Migration Guide
GFK-3135A
Sep 2020

PACMotion™ Migration Guide

PMM335 to PMM345 Replacement

EMERSON™

Contents

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Section 1: Introduction

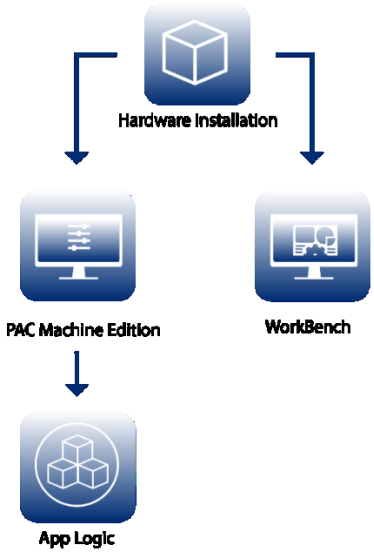
1.1 About this Guide

This guide supplements system installation, programming, and configuration of a PACMotion™ Multi-Axis Motion Controller (PMM345) module. The PMM345 module integrates into a PACSystems RX3i control system.

Customers can expect to learn how to update their RX3i PACSystem controller from a PMM335 motion control to a PMM345 motion control.

For additional information on PMM345 configuration of the PMM345, please consult GFK- 3140[1], *PACMotion Multi-Axis Motion Controller PMM345 User Manual.*

Figure 1: Migration Process



The following items are required for the migration process:

Hardware	Software	PME Project	Workbench
IC695PMM345	PAC Machine Edition ™	Latest PME Project Files	PACMotion Workbench

[1] For information on the PMM335, please consult GFK-2448D and earlier.

1.2 Revisions to this Guide

Rev	Date	Description
A	Sep 2020	Initial Release

1.3 PACSystems Documentation

1.3.1 PACSystems Manuals

Description of Manual	GFK Number
PACSystems RX3i and RSTi-EP CPU Reference Manual	GFK-2222
PACSystems RX3i and RSTi-EP CPU Programmer's Reference Manual	GFK-2950
PACSystems RX3i and RSTi-EP TCP/IP Ethernet Communications User Manual	GFK-2224
PACSystems TCP/IP Ethernet Communications Station Manager User Manual	GFK-2225
C Programmer's Toolkit for PACSystems	GFK-2259
PACSystems Memory Xchange Modules User's Manual	GFK-2300
PACSystems Hot Standby CPU Redundancy User Manual	GFK-2308
PACSystems Battery and Energy Pack Manual	GFK-2741
PAC Machine Edition Logic Developer Getting Started	GFK-1918
PAC Process Systems Getting Started Guide	GFK-2487
PACSystems RXi, RX3i, and RSTi-EP Controller Secure Deployment Guide	GFK-2830
PACSystems RX3i & RSTi-EP PROFINET I/O Controller Manual	GFK-2571

1.3.2 PACMotion Manuals

Description of Manual	GFK Number
PACMotion PMM335 to PMM345 Migration Guide	GFK-3135
PACMotion Multi-Axis Motion Controller PMM345 User Manual	GFK-3140
PACMotion PSD Installation and User Manual	GFK-3168
PACMotion PSR Installation and User Manual	GFK-3169
PACMotion Servo Drive IMR	GFK-3171
PACMotion PSD Accessories Guide	GFK-3173
PACMotion Servo Motor IMR	GFK-3175

1.3.3 RX3i Manuals

Description of Manual	GFK Number
PACSystems RX3i System Manual	GFK-2314
DSM324i Motion Controller for PACSystems RX3i and Series 90-30 User's Manual	GFK-2347
PACSystems RX3i PROFIBUS Modules User's Manual	GFK-2301
PACSystems RX3i Max-On Hot Standby Redundancy User's Manual	GFK-2409
PACSystems RX3i Ethernet Network Interface Unit User's Manual	GFK-2439
PACMotion Multi-Axis Motion Controller User's Manual (PMM335)	GFK-2448

Section 2: PMM335 to PMM345 Migration

2.1 Hardware

The sections that follow highlight the hardware differences between a motion control system using a PMM335 versus a PMM345. It is not meant to be a step by step guide to setting up a PMM345 system. Consult the Installation and User Manuals outlined in Section 1.3.2, *PACMotion Manuals* for additional information on these topics.

2.1.1 PACMotion Servo Drive Replaces FANUC Servo Amplifiers

The PMM345 supports Emerson Servo Drives and Servo Motors. This is a change versus the PMM335 that supports FANUC Servo Amplifiers and Servo Motors.

The following sections highlight the Emerson Servo Drives and Servo Motors HW setup. This is designed to be an overview. Reference the Emerson Servo Drive User's Manual and Motor Guides for more details.

2.1.1.1 Drive Parameters

PACMotion Servo drives are highly configurable with extensive options to allow fine tuning the drive for a specific application. The reader will note that many of the settings have well-chosen default values that do not require changes. Additionally, when using the Emerson "plug and play" servo motors many of the parameters that require changes are done automatically. It is recommended that the user perform an autotune on the velocity loop and position loop during the startup process. The PMM345 closes the position loop for all motion control functionality except homing the drive when the servo encoder is used for feedback. The Servo Drive position loop is used for the find home. The new find home sequence is discussed in later sections of this guide.

