



**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**

DISCLAIMER OF WARRANTIES

THIS DOCUMENT IS PROVIDED ON AN "AS IS" BASIS AND MAY BE SUBJECT TO FUTURE ADDITIONS, MODIFICATIONS, OR CORRECTIONS. PLCOPEN HEREBY DISCLAIMS ALL WARRANTIES OR CONDITIONS OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY WARRANTIES, OR CONDITIONS OF TITLE, NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, FOR THIS DOCUMENT. IN NO EVENT WILL PLCOPEN BE RESPONSIBLE FOR ANY LOSS OR DAMAGE ARISING OUT OF OR RESULTING FROM ANY DEFECT, ERROR OR OMISSION IN THIS DOCUMENT OR FROM ANYONE'S USE OF OR RELIANCE ON THIS DOCUMENT.

Copyright © 2009 – 2011 by PLCopen. All rights reserved.

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](http://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.

- |                                                        |                                                                   |
|--------------------------------------------------------|-------------------------------------------------------------------|
| - <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 B 1. Statement of Supplier**

Supplier name	Danfoss GmbH
Supplier address	Carl-Legien-Straße 8
City	63073 Offenbach / Main
Country	Germany
Telephone	+49 (0) 69 – 89020
Fax	+49 (0) 69 – 89021319
Email address	info@danfoss.com
Product Name	Danfoss motion library for VLT® Integrated Servo Drive ISD® 510 System for TwinCAT® 2
Product version	Version 1.0.0
Release date	08.12.2015

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):  
Stephanie Kreuz

Date of signature (dd/mm/yyyy):  
12.11.2015

Signature:



## Appendix B 2. Supported Data types

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

**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	Yes	AXIS_REF_ISD51x
MC_DIRECTION (extended)	MC_MoveAbsolute MC_MoveVelocity MC_TorqueControl MC_MoveContinuousAbsolute	Yes	MC_DIRECTION_ISD51x
MC_TP_REF	MC_PositionProfile	No	
MC_TV_REF	MC_VelocityProfile	No	
MC_TA_REF	MC_AccelerationProfile	No	
MC_CAM_REF	MC_CamTableSelect	No	
MC_CAM_ID (extended)	MC_CamTableSelect MC_CamIn	No	
MC_START_MODE (extended)	MC_CamIn MC_CamTableSelect	No	
MC_BUFFER_MODE	Buffered FBs: MC_MoveAbsolute_ISD51x MC_MoveRelative_ISD51x MC_MoveAdditive_ISD51x	Yes	MC_BUFFER_MODE_ISD51x
MC_EXECUTION_MODE	MC_SetPosition MC_WriteParameter MC_WriteBoolParameter MC_WriteDigitalOutput MC_CamTableSelect	No	
MC_SOURCE	MC_ReadMotionState MC_CamIn MC_GearIn MC_GearInPos MC_CombineAxes MC_DigitalCamSwitch	No	
MC_SYNC_MODE	MC_GearInPos	Yes	MC_SYNC_MODE_ISD51x
MC_COMBINE_MODE	MC_CombineAxes	No	
MC_TRIGGER_REF	MC_TouchProbe MC_AbortTrigger	No	
MC_INPUT_REF	MC_ReadDigitalInput	No	
MC_OUTPUT_REF	MC_DigitalCamSwitch MC_ReadDigitalOutput MC_WriteDigitalOutput	No	
MC_CAMSWITCH_REF	MC_DigitalCamSwitch	No	
MC_TRACK_REF	MC_DigitalCamSwitch	No	

**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	V2.0	
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	V2.0	
MC_WriteParameter & MC_WriteBoolParameter	V2.0 / Not	MC_WriteBoolParameter not supported, as there is no Boolean parameter to be written.
MC_ReadDigitalInput	V2.0	
MC_ReadDigitalOutput	V2.0	
MC_WriteDigitalOutput	Not	Functionality supported by vendor specific Function Block
MC_ReadActualPosition	V2.0	
MC_ReadActualVelocity	V2.0	
MC_ReadActualTorque	V2.0	
MC_ReadStatus	V2.0	
MC_ReadMotionState	V2.0	
MC_ReadAxisInfo	V2.0	
MC_ReadAxisError	V2.0	
MC_Reset	V2.0	
MC_DigitalCamSwitch	Not	Functionality supported by vendor specific Function Block
MC_TouchProbe	V2.0	
MC_AbortTrigger	V2.0	
Multi-Axis Function Blocks	Supported as V1.0/ V1.1/ V2.0 or Not	Comments (<= 48 char.)
MC_CamTableSelect	V2.0	
MC_CamIn	V2.0	
MC_CamOut	Not	
MC_GearIn	V2.0	
MC_GearOut	Not	
MC_GearInPos	V2.0	
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	
V	TimeLimit	Y	Time out after which an error is signalled, if the Status has not changed to true while Enable is true. 0 will disable the TimeLimit
VAR_OUTPUT			
B	Status	Y	
E	Valid	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information

