

# Cadent™ Series Syringe Pumps



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## Engineering GREAT solutions through people, products, innovation and service

IMI Precision Engineering is a world-leader in fluid and motion control. Building close, collaborative relationships with our customers, we gain a deep understanding of their engineering needs and then mobilise our resources and expertise to deliver distinctive products and solutions.

Wherever precision, speed and engineering reliability are essential, our global footprint, problem-solving capability and portfolio of high performance products enables us to deliver GREAT solutions which help customers tackle the world's most demanding engineering challenges.

### > Reliability

We deliver and support our high quality products through our global service network.

### > High performance products

Calling on a world-class portfolio of fluid and motion control products including IMI Norgren, IMI Buschjost, IMI FAS, IMI Herion and IMI Maxseal. We can supply these singly, or combined in powerful customised solutions to improve performance and productivity.

### > Partnership & Problem Solving

We get closer to our customers to understand their exact challenges.

# Introducing the Cadent™ Series Syringe Pumps

Accurate fluid control is critical in the life science industry and the Cadent series of syringe pumps lets you easily manage your application's dispensing and flow requirements. Whether dealing with particle characterization, cell and gene-based diagnostics or therapies, the Cadent series of pumps accurately dispense and control flow for optimized fluidics. The Cadent series aligns with your customers' expectations for long instrument life and maintenance-free pumps for an excellent customer experience.

When you need accuracy, Cadent syringe pumps are a great solution to incorporate into your life science applications. They use space saving designs and provide options for dispensing, flow rates, and power so you can select the best option for your application.



	<b>Cadent 3</b> 3cm Syringe Pump	<b>Cadent 6</b> 6cm Syringe Pump	<b>Cadent 6M</b> 6cm Multi-Channel Syringe Pump 8-channel
<b>Dimensions</b>	5" H (127mm) 4.89" D (124.21mm) 1.75" W (44.45mm) 2.3lbs (1.04kg)	10" H (254mm) 5.85" D (148.6mm) 2.55" W (64.77mm) 5.14lbs (2.33kg)	11.64" H (295.7mm) 6.05" D (153.7mm) 6.5" W (165.1mm) 5.25lbs (2.38kg)
<b>Plunger Lift Force</b>	6K - 20lbf 12K, 24K - 28lbf	12K - 120lbf 24K, 48K - 140lbf	140lbf
<b>Accuracy - Full Stroke</b>	±0.2%	±0.2%	±0.2%
<b>Accuracy - 1/10th Stroke</b>	±0.3%	±0.3%	±0.3%
<b>Precision - Full Stroke</b>	0.05%	0.05%	0.05%
<b>Precision - 1/10th Stroke</b>	0.5%	0.5%	0.5%

## Endless Application Possibilities

- > Autosamplers for Atomic Absorption
- > Calorimetry
- > Continuous Flow and Discrete Analyzers
- > Field Flow Fractionation
- > High Content Analysis/Cell Imaging
- > In Vitro Diagnostics
- > NMR Prep
- > Nucleic Acid Amplification (PCR)
- > Particle Counting
- > Upstream and Downstream Bioprocessing
- > Many, Many More!



## Cadent™ 3 – Outstanding Fluidic Performance

The Cadent 3 syringe pump provides the reliability and control you need to have confidence in precise and accurate analysis:

- > Impressive low-flow stability down to 1µL/min with a 1mL syringe (tested with DI water)
- > Flow accuracy of  $\pm 1\%$ \*
- > Adjustable flow rate range: 0.008µL/min to 500mL/min (based on syringe size, speed, and resolution)
- > Full syringe dispense time: 1 aspiration provides up to 4.44 days of continuous flow during the low flow dispense which gives you advanced dispense capabilities
- > Extended speed range: 0.0625 steps/sec to 10,000 steps/sec
- > Sustained performance on precision and accuracy over pump lifetime of 5 million cycles

\*Based on a 650Hz sample rate using a 2.5mL syringe at 250µL/min



### Unique Low Flow Stability

With advanced microstepping capabilities at low speeds, customers can achieve low and slow flow rates. The Cadent 3 offers mechanical resolutions up to 24,000 for smooth flow rates to deliver great performance in:

- > Complex imaging instruments: urinalysis and hematology
- > Laser applications: flow cytometry and particle counting
- > Additional low-flow needs for increased surface-area-to-volume sample delivery

Cadent 3  
Level 2:  
Robust Syringe Drive With Valve†



Cadent 3  
Level 1:  
Robust Syringe Drive










# Cadent™ 3 – Flexible Configurations

The Cadent 3 is designed to be easily incorporated into your instrument design and our Level 3 device offers full electronics to enable easy programming. Some customers however, may prefer to design their own electronics:

