

MEP Series Solar Powered Chemical Injection Pump

Installation, Operation, and Maintenance Instructions

The MEP Series of Injection Pumps are designed to provide reliable service while minimizing overall cost of ownership to the End User

Each unit is comprised of a Pump Segment, Power Segment, and Controls Segment. To ensure maximum performance, each application should undergo power sizing and proper system segment selection.

Proper selection variables include, but are not limited to:

- Desired Flow Rate and Injection Style
- Injection Pressure
- Chemical MSDS
- Location (To determine available sunlight hours)

This manual contains the basic information required to install and operate the MEP Series' Solar Powered Chemical Injection Pump. This manual does not profess to cover all details or variations in equipment, nor to provide for every possible contingency associated with installation, operation and maintenance. Please request any additional information required or refer any additional problems not covered in this manual to Megas Manufacturing at 888-366-1290 or support@megasmfg.com

TABLE OF CONTENTS

SECTION	PAGE
IMPORTANT SAFETY PRECAUTIONS	2
SPECIFICATIONS	2
PUMP	2
MOTOR	2
PRESSURE AND FLOW RATE INFORMATION	3
SOLAR PUMP ASSEMBLY	4
PUMP ASSEMBLY	5
PUMP ASSEMBLY PARTS LIST	5
BODY ASSEMBLY AND PARTS LIST	6
INCLUDED COMPONENTS	7
INSTALLATION	8
PUMP MOUNTING AND TUBING	8
TUBING SCHEMATIC	8
SOLAR PANEL MOUNTING AND ASSEMBLY	9
SOLAR PANEL POSITIONING	10
WIRING	11
WIRING DIAGRAMS	12
OPERATION	13
VOLTAGE SCALING AND AUXILIARY OVERRIDE	13
ADJUSTING FOR DESIRED FLOW RATE	14
MAINTENANCE	15
TROUBLESHOOTING	16
ORDERING INFORMATION	17

IMPORTANT SAFETY PRECAUTIONS

Read this manual completely and carefully. Pay special attention to all warnings, cautions, and safety rules. Failure to follow the instructions could produce safety hazards which could injure personnel or damage the pump or motor. If you have any doubts about how to connect the pump or motor, refer to the pertaining sections of this manual.

Please pay special attention to all those paragraphs with the following safety symbols:



Warning

This indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Caution

This indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and/or property damage.

Caution This indicates a potentially hazardous situation which, if not avoided, may result in property damage.

SPECIFICATIONS

PUMP

FEATURE		SPECIFICATION
MATERIALS OF CONSTRUCTION		
Wetted Parts		316 SST (Excluding Plunger)
Plunger		17-4PH SST / H900 OR Ceramic Coated 17-4PH SST
Packing		PTFE / Aflas OR Viton
Check Seats		TFE
Check Balls		316 SST
Pushrod Bushings		Oil Impregnated Bronze
Driveshaft Housing		Aluminum, Powder Coated
Baseplate		Carbon Steel, Powder Coated
OPERATING		
Pump Type		Positive Displacement
Drive Mechanism		Eccentric Cam and Bearing
MAOP-All Plungers		10,000 PSI

MOTOR

Feature		Specifications
Motor	MODEL 12G	MODEL 12E
Voltage	12 VDC	12 VDC
Power	1/6	1/15
Gear Ratio	43.9:1	40:1
Speed	57 RPM	61 RPM
Continuous Current Rating	14 A	6.8 A

PRESSURE AND FLOW RATE INFORMATION

Caution

DO NOT EXCEED MAXIMUM ALLOWABLE OPERATING PRESSURES LISTED IN THESE CHARTS. EXCEEDING MAXIMUM OPERATING PRESSURES MAY CAUSE IRREPARABLE DAMAGE TO THE PUMP AND/OR MOTOR.

MODEL 12G Motor

QD Controller
(On/Off)

PLUNGER	HEAD	MAOP (PSI)	MIN FLOW (QPD)	MAX FLOW (QPD)
3/16"	SINGLE	6,000	1.0	35.0
	DUAL		1.0	70.0
1/4"	SINGLE	5,000	1.0	62.0
	DUAL		2.0	125.0
3/8"	SINGLE	2,500	2.0	141.0
	DUAL		4.0	282.0
1/2"	SINGLE	1,250	3.0	251.0
	DUAL		6.0	502.0

CR Controller
(Variable Speed)

PLUNGER	HEAD	MAOP (PSI)	MIN FLOW (QPD)	MAX FLOW (QPD)
3/16"	SINGLE	6,000	8.0	42.0
	DUAL		16.0	84.0
1/4"	SINGLE	5,000	14.0	69.0
	DUAL		28.0	139.0
3/8"	SINGLE	2,500	32.0	167.0
	DUAL		63.0	334.0
1/2"	SINGLE	1,250	56.0	298.0
	DUAL		112.0	597.0

MODEL 12E Motor

QD Controller
(On/Off)

PLUNGER	HEAD	MAOP (PSI)	MIN FLOW (QPD)	MAX FLOW (QPD)
3/16"	SINGLE	5,000	1.0	37.0
	DUAL		1.0	75.0
1/4"	SINGLE	2,500	1.0	67.0
	DUAL		2.0	134.0
3/8"	SINGLE	1,500	2.0	151.0
	DUAL		4.0	302.0
1/2"	SINGLE	750	3.0	268.0
	DUAL		6.0	537.0

CR Controller
(Variable Speed)

PLUNGER	HEAD	MAQP (PSI)	MIN FLOW (QPD)	MAX FLOW (QPD)
3/16"	SINGLE	4,500	9.0	42.0
	DUAL		17.0	84.0
1/4"	SINGLE	2,000	14.0	69.0
	DUAL		28.0	139.0
3/8"	SINGLE	1000	34.0	167.0
	DUAL		68.0	335.0
1/2"	SINGLE	500	60.0	298.0
	DUAL		120.0	597.0

