

Troubleshooting

This quick start document only lists the faults that you are most likely to encounter during a startup. For the full list of faults in the drive, refer to the M1000 technical manual TM7358.

| Fault | Description | Causes | Fault | Description | Causes |
|----------------------------|---|---|---------------------------|---|---|
| dEv Speed Dev Flt | The deviation between the speed reference and speed feedback is greater than the setting in Spd Dev Flt Lvl (A1) and Spd Dev Flt Time (A1). | <ul style="list-style-type: none"> Check that the brakes are picking Check for incorrect motor and encoder phase rotation Check for incorrect motor parameter setting in the A5 MOTOR sub-menu Increase Spd Dev Flt Lvl (A1) and/or Spd Dev Flt Time (A1) to widen fault tolerance | oPE06 No Encdr Brd Alm | Encoder option board is not connected | <ul style="list-style-type: none"> Check that the drive has a PG-X3 or PG-F3 board on the CN5-C port Check that the Control Method (U8) is set correctly |
| dv6 Over Accel Flt | PM motor has exceeded an acceleration or deceleration limit beyond the setting of Over Accel Lvl (A1) and Over Accel Time (A1). | <ul style="list-style-type: none"> Encoder alignment / autotune was not performed or was performed incorrect Check for incorrect motor and encoder phase rotation Increase Over Accel Lvl (A1) and/or Over Accel Time (A1) to widen fault tolerance | oPE08 Mode Setting Alm | A drive function is set in a control method that does not support that function | <ul style="list-style-type: none"> oPE Flt Parameter (F2) will identify which parameter is causing the fault Check that the Control Method (U8) is set correctly Default the drive to factory setting in U5 sub-menu |
| EF1-8 External Flt | External Fault at Logic input 1-8 on terminals S1 through S8 | <ul style="list-style-type: none"> An external device has tripped the drive fault function Check for incorrect I/O wiring Check for incorrect parameter setting in the C2 LOGIC INPUT sub-menu | PG0 Encoder Fault | Drive does not see any pulses from the encoder | <ul style="list-style-type: none"> Check for incorrect motor parameter setting in the A5 MOTOR sub-menu Check for incorrect parameter setting for Encoder Pulses (A1) Check that mechanical brakes are lifting Check for encoder miswiring |
| Er-01 Data Invalid | Motor parameters that were entered during the autotune are incorrect | <ul style="list-style-type: none"> Check all the values entered during the autotune matches motor nameplate data For induction motors only, No-Load Current should never exceed Rated Current For induction motors only, verify that the Rated Speed is NOT synchronous speed Increase the Rated Motor Power [HP] | PG0H Enc Disconct Flt | Drive senses that the encoder is not connected to the encoder optional board | <ul style="list-style-type: none"> Encoder should NOT be wired to terminals label with lower case a+, a-, b+, and b- Check for encoder miswiring Check for missing pin jumper on the encoder board Bad encoder, encoder cable, or encoder card (PG-F3 or PG-X3) hardware |
| Er-12 I-det. Circuit | No motor current can be detected during an autotune | <ul style="list-style-type: none"> Motor contactor was not closed during autotune Check for loose motor wire connection Bypass the motor contactor | OV Bus Overvolt Flt | Voltage on the DC bus has exceeded the overvoltage detection level. For 200V Class: approx. 410 V For 400V Class: approx. 820 V For 600V Class: approx. 1040 V | <ul style="list-style-type: none"> Check for excessively high main power Check that the DBR, CDBR, or Regen Unit is operating Check for incorrect reading of the bus voltage |
| Er-25 RUN Cmd Removed | The RUN command was removed while an autotune was underway | <ul style="list-style-type: none"> Keep the inspection button held while the drive autotune the motor | SE1 Contactor Fault | Drive detects that the motor contactor is not in the correct state. | <ul style="list-style-type: none"> Check the contactor for any problem Check for any sequencing problem with the contactor Check for loose auxiliary wire Increase the setting of Cont Fault Time (A1) to allow the contactor more time Incorrect setting of the parameters in the C2 LOGIC INPUT sub-menu |
| oFA00 CN5-A Invald Flt | Wrong optional card has been inserted into CN5-A port | <ul style="list-style-type: none"> PG-X3 and PG-F3 cards should be inserted into the CN5-C port | SE2 Start Curr Fault | The output current was lower than 25% of the motor no-load current at start | <ul style="list-style-type: none"> Check the contactor for any problem Check for any sequencing problem with the contactor Check for loose motor wire connection |
| oFB00 CN5-B Invald Flt | Wrong optional card has been inserted into CN5-B port | <ul style="list-style-type: none"> PG-F3 cards can only be inserted into the CN5-C port | SE3 Current Fault | The output current was lower than 25% of the motor no-load current during operation | <ul style="list-style-type: none"> Check the contactor for any problem Check for any sequencing problem with the contactor Check for loose motor wire connection |
| oFC52 CN5-C Enc Timeout | The drive and absolute encoder are not serially communicating | <ul style="list-style-type: none"> Check for encoder miswiring Check for loose wire or pigtail connection Check for missing pin jumper on the encoder board Bad encoder, encoder cable, or PG-F3 hardware | TQLIM Torque Limit Alm | Drive has reached the torque limit | <ul style="list-style-type: none"> Increase the limits on the Mtr Torque Limit (A1) and Regen Torq Limit (A1) Check for incorrect motor and encoder phase rotation Check for incorrect motor parameter setting in the A5 MOTOR sub-menu Check for incorrect parameter setting for Encoder Pulses (A1) |
| oFC53 CN5-C En COM Flt | The drive has not established communication with the absolute encoder. | <ul style="list-style-type: none"> Check for encoder miswiring Check for loose wire or pigtail connection Check for missing pin jumper on the encoder board Bad encoder, encoder cable, or PG-F3 hardware | | | |
| oPE02 Paramtr Rang Alm | One or more parameters are set outside the parameter limit | <ul style="list-style-type: none"> oPE Flt Parameter (F2) will identify which parameter is causing the fault | | | |



