

Subset of the

Technical Specification

PLCopen - Technical Committee 2 – Task Force

Function blocks for motion control

(Formerly Part 1 and Part 2)

Version 2.0

Appendix B

Compliance Procedure and Compliance List

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March 17, 2011.

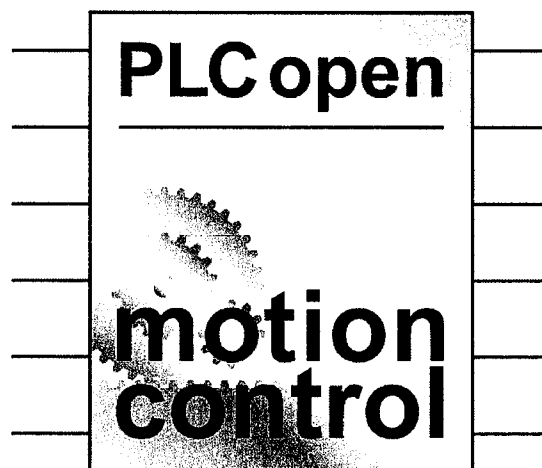
Appendix B. Compliance Procedure and Compliance List

Listed in this Appendix are the requirements for the compliance statement from the supplier of the Motion Control Function Blocks. The compliance statement consists of two main groups: supported data types and supported Function Blocks, in combination with the applicable inputs and outputs. The supplier is required to fill out the tables for the used data types and Function Blocks, according to their product, committing their support to the specification.

By submitting these tables to PLCopen, and after approval by PLCopen, the list will be published on the PLCopen website, www.plcopen.org as well as a shortform overview, as specified in Appendix B 2 Supported Data types and Appendix B 3 Overview of the Function Blocks as below.

In addition to this approval, the supplier is granted access and usage rights of the PLCopen Motion Control logo, as described in Appendix B 4:

The PLCopen Motion Control Logo and Its Usage..



Data types

The data type REAL listed in the Function Blocks and parameters (e.g. for velocity, acceleration, distance, etc.) may be exchanged to SINT, INT, DINT or LREAL without to be seen as incompliant to this standard, as long as they are consistent for the whole set of Function Blocks and parameters.

Implementation allows the extension of data types as long as the basic data type is kept. For example: WORD may be changed to DWORD, but not to REAL.

Function Blocks and Inputs and Outputs

An implementation which claims compliance with this PLCopen specification shall offer a set of Function Blocks for motion control, meaning one or more Function Blocks, with at least the **basic** input and output variables, marked as "**B**" in the tables. These inputs and outputs have to be supported to be compliant.

For higher-level systems and future extensions any subset of the **extended** input and output variables, marked as "**E**" in the tables can be implemented.

Vendor specific additions are marked with "**V**", and can be listed as such in the supplier documentation.

- | | |
|--|---|
| - Basic input/output variables are mandatory | Marked in the tables with the letter " B " |
| - Extended input /output variables are optional | Marked in the tables with the letter " E " |
| - Vendor Specific additions | Marked in the vendor's compliance documentation with " V " |

All the vendor specific items will not be listed in the comparison table on the PLCopen website, but in the detailed vendor specific list, which also is published.

All vendor specific in- and outputs of all FBs must be listed in the certification list of the supplier. With this, the certification listing from a supplier describes all the I/Os of the relevant FBs, including vendor-specific extensions, and thus showing the complete FBs as used by the supplier.

Appendix B 1. Statement of Supplier

Supplier name	MITSUBISHI ELECTRIC CORPORATION
Supplier address	1-14, Yada-minami 5-chome, Higashi-ku
City	Nagoya
Country	Japan
Telephone	+81-52-712-3164
Fax	+81-52-712-4304
Email address	Kimura.Shinsuke@db.MitsubishiElectric.co.jp
Product Name	iQ-F Series FX5U/FX5UC/FX5UJ/FX5S/FX5-ENET, GX Works3
Product version	1.01A
Release date	2021/10/29

I hereby state that the following tables as filled out and submitted do match our product as well as the accompanying user manual, as stated above.

