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1.0 INTRODUCTION

This manual contains specification and detailed description of all components within the Multi Phase Extraction Unit supplied for the Beede Oil site. Also contained within this manual is a brief description of the operation and maintenance of the system. **It is very important to note that these descriptive sections are an attempt to give an overview of the unit operation. For exact process operation procedures, the reader should refer directly to the Mechanical and Electrical Specification Appendices.**

2.0 WARRANTY STATEMENT

The Multi Phase Unit provided for the Beede Oil Site is offered with a one year limited warranty on all parts within. All warranty claims are subject to the discretion of SCG Industries Limited and will be dealt with on an individual component basis. Any abuse or misuse of the equipment will void all pre-stated warranty. Warranty is extended to include all labour performed by SCG if SCG personnel are contracted to provide maintenance through an arranged maintenance contract.

Although these units may be modified to suit the changing needs of the site or future sites, it is strongly recommended that the changes be approved in writing by SCG Industries Limited, at least for modifications performed during the one year warranty period.

3.0 EQUIPMENT AND COMPONENTS

The following section details the specific operation of major components within the Multi Phase Unit. **For exact process operation procedures, the reader should refer directly to the Mechanical and Electrical Specification Appendices.**

3.1 Header Pipe

The extraction piping system consists of the (typical) components listed below.

- 3.1.1. Well Assembly: PVC (sch. 40) well(4") with a 1" low density polyethylene (LDPE) tubing inserted through a EDPM (Ethylene propylene diene Monomer) Gasket. The LDPE tube is perforated at the end with a specified series of 3/16" holes to facilitate optimal suction. Wells are equipped with valves for flow control.
- 3.1.2. Above Ground Piping: The Above ground piping system is constructed of heat welded Polypropylene (PPL) pipe and fittings (from 55 mm to 200 mm diameter), with control valves as specified. The PPL piping terminates with a flange at the treatment system buildings.
- 3.1.3. Building Piping: The header pipe assembly inside the building is constructed of sch 40 PVC and appropriate gaskets and fittings, with a clear pipe observation window in line. The assembly also includes a fresh air dilution valve and a drain valve.

3.2 High Vacuum Liquid Separator

The SCG manufactured High Vacuum Liquid Separator (HVLS) is located upstream of the vacuum pump. The HVLS design serves to separate the extracted aqueous and non-aqueous liquids (i.e., droplets) from the vapour phase stream. The HVLS uses a two-tank design and a combination of floats and timer activated pneumatic actuators to conduct the simultaneous removal of liquid from the bottom tank of the HVLS while allowing concurrent vacuum extraction and accumulation of liquid droplets in the upper tank. The HVLS is equipped with two control floats (F1& F2) and two pneumatically operated wafer valves (Sol 1, & Sol 2) and one electrically operated solenoid (Sol 3).

The upper most float (F1), located in the upper tank, is an overflow control and deactivates the system if the HVLS becomes over-filled with liquid. This prevents any potential breakthrough of liquid droplets into the vacuum pump.

The lower float (F2), located in the bottom tank, serves to cycle the HVLS and evacuate all accumulated liquid from the bottom tank. There is a three step cycle that the HVLS performs to evacuate all the accumulated liquid from the bottom tank.

- **Step 1** The isolation valve (Sol 1) located between the two tanks, and the 3-way valve (Sol 2), located on the end of the tank, close simultaneously to isolate the upper and lower tanks. The lower tank is immediately vented to achieve atmospheric pressure. This allows the continuous accumulation of liquid in the upper tank at the operating vacuum. The duration of this step is approximately 10 seconds.
- **Step 2** While the upper and lower tanks remain isolated, the bottom tank is pressurized with compressed air supplied by the compressor. This step transfers liquids from the HVLS downstream to the Isolation tank. This is achieved upon the pressurization valve (Sol 3) being opened for approximately 15 seconds.
- **Step 3** The 3-way valve re-opens allowing the build-up of pressurized air in the lower tank to pass around the upper tank. This allows the two tanks to achieve the same operating vacuum. Upon equalization of the negative pressure in the two tanks, the isolation valve re-opens allowing all accumulated liquid in the upper tank to drain to the lower tank thus terminating the cycle.

The HVLS is activated through an entire cycle upon the following conditions being achieved:

- i) Panel switch "on".
- ii) Outputs activated
- iii) High level floats in the Reclaimer tank, Isolation Tank and Oil/Water Separator are not activated. All high level floats have a ten second time delay before activating.
- iv) Proper supply of compressed air to each actuator from the compressor.
- v) Activation of F2 in lower tank of HVLS.
- vi) Depressing the "HVLS Jog" button located on the control panel.

3.3 *Liquid Ring Vacuum Pump*

The driving system of the Multi Phase Remediation Unit is a 50 hp SiHi Liquid Ring Vacuum Pump. The liquid ring pump is an Oil-Sealed system, cooled via a fan-cooled radiator. The Vacuum Pump is equipped with a Reclaimer Tank and demister to prevent the breakthrough of oil droplets in the effluent vapour stream.

The 50 hp SiHi Liquid Ring operates effectively at 770 ACFM at 16 in Hg and should not exceed an operating vacuum of 26 in Hg. The specifications and the performance curve for the pump are located in the technical specifications of this manual.

The liquid ring vacuum pump is equipped with two temperature switches (T1, T2). T1 serves to deactivate the system upon the sealant oil achieving a temperature of above 165 °F. T2 serves to deactivate the pump upon the off-gas temperature being in excess of required limits (factory set at 100 °F) this may be adjusted to suit off gas treatment equipment (do not exceed 165 °F without consulting SCG Industries limited).

The Reclaimer Tank on the Vacuum Pump is equipped with two floats (i.e. low/low, high/high) to ensure an adequate volume of oil is contained in the reclaimer tank to provide a continuous flow of oil to properly seal the pump. If the oil level in the pump falls below the low level float, the pump will de-activate. If the oil level exceeds the high /high float the pump will deactivate.

The vacuum pump operates upon having achieved the following conditions:

- i) Panel switch "on".
- ii) Pilot switch at pump "on".
- iii) J-leads/overloads to Vacuum Pump are not "tripped".
- iv) High level floats in the HVLS, Isolation Tank, Oil/Water Separator and Reclaimer tank are not activated. All high level floats have a ten second time delay before activating.
- v) Temperature Switches (T1,T2) on the Liquid Ring Pump are not continuously activated.
- vi) If all the above conditions are satisfied, the system reset button on the panel must be pushed to initially start the pumps. The reset must also be depressed when re-activating the vacuum pump after a failed conditions or deliberate a system shut-down at the panel. If only the pilot switch is used to deactivate the Liquid Ring Pump, the unit can be re-started by activating the pilot switch only.

** "JOG" is used to activate Liquid Ring directly without activating the control circuit.

Important Note for Start-up of the Liquid Ring Pump

The pumping chamber of the liquid ring pump must be drained to the centre line of the pump housing before each pump start-up. A manual ball valve is fitted on the side of the pump chamber to perform the draining. This draining is mandatory for each start-up as the pump can be damaged if allowed to rotate with a full housing. Therefore, start-up requires that a technician to be present during each start-up to drain the pump and to de-press the reset button. In other words, **remote start-up of the system is not recommended.**

3.4 Isolation Tank

The process liquid is transferred from the HVLS to the Isolation Tank for the purpose of stabilizing flow to allow for sediment precipitation as well as emulsion breaking. The tank is equipped with a High/High protection float to protect against System overflow.

3.5 Oil/Water Separator

The process liquid is allowed to pass from the Isolation tank into the SCG manufactured M-16 Oil/Water Separator via gravity flow. All phase separated product is collected in the oil chamber of the Oil Water Separator and transferred to an exterior aboveground Oil Holding Tank (see below). The Oil/Water Separator is equipped with a High/High float , which acts as an overflow control and deactivates the system if the Oil/Water Separator becomes over-filled with liquid. This prevents any potential loss of product from the tank.

The separator is equipped with a pumping chamber which is fitted with a High activation float. Upon activation of this float, the diaphragm pump transfers all accumulated process water in the

pumping chamber downstream(timer controlled).

The High float located in the Oil/Water Separator is activated upon the following conditions being achieved:

- i) Panel switch "on".

3.6 Water Transfer Pump

A diaphragm pump is located between the Oil/Water Separator and the Discharge. The pump removes accumulated process liquid from the secondary chamber of the Oil/Water Separator upon activation of the float. The pump is activated by the float and a timer set-up. The timer is set to let the transfer pump run for 45 seconds during each cycle. The discharge pipe is equipped with a GPI 1" digital water flow meter.

3.7 Oil Transfer Pump

A diaphragm pump is located between the Oil Chamber of the Oil/Water Separator and the Discharge. The pump removes accumulated oil from the oil chamber of the Oil/Water Separator upon activation of the float. The pump is activated by the float and a timer set-up. The timer is set to let the transfer pump run for 15 seconds during each cycle. The discharge pipe is equipped with a GPI 1" digital oil flow meter calibrated to the viscosity of the existing product.

3.8 Compressor

A 5 hp Ingersoll-Rand Compressor supplies the Vacuum Enhanced Dual-Phase Extraction & Treatment Unit with a supply of compressed air used to operate the HVLS and each pneumatically actuated valve (i.e. Liquid Ring Pump and HVLS). The compressor is fitted with an intrinsically safe pressure switch (P1) which regulates the internal pressure of the compressor to maintain a minimum of approximately 90 psi.

The Compressor is activated upon the following conditions being achieved:

- i) Panel switch "on".
- ii) Pilot (wall) switch "on".
- iii) The J-leads and thermal overloads not "tripped".
- iv) P1 being activated.

3.9 Heat and Ventilation

The enclosure is equipped with a 5000 Watt Ruff Neck Heater which is self-regulated by a side-mounted thermostat. The enclosure is also equipped with a 30" motorized actuated damper which is controlled by an internally mounted thermostat. The actuated damper opens when the enclosure temperature exceeds the temperature setting of the internally mounted thermostat. The heater is set to heat the enclosure until the temperature set on the thermostat has been achieved. The heater thermostat must be set to a temperature lower (minimum of 10 degrees) than that of the Damper actuator thermostat setting to avoid unnecessary cycling damper and loss of heat. To ensure that a proper temperature has been set observe one full cycle and note the temperature of the enclosure.

The Convection Heater operates upon having achieved the following conditions:

- i) Panel switch "on".

4.0 START-UP PROCEDURE

The initial start-up of the Multi Phase Extraction Unit requires a multi-step protocol. First, the user should become familiar with the programmable logic controller (PLC) indicator lights and panel hand switches and associated panel lights, as well as the specification of each component supplied in this operation manual. The indicator lights on the face of the PLC are used to display the operating state of all internal components.

Upon becoming familiar with the indicator devices on the control panel, a knowledge of the general flow and process components is necessary to properly operate and calibrate the Unit.

The following is a step by step guide to a typical start-up of the system. This procedure assumes that the valve positions are in the last operating position.

4.1 Panel

Begin the start-up procedure by ensuring that all panel hand switches and associated lights on the control panel are in the "off" position. Ensure that the interior pilot switches, located on the interior wall, are in the "off" position.

Return to the control panel and switch the main power disconnect to the "on" position. Turn PLC to "on" position. This should immediately activate the PLC and the panel heater if the outdoor ambient temperature is less than that set on the thermostat.

Turn the interior pilot switch for the light to the "on" position and observe the illumination of the interior light. This ensures that 110 volt power is supplied to the System.

4.2 Liquid Ring Vacuum Pump

To operate the Liquid Ring Vacuum Pump, begin by turning the exterior system panel switch to the "on" position.

Turn Outputs switch to on position.

Turn the exterior L.R. pilot switch to the "on" position.

Ensure oil fills the housing of the Liquid Ring to the centre line, and is not over full.

Ensure that the dilution valve at the HVLS influent is in the open position.

The pump should now be ready to run upon the reset button being depressed and the pilot switch being activated.

If the power supply has been manipulated since the last period of operation, proper rotation of the pump should be confirmed during the system start-up. Rotation arrows on the pump shaft indicate proper flow orientation.

4.3 Water Transfer Pump

To operate the Transfer Pump, begin by turning the exterior panel hand switch to the "on" position. Also ensure that the regulator supplying compressed air to the diaphragm pump is supplying sufficient pressure. The transfer pump should now be ready to run upon the activation of float F5.

4.4 Oil Transfer Pump

To operate the Transfer Pump, begin by turning the exterior panel hand switch to the "on" position. Also ensure that the regulator supplying compressed air to the diaphragm pump is supplying sufficient pressure. The transfer pump should now be ready to run upon the activation of float F6.

4.5 Compressor

To operate the Compressor, begin by turning the exterior panel system switch to the "on" position. Turn the interior pilot switch to the "on" position. The compressor should now be ready to run if the tank pressure is below the set-point of the internal pressure switch.