M1000 QUICK-START GUIDE (V3.0)

Quick-Start Guide

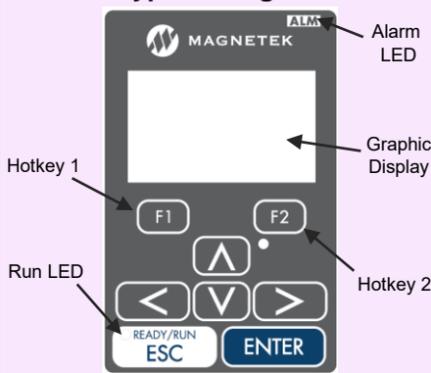
This guide is intended to be supplemental to the full Magnetek M1000 Technical Manual.

Please read TM7358 before powering the device.

LED Indicators

- Run LED, Solid: Drive Running
- Alarm LED, Flashing: Alarm or Base Block function is active
- Alarm LED, Solid: Drive Fault

Keypad Navigation



Start-Up Steps

- A. Encoder Connection
- B. Setting the Motor Control
- C. Controller Manufacturer Dependent Parameters
- D. Hoistway Data
- E. Autotune
- F. Running Motor
- G. Position Lock
- H. Elevator Inspection

(B) Setting the Motor Control

Set/Verify that the drive is set up for the correct motor control in Control Method (U8).

[Closed Loop Vector, PM Closed Loop Vector, Open Loop Vector, V/F Control]

(C) Controller Manufacturer Dependent Parameters

There are drive-controller interfacing parameters that may need to be set for the controller to run the drive (normally already preset in the drive at the controller manufacturer's facility). These parameters should be compliant with controller manufacturer's documentations.

NOTE: the parameters listed below are just a few parameters. For a complete list, refer to the controller manufacturer's documentations.

