

EIP Solar-Powered Chemical Injection Pump with DigiMax ADC Control

Application

The WellMark EIP Solar-Electric Chemical Injection Pump provides an environmentally-clean method for injection of chemical into a line under pressure. It is a positive-displacement design, powered by an electric motor, thereby eliminating the gas emissions inherent with pneumatic-style pumps. Applications include injection of methanol, corrosion inhibitors, friction reducers or scale inhibitors into wellheads or pipelines. Unique Temperature Sensor allows operator to set temperature threshold to disallow pumping until temperature falls to a specified level.

Specifications

Connections

Pump Inlet and Outlet 1/4" Female NPT

Pump

Fluid Head Stainless Steel, Single or Dual

12VDC Gearmotor Size Small - 1/17hp, 30rpm

Large - 1/6hp, 64rpm

120VAC Gearmotor Size 1/6hp, 60rpm

Available Plunger Sizes 1/4", 3/8", 1/2"

3-Position Adjustable Displacement

Power • DC

Available Solar Panels Single or Multiple
50, 80 or 110 Watt

Battery(s) Single or Multiple
110 Amp Hour Deep Cycle

General

Control DigiMax ADC Digital Display
with Auto Mode, Voltage Monitor, Temperature Sensor,
Manual Pump Override, Fuse Protected

Mounts Mast with Quad Legs (Standard)
Skid Mount (Optional)

Principle of Operation

Any chemical injection pump utilizing a photovoltaic power system must manage numerous variables in an attempt to maintain adequate power for the task at hand. Among those variables are:

- Available Sunlight
- Size and Capability of the Solar Panel
- Size of the Battery or Batteries
- Power Draw of the Motor
- Size/Displacement of the Plunger
- Required Discharge Pressure of the Pump

All of these variables must be considered when sizing a photovoltaic pump system.



Skid Mounted
Shown with 80 Watt Panel

Unit Positioning and Panel Tilt Adjustment

Regional information about available sunlight can be found at <http://www.nrel.gov/gis/solar.html>. Further evaluation of the specific site may be necessary to maximize clear presentation of the solar panel to the sun. Any adjacent items that may cast shadows on the panel throughout the day will negatively affect the overall performance of the package. Maximum exposure will help to assure that the battery maintains enough power to drive the pump throughout the night.

To get the most from position-fixed (or seasonally adjusted) photovoltaic solar panels, you need to point them in the direction that captures the most sun.

Solar panels should always face true south in the Northern Hemisphere, north in the Southern Hemisphere, tilted from the horizontal at a degree equal to your latitude plus 15 degrees in winter, or minus 15 degrees in summer.

An additional 3-5% can be gained by evaluating this more carefully and fine-tuning adjustments accordingly.

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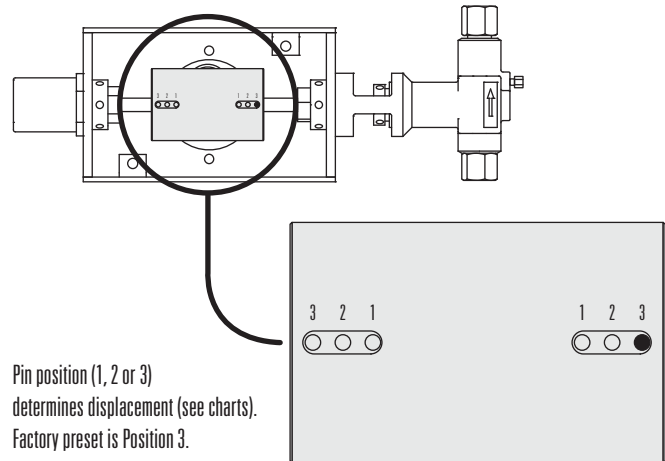
Pump Selection

A wide ratio between OFF time and RUN time (OFF:RUN) will usually result in maximized efficiency of the battery/solar charging system. For example: 30 seconds OFF time versus 5 seconds RUN time would result in a ratio of 6:1. Ratios lower than 2:1 may result in progressive loss of battery charge, depending upon available sunlight and differential pumping pressure.

As reviewed against the "Pump Displacement & Timer Settings" charts, (refer to Installation, Operation & Maintenance Instructions for Solar-Powered Chemical Injection Pump) the pump's required rate should optimally fall within the middle of the pumps capacity range. This gives room for adjustment if the service criteria changes.

