WATER PROCESS SOLUTIONS

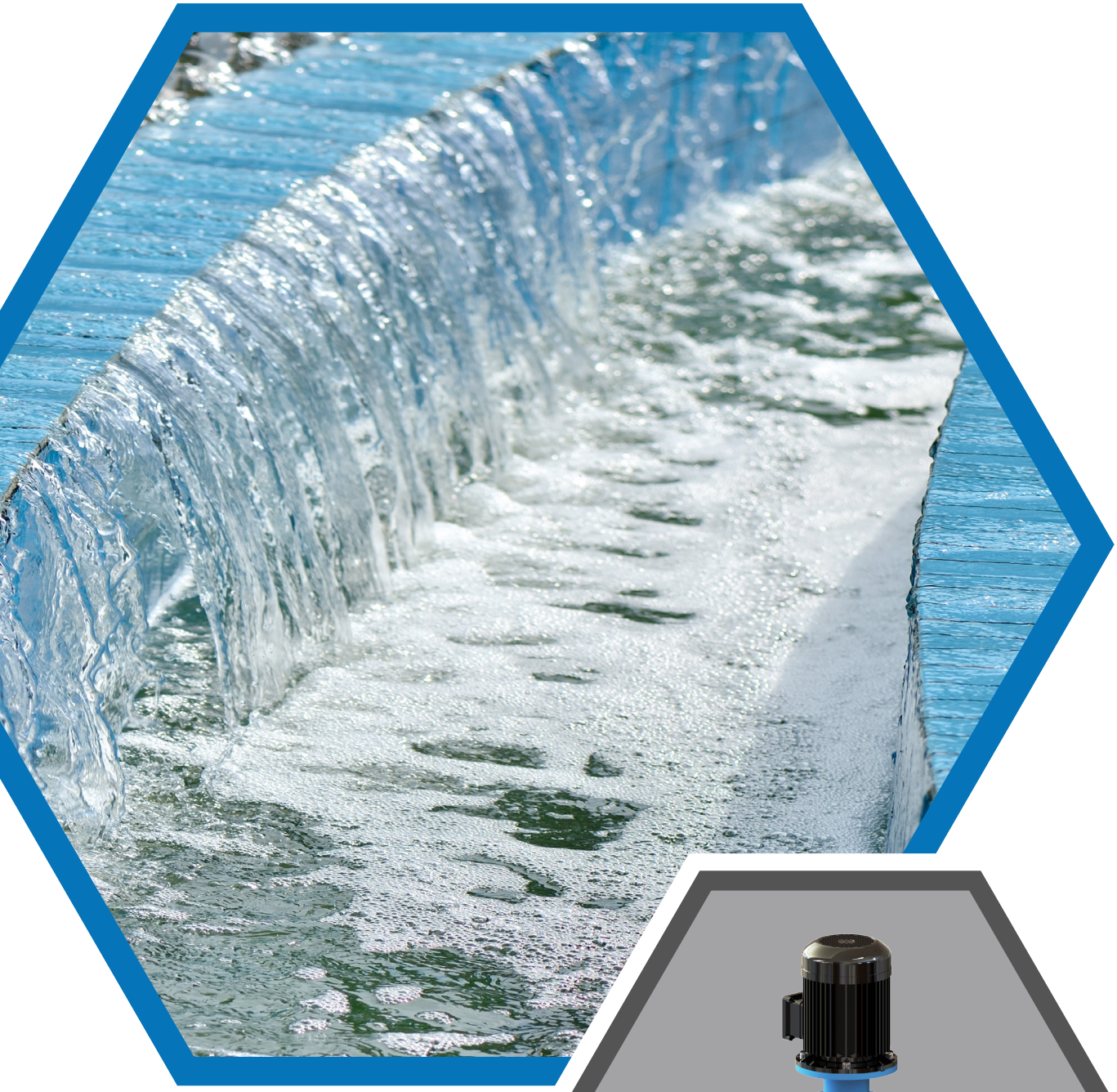
Operation & Maintenance Manual

Encore® 700

Diaphragm Metering Pump

Manual No.

WT.440.400.001.UA.IM.1012 V 3.0



ENCORE® 700
DIAPHRAGM
METERING PUMP

MANUAL NO. WT.440.400.001.UA.IM.1012

WATER PROCESS SOLUTIONS

EC-DECLARATION OF CONFORMITY

Directives covered by this declaration

89/336/EEC Electromagnetic Compatibility Directive, amended by 92/31/EEC & 93/68/EEC

73/23/EEC Low Voltage Equipment Directive, amended by 93/68/EEC

89/392/EEC Machinery Directive, amended by 91/368/EEC, 93/44/EEC & 93/68/EEC

Products Covered by this declaration

ENCORE® 700 Plunger Metering Pump

The products identified above comply with the requirements of the EMC Directive and with the principle elements of the safety objectives of the Low Voltage and Machinery Directives. The following standards have been applied

EMC Emissions:	EN 50 081 Parts 1 & 2
EMC Immunity:	EN 50 082 Parts 1& 2
Electrical Safety:	EN 60034
Machinery Safety:	BS EN 292 BS EN 294

The CE mark was first applied in 1996

Date of Declaration: 09/02/14

.....

C.B. Dean
Managing Director

EQUIPMENT SERIAL NO._____

DATE OF START-UP _____

START-UP BY _____

Prompt service available from nationwide authorized service contractors.

ORDERING INFORMATION

In order for us to fill your order immediately and correctly, please order material by description and part number, as shown in this manual. Also, please specify the serial number of the equipment on which the parts will be installed.

Statements and instructions set forth herein are based upon the best information and practices known to WPS at the time of publication, but it should not be assumed that every acceptable safety procedure is contained herein. WPS does not guarantee that actions in accordance with such statements and instructions included in this manual will result in the complete elimination of hazards and it assumes no liability for accidents that may occur.

Introduction

This manual provides installation, operating, and maintenance instructions for the Encore® 700 Diaphragm Metering Pumps, here in after referred to as the “pump” or “metering pump”. The pump provides accurate metering and transfer of a wide variety of chemicals. It is available in six head sizes, three gear ratios, direct and pulley drive configurations, and a single or double simplex configuration. A non-loss- of-motion stroke adjustment is used to vary the stroke for a smoother pumping action. Non-loss-of-motion is achieved through the use of a variable eccentric mechanism. Stroke adjustment is accomplished either manually or with an optional electric stroke length positioner.

An optional Silicon Control Rectifier (SCR) controls drive motor speed variations through a signal received from an external source.

When an electric stroke length positioner and/or variable speed drive is used with the pump, a separate instruction manual for each will be furnished.

W A R N I N G: TO AVOID POSSIBLE SEVERE PERSONAL INJURY OR DAMAGE TO THE EQUIPMENT, THIS EQUIPMENT SHOULD BE INSTALLED, OPERATED AND SERVICED ONLY BY TRAINED, QUALIFIED PERSONNEL WHO ARE THOROUGHLY FAMILIAR WITH THE ENTIRE CONTENTS OF THIS INSTRUCTION MANUAL. WHEN DEALING WITH HAZARDOUS MATERIAL IT IS THE RESPONSIBILITY OF THE EQUIPMENT USER TO OBTAIN AND FOLLOW ALL SAFETY PRECAUTIONS RECOMMENDED BY THE MATERIAL MANUFACTURER/SUPPLIER. AVOID CONTACTING ELECTRICALLY HOT METER POSTS AND CIRCUIT BOARD COMPONENTS WHILE MAKING METER ADJUSTMENTS.

NOTE: When submitting correspondence always specify model and serial number of apparatus.

Contents

Very Important Safety Precautions

This page provides very important safety information related to safety in installation, operation, and maintenance of this equipment.

WARNING

TO AVOID POSSIBLE SEVERE PERSONAL INJURY OR EQUIPMENT DAMAGE, OBSERVE THE FOLLOWING:

THIS EQUIPMENT SHOULD BE INSTALLED, OPERATED AND SERVICED ONLY BY TRAINED, QUALIFIED PERSONNEL WHO ARE THOROUGHLY FAMILIAR WITH THE ENTIRE CONTENTS OF THIS INSTRUCTION MANUAL.

WHEN HAZARDOUS CHEMICALS ARE BEING PUMPED, AND/OR ELEVATED PRESSURE/TEMPERATURES ARE ENCOUNTERED, RIGID PIPE IS RECOMMENDED. WHEN WORKING WITH RIGID PIPING COMPONENTS,LATERAL AND TORSIONAL FORCES IN THE METERING PUMP SUCTION AND DISCHARGE FITTINGS MUST BE AVOIDED. THESE FORCES CAN LEAD TO COMPONENT FAILURE, WHICH COULD RELEASE HAZARDOUS CHEMICALS THAT COULD PRESENT A PERSONAL HAZARD AS WELL AS AN ENVIRONMENTAL HAZARD. IN RARE CASES, THESE FORCES CANNOT BE ELIMINATED THROUGH THE APPLICATION OF PROPER PIPING PRACTICES AND/OR PIPING SUPPORT SYSTEMS. IN THESE CASES WPS SHOULD BE CONSULTED TO AID IN THE SELECTION OF AN APPROPRIATE FLEXIBLE CONNECTOR.

DUE TO THE SINUSOIDAL FLUID DELIVERY CHARACTERISTICS OF A RECIPROCATING METERING PUMP, ADDITIONAL PRESSURE IS CREATED IN THE SUCTION AND DISCHARGE LINE TO OVERCOME THE INERTIA OF THE FLUID AT REST IN THE LINES. INERTIAL PRESSURE ENCOUNTERED IN THE LINES IS A FUNCTION OF SEVERAL FACTORS (LINE SIZE AND LENGTH, VISCOSITY OF THE FLUID, STROKING SPEED, FLUID DELIVERY RATE, ETC.). THE SUCTION AND DISCHARGE LINES MUST BE SIZED TO THE PRESSURE SURGES DEVELOPED IN THE LINES. INERTIAL PRESSURE SURGE CAN CREATE STRESSES IN THE PIPING THAT COULD LEAD TO COMPONENT FAILURE. IF THE PULSING EFFECTS OF THIS PHENOMENON CANNOT BE CONTROLLED BY PROPER LINE SIZING, THEN ENGINEERING CONTROLS SUCH AS VENTED RISERS, PULSATION DAMPENERS, OR HEADBOXES CAN BE EMPLOYED TO MINIMIZE THE STRESSES PRODUCED IN THE PIPING SYSTEM CAUSED BY THE PRESSURE SURGES. IT IS IMPORTANT TO NOTE THAT THESE ENGINEERING CONTROLS REQUIRE PERIODIC MAINTENANCE. ADDITIONALLY, THE OPERATORS AND SERVICE PERSONNEL OF THIS EQUIPMENT MUST HAVE A WORKING UNDERSTANDING OF THE ENGINEERED CONTROL DEVICES FUNCTION, AND THE CONSEQUENCES OF MISAPPLICATION AND/OR INADEQUATE MAINTENANCE.

IT IS THE RESPONSIBILITY OF THE OWNER TO ENSURE THAT THE INSTALLATION, OPERATION, AND MAINTENANCE OF THIS EQUIPMENT AND ITS ASSOCIATED COMPONENTS ARE IN COMPLIANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS.

AVOID CONTACTING ELECTRICALLY HOT METER POSTS AND CIRCUIT BOARD COMPONENTS WHILE MAKING METER ADJUSTMENTS.

WHEN DEALING WITH HAZARDOUS MATERIALS, IT IS THE RESPONSIBILITY OF THE EQUIPMENT USER TO OBTAIN AND FOLLOW ALL SAFETY PRECAUTIONS RECOMMENDED BY THE HAZARDOUS MATERIAL MANUFACTURER/SUPPLIER.

Very Important Safety Precautions (Cont'd)

CONSULT YOUR REPRESENTATIVE IF THE PUMP IS TO BE USED UNDER CONDITIONS OTHER THAN ORIGINALLY SPECIFIED AND IF THERE IS ANY QUESTION REGARDING THE SIZE OF THE DISCHARGE LINE.

USE RIGID PIPE WHEN HAZARDOUS CHEMICALS ARE PUMPED AND/OR ELEVATED PRESSURE/TEMPERATURES ARE ENCOUNTERED.

USE EXTREME CARE TO AVOID CONTACT WITH THE MATERIAL AND POSSIBLE SEVERE PERSONAL INJURY. CONSULT YOUR CHEMICAL SUPPLIER FOR INSTRUCTIONS IN THE PREPARATION OF SOLUTIONS AND THE HANDLING OF CHEMICALS. OBSERVE ALL RECOMMENDED SAFETY PRECAUTIONS.

DO NOT SPILL SOLUTION. IF ANY SOLUTION IS SPILLED, DILUTE OR WASH AWAY WITH WATER IMMEDIATELY OR FOLLOW SUPPLIER'S INSTRUCTIONS FOR HAZARDOUS MATERIALS.

AVOID BEING SPRAYED WITH LIQUID UNDER PRESSURE. PRIOR TO DISASSEMBLY OF PIPE CONNECTIONS REFER TO SERVICE SECTION FOR DETAILED INSTRUCTIONS ON RELIEVING PRESSURE AND DRAINING. ALLOW SYSTEM TO DRAIN FULLY BEFORE ATTEMPTING TO DISASSEMBLE PIPING AND REMOVING VALVES AND/OR HEAD.

SINCE THE STORAGE AND HANDLING OF SODIUM CHLORITE PRESENTS VERY SPECIFIC HAZARDS, THE USER MUST SEEK THE ADVICE OF THE SODIUM CHLORITE SUPPLIER WITH REFERENCE TO STORAGE FACILITIES, HANDLING PRECAUTIONS AND HEALTH HAZARDS.

SODIUM CHLORITE, WHEN FINELY DIVIDED IN THE PRESENCE OF ORGANIC COMPOUNDS, IS A POSSIBLE FIRE HAZARD. FOR THIS REASON, EXTREME CARE MUST BE EXERCISED TO PREVENT SOLUTIONS FROM DRYING OUT IN THE THREADED PORTIONS OF THE PUMP BODY AND RELATED PARTS. OBSERVE CAREFULLY THE MANUFACTURER/SUPPLIER'S RECOMMENDED SAFETY PROCEDURES AND THE HANDLING AND STORAGE PROCEDURES IN THIS MANUAL.

WHEN SERVICING HEADS AND/OR VALVES, FOLLOW PROCEDURES IN THE SERVICE SECTION FOR DISASSEMBLY.

USE EXTREME CARE TO AVOID CONTACT BECAUSE LIQUID IS PRESENT BETWEEN DISCHARGE DRAIN VALVE AND UNION ELBOW. FLUSH SPILLED LIQUID IMMEDIATELY.

USE EXTREME CARE TO AVOID CONTACT WITH THE MATERIAL AND POSSIBLE SEVERE PERSONAL INJURY. WHEN USING HAZARDOUS MATERIAL, OBSERVE ALL SAFETY PRECAUTIONS RECOMMENDED BY THE HAZARDOUS MATERIAL MANUFACTURER/SUPPLIER. USE APPROPRIATE PROTECTIVE CLOTHING AND EYE PROTECTION WHEN HANDLING HAZARDOUS MATERIAL.

USE EXTREME CARE TO AVOID CONTACT WITH LIQUID PRESENT IN HEAD. ALLOW SUCTION VALVE TO FALL INTO SUITABLE CONTAINER AND CATCH LIQUID.

TURN POWER OFF BEFORE SERVICING.

Very Important Safety Precautions (Cont'd)

DO NOT RUN THE PUMP WITH THE BELT GUARD REMOVED.

USE ONLY WPS LISTED PARTS EXCEPT FOR COMMERCIALLY AVAILABLE PARTS WHICH ARE IDENTIFIED BY COMPLETE DESCRIPTION ON PARTS LIST. THE USE OF UNLISTED PARTS CAN RESULT IN EQUIPMENT MALFUNCTIONS HAVING HAZARDOUS CONSEQUENCES.

THIS EQUIPMENT SHOULD BE INSTALLED, OPERATED AND SERVICED ONLY BY TRAINED, QUALIFIED PERSONNEL WHO ARE THOROUGHLY FAMILIAR WITH THE ENTIRE CONTENTS OF THE INSTRUCTION MANUAL.

DO NOT DISCARD THIS INSTRUCTION MANUAL UPON COMPLETION OF INSTALLATION. INFORMATION PROVIDED IS ESSENTIAL FOR PROPER AND SAFE OPERATION AND MAINTENANCE.

ADDITIONAL OR REPLACEMENT COPIES OF THIS INSTRUCTION MANUAL ARE AVAILABLE FROM:

Water Process Solutions
Unit 10 Mill Hall Business Estate
Aylesford, Kent, ME20 7JZ
Phone: +44(0) 1622719945
Email: enquires@waterprocesssolutions.com

NOTE

Minor part number changes may be incorporated into WPS products from time to time that are not immediately reflected in this instruction manual. If such a change apparently has been made in your equipment and does not appear to be reflected in your instruction manual, contact your local WPS sales office for information.

Please include the equipment serial number in all correspondence. It is essential for effective communication and proper equipment identification.

Preventive Maintenance Schedule And Record Of Performance

This equipment should receive preventive maintenance on a one (1) year cycle.* It is recommended that the following table be used to plan, schedule, and record this important work.

Date of Installation	

Previous Maintenance Log	
Schedule Date	Date Performed

***NOTE: This is the recommended cycle. Your local operating conditions may call for more frequent preventive maintenance.**

- Protect your equipment investment
- Minimize downtime
- Order a preventive maintenance kit now ... keep one on hand

Notes On Protective Equipment And Clothing

The following Warning appears in several locations in this manual. It is general in nature due to the variety of hazardous liquids this equipment is capable of handling.

<u>WARNING:</u> WHEN DEALING WITH HAZARDOUS MATERIAL, IT IS THE RESPONSIBILITY OF THE EQUIPMENT USER TO OBTAIN AND FOLLOW ALL SAFETY PRECAUTIONS RECOMMENDED BY THE HAZARDOUS MATERIAL MANUFACTURER/SUPPLIER.

It is good general practice to make use of protective equipment when handling any hazardous material.

IT IS RECOMMENDED THAT SUCH PROTECTIVE EQUIPMENT BE USED BY ALL PERSONS SERVICING THIS PUMP, ASSOCIATED PIPING, TUBING, VALVES, AND ACCESSORIES, WHEN THE EQUIPMENT IS HANDLING ANY HAZARDOUS MATERIAL

1. Goggles, flexible fitting, hooded ventilation (per ANSI Z87.1)

2. Face Shield (per ANSI Z87.1)

3. Chemical Apron

4. Chemical Gloves

NOTE: (1) ANSI Z87.1 “practice for occupational.....Eye and face protection” recommends goggles (#1 above) as the “preferred protection” when handling chemicals that present a hazard from splash, acid burns or fumes; for severe exposure, a face shield (#2 above) over the goggles is recommended.

(2) An eye flushing fountain and a deluge-type shower may be recommended or required by insurance carriers or governmental safety agencies, which should be consulted for specific requirements.

Quality Equipment	+ Preventive Maintenance	= Dependable Operation Minimum Downtime

There's no question about it. Equipment that is properly maintained is dependable equipment. It will give optimum performance with minimum unscheduled downtime.

WPS manufactures quality equipment designed for performance and reliability. Each product is carefully tested and inspected before shipment to ensure that it meets our high standards.

Our equipment is engineered for easy maintenance. To ensure maximum service life and minimize unscheduled repairs, we recommend a program of regular preventive maintenance, as described in the Service section of this manual. To support this program, we developed standard parts kits. These kits can also be used for minor emergency repairs to minimize downtime.

We recommend that these kits be available in your stock at all times. When the complete kit or any of its parts are used, the kit should be replaced immediately.

Preventive maintenance kits may be ordered directly from the company that supplied your equipment, or they may be ordered directly from WPS for ordering numbers, refer to the parts list at the rear of this manual.

WPS HEADQUARTERS

INSTALLATION, OPERATION, MAINTENANCE, AND SERVICE INFORMATION
Direct any questions concerning this equipment that are not answered in this instruction manual to the reseller from whom the equipment was purchased. If the equipment was purchased directly from WPS, contact the office indicated below.

UNITED Kingdom
Water Process Solutions
Unit 10 Mill Hall Business Estate
Aylesford, Kent, ME20 7JZ
Phone: +44(0) 1622719945
Email: enquires@waterprocesssolutions.com

Section 1 - Technical Data

The overall technical characteristics of the Encore® 700 Series Metering Pumps are listed in Table 1.1.

Material Identification/Composition

The chemical composition of materials used in the manufacture of the metering pump is listed in Table 1.2.

Pump Capacity

The pump capacity for the direct and pulley drive configurations are Listed in Table 1.3.

Pump Compatibility

The compatibility of the metering pump with various liquid materials are listed on Dwg. 440.050.190.010A-F, located at the end of this section. The table identifies the various materials that can enter and come into contact with component materials in the wetted end of the pump and their effects on pump performance.

Table 1.1 - Encore® 700 Series Metering Pump - Technical Data

Pump Type	Non-Loss Motion, Mechanical Diaphragm Metering pump. Simplex and double simplex capabilities.
Diaphragm Type	Teflon®-faced single piece mechanical diaphragm, Six sizes: 1-3/8”, 2”, 3”, 4”, 5” and 6-1/2”.
Service	Metering of mild to very corrosive chemicals; polyelectrolytes and slurries.
Drive Unit	Directly coupled or pulley coupled motor. Three stroking speeds 36, 72, 144 spm. Four step pulley coupled motor provides 4:1 turn down for each speed - 36, 72, 144 spm. Refer to Table 1.3 for additional information.
Variable Speed	AC and DC speed control available.
Capacity Range	Up to 317 gph with single head. Up to 634 gph with double simplex or Duplex*. Refer to Table 1.3 for additional information.
Pressure Range	Up to 175 psi. Refer to Table 1.3 for additional information.
Stroke Length	10 turn stroke control. Adjustable over 10:1 range.
Accuracy	± 2% full scale over 10:1 range under constant suction and discharge conditions.
Suction Lift	Up to 10 feet water lift.
Motor Voltage	115/230 VAC, 50/60 Hz
Ambient Temperature Limits	35 to 125°F (2 to 52°C)
Process Fluid Temperature Limits	125°F (52°C) max; 180°F (83°C) for Kynar® liquid ends.
Viscosity Limits for Polyelectrolytes	5000 centipoise @ 144 strokes per minute (SPM)
Viscosity Limits for Slurries	Hydrated Lime: Up to 3.8 lbs/gallon of water. Activated Carbon: Up to 1.1 lbs/gallon of water Diatomaceous Earth: Up to 1.7 lbs/gallon of water (36 SPM minimum)
Lubrication	Food-grade synthetic oil, SAE90. AAA5499(W2T10431) (Optional), SAE85W90 Mineral gear oil.
Weight	110 lbs (average)

* For Duplex information- Refer to Instruction Manual number WT.440.400.002.UA.IM.

Table 1.2 - Encore 700 Series Metering Pump - Material Identification/Composition

COMMON TERM	**COMPOSITION**
Ceramic	99% aluminium oxide.
Hypalon®*	A chlorosulphonated polyethylene.
Kynar®** (PVDF)	Polyvinylidene fluoride.
PVC	Polyvinyl chloride.
Stainless 316	AISI 316 - Cr 16-18% Ni 10-14%, C 0.08%, Mn 2% Si 1%, P 0.045%, S 0.03% Mo 2-3%
TFE	Fluorocarbon resin of tetrafluoroethylene polymer.
Viton®*	Copolymer of vinylidene fluoride and perfluoropropylene or hexafluoropropylene.
* Trade names of E.I. DuPont de Nemours & Co., Inc. ** Trade name of Atochem North America, Inc.	

Table 1.3 - Encore 700 Series Metering Pump - Capacity Specification

	Direct Drive					*	Pulley Drive					Maximum Discharge Pressure							
	60 Hz 1725 RPM			50 Hz 1450 RPM			60 Hz 1725 RPM			50 Hz 1450 RPM		psi			bar			Connection	
Diaphragm Size	Stroke Frequency	Capacity		Stroke Frequency	Capacity	Pulley	Stroke Frequency	Capacity		Stroke Frequency	Capacity	Motor Horsepower @1725RPM Induction (Variable Speed)			Motor Kilowatts @1450 RPM Induction (Variable Speed)			Cartridge Valves	Threaded Valves
inches	strokes/min	gph	lph	strokes/min	gph	lph	Step	strokes/min	gph	lph	strokes/min	gph	lph	1/4 (1/2)	1/2 (3/4)	3/4 (1)	0.18 (0.37)	0.37 (0.55)	0.55 (0.75)		
1-3/8	36	1.3	4.7	30	1.0	3.9	4	9	0.3	1.2	8	0.3	1.0	175			12			1/2" NPT or 1/2" SOC PVC or R 1/2"	3/8 O.D. HOSE
							3	18	0.6	2.4	15	0.5	2.0								
							2	27	0.9	3.5	23	0.8	3.0								
							1	36	1.3	4.7	30	1.0	3.9								
	72	2.5	9.5	60	2.1	7.9	4	18	0.6	2.4	15	0.5	2.0	175			12				
							3	36	1.3	4.7	30	1.0	3.9								
							2	54	1.9	7.1	45	1.6	5.9								
							1	72	2.5	9.5	60	2.1	7.9								
	144	5.0	18.9	120	4.2	15.8	4	36	1.3	4.7	30	1.0	3.9	175			12				
							3	72	2.5	9.5	60	2.1	7.9								
							2	108	3.8	14.2	90	3.1	11.8								
							1	144	5.0	18.9	120	4.2	15.8								
				144	5.0	18.9	4				36	1.3	4.7				12				
							3				72	2.5	9.5								
							2				108	3.8	14.2								
							1				144	5.0	18.9								
2	36	6.0	22.7	30	5.0	18.9	4	9	1.5	5.7	8	1.3	4.7	175			12			1/2" NPT or 1/2" SOC PVC or R 1/2"	1/2" O.D. HOSE
							3	18	3.0	11.4	15	2.5	9.5								
							2	27	4.5	17.0	23	3.8	14.2								
							1	36	6.0	22.7	30	5.0	37.9								
	72	12.0	45.4	60	10.0	37.9	4	18	3.0	11.4	15	2.5	9.5	175			12				
							3	36	6.0	22.7	30	5.0	18.9								
							2	54	9.0	34.1	45	7.5	28.4								
							1	72	12.0	45.4	60	10.0	37.9								
	144	24.0	90.8	120	20.0	75.7	4	36	6.0	22.7	30	5.0	18.9	175			12				
							3	72	12.0	45.4	60	10.0	37.9								
							2	108	18.0	68.1	90	15.0	56.8								
							1	144	24.0	90.8	120	20.0	75.7								
				144	24.0	90.8	4				36	6.0	22.7				12				
							3				72	12.0	45.4								
							2				108	18.0	68.1								
							1				144	24.0	90.8								

Note: *Pulley Step 1 is the top position of the belt

Table 1.3 - Encore 700 Series Metering Pump - Capacity Specification (Cont'd)

	Direct Drive					*	Pulley Drive					Maximum Discharge Pressure							
	60 Hz 1725 RPM			50 Hz 1450 RPM			60 Hz 1725 RPM			50 Hz 1450 RPM		psi			bar			Connection	
Diaphragm Size	Stroke Frequency	Capacity		Stroke Frequency	Capacity	Pulley	Stroke Frequency	Capacity		Stroke Frequency	Capacity	Motor Horsepower @1725RPM Induction (Variable Speed)			Motor Kilowatts @1450 RPM Induction (Variable Speed)			Cartridge Valves	Threaded Valves
inches	strokes/min	gph	lph	strokes/min	gph lph	Step	strokes/min	gph	lph	strokes/min	gph lph	1/4 (1/2)	1/2 (3/4)	3/4 (1)	0.18 (0.37)	0.37 (0.55)	0.55 (0.75)		
3	36	11.3	42.6	30	9.4 35.5	4 3 2 1	9 18 27 36	2.8 5.6 8.4 11.3	10.6 21.3 31.9 42.6	8 15 23 30	2.3 8.9 4.7 17.7 7.0 26.6 9.4 35.5	150			10			1/2" NPT or 1/2" SOC PVC or R 1/2"	----
	72	22.5	85.2	60	18.8 71.0	4 3 2 1	18 36 54 72	5.6 11.3 16.9 22.5	21.3 42.6 63.9 85.2	15 30 45 60	4.7 17.7 9.4 35.5 14.1 53.2 18.8 71.0	100	150		8	10			
	144	45.0	170.3	120	37.5 141.9	4 3 2 1	36 72 108 144	11.3 22.5 33.8 45.0	42.6 85.2 127.7 170.3	30 60 90 120	9.4 35.5 18.8 71.0 28.1 106.5 37.5 141.9	50	120	150	4	8	10		
				144	45.0 170.3	4 3 2 1				36 72 108 144	11.3 42.6 22.5 85.2 33.8 127.7 45.0 170.3				4	8	10		
4	36	19.3	72.9	30	16.0 60.7	4 3 2 1	9 18 27 36	4.8 9.6 14.4 19.3	18.2 36.4 54.6 72.9	8 15 23 30	4.0 15.2 8.0 30.4 12.0 45.5 16.0 60.7	130			9			3/4" NPT or 3/4" SOC PVC or R 3/4"	----
	72	38.5	145.7	60	32.1 121.4	4 3 2 1	18 36 54 72	9.6 19.3 28.9 38.5	36.4 72.9 109.3 145.7	15 30 45 60	8.0 30.4 16.0 60.7 24.1 91.1 32.1 121.4	75	130		6	9			
	144	77.0	291.4	120	64.2 242.9	4 3 2 1	36 72 108 144	19.3 38.5 57.8 77.0	72.9 145.7 218.6 291.4	30 60 90 120	16.0 60.7 32.1 121.4 48.1 182.2 64.2 242.9	30	75	130	2	6	9		
				144	77.0 291.4	4 3 2 1				36 72 108 144	19.3 72.9 38.5 145.7 57.8 218.6 77.0 291.4				2.5	5	9		

Note: *Pulley Step 1 is the top position of the belt.

Table 1.3 - Encore 700 Series Metering Pump - Capacity Specification (Cont'd)

	Direct Drive						*	Pulley Drive						Maximum Discharge Pressure							
	60 Hz 1725 RPM			50 Hz 1450 RPM				60 Hz 1725 RPM			50 Hz 1450 RPM			psi			bar			Connection	
Diaphragm Size	Stroke Frequency	Capacity		Stroke Frequency	Capacity		Pulley	Stroke Frequency	Capacity		Stroke Frequency	Capacity		Motor Horsepower @1725RPM Induction (Variable Speed)			Motor Kilowatts @1450 RPM Induction (Variable Speed)			Cartridge Valves	Threaded Valves
inches	strokes/min	gph	lph	strokes/min	gph	lph	Step	strokes/min	gph	lph	strokes/min	gph	lph	1/4 (1/2)	1/2 (3/4)	3/4 (1)	0.18 (0.37)	0.37 (0.55)	0.55 (0.75)		
5	36	45.0	170.3	30	37.5	141.9	4 3 2 1	9 18 27 36	11.3 22.5 33.8 45.0	42.6 85.2 127.7 170.3	8 15 23 30	9.4 18.8 28.1 37.5	35.5 71.0 106.5 141.9	75			5			1" NPT or 1" SOC PVC or R 1"	----
	72	90.0	340.7	60	75.0	283.9	4 3 2 1	18 36 54 72	22.5 45.0 67.5 90.0	85.2 170.3 255.5 340.7	15 30 45 60	18.8 37.5 56.3 75.0	71.0 141.9 212.9 283.9	40	75		3	5			
	144	180.0	681.3	120	150.0	567.8	4 3 2 1	36 72 108 144	45.0 90.0 135.0 180.0	170.3 340.7 511.0 681.3	30 60 90 120	35.7 75.0 112.5 150.0	141.9 283.9 425.8 567.8	20	40	75	1.5	3.0	5		
				144	180.0	681.3	4 3 2 1				36 72 108 144	45.0 90.0 135.0 180.0	170.3 340.7 511.0 681.3				1.5	3	5		
6-1/2	36	79	299	30	66	249	4 3 2 1	9 18 27 36	19.8 39.5 59 79	75 150 225 299	8 15 23 30	17.6 33 51 66	67 125 192 250	45			3			1-1/2" NPT or 1-1/2" SOC PVC or R 1-1/2"	----
	72	158	598	60	132	498	4 3 2 1	18 36 54 72	39.5 79 118.8 158	150 299 450 598	15 30 45 60	33 66 99 132	125 250 375 500	25	45		1.7	3			
	144	317	1200	120	164	1000	4 3 2 1	36 72 108 144	79 158 237.7 317	299 598 900 1200	30 60 90 120	66 132 198 264	250 500 750 1000	15	25	45	1	1.7	3		
				144	317	1200	4 3 2 1				36 72 108 144	79 158 237.7 317	299 598 900 1200				1	1.7	3		

Note: *Pulley Step 1 is the top position of the belt

LIQUID	REF NO.	316 S.S	HYPALON	VITON	PVC	TFE	KYNAR 150°F	CERAMIC
ACETALDEHYDE	57	A	C	C	C	A	C	A
ACETATE SOLVENTS	57	A	C	C	C	A	A	A
ACETIC ACID, CRUDE	57	A	C	C	C	A	A	A
ACETIC ACID, PURE	57	A	C	C	C	A	A	A
ACETIC ACID (10%)	3	A	B	C	A	A	A	A
ACETIC ACID (80%)	57	B	C	C	C	A	A	A
ACETIC ANHYDRIDE		B	A	C	C	A	C	A
ACETONE		A	C	C	C	A	C	A
ANETYLENE		A	B	A	A	A	A	N
ACRYLONITRILE	58	A	C	C	A	N	A	N
ALUMINIUM CHLORIDE	5	B	A	A	A	A	A	A
ALUMINIUM HYDROXIDE	6	A	A	A	A	A	A	N
ALUMINIUM NITRATE		A	B	C	A	A	A	A
ALUMINIUM SULFATE	3	A	A	A	A	A	A	A
ALUMS		B	A	C	A	A	A	A
AMINES		A	C	C	A	A	N	N
AMINES (FLIMINE) B		A	C	C	A	A	N	N
AMMONIA ANHYDROUS (LIQ.)		A	B	C	A	A	C	A
AMMONIA SOLUTIONS		A	A	B	A	A	A	N
AMMONIUM CARBONATE		A	A	A	A	A	A	A
AMMONIUM CHLORIDE	7	B	A	A	A	A	A	N
AMMONIUM DIPHOSPHATE	9	A	A	A	A	A	A	A
AMMONIUM HYDROXIDE	8	A	A	A	A	A	A	A
AMMONIUM MONOPHOSPHATE	9	A	A	A	A	A	A	A
AMMONIUM NITRATE		A	A	A	A	A	A	A
AMMONIUM SULFATE	10	A	A	A	A	A	A	A
AMMONIUM SULFIDE		A	A	A	A	A	A	A
AMMONIUM TRIPHOSPHATE	9	A	A	A	A	A	A	A
AMYL ACETATE	58	A	C	C	C	A	A	A
AMYL ALCOHOL	11,12	A	A	A	B	A	A	A
AMYL CHLORIDE		A	C	C	C	A	A	A
ANILINE	13	A	C	A	C	A	B	A
ANILINE DYES		A	B	B	C	A	N	A
ARSENIC ACID	14	B	C	A	A	A	A	N
BARIUM CARBONATE	15	B	A	A	A	A	A	A
BARIUM CHLORIDE		A	B	A	A	A	A	A
BARIUM HYDROXIDE	14.5	A	B	A	A	A	A	N
BARIUM SULFATE		A	A	A	A	A	A	A
BARIUM SULFIDE		B	A	A	A	A	A	A
BEER		A	A	A	A	A	A	A
BEET SUGAR LIQUORS		A	C	A	A	A	A	A
BENZALDEHYDE		A	C	C	C	A	B	A
BENZENE OR BENZOL	13,14	A	C	B	C	A	B	A
BENZOIC ACID		A	C	A	A	A	A	A
BLACK SULFATE LIQUOR	57	A	B	A	A	A	A	A
BORAX (SEE SODIUM BORATE)		-	-	-	-	-	-	-
BORIC ACID	16	A	A	A	A	A	A	A
BUTANE		A	A	B	A	A	A	A
BUTADIENE		A	B	B	A	A	A	A
BUTYL ACETATE		A	C	N	B	A	C	N

WARNING: WHEN DEALING WITH HAZARDOUS MATERIALS, IN ALL CASES THE HAZARDOUS MATERIAL SUPPLIERS OR MANUFACTURERS' RECOMMENDATIONS FOR SAFETY PROCEDURES MUST BE OBTAINED AND FOLLOWED.