Name of representation (person):
Takashi Tsuboi,
Division Manager of FA System Department 3

Date of signature (dd/mm/yyyy):

27/09/2021

Signature:



Appendix B 2. Supported Data types

Defined datatypes with MC library:	Supported	If not supported, which datatype used
BOOL	Y	called Bit
INT	Y	called Word[Signed]
WORD	Y	called Word[Unsigned]/Bit String[16-bit]
REAL	N	Supported as Double Word [Signed]
ENUM	N	Supported as pre-defined INT labels
UINT	Y	called Word[Unsigned]/Bit String[16-bit]

Table 1: Supported datatypes

Within the specification the following derived datatypes are defined. Define which of these structures are used in this system:

Derived datatypes:	Where used	Supported	Which structure
AXIS_REF	Nearly all FBs	Y	Structured Data Types
MC_DIRECTION (extended)	MC_MoveAbsolute MC_MoveVelocity MC_TorqueControl MC_MoveContinuousAbsolute	Y Y Y N	Supported as pre-defined INT label with the following values: mcPositiveDirection 80 mcNegativeDirection 40
MC_TP_REF	MC_PositionProfile	N	
MC_TV_REF	MC_VelocityProfile	N	
MC_TA_REF	MC_AccelerationProfile	N	
MC_CAM_REF	MC_CamTableSelect	N	
MC_CAM_ID (extended)	MC_CamTableSelect MC_CamIn	N N	
MC_START_MODE (extended)	MC_CamIn MC_CamTableSelect	N N	
MC_BUFFER_MODE	Buffered FBs	N	
MC_EXECUTION_MODE	MC_SetPosition MC_WriteParameter MC_WriteBoolParameter MC_WriteDigitalOutput MC_CamTableSelect	N N N N N	
MC_SOURCE	MC_ReadMotionState MC_CamIn MC_GearIn MC_GearInPos MC_CombineAxes MC_DigitalCamSwitch	N N N N N N	
MC_SYNC_MODE	MC_GearInPos	N	
MC_COMBINE_MODE	MC_CombineAxes	N	
MC_TRIGGER_REF	MC_TouchProbe MC_AbortTrigger	N N	
MC_INPUT_REF	MC_ReadDigitalInput	N	
MC_OUTPUT_REF	MC_DigitalCamSwitch MC_ReadDigitalOutput MC_WriteDigitalOutput	N N N	
MC_CAMSWITCH_REF	MC_DigitalCamSwitch	N	
MC_TRACK_REF	MC_DigitalCamSwitch	N	

Table 2: Supported derived datatypes

Appendix B 3. Overview of the Function Blocks

Single Axis Function Blocks	Supported as V1.0/ V1.1/ V2.0 or Not	Comments (<= 48 char.)
MC Power	V2.0	
MC_Home	Not	The vendor-specific MCv_Home is used. This is because the mandatory "position" must be set either via our configurator or via the PLC program before activating the MC_Power FB.
MC Stop	V2.0	
MC Halt	V2.0	
MC MoveAbsolute	V2.0	
MC MoveRelative	V2.0	
MC MoveAdditive	V2.0	
MC MoveSuperimposed	Not	
MC HaltSuperimposed	Not	
MC MoveVelocity	V2.0	
MC MoveContinuousAbsolute	Not	
MC MoveContinuousRelative	Not	
MC TorqueControl	V2.0	
MC PositionProfile	Not	
MC VelocityProfile	Not	
MC AccelerationProfile	Not	
MC SetPosition	Not	
MC SetOverride	Not	
MC_ReadParameter & MC_ReadBoolParameter	Not	
MC_WriteParameter & MC_WriteBoolParameter	Not	
MC ReadDigitalInput	Not	
MC ReadDigitalOutput	Not	
MC WriteDigitalOutput	Not	
MC ReadActualPosition	Not	
MC ReadActualVelocity	Not	
MC ReadActualTorque	Not	
MC ReadStatus	Not	
MC ReadMotionState	Not	
MC ReadAxisInfo	Not	
MC ReadAxisError	Not	
MC Reset	V2.0	
MC DigitalCamSwitch	Not	
MC TouchProbe	Not	
MC AbortTrigger	Not	
Multi-Axis Function Blocks	Supported as V1.0/ V1.1/ V2.0 or Not	Comments (<= 48 char.)
MC CamTableSelect	Not	
MC CamIn	Not	
MC CamOut	Not	
MC GearIn	Not	
MC GearOut	Not	
MC GearInPos	Not	
MC PhasingAbsolute	Not	
MC PhasingRelative	Not	
MC CombineAxes	Not	

