ProMinent[®]

Operating Instructions ProMinent[®] ProMus Series Metering Pumps

ProMus: Rev #6 - NA 6/30/06



Please enter identity code of the device here

Two sets of operating instructions are required for the safe and correct operation of ProMinent[®] ProMus metering pumps:

This product-specific ProMus operating instructions manual and the "General operating instructions ProMinent® motor-driven metering pumps and hydraulic accessories". Each is valid only when used in conjunction with the other.

Please completely read through these operating instructions first! Do not discard! The warranty shall be invalidated by damage caused by operating errors!

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Publishing details:

Operating Instructions **ProMinent® ProMus Series** Metering Pumps © ProMinent Fluid Controls, Inc. (USA) © ProMinent Fluid Controls Ltd. (Canada)

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Product Identification / Identity Code

Please enter the identity code given on the device label into the grey boxes below.

Series:	
PROMUS1	

		Pump v	ersion:								
17A Size 17 liquid end with 3/8" Plunger 17B Size 17 liquid end with 7/16" Plunger 30A Size 30 liquid end with 5/8" Plunger 30B Size 30 liquid end with 13/16" Plunger 30C Size 30 liquid end with 11/16" Plunger 30C Size 30 liquid end with 1-1/8" Plunger 30C Size 40 liquid end with 1-1/8" Plunger 40A Size 40 liquid end with 2" Plunger											
	40B 40C	Size 40 Size 40	ize 40 liquid end with 2" Plunger ize 40 liquid end with 2-1/4" Plunger								
	1 end material: tainless steel Single ball check tainless steel Double ball check (*Needed for applications above 500 psi) t. steel Single inlet, double outlet (Recommended for Flooded suction w/ discharge pressure above 500 psi) lloy C Single ball check lloy C Double ball check lloy C Single inlet, double outlet (Recommended for Flooded suction with discharge pressure above 500 psi) 20 single ball check 20 Double ball check 20 Single inlet, double outlet (Recommended for Flooded suction with discharge pressure above 500 psi) 20 Single inlet, double outlet (Recommended for Flooded suction with discharge pressure above 500 psi) 20 Single inlet, double outlet (Recommended for Flooded suction with discharge pressure above 500 psi) 20 Single inlet, double outlet (Recommended for Flooded suction with discharge pressure above 500 psi) 20 Single inlet, double outlet (Recommended for Flooded suction with discharge pressure above 500 psi)										
	Connectors: 0 Standard (In accordance with technical data) 1 BSP taper							nical data)			
				01 02 03 04 05 06 07 08 09	Gea 12.£ 15:1 30:* 40:* 50:* 12.£ 15:1 30:* 40:*	ar rati 5:1 56 1 56C 1 56C 1 56C 1 56C 1 56C 1 56C 5:1 IE 1 IEC 1 IEC 1 IEC 1 IEC	C (IEC (IEC 7 (IEC 7 (IEC 7 (IEC 7 Iotor: o moto	71 wit 1 with 1 with 1 with r inclue	n B5 35 fla B5 fla B5 fla	flange) ange) ange)	
					D	0	/2 HP T Ba Sta	EFC S	stand	ard Motor	
							1 7	Str Ma Exj	oke a nual plosic	adjustment: stroke adjustment n proof stroke position motor (Nema 7)	
								A B C D E F G H I J K L M N		Internal relief valve: 3500 psi/size 17 2080 psi/size 17 1230 psi/size 17 300 psi/size 17 2080 psi/size 17 2080 psi/size 30 1230 psi/size 30 265 psi/sizes 30 & 40 200 psi/sizes 30 & 40 160 psi (30B,C & 40) 230 psi/size 17 230 psi/size 30 230 psi/size 40	

General User Instructions

Please read through the following user instructions! They will enable you to gain the maximum benefit from the operating instructions manual.

The following items are particularly highlighted in the text:

- Enumerated points
- Highlighted points

Operating instructions:

NOTE

Guidelines are intended to make your work easier.

Safety Guidelines:



WARNING

Describes a potentially dangerous situation. If not avoided, could jeopardize life and/or cause serious injury.



CAUTION

Describes a potentially dangerous situation. If not avoided, could result in lesser injuries or damage to property.



IMPORTANT

Describes a potentially damaging situation. If not avoided, could result in damage to property.

Observe also the instructions in the "General operating instructions manual for ProMinent[®] motor-driven metering pumps and hydraulic accessories"

In the event of complaint or a request for spare parts, quote the identity code and the serial number which you will find on the device label. This will enable clear identification of the pump type and material variant.

Only Explosion-proof Pumps:

The device label attached to the title page is identical to that supplied with the pump in order to facilitate selecting the correct operating instructions manual for the pump.

1. About This Pump

The ProMinent ProMus is a metering pump using a flat, hydraulically actuated Teflon diaphragm. A typical pump assembly includes an electric motor, gear case, hydraulic unit, and liquid end. An oil replenishment valve and poppet relief value maintain fluid volume in the hydraulic piston to transfer reciprocating motion to the diaphragm. A locking stroke adjuster limits piston movement to control flow rates from 0% to 100% in 1% increments for metering fluids into most process systems.

ProMus pumps comply with API 675 performance standards and achieves different pumping capacities by using 5 different gear ratios and 8 different hydraulic piston diameters. Liquid ends are fabricated with Stainless Steel, Alloy 20, or Hastelloy C.

