

Start up reports and Equipment Submittal Record

SOUTH SANGAMON WTP
SANGAMON COUNTY, ILLINOIS

Chemical Feed System



Pulsafeeder, Inc.
2883 Brighton Henrietta Townline Road
Rochester, NY 14623
Phone: 585/292-8000
Fax: 585/424-5619

STARTUP REPORT

BY: Ed Winter & Joe Ewinsmeyer

BROOKS & ASSOCIATES INC
3100 WEST OSAGE
PACIFIC, MO. 63069
PH. 636-451-6969 FX. 636-742-4244

DATE: 1-30-17/2-9-12
JOB: Sangamon Water
9919 Buckhart Rd.
Rochester, IL 62563

CONTR: Plocher Const.
PHONE: 618-781-4080
CONTACT: DAMIEN BOLEN

PHONE: _____
OPERATOR: Jm
OTHER: _____

SYSTEM: Hypochlorite MFR: _____

Serial Numbers	Scale DR20LP	Pump 1 25BBH	Pump 2 25BBH	Pump 3 25BBH
	FF40149	X7898158-7	X7898158-8	X7898158-9

Lubrication _____

Calibration See Attached Curves

CHECKED IN MANUAL WITH WATER

General Description _____

Piping WAS NOT Complete
Contractor Piping Today -

Pump #1 WAS tripping Breaker
Checked Connections & Repaired -

Pumps & Controls were Checked out
& working. Remote Start/stop
AND Analog Input were connected
but NOT CONFIRMED IN AUTO.

Raw Pumps IN MANUAL

2-9-12	Pump #1	= 100%	= 10.4 GPH	Pump #2	= 10.46	Pump 3	10.23
	50%	= 5.2		5.23		5.12	
	20%	= 2.03		2.09		2.04	

SCALE = 0-1800

Operator _____
Instruction NOT YET 2-9-12 - Instructed on
OPERATION, MAINTENANCE & Safety of Equipment

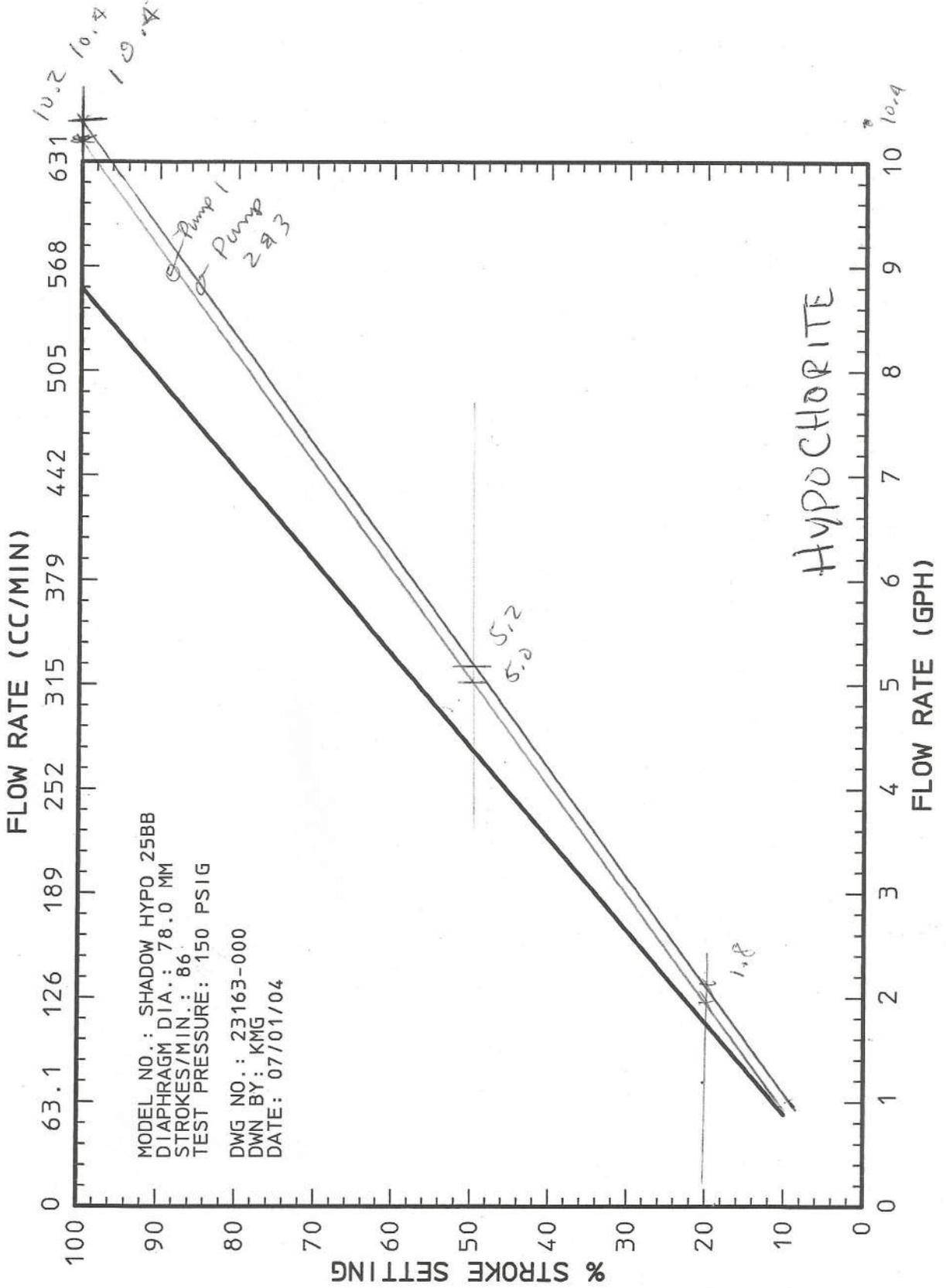
Contr's Rep: [Signature]

Owner's Rep: [Signature]

Done

Need to send priming values
need check valve & Ball valve on Day tank outlet

PULSAFEEDER PUMP FLOW CURVE



STARTUP REPORT

BY: Ed Winter / Joe Eversmeyer

BROOKS & ASSOCIATES INC
3100 WEST OSAGE
PACIFIC, MO. 63069
PH. 636-451-6969 FX. 636-742-4244

DATE: 1-30-12/2-9-12
JOB: SANGAMON WATER
9919 Burkhart Rd
Rochester, IL 62563

CONTR: Plocher Const
PHONE 618-781-4080
CONTACT DAMIEN BOLEN

PHONE _____
OPERATOR Tim
OTHER _____

SYSTEM Ammonia

MFR Pulsa FEEDER / FINE FLOW

Serial Numbers	Scale	DR10LP	#2	25BB	#1	25BB
	FF.40148		X789858-2		V789858-1	

Lubrication Checked

Calibration See Attached Curves & CHECKED ON WATER IN MANUAL

General..Description

Piping WAS NOT COMPLETE *
FILLED DAY TANK AND
STARTED SYSTEM ON WATER -

Pumps & Controls were working
ONLY INPUTS OR OUTPUTS CONNECTED
were Remote Start/Stop AND
4-20 Ma Analog Input. However SCADA
WAS NOT ON LINE -
RAW Pumps ON MANUAL. Will check out
signals later

Calibrated Scale 4-20 MA = 0 - 1000 Lbs
2-9-12 Pump #1 = 100% 7.86PH / Pump #2 = 7.77
50% 3.96PH 3.89
20% 1.566PH 1.55

Operator

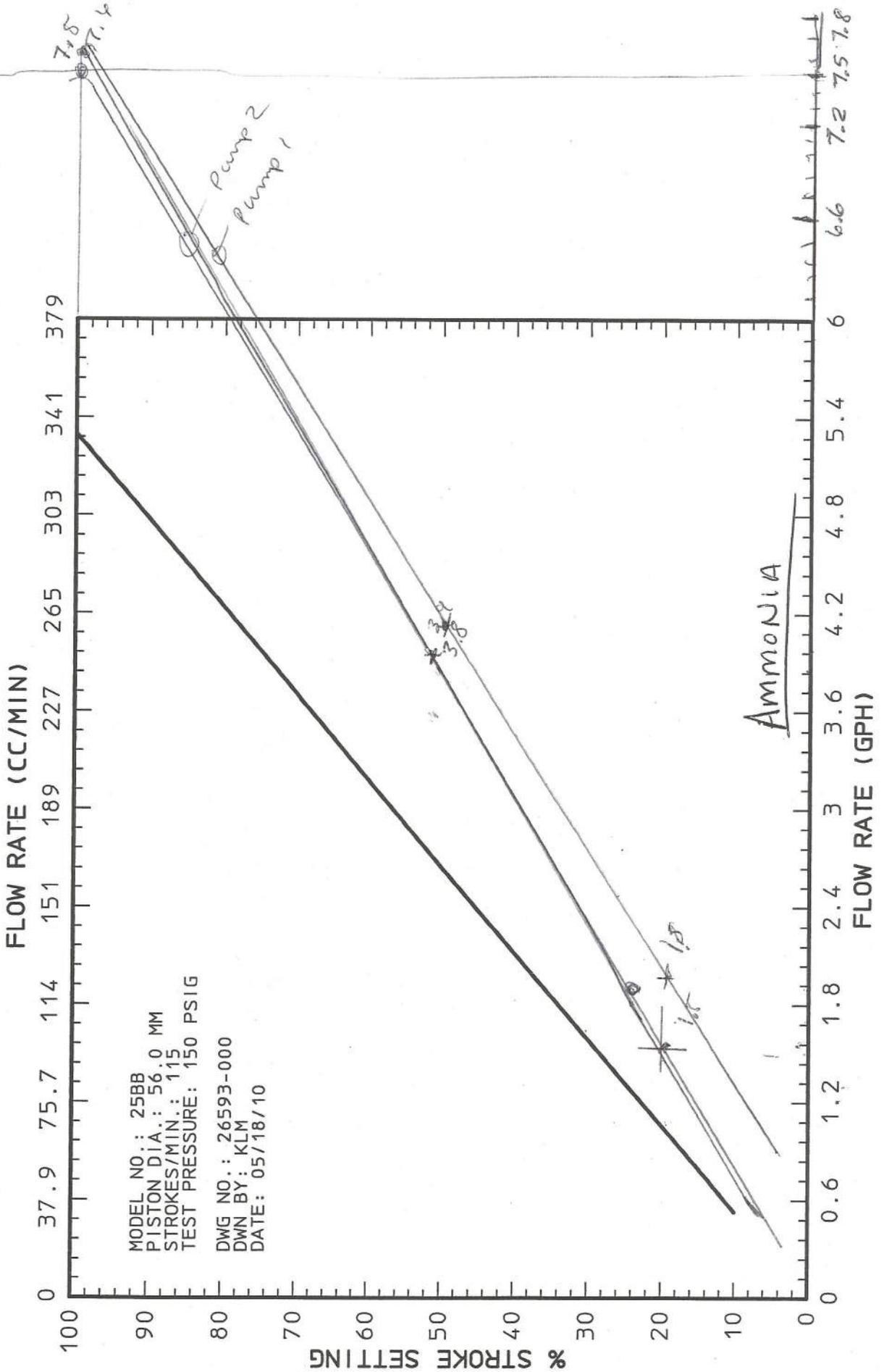
Instruction NOT YET 2-9-12 Instructed on OPERATION,
MAINTENANCE & SAFETY

Contr's Rep. [Signature]

Owner's Rep. [Signature]

Done
{ Need to send Priming Valves
{ Need check & BALL VALVES ON DAY TANK outlet

PULSAFEEDER PUMP FLOW CURVE



STARTUP REPORT

BROOKS & ASSOCIATES INC
3100 WEST OSAGE
PACIFIC, MO. 63069
PH. 636-451-6969 FX. 636-742-4244

BY: ED WINTER Joe Eversmeyer

DATE: 1-30-12 / 2-9-12

JOB: Sangamon Water
9919 BUCKHART Rd
Rochester, IL 62563

CONTR: Plocker Const
PHONE 618-781-4080
CONTACT Damien Bolen

PHONE. _____
OPERATOR Tim
OTHER _____

SYSTEM Fluoride

MFR PulsA Feeder / Force Flow

Serial SCALE DR8DS / MP #1 / MP #2
Numbers FF 40152 / 0911.309361 / 0911.309362

Lubrication N/A

Calibration See Attached Curves

General..Description _____

Piping was not complete
Contractor Piping Today.
Pumps working - Power Connected.

2-9-12 Piping Complete w/ check valve & Priming valves
(1.08 GPH) Pump #1 = .018 = 100% .009 = 50% .0018 = 10%
(1.02 GPH) Pump #2 = .017 = 100% .0085 = 50% .0017 = 10%

SCALE = 0-500 LBS = 4.20 mA

Operator _____
Instruction Not yet in
2-9-12 Instructed on OPERATION, maintenance & Safety
of equipment

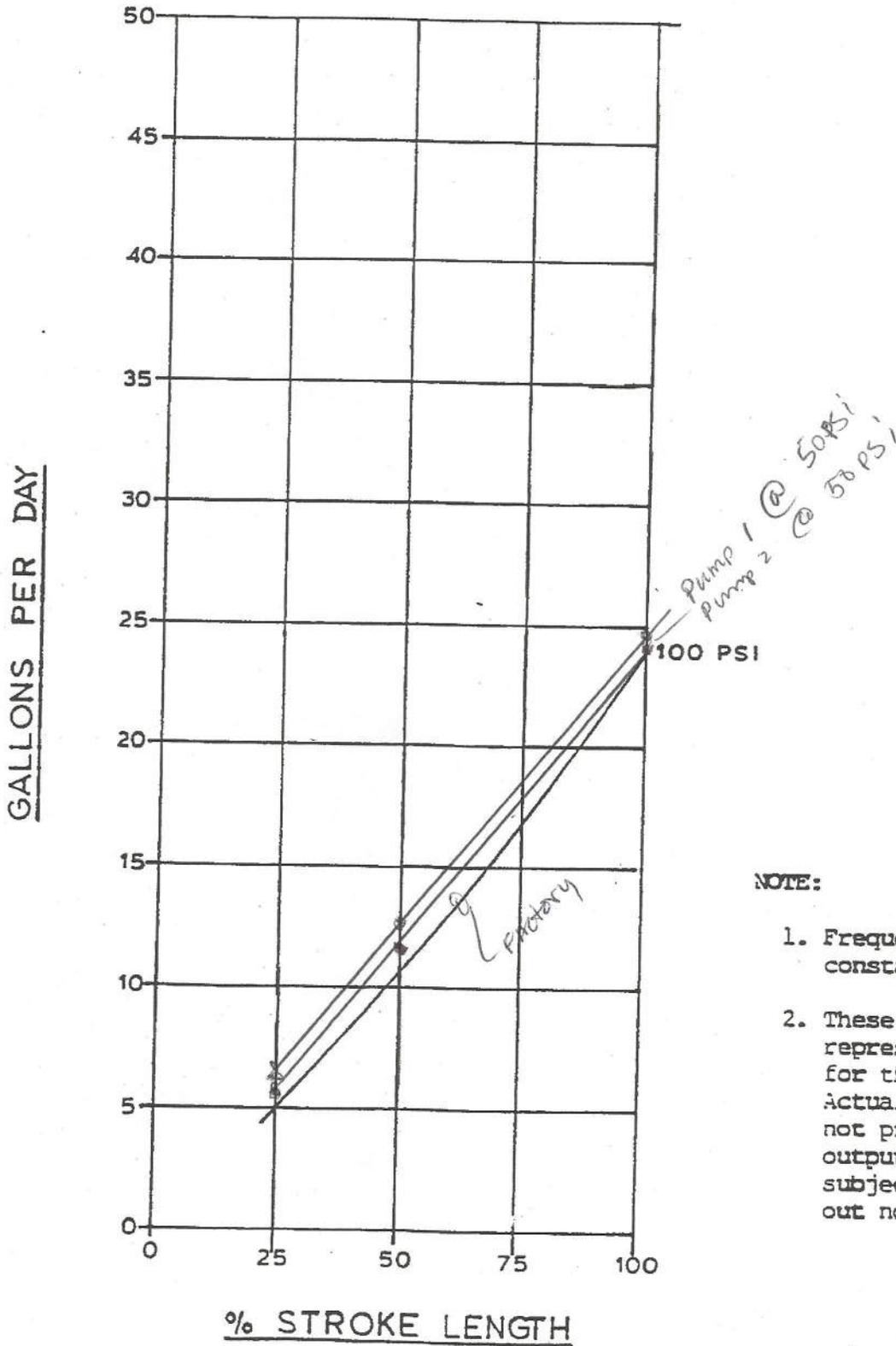
Contr's Rep: [Signature]

Owner's Rep: [Signature]

Don't Need to send Priming valves
Need check valve & Ball valve on Day tank outlet

FLOW RATE CHART

FLUORIDE



NOTE:

1. Frequency set at 100 constant.
2. These feed rate curves represent nominal value for the model listed. Actual pump may or may not provide the stated output. Outputs are subject to change without notice.

STARTUP REPORT

BY: Ed Winter & Joe Eversmeyer

BROOKS & ASSOCIATES INC
3100 WEST OSAGE
PACIFIC, MO. 63069
PH. 636-451-6969 FX. 636-742-4244

DATE: 1-30-12 / 2-9-12
JOB: SARGAMON WATER
9919 Buckhart Rd
Rochester IL 62563

CONTR: Plocher Const
PHONE 618-781-4080
CONTACT DAMIEN BOLEN

PHONE _____
OPERATOR Tim
OTHER _____

SYSTEM Phosphate MFR _____

Serial SCALE DR8DS / MP
Numbers FFA0150 / 09/11.309414 / 09/11.309415

Lubrication N/A

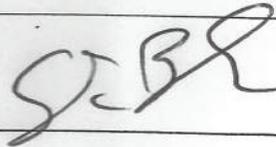
Calibration See Attached Curves 60BPD = 2.56PH = .0426PH
(Checked on water, pumps in MANUAL)

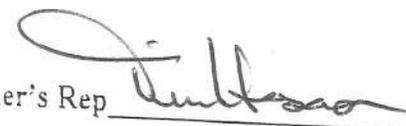
General..Description
Piping was NOT complete
Contractor Piping today
Pumps checked Powered up &
working
Remote start/stop & analog input
connected but NO SCADA SW
we did not check remote signal

2-9-12 Calibrated Scale 4-20mA = 0 to
Pump #1 - 100% = .054 GPM = 3.24 PH Pump #2 - 100% = .053 = 3.186PH
50% = .027 50% = .0265
10% = .0054 10% = .0053

START STOP = 4-20mA control calibrated & confirmed
SCALE = 0-800

Operator _____
Instruction Not yet 2-9-12 Instructed on operation
Maintenance & Safety of Equipment

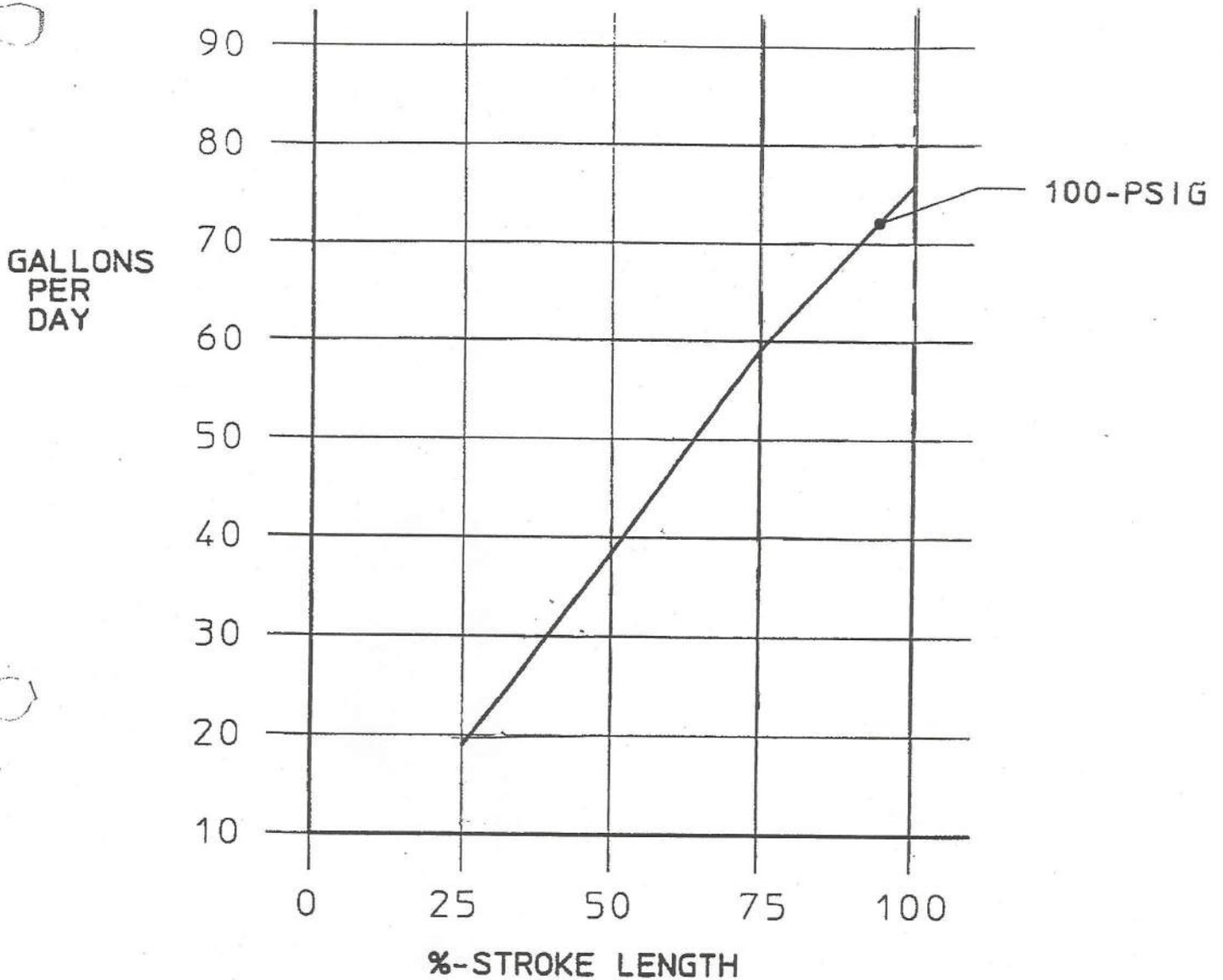
Contr's Rep. 

Owner's Rep. 

Done Need Priming Values
Need check & Ball valves on Day tank outlet

u

FLOW RATE CHART



PHOSPHATE

NOTES:

1. FREQUENCY SET AT 100%.
2. THESE FEED RATE CURVES REPRESENT NOMINAL VALVE FOR THE MODEL LISTED. ACTUAL PUMP MAY or MAY NOT PROVIDE THE STATED OUTPUT. OUTPUTS ARE SUBJECT TO CHANGE WITHOUT NOTICE.



Pulsafeeder, Inc.
2883 Brighton-Henrietta Townline Road
Rochester, New York 14623
(585) 292-8000 - FAX (585) 424-5619
www.pulsa.com

August 11, 2010

PLOCHER CONSTRUCTION
2808 Thole-Plocher Road
Highland, IL 62249
Phone (618) 654-9408
Fax (618) 654-6454

*Need Primary Petcocks (7)
Email Return - KOP kits For Flashed
Check load cell Amminic tank
Change Pulsation on Hypo # 2*

Pulsafeeder Order Number: 789858
Customer Purchase Order Number: 3450-018
Project Name: SOUTH SANGAMON WTP / JOB #3450

LETTER OF TRANSMITTAL

We are sending:

- | | |
|-------------------------------------|-----------------------------|
| <input type="checkbox"/> | Drawings |
| <input type="checkbox"/> | Mark-ups |
| <input type="checkbox"/> | Final Reproducible Prints |
| <input checked="" type="checkbox"/> | Project Submittal Data |
| <input type="checkbox"/> | Construction Specifications |
| <input type="checkbox"/> | Software |
| <input type="checkbox"/> | Project CD |

These are being sent:

- | | |
|-------------------------------------|-----------------|
| <input checked="" type="checkbox"/> | For approval |
| <input type="checkbox"/> | For review |
| <input type="checkbox"/> | For a signature |
| <input type="checkbox"/> | For your use |
| <input type="checkbox"/> | For comments |

Comments:

Bob Catone
Systems Project Engineering Manager
Ph: (585) 292-8053
Fax: (585) 424-5619
bcatone@idexcorp.com



CONTACT INFORMATION

Customer Name: PLOCHER CONSTRUCTION
Project Name: SOUTH SANGAMON WTP / JOB #3450
Pulsafeeder Order No: 789858
Customer Purchase Order No: 3450-018

REPRESENTATIVE CONTACT:

BROOKS & ASSOCIATES
3100 WEST OSAGE
PACIFIC, MO 63069
636-451-6969

FACTORY CONTACT (TECHNICAL):

PULSAFEEDER, INC.
2883 BRIGHTON HENRIETTA TOWNLINE ROAD
ROCHESTER, NEW YORK 14623
TEL: 585-292-8000
FAX: 585-424-5619

BOB CATONE, PROJECT MANAGER



TABLE OF CONTENTS

Customer Name: PLOCHER CONSTRUCTION
Project Name: SOUTH SANGAMON WTP / JOB #3450
Pulsafeeder Order No: 789858
Customer Purchase Order No: 3450-018

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SECTION 2	SCOPE OF SUPPLY HYDROFLUOSILICIC ACID MECHANICAL DETAILS PUMP INFORMATION
SECTION 3	SCOPE OF SUPPLY POLYPHOSPHATE MECHANICAL DETAILS PUMP INFORMATION
SECTION 4	SCOPE OF SUPPLY SODIUM HYPOCHLORITE MECHANICAL DETAILS PUMP INFORMATION
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SECTION 6	ACCESSORIES
SECTION 7	WARRANTY AND LUBRICATION
SECTION 8	INSTALLATION AND OPERATION MANUALS

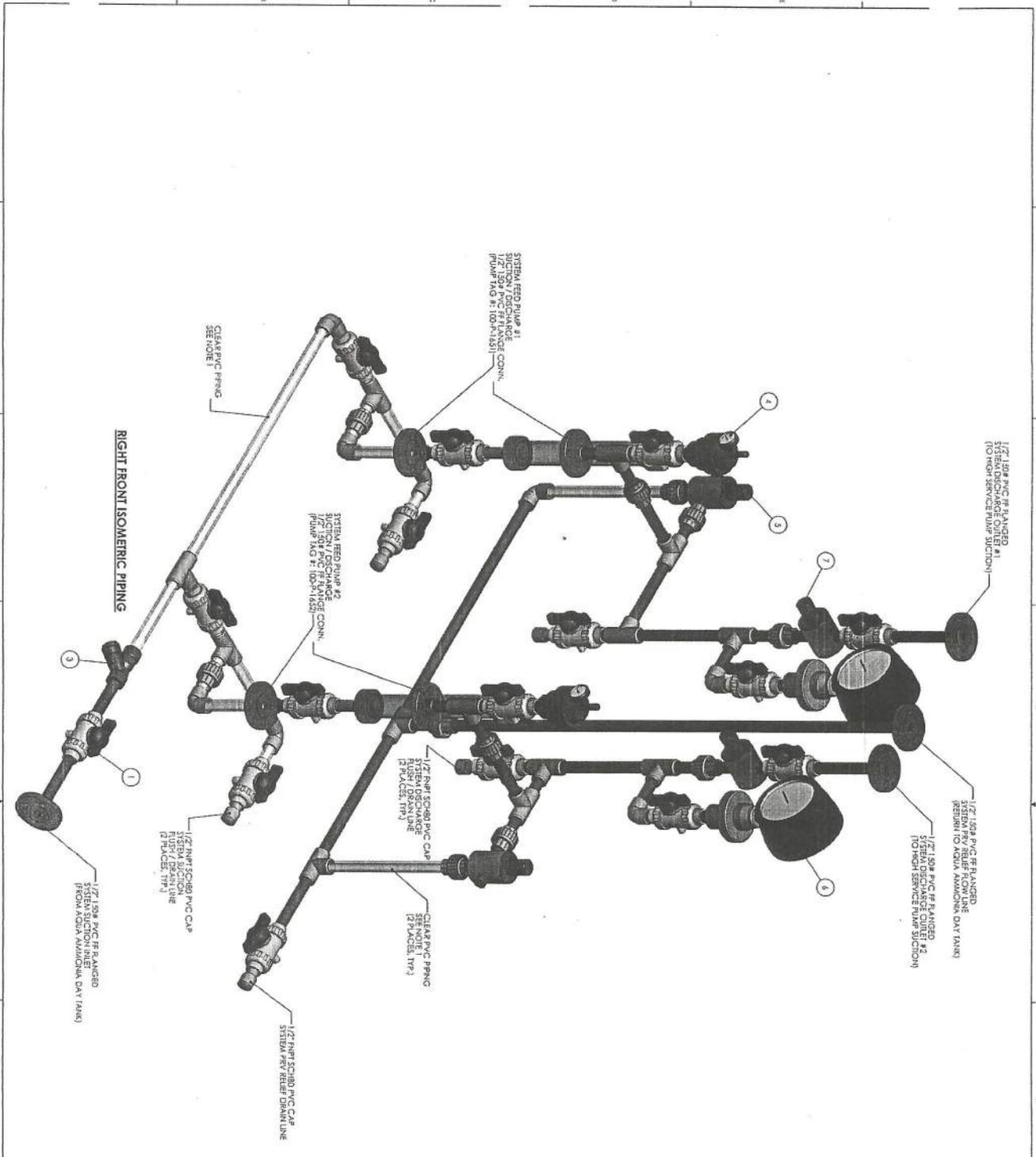


EQUIPMENT SCOPE & DOCUMENTATION CROSS REFERENCE

Customer Name: PLOCHER CONSTRUCTION
 Project Name: SOUTH SANGAMON WTP / JOB #3450
 Pulsafeeder Order No: 789858
 Customer Purchase Order No: 3450-018

Chemical / Application Name: AQUA AMMONIA

Description	Item Number	Qty Supplied	Document No.
System Serial Number	SK10789858-1	1	
Pump Model Number	25BB	2	
Pump Serial Number	X789858-1-2		
Pump Tag Number(s)	N/A		
Pump Dimensional Drawing			26498-000
Flow Curve			26593-000
Pump Controller Model:	MPC	2	
Controller Part Number	MPCLAFAXEM-XXXX		
Motor Part Number:	NP500201-000	2	NP500201-000
Accessories:			
Control Panel	T789858-S01	1	T789858-S01
Pressure Relief Valve	RS600007-PVC	2	RS600007-PVC
Back Pressure Valve	RS580019-PVC	2	RS580019-PVC
Calibration Column	W777036-PVC	2	W777036-PVC
Pulsation Dampener (Discharge)	RS780053-PVC	2	RS780053-PVC
Pressure Gauge/Seal (Discharge)	RS850041-PVC	2	RS850041-PVC
Strainer	RS660024-PVC	1	RS660024-PVC
KOPKIT	NBKVLVUCBCC	2	NBKVLVUCBCC
Test Data & Certificates			
Noise Level			
Hydrostatic Test Certificate			
Calibration Curve			
Standard Test Certificate			
Certificate of API 675			
Certificate of			
Certificate of			
Operation Manuals			



RIGHT FRONT ISOMETRIC PIPING

ITEM NO.	SYMBOL/ABBREV.	DESCRIPTION	QTY.
1	RS640024-F PVC	VALVE BALLTYPE 21 INLE UNION 1/2" SPT PVC/FRM	16
2	W772033 PVC	500M CALIBRATION COLUMN 3/4" SPT PVC	2
3	RS640024-F PVC	V-STRAINER 1/2" SPT PVC/VIN	1
4	RS780033-F PVC	PLEASION DAMPER 4" CI PVC/CATION 1/2" SPT	2
5	RS600030-F PVC	VALVE PRESSURE RELIEF 1/2" SPT PVC	2
6	RS350041-030	ORAG 100PSI 1/2" SPT PVC/PIPE	2
7	RS350010-9-F PVC	BACK PRESSURE VALVE 1/2" SPT PVC	2

NOTES:

1. PIPE AND FITTING CONSTRUCTION, SOLVENT WELDED SCHEDULE 80 PVC WITH BALLTYPE VALVE SUCTION AND PIPING SHALL BE PROVIDED SEVERAL FEET ABOVE THE PIPING TO ALLOW VISUAL VERIFICATION OF RELIEF/TOP.
2. FOR SYSTEM LAYOUT AND ENVELOPE DIMENSIONS, REFER TO SHEET 1 OF THIS DRAWING.
3. WALL MOUNTED BACKBOARD, A/F/C, J-BOXES, AND PUMPS NOT SHOWN FOR CLARITY.

REFERENCES:

PROJECT NAME: SOUTH SANDGAMMON WATER COMMISSION SANDGAMMON COUNTY, LLC
 NEW WATER TREATMENT SYSTEM
 PROJECT NUMBER: 113942
 FIELD DRAWING: N/A
 SYSTEM DESCRIPTION: AQUA AMMONIA FEED SYSTEM
 SYSTEM TAG NUMBER: 1003A-031
 SYSTEM SERIAL NO.: 800795304-1

REFERENCES:

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Mechanically Actuated Diaphragm Metering Pumps



Mechanically Actuated Diaphragm Metering Pumps

The Pulsar Shadow[®] Mechanically Actuated Diaphragm Metering Pump is designed to shadow the paradigm in the metering pump industry: the Pulsar[®] Hydraulically Actuated Diaphragm Metering Pump. The Pulsar Shadow[®] features a rugged and reliable construction designed for simplicity of operation and maintenance. The Pulsar Shadow[®] sets a new standard in the mechanically actuated metering pump arena.

FOUR BOLT TIE BAR SYSTEM

Resists connection forces and piping strain while promoting leak-free performance

THREE COMPONENT CHECK VALVE SYSTEM

High performance ball valves feature wide clearance flow path with controlled rise and four-point guide, assuring optimum life and performance



SUPERIOR DIAPHRAGMS

Sealless Composite PTFE diaphragms designed for minimum of two years uninterrupted performance

CORROSION RESISTANT HARDWARE

Standard stainless steel reagent head bolts and tie bar studs and nuts and powder coated tie bars for maximum atmospheric corrosion resistance

RUGGED POWER TRANSMISSION

Worm is hardened and polished steel; worm gear is constructed of Dynalloy[®] Bronze; forged one-piece eccentric shaft design is non-axially loaded



TOTALLY NON-VENTED GEAR BOX DESIGN

Prevents condensation and ingress of water and other contaminants, providing exceptional durability and protection from the most extreme environments

UNIVERSAL DESIGN

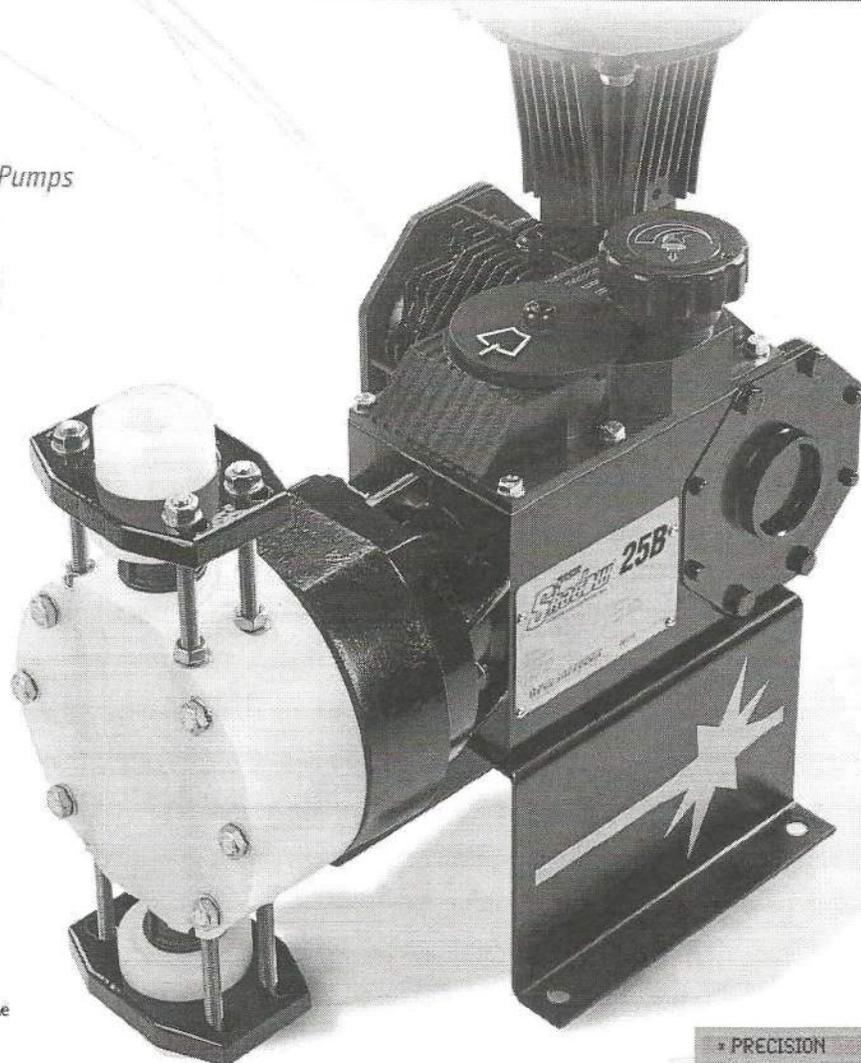
Available with NPT, BSPT, ANSI flange, and DIN flange connections, speed and stroke controllers for a multitude of voltages and currents, and NEMA and IEC motor adapters for global installations

WIDE VARIETY OF SYSTEM CONTROL OPTIONS

Available with standard manual stroke adjustment as well as all exclusive Pulsar[®] speed and stroke control options

FIELD PROVEN DESIGN

Years of installation experience and established proven performance



- * PRECISION
- * MODULAR
- * UNIVERSAL
- * RELIABLE

STANDARD LIQUID END MATERIALS OF CONSTRUCTION

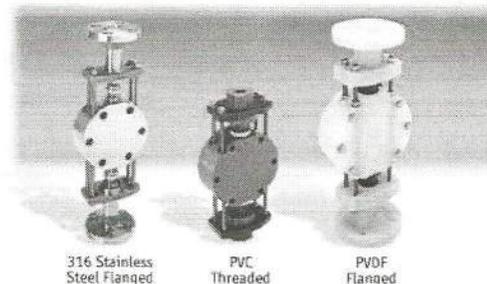
Const. Ref.	Reagent Head	Flat Diaphragm	Check Valves			Cap & Guide
			Ball	Seat	Gasket	
316SS	316SS	TFE FACED	316SS	316SS	PTFE	316SS
H ₂ SO ₄	316SS	TFE FACED	HCO	020SS	PTFE	316SS
20SS	020SS	TFE FACED	HCO	020SS	PTFE	020
PVC	PVC	TFE FACED	ALA	PVC	PTFE	PVC
PVDF	PVDF	TFE FACED	HCO	PVDF	PTFE	PVDF

ALA = Alumina Ceramic HCO = Alloy C H₂SO₄ = Sulfuric Acid Construction 020 = Alloy 20

PULSAR SHADOW[®] PUMP

CAPACITY RANGE		MAXIMUM RATED PRESSURE	
60 HZ GPH (LPH)	50 HZ GPH (LPH)	PSIG	BAR
2.7 - 165.0 (10.0 - 625.0)	2.2 - 170.0 (8.3 - 643.0)	305.0	21.0

This pump is available with flat composite and leak detection diaphragms.



These and other process end connections are available.

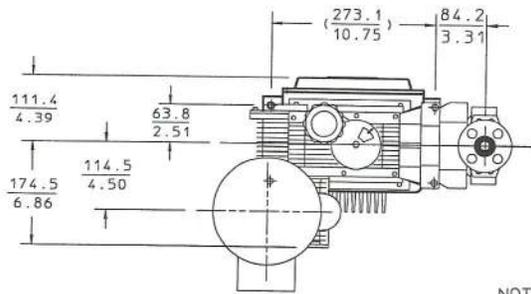
PULSAR SERIES

PUMP
SPECIFICATION
SHEET



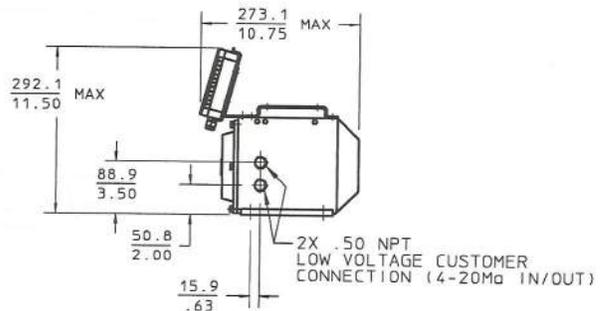
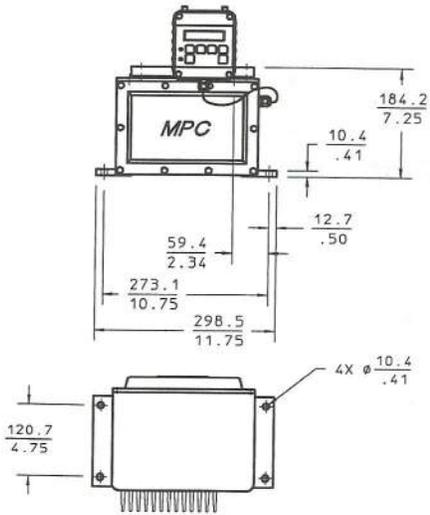
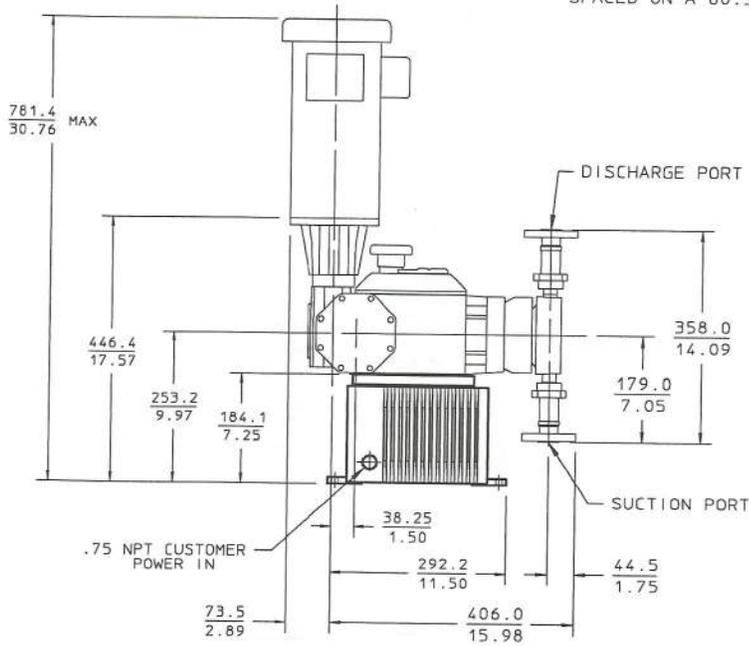
P.O. BOX 22909
ROCHESTER, NEW YORK 14692
PHONE: 585-292-8000
FAX: 585-424-5619

CUSTOMER FLOCHER CONSTRUCTION		SERIAL NO. X789858-1-2		DATE 5/20/2010	
MODEL NO. 25BB SIMPLEX W/MPC (PULSAR SERIES MODEL 25BB SHADOW)		MULTIPLEX HEAD		QUANTITY 2	
CUSTOMER PURCHASE ORDER NO. 3450018			CUSTOMER ITEM NUMBER		
ITEM NUMBER NPMB1801504		KOPKIT NUMBER NBKVLVUCBCC		DIM DWG NUMBER 26498-000	
				FLOW CURVE NUMBER 26593-000	
JOB C O N D	PRODUCT AQUA AMMONIA		FLOW (MAX) 5.000 GPH		FLOW (MIN)
	PUMPING TEMPERATURE 68.000 CENTIGRADE		OPERATING PRESSURE 150.000 PSIG		SPECIFIC GRAVITY 1.000
	VAPOR PRESSURE @ PUMPING TEMP		SUCTION PRESSURE FLOODED		VISCOSITY 10.000 CPS
					SOLIDS CONCENTRATION
S P E C S	RATED CAPACITY 5.300 GPH		VALVE TYPE BALL		GEAR RATIO 15:1
	RATED PRESSURE 150.000 PSIG		SUCTION VALVE QTY 1		SUCTION VALVE SIZE 7.0 MM
	HYDRAULIC BYPASS VALVE SETTING		DISCHARGE VALVE QTY 1		DISCHARGE VALVE SIZE 7.0 MM
					PISTON SIZE B 56 MM
M A T L	SUCTION CONNECTION TYPE FLNG-ANSI		SUCTION CONNECTION SIZE .500 IN		SUCTION CONNECTION FLANGE 150 LBS FLNG
	DISCHARGE CONNECTION TYPE FLNG-ANSI		DISCHARGE CONNECTION SIZE .500 IN		DISCHARGE CONNECTION FLANGE 150 LBS FLNG
	VALVE ALA - ALUMINA CERAMIC		VALVE & CAP GASKETS TFE - TEFLON (VIRGIN)		VALVE CAP & GUIDE PVC - POLYVINYL (PVC)
	VALVE SEAT PVC - POLYVINYL (PVC)		REAGENT HEAD PVC - POLYVINYL (PVC)		R.H. & T.B. HARDWARE STD - STD STAINLESS STEEL (PULSAR)
L E A K	DIAPHRAGM THY - TFE FACED ELASTOMER		DIAPHRAGM TYPE		DIAPHRAGM GASKET NONE REQUIRED
	INTERMEDIATE FLUID X - NONE REQUIRED				
	TYPE		RELAY #		
	COMMENTS				
F E A T	REMOTE HEAD				
	HYPO SYSTEM VOLTAGE		SPECIAL OPTIONS		
	ADDITIONAL OPTIONS/FEATURES				
C O N T R O L S	TYPE MPC W/NEMA 4X ENCL		ITEM # MPC LAFAXEM-XXXX		SERIAL # X789858P1-2
	VOLTAGE 115V/60HZ		CABLE LENGTH 6.000 FEET		ENGINEERING #
	OP STATION - PART NO.		OP STATION - INST DWG #		OP STATION - WIRING #
	COMMENTS MPC ADDENDUM DWG 23094-000				
D R I V E	MOTOR INFO PUMP COMPLETE WITH MOTOR				
	HP 1/4		KW 230/460		HZ 60
	PHASE 3		CURRENT AC		RPM 1725
	FRAME 56C		MANUFACTURER STOCK		MOTOR NO. NP500201-000
P A I N T	ENCLOSURE TEFC				
	COMMENTS THE MPC WILL ACCEPT 115V / SINGLE PHASE POWER AND CONVERT IT TO 230V / 3 PHASE POWER. THE PUMP WILL BE CONTROLLED USING SPEED, THEREFORE A 230V / 3 PHASE INVERTER DUTY MOTOR IS REQUIRED. THE INPUT VOLTAGE IS 115V / 60 HZ				
	SURFACE PREP		TOP COAT STANDARD EPOXY-BLACK		INTERMEDIATE COAT
	SPECIAL INFORMATION				
T E S T	HYDROSTATIC: NO		CALIBRATION: NO		PMI: NO
	API 675 STDS APPLY: NO		API 675 + 4.3.3.4: NO		API TEST ONLY: NO
	MILL (MATL) CERTS: NO		LIQUID PENETRANT: NO		INSPECTION REQUIRED: NO
	WITNESSED: NO		OTHER INFO:		RADIOGRAPHIC: NO
C O M M E N T S	PREP FOR 6M STORAGE: NO		PICKLE & PASSIVATION: NO		
	*** ORDER IS SUBJECT TO APPROVAL ***				
	PUMPS TO BE MOUNTED ON SKID SYSTEM SKID S/N SK10789858-1				



NOTE:

BOTH PORTS ARE .50- 150LB RF FLANGE WITH (4) 15.8/.62 DIA BOLT HOLES EQUALLY SPACED ON A 60.3/2.38 DIA BOLT CIRCLE.