2.1.1.1.1 Drive Parameters Required Changes from Default Value

Drive parameters are set via the Workbench tool. The Workbench tool has online help that can be utilized to better understand parameter functionality. The following drive parameters must be set to the non-default values shown in the table below for proper operation with the PMM345.

Parameter	Value	Default	Description
ECAT.LEGACYREV	0	(1)	The Drive Firmware version 1-16 (and higher) supports a 3rd FMMU if the ECAT.LEGACYREV = 0. The advantage of using a 3rd FMMU is 30% performance improvement with the KAS IDE embedded Workbench communication. PMM Usage – EtherCAT Performance
FB1.PIN	1048576	(100)	Use FB1.PIN with FB1.POUT to set the user units for FB1.P PMM Usage - Sets Scaling for Position Feedback
UNIT.PIN	1048576	(100)	UNIT.PIN is used in conjunction with UNIT.POUT to set application specific units. PMM Usage - Sets Scaling for Position Feedback
UNIT.POUT	1	(20)	UNIT.POUT is used with UNIT.PIN to set application specific units in UNIT.POUT PMM Usage - Sets Scaling for Position Feedback
UNIT.PROTARY	3	(4)	Set the position units when the motor type is rotary PMM Usage - MC_Home and MC_Touchprobe parameter scaling.
UNIT.VROTARY	3	(0)	UNIT.VROTARY sets the velocity units when the motor type (MOTOR.TYPE) is rotary. PMM Usage – MC_Home parameter scaling.
DRV.CMDSOURCE	1	(0)	DRV.CMDSOURCE specifies the source of the command to the drive PMM Usage - Sets Drive to receive commands over EtherCAT
DRV.OPMODE	1	(0)	DRV.OPMODE specifies the operation mode of the drive PMM Usage - Sets Drive to Velocity Control Mode
FB1.EXTENDEDMULTITURN	1	(0)	This parameter allows additional multiturn information to be stored in non-volatile memory and restored on power up. PMM Usage – Absolute Position
FBUS.PARAM01	125	(0)	Sets the EtherCAT station address.Comm Rate?? PMM Usage – Reserved for future development.
FBUS.PARAM02	1	(0)	FBUS.PARAM02 switches the phase locked loop (PLL) for synchronized use PMM Usage – EtherCAT Synchronization
FBUS.SAMPLEPERIOD	4	(32)	FBUS.SAMPLEPERIOD sets the fieldbus cycle time PMM Usage - EtherCAT Update Rate
DRV.DISTO	0	(1000)	DRV.DISTO set the drive disable delay PMM Usage - Drive Disable Delay controlled by PMM
DRV.DIR	1 = Normal 0 = Reverse	(0)	This parameter sets the motor shaft rotation direction in response to a positive command. The hardware configuration parameter Axis Direction sets the value of DRV.DIR. Axis Direction of Normal sets DRV.DIR to 1 and defines positive motion commands to result in counter-clockwise shaft rotation. Reverse sets DRV.DIR to zero to define positive direction as clockwise shaft rotation. This matches the definition in the PMM335 and is needed for application backward compatibility.
CAP Parameters	-	-	User Selection to setup Touch Probes PMM Usage – Touch Probes

2.1.2 FANUC Servo Motor to Emerson Servo Motor

Emerson servo motors have been selected to allow the user as easy a change out path as possible. In some cases, a given Emerson Motor supports the same mounting bolt pattern and same motor shaft size as the FANUC motor it will replace. Thus, the user should consult the motor upgrade guide for additional information when selecting a replacement motor.

2.1.3 PACMotion PMM345 Motion Module

The PMM345 motion module is designed to replace a PMM335 in the PACSystems controller. The PMM345 utilizes the same Fiber Terminal Block (FTB) and faceplate I/O as the PMM335. Thus, only the module itself requires replacement in the rack. Some I/O functions (homing and touchprobes) may have changes that may affect your PMM I/O assignments. For example, moving the I/O from the PMM over to the servo drive. Thus, review the sections that follow for any necessary I/O wiring changes.

2.1.3.1 Replacing the PMM335 with the PMM345

The PMM345 is installed in a PACSystems RX3i Universal Backplane (IC695CHS007, IC695CHS012 or IC695CHS016). It is not supported in an expansion or remote backplane.

Note: The FTB is mounted on a DIN rail and can be located a maximum distance of 100m from the PMM. Fiber optic cables in various standard lengths are available from Emerson.

2.2 Software

The PMM345 may require the user to upgrade their programming software (PME) and modify the application program. The sections that follow highlight these changes.

2.2.1 Software Downloads and Drivers

Software downloads and drivers are available on Emerson's Customer Center: (https://emerson-mas.force.com/communities).

After logging in to the Emerson Customer Center, click the **Software Orders & Download** tab

1. . Upon clicking, a portal will appear (Note: Javascript must be enabled.)
2. Click the **Downloads tab** to see a list of available drivers or software downloads available with your purchase.

2.2.2 Updating Hardware Configuration (PME)

Once the PMM335 has been removed and replaced by the PMM345 motion module in the backplane, the user will need to update their hardware configuration in PAC Machine Edition.

