Tecfluid

INSTRUCTION MANUAL FOR THE MC-01 CONTROL UNIT WITH 4-20 mA INPUT
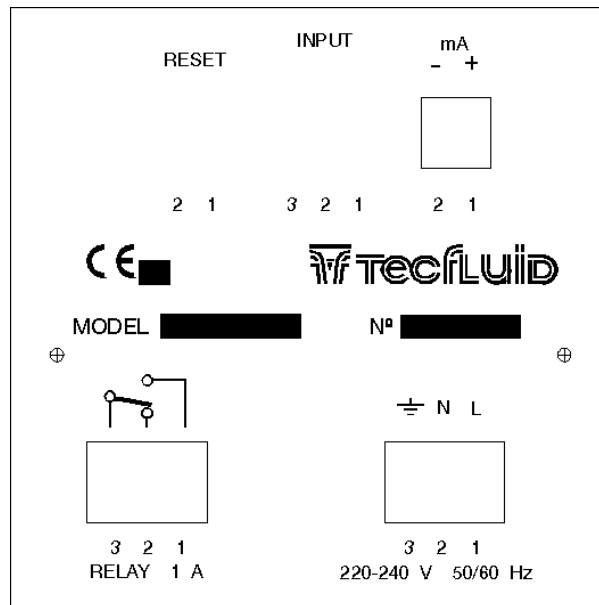
TABLE OF CONTENTS

1 INSTALLATION

1.1 Mounting

The MC-01 control instrument is housed in a DIN 96 x 96 type plastic case intended to be mounted in a front panel of an electrical control panel via a 90 x 90 mm +0.5mm/-0mm square hole. The electrical control panel should have a minimum depth of 190 mm behind the front panel to take the MC-01.

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

- The equipment must be installed in the front panel of an electrical mounting cabinet, leaving only the front of the equipment accessible to the operator.
- 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.

1.2 Mains Connection

The connection of the equipment is via plug-in connectors, polarized to avoid mistakes when plugged in. The connectors have screw terminals, as per VDE norms, to accept 1,5 mm^2 cable.

When we refer to the positions of the connectors, it is looking at the back of the MC-01.

The connector for the mains power supply is situated on the bottom right-hand side, in which the power supply (voltage indicated below the connector) must be connected to terminals Nº1 and Nº2. Terminal Nº3 should be connected to a good earth. The MC-01 has a 5 x 20 mm mains fuse inside. The nominal rating of this fuse depends on the mains voltage.
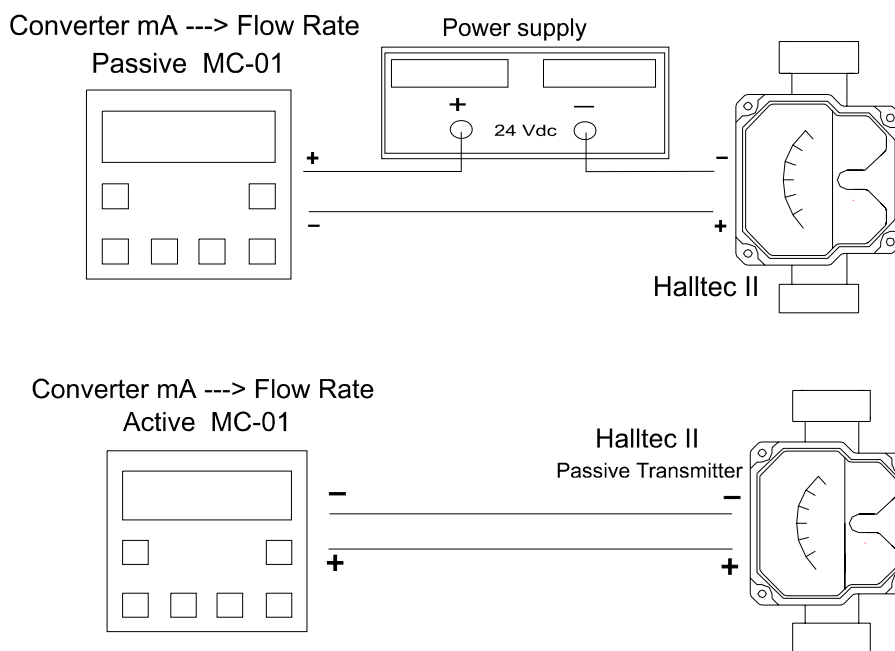
1.3 Relay Connection