## Appendix B 3.2 MC\_Home

If Supported	MC_Home	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Execute	Y	
B	Position	Y	
E	BufferMode	N	
V	Mode	Y	Defines the method used for homing. Depending on this selection, the appropriate input variables are used.
V	Velocity	Y	Value of speed during search for switch [u/s]
V	VelocityOut	Y	Value of speed during search for edge of switch [u/s]
V	Acceleration	Y	Value of the "Acceleration" [u/s <sup>2</sup> ]
V	Deceleration	Y	Value of the "Deceleration" [u/s <sup>2</sup> ]
V	TorqueLimit	Y	Maximum torque that is used for this motion
V	BlockedVelocity	Y	Axis assumes to be blocked, when the actual speed falls below the limit that is given here [u/s]
V	BlockedDuration	Y	Axis assumes to be blocked, when the actual speed falls below the BlockedVelocity for the duration given here [ms]
V	TimeLimit	Y	Time out after which an error is signalled, if the homing procedure has not been completed. The homing procedure will be aborted automatically. 0= disabled
V	DistanceLimit	Y	Maximal distance in which the limit switch has to be reached. Otherwise the home procedure is aborted with error. 0 = disabled
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
E	Active	N	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information

## 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	Y	
E	Jerk	N	
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information

### Appendix B 3.4 MC\_Halt

If Supported	MC_Halt	Sup. Y/N	
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Execute	Y	
E	Deceleration	Y	
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	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information

### 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	
B	Velocity	Y	
E	Acceleration	Y	
E	Deceleration	Y	
E	Jerk	N	
B	Direction	Y	
E	BufferMode	Y	
V	TorqueLimit	Y	Maximum torque that is used for this motion
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
E	Active	Y	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information



### 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	
E	Velocity	Y	
E	Acceleration	Y	
E	Deceleration	Y	
E	Jerk	N	
E	BufferMode	Y	
V	TorqueLimit	Y	Maximum torque that is used for this motion
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
E	Active	Y	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information

### 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	
E	Velocity	Y	
E	Acceleration	Y	
E	Deceleration	Y	
E	Jerk	N	
E	BufferMode	Y	
V	TorqueLimit	Y	Maximum torque that is used for this motion
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
E	Active	Y	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information

### 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	
E	Velocity	Y	
E	Acceleration	Y	
E	Deceleration	Y	
E	Jerk	N	
E	Direction	N	
E	BufferMode	N	
V	TorqueLimit	Y	Maximum torque that is used for this motion
VAR_OUTPUT			
B	InVelocity	Y	
E	Busy	Y	
E	Active	N	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information

### 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	
E	TorqueRamp	Y	
E	Velocity	Y	
E	Acceleration	N	
E	Deceleration	N	
E	Jerk	N	
E	Direction	N	
E	BufferMode	N	
VAR_OUTPUT			
B	InTorque	Y	
E	Busy	Y	
E	Active	N	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information

### 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	Y	
VAR_INPUT			
B	Enable	Y	
B	ParameterNumber	Y	
VAR_OUTPUT			
B	Valid	Y	
E	Busy	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information
V	AbortCode	Y	Abort code that was sent by the drive in case of aborted SDO transfer
B	Value	Y	

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	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information
V	AbortCode	Y	Abort code that was sent by the drive in case of aborted SDO transfer
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/ <del>W</del>	Y	Read only
EnableLimitNeg	E	R/ <del>W</del>	Y	Read only
EnablePosLagMonitoring	E	R/W	N	
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	N	
MaxAccelerationAppl	E	R/W	Y	
MaxDecelerationSystem	E	R	N	
MaxDecelerationAppl	E	R/W	Y	
MaxJerkSystem	E	R	N	
MarkJerkAppl	E	R/W	N	

**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	Y	
VAR_INPUT			
B	Execute	Y	
B	ParameterNumber	Y	
B	Value	Y	
E	ExecutionMode	N	
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information
V	AbortCode	Y	Abort code that was sent by the drive in case of aborted SDO transfer

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	Y	AXIS_REF structure used
VAR_INPUT			
B	Enable	Y	
E	InputNumber	Y	
VAR_OUTPUT			
B	Valid	Y	
E	Busy	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information
B	Value	Y	



### Appendix B 3.22 MC\_ReadDigitalOutput

If Supported	MC_ReadDigitalOutput	Sup. Y/N	Comments
VAR_IN_OUT			
B	Output	Y	AXIS_REF structure used
VAR_INPUT			
B	Enable	Y	
E	OutputNumber	N	
VAR_OUTPUT			
B	Valid	Y	
E	Busy	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information
B	Value	Y	

