**PLCopen**

*for efficiency in automation*

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 WARANTIES

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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 0: 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 | B&R Industrial Automation GmbH |
| Supplier address | B&R Strasse 1 |
| City | 5142 Eggelsberg |
| Country | Austria |
| Telephone | +43 7748 6586 - 0 |
| Fax | +43 7748 6586 - 26 |
| Email address | office@br-automation.com |
| Product Name | PLCopen Motion Library (ACP10_MC) |
| Product version | V5.00.0 |
| Release date | 01.12.2017 |

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): Dipl.-Ing. Dr. Gernot Bachler, Technical Manager Business Unit Motion

Date of signature (dd/mm/yyyy): 05/10/2017

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 | As pointer to vendor specific structure called ACP10AXIS_typ |
| MC_DIRECTION (extended) | MC_MoveAbsolute<br>MC_MoveVelocity | YES | USINT |
| MC_TP_REF | MC_PositionProfile | NO | |
| MC_TV_REF | MC_VelocityProfile | NO | |
| MC_TA_REF | MC_AccelerationProfile | NO | |
| MC_CAM_REF | MC_CamTableSelect | NO | Vendor specific data format |
| MC_CAM_ID (extended) | MC_CamTableSelect<br>MC_CamIn | NO | Vendor specific data format |
| MC_START_MODE (extended) | MC_CamIn | NO | USINT |
| MC_BUFFER_MODE | Buffered FBs | NO | |
| MC_SYNC_MODE | MC_GearInPos | NO | |
| MC_TRIGGER_REF | MC_TouchProbe<br>MC_AbortTrigger | YES | |
| MC_INPUT_REF | MC_ReadDigitalInput | YES | |
| MC_OUTPUT_REF | MC_DigitalCamSwitch<br>MC_ReadDigitalOutput<br>MC_WriteDigitalOutput | YES | |
| MC_CAMSWITCH_REF | MC_DigitalCamSwitch | YES | |
| MC_TRACK_REF | MC_DigitalCamSwitch | YES | |

**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_MoveAbsolute | V1.1 | |
| MC_MoveRelative | NO | |
| MC_MoveAdditive | V1.1 | |
| MC_MoveSuperimposed | NO | |
| MC_MoveVelocity | V1.1 | |
| MC_Home | V1.1 | |
| MC_Stop | V1.1 | |
| MC_Power | V1.1 | |
| MC_ReadStatus | V1.1 | |
| MC_ReadAxisError | V1.1 | |
| MC_Reset | V1.1 | |
| MC_ReadParameter &<br>MC_ReadBoolParameter | V1.1<br>V1.1 | |
| MC_WriteParameter &<br>MC_WriteBoolParameter | V1.1<br>V1.1 | |
| MC_ReadActualPosition | V1.1 | |
| MC_PositionProfile | NO | |
| MC_VelocityProfile | NO | |
| MC_AccelerationProfile | NO | |
| MC_TouchProbe | V1.0 | V1.0 of Part 2 |
| MC_AbortTrigger | V1.0 | V1.0 of Part 2 |
| MC_ReadDigitalInput | V1.0 | V1.0 of Part 2 |
| MC_ReadDigitalOutput | V1.0 | V1.0 of Part 2 |
| MC_WriteDigitalOutput | V1.0 | V1.0 of Part 2 |
| MC_SetPosition | NO | |
| MC_SetOverride | V1.0 | V1.0 of Part 2 |
| MC_ReadActualVelocity | V1.0 | V1.0 of Part 2 |
| MC_ReadActualTorque | V1.0 | V1.0 of Part 2 |
| MC_TorqueControl | V1.0 | V1.0 of Part 2 |
| MC_DigitalCamSwitch | V1.0 | V1.0 of Part 2 |
| MC_MoveContinuous | NO | |
| MC_Halt | V1.0 | V1.0 of Part 2 |
| **Multi-Axis Function Blocks** | **Supported as V1.0/ V1.1/ V2.0 or Not** | **Comments (<= 48 char.)** |
| MC_CamTableSelect | V1.1 | |
| MC_CamIn | V1.1 | |
| MC_CamOut | V1.1 | |
| MC_GearIn | V1.1 | |
| MC_GearOut | V1.1 | |
| MC_Phasing | V1.1 | |
| MC_GearInPos | V1.0 | V1.0 of Part 2 |

