

EZ-LINER

the Quality ^{is In} our Line.

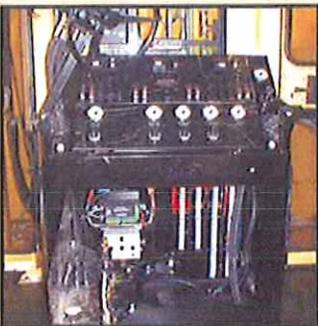
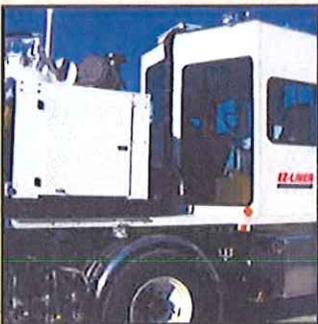
**State of Missouri
RFB #3-150520TV**

STRIPERS

**Custom “Build-a-truck” Descriptive
Literature/Technical Data/Drawings**

Base specification

EZ-LINER



TRUCK MOUNTED CUSTOM BUILT STRIPER

- Variety of paint delivery systems available including airless and airspray technology.
- Choice of chassis. Engineering generated weight distribution layouts to ensure compliance with vehicle and legal limits.
- Simplified and convenient plumbing, wiring and controls for user friendliness and efficiency.
- Utilization of components recognized and trusted as professional, durable, dependable and cost effective.
- High quality welds and unparalleled platform, railing and ladder construction.
- Two component Urethane coating, powder coating and plating for ultimate protection from weathering, wearing and fading.
- Field tested with millions of gallons of traffic paint in on-the-job situations through our own marking division.
- Durable, lightweight, sturdy carriage design with automatic storage lock and down pressure for consistent lines.
- Built to the requirements of each customer.
- Intelligent and safe design, dependable performance and reliable service after the sale.

www.ezliner.com

BUILT TO CUSTOMER SPECIFICATIONS



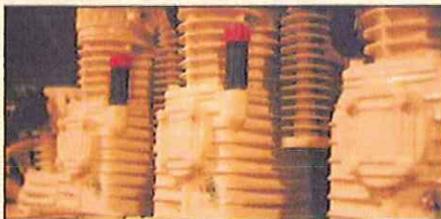
Detailed specifications are available on request. Call for a price quote or demonstration.



DETAILS

- Skipline controllers, paint and bead monitoring systems, footage counters and other high tech electronic equipment.
- Agitators and recirculation for maintaining viscosity and integrity of the traffic paint.
- Surface preparation air jets and electric gun elevators for line width control.
- Solenoid override for gun testing at the carriage location.
- Resourceful paint and bead loading systems and level gauges.
- Safety lighting to include strobes, arrow and message boards, lightbars, etc.
- Endless supply of guiding tools such as mechanical types, laser and video cameras.
- Communications tools such as wireless, duplex simultaneous talk intercom systems.
- Enhanced air preparation fixtures to protect onboard pneumatic systems.
- Auxiliary paint and bead gun options for hand applications.
- Tote and drum draw paint systems
- LED lighting packages

EZ-LINER SERVICE FEATURES



Shipped from in-stock inventory or custom designed to meet your specifications.



Parts orders can be shipped: Same Day Shipping, Direct Shipping or Next Day Air.



Over 50 years of combined experience in our customer service department.

EZ-Liner's continuing quest for improvement makes equipment, specifications and components subject to change without notice.

www.ezliner.com

1920 Albany Place S.E. • Orange City, Iowa 51041 • PH: 712-737-4016 or 800-373-4016 • FAX: 712-737-4148

STRIPING PAINT AND EQUIPMENT

Total pavement marking expertise.



Vogel Traffic Services, Inc. has the answers.

From manufacturing EZ-Liner Industries pavement marking equipment to installing professional traffic markings using quality traffic paint manufactured in our factory, we are able to provide knowledge, versatility and dependability. We serve all phases of government agencies and contractors while focusing on the specific needs of the pavement marking industry with precision control, quality and safety.

ROAD STRIPING EXPERTS

EZ-Liner® and Vogel Traffic Services are the leaders in providing traffic marking solutions. Technical specialists and salespeople are always ready to support and assist customers by phone or on-site. Our workshops and training sessions cover a variety of topics and services giving you the information to enhance your capabilities.

EQUIPMENT TO MEET YOUR NEEDS

EZ-Liner® offers a full line of pavement marking equipment including walk behind, self-propelled ride-on, palletized pickup or flatbed mounted, and large custom built truck mounted strippers. New technology is introduced continuously in response to a demand for long lasting environmentally friendly markings.



Even the smallest glare of a far off lighthouse can provide much needed direction to the weary sailor who has lost their way in the night. Our commitment at EZ-Liner® and Vogel Traffic Services is to provide you the same kind of safety and direction. We are there along side you, through every inch of your journey, guiding the way and providing comfort both day and night.



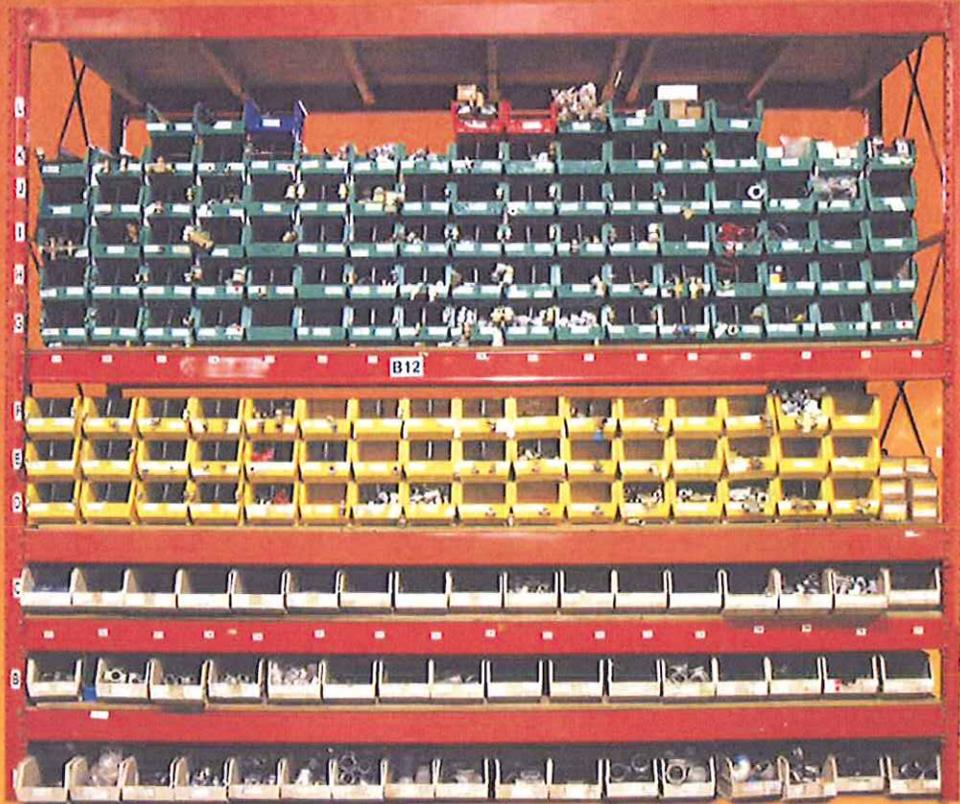
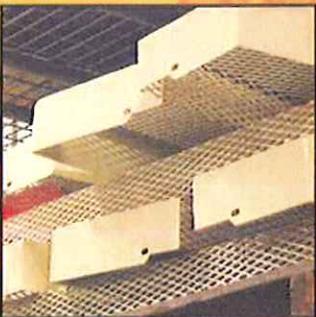
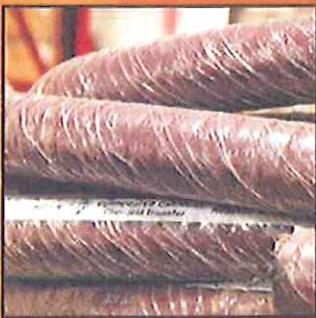


APPLICATION DEDICATION

Vogel Traffic Services contracts with many state, county and municipal government agencies to apply pavement markings. We consult with agencies to identify their needs and strive to provide the best quality services. Vogel Traffic Services also offers a full line of traffic paint, glass beads, and pavement marking stencils.



EZ-LINER PARTS SALES



Speeflo  **BINKS**  **GRACO**

AN EXTENSIVE VARIETY OF BRANDS AND PARTS, DELIVERED PROMPTLY!

- Low Pressure Paint Pumps
- High Pressure Paint Pumps
- Paint Guns
- Bead Guns
- Hoses
- Air Pressure Pumps
- Safety Guards
- Operator Accessories
- Fixtures, Fittings and More
- Safety Devices
- Lighting/Strobes
- Gun Timers

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In Stock Inventory



Solid State Electronic Skip Timer Or
Microprocessor Based Controllers



Shipped From In-Stock Inventory For Less Down Time



Various Paint And Bead Guns To Choose From

Parts Department Business Hours: Monday – Friday, 7 am – 5 pm Central Time Zone

Brands & Parts

- | | | | | |
|---|---|--|--|--|
| <ul style="list-style-type: none"> • Graco® • ARO® • Speeflo® • Binks® • Airlessco® • Wilden • David Clark • Charlynn/Eaton | <ul style="list-style-type: none"> • Potters Industries Inc. • Whelen® • American Signal Corporation • National Signal • Cummins® • Perkins® • Caterpillar® • Vickers | <ul style="list-style-type: none"> • Rex Roth • Red Dot® Corporation • Skip-Line® Inc. • MSDI • Research Derivatives Inc. • Vanair Manufacturing Inc. • Sullair® • Ingersoll Rand® | <p>Sampling of Available Parts:</p> <ul style="list-style-type: none"> • Paint guns • Bead guns • Nozzles, tips, guards and hand guns • Hoses, filters and hose reels • Air system parts, compressors, hoses & gauges • Engine components | <ul style="list-style-type: none"> • Various line spray controllers • Lubricants, oils and cleaners • Hydraulic system parts, pumps, hoses & gauges • Other parts and accessories available upon request |
|---|---|--|--|--|

EZ-Liner Service Features



Shipped from in-stock inventory or custom designed to meet your specifications.



We deliver domestically and worldwide with training on-site by the most qualified technicians in the industry.



Over 50 years of combined experience in our customer service department.

www.ezliner.com

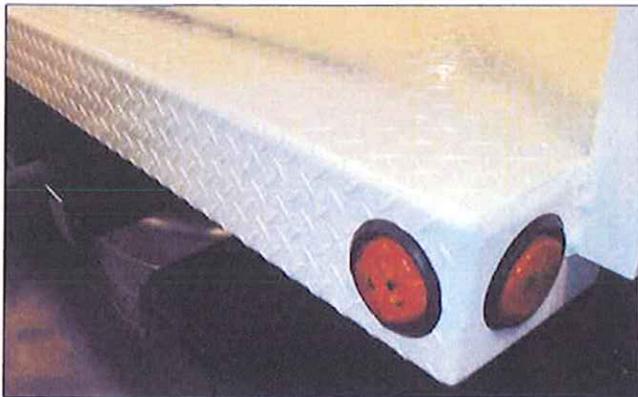
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Platform Construction

- ✓ Heavy duty 3/16" thick platform surface with rolled edges to create a one-piece integrally formed rub-rail and capped ends for finished corners.
- ✓ Safe, rust resistant edges without gaps, cracks, or channels in which debris builds up and moisture can occur over time.
- ✓ Structural channel sub frame, 4" longitudinal stringers *6" long sills*
- ✓ 3" cross members on maximum 24" centers *4" cross members*
- ✓ Various metals, dimensions, and designs available *steel, not to exceed 96" wide*
- ✓ Grade 8 riser bolts, 8" risers
- ✓ 2" diameter inset LED clearance lights
- ✓ Safety railings welded to perimeter of deck for stability and rigidity



the Quality ^{is In} our Line.

Accept no exceptions or equals.

Descriptive, Not Restrictive. EZ-Liner's continuing quest for improvement make equipment, specifications, and components subject to change without notice.

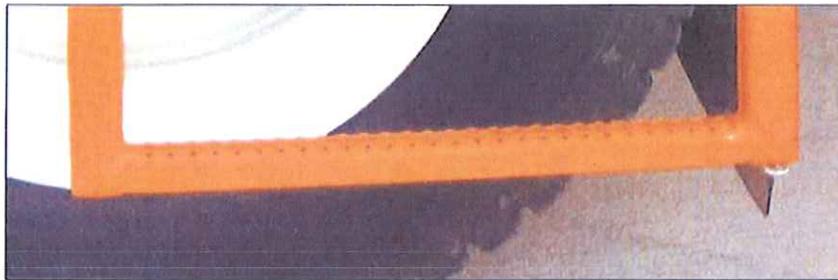
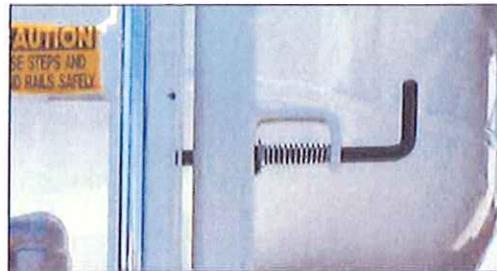
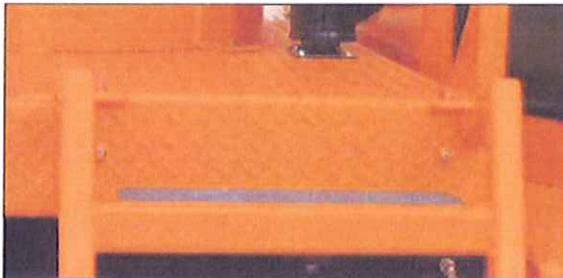
Page 7; PLATFORM: paragraph 2; platform construction



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Safety Ladder Construction

- ✓ Rugged 1 ½" steel square tube construction
- ✓ Heavy duty bullet type low profile hinges with rounded ends for safety
- ✓ Flush fitting with platform railing when stored upright
- ✓ Fail-safe spring loaded finger pull pin type latch
- ✓ Folds down at a slight angle for ease of operator use
- ✓ 25" long chrome handrail mounted vertically on each side of ladder entrance
- ✓ Perforated horizontal step rungs for a slip free sure grip



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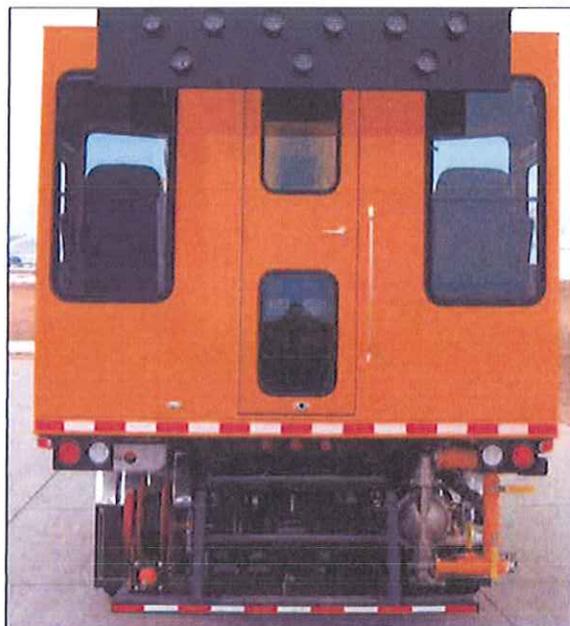
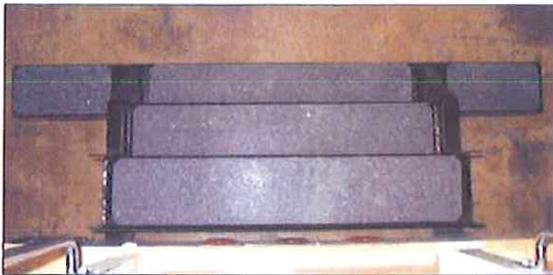
Page 7; PLATFORM: paragraph 3; ladders



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Rear Step Bumper Construction

- ✓ Heavy duty “C” channel steel frame rail extensions and step bumper support.
- ✓ Safe, rust resistant capped ends, rolled edges without gaps, cracks, etc. in which debris builds up and moisture can occur over time.
- ✓ 3/16” formed steel channel staircase style steps 6” deep each with rolled bottom edge for finished look and enhanced safety.
- ✓ Bottom step bumper standard widths of 66”, 88”, and 96”, with other dimensions and design customization available upon request.
- ✓ Heavy duty high traction abrasive step surfaces for secure and safe footing
- ✓ Full width conspicuity tape facing rear for maximum motorist visibility
- ✓ Chrome grab handle(s) for better on and off balance and stability
- ✓ 18” (approximate) 1st step height from pavement



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Page 7; PLATFORM: paragraph 4; rear access stairs

Think Of Our Boxes A Version Of

At ALUM-LINE We Think That

It's Important for you to feel that your tools and equipment are safe. Whatever your truck, pickup, semi, delivery, step van or RV, we can supply you with the box that will last a lifetime and secure your possessions.

We offer many types of boxes: Side Boxes, Low Profile Boxes, Cross Over Boxes, Underbody Boxes, RV Boxes, and Truck Beds. We offer many standard boxes to choose from. But, we'll make whatever you need if you don't see it here.

BRINGING YOU THE BEST...

When you say "ALUM-LINE" you've said it all. There are a lot of imitators out there, but no one builds it right like ALUM-LINE.

From the latches to the lids and everything in-between, you just can't beat the quality and the value of ALUM-LINE BOXES. We use the very best materials in our fine products and we don't cut corners in workmanship.

This all adds up to a box you can count on day after day, year after year. They just keep doing the job for you. After all, isn't that what you expect from a quality investment? ALUM-LINE... It's the best, bar none.

Standard Features On All ALUM-LINE Boxes

1. Heavy-duty aircraft grade aluminum
2. Treadbrite finish. Smooth mill finish available at no additional cost. Other gauges available for special requirements
3. All boxes equipped with stainless steel latches and key locks.
4. Five year workmanship warranty on manufactured items. Twenty year warranty on aluminum metal to original owner.
5. Single source your aluminum needs with ALUM-LINE.
We will do all types of custom applications

Note: Please specify with the letter "S" after model # for smooth aluminum finish

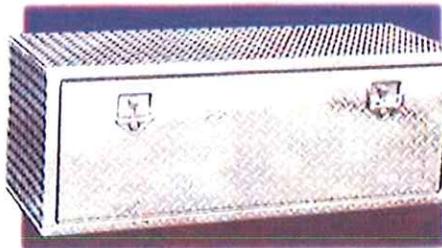
The people at ALUM-LINE understand product satisfaction. We use our own products everyday. An ALUM-LINE box is an investment that you make only once. And, our durable boxes are the right investment in quality. Our goal is providing the best constructed aluminum boxes in the industry with strong commitment to your satisfaction. We deserve a product that far exceeds competitors standards. If you want a box that is worry free and durable enough for everyday use, Alum-Line is the one for you. Use ALUM-LINE is the one for you.



**Toll Free:
1-800-446-1407**

UNDERBODY BOXES

Underbodies are available to fill any space requirement you may have. ALUM-LINE boxes have the strength to stand up to all types of rugged use. Stainless steel recessed latches provide optimum security and machine chains suspend the door when open. Have your door swing to the side at no extra cost. Use in single or multiple applications. The sizes listed are also available in a top opening lid. Factory mounting brackets in steel or aluminum are available.

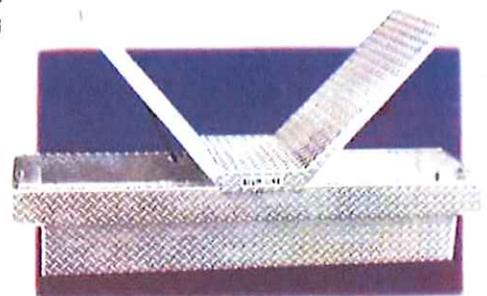
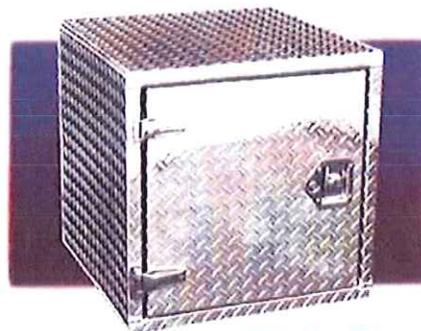


Standard Features:

1. 100% aircraft grade treadbrite aluminum (125 smooth available some cost)
2. Interlocking with rubber gasket
3. Drop down doors with chain hangers (swing to side also available some cost)
4. Continuous aluminum hinges. Strap hinge on special applications
5. Key lock recessed stainless steel handle latches, two latches on 4' boxes and larger

Model#	Size Height x Depth x Length	Weight LBS. UPS
UB2412	12" x 12" x 24"	18UPS
UB2416	16" x 16" x 24"	24 UPS
UB2418	18" x 18" x 24"	28UPS
UB3018	18" x 18" x 30"	34UPS
UB2424	24" x 24" x 24"	40UPS
UB3612	12" x 12" x 36"	24UPS
UB3616	16" x 16" x 36"	36UPS
UB3618	18" x 18" x 36"	40UPS
UB3624	24" x 24" x 36"	55
UB4812	12" x 12" x 48"	30UPS
UB4816	16" x 16" x 48"	40UPS
UB4818	18" x 18" x 48"	52UPS
UB4824	24" x 24" x 48"	65
UB6024	24" x 24" x 60"	80

Any Custom Length, Width & Height Available



CROSS-OVER BOXES

ALUM-LINE cross over boxes are built with commercial use in mind. Starting with heavy-duty aluminum and seams that are welded both side and out, where you need it most. Our hardware includes stainless steel paddle and smooth operating gas prop lids. They are also reinforced with tubing on the inside to weight that may get stacked on top.

Standard Features:

1. 880 gauge aircraft grade aluminum welded seams
2. Treadbrite aluminum construction (smooth aluminum available)
3. Heavy-duty continuous hinge
4. All boxes support with key locks
5. Heavy-duty gas prop on all lids
6. Stainless steel handle handles on all lids (double connecting latch on tubular boxes with adjustable catches)
7. Taper lining lids with rubber gaskets
8. Aluminum sliding storage tray on bottom
9. Choose from three styles of lids: full lid, split lid, split lid toward cab

Model#	Size Length x Depth x Width	Weight LBS
Full Size Trucks		
CBF1610	70" x 16" x 10"	60UPS
CBF2014	70" x 20" x 14"	70
CBF2020	70" x 20" x 20"	90
CBF3014	70" x 30" x 14"	94
CBF3020	70" x 30" x 20"	112
Mini-Trucks		
CBM6114	61" x 20" x 14"	68UPS
CBM5914	50" x 20" x 14"	65UPS
CBM3014	59" x 30" x 14"	84

Other Lengths, Widths & Depths Available

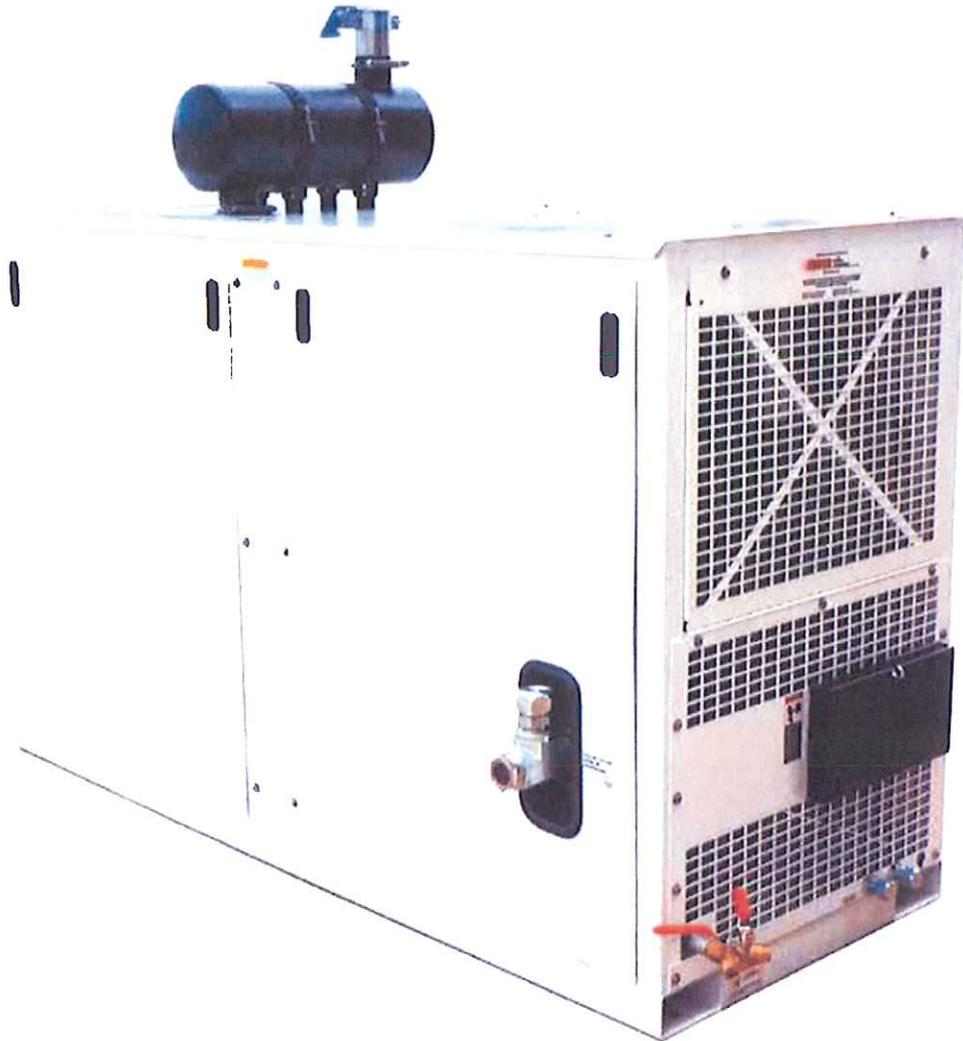
Visit Our website At: www.alumline.com



**ROTARY
SCREW**

the DUS Diesel Rotary Screw Air Compressor

COMPACT DIESEL AIR COMPRESSOR



**HEAVY DUTY DESIGN MANUFACTURED FOR
OEM TRUCK MOUNTED APPLICATIONS**

more air solutions at

BOSSair.com

BOSS®

engineered **AIR** systems

the DUS | Diesel Rotary Screw Air Compressor

FEATURES

- Compact Design
- Separate Engine/Compressor
- Remote Fluid Drains
- Two-Stage Air Filters and Restriction Indicator
- Gauges: Engine Coolant Temp., Engine Oil Pressure, Compressor Air Pressure, Ammeter, and Hour meter
- Shutdown Switches for Low Engine Oil Pressure, High Coolant Temp., and Compressor Discharge Temp.
- Two ¾" Discharge Valves
- 0-100% Capacity Control
- Corrosion Resistant Enclosure
- Engine Auxillary Drive SAE "A" or SAE "B" (Standard)

OPTIONS

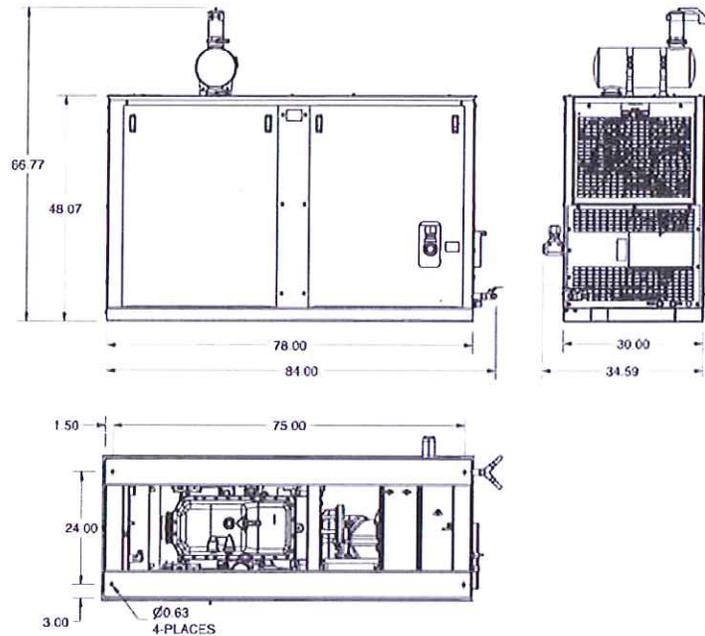
- 120 AMP Alternator
- 10 KW Generator
- Lifting Ball
- Aftercoolers
- OSHA Valves
- Lubricators
- Block Heater
- Spark Arrestor
- 200 PSIG
- Moisture Trap
- Remote Instrument Panel
- OSHA Valve

MODEL	210 DUS	250 DUS
Capacity Delivery	210 CFM @ 100 PSIG	250 CFM @ 100 PSIG
Engine Type	Diesel	Diesel
Make	John Deere	John Deere
Model	4045	4045
Rated Speed	2400 RPM	2400 RPM
Rated Power	74 HP (55.2 KW)	74 HP (55.2 KW)
Weight (Wet)	2,400 LBS (1089 KG)	2,600 LBS (1180 KG)

DIMENSIONS'

Length	84"	84"
Height (Over Exhaust)	66 ¾"	66 ¾"
Width	30"	30"

Specifications Subject to Change Without Notice.
Dimensions May Vary Depending on Configuration of Optional Equipment.



BOSS DUS Dimensions



DISTRIBUTED BY:

BOSS INDUSTRIES, LLC

1761 Genesis Drive LaPorte, IN 46350
Voice: (219) 324-7776 • (800) 635-6587 • Fax: (219) 324-7470
Electronic: www.bossair.com • email: sales@bossair.com

Specifications subject to change without notice.

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Page 8; AUXILIARY POWER UNIT: paragraph 1, 2, & 4; Engine/Compressor

ROTARY SCREW



ABOVEDECK ENGINE DRIVE ROTARY SCREW COMPRESSORS

The MechanX[®] is an all new concept in the Service Mechanics Truck and Tire Service Industry. Wrapped in a corrosion resistant, tough tubular frame, with a T4F Kubota[®] diesel powered 3 cylinder engine, and coupled to a rotary screw compressor, the MechanX is ideal for the tough work of the Tire Service and Mechanics Truck environment. Also, MechanX's versatility allows the work truck's engine to be turned off while you work.

generator, battery charger, and a jump starter!

- Extend the life of your service vehicle
- No more plugged DPf systems from extended idling of vehicle engines
- Reduced fuel consumption and noise pollution
- Small footprint in an aerodynamic design
- The MechanX ties into the vehicle battery and fuel tank
- Keeps vehicle battery charged
- No PTO required

PISTON

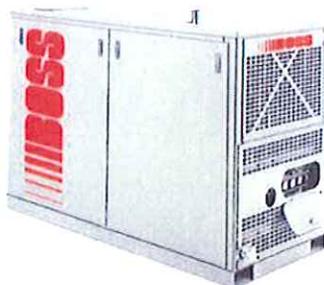


ABOVEDECK HYDRAULIC DRIVE PISTON COMPRESSORS

The BA435 is ideal for the Mechanics Truck and Tire Service Professionals! Engineered around a durable BOSS hand built and tested assembly, this lightweight air compressor package delivers a smooth 35cfm @100psig. It's driven by a hydraulic motor requiring 10gpm @1,850psig for optimum speed of 1,400rpm input.

- High air discharge temperature shutdown
- Integrated compressor hydraulic cooler
- Pressure lubricated oil pump and splash lubrication
- The piston assembly is direct coupled to a hydraulic gear motor resulting in a "No belt, No worries" air compressor.
- Aluminum compressor assembly for better heat dissipation

ROTARY SCREW



COMPACT DIESEL UTILITY AIR COMPRESSOR

This diesel driven 74hp T4F John Deere engine and skid mounted rotary screw air compressor is rated at no less than 210cfm at 100psig for our 210 DUS and 250cfm at 100psig for our 250 DUS. The heavy duty design is perfect for OEM truck mounted applications.

- Separate Engine/Compressor
- Remote Fluid Drains
- Two-Stage Air Filters and Restriction Indicator
- Shutdown Switches for Low Engine Oil Pressure, High Coolant Temp., and Compressor Discharge, Temp.

Other additional products in this category: Bullet 2 (70CFM) - Gasoline Driven Engine

ROTARY SCREW



ABOVEDECK HYDRAULIC DRIVE ROTARY SCREW COMPRESSORS

The BOSS[®] 80102-AHBI advanced design allows you the option to choose any CFM output up to 100cfm (80102). By simply adjusting hydraulic flow to the compressor, the system will produce up to 100cfm at 110psig.

- Self-contained separator element with easy access spin-on housing
- Integrated receiver tank with filler port and drain valve
- Optional hydraulic system oil cooling packages available upon request (recommended)

Now, when you need that extra boost, you have it.

- Integrated compressor oil cooling package with automatic thermal sensing control to ensure proper operating temperatures
- Hydraulic motor directly coupled to geared air end

Other additional products in this category: 80201 - AHBI (125CFM - 185CFM); Series 35 (20-CFM - 35CFM); Infinity 60 (45CFM - 60CFM)

ROTARY SCREW



AIRENDS FOR OEM'S

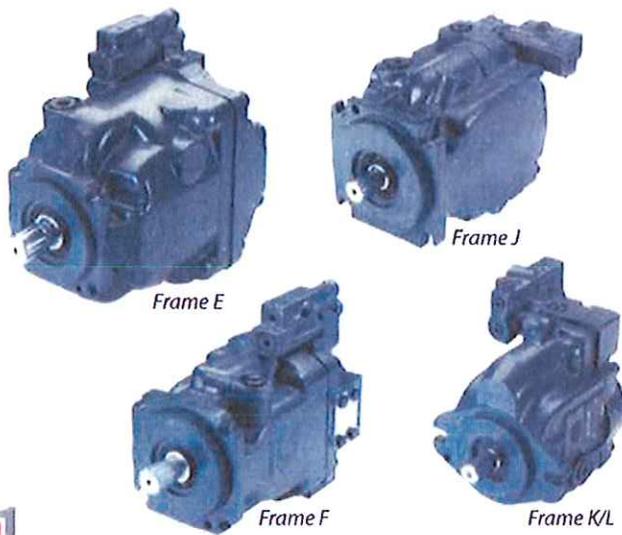
While our competitors are utilizing technology from the 70's, BOSS[®] is providing the latest technology to offer air compressors with conservative input speeds to save you fuel and decrease horsepower at the same CFM output. Airends used in our PTO systems, are designed specifically for the PTO underdeck air compressor market featuring flexible mounting, clearance, and drive line angles.