With version 9.80 of PAC Machine Edition, PMM345 will be available in the device catalog. To swap devices, follow the instructions below:

1. Open Hardware Configuration within PME and locate the PMM335 in the rack.
2. Right-click the PMM335 module and select **Replace Module** (Figure 2).
   The **Catalog** window will open.
3. Navigate to the **Motion** tab to reveal the catalog of Motion Devices.
4. Select **IC695PMM345 PAC Motion Digital Control Module** (Figure 3) and click **OK.**
5. The PMM345 module is now added to the hardware configuration. Additional steps to configure the module are detailed below and in PMM345 User's Manual.

Figure 2: Replace Module

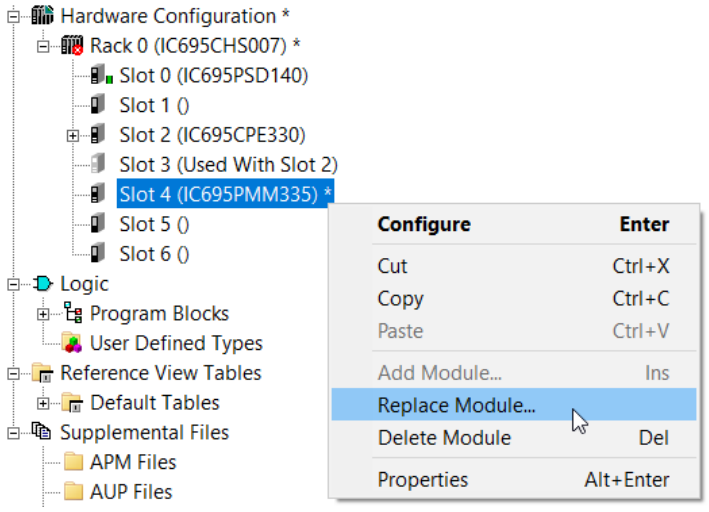
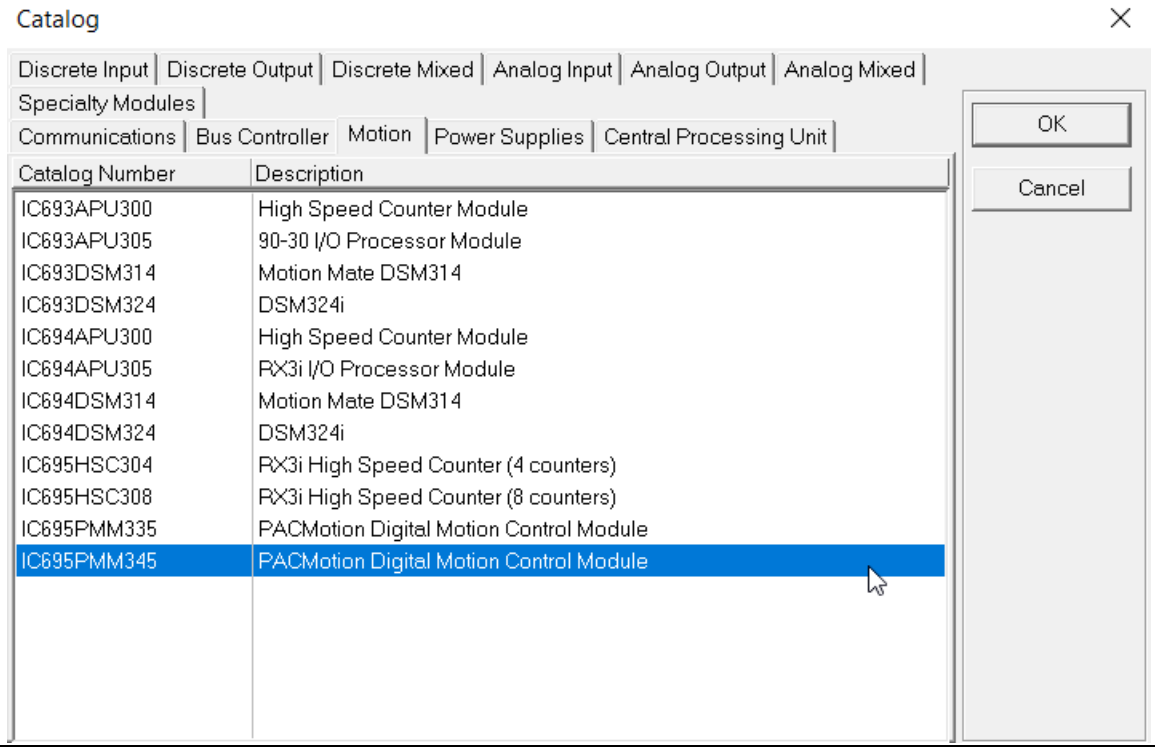


Figure 3: IC695PMM345



2.2.3 PMM345 Parameter Changes

The PMM345 supports Emerson EtherCAT based drives/motors. To access the new parameter options available in PME's hardware configuration, use the instructions in the PMM345 manual that focus on Hardware Configuration.