5.0 GENERAL MAINTENANCE PROCEDURE

This section focuses on the major components of the Vacuum Enhanced Dual-Phase Extraction & Treatment Unit and the associated maintenance to be expected. As maintenance is conducted, other areas of concern may arise based on the site conditions including, but not limited to, hardness and sediment levels within the process water. In general, the main focus of regular maintenance is associated with the working components (i.e., motors, pumps, belts, solenoids, filters, strainers, etc). For more detailed information, refer to the specification sheets located in the Mechanical Specification Appendix of this manual.

5.1 PVC Header Pipe

Periodic cleaning of the observation pipe will be required to ensure visual inspection. The header pipe assembly (building interior) should be inspected for degradation monthly, and disassembled at 6 months intervals to inspect for interior degradation of the materials.

5.2 High Vacuum Liquid Separator

The HVLS requires little maintenance but may periodically require the removal of sediment which may accumulate at the bottom of the tank.

Sediment accumulation is usually indicated by check valve failure, resulting in a back flow through the discharge check valve and is indicated by syphoning of the Isolation tank back to the HVLS.

- The unit can be drained by manually depressing the HVLS "Jog" button located on the exterior electrical Panel. This button must be depressed every 30 seconds until only air exists the HVLS to the Isolation tank. At this point the line can be disconnected and cleaned.

Float switches will require periodic cleaning due to scaling if significant suspended solids exist. Irregular cycling of the HVLS will indicate float malfunctions.

Air lines supplying compressed air to all pneumatic valves should be inspected and cleaned of all moisture on a monthly basis.

5.3 Liquid Ring Vacuum Pump

The Liquid Ring Pump requires the following regular preventative maintenance:

- Inspect the flex connector for wear and increased temperature on a monthly basis (this is observed at the end of the systems operation, and can be determine by touch).
- Remove and inspect the demister element for internal scaling on a monthly basis.
- Inspect bearing for increased temperature upon each visit (this is observed at the end of the systems operation, and can be determine by touch). If discolour of paint occurs bearing inspection will be required.
- Provide grease to bearings on a monthly basis, with the installation of grease vent to ensure over greasing does not occur.
- Inspect pneumatic solenoid, the temperature probe and vacuum gauge to ensure proper operation on a quarterly basis.
- Check amperage being drawn by the motor on a quarterly basis.

5.4 Isolation Tank

The tank may require periodic sediment removal. Float operation should be inspected monthly. Sediment removal can be conducted through the drain valve located at the bottom of the tank. This is most effectively performed with the use of a vacuum truck. And is only required when significant accumulations of sediment occur.

5.5 Oil/Water Separator

The Oil/Water Separator requires little maintenance. Proper operation of the high/high level float should be verified on monthly basis. The tank will collect sediment and sludge on a regular basis and requires cleaning through the clean-out port. Upon draining, inspect the coalescing pack to ensure no fouling has occurred. The draining of the Oil Water separator is conducted by connecting the 1.5" discharge valve, located at the bottom of the first chamber, to a waste container of vacuum truck. Upon draining the vessel's Coalescent pack should be inspected and cleaned with pressurized water to ensure proper flow through.

5.6 Transfer Pump

The Transfer Pump is a low maintenance item. If observed flow rates decrease during regular operation of the pump, verify the pressure at the regulator located adjacent to the three way valve on the bottom tank of the HVLS. to ensure the proper pressure is being supplied. Inspect the pump for leaks or excess vibration. For more information on air consumption, refer to the Mechanical Specifications Appendix of this manual. If the totalizer is observed to be sticking or losing accuracy the meter should be removed and cleaned of any debris.

5.7 Compressor

The compressor should be drained of all accumulated moisture on a bi-weekly (i.e., twice per

week) basis. The belts on the compressor should be inspected on a monthly basis. The oil should be checked monthly and the filters should be changed every 6 months of operation. Also, a check of the amperage being drawn by the compressor motor should be performed on a quarterly basis.

6.0 Spare Parts List

With the supply of the units one full set of fuses, for one complete change have been provided.

A complete spare parts list is not required but is available at an additional cost. This list would include the following components.

HVLS

- Actuator for HVLS
- Float assemblies
- Check valve
- Regulator

Compressor

- Air filter
- Regulator

Isolation Tank

- Float

Oil Water Separator

- Coalescing material
- Floats

Transfer Pumps

- Diaphragms
- Gauges
- Kitec "O" Rings

Liquid Ring

- Demister element
- Floats
- Temp switch
- Oil T-32

APPENDIX I
Input / Output List

Job Name: Beede Oil

Controller Type: Micro
Model: 31100
Manufacturer:

Job number: 356
Schneider

Input voltage: 24 vdc
Output relays: 120 vac

Input designations

No.	Input Description	Reference	Notes
01	HVLS HH	F 1	NI
02	HVLS H/JOG	F 2	NI
03	ISOLATION H/H	F 3	NI
04	OWS H/H	F 4	NI
05	OWS H	F 5	NI
06	OWS OIL SUMP H	F 6	NI
07	OWS OIL SUMP H/H	F 7	NI
08	RECLAIMER H/H	F 8	NI
09	RECLAIMER L	F 9	NI
10	LRP OIL TEMP	T 1	NI
11	LRP OFF GAS TEMP	T 2	NI
12	LRP VAC SWITCH	Vac Sw	NI
13	DAMPER THERMOSTAT	TH1	NI
14	COMPRESSOR PRESSURE SWITCH	Ps Sw 1	NI
15	RESET	B1	PANEL
16	EXTERIOR TANK (oil and water) H/H	F10	NI

Output Designations:

No.	Output Description	Reference	Notes
0001	50 HP LIQUID RING PUMP	M-1	
0002	5 HP COMPRESSOR	M-2	
0003	HVLS ISOLATION VALVE	SOL-1	
0004	HVLS 3-WAY VALVE	SOL-2	
0005	HVLS PRESSURIZATION	SOL-3	
0006	DAMPER ACTUATOR	SOL-4	
0007	WATER TRANSFER PUMP	SOL-5	
0008	OIL TRANSFER PUMP	SOL-6	
0009			
0010			
0011			
0012	AUTO DIALER	DEVICE 1	

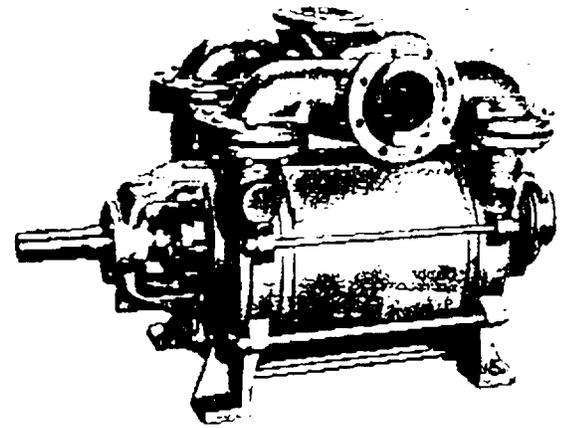
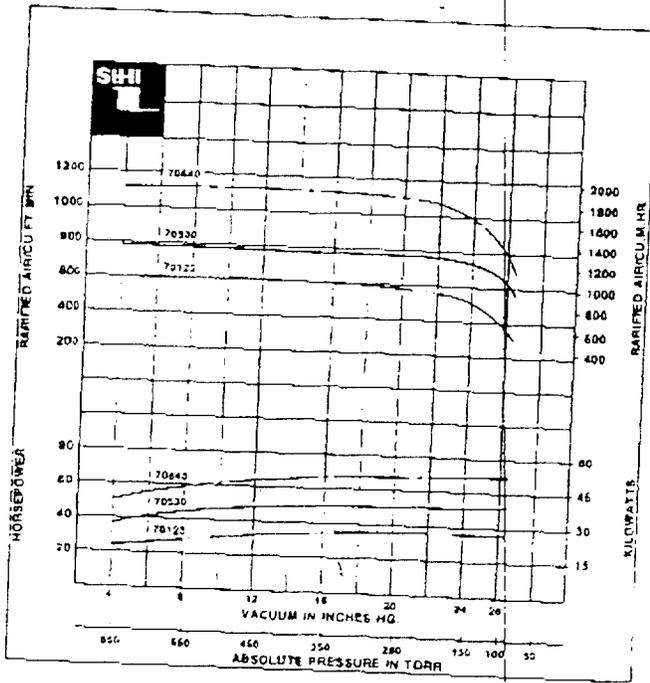
ANALOG INPUTS/OUTPUTS

4-20 Ma.

No.	Description	Reference	Input/output
01			
02			
03			
04			
05			
06			

APPENDIX II
Mechanical / Electrical Specifications

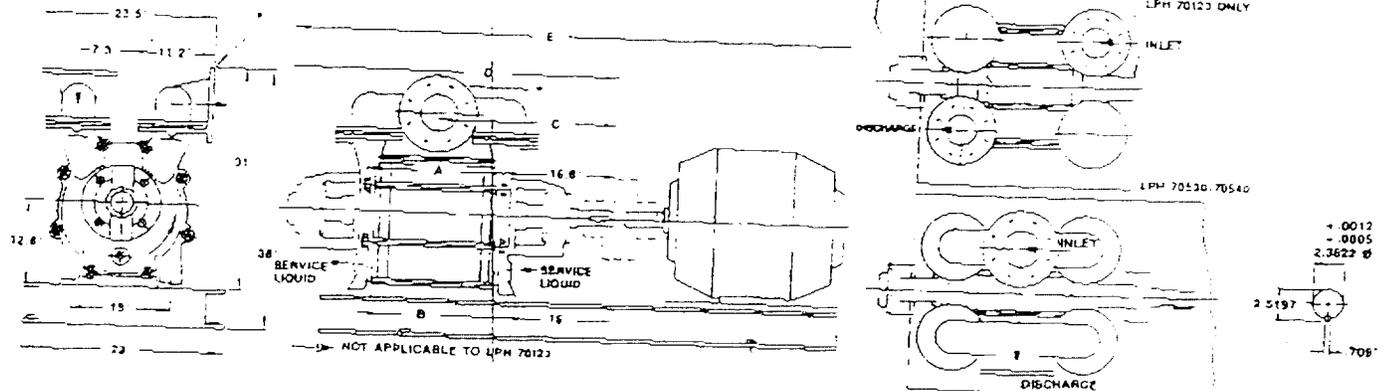
Liquid Ring Vacuum Pump and accessories
High Vacuum Liquid Separator and accessories
Isolation Tank
Compressor
Oil Water Separator
Transfer Pump
Flow meter
Heater



Dimensions (inches)

Pump Model	A	B	C	D	E
70123	16.5	19.7	—	44.0	75
70530	19.3	22.4	28.3	48.7	80
70540	23.2	26.4	28.2	50.6	87

For connection sizes/ratings and motor sizes refer to engineering data table on reverse



Capacity Table

*SIDE DISCHARGE SUPPLIED ON ALL IRON PUMPS ONLY
For baseplate mounting please obtain factory certified dimensions

Pump Model — LPH 70123																
Speed (RPM)	4" Hg 888 Torr		8" Hg 857 Torr		12" Hg 455 Torr		18" Hg 354 Torr		28" Hg 252 Torr		24" Hg 150 Torr		26" Hg 100 Torr		26.4" Hg 88 Torr	
	cfm	HP	cfm	HP	cfm	HP	cfm	HP	cfm	HP	cfm	HP	cfm	HP	cfm	HP
1150	600	23.5	600	29.0	600	33.5	600	37.0	580	38.1	485	38.2	380	38.5	305	38.5
975	502	18.0	502	22.2	502	25.8	502	28.1	483	29.0	410	29.5	330	29.3	295	29.5
880	455	14.5	455	19.2	455	23.0	455	25.6	440	26.0	375	26.1	285	26.1	259	26.1
Pump Model — LPH 70530																
1150	825	36.0	820	40.0	812	43.6	795	47.0	760	49.0	685	50.5	545	51.0	430	50.5
975	685	24.5	685	28.8	685	32.2	675	35.5	655	37.5	590	38.5	485	38.2	410	38.3
880	590	20.5	590	24.5	590	28.0	590	31.0	575	33.5	535	34.0	450	34.0	385	34.0
Pump Model — LPH 70540																
1150	1120	49	1120	55	1120	60	1120	64	1095	67	1000	68	825	68	700	68
975	913	31	913	37	913	42	913	48	910	49	845	50	700	50	600	50
880	850	27	850	33	850	38	850	42	830	45	770	48	630	48	500	48

This data represents average values for pumps in standard materials. Capacity in cubic feet per minute at 68°F (20°C) using 60°F (16°C) water as service liquid. Vacuum in inches Hg. Barometric pressure at sea level 29.92" Hg. abs. (760 Torr). All performance data per HEI standards; subject to SIHI standard tolerances.