2. Safety

Correct Use Of The Pump

- Use the ProMus pump only for metering fluids. Gases, fluids containing dissolved gases, or solid particles may destroy the pump or reduce its performance.
- The pump must not be operated in hazardous areas unless motor, electric stroke control and any other electrical components and wiring comply with the National Electric Code and other applicable codes. Refer to articles 500 through 510 of the National Electric Code for requirements to prevent fire or explosion caused by flammable gases or vapors, flammable liquids, combustible dust, or ignitable fibers or flyings.
- This operating manual and an accompanying manual "General Operating Instructions for ProMinent Metering Pumps and Hydraulic Accessories" contain the necessary information for the assembly of hydraulic system components, installation, and maintenance of ProMus pumps.
- Only properly trained and authorized personnel should operate this pump.



Correct Use Of The Internal Pressure Relief Valve

Do not use the pump's internal relief valve to protect discharge lines from overpressure. The pump's internal pressure relief valve is designed to protect pump components and may have setting that exceed safe pressures for the piping system. Install a separate external relief valve to protect the fluid system from over pressure caused by blockage of the meter fluid.v

After internal relief valve pressure setting has been exceeded, the pump will require time to balance pressure and pump to volume. To avoid this an external pressure relief valve is required.

Periodically inspect the breather vent of the pump. If spillage occurs from this area immediately turn off the pump. Spillage from this area is usually an indication of a ruptured diaphragm. (Spillage from this area could also be the result of overfilling of the hydraulic oil if the oil level plug is not removed when oil is added). If the diaphragm is ruptured, the chemical being pumped and the hydraulic oil will mix. Some hydraulic oil will be introduced to the chemical being pumped and delivered to the final destination of the pumped chemical. Likewise pumped chemical will slowly enter the gearbox and mix with the hydraulic oil. If the pump continues to run the level of the oil/pumped chemical will slowly rise in the gearbox. If the pump is not turned off, this mixture will exit the breather vent and spill on the surroundings. If the chemical being pumped and Remove the pump from service using all appropriate safety precautions outlined in this manual. Inspect and clean the pump replacing the ruptured diaphragm if the pump internals are not damaged using the procedure outlined in the maintenance section of this manual.

Safety Guidelines



WARNING

- Because the pump operates whenever the motor is energized, always take precautions to avoid personal injury or hazards from unexpected startup of the motor.
- · Lock out pump motor before performing any maintenance on pump or pump system.
- Lockout the pump motor following a power failure, if such interuptions in pump function would create a hazard or cause damage to components.
- Periodically inspect for chemical leaks. Because this pump and its discharge operate continually under high pressure, system leaks may develop over time.
- Always de-pressurize the liquid end before performing any maintenance on the pump or system.
- Always empty and rinse pump liquid end before maintenance activities.
- Always wear appropriate protective equipment with performing pump maintenance.
- Keep pump accessible at all times for necessary operating and maintenance activities.
- Do not return pumps to ProMinent that have been used for radioactive chemicals.



CAUTION

- Use only components manufactured by Prominent for assembly, installation, or repair to avoid damage to pump components or personal injury.
- Before metering corrosive liquids, check compatibility in our resistance guide. (See the last catalog or www.prominent.us)
- The installation, operation and maintenance of ProMinent pumps may be subject to regulations set by state and federal agencies depending upon environmental conditions and the fluid being handled. See the list of regulations agencies at the end of this document or consult your safety professional.

3 Storage, Transport And Unpacking

3.1 Storage

- Prepare the pump for storage by flushing all chemicals from the liquid end and replacing the oil breather cap (orange) with the shipping plug (no color specified).
- Store in original shipping container if possible.
- Store pump in upright position in a dry, dust-free environment.

3.2 Transport

- Replace oil breather cap (orange) with shipping plug (no color specified) for transit.
- Transport in original container or container that will keep pump upright.

3.3 Unpacking

- Inspect package before unpacking. If package is found to be damaged, notify shipping company immediately
- After unpacking, mount pump on a secure, level surface.
- Save the shipping plug (no color specified) and shipping container for possible future storage or transit.

4 Functional description

General Description

The Prominent ProMus is a motor-driven metering pump incorporating a hydraulically balanced diaphragm. Pump energy comes from an electric motor that drives a worm gear in a cast iron drive case to rotate a cam. The cam gives linear motion to plunger hydraulically linked to the Teflon' Diaphragm. Movement of the plunger is controlled with a locking stroke adjuster to vary pump capacity from 0% to 100%. Pressures across the flat diaphragm, which separates hydraulic fluid from metered liquids, are balanced by a replenishment valve and a simple internal relief value. The replenishment valve adds fluids when needed, and the relief value continually circulates hydraulic fluid through the pump, removes of gases from hydraulic fluids, and limits hydraulic pressure.

Major Pump Components

The pump has four major components: driver, stroke adjuster, hydraulic system and liquid end

The Driver Component

The drive case includes an electric motor that is coupled to a hardened steel and bronze worm gear assembly to create rotational speeds needed for the cam. The cam is an eccentric needle cage-and-roller assembly that creates reciprocating motion and minimizes wear and heat at the cam-plunger interface. The cast iron case supports the worm gear, cam shaft and cam assembly and doubles as an reservoir for the hydraulic oil, which also serves as a lubricant for bearing and gears. A suction strainer within the drive case removes particulate from the oil before it enters the hydraulic system. The drive case also includes a sight tube for monitoring oil flow from the internal relief valve and an air bleed valve.

The Stroke Adjuster Component

The stroke adjuster controls pump output by altering the length of plunger stroke. The adjuster is a threaded rod that functions as stop to limit plunger movement on return strokes from 0% to 100% of cam movement. Position of the adjuster can be measured in 1% increments using a numerical scales stamped on the pump housing and 10-turn adjuster knob. A thumbscrew locks settings of the stroke adjuster knob.

Electrical stroke adjusters with 4 to 20mA output are available for remote control of flows in NEMA 4 and NEMA 7 environments.

