

Subset of the

**Technical Specification**

**PLCopen - Technical Committee 2 – Task Force**

**Function blocks for motion control**

**Version 1.1**

**Appendix A :**

**Compliance Procedure and Compliance List**

DISCLAIMER OF WARRANTIES

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## Appendix A. 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 (see Appendix A 2 Supported Data types) and supported Function Blocks, in combination with the applicable inputs and outputs (see Appendix A 3 Overview of the Function Blocks and its paragraphs). The supplier is required 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](http://www.plcopen.org) , as well as a shortform overview, as specified in Appendix A 2 Supported Data types and Appendix A 3 Overview of the Function Blocks.

In addition to this approval, the supplier is granted access and usage rights of the PLCopen Motion Control logo, as described in chapter Appendix A 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 non-compliant 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.

- <b>Basic</b> input/output variables are mandatory	Marked in the tables with the letter “ <b>B</b> ”
- <b>Extended</b> input/output variables are optional	Marked in the tables with the letter “ <b>E</b> ”
- <b>Vendor Specific</b> additions	Marked in the vendor’s compliance documentation with “ <b>V</b> ”

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 A 1. Statement of Supplier**

Supplier name	GE Fanuc Intelligent Platforms
Supplier address	RT29N & RT606, PO Box 8106
City	Charlottesville, VA 22911
Country	U.S.A.
Telephone	(434) 978 5023
Fax	(434) 978 5102
Email address	Dan.Miller@gefanuc.com
Product Name	PACMotion
Product version	1.00
Release date	October, 2008

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):  
Dan Miller

Date of signature (dd/mm/yyyy):  
9/26/2008

Signature: 

## Appendix A 2. Supported Data types

Defined datatypes with MC library:	Supported	If not supported, which datatype used
BOOL	YES	
INT	YES	
WORD	YES	
REAL	YES	LREAL
ENUM	YES	

**Table 1: Supported datatypes**

Within the specification the following derived datatypes are defined. Which structure is used in this system:

Derived datatypes:	Where used	Supported	Which structure
Axis_Ref	Nearly all FBs	YES	STRUCTURE (AXIS_REF)
MC_Direction (extended)	MC_MoveAbsolute MC_MoveVelocity	YES	ENUM (MC_DIRECTION)
MC_TP_REF	MC_PositionProfile	NO	
MC_TV_REF	MC_VelocityProfile	NO	
MC_TA_REF	MC_AccelerationProfile	NO	
MC_CAM_REF	MC_CamTableSelect	YES	STRUCTURE (MC_CAM_REF)
MC_CAM_ID (extended)	MC_CamTableSelect MC_CamIn	YES	STRUCTURE (MC_CAM_ID)
MC_StartMode (extended)	MC_CamIn	NO	
MC_BufferMode	Buffered FBs	YES	ENUM (MC_BUFFERMODE)

**Table 2: Supported derived datatypes**

## Appendix A 3. Overview of the Function Blocks

<b>Single Axis Function Blocks</b>	<b>Supported Yes / No</b>	<b>Comments (&lt;= 48 char.)</b>
MC_MoveAbsolute	YES	
MC_MoveRelative	YES	
MC_MoveAdditive	YES	
MC_MoveSuperimposed	YES	Only with MC_GearIn and MC_GearInPos
MC_MoveVelocity	YES	
MC_Home	YES	
MC_Stop	YES	
MC_Power	YES	
MC_ReadStatus	YES	
MC_ReadAxisError	YES	
MC_Reset	YES	
MC_ReadParameter	YES	
MC_ReadBoolParameter	YES	
MC_WriteParameter	YES	
MC_WriteBoolParameter	YES	
MC_ReadActualPosition	YES	
MC_PositionProfile	NO	
MC_VelocityProfile	NO	
MC_AccelerationProfile	NO	
<b>Multi-Axis Function Blocks</b>	<b>Supported Yes / No</b>	<b>Comments (&lt;= 48 char.)</b>
MC_CamTableSelect	YES	
MC_CamIn	YES	
MC_CamOut	YES	
MC_GearIn	YES	
MC_GearOut	YES	
MC_Phasing	YES	Only with MC_CamIn

