



Variable Speed Submersible Turbine Pumps

Introduced in 1995, FE Petro™ brand variable speed submersible turbine pumps (STPs) were the first of their kind for the petroleum equipment industry. With faster fill times during peak hours and power savings during non-peak hours, FE Petro™ brand variable speed STPs allow you to maximize profits while minimizing operating expense. These benefits are something only FE Petro™ brand variable speed STPs, the industry's highest performing 4" diameter STPs, can provide.



Highlights

Higher Flow Rates

Variable speed systems ramp up the system's horsepower as needed to provide optimal flow rates at fueling points. This results in faster and more consistent flow rates at peak business times compared to fixed speed systems. Benefits include:

- Faster and more reliable flow rates than fixed speed systems resulting in higher throughput at virtually the same total cost of ownership.
- Ramps pressure up and down making nozzles easier to squeeze for consistent customer user experience.
- Ramping up and down reduces system wear from line shock, promoting a longer overall system lifetime.

Efficient Energy Consumption

Because a variable speed system is constantly providing only the necessary horsepower to achieve desired flow rates, the system only consumes as much energy as is needed. Benefits include:

- Energy savings during non-peak business hours and increased flow during peak hours.
- Potential for reduced energy costs without sacrificing a faster customer refueling experience.

Minimize Hydraulic Hammer

Hydraulic hammer is defined as a sudden pressure spike that is the result of a sudden stoppage in flow in a pressurized piping system. Hydraulic hammer can be exaggerated in a system that utilizes a high pressure fixed speed STP.

- A fixed speed pumping system is incapable of changing the flow rate dependent upon demand and as a result, hydraulic hammer is likely to result when flow is interrupted.
- Hydraulic hammer may result in system fatigue and intensified wear to system components such as diaphragm valves in multiproduct dispensers, leak detectors or hanging hardware.
- A variable speed STP will ramp up and down to provide only the pressure required to meet demand significantly minimizing the effects of hydraulic hammer.

Meet Your Flow Rate Needs

The STP can be adjusted at installation to perform at a maximum per-nozzle flow rate of 10 gpm (38 lpm) based on the specifications of your piping and dispensing system.

- Depending on peak business requirements, choose from either 2 Hp or 4 Hp variable speed models to meet your desired flow rates.
- 2 Hp pumps provide constant 10 gpm (38 lpm) for up to eight fueling positions operating simultaneously.
- 4 Hp pumps provide constant 10 gpm (38 lpm) for up to 12 fueling positions operating simultaneously.

Highlights continued

MagVFC™ Variable Frequency Controller

Variable speed pumps are controlled by the MagVFC™ variable frequency controller which provides control for both 2 Hp and 4 Hp variable speed STPs. Features include:

- Faster fill times during peak hours and power savings during non-peak hours.
- Control is determined through the PMA power consumption, eliminating the need for a transducer or special wiring.
- Setup selections include 2 Hp or 4 Hp, MLD or PLLD, gas or diesel, and Master-Slave, alternating circuit manifolded pump control options.
- Capable of networking with INCON™ fuel management systems for enhanced pump control capabilities.

Diagnostic Fault Detection

The MagVFC™ variable frequency controller features a dual 7-segment display that displays running status and fault codes. A fault history on the controller also provides an enhanced troubleshooting process with faults like:

Fault Detection Display Codes

- UL** UL = Underload: Dry run or blocked PMA intake
- LI** LI = Low Incoming: Input power under voltage
- Lr** Lr = Locked Rotor: Overloaded while PMA is running
- LU** LU = Locked Up: Overload at PMA startup
- SC** SC = Short Circuit: Short typically from controller to PMA
- SU** SU = Shorted Upper: Short typically in controller
- OC** OC = Open Circuit: Broken connection to PMA
- Er** Er = Extended Run: No power change for 60 minutes
- HO** HO = Hot Operation: Excessive controller temp / fan protection



Specifications

- Variable speed models are available in variable lengths only.
- Check valve: 2¾" diameter fluorocarbon seal constructed with cast aluminum body and steel backing washer.
- Pressure relief valve: available in four pressure relief settings, integral to check valve. Standard model relieves at 40 psi and resets above 35 psi.
- Syphon: venturi-type syphon primer supplied with every submersible. Syphon check valve and secondary syphon sold separately.
- Air eliminator: every submersible includes a tank return path with one-way check valve to provide active air elimination.
- Electrical disconnect: electrical yoke for positive contractor disconnect during service.

