



Subset of the

**Technical Paper**

**PLCopen Technical Committee 2 – Task Force**

**Function Blocks for motion control:**

**Part 4 – Coordinated Motion**

**Version 1.0, Published**

**Appendix I**

**Compliance Procedure and Compliance List**

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## Appendix 1. 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 1.2 Supported Data types) and supported Function Blocks, in combination with the applicable inputs and outputs see (Appendix 1.2 Supported Data types 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 1.5 Short overview of the Functions 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 1.6 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 1.1. Statement of Supplier**

|                  |                          |
|------------------|--------------------------|
| Supplier name    | Advanced Motion Controls |
| Supplier address | 3805 Calle Tecate        |
| City             | Camarillo                |
| Country          | California 93012, USA    |
| Telephone        | 805-389-1935             |
| Fax              | 805-389-1165             |
| Email address    | bartasa@t-online.hu      |
| Product Name     | Click&Move (C&M)         |
| Product version  | 5                        |
| Release date     | 30/09/2019               |

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):  
Sándor Barta

CEO of Advanced Motion Controls

Date of signature (dd/mm/yyyy):  
19/06/2019

Signature:



## Appendix 1.2. Supported Data types

| Defined datatypes with MC library: | Supported | If not supported, which datatype used |
|------------------------------------|-----------|---------------------------------------|
| BOOL                               | Y         |                                       |
| INT                                |           | Int8, Int16, Int32, Int64             |
| WORD                               |           | UInt8, UInt16, UInt32, UInt64         |
| REAL                               |           | Float32, Float64                      |
| ENUM                               | Y         |                                       |

**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   |
|---------------------------------|--|-----------|-------------------|
| AXES_GROUP_REF                  | Nearly all FBs   | Y         | TD_AxisRefIntf    |
| IDENT_IN_GROUP_REF              | MC_AddAxisToGroup<br>MC_RemoveAxisFromGroup  | Y         | IdentInGroupRef   |
| MC_BUFFER_MODE                  | In all buffered FBs  | Y         | EN_BufferMode     |
| MC_KIN_REF                      | MC_SetKinTransform<br>MC_ReadKinTransform  | Y         | KinRefIntf        |
| MC_EXECUTION_MODE               | MC_SetKinTransform   | Y         | EN_ExecutionMode  |
| MC_COORD_REF                    | MC_SetCoordinateTransformation   | Y         | CoordRefIntf      |
| MC_GROUP_BUFFER_MODE            | MC_MoveLinearAbsolute<br>MC_MoveCircularAbsolute   | Y         | EN_BufferMode     |
| MC_TRANSITION_MODE              | MC_MoveLinearAbsolute<br>MC_MoveLinearRelative<br>MC_MoveCircularAbsolute<br>MC_MoveCircularRelative | Y         | EN_TransitionMode |
| MC_CIRC_PATHCHOICE              | MC_MoveCircularAbsolute<br>MC_MoveCircularRelative   | Y         | EN_PathChoice     |
| MC_PATH_DATA_REF<br>MC_PATH_REF | MC_PathSelect<br>MC_MovePath   | Y         | PathRefIntf       |

**Table 2: Supported derived datatypes**

## Appendix 1.3. Supported Buffer Modes

| No. | MC_BUFFER_MODE   | Supported |
|-----|------------------|-----------|
| 0   | Aborting         | Y         |
| 1   | Buffered         | Y         |
| 2   | BlendingLow      | Y         |
| 3   | BlendingPrevious | Y         |
| 4   | BlendingNext     | Y         |
| 5   | BlendingHigh     | Y         |

**Table 3: Overview of buffer modes**

## Appendix 1.4. Supported Transition Modes

| No.   | MC_TRANSITION_MODE   | Supported |
|-------|----------------------|-----------|
| 0     | TMNone               | Y         |
| 1     | TMMaxVelocity        | N         |
| 2     | TMDefinedVelocity    | N         |
| 3     | TMCornerDistance     | N         |
| 4     | TMMaxCornerDeviation | N         |
| 5 - 9 | Reserved by PLCopen  | N         |
| 10    | TMCornerVelocity     | Y         |

