

Алматы (7273)495-231
Ангарск (3955)60-70-56
Архангельск (8182)63-90-72
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Благовещенск (4162)22-76-07
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Владикавказ (8672)28-90-48
Владимир (4922)49-43-18
Волгоград (844)278-03-48
Вологда (8172)26-41-59
Воронеж (473)204-51-73
Екатеринбург (343)384-55-89

Иваново (4932)77-34-06
Ижевск (3412)26-03-58
Иркутск (395)279-98-46
Казань (843)206-01-48
Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Коломна (4966)23-41-49
Кострома (4942)77-07-48
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курск (4712)77-13-04
Курган (3522)50-90-47
Липецк (4742)52-20-81

Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Ноябрьск (3496)41-32-12
Новосибирск (383)227-86-73
Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Петрозаводск (8142)55-98-37
Псков (8112)59-10-37

Пермь (342)205-81-47
Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Саранск (8342)22-96-24
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35
Сыктывкар (8212)25-95-17
Тамбов (4752)50-40-97

Тверь (4822)63-31-35
Тольятти (8482)63-91-07
Томск (3822)98-41-53
Тула (4872)33-79-87
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Улан-Удэ (3012)59-97-51
Уфа (347)229-48-12
Хабаровск (4212)92-98-04
Чебоксары (8352)28-53-07
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Чита (3022)38-34-83
Якутск (4112)23-90-97
Ярославль (4852)69-52-93

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Технические характеристики на стеклянные прецизионные шприцы, шприцевые и встроенные насосы, поворотные клапаны KloeHN компании **IMI NORGREN**

IP 4000 Series Inline Pump

- > Positive displacement design with a transparent manifold housing for micro fluid dispensing
- > High accuracy
- > High precision
- > High chemical compatibility
- > Seal wash option
- > For precise dispensing application in analytical chemistry & diagnostics



Technical features

Physical

Height: 25.4 mm
Width: 41.9 mm
Length: 135.9 mm
Weight: Up to 0.6 kg

Mechanical

Operation:
 Any orientation
 (Vertical preferred)
Mounting configuration:
 See Figure 1
Motor:
 1.8 Degree Full Step
 Two resolutions available
 (200 and 400 full steps)
Pressure:
 6.8 bar (100 psig)
Full volume dispense:
 50 µL to 5 mL
 (Customised volumes available on request)
Linear dispense:
 Accuracy: <0.5% CV at full dispense
Linear dispense:
 Precision: <1% CV at 2% dispense
Life cycle:
 High reliability
 (≥5 million cycles)

Environmental

Operating temperature:
 0... 45°C (32°F to 131°F)
Operating humidity:
 5 to 95% RH, non-condensing at 55°C (131°F)
Storage temperature:
 -25...55°C (13°F to 131°F)
 RoHS 3.0 Compliant

Electrical Interface:

Motor wiring diagram:
 See Figure 2
Optical sensor:
 Series: OPB880 (Standard)
Sensor wiring diagram:
 See Figure 3
 (Sensor model can be customised on request)
 NEMA 17 Bipolar Stepper Motor (4 lead) (Standard)
 (Unipolar motor available on request)

Chemical:

Wetted materials:
 Acrylic, 316 Stainless steel, Z80 (Polyethylene), EPDM
 (Above are wetted materials for our standard variant. Materials may change for customised variants)

Ancillary Items:

Operation manual

Note: One Mounting bracket will be supplied with standard IP 4000 series.
 Suggested hardware for thru hole mounting:
 Screw M3

Option selector

IP 4000 ★★ ★★ ★★ ★★ ★★

Volume selector	Substitute
100 µl	1
500 µl	2
1000 µl	3
50 µl	4
250 µl	5
2500 µl	6
5000 µl	7
Special/Customised	S*
Seal wash (optional)	Substitute
No	0
Yes	1
Plunger & seal material	Substitute
SS 316 L with EPDM Seals	1
PEEK with EPDM Seals	2
Ceramic with EPDM Seals	3
SS 316 L with FKM Seals	4
PEEK with FKM Seals	5
Ceramic with FKM Seals	6

Head material & port size	Substitute
Acrylic with 1/4-28 UNF-2B	1
Acrylic with M6	2
PTFE with 1/4-28 UNF-2B	3
PTFE with M6	4
PEEK with 1/4-28 UNF-2B	5
PEEK with M6	6
Encoder with stepper motor	Substitute
No	0
Yes	1
Stepper motor resolution	Substitute
200 full steps - Bipolar	1
400 full steps - Bipolar	2
200 full steps - Unipolar	3
400 full steps - Unipolar	4

*For customised volume, mention volume in µl at the end of part number.
Ex - For 60 µl, IP4000S11101/60

Dimensions

Dimensions in mm
Projection/First angle



Mounting Details

Shown without valve and encoder option

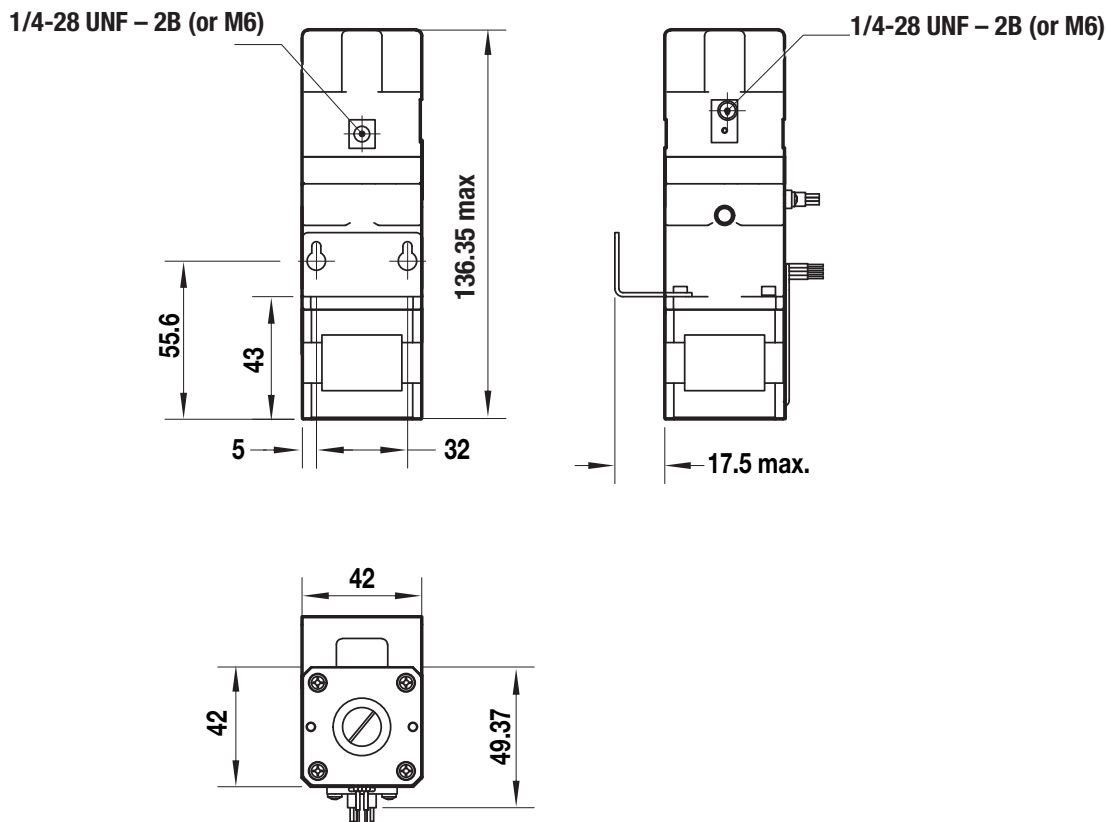


Figure 1

Dimensions

Dimensions in mm
Projection/First angle



Motor Wiring Diagram

Exciting Sequence vs. Direction of Rotation

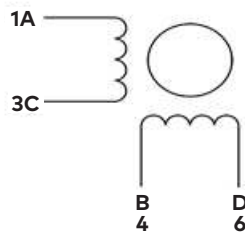


Figure 2

PIN No. Colour		Clockwise view from mounting side				
1	BLK	Step	A	B	C	D
1	BLK	1	+	+	-	-
3	GRN	2	-	+	+	-
4	RED	3	-	-	+	+
6	BLU	4	+	-	-	+

Sensor Wiring Diagram

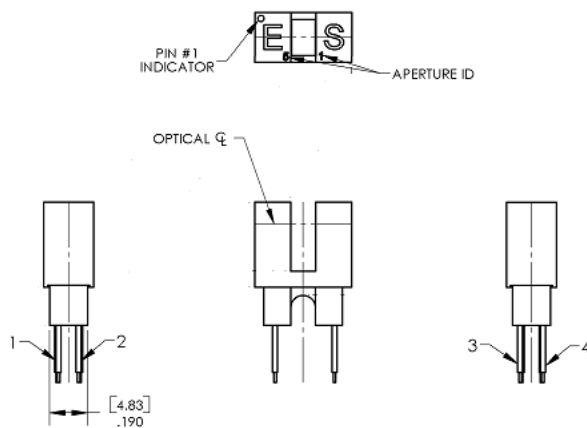


Figure 3

Pin #	Emitter	Pin #	Transistor/Diode
1	Anode	3	Collector/Anode
2	Cathode	4	Emitter/Cathode

Warning

These products are intended for use in industrial DI water and fluid systems only. Do not use these products where pressures and temperatures can exceed those listed under

»Technical features/data«

Before using these products with fluids other than those specified, for non-industrial applications, life-support systems, or other applications not within published specifications, consult Norgren, IMI Norgren Herion Pvt. Ltd.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes. The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure. System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.

System designers and end users are cautioned to review specific warnings found in instruction sheets packed and shipped with these products.

3cm Rotary Valves

- > Designed for use with Cadent™ 3 syringe pumps and Kloehn 3cm syringes
- > Bi-directional flow valves; not intended for use as shut-off or relief valves
- > Rated to 100psig (6.89barg)
- > Suitable for use in analytical, biotechnology and diagnostics instruments
- > Available in plug style with PTFE or in face style with PPS/XP-113 or Ceramic
- > Highly inert to most chemistries and designed for long life
- > Available in distribution and non-distribution configurations



Technical Features

Diameter:

1.40" (3.56cm)

Length:

1.78"

1.91" (8-way)

2.30" (12-way)

Mass:

1.05 oz (30g)

Life Cycle⁽¹⁾ (Minimum):

100,000 [Plug]

100,000 [Plastic Face Seal]

500,000 [Ceramic Face Seal]

⁽¹⁾ Tested with DI water using Norgren standard protocol

⁽²⁾ Vacuum pressure -25inHg maximum at 2750ft

Environmental Operating
Temperature:

10°C to 40°C (50°F to 104°F)

Operating Humidity:

5% to 95% relative humidity, non-condensing at 40°C (104°F)

Storage Temperature:

-33°C to 71°C (-27°F to 160°F)

WEEE & RoHS Compliant
Chemical (Wetted)
Orifice Size:

See table for available diameters

Port Specifications:

1/4-28 flat bottom threaded ports, 0.245" deep

Rated Pressure:

Vacuum⁽²⁾ to 100 psig (6.89 barg)

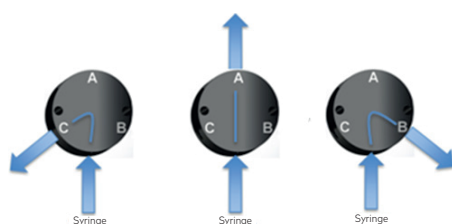
Syringe Locking Set Screw
Torque:

1.0 in-lbs.

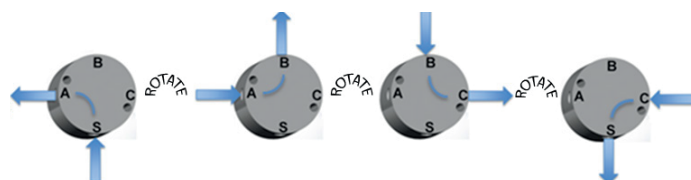
Valve Mounting Hardware
(supplied) Torque

5.0 in-lbs.

Valve Flow Configuration Types



Possible flow paths on a 3-way distribution valve



Possible flow paths on a 4-way non-distribution valve

Distribution

Distribution valves have a flow path configuration that connects the syringe port to any of the other fluid ports through a central common port. Flow is bi-directional for each connection. The naming of each valve type is determined by the number of ports available to connect with the syringe port (the syringe port is not counted).

Non-Distribution

A non-distribution valve connects adjacent ports on a valve to allow fluid to flow between them. Fluid may be drawn into the syringe only from one of the adjacent ports. Non-distribution valves allow a "bypass" fluid path where the fluid flows through the valve without entering the syringe. An external pressure system is required to move fluids through any flow paths not involving the syringe port. The naming of each valve type is determined by the number of possible fluid paths.

