

# ROYTRONIC EXCEL™

*The Digital Series of LMI Chemical Metering Pumps*

Revolutionizing the Chemical  
Metering Pump Industry  
with Versatility & Innovation



**LMI**  
MILTON ROY

# ROYTRONIC EXCEL™ Series AD Electronic Metering Pumps

LMI ROYTRONIC EXCEL™ Series AD pumps achieve a new level of innovation in solenoid-driven metering pump technology. Offering a robust design, microprocessor control options and improved electro-magnetics to meet all flow/pressure ratings, ROYTRONIC EXCEL™ Series AD chemical metering pumps will provide industry solutions for more versatile chemical injection with greater turn-down capability.

The line includes an advanced design fitting system for secure, leak-proof tubing connections. Every pump with a FastPrime™ or AutoPrime™ liquid end includes half-inch NPT connections to allow for ease of configuration.

Standard FastPrime™ liquid ends incorporate a unique design to bleed the head without depressurizing the discharge tubing. FastPrime™ liquid ends are available with a variety of material constructions to meet demanding application requirements. Optional AutoPrime™ liquid ends automatically and continuously purge entrapped air from process fluid, eliminating “vapor lock” with liquids such as Sodium Hypochlorite, even in remote installations. High Viscosity liquid ends engineered to pump your most challenging viscous fluids are also available.

## Features include:

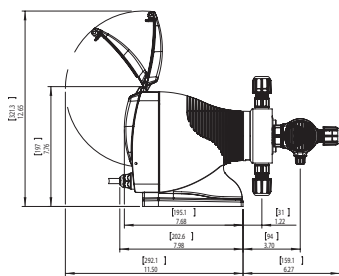
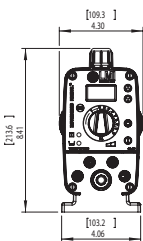
- Push button controls
- Manual knob to control stroke length
- LCD user interface
- Dual manual control
- Low level float switch connection
- Durable and lockable clear cover
- Theoretical flow rate display
- NEMA 4X/IP-65 enclosure
- Industrial grade IP-68 external signal/equipment interface
- 3 Year Warranty\*

## Select models include:

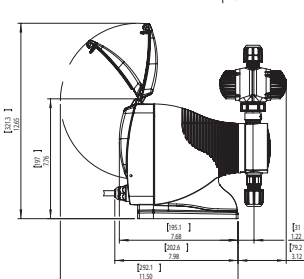
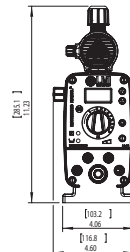
- Remote Start/Stop
- External control options for pulse or 4-20 mA input
- Backlit graphical display
- Selectable Alarms
- Separate pulse/4-20 mA input and output connections
- Dual low level float switch connection
- Universal voltage 85-265V
- 7 day event timer
- Bi-colored LED with external signal indication
- Pulse divide/multiply modes; batch accumulate option
- Internal/External mode indicated with a wired output
- Two Point Calibration (Flow Display)
- Advanced electronic features for pump configuration

## Dimensions:

AUTOPRIME LIQUID ENDS

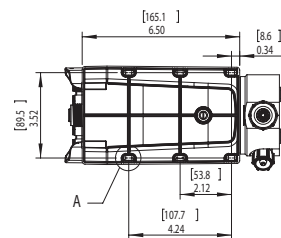
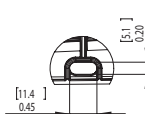


FASTPRIME LIQUID ENDS



## MOUNTING INFORMATION

VIEW A



NOTE: ALL DIMENSIONS ARE IN INCHES [MM]. DIMENSIONS SHOWN ARE FOR LARGEST LIQUID END. DIMENSIONS WILL VARY DEPENDING ON LIQUID END SELECTED.

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Specifications Subject to Change

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ROYTRONIC EXCEL is a trademark of Milton Roy Company

\*contact your LMI distributor for details

## Specifications:

Series	Strokes Per Minute (Adjustable)		Stroke Length (Adjustable) Recommended Minimum	Average Input Power @ Max Speed and Pressure	Max. Shipping Weight
	Min	Max			
AD 2X* AD 8X* AD 9X*	1	120	20%	25 watts	10 lbs (4.75 kg)