CHEMICAL COMPATIBILITY OF METERING PUMPS - PERFORMANCE
440.050.190.010A
ISSUE 0 8-95

LIQUID	REF NO.	316 S.S	HYPALON	VITON	PVC	TFE	KYNAR 150°F	CERAMIC
BUTYL ALCOHOL	17	A	A	A	A	A	A	A
BUTYRIC ACID	14	A	A	B	B	A	A	A
CALCIUM BISCULFITE		A	A	A	A	A	A	A
CALCIUM CARBONATE	15	A	A	A	A	A	A	B
CALCIUM CHLORATE		A	A	A	A	A	A	A
CALCIUM CHLORIDE	18	B	A	A	A	A	A	A
CALCIUM HYDROXIDE	15	A	A	A	A	A	A	C
CALCIUM HYPOCHLORITE		C	A	A	A	A	A	B
CALCIUM NITRATE		A	A	A	A	A	A	A
CALCIUM SULFATE		A	A	A	A	A	A	N
CANE SUGAR LIQUORS	14	A	C	B	N	A	A	A
CARBOLIC ACID (PHENOL)	11,14,57	A	C	A	A	A	A	A
CARBON BISULFIDE		A	C	A	A	N	N	N
CARBONIC ACID	14,57	A	A	A	A	A	A	N
CARBON TETRACHILORIDE	13,3	A	C	A	C	A	A	A
CHLORACETIC ACID		C	C	C	A	A	C	A
CHLOROBENZENE (DRY)		A	C	A	C	A	A	A
CHLOROFORM		A	C	A	C	A	A	A
CHLORSULPHONIC ACID		B	C	C	A	A	C	A
CHROMIC ACID	19,58	A	A	A	A	A	A	A
CITRIC ACID	20	A	A	A	A	A	A	A
COPPER ACETATE		A	C	C	A	A	A	N
COPPER CHLORIDE	5	C	B	A	A	A	A	A
COPPER CYANIDE	3	A	A	A	A	A	A	N
COPPER NITRATE	3	A	A	A	A	A	A	A
COPPER SULFATE	21	A	A	A	A	A	A	A
CREOSOTE	3	A	C	A	C	A	A	A
CRESYLIC ACID (50%)		A	C	A	A	A	A	N
CYCLOHEXANE		A	C	A	C	A	A	A
DETERGENT		N	A	A	A	A	N	A
DIETHYLAMINE	57	A	C	C	C	N	A	A
DIESTHYLENE GLYCOL		A	A	A	A	A	N	A
DOWTHERMS		A	C	A	C	N	N	N
ETHERS (ETHYL)		A	C	B	C	A	B	A
ETHYL ACETATE		A	C	C	C	A	C	A
ETHYL ALCOHOL	12	A	A	A	A	A	A	A
ETHYL CHLORIDE		A	C	A	C	A	A	A
ETHYLENE CHLORIDE	22	A	C	B	C	A	A	N
ETHYLENE GLYCOL	12	A	A	A	A	A	A	A
ETHYL MERCAPTAN		A	C	N	N	N	N	N
ETHYLENE OXIDE		A	C	C	C	A	C	A
FATTY ACIDS	14	A	C	A	A	A	A	A
FERRIC CHLORIDE	6	C	A	A	A	A	A	A
FERRIC NITRATE		A	A	A	A	A	A	A
FERRIC SULFATE	24	B	A	A	A	A	A	A
FERROUS CHLORIDE		C	A	A	A	A	A	A
FERROUS SULFATE	14	B	A	A	A	A	A	A
FILTER AID	15	A	A	A	C	A	A	A
FLORSILICIC ACID	6,25,26	B	A	A	A	A	A	C
FORMALDEHYDE		A	A	C	A	A	A	A
FORMIC ACID	3,58	A	A	B	B	A	A	A
FRUIT JUICES		A	C	A	A	A	A	A
FURFURAL	57	A	C	C	C	A	A	A
GALLIC ACID (5%)		A	C	A	A	A	B	A
GASOLINE		A	C	A	A	A	A	A

CHEMICAL COMPATIBILITY OF METERING PUMPS - PERFORMANCE

440.050.190.010B
ISSUE 0 8-95

LIQUID	REF NO.	316 S.S	HYPALON	VITON	PVC	TFE	KYNAR 150°F	CERAMIC
GLUCOSE		A	A	A	A	A	A	A
GLYCEROL (GLYCERIN)	6,11,27	A	A	A	A	A	A	A
HEPTANE, HEXANE		A	A	A	C	A	A	A
HYDRAZINE (35%)	28	A	B	C	N	N	A	B
HYDROBROMIC ACID	29	C	A	A	A	A	A	A
HYDROCHLORIC ACID (37%)	5,30	C	A	A	A	A	A	A
HYDROCYANIC ACID		A	A	A	A	A	A	A
HYDROFLUORIC ACID	6,26,25	C	A	A	A	A	A	C
HYDROFLUOSILICIC ACID	6,25,26,57	B	A	A	A	A	A	C
HYDROGEN PEROXIDE	31,59	B	A	A	A	A	A	A
HYDROGEN SULFIDE	11,3	A	A	A	A	A	A	A
INKS	19	A	A	A	A	A	N	N
IODINE SOLUTION		C	B	A	C	A	A	A
KEROSENE		A	C	A	A	A	A	A
LACTIC ACID	32,57	A	A	A	A	A	A	A
LEAD ACETATE		A	C	C	A	A	A	A
LIME SLURRIES	15	A	A	A	A	A	A	N
LINSEED OIL		A	A	A	A	A	A	A
MAGNESIUM CARBONATE		A	A	A	A	A	A	A
MAGNESIUM CHLORIDE	6,34	C	A	A	A	A	A	A
MAGNESIUM HYDROXIDE	6,15	A	A	A	A	A	A	N
MAGNESIUM NITRATE		A	A	A	A	A	A	A
MAGNESIUM SULFATE	14,5	A	A	A	A	A	A	A
MALEIC ACID (DILUTE)	5,14	A	C	A	A	A	A	A
MALIC ACID	14	A	B	A	A	A	A	A
MELAMINE RESINS		A	C	N	A	A	N	A
MERCURIC CHLORIDE	5	C	A	A	A	A	A	A
MERCURIC CYANIDE		A	A	A	A	A	A	N
MERCURY		A	A	A	A	A	A	A
METHYL ACETATE	57	A	C	C	N	A	A	N
METHYL ACETONE		A	C	C	C	N	N	N
METHYL ALCOHOL	35	A	A	B	A	A	A	A
METHYLAMINE		A	C	C	N	N	C	N
METHYL BROMIDE		A	C	A	C	N	A	N
METHYL CELLOSOLVE		A	C	C	N	A	A	A
METHYL CHLORIDE (LIQ.)		A	C	C	C	A	A	A
METHYLETHYL KETONE		A	C	C	C	A	C	A
METHYLENE CHLORIDE	36,14	A	C	B	C	A	C	A
MOLASSES		A	A	A	A	A	A	N
MONOCHLORACETIC ACID		C	N	N	A	A	A	A
MORPHOLINE	57	A	C	C	A	A	A	A
NAPHTHA	13	A	C	A	A	A	A	A
NAPHTHALENE	11	A	C	A	C	A	A	A
NICKEL CHLORIDE		A	A	A	A	A	A	A
NICKEL NITRATE	14	A	A	A	A	A	A	A
NICKEL SULFATE	14	A	A	A	A	A	A	A
NICOTINIC ACID		A	C	A	A	N	A	A
NITRIC ACID (10%)	60	A	A	A	A	A	A	A
NITRIC ACID (70%) TO 100*F	60	B	C	B	A	A	A	A
NITROBENZENE		A	C	C	C	A	B	A
OILS ANIMAL		A	C	A	A	A	A	A
OILS, COTTONSEED	11,58	A	A	A	A	A	A	A
OILS, FUEL	37,14	A	A	A	A	A	A	A
OLEIC ACID	3	A	C	C	A	A	A	A
OLEUM (20-25%)		A	C	B	C	A	C	A

CHEMICAL COMPATIBILITY OF METERING PUMPS - PERFORMANCE

440.050.190.010C
ISSUE 0 8-95

LIQUID	REF NO.	316 S.S	HYPALON	VITON	PVC	TFE	KYNAR 150°F	CERAMIC
OXALIC ACID		B	A	A	A	A	A	A
PALMITIC ACID	3	A	C	A	A	A	A	N
PERCHLORIC ACID (10%)		C	B	N	B	N	A	N
PERCHLOROETHYLENE (DRY)	11	A	C	A	C	N	A	N
PHEMOL (CARBOLIC ACID)	11	A	C	A	A	A	A	A
PHOSPHORIC ACID	6,11,39	A	A	A	A	A	A	A
PHOSPHOUS TRICHLORIDE		N	C	A	C	A	A	A
PICRIC ACID	57	A	A	A	C	N	A	N
POTASSIUM BICARBONATE		A	A	A	A	N	A	A
POTASSIUM BROMATE		N	N	N	A	N	A	N
POTASSIUM BROMIDE		A	A	A	A	A	A	A
POTASSIUM CARBONATE	40	A	A	A	A	A	A	A
POTASSIUM CHLORATE	3	A	A	A	A	A	A	A
POTASSIUM CHLORIDE	5,41	B	A	A	A	A	A	A
POTASSIUM CHROMATE		A	A	A	A	A	A	N
POTASSIUM CYANIDE		A	A	A	A	A	A	N
POTASIUM DISPHOSPHATE		A	N	A	A	N	N	N
POTASSIUM HYDROXIDE	42	A	A	C	A	A	A	C
POTASSIUM MONOPHOSPHATE		A	A	A	A	N	N	N
POTASSIUM NITRATE		A	A	A	A	A	A	A
POTASSIUM PERMANGANATE	5,43	A	A	A	A	A	A	A
POTASSIUM SULFATE	41,5	A	A	A	A	A	A	N
POTASSIUM SULFIDE		A	N	A	A	A	A	A
POTASSIUM SULFITE		A	B	A	A	N	N	N
POTASSIUM TETRABORATE		N	N	N	A	N	N	N
PROPANE (LIQ.)		A	A	B	A	A	A	A
PROPYL ALCOHOL	12,58	A	A	A	B	A	A	N
PROPYLENE GLYCOL		A	A	A	C	A	A	A
RESINS & ROSINS		A	N	A	N	N	N	N
SEA WATER		B	A	A	A	A	A	A
SILVER NITRATE		A	A	A	A	A	A	A
SOAP SOLUTIONS (STEARATES)	6,57	A	A	A	A	A	A	A
SODIUM ACETATE		A	C	A	A	A	A	A
SODIUM ALUMINATE 27Be		A	A	A	B	A	A	A
SODIUM BICARBONATE		A	A	A	A	A	A	A
SODIUM BISULFATE (TO 100°F)		A	A	A	A	A	A	A
SODIUM BISULFITE (TO 100°F)		A	A	A	A	A	A	A
SODIUM BORATE	14	A	A	A	A	A	A	N
SODIUM CARBONATE	44	A	A	A	A	A	A	A
SODIUM CHLORATE	14	A	A	A	A	A	A	A
SODIUM CHLORIDE	3	B	A	A	A	A	A	A
SODIUM CHLORITE (TO 20%)	45	C	N	N	C	N	A	A
SODIUM CHROMATE		A	N	A	A	A	A	N
SODIUM CYANIDE		A	A	A	A	A	A	A
SODIUM DI- OR TRIPHOSPHATE		A	A	A	A	A	A	A
SODIUM FLUORIDE	25,46	B	A	A	A	A	A	C
SODIUM HYDROXIDE 20%	5,3,6	A	A	C	A	A	A	C
SODIUM HYDROXIDE 50%	5,3,6	A	A	C	A	A	A	C
SODIUM HYPOCHLORITE	30,13,47	C	A	B	A	A	A	N
SODIUM MONOPHOSHATE		A	A	A	A	A	A	A
SODIUM NITRATE	48	A	A	A	A	A	A	A
SODIUM PERBORATE		A	B	A	B	A	N	N
SODIUM PEROXIDE	6	A	A	A	B	A	A	A
SODIUM POLYPHOSPHATE		A	B	A	A	A	A	A
SODIUM SILICATE	49	A	A	A	B	A	A	A

CHEMICAL COMPATIBILITY OF METERING PUMPS - PERFORMANCE

440.050.190.010D
ISSUE 0 8-95

LIQUID	REF NO.	316 S.S	HYPALON	VITON	PVC	TFE	KYNAR 150°F	CERAMIC
SODIUM SULFATE	50	A	A	A	A	A	A	A
SODIUM SULFIDE	1,48	A	A	A	B	A	A	N
SODIUM SULITE	44	A	A	A	A	A	A	A
SODIUM THOSULFATE (HYPO)	51	B	A	A	B	A	A	A
STARCH		A	A	A	A	A	N	A
STEARIC ACID	37	A	B	A	A	A	A	A
SUGAR SOLUTIONS	14	A	B	N	A	A	A	A
SULFUR CHLORIDE	57	C	A	A	N	A	A	A
SULFUR MOLTEN		A	C	A	A	A	A	A
SULFURIC ACID (0-40%)	5	C	A	A	A	A	A	A
SULFURIC ACID (40-95%)	5,58	C	A	A	A	A	A	A
SULFURIC ACID (95-100%)	58	A	A	A	A	A	A	A
SULFURIC ACID		B	A	A	A	A	A	A
TANNIC ACID	52	A	A	A	A	A	N	A
TARTARIC ACID	6,44	A	A	A	A	A	A	A
TITANIUM DIOXIDE		A	A	A	B	A	N	N
TOLUOL & TOLUENE	36	A	C	A	C	A	B	A
TRICHLORETHYLENE	57	A	C	A	C	A	A	A
TURPENTINE	13	A	C	A	A	A	A	A
UREA FORMALDEHYDE		A	N	N	N	A	A	A
VARNISH & SOLVENTS	14	A	C	A	N	A	N	A
VINEGAR		A	A	N	A	A	N	A
VINYL ACETATE		A	C	C	C	A	A	A
WATER, DEIONIZED		A	A	A	A	A	A	A
WATER, SALT		B	A	A	A	A	N	A
WHISKEY AND WINES	58	A	A	A	A	A	A	A
XYLENE OR XYLOL	13	A	C	A	C	A	A	A
SINC CHLORIDE	6,53	C	A	A	A	A	A	A
ZINC HYDROSULFITE		B	N	A	A	A	N	N
SINC SULFATE		A	A	A	A	A	A	A

WARNING: TO AVOID POSSIBLE SEVERE PERSONAL INJURY AND/OR DAMAGE TO EQUIPMENT WHEN DEALING WITH ANY CHEMICAL, IT IS THE RESPONSIBILITY OF THE EQUIPMENT USER TO OBTAIN AND FOLLOW THE SAFETY PRECAUTIONS OF THE MANUFACTURER OF THE CHEMICAL.

RATING KEY

- A ACCEPTABLE
- B SATISFACTORY WHERE MINOR ATTACK IS ACCEPTABLE
- C SHOULD NOT BE USED
- N INFORMATION LACKING

UNLESS OTHERWISE NOTED, CONCENTRATION OF AQUEOUS SOLUTIONS ARE SATURATED. ALL RATINGS ARE AT ROOM TEMPERATURE UNLESS OTHERWISE SPECIFIED.

CHEMICAL COMPATIBILITY OF METERING PUMPS - PERFORMANCE

440.050.190.010E
ISSUE 0 8-95

1. WARNING : DRIED RESIDUE OF SPILLED SOLUTIONS IS EXPLOSIVE.

3. SS TO 180°F

5. PVC TO 125°F

6. HYPALON TO 180°F

7. SS TO 125°F 10%, PVC TO 125°F

8. PVC TO 125°F, 29%, SS TO 180°F, 29%

9. SS TO 70°F,5%

10. PVC TO 105°F, 40%, SS TO 180°F SAT

11. VITON TO 180°F

12. PVC TO 100°F PURE

13. VITON TO 158°F

14. SS TO 140°F

15. USE SLURRY VALVES

16. PVC TO 105°F, SS TO 180°F

17. PVC TO 100°F, SS TO 100°F

18. SS TO 70°F DILUTE, PVC TO 125°F

19. PVC TO 100°F, 50%, SS TO 70°F, 5%

20. PVC TO 100°F, 35%, SS TO 180°F, 50%

21. PVC TO 100°F, SS TO 160°F

22. VITON TO 120°F

24. PVC TO 125°F, 36%, SS TO 180°F 10%

25. FLUORIDATION REQUIRES AN ANTI-SYPHON PUMP INSTALLATION CONSULT LOCAL REGULARIONS FOR DETAILS

26. PVC TO 30%

27. PVC TO 125°F, 50%, SS TO 70°F, 5%

28. MAY CAUSE SURFACE PITTTING TO SS

29. PVC TO 125°F, 48%

30. HYPALON TO 130°F

31. PVC TO 100°F, 50%, SS TO 100°F, 50%

32. PVC TO 70°F, 10%, SS TO 70°F, 10%

34. SS TO 70°F, 5%, PVC 125°F SAT

35. PC TO 100°F, SS TO 70°F

36. VITON TO 100°F

37. HYPALON TO 150°F

38. SS TO 70°F, 10%

39. PVC TO 125°F, 80%, SS TO 70°F, 80%

40. PVC TO 100°F, SAT, SS TO 180°F, 50%

41. SS TO 180°F, 5%

42. PVC TO 70°F, 50% OR TO 125°F, 30%, SS TO 180°F, 50%

43. SS TO 140°F, 10%

44. SS TO 180°F, 50%

45. PVC TO 105°F

46. PCV TO 125°F, 4%, SS TO 70°F, 5%

47. PVC TO 125°F, 15%, SS TO 70°F, 5%

48. SS TO 125°F

49. PVC TO 125°F, 41 Be, SS TO 140°F, 41 Be

50. PVC TO 125°F, 30%

51. PVC TO 125°F, 50%, SS TO 70°F, 50%

52. PVC TO 100°F, 10%, SS TO 150°F

53. PVC TO 100°F, SS TO 180°F, 70%

57, KYNAR TO 70°F

58. KYNAR TO 120°F

59. KYNAR TO 120°F, 30%

60. KYNAR TO 100°F

Statements and suggestions set forth herein are based upon the best information and practices known to WPS. However, it should not be assumed either that information is complete on the subjects covered or that all possible circumstances, safety measures, precautions, etc., have been included. These statements and suggestions are not intended to reflect state, municipal, or insurance requirements or national safety codes; where applicable, those sources should be consulted directly Moreover, since the conditions of use are beyond its control, WPS makes no guarantee of results and assumes no liability in connection with the information contained herein.

When dealing with the installation, operation or maintenance of a specific WPS product, the manuals and data sheets pertaining to that product should be studied carefully. In case of any doubt about a specific installation, direct inquiries to your local WPS representative.

CHEMICAL COMPATIBILITY OF METERING PUMPS - PERFORMANCE

440.050.190.010F
ISSUE 0 8-95

Section 2 - Installation

To provide satisfactory service, the metering pump must be installed in accordance with the instructions that follow. Operational difficulties, lack of accuracy, and possible damage to the pump mechanism may occur if these instructions are not followed properly.

Unpacking

When the pump is unpacked, check all items against the packing list to make sure that no parts are discarded with the packaging material. Whenever possible, unpack the equipment at the installation site.

Mounting the Pump

Pump location is important to the operation of the pump. Select a place that is dry and that provides a level base for the pump. Allow work space around the pump for inspection, adjustments, and servicing (refer to Dwgs. 440.400.110.010 or 440.400.110.020). Be sure it is near a power supply and located where the discharge line may be conveniently run to the point of application. The pump may be installed with a floodedsuction arrangement (refer to Dwg. 440.400.110.040). A carefully considered and correct installation will help provide satisfactory performance.

When installing the equipment, proceed as follows:

a. Select the appropriate dimension and/or installation drawing to be sure the location selected will meet all requirements. Refer to Dwgs. 440.400.110.010, 020, 030, and 040.

b. Mount the pump on the bench, shelf, or level pad on which it will be located.

c. Connect to a power supply matching the characteristics specified on the motor nameplate and in accordance with local electrical code requirements. Sufficient flexibility must be provided in the connection to permit adjustments. Be sure to provide a shut-off switch in the power supply.

NOTE: Field wiring must conform to local electrical codes.

WARNING: TOAVOID POSSIBLE SEVERE PERSONAL INJURY ORDAMAGE TO THE EQUIPMENT CONSULTYOUR WPS REPRESENTATIVE IFTHE PUMP IS TO BE USED UNDER CONDITIONS OTHER THAN ORIGINALLY SPECIFIED AND IFTHERE IS ANY QUESTION REGARDING THE SIZE OF THE DISCHARGE LINE.

d. If a pulsation dampener is required to reduce pressure peaks, install it in the discharge line. Refer to Dwgs. 440.400.110.010, 020, 030, and 040. The dampener will minimize vibrations and reduce wear due to long lines and/or high stroking speeds.

NOTE: Take care not to drip pipe primer or cement into valves. This could damage ball checks and seats.

e. Connect rigid pipe or tubing to the suction connection on the pump and run a line without traps to the bottom of the solution container. Install a strainer.

Pipe Line Diameter

To determine the proper diameter of the suction and discharge lines, take the following into consideration:

- Cavitation
- Overloading (elbow, valves, tees, etc.)

To avoid cavitation for shorter runs of pipe (less than 10 feet), use pipe with a diameter at least equal to the valve connection. To avoid cavitation for longer runs of pipe (greater than 10 feet), use pipe with a diameter at least one size larger than the valve connection.

The following formula can be used to compute the fluid velocity in meters/second:

$$\text{Velocity} = \frac{\{\text{Discharge (Q)} \times 0.35\}}{d^2}$$

where Q = feed rate in liters/hour
d = inside diameter of pipe in mm

Select an appropriate pipe diameter that keeps the velocity in the suction line from exceeding 0.2 meters/second.

Tubing

For safety and best results when tubing is to be used, select the appropriate size and material according to the pressure and temperature limits detailed in Table 2.1.

Table 2.1 - Pressure/Temperature Ratings for Suction and Discharge Tubing

			Maximum Working Pressure (psi) at			
HEAD	TUBE SIZE	MATERIAL	60°F	73°F	100°F	120°F
1-3/8”	1/4” x 3/8”	Polyethylene	100	100	90	70
2”	3/8” x 1/2”	Polyethylene	100	90	70	53

NOTE: Tubing connection is available on 1-3/8” and 2” heads only.

WARNING: TO AVOID POSSIBLE SEVERE PERSONAL INJURY WHEN HAZARDOUS CHEMICALS ARE PUMPED AND/OR ELEVATED PRESSURE/ TEMPERATURES ARE ENCOUNTERED, USE RIGID PIPE.

Installation

The Typical Installation drawings (Dwgs. 440.400.110.010, .020, .030, and .040) and the associated wiring diagram (Dwg. 440.400.130.010) for the various pump configurations are located at the end of this section

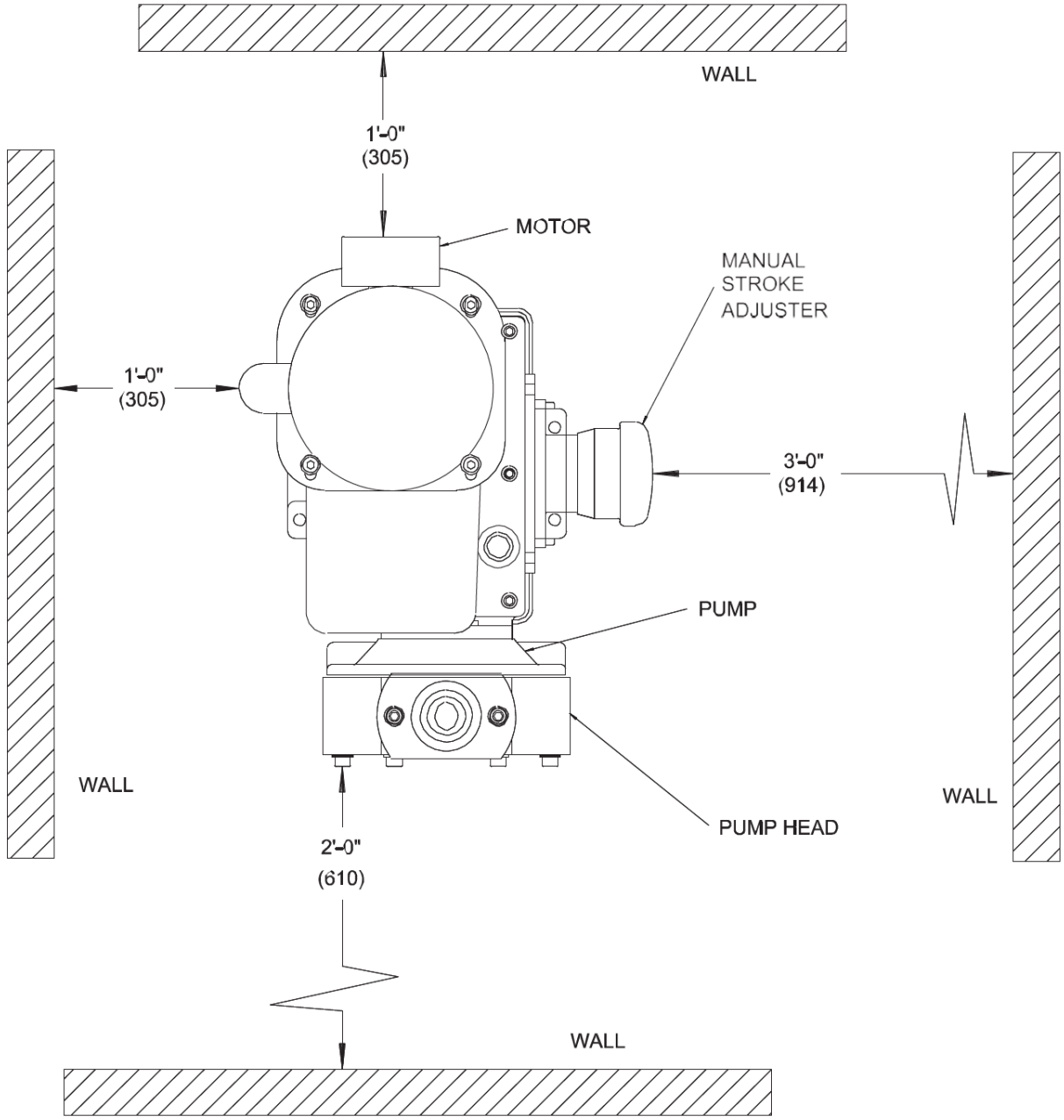
NOTE: Some chemicals (such as sodium hypochlorite) emit gas and could cause “air binding.” Follow installation Dwg. 440.400.110.050 and consult publication TA1055-A for additional tips.

Avoid operating problems by preventing the following:

- Unnecessary restrictions in piping
- Thin-walled hose, which may collapse due to a small cross-sectional area during suction stroke, thereby causing both a high pressure drop and velocity
- Difficult to vent bends in the line, where air may be trapped, impairing the accuracy of feed rate

If a storage container is used, the suction line should be connected above the container’s bottom to avoid any deposits on the bottom that can enter the suction line. Such deposits may damage the pump valves and impair the function of the pump.

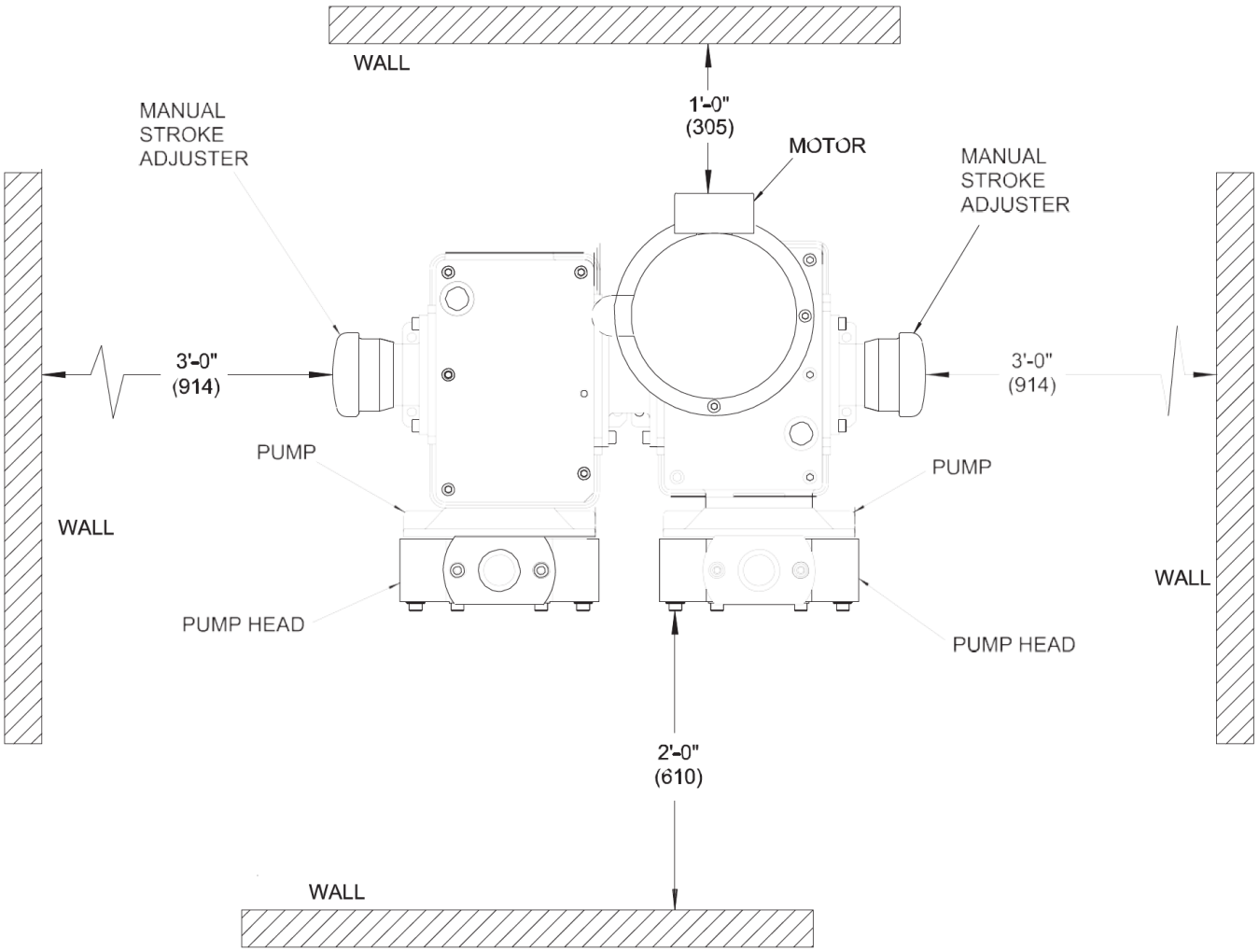
If the liquid to be pumped contains undissolved particles, install an adequately dimensioned strainer (preferably one size larger than the pipe diameter) in the suction line.



NOTES: ( ) INDICATES DIMENSIONS IN MILLIMETERS.
RECOMMENED MINIMUM HEIGHT FROM FLOOR TO VALVE CONNECTIONS SHOULD BE 12" (305).

SIMPLEXMANUALARRANGEMENT - SPACE
RECOMMENDATIONS

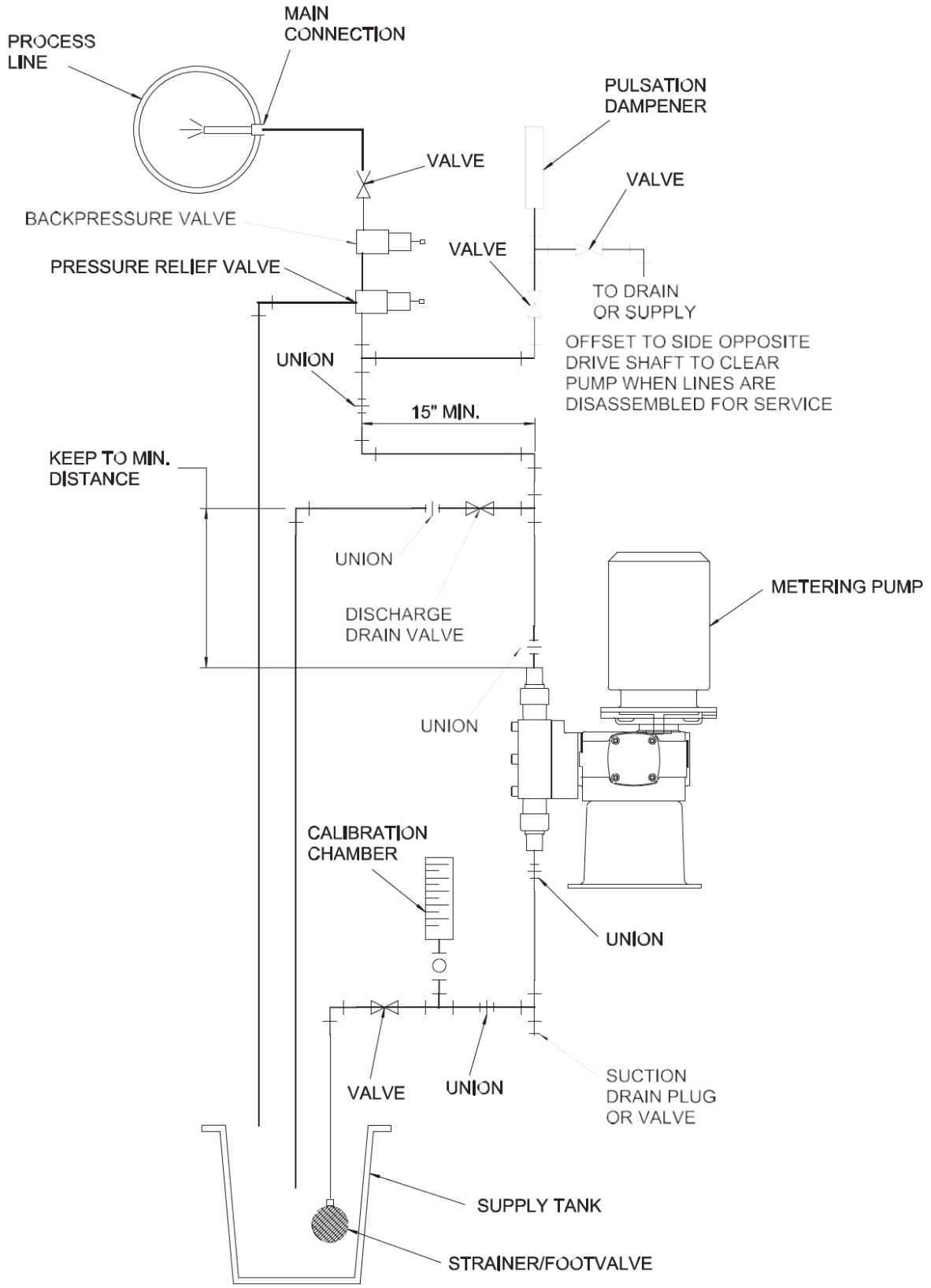
440.400.110.010
ISSUE 2 2-98



NOTES: ( ) IINDICATES DIMENSIONS IN MILLIMETERS.
RECOMMENED MINIMUM HEIGHT FROM FLOOR TO VALVE CONNECTIONS SHOULD BE 12" (305).

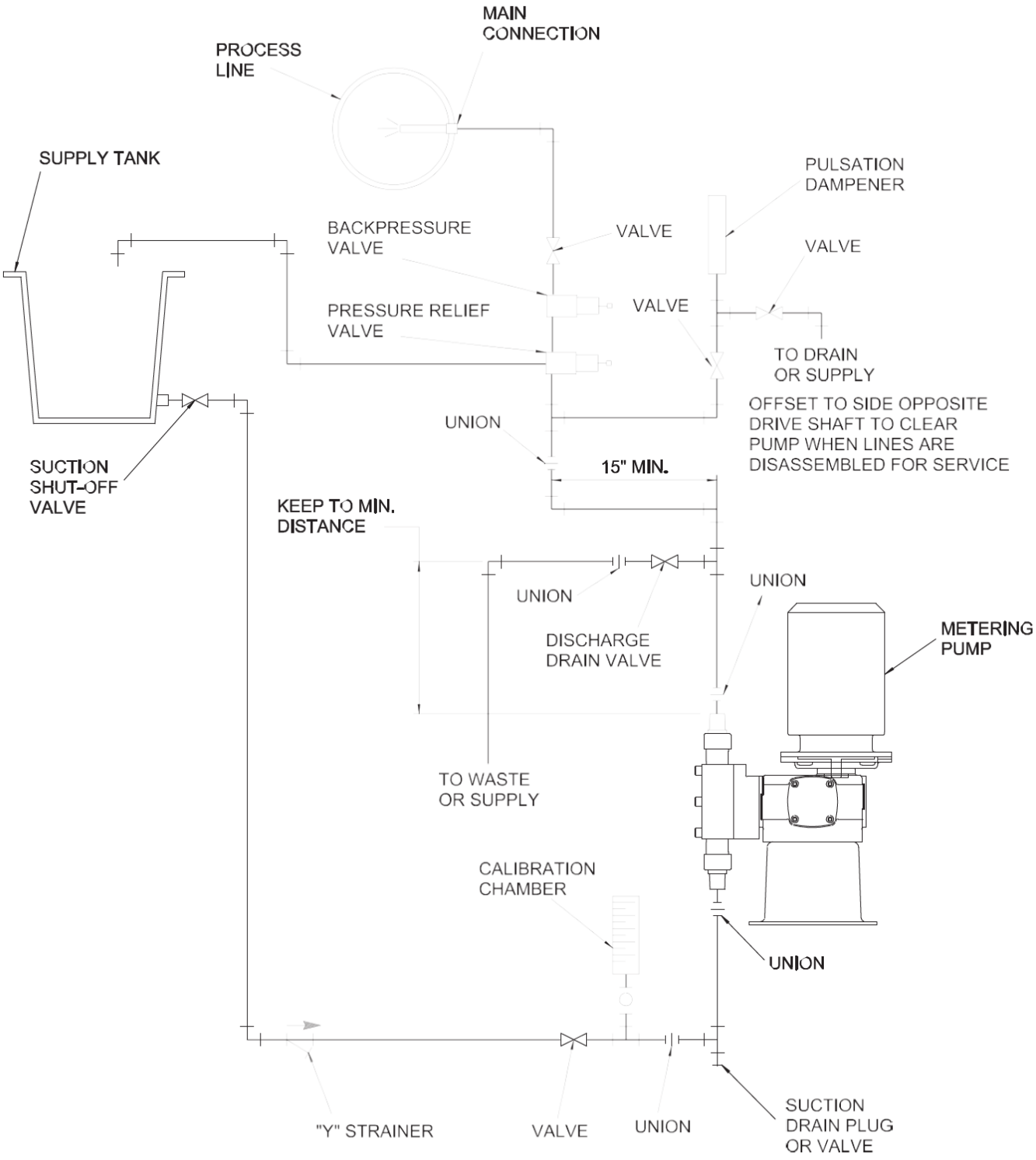
DOUBLE SIMPLEXMANUALARRANGEMENT - SPACE RECOMMENDATIONS

440.400.110.020
ISSUE 2 2-98



WARNING: **TO AVOID POSSIBLE SEVERE PERSONAL INJURY, WHEN HAZARDOUS CHEMICALS ARE PUMPED AND/OR ELEVATED TEMPERATURES/PRESSURES ARE ENCOUNTERED, USE RIGID PIPE.**

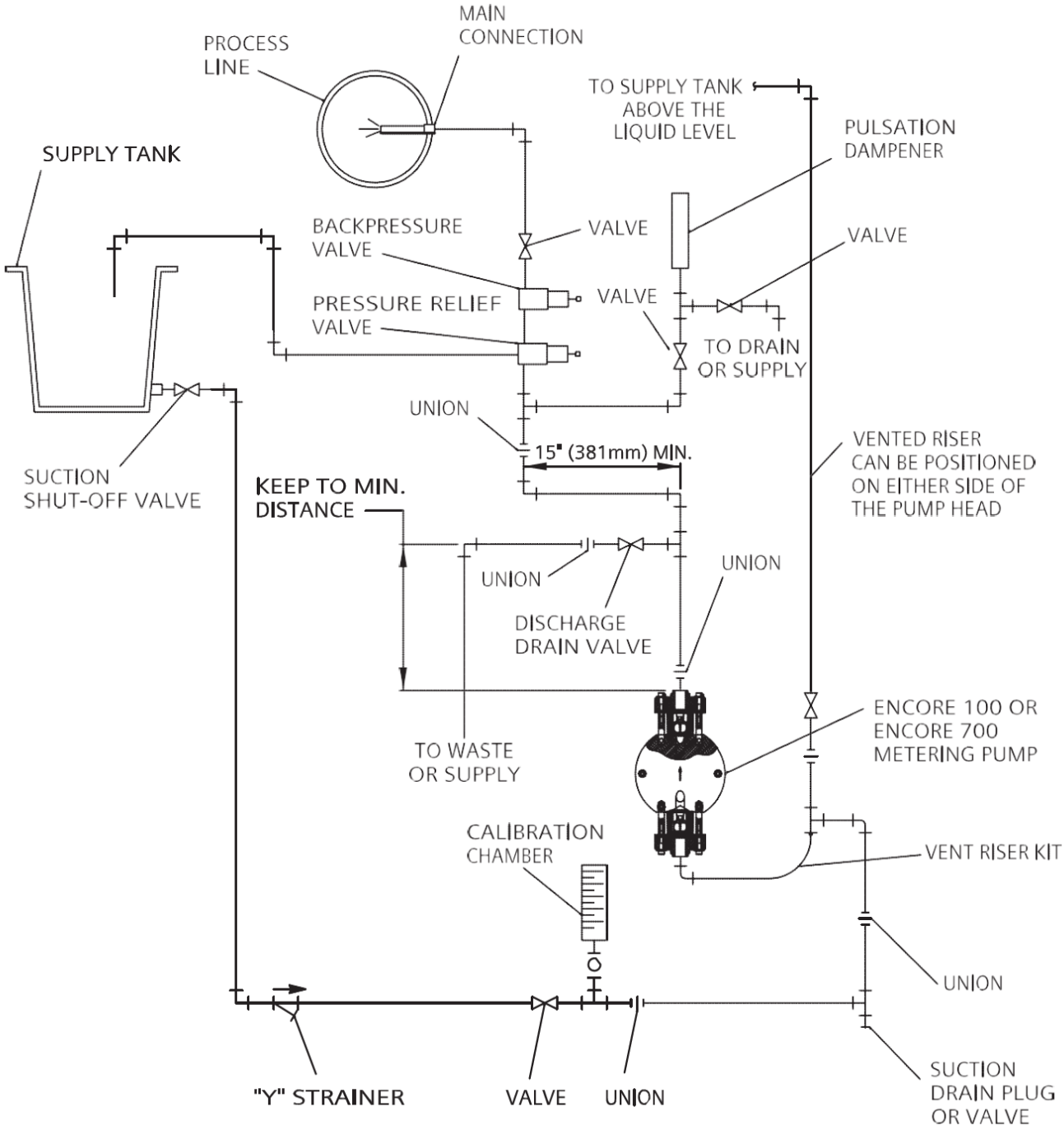
METERING PUMPS - TYPICAL INSTALLATION
- Suction Lift
440.400.110.030
ISSUE 1 2-98



WARNING: **TO AVOID POSSIBLE SEVERE PERSONAL INJURY, WHEN HAZARDOUS CHEMICALS ARE PUMPED AND/OR ELEVATED TEMPERATURES/PRESSURES ARE ENCOUNTERED, USE RIGID PIPE.**