The Hydraulic System Component

The hydraulic system consists of a fluid reservoir, a hydraulic piston and subassemblies that control and condition the fluid. The piston is composed of a plunger, return spring, and Teflon diaphragm, which also isolates hydraulic fluids from process fluids. An internal pressure relief/air bleed valve and oil replenishment check value remove entrained air and balance the pressure in the piston with pressures in the metered fluid. The system continuously cycles fresh oil through an oil replacement value and check valve.

Internal Pressure Relief / Air Bleed Valve

The sole purpose for the adjustable pressure relief value is to protect drive components from damage caused by excessive pressures. To protect the system from overpressure an external pressure relief valve must be used. The valve contains a spring whose tension can be adjusted to select the pressure at which the poppet lifts from its seal and allows oil to return to the reservoir. The air bleed valve contains two opposing ball check valves that serve the purposes of removing air entrained in the hydraulic fluid and allowing a small amount of fluid to circulate through the system. The air bleed valve is located at the highest point in the hydraulic system where air would normally accumulate. After internal relief valve pressure setting has been exceeded, the pump will require time to balance pressure and pump to volume. To avoid this an external pressure relief valve is required.

Oil Replenishment Valve

The replenishment valve replaces oil lost through the air bleed value and maintains the consistent volume of fluid needed for metering accuracy. The valve is opened by the diaphragm when the volume of oil is low.

Replenishment Check Valve

Located on the inlet of the hydraulic system, the replenishment check valve prevents back flow of hydraulic fluid during pumping strokes.

The Liquid End Component

All pump sizes are available in 316 SS, Alloy 20, Hastelloy and PVT in single ball. Size 17 and Size 30 metallic pumps are available with double ball configurations



























5 Device Overview / Control Elements

6 Assembly

The ProMus pump is shipped complete from ProMinent and no assembly is required. A shipping plug must be removed from the oil fill/breather vent hole and replaced with the supplied orange breather vent plug.

If the pump was ordered without a liquid end, proceed to Changing the diaphragm located in the Maintenance section of this manual.

The pump must be mounted on a level, even, and stable surface using four 3/8" diameter bolts through holes in the pump base.

7 Installation



WARNING

Observe the guidelines "General operating instructions for ProMinent metering pumps and hydraulic accessories", found in the operating instructions manual, particularly when pump applications are classified as hazardous.

7.1 Installation, Hydraulic



WARNING

- Hazardous locations: Install an external pressure relief valve downstream from the liquid end to avoid potential hazards caused by blockage in the discharge line. In some environments, heat generated by excessive fluid passing through the internal relief value may cause temperatures of the cast iron housing to reach dangerous levels.
- If the pump is to be used with chemicals that are reactive with water, be sure to remove any
 residue that may remain from factory testing. Feed low-pressure compressed air through the
 suction valve to purge water from the liquid end.



IMPORTANT

For chemicals with a particle size greater than 0.01 in. (0.3 mm), install a strainer in the suction line.

NOTE

If the metering pump discharges to atmospheric pressure, install a backpressure valve to create a minimum backpressure of approximately 22 PSI (1.5 bar).

Maximum admissible priming pressure (suction side): 14.5 PSI (1 bar).

Viscosity limits maximum 200 mPa-s (200 cP).

7.2 Installation, Electrical



WARNING

- Articles 500 through 510 of the National Electric Code cover the requirements for electrical equipment and wiring when flammable gases or vapors, flammable liquids, combustible dust, ignitable fibers, or flying may create fire or explosion hazards.
- For safe operation in hazardous environments, all electrical components, including motor, electric stroke control and other devices must be rated for hazardous areas as described in the National Electric Code.



IMPORTANT

Motor

- Read the "General Operating Instructions ProMinent Motor-Driven Metering Pumps and Hydraulic Accessories" which accompanies this manual, for placement of accessory items.
- Connect the motor using the information provided on the motor nameplate. Motor rotation should be counter clockwise looking down on motor (fan end). Also, read and follow additional instructions in manuals provided with the motor.
- For pumps with an electric stroke adjuster, follow any supplemental instructions provided for making electrical connections and operating the unit.

8 Commissioning



WARNING

Hazardous locations: when installing the metering pump in areas with potentials for explosion, observe related directives for installation covered the National Electric Code Articles 500 through 510.



IMPORTANT

Before beginning startup procedures:

- Check the breather vent has been installed. The pump is shipped with a plug on the breather vent and the cavity filled with oil, which must be removed prior to installation.
- Check that pump capabilities are not exceeded when metering highly viscous or dense chemicals.
- Check that liquid end materials are chemically resistant to the metered fluid (see the resistance list on line at www.prominent.us or the latest catalog)

Venting The Liquid End To Prime The Pump

Priming the pump may require venting the discharge line to atmospheric pressure to purge air from the liquid end and fill cavities with metered fluid before applying high pressure.

Promus Pump Startup Guide

TO BE USED FOR INITIAL INSTALLATION



WARNING

- · Always wear appropriate protective equipment when working with hazardous chemicals.
- Detach the discharge line or use a separate priming valve that discharges to atmospheric pressure.
- Energize the pump and allow it to run until the metered fluid appears on the discharge side of the liquid end.
- Re-attach the discharge line or close priming valve.
- Pump is now ready for normal operation.

9 Operation

Pump output can be adjusted using a mechanical or electronic stroke adjuster mounted on the pump.

Pump output can also be adjusted by stroke frequency, if the pump is supplied with a variable speed motor. If such is the case, follow manufacturer's instructions for the motor drive.