Face Seal Valves - Ceramic

P/N	Orifice Size (in)	Internal Volume (μL)	Valve Type
30138	0.031	13.9	2-Way Distribution
30149	0.059	53.9	2-Way Distribution
30139	0.031	13.9	3-Way Distribution
30150	0.059	53.4	3-Way Distribution
30140	0.031	14.3	4-Way Distribution
30151	0.059	53.4	4-Way Distribution
30141	0.031	14.1	5-Way Distribution
30152	0.040	23.5	5-Way Distribution
30142	0.031	13.9	6-Way Distribution
30153	0.040	23.5	6-Way Distribution
101034	0.031	16.9	8-Way Distribution
101035	0.040	30.1	8-Way Distribution
101036	0.031	21.4	12-Way Distribution
101038	0.040	33.6	12-Way Distribution
30144	0.031	14.0	3-Way Non-Distribution
30155	0.059	52.8	3-Way Non-Distribution
30145	0.031	12.9	4-Way Non-Distribution
30156	0.059	49.0	4-Way Non-Distribution
30147	0.031	12.2	6-Way Non-Distribution
30158	0.040	20.5	6-Way Non-Distribution

Face Seal Valves - Plastic

P/N	Orifice Size (in)	Internal Volume (μL)	Valve Type
23324	0.059	48.7	3-Way Distribution
24643	0.020	5.30	4-Way Distribution
23325	0.059	48.7	4-Way Distribution
23326	1mm	23.6	5-Way Distribution
23327	1mm	23.6	6-Way Distribution
23562	0.059	48.1	3-Way Non-Distribution
23563	0.059	48.1	4-Way Non-Distribution

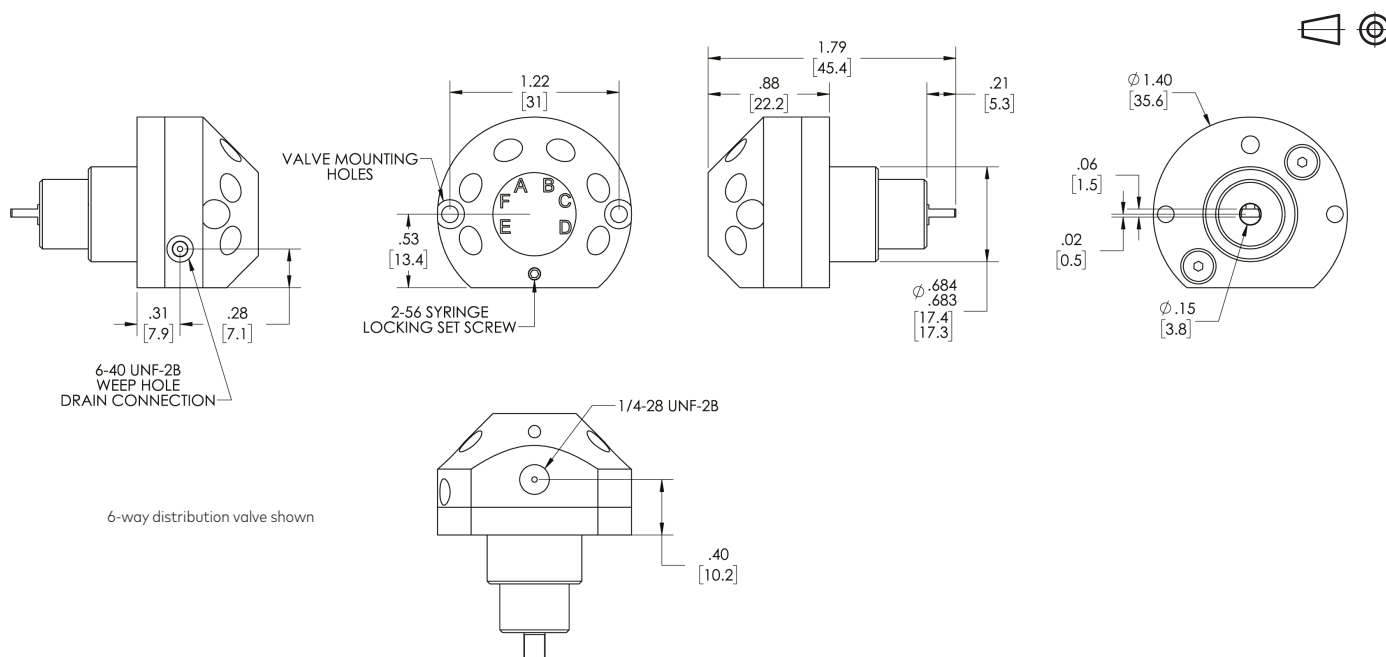
Optional Accessories

P/N	Description
24528	Weep Hole Fitting - PEEK
24529	Weep Hole Fitting - Stainless Steel
18659	Port Plug Screw, use with seal p/n 18781

Seal Washers

P/N	Description
14271	Teflon, 0.070" ID Hole, for 0.059" orifice
18031	Teflon, 0.095" ID Hole, for 0.076" orifice
18033	Teflon, 0.125" ID Hole, for 0.089" orifice
18781	Teflon, No hole, for port plug

Dimensions in inches [mm]
Projection/Third angle



Plug Valves			
P/N	Orifice Size (in)	Internal Volume (μL)	Valve Type
23272	0.059	8.51	1-Way Distribution
20051	0.031	14.8	2-Way Distribution
20052	0.059	52.3	2-Way Distribution
20053	0.076	86.6	2-Way Distribution
25393	0.031	14.8	3-Way Distribution
25394	0.059	51.7	3-Way Distribution
25395	0.076	23.9	3-Way Distribution
25396	0.031	14.7	4-Way Distribution
25397	0.059	23.6	4-Way Distribution
25398	0.076	85.3	4-Way Distribution
25399	0.031	14.7	5-Way Distribution
25400	1mm	24.3	5-Way Distribution
25401	0.031	6.50	6-Way Distribution
25402	1mm	24.1	6-Way Distribution

Plug Valves			
P/N	Orifice Size (in)	Internal Volume (μL)	Valve Type
28391	0.031	8.90	3-Way Non-Distribution
28393	0.059	31.5	3-Way Non-Distribution
28395	0.076	51.5	3-Way Non-Distribution
28397	0.031	8.70	4-Way Non-Distribution
28399	0.059	30.3	4-Way Non-Distribution
28401	0.076	49.1	4-Way Non-Distribution

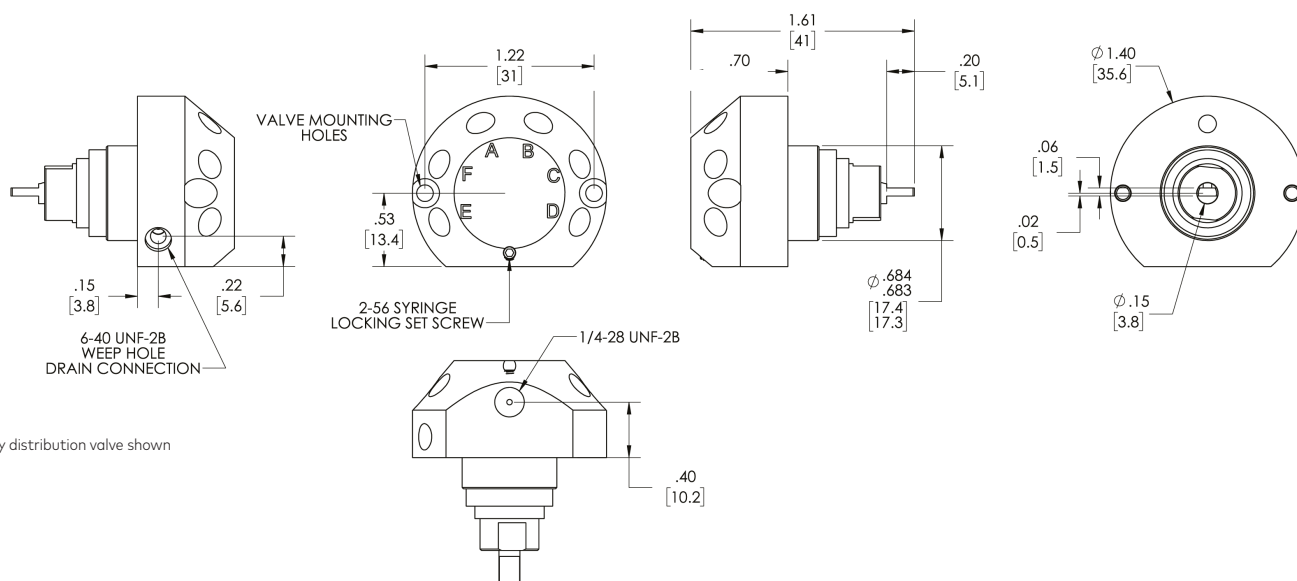
Optional Accessories

P/N	Description
24528	Weep Hole Fitting - PEEK
24529	Weep Hole Fitting - Stainless Steel
18659	Port Plug Screw, use with seal p/n 18781

Seal Washers

P/N	Description
14271	Teflon, 0.070" ID Hole, for 0.059" orifice
18031	Teflon, 0.095" ID Hole, for 0.076" orifice
18033	Teflon, 0.125" ID Hole, for 0.089" orifice
18781	Teflon, No hole, for port plug

Dimensions in inches [mm]
Projection/Third angle



6-way distribution valve shown

Warning

Improper selection, misuse, age or malfunction of components used in systems can cause failure in various modes. The system designer is warned to consider the failure modes of all component parts and to provide adequate safeguards to prevent personal injury or damage to equipment or property in the event of such failure modes. System designers and end-users are cautioned to consult instruction sheets and specifications available from the factory. The system designer/end-user is responsible for verifying that all requirements for the application are met. Due to unlimited application, system conditions and chemistries, it is the buyers responsibility to validate the product within their specific application.

Proposition 65: These products may contain chemicals known to the state of California to cause cancer, or birth defects, or other reproductive harm.

The Intellect II is a programmable precision fluid directional control instrument with non-volatile user program memory and system input/output (I/O). The Intellect II is designed with the flexibility and versatility to meet a variety of system configurations. It can be used as a stand alone controller, or integrated into system configurations. The module is capable of simple closed loop control of an external quantity or process without the need of an external controller for direction.

The Intellect II can be coupled with a variety of valve selections to meet specific needs. Valve drive communications are compatible with other Kloehn devices.

The Intellect II Valve Driver is available as a single unit or as a stacked pair that are stacked on top of each other. The dual stacked Intellect II has the same form factor as Kloehn's VersaPump 6.



P/N 23425

Physical

Height

5.0 (single); 10.0 (stacked)

Width

2.55"

Depth

4.75" (face plate to back plate)

Weight

2.5 lbs (single); 5.0 lbs (stacked)

Environmental

Operating Temperature

32°F to 131°F (0° to 55°C)

Operating Humidity

5 to 95% RH, non-condensing at 131°F (55°C)

Storage Temperature

13°F to 185°F (-25° to 85°C)

RoHS and WEEE compliant

Mechanical

Operation

Any orientation

Mounting Holes

At bottom as well as on the face plate

Stackable

Optional stacking kit available

Multiple Valve Choices

Valve type – 2 way to 12 way

Syringe Size

25ul to 50ml

PC board

Driver/Control board (fully

functional motor drivers and control electronics).

Optional RS232 PCB with

termination for communication bus

Interface

RS-485 or RS-232 communications

Data terminal or OEM protocol

1200 to 38.4K baud, 8 data bits, 1

stop bit, no parity, half duplex

User I/O: Three inputs, three output

Switched device address

Power

Operation

24V (with a maximum power voltage ripple of 720mv peak-to-peak)

Power Consumption

40 watts, 8.5 watts idle for single valve driver; 80 watts, 17 watts idle for the stacked Intellect.

Ancillary items:

Communication cable RS485, 6" long; pump to pump (2 units)

P/N 17736

Optional RS232 Communication PCB

P/N 50677

Starter Kit (includes all items listed below)

P/N 17730

24VDC Power supply

P/N 50601

Software; operator's manual; and application notes.

P/N 23422

Communications cable (RS232/5' long; Intellect to computer)

P/N 17734

Decal

P/N 24606

Stacking Kit (stacks two Intellect II units – One on top of the other)

P/N 24636

Software support:

KloehnControl (script programming – configuration and debug program)

KSerial (command-line communication utility)

KCom (machine language helper program)

KProbe (communication trouble shooting utility)

For additional information see the Intellect II hardware user's manual, P/N 24633.

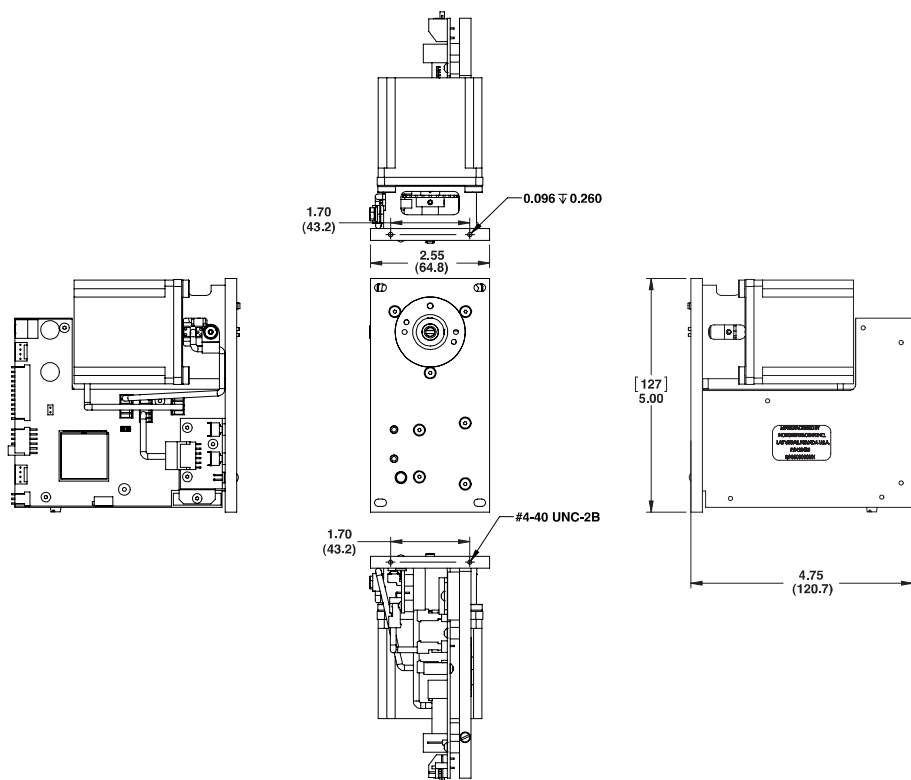
Valves:

Configuration	Orifice	Distribution	non-distribution	Port Thread
3-WAY	0.8mm	20463	18355	1/4-28 UNF
3-WAY	0.059	17316	17315	1/4-28 UNF
4-WAY	0.8mm	—	20464	1/4-28 UNF
4-WAY	0.059	17318	17317	1/4-28 UNF
5-WAY	0.059	17748	17745	1/4-28 UNF
6-WAY	0.8mm	24663	20465	1/4-28 UNF
6-WAY	0.059	17320	17319	1/4-28 UNF
8-WAY	0.076	19673	—	1/4-28 UNF
8-WAY	0.8mm	20466	20479	1/4-28 UNF
8-WAY	0.059	17322	17321	1/4-28 UNF
12-WAY	0.040	24493	—	1/4-28 UNF

Valve construction:

Valve wetted surfaces have a PCTFE body insert and PTFE plug.
Port connection is 1/4-28 UNF.