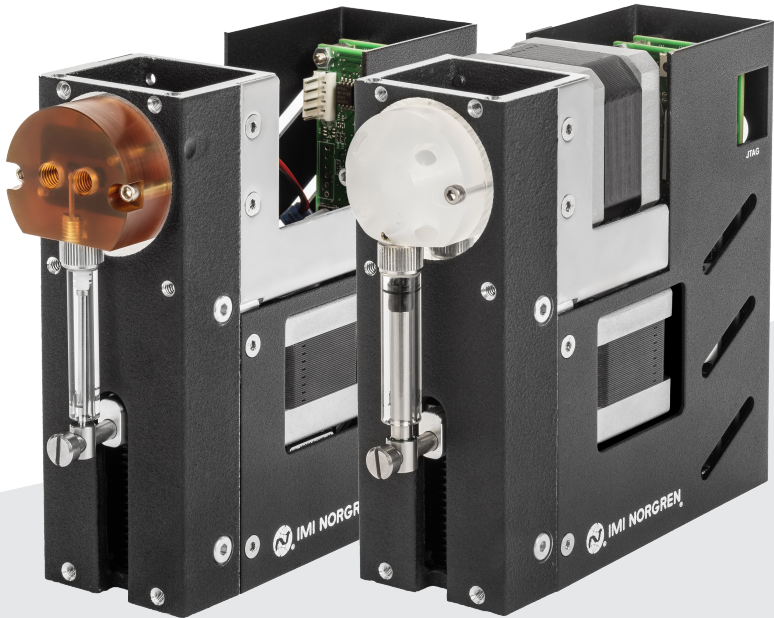
- > The Level 1 configuration delivers the robust syringe and valve driver while allowing the customer to use our valve or to leverage their own design along with their own electronics
- > The Level 2 configuration offers the robust syringe and valve driver with a valve for the customer who wants to leverage their own electronics design
- > The Level 3 configuration offers all of the above as well as electronics for system integration.
- > In all cases, the 3cm long life syringes are sold separately
- > Our pump design including our ball screw pitch and motor angle provide high mechanical resolutions for exacting fluid control



The Cadent 3 pump's small size fits easily in laboratory analytical and point of care instruments.

Configurations		Resolutions
Level 1: Robust Syringe and Valve Drive*		6K, 12K, 24K
Level 2: Robust Syringe + Valve Drive with Valve**		
Level 3: Robust Syringe-And-Valve Drive with Valve and Electronics		

\* Valve and electronics not included  
\*\*Electronics not included



Cadent 3  
Level 3:  
Robust Syringe-And-Valve Drive with Valve and Electronics†




† Syringe sold separately



Level 3:  
Cadent 6  
Single-Channel Pump

# The Next Generation Of Fluid Control – Cadent™ 6

- The Cadent 6 syringe pump offers industry-leading specifications and performance in:
- > Volume ranges with syringe sizes ranging from 10µL to 50mL and flow rates from 0.78nL/min to 2.5L/min
  - > Full syringe dispense time from 1 aspiration provides up to 8.9 full days of continuous flow
  - > Accuracy at ± 0.2% at full stroke and ± 0.3% at 1/10th stroke
  - > 60mm stroke driven via stepper motor and precision ball screw for excellent mechanical resolution which helps ensure accuracy
  - > Long lifetime – over 5.7 million full-stroke cycles
  - > Strong plunger lift force: 120lbs force with the 12K resolution pump and 140lbs force with the 24 and 48K resolution pumps – ideal for high backpressure or high viscosity liquid applications
  - > Powerful valve torque: 120in-oz – Ideal for overcoming particulate content or high viscosity fluids
  - > In all cases, the 6cm long life syringes are sold separately

Configurations		Resolutions
Level 1: Robust Syringe Drive*		12K, 24K, 48K
Level 3: Robust Syringe Drive + Advanced Controller**		12K, 24K, 48K
Multi-Channel Robust Syringe Drive + Solenoid Valves + Advanced Controller†		24K, 48K