The connector for the Relay is marked "**RELAY 1A**" (situated on the bottom left-hand side). The common contact of the relay is terminal Nº3. The normally open contact (with the relay disactivated) is terminal Nº1 and the normally closed contact is terminal Nº2. There are no provisions for protection of the relay contacts inside the MC-01, neither fuse nor over-voltage protection (such as may be needed with inductive loads), and these must be provided externally as required.

1.4 Input Connection

The connection to the input from the current generator (flowmeter) of 4 - 20 mA should be made to the connector situated at the top right hand side of the instrument.

For MC-01 with a passive input (the transmitter with an active output), terminal Nº 1 is the positive and terminal Nº 2 is the negative of the input signal.

For MC-01 with an active input (MC-01 supplies the voltage to a passive transmitter), then the connection should be with the positive of the transmitter to terminal 2 and the negative to terminal 1.

Converter mA ---> Flow Rate
Passive MC-01
Power supply
+ — 24 Vdc
+ —
— +
Halltec II

Converter mA ---> Flow Rate
Active MC-01
Halltec II
Passive Transmitter
— —
+ +

1.5 Remote Reset Connection (optional)

The input for the remote Reset is intended for a normally open electrical contact connected between terminals Nº1 and Nº2 of the connector situated at the left of the connector marked "**INPUT**".

The connection to the input from the remote Reset must be made using shielded cable with two live wires and the external shield. The external shield must be connected to the chassis of the remote Reset and to terminal Nº1 on the input connector of the MC-01 which is marked "**INPUT**". The two live wires are connected to the terminals of the remote Reset connector.

The input cables must not be installed close to power lines as these will induce interferences in the input lines causing errors in the equipment.

2   **SETTING UP AND PROGRAMMING**
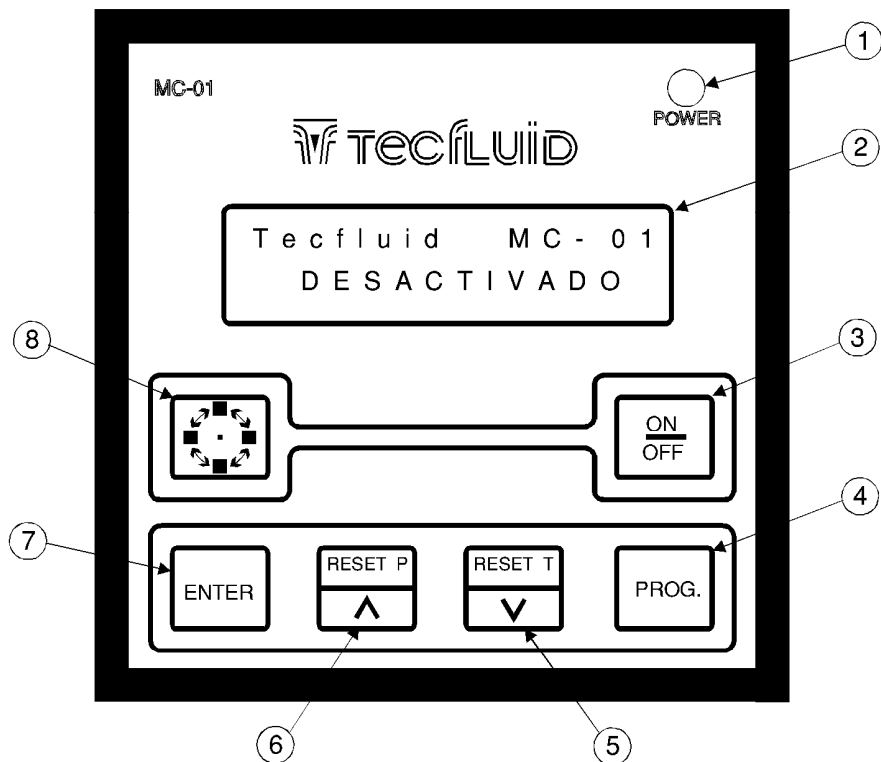
2.1   **Description of the front panel**

