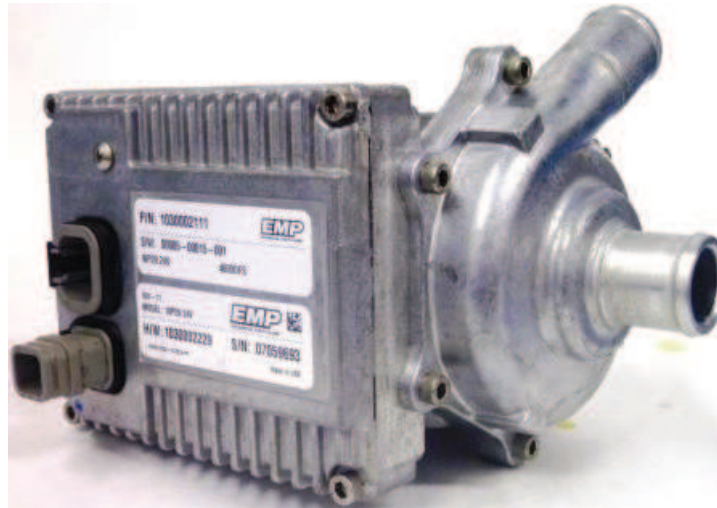




Installation Manual E2512A & WP29 Electric Water Pump



This installation manual is effective for aftermarket installations
Of the following part and serial numbers:

Part Number
1030002xxx

Serial Number(s)
All



The information contained in this manual is updated periodically. While great care is taken in compiling the information contained in this manual, EMP 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. EMP reserves the right to change the content of this manual at anytime 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 WP29. 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 WP29 OR THE VEHICLE, OR BOTH.


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


Product Safety Warnings


 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 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.

 Ensure that all safety message and information messages are read and understood before installation, maintenance, or any repairs are performed. The person who services the product may be unfamiliar with many of the systems on the product. 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.


 Make sure the vehicle is in neutral, the parking brake is set, and the wheels are blocked before doing any work or diagnostic procedures on the WP29 or vehicle.


 Disconnect the main negative battery cable and/or switch the battery disconnect switch to the OFF position first before installation or servicing.


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


 Make sure the work area is ventilated and well lit.

 Make sure charged fire extinguishers are in the work area.

 Reinstall all safety guards, shields, and covers after servicing the vehicle.

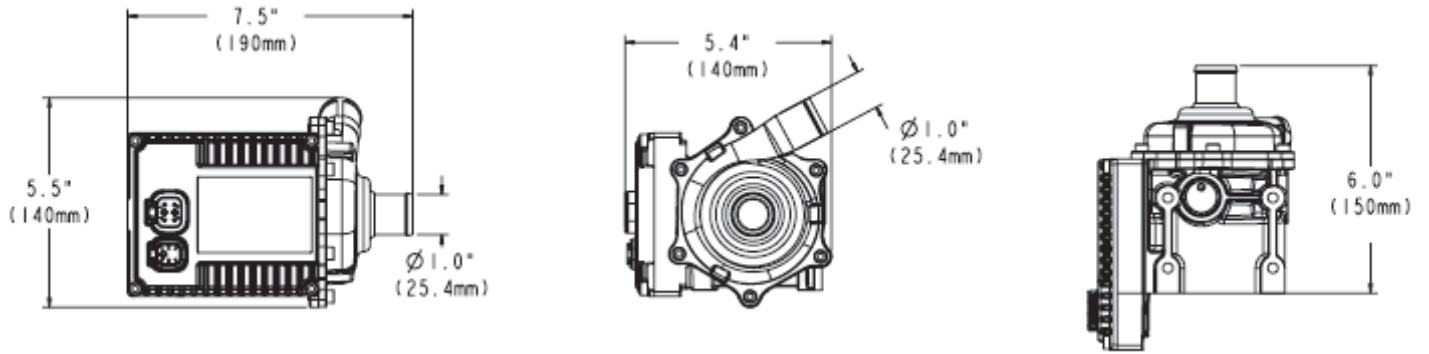
 Make sure all tools, parts, and service equipment are removed from the engine compartment and vehicle after all work is done.

 Do not apply power to the pump without fluid since most pumps are programmed to start when power is applied and the pump seal will be damaged if run dry.