- BOSS[®] airends provide a safe, reliable flow in ranges of 15-900cfm up to 220psig, depending on your air demands
- BOSS[®] compressor's advanced technology utilizes a 6/5 rotor profile versus 6/4 typically used by competitive suppliers
- BOSS[®] airends are smaller in size and weight and allow increased efficiencies with higher productivity



Data Sheet

Open Circuit Pumps Series 45



For more than 40 years, Danfoss has been developing state-of-the-art components and systems for mobile machinery used in off-highway operations around the world. We have become a preferred supplier by offering the best of what really matters: The hardware inside your vehicle application.

Series 45 pumps are a high efficiency alternative to traditional open circuit pumps. Each frame size is uniquely designed to optimize performance, size, and cost, while matching the demanding requirements of the mobile equipment market.

Series 45 pumps are designed to fit the needs of open circuit systems capable of speeds up to 3600 rpm, maximum pressures up to 400 bar, continuous pressures up to 310 bar [4500 psi]. Series 45 pumps offer a wide variety of control options with displacements ranging from 25 to 147 cm³/rev [1.53 - 8.97 in³/rev].

Series 45 pumps are PLUS+1[®] compliant. With robust designs and proven reliability in the test lab and the field, Series 45 pumps set the standard for market quality.

Danfoss pumps are supported by a global network of authorized service centers.

Features

- **Designed for durability and flexibility**
 - Heavy-duty tapered roller bearings for long life
 - Single piece rigid housing reduces leak paths and noise
 - Designed and manufactured to rigorous standards for mobile equipment
 - Displacements ranging from 25 to 147 cm³/rev [1.53 - 8.97 in³/rev]
- **Installation and packaging benefits**
 - Compact design minimizes installation space requirements
 - Wide range of mounting flanges, shafts, and porting options for ease of installation
 - Robust input shaft bearings to handle large external loads
 - Low noise for operator comfort
- **Wide range of controls:**
 - Pressure Compensating (PC)
 - Load Sensing (LS)
 - Remote Pressure Compensation (RP)
 - Electric Normally Open On/Off - 12 V / 24 V (NO)
 - Electric Normally Closed On/Off - 12 V / 24 V (NC)
 - Electric Proportional Pressure Control (EPC)
- **Application benefits**
 - Optimized design maximizes efficiency and quiet operation
 - PLUS+1[®] compliant control options
 - Simple design reduces service requirements
 - Optimizes machine power usage to maximize productivity
 - Maximizes fuel economy to meet engine emission standards

Specifications

Pump model		Frame L		Frame K		Frame J		
Maximum displacement	cm ³ /rev [in ³ /rev]	25 [1.35]	30 [1.83]	38 [2.32]	45 [2.75]	45 [2.75]	51 [3.11]	60 [3.66]
Cont. working pressure	bar [psi]	260 [3771]	210 [3046]	260 [3771]	210 [3046]	310 [4496]	310 [4496]	310 [4496]
Max. working pressure		350 [5075]	300 [4350]	350 [5075]	300 [4350]	400 [5800]	400 [5800]	400 [5800]
Continuous input speed	min ⁻¹ (rpm)	3200	3200	2650	2650	2800	2700	2600
Theoretical flow	l/min [US gal/min]	80 [21.1]	96 [25.4]	100.7 [26.6]	119.2 [31.5]	126 [33.3]	137.7 [36.4]	156 [41.2]
Weight	kg [lb]	Axial 19 [41.9], Radial 24 [52.9]				Axial 22 [48.5], Radial 25 [55.1]		

Pump model		Frame J (cont.)		Frame F		Frame E		
Maximum displacement	cm ³ /rev [in ³ /rev]	65 [3.97]	75 [4.58]	74 [4.52]	90 [5.49]	100 [6.1]	130 [7.93]	147 [8.97]
Cont. working pressure	bar [psi]	260 [3771]	260 [3771]	310 [4496]	260 [3771]	310 [4496]	310 [4496]	260 [3771]
Max. working pressure		350 [5075]	350 [5075]	400 [5800]	350 [5075]	400 [5800]	400 [5800]	350 [5075]
Continuous input speed	min ⁻¹ (rpm)	2500	2400	2400	2200	2800	2200	2100
Theoretical flow	l/min [US gal/min]	162 [42.9]	180 [47.5]	177.6 [47.4]	198 [52.8]	245 [64.7]	286 [75.6]	308 [81.4]
Weight	Axial	22 [48.5]		29 [63.9]		51.3 [113]		
	Radial	25 [55.1]		36 [79.4]		54.9 [121]		

Dimensions	Frame L/K		Frame J	
Axial port mm [in]				
Radial port mm [in]				
Dimensions	Frame F		Frame E	
Axial port mm [in]				
Radial port mm [in]				

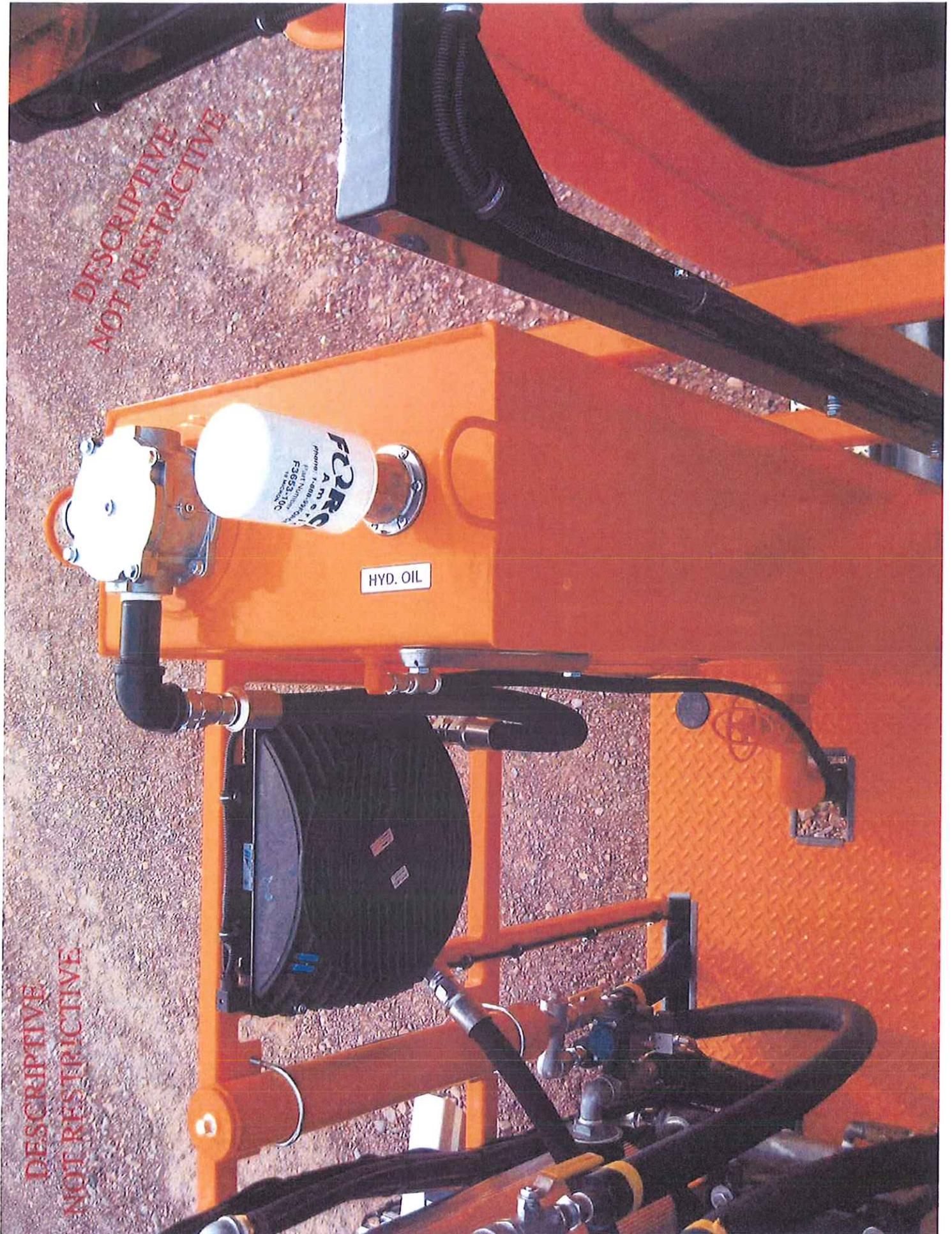
Danfoss Power Solutions US Company
 2800 East 13th Street
 Ames, IA 50010, USA
 Phone: +1 515 239 6000

Danfoss Power Solutions GmbH & Co. OHG
 Krokamp 35
 D-24539 Neumünster, Germany
 Phone: +49 4321 871 0

Danfoss Power Solutions ApS
 Nordborgvej 81
 DK-6430 Nordborg, Denmark
 Phone: +45 7488 2222

Danfoss Power Solutions
 22F, Block C, Yishan Rd
 Shanghai 200233, China
 Phone: +86 21 3418 5200

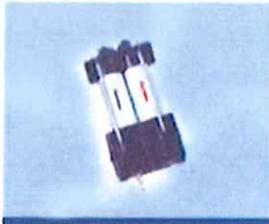
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Page 8; AUXILIARY POWER UNIT: paragraph 4; hydraulic reservoir



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Extractor/Dryers®



FAMILY OF LA-MAN EXTRACTOR/DRYERS AND MODEL NUMBERS

Not shown: Model #195A – 2000 SCFM

Extractor/Dryer®

The patented Extractor/Dryer is a two-stage, point-of-use compressed air filter. Designed primarily for the final usage of air, it will remove water, oil and other contaminants from compressed air lines. Developed for air driven tools, paint spraying, manufacturing equipment or any other compressed air equipment to produce clean, dry, compressed air. In return you receive extended equipment life, improved product quality, reduced downtime, and savings on costly repairs to damaged equipment. These advantages will pay for themselves in a short amount of time.

Standard Features include:

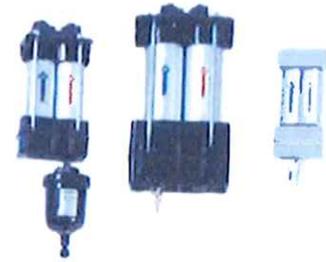
- **Differential Pressure Gauge** (All models except 520's and 195A) - Allows the user to visually see the change from green to red, indicating a pressure drop of 10 PSI and the need to service the elements. Service Kits available for all models.
- **Weep Drain** - Allows minimal, continuous flow of contaminated air to escape the base of the unit.
- **Mounting Brackets** (All models except 520's and 195A) - Allows for easy and protective mounting of your Extractor/Dryer.

Point-of-Use:

La-Man® takes a different approach to cleaning up contaminated compressed airlines. Our Extractor/Dryer provides the best service when it is located at the point-of-use in an application. This allows the air from the compressor to cool, thus condensing to liquid and enabling the Extractor/Dryer to do its job. The shortest distance from our filter to the point-of-use ensures cleaner air, therefore protecting valuable machinery and equipment.

Additional Features- Benefits

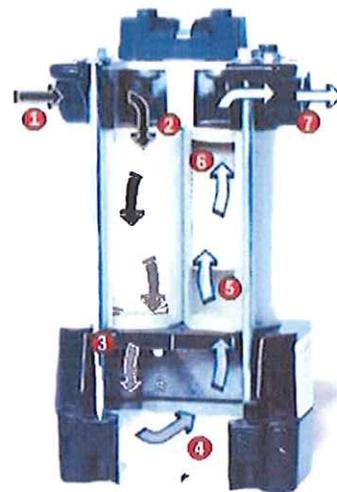
- Models range from 15 SCFM thru 2,000 SCFM
- Standard 5 micron ratings (lower micron rating available)
- Removes 99.9% of the liquids entering the Extractor/Dryer
- Easy to install and maintain without removal
- Lightweight aluminum housing
- Immediate cost savings from decreased downtime
- Standard inlet and outlet NPT sizes
- Improve equipment performance and product quality
- Standard Differential Pressure Gauge for rust and dirt particles



Additional options available: float drain, regulator, lockout valve and electronic drain

How it Works:

- ① Compressed air containing tiny particles of dirt, dust, oil and moisture enters the first stage of the **Extractor/Dryer**.
- ② A coalescing effect occurs as air passes through a cartridge mesh filter that captures particles and causes moisture to form larger droplets.
- ③ Air velocity lessens as it enters the extraction chamber allowing particles to collect and moisture to condense on the honeycomb.
- ④ Particle laden water flows along the bottom and out the drain.
- ⑤ Air passes through the second stage wire supported fiber filter cartridge that captures remaining particles down to 5 micron.
- ⑥ Remaining moisture and contaminants are dried and filtered in the second stage filter.
- ⑦ Exhaust air is clean and dry - no dirt, rust, oil or water droplets to disrupt air equipment operation.



Specifications:

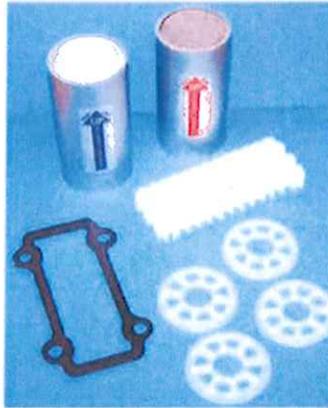
MODELS	520A	520B	105	106	107	110	111	120	140	180	195A
NPT	1/4"	1/4"	1/4"	3/8"	1/2"	1/2"	3/4"	1"	1-1/2"	2"	4" FLANGE
SCFM	15	15	50	50	50	80	80	150	250	500	2000
MAX PSI	250	250	250	250	250	250	250	250	250	150	150
SERVICE KIT #	015SKA	015SKA	050SKA	050SKA	050SKA	080SKA	080SKA	150SKA	250SKA	500SKA	195SKA
SIZE (INCHES)	7-1/8 x 3 x 1-1/4	8-1/4 x 3 x 1-3/4	8-1/4 x 4 x 2-1/2	8-1/4 x 4 x 2-1/2	8-1/4 x 4 x 2-1/2	11-3/4 x 6 x 3-1/4	11-3/4 x 6 x 3-1/4	15 x 9-1/2 x 12-1/2	20 x 12-1/2 x 7-1/4	27 x 18 x 9-3/4	42-1/2 x 32 x 17
APPROX WT. LBS	2#	2#	3#	3#	3#	6#	6#	15#	36#	70#	375#

Maintenance:

Page 8; AUXILIARY POWER UNIT: paragraph 5; dual stage dryer

All compressed air filters require servicing of the elements. Proper maintenance is important in order to keep the Extractor/Dryer performing at optimum levels. La-Man has taken great efforts to create a filter that makes servicing user friendly. By simply removing one bolt, the Extractor/Dryer never has to be disconnected from the airline in order to replace the elements.

On average, we recommend servicing the Extractor/Dryer every 6 months. Each model has a complete Service Kit available (see specifications for service kit numbers) that provides everything needed for proper servicing. Service Kits include a 1st stage replacement element, 2nd stage replacement element, cap gaskets, base gasket, and base core (honeycomb).



EXTRACTOR/DRYER SERVICE
KIT
050SKA Service Kit Pictured

P.O. Box 328 Mazeppa, MN 55956

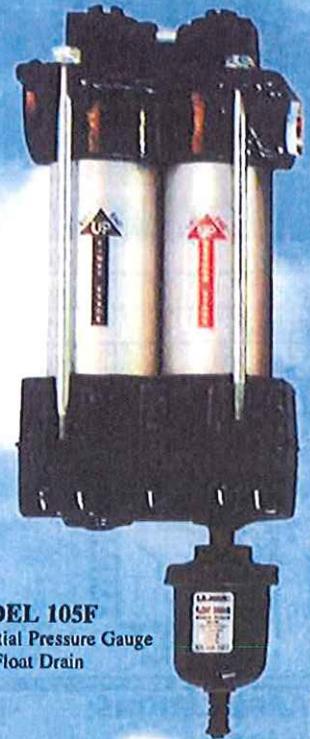
Phone: (800) 348-2463 or (507) 843-4800 Fax: (888) 905-2626 or (507) 843-4953 Site Credits: ECW

LA-MAN[®]

We Make Compressed Air Work[®]

Clean, Dry Compressed Air Starts with The Extractor/Dryer[®] Manufactured by LA-MAN Corporation

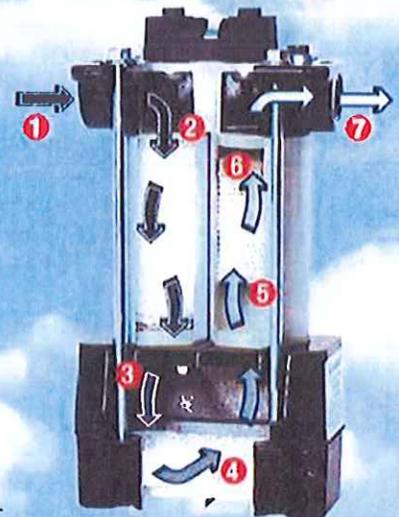
- Point of Use Compressed Air Filter to Improve and Extend Equipment Life
- Removes Liquids and Contaminates to a 5-Micron Rating; Lower Micron Ratings are Available
- Models with Flow Ranges of 15 SCFM to 500 SCFM Rated Up To 250 PSI are Standard
- Differential Pressure Gauge Built In
- Mounting Hardware Included for Easy Installation
- Weep Drain is Standard; Float Drain or Electronic Drain Valve Optional

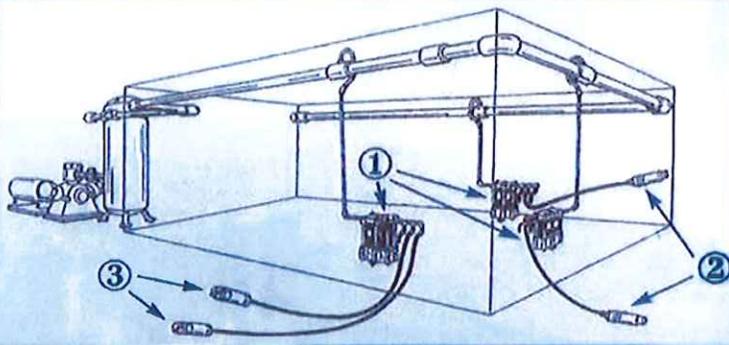


MODEL 105F
with Differential Pressure Gauge
and Float Drain

How It Works –

- 1** Compressed air containing tiny particles of dirt, dust, oil, rust and moisture, enters the first stage of the LaMan[®] Extractor/Dryer Filter.
- 2** A coalescing effect occurs as air passes through a cartridge mesh filter which captures larger particles and causes moisture to form larger droplets.
- 3** Air velocity lessens as it enters the extraction chamber allowing particles and liquids to collect in the honeycomb.
- 4** Particle laden liquid flows along the bottom and out the drain.
- 5** Air passes through the second stage wire supported fiber filter cartridge which captures remaining particles down to 5 microns.
- 6** Remaining moisture and contaminants are dried and filtered in the second stage filter.
- 7** Exhaust air is clean and dry – no dirt, rust, oil, or water drops to disrupt air equipment operation.



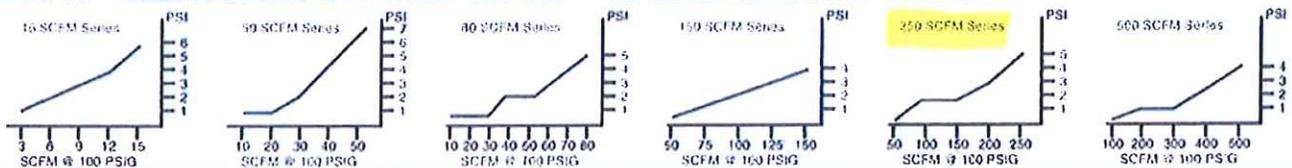


La-Man provides a wide range of compressed air filtration and preparation devices. As shown, the Extractor/Dryer **1** is installed for primary filtration and moisture removal. Each unit is augmented with either the Pneuguard® Inline Dryer **2** or Dryer/Pneuguard® **3** for additional filtration.

SPECIFICATIONS

Model	520A	520B	105	106	107	110	111	120	140	180
NPT	1/4"	1/4"	1/4"	3/8"	1/2"	1/2"	3/4"	1"	1 1/2"	2"
SCFM	15	15	50	50	50	80	80	150	250	500
MAX. PSI	250	250	250	250	250	250	250	250	250	150
APPR. WT.	2#	2#	3#	3#	3#	6#	6#	17#	36#	72#
Service Kit #	015SKA	015SKA	050SKA	050SKA	050SKA	080SKA	080SKA	150SKA	250SKA	500SKA

FLOW CHARACTERISTICS - PRESSURE DROP



APPLICATIONS:

- Air Guns
- Injection Molding
- Hospital Equipment
- Staple Guns
- Printing Presses
- Air Operated Chucks
- Auto Paint & Body Shop
- Sandblasting
- Air Doors
- Air Brushes
- Rivet Guns
- Bakery Equipment
- Textile Needles
- Package Coding
- Transit Systems
- Dental Equipment
- Nailers
- Brewery Bottling
- Construction
- Electronics
- Air Tools
- Air Cylinders



Weep Drain - Standard

The standard drain of the Extractor/ Dryer continuously weeps moisture with a minimal amount of air loss (.16 to .2 CFM at 100 PSI).



Safety Lockout Valve

Relieves downstream pressure and accepts locking devices, per OSHA 29 CFR-Part 10, when used before servicing the air filter.



Float Drain - No Air Loss

The 500 FD Float Drain will automatically expel liquids from the Extractor/Dryer. It can be used on all models. Drain hose included.



Complete Service Kits

EACH KIT INCLUDES:
1st & 2nd Stage Elements
Base Core
All Gaskets & Seals
Can be serviced without filter being removed from air line.



Electronic Drain

The Electronic Drain can be installed on any Extractor/ Dryer as well as surge tanks and drip legs. Adjustable interval and discharge times on various models.

For More Information Contact:

Excelon 74 Micro-Fog and Oil-Fog Lubricators 3/8", 1/2", 3/4" Port Sizes

- Excelon design allows in-line or modular installation
- Quick release bayonet bowl
- Highly visible, prismatic liquid level indicator lens
- Flow sensor design provides a nearly constant oil/air ratio over a wide range of air flows
- All around (360°) visibility of the sight-feed dome simplifies installation and adjustment
- Modular installations with Excelon 72, 73, and 74 series can be made to suit particular applications

Use Micro-Fog models in applications with one or more points of lubrication.

Use Oil-Fog models to lubricate a single tool, cylinder, or other air driven device.



Ordering Information. Models listed include PTF threads, manual drain, and 7 fluid ounce (0.2 liter) metal bowl with plastic liquid level indicator.

Type	Main Port Size	Model Number *	Flow ** scfm (dm ³ /s)	Weight lb (kg) [†]
Micro-Fog	3/8"	L74M-3AP-QDN	114 (54)	1.70 (0.77)
	1/2"	L74M-4AP-QDN	154 (73)	1.61 (0.73)
	3/4"	L74M-6AP-QDN	142 (67)	1.55 (0.71)
Oil-Fog	3/8"	L74C-3AP-QDN	118 (56)	1.70 (0.77)
	1/2"	L74C-4AP-QDN	192 (91)	1.61 (0.73)
	3/4"	L74C-6AP-QDN	186 (88)	1.55 (0.71)

* Models listed in the order table must not be located downstream of frequently cycling directional control valves. Order the optional bi-directional Oil-Fog Lubricator for use under such conditions.

** Typical flow with 90 psig (6.3 bar) inlet pressure and a pressure drop of 7 psig (0.5 bar).

† Lubricators with 1 quart (1 litre) metal bowl: Add 2.01 lbs (0.91 kg).

Alternative Models

L | 7 | 4 | ★ | - | ★ | ★ | ★ | - | ★ | ★ | ★

Type	Substitute
Oil-Fog	C
Micro-Fog	H

Port Size	Substitute
3/8"	3
1/2"	4
3/4"	6

Threads	Substitute
PTF	A
ISO Rc taper	B
ISO G parallel	G

Air Flow Direction	Substitute
Bi-directional (Oil-Fog only)	E
Uni-directional	P

Options	Substitute
Low oil level switch ***	L
None	N
Pyrex dome *†	P
Quick fill nipple	Q

Bowl	Substitute
1 quart US (1 liter) metal with Pyrex liquid level indicator ††	A
7 fluid oz. (0.2 liter) metal with plastic liquid level indicator	D
7 fluid oz. (0.2 liter) transparent with guard	P
7 fluid oz. (0.2 liter) metal with Pyrex liquid level indicator ††	R

Drain	Substitute
Closed bottom	E
Manual 1/4 turn	Q
Remote fill device - Use only with 7 fluid oz. (0.2 liter) bowl.	R

*** Low oil level switch requires 1 litre bowl, type 'A' at 9th digit.

*† Pyrex dome used only with bowl type 'A' or 'R' at 9th digit.

†† Pyrex liquid level indicator used only with option 'P' at 10th digit.



Technical Data

Fluid: Compressed air
Maximum pressure:

Transparent bowl: 150 psig (10 bar)
Metal bowl: 250 psig (17 bar)

Operating temperature*:

Transparent bowl: 0° to 125°F (-20° to 50°C)
Metal bowl: 0° to 175°F (-20° to 80°C)

* Air supply must be dry enough to avoid ice formation at temperatures below 35°F (2°C).

Start point (i.e. minimum flow required for lubricator operation): 2.5 scfm (0.94 dm³/s) at 90 psig (6.3 bar) inlet pressure

Typical flow with 90 psig (6.3 bar) inlet pressure and 7 psig (0.5 bar) pressure drop

Micro-fog: 154 scfm (73 dm³/s)
Oil-fog: 192 scfm (91 dm³/s)

Nominal bowl size:

Standard: 7 fluid ounce (0.2 liter)
Optional: 1 quart US (1 liter)

Manual drain connection: Will fit 1/8-27 and 1/8-28 pipe thread

Recommended lubricants: See Section ALE-29.

Materials

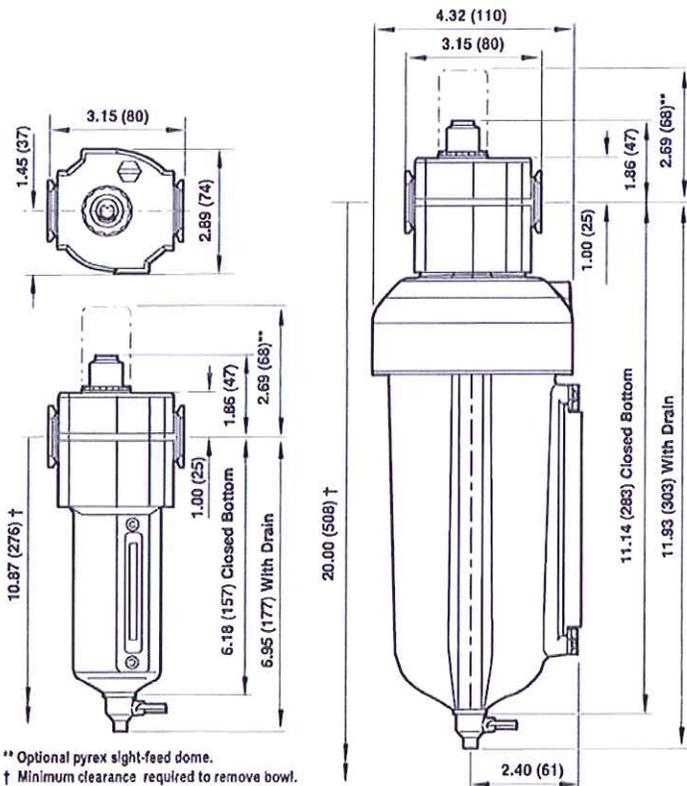
Body: Aluminum
Bowl

Transparent: Polycarbonate with steel bowl guard
Metal: Aluminum

Metal bowl liquid level indicator lens:
7 fluid ounce (0.2 liter): Transparent nylon
1 quart US (1 liter): Pyrex

Sight-feed dome: Transparent nylon
Elastomers: Neoprene and Nitrile

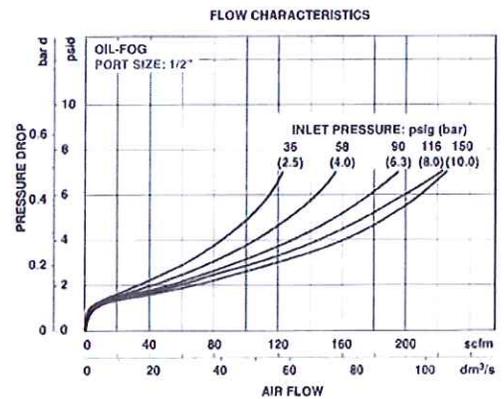
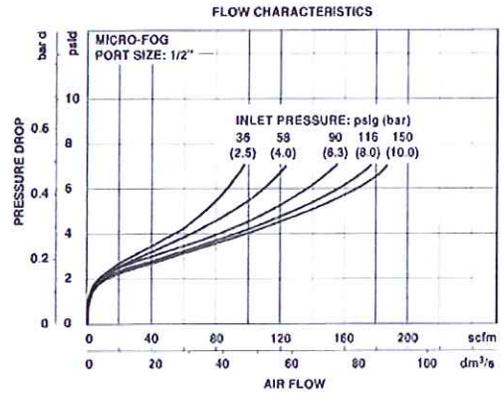
All Dimensions in Inches (mm)



** Optional pyrex sight-feed dome.

† Minimum clearance required to remove bowl.

Typical Performance Characteristics

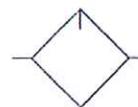


Service Kits

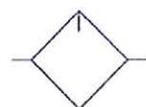
Item	Type	Part Number
Service kit	Seal & Gasket	4382-700
Liquid level lens kit	7 fluid ounce (0.2 liter) bowl	4380-050
	1 quart US (1 liter) bowl	2273-22
Replacement drain	Manual 1/4 turn	619-50

Service kit includes dome seal, drain seal, bowl seal and fill plug seal

ISO Symbols



No Drain



With Drain

See Section ALE-24 for Accessories

Air line equipment

Excelon® Modular System

F72C, F73C, F74C, F74H Oil Removal (Coalescing) Filters

Excelon® design allows in-line or modular installation
 High efficiency oil and particle removal
 Quick release bayonet bowl
 Standard visual service life indicator turns from green to red when the filter element needs to be replaced

Technical data

Fluid:

Compressed air

Maximum pressure:

Transparent bowl: Manual or semi

automatic drain: 150 psig (10 bar)

Automatic drain: 116 psig (8 bar)

Metal bowl: manual or semi automatic

drain: 250 psig (17 bar)

Automatic drain: 116 psig (8 bar)

Operating temperature*:

Transparent bowl:

-30° to 125°F (-34° to 50°C)

Metal bowl:

-30° to 150°F (-34° to 65°C)

* Air supply must be dry enough to avoid ice formation at temperatures below 35°F (2°C).

Particle removal:

0.01 µm

Materials

F72C

Body: zinc

Bowl transparent: polycarbonate

Guard for transparent bowl: zinc

Metal: zinc

Metal bowl liquid level indicator lens:

Transparent nylon

Element: synthetic fiber and

polyurethane foam

Elastomers: neoprene and nitrile

Service life indicator materials-Body:

transparent nylon.

Internal parts: acetal.

Spring: stainless steel.

Elastomers: nitrile

F73C and F74C

Body: aluminum

Transparent bowl: polycarbonate

Transparent with guard: polycarbonate,

steel guard

Metal bowl: aluminum

Metal bowl liquid level indicator lens:

Transparent nylon

Element: synthetic fiber and

polyurethane foam

Elastomers: neoprene and nitrile

Mechanical service indicator materials

Body: transparent nylon

Internal parts: Acetal

Spring: Stainless steel

Elastomers: Nitrile



F72C



F73C



F74C

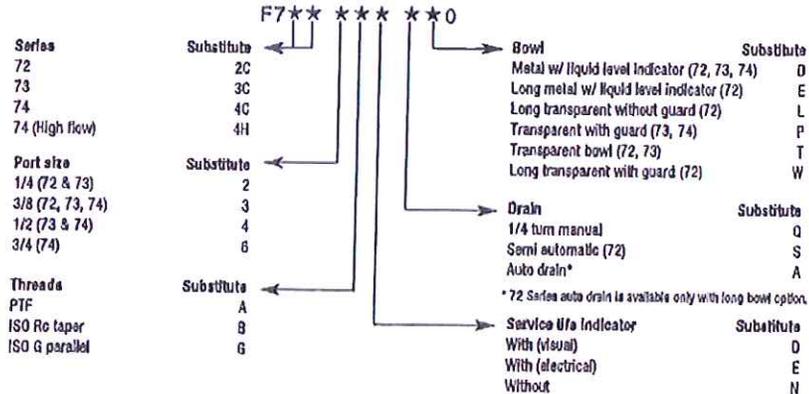
Ordering Information

Models listed include PTF threads, service indicator, automatic drain, and a metal bowl with liquid level indicator.

Port Size	Model Number	Maximum Flow* scfm (dm ³ /s)	Weight lb (kg)
1/4"	F72C 2AD ALO	9.5 (4.5)	1.2 (0.54)
3/8"	F72C 3AD ALO	9.5 (4.5)	1.2 (0.54)
1/4"	F73C 2AD ADO	21.2 (10.0)	1.2 (0.54)
3/8"	F73C 3AD ADO	21.2 (10.0)	1.2 (0.54)
1/2"	F73C 4AD ADO	21.2 (10.0)	1.2 (0.54)
3/8"	F74C 3AD ADO(sto)	33.9 (16.0)	1.88 (0.85)
1/2"	F74C 4AD ADO(sto)	33.9 (16.0)	1.84 (0.83)
1/2"	F74H 4AD ADO (hi)	59.3 (28.0)	2.45 (1.11)
3/4"	F74H 6AD ADO (hi)	59.3 (28.0)	2.40 (1.10)

* Maximum flow with 90 psig (6.3 bar) inlet pressure to maintain stated oil removal performance.

Options selector



www.norgren.com/info/US-ALE-4

In the following parts list, assemblies are printed in capital letters. Parts that are included with an assembly are listed and indented directly beneath it. When an assembly is ordered, the assembly and all parts indented beneath it are included in the shipment.
When an assembly lists a letter code in the USED ON column, parts that list the same letter code are used in that assembly. Parts coded A are used in the Assembly coded A, parts coded B are used in the Assembly coded B, etc.

