



# High Precision Flow Transmitter

## Hygienic Flow Transmitter

### Application

The Alfa Laval Flow Transmitter is designed to fulfill the demands of hygienic and pharmaceutical production. Amongst others it is suitable for flow measurement in Food, Beverage, Dairy and Biopharm industries

#### Main features:

- Suitable for Hygienic applications – 3A approved.
- No internal pressure drop.
- Robust and compact design - easy to mount, even in difficult applications.
- Constructed to be independent of variations in flow profile.
- Optimized for high accuracy and linearity.
- Pre set-up from factory, ready for installation.
- Bidirectional, (can measure in both flow directions).
- No moving parts - no maintenance.

### Standard range

The Alfa Laval Flow Transmitter is an electromagnetic precision meter for volumetric measurement of liquids that are electrically conductive. The transmitter can be used in applications where a hygienic design is required and the rugged construction of the transmitter makes it suitable for installations where solid particles are present in the liquid. The standard version is delivered pre-setup making installation quick and easy. The output signal is as standard a pulse-signal (0 to 1000 Hz) with a resolution of either 0,01 or 0,1 ltr/pulse. As an option the Flow transmitter can be delivered with analogue 4-20 mA output or with a display enabling advanced features.

The metering tube is coated with Teflon (FEP) on the inside and is fitted with clamp connections. The sensitive electronic is completely embedded and consequently hermetically sealed. The flow transmitter is water proof with protection class IP 67. The terminals for electrical connection are marked with both number and function and cable access is done through 3 PG-11 cable glands.



### Working principle

The Alfa Laval Flow Transmitter consists of a metering pipe and two magnetic coils. When a current is applied to the coils a magnetic field is produced at right angles to the metering pipe.

With a conductive liquid flowing through the metering pipe an electrical voltage is induced and measured by two electrodes mounted in the metering pipe. This voltage is proportional to the average velocity of flow and therefore to the volume flowing..

The Alfa Laval Flow Transmitter utilizes a square measurement chamber. The shape of the measurement chamber significantly reduces the influence of viscosity, type of liquid, and flow profiles and eliminates any need for recalibration when changing product for instance from milk to water.

The microprocessor in the transmitter controls the current generator keeping the magnetic field constant. The voltage across the electrodes is amplified and converted to a digital value from which the microprocessor calculates the liquid flow

## Technical data

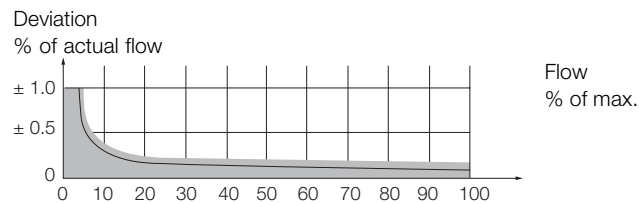
### Measuring ranges:

0 to 8 m<sup>3</sup>/h (connection:DN25 (ISO2852))  
0 to 20 m<sup>3</sup>/h (connection:DN38 (ISO2852))  
0 to 40 m<sup>3</sup>/h (connection:DN51 (ISO2852))  
0 to 80 m<sup>3</sup>/h (connection:DN63 (ISO2852))  
0 to 120 m<sup>3</sup>/h (connection:DN76 (ISO2852))  
0 to 200 m<sup>3</sup>/h (connection:DN102 (ISO2852))

### Resolution output signal:

TE67A1XXXXXXXX: 0.01 litre/pulse  
TE67A2XXXXXXXX: 0.01 litre/pulse  
TE67A3XXXXXXXX: 0.10 litre/pulse  
TE67A4XXXXXXXX: 0.10 litre/pulse  
TE67A5XXXXXXXX: 0.10 litre/pulse  
TE67A6XXXXXXXX: 0.10 litre/pulse

**Accuracy: between ±0.02% of FS and ± 1% of FS, see below graph**



%&  
Max. error vs.actual flow rate

Flow velocity: 100% of max. equals 5.4 [m/s]

- Calibration test limits at reference conditions.
- Real life performance including the effects of variations in liquid type/temperature, ambient temperature and powersupply.