\* where X = output code

## Control Code Features:

- 2 - **Dual Manual Control**  
Stroke frequency and length manually adjustable, LCD display, low level indication (remote input). Display configurable to indicate theoretical pump flow.
- 8 - **Pulse/Analog Input w/ Dual Manual Control**  
Pulse or 4-20 mA signal input controls frequency, LCD display, manual stroke length control, frequency manually adjustable when in local control, pulse multiply/divide functions, 24 V output for remote device. Includes dual low level float switch input. Display configurable to indicate theoretical pump flow.
- 9 - **Pulse/Analog Input w/Dual Manual Control & Enhanced Controls**  
Advanced Features - Pulse or 4/20 mA signal input controls frequency, graphical display, manual stroke length control, Frequency manually adjustable when in local control, Pulse multiply/divide functions, 24 V output for remote device, dual low level float switch input, Remote on/off signal input. Outputs include: 4-20 mA, pulse, & Alarm. Remote internal/external mode input. Display configurable to indicate theoretical pump flow.

## Output Code and Pressure Ratings with FastPrime™ Liquid End:

Code	Max Capacity	Max Pressure
1	0.21 GPH (0.8 l/h)	250 psi (17.2 Bar)
4	0.5 GPH (1.9 l/h)	250 psi (17.2 Bar)
5	1.0 GPH (3.8 l/h)	110 psi (7.6 Bar)
6	2.0 GPH (7.6 l/h)	50 psi (3.4 Bar)

## Certifications:



201 Ivyland Road  
Ivyland, PA 18974 USA  
TEL: (215) 293-0401  
FAX: (800) 327-7563  
<http://www.lmipumps.com>

# Data Sheet

## ROYTRONIC EXCEL™ Series AD

### Electronic Metering Pumps

Model AD 2 5 1 - 8 3 8 S I

#### Model Code Configuration

Drive

**Control Code**

2 - **Dual Manual Control**  
Stroke frequency and length manually adjustable, LCD display, low level indication (remote input). Display configurable to indicate theoretical pump flow.

8 - **Pulse/Analog Input w/ Dual Manual Control**  
Pulse or 4-20 mA signal input controls frequency, LCD display, manual stroke length control, frequency manually adjustable when in local control, pulse multiply/divide functions, 24 V output for remote device. Includes dual low level float switch input. Display configurable to indicate theoretical pump flow.

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**Output Code with FastPrime™ Liquid End**

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5 - 1.0 GPH (3.8 l/h)	110 psi (7.6 Bar)
6 - 2.0 GPH (7.6 l/h)	50 psi (3.4 Bar)

**Voltage Code**

1 - 110-120V US Plug  
2 - 220-240V US Plug  
3 - 220-240V DIN Plug  
5 - 220-240V UK Plug  
6 - 220-240V Aust/NZ Plug  
7 - 220-240V Swiss Plug  
8 - 110-120V No Plug

Liquid End

**Liquid End Code**  
See Accompanying Pages for Options

**Liquifram™ Size Code**

1 - 0.2 in<sup>2</sup>  
2 - 0.4 in<sup>2</sup>  
3 - 0.8 in<sup>2</sup>  
4 - 1.6 in<sup>2</sup>

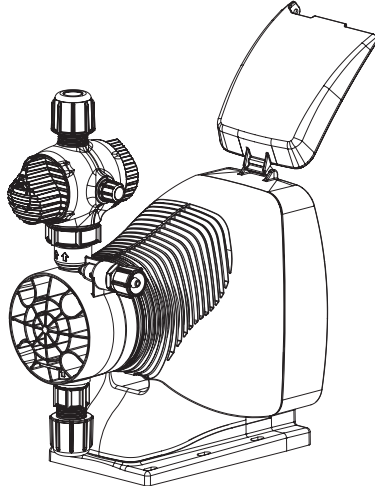
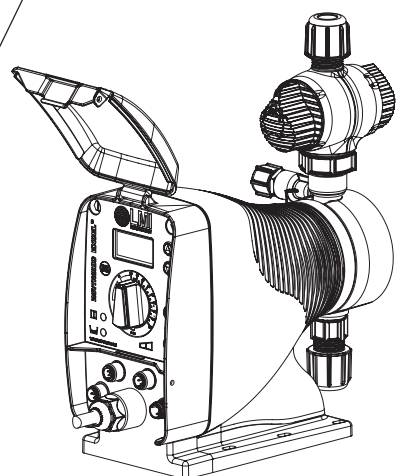
**Material Code**  
See Accompanying Pages for Options

