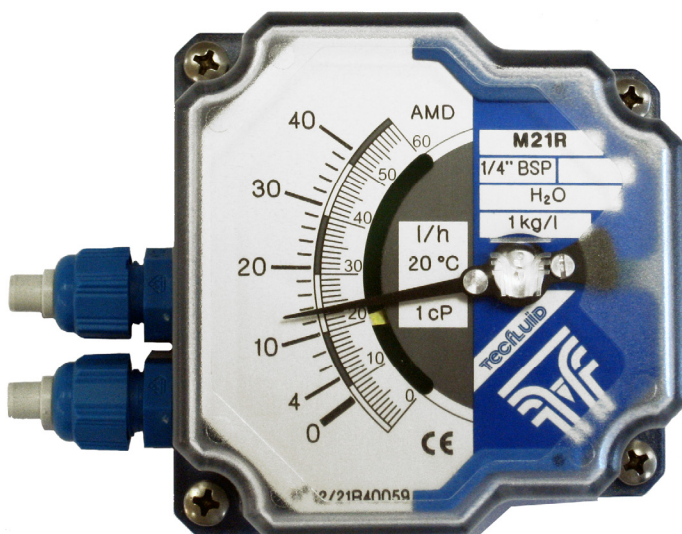


Instructions Manual



HART 
COMMUNICATION PROTOCOL

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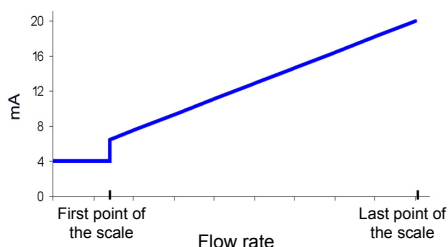
1 INTRODUCTION

The Halltec VI transmitter is an electronic position transducer with a microprocessor. The instrument uses the Hall effect to capture the field of a magnet. This signal, after the microcontroller processing, is converted into a current signal of 4-20 mA in a 2-wire loop. This signal is proportional to the flow rate.

2 MODELS

2.1 TH6

It is a 4 to 20 mA transmitter proportional to flow rate. 4 mA corresponds to beginning of the scale. 20 mA corresponds to full scale. Between the beginning of the scale and the first point of the scale the analog output is constant at 4 mA, to avoid false readings of flow rate.



1. Example: Response of the TH6 transmitter

2.2 TH6H

It is a TH6 transmitter that incorporates HART™ protocol compatibility. With this protocol the user can change the measuring range of the 4-20 mA loop, and data like flow rate, with its associated measuring units.

3 ELECTRICAL CONNECTION

For the electrical connection, the Halltec VI has two screw terminals.

For the electrical installation it is recommended to use multiple conductor cables with individual cable sections in the order of 0.25 to 0.5 mm² in order to make it easier to connect.

A twisted pair wiring should be used to avoid electrical interferences in the 4-20 mA loop. In some instances, shielded cable may be necessary.

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 M12x1.5 cable glands used are for cables with outside diameters between 2.5 mm and 6.5 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 degree of protection.

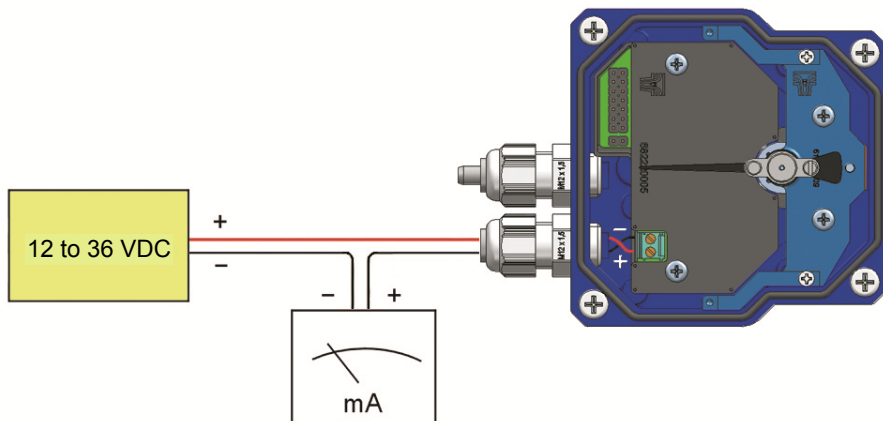
The cable glands must be always closed. Entry of dust or some types of vapours can damage the internal system of bearings and therefore the equipment.