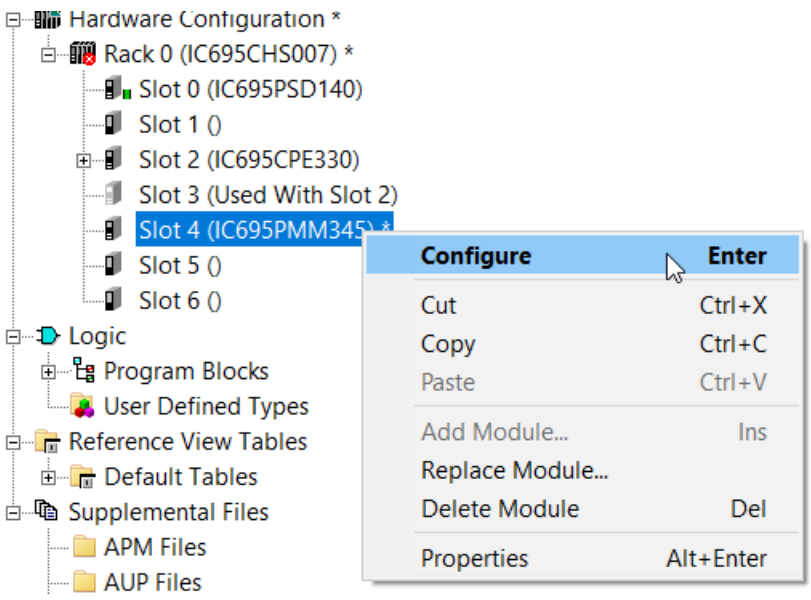
The module parameters are organized by tab. The following sections summarize the new parameters and their location.

For in-depth review of parameters, please consult GFK- 3140, *PACMotion Multi-Axis Motion Controller PMM345 User Manual.*

2.2.3.1 PMM345 Hardware Configuration

1. Open Hardware Configuration within PME and locate the PMM345 in the rack.
2. Right-click the PMM345 module and select **Configure**. The InfoViewer window will open.

Figure 4: Configure Module



The sections that follow highlight changes to the hardware configuration that will require attention in the migration process.

2.2.3.2 Axes Parameters

The following table shares new or changed drive parameters that are available in the PMM345 Hardware Configuration.

Parameter	Description
Drive Homing Mode	See Figure 7.
Drive Homing Direction	[Positive Edge Trigger | Negative Edge Trigger]
TouchProbe1 Drive Input	Drive Digital Input (1-7) RS485 Input (1-3)
TouchProbe1 Drive Detection	[Enabled | Disabled]
TouchProbe2 Drive Input	Drive Digital Input (1-7) RS485 Input (1-3)
TouchProbe2 Drive Detection	[Enabled | Disabled]
Torque Limt % Changed to Current Limit %	Current Limit % sets the maximum drive current available for the servo motor.

The following are parameter are no longer valid for a PMM345.

Parameter	Description
Load Inertia Ratio (256 = 1:1)	In PMM335, this parameter set the load inertia ratio utilized by the velocity loop. This is replaced by servo drive functionality and is no longer in the HW Configuration.

If the above parameters are not available, verify whether:

1) **Position Feedback Source** is set to **Motor Encoder** (Figure 5).
2) **Motor Type** is set to **PACMotion PSD411** (Figure 6).

Parameters for the touchprobe and drive homing will appear at the end of the parameter list on Axis 1.

Figure 5: Position Feedback Source

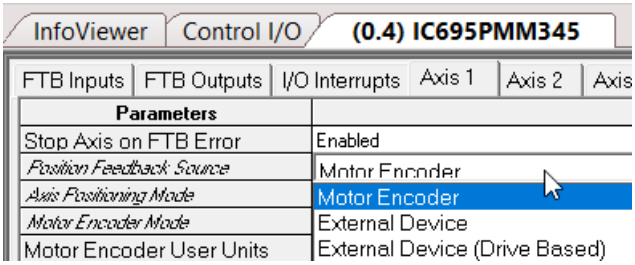
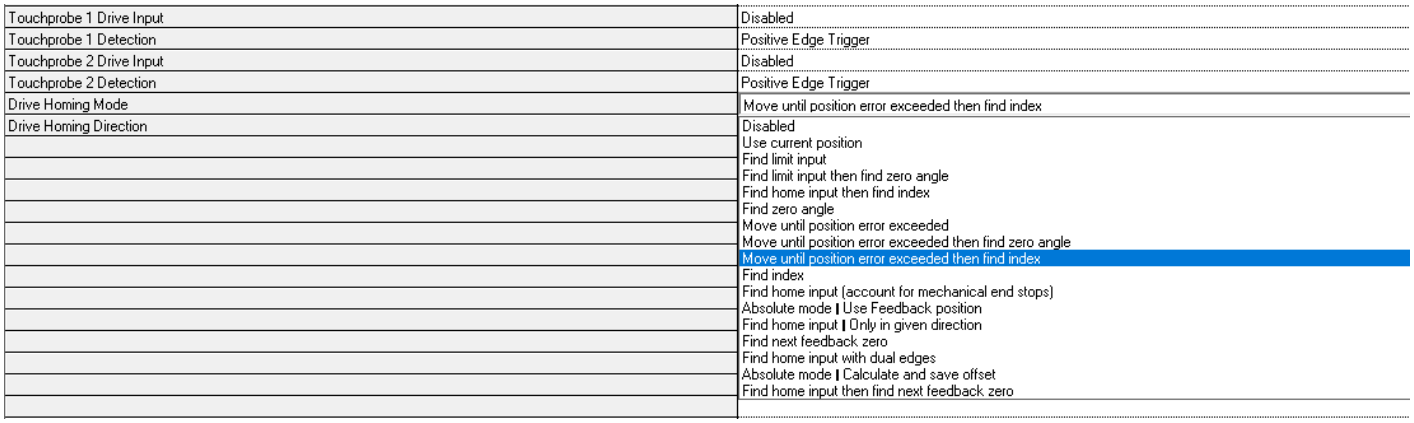


