

Flow Display model 6001 Installation Manual



Despite effort to avoid errors in the preparation of this manual, Equflow cannot be held liable for any mistakes or consequences related to mistakes that may be present

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1. Safety Instructions

This instrument has been manufactured in accordance with the applicable state of the art and meets all safety regulations as shipped from the factory. Installation and startup must be performed by qualified personnel only.

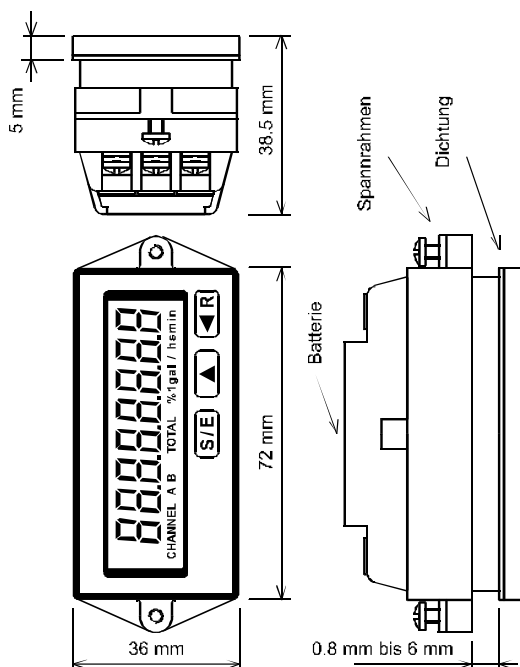
Operate instrument only when it is properly installed.

If safe operation can no longer be ensured, disable the instrument and secure it against unauthorized operation.

Prevent injury to people or damage to property due to failure or malfunction of the equipment through additional safety measures such as limit switches, protective equipment, etc.

Read the Instruction Manual carefully before startup!

2. Product Identification - Dimensions



3. Function Description

This instrument can be used as a rate meter and as a pulse counter.

The instrument has been pre-programmed in the factory and must be adapted to your process for both the rate meter function and pulse counting (see Section 5 – Programming).

The instrument is ready for operation when the programming input is not wired. You can switch between Rate meter and Pulse Counter displays using the **S/E** key during operation at any time.

The instrument has two signal inputs. Use input A for the rate meter with pulse frequencies up to 10 kHz; use input B for pulse counter with pulse frequencies up to 10 kHz (“Speed Hi”, use this for Equflow sensors) or alternatively up to 30 Hz (“Speed Lo”).

The backlighting is activated and load on the internal battery is reduced by applying an external supply voltage of 24 VDC. We recommend using this external supply, since it can also be used to power an Equflow flowsensor.

All stored data is lost when the battery is replaced. The message "260_ xx" (xx for software version number) appears after the (new) battery is installed. The instrument is ready to operate after the **S/E** key is pressed.

Rate meter

The rate meter operates by the principle of period length measurement with **ARS (Auto Range System)**.

You can adapt the display to your operation using the programming sequence:

1. Input the physical units of the rate meter (volume and time unit)
2. Select accuracy
3. Set sensor pulse constant
4. If necessary, program a suitable scaling factor.

ARS helps minimize display process-related fluctuations depending on the selected accuracy, rounds off the displayed value, and sets the decimal point automatically. Measurement starts with the active edge at the counter input A. After the measurement time (1 sec) has elapsed, the measurement is completed with the next active edge, and the value is displayed in CHANNEL A. If no active edge appears within the “time out” period you have programmed, the rate meter is reset to zero. At frequencies > 1 Hz the average is calculated.

When the allowable count frequency is exceeded, the value zero appears in the display; if the possible display range (99999999) is exceeded, the display shows an “E”.

Display as delivered:



Pulse Counter

The pulses entering at the input B are totalized and displayed in CHANNEL. The input B is programmable as "HIGH SPEED" - or "SLOW SPEED" - input. Furthermore, you can scale the display using an appropriate scaling factor. You can also set a fixed decimal point and program the pulse counter so that you can reset it either through the regular electrical reset on the back or through the red **R** key on the front.

After pressing the **S/E** key:



4. Installation and Battery Replacement

To install this panel mount meter, slide the housing through the cutout prepared in the front panel. Attach the frame onto the back of the housing, slide it all the way against the back of the front panel, and carefully fasten it with the two side screws to the front panel.

In this way, you can compensate for different front panel thicknesses. IP class 65 front protection is achieved through the seal integrated in the housing.

See the wiring diagram below for the electric wiring.

The battery is accessible from the back of the instrument. There is a vertical notch in the middle of the nameplate. Slide out the two-part battery cover to both sides along the guide grooves, and replace the battery observing the correct polarity. The instrument should **not** be connected to an external 24 VDC at this time!