TEMPERATURE SWITCHES

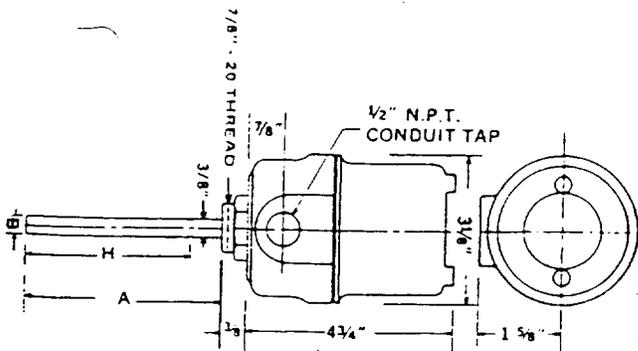
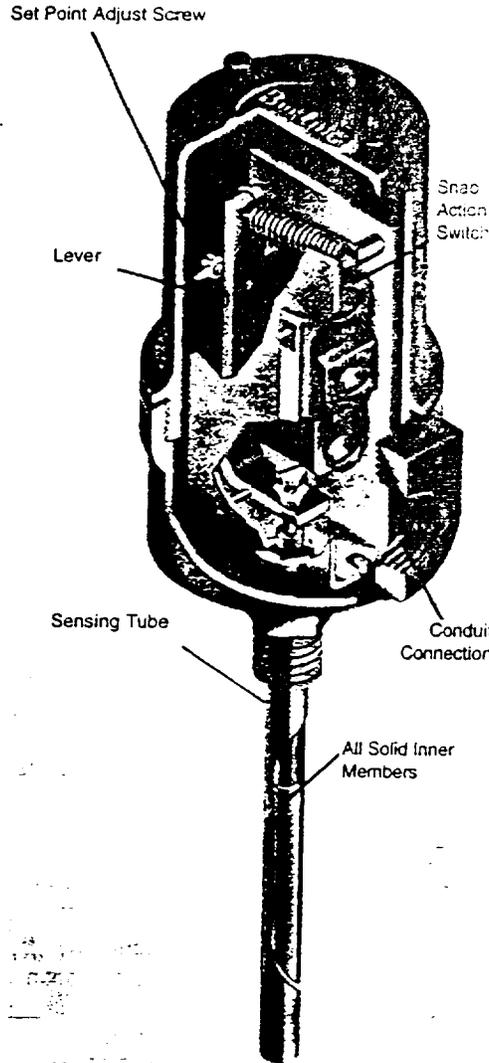
BURLING

FEATURES:

- Standard series
- Single switch
- NEMA 4 enclosure (B-1C only)
- Explosion-proof housing (B-1X only)
- Internal temperature adjusting screw
- For temperatures up to 1200°F (650°C)
- C.S.A. and F.M. approved

HOW TO ORDER:

- 1) Model B-1C (with housing) or B-10 (without housing), or B-1X (with explosion proof housing)
- 2) Select Code from chart below.
- 3) Range in °F is standard. Specify if °C is required. Specify if alternate range for codes 62 - 68 is required.
- 4) Add CSA or FM, if required (B-1C and B-1X only)
 - a. CSA Certifications: specify CSA
 - b. FM Approval: specify FM, show sealed factory temperature setting, and show manual reset switch (type "J"). See item 5.
- 5) Specify letter for type of SPDT snap action switch required.
 - a. "N" is standard automatic reset with U.L. rating of 15A, 125-250-460 VAC, 1/8 HP, 125 VAC; 1/4 HP, 250 VAC.
 - b. "J" is manual reset. See other side for U.L. rating.
 - c. For higher ratings or wider differentials, consult Baker.
- 6) Specify Tube Number for code selected. See chart below.
- 7) Specify Mounting Fitting part number for other side.

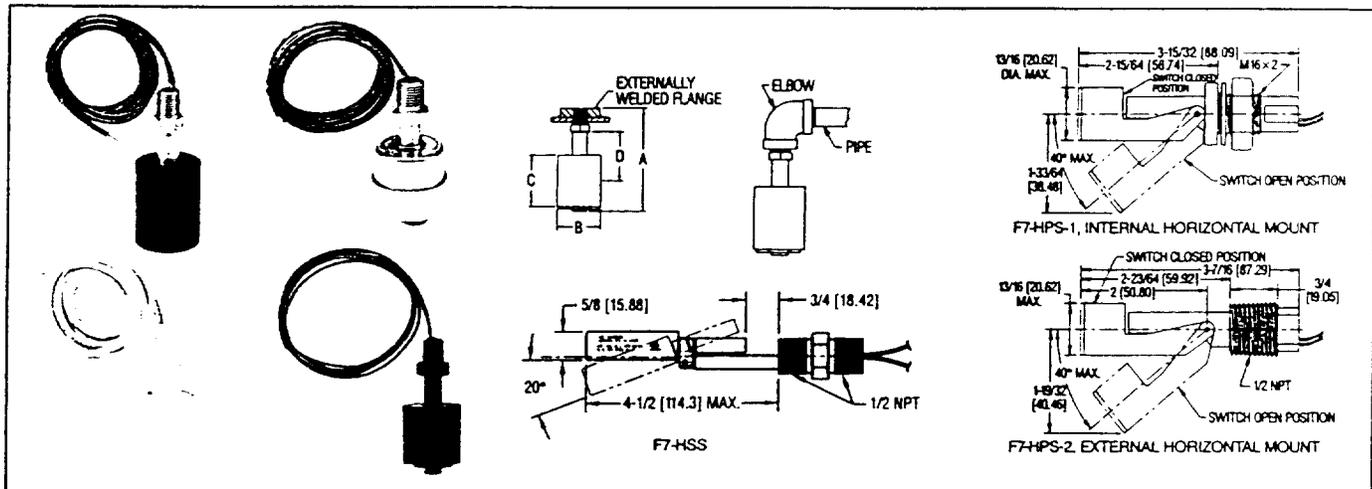


Code	Adjustable Temp. Range		Max. Temp.	Tube Specifications					Total Oper. Diff.	Temp. per Turn of Adj. Screw	Position of Bushing (C) or Union (D) on Tube	Standard Thermowell		
				Active Part			Overall Length	Part No.				Draw.	Length "U"	
	Fahrenheit	Celsius		Length "H"	Dia. "B"	Mat.								Inactive Part Mat.
30	-100 to 100°F	-75 to 35°C	600°F	9 1/8"	3/8"	S.S.	S.S.	10"	163-30	2°F	40°F	C=9 1/8", D=8 1/4"	A-666-3	9 1/4"
33	0 to 200°F	-10 to 100°C	"	"	"	"	"	"	163-30	2°F	40°F	"	"	"
	100 to 300°F	40 to 150°C	"	"	"	"	"	"	163-30	2°F	40°F	"	"	"
	200 to 400°F	90 to 200°C	"	"	"	"	"	"	163-30	3°F	50°F	"	"	"
36	300 to 500°F	150 to 260°C	"	"	"	"	"	"	163-30	3°F	50°F	"	"	"
32	100 to 600°F	40 to 310°C	600°F	4 1/8"	3/8"	S.S.	S.S.	5"	163-20	5°F	95°F	C=4 1/8"	A-666-3	4 1/4"
	100 to 600°F	40 to 310°C	600°F	5"	1/4"	S.S.	Ni. alloy	5 15/16"	131-10	3°F	90°F	C=5 1/16"	None	"
	100 to 600°F	40 to 310°C	600°F	5"	1/4"	S.S.	Ni. alloy	7 1/8"	131-40	3°F	90°F	C=6 1/4", D=5"	A-698-1	5 1/4"
37	100 to 600°F	40 to 310°C	600°F	5"	1/4"	S.S.	Ni. alloy	8"	131-30	3°F	90°F	C=6 1/4", D=6 1/4"	A-689-1	5 1/4"
	0 to 650°F	200 to 340°C	1200°F	8"	3/8"	S.S.	S.S.	12"	132-10	4°F	48°F	C=9 1/2", D=9 1/2"	A-807	8 3/4"
	0 to 800°F	200 to 425°C	1200°F	5"	3/8"	S.S.	S.S.	10"	132-20	6°F	75°F	C=6 1/2", D=6 1/2"	A-807	5 3/4"
	600 to 1000°F	310 to 525°C	1200°F	5"	3/8"	S.S.	S.S.	10"	132-20	6°F	75°F	C=6 1/2", D=6 1/2"	A-807	5 3/4"
38	600 to 1200°F	320 to 650°C	1200°F	3"	3/8"	S.S.	S.S.	3-8"	132-60	10°F	120°F	C=4 1/8", D=4 1/8"	A-1198	3 5/8"



Series F7 Level Switches

Low cost, reliable and compact. Hermetically sealed contacts.



Series F7 compact level switches combine low cost and reliability with fast, simple installation. Seven models assure you can choose just the right combination of features, capabilities and media compatibility for almost any application. Model F7 HSS is approved for use in hazardous locations.

Hermetically sealed reed switches are actuated by magnets permanently bonded inside the float and can be easily adapted to open or close a circuit on rising or falling levels. Vertical mount models are shipped with normally open switch contacts which close as the float rises toward the mounting threads. Reverse switch action by removing the float, rotating it end-for-end and replacing it on the stem. Vertical models mount internally, oriented within 30° of vertical, or select optional fittings for external mounting. Contacts in horizontal models F7-HPS-1 (internal mount) and F7-HPS-2 (external mount), are normally open when the float is down and normally closed when the float is up. Horizontal model F7-HSS is in the normally open position when the indicating arrow points up, and normally closed when the arrow points down. Install model F7-HSS internally or externally. Switch ratings are suitable for many solid state control systems and monitors or alarms. Simple relay interfaces can be used for higher current applications.

APPLICATIONS

Chemical processing systems, sumps, coolant tanks, oil reservoirs, fuel or water tanks, sterilizing equipment.

- The F7-SB is an ideal general purpose switch.
- The F7-SS2 is designed for high temperature, high pressure or corrosives.
- The F7-PP is suggested for highly acidic conditions.
- The F7-BT is an economical choice for lubricating and hydraulic oils, gasoline, diesel fuel and many solvents.
- The F7-HPS-1, -2 are suitable for gasoline, kerosene or solvents.
- The F7-HSS is designed for high temperatures or corrosives.

Suggested Specifications:

Level switch shall be operated by a (specify material) float actuating a SPST hermetically sealed reed switch potted in a (specify material) stem, with normally open contacts, reversible to normally closed. Switch shall be W.E. Anderson Model No. F7 ____.

PHYSICAL DATA

Electrical Rating (Maximum):

F7-SB, -SS2 AC: 25VA, 1.0A, 200V DC: 10W, 1.0A, 200V.
 F7-PP, -BT, -HSS AC: 30W, 0.14A, 220V DC: 0.28A, 24V; 0.07A, 120V.
 F7-HPS-1, -2 AC/DC: 15VA, 220V, 1.0A max.

(F7-HSS is rated explosion-proof for Class I, Groups A, B, C, D; Class II, Groups E, F, G; Class III).

Mounting Connection: 1/4" NPTM (all vertical mount), 1/2" NPTM F7-HPS-2, F7-HSS, M16x2 (F7-HPS-1).

Wire Leads: 22 AWG x 18" (46 cm), vertical mount models; 22 AWG x 39" (1 m), models F7-HPS-1, -2, 22 AWG x 24" (61 cm) model F7-HSS.

Magnet: Alnico (F7-SB, -PP, -BT, -HPS), ceramic (F7-SS2, -HSS).

Weight: F7-SB, 2 oz. (58 g); F7-SS2, 1.2 oz. (34 g); F7-PP, 0.8 oz. (23 g); F7-BT, 0.7 oz. (20 g); F7-HPS-1, 1.5 oz. (43 g); F7-HPS-2, 2 oz. (57 g); F7-HSS, 3 oz. (94 g)

DIMENSIONS, INCHES (MM)

Model Number	(A) Stem Length	(B) Float Diameter	(C) Float Height	(D) Actuation from Hex [Ⓛ]
F7-SB	2.75(70)	1.13(29)	1.38(35)	1.2(31)
F7-SS2	2.06(52)	1.0(25)	1.0(25)	0.73(19)
F7-PP	2.18(55)	1.18(30)	1.0(25)	0.69(18)
F7-BT	2.18(55)	1.18(30)	1.0(25)	0.69(18)

Ⓛ Distance between hex and liquid (S.G. = 1.0) level at actuation point will vary with specific gravity changes.