10 Maintenance



WARNING

- Always wear appropriate protective equipment when working with hazardous chemicals.
- Always de-pressurize the liquid end before undertaking maintenance on the pump or pump system.
- Only trained and authorized personnel should maintain and repair pumps and accessories.
- Follow lockout procedures to prevent unauthorized personnel from energizing pumps during maintenance.
- Hazardous locations: Additional safety regulations and procedures may apply for pumps in areas classified as hazardous.

NOTE

• Keep a set of spare parts in stock for maintenance work on each liquid end.

Maintenance tasks

Initial Three Months

- A shorter maintenance interval may be required for systems under heavy load (e.g. continuous operation, high system pressures, or abrasive media).
- Check torque of the liquid end bolts and re-torque if necessary.

Metallic Liquid end 1/2" Bolts:90-120 ft.lbs (149-163 N m)

Plastic Liquid end 1/2" Bolts:20-30 ft.lbs (27-41 N m)

Metallic Liquid end 5/16" Bolts:35 ft.lbs (47 N m)

Plastic Liquid end 5/16" Bolts:20 ft.lbs (27 N m)

Check discharge and suction valves for chemical leakage

- Check system accessories for correct operation and related connections and fittings for chemical leakage.
- Check the oil level in the pump drive case.
- Check pump feed rate using calibration column if available. Changes in feed rate indicate the need for pump maintenance or system problems.

After Approximately 5000 Operating Hours:

Change the hydraulic oil.

WARNING

Hot hydraulic oil presents a risk of burning. Avoid contact with draining oil. Gear oil: Mobilube 1 SHC 70W-90, or equal ProMinent part #1005823 Oil quantity: 1.5 quarts (1.42 I)

Changing The Hydraulic Oil:

- 1. Remove the breather vent.
- 2. Place an oil disposal container under the drain plug.
- 3. Unscrew the drain plug.
- 4. Drain the oil from the drivecase.
- 5. Remove the oil level plug
- 6. Replace the drain plug
- 7. Refill with oil until the oil overflows the bottom of the oil level hole
 - Gear oil: ProMinent part #1005823 or Mobilube 1 SHC 70W-90
 - Oil quantity: 1.5 quarts (1.42 l)
- 8. Replace the oil level plug
- 9. Replace the breather vent

After Approximately 10,000 Operating Hours:

Change the diaphragm. Useful life of the diaphragm may vary depending upon system backpressure, operating temperatures, stroke length and frequency, and pump chemical characteristics.

Changing The Diaphragm:

Change the diaphragm as follows

- 1. Disconnect the inlet and outlet piping from the pump
- 2. Remove the vent.
- 3. Place an oil disposal container under the drain plug.
- 4. Unscrew the drain plug.
- 5. Drain the oil from the drivecase.
- 6. Place an oil container under the liquid end
- 7. Loosen the liquid end bolts.
- 8. Allow the oil to drain from the plunger body.
- 9. Remove the liquid end.
- 10. Remove the old diaphragm and discard.
- 11. Loosen the relief valve adjusting screw counting the number of turns
- 12. Record the number of turns to remove the adjusting screw.
- 13. Remove the relief valve poppet

- 14. Insert the new diaphragm in the counterbore of the liquid end.
- 15. Reinstall the liquid end taking care that the diaphragm stays in the counterbore
- 16. Tighten the liquid end bolts to the specified torque.
- 17. Replace the oil drain plug
- 18. Refill with oil until the oil just overflows the bottom of the oil level hole.
- 19. Replace the oil level plug
- 20. Replace the breather vent

Prime the hydraulic system as follows

- 1. Slowly add oil to the relief valve threaded hole while running the pump to purge the air from the hydraulic system.
- 2. Turn the pump off
- 3. Reinstall the spring and poppet.
- 4. Reinstall the relief valve adjusting screw to it's original position counting the number of recorded turns above
- 5. Reconnect the pump to the process piping
- 6. Check the oil level in the drivecase and add oil if necessary
- 7. Reprime the pump per the commissioning procedure
- 8. Check for proper operation by observing the "heartbeat" action of fluid in the sight tube for the relief/air bleed valve .



IMPORTANT

The diaphragm can never be reused once it is removed from the pump.

ProMus Pump Startup Guide

TO BE USED ONLY AFTER THE DIAPHRAGM HAS BEEN REMOVED OR CHANGED DURING MAINTENANCE. THIS PROCEDURE DOES NOT APPLY FOR NEW OR FACTORY REBUILT PUMPS.



CAUTION:

The pump must be primed before it is returned to service under system pressure. If the liquid end does not contain media when placed under pressure, damage to the diaphragm may occur.

- 1. Install high pressure piping and hoses on the suction and discharge sides of the pump.
- Reduce the pressure on the diaphragm to atmospheric pressure by adjusting the poppet relief valve. Remove the plug seal on the adjusting screw tower, and using a flathead screw drive, turn the poppet adjustment screw counterclockwise until there is no tension on the poppet valve spring.
- 3. Supply media through the suction line and flow media until all the air has been purged from the liquid end and discharge lines
- 4. Warning: Before proceeding further, check that the clear sight cover is tightly secured to the pump housing before starting the pump. The cover may be loosened by fluid percolating through the site tube when the system was depressurized.
- 5. Start the pump and use the following procedure to reset output pressure and pressure balance on the diaphragm:
 - a. Slowly apply backpressure on the discharge line.
 - b. Turn the poppet adjusting screw clockwise (tighten) until return flow in the sight tube

slows to a pulse. Advance the screw 1/2 turn

- c Increase backpressure on the discharge line until the relief valve lifts.
- d. Repeat steps b and c until the desired discharge pressure is achieved. At that pressure set the adjusting screw within ±1/2 turn of stopping the flow.
- 6. Allow the pump to run for an hour to allow the air relief valve and diaphragm to flex. If a increased flow becomes apparent in the sight tube, tighten the adjustment screw no more than 1/2 additional turn.
- 7 Insert the plug seal back on the adjusting screw tower.

