

Pump Engineering Specifications

QUICK REFERENCE

“pump engineering specifications” T.O.C.

VII

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Solenoid Pump Specifications

beta

(THIS IS A MASTER, EDIT FOR SPECIFIC APPLICATION)

PROMINENT FLUID CONTROLS, INC. – beta 4 and beta 5 (for flow rates less than 9 gph)

SECTION _____ CHEMICAL METERING PUMPS

1.1 APPLICATION

- A. Quantity: _____
- B. Chemical Service: _____
- C. Tag. Nos.: _____
- D. Capacity (US gallons per hour) _____
- E. Backpressure (psig): _____

1.2 DESCRIPTION

- A. The chemical metering pump(s) shall be a microprocessor-controlled, simplex, solenoid-driven, reciprocating, mechanically-actuated diaphragm type. The housing shall be rated NEMA 4X.
- B. The manufacturer shall provide a two year warranty on the pump drive and one year warranty on the pump liquid end, including diaphragm and O-rings. The pump shall be fully tested to meet rated flow and pressure by the manufacturer.
- C. The power supply shall be ____ VAC, ____ Hz, single phase. The microprocessor is to automatically compensate for supply voltage variations within 15% of the rated voltage such that frequency of the pump remains constant.
- D. The liquid end shall be physically separated from the drive unit by backplate with weep hole creating an air gap. An elastomer shaft wiper seal shall prevent contamination of the solenoid if the primary diaphragm fails. The diaphragm shall be nylon-reinforced EPDM with PTFE-faced fluid contact surface.

1.3 LIQUID END((SELECT ONE))

- The liquid end shall be glass-filled polypropylene, with built coarse valve and needle valve for air bleed, manually adjusted for continuous degassing of process fluid and self-priming against pressure. The suction and discharge valve shall be of the double ball check design.
- The liquid end shall be PVDF, suitable for pumping high viscosity fluids, with spring-loaded single ball check valves.
- The liquid end shall be Plexiglas (acrylic) with built coarse valve and needle valve for air bleed, manually adjusted for continuous degassing of process fluid and self-priming against pressure. The suction and discharge valve shall be PVC, with double ball check design
- The liquid end shall be of the self-degassing type, with integral automatic air relief valve for self priming under maximum rated discharge line pressure. The liquid end shall be constructed of (PVC). The suction valve shall be of the double ball check design and discharge valve shall be double ball design, perpendicular to the suction valve.
- The liquid end shall be constructed of carbon-filled PTFE. The suction and discharge valve shall be of the double ball check design.
- The liquid end shall be constructed of 316 stainless steel. The suction and discharge valve shall be of the double ball check design.
- The liquid end shall be constructed of PVDF with Teflon seals, with built coarse and

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ON-OFF operation using the PAUSE function via a voltage-free contact relay through an optional control cable.

1.5 STATUS / LOW LEVEL INDICATION((OPTIONAL))

- A. Low Level Control - A 2-stage Float Switch shall be supplied to stop the pump prior to losing prime and annunciate low level on the pump via a LCD light.
- B. Relay Output - An SPDT relay shall be installed on the pump for:
((SELECT ONE OR BOTH OF THE FOLLOWING))
 - Fault Indication - ((OPTIONAL)) the metering pump shall have an integral relay to allow remote annunciation of a fault condition (i.e. low supply solution early warning/lack of supply solution shut down, flow monitor, system faults, and fuse/power supply failure).
 - Pacing Relay - ((OPTIONAL)) the metering pump shall have an integral relay to issue a contact closure with every pump stroke to pace a second PROMINENT metering pump.
 - If both of the above options are chosen, two SPST relay contacts shall be provided through a four-conductor cable.

1.6 ACCEPTABLE MANUFACTURER:

- A. ProMinent Fluid Controls, model _____

1.7 ACCESSORIES ((ALL ARE OPTIONAL AND MAY BE INCLUDED AS SEPARATE ITEMS OR AS COMPONENTS OF A PUMP STAND))

- A. The pump shall be mounted on a ((CHOOSE ONE: Black, UV-protected polypropylene / Stainless Steel)) support stand suitable for wall, floor or top-of-tank mounting, and including the following accessories pre-piped and factory tested:
- B. A foot valve and strainer shall be provided with each pump.
- C. An injection check valve shall be provided with each pump.
- D. A universal control cable with 4 pole round plastic connector and 5-wire cable with loose ends shall be provided with each pump.
- E. A two-stage float switch compatible with the chemical metering pump shall be provided for monitoring tank level.
- F. A diaphragm failure detector shall be provided to ((open/close)) a contact in the event of diaphragm failure.
- G. An adjustable-pressure, diaphragm-type backpressure/antisiphon valve shall be provided with each metering pump.
- H. An in-line, adjustable-pressure, diaphragm-type pressure relief valve shall be provided with each metering pump.
- I. A pump-mounted, multi-function, fixed-spring pressure diaphragm-type valve for backpressure/antisiphon protection, pressure relief, priming and discharge line drain shall be provided with each metering pump.
- J. An air-charged, bladder-type pulsation dampener shall be provided with each metering pump.
- K. A clear PVC calibration column with FNPT fittings top and bottom shall be provided with each pump.
- L. Fifteen feet of tubing compatible with the fluid pumped shall be provided with each pump.

END OF SECTION

Solenoid Pump Specifications

gamma/ L

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PROMINENT FLUID CONTROLS, INC. – gamma/ L (for flow rates up to 8.4 gph)

PART 1 - GENERAL

1.1 GENERAL

- A. This specification covers the supply, installation, and testing of completely functional metering pump feed systems including all necessary accessories and appurtenances as shown on the drawings and described herein. A single chemical metering pump manufacturer shall be responsible for supplying all components of the metering pump feed system.

1.2 QUALITY ASSURANCE

- A. For the purpose of establishing quality assurance, experience, and system reliability, the products described herein are based on those metering pumps manufactured by ProMinent Fluid Controls, Inc. All pumps shall be shop-tested for capacity and pressure prior to shipment with documented results provided.

1.3 WARRANTY

- A. The chemical metering pump manufacturer shall provide a two year warranty on the metering pump mechanical drive and one year on the liquid end.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Manufacturers:
 1. ProMinent Fluid Controls, Inc.
 2. Pre-approved equal.

2.2 DESCRIPTION

- A. The chemical metering pump(s) shall be microprocessor-controlled, simplex, solenoid-driven, reciprocating, mechanically-actuated diaphragm type. All pumping functions shall be set by membrane-switch keypad and status shall be displayed on an illuminated LCD which is readable at an offset angle of 45 degrees. Keypad will allow for simple scrolling and display of programmed parameters. The housing shall be rated NEMA 4X.
- B. The power supply shall be ___VAC, ___Hz, single phase. The microprocessor is to automatically compensate for supply voltage variations within 15% of the rated voltage such that the frequency of the pump remains constant.
- C. The liquid end shall be physically separated from the drive unit by a backplate with weep hole creating an air gap. An elastomer shaft wiper seal shall prevent contamination of the solenoid if the primary diaphragm fails. The diaphragm shall be constructed of a steel core, vulcanized into nylon-reinforced EPDM, with PTFE-faced fluid contact surface.

Solenoid Pump Specifications

gamma/ L

2.3 LIQUID END ((SELECT ONE))

- The liquid end shall be glass-filled polypropylene with ((EPDM/Viton) seals, (without/with built-in coarse valve and needle valve for air bleed, manually adjusted for continuous degassing of process fluid and self-priming against pressure. Note-bleeder valve is not available with model type 0232)). The suction and discharge valves shall be of the double ball check design.
- The liquid end shall be PVC with ((EPDM/Viton)) seals, (without/with built-in coarse valve and needle valve for air bleed, manually adjusted for continuous degassing of process fluid and self-priming against pressure.. Note-bleeder valve is not available with model type 0232)). The suction and discharge valves shall be of the double ball check design.
- The liquid end shall be Plexiglas (acrylic) with ((EPDM/Viton)) seals, (without/with built-in coarse valve and needle valve for air bleed, manually adjusted for continuous degassing of process fluid and self-priming against pressure. Note-bleeder valve is not available with model type 0232)). The suction and discharge valves shall be PVC, with double ball check design.
- The liquid end shall be of the self-degassing type, with integral automatic air relief valve for self-priming under maximum rated discharge line pressure. The liquid end shall be constructed of ((acrylic/polypropylene)). The suction valve shall be of the double ball check design and discharge valve shall be spring-loaded, horizontally acting single ball design. Note-this liquid end is not available for model types 1000 and 0232.
- The liquid end shall be constructed of carbon-filled PTFE with PTFE seals. The suction and discharge valves shall be of the double ball check design.
- The liquid end shall be constructed of 316 stainless steel with PTFE seals. The suction and discharge valves shall be of the double ball check design.
- The liquid end shall be constructed of PVDF with Teflon seals, ((without/with built-in coarse valve and needle valve for air bleed, manually adjusted for continuous degassing of process fluid and self-priming against pressure. Note-bleeder valve is not available with model type 0232)).