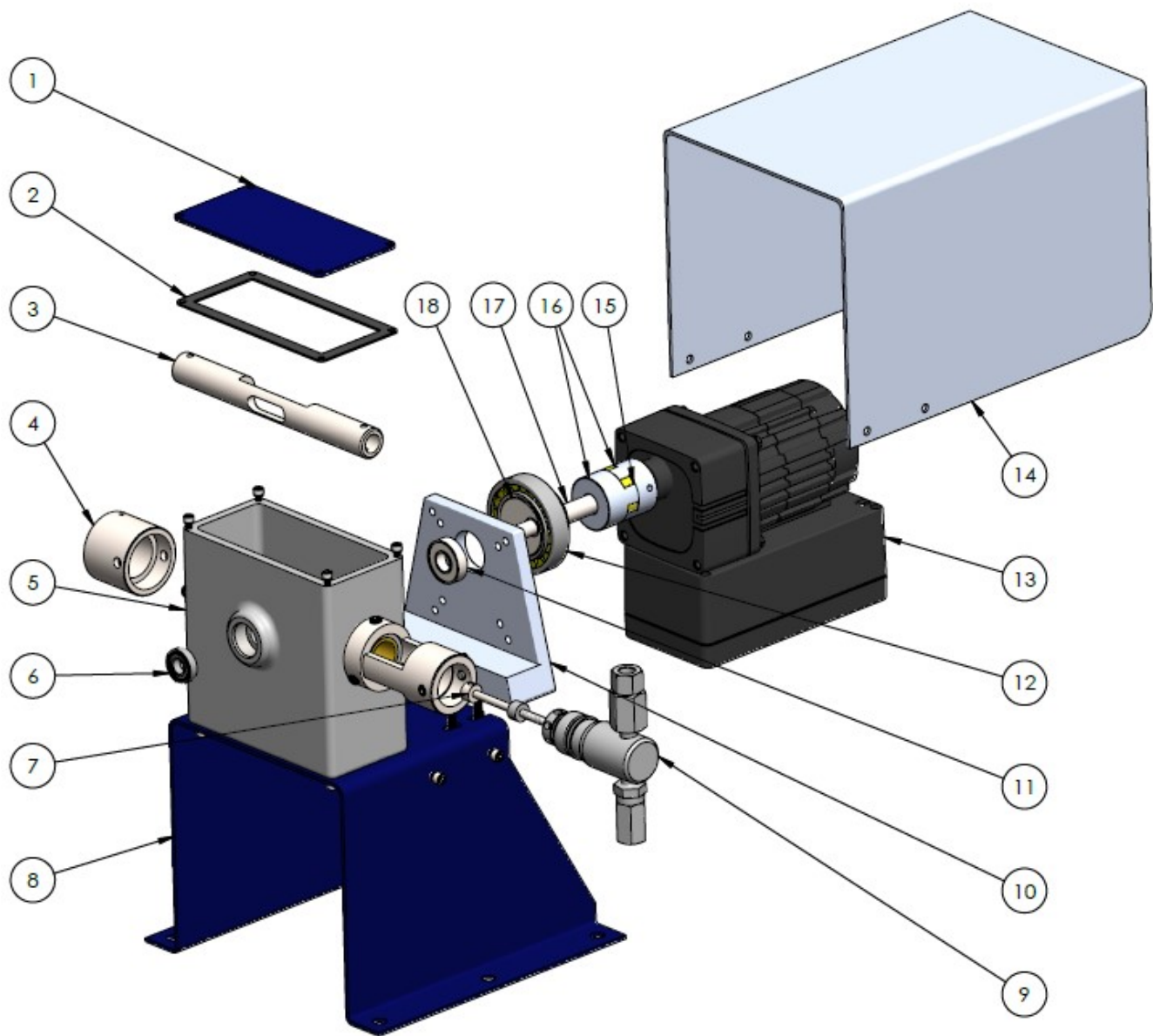
Caution

BEFORE INSTALLATION, REVIEW THE APPLICATION TO ENSURE THAT PROPER PUMP SELECTION HAS BEEN PERFORMED. THIS SHOULD BE DONE AFTER READING THIS MANUAL AND ALL APPLICABLE SAFETY STANDARDS. IF IN DOUBT, CONTACT YOUR LOCAL MEGAS MANUFACTURING REPRESENTATIVE OR THE HOME OFFICE.
DETERMINATION OF SYSTEM FITNESS FOR PURPOSE OR USE IS SOLELY THE CUSTOMER'S RESPONSIBILITY.

*Advertised minimum and maximum flow rates shown were tested at 0 PSI; increased discharge pressure may result in increased minimum and reduced maximum flow rates.

SOLAR PUMP ASSEMBLY

PUMP ASSEMBLY



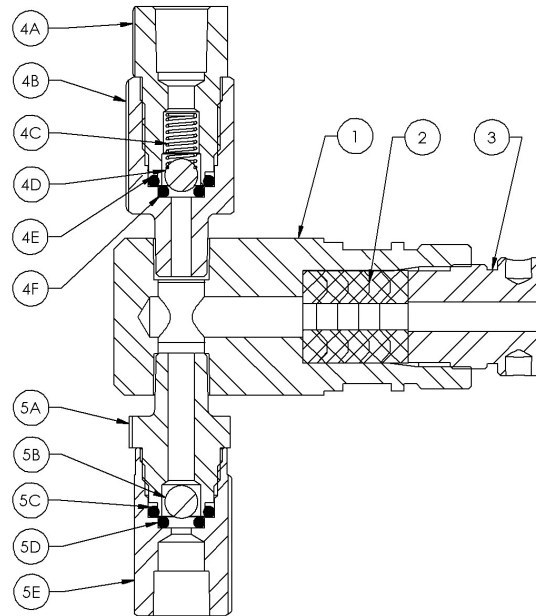
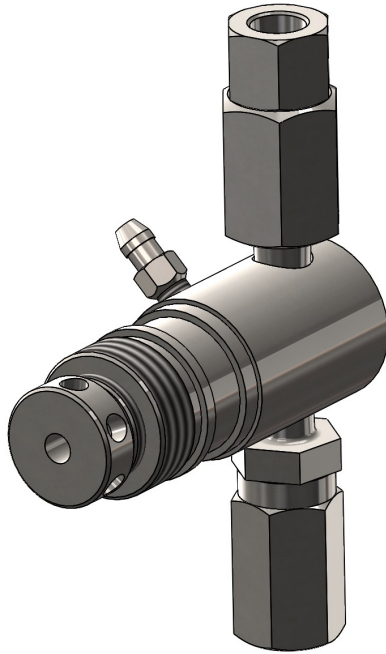
SOLAR PUMP ASSEMBLY

