude of the vibrating signal.

When the fork contacts a solid, this prevents the vibration so that the amplitude of the signal decreases. The internal electronic circuit detects this change and determines the status of the relay outputs.



3 MODELS

LD60R. For solid level detection.

LD61R. For liquid level detection.

4 RECEPTION

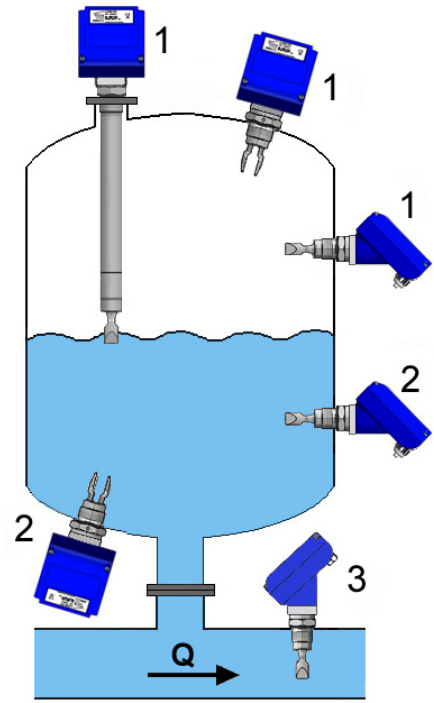
The LD61R level switches are supplied conveniently packaged for their protection during transportation and storage, together with their instructions manual for installation and operation.

To handle the detectors, they should always be held by the head, never by the fork.

The fork should not be modified or bent, as this could damage the detector beyond repair.

5 INSTALLATION

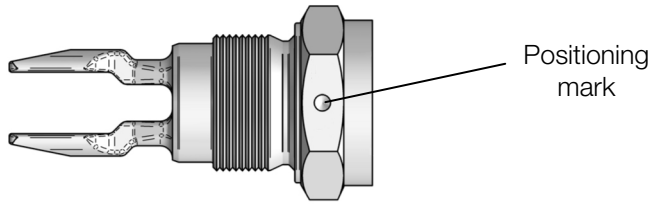
The LD6XR level switch can be mounted in any position. The more usual insertion points are shown in the figure on the next page.



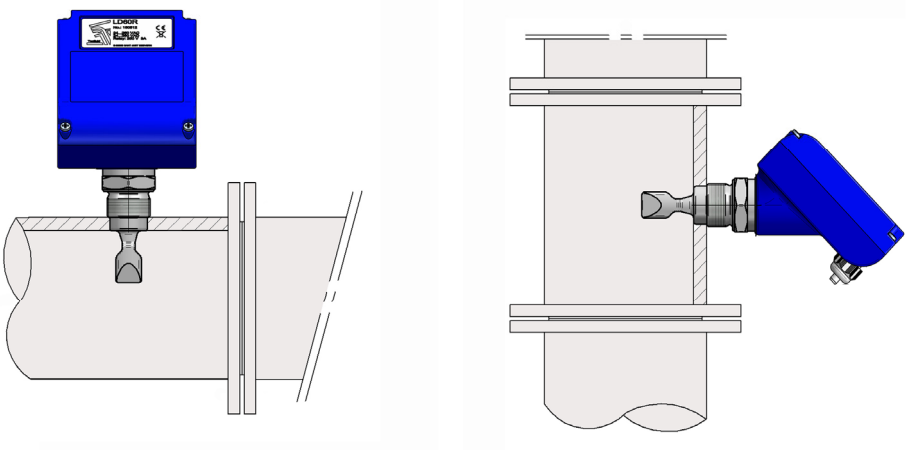
In positions 1 the LD6XR acts as a maximum level switch. In positions 2 the LD6XR acts as a minimum level switch and in position 3 it acts as a liquid presence detector (for example, to protect a pump).

If the LD6XR is installed in a horizontal position it is recommended that the cables go downwards from the cable glands. Furthermore, the position of the flaps should be vertical in order to avoid accumulation of substances, especially in the case of high viscosity liquids.

To indicate the position of the fork the LD6XR has a round mark on two of the flats of the nut. These marks should be pointing upwards or downwards when the detector is installed in a horizontal position.