Table 3: Short overview of the Function Blocks

Appendix B 3.1 MC Power

If Supported	MC Power	Sup. Y/N	Comments
VAR IN OUT			
B	Axis	Y	
VAR INPUT			
B	Enable	Y	
E	EnablePositive	N	
E	EnableNegative	N	
VAR OUTPUT			
B	Status	Y	
E	Valid	N	
V	Busy	Y	Datatype is BOOL Indicates that the FB is in execution
B	Error	Y	
E	ErrorID	Y	

Appendix B 3.2 MC Home

If Supported	MC Home	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
VAR INPUT			
B	Execute		
B	Position		
E	BufferMode		
VAR OUTPUT			
B	Done		
E	Busy		
E	Active		
E	CommandAborted		
B	Error		
E	ErrorID		

Appendix B 3.3 MC Stop

If Supported	MC Stop	Sup. Y/N	Comments
VAR IN OUT			
B	Axis	Y	
VAR INPUT			
B	Execute	Y	
E	Deceleration	N	Intepreted according the settings of the servo amplifier. It can be read resp. set by <u>Obj.6084h</u> when using <u>MCv_ReadMultiObject / MCv_WriteMultiObject</u> (FBs)
E	Jerk	N	
VAR OUTPUT			
B	Done	Y	
E	Busy	Y	
E	CommandAborted	N	
B	Error	Y	
E	ErrorID	Y	

Appendix B 3.4 MC Halt

If Supported	MC Halt	Sup. Y/N	Comments
VAR IN OUT			
B	Axis	Y	
VAR INPUT			
B	Execute	Y	

E	Deceleration	Y	Supported as Double Word [Signed] The value specifies the time needed for the speed to decrease from speed limit value to zero. The value is specified in the unit [ms] (>1 ms).
E	Jerk	N	
E	BufferMode	N	
VAR OUTPUT			
B	Done	Y	
E	Busy	Y	
E	Active	N	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	Y	

Appendix B 3.5 MC MoveAbsolute

If Supported	MC MoveAbsolute	Sup. Y/N	Comments
VAR IN OUT			
B	Axis	Y	
VAR INPUT			
B	Execute	Y	
E	ContinuousUpdate	N	
B	Position	Y	Supported as Double Word [Signed]
B	Velocity	Y	Supported as Double Word [Signed]
E	Acceleration	Y	Supported as Double Word [Signed] The value specifies the time needed for the speed to increase from zero to the speed limit value. The value is specified in the unit [ms] (>1 ms).
E	Deceleration	Y	Supported as Double Word [Signed] The value specifies the time needed for the speed to decrease from speed limit value to zero. The value is specified in the unit [ms] (>1 ms).
E	Jerk	N	
B	Direction	Y	Supported as pre-defined INT label Refer to Table 2 for their values
E	BufferMode	N	
VAR OUTPUT			
B	Done	Y	
E	Busy	Y	
E	Active	N	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	Y	

Appendix B 3.6 MC MoveRelative

If Supported	MC MoveRelative	Sup. Y/N	Comments
VAR IN OUT			
B	Axis	Y	
VAR INPUT			
B	Execute	Y	
E	ContinuousUpdate	N	
B	Distance	Y	Supported as Double Word [Signed]
E	Velocity	Y	Supported as Double Word [Signed]

E	Acceleration	Y	Supported as Double Word [Signed] The value specifies the time needed for the speed to increase from zero to the speed limit value. The value is specified in the unit [ms] (>1 ms).
E	Deceleration	Y	Supported as Double Word [Signed] The value specifies the time needed for the speed to decrease from the speed limit value zero. The value is specified in the unit [ms] (>1 ms).
E	Jerk	N	
E	BufferMode	N	
VAR OUTPUT			
B	Done	Y	
E	Busy	Y	
E	Active	N	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	Y	