Dimensions in, (mm)

**Warning**

Improper selection, misuse, age or malfunction of components used in systems can cause failure in various modes. The system designer is warned to consider the failure modes of all component parts and to provide adequate safeguards to prevent personal injury or damage to equipment or property in the event of such failure modes. System designers and end users are cautioned to consult instruction sheets and specifications available from the factory. The system designer/end user is responsible for verifying that all requirements for the application are met.

Warranty

The products described herein are warranted subject to seller's Standard Terms and Condition of Sale, available at seller's website.

Proposition 65: These products may contain chemicals known to the state of California to cause cancer, or birth defects, or other reproductive harm.

Kloehn miniature valves offer a wide variety of fluid flow possibilities for the fluidic designer. The valves are light weight requiring minimum space (less than 2 cubic inches). The valve housings come in two body types, Distribution and Non-Distribution for both loop and distribution type flow patterns.



Physical Height

KV: 1.50"; KVP: 1.91"

Housing

75" Square

Mass

28g

Environmental

Operating Temperature

50°F to 203°F (10°C to 95°C)

RoHS and REACH compliant

Mechanical

Orifice Diameter

0.059" – custom sizes are available

Pressure rating

100psi

Mount Style

KV and KVD styles are free standing; KVP and KVPD styles are for panel mount applications up to 0.150" thick.

1/4-28 UNF Threads

To accept a variety of fittings and adapters.

Valve plug

Manually rotated by turning the drive lever clockwise or counterclockwise; 360° range of motion.

Chemical

Wetted Materials

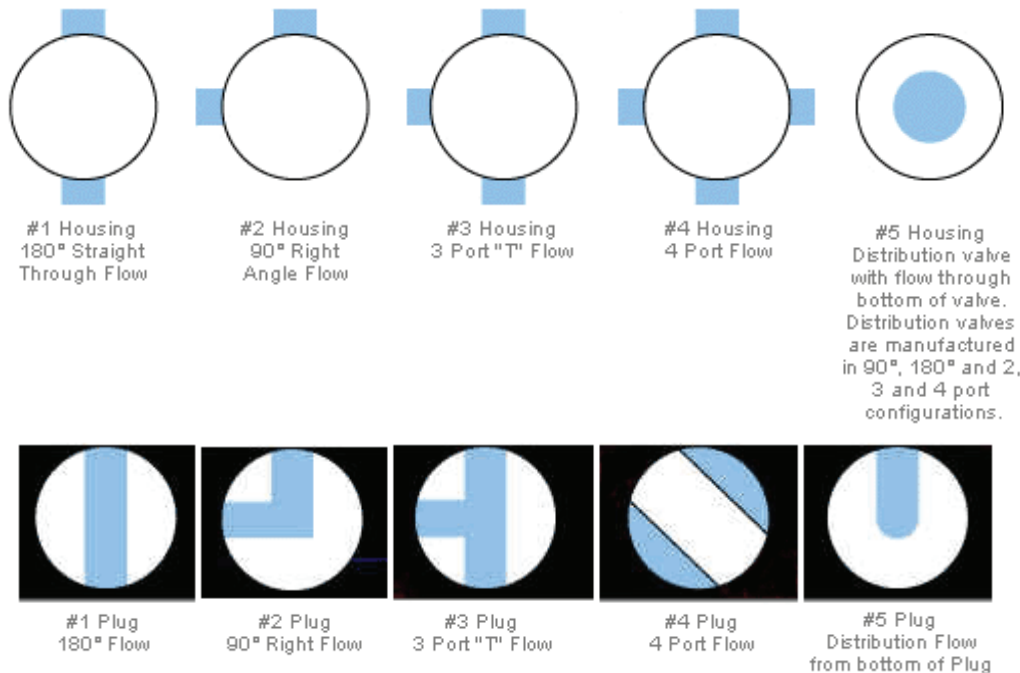
PCTFE and PTFE

Housing

Aluminum, hard black anodized.

Housing and Plug Configurations

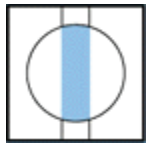
There are five valve housing configurations and five tapered plug configurations that are combined to form twelve standard valve configurations.



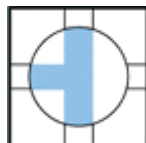
Valve Configuration and Part Number

The chart below shows the standard valve configurations.

These configurations can be modified for applications where the designer needs round valve housings in place of the standard 3/4 square valve housings. See the sales representative.



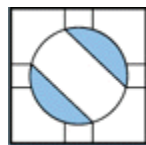
#1 180° Housing, #1 180° Plug.
For straight through flow.
7010KV 7010KVP



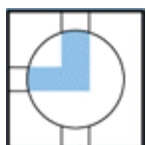
#4 4 Port Housing, #3 "T" Plug
For flow through 4 ports.
7016KV 7016KVP



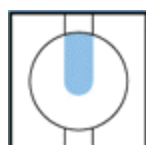
#2 90° Housing, #2 90° Plug
For single right hand flow.
7011KV 7011KVP



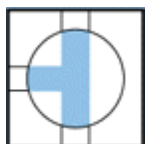
#4 4 Port Housing, #4 Port Plug
For two right angle flow through
4 ports.
7017KV 7017KVP



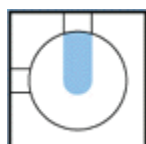
#3 3 Port Housing, #2 90° Plug
For right hand flow through
3 ports.
7012KV 7012KVP



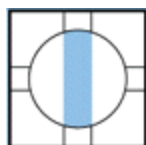
#5 1 180° Distribution Housing.
#5 Distribution Plug
For single flow from bottom
through 2 ports.
7018KVD 7018KVPD



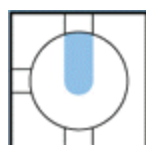
#3 3 Port Housing, #3 "T" Plug
For flow through 3 ports.
7013KV 7013KVP



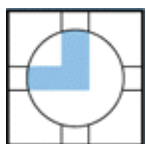
#5 2 90° Distribution Housing.
#5 Distribution Plug
For single flow from bottom
through 2 right angle ports.
7019KVD 7019KVPD



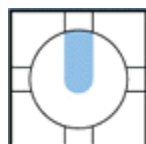
#4 4 Port Housing, #1 180° Plug
For straight flow through
4 ports.
7014KV 7014KVP



#5 3 Port Distribution Housing.
#5 Distribution Plug
For single flow from bottom
through 3 ports.
7020KVD 7020KVPD



#4 4 Port Housing, #2 90° Plug
For single right angle flow through
4 ports.
7015KV 7015KVP



#5 4 Port Distribution Housing.
#5 Distribution Plug
For single flow from bottom
through 4 ports.
7021KVD 7021KVPD

Warning

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Warranty

The products described herein are warranted subject to seller's Standard Terms and Condition of Sale, available at seller's website.

Proposition 65: These products may contain chemicals known to the state of California to cause cancer, or birth defects, or other reproductive harm.



- > Designed for use with IMI Norgren Cadent™ 6 syringe pumps and Kloehn™ 6cm syringes
- > Highly inert to most chemistries and designed for long life
- > Available with PTFE or ceramic
- > Available in distribution, non-distribution and loop configurations
- > Rated to 100 psig (6.89 barg)
- > Suitable for use in analytical, biotechnology, medical device, and diagnostic instruments



Specifications

Physical

Valve Overall Dimensions

Diameter:

1.30" (3.3cm)

Length:

1.90" (4.8cm)

Mass:

55 to 97 grams

Life cycle⁽¹⁾ (Minimum):

100,000 [Plug]

1,000,000 [Ceramic]

Environmental

Operating Temperature:

10°C to 40°C (50°F to 104°F)

Operating Humidity:

5% to 95% relative humidity,
non-condensing at 40°C (104°F)

Storage Temperature:

-10°C to 85°C (13°F to 185°F)

WEEE & RoHS Compliant

Chemical (wetted)

Orifice Diameter:

See table for available diameters

Port Specifications:

1/4-28 flat bottom threaded ports,
0.245" deep

Rated pressure

Vacuum⁽²⁾ to 100 psig (6.89 barg)

Valve Mounting Hardware

(supplied) Torque

5.0 in-lbs.

⁽¹⁾Tested with DI water using IMI standard protocol

⁽²⁾Vacuum pressure: -25inHg maximum at 2750ft elevation (1psia max).

Valve Flow Configuration Types

Distribution

Distribution valves have a flow path configuration that connects the syringe port to any of the other fluid ports through a central common port. Flow is bi-directional for each connection. The naming of each valve type is determined by the number of ports available to connect with the syringe port (the syringe port is not counted).

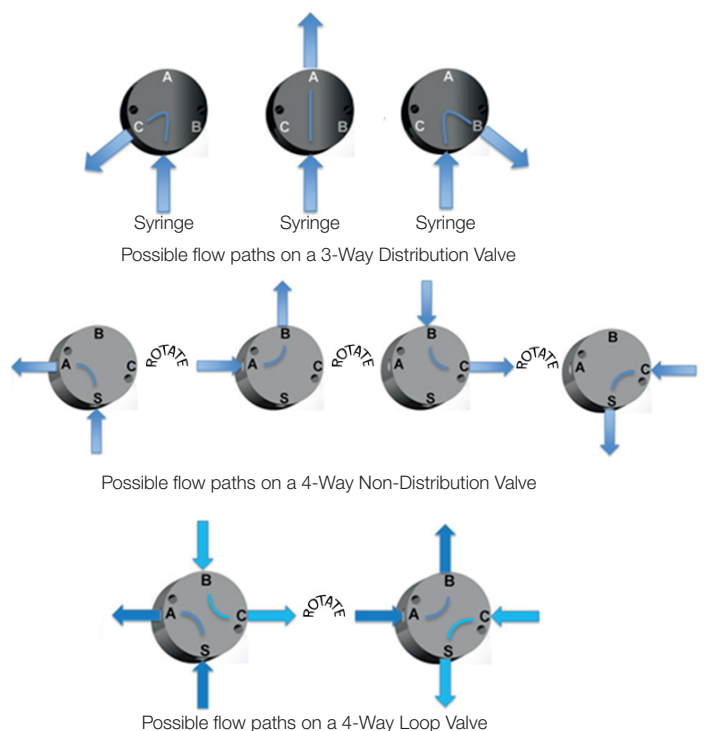
Non-Distribution

A non-distribution valve connects adjacent ports on a valve to allow fluid to flow between them. Fluid may be drawn into the syringe only from one of the adjacent ports. Non-distribution valves allow a "bypass" fluid path where the fluid flows through the valve without entering the syringe. An external pressure system is required to move fluids through any flow paths not involving the syringe port. The naming of each valve type is determined by the number of possible fluid paths.

Loop

A loop valve connects adjacent ports on a valve to create multiple simultaneous flow paths including the syringe port. These valves therefore only exist in even numbered port configurations. Fluid may be drawn into the syringe only from one of the adjacent ports. An external pressure system is required to move fluids through any flow paths not involving the syringe port.

