

Haskel[®]
INTERNATIONAL, INC.



CIP SERIES

**AIR/GAS DRIVEN
CHEMICAL
INJECTION
PUMPS**

**OUR PRODUCTS ARE BACKED BY OUTSTANDING TECHNICAL SUPPORT, AN
EXCELLENT REPUTATION FOR RELIABILITY AND WORLDWIDE DISTRIBUTION**



CERT. NO. Q 5225



INJECTION PUMPS AND SYSTEMS

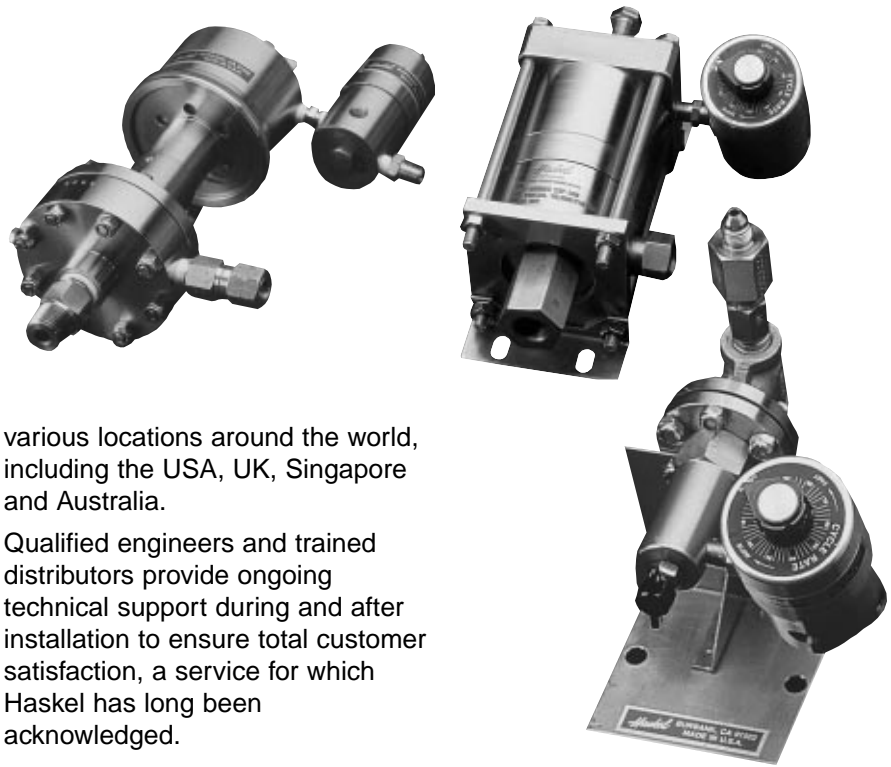
Haskel International, Inc. has one of the widest choices of air-gas driven metering pumps available, meeting pressure and flow rates not achieved by other manufacturers.

By listening to the needs of our customers, we have developed and offer a comprehensive pump range utilizing materials such as 316SS, ceramics, and Teflon in order to achieve the highest corrosion resistance possible.

To meet the needs of highest accuracy and reduced chemical costs, Haskel pumps offer both stroke rate and stroke length adjustment providing high flow rate turndown ratios, and enabling simple setup and operator adjustments when necessary.

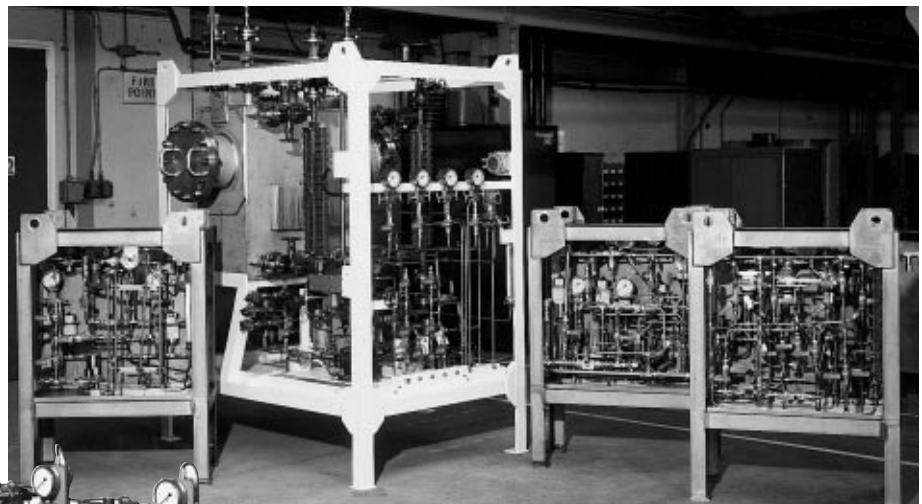
In developing this extensive range, Haskel has drawn on decades of knowledge and experience in producing high-pressure pumps (up to 100,000 psi) and has built in the technology and high quality that has made Haskel the largest manufacturer of high-pressure pumps in the world.

