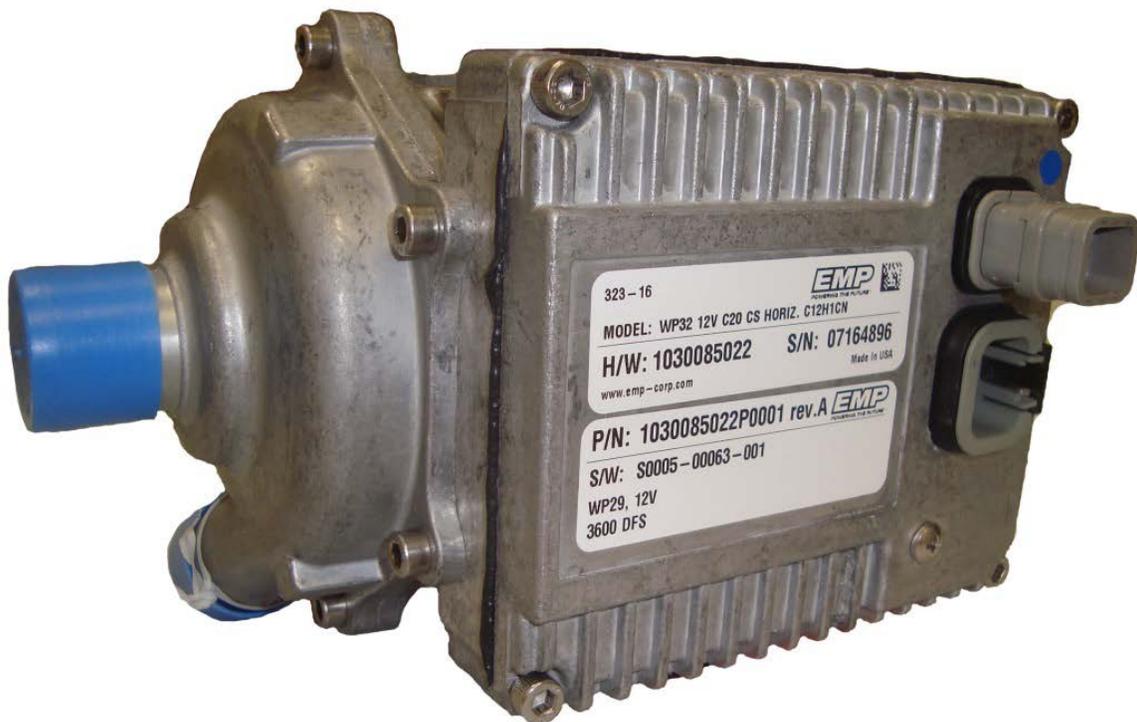




# Quick Start Guide

## WP29/WP32 Electric Water Pump



This Manual Is Effective For Consumer  
 Installations Of EMP WP29 And WP32 Water Pumps  
 OEM Installers Must Contact EMP For Production Requirements

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# Engineered Machined Products Inc.

2701 North 30<sup>th</sup> Street  
Escanaba, MI, USA 49829  
Phone: +1 (906) 789-7497  
[www.emp-corp.com](http://www.emp-corp.com)  
[Service@emp-corp.com](mailto:Service@emp-corp.com)

## Product Overview

The WP29 and WP32 are electrically powered fluid pumps available in 12 volt DC and 24V DC configurations. The pump is standard with carbon steel shafts. Proper installation of the pump will help ensure the performance and reliability of the electric pump while reducing the risk of damage to other components in the system.

The information contained in this manual is updated periodically. While great care is taken in compiling the information contained in this manual, Engineered Machined Products, Inc. cannot assume liability for losses of any nature arising from any errors and/or omissions.

The information and specifications contained throughout this manual are up to date at the time of publication. Engineered Machined Products, Inc. reserves the right to change the content of this manual at any time without notice.

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## Safety

### **Warnings, Cautions & Notes**

Three types of headings are used in this manual to stress your safety and safe operation of the system. They appear in the text as follows:

 **WARNING:** This symbol is used to make you aware of an unsafe condition, hazard, or practice that can result in personal injury or death.