Bi-directional flow valves; not intended for use as shut-off or relief valves



Face Seal Valves - Ceramic

P/N	Orifice Size (in)	Valve Type
23550	0.059	3-Way Distribution
23551	0.078	3-Way Distribution
24898	0.059	4-Way Distribution
23604	0.059	5-Way Distribution
23370	0.059	8-Way Distribution
24090*	0.076	8-Way Distribution
24105**	0.040	12-Way Distribution
23548	0.059	3-Way Non-Distribution
23549	0.078	3-Way Non-Distribution

Wetted materials: alumina ceramic, FFKM (seals)

*Overall length: 2.50"

**Overall length: 2.70"

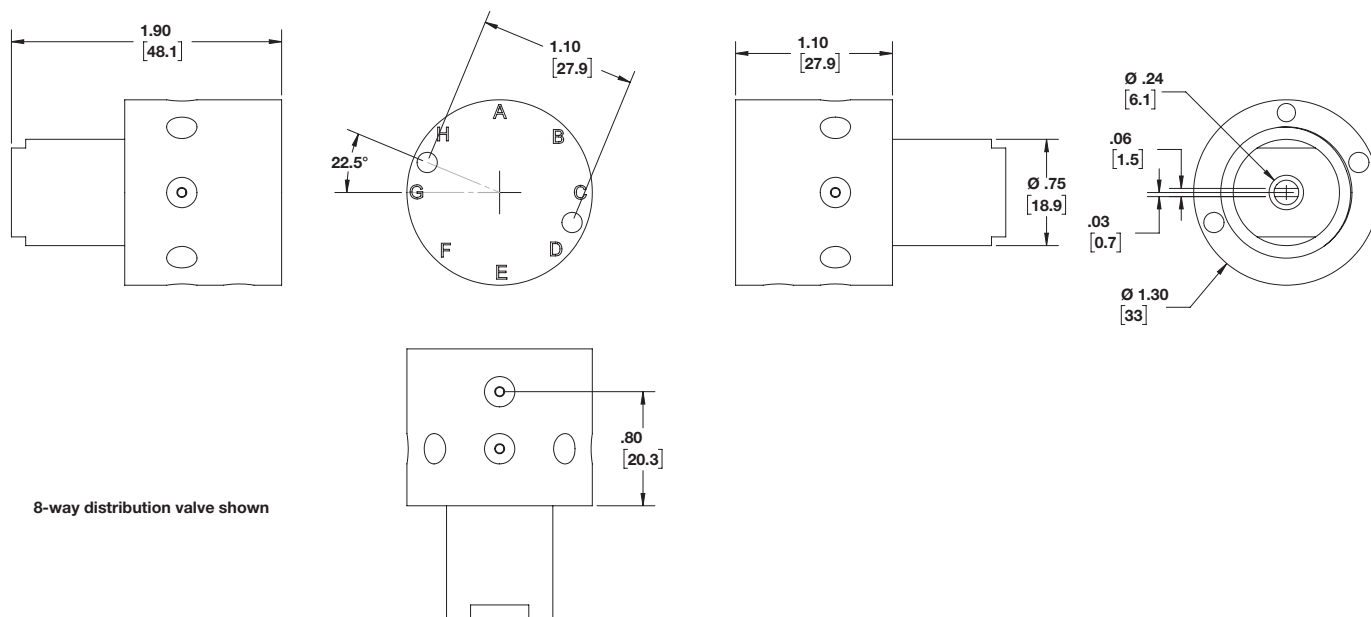
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Optional Accessories

P/N	Description
18659	Port Plug Screw, use with seal p/n 18781

Seal Washers

P/N	Description
14271	Teflon, 0.070" ID Hole, for 0.059" orifice
18031	Teflon, 0.095" ID Hole, for 0.076" orifice
18033	Teflon, 0.125" ID Hole, for 0.089" orifice
18781	Teflon, No hole, for port plug

 Dimensions in inches [mm]
 Projection/Third angle


Plug Valves

P/N	Orifice Size (in)	Valve Type	P/N	Orifice Size (in)	Valve Type
19218	0.059	1-Way Distribution	19194	0.031	3-Way Non-Distribution
18247	0.059	1-Way Distribution	17615	0.059	3-Way Non-Distribution
18248	0.076	1-Way Distribution	18192	0.076	3-Way Non-Distribution
99884	0.031	3-Way Distribution	18680	0.089	3-Way Non-Distribution
17616	0.059	3-Way Distribution	24699	0.090	3-Way Non-Distribution
18189	0.076	3-Way Distribution	17712	0.059	4-Way Non-Distribution
23554	0.031	4-Way Distribution	18191	0.076	4-Way Non-Distribution
17617	0.059	4-Way Distribution	24697	0.059	4-Way Loop
18190	0.076	4-Way Distribution	29621	0.059	6-Way Loop
17618	0.059	5-Way Distribution			
18188	0.076	5-Way Distribution			
24701	0.031	6-Way Distribution			
17619	0.059	6-Way Distribution			
18193	0.076	6-Way Distribution			
19323	0.031	8-Way Distribution			
17620	0.059	8-Way Distribution			
17877	0.076	8-Way Distribution			

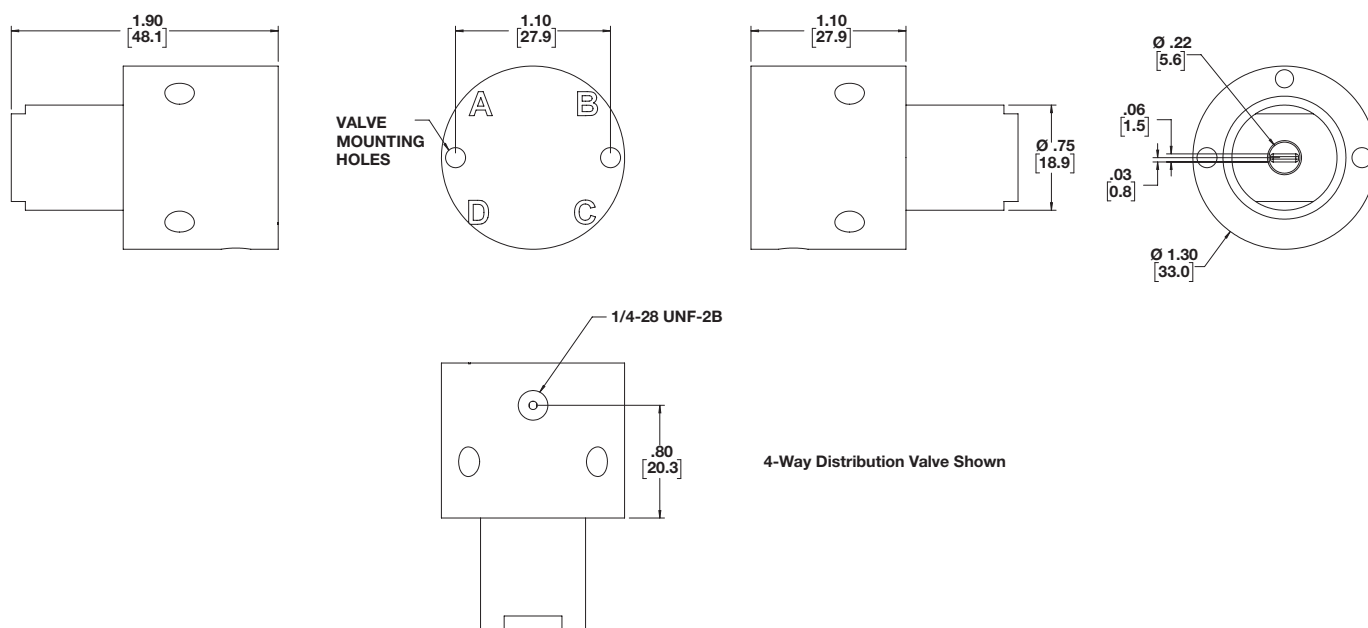
Optional Accessories

P/N	Description
18659	Port Plug Screw, use with seal p/n 18781

Seal Washers

P/N	Description
14271	Teflon, 0.070" ID Hole, for 0.059" orifice
18031	Teflon, 0.095" ID Hole, for 0.076" orifice
18033	Teflon, 0.125" ID Hole, for 0.089" orifice
18781	Teflon, No hole, for port plug

Dimensions in inches [mm]
Projection/Third angle

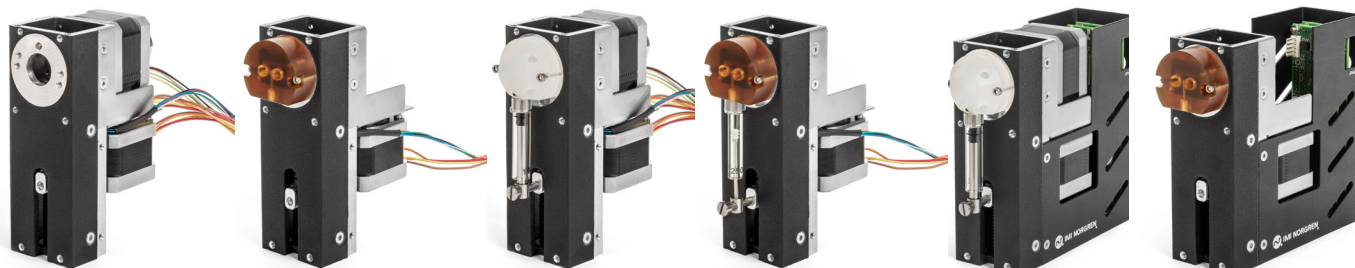

Warning

Improper selection, misuse, age or malfunction of components used in systems can cause failure in various modes. The system designer is warned to consider the failure modes of all component parts and to provide adequate safeguards to prevent personal injury or damage to equipment or property in the event of such failure modes. System designers and end-users are cautioned to consult instruction sheets and specifications available from the factory. The system designer/end-user is responsible for verifying that all requirements for the application are met. Due to unlimited application, system conditions and chemistries, it is the buyers responsibility to validate the product within their specific application.

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Cadent™ 3 Syringe Pump

- > Programmable, maintenance free, precision liquid metering device
- > 30mm stroke driven via stepper motor and precision lead screw
- > Available in three mechanical resolutions: 6K, 12K, 24K
- > Highly flexible and versatile to meet a variety of system configurations
- > Exceptional precision, accuracy and lifetime performance
- > Available with or without an advanced controller
- > Can be used as a stand-alone controller or integrated into more complex systems



Level 1
Robust Syringe and Valve Drive

Level 2*
Including Valve
*Syringes sold separately

Level 3*
Including Advanced Controller
*Syringes sold separately

Specifications

Environmental

Operating Temperature:
2°C to 50°C (36°F to 122°F)

Operating Humidity:
<80% Relative Humidity at 5°C to 30°C and <50% at 31°C to 50°C

Storage Temperature:
-33°C to 71°C (-27°F to 160°F)

Noise ⁽¹⁾:

< 55dBA

Lifetime ⁽²⁾:

> 5 Million cycles (Cadent 3)
[1 cycle = 1 full dispense and aspirate move]

Mechanical

Operation:

Any orientation

Mounting Holes:

Top and bottom

Front face

Resolutions:

6K, 12K and 24K steps

Performance Speed ⁽³⁾:

0.0625 - 10,000 steps/sec

Precision:

0.50% CV at 1/10th dispense

0.05% CV at full stroke dispense

Accuracy:

±0.3% at 1/10th dispense

±0.2% at full stroke dispense

Flow Rate ⁽³⁾:

Min: 0.008µL/min (with 50µL syringe)

Max: 500mL/min (with 5mL syringe)

Full Dispense Time ⁽³⁾:

Min: 0.6 secs (with 6K resolution)

Max: 6400 mins (with 24K resolution)

Flow Accuracy ⁽³⁾:

±1%

Linearity:

R > 0.9999

Electrical Connection ⁽³⁾:

6 inputs - 2 Analog/Digital, 4 Digital

4 digital outputs

Tamper pin

Communication Options ⁽³⁾:

RS-232, RS485, CANbus

Power Requirements:

24VDC (± 5% allowance)
(with a maximum power ripple of 720mv peak to peak).

Power Consumption:

32 watts max; 3 watts idle.

Accessory Options

Solenoid Valve Options:

FAS 3/2 Microsol MS (Media Separated) Isolation Valve

Rotary Valve Options:

up to 12-way

Syringe Options:

50µl to 5mL

Compliance:

REACH & RoHS Compliant

UL & CE Compliant

CSA Certified

⁽¹⁾ Rated with Norgren advanced controller (Level 3)

⁽²⁾ Tested using DI water and a 2.5mL syringe at 30psig

⁽³⁾ Based on a 650Hz sample rate using a 2.5mL syringe at 250µL per minute

Cadent 3 Pump

All pumps are offered with a pre-assembled valve. Replacement valves and KloeHN™ syringes (not included) may be purchased separately.

Cadent 3 Valve Description	6K Resolution			12K Resolution			24K Resolution			Replacement Valve Part Number
	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3	Level 1	Level 2	Level 3	
None (rotary valve feature)	100276		100285	100277		100736	100278		100286	
FAS 3/2 Microsol Solenoid valve		100279	100287		100280	100288		100281	100289	20413
1-Way Valve (Through-Block)		100273	100282		100274	100283		100275	100284	23272
2-WAY Distribution - Plug		100926	100940		100954	100968		100982	100996	20052
3-WAY Distribution - Plug		100927	100941		100955	100969		100983	100997	25394
4-WAY Distribution - Plug		100928	100942		100956	100970		100984	100998	25397
5-WAY Distribution - Plug		100929	100943		100957	100971		100985	100999	25400
6-WAY Distribution - Plug		100930	100944		100958	100972		100986	101000	25402
3-WAY Distribution - Face		100931	100945		100959	100973		100987	101001	23324
4-WAY Distribution - Face		100932	100946		100960	100974		100988	101002	23325
6-WAY Distribution - Face		100933	100947		100961	100975		100989	101003	23327
3-WAY Distribution - Ceramic		100934	100948		100962	100976		100990	101004	30150
4-WAY Distribution - Ceramic		100935	100949		100963	100977		100991	101005	30151
5-WAY Distribution - Ceramic		100936	100950		100964	100978		100992	101006	30141
6-WAY Distribution - Ceramic		100937	100951		100965	100979		100993	101007	30142
8-WAY Distribution - Ceramic					100966	100980		100994	101104	101035
12-WAY Distribution - Ceramic					100967	100981		100995	101105	101038

Solenoid and Through-Block options are not available without a valve.

See Page 3 for additional valve options.

Other combinations not shown in the table above are available upon request.

Starter Kit	RS-232	RS-485	CANbus
Starter Kit (includes all items listed below)	100904	100905	100906
Power Supply	100907	100907	100907
Power Cable	50603	50603	50603
Communications Cable	100883	100884	100885
USB Communications Adapter	28646	100917	100918
Hardware User Manual	101101	101101	101101
Cadent Connect Software (GUI)	101102	101102	101102

PTFE KloeHN Syringes			
Size	Standard Assy	ZDV Assy	Orifice Size (in)
50µL	23164	27960	0.023
100µL	23165	27961	0.023
250µL	23166	28006	0.031
500µL	23167	28007	0.031
1.0mL	23168	28008	0.073
2.5mL	23169	28009	0.073
5.0mL	23170	28010	0.073

Wetted materials: Borosilicate glass, PCTFE, PTFE

Zero Dead Volume (ZDV) KloeHN syringes have a pointed plunger tip to minimize carryover. All syringes are lubricated with Silicone oil. For more information on syringes please consult PSD-0006 or visit our website.

