



INVUE™ CR288 CONCENTRATION MONITOR

Process monitoring for in-line liquid chemical applications

Overview

Entegris' InVue™ CR288 concentration monitor and 288-connect® software package deliver real-time information for point-of-use chemical/mixing blending, spiking and dilution without process intrusion or interruption. The PC-based graphical user interface and LCD display integrate data collection, analysis and field calibration along with convenient, scalable data interface and acquisition options. The optical system calculates real-time concentration and temperature-compensated data, all to improve productivity.

For safe integration into biological and pharmaceutical processes for in-line concentration monitoring, the Entegris CR288 is certified to USP Class VI standards.

Increase Productivity

Integrated in a compact, ultra-high purity package, the CR288 delivers cost-effective yet high performance concentration monitoring enabling greater process efficiency for BEOL, FEOL and sub-fab delivery chemical systems. This increased window of visibility equates to tight process control increasing wafer throughput, reducing chemical costs and decreasing scrap.

The CR288 allows users to:

- Precisely monitor and control chemical dilution and blending real-time
- Increase chemical bath lifetime, reducing chemical usage and disposal costs
- Monitor for chemical excursions
- Have access to real-time data for optimizing a process
- Replace alternative outdated or expensive monitoring technologies



Integration Flexibility

The CR288 utilizes an innovative refractive index technology packaged in a compact and flexible configuration. The measurement is based on the refraction of light in the process fluid, resulting in an accurate, safe and repeatable means of measuring liquid concentration. The in-line sensor accurately measures the index of refraction and the temperature of the process fluid. This information is transferred to the remote digital display unit (DDU) via an interconnecting cable. The DDU uses this information along with user-defined characteristics to calculate the process fluid's concentration. The DDU displays the index of refraction, temperature, and concentration on a liquid crystal display (LCD) screen. It also outputs 4 to 20 mA and RS-232 signals that can be used as inputs to process controllers. A system can be ordered with one to four flow cell sensors. Flow cells are available with Flaretek®, PrimeLock® and Pillar® connections. Custom mounting configurations are also available upon request.

Features and Benefits

Features	Benefits
Miniaturized sensor	Agile packaging for analysis systems, enabling customization and design flexibility
Measurement based on Index of Refraction (IoR)	Superior accuracy and response times
	Large dynamic range
	Achieves accuracy more rapidly than alternate technologies
	Measures concentration accurately and repeatedly even with non-conductive fluids
Small footprint installed directly in line with the process chemicals	Method is non-invasive; in line means no interruption of process and no delay in measurement Easily integrated into new tools or existing tools
288-connect software, Digital Display Unit (DDU)	GUI and software simplify programming and use Software enable on-site calibration in minutes, reducing cost of ownership
Sensor has no consumable parts	Fewer replacement parts means minimal hardware maintenance

Specifications

Sensor materials of construction:	Flow cell	Teflon® (modified PTFE)*
	Optical window	Semiconductor-grade Sapphire*
	Cable	Polypropylene (PP)
	Bonnet	Polypropylene (PP)
Sensor operating parameters:	Fluid pressure rating	0 – 5.5 bar (0 – 80 psig)
	Fluid temperature rating	5°C-50°C (41°F - 122°F)
	Process fluid index of refraction range	1.28000 to 1.40000**
DDU operating parameters:	Power requirements	24V (DC) ±5%, 0.5A minimum
	Included power supply input requirements	110/240 VAC, 50/60 ±3 Hz
	Serial port	RS-232
	Analog output	4–20 mA for temperature and concentration; up to four sensors per DDU
	Electrical connector	IP67-compliant, 12-pole, 1 A, panel-mount type
	Ambient operating environment	Room temperature – 25°C ±5°C (77°F ±9°F)
Machine interface:	4–20 mA RS-232	Analog, scalable resolution
		Digital over serial***
Software:	Windows®-based interface for user setup, calibration, monitoring and data logging of up to four sensors. System requirements: Windows 98 or higher, 128+MB RAM, CD-ROM.	

*Wetted components

**For fluids with an RI above 1.40000, please consult your local Entegris support person.

***Full digital protocol available to replicate service software 288-connect

Performance Data

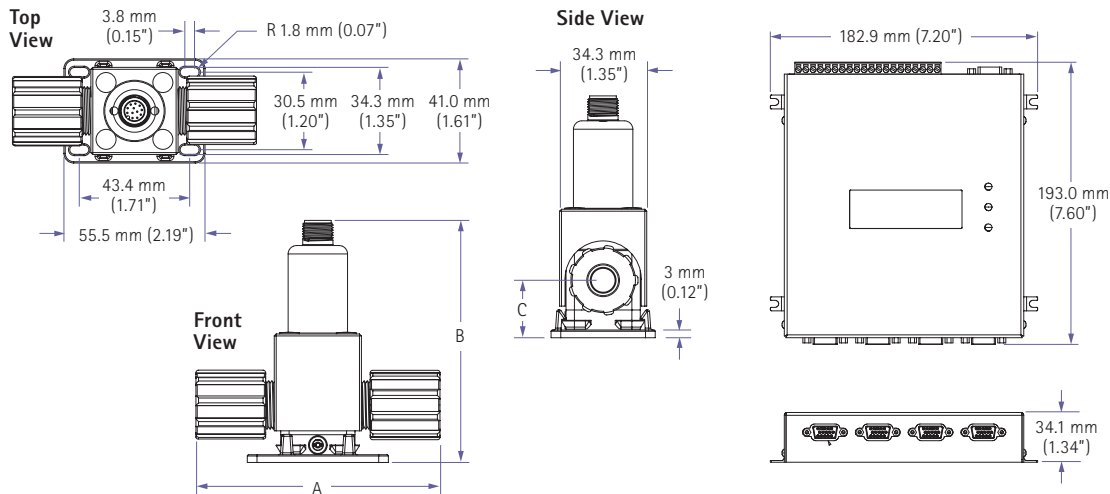
The following performance data is based on operation within the calibrated range, $\pm 0.3\%$ of the refractive index calibration point or $\pm 0.3\%$ of concentration.*