STOCKED MODELS

Model Number	Material Float/Stem	Max Temp.	Max Press.	Min. S.G.	Approx. Deadband
Vertical Mount					
F7-SB	Buna-N & Epoxy/ 316SS	220°F 105°C	150 PSIG 10 Bar	0.60	1/4" 2mm
F7-SS2	316SS (CYC)/ 316SS	300°F 149°C	450 PSIG 31 bar	0.75	1/4" 2mm
F7-PP	Polypropylene & Epoxy/Polypropylene	220°F 105°C	100 PSIG 6.89 Bar	0.60	1/4" 4mm
F7-BT	Buna-N & Epoxy/ PBT*	220°F 105°C	150 PSIG 10 Bar	0.45	1/4" 4mm
Horizontal Mount					
F7-HPS -1, -2	Polysulfone/ Polysulfone	185°F 85°C	150 PSIG 10 Bar	0.85	1/4" 5mm
F7-HSS	316SS/316SS	392°F 200°C	300 PSIG 20.7 Bar	0.60	1/4" 4mm

*PBT - Polybutylene Terephthalate

Optional Fittings — For external mounting of vertical models

A-347 1/4" x 1 1/4" NPT carbon steel adapter
 A-347-SS 1/4" x 1 1/4" NPT 316 stainless steel adapter
 A-348 1/4" x 1 1/4" NPT carbon steel adapter
 A-348-SS 1/4" x 1 1/4" NPT 316 stainless steel adapter

F7-HPS-1

SCG Industries Limited

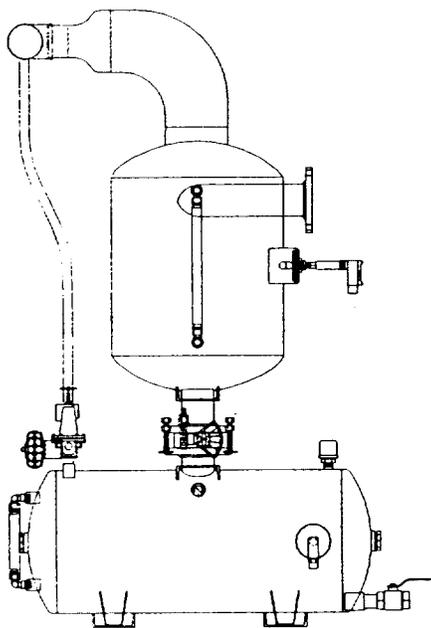
250 King William Road
Dance Lake Industrial Park
Saint John, NB, Canada, E2M 5Y5
Tel: (506) 674-1081
Fax: (506) 674-1082
Web Site: www.remedi8.com

1-888-REMEDi8

HVLS - High Vacuum Liquid Separator

The SCG patented HVLS is a unique design used for the continuous separation of liquid and vapour phases during high vacuum extraction (i.e., bioslurping). The HVLS provides upstream separation of all process liquids before the process vapour enters the vacuum driving system (i.e., liquid ring pump).

Once separated, process water is allowed to pass downstream for subsequent treatment while constant liquid separation from the vapour stream is achieved. The two-tank design provides phase separation with reduced emulsification that sets apart SCG's approach to vacuum extraction from its competitors. The HVLS construction includes two vacuum tanks, pneumatic valves, hazardous location floats, sight glasses and carbon steel inlet and outlet lines.



Above:
Profile view of
SCG's HVLS,
Model:
HVLS-2-B-1-A-1

User-Defined Specifications:

- ACFM
- Hydraulic Flowrate

Warranty: SCG Industries Limited offers a standard manufacturer's warranty against material defects and manufacturer's workmanship.

Saint John

Montréal

Calgary





Specifications

1. EV1 - 4 Way NEMA 4 solenoid valve with proprietary mount. (M20 - M103)

Specifications:

Nominal Voltage: 110 VAC +/- 10%
Port Dimensions: Ports 1,3,5 1/8" NPT
Power: 60 Hz AC at 3.3 Watts
Pressure Range: Min - 29 psi. / Max - 145 psi.
KV Factor: 4

2. EV2 - 4 Way NEMA 4 solenoid valve with namur mount (M148 - M2958)

Specifications:

Nominal Voltage: 110 VAC +/- 10%
Port Dimensions: Ports 1,3,5 1/4" NPT
Power: 60 Hz AC at 3.3 Watts
Pressure Range: Min - 29 psi. / Max - 145 psi.
KV Factor: 9

In addition to these two basic models UniTorq also offers a NEMA 4,7,9 upgrade for explosion proof applications. The UniTorq explosion proof solenoid can easily be mounted to the standard UniTorq valve block with the addition of a spacer block and a valve adapter kit.

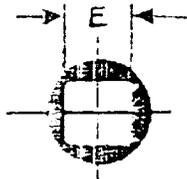
3. EV1 & EV2 - 4Way - NEMA 4,7,9 solenoid valve with proprietary or Namur Mounting

Specification:

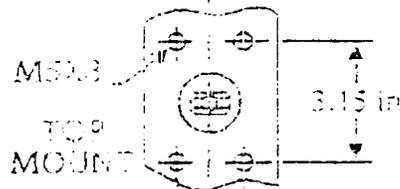
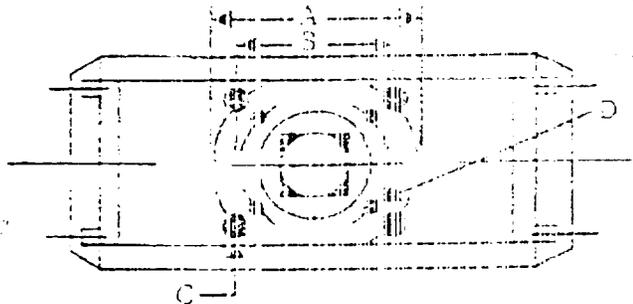
Nominal Voltage: 110 VAC +/- 10%
Port Dimensions: 1,3,5 1/4" NPT (Namur); 1/8" NPT (Proprietary)
Power: 60 Hz AC at 5.9 Watts
Pressure Range: Min - 29 psi. / Max - 145 psi.
KV Factor: 4,9

MINI
674-1082

OUTPUT SHAFT



BOTTOM VIEW

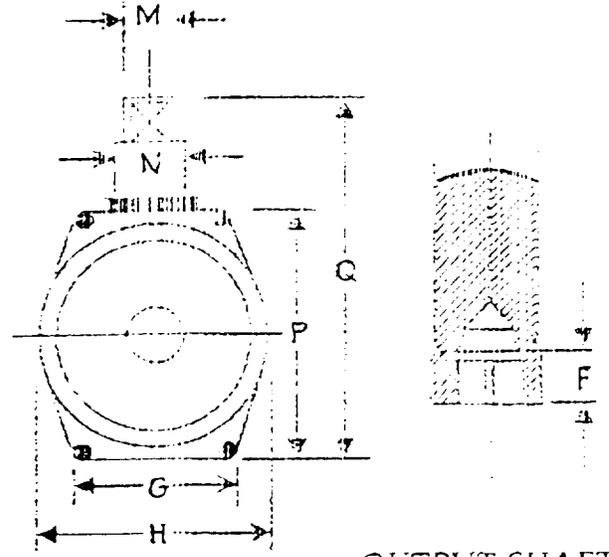
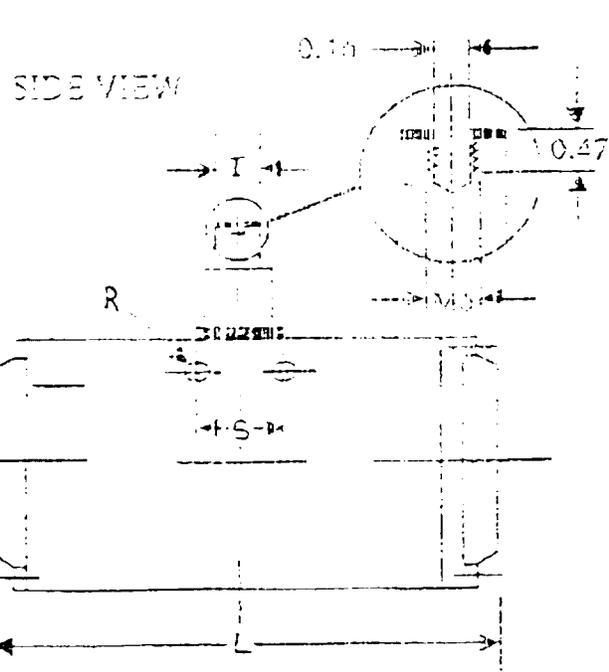


C-1
B C D E F G H I L M N P Q R S 1.18 in

	#	B	C	D	E	F	G	H	I	L	M	N	P	Q	R	S	
M 20	1.97	1.42	1/4 - 20	1/10 - 32	.551	.55	1.97	2.32	.39	5.00	4.72	4.72	3.94	3.70	1/8	87	3.15 x 1.18
M 30	2.76	1.97	5/16 - 18	1/4 - 20	.551	.71	2.36	2.78	.39	5.24	4.72	4.72	3.94	4.25	1/8	87	3.15 x 1.18
M 52	2.76	1.97	5/16 - 18	1/4 - 20	.669	.75	2.58	3.27	.39	6.10	5.51	5.51	3.94	4.73	1/8	87	3.15 x 1.18
M 73	2.78	1.97	5/16 - 18	1/4 - 20	.669	.75	2.56	3.38	.39	6.97	5.51	5.51	4.25	5.04	1/8	87	3.15 x 1.18
M 103	2.76	1.97	5/16 - 18	1/4 - 20	.669	.75	2.78	3.94	.55	7.99	6.69	6.69	4.61	5.40	1/8	87	3.15 x 1.18
M 148	4.02	2.78	3/8 - 16	5/16 - 18	.855	.96	3.54	4.72	.55	8.50	7.63	7.63	5.31	6.30	1/4	94	3.15 x 1.18
M 222	4.02	2.76	3/8 - 16	5/16 - 18	.855	.96	3.54	4.72	.79	11.23	1.102	1.102	5.52	6.30	1/4	94	3.15 x 1.18
M 295	4.02	2.78	3/8 - 16	5/16 - 18	.855	.98	4.06	5.39	.79	11.42	1.102	1.102	5.30	7.10	1/4	94	3.15 x 1.18
M 586	4.92	4.02	1/2 - 13	1/2 - 13	1.063	1.14	4.33	6.77	1.10	14.40	1.417	1.417	7.80	8.58	1/4	94	5.12 x 1.18
M 1213	5.51	—	5/8 - 11	—	1.417	1.57	5.31	8.82	1.26	17.72	1.360	1.360	10.00	11.18	1/4	94	5.12 x 1.18
M 2366	6.50	—	3/4 - 10	—	1.811	1.97	6.26	10.71	1.26	23.07	1.360	1.360	11.89	13.07	1/4	94	5.12 x 1.18
M 2958	6.50	—	3/4 - 10	—	1.811	1.97	6.26	10.71	1.26	28.22	1.360	1.360	11.89	13.07	1/4	94	5.12 x 1.18

3" Refer

* U.N.C. bolt sizes — Top mounting dimensions for accessories to Nemur standard. Bottom mounting is to DIN-ISO standards. Solenoid mounting to Nemur specifications is available on all units and is standard on units 148 and higher.



OUTPUT SHAFT X-SECTION

DIMENSIONS

Features New Chemline Isolator Ball Valves

Compare these safety features with competition!

This is a temporary data information page.

Pressure Rated to 225 psi.

- Provides a higher factor of safety.

Double Stem O-rings

- If excessive force is applied the deeper upper O-ring groove will shear first and lower O-ring remains intact and valve continues to hold pressure.

A very important safety feature!

Modular ISO Top Flange Design

- This permits secure and easy actuator mounting with the moulded valve body incorporating an ISO Actuator mounting flange.

Panel Mount Bottom Pad

- The bottom of the body of the valve incorporates a mounting pad. This permits valves with heavy actuators to be securely mounted.

Teflon seats have elastomer cushions.

- Helps seats to seal with minimum pressure, thus lower stem torques.
- Compensates for seat wear.

Full Port - Lower pressure loss

Fully Blocking

- The Safe-Bloc design enables the down line pipe to be removed.
- True union connectors allow for simple and quick disconnecting.

Built in Spanner Wrench.

- Top of the handle is designed to be used as a spanner wrench for tightening and loosening the Teflon seat carrier.

High Chemical Resistance Material

- PVC and CPVC compounds have an A chemical resistance rating as per ASTM D-1784. They have outperformed other PVC and CPVC compounds on aggressive chemicals.