**Table 4: Overview of available transition modes**

## Appendix 1.5. Short overview of the Function Blocks

| <b>Coordinated Function Blocks</b> | <b>Supported Yes / No</b> | <b>Comments (&lt;= 48 char.)</b>           |
|------------------------------------|---------------------------|--|
| MC_AddAxisToGroup                  | Y                         |  |
| MC_RemoveAxisFromGroup             | Y                         |  |
| MC_UngroupAllAxes                  | Y                         |  |
| MC_GroupReadConfiguration          | Y                         |  |
| MC_GroupEnable                     | Y                         |  |
| MC_GroupDisable                    | Y                         |  |
| MC_GroupHome                       | N                         |  |
| MC_SetKinTransform                 | Y                         |  |
| MC_SetCartesianTransform           | N                         | Implemented in MC_SetCoordinateTransform   |
| MC_SetCoordinateTransform          | Y                         |  |
| MC_ReadKinTransform                | Y                         |  |
| MC_ReadCartesianTransform          | N                         | Implemented in MC_ReadCoordinateTransform  |
| MC_ReadCoordinateTransform         | Y                         |  |
| MC_GroupSetPosition                | N                         |  |
| MC_GroupReadActualPosition         | Y                         |  |
| MC_GroupReadActualVelocity         | N                         | This function supported by C&M specific FB |
| MC_GroupReadActualAcceleration     | N                         | This function supported by C&M specific FB |
| MC_GroupStop                       | Y                         |  |
| MC_GroupHalt                       | Y                         |  |
| MC_GroupInterrupt                  | Y                         |  |
| MC_GroupContinue                   | Y                         |  |
| MC_GroupReadStatus                 | Y                         |  |
| MC_GroupReadError                  | Y                         |  |
| MC_GroupReset                      | Y                         |  |
| MC_MoveLinearAbsolute              | Y                         |  |
| MC_MoveLinearRelative              | Y                         |  |
| MC_MoveCircularAbsolute            | Y                         |  |
| MC_MoveCircularRelative            | Y                         |  |
| MC_MoveDirectAbsolute              | Y                         |  |
| MC_MoveDirectRelative              | Y                         |  |
| MC_PathSelect                      | N                         | This function supported by C&M specific FB |
| MC_MovePath                        | Y                         |  |
| MC_GroupSetOverride                | N                         |  |
|                                    |                           |  |
| <b>Coordinated</b>                 | <b>Supported Yes / No</b> | <b>Comments (&lt;= 48 char.)</b>           |
| MC_SyncAxisToGroup                 | N                         |  |
| MC_SyncGroupToAxis                 | N                         |  |
| MC_SetDynCoordTransform            | N                         |  |
| MC_TrackConveyorbelt               | N                         |  |
| MC_TrackRotaryTable                | N                         |  |

**Table 5: Short overview of the Function Blocks**

### Appendix A 5.1. MC\_AddAxisToGroup

| If Supported | MC_AddAxisToGroup | Sup.Y/N | Comments       |
|--------------|-------------------|---------|----------------|
| VAR_IN_OUT   |                   |         |                |
| B            | AxesGroup         | Y       | AXES_GROUP_REF |
| B            | Axis              | Y       | AXIS_REF       |
| VAR_INPUT    |                   |         |                |
| B            | Execute           | Y       |                |
| E            | IdentInGroup      | Y       |                |
| VAR_OUTPUT   |                   |         |                |
| B            | Done              | Y       |                |
| E            | Busy              | Y       |                |
| B            | Error             | Y       |                |
| E            | ErrorID           | Y       |                |

### Appendix A 5.2. MC\_RemoveAxisFromGroup

| If Supported | MC_RemoveAxisFromGroup | Sup.Y/N | Comments       |
|--------------|------------------------|---------|----------------|
| VAR_IN_OUT   |                        |         |                |
| B            | AxesGroup              | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                        |         |                |
| B            | Execute                | Y       |                |
| E            | IdentInGroup           | Y       |                |
| VAR_OUTPUT   |                        |         |                |
| B            | Done                   | Y       |                |
| E            | Busy                   | Y       |                |
| B            | Error                  | Y       |                |
| E            | ErrorID                | Y       |                |

### Appendix A 5.3. MC\_UngroupAllAxes

| If Supported | MC_UngroupAllAxes | Sup.Y/N | Comments       |
|--------------|-------------------|---------|----------------|
| VAR_IN_OUT   |                   |         |                |
| B            | AxesGroup         | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                   |         |                |
| B            | Execute           | Y       |                |
| VAR_OUTPUT   |                   |         |                |
| B            | Done              | Y       |                |
| E            | Busy              | Y       |                |
| B            | Error             | Y       |                |
| E            | ErrorID           | Y       |                |