ALL DIMENSIONS ARE MM/INCHES
PULSAR
SHADOW **PULSAFEEDER**
 A Unit of IDEX Corporation

DIMENSIONAL DWG
25BB MPC CONTROL
PLASTIC CONST 50/60 Hz

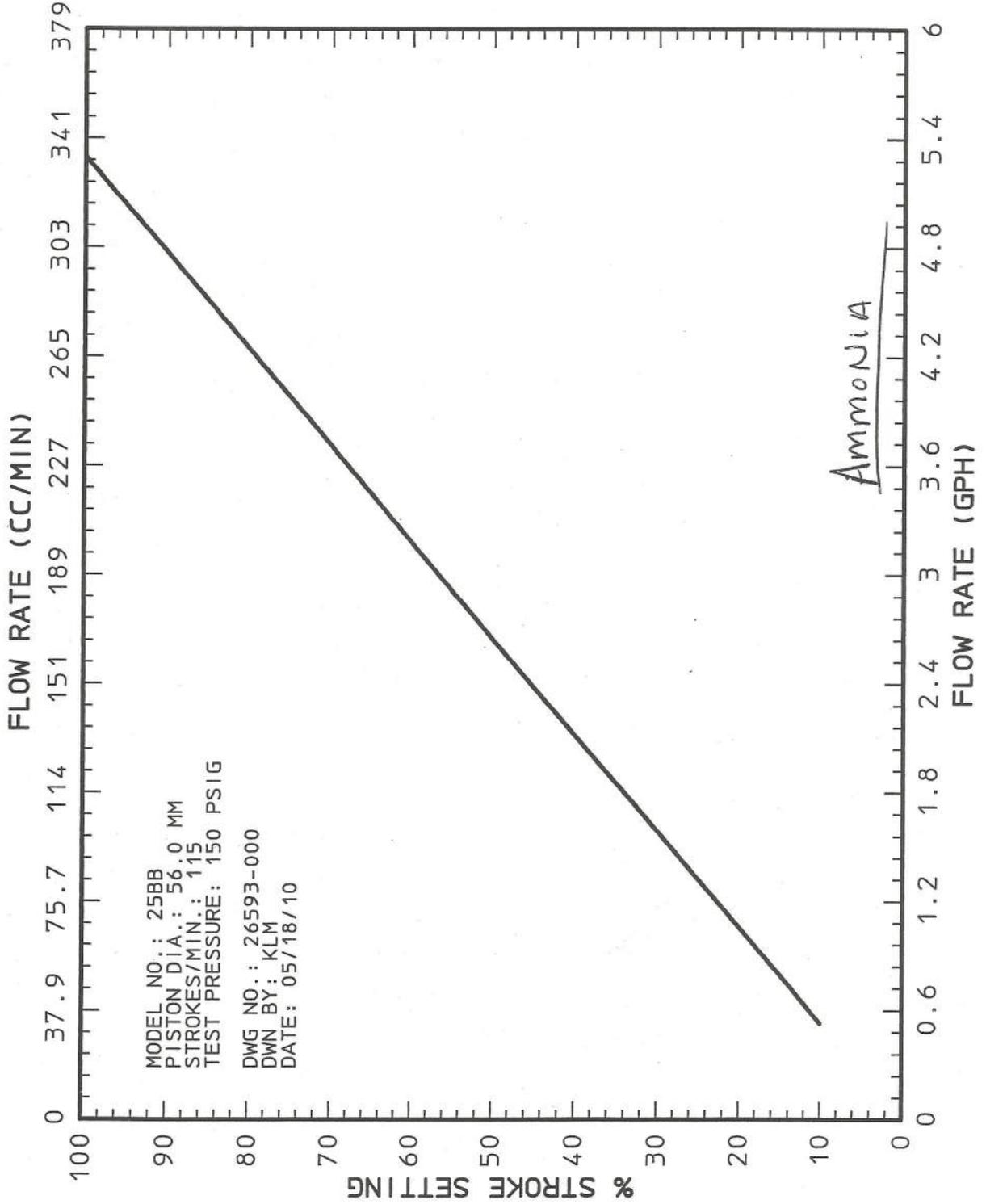
DWN BY: KMG
 DATE: 02/25/10
 26498-000

RHA: B HEAD W/ CC VALVING
 SUCTION/DISCH PORTS: CC/CC
 MOTOR FRAME SIZE: 56C

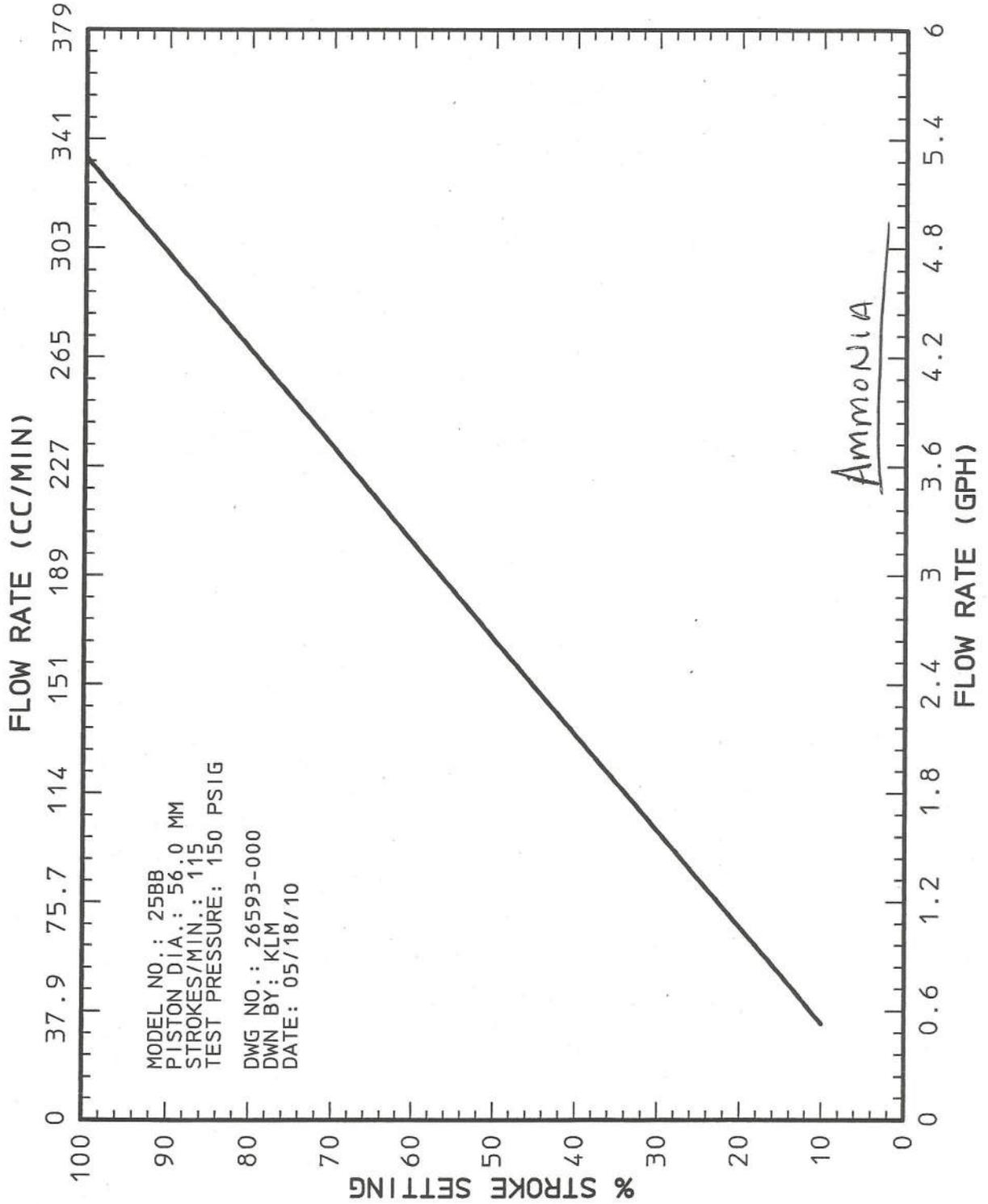
REF	REVISION UPDATE	DATE
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SCALE: 1:8

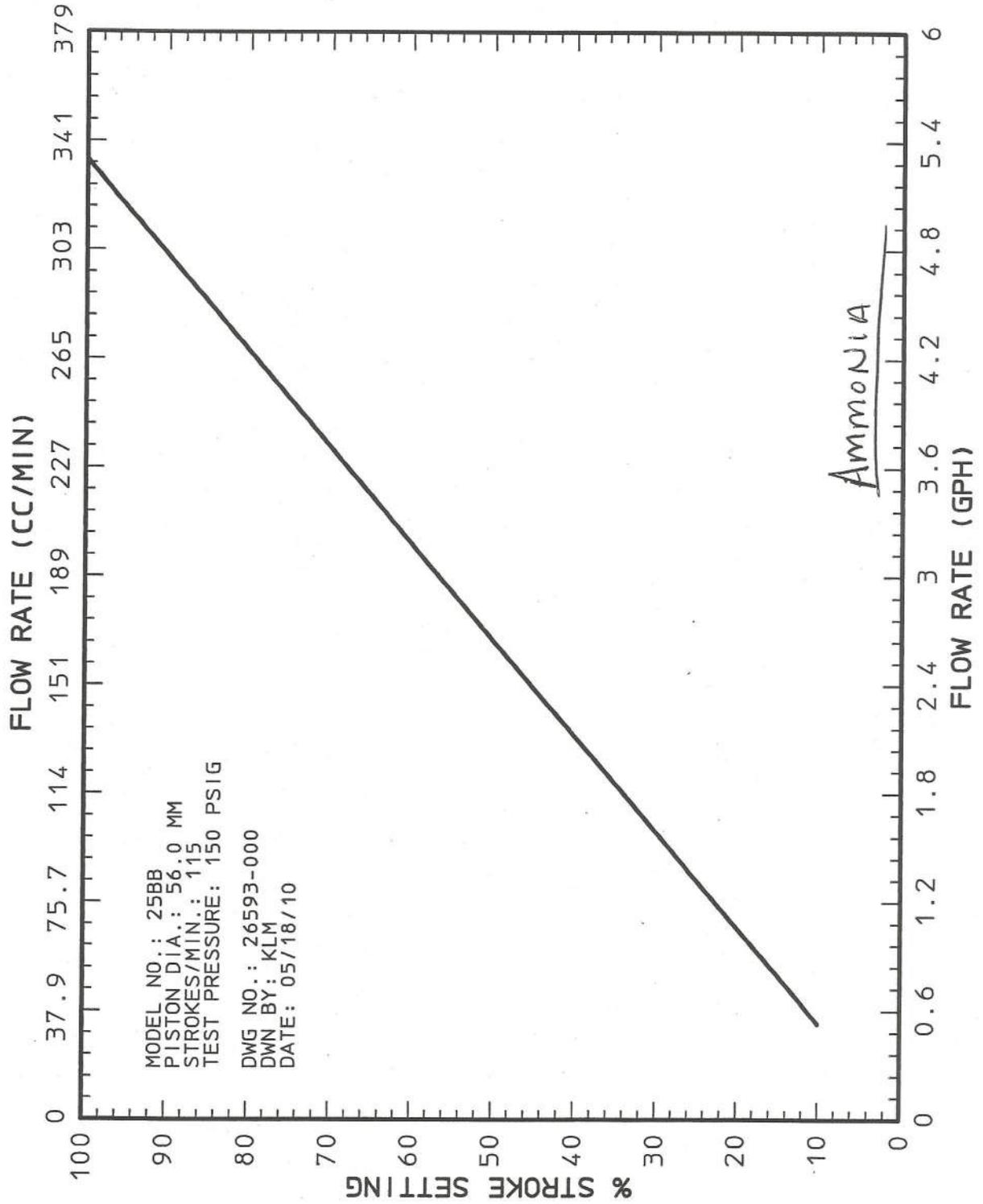
PULSAFEEDER PUMP FLOW CURVE



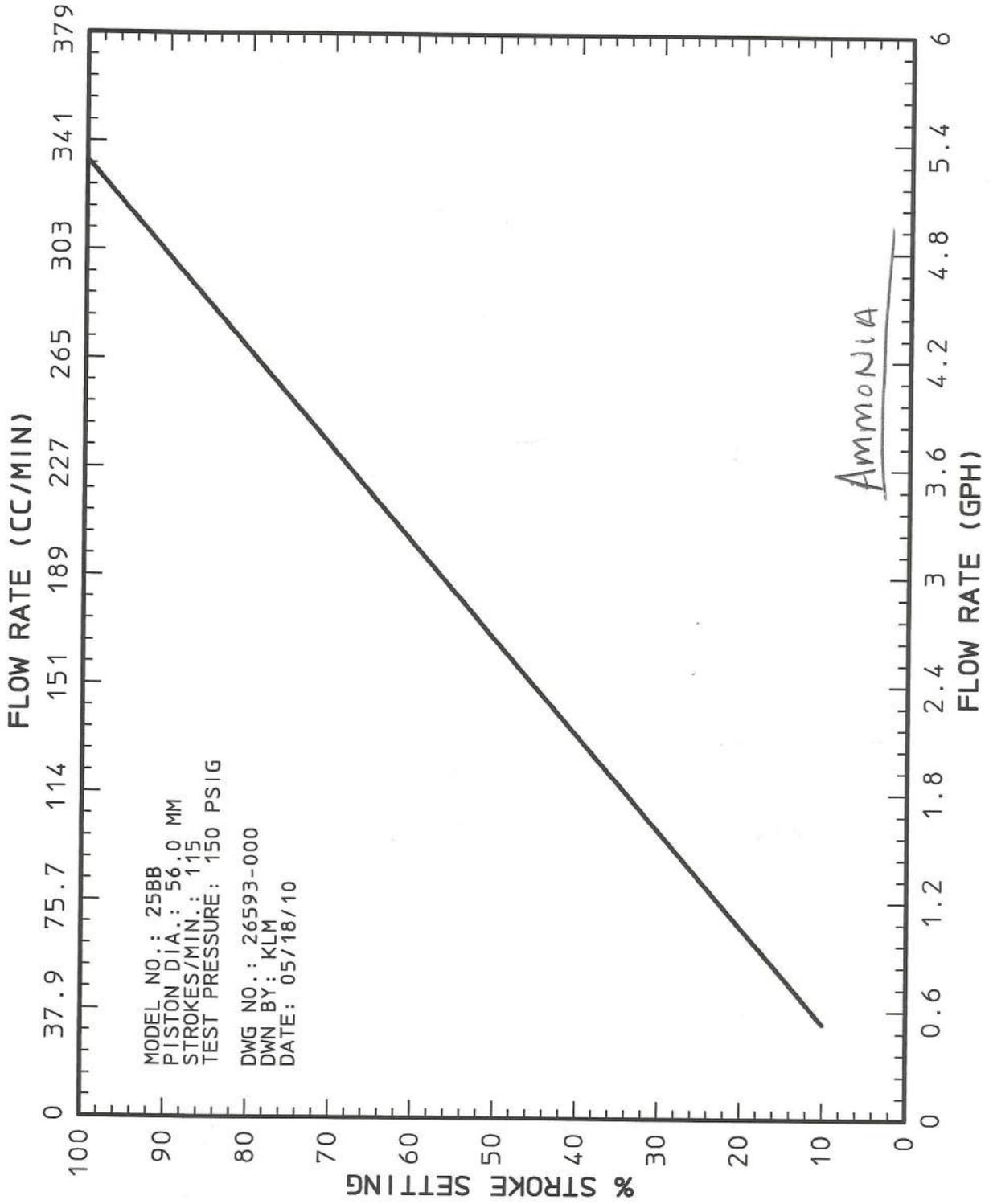
PULSAFEEDER PUMP FLOW CURVE



PULSAFEEDER PUMP FLOW CURVE



PULSAFEEDER PUMP FLOW CURVE



RECOMMENDED SPARE PARTS - KOPKIT

Customer Name: PLOCHER CONSTRUCTION
Project Name: SOUTH SANGAMON WTP / JOB #3450
Pulsafeeder Order No: 789858
Customer Purchase Order No: 3450-018
Application Name: AQUA AMMONIA
System Serial No: SK10789858-1
Pump Serial No: X789858-1-2
KOPkit Part No: NBKVLVUCBCC
Equipment Tag No(s):

Consisting of the following parts:

Component	Description	Qty
NP170013-THY	DIAPHRAGM ASSY,MECH 56	1
NP340002-ALA	VALVE,BALL 7.0 MM DIA	2
NP440015-TFE	GASKET,O RING	6
NP330026-PVC	SEAT,VALVE 7.00 MM DIA	2
NP310015-PVC	GUIDE,VALVE 7.0 MM DIA	2
NP450013-000	SEAL,OIL PUMP HEAD MECH	1

$$\frac{20\%}{12} = 2.29 \div 2 = 1.145$$

$$1.145 \times 1.146 = 1.314$$

$$1.314 \times 3.14 = 4.12$$

$$4.12 \times 7.48 = 30.84 \div 12 = 2.57$$

$$3.75$$

$$\frac{257.21}{12} = 21.43$$

$$21.43 + 3.75 = 25.18$$



EQUIPMENT SCOPE & DOCUMENTATION CROSS REFERENCE

Customer Name: PLOCHER CONSTRUCTION
 Project Name: SOUTH SANGAMON WTP / JOB #3450
 Pulsafeeder Order No: 789858
 Customer Purchase Order No: 3450-018

Chemical / Application Name: HYDROFLUOSILICIC ACID

Description	Item Number	Qty Supplied	Document No.
System Serial Number	SK10789858-2	1	
Pump Model Number	LMB4TA-PTT1-XXX	2	
Pump Serial Number	X789858-3-4		
Pump Tag Number(s)	N/A		
Pump Dimensional Drawing			AC00260-001
Flow Curve			LMB4
Accessories:			
Control Panel	T789858-S02	1	T789858-S02
Pressure Relief Valve	RS600007-PVC	2	RS600007-PVC
Back Pressure Valve	RS580019-PVC	2	RS580019-PVC
Calibration Column	W777036-PVC	2	W777036-PVC
Pulsation Dampener (Discharge)	RS780053-PVC	2	RS780053-PVC
Pressure Gauge/Seal (Discharge)	RS850041-PVC	2	RS850041-PVC
Strainer	RS660024-PVC	1	RS660024-PVC
KOPKIT	K4PTT1	2	K4PTT1
Test Data & Certificates			
Noise Level			
Hydrostatic Test Certificate			
Calibration Curve			
Standard Test Certificate			
Certificate of API 675			
Certificate of			
Certificate of			
Operation Manuals			

PULSAtron®

Series MP

Electronic Metering Pumps

PULSAFEEDER®

A Unit of IDEX Corporation

Key Features

- **Automatic Control**, Fully scalable 4-20mA current signal that can also be calibrated to precisely match the current signal reading of the sending device.
- **Flow Verification** on select sizes can disable the pump and activate alarm if flow is interrupted for any reason.
- **Flow Totalization** accurately reports the volume of chemical pumped at the touch of a button in either Gallons or Liters. Factory preset to pump rating, manual calibration volume can be input to fine tune reporting.
- **Relay Output** for computer interface or AC power allows for external control.
- **Simple Prompts** in plain language allow for easy-to-understand instructions for programming. Available in four languages, English, French, German and Spanish.
- **Alarm Signals** for signal loss, full count, circuit failure, pulse overflow and pulse rate high. Liquid low level indicator capability is standard.
- **Timed Sequences** can be set for selected intervals and rate for repetitive metering.
- **Pulse Signals** can be multiplied or divided by 1 to 999 allowing for pumps to handle peak requirements.
- **Flow Rate** is displayed as GPH, GPD or LPH.
- **Large easy to read backlit LCD** display keeps you informed with the data that you need.

Complete Economical Selection

Nineteen distinct models are available, having pressure capabilities to 300 PSIG @ 3 GPD, and flow capacities to 504 GPD @ 20 PSIG, with a turndown ratio of 1000:1. Metering performance is reproducible to within $\pm 2\%$ of maximum capacity.

Operating Benefits

Reliable metering performance. Our guided check valves, with their state-of-the-art seat and ball designs, provide precise seating, and excellent priming and suction lift characteristics. Our timing circuit is highly reliable and, by design, virtually unaffected by temperature, EMI and other electrical disturbances.

Rated "hot" for continuous duty. Series MP pumps continue to meet their specifications for pressure and capacity even during extended use. That's because of our high quality solenoid and special enclosure that effectively dissipates heat.

High viscosity capability. A straight flow path and ample clearance between the diaphragm and head enable standard PULSAtron pumps to handle viscous chemicals up to a viscosity of 3000 CPS. For higher viscosity applications, larger, spring-loaded connections are available.

Leak-free, sealless, liquid end. Our diaphragms are of superior construction—PTFE-faced, bonded to a composite of Hypalon and fabric layers, and reinforced with a metal insert for optimum flexibility and durability.

System Compatibility

A wide variety of chemicals can be pumped.

Liquid end materials include glass-filled polypropylene (GFPP), PVC, Polyvinylidene Fluoride (PVDF), PTFE, Hypalon, Viton, ceramic, alloys and 316SS.

Immediate installation and start-up.

Included as standard accessories with all models are an injection/back pressure valve assembly and a foot valve/strainer assembly*, including discharge and suction tubing (*not avail. with high viscosity connections for >3000 CPS).

Safe and easy priming and valve maintenance.

Included as a standard accessory is a bleed valve assembly, including return tubing (available only on those models with tubing connections and ≤ 240 GPD).

Quick and economical liquid end maintenance.

Available for every model is a unique KOPkit®, a convenient, economically priced, package containing new cartridge check valves and other important spare parts.

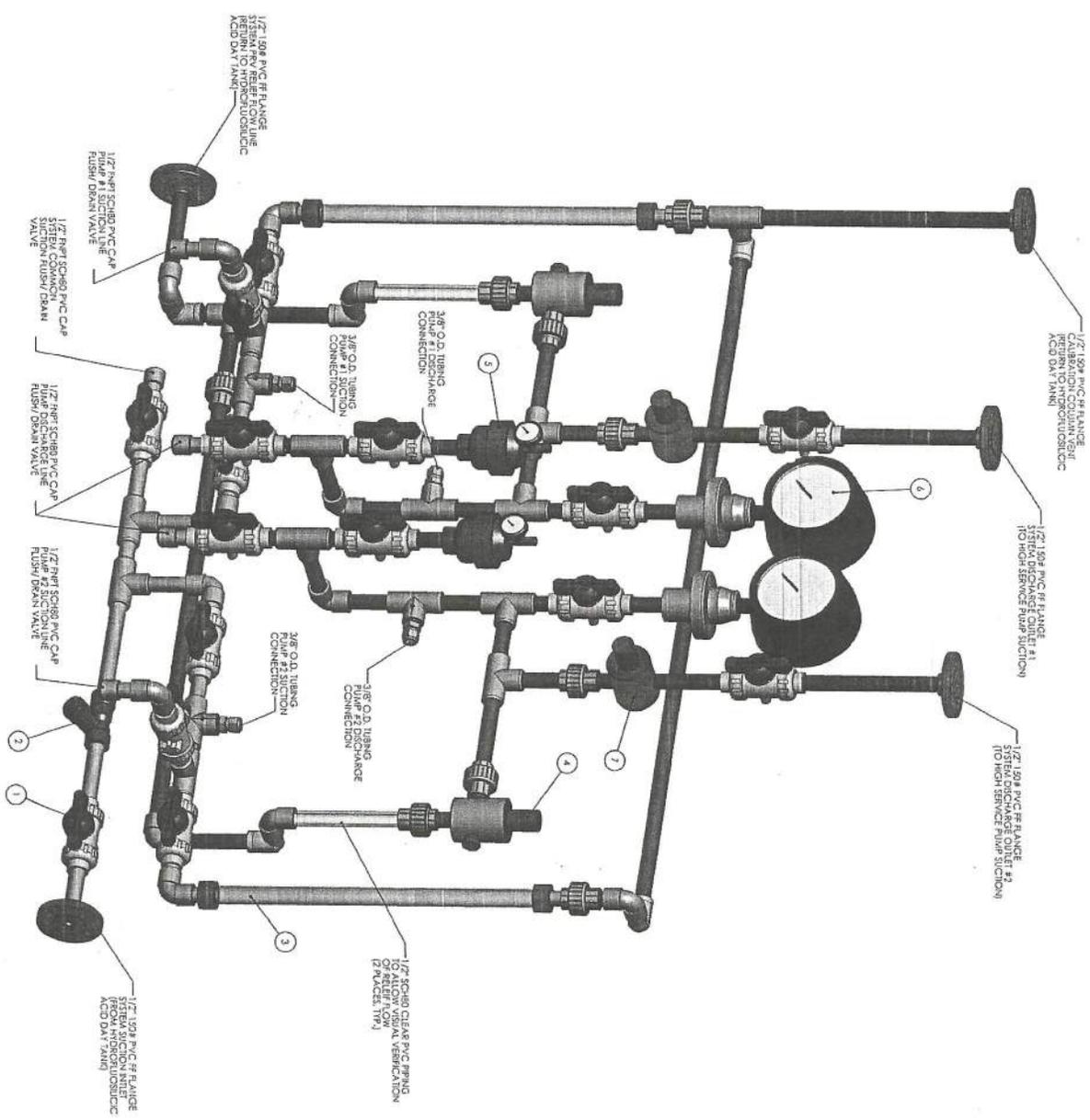


For additional information about PULSAtron's full-featured Series E PLUS refer to Technical Sheet No. EMP-021, about the mid-range Series E, Series D & Series A PLUS refer to Technical Sheet No. EMP-022, EMP-023 & EMP-025. For information about the economical Series C PLUS & Series C, refer to Technical Sheet No. EMP-026 & EMP-024.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

technology
innovation diversity
excellence

NO.	REV.	DATE	BY	CHKD.
1				
2				



ISOMETRIC PIPING LAYOUT
SCALE: 1" = 1'-0"

REFERENCES:
PROJECT NAME: SOUTH SANGAMON WATER COMMISSION (SANGAMON COUNTY, IL)
NEW WATER TREATMENT SYSTEM
NEW WATER TREATMENT FACILITIES
PROJECT NUMBER: 1129-4-C
R.A.D. DRAWING NO.: N/A
SYSTEM DESCRIPTION: HYDROCHLORIC ACID FEED SYSTEM
R.A.D. SERIAL NO.: 200729354-2

- NOTES:**
1. PIPE AND FITTING CONSTRUCTION: SOLVER-WELDED SCHEDULE 80 PVC WITH WITON ELASTOMERS.
 2. FOR SYSTEM LAYOUT DIMENSIONS, REFER TO SHEET 1 OF THIS DRAWING.
 3. WALL MOUNTED BACKBOARD, PUMPS, AND JACOBS ARE NOT SHOWN FOR CLARITY.

ITEM	SYMBOL/DESCRIPTION	DESCRIPTION	QTY.
1	R540024-PVC	VALVE BALL TYPE 21 TRITE UNSOU 1/2" SCT PVC/95M	16
2	R540024-PVC	1/2" STRANGE 1/2" SCT PVC/VIN	1
3	W777004-PVC	CARBARATION COLUMN PVC 1/2" TRIM/20" H	2
4	R540003-PVC	VALVE PRESSURE RELIEF 1/2" NPT PVC	2
5	R5720035-PVC	PULSATION DAMPNER AC PVC/VINON 1/2" X 1/2"	2
6	R545004-1000	O.R.G. 100PSI 1/2" SCT PVC/PPHE	2
7	R5390019-PVC	BACK PRESSURE VALVE 1/2" SCT PVC	2

DATE: 11/11/2011 10:11:48 AM
 PROJECT: NEW WATER TREATMENT FACILITIES
 DRAWING: R5010750-001
 SHEET: 2 OF 2
 SCALE: 1" = 1'-0"
 DESIGNED BY: [Name]
 CHECKED BY: [Name]
 DRAWN BY: [Name]
 PULSAFEEDER
 AMERICAN PIPE & FOUNDRY CO.
 375 S. 530 W. LAMAR, MO. 64801-1000
 TEL: 417-335-2200 FAX: 417-335-2201
 WWW.PULSAFEEDER.COM

PULSAtron Series MP Selection Guide

MODELS:	
K2	= 0.13 gph / 3 gpd (0.5 lph) max pres.: 300 PSI (21 BAR)
B2	= 0.21 gph / 5 gpd (0.8 lph) max pres.: 250 PSI (17 BAR)
D3	= 0.50 gph / 12 gpd (1.9 lph) max pres.: 250 PSI (17 BAR)
F4	= 0.85 gph / 20 gpd (3.2 lph) max pres.: 250 PSI (17 BAR)
H4	= 1.70 gph / 41 gpd (6.4 lph) max pres.: 250 PSI (17 BAR)
A2	= 0.25 gph / 6 gpd (0.9 lph) max pres.: 150 PSI (10 BAR)
B3	= 0.50 gph / 12 gpd (1.9 lph) max pres.: 150 PSI (10 BAR)
D4	= 0.90 gph / 22 gpd (3.4 lph) max pres.: 150 PSI (10 BAR)
G4	= 1.75 gph / 42 gpd (6.6 lph) max pres.: 150 PSI (10 BAR)
K5	= 2.50 gph / 60 gpd (9.5 lph) max pres.: 150 PSI (10 BAR)
H5	= 3.15 gph / 76 gpd (11.9 lph) max pres.: 150 PSI (10 BAR)
A3	= 0.50 gph / 12 gpd (1.9 lph) max pres.: 100 PSI (7 BAR)
K3	= 0.60 gph / 14 gpd (2.3 lph) max pres.: 100 PSI (7 BAR)
B4	= 1.00 gph / 24 gpd (3.8 lph) max pres.: 100 PSI (7 BAR)
E4	= 1.85 gph / 44 gpd (7.0 lph) max pres.: 100 PSI (7 BAR)
H6	= 5.00 gph / 120 gpd (18.9 lph) max pres.: 100 PSI (7 BAR)
K7	= 8.00 gph / 192 gpd (30.3 lph) max pres.: 50 PSI (3.3 BAR)
H7	= 10.0 gph / 240 gpd (37.9 lph) max pres.: 35 PSI (2.4 BAR)
H8	= 21.0 gph / 504 gpd (79.5 lph) max pres.: 20 PSI (1.3 BAR)

CONTROLS:	
T	= Signal Level Output Relay
K	= Power Level Output Relay

ELECTRICAL:	
A	= 115 Volt / 50-60Hz
1	= 115 Volt / 50-60Hz (without agency approvals)
B	= 230 Volt / 50-60Hz / 1ph with 6' (1.8m) 3-wire US Plug
2	= 230 Volt / 50-60Hz (without agency approvals)

LIQUID END MATERIALS:	
PTT	= GFPP (Polypropylene), TFE = Teflon, TFE = Teflon
Pump Head & Fittings/Seats & O-rings/Balls	

See page 6 for additional liquid end materials.

CONNECTION SIZES:	
1	= Tubing .25" I.D. x .38" O.D. / .25" Ball, 0 - 1.88 GPH
3	= Tubing .38" I.D. x .50" O.D. / .38" Ball, 1.63 - 10 GPH
9	= Degas Head: .25" I.D. x .38" O.D. / 0-1.83 GPH
J	= Tubing, .25" I.D. x .38" O.D. / .19 Ball; 0 - 1.04 GPH
METRIC:	
M	= G 1/2 A Threads, .38" Ball, 6.15 - 37.85 LPH
R	= G 1/2 A Threads, .25" Ball, 0 - 7.10 LPH
Y	= 6 x 12mm, .25" Ball, 0 - 7.10 LPH

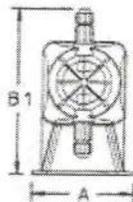
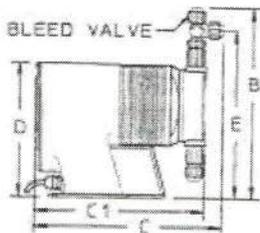
Please Refer to page 7 for additional connection sizes. All pumps with tubing connections come with the following items (except for LMH8, LPH8, LEH8, HV series pumps and pumps >150PSI in PVC): 4' Suction, 4' Return, 8' discharge tubing, footvalve/strainer assy., injection valve and bleed valve.

SUFFIX CODES:	
XXX	= No Additional Options
130	= PVDF Tubing
500	= Five Function Valve
520	= Five Function Degas Valve
FVE	= Flow Verification / EPDM (not available on pumps greater than 100 psi)
FVV	= Flow Verification / Viton (not available on pumps greater than 100 psi)
ITS	= 15 gal. ITS Tank System (ITS Tank not available on LM, LP, LT, and LE: H4, H5, H6, H7, H8, J7, K7 models)
CZXXX	= CE Approval (5 digits used for this suffix code)

See pages 9, 10 & 11 for additional information and specs.

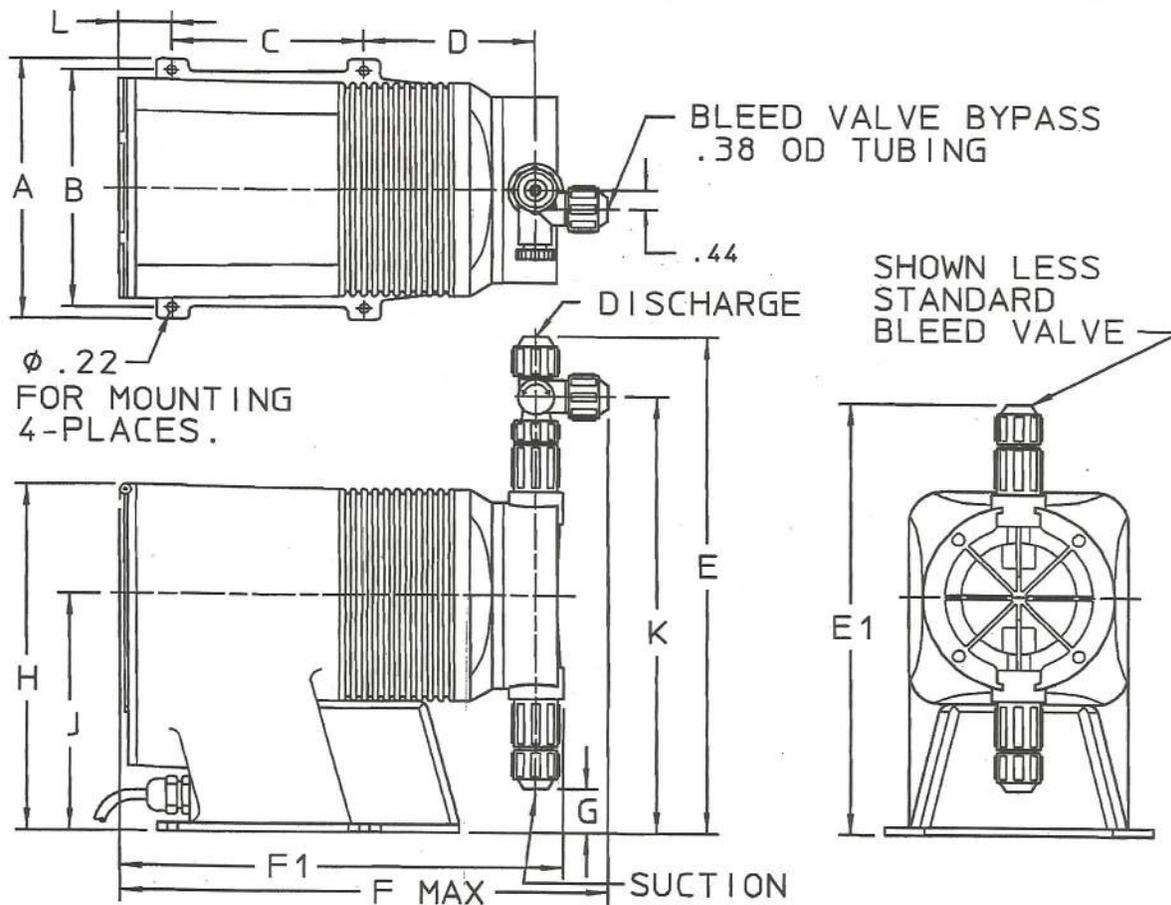
A completed model number should look like 'LMB3TA-PTC1-XXX'

Dimensions



Series MP Dimensions (inches)																	
Model No.	A	B	B1	C	C1	D	E	Shpg Wt	Model No.	A	B	B1	C	C1	D	E	Shpg Wt
LMA2	5.4	10.3	-	10.8	-	7.5	8.9	13	LMH4	6.2	10.9	-	11.2	-	8.2	9.5	21
LMA3	5.4	10.6	-	10.7	-	7.5	9.2	13	LMH5	6.2	11.3	-	11.2	-	8.2	9.9	21
LMB2	5.4	10.3	-	10.8	-	7.5	8.9	13	LMH6	6.2	11.3	-	11.2	-	8.2	9.9	21
LMB3	5.4	10.6	-	10.7	-	7.5	9.2	13	LMH7	6.1	11.7	-	11.2	-	8.2	10.3	21
LMB4	5.4	10.6	-	10.7	-	7.5	9.2	13	LMH8*	6.1	-	10.9	-	10.6	8.2	-	25
LMD3	5.4	10.6	-	11.2	-	7.5	9.2	15	LMK2	5.4	10.3	-	10.8	-	7.5	8.9	13
LMD4	5.4	10.6	-	11.2	-	7.5	9.2	15	LMK3	5.4	10.6	-	10.7	-	7.5	9.2	13
LME4	5.4	10.6	-	11.2	-	7.5	9.2	15	LMK5	5.4	10.9	-	11.7	-	7.5	9.5	18
LMF4	5.4	10.6	-	11.7	-	7.5	9.2	18	LMK7	6.1	11.7	-	11.2	-	8.2	10.3	21
LMG4	5.4	10.6	-	11.7	-	7.5	9.2	18									

NOTE: Inches X 2.54 = cm / * the LMH8 is designed without a bleed valve available



MODEL #	DIMENSIONS											W/OUT BLEED VALVE		STD. PORT CONNECTION	PUMP WEIGHT LBS.
	A	B	C	D	E	F	G	H	J	K	L	E1	F1		
LMA2	5.38	4.81	4.38	3.50	10.31	10.75	1.69	7.44	5.22	8.94	1.19	8.78	9.78	.38" OD TUBING	9.50
LMA3	5.38	4.81	4.38	3.44	10.56	10.69	1.41	7.44	5.22	9.19	1.19	9.03	9.78	.38" OD TUBING	9.50
LMB2	5.38	4.81	4.38	3.50	10.31	10.75	1.69	7.44	5.22	8.94	1.19	8.78	9.78	.38" OD TUBING	9.50
LMB3	5.38	4.81	4.38	3.44	10.56	10.69	1.41	7.44	5.22	9.19	1.19	9.03	9.78	.38" OD TUBING	9.50
LMB4	5.38	4.81	4.38	3.44	10.56	10.69	1.41	7.44	5.22	9.19	1.19	9.03	9.78	.38" OD TUBING	9.50
LMD3	5.38	4.81	4.38	3.94	10.56	11.19	1.41	7.44	5.22	9.19	1.19	9.03	10.28	.38" OD TUBING	12.00
LMD4	5.38	4.81	4.38	3.94	10.56	11.19	1.41	7.44	5.22	9.19	1.19	9.03	10.28	.38" OD TUBING	12.00
LME4	5.38	4.81	4.38	3.94	10.56	11.19	1.41	7.44	5.22	9.19	1.19	9.03	10.28	.38" OD TUBING	12.00
LMF4	5.38	4.81	4.38	4.44	10.56	11.69	1.41	7.44	5.22	9.19	1.19	9.03	10.78	.38" OD TUBING	14.75
LMG4	5.38	4.81	4.38	4.44	10.56	11.69	1.41	7.44	5.22	9.19	1.19	9.03	10.78	.38" OD TUBING	14.75
LMG5	5.38	4.81	4.38	4.44	10.94	11.69	1.03	7.44	5.22	9.53	1.19	9.41	10.78	.50" OD TUBING	14.75
LMH4	6.12	5.56	4.38	3.94	10.94	11.19	1.78	8.19	5.59	9.53	1.19	9.41	10.28	.38" OD TUBING	17.75
LMH5	6.12	5.56	4.38	3.94	11.31	11.19	1.78	8.19	5.59	9.94	1.19	9.78	10.28	.50" OD TUBING	17.75
LMH6	6.12	5.56	4.38	3.94	11.31	11.19	1.78	8.19	5.59	9.94	1.19	9.78	10.28	.50" OD TUBING	17.75
LMH7	6.12	5.56	4.38	3.94	11.69	11.19	1.03	8.19	5.59	10.29	1.19	10.16	10.28	.50" OD TUBING	17.75
LMH8	6.12	5.56	4.38	4.00	-	-	.44	8.19	5.59	-	1.19	10.94	10.59	.75" OD TUBING	23.00
LMK2	5.38	4.81	4.38	3.50	10.31	10.75	1.69	7.44	5.22	8.94	1.19	8.78	9.78	.38" OD TUBING	9.50
LMK3	5.38	4.81	4.38	3.44	10.56	10.69	1.41	7.44	5.22	9.19	1.19	9.03	9.78	.38" OD TUBING	9.50
LMK5	5.38	4.81	4.38	4.44	10.94	11.69	1.03	7.44	5.22	9.53	1.19	9.41	10.78	.50" OD TUBING	14.75
LMK7	6.12	5.56	4.38	3.94	11.69	11.19	1.03	8.19	5.59	10.29	1.19	10.16	10.28	.50" OD TUBING	17.75

NOTES:

- WHEN USING .25 NPT CONNECTIONS:
 A) BLEED VALVE IS NOT AVAILABLE.
 B) ADD .25" TO 'G' DIM.
 C) SUBTRACT .25 FROM 'E' DIM.
- WHEN USING OPTIONAL TUBE SIZES, ALL DIM. ARE THE SAME.
- FINAL ORIENTATION OF BLEED VALVE TO PUMP MAY VARY FROM THAT SHOWN.

ALL DIMENSIONS ARE IN INCHES

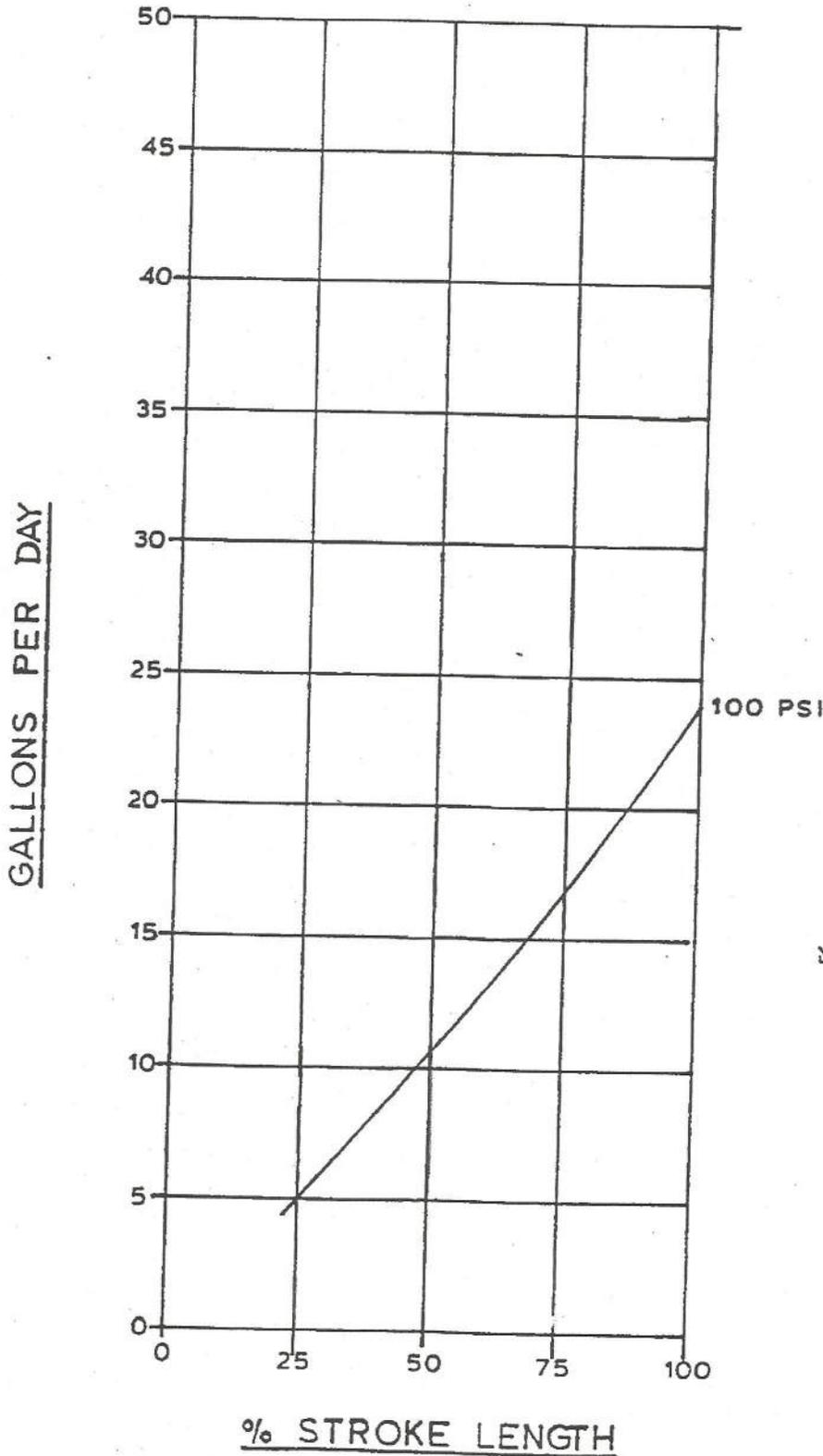
PULSAtron **PULSAFEEDER**
 A Unit of IDEX Corporation

DWG. TITLE
SERIES 'MP'
PUMP HEAD ASSEMBLY

REF	ADDED 'K2 3 & 5' MODELS(3-27-96). HMK	3-4-03	SECTION/PAGE:	PULSAtron/XXX	DWN BY: PTP	CAD DWG.# 4-C-03
			EFFECTIVE:...	06/01/95		
	REVISION	DATE	SUPERSEDES:...	NEW	DATE: 6-1-95	AC00260.001

FLOW RATE CHART

FLUORIDE

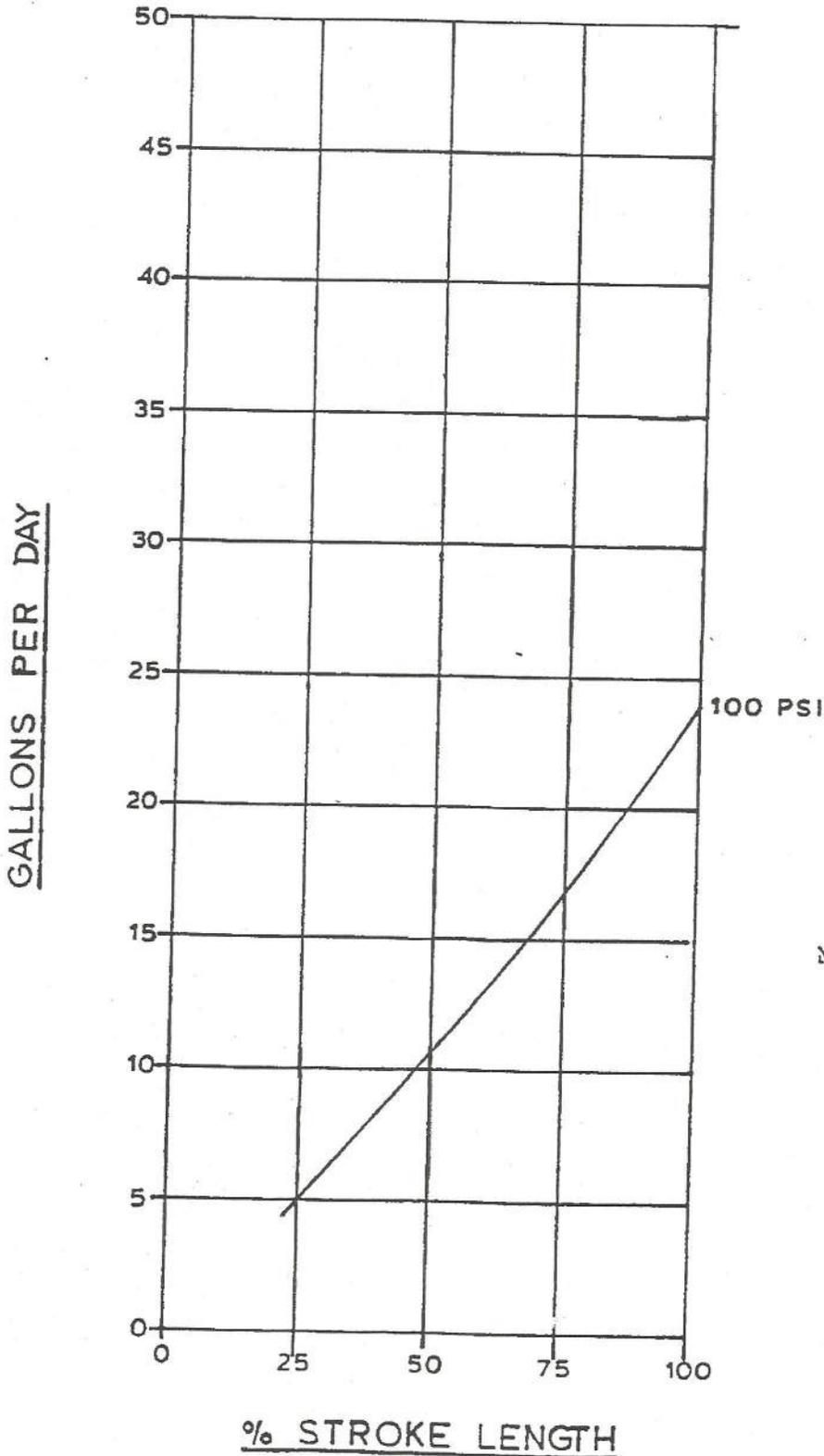


NOTE:

1. Frequency set at 100 constant.
2. These feed rate curves represent nominal value for the model listed. Actual pump may or may not provide the stated output. Outputs are subject to change without notice.