\* Syringe, valve and electronics not included

\*\*Syringe and valve not included

† Syringe not included



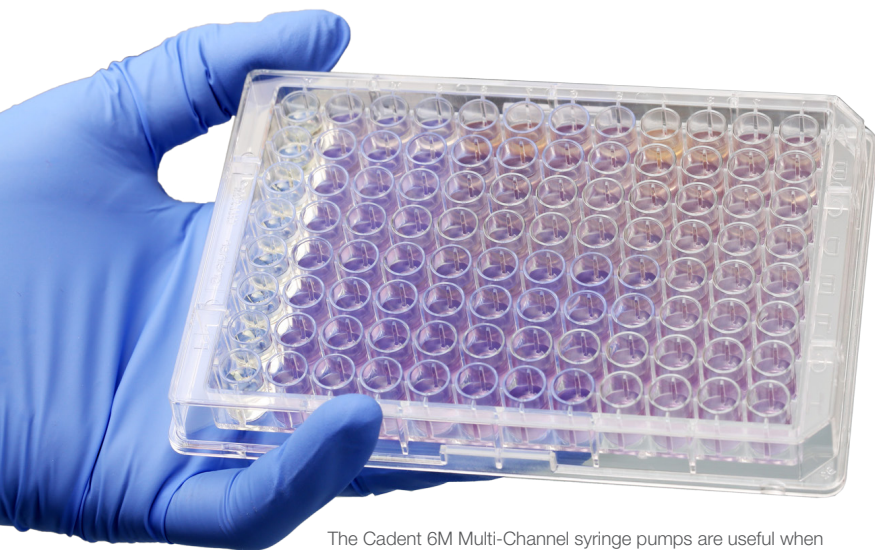
The Cadent 6 syringe pump offers a wide flow range to address analytical, diagnostic, and bioprocessing needs.



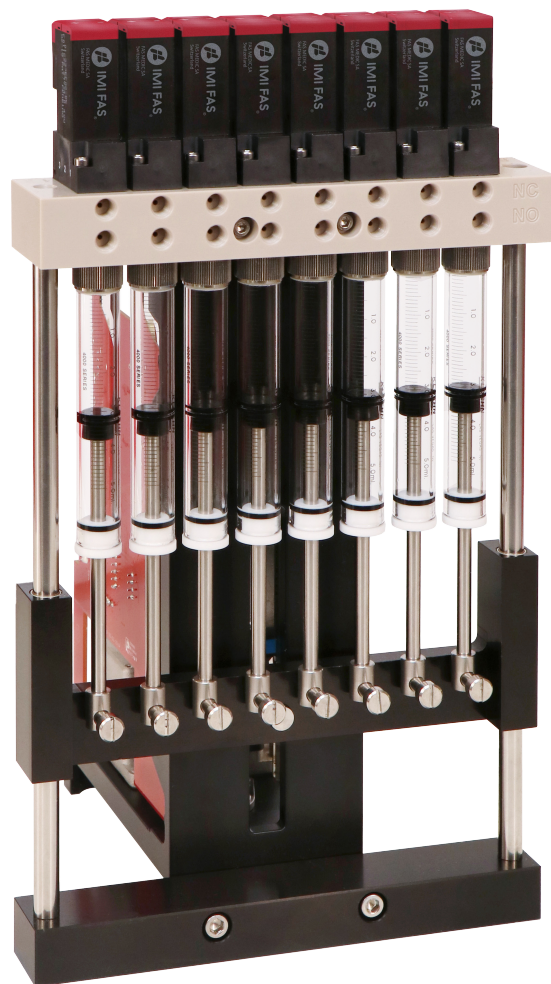
## Multiple Channels, Multiple Solutions – Cadent™ 6M

The Cadent 6M Multi-Channel syringe pump offers compact, precision liquid handling for multi-probe requirements including sample transfers, dilutions, mixing, reagent additions, and plate reformatting.

- > Long-life product uses a 60mm stroke driven by a stepper motor and precision ball screw
- > Available in two mechanical resolutions: 24K, 48K
- > 3/2 solenoid valve available with EPDM or FFKM wetted materials
- > Compatible syringes available 250µL to 5mL
- > Flexible to meet a variety of system configurations
- > Suitable for use in analytical, biotechnology, medical device and diagnostic applications



The Cadent 6M Multi-Channel syringe pumps are useful when performing high density assays, serial dilutions, or intensive liquid dispensing.



Cadent 6M  
Multi-Channel Pump





## A Broad Array Of Kloehn Syringes

At IMI Norgren, we have a long history of making precision syringes and have perfected the entire manufacturing process to guarantee the right materials and treatments are used to ensure strength and smooth finishes which result in exceptional syringe performance including long life cycles.

Our syringes are made with Borosilicate glass and come in a wide range of volumes and with options for wetted materials like PTFE and UHMW. Syringes are normally lubricated but can be purchased without lubrication if needed.