PUMP ASSEMBLY PARTS LIST

Item	Part Number	Description
1	EA-7280	Housing Cover
2	EA-7270	Housing Gasket
3	EA-2130	Pushrod
4	FG-2290	Blank Single Head
5	EA-7250	Housing
6	EA-2212	Bearing - Backside
7	SB-2245	3/16" Ceramic Coated Plunger
	SB-2246	1/4" Ceramic Coated Plunger
	SB-2247	3/8" Ceramic Coated Plunger
	SB-2248	1/2" Ceramic Coated Plunger
	EA-3240	3/16" SST Plunger
	EA-3241	1/4" SST Plunger
	EA-3242	3/8" SST Plunger
	EA-3243	1/2" SST Plunger
8	EA-7260	Baseplate
9	Fluid End	
10	EA-8888	Motor Foot Mount
11	EA-2210	Bearing - Motor Side
12	EA-2200	Cam Bearing
13	EA-9125	12X Motor
	EA-9245	24X Motor
	EA-9126	12G Motor
	EA-9121	12E Motor
	EA-9157	ACG Motor
14	EA-7262	Motor Cover
15	EA-2322	Coupling Spider
16	EA-2320	Coupling
17	EA-2150	Drive Shaft
18	FG-2140	Cam

SOLAR PUMP ASSEMBLY

BODY ASSEMBLY AND PARTS LIST



ITEM	PART NUMBER	DESCRIPTION	MATERIAL
1	FG-2180	PACKING NUT, 3/16"	303 SST
	FG-2181	PACKING NUT, 1/4"	
	FG-2182	PACKING NUT, 3/8"	
	FG-2183	PACKING NUT, 1/2"	
2	FG-2190	BODY, 3/16"	316 SST
	FG-2192	BODY, 1/4" AND 3/8"	
	FG-2193	BODY, 1/2"	
3	EA-1339	PACKING, 3/16"	PTFE/AFLAS
	EA-1341	PACKING, 1/4"	
	EA-1342	PACKING, 3/8"	
	EA-1343	PACKING, 1/2"	
	EA-1340	PACKING, 3/16"	VITON
	EA-1344	PACKING, 1/4"	
	EA-1345	PACKING, 3/8"	
	EA-1346	PACKING, 1/2"	
5	SB-2380	SUCTION CHECK VALVE	N/A
5A	FG-2610	SUCTION CHECK OUTLET BODY	316 SST
5E	FG-2620	SUCTION CHECK INLET BODY	316 SST
5D	CO-1341	108 O-RING	TFE
5C	CO-1281	111 O-RING	TFE
5B	CO-7320	5/16 BALL	SST
4	SB-6235	DISCHARGE CHECK VALVE	N/A
4B	FG-4230	DICHARGE CHECK INLET BODY	316 SST
4A	FG-4240	DISCHARGE CHECK OUTLET BODY	316 SST
4E	CO-1341	111 O-RING	TFE
4F	CO-1281	108 O-RING	TFE
4D	CO-7320	5/16 BALL	SST
4C	CO-7260	DISCHARGE CHECK SPRING	302 SST
6	FG-4100	BLEED SCREW (NOT SHOWN)	316 SST

INCLUDED COMPONENTS

Components below are shown for a standard, base solar pump system. Additional fluid ends, solar panels, battery enclosures, and charge controllers are available for systems requiring additional power.

Your product is delivered with the following components:

DESCRIPTION	QTY
Pump Unit	1
Battery/Control Enclosure	1
Pump Controller	1
Charge Regulator	1
Horizontal Support Assembly	1
Solar Panel	1
Solar Panel Mounting Pole (6-8')	1
Solar Panel Mounting Hardware Kit	
Unistrut Clamp	4
¼"-20 x 1" Bolt	2
¼"-20 Square Nut	2
Wiring Accessories	
Battery Jumper Wires	2
Battery Fuse Wire	1
Spare 15A Inline Fuse	2

OPTIONAL COMPONENTS

- Pump and Power Mounting
- High Pressure Line Check
- High Pressure Needle Valve
- Pump Setting Gage
- Y Strainer/Filter
- Isolation Valves – Suction and Rate Gage
- Tubing/Tube Fittings
- Pressure Safety Valve

Your representative is able to supply all relevant accessories.

INSTALLATION

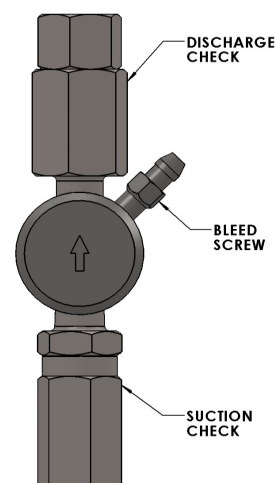
This product should only be installed by a qualified person familiar with its operation and associated hazards. The National Electrical Code (NEC), local electrical and safety codes, and when applicable, the Occupational Safety and Health Act (OSHA) should be observed to reduce hazards to personnel and property. **READ ALL INSTRUCTIONS BEFORE PROCEEDING.**