Operation

The WellMark Solar Electric Chemical Injection Pump features a control timer that allows a broad range of operating conditions. The pump head can be adjusted for one of three different displacement



Pin position (1, 2 or 3) determines displacement (see charts). Factory preset is Position 3.

settings. Control of fluid volume can be achieved by utilizing an infinite number of combinations of RUN and OFF times along with three different displacement settings. Suggested settings for common volumes are listed on included charts.

Displacement Volumes by Pin Placement

| Displacement Volumes | 1/4" Plunger | | | 3/8" Plunger | | | 1/2" Plunger | | |
|---------------------------------------|--------------|--------|--------|--------------|--------|--------|--------------|--------|--------|
| | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| DISPLACEMENT PER STROKE (OZ.) | 0.0170 | 0.0238 | 0.0306 | 0.0382 | 0.0535 | 0.0688 | 0.0679 | 0.0951 | 0.1223 |
| DISPLACEMENT PER SECOND (SMALL MOTOR) | 0.0085 | 0.0119 | 0.0153 | 0.0191 | 0.0267 | 0.0344 | 0.0339 | 0.0475 | 0.0611 |
| DISPLACEMENT PER SECOND (LARGE MOTOR) | 0.0181 | 0.0254 | 0.0326 | 0.0407 | 0.0570 | 0.0733 | 0.0724 | 0.1014 | 0.1304 |

DigiMax ADC Control/Timer



Temperature Sensor

The Control Timer is equipped with a Temperature Sensor feature. When activated this feature turns the pump off until the temperature drops to a set temperature threshold or lower, regardless of program settings. This allows the user to minimize the waste of methanol by only pumping during conditions approaching freezing temperatures.

Program Functions

Auto Mode

After a one-time setup, this feature allows the operator to simply enter the number of quarts desired per day - No need to consult RUN TIME and OFF TIME charts. The DigiMax ADC is programmed to be hassle-free. Of course, Manual Mode is available allowing the user to manually set the control if desired.

In Auto Mode Digital Display continuously indicates settings:

- Plunger Size and Pin Setting
- Battery Voltage
- Temp. Settings (ON/OFF, Temp. Threshold Setting and Current)
- Pump Rate (Quarts per Day)

In Manual Mode Digital Display continuously indicates settings:

- RUN Time
- OFF Time
- Cycle Count
- Battery Voltage
- Temp. Settings (ON/OFF, Temp. Threshold Setting and Current)

Pump Override

Runs pump continuously, overriding the program until the button is pressed again or until the pump runs for 5 minutes.

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Pump Specifications

| Specification | Plunger/Pin Position | | | | | | | | |
|---------------------------------------|----------------------|--------|--------|--------------|--------|--------|--------------|--------|--------|
| | 1/4" Plunger | | | 3/8" Plunger | | | 1/2" Plunger | | |
| | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| PISTON AREA (SQ. IN.) | 0.0491 | | | 0.1104 | | | 0.1963 | | |
| STROKE (IN.) | 0.624 | 0.874 | 1.124 | 0.624 | 0.874 | 1.124 | 0.624 | 0.874 | 1.124 |
| DISPLACEMENT PER STROKE (CU. IN.) | 0.0306 | 0.0429 | 0.0562 | 0.0689 | 0.0965 | 0.1241 | 0.1225 | 0.1716 | 0.2206 |
| DISPLACEMENT PER STROKE (OZ.) | 0.0170 | 0.0238 | 0.0306 | 0.0382 | 0.0535 | 0.0688 | 0.0679 | 0.0951 | 0.1223 |
| DISPLACEMENT PER SECOND (SMALL MOTOR) | 0.0085 | 0.0119 | 0.0153 | 0.0191 | 0.0267 | 0.0344 | 0.0339 | 0.0475 | 0.0611 |
| DISPLACEMENT PER SECOND (LARGE MOTOR) | 0.0181 | 0.0254 | 0.0326 | 0.0407 | 0.0570 | 0.0733 | 0.0724 | 0.1014 | 0.1304 |