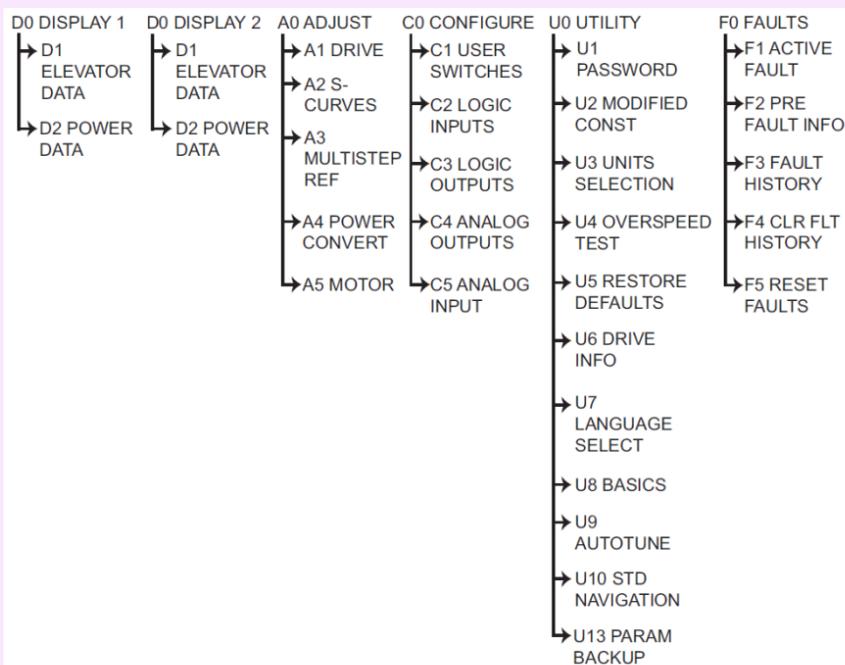
- A3 sub-menu – Speed Command 1-15
- C1 sub-menu – Spd Command Src
- C1 sub-menu – Run Command Src
- C1 sub-menu – Serial Run Src
- C1 sub-menu – Serial Comm Mode
- C2 sub-menu – Term S1-S8 Func Sel
- C3 sub-menu – M1-M2 Func Sel

(D) Hoistway Data

1. The elevator contract speed should be set in the Contract Car Spd (A1) parameter
2. The motor application RPM should be set in the Contract Mtr Spd (A1) parameter (a good starting value will be to match the motor nameplate RPM)
3. The measured main line voltage should be set in Input Voltage (A4)

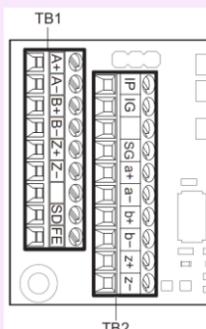
Menu Structure

There are 6 main menus and up to 11 sub-menus in each



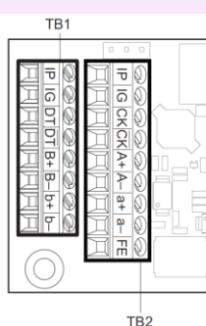
(A) Encoder Connection

- If an incremental encoder (Induction, Closed Loop) is being used, the PG-X3 optional board should be selected.



NOTE: connect encoder to the CAPITAL letter A+, A-, B+, B-, Z+, and Z- and NOT the lower case letter a+, a-, b+, b-, z+, and z-.

- If an absolute encoder (Permanent Magnet) is being used, the PG-F3 optional board should be selected.



NOTE: connect encoder to the CAPITAL letter A+, A-, B+, and B- and not the lower case letter a+, a-, b+, and b-

NOTE: color code connection can be found in the M1000 technical manual TM7358.

(E) Autotune

Induction Motor (□) and Permanent Magnet Motor (○)

- Disable the mechanical brakes so they do not pick during the autotune process.
- Select the non-rotational autotune from the U9 AUTOTUNE sub-menu
 - Set the Tuning Mode Sel (U9) parameter to "Tune-No Rotate1"
 - Set the PM Tuning Mode (U9) parameter to "Tune-No Rotate"
 - After selecting "Tune-No Rotate1" or "Tune-No Rotate", use the down navigational keys to step through all the motor data

Motor Data

- Enter the horse power [HP] from motor nameplate for Mtr Rated Power



- Enter the voltage [V] from motor nameplate for Rated Voltage



- Enter the amps [A] from motor nameplate for Rated Current



- Enter the frequency [Hz] from motor nameplate for Rated Frequency



- Enter the number of poles for Number of Poles
 - Poles are usually not listed on the nameplate. Calculate using:

$$\# \text{ of poles} = \frac{120 \times \text{frequency}}{\text{RPM}}$$

- Poles are ALWAYS an even whole number.