Caution

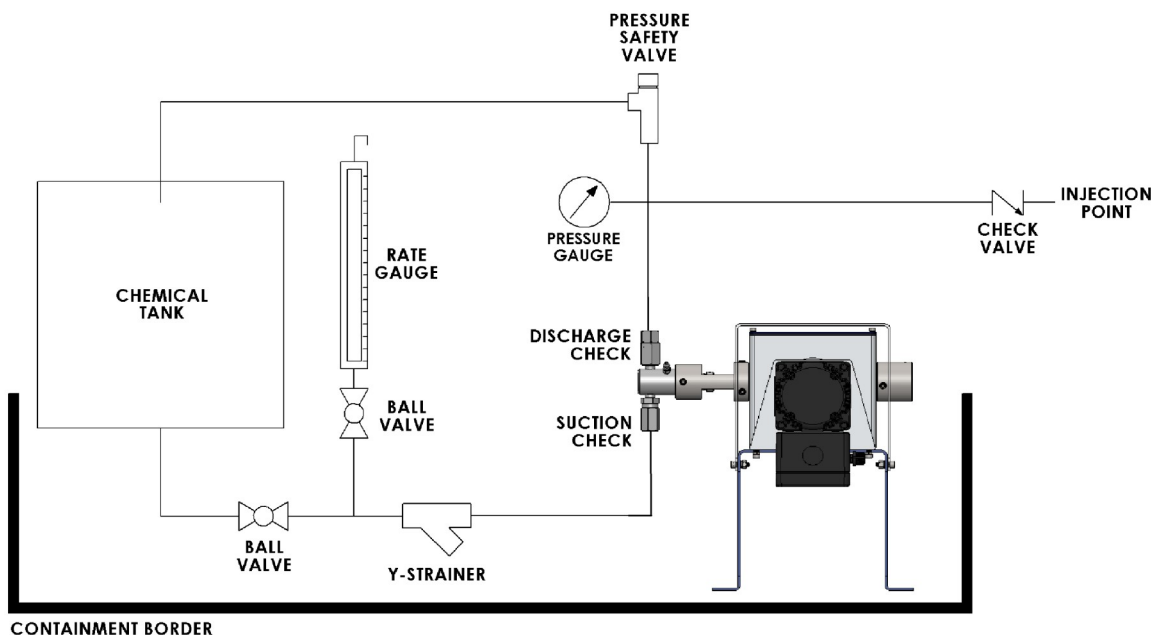
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DETERMINATION OF SYSTEM FITNESS FOR PURPOSE OR USE IS SOLELY THE CUSTOMER'S RESPONSIBILITY.

PUMP MOUNTING AND TUBING

1. The pump unit should be mounted on a flat and level surface. The chemical supply level must be at least 6" above the suction check valve at startup.
2. Verify that the arrow on the end of the pump body is pointing straight upward and suction check valve is facing downwards for 1/4", 3/8", and 1/2" plunger bodies (Shown to the right).
 - For 3/16" plunger bodies, verify bleed screw is pointing directly upwards and suction check valve is facing downwards.
3. Install the pump unit onto a firm base through the use of the six holes provided in the Baseplate.
4. Typical installations include the following:
 - A rate gauge or drum gauge to accurately set the injection rate
 - Isolation valves on the suction and discharge lines
 - Line check on the chemical discharge line
 - A filter/strainer on the fluid suction line to prevent trash from embedding in the seat O-rings
5. Install suction and discharge line tubing and fittings per manufacturer's recommendations. Megas



TUBING SCHEMATIC



LEAK HAZARD—PUMP MAY GENERATE PRESSURES IN EXCESS OF 10,000 PSI IN THE EVENT OF DEAD-HEAD OR BLOCKAGE. A PRESSURE SAFETY VALVE SHOULD BE INSTALLED IN ALL APPLICATIONS ON THE PUMP DISCHARGE LINE WITH RELIEF VALVE OUTLET PIPED BACK TO THE CHEMICAL SUPPLY TO PREVENT OVERPRESSURE OF DOWNSTREAM EQUIPMENT.

INSTALLATION

SOLAR PANEL MOUNTING AND ASSEMBLY

Before installing any photovoltaic system, contact local authorities to determine the necessary permits and installation/inspection permits.



- NEVER EXPOSE THE MODULE TO ARTIFICIALLY CONCENTRATED SUNLIGHT.
- UNDER NORMAL CONDITIONS A PHOTOVOLTAIC MODULE MAY EXPERIENCE CONDITIONS THAT PRODUCE MORE CURRENT AND/OR VOLTAGE THAN REPORTED AT STANDARD TEST CONDITIONS. ACCORDINGLY, THE VALUES OF ISC AND VOC MARKED ON UL LISTED MODULES SHOULD BE MULTIPLIED BY A FACTOR OF 1.25 WHEN DETERMINING THE COMPONENT VOLTAGE RATINGS, CONDUCTOR CAPACITIES, FUSE SIZES AND SIZE OF CONTROLS CONNECTED TO THE MODULE OUTPUT. REFER TO SECTION 690-8 OF THE NATIONAL ELECTRIC CODE FOR AN ADDITIONAL MULTIPLYING FACTOR OF 1.25 WHICH MAY BE APPLICABLE.
- INSTALL CABLE WITH APPROPRIATE HARDWARE IN ACCORDANCE WITH APPLICABLE ELECTRICAL CODES.
- GROUNDING IS ACHIEVED BY SECUREMENT TO THE ARRAY FRAME. THE ARRAY FRAME SHALL BE GROUNDED IN ACCORDANCE WITH NEC ARTICLE 250.



THIS SYSTEM SHOULD ONLY BE INSTALLED BY A QUALIFIED TECHNICIAN, ELECTRICIAN, OR ELECTRICAL MAINTENANCE PERSON FAMILIAR WITH ITS OPERATION AND ASSOCIATED HAZARDS. THE NATIONAL ELECTRICAL CODE (NEC), LOCAL ELECTRICAL AND SAFETY CODES, AND WHEN APPLICABLE, THE OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA) SHOULD BE OBSERVED TO REDUCE HAZARDS TO PERSONNEL AND PROPERTY.