Pump Motor

- 2 Hp or 4 Hp, variable speed, two-stage centrifugal type pump motor with integral, automatic, thermal overload protection.
- Max. flow: VS2 = 110 gpm, VS4 = 140 gpm.
- Max. pressure: selectable operating pressure on MagVFC™ between 24 psi and 42 psi deadhead.
- Available with MagShell™ which results in 45% increased flow area around motor.

Approvals

- cULus listed.
- Consult factory for applicable approvals.

Power Requirements

- Variable speed pumps can only be controlled by a MagVFC™ variable frequency controller:
 - VS2 models can operate with single- or three-phase incoming power supply to the MagVFC™.
 - VS4 models require three-phase incoming power supply to the MagVFC™ for proper operation.
- Incoming power supply to the MagVFC™ can be 200-250 VAC, 50 or 60 Hz.
- MagVFC™ outputs a three-phase, variable frequency signal, valid for FE Petro™ variable speed pumps only.
- VS2 max. motor draw: 9 Amps.
- MagVFC™ max. line draw: 20 Amps.

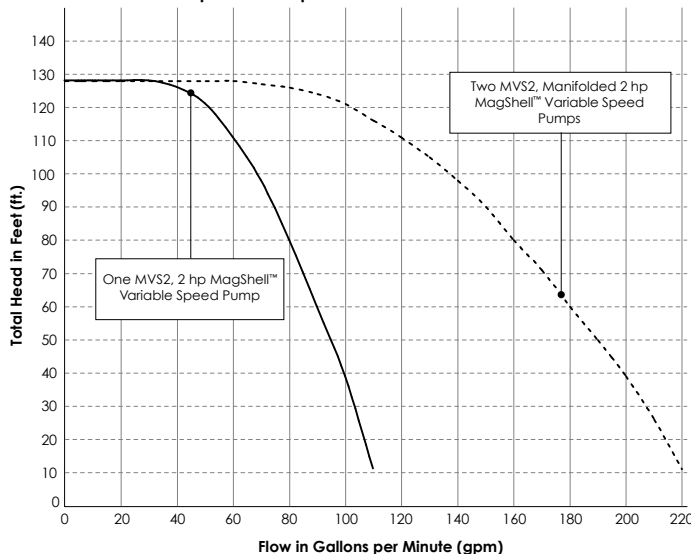
Liquid Compatibility

- Max. liquid viscosity: 70 SSU at 60 °F (15 °C).
- STP variable speed models are UL and cUL listed for fuel mixtures containing up to 10% ethanol, and 20% MTBE, 20% ETBE or 17% TAME with gasoline.
- IST variable speed models are UL and cUL listed for fuel mixtures containing diesel fuel with up to 20% biodiesel, 100% biodiesel, up to 85% ethanol with gasoline, and 20% MTBE, 20% ETBE or 17% TAME with gasoline.
- All variable speed (non-AG) models can also be used with diesel fuels, fuel oils, kerosene, Avgas and jet fuels in a non-gelled pourable state.
- All wetted elastomers are made of a high grade, fluorocarbon compound.

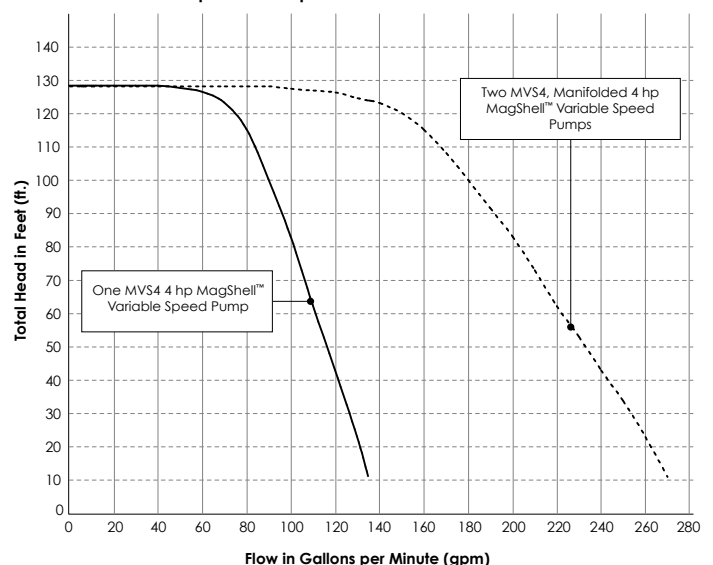
Quality Certification

- Franklin Fueling Systems is an ISO 9001 Certified Manufacturer.