2.4 PROGRAMMING AND CONTROL

- A. Stroke length control shall be manually adjusted between 100% and 0% with a stroke adjustment knob on the pump face control. The LCD shall digitally display stroke length setting in 1% increments in the full range between 100% and 0%
- B. Programming shall allow pump to be calibrated so as to display pump output in gallons/hour or liters/hour. Calibration shall be maintained when stroke length is altered up to plus or minus 10% on the stroke length knob. If stroke length is altered by more than 10%, a yellow warning light will light and a flashing message "calib" will appear.
- C. The pump shall be equipped with the programmable function of pressure levels to allow pump to operate at reduced pressures from the maximum rated pressure of the pump.
- D. The pump shall be equipped with the programmable function of electronic interlocking of the keypad by access code to prevent unauthorized adjustments to the pump.
- E. Keypad shall allow for scrolling and display on LCD such parameters as stroke frequency, stroke length, stroke counter, pump output in gals/hr or l/hr, dosing quan-

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gamma/ L

- tity, mA current input being received by pump, and indication of external mode.
- F. Stroke frequency control shall be manually adjusted by touch keypads, with the set stroke rate displayed on the LCD. The metering pump shall be capable of receiving a pulse input via optional external control cable such that 1 pulse gives 1 pump stroke rate. The pump shall be capable of remote ON-OFF operation using the pause function via a voltage free contact relay through an optional control cable. ((OPTIONAL SELECTIONS))
- PULSE MULTIPLIER/DIVIDER - The pump shall allow factoring to issue from 1 to 9,999 strokes per pulse input or to issue 1 stroke per 1 to 9,999 input pulses.
- Or
- ANALOG- The pump shall accept an analog signal such that stroke frequency is proportional to 0/4-20mA or 20-4/0mA, the choice of which is programmable at the pump. The pump shall allow the setting of a maximum stroke rate which corresponds to the maximum analog signal, with stroke rate proportional to signal strength below that rate. Programming for curve processing shall also be possible, in which any stroke frequency ratio in proportion to the electrical signal can be configured. Analog to digital converters external to the pump shall not be allowed.
- Or
- PULSE MULTIPLIER/DIVIDER AND ANALOG – Both modes of frequency control, as described above, shall be configured into the metering pump.

2.5 FLOW ASSURANCE ((OPTIONAL, SELECT AS REQUIRED))

- A. Low Level Control – A 2-stage float switch shall be supplied to stop pump prior to losing prime and annunciate low level on the pump LCD display.
- B. Flow Monitor – A flow monitor shall be installed on the discharge line to automatically stop pumping and annunciate a fault condition on the pump LCD display upon loss of discharge flow. The pump shall be programmable, between 1 and 125 strokes per minute, to actuate the fault annunciation after flow is lost.
- C. Relay Output – An SPDT relay shall be installed for ((SELECT ONE)) fault Indication. The metering pump shall have an integral relay to allow remote annunciation of a fault condition (i.e. low chemical supply in tank/lack of chemical supply shut down, flow monitor, system faults, and fuse/power supply failure). Configure as ((NO/NC)) contact closure relay.
- Or pacing relay. The metering pump shall have an integral relay to issue a contact closure with every pump stroke to pace a second ProMinent metering pump or both fault indication and pacing. The fault relay shall be configured as a ((NO/NC)) contact closure relay. The pacing relay shall be electrically isolated via an optical coupler with a semiconductor switch.

2.6 ACCESSORIES((ALL ARE OPTIONAL AND MAY BE INCLUDED AS SEPARATE ITEM-SOR AS COMPONENTS OF A PUMP STAND))

- A. The pump shall be mounted on a ((black, UV-protected polypropylene/304 stainless)) support stand suitable for wall, floor or top-of-tank mounting. A single chemical metering pump manufacturer shall be responsible for supplying and assembling all components of the skid, in addition to testing the skid-mounted metering system prior to shipment. The stand shall include the following accessories, pre-piped;
- B. A foot valve and strainer, constructed of materials compatible with chemical to be used, shall be provided with each pump.
- C. An injection valve, constructed of materials compatible with chemical to be used, shall be provided with each pump.

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- D. A universal control cable with 5-pole round plastic connector and 5-wire cable with loose ends shall be provided with each pump.
- E. A two stage float switch compatible with chemical to be used shall be provided with each pump to monitor tank level.
- F. An adjustable discharge flow monitoring device, compatible with chemical to be used, shall be provided with each pump. The flow monitor shall be capable of signaling a fault condition to the pump.
- G. A diaphragm failure detector shall be provided to ((open/close)) a contact for alarm in the event of a diaphragm failure.
- H. An adjustable-pressure, diaphragm-type back pressure/anti-siphon valve, constructed of materials compatible with chemical to be used, shall be provided with each pump.
- I. An in-line, adjustable-pressure, diaphragm-type pressure relief valve, constructed of materials compatible with chemical to be used, shall be provided with each pump.
- J. A pump-mounted, multi-function, fixed-spring pressure diaphragm-type valve for backpressure/anti-siphon protection, pressure relief, priming, and discharge line drain, constructed of PVDF, shall be provided with each pump.
- K. An air-charged, bladder-type pulsation dampener, constructed with materials compatible with chemical to be used, shall be provided with each pump. The pulsation dampener shall be sized to reduce pulsations by at least 90% at full pump capacity.
- L. A clear PVC calibration column with FNPT fitting on top and bottom shall be provided with each pump. The column shall be sized to provide at least 2 minutes draw down at maximum pump capacity.
- M. Fifteen feet of tubing compatible with chemical to be used shall be provided with each pump.

2.7 APPLICATION

- A. Quantity:
- B. Chemical Service:
- C. Capacity (US gph):
- D. Backpressure (psig):

END OF SECTION

Solenoid Pump Specifications

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PROMINENT FLUID CONTROLS, INC. – DELTA (for flow rates 3.1 to 21.1 gph)

PART 1 - GENERAL

1.1 GENERAL

- A. This specification covers the supply, installation, and testing of completely functional metering pump feed systems including all necessary accessories and appurtenances as shown on the drawings and described herein. A simple chemical metering pump manufacturer shall be responsible for supplying all components of the metering pump feed system.

1.2 QUALITY ASSURANCE

- A. For the purpose of establishing quality assurance, experience, and system reliability, the products described herein are based on those metering pumps manufactured by ProMinent Fluid Controls, Inc.
- B. All pumps shall be shop-tested for capacity and pressure prior to shipment with documented results provided.

1.3 WARRANTY

- A. The chemical metering pump manufacturer shall provide a two year warranty on the metering pump mechanical drive and one year on the liquid end.

PART 2 - PRODUCTS

1.2 GENERAL

- A. Manufacturers:
 1. ProMinent Fluid Controls, Inc.
 2. Pre-approved equal.

2.2 DESCRIPTION

- A. The chemical metering pump(s) shall be microprocessor-controlled, simplex, solenoid-driven, reciprocating, mechanically-actuated diaphragm type. All pumping functions shall be set by membrane-switch keypad and status shall be displayed on an illuminated LCD, which is readable. Keypad will allow for simple scrolling and display of programmed parameters. The housing shall be rated NEMA 4X.
- B. The power supply shall be ___ VAC, ___ Hz, single phase. The microprocessor is to automatically compensate for supply voltage variations within 15% of the rated voltage such that the frequency of the pump remains constant.
- C. The liquid end shall be physically separated from the drive unit by a backplate with weep hole creating an air gap. An elastomer shaft wiper seal shall prevent contamination of the solenoid if the primary diaphragm fails. The diaphragm shall be constructed of a steel core, vulcanized into nylon-reinforced EPDM, with PTFE faced fluid contact surface.
- D. The pump shall utilize optoDrive® technology or equal whereby the time sequence of the dosing flow can be exactly matched to the requirements of the application. The user can set a slow pressure stroke for almost continuous dosing, or a quick stroke as needed to prevent incomplete filling of the liquid end due to viscosity of

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the media being pumped. In cases of outgassing dosing media, the settable suction stroke shall assist in preventing cavitation. Fluctuation in backpressure shall be automatically compensated by the drive.

- E. The pump shall have optoGuard® technology integrated into the drive to detect blocked metering points or broken metering lines, and to detect airlocks within the delivery unit. This will function to prevent uncontrolled metering. These problems are to be shown on the pump delay.

2.3 LIQUID END ((SELECT ONE))

- The liquid end shall be constructed of 316 stainless steel with PTFE seals. The suction and discharge valves shall be of the double ball check design for discharge pressure greater than 100 psi.
- The liquid end shall be constructed of PVDF with Teflon seals, ((without/with built-in coarse valve and needle valve for air bleed, manually adjusted for continuous degassing of process fluid and self-priming against pressure)). The suction and discharge valves shall be of the double ball check design for discharge pressures greater than 100 psi.