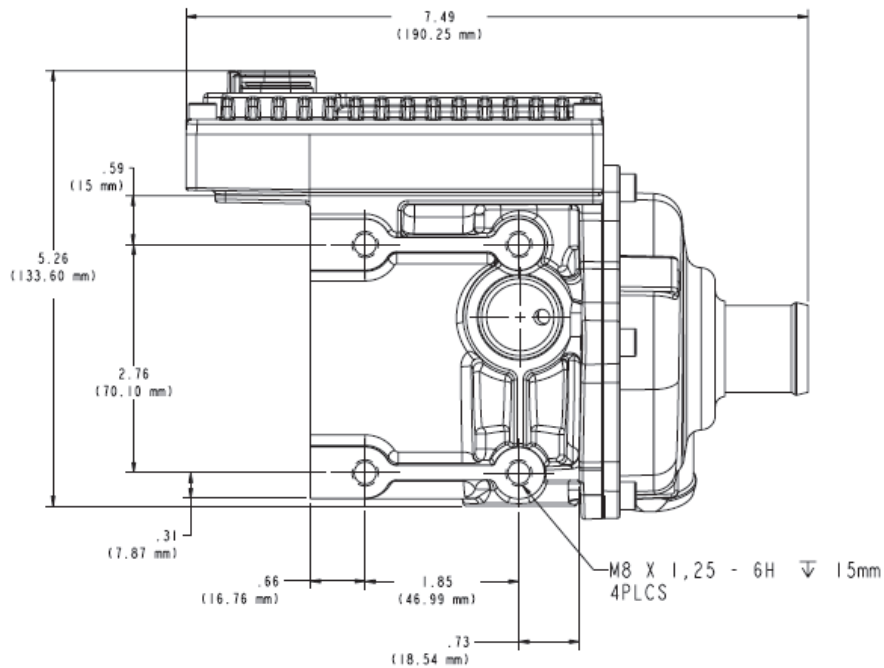
 If CAN or Serial TTL control is not used the 6 pin DTM connector must be blocked off to prevent entry of water or dirt which will result in damage to the pump. A block-off plug is supplied with this pump for use when this connector is not used (traditional on/off control wiring configuration).

Specifications

Dimensions



Hole Locations/Bolt Spacing



Mounting Screws

The pump should be fixed to a solid surface using 4, M8 x 1.25 screws. These must have a minimum thread engagement of ½ inch (12.7 mm) and be tightened to a torque of **15 lb-ft (20N-m)**.

Material Listing of Major External and Fluid Contacting Parts

Item	Quantity	Description	Material	Fluid Contact
1	1	Cover	Cast Aluminum (413)	
2	1	Housings	Cast Aluminum (413)	YES
3	10	Bolt	18 – 8 Stainless Steel	
4	1	Volute	Cast Aluminum (413)	YES
5	1	Impeller (Internal)	304 Stainless Steel	YES
6	1	Shaft	1020 Carbon Steel	YES
7	1	Product Label	M - 714	
8	2	Connector	Dupont Zytel Nylon 70G33L	

Note:

316 Stainless Steel Shafts are offered as an option on EMP WP29 Pumps. Contact customer service for P/N information.

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 70 +/-10 in lbs. Spring type clamps are not recommended.

Identification

- The pump voltage (12V or 24V) is identified with the attached label. The pump serial number is located on the label attached to the housing of the pump. (See below.)

Part Information Location

The label containing the part information is located on the outside surface of the pump.