METERING PUMPS - TYPICAL INSTALLATION
- Flooded Suction

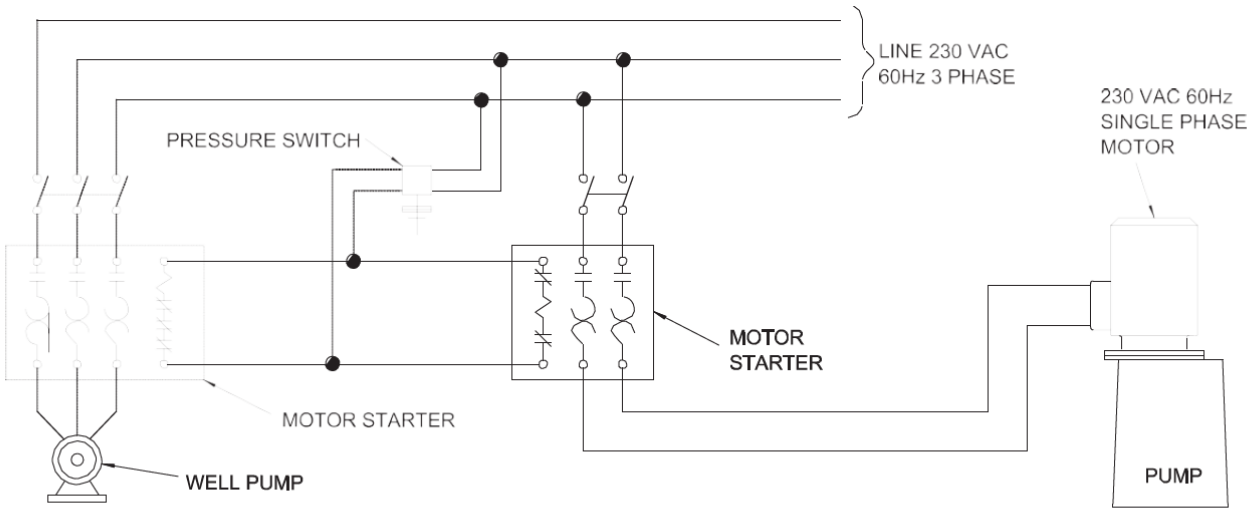
440.400.110.040
ISSUE 1 2-98

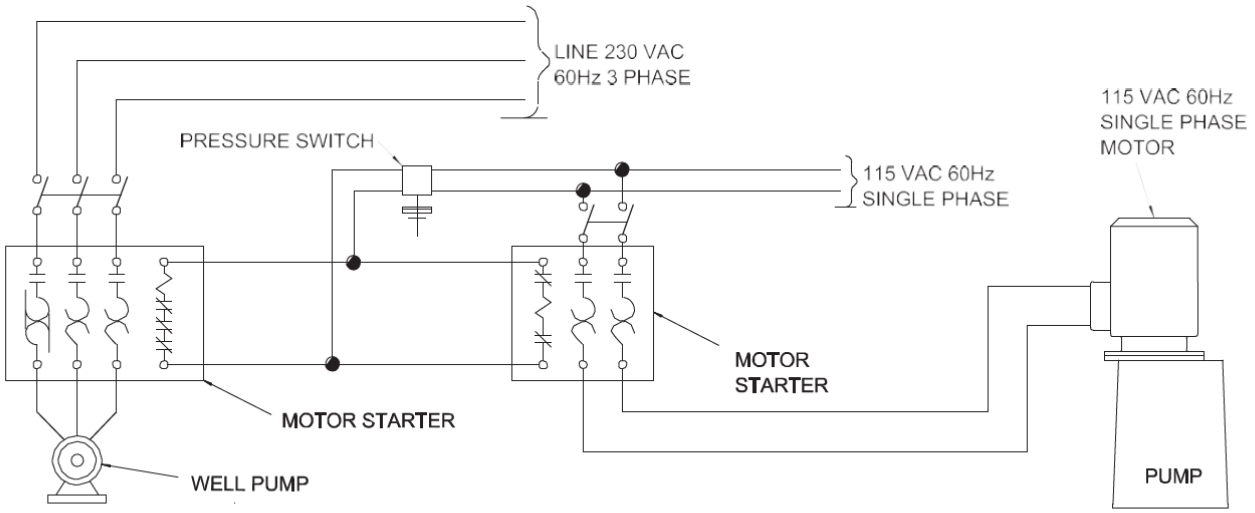


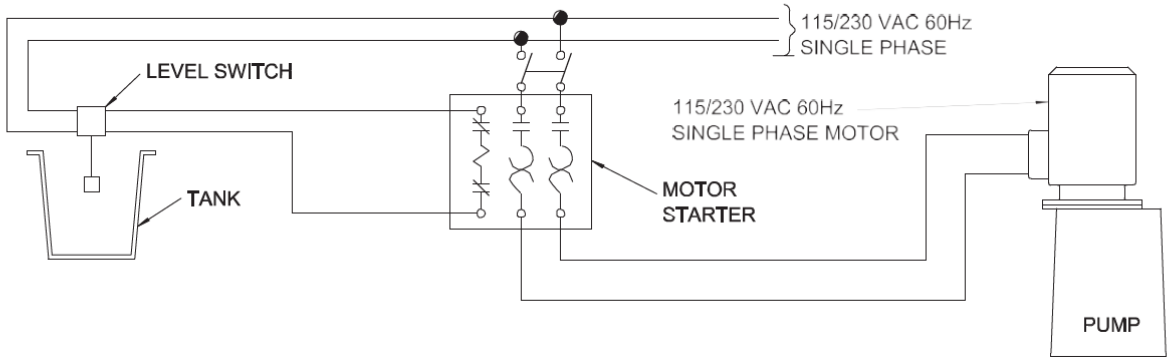
WARNING: **TO AVOID POSSIBLE SEVERE PERSONAL INJURY, WHEN HAZARDOUS CHEMICALS ARE PUMPED AND/OR ELEVATED TEMPERATURES/PRESSURES ARE ENCOUNTERED, USE RIGID PIPE.**

METERING PUMPS - TYPICAL INSTALLATION
- Flooded Suction & Vent Riser

440.400.110.050
ISSUE 1 2-06







NOTES: **FIELD WIRING (NOT BY WPS) MUST CONFROM TO LOCAL ELECTRICAL CODES. ALL VOLTAGES SHOULD BE 50/60 HZ.**

METERING PUMPS - INSTALLATIONWIRING
- For Intermittent Start-Stop Operation

440.400.130.010
ISSUE 3 4-09

Section 3 - OPERATION

a. Fill the solution container with solution.

WARNING: TO AVOID POSSIBLE SEVERE PERSONAL INJURY, USE EXTREME CARE TO AVOID CONTACT WITH THE MATERIAL. CONSULT YOUR CHEMICAL SUPPLIER FOR INSTRUCTIONS IN THE PREPARATION OF SOLUTIONS AND THE HANDLING OF CHEMICALS.

NOTE: Unless otherwise indicated, drawings referenced in this section are located in Section 5.

b. Remove the plug on top of the gearbox and replace it with breather cap (26, Dwg., 440.400.001.020A).

NOTE: The pump is shipped with the gearbox already filled with enough oil. However, checking the oil level at this time is an added precaution.

CAUTION: To avoid possible severe damage to the pump mechanism, do not run the pump without the gearbox filled with oil. The oil level must be up to the oil check hole.

c. Refer to Table 1.3 (in Section 1) to identify the belt location on the pulley to obtain the desired feed rate. Pumps delivered from the factory will have the belt located on the first step (top step of the pulley), which is the maximum speed setting. Install the belt guard before operating the equipment.

WARNING: TO AVOID POSSIBLE SEVERE PERSONAL INJURY, DO NOT RUN THE PUMP WITH THE BELT GUARD REMOVED.

d. Start the motor and operate the pump at a stroke setting of 100% of the scale until it is primed and ready for operation. The pump is designed to self-prime under a no backpressure condition; however, if difficulty is encountered in priming, check that the suction valve is not adhering to the suction valve seat. Refer to Section 4 - Service if the pump does not prime

Starting and Stopping the Pump

Turn the power supply to the pump on or off as needed.

Intermittent Start-Stop Operation (Refer to Dwg. 440.400.130.010 In Section 2)

Intermittent start-stop operation, also called semi-automatic operation, is simply the starting and stopping of the treatment (pump) in synchronism with an intermittent flow. This is accomplished by interrupting the electric current to stop the pump. The usual example calls for treating the discharge from a pumping system that starts and stops in response to predetermined variations in elevation or pressure of the liquid being treated.

Adjustment of Feed Rate

The feed rate of the pump is governed by the frequency of the pump stroke, the length of the pump stroke, and the strength of the solution to be fed.

Frequency of the Pump Stroke

Thefrequencyofthepumpstrokeisdeterminedbythegearratioof the speed reducer. Available speeds for the Encore 700 are listed in

Table 3.1: Table 3.1 - Pump Gear Ratios and Speeds

Available Gear Ratios	Number of Strokes at 1725 rpm, 60 Hz
10:1	144 spm (50Hz)
12:1	144 spm
24:1	72 spm
48:1	36 spm

If the pump is a pulley drive arrangement, each stroking speed can be further turned down. Refer to Table 1.3 (in Section 1) for further details on stroking speeds. If the pump is equipped with a variable speed drive, refer to the applicable instruction manual.

Length of the Pump Stroke

CAUTION: Toavoidequipmentdamage, donot forcethestrokecontrol above 100% or below the 0% position. If it is hard to turn, have the pump operating and then turn the stroke control knob.

- Manual Positioning: Pump stroke length is adjusted by turning the stroke control knob (47, Dwg. 440.400.000.010B). Percent stroke length is shown on the micrometer scale, which consists of a linear scale and a circular scale. Ten turns of the knob covers 0 to 100% of the stroke length. Numbers on the scale represent percent stroke. Each full turn of the knob will result in a 10% change of the stroke length. Each graduation on the circular scale on the knob is equal to 0.25%.
- Automatic Positioning: Pump can be equipped with an electric stroke positioner. If applicable, refer to the separate instruction manual provided with the equipment.

Strength of the Solution

Appropriate dilution of the solution will modify the concentration and, therefore, the feed rate. This will increase or decrease the amount of solution to be pumped per unit time. Adjusting the solution concentration can match the feed rate with the pump's capabilities and enhance the metering repeatability.

<u>WARNING:</u> TO AVOID POSSIBLE SEVERE PERSONAL INJURY, USE EXTREME CARE TO AVOID CONTACT WITH THE MATERIAL. CONSULT YOUR CHEMICAL SUPPLIER FOR INSTRUCTIONS IN THE PREPARATION OF SOLUTIONS AND THE HANDLING OF CHEMICALS.

Calibrating the Pump

Perform calibration on the suction side of the pump against actual back pressure, so that piping will not have to be disturbed nor the pumping process interrupted. Refer to Dwgs. 440.400.110.030 and 440.400.110.040.

To calibrate the pump, proceed as follows:

a. Close the chamber valve of the calibration chamber and fill the chamber to the top.

b. With the pump running, close the in-line valve upstream of the chamber and, at the same time, open the chamber valve.

c. Using a stopwatch, note the length of time required to drop the calibration chamber contents from the uppermost graduated line to a suitable graduated line lower on the chamber. Open the in-line valve and close the chamber valve to prevent air from being sucked into the suction line and interrupting the pumping cycle.

d. Divide the quantity withdrawn from the chamber in cc by the elapsed time in minutes to obtain the pump rate in cc/minute.

(cc / minute) x 0.38 = gallons per day (gpd)
or
(cc / minute) x 1.44 = liters per day

The theory of operation for the Encore® 700 Mechanical Diaphragm Metering Pump is addressed by discussing the operation and interrelationships of the following assemblies:

- Pump Drive Mechanism
- Speed Reducer
- Stroke Control Mechanism
- Liquid Ends (including head, valves, and connections)

The Encore® 700 metering pump is comprised of a liquid end and a pump drive mechanism. The stroke length can be varied either manually or with an optional electric stroke positioner. The pump is driven by an electric motor that can be coupled either directly to the worm shaft (refer to Dwg. 440.400.001.010A) or indirectly by a pulley drive arrangement (refer to Dwg. 440.400.001.020A). The pulley drive arrangement provides a wide range of stroking speeds with the same gear ratio and, therefore, a wide range of capacities. A double simplex arrangement is also available (refer to Dwg. 440.400.000.020A).

Pump Drive Mechanism (Refer to Dwg. 440.400.000.010B)

The pump drive mechanism is contained within the gearbox. The motor rotates the worm wheel through the worm shaft. Worm wheel is coupled to the variable eccentric non-loss-motion mechanism, which rotates along with it, converting the rotational motion into the reciprocating motion of the crosshead (27) through a connecting rod (31). The crosshead provides a link between the connecting rod and the liquid end. Stroke length of the pump can be changed from 0 to 100 % by turning the stroke control knob (47).

Speed Reducer (Refer to Dwgs. 440.400.000.010A)

The pump stroking speed is obtained through gear ratios, which provide 36 spm, 72 spm, and 144 spm. Each stroking speed is available in a pulley drive configuration or a direct drive configuration. The four-step pulley combination provides additional stroking speed with each gear ratio.

Stroke Control Mechanism (Refer to Dwg. 440.400.000.010B)

The stroke control mechanism consists of a triangular knob (47) secured to the bearing carrier (22), which is bolted to the eccentric shaft (45) and turns on threads through a double row bearing (19) inside the stroke control housing (25). The stroke control housing has a linear scale showing 0 to 100%. This scale indicates the percent stroke length of the pump. Combination of a linear scale (0 to 100%) on the stroke control housing and a circular scale (0 to 10) provides an accurate micrometer-type setting of the stroke, with a resolution of 0.25%.

Liquid Ends

NOTE: Refer to the List of Contents for Section 5 - Illustrations toidentify the applicable drawings.

The Encore® 700 metering pump offers six different sizes of liquid ends to provide awide range ofcapacities andpressures. The simplexarrangement has a capacity up to 317 gph and pressure up to 175 psi. Teflon-faced diaphragms are used as pumping diaphragms to provide metering accuracy as well as chemical compatibility. Six sizes of Teflon-faced diaphragms are available: 1-3/8", 2", 3", 4", 5", and 6-1/2". A variable eccentric mechanism is mechanically connected to the Teflon-faced diaphragm by a crosshead. A secondary seal mounted on the crosshead isolates the gearbox from the liquid end. Table 1.3 (in Section 1) provides further details on capacity and pressure capabilities for each liquid end. Cartridge valves are used on all the liquid ends to provide ease of service and field maintenance. Threaded valves are available on 1-3/8" and 2" heads only. Clear valve housings assist in checking the valve performance, providing built-in sight flow indication (except for the 6-1/2" head).

Section 4 - SERVICE

WARNING: TO AVOID POSSIBLE SEVERE PERSONAL INJURY OR EQUIPMENT DAMAGE FROM BEING SPRAYED WITH LIQUID UNDER PRESSURE, PRIOR TO DISASSEMBLY OF PIPE CONNECTIONS, REFER TO DETAILED INSTRUCTIONS ON RELIEVING PRESSURE AND DRAINING.

General

Routine maintenance of the metering pump consists of two operations:

- Periodic cleaning: To remove contaminants and deposits formed on parts in contact with the solution.
- Periodic preventive maintenance: To disassemble, inspect, clean, and replace recommended parts.

Corrective maintenance is performed (as required, at unscheduled intervals) to correct a discrepant operating or non-operating condition. A troubleshooting table (refer to Table 4.3) lists possible fault conditions and corrective actions as a guide for service personnel.

Periodic Cleaning

Cleaning Pumping Head Parts If difficulty is encountered in pumping the solution where hard water is known to have been used in the preparation of the solution, remove the pumping head parts for cleaning (refer to paragraph 4.3.4). The effects of hard water are indicated by a white coating on all parts in contact with the solution. This coating is most easily removed by soaking the parts in 5% hydrochloric acid, commonly obtainable in drug stores. The commercial grade of hydrochloric acid-known as muriatic acid-is also suitable for this purpose. Where the above condition is known to exist, pump the acid solution through the pump head for approximately five minutes as a periodic preventive maintenance procedure.

WARNING: TO AVOID POSSIBLE SEVERE PERSONAL INJURY, USE EXTREME CARE TO AVOID CONTACT WITH THE MATERIAL. CONSULT YOUR CHEMICAL SUPPLIER FOR INSTRUCTIONS IN THE PREPARATION OF SOLUTIONS AND THE HANDLING OF CHEMICALS.

Cleaning Clogged Solution Tube

Where solution joins water being treated and that water contains considerable hardness, there may be a deposit formed inside the solution tube at the point of application. In time, this can completely plug this tube and the deposit must be removed. The best method is by dissolving the deposit as described in paragraph 4.2.1. Where this condition is known to exist, clean the solution tube as a part of routine maintenance.

Periodic Preventive Maintenance

To minimize unscheduled shut down and ensure maximum service life, perform periodic maintenance at specified intervals while the equipment is in satisfactory condition. Table 4.1 lists the intervals, maintenance operation, and the preventive maintenance kits required. Before starting the work, ensure that the appropriate preventive maintenance kits are in stock. Refer to Section 6 - Preventive Maintenance Kits and Spare Parts List for the appropriate maintenance kit.

NOTE: Although all parts are designed for long service life, it is recommended that routine maintenance be performed to safeguard against unexpected downtime.

Table 4.1 - Scheduled Maintenance Index

Interval	Maintenance Operation	Preventive Maintenance Kit
Annually	Replace PTFE diaphragm, PTFE disc (between diaphragm and back-up ring), and crosshead bellow seal.	Diaphragm Maintenance Kit
	Replace valve sets, which include the seat, ball, retainer/ guide, and O-rings.	Valve Kit (Double ball valves: 2 kits required)
	Lubricate (refer to paragraph 4.3.1).	Food-grade synthetic oil AAA5499 (W2T10431) (optional) SAE85W90 Mineral Gear Oil (2 qts)
	Replace belt.	APS4857
Six Months	For slurry application or other abrasive chemical, replace valve sets every six months.	Valve Kit (Double ball valves: 2 kits required)

Gearbox Lubrication (Refer to Dwg. 440.400.000.010)

The gearbox is filled with approximately two quarts of mineral oil SAE85W90 gear oil. This lubricant must be replaced annually to realize optimum performance of the mechanism. The first oil change is recommended after six months of operation. If synthetic oil (AAA5499) is used, change the oil every three years of operation, with the first oil change after three months of operation.

NOTE: Do not mix synthetic oil with mineral oil.

To drain and replace the gearbox oil, perform the following steps:

a. Remove the oil drain plug (33) located at the bottom of the side wall of the gearbox (toward the stroke control knob). Catch the oil with an appropriate container.

b. Let the oil drain completely and flush the gearbox using suitable detergents.

c. Apply Teflon tape to the oil drain plug and install it to the gearbox.

d. Remove the breather cap (44) located at the top of the gearbox cover and the oil check plug (36) located at the center of the gearbox side wall (toward the stroke control knob)

e. Fill the gearbox with oil (SAE85W90) until the oil flows out of the oil check hole.

f. Apply Teflon tape to the oil check plug; thread and tighten.

g. Install the breather cap.

Priming Troubles or Loss of Suction

Difficulties in priming are usually encountered when there is an air leak in the suction line or when the valves are obstructed. Air leaks in the suction line may be due to a loose valve, O-ring damage, cracked tubing, or leaking joints in the pipe thread connections. Obstruction on the valves may be caused by foreign material or by deposits on the pumping head parts.

Where liquid is withdrawn from containers that are replaced when they are empty, or if the level in a fixed tank occasionally falls below the suction line inlet, air will be introduced into the pump. If the pump is discharging against atmospheric pressure (or only slightly above), the pump may be expected to reprime itself if the liquid supply is replenished and it is operated briefly at full stroke. If discharging against greater pressures, the pump will not reprime itself due to compression and re-expansion of the air trapped in the pump head.

If the system is installed in accordance with Dwgs. 440.400.110.030 or 440.400.110.040 (located in Section 2 - Installation) using a backpressure valve and/or pressure relief valve, the discharge drain valve may be opened to allow the pump to prime against atmospheric pressure. Once primed, close the discharge drain valve to resume normal operation.
If no backpressure and/or pressure relief valve are used, repriming is greatly simplified if a three-way valve is installed in the discharge line close to the pump outlet. This valve normally passes the pump output to the downstream tubing or pipe. When repriming is desired, the valve is turned to divert the pump output back to the liquid container, the downstream pressure is blocked off, and the pump operates at atmospheric discharge pressure. When a flow of

liquid is observed returning to the source container, the pump is reprimed. The three-way valve is then turned back to its normal position and pump delivery can continue.

If an appropriate three-way valve is unavailable, the same result can be achieved by using two conventional shut-off valves. One is placed in the discharge line and other on the side opening of a tee located immediately upstream of the line valve.

Hazardous Properties of Sodium Chlorite (NaClO2)

<u>WARNING</u>: TO AVOID POSSIBLE SEVERE PERSONAL INJURY, AS THE STORAGE AND HANDLING OF SODIUM CHLORITE PRESENTS VERY SPECIFIC HAZARDS, THE USER MUST SEEK THE ADVICE OF THE CHEMICAL SUPPLIER WITH REFERENCE TO STORAGE FACILITIES, HANDLING PRECAUTIONS, AND HEALTH HAZARDS.

Sodium chlorite is a dry, flaked salt that, because of its powerful oxidizing nature, is shipped in steel drums bearing a DOT “yellow” label classification. It is stable when sealed or in solution, but is very combustible in the presence of organic material. For this reason do not allow the solution to dry out on floors. Mop up the solution with technical sulfite solution.

Technical sodium chlorite is a white, flaked salt with a density of approximately 56 lbs per cubic foot. It is a very powerful oxidizing agent.

Sodium chlorite in contact with acid will react with rapid evolution of chlorine dioxide gas. When heated above 347°F, sodium chlorite will decompose rapidly liberating oxygen with the evolution of sufficient heat to make the decomposition self-sustaining. If this decomposition is confined, as in closed containers, the effect is explosive. Therefore, it must be protected at all times from exposure to heat.

Sodium chlorite dissolves easily in water at ordinary temperatures to form a cloudy, white solution. This solution is chemically stable under ordinary conditions of temperature and pressure.

When received in loose flake form in metal containers, sodium chlorite will stand considerable rough handling. In scooping or weighing out the material, avoid contact with eyes, skin, mucous membranes, and clothing. Wash contaminated clothing quickly and thoroughly with water to avoid fire.

The danger lies in the fact that sodium chlorite in contact with or mixed with organic substances, such as clothing, cloth gloves, cotton waste, sawdust, mops, brooms, etc., becomes extremely sensitive to any agent, such as heat, friction, or impact, and these exposed organic substances will ignite readily when any of these are applied accidentally or otherwise. The finer the sodium chlorite is sub-divided, as is the case when sodium chlorite solution is left to evaporate and the more intimately it is mixed with the organic substance, the more sensitive to heat it becomes. Although, in practice, spontaneous ignition of such mixture is unlikely, it is theoretically possible for such a reaction to occur. Therefore, extreme care must be used to prevent sodium chlorite flakes or sodium solution from coming in contact with combustible material, especially fibrous or finely divided material.

Cleaning the Pump - Sodium Chlorite Applications - Special Precautions

<u>WARNING:</u> SODIUM CHLORITE, WHEN FINELY DIVIDED IN THE PRESENCE OF ORGANIC COMPOUNDS, IS A POSSIBLE FIRE HAZARD. FOR THIS REASON, EXTREME CARE MUST BE EXERCISED TO PREVENT SOLUTIONS FROM DRYING OUT IN THE THREADED PORTIONS OF THE PUMP BODY AND RELATED PARTS. OBSERVE CAREFULLY THE MANUFACTURER/ SUPPLIER'S RECOMMENDED SAFETY PROCEDURES AND THE HANDLING AND STORAGE PROCEDURES IN THIS MANUAL.

Perform pump cleaning procedures in accordance with the following steps. When procedures require pump disassembly, refer to paragraph 4.4.1 - Removing Pump From Service. Refer to Dwg. 440.400.150.010 as a guide during this procedure.

a. Transfer the suction line to a container of water and pump water until all the sodium chlorite in the pump and discharge lines has been replaced by water.

b. Place a container under the pump head, then remove the suction line.

c. Shut-off the discharge line valve.

d. Relieve the pressure and drain the discharge line between the pump and the discharge line shut-off valve.

e. Remove the pump head. Flush away any spilled solution not caught in the container with ample quantities of water.

f. Immerse the pump head, valves, and lines that were removed in lukewarm water for two minutes.

g. Unscrew the threaded parts under water.

h. Rinse all the parts in fresh water before reassembly.

i. Use water to prime the pump, then transfer the suction line to the sodium chlorite solution container.

Inspection

After the disassembled parts are cleaned and prior to reassembly perform the following procedure:

a. Check for physical damage of removed parts (chipped, cracked, damaged threads, etc.). Replace damaged parts.

b. Discard and replace all removed O-rings, seals, and gaskets.

c. Check diaphragms for chafing or cracking. Replace damaged diaphragms.

Corrective Maintenance

WARNING: TO AVOID CONTACT WITH THE MATERIAL AND POSSIBLE SEVERE PERSONAL INJURY WHEN SERVICING HEADS AND/OR VALVES, FOLLOW THE PROCEDURES IN THIS SECTION FOR DISASSEMBLY.

WARNING: USE EXTREME CARE TO AVOID CONTACT WITH THE MATERIAL AND POSSIBLE SEVERE PERSONAL INJURY. WHEN HANDLING HAZARDOUS MATERIAL, OBSERVE ALL SAFETY PRECAUTIONS RECOMMENDED BY THE MATERIAL MANUFACTURER/ SUPPLIER.

CAUTION: To prevent possible equipment damage, the solution must never be allowed to freeze in the pump. If freezing conditions are present when pump is shut off, drain pump head and all solution lines.

Corrective maintenance is performed as required to correct a discrepant operating or non-operating condition. A troubleshooting table is provided to guide service personnel in diagnosing and correcting most common troubles. Routine maintenance procedures include the elimination of solution leaks when they are found, to avoid corrosion damage. Flush away spilled solution with water and wipe the parts clean and dry.

Maintain gasketed joints in good condition. Keep an adequate supply of gaskets and O-rings available so that repair of leaks can be accomplished without delay. It is a good practice to discard used gaskets and O-rings, replacing them with new material each time a joint is broken.

Removing Pump From Service and Disassembling Valves, Head, and Diaphragms

<u>WARNING</u>: USE EXTREME CARE TO AVOID CONTACT WITH THE MATERIAL AND TO AVOID POSSIBLE SEVERE PERSONAL INJURY WHEN USING HAZARDOUS MATERIAL. OBSERVE ALL SAFETY PRECAUTIONS, INCLUDING USING APPROPRIATE PROTECTIVE CLOTHING AND EYE PROTECTION WHEN HANDLING HAZARDOUS MATERIAL.

Procedures for the assembly and disassembly of parts for pump corrective maintenance are referenced in the following paragraphs.

Draining System of Hazardous Material

<u>WARNING:</u> TO AVOID POSSIBLE SEVERE PERSONAL INJURY FROM BEING SPRAYED BY LIQUID UNDER PRESSURE, ALLOW THE SYSTEM TO DRAIN FULLY BEFORE ATTEMPTING TO DISASSEMBLE PIPING AND REMOVING VALVES AND/OR HEAD.

a. Disconnect power from the pump.

b. Close the discharge shutoff valve.

c. For flooded suction, close the suction shutoff valve to prevent the backflow of liquid when suction lines are opened. (Refer to Dwg. 440.400.110.040 in Section 2.)

d. Open the suction drain valve and drain the suction line of liquid.

e. Open the discharge drain valve to relieve pressure and drain the discharge line.

f. Open the bypass valve in the pressure relief valve.

g. If a pulsation dampener is used, close off its valve when pressure has reached zero.

Removing Suction and Discharge Valves

<u>WARNING:</u> TO AVOID POSSIBLE SEVERE PERSONAL INJURY, USE EXTREME CARE TO AVOID CONTACT WITH LIQUID PRESENT IN THE HEAD. ALLOW THE SUCTION VALVE TO FALL INTO A SUITABLE CONTAINER AND CATCH THE LIQUID.

<u>WARNING:</u> TO AVOID POSSIBLE SEVERE PERSONAL INJURY, USE EXTREME CARE TOAVOIDCONTACT WITHTHE LIQUID PRESENT BETWEEN THE DISCHARGE DRAIN VALVE AND THE UNIT BELOW. FLUSH ANY SPILLED LIQUID IMMEDIATELY.

- Cartridge Type Valve (refer to the Cartridge Liquid End parts drawings in Section 5):

a. Loosen the two screws located on the clamping block.

b. Slide the clamping block up.

c. Pull the valve cartridge out.

d. Slide the seat out of the cartridge to remove the ball.

<u>NOTE:</u> On the 1-3/8”, 2”, 3”, 4”, and 5” heads, the solution valve, guide, and retainer are molded as one piece. Slurry valves and spring loaded polymer valves have a separate guide assembled inside the clear PVC retainer. On the 6.5” head, the retainer is machined and is opaque.

• Threaded Type Valve (refer to the Threaded Type parts drawings in Section 5):

a. Unscrew the valves from the head.

b. Remove the seats and guides.

c. Flush and clean the valves.

Removing the Diaphragm

a. Remove the suction and discharge valves as described in paragraph 4.4.3.

b. Remove the head screws, washers, and the pump head.

c. Unscrew the diaphragm assembly by rotating it counterclockwise.

Valve and Diaphragm Replacement

NOTE: The 1-3/8", 2", 3", and 4"diaphragms utilize a circular back-up ringscrewed onthe diaphragm insert. When replacing the diaphragm, unscrew the back-up ring for reuse. A Teflon disc is inserted between the diaphragm and the back-up ring. A new Teflon disc must be used every time a new diaphragm is installed. For specific part numbers on the diaphragm, back-up ring, and Teflon disc, refer to the Spare Parts List in Section 6.

All O-rings must be lightly lubricated with silicone grease before assembly.

The assembly procedure for the cartridge or the threaded valves is the reverse of the disassembly procedures described inparagraph 4.4.3. Refer to Table 4.2 under head size for the corresponding torque to tighten the clamping bolts for the cartridge valves.

Refer to Dwg. 440.050.001.030 for the 1-3/8" Diaphragm and Dwg. 440.050.001.040 for the 2" Diaphragm. Use the 2" Diaphragm drawing as reference for all other sizes.

a. After the removal of the diaphragm assembly, as described in paragraph 4.4.4, the bellow clamp (4) can be removed. On the 1-3/8" Diaphragm, the bellow clamp (3) is secured by a nut (4). The diaphragm spacer (5), if used, can also be removed.

b. Remove four screws (3) and slide out the adapter (1). On 1-3/8" Diaphragm, four long head bolts secure the adapter (1). Watch for the O-ring between the adapter and the gearbox.

c. Pry off the old bellow seal (2) from the adapter and scrape the old sealant from around the counterbore.

d. Clean the adapter thoroughly of oil with appropriate solvent, specially the counterbore where the bellow seal will be glued.

e. Apply a 1/16" bead of RTV sealant along the corner of the counterbore.

f. Install the new bellow seal carefully and avoid smearing any RTV on the folded surface of the bellow seal. Wipe off any excess RTV inside and outside of the bellow seal.

g. Set aside, face up, and let the RTV sealant cure for a minimum of three hours before continuing the assembly. Recommended time for RTV sealant to cure before filling the gearbox with oil is 12 hours.

NOTE: Adapters with bellow seals already glued and ready for assembly to the pump are available. See Table 6.2 (in Section 6) for kit number.

h. Clean the bellow clamp and remove any sharp edges along the area that makes contact with the bellow seal. Do the same to the plunger.

i. Apply silicone grease to the O-ring and position it into the gearbox.

j. Hold and centralize the plunger while inserting the adapter. Ensure that it fits freely into the gearbox.

k. Tighten the four bolts diagonally. On the 1-3/8” Diaphragm, temporarily secure the adapter in position.

l. Lubricate the bellow clamp and install it into the plunger, pressing lightly against the bellow seal. On the 1-3/8” Diaphragm, tighten the nut against the bellow clamp.

m. Install the diaphragm spacer, if used, and thread the diaphragm assembly to the plunger against the bellow clamp. Rotate the pump input shaft to extend the diaphragm for a better grip.

n. Turn the pump shaft until the diaphragm outer diameter is sitting flat, without strain, against the spacer.

o. Assemble the remaining parts in the reverse order in which they were disassembled.

Table 4.2 - Recommended Torque Values

	Recommended Torque	
Head Size	**Head Screws**	**Cartridge Valve Clamping**
1-3/8”	45 to 60 in-lbs	20 to 25 in-lbs
2”	45 to 60 in-lbs	
3”	60 to 70 in-lbs	
4”	60 to 70 in-lbs	
5”	60 to 90 in-lbs	
6-1/2”	60 to 90 in-lbs	

Disassembly of Complete Pump

<u>WARNING:</u> TO AVOID POSSIBLE SEVERE PERSONAL INJURY OR EQUIPMENT DAMAGE, TURN POWER OFF BEFORE SERVICING.

<u>WARNING:</u> TO AVOID POSSIBLE SEVERE PERSONAL INJURY FROM BEING SPRAYED BY LIQUID UNDER PRESSURE, ALLOW SYSTEM TO DRAIN FULLY BEFORE ATTEMPTING TO DISASSEMBLE PIPING AND REMOVING VALVES OR HEADS.

The procedures below describe a simplex arrangement with manual stroke control.

All O-rings must be lightly lubricated with silicone grease before assembly.

Under normal operating conditions, disassembly of the gearbox is not required. Should disassembly be necessary, proceed as follows:

- Gearbox Cover Removal (refer to Dwg. 440.400.001.010A or Dwg. 440.400.001.020A)

a. Remove the liquid end, which includes the valves, head, and diaphragm, as described paragraph 4.4.2.

b. For a direct drive, refer to Dwg. 440.400.001.010A. Remove the electric motor and set aside. Do not remove the coupling flange unless it is to be replaced. Remove the motor support (5), loosen the set screws, and remove the coupling flange. Proceed to step d.

c. For a pulley drive, refer to Dwg. 440.400.001.020A. Remove the belt guard (10), loosen the belt (9), and remove the electric motor. The pulley (2) need not be removed from the motor shaft unless it is being replaced. Loosen the set screws (8) on the worm shaft pulley (7) and pull out the pulley.

d. Unscrew all of the M8 screws that secure the cover (1, Dwg. 440.400.001.010A, or 22, Dwg. 440.400.001.020A) and pry it open with a suitable screwdriver. The complete mechanism is now exposed.

<u>NOTE</u>: Two slots are provided for this purpose, one in the front and one in the back. Silicone RTV is used as a seal and it requires a gentle tap to break the seal. Note the locations of the special washer and all the screws.

- Worm Shaft and Worm Wheel Removal (refer to Dwg. 440.400.000.010A&B)

a. Remove the gearbox cover, as described in step a, above.

b. Drain the gearbox oil.

c. Remove the worm shaft assembly (51) by pulling it up.

NOTE: Two bearings (6) and (7) and a shim combination (12-15) come out with the assembly.

d. Set the knob (47) to zero.

e. Remove the gear access flange (2) by unscrewing the four M8 screws (3).

f. Slide the worm wheel (50) and the drive bushing assembly (4) out through the flange opening.

NOTE: Mark the relative position of the drive bushing (4) and sheave (46) so that they can be reassembled at the same position.

g. On a bench, remove the taper roller bearing (30) from the drive bushing (4).

h. Unscrew the five M6 screws (10) (for 5" and 6-1/2" liquid end only) and remove the worm wheel (50).

- Worm Shaft and Worm Wheel Replacement (refer to Dwg. 440.400.000.010A)

a. Apply Blue Loctite thread locker (11) to the five M6 screws (10). Replace the worm wheel (50) and secure with screws (10).

b. Reverse the remaining procedures for replacement of the worm shaft and the worm wheel.

- Eccentric Assembly, Taper Roller Bearings, Connecting Rod, Stroke Control Housing, and Knob Removal (refer to Dwg. 440.400.000.010A&B)

a. Follow steps a through d of the procedure for worm shaft and worm wheel removal, above.

b. Remove the stroke control knob (47) by loosening the three set screws (48) just enough to slide the knob out. Do not screw all the way out, just flush with the surface of the knob.

NOTE: If the pump is equipped with an electric stroke positioner, refer to the applicable instruction manual.

NOTE: The set screws (48) are coated with Nylok™ to seal. If set screws were removed or are leaking, replace with a new one.

c. With a 6mm Allen wrench, remove one M8 screw (21) from the eccentric shaft (45), which is accessible through the carrier bearing (22) end opening. Hold the worm wheel (50) to keep the eccentric assembly from turning.

NOTE: If the pump is equipped with detent stroke mechanism, proceed to step e, if not, proceed to step d.

NOTE: Pumps with an Electric Stroke Positioner do not have detent stroke mechanism.

d. Turn the carrier bearing (22) counterclockwise until it comes all the way out, then proceed to step i.

e. Refer to Dwg. 440.400.000.030 for the next three steps f, g, and h.

f. Turn the carrier bearing (22) until the two detent pawls (52) are visible.

g. Hold the two detent pawls, they are pre-loaded with springs (53), and continue to turn the carrier bearing counterclockwise until the two detent pawls are free.

h. Carefully release and remove the two pawls and two springs and set aside. The carrier bearing can now be unscrewed completely out.

NOTE: The bearing(19) andtheflatwasher (20) neednot beremoved unless they are being replaced. A special wrench is needed to loosen or tighten the adjuster bearing (23) (AAA3731/W2T10059).

i. Unscrew the four M8 screws (49) and remove the stroke control housing (25).

j. Unscrew the pre-load nut (17).

k. Unscrew the four M8 screws (3) and remove the gear access flange (2).

l. Slide out the worm wheel (50) and the drive bushing assembly (4).

m. Holding the connecting rod assembly, slide the eccentric assembly out of the gearbox.

- Eccentric Assembly, Taper Roller Bearings, Connecting Rod, Stroke Control Housing, and Knob Replacement (refer to Dwg. 440.400.000.010B)

Reverse the removal procedures for the replacement of the item mentioned above, however, the following additional procedures must be adhered to:

a. Tighten the pre-load nut (17) just enough to eliminate axial movement of the eccentric assembly in step j, above. The eccentric shaft (45) must slide in and out without any binding.

NOTE: If the pump is equipped with detent stroke mechanism, proceed to step b, if not, proceed to step e.

NOTE: Pumps with an Electric Stroke Positioner do not have detent stroke mechanism.

b. Refer to Dwg. 440.400.000.030 for the next two steps, c and d.

c. Screw the carrier bearing (22) to the stroke adjust housing (25) up to the edge of the two holes for the detent pawls (52). Position the two holes so that they are horizontal.

d. Lubricate and install the spring, followed by the pawl, into the holes and hold them in position. Continue to turn clockwise to secure the pawls.

e. Continue to turn the carrier bearing (22) clockwise until it stops. The bearing (19) must be against the eccentric shaft (45) shoulder before tightening the screw (21) in step c, above.

f. Set the stroke position to approximately zero by turning the carrier bearing (22) counterclockwise until it stops. Then rotate the carrier bearing one turn clockwise.

g. Place a dial indicator with a magnetic base on top of the gearbox. Set the indicator shaft to indicate the eccentricity of the sheave (46), as shown in Figure 4-1.