**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 | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Enable | YES | |
| E | EnablePositive | NO | |
| E | EnableNegative | NO | |
| E | BufferMode | NO | |
| VAR_OUTPUT | | | |
| B | Status | YES | |
| V | Busy | YES | FB is active and needs to be called |
| E | Active | NO | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |

### Appendix B 3.2 MC_Home

| If Supported | **MC_Home** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| B | Position | YES | |
| E | HomingMode | YES | USINT |
| E | BufferMode | NO | |
| VAR_OUTPUT | | | |
| B | Done | YES | |
| E | Busy | YES | |
| E | Active | NO | |
| E | CommandAborted | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |

### Appendix B 3.3 MC_Stop

| If Supported | **MC_Stop** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| E | Deceleration | YES | |
| E | Jerk | NO | |
| E | BufferMode | NO | |
| VAR_OUTPUT | | | |
| B | Done | YES | |
| E | Busy | YES | |
| E | Active | NO | |
| E | CommandAborted | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |

### Appendix B 3.4 MC_Halt

| If Supported | **MC_Halt** | Sup. Y/N | |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| E | Deceleration | YES | |
| E | Jerk | NO | |
| E | BufferMode | NO | |
| VAR_OUTPUT | | | |
| B | Done | YES | |
| E | Busy | YES | |
| E | Active | NO | |
| E | CommandAborted | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |

### Appendix B 3.5 MC_MoveAbsolute

| If Supported | **MC_MoveAbsolute** | Sup.Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| B | Position | YES | |
| B | Velocity | YES | |
| E | Acceleration | YES | |
| E | Deceleration | YES | |
| E | Jerk | NO | |
| B | Direction | YES | USINT |
| E | BufferMode | NO | |
| VAR_OUTPUT | | | |
| B | Done | YES | |
| E | Busy | YES | |
| E | Active | NO | |
| E | CommandAborted | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |

### Appendix B 3.6 MC_MoveRelative

| If Supported | **MC_MoveRelative** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | | |
| VAR_INPUT | | | |
| B | Execute | | |
| E | ContinuousUpdate | | |
| B | Distance | | |
| E | Velocity | | |
| E | Acceleration | | |
| E | Deceleration | | |
| E | Jerk | | |
| E | BufferMode | | |
| VAR_OUTPUT | | | |
| B | Done | | |
| E | Busy | | |
| E | Active | | |
| E | CommandAborted | | |
| B | Error | | |
| E | ErrorID | | |

### Appendix B 3.7 MC_MoveAdditive

| If Supported | **MC_MoveAdditive** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| B | Distance | YES | |
| E | Velocity | YES | |
| E | Acceleration | YES | |
| E | Deceleration | YES | |
| E | Jerk | NO | |
| E | BufferMode | NO | |
| VAR_OUTPUT | | | |
| B | Done | YES | |
| E | Busy | YES | |
| E | Active | NO | |
| E | CommandAborted | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |

### 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_MoveVelocity

| If Supported | **MC_MoveVelocity** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| E | Velocity | YES | |
| E | Acceleration | YES | |
| E | Deceleration | YES | |
| E | Jerk | NO | |
| E | Direction | YES | USINT |
| E | BufferMode | NO | |
| VAR_OUTPUT | | | |
| B | InVelocity | YES | |
| E | Busy | YES | |
| E | Active | NO | |
| E | CommandAborted | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type DINT instead of WORD |

### Appendix B 3.10 MC_MoveContinuous

| If Supported | **MC_MoveContinuous** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | | |
| VAR_INPUT | | | |
| B | Execute | | |
| B | Distance | | |
| B | Velocity | | |
| B | EndVelocity | | |
| E | Acceleration | | |
| E | Deceleration | | |
| E | Jerk | | |
| E | BufferMode | | |
| VAR_OUTPUT | | | |
| B | InEndVelocity | | |
| E | Busy | | |
| E | Active | | |
| E | CommandAborted | | |
| B | Error | | |
| E | ErrorID | | |