**Table 3: Short overview of the Function Blocks**

### Appendix A 3.1 MoveAbsolute

If Supported	MC MoveAbsolute	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Execute	Y	
B	Position	Y	
E	Velocity	Y	
E	Acceleration	Y	
E	Deceleration	Y	
E	Jerk	Y	
V	Jerk Units	Y	
E	Direction	Y	
E	BufferMode	Y	
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
E	Active	Y	
E	CommandAborted	Y	
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	

### Appendix A 3.2 MoveRelative

If Supported	MC MoveRelative	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Execute	Y	
B	Distance	Y	
E	Velocity	Y	
E	Acceleration	Y	
E	Deceleration	Y	
E	Jerk	Y	
V	Jerk Units	Y	
E	BufferMode	Y	
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
E	Active	Y	
E	CommandAborted	Y	
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	

### Appendix A 3.3 MoveAdditive

If Supported	MC MoveAdditive	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Execute	Y	
B	Distance	Y	
E	Velocity	Y	
E	Acceleration	Y	
E	Deceleration	Y	
E	Jerk	Y	
V	Jerk Units	Y	
E	Direction	Y	
E	BufferMode	Y	
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
E	Active	Y	
E	CommandAborted	Y	
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	

### Appendix A 3.4 MoveSuperimposed

If Supported	MC MoveSuperimposed	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Execute	Y	
B	Distance	Y	
E	VelocityDiff	Y	
E	Acceleration	Y	
E	Deceleration	Y	
E	Jerk	Y	
V	Jerk Units	Y	
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
E	Active	Y	
E	CommandAborted	Y	
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	

### Appendix A 3.5 MoveVelocity

If Supported	MC MoveVelocity	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Execute	Y	
E	Velocity	Y	
E	Acceleration	Y	
E	Deceleration	Y	
E	Jerk	Y	
V	Jerk Units	Y	
E	Direction	Y	
E	BufferMode	Y	
VAR_OUTPUT			
B	InVelocity	Y	
E	Busy	Y	
E	Active	Y	
E	CommandAborted	Y	
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	

### Appendix A 3.6 Home

If Supported	MC Home	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Execute	Y	
B	Position	Y	
E	HomingMode	Y	
E	BufferMode	Y	
V	HomeOffset	Y	
V	FinalHomeVelocity	Y	
V	FindHomeVelocity	Y	
V	Acceleration	Y	
V	Deceleration	Y	
V	Jerk Units	Y	
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
E	Active	Y	
E	CommandAborted	Y	
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	



### Appendix A 3.7 Stop

If Supported	MC Stop	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Execute	Y	
E	Deceleration	Y	
E	Jerk	Y	
V	Jerk Units	Y	
E	BufferMode	Y	
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
E	Active	Y	
E	CommandAborted	Y	
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	

### Appendix A 3.8 Power

If Supported	MC Power	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Enable	Y	
E	Enable_Positive	Y	
E	Enable_Negative	Y	
E	BufferMode	Y	
VAR_OUTPUT			
B	Status	Y	
E	Busy	Y	
E	Active	Y	
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	

### Appendix A 3.9 ReadStatus

If Supported	MC_ReadStatus	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Enable	Y	
VAR_OUTPUT			
B	Valid	Y	
E	Busy	Y	
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	
B	Errorstop	Y	
B	Disabled	Y	
B	Stopping	Y	
B	StandStill	Y	
B	DiscreteMotion	Y	
B	ContinuousMotion	Y	
E	SynchronizedMotion	Y	
E	Homing	Y	
E	Setup	Y	
E	Jogging	Y	
E	ConstantVelocity	Y	
E	Accelerating	Y	
E	Decelerating	Y	