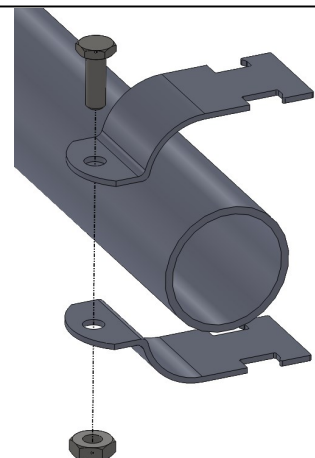
MEGAS MANUFACTURING PROVIDES A SUPPLIED WIRING HARNESS FOR DC POWER CONNECTIONS
DETERMINATION OF SYSTEM FITNESS FOR PURPOSE OR USE IS SOLELY THE CUSTOMER'S RESPONSIBILITY.

1. Inspect for any damage to the solar panel and/or mounting hardware before proceeding.
2. Locate the Solar Panel Mounting Pole. Install and secure pipe stand for mounting the photovoltaic module(s).



THE MOUNTING METHOD USED TO SUPPORT THE MODULE AND BATTERY ENCLOSURE (IF A METAL ENCLOSURE IS USED) SHOULD BE WIND RATED AND APPROVED TO THE LOCAL AND CIVIL CODES PRIOR TO INSTALLATION.

3. Attach the horizontal support assembly to the unistrut which is pre-attached to the solar panel with the provided unistrut clamps as shown in the illustration to the right.
4. Mount the solar panel(s) and horizontal support assembly to the pipe stand using the adjustment tee fitting (image on next page).



INSTALLATION

SOLAR PANEL POSITIONING

The solar panel should be positioned to achieve maximum solar exposure. Proper adjustment of the mounting assembly is critical to proper performance of the assembly.

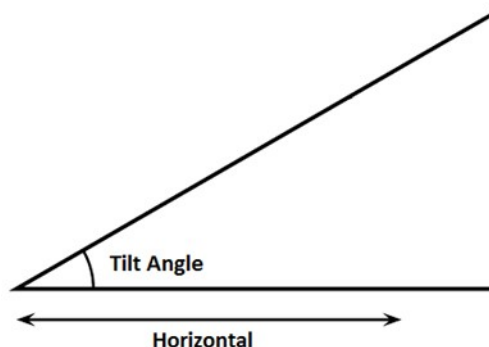
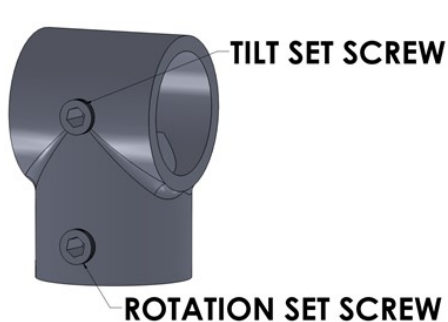
1. **Rotation:** Loosen the rotation set screw on the adjustment tee (shown below) and position the panel so that it is facing true south (for northern hemisphere installations) or true north (for southern hemisphere installations), then re-tighten the set screw. True south (or north) is defined as the position halfway between sunrise and sunset. Determine the halfway point between sunrise and sunset for a given day, and face the solar panel(s) in that direction. True south varies slightly from magnetic south as shown on a compass.
2. **Tilt:** The optimum tilt angle for the panel (measured from the horizontal) is determined by the site latitude. See the table below for recommendations. Loosen the tilt set screw on the adjustment tee and using either a smart phone app or protractor and plumb-bob, adjust the tilt angle of the panel until the angle the panel makes with the horizontal matches the recommended tilt angle. Re-tighten the set screws.

Recommended Tilt Angles

Site Latitude	Recommended Tilt Angle
25° to 30° (Houston, TX)	Site Latitude minus 2.5°
31° to 35° (Dallas, TX)	Site Latitude minus 5°
36° to 40° (St. Louis, MO)	Site Latitude minus 6.5°
41° to 45° (Chicago, IL)	Site Latitude minus 7.5°
46° to 50° (Bismarck, ND)	Site Latitude minus 8.5°

These numbers are based on a fixed angle to provide the most energy year round. Increasing the tilt angle during winter months may increase solar panel output, however leaving panels at a winter tilt angle will significantly reduce output during summer months. Contact the manufacturer for more information.

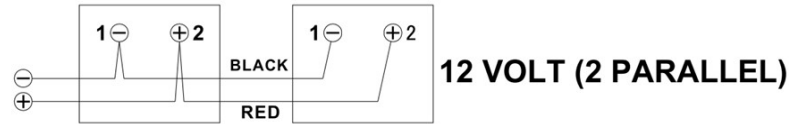
Example: For a Houston, TX installation (Latitude 29.8°), tilt angle is 27.3° ($29.8^\circ - 2.5^\circ = 27.3^\circ$).



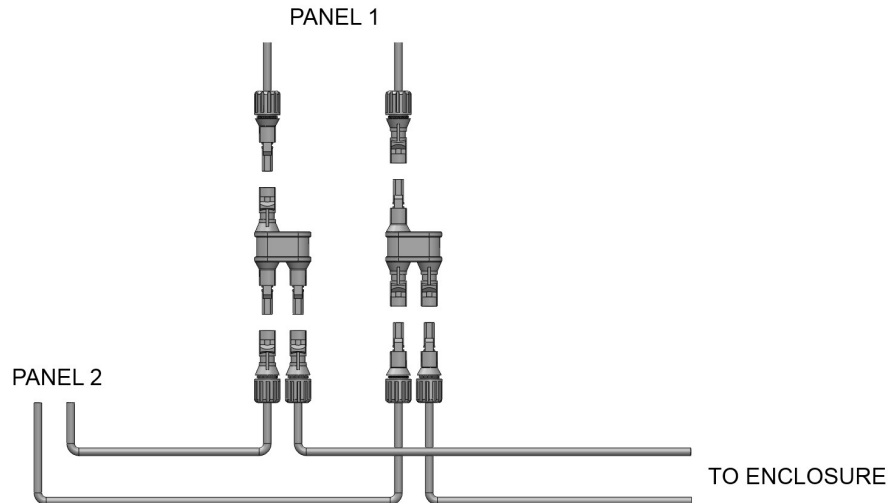
INSTALLATION

WIRING

1. Insert batteries into the battery/control enclosure and ensure that batteries are wired in parallel using the provided battery jumper cables. An example of parallel wiring is shown below.



