

## Upgrade of a Standard Pump to a Variable Speed 2 Horsepower Pump

FE Petro's Intelligent Submersible Turbine (IST) incorporates a 2 horsepower Variable Speed motor (PMAVS2) 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 *MagVFC*'s initial setup. This feature, coupled with others of the *MagVFC* (e.g., dry run protection), encourages current standard submersible turbine owners to upgrade their units.

**Note:** Always consult the STP/IST Fixed and VL *Installation and Owner's Manual*, which is provided with product, for additional information and warnings. The PMA VS2, incorporated in this kit, can only be electrically connected to an IST-VFC or *MagVFC*. The *MagVFC*, included in this kit, can only be paired with another *MagVFC* for Master/Slave and Alternating Circuit configurations. Unlike FE Petro's standard pumps, the variable speed PMA VS2 cannot be interchanged with competitive models.

### Service Station Requirements

200 - 250VAC, single or three phase, 50 or 60 Hz power (No change from current requirements)

### Electrical Requirements

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

PMA VS2 Motor Draw = 9 amps maximum at full load

PMA VS2 Lead-To-Lead Winding Resistance = 2.5 ohms Ohms +/-5%

### Parts Requirements

Part Number	Description
PMA VS2	2HP Variable Speed Pump Motor Assembly
<i>MagVFC</i>	Variable Frequency Controller
400236903	Contractors 4-wire Plug

To order the required parts, specify either the:

- 400693901 PMA VS2 Conversion Kit (standard)
- 400693905 PMA AG VS2 Conversion Kit (alcohol gasoline)
- 400693906 PMAM VS2 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 power at the load center and lock out and tag the circuit breakers. Pull extractable section from STP Manifold and remove Pump Motor Assembly (PMA).
2. Attach a PMA VS2 (2HP Variable Speed Pump Motor Assembly) to the extractable section of the STP and reinstall into the STP manifold.

**Note:** By upgrading to a PMA VS2, 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 and the difference in length of the PMA-VS2 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 PMAVS2</b>
¾ horsepower (PMA 75)	1 ¾" closer to the bottom
1 ½ horsepower (PMA 150)	1" additional bottom clearance
1 ½ horsepower High Pressure (PMA H150)	1 ¾" additional bottom clearance
2 horsepower (PMA 200)	3 ¾" additional bottom clearance
2 horsepower High Pressure (PMA H200)	4 ½" additional bottom clearance
4 horsepower variable speed (PMA VS4)	5" additional bottom clearance

3. Mount the *MagVFC* to the wall in the service station. Refer to the *MagVFC* Installation and Owner's Manual for proper mounting.
4. *If you are using an IST-VS4 or STP-VS4 model submersible turbine pump, proceed to Step 6 because these models do not incorporate a capacitor in the Junction Box and already utilize three power wires and one ground wire from the MagVFC to the Junction Box in the pump. 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 and Owner's Manual* provided with the *MagVFC*.

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

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