Maximum Working Pressure Ratings:

Sizes 1/2" to 2"

PVC

225 psi at 20°C

150 psi at 50°C

CPVC

225 psi at 20°C

150 psi at 50°C

PP

150 psi at 30°C

PVDF

225 psi at 20°C

150 psi at 60°C

Sizes 2-1/2", 3" & 4"

PVC

150 psi at 50°C

CPVC

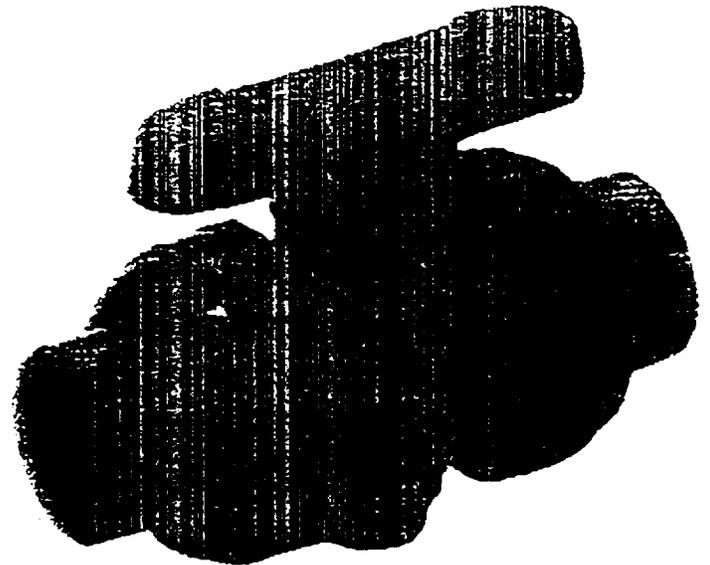
150 psi at 50°C

PP

150 psi at 20°C

PVDF

150 psi at 60°C



PPR Pneumatic Actuators

CHEMLINE
Plastics Limited

Series – for Ball and Butterfly Valves

ELS: PPD (Double Acting)
PPS (Spring Return)

7 & END
3: 50% Glass Reinforced Polyamide*

TT &
WARE: 303 Stainless Steel

ON RACKS: Polyamide* Plastic

● All-Plastic Construction

● For Plastic or Metal Valves

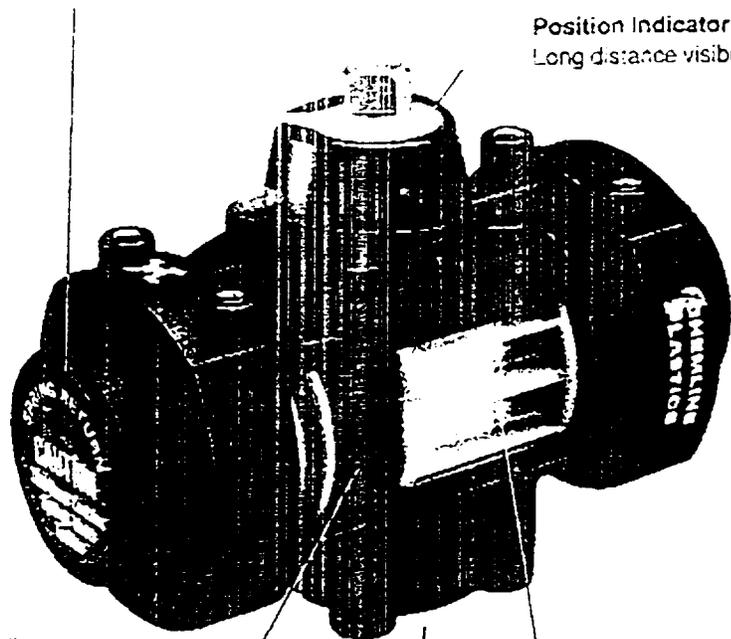
● Economical

Chemline has found a perfect match in the Series Pneumatic Rotary actuators with ball and butterfly valves. These compact rack and pinion design units are constructed mostly plastic with stainless steel shaft and hardware. Chemline offers control series of similar plastic construction. Actuated valve packages are assembled, bench tested, and adjusted before shipment. These packages are 100% warranted, compact and lightweight – perfect for all process piping systems.

Features

- Lightweight seal for plastic valves.
- Lower stresses on plastic piping.
- All major parts are Polyamide* plastic.
- Shaft and metal parts are 303 SS.
- Compact, Simple Design
- Double rack, double pinion design supplies constant torque output.
- Self porting is integral.
- Long Cycling Life
- Double O-ring shaft seals at top and bottom of shaft.
- Massive teeth engagement between dual racks and pinions.
- Direct mounted All-Plastic Solenoid (optional)
- Plastic polyamide pilot solenoid valves mount flush (no nipples used.)
- Solenoid coil is epoxy imbedded and all parts are plastic or stainless.
- Screw type override is standard.

Concentric Spring Sets
Spring return models are adjustable to various supply pressures by removing or adding springs.



Position Indicator
Long distance visibility

Pinion is SS shaft with gear teeth cut across full length

One-piece Polyamide* Piston/Rack/Piston Guides.

ISO Mounting - International Standard mounting bolt circle dimensions for convenient mounting. Drive is recessed square.

INGERSOLL-RAND.

**SMALL
COMPRESSOR**

2475

Ref: 9820.00
Sheet: 105
Date: 1 June 1999
Cancels: 1 Jan. 1999

Davidson, NC 28036

Model 2475 Engineering Data

Bore4" & 2.5"
Stroke2.75"
Inlet Size1" NPT
Discharge Size...0.5" NPT

Min RPM575
Max RPM1600
Sheave OD ..13.75"
Sheave PD13.5"

Air cooled aftercooler CTD 25° F
(Package performance)
Number of belts 1
Belt Section A

Performance

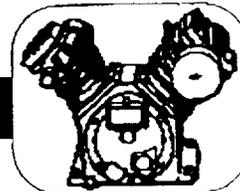
Bare	Motor HP	PSI	RPM	ACFM	BHP
2475	5	75#	1040	17.3	4.5
2475	5	125#	1040	17.1	4.8
2475	5	175#	1040	16.8	5.5
2475	7.5	75#	1500	24.3	7.3
2475	7.5	125#	1500	24.2	7.8
2475	7.5	175#	1500	24.0	8.2
2475 (Gas)*	11	175#	1200	19.0	6.8
2475 (Gas)**	11	175#	1600	25.0	8.1
2475 (Gas)***	12.5	175#	1500	24.0	8.2

*Honda **Kawasaki ***Kohler
(5hp Duplex units multiply capacity by 2)

	Nominal Amp Rating				
	200-3-60	230-1-60	230-3-60	460-3-60	575-3-60
5 HP	17.5	28	15.2	7.6	6.1
7.5HP	25.3	40	22	11	9

Nominal Amps are based on NEC full load amperage rating for this size motor. Actual nameplate amps may vary according to motor design and/or motor manufacturer.

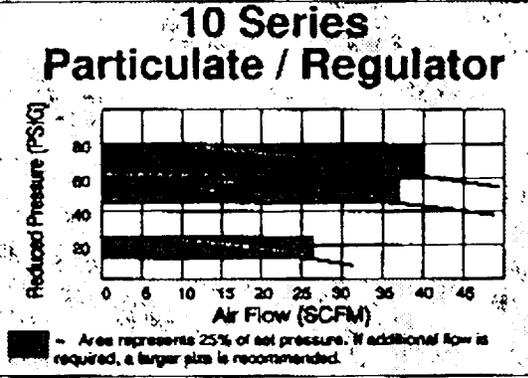
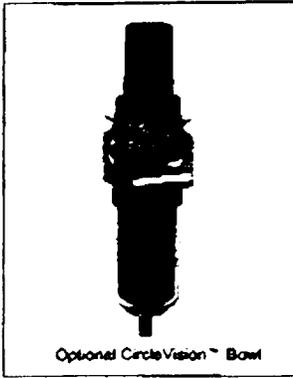
Model 2475 Detailed Specifications BARE



- FRAME**—The 100% cast iron frame is designed to support the overhung crankshaft. Cylinders bolt directly to the cast iron frame. Frame is completely sealed yet allows for maximum accessibility.
- CRANKSHAFT**—A unique overhung design supported by two heavy duty ball bearings with replaceable crankpin bushing. Entire shaft is balanced with an integral counterweight to insure smooth operation.
- CONNECTING RODS**—Solid one-piece design. These simple, easy to maintain rods can be used only with an overhung crankshaft. Crankpin bushing inside the rod is precision ground requiring no alignment.
- CYLINDERS**—These are 100% cast iron, separately cast and individually bolted to the frame in a V-type configuration. The cylinders are precision honed for low oil carryover. Radial fins on the cylinders help remove heat and ensure 360 degree cooling of the cylinders.
- PISTONS**—Precision balanced low pressure aluminum and high pressure cast iron pistons provide smooth operation.
- RINGS**—There are three piston rings for sealing compression and oil control. The taper faced compression ring and beveled oil scraper ring provide quick seating. One, three-piece oil control ring maintains proper lubrication on cylinder wall. Precision honing used in conjunction with the ring stack up means low oil carryover.
- FLYWHEEL**—The cast iron fan type flywheel forces a "cyclone" air blast to provide cooling for the deep finned cylinders and finned copper tube intercooler. The flywheel is balanced to keep vibration to a minimum.
- INTERCOOLER**—Two stage compressors use an intercooler. The intercooler between stages is of finned copper tube construction to provide maximum cooling area. It is located directly in the flywheel air blast to remove the heat of compression between stages keeping running temperatures and power needs to a minimum, ensuring high air delivery for horsepower expended. The intercooler is provided with a relief valve to prevent over-pressurization.
- LUBRICATION**—Splash lubrication of running parts is simple and reliable. Lubrication dippers are integral with connecting rods and cannot come loose.
- INLET FILTER**—The filter has a durable canister with a dry type 10 micron inlet filter/silencer as standard.
- VALVES**—Reliable, time proven finger valves are quick acting and made from premium grade stainless steel. Valve components are easily removable for maintenance.

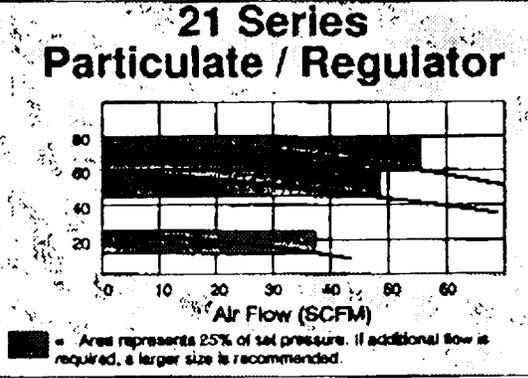
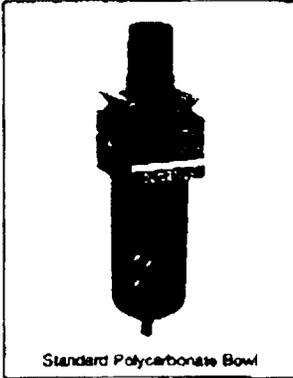
Revisions—Revised Amp Rating.

FRL FLEXIBLOK® SERIES



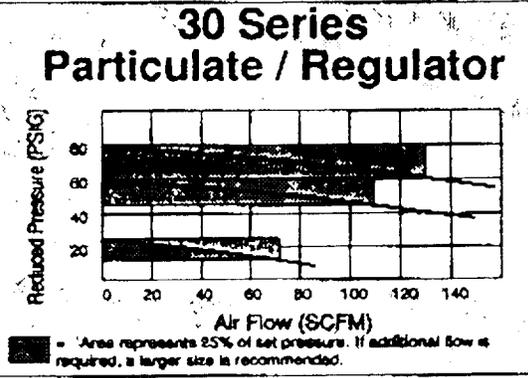
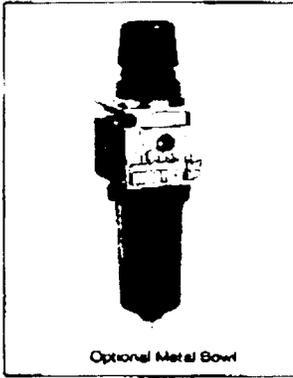
MODEL NUMBER	PIPE SIZE	Bowl Size	Micron Rating	SCFM AT REDUCED PRESSURE OF		
				25 PSIG	60 PSIG	80 PSIG
P10A-01	1/8	1.5 oz.	20	27	36	38
P10B-01	1/8	1.5 oz.	05	24	30	33
P10A-02	1/4	1.5 oz.	20	31	39	42
P10B-02	1/4	1.5 oz.	05	27	37	40

Flows are 100 PSIG inlet and a 25% PSID.



MODEL NUMBER	PIPE SIZE	Bowl Size	Micron Rating	SCFM AT REDUCED PRESSURE OF		
				25 PSIG	60 PSIG	80 PSIG
P21A-02	1/4	3.8 oz.	40	31	59	61
P21B-02	1/4	3.8 oz.	05	22.3	38	45
P21A-03	3/8	3.8 oz.	40	54	60	62
P21B-03	3/8	3.8 oz.	05	39	49	55
P21A-04	1/2	3.8 oz.	40	54	60	62
P21B-04	1/2	3.8 oz.	05	39	49	55

Flows are 100 PSIG inlet and a 25% PSID.



MODEL NUMBER	PIPE SIZE	Bowl Size	Micron Rating	SCFM AT REDUCED PRESSURE OF		
				25 PSIG	60 PSIG	80 PSIG
P30A-04	1/2	8.5 oz.	40	101	128	141
P30B-04	1/2	8.5 oz.	05	73	115	129
P30A-06	3/4	8.5 oz.	40	101	128	141
P30B-06	3/4	8.5 oz.	05	73	115	129

Flows are 100 PSIG inlet and a 25% PSID.