**Head/Valve Code**

S - FastPrime™ Head + 4FV    V - High Viscosity Head  
N - FastPrime™ Head        P - High Viscosity with Ported Head  
H - AutoPrime™ Head + 4FV  
A - AutoPrime™ Head

**Connection Code**

I - Inch Tube connections with tubing  
M - Metric Tube connection without tubing  
U - Inch Tube connection with Black UV resistant suction/discharge tubing  
P - 1/2" NPT - 1/2" BSP Pipe (SS 1/4" NPT)



#### Specifications

Series	Strokes Per Minute (Adjustable)		Stroke Length (Adjustable) Recommended Minimum	Average Input Power @ Max Speed and Pressure	Max. Shipping Weight
	Min	Max			
AD 2X* AD 8X* AD 9X*	1	120	20%	25 watts	10 lbs (4.75 kg)

\* where X = output code



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**Standard FastPrime™ Liquid End Configuration Data & Materials of Construction**

Drive Assembly	Liquid End	Size Code	Materials of Construction				Accs. Valve	Tubing & Connections Discharge & Suction
			Head/Fittings	Balls	Liquifram™	Seat/O-Ring		
AD91 ■ AD81 ■ AD21 ■	910SI†	1	Acrylic/PVC	Ceramic	Fluorofilm™	PTFE/Polyprel®	4FV	PE 1/4" O.D.
	915SI†	1	PP/PP	Ceramic	Fluorofilm™	PTFE	4FV	PE 1/4" O.D.
	918SI†	1	PVC/PVC	Ceramic	Fluorofilm™	PTFE/Polyprel®	4FV	PE 1/4" O.D.
	919SI†	1	Acrylic/PVDF	PTFE	Fluorofilm™	PTFE/Polyprel®	4FV	PE 1/4" O.D.
	917NP	1	316ss/316ss	316ss	Fluorofilm™	316ss/PTFE	—	1/4" NPT
	812SI†	1	PVDF/PVDF	Ceramic	Fluorofilm™	PTFE/Polyprel®	4FV	PE 1/4" O.D.
	813SI†	1	PVDF/PVDF	Ceramic	Fluorofilm™	PTFE	4FV	PE 1/4" O.D.
	818SI†	1	PVC/PVC	Ceramic	Fluorofilm™	PTFE/Polyprel®	4FV	PE 1/4" O.D.
718SI†	1	PVC/PVC	Ceramic	Fluorofilm™	PTFE/Polyprel®	4FV	PE 1/4" O.D.	

Drive Assembly	Liquid End	Size Code	Materials of Construction				Accs. Valve	Tubing & Connections Discharge & Suction
			Head/Fittings	Balls	Liquifram™	Seat/O-Ring		
AD94 ■ AD84 ■ AD24 ■	920SI†	2	Acrylic/PVC	Ceramic	Fluorofilm™	Polyprel®	4FV	PE 1/4" O.D.
	925SI†	2	PP/PP	Ceramic	Fluorofilm™	PTFE	4FV	PE 1/4" O.D.
	928SI†	2	PVC/PVC	Ceramic	Fluorofilm™	Polyprel®	4FV	PE 1/4" O.D.
	929SI†	2	Acrylic/PVDF	PTFE	Fluorofilm™	Polyprel®	4FV	PE 1/4" O.D.
	927NP	2	316ss/316ss	316ss	Fluorofilm™	316ss/PTFE	—	1/4" NPT
	822SI†	2	PVDF/PVDF	Ceramic	Fluorofilm™	Polyprel®	4FV	PE 1/4" O.D.
	823SI†	2	PVDF/PVDF	Ceramic	Fluorofilm™	PTFE	4FV	PE 1/4" O.D.
	828SI†	2	PVC/PVC	Ceramic	Fluorofilm™	Polyprel®	4FV	PE 1/4" O.D.
	728SI†	2	PVC/PVC	Ceramic	Fluorofilm™	Polyprel®	4FV	PE 1/4" O.D.
	624VI*	2	PP/PP	316ss	Fluorofilm™	PTFE	—	PE.5" O.D. Vinyl.938" O.D.
626VI	2	Acrylic/PP	316ss	Fluorofilm™	Viton®/ Polyprel®	—	PE.5" O.D. Vinyl.938" O.D.	