Haskel International, Inc. designs and builds chemical injection skids and customizes system packages to individual specifications at its

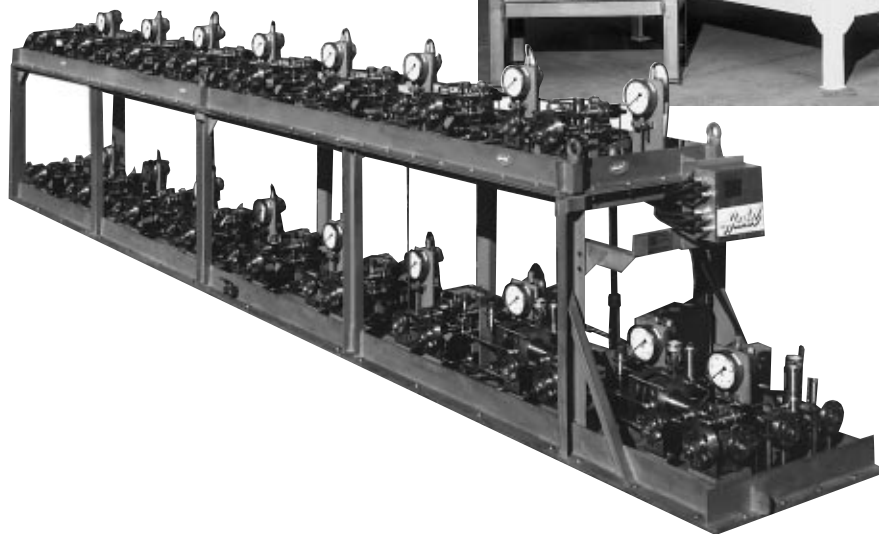


various locations around the world, including the USA, UK, Singapore and Australia.

Qualified engineers and trained distributors provide ongoing technical support during and after installation to ensure total customer satisfaction, a service for which Haskel has long been acknowledged.



Haskel metering pumps and systems are utilized worldwide by most of the leading oil and gas companies and their operators. A complete reference guide is available upon request, which serves to show the depth and experience Haskel has in meeting the requirements of the "chemical injection" industry.



SAFETY

- Intrinsically safe, non-electrical.
- Use of air/gas and corrosion resistant materials allows use in difficult and hazardous areas such as offshore oil/gas platforms.

PERFORMANCE

- Positive displacement.
- Stroke rate and stroke length adjustment for accuracy.
- Materials chosen for maximum corrosion resistance.

QUALITY

- Manufactured to the highest quality standards demanded by today's industry.

SIMPLICITY

- Compact design compared with alternate electric pumps.
- Reduced components for easy maintenance.
- Easily installed, easily operated.

APPLICATIONS

- Oil, Petrochemical & Refining – Metering and injection of chemicals during the production, processing, refining or transmission of oil and gas.
- Offshore Oil & Gas – Injection and metering of Methanol, Glycol, corrosion inhibitors, emulsion breakers, oxygen scavenging, etc.
- Gas LNG, LPG and CNG – Injection of Methanol, corrosion inhibitors and odorants.
- Power Generation – Injection of caustic and other chemicals for prevention of corrosion and scale in industry boilers.
- Chemical Processing & Laboratories – Metering of dyes, detergents, lubricants, etc.
- Pulp & Paper – Metering of caustics, solvents, defoamers, and biocides.
- Water Treatment – Metering of acids, corrosion and scale inhibitors.
- Industrial – Metering of chemicals and solutions used in the manufacture of paint, rubber, plastic, ink, textiles, fertilizers, electronics, etc.

SELECTION

Each injection or metering application has characteristics that can affect metering accuracy. These include fluid compressibility, viscosity, line length, etc. It is therefore necessary to select a pump that will provide both the pressure, displacement and cycle rate well within the requirements and adjust the cycle rate under actual site conditions.

This is most commonly done by observing the amount of time taken for a known volume of liquid to flow into the pump (while operating under full load if possible) for good accuracy. Simply observe the time taken while the pump draws fluid from a graduated tube or container and extrapolate the results in a rate per minute, hour or day as required.

HOW TO SELECT THE CORRECT MODEL

1. Output per hour – select the smallest pump capable of achieving the output flow rate within the maximum number of strokes per minute. (Consult the chart for maximum number of strokes per pump.)
2. Outlet pressure available – select a pump nominal ratio to give an outlet pressure greater than the process line pressure; e.g., if process line pressure is 5000 psi (345 bar) and available air drive pressure = 90 psi (6.2 bar), then ratio = 5000 psi/90 psi = 55:1. Choose the next ratio pump size above, i.e. 60:1. Therefore 60x90 psi = 5400 psi (372 bar) and so injecting above the process line pressure.
3. Chemical to be pumped – check the wetted materials section table to ensure seal package, pump body, piston, bearings and check valves are compatible with your conditions.

All Haskel injection pumps utilize a pneumatic timer (delay valve) to operate in a reciprocating manner.

While the exact cycling mechanism varies with each pump series, dependent upon whether it is spring or air returned, the cutaway diagrams provided in this catalog serve to demonstrate the basic operating principle which in the case of the CIP M-Series is described here.