 **CAUTION:** This symbol is used to alert you to a condition or practice that can cause damage to the system or the vehicle, or both.

**NOTE:** Is used to provide additional information that requires special attention by the technician.

### **Product Safety Warnings**

 **WARNING:** EMP cannot anticipate every possible circumstance that might involve a potential hazard. The safety messages in this document, in related manuals, and on the product are therefore not all inclusive. If a tool, procedure, work method, or operating technique that is not specifically recommended by EMP is used, you must satisfy yourself that it is safe for you and for others. You should ensure that the product will not be damaged or be made unsafe by the operation, maintenance, or repair procedures that you choose.

 **WARNING:** Ensure that all safety messages and information messages are read and understood before installation, maintenance, or any repairs are performed. The person servicing may be unfamiliar with many of the systems on the vehicle. It is important to use caution when service work is performed. Knowledge of the vehicle system and operation are important before the removal or disassembly of any component.

 **WARNING:** Make sure the equipment cannot move while being serviced. If on vehicle, ensure the vehicle is in neutral, the parking brake is set, and the wheels are blocked before doing any work or diagnostic procedures on the EMP component, system, or vehicle.

 **WARNING:** Disconnect the power supply, main negative battery cable, and/or switch off the battery disconnect switch before installation or servicing.

 **WARNING:** Use extreme caution when working on systems under pressure (i.e. coolant, hydraulic fluids, air, fire suppression, etc...)

 **WARNING:** Make sure the work area is ventilated and well lit.

 **WARNING:** Make sure charged fire extinguishers are in the work area.

 **WARNING:** Reinstall all safety guards, shields, and covers after servicing the equipment or vehicle.

 **WARNING:** Make sure all tools, parts, and service equipment are removed from the equipment, engine compartment, and/or vehicle after all work is done.

 **WARNING:** Ensure that all system power and ground connection points are properly secured. Improper attachments at any point of the equipment or vehicle system power and ground can result in loose connections which can damage electronic components on EMP components and systems and will void EMP warranty.

## Purpose

The purpose of this Quick Start Guide is to present information related to the pump's dimensions, electrical specifications, coolant guidelines, recommended plumbing, and routine maintenance.

**NOTE:** For production applications of this product, the full installation specifications must be met. Contact EMP to request documentation.