2.4 PROGRAMMING AND CONTROL

- A. Stroke length control shall be manually adjusted between 0% and 100% with a stroke adjustment knob on the pump face control, The LCD shall digitally display stroke length setting in 1% increments in the full range between 0% and 100%
- B. Programming shall allow pump to be calibrated so as to display pump output in gallons/hour or liters/hour. Calibration shall be maintained when stroke length is altered up to plus or minus 10% on the stroke length knob. If stroke length is altered by more than 10%, a yellow warning will light and a flashing message “calib” will appear.
- C. The pump shall be equipped with the programmable function of pressure levels to allow pump to operate at reduced pressures from the maximum rated pressure of the pump (not available for models 0450 and 0280).
- D. The pump shall be equipped with the programmable function of electronic interlocking of the keypad by access code to prevent unauthorized adjustments to the pump.
- E. Keypad shall allow for scrolling and display on LCD such parameters as stroke frequency, stroke length, stroke counter, pump output in gals/hr or l/hr, dosing quantity, mA current input being received by pump, and indication of external mode.
- F. Stroke frequency control shall be manually adjusted by touch keypads, with the set stroke rate displayed on the LCD. The metering pump shall be capable of receiving a pulse input via optional external control cable such that 1 pulse gives 1 pump stroke rate. The pump shall be capable of remote ON-OFF operation using the pause function via a voltage free contact relay through an optional control cable.

((OPTIONAL SELECTIONS))

CONTACT-The pump shall allow fine-tune factoring to issue from 1 to 9,999 strokes per pulse input or to issue 1 stroke per 1 to 9,999 input pulses. The dosing can be activated by an impulse via external control through a contact or a semiconductor switching element.

Or

Batch-The dosing can be activated by pressuring the P key or by an external impulse through a contact or a semiconductor switching element. A dosing quantity

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(batch) or a number of strokes (max 65535) can be preselected via the control unit.
Or

ANALOG-The pump shall accept an analog signal such that stroke frequency is proportional to 0/4-20mA or 20-4/0mA, the choice of which is programmable at the pump. The pump shall allow the setting of a maximum stroke rate which corresponds to the maximum analog signal, with stroke rate proportional to signal strength below that rate. Programming for curve processing shall also be possible, in which any stroke frequency ratio in proportion to the electrical signal can be configured. Analog to digital converters external to the pump shall not be allowed.

Or

PULSE AND ANALOG – Both modes of frequency control, as described above, shall be configured into the metering pump.

2.5 FLOW ASSURANCE ((OPTIONAL, SELECT AS REQUIRED))

- A. Low Level Control – A 2-stage float switch shall be supplied to stop pump prior to losing prime and annunciate low level on the pump LCD display.
- B. Flow Monitor – A flow monitor shall be installed on the discharge line to automatically stop pumping and annunciate a fault condition on the pump LCD display upon loss of discharge flow. The pump shall be programmable, between 1 and 125 strokes per minute, to actuate the fault annunciation after flow is lost.
- C. Relay Output – An SPDT relay shall be installed for ((SELECT ONE)) fault indication. The metering pump shall have an integral relay to allow remote annunciation of a fault condition (i.e. low chemical supply in tank/lack of chemical supply shut down, flow monitor, system faults, and fuse/power supply failure). Configure as ((NO/NC)) contact closure relay.
or pacing relay. The metering pump shall have an integral relay to issue a contact closure with every pump stroke to pace a second ProMinent metering pump or both fault indication and pacing. The fault relay shall be configured as a ((NO/NC)) contact closure relay. The pacing relay shall be electrically isolated via an optical coupler with a semiconductor switch.
- D. Diaphragm Failure – A diaphragm failure detector will alert the possibility of a ruptured or distressed diaphragm.

2.6 ACCESSORIES ((ALL ARE OPTIONAL AND MAY BE INCLUDED AS SEPARATE ITEMS OR AS COMPONENTS OF A PUMP STAND))

- A. The pump shall be mounted on a ((black, UV-protected polypropylene/304 stainless)) support stand suitable for wall, floor or top-of-tank mounting. A single chemical metering pump manufacturer shall be responsible for supplying and assembling all components of the skid, in addition to testing the skid-mounted metering system prior to shipment. The stand shall include the following accessories, pre-piped:
- B. A foot valve and strainer, constructed of materials compatible with chemical to be used, shall be provided with each pump.
- C. An injection valve, constructed of materials compatible with chemical to be used, shall be provided with each pump.
- D. A universal control cable with 5-pole round plastic connector and 5-wire cable with loose ends shall be provided with each pump.
- E. A two stage float switch compatible with chemical to be used shall be provided with

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- each pump to monitor tank level.
- F. An adjustable discharge flow monitoring device, compatible with chemical to be used, shall be provided with each pump. The flow monitor shall be capable of signaling a fault condition to the pump.
 - G. A diaphragm failure detector shall be provided to ((open/close)) a contact for alarm in the event of a diaphragm failure.
 - H. An adjustable-pressure, diaphragm-type back pressure/anti-siphon valve, constructed of materials compatible with chemical to be used, shall be provided with each pump.
 - I. An in-line, adjustable-pressure, diaphragm-type pressure relief valve, constructed of materials compatible with chemical to be used, shall be provided with each pump.
 - J. A pump-mounted, multi-function, fixed-spring pressure diaphragm-type valve for backpressure/anti-siphon protection, pressure relief, priming, and discharge line drain, constructed of PVDF, shall be provided with each pump.
 - K. An air-charged, bladder-type pulsation dampener, constructed with materials compatible with chemical to be used, shall be provided with each pump. The pulsation dampener shall be sized to reduce pulsations by at least 90% at full pump capacity.
 - L. A clear PVC calibration column with FNPT fitting on top and bottom shall be provided with each pump. The column shall be sized to provide at least 2 minutes draw down at maximum pump capacity.
 - M. Fifteen feet of tubing compatible with chemical to be used shall be provided with each pump.

2.7 APPLICATION

- A. Quantity:
- B. Chemical Service:
- C. Capacity (US gph):
- D. Backpressure (psig):

END OF SECTION

Motor Pump Specifications

Sigma/1 HM (basic and control versions)

((THIS IS A MASTER, EDIT FOR SPECIFIC APPLICATION))

PROMINENT FLUID CONTROLS, INC. – SIGMA/1 HM (for flow rates from 5 to 38 gph)

PART 1 – GENERAL

1.1 GENERAL

- A. This specification covers the supply, installation, and testing of completely functional metering pump systems including all accessories and appurtenances as shown on the drawings and described herein. A single chemical metering pump manufacturer shall be responsible for supplying all components of the metering feed system.

1.2 QUALITY ASSURANCE

- A. For the purpose of establishing quality assurance, experience, and system reliability, the products described herein are based on those metering pumps manufactured by ProMinent Fluid Controls, Inc. All pumps shall be shop-tested for capacity and pressure prior to shipment, with documented results provided.

1.3 WARRANTY

- A. The chemical metering pump manufacturer shall provide a two year warranty on the metering pump mechanical drive and one year on the liquid end.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Manufacturers:
 1. ProMinent Fluid Controls, Inc.
 2. Pre-approved equal.

2.2 DESCRIPTION

- A. The chemical metering pump shall be a simplex, motor-driven, reciprocating, mechanically-actuated diaphragm type. The pump shall include integral motor, permanently lubricated gear reducer, cam-and-spring drive mounted and sealed in a non-corrosive plastic outer, with heat sinks for cooling.
- B. The power supply shall be ___VAC, ___Hz, ___Phase.
- C. The liquid end shall be physically separated from the drive unit by a back plate with weep hole creating air gap separation. An elastomer shaft wiper seal shall prevent contamination of the gear box by confining chemical within the back plate if the primary diaphragm fails. The primary diaphragm shall have a steel core, vulcanized into a nylon-reinforced EPDM backing, with PTFE-faced fluid contact surface.
- D. ((OPTIONAL)) The liquid end shall also feature a secondary diaphragm separated

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Sigma/1 HM (basic and control versions)

from the primary diaphragm by a spacer plate with diaphragm-isolated pressure switch to close a contact for alarm annunciation and to prevent chemical spill or intrusion into pump drive upon failure of the primary diaphragm.

2.3 LIQUID END

- A. The diaphragm shall be of a convex design fitting into a concave liquid end to minimize diaphragm wear, liquid end dead volume, and to promote flow of solids in suspension.

((SELECT ONE))

- The liquid end shall be virgin PVDF. The suction and discharge valve shall be PVDF with PTFE faced Viton gasket seals and ceramic valve balls.