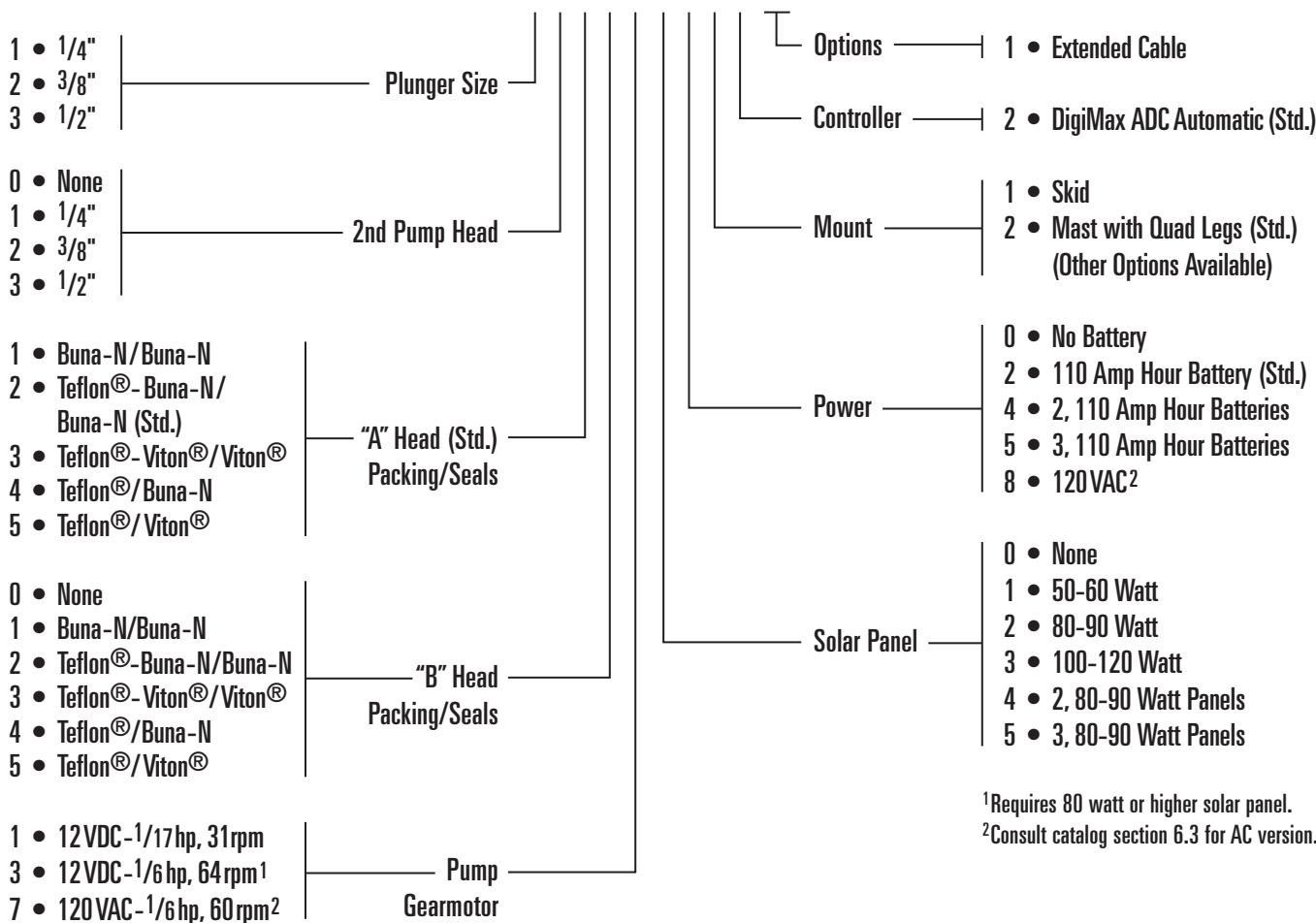
Maximum Discharge Pressures

| Motor | Plunger/Discharge Pressure | | |
|-------------------------------|----------------------------|--------------|--------------|
| | 1/4" Plunger | 3/8" Plunger | 1/2" Plunger |
| SMALL MOTOR - 1/17HP DC | 3000 PSI | 1500 PSI | 800 PSI |
| LARGE MOTOR - 1/6HP DC AND AC | 5000 PSI | 2500 PSI | 1200 PSI |