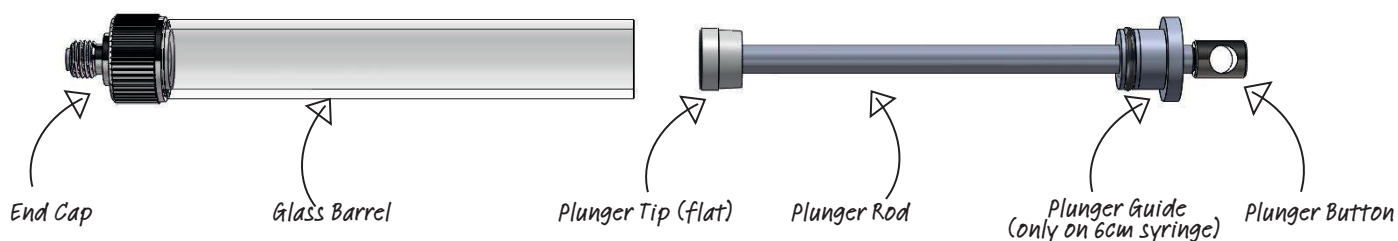
For increased safety when using Kloehn syringes in high pressure environments, the syringes can be supplied with a shrink-wrapped glass barrel.



	Length	Syringe Sizes
<b>Cadent 3</b>	3cm	50 $\mu$ L, 100 $\mu$ L, 250 $\mu$ L, 500 $\mu$ L, 1.0mL, 2.5mL, 5.0mL
<b>Cadent 6</b>	6cm	10 $\mu$ L**, 25 $\mu$ L**, 50 $\mu$ L, 100 $\mu$ L, 250 $\mu$ L, 500 $\mu$ L, 1.0mL, 1.25mL, 2.5mL, 5.0mL, 10mL, 25mL, 50mL
<b>Cadent 6M</b>	6cm	250 $\mu$ L, 500 $\mu$ L, 1.0mL, 1.25mL, 2.5mL, 5.0mL

\* Tested with DI water using IMI standard protocol

\*\* Stainless steel in wetted path



## Zero Dead Volume Plunger Tips

Kloehn Syringes are available with an enhanced Zero Dead Volume (ZDV) plunger tip. These tips have a pointed end and extend into the end cap, providing a fully-swept wetted path, minimizing the presence of residual fluids to address cross-contamination or carryover into subsequent operations.

Both flat and ZDV plunger tips can be supplied in either PTFE, a chemically-inert material offering high durability, or UHMW-PE, offering high impact strength and suitable for use with fluids containing particulate.







## Valves For Any Application

Our rotary and solenoid valves are perfect for optimizing your system fluid paths. The valves leverage wetted materials that have been chosen due to their performance.

- > Designed for long life and to be inert to most chemicals
- > PTFE, Kel-F, ceramic, or PEEK construction
- > Available from 1 to 12 ports
  - > 3/2 solenoid valve option also available for Cadent™ 3 and standard for Cadent 6 Multi-Channel
- > Flow configurations in distribution and non-distribution configurations
- > Rotary valves rated to 100psig (6.89barg)



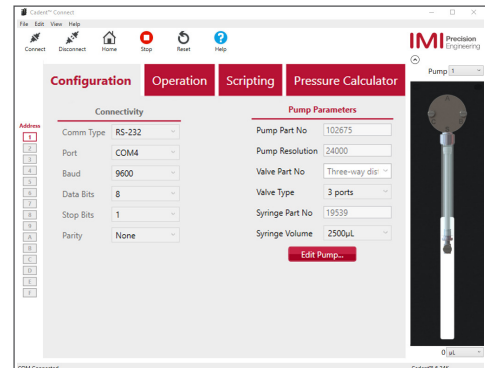
## Cadent Connect



## Advanced Controls

As fluidic pioneers, we've taken the Cadent design to the next level with superior technology that allows for faster bench testing, smarter serviceability, and easier integration.

- > Internal diagnostics and error feedback
- > Colored LED provides visual status feedback
- > Built-in event and error logs
- > Multiple interface options (GPIO, RS-232, RS-485, CAN)
- > Flexible and powerful command set
- > Home button for easy installation



Cadent Connect is our GUI for controlling your Cadent series syringe pump:

- > Works with Cadent 3, Cadent 6, and Cadent 6M
- > Provides quick access for several simple pump actions
- > Build, save, and load your own custom application scripts and send them directly to the pump for easy development
- > Visit [www.imi-precision.com/cadentconnect](http://www.imi-precision.com/cadentconnect) to download and install the program

IMI Precision Engineering operates four global centers of technical excellence and a sales and service network in 50 countries, as well as manufacturing capability in the USA, Germany, China, UK, Switzerland, Czech Republic, Mexico and Brazil.

The Cadent series of pumps, valves, and syringes are built in a best-in-class factory using Lean enterprise which means that you are selecting a dependable supplier who will be in your corner now and in the future.

For more information on the Cadent series of pumps, valves, and syringes:

visit **[www.norgren.com/lifescience](http://www.norgren.com/lifescience)**

call **(702) 243-7727**

email **[IMIKloehncustomersupport@imi-precision.com](mailto:IMIKloehncustomersupport@imi-precision.com)**



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