FLOW RATE CHART

FLUORIDE

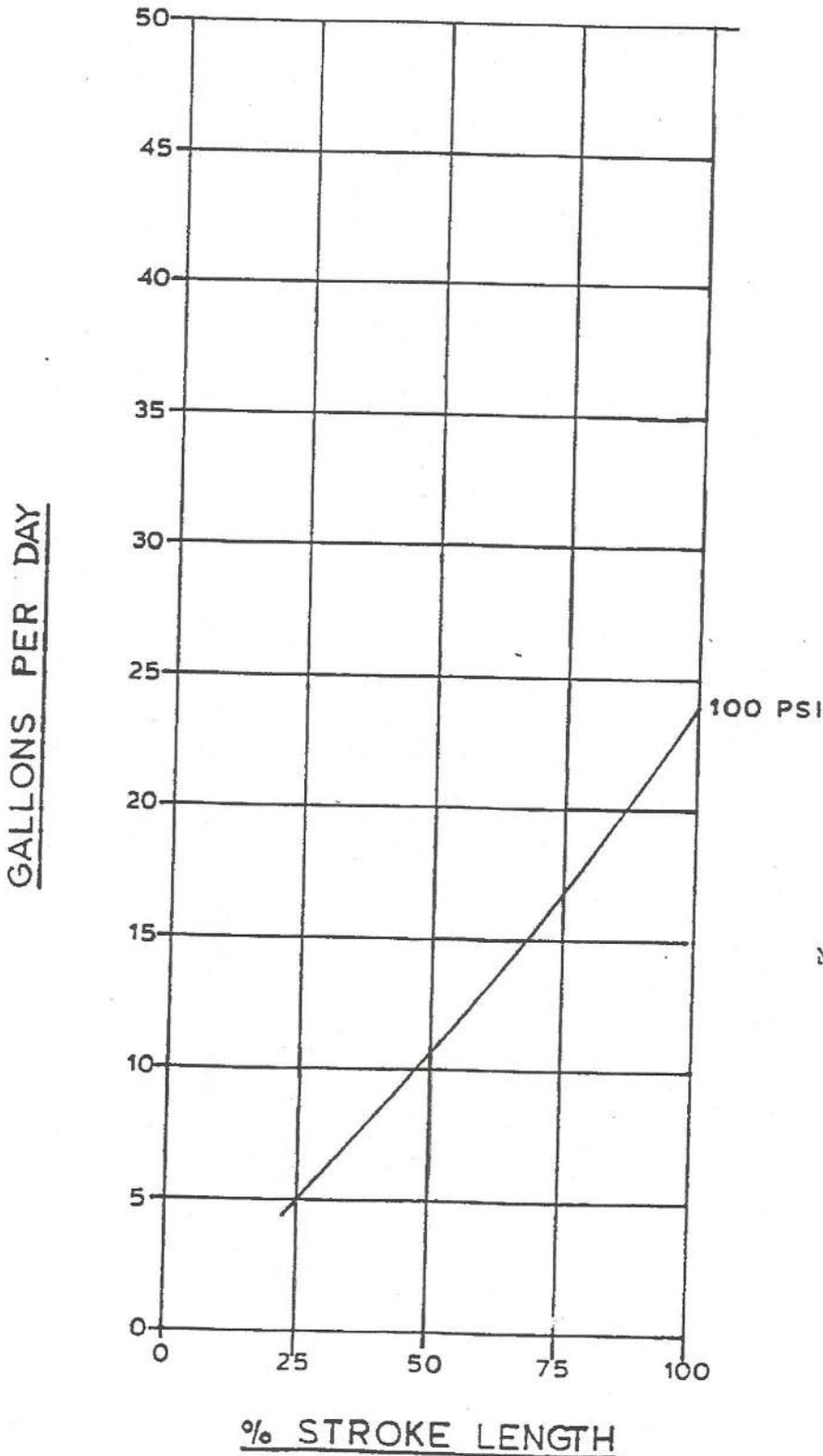


NOTE:

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FLOW RATE CHART

FLUORIDE

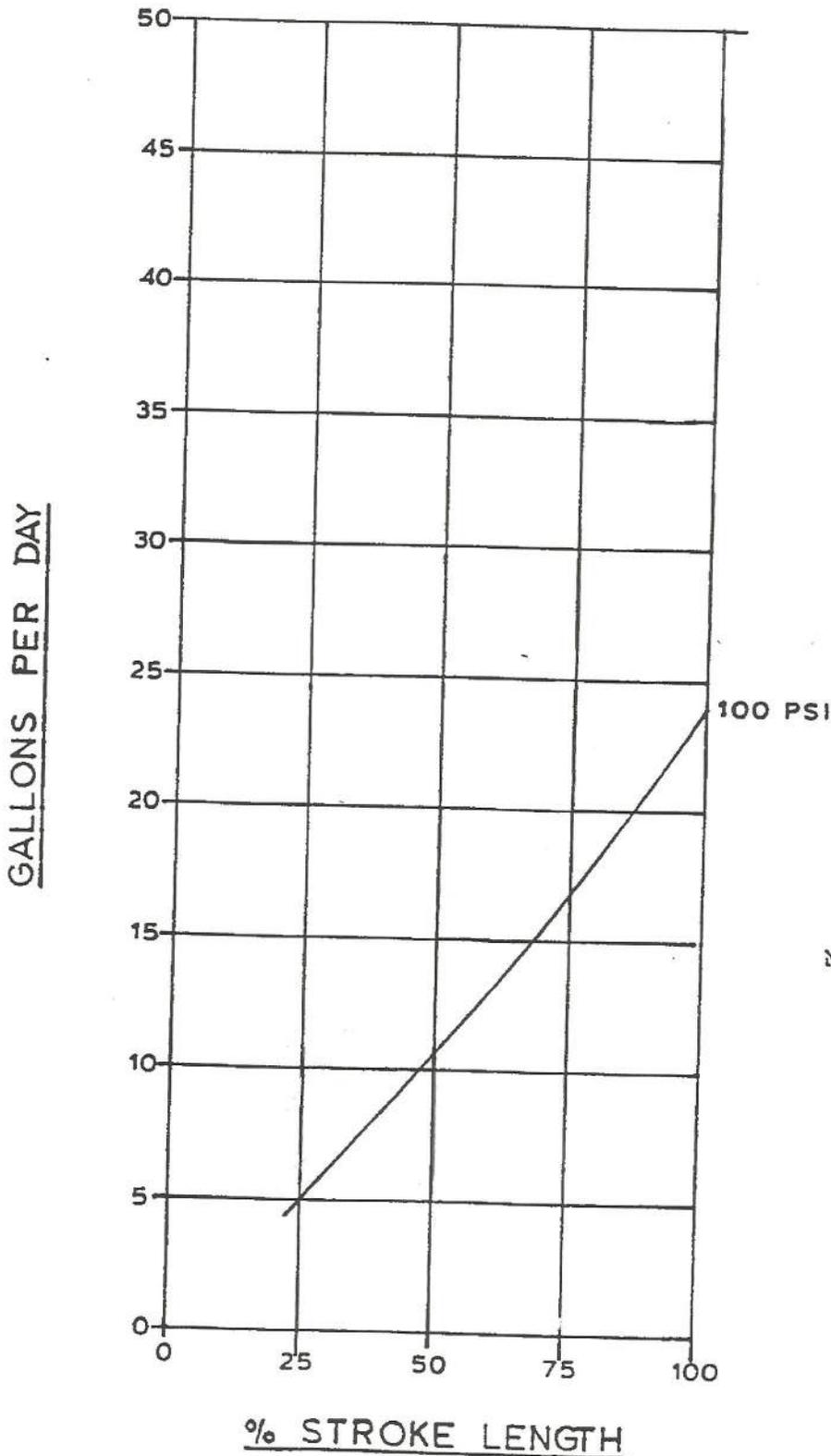


NOTE:

1. Frequency set at 100 constant.
2. These feed rate curves represent nominal value for the model listed. Actual pump may or may not provide the stated output. Outputs are subject to change without notice.

FLOW RATE CHART

FLUORIDE



NOTE:

1. Frequency set at 100 constant.
2. These feed rate curves represent nominal value for the model listed. Actual pump may or may not provide the stated output. Outputs are subject to change without notice.



RECOMMENDED SPARE PARTS - KOPKIT

Customer Name: PLOCHER CONSTRUCTION
Project Name: SOUTH SANGAMON WTP / JOB #3450
Pulsafeeder Order No: 789858
Customer Purchase Order No: 3450-018
Application Name: HYDROFLUOSILICIC ACID
System Serial No: SK10789858-2
Pump Serial No: X789858-3-4
KOPkit Part No: K4PTT1
Equipment Tag No(s): N/A

Consisting of the following parts:

Component	Description	Qty
L0200400-FPP	HEAD(FPP), 1.25" PUMP	1
L0301100-THY	DIAPHRAGM(TFE/HYP) AS'Y	1
L1500700-NTR	O-RING(NTR),#2-109, SEC	1
L1501200-TFE	O-RING(TFE),#2-013,.426	1
L3101TT1-FPP	VLV ASY,SUC FPP/TFE/TDB	1
L3201TT1-FPP	VLV ASY,DIS FPP/TFE/TDB	1
L9890200-188	HDWARE,P.H.MOUNT/02-H4	1
L9901200-BRS	SHIM,.28X.5X.03"THK BRASS	1
L2100400-FPP	DEFLECTION PLATE,1.250	1



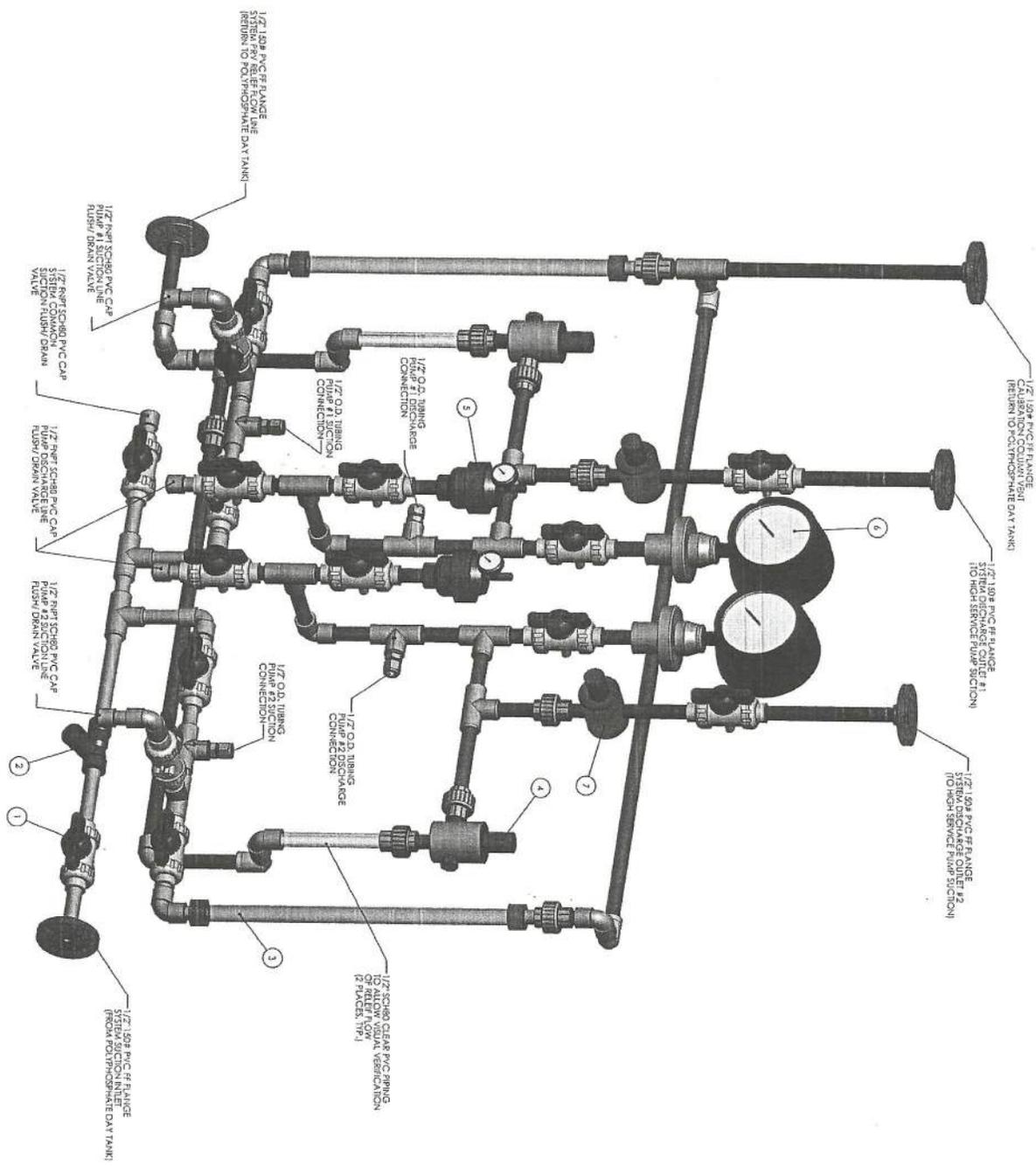
EQUIPMENT SCOPE & DOCUMENTATION CROSS REFERENCE

Customer Name: PLOCHER CONSTRUCTION
 Project Name: SOUTH SANGAMON WTP / JOB #3450
 Pulsafeeder Order No: 789858
 Customer Purchase Order No: 3450-018

Chemical / Application Name: POLYPHOSPHATE

Description	Item Number	Qty Supplied	Document No.
System Serial Number	SK10789858-3	1	
Pump Model Number	LMK5TA-VVC3-XXX	2	
Pump Serial Number	X789858-5-6		
Pump Tag Number(s)	N/A		
Pump Dimensional Drawing			AC00260-001
Flow Curve			LMK5
Accessories:			
Control Panel	T789858-S03	1	T789858-S03
Pressure Relief Valve	RS600007-PVC	2	RS600007-PVC
Back Pressure Valve	RS580019-PVC	2	RS580019-PVC
Calibration Column	W777036-PVC	2	W777036-PVC
Pulsation Dampener (Discharge)	RS780053-PVC	2	RS780053-PVC
Pressure Gauge/Seal (Discharge)	RS850041-PVC	2	RS850041-PVC
Strainer	RS660024-PVC	1	RS660024-PVC
KOPKIT	K5VVC3	2	K5VVC3
Test Data & Certificates			
Noise Level			
Hydrostatic Test Certificate			
Calibration Curve			
Standard Test Certificate			
Certificate of API 675			
Certificate of			
Certificate of			
Operation Manuals			

DATE	REVISION	BY	APPROVED



ISOMETRIC PIPING LAYOUT
SCALE: 3/8"=1'-0"

REFERENCES:
PROJECT NAME: SOUTH SANDAGAMON WATER COMMISSION (SANDAGAMON COUNTY, CA)
NEW WATER TREATMENT SYSTEM
NEW WATER TREATMENT FACILITIES
PROJECT NUMBER: 1129-2-AC
RFD DRAWING: N/A
SYSTEM DESCRIPTION: POLYPHOSPHATE FEED SYSTEM
SYSTEM SERIAL NO.: 200778988-3

- NOTES:**
1. PIPE AND FITTING CONSTRUCTION: SOLVENT WELDED SCHEDULE 80 PVC WITH VITON ELASTOMERS.
 2. FOR SYSTEM LAYOUT DIMENSIONS, REFER TO SHEET 1 OF THIS DRAWING.
 3. WALL MOUNTED BACKBOARD, PUMPS, AND LABORS ARE NOT SHOWN FOR CLARITY.

ITEM NO.	SYMBOL/ABBV.	DESCRIPTION	QTY.
1	RS660028-PVC	VALVE BALL VALVE 21 TRIM UNION 1/2" SPT PVC/PPA	16
2	RS660028-PVC	VALVE BALL VALVE 21 TRIM UNION 1/2" SPT PVC/VIN	1
3	W777034-PVC	CALIBRATION COLUMN PVC 1/2" TRIP/200#	2
4	RS660028-PVC	VALVE PRESSURE RILET 1/2" SPT PVC	2
5	R3780023-PVC	PULSATOR DAMPENER 4CI PVC/VINION 1/2" SPT	2
6	RS330041-1000	GA.G. 100PSI 1/2" SPT PVC/PIRE	2
7	RS3900119-PVC	BACK PRESSURE VALVE 1/2" SPT PVC	2

PULSAFEEDER
VALVE DAMPENER

DATE: 07/21/01
DRAWN BY: [Name]
CHECKED BY: [Name]
SCALE: 3/8"=1'-0"

REV: [Number]
DATE: 07/21/01
SCALE: 3/8"=1'-0"

PULSAtron®

Series MP

Electronic Metering Pumps

PULSAFEEDER®
A Unit of IDEX Corporation

Key Features

- **Automatic Control**, Fully scalable 4-20mA current signal that can also be calibrated to precisely match the current signal reading of the sending device.
- **Flow Verification** on select sizes can disable the pump and activate alarm if flow is interrupted for any reason.
- **Flow Totalization** accurately reports the volume of chemical pumped at the touch of a button in either Gallons or Liters. Factory preset to pump rating, manual calibration volume can be input to fine tune reporting.
- **Relay Output** for computer interface or AC power allows for external control.
- **Simple Prompts** in plain language allow for easy-to-understand instructions for programming. Available in four languages, English, French, German and Spanish.
- **Alarm Signals** for signal loss, full count, circuit failure, pulse overflow and pulse rate high. Liquid low level indicator capability is standard.
- **Timed Sequences** can be set for selected intervals and rate for repetitive metering.
- **Pulse Signals** can be multiplied or divided by 1 to 999 allowing for pumps to handle peak requirements.
- **Flow Rate** is displayed as GPH, GPD or LPH.
- **Large easy to read backlit LCD** display keeps you informed with the data that you need.

Complete Economical Selection

Nineteen distinct models are available, having pressure capabilities to 300 PSIG @ 3 GPD, and flow capacities to 504 GPD @ 20 PSIG, with a turndown ratio of 1000:1. Metering performance is reproducible to within $\pm 2\%$ of maximum capacity.

Operating Benefits

Reliable metering performance. Our guided check valves, with their state-of-the-art seat and ball designs, provide precise seating, and excellent priming and suction lift characteristics. Our timing circuit is highly reliable and, by design, virtually unaffected by temperature, EMI and other electrical disturbances.

Rated "hot" for continuous duty. Series MP pumps continue to meet their specifications for pressure and capacity even during extended use. That's because of our high quality solenoid and special enclosure that effectively dissipates heat.

High viscosity capability. A straight flow path and ample clearance between the diaphragm and head enable standard PULSAtron pumps to handle viscous chemicals up to a viscosity of 3000 CPS. For higher viscosity applications, larger, spring-loaded connections are available.

Leak-free, sealless, liquid end. Our diaphragms are of superior construction—PTFE-faced, bonded to a composite of Hypalon and fabric layers, and reinforced with a metal insert for optimum flexibility and durability.

System Compatibility

A wide variety of chemicals can be pumped. Liquid end materials include glass-filled polypropylene (GFPP), PVC, Polyvinylidene Fluoride (PVDF), PTFE, Hypalon, Viton, ceramic, alloys and 316SS.

Immediate installation and start-up.

Included as standard accessories with all models are an injection/back pressure valve assembly and a foot valve/strainer assembly*, including discharge and suction tubing (*not avail. with high viscosity connections for >3000 CPS).

Safe and easy priming and valve maintenance.

Included as a standard accessory is a bleed valve assembly, including return tubing (available only on those models with tubing connections and ≤ 240 GPD).

Quick and economical liquid end maintenance.

Available for every model is a unique KOPkit®, a convenient, economically priced, package containing new cartridge check valves and other important spare parts.



For additional information about PULSAtron's full-featured Series E PLUS refer to Technical Sheet No. EMP-021, about the mid-range Series E, Series D & Series A PLUS refer to Technical Sheet No. EMP-022, EMP-023 & EMP-025. For information about the economical Series C PLUS & Series C, refer to Technical Sheet No. EMP-026 & EMP-024.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

technology
innovation diversity
excellence

PULSAtron Series MP Selection Guide

MODELS:	
K2	= 0.13 gph / 3 gpd (0.5 lph) max pres.: 300 PSI (21 BAR)
B2	= 0.21 gph / 5 gpd (0.8 lph) max pres.: 250 PSI (17 BAR)
D3	= 0.50 gph / 12 gpd (1.9 lph) max pres.: 250 PSI (17 BAR)
F4	= 0.85 gph / 20 gpd (3.2 lph) max pres.: 250 PSI (17 BAR)
H4	= 1.70 gph / 41 gpd (6.4 lph) max pres.: 250 PSI (17 BAR)
A2	= 0.25 gph / 6 gpd (0.9 lph) max pres.: 150 PSI (10 BAR)
B3	= 0.50 gph / 12 gpd (1.9 lph) max pres.: 150 PSI (10 BAR)
D4	= 0.90 gph / 22 gpd (3.4 lph) max pres.: 150 PSI (10 BAR)
G4	= 1.75 gph / 42 gpd (6.6 lph) max pres.: 150 PSI (10 BAR)
K5	= 2.50 gph / 60 gpd (9.5 lph) max pres.: 150 PSI (10 BAR)
H5	= 3.15 gph / 76 gpd (11.9 lph) max pres.: 150 PSI (10 BAR)
A3	= 0.50 gph / 12 gpd (1.9 lph) max pres.: 100 PSI (7 BAR)
K3	= 0.60 gph / 14 gpd (2.3 lph) max pres.: 100 PSI (7 BAR)
B4	= 1.00 gph / 24 gpd (3.8 lph) max pres.: 100 PSI (7 BAR)
E4	= 1.85 gph / 44 gpd (7.0 lph) max pres.: 100 PSI (7 BAR)
H6	= 5.00 gph / 120 gpd (18.9 lph) max pres.: 100 PSI (7 BAR)
K7	= 8.00 gph / 192 gpd (30.3 lph) max pres.: 50 PSI (3.3 BAR)
H7	= 10.0 gph / 240 gpd (37.9 lph) max pres.: 35 PSI (2.4 BAR)
H8	= 21.0 gph / 504 gpd (79.5 lph) max pres.: 20 PSI (1.3 BAR)

CONTROLS:	
T	= Signal Level Output Relay
K	= Power Level Output Relay

ELECTRICAL:	
A	= 115 Volt / 50-60Hz
1	= 115 Volt / 50-60Hz (without agency approvals)
B	= 230 Volt / 50-60Hz / 1ph with 6' (1.8m) 3-wire US Plug
2	= 230 Volt / 50-60Hz (without agency approvals)

LIQUID END MATERIALS:	
PTC	= GFFPL / TFE / Ceramic
KTC	= PVDF / TFE / Ceramic (not available on H8)
VHC	= PVC / Hypalon / Ceramic (not available on H7, H8, K7)
VTC	= PVC / TFE / Ceramic (models <= 150 psi excluding H7, H8, K7)
WTC	= PVC / TFE / Ceramic (models > 150 psi and H7, H8, K7)
VVC	= PVC / Viton / Ceramic (not available on H8)
ATS	= 316 S.S. / TFE / 316 S.S. (must use FNPT piping connection) (not available on H8)

See page 6 for additional liquid end materials.

CONNECTION SIZES:	
1	= Tubing .25" I.D. x .38" O.D. / .25" Ball, 0 - 1.88 GPH
3	= Tubing .38" I.D. x .50" O.D. / .38" Ball, 1.63 - 10 GPH
9	= Degas Head: .25" I.D. x .38" O.D. / 0-1.83 GPH
J	= Tubing, .25" I.D. x .38" O.D. / .19" Ball, 0 - 1.04 GPH
METRIC:	
M	= G 1/2 A Threads, .38" Ball, 6.15 - 37.85 LPH
R	= G 1/2 A Threads, .25" Ball, 0 - 7.10 LPH
Y	= 6 x 12mm, .25" Ball, 0 - 7.10 LPH

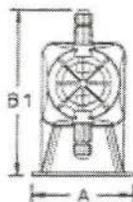
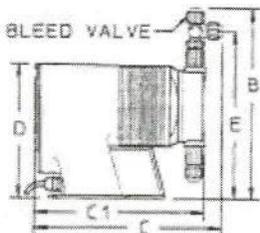
Please Refer to page 7 for additional connection sizes. All pumps with tubing connections come with the following items (except for LMH8, LPH8, LEH8, HV series pumps and pumps >150PSI in PVC): 4' Suction, 4' Return, 8' discharge tubing, footvalve/strainer assy., injection valve and bleed valve.

SUFFIX CODES:	
XXX	= No Additional Options
130	= PVDF Tubing
500	= Five Function Valve
520	= Five Function Degas Valve
FVE	= Flow Verification / EPDM (not available on pumps greater than 100 psi)
FVV	= Flow Verification / Viton (not available on pumps greater than 100 psi)
ITS	= 15 gal. ITS Tank System (ITS Tank not available on LM, LP, LT, and LE: H4, H5, H6, H7, H8, J7, K7 models)
CZXXX	= CE Approval (5 digits used for this suffix code)

See pages 9, 10 & 11 for additional information and specs.

A completed model number should look like 'LMB3TA-PTC1-XXX'

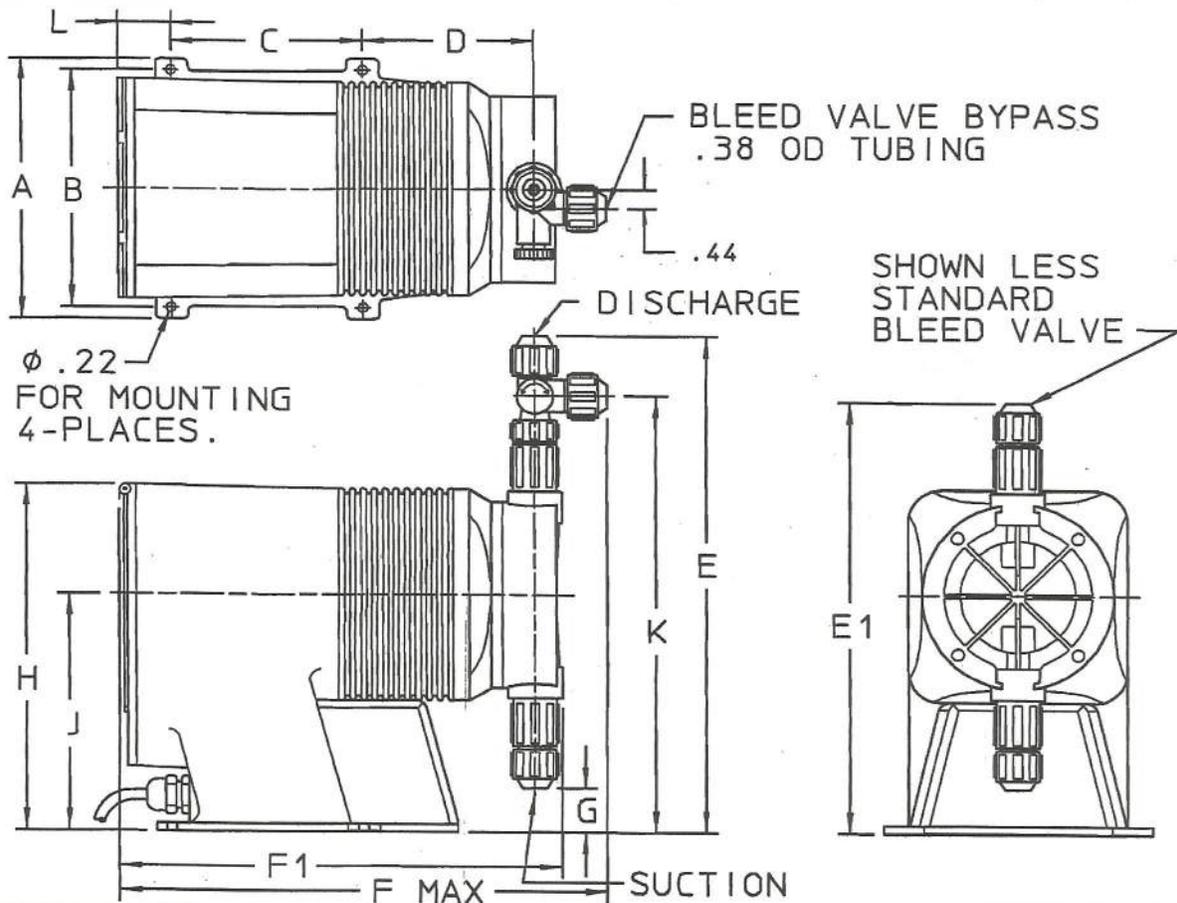
Dimensions



Series MP Dimensions (inches)

Model No.	A	B	B1	C	C1	D	E	Shpg Wt	Model No.	A	B	B1	C	C1	D	E	Shpg Wt
LMA2	5.4	10.3	-	10.8	-	7.5	8.9	13	LMH4	6.2	10.9	-	11.2	-	8.2	9.5	21
LMA3	5.4	10.6	-	10.7	-	7.5	9.2	13	LMH5	6.2	11.3	-	11.2	-	8.2	9.9	21
LMB2	5.4	10.3	-	10.8	-	7.5	8.9	13	LMH6	6.2	11.3	-	11.2	-	8.2	9.9	21
LMB3	5.4	10.6	-	10.7	-	7.5	9.2	13	LMH7	6.1	11.7	-	11.2	-	8.2	10.3	21
LMB4	5.4	10.6	-	10.7	-	7.5	9.2	13	LMH8*	6.1	-	10.9	-	10.6	8.2	-	25
LMD3	5.4	10.6	-	11.2	-	7.5	9.2	15	LMK2	5.4	10.3	-	10.8	-	7.5	8.9	13
LMD4	5.4	10.6	-	11.2	-	7.5	9.2	15	LMK3	5.4	10.6	-	10.7	-	7.5	9.2	13
LME4	5.4	10.6	-	11.2	-	7.5	9.2	15	LMK5	5.4	10.9	-	11.7	-	7.5	9.5	18
LMF4	5.4	10.6	-	11.7	-	7.5	9.2	18	LMK7	6.1	11.7	-	11.2	-	8.2	10.3	21
LMG4	5.4	10.6	-	11.7	-	7.5	9.2	18									

NOTE: Inches X 2.54 = cm / * the LMH8 is designed without a bleed valve available



MODEL #	DIMENSIONS												W/OUT BLEED VALVE		STD. PORT CONNECTION	PUMP WEIGHT LBS.
	A	B	C	D	E	F	G	H	J	K	L	E1	F1			
LMA2	5.38	4.81	4.38	3.50	10.31	10.75	1.69	7.44	5.22	8.94	1.19	8.78	9.78	.38"OD TUBING	9.50	
LMA3	5.38	4.81	4.38	3.44	10.56	10.69	1.41	7.44	5.22	9.19	1.19	9.03	9.78	.38"OD TUBING	9.50	
LMB2	5.38	4.81	4.38	3.50	10.31	10.75	1.69	7.44	5.22	8.94	1.19	8.78	9.78	.38"OD TUBING	9.50	
LMB3	5.38	4.81	4.38	3.44	10.56	10.69	1.41	7.44	5.22	9.19	1.19	9.03	9.78	.38"OD TUBING	9.50	
LMB4	5.38	4.81	4.38	3.44	10.56	10.69	1.41	7.44	5.22	9.19	1.19	9.03	9.78	.38"OD TUBING	9.50	
LMD3	5.38	4.81	4.38	3.94	10.56	11.19	1.41	7.44	5.22	9.19	1.19	9.03	10.28	.38 OD TUBING	12.00	
LMD4	5.38	4.81	4.38	3.94	10.56	11.19	1.41	7.44	5.22	9.19	1.19	9.03	10.28	.38 OD TUBING	12.00	
LME4	5.38	4.81	4.38	3.94	10.56	11.19	1.41	7.44	5.22	9.19	1.19	9.03	10.28	.38 OD TUBING	12.00	
LMF4	5.38	4.81	4.38	4.44	10.56	11.69	1.41	7.44	5.22	9.19	1.19	9.03	10.78	.38 OD TUBING	14.75	
LMG4	5.38	4.81	4.38	4.44	10.56	11.69	1.41	7.44	5.22	9.19	1.19	9.03	10.78	.38 OD TUBING	14.75	
LMG5	5.38	4.81	4.38	4.44	10.94	11.69	1.03	7.44	5.22	9.53	1.19	9.41	10.78	.50 OD TUBING	14.75	
LMH4	6.12	5.56	4.38	3.94	10.94	11.19	1.78	8.19	5.59	9.53	1.19	9.41	10.28	.38 OD TUBING	17.75	
LMH5	6.12	5.56	4.38	3.94	11.31	11.19	1.78	8.19	5.59	9.94	1.19	9.78	10.28	.50 OD TUBING	17.75	
LMH6	6.12	5.56	4.38	3.94	11.31	11.19	1.78	8.19	5.59	9.94	1.19	9.78	10.28	.50 OD TUBING	17.75	
LMH7	6.12	5.56	4.38	3.94	11.69	11.19	1.03	8.19	5.59	10.29	1.19	10.16	10.28	.50 OD TUBING	17.75	
LMH8	6.12	5.56	4.38	4.00	-	-	.44	8.19	5.59	-	1.19	10.94	10.59	.75 OD TUBING	23.00	
LMA2	5.38	4.81	4.38	3.50	10.31	10.75	1.69	7.44	5.22	8.94	1.19	8.78	9.78	.38 OD TUBING	9.50	
LMK2	5.38	4.81	4.38	3.44	10.56	10.69	1.41	7.44	5.22	9.19	1.19	9.03	9.78	.38 OD TUBING	9.50	
LMK3	5.38	4.81	4.38	3.44	10.56	10.69	1.41	7.44	5.22	9.19	1.19	9.03	9.78	.38 OD TUBING	9.50	
LMK5	5.38	4.81	4.38	4.44	10.94	11.69	1.03	7.44	5.22	9.53	1.19	9.41	10.78	.50 OD TUBING	14.75	
LMK7	6.12	5.56	4.38	3.94	11.69	11.19	1.03	8.19	5.59	10.29	1.19	10.16	10.28	.50 OD TUBING	17.75	

NOTES:

- WHEN USING .25 NPT CONNECTIONS:
 A) BLEED VALVE IS NOT AVAILABLE.
 B) ADD .25" TO 'G' DIM.
 C) SUBTRACT .25 FROM 'E' DIM.
- WHEN USING OPTIONAL TUBE SIZES ALL DIM. ARE THE SAME.
- FINAL ORIENTATION OF BLEED VALVE TO PUMP MAY VARY FROM THAT SHOWN.

ALL DIMENSIONS ARE IN INCHES

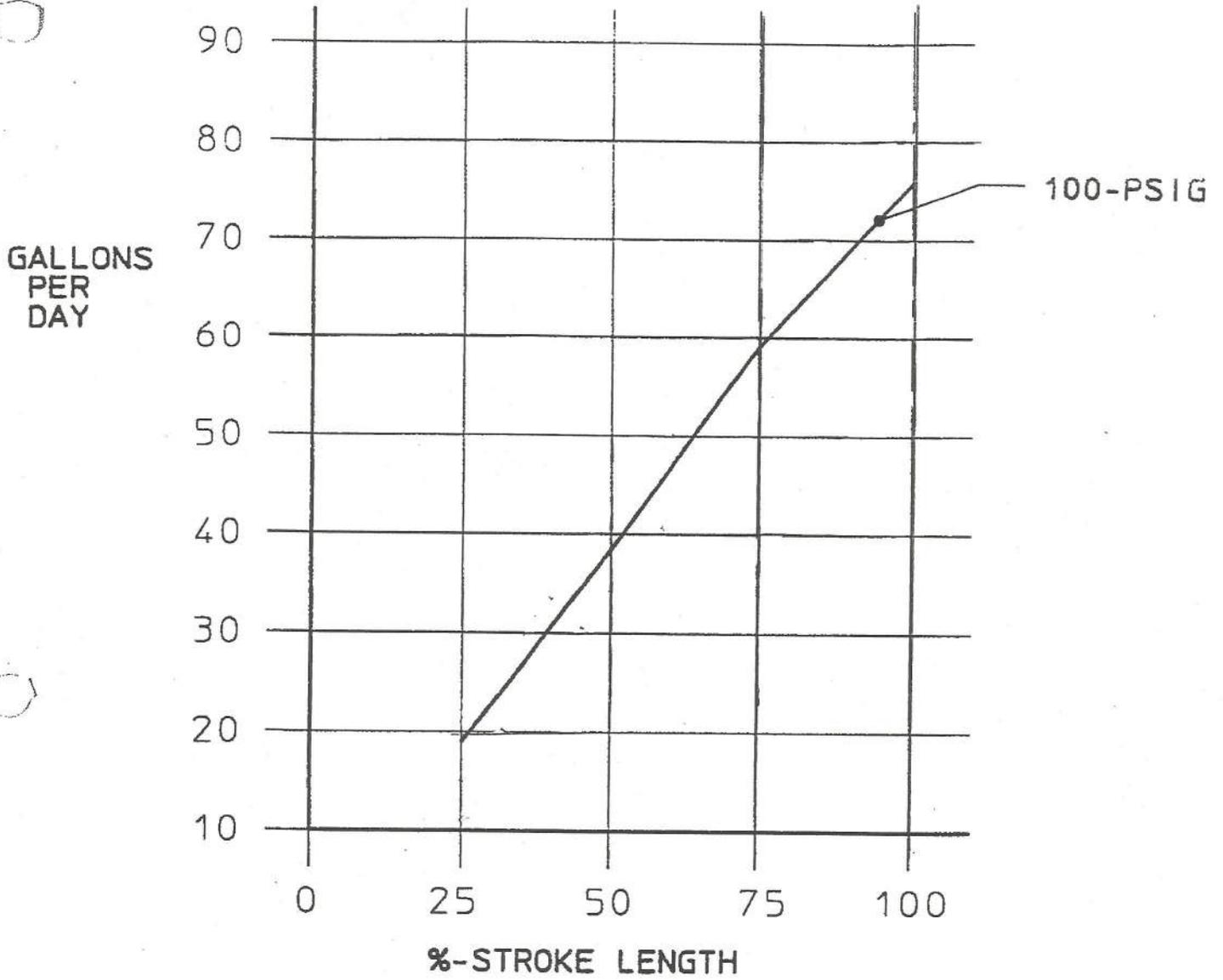


DWG. TITLE
SERIES 'MP'
PUMP HEAD ASSEMBLY

REF	ADDED 'K2 3 & 5' MODELS(3-27-96), HMK	3-4-03	SECTION/PAGE: PULSAtron/XXX	DWN BY: PTP	CAD DWG.# 4-C-03
	REVISION	DATE	EFFECTIVE:... 06/01/95	DATE: 6-1-95	AC00260.001
			SUPERSEDES:... NEW		

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FLOW RATE CHART



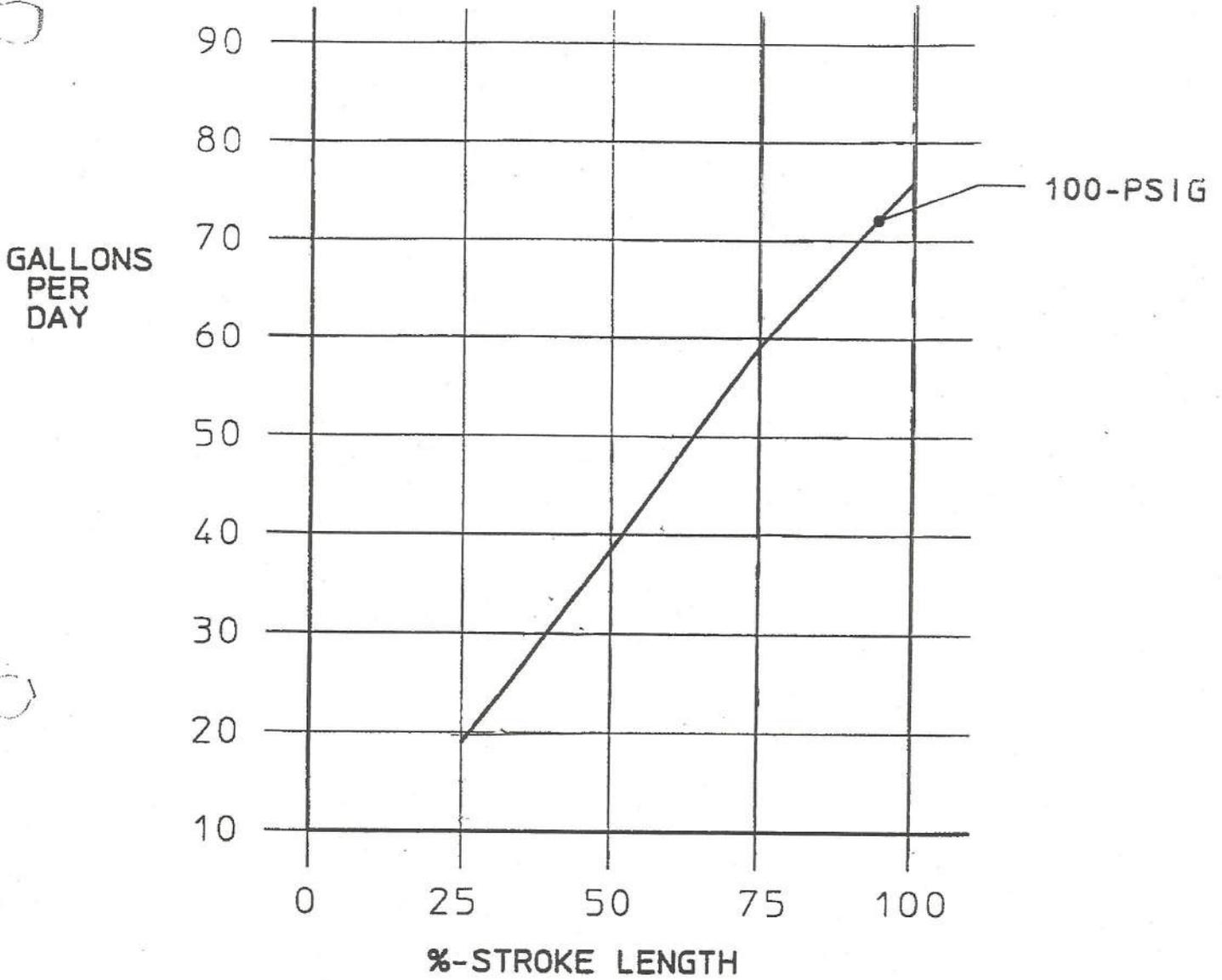
PHOSPHATE

NOTES:

1. FREQUENCY SET AT 100%.
2. THESE FEED RATE CURVES REPRESENT NOMINAL VALVE FOR THE MODEL LISTED. ACTUAL PUMP MAY or MAY NOT PROVIDE THE STATED OUTPUT. OUTPUTS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

4

FLOW RATE CHART



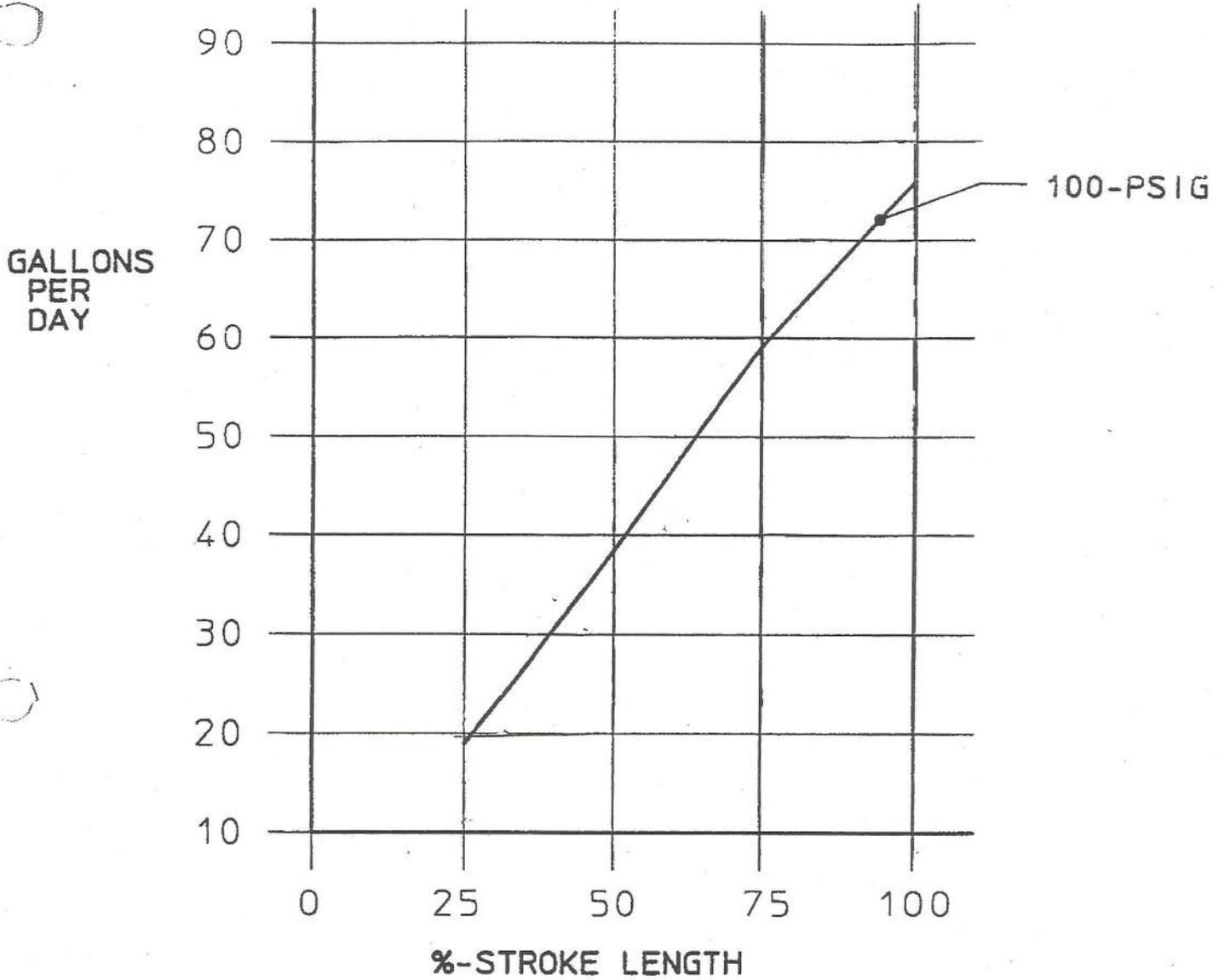
PHOSPHATE

NOTES:

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FLOW RATE CHART



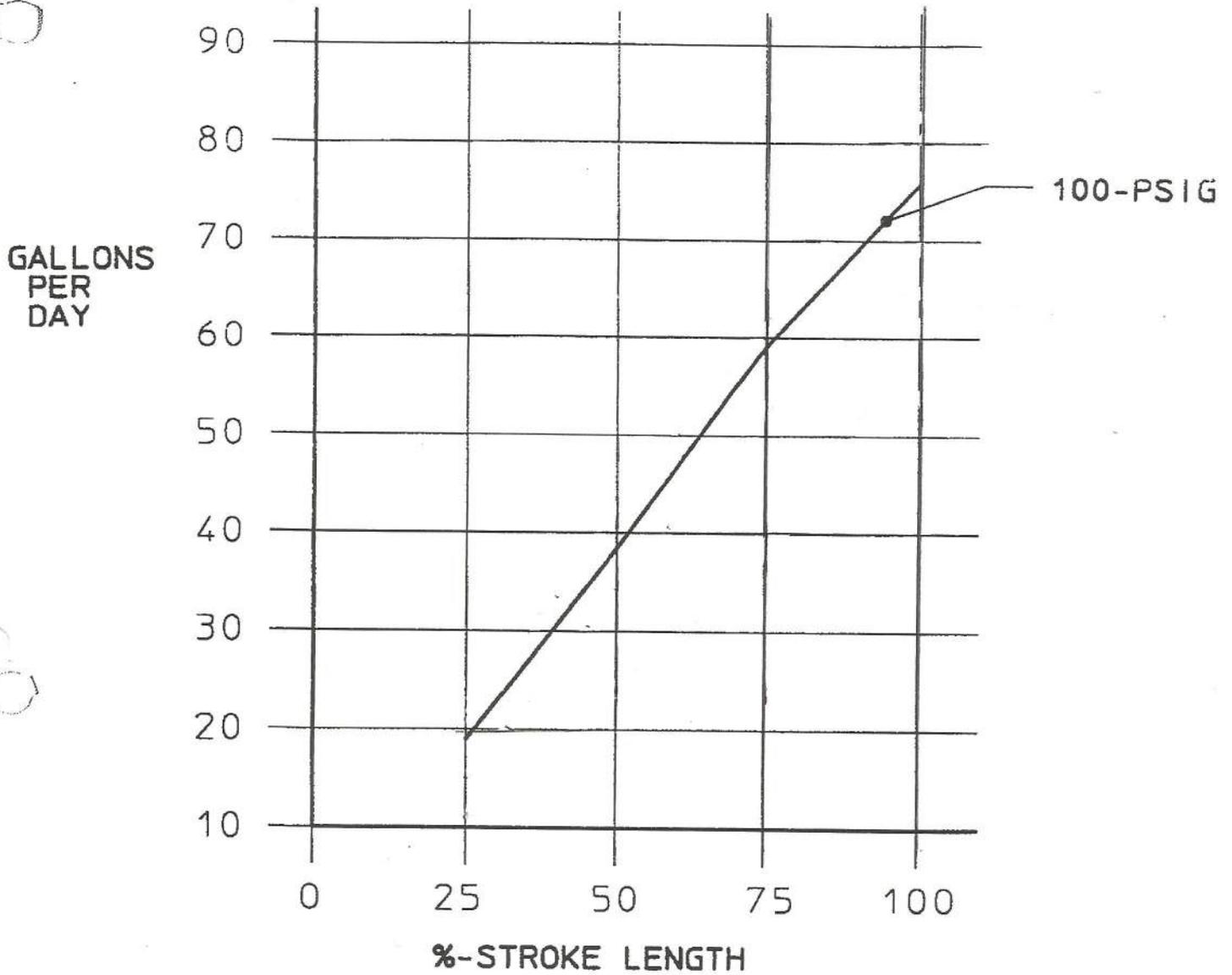
PHOSPHATE

NOTES:

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u

FLOW RATE CHART



PHOSPHATE

NOTES:

1. FREQUENCY SET AT 100%.
2. THESE FEED RATE CURVES REPRESENT NOMINAL VALVE FOR THE MODEL LISTED. ACTUAL PUMP MAY or MAY NOT PROVIDE THE STATED OUTPUT. OUTPUTS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

RECOMMENDED SPARE PARTS - KOPKIT

Customer Name:	PLOCHER CONSTRUCTION
Project Name:	SOUTH SANGAMON WTP / JOB #3450
Pulsafeeder Order No:	789858
Customer Purchase Order No:	3450-018
Application Name:	POLYPHOSPHATE
System Serial No:	SK10789858-3
Pump Serial No:	X789858-5-6
KOPkit Part No:	K5VVC3
Equipment Tag No(s):	N/A

Consisting of the following parts:

Component	Description	Qty
L0200500-PVC	HEAD(PVC), 1.63" 150-PS	1
L0301200-THY	DIAPHRAGM(TFE/HYP) ASY	1
L1500700-NTR	O-RING(NTR),#2-109, SEC	1
L1501200-TFE	O-RING(TFE),#2-013,.426	1
L3101VC3-PVC	VLV ASY,SUC PVC/VTN/C	1
L3201VC3-PVC	VLV ASY,DIS PVC/VTN/C	1
L9890300-188	HDWARE,P.H.MOUNT/G5-K7	1
L9901200-BRS	SHIM,.28X.5X.03"THK BRASS	1
L2100500-FPP	DEFLECTION PLATE,1.625	1

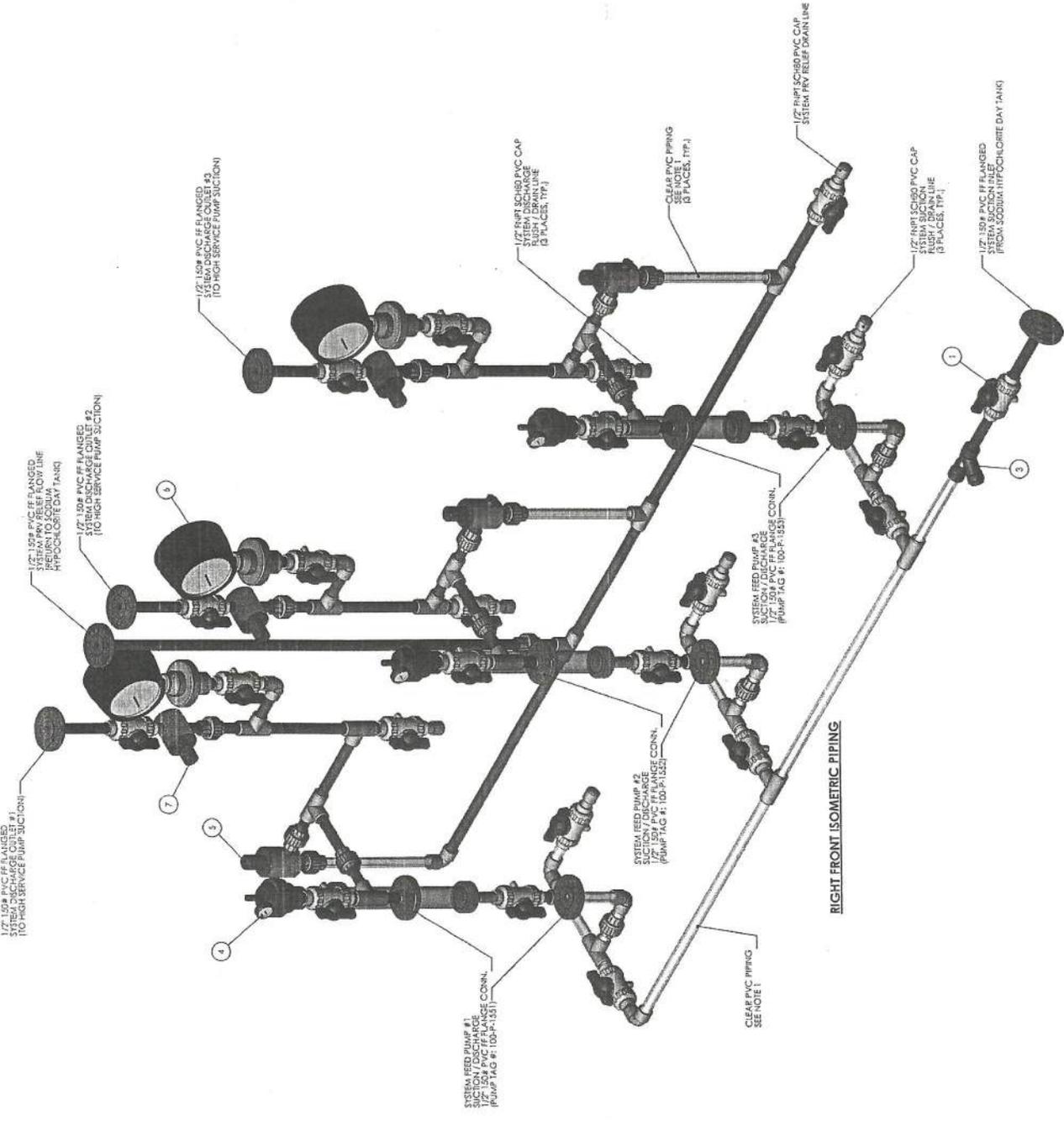


EQUIPMENT SCOPE & DOCUMENTATION CROSS REFERENCE

Customer Name: PLOCHER CONSTRUCTION
Project Name: SOUTH SANGAMON WTP / JOB #3450
Pulsafeeder Order No: 789858
Customer Purchase Order No: 3450-018

Chemical / Application Name: SODIUM HYPOCHLORITE

Description	Item Number	Qty Supplied	Document No.
System Serial Number	SK10789858-4	1	
Pump Model Number	25BBH	3	
Pump Serial Number	X789858-7-9		
Pump Tag Number(s)	N/A		
Pump Dimensional Drawing			22867-000
Flow Curve			23163-000
Pump Controller Model:	MPC	3	
Controller Part Number	MPCLAGAXEM-XXXX		
Motor Part Number:	NP500201-000	3	NP500201-000
Accessories:			
Control Panel	T789858-S04	1	T789858-S04
Pressure Relief Valve	RS600007-PVC	3	RS600007-PVC
Back Pressure Valve	RS580019-PVC	3	RS580019-PVC
Calibration Column	W777036-PVC	3	W777036-PVC
Pulsation Dampener (Discharge)	RS780053-PVC	3	RS780053-PVC
Pressure Gauge/Seal (Discharge)	RS850041-PVC	3	RS850041-PVC
Strainer	RS660024-PVC	1	RS660024-PVC
KOPKIT	NSK7LVVCEE	3	NSK7LVVCEE
Test Data & Certificates			
Noise Level			
Hydrostatic Test Certificate			
Calibration Curve			
Standard Test Certificate			
Certificate of API 675			
Certificate of			
Certificate of			
Operation Manuals			



REFERENCES:

PROJECT NAME: SOUTH SANGHAMON WATER COMMISSION (SANGHAMON COUNTY, ILL.)
 PROJECT NUMBER: N/A
 CONTRACT #: WATER TREATMENT FACILITIES
 PWD DRAWING: N/A
 SYSTEM DESCRIPTION: SODIUM HYPOCHLORITE FEED SYSTEM
 SYSTEM TAG NUMBER: N/A
 SYSTEM SERIAL NO.: S09789858-4

NOTES:

1. PIPE AND FITTING CONSTRUCTION, EXCEPT THE STD. SCHEDULE 80 PVC WITH VITON ELASTOMERS, CLEAR PVC PIPING SHALL BE PROVIDED BETWEEN STRAINER AND PUMP SUCTION VALVE. ADDITIONALLY, CLEAR PVC PIPING SHALL BE PROVIDED BETWEEN PUMP SUCTION VALVE AND PUMP. PUMP RELIEF END TO ALLOW VISUAL VERIFICATION OF RELIEF FLOW.
2. FOR SYSTEM LAYOUT AND ENVELOPE DIMENSIONS, REFER TO SHEET T OF THIS DRAWING.
3. WALL MOUNTED BACKBOARD, HPC J-BOXES, AND PUMPS NOT SHOWN FOR CLARITY.
4. *** ALL BALL VALVES, ITEM #1, SHALL BE INTERNALLY VENTED. ***

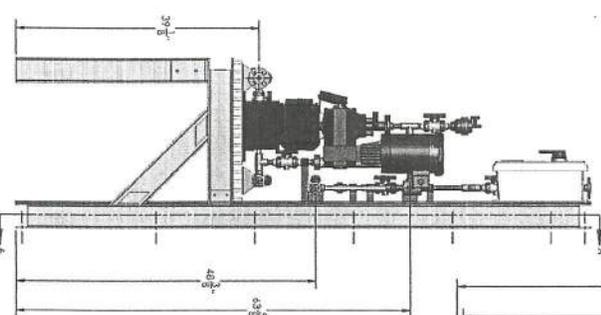
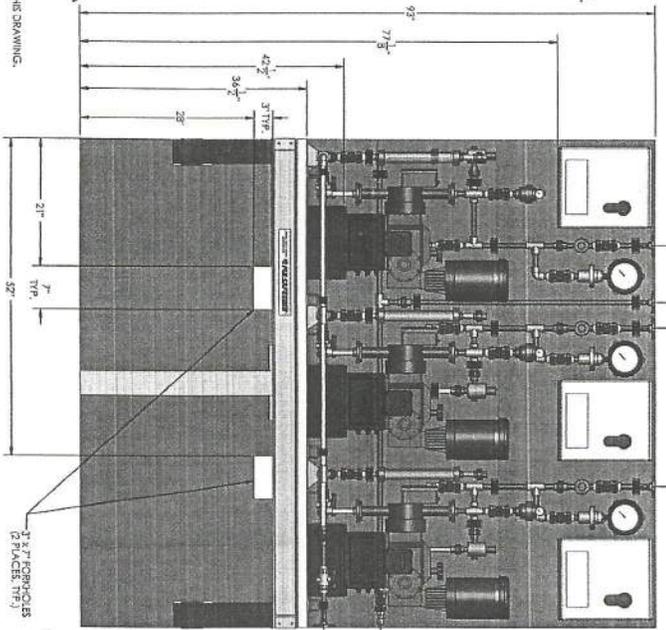
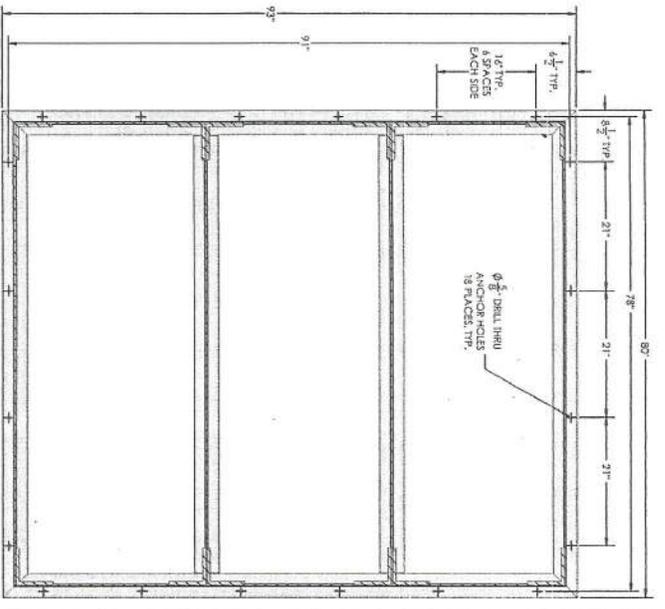
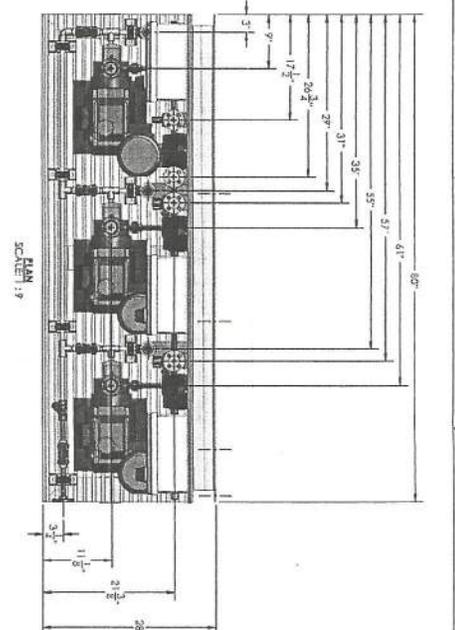
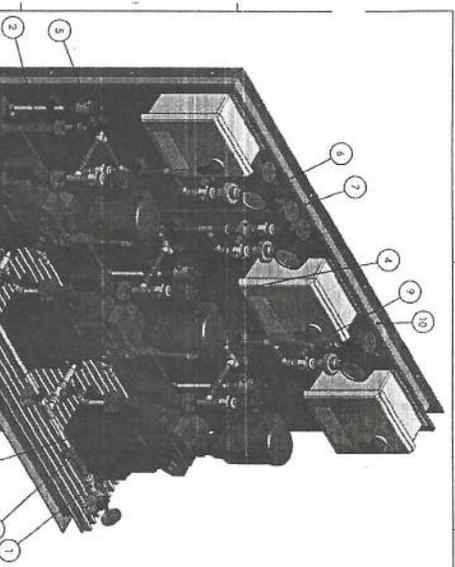
ITEM NO.	SWBCOMPARTNO.	DESCRIPTION	QTY.
1	R620026-PVC	VALVE BALL TYPE 21 TRUE UNION, 1/2" SKT. PVC/FRM	23
2	R771035-PVC	500PI CALIBRATION COLUMN 3/4"HTPVC	3
3	R646024-PVC	1-STRAINER, 1/2" SKT PVC/VIN	1
4	R5760033-PVC	PULLATION DAMPENER 4CI PVC/VINION 1/2" SKT	3
5	R640000-PVC	VALVE PRESSURE RELIEF 1/2" SKT PVC	3
6	R3850041-000	CSG, 100PSI 1/2" SKT PVC/PIPE	3
7	R6590018-PVC	BACK PRESSURE VALVE, 1/2" SKT, PVC	3

APUL SAFEFEDER
 AVERESTATION

DATE: 08/13/2013 10:52 AM
 DRAWN BY: J. B. BROWN
 CHECKED BY: J. B. BROWN
 SCALE: 1" = 10'-0"

PROJECT NO.: R3010752-001
 SHEET OF: C

NO.	REV.	DESCRIPTION	DATE	BY
1		ISSUED FOR CONSTRUCTION	04/21/2011	AW/STB
2		REVISIONS TO DRAWING	04/21/2011	AW/STB
3		REVISIONS TO DRAWING	04/21/2011	AW/STB
4		REVISIONS TO DRAWING	04/21/2011	AW/STB
5		REVISIONS TO DRAWING	04/21/2011	AW/STB



- NOTES:**
- FRAME CONSTRUCTION: FIBERGLASS (FPP) STRUCTURAL FRAMES FOR BENCH CONSTRUCTION. 1/2" THICK INFRS BUSHES (BUSHES) FROM SHEET METAL AND FITTING CONSTRUCTION. 1/2" THICK INFRS BUSHES (BUSHES) FROM SHEET METAL AND FITTING CONSTRUCTION. 1/2" THICK INFRS BUSHES (BUSHES) FROM SHEET METAL AND FITTING CONSTRUCTION. 1/2" THICK INFRS BUSHES (BUSHES) FROM SHEET METAL AND FITTING CONSTRUCTION.
 - WATER AND FITTING CONSTRUCTION: 1/2" THICK INFRS BUSHES (BUSHES) FROM SHEET METAL AND FITTING CONSTRUCTION. 1/2" THICK INFRS BUSHES (BUSHES) FROM SHEET METAL AND FITTING CONSTRUCTION. 1/2" THICK INFRS BUSHES (BUSHES) FROM SHEET METAL AND FITTING CONSTRUCTION.
 - ALL PIPE SUPPORT BRACKETS AND CLAMPS ARE SHOWN AS OPTIONAL. ALL PIPE SUPPORT BRACKETS AND CLAMPS ARE SHOWN AS OPTIONAL. ALL PIPE SUPPORT BRACKETS AND CLAMPS ARE SHOWN AS OPTIONAL.
 - PAPER PARKING PIPE AND TUBING CLAMPS ARE USED FOR REMAINING PIPE AND NOT ALL ARE SHOWN. ADDITIONAL PIPE SUPPORTS SHALL BE PROVIDED AS REQUIRED TO PROVIDE SUPPORT FOR PIPING AND APPROPRIATE DURING OPERATION.
 - FOR DIMENSIONAL TOLERANCE: 1/16" INCH.
 - FOR COMPONENT AND TERMINATION POINT IDENTIFICATION, REFER TO SHEET 2 OF THIS DRAWING.
 - ALL PAIP VALVES, ITEM #1, SHALL BE INTERNALLY VENTED.

PROJECT NAME: SOUTH SANDHILLS WATER COMMISSION (SANDHILLS COUNTY, AL.)
 PROJECT NUMBER: NEW WATER TREATMENT SYSTEM
 CONTRACTOR: WATER TREATMENT FACILITIES
 PROJECT DRAWING: N/A
 SYSTEM DESCRIPTION: SODIUM HYPOCHLORITE FEED SYSTEM
 SYSTEM TAG NUMBER: N/A
 SYSTEM SERIAL NO.: 500798689-4

REFERENCES:
 WATERWAY AIR
 SCALE: 1" = 8"

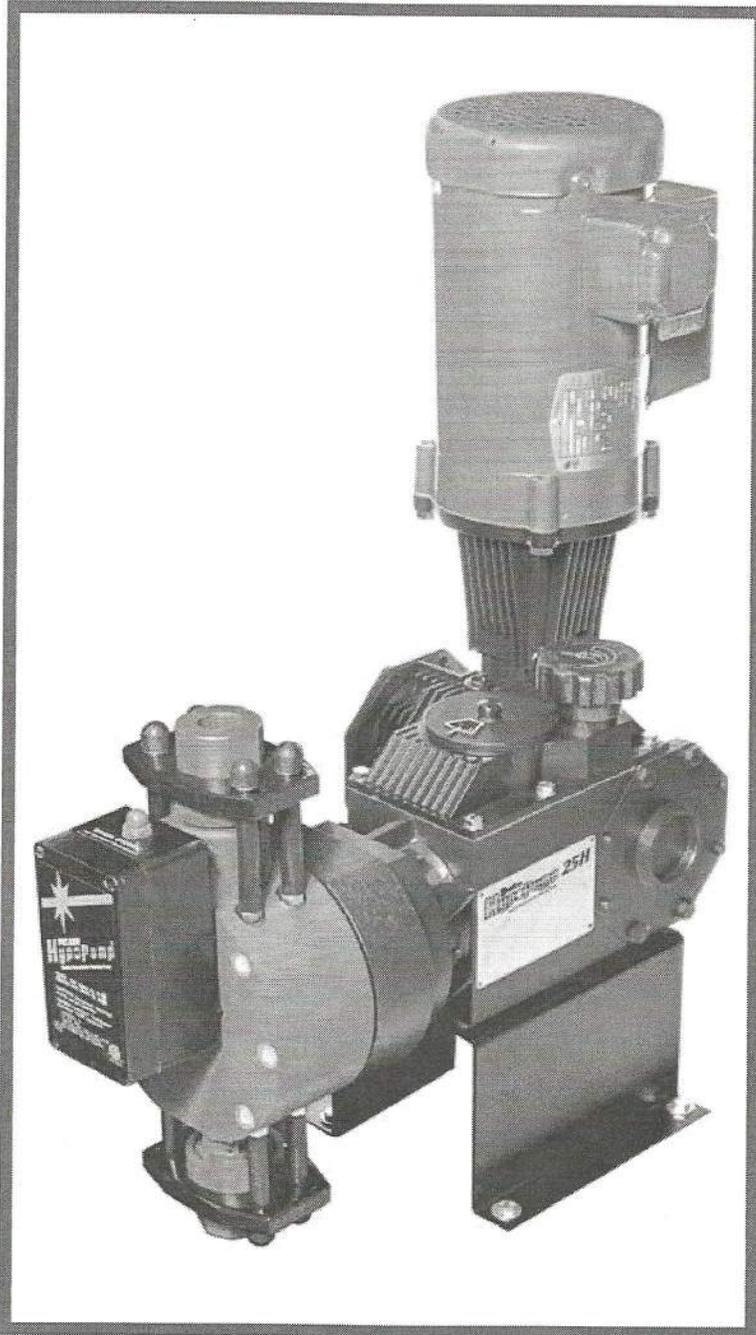
ITEM NO.	SYMBOL/ABBREVIATION	DESCRIPTION	QTY
1	W450024-PVC	VALVE BALL TYPE 21 TUBE UNION 1/2" SPT PVC/CPVC	23
2	W77035-PVC	50MM CALIBRATION COLUMN 21/8" PVC	3
3	836004-PVC	Y-SUBASSEMBLY 1/2" SPT PVC/CPVC	1
4	8370035-PVC	PULSATION DAMPENER 4" PVC/CPVC 1/2" SPT	3
5	8560007-PVC	VALVE PRESSURE BLEED 1/2" SPT PVC	3
6	8580041-000	G.A.G. 100PSI 1/2" SPT PVC/CPVC	3
7	8580019-PVC	BACK PRESSURE VALVE 1/2" SPT PVC	3
8	8580019-PVC / W450024-PVC / W77035-PVC	PULSATION DAMPENER 4" PVC/CPVC 1/2" SPT / VALVE BALL TYPE 21 TUBE UNION 1/2" SPT PVC/CPVC / 50MM CALIBRATION COLUMN 21/8" PVC	3
9	8590028-504	WALL MOUNT BRACKET 1/2" X 1/2" NEMA 4X RPP	3
10	8590028-504	WALL MOUNT BRACKET 1/2" X 1/2" NEMA 4X RPP	3
11	8590028-500	VALVE LATE PULSATION SYSTEM	1

MANUFACTURER:
 PULSAFEEDER
 575-340-2488, 50 PVC/CPVC
 OVERALL SYS LAYOUT

DATE: 04/21/2011
 DRAWING NO.: R5010752-001
 SHEET NO.: 1 OF 2

Shadow Hypopump® PULSAR

Sodium Hypochlorite Metering Pump



The Pulsar Shadow HypoPump® is a mechanically actuated diaphragm metering pump that is specifically designed to meter the full range of concentrations of Sodium Hypochlorite and its vapors. The patent-pending design allows pressurized fluid to cyclically flush liquid and vapors through the pump's discharge check system while maintaining high performance and chemical dosing accuracy.

KEY FEATURES:

- Automatically evacuates air and vapors from the reagent head
- Completely integral to the pump-closed loop vapor-handling system
- Requires no external valves or tubing for removal of vapors
- Self-priming features aids in quicker and more efficient start-ups
- No sacrificial parts like tubing or stators to replace at frequent intervals
- Mechanically Actuated Diaphragm Design results in simplified maintenance

STANDARD FEATURES:

- Three-component check valves
- Four bolt tie bar system
- Steady state accuracy of +/-2%
- Stainless steel hardware on liquid end
- Manual stroke length adjustment
- PTFE faced diaphragm
- Designed for 2 yrs uninterrupted service
- NEMA 4X & IP65 enclosure rating
- 115 or 230 VAC, single phase power

PULSAFEEDER
A Unit of IDEX Corporation

PULSAR®
PUMPS

Performance Specifications:

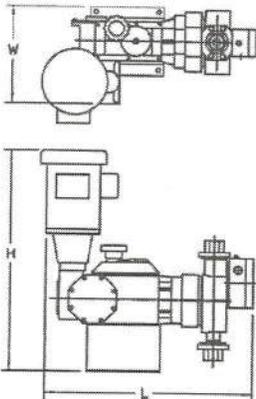
Pump Model & Head Size	Maximum Capacity Range Metal Wetted Ends Only Consult your Pulsafeeder sales representative for plastic wetted ends				Rated Pressure	
	60 HZ GPH	60 HZ LPH	50 HZ GPH	50 HZ LPH	PSIG	BAR
Includes all stroking rates						
25BB B Head	2.6 – 7.7	9.7 – 29.1	2.1 – 7.9	8.1 – 29.9	150	10.3
25BB C Head	5.9 – 17.7	22.5 – 67.2	4.9 – 18.2	18.6 – 69.2	150	10.3
25BD C Head	8.9 – 26.7	33.8 – 100.9	7.4 – 27.4	27.9 – 103.8	150	10.3
55BD C Head	7.8 – 23.3	29.6 – 88.3	6.5 – 24.0	24.4 – 90.8	150	10.3
55BD D Head	14.1 – 41.8	53.1 – 158.1	11.6 – 43.1	43.9 – 163.0	150	10.3
55BF D Head	23.4 – 69.7	88.5 – 263.8	19.3 – 71.8	73.2 – 271.6	150	10.3
55 BF E Head	51.5 – 153.3	195.0 – 581.0	42.6 – 158.1	161.0 – 598.5	75	5.2

Pulsar Shadow HypoPump® is available with PTFE/elastomer composite and leak detection diaphragms

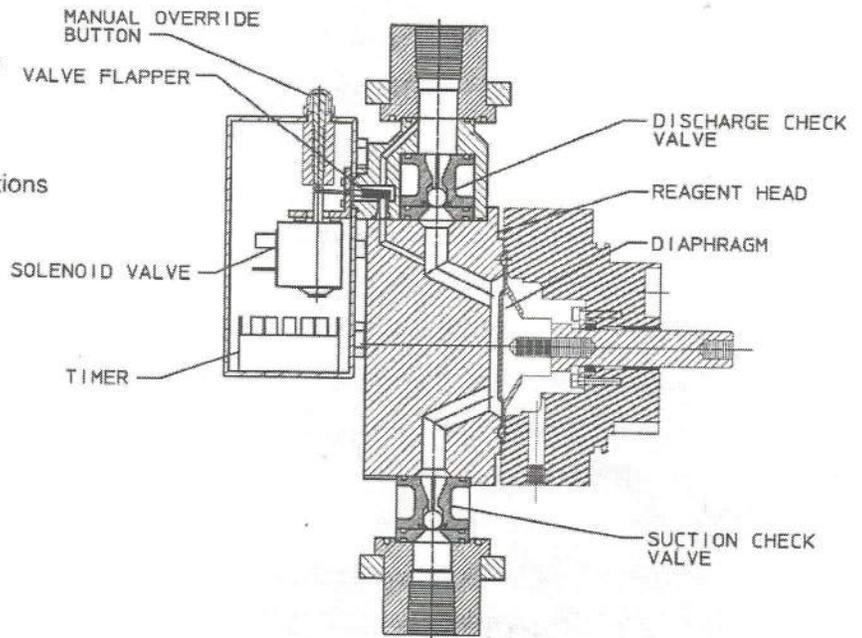
Optional Features:

- Flanged suction & discharge connections
- Microprocessor controllers
- MODBUS serial communication
- PULSAlarm® leak detection system
- Multiplex systems for engineered applications
- Stainless Steel Base
- Variable Speed Drive Systems

Approximate Overall Dimensions:



DIM	MODEL 25		MODEL 55	
	INCH	MM	INCH	MM
L	21.4	544.8	22.5	571.8
W	10.6	269.3	10.6	269.3
H	32.1	816.2	32.1	816.2
APPROX SHIP WT.	127LBS	57.6Kg	142LBS	64.4Kg



The closed-loop vapor handling system utilizes a pressure balanced flapper valve, which opens periodically to allow fluid from the discharge line to bypass the discharge check valve and flow back into the reagent head forcing the vapor and air out of the head to keep it from losing its prime. The flapper valve is actuated by a solenoid, which is controlled by a solid-state timer. The flapper valve can also be manually actuated.

Liquid End Materials of Construction:

Const. Ref.	Reagent Head	Diaphragm	Check Valves			Cap & Guide
			Ball	Seat	Gasket	
PVC	PVC	TFE Faced	ALA	PVC	VTN	PVC
PVDF	PVDF	TFE Faced	ALA	PVDF	VTN	PVDF

PULSAFEEDER
A Unit of IDEX Corporation



Engineered Pump Operations
2883 Brighton-Henrietta Town Line Road
Rochester, New York 14623 USA
Telephone: 585-292-8000
Fax: 585-424-5619
<http://www.pulsa.com> - Email: pulsa@idexcorp.com



HYP SHDW-TS 09/03

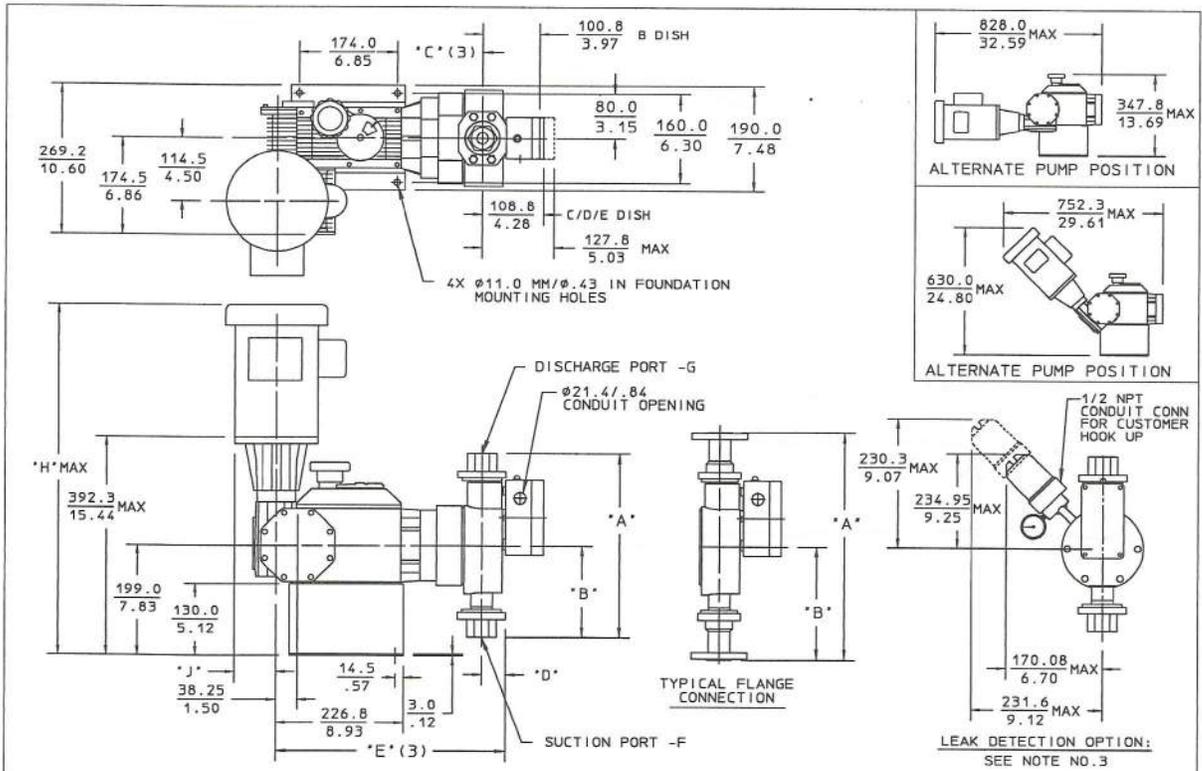
PULSAR SERIES

PUMP
SPECIFICATION
SHEET



P.O. BOX 22909
ROCHESTER, NEW YORK 14692
PHONE: 585-292-8000
FAX: 585-424-5619

CUSTOMER	PLOCHER CONSTRUCTION			SERIAL NO.	X789858-7-9		DATE	5/20/2010	
	MODEL NO. 25BBH SIMPLEX W/MPC (PULSAR SERIES MODEL 25BB SHADOW/HYPO)			MULTIPLEX HEAD	3		QUANTITY	789858	
CUSTOMER PURCHASE ORDER NO. 3450018				CUSTOMER ITEM NUMBER					
JOB C O N D	ITEM NUMBER	KOPKIT NUMBER		DIM DWG NUMBER		FLOW CURVE NUMBER			
	NPMS1801190	NSK7LVVCCCE		22867-000		23163-000			
	PRODUCT	SODIUM HYPOCHLORITE			FLOW (MAX)		8.400 GPH		
	PUMPING TEMPERATURE	68.000 CENTIGRADE		OPERATING PRESSURE		50.000 PSIG		SPECIFIC GRAVITY	
S P E C S	VAPOR PRESSURE @ PUMPING TEMP		SUCTION PRESSURE		FLOODED		VISCOSITY		10.000 CPS
	SOLIDS CONCENTRATION		SOLIDS SIZE		COMMENTS				
	RATED CAPACITY		VALVE TYPE		GEAR RATIO		PISTON SIZE		
8.800 GPH		BALL		20:1		C 78 MM			
RATED PRESSURE		SUCTION VALVE QTY		SUCTION VALVE SIZE		STROKE LENGTH			
150.000 PSIG		1		10.0 MM		2 MM			
HYDRAULIC BYPASS VALVE SETTING		DISCHARGE VALVE QTY		DISCHARGE VALVE SIZE		STROKE RATE			
		1		10.0 MM		86 SPM			
M A T L	SUCTION CONNECTION TYPE		SUCTION CONNECTION SIZE		SUCTION CONNECTION FLANGE				
	FLNG-ANSI		.500 IN		150 LBS FLNG				
	DISCHARGE CONNECTION TYPE		DISCHARGE CONNECTION SIZE		DISCHARGE CONNECTION FLANGE				
	FLNG-ANSI		.500 IN		150 LBS FLNG				
VALVE		VALVE & CAP GASKETS		VALVE CAP & GUIDE		R.H. & T.B. HARDWARE			
ALA - ALUMINA CERAMIC		VTN - VITON		PVC - POLYVINYL (PVC)		STD - STD STAINLESS STEEL (PULSAR)			
VALVE SEAT		REAGENT HEAD		DIAPHRAGM		DIAPHRAGM GASKET			
PVC - POLYVINYL (PVC)		PVC - POLYVINYL (PVC)		THY - TFE FACED ELASTOMER		NONE REQUIRED			
INTERMEDIATE FLUID		X - NONE REQUIRED		TYPE					
				RELAY #					
L E A K	COMMENTS								
	REMOTE HEAD								
	HYPO SYSTEM VOLTAGE				SPECIAL OPTIONS				
115V/60HZ									
ADDITIONAL OPTIONS/FEATURES									
F E A T	TYPE								
	MPC W/NEMA 4X ENCL				ITEM #		SERIAL #		
	115V/60HZ				MPCLAGAXEM-XXXX		X789858P7-9		
	VOLTAGE		CABLE LENGTH		ENGINEERING #		WIRING #		
115V/60HZ		6.000 FEET							
OP STATION - PART NO.			OP STATION - INST DWG #			OP STATION - WIRING #			
COMMENTS MPC ADDENDUM DWG: 23094-000									
C O N T R O L S	MOTOR INFO								
	PUMP COMPLETE WITH MOTOR								
	HP	KW	VOLTAGE	HZ	PHASE	CURRENT	RPM	FRAME	
	1/4		230/460	60	3	AC	1725	56C	
MANUFACTURER			MOTOR NO.			ENCLOSURE			
STOCK			NP500201-000			TEFC			
COMMENTS									
THE MPC WILL ACCEPT 115V /SINGLE PHASE POWER AND CONVERT IT TO 230 V / 3 PHASE POWER. THE PUMP WILL BE CONTROLLED USING SPEED, THEREFORE A 230 V / 3 PHASE INVERTER DUTY MOTOR IS REQUIRED. THE INPUT VOLTAGE IS 115 V / 60 HZ									
P A I N T	SURFACE PREP			TOP COAT			INTERMEDIATE COAT		
				STANDARD EPOXY-BLACK					
SPECIAL INFORMATION									
T E S T	HYDROSTATIC:		NO		CALIBRATION:		NO		PMI: NO
	API 675 STDS APPLY:		NO		API 675 + 4.3.3.4:		NO		RADIOGRAPHIC: NO
	MILL (MATL) CERTS:		NO		LIQUID PENETRANT:		NO		PREP FOR 6M STORAGE: NO
	WITNESSED:		NO		INSPECTION REQUIRED:		NO		PICKLE & PASSIVATION: NO
C O M M E N T S	OTHER INFO:								
	** ORDER SUBJECT TO APPROVAL ** PUMPS TO BE MOUNTED ON SKID SYSTEM SKID S/N SK10789858-4								



MAX PRESSURE BAR/PSIG	CAPACITY LPH/GPH	DIAPHRAGM / STRK LENGTH	MM / INCHES					SUCTION PORT SIZE -F	DISCHARGE PORT SIZE -G	MOTOR FRAME INFO	MAX "H"	"J"
			"A"	"B"	"C"	"D"	"E"					
56C FR	727.2	73.5								28.6	2.89	

10.3	18.6	69.2	C / B	380.0	190.0	148.5	44.4	471.3	.50-150	.50-150
150.0	4.9-	18.2		14.96	7.48	5.85	1.75	18.56	ANSI	ANSI

- NOTES: 1. TO USE THE CHART, YOU MUST FIND THE ROW SHOWING THE APPROPRIATE PRESSURE, FLOW RANGE AND DIAPH /STROKE LENGTH SIZE OF YOUR PUMP.
 2. CONSULT FACTORY
 3. LEAK DETECTION: WHEN LEAK DETECTION OPTION IS SELECTED, INCREASE DIMENSIONS "C" & "E" BY 20.0 MM/ .78 IN FROM STD DIM DWG; REFER TO LEAK DETECTION SIDE VIEW FOR CLEARANCE DIMENSIONS.

ALL DIMENSIONS ARE MM/INCHES

SHADOW HYPO PUMP
SHADLOW
 A Unit of IDEX Corporation

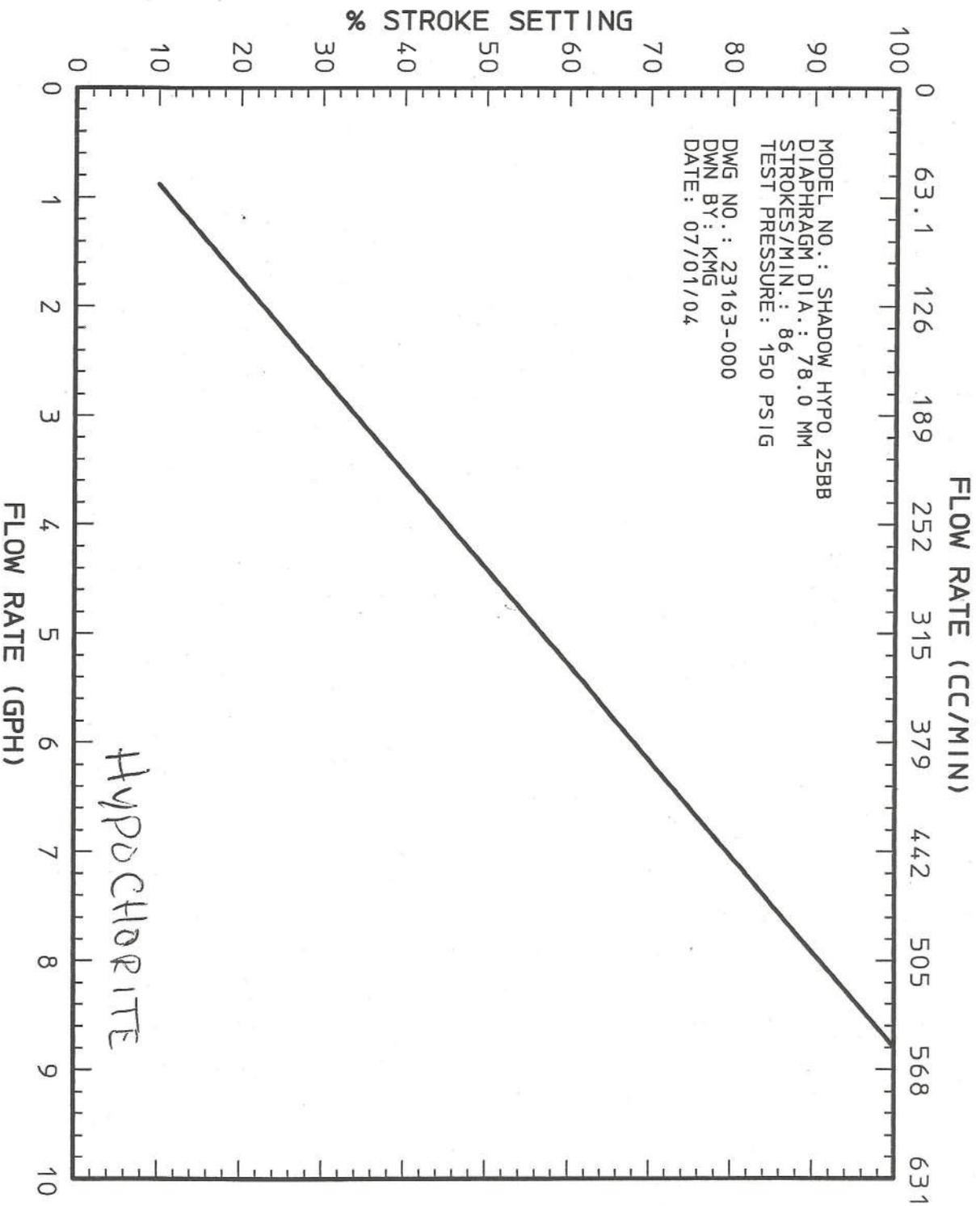
DIMENSIONAL DRAWING
 25BB EXT/MAN CONTROL
 PLASTIC CONST 50/60 Hz