Appendix B 3.7 MC MoveAdditive

If Supported	MC MoveAdditive	Sup. Y/N	Comments
VAR IN OUT			
B	Axis	Y	
VAR INPUT			
B	Execute	Y	
E	ContinuousUpdate	N	
B	Distance	Y	Supported as Double Word [Signed]
E	Velocity	Y	Supported as Double Word [Signed]
E	Acceleration	Y	Supported as Double Word [Signed] The value specifies the time needed for the speed to increase from zero to the speed limit value. The value is specified in the unit [ms] (>1 ms).
E	Deceleration	Y	Supported as Double Word [Signed] The value specifies the time needed for the speed to decrease from the speed limit value to zero. The value is specified in the unit [ms] (>1 ms).
E	Jerk	N	
E	BufferMode	N	
VAR OUTPUT			
B	Done	Y	
E	Busy	Y	
E	Active	N	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	Y	

Appendix B 3.8 MC_MoveSuperimposed

If Supported	MC_MoveSuperimposed	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis		
VAR_INPUT			
B	Execute		
E	ContinuousUpdate		
B	Distance		
E	VelocityDiff		
E	Acceleration		
E	Deceleration		
E	Jerk		
VAR_OUTPUT			
B	Done		
E	Busy		
E	CommandAborted		
B	Error		
E	ErrorID		
E	CoveredDistance		

Appendix B 3.9 MC_HaltSuperimposed

If Supported	MC_HaltSuperimposed	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis		
VAR_INPUT			
B	Execute		
E	Deceleration		
E	Jerk		
VAR_OUTPUT			
B	Done		
E	Busy		
E	CommandAborted		
B	Error		
E	ErrorID		

Appendix B 3.10 MC MoveVelocity

If Supported	MC MoveVelocity	Sup. Y/N	Comments
VAR IN OUT			
B	Axis	Y	
VAR INPUT			
B	Execute	Y	
E	ContinuousUpdate	N	
B	Velocity	Y	Supported as Double Word [Signed]
E	Acceleration	Y	Supported as Double Word [Signed] The value specifies the time needed for the speed to increase from zero to the speed limit value. The value is specified in the unit [ms] (>1 ms).
E	Deceleration	Y	Supported as Double Word [Signed] The value specifies the time needed for the speed to decrease from the speed limit to zero. The value is specified in the unit [ms] (>1 ms).
E	Jerk	N	
E	Direction	Y	Supported as pre-defined INT label Refer to Table 2 for their values
E	BufferMode	N	
VAR OUTPUT			
B	InVelocity	Y	
E	Busy	Y	
E	Active	N	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	Y	

Appendix B 3.11 MC MoveContinuousAbsolute

If Supported	MC MoveContinuousAbsolute	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
VAR INPUT			
B	Execute		
E	ContinuousUpdate		
B	Position		
B	EndVelocity		
B	Velocity		
E	Acceleration		
E	Deceleration		
E	Jerk		
E	Direction		
E	BufferMode		
VAR OUTPUT			
B	InEndVelocity		
E	Busy		
E	Active		
E	CommandAborted		
B	Error		
E	ErrorID		

Appendix B 3.12 MC MoveContinuousRelative

If Supported	MC MoveContinuousRelative	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		

VAR INPUT			
B	Execute		
E	ContinuousUpdate		
B	Distance		
B	EndVelocity		
B	Velocity		
E	Acceleration		
E	Deceleration		
E	Jerk		
E	BufferMode		
VAR OUTPUT			
B	InEndVelocity		
E	Busy		
E	Active		
E	CommandAborted		
B	Error		
E	ErrorID		

Appendix B 3.13 MC_TorqueControl

If Supported	MC_TorqueControl	Sup. Y/N	Comments
VAR IN OUT			
B	Axis	Y	
VAR INPUT			
B	Execute	Y	
E	ContinuousUpdate	N	
B	Torque	Y	Supported as Double Word [Signed]
E	TorqueRamp	Y	Supported as Double Word [Signed]
E	Velocity	Y	Supported as Double Word [Signed]
E	Acceleration	N	
E	Deceleration	N	
E	Jerk	N	
E	Direction	Y	Supported as pre-defined INT label Refer to Table 2 for their values
E	BufferMode	N	
VAR OUTPUT			
B	InTorque	Y	
E	Busy	Y	
E	Active	N	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	Y	