ITEM	DESCRIPTION	PART NO.	QTY	USED ON
1	MECHANICAL SERVICE INDICATOR ASSY.....	5797-50	1	ON
2	• Screw.....	9F08-15	2	
3	• Body, nylon.....	Not available separately-order item 1	1	
4	• Ring support.....	Not available separately-order item 1	1	
5	• Diaphragm.....	Not available separately-order item 1	1	
6	• Body, standard.....	Not normally replaced	1	
7	• Body, high flow.....	Not normally replaced	1	
8	OPTIONAL ELECTRICAL SERVICE INDICATOR ASSY.....	4020-51R	1	
9	• Screw.....	9F08-13	2	
10	• Switch.....	Not available separately-order item 8	1	
11	• Seal.....	Not available separately-order item 8	1	
12	• CONNECTOR ASSY.....	4346-01R	1	
13	• Screw.....	Not available separately-order item 12	1	
14	• Seal.....	Not available separately-order item 12	1	

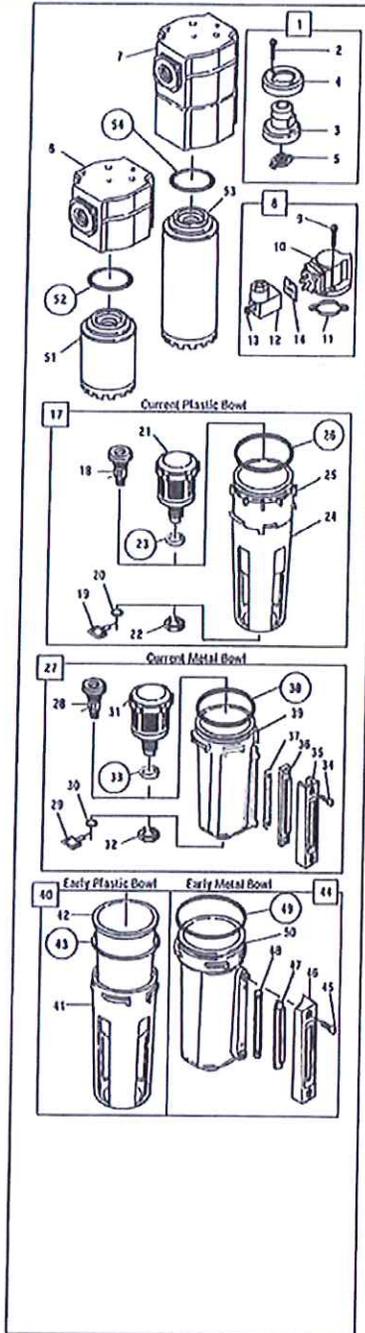
Items 15 and 16 are not used in this parts list

17	PLASTIC BOWL & GUARD ASSY, 1/4 turn manual drain.....	4325-51R	1	A
17	PLASTIC BOWL & GUARD ASSY, automatic drain.....	4325-52R	1	B
18	• MANUAL DRAIN ASSY, 1/4 turn.....	819-50	1	A
19	• Valve, drain.....	817-89	1	A
20	• O-ring.....	2307-05	1	A
21	• AUTOMATIC DRAIN ASSY, 1/8 PTF Outlet *.....	3000-10	1	B
22	• Nut.....	2797-89	1	B
23	• Gasket (service kit item).....	2811-01	1	B
24	• Guard, bowl.....	4326-01	1	AB
25	• Bowl, plastic.....	Not normally replaced	1	AB
26	• O-ring (service kit item).....	2316-38	1	AB
27	METAL BOWL ASSY, sight glass, 1/4 turn manual drain.....	4303-51R	1	C
27	METAL BOWL ASSY, sight glass, automatic drain.....	4303-52R	1	D
28	• MANUAL DRAIN ASSY, 1/4 turn.....	819-50	1	C
29	• Valve, drain.....	817-89	1	C
30	• O-ring.....	2307-05	1	C
31	• AUTOMATIC DRAIN ASSY, 1/8 PTF Outlet *.....	3000-10	1	D
32	• Nut.....	2797-89	1	D
33	• Gasket (service kit item).....	2811-01	1	D
34	• Screw (service kit item).....	9P06-12	2	CD
35	• Clamp, sight glass.....	4323-01	1	CD
36	• Lens, sight glass (service kit item).....	4321-38	1	CD
37	• Seal, sight glass lens (service kit item).....	4322-37	1	CD
38	• O-ring, bowl (service kit item).....	2316-38	1	CD
39	• Bowl, metal.....	Not normally replaced	1	CD
40	PLASTIC BOWL & GUARD, early models.....	Not available - order item 17	1	
41	• Guard, bowl.....	Not available - order item 17	1	
42	• Bowl, plastic.....	Not available - order item 17	1	
43	• O-ring (service kit item).....	2316-38	1	
44	METAL BOWL, early models.....	Not available - order item 27	1	
45	• Screw.....	Not available	2	
46	• Clamp, sight glass.....	Not available	1	
47	• Lens, sight glass.....	Not available	1	
48	• Seal, sight glass lens.....	Not available	1	
49	• O-ring, bowl (service kit item).....	2316-38	1	
50	• Bowl, metal.....	Not available - order item 27	1	
51	ELEMENT ASSY, standard body.....	4344-01	1	
52	• O-ring.....	2305-25	1	
53	ELEMENT ASSY, high flow body.....	4344-02	1	
54	• O-ring.....	2305-25	1	

SERVICE KITS & ACCESSORIES

Service kit - Includes items circled on exploded view.....	4380-730
Current metal bowl liquid level lens kit - Items 34, 36, 37, 38.....	4380-050
Universal wall mounting bracket kit.....	4324-50

* For optional low flow automatic drain with 1/8 PTF outlet, specify 3000-11.
For standard automatic drain with ISO G 1/8 outlet, specify 3000-37.



Excelon® Modular System

F72C, F73C, F74C, F74H Oil Removal (Coalescing) Filters

Dimensions in inches.

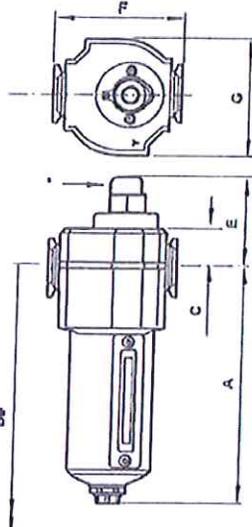
Accessories*

	Wall mounting bracket**	Quickmount pipe adapters (quantity of 1) (NPT)	Quickclamp†	Quickclamp® and wall bracket	Service life Indicator	Electrical service life Indicator
F72C	4224-50	4215-02 (1/4) 4215-03 (3/8)	4214-51	4214-52 4213-89*	5797-50	4020-51R
F73C	4424-50	4315-01 (1/4) 4315-02 (3/8) 4315-03 (1/2) 4315-04 (3/4)	4314-51	4314-52 4313-50*	5797-50	4020-51R
F74C, F74H	4324-50	4315-02 (3/8) 4315-03 (1/2) 4315-04 (3/4)	4314-51	4314-52 4313-50*	5797-50	4020-51R

* For additional options see website.

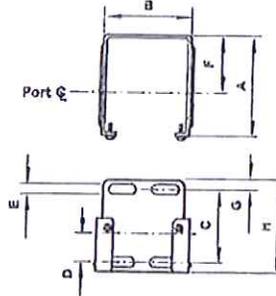
** Bracket only.

† Quickclamps patented (US patent 5372392) and foreign patents.



* Standard service indicator
Minimum clearance required to remove bowl

Mounting bracket



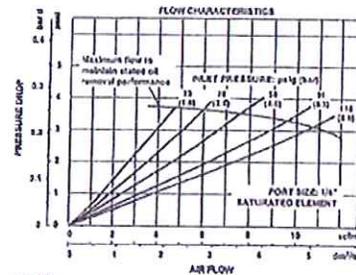
Service Kit

Item	Type	Part Number
72C	Seal and Gasket	4380-500
73C	Seal and Gasket	4380-602
74C/H	Seal and Gasket	4380-730

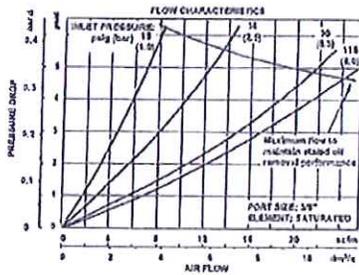
Series	A	B	C	D	E	F	G	H
72	2.36	1.65	1.54	0.73	0.16	1.50	0.24	2.01
73	2.64	2.36	1.89	0.75	0.28	1.50	0.24	2.40
74	3.11	2.72	1.97	0.79	0.20	2.01	0.24	2.40

Series	Drain type	A	B	C	E	F	G
F72C	Auto	5.99	7.99	0.75	2.09	1.97	1.89
	Manual	5.23	7.28	0.75	2.09	1.97	1.89
F73C	Auto	6.43	8.84	0.98	2.36	2.63	2.44
	Manual	6.14	8.50	0.98	2.36	2.63	2.44
F74C	Auto	7.03	9.75	0.98	2.36	3.15	2.91
	Manual	6.97	9.69	0.98	2.36	3.15	2.91
F74H	Auto	9.15	11.87	0.98	2.36	3.15	2.91
	Manual	9.05	11.81	0.98	2.36	3.15	2.91

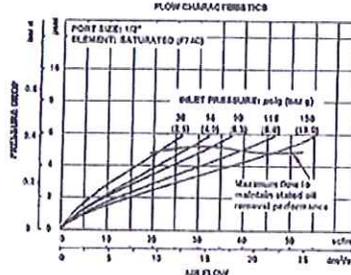
F72



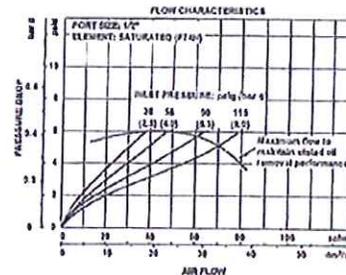
F73



F74C



F74H



320/420 Valves

320, 420, M420

The 320 and 420 Series Direct-Acting Solenoid Valves have a maximum performance balanced poppet, achieving high flow rates of 1.0 Cv, in a compact design. No air supply lubrication is required. Continuous-Duty molded coil and Class B insulation system provides long hours in tough-working conditions.

320: Multi-purpose universal 2- or 3-way valve.

420: Multi-purpose universal 4-way valve.

420 Series valves also available as a manifold mount, model M420.

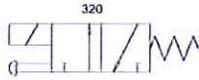
Base Models

- 2- or 3-Way Inline (320), 4-Way Inline (420)
- 4-Way Manifold Mount (M420)

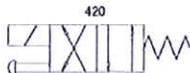
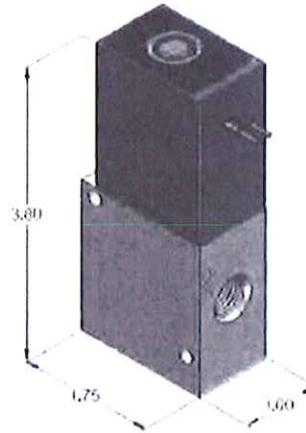
Features and Benefits

- Multi-purpose: normally closed, normally open, selector or divertor, pressure or vacuum, 2-, 3- or 4-way.
- Quiet operation. No AC hum. Low leak rate.
- Electrical connection options include lead wires, conduit connector, or DIN connector.
- Available with UR rating. Contact factory representative.
- Non-locking manual override: Standard. Optional, no override order Code 87.
- Mount in any position – inline, body mounting holes or mounting bracket.

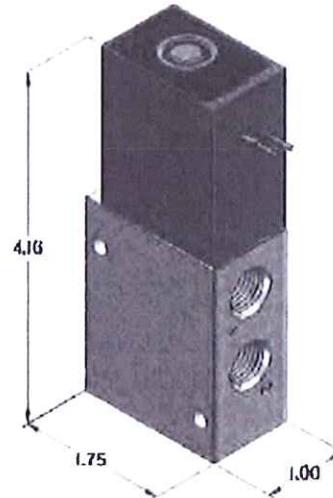
DIRECT-ACTING SOLENOID VALVES



320



420



SPECIFICATIONS FOR 320 AND 420

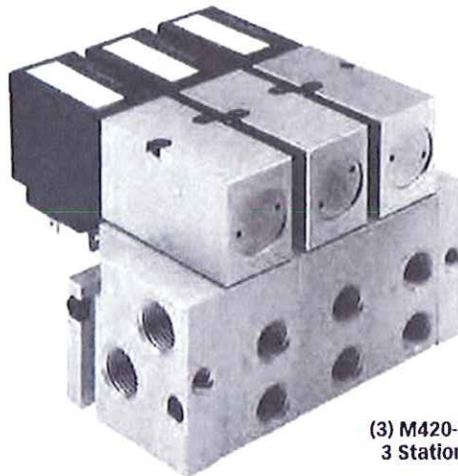
Design Principle:	Pressure Balanced – Spring Return	Temperature Range:	32°F to 125°F
Porting Type:	2-, 3- or 4-Way	Flow @100 PSIG:	60 CFM, 1699 LPM (Cv=1.0)
Port Size:	1/4 PIPE (E320/E420: 1/4 BSP)	Power:	8 W
Media:	Air, Inert Gas	Available Voltages:	12VDC, 24VDC, 24/50/60, 120/50/60, 240/50/60
Pressure Range:	28"Hg to 125 PSIG (see Vacuum, p. 76-77)		

Manifold

M420 series valves are multi-purpose 4-way, base piping types to permit mounting to manifolds and subbases. The high flow (1 Cv) M420 series can be used as 2- or 3-way valves, in normally closed or normally open function, as 4-way valves, or as diverter or selector function.

Subbase: Mount M420 valve to SB-2 subbase with 7-200A end plate kit. Subbase permits convenient valve replacement without disturbing the plumbing.

Manifold: Stack several SB-2 subbases together and with one 7-200A end plate for multiple valve manifold. Mount M420 to each subbase. Ports 1, 2, 3 and 4 located in manifold for convenient valve replacement without disturbing the plumbing.



(3) M420-39 Valves Mounted to 3 Station Manifold Assembly

DIRECT-ACTING SOLENOID VALVES

Manifold Types Available	Overall Size (valves not mounted)	Nominal Dimensions (inch)		
		L	H	D
SB2 Subbase: Extruded Aluminum subbases held together by 7-200A end plates. Delivery ports 1 and 2 located on manifold. Accepts M420 valve model.	Two Valves with End Plates	3.38	2.22	2.25
	Each Additional Valve	1.19		
	Max # of stations	12		

Consult website for exact dimensions and additional manifold configurations.

How To Order Valves & Manifolds...Pages 97, 98 & 117

HOW TO OBTAIN VALVE SPECIFICATIONS

- ☞ Visit www.humphrey-products.com and select "Online Product Guide."
- From the search options provided, choose the valve you want and the details for that product.
- Once completed, select "Spec Sheet" to create a PDF of the valve, which you may save and print at your convenience.

HOW TO FIND A DISTRIBUTOR

- ☞ Visit www.humphrey-products.com, select "Find A Distributor," and input your information to locate a distributor nearest you.
- Or, call Customer Service at 1-800-477-8707 for the name and phone number of your local distributor.

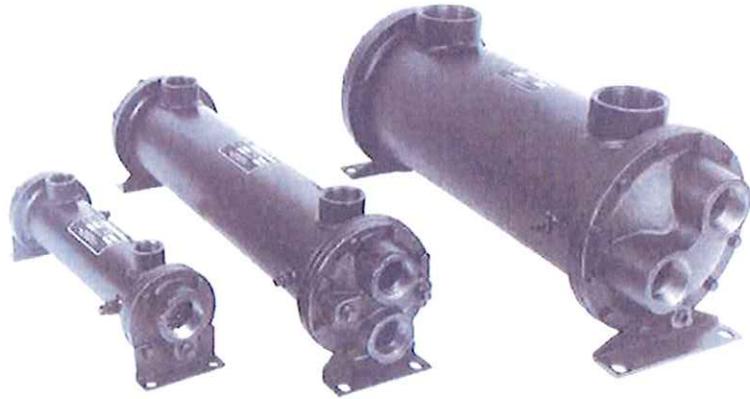
HUMPHREY PRODUCTS ARE SOLD WORLD-WIDE THROUGH AUTHORIZED DISTRIBUTORS

FLUID COOLING | Shell & Tube C & SSC Series

COPPER/STEEL OR STAINLESS STEEL CONSTRUCTION

Features

- API/BASCO Interchange
- ASME Code Option
- Preferred for New Oil-Water Applications
- C-Series / SSC Series
- Rugged Steel Construction
- Low Cost
- Type 316 Stainless Steel Construction Optional
- Custom Designs Available
- Competitively Priced
- Optional Material Construction on C-Series: Tubes, Tubesheets, End Bonnets
- NPT, SAE O-Ring, SAE Flange, or BSPP Shell Side Connections Available
- End Bonnets Removable for Servicing
- Mounting Feet Included (May be rotated in 90° increments)



WATER COOLED
C & SSC

Ratings Standard

Maximum Shell Pressure 300 psi
Maximum Tube Side Pressure 150 psi
Maximum Temperature 300°F

Ratings ASME Code

Maximum Shell Pressure 300 psi
Maximum Tube Side Pressure 150 psi
ASME Code SSC-1700 200 psi
Maximum Temperature 300°F

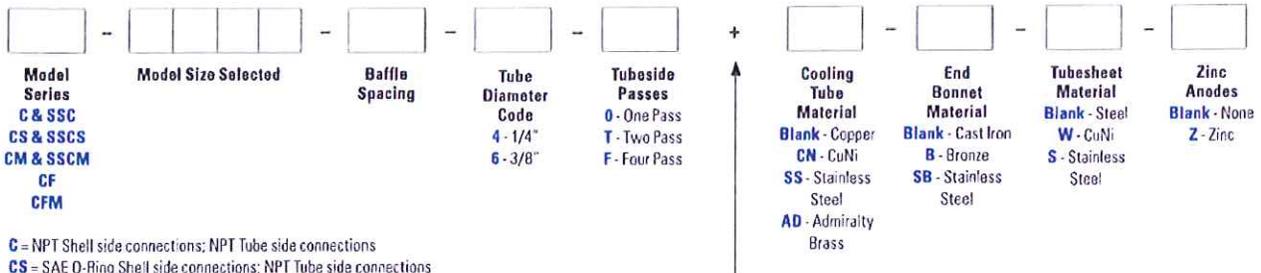
Materials C Series

Tubes Copper
Headers Steel
Shell Steel
Shell Connections Steel
Baffles Brass
End Bonnets Cast Iron
Mounting Brackets Steel
Gaskets Nitrile Rubber/Cellulose Fiber
Nameplate Aluminum Foil

Materials SSC Series

Tubes 316 Stainless Steel
Tubesheets 316 L Stainless Steel
Shell 316 L Stainless Steel
Shell Connections 316 L Stainless Steel
Baffles 316 Stainless Steel
End Bonnets 316 Stainless Steel
Mounting Brackets Mild Steel
Gaskets Nitrile Rubber/Cellulose Fiber
Nameplate Aluminum Foil

How to Order



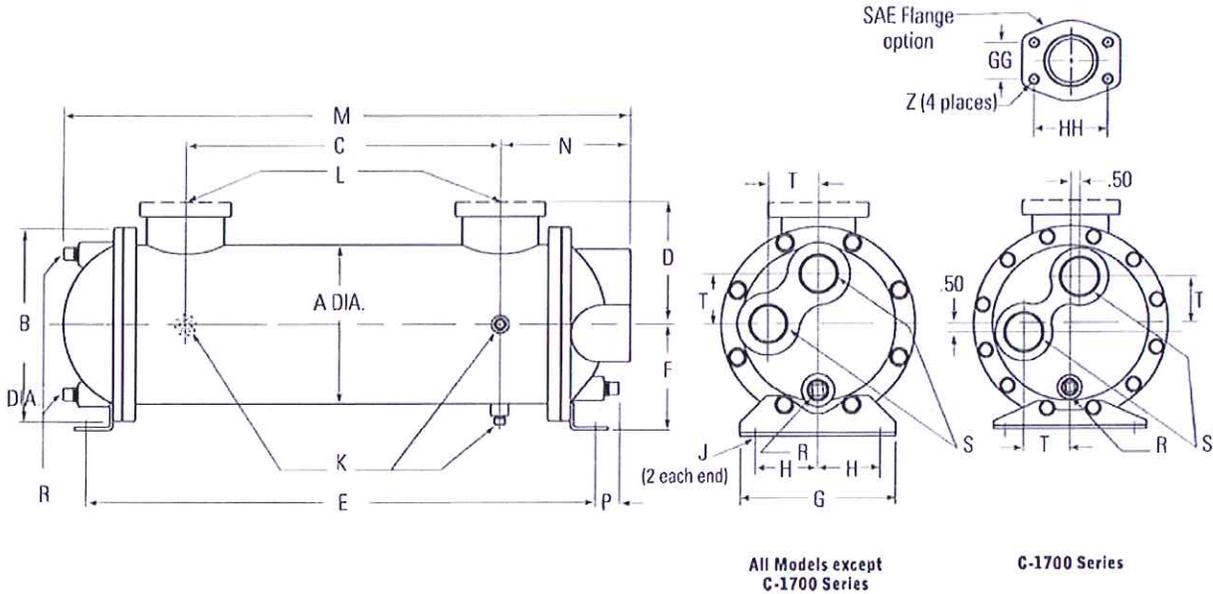
C = NPT Shell side connections; NPT Tube side connections
CS = SAE O-Ring Shell side connections; NPT Tube side connections
CM = BSPP Shell side connections; BSPP Tube side connections
CF = SAE Flange (with UNC threads) Shell side connections; NPT Tube side connections
CFM = SAE Flange (with Metric threads) Shell side connections; BSPP Tube side connections
SSC = NPT Shell side connections; NPT Tube side connections
SSCS = SAE O-Ring Shell side connections, NPT Tube side connections
SSCM = BSPP Shell side connections; BSPP Tube side connections

ADD FOR C, CS, CM, CF and CFM MODELS ONLY:
 Cooling tube material, end bonnet material, tubesheet material & zinc anodes

Consult factory for ASME Code

Dimensions

Four Pass



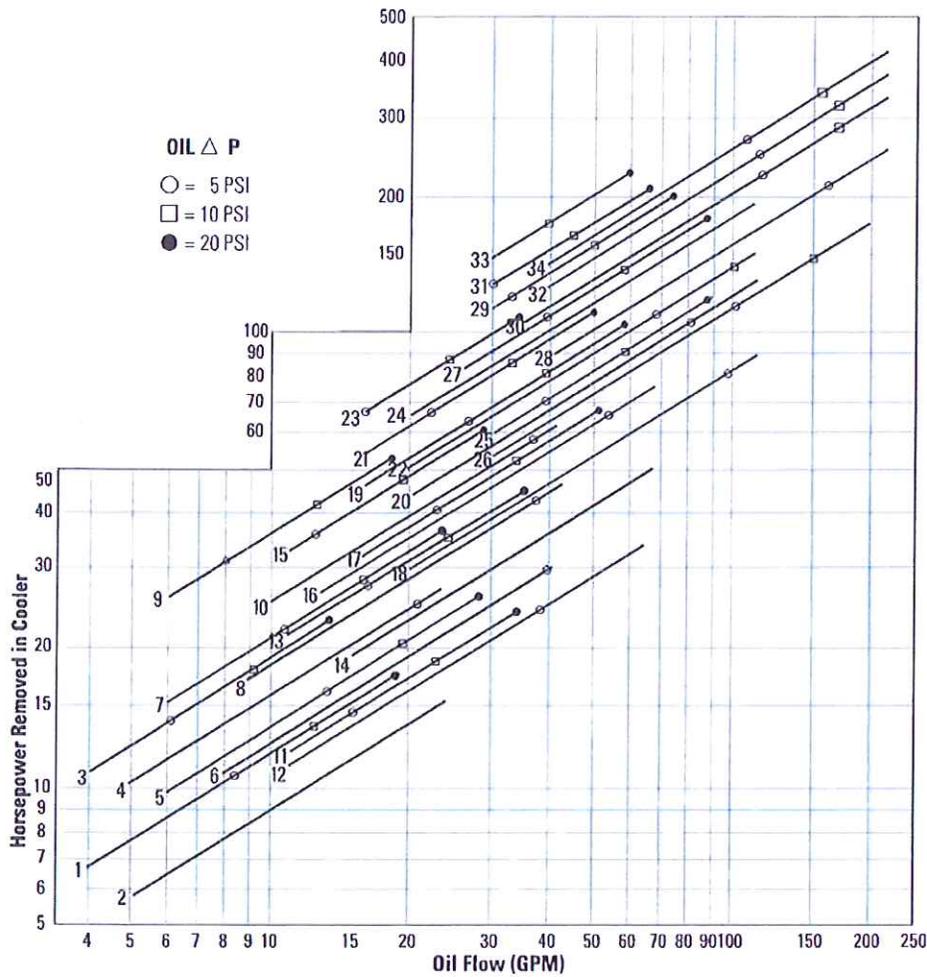
Flange Size	C-1700 Series			
	GG	HH	Z - CF	Z - CFM
1	1.03	2.06	3/8-16 UNC	M-10
1.50	1.41	2.75	1/2-13 UNC	M-12
2	1.69	3.06		
3	2.44	4.19	5/8-11 UNC	M-16

MODEL SIZE	A	B	C	D		E	F	G	H	J	K	L		M	N	P	R	S	T	
				NPT/BSPP SAE O-RING	SAE FLANGE							NPT/BSPP FLANGE	SAE O-RING							
614	3.25	4.50	10.00	2.62	2.88	16.38	2.75	4.18	1.62	.44	(3)	1.00	#16 1 5/16-12 UNF-2B	17.12	3.56	.38	(2)	38	75	1.00
624			20.00			26.38								27.12						
814	4.25	6.00	9.00	3.25	3.50	16.62	3.50	4.25	1.75	.44	(3)	1.50	#24 1 7/8-12 UN-2B	17.88	4.44	.63	(2)	38	75	1.25
824			19.00			26.62								27.88						
836	5.25	6.75	31.00	3.75	4.00	38.62	4.00	5.25	2.00	.50	(3)	2.00	#32 2 1/2-12 UN-2B	39.88	4.81	.75	(3)	38	1.00	1.69
1014			9.00			17.12								18.81						
1024	6.25	7.75	19.00	4.25	4.88	27.12	4.50	6.25	2.50	.75	(3)	2.00	#32 2 1/2-12 UN-2B	28.81	5.44	1.00	(3)	38	1.50	2.00
1036			31.00			39.12								40.81						
1224	8.62	10.50	18.25	5.84	6.81	27.13	5.75	8.25	3.50	.62	(3)	3.00	#32 2 1/2-12 UN-2B	29.13	7.06	1.81	(3)	38	2.00	2.50
1236			30.25			39.13								41.13						
1248	8.62	10.50	42.25	5.84	6.81	51.13	5.75	8.25	3.50	.88	(3)	3.00	#32 2 1/2-12 UN-2B	53.13	7.06	1.81	(3)	38	2.00	2.50
1260			54.25			63.13								65.13						
1724	8.62	10.50	17.00	5.84	6.81	27.50	5.75	8.25	3.50	.62	(3)	3.00	#32 2 1/2-12 UN-2B	29.86	7.06	1.81	(3)	38	2.00	2.50
1736			29.00			39.50								41.86						
1748	8.62	10.50	41.00	5.84	6.81	51.50	5.75	8.25	3.50	.88	(3)	3.00	#32 2 1/2-12 UN-2B	53.86	7.06	1.81	(3)	38	2.00	2.50
1760			53.00			63.50								65.86						
1772	8.62	10.50	65.00	5.84	6.81	75.50	5.75	8.25	3.50	.88	(3)	3.00	#32 2 1/2-12 UN-2B	77.86	7.06	1.81	(3)	38	2.00	2.50

NOTE: We reserve the right to make reasonable design changes without notice. Consult factory. All dimensions are inches.

WATER COOLED
C & SSC

Performance Curves



Model	Ship Wt. (lbs)
1. C/SSC-614-1.3-4-F	17
2. C/SSC-614-3-4-F	17
3. C/SSC-624-1.3-4-F	24
4. C/SSC-624-3-4-F	24
5. C/SSC-814-1.7-4-F	32
6. C/SSC-814-4-4-F	32
7. C/SSC-824-1.7-4-F	41
8. C/SSC-824-4-4-F	41
9. C/SSC-836-1.7-4-F	53
10. C/SSC-836-4-4-F	53
11. C/SSC-1014-2-6-F	43
12. C/SSC-1014-5-6-F	43
13. C/SSC-1024-2-6-F	57
14. C/SSC-1024-5-6-F	57
15. C/SSC-1036-2-6-F	72
16. C/SSC-1036-5-6-F	72
17. C/SSC-1224-2.5-6-F	85
18. C/SSC-1224-6-6-F	85
19. C/SSC-1236-2.5-6-F	110
20. C/SSC-1236-6-6-F	110
21. C/SSC-1248-2.5-6-F	135
22. C/SSC-1248-6-6-F	135
23. C/SSC-1260-2.5-6-F	160
24. C/SSC-1260-6-6-F	160
25. C/SSC-1724-3.5-6-F	140
26. C/SSC-1724-8.4-6-F	140
27. C/SSC-1736-3.5-6-F	180
28. C/SSC-1736-8.4-6-F	180
29. C/SSC-1748-3.5-6-F	220
30. C/SSC-1748-8.4-6-F	270
31. C/SSC-1760-3.5-6-F	260
32. C/SSC-1760-8.4-6-F	260
33. C/SSC-1772-3.5-6-F	300
34. C/SSC-1772-8.4-6-F	300

*Shipping Weights are approximate

WATER COOLED
C & SSC

Selection Procedure

Performance Curves are based on 100SSU oil leaving the cooler 40°F higher than the incoming water temperature (40°F approach temperature). Curves are based on a 2:1 oil to water ratio.

Step 1 Determine the Heat Load. This will vary with different systems, but typically coolers are sized to remove 25 to 50% of the input nameplate horsepower. (Example: 100 HP Power Unit x .33 = 33 HP Heat load.)
If BTU/Hr. is known: $HP = \frac{BTU/Hr}{2545}$

Step 2 Determine Approach Temperature.
Desired oil leaving cooler °F - Water Inlet temp. °F = Actual Approach

Step 3 Determine Curve Horsepower Heat Load. Enter the information from above:
 $HP \text{ heat load} \times \frac{40}{\text{Actual Approach}} \times \frac{\text{Viscosity}}{\text{Correction A}} = \text{Curve Horsepower}$

Step 4 Enter curves at oil flow through cooler and curve horsepower. Any curve above the intersecting point will work.

Step 5 Determine Oil Pressure Drop from Curves. Multiply pressure drop from curve by correction factor B found on oil viscosity correction curve.
● = 5 PSI; ■ = 10 PSI; ▲ = 20 PSI; + = 40 PSI.

Oil Temperature

Oil coolers can be selected by using entering or leaving oil temperatures.

Typical operating temperature ranges are:

Hydraulic Motor Oil	110°F - 130°F
Hydrostatic Drive Oil	130°F - 180°F
Lube Oil Circuits	110°F - 130°F
Automatic Transmission Fluid	200°F - 300°F

Desired Reservoir Temperature

Return Line Cooling: Desired temperature is the oil temperature leaving the cooler. This will be the same temperature that will be found in the reservoir.

Off-Line Recirculation Cooling Loop: Desired temperature is the temperature entering the cooler. In this case, the oil temperature change must be determined so that the actual oil leaving temperature can be found. Calculate the oil temperature change (Oil ΔT) with this formula:

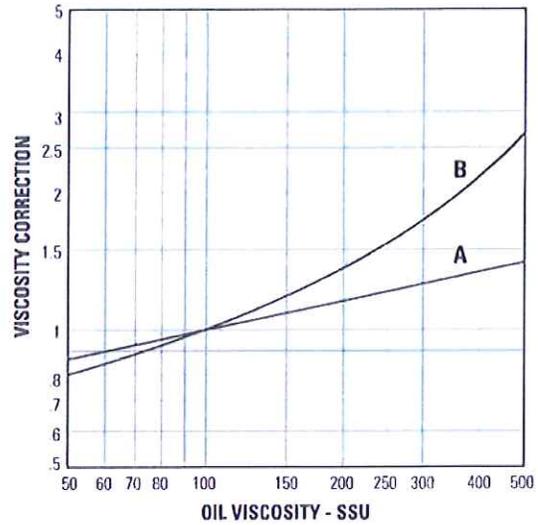
$$\text{Oil } \Delta T = (\text{BTU's/Hr.}) / \text{GPM Oil Flow} \times 210.$$

To calculate the oil leaving temperature from the cooler, use this formula:

$$\text{Oil Leaving Temperature} = \text{Oil Entering Temperature} - \text{Oil } \Delta T.$$

This formula may also be used in any application where the only temperature available is the entering oil temperature.

Oil Pressure Drop: Most systems can tolerate a pressure drop through the heat exchanger of 20 to 30 PSI. Excessive pressure drop should be avoided. Care should be taken to limit pressure drop to 5 PSI or less for case drain applications where high back pressure may damage the pump shaft seals.



Maximum Flow Rates

Example Model No.

C/SSC - 1024 - 2 - 6 - F

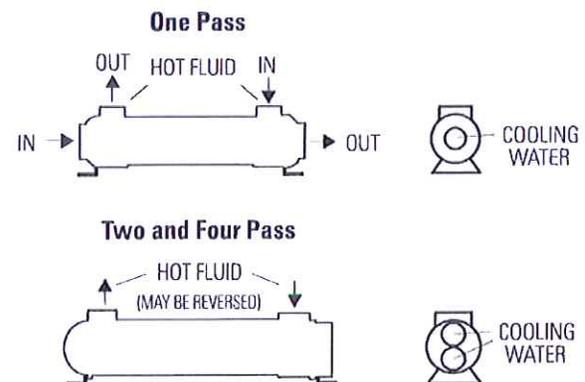
Unit Size	Baffle Spacing	Shell Side (GPM)	Tube Side (GPM)		
			O	T	F
600	1.3, 3	19, 29	48	24	12
800	1.7, 4	32, 69	84	42	21
1000	2, 5	41, 69	146	73	37
1200	2.5, 6	60, 115	224	112	56
1700	3.5, 8.4	125, 253	465	232	116

Exceptions to Maximum Shell Side Flows

C/SSC-814-4-4-*	63 GPM Max.
C/SSC-1014-2-6-*	33 GPM Max.
C/SSC-1014-5-6-*	66 GPM Max.
C/SSC-1724-3.5-6-*	105 GPM Max.
C/SSC-1724-8.4-6-*	200 GPM Max.

Caution: Incorrect installation can cause this product to fail prematurely, causing the shell side and tube side fluids to intermix.

Piping Hook-up



Specific applications may have different piping arrangements. Contact factory for assistance.

OPERATOR'S MANUAL

66610X-X-C

INCLUDING: OPERATION, INSTALLATION & MAINTENANCE

RELEASED: 8-24-89
 REVISED: 11-1-06
 (REV. X)

1" DIAPHRAGM PUMP 1:1 RATIO (METALLIC)



**READ THIS MANUAL CAREFULLY BEFORE INSTALLING,
 OPERATING OR SERVICING THIS EQUIPMENT.**

It is the responsibility of the employer to place this information in the hands of the operator. Keep for future reference.

