

MagForce PM Drive Basic Setup Guide



Refer to the MagForce PM Drive Installation Manual for detailed setup and safety information—www.franklinwater.com.

Wiring

High Voltage Connections

WARNING Disconnect and lock out all power before installing or servicing equipment.

1. Connect the three-phase input power leads to L1, L2, and L3 terminals on the disconnect breaker located in the upper right corner of the panel.
Input voltage should be 60hz-480v three-phase power (480-5%/500vac+10%).
2. For proper rotation, connect the motor lead wires to the drive panel—Black = U2/T1, Yellow = V2/T2, Red = W2/T3.
3. Connect the motor and service grounds into the PE (Protective Earth) terminal or the ground lug on the back panel.

Control Wiring Connections

The user terminal block is setup to connect:

1. A potentiometer between +10vdc, V1+ and V1- (used for speed pot control/additional programming required).
2. 4-20 ma (non-powered) transducer between +24v and I.
3. Start switch (relay contacts) (N.C.) in place of the JRS jumper, terminals 1 and 2. Closed = run, Open = stop.
4. Over pressure switch (N.C.) in place of the JBX jumper, terminals 2 and PSW. This will trigger an external fault if opened.
5. The other connections on the terminal block are used for the internal panel thermostat and vent fans.
6. Set the thermostat to 75 degrees F to turn on the panel vent fans.

Parameter Settings

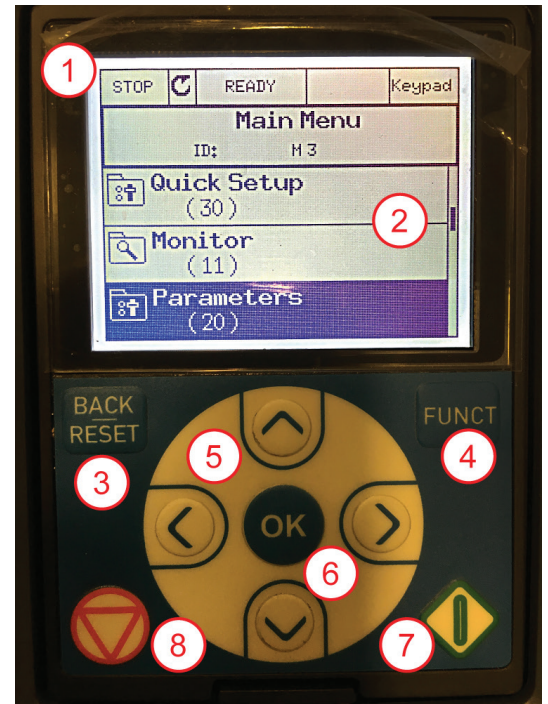
At initial power-up, press the BACK/RESET button to display the Main Menu. From there, use the arrow keys to open the Parameters menu and navigate to the settings below.

NOTICE DO NOT select Quick Setup or drive programming will be erased. If this occurs, refer to "Setting Basic Parameters" in the Installation Manual.

When all changes have been made, save as follows: **User Settings>Parameter Backup>Save to Keypad.**

1. **P3.1.1.4 Parameters>Motor Settings>Motor Nameplate>Motor Nominal Current:** The default motor nominal current is set to the max SFA of the motor. This current setting will need to be changed to the maximum current seen when the installed pump is running at 115hz and surfacing water under normal conditions. This is done to scale the true load on the motor to the drive—Do Not increase current setting above the default setting.
 - Turn the HOA switch to **Hand** mode to run the motor at 115 Hz with the default motor nominal current setting. Read the drive motor current and torque when you are surfacing water under normal conditions and record.
 - Switch HOA to **Off** and enter this current into P3.1.1.4 Motor Nominal Current, if it is less than the preset maximum amperage of 22.5, 46, or 80, as listed on the motor nameplate.
 - Rerun the motor at 115 Hz and see that the drive output current matches the new nominal current setting and the motor torque is in the 90%-100% range.
2. **P3.1.3.1 Parameters>Motor Setting>Current limit:** Default 22.5/46/80 amps. When using a smaller pump this can be lowered just above motor nominal current.
3. **P3.2.11 Parameters>Start/Stop Setup>Restart Delay:** Default = 5 minutes.
4. **P3.3.1.1 Parameters>References>Frequency Ref>MinFreqReference:** Default = 60.00. Set minimum speed for the pump. The setpoint is 2x shaft speed.
5. **P3.3.1.8 Parameters>References>Frequency Ref>Keypad Reference:** Default = 115.
6. **P3.9.3.4 Parameters>Protections>Motor Stall>Stall Freq Limit:** Default = 90.00. The default trip frequency is set to 90 Hz. This setting needs to be changed if P3.3.1.1 Parameters>References>Frequency Ref>MinFreqReference: is set above 90hz.

Control Navigation



1. **STATUS BAR:** Run/Stop, Rotation Direction, Ready/Not Ready/Fault, Alarm, Control location—PC/IO/Keypad/Fieldbus.
2. **MENU ITEMS.**
3. **BACK/RESET:** Navigate between menu screens. When faulted, hold down for 3 seconds to reset drive to Ready. Press repeatedly to return to the Main Menu screen.
4. **FUNCT:** Use to change directions or get to the control screen for the mode selected.
5. **ARROWS:** (Up/Down) scroll up/down within a menu, (Left/Right) add characters for correct input.
6. **OK:** To accept input.
7. **GREEN BUTTON:** Start function (hand or local mode).
8. **RED TRIANGLE:** Stop function (hand or local mode).