Repeatability accuracy: . . . . .Max 0.5 \* accuracy  
Media conductivity: . . . . .Min 5 µS/cm

## Mechanical data

### Process connections:

TE67A1XXXXXXXX: connection: clamp DN25 (ISO2852)  
TE67A2XXXXXXXX: connection: clamp DN38(ISO2852)  
TE67A3XXXXXXXX: connection: clamp DN51(ISO2852)  
TE67A4XXXXXXXX: connection: clamp DN63(ISO2852)  
TE67A5XXXXXXXX: connection: clamp DN76(ISO2852)  
TE67A6XXXXXXXX: connection: clamp DN102(ISO2852)

### Materials

Wetted parts: . . . . .AISI 316 and Teflon  
Housing: . . . . .Noryl

### Operating temperature

Wetted parts: . . . . .-30 to 100 degr. Celsius  
Electronics range . . . . .-10 to 50 degr. Celsius

Protection class: . . . . .IP67

Max media pressure: . . . . .10 bar

### Weight

Flow transmitter: . . . . .5 kg. (type TE67A6: 10 kg. )

## Electrical data

The Alfa Laval Flow Transmitter is pre-setup from factory ready for installation and has as standard integrated automatic zero point adjustment

As an option The Alfa Laval Flow Transmitter can be delivered with display giving access to advanced features such as integrated temperature compensation through external pt100 sensor, PI regulator and for low flows a linearization function further optimizing the accuracy at low flows.

Power supply: . . . . .24 V AC/DC (0.25A)

### Output

Puls output: . . . . .(0 to 1000Hz)  
4-20 mA (option)

### Response time

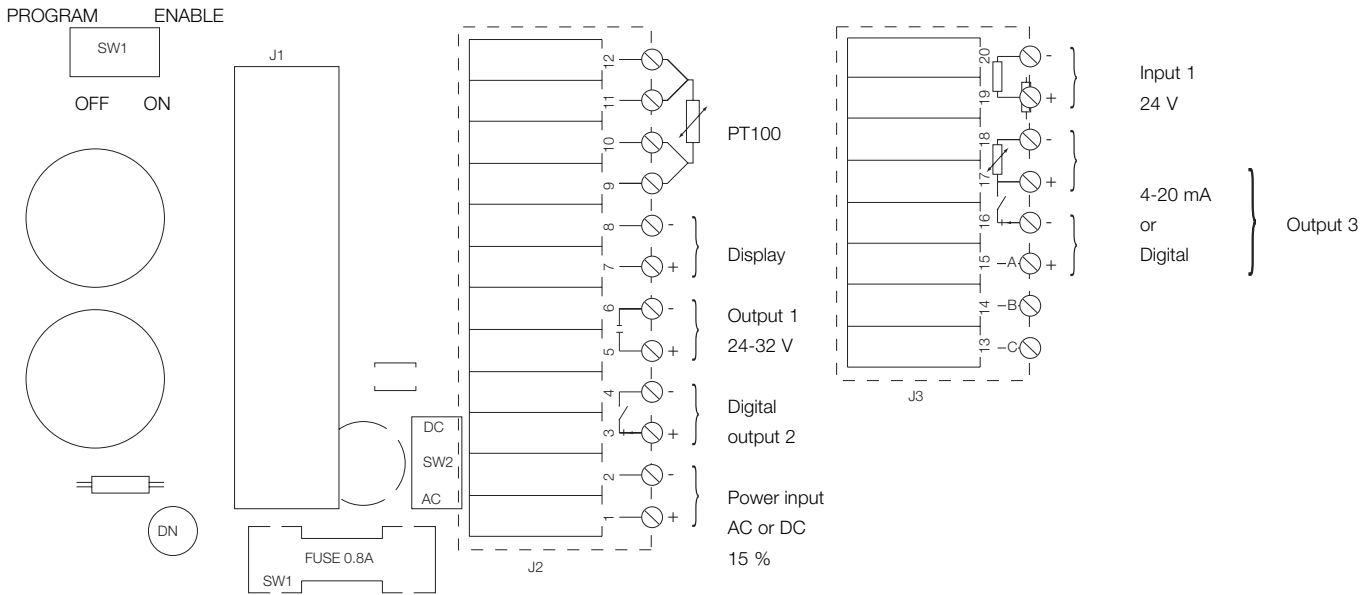
Puls output: . . . . .0.2 sec.  
4-20 mA: . . . . .1 sec.