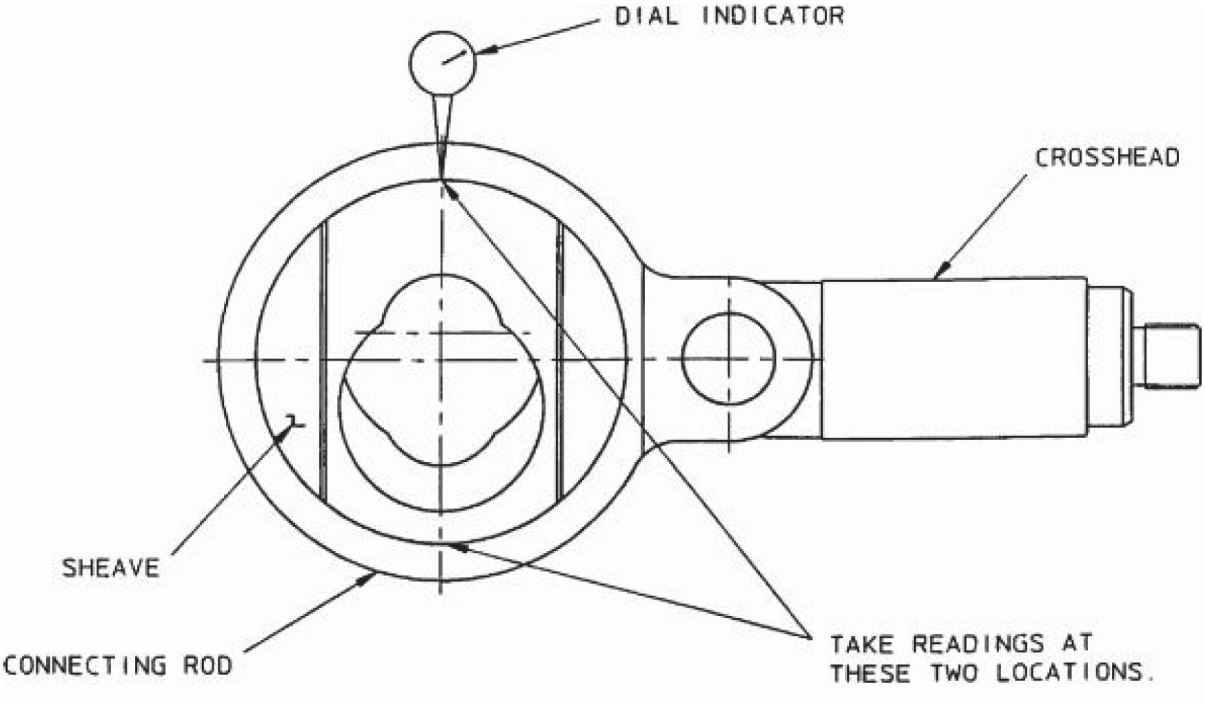


Figure 4-1. Eccentric Shaft Alignment

h. Rotate the eccentric shaft assembly (45) and take the indicator reading at two locations, 180° apart, and along the eccentric travel of the sheave.

i. Both readings must be the same. If the readings are different, turn the carrier bearing clockwise or counterclockwise until a point is found where the readings are the same.

j. If the pump is equipped with detent stroke mechanism, turn the carrier bearing clockwise to the nearest detent.

NOTE: Do not disturb this set position until the knob is secured at zero scale indication.

k. Apply silicone grease to the O-ring and install it in the groove in the stroke control housing.

CAUTION: The carrier bearing must not be disturbed while performing the next four steps.

l. Start the three M6 screws, with Nylok™ patch, in the knob.

m. Position the knob (47) over the stroke control housing with the zero graduation on the knob lined up with the center line of the stroke control housing scale, as shown in Figure 4-2.

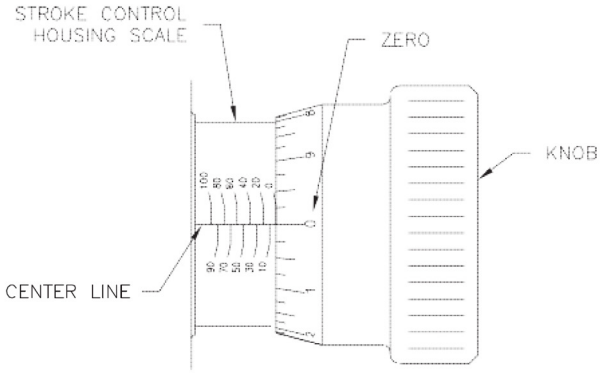


Figure 4-2. Stroke Control Alignment

n. Push the knob past the O-ring for manual position (quad-ring for automatic position) until the front edge of the knob is in line with the zero percent line on the stroke control housing scale.

o. Slide the knob, if necessary, to align the scales as shown in Figure 4-2. Tighten the three M6 set screws equally. Make sure the set screws that are used have a Nylok™ patch on the threads to prevent oil leakage

NOTE: All O-rings must be lightly lubricated with silicone grease before assembly.

- Gearbox Cover Installation for Direct Drive (refer to Dwg. 440.400.001.010A)

a. Position lower taper roller bearing to worm shaft and install to the gearbox.

b. Install shims and taper roller bearing.

c. Temporarily install the cover, tightening the four bolts closest to the worm shaft that threads to the gearbox.

d. Check that end play is within .005”. If not, select proper shims.

e. Remove the cover and apply grease to the top bearing.

f. Apply 1/8” bead of RTV around the top lip of the gearbox.

g. Install the cover and tighten all bolts.

h. Install one coupling flange to the worm shaft, tighten the two set screws.

i. Mount the motor support and secure with four M8 screws (longer screws to the outside, shorter screws to the inside).

j. Position the rubber coupling to the coupling flange.

k. Measure the distance from the top surface of the motor support to the top surface of the rubber coupling (“A” dimension) and add to this dimension the depth of the groove (“B” dimension). This groove is where the rubber coupling engages. Record this dimension (“A” + “B”). See Figure 4-3.

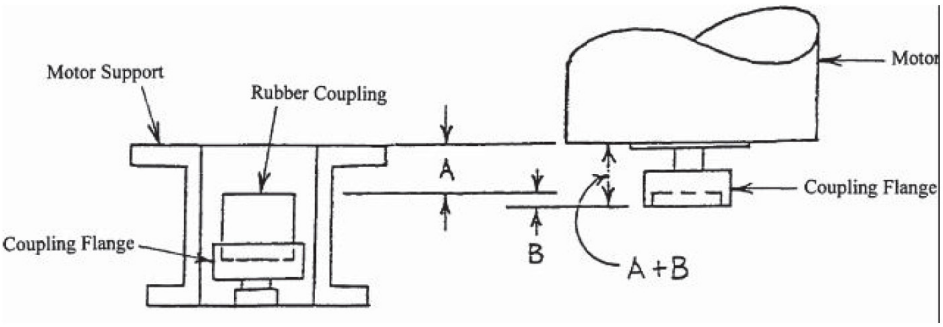


Figure 4.3 - Rubber Coupling Engagement

l. Position the other coupling flange to the motor shaft facing outward.

m. Locate the front face of the flange from the face of the motor according to the dimension (“A” + “B”), recorded above. Tighten the two set screws.

n. Carefully lower the motor to the motor support. It will drop into place once the coupling is engaged. A little twist of the motor while lowering it will help to engage the coupling.

o. Tighten the motor mounting bolts.

- Gearbox Cover Installation for Pulley Drive (refer to Dwg. 440.400.001.020A)

a. Position lower taper roller bearing to the worm shaft and install to the gearbox.

b. Install the shims and taper roller bearing.

c. Temporarily install the cover, tightening the four bolts closest to the worm shaft that threads to the gearbox.

d. Check that end play is within .005”. If not, select proper shims.

e. Remove the cover and apply grease to the top bearing.

f. Apply 1/8” bead of RTV around the top lip of the gearbox.

g. Install the cover and tighten all bolts.

h. Install the bigger pulley, smaller step on top, to the worm shaft all the way against the shoulder, and tighten the two set screws.

i. Thread the three stand-offs tight against the shoulder to the gearbox cover.

j. Mount the stand-off plate to the three stand-offs and secure with the three M8 flat head screws.

NOTE: There must be an electrical continuity between the stand-offs and the stand-off plate. Scratch off the paint under one of the bolt heads if necessary.

k. Place the belt around the front pulley.

l. Install the slide plate to the motor front face.

NOTE: The orientation of the motor junction box to the pump is established here. Electrical continuity between the motor and the slide plate is necessary.

m. Install the smaller pulley to the motor shaft and snug the set screw.

n. Position the motor assembly to the stand-off plate with the adjustment screw to the back of the pump.

o. Secure the slide plate to the stand-off plate with four M8 screws, flat washers, and lock washers. Do not tighten screws.

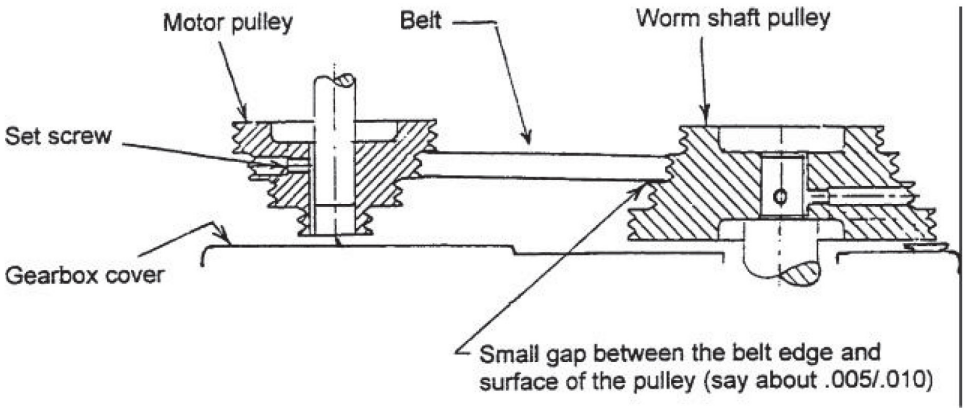
p. Position the belt on the top step of the pulley.

q. Adjust the belt tension by tightening the adjusting screw at the back of the slide plate, tighten the jam nut. Tighten the four M8 screws.

NOTE: The proper adjustment of the belt tension is when it stops "flapping" while the motor is running. Electrical continuity between the slide plate and the stand-off plate is necessary.

r. Loosen the set screw (3mm allen wrench) on the motor pulley just enough so it will not drop.

s. With reference to Figure 4-4, adjust the motor pulley so that there is a .005"/.010" gap between the belt edge and the pulley surface on the worm shaft.



t. Install the rear belt guard to the pump followed by the front belt guard and screw the two side screws. Make sure that the front belt guard catches the shoulder washer in front of the pump.

u. Screw the two cap screws that hold the rear belt guard and slightly push the front belt guard against the shoulder washer and tighten the two cap screws.

4.5 Troubleshooting

Troubleshooting of the Encore 700 Series Metering Pump consists of procedures and instructions for repair and/or replacement of subassemblies and components.

The troubleshooting procedures are limited to fault isolation toa defective item. Potential problems that could be at fault and recommendations for corrective action are listed in Table 4.3. Procedures are based on potential fault conditions that may occur under normal pump operation.

Table 4.3 - Troubleshooting

Fault Condition	Possible Cause	Corrective Action
No Feed Rate or Insufficient Feed Rate.	Zero or insufficient stroke length.	Adjust to proper stroke length.
	Ball valves on suction or discharge side do not close tightly.	Replace balls in valves. Remove possible deposits in valves or pump head. Replace pump head.
	Gas in suction line or pump head.	Check for cavitation and, if necessary, use a suction line with a larger inside diameter. Dilute the liquid (sodium hypochlorite).
	Air in suction line or pump head.	Bleed the suciton line and pump head.
	Supply tank is empty.	Fill supply tank.
	Shut-off valves in suction or discharge lines are closed.	Open valves.
	Strainer is clogged.	Clean strainer.
	Damaged drive mechanism	Check mechanism and replace defective parts.
No Feed Rate on Point of Application, Though Pump is Running.	Pressure relief valve is defective or misadjusted, so that the liquid flows back into thesupply tank.	Adjust pressure relief valve to proper relief pressure.
Liquid is Emerging From Pump Head Near the Diaphragm.	Broken diaphragm or broken crosshead oil seal.	Replace diaphragm, or replace oil seal.
Pump is Pumping Erratically or Feed Rate is Inaccurate.	No back pressure.	Install back pressure valve into the discharge line. Discharge pressure must be at least 15 PSI more than the suction pressure.
Erratic Diaphragm Movement or No Movement At All. Diaphragm Movement Does Not Correspond to the Stroke Length Setting of the Knob.	Adjuster bearing (23) is loose or completely unscrewed.	Remove the knob and tighten the adjuster bearing. Clean the threads of oil and apply “Locktite 242”.
Extremely Noisy or Hot Gear Box.	Insufficient lubrication or defective bearing(s).	Check oil level through oil check hole, if required, replace bearing(s).
	Incorrect worm shaft end play.	Add or remove shims to achieve proper clearance.
Motor Will Not Run.	Power off or fuse is blown.	Turn on the power. Replace the fuse after correcting the cause.

Table 4.3 - Troubleshooting (Cont'd)

Motor is Hot, But Starts	Overload protector has opened.	Check supply voltage. Check excessive pressure at point of application. Check binding pump mechanism.
Belt is Noisy.	Worn belt. Pulley misaligned. Pulley out of round; wobbly.	Replace belt. Adjust tension by the tensioning screw. Align pulley per procedure found on in Section 4.4.6 (Gearbox Cover Installation for Pulley Drive), steps q through u.

WARNING LABELS AND TAGS

The following warning labels and tags are attached to the equipment:

AAA3769:

THIS EQUIPMENT MAY HANDLE HAZARDOUS MATERIALS WHICH CAN CAUSE SEVERE PERSONAL INJURY. OBSERVE THE FOLLOWING:

THIS EQUIPMENT MUST BE INSTALLED, OPERATED, SERVICED BY TRAINED QUALIFIED PERSONNEL, WHO ARE THOROUGHLY FAMILIAR WITH THE CONTENTS OF THE INSTRUCTION BOOK.

TURN OFF POWER BEFORE SERVICING TO AVOID ELECTRICAL SHOCK.

USE RIGID PIPE WHEN PUMPING THE HAZARDOUSMATERIALS OR AT HIGH FLUID TEMPERATURE OR AT HIGH DISCHARGE PRESSURES.

REFER TO THE SAFETY PRECAUTIONS OF THE SUPPLIER OF THE HAZARDOUS MATERIAL AND THE EQUIPMENT INSTRUCTION BOOK FOR FURTHER IMPORTANT DETAILS AND PRECAUTIONS.

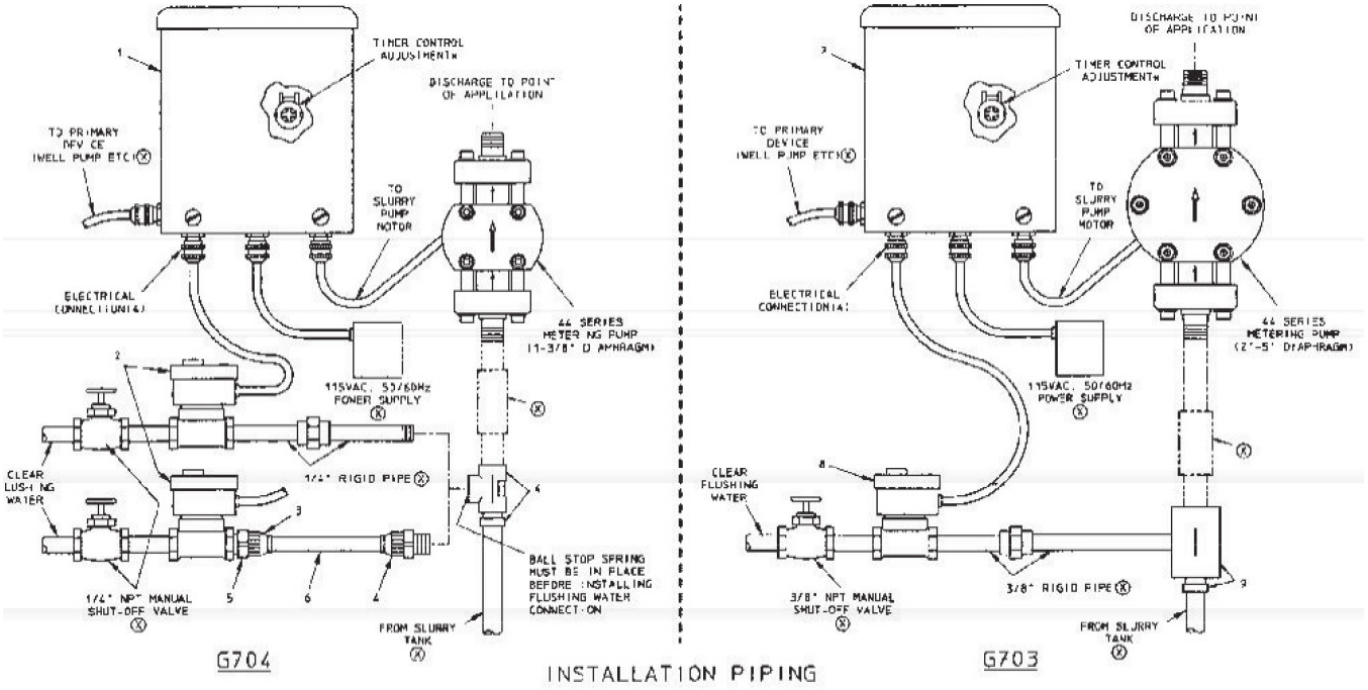
USE APPROPRIATE PROTECTIVE CLOTHING AND EYE PROTECTION, AS RECOMMENDED BY THE CHEMICAL MANUFACTURER.

AAA3759:

TO PREVENT POSSIBLE SEVERE PERSONAL INJURY DUE TO BEING SPRAYED WITH HAZARDOUS LIQUID UNDER PRESSURE DO NOT DISCONNECT DISCHARGE TUBE/PIPE/MAIN CONNECTION WITHOUT FIRST RELIEVING PRESSURE AND DRAINING DISCHARGE LINE. SEE INSTRUCTION BOOK FOR DETAILED GUIDANCE.

AEK3676:

TO AVOID POSSIBLE SEVERE PERSONAL INJURY FROM CONTACT WITH MOVING PARTS REPLACE GUARD AFTER SERVICING EQUIPMENT.



INSTALLATION PIPING

NOTE: SUFFICIENT FLUSHING WATER PRESSURE IS REQUIRED TO OPERATE FLUSHING SYSTEM. IF FLUSHING WATER SUPPLY PRESSURE IS LOW, PUMP MUST BE OPERATED NEAR MAXIMUM STROKE LENGTH AND MOTOR SPEED TO ENSURE SUFFICIENT PRESSURE IN PUMP HEAD.

Ⓧ NOT FURNISHED BY UGSI CHEMFEED, INC.

G704 (1-3/8" DIAPHRAGM)

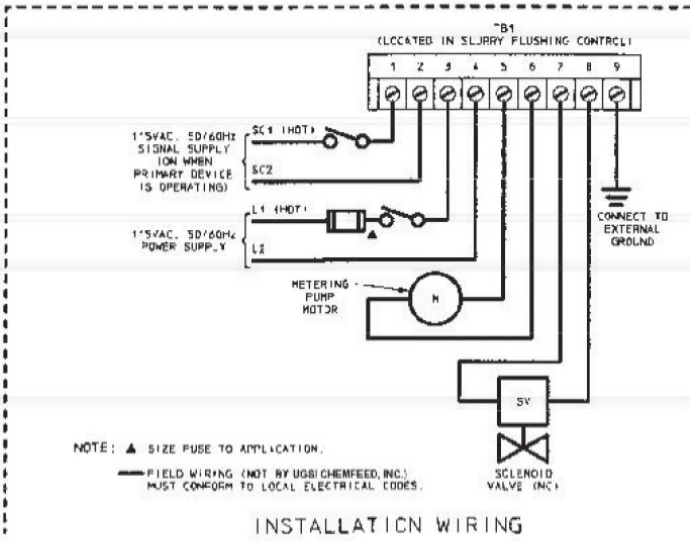
KEY NO.	PART NO.	QTY.	DESCRIPTION
1	U23906	1	FLUSHING CONTROL UNIT (SEE DWG. 440.300.002.010)
2	U21834	1	1/4" NPT SOLENOID VALVE (NC)
3	P39234	1	UNION NUT (3/8" OD TUBING)
4	U23830	1	FLUSHING CONNECTION (1/4" NPT) (SEE DWG. 440.050.050.070)
5	U39233	1	HALF UNION (1/4" NPT TO 3/8" OD TUBING)
6	RP68481B	SFT	POLYETHYLENE TUBING (1/4" ID X 3/8" OD)

G703 (2"-5" DIAPHRAGM)

KEY NO.	PART NO.	QTY.	DESCRIPTION
7	U23906	1	FLUSHING CONTROL UNIT (SEE DWG. 440.300.002.010)
8	U20743	1	3/8" NPT SOLENOID VALVE (NC)
9	U23829	1	FLUSHING CONNECTION (1" NPT) (SEE DWG. 440.050.050.065)

* OPERATION: 1) THE AUTOMATIC FLUSHING SYSTEM, UPON RECEIPT OF AN OFF SIGNAL FROM THE PRIMARY DEVICE, WILL CONTINUE TO OPERATE THE PUMP AND ENERGIZE THE SOLENOID VALVE FOR THE DURATION OF THE FLUSHING CYCLE.

2) TO ADJUST THE FLUSH CYCLE TIME, USE A SMALL SCREWDRIVER INSERTED INTO THE SLOT OF THE TIMER CONTROL. FULL COUNTERCLOCKWISE FOR ZERO TIME TO FULL CLOCKWISE FOR A MAXIMUM PERIOD OF APPROXIMATELY 120 SECONDS. FLUSHING CYCLE SHOULD BE LONG ENOUGH TO ENSURE PURGING OF THE SLURRY FROM VALVES AND HEAD.



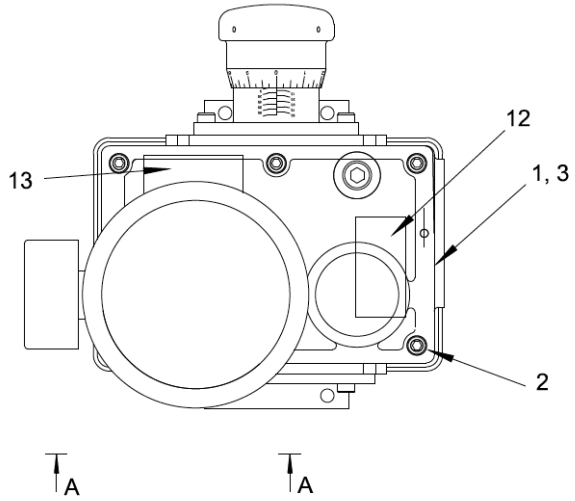
NOTE: ▲ SIZE FUSE TO APPLICATION.

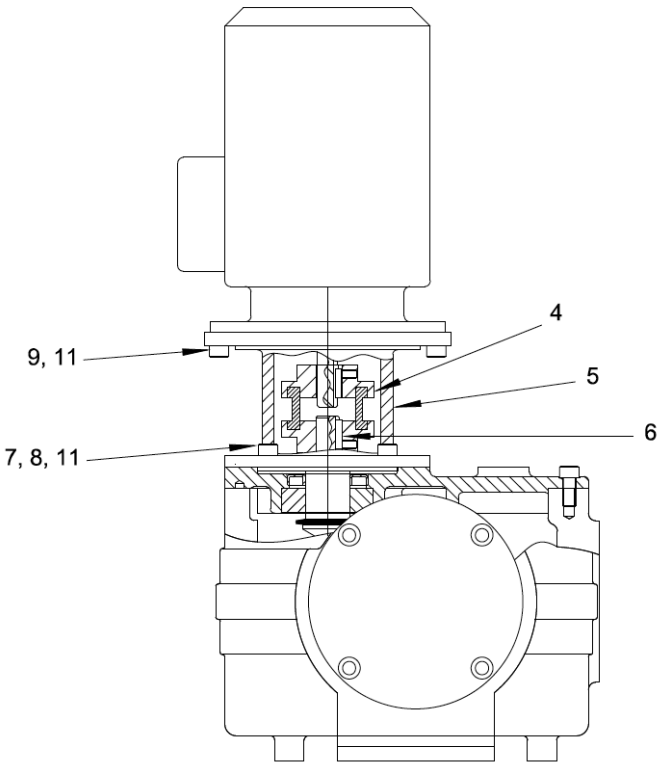
FIELD WIRING (NOT BY UGSI CHEMFEED, INC.) MUST CONFORM TO LOCAL ELECTRICAL CODES.

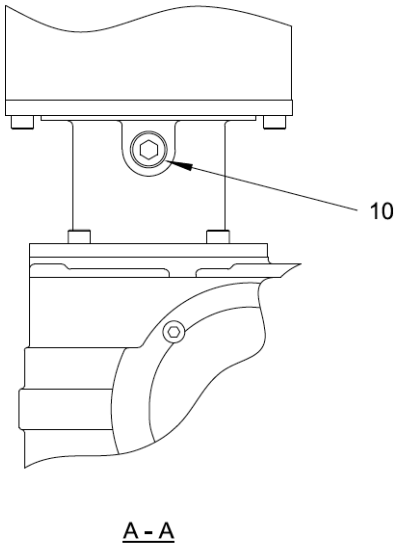
INSTALLATION WIRING

AUTOMATIC SLURRY FLUSHING
SYSTEM - SERVICE
440.400.150.010
ISSUE 1 10-12

Section 5 - ILLUSTRATIONS







NOTE: FOR PARTS LIST, SEE DWG. 44.400.001.015B.

DIRECT DRIVE - PARTS

440.400.001.015A

ISSUE 0 02-06

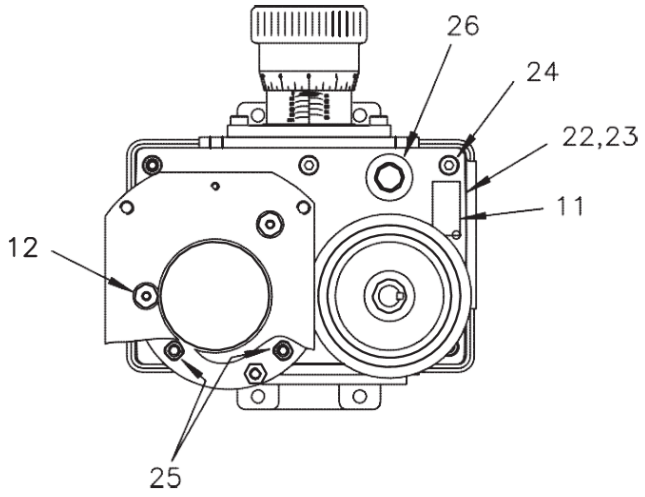
KEY NO.	LEGACY PART NO.	ALT. PART NO.	QTY.	DESCRIPTION
• 1	ARQ5712	W2T367161	1	Cover, Simplex, Direct Drive
• 2	AXS3656	W2T11182	4	Scr., Cap, M8 x 20, Sock. Hd., 316SS
• 3	AXQ3743	W2T417691	A/R	Adhesive, GE Silicone RTV
• 4	AAA9542	W2T365047	1	Coupling, Sure-Flex, .625"/.625", 56C
	OR			
	U19946	W2T19457	1	Coupling, Sure-Flex, .625"/.875", 143TC
• 5	AAA9560	W2T416695	1	Support, Motor, D71/D80
• 6	AQC3464	W2T367147	1	Key, 3/16 Sq. x 3/4" Lg.
• 7	ARE3591	W2T367156	2	Scr. Cap, M8 x 40 Lg., Sock. Hd., 316SS
• 8	AXS3656	W2T11182	2	Scr. Cap, M8 x 20 Lg., Sock. Hd., 316SS
• 9	AAA6564	W2T10422	4	Bolt, Sock. Hd., 3/8"-16 x 1" Lg.
• 10	AHS4653	W2T11192	1	Plug, Socket, Screw, R1/2, 316SS
• 11	AAA1035	W2T11128	A/R	Anti-Seize NI Lube 771
... 12	AAA1902	W2T11026	1	Label, Nameplate, Encore 700

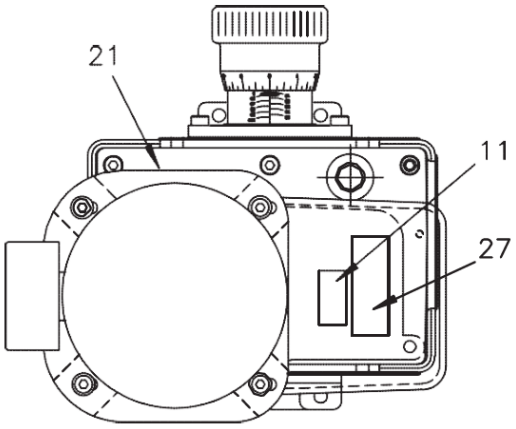
NOTE: • Part of AAA9602 (W3T99430).
• Part of API3492 (W2T417670).
... Part of AOO4751.

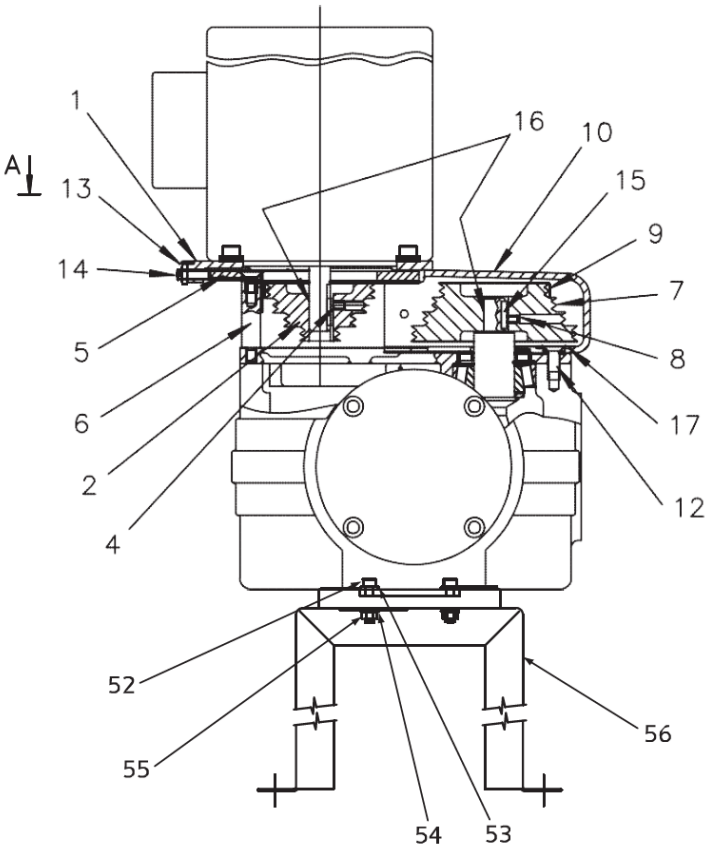
WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

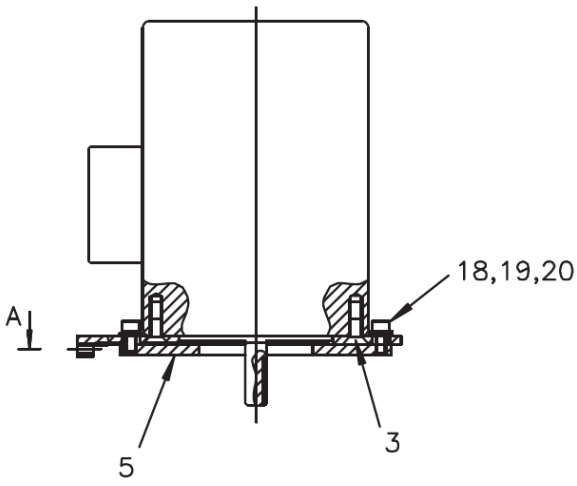
AIC3021 DIRECT DRIVE - PARTS LIST

440.400.001.010B
ISSUE 4 1-10









MOTOR MOUNTING

NOTE: FOR PARTS LIST, SEE DWG. 44.400.001.020B.

AKG3009 (W2T417632) PULLEY DRIVE - PARTS

440.400.001.020A

ISSUE 3 2-10

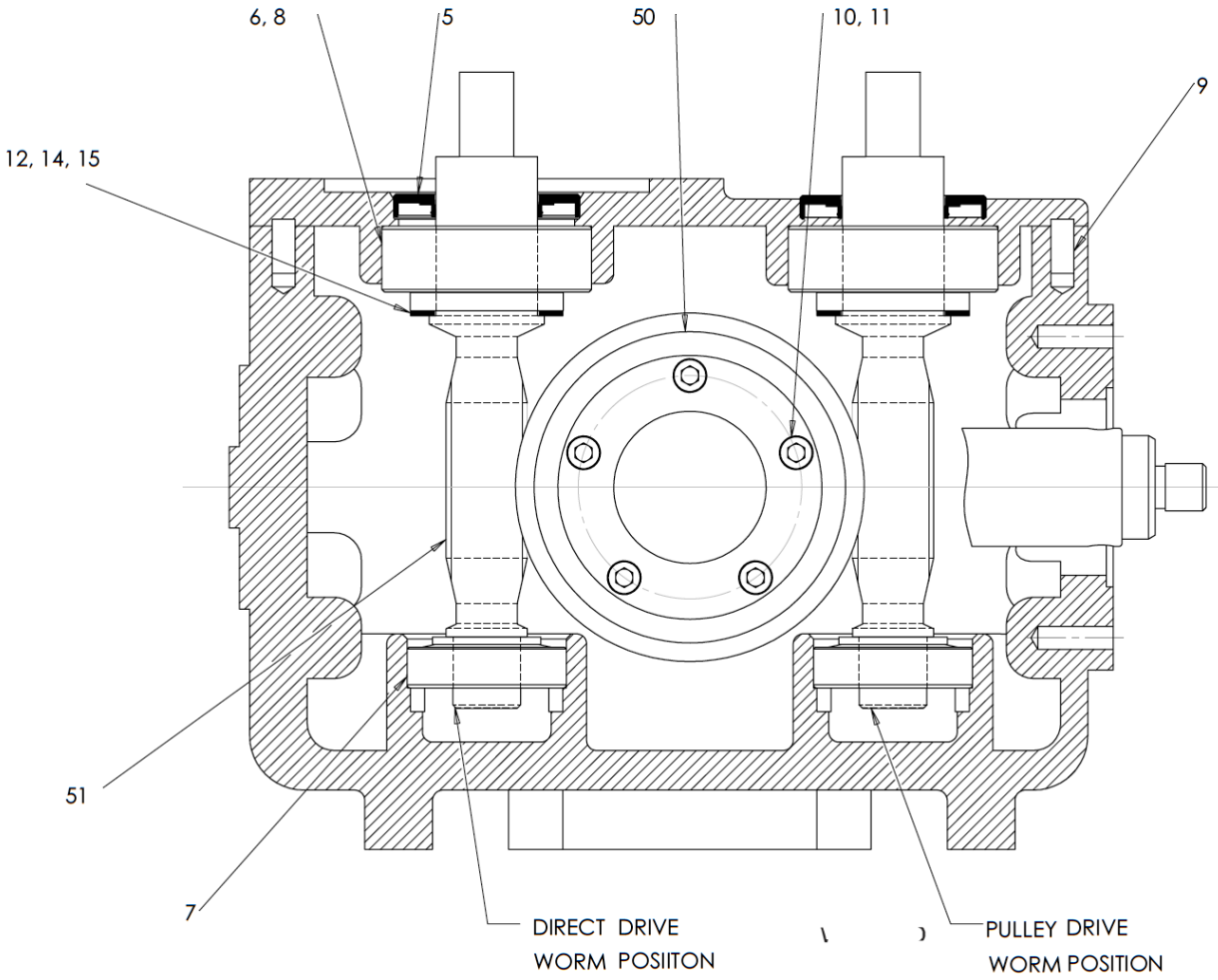
KEY NO.	LEGACY PART NO.	ALT. PART NO.	QTY.	DESCRIPTION
• 1	AJA5596	W2T367023	1	Slide Plate, Motor 56C
• 2	APS3182	W2T367122	1	Pulley, Motor 56C, Double Groove
• 3	AXS3532	W2T367184	4	Screw, 3/8-16 x 3/4", Flat Head Cap
• 4	AAB2979	W2T9572	2	Screw, Set M6 x 12, Sock. Hd.
• 5	ALI3168	W2T367048	1	Stand Off Plate
• 6	AIC5131	W2T11439	3	Stand Off, Pulley Drive
• 7	AIC4746	W2T11438	1	Worm Pulley, Double Groove
• 8	AAB2979	W2T9572	1	Screw, Set M6 x 12 Lg.
• 9	APS4857	W2T11316	1	Joint Belt, Polyflex
• 10	AIC4085	W2T11369	1	Belt Guard
• 11	AEK3676	W2T366980	2	Label, Warning Guard
• 12	AQA3480	W2T11171	4	Scr., Flat Hd., M8 x 20, Sock., 316SS
• 13	AUK3630	W2T11170	1	Jam Nut, Hex., M8, 316SS
• 14	AAA3708	W2T10635	1	Screw, Set M8 x 25, Slotted, 316SS
• 15	AQC3464	W2T367147	1	Key, 3/16 Sq. x 3/4" Lg.
• 16	AAA1035	W2T11128	A/R	Anti-Seize NI Lubricant
• 17	AMK5576	W2T417658	1	Washer, Shoulder, Guard
• 18	AXS3577	W2T367185	4	Cap Scr., M8 x 16, Sock. Hd., 316SS
• 19	AWO5392	W2T11160	4	Washer, Flat, M8, 316SS
• 20	AXQ3226	W2T11183	4	Lock Washer, Helical, M8, 316SS
• 21	ATI3486	W2T11179	2	Cap Scr., M6 x 12, Socl. Hd., 316SS
• 22	ANI5724	W2T367083	1	Cover, Simplex Pulley Drive
• 23	AXQ3743	W2T417691	A/R	Adhesive, GE Silicone, RTV
• 24	AXS3656	W2T11182	3	Cap Scr., M8 x 20, Sock. Hd., 316SS
• 25	AXS3583	W2T11181	2	Cap Scr., M8 x 25, Sock. Hd., 316SS
• 26	APP5655	W2T11093	1	Breather Cap
... 27	AAA1902	W2T11026	1	Nameplate, Encore 700

NOTE: • Part of APQ4791.
• Part of AOO4859.
... Part of AOO4751.

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

AKG3009 (W2T417632) PULLEY DRIVE - PARTS LIST

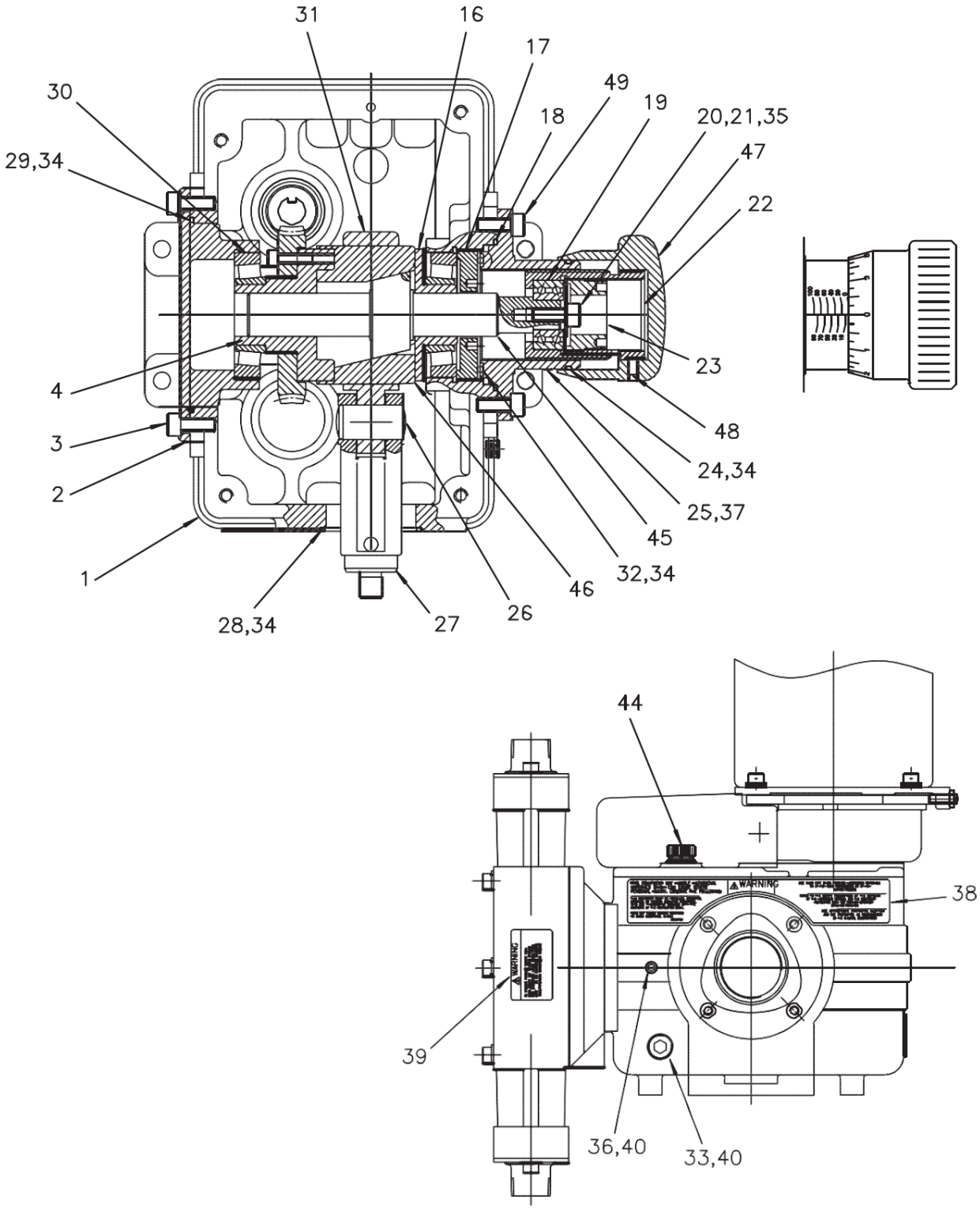
440.400.001.020B
ISSUE 3 2-10



NOTE: FOR PARTS LIST SEE DWG. 440.400.000.010C&D.