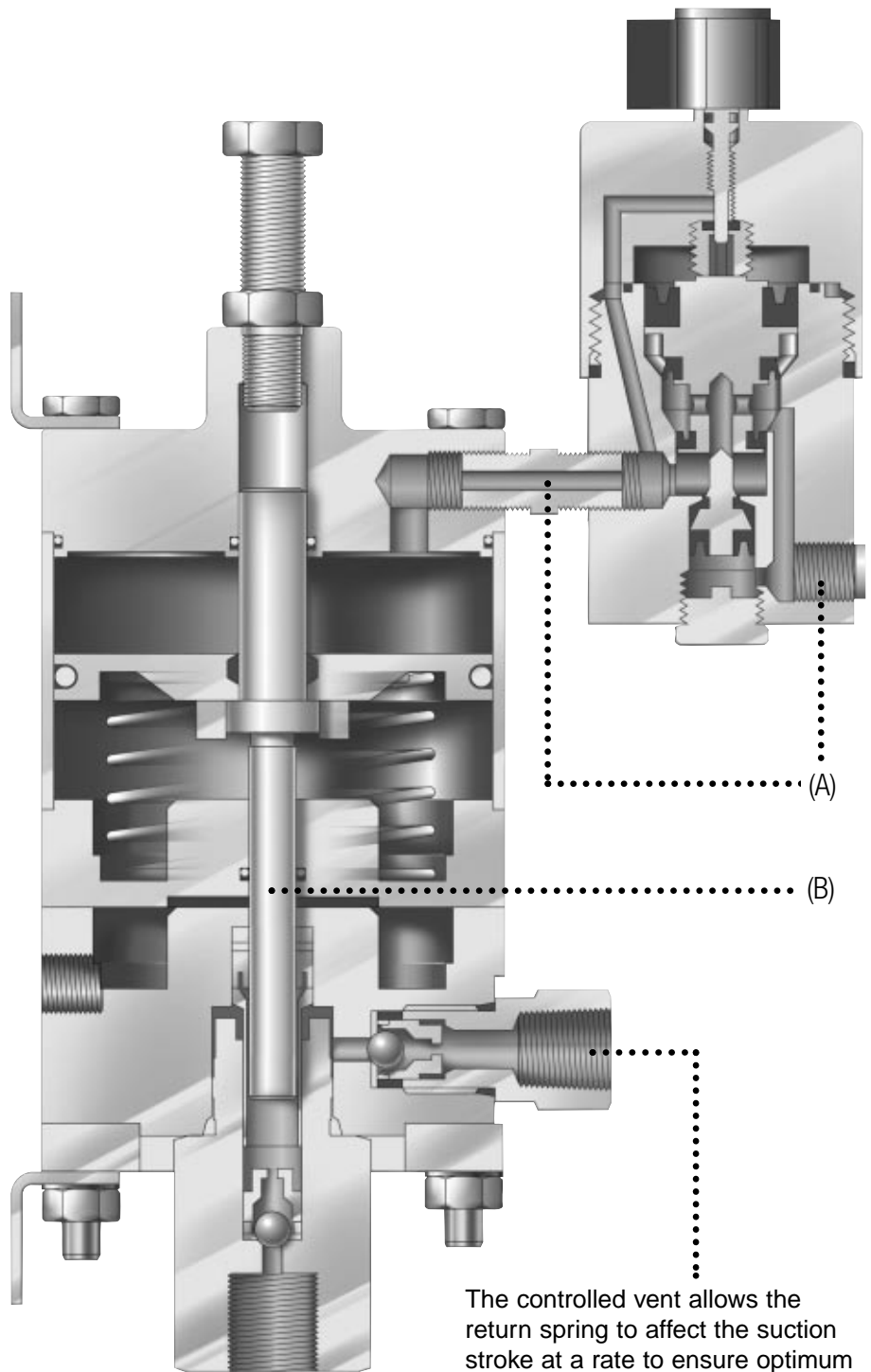
Further technical explanation or guidance on the operational sequence of any product described in this catalog may be obtained from any Haskel facility or distributor.

OPERATING PRINCIPLE

Drive air or gas is routed through the adjustable time delay valve (A). The valve adjustment range provides for cycle rates from 0 to 50 cpm*. When the drive media is supplied, the valve allows flow to the drive piston, commencing the injection cycle.

The liquid plunger (B) is driven through its power stroke displacing a controlled amount of fluid. The stroke length is adjustable, dependent on the pump, between 25% and 100% providing adjustment of injection volume per cycle. The plunger remains at the end of the power stroke until the time delay valve switches, venting the drive air.

*Consult factory for cpm above stated figures.