UHMW KloeHN Syringes			
Size	Standard Assy	ZDV Assy	Orifice Size (in)
50µL	24411	27958	0.023
100µL	24412	27959	0.023
250µL	24413	28011	0.031
500µL	24414	28012	0.031
1.0mL	24415	28013	0.073
2.5mL	24416	28014	0.073
5.0mL	24417	28015	0.073

Wetted materials: Borosilicate glass, PCTFE, UHMW-PE, PTFE

Ancillary Items	
Electrical Mounting Adapter Kit (V3 to Cadent 3)	100624

Rotary Face Valves

P/N	Orifice Size (in/mm)	Valve Type
23324	0.059	3-Way Distribution
24643	0.020	4-Way Distribution
23325	0.059	4-Way Distribution
23326	1mm	5-Way Distribution
23327	1mm	6-Way Distribution

Wetted Materials: PPS, XP-113, PTFE. These valves are also lubricated with Krytox oil.

Rotary Ceramic Valves

P/N	Orifice Size (in)	Valve Type
30138	0.031	2-Way Distribution
30149	0.059	2-Way Distribution
30139	0.031	3-Way Distribution
30150	0.059	3-Way Distribution
30140	0.031	4-Way Distribution
30151	0.059	4-Way Distribution
30141	0.031	5-Way Distribution
30152	0.040	5-Way Distribution
30142	0.031	6-Way Distribution
30153	0.040	6-Way Distribution
101034	0.031	8-Way Distribution
101035	0.040	8-Way Distribution
101036	0.031	12-Way Distribution
101038	0.040	12-Way Distribution

Wetted Materials: PEEK, Alumina Ceramic, FFKM PTFE. These valves are lubricated with Krytox oil.

Rotary Plug Valves

P/N	Orifice Size (in/mm)	Valve Type
23272	0.059	1-Way Distribution
20051	0.031	2-Way Distribution
20052	0.059	2-Way Distribution
20053	0.076	2-Way Distribution
25393	0.031	3-Way Distribution
25394	0.059	3-Way Distribution
25395	0.076	3-Way Distribution
25396	0.031	4-Way Distribution
25397	0.059	4-Way Distribution
25398	0.076	4-Way Distribution
25399	0.031	5-Way Distribution
25400	1mm	5-Way Distribution
25401	0.031	6-Way Distribution
25402	1mm	6-Way Distribution

Wetted Materials: PCTFE, PTFE. These valves are lubricated with Silicone oil.

Solenoid Valves

Configuration	P/N	Orifice Size (in)
FAS 3/2 Microsol Media Separated valve	20413	0.062

Wetted Materials: PEEK, EPDM

Valve Notes:

Port connection is 1/4-28 UNF. For more information on valves, consult PSD-0031 or visit our website.

All valve ports are accessible when using syringes listed and Kloehn™ spring-loaded fittings (recommended).

Valve weep hole port connection is #6-40 UNF-2A. For use with 1/16" OD tubing.

P/N	Orifice Size (in)	Valve Type
23562	0.059	3-Way Non-Distribution
23563	0.059	4-Way Non-Distribution

Optional Accessories

P/N	Description
24528	Weep Hole Fitting - PEEK
24529	Weep Hole Fitting - Stainless Steel
18659	Port Plug Screw, use with seal P/N 18781

P/N	Orifice Size (in)	Valve Type
30144	0.031	3-Way Non-Distribution
30155	0.059	3-Way Non-Distribution
30145	0.031	4-Way Non-Distribution
30156	0.059	4-Way Non-Distribution
30147	0.031	6-Way Non-Distribution
30158	0.040	6-Way Non-Distribution

Optional Accessories

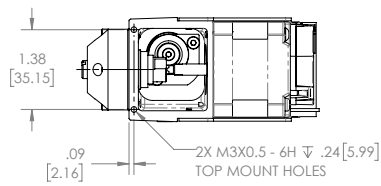
P/N	Description
24528	Weep Hole Fitting - PEEK
24529	Weep Hole Fitting - Stainless Steel
18659	Port Plug Screw, use with seal P/N 18781

P/N	Orifice Size (in)	Valve Type
28391	0.031	3-Way Non-Distribution
28393	0.059	3-Way Non-Distribution
28395	0.076	3-Way Non-Distribution
28397	0.031	4-Way Non-Distribution
28399	0.059	4-Way Non-Distribution
28401	0.076	4-Way Non-Distribution

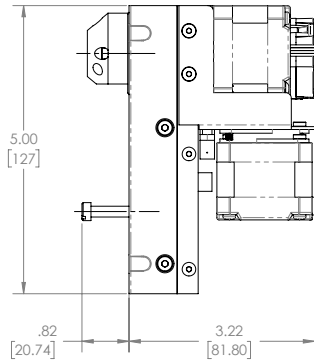
Optional Accessories

P/N	Description
24528	Weep Hole Fitting - PEEK
24529	Weep Hole Fitting - Stainless Steel
18659	Port Plug Screw, use with seal P/N 18781

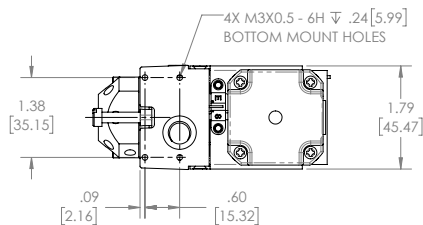
Dimensions for Level 2



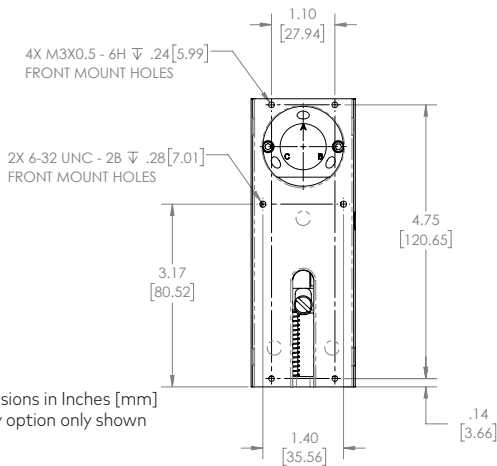
TOP VIEW



SIDE VIEW

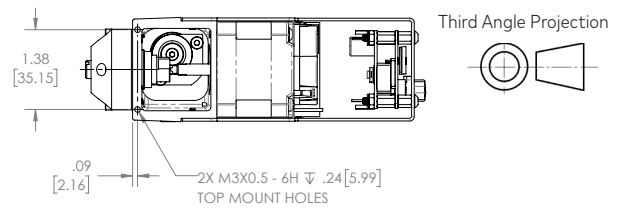


BOTTOM VIEW

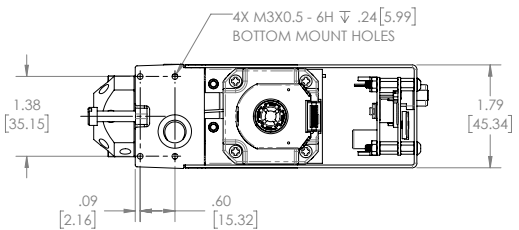
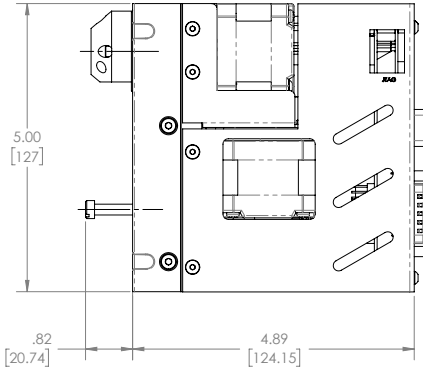


Dimensions in Inches [mm]
Rotary option only shown

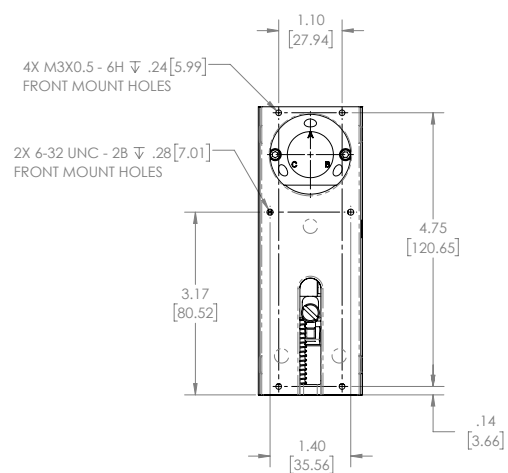
Dimensions for Level 3



Third Angle Projection



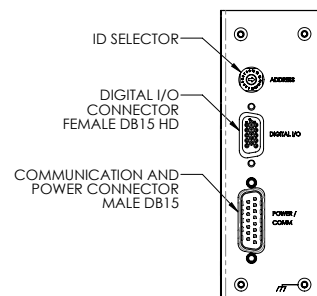
FRONT VIEW



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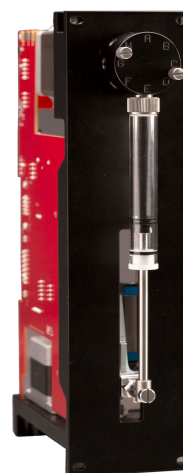
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BACK VIEW

Cadent™ 6 Syringe Pump

- > Programmable, maintenance free, precision liquid metering device
- > 60mm stroke driven via stepper motor and precision ball screw
- > Available in three mechanical resolutions: 12K, 24K, 48K
- > Powerful lift force and valve torque
- > Exceptional precision, accuracy and lifetime performance
- > Suitable for use in analytical, biotechnology, medical device, and diagnostic applications



Level 1
Robust Syringe
and Valve Drive



Level 3*

Including Advanced Controller to easily program the system using the industry standard CAVRO protocol

*syringe and valve sold separately



Specifications

Environmental

Operating Temperature:
2°C to 50°C (36°F to 122°F)

Operating Humidity:
<80% Relative Humidity at 5°C to 30°C and <50% at 31°C to 50°C

Storage Temperature:
-33°C to 71°C (-27°F to 160°F)

Noise ⁽¹⁾:
< 55dBA

Lifetime ⁽²⁾:
> 5.7 Million cycles
[1 cycle = 1 full dispense and aspirate move]

Mechanical Operation:

Any orientation

Mounting Holes:
Bottom and Front

Resolutions:
12K, 24K and 48K steps

Performance Speed ⁽³⁾:
0.0625 - 10,000 steps/sec

Precision:
0.50% CV at 1/10th dispense
0.05% CV at full stroke dispense

Accuracy:
±0.3% at 1/10th dispense
±0.2% at full stroke dispense

Flow Rate ⁽¹⁾:

Min: 46.9nL/hr (with 10µL syringe)

Max: 2.5mL/min (with 50mL syringe)

Full Dispense Time ⁽¹⁾:
Min: 1.2 secs (with 12K resolution)
Max: 12,800 min (with 48K resolution)

Flow Accuracy ⁽³⁾:
±1%

Plunger Lift Force:
120lbs force, 12K res.
140lbs force, 24 and 48K res.

Electrical Connection ⁽¹⁾:
6 inputs - 2 Analog/Digital, 4 Digital
4 digital outputs
Tamper pin

Communication Options ⁽¹⁾:

RS-232, RS485, CANbus

Power Requirements:
24VDC (± 5% allowance)
(with a maximum power ripple of 720mv peak to peak).

Power Consumption:
14 watts max; 3.5 watts idle.

Rotary Valve Options:
up to 12-way

Syringe Options:
10µl to 50mL

Compliance:
REACH & RoHS Compliant
UL & CE Compliant
CSA Certified

⁽¹⁾ Rated with advanced controller (Level 3)

⁽²⁾ Tested using DI water and a 2.5mL syringe at 30psig

⁽³⁾ Based on a 650Hz sample rate using a 2.5mL syringe at 250µL per minute

Cadent 6 Pump

Valves and syringes (not included) may be purchased separately.

Cadent					
12K Resolution		24K Resolution		48K Resolution	
Level 1	Level 3	Level 1	Level 3	Level 1	Level 3
102671	102674	102672	102675	102673	102676

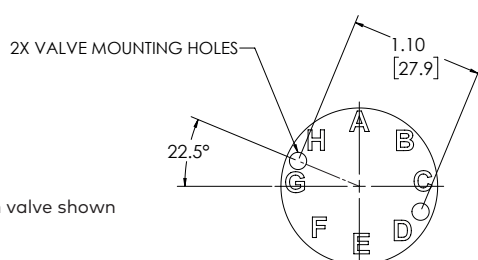
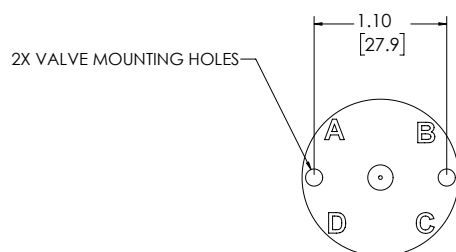
Starter Kit	RS-232	RS-485	CANbus
Starter Kit (includes all items listed below)	100904	100905	100906
Power Supply	100907	100907	100907
Power Cable	50603	50603	50603
Communications Cable	100883	100884	100885
USB Communications Adapter	28646	100917	100918

Plug Valves					
P/N	Orifice Size (in)	Valve Type	P/N	Orifice Size (in)	Valve Type
19218	0.059	1-Way Distribution	19194	0.031	3-Way Non-Distribution
18247	0.059	1-Way Distribution	17615	0.059	3-Way Non-Distribution
18248	0.076	1-Way Distribution	18192	0.076	3-Way Non-Distribution
99884	0.031	3-Way Distribution	18680	0.089	3-Way Non-Distribution
17616	0.059	3-Way Distribution	24699	0.090	3-Way Non-Distribution
18189	0.076	3-Way Distribution	17712	0.059	4-Way Non-Distribution
17617	0.059	4-Way Distribution	18191	0.076	4-Way Non-Distribution
18190	0.076	4-Way Distribution	24697	0.059	4-Way Loop
17618	0.059	5-Way Distribution	29621	0.059	6-Way Loop
18188	0.076	5-Way Distribution			
24701	0.031	6-Way Distribution			
17619	0.059	6-Way Distribution			
18193	0.076	6-Way Distribution			
19323	0.031	8-Way Distribution			
17620	0.059	8-Way Distribution			
17877	0.076	8-Way Distribution			