2 hp Variable Speed Turbine Performance Chart



4 hp Variable Speed Turbine Performance Chart



Ordering Information

A typical turbine model designation has up to five components to define the pump being supplied as follows:

XXX YYYYY Z - A - B

XXX = Basic Model Designation

STP = These standard variable speed and variable length models are capable of up to 10% ethanol with gasoline

IST** = These variable speed and variable length models include alcohol-gasoline compatibility (up to 85% ethanol, up to 20% biodiesel, or 100% biodiesel).

YYYYY = Factory Installed Options

Model designations may include one or more of the following characters in alphabetical order:

F = Floating suction adapter (1 1/2" NPT female adapter)

K = Intake filter screen (IFS, factory installed to PMA)

M = MagShell™ (flow enhancing, expanded PMA shell)

R* = Model R check valve (24 psi relief/22 psi reset for PLLD)

W* = Model W check valve (16 psi relief/13 psi reset for PPM4000)

Z = Pump Motor Horsepower Rating

VS2** = 2 Hp variable speed

VS4 = 4 Hp variable speed

A = Model Length (see table)

VL1 = STP variable length range #1

VL2 = STP variable length range #2

VL3 = STP variable length range #3

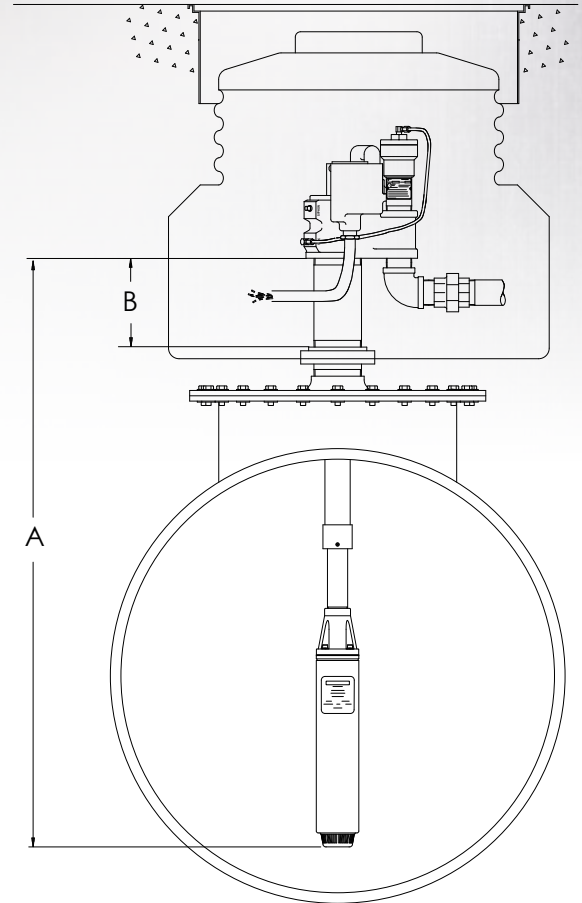
B = Riser Pipe Length (see diagram)

Riser pipe length is expressed as two numeric characters that indicate the total length of the riser in inches. Riser pipes are available from 7" to 69" in 1" increments (additional charge for risers 31" or longer).

Notes:

*If not otherwise specified, all models are supplied with standard model check valve (40 psi relief /35 psi reset for MLD, TS-LS300, and TS-LS500).

**If not otherwise specified, 2 Hp variable speed pump motor horsepower rating is implied for IST models.



Model Length (A)

STP Horsepower	Model Length Range	Model Length Designation
2 Hp	59"-87"	VL1
	90"-151"	VL2
	122"-213"	VL3
4 Hp	64"-92"	VL1
	95"-156"	VL2
	127"-218"	VL3

Ordering Information continued

Variable Speed Submersible Turbine Pumps

Variable speed, variable length.

Model	Description	Model Length Range Number	Model Length Range*
STPMVS2-VL1	2 hp variable speed with MagShell™	VL1	59"-87"
STPMVS2-VL2	2 hp variable speed with MagShell™	VL2	90"-151"
STPMVS2-VL3	2 hp variable speed with MagShell™	VL3	122"-213"
STPMVS4-VL1	4 hp variable speed with MagShell™	VL1	64"-92"
STPMVS4-VL2	4 hp variable speed with MagShell™	VL2	95"-156"
STPMVS4-VL3	4 hp variable speed with MagShell™	VL3	127"-218"

Variable Speed Intelligent Submersible Turbine Pumps

Variable speed, variable length, and AG compatible.