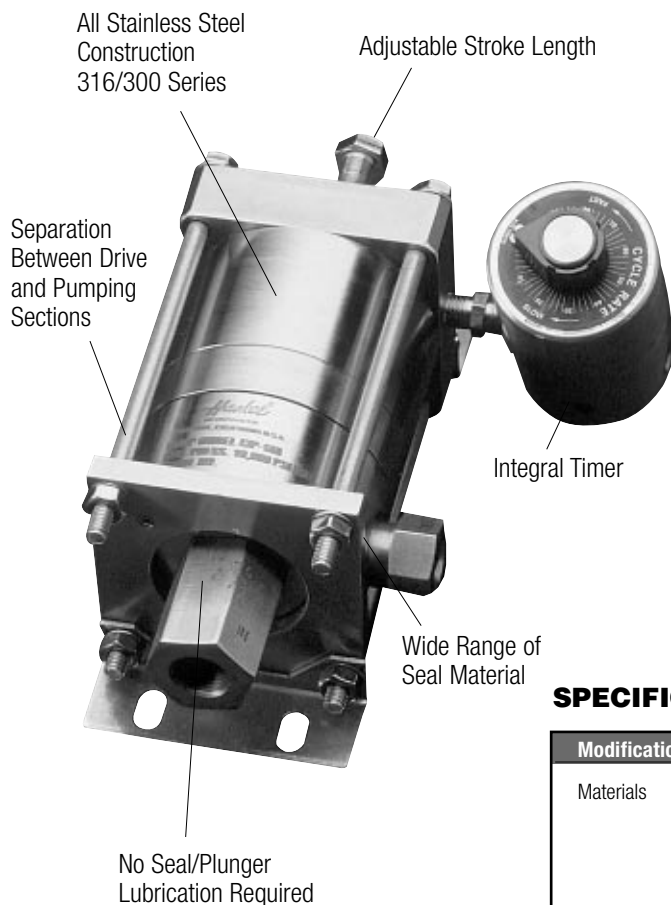
The controlled vent allows the return spring to affect the suction stroke at a rate to ensure optimum fill to the pump chamber. The pump then dwells at the top of the stroke, primed for the next injection stroke. The timer valve will continue to automatically cycle the pump at the set rate and stroke to provide a consistent injection volume.

CIP M-SERIES INJECTION PUMPS

Model	Plunger Displacement cc / cu ins	Pump Ratio	Stroke Length in / cm	Connections All NPT (ins) input / output	Max Displacement Pressure* psi / bar	Output Per Hour** gal / lts
21	3.3 / 0.2	21 : 1	1 / 2.54	3/8 / 1/4	2625 / 181	0.05 - 2.6 / 0.19 - 9.8
36	2.0 / 0.12	36 : 1	1 / 2.54	3/8 / 1/4	4500 / 310	0.03 - 1.6 / 0.13 - 6
71	1.0 / 0.06	71 : 1	1 / 2.54	3/8 / 1/4	8875 / 612	0.02 - 0.75 / 0.06 - 3
110	0.6 / 0.039	110 : 1	1 / 2.54	3/8 / 1/4	10,000 / 690	0.01 - 0.5 / 0.04 - 1.8
188	0.4 / 0.023	188 : 1	1 / 2.54	3/8 / 1/4	10,000 / 690	0.006 - 0.3 / 0.02 - 1.25

* Actual stall pressure based on 125 psi / 8 bar Maximum Drive Pressure.

** Based on 50 cpm Maximum Stroke Rate.



ADD MODIFICATION NUMBERS

Modification		Number
Plunger Seal (Polyurethane Standard)	Ultra-High Molecular Weight Polyethylene (UHMWPE)	01
	Reinforced Teflon	02
	Other - Consult Customer Technical Support	
Wetted O-rings (Viton/Standard)	Buna-N	03
	EPR	04
	Teflon	05
	Other - Consult Customer Technical Support	
Drive Selection O-rings (Viton/Standard)	Buna-N	06
	Other - Consult Customer Technical Support	
Selection Example:	CIP Series 71 Ratio Model 01 Plunger Seal 04 Wetted O-rings 06 Drive O-rings	

SPECIFICATIONS

Modification	Description	
Materials	Body	316 Stainless Steel
	Plunger	316 Stainless Steel
	Drive Section	300 Series Stainless Steel/Viton O-rings
	Check Balls	316 Stainless Steel
	Check Valves	Teflon (Semi-soft Seats)
	Plunger Seal	Polyurethane Standard (See Modification Chart for Alternatives)
	Static O-ring	Viton Standard (See Modification Chart for Alternatives)
Pressure	Output	To 690 Bar (10,000 psi) (See Pump Section Table)
	Drive	3.5 to 8 Bar (50 to 125 psi)
	Suction	NPSHR (Below)
Injection Rate		0.02 to 9.8 L/hr (0.006 to 2.6 USG/hr) (See Pump Selection Chart for Specific Model Capacities)
Wetted O-rings (Viton/Standard)	Outlet	1/4" NPT
	Suction	3/8" NPT
	Drive	1/8" NPT 125 psi Maximum, 25 psi Minimum
NPSHR		2 ft / H ₂ O 2 ft / H ₂ O 1.5 ft / H ₂ O 1 ft / H ₂ O 1 ft / H ₂ O

