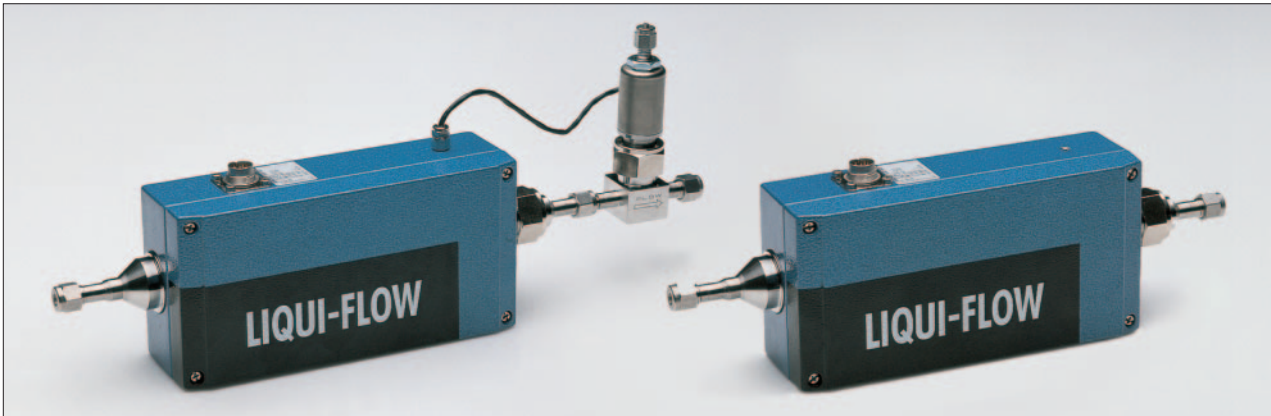


## LIQUI-FLOW® SERIES L30

### MASS FLOW METERS/CONTROLLERS FOR LIQUIDS



#### INTRODUCTION

Bronkhorst HIGH-TECH B.V. has been the pioneer in the field of micro to low flow liquid metering instruments based on a thermal measuring principle. Much experience was gathered over the past 20 years and with this knowledge the product requirements were laid down for new liquid mass flow meters and controllers.

The smallest ranges, from 1,5...30 mg/h up to 0,1...2 g/h are covered by the  $\mu$ -FLOW series. For 0,1...5 g/h up to 20...1000 g/h LIQUI-FLOW® Series L1 and L2 thermal mass flow meters and controllers with a thru-flow measuring principle have acquired an excellent reputation on the market. In co-operation with TNO's Institute of Applied Physics (TPD)\*, the LIQUI-FLOW® product line has been expanded with a new instrument for flow ranges up to 0,4...20 kg/h, the L30 Series.

#### DESCRIPTION

The LIQUI-FLOW® L30 mass flow meter is basically a straight tube of stainless steel 316L with a unique thin film thermopile sensor/heater design, fixed on the outside of the tube. The sensor signal is obtained by measuring the power needed to maintain a constant temperature rise of the fluid. In a formula this can be expressed as follows:

$$\text{Signal output} = \frac{\text{power}}{\Delta T} = k \cdot c_p \cdot \Phi_m$$

$\Delta T$  = temperature difference       $c_p$  = specific heat  
 $k$  = meter constant                 $\Phi_m$  = mass flow

Flow control is achieved by coupling to the meter a COMBI-FLOW control valve with a purge connection on the top of the sleeve, or as an option an on/off valve, so as to eliminate air or gas when starting up the system. The electronic valve control function forms part of the normal circuitry in the meter.

#### FEATURES

- no moving parts
- thru-flow measurement
- compact complete control loop with control valve
- only a few degrees temperature rise in sensor
- attitude and vibration insensitive
- all wetted parts electro-polished stainless steel
- all metal seals
- easy to clean straight tube construction
- stable zero point
- high accuracy
- pressure rating 100 bar

#### FIELDS OF APPLICATION

- Food industry
- Chemical industry
- Pharmaceutical industry
- Analytical laboratories
- Semiconductor industry

\* The TNO Institute of Applied Physics (TPD) is one of the R&D institutes of TNO, the Dutch organisation for Applied Scientific Research. TNO is the largest independent R&D organisation in the Netherlands and one of the largest in Europe.