Model	Description	Model Length Range Number	Model Length Range*
ISTM-1	2 hp variable speed with MagShell™	VL1	59"-87"
ISTM-2	2 hp variable speed with MagShell™	VL2	90"-151"
ISTM-3	2 hp variable speed with MagShell™	VL3	122"-213"
ISTMVS4-VL1	4 hp variable speed with MagShell™	VL1	64"-92"
ISTMVS4-VL2	4 hp variable speed with MagShell™	VL2	95"-156"
ISTMVS4-VL3	4 hp variable speed with MagShell™	VL3	127"-218"

Notes:

1. Remove "M" from model number for non-MagShell™ pump motor assembly.
2. All STP models are UL and cUL listed for compatibility with fuel mixtures containing up to 10% ethanol with gasoline, diesel fuels, and 20% MTBE, 20% ETBE or 17% TAME with gasoline.
3. All IST models are compatible with fuel mixtures containing diesel fuel with up to 20% biodiesel, 100% biodiesel, up to 85% ethanol with gasoline, and 20% MTBE, 20% ETBE or 17% TAME with gasoline.
4. All models are supplied with a standard check valve unless factory option "R" or "W" is specified.
5. All above models can only be powered by a MagVFC™. 4 Hp models require three-phase incoming power supply, 2 Hp models can be supplied with single- or three-phase incoming power.
6. 4" riser pipe, if supplied locally, must be 4½" OD by 3/16" WT tubing.
7. For riser pipe length 31" to 69", additional charge applies.

*Model length (A) defined as the dimension from turbine manifold bottom to pump motor inlet.

Factory Installed Options

Specified in model number at time of STP order.

Model	Description
F	Floating suction adapter, 1½" NPT female, must be factory installed
K	IFS (intake filter screen) factory assembled to pump motor assembly
R	Model R check valve, factory installed, for Veeder-Root™ PLLD Line Leak
W	Model W check valve, factory installed, for Red Jacket PPM4000 Line Leak

Field Installed Options

Intelligent submersible turbine pump specific accessories.

Model	Description
5874202800	MagVFC™, 2 Hp or 4 Hp variable frequency controller, one required per STPM VS2 or VS4
400137908	Syphon check valve, alcohol-gasoline compatible (when ordered with STPM VS2 or VS4)
402459931	Model 65 psi check valve (for slave of manifolded STPM VS2 or VS4 with Veeder-Root™ PLLD)
402507930	Secondary syphon kit (when two syphon primes are required for one STPM VS2 or VS4)
5800300100	STP-DHI dispenser hook isolation for 110 volt dispenser handle switches, up to eight each

Ordering Information continued

Variable Speed Conversion Kits

With variable speed conversion kits you can achieve higher, consistent flow rates, in turn boosting your profits, while eliminating the wear and tear hydraulic hammer can cause. Installation is easy with a variable speed pump motor assembly, MagVFC™ variable frequency controller and four-wire contractor's plug. All-in-one variable speed kits are compatible with both FE Petro™ brand 4" submersible turbine pumps, as well as other competitive systems. The MagVFC™ works with the existing system to increase flow as more fueling points go live, delivering the flow you need as you need it. Your customers will know the difference between sites that provide steady flow and faster fueling during peak business hours and those sites that don't.

Model	Description
402671901	Kit with 4 Hp variable speed non-MagShell™ (PMA VS4)
400693901	Kit with 2 Hp variable speed non-MagShell™ (PMA VS2)
400693905	Kit with AG compatible 2 Hp variable speed non-MagShell™ (PMAAGVS2)
400693906	Kit with AG compatible 2 Hp variable speed with MagShell™ (PMAAGMVS2)
402671905	Kit with AG compatible 4 Hp variable speed non-MagShell™ (PMAAGVS4)
402671906	Kit with AG compatible 4 Hp variable speed with MagShell™ (PMAAGMVS4)

Note: Kits include variable speed pump motor assembly, MagVFC™ variable frequency controller, four-wire contractor's plug and installation instructions.

FE PETRO®

A Franklin Fueling Systems Brand

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