SERVICE KITS

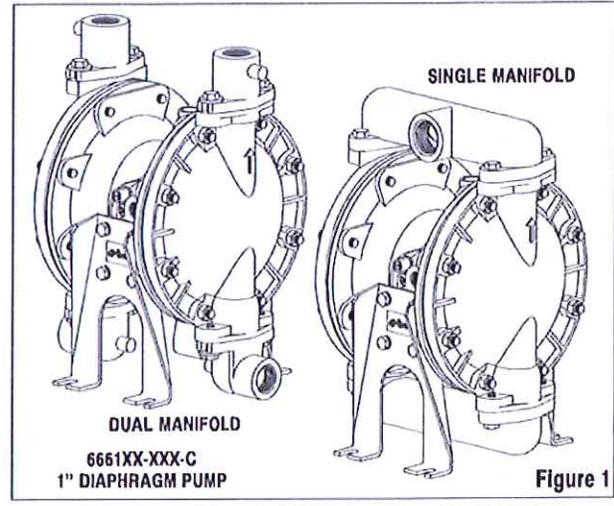
Refer to "Model Description Chart" to match the pump material options.
 637118-C for air section repair (see page 6).
 637119-XX-C for fluid section repair (see page 4).
 637167 abrasion resistant conversion kit is available for use in heavy
 and abrasive material applications (see page 4).

PUMP DATA

Models	see "Model Description Chart" for "-XXX".
Pump Type	Metallic Air Operated Double Diaphragm.
Material	see "Model Description Chart".
Weight	Aluminum 19 lbs (8.62 kg)
	Cast Iron 31 lbs (14.06 kg)
	Stainless Steel 36 lbs (16.33 kg)
	(add 8 lbs (3.63 kg) for cast iron air motor section)
Maximum Air Inlet Pressure	120 p.s.i. (8.3 bar)
Maximum Material Inlet Pressure	10 p.s.i. (0.69 bar)
Maximum Outlet Pressure	120 p.s.i. (8.3 bar)
Maximum Flow Rate (flooded inlet) ...	35 g.p.m. (133 l.p.m.)
Maximum Particle Size	1/8" dia. (3.2 mm)
Maximum Temperature Limits (diaphragm / ball / seal material)	
Acetal	10° to 180° F (-12° to 82° C)
E.P.R. / EPDM	-60° to 280° F (-51° to 138° C)
Hytre®	-20° to 150° F (-29° to 66° C)
Neoprene	0° to 200° F (-18° to 93° C)
Nitrile	10° to 180° F (-12° to 82° C)
Polypropylene	35° to 150° F (2° to 66° C)
Polyurethane	10° to 150° F (-12° to 66° C)
Kynar® PVDF	10° to 200° F (-12° to 93° C)
Santoprene®	-40° to 225° F (-40° to 107° C)
Teflon® PTFE	40° to 225° F (4° to 107° C)
Viton®	-40° to 350° F (-40° to 177° C)
Dimensional Data	see page 8.
Noise Level @ 70 p.s.i., 60 c.p.m.	64.5 db(A)*

* The pump sound pressure levels published here have been updated to an Equivalent Continuous Sound Level (L_{Aeq}) to meet the intent of ANSI S1.13-1971, CAGI-PNEUROP S5 1 using four microphone locations

NOTICE: All possible options are shown in the chart. However, certain combinations may not be recommended, consult a representative or the factory if you have questions concerning availability.



MODEL DESCRIPTION CHART

6661 XX - XXX - C	
Center Body Material, Threads	
0 - Aluminum, N.P.T.F.	2 - Aluminum, BSP
1 - Cast Iron, N.P.T.F.	3 - Cast Iron, BSP
Fluid Cap / Manifold Material, Inlet / Outlet (Steel Hardware)	(Stainless Steel Hardware)
0 - Aluminum, Single	A - Aluminum, Single
1 - Stainless Steel, Single	B - Stainless Steel, Single
2 - Cast Iron, Single	C - Cast Iron, Single
9 - Stainless Steel, Dual	D - Stainless Steel, Dual
Seat Material	
1 - Aluminum	4 - Kynar PVDF
2 - 316 Stainless Steel	5 - Carbon Steel
3 - Polypropylene	8 - Hard 440 Stainless Steel
Ball Material	
1 - Neoprene	6 - Acetal
2 - Nitrile	8 - Polyurethane
3 - Viton	A - Stainless Steel
4 - Teflon PTFE	C - Hytre
5 - E.P.R.	E - Santoprene
Diaphragm Material	
1 - Neoprene	3 - Viton
2 - Nitrile	5 - E.P.R.
4 - Teflon PTFE / Santoprene	9 - Hytre
	B - Santoprene
FLUID SECTION SERVICE KIT SELECTION	6661XX - X X X - C
EXAMPLE: Model # 666100-361-C	637119 - [X][X] - C
Fluid Section Service Kit # 637119-61-C	Ball [] Diaphragm []



PARTS LIST / 66610X-X-C FLUID SECTION

★ 637119-XX-C Fluid Section Service Kits include: Balls (see BALL Option, refer to -XX in chart below), Diaphragms (see DIAPHRAGM Option, refer to -XX in chart below), plus items: 2, 3, 19 and 93706-1 Key-Lube grease.

SEAT OPTIONS 6661XX-XXX-C			
"21"			
-XXX	Seat	Qty	[Mtl]
-1XX	92008-1	(4)	[A]
-2XX	90428-1	(4)	[SS]
-3XX	92926	(4)	[P]
-4XX	92941	(4)	[K]
-5XX	95675-1	(4)	[C]
-8XX	93367-1	(4)	[SH]

BALL OPTIONS 6661XX-XXX-C							
★ "22" (1" dia.) (Service Kit -XX)							
-XXX	Ball	Qty	[Mtl]	-XXX	Ball	Qty	[Mtl]
-X1X	90532-1	(4)	[N]	-X6X	90532-6	(4)	[D]
-X2X	90532-2	(4)	[B]	-X8X	90532-8	(4)	[U]
-X3X	90532-3	(4)	[V]	-XAX	90948	(4)	[SS]
-X4X	90532-4	(4)	[T]	-XCX	90532-C	(4)	[H]
-X5X	90532-5	(4)	[E]	-XEX	90532-A	(4)	[SP]

MATERIAL CODE	
[A]	Aluminum
[B]	Nitrile
[C]	Carbon Steel
[CI]	Cast Iron
[Co]	Copper
[D]	Acetal
[E]	E.P.R.
[H]	Hytel
[K]	Kynar PVDF
[N]	Neoprene
[P]	Polypropylene
[SP]	Santoprene
[SH]	Hard Stainless Steel
[SS]	Stainless Steel
[T]	Teflon PTFE
[U]	Polyurethane
[V]	Viton

DIAPHRAGM OPTIONS 66610X-XXX-C													
-XXX	★ SERVICE KIT -XX = (Ball) -XX = (Diaphragm)	★ "7"			★ "8"			★ "3"			★ "19"		
		Diaphragm	Qty	[Mtl]	Diaphragm	Qty	[Mtl]	"O" Ring 1/16" x 5/8" o.d.	Qty	[Mtl]	"O" Ring 3/32" x 1-9/16" o.d.	Qty	[Mtl]
-XX1	637119-X1-C	90533-1	(2)	[N]	-----	---	---	Y325-14	(4)	[B]	Y325-126	(4)	[B]
-XX2	637119-X2-C	90533-2	(2)	[B]	-----	---	---	Y325-14	(4)	[B]	Y325-126	(4)	[B]
-XX3	637119-X3-C	90533-3	(2)	[V]	-----	---	---	Y328-14	(4)	[T]	Y327-126	(4)	[V]
-XX4	637119-X4-C	93459-4	(2)	[T]	92973-B	(2)	[SP]	Y328-14	(4)	[T]	Y328-126	(4)	[T]
-XX5	637119-X5-C	90533-5	(2)	[E]	-----	---	---	Y328-14	(4)	[T]	90534	(4)	[E]
-XX9	637119-X9-C	90533-9	(2)	[H]	-----	---	---	Y328-14	(4)	[T]	Y327-126	(4)	[V]
-XXB	637119-XB-C	90533-B	(2)	[SP]	-----	---	---	Y328-14	(4)	[T]	90534	(4)	[E]

MANIFOLD / FLUID CAP MATERIAL OPTIONS 6661XX-XXX-C											
Item	Description (size)	Qty	Aluminum 6661XQ-X, 6661XA-X			Stainless Steel 6661X1-, 1X9-, 1XB-, 1XD-			Cast Iron 6661X2-X, 6661XC-X		
			N.P.T.F. Part No.	BSP Part No.	[Mtl]	N.P.T.F. Part No.	BSP Part No.	[Mtl]	N.P.T.F. Part No.	BSP Part No.	[Mtl]
15	Fluid Cap	(2)	94945	94945	[A]	91045	91045	[SS]	94277	94277	[CI]
16	Manifold (6661X0, 1X1, 1X2, 1XA, 1XB, 1XC)	(2)	92001	92001-1	[A]	91044	91044-1	[SS]	94278	94278-1	[CI]
17	Outlet Manifold (6661X9-, 6661XD- only)	(2)	-----	-----	---	92846	92846-1	[SS]	-----	-----	---
18	Inlet Manifold (6661X9-, 6661XD- only)	(2)	-----	-----	---	92847	92847-1	[SS]	-----	-----	---
23	Spring (6661X9-, 6661XD- only)	(2)	-----	-----	---	22155	22155	[SS]	-----	-----	---

HARDWARE OPTIONS 6661XX-XXX-C						
Item	Description (size)	Qty	Carbon Steel 6661XQ-, 1-, 2-, 9-		Stainless Steel 6661XA-, B-, C-, D-	
			Part No.	[Mtl]	Part No.	[Mtl]
5	Washer - Air Side (3-5/8" o.d.)	(2)	93441-2	[C]	93441-1	[SS]
24	Washer - models 6661X9 and 6661XD only (5/16")	(8)	Y13-5-C	[C]	Y13-5-T	[SS]
26	Bolt (5/16" - 18 x 1")	(8)	Y6-55-C	[C]	Y6-55-T	[SS]
29	Nut (5/16" - 18)	(16)	Y12-5-C	[C]	Y12-5-S	[SS]

637167
ABRASION RESISTANT
CONVERSION KITS INCLUDE:
 "21" Seat 93367-1 (4)
 "22" Ball 90532-8 (4)

COMMON PARTS									
Item	Description (size)	Qty	Part No.	[Mtl]	Item	Description (size)	Qty	Part No.	[Mtl]
□ 1	Rod	(1)	98724-1	[C]	9	Washer (0.505" l.d.)	(2)	93189-1	[SS]
★ 2	"O" Ring (3/32" x 3/4" o.d.) *	(1)	Y330-113	[B]	14	Screw (1/2" - 20 x 1")	(2)	Y5-85-T	[SS]
□ 6	Washer - Fluid Side models 6661X9 and 6661X2 only	(2)	93441-2	[C]	43	Ground Lug (see page 7)	(1)	93004	[Co]

* Service Note: Fluid Section Service Kits also include part no. 93131 (5) "O" rings for repair of "B" (pre - 8/89) models.
 Service Note: Part no. 98930-T installation tool is available separately for use with items 1 and 2.
 □ "Smart Parts", keep these items on hand in addition to the service kits for fast repair and reduction of down time.

PARTS LIST / 66610X-X-C FLUID SECTION

COLOR CODE		
MATERIAL	DIAPHRAGM COLOR	BALL COLOR
Acetal	N/A	Orange
Nitrile	Red (-)	Red (+)
E.P.R.	Blue (-)	Blue (+)
Hydrel	Cream	Cream
Neoprene	Green (-)	Green (+)
Santoprene	Cream*	Cream
Teflon PTFE	White	White
Urethane	N/A	Red
Viton	Yellow (-)	Yellow (+)
	(-) Stripe	(+) Dot

* See item 8 in inset below.

**FOR THE AIR MOTOR SECTION
SEE PAGES 6 & 7**

TORQUE REQUIREMENTS
NOTE: DO NOT OVERTIGHTEN FASTENERS
(14) Bolt, 25 - 30 ft lbs (33.9 - 40.7 Nm).
(26) Bolts and (29) nuts, 120 - 140 in. lbs (13.6 - 15.8 Nm).

LUBRICATION / SEALANTS

- ◆ Apply Loctite 271 to threads.
- ☆ Apply Key-Lube to all "O" rings, "U" Cups & mating parts.
- ☒ Apply anti-seize compound to threads and bolt and nut flange heads which contact pump case when using stainless steel fasteners.

○ NOTE: Radius edge of parts (5 and 6) is against diaphragm.

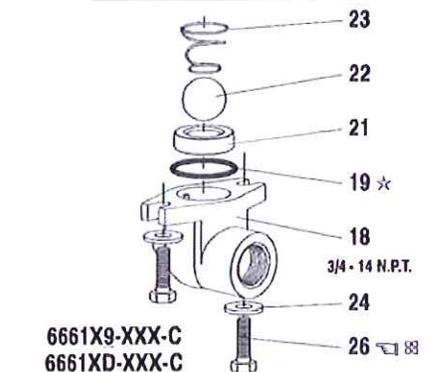
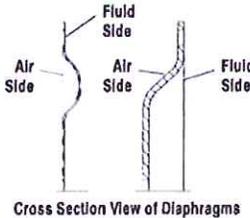
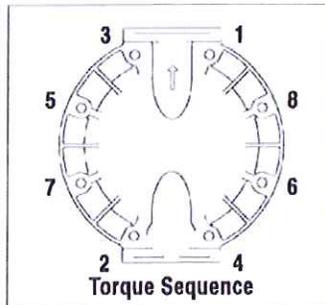
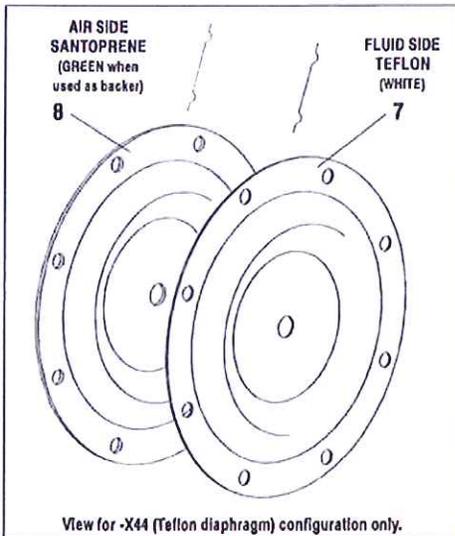
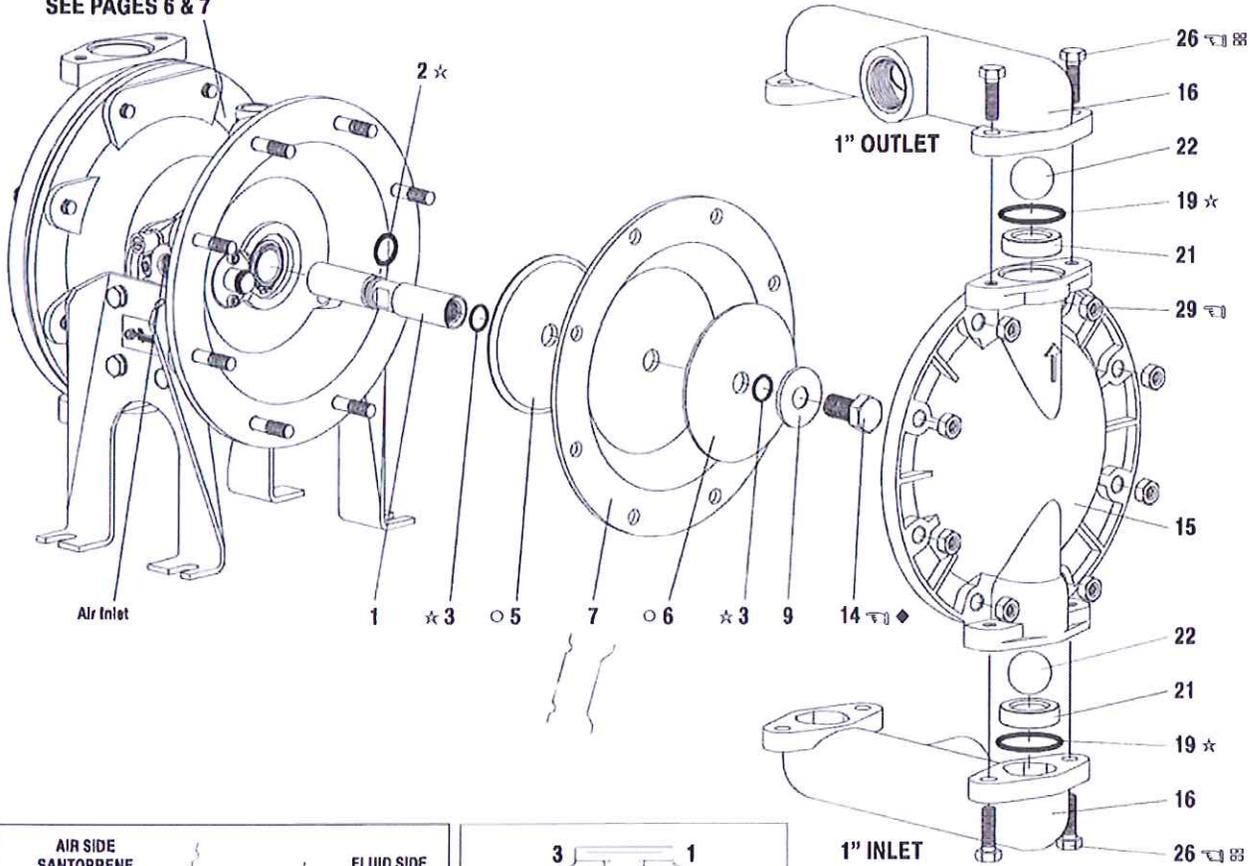
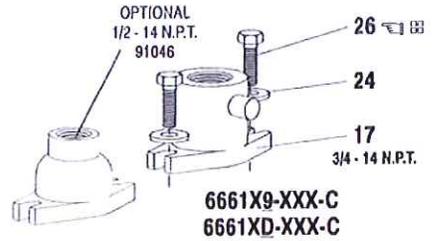


Figure 2

PARTS LIST / 66610X-X-C AIR MOTOR SECTION

✓ Indicates parts included in 637118-C Air Section Service Kit.

SERVICE KIT NOTE: Service Kit 637118-C is a general repair kit for all 1" and larger ARO diaphragm pump air motors. It contains extra "O" rings and extra parts that may not be needed to service this model.

Item	Description (size)	Qty	Part No.	[MI]
101	Motor Body (models 66610X, 66612X)	(1)	94743	[A]
	(models 66611X, 66613X)	(1)	94741	[C]
✓ 102	"O" Ring (1/16" x 1" o.d.)	(2)	Y325-20	[B]
□ 103	Sleeve	(1)	94527	[D]
✓ 104	Retaining Ring, TruArc (0.925" I.d.)	(2)	Y145-25	[C]
105	Screw/Wshr (1/4"-20 x 5/8") (-XX0, 1, 2, 9)	(8)	93860	[C]
	Cap Screw (1/4"-20 x 5/8") (-XXA, B, C, D)	(8)	Y6-42-T	[SS]
106	Lockwasher (1/4") (6661XA, 1XB, 1XC, 1XD)	(8)	Y14-416-T	[SS]
107	Leg (models 6661X0, 1X1, 1X2, 1X3)	(2)	92003	[C]
	(models 6661XA, 1XB, 1XC, 1XD)	(2)	92003-1	[SS]
✓ 108	Gasket (with notch)	(1)	92878	[B/Ny]
□ 109	Piston	(1)	92011	[D]
✓ 110	"U" Cup (3/16" x 1-3/8" o.d.)	(1)	Y186-51	[B]
□ 111	Spool (models 66610X, 66612X)	(1)	92005	[A]
	(models 66611X, 66613X)	(1)	93047	[C]
□ 112	Washer (1.557" o.d.)	(5)	92877	[Z]
✓ 113	"O" Ring (small) (1/8" x 1-1/4" o.d.)	(5)	Y325-214	[B]
✓ 114	"O" Ring (large) (3/32" x 1-9/16" o.d.)	(6)	Y325-126	[B]
□ 115	Spacer	(4)	92876	[Z]

Item	Description (size)	Qty	Part No.	[MI]
□ 116	Spacer	(1)	92006	[Z]
✓ 117	Gasket	(1)	92004	[B/Ny]
118	Pilot Rod	(1)	93309-1	[C]
✓ 119	"O" Ring (1/8" x 3/4" o.d.)	(4)	93075	[U]
120	Spacer	(3)	115959	[Z]
121	Sleeve Bushing	(2)	98723-1	[Bz]
✓ 122	"O" Ring (3/32" x 9/16" o.d.)	(2)	94820	[U]
✓ 123	Screw (#8 - 32 x 3/8")	(4)	Y154-41	[C]
124	Stud (5/16" - 18 x 1-3/4") (6661X0, 1X1, 1X2, 1X3)	(16)	92866	[C]
	(5/16" - 18 x 1-3/4") (6661XA, 1XB, 1XC, 1XD)	(16)	92866-1	[SS]
128	Pipe Plug (1/8" - 27 N.P.T. x 1/4")	(1)	Y227-2-L	[C]
133	Lockwasher (1/4")	(1)	Y14-416-T	[SS]
197	Button Head Screw (1/4" - 20 x 1/4")	(2)	94987	[SS]
198	Button Head Screw (1/4" - 20 x 3/8")	(1)	94987-1	[SS]
201	Muffler	(1)	93110	[C]
✓	Key-Lube "O" Ring Lubricant	(1)	93706-1	
	10 Pak of Key-Lube		637175	
✓	Service Kits include: Y212-101 (2) screws (#10 - 32 x 1/4") used on units m'd between 8/90 and 4/92 to retain the pilot bushing.			

AIR MOTOR SECTION SERVICE

Service is divided into two parts - 1. Pilot Valve, 2. Major Valve.

GENERAL REASSEMBLY NOTES:

- Air Motor Section Service is continued from Fluid Section repair.
- Inspect and replace old parts with new parts as necessary. Look for deep scratches on metallic surfaces, and nicks or cuts in "O" rings.
- Take precautions to prevent cutting "O" rings upon installation.
- Lubricate "O" rings with Key-Lube grease.
- Do not over-tighten fasteners, refer to torque specification block on view.
- Re-torque fasteners following restart.

PILOT VALVE DISASSEMBLY

1. Remove (104) retaining ring.
2. Remove (123) screws and (122) "O" rings.
3. Remove (118) piston rod, (121) sleeve bushing, (119) "O" rings and (120) spacers from the (101) motor body.
4. Remove (103) sleeve and (102) "O" rings.

PILOT VALVE REASSEMBLY

1. Replace two (102) "O" rings, if worn or damaged, and reinstall (103) sleeve.
2. Install one of the (121) sleeve bushings, (119) "O" rings, (120) spacers and the remaining (121) bushing.
3. Carefully push (118) pilot rod into bushings etc. and retain on each end with the two (122) "O" rings, retain with (123) screws.
4. Replace (104) retaining rings.

✓ Parts Y145-26 (1.156" i.d.) (qty 2) retaining rings and Y325-24 "O" rings (qty 2) are included in the service kit for the repair of larger pumps.

MATERIAL CODE

[A] = Aluminum	[C] = Cast Iron	[U] = Polyurethane
[B] = Nitrile	[D] = Acetal	[SS] = Stainless Steel
[Bz] = Bronze	[Ny] = Nylon	[Z] = Zinc
[C] = Carbon Steel		

MAJOR VALVE DISASSEMBLY

1. Remove (107) plate (or leg depending on model), (108 and 117) gaskets.
2. On the side opposite the air inlet, push on the inner diameter (111) spool. This will force the (109) piston out. Continue pushing the (111) spool and remove. Check for scratches and gouges.
3. Reach into the air section (exhaust side) and remove (116) spacer, (115) spacers, (113) "O" rings, (114) "O" rings, (112) washers, etc. Check for damaged "O" rings.

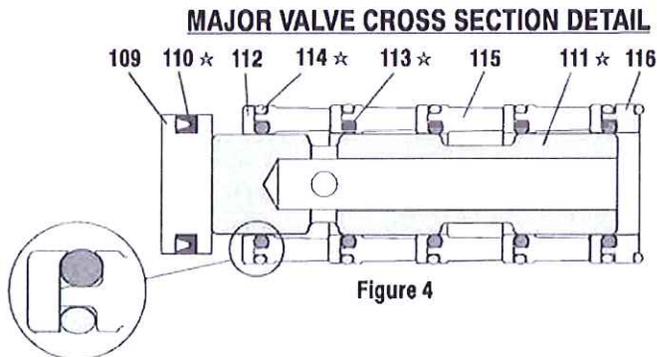
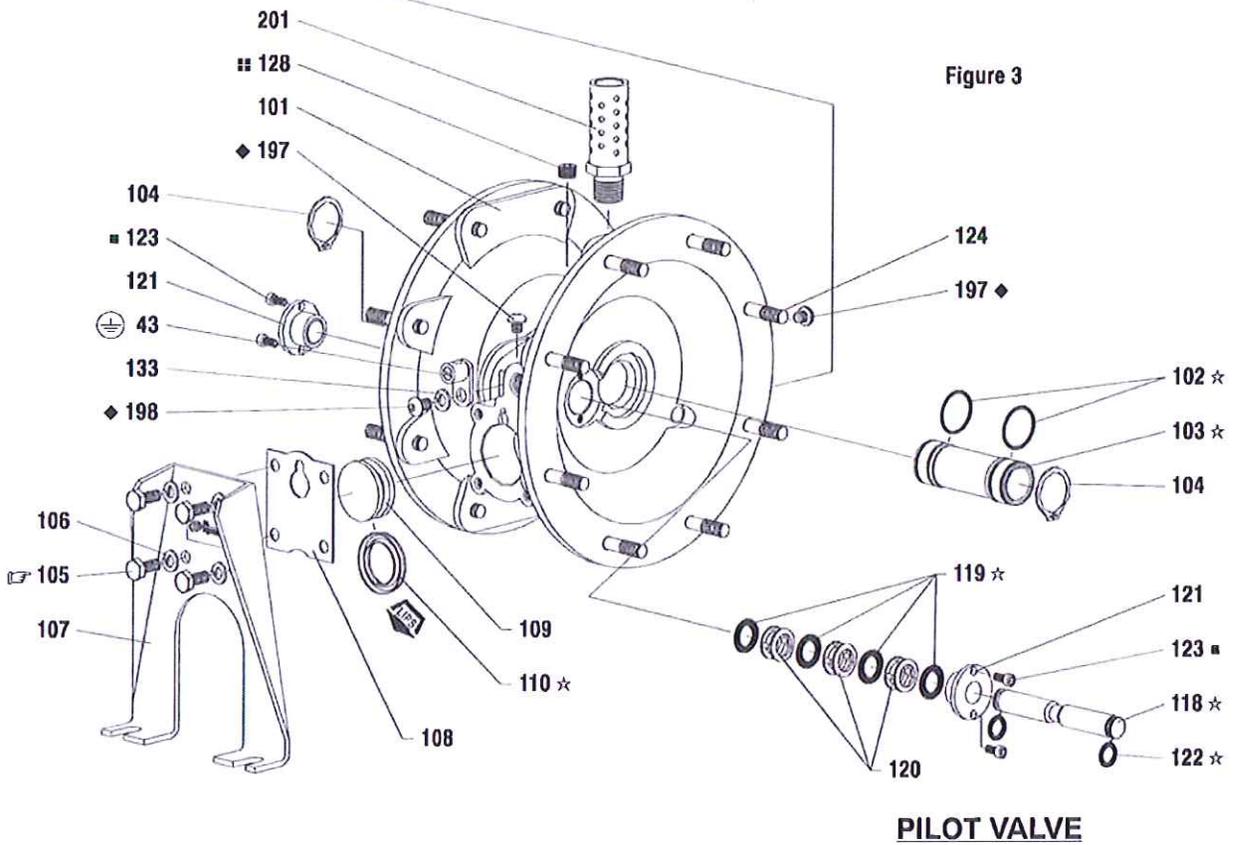
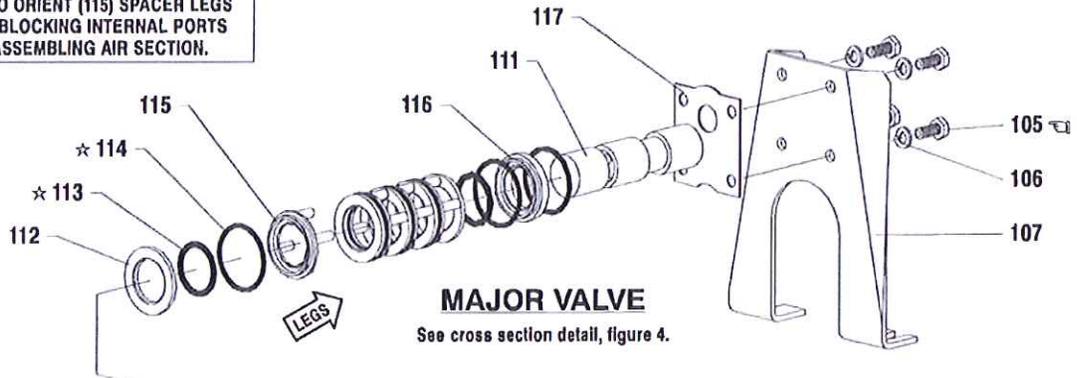
MAJOR VALVE REASSEMBLY

1. Replace (112) washer, (114) "O" ring and (113) "O" ring onto (115) spacer and insert etc.
NOTE: Be careful to orient spacer legs away from blocking internal ports.
2. Lubricate and carefully insert (111) spool.
3. Install (117) gasket and (107).
4. Lubricate and install (110) packing cup and insert (109) piston into (air inlet side) cavity, the (110) packing cup lips should point outward.
5. Install (108) gasket and replace (107).

□ "Smart Parts", keep these items on hand in addition to the service kits for fast repair and reduction of down time.

PARTS LIST / 66610X-X-C AIR MOTOR SECTION

IMPORTANT
BE CERTAIN TO ORIENT (115) SPACER LEGS
AWAY FROM BLOCKING INTERNAL PORTS
WHEN REASSEMBLING AIR SECTION.



TORQUE REQUIREMENTS
NOTE: DO NOT OVERTIGHTEN FASTENERS.
(105) 40 - 50 in. lbs (4.5 - 5.6 Nm).

LUBRICATION / SEALANTS

- ★ Apply Key-Lube grease to all "O" rings, "U" Cups & mating parts.
- ◆ Apply Loctite 271 to threads.
- Apply Loctite 262 to threads.
- ▣ Apply Loctite 572 to threads.

TROUBLE SHOOTING

Product discharged from exhaust outlet.

- Check for diaphragm rupture.
- Check tightness of (14) diaphragm screw.

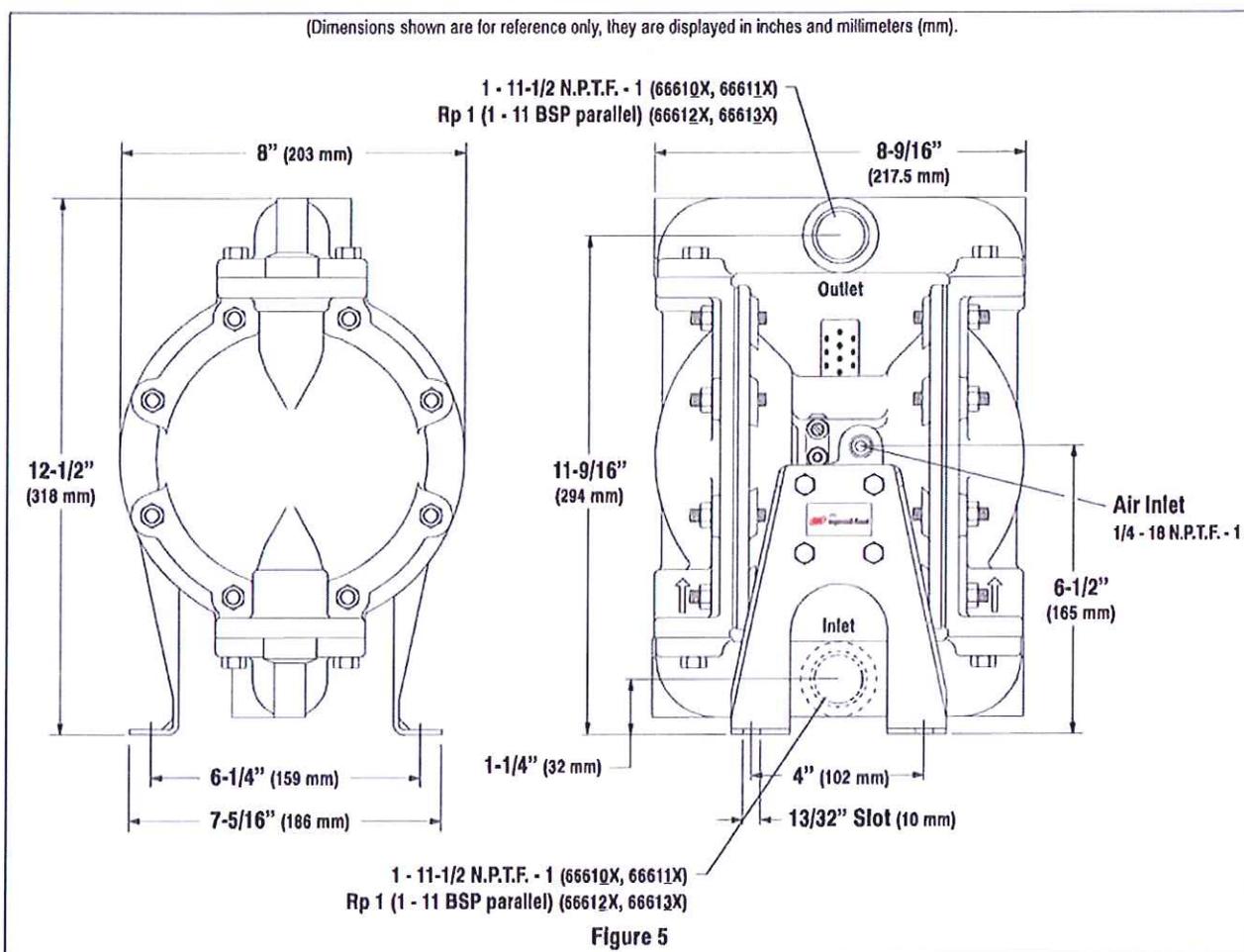
Air bubbles in product discharge.

- Check connections of suction plumbing.
- Check "O" rings between intake manifold and fluid caps.
- Check tightness of (14) diaphragm screw.

Low output volume, erratic flow, or no flow.