DWN BY: PFM
 DATE: 09/02/03

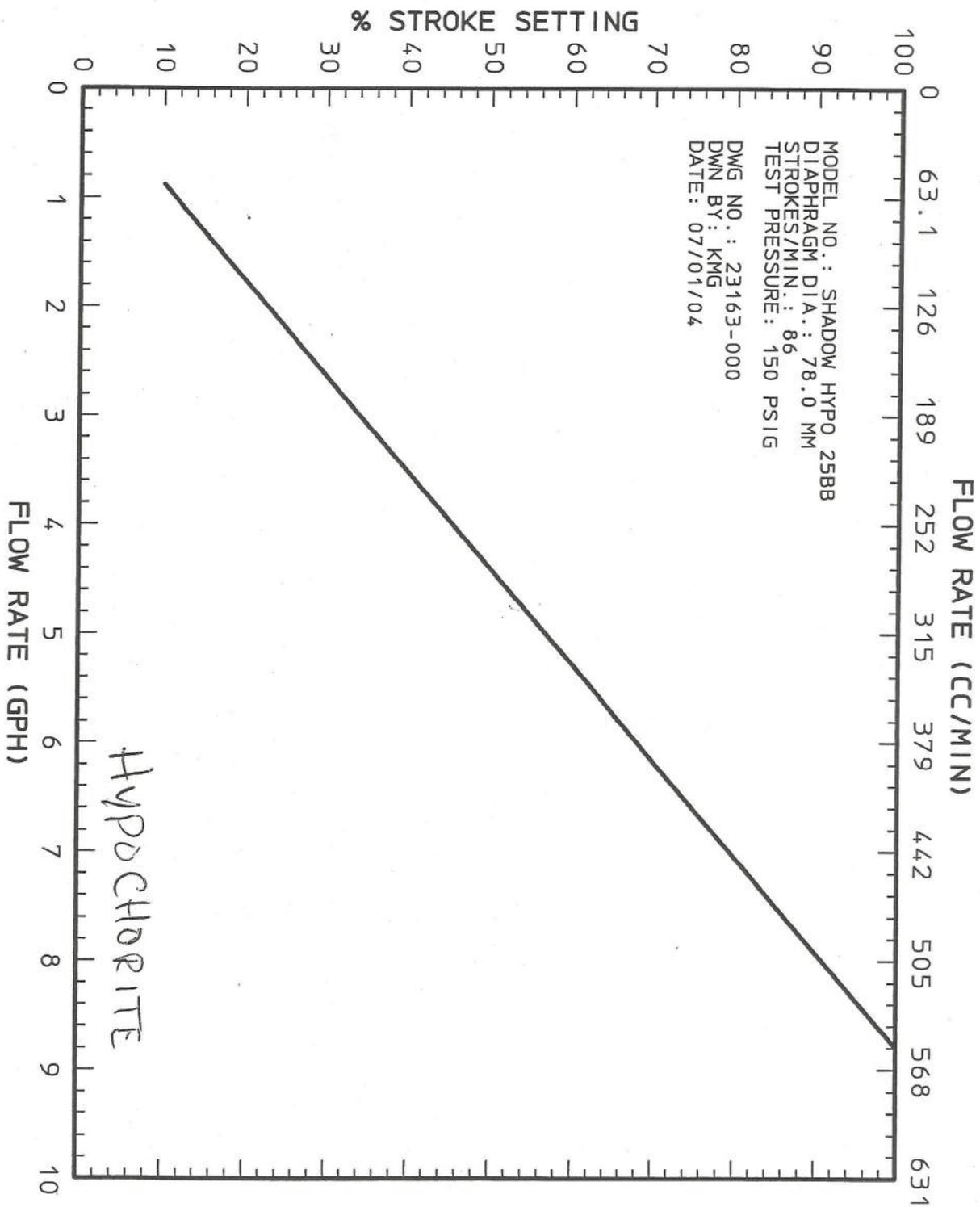
22867-000

REF	REVISION UPDATE	DATE	SUPERSEDES	NEW

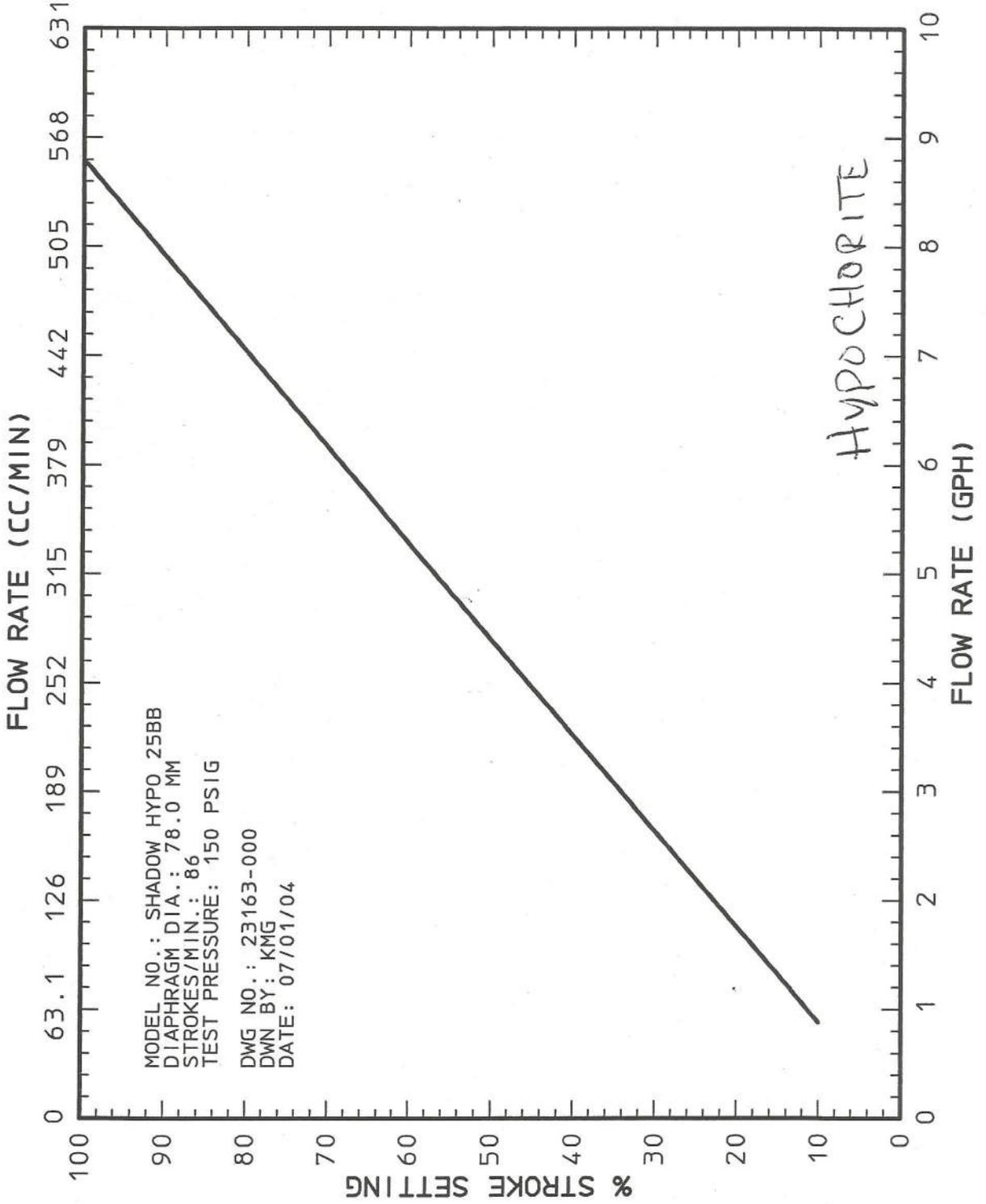
PULSAFEEDER PUMP FLOW CURVE



PULSAFEEDER PUMP FLOW CURVE



PULSAFEEDER PUMP FLOW CURVE



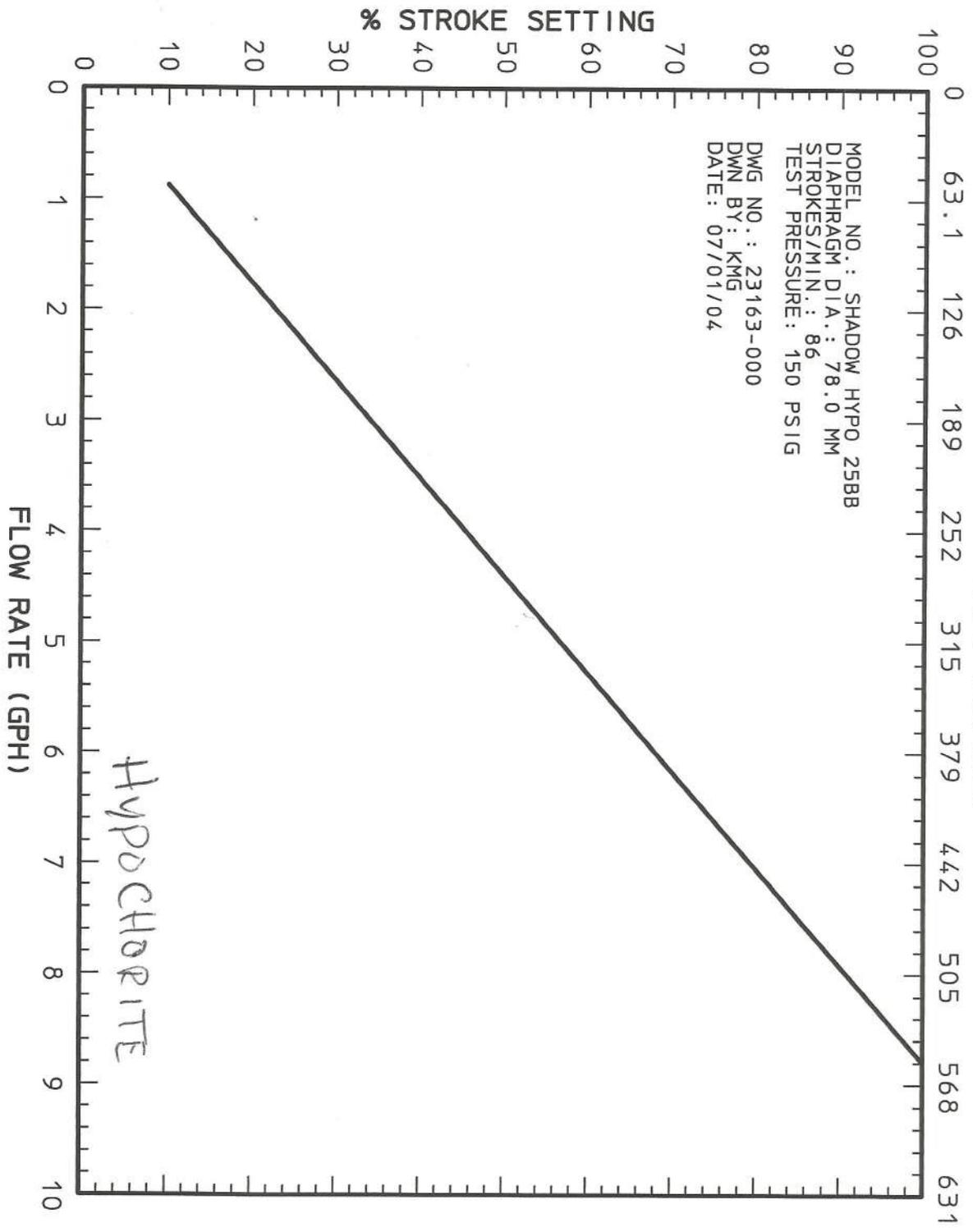
MODEL NO.: SHADOW HYPO 25BB
DIAPHRAGM DIA.: 78.0 MM
STROKES/MIN.: 86
TEST PRESSURE: 150 PSIG

DWG NO.: 23163-000
DWN BY: KMG
DATE: 07/01/04

HYPPOCHORITE

PULSAFEEDER PUMP FLOW CURVE

FLOW RATE (CC/MIN)



MODEL NO. : SHADOW HYPO 25BB
DIAPHRAGM DIA. : 78.0 MM
STROKES/MIN. : 86
TEST PRESSURE : 150 PSIG
DWG NO. : 23163-000
DWN BY : KMG
DATE : 07/01/04

HYPOCHORITE

RECOMMENDED SPARE PARTS - KOPKIT

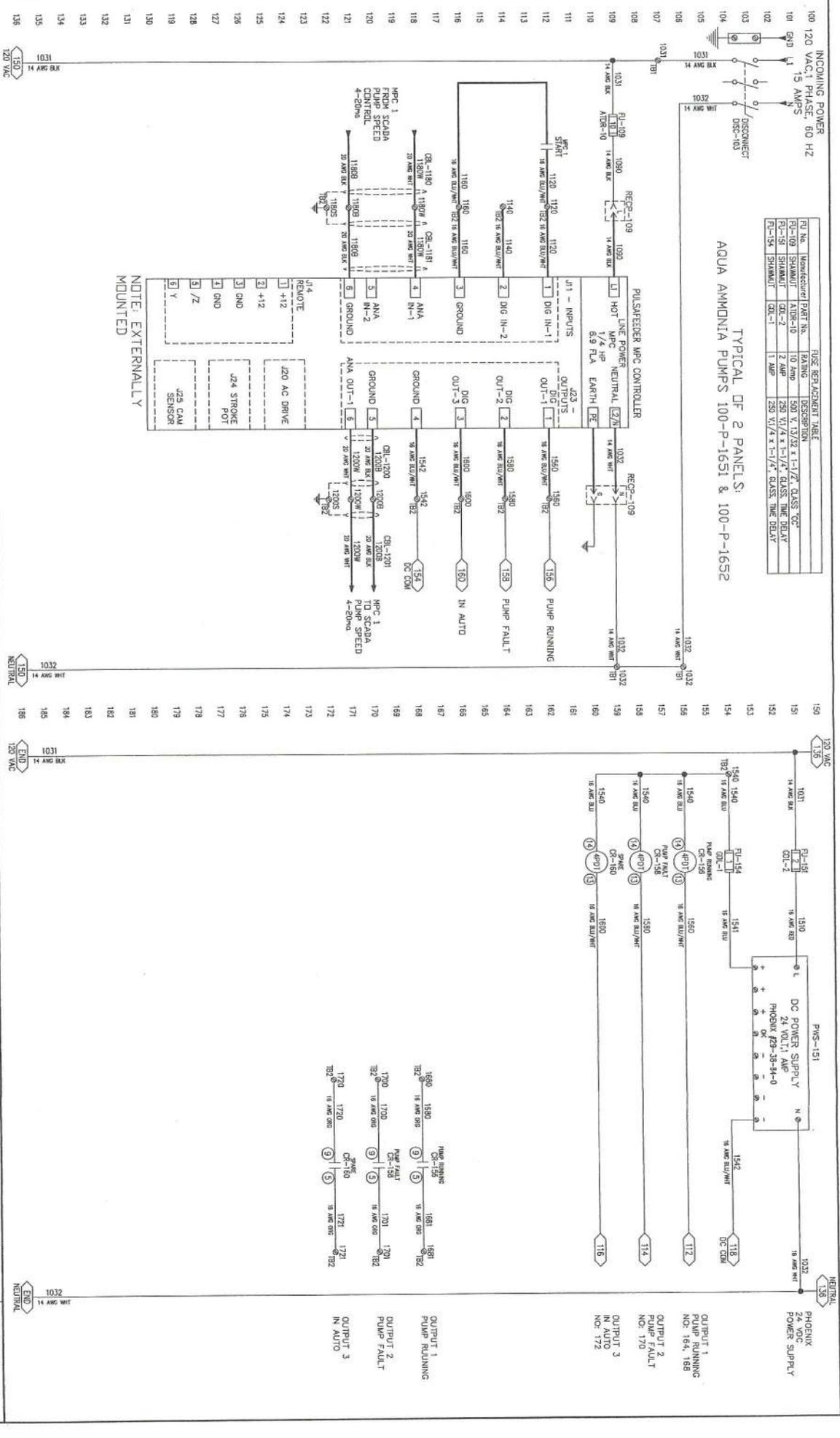
Customer Name:	PLOCHER CONSTRUCTION
Project Name:	SOUTH SANGAMON WTP / JOB #3450
Pulsafeeder Order No:	789858
Customer Purchase Order No:	3450-018
Application Name:	SODIUM HYPOCHLORITE
System Serial No:	SK10789858-4
Pump Serial No:	X789858-7-9
KOPkit Part No:	NSK7LVVCCEE
Equipment Tag No(s):	N/A

Consisting of the following parts:

Component	Description	Qty
NP440122-VTN	GASKET,O RING	7
NP310017-PVC	GUIDE,VALVE 10.0 MM DIA	2
NP340003-ALA	VALVE,BALL 10.0 MM DIA	2
NP330028-PVC	SEAT,VALVE 10.00 MM DIA	2
NP440033-VTN	GASKET,O RING	1
NP170014-THY	DIAPHRAGM ASSY,MECH 78	1
NP330089-VTN	SEAT,FLAPPER VALVE	1
NP450013-000	SEAL,OIL PUMP HEAD MECH	1
W078419-VTN	GASKET,O RING	1

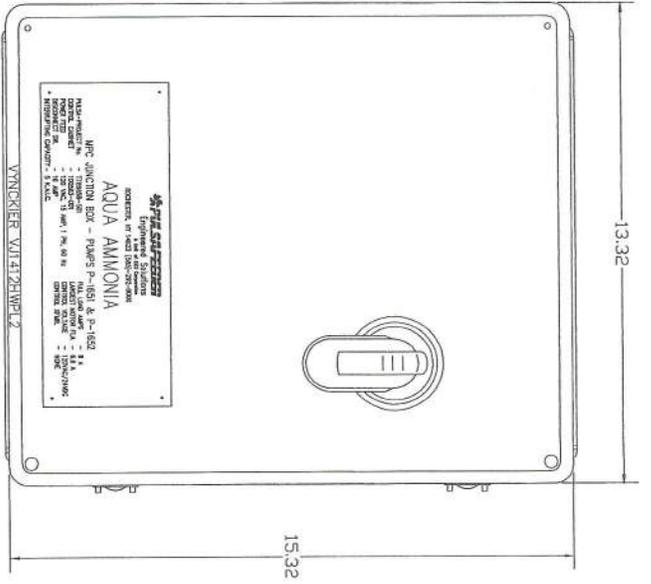
PLC No.	Manufacturer	Part No.	Rating	Description
PLC-109	SIEMENS	A5D-10	10 AMP	150 V, 1/2" 2.1, 1.1, 1/2" CLASS 100
PLC-154	SIEMENS	DI2-2	2 AMP	250 V, 1/4" 1.1, 1/4" CLASS TIME DELAY
PLC-154	SIEMENS	DO2-1	1 AMP	250 V, 1/4" 1.1, 1/4" CLASS TIME DELAY

TYPICAL DF 2 PANEL S1:
AQUA AMMONIA PUMPS 100-P-1651 & 100-P-1652

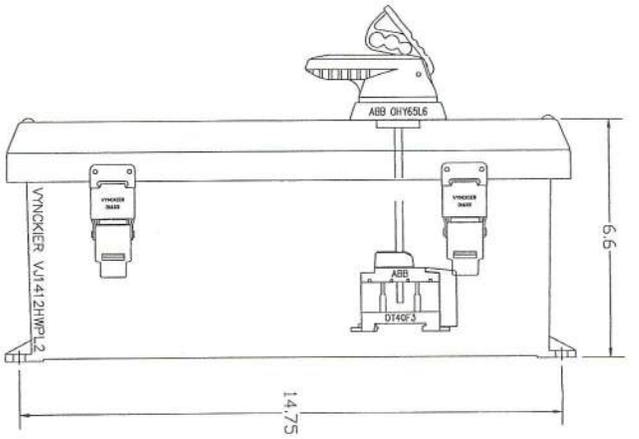


NOTE: EXTERNALLY MOUNTED

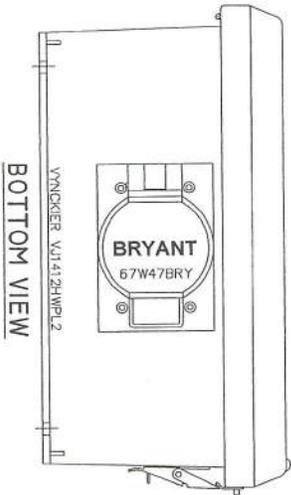
DESIGNED ON AUTOCAD: A449424 2004	DWG. LAST SAVED ON: XX-XX-XX, 12:00PM	ROCHESTER, NY	(985) 292-8000
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<p>A ORIGINAL ISSUE REV. DESCRIPTION DATE</p>	<p>06/27/10</p>	<p>CUSTOMER: PULSAFEEDER INC. 1100 W. WASHINGTON ST. ROCHESTER, NY 14623</p>	<p>DATE: 5/27/10 DRAWING NUMBER: 100585-AA PAGE: 01 OF 07</p>
<p>REVISIONS:</p>		<p>ISSUED BY: [Signature] CHECKED BY: [Signature] DATE: 5/27/10</p>	<p>WORK-SHEET # 100585-AA</p>
<p>SCALE: 1 = 1</p>		<p>PAGE: 01</p>	
<p>REV: A</p>		<p>LISTED CONTROL PANEL</p>	



FRONT VIEW



RIGHT SIDE VIEW



BOTTOM VIEW

REV	DESCRIPTION	DATE	DESIGNED BY	CHECKED BY	DATE	SCALE	PAGE	REV
A	ORIGINAL ISSUE	05/27/10	JMS	JMS	05/27/10	1 = 1	03	A
<p>DESIGNED ON AUTOCAD: AUC640 2004</p> <p>INC. LAST SAVED ON: 07-XX-XX, 12:00PM</p>								
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<p>CUSTOMER: PULSAFEEDER INC. STREET: 2883 BRIGHTON-HENRIETTA TL ROAD CITY / STATE: ROCHESTER, NY 14623</p>			<p>PROJECT: SAUKAMON WATER MPC JUNCTION BOX CHEMICALS: AQUA AMMONIA</p>			<p>EXTENSION VIEW</p>		
<p>DATE: 05/27/10</p>			<p>SCALE: 100583-AA</p>			<p>PROJECT: 100583-AA</p>		
<p>SCALE: 1 = 1</p>			<p>PAGE: 03</p>			<p>REV: A</p>		

9"

3.5"


Engineered Solutions
 A Unit of IDEX Corporation
 ROCHESTER, NY 14623 (585)-292-8000

AQUA AMMONIA
 MPC JUNCTION BOX - PUMP 100-P-1651

• PULSA-PROJECT No. - T789858-S01	• FULL LOAD AMPS - 8 A
• CONTROL CABINET - 100583-001	• LARGEST MOTOR FLA - 6.9 A
• POWER FEED - 120 VAC, 15 AMP, 1 PH, 60 Hz	• CONTROL VOLTAGE - 120VAC/24VDC
• DISCONNECT SW. - 16 AMP	• CONTROL XHR. - NONE
• INTERRUPTING CAPACITY - 5 K.A.I.C.	

0.375" TALL TEXT

0.1875" TALL TEXT

0.125" TALL TEXT

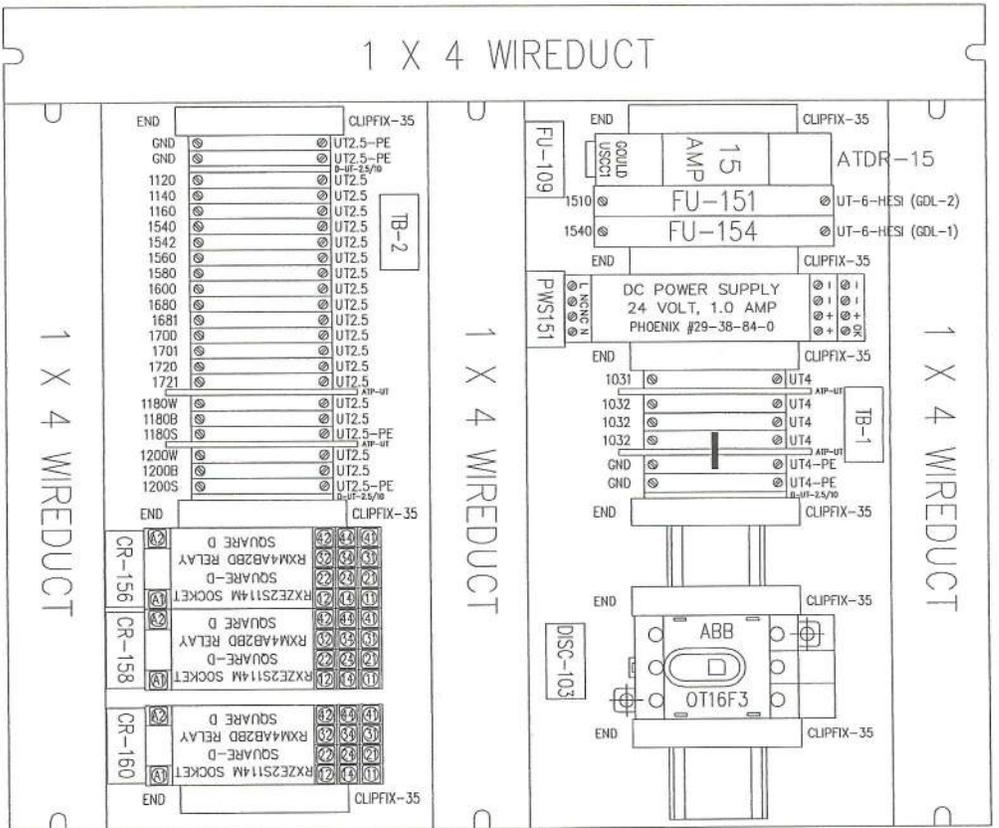

Engineered Solutions
 A Unit of IDEX Corporation
 ROCHESTER, NY 14623 (585)-292-8000

AQUA AMMONIA
 MPC JUNCTION BOX - PUMP 100-P-1652

• PULSA-PROJECT No. - T789858-S01	• FULL LOAD AMPS - 8 A
• CONTROL CABINET - 100583-002	• LARGEST MOTOR FLA - 5.9 A
• POWER FEED - 120 VAC, 15 AMP, 1 PH, 60 Hz	• CONTROL VOLTAGE - 120VAC/24VDC
• DISCONNECT SW. - 16 AMP	• CONTROL XHR. - NONE
• INTERRUPTING CAPACITY - 5 K.A.I.C.	

ALL NAMEPLATE TAGS
 ARE BLUE LETTERING
 ON WHITE LAMICOID
 (MAKE 1 EACH)

REV. A	DESCRIPTION	DATE	05/27/10
DESIGNED ON AUTOCAD: AUTOCAD 2004			
DWG. LAST SAVED ON: XX-XX-XX, 12:00PM			
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 Engineered Solutions A Unit of IDEX Corporation		CUSTOMER : PULSAFEEDER INC. STREET: 2885 BRIGHTON-HENRIETTA TL. ROAD CITY / STATE: ROCHESTER, NY 14623 SANGAMON WATER MPC JUNCTION BOX CHEMICALS: AQUA AMMONIA	
ROCHESTER, NY		(585) 292-8000	
DRAWN BY: JPS		DATE: 05/27/10	
CHECKED BY:		DATE:	
FULL REFERENCE: 1A-07A IDEX-PROJECT: 1789858-S01		MODE-PART # UL LISTED CONTROL PANEL DRAWING NUMBER 100583-AA SCALE: 1 = 1 PAGE: 04 REV: A	



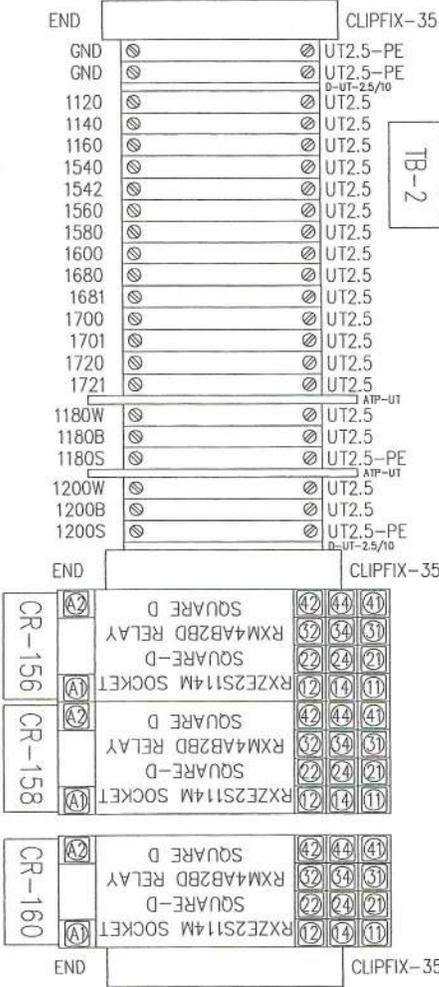
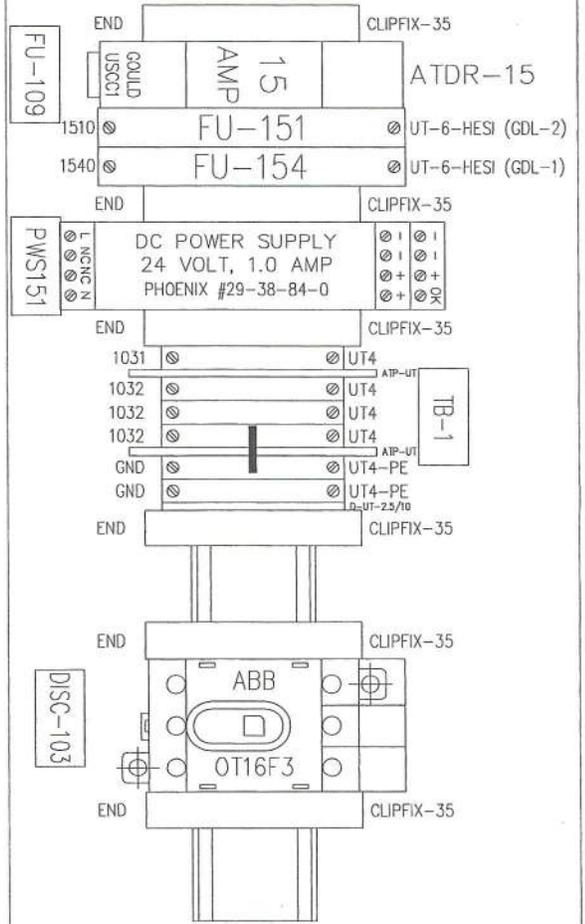
1 X 4 WIREDUCT

1 X 4 WIREDUCT

1 X 4 WIREDUCT

VYNCKIER MP1412S SUBPLATE

REV. A	DESCRIPTION	DATE	06/27/10
DESIGNED ON AUTOCAD: AUTOCAD 2004			
DWG. LAST SAVED ON: XX-XX-XX, 12:00PM			
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PULSAFEEDER Engineered Solutions A Unit of IDEX Corporation		CUSTOMER: PULSAFEEDER INC. STREET: 2883 BRIGHTON-HENRIETTA TL ROAD CITY / STATE: ROCHESTER, NY 14823 SANGAMON WATER MPC JUNCTION BOX CHEMICALS: AQUA AMMONIA	
ROCHESTER, NY (585) 292-8000		INTERIOR VIEW	
DRAWN BY:	JPG	DATE:	06/27/10
CHECKED BY:		DATE:	
FILE REFERENCE:	100563-001-001	PAGES:	05 OF 07
MODEL-PART #	UL LISTED CONTROL PANEL	SCALE:	05
REV	A		



REV. A	DESCRIPTION	DATE	DESIGNED BY	DATE	SCALE	REV. A
	DESIGNED ON AUTOCAD: AUTOCAD 2004	09/27/10	DWG. LAST SAVED ON: XX-XX-XX, 12:00PM		1 = 1	
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<p>PULSAFEENEER Engineered Solutions A Unit of EEX Corporation</p>						
<p>CUSTOMER: PULSAFEENEER INC. SITE: 2883 BRIGHTON-HEWLETTA TL. ROAD CITY / STATE: ROCHESTER, NY 14623</p>						
<p>SALESMAN: JIM BOY TELEPHONE: 716-442-1000 FAX: 716-442-1001 E-MAIL: JIMBOY@PULSAFEENEER.COM CHEMICALS: AQUA AMMONIA</p>						
<p>TERMINAL STRIPS</p>						
<p>ISSUE NO: 09/27/10 DATE: 09/27/10 DRAWING NO: 100583-AA SCALE: 1 = 1 PAGE: 07 OF 07 REV: A</p>						

Bill of Material

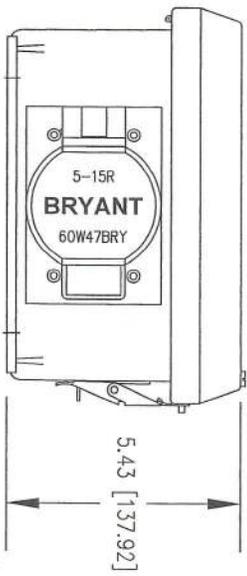


Project Description: Pulsafeeder- Sangamon
Chemicals: Aqua Ammonia
MPC Junction Box

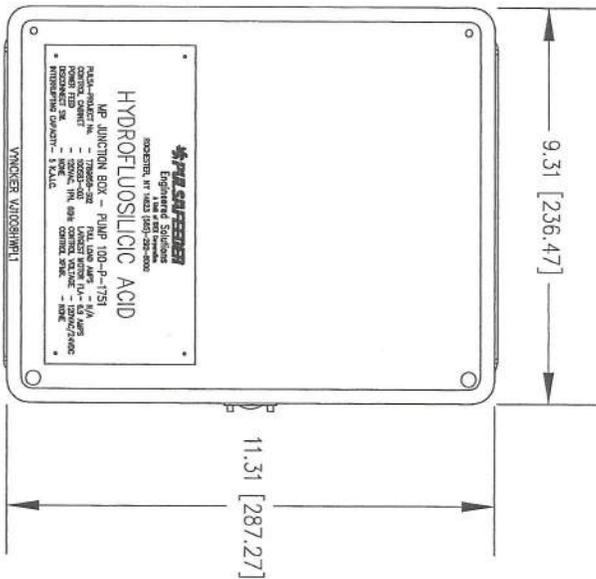
BOM Number:	100583-AA-BOM
Approval Date:	May 27, 2010
Prepared By:	Jamie Girard

Revision:	A
Approval ER/ECN:	100583-0001

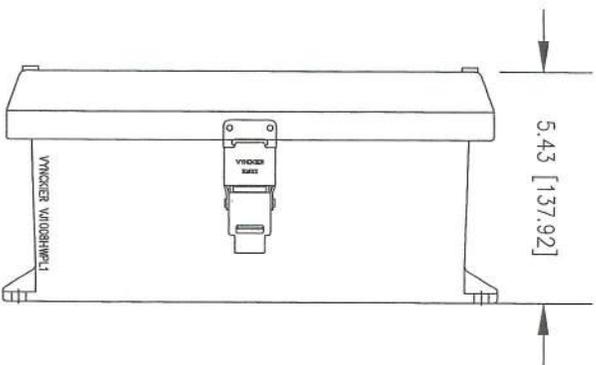
Item	Device ID	Item Description	Manufacturer	Manufacturer Part No.	Qty
1	Enclosure	FRP 14" x 12" NEMA 4X Enclosure	Vynckler	VJ1412HW/PL2	1
2	Mounting Panel	Mounting Panel (for 14" X 12" Enclosure)	Vynckler	MP1412S	1
3	Disc-103	Disconnect Switch, UL508 16 amp	ABB	OT16F3	1
4	Disc-103	Pistol Handle, Red/Yellow, Nema 4X	ABB	OHY65L6	1
5	Disc-103	Shaft 6mm for above	ABB	OXPEX265	1
6	RECP-109	NEMA 4x Receptacle assembly w/cover	BRYANT	67W47BRY	1
7	FU-109	Fuseblock, 30 amp, 600 Volt, Dinrail Mountable	Gould	USC1	1
8	FU-109	Fuses, 15 amp, 500 Volt, Class - CC	Gould	ATDR15	1
9	FU-151, 154	Fuse Terminal Block, 1 Pole, 10 Amp, 250 Volt, UT-6-HESI	Phoenix	3046401	2
10	FU-151	Fuse, Cartridge, 1/4" x 1-1/4", 250 Volt, 2A	Gould	GDL2	1
11	FU-154	Fuse, Cartridge, 1/4" x 1-1/4", 250 Volt, 1A	Gould	GDL1	1
12	PWS-151	Power Supply, 24 VDC, 1A	Phoenix	2938840	1
13	CR-156, 158, 160	Relay, 4-Pole, General Purpose, 24VDC	Square-D	RXMAAB2BD	3
14	CR-156, 158, 160	Relay base	Square-D	RXZE2S114M	3
15	Terminals	Terminal Blocks UT 2,5	Phoenix	3044076	22
16	Terminals	UT 2,5-PE ground	Phoenix	3044092	4
17	Terminals	Terminal Blocks UT 4	Phoenix	3044102	4
18	Terminals	UT 4-PE ground	Phoenix	3044128	2
19	Terminals	Standard Partition plate, ATP-UT	Phoenix	3047167	4
20	Terminals	Cover D-UT 2,5/10	Phoenix	3047028	3
21	Terminals	Dinrail End Clamp, CLIPFIX 35	Phoenix	3022218	9
22	Terminals	FBS-3-6, Plug-In Center jumper, 3 Position	Phoenix	3030242	2
23	Service Tag	Custom Pulsafeeder Service Tag, See Drawings	Zeller	NP-9 x 3.5	1
24	Din Rail	NS35/15-GELOCHT, 35mm DIN Rail, 2 meter length	Phoenix	1201730	1
25	Wireduct	Wireduct, 1" W x 4" H, Plastic, White, Includes Cover, 6 foot long	Phoenix	T1-1040W	1
26	UL LISTING	UL Listing	Zeller	UL LISTING	1



END VIEW



FRONT VIEW



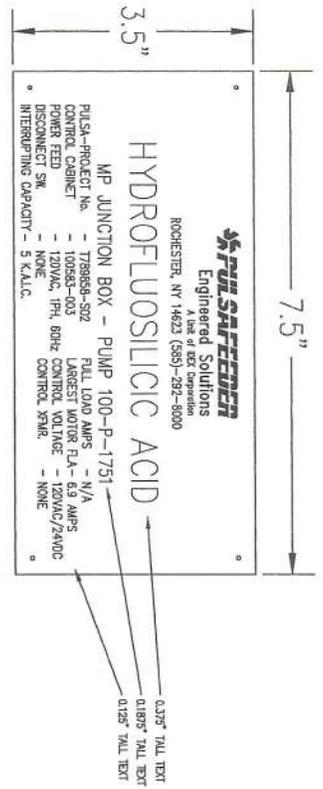
RIGHT SIDE VIEW

VYNCKIER ENCLOSURE
 MODEL: VJ1008HWPL1
 NEMA 4X, FRP

DIMENSIONS ARE IN INCHES

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<p>DESIGNED ON AUTOCAD: AutoCAD 2004</p>		<p>DWG. LAST SAVED ON: XZ-10X-2K, 12:00PM</p>		<p>ROCHESTER, NY</p>		<p>EXTENSION VIEW</p>	
<p>REV. DESCRIPTION DATE</p>		<p>6/10/10</p>		<p>05/27/10</p>		<p>SCALE 1 = 1</p>	
<p>8 CHANGED FROM HPC TO HP</p>		<p>6/10/10</p>		<p>05/27/10</p>		<p>PAGE 03</p>	
<p>A ORIGINAL ISSUE</p>		<p>6/10/10</p>		<p>05/27/10</p>		<p>REV B</p>	

DIMENSIONS ARE IN INCHES



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 Engineered Solutions
 A Unit of IDEX Corporation
 ROCHESTER, NY 14623 (585)-292-8000

HYDROFLUOSILICIC ACID

MP JUNCTION BOX - PUMP 100-P-1751

PULSA-PROJECT No. - 1788989-S02 FULL LOAD AMPS - N/A
 CONTROL CABINET - 100983-003 LARGEST MOTOR FLA - 6.9 AMPS
 POWER FEED - 120VAC, 1PH, 60Hz LARGEST MOTOR FLA - 6.9 AMPS
 DISCONNECT SW - NONE CONTROL VOLTAGE - 120VAC/24VDC
 INTERRUPTING CAPACITY - 5 K.A.L.C. CONTROL VOLTAGE - NONE

SERVICE TAGS ARE BLUE LETTERING ON WHITE LAMICOID, MAKE 2 TAGS

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A	ORIGINAL ISSUE	05/27/10				(585) 292-8000 ROCHESTER, NY	NAMEPLATES	4 OF 5	04
B	CHANGED FROM MPC TO MP	6/10/10							
DESIGNED ON AUTOCAD	AUTOCAD 2004	DWG. LAST SAVED ON: XX-XX-XX, 12:00PM							



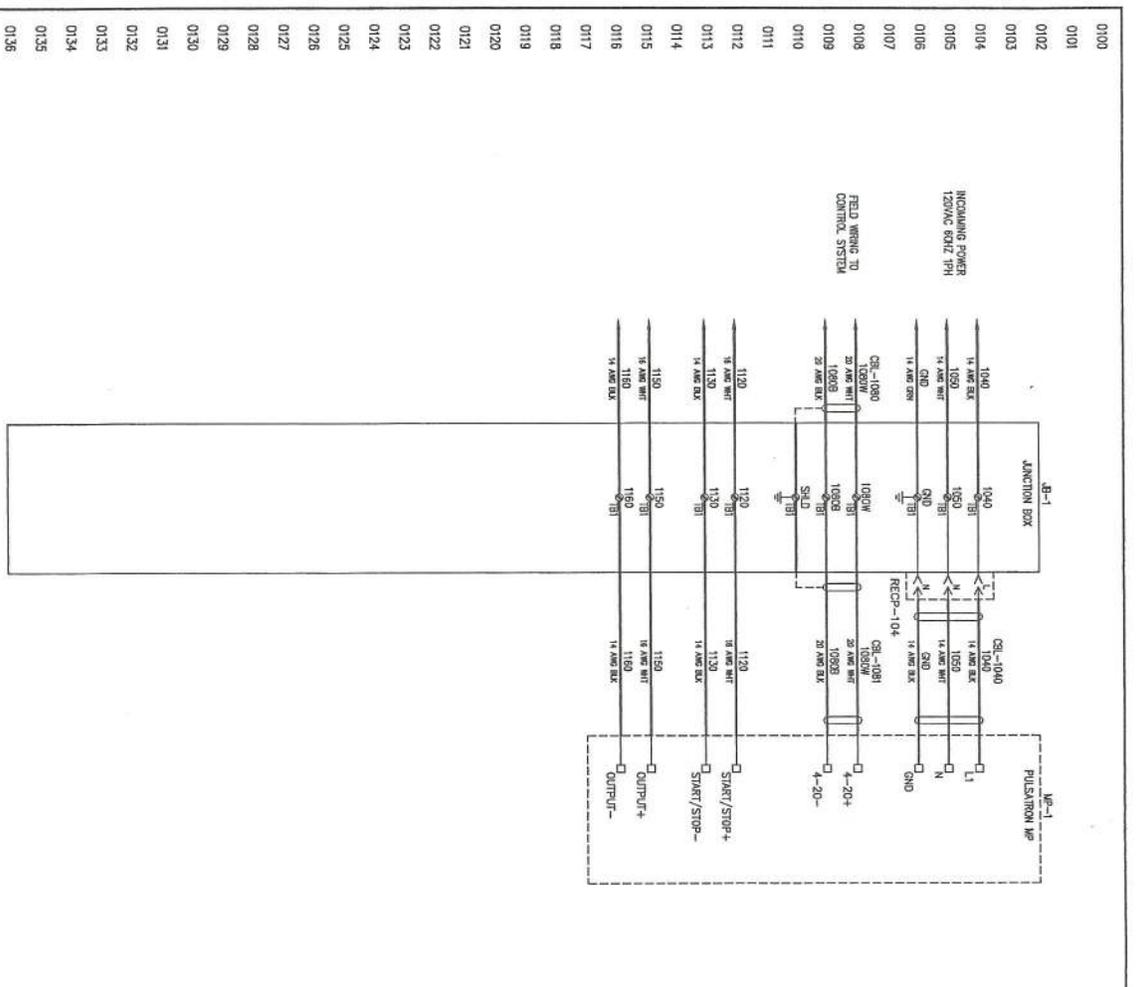
Project Description: Pulsafeeder- Sangamon
Chemicals: Hydrofluosilicic Acid
MP Junction Box

Bill of Material

BOM Number:	100583-HA-BOM
Approval Date:	June 10, 2010
Prepared By:	Jamie Girard

Revision:	B
Approval ER/ECN:	100583-0002

Item	Device ID	Item Description	Manufacturer	Manufacturer Part No.	Qty
1	Enclosure	FRP Enclosure; NEMA 4X; 10" x 8"	Ynckler	VJ1008HWPL1	1
2	Enclosure	Mounting Panel	Ynckler	MP1008S	1
3	Terminals	Terminal Blocks UT 2.5	Phoenix	3044076	8
4	Terminals	UT 2.5-PE ground	Phoenix	3044092	2
5	Terminals	Standard Partition plate, ATP-UT	Phoenix	3047167	5
6	Terminals	DIN Rail End Clamp, CLIPFIX 35	Phoenix	3022218	2
7	Service Tag	Custom Pulsafeeder Service Tag. See Drawings	Zeller	NP-7.5 x 3.5	1
8	Din Rail	NS35/15-GELOCHT, 35mm DIN Rail, 2 meter length	Phoenix	12-01-73-0	1
9	Wireduct	Wireduct, 1.5" W x 3" H, Plastic, White, Includes Cover, per foot	Panduit	F1X3WH6	2
10	RECP-104	NEMA 4X Receptacle w/ cover	Bryant	60W47BRY	1



0100		0150
0101		0151
0102		0152
0103		0153
0104		0154
0105		0155
0106		0156
0107		0157
0108		0158
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0111		0161
0112		0162
0113		0163
0114		0164
0115		0165
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0133		0183
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0135		0185
0136		0186

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A	CHANGED FROM MP TO MP	09/10/10				(485) 292-8000 ROCHESTER, NY	SCHEMATIC		
B	ORIGINAL ISSUE	05/27/10							
DESCRIBED ON AUTOCAD: AUTOCAD 2004 DWG. LAST SAVED ON: 03-XX-XX-XX, 12:00PM									

WIRING DESIGNATIONS	COLOR	APPLICATION	WIRE SIZE
0200	BLACK	ALL	14 AWG
0201	RED	POWER/CONTROL	14 AWG
0202	WHITE	120AC COMMON	18 AWG
0203	BROWN	MOTOR ARMATURE	14 AWG
0204	PURPLE	MOTOR FIELD	14 AWG
0205	BLUE	ALL	18 AWG
0206	BLUE/WHITE	ALL	18 AWG
0207	ORANGE	LIVE WITH MAIN DISCONNECT OFF	18 AWG
0208	SH. TRINTEO PWR	ALL	20 AWG +
0209			
0210	TERMINAL COLOR DESIGNATIONS:		
0211	COLOR APPLICATION		
0212	GREY CONTROL/POWER WIRING		
0213	GRN/YEL GROUND		
0214			
0215			
0216			
0217			
0218			
0219			
0220			
0221			
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REV.	DESCRIPTION	DATE	DATE
B	CHANGED FROM WPC TO WP	06/19/10	
A	ORIGINAL ISSUE	05/27/10	

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CUSTOMER: PULSAFEEDER INC.
 STREET: 2885 BRIGHTON-HENRIETTA TL ROAD
 CITY / STATE: ROCHESTER, NY 14623
 SANGAMON WATER
 WP JUNCTION BOX
 CHEMICAL: POLYPHOSPHATE

ROCHESTER, NY (585) 292-8000 USEFUL INFORMATION

DRAWN BY: JRG DATE: 02-27-10 MODIFIED BY: JRG

CHECKED BY: DATE: DRAWING NUMBER: 100583-PPH

FILE REFERENCE: 100583-PPH-02 PAGES: 2 OF 5 SCALE: 1 = 1 PAGE: 02 REV: A



Project Description: Pulsafeeder- Sangamon
Chemicals: Polyphosphate
MP Junction Box

Bill of Material

BOM Number:	100583-PPH-BOM
Approval Date:	June 10, 2010
Prepared By:	Jamie Girard

Revision:	B
Approval ER/ECN:	100583-0002

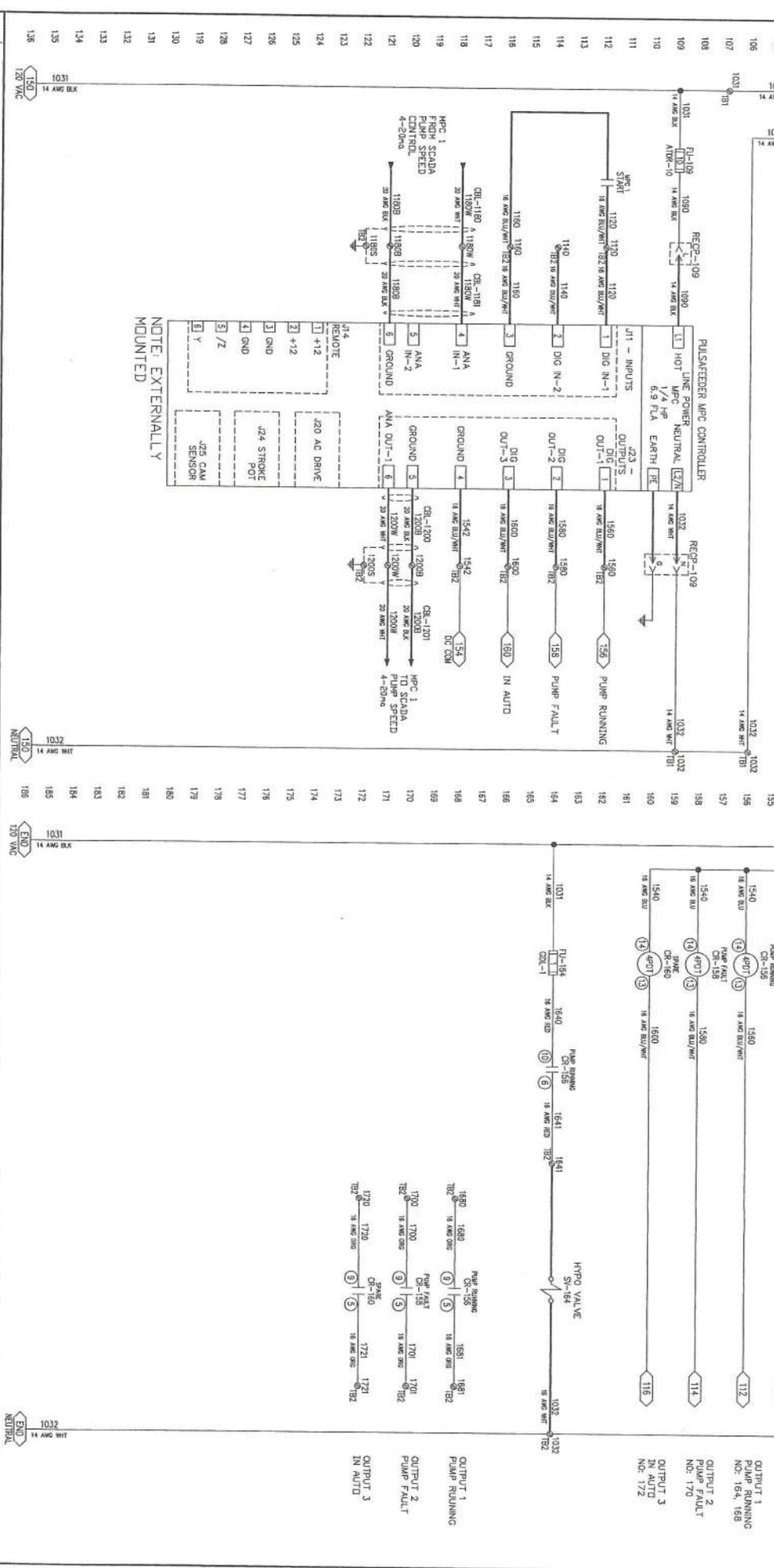
Item	Device ID	Item Description	Manufacturer	Manufacturer Part No.	Qty
1	Enclosure	FRP Enclosure; NEMA 4X; 10" x 8"	Vynckler	VJ1008HWPL1	1
2	Enclosure	Mounting Panel	Vynckler	MP1008S	1
3	Terminals	Terminal Blocks UT 2.5	Phoenix	3044076	8
4	Terminals	UT 2.5-PE ground	Phoenix	3044092	2
5	Terminals	Standard Partition plate, ATP-UT	Phoenix	3047167	5
6	Terminals	DIN Rail End Clamp, CLIPFIX 35	Phoenix	3022218	2
7	Service Tag	Custom Pulsafeeder Service Tag. See Drawings	Zeller	NP-7.5 x 3.5	1
8	Din Rail	NS35/15-GELOCHT, 35mm DIN Rail, 2 meter length	Phoenix	12-01-73-0	1
9	Wireduct	Wireduct, 1.5" W x 3" H, Plastic, White, Includes Cover, per foot	Panduit	F1X3WH6	2
10	RECP-104	NEMA 4X Receptacle w/ cover	Bryant	60W47BRY	1