ANM4784 ENCORE® 700 METERING PUMP - PARTS
Simplex Gearbox Assembly

440.400.000.010A
ISSUE 2 2-98



NOTE: FOR PARTS LIST SEE DWGS. 440.400.000.010C&D.

ANM4784 ENCORE® 700 METERING PUMP - PARTS
Simplex Gearbox Assembly

440.400.000.010B
ISSUE 3 7-01

KEY NO.	LEGACY PART NO.	ALT. PART NO.	QTY.	DESCRIPTION
• 1	APQ5142	W2T417678	1	Gearbox, Simplex
• 2	AKC5702	W2T417631	1	Flange, Gear Access, Simplex
• 3	AXS3656	W2T11182	4	Cap Scr., M8 x 20, Sock. Hd., 316SS
• 4	ANM4788	W2T417655	1	Bushing Drive, Simplex, LMAD (5" and 6-1/2" Liquid End Only)
• 5	ALI3193	W2T367049	1	Oil Seal, 30 x 55 x 7 , BUNA-N
• 6	AIC4251		1	Bearing, TPRL, 30 x 62 x 21.25mm
• 7	AMG3448	W2T367066	1	Bearing, TPRL, 20 x 47 x 15.25mm
• 8	AHS4651	W2T417611	0	Grease, Sunaplex, #992EP
• 9	ATI3247	W2T417689	2	Pin, Dowel, 6 x 16, M6, Hardened
• 10	AUK3561	W2T11169	5	Cap Scr., M6 x 20, Sock. Hd., 316SS (5" and 6-1/2" Liquid End Only)
• 11	AQC3041	W2T417685	0	"Locktite" Sealant, TL-242
• 12	AAA1373	W2T11031	1	Shim (.79mm Thk.) Wormshaft
• 15	AAA1388	W2T11029	2	Shim (.13mm Thk.) Wormshaft
• 16	AIC4878	W2T417621	1	Bushing, Tail, LMAD
• 17	AKG5547	W2T417641	1	Nut, Preload
• 18	ALE4774	W2T11422	1	O-Ring, #152, BUNA-N
• 19	ARQ3426	W2T11452	5	Bearing, ANGC, 17 x 40 x 17.5mm
• 20	AVM3239	W2T11162	1	Washer, Oversized OD, M8
• 21	AXS3656	W2T11182	1	Cap Scr., M8 x 20, Sock. Hd., 316SS
• 22	AIC4016	W2T11368	1	Carrier, Bearing, Str. Adj.
• 23	AJE5116	W2T11441	1	Adjuster, Bearing
• 24	AAA3920	W2T16994	1	Quad-Ring #4141, Auto
	OR			
	AQO4757	W2T11391	1	O-Ring #141 (BUNA-N) Manual
• 25	AKG4860	W2T417639	1	Housing, Stroke Adj., LMAD
• 26	ASG3256	W2T11176	1	Dowel Pin, 20 x 40mm, M8, Hardened
• 27	AJE4035	W2T367030	1	Crosshead, Diaphragm
• 28	ARQ4767	W2T11453	1	O-Ring, #138, BUNA-N
• 29	AJA4780	W2T11333	1	O-Ring, #156, BUNA-N
• 30	AMG3442	W2T11378	2	Bearing, TPRL., 35 x 72 x 18.25mm
• 31	ARQ5679	W2T417686	1	Conrod, Splex, Dplex (Mach.)
• 32	AKG4976	W2T11401	1	O-Ring, #332, BUNA-N
• 33	AHS4653	W2T11192	1	Plug, R1/2, Socket Head
• 34	AAA3791	W2T11137	0	Silicone Grease, Light
• 35	AQC3041	W2T417685	0	"Locktite" Sealant, TL-242
• 36	AAC4634	W2T416779	1	Plug, Socket, Screw R1/8, 316SS
• 37	AOO4043	W2T11392	1	Label, Str. Adj., LMAD
• 38	AAA3769	W2T11314	1	Warning Label, Gearbox
• 39	AAA3759	W2T11313	1	Warning Label, Liquid End
• 40	E942	W2T409235	0	Tape, Thread Sealant
• 41	AAA3726		1	Label, Dataplate, LMAD
• 43	AAA1902	W2T11026	1	Label, Nameplate, Encore 700

NOTE:

e PART OF AOO4751
O PART OF AAA9593 (W3T108130)
PART OF AAA9599 (W3T108131)

• PART OF AJE4758
D PART OF AAA9596 (W3T110122)
PART OF AIC3164

• PART OF ANM4767
PART OF APQ4775
PART OF AAA9590 (W3T108129)

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

ANM4784 ENCORE® 700 METERING PUMP - PARTS LIST
Simplex Gearbox Assembly

440.400.000.010C
ISSUE 4 1-10

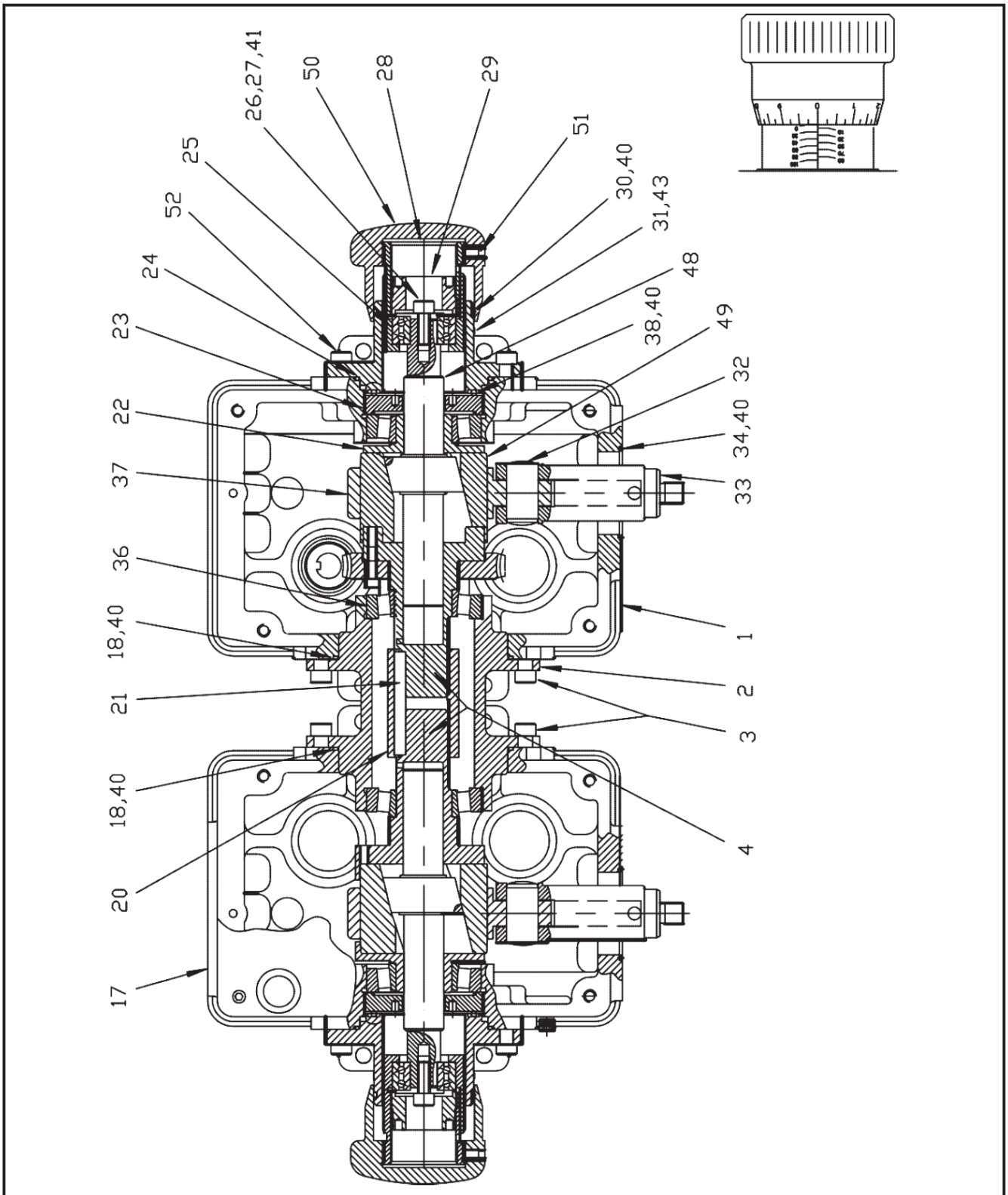
KEY NO.	LEGACY PART NO.	ALT. PART NO.	QTY.	DESCRIPTION
• 44	APP5655	W2T11093	1	Breather Cap
45	APS4845	W2T417684	1	Shaft, Eccentric, 4.8mm Stroke (1-3/8" & 2" Liquid End Only)
	OR			
	• ALI4852	W2T11404	1	Shaft, Eccentric, 9.6mm Stroke
46	AIA4800	W2T417615	1	Sheave, 4.8mm Stroke (1-3/8" & 2" Liquid End Only)
	OR			
	• AIA4795	W2T11341	1	Sheave, 9.6mm Stroke
... 47	ANI4750	W2T10695	1	Knob, Str., Adj., LMAD (Mach.), Manual
	OR			
	AJA3455	W2T367021	1	Knob, Str., Adj., Auto
... 48	AAA2382	W2T11020	3	Scr., Set, M6 x 10, Flat, Skt., Nyl., 316
... 49	AXS3656	W2T11182	4	Cap., Scr., M8 x 20, Sock. Hd., 316SS
50	t ASS3183	W2T417687	1	Drive Gear, Worm, Ratio 10 (144 SPM @ 50Hz) (5" & 6-1/2" Liquid End Only)
	OR			
	AOK3192	W2T11323	1	Drive Gear, Worm, Ratio 12 (144 SPM) (5" & 6-1/2" Liquid End Only)
	OR			
	ARQ3199	W2T11264	1	Drive Gear, Worm, Ratio 24 (72 SPM) (5" & 6-1/2" Liquid End Only)
	OR			
	AKC3205	W2T11269	1	Drive Gear, Worm, Ratio 48 (36 SPM) (5" & 6-1/2" Liquid End Only)
	OR			
	AAC5597	W2T416795	1	Drive Gear, Worm, Ratio 10 (144 SPM @ 50Hz) (1-3/8", 2", 3" & 4" Liquid End Only)
	OR			
	AAC5831	W2T8583	1	Drive Gear, Worm, Ratio 12 (144 SPM @ 60Hz) (1-3/8", 2", 3" & 4" Liquid End Only)
	OR			
	AAC5834	W2T8581	1	Drive Gear, Worm, Ratio 24 (72 SPM) (1-3/8", 2", 3" & 4" Liquid End Only)
	OR			
	AAC5837	W2T8582	1	Drive Gear, Worm, Ratio 48 (36 SPM) (1-3/8", 2", 3" & 4" Liquid End Only)
51	t AAA9530	W2T416692	1	Worm Shaft, Ratio 10 (144 SPM @ 50Hz)
	OR			
	AAA9533	W2T10250	1	Worm Shaft, Ratio 12 (144 SPM @ 60Hz)
	OR			
	AAA9536	W2T10251	1	Worm Shaft, Ratio 24 (72 SPM)
	OR			
	AAA9539	W2T10252	1	Worm Shaft, Ratio 48 (36 SPM)
52	ARE3591	W2T367156	4	Scr.Cap, M8 x 40, Soc. Hd., 316SS
53	AWO5392	W2T11160	4	Washer, Flat, M8, 316SS
54	AXQ3226	W2T11183	4	Lockwasher, M8, 316SS
55	AAA1698	W2T8462	4	Nut, M8, 316SS
56	AAC7619	W2T8262	1	Metal Base, 1-3/8", 2", 3", 4" & 5" Head (Includes Key No.'s 52, 53, 54 & 55)
	OR			
	AAC7622	W2T365189	1	Metal Base, 6-1/2" Head (Includes Key No.'s 52, 53, 54 & 55)

NOTE: e PART OF AOO4751
0 PART OF AAA9593 (W3T108130)
PART OF AAA9599 (W3T108131)
• PART OF AJE4758
D PART OF AAA9596 (W3T110122)
PART OF AIC3164
• PART OF ANM4767
PART OF APQ4775
PART OF AAA9590 (W3T108129)

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

ANM4784 ENCORE® 700 METERING PUMP - PARTS LIST
Simplex Gearbox Assembly

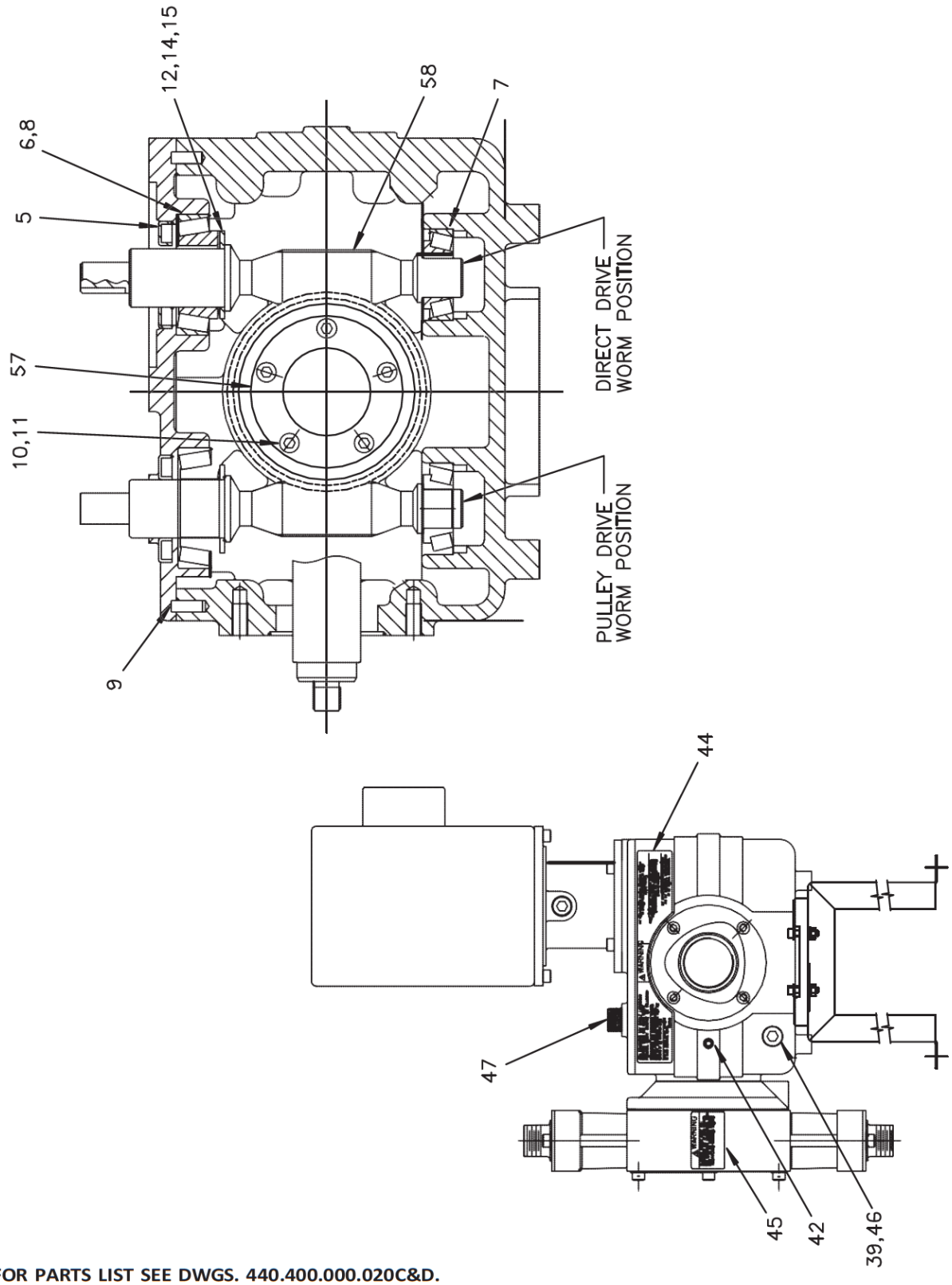
440.400.000.010D
ISSUE 5 1-10



NOTE: FOR PARTS LIST SEE DWGS. 440.400.000.020C&D.

AAA1445 ENCORE® 700 METERING PUMP - PARTS
Double Simplex Gearbox Assembly

440.400.000.020A
ISSUE 3 7-01



NOTE: FOR PARTS LIST SEE DWGS. 440.400.000.020C&D.

AAA1445 ENCORE® 700 METERING PUMP - PARTS
Double Simplex Gearbox Assembly

440.400.000.020B
ISSUE 4 2-10

KEY NO.	LEGACY PART NO.	ALT. PART NO.	QTY.	DESCRIPTION
• 1	APQ5142	W2T417678	1	Gearbox, Simplex
• 2	AJA5697	W2T417624	1	Connection, DSplex,
• 3	AXS3656	W2T11182	8	Cap Scr., M8 x 20, Sock. Hd., 316SS
• 4	AKG4783		2	Bushing Drive, DSplex (5" and 6-1/2" Liquid End Only)
• 5	ALI3193	W2T367049	1	Oil Seal, 30 x 55 x 7, BUNA
• 6	AIC4251	W2T367014	1	Bearing, TPRL, 30 x 62 x 21.25mm
• 7	AMG3448	W2T367066	1	Bearing, TPRL, 20 x 47 x 15.25mm
8	AHS4651	W2T417611	0	Grease, Sunaplex, #992 EP
• 9	ATI3247	W2T417689	2	Dowel Pin, 6 x 16, M6
10	AQC3041	W2T417685	0	"Locktite" Sealant, TL-242
• 11	AUK3561	W2T11169	5	Scr. Cap, M6 x 20, Sock. Hd., 316SS
• 12	AAA1373	W2T11031	1	Shim (.79mm Thick)
• 15	AAA1388	W2T11029	2	Shim (.13mm Thick)
• 17	ALI5148	W2T417649	1	Gearbox, Double Simplex
• 18	AJA4780	W2T11333	2	O-Ring (156) BUNA-N
• 20	AMK4076	W2T417656	1	Coupling, Rigid, DSplex
• 21	ATI3361		1	Key, 8 x 7/63
• 22	AIC4878	W2T417621	2	Tail Bushing
• 23	AKG5547	W2T417641	2	Preload Nut
• 24	ALE4774	W2T11422	2	O-Ring (152) BUNA-N
• 25	ARQ3426	W2T11452	2	Bearing, Angc, 17 x 40 x 17.5
• 26	AVM3239	W2T11162	2	Washer, Oversized OD, M8
• 27	AXS3656	W2T11182	2	Cap Scr., M8 x 20, Sock. Hd., 316SS
• 28	AIC4016	W2T11368	2	Carrier, Bearing
• 29	AJE5116	W2T11441	2	Adjuster, Bearing
• 30	AAA3920	W2T10994	2	Quad-Ring #4141, Auto
	OR			
	AQO4757	W2T11391	2	O-Ring (141) BUNA-N, Manual
• 31	AKG4860	W2T417639	2	Housing
• 32	ASG3256	W2T11176	2	Dowel Pin, 20 x 40mm, M6
• 33	AJE4035	W2T367030	2	Crosshead, Diaphragm
• 34	ARQ4767	W2T11453	2	O-Ring (138) BUNA-N
• 36	AMG3442	W2T11378	4	Bearing, TPRL, 35 x 72 x 18.25
• 37	ARQ5679	W2T417686	2	Conrod
• 38	AKG4976	W2T11401	2	O-Ring (332) BUNA-N
• 39	AHS4653	W2T11192	2	Plug, R1/2 Socket Head
40	AAA3797	W2T11137	0	Silicone Grease, Light
• 42	AAC4634	W2T416779	2	Plug, Socket, Screw R1/8, 316SS
• 43	AOO4043	W2T11392	2	Label, Str. Adj.
• 44	AAA3769	W2T11314	2	Warning Label
• 45	AAA3759	W2T11313	2	Warning Label
t 47	APP5655	W2T11093	2	Breather Cap

NOTES: • PART OF AAA4385
PART OF AAA4394

e PART OF AOO4751

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

AAA1445 ENCORE® 700 METERING PUMP - PARTS LIST
Double Simplex Gearbox Assembly

440.400.000.020C
ISSUE 5 1-10

KEY NO.	LEGACY PART NO.	ALT. PART NO.	QTY.	DESCRIPTION
48	APS4845	W2T417684	2*	Shaft, Eccentric, 4.8mm Stroke
	OR			
	• ALI4852	W2T11404	2*	Shaft, Eccentric, 9.6mm Stroke
49	AIA4800	W2T417615	2*	Sheave, 4.8mm Stroke
	OR			
	• AIA4795	W2T11341	2*	Sheave, 9.6mm Stroke
... 50	ANI4750	W2T10695	2	Knob, Str., Manual
	OR			
	AJA3455	W2T367021	2	Knob, Str., Adj., Auto
... 51	AAA2382	W2T11020	6	Scr., Set, M6 x 10, Flat, Skt., Nyl., 316
... 52	AXS3656	W2T11182	8	Cap., Scr., M8 x 20, Sock. Hd., 316SS
57	ASS3183	W2T417687	1	Drive Gear, Worm, Ratio 10 (144 SPM @ 50Hz) (5" & 6" Liquid End Only)
	OR			
	AOK3192	W2T11323	1	Drive Gear, Worm, Ratio 12 (144 SPM) (5" & 6" Liquid End Only)
	OR			
	ARQ3199	W2T11264	1	Drive Gear, Worm, Ratio 24 (72 SPM) (5" & 6" Liquid End Only)
	OR			
	T AKC3205	W2T11269	1	Drive Gear, Worm, Ratio 48 (36 SPM) (5" & 6" Liquid End Only)
	OR			
	AAC5591	W2T416795	1	Drive Gear, Worm, Ratio 10 (144 SPM @ 50Hz) (1-3/8", 2", 3" & 4" Liquid End Only)
	OR			
	AAC5840	W2T8583	1	Drive Gear, Worm, Ratio 12 (144 SPM @ 60Hz) (1-3/8", 2", 3" & 4" Liquid End Only)
	OR			
	AAC5843	W2T8581	1	Drive Gear, Worm, Ratio 24 (72 SPM @ 60Hz) (1-3/8", 2", 3" & 4" Liquid End Only)
	OR			
	AAC5846	W2T8582	1	Drive Gear, Worm, Ratio 48 (36 SPM @ 60Hz) (1-3/8", 2", 3" & 4" Liquid End Only)
58	AAA9530	W2T416692	1	Worm Shaft, Ratio 10 (144 SPM @ 50Hz)
	OR			
	AAA9533	W2T10250	1	Worm Shaft, Ratio 12 (144 SPM @ 60Hz)
	OR			
	AAA9536	W2T10251	1	Worm Shaft, Ratio 24 (72 SPM)
	OR			
	T AAA9539	W2T10252	1	Worm Shaft, Ratio 48 (36 SPM)

NOTES: • PART OF AAA4385
e PART OF AOO4751
PART OF AAA4394

• PART OF AIC3164
• PART OF ANM4767
PART OF APQ4775

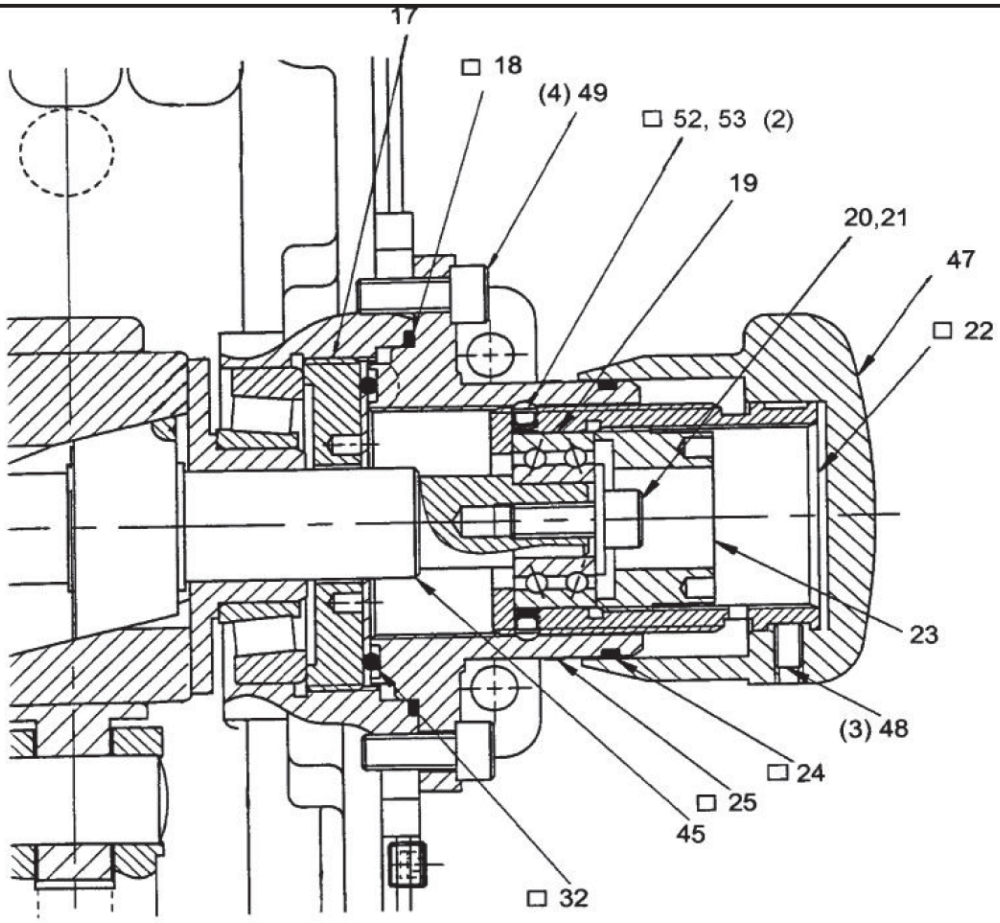
O PART OF AOO4394
D PART OF AJE4411
PART OF APS4684

* TWO REQUIRED; MAY BE A COMBINATION OF ONE 4.8 MM STROKE AND ONE 9.6 MM STROKE. 1-3/8" AND 2" HEADS REQUIRE A 4.8 MM STROKE. 3", 4", 5", AND 6-1/2" HEADS REQUIRE A 9.6 MM STROKE. ECCENTRIC SHAFT AND SHEAVE MUST HAVE THE SAME STROKE.

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

AAA1445 ENCORE® 700 METERING PUMP - PARTS LIST
Double Simplex Gearbox Assembly

440.400.000.020D
ISSUE 5 1-10

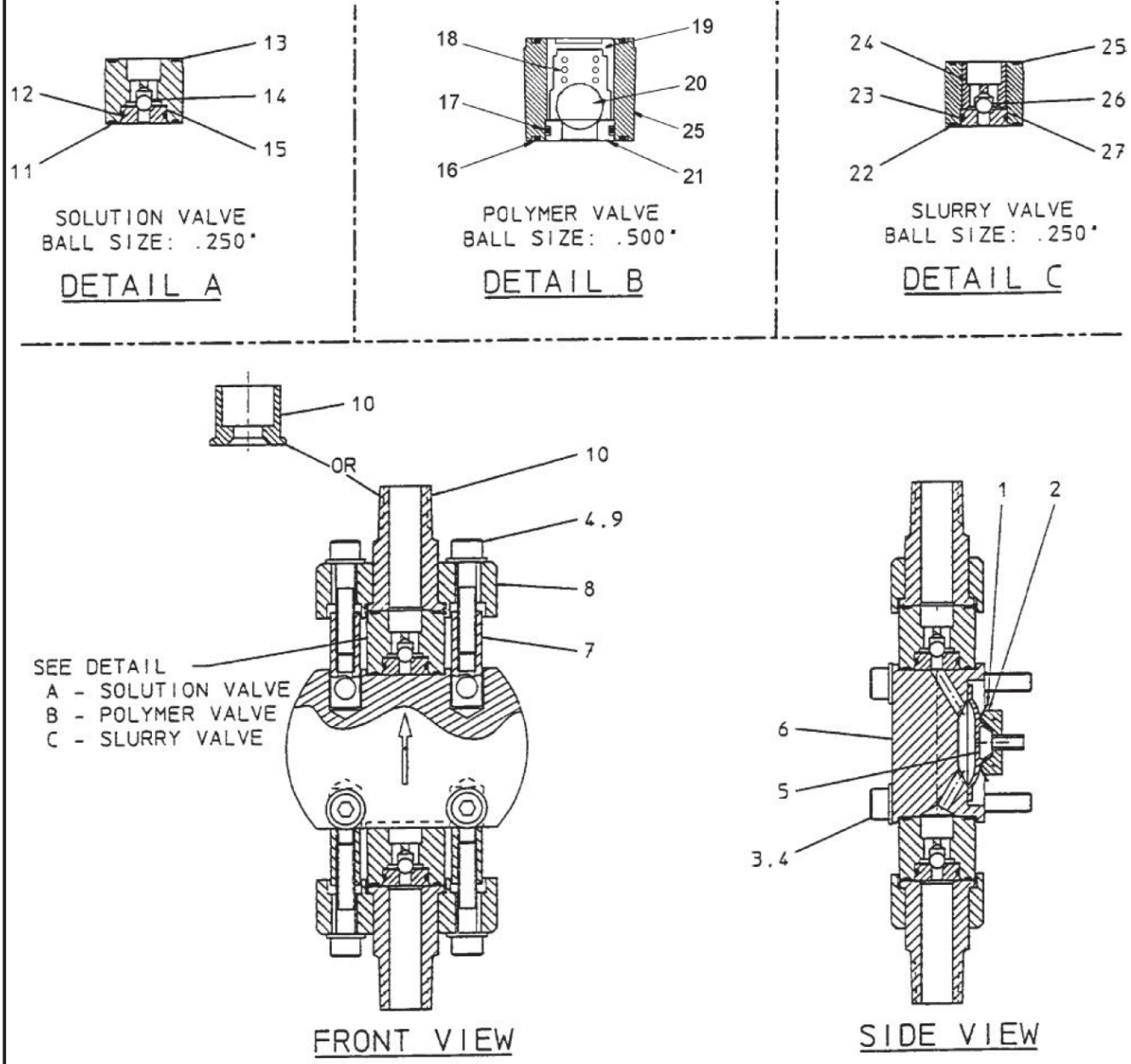


KEY NO.		LEGACY PART NO.	ALT PART NO.	QTY.	DESCRIPTION
	17	AKG5547	W2T417641	1	NUT, PRELOAD
D	18	ALE4774	W2T11422	1	O-RING (#152) BUNA-N
	19	ARQ3426	W2T11452	1	BEARING, 17 x 40 x 17.5MM
	20	AVM3239	W2T11162	1	WASHER, OVERSIZED OD, M8
	21	AXS3656	W2T11182	1	CAP SCR. M8 x 20, SOC. HD.
D	22	AIC4016	W2T11368	1	CARRIER BEARING, STR. ADJ.
	23	AJE5116	W2T11441	1	ADJUSTER, BEARING
D	24	AQO4757	W2T11391	1	O-RING (#141) BUNA-N
D	25	AAB5783	W2T416736	1	HOUSING, STR. ADJ., LABELED
D	32	AKG4976	W2T11401	1	O-RING (#332) BUNA-N
	45	ALI4852	W2T11404	1	ECCENTRIC SHAFT, 9.6MM STROKE
		OR			
		APS4845	W2T417684	1	ECCENTRIC SHAFT, 4.8MM STROKE
	47	ANI4750	W2T10695	1	KNOB
	48	AAA2382	W2T11020	3	SET SCR. M6 x 10, "NYLOK"
	49	AXS3656	W2T11182	4	CAP SCR. M8 x 20, SOC. HD.
D	52	AAB5789	W2T9614	2	PAWL, DETENT
D	53	AAB5786	W2T9613	2	SPRING, DETENT

NOTE: ✎ INDICATES PARTS FURNISHED IN KIT.
WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

AAB5792 (W2T9612) DETENT STROKE ADJUSTMENT KIT - PARTS
Common to Simplex and Double Simplex

440.400.000.030
ISSUE 1 1-10

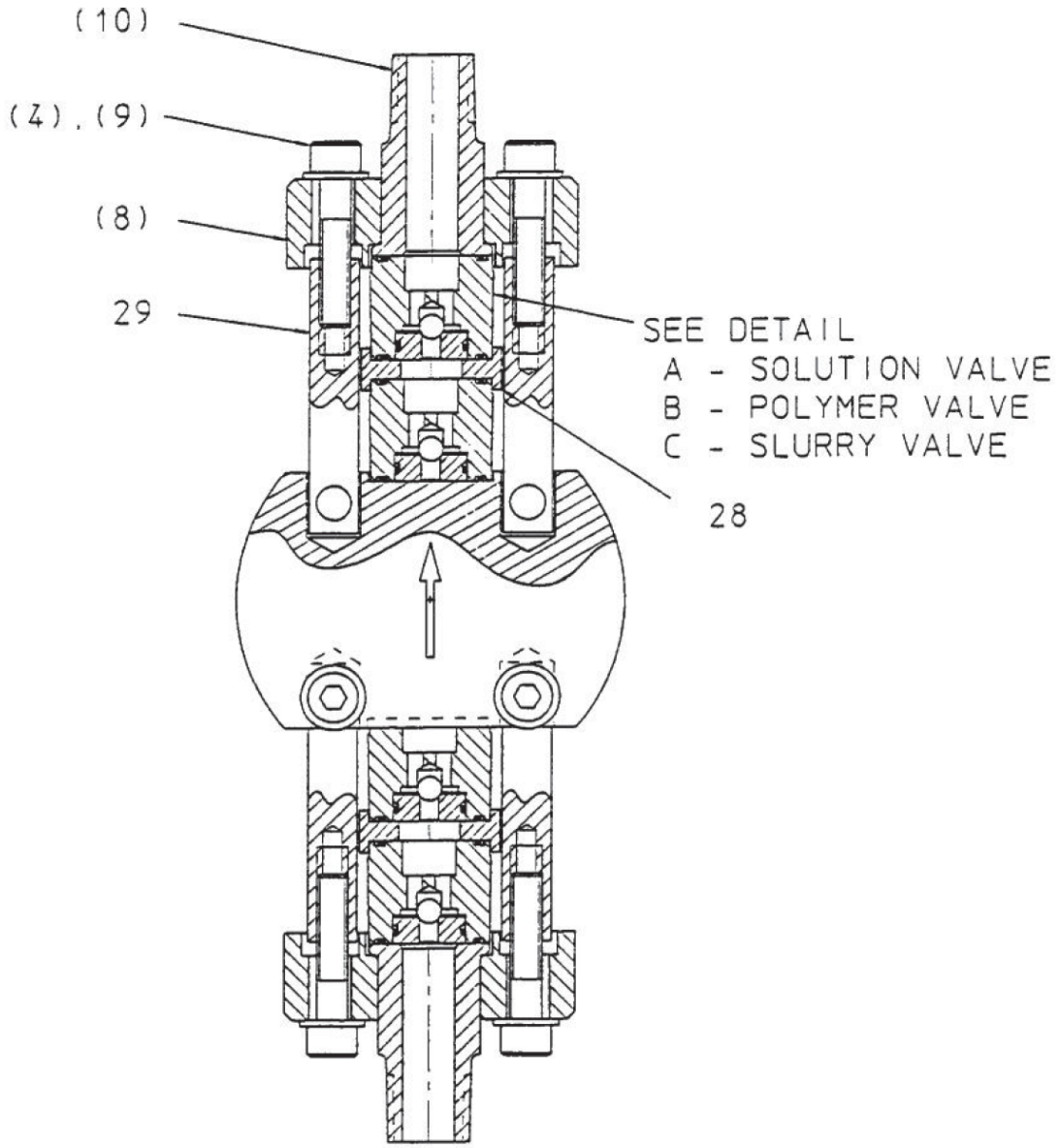


NOTE: FOR PARTS LIST SEE DWGS. 440.050.010.010C&D.

1-3/8" CARTRIDGE LIQUID END - PARTS

440.050.010.010A

ISSUE 2 4-09



NOTE: ( ) INDICATES REFERENCED PARTS.