## Specifications

**Important Note:** Images do not represent acceptable mounting positions. They are for dimensional reference only.

### Dimensions

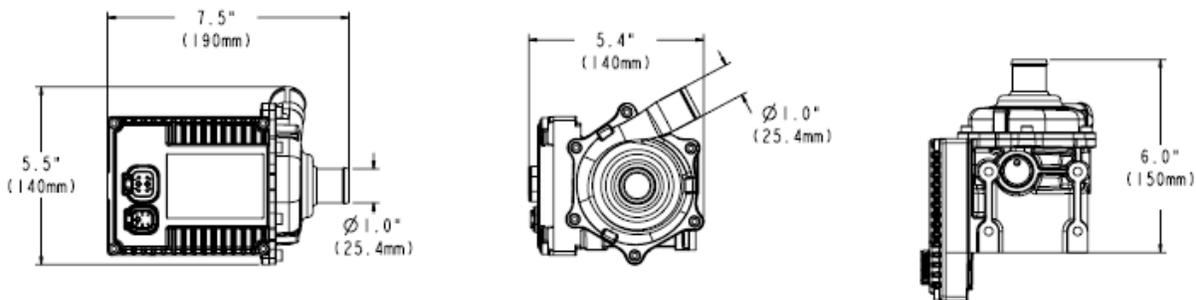


Figure 1

### Hole Locations/Bolt Spacing

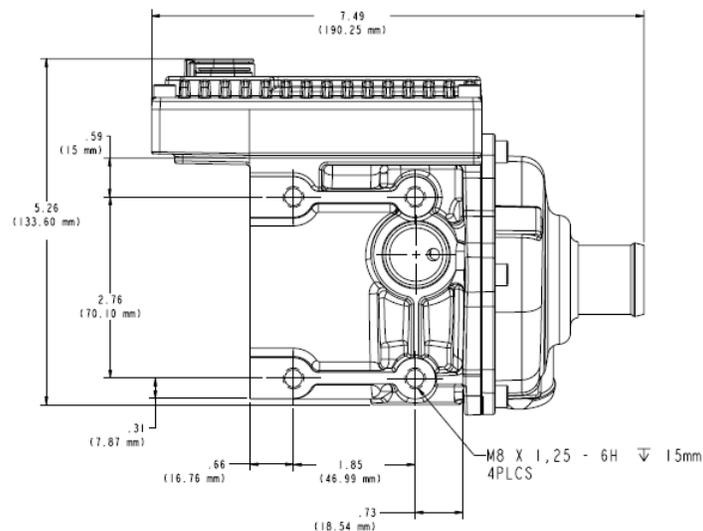


Figure 2

### Electrical

Table 1

Operating Voltage (DC)	Rated Output	Min	Max
12V Models	13.5V nominal	9V	16V
24V Models	27.0V nominal	18V	32V

**Identification**

The product identification labels are attached to the controller housing next to the electrical interface of the pump. The pump hardware part and serial numbers are located on the upper label. The lower label identifies the Programmed Assembly number and the associated control software as the pump leaves the manufacturing facility.



Figure 3

**Label Details**

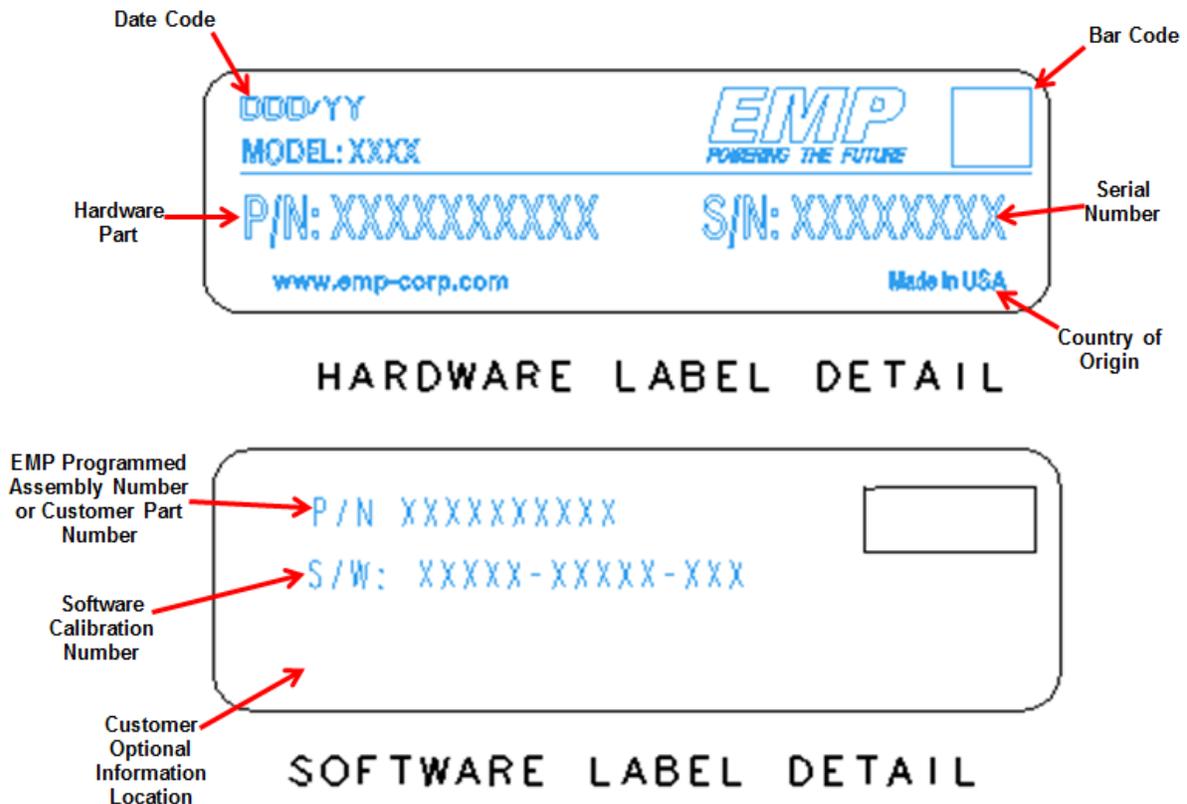


Figure 4

## Installation

### Proper Pump Orientation

For vertical, horizontal, and dual orientation specific pumps, orientations are tied to the individual pump part numbers. The part number includes the motor stator for the appropriate voltage, the controller circuit board, and the vent port configuration.