Figure 6: Motor PACMotion PSD411

Settings | FP I/O | FTB Inputs | FTB Outputs | I/O Interrupts | Axis 1 | Axis 2 | Axis 3

Parameters	
Stop Axis on FTB Error	Enabled
Position Feedback Source	Motor Encoder
Axis Positioning Mode	Linear
Motor Encoder Mode	Absolute
Motor Encoder User Units	1.0
Motor Encoder Counts	1
Motor Encoder Counts Per Motor Revolut...	1048576
Motor Encoder Maximum Positive RPM Li...	8191
Motor Encoder Maximum Negative RPM ...	8191
External Device	None
Over Travel Limit Switch	Enabled
Axis Direction	Normal
Software End of Travel	Enabled
High Software EOT Limit (uu)	8388607.0
Low Software EOT Limit (uu)	-8388608.0
Max Velocity System (RPM)	4000.0
Equivalent Velocity (uu/sec)	4369066.66666667
Max Acceleration System (RPM/sec)	40000.0
Equivalent Acceleration (uu/sec**2)	43690666.6666667
Max Deceleration System (RPM/sec)	40000.0
Equivalent Deceleration (uu/sec**2)	43690666.6666667
Max Jerk (uu/sec **3)	100000000000000.0
Drive Disable Delay (ms)	100
Drive Type	PACMotion PSD411
Motor Velocity Limit (RPM)	4000

Figure 7: Drive Homing Mode



2.2.4 New Find Home Sequence

The PMM345 EtherCAT axes uses a new Find Home Sequence. Specifically, the EtherCAT drive controls the find home cycle. Thus, the extensive drive homing modes are utilized to set a valid axis position.

This section will address requisite actions and states for configuration as well as different homing modes.

2.2.4.1 EtherCAT Drive Controlled Homing Configuration

When the EtherCAT drives motor encoder is used as the feedback source, the drive controls the homing cycle. The PMM345 Hardware Configuration and MC_Home function block parameters set the drive homing parameters and initiate the Find Home cycle. The drive controls homing movement including using the drive's position loop. Note: In all operational scenario's except homing, the PMM345 closes the position loop.

For the EtherCAT drive to be the feedback source the following parameters must be set in the PMM345 Hardware Configuration:

- Axis n Mode on the Settings Tab is set to **PM EtherCAT Servo**
- Position Feedback Source on the Axis n Tab is set to **Motor Encoder**
- Motor Type on the Axis n Tab is NOT set to **Synthetic**

When the above options are selected there will be two additional Hardware Configuration parameters on the Axis n Tab.

- Drive Homing Mode – Sets the drive mode. A detailed discussion of the available homing modes is available in the Servo Drive User's manual. Note: If the mode is set to Disabled, homing will have to be performed using PACMotion Workbench in service mode before connecting to the PMM345.

- Drive Homing Direction – Sets the homing direction, either Positive or Negative. Not used if Drive Homing Mode is set to Disabled.

Home switches or limit switches used for homing are configured on the Drive Digital I/O tab.

2.2.4.2 EtherCAT Drive Controlled Homing Application Logic

Set the MC_Home Homing Mode to DriveControlled to execute the Find Home cycle on the EtherCAT drive. Refer to PMM345 User Manual for details on other MC_Home parameters.

2.2.4.3 Restriction of Drive Controlled Homing

The drive does not use jerk limiting as part of the find home path planning. The MC_Home Jerk and JerkUnits parameters will not be used but are still required to be set to valid values.

MC_SetOverride cannot be used to modify the MC_Home velocity, acceleration or jerk when the drive is controlling the Find Home cycle.

2.2.4.4 Drive Homing Modes

List of available homing modes, Refer to the Servo Drive User's Manual for additional details:

- Current position
- Find limit input
- Find limit input then find zero angle
- Find home input then find index (Note 1)
- Find home switch
- Find home switch then find zero angle
- Find home switch then find index (Note 1)
- Find zero angle
- Find end stop (Note 2)
- Find end stop then find zero angle (Note 2)
- Find end stop then find index (Note 1)
- Find index (Note 1)
- Find home switch, including end stop detection
- Absolute feedback
- Find home switch only in given direction
- Find next zero angle
- Find home switch using dual edges

- User position
- Find home switch then next zero angle

Notes:

1. Homing to an index only applies to encoders with a physical marker pulse signal found on 3rd party motors. For Emerson Servo motors use the equivalent homing mode to Zero Angle.
2. When homing to a hard stop the drive parameter HOME.PERRTHRESH is used to set the amount of position error required to detect a mechanical stop. Use PMM345 Parameter 1305 to limit the torque when homing to a hard stop.

2.2.4.5 Using PMM345 to Control Homing

Analog Axes (Velocity and Torque), Synthetic Axes, and EtherCAT drives using an External Encoder connected to the PMM Faceplate or FTB will continue to use the PMM345 to control the Find Home cycle. Refer to the PMM345 User Manual for details on the available homing modes.

2.2.4.6 Checklist for Find Home Sequence

- The axis and drive must be powered on during an entire home cycle.
- When the Execute input transitions ON, the PositionValid axis status bit is turned OFF until the end of the home cycle.
- If an MC_Stop function block halts a home cycle, the PositionValid bit does not turn back ON.