Parameter Settings (Continued)

7. **P3.9.3.3 Parameters>Protections>Stall Time Limit:** Default = 5 seconds.
8. **P3.9.4.2 Parameters>Protections>Underload>Fieldweak Load:** Default = 70%.
9. **P3.9.8.1 Parameters>Protections>AI Low Protection:** Default = Enabled Run/Stop. Set to Disabled if no analog sensor is being used in the system.
10. **P3.13.1.4 Parameters>PID Controller>Basic Settings>ProcessUnitSel:** Default = PSI. Set the units for the PID control. PSI, Feet, GPM etc.
11. **P3.13.1.6 Parameters>PID Controller>Basic Settings>ProcessUnitMax:** Default = 100.00. Set to sensor full scale for pressure and flow, set to sensor full scale x 2.31 for water level sensor to convert the pressure to feet.
12. **P3.13.1.8 Parameters>PID Controller>Basic Settings>Error Inversion:** Default = 0 (Normal). Set to Inverted for water level control. Set to Normal for surface pressure and flow control.
13. **P3.13.2.1 Parameters>PID Controller>Setpoints>Keypad SP 1:** Default = 50.00. Set pressure, level, or flow setpoint/target level.
14. **P3.4.2.2 Parameters>Ramps and Breaks>Accel Time 2:** To adjust the acceleration, adjust only time 2. Accel Time 1 must be set to 1 second to protect the motor.
15. **P3.4.2.3 Parameters>Ramps and Breaks>Decel Time 2:** To adjust deceleration, adjust only Time 2. Decel Time 1 must be set to 1 second to protect the motor.
16. **P3.13.5.1 Parameters>PID Controller>Sleep Function>SP 1 Sleep Freq:** Default = 90.00. Set above the minimum frequency to sleep. When the setpoint is maintained, the motor output frequency will decrease. When output is below the sleep frequency for the **P3.13.5.2 Sleep Delay Time**, the drive will go to sleep. Sleep frequency must be above **P3.3.1.1 Parameters>References>Frequency Ref>MinFreqReference**.
17. **P3.13.5.3 Parameters>PID Controller>Sleep Function>SP 1 WakeUpLevel:** Default = 10.00. Set pressure or level to restart motor. When the drive is asleep (stopped) it will restart when the pressure falls below setting or the water raises above setting.
18. **Set the time/date/year/daylight savings as follows:**
 - **P5.5.2 I/O and Hardware>Real Time Clock>Time:** (05:40:37).
 - **P5.5.3 I/O and Hardware>Real Time Clock>Date:** (27.3 = Day/month).
 - **P5.5.4 I/O and Hardware>Real Time Clock>Year:** (2018).
 - **P5.5.5 I/O and Hardware>Real Time Clock>Daylight Saving:** (3 = US).

Identification Run

Drive ID-Run can fine-tune settings for the installed motor if **V4.6.1 Diagnostics>Software info>Software Package** is FW0159V020 or greater. If the software package is earlier, refer to the table under "Identification Run" in the Installation Manual for settings for the installed motor. To activate ID-Run:

1. Set **P3.2.9 Parameters>Start/Stop Setup>Start Delay** and **P3.2.11 Parameters>Start/Stop Setup>Restart Delay** to 0.
2. Set **P3.1.2.4 Parameters>Motor Settings>Motor Control>Identification** to standstill.
3. Press the Green Start button within 5 seconds after the previous step.

The drive front light will turn solid green and when ID-Run is complete the green light will flash. If the ID-Run fails, the light will blink red.

⚠ WARNING



High voltages capable of causing severe injury or death by electrical shock are present in this unit.

- To reduce risk of electrical shock, disconnect power before working on or around the system. More than one disconnect switch may be required to de-energize the equipment before servicing
- Make sure the ground terminal is connected to the motor, control enclosures, metal plumbing, and other metal near the motor or cable using wire no smaller than motor cable wires.
- Do not remove VFD cover for wiring or periodic inspections while power is applied, or the unit is in operation.
- Wiring and periodic inspections should be performed at least 5 minutes after disconnecting the input power.
- Operate VFD and control devices with dry hands.
- Do not use VFD if power or motor cable is damaged.
- Perform wiring after VFD has been mounted. Otherwise, electric shock or bodily injury can occur.

⚠ CAUTION

Risk of fire, secondary accidents, or bodily injuries such as skin burns.

- This equipment must not be used by children or persons with reduced physical, sensory or mental abilities, or lacking in experience and expertise, unless supervised or instructed. Children may not use the equipment, nor may they play with the unit or in the immediate vicinity.
- Equipment can start automatically. Lockout-Tagout before servicing equipment.
- Permanent magnet motors need to have a check valve (reverse flow preventer) installed above the pump to prevent dangerous voltages from generating on the motor leads when the pump spins backwards. This will also limit the pump/motor from running in up thrust conditions at every startup. Operation of this equipment requires detailed installation and operation instructions provided in this manual for use with this product.