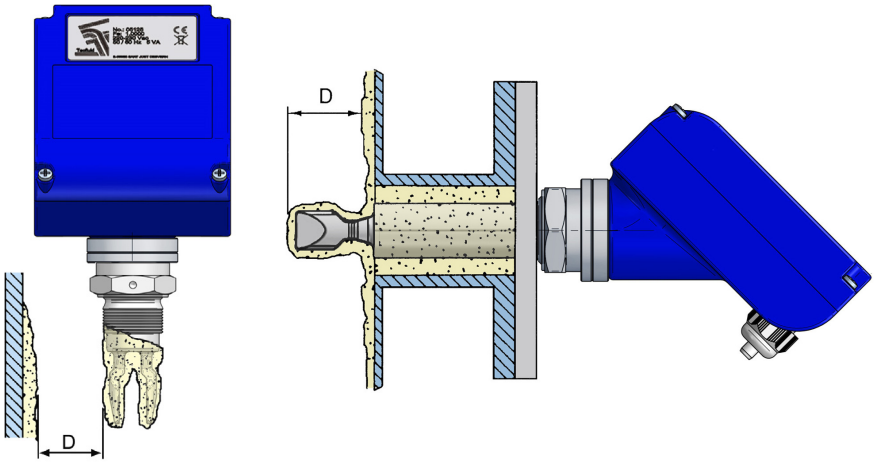
In the same way, when the switch is installed as a liquid presence detector, the position must be taken into account. The flat part of the flaps must be aligned parallel with the flow direction.



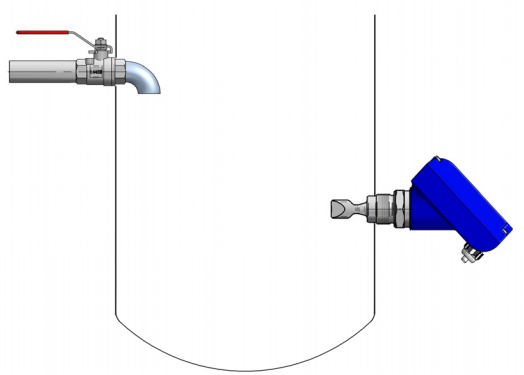
If the viscosity is high, the flaps must be kept away from other objects (such as the wall of the tank or a nozzle).

In this last case it is preferable to install a longer detector (ML models).

The minimum recommended distance **D** is 50 mm.



If the filling of the tank is above the level where the LD6XR must be installed, try to move the detector away as much as possible, and If during the filling of the tank strong waves are produced, the level detector must be protected.



6 ELECTRICAL CONNECTION

For the electrical connection, the switch LD6XR has a screw terminal strip.

It is recommended to use multiple conductor cables with individual cable sections in the order of 0.25 to 0.5 mm^2 in order to make it easier to connect. It is better to maintain the cables with mains voltage (power supply) separated from the cables of relay output signals.

Before starting the installation, check that the cable glands are the right size for the cables to be used, this will guarantee the instrument will stay watertight. The cable glands used are for cables with outside diameters between 6 mm and 10 mm.

Peel the outside insulation to free the inner cables. It is recommended to tin the ends of the wires to avoid loose ends. Pass the cables through the cable glands and screw down in the corresponding positions of the terminal strip. Once the wiring is finished make sure that the cables are well gripped by the cable glands to maintain the ingress protection.

IMPORTANT NOTE: In order to comply with the electrical safety requirements as per EN-61010-1 (IEC 1010-1), the installation of the equipment must take into account the following:

- A mains switch must be provided to disconnect the equipment. This switch must be marked as the disconnecting device for the equipment and be within easy reach of the operator.
- The mains supply must have an earth line.
- The housing must not be opened when the instrument has mains supply connected.

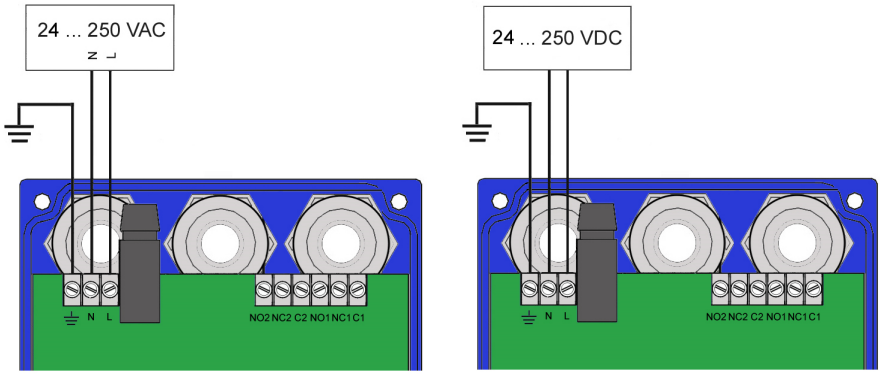
Before installing the equipment, check that the supply voltage available in the installation is compatible with the marked on the label of the instrument.