4.1 Connecting Equflow flowmeters:



Equflow Flowmeter	6001 Display	Connection
Red wire (5-24 VOLT)	24 VDC*	2
White wire (Signal)	IN A**	4
Black wire (0 VOLT)	Ground	3

*To power the Equflow sensor, an external 24 VDC power supply has to be connected to pins 2 and 3 as well.

**Use IN B (connection 5) if you want to use the pulse counter.

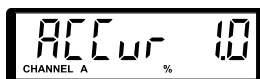
5. Programming

The instrument can only be programmed by connecting the programming input PROG to 0 V. Please note that this causes the pulse counter to be reset internally.

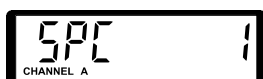
By repeatedly pressing the **S/E** key, you can cycle through the individual menu items. The following figures correspond to the factory settings of the instrument:



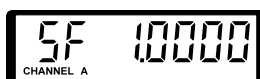
Physical unit, Channel A



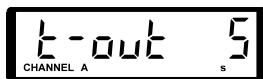
Accuracy, Channel A



Sensor pulse constant, Channel A



Scaling factor, Channel A



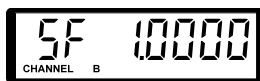
Time-out period, Channel A



This display identifies the pulse counter (Channel B); it cannot be changed.



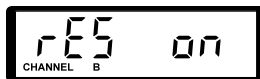
Count frequency, Channel B



Scaling factor, Channel B



Decimal point, Channel B



Reset-key enabled, Channel B

You can make changes within each menu point as follows:

1. Press the **<R** key: the selected parameter can be changed, i.e. it begins to flash.
2. Press **^** repeatedly if necessary: Set the desired parameter.
3. If applicable, press the **<R** key if you want to change the next digit in the line
4. Press **S/E**: the parameter setting is confirmed and the display stops flashing.
5. Press **S/E** again: you reach the next menu item.

Flashing display elements are shown in a lighter color in the examples in this manual.

Physical unit, Channel A – Rate meter

Here you can select the units for the rate meter. The available options are:

1/min	L/s	gal/s
1/h	L/min	gal/min
1/s	L/h	gal/h

Accuracy, Channel A – Rate meter

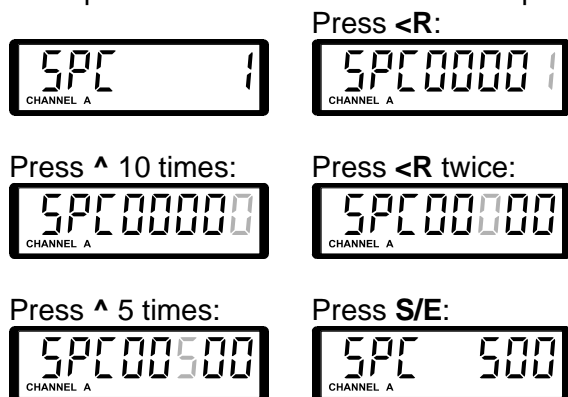
Setting measurement accuracy, you can select 0.1%, 1% or 10%, which corresponds to a minimum resolution of 4, 3 or 2 digits respectively.

Sensor Pulse Constant, Channel A – Rate meter

You can set the pulse constant of the sensor in the range of 1 to 99999. The sensor pulse constant is the number of pulses per unit.

For Equiflow flowsensors the pulse constant is given in pulses/L. If you want to use different units on your display (**Unit**), make sure to convert the Equiflow K-factor accordingly.

Example: Set a sensor constant of 500 pulses per Liter



Scaling factor, Channel A - Rate meter

You may set the scaling factor (**SF**) in the range of 0.0001 to 99.9999 as explained for setting the pulse constant. The scaling factor can be used when converting one physical unit to another (e.g liters to milliliters).

Time-out Period, Channel A - Rate meter

You can set the desired timeout period (**time out**) after which the display is reset to zero if the operating frequency is so low (or zero) that the measuring time would be intolerably long. The timeout period can be set in the range of 1s to 99s.

Count Frequency, Channel B – Pulse Counter

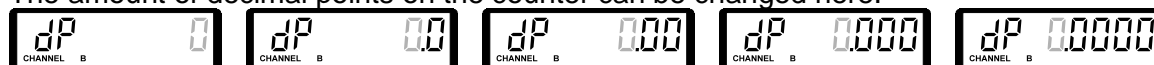
Here you can choose between a Hi(gh) Speed (maximum frequency 10 kHz) and a Lo(w) Speed (maximum frequency 30 Hz).