Or

- The liquid end shall be 316 stainless steel. The suction and discharge valves shall be 316 stainless steel with PTFE-faced Viton gasket seals and stainless steel valve balls.

2.4 CONTROL ((BASIC VERSION PUMP))

- A. Stroke length control of the basic version pump

((SELECT ONE))

- shall be adjustable manually by means of a stroke length knob, in increments of 1.0%, from 0% to 100% of stroke length.

Or

- shall be adjustable by means of a stroke positioning motor from 0% to 100% of stroke length. The stroke positioning motor shall feature visual stroke length indication and manual/ external selector switch for local control via toggle switch or external control in proportion to a 4-20 mA signal.

- B. Stroke frequency control of the basic version pump

((SELECT ONE))

- shall be fixed at the pump's maximum stroke rate. Pump shall include a 1/8 HP, TEFC, four-pole AC motor.

Or

- shall be controlled by DC SCR drive system for stroke frequency control. The SCR shall include a wall mountable NEMA 4 enclosure with on/off switch, manual/external switch and speed potentiometer. The DC voltage output to the motor shall be proportional to the potentiometer setting in manual mode, or proportional to an external 4-20 mA signal in external mode. Pump shall include a 1/8 HP, TENV, permanent magnet 90V DC motor.

Or

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Sigma/1 HM (basic and control versions)

- shall be controlled by an AC inverter system for stroke frequency control. The inverter shall include a wall mountable NEMA 4/12 enclosure with keypad and display of % load or output voltage. Selectable for local or remote operation via 4-20 mA signal. Pump shall include a 1/8 HP, inverter duty, 3-phase, 208-230 VAC motor. Minimum speed 3-30 Hz.

2.4 PROGRAMMING AND CONTROL ((CONTROL VERSION PUMP))

- A. The metering pump shall be microprocessor-controlled. All pumping functions shall be set by membrane-switch keypad and status shall be displayed on an illuminated LCD, which is readable at an offset of 45 degrees. Keypad will allow for simple scrolling of programmed parameters.
- B. Stroke length control shall be adjustable manually by means of a stroke length, in increments of 1.0%, from 0 to 100% of stroke length. The LCD shall digitally display stroke length in 1% increments in the full range between 100% and 0%.
- C. Programming shall allow pump to be calibrated so as to display pump output in gallons/hour or liters/hour. Calibration shall be maintained when stroke length is altered up to plus or minus 10% on the stroke length knob. If stroke length is altered by more than 10%, a yellow warning light will light and a flashing message "calib" will appear.
- D. The pump shall be equipped with the programmable function of electronic interlocking of the keypad by access code to prevent unauthorized adjustments to the pump.
- E. Keypad shall allow for scrolling and display on LCD such parameters as stroke frequency, stroke length, stroke counter, pump output in gals/hr or L/hr, dosing quantity, mA input being received by pump, and indication of external mode.
- F. An AC inverter shall be integral to the microprocessor control and function of the pump. While 115VAC or 230VAC, 1 phase may be used to power the pump, the inverter shall drive a 1/8 HP, 230VAC, 3 phase motor. Stroke frequency shall be accomplished through microprocessor control with proportional start/stop of the motor, from 0% to 33% of stroke rate. Stroke rate shall be accomplished through variable speed of the motor from 34% to 100% of stroke rate. Stroke frequency control shall be manually adjusted by touch keypads, with the set stroke rate displayed on the LCD. The pump shall be capable of receiving a pulse input via optional external control cable such that one pulse gives one pump stroke rate. The pump shall be capable of remote ON-OFF operation using the pause function via a voltage free contact relay through an optional control cable. In addition, the pump shall be configured with;

Motor Pump Specifications

Sigma/1 HM (basic and control versions)

((OPTIONAL SELECTIONS))

- pulse multiplier/divider functionality. The pump shall allow factoring to issue from 1 to 9,999 strokes per pulse input or to issue 1 stroke per 1 to 9,999 input pulses.

Or

- analog input functionality. The pump shall accept an analog signal such that stroke frequency is proportional to 0/4-20mA or 20-4/0mA, the choice of which is programmed at the pump. The pump shall allow the setting of a maximum stroke rate, which corresponds to the maximum analog signal, with stroke rate proportional to signal strength below that rate. Programming for curve processing shall also be possible, in which any stroke frequency ratio in proportion to the electrical signal can be configured. Analog to digital converters external to the pump shall not be acceptable.

Or

- pulse multiplier/divider and analog input functionality. The pump shall allow factoring to issue from 1 to 9,999 strokes per pulse input or to issue 1 stroke per 1 to 9,999 input pulses. The pump shall also accept an analog signal such that stroke frequency is proportional to 0/4-20mA or 20-4/0mA, the choice of which is programmed at the pump. The pump shall allow the setting of a maximum stroke rate, which corresponds to the maximum analog signal, with stroke rate proportional to signal strength below that rate. Programming for curve processing shall also be possible, in which any stroke frequency ratio in proportion to the electrical signal can be configured. Analog to digital converters external to the pump shall not be acceptable.

Or

- programmable timer functionality. The pump shall be configured with an integral, programmable 2-week, 81 event timer to change operational state of the pump. Timers external to the metering pump are not acceptable.

Or

- pulse multiplier/divider, analog input, and programmable timer functionality (as described above).

G. The pump shall be equipped with the programmable function of auxiliary frequency control, allowing for quick priming of the pump or for slug feed of process during initial start up after shutdown. Stroke frequency shall be programmable to the maximum for the pump, and the auxiliary frequency function shall be capable of interfacing with a contact closure relay for control purposes.

2.5 FLOW ASSURANCE ((OPTIONAL))

- A. Low Level Control - A 2-stage Float Switch shall be supplied to stop the pump prior to losing prime and annunciate low level on the pump LED.

Motor Pump Specifications

Sigma/1 HM (basic and control versions)

- B. Relay Output - An SPDT relay shall be installed on the pump for:

((SELECT ONE))

- fault Indication. ((OPTIONAL)) The metering pump shall have an integral relay to allow remote annunciation of a fault condition (i.e. low supply solution early warning/lack of supply solution shut down, loss of chemical output, system faults, and fuse/power supply failure). Configure as ((N/O//N/C)) contact closure relay.

Or

- both fault indication and pacing relay. ((OPTIONAL)) The metering pump shall have an integral relay to allow remote annunciation of a fault condition (i.e. low supply solution early warning/lack of supply solution shut down, loss of chemical output, system faults, and fuse/power supply failure). Configure as ((N/O//N/C)) contact closure relay. The pump shall also have an integral relay to issue a contact closure with every pump stroke to pace a second metering pump. The pacing relay shall be electrically isolated via an optical coupler with a semiconductor switch.

Or

- both 4-20mA output and fault indication. ((OPTIONAL)) The analog output function shall be a multiplicative factor of both stroke length % and stroke frequency %, reflecting the real time output capacity of the metering pump. The metering pump shall also have an integral relay to allow remote annunciation of a fault condition (i.e. low supply solution early warning/lack of supply solution shut down, loss of chemical output, system faults, and fuse/power supply failure). Configure as ((N/O//N/C)) contact closure relay.

Or

- both 4-20mA output and pacing relay. ((OPTIONAL)) The analog output function shall be a multiplicative factor of both stroke length % and stroke frequency %, reflecting the real time output capacity of the metering pump. The pump shall also have an integral relay to issue a contact closure with every pump stroke to pace a second metering pump. The pacing relay shall be electrically isolated via an optical coupler with a semiconductor switch.

2.6 ACCESSORIES ((ALL ARE OPTIONAL AND MAY BE INCLUDED AS SEPARATE ITEMS OR AS COMPONENTS OF A PUMP STAND))

- A. The pump shall be mounted on a ((CHOOSE ONE: black, UV-protected polypropylene//304 stainless steel//FRP grating)) support stand suitable for wall, floor or top-of-tank mounting. A single chemical metering pump manufacturer shall be responsible for supplying and assembling all components of the skid, in addition to testing the skid-mounted metering system under conditions of maximum rated pump pressure, prior to shipment. The stand shall include the following accessories, pre-piped;
- B. A foot valve and strainer shall be provided with each pump.
- C. An injection check valve shall be provided with each pump.

Motor Pump Specifications

Sigma/1 HM (basic and control versions)

- D. A universal control cable with 5-pole round plastic connector and 5-wire cable with loose ends shall be provided with each pump
- E. A two stage float switch compatible with the chemical metering pump shall be provided for monitoring tank level.
- F. An adjustable discharge flow monitoring device mounted on a valved bypass shall be provided. The flow monitor shall be capable of signaling a fault condition to the metering pump.
- G. A diaphragm failure detector shall be provided to ((open/close)) a contact in the event of diaphragm failure.
- H. An adjustable-pressure, diaphragm-type backpressure/antisiphon valve shall be provided with each metering pump.
- I. An in-line, adjustable-pressure, diaphragm-type pressure relief valve shall be provided with each metering pump.
- J. An air-charged, bladder-type pulsation dampener shall be provided with each metering pump.
- K. A clear PVC calibration column with FNPT fittings top and bottom shall be provided with each pump//skid.