Appendix B 3.14 MC_PositionProfile

If Supported	MC_PositionProfile	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
B	TimePosition		
VAR INPUT			
B	Execute		
E	ContinuousUpdate		
E	TimeScale		
E	PositionScale		
E	Offset		
E	BufferMode		
VAR OUTPUT			

B	Done		
E	Busy		
E	Active		
E	CommandAborted		
B	Error		
E	ErrorID		

Appendix B 3.15 MC VelocityProfile

If Supported	MC VelocityProfile	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
B	TimeVelocity		
VAR INPUT			
B	Execute		
E	ContinuousUpdate		
E	TimeScale		
E	VelocityScale		
E	Offset		
E	BufferMode		
VAR OUTPUT			
B	ProfileCompleted		
E	Busy		
E	Active		
E	CommandAborted		
B	Error		
E	ErrorID		

Appendix B 3.16 MC AccelerationProfile

If Supported	MC AccelerationProfile	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
B	TimeAcceleration		
VAR INPUT			
B	Execute		
E	ContinuousUpdate		
E	TimeScale		
E	AccelerationScale		
E	Offset		
E	BufferMode		
VAR OUTPUT			
B	ProfileCompleted		
E	Busy		
E	Active		
E	CommandAborted		
B	Error		
E	ErrorID		

Appendix B 3.17 MC SetPosition

If Supported	MC SetPosition	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
VAR INPUT			
B	Execute		
B	Position		
E	Relative		
E	ExecutionMode		
VAR OUTPUT			
B	Done		
E	Busy		
B	Error		
E	ErrorID		

Appendix B 3.18 MC SetOverride

If Supported	MC SetOverride	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
VAR INPUT			
B	Enable		
B	VelFactor		
E	AccFactor		
E	JerkFactor		
VAR OUTPUT			
B	Enabled		
E	Busy		
B	Error		
E	ErrorID		

Appendix B 3.19 MC_ReadParameter & MC_ReadBoolParameter

If Supported	MC_ReadParameter	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
VAR INPUT			
B	Enable		
B	ParameterNumber		
VAR OUTPUT			
B	Valid		
E	Busy		
B	Error		
E	ErrorID		
B	Value		

If Supported	MC_ReadBoolParameter	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
VAR INPUT			
B	Enable		
B	ParameterNumber		
VAR OUTPUT			
B	Valid		
E	Busy		
B	Error		
E	ErrorID		
B	Value		

Name	B/E	R/W	Supp . Y/N	Comments
CommandedPosition	B	R		
SWLimitPos	E	R/W		
SWLimitNeg	E	R/W		
EnableLimitPos	E	R/W		
EnableLimitNeg	E	R/W		
EnablePosLagMonitoring	E	R/W		
MaxPositionLag	E	R/W		
MaxVelocitySystem	E	R		
MaxVelocityAppl	B	R/W		
ActualVelocity	B	R		
CommandedVelocity	B	R		
MaxAccelerationSystem	E	R		
MaxAccelerationAppl	E	R/W		
MaxDecelerationSystem	E	R		
MaxDecelerationAppl	E	R/W		
MaxJerkSystem	E	R		
MarkJerkAppl	E	R/W		
SWLimitValid	V	R/W		

Table 4: Parameters for MC_Read(Bool)Parameter and MC_Write(Bool)Parameter

Appendix B 3.20 MC WriteParameter & MC WriteBoolParameter

If Supported	MC WriteParameter	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
VAR INPUT			
B	Execute		
B	ParameterNumber		
B	Value		
E	ExecutionMode		
VAR OUTPUT			
B	Done		
E	Busy		
B	Error		
E	ErrorID		

If Supported	MC WriteBoolParameter	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
VAR INPUT			
B	Execute		
B	ParameterNumber		
B	Value		
E	ExecutionMode		
VAR OUTPUT			
B	Done		
E	Busy		
B	Error		
E	ErrorID		

Appendix B 3.21 MC ReadDigitalInput

If Supported	MC ReadDigitalInput	Sup. Y/N	Comments
VAR IN OUT			
B	Input		
VAR INPUT			
B	Enable		
E	InputNumber		
VAR OUTPUT			
B	Valid		
E	Busy		
B	Error		
E	ErrorID		
B	Value		