1-3/8" CARTRIDGE LIQUID END - PARTS

440.050.010.010B
ISSUE 0 6-95

KEY NO.	LEGACY PART NO.	ALT. PART NO.	QTY.	DESCRIPTION
1	AKG5103	W2T11402	1	Disc, Backing, 1.375" Diaphragm
2	ALI5124	W2T11408	1	Ring, Backup, 1.375" Diaphragm
3	AQA3639	W2T11172	4	Screw, Cap, M8 x 100, Sock. Hd., 316SS
4	AWO5392	W2T11160	8	Washer, Flat M8, 316SS
5	AQO4074	W2T11475	1	Diaphragm, 1.375"
6	APS4346	W2T367124	1	Head, 1.375" Diaphragm, PVC
	OR			
	AIC4339	W2T11038	1	Head, 1.375" Diaphragm, Kynar
	OR			
	AAB2525	W2T416702	1	Head, 1.375" Diaphragm, 316SS
7	APS5528	W2T11382	4	Eyenut, Valve, SB, 1.375" & 2" Head
8	AMK5551	W2T11345	2	Clamp, 1.375" & 2" Head, PVC
	OR			
	AAB2720	W2T416705	2	Clamp, 1.375" & 2" Head, SST
9	ARE3591	W2T367156	4	Screw, Cap, M8 & 40, Soc. Hd., 316SS
10	ALI4883	W2T367056	2	Conn., M, 1.375" & 2" Head, 1/2" NPT, PVC
	OR			
	ALI4896	W2T11405	2	Conn., M, 1.375" & 2" Head, 1/2" NPT, Kynar
	OR			
	AAB2732	W2T416709	2	Conn., M, 1.375" & 2" Head, 1/2" NPT, 316SS
	OR			
	AOO4969	W2T11418	2	Conn., Sock. 1.375" & 2" Head, 1/2" Pipe, PVC
11	AMK5913	W2T11344	4	O-Ring (022) Viton, 25.12 ID x 1.78mm
	OR			
	AIA5772	W2T367010	4	O-Ring (022) Hypalon, 25.12 ID x 1.78mm
	OR			
	AAC6254	W2T416809	4	O-Ring (022) EPDM, 25.12 ID x 1.78mm
12	AMK5919	W2T11350	2	O-Ring (016) Viton, 15.60 ID x 1.78mm
	OR			
	AMK5705	W2T367074	2	O-Ring (016) Hypalon, 15.60 ID x 1.78mm
	OR			
	AAC6251	W2T416808	2	O-Ring (016) EPDM, 15.60 ID x 1.78mm
13	AIA5148	W2T11336	2	Guide, Ret., .250" Ball, PVC Mold.
	OR			
	AOO5141	W2T11417	2	Guide, Ret., .250" Ball, Kynar
	OR			
	AAC5375	W2T416787	2	Guide, Ret., .250" Ball, 316SS
14	AFM5842	W2T11310	2	Ball, .250" 316SS
	OR			
	AHQ5882	W2T11307	2	Ball, .250" Teflon
	OR			
	ACG3695	W2T11261	2	Ball, .250" Ceramic
15	APQ5049	W2T11354	2	Seat, .250" Ball 316SS
	OR			
	AJE5015	W2T11360	2	Seat, .250" Ball PVC
	OR			
	ANM5023	W2T11374	2	Seat, .250" Ball Ceramic

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

1-3/8” CARTRIDGE LIQUID END - PARTS LIST

440.050.010.010C
ISSUE 5 1-10

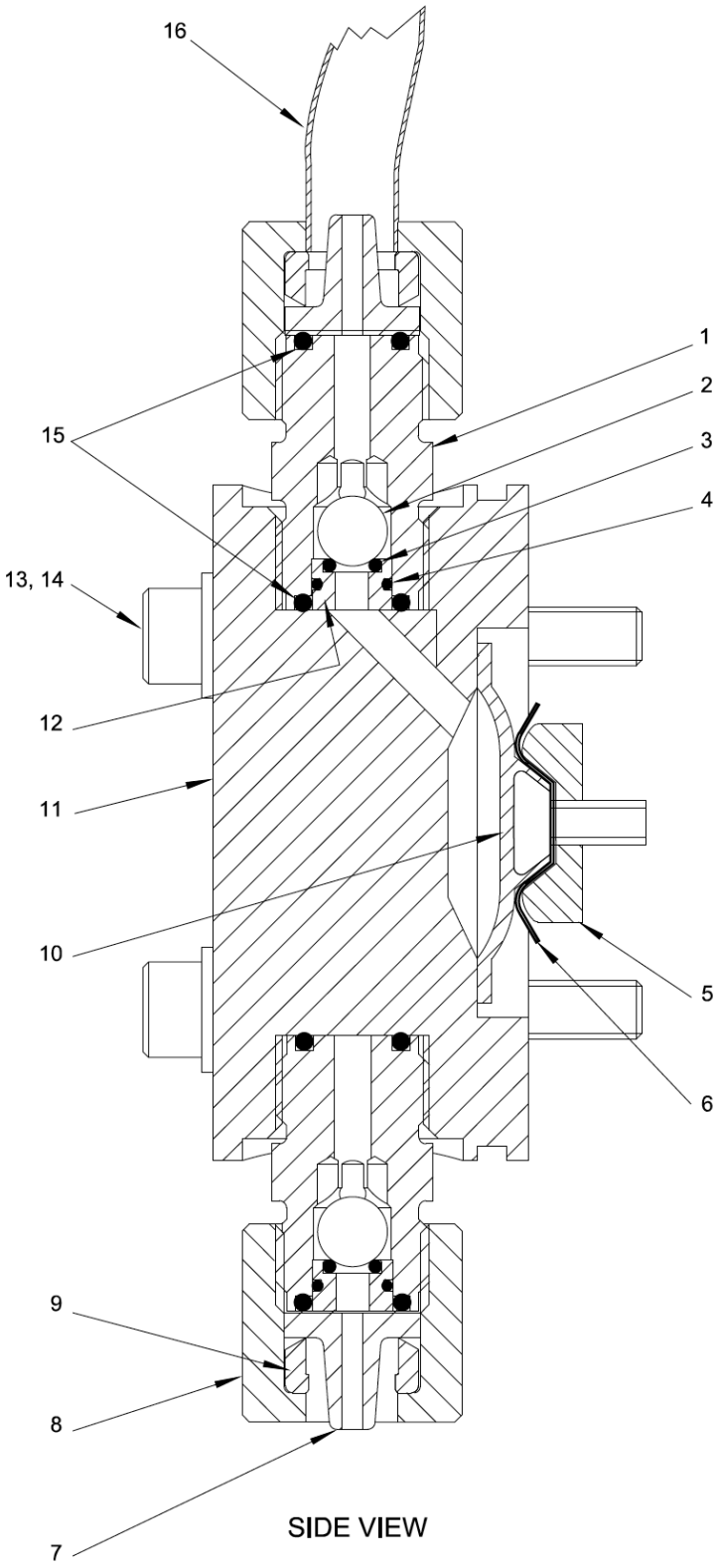
KEY NO.	LEGACY PART NO.	ALT. PART NO.	QTY.	DESCRIPTION
16	AMK5913	W2T11344	4	O-Ring (022) Viton, 25.121 ID x 1.78mm
17	AMK5919	W2T11350	2	O-Ring (016) Viton, 15.60 ID x 1.78mm
18	AOO4265	W2T11278	2	Spring, .50" Ball
19	AAB9599	W2T8992	2	Guide, Polymer, .500" Ball, PVC
20	AAA5905	W2T11300	2	Ball, .500" Teflon
21	ANM4382	W2T11380	2	Seat, .500" Ball, PVC
22	AIA5772	W2T367010	4	O-Ring (022) Hypalon, 25.121 ID x 1.78mm
23	AMK5705	W2T367074	2	O-Ring (016) Hypalon, 15.60 ID x 1.78mm
24	AMK5077	W2T10984	2	Guide, Slurry, .250" Ball, Lift 1.5mm SST
25	APS4995	W2T11384	2	Retainer, PVC
26	AFM3749	W2T11311	2	Ball, .250" Polyurethane
27	AOO5055	W2T11416	2	Seat, .250" Ceramic
28	APS4954	W2T11362	2	Adapter, .250" & .500" Ball, PVC
	OR			
	AJE4961	W2T367032	2	Adapter, V, .250" & .500" Ball, Kynar
29	APQ5533	W2T11448	4	Eyenut, Valve, DB, 1.375" & 2" Head

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

1-3/8” CARTRIDGE LIQUID END - PARTS LIST

440.050.010.010D

ISSUE 1 1-10



SIDE VIEW

NOTE: FOR PARTS LIST SEE DWG. 440.050.010.020B.

1-3/8" THREADED LIQUID END - PARTS

440.050.010.020A

ISSUE 1 2-98

KEY NO.		LEGACY PART NO.	ALT PART NO.	QTY.	DESCRIPTION
▬	1	ALI3455	W2T367050	2	HOUSING
▬	2	AMS3988		2	BALL, .375", GLASS
▬	3	AIA3596	W2T11215	2	O-RING (008) VITON, 4.47 x .78MM
▬	4	APQ3916	W2T11233	2	O-RING, VITON, 8 x 1.5MM
▬	5	ALI5124	W2T11408	1	RING, BACKUP, 1.375" DIAPHRAGM
▬	6	AKG5103	W2T11402	1	DISC, BACKING, 1.375" DIAPHRAGM
🗀	7	AKG3480	W2T11023	2	NIPPLE, .37" OD TUBE
🗀	8	AAA1229	W2T10986	2	NUT, .37" OD TUBE
🗀	9	AJE3496	W2T417626	2	HOLDER, .37" OD TUBE
…	10	AQO4074	W2T11475	1	DIAPHRAGM 1.375", TEFLON FACED
…	11	APS3127	W2T367121	1	HEAD
▬	12	AJE3464	W2T417625	2	SEAT
•🔧	13	AWO5392	W2T11160	4	WASHER, FLAT M8
▬	14	ARE3624	W2T367157	4	SCREW, M8 x 60 SOCK. HD. CAP. (ENCORE 100)
		OR			
🔧		AQA3639	W2T11172	4	SCREW, M8 x 60 SOCK. HD. CAP. (ENCORE 700)
▬	15	AKG3575	W2T11198	4	O-RING, VITON, 11.3 x 2.4MM
*	16	RP684464	W2T16217	A/R	TUBING, .37" OD x .25" ID, POLYETHYLENE

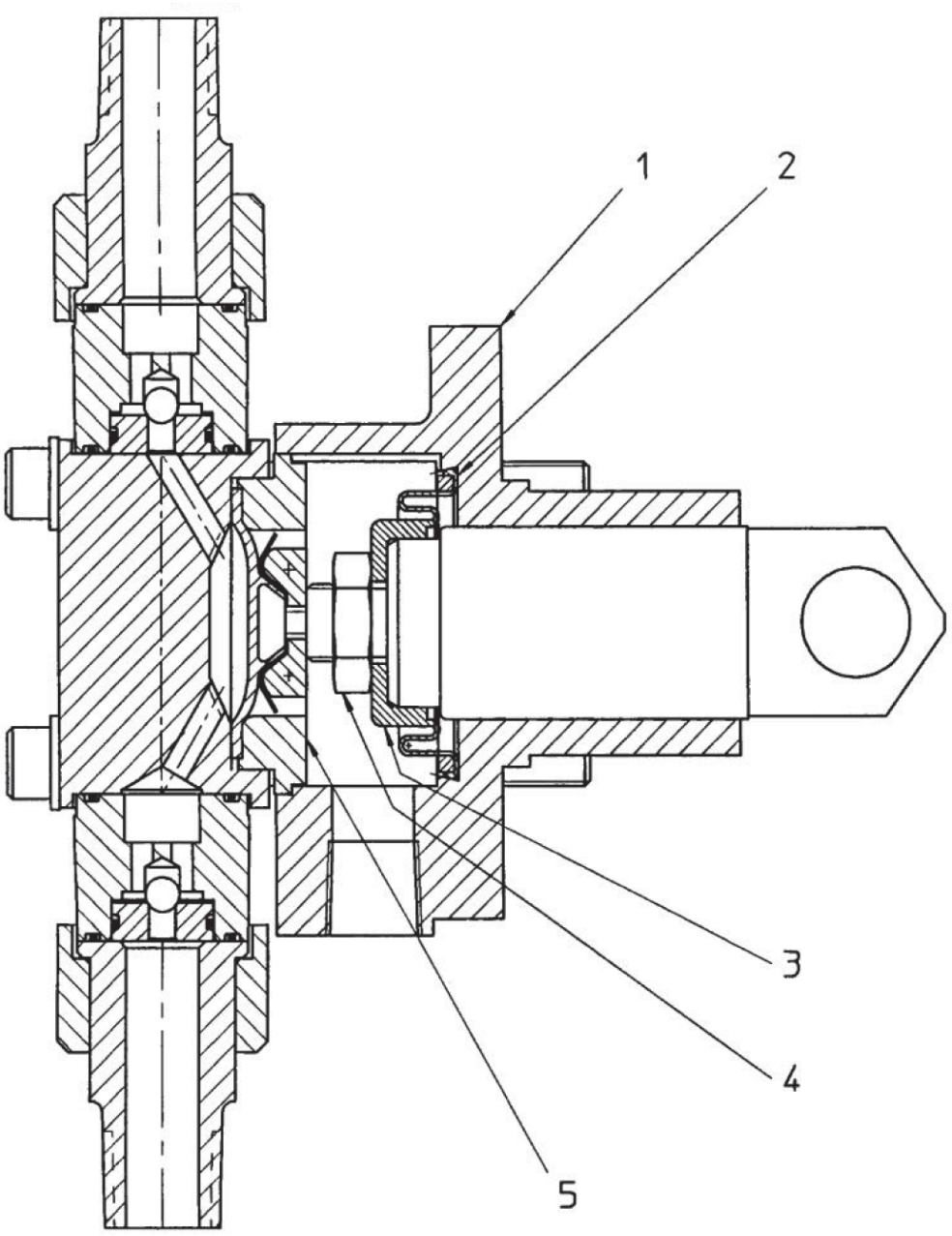
* AVAILABLE AS AN ACCESSORY. NOT PART OF STANDARD PUMP PACKAGE.

NOTE: ▬ PART OF AOO3615.
• PART OF APS3628 (W3T98112).
🗀 PART OF AAA1187 (W3T108073).
… PART OF AAA1097 (W3T99089).
🔧 PART OF AAA4334 (W3T99147).

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

1-3/8" THREADED LIQUID END - PARTS LIST

440.050.010.020B
ISSUE 4 1-10



KEY NO.	LEGACY PART NO.	ALT PART NO.	QTY.	DESCRIPTION
*• 1	ALE4874	W2T367046	1	ADAPTER, 1.375" DIAPHRAGM
*• 2	AAB7205	W2T9156	1	SEAL, BELLOW, CROSSHEAD
• 3	AJA5915	W2T11357	1	CLAMP, DIAPHRAGM, BELLOW
• 4	AMK4863	W2T11047	1	NUT, M14x 1
• 5	AIA5111	W2T11335	1	SPACER, 1.375" DIAPHRAGM

NOTES: • PART OF APQ4097 (W3T99941).

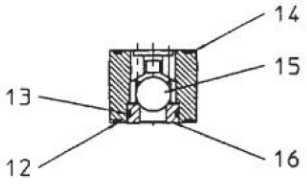
* W3T108212 ADAPTER WITH PRE-INSTALLED BELLOW SEAL CAN BE ORDERED IN PLACE OF KEY NO.'S 1 & 2.

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

1-3/8" LIQUID END ADAPTER - PARTS

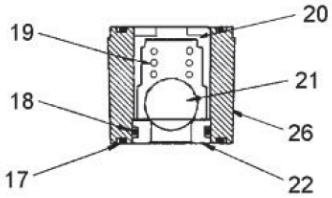
440.400.001.030

ISSUE 2 1-10



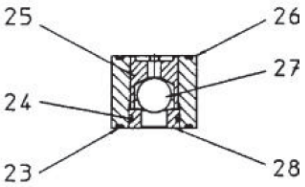
SOLUTION VALVE
BALL SIZE: 0.5"

DETAIL D



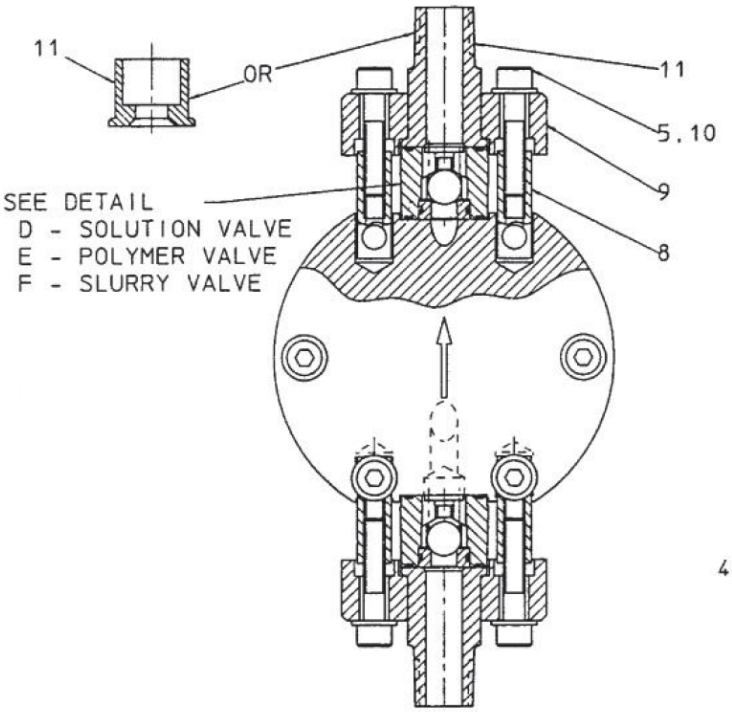
POLYMER VALVE
BALL SIZE: 0.5"

DETAIL E

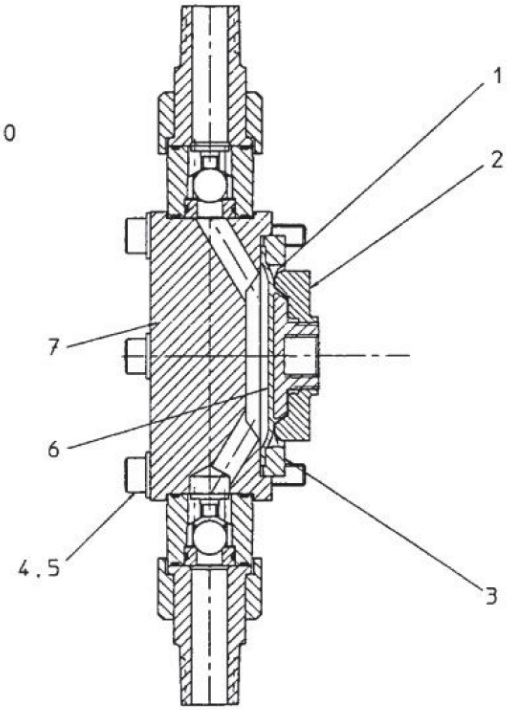


SLURRY VALVE
BALL SIZE: 0.5"

DETAIL F



FRONT VIEW

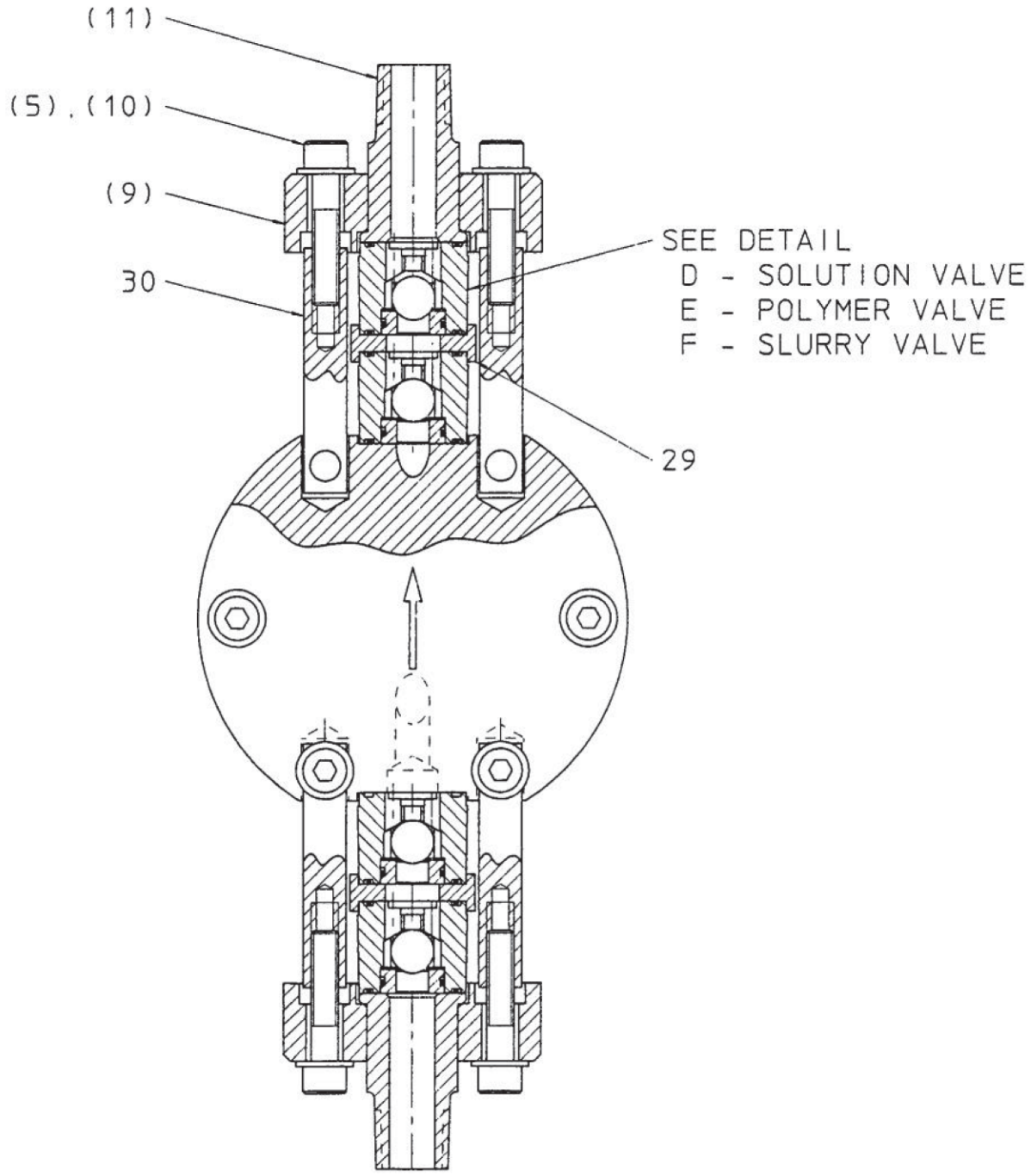


SIDE VIEW

NOTE: FOR PARTS LIST SEE DWGS. 440.050.010.030C&D.

2" CARTRIDGE LIQUID END - PARTS

440.050.010.030A
ISSUE 2 4-09



NOTE: ( ) INDICATES REFERENCED PARTS.

2" CARTRIDGE LIQUID END - PARTS

440.050.010.030B
ISSUE 0 6-95

KEY NO.	LEGACY PART NO.	ALT PART NO.	QTY.	DESCRIPTION
1	AAA3323	W2T10795	1	Disc, Backing, 2" Diaphragm
2	AJE4030	W2T11086	1	Ring, Backup, 2" Diaphragm
3	AIC5296	W2T11339	1	Spacer, 2" Diaphragm
4	AVM3618	W2T11163	6	Screw, Cap, M8 x 60, Sock. Hd., 316SS
5	AWO5392	W2T11160	10	Washer, Flat M8, 316SS
6	AMG4773	W2T11476	1	Diaphragm, 2"
7	AOO5277	W2T367105	1	Head, 2" Diaphragm, PVC
	OR			
	APQ5281	W2T11069	1	Head, 2" Diaphragm, Kynar
	OR			
	AAB2528	W2T9940	1	Head, 2" Diaphragm, 316SS
8	APS5528	W2T11382	4	Eyenut, Valve, SB, 1.375" & 2" Head
9	AMK5551	W2T11345	2	Clamp, 1.375" & 2" Head, PVC
	OR			
	AAB2720	W2T416705	2	Clamp, 1.375" & 2" Head, SST
10	ARE3591	W2T367156	4	Screw, M8 & 40, Sock. Hd., 316SS
11	ALI4883	W2T367056	2	Conn., M, 1.375" & 2" Head, 1/2" NPT, PVC
	OR			
	ALI4896	W2T11405	2	Conn., M, 1.375" & 2" Head, 1/2" NPT, Kynar
	OR			
	AAB2732	W2T416709	2	Conn., M, 1.375" & 2" Head, 1/2" NPT, 316SS
	OR			
	AOO4969	W2T11418	2	Conn., Sock., 1.375" & 2" Head, 1/2" Pipe, PVC
12	AIA5772	W2T367010	4	O-Ring (022) Hypalon, 25.12 ID x 1.78mm
	OR			
	AMK5913	W2T11344	4	O-Ring (022) Viton, 25.12 ID x 1.78mm
	OR			
	AAC6254	W2T416809	4	O-Ring (022) EPDM, 25.12 ID x 1.78mm
13	AMK5705	W2T367074	2	O-Ring (016) Hypalon, 15.60 ID x 1.78mm
	OR			
	AMK5919	W2T11350	2	O-Ring (016) Viton, 15.60 ID x 1.78mm
	OR			
	AAC6251	W2T416808	2	O-Ring (016) EPDM, 15.60 ID x 1.78mm
14	AKG5133	W2T11403	2	Guide, Retainer, .500" Ball, PVC
	OR			
	AOO5050	W2T11415	2	Guide, Retainer, .500" Ball, Kynar
	OR			
	AAC5378	W2T416788	2	Guide, Retainer, .500" Ball, 316SS
15	ABE5824	W2T11260	2	Ball, .500" 316SS
	OR			
	AAA5905	W2T11300	2	Ball, .500" Teflon
	OR			
	AAC3580	W2T11255	2	Ball, .500" Ceramic
16	AIC4369	W2T11434	2	Seat, .500" Ball, 316SS
	OR			
	ANM4382	W2T11380	2	Seat, .500" Ball, PVC
	OR			
	AIC4376	W2T11435	2	Seat, .500" Ball, Kynar

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

2” CARTRIDGE LIQUID END - PARTS LIST

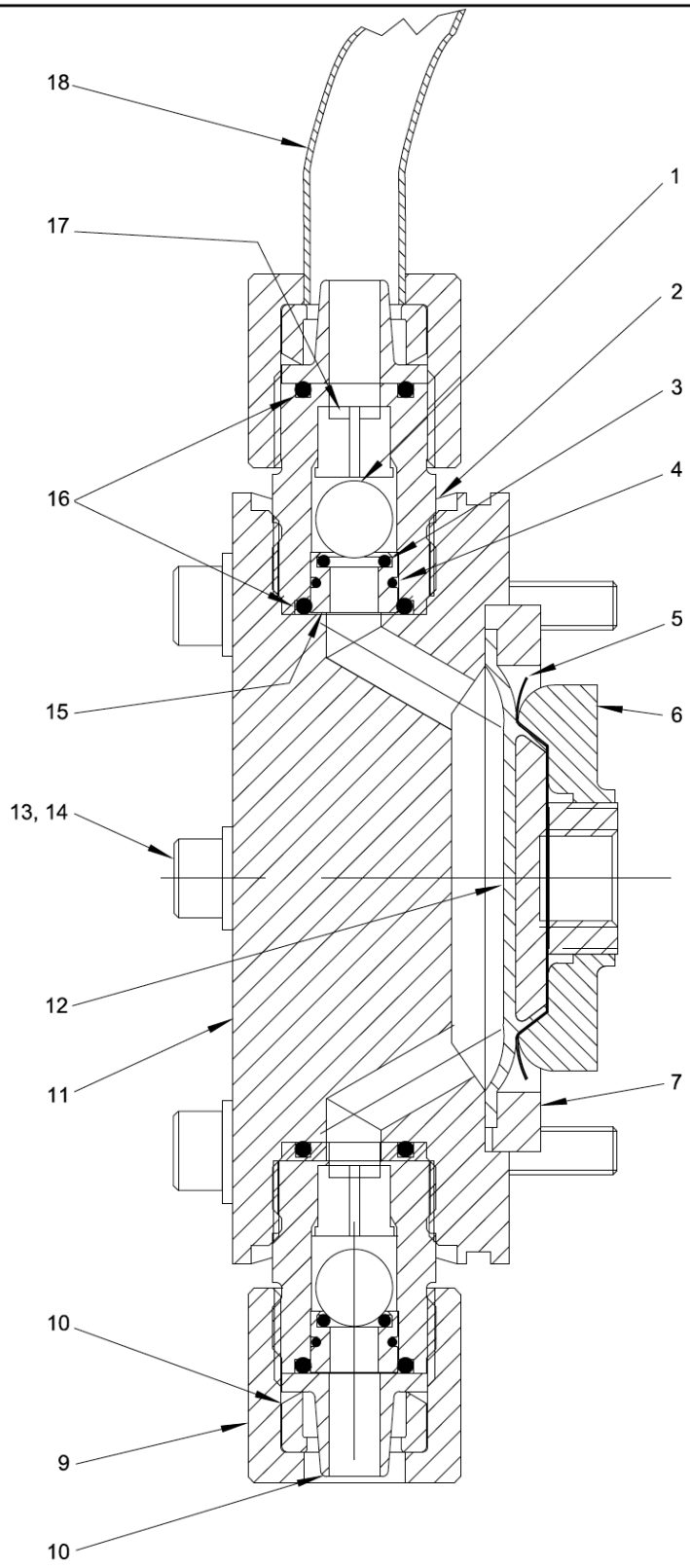
440.050.010.030C
ISSUE 5 1-10

KEY NO.	LEGACY PART NO.	ALT PART NO.	QTY.	DESCRIPTION
17	AMK5913	W2T11344	4	O-Ring (022) Viton, 25.121 ID x 1.78mm
18	AMK5919	W2T11350	2	O-Ring (016) Viton, 15.60 x 1.78mm
19	AOO4265	W2T11278	2	Spring, .50" Ball
20	AAB9599	W2T8992	2	Guide, Polymer, .500" Ball, PVC
21	AAA5905	W2T11300	2	Ball, .500" Teflon
22	ANM4382	W2T11380	2	Seat, .500" Ball, PVC
23	AIA5772	W2T367010	4	O-Ring (022) Hypalon, 25.121 ID x 1.78mm
24	AMK5705	W2T367074	2	O-Ring (016) Hypalon, 15.60 ID x 1.78mm
25	AIA5317	W2T11337	2	Guide, Slurry, .500" Ball, 316SS
26	APS4995	W2T11384	2	Retainer, PVC
27	AEK5764	W2T11296	2	Ball, .500" Polyurethane
28	AMK4354	W2T11409	2	Seat, .500" Ball Ceramic
29	APS4954	W2T11362	2	Adapter, .250" & .500" Ball, PVC
	OR			
	AJE4961	W2T367032	2	Adapter, V, .250" & .500" Ball, Kynar
30	APQ5533	W2T11448	4	Eyenut, Valve, DB, 1.375" & 2" Head

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

2” CARTRIDGE LIQUID END - PARTS LIST

440.050.010.030D
ISSUE 1 1-10



NOTE: FOR PARTS LIST SEE DWG. 440.050.010.040B.

2" THREADED LIQUID END - PARTS

440.050.010.040A

ISSUE 1 2-98

KEY NO.		LEGACY PART NO.	ALT PART NO.	QTY.	DESCRIPTION
•	1	AHQ4025	W2T11220	2	BALL, .500", GLASS
•	2	AMK3450	W2T417653	2	HOUSING
•	3	ANM3591	W2T367086	2	O-RING, VITON, 8 x 2MM
•	4	ALI3911	W2T11208	2	O-RING, VITON, 11 x 1.5MM
•	5	AAA3323	W2T10795	1	DISC, BACKING, 2" DIAPHRAGM
•	6	AJE4030	W2T11086	1	RING, BACKING, 2" DIAPHRAGM
•	7	AIC5296	W2T11339	1	SPACER, 2" DIAPHRAGM
□	8	AAA1490	W2T10996	2	NIPPLE, .50" OD TUBE
□	9	AKG3500	W2T367042	2	NUT, 16MM OD TUBE
□	10	AAA1496	W2T10997	2	HOLDER, .50" OD TUBE
...	11	AMK3122	W2T367067	1	HEAD
...	12	AMG4773	W2T11476	1	DIAPHRAGM, 2" TEFLON FACED
•	13	AAA1044	W2T11100	6	SCREW, CAP, M8 x 65 SOCK. HD., 316SS (ENCORE 100)
		OR			
✎		AVM3618	W2T11163	6	SCREW, CAP, M8 x 60 SOCK. HD., 316SS (ENCORE 700)
•✎	14	AWO5392	W2T11160	6	WASHER, FLAT M8, 316SS
•	15	AMK3460	W2T367068	2	SEAT
•	16	APQ3604	W2T11232	4	O-RING (113) VITON, 13.94 x 2.62MM
•	17	AAA4331	W2T10741	2	BALL STOP
*	18	RP684820	W2T16216	A/R	TUBING, 1/2" OD x 3/8" ID, POLYETHYLENE

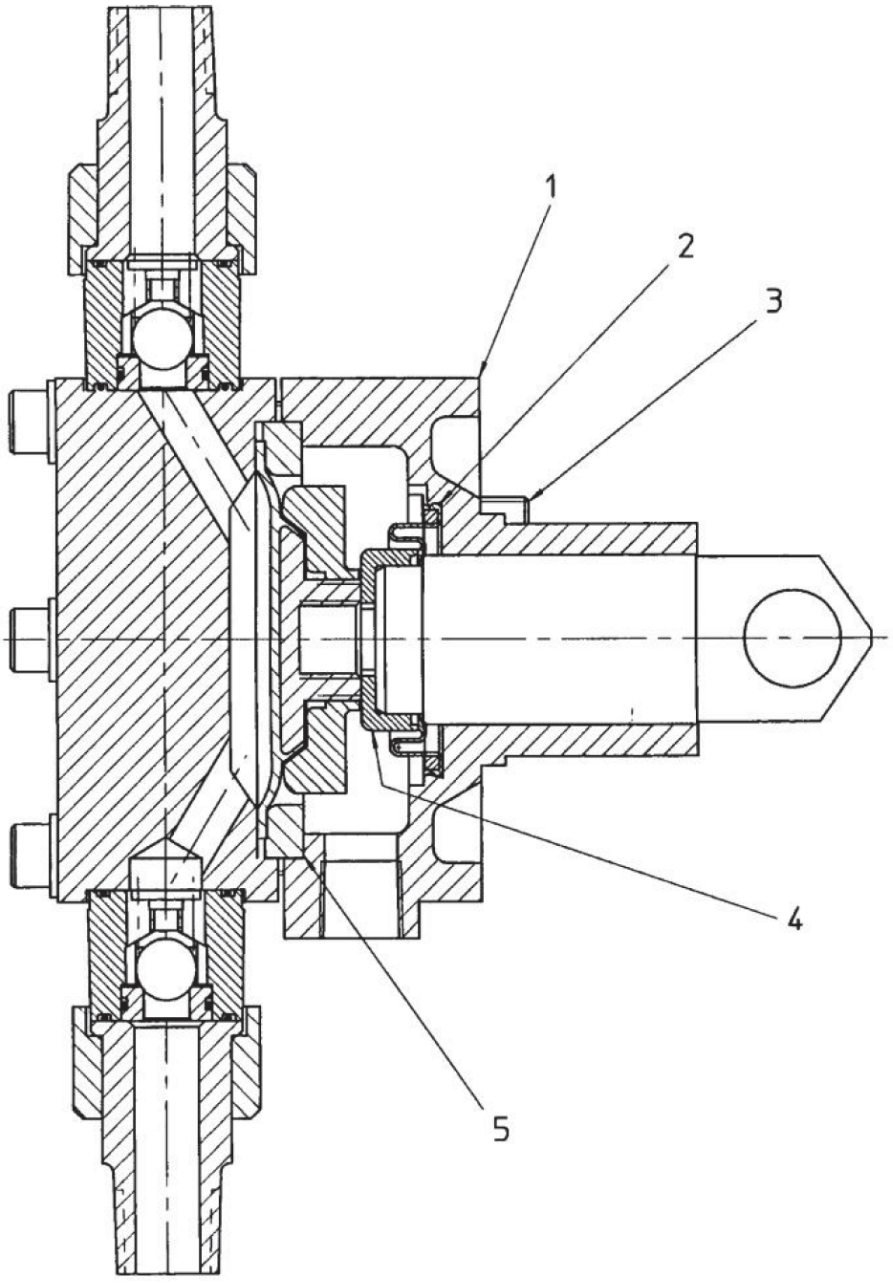
* AVAILABLE AS AN ACCESSORY. NOT PART OF STANDARD PUMP PACKAGE.

NOTE: • PART OF AOO3609 (W2T367100).
• PART OF AOO3623 (W3T98102).
□ PART OF AAA1505 (W2T10998).
... PART OF AAA1499 (W3T99103).
✎ PART OF AAA4337 (W3T99148).

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

2" THREADED LIQUID END - PARTS LIST

440.050.010.040B
ISSUE 4 1-10



KEY NO.		LEGACY PART NO.	ALT PART NO.	QTY.	DESCRIPTION
*•	1	AQO5451	W2T367150	1	ADAPTER, 2" DIAPHRAGM
*•	2	AAB7205	W2T9156	1	SEAL, BELLOW, CROSSHEAD
•	3	AXS3583	W2T11181	4	SCREW, CAP, M8 x 25, SOCK. HD., 316SS
•	4	AJA5915	W2T11357	1	CLAMP, DIAPHRAGM, BELLOW
•	5	AIC5296	W2T11339	1	SPACER, 2" DIAPHRAGM

NOTES: • PART OF APQ4101 (W3T99942).

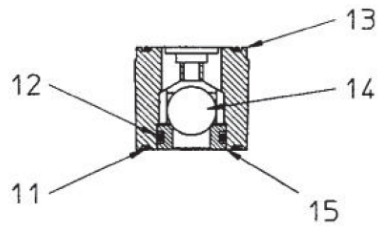
* W3T108211 ADAPTER WITH PRE-INSTALLED BELLOW SEAL CAN BE ORDERED IN PLACE OF KEY NO.'S 1 & 2.