2.7 APPLICATION

- A. Quantity:
- B. Chemical Service:
- C. Capacity (U.S. gph):
- D. Backpressure (psig):

END OF SECTION

Motor Pump Specifications

Sigma/2 HM (basic and control versions)

((THIS IS A MASTER, EDIT FOR SPECIFIC APPLICATION))

PROMINENT FLUID CONTROLS, INC. – SIGMA/2 HM (for flow rates from 16 to 111 gph)

PART 1 – GENERAL

1.1 GENERAL

- A. This specification covers the supply, installation, and testing of completely functional metering pump systems including all accessories and appurtenances as shown on the drawings and described herein. A single chemical metering pump manufacturer shall be responsible for supplying all components of the metering feed system.

1.2 QUALITY ASSURANCE

- A. For the purpose of establishing quality assurance, experience, and system reliability, the products described herein are based on those metering pumps manufactured by ProMinent Fluid Controls, Inc. All pumps shall be shop-tested for capacity and pressure prior to shipment, with documented results provided.

1.3 WARRANTY

- A. The chemical metering pump manufacturer shall provide a two year warranty on the metering pump mechanical drive and one year on the liquid end.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Manufacturers:
 1. ProMinent Fluid Controls, Inc.
 2. Pre-approved equal.

2.2 DESCRIPTION

- A. The chemical metering pump shall be a simplex, motor-driven, reciprocating, mechanically-actuated diaphragm type. The pump shall include integral motor, oil-lubricated gear reducer, and cam-and-spring drive mounted in an aluminum housing. Such housing to be sealed into an outer plastic housing for corrosion protection with heat sinks for cooling.
- B. The power supply shall be ___VAC, ___Hz, ___Phase.
- C. The liquid end shall be physically separated from the drive unit by a back plate with weep hole creating air gap separation. An elastomer shaft wiper seal shall prevent contamination of the gear box by confining chemical within the back plate if the primary diaphragm fails. The primary diaphragm shall have a steel core, vulcanized into a nylon-reinforced EPDM backing, with PTFE-faced fluid contact surface.

Motor Pump Specifications

Sigma/2 HM (basic and control versions)

- D. ((OPTIONAL)) The liquid end shall also feature a secondary diaphragm separated from the primary diaphragm by a spacer plate with diaphragm-isolated pressure switch to close a contact for alarm annunciation and to prevent chemical spill or intrusion into pump drive upon failure of the primary diaphragm.

2.3 LIQUID END

- A. The diaphragm shall be of a convex design fitting into a concave liquid end to minimize diaphragm wear, liquid end dead volume, and to promote flow of solids in suspension.

((SELECT ONE))

- The liquid end shall be virgin PVDF. The suction and discharge valve shall be PVDF with PTFE faced Viton gasket seals and ceramic valve balls.

Or

- The liquid end shall be 316 stainless steel. The suction and discharge valves shall be 316 stainless steel with PTFE-faced Viton gasket seals and stainless steel valve balls.

2.4 CONTROL ((BASIC VERSION PUMP))

- A. Stroke length control of the basic version pump

((SELECT ONE))

- shall be adjustable manually by means of a stroke length knob, in increments of 1.0%, from 0% to 100% of stroke length.

Or

- shall be adjustable by means of a stroke positioning motor from 0% to 100% of stroke length. The stroke positioning motor shall feature visual stroke length indication and manual/ external selector switch for local control via toggle switch or external control in proportion to a 4-20 mA signal.

- B. Stroke frequency control of the basic version pump

((SELECT ONE))

- shall be fixed at the pump's maximum stroke rate. Pump shall include a 1/3 HP, TEFC, four-pole AC motor.

Or

- shall be controlled by DC SCR drive system for stroke frequency control. The SCR shall include a wall mountable NEMA 4 enclosure with on/off switch, manual/external switch and speed potentiometer. The DC voltage output to the motor shall be proportional to the potentiometer setting in manual mode, or proportional to an external 4-20 mA signal in external mode. Pump shall include a 1/3 HP, TENV, permanent magnet 90V DC motor.

Motor Pump Specifications

Sigma/2 HM (basic and control versions)

Or

- shall be controlled by an SCR drive system for stroke frequency control. The SCR shall include a wall mountable NEMA 4 enclosure with on/off switch, manual/external switch and membrane keypad and digital display spannable to show RPM, percent output or flow rate. The actual motor speed, as measured by motor-mounted tachometer, shall be proportional to the rate setting in manual mode, or proportional to an external 4-20 mA signal in external mode. Pump shall include a 1/3 HP, TENV, permanent magnet 90V DC motor and Tach.

Or

- shall be controlled by an AC inverter system for stroke frequency control. The inverter shall include a wall mountable NEMA 4/12 enclosure with keypad and display of % load or output voltage. Selectable for local or remote operation via 4-20 mA signal. Pump shall include a 1/3 HP, inverter duty, 3-phase, 208-230 VAC motor. Minimum speed 3-30 Hz.

2.4 PROGRAMMING AND CONTROL ((CONTROL VERSION PUMP))

- A. The metering pump shall be microprocessor-controlled. All pumping functions shall be set by membrane-switch keypad and status shall be displayed on an illuminated LCD, which is readable at an offset of 45 degrees. Keypad will allow for simple scrolling of programmed parameters.
- B. Stroke length control shall be adjustable manually by means of a stroke length, in increments of 1.0%, from 0 to 100% of stroke length. The LCD shall digitally display stroke length in 1% increments in the full range between 100% and 0%.
- C. Programming shall allow pump to be calibrated so as to display pump output in gallons/hour or liters/hour. Calibration shall be maintained when stroke length is altered up to plus or minus 10% on the stroke length knob. If stroke length is altered by more than 10%, a yellow warning light will light and a flashing message "calib" will appear.
- D. The pump shall be equipped with the programmable function of electronic interlocking of the keypad by access code to prevent unauthorized adjustments to the pump.
- E. Keypad shall allow for scrolling and display on LCD such parameters as stroke frequency, stroke length, stroke counter, pump output in gals/hr or L/hr, dosing quantity, mA input being received by pump, and indication of external mode.

product

solenoid-driven
meteringmotor-driven
meteringpump spare parts &
accessoriespump engineering
specificationsanalytical
instrumentationanalytical
sensors

Motor Pump Specifications

Sigma/2 HM (basic and control versions)

- F. An AC inverter shall be integral to the microprocessor control and function of the pump. While 115VAC or 230VAC, 1 phase may be used to power the pump, the inverter shall drive a 1/4 HP, 230VAC, 3 phase motor. Stroke frequency shall be accomplished through microprocessor control with proportional start/stop of the motor, from 0% to 33% of stroke rate. Stroke rate shall be accomplished through variable speed of the motor from 34% to 100% of stroke rate. Stroke frequency control shall be manually adjusted by touch keypads, with the set stroke rate displayed on the LCD. The pump shall be capable of receiving a pulse input via optional external control cable such that one pulse gives one pump stroke rate. The pump shall be capable of remote ON-OFF operation using the pause function via a voltage free contact relay through an optional control cable. In addition, the pump shall be configured with;

((OPTIONAL SELECTIONS))

- pulse multiplier/divider functionality. The pump shall allow factoring to issue from 1 to 9,999 strokes per pulse input or to issue 1 stroke per 1 to 9,999 input pulses.
 - Or
 - analog input functionality. The pump shall accept an analog signal such that stroke frequency is proportional to 0/4-20mA or 20-4/0mA, the choice of which is programmed at the pump. The pump shall allow the setting of a maximum stroke rate, which corresponds to the maximum analog signal, with stroke rate proportional to signal strength below that rate. Programming for curve processing shall also be possible, in which any stroke frequency ratio in proportion to the electrical signal can be configured. Analog to digital converters external to the pump shall not be acceptable.
 - Or
 - pulse multiplier/divider and analog input functionality. The pump shall allow factoring to issue from 1 to 9,999 strokes per pulse input or to issue 1 stroke per 1 to 9,999 input pulses. The pump shall also accept an analog signal such that stroke frequency is proportional to 0/4-20mA or 20-4/0mA, the choice of which is programmed at the pump. The pump shall allow the setting of a maximum stroke rate, which corresponds to the maximum analog signal, with stroke rate proportional to signal strength below that rate. Programming for curve processing shall also be possible, in which any stroke frequency ratio in proportion to the electrical signal can be configured. Analog to digital converters external to the pump shall not be acceptable.
 - Or
 - programmable timer functionality. The pump shall be configured with an integral, programmable 2-week, 81 event timer to change operational state of the pump. Timers external to the pump are not acceptable.
 - Or
 - pulse multiplier/divider, analog input, and programmable timer functionality (as described above).
- G. The pump shall be equipped with the programmable function of auxiliary frequency control, allowing for quick priming of the pump or for slug feed of process during initial start up after shutdown. Stroke frequency shall be programmable to the maximum for the pump, and the auxiliary frequency function shall be capable of interfacing with a contact closure relay for control purposes.