### Appendix B 3.11 MC_TorqueControl

| If Supported | **MC_TorqueControl** | Sup.Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| B | Torque | YES | |
| E | TorqueRamp | YES | |
| E | Velocity | YES | |
| E | Acceleration | YES | |
| E | Deceleration | NO | |
| E | Jerk | NO | |
| E | Direction | NO | |
| E | BufferMode | NO | |
| VAR_OUTPUT | | | |
| B | InTorque | YES | |
| E | Busy | YES | |
| E | Active | YES | |
| E | CommandAborted | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |
| V | AxisLimitActive | YES | BOOL |

## Appendix B 3.12 MC_PositionProfile

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

## Appendix B 3.13 MC_VelocityProfile

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

### Appendix B 3.14 MC_AccelerationProfile

| If Supported | **MC_AccelerationProfile** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | | |
| B | TimeAcceleration | | |
| VAR_INPUT | | | |
| B | Execute | | |
| E | TimeScale | | |
| E | AccelerationScale | | |
| E | Offset | | |
| E | BufferMode | | |
| VAR_OUTPUT | | | |
| B | Done | | |
| E | Busy | | |
| E | Active | | |
| E | CommandAborted | | |
| B | Error | | |
| E | ErrorID | | |

### Appendix B 3.15 MC_SetPosition

| If Supported | **MC_SetPosition** | Sup.Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | | |
| VAR_INPUT | | | |
| B | Execute | | |
| B | Position | | |
| E | Mode | | |
| VAR_OUTPUT | | | |
| B | Done | | |
| E | Busy | | |
| B | Error | | |
| E | ErrorID | | |

### Appendix B 3.16 MC_SetOverride

| If Supported | **MC_SetOverride** | Sup.Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Enable | YES | |
| B | VelFactor | YES | |
| E | AccFactor | YES | |
| E | JerkFactor | NO | |
| VAR_OUTPUT | | | |
| B | Enabled | YES | |
| E | Busy | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |

## Appendix B 3.17 MC_ReadParameter & MC_ReadBoolParameter

| If Supported | **MC_ReadParameter** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Enable | YES | |
| B | ParameterNumber | YES | |
| VAR_OUTPUT | | | |
| B | Valid | YES | |
| E | Busy | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |
| B | Value | YES | |

| If Supported | **MC_ReadBoolParameter** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Enable | YES | |
| B | ParameterNumber | YES | |
| VAR_OUTPUT | | | |
| B | Valid | YES | |
| E | Busy | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |
| B | Value | YES | |

| **Name** | **B/E** | **R/W** | **Supp. Y/N** | **Comments** |
|---|---|---|---|---|
| CommandedPosition | B | R | YES | mcCOMMANDED_POSITION |
| SWLimitPos | E | R/W | YES | mcSW_LIMIT_POS |
| SWLimitNeg | E | R/W | YES | mcSW_LIMIT_NEG |
| EnableLimitPos | E | R/W | YES | mcENABLE_LIMIT_POS |
| EnableLimitNeg | E | R/W | YES | mcENABLE_LIMIT_NEG |
| EnablePosLagMonitoring | E | R/W | YES | mcENABLE_POS_LAG_MONITORING |
| MaxPositionLag | E | R/W | YES | mcMAX_POSITION_LAG |
| MaxVelocitySystem | E | R | YES | mcMAX_VELOCITY_SYSTEM |
| MaxVelocityAppl | B | R/W | YES | mcMAX_VELOCITY_APPL |
| ActualVelocity | B | R | YES | mcACTUAL_VELOCITY |
| CommandedVelocity | B | R | YES | mcCOMMANDED_VELOCITY |
| MaxAccelerationSystem | E | R | YES | mcMAX_ACCELERATION_SYSTEM |
| MaxAccelerationAppl | E | R/W | YES | mcMAX_ACCELERATION_APPL |
| MaxDecelerationSystem | E | R | YES | mcMAX_DECELERATION_SYSTEM |
| MaxDecelerationAppl | E | R/W | YES | mcMAX_DECELERATION_APPL |
| MaxJerkSystem | E | R | YES | mcMAX_JERK |
| MarkJerkAppl | E | R/W | NO | |