CIP DSTV-SERIES PUMPS

CIP DSTV-SERIES INJECTION PUMPS

Model	Plunger Displacement cc / cu ins	Pump Ratio	Stroke Length in / cm	Connections All NPT (ins) input / output	Max Displacement Pressure* psi / bar	Output Per Hour** gal / lts
1.5	513 / 31.9	1.5 : 1	1 7/8 / 4.76	1 / 1/2	225 / 15.5	413 / 1563
B10	66.4 / 4.05	10 : 1	1 7/8 / 4.76	1 / 1/2	1500 / 103	52 / 198
B15	44.3 / 2.7	15 : 1	1 7/8 / 4.76	1 / 1/2	2250 / 155	35 / 131
B22	66.4 / 4.05	22 : 1	1 7/8 / 4.76	1/2 / 1/2	3300 / 228	52 / 198
25	26.6 / 1.62	25 : 1	1 7/8 / 4.76	1 / 1/2	3750 / 259	21 / 79
B32	44.3 / 2.7	32 : 1	1 7/8 / 4.76	1/2 / 1/2	4800 / 331	35 / 131
35	19 / 1.16	35 : 1	1 7/8 / 4.76	1/2 / 1/2	5250 / 362	15 / 56
52	26.6 / 1.62	52 : 1	1 7/8 / 4.76	1/2 / 1/2	7800 / 538	21 / 79
60	11 / 0.67	60 : 1	1 7/8 / 4.76	1/2 / 1/2	9000 / 621	8.75 / 33
72	19 / 1.16	72 : 1	1 7/8 / 4.76	1/2 / 1/2	10,800 / 745	15 / 56
100	6.7 / 0.41	100 : 1	1 7/8 / 4.76	1/2 / 1/2	15,000 / 1034	5.2 / 20
150	4.5 / 0.27	150 : 1	1 7/8 / 4.76	1/2 / 1/2	22,500 / 1551	3.5 / 13

* Actual stall pressure based on 150 psi / 10 bar Maximum Drive Pressure.
 ** Based on 50 cpm Maximum Stroke Rate.

SPECIFICATIONS

Item	Description	
Materials	Body	316 Stainless Steel
	Plunger	316 Stainless Steel
	Drive Section	Aluminum Epoxy Coated (Optional 303 SS) Viton O-rings
	Check Balls	316 Stainless Steel
	Check Valves	Teflon (Semi-soft Seats)
	Plunger Seal	Reinforced Teflon
	Static O-ring	Viton
Pressure	Output	To 1551 Bar (22,500 psi) <i>(See Pump Section Table)</i>
	Drive	2 to 10 Bar (30 to 150 psi)
Injection Rate		To 1563 L/hr (413 USG/hr) <i>(See Pump Selection Chart for Specific Model Capacities)</i>
Connections	Drive	1/8" NPT

CIP G-SERIES PUMPS

CIP G-SERIES INJECTION PUMPS

Model	Plunger Displacement cc / cu ins	Pump Ratio	Stroke Length in / cm	Connections All NPT (ins) input / output	Max Displacement Pressure* psi / bar	Output Per Hour** gal / lts
DGSTVD-12	260 / 15.9	12 : 1	4 1/2 / 11.4	1 1/4 / 3/4	1500 / 103	206 / 781
DGSTV-35	98 / 6	35 : 1	4 1/2 / 11.4	1 1/4 / 1/2	4375 / 302	77 / 292
DGSTV-60	57 / 3.5	60 : 1	4 1/2 / 11.4	1 1/4 / 1/2	7500 / 517	46 / 171
DGSTV-100	34 / 2.1	100 : 1	4 1/2 / 11.4	1 1/4 / 1/2	12,500 / 862	27 / 102

* Actual stall pressure based on 125 psi / 8 bar Maximum Drive Pressure.
 ** Based on 50 cpm Maximum Stroke Rate.

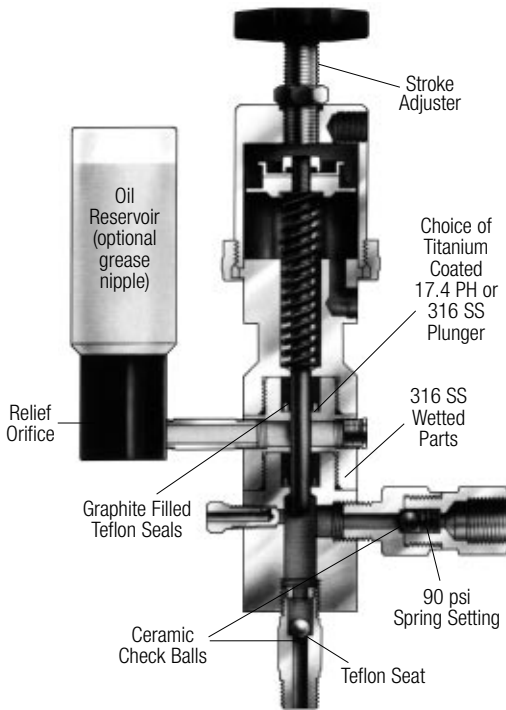
SPECIFICATIONS

Item	Description	
Materials	Body	316 Stainless Steel
	Plunger	316 Stainless Steel
	Drive Section	Aluminum Epoxy Coated (Optional 303 SS / Viton O-rings)
	Check Balls	316 Stainless Steel
	Check Valves	Teflon (Semi-soft Seats)
	Plunger Seal	Reinforced Teflon
	Static O-ring	Viton
Pressure	Output	0 to 690 Bar (0 to 10,000 psi) <i>(See Pump Section Table)</i>
	Drive	2 to 8.5 Bar (25 to 125 psi)
Injection Rate		To 781 L/hr (200 USG/hr) <i>(See Pump Selection Chart for Specific Model Capacities)</i>
Connections	Drive	1/8" NPT