### Appendix A 3.10 ReadAxisError

If Supported	MC_ReadAxisError	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
	Enable	Y	
VAR_OUTPUT			
B	Valid	Y	
E	Busy	Y	
V	Warning	Y	
B	Error	Y	
B	ErrorID	Y	
B	AxisErrorID	Y	

### Appendix A 3.11 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	
V	Warning	Y	
B	Error	Y	
B	ErrorID	Y	

### Appendix A 3.12 ReadParameter

If Supported	MC ReadParameter	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Enable	Y	
B	ParameterNumber	Y	
VAR_OUTPUT			
B	Valid	Y	
E	Busy	Y	
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	
B	Value	Y	

### Appendix A 3.13 ReadBoolParameter

If Supported	MC ReadBoolParameter	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Enable	Y	
B	ParameterNumber	Y	
VAR_OUTPUT			
B	Valid	Y	
E	Busy	Y	
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	
B	Value	Y	

Name	B/E	R/W	Sup. Y/N	Comments
CommandedPosition	B	R	Y	
SWLimitPos	E	R/W	Y	
SWLimitNeg	E	R/W	Y	
EnableLimitPos	E	R/W	Y	
EnableLimitNeg	E	R/W	Y	
EnablePosLagMonitoring	E	R/W	Y	
MaxPositionLag	E	R/W	Y	
MaxVelocitySystem	E	R	Y	
MaxVelocityAppl	B	R/W	Y	
ActualVelocity	B	R	Y	
CommandedVelocity	B	R	Y	
MaxAccelerationSystem	E	R	Y	
MaxAccelerationAppl	E	R/W	Y	
MaxDecelerationSystem	E	R	Y	
MaxDecelerationAppl	E	R/W	Y	
MaxJerk	E	R/W	Y	

**Table 4: Parameters for ReadParameter and WriteParameter**

### Appendix A 3.14 WriteParameter

If Supported	MC WriteParameter	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Execute	Y	
B	ParameterNumber	Y	
B	Value	Y	
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
E	Buffered	N	Not in PLCopen specification
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	

### Appendix A 3.15 WriteBoolParameter

If Supported	MC WriteBoolParameter	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Execute	Y	
B	ParameterNumber	Y	
B	Value	Y	
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
E	Buffered	N	Not in PLCopen specification
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	

### Appendix A 3.16 ReadActualPosition

If Supported	MC ReadActualPosition	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Enable	Y	
VAR_OUTPUT			
B	Valid	Y	
E	Busy	Y	
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	
B	Position	Y	

### Appendix A 3.17 PositionProfile

If Supported	MC_PositionProfile	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	N	
B	TimePosition	N	
VAR_INPUT			
B	Execute	N	
B	TimeScale	N	
E	PositionScale	N	
E	Offset	N	
E	BufferMode	N	
VAR_OUTPUT			
B	Done	N	
E	Busy	N	
E	Active	N	
E	CommandAborted	N	
B	Error	N	
E	ErrorID	N	

### Appendix A 3.18 VelocityProfile

If Supported	MC_VelocityProfile	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	N	
B	TimeVelocity	N	
VAR_INPUT			
B	Execute	N	
B	TimeScale	N	
E	VelocityScale	N	
E	Offset	N	
E	BufferMode	N	
VAR_OUTPUT			
B	Done	N	
E	Busy	N	
E	Active	N	
E	CommandAborted	N	
B	Error	N	
E	ErrorID	N	

### Appendix A 3.19 AccelerationProfile

If Supported	MC AccelerationProfile	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	N	
B	TimeAcceleration	N	
VAR_INPUT			
B	Execute	N	
B	TimeScale	N	
E	AccelerationScale	N	
E	Offset	N	
E	BufferMode	N	
VAR_OUTPUTN			
B	Done	N	
E	Busy	N	
E	Active	N	
E	CommandAborted	N	
B	Error	N	
E	ErrorID	N	