The Dual Orientation pumps cannot be mounted at any arbitrary angle (i.e. 45 degrees off axis) for a list of part numbers with dual orientation. Standard Service pumps can use either the Vertical or Horizontal Orientations for list of part numbers with vertical and horizontal orientations.

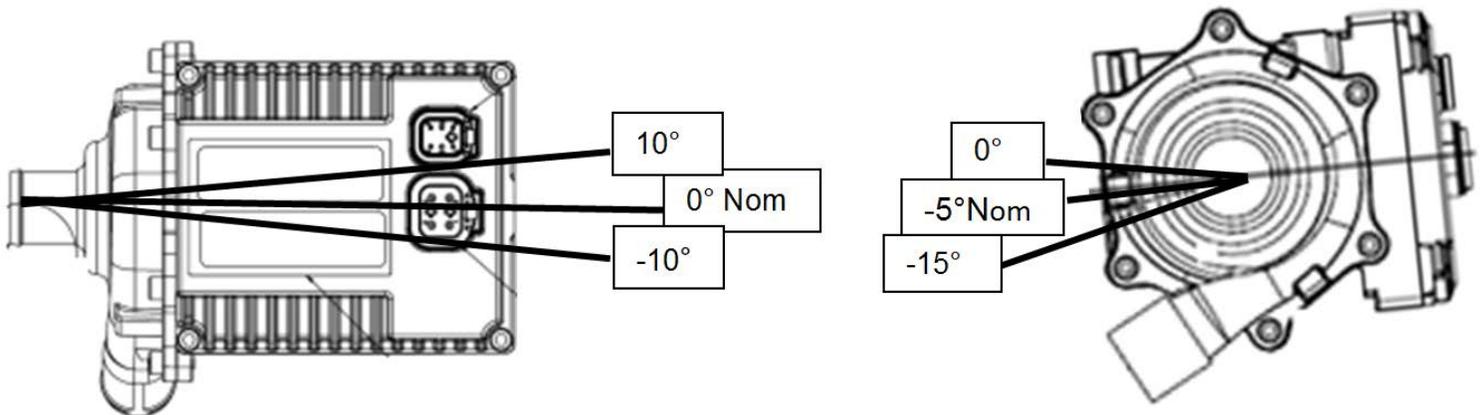


Figure 5 - Vertical Pump Orientation – (Pump is shown at -5 degrees nominal angle)