Drive Assembly	Liquid End	Size Code	Materials of Construction				Accs. Valve	Tubing & Connections Discharge & Suction
			Head/Fittings	Balls	Liquifram™	Seat/O-Ring		
AD95 ■ AD85 ■ AD25 ■	930SI†	3	Acrylic/PVC	Ceramic	Fluorofilm™	Polyprel®	4FV	PE 3/8" O.D.
	935SI†	3	PP/PP	Ceramic	Fluorofilm™	PTFE	4FV	PE 3/8" O.D.
	938SI†	3	PVC/PVC	Ceramic	Fluorofilm™	Polyprel®	4FV	PE 3/8" O.D.
	939SI†	3	Acrylic/PVDF	PTFE	Fluorofilm™	Polyprel®	4FV	PE 3/8" O.D.
	937NP	3	316ss/316ss	316ss	Fluorofilm™	316ss/PTFE	—	1/4" NPT
	832SI†	3	PVDF/PVDF	Ceramic	Fluorofilm™	Polyprel®	4FV	PE 3/8" O.D.
	833SI†	3	PVDF/PVDF	Ceramic	Fluorofilm™	PTFE	4FV	PE 3/8" O.D.
	838SI†	3	PVC/PVC	Ceramic	Fluorofilm™	Polyprel®	4FV	PE 3/8" O.D.
	738SI†	3	PVC/PVC	Ceramic	Fluorofilm™	Polyprel®	4FV	PE 3/8" O.D.
	634VI*	3	PP/PP	316ss	Fluorofilm™	PTFE	—	PE.5" O.D. Vinyl.938" O.D.
	636VI	3	Acrylic/PP	316ss	Fluorofilm™	Viton®/ Polyprel®	—	PE.5" O.D. Vinyl.938" O.D.

Drive Assembly	Liquid End	Size Code	Materials of Construction				Accs. Valve	Tubing & Connections Discharge & Suction
			Head/Fittings	Balls	Liquifram™	Seat/O-Ring		
AD96 ■ AD86 ■ AD26 ■	940SI†	4	Acrylic/PVC	Ceramic	Fluorofilm™	Polyprel®	4FV	PE 3/8" O.D.
	945SI†	4	PP/PP	Ceramic	Fluorofilm™	PTFE	4FV	PE 3/8" O.D.
	948SI†	4	PVC/PVC	Ceramic	Fluorofilm™	Polyprel®	4FV	PE 3/8" O.D.
	949SI†	4	Acrylic/PVDF	PTFE	Fluorofilm™	Polyprel®	4FV	PE 3/8" O.D.
	947NP	4	316ss/316ss	316ss	Fluorofilm™	316ss/PTFE	—	1/4" NPT
	842SI†	4	PVDF/PVDF	Ceramic	Fluorofilm™	Polyprel®	4FV	PE 3/8" O.D.
	843SI†	4	PVDF/PVDF	Ceramic	Fluorofilm™	PTFE	4FV	PE 3/8" O.D.
	848SI†	4	PVC/PVC	Ceramic	Fluorofilm™	Polyprel®	4FV	PE 3/8" O.D.
	748SI†	4	PVC/PVC	Ceramic	Fluorofilm™	Polyprel®	4FV	PE 3/8" O.D.
	644VI*	4	PP/PP	316ss	Fluorofilm™	PTFE	—	PE.5" O.D. Vinyl.938" O.D.
646VI	4	Acrylic/PP	316ss	Fluorofilm™	Viton®/ Polyprel®	—	PE.5" O.D. Vinyl.938" O.D.	

## Output Information with FastPrime™ Liquid End

Series	Gallons per Hour		Liters per Hour		mL/cc per Minute		mL/cc per Stroke		Maximum Injection Pressure
	Min	Max	Min	Max	Min	Max	Min	Max	
ADX1	0.002	0.21	0.01	0.8	0.132	13.2	0.011	0.11	250 psi (17.2 Bar)
ADX4	0.005	0.5	0.02	1.9	0.315	31.5	0.013	0.13	250 psi (17.2 Bar)
ADX5	0.01	1.0	0.04	3.8	0.630	63.0	0.026	0.26	110 psi (7.6 Bar)
ADX6	0.02	2.0	0.08	7.6	1.260	126.0	0.053	0.53	50 psi (3.4 Bar)

(Where X = Control Code 2,8,9).

## AutoPrime™ Liquid End Configuration Data & Materials of Construction

Drive Assembly	Liquid End	Size Code	Materials of Construction				Accs. Valve	Tubing & Connections
			Head/Fittings	Balls	Liquifram™	Seat/O-Ring		
AD91 ■ AD81 ■ AD21 ■	910HI†	1	Acrylic/PVC	Ceramic	Fluorofilm™	PTFE/Polyprel®	4FV	PE 1/4" O.D.
	918HI†	1	PVC/PVC	Ceramic	Fluorofilm™	PTFE/Polyprel®	4FV	PE 1/4" O.D.