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

### Appendix B 3.18 MC_WriteParameter & MC_WriteBoolParameter

| If Supported | **MC_WriteParameter** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| B | ParameterNumber | YES | |
| B | Value | YES | |
| VAR_OUTPUT | | | |
| B | Done | YES | |
| E | Busy | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |

| If Supported | **MC_WriteBoolParameter** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| B | ParameterNumber | YES | |
| B | Value | YES | |
| VAR_OUTPUT | | | |
| B | Done | YES | |
| E | Busy | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |

### Appendix B 3.19 MC_ReadDigitalInput

| If Supported | **MC_ReadDigitalInput** | Sup.Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Input | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Enable | YES | |
| E | InputNumber | NO | Input is addressed in in MC_INPUT_REF |
| VAR_OUTPUT | | | |
| B | Valid | YES | |
| E | Busy | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |
| B | Value | YES | |

### Appendix B 3.20 MC_ReadDigitalOutput

| If Supported | **MC_ReadDigitalOutput** | Sup.Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Output | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Enable | YES | |
| E | OutputNumber | NO | Output is addressed in in MC_OUTPUT_REF |
| VAR_OUTPUT | | | |
| B | Valid | YES | |
| E | Busy | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |
| B | Value | YES | |

### Appendix B 3.21 MC_WriteDigitalOutput

| If Supported | **MC_WriteDigitalOutput** | Sup.Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Output | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| E | OutputNumber | NO | Output is addressed in in MC_OUTPUT_REF |
| B | Value | YES | |
| VAR_OUTPUT | | | |
| B | Done | YES | |
| E | Busy | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |

### Appendix B 3.22 MC_ReadActualPosition

| If Supported | **MC_ReadActualPosition** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Enable | YES | |
| VAR_OUTPUT | | | |
| B | Valid | YES | |
| E | Busy | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |
| B | Position | YES | |

### Appendix B 3.23 MC_ReadActualVelocity

| If Supported | **MC_ReadActualVelocity** | Sup.Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Enable | YES | |
| VAR_OUTPUT | | | |
| B | Valid | YES | |
| E | Busy | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |
| B | Velocity | YES | |

### Appendix B 3.24 MC_ReadActualTorque

| If Supported | **MC_ReadActualTorque** | Sup.Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Enable | YES | |
| VAR_OUTPUT | | | |
| B | Valid | YES | |
| E | Busy | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |
| B | Torque | YES | |

### Appendix B 3.25 MC_ReadStatus

| If Supported | **MC_ReadStatus** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Enable | YES | |
| VAR_OUTPUT | | | |
| B | Valid | YES | |
| E | Busy | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |
| B | ErrorStop | YES | |
| B | Disabled | YES | |
| B | Stopping | YES | |
| E | Homing | YES | |
| B | Standstill | YES | |
| E | DiscreteMotion | YES | |
| E | ContinuousMotion | YES | |
| E | SynchronizedMotion | YES | |
| E | ConstantVelocity | NO | |
| E | Accelerating | NO | |
| E | Decelerating | NO | |

### Appendix B 3.26 MC_ReadAxisError

| If Supported | **MC_ReadAxisError** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Enable | YES | |
| V | Acknowledge | YES | BOOL |
| V | DataAddress | YES | UDINT |
| V | DataLength | YES | UINT |
| V | DataObjName | YES | STRING[12] |
| VAR_OUTPUT | | | |
| B | Valid | YES | |
| E | Busy | YES | |
| B | Error | YES | |
| B | ErrorID | YES | Data type UINT instead of WORD |
| B | AxisErrorID | YES | Data type UINT instead of WORD |
| V | AxisErrorCount | YES | UINT |