INCOMING POWER
100 120 VAC, 1 PHASE, 60 HZ
15 AMPS

FUSE RECOMMENDATION TABLE

FU No.	Manufacturer	Part No.	RATING	DESCRIPTION
FU-108	SHAWMUT	ALTR-10	10 AMP	250 V, 1/2" x 1-1/4", CLASS CC
FU-151	SHAWMUT	DC-2	2 AMP	250 V, 1/4" x 1-1/4", GLASS, TIME DELAY
FU-154	SHAWMUT	DC-1	1 AMP	250 V, 1/4" x 1-1/4", GLASS, TIME DELAY
FU-164	SHAWMUT	DC-1	1 AMP	250 V, 1/4" x 1-1/4", GLASS, TIME DELAY

TYPICAL DF 3 PANELS:
SODIUM HYPOCHLORITE PUMPS 100-P-1551, 100-P-1552 & 100-P-1553



NOTE: EXTERNALLY MOUNTED

PULSAFEEDER
Engineered Solutions
A Unit of OTC Corporation

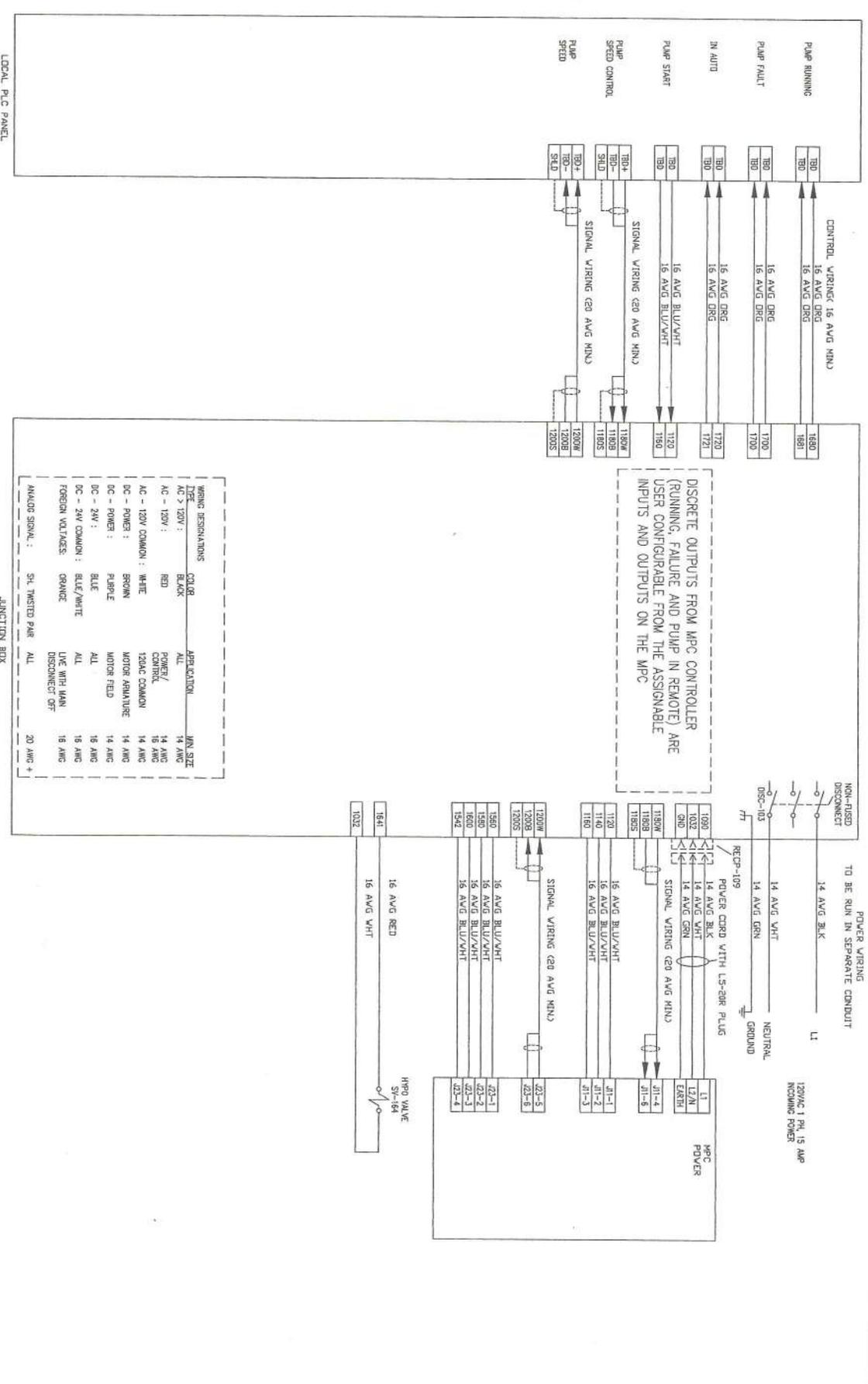
CUSTOMER: PULSAFEEDER INC.
ADDRESS: 2885 BRIGHTON-HENRIETTA TL ROAD
CITY / STATE: ROCHESTER, NY 14623

PROJECT: SANGAMON WATER
MPC JUNCTION BOX
CHEMICALS: SODIUM HYPOCHLORITE

DESIGNED ON AUTOCAD / AUTOCAD 2004
DATE: 05/27/10
SCALE: 1 = 1

FILE REFERENCE: 010053-SH-014
CHECKED BY: JFC
DATE: 5/27/10
SCALE: 1 = 1

MODEL - PART #
DRAWING NUMBER
100583-SH
PAGE
01
REV
A



WIRING DESIGNATIONS

WIRING DESIGNATIONS	COLOR	APPLICATION	WIRE SIZE
AC - 120V :	BLACK	ALL	14 AWG
AC - 120V :	RED	POWER / SIGNAL	14 AWG
AC - 120V COMMON :	WHITE	120VAC COMMON	14 AWG
DC - POWER :	BROWN	MOTOR ARMATURE	14 AWG
DC - POWER :	PURPLE	MOTOR FIELD	14 AWG
DC - 24V :	BLUE	ALL	16 AWG
DC - 24V COMMON :	BLK/WHITE	ALL	16 AWG
FOREIGN VOLTAGES :	ORANGE	LIVE WITH MAIN DISCONNECT OFF	16 AWG
ANALOG SIGNAL :	SH. THREADED PAIR	ALL	20 AWG +

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SANGAMON WATER
MPC JUNCTION BOX
CHEMICALS SOURCE HYPOCHLORITE

FIELD WIRING

DRAWN BY: JFG
DATE: 05/27/10

CHECKED BY: []
DATE: []

MODEL-PART #
UL LISTED CONTROL PANEL

DRAWING NUMBER:
100583-SH

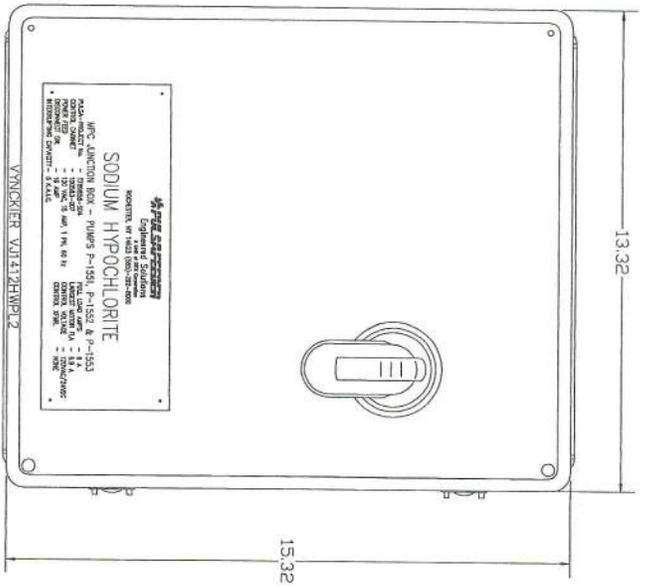
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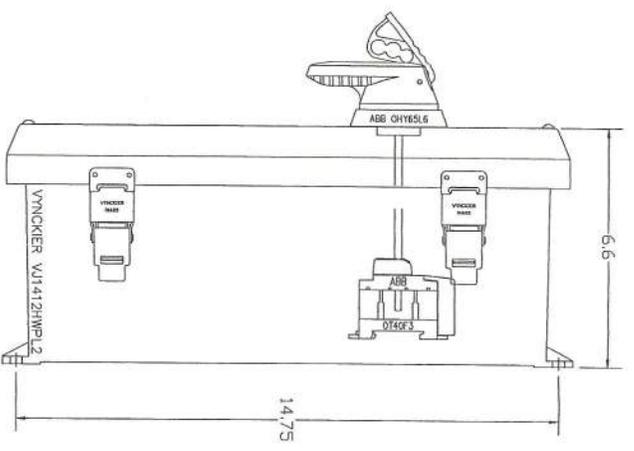
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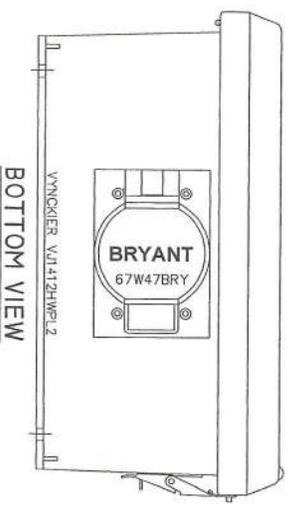
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FRONT VIEW



RIGHT SIDE VIEW



BOTTOM VIEW

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<p>VYNCKER Engineering Solutions A Unit of DEQ Corporation</p>		<p>CUSTOMER: PULSAFEEDER INC. STREET: 2883 BRIGHON-HENRIETTA TL ROAD CITY / STATE: ROCHESTER, NY 14623 SANGAMON WATER MFC JUNCTION BOX CHEMICALS SODIUM HYPOCHLORITE</p>	
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DESIGNED ON AUTOCAD: AUTOCAD 2004	05/27/10	JPG	05/27/10
DESIGNED BY	DATE	CHECKED BY	DATE
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9"

3.5"


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 ROCHESTER, NY 14623 (585)-292-8000

SODIUM HYPOCHLORITE
 MPC JUNCTION BOX - PUMP 100-P-1551

PULSA-PROJECT No. - T789858-S04	FULL LOAD AMPS - 8 A
CONTROL CABINET - 100583-007	LARGEST MOTOR FLA - 6.9 A
POWER FEED - 120 VAC, 15 AMP, 1 PH, 60 Hz	CONTROL VOLTAGE - 120VAC/24VDC
DISCONNECT SW. - 16 AMP	CONTROL XFRM. - NONE
INTERRUPTING CAPACITY - 5 K.A.I.C.	


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SODIUM HYPOCHLORITE
 MPC JUNCTION BOX - PUMP 100-P-1552

PULSA-PROJECT No. - T789858-S04	FULL LOAD AMPS - 8 A
CONTROL CABINET - 100583-008	LARGEST MOTOR FLA - 6.9 A
POWER FEED - 120 VAC, 15 AMP, 1 PH, 60 Hz	CONTROL VOLTAGE - 120VAC/24VDC
DISCONNECT SW. - 16 AMP	CONTROL XFRM. - NONE
INTERRUPTING CAPACITY - 5 K.A.I.C.	


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SODIUM HYPOCHLORITE
 MPC JUNCTION BOX - PUMP 100-P-1553

PULSA-PROJECT No. - T789858-S04	FULL LOAD AMPS - 8 A
CONTROL CABINET - 100583-009	LARGEST MOTOR FLA - 6.9 A
POWER FEED - 120 VAC, 15 AMP, 1 PH, 60 Hz	CONTROL VOLTAGE - 120VAC/24VDC
DISCONNECT SW. - 16 AMP	CONTROL XFRM. - NONE
INTERRUPTING CAPACITY - 5 K.A.I.C.	

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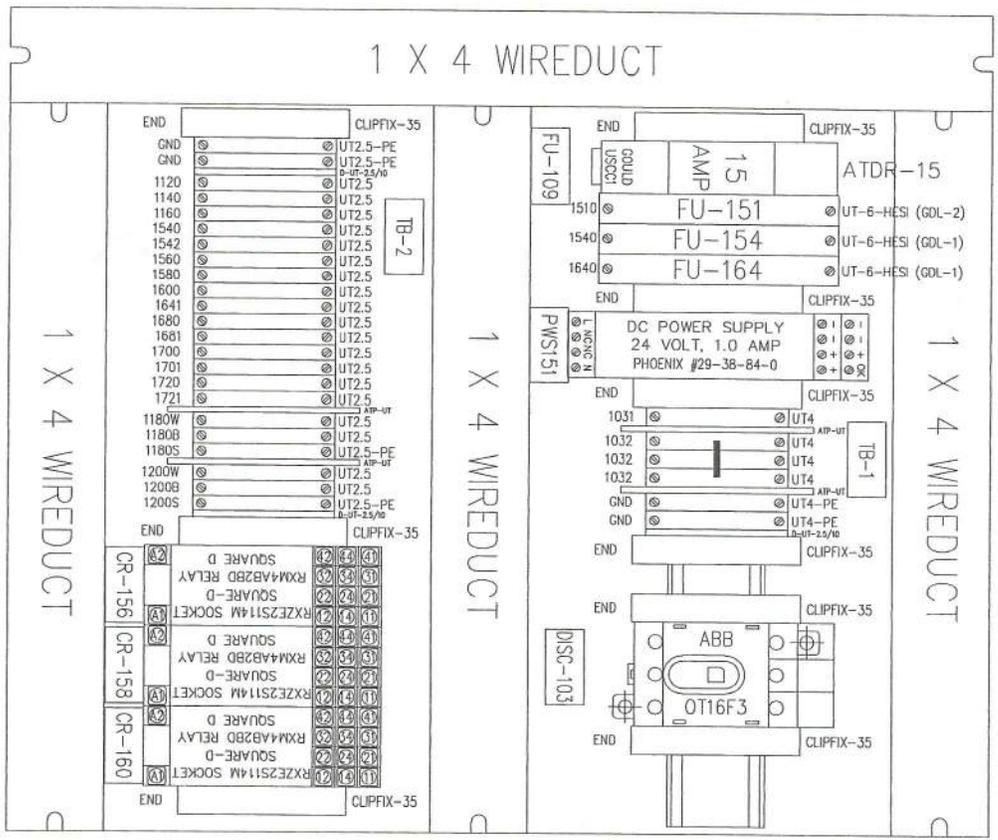
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T789858-S04		DATE: 04 OF 07	REV. A

REV. 1	DESCRIPTION: ORIGINAL ISSUE	DATE: 05/27/10	REV. A
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CUSTOMER: PULSAFEEDER INC.
 STREET: 2883 BROOKTON-HERNETTA TL ROAD
 CITY / STATE: ROCHESTER, NY 14623
 NAMEPLATES: MPC JUNCTION BOX
 CIPHERALIST: SODIUM HYPOCHLORITE



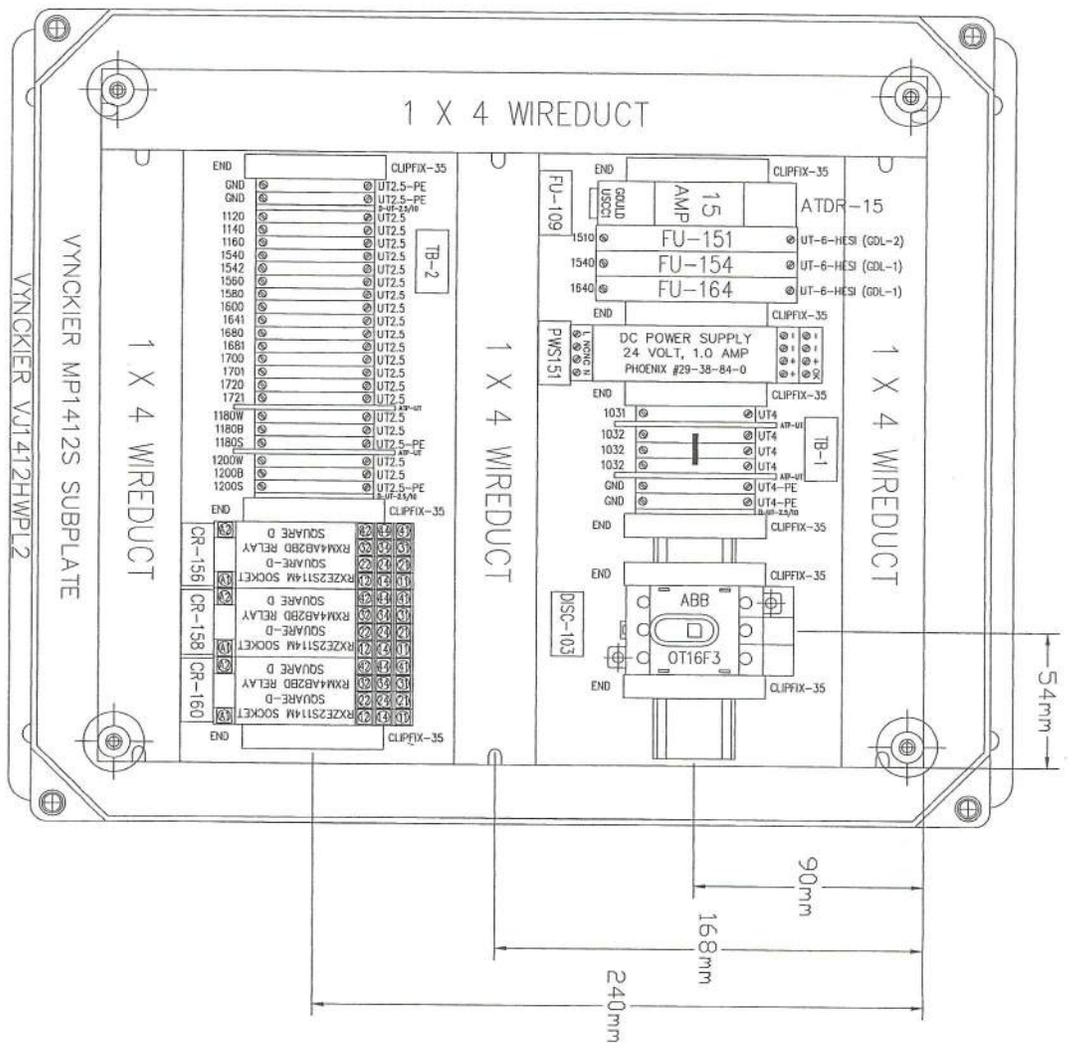
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<p>CUSTOMER: PULSAFEEDER INC. 2883 BRIMPTON-HENRIETTA TL ROAD CHENANGO WATER DIVISION BOX CHEMUNGAUS, SODIUM HYPOCHLORITE INTERIOR VIEW</p>		<p>DATE: 09/27/10 DRAWING NUMBER: 100583-SH SCALE: 05 PAGE: A</p>	
<p>DOWN BY: JPB CHECKED BY: [Signature] DATE: 09/27/10</p>		<p>DATE: 09/27/10 DRAWING NUMBER: 100583-SH SCALE: 05 PAGE: A</p>	



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<p>SANGKAMON WATER MPC JUNCTION BOX CHIKHAKASI SODUM HYPOCHLORITE</p>				
<p>INTERIOR DIMENSIONS</p>				
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FILE REFERENCE:	03-07A	SCALE:	1 = 1	PAGE:
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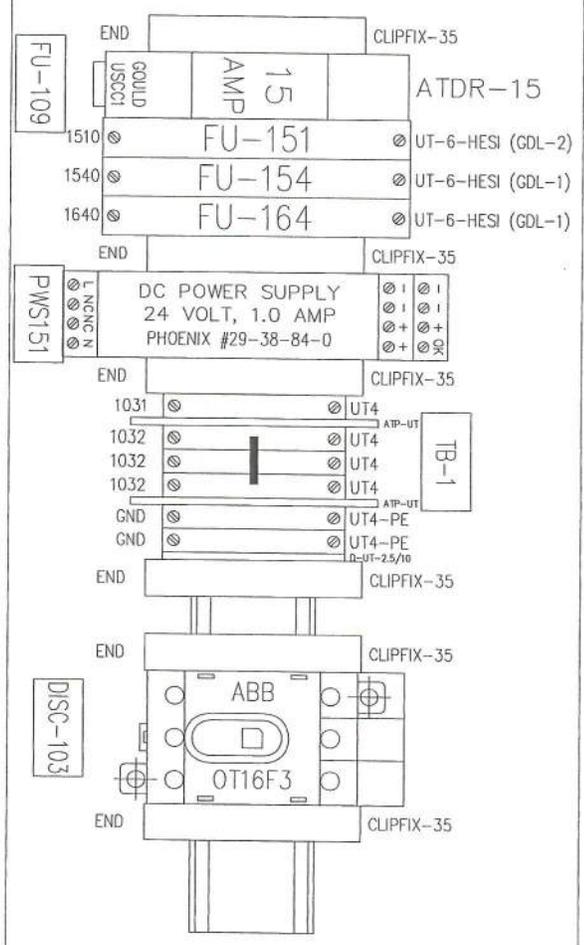
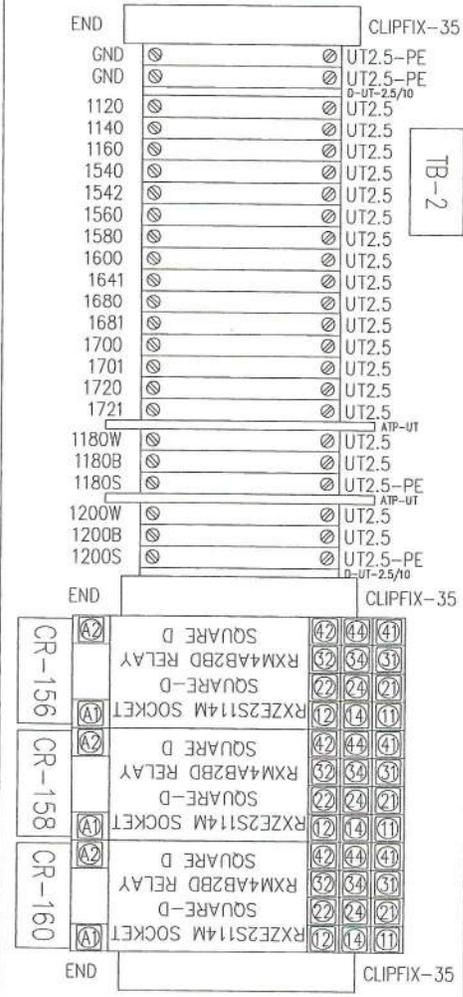
SANGKAMON WATER
MFC JUNCTION BOX
CHEMICALS SODIUM HYPOCHLORITE

TERMINAL STRIPS

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DRAWN BY: JPD
CHECKED BY: []
DATE: []

MODEL: PART # []
UL LISTED CONTROL PANEL
DRAWING NUMBER: 100583-SH
SCALE: 1" = 1"
PAGE: 07
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REVISIONS:

REV	DATE	DESCRIPTION
07	07 OF 07	

Bill of Material



Project Description: Pulsafeeder-Sangamon
Chemicals: Sodium Hypochlorite
MPC Junction Box

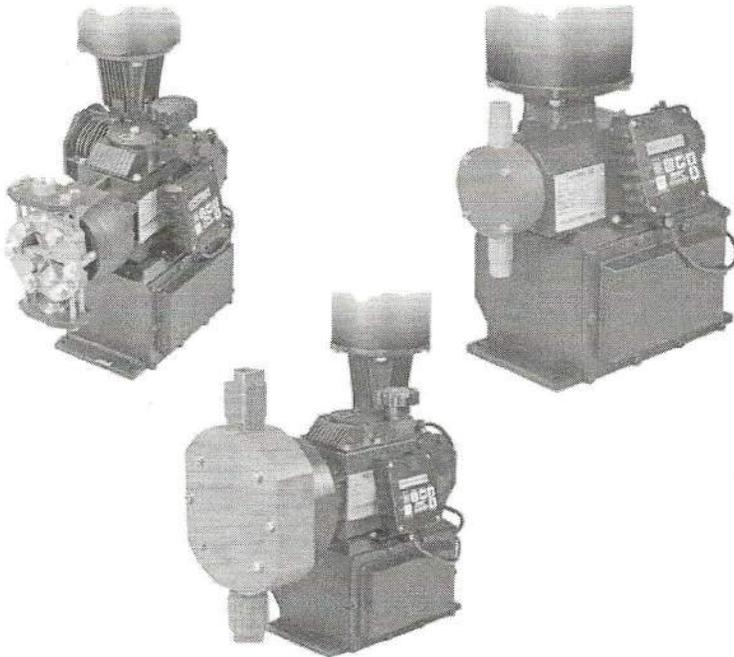
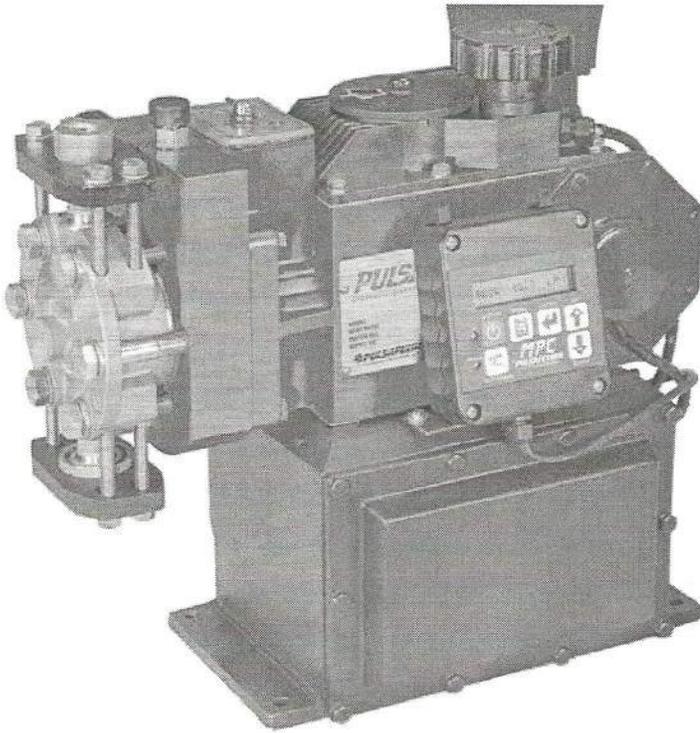
BOM Number:	100583-SH-BOM
Approval Date:	May 27, 2010
Prepared By:	Jamie Girard

Revision:	A
Approval ERI/CN:	100583-0001

Item	Device ID	Item Description	Manufacturer	Manufacturer Part No.	Qty
1	Enclosure	FRP 14" x 12" NEMA 4X Enclosure	Vynckler	VJ1412HW/PL2	1
2	Mounting Panel	Mounting Panel (for 14" X 12" Enclosure)	Vynckler	MP1412S	1
3	Disc-103	Disconnect Switch, UL508 16 amp	ABB	OT16F3	1
4	Disc-103	Pistol Handle, Red/Yellow, Nema 4X	ABB	OHY65L6	1
5	Disc-103	Shaft 6mm for above	ABB	OXPEX265	1
6	RECP-109	NEMA 4x Receptacle assembly w/cover	BRYANT	67W47BRY	1
7	FU-109	Fuseblock, 30 amp, 600 Volt, Dinrail Mountable	Gould	USCC1	1
8	FU-109	Fuses, 15 amp, 500 Volt, Class - CC	Gould	ATDR15	1
9	FU-151, 154, 164	Fuse Terminal Block, 1 Pole, 10 Amp, 250 Volt, UT-6-HESI	Phoenix	3046401	3
10	FU-151	Fuse, Cartridge, 1/4" x 1-1/4", 250 Volt, 2A	Gould	GDL2	1
11	FU-154, 164	Fuse, Cartridge, 1/4" x 1-1/4", 250 Volt, 1A	Gould	GDL1	2
12	PWS-151	Power Supply, 24 VDC, 1A	Phoenix	2938840	1
13	CR-156, 158, 160	Relay, 4-Pole, General Purpose, 24VDC	Square-D	RXM4AB2BD	3
14	CR-156, 158, 160	Relay base	Square-D	RXZE2S14M	3
15	Terminals	Terminal Blocks UT 2.5	Phoenix	3044076	22
16	Terminals	UT 2.5-PE ground	Phoenix	3044092	4
17	Terminals	Terminal Blocks UT 4	Phoenix	3044102	4
18	Terminals	UT 4-PE ground	Phoenix	3044128	2
19	Terminals	Standard Partition plate, ATP-UT	Phoenix	3047167	4
20	Terminals	Cover D-UT 2.5/10	Phoenix	3047028	3
21	Terminals	Dinrail End Clamp, CLIPFIX 35	Phoenix	3022218	9
22	Terminals	FBS-3-6, Plug-In Center jumper, 3 Position	Phoenix	3030242	2
23	Service Tag	Custom Pulsafeeder Service Tag, See Drawings	Zeller	NP-9 x 3.5	1
24	Din Rail	NS35/15-GELOCHT, 35mm DIN Rail, 2 meter length	Phoenix	1201730	1
25	Wireduct	Wireduct, 1" W x 4" H, Plastic, White, Includes Cover, 6 foot long	Phoenix	T1-1040W	1
26	UL LISTING	UL Listing	Zeller	UL LISTING	1



Metering Pump Controller



The MPC, Metering Pump Controller, expands the flow range capability of the PULSAR, Pulsar HypoPump, Shadow, Shadow HypoPump, Series M, and Series M OMNI model pumps. The MPC is a speed based control system for automatic control with an analog input signal and manual control either at the pump or up to 1000 feet away (304 meters) from the pump with the MPC's exclusive handheld keypad.

KEY FEATURES:

- Detachable handheld keypad with 4.5 feet (1.3 m) of cable as standard
- Handheld keypad can be mounted up to 1000 feet (304 m) from pump
- 1000:1 Turndown for wide range of flow (flows are always based on 60hz)
- Motor on/off control on the handheld keypad with high visibility red button
- UL, CSA and CE Approved
- Uses a commercially available inverter rated motor (standard motor is not NEMA 4X (IP56))
- Displays pump output in units of flow (GPH or LPH)*
- NEMA 4X (IP56) rating on both pump mounted and handheld keypad enclosures (Requires different rated motor)
- Stroke length indication on the controller display*
- Automatic re-calibration of the pump curve with manual changes in stroke length*
- Security code to lock out unauthorized users
- Designed with safety and ergonomics in mind

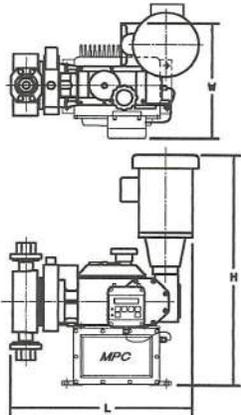
Feature Performance Comparison:

Feature	MPC	Competition	DC Drive	AC Drive	Vector
NEMA 4X Enclosure (minimum IP56)	X		X	X	X
Typical Turndown	1000:1	90:1	20:1	10:1	100:1
CSA Approval and UL Approval pending	X		Optional	Optional	Optional
On Board Pump and Process System Diagnostics	X	X			
Simple Flow & Signal Calibration Routine	X	X			
Keypad with Liquid Crystal Display	X	X		X	X
Single Function Auto/Manual Switch	X		X	X	X
Motor ON/OFF Control at Pump	X	X			
Memory of Settings	X	X		X	X
Alarm Outputs	X	X		Optional	Optional
Uses a Motor Requiring No Maintenance	X	X		X	X
Factory Calibration of Flow w/ Flow Indication at Pump	X	X			
Auto Re-Calibration of Flow if Manual Stroke Length Control Changes	X				
CE Mark Standard	X	X	Optional	Optional	Optional
Modular for Field Convert from Pump Mount to Wall Mount Controls	X				

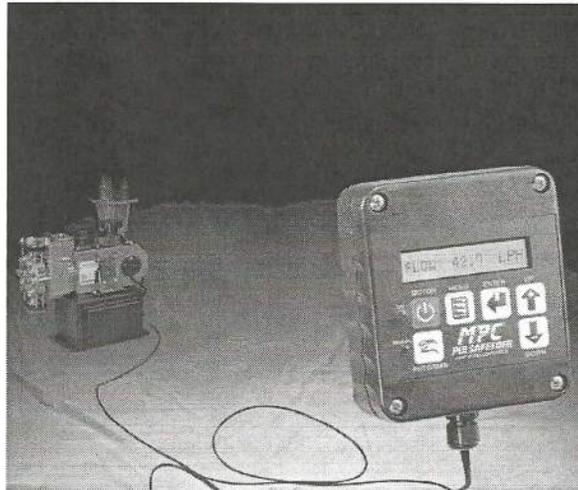
Technical Specifications:

Power Input Options	Single Phase, 115 or 230VAC (50 or 60 hz)
Analog Input/Output	One of each, Range is 4-20mA
Digital Inputs	(Two) Powered (up to 24V) or Non-powered solid-state contacts - User configurable
Digital Outputs	(Three) Non-powered solid-state contacts - User configurable
Rated Ambient Temperature	0 - 40°C
Steady State Accuracy	±1% over a 3:1 speed turndown ±2% over a 1000:1 speed turndown

Typical Dimensions: All Pulsar Series

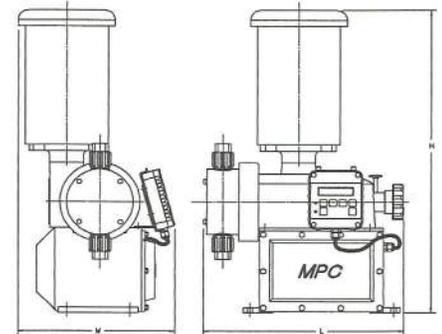


DIM	MODEL 25		MODEL 55	
	INCH	MM	INCH	MM
L	21.3	542.1	22.0	559.8
W	12.8	325.1	12.8	325.1
H	33.5	851.3	33.5	851.3
APPROX SHIP WT.	146LBS	66.2Kg	161LBS	73Kg



The MPC Handheld has remote capabilities of up to 1000 feet (304m) and can be mounted in safe and easily accessible environments. The backlit display allows for easy reading and can be programmed for english or metric measurements. Flow is indicated in relation to the pump and manual calculations are no longer required.

Typical Dimensions: OMNI



	L	H	W	WEIGHT
INCHES	15.50	23.50	12.00	66 LBS.
CENTIMETERS	39.37	59.69	30.48	30 KGS

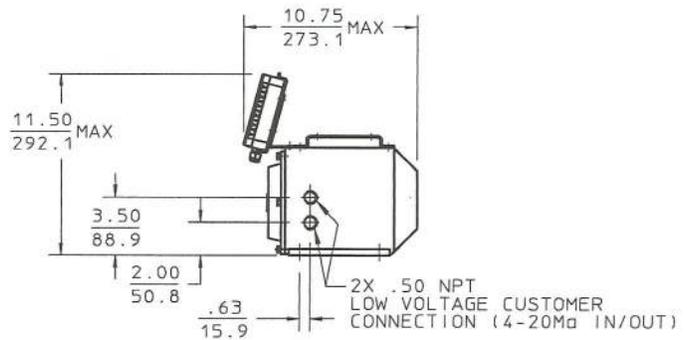
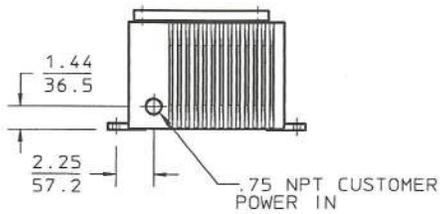
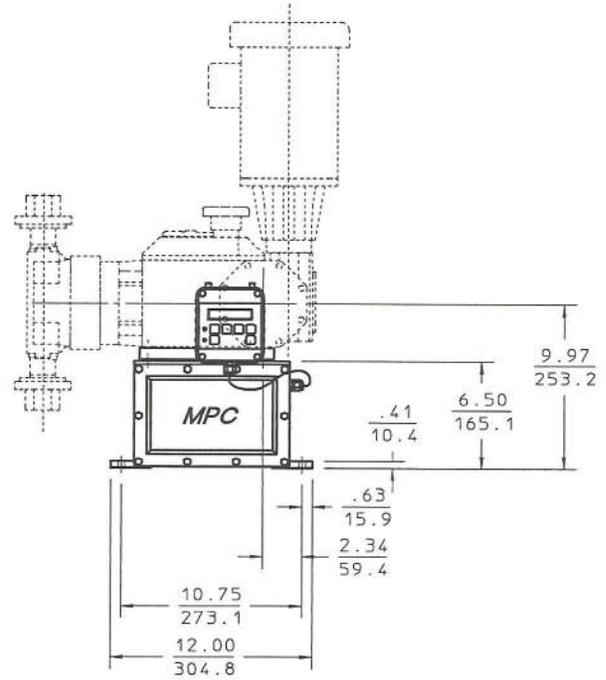
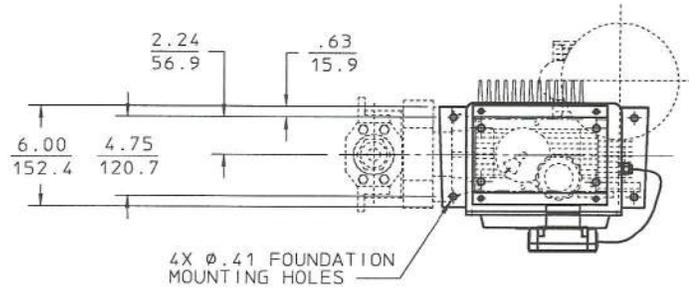
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A Unit of IDEX Corporation



Engineered Pump Operations
2883 Brighton-Henrietta Town Line Road
Rochester, New York 14623 USA
Telephone: 585-292-8000
Fax: 585-424-5619
<http://www.pulsa.com> - Email: pulsa@idexcorp.com



MPC-TS 06/04



ALL DIMENSIONS ARE IN INCH/MM

PULSAR **PULSAFEEDER**
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MPC CONTROLLER
PUMP MOUNTING

△	UPDATED TOP VIEW	03/02/10	EFFECTIVE	03/02/10
REF	REVISION UPDATE	DATE	SUPERSEDES	02/25/10

SECTION/PAGE	MPC
EFFECTIVE	03/02/10
SUPERSEDES	02/25/10

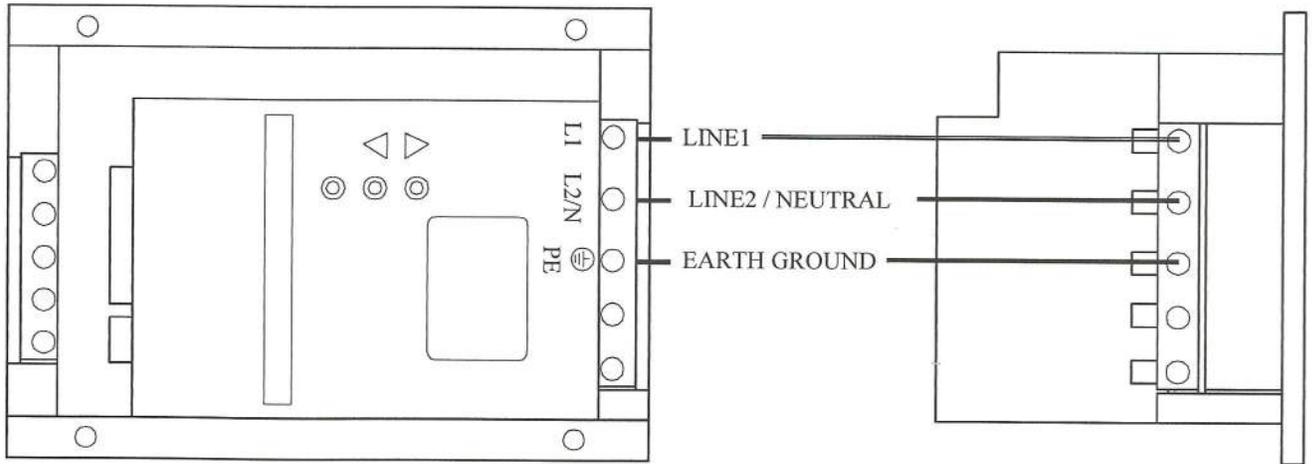
DWN BY: PFM	23094-000
DATE: 04/16/04	

5.3.3 Power Wiring Diagram



MPC Drive Terminal	120 V operation	240 V operation
L1	Line	Line
L2 / N	Neutral	Line
Earth	Ground	Ground

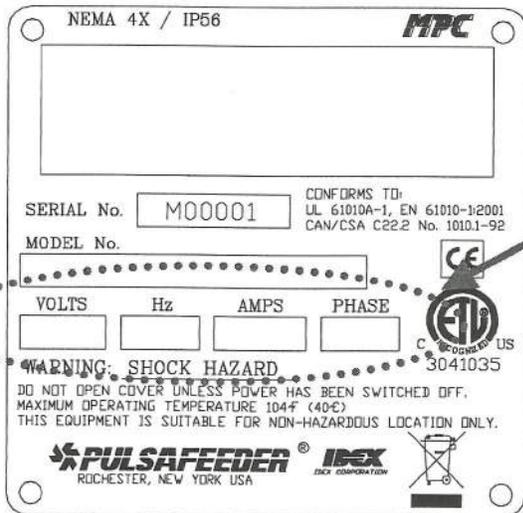
Table 2 – AC Drive Terminals



AN00446_004

Figure 3 – AC Power Connections

Wait a minimum of 3 minutes after disconnecting power before servicing the MPC or pump motor. Capacitors retain a charge even after power is removed from the controller.



Find the proper AC input voltage for your MPC controller on the nameplate at the rear of the unit. MPC input is always single phase, and can be either 115 VAC or 230 VAC, determined at time of order.

5.3.4 Input/Output Signal Wiring

Signal wiring is routed through the two unused conduit openings at the side of the MPC. All input/output signals are connected to the terminal strips at the edge of the MPC circuit board. Use caution to observe proper wire location and signal polarity. Always cap or plug unused openings. Wires should be routed within the enclosure in a manner that maintains separation between high voltage and low voltage conductors. Ensure all low voltage wiring is installed as per any applicable local and national electrical codes and regulations.

Utilize 20 or 22 AWG, 250 V, shielded cable, with a 105° C insulation rating (or better) for all signal input and output wiring. Recommended strip length is 0.39" or 10 mm. Refer to *Figure 4* below for signal connection locations.



Unused conduit openings should be plugged as required to avoid ingress of moisture and contaminants into the MPC enclosure. Do not remove the factory provided plug from openings that are not required for field wiring.



IT IS RECOMMENDED THAT A WRIST STRAP BE WORN WHEN MAKING CONNECTIONS TO ANY PRINTED CIRCUIT BOARD.

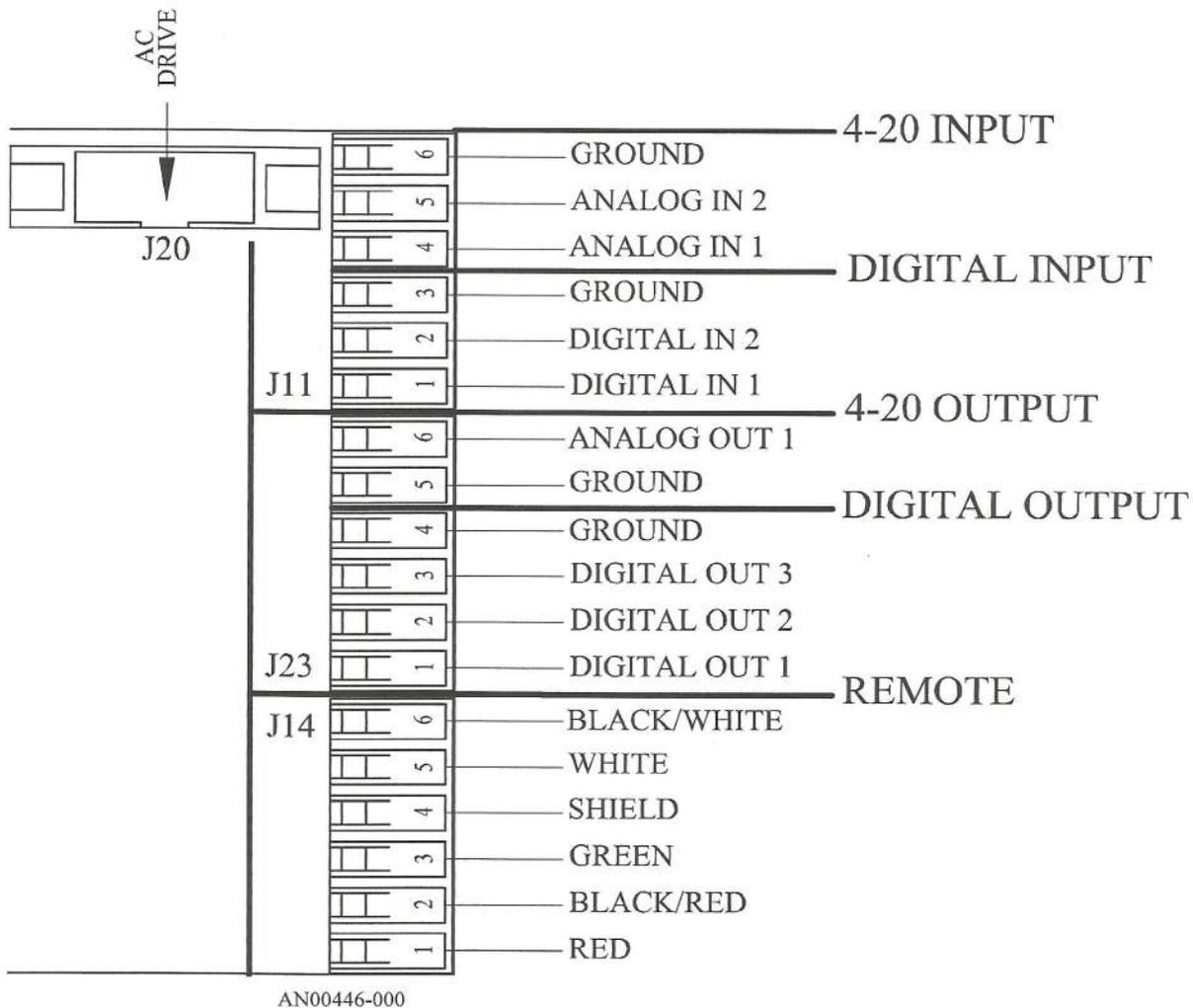


Figure 4 – Signal Connections

Digital output signals can drive devices such as relays or indicator lamps. 24 VDC power must be supplied from an external source. Each output has a maximum current capability of 500 mA.

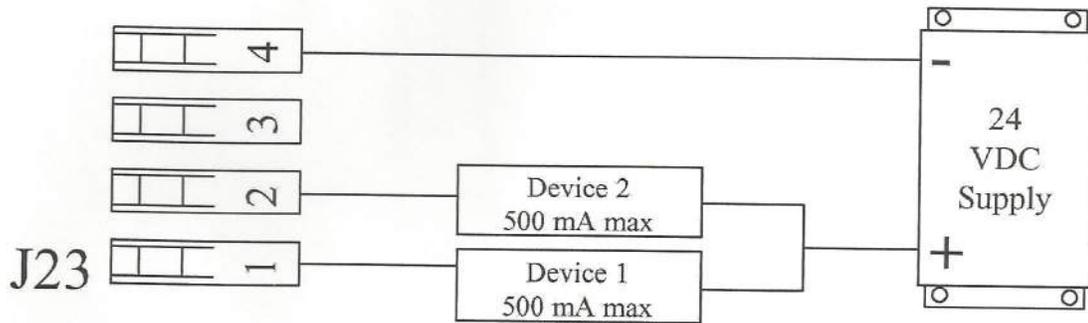


Figure 5 – Sample Digital Output Connections

5.4 Check Wiring and Close Access Cover

Double-check all of your electrical connections. Pay attention to polarity of all inputs and outputs – both low and high voltage. Additionally, insure that all terminals are clamping onto the bare conductor, not on its insulation. Ensure that wires will not be trapped or pinched when front cover is replaced and secured. Ensure that excess insulation is not removed from the wires, as this can lead to poor connections or faulty operation.

Replace the main access cover and secure the 10 bolts.



Use a nut driver to tighten the retaining bolts evenly. Failure to do so may cause the cover to leak and void the warranty.

5.5 Confirm Correct Incoming Power



WITHOUT PRIOR OPERATING KNOWLEDGE, IT IS IMPOSSIBLE TO TELL IF THE PUMP MOTOR WILL RUN WHEN POWER IS APPLIED TO THE MPC. YOU ARE RESPONSIBLE FOR TAKING THE NECESSARY STEPS TO ENSURE THAT ALL ASPECTS OF SAFETY HAVE BEEN CONSIDERED (E.G., ELECTRICAL, HYDRAULIC, ETC.).

Turn on power at the mains or distribution panel. If the MPC's incoming power is connected correctly, the backlighting on the MPC's display will illuminate (depending on lighting conditions, it may be necessary to shade the display to confirm illumination). If the display is not illuminated, first check the line voltage with a voltmeter. If the voltage is not correct, return to *Section 5.3.2 – Installation: High Voltage Connections*. Otherwise, proceed with the next step.