PANEL MOUNT NUT

Series	Model	Hole Dia.	A	B
10/21	PN10	1.25 (32)	1.38 (35)	1-3/16 18 UNEF-2B
30	PN31P	1.77 (45)	2.05 (52)	1-3/4 18 UNS-2B

NOTE: For Regulator Brackets, See accessories section

SPECIFICATIONS

	Temp. Range		Maximum Pressure		Weight					
	°F	°C	PSIG	BAR	10 Series		21 Series		30 Series	
					lbs	Kg	lbs	Kg	lbs	Kg
Polycarbonate Bowl	40 to 120	4.4 to 48.9	150	10.3	.78	.35	1.39	.63	2.21	1.0
CircleVision Bowl	40 to 150	4.4 to 65.6	250	17.2	1.03	.47	1.85	.84	2.66	1.3
Metal Bowl	40 to 180	4.4 to 82.2	300	20.8	.98	.45	1.72	.78	2.66	1.2
Body Material	---		---		Zinc		Zinc		Aluminum	

GAUGES

Series	Model Numbers		PSIG Range
	1/8 NPT	G 1/8	
10/21	GA060	RA060	0-60
10/21	GA160	RA160	0-160

Series	Model Numbers		PSIG Range
	1/4 NPT	G 1/4	
30	GB060	RB060	0-60
30	GB160	RB160	0-160
30	GB300	RB300	0-300

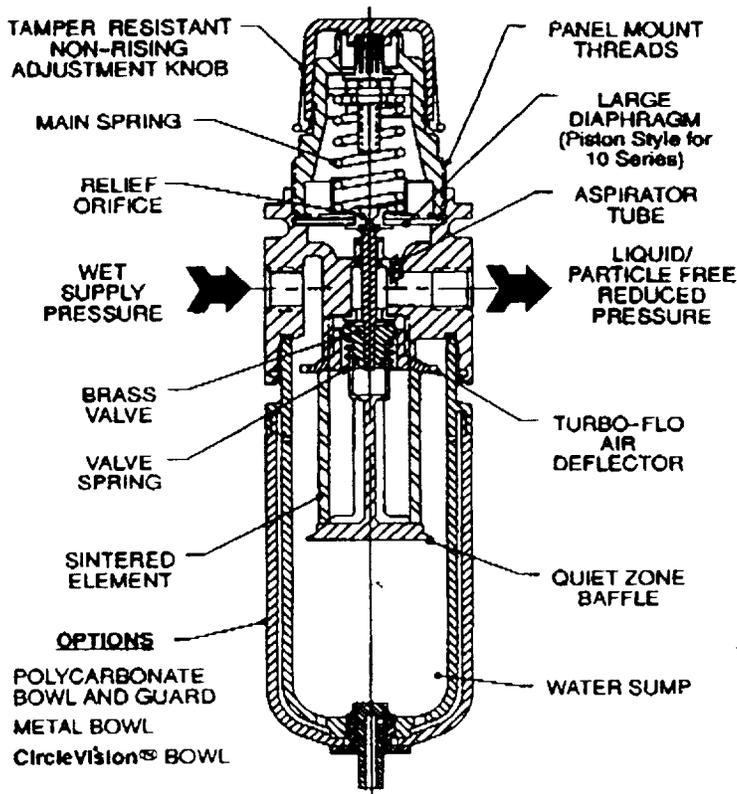
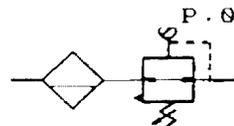
GA and RA models gauges have a 1.5" (38) face diameter. GB and RB model gauges have a 2.0" (50.8) face diameter.

AUTO DRAIN OPTIONS

SUFFIX	FOR UNITS	KIT NO.
A	21 and 30 Series	AKF00
J	10 Series	JK10

PARTICULATE FILTER / REGULATORS

A.N.S.I.
SYMBOL



APPLICATION

The integral particulate filter/regulator (piggyback) is a two station component designed to filter and regulate compressed air when cost and space are of primary concern. As dirty, wet air enters, it immediately flows through the air deflector causing the air to move in a swirling motion. After condensed water is centrifugally removed, air passes through the filter and into the regulator. The high pressure air is systematically reduced via the adjustment spring and valve and exits the housing as a clean and dry air that is ready to work at the specified pressure.

NOTE: See separate Filter and Regulator sections for additional information.

FEATURES

- Three convenient sizes
- 5 Micron element standard.
- Can be mounted as modular or individual unit
- Available with CircleVision™ sight bowl.
- Non-rising knob.
- Standard output pressure 0-125 PSIG

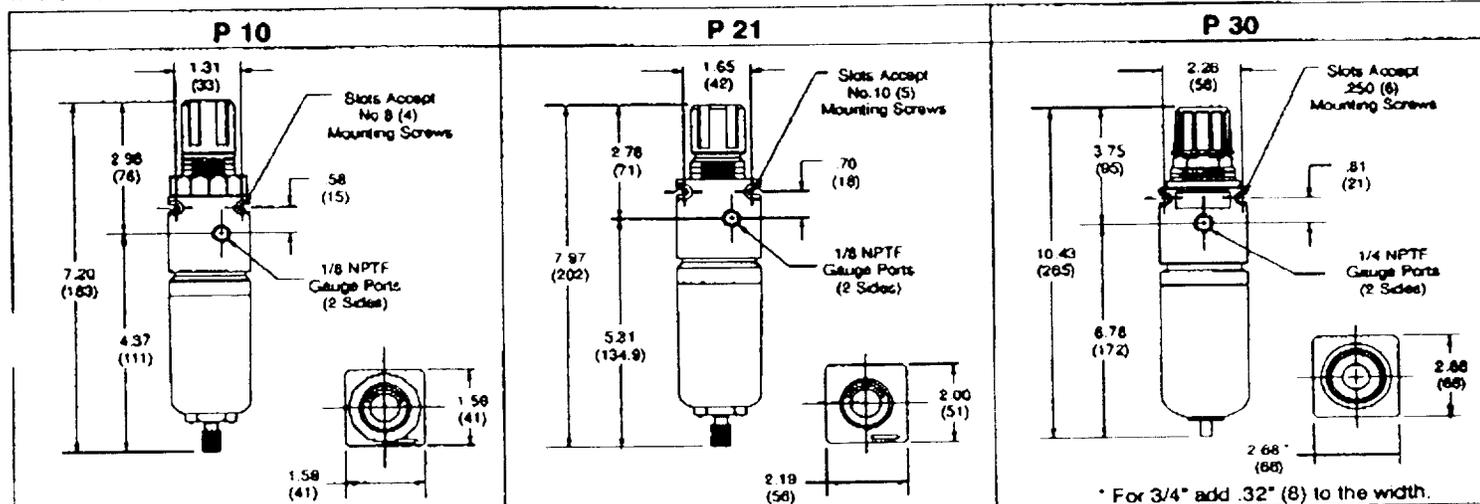
*Att: Ken
Specs for P30B-06A.*

HOW TO ORDER

EXAMPLE:

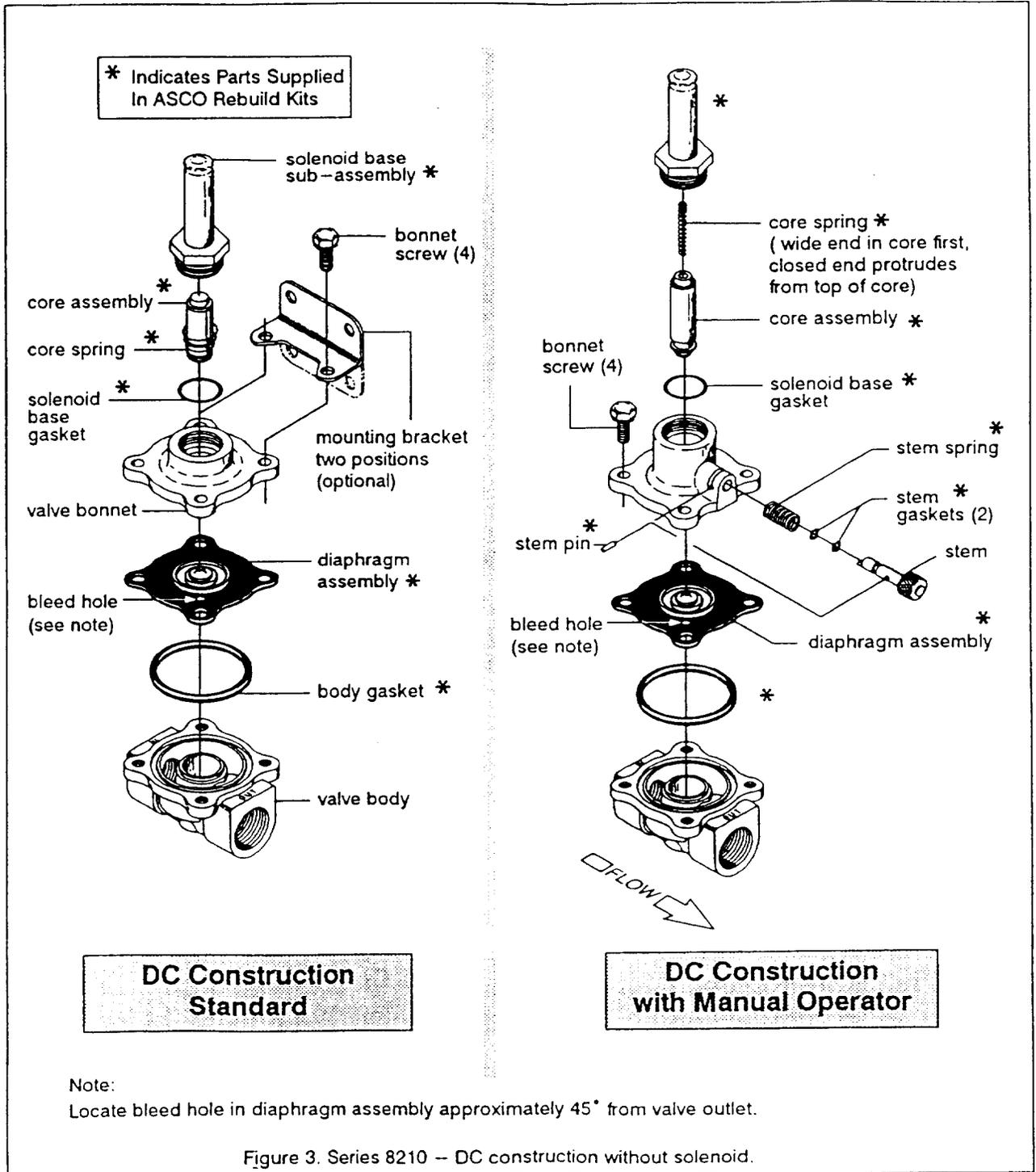
P	1 0	B	-	0 2	C G J P
MODEL	SERIES	ELEMENT	THREADS	PORT SIZE	OPTIONS
P = Particulate/Regulator	10 = 1.5 oz. Bowl 21 = 3.8 oz. Bowl 30 = 8.5 oz. Bowl	A = 40 Micron Particulate B = 5 Micron Particulate (Standard)	- = NPTF G = G Tap	Series Available 01 = 1/8 10 02 = 1/4 10, 21 03 = 3/8 10*, 21 04 = 1/2 21, 30 08 = 3/4 30 * With End Plates	A = Auto Drain (21/30) C = CircleVision® Sight Bowl E = End Plates (Attached) G = Gauge H = 0-250 PSIG Output (30) I = 0-25 PSIG Output J = Piston Drain (10) L = 0-60 PSIG Output M = Metal Bowl N = Non-relieving P = Panel Mount Nut

MOUNTING DIMENSIONS



Torque Chart

Part Name	Torque Value Inch-Pounds	Torque Value Newton-Meters
Solenoid base sub-assembly	175 ± 25	19,8 ± 2,8
Bonnet screws	95 ± 10	10,7 ± 1,1



Oil/Water Separator



SCG Industries Limited

250 King William Road
Spruce Lake Industrial Park
Saint John, NB, Canada, E2M 5Y5
Tel: (506) 674-1081
Fax: (506) 674-1082
Web Site: www.remedi8.com

1-888-REMEDi8

OWSEP- Oil/Water Separator

The SCG manufactured OWSEP is used as a secondary water treatment vessel which is employed to coalesce and remove free phase oils and petroleum hydrocarbons from contaminated water streams. As the OWSEP operates most effectively with a laminar influent flow of up to 50 gpm it is typically located downstream of an ISOL.