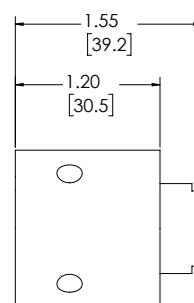
Optional Accessories	
P/N	Description
18659	Port Plug Screw, use with seal P/N 18781

Seal Washers	
P/N	Description
14271	Teflon, 0.070 ID Hole, for 0.059" orifice
18031	Teflon, 0.095 ID Hole, for 0.076" orifice
18033	Teflon, 0.125 ID Hole, for 0.089" orifice
18781	Teflon, No hole, for port plug

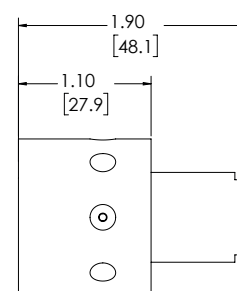
Wetted Materials: PCTFE, PTFE



4-way distribution valve shown



Dimensions in inches
[mm]



Face Seal Valves - Ceramic

P/N	Orifice Size (in)	Valve Type
23550	0.059	3-Way Distribution
23551	0.078	3-Way Distribution
24898	0.059	4-Way Distribution
23604	0.059	5-Way Distribution
23370		8-Way Distribution
24090*	0.076	8-Way Distribution
24105**	0.040	12-Way Distribution
23548	0.059	3-Way Non-Distribution
23549	0.078	3-Way Non-Distribution

Wetted materials: alumina ceramic, FFKM (seals)

* Overall length: 2.50"

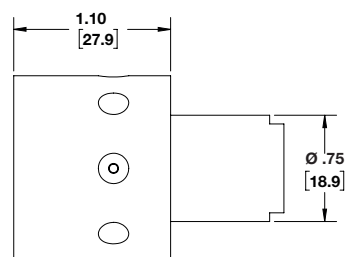
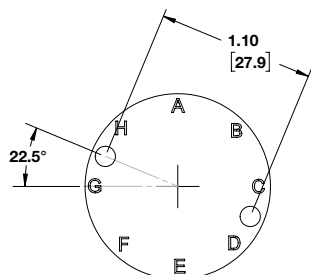
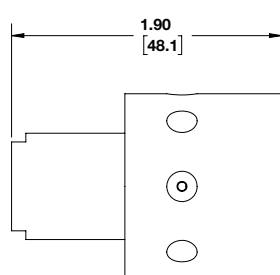
** Overall length: 2.70"

Optional Accessories

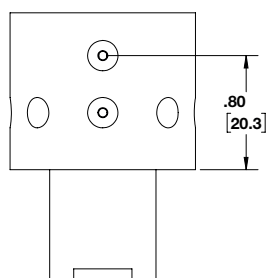
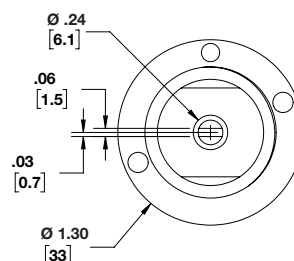
P/N	Description
18659	Port Plug Screw, use with seal p/n 18781

Seal Washers

P/N	Description
14271	Teflon, 0.070 ID Hole, for 0.059" orifice
18031	Teflon, 0.095 ID Hole, for 0.076" orifice
18033	Teflon, 0.125 ID Hole, for 0.089" orifice
18781	Teflon, no hole, for port plug



Projection/Third angle


Dimensions in inches [mm]
8-way distribution valve shown

Valve Notes

Port connection is 1/4-28 UNF. For more information on valves, consult PDS-0032 or visit our website.

All valve ports are accessible when using syringes listed and spring-loaded fittings (recommended).

Valve weep hole port connection is #6-40 UNF-2A. For use with 1/16" OD tubing.

UHMW KloeHN™ Syringes (individually boxed):

Size	Orifice Size (in)	Standard Lubricated Syringe	Zero Dead Volume (Lubricated)
25µL*	0.016	103177	-
50µL	0.024	103178	-
100µL	0.032	24518	-
250µL	0.039	19513	-
500µL	0.076	24694	25427
1.0mL	0.076	24690	25413
1.25mL	0.076	-	25438
2.5mL	0.076	24685	25388
5.0mL	0.076	18857	24691
10.0mL	0.076	19110	24139
25.0mL	0.076	24688	25380

Wetted materials: Borosilicate glass, PCTFE, UHMW-PE, PTFE

* Contains stainless steel in wetted path

PTFE KloeHN Syringe Assembly (individually boxed):

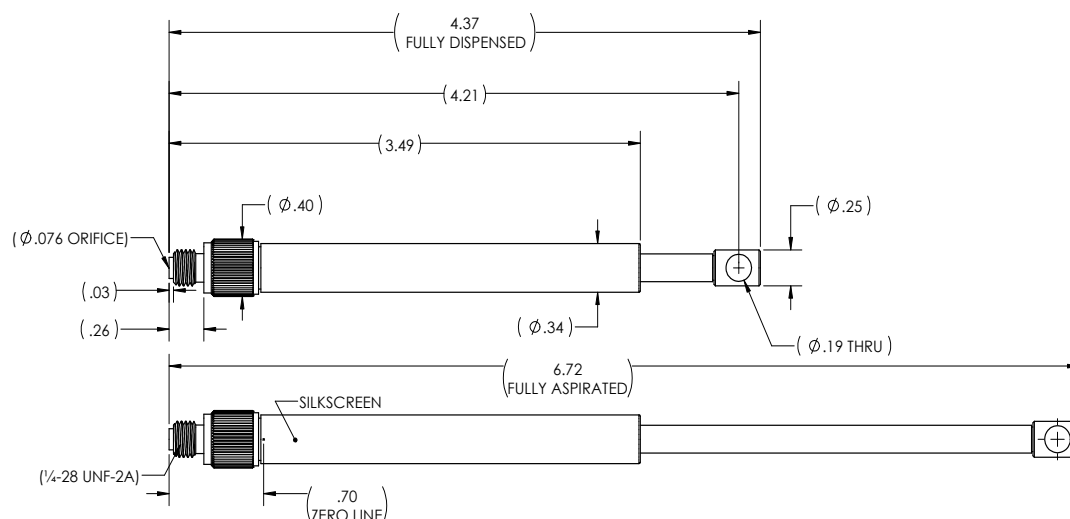
Size	Orifice Size (in)	Standard Lubricated Syringe	Zero Dead Volume (Lubricated)
10µL*	0.016	103179	-
25µL*	0.016	103180	-
50µL	0.024	103185	-
100µL	0.032	17593	-
250µL	0.039	17594	19509
500µL	0.076	17595	19537
1.0mL	0.076	17596	25429
1.25mL	0.076	17597	25431
2.5mL	0.076	17598	19539
5.0mL	0.076	17599	18463
10.0mL	0.076	17600	18469
25.0mL	0.076	17601	23734
50.0mL	0.076	17602	-

Wetted materials: Borosilicate glass, PCTFE, PTFE

* contains stainless steel in wetted path

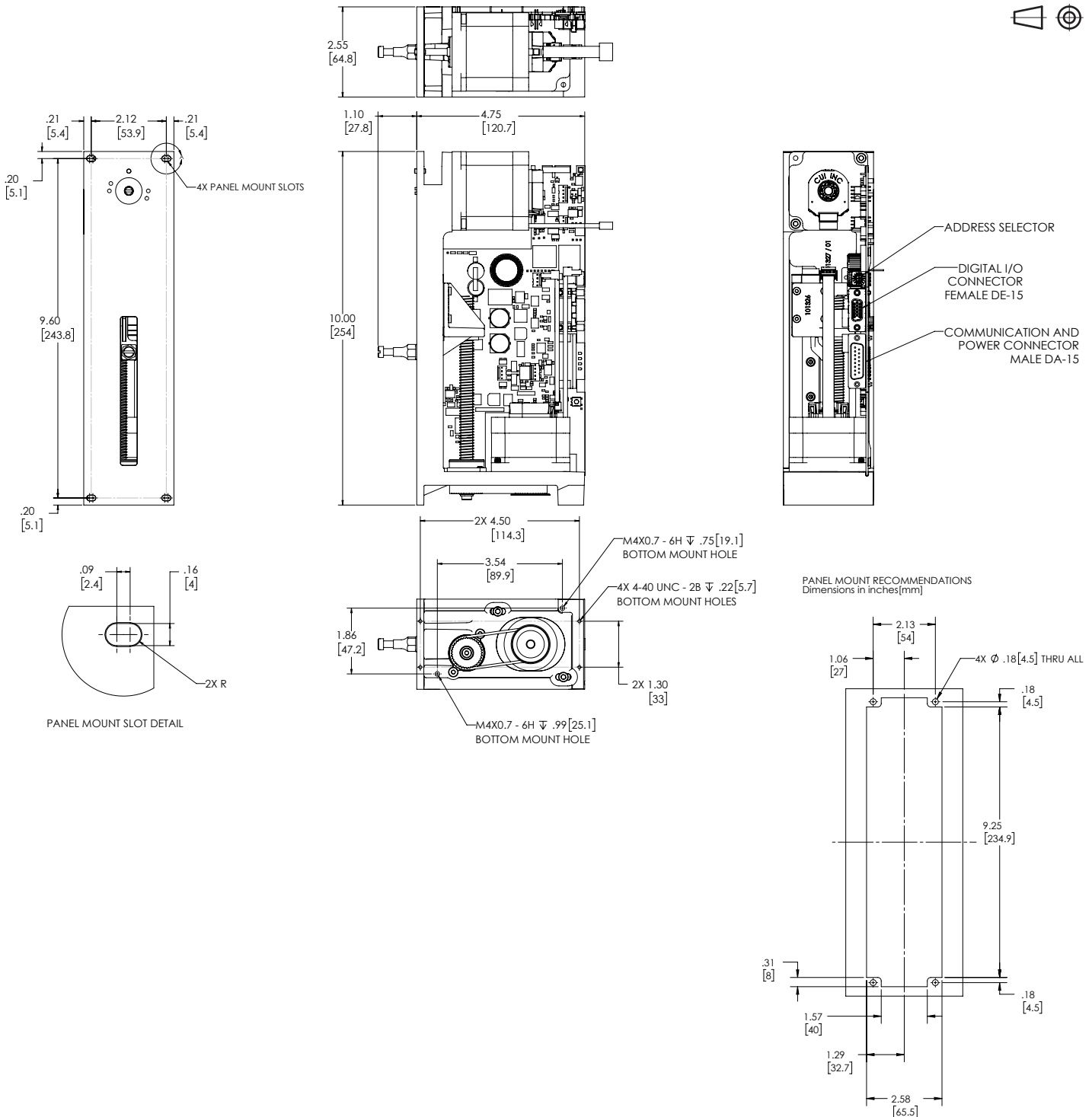
Dimensions in inches [mm]

1mL syringe shown



Level 3 Envelope

Dimensions in inches [mm]
Projection/Third angle



Warning

Improper selection, misuse, age or malfunction of components used in systems can cause failure in various modes. The system designer is warned to consider the failure modes of all component parts and to provide adequate safeguards to prevent personal injury or damage to equipment or property in the event of such failure modes. System designers and end-users are cautioned to consult instruction sheets and specifications available from the factory. The system designer/end-user is responsible for verifying that all requirements for the application are met. Due to unlimited application, system conditions and chemistries, it is the buyers responsibility to validate the product within their specific application.

Proposition 65: These products may contain chemicals known to the state of California to cause cancer, or birth defects, or other reproductive harm.

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. Available with 2, 4, 6, and 8 Kloehe™ syringes as standard configurations, additional configurations are available on request. The Cadent™ 6M is simple to incorporate into your systems where intensive pipetting is the norm.



- > **Programmable precision Multi-Channel syringe pump**
- > **Long-life product uses a 6cm stroke driven by a stepper motor and precision ball screw**
- > **Available in two mechanical resolutions: 24K, 48K**
- > **Each channel is pre-equipped with a 3/2 solenoid valve**
- > **Compatible syringes available from 250µL to 5mL**
- > **Flexible to meet a variety of system configurations**
- > **Capable of simple closed loop control of an external quantity or process**
- > **Suitable for use in analytical, biotechnology, medical device, and diagnostic applications**



Specifications

Physical

Overall Height:

11.67" (296.4mm)

Overall Width:

Maximum: 6.5" (165.1mm)

Minimum: 3.2" (81.3mm)

Overall Depth:

6.05" (153.7mm)

Weight:

5.25lbs (2.38kg)

Lifetime ⁽¹⁾:

> 5.7 Million cycles

[1 cycle = 1 full dispense and aspirate move]

Environmental

Operating Temperature:

2°C to 50°C (36°F to 122°F)

Operating Humidity:

<80% Relative Humidity at 5°C to 30°C and <50% at 31°C to 50°C

Storage Temperature:

-33°C to 71°C (-27°F to 160°F)

Compliance:

REACH & RoHS Compliant

UL & CE Compliant

CSA Certified

Mechanical

Mounting Holes:

Bottom

Resolutions:

24K, and 48K Increments

Speed:

0.0625 - 10,000 steps/sec

Syringe Size (60mm stroke):

250µL to 5mL (supplied separately)

Valve Type:

FAS MS-E 3/2 Solenoid Valve per channel

Performance

Precision:

0.50% CV at 1/10th dispense

0.05% CV at full stroke dispense

Accuracy:

±0.3% at 1/10th dispense

±0.2% at full stroke dispense

Communications Options:

RS-232, RS-485, CANbus

Power Requirements:

24V (with maximum power voltage ripple of 720mv peak-to-peak).