BALDOR • RELIANCE

Product Information Packet

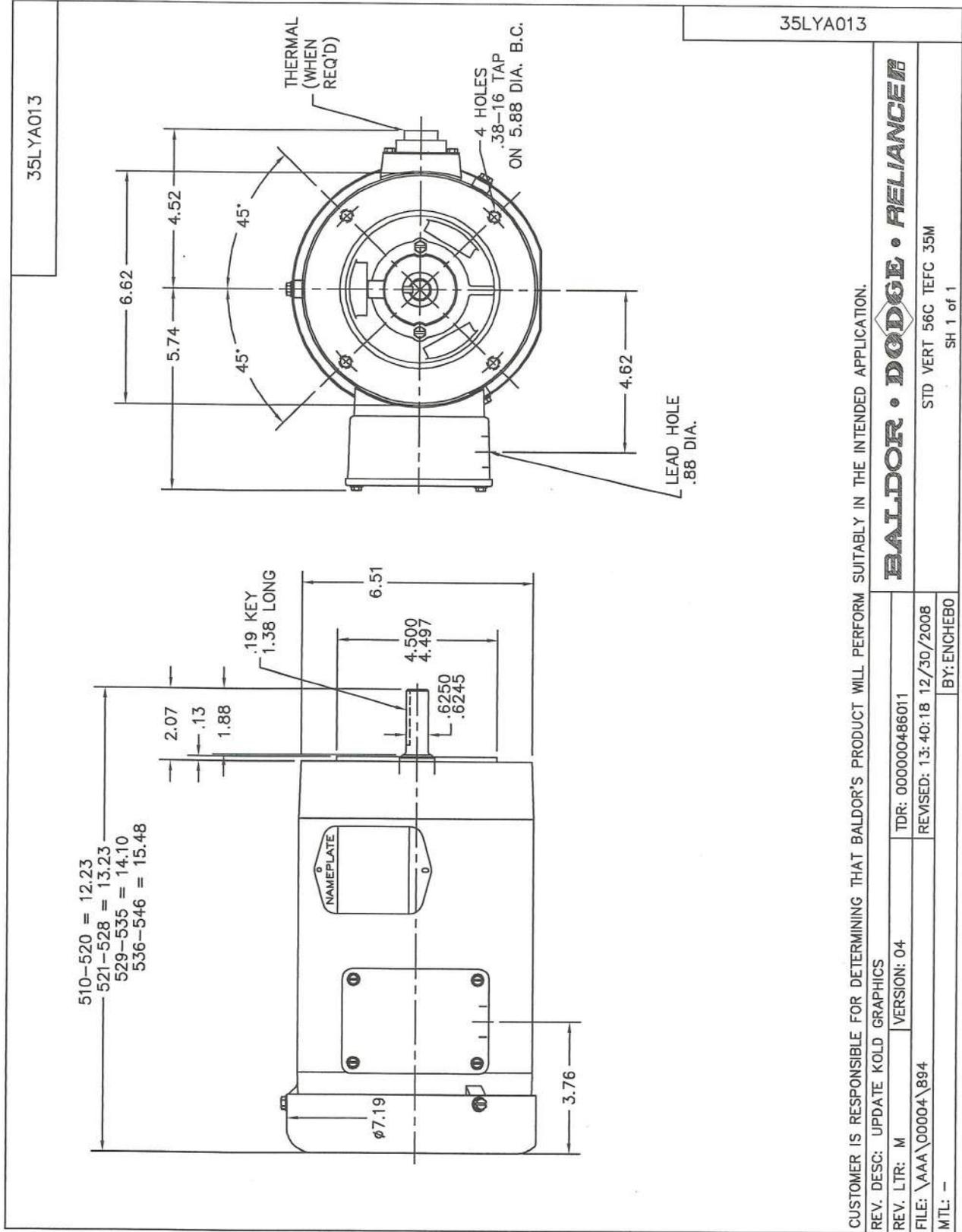
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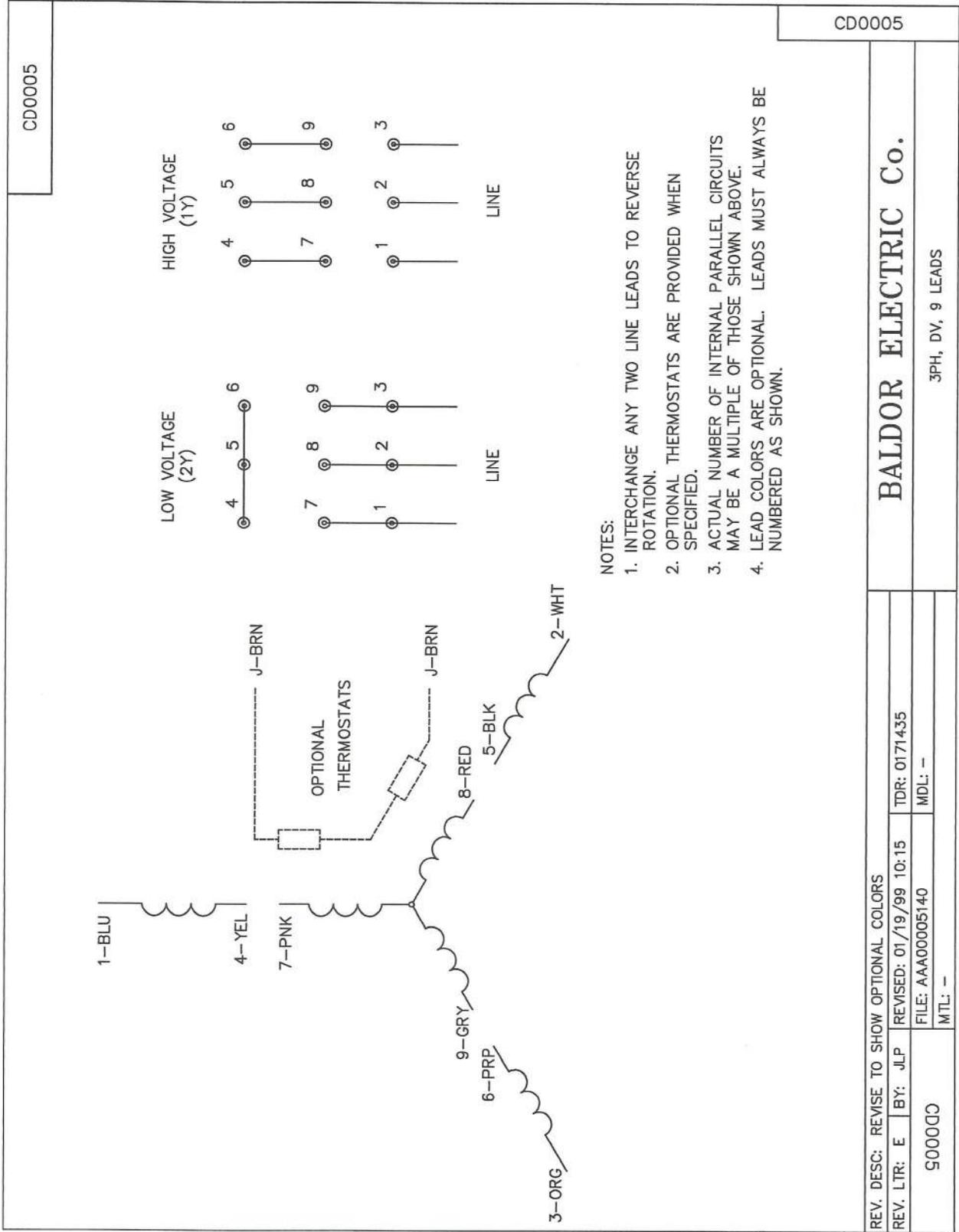
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Parts List			
Product ID	Description	Quantity	List Price
SA114258	SA 35A013-0083G4	1.000	151.00
RA105398	RA 35A013-0083G4	1.000	126.00
NS2512A01	INSULATOR, CONDUIT BOX X X	1.000	3.00
35CB3007	35 CB CASTING W/.88 DIA. LEAD HOLE	1.000	33.00
36GS1000SP	GASKET-CONDUIT BOX, .06 THICK #SV-330 LE	1.000	6.00
51XB1016A07	10-16 X 7/16 HXWSSLD SERTYB	2.000	3.00
11XW1032G06	10-32 X .38, TAPTITE II, HEX WSHR SLTD U	1.000	4.00
35EP3100M02	FREP TEFC 203 BRG W/O GRSSR (RAISED FH MT	1.000	34.00
HW5100A03SP	WAVY WASHER (W1543-017)	1.000	3.00
35EP3300A33	SPL FACE MTD EP -ENCL-205 BRG	1.000	96.00
51XN1032A20	10-32 X 1 1/4 HX WS SL SR	2.000	3.00
51XB1214A16	12-14X1.00 HXWSSLD SERTYB	1.000	3.00
35FH4005A32SP	IEC FH NO GRSSR W/3 HOLES - W/AUTOPHERETI	1.000	28.00
51XW1032A06	10-32 X .38, TAPTITE II, HEX WSHR SLTD S	3.000	4.00
35CB4521	35 LIPPED CB LID (GALV & PHOSPH)	1.000	3.00
35GS1030	35 GS FOR CB LID - LEXIDE	1.000	3.00
51XW0832A07	8-32 X .44, TAPTITE II, HEX WSHR SLTD SE	4.000	3.00
HW2501D13SP	KEY, 3/16 SQ X 1.375	1.000	3.00
HA7000A04	KEY RETAINER 0.625 DIA SHAFTS	1.000	3.00
10XF0440S02	04-40 X 1/8 TYPE F HEX HD STAINLESS STIC	2.000	2.00
MJ1000A02	GREASE, POLYREX EM EXXON	0.050	12.00
35FN3002A05SP	EXTERNAL FAN, PLASTIC, FOR .637 DIA JOUR	1.000	27.00
HA3100A12	THRUBOLT 10-32 X 7.375	4.000	3.00
MG1025L01	PAINT- 786-04 WILKOFAST BLACK EPOXY	0.017	335.00

Parts List (continued)

Product ID	Description	Quantity	List Price
LB1304	LABEL "INVERTER READY"	1.000	3.00
LC0005E01	CONN.DIA./WARNING LABEL (LC0005/LB1119)	1.000	3.00
LB5040	INSTRUCTION TAG, AC & DC	1.000	3.00
LB1172A01	CUSTOM MTR CARTON LABEL LASER PRINTER	1.000	3.00
NP1372L	STD NP LASER ENGRAVED, UL CSA CE CC, W/O	1.000	
35PA1066	PACKING GROUP COMBINED PRINT	1.000	16.00
PK3082	STYROFOAM CRADLE	1.000	3.00





REV. DESC: REVISE TO SHOW OPTIONAL COLORS

REV. LTR: E BY: JLP REVISED: 01/19/99 10:15 TDR: 0171435

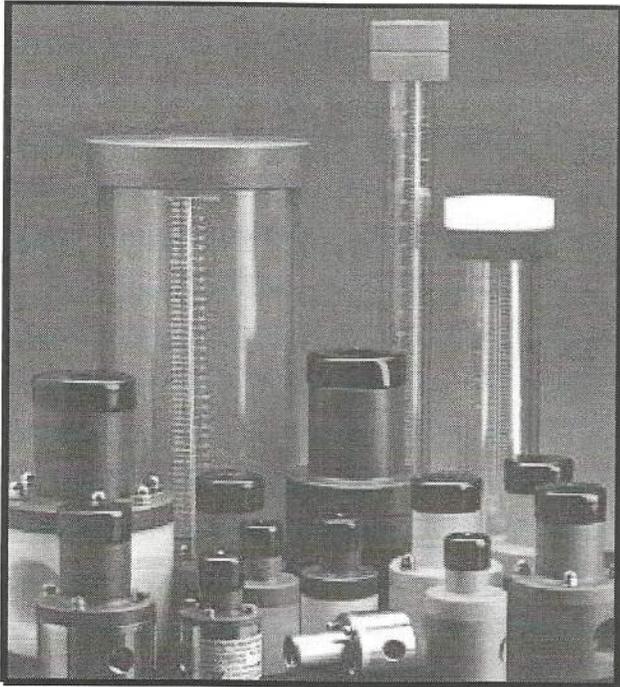
FILE: AAA00005140 MDL: -

MTL: -

500005

BALDOR ELECTRIC Co.

3PH, DV, 9 LEADS



Pulsafeeder diaphragm back pressure valves are designed to enhance the performance of chemical feed systems by applying a continuous back pressure to the chemical feed pump, while also acting as an anti-siphon valve. Robust construction ensures reliability in the rigorous service of municipal and industrial applications. Wetted materials include: **PVC, CPVC, PP, PVDF, PTFE, 316 SS, A 20 and Hast. C.** Available sizes: 1/4" - 1/2".

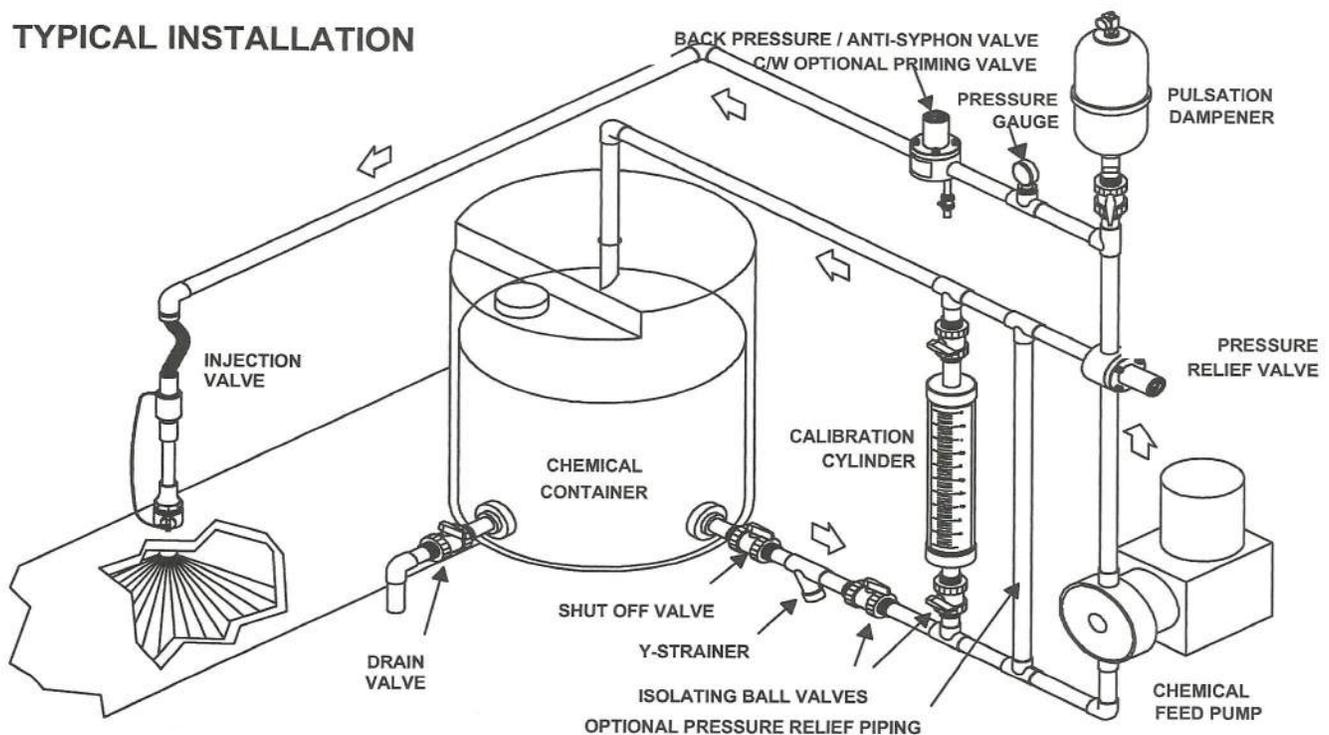
Features:

- High Reliability / Low Cost
- No Bolts on Plastic Models
- Compact Size for OEM Applications
- Adjustable 10 - 150 PSI
- Optional 350 PSI Rated Valve
- Anti-Siphon Function
- Robust, Machined Construction
- Vulcanised PTFE/EPDM Diaphragm
- Wide Range of Materials

Operation:

Pulsafeeder diaphragm back pressure valves apply positive discharge pressure to a metering pump system to prevent siphoning and eliminate varying dosage rates caused by fluctuating downstream pressure. The diaphragm is held against the valve seat by an internal spring. When the preset pressure is exceeded, the diaphragm is forced up and chemical flows through the valve to the injection point. The valves are preset for 50 psi, however they are field adjustable from 10 - 150 psi via the adjustment screw. Installation should be as close to the injection point as possible to prevent chemical line drainage, and it is most important that all chemical system equipment such as pulsation dampeners and pressure gauges are between the pump and back pressure valve.

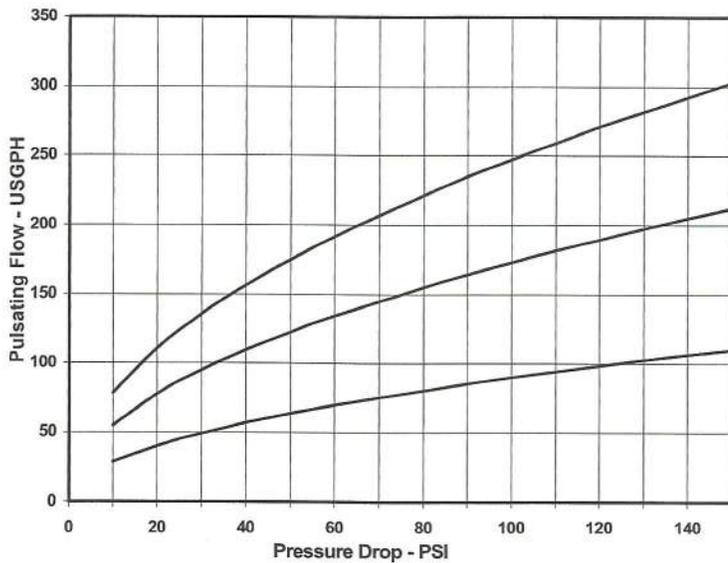
TYPICAL INSTALLATION



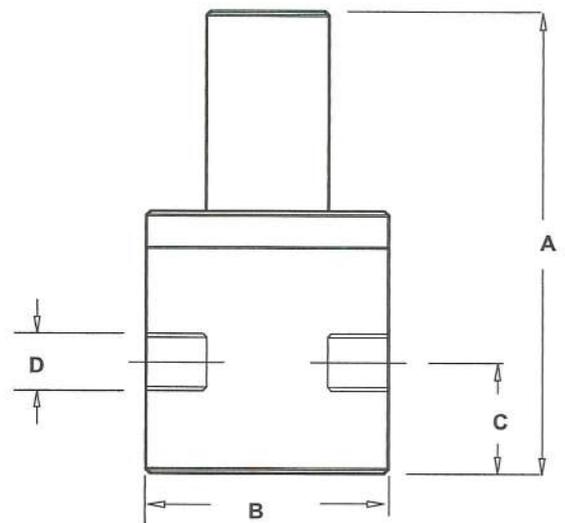
Technical Data:

Size:		1/2"			
Connections:		NPT			
Pressure Adjustment		10 - 150 psi			
Flow Rates @ 150 psi		Shipping Weight: lbs			
Size	Pulsating	Continuous	Plastic	Metal / Plastic Top	Metal / Metal Top
1/2"	300 USgph	15 USgpm	1.0		
Max Temperature: (°F)		140°			
Materials of Construction:					
Diaphragm		PTFE / EPDM			
Valve Top		PVC			
Valve Body		PVC			

Performance Curves:



Dimensions:



PART NUMBER: RS580019-PVC

D	A	B	C
1/4"	3.90	2.375	0.75
3/8"	3.90	2.375	0.75
1/2"	4.60	2.375	1.10



Y Strainers

1/2" to 4" - PVC and Corzan® CPVC



Features

- Rated to 150 PSI
- FPM Seals
- Standard 1/32" perf screen
- All-Plastic Construction
- Easy Screen Access
- Can Be Used in Horizontal or Vertical Position

Options

- Stainless Steel Strainer Screens

Economical Protection

Hayward Y Strainers protect piping system components from damage caused by dirt or debris in the process media. They cost less than other types of strainers and are light-weight and very compact. Because they can often be supported by the pipeline alone, they work in applications where other strainers cannot.

Rugged Plastic Screens

Hayward Y Strainers are supplied with a 1/32" perforated plastic screen. This screen is ultrasonically welded, not glued, for superior strength. Screens fabricated from type 316 stainless steel are also available in openings from 1/2" down to super fine 325 mesh. All screens have an open area at least twice that of the equivalent pipe size cross-sectional area to minimize pressure drop.

Easy Clean Out

All sizes of Hayward Y Strainers feature a heavy-duty hex cap that permits quick and easy removal of the strainer screen when cleanout becomes necessary.

Adaptable Design

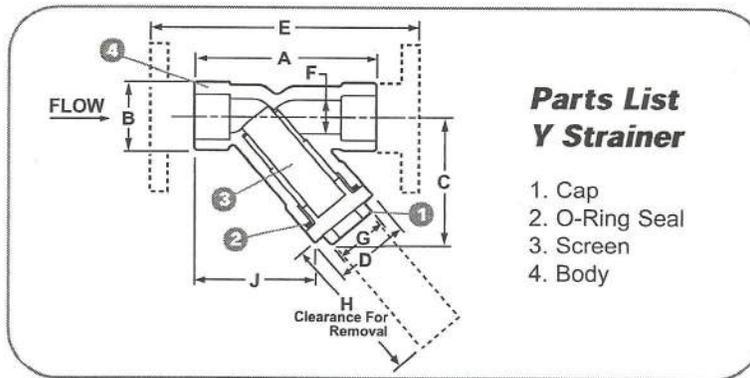
Hayward Y Strainers will work equally well in the horizontal or vertical position, simplifying piping system layout.

All Plastic Construction

Hayward Plastic Y Strainers will never rust or corrode – and they don't require painting or coating to survive corrosive environmental conditions.

Corzan® is a trademark of Noveon, Inc.

Technical Information



Parts List Y Strainer

1. Cap
2. O-Ring Seal
3. Screen
4. Body

Dimensions - Inches / Millimeters

Size	A	B	C	D	E	F	G	H	J	Weight (lb / kg)	
										Skt / Thd	Fla
1/2"	3.38 / 86	1.38 / 35	2.25 / 57	1.50 / 38	N/A	0.56 / 14	1.00 / 25	2.13 / 54	2.50 / 64	0.25 / .11	N/A
3/4"	4.18 / 106	1.69 / 43	2.88 / 73	2.00 / 51	N/A	0.81 / 21	1.25 / 32	2.75 / 70	3.00 / 76	0.63 / .29	N/A
1"	5.19 / 132	2.00 / 51	3.63 / 92	2.16 / 55	N/A	1.00 / 25	1.50 / 38	3.30 / 84	3.32 / 84	0.88 / .40	N/A
1-1/4"	6.63 / 168	2.63 / 67	4.50 / 114	2.94 / 75	N/A	1.25 / 32	2.00 / 51	4.50 / 114	4.45 / 113	1.75 / .80	N/A
1-1/2"	6.63 / 168	2.63 / 67	4.50 / 114	2.94 / 75	N/A	1.56 / 40	2.00 / 51	4.50 / 114	4.45 / 113	1.63 / .74	N/A
2"	7.63 / 194	3.38 / 86	5.38 / 137	3.75 / 95	11.00 / 279	2.00 / 51	2.38 / 60	5.06 / 129	4.88 / 124	3.00 / 1.4	5.00 / 2.3
2-1/2"	10.31 / 262	4.69 / 119	7.25 / 184	5.25 / 133	N/A	2.90 / 74	3.50 / 89	6.60 / 168	6.54 / 166	7.75 / 3.5	N/A
3"	10.31 / 262	4.69 / 119	7.25 / 184	5.50 / 140	14.37 / 365	2.90 / 74	3.50 / 89	6.60 / 168	6.54 / 166	7.50 / 3.4	12.25 / 5.7
4"	12.81 / 325	5.75 / 146	8.88 / 226	6.18 / 157	17.73 / 450	3.78 / 96	4.25 / 108	8.00 / 203	8.58 / 218	9.50 / 4.3	17.50 / 8.0

Cv Factors*

Size	Factor	Size	Factor
1/2"	4.0	2"	28
3/4"	6.8	2-1/2"	40
1"	9.0	3"	65
1-1/4"	12	4"	100
1-1/2"	28		

* With 1/32" plastic screen

Pressure Drop Calculations

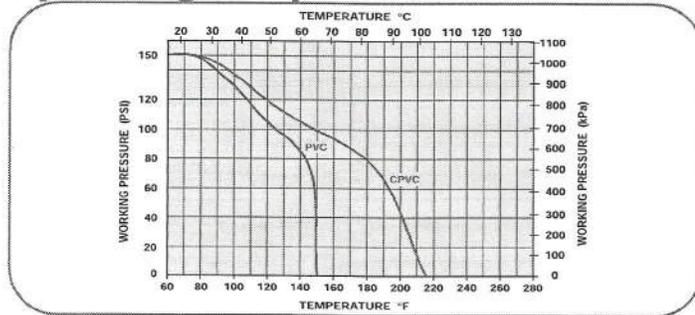
The pressure drop across the strainer, for water or fluids with a similar viscosity, can be calculated using the formula at the right:

$$\Delta P = \left[\frac{Q}{Cv} \right]^2$$

Where ΔP = Pressure Drop
 Q = Flow in GPM
 Cv = Flow Coefficient

The pressure loss across a valve or filter can be calculated using the system's flow rate and the Cv factor for that valve or filter. For example, a 1" strainer with a Cv factor of 8 will have a 4 psi pressure loss in a system with a 16 gpm flow rate $(16 \div 8)^2 = 4$

Operating Temperature/Pressure



Selection Chart

Size	Material	End Connection	Seal	Rating
1/2" to 4"	PVC, CPVC	Thd, Skt, Flg*	FPM	150 PSI @ 70F

* 1/2" to 1-1/2" not available with flanged connections

Strainer Screen Selection

- Y Strainers are furnished with a 1/32" perf plastic screen.
- Stainless steel strainer screens are available in these perfs: 1/32", 3/64", 1/16", 5/64", 7/64", 1/8", 5/32", 3/16", 1/4", 3/8", 1/2"; and in mesh sizes: 20, 40, 60, 80, 100, 200, 325

HAYWARD



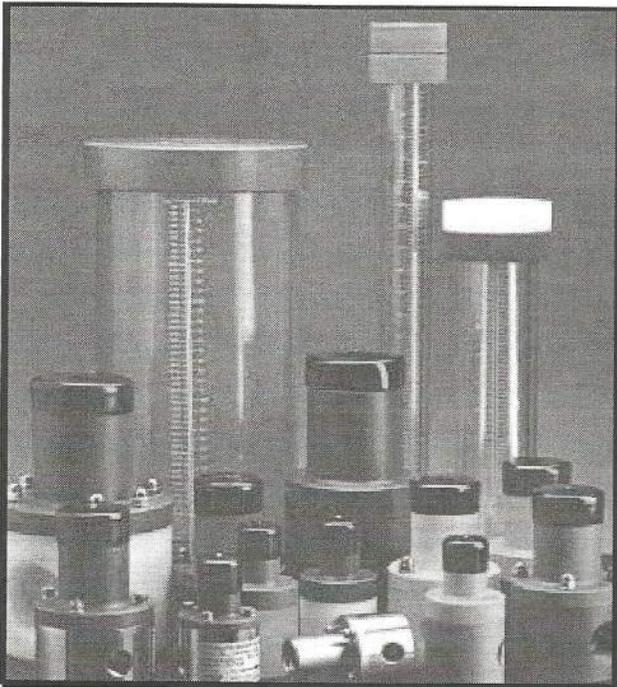
Hayward Industrial Products, Inc.

One Hayward Industrial Drive, Clemmons, NC 27012

Tel: 1-888-429-4635 (1-888-HAYINDL) • Fax: 1-888-778-8410

E-mail: hflow@haywardnet.com

Web Site: <http://www.haywardindustrial.com>



Pulsafeeder diaphragm pressure relief valves are designed to protect chemical feed systems from over pressure damage caused by defective equipment or a blockage in the chemical feed line. Robust construction ensures reliability in the rigorous service of municipal and industrial applications. Wetted materials include: **PVC, CPVC, PP, PVDF, PTFE, 316 SS, A 20 and Hast. C.**
Available sizes: 1/4" - 1/2".

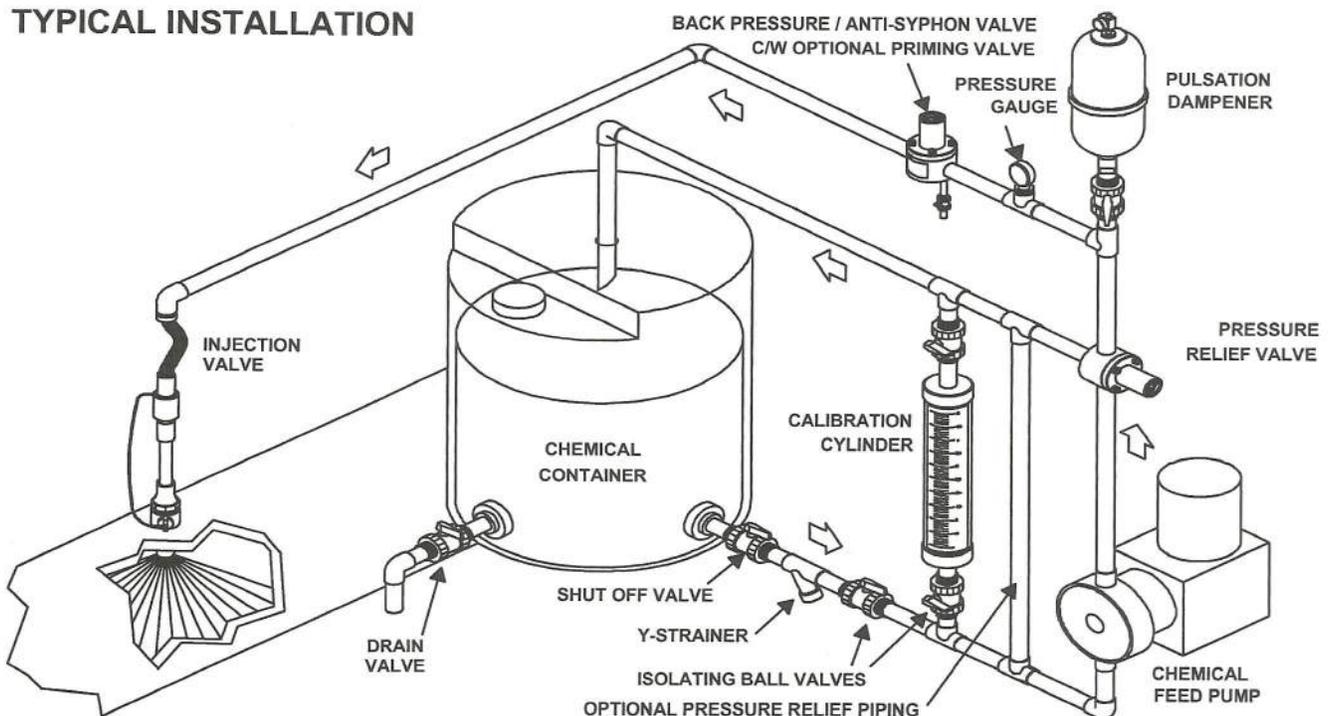
Features:

- High Reliability / Low Cost
- No Bolts on Plastic Models
- Compact Size for OEM Applications
- Adjustable 10 - 150 PSI
- Optional 350 PSI Rated Valve
- 3 Port, 2 Port, & 90° Configuration
- Robust, Machined Construction
- Vulcanised PTFE/EPDM Diaphragm
- Wide Range of Materials

Operation:

Pulsafeeder diaphragm pressure relief valves operate when the pressure in the chemical system exceeds the preset pressure of the valve. The diaphragm is held against the valve seat by an internal spring. When the preset pressure is exceeded the diaphragm is forced up and the chemical flows out the relief port, back to the chemical tank or to the suction side of the pump. The valves are pre-set at 50 psi, however they are field adjustable from 10 - 150 psi, (optional 350 psi) via the adjustment screw. The relief valve should be set approximately 15 psi higher than the system pressure. Installation should be made as close to the pump as possible, without any valves or accessories between the relief valve and the pump. Consult your pump manufacturer for his recommendations.

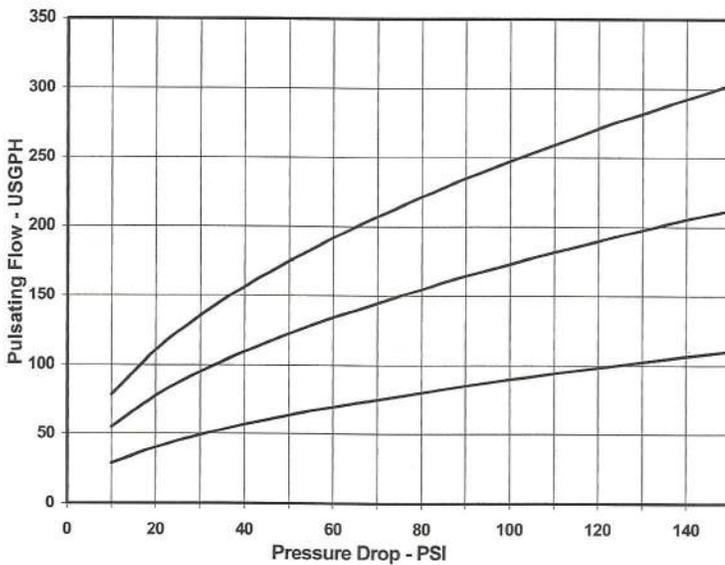
TYPICAL INSTALLATION



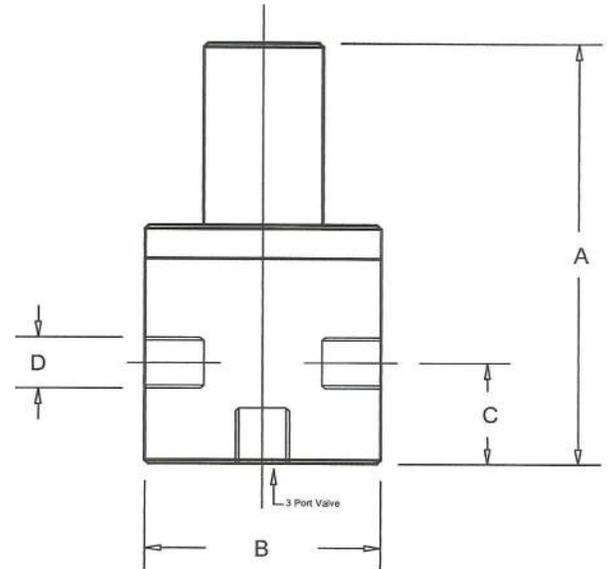
Technical Data:

Size:		1/2"			
Connections:		NPT			
Pressure Adjustment		10 - 150 psi			
Flow Rates @ 150 psi		Shipping Weight: lbs			
Size	Pulsating	Continuous	Plastic	Metal / Plastic Top	Metal / Metal Top
1/2"	300 USgph	15 USgpm	1.0		
Max Temperature: (°F)		140°			
Materials of Construction:					
Diaphragm		PTFE / EPDM			
Valve Top		PVC			
Valve Body		PVC			

Performance Curves:



Dimensions:



PART NUMBER RS600007-PVC

D	A	B	C
1/4"	3.90	2.375	0.75
3/8"	3.90	2.375	0.75
1/2"	4.60	2.375	1.10



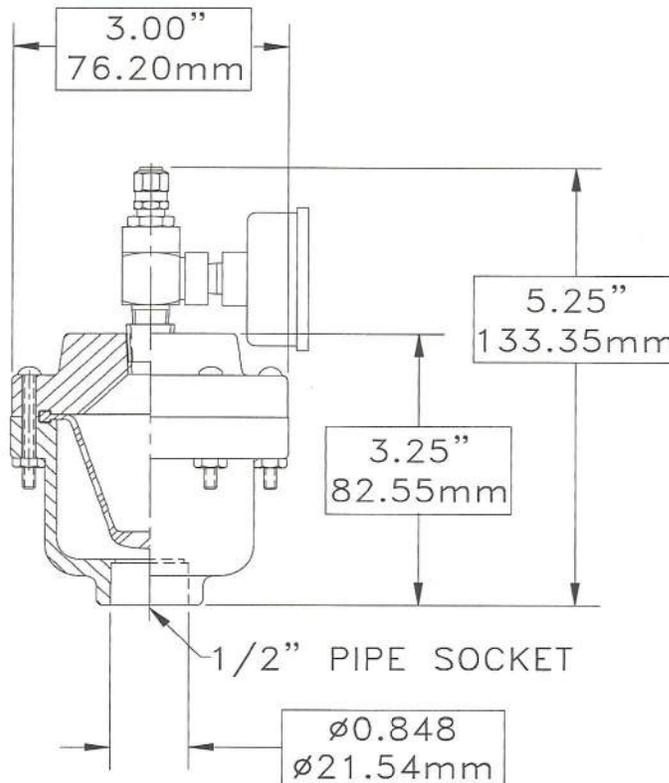
SENTRY MODEL #:	CTP1115V-5-SW
MAXIMUM PRESSURE:	150 PSI/10 BAR
CAPACITY:	4 CUBIC INCHES/.06 LITERS
WETTED HOUSING:	PVC
NONWETTED HOUSING:	PVC
BLADDER:	VITON
INLET:	SOCKET WELD FOR 1/2" PIPE
AIR CONTROL:	CHARGEABLE

ALTHOUGH THE INFORMATION ON THIS SHEET IS BELIEVED TO HAVE BEEN ACCURATE WHEN THE SHEET WAS FIRST PREPARED, SOME INFORMATION ON THIS SHEET MAY NOT BE ENTIRELY ACCURATE NOW. PLEASE VERIFY MATERIAL COMPONENTS, DIMENSIONS, AND PRESSURE RATING ON THE CURRENT BROCHURE FOR THIS PRODUCT BY BLACOH FLUID CONTROL, INC. ("BLACOH") OR, IF NECESSARY, CONTACT BLACOH DIRECTLY. PRESSURE TOLERANCES, INCLUDING BUT NOT LIMITED TO, ON MODELS MADE OF PLASTIC, MAY BE REDUCED BY TEMPERATURE VARIATION AND BY THE COMPOSITION OF THE SUBSTANCE BEING PUMPED.

USE OF AN INCOMPATIBLE OR UNSUITABLE DAMPENOR ON A PUMP MAY BE DANGEROUS TO PERSONS AND PROPERTY. BY WAY OF EXAMPLE BUT NOT LIMITATION, USE OF AN INCOMPATIBLE OR UNSUITABLE DAMPENOR MAY RESULT IN EXPLOSIONS, LEAKAGE OF LIQUIDS OR GASES (WHICH MAY BE HAZARDOUS), OR MALFUNCTIONING EQUIPMENT.

THE USER IS SOLELY RESPONSIBLE FOR (AND BLACOH IS NOT RESPONSIBLE FOR) VERIFYING THE COMPATIBILITY AND SUITABILITY OF A PARTICULAR DAMPENOR FOR A PARTICULAR PUMP AND APPLICATION. AS WELL AS DETERMINING WHETHER TESTING OF A DAMPENOR IS ADVISABLE PRIOR TO USE IN A PARTICULAR APPLICATION.

DIMENSIONAL DRAWING



TOLERANCE ± .25"

BLACOH FLUID CONTROL, INC

RIVERSIDE, CALIFORNIA USA

TEL: 800.603.7867 or 951.342.3100 Fax: 951.342.3101

E-mail: sales@blacoh.com web site: www.blacoh.com

**Duragauge® Pressure Gauge
Type 1279, ASME B 40.1
Grade 2A (±0.5% of span)**

- 4½" full-size bourdon tube
- Patented Duratube™ with as-welded-tube construction controls stress for longer life
- "Round Cap Tip" construction lowers stresses for longer life
- Easily adjustable, self-locking micrometer pointer
- Burn-resistant phenol turret case
- Exclusive Teflon coated 400 series stainless steel rotary movement for longer life
- New PLUS!™ Performance Option:
 - Liquid-filled performance in a dry gauge
 - Fights vibration and pulsations without liquid-filled headaches

- See pages 6-7 for details
- Order as option XLL
- Epoxy-coated system for superior corrosion resistance

Type 1279 Duragauge® pressure gauge is offered in 4½" phenolic case for superior chemical and heat resistance. Solid-front case design with blow-out back for safety. Dry, liquid-filled, hermetically sealed, weatherproof or **PLUS!** options available. Field convertible to liquid-fill with conversion kit (detailed on page 243). All case styles provide full temperature compensation.



BOURDON SYSTEM SELECTION

Ordering Code	Bourdon Tube & Tip Material ⁽¹⁾ (all joints TIG welded except "A")	Socket Material	Tube Type	Range Selection Limits (psi)	NPT Conn. ⁽²⁾
A	Phosphor Bronze Tube-Brass Tip, Silver Brazed	Brass	C-Tube	12/1000	¼, ½
R	316L stainless steel	1019 steel	C-Tube	12/1500	¼, ½
S	316L stainless steel	316L stainless steel	Helical	2000/20,000	¼, ½
			C-Tube	12/1500	¼, ½
P ⁽³⁾	K Monel	Monel 400	Helical	2000/30,000	¼, ½ ⁽⁴⁾
			C-Tube	15/1500	¼, ½

(1) For selection of the correct bourdon system material, see the media application table on page 243.
 (2) Other connections available on application.
 (3) Use for applications where NACE standard MR-01-75 is specified.
 (4) 30,000 psi range supplied with ¼ high pressure connection, ½ NPT optional.

STANDARD RANGES

Pressure psi	Compound psi
0/15	30 in.Hg/15 psi
0/30	30 in.Hg/30 psi
0/60	30 in.Hg/60 psi
0/100	30 in.Hg/100 psi
0/160	30 in.Hg/150 psi
0/200	30 in.Hg/300 psi
0/300	
0/400	Vacuum
0/600	30/0 in.Hg
0/800	34/0 ftH ₂ O
0/1000	
0/1500	
0/2000	
0/3000	
0/5000	
0/10,000	
0/20,000	
0/30,000	

NOTE:
Equivalent standard kg/cm², and kPa metric ranges are available.

TO ORDER THIS 1279 DURAGAUGE:

Select: _____ 45 _____ 1279 _____ SSL _____ 04L _____ XXX _____ 0 - 160 PSI

1. Dial size—4½" _____

2. Case type—1279 _____
Ring-threaded reinforced polypropylene

3. Bourdon system selection ordering code _____

4. Connection—¼ NPT (02) ½ NPT (04), Lower (L) Back (B) _____

5. Optional features—see page 239 _____

6. Standard pressure range _____

7. Accessories—see pages 233-238 _____

(*) "S" denotes solid front case design

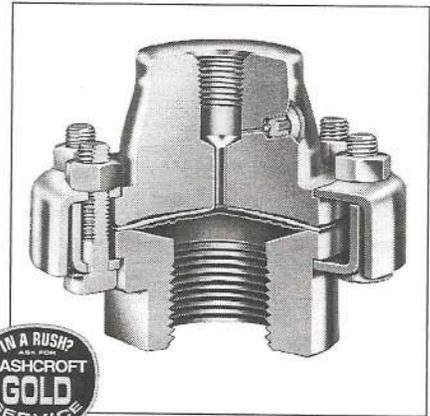
Consult factory for guidance in product selection
 Phone (203) 385-0217, Fax (203) 385-0602 or
 visit our web site at www.ashcroft.com

Type 200 Welded

- Teflon gasketed, continuous-duty diaphragm capsule is welded to the top housing, which is then clamped to a bottom housing.
- Fill/bleed connection is standard.
- Top housing and pressure instrument are removable.
- Available in same process connections, materials, types and sizes as the Type 100 capsule design.
- Top housing is interchangeable with all standard Ashcroft® bottom housings.

Type 200 Bonded Viton, Kalrez and Teflon

Similar in construction, materials, and product features to the Type 300 clamped diaphragm seal on page 142, the diaphragm in the Type 200 seal is bonded permanently to the top housing – and is the removable type.



SELECTION TABLES

Table A – Process Connection/Type Number

Process Connection	Process Connection Size/Code—Inches										Type Number	
	Code	1/4	1/2	3/4	1	1 1/2	2	3	4	6		8
Threaded—female NPT		*	*	*	*	*	*	*	*	*	*	200
Threaded—female NPT (with flushing connection)		*	*	*	*	*	*	*	*	*	*	201
Flanged ⁽¹⁾		*	*	*	*	*	*	*	*	*	*	202
Flanged (with flushing connection)		*	*	*	*	*	*	*	*	*	*	203
In-line—threaded NPT		*	*	*	*	*	*	*	*	*	*	204
Saddle		*	*	*	*	*	*	*	*	*	*	AND LARGER 205
In-line—butt weld		*	*	*	*	*	*	*	*	*	*	208
In-line—flanged ⁽²⁾		*	*	*	*	*	*	*	*	*	*	206
In-line—socket weld		*	*	*	*	*	*	*	*	*	*	207

Pressure Ratings—All 2500 psi except flanged seals are per ASME B 16.5, temperature limit determined by diaphragm, bottom housing and/or filling fluid.

**Table B
Diaphragm Material**

Material	Code
316L stainless steel	S
304 stainless steel	C
K-Monel ⁽⁶⁾	P
Nickel	N
Carpenter 20	D
Tantalum	U
Hastelloy B	G
Hastelloy C 22 ⁽⁷⁾	J
Hastelloy C 276 ⁽⁷⁾	H
Teflon ⁽⁵⁾	T
Viton ⁽⁸⁾	Y
Kalrez ⁽¹²⁾	K
Titanium	TI

**Table C
Bottom Housing Materials**

Material	Code
Steel	B
304L stainless steel	C
316L stainless steel	S
Hastelloy B	G
Hastelloy C 22 ⁽⁷⁾	J
Hastelloy C 276 ⁽⁷⁾	H
Carpenter 20	D
Monel “400” ⁽⁷⁾	M
Inconel “600”	W
Nickel	N
PVC ⁽⁹⁾	V
Tantalum clad stainless steel ⁽¹⁰⁾	SU
Halar coated stainless steel ⁽¹⁰⁾	BH
Teflon flanged steel ⁽¹¹⁾	T
Kynar ⁽¹³⁾⁽¹⁴⁾	KY
Titanium ⁽¹²⁾	TI

**Table D
Instrument Connection**

Size – NPT	Code
1/4	02T
1/2	04T

SB = SOCKET WELD PROCESS CONNECTION

Table E – Filling Fluid

Filling	Service	Connection to Instrument	Temperature Range °F	Code
Glycerin	Pressure	Direct Only	0/400	CG
Silicone	Pressure/Vacuum	Direct or Flexible Line	-40/600	CK
Halocarbon	Pressure/Vacuum in presence of strong oxidizing agent	Direct or Flexible Line	-70/300	CF
Syltherm	Pressure/Vacuum	Direct or Flexible Line	-40/750	HA

TO ORDER THIS TYPE 200 DIAPHRAGM SEAL:

1. From Table A...select TYPE NUMBER based on process connection, process connection size and diaphragm type/construction. (e.g., Threaded/1”welded-code-10-200)
2. From Table B...select DIAPHRAGM MATERIAL. (e.g., 316L stainless steel-code S)
3. From Table C...select BOTTOM HOUSING MATERIAL. (e.g., 316 stainless steel-code S)
4. From Table D...select INSTRUMENT CONNECTION size. (e.g., 1/4 NPT-code 02T)
5. From Table E...select FILLING FLUID, if diaphragm seal will be attached to instrument. (e.g., Glycerin-code CG)

Coded order: 50200TV-SB04TXCK

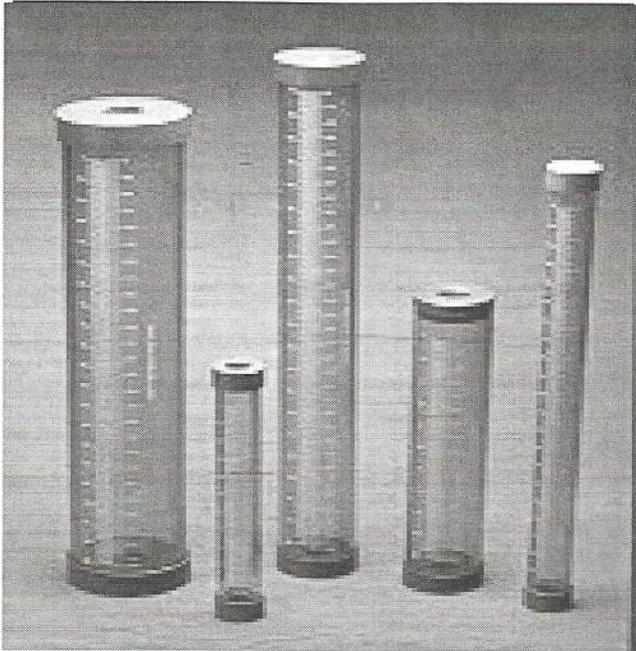
NOTES:

- (1) 150, 300, 600, 900, 1500 & 2500 class flanges.
- (2) 1” 150 thru 8” 300 class flanges only.
- (3) Metal diaphragms welded; Teflon, Kalrez & Viton diaphragms bonded.
- (5) Temp. Limits: -40/400°F.
- (6) Max. Pressure: 500 psi. Temp. Limits: -40/350°F.
- (7) Use on applications where NACE standard MR-01-75 2003 is specified.
- (8) Maximum Press./Temp.
Threaded: 200 psi/74°F, 125 psi/125°F, 80 psi/150°F.
Flanged: 75 psi/100°F.
- (9) Type 202 only.
- (10) Temp. Limits: -40/300°F.
- (11) Only available in 1”, 1 1/2”, & 2” 150 class, Type 202.
Max. Press./Temp. – 270 psi and 150°F.
Consult factory for conditions beyond these limits.
- (12) Max. Pressure: 500 psi. Temp. Limits: 30/212°F.
- (13) On application.
- (14) Maximum Pressure/Temp.: 200 psi and 180°F.