- Check air supply.
- Check for plugged outlet hose.
- Check for kinked (restrictive) outlet material hose.
- Check for kinked (restrictive) or collapsed inlet material hose.
- Check for pump cavitation – suction pipe should be sized at least as large as the inlet thread diameter of the pump for proper flow if high viscosity fluids are being pumped. Suction hose must be a non-collapsing type, capable of pulling a high vacuum.
- Check all joints on the inlet manifolds and suction connections. These must be air tight.
- Inspect the pump for solid objects lodged in the diaphragm chamber or the seat area.

DIMENSIONAL DATA

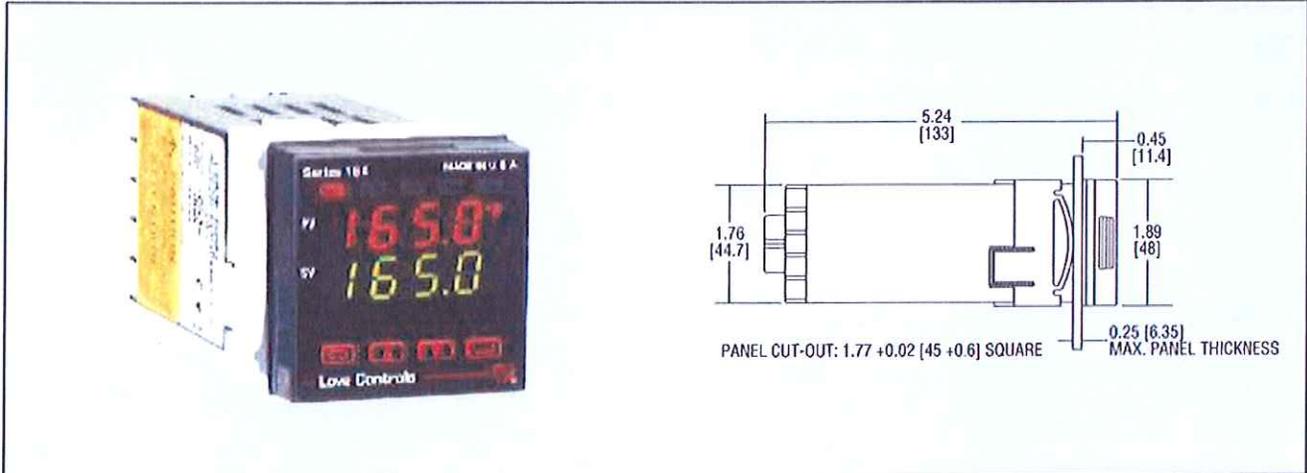




Series
16A

Temperature/Process Controller

1/16 DIN, Universal Input, Fuzzy Logic, Self-Tune PID



Latest microprocessor based technology affords full programmability with complete array of features in compact ultra low cost unit. 16A Series Temperature/Process Controller features universal input, Self-Tune PID, Fuzzy Logic, and dual four-digit LED displays for process and set point value. Selectable inputs can be thermocouple, RTD, current or voltage. Available outputs are solid-state relay, relay, pulsed voltage, or proportional current. Programmable alarm (optional) can be reset automatically or manually. Front panel is waterproof and corrosion resistant (UL type 4X), making it ideal for sanitary applications. Replace electronics without wiring changes (via removable front panel). Self diagnostics, nonvolatile memory and selectable control modes are all designed for greater productivity. Four security levels are password protected. On-off, P, PI or PID manual tune control functions can be selected or the controller will Self-Tune automatically for best PID control.

The 16A2 offers the best value in Standard Features in a Process and Temperature control. In addition to the features listed above, the 16A2 offers Peak/Valley indication, Percent Output indication, Digital Input Filter, and a host of others.

Model	Alarm	Output A	Output B
16A2111	Yes	SSR	SSR
16A2030	No	Relay	None
16A2133	Yes	Relay	Relay
16A2130	Yes	Relay	None
16A2020	No	15 VDC	None
16A2110	Yes	SSR	None
16A2050	No	Current	None

For Enhanced Ramp and Soak features, change 16A2 to 16A3

ACCESSORIES

MN-1, Mini-Node™ USB/RS-485 converter
 LoveLinks III, Configuration software
 A-800, R/C snubber

SPECIFICATIONS

Selectable Inputs: Thermocouple, RTD, DC voltage, or DC current (see input ranges).

Display: Two four-digit LED displays, 0.3 in (7.62 mm) high.

Display Resolution: 1 degree or 0.1 degree (sensor dependent), or 1 count.

Accuracy: ±0.25% of span ±1 least significant digit.

Supply Voltage: 100 to 240 VAC nominal, +10% -15%, 50 to 400 Hz single phase; 132 to 240 VDC +10% -20%.

Operating Temperature: 14 to 131°F (-10 to 55°C).

Power Consumption: 5 VA maximum.

Control Output Ratings:

SSR: 2.0 A at 240 VAC resistive at 77°F (25°C). De-rates to 1.0 A at 130°F (55°C). Minimum load of 100 mA;

DC SSR: 1.75 A at 32 VDC maximum;

Relay: SPST, 3A at 240 VAC resistive, 1.5 A @ 240 VAC inductive;

Pilot duty rating: 250 VA, 2 A @ 120 VAC, 1 A @ 240 VAC;

Alarm relay: SPST, 3 A @ 240 VAC resistive; 1.5 A @ 240 VAC

inductive. Pilot duty rating: 240 VA, 2 A @ 120 VAC or 1 A @ 240 VAC;

Switched voltage: 15 VDC at 20 mA;

Proportional current: 0 to 20 mADC, scalable, into 600 ohms maximum.

Weight: 8 oz (227 g).

Agency Approvals: UL E83725, CE.

Front Panel Rating: NEMA 4X (IP66).

Serial Communications (Optional): RS-232 or RS-485 with either LoveLink™ Software or Modbus® RTU protocol.

OPTIONS (Add as a suffix to model number)

-934**, Process Signal Output, PV or SV.

Isolated 0 to 20 mADC

-936**, Process Signal Output, PV or SV.

Isolated 0 to 10 VDC

-992**, RS-485 Serial Communications Lovelink™ Protocol

-993**, RS-232 Serial Communications Lovelink™ Protocol

-995**, RS-232 Serial Communications Modbus RTV Protocol

-996**, RS-485 Serial Communications Modbus RTV Protocol

-9502, 12-24 VDC/VAC power input

TEMPERATURE

Temperature/Process
Controllers

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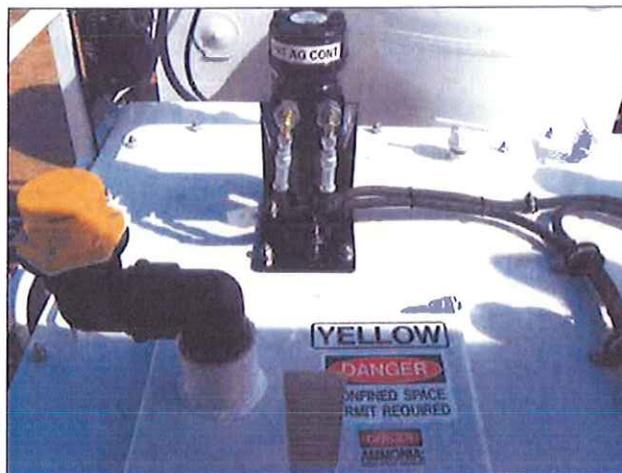
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- ✓ Rounded corners for safety
- ✓ Graphite coating on interior walls for ease of end of season cleanup
- ✓ 10 gauge stainless steel with plural component urethane automotive exterior finish
- ✓ Heavy duty PVC pressure equalization vents to prevent pressure or vacuum build up including double 90 degree elbows for splash resistance
- ✓ Integral dipstick for paint level monitoring without opening
- ✓ 12" square hinged inspection port with gasket and over-the-center latch
- ✓ Hydraulic agitator with adjustable speed control



the Quality ⁱⁿ our Line.

Descriptive, Not Restrictive. EZ-Liner's continuing quest for improvement make equipment, specifications, and components subject to change without notice.

Page 9 & 10; A), B), & C) UNPRESSURIZED PAINT TANKS

OPERATOR'S MANUAL

65142X-XX

INCLUDING: OPERATION, INSTALLATION & MAINTENANCE

RELEASED: 11-10-92
REVISED: 12-11-07
(REV. H)

MATERIAL FILTER MAXIMUM INLET PRESSURE 6,000 P.S.I. (414 Bar)



**READ THIS MANUAL CAREFULLY BEFORE INSTALLING,
OPERATING OR SERVICING THIS EQUIPMENT.**

It is the responsibility of the employer to place this information in the hands of the operator. Keep for future reference.

THIS MANUAL COVERS THE FOLLOWING MODELS:

	CARBON STEEL	300 STAINLESS STEEL	CARTRIDGE	MESH SIZE
		651422-3T	94597-3T	None
		651422-30	94597-30	30
651420-40		651422-40	93944-40	40
651420-70		651422-70	93944-70	70
651420-100		651422-100	93944-100	100
			93944-200	200

SERVICE KITS

- Use only genuine ARO replacement parts to assure compatible pressure rating and longest service life.
- Refer to figure 3 to order replacement parts.

MATERIAL FILTER DATA

Models..... see Model Description Chart
for "-XXX" (optional screen)
Material..... see Model Description Chart
Maximum Fluid Pressure 6,000 p.s.i.g. (414 bar)

OPERATING AND SAFETY PRECAUTIONS

- Read and heed all warnings, cautions and safety precautions before operating this pump.
- ⚠ WARNING** HAZARDOUS PRESSURE. Can result in serious injury or property damage. Do not service or clean pump, hoses or dispensing valve while the system is pressurized.
- ⚠ CAUTION** Be certain all operators of this equipment have been trained for safe working practices, understand its limitations, and wear safety goggles / equipment when required.
- ⚠ WARNING** Do not exceed the maximum inlet air pressure as stated on the air motor model plate. Operating pump at higher pressure may cause pump damage.
- ⚠ WARNING** HAZARDOUS MATERIALS. Can cause serious injury or property damage. Do not attempt to return a pump to the factory or service center that contains hazardous material. Safe handling practices must comply with local and national laws and safety code requirements. Obtain Material Safety Data Sheets on all materials from the supplier for proper handling instructions.

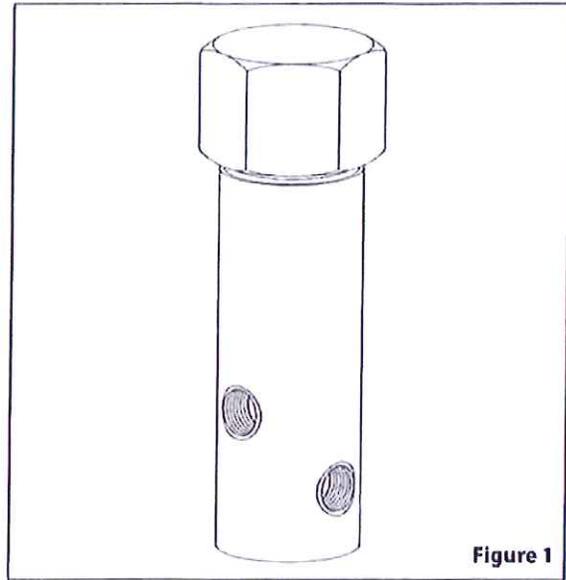


Figure 1

GENERAL DESCRIPTION

The ARO model 65142X-XX material filter is used to separate foreign materials, like dirt, stones and sweeping compound, from the material handling section. Material filters and strainers can be installed in a system to combat this problem, thereby achieving longer service life. Filters and strainers are normally located in one of two places in the pumping system. At this point, where the fluid enters the material handling section, the strainer prevents foreign material from entering the system.

DISASSEMBLY

1. Unscrew and remove (1) cap from the (7) body.
2. Remove (2) gasket from (1) cap.
3. Remove (3) spring and (4) button guide from the (7) body.
4. Pull the (6) cartridge and (5) ball from the (7) body.

TYPICAL SYSTEM VIEW

1. Install the material filter either at the inlet of material handling section or upstream from the other accessories (control handle, etc.).
2. Refer to typical installation (figure 2).
3. The filter unit was tested at the factory with a maximum working pressure of 6,000 p.s.i. (414 bar).
4. Two (8) pipe plugs are included with this unit to plug the inlet and outlet ports not being used.

ⓐ These system components are shown for installation purposes only and must be purchased separately.

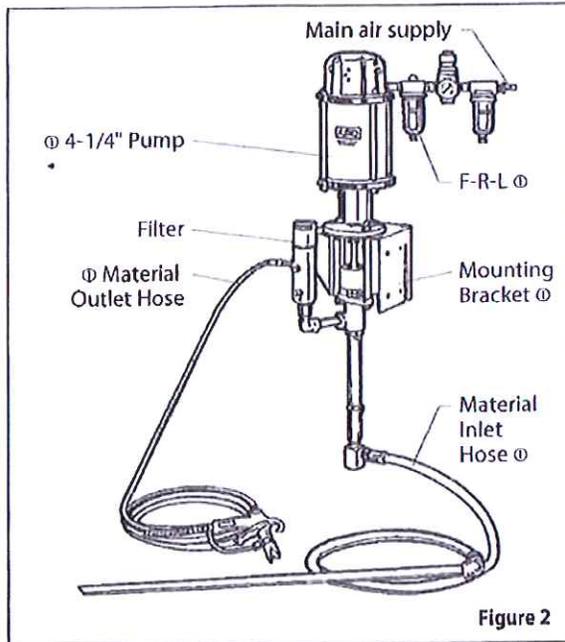


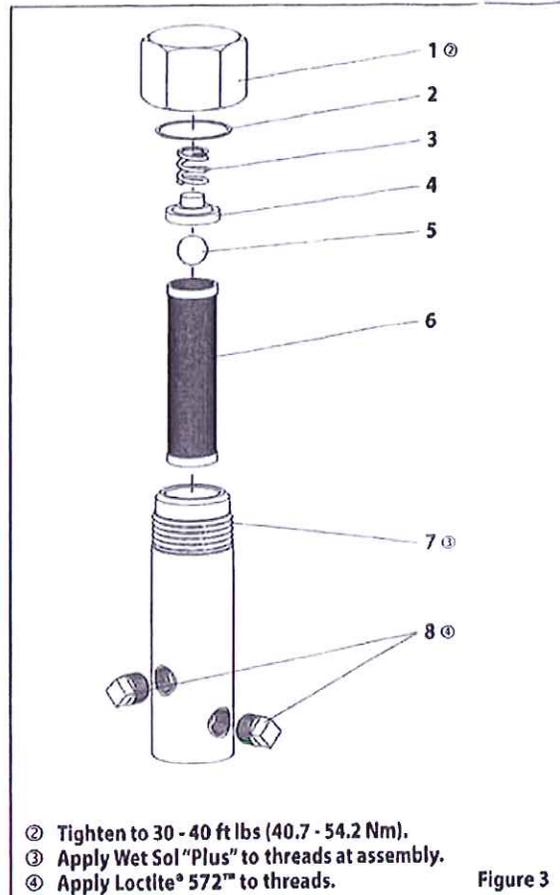
Figure 2

PARTS LIST / 65142X-XX

Item	Description (Size)	(Qty)	Part No.	(Mtl)
1	Cap (651420-XX)	(1)	92990-1	(C)
	(651422-XX)	(1)	92990-2	(SS)
2	Gasket	(1)	91447	(D)
3	Spring	(1)	90408	(SS)
4	Guide Button	(1)	93949	(SS)
5	Ball (1 3/16" o.d.) (651420-XX)	(1)	Y16-126	(SH)
	(651422-3T)	---	-----	---
	(651422-30, -40, -70, -100)	(1)	90815	(SS)
6	Cartridge (see table, page 1)	(1)	-----	(SS)
7	Body (651420-XX)	(1)	92992-1	(C)
	(651422-XX)	(1)	92992-2	(SS)
8	Pipe Plug (1/2 - 14 N.P.T.) (651420-XX)	(2)	Y17-13-C	(C)
	(651422-XX)	(2)	Y17-13-S	(SS)

MATERIAL CODE

(C) = Carbon Steel
 (D) = Acetal
 (SH) = Hard Stainless Steel
 (SS) = Stainless Steel



- ② Tighten to 30 - 40 ft lbs (40.7 - 54.2 Nm).
- ③ Apply Wet Sol "Plus" to threads at assembly.
- ④ Apply Loctite® 572™ to threads.

Figure 3

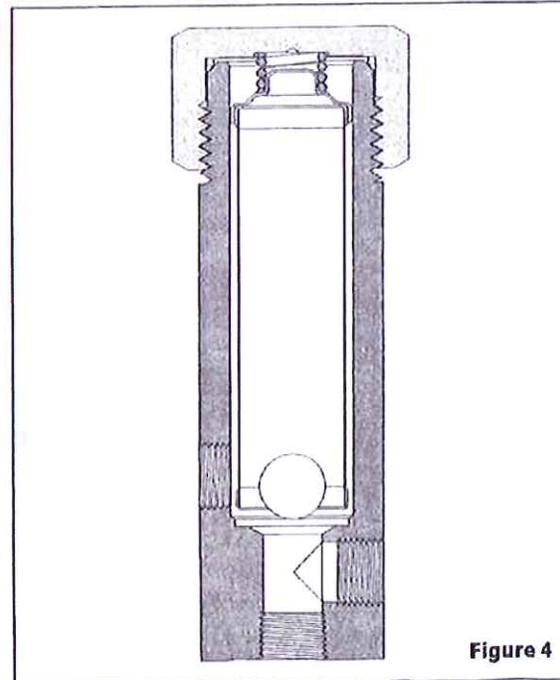


Figure 4

• ARO® is a registered trademark of Ingersoll-Rand Company •
 • Loctite® is a registered trademark of Henkel Loctite Corporation •
 • 572™ is a trademark of Henkel Loctite Corporation •

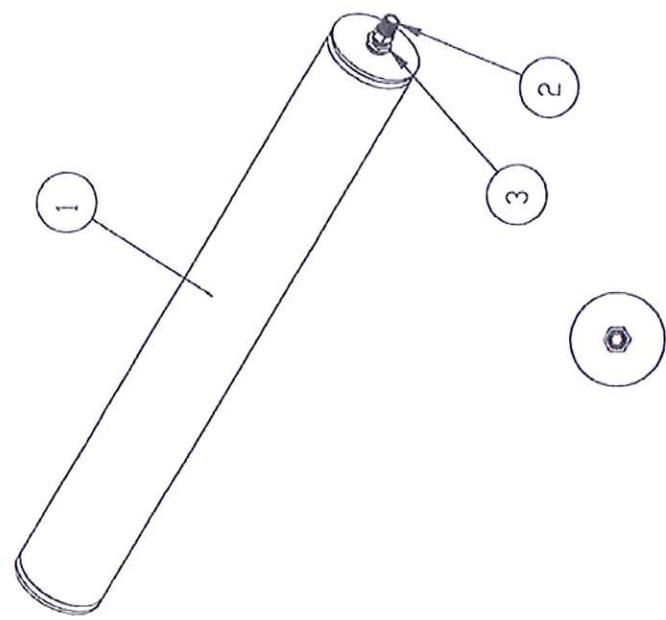
ARO

IR Ingersoll Rand
 Industrial Technologies

PN 97999-6

Date 2 of 2

65142X-XX (en)



ITEM NO.	QTY.	PART NUMBER	DESCRIPTION
1	1	054-W010-00	SURGE CHAMBER, HP
2	1		1/2" HEX NIPPLE, SS
3	1		BUSHING, 3/4" TO 1/2"

DATE	BY	DESCRIPTION
10/20/2005	JDE S	DRAWN
		CHECKED
10/21/2005	SB	APPROVED

DATE: 10/20/2005
 CHECKED: SB
 APPROVED: SB
 THIRD ANGLE PROJECTION
 UDS ALL RADII
 UDS SURFACE FINISH
 BREAK ALL EDGES .01 x 45°
 UDS DIMENSIONS ARE IN INCHES
 DIMENSIONS CONFORM TO ASME Y14.5M-1994
 GENERAL TOLERANCES
 .XX ± .03 .XXX ± .005 ANGULAR ±1°

PROPERTY OF EZ-LINER INDUSTRIES, REPRODUCTION IN WHOLE OR IN PART IS EXPRESSLY PROHIBITED

EZ-LINER INDUSTRIES
 ORANGE CITY, IOWA 51041

SURGE CHAMBER ASSM, HP

SIZE DWG NO. A 054-A010-00 REV
 PREVIOUS PART NO. SCALE 1:8 SHEET OF

395

40436
Job Number
P. O. Number

FORM U-1A MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS
(Alternative Form for Single Chamber, Completely Shop or Field Fabricated Vessels Only)
As Required by the Provisions of the ASME Boiler and Pressure Vessel Code Rules, Section VIII, Division 1

Surge Chamber

Manufactured and certified by Silvan Industries, Inc., 2121 Cleveland Avenue, Marinette, Wisconsin, 54143, USA
(Name and address of manufacturer)

Manufactured for EZ Liner, Orange City, Iowa, USA
(Name and address of purchaser)

3. Location of Installation Unknown
(Name and address)

4. Type Horizontal 812152 to 612181 N/A 133-326 R.A 612152-612181 2009
(Horizontal or vertical, tank) (Manufacturer's serial number) (CRN) (Drawing No.) (National Board number) (Year built)

5. The chemical and physical properties of all parts meet the requirements of material specifications of the ASME BOILER AND PRESSURE VESSEL CODE. The design, construction, and workmanship conform to ASME Rules, Section VIII, Division 1 2007 to 2008
(Code Case numbers) (Special Service per UG-120(d)) (year) [Addenda (Date)]

6. Shell: SA312 Type 304 .3 in 0 in 0' 3.50" (OD) 1' 11.750"
(Material spec. number, grade) (Nominal thickness) (Corr. allow.) (Inner diameter) (Length (overall))

7. Seams: Type 1 None 85 No No Type 2 None 85 1
(Long. (welded, dbl., singl., lap, built)) (R.T. (Spot or Full)) (Eff. (%)) (H.T. temp) (Time (hr)) (Sizhr. (welded, dbl., singl., lap, built)) (R.T. (spot or full)) (Eff. (%)) (No. of Courses)

8. Heads: (a) Material SA240 Type 304 (b) Material SA240 Type 304
(Spec. no., grade) (Spec. no., grade)

	Location (Top, Bottom, Ends)	Minimum Thickness	Corrosion Allowance	Crown Radius	Knuckle Radius	Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure (Convex or Concave)
(a)	End	.865	0	N/A	N/A	0	N/A	N/A	3.5"	N/A
(b)	End	.865	0	N/A	N/A	0	N/A	N/A	3.5"	N/A

If removable, bolts used (describe other fastenings) N/A
(Material, spec. number, grade, size, number)

9. MAWP 2700 psi N/A at max. temp. 200 °F N/A
(Internal) (External) (Internal) (External)

Min. design metal temp. -20 °F at 2700 psi Hydro, pneu., or comb. test pressure HYDRO, at 3510 psi

10. Nozzles, inspection and safety valve openings:

Position (Inlet, Outlet, Drain)	Number	Diameter or Size	Type	Material	Nominal Thickness	Reinforcement Material	How Attached	Location
Inlet/Outlet	1	3/4"	Tapped Hole			Inherent		

11. Supports: Skirt No Lugs 0 Legs 0 Other None Attached N/A
(Yes or no) (Number) (Number) (Describe) (Where and how)

12. Remarks: Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors, have been furnished for the following items of the report
N/A
(Name of part, item number, Manufacturer's name and identifying stamp)

Pressure Relief Valve Supplied by Other Than Mfg. "CONSTRUCTED UNDER THE PROVISIONS OF PAR.UG90 (c) (2), UHA51 (d)". ASME Surge Tank. CFN 054-A010-00

CERTIFICATE OF SHOP/FIELD COMPLIANCE

We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship of this vessel conform to the ASME BOILER AND PRESSURE VESSEL CODE, Section VIII, Division 1. 'U' Certificate of Authorization No. 16802 expires 08/13/2009

Date 02/10/2009 Co. name Silvan Industries, Inc. Signed [Signature]
(Manufacturer) (Representative)

CERTIFICATE OF SHOP/FIELD INSPECTION

Vessel constructed by Silvan Industries, Inc. at 2121 Cleveland Avenue, Marinette, Wisconsin, 54143, USA, I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and/or the State or Province WI and employed by OneBeacon America Insurance Co. of Lynn, MA have inspected the component described in this Manufacturer's Data Report on February 11, 2009 and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME BOILER AND PRESSURE VESSEL CODE, Section VIII, Division 1. By signing this certificate neither the Inspector nor his/her employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his/her employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

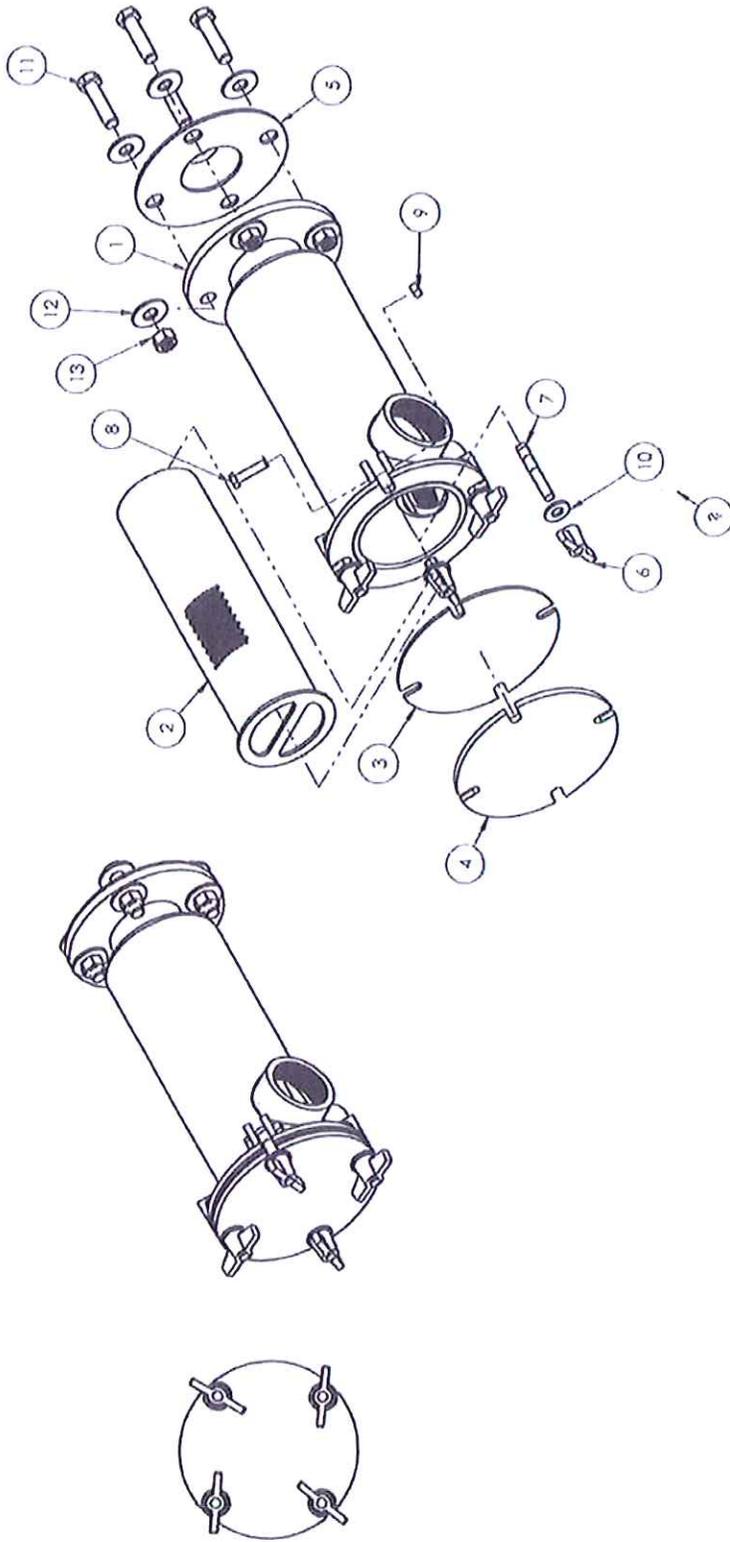
Date 02/11/2009 Signed [Signature] Commissions 10105 A, WI100181
(Authorized Inspector) (National Board (incl. endorsements), State, Province and number)

957087

exe: v4.5.1

U1A-15

025-A022-00



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	025-A022-00	FILTER SS/TP HOUSING 100 SQ IN	1
2	025-W010-00	FILTER SS/TP SCREEN	1
3	025-0000-03	LP COVER GASKET	1
4	025-0000-01	LP FILTER COVER	1
5	025-0000-02	LP FLANGE GASKET	1
6	10488/7824	TANK PAINT WING NUT	4
7	10298/7821	LOCK HEX S1/4 X 1 1/4	4
8	280-42-0505	NUT LOCK DEFORMED S1/8-18-2-5	4
9	280-40-0404	WASHER FLAT 3/8" X 7/8	4
10	280-08-0802	WASHER FLAT 1/2" X 7/8	4
11	280-08-0802	WASHER FLAT 1/2" X 7/8	4
12	280-08-0802	WASHER FLAT 1/2" X 7/8	4
13	280-42-0808	NUT LOCK DEFORMED 1/2"-13-78	4

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EZ-LINER INDUSTRIES
ORANGE CITY, IOWA 51041

LP FILTER ASSY

DATE: 10/20/09
DRAWN BY: SRB
DATE: 10/20/09

REVISIONS:

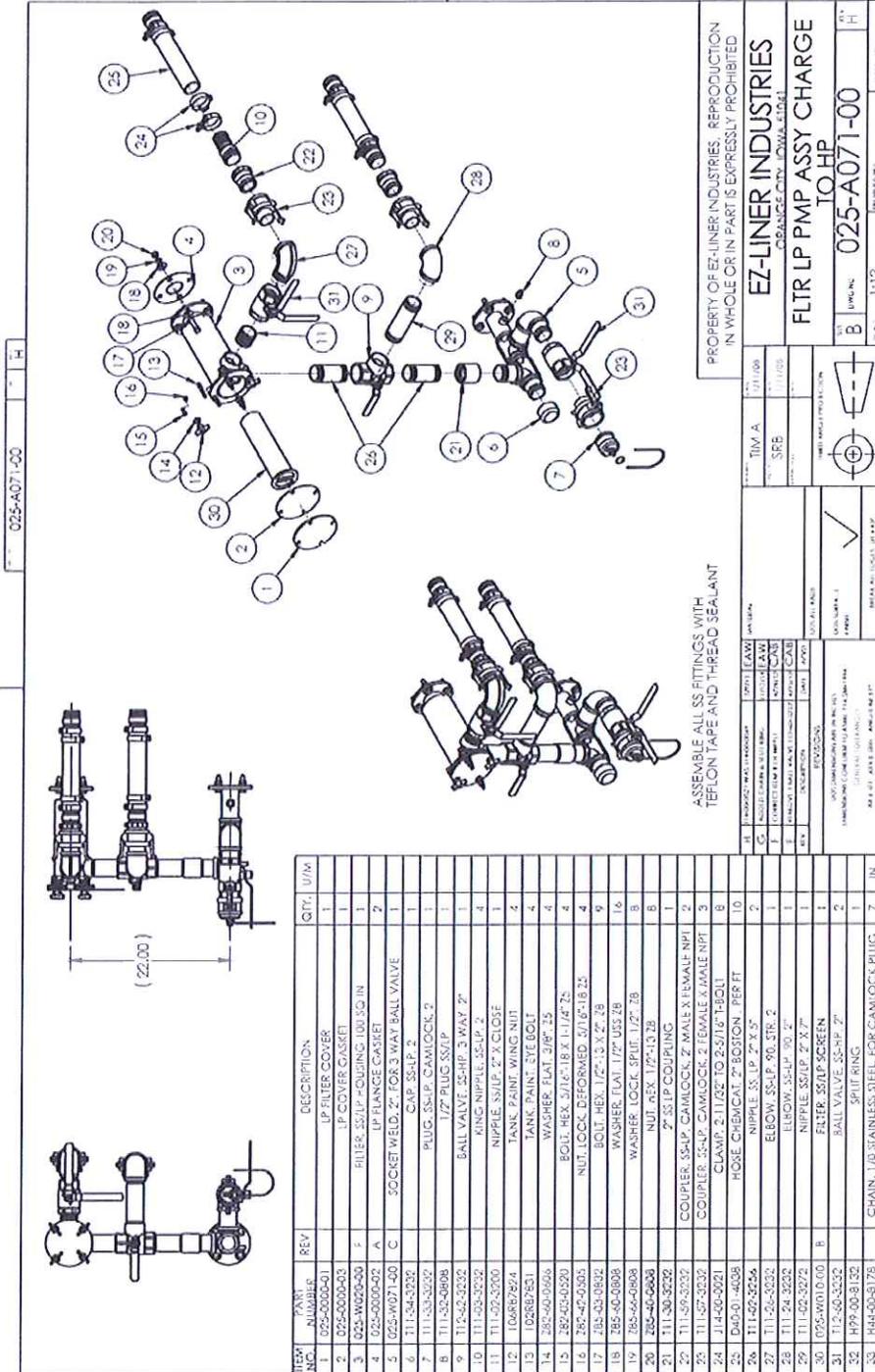
REV	DESCRIPTION	DATE	BY
1	REVISED		
2	REVISED		
3	REVISED		
4	REVISED		
5	REVISED		
6	REVISED		
7	REVISED		
8	REVISED		
9	REVISED		
10	REVISED		
11	REVISED		
12	REVISED		
13	REVISED		