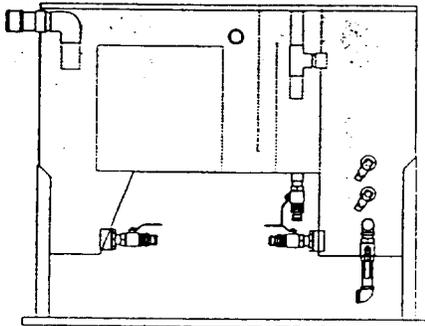
The OWSEP is an epoxy-lined carbon steel tank equipped with weirs to regulate liquid flow to prevent breakthrough of separated product, an adjustable skimmer, oleophilic coalescing pack, sludge clean-outs, vapour-tight lid and vent assembly, and a hazardous location float for overflow protection.

User-Defined Specifications:

- Hydraulic Flowrate
- Removal Efficiency
- Contaminant Type
- Influent Concentration

Listed Options:

- Cleanout chambers
- Additional Floats
- Influent Concentration
- Effluent Concentration



Above:
A profile view of
SCG's OWSEP.

Model:
OWSEP-3-B-2-B-4

Warranty: SCG Industries Limited offers a standard manufacturer's warranty against material defects and manufacturer's workmanship.

Saint John

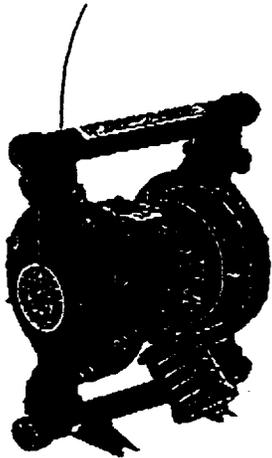
Montréal

Calgary

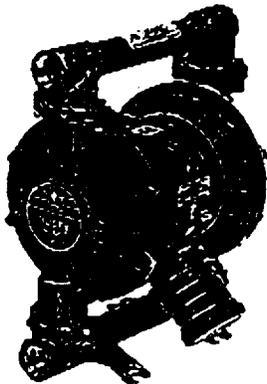


Husky™ 1040

Air-Operated Double Diaphragm Pump



Aluminum



Stainless Steel



Acetal



Polypropylene



Kynar

Your Husky 1040 is a pump ready for action. With high flow rates, it can take on a large range of fluids to meet your wide variety of needs. You get a lot of pumping in a small package.

Smooth, clean fluid passages permit the use of heavier fluids at faster flow rates. The Husky 1040 has a new valve system that is 100% serviceable without disassembly of the wetted parts.

You have a choice of 5 models: the aluminum all-around general purpose pump; 316 stainless steel to better handle the more abrasive or corrosive fluids; acetal for paints/solvents; polypropylene for general chemicals; and Kynar for very aggressive chemicals or elevated temperatures. Each model has a selection of conversion kits, making it easy to adapt your pump to your specific fluid needs. UL listed models are also available.

- **High flow – 42 gpm (159 lpm) in a compact, portable size**
- **Fluid pressure to 120 psi (8.3 bar)**
- **E-coated center section for corrosive environments**
- **Equipped with a new, tried & true valve system**
- **Stainless steel exterior hardware**



Form No. 305-588

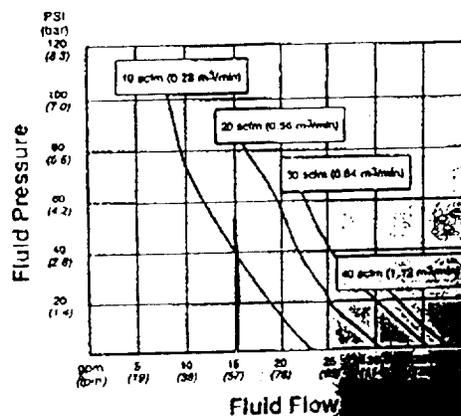
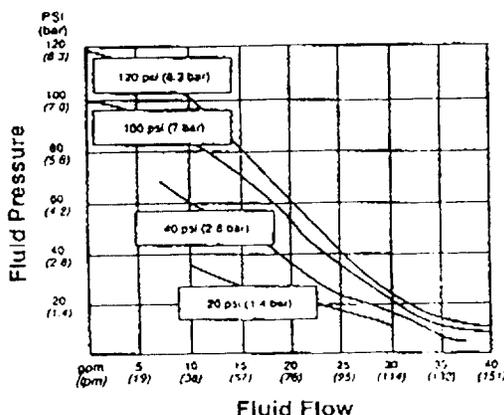


A hard working pump for a wide variety of fluids

Technical Specifications

Maximum Fluid Pressure	120 psi (8.3 bar)
Maximum Free Flow Delivery	42 gpm (159 lpm)
Maximum Pump Speed	276 cpm
Gallons (liters) per Cycle	0.15 (0.57)
Maximum Size Pumpable Solids	1/8 in. (3.2 mm)
Maximum Suction Lift - Wet or Dry	18 ft. (5.48 m)
Air Pressure Operating Range	20-120 psi (1.4-8.3 bar)
Maximum Operating Temperature	150°F (65.5°C)
	<i>200°F (93.3°F) for models with Teflon diaphragms and metal or Kynar housings</i>
Typical Noise Level (at 70 psi, 50 cpm)	78 dBA
Air Inlet	1/2 npt(f)
Fluid Inlet	
Metals	1 npt(f)
Plastics	1 in. raised face flange
Fluid Outlet	
Metals	1 npt(f)
Plastics	1 in. raised face flange
Weight	
Aluminum	18 lbs. (8.2 kg)
Stainless Steel	33 lbs. (15 kg)
Polypropylene	19 lbs. (8.6 kg)
Acetal	22 lbs. (10 kg)
Kynar	25 lbs. (11.3 kg)
Size	
Metal Models	12 in. W x 14 in. H x 9 1/4 in. D (304.8 mm W x 355.6 mm H x 235 mm D)
Plastic Models	13.5 in. W x 16.88 in. H x 9 1/4 in. D (342.9 mm W x 428.8 mm H x 235 mm D)
Mounting Hole Layout	5 in. x 5 1/2 in. (127 mm x 139.7 mm)
Wall Bracket Mounting Hole Pattern	6.24 in. W x 5.38 in. H (158.5 mm W x 136.7 mm H)
Instruction Manual	
Aluminum and Stainless Steel	308-479
Acetal, Polypropylene & Kynar	308-443

Husky 1040 Performance Chart *(Inlet Submerged in Water)*



HUSKY PUMPS (Continued)

7-120 PSI

Part No.	Description	Flow at 60 cpm		Max. Output Pressure		Wetted Parts				Instruction Manual
		gpm	lpm	psi	bar	Housing	Seats	Balls	Diaphragms	
D61-211	Husky 715	16	60	100	7	Acetal	Acetal	Teflon	Teflon	308-444
D61-277	Husky 715	16	60	100	7	Acetal	Acetal	Buna-N	Buna-N	308-444
D62-911	Husky 715	16	60	100	7	Polypropylene	Polypropylene	Teflon	Teflon	308-444
D62-977	Husky 715	16	60	100	7	Polypropylene	Polypropylene	Buna-N	Buna-N	308-444
D62-211	Husky 715	16	60	100	7	Aluminum	Acetal	Teflon	Teflon	308-037
D62-277	Husky 715	16	60	100	7	Aluminum	Acetal	Buna-N	Buna-N	308-037
D64-311	Husky 715	16	60	100	7	SST	SST	Teflon	Teflon	308-037
D64-377	Husky 715	16	60	100	7	SST	SST	Buna-N	Buna-N	307-037
D73-911	Husky 1040	42	159	120	8.3	Aluminum	Polypropylene	Teflon	Teflon	308-479
D73-525	Husky 1040	42	159	120	8.3	Aluminum	Hytrel	Acetal	Hytrel	308-479
D73-666	Husky 1040	42	159	120	8.3	Aluminum	Santoprene	Santoprene	Santoprene	308-479
D73-311	Husky 1040	42	159	120	8.3	Aluminum	316 SST	Teflon	Teflon	308-479
D74-525	Husky 1040	42	159	120	8.3	SST	Hytrel	Acetal	Hytrel	308-479
D74-666	Husky 1040	42	159	120	8.3	SST	Santoprene	Santoprene	Santoprene	308-479
D74-311	Husky 1040	42	159	120	8.3	SST	316 SST	Teflon	Teflon	308-479
D71-221	Husky 1040	42	159	120	8.3	Acetal	Acetal	Acetal	Teflon	308-443
D71-311	Husky 1040	42	159	120	8.3	Acetal	316 SST	Teflon	Teflon	308-443
D71-411	Husky 1040	42	159	120	8.3	Acetal	Hardened SST	Teflon	Teflon	308-443
D71-431	Husky 1040	42	159	120	8.3	Acetal	Hardened SST	SST	Teflon	308-443
D72-311	Husky 1040	42	159	120	8.3	Polypropylene	316 SST	Teflon	Teflon	308-443
D72-911	Husky 1040	42	159	120	8.3	Polypropylene	Polypropylene	Teflon	Teflon	308-443
D72-525	Husky 1040	42	159	120	8.3	Polypropylene	Hytrel	Acetal	Hytrel	308-443
D72-666	Husky 1040	42	159	120	8.3	Polypropylene	Santoprene	Santoprene	Santoprene	308-443
D75-311	Husky 1040	42	159	120	8.3	Kynar	316 SST	Teflon	Teflon	308-443
D75-666	Husky 1040	42	159	120	8.3	Kynar	Santoprene	Santoprene	Santoprene	308-443
D75-A11	Husky 1040	42	159	120	8.3	Kynar	Kynar	Teflon	Teflon	308-443
D75-A88	Husky 1040	42	159	120	8.3	Kynar	Kynar	Viton	Viton	308-443
DB3-911	Husky 1590	90	34	120	8.3	Aluminum	Polypropylene	Teflon	Teflon	308-441
DB3-525	Husky 1590	90	34	120	8.3	Aluminum	Hytrel	Acetal	Hytrel	308-441
DB3-666	Husky 1590	90	34	120	8.3	Aluminum	Santoprene	Santoprene	Santoprene	308-441
DB3-311	Husky 1590	90	34	120	8.3	Aluminum	316 SST	Santoprene	Teflon	308-441
DB4-311	Husky 1590	90	34	120	8.3	SST	316 SST	Teflon	Teflon	308-441
DB4-525	Husky 1590	90	34	120	8.3	SST	Hytrel	Acetal	Hytrel	308-441
DB4-666	Husky 1590	90	34	120	8.3	SST	Santoprene	Santoprene	Santoprene	308-441
DB2-311	Husky 1590	90	34	120	8.3	Polypropylene	316 SST	Teflon	Teflon	308-549
DB2-666	Husky 1590	90	34	120	8.3	Polypropylene	Santoprene	Santoprene	Santoprene	308-549
DB2-911	Husky 1590	90	34	120	8.3	Polypropylene	Polypropylene	Teflon	Teflon	308-549
DB2-555	Husky 1590	90	34	120	8.3	Polypropylene	Hytrel	Hytrel	Hytrel	308-549
DB5-311	Husky 1590	90	34	120	8.3	Kynar	316 SST	Teflon	Teflon	308-549
DB5-666	Husky 1590	90	34	120	8.3	Kynar	Santoprene	Santoprene	Santoprene	308-549
DB5-A11	Husky 1590	90	34	120	8.3	Kynar	Kynar	Teflon	Teflon	308-549
DB5-A88	Husky 1590	90	34	120	8.3	Kynar	Kynar	Viton	Viton	308-549
DF3-911	Husky 2150	150	568	120	8.4	Aluminum	Polypropylene	Teflon	Teflon	308-368
DF3-525	Husky 2150	150	568	120	8.4	Aluminum	Hytrel	Acetal	Hytrel	308-368
DF3-666	Husky 2150	150	568	120	8.4	Aluminum	Santoprene	Santoprene	Santoprene	308-368
DF3-311	Husky 2150	150	568	120	8.4	Aluminum	SST	Teflon	Teflon	308-368
DF4-311	Husky 2150	150	568	120	8.4	SST	SST	Teflon	Teflon	308-368
DF4-525	Husky 2150	150	568	120	8.4	SST	Hytrel	Acetal	Hytrel	308-368
DF4-666	Husky 2150	150	568	120	8.4	SST	Santoprene	Santoprene	Santoprene	308-368
DF2-311	Husky 2150	150	568	120	8.4	Polypropylene	316 SST	Teflon	Teflon	308-550
DF2-666	Husky 2150	150	568	120	8.4	Polypropylene	Santoprene	Santoprene	Santoprene	308-550
DF2-911	Husky 2150	150	568	120	8.4	Polypropylene	Polypropylene	Teflon	Teflon	308-550
DF2-555	Husky 2150	150	568	120	8.4	Polypropylene	Hytrel	Hytrel	Hytrel	308-550
DF5-311	Husky 2150	150	568	120	8.4	Kynar	316	Teflon	Teflon	308-550
DF5-666	Husky 2150	150	568	120	8.4	Kynar	Santoprene	Santoprene	Santoprene	308-550
DF5-A11	Husky 2150	150	568	120	8.4	Kynar	Kynar	Teflon	Teflon	308-550
DF5-A88	Husky 2150	150	568	120	8.4	Kynar	Kynar	Viton	Viton	308-550

Note: In addition to the pump selections shown above, you may order custom configured pumps available in hundreds of material combinations. Contact your local Graco representative for further information.