AIR CONSUMPTION CALCULATION

$\frac{\text{Air Drive VOL (factor)}}{1728} \times \frac{\text{Air Drive Press} \times \text{Cycles / Min.}}{14.7}$
Air Drive VOL Factor: CIP M-Series = 7 CIP DSTV-Series = 113 CIP G-Series = 255
Example (Model CIP-71) = $\frac{7}{1728} \times \frac{60}{14.7} \times 40 = 0.66$
Air Consumption = 0.66 SCFM

**CIP H-SERIES
INJECTION PUMPS**



KEY FEATURES

- All 316 Stainless Steel Wetted Ends. Other: 300 SS Series.
- Adjustable Stroke Length.
- Integral Timer (see page 5).
- Ceramic Check Valve Balls for Extended Life.
- Available in Double Seal (DS) Version.
- Wide Selection of Materials to Assure Chemical Compatibility.
- Designed to Provide Easy and Fast Maintenance.

SEAL OPTIONS

- (please state choice when ordering)
- Teflon (Graphite Filled) as Standard
 - Viton
 - Buna-N
 - Fluoraz

PLUNGER OPTIONS

- (please state choice when ordering)
- 316 SS
 - 17.4 PH (Titanium Coated)
 - Carpenter 20

AIR CONSUMPTION CALCULATION

Pump Model	25 psi	50 psi	75 psi	100 psi	125 psi	150 psi
55	1.3	2.1	3.0	3.8	4.6	5.4
125	3.9	6.4	8.9	11.3	13.8	16.2
225 / 235 / 275	8.9	14.4	19.9	25.5	31.0	36.5
325 / 335 / 375 / 3500 / 3755	15.7	25.6	35.4	45.3	55.1	64.9
425 / 435 / 475 / 4500 / 4755	28.0	45.5	63.0	80.5	98.0	115.5
5500	314.5	511	707.6	904.1	1100.7	1297.2
8500	693	1125.4	1558.2	1991	2424	2856.8

Table constant multiplied by Stroke Rate = SCFD.
Example: D10-XXX operated at 50 psi (.4) multiplied by 20 strokes per minute = 8 SCFD.

CIP H-SERIES INJECTION PUMPS

Model	Plunger Displacement	Pump Ratio	Stroke Length in / cm	Connections All NPT (ins) input / output	Max Displacement Pressure ^(a) psi / bar	Output Per Hour ^(b) gal / lts
55DS	.2 cc	54 : 1	3/4 / 1.91	1/4-M / 1/4-F	8100 / 558	.01-.12 / .05-.46
125 / 125DS	.8 cc	31 : 1	1 / 2.54	1/4-M / 1/4-F	4650 / 320	.06-.63 / .24-2.4
225 / 225DS	.8 cc	69 : 1	1 / 2.54	1/4-M / 1/4-F	10,000 / 689	.06-.63 / .24-2.4
325 / 325DS	.8 cc	122 : 1	1 / 2.54	1/4-M / 1/4-F	15,000 / 1034 ⁽¹⁾	.06-.63 / .24-2.4
425 / 425DS*	.8 cc	217 : 1	1 / 2.54	1/4-M / 1/4-F	15,000 / 1034 ⁽¹⁾	.06-.63 / .24-2.4
235 / 235DS	1.8 cc	31 : 1	1 / 2.54	1/4-M / 1/4-F	4650 / 320	.15-1.5 / .55-5.5
335 / 335DS	1.8 cc	54 : 1	1 / 2.54	1/4-M / 1/4-F	8100 / 558	.15-1.5 / .55-5.5
435 / 435DS*	1.8 cc	97 : 1	1 / 2.54	1/4-M / 1/4-F	10,000 / 689	.15-1.5 / .55-5.5
275 / 275DS	3.2 cc	17 : 1	1 / 2.54	1/2-M / 1/4-F	2550 / 175	.25-2.5 / .95-9.5
375 / 375DS	3.2 cc	31 : 1	1 / 2.54	1/2-M / 1/4-F	4650 / 320	.25-2.5 / .95-9.5
475 / 475DS	3.2 cc	54 : 1	1 / 2.54	1/2-M / 1/4-F	8100 / 558	.25-2.5 / .95-9.5
3755 / 3755DS	7.2 cc	14 : 1	1 / 2.54	3/4-M / 1/2-F	2100 / 144	.56-5.6 / 2.1-21
4755 / 4755DS*	7.2 cc	24 : 1	1 / 2.54	3/4-M / 1/2-F	3600 / 248	.56-5.6 / 2.1-21
3500 / 3500DS	12.8 cc	8 : 1	1 / 2.54	3/4-M / 1/2-F	1200 / 83	1-10 / 3.9-39
4500 / 4500DS*	12.8 cc	14 : 1	1 / 2.54	3/4-M / 1/2-F	2100 / 144	1-10 / 3.9-39
880DS ^{(2)**}	19.7 cc	31 : 1	2 / 5.10	1 1/2-M / 3/4-F	4650 / 320	1.1-11 / 4.1-41
1255DS**	40.0 cc	14 : 1	2 / 5.10	1 1/2-M / 3/4-F	2550 / 175	2.2-22 / 8.4-84
5500DS ^{(2)**}	154.0 cc	6 : 1	3.1 / 7.87	1 1/2-M / 3/4-F	900 / 62	9-90 / 34-341
8500DS**	154.0 cc	14 : 1	3.1 / 7.87	1 1/2-M / 3/4-F	2100 / 144	9-90 / 34-341

Note: All models come complete with timers.
*SR15 Snap Action Relay Included.
**SR25 Snap Action Relay Included.