11 Troubleshooting



WARNING

- · Always wear appropriate protective equipment when working with hazardous chemicals
- Always depressurize the suction and discharge lines before working on the pump.
- Always empty and rinse the liquid end before maintenance and repair work!

Pump Fails To Meter Liquid To Pump Specification

or

Pump Does Not Prime Despite Full Stroke Action And Venting

Cause:	Valves dirty or worn
Remedy:	Overhaul valves (see "Overhaul valves", "Repair" section)
Cause:	Internal relief valve open
Remedy:	Unscrew knurled screw in bypass valve
Cause:	Internal relief valve heavily worn as discharge line blocked or constricted
Remedy:	Replace bypass valve and remove blockage from discharge line
Cause:	Hydraulic oil low
Remedy:	Add hydraulic oil until oil level has reached inspection port on the side of the pump housing (see "Replace Diaphragm":, "Maintenance" section)
Cause:	Electrical connections to motor
Remedy:	1. Verify voltage and frequency
	2. Check motor connections

Power End Motor Very Hot

Cause:	Discharge line greatly constricted
Remedy:	1. Remove blockage from discharge line
	2. Check bypass valve

12 Decommissioning And Disposal

Decommissioning



WARNING

- Always wear appropriate protective equipment when working with hazardous chemicals
- Before working on any pump, disconnect electrical power sources and lockout or tagout switches that could accidentally energize the motor.
- Always depressurize the suction and discharge lines before working on the pump.
- · Risk of burning by hot hydraulic oil. Avoid contact with draining oil until housing is cool.
- When decommissioning pump, clean housing and liquid end thoroughly to remove all dirt and chemicals.

Final Decommissioning

- Disconnect pump from power supply
- Rinse the liquid end with a suitable cleaning agent, and clean thoroughly if the pump has been used with hazardous materials
- Drain hydraulic oil.

Temporary Decommissioning

- Disconnect pump from power supply
- Rinse the liquid end with a suitable cleaning agent, clean thoroughly if the pump has been used with hazardous materials
- Drain hydraulic oil.
- Place valve covers on valves
- Place the pump on a pallet if possible
- · Store the pump in a dry enclosed area indoors under ambient conditions

Storage temperature: 15 °F (-10 °C) to 125 °F (52 °C)

Air humidity: max. 95%, non-condensing

Disposal



Observe all current local, state/provincial and federal directives that apply to disposal of pumps, pump components, and waste products. Give particular attention to waste oils and electronic materials.

13 Technical Data

Priming Lift

The priming lift is 5 feet (1.5 m). (Determined for 68 °F (20 °C) water with liquid end and suction line empty and clean moistened valves.)

Suction Lift

The suction lift is 7.5 feet (2.3m) (Determined for 68 °F (20 °C) water with liquid end and suction line filled and a suction line with adequate cross section.)

Priming Pressure

The maximum allowable priming pressure is 14.5 psi (1 bar)

Internal Hydraulic Pressure Relief Valve

The internal relief valve is set to 10% over the pressures listed in the following chart.

ASTM A276 Type 316

Pump Accuracy

Steady state flow accuracy is +/- 1% over a turndown ratio of 10:1

The flow repeatability is +/- 3% over the specified turn down ratio.

Deviation from linearity does not exceed +/- 3% of the rated flow over the $\$ specified turn down ratio

Viscosity

Viscosity limit without valve 200 mPa-s (200 cP)

Liquid End Materials of Construction

Stainless Steel Hastelloy C Alloy 20 PVT

Hydraulic Oil

Type Quantity Mobilube SHC 75w-90 Prominent Part Number 1005823 1.5 Quart (1.42 I)

Temperature Range

Storage	15 °F (-10 °C) to 125 °F (52 °C
Operating	15 °F (-10 °C) to 105 °F (40 °C

Maximum Pumped Fluid Temperature

Maximum Pumped Fluid Temperature (Metallic Liquid Ends Only)

Continous 195F (90C)

Intermitent 250F (121C)

Maximum Pumped Fluid Temperature (Plastic Liquid Ends)

Continuous 95F (35C)

Environmental

Permissible air humidity 95% non- condensing

Chemical Resistance

See our latest product catalog or www.prominent.us.

Applicable Standards

API 675 (built in accordance to API 675 standards) National Fire Protection Association (NFPA) National Electric Manufactures Association (NEMA) Occupational Safety and Health Administration (OSHA)