Drive Assembly	Liquid End	Size Code	Materials of Construction				Accs. Valve	Tubing & Connections
			Head/Fittings	Balls	Liquifram™	Seat/O-Ring		
AD94 ■ AD84 ■ AD24 ■	920HI†	2	Acrylic/PVC	Ceramic	Fluorofilm™	PTFE/Polyprel®	4FV	PE 1/4" O.D.
	928HI†	2	PVC/PVC	Ceramic	Fluorofilm™	PTFE/Polyprel®	4FV	PE 1/4" O.D.

Drive Assembly	Liquid End	Size Code	Materials of Construction				Accs. Valve	Tubing & Connections
			Head/Fittings	Balls	Liquifram™	Seat/O-Ring		
AD95 ■ AD85 ■ AD25 ■	930HI†	3	Acrylic/PVC	Ceramic	Fluorofilm™	PTFE/Polyprel®	4FV	PE 3/8" O.D.
	938HI†	3	PVC/PVC	Ceramic	Fluorofilm™	PTFE/Polyprel®	4FV	PE 3/8" O.D.

Drive Assembly	Liquid End	Size Code	Materials of Construction				Accs. Valve	Tubing & Connections
			Head/Fittings	Balls	Liquifram™	Seat/O-Ring		
AD96 ■ AD86 ■ AD26 ■	940HI†	4	Acrylic/PVC	Ceramic	Fluorofilm™	PTFE/Polyprel®	4FV	PE 3/8" O.D.
	948HI†	4	PVC/PVC	Ceramic	Fluorofilm™	PTFE/Polyprel®	4FV	PE 3/8" O.D.

## Output Information with AutoPrime™ Liquid End — Estimated

Series	Gallons per Hour		Liters per Hour		mL/cc per Minute		mL/cc per Stroke		Maximum Injection Pressure
	Min	Max	Min	Max	Min	Max	Min	Max	
ADX1	0.0015	0.15	0.006	0.6	0.095	9.5	0.0008	0.079	150 psi (10.3 Bar)
ADX4	0.0033	0.33	0.012	1.2	0.21	20.8	0.0017	0.17	150 psi (10.3 Bar)
ADX5	0.008	0.8	0.030	3.0	0.50	50.5	0.0042	0.42	110 psi (7.6 Bar)
ADX6	0.018	1.8	0.068	6.8	1.14	113.6	0.0095	0.95	50 psi (3.4 Bar)

(Where X = Control Code 2,8,9).

AUTOPRIME™ liquid ends have 3 check valves: suction on the bottom; discharge on the front; autopriming bleed on the top. By design, a repeatable portion of the process fluid continuously bleeds through the top check valve to be returned to the chemical supply. The result is the assurance that any gas in the head is automatically relieved thus eliminating air-binding. Depending on application, output may be reduced up to 50%. Variables include supplier piping, stroke length and speed setting. Maximum pressure is 150 psi (10.3 Bar) for AX1, AX4, 110 psi (7.6 Bar) for AX5, 50 psi (3.4 Bar) for AX6 models. (Where X = control codes 0,1,3,7,8).

■ See front page for voltage code specifications. **4FV**

† To specify black, UV resistant tubing, change 'I' to 'U'. To specify head only and no 4FV, change S to N for FastPrime or change H to A for AutoPrime.  
To specify 1/2" NPT Male, change "I" to "P".  
\* To specify Ported Head, change "V" to "P".

**4FV** indicates that the pump is equipped with an LMI Four Function Valve. This diaphragm type, anti-syphon/pressure relief valve is installed on the pump head. It provides anti-syphon protection and aids priming, even under pressure.

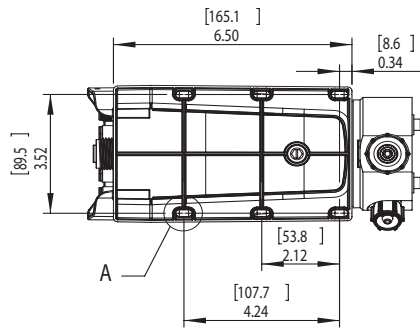
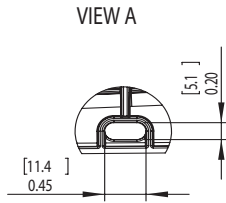
Fluorofilm™ is a copolymer of PTFE and PFA. Polyprel® is an elastomeric PTFE copolymer.