### Appendix A 5.4. MC\_GroupReadConfiguration

| If Supported | MC_GroupReadConfiguration | Sup.Y/N | Comments       |
|--------------|---------------------------|---------|----------------|
| VAR_IN_OUT   |                           |         |                |
| B            | AxesGroup                 | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                           |         |                |
| B            | Enable                    | Y       |                |
| B            | IdentInGroup              | Y       |                |
| E            | CoordSystem               | Y       |                |
| VAR_OUTPUT   |                           |         |                |
| B            | Axis                      | Y       | AXIS_REF       |
| B            | Valid                     | Y       |                |
| E            | Busy                      | Y       |                |
| B            | Error                     | Y       |                |
| E            | ErrorID                   | Y       |                |

### Appendix A 5.5. MC\_GroupEnable

| If Supported | MC_GroupEnable | Sup.Y/N | Comments       |
|--------------|----------------|---------|----------------|
| VAR_IN_OUT   |                |         |                |
| B            | AxesGroup      | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                |         |                |
| B            | Execute        | Y       |                |
| V            | BufferMode     | Y       |                |
| VAR_OUTPUT   |                |         |                |
| B            | Done           | Y       |                |
| E            | Busy           | Y       |                |
| V            | Active         | Y       |                |
| V            | CommandAborted | Y       |                |
| B            | Error          | Y       |                |
| E            | ErrorID        | Y       |                |

### Appendix A 5.6. MC\_GroupDisable

| If Supported | MC_GroupDisable | Sup.Y/N | Comments       |
|--------------|-----------------|---------|----------------|
| VAR_IN_OUT   |                 |         |                |
| B            | AxesGroup       | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                 |         |                |
| B            | Execute         | Y       |                |
| V            | BufferMode      | Y       |                |
| VAR_OUTPUT   |                 |         |                |
| B            | Done            | Y       |                |
| E            | Busy            | Y       |                |
| V            | Active          | Y       |                |
| V            | CommandAborted  | Y       |                |
| B            | Error           | Y       |                |
| E            | ErrorID         | Y       |                |

### Appendix A 5.7. MC\_GroupHome

| If Supported | MC_GroupHome   | Sup.Y/N | Comments |
|--------------|----------------|---------|----------|
| VAR_IN_OUT   |                |         |          |
| B            | AxesGroup      |         |          |
|              |                |         |          |
| VAR_INPUT    |                |         |          |
| B            | Execute        |         |          |
| B            | Position       |         |          |
| E            | CoordSystem    |         |          |
| E            | BufferMode     |         |          |
| VAR_OUTPUT   |                |         |          |
| B            | Done           |         |          |
| E            | Busy           |         |          |
| E            | Active         |         |          |
| E            | CommandAborted |         |          |
| B            | Error          |         |          |
| E            | ErrorID        |         |          |

### Appendix A 5.8. MC\_SetKinTransform

| If Supported | MC_SetKinTransform | Sup.Y/N | Comments       |
|--------------|--------------------|---------|----------------|
| VAR_IN_OUT   |                    |         |                |
| B            | AxesGroup          | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                    |         |                |
| B            | Execute            | Y       |                |
| E            | KinTransform       | Y       |                |
| E            | ExecutionMode      | Y       |                |
| VAR_OUTPUT   |                    |         |                |
| B            | Done               | Y       |                |
| E            | Busy               | Y       |                |
| E            | Active             | N       |                |
| E            | CommandAborted     | Y       |                |
| B            | Error              | Y       |                |
| E            | ErrorID            | Y       |                |

### Appendix A 5.9. MC\_SetCartesianTransform

| If Supported | MC_SetCartesianTransform | Sup.Y/N | Comments |
|--------------|--------------------------|---------|----------|
| VAR_IN_OUT   |                          |         |          |
| B            | AxesGroup                |         |          |
| VAR_INPUT    |                          |         |          |
| B            | Execute                  |         |          |
| B            | TransX                   |         |          |
| B            | TransY                   |         |          |
| B            | TransZ                   |         |          |
| B            | RotAngle1                |         |          |
| B            | RotAngle2                |         |          |
| B            | RotAngle3                |         |          |
| E            | ExecutionMode            |         |          |
| VAR_OUTPUT   |                          |         |          |
| B            | Done                     |         |          |
| E            | Busy                     |         |          |
| E            | Active                   |         |          |
| E            | CommandAborted           |         |          |
| B            | Error                    |         |          |
| E            | ErrorID                  |         |          |