2. Locate the positive (red) and negative (black) battery wires which are pre wired into the controller and Sun Saver. These wires are terminated with #10 ring lugs for connecting the batteries.
3. Connect the battery wires to the battery ensuring that positive and negative terminals receive the corresponding wire color.
4. Cover the solar panel(s) as completely as possible, i.e., with a blanket or cardboard, to minimize power generation while performing wiring steps below.
5. Each solar panel should include 3ft. of attached wire with quick connect adapters pre-installed. Additionally, the battery/control enclosure should include 12 ft. of attached wire with corresponding quick connect adapters.
6. Connect the solar panel cables by plugging in the attached MC4 connectors. The connectors should snap into place to prevent accidental removal.
7. For dual panel systems, branch connectors are provided for wiring the panels in parallel. An example is shown below when wiring multiple panels.
8. Run the pump motor wire through the supplied cord grip and into the control enclosure. The pump motor wire is terminated with polarized male/female quick disconnects for easy hookup. Tighten the cord grip.
9. Locate the corresponding male/female bullets inside of the enclosure and terminate the leads.



Caution

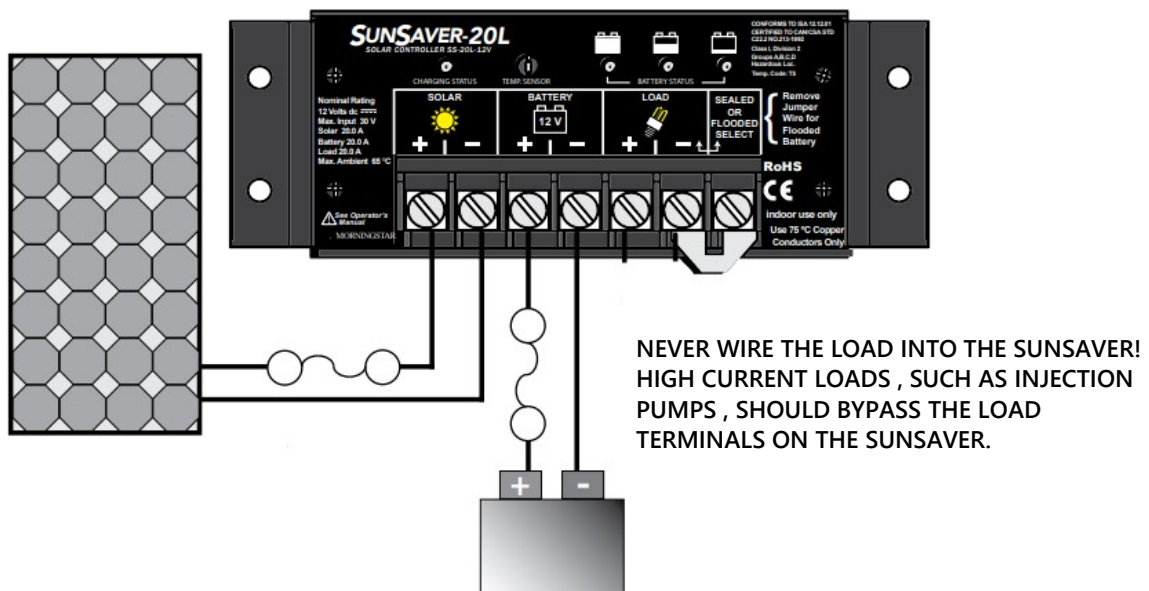
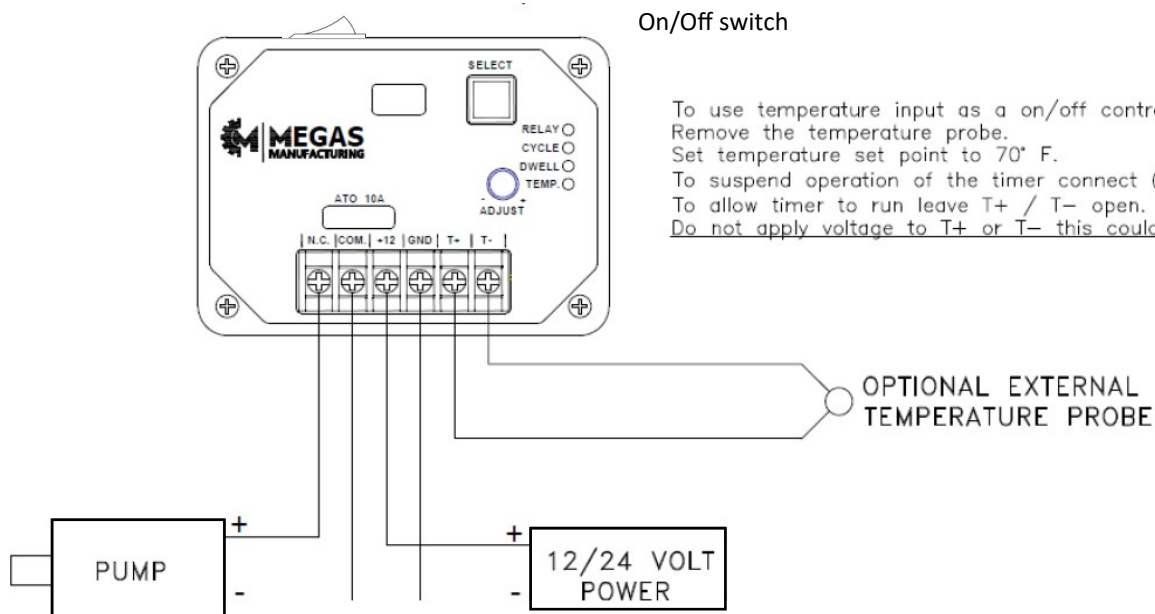
BATTERIES AND PANELS MUST BE WIRED IN PARALLEL FOR 12VDC OPERATION. WIRING IN SERIES WILL DOUBLE THE OUTPUT VOLTAGE AND RESULT IN SERIOUS SYSTEM HARM.