Label Details

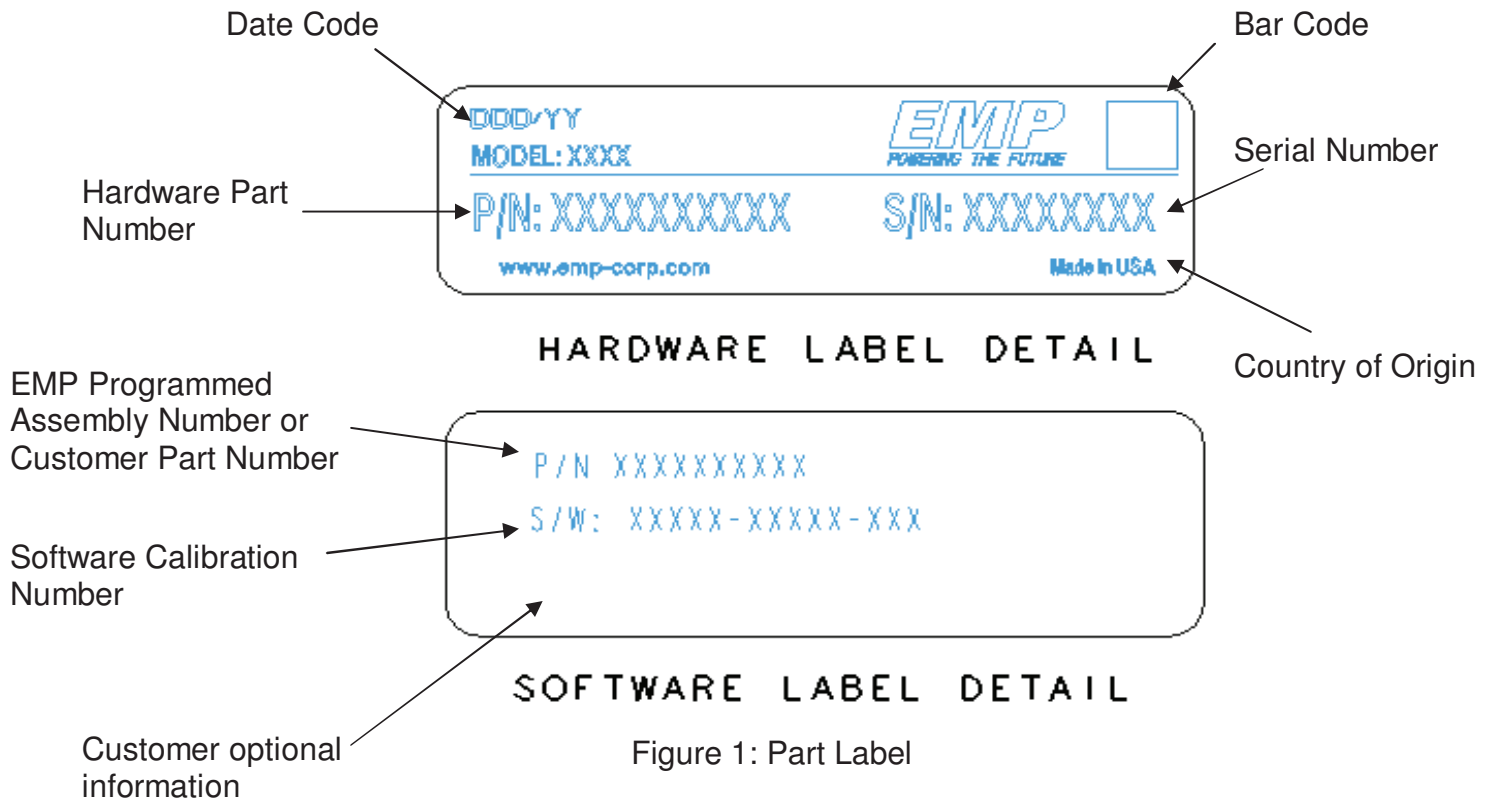


Figure 1: Part Label

Operating Range

Table 1: Operating Range

Maximum Operating Speed (12V)	4600	RPM	Maximum Operating Speed (24V)	4600	RPM
Minimum Operating Speed (12V)	750	RPM	Minimum Operating Speed (24V)	750	RPM

Rated Environmental Conditions

Table 2: Environmental Conditions

Maximum Operating Temp	203°F (95°C)
Minimum Operating Temp	-40°F (-40°C)
Maximum Storage Temp	257°F (125°C)
Minimum Storage Temp	-40°F (-40°C)
Pressure Wash	1740 PSI

Note:
 If Controller Operating Temp exceeds 266f (130c) the pump will shut off and stay off until the temperature drops to 257°F (125°C)

Coolant Recommendation

Based on our testing and field experience we know that our seals function well with traditional silicate (ethylene glycol) and HOAT (hybrid organic acid technology) coolants. We also have a lot of experience with OAT; however this is the one coolant type that can present issues with face filming. This does not imply that our seals will not function with this coolant but we do see more returns due to filming than for other coolant types.

One additional point to be aware of is the use of SCA's (supplementary coolant additives). There are many types of these available and they are a big unknown. If the seal is going to be exposed to one of these products then EMP must approve the application or warranty may be void.

Contact customer service to verify coolants not listed above are compatible with pump components and complete an application approval form. When using coolant that is not approved without completing the application approval form the warranty will be void.

Electrical Specifications

Vehicle Battery Parameters

12V Pump				
Parameter	Min	Nom	Max	Units
Vin – Operating	9.0	13.5	16	V
Operating current	-	-	25 ⁽¹⁾⁽²⁾	A
Ignition off current	-	-	300	μA
Motor off current	-	80	-	mA
Inrush current	-	-	205 ⁽³⁾	A
Inrush current duration	-	-	270	μS
24V Pump				
Parameter	Min	Nom	Max	Units
Vin – Operating	18	27.0	32	V
Operating current	-	-	15 ⁽¹⁾⁽²⁾	A
Ignition off current	-	-	300	μA
Motor off current	-	60	-	mA
Inrush current	-	-	370 ⁽³⁾	A
Inrush current duration	-	-	250	μS

(1): Peak current is based on the software current limit. 25 amps is the standard current limit for a 12V pump and 15 amps is the standard current limit for a 24V pump for serial numbers > 07065826.