## Appendix B 3.27 MC_Reset

| If Supported | **MC_Reset** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| VAR_OUTPUT | | | |
| B | Done | YES | |
| E | Busy | YES | |
| B | Error | YES | |
| B | ErrorID | YES | Data type UINT instead of WORD |

## Appendix B 3.28 MC_DigitalCamSwitch

| If Supported | **MC_DigitalCamSwitch** | Sup.Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| B | Switches | YES | VAR_INPUT instead of VAR_IN_OUT |
| E | Outputs | YES | VAR_INPUT instead of VAR_IN_OUT |
| E | TrackOptions | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Enable | YES | |
| E | EnableMask | YES | |
| V | InitSwitches | YES | BOOL |
| V | InitTrackOptions | YES | BOOL |
| VAR_OUTPUT | | | |
| B | InOperation | YES | |
| E | Busy | YES | |
| V | SwitchesInitialized | YES | BOOL |
| V | TrackOptionsInitialized | YES | BOOL |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |

Basic elements within the array structure of MC_CAMSWITCH_REF

| **B/E** | **Parameter** | Sup.Y/N | Comments |
|---|---|---|---|
| B | TrackNumber | YES | |
| B | FirstOnPosition [u] | YES | Data type is an array of 16 REAL |
| B | LastOnPosition [u] | YES | Data type is an array of 16 REAL |
| E | AxisDirection | NO | |
| E | CamSwitchMode | NO | |
| E | Duration | NO | |
| V | Period | YES | REAL |

Basic elements within the array structure of MC_TRACK_REF

| **B/E** | **Parameter** | Sup.Y/N | Comments |
|---|---|---|---|
| E | OnCompensation | YES | |
| E | OffCompensation | YES | |
| E | Hysteresis [u] | YES | |

### Appendix B 3.29 MC_TouchProbe

| If Supported | MC_TouchProbe | Sup.Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| E | TriggerInput | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| E | WindowOnly | YES | |
| E | FirstPosition | YES | |
| E | LastPosition | YES | |
| VAR_OUTPUT | | | |
| B | Done | YES | |
| E | Busy | YES | |
| E | CommandAborted | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |
| B | RecordedPosition | YES | |

### Appendix B 3.30 MC_AbortTrigger

| If Supported | MC_AbortTrigger | Sup.Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Axis | YES | VAR_INPUT instead of VAR_IN_OUT |
| E | TriggerInput | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| VAR_OUTPUT | | | |
| B | Done | YES | |
| E | Busy | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |

### Appendix B 3.31 MC_CamTableSelect

| If Supported | MC_CamTableSelect | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| E | Master | YES | VAR_INPUT instead of VAR_IN_OUT |
| E | Slave | YES | VAR_INPUT instead of VAR_IN_OUT |
| B | CamTable | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| E | Periodic | YES | |
| E | MasterAbsolute | NO | |
| E | SlaveAbsolute | NO | |
| VAR_OUTPUT | | | |
| B | Done | YES | |
| E | Busy | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |
| E | CamTableID | YES | |

### Appendix B 3.32 MC_CamIn

| If Supported | **MC_CamIn** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Master | YES | VAR_INPUT instead of VAR_IN_OUT |
| B | Slave | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| E | MasterOffset | YES | |
| E | SlaveOffset | YES | |
| E | MasterScaling | YES | |
| E | SlaveScaling | YES | |
| E | StartMode | YES | |
| E | CamTableID | YES | |
| E | BufferMode | NO | |
| V | MasterParID | YES | UINT |
| VAR_OUTPUT | | | |
| B | InSync | YES | |
| E | Busy | YES | |
| E | Active | NO | |
| E | CommandAborted | YES | |
| B | Error | YES | . |
| E | ErrorID | YES | Data type UINT instead of WORD |
| E | EndOfProfile | YES | |

### Appendix B 3.33 MC_CamOut

| If Supported | **MC_CamOut** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Slave | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| VAR_OUTPUT | | | |
| B | Done | YES | |
| E | Busy | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |

## Appendix B 3.34 MC_GearIn

| If Supported | **MC_GearIn** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Master | YES | VAR_INPUT instead of VAR_IN_OUT |
| B | Slave | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| B | RatioNumerator | YES | |
| B | RatioDenominator | YES | |
| E | Acceleration | YES | |
| E | Deceleration | YES | |
| E | Jerk | NO | |
| E | BufferMode | NO | |
| V | MasterParID | YES | UINT |
| V | MasterParIDMaxVelocity | YES | REAL |
| VAR_OUTPUT | | | |
| B | InGear | YES | |
| E | Busy | YES | |
| E | Active | YES | |
| E | CommandAborted | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |

## Appendix B 3.35 MC_GearOut

| If Supported | **MC_GearOut** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Slave | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| VAR_OUTPUT | | | |
| B | Done | YES | |
| E | Busy | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |

## Appendix B 3.36 MC_GearInPos

| If Supported | **MC_GearInPos** | Sup.Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Master | YES | VAR_INPUT instead of VAR_IN_OUT |
| B | Slave | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| B | RatioNumerator | YES | |
| B | RatioDenominator | YES | |
| B | MasterSyncPosition | YES | |
| B | SlaveSyncPosition | YES | |
| E | SyncMode | YES | |
| E | MasterStartDistance | YES | |
| E | Velocity | YES | |
| E | Acceleration | YES | |
| E | Deceleration | NO | |
| E | Jerk | NO | |
| E | BufferMode | NO | |
| VAR_OUTPUT | | | |
| E | StartSync | YES | |
| B | InSync | YES | |
| E | Busy | YES | |
| E | Active | NO | |
| E | CommandAborted | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |

## Appendix B 3.37 MC_Phasing

| If Supported | **MC_Phasing** | Sup. Y/N | Comments |
|---|---|---|---|
| VAR_IN_OUT | | | |
| B | Master | YES | VAR_INPUT instead of VAR_IN_OUT |
| B | Slave | YES | VAR_INPUT instead of VAR_IN_OUT |
| VAR_INPUT | | | |
| B | Execute | YES | |
| B | PhaseShift | YES | |
| E | Velocity | YES | |
| E | Acceleration | YES | |
| E | Deceleration | NO | |
| E | Jerk | NO | |
| E | BufferMode | NO | |
| VAR_OUTPUT | | | |
| B | Done | YES | |
| E | Busy | YES | |
| E | Active | NO | |
| E | CommandAborted | YES | |
| B | Error | YES | |
| E | ErrorID | YES | Data type UINT instead of WORD |

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:

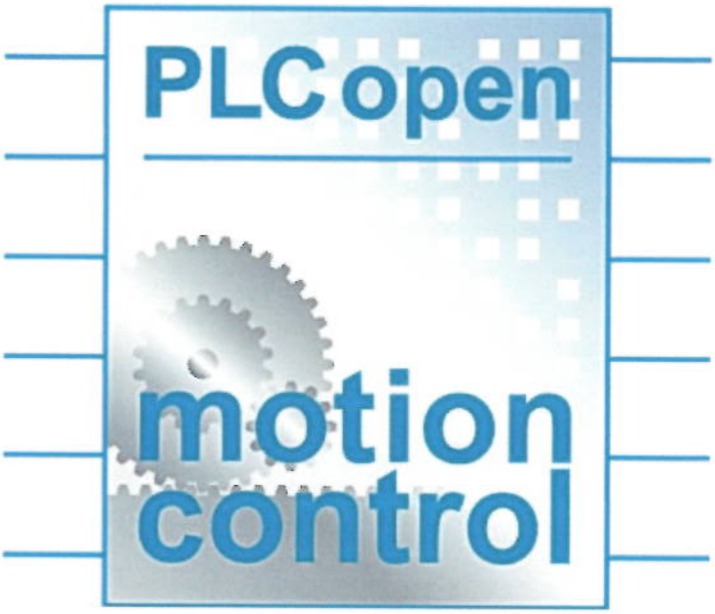

**Figure 1: The PLCopen Motion Control Logo**

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.