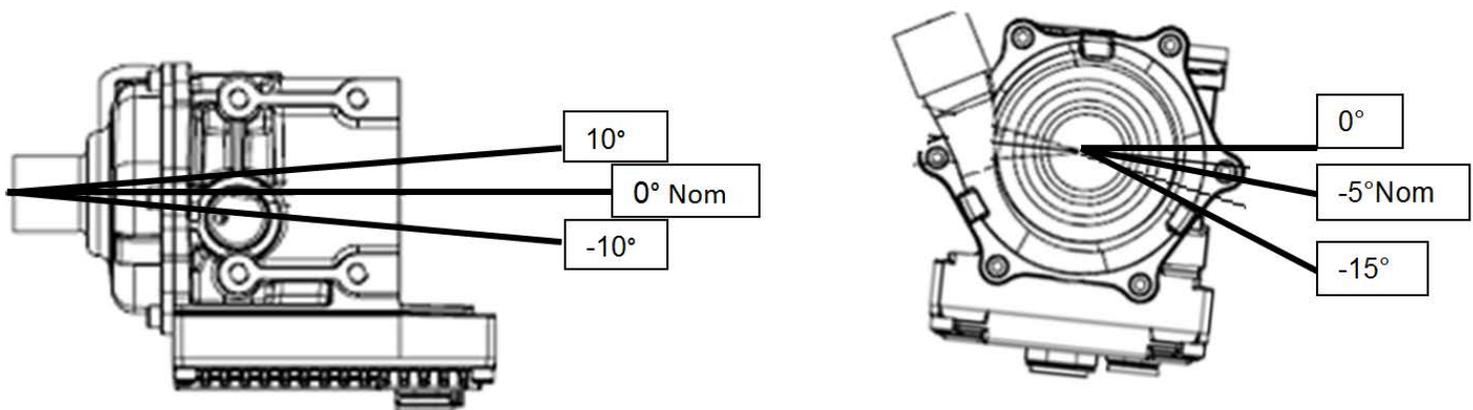
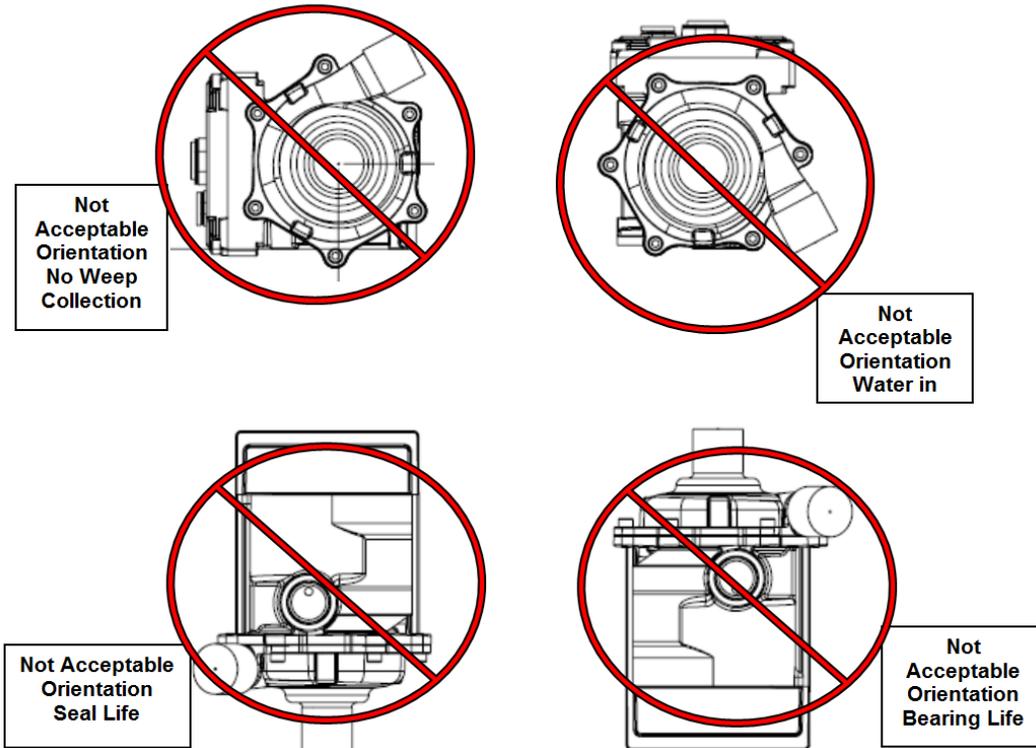


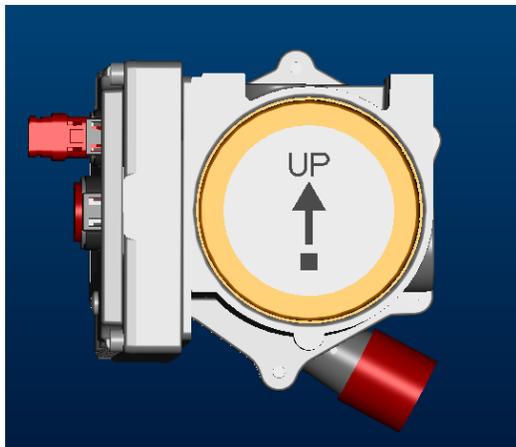
Figure 6 - Horizontal Pump Orientation – (Pump is shown at -5 degrees nominal angle)