(2): The pump shuts down when the internal controller temperatures reaches 130°C at this point the pump will stop running until the internal controller temperature drops below 125c. Once the safe value is reached, the pump will restart. No ignition cycle is required to restart the pump.

(3): The inrush current occurs when the controller first receives the required voltage on the ignition pin. This current inrush is due to the charging of the bulk capacitors in the controller. The inrush current numbers are worst case. They were measured with a battery as the source with a harness that was 3ft in length (very low source impedance). Anything done in the application to increase the source impedance will have a significant (downward) impact on these numbers. This current is not generated every time the motor is started, but only when the ignition line is first applied.

Vehicle Ignition Parameters

Parameter	Min	Nom	Max	Unit
Vin	9	13.5 or 27	32	V
IGN Current (13.5v)	-	2.5	-	mA
IGN Current (27.5v)	-	4	-	mA
Vin – Low (sleep)	-50	0	1	V

Parts List

The following connector kits are available for WP29 connections.

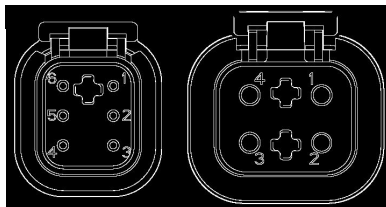
1370001077 – DTM Connector 6 Pin Service Parts Kit

1370001078 – DTP Connector 4 Pin Service parts Kit

Drawings for wiring kits can be found at <http://www.emp-corp.com/support/documents/> and by entering the appropriate part number in the “Enter Text to Search” field.

Schematics

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



- 1 – NOT USED ON STANDARD WP29, TEMP INPUT ON WP29 WITH CM20 BRD
- 2 – GND
- 3 – BATT
- 4 – IGNITION

Note – These represent the controller connectors – not the mating harness connectors.

Figure 2 Controller connectors

! 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 EMP P/N 3250001030 can be purchased or one can be fabricated from the Deutsch parts listed in the table