- Enter the speed [RPM] from motor nameplate for Rated Speed



- Enter the encoder pulses [PPR] from the encoder nameplate for Encoder PPR



- No-Load Current should be left at default unless the motor nameplate lists the no load current [A]



- On the Tuning Ready? screen, give the drive an inspection run.
- There will be noise coming out of the motor while the drive measures various motor characteristics. Hold on to the inspection button until the drive annunciates that the autotune has completed.
- Upon completing the autotune, the drive will automatically populate the parameters in the A1 and A5 sub-menu with values from the autotune

Rotor Alignment

Permanent Magnet Motor

- Disable the mechanical brakes so they do not pick during the rotor alignment process.
- Select the non-rotational alignment from the U9 AUTOTUNE sub-menu
- Set the PM Tuning Mode (U9) parameter to "PolePos-norotate"
- On the tuning ready, give the drive an inspection run.
- There will be noise coming out of the motor while the drive measures various motor characteristics. Hold on to the inspection button until the drive annunciates that the tune has completed.
- Upon completing the rotor alignment, the drive will automatically populate the Enc Z-Pulse Offs (A5)

(F) Running Motor

Running on Construction / Inspection

- Verify that the motor spins both up and down at controlled speed with no drive faults.
 - If the motor is spinning slowly or erratic and the drive is outputting a lot of amperes (above nameplate), then motor and encoder are phased opposite of each other.
 - Change the Encoder Connect (C1) parameter setting.

NOTE: For PM ONLY, if motor or encoder phasing changes, a rotor alignment needs to be redone.
 - If the motor is spinning at the correct speed with reasonable amperes but the elevator runs in the opposite direction
 - Change both the Motor Rotation (C1) and Encoder Connect (C1) parameters settings.

NOTE: For PM ONLY, if motor and / or encoder phasing changes, a rotor alignment needs to be redone.
- PM motor vibrating or faulting with an un-roped machine.
 - Set Inertia (A1) to 0.5 sec to prevent the drive from being overly reactive in an unloaded condition.

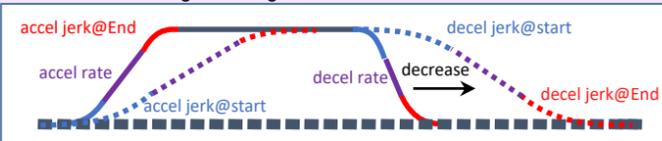
Running at High Speed

- Match actual elevator speed with speed displayed on the drive
 - If the elevator is traveling faster or slower than what the drive Speed Feedback (D1) reports, lower or increase Contract Mtr Spd (A1).

$$\text{new Contract Mtr Spd} = \text{old Contract Mtr Spd} \times \frac{\text{desired elevator speed}}{\text{Actual measured elevator speed}}$$

- Adjusting S-Curve profile

- If the drive is generating the S-curve



Decreasing the parameters in the A2 sub-menu will result in a flatter slope with smoother changes

Increasing the parameters in the A2 sub-menu will result in a steeper slope with more immediate changes

- If the controller is generating the S-curve, set the parameters in the A2 sub-menu to: accel rate & decel rate parameters to 7.99 fps² and jerk@start & jerk@End parameters to 30 fps³
- Finer speed tracking
 - If the elevator is overshooting the floor AND it is approaching the floor at leveling speed
 - Increase the Response (A1) parameter. Too high of a value could introduce instability / vibration.

(G) Position Lock

Position lock is a feature in the drive that will prevent rollback without the need for a load weighing device. If Pre-Torque is used, Position Lock will be disabled.

- Run the elevator towards the middle of the hoist way so the elevator does not go pass the final limits while the position lock parameters are adjusted.
- Set the elevator for inspection if it is not already on inspection.
- Set the inspection speed of the elevator to 0 so the rollback can be seen easily.
- Check that the following drive parameters are set to the recommended starting values.

| Sub-menu | Parameter Name | Default | Recommended Starting Value |
|----------|------------------|---------------|---|
| C1 | Pre-Torq Cmd Src | Disabled | Disabled |
| C5 | Term A1 FuncSel | Speed Command | Neither of these parameter should be set to Pre-Torque. If it is, position lock will be disabled. |
| C5 | Term A2 FuncSel | Pre-Torque | |
| A1 | DC Brk TimeStart | 0.40 sec | 0.40 sec |
| A1 | Gain2 Dec Time | 0.00 | 0.00 |
| A1 | Reduce T Gain2 | 0.10 sec | 0.10 |
| A1 | SpCtrlGn@PosLck | 10.00 | Default |
| A1 | SpCtrlTim@PosLck | 0.100 | Default |
| A1 | StrPosLck Gain 1 | 5 | 5 |
| A1 | StrPosLck Gain 2 | 0.00 | 0.01 |
| A1 | Redc Fact | 0.50 | 0.30 |

