

# DATASHEET L13I-C2I

## LIQUI-FLOW™ 'Industrial Style' L13I+C2I

Digital Thermal Liquid Mass Flow Controller, Industrial Style



### Liquid Mass Flow Controllers for low flow rates, industrial style

Bronkhorst® model L13I+C2I Liquid Flow Controllers (LFCs) are suited for precise measurement and control of flow ranges between 0,25...5 g/h and 5...100 g/h at operating pressures up to 100 bar. The LFC consists of a thermal mass flow sensor and a microprocessor based pc-board with signal and fieldbus conversion and a PID controller for mass flow control by means of an integrated control valve. The "Industrial Style" LIQUI-FLOW™ model is of rugged design (IP65) for use in industrial environments.

LIQUI-FLOW™ series are equipped with a digital pc-board, offering high accuracy, excellent temperature stability and fast response. The main digital pc-board contains all of the general functions needed for measurement and control. In addition to the standard RS232 output the instruments also offer analog I/O. As an option, an on-board interface can be mounted to provide CANopen®, DeviceNet™, EtherCAT®, PROFIBUS DP, PROFINET, Modbus RTU, ASCII or TCP/IP, EtherNet/IP, POWERLINK or FLOW-BUS protocols.

### Technical specifications

#### Measurement / control system

Flow range (intermediate ranges available)	min. 0,25...5 g/h max. 5...100 g/h (based on H <sub>2</sub> O)
Accuracy (incl. linearity) (based on actual calibration)	± 1 % FS
Repeatability	< 0,2 % FS (typical H <sub>2</sub> O)
Turndown ratio	FS <50 g/h : 1:20 (5...100%); FS >50 g/h : 1:50 (2...100%)
Settling time (in control, typical)	< 2 sec.
Operating temperature	5 ... 50 °C
Temperature sensitivity	± 0,1% FS/°C
Max. Kv-value	2,37x10 <sup>-3</sup>
Max. fluid viscosity	0.1 Pa·s
Attitude sensitivity	negligible
Warm-up time	30 min. for optimum accuracy; 2 min for accuracy ± 2% FS

#### Mechanical parts

Material (wetted parts)	stainless steel 316L/320
-------------------------	--------------------------

## Mechanical parts

Pressure rating (PN)	100 bar abs
Max. ΔP	10 bar dif.
Process connections	compression type or face seal (VCR/VCO) couplings
Purge connection	1/8" OD compression type or 1/8" VCR
Seals	FFKM/Kalrez®; other on request
Ingress protection	IP65

## Electrical properties

Power supply	+15 ... 24 Vdc +/-10%			
Max. power consumption	Supply	at voltage I/O	at current I/O	extra for fieldbus
	15 V	285 mA	305 mA	<75 mA
	24 V	250 mA	270 mA	<50 mA
CANopen® / DeviceNet™	add 48 mA (24 V supply)			
Analog output	0...5 (10) Vdc or 0 (4)...20 mA (sourcing output)			
Digital communication	standard: RS232; options: CANopen®, DeviceNet™, EtherCAT®, PROFIBUS DP, PROFINET, Modbus RTU, ASCII or TCP/IP, EtherNet/IP, POWERLINK or FLOW-BUS			

## Electrical connection

Analog/RS232	8 DIN (male)
PROFIBUS DP	bus: 5-pin M12 (female); power: 8 DIN (male)
CANopen® / DeviceNet™	5-pin M12 (male)
FLOW-BUS/Modbus-RTU/ASCII	5-pin M12 (male)
Modbus TCP / EtherNet/IP / POWERLINK	bus: 2 x 5-pin M12 (female) (in/out); power: 8 DIN (male);

## Control valve options

## External actuator options to be connected to the controller

## Certification for hazardous areas

## Approvals / certificates

Technical specifications subject to change without notice.

For dimensional drawings and hook-up diagrams please visit the [product page](#) on our [website](#)

## Recommended accessories



**E-8000 SERIES**

### Digital Readout / Control Systems

Bright, wide angle, 1.8" display (TFT technology)  
User friendly operation, menu driven with 4 push buttons



**BRIGHT SERIES**

### Compact Local R/C Module

Bright, wide angle, 1.8" display  
User friendly operation  
Indication/operation/configuration



**PIPS SERIES**

### Plug-in Power Supply

For lab-style or industrial devices  
Interchangeable plugs (Euro, UK, USA, Australian, IEC) for mains connection

## Related products



**LIQUI-FLOW™ 'INDUSTRIAL STYLE' L13I**

Min. flow 0,25 ... 5 g/h  
Max. flow 5 ... 100 g/h  
Pressure rating 100 bar  
Compact, IP65 design  
Analog, RS232 or fieldbus I/O



**LIQUI-FLOW™ 'INDUSTRIAL STYLE' L23I+C2I**

Min. flow 2 ... 100 g/h  
Max. flow 2 ... 1000 g/h  
Pressure rating 100 bar  
IP65 protected  
Analog, RS232 or fieldbus I/O



**LIQUI-FLOW™ L13V12**

Min. flow 0,25 ... 5 g/h  
Max. flow 5 ... 100 g/h  
Pressure rating 100 bar  
Compact, IP40 design  
Analog, RS232 or fieldbus I/O