Appendix B 3.22 MC_ReadDigitalOutput

If Supported	MC_ReadDigitalOutput	Sup. Y/N	Comments
VAR IN OUT			
B	Output		
VAR INPUT			
B	Enable		
E	OutputNumber		
VAR OUTPUT			
B	Valid		
E	Busy		
B	Error		
E	ErrorID		
B	Value		

Appendix B 3.23 MC_WriteDigitalOutput

If Supported	MC_WriteDigitalOutput	Sup. Y/N	Comments
VAR IN OUT			
B	Output		
VAR INPUT			
B	Execute		
E	OutputNumber		
B	Value		
E	ExecutionMode		
VAR OUTPUT			
B	Done		
E	Busy		
B	Error		
E	ErrorID		

Appendix B 3.24 MC_ReadActualPosition

If Supported	MC_ReadActualPosition	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
VAR INPUT			
B	Enable		
VAR OUTPUT			
B	Valid		
E	Busy		
B	Error		
E	ErrorID		
B	Position		
V	MachinePosition		

Appendix B 3.25 MC_ReadActualVelocity

If Supported	MC_ReadActualVelocity	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
VAR INPUT			
B	Enable		
VAR OUTPUT			
B	Valid		
E	Busy		
B	Error		

E	ErrorID		
B	Velocity		

Appendix B 3.26 MC_ReadActualTorque

If Supported	MC_ReadActualTorque	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
VAR INPUT			
B	Enable		
VAR OUTPUT			
B	Valid		
E	Busy		
B	Error		
E	ErrorID		
B	Torque		

Appendix B 3.27 MC_ReadStatus

If Supported	MC_ReadStatus	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
VAR INPUT			
B	Enable		
VAR OUTPUT			
B	Valid		
E	Busy		
B	Error		
E	ErrorID		
B	ErrorStop		
B	Disabled		
B	Stopping		
E	Homing		
B	Standstill		
E	DiscreteMotion		
E	ContinuousMotion		
E	SynchronizedMotion		

Appendix B 3.28 MC_ReadMotionState

If Supported	MC_ReadMotionState	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
VAR INPUT			
B	Enable		
E	Source		
VAR OUTPUT			
B	Valid		
E	Busy		
B	Error		
E	ErrorID		
E	ConstantVelocity		
E	Accelerating		
E	Decelerating		
E	DirectionPositive		
E	DirectionNegative		

Appendix B 3.29 MC_ReadAxisInfo

If Supported	MC_ReadAxisInfo	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
VAR INPUT			
B	Enable		
VAR OUTPUT			
B	Valid		
E	Busy		
B	Error		
E	ErrorID		
E	HomeAbsSwitch		
E	LimitSwitchPos		
E	LimitSwitchNeg		
E	Simulation		
E	CommunicationReady		
E	ReadyForPowerOn		
E	PowerOn		
E	IsHomed		
E	AxisWarning		

Appendix B 3.30 MC_ReadAxisError

If Supported	MC_ReadAxisError	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
VAR INPUT			
B	Enable		
VAR OUTPUT			
B	Valid		
E	Busy		
B	Error		
B	ErrorID		
E	AxisErrorID		
V	AxisWarningID		

Appendix B 3.31 MC Reset

If Supported	MC Reset	Sup. Y/N	Comments
VAR IN OUT			
B	Axis	Y	
VAR INPUT			
B	Execute	Y	
VAR OUTPUT			
B	Done	Y	
E	Busy	Y	
B	Error	Y	
E	ErrorID	Y	

Appendix B 3.32 MC DigitalCamSwitch

If Supported	MC_DigitalCamSwitch	Sup.Y/N	Comments
VAR IN OUT			
B	Axis		
B	Switches		
E	Outputs		
E	TrackOptions		
VAR INPUT			
B	Enable		
E	EnableMask		
E	ValueSource		
VAR OUTPUT			
B	InOperation		
E	Busy		
B	Error		
E	ErrorID		