Power Consumption:

Unenergized: 3.5W

Energized: 62W (peak)

⁽¹⁾ Tested using DI water and a 2.5mL syringe at 30 psig

Syringe Pump:**Multi-Channel Syringe Pump (with EPDM valve)**

24K resolution	48K resolution	Part number
X		102677-103050-2
X		102677-103050-4
X		102677-103050-6
X		102677-103050-8
	X	102678-103050-2
	X	102678-103050-4
	X	102678-103050-6
	X	102678-103050-8

Decals can be added to individual orders as required.

Starter Kit	RS-232	RS-485	CANbus
Starter Kit (includes all items listed below)	100904	100905	100906
Power Supply	100907	100907	100907
Power Cable	50603	50603	50603
Communications Cable	100883	100884	100885
USB Communications Adapter	28646	100917	100918

Multi-Channel Syringe Pump (with FFKM valve)

24K resolution	48K resolution	Part number
X		102677-103051-2
X		102677-103051-4
X		102677-103051-6
X		102677-103051-8
	X	102678-103051-2
	X	102678-103051-4
	X	102678-103051-6
	X	102678-103051-8

Valve—3 Way Solenoid:**Part Number**

102630

Orifice Diameter

1.2mm

Internal Volume

91µL

Rated Pressure

13.8 to 65.2 psig [0.95 to 4.5 barg]

Wetted Materials

PEEK, EPDM

Valve—3 Way Solenoid:**Part Number**

103049

Orifice Diameter

1.2mm

Internal Volume

91µL

Rated Pressure

13.8 to 65.2 psig [0.95 to 4.5 barg]

Wetted Materials

PEEK, FFKM

PTFE Kloehn™ Syringe Assembly:
Thread Type

1/4-28 UNF-2A

Wetted Materials

Borosilicate glass, PCTFE, PTFE

Fine Tuning Adjustment

Zero dead volume only

Size	Orifice Size (in)	Standard Lubricated Syringe	Zero Dead Volume (Lubricated)
250µL	0.039	29439	29441
500µL	0.076	29442	29443
1.0mL	0.076	29447	29448
1.25mL	0.076	29451	29450
2.5mL	0.076	29454	29452
5.0mL	0.076	29456	29458

See PDS-0011 for additional syringe details.

UHMW-PE Kloehn™ Syringe Assembly:
Thread Type

1/4-28 UNF-2A

Wetted Materials

Borosilicate glass, PCTFE, PTFE, UHMW-PE

Fine Tuning Adjustment

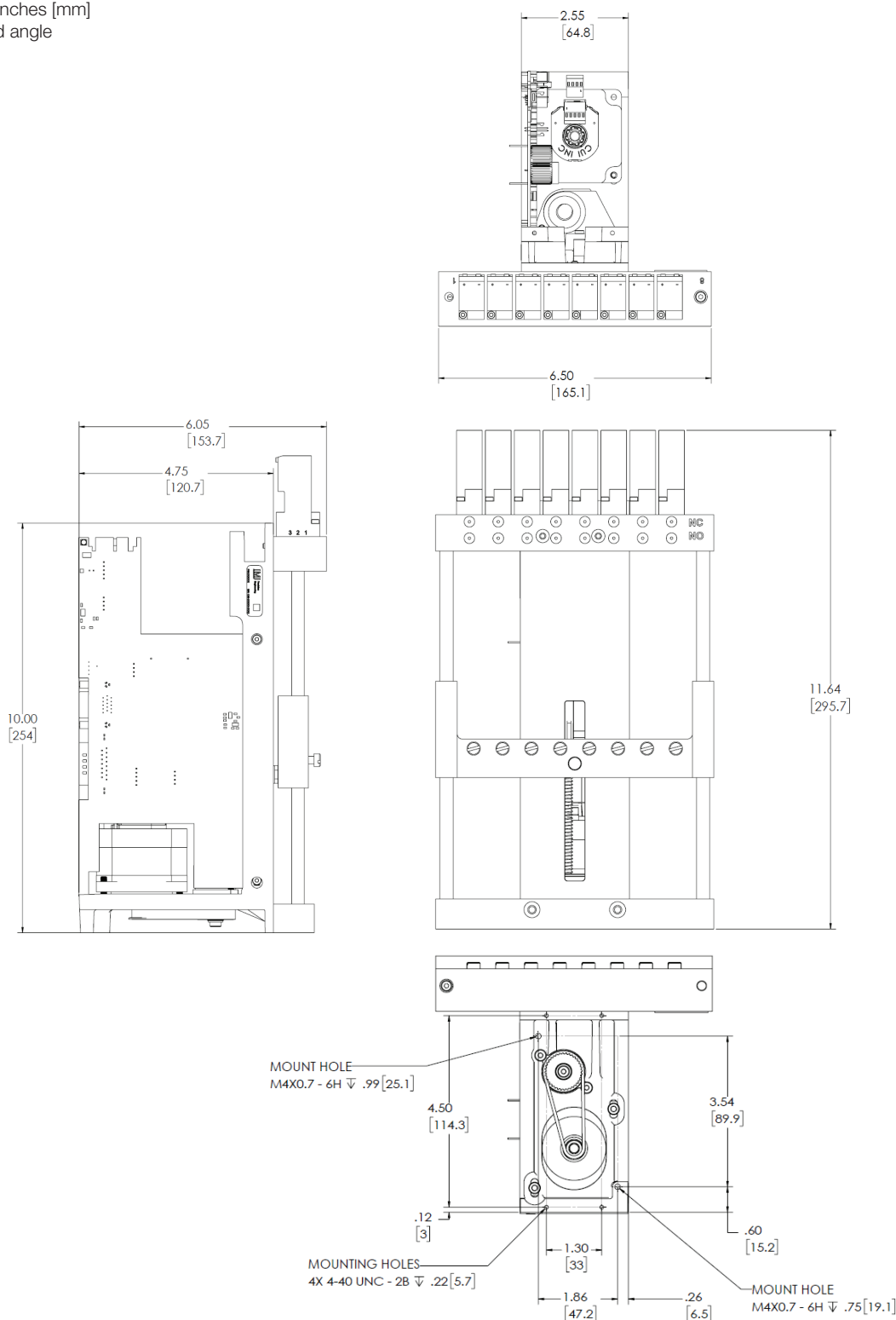
Zero dead volume only

Size	Orifice Size (in)	Standard Lubricated Syringe	Zero Dead Volume (Lubricated)
250µL	0.039	29440	29861
500µL	0.076	29444	29863
1.0mL	0.076	29445	29446
1.25mL	0.076	29864	29449
2.5mL	0.076	29455	29453
5.0mL	0.076	29457	29459

See PDS-0011 for additional syringe details.

Dimensions in inches [mm]

Projection/Third angle



Warning

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Proposition 65: These products may contain chemicals known to the state of California to cause cancer, or birth defects, or other reproductive harm.

- > Designed for use with IMI Norgren Cadent™ 6M Multi-Channel syringe pumps
- > Available in various materials and tip styles and available with Zero Dead Volume (ZDV) to fully sweep the wetted path
- > Syringes available in sizes between 250µL and 5mL
- > Rated to 80 psig (5.52 barg)
- > Suitable for use in analytical, biotechnology, medical device, and diagnostic applications



Specifications

Physical

Length (Dispensed):

4.61" (11.7cm)

Thread Type:

¼-28 UNF-2A

Test Pressure:

80 psig (5.52 barg)

Environmental

Operating Temperature:

10°C to 40°C (50°F to 104°F)

Storage Temperature:

-25° to 85°C (-13°F to 185°F)

Relative Humidity:

Up to 100%

Chemical

Wetted Materials:

Borosilicate glass, PCTFE, PTFE (or UHMW-PE)

Syringe Tips:

Lubricated with laboratory grade silicone (syringes without silicone available on request)

Mechanical Specifications

Syringe Sizes		250µL	500µL	1.0mL	1.25mL	2.5mL	5.0mL
Orifice Diameter (in)		0.039	0.076	0.076	0.076	0.076	0.076
Syringe (End Cap) Diameter (in)		0.4	0.4	0.4	0.4	0.5	0.6
*Max Drag Force (lbs)	PTFE	3.0	3.0	3.0	3.0	3.0	6.0
	UHMW	7.0	7.0	7.0	7.0	7.0	10.0

*Add 1 pound drag force to non-lubricated plunger tip requests.



Kloehn™ Syringe Enhancements



Zero Dead Volume Plunger Tip

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.

Glass Barrel Shrink Wrap

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

This enhancement is available on request and can be applied to any syringe volume dispense size.



Zero dead volume only

* Tip nose is 316L SS PTFE coated

Zero dead volume only

1/20

- > Designed for use with Cadent™ 3 syringe pumps
- > Rated to 80 psig (5.52 barg)
- > Available in various volumes, materials and tip styles
- > Suitable for use in analytical, biotechnology and diagnostic applications



Specifications

Physical

Length (Dispensed):

2.37"

Thread Type:

¼-28 UNF-2A

Test Pressure:

80 psig (5.52 barg)

Life cycle (Minimum):

100,000

Tested with DI water using IMI standard protocol

Environmental

Operating Temperature:

10°C to 40°C (50°F to 104°F)

Storage Temperature:

-33°C to 71°C (-27°F to 160°F)

Relative Humidity:

Up to 100%

Chemical

Wetted Materials:

Borosilicate glass, PCTFE, PTFE (or UHMW-PE)

Syringe Tips:

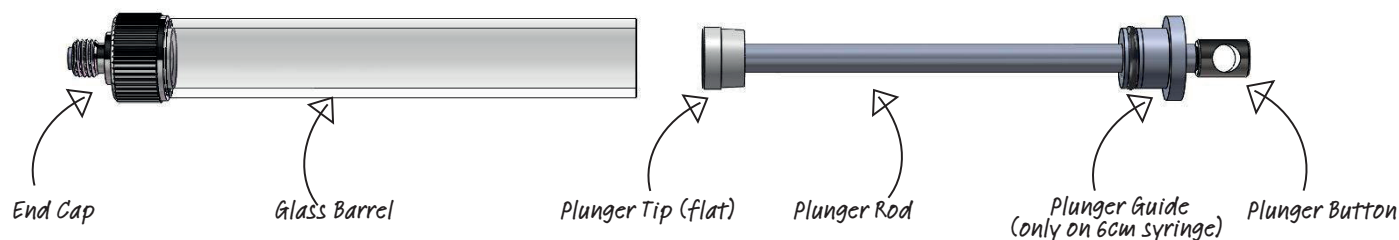
Lubricated with laboratory grade silicone

Mechanical Specifications

Kloehn™ Syringe Sizes		50µL	100µL	250µL	500µL	1.0mL	2.5mL	5.0mL
Orifice Size (in)		0.023	0.023	0.031	0.031	0.073	0.073	0.073
Syringe(End Cap) Diameter (in)		0.43	0.43	0.43	0.43	0.43	0.56	0.72
Button Diameter (in)		0.25	0.25	0.25	0.25	0.3	0.3	0.3
Max Drag Force* (lbs)	PTFE	3.0	3.0	3.0	3.0	3.0	6.0	6.0
	UHMW	7.0	7.0	7.0	7.0	7.0	10.0	10.0

*Add 1 pound (lbs) drag force for non-lubricated plunger tip syringes. Installation torque = 20oz-in

Kloehn™ Syringe Anatomy



Kloehn™ Syringe Enhancements



Zero Dead Volume Plunger Tip

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.

Glass Barrel Shrink Wrap

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

This enhancement is available on request and can be applied to any syringe volume dispense size.



PTFE Kloehn™ Syringes (individually boxed):

Dispense Volume	Orifice Size (in)	Standard Lubricated Syringe	Non-Lubricated Syringe	ZDV Syringe (Lubricated)
50µL	0.023	23164	22007	27960
100µL	0.023	23165	22008	27961
250µL	0.031	23166	22009	28006
500µL	0.031	23167	22010	28007
1.0mL	0.073	23168	22011	28008
2.5mL	0.073	23169	22012	28009
5.0mL	0.073	23170	22013	28010

Wetted materials: Borosilicate glass, PCTFE, UHMW-PE, PTFE

UHMW Kloehn™ Syringes (individually boxed):

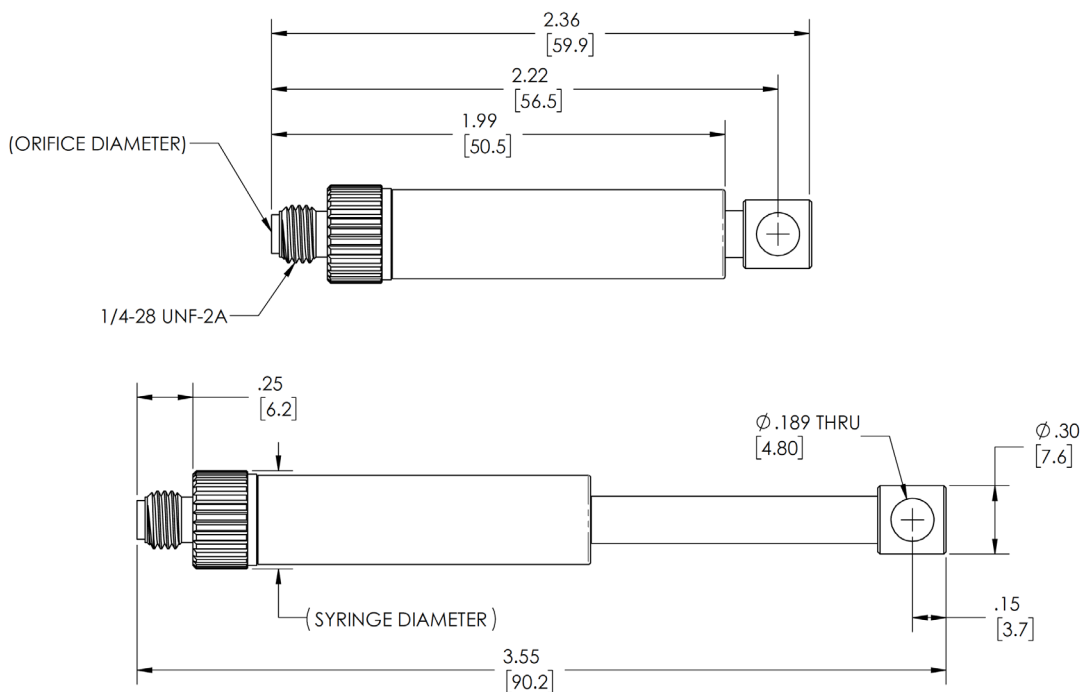
Dispense Volume	Orifice Size (in)	Standard Lubricated Syringe	Non-Lubricated Syringe	ZDV Syringe (Lubricated)
50µL	0.023	24411	*	27958
100µL	0.023	24412	*	27959
250µL	0.031	24413	*	28011
500µL	0.031	24414	*	28012
1.0mL	0.073	24415	*	28013
2.5mL	0.073	24416	*	28014
5.0mL	0.073	24417	*	28015

Wetted materials: Borosilicate glass, UHMW-PE, PTFE

* Available upon request

Dimensions in inches [mm]
1mL syringe shown

Third Angle Projection

**Warning**

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Proposition 65: These products may contain chemicals known to the state of California to cause cancer, or birth defects, or other reproductive harm.