	Mettalic Liquid Ends Only									
	At 60 Hz (1750rpm) Capacity at Max. Backpressure			Gear Ratio	Max Stroke Rate	At 50 Hz (1458 rpm) Capacity at Max. Backpressure				Typical suct./dis. Connectior
Plunger (in.)	psig	U.S. GPH	l/h		Stroke min.	/ U.S. GPH	l/h	Stroke/ min.	Max bar	MNPT
3/8" Plunger	3500	0.61	2.3	50	35	*	*	*	*	
3/8" Plunger	3500	0.76	2.8	40	43	0.63	2.45	36	241	1/4
3/8" Plunger	3500	1.02	3.8	30	58	0.85	3.29	48	241	1/4
3/8" Plunger	3500	2.03	7.6	15	115	1.69	6.56	96	241	1/4
3/8" Plunger	3500	2.44	9.2	12.5	138	2.03	7.88	115	241	1/4
7/16" Plunger	3500	0.83	3.1	50	35	*	*	*	*	
7/16" Plunger	3500	1.04	3.9	40	43	0.87	3.36	36	241	1/4
7/16" Plunger	3500	1.38	5.2	30	58	.15	4.46	48	241	1/4
7/16" Plunger	3500	2.77	10.4	15	115	2.31	8.94	96	241	1/4
7/16" Plunger	3500	3.32	12.5	12.5	138	2.77	10.72	115	241	1/4
5/8" Plunger	2080	1.8	6.8	50	35	*	*	*	*	
5/8" Plunger	2080	2.25	8.5	40	43	1.87	7.26	36	143	1/4
5/8" Plunger	2080	3	11.3	30	58	2.5	9.68	48	143	1/4
5/8" Plunger	2080	6	22.7	15	115	5	19.37	96	143	1/4
5/8" Plunger	2080	7.2	27.2	12.5	138	6	23.24	115	143	1/4
13/16" Plunger	1230	3.04	11.5	50	35	*	*	*	*	
13/16" Plunger	1230	3.8	14.3	40	43	3.17	12.27	36	85	3/8
13/16" Plunger	1230	5.07	19.1	30	58	4.22	16.37	48	85	3/8
13/16" Plunger	1230	10.1	38.2	15	115	8.45	32.73	96	85	3/8
13/16" Plunger	1230	12.2	46.1	12.5	138	10.14	39.28	115	85	3/8
1-1/8" Plunger	640	6.34	24	50	35	*	*	*	*	3/8
1-1/8" Plunger	640	7.93	30	40	43	6 61	25.61	36	44	3/8
1-1/8" Plunger	640	10.6	40.1	30	58	8 81	34 14	48	44	3/8
1-1/8" Plunger	640	21.1	79.8	15	115	17.62	68 29	96	44	3/8
1-1/8" Plunger	640	25.4	96.1	12 5	138	21.15	81.95	115	11	3/8
1_3//" Plunger	265	15 /	58.2	50	35	*	*	*	*	0/0
1-3/4" Plunger	265	19.4	72.6	40	43	15 99	61 97	36	18	3/4
1 3/4" Plunger	265	25.6	06.0	30	59	01 22	82.62	49	10	3/4
1 3/4" Plunger	205	51.0	102.9	15	115	42.64	165.02	40	10	3/4
1 2/4" Plunger	205	61.4	020.4	10.5	120	51 17	109.24	115	10	2/4
1-3/4 Fluriger	205	01.4	202.4	12.5	130	*	190.29	*	10	3/4
2 Plunger	200	20.1	76	50	30	00.00	00.04	00	14	0/4
2" Plunger	200	25.1	95	40	43	20.89	80.94	30	14	3/4
2 Plunger	200	33.4	126.4	30	58	27.85	107.91	48	14	3/4
∠ Plunger	200	8.00	252.8	10 5	100	55./	215.83	90	14	3/4
	200	80.2	303.5	12.5	138	66.84	258.99	115	14	3/4
2-1/4" Plunger	160	25.4	96.1	50	35	*	*	*	*	21/
2-1/4" Plunger	160	31.7	119.9	40	43	26.43	102.43	36	11	3/4
2-1/4" Plunger	160	42.3	160.1	30	58	35.25	136.58	48	11	3/4
2-1/4" Plunger	160	84.6	327.8	15	115	70 49	273 16	96	11	3/4

138

84.59

327.79

115

11

Capacity Data

2-1/4" Plunger

160

101.5

384.2

12.5

3/4

Capacity Data

Plastic Liquid Ends Only

	At 60 H Capaci Backpr	At 60 Hz (1750rpm) Capacity at Max. Backpressure			Max Stroke Rate	At 50 Hz (1458 rpm) Capacity at Max. Backpressure				Typical suct./dis. Connection	
		U.S.			Stroke,	U.S.		Stroke/	Max		
Plunger (in.)	psig	GPH	l/h		min.	GPH	l/h	min.	bar	MNPT	
3/8" Plunger	232	0.61	2.3	50	35	*	*	*	*		
3/8" Plunger	232	0.76	2.8	40	43	0.63	2.45	36	16	1/4	
3/8" Plunger	232	1.02	3.8	30	58	0.85	3.29	48	16	1/4	
3/8" Plunger	232	2.03	7.6	15	115	1.69	6.56	96	16	1/4	
3/8" Plunger	232	2.44	9.2	12.5	138	2.03	7.88	115	16	1/4	
7/16" Plunger	232	0.83	3.1	50	35	*	*	*	*		
7/16" Plunger	232	1.04	3.9	40	43	0.87	3.36	36	16	1/4	
7/16" Plunger	232	1.38	5.2	30	58	1.15	4.46	48	16	1/4	
7/16" Plunger	232	2.77	10.4	15	115	2.31	8.94	96	16	1/4	
7/16" Plunger	232	3.32	12.5	12.5	138	2.77	10.72	115	16	1/4	
5/8" Plunger	232	1.8	6.8	50	35	*	*	*	*		
5/8" Plunger	232	2.25	8.5	40	43	1.87	7.26	36	16	1/2	
5/8" Plunger	232	3	11.3	30	58	2.5	9.68	48	16	1/2	
5/8" Plunger	232	6	22.7	15	115	5	19.37	96	16	1/2	
5/8" Plunger	232	7.2	27.2	12.5	138	6	23.24	115	16	1/2	
13/16" Plunger	232	3.04	11.5	50	35	*	*	*	*		
13/16" Plunger	232	3.8	14.3	40	43	3.17	12.27	36	16	1/2	
13/16" Plunger	232	5.07	19.1	30	58	4.22	16.37	48	16	1/2	
13/16" Plunger	232	10.1	38.2	15	115	8.45	32.73	96	16	1/2	
13/16" Plunger	232	12.2	46.1	12.5	138	10.14	39.28	115	16	1/2	
1-1/8" Plunger	232	6.34	24	50	35	*	*	*	*	1/2	
1-1/8" Plunger	232	7.93	30	40	43	6.61	25.61	36	16	1/2	
1-1/8" Plunger	232	10.6	40.1	30	58	8.81	34.14	48	16	1/2	
1-1/8" Plunger	232	21.1	79.8	15	115	17.62	68.29	96	16	1/2	
1-1/8" Plunger	232	25.4	96.1	12.5	138	21.15	81.95	115	16	1/2	
1-3/4" Plunger	232	15.4	58.2	50	35	*	*	*	*		
1-3/4" Plunger	232	19.2	72.6	40	43	15.99	61.97	36	16	3/4	
1-3/4" Plunger	232	25.6	96.9	30	58	21.32	82.62	48	16	3/4	
1-3/4" Plunger	232	51.2	193.8	15	115	42.64	165.24	96	16	3/4	
1-3/4" Plunger	232	61.4	232.4	12.5	138	51.17	198.29	115	16	3/4	
2" Plunger	200	20.1	76	50	35	*	*	*	*		
2" Plunger	200	25.1	95	40	43	20.89	80.94	36	14	3/4	
2" Plunger	200	33.4	126.4	30	58	27.85	107.91	48	14	3/4	
2" Plunger	200	66.8	252.8	15	115	55.7	215.83	96	14	3/4	
2" Plunger	200	80.2	303.5	12.5	138	66.84	258.99	115	14	3/4	
2-1/4" Plunger	160	25.4	96.1	50	35	*	*	*	*		
2-1/4" Plunger	160	31.7	119.9	40	43	26.43	102.43	36	11	3/4	
2-1/4" Plunger	160	42.3	160.1	30	58	35.25	136.58	48	11	3/4	
2-1/4" Plunger	160	84.6	327.8	15	115	70.49	273.16	96	11	3/4	
2 1/4" Plungor	160	101 5	201 2	10 5	120	01 50	207 70	115	44	2/4	