Motor Pump Specifications

Sigma/2 HM (basic and control versions)

2.5 FLOW ASSURANCE ((OPTIONAL))

- A. Low Level Control - A 2-stage Float Switch shall be supplied to stop the pump prior to losing prime and annunciate low level on the pump LED.
- B. Relay Output - An SPDT relay shall be installed on the pump for:
- ((SELECT ONE))
- fault indication. ((OPTIONAL)). The metering pump shall have an integral relay to allow remote annunciation of a fault condition (i.e. low supply solution early warning/lack of supply solution shut down, loss of chemical output, system faults, and fuse/power supply failure). Configure as ((N/O//N/C)) contact closure relay.
- Or
- both fault indication and pacing relay. ((OPTIONAL)). The metering pump shall have an integral relay to allow remote annunciation of a fault condition (i.e. low supply solution early warning/lack of supply solution shut down, loss of chemical output, system faults, and fuse/power supply failure). Configure as ((N/O//N/C)) contact closure relay. The pump shall also have an integral relay to issue a contact closure with every pump stroke to pace a second metering pump. The pacing relay shall be electrically isolated via an optical coupler with a semiconductor switch.
- Or
- both 4-20mA output and fault indication. ((OPTIONAL)) The analog output function shall be a multiplicative factor of both stroke length % and stroke frequency %, reflecting the real time output capacity of the metering pump. The metering pump shall also have an integral relay to allow remote annunciation of a fault condition (i.e. low supply solution early warning/lack of supply solution shut down, loss of chemical output, system faults, and fuse/power supply failure). Configure as ((N/O//N/C)) contact closure relay.
- Or
- both 4-20mA output and pacing relay. ((OPTIONAL)) The analog output function shall be a multiplicative factor of both stroke length % and stroke frequency %, reflecting the real time output capacity of the metering pump. The metering pump shall also have an integral relay to issue a contact closure with every pump stroke to pace a second metering pump. The pacing relay shall be electrically isolated via an optical coupler with a semiconductor switch.

2.6 ACCESSORIES ((ALL ARE OPTIONAL AND MAY BE INCLUDED AS SEPARATE ITEMS OR AS COMPONENTS OF A PUMP STAND))

- A. The pump shall be mounted on a ((CHOOSE ONE: black, UV-protected polypropylene//304 stainless steel//FRP grating)) support stand suitable for wall, floor or top-of-tank mounting. A single chemical metering pump manufacturer shall be responsible for supplying and assembling all components of the skid, in addition to testing the skid-mounted metering system under conditions of maximum rated pump pressure, prior to shipment. The stand shall include the following accessories, pre-piped.

Motor Pump Specifications

Sigma/2 HM (basic and control versions)

- B. A foot valve and strainer shall be provided with each pump.
- C. An injection check valve shall be provided with each pump.
- D. A universal control cable with 5-pole round plastic connector and 5-wire cable with loose ends shall be provided with each pump.
- E. A two-stage float switch compatible with the chemical metering pump shall be provided for monitoring tank level.
- F. An adjustable discharge flow monitoring device mounted on a valved bypass shall be provided. The flow monitor shall be capable of signaling a fault condition to the metering pump.
- G. A diaphragm failure detector shall be provided to ((open/close)) a contact in the event of diaphragm failure.
- H. An adjustable-pressure, diaphragm-type backpressure/antisiphon valve shall be provided with each metering pump.
- I. An in-line, adjustable-pressure, diaphragm-type pressure relief valve shall be provided with each metering pump.
- J. An air-charged, bladder-type pulsation dampener shall be provided with each metering pump.
- K. A clear PVC calibration column with FNPT fittings top and bottom shall be provided with each pump/skid.

2.7 APPLICATION

- A. Quantity:
- B. Chemical Service:
- C. Capacity (U.S. gph):
- D. Backpressure (psig):

END OF SECTION

Motor Pump Specifications

Sigma/2 HK (basic and control versions)

((THIS IS A MASTER, EDIT FOR SPECIFIC APPLICATION))

PROMINENT FLUID CONTROLS, INC.

- SIGMA HK ((for flow rates from 0.12 gpd to 20 gph (basic) or to 17.2 gph (control))

SECTION _____ - CHEMICAL METERING PUMPS

1.1 APPLICATION

- A. Quantity: _____
- B. Chemical Service: _____
- C. Tag. Nos.: _____
- D. Capacity (US gallons per hour) _____
- E. Backpressure (psig): _____

1.2 DESCRIPTION

- A. The chemical metering pump(s) shall be a simplex, motor-driven, reciprocating, packed plunger type. The pump shall include integral motor, oil-lubricated gear reducer and cam-and-spring drive mounted in an aluminum housing, such housing to be sealed into an outer plastic housing for corrosion protection with heat sink fins for cooling.
- B. The chemical metering pump manufacturer shall provide a two year warranty on the pump drive and one year warranty on the pump liquid end, including packed plunger and O-rings.
- C. The pump shall be fully tested to meet rated flow and pressure by the manufacturer.
- D. The power supply shall be ____ VAC, ____ Hz, ____ phase.

1.3 LIQUID END

- The liquid end shall be 316 stainless steel. The suction and discharge valve shall be 316 stainless steel with PTFE-faced Viton® gasket seals and stainless steel valve balls.

1.4 CONTROL

- A. Stroke length control ((SELECT ONE))
 - shall be adjustable manually by means of a stroke length knob, in increments of 1%, from 0% to 100% of stroke length.
 - shall be adjustable by means of a stroke positioning motor from 0% to 100% of stroke length. The stroke positioning motor shall feature visual stroke length indication and adjust in proportion to a 4-20 mA signal.
- B. Stroke frequency control ((SELECT ONE))

product

solvent-driven
metering pumpsmotor-driven
metering pumpspump spare parts &
accessoriespump engineering
specificationsanalytical
instrumentationanalytical
sensors

Motor Pump Specifications

Sigma/2 HK (basic and control versions)

- shall be fixed at the pump's maximum stroke rate. Pump shall include a 1/3 HP, TEFC, four-pole AC motor.
- shall be switchable between manual or external control via 4-20 mA signal. In manual mode, stroke frequency control shall be manually adjusted by touch keypads, with the set stroke rate displayed on the pump's LCD. In external mode, the pump shall be capable of receiving a 4-20 mA input via optional external control cable. The pump shall allow setting of a maximum stroke rate which corresponds to the maximum analog signal, with stroke rate proportional to signal strength below that rate. The metering pump shall be capable of remote ON-OFF operation using the PAUSE function via a voltage-free contact relay through an optional control cable.
- shall be switchable between manual or external control via pulse signal. In manual mode, stroke frequency control shall be manually adjusted by touch keypads, with the set stroke rate displayed on the pump's LCD. In external mode, the pump shall be capable of receiving a pulse train input via optional external control cable. The metering pump shall allow factoring to issue from 1 to 99.99 strokes per pulse input or to issue 1 stroke per 1 to 100 input pulses. The metering pump shall be capable of remote ON-OFF operation using the PAUSE function via a voltage-free contact relay through an optional control cable.

1.5 FLOW ASSURANCE ((OPTIONAL))

- A. Low Level Control - A 2-stage Float Switch shall be supplied to stop the pump prior to losing prime and annunciate low level on the pump LED.
- B. Relay Output - An SPDT relay shall be installed on the pump for: ((SELECT ONE))
 - Fault Indication - ((OPTIONAL)) the metering pump shall have an integral relay to allow remote annunciation of a fault condition (i.e. low supply solution early warning/lack of supply solution shut down, flow monitor, system faults, and fuse/power supply failure).
 - Pacing Relay - ((OPTIONAL)) the metering pump shall have an integral relay to issue a contact closure with every pump stroke to pace a second PROMINENT metering pump.

1.6 ACCEPTABLE MANUFACTURER:

- A. ProMinent Fluid Controls, Inc. model _____
- B. Or pre-approved equal.

1.7 ACCESSORIES ((ALL ARE OPTIONAL AND MAY BE INCLUDED AS SEPARATE ITEMS OR AS COMPONENTS OF A PUMP STAND))

- A. The pump shall be mounted on a ((CHOOSE ONE: Fiberglass Reinforced Plastic / Stainless Steel)) support stand suitable for wall, floor or top-of-tank mounting, and including the following accessories pre-piped and factory tested:
- B. A universal control cable with 4 pole round plastic connector and 4-wire cable with loose ends shall be provided with each pump.