### Performance specifications

Accuracy, standard (based on actual calibration)	: ±1% FS including non-linearity and repeatability.
Accuracy, polynomial (based on actual calibration)	: ±0,8% of reading plus ±0,2% of FS.
Reproducibility	: 0,2% FS
Settling time (controller)	: 4...10 seconds
Attitude sensitivity	: negligible
Vibration sensitivity	: negligible

### Mechanical/Electrical specifications

Material (wetted parts)	: electro-polished stainless steel 316 L.
Housing	: aluminium (coated)
Process connections	: ¼" face seal couplings or ¼" or 6 mm compression type couplings, orbitally welded. Others on request.
Outer seals	: metallic
Plunger (in Control Valve)	: standard elastomeric PTFE. Other on request.
Power supply	sensor : +15 Vdc, max. 1,25 A* -15 Vdc, approx. 50 mA control valve : add. +15 Vdc, max. 250 mA* * depending on configuration.
Output/Command signal	: 0...5 (10) Vdc, or 0 (4)...20 mA (sourcing output).
Electrical connection	: male, 8-pin Amphenol
Ingress protection	: IP65 (weatherproof) for meter; for controller on request.

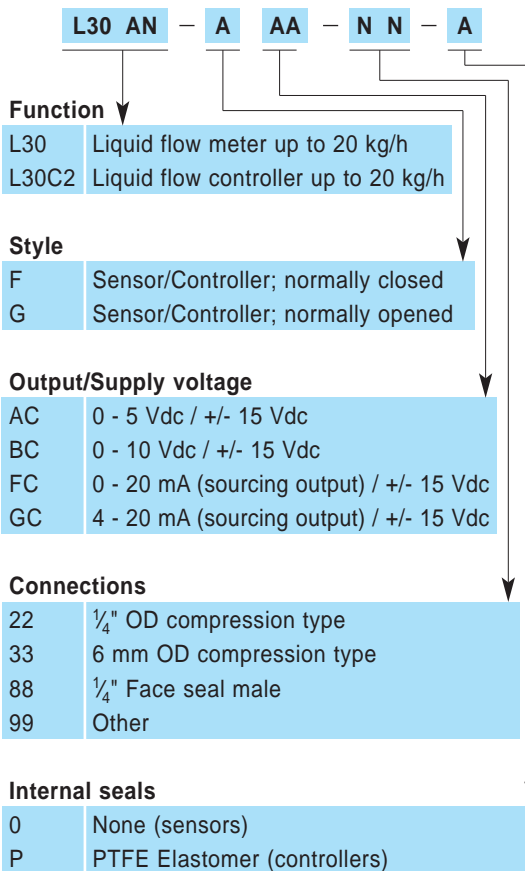
### Operating conditions

Measuring range (based on water)	: smallest 0,04...2 kg/h highest 0,4...20 kg/h (all intermediate values available).
Turndown	: 1:50 (2...100%)
Pressure drop	: approx. 350 mbar (based on 20 kg/h H <sub>2</sub> O).
Max. operating pressure	: 100 bar
Operating temperature	: 5...70°C
Warm-up time	: 30 min. for optimum accuracy; after 3 min. better than 2% FS.

### Calibration

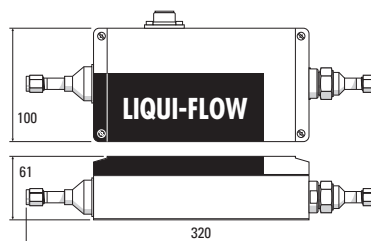
References	: Verified by NKO, the Dutch calibration organisation, and traceable to Dutch and international standards.
Liquids	: Standard calibration liquid: H <sub>2</sub> O For other liquids apply to factory.

### Model number identification

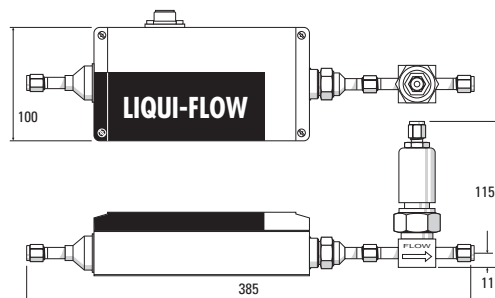


### Dimensions (in mm)

Liquid flow meter model L30.



Liquid flow controller model L30C2.



Technical specifications and dimensions subject to change without notice.

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