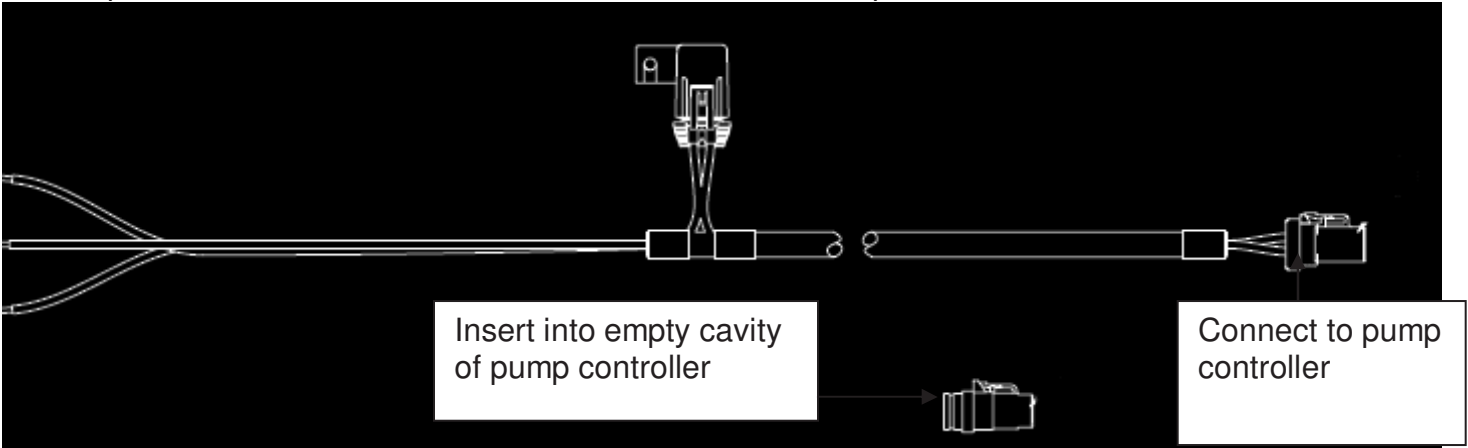


Figure 3 On/Off Wire harness p/n 1370005038

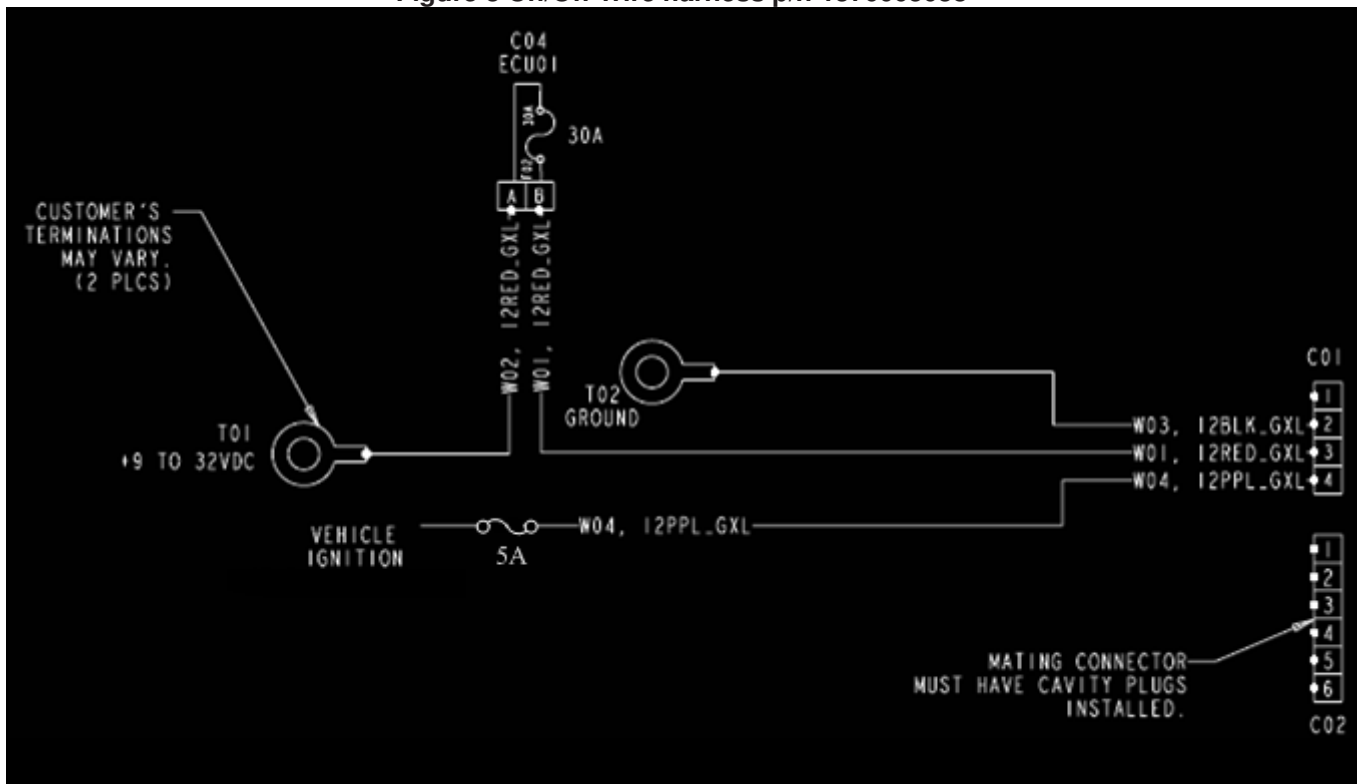


Figure 4: Wiring Schematic

Controller Connectors

- The pump controller has two connectors: a four-cavity connector for power, ground and ignition and a six-cavity connector for use only when the pump is operating via CAN communication. The 6 pin Deutsch DTM connector must be blocked off if CAN or serial control is not used.
- The connector terminals are greased with dielectric grease. Dow Corning DC-4 dielectric grease is recommended.
- If it becomes necessary to un-mate the connectors, clean the terminals and re-apply dielectric grease before re-mating.
- Gold-plated terminals should be used in the mating connectors including power and ground.

Wire Connections

CAUTION:

- The 6 pin Deutsch DTM connector must be blocked off if CAN or Serial control is not used.
- Wiring and electrical harness must not rub on a sharp edge.
- Wiring and electrical harness must not make contact with a hot surface. There should be 5" minimum clearance from extreme heat such as the exhaust.
- Wiring and electrical harness should be supported at least every 18" to 20".
- Do not pinch any wiring or electrical harnesses.
- See the online Technical documentation or call EMP Technical Support for detailed information about CAN and Serial implementation and messaging.