### Appendix A 3.20 CamTableSelect

If Supported	MC CamTableSelect	Sup. Y/N	Comments
VAR_IN_OUT			
B	Master	Y	
B	Slave	Y	
B	CamTable	Y	
VAR_INPUT			
B	Execute	Y	
E	Periodic	Y	
E	MasterAbsolute	N	
E	SlaveAbsolute	N	
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	
E	CamTableID	Y	

### Appendix A 3.21 CamIn

If Supported	MC_CamIn	Sup. Y/N	Comments
VAR_IN_OUT			
B	Master	Y	
B	Slave	Y	
VAR_INPUT			
B	Execute	Y	
E	MasterOffset	Y	
E	SlaveOffset	Y	
E	MasterScaling	Y	
E	SlaveScaling	Y	
E	StartMode	Y	
E	CamTableID	Y	
E	BufferMode	Y	
V	RampDistance	Y	
V	PositionSource	Y	
VAR_OUTPUT			
B	InSync	Y	
E	Busy	Y	
E	Active	Y	
E	CommandAborted	Y	
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	
E	EndOfProfile	Y	
V	CycleCount	Y	

### Appendix A 3.22 CamOut

If Supported	MC_CamOut	Sup. Y/N	Comments
VAR_IN_OUT			
B	Slave	Y	
VAR_INPUT			
B	Execute	Y	
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	

### Appendix A 3.23 GearIn

If Supported	MC_GearIn	Sup. Y/N	Comments
VAR_IN_OUT			
B	Master	Y	
B	Slave	Y	
VAR_INPUT			
B	Execute	Y	
B	RatioNumerator	Y	
B	RatioDenominator	Y	
E	Acceleration	Y	
E	Deceleration	Y	
E	Jerk	N	
E	BufferMode	Y	
V	PositionSource	Y	
VAR_OUTPUT			
B	InGear	Y	
E	Busy	Y	
E	Active	Y	
E	CommandAborted	Y	
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	

### Appendix A 3.24 GearOut

If Supported	MC_GearOut	Sup. Y/N	Comments
VAR_IN_OUT			
B	Slave	Y	
VAR_INPUT			
B	Execute	Y	
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	

### Appendix A 3.25 Phasing

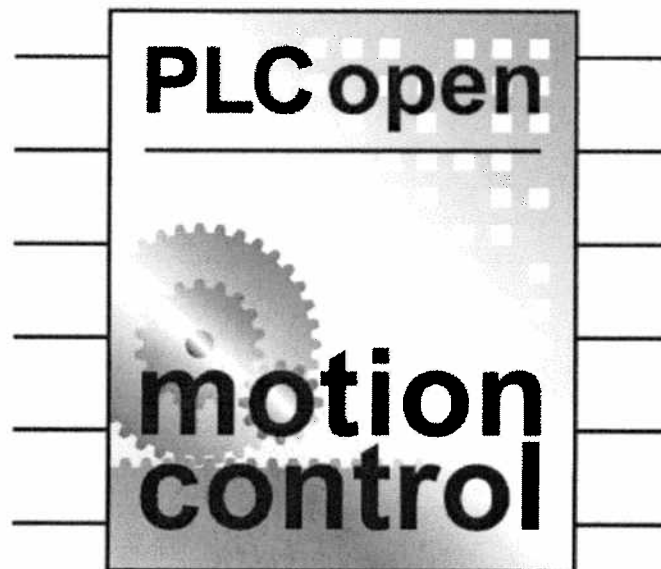
If Supported	MC_Phasing	Sup. Y/N	Comments
VAR_IN_OUT			
B	Master	Y	
B	Slave	Y	
VAR_INPUT			
B	Execute	Y	
B	PhaseShift	Y	
E	Velocity	Y	
E	Acceleration	Y	
E	Deceleration	Y	
E	Jerk	Y	
V	Warning	Y	
E	BufferMode	N	
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	



E	Active	Y	
E	CommandAborted	Y	
V	Warning	Y	
B	Error	Y	
E	ErrorID	Y	

**Appendix A 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.