**Incorrect Pump Orientation and Reasons**

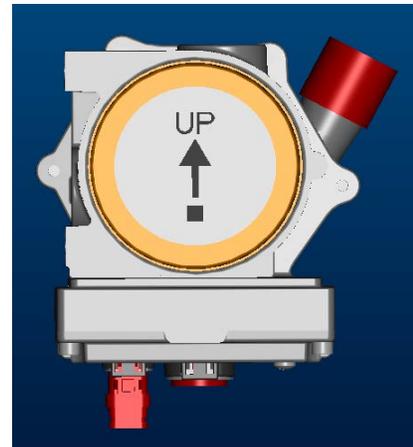
The WP29 and WP32 contain a mechanical seal; 0.1cubic centimeters per hour may weep past the seal as a part of normal operation. To properly collect the weepage pump orientation is important. Too steep of an angle will not allow the fluid to collect in the weep pocket and evaporate off and the pump may appear to be leaking when in fact it is operating as designed. An incorrect mounting angle may also result in too much fluid being retained in the weep pocket resulting in bearing contamination and reduced service life. See Figure 7 for incorrect pump orientation and reasons. The WP29 and WP32 are marked with orientation labels. (See Figure 8 and Figure 9 below).



**Figure 7 - Incorrect Pump Orientation and Reasons**



**Figure 8 - Vertical Pump Orientation Label**



**Figure 9 - Horizontal Pump Orientation Label**

### Recommended Plumbing

Pump Inlet must be plumbed using 25mm (1.0 inch) diameter hose and/or thin walled tubing from the fluid supply to the pump inlet.

A restriction in the inlet plumbing is allowed as long as the flow diameter is not less than 17mm (0.75 inch) and does not exceed 25mm (1.0 inch) in length.

**CAUTION:** Localized high spots in the plumbing will cause air to be trapped in the pump causing the pump to be air locked. The result of air trapped in the pump is loss of prime and no fluid moving resulting in water seal damage or potential system component damage.

**CAUTION:** EMP warranty does not cover seal damage due to low lubrication.

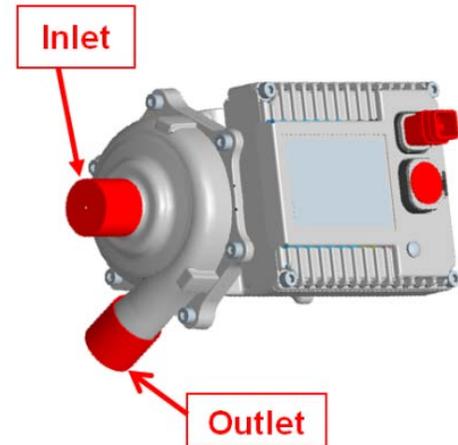


Figure 10

### Hose Clamps

When making the inlet and outlet hose connections to the pump it is strongly recommended to use SAE20CT worm drive type hose clamps. Torque worm drive clamps to 45 in-lbs per SAE J1508. Spring type clamps are not recommended.

### Pump Mounting

#### Mounting Screws

Mounting screws used should be M8 x 1.25 screws (quantity = 4). These must have a minimum thread engagement of 0.50 inch (12.7 mm) and be tightened to a torque of 15 ft-lb (20N-m).

**CAUTION:** The mounting holes are tapped to a depth of 0.59 inches (15mm). Be aware of the bracket thickness when selecting the fastener length to ensure that the fastener will not bottom out in the pump housing.

#### Bracket Mounting

- Hard Mount pump on a solid bracket
- Bracket material should be .187 inch minimum thickness
- Bracket natural frequency must be above 150 Hz with pump mounted.
- Bracket should shield weep holes if possible
- Locate the pump away from external heat sources and direct road spray

**CAUTION:** Using isolators may cause pump damage. If using the isolators, it is the installer's responsibility to Verify isolator size for pump weight and operating conditions with isolator vendor to ensure correct isolator.