Follow the Schematic in this Manual for proper installation of the wiring kit. If installing without the wiring kit:

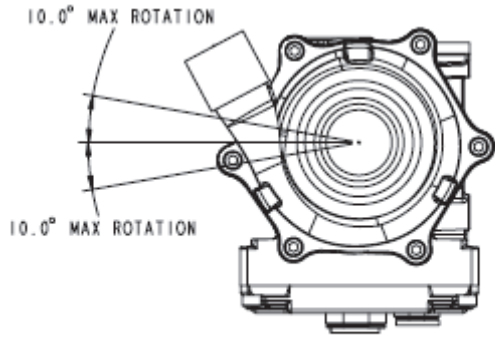
1. Run a 12 AWG wire from cavity 3 of the 4-way Deutsch connector on the pump controller to a battery feed with a 30A fuse.
2. Run a 12 AWG wire from cavity 2 of the 4-way Deutsch connector on the pump controller to a good ground.
3. Run a wire from cavity 4 of the 4-way Deutsch connector on the pump controller to a 5 amp fused ignition source or 5 amp fused switch depending on desired operation (see wiring diagram).
4. Put a cavity plug in cavity 1 of the 4-way Deutsch connector on the pump controller.
5. Insert 4-way Deutsch connector into the pump controller.
6. Put cavity plugs in all 6 cavities of the 6-way Deutsch connector, install the wedge lock in the mating side of the connector and insert into 6 pin cavity on pump controller.

Controlling Pump with CAN

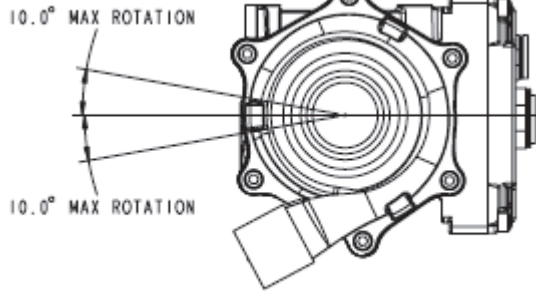
- Pump speed can be controlled and status information is available through the CAN interface. Address information and structure of the CAN Command and Status messages can be found on the EMP website under support/product documentation section.
- If CAN communication is lost pump reverts to programmed DFS (default speed)
- In the absence of CAN the pump will run at DFS

Installation

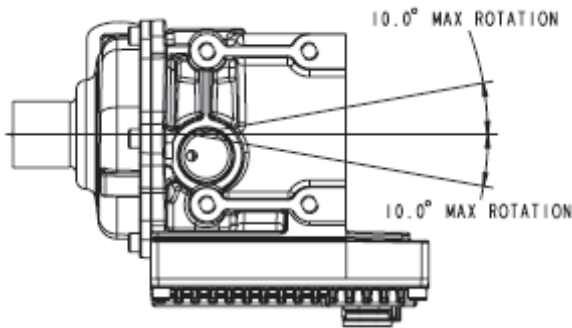
Pump Orientation



**Preferred Orientation
(View From Front of Pump)**



Acceptable Orientation

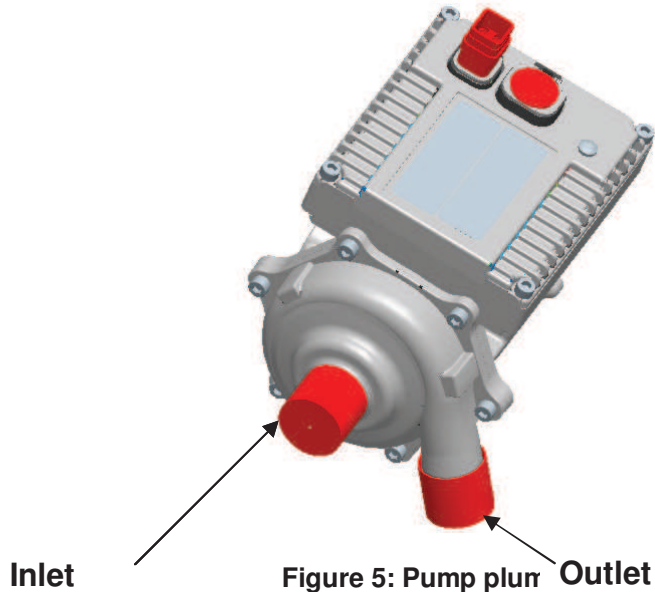


HORIZONTAL LIMITS

Plumbing

⚠ CAUTION:

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



Plumbing Requirements

Pump inlet must be free from restrictions and blockages to prevent cavitation.