To help in the connection of the equipment, the description of the terminals is marked on the printed circuit next to the terminal strip.

6.1 Power supply connection

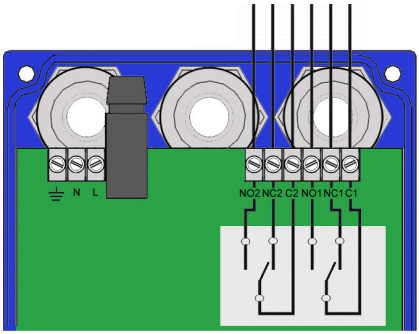
Terminal	Power supply AC	Power supply DC
⏚	Earth	Earth
N	Neutral	(-)
L	Live	(+)

IMPORTANT NOTE: Power supply terminals are different from the ones in the previous version. Be sure to connect properly the power supply as in the following image:



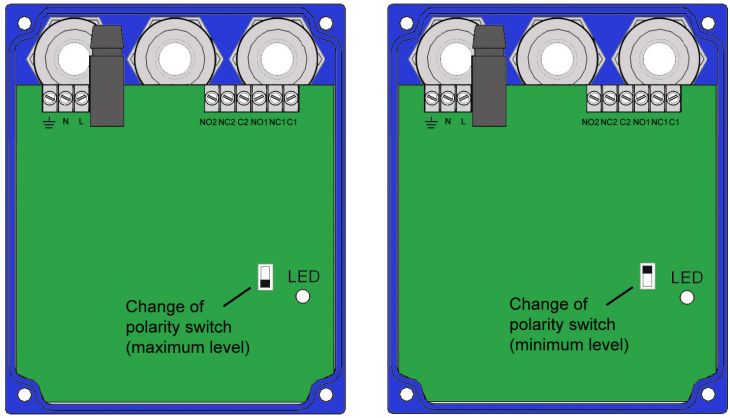
6.2 Relay output connection

Terminal	
NO	Normally open
NC	Normally closed
C	Common



7 OPERATION

The LD6XR can be installed as a detector of minimum or maximum level. To do that, it has a switch inside the cover. Furthermore, the instrument has a LED that indicates the relay status.



With the switch in the **maximum** level position, the common contacts of the relays are in "normally open" when the detector is not in contact with the liquid/solid (level below the detector), and change to "normally closed" when the detector is submerged. The LED changes from green to red.

With the switch in the **minimum** level position, the common contacts of the relays are in "normally open" when the detector is in contact with the liquid/solid (level above the detector), and change to "normally closed" when the liquid falls below the detector. The LED changes from green to red.

8 MAINTENANCE

The life of the vibrating fork depends basically on the abrasive characteristics of the product used.

The LD6XR level switch only needs maintenance when the product, which can adhere to the flaps, will not let the detector change to a non detection state. In these cases the flaps must be cleaned.

8.1 Cleaning

To clean the fork, a brush suitable for removing the embedded product should be used. Never hit the fork in order to remove the adhered product.

During the cleaning process, be careful not to apply force against the flaps as this can bend them and damage the detector beyond repair.

8.2 Fuse

In the event that the fuse blows, this should be replaced with a slow blow "T" fuse with size Ø5 x 20 mm and 250 mA rating.

9 TECHNICAL CHARACTERISTICS

Materials:

Fork: EN 1.4404 (AISI 316L), EN 1.4404 (AISI 316L) HALAR® coating. Others on demand.
Housing: Polycarbonate.

Process connection:

Threads G1, 1" NPT, ANSI.
Flanges EN-1092-1 DN40 PN25, ANSI. Others on demand
Sanitary connections according to ISO 2852, SMS 1145, DIN 11851, TRI-CLAMP®.

Power supply

24 … 250 VAC / VDC
Power consumption: ≤ 1 W

Relay characteristics

Number of contacts and type: Double pole, double throw
Maximum switching current: 3 A
Maximum switching voltage: 220 VDC, 250 VAC
Maximum switching power: 60 W, 125 VA
Mechanical resistance: 15.0 x 10^6 operations

General characteristics

Hysteresis	±2 mm with H_2O
Liquid density	> 0,6 kg/l
Switching time:	≈ 1s
Viscosity:	up to 10.000 cSt
Solids	Depending on application. Consult factory
Process temperature	-30ºC ... +115ºC
Ambient temperature	-20ºC ... +70ºC
Working pressure	PN25, others on demand
Cable glands	PG11, for cables with outside diameters between 6 mm and 10 mm.
Ingress protection	IP67

10 SAFETY INSTRUCTIONS

The series LD level detectors are in conformity with all essential requirements of all EC directives applicable to them:

2014/68/EU Pressure equipment directive (PED)

2014/30/EU Electromagnetic compatibility directive (EMC)

2012/19/EU Waste electric and electronic equipment (WEEE).