- Run the elevator on inspection at 0 speed. Make note of how much rollback is observed and how it rolled back.
 - Increase the DC Brk TimeStart (A1) timer by increments of 0.05 sec until you see an effect on the rollback (either there is less rollback, the motor rolls back then rolls forward, or rocks back and forth).
 - If the motor starts to vibrate or oscillate, dampen the speed regulator gains: SpCtrlGn@PosLck (A1) and SpCtrlTim@PosLck (A1)
 - Lower SpCtrlGn@PosLck (A1) by steps of 5
 - Increase SpCtrlTim@PosLck (A1) by increments of 0.5
 - Next increase StrPosLckGain 2 (A1) by increments of 0.1 for IM or 1 for PM until the rollback is eliminated
 - Set Gain2 Dec Time (A1) to 0.01
 - Set Gain2 Reduce T (A1) to the maximum value.
- NOTE:** this maximum value depends on the values of DC Brk TimeStart (A1) and Gain2 Dec Time (A1).

(H) Elevator Inspection

Overspeeding Elevator

The drive has a feature that will allow it to overspeed the elevator for 1 run to test the elevator overspeed devices.

- Set the Ovrspd Tst Mult (A1) to a value that will trip the elevator overspeed

$$\text{Ovrspd Tst Mult (A1)} = \frac{\text{Governor Overspeed Trip}}{\text{Elevator Contract Speed}}$$

- If Spd Command Src (C1) is set to "Multi-step Speed"
 - Find the Speed Command in the A3 sub-menu that the controller uses to select high speed: Speed Command 1 (A3) through Speed Command 15 (A3)
 - Increase the Speed Command to a value that will trip the governor or electrical overspeed
- Set Overspeed Test? (U4) to "Enabled"
- Give the elevator a multi-floor run so it gives the drive time to accelerate up to trip the overspeed device
- After the test has been completed, set the parameter in step 2 back to the original value if step 2 was done.

Full Load Test

Drive struggles to lift full load or outputs too much ampere

- With an induction motor
 - Change the Motor Rated Slips (A5) parameter
- With a PM motor
 - Perform another autotune and rotor alignment
- Check elevator counter balance
- Check for mechanical issue: brakes, gear box, ropes

Quick Start Parameters

A1 Drive

| Parameter | Description | Suggested Adjustments |
|------------------|--|---|
| Contract Car Spd | Elevator contract speed | Set to the speed the elevator will be certified at. |
| Contract Mtr Spd | Rotational motor shaft speed that will make the elevator run at contract speed | Adjust this value to ensure the actual running speed of the elevator matches the Contract Car Spd. If the elevator is traveling too fast, lower this value. If the elevator is traveling too slow, increase this value. |
| Response | Sets the sensitivity of the speed regulator | Normally, the default of 10 is used. An increase to 20 will make the drive more responsive. Too low of a value will cause the drive to have sluggish responsiveness |
| Inertia | System inertia | Normally, the default of 2 is used. |
| Encoder Pulses | The encoder's pulses per revolution | Set this to match the encoder nameplate PPR. |
| Mtr Torque Limit | This parameter sets the maximum motoring torque the drive can produce. | It is recommended to set this to 250%. |
| Regen Torq Limit | This parameter sets the maximum regenerative torque the drive can produce. | It is recommended to set this to 250%. |

A4 Power Convert

| Parameter | Description | Suggested Adjustments |
|---------------|--|--|
| Input Voltage | Nominal line-to-line AC input voltage in RMS | Set this to match the measured voltage across R, S, and T. |

A5 Motor (Induction Motor)

