

# Controlled Delivery Module

## Pulseless. Accurate. Precise.

### Unmatched precision and control for critical fluid delivery applications

- ▶ Fully integrated module: pump, valve, and flow sensor with controller
- ▶ Typical flow precision of 0.1% or better CV\*\*
- ▶ Flow rates range from 50 nL to 5 mL/min
- ▶ Available for low- to high-pressure applications up to 354 bar
- ▶ Configurable, space-saving design
- ▶ Automated operation
- ▶ Fluidic engineering available

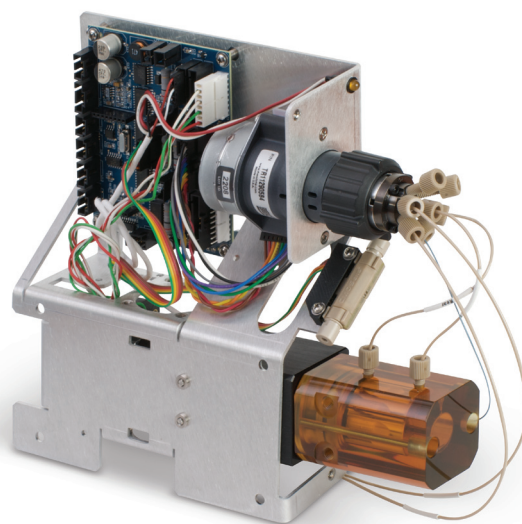
### Customized Fluid Delivery for OEMs

The Controlled Delivery Module (CDM) is a miniature, low power pumping system that provides precise flow control through feedback from an integrated flow sensor. The module also contains a flow control valve to automate filling, rinsing, and dispensing functions within an instrument. Each module is operated through a shared communication bus protocol, enabling multiple modules to be operated simultaneously from a single controller.

A flow validation study conducted by IDEX Health & Science proved an existing need for CDM technology, verifying significant variation in flow rate precision systemic among mechanically driven pumps commonly installed in scientific instruments. The study found that the design of precise pump technology requires compensation for system compression, errors in the pump mechanism, and temperature effects on the system fluid paths.

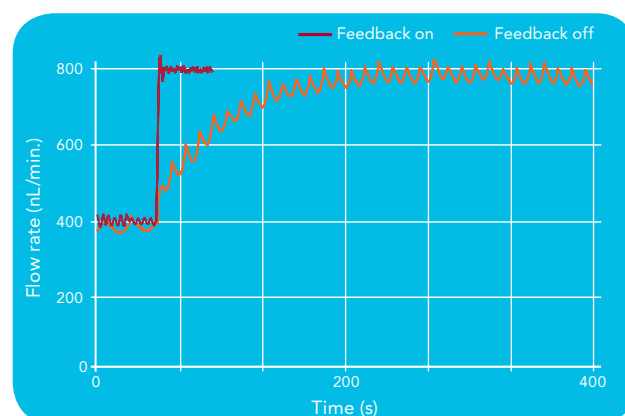
### Constant Flow Feedback

The flow sensor integrated into the CDM provides feedback to the pump. Using this flow feedback, the pump dynamically adjusts flow output to a user defined set point ten times per second. This continuous flow monitoring allows for very consistent flow, even under conditions of changing pressure produced by downstream devices, trapped gases, system compression, or variations in the pump mechanism. The result is higher precision fluid handling that creates more accurate data and higher customer confidence in the analysis.



### Component Modularity

The CDM can be reconfigured to fit an OEM's existing instrument fluid path. IDEX Health & Science can also co-engineer the entire fluid path of a future generation instrument from schematic to assembly, expanding an OEM's engineering capacity and speeding instrument development. With more than 100 fluidic engineers, IDEX Health & Science is fully equipped to be the single development or manufacturing resource for fluidic system integration.



The CDM's ability to integrate "Flow Feedback" dramatically improves stability, precision and rise time during flow rate changes.

## CDM Module Specifications

The CDM is designed to meet the following specifications:

Note: Custom configurations available. Please see your IDEX Health & Science Sales Representative.

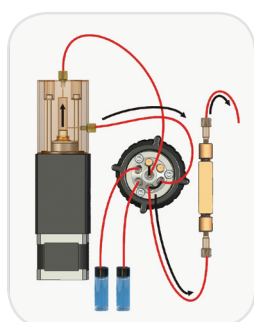
### General Specifications

Specification	Description	Details	Units
Pump head options	100 µL	Titanium	N/A
	250 µL	Titanium	N/A
	1125 µL	Ultem®	N/A
	5000 µL	Ultem	N/A
Flow feedback range*	Forward and reverse flows	-50,000 to +50,000	nL/min
Feedback flow rate precision	Percent of set point	0.1% or better**	RSD
Flow rate accuracy	Flow sensor calibration dependent	Less than or equal to 3%	percent
Open loop flow range*	Forward flows	Up To 150	mL/min
Open loop flow rate precision	Percent of set point	2%	RSD
Open loop flow rate accuracy	No feedback control	Less than or equal to 5%	percent
Pressure range	Dependent on components selected	0-345	bar
Wetted materials options	PEEK™, stainless steel, zirconia, fused-silica, Perlast®, and UHMWPE, Viton®, EPDM, etc.	Acetonitrile, water, methanol, ethanol, propanol, TFA, acetic acid, formic acid, etc.	N/A
Automated control	RS-232/other options	yes	N/A
Pressure feedback	Offered on 100 µL and 250 µL pump head options	0-345 (0-5000)	bar (psi)
Pump encoder feedback	Optional	-	N/A
Pump seal wash	Optional	-	N/A
Size	D x W x H, (depends on OEM configuration)	25.4 x 5.72 x 20.3	cm
Weight	Dependent on OEM design	1.42	kg
Power	Peak power	24VDC, 2A	N/A

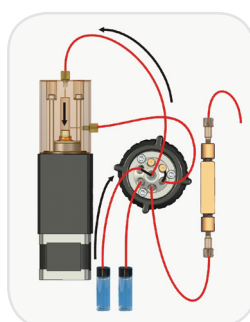
\* Flow rate ranges are dependent on application and system configuration.

\*\*Dependent upon application configuration

## CDM Operational Modes



Valve rotated to dispense through the flow sensor into your system



Valve rotated to withdraw the fluid into the pump

PEEK® polymer is a trademark of Victrex plc.  
 Perlast® is a registered trademark of Precision Polymer Engineering, Inc.  
 Ultem® is a registered trademark of General Electric Corporation.  
 Viton® is a registered trademark of E.I. du Pont de Nemours and Company.  
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