2014/35/EU Low voltage directive (LV)

Declarations of conformity EC can be downloaded from the section "Download" of the Tecfluid S.A. website.

10.1 Pressure equipment directive

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

The series LD, 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, point 5.

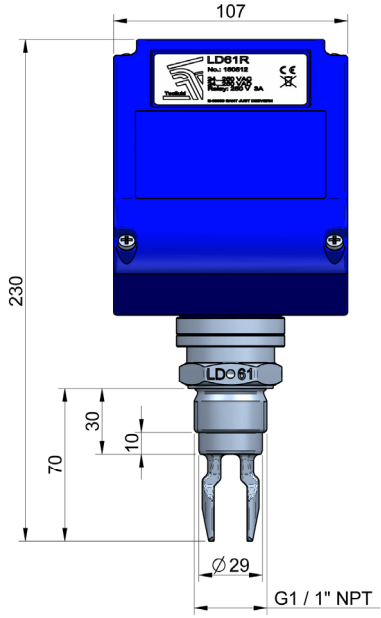
10.2 Certificate of conformity TR CU (EAC marking)

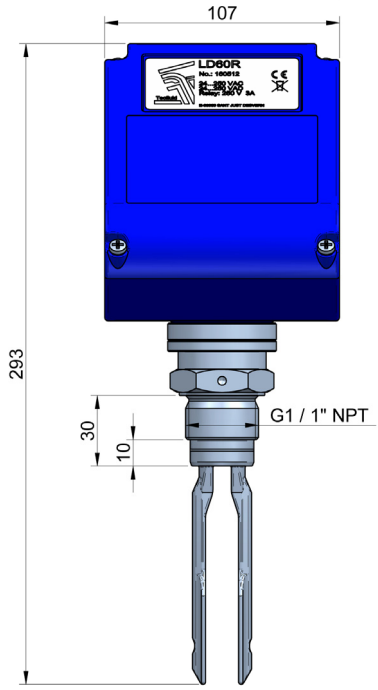
Tecfluid S.A. have subjected the series LD of level detectors to a certification procedure according to the technical regulations of the Customs Union of the Eurasian Economic Union (EEU).