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

2" LIQUID END ADAPTER - PARTS

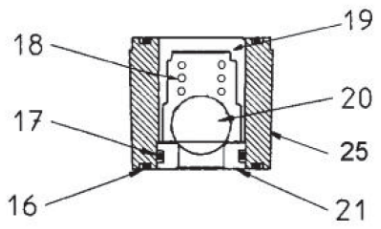
440.400.001.040

ISSUE 2 1-10



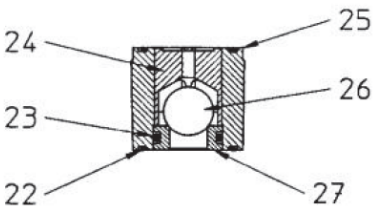
SOLUTION VALVE
BALL SIZE: .625"

DETAIL G



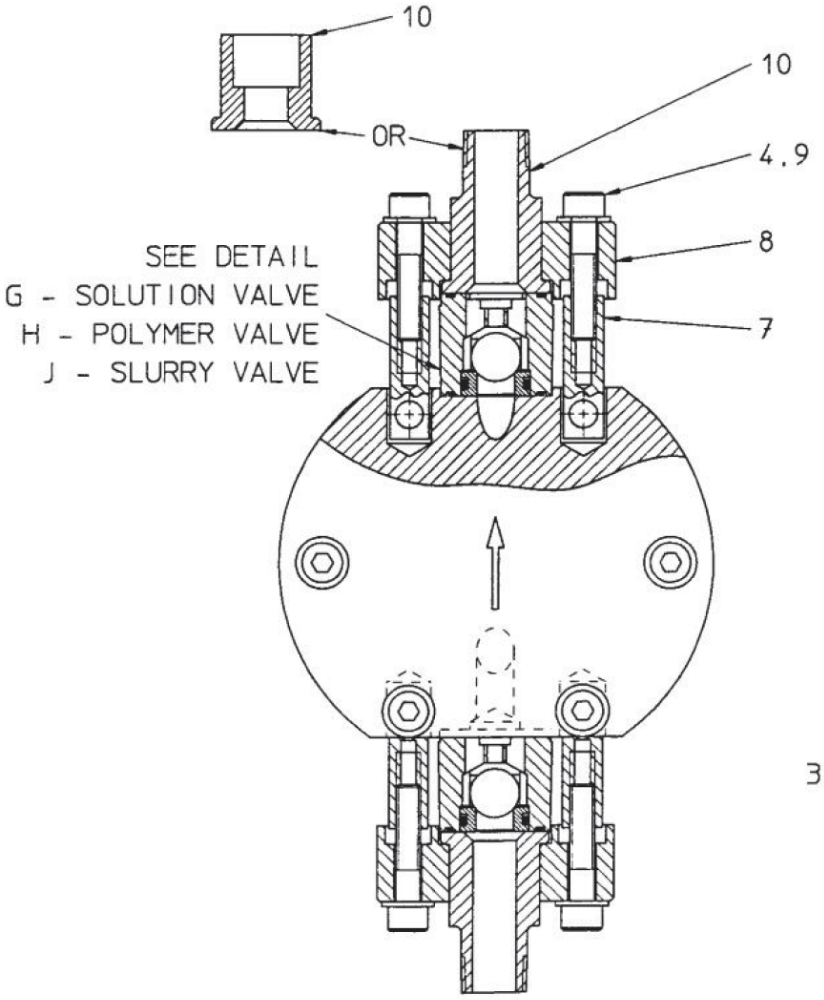
POLYMER VALVE
BALL SIZE: .625"

DETAIL H

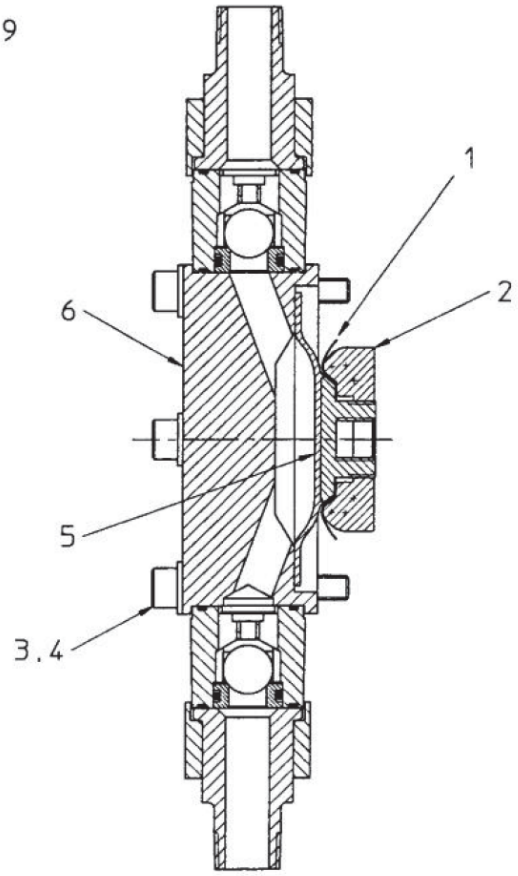


SLURRY VALVE
BALL SIZE: .625"

DETAIL J



FRONT VIEW



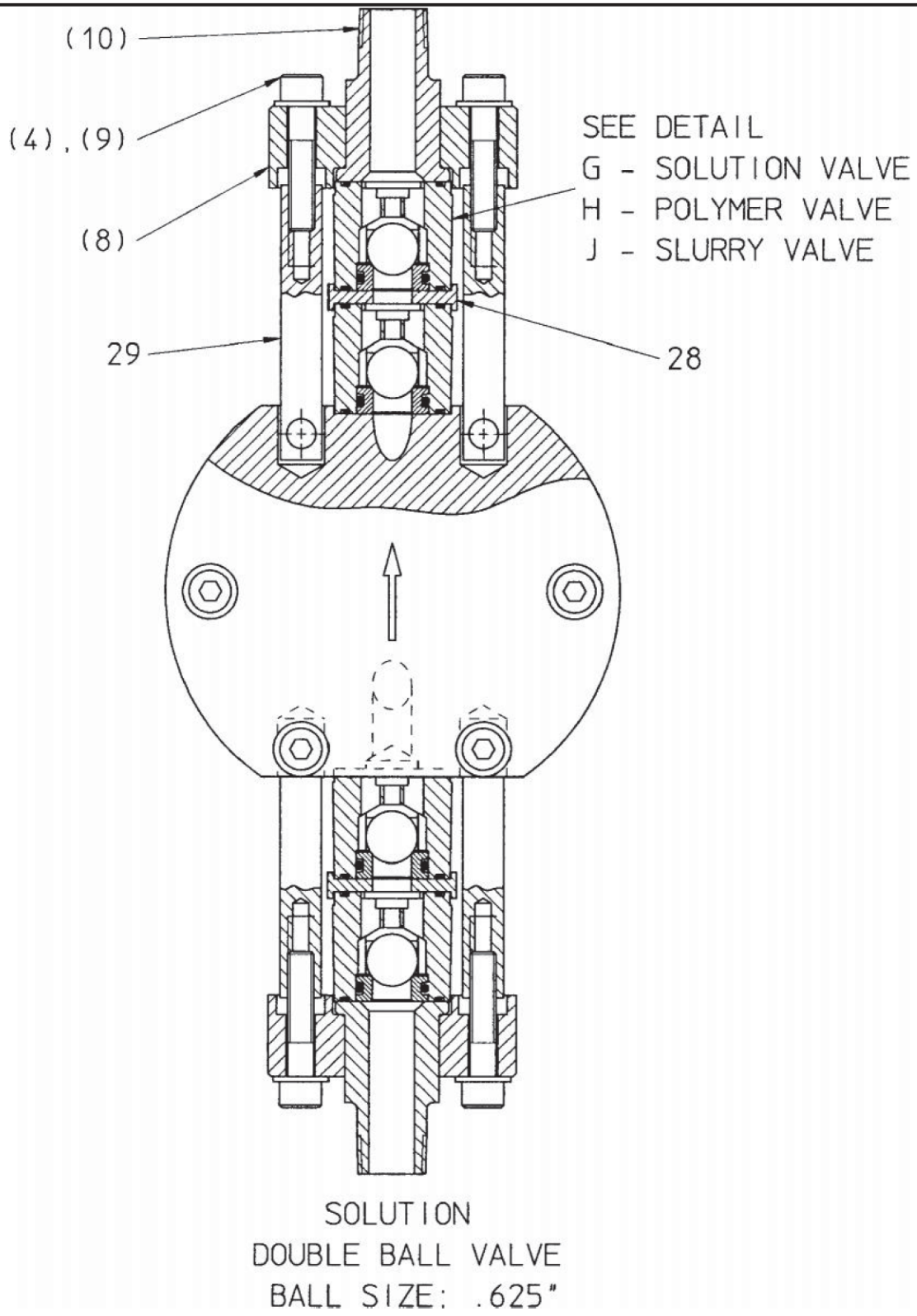
SIDE VIEW

NOTE: FOR PARTS LIST SEE DWGS. 440.400.010.010C&D.

3" LIQUID END - PARTS

440.400.010.010A

ISSUE 3 4-09



NOTE: FOR PARTS LIST SEE DWGS. 440.400.010.010C&D.

3" LIQUID END - PARTS

440.400.010.010B

ISSUE 2 4-09

KEY NO.	LEGACY PART NO.	ALT PART NO.	QTY.	DESCRIPTION
1	AAA3320	W2T10794	1	Disc, Backing
2	APP4035	W2T11080	1	Ring, Backup
3	AVM3599	W2T367176	6	Cap Screw, M8 x 55, Sock. Hd., 316SS
4	AWO5392	W2T11160	10	Washer, Flat, M8, 316SS
5	AQO5748	W2T11474	1	3" Diaphragm
6	ALI5254	W2T367058	1	Head, PVC
	OR			
	APQ5268	W2T417679	1	Head, Kynar
	OR			
	AAB2531	W2T416703	1	Head, 316SS
7	APQ5538	W2T11449	4	Eyenut, Valve, SB
8	AIC5568	W2T11331	2	Clamp, PVC
	OR			
	AAB2723	W2T416706	2	Clamp, SST
9	ARE3591	W2T367156	4	Cap Screw, M8 & 40, Sock. Hd., 316SS
10	AIA4133	W2T11359	2	Conn., M, 1/2" NPT, PVC
	OR			
	ANM4255	W2T11381	2	Conn., M, 1/2" NPT, Kynar
	OR			
	AAB2738	W2T416711	2	Conn., M, 1/2" NPT, 316SS
	OR			
	AMK4974	W2T11393	2	Conn., Sock., 1/2" Pipe, PVC
11	AJE5881	W2T11432	4	O-Ring (024) Hypalon, 28.3 ID x 1.78mm
	OR			
	AOO5871	W2T11372	4	O-Ring (024) Viton, 28.3 ID x 1.78mm
	OR			
	AAC6257	W2T416810	4	O-Ring (024) EPDM, 28.3 ID x 1.78mm
12	AOO5683	W2T367106	2	O-RIng, (115) Hypalon, 17.12 ID x 2.62mm
	OR			
	APQ5924	W2T11447	2	O-RIng, (115) Viton, 17.12 ID x 2.62mm
	OR			
	AAC6260	W2T416811	2	O-RIng, (115) EPDM, 17.12 ID x 2.62mm
13	AMK5020	W2T11395	2	Guide, Retainer, .625" Ball, PVC
	OR			
	AOO5014	W2T11420	2	Guide, Retainer, .625" Ball, Kynar
	OR			
	AAC5381	W2T416789	2	Guide, Retainer, .625" Ball, 316SS
14	AFM5802	W2T11309	2	Ball, .625" 316SS
	OR			
	AEK5860	W2T11298	2	Ball, .625" Teflon
	OR			
	AAC3514	W2T11253	2	Ball, .625" Ceramic
15	ANM4397	W2T11379	2	Seat, .625" Ball, 316SS
	OR			
	AIC4409	W2T11436	2	Seat, .625" Ball, PVC
	OR			
	AIA4403	W2T417613	2	Seat, .625" Ball, Kynar

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

3” LIQUID END - PARTS LIST

440.400.010.010C
ISSUE 4 1-10

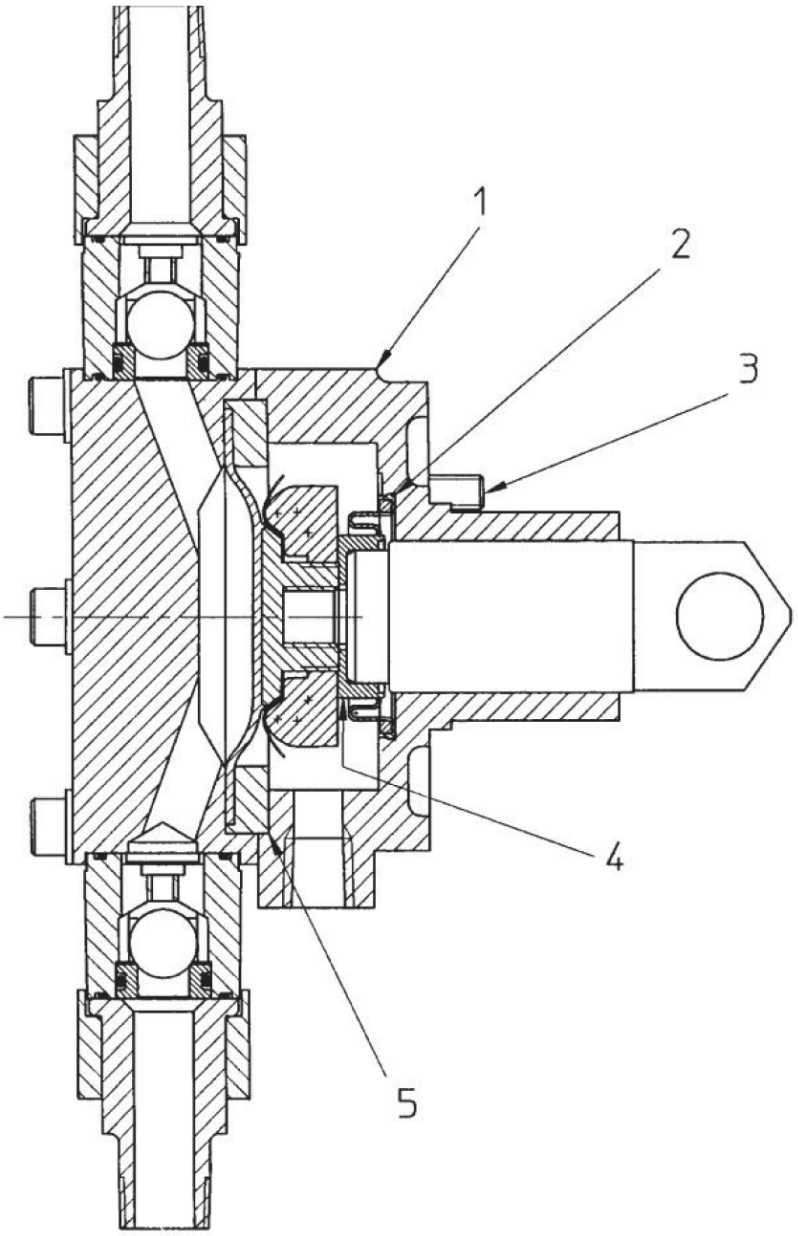
KEY NO.	LEGACY PART NO.	ALT PART NO.	QTY.	DESCRIPTION
16	AOO5871	W2T11372	4	O-Ring (024) Viton, 28.3 ID x 1.78mm
17	APQ5924	W2T11447	2	O-Ring (115) Viton, 17.12 x 2.62mm
18	ANM4215	W2T10728	2	Spring, .625" Ball
19	AAB9602	W2T416755	2	Guide, Polymer, .625" Ball, PVC
20	AEK5860	W2T11298	2	Ball, .625" PVC
21	AIC4409	W2T11436	2	Seat, .625" Ball, PVC
22	AJE5881	W2T11432	4	O-Ring (024) Hypalon, 28.3 ID x 1.78mm
23	AOO5683	W2T367106	2	O-Ring (115) Hypalon, 17.12 ID x 2.62mm
24	ALI5332	W2T11421	2	Guide, Slurry, .625" Ball, 316SS
25	AIC4989	W2T11442	2	Retainer, .625" Ball, PVC
26	AEK5786	W2T11297	2	Ball, .625" Polyurethane
27	AKG4390	W2T11396	2	Seat, .625" Ball Ceramic
28	APS4943	W2T11361	2	Adapter, V, .625" Ball, PVC
	OR			
	APQ4948	W2T367116	2	Adapter, V, .625" Ball, Kynar
29	APQ5542	W2T11450	4	Eyenut, Valve, DB

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

3" LIQUID END - PARTS LIST

440.400.010.010D

ISSUE 1 1-10



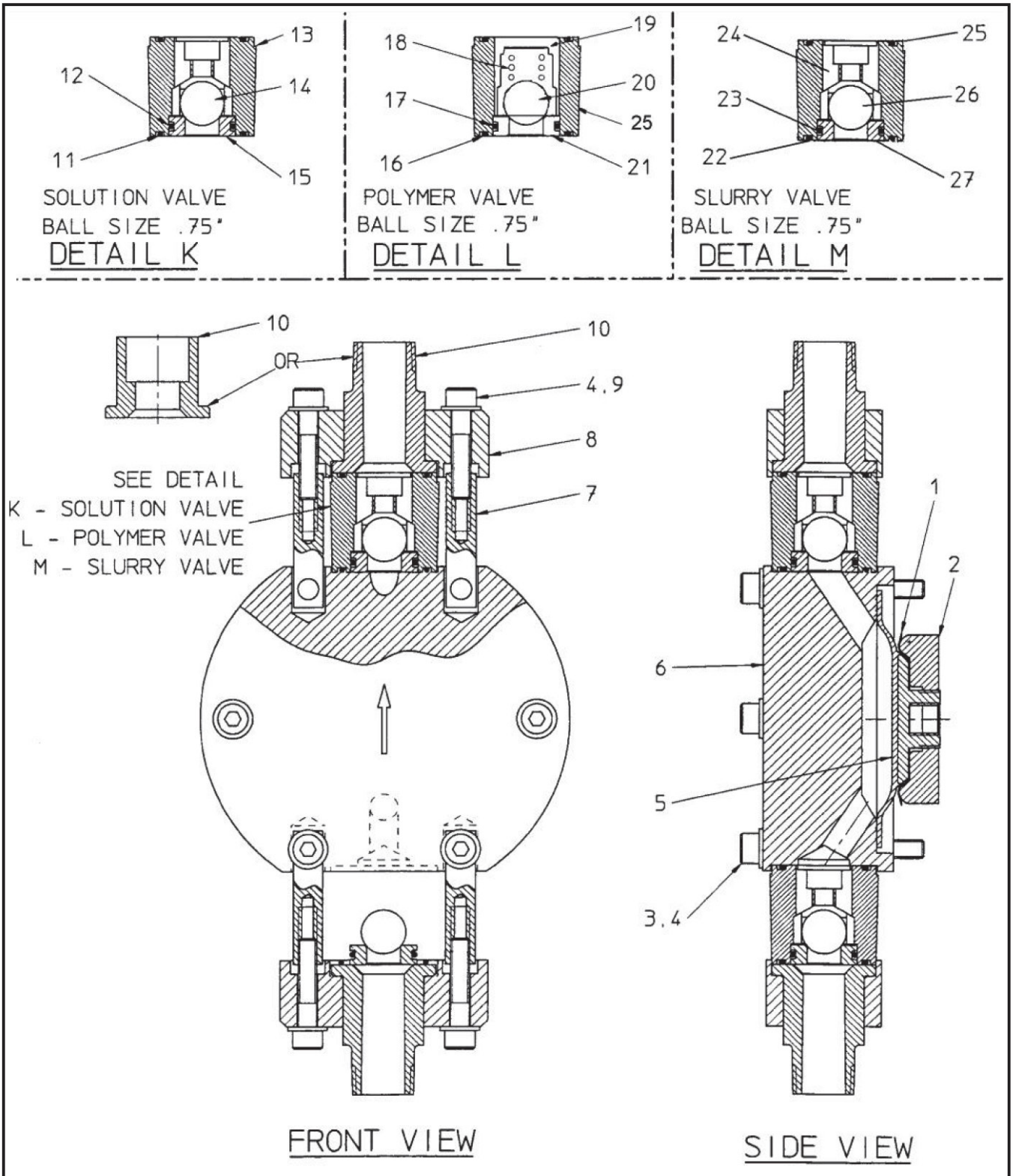
KEY NO.	LEGACY PART NO.	ALT PART NO.	QTY.	DESCRIPTION
*• 1	APM5645	W2T367112	1	ADAPTER, 3" DIAPHRAGM
*• 2	AAB7205	W2T9156	1	SEAL, BELLOW, CROSSHEAD
• 3	AXS3583	W2T11181	4	SCREW, CAP, M8 x 25, SOCK. HD., 316SS
• 4	AJA5915	W2T11357	1	CLAMP, DIAPHRAGM, BELLOW
• 5	AJE5301	W2T11428	1	SPACER, 3" DIAPHRAGM

NOTES: • PART OF APS4105 (W3T98114).
* AAB9299 ADAPTER WITH PRE-INSTALLED BELLOW SEAL CAN BE ORDERED IN PLACE OF KEY NO.'S 1 & 2.

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

3" LIQUID END ADAPTER - PARTS

440.400.001.050
ISSUE 2 1-10

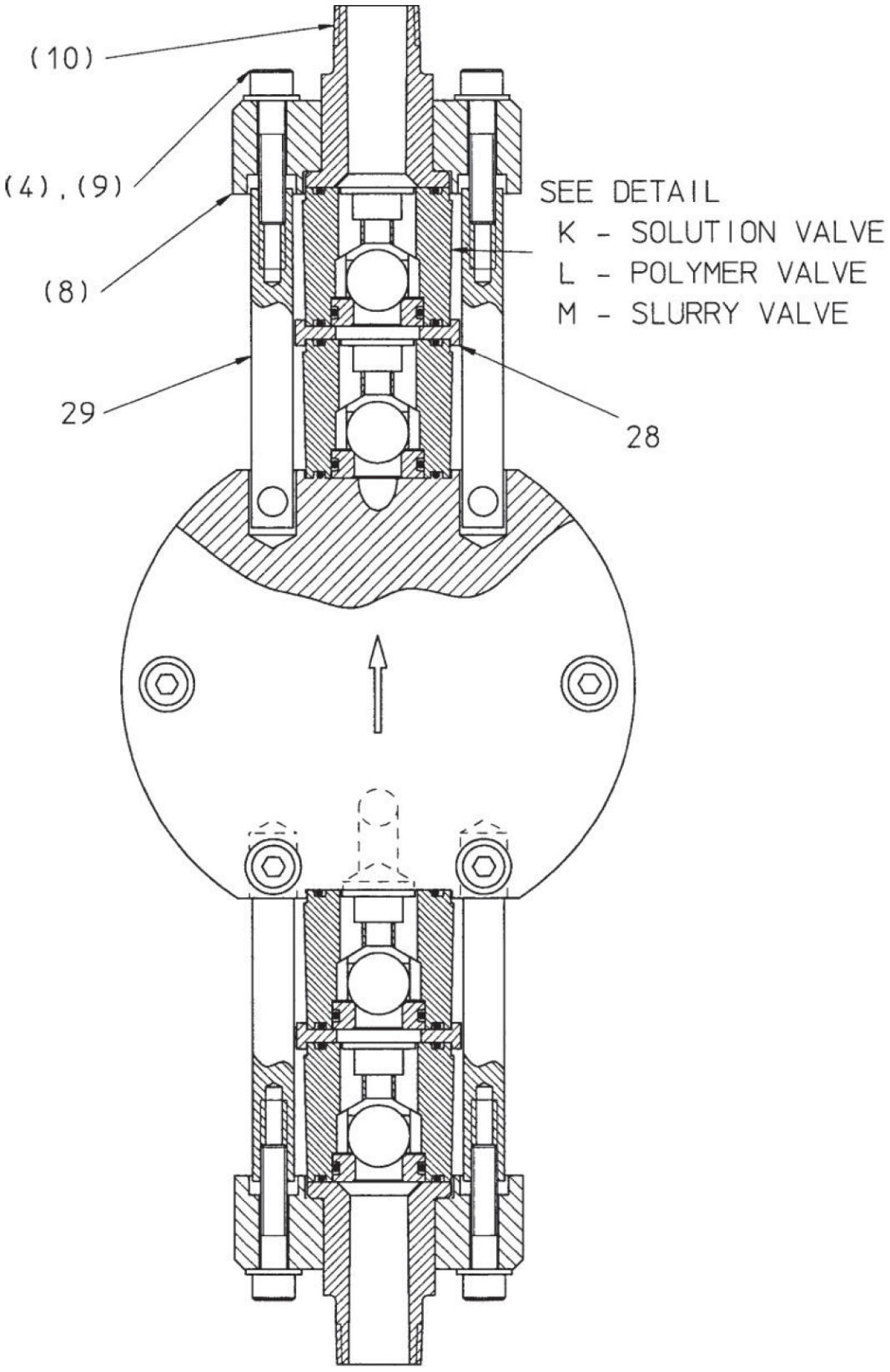


NOTE: FOR PARTS LIST SEE DWGS. 440.400.010.020C&D.

4" LIQUID END - PARTS

440.400.010.020A

ISSUE 3 4-09



NOTE: FOR PARTS LIST SEE DWGS. 440.400.010.020C&D.

4" LIQUID END - PARTS

440.400.010.020B

ISSUE 2 4-09

KEY NO.	LEGACY PART NO.	ALT PART NO.	QTY.	DESCRIPTION
1	AJE4048	W2T11087	1	Disc, Backing
2	ALJ4039	W2T99904	1	Ring, Backup
3	ARE3624	W2T367157	6	Cap Screw, M8 x 70, Sock. Hd., 316SS
4	AWO5392	W2T11160	10	Washer, Flat, M8, 316SS
5	ARQ5736	W2T11454	1	4" Diaphragm
6	APQ5186	W2T367117	1	Head, PVC
	OR			
	ANM5205	W2T11078	1	Head, Kynar
	OR			
	AAB2534	W2T9941	1	Head, 316SS
7	AJE5494	W2T11431	4	Eyenut, Valve
8	AIA5558	W2T11365	2	Clamp, PVC
	OR			
	AAB2726	W2T416707	2	Clamp, SST
9	ARE3591	W2T367156	4	Cap Screw, M8 & 40, Sock. Hd., 316SS
10	AIC4106	W2T11370	2	Conn., M, 3/4" NPT, PVC
	OR			
	AIA4119	W2T11358	2	Conn., M, 3/4" NPT, Kynar
	OR			
	AAB2744	W2T416713	2	Conn., M, 3/4" NPT, 316SS
	OR			
	APQ4991	W2T11352	2	Conn., Sock., 3/4" Pipe, PVC
11	ALI5643	W2T11424	4	O-Ring (126) Hypalon, 34.59 ID x 2.62mm
	OR			
	AMK5934	W2T367078	4	O-Ring (126) Viton, 34.59 ID x 2.62mm
	OR			
	AAC6263	W2T416812	4	O-Ring (126) EPDM, 34.59 ID x 2.62mm
12	AMK5655	W2T11347	2	O-RIng, (119) Hypalon, 23.47 ID x 2.62mm
	OR			
	AMK5929	W2T367077	2	O-RIng, (119) Viton, 23.47 ID x 2.62mm
	OR			
	AAA5549	W2T416677	2	O-RIng, (119) EPDM, 23.47 ID x 2.62mm
13	AIC5037	W2T11443	2	Guide, Retainer, .75" Ball, PVC
	OR			
	AOO5029	W2T11413	2	Guide, Retainer, .75" Ball, Kynar
	OR			
	AAC5384	W2T416790	2	Guide, Retainer, .75" Ball, 316SS
14	AHQ3932	W2T11308	2	Ball, .75" 316SS
	OR			
	ACG3819	W2T11262	2	Ball, .75" Teflon
	OR			
	AAA3656	W2T11291	2	Ball, .75" Ceramic
15	APQ4708	W2T11348	2	Seat, .75" Ball, 316SS
	OR			
	APS4721	W2T11363	2	Seat, .75" Ball, PVC
	OR			
	AIA4715	W2T11340	2	Seat, .75" Ball, Kynar

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

4” LIQUID END - PARTS LIST

440.400.010.020C
ISSUE 5 1-10

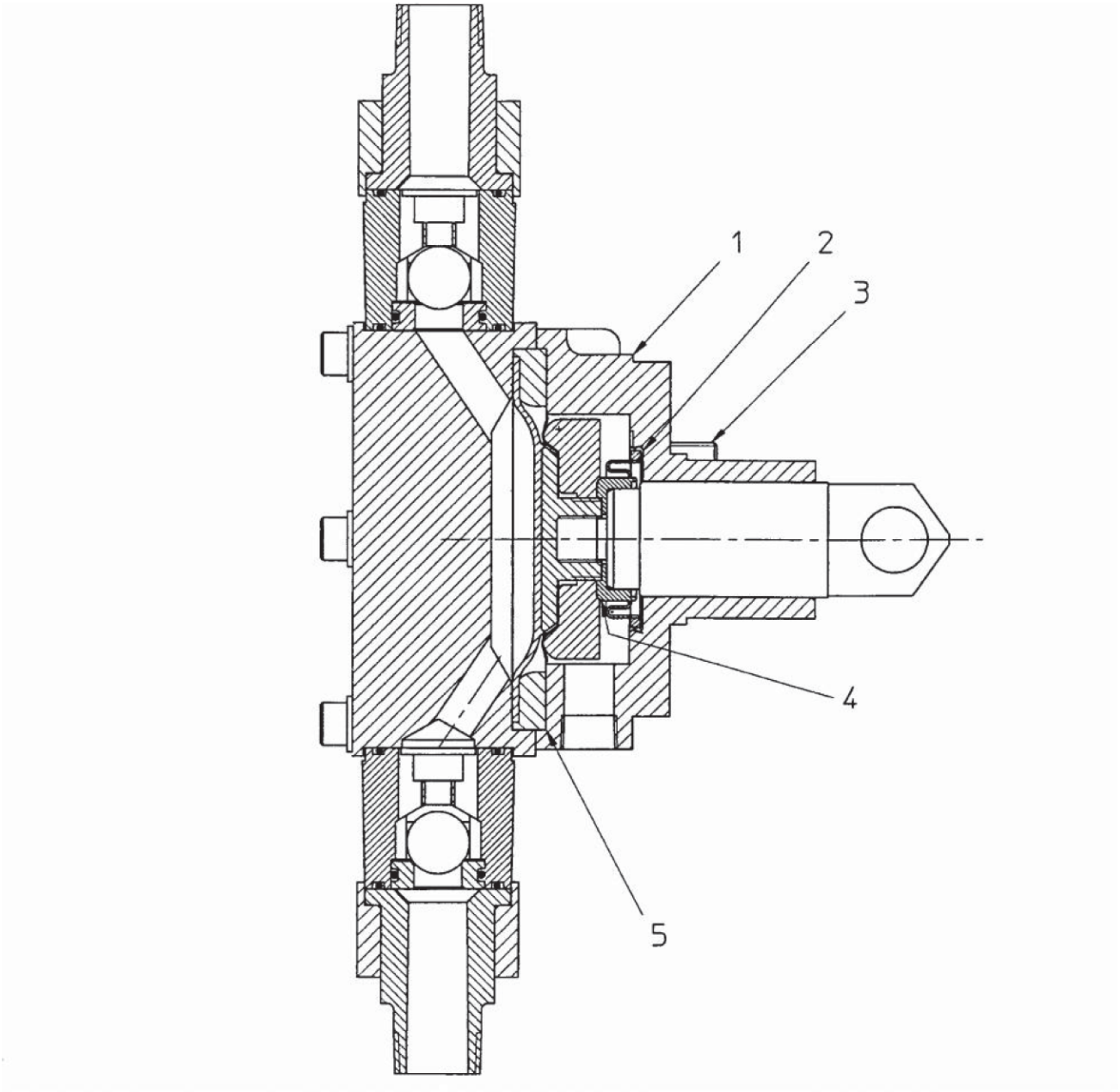
KEY NO.	LEGACY PART NO.	ALT PART NO.	QTY.	DESCRIPTION
16	AMK5934	W2T367078	4	O-Ring (126) Viton, 34.59 ID x 2.62mm
17	AMK5929	W2T367077	2	O-Ring (119) Viton, 23.47 x 2.62mm
18	AAB9218	W2T365136	2	Spring, .75" Ball
19	AAB9221	W2T8563	2	Guide, Polymer, .75" Ball, PVC
20	ACG3819	W2T11262	2	Ball, .75" PVC
21	APS4721	W2T11363	2	Seat, .75" Ball, PVC
22	ALI5643	W2T11424	4	O-Ring (126) Hypalon, 34.59 ID x 2.62mm
23	AMK5655	W2T11347	2	O-Ring (119) Hypalon, 23.47 ID x 2.62mm
24	APQ5338	W2T11386	2	Guide, Slurry, .75" Ball, 316SS
25	ANM4983	W2T11373	2	Retainer, .75" Ball, PVC
26	AFM3860	W2T11312	2	Ball, .75" Polyurethane
27	AMK4698	W2T11410	2	Seat, .75" Ball Ceramic
28	AKG4927	W2T11397	2	Adapter, V, .75" Ball, PVC
	OR			
	AKG4933	W2T11398	2	Adapter, V, .75" Ball, Kynar
29	AIA5499	W2T11364	4	Eyenut, Valve, DB

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

4” LIQUID END - PARTS LIST

440.400.010.020D

ISSUE 1 1-10



KEY NO.	LEGACY PART NO.	ALT PART NO.	QTY.	DESCRIPTION
*• 1	AKC5653	W2T367040	1	ADAPTER, 4" DIAPHRAGM
*• 2	AAB7205	W2T9156	1	SEAL, BELLOW, CROSSHEAD
• 3	AXS3583	W2T11181	4	SCREW, CAP, M8 x 25, SOCK. HD., 316SS
• 4	AJA5915	W2T11357	1	CLAMP, DIAPHRAGM, BELLOW
• 5	AJE5306	W2T11429	1	SPACER, 4" DIAPHRAGM

NOTES: • PART OF APS4110 (W3T99952).

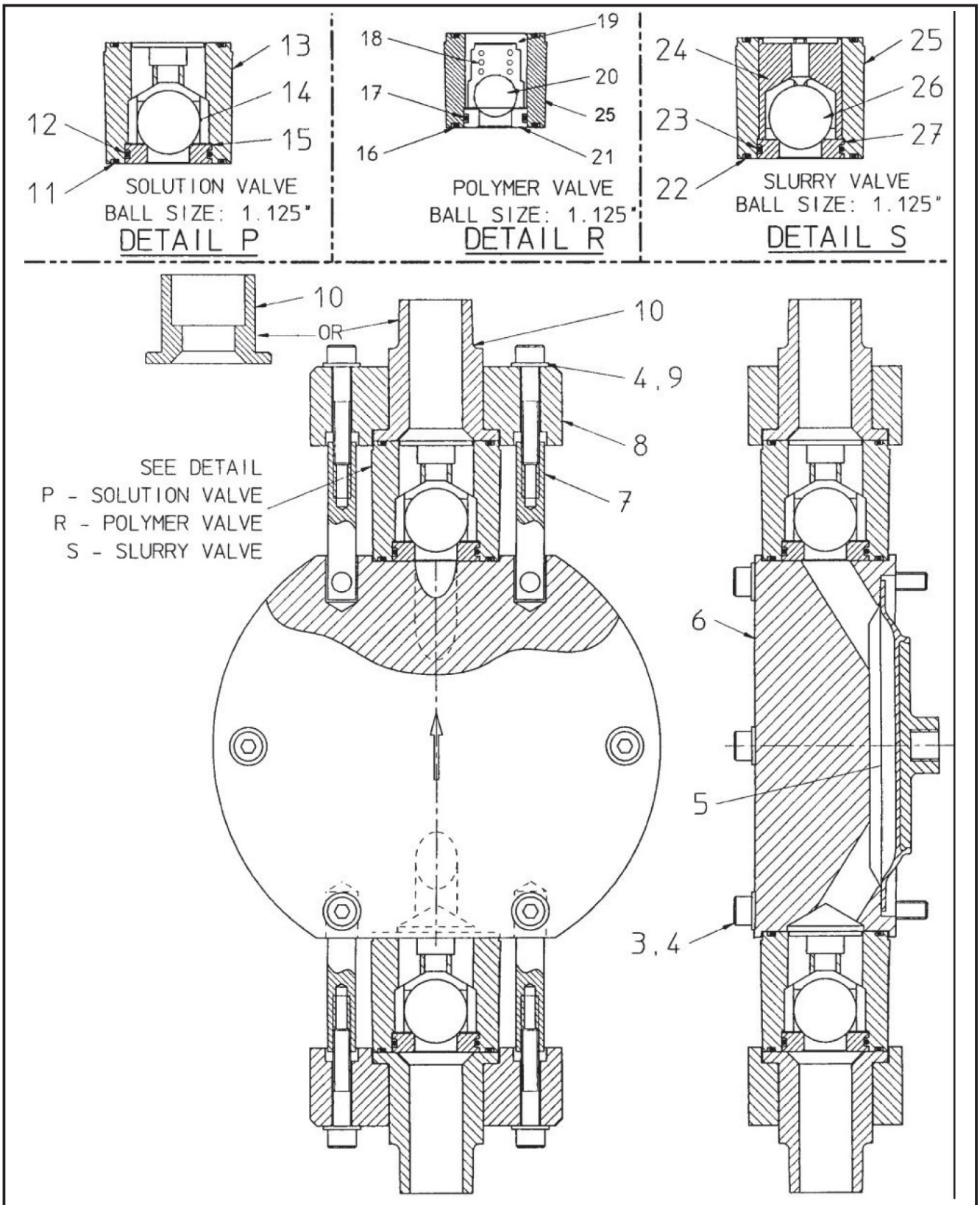
* W3T110146 ADAPTER WITH PRE-INSTALLED BELLOW SEAL CAN BE ORDERED IN PLACE OF KEY NO.'S 1 & 2.

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

4" LIQUID END ADAPTER - PARTS

440.400.001.060

ISSUE 3 1-10

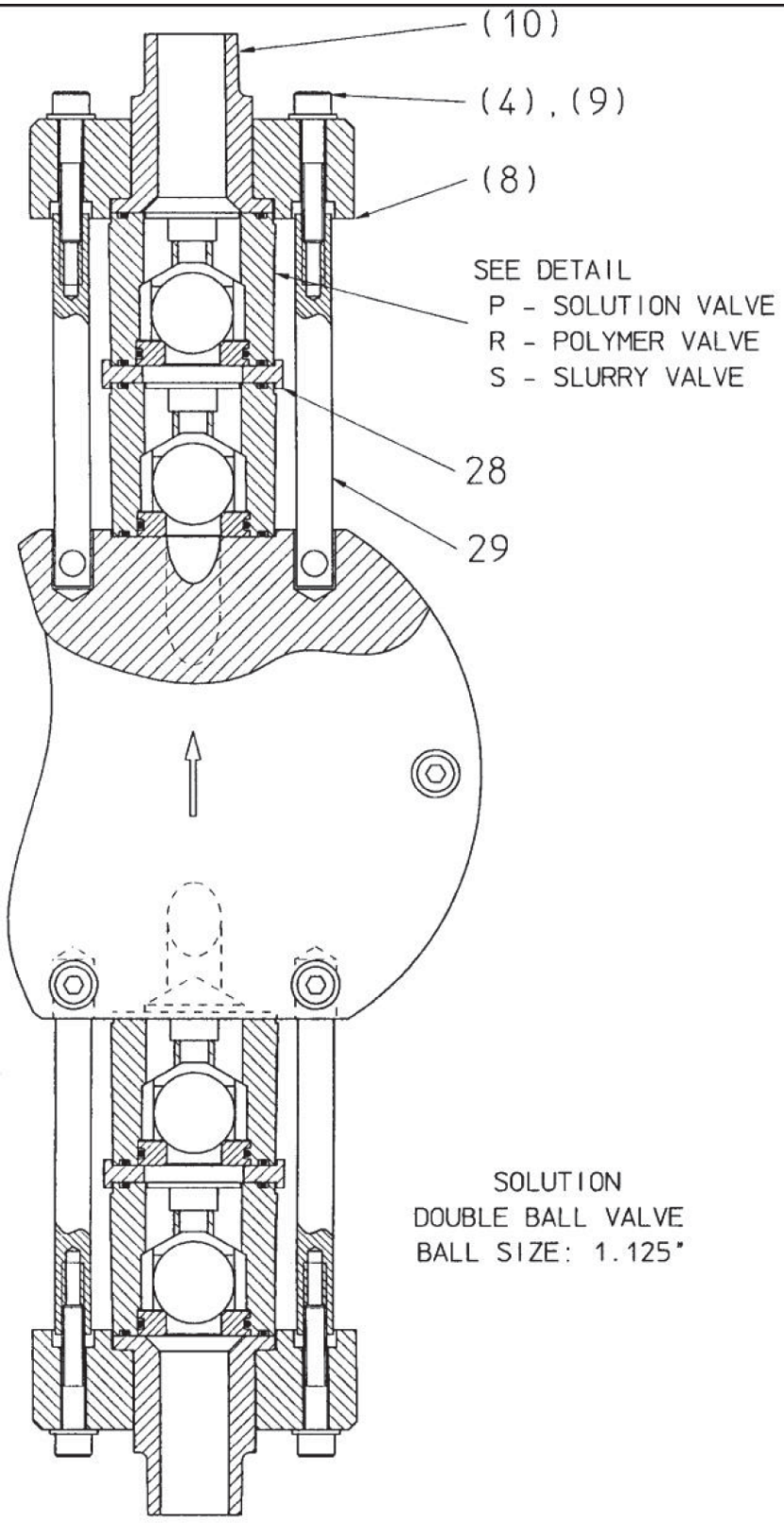


NOTE: FOR PARTS LIST SEE DWGS. 440.400.010.030C&D.

5" LIQUID END - PARTS

440.400.010.030A

ISSUE 3 4-09



NOTE: FOR PARTS LIST SEE DWGS. 440.400.010.030C&D.