  Note: No motion function blocks, with the exception of MC_JogAxis, that cause motion can be executed unless the PositionValid bit is ON. The Position input sets the absolute position when a reference signal is detected. The configured Home Offset defines the location of Home Position as the offset distance from the Home Marker.

2.2.4.7 Overview of Find Home Sequence

Issuing the MC_Home command in any state other than Standstill will result in an ErrorStop. MC_Home will end in Standstill state when it completes successfully.

The MC_Home function can operate in one of four modes, selected by the HomingMode input. For details and examples of the four homing modes reference the Servo Drive User's Manual.

- ***Drive Controlled: EtherCAT axes with motor feedback devices.*** In this mode, the drive performs homing using available drive homing modes. The MC_Home inputs will be written to corresponding drive parameters. MC_SetOverride is not available in this mode.
- **Limit Switch Reference Pulse (Absolute Home Switch): Axes 1 – 4.** In this mode, the configured Home Switch input is used to trigger the home cycle to look for the next Encoder Marker pulse. The next Encoder Marker pulse encountered when traveling in the negative direction sets the home position location.

  Note: Axis 5 does not support this mode.

- **Move+ (RefPulse).** In this mode, the first Encoder Marker pulse encountered when moving in the positive direction after the Find Home command is given is used to establish the exact location.
- **Move – (RefPulseNeg).** In this mode, the first Encoder Marker pulse encountered when moving in the negative direction after the Find Home command is given is used to establish the exact location.
- Axis 5 provides a Virtual Path Planner and interface to an External Device. Move+ and Move- are supported on Axis 5 only when configured with an External Device. In this case, the application must provide the means to rotate the External Device. The home position will be set when the first Encoder Marker pulse is encountered; regardless of the direction in which the axis is moving. If the Axis 5 Virtual Path Planner is used in the application, its position must be set independently, using MC_SetPosition.
- Execution type: Immediate execution/deferred response.

2.2.4.8 Homing Modes

2.2.4.8.1 Drive Controlled (EtherCAT Axes with Motor Feedback Devices only)

In this mode, the EtherCAT drive performs the homing operation using the Drive Homing mode. The Drive Homing mode can be set in the PMM345 hardware configuration by configuring the Drive Homing Mode parameter on the Axis 1 tab. It can also be configured in Workbench by setting the type of homing on the Home tab. Note: Using Workbench to control homing parameters requires that the Drive Homing Mode is set to Disabled. Both options will write the drive parameters HOME.MODE and HOME.DIR.

When MC_Home is executed the drive will switch to Position Mode and control the motion using parameters input to the MC_Home function block as well as parameters optionally set on the drive.

Restrictions on input parameters in this mode:

- Jerk and JerkUnits are not used in this mode; any values set will be ignored.
- FinalHomeVelocity is only used with Homing Modes that move to an index. Feedback devices that support homing to zero angle can perform the entire homing operation at the FindHomeVelocity as the feedback device knows the location of zero angle and is not searching for it as required for an index.

Restrictions on operations with this mode:

- MC_SetOverride is not available during this mode.

2.2.4.8.2 Parameters Written to Drive by Home Function

MC_Home Parameter	Drive Parameter	EtherCAT CoE Index	EtherCAT CoE Subindex
Position	HOME.P	0x607C	0
HomeOffset	Home.DIST	0x3484	0
FinalHomeVelocity	HOME.FEEDRATE	0x6099	2
FindHomeVelocity	HOME.V	0x6099	1

Acceleration	HOME.ACC	0x609A	0
Deceleration	HOME.DEC	0x3524	0

Additional homing parameters can be set on the drive. For a list of additional homing parameters, please consult GFK-3135, *PACMotion PMM335 to PMM345 Migration Guide*.

When homing to a hard stop HOME.IPEAK and HOME.IPEAKACTIVE can be used to limit the current and HOME.PERRTHRESH can be used to set the amount of position error to detect that a hard stop has been reached.

2.2.5 Touchprobes with EtherCAT Drives

To achieve the highest level of touchprobe accuracy the PMM345 module uses position captured on the EtherCAT drives.

This section will address the configuration and application logic updates for drive touchprobes.

2.2.5.1 Touchprobe Configuration

When the EtherCAT drives motor encoder is used as the feedback source, the touchprobe position capture is performed on the drive. The PMM345 Hardware Configuration and MC_Touchprobe function block parameters identify the drive input and edge transition that will trigger the position capture.

For the EtherCAT drive to capture the position the following parameters must be set in the PMM345 Hardware Configuration:

- Axis n Mode on the Settings Tab is set to **PM EtherCAT Servo**
- Position Feedback Source on the Axis n Tab is set to **Motor Encoder**
- Motor Type on the Axis n Tab is NOT set to **Synthetic**

When the above options are selected there will be four additional Hardware Configuration parameters on the Axis n Tab.

- Touchprobe 1 Drive Input – Selects the input on the drive used for Touchprobe 1.
- Touchprobe 1 Detection – Selects the transition of the drive input that will trigger Touchprobe 1.
- Touchprobe 2 Drive Input – Selects the input on the drive used for Touchprobe 2.
- Touchprobe 2 Detection – Selects the transition of the drive input that will trigger Touchprobe 2.