| Parameter | Description | Suggested Adjustments |
|-------------------|---|--|
| Mtr Rated Power | Motor rated output power on the nameplate | This parameters should be set to match the motor nameplate power. This parameter will be automatically populated after a successful U9 AUTOTUNE. |
| Mtr Rated Voltage | Motor rated voltage on the nameplate | This parameter should be set to match the motor nameplate voltage. This parameter will be automatically populated after a successful U9 AUTOTUNE. |
| Max Frequency | Motor rated frequency on the nameplate | This parameter should be set to match the motor nameplate frequency. This parameter will be automatically populated after a successful U9 AUTOTUNE. |
| Motor Rated FLA | Motor rated current on the nameplate | This parameter should be set to match the motor nameplate current. This parameter will be automatically populated after a successful U9 AUTOTUNE. |
| Number of Poles | The number of poles the motor has | This parameter should be set to match the number of poles inside the motor. This parameter will be automatically populated after a successful U9 AUTOTUNE. |
| Motor Rated Slips | The slip frequency of the motor | It is recommended that this setting be determined by a U9 Autotune |
| No-Load Current | The magnetizing current of the motor | IF provided on the motor nameplate, this parameter should be set to match the motor nameplate no-load current. This parameter will be automatically populated after a successful U9 AUTOTUNE. |
| Leak Inductance | The inductance of the motor | It is recommended that this setting be determined by a U9 Autotune |
| Term Resistance | The resistance of the motor | It is recommended that this setting be determined by a U9 Autotune |

A5 Motor (Permanent Magnet Motor)

| Parameter | Description | Suggested Adjustments |
|-------------------|--|--|
| PM Mtr Power | Motor rated output power on the nameplate | This parameters should be set to match the motor nameplate power. This parameter will be automatically populated after a successful U9 AUTOTUNE. |
| Mtr Rated Voltage | Motor rated voltage on the nameplate | This parameter should be set to match the motor nameplate voltage. This parameter will be automatically populated after a successful U9 AUTOTUNE. |
| PM Mtr Rated FLA | Motor rated current on the nameplate | This parameter should be set to match the motor nameplate current. This parameter will be automatically populated after a successful U9 AUTOTUNE. |
| PM Motor Poles | The number of poles the motor has | This parameter should be set to match the number of poles inside the motor. This parameter will be automatically populated after a successful U9 AUTOTUNE. |
| Max Motor Speed | Motor rated speed on the nameplate | This parameter should be set to match the motor nameplate RPM. This parameter will be automatically populated after a successful U9 AUTOTUNE. |
| Rated Motor Speed | Motor rated speed on the nameplate | This parameter should be set to match the motor nameplate RPM. This parameter will be automatically populated after a successful U9 AUTOTUNE. |
| PM Mtr Arm Ohms | The resistance of the motor | It is recommended that this setting be determined by a U9 Autotune |
| PM Mtr d Induct | Inductance in the D-Axis | It is recommended that this setting be determined by a U9 Autotune |
| PM Mtr q Induct | Inductance in the Q-Axis | It is recommended that this setting be determined by a U9 Autotune |
| Enc Z-Pulse Offs | The angular offset position of the magnets to the encoder zero position. | It is recommended that this setting be determined by a U9 Autotune |

C1 User Switches

| Parameter | Description | Suggested Adjustments |
|------------------|--|---|
| Spd Command Src | This parameter designates the source of the drive's speed. There are 5 choices: Analog Input, Multi-step Speed, Option PCB, Serial Com, Serial HPV Ref | It is recommended that you refer to the controller manufacturer documentation. |
| Run Command Src | This parameter designates the source of the drive run signal. | It is recommended that you refer to the controller manufacturer documentation. |
| Motor Rotation | Rotation of the motor that the drive interprets as up or down. | It is recommended that this be set so the elevator and drive have the same direction orientation. |
| Encoder Connect | Rotation of the encoder that the drive interprets as forward or reverse. | This should be set so the motor and encoder have the same phase orientation. |
| Serial Comm Mode | Selects the serial protocol for the RS485/RS422 port between the drive and controller | It is recommended that you refer to the controller manufacturer documentation. |

U8 Basic

| Parameter | Description | Suggested Adjustments |
|----------------|--|--|
| Control Method | This parameter will set the type of motor control technique. | Set to "Closed Loop Vect" for induction motor or "PM ClosedLoopVct" for permanent magnet motor |

U9 Autotune (Induction Motor)

| Parameter | Description | Suggested Adjustments |
|-----------------|--|--|
| Tuning Mode Sel | This parameter will set the type of autotune the drive will perform. | For convenience, it is recommended that the "Tune-No Rotate1" is performed |

U9 Autotune (P.M. Motor)

| Parameter | Description | Suggested Adjustments |
|----------------|--|--|
| PM Tuning Mode | This parameter will set the type of autotune the drive will perform. | For convenience, it is recommended that the "Tune-No Rotate" and "PolePos-norotate" is performed |