(1) Discharge pressure over 10,000 psi (689 bar) requires special seal assembly.
(2) Limited to 35 cpm.
(a) Actual stall pressure based on 150 psi / 10 bar Maximum Drive Pressure.
(b) Based on 50 cpm Maximum Stroke Rate.

CIP HD-SERIES PUMPS



CIP HD-Series Injection Pumps require a Haskel Timer as shown, or an electronic solenoid valve.

Unless otherwise required, pumps will be offered with pneumatic timers.

CIP HD-SERIES INJECTION PUMPS

Model	Plunger Displacement	Pump Ratio	Stroke Length in / cm	Connections All NPT (ins) input / output	Max Displacement Pressure ^(a) psi / bar	Output Per Hour ^(b) gal / lts
HD187	.2 cc	10 : 1	1/2 / 1.27	1/4-M / 1/8-F	1000 / 68.9	.01-.12 / .05-.46
HD312	1.0 cc	10 : 1	1 / 2.54	1/4-M / 1/4-F	1000 / 68.9	.06-.63 / .24-2.4
HD312-3K	1.0 cc	30 : 1	1 / 2.54	1/4-M / 1/4-F	3000 / 206	.06-.63 / .24-2.4
HD312-5K	1.0 cc	50 : 1	1 / 2.54	1/4-M / 1/4-F	5000 / 344	.06-.63 / .24-2.4
HD562	3.5 cc	10 : 1	1 / 2.54	1/2-M / 1/4-F	1000 / 68.9	.25-2.5 / 1-9.5
HD562-3K	3.5 cc	30 : 1	1 / 2.54	1/2-M / 1/4-F	3000 / 206	.25-2.5 / 1-9.5
HD1062	12.8 cc	10 : 1	1 / 2.54	3/4-M / 1/2-F	1000 / 68.9	1-10.4 / 3.9-39
HD2000	135.8 cc	6 : 1	3.1 / 7.87	1 1/4-M / 3/4-F	900 / 62	8.1-81.3 / 30.7-307

(a) Based on 100 psi / 7 bar Maximum Drive Pressure (except HD2000 - 150 psi / 8 bar Maximum).

(b) Based on 50 cpm Maximum Stroke Rate.

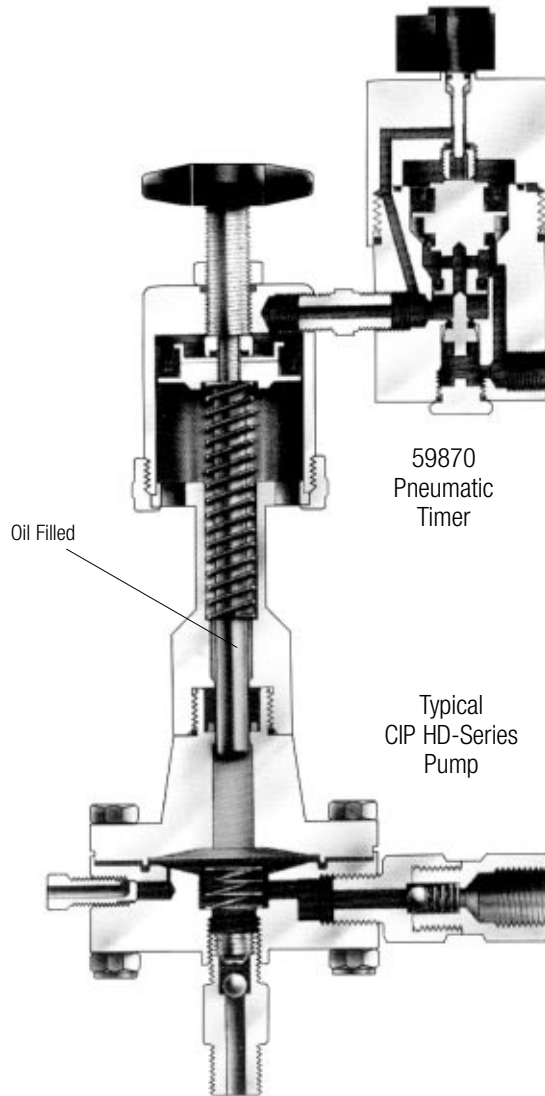
Note: HD1062 requires SR1S snap action relay.
 HD2000 requires SR2S snap action relay.
 Maximum stroke for all pumps is 50 SPM (except HD2000-35 SPM).
 Consult factory for further information.

CIP HD-SERIES
HYDRAULIC
DIAPHRAGM
INJECTION PUMPS

Specifically designed for more difficult applications such as odorant, acid, caustic and formaldehyde injection, this innovative pump design incorporates many benefits and features not found in competitive makes.

KEY FEATURES

- Hydraulic diaphragm providing separation between chemical being pumped and seals, thereby preventing leaks and seepage.
- Diaphragm is Teflon coated to prevent corrosion.
- Oil in the upper chamber serves as a plunger lubricant as well as hydraulic fluid.
- Teflon coated – Inconel plunger spring for longer service life.
- All Stainless Steel construction (wetted parts 316, other parts 300 series).
- HDM option available on certain models providing micrometer output volume adjustment in place of stroke adjuster.