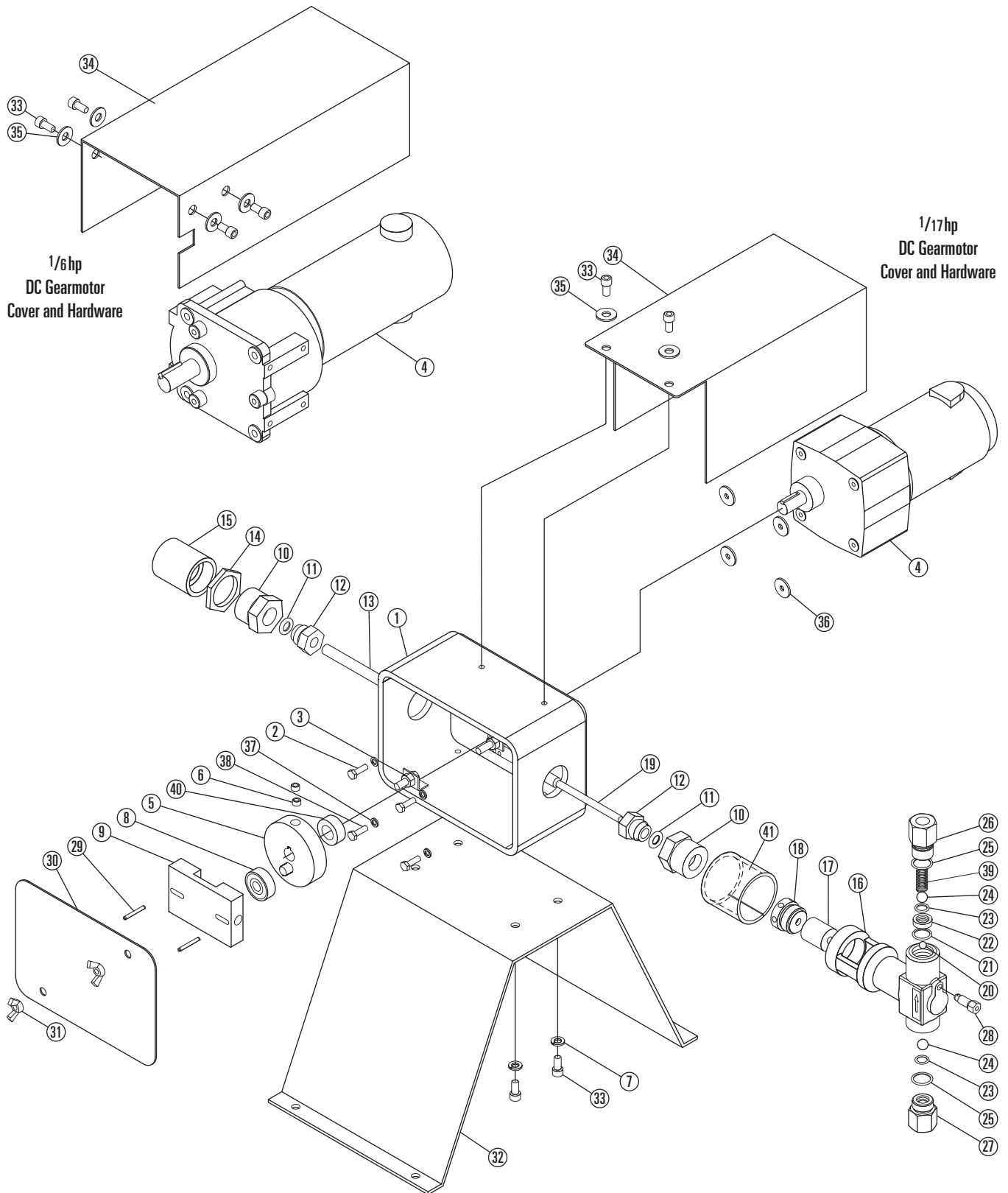
Determining the Model Number

Example given: Standard Model EIP-102011222 Pump with 1/4" Plunger, No 2nd Head, Teflon®-Buna-N/Buna-N Packing and Seals, 1/17hp 12VDC Gearmotor, 50-60 Watt Solar Panel, 110 Amp Hour Battery, Mast with Quad Legs, DigiMax ADC Timer with Temperature Sensor.