• Stainless Steel ** Hard Chrome plating over Stainless Steel
 * Waterborne Paint Compatible

SST=Stainless Steel CS=Carbon Steel



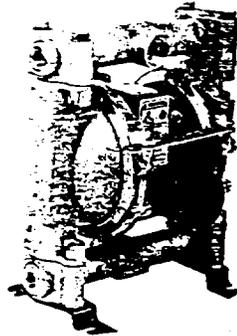
GRACO
First choice when
quality counts.™

Husky™ 715 Air-Operated Diaphragm Pumps



Aluminum

- No seals to leak or fail mean less downtime
- Clean, hands-off fluid handling
- Quiet running, less than 85 dB(A) with easy to use remote muffler capability for even lower noise levels
- High flow - 16 gpm (60 l/min.) in a small portable package



Stainless Steel

Multiple Uses and Hard Working

The Husky 715 is a versatile pump, well suited for a variety of utility duties requiring operation up to 16 gpm (60 l/min.) with light to medium viscosity fluids. This is an excellent pump for a variety of applications, including machine lube servicing, cleaning fluids and detergents, plating and dip tanks, water treatment, chemicals and other difficult fluids. Uses include drum evacuation, chemical injection, ceramic glaze supply, low viscosity printing inks and similar fluids. Because of its small size, the Husky 715 is compact, lightweight and easy to carry.

**Reliable
transfer pump
handles
a variety
of fluids**



Acetal

The Husky 715 is available in four models: Acetal for solvents and flammables, Polypropylene for acids and bases, Aluminum for oil and water and most solvents, and Stainless Steel for those wanting an all metal pump with excellent corrosion and abrasion resistance. UL models are available for oil transfer, or waste oil evacuation.

New Air Valve Design

The Husky 715 now features Graco's new patented air valve design with the following advantages.

- Simple design with only 15 parts, accessed by removing six screws
- Lubricated air is not required
- Air valve operates with 20 psi (1.4 bar) air or less
- Common to Graco's Husky 307 pump



Polypropylene

Technical Specifications

Maximum fluid pressure 100 psi (7 bar)
 Maximum free flow delivery 16 gpm (60 l/min.)
 Displacement08 gallon (0.3 liter)
 Maximum pump speed 200 cycles/min.
 Maximum size pumpable solids 3/32 in. (2.4 mm)
 Maximum suction lift – wet 21 ft. (6.4 m)
 Maximum suction lift – dry 16 ft. (4.9 m)
 Air pressure operating range 25-100 psi (1.7-7 bar)
 Operating temperature range 40°-150°F (5°-65°C)
 Maximum noise level 85 dB(A)
 Air inlet 1/4 npt(f)
 Fluid inlet/outlet 3/4 npt(f)
 Maximum air consumption 19 scfm

Maximum recommended viscosity 5000 cps
 Dimensions (W x H x D) 8-3/4 in. x 10-3/4 in. x 7-1/2 in.
 (222 mm x 273 mm x 191 mm)

Weight

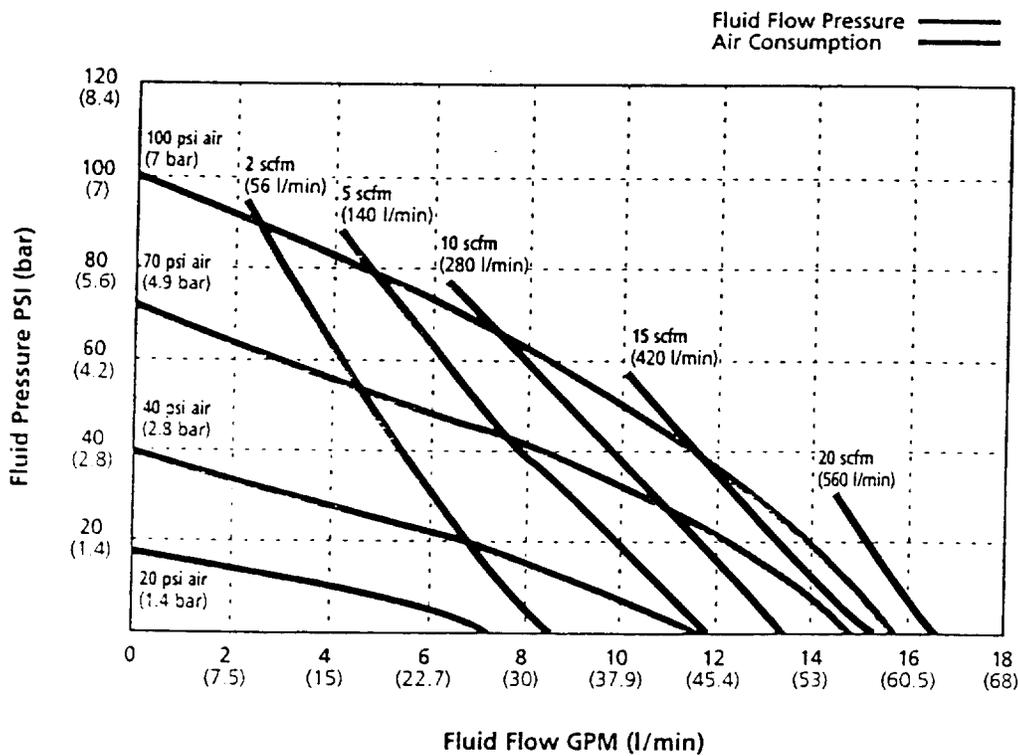
Acetal and Polypropylene 7 lbs. (3.2 kg)
 Aluminum 9.6 lbs. (4.4 kg)
 Stainless Steel 19.25 lbs. (8.7 kg)
 Mounting Hole Layout 4.3 in. x 6.62 in.
 (109 mm x 168 mm)

Instruction manuals

Acetal and Polypropylene 307-855
 Aluminum and Stainless Steel 308-037

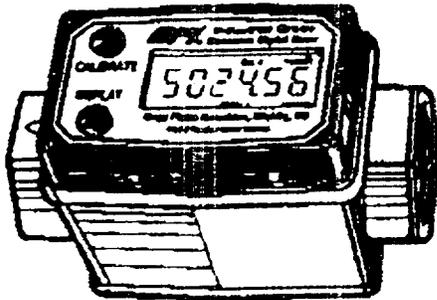


Husky 715 Performance Chart (Inlet Submerged in Water)





Fact Sheet



Model S100 Turbine shown with standard Computer Electronics which are sold separately

- Field Replaceable Internal Parts
- Excellent Chemical Compatibility
- High Accuracy
- High Turndown Ratio
- Pressure Rating of 1,500 PSIG (103 bar)
- Extended Flow Range of 2.5 to 50 GPM (9.5 to 190 LPM)
- Linear Range of 5 to 50 GPM (18.9 to 190 LPM)
- Signal Output Capabilities
- Repeatability of $\pm 0.1\%$
- Accessories easily upgrade meters



All GPI turbines are Factory Mutual Approved and carry a Class 1, Division 1 Approval for hazardous environments

GPI is a registered trademark of Great Plains Industries, Inc. U.S. Patents 4,856,384; 4,700,579, and 5,046,370. Australian Patent 572,494. Canadian Patent 1,223,464. European Patent EU0147004. German Patent P3473494.2-08. Italian Patent 68074-BE/89.

Industrial Grade Metering Products Stainless Steel Turbine Model S100

Technical Specifications

Flow Ranges

Linear:	5 to 50 GPM (18.9 to 190 LPM)
Extended:	2.5 to 50 GPM (9.5 to 190 LPM)
Maximum Flow:	75 GPM (284 LPM)
Fluid Velocity in Extended Range:	0.93-18.6 ft./sec. (0.28-5.7 m/sec.)

Performance*

Linear Range:	10:1 @ $\pm 1.5\%$ of reading
Extended Range:	20:1 @ $\pm 5.0\%$ of reading
Repeatability:	$\pm 0.1\%$
Maximum Pressure Drop in 10:1 Range:	5 PSIG (0.34 bar)
Pressure Rating:	1,500 PSIG (103 bar)
Frequency Range:	45-475 Hz @ 5-50 GPM

Connections

Inlet and Outlet:	1 inch female NPT or ISO
Wrench Flat Size:	1-5/8 in. (41mm)

Temperatures**

Operational:	-40° to +250°F (-40° to +121°C)
Storage:	-40° to +250°F (-40° to +121°C)

Wetted Components

Housing:	316 Stainless Steel
Journal Bearings:	Ceramic (96% Alumina)
Shaft:	Tungsten Carbide
Rotor and Supports:	PVDF
Retaining Rings:	316 Stainless Steel

Weight

Turbine only:	2.4 lbs. (1.1 kg)
Turbine with computer:	2.6 lbs. (1.2 kg)

Shipping Weight

Turbine only:	2.6 lbs. (1.2 kg)
Turbine with computer:	2.8 lbs. (1.3 kg)

- * Results determined with 1 centistoke stoddard solvent test fluid at 70°F (21°C).
- ** Turbine only without computer.



5252 East 36th Street North
Wichita, KS USA 67220-3205
TEL: 316-686-7381
FAX: 316-686-6748

GREAT PLAINS INDUSTRIES, INC.

Roughneck.

Performance Data For 60 Hertz



CSA certified or UL listed

NOMINAL WATTAGE (KW)	MODEL	VOLTAGE	PHASE	TOTAL CURRENT (A)		TEMPERATURE (SE)		BTU/HR
				PHASE A	PHASE B	PHASE A	PHASE B	
	XL412-208160-3	208	1	15.3		19.0	10.5	10,250
	XL412-240160-3	240	1	13.5				
	XL412-208360-3	208	3	8.9				
	XL412-240360-3	240	3	7.9				
	XL412-480160-3*	480	1	N/A				
	XL412-480360-3	480	3	3.9				
XL412-600360-3*	600	3	N/A					
	XL412-208160-5	208	1	24.9		31.6	17.6	7,050
	XL412-240160-5	240	1	21.9				
	XL412-208360-5	208	3	14.4				
	XL412-240360-5	240	3	12.7				
	XL412-480160-5*	480	1	N/A				
	XL412-480360-5	480	3	6.4				
XL412-600360-5*	600	3	N/A					
	XL412-208160-7.5	208	1	36.9		27.9	15.5	5,600
	XL412-240160-7.5	240	1	32.3				
	XL412-208360-7.5	208	3	21.4				
	XL412-240360-7.5	240	3	18.7				
	XL412-480160-7.5*	480	1	N/A				
	XL412-480360-7.5	480	3	9.4				
XL412-600360-7.5*	600	3	N/A					
	XL412-208160-10**	208	1	N/A	N/A	37.2	20.6	9,100
	XL412-240160-10	240	1	42.7	35.1			
	XL412-208360-10	208	3	28.3	23.3			
	XL412-240360-10	240	3	24.7	21.7			
	XL412-480160-10*	480	1	N/A	N/A			
	XL412-480360-10	480	3	12.4	12.4			
XL412-600360-10*	600	3	N/A	N/A				
	XL416-240160-15**	240	1	N/A	N/A	27.1	15.0	5,120
	XL416-208360-15	208	3	41.4	36.0			
	XL416-240360-15	240	3	36.0	30.0			
	XL416-480160-15*	480	1	N/A	N/A			
	XL416-480360-15	480	3	18.0	18.0			
	XL416-600360-15*	600	3	N/A	N/A			
	XL416-208360-20**	208	3	N/A	N/A	36.1	20.1	6,250
	XL416-240360-20**	240	3	N/A	N/A			
	XL416-480160-20*	480	1	N/A	N/A			
	XL416-480360-20	480	3	24.0	24.0			
	XL416-600360-20*	600	3	N/A	N/A			
	XL420-240360-25**	240	3	N/A	N/A	21.9	12.2	8,500
	XL420-480360-25	480	3	30.1	30.1			
	XL420-600360-25*	600	3	N/A	N/A			
	XL420-480360-30	480	3	36.1	36.1	26.3	14.6	10,350
	XL420-600360-30*	600	3	N/A	N/A			
	XL420-480360-35	480	3	42.1	42.1	28.0	15.6	11,450
	XL420-600360-35*	600	3	N/A	N/A			

Note: * CSA certified ONLY.

• Exceeds the 48 amp. circuit limit of NEC 424-22.

Not available with Group C rating.

To order a heater with an optional built-in thermostat, add a "T" suffix to model number.

To order a heater with a Group (C, D, F, & G) rating, add a "C" suffix to model number.

To order a heater with a Group (D, E, F, & G) rating, no suffix is required.

Please specify CSA or UL when ordering.

See Page 6 for Model Coding and Installation Conditions.