Caution

SINGLE PANEL SYSTEMS ARE SUPPLIED WITH AN 10 AMP REGULATOR WHICH IS SUFFICIENT FOR (1) 100 OR 140W PANEL. DUAL PANEL SYSTEMS ARE SUPPLIED WITH A 20 AMP REGULATOR WHICH IS SUFFICIENT FOR (2) 100 OR 140W PANELS. WHEN UPGRADING A SYSTEM A LARGER OR ADDITIONAL CHARGE REGULATOR MAY BE REQUIRED. CONTACT FACTORY FOR ASSISTANCE.

INSTALLATION

WIRING DIAGRAMS—Model QD



OPERATION

STARTUP



VERIFY THAT ALL MOUNTING, TUBING, AND WIRING STEPS HAVE BEEN COMPLETED IN ACCORDANCE WITH THE PREVIOUS SECTIONS BEFORE PERFORMING ANY OF THESE STEPS.

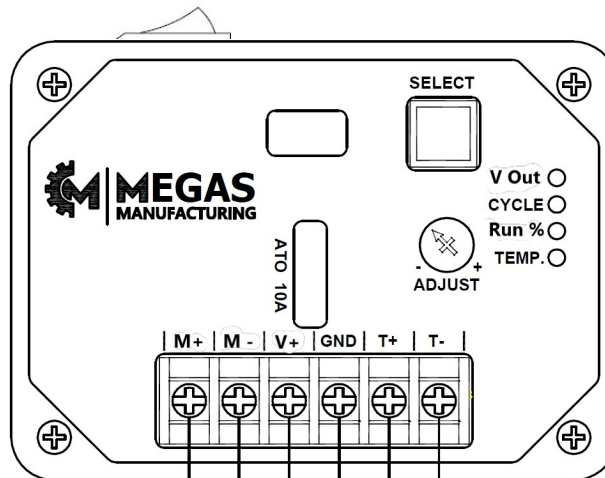
1. Verify that any valves necessary to allow for chemical flow are turned to the ON position.
2. Loosen the bleed screw until chemical comes out of the end using a 3/8" wrench. Tighten the bleed screw once there is a constant stream of chemical and no air bubbles are present. Timberline's bleed screw allows for easy connection of rubber tubing to the bleed screw to recapture any chemical used in the bleed process. Do not over tighten bleed screw.
3. Find the pump controller located inside of the battery/control enclosure. Turn the power switch to the "ON" position.

ADJUSTING FOR DESIRED FLOW RATE

Continuous Run, Variable Speed Controller

1. Turn the power switch to the "ON" position and adjust motor speed using the potentiometer.
2. Using an isolation valve and rate gauge on the suction line, the speed may be adjusted until the desired flow rate is achieved.

Model QD Controller



LEDS

V Out (on when output is on)

Cycle (7 segment display shows Cycle 15 Sec, 30 Sec, 60 Sec, or 3 Minute)

Run % (7 segment display shows the Run percentage of the Cycle)

Temp (7 segment display shows Temperature Set Point)

Use

During normal run, the display will show a count down of on and off time in 1 second increments. If the time is greater than 99 the count down will be in 10 second increments until 99 is reached then it will switch to 1 second increments. After 5 minutes the 7 segment display will blank. Press and release the push button to display the countdown again.

Press and release button to view settings. Each press of the push button will step to the next setting. Pressing the push button while viewing Temperature Set Point will return unit to the normal run mode. If left with a setting being displayed, the timer will return to the countdown after 30 seconds.

To change a setting, use the push button to step to the setting to change. Press and hold the push button until the led starts to blink. Turn the pot to the desired setting. Press and release the push button to return to view settings. If left with a setting being changed, the timer will return to the countdown after 30 seconds and the previous settings will be restored.

OPERATION

Voltage Scaling Function

Trip Point	Duty Cycle	Display (Flash)	Reset Condition
$\leq 12.0 \text{ V}$	75%	L1 / 75	$\geq 12.2 \text{ V}$
$\leq 11.6 \text{ V}$	50%	L2 / 50	$\geq 12.2 \text{ V}$
$\leq 11.2 \text{ V}$	25%	L3 / 25	$\geq 12.2 \text{ V}$
$\leq 10.8 \text{ V}$	OFF	L4 / Blank	$\geq 12.5 \text{ V}$

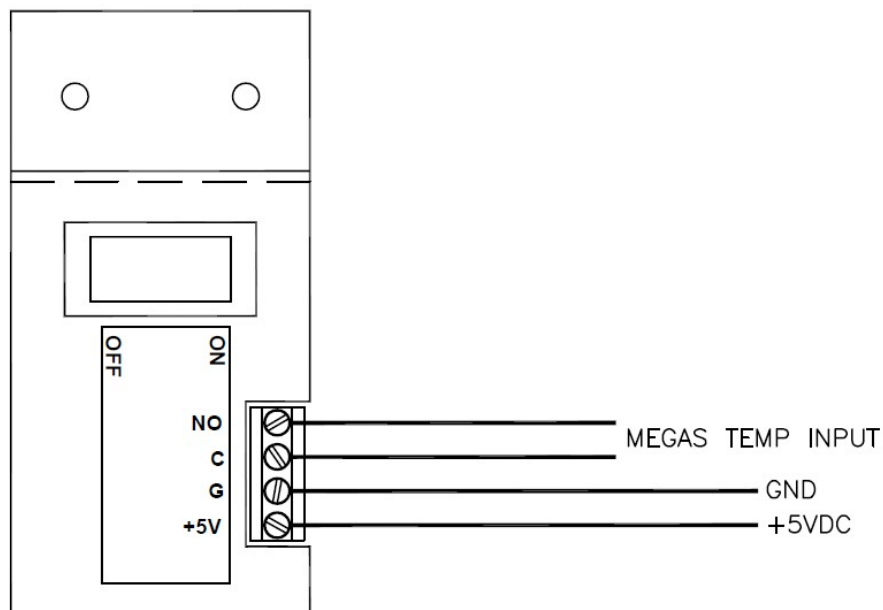
The voltage scaling function automatically reduces flow rate when low voltage is detected to prevent deep discharge of the battery.