### 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	Y	
VAR_INPUT			
B	Enable	Y	
VAR_OUTPUT			
B	Valid	Y	
E	Busy	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information
B	Position	Y	

### Appendix B 3.25 MC\_ReadActualVelocity

If Supported	MC_ReadActualVelocity	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Enable	Y	
VAR_OUTPUT			
B	Valid	Y	
E	Busy	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information
B	Velocity	Y	

### Appendix B 3.26 MC\_ReadActualTorque

If Supported	MC_ReadActualTorque	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Enable	Y	
VAR_OUTPUT			
B	Valid	Y	
E	Busy	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information
B	Torque	Y	

### Appendix B 3.27 MC\_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	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information
B	ErrorStop	Y	
B	Disabled	Y	
B	Stopping	Y	
E	Homing	Y	
B	Standstill	Y	
E	DiscreteMotion	Y	
E	ContinuousMotion	Y	
E	SynchronizedMotion	Y	

### Appendix B 3.28 MC\_ReadMotionState

If Supported	MC_ReadMotionState	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Enable	Y	
E	Source	N	
VAR_OUTPUT			
B	Valid	Y	
E	Busy	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information
E	ConstantVelocity	Y	
V	Standstill	Y	Velocity is constant. Velocity is 0.
E	Accelerating	Y	
E	Decelerating	Y	
E	DirectionPositive	Y	
E	DirectionNegative	Y	
V	LimitActive	Y	Signals that an internal limit is active

### Appendix B 3.29 MC\_ReadAxisInfo

If Supported	MC_ReadAxisInfo	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Enable	Y	
VAR_OUTPUT			
B	Valid	Y	
E	Busy	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information
E	HomeAbsSwitch	Y	
E	LimitSwitchPos	Y	
E	LimitSwitchNeg	Y	
E	Simulation	N	
E	CommunicationReady	Y	
E	ReadyForPowerOn	Y	
E	PowerOn	Y	
V	SafeTorqueOff	Y	If TRUE: STO is activated = Safety voltage is missing
E	IsHomed	Y	
E	AxisWarning	Y	
V	AxisError	Y	Error(s) on the axis is present

## Appendix B 3.30 MC\_ReadAxisError

If Supported	MC_ReadAxisError	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Enable	Y	
VAR_OUTPUT			
B	Valid	Y	
E	Busy	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information
B	AxisErrorID	Y	

### 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	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information

### 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	Y	
E	TriggerInput	Y	
VAR_INPUT			
B	Execute	Y	
E	WindowOnly	Y	
E	FirstPosition	Y	
E	LastPosition	Y	
V	EdgeMode	Y	Indicates on which input events the drive triggers
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information
B	RecordedPosition	Y	

### Appendix B 3.34 MC\_AbortTrigger

If Supported	MC_AbortTrigger	Sup.Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
E	TriggerInput	Y	
VAR_INPUT			
B	Execute	Y	
VAR_OUTPUT			
B	Done	Y	
E	Busy	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information

## Appendix B 3.35 MC\_CamTableSelect

If Supported	MC_CamTableSelect	Sup. Y/N	Comments
<b>VAR_IN_OUT</b>			
E	Master	N	
E	Slave	Y	
B	CamTable	Y	
<b>VAR_INPUT</b>			
B	Execute	Y	
V	CamTableID	Y	Identifier of CAM table to be used, needs to be linked to input of MC_CamIn_ISD51x
E	Periodic	N	
E	MasterAbsolute	Y	
E	SlaveAbsolute	Y	
E	ExecutionMode	N	
V	Cyclic	Y	TRUE = cyclic; FALSE = non-cyclic
V	Path	Y	The variable of this type selects generic or one of the system paths on the target device
V	PatternFile	Y	Name of the pattern file on the PLC in case the CAM profile contains a pattern alignment
<b>VAR_OUTPUT</b>			
B	Done	Y	
E	Busy	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information
E	CamTableID	N	
V	ParseError	Y	Detailed information on the type of error in case of CAM parsing failure
V	ParseErrorDebug	Y	Depending on the cause given in the ParseError output, additional debug information is given here. See documentation for interpretation of this data.