MODEL EIP - 1 0 2 0 1 1 2 2 2 -



EIP Solar-Powered Chemical Injection Pump with DigiMax ADC Control
Solar-Powered Pump Unit Component Parts



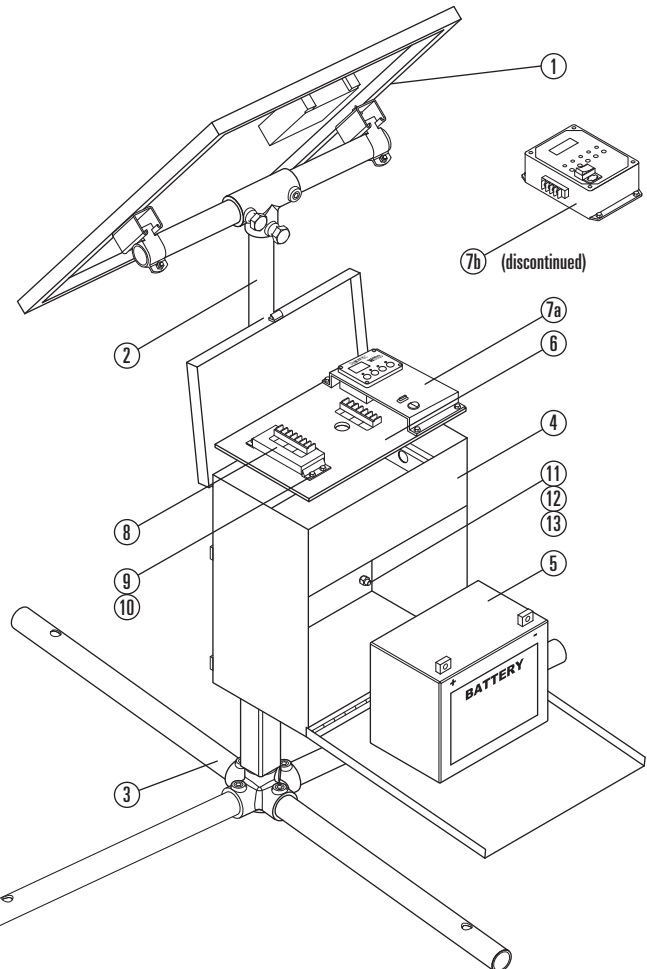
EIP Solar-Powered Chemical Injection Pump with DigiMax ADC Control

Solar-Powered Pump Parts List

| Item | Description | Qty. | Part No. |
|------|-----------------------------|------|------------|
| 1 | HOUSING | 1 | 06500-7215 |
| | | 1 | 06500-7219 |
| 2 | SCREW | 2 | 05000-1692 |
| 3 | HEX NUT | 2 | 10007 |
| 4 | MOTOR | 1 | 06000-8487 |
| | | 1 | 06000-8485 |
| 5 | ECCENTRIC WHEEL | 1 | 06500-7205 |
| | | 1 | 06500-7209 |
| 6 | SET SCREW | 2 | 05000-2294 |
| 7 | LOCK WASHER | 4 | 10709 |
| | | 7 | 10709 |
| 8 | BEARING | 1 | 06000-8477 |
| 9 | RECIPROCATING BLOCK | 1 | 05013-6995 |
| 10 | BUSHING | 2 | 05013-7012 |
| 11 | O-RING | 2 | 11017 |
| 12 | GUIDE NUT | 2 | 05013-7020 |
| 13 | GUIDE | 1 | 05013-6986 |
| 14 | JAM NUT | 1 | 05013-6968 |
| 15 | CAP | 1 | 05013-7119 |
| 16 | FLUID END | 1/4" | 05013-6907 |
| | | 3/8" | 05013-6909 |
| | | 1/2" | 05013-6905 |
| 17 | PACKING SET-TEFLON®/BUNA-N* | 1/4" | 06000-9293 |
| | | 3/8" | 06000-9301 |
| | | 1/2" | 06000-9319 |
| 18 | GLAND NUT | 1/4" | 05013-7005 |
| | | 3/8" | 05013-7001 |
| | | 1/2" | 05013-7007 |
| 19 | PLUNGER | 1/4" | 05013-6975 |
| | | 3/8" | 05013-6977 |
| | | 1/2" | 05013-6979 |
| 20 | BALL - 1/4" | 1 | 06000-0265 |
| 21 | O-RING | 1 | 10460 |
| 22 | SEAT | 1 | 05013-6950 |
| 23 | O-RING | 2 | 05000-0066 |