Pump Inlet must be plumbed using 1.0”Dia. hose or thin walled tubing.

- **Up to 1” length of 0.75” dia is permissible**

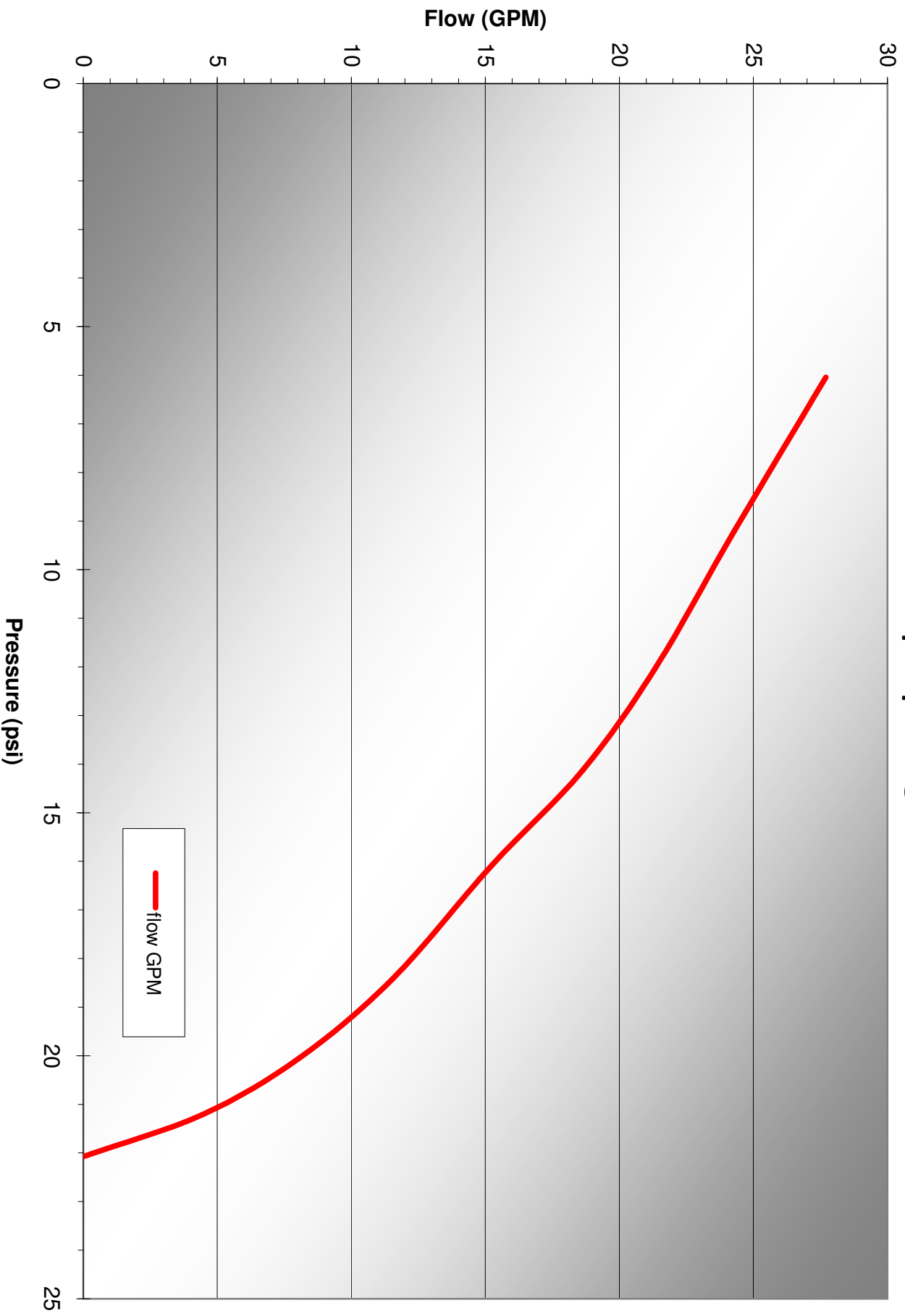
Deviations from this requirement must be approved by EMP

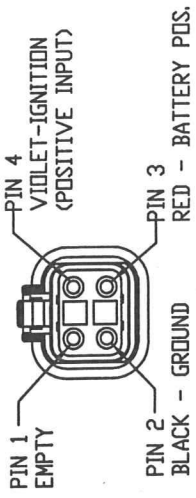
- **Please contact EMP customer service for application review**
- **Warranty is void without application approval**