SCALE: 1:4

REV: B
DATE: 10/20/09

PREVIOUS NO: 025-A022-00

REV: -



025-A071-00 H

ITEM NO.	PART NUMBER	REV	DESCRIPTION	QTY	U/M
1	025-0000-01		LP FILTER COVER	1	
2	025-0000-03		LP COVER GASKET	1	
3	025-W020-00	F	FILTER, 35/16" HOUSING 100 SQ IN	1	
4	025-0000-02	A	LP FLANGE GASKET	2	
5	025-W071-00	C	SOCKET WELD, 2" FOR 3 WAY BALL VALVE	1	
6	111-544-3030		CAP, SS/1P, 2"	1	
7	111-533-3030		PLUG, SS/1P, CAMLOCK, 2"	1	
8	111-532-0098		1/2" PLUG, SS/1P	1	
9	112-525-3030		BALL VALVE, 35/16" 3 WAY, 2"	1	
10	111-535-3030		KING NIPPLE, 35/16", 2"	4	
11	111-535-3030		NIPPLE, SS/1P, 2" X CLOSE	1	
12	10687-8274		TANK, PAINT, WING NUT	4	
13	10260-7631		WASHER, FLAT, 3/16", 15	4	
14	282-640-0666		WASHER, FLAT, 3/16", 15	4	
15	282-640-0020		BOLT, HEX, 5/16" X 1 1/4", 75	4	
16	282-640-0020		BOLT, HEX, 5/16" X 1 1/4", 75	4	
17	282-640-0892		NUT, LOCK, DEFORMED, 5/16" X 1 1/4", 18, 25	4	
18	282-640-0892		BOLT, HEX, 1/2" X 3/4", 28	9	
19	282-640-0898		WASHER, FLAT, 1/2", 15, 28	16	
20	282-640-0668		WASHER, LOCK, SPLIT, 1/2", 28	8	
21	111-301-3030		NUT, HEX, 1/2" X 3/4", 28	8	
22	111-301-3030		2" SS/1P COUPLING	1	
23	111-535-3030		COUPLER, SS/1P, CAMLOCK, 2" MALE X FEMALE NPT	2	
24	111-535-3030		COUPLER, SS/1P, CAMLOCK, 2" FEMALE X MALE NPT	3	
25	111-535-3030		CLAMP, 2" 11/32" TO 2 5/16" 1/8" BOLT	8	
26	04020-14038		HOSE, CHEM/CAT, 2" BOSTON, 168 FT	10	
27	111-535-3030		NIPPLE, SS, 1P, 2" X 2"	2	
28	111-535-3030		ELBOW, SS/1P, 90, 2"	1	
29	111-535-3030		ELBOW, SS/1P, 90, 2"	1	
30	105-W010-00	B	NIPPLE, SS/1P, 2" X 2"	1	
31	112-540-3030		FRITER, 35/16" SCREEN	2	
32	1499-000-8132		SPLIT RING	1	
33	1499-000-8175		CHAIN, 1/40 STAINLESS STEEL, FOR CAMLOCK PLUG	7	IN

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EZ-LINER INDUSTRIES
ORANGE CITY, IOWA 51041

FLTR LP PMP ASSY CHARGE TO HP
025-A071-00

REV: 1:12

REV	DATE	DESCRIPTION
1	11/1/00	INITIAL PRODUCTION
2	11/1/00	REWORK
3	11/1/00	REWORK
4	11/1/00	REWORK
5	11/1/00	REWORK
6	11/1/00	REWORK
7	11/1/00	REWORK
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29	11/1/00	REWORK
30	11/1/00	REWORK
31	11/1/00	REWORK
32	11/1/00	REWORK
33	11/1/00	REWORK

ASSEMBLE ALL SS FITTINGS WITH TEFLON TAPE AND THREAD SEALANT

APPROVED FOR PRODUCTION: [Signature]

DATE: 11/1/00

BY: [Signature]

1:12

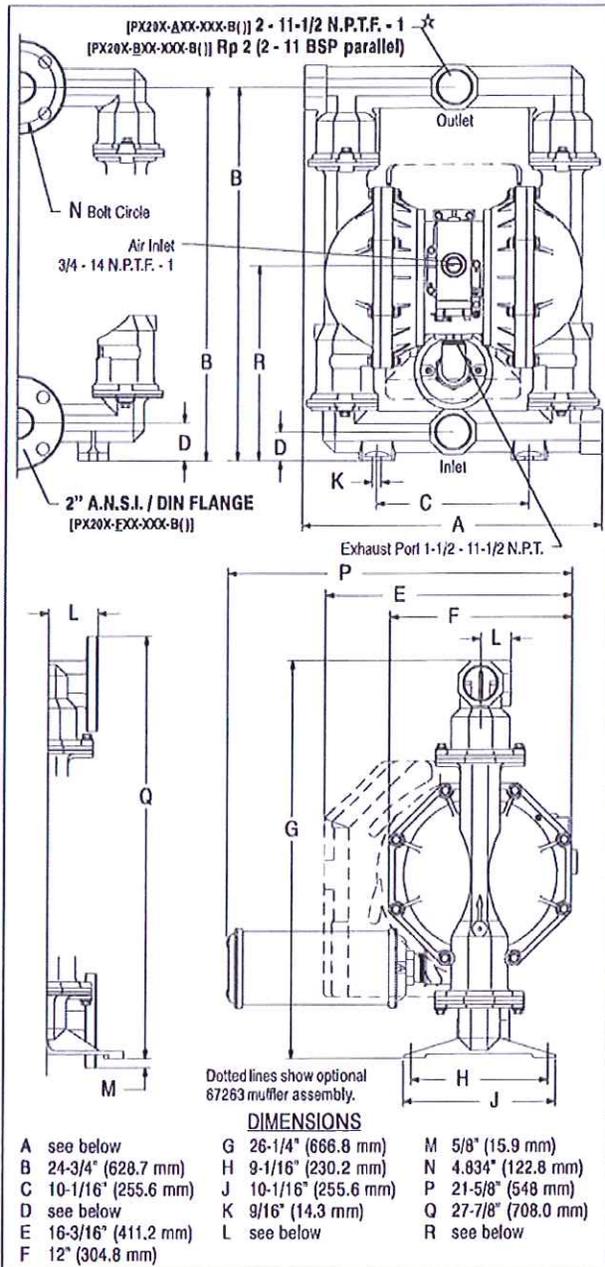
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1/4

SALES & ENGINEERING DATA

PD20A-XXX-XXX-B / PD20S-XXX-XXX-B
PE20A-XXX-XXX-B() / PE20S-XXX-XXX-B()
2" METALLIC DIAPHRAGM PUMP

RATIO SERIES:	1:1
FLUID P.S.I. RANGE:	20 - 120
RELEASED:	2-3-05
REVISED:	9-15-11
(REV. 05)	S-1338

DIMENSIONAL DATA



SPECIFICATIONS

CONSTRUCTION

Model Series	PD20A-X-X-B / PD20S-X-X-B
.....	PE20A-X-X-B() / PE20S-X-X-B()
Pump Type	Metallic, Air Operated, Double Diaphragm
Ratio	1:1
Material Inlet / Outlet (female)	
PX20X-AXX-XXX-B()	2 - 11-1/2 N.P.T.F. - 1
PX20X-BXX-XXX-B()	Rp 2 (2 - 11 BSP parallel)
PX20X-EXX-XXX-B()	2" A.N.S.I. / DIN Flange
Air Inlet (female)	3/4 - 14 N.P.T.F. - 1
Air Exhaust (female)	1-1/2 - 11-1/2 N.P.T.
Weight .	
PX20A-XAX-XXX-B()	91.4 lbs (41.5 kgs)
PX20A-XCX-XXX-B()	147.4 lbs (66.9 kgs)
PX20A-AHX-XXX-B(), -BHX	155.0 lbs (70.3 kgs)
PX20A-ASX-XXX-B(), -BSX	149.8 lbs (68.0 kgs)
PX20A-FHX-XXX-B()	169.4 lbs (76.8 kgs)
PX20A-FSX-XXX-B()	162.0 lbs (73.5 kgs)
<small>(add 28.9 lbs [13.1 kgs] for stainless steel air motor section)</small>	
Air Section Service Kit	637421
Fluid Section Service Kit	637309-XX
Major Air Valve Assembly	637374-X

PX20X-XXX-X [X] [X] -B()

637309 - [X] [X]

Diaphragm Material
Ball Material

EXAMPLE: Model # PD20A-AAP-AAA-B
Fluid Section Service Kit is 637309-AA

PERFORMANCE

Air Inlet Pressure Range	20 - 120 p.s.i. (1.4 - 8.3 bar)
Maximum Material Inlet Pressure	10 p.s.i. (0.69 bar)
Fluid Pressure Range	20 - 120 p.s.i. (1.4 - 8.3 bar)
Maximum Flow Rate	172 g.p.m. (651 l.p.m.)
Displacement / Cycle @ 100 p.s.i.	1.4 gal. (5.3 lit.)
Maximum Particle Size	1/4" dia. (6.4 mm)
Maximum Temperature Limits (diaphragm / ball / seal material)	
E.P.R. / EPDM	-60° to 280° F (-51° to 138° C)
Hytrel®	-20° to 150° F (-29° to 66° C)
Nitrile	10° to 180° F (-12° to 82° C)
PVDF (Kynar®)	10° to 200° F (-12° to 93° C)
Santoprene®	-40° to 225° F (-40° to 107° C)
PTFE	40° to 225° F (4° to 107° C)
Viton®	-40° to 350° F (-40° to 177° C)
Noise Level @ 70 p.s.i. - 60 c.p.m.①	85.0 db(A)②

① Tested with 67263 muffler assembly installed.

② The pump sound pressure level has been updated to an Equivalent Continuous Sound Level (L_{Aeq}) to meet the intent of ANSI S1. 13-1971, CAGI-PNEUROP S5.1 using four microphone locations.

ACCESSORIES:

66312 Air Line Connection Kit
67263 Continuous Muffler
94117 Int. Muffler

	"A"	"D"	"L"	"R"
PX20X-XAX-XXX-B()	19-3/4" (501.4 mm)	1-7/8" (47.6 mm)	2" (50.8 mm)	12-15/16" (328.6 mm)
PX20X-XCX-XXX-B()	19-3/4" (501.4 mm)	1-7/8" (47.6 mm)	2" (50.8 mm)	12-15/16" (328.6 mm)
PX20X-AHX-XXX-B(), -BHX	19-1/4" (488.7 mm)	2-1/2" (63.5 mm)	2-3/32" (53.0 mm)	13-9/16" (344.5 mm)
PX20X-ASX-XXX-B(), -BSX	19-1/4" (488.7 mm)	2-1/2" (63.5 mm)	2-3/32" (53.0 mm)	13-9/16" (344.5 mm)
PX20X-FHX-XXX-B(), -FSX	19-1/4" (488.7 mm)	2-1/2" (63.5 mm)	3-1/4" (82.6 mm)	13-9/16" (344.5 mm)

NOTE: Dimensions are shown in inches and (mm), supplied for reference only and are typically rounded up to the nearest 1/16 inch.

* Side Discharge Ports are not available on PX20X-XSX-X-B Models.

INGERSOLL RAND COMPANY LTD
 209 NORTH MAIN STREET - BRYAN, OHIO 43506
 (800) 495-0276 • FAX(800) 892-6276
 www.ingersollrandproducts.com

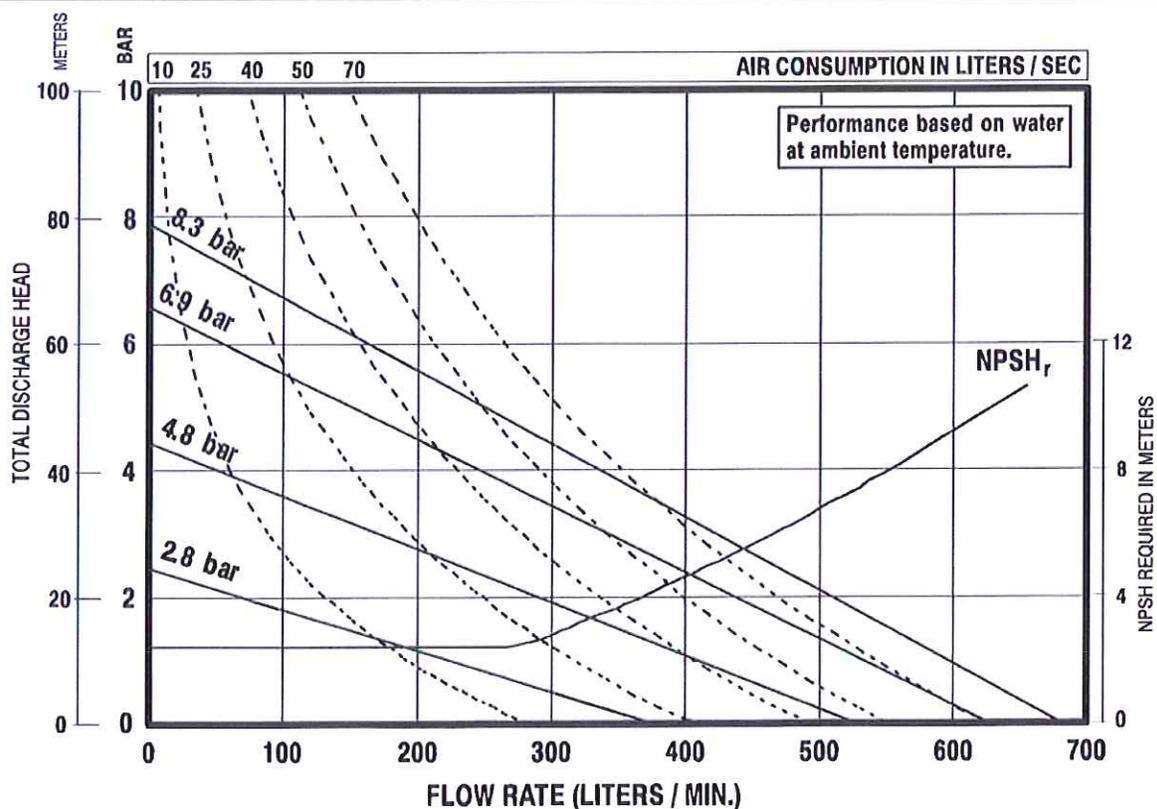
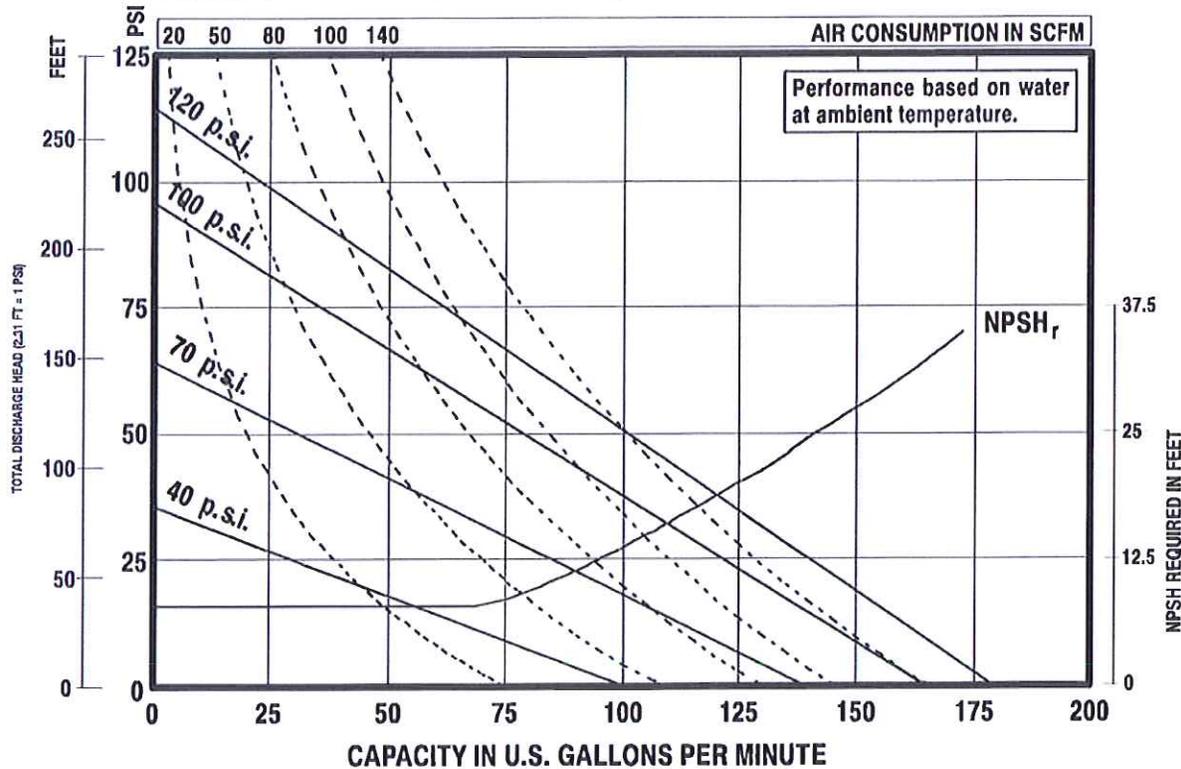
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CCN 15227721

ARO Ingersoll Rand
Industrial Technologies

PERFORMANCE CURVES

PD20X-XXX-XXX-B / PE20X-XXX-XXX-B() 2" METALLIC DIAPHRAGM PUMP



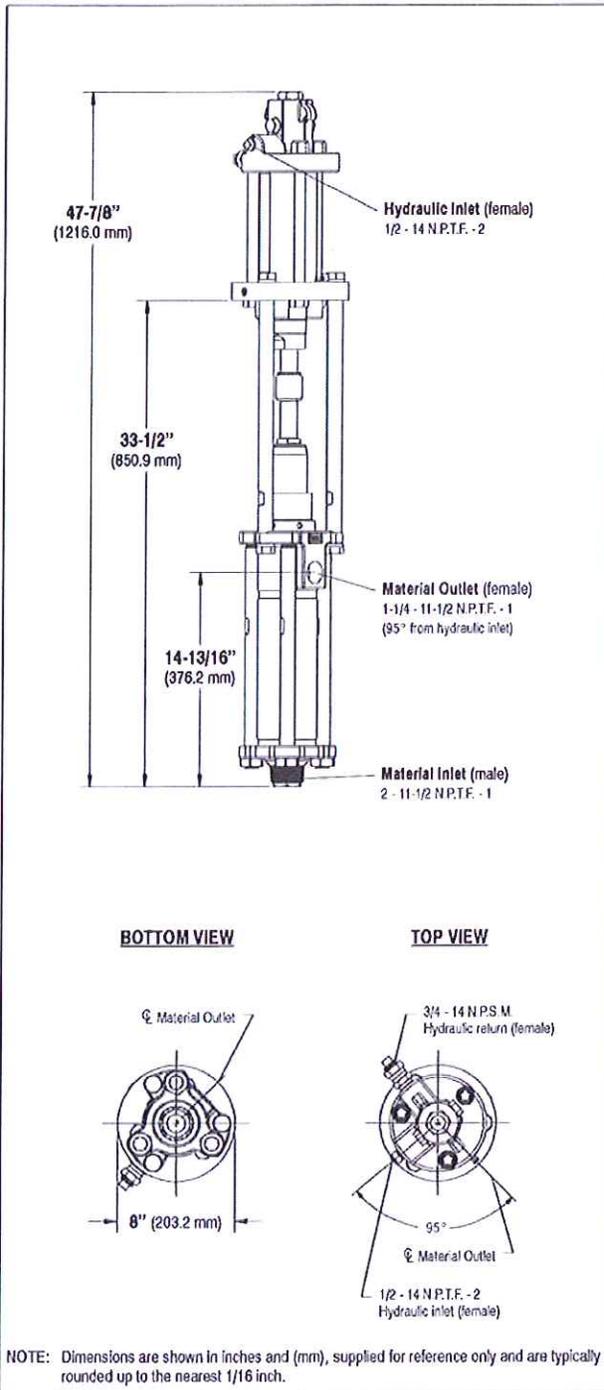
SALES & ENGINEERING DATA

650940-XXD-B TWO - BALL PUMP

RATIO SERIES:	0.8:1
FLUID P.S.I. RANGE:	40 - 1600

RELEASED: 9-21-01
REVISED: 5-26-10
REV. 05 S-1024

DIMENSIONAL DATA



SPECIFICATIONS

CONSTRUCTION

Model Series (refer to option chart)	650940-XXD-B
Pump Type	Hydraulic Operated, Two Ball, Double Acting Pump
Ratio	0.8:1
Hydraulic Motor	67314-B
Motor Repair Kit	637450
Motor Size	4.125 sq." (26.6 sq. cm)
Stroke	6" (15.2 cm)
Hydraulic Inlet (female)	1/2 - 14 N.P.T.F. - 2
Hydraulic Return (female)	3/4 - 14 N.P.S.M.
Lower Pump End Series	66941-XXD
Lower Pump Repair Kit	637211-XX3
Packing Options:	

C - UHMW-PE
K - Carbon Graphite filled PTFE with Nitrile Energizer
L - Mineral filled PTFE
P - UHMW-PE / Mineral filled PTFE staggered upper • UHMW-PE lower
R - Mineral filled PTFE / UHMW-PE staggered upper • Mineral filled PTFE lower

Material Inlet (male)	2 - 11-1/2 N.P.T.F. - 1
Material Outlet (female)	1-1/4 - 11-1/2 N.P.T.F. - 1

MATERIALS OF CONSTRUCTION

Outlet Body	CF-8M Stainless Steel (316)
Cylinder	15-5 Stainless Steel, Chrome plated
Plunger	15-5 Stainless Steel, Chrome plated
Upper Ball	440 Stainless Steel
Upper Seat	650940-X6D-B .. 440 Stainless Steel 650940-XDD-B .. Tungsten Carbide
Lower Ball	440 Stainless Steel
Lower Seat	650940-X6D-B .. 440 Stainless Steel 650940-XDD-B .. Tungsten Carbide
Inlet Body	CF-8M Stainless Steel (316)
Weight	140 lbs (63.5 kgs)

PERFORMANCE

Hydraulic Inlet Pressure Range	50 - 2000 p.s.i. (3.4 - 137.9 bar)
Fluid Pressure Range	40 - 1600 p.s.i. (4.1 - 110.3 bar)
Required H-power @ 50 c.p.m.	3.2 @ 1200 (82.8 bar)
Hydraulic flow req'd @ 50 c.p.m.	8.7 g.p.m. (32.9 l.p.m.)
Maximum Rec'd Cycles / Minute	50
Displacement In ³ Per Cycle	59.6
Volume / Cycle	33.0 oz. (976.4 ml)
Cycles Per Gallon	3.9
Flow @ 50 Cycles / Minute	12.9 g.p.m. (48.8 l.p.m.)
Noise Level	N/A
Maximum Temperature Limit	130° F (54° C)

ACCESSORIES:

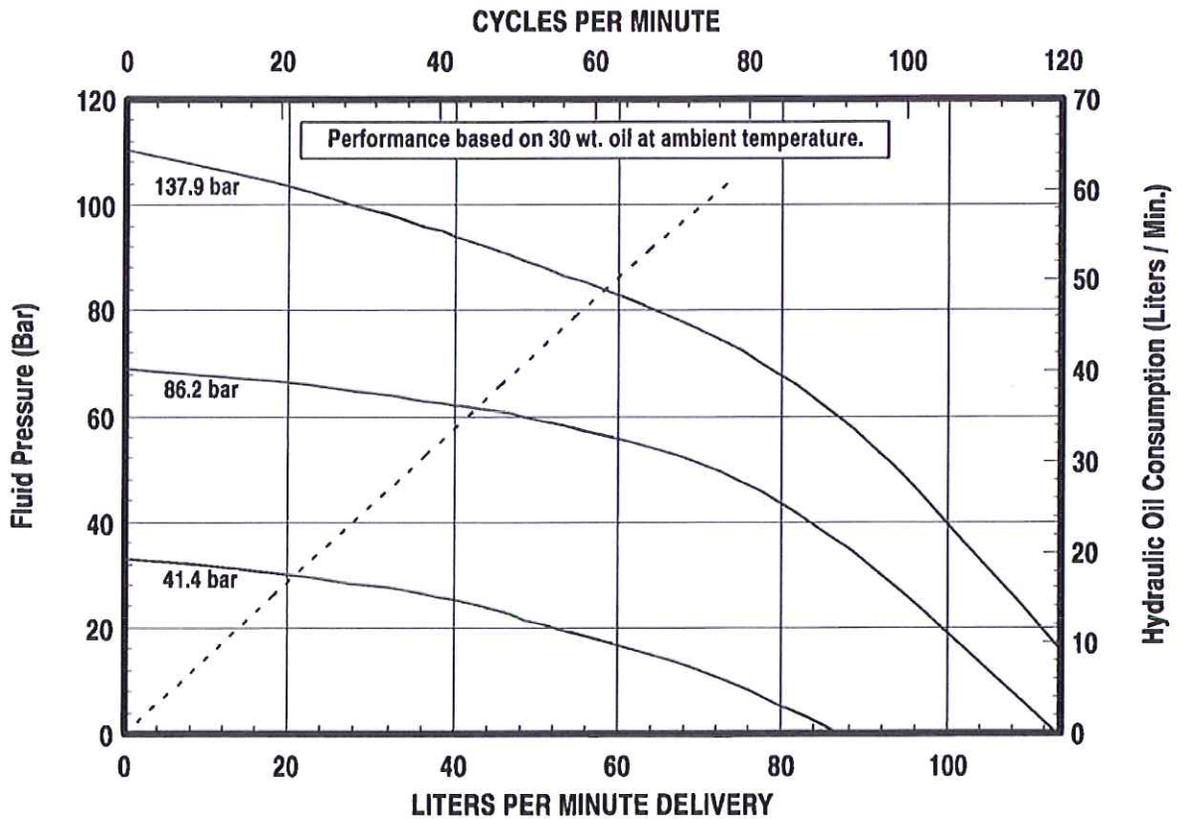
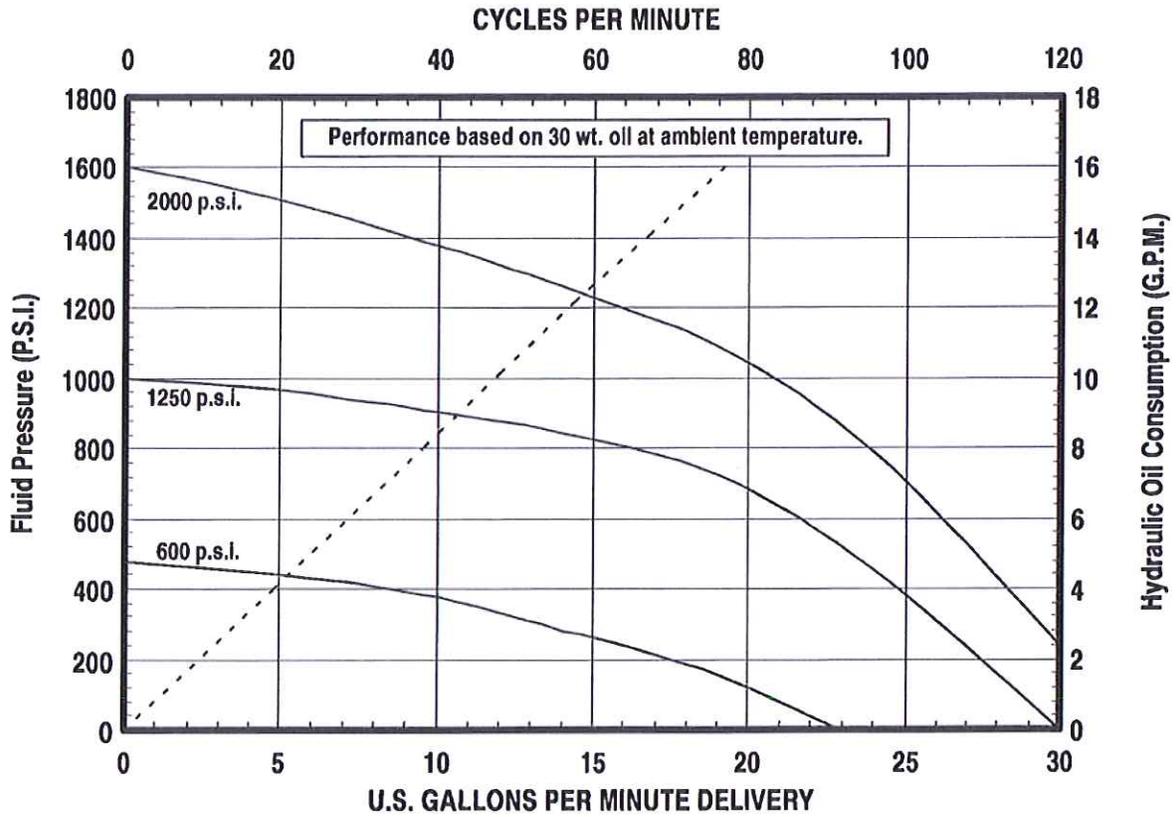
- 62151 Wall Mount Bracket
- 65138 Floor Mount
- 67136 Floor / Follower Adapter

INGERSOLL RAND COMPANY LTD
 209 NORTH MAIN STREET - BRYAN, OHIO 43506
 (800) 495-0276 • FAX(800) 892-6276
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PERFORMANCE CURVES





PO Box 140, Orange City, IA 51041
Ph: 712-737-4016 Fax: 712-737-4148

Heavy Duty Gun Carriage Outriggers

- ✓ Various tire and swivel caster sizes and configurations available.
- ✓ Zinc plated gun holding rods and brackets for durability and ease of overspray clean up.
- ✓ Powder coated parallel hinged bar type construction absorbs terrain both horizontally and vertically, yet maintains rigidity from side to side, ensuring the straightest lines and the most consistent gun height relative to the pavement.
- ✓ Pneumatic air cylinder to lift the spray gun carriage off the road surface and to apply down pressure when striping.
- ✓ Dual (two per carriage) tube in tube retractable structural steel slides with UHMW PE bearing material controlled with hydraulic power steering.
- ✓ Auto-hold transport bracket does not require chains to hold the carriage in place.
- ✓ Trailing wheel design sets gun bars back behind the outriggers for maximum operator visibility
- ✓ Flashing LED lights for maximum visibility to traffic

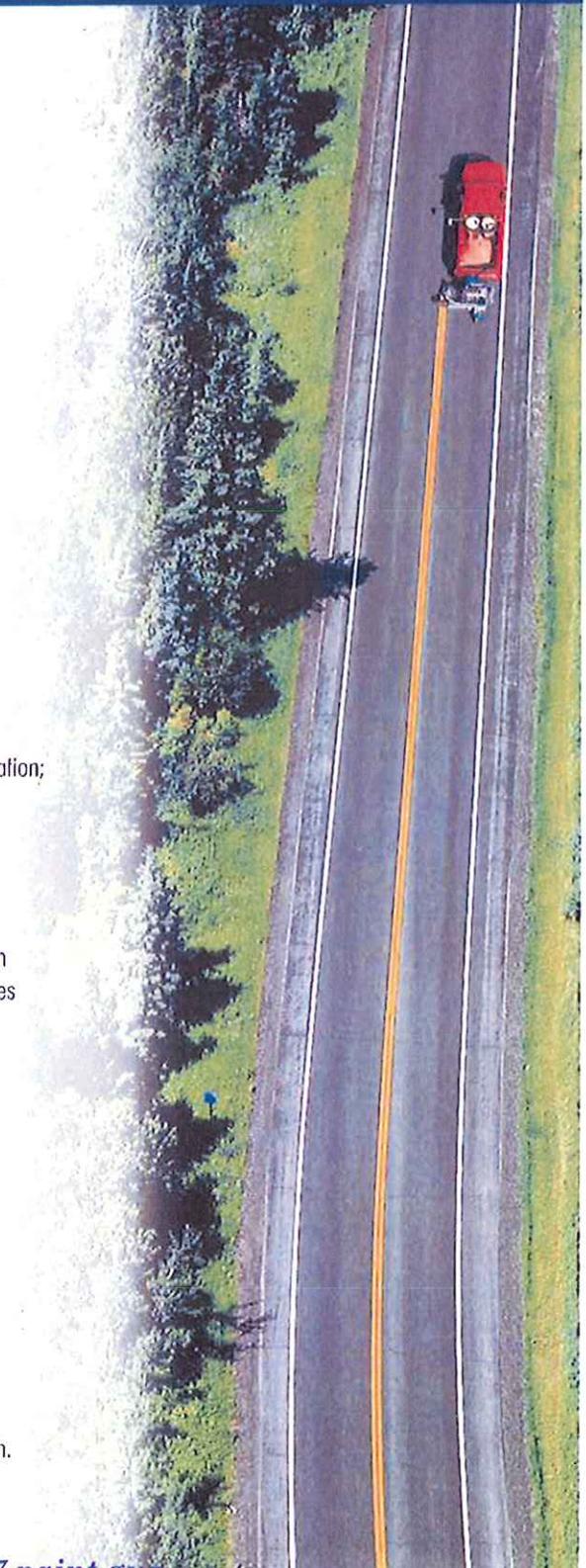
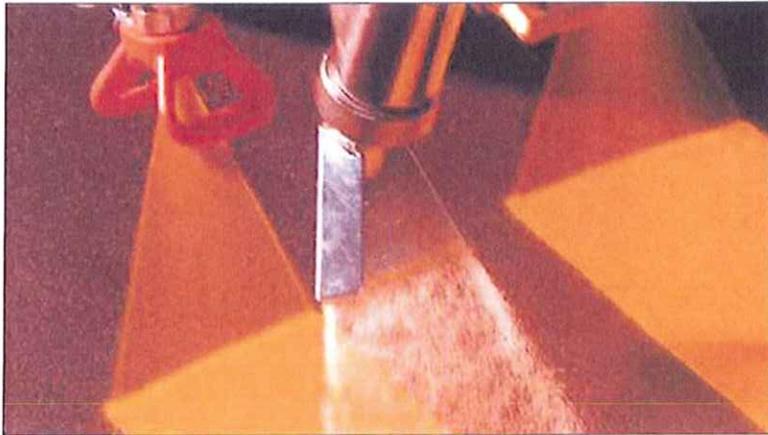


the Quality ^{is In} Our Line.

Descriptive, Not Restrictive. EZ-Liner's continuing quest for improvement make equipment, specifications, and components subject to change without notice.



Graco Road Striping Gun



Quality Design

- 300 grade SST design assures chemical compatibility with all high performance waterborne paints.
- Lowest paint gun exit velocities ensure long life, regardless of tip size.
- Consistently performs on demand despite the harsh gun carriage environment.
- Dual ported fluid chamber allows many fluid circuit options including hot/cold recirculation; dual color porting; flush port, or dead-end/non-circulating.
- Divorced design prevents paint contamination from entering the air chamber in the event of seal failure, to maximize uptime.

Wear Resistance

- Unlike 400 Grade SST and Aluminum found in competitive guns, the Graco striping gun offers all wetted gun parts made from Corrosion-Resistant 300 Grade SST which assures complete chemical compatibility with waterborne traffic paints and the high PH levels found in high performance waterborne paints.
- 300 Grade SST meets industry requirements for all waterborne paints and high solids, solvent-based traffic paints.
- Tungsten Carbide Seat offers abrasion resistance when spraying high solid materials at higher pressures, extending gun life.
- Oversized porting and clearances in the gun allow a smooth, undisturbed paint flow with very low shear.

Superior Performance

- Airless atomization offers consistent, high quality lines with virtually no overspray.
- Powerful air actuation piston and high tension needle spring guarantees instant starts and stops for reliable operation day in and day out!
- Large orifice increases productivity capability by allowing more material to flow through.
- Enlarged fluid inlet ports and 3/8 in. (3.1 mm) hose provide unrestricted flow to tip.



The One-Person Show.

To meet the needs of this changing industry, Graco has focused its design efforts on chemically compliant striping equipment. Graco's Road Striping Gun is designed with 300 Grade SST to handle today's higher performance waterborne paints. To you, this means trouble-free operation and equipment designed to last!