Scaling Factor, Channel B – Pulse Counter

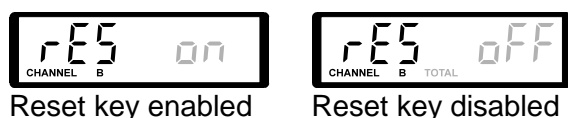
You can set the **Scaling Factor** in the range of 0.0001 to 99.9999. Set the scaling factor as described under Scaling Factor, Channel A.

Decimal point, Channel B – Pulse Counter

The amount of decimal points on the counter can be changed here.



Reset Key enabled, Channel B – Pulse Counter



If you have not enabled the reset key, the string “TOTAL” is displayed. Having completed the programming, disconnect the programming input PROG from 0 V. Please note that only the parameters confirmed with **S/E** are accepted.

6. Technical Specifications

Display

Special LC display with dimension line, 8 digits, 10 mm digit height, pre-decimal point zero suppressed. Display Capacity:

Rate meter: 99999999

Automatic decimal point

Pulse counter: 99999999

Programmable decimal point

Accuracy

Period measurement accuracy:

Programmable to 0.1%, 1%, or 10% (corresponds to a minimum resolution of 4, 3, or 2 digits respectively.)

Power Supply

Internal lithium battery: 3.6 V / 1.2 Ah

Average battery life: 5 years

LED – Display backlighting

The LED display backlighting must be operated with external voltage connected to 24 VDC and 0 V screw terminals.

External Voltage: 24 VDC, max. residual ripple 5%

Absolute limits: 19 to 30 VDC

Electromagnetic Compatibility (EMC)

Interference emission: EN 55011, Group 1, Class B

Interference strength: EN 50082-2

EN 61010-1 Measuring Insulation Voltage

100 Veff, Contamination Class 2, Surge Category III

DIN VDE 0411 Protection Class

Protection Class II

Electrical Connection

Terminal screw connection, P Phillips screws, size 1

max. lead section: 2 x 1.5 mm²

min. lead section: 2 x 0.2 mm²

IEC 529 Protection Class

IP 65 (front)

Temperature / Humidity range

Operating temperature range: - 10°C to + 50°C

Storage temperature range: - 20°C to + 70°C

Temperature / Humidity: 90% relative humidity @ 38°C

IEC 68-2-6 Vibration Strength

Variable frequency range: 10 to 500 Hz

0.35 mm or 5 g amplitude

10 Frequency cycles per axis

Dimensions

Frontal dimensions : 36 mm x 72 mm

Total depth: 38.5 mm

Fastening

Front panel mount via frame

Front panel thickness: 0.8 mm to 6 mm

Front panel cutout DIN 43700: 33+0.6 mm x 68+0.6 mm

Weight

approx. 95 g

Housing Material / Combustibility

PC plastic, Combustibility V0 under UL Standard 94

Inputs

Counter Input A (Rate meter)

Pulse shape:	any
“HIGH - SPEED” input:	“High” active
Signal level:	$L \leq 1 \text{ VDC}$, $H \geq 5 \text{ VDC}$
Max. voltage amplitude :	$\pm 30 \text{ VDC}$
Input resistance:	approx. 39 kOhm
Max. frequency (pulse duty factor 1:1):	10 kHz
min. pulse time:	50 μs
min. pulse pause:	50 μs
Active edge:	High/Low

Counter Input B (Pulse Counter)

Pulse shape:	any
Programmed as “HIGH - SPEED” input:	“High” - active
Signal level:	$L \leq 1 \text{ VDC}$, $H \geq 5 \text{ VDC}$
Max. voltage amplitude :	$\pm 30 \text{ VDC}$
Input resistance:	approx. 39 kOhm
Max. frequency (pulse duty factor 1:1):	10 kHz
min. pulse time:	50 μs
min. pulse pause:	50 μs
Active edge:	High/Low
Programmed as “SLOW – SPEED” input:	“Low” - active
Signal level:	$L \leq 0 \text{ VDC}$, $H \geq 5 \text{ VDC}$ or open
Max. voltage amplitude :	$\pm 30 \text{ VDC}$
Input resistance:	approx. 1 MOhm
Max. frequency (pulse duty factor 1:1):	30 Hz
min. pulse time:	16 ms
min. pulse pause:	16 ms
Active edge:	Low/High

Reset Input R (Pulse Counter)

Pulse shape:	any
Signal level:	$L \leq 0 \text{ VDC}$, $H \geq 5 \text{ VDC}$ or open
Max. voltage amplitude :	$\pm 30 \text{ VDC}$
Input resistance:	approx. 1 MOhm
Static response:	“Low” - active
min. pulse time:	65 ms

Programming Input PROG

Static response:	“Low” active
Input open:	Operating mode
Input connected to “0 V”:	Programming mode

7. Spare Parts

Lithium battery: SL-761/S