Connection: . . . . .Pg11 cable gland

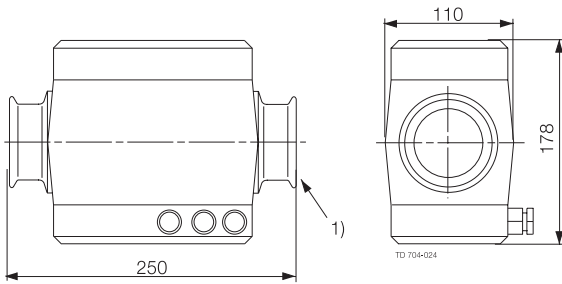
## Certificates

- Calibration certificate is as standard delivered with every unit
- 3.1.B certificate (option)
- 3A certificate (option)
- CE marked

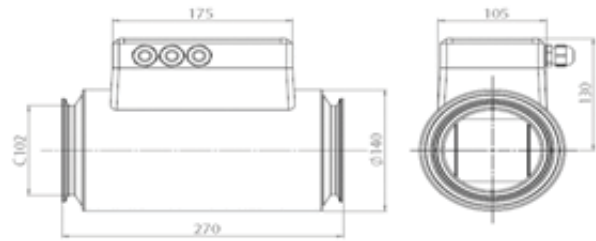
## Electrical layout diagram of connection box



## Dimensions (mm)



Dimensional drawing of Alfa Laval Flow Transmitter TE67A1XXXXXXX to TE67A5XXXXXXX,



Dimensional drawing of Alfa Laval Flow Transmitter TE67A6XXXXXXX

## Selection guide

When selecting a Flow Transmitter two follow rules should be followed:

1. The Flow Transmitter with a pipe dimension equal to the rest of the piping system should be selected.
2. If optimum measurement accuracy is of primary concern, the smallest possible transmitter should be chosen, while still observing that the maximum flow rate must never be exceeded.

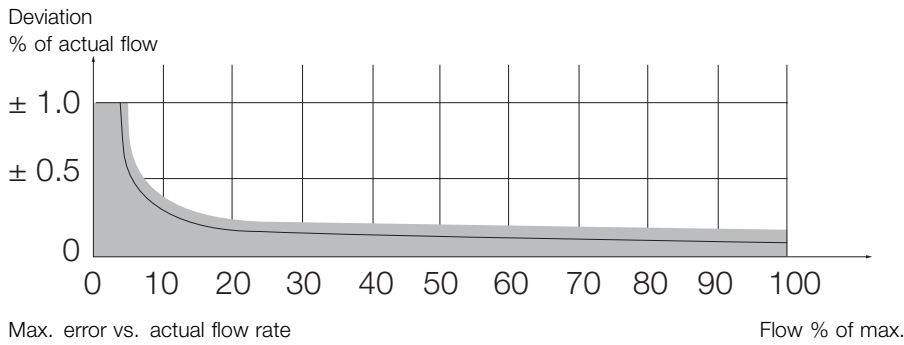
The below table can assist in selection.

Selection guide																	
model:	range	m <sup>3</sup> /h:	0.03	0.08	0.2	0.4	0.8	2	4	8	12	20	40	80	120	200	240
TE67A1xxxxxxx	8 m <sup>3</sup> /h							Note 3							Note 4		
TE67A2xxxxxxx	20 m <sup>3</sup> /h			Note 2					OK								not
TE67A3xxxxxxx	40 m <sup>3</sup> /h		Note 1		(OK)												OK
TE67A4xxxxxxx	80 m <sup>3</sup> /h		Re-														
TE67A5xxxxxxx	120 m <sup>3</sup> /h		duced														
TE67A6xxxxxxx	200 m <sup>3</sup> /h		accu-														
			rary														

## Note:

1. Reduced accuracy
2. Linearization function enabled
3. Best accuracy
4. Out of range, flow meter will be damaged

Accuracy: between  $\pm 0.02\%$  of FS and  $\pm 1\%$  of FS, see below graph



Max. error vs. actual flow rate

Flow % of max.

Flow velocity: 100% of max. equals 5.4 [m/s]

- Calibration test limits at reference conditions.
- Real life performance including the effects of variations in liquid type/temperature, ambient temperature and powersupply.

**Selection example:**

Problem: The flow to be measured is between 4 and 12 m<sup>3</sup>/h and the piping installation is 38 mm (1")

Solution: according to the selection guide model TE67A2xxxxxxx and TE67A3xxxxxxx can be used, both selections will give optimum accuracy. But following rule number TE67A2xxxxxxx is selected as it has the same piping diameter as the installation and thereby minimizes pressure loss in the system.