2.2.5.2 Pre-trigger Replaces Window Only Mode

The windowing mode is not supported on EtherCAT drives. If WindowOnly is enabled MC_Touchprobe will return an error. Instead the drives support a pre-trigger that can be used as a condition that must be met for the trigger to capture position. One option to replicate the WindowOnly mode is to use a Digital Cam Switch to set the pre-trigger condition.

2.2.5.3 Touchprobe Input on PMM345 Faceplate and FTB

Analog Axes (Velocity and Torque), Synthetic Axes, and EtherCAT drives using an External Encoder connected to the PMM Faceplate or FTB will continue to use touchprobe inputs on the PMM345 faceplate and/or Fiber Terminal Board (FTB). Refer to the PMM345 User Manual for details on faceplate and FTB wiring options.

2.2.6 Interpreting EtherCAT Faults

EtherCat faults will differ from legacy driver faults associated with PMM335. The following section outlines how to interpret vendor-specific drive faults and warnings.

2.2.6.1 Interpreting Drive Faults and Warnings

The PMM345 returns diagnostics to the I/zO fault table instead of a function block output pin. In the I/O fault table, the drive diagnostics are denoted by the Error ID 0xDE.

Diagnostic data denoted by Error ID 0xDE are reported in order of most recent to least recent. Thus, the most recent diagnostic data appears above less recent diagnostics in the I/O fault table, when more than one diagnostic is generated for an event.

2.2.6.2 Drive Faults

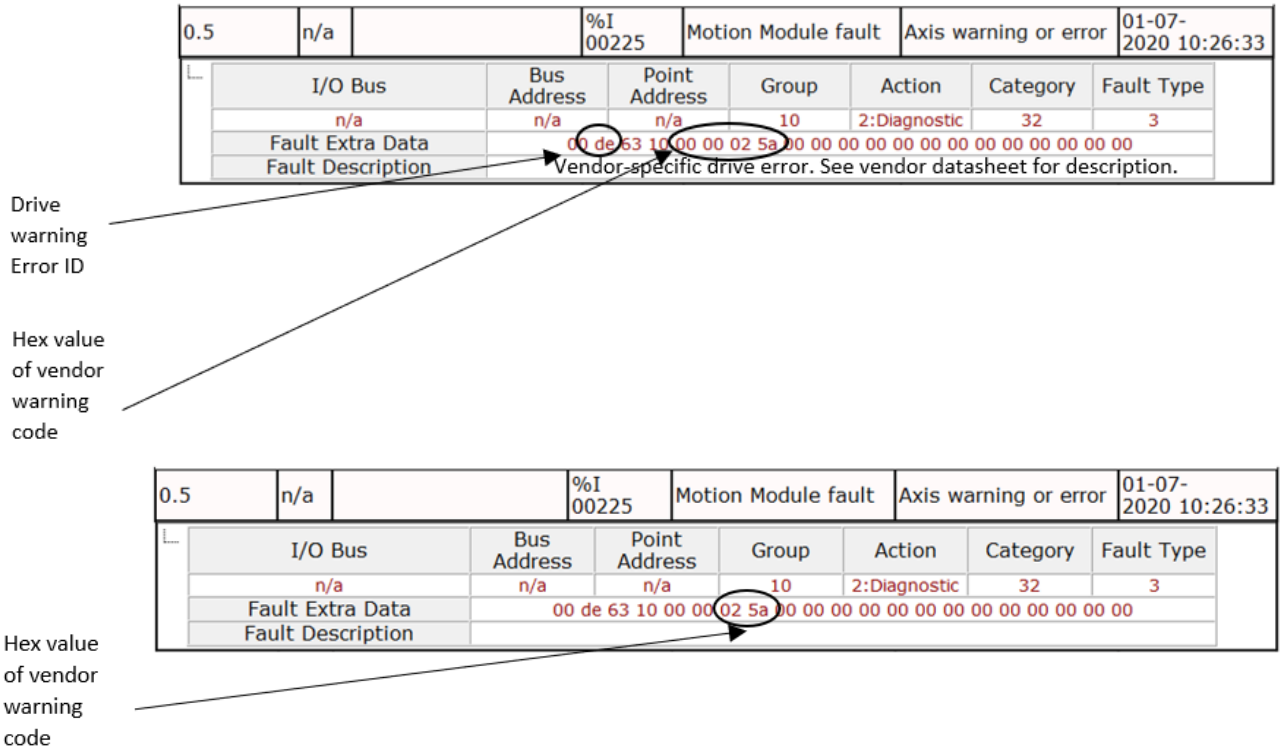
The PMM returns vendor-specific drive faults in the form of 16-bit hex numbers. The hexadecimal value can be converted to a decimal number that corresponds to the error table in *Fault and Warning Messages section of the Servo Drive User Guide.* These fault values will differ from legacy drive faults.

2.2.6.3 Drive Warnings

The PMM returns vendor-specific drive warnings in the form of 32-bit hex numbers. The hexadecimal value can be converted to a decimal number that corresponds to the error table contained in The warning code can be found in bytes 4-7 of the Fault Extra Data, corresponding to the entry for vendor-specific drive diagnostic information. Drive warnings are logged as warning-level events, which must be enabled on the PMM Hardware Configuration settings tab to be logged in the I/O fault table.