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

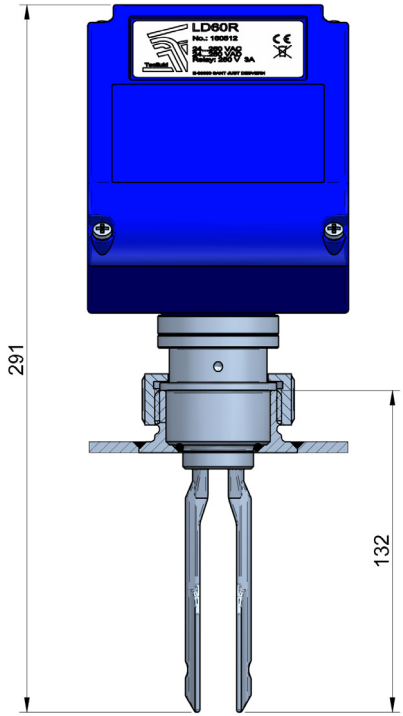
11 DIMENSIONS

Thread G1 or 1" NPT

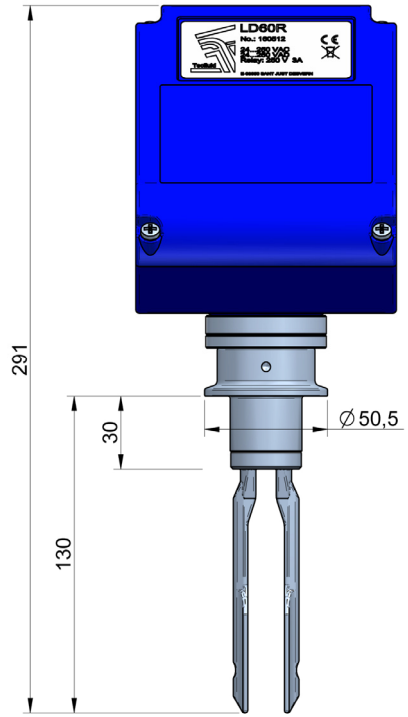


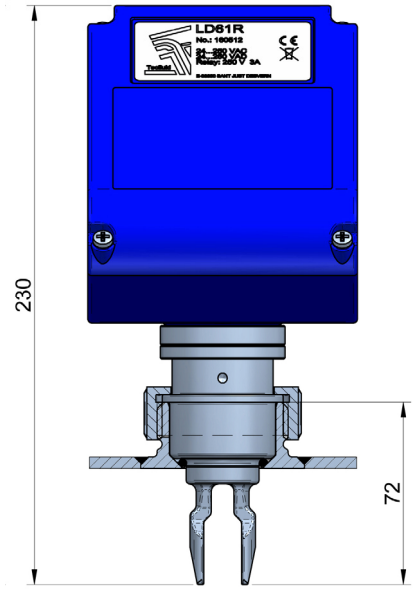


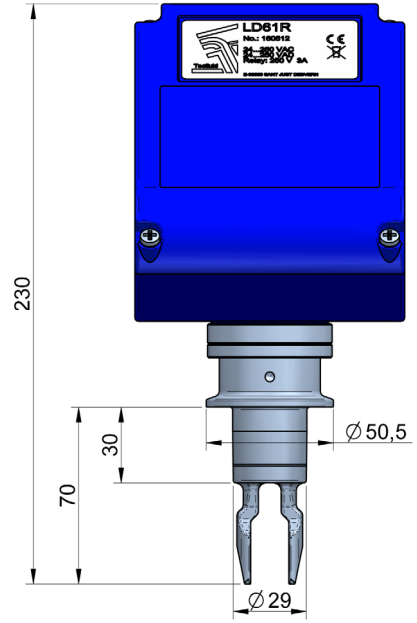
TF DIN405 Rd52 x 1/6

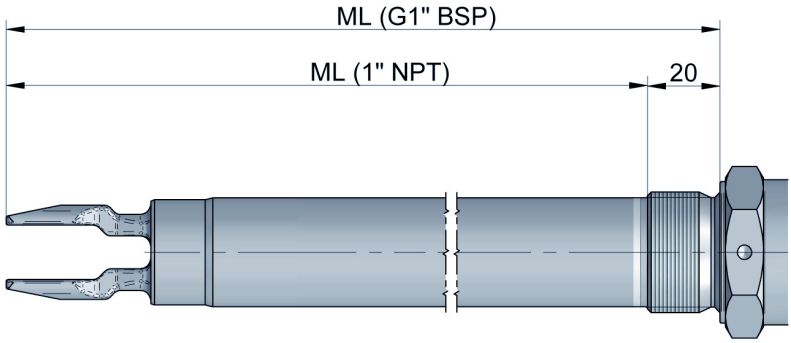


CLAMP ISO 2852 DN33.7/50.5 & 38/50.5








ML (G1" BSP)
ML (1" NPT)
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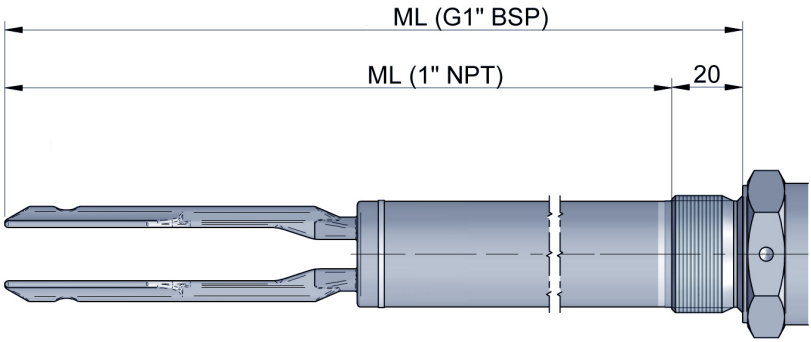
ML (G1" BSP)
ML (1" NPT)
20

12 TROUBLESHOOTING

Problem	Probable cause	Solution
The instrument is always detecting product	Rest of product adhered on the fork flaps.	Clean softly the fork with a brush, avoiding to press on the tines.
The detector does not vibrate and the LED inside the cover is off	Power supply not correct.	Verify that the power supply cables are well connected to the terminal strip and that the voltage between them is correct.
	Fused fuse.	Change the fuse (250 mA T).
The detector vibrates but does not change its state	Damaged instrument.	Contact with technical service
The detector changes its state without presence of fluid	Interferences in the installation	Contact with technical service

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
The art of measuring

Tecfluid S.A.
Narcís Monturiol 33
08960 Sant Just Desvern
Barcelona
Tel: +34 93 372 45 11
Fax: +34 93 473 44 49
tecfluid@tecfluid.com
www.tecfluid.com

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