1.   Red LED power supply pilot light .

2.   LCD Display (2 lines with 16 characters per line)

3.   "ON/OFF" Push-button

4.   "PROG." Push-button

5.   "RESET T" or "Increment Data" Push-button

6.   "RESET P" or "Decrement Data" Push-button

7.   "ENTER" Push-button

8.   "Rotation" Push-button

        The MC-01 has six Push-buttons to control the different working modes as explained in these instructions. The Liquid Crystal Display (LCD) is used to visualize the working data and messages of the equipment. The LED pilot light is only for indicating the presence of mains supply voltage; in the event that the mains fuse blows, the pilot light will be off.

2.2   Starting up

When the mains supply is connected and the MC-01 has been previously programmed the selected normal working screen will automatically appear. To program the MC-01 we must start from the "Standby" screen. If the normal working screen is displayed, by pressing the **"ON/OFF" [3]** push-button we will go back to the "Standby" screen for programming.

2.3   Basic Configuration of the equipment

The "Standby" screen must be displayed in order to be able to enter in the programming screens.

```
Tecfluid   MC-01
     Standby
```

From this screen we can enter the basic configuration sequence by pressing the **"PROG." [4]** push-button. Pressing this push-button, the first screen for programming the beginning of the scale appears. Here we have to enter the flow rate corresponding to 4 mA (normally zero).

```
B. Scale Litres
    >000000
```

When the programming screen appears the cursor is below the first digit to modify. The **"RESET P"** "Λ" **[6]** push-button is used to increase the value of the number and the "**RESET T" "V" [5]** is used to reduce its value. Once the desired value of the digit in question is achieved using the previously mentioned push-buttons, by pressing the "**ENTER" [7]** push-button the cursor will pass to the next digit to be modified. When the **"PROG." [4]** push-button is pressed the value displayed on the screen will automatically be saved in memory and the next programming screen will appear. If you are not interested in modifying the value on a particular programming screen you can jump to the next screen by using the **"PROG." [4]** push-button.

```
E. Scale Litres
    >000000
```

In this screen the flow rate corresponding to the end of the scale (20 mA) must be entered. This value must be greater than the value entered for the beginning of the scale.

```
Dropout
   >0
```

After entering the beginning and end of the scale, the Dropout value in % of full scale must be entered. Values between 0% and 9% of full scale are valid. The dropout is the input value above which the instrument will give a flow reading different from zero. Below this value the flow reading will be zero and the instrument will not totalize.

2.4   Selection of the normal working screen

In this part of the programming sequence we select the screen that will appear when the equipment is turned on. There are six possible screens of which we must select one.

```
┌──────────────────────┐        ┌──────────────────────┐
│                      │        │                      │
│  Partial   Total     │        │  Q  l/h   Partial    │
│                      │        │                      │
└──────────────────────┘        └──────────────────────┘

┌──────────────────────┐        ┌──────────────────────┐
│                      │        │                      │
│  Q m3/h    Partial   │        │  Q  l/h    Total     │
│                      │        │                      │
└──────────────────────┘        └──────────────────────┘

┌──────────────────────┐        ┌──────────────────────┐
│                      │        │                      │
│  Q m3/h     Total    │        │  Preset   Partial    │
│                      │        │                      │
└──────────────────────┘        └──────────────────────┘
```

Using the **"Rotation" [8]** push-button we can rotate between the six options until the desired screen appears. By pressing the **"ENTER" [7]** push-button the displayed screen will be selected as the normal working screen,the programming sequence will finish and the "Standby" screen will appear.