Polyprel is a registered trademark of the Milton Roy Company.

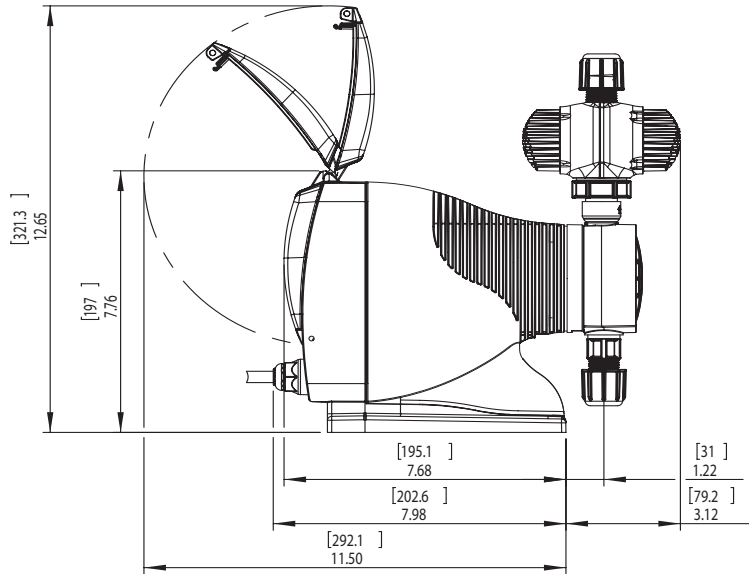
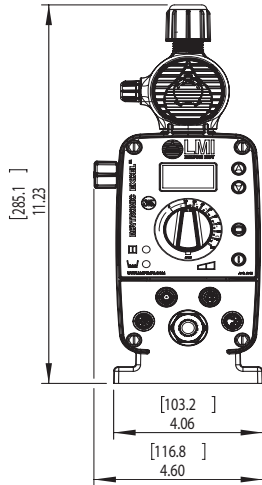
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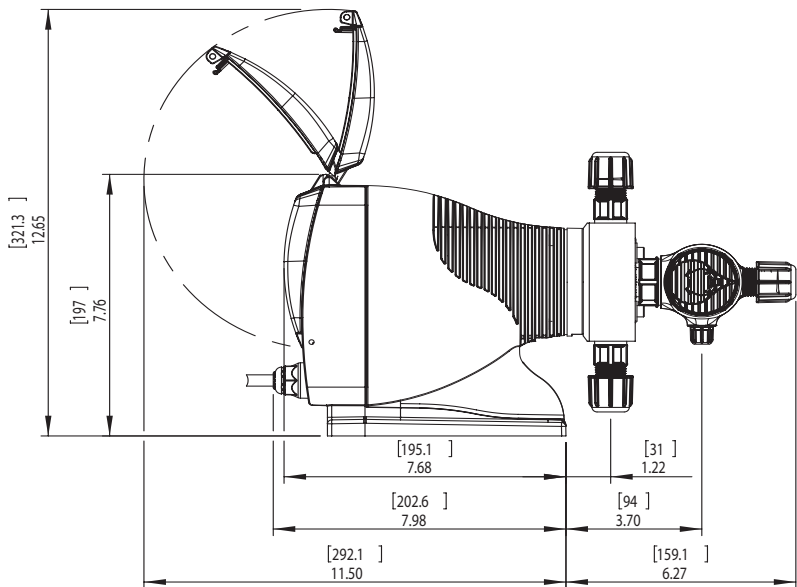
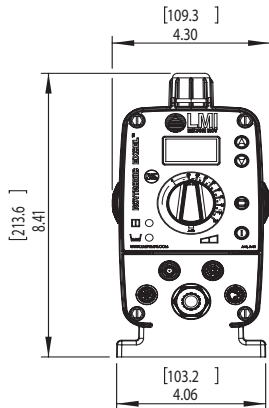
MOUNTING INFORMATION



FASTPRIME LIQUID ENDS



AUTOPRIME LIQUID ENDS



NOTE: ALL DIMENSIONS ARE IN INCHES [MM]. DIMENSIONS SHOWN ARE FOR LARGEST LIQUID END.  
DIMENSIONS WILL VARY DEPENDING ON LIQUID END SELECTED.

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