AIR CONSUMPTION CALCULATION

Pump Model	25 psi	50 psi	75 psi	100 psi	125 psi	150 psi
HD187	1.0	2.0	2.9	3.7	4.5	5.3
HD312	3.9	6.4	8.9	11.3	13.8	16.2
HD312-3K	8.9	14.4	19.9	25.5	31.0	36.5
HD312-5K	15.7	25.6	35.4	45.3	55.1	64.9
HD562	8.9	14.4	19.9	25.5	31.0	36.5
HD562-3K	15.7	25.6	35.4	45.3	55.1	64.9
HD562-5K	28.0	45.5	63.0	80.5	98.0	115.5
HD1062	28.0	45.5	63.0	80.5	98.0	115.5
HD2000	314.5	511.0	707.6	904.1	1100.7	1297.2

Table constant multiplied by Stroke Rate = SCFD.
Example: D10-XXX operated at 50 psi (.4) multiplied by 20 strokes per minute = 8 SCFD.

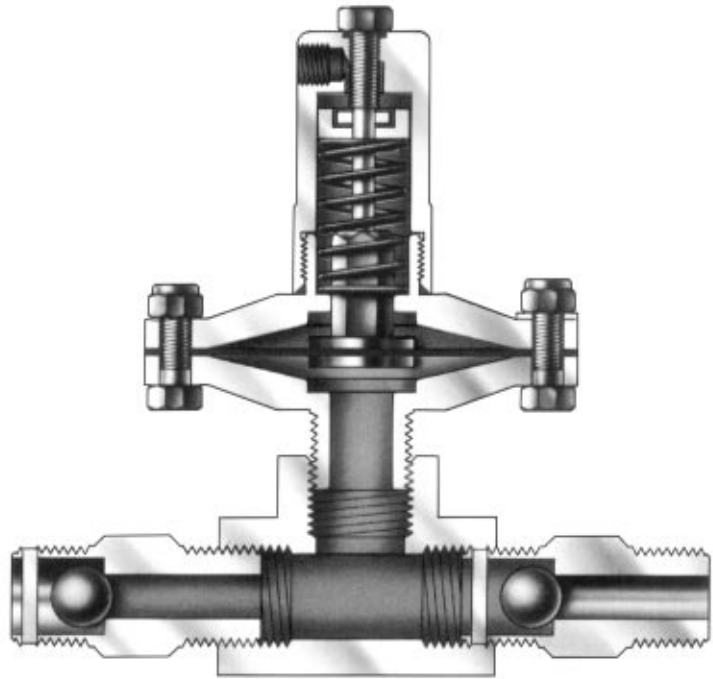
CIP PD - SERIES PNEUMATIC DIAPHRAGM

CIP PD - SERIES PNEUMATIC DIAPHRAGM INJECTION PUMPS

Designed for pumping caustics, acids and other difficult chemicals at low pressure, up to 125 psi, this range of pump is offered in either solid Stainless Steel construction or a combination of Stainless Steel and PVC.

KEY FEATURES

- Unique design eliminates unbalanced pressures.
- Teflon laminated diaphragm for increased durability.
- Rate and volume adjustments can be made while unit is in operation.
- Available in all Stainless Steel or Stainless Steel and PVC.
- Ideal for pumping acids or caustics at up to 125 psi.



CIP PD-SERIES INJECTION PUMPS

Model	Diaphragm Displacement	Pump Ratio	Diaphragm Size in / cm	Connections All npt (ins) input / output	Max Displacement Pressure* psi / bar	Output Per Hour** gal / lts
PD10-316 / PD10-PVC	.8 cc	1 : 1	1 / 2.5	1/4-M / 1/4-F	125 / 8.6	.06-.63 / .24-2.4
PD15-316 / PD15-PVC	6.6 cc	1 : 1	1 1/2 / 3.8	1/4-M / 1/4-F	125 / 8.6	5-5.2 / 2-20
PD25-316 / PD25-PVC	21.0 cc	1 : 1	2 1/2 / 6.4	1/2-M / 1/2-F	125 / 8.6	2-17 / 6.3-63
PD40-316 / PD40-PVC	37.9 cc	1 : 1	4 / 10	3/4-M / 3/4-F	125 / 8.6	3-30 / 11-114

* Based on 125 psi / 8 bar Maximum Drive Pressure.
 ** Based on 50 cpm Maximum Stroke Rate.

AIR CONSUMPTION CALCULATION

Pump Model	25 psi	50 psi	75 psi	100 psi	125 psi	150 psi
PD10-XXX	.2	.4	.5	.7	.8	1.0
PD15-XXX	.7	1.1	1.6	2.0	2.4	28.4
PD25-XXX	2.2	3.5	4.8	6.2	7.5	8.9
PD40-XXX	9.2	14.9	20.7	26.4	32.2	37.9

Table constant multiplied by Stroke Rate = SCFD.
 Example: D10-XXX operated at 50 psi (.4) multiplied by 20 strokes per minute = 8 SCFD.



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