Basic elements within the array structure of MC CAMSWITCH_REF

B/E	Parameter	Sup.Y/N	Comments
B	TrackNumber		
B	FirstOnPosition [u]		
B	LastOnPosition [u]		
E	AxisDirection		
E	CamSwitchMode		
E	Duration		

Basic elements within the array structure of MC TRACK_REF

B/E	Parameter	Sup.Y/N	Comments
E	OnCompensation		
E	OffCompensation		
E	Hysteresis [u]		

Appendix B 3.33 MC TouchProbe

If Supported	MC TouchProbe	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
E	TriggerInput		
VAR INPUT			
B	Execute		
E	WindowOnly		
E	FirstPosition		
E	LastPosition		
VAR OUTPUT			
B	Done		
E	Busy		
E	CommandAborted		
B	Error		
E	ErrorID		
B	RecordedPosition		

Appendix B 3.34 MC AbortTrigger

If Supported	MC AbortTrigger	Sup. Y/N	Comments
VAR IN OUT			
B	Axis		
E	TriggerInput		
VAR INPUT			
B	Execute		
VAR OUTPUT			
B	Done		
E	Busy		
B	Error		
E	ErrorID		

Appendix B 3.35 MC CamTableSelect

If Supported	MC CamTableSelect	Sup. Y/N	Comments
VAR IN OUT			
E	Master		
E	Slave		
B	CamTable		
VAR INPUT			
B	Execute		
E	Periodic		
E	MasterAbsolute		
E	SlaveAbsolute		
E	ExecutionMode		
VAR OUTPUT			
B	Done		
E	Busy		
B	Error		
E	ErrorID		
E	CamTableID		

Appendix B 3.36 MC_CamIn

If Supported	MC_CamIn	Sup. Y/N	Comments
VAR IN OUT			
B	Master		
B	Slave		
VAR INPUT			
B	Execute		
E	ContinuousUpdate		
E	MasterOffset		
E	SlaveOffset		
E	MasterScaling		
E	SlaveScaling		
E	MasterStartDistance		
E	MasterSyncPosition		
E	StartMode		
E	MasterValueSource		
E	CamTableID		
E	BufferMode		
VAR OUTPUT			
B	InSync		
E	Busy		
E	Active		
E	CommandAborted		
B	Error		
E	ErrorID		
E	EndOfProfile		

Appendix B 3.37 MC_CamOut

If Supported	MC_CamOut	Sup. Y/N	Comments
VAR IN OUT			
B	Slave		
VAR INPUT			
B	Execute		
VAR OUTPUT			
B	Done		
E	Busy		
B	Error		
E	ErrorID		

Appendix B 3.38 MC_GearIn

If Supported	MC_GearIn	Sup. Y/N	Comments
VAR IN OUT			
B	Master		
B	Slave		
VAR INPUT			
B	Execute		
E	ContinuousUpdate		
B	RatioNumerator		
B	RatioDenominator		
E	MasterValueSource		
E	Acceleration		
E	Deceleration		
E	Jerk		
E	BufferMode		
VAR OUTPUT			
B	InGear		
E	Busy		
E	Active		
E	CommandAborted		
B	Error		
E	ErrorID		

Appendix B 3.39 MC_GearOut

If Supported	MC_GearOut	Sup. Y/N	Comments
VAR IN OUT			
B	Slave		
VAR INPUT			
B	Execute		
VAR OUTPUT			
B	Done		
E	Busy		
B	Error		
E	ErrorID		

Appendix B 3.40 MC GearInPos

If Supported	MC GearInPos	Sup. Y/N	Comments
VAR IN OUT			
B	Master		
B	Slave		
VAR INPUT			
B	Execute		
B	RatioNumerator		
B	RatioDenominator		
E	MasterValueSource		
B	MasterSyncPosition		
B	SlaveSyncPosition		
E	SyncMode		
E	MasterStartDistance		
E	Velocity		
E	Acceleration		
E	Deceleration		
E	Jerk		
E	BufferMode		
VAR OUTPUT			
E	StartSync		
B	InSync		
E	Busy		
E	Active		
E	CommandAborted		
B	Error		
E	ErrorID		