Motor Pump Specifications

Sigma/2 HK (basic and control versions)

- C. A two stage float switch compatible with the chemical metering pump shall be provided for monitoring tank level.
- D. An adjustable discharge flow monitoring device mounted on a valved bypass shall be provided. The flow monitor shall be capable of signaling a fault condition to the metering pump.
- E. A packing failure detector shall be provided to ((open/close)) a contact in the event of a failure.

END OF SECTION

product overview

solenoid-driven
metering pumps

motor-driven
metering pumps

pump spare parts &
accessories

pump engineering
specifications

analytical
instrumentation

analytical
sensors

Motor Pump Specifications

Sigma/3 HM (basic and control versions)

((THIS IS A MASTER, EDIT FOR SPECIFIC APPLICATION))

PROMINENT FLUID CONTROLS, INC. – SIGMA/3 HM (for flow rates from 46 to 264 gph)

PART 1 – GENERAL

1.1 GENERAL

- A. This specification covers the supply, installation, and testing of completely functional metering pump systems including all accessories and appurtenances as shown on the drawings and described herein. A single chemical metering pump manufacturer shall be responsible for supplying all components of the metering feed system.

1.2 QUALITY ASSURANCE

- A. For the purpose of establishing quality assurance, experience, and system reliability, the products described herein are based on those metering pumps manufactured by ProMinent Fluid Controls, Inc. All pumps shall be shop-tested for capacity and pressure prior to shipment, with documented results provided.

1.3 WARRANTY

- A. The chemical metering pump manufacturer shall provide a two year warranty on the metering pump mechanical drive and one year on the liquid end.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Manufacturers:
 - 1. ProMinent Fluid Controls, Inc.
 - 2. Pre-approved equal.

2.2 DESCRIPTION

- A. The chemical metering pump shall be a simplex, motor-driven, reciprocating, mechanically-actuated diaphragm type. The pump shall include integral motor, oil-lubricated gear reducer, and cam-and-spring drive mounted in an aluminum housing such housing to be sealed into an outer plastic housing for corrosion protection with heat sinks for cooling.
- B. The power supply shall be ___VAC, ___Hz, ___Phase.
- C. The liquid end shall be physically separated from the drive unit by a back plate with weep hole creating air gap separation. An elastomer shaft wiper seal shall prevent contamination of the gear box by confining chemical within the back plate if the primary diaphragm fails. The primary diaphragm shall have a steel core, vulcanized into a nylon-reinforced EPDM backing, with PTFE-faced fluid contact surface.

Motor Pump Specifications

Sigma/3 HM (basic and control versions)

- D. ((OPTIONAL)) The liquid end shall also feature a secondary diaphragm separated from the primary diaphragm by a spacer plate with diaphragm-isolated pressure switch to close a contact for alarm annunciation and to prevent chemical spill or intrusion into pump drive upon failure of the primary diaphragm.

2.3 LIQUID END

- A. The diaphragm shall be of a convex design fitting into a concave liquid end to minimize diaphragm wear, liquid end dead volume, and to promote flow of solids in suspension.

((SELECT ONE))

- The liquid end shall be virgin PVDF. The suction and discharge valve shall be PVDF with PTFE faced Viton gasket seals and ceramic valve balls.

Or

- The liquid end shall be 316 stainless steel. The suction and discharge valves shall be 316 stainless steel with PTFE-faced Viton gasket seals and stainless steel valve balls.

2.4 CONTROL ((BASIC VERSION PUMP))

- A. Stroke length control of the basic version pump
((SELECT ONE))

- shall be adjustable manually by means of a stroke length knob, in increments of 1.0%, from 0% to 100% of stroke length.

Or

- shall be adjustable by means of a stroke positioning motor from 0% to 100% of stroke length. The stroke positioning motor shall feature visual stroke length indication and manual/ external selector switch for local control via toggle switch or external control in proportion to a 4-20 mA signal.

- B. Stroke frequency control of the basic version pump
((SELECT ONE))

- shall be fixed at the pump's maximum stroke rate. Pump shall include a 3/4 HP, TEFC, four-pole AC motor.

Or

- shall be controlled by DC SCR drive system for stroke frequency control. The SCR shall include a wall mountable NEMA 4 enclosure with on/off switch, manual/external switch and speed potentiometer. The DC voltage output to the motor shall be proportional to the potentiometer setting in manual mode, or proportional to an external 4-20 mA signal in external mode. Pump shall include a 3/4 HP, TENV, permanent magnet 90V DC motor.

Motor Pump Specifications

Sigma/3 HM (basic and control versions)

Or

- shall be controlled by an SCR drive system for stroke frequency control. The SCR shall include a wall mountable NEMA 4 enclosure with on/off switch, manual/external switch and membrane keypad and digital display spannable to show RPM, percent output or flow rate. The actual motor speed, as measured by motor-mounted tachometer, shall be proportional to the rate setting in manual mode, or proportional to an external 4-20 mA signal in external mode. Pump shall include a 3/4 HP, TENV, permanent magnet 90V DC motor and Tach.

Or

- shall be controlled by an AC inverter system for stroke frequency control. The inverter shall include a wall mountable NEMA 4/12 enclosure with keypad and display of % load or output voltage. Selectable for local or remote operation via 4-20 mA signal. Pump shall include a 3/4 HP, inverter duty, 3-phase, 208-230 VAC motor. Minimum speed 3-30 Hz.

2.4 PROGRAMMING AND CONTROL ((CONTROL VERSION PUMP))

- A. The metering pump shall be microprocessor-controlled. All pumping functions shall be set by membrane-switch keypad and status shall be displayed on an illuminated LCD, which is readable at an offset of 45 degrees. Keypad will allow for simple scrolling of programmed parameters.
- B. Stroke length control shall be adjustable manually by means of a stroke length, in increments of 1.0%, from 0 to 100% of stroke length. The LCD shall digitally display stroke length in 1% increments in the full range between 100% and 0%.
- C. Programming shall allow pump to be calibrated so as to display pump output in gallons/hour or liters/hour. Calibration shall be maintained when stroke length is altered up to plus or minus 10% on the stroke length knob. If stroke length is altered by more than 10%, a yellow warning light will light and a flashing message "calib" will appear.
- D. The pump shall be equipped with the programmable function of electronic interlocking of the keypad by access code to prevent unauthorized adjustments to the pump.
- E. Keypad shall allow for scrolling and display on LCD such parameters as stroke frequency, stroke length, stroke counter, pump output in gals/hr or L/hr, dosing quantity, mA input being received by pump, and indication of external mode.

Motor Pump Specifications

Sigma/3 HM (basic and control versions)

- F. An AC inverter shall be integral to the microprocessor control and function of the pump. While 115VAC or 230VAC, 1 phase may be used to power the pump, the inverter shall drive a 1/2 HP, 230VAC, 3 phase motor. Stroke frequency shall be accomplished through microprocessor control with proportional start/stop of the motor, from 0% to 33% of stroke rate. Stroke rate shall be accomplished through variable speed of the motor from 34% to 100% of stroke rate. Stroke frequency control shall be manually adjusted by touch keypads, with the set stroke rate displayed on the LCD. The pump shall be capable of receiving a pulse input via optional external control cable such that one pulse gives one pump stroke rate. The pump shall be capable of remote ON-OFF operation using the pause function via a voltage free contact relay through an optional control cable. In addition, the pump shall be configured with; ((OPTIONAL SELECTIONS))
- pulse multiplier/divider functionality. The pump shall allow factoring to issue from 1 to 9,999 strokes per pulse input or to issue 1 stroke per 1 to 9,999 input pulses.
- Or
- analog input functionality. The pump shall accept an analog signal such that stroke frequency is proportional to 0/4-20mA or 20-4/0mA, the choice of which is programmed at the pump. The pump shall allow the setting of a maximum stroke rate, which corresponds to the maximum analog signal, with stroke rate proportional to signal strength below that rate. Programming for curve processing shall also be possible, in which any stroke frequency ratio in proportion to the electrical signal can be configured. Analog to digital converters external to the pump shall not be acceptable.
- Or
- pulse multiplier/divider and analog input functionality. The pump shall allow factoring to issue from 1 to 9,999 strokes per pulse input or to issue 1 stroke per 1 to 9,999 input pulses. The pump shall also accept an analog signal such that stroke frequency is proportional to 0/4-20mA or 20-4/0mA, the choice of which is programmed at the pump. The pump shall allow the setting of a maximum stroke rate, which corresponds to the maximum analog signal, with stroke rate proportional to signal strength below that rate. Programming for curve processing shall also be possible, in which any stroke frequency ratio in proportion to the electrical signal can be configured. Analog to digital converters external to the pump shall not be acceptable.
- Or
- programmable timer functionality. The pump shall be configured with an integral and programmable 2-week, 81 event timer to change the operational state of the pump. Timers external to the pump are not acceptable.
- Or
- pulse multiplier/divider, analog input, and programmable timer functionality (as described above).