### Appendix B 3.36 MC\_CamIn

If Supported	MC_CamIn	Sup. Y/N	Comments
VAR_IN_OUT			
B	Master	Y	
B	Slave	Y	
VAR_INPUT			
B	Execute	Y	
E	ContinuousUpdate	N	
E	MasterOffset	Y	
E	SlaveOffset	Y	
E	MasterScaling	N	
E	SlaveScaling	N	
E	MasterStartDistance	N	
E	MasterSyncPosition	N	
E	StartMode	N	
E	MasterValueSource	N	
E	CamTableID	Y	
E	BufferMode	N	
V	ChangeImmediate	Y	TRUE: Abort the currently running CAM immediately FALSE: let the currently running CAM finish first
V	UseBlendingDistance	Y	FALSE: Automatically blend to the beginning of the new CAM TRUE: Use the BlendingDistance at minimum for blending
V	BlendingDistance	Y	Used in the direction of the Master, minimum length used for blending to the new CAM if UseBlendingDistance = TRUE
V	SwitchControlSetByCam	Y	TRUE: Control parameter set selection is handled by the CAM itself FALSE: Control parameter set selection is done using DD_SelectControlParamSet_ISD51x
V	StartDelay	Y	Influences the activation behaviour of a CAM. Only valid for Master relative CAMs.
VAR_OUTPUT			
B	InSync	Y	
E	Busy	Y	
E	Active	Y	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information
E	EndOfProfile	Y	

### 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	Y	
B	Slave	Y	
VAR_INPUT			
B	Execute	Y	
E	ContinuousUpdate	N	
B	RatioNumerator	Y	
B	RatioDenominator	Y	
E	MasterValueSource	N	
V	Velocity	Y	Maximum velocity used during gearing in procedure
E	Acceleration	Y	
E	Deceleration	Y	
E	Jerk	N	
E	BufferMode	N	
VAR_OUTPUT			
B	InGear	Y	
E	Busy	Y	
E	Active	N	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information

### 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
<b>VAR_IN_OUT</b>			
B	Master	Y	
B	Slave	Y	
<b>VAR_INPUT</b>			
B	Execute	Y	
B	RatioNumerator	Y	
B	RatioDenominator	Y	
E	MasterValueSource	N	
B	MasterSyncPosition	Y	
B	SlaveSyncPosition	Y	
E	SyncMode	Y	
V	MasterSyncDirection	Y	FALSE: Master start distance is in the positive direction of the guide value TRUE: Master start distance is in the negative direction of the guide value
E	MasterStartDistance	Y	
E	Velocity	Y	
E	Acceleration	Y	
E	Deceleration	Y	
E	Jerk	N	
E	BufferMode	N	
<b>VAR_OUTPUT</b>			
E	StartSync	Y	
B	InSync	Y	
E	Busy	Y	
E	Active	N	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	N	
V	ErrorInfo	Y	Structure that contains ErrorID and additional information

### Appendix B 3.41 MC\_PhasingAbsolute

If Supported	MC_PhasingAbsolute	Sup. Y/N	Comments
<b>VAR_IN_OUT</b>			
B	Master		
B	Slave		
<b>VAR_INPUT</b>			
B	Execute		
B	PhaseShift		
E	Velocity		
E	Acceleration		
E	Deceleration		
E	Jerk		
E	BufferMode		
<b>VAR_OUTPUT</b>			
B	Done		
E	Busy		
E	Active		
E	CommandAborted		
B	Error		
E	ErrorID		
E	AbsolutePhaseShift		

### Appendix B 3.42 MC\_PhasingRelative

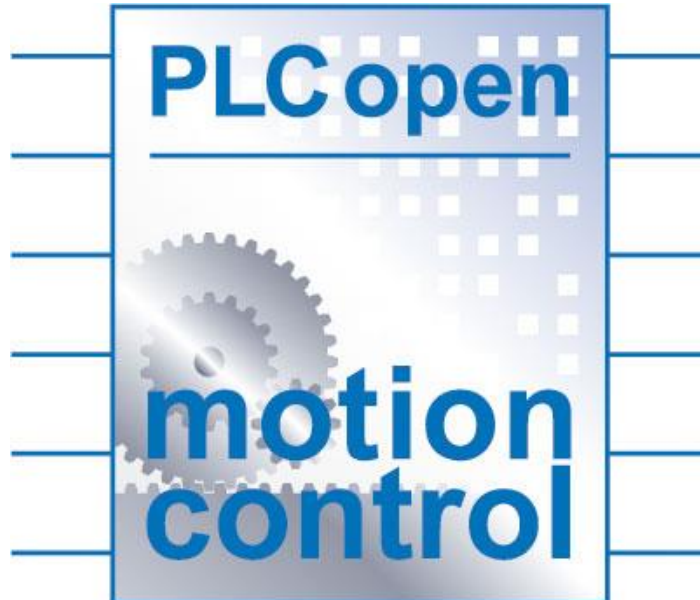
If Supported	MC_PhasingRelative	Sup. Y/N	Comments
VAR_IN_OUT			
B	Master		
B	Slave		
VAR_INPUT			
B	Execute		
B	PhaseShift		
E	Velocity		
E	Acceleration		
E	Deceleration		
E	Jerk		
E	BufferMode		
VAR_OUTPUT			
B	Done		
E	Busy		
E	Active		
E	CommandAborted		
B	Error		
E	ErrorID		
E	CoveredPhaseShift		

### 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.