

## Upgrading a FE Petro Pump to a Variable Speed Four Horsepower

FE Petro's Intelligent Submersible Turbine (IST VS4) incorporates a 4HP Variable Speed motor (PMA VS4) and a Variable Frequency Controller (*MagVFC*) that varies the speed of the motor. The *MagVFC* maintains a constant pressure in the piping system, providing a constant flow to the nozzles, based on the initial setup of the *MagVFC*. This feature, coupled with others of the *MagVFC* (dry run protection, for example) encourages current standard submersible turbine owners to upgrade their units. This bulletin aids in the upgrade process of a FE Petro submersible to a four horsepower variable speed turbine.

**Note:** Always consult the STP/IST Fixed and VL *Installation and Owner's Manual* for additional information and warnings. The PMA VS4, incorporated in this kit, can only be electrically connected to a *MagVFC*. Unlike FE Petro's standard pumps, the variable speed PMA VS4 cannot be interchanged with competitive models. The *MagVFC*, included in this kit, can only be paired with another *MagVFC* for Master/Slave and Alternating Circuit configurations.

### Service Station Requirements

200 - 250VAC, 3 phase, 50 or 60 Hz power

### Electrical Requirements

*MagVFC* Incoming Line Draw = 20 amps Amps maximum (typical 30A service)

PMA VS4 Motor Draw = 15 amps maximum at full load

PMA VS4 Lead-To-Lead Winding Resistance = 1.2 ohms Ohms +/-5%

### Parts Requirements

Part Number	Description
PMA VS4	Variable Speed, 4HP Pump Motor Assembly
<i>MagVFC</i>	Variable Frequency Controller
400236903	Plug, Contractors 4-wire

To order the required parts, specify either the:

402671901 PMA VS4 Conversion Kit (standard)

402671905 PMA AG VS4 Conversion Kit (alcohol gasoline)

402671906 PMA AG MVS4 Conversion Kit (alcohol gasoline, *MagShell*)

**Warning:** Highly flammable vapors or liquids may be present in the environment in which this equipment is installed or serviced. Installing or working on this equipment means working in an environment that presents risks of severe injury or death if instructions and standard industry practices are not followed. Follow all applicable codes governing the installation and servicing of this product and the entire system. Always lock out and tag electrical circuit breakers while installing or servicing this equipment and related equipment. Refer to the *Installation and Owner's Manual* of this equipment and related equipment for complete installation and safety information.

### Procedure

1. Shut off the power at the load center, and lock out and tag the circuit breakers. Pull extractable section out from the STP/IST Manifold and remove the Pump Motor Assembly (PMA).
2. Attach a PMA VS4 (Variable Speed, 4HP Pump Motor Assembly) to the extractable section of the STP/IST and reinstall it into the STP/IST manifold.

**Note:** By upgrading to a PMA VS4, the amount of clearance from the bottom of the tank is modified. The amount of change in bottom clearance is determined by what horsepower PMA you are removing from service, the difference in length of the PMA VS4 and the length of the PMA that is being removed. If the net change in the bottom clearance is not acceptable, a Variable Length Extractable Section can be used to obtain the desired bottom clearance. Refer to the following table to determine the amount clearance has been changed by.

<b>PMA being removed</b>	<b>Net change when installing a PMA VS4</b>
¾ horsepower (PMA 75)	6 ¾" closer to the bottom
1 ½ horsepower (PMA 150)	4" closer to the bottom
1 ½ horsepower High Pressure (PMA H150)	3 ¼" closer to the bottom
2 horsepower (PMA 200)	1 ¼" closer to the bottom
2 horsepower High Pressure (PMA H200)	½" closer to the bottom
2 horsepower Variable Speed (PMA VS2)	5" closer to the bottom

3. Mount the *MagVFC* to the wall in the service station. Refer to the *MagVFC Installation and Owner's Manual* for proper mounting instructions.
4. *If you are using an IST or STP VS2 model submersible turbine pump, proceed to Step 6 because these models already utilize three power wires and one ground wire from the MagVFC to the Junction Box in the Pump and they do not incorporate a capacitor in the junction box.* Pull three power wires and one ground wire (wire sized per local, state, and federal requirements) from the *MagVFC* to the Junction Box in the Pump.
 

**Note:** A standard STP uses a 3-wire contractors plug at the inlet to the junction box. The *MagVFC* has a 3-phase power output and a ground connection; therefore, it requires a 4-wire contractors plug at the inlet to the Junction Box as detailed in the "Parts Required" section. Remove the existing 3-wire contractors plug and insert the new 4-wire plug.
5. Remove the capacitor from the Junction box. The *MagVFC* now delivers true 3-phase power to the pump, so no capacitor is required in the pump Junction Box.
6. Wire the pump and *MagVFC* per the installation instructions provided with the *MagVFC*.
7. Set the gallons per minute, pipe compensation, and other settings per the installation instructions provided with the IST-VFC.

Please contact Technical Support if we may be of any assistance.