InVue® CR288 Concentration Monitor

Process monitoring for in-line liquid chemical applications

The InVue® CR288 concentration monitor with 288-connect® software package delivers 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 InVue CR288 concentration monitor is certified to USP Class VI standards.

Increase Productivity

Integrated in a compact, ultra-high purity package, the CR288 monitor 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 throughout, reducing chemical costs, and decreasing scrap.

The CR288 monitor allows users to:

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- Replace alternative outdated or expensive monitoring technologies

Integration Flexibility

The CR288 concentration monitor uses 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® connections. PrimeLock® and Super 300 Type Pillar® end connections are available upon special request.

FEATURES AND 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 nonconductive fluids
Small footprint installed directly in line with the process chemicals	Method is noninvasive; in line means no interruption of process and no delay in measurement Easily integrated into new tools or existing tools
288-connect software, 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	PTFE*
	Optical window	Semiconductor-grade sapphire*
	Cable and bonnet	Polypropylene (PP)
Sensor operating parameters:	Fluid pressure rating	0–5.5 bar (0–80 psig)
	Fluid temperature rating	5°–50°C (41°–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

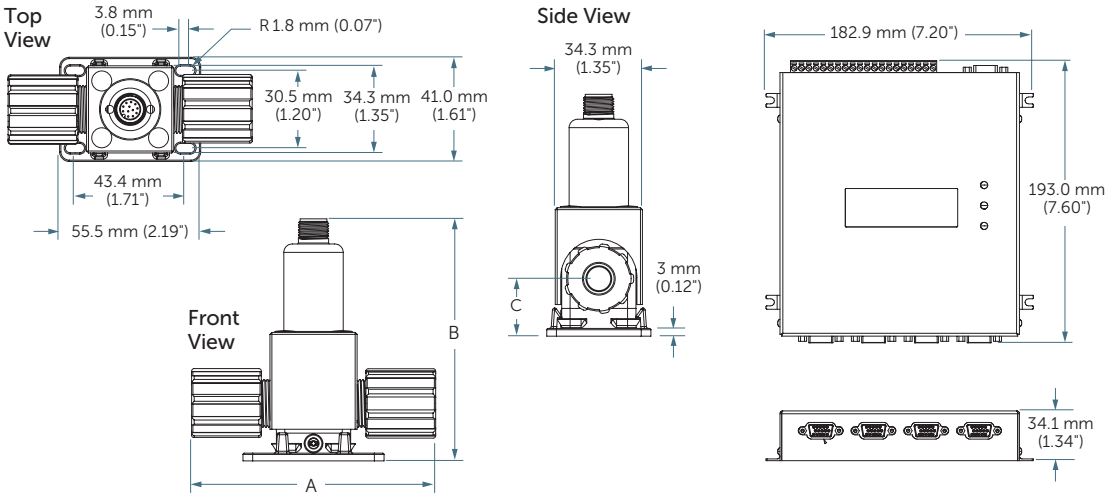
The following performance data is based on operation within the calibrated range, ±0.3% of the refractive index calibration point or ±0.3% of concentration.*

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:	±0.2 wt%**
Concentration repeatability:	±0.025 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 (±0.25 psig) and a temperature of 20°C ±0.1°C (68°F ±0.18°F).*

DIMENSIONS

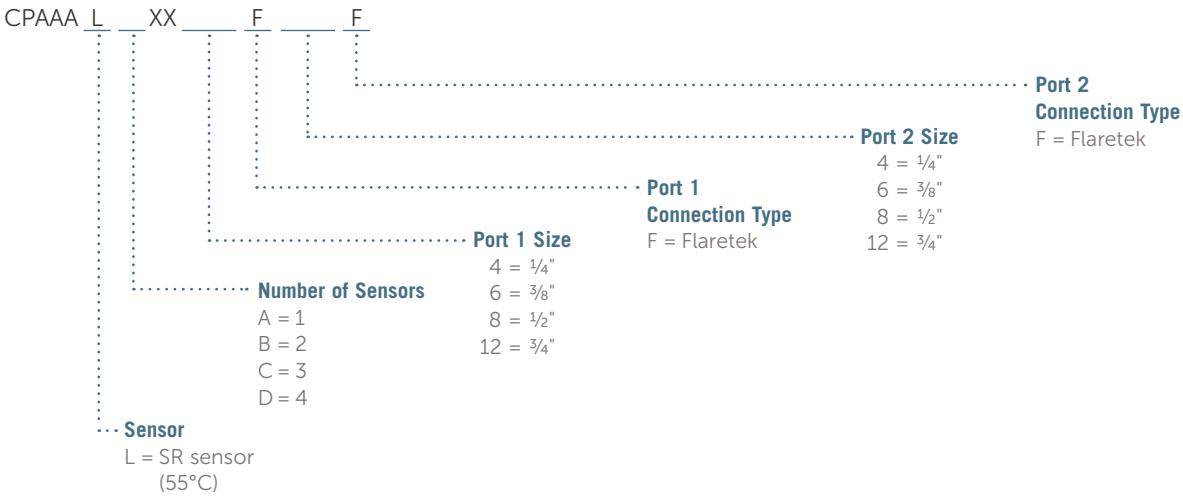


Port Connection	A	B	C
¼" Flaretek	86.4 mm (3.40")	86.1 mm (3.39")	18.0 mm (0.71")
⅜" Flaretek	91.9 mm (3.62")	91.2 mm (3.59")	20.6 mm (0.81")
½" Flaretek	96.0 mm (3.78")	95.3 mm (3.75")	22.6 mm (0.89")
¾" Flaretek	110.0 mm (4.33")	99.8 mm (3.93")	24.9 mm (0.98")

ORDERING INFORMATION

InVue CR288 Concentration Monitor: part number

CPAAA L XX F F



Note: For configurations not listed, please contact Entegris.

FOR MORE INFORMATION

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

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