SIZE 17 SINGLE BALL LIQUID END P\N 853500

ltem Number	Quantity	Part Number	Title
1	1	853200	liquid end, size 17, 316 SST
2	3	853209	Seal, Check valve size 17, skive cut teflon
3	1	853203	SEAT, UPPER CHECK VALVE, SIZE 17
4	2	853211	BALL, 1/4 316 SST, SIZE 17
5	2	853208	guide, check valve ball, Size 17, 316 SST
6	2	853201	Pin, Ball Guide, Size 17, 1/8 dia. x 1/2 long, 316 SST
7	2	853202	Cap, Check Valve, Size 17, 316 SST
8	1	853210	Diaphragm, size 17, gylon Type 3522
9	1	853204	SEAT, LOWER CHECK VALVE, SIZE 17, 316 SST

LIQUID END SPARE PARTS KIT ORDER P\N 853503

SIZE 17 SINGLE BALL LIQUID END P\N 853500



SIZE 17 DOUBLE BALL LIQUID END P\N 853501

ltem Number	Quantity	Part Number	Title
1	1	853200	Liquid End, size 17, 316 SST
2	6	853209	SEAL, CHECK VALVE SIZE 17, SKIVE CUT TEFLON
3	2	853203	SEAT, UPPER CHECK VALVE, SIZE 17
4	2	853202	CAP, CHECK VALVE, SIZE 17, 316 SST
6	4	853211	BALL, 1/4 316 SST, SIZE 17
7	1	853206	Cap, Upper, Double Ball, Size 17, 316 SST
9	1	853210	Diaphragm, size 17, gylon Type 3522
10	4	853208	guide, check valve ball, Size 17, 316 SST
11	4	853201	pin, Ball Guide, Size 17, 1/8 dia. x 1/2 long, 316 SST
12	2	853204	SEAT, LOWER CHECK VALVE, SIZE 17, 316 SST
13	1	853207	Cap, Lower, Double Ball, Size 17, 316 SST

LIQUID END SPARE PARTS KIT ORDER P\N 853504

SIZE 17 DOUBLE BALL LIQUID END P\N 853501



ltem Number	Quantity	Part Number	Title
1	1	854203	Liquid End, Size 30, 316 Sst
2	3	854210	SEAL, CHECK VALVE SIZE 30, TEFLON
3	1	854207	SEAT,UPPER CHECK VALVE, SIZE 30, 316 SST
4	2	854205	guide, check valve ball, Size 30
5	2	854209	CAP, CHECK VALVE, SIZE 30, 316 SST
6	1	854201	Diaphragm, Size 30, Gylon Type 3522
7	1	854208	SEAT, LOWER CHECK VALVE, SIZE 30, 316 SST
8	2	854206	BALL, 7/16 316 SST, SIZE 30

LIQUID END SPARE PARTS KIT ORDER P\N 854501

SIZE 30 LIQUID END P\N 854500

SIZE 40 LIQUID END P\N 855500



Spare Parts and Accessories

ltem Number	Quantity	Part Number	Title
1	1	855200	liquid end, size 40, 316 SST
2	2	855208	guide, check valve ball, Size 40
3	2	855207	SEAL, CHECK VALVE SIZE 40, TEFLON
4	2	855205	CAP, CHECK VALVE, SIZE 40, 316 SST
5	2	855206	SEAT, CHECK VALVE, SIZE 40, 316 SST
6	2	855204	BALL, 3/4 316 SST, SIZE 40
7	1	855201	Diaphragm, size 40, gylon Type 3522