Griffco Valve Inc.
 6010 N. Bailey Ave, Ste 1B
 Amherst, NY 14226
 Phone: 1 800-474-3326
 Fax: 1 716-835-0893

PVC CALIBRATION CYLINDERS



Griffco calibration cylinders are designed to enhance the performance of chemical feed systems by providing a verification of the flow rate of the chemical feed pump. Robust construction of clear PVC with an easy to read graduation in mls and gph. Available in three models: EZ-Clean, Vented, and Open Top; and 6 sizes; 100 mL, 200 mL, 500 mL, 1000 mL, 2000 mL, 4000 mL, 10,000 mL, and 20,000 mL.

Features:

- High Reliability / Low Cost
- High Contrast Graduation Markings
- Clear Easy-View Tube
- Robust Construction
- Direct GPH Readout
- Sealed Top with Overflow Connection
- Optional EZ-Clean Model
- Optional Open Top with Dust Cap

Operation:

Griffco calibration cylinders are installed in the suction line to the chemical metering pump. Two isolating valves, (not supplied) must be install in the suction line as per the drawing below. The top of the cylinder should be vented back to the storage tank or to drain.

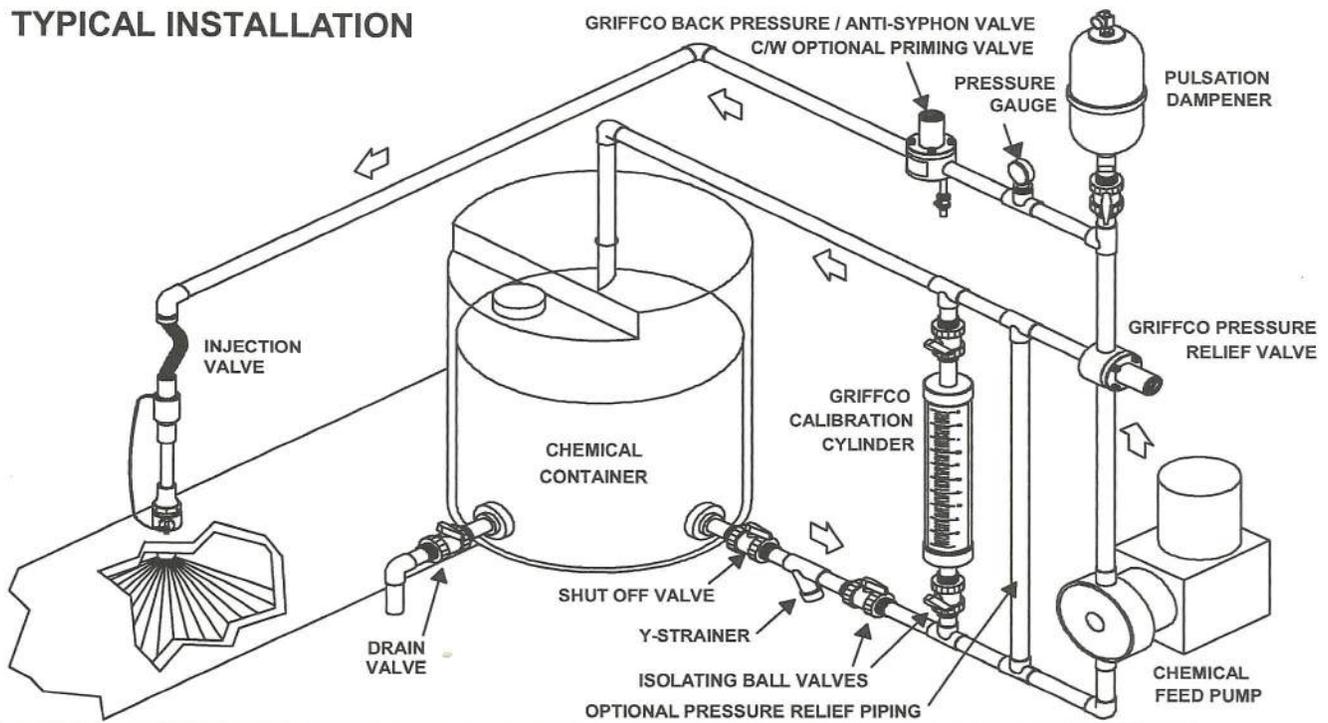
Fill the cylinder to the top mark then close the valve from the chemical tank. Switch on the chemical feed pump and draw down the chemical in the cylinder for 30 seconds. Switch the pump off. The reading on the left side of the cylinder is a direct readout of USgph. Alternatively, observe the volume withdrawn on the ml scale. To convert to LPH or GPH use this formula:

$$\text{LPH} = (\text{volume} \div \text{draw time}) \times 3.6$$

$$\text{GPH} = (\text{volume} \div \text{draw time}) \times 0.952$$

Note: Max. cylinder pressure is 15 psi.

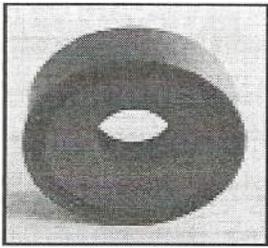
TYPICAL INSTALLATION



CALL 1 - 800 - GRIFFCO

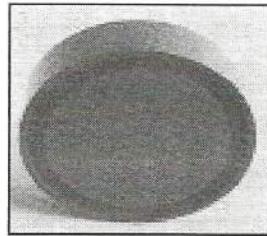
Bulletin # CAL7003-98

Description of models:



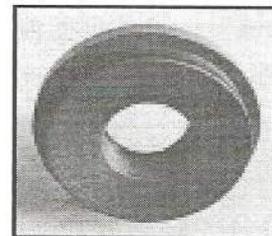
Sealed:

Top is glued to cylinder and contains a vent or overflow connection. (NPT). Used in applications where there is a positive suction head and a permanent installation is desired.



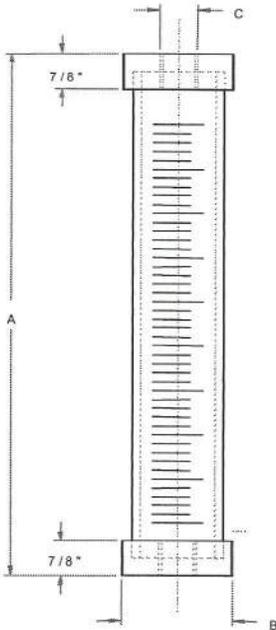
Loose Cap:

Top is loose and does not have a connection in the top. Dust cover only. Used in applications where there is no positive suction head and the cylinder must be filled from the top.



EZ-Clean:

Top is sealed with an O-ring and has a vent connection, but removable for easy cleaning. Used in applications where frequent cleaning is required such as polymer, alum, ferric chloride or chlorine.



Capacity		Scale		A	B	C
(mL)	(Usgph)	(mL)	(Usgph)	(in)	(in)	(in)
100	3.2	2	.1	11	1.5	1/2
200	6.4	2	.1	19	1.5	1/2
500	16	5	.2	13	2.5	3/4
1,000	32	5	.2	22	2.5	3/4
2,000	64	10	1	20	3.7	1
4,000	127	10	1	37	3.7	1
10,000	320	20	5	26	7.25	2
20,000	640	20	5	48	7.25	2

Chemical Resistance Guide

RECOMMENDED

Acetic Acid 10-20%	Barium Sulphate	Copper Sulphate
Acetylene	Barium Sulfide	Cupric Fluoride
Adipic Acid	Beer	Detergents
Alum	Benzoic Acid	Dextrose
Aluminium Alum	Black Liquors	Distilled Water
Aluminium Chloride	Bleach (12% Cl)	Ethylene Glycol
Aluminium Fluoride	Borax	Fatty Acids
Aluminium Hydroxide	Boric Acid	Ferric Chloride
Aluminium Oxochloride	Bromic Acid	Ferric Hydroxide
Aluminium Nitrate	Cadmium Cyanide	Ferric Nitrate
Aluminium Sulfate	Calcium Bisulfide	Ferric Sulfate
Ammonia (dry-gas)	Calcium Bisulfite	Ferrous Chloride
Ammonium Acetate	Calcium Carbonate	Ferrous Sulfate
Ammonium Alum	Calcium Chloride	Fluorosilicic Acid 25%
Ammonium Bifluoride	Calcium Hydroxide	Gallic Acid
Ammonium Carbonate	Calcium Hypochlorite	Gasoline
Ammonium Chloride	Calcium Nitrate	Glycerine
Ammonium Hydroxide	Carbon Dioxide	Glycol
Ammon. Metaphosphate	Carbonic Acid	Glycolic Acid
Ammonium Nitrate	Caustic Potash	Hydrobromic Acid 20%
Ammonium Persulfate	Caustic Soda	Hydrochloric Acid 35%
Ammonium Phosphate	Chlorine Water	Hydrocyanic Acid
Ammonium Sulfate	Chrome Alum	Hydrogen Peroxide 90%
Ammonium Sulfide	Citric Acid	Hydrogen Sulfite
Ammonium Thiocyanate	Copper Carbonate	Kraft Liquors
Arsenic Acid	Copper Chloride	Lactic Acid 25%
Barium Carbonate	Copper Cyanide	Lead Acetate
Barium Chloride	Copper Fluoride	Lead Chloride
Barium Hydroxide	Copper Nitrate	Lead Sulfate

Linoleic Acid	Potassium Hydroxide
Linseed Oil	Potassium Nitrate
Lithium Bromide	Potm Permanganate
Malic Acid	Plating Solutions
Mercuric Chloride	Sea Water
Mercuric Cyanide	Silicic Acid
Mercury	Silver Cyanide
Methyl Alcohol	Silver Nitrate
Methyl Sulfuric Acid	Sodium Acetate
Milk	Sodium Alum
Muratic Acid	Sodium Bicarbonate
Nitric Acid 10% - 60%	Sodium Bisulfate
Oleic Acid	Sodium Carbonate
Ozone	Sodium Cyanide
Palmitric Acid 10%	Sodium Hydroxide
Perchloric Acid 10%	Sodium Hypochlorite
Phosphoric Acid 10%	Stannic Chloride
Phosphoric Acid 25%	Sulfuric Acid 3%
Phosphoric Acid 75%	Sulfuric Acid 10%
Phosphoric Acid 85%	Sulfuric Acid 33%
Potassium Alum	Sulfuric Acid 50%
Potassium Bicarbonate	Sulfuric Acid 70%
Potassium Borate	Trisodium Phosphate
Potassium Bromate	Water, Deionized
Potassium Carbonate	Water, Distilled
Potassium Chlorate	Water, Salt
Potassium Chloride	Zinc Chloride
Potassium Cyanide	Zinc Sulfate
Potassium Fluoride	

NOT RECM'D

Acetic Acid
Acetone
Ammonia (liquid)
Ammonium Fluoride
Amyl Acetate
Benzene
Bromine, Liquid
Bromine, water
Butyl Acetate
Carbon Bisulfide
Carbon Tetrachloride
Chlorine Gas
Chlorine (wet)
Chromic Acid 10%
Chromic Acid 50%
Ethers
Fluorine Gas
Hydrofluoric Acid 50%
Iodine
Nitric Acid Anhydrous
Nitric Acid 68%
Perchloric Acid 15%
Perchloric Acid 70%
Sulfur Dioxide (wet)
Sulfuric Acid 80-94%
Titanium Tetrachloride
Tributyl Phosphate
Turpentine

For a more complete listing see our Chemical Resistance Guide - Request Bulletin # CRG 1000-94

CALIBRATION COLUMNS

Model Selection & Specifications

Selection: Calculate minimum column capacity as follows:

For pump flow rate of > 2 gal/hour < 2 gal/hour

Desired calibration time is 30 seconds 60 seconds

Capacity = (Flow Rate) x (0.00028 hour/sec) x (Calibration Time)

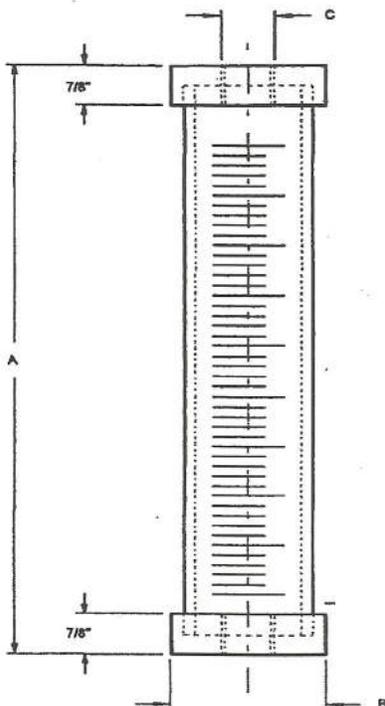
Example: Pumping at 2 gal/hour, using calibration time of 60 seconds;

$$(2 \text{ gal/hr}) \times (0.00028 \text{ hr/sec}) \times (60 \text{ sec.}) \times (3785 \text{ ml/gal}) = V = 0.034 \text{ gal or } 127 \text{ ml}$$

Required capacity = minimum plus 20% for safety = 0.040 gal or 150 ml

All columns are made of schedule 40 clear PVC with machined PVC end caps.

Capacity mL	Scale mL	Capacity Gal.	Scale Gal.	Height "A" In./mm	Diameter "B" In./mm	Connections "C" In. FNPT	Item Number
100	2	.027	.0005	11.0/279.4	1.5/38.1	1/2	W777033- PVC
200	2	.053	.0005	19.0/482.6	1.5/38.1	1/2	W777034- PVC
500	5	.133	.001	13.0/330.2	2.5/63.5	3/4	W777035-PVC
1000	5	.267	.001	22.0/558.8	2.5/63.5	3/4	W777036-PVC
2000	10	.533	.005	20.0/508.0	3.7/93.9	1	W777037-PVC
4000	10	1.07	.005	37.0/939.8	3.7/93.9	1	W777038-PVC
10000	100	2.67	.025	26.0/660.4	7.25/184.2	2	W777039-PVC
20000	100	5.33	.025	48.0/1219.2	7.25/184.2	2	W777040-PVC





Pulsafeeder, Inc.
2083 Brighton-Henrietta Town Line Road
Henrietta, NY 14623
www.pulsa.com



FLUID & METERING
Agriculture
Chemical Processing
Fuels & Energy
Sanitary

Pulsafeeder Engineered Solutions LIMITED WARRANTY

Providing that the equipment has been installed, maintained, and operated in accordance with our recommendations and instructions: Pulsafeeder, Inc., a Unit of IDEX Corporation, warrants its engineered metering systems against defects in workmanship or materials under normal use for a period of two years from the date of shipment or one year from verified start-up¹, whichever come first. All components supplied with the system(s) including pumps, motors, drives, accessories, and pump controllers are covered under the standard Pulsafeeder Products Limited Warranty statement

Determination of warranty coverage is based upon our inspection. All obligations and liabilities under this warranty are limited to repairing, replacing, or refunding the purchase price at Pulsafeeder's discretion.

This warranty does not extend to and expressly excludes the following:

- Damage by corrosion or erosion that is NOT a result of defects in workmanship or materials.
- Normal wear items such as diaphragms, piston seals and valve assemblies.
- Improper maintenance.
- Improper protection during storage².
- Improper piping by the buyer or any third party.
- Defects caused by misuse, abuse, improper application, employment or operation.
- Expendable items and damage resulting from unauthorized repair.

The materials of construction offered are recommendations, subject in all cases, to verification and acceptance by the customer. These recommendations are based on previous Company experience and best available information and do not constitute guarantees against wear or chemical reaction.

The above warranty is in lieu of any other guarantee, either expressed or implied. We make no warranty of fitness or merchantability. No agent of Pulsafeeder or IDEX is authorized to make any warranty other than the above.

- (1) Verified start-up forms must be completed, properly signed off, and returned to Pulsafeeder After Market Services within 30 days of start-up to validate date.
- (2) For proper storage, installation, and operation equipment must be shaded from direct sunlight and protected against ambient temperatures below freezing 32 °F/0 °C and above 105 °F/46 °C.

Systems Warranty Rev: 09/01/09 FIS
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SECTION: POLICY
PAGE: 95/113
EFFECTIVE: 11/01/2005
SUPERSEDES: ALL PREVIOUS

Pulsafeeder Products Limited Warranty

All Pulsafeeder Pulsa Series[®] and PULSAR[®] metering pumps are guaranteed against defects in materials and workmanship under normal use, for a period of twelve months from date of startup, or eighteen months from date of shipment, whichever comes first.

Drive assemblies (gearing, shafts, eccentric, and related components) in Pulsa Series and PULSAR[®] metering pumps are guaranteed for a period of five years from date of shipment.

All Pulsafeeder electronic control products, such as stroke length and motor speed controllers, are guaranteed for a period of one year from date of shipment.

Pulsafeeder PULSAtron[®], Eco[®], Eastern[®], Isochem[®], FOSTER[®], Omni[®], and Eclipse[®] pumps are guaranteed against defects in materials and workmanship under normal use, for a period of twelve months from date of shipment (from the factory, or an authorized distributor).

Determination of warranty coverage is based upon our inspection. If a failure occurs during any of the above warranty periods, Pulsafeeder will, solely at our discretion, repair or replace the pump or the suspect component(s), or refund the purchase price.

Field repair service is not offered. Repairs for Pulsafeeder equipment are provided at the factory. A Return Materials Authorization form must be issued for all incoming shipments. Pulsafeeder shall not be held responsible for any removal or replacement costs, or consequential damages.

Equipment and accessories manufactured by others but purchased through Pulsafeeder, such as electric motors, valves, and other controls, are guaranteed only to the extent of coverage offered by their original manufacturer.

This warranty does not extend to damage caused by corrosion or erosion, or to components of the pumps that are considered normal wear items (to include, but not limited to, diaphragms, check valves, gearpump bearings and wearplates). The materials of construction offered are recommendations only, subject in all cases to verification and acceptance by the customer. These recommendations are based on previous experience and best available information, and do not constitute any guarantee against wear or chemical incompatibility.

Expressly excluded from the warranty are defects caused by misuse, abuse, or improper application, employment, or operation of the unit. Improper protection during storage, failure to follow storage recommendations, and incorrect piping by the buyer or a third party is also excluded from the warranty. Expendable items and damage resulting from unauthorized repair are not covered by this warranty.

The above warranty is in lieu of any other guarantee, either expressed or implied. We make no warranty of fitness or merchantability. No agent of ours is authorized to make any other warranty statements other than the above. Pulsafeeder's total liability under any circumstance shall not exceed the original purchase price of the equipment in question. Further terms are listed on the back of Pulsafeeder packing slips included with all outgoing orders.

Pulsafeeder Metering Pump Storage Procedures

Always check all equipment and accessories against the order documents immediately upon receipt. Any evidence of damage must be noted on the shipping documents, and reports of damage and/or suspected shortages must be reported to your Pulsafeeder Representative immediately.

Storage – all intervals

- It is preferred that the pump be stored indoors in a dry, controlled environment.
- If the pump has been in service, the wet end should be thoroughly flushed of chemical substances and neutralized appropriately, both to prevent buildup of residues that might affect operation, and also for safety during storage.
- The pump gearbox, eccentric box, and hydraulic section must be filled with the appropriate PULSAlube oil. If the pump is new, oil must be placed into the pump within 2 months of the ship date. An oil reference chart can be found on *page 2*.
- A spray-type rust preventative, for example "LPS-3[®]", should be used to protect the interior surfaces of the pump that are not submerged in the oil.
- Set the pump to position the diaphragm in a neutral position, as per the attached table (*page 2*).
- Ensure that housings for all electronic components and controls are protected from the ingress of moisture and chemical vapors. Seal any open ports.
- Consult with the manufacturer or representative of any accessory or ancillary items for special storage recommendations, for example motors, gearboxes, pressure valves, dampeners, etc.

Storage – 3 month intervals

- Inspect the overall condition of the pump, check inside all housings including controls and electronics for evidence of moisture or ingress of contaminants.
- Examine the condition of the oil, if there is evidence of moisture or contamination of any kind, change the oil as per the directions in your Pulsafeeder IOM.
- Raise the stroke length setting to 100% and manually cycle the piston through several full strokes to circulate the oil and coat internal surfaces (see **NOTES** below).
- The motor should be operated for 1 hour, to eliminate buildup of moisture and prevent damage to bearings (see **NOTES** below). No extended warranty coverage is offered on motors that have been in storage, and users are advised to consult with the motor manufacturer directly for further recommendations.
- Reset the stroke setting as per the attached table before the pump is returned to storage.

Storage – 1 year intervals

- PULSAlube oil must be drained from the pump, the gearbox and internal components should be cleaned and inspected, and the pump refilled with fresh PULSAlube oil. Even when a pump is not in service, the oil will be affected by moisture and environmental contaminants. Detailed instructions for oil changes are found in your Pulsafeeder IOM.
- Spray-type rust preventative, for example "LPS-3[®]", should be re-applied at this time.

NOTES: during storage, it is not necessary to have liquid in the wet end. However, any time the piston is moved or the motor is run, the suction and discharge connections of the pump must be open to the atmosphere to prevent hydraulic upset and diaphragm damage.

For pumps equipped with PULSAlarm vacuum coupled leak detection diaphragms, it is not required to maintain vacuum during storage periods, however a vacuum should be drawn any time the piston and diaphragm will be moved or cycled. Pressure-based leak detection systems and barrier/intermediate fluids do not need specific attention during storage but should be checked prior to startup.



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 Page: 60 - 61
 Effective: 6-1-2005
 Supersedes: all previous

Startup

After any storage period, the pump must be inspected before being placed back into service. Certain components such as gaskets, seals, elastomer diaphragms, and other items may deteriorate with age and should be replaced. Your local Pulsafeeder Representative can assist with inspection and service. If the oil has not been changed within the past 6 months, it is recommended that an oil change be done before returning the pump to service.

After inspection and any required maintenance, perform startup as per the instructions in your Pulsafeeder IOM. If an IOM is not available, they may be downloaded from www.pulsa.com, or acquired from your local Pulsafeeder Representative.

Diaphragm Position Table

Following these recommendations will maintain the diaphragm in a neutral position during storage, minimizing the possibility of damage. For long storage intervals, diaphragms may still need replacement before the pump is returned to service.

Diaphragm type	Storage recommendation
Pulsa Series, Full Motion Models 7120-7440-7660-8480-9490 Flat Diaphragm	Stroke length set at 0% to keep flat diaphragm in neutral position
Pulsa Series, Full Motion Models 7120-7440-7660-8480 Hydratube Diaphragm	Stroke length at 100% setting, piston moved to full rearward position to keep Hydratube fully open
Pulsa Series, Lost motion Models 680-880 Flat Diaphragm	Stroke length at 50% setting, rotate drive so that piston is not resting on any part of the cam *
Pulsa Series, Lost motion Models 680-880 Hydratube Diaphragm	Stroke length at 100% setting, piston moved to full rearward position to keep Hydratube fully open
Pulsa Series Models 340, R1, 680C Hydracone Diaphragm	Stroke length at 100% setting, piston moved to full rearward position to keep Hydracone in a neutral position
PULSAR, all models	Stroke length at 50% setting, rotate drive so that piston is not resting on any part of the cam *
SHADOW, all models	Mechanical diaphragm pump, storage position is not critical for this model

* for lost motion type pumps with flat diaphragms, it is harder to monitor the exact position of the piston and diaphragm. These pumps should be cycled more frequently to maintain the diaphragm during storage.

Oil Reference Table

Pump Type	Recommended Oil	
All Pulsa Series, R1 thru 8480	PULSAlube # 1 or PULSAlube # 5	
PULSAR Hydraulic Pumps	Eccentric box	PULSAlube 7H
	Gearbox	PULSAlube 8G
SHADOW Mechanical pumps	Eccentric box	PULSAlube 9M
	Gearbox	PULSAlube 8G

NOTE: Some pumps may use alternate lubricants, consult your Specification Sheet for guidance

LUBRICATIONS INSTRUCTIONS

The recommended oil change interval is dependent upon the operating environment, two classifications are used.

1. **Normal Service:** Clean/dry atmosphere and a gearbox operating temperature of 40°F to 100°F (4.4°C to 37.7°C).
2. **Severe Service:** Humid atmosphere and a gearbox operating temperature below 40°F or over 100°F.

The first oil change should be done after six (6) months of continuous operation (approximately 4500 hours) and thereafter every twelve (12) months, (9000 hours) for **normal** service and every six (6) months (4500 hours) for **severe** service.

Review Date	July, 2006
Next Review Date	July, 2009

Material Safety Data Sheet
Pulsalube #8G, Gear Oil

Status: Final

Date of Issue: 18-Oct-2005



MATERIAL SAFETY DATA SHEET

Conoco Multipurpose R&O Oil

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Conoco Multipurpose R&O Oil
Synonyms: Conoco Multipurpose R&O Oil 32
Conoco Multipurpose R&O Oil 46
Conoco Multipurpose R&O Oil 68
Conoco Multipurpose R&O Oil 100
Conoco Multipurpose R&O Oil 150
Conoco Multipurpose R&O Oil 220
Conoco Multipurpose R&O Oil 320
Conoco Multipurpose R&O Oil 460

Intended Use: Industrial Oil
Chemical Family: Petroleum Oil

Responsible Party: ConocoPhillips Lubricants
600 N. Dairy Ashford
Houston, Texas 77079-1175

Customer Service: 800-640-1956
Technical Information: 800-255-9556

Emergency Overview

24 Hour Emergency Telephone Numbers:
Spill, Leak, Fire or Accident Call CHEMTREC:
North America: (800) 424-9300
Others: (703) 527-3887 (collect)

California Poison Control System: (800) 356-3219

Health Hazards/Precautionary Measures: Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

Physical Hazards/Precautionary Measures: Keep away from all sources of ignition.

Appearance: Clear and bright
Physical Form: Liquid
Odor: Characteristic petroleum

NFPA 704 Hazard Class:
Health: 1 (Slight)
Flammability: 1 (Slight)
Instability: 0 (Least)

2. COMPOSITION / INFORMATION ON INGREDIENTS

NON-HAZARDOUS COMPONENTS					
Component / CAS No:	Percent (%)	ACGIH:	OSHA:	NIOSH:	Other:
Lubricant Base Oil (Petroleum) VARIOUS	> 99	5mg/m ³ TWA 10 mg/m ³ STEL	5 mg/m ³ TWA	2500 mg/m ³ IDLH	as Oil Mist, if Generated 5 mg/m ³ NOHSC TWA
Additives PROPRIETARY	< 1	NE	NE	NE	NE

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

1%=10,000 PPM.

NE=Not Established

3. HAZARDS IDENTIFICATION

Potential Health Effects

Eye: Contact may cause mild eye irritation including stinging, watering, and redness.

Skin: Contact may cause mild skin irritation including redness, and a burning sensation. Prolonged or repeated contact can worsen irritation by causing drying and cracking of the skin leading to dermatitis (inflammation). No harmful effects from skin absorption are expected.

Inhalation (Breathing): No information available. Studies by other exposure routes suggest a low degree of toxicity by inhalation.

Ingestion (Swallowing): No harmful effects expected from ingestion.

Signs and Symptoms: Effects of overexposure may include irritation of the respiratory tract, irritation of the digestive tract, nausea, diarrhea. Inhalation of oil mist or vapors at elevated temperatures may cause respiratory irritation.

Cancer: There is inadequate information to evaluate the cancer hazard of this material. See Section 11 for information on the individual components, if any.

Target Organs: No data available for this material.

Developmental: No data available for this material.

Pre-Existing Medical Conditions: Conditions aggravated by exposure may include skin disorders.

4. FIRST AID MEASURES

Eye: If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water. If symptoms persist, seek medical attention.

Skin: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water. If irritation or redness develops and persists, seek medical attention.

Inhalation (Breathing): If respiratory symptoms develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

Notes to Physician: High-pressure hydrocarbon injection injuries may produce substantial necrosis of underlying tissue despite an innocuous appearing external wound. Often these injuries require extensive emergency surgical debridement and all injuries should be evaluated by a specialist in order to assess the extent of injury.

Acute aspirations of large amounts of oil-laden material may produce a serious aspiration pneumonia. Patients who aspirate these oils should be followed for the development of long-term sequelae. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities.

5. FIRE-FIGHTING MEASURES

Flammable Properties:

Flash Point:	> 446°F / 230°C
Test Method:	Cleveland Open Cup (COC), ASTM D92
OSHA Flammability Class:	Not applicable
LEL%:	No data
UEL%:	No data
Autoignition Temperature:	No data

Unusual Fire & Explosion Hazards: This material may burn, but will not ignite readily. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire.

Extinguishing Media: Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces.

Fire Fighting Instructions: For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by DOT, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk.

Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

6. ACCIDENTAL RELEASE MEASURES

This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release.

Stay upwind and away from spill/release. Notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory protection as conditions warrant (see Section 8).

Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Dike far ahead of spill for later recovery or disposal. Spilled material may be absorbed into an appropriate absorbent material.

Notify fire authorities and appropriate federal, state, and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, notify the National Response Center (phone number 800-424-8802).

7. HANDLING AND STORAGE

Handling: Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits (see Sections 2 and 8).

Do not wear contaminated clothing or shoes. Use good personal hygiene practices.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection apparatus or from pinhole leaks in tubing of high pressure hydraulic oil equipment.

Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Storage: Keep container(s) tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat and all sources of ignition. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits (see Section 2), additional engineering controls may be required.

Personal Protective Equipment (PPE):

Respiratory: A NIOSH certified air purifying respirator with a Type 95 (R or P) particulate filter may be used under conditions where airborne concentrations are expected to exceed exposure limits (see Section 2).

Protection provided by air purifying respirators is limited (see manufacturer's respirator selection guide). Use a NIOSH approved self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode if there is potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.

A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

Skin: The use of gloves impervious to the specific material handled is advised to prevent skin contact and possible irritation (see manufacturers literature for information on permeability).

Eye/Face: Approved eye protection to safeguard against potential eye contact, irritation, or injury is recommended. Depending on conditions of use, a face shield may be necessary.

Other Protective Equipment: A source of clean water should be available in the work area for flushing eyes and skin. Impervious clothing should be worn as needed.

Suggestions for the use of specific protective materials are based on readily available published data. Users should check with specific manufacturers to confirm the performance of their products.

9. PHYSICAL AND CHEMICAL PROPERTIES

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm).

Appearance:	Clear and bright
Physical Form:	Liquid
Odor:	Characteristic petroleum
Odor Threshold:	No data

pH:	Not applicable
Vapor Pressure (mm Hg):	No data
Vapor Density (air=1):	No data
Boiling Point:	No data
Solubility in Water:	Negligible
Partition Coefficient (n-octanol/water) (Kow):	No data
Specific Gravity:	0.87-0.88
Bulk Density:	7.3 lbs/gal
Viscosity cSt @ 100°C:	11-15
Viscosity cSt @ 40°C:	100-150
Percent Volatile:	Negligible
Evaporation Rate (nBuAc=1):	No data
Flash Point:	> 446°F / 230°C
Test Method:	Cleveland Open Cup (COC), ASTM D92
LEL%:	No data
UEL%:	No data
Autoignition Temperature:	No data
Decomposition Temperature:	No data

10. STABILITY AND REACTIVITY

Stability: Stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Conditions to Avoid: Extended exposure to high temperatures can cause decomposition.

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products: Combustion can yield carbon, nitrogen and sulfur oxides.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Chronic Data:

Lubricant Base Oil (Petroleum) - CAS: VARIOUS

Carcinogenicity: The petroleum base oils contained in this product have been highly refined by a variety of processes including solvent extraction, hydrotreating, and/or dewaxing to remove aromatics and improve performance characteristics. All of the oils meet the IP-346 criteria of less than 3 percent PAH's and are not considered carcinogens by NTP, IARC, or OSHA.

Acute Data:

Lubricant Base Oil (Petroleum) - CAS: VARIOUS

Dermal LD50 = >2 g/kg

LC50 = No information available

Oral LD50 = >5 g/kg

Additives - CAS: PROPRIETARY

Dermal LD50 = No information available

LC50 = No information available

Oral LD50 = No information available

12. ECOLOGICAL INFORMATION

Not evaluated at this time.

13. DISPOSAL CONSIDERATIONS

This material under most intended uses would become used oil due to contamination by physical or chemical impurities. RECYCLE ALL USED OIL. While being recycled, used oil is regulated by 40 CFR 279. Use resulting in chemical or physical change or contamination may also subject it to regulation as hazardous waste. Under federal regulations, used oil is a solid waste managed under 40 CFR 279. However, in California, used oil is managed as hazardous waste until tested to show it is not hazardous. Consult state and local regulations regarding the proper handling of used oil. In the case of used oil, the intent to discard it may cause the used oil to be regulated as hazardous waste.

Contents should be completely used and containers emptied prior to discard. Rinsate may be considered a RCRA hazardous waste and must be disposed of with care and in compliance with federal, state and local regulations. Large empty containers, such as drums, should be returned to the distributor or a drum reconditioner. To assure proper disposal of small empty containers, consult with state and local regulations and disposal authorities.

14. TRANSPORTATION INFORMATION

DOT

Shipping Description: Not classified as hazardous

Note: Material is unregulated unless shipped by land in a packaging having a capacity of 3500 gallons or more. Then the provisions of 49 CFR, Part 130 apply.

IMDG

Shipping Description: Not regulated

ICAO/IATA

Shipping Description: Not regulated

15. REGULATORY INFORMATION

U.S. Regulations:

EPA SARA 311/312 (Title III Hazard Categories)

Acute Health:	No
Chronic Health:	No
Fire Hazard:	No
Pressure Hazard:	No
Reactive Hazard:	No

SARA - Section 313 and 40 CFR 372:

This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:
--None Known--

EPA (CERCLA) Reportable Quantity (in pounds):

--None Known--

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):

This material contains the following chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372:
-- None Known --

California Proposition 65:

Warning: This material contains the following chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm, and are subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

-- None Known --

Carcinogen Identification:

This material has not been identified as a carcinogen by NTP, IARC, or OSHA. See Section 11 for carcinogenicity information of individual components, if any.

TSCA:

All components are listed on the TSCA inventory.

International Regulations:

Canadian Regulations: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

Domestic Substances List: Listed

WHMIS Hazard Class:
Not Regulated

16. OTHER INFORMATION

Issue Date:	18-Oct-2005
Previous Issue Date:	02-Jun-2003
Revised Sections or Basis for Revision:	Composition (Section 2) Physical Properties (Section 9)
MSDS Code:	775465

Disclaimer of Expressed and Implied Warranties:

The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

Review Date	July, 2006
Next Review Date	July, 2009

Material Safety Data Sheet Pulsalube #9M, Gear Oil

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: 600W SUPER CYLINDER OIL
MANUFACTURER CODE: 601211
CMCS CODE: 970121

SUPPLIER: MOBIL OIL AUSTRALIA PTY LTD A.B.N. 88 004 052 984
417 ST. KILDA RD.
MELBOURNE 3004
Telephone: (03) 9252 3111
Fax: (03) 9866 9079

After hours: National Emergency Communication System 1-800-023-005
Product Information contact: Mobil Lubeline on 1-800-033-863
Contact Point: Mobil Lubeline 1-800-033-863

Worksafe Classification: Not classified as hazardous according to
criteria of Worksafe Australia.

2. COMPOSITION/INFORMATION ON INGREDIENTS

GENERIC COMPOSITION: SEVERE TREAT MIN. OILS & ADDITIVES

GLOBALLY REPORTABLE MSDS INGREDIENTS:

Substance Name	Approx. Wt%	EU Classification
RESIDUAL OIL SOLVENT EXTRACT 10-20 (64742-10-5)		Xn;R40

3. HAZARDS IDENTIFICATION

This product is not considered hazardous according to regulatory
guidelines (See Section 1).

POTENTIAL HEALTH EFFECTS: Under normal conditions of intended use,
this product does not pose a risk to health. Excessive exposure
may result in eye, skin or respiratory irritation.

For further health effects/toxicological data, see Section 11.

4. FIRST AID MEASURES

EYE CONTACT: Flush thoroughly with water. If irritation persists,
call a doctor.

SKIN CONTACT: Wash contact areas with water. Remove and clean oil
soaked clothing daily and wash affected area. (See Section 16 -
Injection Injury)

INHALATION: Not expected to be a problem. However, if respiratory
irritation, dizziness, nausea, or unconsciousness occurs due to
excessive vapour or mist exposure, seek immediate medical
assistance. If breathing has stopped, assist ventilation with a
mechanical device or mouth-to-mouth resuscitation.

INGESTION: Not expected to be a problem. Seek medical attention if
discomfort occurs. Do not induce vomiting.

NOTE TO PHYSICIANS: Treat symptoms with reference to specific health
effects identified above.

5. FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Foam, dry chemical, CO2 and water fog.
SPECIAL FIRE FIGHTING PROCEDURES: Water or foam may cause frothing.
Use water to cool fire-exposed containers. Water spray may be used to flush spills away from exposures. Prevent runoff from fire control or dilution from entering waterways, sewers or drinking water supply.
SPECIAL PROTECTIVE EQUIPMENT: For fires in enclosed areas, firefighters must use self-contained breathing apparatus.
UNUSUAL FIRE AND EXPLOSION HAZARDS: None.
COMBUSTION PRODUCTS: Fumes, smoke, carbon monoxide, sulfur oxides, aldehydes and other decomposition products, in the case of incomplete combustion.
Flash Point C (F): > 282(540) (IP 34 / ASTM D-93).
Flammable Limits (approx.% vol.in air)- LEL 0.9%, UEL: 7.0%
NFPA HAZARD ID: Health: 0 , Flammability: 1 , Reactivity: 0

6. ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES: Report spills as required to appropriate authorities. In case of accident or road spill, contact the Police and Fire Brigade and, if appropriate, the Area Water Authority.
PROCEDURES IF MATERIAL IS RELEASED OR SPILLED:
LAND SPILL: Shut off source taking normal safety precautions. Take measures to minimize the effects on ground water. Recover by pumping or contain spilled material with sand or other suitable absorbent and remove mechanically into containers. If necessary, dispose of adsorbed residues as directed in Section 13.
WATER SPILL: Confine the spill immediately with booms. Warn other ships in the vicinity. Notify port and other relevant authorities. Remove from the surface by skimming or with suitable absorbents. If permitted by regulatory authorities the use of suitable dispersants should be considered where recommended in local oil spill procedures.
ENVIRONMENTAL PRECAUTIONS: Prevent material from entering sewers, water sources or low lying areas; advise the relevant authorities if it has, or if it contaminates soil/vegetation.
PERSONAL PRECAUTIONS: See Section 8

7. HANDLING AND STORAGE

HANDLING: No special precautions are necessary beyond normal good hygiene practices. See Section 8 for additional personal protection advice when handling this product.
STORAGE: Keep containers closed when not in use. Do not store in open or unlabelled containers. Store away from strong oxidizing agents and combustible materials. Do not store near heat, sparks, flame or strong oxidants. See Section 15 for Regulatory information when storing this product.
SPECIAL PRECAUTIONS: Prevent small spills and leakages to avoid slip hazard.
EMPTY CONTAINER WARNING: Empty containers retain residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to refill or clean container since residue is difficult to remove. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. All containers should

be disposed of in an environmentally safe manner and in accordance with governmental regulations.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS:

When mists/aerosols can occur, the following is recommended: 5 mg/m³ as oil mist (NOHSC).

VENTILATION: If mists are generated, use adequate ventilation, local exhaust or enclosures to control below exposure limits.

RESPIRATORY PROTECTION: If mists are generated, and/or when ventilation is not adequate, wear approved respirator.

EYE PROTECTION: If eye contact is likely, safety glasses with side shields or chemical type goggles should be worn.

SKIN PROTECTION: When splashing or liquid contact can occur frequently, wear oil resistant gloves and/or other protective clothing. Good personal hygiene practices should always be followed.

9. PHYSICAL AND CHEMICAL PROPERTIES

Typical physical properties are given below. Consult Product Data Sheet for specific details.

PHYSICAL STATE: Liquid

COLOUR: Brown

ODOUR: Mild

ODOUR THRESHOLD (ppm): NE

pH: NA

Boiling Point C (F): > 316(600)

Melting Point C (F): NA

Flash Point C(F): > 282(540) (IP 34 / ASTM D-93)

FLAMMABILITY (solids): NE

AUTO FLAMMABILITY C(F): NA

EXPLOSIVE PROPERTIES: NA

OXIDIZING PROPERTIES: NA

Vapour Pressure-mm Hg 20 C: < 0.1

VAPOUR DENSITY: > 2.0

EVAPORATION RATE: NE

Relative Density, 15/4 C: 0.9

Solubility in Water: Negligible

PARTITION COEFFICIENT: > 3.5

Viscosity at 40 C, cSt: 496.2

Viscosity at 100 C, cSt: 32.2

Pour Point C: -6(22)

FREEZING POINT C(F): NE

DMSO EXTRACT, IP-346 (WT.%): <3, for mineral oil only

NA=Not Applicable, NE=Not Established, D=Decomposes

For further technical information, contact your Mobil Marketing Representative.

10. STABILITY AND REACTIVITY

STABILITY (Thermal, Light, etc.): Stable.

CONDITIONS TO AVOID: Extreme heat and high energy sources of ignition.

INCOMPATIBILITY (Materials to Avoid): Strong oxidisers.

HAZARDOUS DECOMPOSITION PRODUCTS: Product does not decompose at ambient temperatures.

HAZARDOUS POLYMERISATION: Will not occur.

11. TOXICOLOGICAL DATA

---ACUTE TOXICOLOGY---

ORAL TOXICITY: Practically non-toxic (LD50: greater than 2000 mg/kg). ---Based on testing of similar products and/or the components.

DERMAL TOXICITY: Practically non-toxic (LD50: greater than 2000 mg/kg). ---Based on testing of similar products and/or the components.

INHALATION TOXICITY: Practically non-toxic ---Based on testing of similar products and/or the components.

EYE IRRITATION: Practically non-irritating. (Draize score: greater than 6, but 15 or less). ---Based on testing of similar products and/or the components.

SKIN IRRITATION: Practically non-irritating. (Primary Irritation Index: greater than 0.5, but less than 3). ---Based on testing of similar products and/or the components.

OTHER ACUTE TOXICITY DATA: Although an acute inhalation study was not performed with this product, a variety of mineral and synthetic oils, such as those in this product, have been tested. These samples had virtually no effect other than a nonspecific inflammatory response in the lung to the aerosolized mineral oil. The presence of additives in other tested formulations (in approximately the same amounts as in the present formulation) did not alter the observed effects.

---SUBCHRONIC TOXICOLOGY (SUMMARY)---

No significant adverse effects were found in studies using repeated dermal applications of similar formulations to the skin of laboratory animals for 13 weeks at doses significantly higher than those expected during normal industrial exposure. The animals were evaluated extensively for effects of exposure (hematology, serum chemistry, urinalysis, organ weights, microscopic examination of tissues etc.).

---REPRODUCTIVE TOXICOLOGY (SUMMARY)---

No teratogenic effects would be expected from dermal exposure, based on laboratory developmental toxicity studies of major components in this formulation and/or materials of similar composition.

---CHRONIC TOXICOLOGY (SUMMARY)---

Repeated and/or prolonged exposure may cause irritation to the skin, eyes or respiratory tract. Overexposure to oil mist may result in oil droplet deposition and/or granuloma formation. For mineral base oils: Base oils in this product are severely solvent refined and/or severely hydrotreated. Chronic mouse skin painting studies of severely treated oils showed no evidence of carcinogenic effects. These results are confirmed on a continuing basis using various screening methods such as Modified Ames Test, IP-346, and/or other analytical methods. For synthetic base oils: The base oils in this product have been tested in the Ames assay and other tests of mutagenicity with negative results. These base oils are not expected to be carcinogenic with chronic dermal exposures.

---SENSITIZATION (SUMMARY)---

Not expected to be sensitizing based on tests of this product, components, or similar products.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE AND EFFECTS:

In the absence of specific environmental data for this product, this assessment is based on information for representative products.

ECOTOXICITY: Available ectotoxicity data (LL50 >1000 mg/L) indicates

that adverse effects to aquatic organisms are not expected from this product.

MOBILITY: When released into the environment, adsorption to sediment and soil will be the predominant behavior.

PERSISTENCE AND DEGRADABILITY: This product is expected to be inherently biodegradable.

BIOACCUMULATIVE POTENTIAL: Bioaccumulation is unlikely due to the very low water solubility of this product, therefore bioavailability to aquatic organisms is minimal.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL: Product is suitable for burning in an enclosed, controlled burner for fuel value. In addition, the product is suitable for processing by an approved recycling facility or can be disposed of at an appropriate licensed waste disposal site. Use of these methods is subject to user compliance with applicable laws and regulations and consideration of product characteristics at time of disposal.

14. TRANSPORT INFORMATION

ACTDG: NOT REGULATED BY ACTDG.

IMO: NOT REGULATED BY IMO

IATA: NOT REGULATED BY IATA

STATIC ACCUMULATOR (50 picosiemens or less): YES

15. REGULATORY INFORMATION

Australian Classifications:

UN Number: NA

HAZCHEM Code: Not applicable

Dangerous Goods Class/Subsidiary Risk: Not applicable

Packaging Group: NA

AS 1940 Class: C2

Poisons Schedule: Not applicable

EC Labeling: Product is not dangerous as defined by the European Union Dangerous Substances/Preparations Directives. EU labeling not required.

Governmental Inventory Status: All components comply with Australian AICS.

THE FOLLOWING PRODUCT INGREDIENTS ARE CITED ON THE LISTS BELOW:

CHEMICAL NAME	CAS NUMBER	LIST CITATIONS
RESIDUAL OIL SOLVENT EXTRACT	64742-10-5	3

--- REGULATORY LISTS SEARCHED ---

1=IARC 1 2=IARC 2A 3=IARC 2B 4=NTP CARC 5=NTP SUS

6=ACGIH 7=ACGIH CARC 8=ACGIH SUS

CARC=CARCINOGEN; SUS=SUSPECTED CARCINOGEN; TERAT=TERATOGENIC

16. OTHER INFORMATION

USE: CYLINDER OIL

NOTE: EXXONMOBIL PRODUCTS ARE NOT FORMULATED TO CONTAIN PCBS.

Health studies have shown that many hydrocarbons pose potential human health risks which may vary from person to person. Information provided on this MSDS reflects intended use. This product should not be used for other applications. In any case, the following advice should be considered:

INJECTION INJURY WARNING: If product is injected into or under the skin, or into any part of the body, regardless of the appearance of

the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

INDUSTRIAL LABEL

Under normal conditions of use, this product should not pose a risk to health. However, users should avoid overexposure to liquids and mists which may result in eye, skin or respiratory irritation. Always observe good hygiene measures. First Aid: Wash skin with soap and water. Flush eyes with water. If overcome by fumes or vapor, remove to fresh air. If ingested, do not induce vomiting. If symptoms persist seek medical assistance. Read and understand the MSDS before using this product. This MSDS meets Worksafe Australia accepted format requirements.

For Internal Use Only: MHC: 1* 1* 1* 1* 1*, MPPEC: A, TRN:

601211-85, ELIS: 400010

Issue Date: 06DEC2001

Information given herein is offered in good faith as accurate, but without guarantee. Conditions of use and suitability of the product for particular uses are beyond our control; all risks of use of the are therefore assumed by the user and WE EXPRESSLY DISCLAIM ALL WARRANTIES OF EVERY KIND AND NATURE, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE IN RESPECT TO THE USE OR SUITABILITY OF THE PRODUCT. Nothing is intended as a recommendation for uses which infringe valid patents or as extending license under valid patents. Appropriate warnings and safe handling procedures should be provided to handlers and users.

Prepared by: Exxon Mobil Corporation

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