GRACO INC. P.O. Box 1441 Minneapolis, MN 55440-1441
 1.800-690-2894 Fax: 1.800-334-6955 <http://www.graco.com>
 ©2005-2004 Graco Inc. 320092 Rev. 8/04/05 Printed in U.S.A. All information is subject to change without notice. All other brand names or marks are used for identification purposes and are trademarks of their respective owners.
 Blue is a trademark of Graco Inc. for Contractor Equipment Sprayers.

Adjustable spring tension cap allows the operator to fine tune and synchronize all striping guns.

Oversized Air Piston & Spring Assembly ensure instant start and stop for reliable operation.

Protective Guard prevents material build-up, minimizing downtime.

Divorced Design prevents paint contamination from entering the air chamber in the event of seal failure, minimizing internal parts damage.

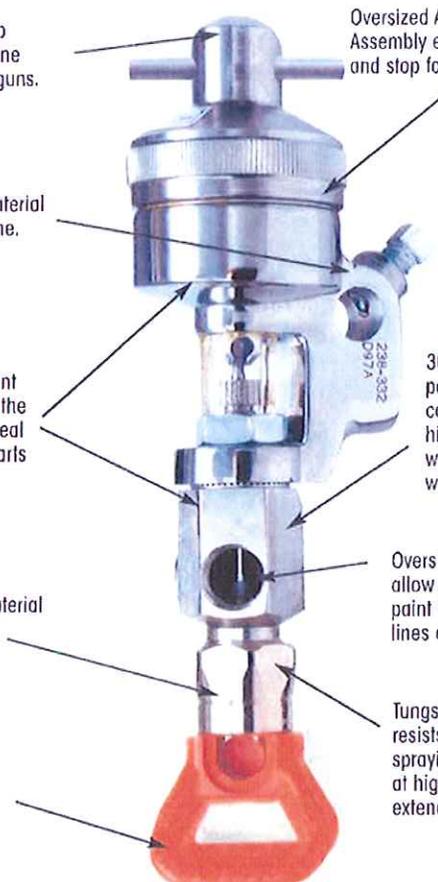
300 Grade SST wetted parts offer chemical compatibility with all high performance waterborne paints with minimal wear.

Large Orifice allows more material to flow through, increasing productivity.

Oversized 3/8" Porting(s) allow smooth, undisturbed paint flow for consistent lines every time.

RAC™ IV DripLess Tip Guard is aerodynamically designed to prevent paint build-up, reducing downtime.

Tungsten Carbide Seat resists abrasion when spraying high solids at high pressures, extending gun life.



Spray Tip Recommendations

Travel Speed in MPH (KPH) - Based on 15 mils (.06 mm) wet paint

	3 (5)	4 (6)	5 (8)	6 (10)	7 (11)	8 (12)	9 (14)	10 (16)	11 (18)	12 (19)
Paint Tip Size @ 1500 psi (102 bar)										
4 in. (101 mm) line	333	339	343	349	351	355	357	359	361	365
6 in. (152 mm) line	441	448	451	457	459	461	465			
12 in. (304 mm) line	649	653	653	655	655					

TSG Specifications:

Part No.238-377
 Working Pressure3,000 psi (210 bar)
 Fluid Housing, Packing Assembly300 Grade SST
 Outlet SeatTungsten Carbide
 Paint Outlet Size3/8 in. (3.1 mm)
 Paint Inlet Ports.....3/8 in. (3.1 mm)

Line Striping Spray Guns

Reliability • Versatility • Value

Model 30 Bead Gun & (Model 30 Big Bore)



Developed by Binks for laying out glass bead during a line striping operation. Will spread glass beads at a rate of 20lbs. per minute. Pneumatically operated from the rear of the gun using a minimum of 50 psi. Use on hand line strippers or moving trucks. The gun is furnished with four nozzle inserts with orifice dias. of 7/32", 1/4", 9/32" and 11/32". Part sheet 2151.

A optional Big Bore Kit (6-1287) with a 1/2" dia nozzle delivers glass beads at a rate of up to 60lbs. per minute @ 70 psi. Actual wt. 6 lbs. 1 oz. Part sheet 77-2774

Model 30A - High Flow (not shown)

Similar in design to Model 30, but the 30A is a "bleeder" type heavy materials spray gun for road marking operations requiring a high volume delivery of viscous materials. 1/4" NPS(m) air inlet. 3/4" NPS(m) fluid inlet. Actual wt. 6 lbs. 1 oz. Part sheet 77-2258.

Model 21M Gun



Heavy duty, pneumatically operated gun for spraying all conventional coatings. Drop-forged, brass-plated body. Adjustable stainless steel fluid needle. Adjustable spray pattern control at side of gun head. Replaceable gasket fluid nozzle seal. Gun controlled remotely with three-way valve. Requires 35 PSI air pressure to trigger. Up to 250 cycles per minute. 3/8" NPS (m) fluid inlet. 1/4" NPS (m) air connections. 1/2 inch diameter mounting hole. Shipping wt. 3 lbs. Actual wt. 2 lbs. 9 oz. Part sheet 77-2976.

Model 33 SS Gun



Heavy duty high volume gun for use on automatic road striping machines. Can be used at vehicle speeds of 15 to 25 m.p.h. Brass body and stainless steel head. Stainless steel fluid needle valve. Hardened steel fluid nozzle. Optional nitralloy, hardened steel, or tungsten carbide air nozzle. A port of catalyst injection in the atomizing air is included. Pneumatic operated trigger opens at 45 PSI. Fan spray nozzle. 1/2" NPS (m) fluid inlet. 3/8" NPS (m) atomizing air inlet. 1/4" NPS (f) cylinder air inlet. Shipping wt. 7 1/4 lbs. Actual wt. 6 lbs. 1 oz. Part sheet 77-1441.

Part Number 54-2831 Spray Shield.

Use with 21, 21M and 95AM line striping guns to insure sharp edge spray patterns.

Fluid Nozzle	GPM	Air Nozzle	CFM	Fan Width @ 6 inches
59ASS	2.5	242	6	5"
59BSS	3	252	11.5	6"
59CSS	3.5	262	11	7"



BINKS MODEL 30 AUTOMATIC GLASS BEAD DISPENSING GUN

6279-000-1



The Model 30 Glass Bead Dispensing Gun delivers glass beads at the rate of up to 20 lbs. per minute. (A pressure tank with follower plate and bottom outlet is recommended for supply of glass beads to the gun.) Air for atomization is not required.

"On-off" of the gun is provided by the air cylinder. It is located at the rear of the gun body. The minimum recommended air pressure to the cylinder is 50 PSIG.



CAUTION

The gun should never be operated without having the guard (28) installed. All threads, including the hose connections, should be clean of beads before mating. The needle (15) should always be kept clean.

INSTALLATION

Mount the Model 30 gun on a 1/2" diameter steel rod. (Not furnished with gun. Please order separately, Model 54-380.) The rod should have a flat area to receive the mounting screw (19) for locking the gun to the rod. Attach the air hose to the 1/4" NPS(m) nipple (21) and attach the glass bead supply hose to the 3/4" NPS(m) inlet on the gun head (16).

NOTE

Be sure mating threads are clean of beads.

Depending on the delivery required, select the appropriate nozzle (orifice) insert (13) and install into the deflection nozzle (12). Install this assembly (14) into the gun and fasten securely with retainer ring (10) and o-ring (11).

NOTE

Be sure mating threads are clean of beads.

DISASSEMBLY INSTRUCTIONS

Read entire disassembly instructions before attempting repairs. Do only that which is required to repair a specific trouble. Complete disassembly may not be required.

1. Remove the screw (27) and guard (28).
2. Remove cap (3), control screw (1) and lock-nut (2). Remove springs (4) and (5).
3. Remove nozzle assembly (14) by unscrewing retainer ring (10).
4. Using a 11/16" socket, hold piston rod (6) and loosen nut (22) with a 7/16" wrench.
5. Unscrew needle (15) from piston rod (6) and nut (22). Remove take-up screw (23) from gun head (16). Since o-ring (24) and take-up screw (23) offer resistance to removal from needle (15), unscrew take-up screw (23) from needle (15), rather than pulling forcefully. Remove needle (15) from front of gun head (16).
6. Remove wiper (25) and retainer (26) from gun head (16).

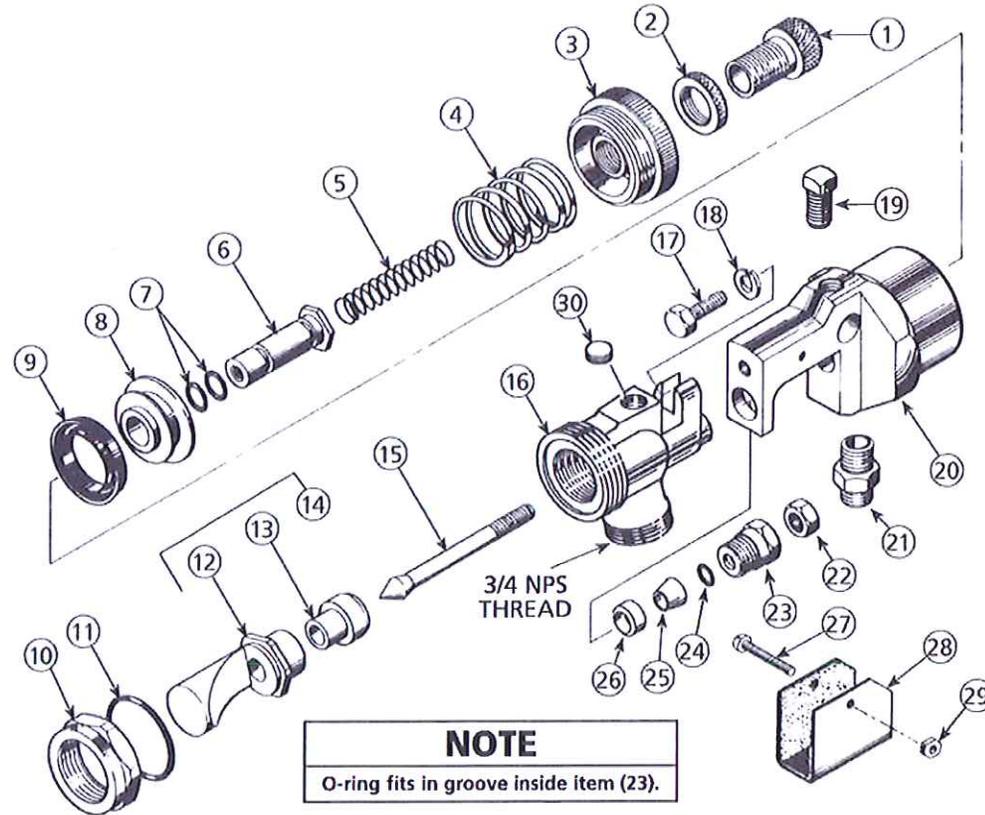
7. Remove piston rod (6) and piston (8) by feeding air into the air inlet (21) at 5-10 PSIG.
8. Remove screw (17) and lockwasher (18) and separate gun body (20) from gun head (16).

ASSEMBLY INSTRUCTIONS

Before assembling gun, clean off all mating surfaces and remove any beads clinging to them.

1. Attach gun head (16) to gun body (20) with screw (17) and lockwasher (18).
2. Insert needle (15) through front of gun head (16). Check wiper (25) and retainer (26) and replace if worn or damaged. Install retainer (26) and wiper (25) through rear of gun head (16) onto needle (15).
3. Check o-ring (24) and replace if worn or damaged. Seat o-ring (24) correctly into take-up screw (23). Screw take-up screw o-ring assembly (23, 24) over needle threads (15) and into gun head (16) to finger tightness and tighten additionally 1/8 to 1/4 turn by wrench.
4. Screw nut (22) onto needle (15).
5. Check u-cup (9) and two o-rings (7) and replace if worn or damaged. Seat two o-rings (7) correctly onto piston rod (6) and seat u-cup (9) correctly onto piston (8). Insert piston rod (6) through piston (8) and insert piston rod/piston assembly (6, 8) into gun body (20).
6. Push piston rod (6) all the way into gun body (20) and hold it there with 11/16" socket wrench. Screw needle (15) deep into piston rod (6) while, at same time, turning nut (22), as required, to avoid "lockup".
7. Hold gun with nozzle end up. Insert nozzle assembly (14). Do not install retainer ring (10).
8. Unscrew piston rod (6) with socket wrench, while pushing on piston rod (6) and allow needle (15) to "lift" nozzle assembly (14) 3/32" off gun head (16).
9. While preventing needle (15) from turning, and while push-ing on piston rod (6), screw nut (22) forward so as to lock against take-up screw (23). Tighten nut (22) securely with 7/16" wrench.
10. Install spring (4) and cap (3).
11. Install spring (5), lock-nut (2) and control screw (1).
12. Select appropriate nozzle insert (13) and insert into deflection nozzle (12). Insert nozzle assembly (14) into gun head (16).
13. Check o-ring (11) and replace if worn or damaged. Seat o-ring (11) correctly onto gun head (16).
14. Screw retainer ring (10) onto gun head (16) and make hand tight.
15. Attach guard (28) with screw (27) and nut (29).

Binks Model 30 AUTOMATIC GLASS BEAD DISPENSING GUN



NOTE
O-ring fits in groove inside item (23).

PARTS LIST

When ordering, please specify Part No.

ITEM NO.	PART NO.	DESCRIPTION	QTY.	ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	54-1195	CONTROL SCREW.....	1	16	54-1208	GUN HEAD	1
2	54-323	CONTROL SCREW LOCKNUT.....	1	17	20-702-1	SCREW, HEX HEAD	1
3	54-1196	CAP	1			1/4" -20 x 7/8" Long	1
4	54-236	SPRING.....	1	18	20-1041-1	LOCKWASHER.....	1
5	54-1648▲	SPRING.....	1				
6	54-1197	PISTON ROD	1	19	54-335	MOUNTING SCREW	1
7	20-2369▲	O-RING	2	20	54-1194	GUN BODY	1
8	102-2059	PISTON.....	1	21	57-13	D.M. NIPPLE 1/4" NPS x 1/4" NPT.....	1
9	20-3723▲	U-CUP.....	1	22	20-301-1	HEX NUT 1/4"-20.....	1
10	52-1635	RETAINER RING	1	23	54-1198	SCREW.....	1
11	20-3829▲	O-RING	1	24	20-3620▲	O-RING	1
12	45-102■	DEFLECTION NOZZLE .344" Dia.....	1	25	54-3114▲*	WIPER.....	1
13	45-103■	NOZZLE INSERT 7/32" Dia.....	1	26	54-3113▲*	RETAINER	1
13	45-104■	NOZZLE INSERT 1/4" Dia.....	1	27	20-4827	SCREW, ROUND HEAD	1
13	45-105■	NOZZLE INSERT 9/32" Dia.....	1			6-32 x 1 1/4" Long.....	1
13	45-106■	NOZZLE INSERT 11/32" Dia.....	1	28	54-1199	GUARD	1
14	45-101	DEFLECTION NOZZLE and	1	29	20-412-1	NUT 6-32	1
		INSERT ASSEMBLY	1	30	20-2287-1	PIPE PLUG 1/8" NPT SOC Head	1
15	47-458	NEEDLE.....	1	—	6-1287	OPTIONAL: 1/2" BIG BORE KIT ...	1

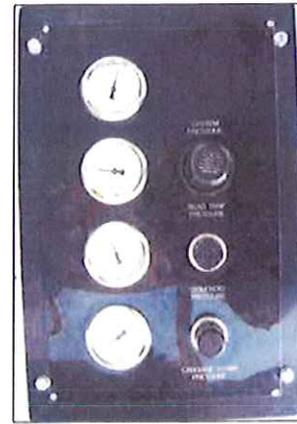
▲ Also available in 6-271 Repair Kit. Please order separately.
 ■ Part of 45-101 Assembly.
 * Also available in 54-3116 Wiper Kit. Please order separately.
 Ref. Only: To convert to 1/2" nozzle, use 6-1287 Kit.



PO Box 140, Orange City, IA 51041
Ph: 712-737-4016 Fax: 712-737-4148

Glass Bead Tanks

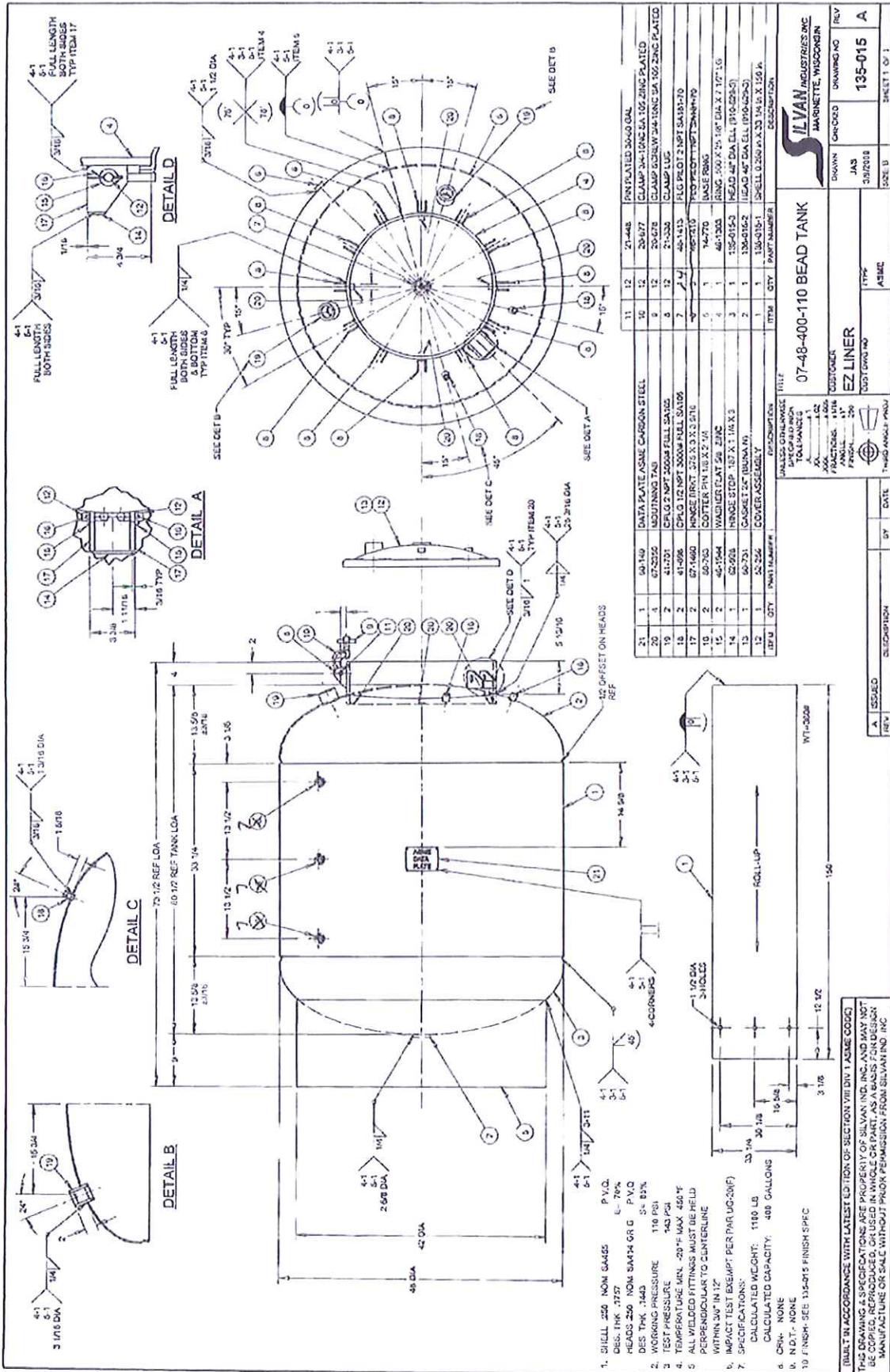
- ✓ 12 forged steel C-clamps with T handle head bolted lids and air tight gasket seal
- ✓ A.S.M.E. certification standard on all pressure vessels
- ✓ Hinged full top opening lid with handle welded to lid
- ✓ Instant glass bead level monitoring featuring large 2" diameter sight glasses installed at ¼, ½, and ¾ full
- ✓ Heavy duty tank walls with plural component urethane automotive exterior finish
- ✓ Splitter/strainer screen fits in neck of tank to catch debris while loading manually or with a vacuum bead loading system
- ✓ Application pressure regulated from the operator's station
- ✓ Optional anti-surge features and devices available for specialized or high density reflective media
- ✓ Preset safety pressure relief or "pop-off" valves



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Accept no exceptions or equals!
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Page 14; BEAD SUPPLY TANK: ASME certified 5,000 lbs. capacity



1. SHELL 250 NON GRADES P.V.O.
2. HEAD 250 NON GRADES U-70%
3. NECK 250 NON GRADES G.P.V.O.
4. TEST PRESSURE 110 PSI
5. TEMPERATURE UNL. 207°F MAX. 460°F
6. ALL WELDED FITTINGS MUST BE FIELD PERPENDICULAR TO CENTERLINE WITHIN 90° IN 12"
7. SPECIFICATIONS: IMPACT TEST EXEMPT PER PARA UG-30(F)
8. CALCULATED WGT.: 1180 LB.
9. CALCULATED CAPACITY: 408 GALLONS
10. FINISH: SEE 135-015 FINISH SPEC

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION	
1	1	DATA PLATE ASME CARBON STEEL	11	12	21-448	FIN PLATED 3040 GAL
2	1	CLAMP 2 1/2" DIA. 100 ZINC PLATED	12	12	20-677	CLAMP 2 1/2" DIA. 100 ZINC PLATED
3	1	CLAMP 2 1/2" DIA. 100 ZINC PLATED	13	12	20-678	CLAMP 2 1/2" DIA. 100 ZINC PLATED
4	1	CLAMP 2 1/2" DIA. 100 ZINC PLATED	14	12	21-323	CLAMP USE
5	1	CLAMP 2 1/2" DIA. 100 ZINC PLATED	15	12	21-323	CLAMP USE
6	1	CLAMP 2 1/2" DIA. 100 ZINC PLATED	16	12	21-323	CLAMP USE
7	1	CLAMP 2 1/2" DIA. 100 ZINC PLATED	17	12	21-323	CLAMP USE
8	1	CLAMP 2 1/2" DIA. 100 ZINC PLATED	18	12	21-323	CLAMP USE
9	1	CLAMP 2 1/2" DIA. 100 ZINC PLATED	19	12	21-323	CLAMP USE
10	1	CLAMP 2 1/2" DIA. 100 ZINC PLATED	20	12	21-323	CLAMP USE
11	1	CLAMP 2 1/2" DIA. 100 ZINC PLATED	21	12	21-323	CLAMP USE

ITEM	QTY	DESCRIPTION	ITEM	QTY	DESCRIPTION	
1	1	CLAMP 2 1/2" DIA. 100 ZINC PLATED	11	12	21-448	FIN PLATED 3040 GAL
2	1	CLAMP 2 1/2" DIA. 100 ZINC PLATED	12	12	20-677	CLAMP 2 1/2" DIA. 100 ZINC PLATED
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4	1	CLAMP 2 1/2" DIA. 100 ZINC PLATED	14	12	21-323	CLAMP USE
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11	1	CLAMP 2 1/2" DIA. 100 ZINC PLATED	21	12	21-323	CLAMP USE

07-48-400-110 BEAD TANK
 EZ LINER
 CUSTOMER
 DATE: 3/2/2018

REV	DESCRIPTION	BY	DATE
A	ISSUED		

REV	DESCRIPTION	BY	DATE
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REV	DESCRIPTION	BY	DATE
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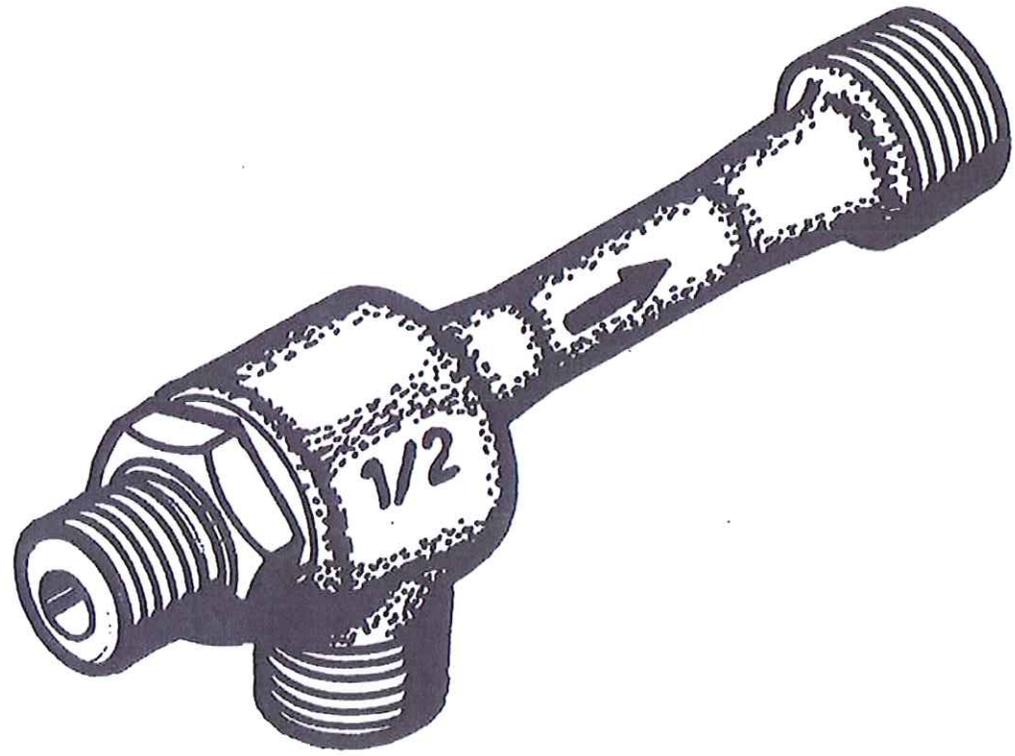
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Replaces 12/90

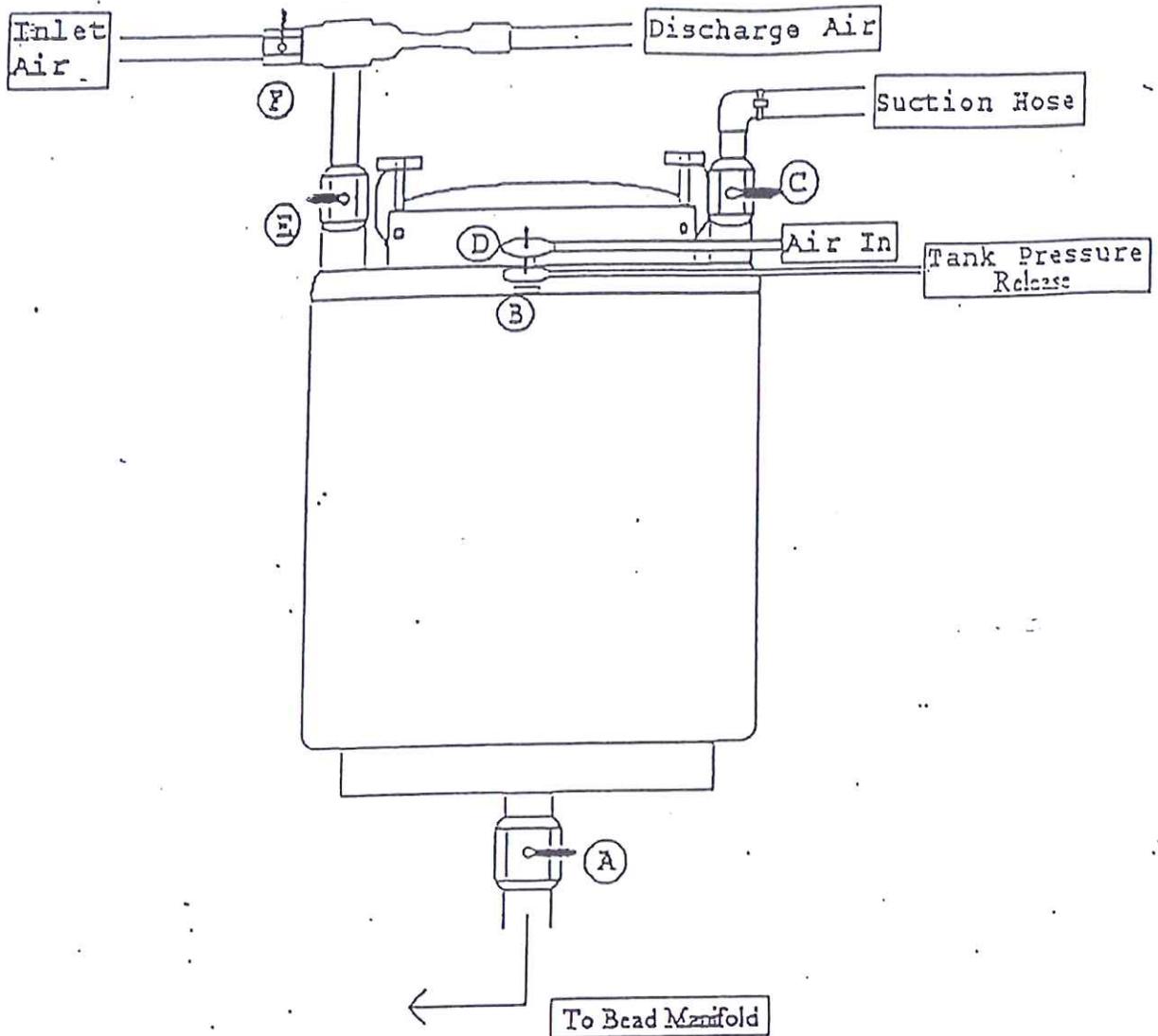
Jet Pumps

Models GL, GH — Gas Operated



Installation / Operation / Maintenance Instructions

Bead Load Schematic



Ball Valve Position for Loading Beads:

- Ⓐ — Closed
- Ⓑ — Closed
- Ⓒ — Closed
- Ⓓ — Closed
- Ⓔ — Open
- Ⓕ — Open

Let air system run for 5 minutes with ball valves Ⓔ and Ⓕ open. This will create vacuum pressure in the bead tank. After building vacuum pressure, open ball valve Ⓒ and make sure that the bead suction hose is one foot into the glass beads.



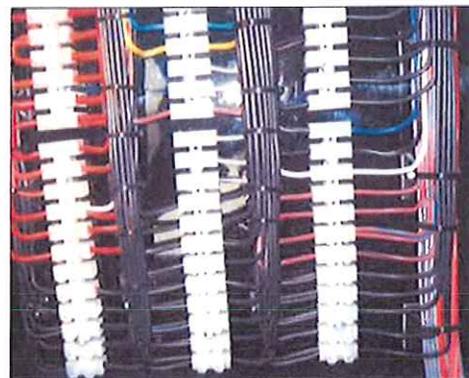
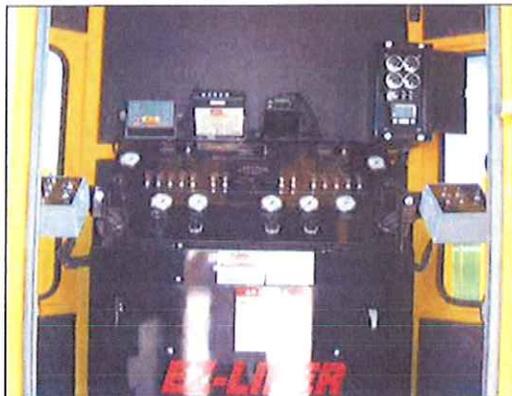
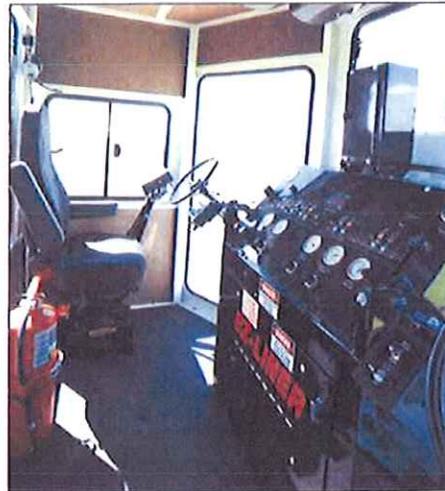
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Electrical Control Console

- ✓ Rugged powder coated steel constructed housing
- ✓ Hinged front and top panels for access to all internal components
- ✓ Panel mounted switches, regulators, and liquid filled gauges
- ✓ Black facplate, anodized aluminum with permanent etched function labels
- ✓ Operator steering wheels hinge up and out of the way when not in use
- ✓ Indicator lights illuminate when switch is activated
- ✓ Neat and organized wiring with electrical schematic prints provided
- ✓ Reset-able circuit breakers for surge protection
- ✓ Grounded UL and CSA compliant junction blocks, connectors, switches, etc.
- ✓ Main power kill switch for emergency shutdown



removable back plate



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Page 15; CONTROL CENTER: Master in operator's cab main control center

SKIP

LINE

SM-5 Striping Control System



The Industry Standard In Road Marking

The SM-5 Striping Control system is the most widely used road marking controller on the market. It is capable of handling everything from simple skip patterns to complex road markings. Rugged toggle switches provide durability and straightforward control of material application.

Extremely configurable, the SM-5 Striping Control System has many options. Almost every order is custom tailored to specific needs. Switch positions and functions are designed to match each individual system specification.

Whether applying reflective marker, highway, airport, or black highlight patterns, the SM-5 is more than capable.