It can be seen that there are options to select the flow-rate (Q) to be given in litres per hour (l/h) or in cubic meters per hour (m3/h). If the l/h option is selected, the flow-rate will be given in litres per hour unless the flow-rate reaches 20,000 l/h and above which it will be displayed in cubic meters per hour. If the m3/h option is selected, the flow-rate will be given in cubic meters per hour unless the flow-rate drops to 5 m3/h and below which it will be displayed in litres per hour.

This selection of the normal working screen is only to select the screen that will appear when the power is switched on, or when one changes from the "Standby" screen to the working screen. When in a working screen, it can be changed for another by using the **"Rotation" [8]** push-button, without having to enter the programming sequence.

3   BATCHING

3.1   Entering the preset value

Starting from the "Standby" screen, by pressing the **"Rotation" [8]** push-button we can enter in the screen to program the preset value in litres for batching.

```
┌──────────────────────┐
│                      │
│   Preset.(litres):   │
│      >000000         │
│                      │
└──────────────────────┘
```

When the programming screen appears the cursor is below the first digit to modify. The "**RESET P**" "Λ" **[6]** push-button is used to increase the value of the number and the "**RESET T**" "**V**" **[5]** is used to decrease its value. Once the desired value of the digit in question is achieved using the previously mentioned push-buttons, pressing the "**ENTER**" **[7]** push-button the cursor will pass to the next digit to be modified. On the last digit, by pressing the "**ENTER**" **[7]** push-button the value displayed on the screen will automatically be saved in memory and the "Standby" screen will appear.

3.2   **Batching**

From the "standby" screen, we press the "**ON/OFF**" **[3]** push-button to enter the normal working screen. The normal working screen will appear, selected as per instructions **2.4**, for example:-

```
┌─────────────────────────┐
│ Preset.     Partial     │
│                         │
│ 000000      000000      │
│                         │
└─────────────────────────┘
```

To start the batching process, first we press the "**RESET P**" **[6]** push-button to clear the partial counter, and the following screen will appear, but the relay will not yet be activated:

```
┌─────────────────────────┐
│                         │
│    Press   Enter        │
│                         │
│                         │
└─────────────────────────┘
```

In the instant that the "**ENTER**" **[7]** push-button is pressed the relay is activated and the batching process begins, counting the volume passing through the flowmeter and adding it to the partial and total counters. When the partial counter reaches the preset value the relay is disactivated and the batching process finishes.

If the "**ON/OFF**" **[7]** push-button is pressed during the batching process, the relay is disactivated and the process is aborted. In this case, instead of showing the normal working screen, the "Standby" screen appears. By pressing the **ON/OFF**" **[7]** push-button we get back to the normal working screen. This screen always shows the state at which the batching was finished. In the event that one needs to finish a batch which was stopped, by pressing the **ON/OFF**" **[7]** push-button or by a power failure, one must enter a preset value equal to the difference between the original preset value and the value of the partial counter when the process was stopped.

4   **TOTALIZING COUNTER**

The total counter shows the total volume that has passed through the flowmeter, independently of the use or not of the batching option.

To clear the totalizing counter, we must go to the "Standby" screen and press the "**RESET T**"**[5]** and "**ENTER**" **[7]** push-buttons at the same time.

If the totalizing counter has overflown indicating in litres it will automatically start to indicate in cubic meters without loosing the data, and in this case the letter "m" will be seen after the number. In this case it is advisable to put the counter to zero in order not to loose precision in the reading.