Troubleshooting

Symptom	Check
Pump not running.	<ul style="list-style-type: none"> • Check electrical connections • Check ignition wire • Check if ignition wire is "on" • Verify pin location
Not pumping fluid.	<ul style="list-style-type: none"> • Check system fluid level • Check for tubing restrictions (kinks) • Make sure pump is primed • Check for collapsed inlet or outlet hose • Check pump inlet for trapped debris
CAN not operating properly	<ul style="list-style-type: none"> • Check communication harness wiring. • Verify that CAN messages are being transmitted in the proper formats (see online Technical Guide or contact EMP Technical Support for CAN message details). • Verify that the proper component CAN address is being used.

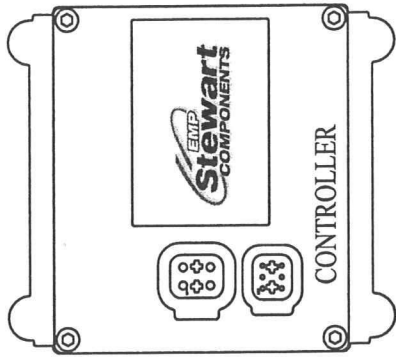
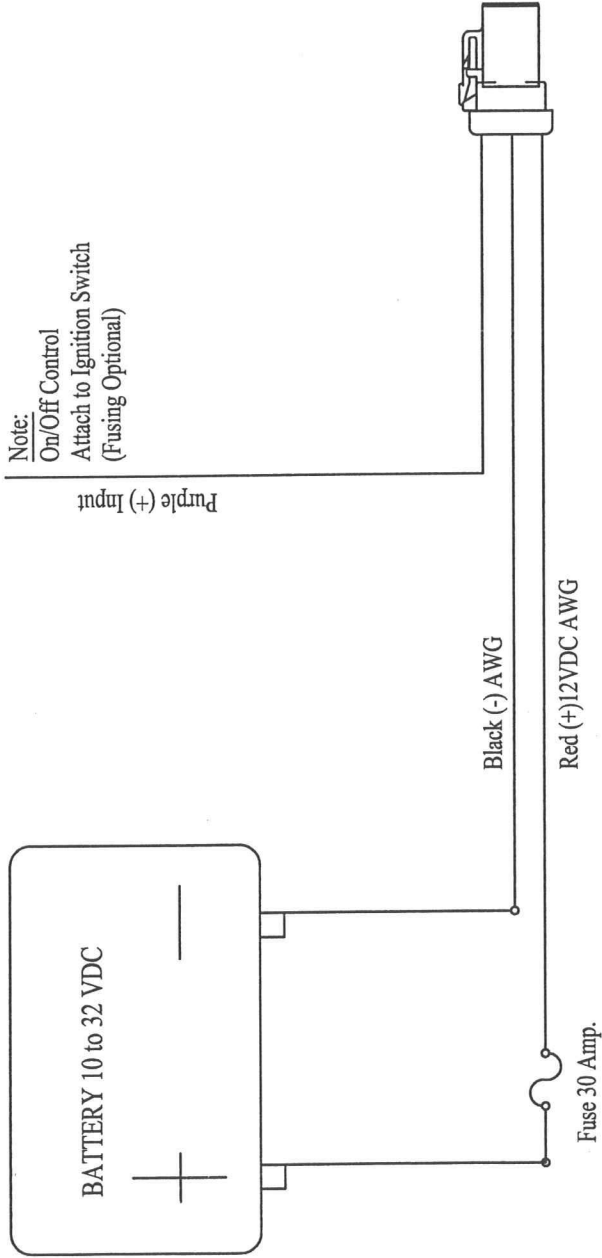
WP29 (PN 1030002xxx)
Flow rate vs pump rise @ 12vdc





CONNECTOR C01 PIN-OUT
(FRONT VIEW)

Note:
On/Off Control
Attach to Ignition Switch
(Fusing Optional)



Note: DO NOT RUN PUMP DRY.

WIRING

- Red: Attach to Positive (+) side of battery.
- Black: Attach to Neg (-) side of battery.
- Purple: Attach to Positive (+) Ignition Switch.



EMP Stewart COMPONENTS		VIRE DIAGRAM	
REV	DATE	BY	CHK
1			
EMP Stewart COMPONENTS		VIRE DIAGRAM	
REV	DATE	BY	CHK
1			