Appendix B 3.41 MC PhasingAbsolute

If Supported	MC PhasingAbsolute	Sup. Y/N	Comments
VAR IN OUT			
B	Master		
B	Slave		
VAR INPUT			
B	Execute		
B	PhaseShift		
E	Velocity		
E	Acceleration		
E	Deceleration		
E	Jerk		
E	BufferMode		
VAR OUTPUT			
B	Done		
E	Busy		
E	Active		
E	CommandAborted		
B	Error		
E	ErrorID		
E	AbsolutePhaseShift		

Appendix B 3.42 MC PhasingRelative

If Supported	MC_PhasingRelative	Sup. Y/N	Comments
VAR IN OUT			
B	Master		
B	Slave		
VAR INPUT			
B	Execute		
B	PhaseShift		
E	Velocity		
E	Acceleration		
E	Deceleration		
E	Jerk		
E	BufferMode		
VAR OUTPUT			
B	Done		
E	Busy		
E	Active		
E	CommandAborted		
B	Error		
E	ErrorID		
E	CoveredPhaseShift		

Appendix B 3.43 CombineAxes

If Supported	MC_CombineAxes	Sup. Y/N	Comments
VAR IN OUT			
B	Master1		
B	Master2		
B	Slave		
VAR INPUT			
B	Execute		
E	ContinuousUpdate		
E	CombineMode		
E	GearRationNumeratorM1		
E	GearRatioDenominatorM1		
E	GearRatioNumeratorM2		
E	GearRatioDenominatorM2		
E	MasterValueSourceM1		
E	MasterValueSourceM2		
E	BufferMode		
VAR OUTPUT			
B	InSync		
E	Busy		
E	Active		
E	CommandAborted		
B	Error		
E	ErrorID		

Appendix B 4. The PLCopen Motion Control Logo and Its Usage

For quick identification of compliant products, PLCopen has developed a logo for the Motion Control Function Blocks:

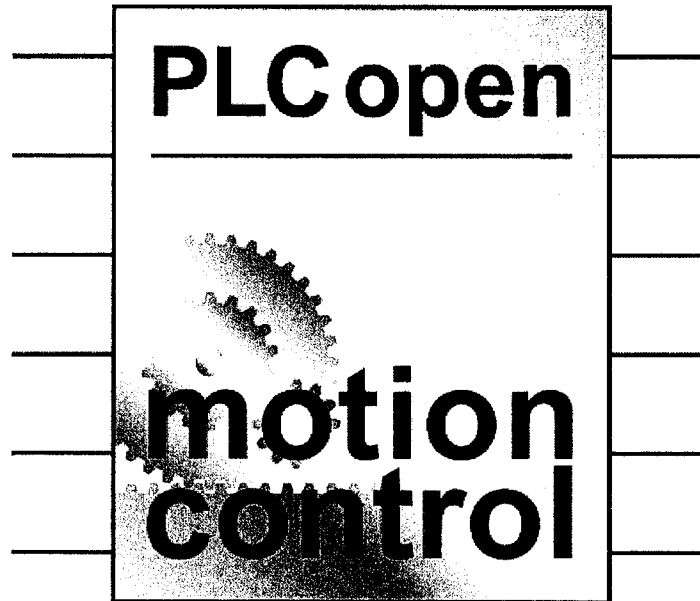


Figure 1: The PLCopen Motion Control Logo

This motion control logo is owned and trademarked by PLCopen.

In order to use this logo free-of-charge, the relevant company has to fulfill all the following requirements:

1. the company has to be a voting member of PLCopen;
2. the company has to comply with the existing specification, as specified by the PLCopen Task Force Motion Control, and as published by PLCopen, and of which this statement is a part;
3. this compliance application is provided in written form by the company to PLCopen, clearly stating the applicable software package and the supporting elements of all the specified tables, as specified in the document itself;
4. in case of non-fulfillment, which has to be decided by PLCopen, the company will receive a written statement concerning this from PLCopen. The company will have a one month period to either adopt their software package in such a way that it complies, represented by the issuing of a new compliance statement, or remove all reference to the specification, including the use of the logo, from all their specification, be it technical or promotional material;
5. the logo has to be used as is - meaning the full logo. It may be altered in size providing the original scale and color setting is kept.
6. the logo has to be used in the context of Motion Control.