LIQUID END SPARE PARTS KIT ORDER P\N 855501

SIZE 40 LIQUID END P\N 855500

Spare Parts and Accessories

вом	Description	Extended Description
851763	Drivecase 56C Rebuild Kit	Rebuild Kit Drivecase 56c
851764	Drivecase IEC Rebuild Kit	Rebuild Kit Drivecase IEC
852751	Rebuild Kit Manual Stroke Adjuster	Rebuild Kit Manual Stroke Adjuster
852753	Nema 7 Electric Stroke Adjuster Reb/Kit	Rebuild Kit, Electric Stroke Adjuster Nema 7
853755	Sz 17 Hydraulics 3/8 Plunger Rebuild Kit	Sz 17 Hydraulics 3/8 Plunger Rebuild Kit
853756	Sz 17 Hydraulics 7/16 Plunger Rebuild Kit	Sz 17 Hydraulics 7/16 Plunger Rebuild Kit
854756	Sz 30 Hydraulics 5/8 Plunger Rebuild Kit	Rebuild Kit Size 30 Hydraulics 5/8 Plunger
854757	Sz 30 Hydraulics 13/16 Plunger Rebuild Kit	Rebuild Kit Size 30 Hydraulics 13/16 Plunger
854758	Sz 30 Hydraulics 1 1/8 Plunger Rebuild Kit	Rebuild Kit Size 30 Hydraulics 1 1/8 Plunger
855754	Sz 40 Hydraulics 1 3/4 Plunger Rebuild Kit	Rebuild Kit Size 40 Hydraulics 1 3/4 Plunger
855755	Sz 40 Hydraulics 2 Plunger Rebuild Kit	Rebuild Kit Size 40 Hydraulics 2 Plunger
855756	Sz 40 Hydraulics 2 1/4 Plunger Rebuild Kit	Rebuild Kit Size 40 Hydraulics 2 1/4 Plunger
853502	SP-Kit LE 17 SS	Rebuild Kit Liquid End Size 17 Single Ball 316SS
853503	SP- Kit LE 17 SS Dbl I/O	Rebuild Kit Liquid End Size 17 Double Ball 316SS
853505	SP-Kit LE 17 SS Dbl Out	Rebuild Kit Liquid End Size 17 Double Ball 316SS Out Only
853582	SP-Kit LE 17 A2	Rebuild Kit Liquid End Size 17 Single Ball Alloy 20
853583	SP-Kit LE 17 A2 Dbl I/O	Rebuild Kit, Liquid End, Size 17, Double Ball Alloy 20
853585	SP-Kit LE 17 A2 Dbl Out	Rebuild Kit, Liquid End, Size 17, Double Ball, Out Only, Alloy 20
853662	SP-Kit LE 17 HC	Rebuild Kit, Liquid End, Size 17, Single Ball, Hastelloy C-276
853663	SP-Kit LE 17 HC Dbl I/O	Rebuild Kit, Liquid End, Size 17, Double Ball, Hastelloy C-276
853665	SP-Kit LE 17 HC Dbl Out	Rebuild Liquid End Kit Size 17 Double Ball Out Only Hastelloy C-276
854501	SP-Kit LE 30 SS	Rebuild Kit Liquid End Size 30 Single Ball 316SS
854503	SP-Kit LE 30 SS Dbl I/O	Rebuild Kit, Liquid End, Size 30, Double Ball 30/30 In & Out, 316SS
854505	SP-Kit LE 30 SS Dbl O 30/17	Rebuild Kit, Liquid End, Size 30, Double Ball, 30/17, Out Only, 316SS
854507	SP-Kit LE 30 SS Dbl O 30/30	Rebuild Kit, Liquid End, Size 30, Double Ball, Out Only, 316SS
854509	SP-Kit LE 30 SS Dbl O 30/17	Rebuild Kit, Liq End 30 Dbl Ball In&Out 30/17 316SS
854601	SP-Kit LE 30 A2	Rebuild Kit, Liquid End Size 30, Single Ball Alloy 20
854603	SP-Kit LE 30 A2 Dbl I/O	Rebuild Kit, Liq End 30 Dbl Ball In&Out 30/30 Alloy 20
854605	SP-Kit LE 30 A2 Dbl O 30/17	Rebuild Kit, Liq End 30 Dbl Ball Out Only 30/17 Alloy 20
854607	SP-Kit LE 30 A2 Dbl O 30/30	Rebuild Kit, Liq End 30 Dbl Ball Out Only 30/30 Alloy 20
854609	SP-Kit LE 30 A2 Dbl O 30/17	Rebuild Kit, Liq End 30 Dbl Ball In&Out 30/17 Alloy 20
854801	SP-Kit LE 30 HC	Rebuild Kit, Liquid End Size 30, Single Ball Hastelloy C-276
854803	SP-Kit LE 30 HC Dbl I/O	Rebuild Kit, Liq End 30 Dbl Ball In&Out 30/30 Hastelloy C-276
854805	SP-Kit LE 30 HC Dbl O 30/17	Rebuild Kit, Liq End 30 Dbl Ball Out Only 30/17 Hastelloy C-276
854807	SP-Kit LE 30 HC Dbl O 30/30	Rebuild Kit, Liq End 30 Dbl Ball Out Only 30/30 Hastelloy C-276
854809	SP-Kit LE 30 HC Dbl O 30/17	Rebuild Kit, Liq End 30 Dbl Ball In&Out 30/17 Hastelloy C-276
855501	SP-Kit LE 40 SS	Rebuild Kit Size 40 Liquid End Single Ball 316SS
855504	SP-Kit LE 40 A2	Rebuild Kit Size 40 Liquid End Single Ball Alloy 20
855507	SP-Kit LE 40 HC	Rebuild Kit Size 40 Liquid End Single Ball Hastelloy C-276



Metering Pumps







ProMinent®

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