Motor Pump Specifications

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- G. The pump shall be equipped with the programmable function of auxiliary frequency control, allowing for quick priming of the pump or for slug feed of process during initial start up after shutdown. Stroke frequency shall be programmable to the maximum for the pump, and the auxiliary frequency function shall be capable of interfacing with a contact closure for control purposes.

2.5 FLOW ASSURANCE ((OPTIONAL))

- A. Low Level Control - A 2-stage Float Switch shall be supplied to stop the pump prior to losing prime and annunciate low level on the pump LED.

- B. Relay Output - An SPDT relay shall be installed on the pump for: ((SELECT ONE))

- fault indication. ((OPTIONAL)) The metering pump shall have an integral relay to allow remote annunciation of a fault condition (i.e. low supply solution early warning/lack of supply solution shut down, loss of chemical output, system faults, and fuse/power supply failure). Configure as ((N/O//N/C)) contact closure relay.

Or

- both fault indication and pacing relay. ((OPTIONAL)) The metering pump shall have an integral relay to allow remote annunciation of a fault condition (i.e. low supply solution early warning/lack of supply solution shut down, loss of chemical output, system faults, and fuse/power supply failure). Configure as ((N/O//N/C)) contact closure relay. The pacing relay shall issue a contact closure with every pump stroke to pace a second metering pump. The pacing relay shall be electrically isolated via an optical coupler with a semiconductor switch.

Or

- both 4-20mA output and fault indication. ((OPTIONAL)) The analog output function shall be both stroke length % and stroke frequency %, reflecting the real time output capacity of the metering pump. The metering pump shall also have an integral relay to allow remote annunciation of a fault condition (i.e. low supply solution early warning/lack of supply solution shut down, loss of chemical output, system faults, and fuse/power supply failure). Configure as ((N/O//N/C)) contact closure relay.

Or

- both 4-20mA output and pacing relay. ((OPTIONAL)) The analog output function shall be a multiplicative factor of both stroke length % and stroke frequency %, reflecting the real time output capacity of the metering pump. The pacing relay shall issue a contact closure with every pump stroke to pace a second metering pump. The pacing relay shall be electrically isolated via an optical coupler with a semiconductor switch.

Motor Pump Specifications

Sigma/3 HM (basic and control versions)

2.6 ACCESSORIES ((ALL ARE OPTIONAL AND MAY BE INCLUDED AS SEPARATE ITEMS OR AS COMPONENTS OF A PUMP STAND))

- A. The pump shall be mounted on a ((CHOOSE ONE: black, UV-protected polypropylene// 304 stainless steel//FRP grating)) support stand suitable for wall, floor or top-of-tank mounting. A single chemical metering pump manufacturer shall be responsible for supplying and assembling all components of the skid, in addition to testing the skid-mounted metering system under conditions of maximum rated pump pressure, prior to shipment. The stand shall include the following accessories, pre-piped.
- B. A foot valve and strainer shall be provided with each pump.
- C. An injection check valve shall be provided with each pump.
- D. A universal control cable with 5-pole round plastic connector and 5-wire cable with loose ends shall be provided with each pump.
- E. A two-stage float switch compatible with the chemical metering pump shall be provided for monitoring tank level.
- F. An adjustable discharge flow monitoring device mounted on a valved bypass shall be provided. The flow monitor shall be capable of signaling a fault condition to the metering pump.
- G. A diaphragm failure detector shall be provided to ((open/close)) a contact in the event of diaphragm failure.
- H. An adjustable-pressure, diaphragm-type backpressure/antisiphon valve shall be provided with each metering pump.
- I. An in-line, adjustable-pressure, diaphragm-type pressure relief valve shall be provided with each metering pump.
- J. An air-charged, bladder-type pulsation dampener shall be provided with each metering pump.
- K. A clear PVC calibration column with FNPT fittings top and bottom shall be provided with each pump//skid.

2.7 APPLICATION

- A. Quantity:
- B. Chemical Service:
- C. Capacity (U.S. gph):
- D. Backpressure (psig)

END OF SECTION

Motor Pump Specifications

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((THIS IS A MASTER, EDIT FOR SPECIFIC APPLICATION))

PROMINENT FLUID CONTROLS, INC. - MAKRO HM/AM

SECTION - CHEMICAL METERING PUMP

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The chemical metering pump(s) shall be a motor-driven, mechanically actuated reciprocating diaphragm type positive displacement pump. The metering pump shall have a cast aluminum housing and shall be driven by a standard electric motor.

1.02 QUALITY ASSURANCE

- A. The chemical metering pump manufacturer shall provide a two year warranty on the pump chassis components and one year warranty on the pump liquid end components, including diaphragm and O-rings.
- B. The chemical metering pump shall be fully tested to meet rated flow and pressure, by the manufacturer prior to shipment.
- C. All metering pump options and accessories shall be provided by the metering pump manufacturer to ensure system compatibility.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Chemical Metering Pump:
 1. The Main Chassis of the pump, housing the drive train, shall be enclosed in a cast aluminum housing coated with corrosion resistant acrylic resin. The pump shall be driven by a standard electric motor whose drive rotation is reduced by a worm gear and converted into a reciprocating motion by means of an excentric sleeve and transmitted by a connecting rod to the thrust rod creating a back and forth motion on the diaphragm, hydraulically actuated diaphragm pumps will not be accepted . The stroke length is adjusted limiting the amount of the excentric (stroke amplitude modulation) via a knob on the pump control face. The pump shall be of a modular design to accommodate add-on pumps powered by a single electric motor.
 2. The Motor shall be shall be a NEMA 56C frame and ____ HP ____ nominal AC voltage, 60 Hz TEFC 1750 RPM, ____ phase AC motor. ((Optional DC motor with SCR controller))
 3. The Liquid End shall be physically separated from the main chassis with an air gap back plate, complete with drip port. The suction and discharge valves shall be of the single ball check design with the ball checks mounted internally in the valves. The diaphragm shall consist of a steel core vulcanized into an EPDM elastomer reinforced with nylon fabric and Teflon coated on the media contact surface.
- ((SELECT ONE))
 - The liquid end shall be constructed of polypropylene. The suction and discharge valve shall be constructed of polypropylene with ((EPDM or Viton)) seals and ceramic valve balls.

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- The liquid end shall be constructed of PVC. The suction and discharge valve shall be constructed of PVC with Viton seals and ceramic valve balls.
 - The liquid end shall be constructed of carbon-loaded PTFE. The suction and discharge valve shall be constructed of carbon-loaded PTFE with PTFE seals and ceramic valve balls.
 - The liquid end shall be constructed of 316 stainless steel. The suction and discharge valve shall be constructed of 316 stainless steel with PTFE seals and ceramic valve balls.
- B. Metering Pump Control:
1. Stroke Length Control shall be manually adjusted between 100% and 0% with a stroke adjusting knob on the pump. ((OPTIONAL Stroke Length Control shall be automatically positioned with an electric motor with 2 limit switches for maximum and minimum positions.))
 2. Stroke Frequency Control:
 - a. Basic version - the pumping stroke frequency is not adjustable. On-off via the use of standard motor starter switch controls pump operation, when on, the pump meters continuously.
 - b. Analog - ((OPTIONAL)) the metering pump shall have a SCR/DC drive system for stroke frequency control. The stroke frequency shall be proportional to the direct input of a remotely generated analog signal. The SCR/DC motor system shall be ____ hp motor, TEFC 1725 RPM, max, operating with 120/240 nominal single phase AC voltage, accepting 4-20 mA input signal.
 3. Flow Assurance:
 - a. Low Level Control - the metering pump shall automatically stop pumping prior to losing prime through the use of an OPTIONAL single-stage Float Switch.
 - b. Diaphragm-failure Detector - ((OPTIONAL with some models)) a detector shall be provided to signal the metering pump in the event of diaphragm failure.
- C. Capacity Specifications:
1. All components of the liquid end must be compatible with _____ Solution.
 2. The pump shall produce ____ gph, at ____ psi at maximum capacity.
- D. Acceptable Manufacturer:
1. PROMINENT FLUID CONTROLS, INC.,
Makro model _____
 2. or approved equal.

2.02 ACCESSORIES

- A. ((OPTIONAL)) A foot valve and strainer shall be provided with each pump.
- B. ((OPTIONAL)) A spring loaded injection valve shall be provided with each pump.
- C. Backpressure and/or Pressure Relief Valve - ((OPTIONAL)) a backpressure valve (and/or pressure relief valve shall be provided with each metering pump.
- D. Pulsation Dampener - ((OPTIONAL)) A flow pulsation dampener shall be provided with each metering pump.

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PART 3 - EXECUTION

3.01 INSTALLATION

- A. The metering pump installation shall be in accordance with manufacturers recommendations.

END OF SECTION