**Electrical**

**Connector Pin-outs**

1 – CANH  
2 – CAN SHIELD  
3 – SERIAL GND  
4 – SERIAL TX  
5 – SERIAL RX  
6 – CANL

1 – TEMP INPUT OR CAN ADDRESS  
2 – GND  
3 – BATT  
4 – IGNITION

**NOTE:** These represent the controller connectors – not the mating harness connectors.

**NOTE:** Addressing and motor status message information can be found in our J1939 Motor Control Document, 9980001068

**Figure 11 - Controller Connectors**

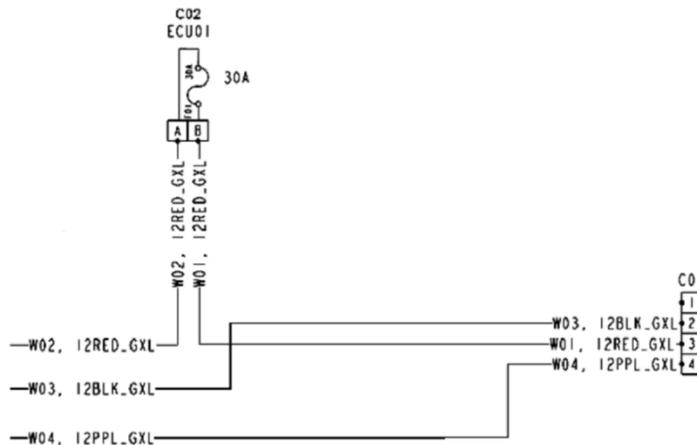
**Mating Connectors**

The mating connectors and pins are available from your EMP distributor in kit 1370001077 for the 6 pin and 1370001078 for the 4 pin connector.

**Table 2**

6 Pin Connector Deutsch Part Numbers		4 Pin Connector Deutsch Part Numbers	
Description	Part Number	Description	Part Number
Socket Pins	0462-201-20141	Socket Pins	0462-203-12141
Connector Body	DTM06-6S	Connector Body	DTP06-4S
Wedge Lock	WM-6S	Wedge lock	WP-4S
Plugs	0413-204-2005	Plugs	114017

**NOTE:** If CAN or Serial TTL control is not used the 6 pin DTM connector must be blocked off to prevent entry of water or dirt which will result in damage to the pump. A block off plug is supplied with the pump.



**Figure 12 - Sample Wiring Schematic – Harness 3170001029 is available for purchase**

**Ignition Input**

Pin 4 on the 4-pin connector is used for ignition. This should be tied to a switched power supply, separate from the power and ground pins.

The ignition input must be used to turn the pump “on” and “off”. This is to ensure that the fault code history and warranty data is captured in the pump’s memory.

**Table 3 - Vehicle Ignition Parameters**

Vehicle Ignition Parameters	
V <sub>in</sub> Limits	9V minimum
	32V maximum
V <sub>in</sub> Nominal	13.5V (12V system)
	27V (24V system)
Ignition Current	2.5mA @13.5V
	4mA @ 27V

**Wire Sizing**

- For complete connector body sealing the ignition wire should be 16ga minimum and the power and ground wires should be 12ga minimum.
- Wire jacket diameter must be compatible with seal requirements.

**Recommended Wiring Practices**

- Wiring or electrical harness must not rub on sharp edges.
- The electrical harness should not be stressed at connections. Wires pulling on connectors can compromise the connector body seal and possibly create a water intrusion event.
- The voltage drop between the battery and the pump should not exceed 5% of the rated battery voltage. This should be verified at the pump’s maximum current draw. Wiring or electrical harness must not rub or make contact with a hot surface. There should be 5" minimum clearance from the exhaust.
- Wiring or electrical harness should be supported at least every 18" to 20".
- To avoid possible fire or shock, do not pinch any wiring or electrical harnesses.
- Incorporate Drip Loops into wiring designs. The pump connectors are environmentally sealed. However, good wire management can help ensure a good seal over the life of the product. Drip loops collect water and shed it away from connector.
- The use of Dielectric Grease such as Dow Corning DC-4 is acceptable as long as the connection is mated directly after grease application to prevent dirt from being captured by the grease.