SM-5 Features:

- Centralized Wiring
- High Temperature Backlit LCD Display
- Easy-to-Operate
- Military Specification Toggle Switches
- Bead Registration
- AutoCycle feature with Advance/Retard Switch
- Built-In Counter Channels

Available Peripherals:

Data Logger System
Paper-Tape Printer
CVO-312 Video Overlay
Push Button Remote
Speedometer

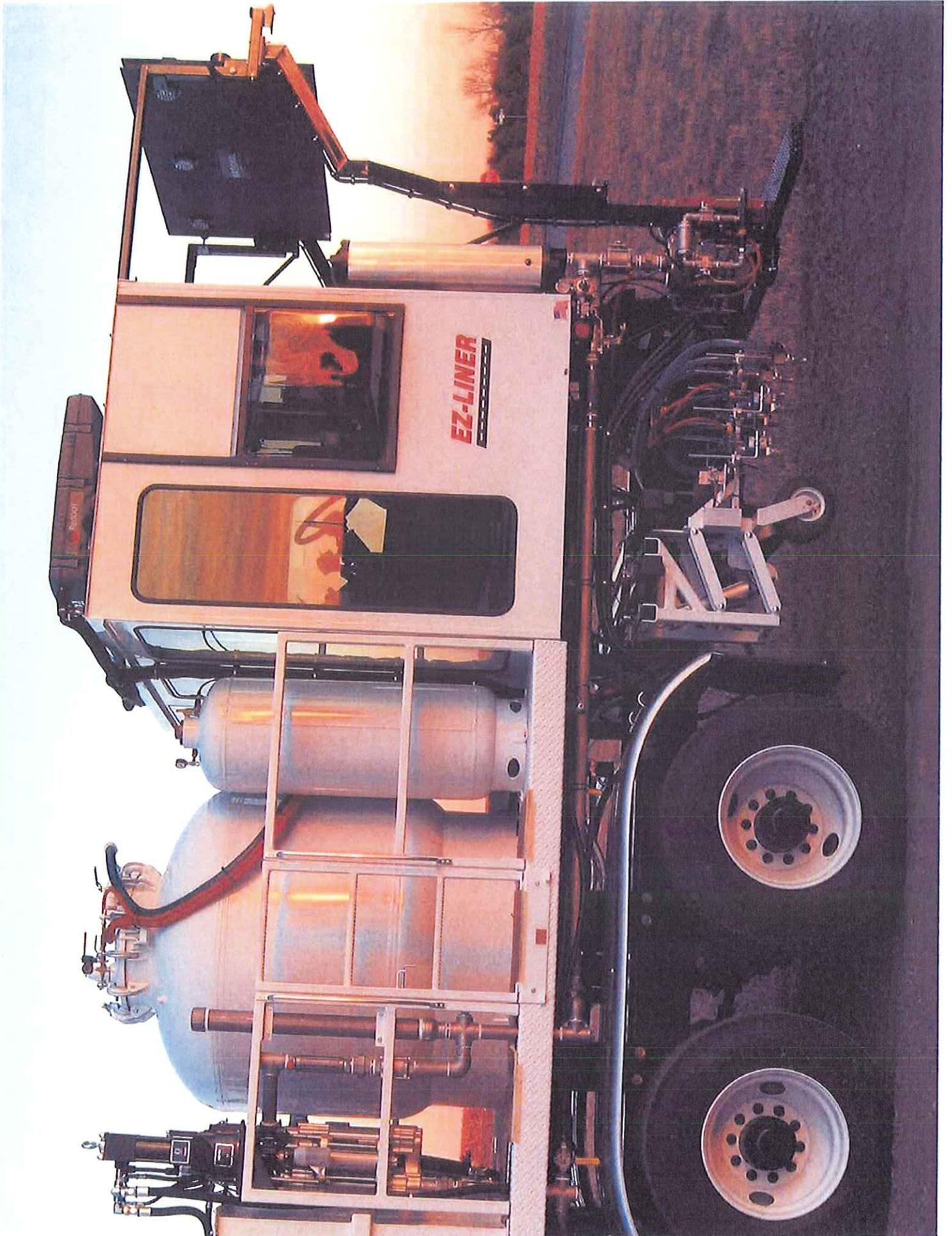


PLEASE CONTACT YOUR PREFERRED OEM FOR PRICING

Skip-Line® Products are proudly designed and manufactured in the USA.

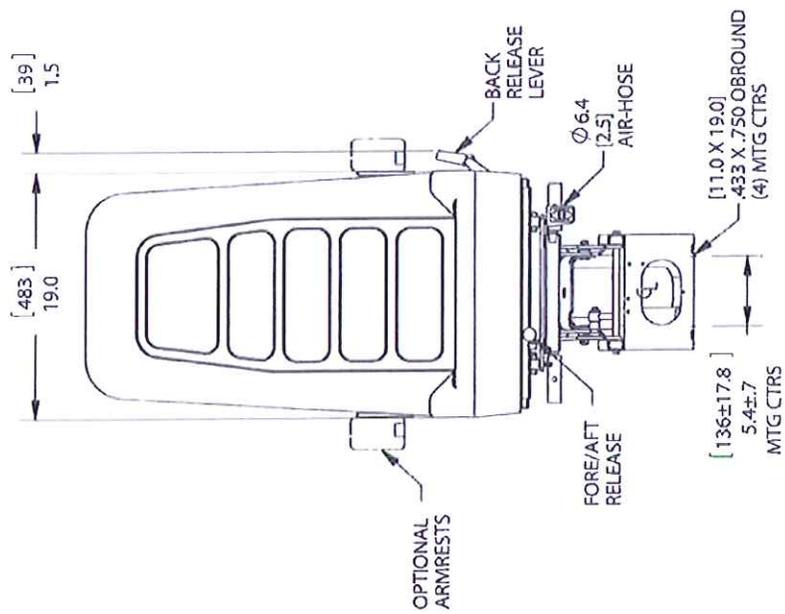
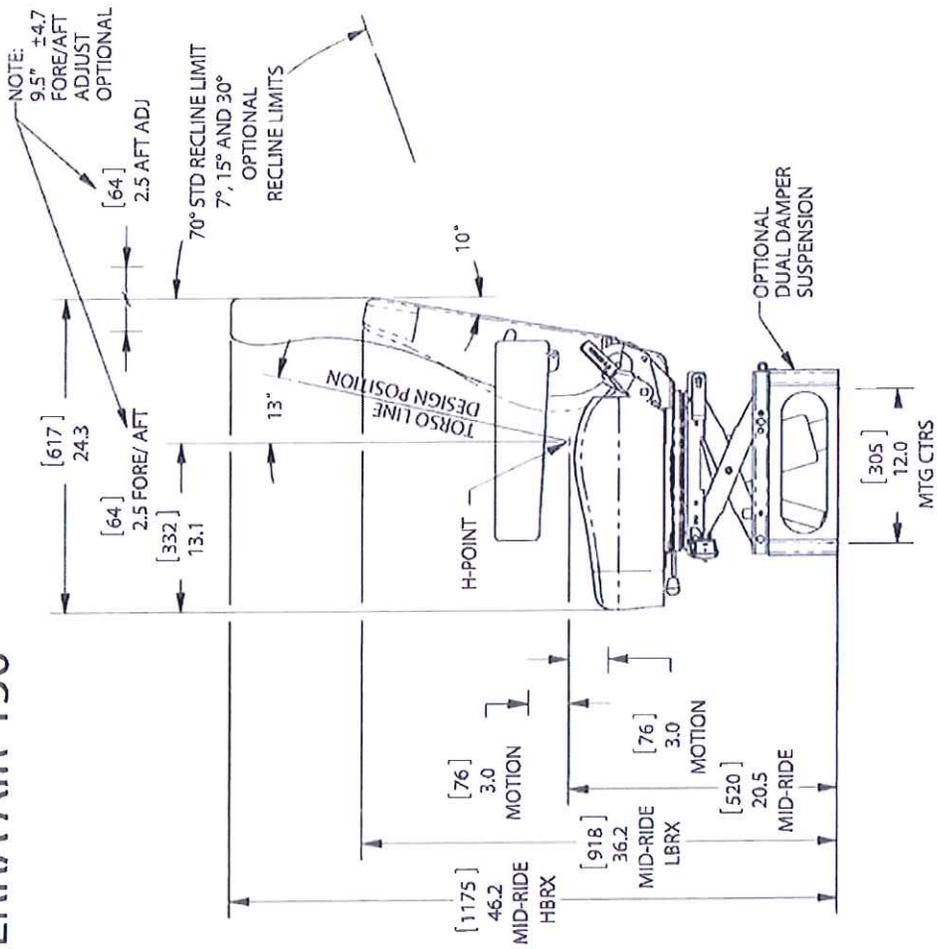
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www.skipline.com



Page 16; ENCLOSED CAB: fabricated to ROPS SAE J1040 standards, non-certified

SIERRA AIR-150



SIERRA AIR 100 • 140 • 150
FIREFIGHTER SERIES



400 SERIES



**High back
(low back available)**

**Available in
vinyl, cloth
and Mordura
upholstery**

Back recline

**Driver weight/ride
adjustment**

**Air suspension with
6" travel isolates shock
(models with 4" and 5"
travel available)**

**Built-in
lumbar
support**

**Optional
flip-up
armrests**

**5" fore/aft
adjustment
(Optional
9" fore/aft)**

The H.O. Bostrom Advantage

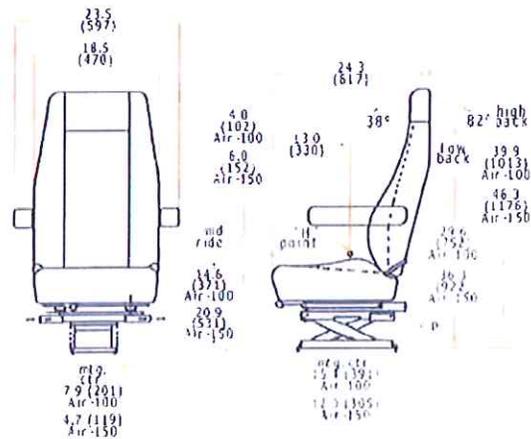
As a worldwide leader in seating for over 50 years, H.O. Bostrom produces seats and seating accessories for off-highway, specialized on-highway, industrial, healthcare, marine and railroad industries.

Our product design team has nearly 200 years of experience, numerous patents for seating innovations and uses the Pro-Engineer CAD system to create advanced seating designs. For special applications, we can combine our products to meet virtually any requirement; or we'll work with you on custom design, testing and prototypes.

Through a Total Quality Management (TQM) approach, we are able to give you one of the best warranty programs in the industry.

The H.O. Bostrom advantage brings you innovation, fast response and comfort – our reputation rides on it.

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WWW.HOBOSTROM.COM

F119-497

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HEATER - AIR CONDITIONER
Red Dot Model **R-9777**

ROOFTOP

R-9777



Using the latest in design techniques Red Dot has produced a rugged unit combining European styling with heavy-duty components that will withstand the toughest of installations. The R-9777 Heater/Air conditioner is the first in our industry to employ engineered resin technology. The design sets this unit far beyond the competition in appearance, durability and performance.



HEATER - AIR CONDITIONER
Red Dot Model **R-9777**

ROOFTOP

SPECIFICATIONS

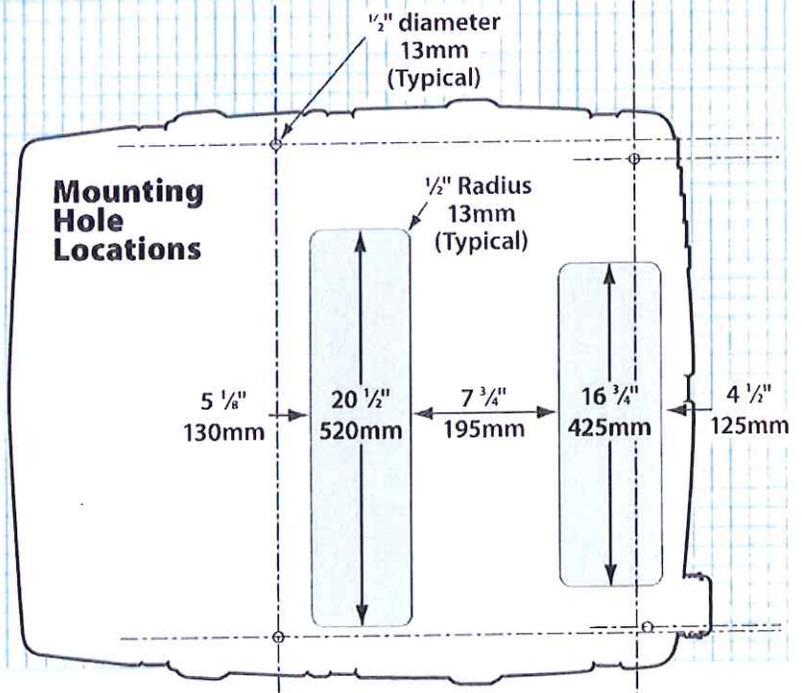
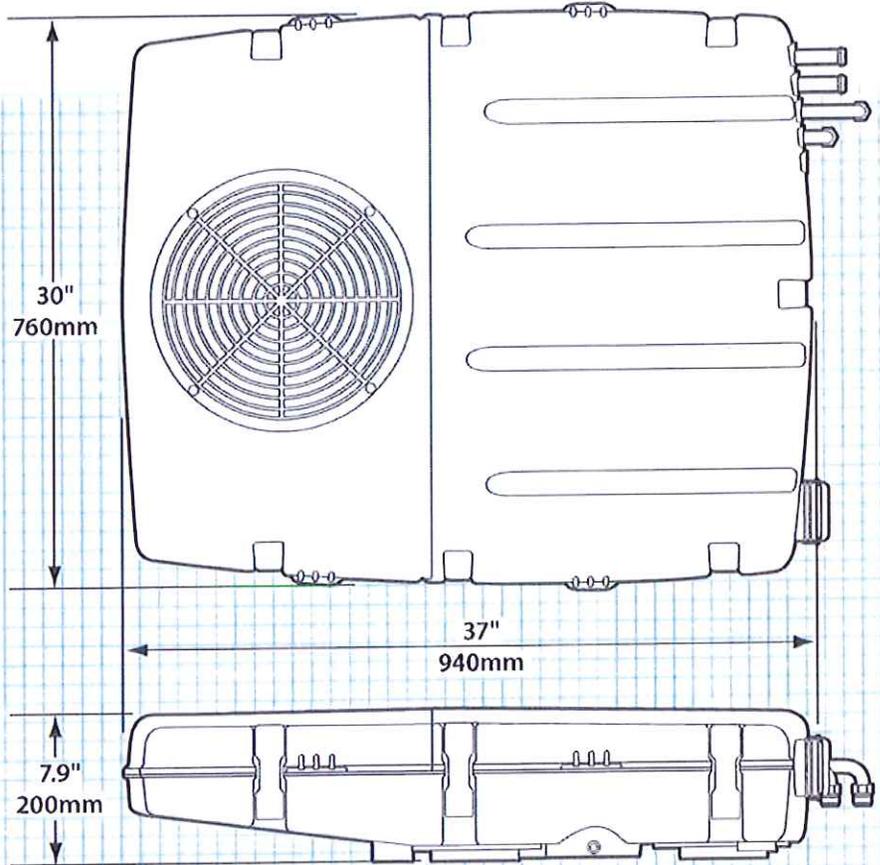
BTU's Heating – 45,000 BTU/Hr @ 100°F (13.2 kW @ 37.8°C) air temp. rise Cooling – 25,000 BTU/Hr with 36°F (7.3 kW with 2.2°C) refrigerant temp. and 80°F (26.7°C) wet bulb entering air

Air Flow 355 CFM (580 m3/h)

Weight 65 lbs.

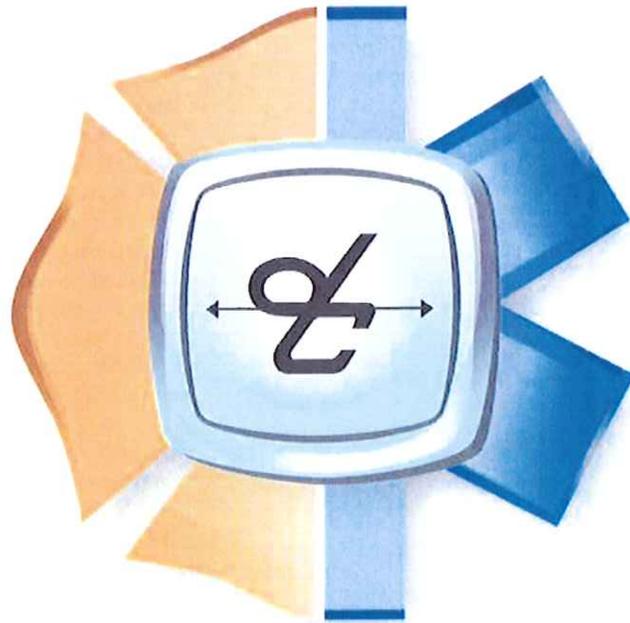
Motors Evaporator – One 12 VDC, three speed (24 VDC available)
Condenser – One 12 VDC low profile (24 VDC available)

Draw 38.2 amps @ 13.6 VDC (includes 4 amps for A/C clutch)
19.1 amps @ 27.2 VDC (includes 2 amps for A/C clutch)



1 square = 1"

SERIES 3800 VEHICLE INTERCOM SYSTEM



PROVEN · ESTABLISHED · TRUSTED

A vehicle intercom system that provides a solution for enhanced safety,
hearing protection, and clear communication.



WWW.DAVIDCLARK.COM



U3803 REMOTE JUNCTION MODULE

A passive module containing four identically wired connectors for expanding the number of headset stations utilized in the system. A U3803 may be added to the system wherever C38-XX Jumper Cords are to be interconnected.
5-1/4" L x 5-1/4" W x 2-3/8" D.



U3805 RADIO CORD JUNCTION MODULE

Recommended for systems utilizing two or more radio interface headset stations. It is a passive module that permits multiple Series 3800 Radio Interface Modules (a maximum of four) to be connected to one radio. The U3805 provides one output to a mobile radio, one primary input from a Series 3800 Radio Interface Module, and three secondary inputs from Series 3800 Radio Interface Modules.
6-3/4" L x 5-1/4" W x 2-3/8" D.
Note: With modifications, the U3805 also accepts input from model C3019 Utility Radio Adapters.



U3806 DUAL HEADSET INTERCOM STATION

Expands the system beyond the master station. Contains two headset jacks, each with listen level control, system input connector and two system output connectors. Provides a path for "daisy-chaining" to additional headset stations.
6-3/4" L x 4-1/4" W x 3-1/16" D.



U3810 RADIO INTERFACE MODULE

Adds the transmit and receive functions of a mobile radio to the David Clark Series 3800 Intercom System. Use of this module is recommended for two- or three-person systems only. The U3810 has one radio push-to-talk (PTT) switch, one system input connection, one radio input connection and two connectors for optional remote PTT.
5-1/4" L x 5-1/4" W x 2-3/4" D.
Note: All intercom traffic is transmitted when PTT is engaged.



U3811 RADIO INTERFACE MODULE

Provides isolated radio transmit function for one headset and radio receive function for all users. Contains one radio PTT switch, one headset jack and listen level control, one system input connection and one radio input connection.
5-1/4" L x 3-5/8" W x 3-1/16" D.



U3812 DUAL RADIO INTERFACE MODULE

Designed to connect two separate radios to a David Clark Series U3800 Intercom System. The priority reception feature enables the user to select which radio's receive audio will have precedence by simply connecting the priority radio to the priority radio input connector. Contains one C38-XX system connector, two connectors for radio input (C3821), and two connectors for optional remote PTTs.
8-1/2" L x 5-3/4" W x 4-1/8" D.
Note: All intercom traffic is transmitted when PTT is engaged.

Page 17; INTERCOM SYSTEM: David Clark U3800

Note: All Radio Interface Headset Station Modules provide radio transmit isolation with the exception of the U3810 and the U3812.



U3813 RADIO INTERFACE MODULE (use with H7042 Headset only)

Is designed to combine the transmit/receive functions of a mobile radio with the David Clark Series 3800 Intercom System. The U3813 contains one headset jack, one listen level control, one PTT switch, one radio input connector (C3821), two intercom connectors (C38-XX) and a remote PTT connector that allows the use of an optional Footswitch (40071G-04) or other remote PTTs.

7" L x 4-1/3" W x 3-1/8" D.

Note: The U3813 Radio Interface Module and the U3817 Remote Headset Station are the only Series 3800 Modules that accept the H7042 Headset. The H7042 Headset is designed for use with certain older portable radios and requires a David Clark Company 7000 Series Adapter specific to the portable radio brand and model.



U3814 MULTI RADIO INTERFACE MODULE

Is designed to connect up to four radios to a David Clark Series 3800 Intercom System. Contains one headset jack with listen level control, one radio volume control, one four-position radio select switch, one radio PTT, four connectors for radio input (C3821), two system connectors (C38-XX), one connector for speaker cut-out option, and one connector for optional C3023 Belt Station, Footswitch (40071G-04) or other remote PTT. A red LED indicator over the PTT switch will light, indicating transmission over the selected radio.

Provides isolated radio transmit function for one headset and radio receive function for all users on the system.

8-1/2" L x 5-1/4" W x 3-1/8" D.



U3815 RADIO INTERFACE MODULE

Combines the transmit/receive functions of a mobile radio with the David Clark Series 3800 Intercom System. This module has one headset jack with listen level control, one PTT switch, one radio input connector (C3821), two intercom connectors (C38-XX) and one connector allowing use of an optional Footswitch (40071G-04) or other remote PTT.

7" L x 4-1/3" W x 3-1/8" D.



U3815A RADIO INTERFACE MODULE

Same features as U3815, but remote PTT connection will accept 40071G-04 Footswitch or C3023 Belt Station.

7" L x 4-1/3" W x 3-1/8" D.



U3816 DUAL RADIO INTERFACE HEADSET STATION

The standard choice when connecting the 3800 Intercom System to two radios. Provides two connectors to mobile radios (C3821), two intercom system connections (C38-XX), one headset jack with listen level control, two radio receive level controls, two PTT switches and two remote PTT connections (corresponding to each of the mobile radios). The remote PTT connectors will accept C3023 Belt Stations or Footswitches (40071G-04).

8-1/2" L x 5-1/4" W x 3-1/8" D.



U3817 REMOTE HEADSET STATION (use with H7042 Headset only)

Expands the system beyond the master station. Contains one headset jack and listen level control, system input connector and two system output connectors. Provides a path for "daisy-chaining" to additional headset stations.

5-3/8" L x 4-1/4" W x 3" D.

Note: The U3813 Radio Interface Module and the U3817 Remote Headset Station are the only Series 3800 Modules that accept the H7042 Headset. The H7042 Headset is designed for use with certain older portable radios and requires a David Clark Company 7000 Series Adapter specific to the portable radio brand and model.

CORDS/ADAPTERS/ACCESSORIES



C3820 POWER CORD

Connects U3800 to power source, 20-foot, two-conductor shielded cable with two-socket MS connector. Power end has stripped and tinned conductors. Fuse Kit included.



C3821 RADIO CORD

Connects radios to radio interface module. 21-foot, six-conductor shielded cable with six-pin MS connector. Radio end has stripped and tinned conductors.



C38-12, -25, -50, -75, -100 JUMPER CORDS

Connects modules and U3800. Four-conductor shielded cable with four-pin MS connectors on each end. (Number after dash indicates length in feet.)



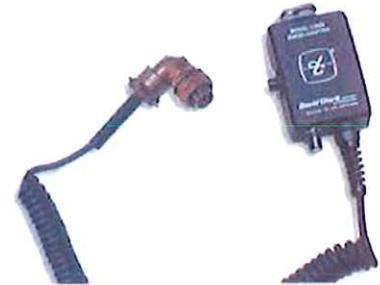
C3019 UTILITY RADIO ADAPTER

Provides interface between any David Clark Series 3000 Noise-attenuating Headset and most mobile radios. Ideal for radio interface at the pump panel. Has radio PTT switch and listen level control. A 15-foot (extended) coil cord allows increased mobility.



18352G-16 CONNECTOR KIT

Accepts C3019 Utility Radio Adapter. Use as panel or bulkhead mount. A Protector Cap (13238P-01) is recommended. Six-conductor cable is available. (Order per foot - P/N 09271P-13.)



C3023 BELT STATION

Provides intercom and radio transmit capability. Has radio PTT switch and listen level control. May be used with U3814, U3815A, & U3816. A 15-foot (extended) coil cord allows increased mobility.



40071G-04 FOOTSWITCH

May be used with U3813, U3814, U3815, U3815A & U3816. (Option for Remote Push-to-Talk with Mobile Radios)



40107G-01 RADIO INTERFACE ADAPTER

Use if adapting to a Motorola Spectra, Syntor X9000, or Maratrac w/A7 heads. Mates with five-pin connector 09227P-81.



40666G-01 HEADSET ADAPTER

Allows 6000 and 4200 Series Headsets to be used with 3800 System Headset Stations. (Exception: do not use with U3813 or U3817).

SERIES 3400 HEADSETS

Over-the-head-style



MODEL H3432 HEADSET/MICROPHONE

Over-the-Head Style.

- Microphone: Noise-cancelling M-7A Electret (nominal 50 ohm).
- Boom: Hybrid boom assembly for precise microphone positioning.
- Rotates for left or right side placement.
- Earphone: Lightweight dynamic (nominal 300 ohm) wired in series.
- Cord: Shielded 4-conductor, 5' Coil.
- Plug: PJ-051.
- Microphone on/off button.
- NRR: 23dB.

Over-the-head-style



MODEL H3492 HEADSET/MICROPHONE

Single Ear.

- Microphone: Noise-cancelling M-7A Electret (nominal 50 ohm).
- Boom: Hybrid boom assembly for precise microphone positioning.
- Rotates for left or right side placement.
- Earphone: Lightweight dynamic (nominal 300 ohm) wired in series.
- Cord: Shielded 4-conductor, 5' Coil.
- Plug: PJ-051.
- Microphone on/off button.

Behind-the-head-style



MODEL H3442 HEADSET/MICROPHONE

Designed to be worn under helmets or safety caps.

- Microphone: Noise-cancelling M-7A Electret (nominal 50 ohm).
- Boom: Hybrid boom assembly for precise microphone positioning.
- Rotates for left or right side placement.
- Earphone: Lightweight dynamic (nominal 300 ohm) wired in series.
- Cord: Shielded 4-conductor, 5' Coil.
- Plug: PJ-051.
- Microphone on/off button.
- NRR: 23dB.

Behind-the-head-style



MODEL H3441 HEADSET/MICROPHONE

Single receiver, slotted dome. Designed to be worn under helmets or safety caps.

- Microphone: Noise-cancelling M-7A Electret (nominal 50 ohm).
- Boom: Hybrid boom assembly for precise microphone positioning.
- Rotates for left or right side placement.
- Earphone: Lightweight dynamic (nominal 300 ohm) wired in series.
- Cord: Shielded 4-conductor, 5' Coil.
- Plug: PJ-051.
- Microphone on/off button.

SERIES 6000 HEADSET

Behind-the-head-style



Other Styles Available

MODEL H6040 HEADSET/MICROPHONE

- Microphone: Noise-cancelling M-77 Electret.
- Boom: Full flex for precise microphone positioning. Can be positioned for left or right side microphone placement.
- Earphone: Lightweight dynamic (nominal 275 ohm) wired in parallel.
- Cord: Shielded 4-conductor, 36" straight.
- Plug: U-174/U.

NOTE: If a Series 6000 Headset is to be integrated into the 3800 System, an adapter, P/N 40666G-01, must be used. Not to be used with the U3817 Remote Headset Station or the U3813 Radio Interface Module.

SERIES 7000 HEADSET

Behind-the-head-style



Other Styles Available

MODEL H7042 HEADSET/MICROPHONE

Designed to be worn under helmets or safety caps.

- Microphone: Dynamic Noise-cancelling MI01/DC (nominal 7 ohm).
- Boom: Has three different adjustment points for perfect microphone placement. Can be rotated to position microphone on left or right side.
- Earphone: Lightweight dynamic (nominal 19 ohm) wired in parallel.
- Cord: Shielded 4-conductor, 5' Coil.
- Plug: U-174/U

NOTE: If a headset compatible with portable radios (Series 7000, low impedance) is to be integrated into the 3800 System, the U3817 Remote Headset Station and the U3813 Radio Interface Module are the only Series 3800 modules that accept LOW IMPEDANCE HEADSETS.

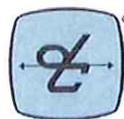
DAVID CLARK COMPANY...PROVIDING COMMUNICATION SOLUTIONS FOR HIGH-NOISE ENVIRONMENTS.



MARINE INTERCOM SYSTEMS

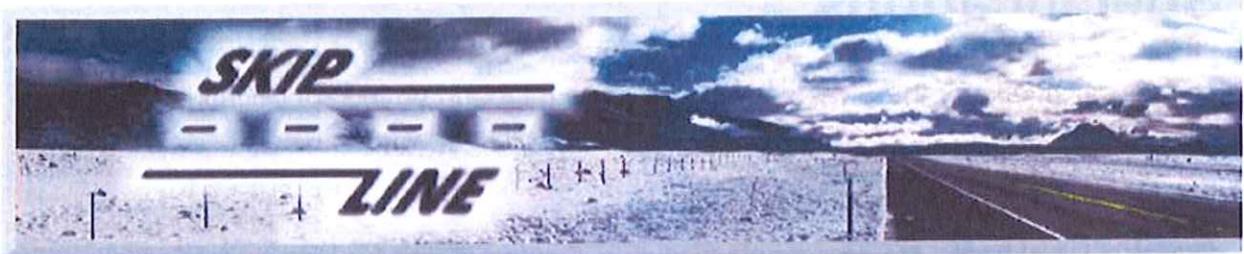


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SM-5 Speedometer

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[Options](#)

[Specifications](#)

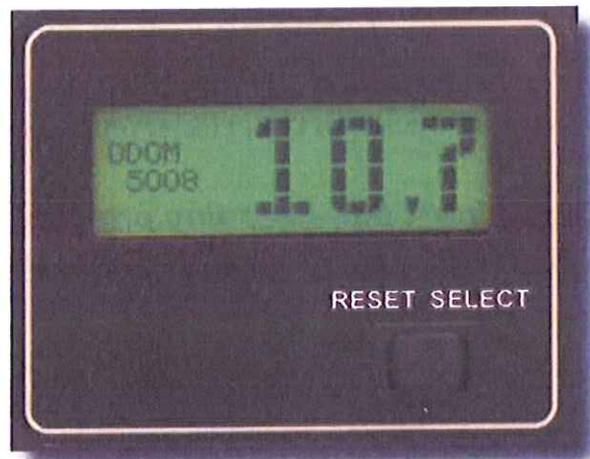
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[Training Materials](#)

[Distributors](#)

Overview

This speedometer is capable of showing truck speed to 1/10th MPH in large, daylight readable digits. It also displays counter channels, and allows the operator to reset any channel individually. This device requires only a single 6-conductor cable with RJ-11 (telephone style) jacks to connect it to any other serial device in the SM-5 system.



Options

The SM-5 speedometer does not have any available options. [Contact](#) Skip-Line for customization information.

EZ-LINER LIMITED WARRANTY

EZ-Liner warrants all equipment manufactured by it and bearing its brand names to be free from defects in material and workmanship at the time of sale by EZ-Liner or an authorized EZ-Liner distributor. EZ-Liner will for a period of twelve months from the date of sale, repair or replace any part of the equipment proven defective. Repair or replacement under this warranty shall be purchaser's sole remedy for breach of the warranty. Products furnished by but not manufactured by EZ-Liner (such as chassis, engines, compressor, etc.) will carry only the warranty of the original equipment manufacturer.

This warranty shall not apply if the product has been subject to misuse, negligence, accident or tampering or has not been operated in accordance with EZ-Liner's recommendations. This warranty does not cover and EZ-Liner shall not be liable for any damage, wear or malfunction caused by improper or inadequate maintenance, or substitution of components not supplied by EZ-Liner. Warranty does not apply to normal wear and tear due to equipment operation or to consumable replacement parts.

This warranty applies only to the original purchaser and only when the equipment is operated and maintained in accordance with EZ-Liner's written recommendations or instructions. Purchaser must, with transportation prepaid, return the equipment claimed to be defective to EZ-Liner for verification of the claimed defect. If the alleged defect is verified, EZ-Liner will, at EZ-Liner's option, repair or replace any defective parts. The equipment will be returned including prepayment of transportation charges to the original purchaser. Expedited fees will be paid by the customer if requested. If no defects in material and workmanship are found, repairs will be made by EZ-Liner at a reasonable charge. Charges may include the cost of parts, labor and freight.

EZ-LINER DISCLAIMS TO THE FULL EXTENT PERMITTED BY LAW ALL WARRANTIES, EXPRESSED OR IMPLIED INCLUDING ANY WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND ANY NON CONTRACTUAL LIABILITIES INCLUDING PRODUCT LIABILITY BASED ON NEGLIGENCE OR STRICT LIABILITIES. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION OF THE FACE HEREOF.

Every form of liability is expressly excluded and denied for direct, indirect, special or consequential damages or loss. The warranty shall be in lieu of any other warranty expressed or implied. The terms of this warranty constitute purchaser's sole and exclusive remedy. In no case shall EZ-Liner liability exceed the amount of the purchase price. Any action for breach of warranty must be brought within one (1) year of the date of sale or in service date.

The following list is intended to act only as an example of these warranties, which are subject to change without notice but may not be limited to only the following:

- ❖ Industrial/Commercial engines carry a one year limited warranty
- ❖ Air compressors carry a one year limited warranty
- ❖ ASME pressure pots are pressure tested, certified and carry a one year limited warranty
- ❖ Bead guns carry a one year limited warranty
- ❖ Hydraulic pumps carry a one year warranty
- ❖ Paint pumps carry a one year limited warranty
- ❖ Paint guns carry a one year limited warranty
- ❖ Air solenoids carry a one year warranty
- ❖ Electronic controllers carry a one year limited warranty

For a list of wearable items, see AD-0002-DOC – EZ-Liner Warranty-Wearable Parts.

EZ Liner Paint Truck Reference List

- Minnesota State DOT
Brad Lechtenberg Ph: 651-366-3584
E-mail: brad.lechtenberg@state.mn.us
- Iowa State DOT
Tim Nordholm Ph: 515-239-1607
E-mail: timothy.nordholm@dot.state.ia.us
- Idaho State DOT
Steve Spoor Ph: 208-334-8413
E-mail: steve.spoor@itd.idaho.gov
- Wyoming State DOT
Bernie Kushnir or Ron Koehn Ph: 307-777-4392 or 777-4061
E-mail: bernie.kushnir@dot.state.wy.us
- South Dakota State DOT
Clark Guthrie Ph: 605-773-5585
E-mail: clark.guthrie@state.sd.us
- Oklahoma DOT
Brad Faust Ph: 580-332-1526
E-mail: bfaust@odot.org
- Tulsa County, Oklahoma
Darrel Hicks Ph: 918-591-6094
E-mail: dhicks@tulsacounty.org
- City of Odessa, Texas
Hal Feldman Ph: 432-335-3239
E-mail: hfeldman@ci.odessa.tx.us
- Marin County, California
Steve Soldavini Ph: 415-446-4422
E-mail: ssoldavini@co.marin.ca.us
- Reno Tahoe Airport, Nevada
Scott Harkema Ph: 775-328-6541
E-mail: sharkema@renoairport.com

- Washoe County, Nevada
Dave Gonzales or Eric Ph: 775-328-2188
E-mail: dgonzales@washoecounty.us
- Los Angeles County, California
Dave Friar Ph: 626-458-1700
- Santa Clara County, California
Shane Gore Ph: 408-494-1307
- City of Tempe, Arizona
Isaac Chavira Ph: 480-350-8349
E-mail: Isaac_chavira@tempe.gov
- Denver International Airport, Colorado
Ray Moreno Ph: 303-342-2972
E-mail: ray.moreno@flydenver.com
- Arapahoe County, Colorado
Jim Katzer Ph: 720-874-6837
E-mail: jkatzer@co.arapahoe.co.us
- Calgary Airport, Alberta, Canada
Jim Lightfoot Ph: 404-735-1416
E-mail: jimli@yyc.com

More references available upon request