*Other packing materials available. Consult factory for information.

| Item | Description | Qty. | Part No. | |
|------|----------------------|--------------------|------------|------------|
| 24 | BALL - 3/8" | 2 | 06000-0267 | |
| 25 | O-RING | 2 | 05000-0058 | |
| 26 | DISCHARGE VALVE BODY | 1 | 05013-6942 | |
| 27 | SUCTION VALVE BODY | 1 | 05013-6934 | |
| 28 | BLEED SCREW | 1 | 05013-1558 | |
| 29 | PIN | 2 | 001000-P | |
| 30 | HOUSING COVER | 1 | 05013-7136 | |
| 31 | WING NUT | 2 | 05000-5642 | |
| 32 | PUMP BASE | 1 | 05013-7142 | |
| 33 | SCREW, | 1/17HP SMALL MOTOR | 6 | 05000-5648 |
| | SOCKET HEAD | 1/6HP LARGE MOTOR | 8 | 05000-5648 |
| 34 | MOTOR COVER | 1/17HP SMALL MOTOR | 1 | 05013-7192 |
| | | 1/6HP LARGE MOTOR | 1 | 05013-7190 |
| 35 | FLAT WASHER | 1/17HP SMALL MOTOR | 2 | 007124-P |
| | | 1/6HP LARGE MOTOR | 4 | 007124-P |
| 36 | FLAT WASHER | 1/17HP SMALL MOTOR | 4 | 05000-6148 |
| 37 | LOCK WASHER | 1/17HP SMALL MOTOR | 4 | 05000-5836 |
| 38 | SCREW | 1/17HP SMALL MOTOR | 4 | 05000-1585 |
| | | 1/6HP LARGE MOTOR | 3 | 05000-5646 |
| 39 | SPRING | 1 | 10606 | |
| 40 | SPACER | 1/17HP SMALL MOTOR | 1 | 05013-7535 |
| | | 1/6HP LARGE MOTOR | 1 | 05013-7543 |
| 41 | PACKING COVER | 1 | 05013-7527 | |



Panel, Control Box & Stand Parts List

| Item | Description | Qty. | Part No. |
|------|---------------------------|--------------------|-----------------|
| 1 | SOLAR PANEL ASSEMBLY | 50 WATT | 06500-7285 |
| | | 80 WATT | 06500-7281 |
| | | 110 WATT | 06500-7283 |
| 2 | POST | 1 | 05013-7180 |
| 3 | QUAD-LEG ASSEMBLY | 1 | 06500-7342 |
| | SKID ASSEMBLY (NOT SHOWN) | 1 | 06500-7227 |
| 4 | BATTERY BOX | 1 | 05013-7255 |
| 5 | BATTERY | 1 | 06000-8429 |
| 6 | CONTROL MOUNTING PLATE | 1 | 05013-7269 |
| 7a | DIGIMAX ADC CONTROL | 1 | 06000-6385 |
| 7b | TIMER (DISCONTINUED) | 1 | 06000-8435 |
| 8 | CHARGER | FOR 50 WATT PANEL | 06000-8425 |
| | | FOR 80 WATT PANEL | 06000-8427 |
| | | FOR 110 WATT PANEL | CONSULT FACTORY |
| 9 | SCREW | 8 | 05000-1585 |
| 10 | NY-LOC NUT | 8 | 05000-2567 |
| 11 | SCREW | 4 | 05000-1841 |
| 12 | LOCK WASHER | 4 | 11018 |
| 13 | NUT | 4 | 05000-2104 |
| 14 | LOCK SCREW (NOT SHOWN) | 1 | 05000-2005 |
| 15 | STAKE (NOT SHOWN) | 4 | 06500-7418 |

Note: Wiring harnesses are included with Solar Panel Assemblies and Pump Assemblies. They may however be ordered separately. Consult factory for part numbers, prices and availability. AC Power Versions, Consult Catalog Section 6.3.