Before connecting the power supply, you must be sure that the supply voltage is the correct for the installation. The power supply voltage is indicated on the label of the transmitter.

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

3.1 Power supply and analog output



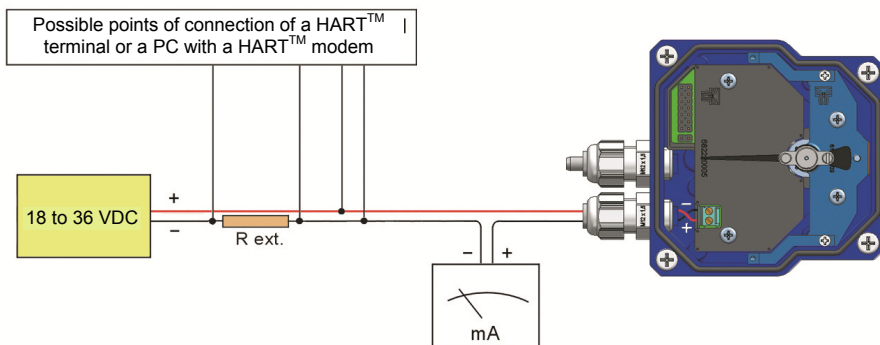
The connection is made in the terminal block. The positive terminal of the power supply is connected to the position + and the positive terminal of the load in the position -. The negative terminals of the power supply and the load are connected together. The instrument works in a 2-wire system, that is, the supply and signal line is the same. It is recommended to use a twisted pair wiring or shielded cable to avoid interferences in the current loop.

3.2 HART™ transmitters

In the case of a HART™ transmitter, an external resistor (R ext.) must be included. Its minimum value will be 200 Ω, and the maximum value will depend on the power supply as follows, **being the power supply voltage V, 18 VDC minimum.**

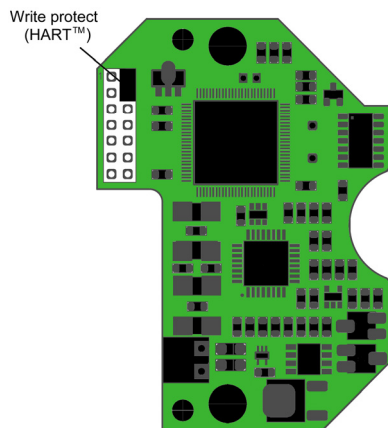
$$R(\text{Ohm}) = \frac{V - 14}{20 \cdot 10^{-3}}$$

In order to establish HART™ communication, it is necessary to connect a terminal or PC with a HART™ modem, in one of the points indicated in the following figure.



4 “WRITE PROTECT”.

The instrument has a jumper that can be used to avoid changes in the configuration. When the jumper is connected the instrument can be configured via HART™. When the jumper is removed, “Write Protect” is activated for HART™, thus avoiding any changes in the configuration.

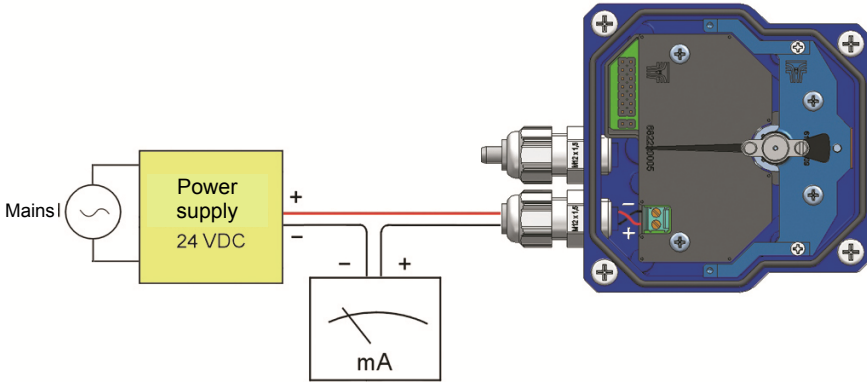


5 MAINTENANCE

No special maintenance is required.

6 4-WIRE CONNECTION

If Direct Current power supply for the transmitter is not available in the installation, it will be necessary to incorporate an additional power supply as in the following figure.



7 TECHNICAL CHARACTERISTICS

7.1 Power supply

2 wire.

Minimum voltage (TH6):

$0.02 Z + 12$ (Volt) (Z is the load in the current loop in Ohm).