## Fluids

### Approved Coolants

Based on field testing and experience, the WP29/WP32 is compatible with the following coolant types:

1. Ethylene Glycol
2. HOAT ( Hybrid Organic Acid Technology)
3. OAT (Organic Acid Technology)
4. Propylene Glycol

**NOTE:** Use distilled water to dilute coolant or use pre-mix coolant.

### Supplementary Coolant Additives (SCA)

Coolant additives are allowed with the WP29/WP32 water pump. The additive must be compatible with the base coolant and all contact surfaces of the pump. The additive concentration must be within the additive manufacturer's specification. Damage to the pump or the system will not be warranted if the additive is not compatible with the base coolant or the concentration is outside manufacturer recommendations.

 **CAUTION:** Use of "Stop Leak" style system additives is not approved.

 **CAUTION:** Mixing of coolants can cause problems with the cooling system. Fluids can interact resulting in damage to the cooling system and pump.

### Coolant Fill Procedure

Each time the cooling system is drained, caution must be taken to ensure the system is refilled properly to prevent running the pump in a dry state.

1. Install pump and piping according to installation instructions.
2. Ensure flow path is open through the entire system.
3. Fill the system with coolant such that the pump is filled with coolant and there is coolant without air pockets in the piping leading to the pump.
4. Run the pump at high speed, ensuring coolant levels are topped off as air is pushed out of the system. Do not allow the pump coolant supply to become empty.
5. Verify coolant flow in the surge tank or heat exchanger to ensure pump operation. If no flow is detected, turn the pump off and evacuate system air.

 **CAUTION:** Do not run the pump without fluid present. If run dry even for a short period the seal will be damaged.

 **CAUTION:** Pump may start running upon connection of power, ground and ignition. Do not make electrical connections until pump and system are filled with coolant.

**Routine Maintenance Schedule**

Frequency	Action
When checking/filling vehicle fluids	Ensure fluid levels are correct. Low coolant can cause a pump seal failure.
Every engine oil change	Inspect cooling system for leaks. Sample coolant and check to ensure coolant meets minimum coolant quality requirements. Before removing the pump, evaluate the leak using the methods outlined in the physical inspection of this document.
Every three months or more often if conditions are harsh*	Visually inspect exterior of pump and ensure weep holes are not clogged by debris. Check wires for wear or frayed insulation. Ensure all electrical connections are tight.
Annually+	Ensure connections are tightened to proper torque rating. Ensure all wires and pin connections are intact. Inspect support structure for any damage or loose hardware.

+ Inspections should also be conducted after any service to the unit.

**EMPower Connect™ Service Tool**

Monitoring operation and manual control of the pump can be accomplished using the service tool EMPower Connect™ which is part of the EMP Service Suite available at no cost on our website: <http://www.emp-corp.com/support/downloads/>

To use EMPower Connect™, download and install the Service Suite software on your Windows PC. An interface device will be needed between the computer and the pump. If the pump is being run without J1939 CAN, use an interface cable from the 6 pin Deutsch connector on the pump and an EMP USB/TTL converter. The harness and converter are available as a kit (P/N 7500038001). If the pump is on a J1939 CAN bus EMPower Connect™ can be connected using an RP1210 compatible Data Link Adapter (DLA) to interface to the CAN bus.

## Troubleshooting

Symptom	Check
Pump not running.	<ul style="list-style-type: none"><li>• Check electrical connections</li><li>• Check ignition wire</li><li>• Check if ignition wire is “on”</li><li>• Verify pin location</li></ul>
Pump is running but not pumping fluid.	<ul style="list-style-type: none"><li>• Check system fluid level</li><li>• Check for tubing restrictions (kinks)</li><li>• Make sure pump is primed</li><li>• Check for collapsed inlet or outlet hose</li><li>• Check pump inlet for trapped debris</li></ul>
No CAN communication and/or pump not responding to CAN commands.	<ul style="list-style-type: none"><li>• Check communication harness wiring.</li><li>• Verify that the proper component CAN address is being used.</li><li>• Verify that CAN messages are being transmitted in the proper formats (Contact EMP Technical Support for CAN message details).</li></ul>
Pump is leaking excessively while running.	Replace pump. No action is required by customers for pumps exhibiting acceptable leakage as described

## Technical Help

If your questions are not answered in this guide, contact EMP Customer Service for technical help via email at [service@emp-corp.com](mailto:service@emp-corp.com). Provide the serial number of the pump you are working with.