A second, informational event is logged along with a drive warning, which provides additional debug information in case of an issue. This informational event can be obtained from the PMM Event Queue Log.

Figure 8: Vendor-Specific Drive Warning Example



The 32-bit warning code can be found in the Event Data field of the Event Queue Log. The lower 16-bits of the associated informational event contain the lower 16-bits of the warning code.

Figure 9: Vendor-Specific Drive Warning, Viewed from PMM Event Queue

Axis 1	Informational	0x00DE	0x6300	0x09A0025A	No Stop	Vendor-specific drive error. See vendor datasheet for description.
Axis 1	Warning	0x00DE	0x6310	0x0000025A	No Stop	Vendor-specific drive error. See vendor datasheet for description.

Note: Home Switch and Touchprobe parameters will no longer have selections available.

The Find Home sequence is used to establish a valid actual position relative to a known reference point. The configured Home Offset defines the location of Home Position as the offset distance from the Home Marker.

2.2.7 PMM345 Replaces Torque Limit with Current Limit

Due to the EtherCAT Drives ability to support a broad motor offering, the PMM345 replaces Torque Limit with Current Limit. Thus, the TorqueLimit HWCfg setting and parameter 1015 are redefined to Current Limit. Both functions allow the application to approximately control motor torque. The new Current Limit function is defined as follows:

Current Limit

Specifies the maximum allowed drive current, in percent of available continuous drive current, to be produced by the servo motor at commanded velocity. The current limit range covers the drive continuous current rating (current limit = 100%) to the peak drive current rating (current limit = 300%). Drive current output is related to motor torque. Thus, setting the current limit yields the ability to approximately set the maximum motor torque. To determine the actual value of torque output available at a given velocity, refer to the motor torque curve and Motor Torque Constant in the appropriate servo motor manual.

To set new Current Limit Function to be equal to Old Torque Limit use the following formula.

New Current Limit Value = (Old Torque Limit Value/100)*(Peak Motor Current/Peak Drive Current)*300

For Example

Motor Peak Current = 6.312 Arms

Peak Drive Current = 9 Arms

Old Torque Limit = 50%

New Current Limit Value = (50/100)*(6.312/9)*300

New Current Limit Value = 105.2

2.2.8 PMM345 Replaces TorqueLimitActive with CurrentLimitActive

The PMM345 redefines parameter 1207 to be CurrentLimitActive.

In the PMM335, TorqueLimitActive (parameter 1207) indicates commanded torque has exceeded the Torque Limit setting (set in HWCfg and modified via Parameter 1015).

In the PMM345, CurrentLimitActive (parameter 1207) indicates commanded current has exceeded the Current Limit setting (set in HWCfg and modified via Parameter 1015).

2.2.9 Servo Drive Parameters Managed by PMM345

The table that follows summarizes all the Servo Drive Parameters that are managed by the PMM345 module. Thus, any value that a user defines in Workstation can be overwritten by the PMM345 either during startup or via a function block. Note: Drive Homing Mode when set to disabled allows homing to be configured in Workbench if desired and the PMM345 will not modify these parameters while in this mode. See prior section on homing for more information.

PSD Parameter	PMM345 Parameter	Description
IL.LIMITN (Current Limit Negative) IL.LIMITP (Current Limit Positive)	HWCfg – Current Limit Parameter 1015 – Current Limit	Specifies the maximum allowed drive current, in percent of available continuous drive current, to be produced by the servo motor at commanded velocity
HOME.MODE	HWCfg – Drive Homing Mode	Specifies the homing method that will be used when MC_Home is executed with MC_HomingMode = DriveControlled.
HOME.DIR	HWCfg – Drive Homing Direction	Specifies the direction of the homing move, either Positive or Negative that will be used when MC_Home is executed with MC_HomingMode = DriveControlled.
HOME.P	MC_Home.Position	The value assigned to Commanded Position when a drive controlled Find Home cycle completes.
HOME.V	MC_Home.FindHomeVelocity	The maximum velocity of a drive-controlled homing move. See description of the HOME.MODE selection for more details.
HOME.FEEDRATE	MC_Home.FinalHomeVelocity	The maximum velocity of a drive-controlled homing move to the encoder index pulse. Not used for all homing modes. See description of the HOME.MODE selection for more details.
HOME.ACC	MC_Home.Acceleration	The maximum acceleration of a drive-controlled homing move.

PSD Parameter	PMM345 Parameter	Description
HOME.DEC	MC_Home.Deceleration	The maximum deceleration of a drive-controlled homing move.
HOME.DIST	MC_Home.HomeOffset	A value added to or subtracted from the servo's final stopping point when a Find Home cycle completes.
CAP0.TRIGGER CAP1.TRIGGER	HWCfg – Touchprobe 1 Drive Input, Touchprobe 2 Drive Input	Specifies which drive input will be used to trigger the touchprobe used with MC_Touchprobe.
CAP0.MODE CAP1.MODE	N/A	Sets the touchprobe capture position mode to Standard Position. Only set if CAPn.TRIGGER is NOT set to Disabled.
CAP0.FBSOURCE CAP1.FBSOURCE	N/A	Sets the touchprobe capture feedback source to Standard Position Capture. Only set if CAPn.TRIGGER is NOT set to Disabled.
DRV.DIR	HWCfg – Axis Direction	Specifies whether the axis direction is normal or reverse.

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