5   **ERROR MESSAGES**

If at some time the input pulses have gone above the maximum input frequency (1900 Hz) an asterisk will appear between the two blocks of numbers on the bottom half of the screen. In the event that the input frequency supersedes the maximum input frequency, it can introduce errors in the results of the calculations of volume.

To clear this error indicator one must press the "**ON/OFF**" **[3]** push-button twice to pass to the "Standby" screen, and then again back to the normal working screen.

6 TECHNICAL CHARACTERISTICS

6.1 Power supply

The standard mains voltages for the MC-01 are 240 V, 220 V, 110 V, 24 V AC - 50/60 Hz. The mains voltage must be specified on ordering.

On special order supply voltages of 12 or 24 V DC can be supplied.

The MC-01 consumes less than 3 VA with AC mains supply.

Fuse : 250 mA slow (T)

6.2 Signal Inputs

For the option designed to take a 4-20 mA input from an active transmitter (passive MC-01), the input presents a 300 ohm impedance in series with a diode. The diode is to avoid damage to the equipment in the case of inverting the input polarity.

With the active option of the MC-01, the MC-01 input supplies 24 Volts to supply the passive transmitter. This input also has a 300 ohm impedance.

6.3 Auxiliary Inputs

An optional input exists for a remote "**RESET P**" to start batching processes. This input is designed to take a normally open electrical contact between terminals Nº1 and Nº2 of the connector. For this input to be effective it must be closed during about 200 milliseconds in order to start the batching process. In the event of using this input to start batching processes, the relay will be activated on closing the contact, without having the screen displaying "Press ENTER".

6.4 Relay Outputs

The output to control the batching processes is by means of an electro-mechanical relay with the following characteristics:
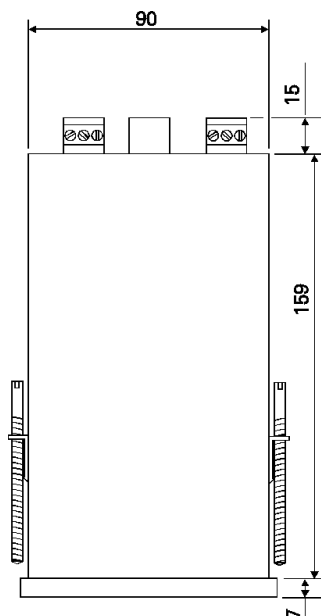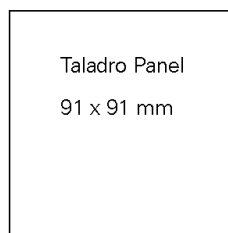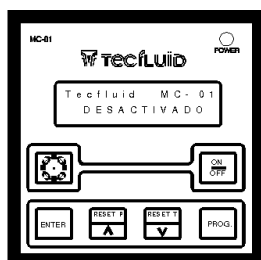
Maximum Voltage : 250 V
Maximum Current : 1 A
Maximum Power : 30 VA

6.5 Working Conditions

Ambient Temperature : 0 to 60 ºC

The housing is IP 30 at the rear and IP 50 at the front when mounted in a panel. An IP 65 protection is available for the front of the housing.

6.6 Dimensions

Taladro Panel

91 x 91 mm

WARRANTY

Tecfluid S.A. GUARANTEES ALL ITS PRODUCTS FOR A PERIOD OF 12 MONTHS, maximum 18 months after consignment, against all defects in materials and workmanship.

This warranty does not cover failures which can be imputed to misuse, use in an application different to that specified in the order, the result of service or modification by un-authorized persons, bad handling or accident.

This warranty is limited to cover the repair or replacement defective parts which have not been damaged by misuse.

This warranty is limited to the repair of the equipment and all further and eventually following damages are not covered by this warranty.

In the event of consignment of equipment to our factory, this should be done with the equipment well packed and prepaid transport. Tecfluid S.A. will not accept any responsibility for damage done during transport. Together with the equipment, a note should be enclosed indicating the failure observed, the name, address and telephone number of the sender.

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