When the controller is in low voltage mode, the display will flash showing the under voltage condition and the factor which flow rate is multiplied by.

When voltage increases to the reset condition, the controller exits alarm mode and flow rate is returned to normal.

Auxiliary Override

Optional 5V+ Override for simple automation. Suspend pump control anywhere you can harness a 5VDC Signal by utilizing the temperature terminals.



*Does not include low-flow style controllers. See next page for more information

OPERATION

MAINTENANCE

PUMP

- Lubricate shaft and bearings with multi purpose grease. Alternatively, lubricate by filling the pump housing with hydraulic oil. Add or replace lubricant quarterly, as a minimum. Use lubricant suitable for climate where the pump is installed.
- Monitor plunger packing for leaks. Packing may need to be tightened 24-72 hours after installation to account for the initial break-in period. Replace packing if necessary.

Caution	OVER-TIGHTENING PACKING MAY CAUSE EXCESSIVE FRICTION ON PLUNGER RESULTING IN INCREASED POWER CONSUMPTION AND DEGRADED SYSTEM PERFORMANCE
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- Monitor driveshaft and pushrod bushings for wear. Replace if necessary.

SOLAR PANELS

- Periodically clean the solar panel to ensure optimum performance. Use a mild soap with warm water and a clean soft towel to remove dust, bird droppings, etc.

Caution	THE SOLAR PANELS ARE FRAGILE—HANDLE WITH CARE TO AVOID IRREPARABLE DAMAGE. AVOID IMPACTING, TWISTING, OR BENDING THE ASSEMBLY.
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BATTERIES

- Repeated deep discharge cycles may permanently damage the batteries. Proper sizing is essential to ensure battery life. Replacement may be necessary after an extended period of time or repeated deep discharges.

TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE	VERIFICATION	CORRECTIVE ACTION
PUMP NOT RUNNING	Low battery voltage	Voltage test battery	See other section
	Fuse blown	Fuse visibly blown	Replace fuse (Proper diagnosis should be performed to determine cause of fuse failure)
	Obstructed flow	Pump operates when bleed screw is opened	Verify all valves between injection point and pump are open and lines are free of debris
	Pressure over MAOP	Pump operates when bleed screw is opened; Process gauge readings	Verify injection pressure is within the pumps limits; Smaller plunger sizes may be able to accommodate higher pressure
	Plunger roll pin inserted too far	Visual inspection to verify roll pin is not protruding enough to contact pushrod bushings	Replace roll pin and insert correctly
	Air/vapor in pump	Bubbles in bleed screw output	Bleed pump until flow from bleed screw is smooth with no bubbles.
PUMP RUNS, BUT WITH LITTLE OR NO FLUID OUTPUT	Pump mounted too high to create adequate suction	Verify pump suction check is 6" below chemical level	Mount pump such that suction check is at least 6" below chemical level
	Discharge or suction lines plugged	N/A	Clean lines
	Suction check failure	Rate gauge "bounces" when pumping	Clean suction O-rings; Replace suction check parts; Replace suction check
	Discharge check failure	No movement in rate gauge	Replace discharge check parts; Replace discharge check
	Electrical short	N/A	Qualified technician should identify and repair the electrical short
LOW BATTERY VOLTAGE	Solar panel positioned improperly	See page 15	Re-position as required
	Panel not getting adequate sunlight	Visual Inspection	Relocate panel if possible. Clear any obstructions such as tree limbs.
	Panel is dirty	Visual Inspection	Clean as required
	Battery failure	N/A	Replace if necessary
	Solar array improperly sized	Contact manufacturer	Add panels/batteries as necessary
BLOWN FUSE	Over current on motor	N/A	Check for dead-head due to closed valves or blockage; Check for discharge pressure over MAOP; Check for pump mechanical failure
	Lightning strike	N/A	Complete replacement may be required

How to Order

DC Solar Pump Sample Code:

<u>1</u>	<u>2</u>	-	<u>3</u>	-	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	-	<u>8</u>	<u>9</u>	<u>10</u>
	1	-	12E	-	A	A	4	S	-	A	0	B

*In the above example, a **Fixed, On/Off-Efficiency,- Single Head, AFLAS/TFE, 1/4", Stainless Plunger,- Single Battery Enclosure, with No Battery, 100 Watt** unit has been ordered.

1	<u>Stroke</u>	<u>Code</u>
	Fixed	(blank)
	Adjustable	ADJ
2	<u>Controller</u>	<u>Code</u>
	Continuous Run	CR
	On/Off	1
3	<u>Motor</u>	<u>Code</u>
	Efficiency	12E
	High Torque	12G
	12V Brushless	12X
	24V Brushless	24X
4	<u># Heads</u>	<u>Code</u>
	Single	A
	Dual	B
	Triple	C
	Quad	D
5	<u>Packing Matl.</u>	<u>Code</u>
	Aflas/TFE	A
	Viton/TFE	V
	Adapter Seal	S
6	<u>Plunger Size</u>	<u>Code</u>
	3/16	3
	1/4	4
	3/8	6
	1/2	8

7	<u>Plunger Matl.</u>	<u>Code</u>
	Stainless	S
	Ceramic	C
8	<u>Batty. Enclosure</u>	<u>Code</u>
	Single	A
	Dual	B
9	<u># Batteries</u>	<u>Code</u>
	None	0
	1	1
	2	2
10	<u>Solar Wattage</u>	<u>Code</u>
	60	A
	100	B
	150	C
	200	D
	300	E

Before setting up any solar pump system, contact the manufacturer for proper sizing based on your location, pressure, and flow rate. Improper sizing and/or unintended use may cause system failure.