5" LIQUID END - PARTS

440.400.010.030B

ISSUE 2 4-09

KEY NO.	LEGACY PART NO.	ALT PART NO.	QTY.	DESCRIPTION
3	ASG3633	W2T367165	6	Cap Screw, M8 x 80, Sock. Hd., 316SS
4	AWO5392	W2T11160	10	Washer, Flat, M8, 316SS
5	APM5758	W2T11477	1	5" Diaphragm
6	ALI5285	W2T417651	1	Head, PVC
	OR			
	AMK5290	W2T417657	1	Head, Kynar
	OR			
	AAB2537	W2T416704	1	Head, 316SS
7	AOO5518	W2T11445	4	Eyenut, Valve, SB
8	AIA5573	W2T11366	2	Clamp, PVC
	OR			
	AAB2729	W2T416708	2	Clamp, SST
9	AAA2028	W2T11024	4	Cap Screw, M8 x 45, Sock. Hd., 316SS
10	AJE4298	W2T11371	2	Conn., M, 1" NPT, PVC
	OR			
	AOO4311	W2T11389	2	Conn., M, 1" NPT, Kynar
	OR			
	ALI4282	W2T11342	2	Conn., M, 1" NPT, 316SS
	OR			
	AMK4997	W2T11394	2	Conn., Sock., 1" Pipe, PVC
11	AMK3876	W2T11225	4	O-Ring (134) Hypalon, 47.29 ID x 2.62mm
	OR			
	AJE3882	W2T367029	4	O-Ring (134) Viton, 47.29 ID x 2.62mm
	OR			
	AAC6266	W2T416813	4	O-Ring (134) EPDM, 47.29 ID x 2.62mm
12	ALI5643	W2T11424	2	O-Ring (126) Hypalon, 34.59 ID x 2.62mm
	OR			
	AMK5934	W2T367078	2	O-Ring (126) Viton, 34.59 ID x 2.62mm
	OR			
	AAC6263	W2T416812	2	O-Ring (126) EPDM, 34.59 ID x 2.62mm
13	AKG5002	W2T11400	2	Guide, Retainer, 1.125" Ball, PVC
	OR			
	AIA5008	W2T11334	2	Guide, Retainer, 1.125" Ball, Kynar
	OR			
	AAC5387	W2T416791	2	Guide, Retainer, 1.125" Ball, 316SS
14	ABE3904	W2T11258	2	Ball, 1.125", 316SS
	OR			
	ABE3796	W2T11256	2	Ball, 1.125", Teflon
	OR			
	AEK3629	W2T11299	2	Ball, 1.125", Ceramic
15	AIC4733	W2T11437	2	Seat, 1.125" Ball, 316SS
	OR			
	AIC3361	W2T11367	2	Seat, 1.125" Ball, PVC
	OR			
	ANM3369	W2T11426	2	Seat, 1.125" Ball, Kynar

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

5" LIQUID END - PARTS LIST

440.400.010.030C

ISSUE 1 1-10

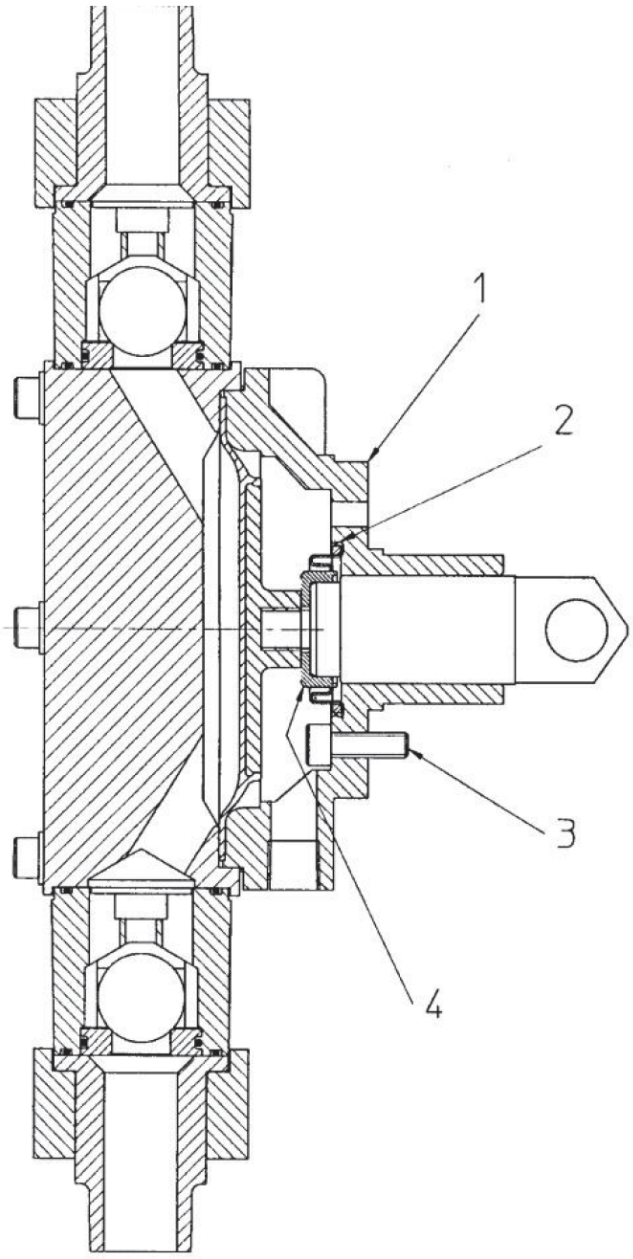
KEY NO.	LEGACY PART NO.	ALT PART NO.	QTY.	DESCRIPTION
16	AJE3882	W2T367029	4	O-Ring (134) Viton, 47.29 ID x 2.62mm
17	AMK5934	W2T367078	2	O-Ring (126) Viton, 34.59 x 2.62mm
18	ALI4222	W2T11325	2	Spring, 1.125" Ball
19	AAB5987	W2T9476	2	Guide, Polymer, 1.125" Ball, PVC
20	ABE3796	W2T11256	2	Ball, 1.125" Teflon
21	AIC3361	W2T11367	2	Seat, 1.125" Ball, PVC
22	AMK3876	W2T11225	4	O-Ring (134) Hypalon, 47.29 ID x 2.62mm
23	ALI5643	W2T11424	2	O-Ring (126) Hypalon, 34.59 ID x 2.62mm
24	AOO5311	W2T11444	2	Guide, Slurry, 1.125" Ball, 316SS
25	APS4977	W2T11383	2	Retainer, 1.125" Ball, PVC
26	ABE3839	W2T11257	2	Ball, 1.125" Polyurethane
27	AOO4728	W2T11387	2	Seat, 1.125" Ball Ceramic
28	APQ4909	W2T11351	2	Adapter, V, 1.125" Ball, PVC
	OR			
	ANM4915	W2T417666	2	Adapter, V, 1.125" Ball, Kynar
29	AIC5522	W2T11332	4	Eyenut, Valve, DB

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

5” LIQUID END - PARTS LIST

440.400.010.030D

ISSUE 1 1-10



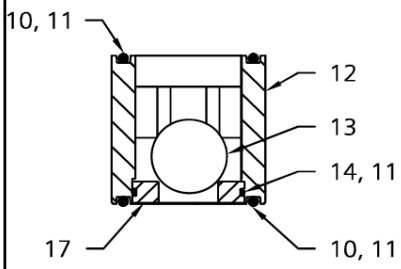
KEY NO.	LEGACY PART NO.	ALT PART NO.	QTY.	DESCRIPTION
*• 1	AJA5631	W2T367024	1	ADAPTER, 5" DIAPHRAGM
*• 2	AAB7205	W2T9156	1	SEAL, BELLOW, CROSSHEAD
• 3	AXS3583	W2T11181	4	SCREW, CAP, M8 x 25, SOCK. HD., 316SS
• 4	AJA5915	W2T11357	1	CLAMP, DIAPHRAGM, BELLOW

NOTES: • PART OF ANM4120 (W3T99922).
* AAB9311 ADAPTER WITH PRE-INSTALLED BELLOW SEAL CAN BE ORDERED IN PLACE OF KEY NO.'S 1 & 2.

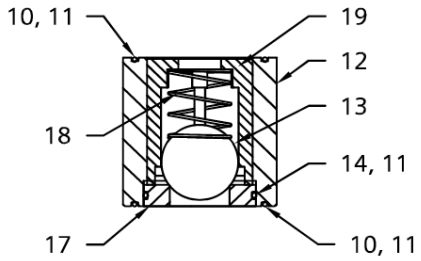
WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

5" LIQUID END ADAPTER - PARTS

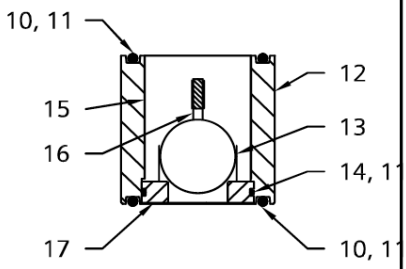
440.400.001.070
ISSUE 1 1-10



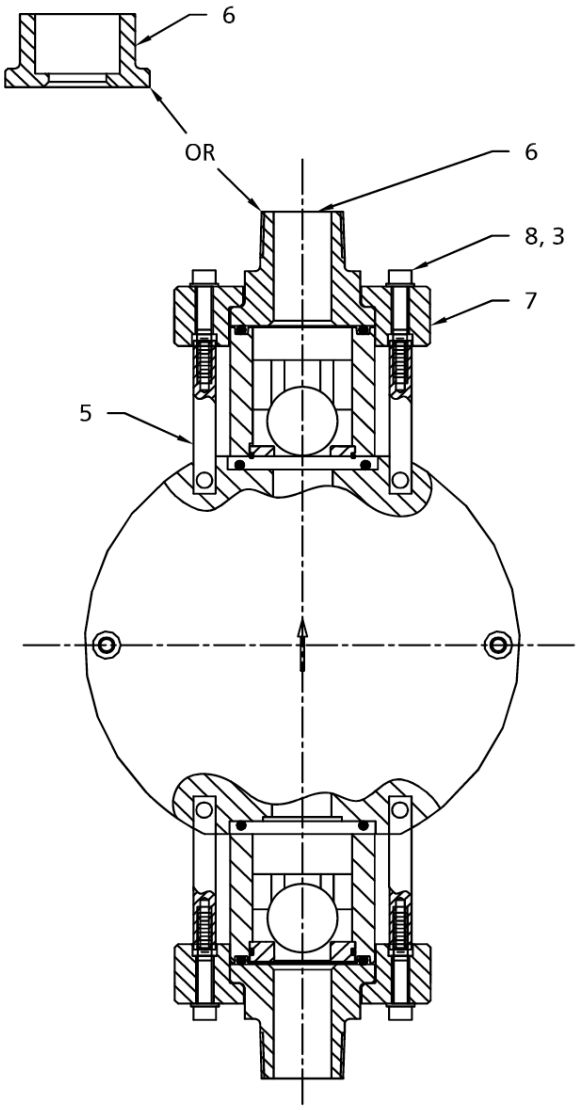
SOLUTION VALVE
DETAIL T

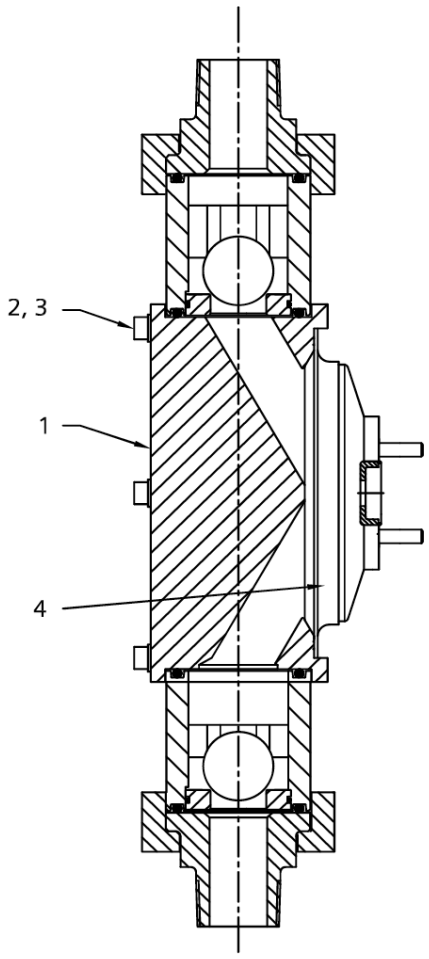


POLYMER VALVE
DETAIL U



SLURRY VALVE
DETAIL V



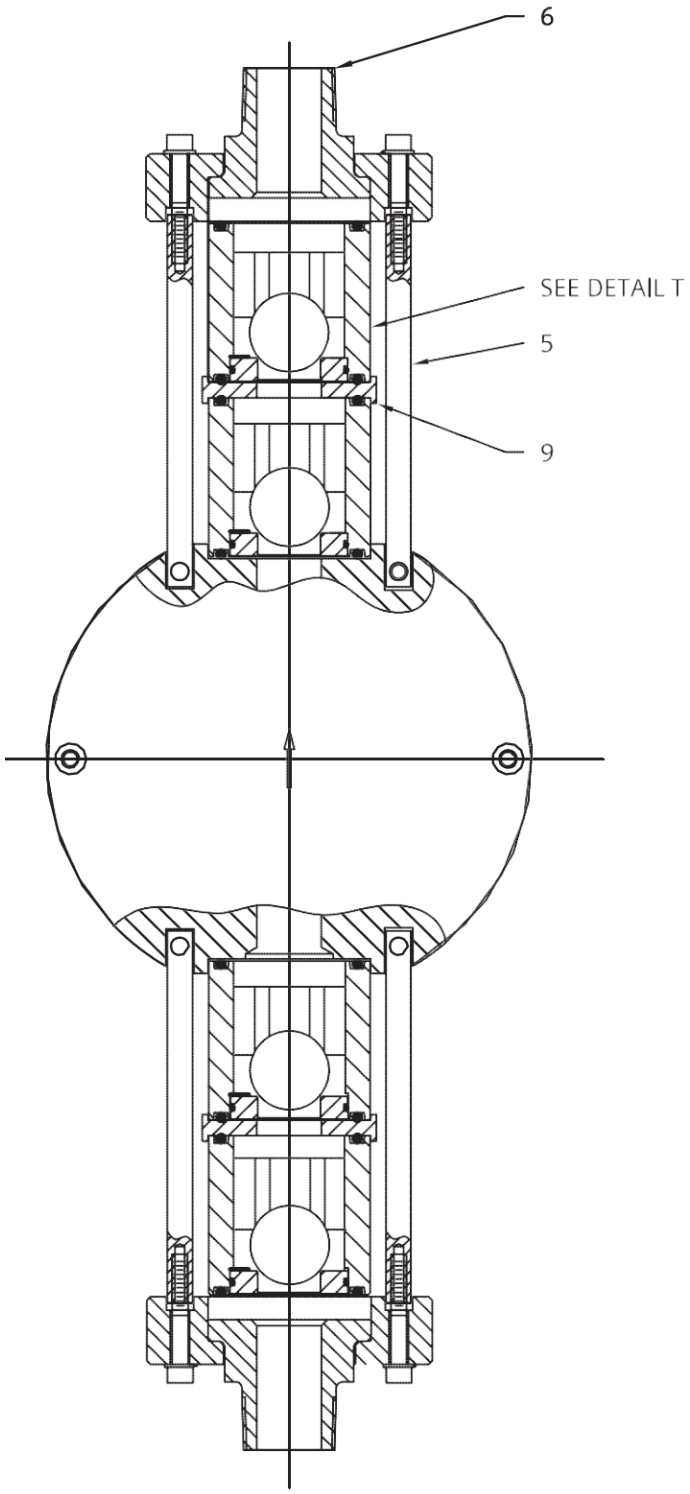


NOTE: FOR PARTS LIST SEE DWGS. 440.400.010.040C&D.

6-1/2" LIQUID END - PARTS

440.400.010.040A

ISSUE 1 2-06



NOTE: FOR PARTS LIST SEE DWGS. 440.400.010.040C&D.

6-1/2" LIQUID END - PARTS

440.400.010.040B

ISSUE 1 4-09

KEY NO.	LEGACY PART NO.	ALT PART NO.	QTY.	DESCRIPTION
1	AAA9089	W2T10042	1	Head, PVC
	OR			
	AAA9116	W2T416687	1	Head, Kynar
	OR			
	AAA9137	W2T416688	1	Head, 316SS
2	AAA5283	W2T10474	6	Screw, Cap M8 x 120, Sock. Head, 316SS
3	AWO5392	W2T11160	10	Flat Washer, M8, 316SS
• 4	AAA9077	W2T10047	1	Diaphragm, 6.5" Teflon Faced
5	AAA9383	W2T10321	4	Eyenut, Single Ball
	OR			
	AAA9380	W2T10320	4	Eyenut, Double Ball
6	AIC3543	W2T11305	2	1-1/2" NPT Connection, PVC
	OR			
	ALI3579	W2T417645	2	1-1/2" NPT Connection, Kynar
	OR			
	AJE3531	W2T417627	2	1-1/2" NPT Connection, SS
	OR			
	APQ3649	W2T417673	2	R1-1/2" Conenction, PVC
	OR			
	APQ3666	W2T417674	2	R1-1/2" Conenction, Kynar
	OR			
	AJE3640	W2T417628	2	R1-1/2" Conenction, SS
	OR			
	AKG3698	W2T417634	2	1-1/2" Socket Conenction, PVC
7	AAA9377	W2T10054	2	Clamp, PVC
	OR			
	AAA9410	W2T416689	2	Clamp, Kynar
	OR			
	AAA9413	W2T416690	2	Clamp, SS
8	AVM3599	W2T367176	4	Screw, Cap M8 x 55, Sock. Head, 316SS
9	APQ3953	W2T417675	2	Double Valve Adapter, 1.625" Ball, PVC
	OR			
	ANM3962	W2T417662	2	Double Valve Adapter, 1.625" Ball, Kynar
	OR			
	AKG3946	W2T417635	2	Double Valve Adapter, 1.625" Ball, SS
10	AIC5182	W2T11440	4	#147 O-Ring, 67.95 ID x 2.62mm, Hypalon
	OR			
	AKG5710	W2T11433	4	#147 O-Ring, 67.95 ID x 2.62mm, Viton
	OR			
	AAC6272	W2T416815	4	#147 O-Ring, 67.95 ID x 2.62mm, EPDM
11	AAA3797	W2T11137	A/R	Light Silicone Grease

• PART OF AAA9407

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

6-1/2” LIQUID END - PARTS LIST

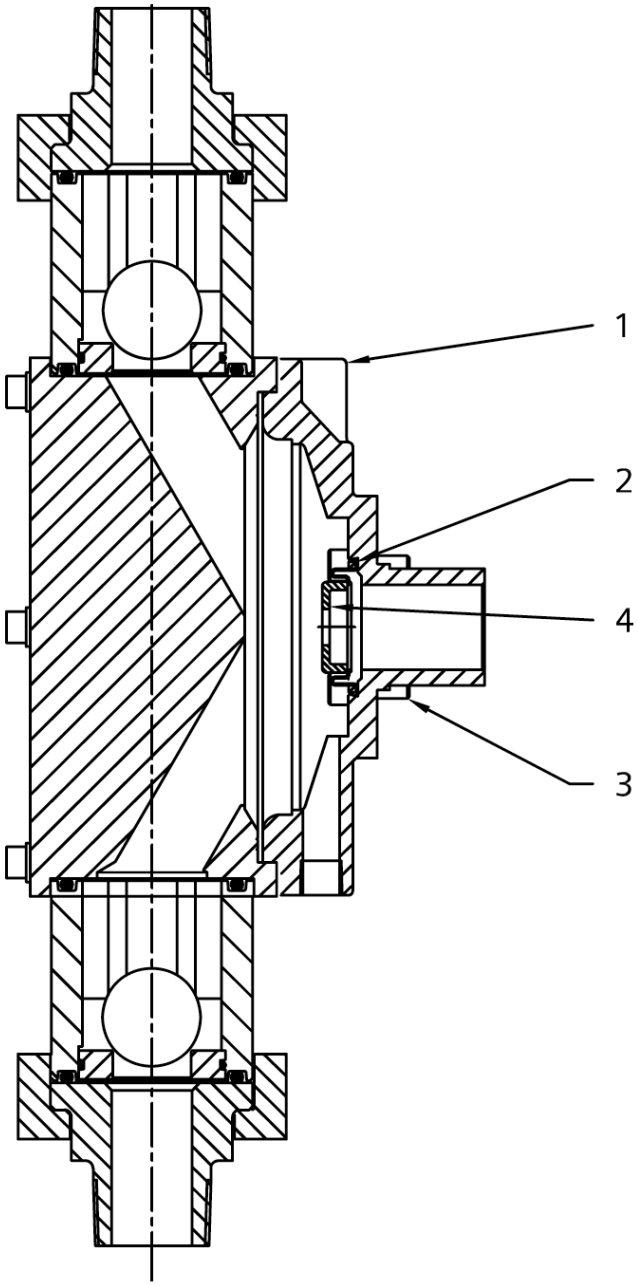
440.400.010.040C
ISSUE 2 1-10

KEY NO.	LEGACY PART NO.	ALT PART NO.	QTY.	DESCRIPTION
12	AAC6437	W2T8384	2	Retainer/Guide, PVC, For Solution Only
	OR			
	AAC6440	W2T8385	2	Retainer/Guide, Kynar, For Solution Only
	OR			
	AAC5390	W2T416792	2	Retainer/Guide, SS, For Solution Only
	OR			
	AJE3930	W2T417629	2	Retainer/Guide, PVC, For Slurry & Polymer
	OR			
	ALI3938		2	Retainer/Guide, Kynar, For Slurry & Polymer
	OR			
	ANM3922		2	Retainer/Guide, SS, For Slurry & Polymer
13	ACG5578	W2T417610	2	Ball, 1.625", SS
	OR			
	AAA5536	W2T11280	2	Ball, 1.625", Teflon
	OR			
	AAC5452	W2T11254	2	Ball, 1.625", Ceramic
	OR			
	ABE5509	W2T11259	2	Ball, 1.625", Polyurethane
14	ANM5190	W2T1376	2	#139 O-Ring, 55.25 ID x 2.62mm, Hypalon
	OR			
	ANM5700	W2T11349	2	#139 O-Ring, 55.25 ID x 2.62mm, Viton
	OR			
	AAC6269	W2T416814	2	#139 O-Ring, 55.25 ID x 2.62mm, EPDM
15	AAB4715	W2T416724	2	Top Guide, SS, Slurry Valve Only
16	AAB4703	W2T416723	2	Bottom, Guide, SS, Slurry Valve Only
17	ALI4362	W2T417647	2	Seat, SS
	OR			
	APQ4371	W2T11287	2	Seat, PVC
	OR			
	AIC4366	W2T11268	2	Seat, Kynar
	OR			
	AOO4357	W2T417669	2	Seat, Ceramic
18	ALI4260	W2T367054	2	Spring, Comp., Cob., 1.34 OD x .06 W x 1.68
19	AMK3904	W2T417654	2	Guide, PVC Polymer

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

6-1/2” LIQUID END - PARTS LIST

440.400.010.040D
ISSUE 2 1-10



KEY NO.	PART NO.	QTY.	DESCRIPTION
1	AAA9098	1	ADAPTER, 6.5" DIAPHRAGM
2	AAB7205	1	SEAL, BELLOW, CROSSHEAD
3	AXS3583	4	SCREW, CAP, M8 x 25, SOCK. HD., 316SS
4	AJA5915	1	CLAMP, DIPHRAGM, BELLOW

WHEN ORDERING MATERIAL, ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS.

6-1/2” LIQUID END ADAPTER - PARTS

440.400.001.080

ISSUE 2 2-06

Section 6 - PREVENTIVE MAINTENANCE KITS & SPARE PARTS LIST

List of Contents TABLE NO.

Table 6.1 - Spares For Encore 700

Description	Used On	LEGACY Part Number	ALT PART NO.
Diaphragm Maintenance Kit	1-3/8" Head	AAA1136	W2T110105
	2" Head	AAA1118	W3T108069
	3" Head	AAA1121	W3T108070
	4" Head	AAA1124	W3T108071
	5" Head	APM5758 Diaphragm Only	W2T11477
	6-1/2" Head	AAA9077 Diaphragm Only	W2T10047
Valve Kit **	1-3/8" Head	Refer to Tables 6.1.1 & 6.1.2	
	2" Head	Refer to Tables 6.1.3 & 6.1.4	
	3" Head	Refer to Table 6.1.5	
	4" Head	Refer to Table 6.1.6	
	5" Head	Refer to Table 6.1.7	
	6-1/2" Head	Refer to Table 6.1.8	
Diaphragm Backup Ring	1-3/8" Head	ALI5124	W2T11408
	2" Head	AJE4030	W2T11086
	3" Head	APP4035	W2T11080
	4" Head	ALJ4039	W2T11034
Head, PVC (Cartridge Valves)	1-3/8" Head	APS4346	W2T367124
	2" Head	AOO5277	W2T367105
	3" Head	ALI5254	W2T367058
	4" Head	APQ5186	W2T367117
	5" Head	ALI5285	W2T417651
	6-1/2" Head	AAA9089	W2T10042
Head, PVC (Threaded Valves)	1-3/8" Head	APS3127	W2T367121
	2" Head	AMK3122	W2T367067
Head, Kynar (Cartridge Valves)	1-3/8" Head	AIC4339	W2T11038
	2" Head	APQ5281	W2T11069
	3" Head	APQ5268	W2T417679
	4" Head	ANM5205	W2T11078
	5" Head	AMK5290	W2T417657
	6-1/2" Head	AAA9116	W2T416687
Head, Stainless Steel (Cartridge Valves)	1-3/8" Head	AAB2525	W2T416702
	2" Head	AAB2528	W2T9940
	3" Head	AAB2531	W2T416703
	4" Head	AAB2534	W2T9941
	5" Head	AAB2537	W2T416704
	6-1/2" Head	AAA9137	W2T416688
Oil Seal (Worm Shaft)	Common to all gearboxes.	ALI3193	W2T367049
Belt	Common to all pulley driven gearboxes.	AAA5499 (order quantity = 2)	W2T11316
Food-Grade Synthetic Oil (Optional)* SAE90 (2 liters required)	Gearbox	AAA5499 (order quantity = 2)	W2T10431

NOTES:

**Each valve kit consists of two valve sets, one for suction and one for discharge. For double ball valves, order a quantity of two kits per head.

* Commercially available SAE85W90 may be used.

Table 6.1.1 - 1-3/8” Maintenance Kit, Cartridge Valves

1-3/8”	Guide Retainer Material	Guide Material	Seat Material	Ball Material	Spring Material	O-Ring Material	Qty.*	LEGACY PART NUMBER	ALT PART NUMBER
Solution	PVC	---	316SS	316SS	---	Hypalon	1	APS4297	W3T110398
	PVC	---	316SS	316SS	---	Viton	1	AJE4302	W3T110388
	PVC	---	PVC	PTFE	---	Hypalon	1	API4307	W3T108956
	PVC	---	PVC	PTFE	---	Viton	1	ALI4333	W3T108940
	PVC	---	PVC	PTFE	---	EPDM	1	AAC6299	W3T108285
	PVC	---	PVC	Ceramic	---	Hypalon	1	ANM4337	W3T108947
	PVC	---	PVC	Ceramic	---	Viton	1	APS4341	W3T108961
	PVDF	---	316SS	316SS	---	Hypalon	1	AIC4345	
	PVDF	---	316SS	316SS	---	Viton	1	ANM4352	
	PVDF	---	PVDF	PTFE	---	Hypalon	1	AOO4356	W3T108952
	PVDF	---	PVDF	PTFE	---	Viton	1	AJE4360	W3T108928
	PVDF	---	PVDF	Ceramic	---	Hypalon	1	AKG4364	
	PVDF	---	PVDF	Ceramic	---	Viton	1	ALI4368	
	316SS	---	316SS	316SS	---	Hypalon	1	AAC6302	
	316SS	---	316SS	316SS	---	Viton	1	AAC6305	W3T108286
	316SS	---	316SS	316SS	---	EPDM	1	AAC6308	
Slurry	PVC	---	Ceramic	Polyuret.	---	Hypalon	1	AKG4374	
Polymer	PVC	PVC	PVC	PTFE	Elgiloy	Viton	1	APQ4379	W3T108957

NOTE:
***Each valve kit consists of two valve sets, one for suction and one for discharge. For double ball valves, order a quantity of two kits per head.**

NOTE:
Always change diaphragms and valves at the same time, annually, for optimum performance.

NOTE:
This table shows the material the parts are made of and not the content of the kit.

Table 6.1.2 - 1-3/8" Maintenance Kit Threaded Valves (Single Ball Only)

1-3/8”	Housing Material	Ball Material	Seat Material	O-Ring Material	Qty.	Part Number
Solution	PVC	Glass	PVC	Viton	1	AAA1130

NOTE:
Always change diaphragms and valves at the same time, annually, for optimum performance.

Table 6.1.3 - 2” Maintenance Kit, Cartridge Valves

2”	Guide Retainer Material	Guide Material	Seat Material	Ball Material	Spring Material	O-Ring Material	Qty.*	LEGACY PART NUMBER	ALT PART NUMBER
Solution	PVC	---	316SS	316SS	---	Hypalon	1	AJE4773	W3T110389
	PVC	---	316SS	316SS	---	Viton	1	AIC4778	W3T108925
	PVC	---	PVC	PTFE	---	Hypalon	1	AJE4781	W3T108929
	PVC	---	PVC	PTFE	---	Viton	1	APQ4786	W3T110396
	PVC	---	PVC	PTFE	---	EPDM	1	AAC6311	
	PVC	---	PVC	Ceramic	---	Hypalon	1	ALI4789	W3T108941
	PVC	---	PVC	Ceramic	---	Viton	1	ALI4793	W3T110392
	PVDF	---	316SS	316SS	---	Hypalon	1	ANM4797	
	PVDF	---	316SS	316SS	---	Viton	1	AMK4801	
	PVDF	---	PVDF	PTFE	---	Hypalon	1	AKG4804	W3T108935
	PVDF	---	PVDF	PTFE	---	Viton	1	ANM4809	W3T108948
	PVDF	---	PVDF	Ceramic	---	Hypalon	1	ALI4812	
	PVDF	---	PVDF	Ceramic	---	Viton	1	AIA4817	W3T108921
	316SS	---	316SS	316SS	---	Hypalon	1	AAC6314	W3T110163
	316SS	---	316SS	316SS	---	Viton	1	AAC6317	W3T108287
	316SS	---	316SS	316SS	---	EPDM	1	AAC6320	
Slurry	PVC	316SS	Ceramic	Polyuret.	---	Hypalon	1	APQ4826	W3T108958
Polymer	PVC	PVC	PVC	PTFE	Elgiloy	Viton	1	APQ4379	W3T108957

NOTE:
***Each valve kit consists of two valve sets, one for suction and one for discharge. For double ball valves, order a quantity of two kits per head.**

NOTE:
Always change diaphragms and valves at the same time, annually, for optimum performance.

NOTE:
This table shows the material the parts are made of and not the content of the kit.

Table 6.1.4 - 2” Maintenance Kit, Threaded Valves (Single Ball Only)

2”	Housing Material	Ball Material	Seat Material	O-Ring Material	Qty.	Part Number	Part Number
Solution	PVC	Glass	PVC	Viton	1	AAA1133	W3T108072

NOTE:
Always change diaphragms and valves at the same time, annually, for optimum performance.

Table 6.1.5 - 3” Maintenance Kit, Cartridge Valves

3”	Guide Retainer Material	Guide Material	Seat Material	Ball Material	Spring Material	O-Ring Material	Qty.*	LEGACY PART NUMBER	ALT PART NUMBER
Solution	PVC	---	316SS	316SS	---	Hypalon	1	AOO4862	W3T110395
	PVC	---	316SS	316SS	---	Viton	1	AIA4866	W3T108922
	PVC	---	PVC	PTFE	---	Hypalon	1	AMK4870	W3T108945
	PVC	---	PVC	PTFE	---	Viton	1	APS4873	W3T108962
	PVC	---	PVC	PTFE	---	EPDM	1	AAC6335	
	PVC	---	PVC	Ceramic	---	Hypalon	1	AKG4877	W3T108936
	PVC	---	PVC	Ceramic	---	Viton	1	AOO4881	W3T108953
	PVDF	---	316SS	316SS	---	Hypalon	1	ALI4884	
	PVDF	---	316SS	316SS	---	Viton	1	AIC4887	W3T108926
	PVDF	---	PVDF	PTFE	---	Hypalon	1	AJE4891	W3T108930
	PVDF	---	PVDF	PTFE	---	Viton	1	APQ4896	
	PVDF	---	PVDF	Ceramic	---	Hypalon	1	ALI4900	W3T110393
	PVDF	---	PVDF	Ceramic	---	Viton	1	AMK4904	
	316SS	---	316SS	316SS	---	Hypalon	1	AAC6338	
	316SS	---	316SS	316SS	---	Viton	1	AAC6341	
	316SS	---	316SS	316SS	---	EPDM	1	AAC6344	
Slurry	PVC	316SS	Ceramic	Polyuret.	---	Hypalon	1	ANM4908	W3T108949
Polymer	PVC	PVC	PVC	PTFE	Elgiloy	Viton	1	ALI4912	W3T108942

NOTE:
Each valve kit consists of two valve sets, one for suction and one for discharge. For double ball valves, order a quantity of two kits per head.

NOTE:
Always change diaphragms and valves at the same time, annually, for optimum performance.

NOTE:
This table shows the material the parts are made of and not the content of the kit.

Table 6.1.6 - 4” Maintenance Kit, Cartridge Valves

4”	Guide Retainer Material	Guide Material	Seat Material	Ball Material	Spring Material	O-Ring Material	Qty.*	LEGACY PART NUMBER	ALT PART NUMBER
Solution	PVC	---	316SS	316SS	---	Hypalon	1	AJE5023	W3T108932
	PVC	---	316SS	316SS	---	Viton	1	AOO5028	W3T108954
	PVC	---	PVC	PTFE	---	Hypalon	1	APQ5032	W3T108959
	PVC	---	PVC	PTFE	---	Viton	1	AJE5036	W3T110390
	PVC	---	PVC	PTFE	---	EPDM	1	AAC6392	
	PVC	---	PVC	Ceramic	---	Hypalon	1	ALI5040	
	PVC	---	PVC	Ceramic	---	Viton	1	AKG5045	W3T108937
	PVDF	---	316SS	316SS	---	Hypalon	1	AOO5051	
	PVDF	---	316SS	316SS	---	Viton	1	AJE5057	W3T108933
	PVDF	---	PVDF	PTFE	---	Hypalon	1	AIA5160	
	PVDF	---	PVDF	PTFE	---	Viton	1	APQ5164	
	PVDF	---	PVDF	Ceramic	---	Hypalon	1	ALI5168	
	PVDF	---	PVDF	Ceramic	---	Viton	1	AOO5172	W3T108955
	316SS	---	316SS	316SS	---	Hypalon	1	AAC6395	
	316SS	---	316SS	316SS	---	Viton	1	AAC6398	
	316SS	---	316SS	316SS	---	EPDM	1	AAC6401	W3T108288
Slurry	PVC	316SS	Ceramic	Polyuret.	---	Hypalon	1	AIA5176	W3T110386
Polymer	PVC	PVC	PVC	PTFE	Elgiloy	Viton	1	APQ5180	W3T108960

NOTE:
Each valve kit consists of two valve sets, one for suction and one for discharge. For double ball valves, order a quantity of two kits per head.

NOTE:
Always change diaphragms and valves at the same time, annually, for optimum performance.

NOTE:
This table shows the material the parts are made of and not the content of the kit.

Table 6.1.6 - 5” Maintenance Kit, Cartridge Valves

5”	Guide Retainer Material	Guide Material	Seat Material	Ball Material	Spring Material	O-Ring Material	Qty.*	LEGACY PART NUMBER	ALT PART NUMBER
Solution	PVC	---	316SS	316SS	---	Hypalon	1	ANM5211	W3T108951
	PVC	---	316SS	316SS	---	Viton	1	APS5215	W3T108963
	PVC	---	PVC	PTFE	---	Hypalon	1	ALI5218	W3T110394
	PVC	---	PVC	PTFE	---	Viton	1	AKG5223	W3T108938
	PVC	---	PVC	PTFE	---	EPDM	1	AAC6416	
	PVC	---	PVC	Ceramic	---	Hypalon	1	AKG5228	W3T108939
	PVC	---	PVC	Ceramic	---	Viton	1	APQ5233	W3T110397
	PVDF	---	316SS	316SS	---	Hypalon	1	APS5237	
	PVDF	---	316SS	316SS	---	Viton	1	ALI5242	
	PVDF	---	PVDF	PTFE	---	Hypalon	1	AIC5272	W3T108927
	PVDF	---	PVDF	PTFE	---	Viton	1	AIA5276	W3T108923
	PVDF	---	PVDF	Ceramic	---	Hypalon	1	AJE5280	
	PVDF	---	PVDF	Ceramic	---	Viton	1	AKG5283	
	316SS	---	316SS	316SS	---	Hypalon	1	AAC6419	
	316SS	---	316SS	316SS	---	Viton	1	AAC6422	
	316SS	---	316SS	316SS	---	EPDM	1	AAC6425	
Slurry	PVC	316SS	Ceramic	Polyuret.	---	Hypalon	1	AIC5287	W3T110387
Polymer	PVC	PVC	PVC	PTFE	Elgiloy	Viton	1	ALI5292	W3T108943

NOTE:
Each valve kit consists of two valve sets, one for suction and one for discharge. For double ball valves, order a quantity of two kits per head.

NOTE:
Always change diaphragms and valves at the same time, annually, for optimum performance.

NOTE:
This table shows the material the parts are made of and not the content of the kit.

Table 6.1.8 - 6-1/2” Maintenance Kit, Cartridge Valves

6-1/2”	Guide Retainer Material	Guide Material	Seat Material	Ball Material	Spring Material	O-Ring Material	Qty.*	LEGACY PART NUMBER	ALT PART NUMBER
Solution	PVC	---	316SS	316SS	---	Hypalon	1	AAA4982	
	PVC	---	316SS	316SS	---	Viton	1	AAA4985	
	PVC	---	PVC	PTFE	---	Hypalon	1	AAA4988	
	PVC	---	PVC	PTFE	---	Viton	1	AAA4991	W3T108086
	PVC	---	PVC	PTFE	---	EPDM	1	AAC6443	
	PVC	---	PVC	Ceramic	---	Hypalon	1	AAA4994	W3T108087
	PVC	---	PVC	Ceramic	---	Viton	1	AAA4997	
	PVDF	---	316SS	316SS	---	Hypalon	1	AAA5000	
	PVDF	---	316SS	316SS	---	Viton	1	AAA5003	
	PVDF	---	PVDF	PTFE	---	Hypalon	1	AAA5006	
	PVDF	---	PVDF	PTFE	---	Viton	1	AAA5009	
	PVDF	---	PVDF	Ceramic	---	Hypalon	1	AAA5012	
	PVDF	---	PVDF	Ceramic	---	Viton	1	AAA5015	
	316SS	---	316SS	316SS	---	Hypalon	1	AAA5018	
	316SS	---	316SS	316SS	---	Viton	1	AAA5021	
	316SS	---	316SS	316SS	---	EPDM	1	AAC6446	
Slurry	PVC	316SS	Ceramic	Polyuret.	---	Hypalon	1	AAA5024	
Polymer	PVC	PVC	PVC	PTFE	Elgiloy	Viton	1	AAA5027	W3T110108

NOTE:
Each valve kit consists of two valve sets, one for suction and one for discharge. For double ball valves, order a quantity of two kits per head.

NOTE:
Always change diaphragms and valves at the same time, annually, for optimum performance.

NOTE:
This table shows the material the parts are made of and not the content of the kit.

Table 6.2 - Adapter and Bellow Seal Kit

	Adapter With Pre-Installed Bellow Seal	
Pump Size	**LEGACY PART NUMBER**	**ALT PART NUMBER**
1-3/8”	AAB9305	W3T108212
2”	AAB9302	W3T108211
3”	AAB9299	W3T108210
4”	AAB9308	W3T110146
5”	AAB9311	W3T108213
6-1/2”	AAB9314	W3T108214

Table 6.3 - Electric Motors

NOTE: Many different electric motors can be fitted from new, the table below gives the most common units. Please call to identify your exact requirments.

MOTOR TYPE	Pt No
D71 220/440 Volt 3 Phase 0.37kW Gloss Black	WPSPM003
D80 220/440 Volt 3 Phase 0.75kW Gloss Black	WPSPM002
D71 220/440 Volt 3 Phase 0.55kW Gloss Black	WPSPM006
D80 220/440V 3 Phase 0.75k TEFC W Gloss Black	WPSPM009
D80 220/440 Volt 3 Phase 0.75kw WEG Blue WIMMES	WPSPM010
D80 220/440 Volt 3 Phase 0.75kw ABB WIMMES	WPSPM011
D80 220/440 Volt 3 Phase 0.75kw BROWN EURO WIMMES	WPSPM001

Section 7 - CAPACITY TEST DATA

CONFIGURATION:		SERIAL #:
PISTON SIZE:		GPH:
SPM:	GEAR RATIO:	
BACK PRESSURE (PSI):		
MOTOR TYPE:		

Stroke Length %		**Capicity IN GPH AT FULL RATED PRESSURE**
		PUMP 1
100		
75		
50		
25		

CHECK LIST	**PASSED (Y/N)**
VALVE SEALING (NO EXTERNAL LEAKS):	
DIAPHRAGM SEALING (NO EXTERNAL LEAKS):	
GREASE SEAL (NO EXTERNAL LEAKS):	
WARNING LABELS (ALL ATTACHED):	
TEST TAG (COMPLETED AND ATTACHED):	
PAINT (FULL COVERAGE):	
VALVE (INSTALL CAPS):	
CLEAN (EXTERNALS FREE OF GREASE, DIRT):	
OIL IN PUMP:	

PRODUCT COMPLIES WITH DESIGN, ASSEMBLY, MANUFACTURING AND TESTING PROCEDURES.

QUALITY CONTROL _____

_____

REMARKS: **DATE:** _____

www.waterprocesssolutions.com
enquiries@waterprocesssolutions.com

Water-Process-Solutions

@waterwps

Water Process Solutions Ltd
Unit 10,
Mill Hall Business Estate,
Aylesford,
Kent, ME20 7JZ

WATER PROCESS SOLUTIONS

Literature No. WPS Gen Flyer UK 001.V1