Criteria	Value
Refractive index accuracy (Refractive Index Units, RIU):	$\pm 2 \times 10^{-4}$
Refractive index repeatability:	2.5×10^{-5}
Refractive index resolution:	1.0×10^{-5}
Concentration accuracy:	$\pm 0.2 \text{ wt}\%^{**}$
Concentration repeatability:	$\pm 0.025 \text{ wt}\%$
Concentration resolution:	Chemical dependent 0.01 wt% or better
Response time:	1.2 sec standard, no rolling averaging enabled, rolling averaging is user-configurable

*The fluid temperature compensation coefficient (TCC) is shipped factory set using room temperature DI water.

**Based on measuring ethylene glycol at 0.345 bar (5 psig) with a maximum variation of 0.017 bar ($\pm 0.25 \text{ psig}$) and a temperature of $20^\circ\text{C} \pm 0.1^\circ\text{C}$ ($68^\circ\text{F} \pm 0.18^\circ\text{F}$).

Dimensions

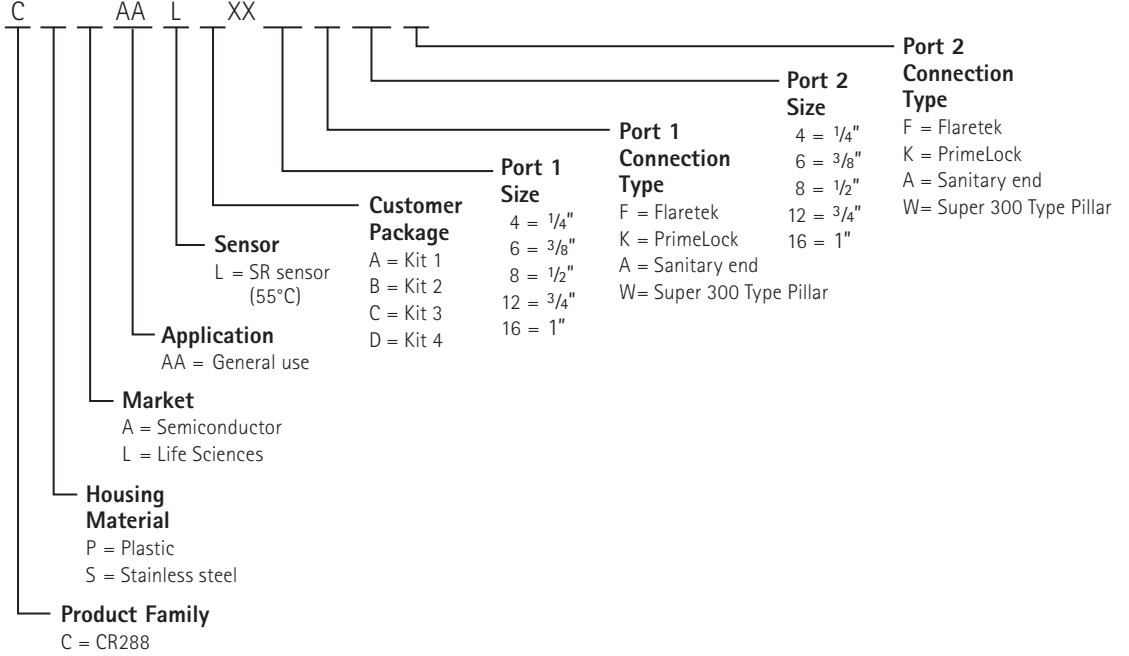


Port Connection	Dimensions		
	A	B	C
1/4" Flaretek	86.4 mm (3.40")	86.1 mm (3.39")	18.0 mm (0.71")
1/4" Super 300 Type Pillar	67.3 mm (2.65")	86.1 mm (3.39")	18.0 mm (0.71")
1/4" PrimeLock	78.0 mm (3.07")	86.1 mm (3.39")	18.0 mm (0.71")
3/8" Flaretek	91.9 mm (3.62")	91.2 mm (3.59")	20.6 mm (0.81")
3/8" Super 300 Type Pillar	79.2 mm (3.12")	91.2 mm (3.59")	20.6 mm (0.81")
3/8" PrimeLock	94.2 mm (3.71")	91.2 mm (3.59")	20.6 mm (0.81")
1/2" Flaretek	96.0 mm (3.78")	95.3 mm (3.75")	22.6 mm (0.89")
1/2" Super 300 Type Pillar	85.1 mm (3.35")	95.3 mm (3.75")	22.6 mm (0.89")
1/2" PrimeLock	101.9 mm (4.01")	95.3 mm (3.75")	22.6 mm (0.89")
3/4" Flaretek	110.0 mm (4.33")	99.8 mm (3.93")	24.9 mm (0.98")
3/4" Super 300 Type Pillar	113.8 mm (4.48")	99.8 mm (3.93")	24.9 mm (0.98")
3/4" PrimeLock	116.6 mm (4.59")	103.1 mm (4.06")	28.2 mm (1.11")

Ordering Information

InVue CR288 Concentration Monitor

Part Number



For More Information

Please call your Regional Customer Service Center today to learn what Entegris can do for you. Visit www.entegris.com and select the Customer Service link for the center nearest you.

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