- > Gas and liquid tight manual Kloehn™ syringes using PTFE tips to provide seal
- > Suitable for use on GC, LC & HPLC applications
- > Capable of handling corrosive fluids
- > Available in various volumes (10µL to 500µL) and terminations
- > Available in five needle point styles to suit septum piercing and suction needs
- > Color coded flange caps for easy identification



Specifications

Physical

Length (Dispensed)

FN/RN - 6.0"

TLL/TLT - 4.5"

Pressure

80 psi

Needle Length

2 in.

Environmental

Operating Temperature

10°C to 40°C (50°F to 104°F)

Storage Temperature

-33°C to 71°C (-27°F to 160°F)

Relative Humidity

Up to 100%

Accuracy

±1%

Chemical

Wetted Materials

Borosilicate Glass, 304 SS (Needle), PTFE

Syringe tips

Lubricated with laboratory grade Silicone

Mechanical Specifications

Kloehn™ Syringe Sizes	10µL	25µL	50µL	100µL	250µL	500µL	5.0ml
Button Diameter (in)	0.312	0.375	0.375	0.375	0.375	0.375	0.073
*Max Drag Force (lbs)	3.0	3.0	3.0	3.0	3.0	3.0	0.72

*Add 1 pound drag force to non-lubricated plunger tip requests.

Syringe Termination	Needle Point Style	10µL (Blue)	25µL (Green)	50µL (Yellow)	100µL (Orange)	250µL (Red)	500µL (Black)
Fixed Needle (FN)	A (22° bevel curve)	3010FN-A	3025FN-A	3050FN-A	3100FN-A	3250FN-A	3500FN-A
	B (90° bevel)	3010FN-B	3025FN-B	3050FN-B	3100FN-B	3250FN-B	3500FN-B
	C (22° bevel)	3010FN-C	3025FN-C	3050FN-C	3100FN-C	3250FN-C	3500FN-C
	D (Side hole)	3010FN-D	3025FN-D	3050FN-D	3100FN-D	3250FN-D	3500FN-D
	E (Round Taper)	3010FN-E	3025FN-E	3050FN-E	3100FN-E	3250FN-E	3500FN-E
Removable Needle (RN)	A (22° bevel curve)	3010RN-A	3025RN-A	3050RN-A	3100RN-A	3250RN-A	3500RN-A
	B (90° bevel)	3010RN-B	3025RN-B	3050RN-B	3100RN-B	3250RN-B	3500RN-B
	C (22° bevel)	3010RN-C	3025RN-C	3050RN-C	3100RN-C	3250RN-C	3500RN-C
	D (Side hole)	3010RN-D	3025RN-D	3050RN-D	3100RN-D	3250RN-D	3500RN-D
	E (Round Taper)	3010RN-E	3025RN-E	3050RN-E	3100RN-E	3250RN-E	3500RN-E
Tapered Luer Lock (TLL)	TLL	3010TLL	3025TLL	3050TLL	3100TLL	3250TLL	3500TLL
Tapered Luer Tip (TLT)	TLT	3010TLT	3025TLT	3050TLT	3100TLT	3250TLT	3500TLT

Syringe Termination	Needle Point Style	10µL (Blue)	25µL (Green)	50µL (Yellow)	100µL (Orange)	250µL (Red)	500µL (Black)
Needle Gauge		26s	22s	22s	22s	22s	22
Needle OD (in)		0.019	0.028	0.028	0.028	0.028	0.028
Needle ID (in)		0.005	0.006	0.006	0.006	0.006	0.016
Replacement Needle Part Number	A (22° bevel curve)	100749	100759	100759	100759	100759	100782
	B (90° bevel)	100750	100760	100760	100760	100760	100786
	C (22° bevel)	100751	100761	100761	100761	100761	100787
	D (Side hole)	100752	100762	100762	100762	100762	100788
	E (Round Taper)	100753	100763	100763	100763	100763	100789
Luer Orifice Diameter (in)		0.016	0.025	0.027	0.040	0.040	0.038

- > Gas and liquid tight manual Kloehn™ syringes using PTFE tips to provide seal
- > Suitable for use on GC, LC, HPLC and autosampler applications
- > Capable of handling corrosive fluids
- > Incorporates 6-32 thread connections for mounting
- > Available in various volumes (1mL to 50mL) and terminations
- > PTFE coated plunger rods (for syringes > 1.25mL) to protect glass barrel
- > Available in five needle point styles to suit septum piercing and suction needs



Specifications

Physical

Length (Dispensed)

FN - 6.3"

TLL/TLT - 4.5" - 6.3"

Pressure

80 psi

Needle Length

2 in.

Environmental

Operating Temperature

10°C to 40°C (50°F to 104°F)

Storage Temperature

-33°C to 71°C (-27°F to 160°F)

Relative Humidity

Up to 100%

Accuracy

±1%

Chemical

Wetted Materials

Borosilicate Glass, 304 SS (Needle), PTFE

Syringe tips

Lubricated with laboratory grade Silicone

Mechanical Specifications

Kloehn™ Syringe Sizes	1mL	1.25mL	2.5mL	5mL	10mL	25mL	50mL
Button Diameter (in)	0.375	0.375	0.500	0.620	0.870	0.870	1.125
*Max Drag Force (lbs)	3.0	3.0	3.0	6.0	6.0	8.0	8.0

*Add 1 pound drag force to non-lubricated plunger tip requests.

Syringe Termination	Needle Point Style	1mL	1.25mL	2.5mL	5mL	10mL	25mL	50mL
Fixed Needle (FN)	A (22° bevel curve)	4001FN-A	4001.25FN-A	4002FN-A	4005FN-A	4010FN-A	4025FN-A	4050FN-A
	B (90° bevel)	4001FN-B	4001.25FN-B	4002FN-B	4005FN-B	4010FN-B	4025FN-B	4050FN-B
	C (22° bevel)	4001FN-C	4001.25FN-C	4002FN-C	4005FN-C	4010FN-C	4025FN-C	4050FN-C
	D (Side hole)	4001FN-D	4001.25FN-D	4002FN-D	4005FN-D	4010FN-D	4025FN-D	4050FN-D
	E (Round Taper)	4001FN-E	4001.25FN-E	4002FN-E	4005FN-E	4010FN-E	4025FN-E	4050FN-E
Tapered Luer Lock (TLL)	TLL	4001TLL	4001.25TLL	4002TLL	4005TLL	4010TLL	4025TLL	4050TLL
Tapered Luer Tip (TLT)	TLT	4001TLT	4001.25TLT	4002TLT	4005TLT	4010TLT	4025TLT	4050TLT

Syringe Termination	1mL	1.25mL	2.5mL	5mL	10mL	25mL	50mL
Needle Gauge	22	22	22	22	22	22	22
Needle OD (in)	0.028	0.028	0.028	0.028	0.028	0.028	0.028
Needle ID (in)	0.016	0.016	0.016	0.016	0.016	0.016	0.016
Luer Orifice Diameter (in)	0.063	0.038	0.070	0.046	0.039	0.073	0.073

Warning

Improper selection, misuse, age or malfunction of components used in systems can cause failure in various modes. The system designer is warned to consider the failure modes of all component parts and to provide adequate safeguards to prevent personal injury or damage to equipment or property in the event of such failure modes. System designers and end-users are cautioned to consult instruction sheets and specifications available from the factory. The system designer/end-user is responsible for verifying that all requirements for the application are met. Due to unlimited application, system conditions and chemistries, it is the buyers responsibility to validate the product within their specific application.

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- > Long-life 6cm Kloehn™ syringes designed for use with IMI Norgren Cadent™ 6 syringe pumps
- > Rated to 80 psig (5.52 barg)
- > Syringes available in sizes from 10µL to 50mL with various materials and tip styles
- > Suitable for use in analytical, biotechnology, medical device, and diagnostic applications



Specifications

Physical

Length (Dispensed):

4.37" (11.1cm)

Thread Type:

¼-28 UNF-2A

Test Pressure:

80 psig (5.52 barg)

Life cycle (Minimum):

250,000 full strokes

Tested with DI water using IMI standard protocol

Environmental

Operating Temperature:

10°C to 40°C (50°F to 104°F)

Storage Temperature:

-25°C to 85°C (-13°F to 185°F)

Relative Humidity:

Up to 100%

Chemical

Wetted Materials:

Borosilicate glass, PCTFE, PTFE (or UHMW-PE)

Syringe Tips:

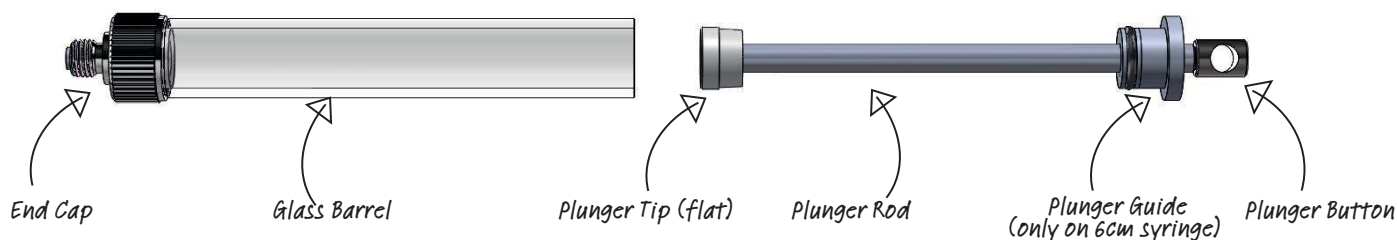
Lubricated with laboratory grade silicone (syringes without silicone available on request)

Mechanical Specifications

Kloehn™ Syringe Sizes	10µL	25µL	50µL	100µL	250µL	500µL	1.0mL	1.25mL	2.5mL	5.0mL	10mL	25mL	50mL
Orifice Diameter (in)	0.016	0.016	0.024	0.032	0.039	0.076	0.076	0.076	0.076	0.076	0.076	0.076	0.076
Syringe (End Cap) Diameter (in)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.75	1.12	1.5
Max Drag Force*	PTFE	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	6.0	6.0	8.0	8.0
	UHMW	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	10.0	10.0	15.0	-

* Add 1 pound drag force to non-lubricated plunger tips

Kloehn™ Syringe Anatomy



Kloehn™ Syringe Enhancements



Zero Dead Volume Plunger Tip

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.



Glass Barrel Shrink Wrap

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

This enhancement is available on request and can be applied to any syringe volume dispense size.

UHMW Kloehn™ Syringe Assembly (individually boxed):

Size	Orifice Size (in)	Standard Lubricated Syringe	Zero Dead Volume (Lubricated)
25µL†	0.016	103177	-
50µL	0.024	103178	-
100µL	0.032	24518	-
250µL	0.039	19513	-
500µL	0.076	24694	25427
1.0mL	0.076	24690	25413
1.25mL	0.076	-	25438
2.5mL	0.076	24685	25388
5.0mL	0.076	18857	24691
10.0mL	0.076	19110	24139
25.0mL	0.076	24688	25380

Wetted materials: Borosilicate glass, PCTFE, UHMW-PE, PTFE

† Contains stainless steel in wetted path

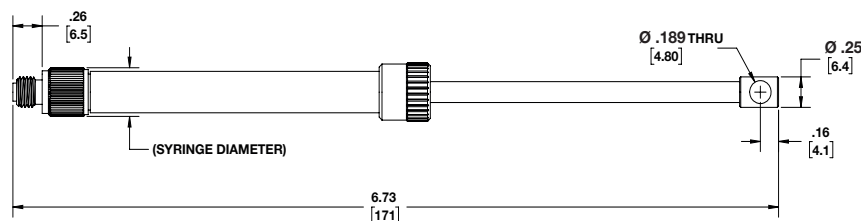
PTFE Kloehn™ Syringe Assembly (individually boxed):

Size	Orifice Size (in)	Standard Lubricated Syringe	Zero Dead Volume (Lubricated)
10µL†	0.016	103179	-
25µL†	0.016	103180	-
50µL	0.024	103185	-
100µL	0.032	17593	-
250µL	0.039	17594	19509
500µL	0.076	17595	19537
1.0mL	0.076	17596	25429
1.25mL	0.076	17597	25431
2.5mL	0.076	17598	19539
5.0mL	0.076	17599	18463
10.0mL	0.076	17600	18469
25.0mL	0.076	17601	23734
50.0mL	0.076	17602	-

Wetted materials: Borosilicate glass, PCTFE, PTFE

† Contains stainless steel in wetted path

Dimensions in inches [mm]
1mL syringe shown

**Warning**

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