The minimum value is 12 VDC for $Z=0$ Ohm.

Minimum voltage (TH6H):

$0.02 (Z + R_{ext}) + 14$ (Volt) (Z is the load in the current loop in Ohm).

The minimum value is 18 VDC for $Z=0$ Ohm and $R_{ext}=200$ Ohm.

Maximum voltage:

36 VDC (for the Ex version see point 8.3)

Consumption:

maximum 20 mA

7.2 Outputs

Analog output:

4 - 20 mA, factory calibrated

Maximum load in the 4-20 loop:

$1.1 \text{ k}\Omega$ (at 36 VDC supply voltage)

7.3 General characteristics

Housing ingress protection:

IP65

Cable glands:

M12 x 1.5

Ambient temperature:

$-5 \dots +70 \text{ }^\circ\text{C}$

Precision (analog output respect the magnetic field):

$< 0.6 \%$

7.4 Safety characteristics

This material conforms with the following directives:

2004/108/EC Electromagnetic Compatibility.

2002/96/EC Waste electrical and electronic equipment.



8 ADDITIONAL INSTRUCTIONS FOR THE ATEX VERSION

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

These equipment conform with the directive 94/9/CE (Equipment and protective systems intended for use in potentially explosive atmospheres) as is indicated in the EC-type examination certificate LOM 09ATEX2087 X and in its marking.

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

The category is 1GD, that is, it is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours, mists or dust are present continuously, for long periods or frequently.

8.1 Non metallic parts and impact risk



WARNING: POTENTIAL RISK OF ELECTROSTATIC CHARGE.

The front of the apparatus consists of a transparent plastic window in order to let the user see the position of the pointer on the scale.

Since the danger of ignition by electrostatic discharge when rubbing this window can not be avoided, **the instrument must always be cleaned with a damp cloth.**

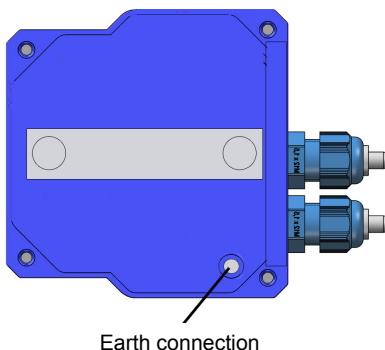


WARNING: IMPACT RISK.

As the base of the apparatus is made in aluminium, **the instrument must be always installed and used in places with low impact risk.**

8.2 Facilities 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.



8.3 Technical characteristics of the Exi version

Maximum voltage: 30 VDC
Maximum load in the 4-20 loop: 900 Ω (at 30 VDC supply voltage)
Ambient temperature: -5 - +40 °C
The rest of characteristics are the same as in the point 7.

8.4 Marking

A drawing of the marking . For example, for a M21.



The marking of the equipment shows the following characteristics:

- Manufacturer
- Model
- Serial number (year of construction and number)
- CE marking
- ATEX marking
- Certification number
- Address of the manufacturer

8.5 Exi parameters

Marcado	Ex ia IIC T4	Ex ia IIC T6
Specific parameters	Ui : 30 V Pi : 1,3 W Ci : 56 nF	Ui : 30 V Pi : 1,3 W Ci : 56 nF

9 TROUBLESHOOTING

Problem	Probable cause	Remedy
The analog output gives always 0 mA	Cables disconnected.	Check the cable connection.
The pointer rubs on the scale	Normally occurs due to a blow or fall of the instrument.	Straighten the pointer by bending it gently until separate it 2-3 mm from the scale surface.
When the float is moved the pointer follows it, but does not return to 0	The pointer is not properly secured to the shaft.	Set the pointer on the conical shaft through a soft and careful blow.
The pointer is displaced with respect to the zero of the scale.	Blow or fall of the instrument.	Match the pointer to the 0 of the scale by means of the adjustment screw of the pointer, turning left or right according to convenience. Hold the shaft in such a way that is not bent or damaged.



Note: To remove the cover, it is necessary to remove the four screws in the front cover of the housing.

In all cases, check that there is no friction between the movement of the needle and the connecting cables of the limit switches or transmitters.

When the pointer of the instrument is handled, it can become in a loss of accuracy of the transmitter.

NOTES

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WARRANTY

Tecfluid S.A. guarantees 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.



Instrumentation for fluids

TECFLUID, S.A. design and manufacture instrumentation for flow and level measurement using the most advanced techniques.
May you need more information, please contact us.

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