### Appendix A 5.10. MC\_SetCoordinateTransform

| If Supported | MC_SetCoordinateTransform | Sup.Y/N | Comments       |
|--------------|---------------------------|---------|----------------|
| VAR_IN_OUT   |                           |         |                |
| B            | AxesGroup                 | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                           |         |                |
| B            | Execute                   | Y       |                |
| E            | CoordTransform            | Y       |                |
| E            | ExecutionMode             | Y       |                |
| VAR_OUTPUT   |                           |         |                |
| B            | Done                      | Y       |                |
| E            | Busy                      | Y       |                |
| E            | Active                    | N       |                |
| E            | CommandAborted            | Y       |                |
| B            | Error                     | Y       |                |
| E            | ErrorID                   | Y       |                |



### Appendix A 5.11. MC\_ReadKinTransform

| If Supported | MC_ReadKinTransform | Sup.Y/N | Comments       |
|--------------|---------------------|---------|----------------|
| VAR_IN_OUT   |                     |         |                |
| B            | AxesGroup           | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                     |         |                |
| B            | Enable              | Y       |                |
| VAR_OUTPUT   |                     |         |                |
| B            | Valid               | Y       |                |
| E            | Busy                | Y       |                |
| B            | KinTransform        | Y       |                |
| B            | Error               | Y       |                |
| E            | ErrorID             | Y       |                |

### Appendix A 5.12. MC\_ReadCartesianTransform

| If Supported | MC_ReadCartesianTransform | Sup.Y/N | Comments |
|--------------|---------------------------|---------|----------|
| VAR_IN_OUT   |                           |         |          |
| B            | AxesGroup                 |         |          |
| VAR_INPUT    |                           |         |          |
| B            | Enable                    |         |          |
| VAR_OUTPUT   |                           |         |          |
| B            | Valid                     |         |          |
| E            | Busy                      |         |          |
| B            | TransX                    |         |          |
| B            | TransY                    |         |          |
| B            | TransZ                    |         |          |
| B            | RotAngle1                 |         |          |
| B            | RotAngle2                 |         |          |
| B            | RotAngle3                 |         |          |
| B            | Error                     |         |          |
| E            | ErrorID                   |         |          |

### Appendix A 5.13. MC\_ReadCoordinateTransform

| If Supported | MC_ReadCoordinateTransform | Sup.Y/N | Comments       |
|--------------|----------------------------|---------|----------------|
| VAR_IN_OUT   |                            |         |                |
| B            | AxesGroup                  | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                            |         |                |
| B            | Enable                     | Y       |                |
| VAR_OUTPUT   |                            |         |                |
| B            | Valid                      | Y       |                |
| E            | Busy                       | Y       |                |
| B            | CoordTransform             | Y       |                |
| B            | Error                      | Y       |                |
| E            | ErrorID                    | Y       |                |

### Appendix A 5.14. MC\_GroupSetPosition

| If Supported | MC_GroupSetPosition | Sup.Y/N | Comments |
|--------------|---------------------|---------|----------|
| VAR_IN_OUT   |                     |         |          |
| B            | AxesGroup           |         |          |
| VAR_INPUT    |                     |         |          |
| B            | Execute             |         |          |
| B            | Position            |         |          |
| E            | Relative            |         |          |
| E            | CoordSystem         |         |          |
| E            | BufferMode          |         |          |
| VAR_OUTPUT   |                     |         |          |
| B            | Done                |         |          |
| E            | Busy                |         |          |
| E            | Active              |         |          |
| E            | CommandAborted      |         |          |
| B            | Error               |         |          |
| E            | ErrorID             |         |          |

### Appendix A 5.15. MC\_GroupReadActualPosition

| If Supported | MC_GroupReadActualPosition | Sup.Y/N | Comments       |
|--------------|----------------------------|---------|----------------|
| VAR_IN_OUT   |                            |         |                |
| B            | AxesGroup                  | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                            |         |                |
| B            | Enable                     | Y       |                |
| E            | CoordSystem                | Y       |                |
| VAR_OUTPUT   |                            |         |                |
| B            | Valid                      | Y       |                |
| E            | Busy                       | Y       |                |
| B            | Error                      | Y       |                |
| E            | ErrorID                    | Y       |                |
| B            | Position                   | Y       |                |
| V            | TimeStamp                  | Y       |                |

### Appendix A 5.16. MC\_GroupReadActualVelocity

| If Supported | MC_GroupReadActualVelocity | Sup.Y/N | Comments |
|--------------|----------------------------|---------|----------|
| VAR_IN_OUT   |                            |         |          |
| B            | AxesGroup                  |         |          |
| VAR_INPUT    |                            |         |          |
| B            | Enable                     |         |          |
| E            | CoordSystem                |         |          |
| VAR_OUTPUT   |                            |         |          |
| B            | Valid                      |         |          |
| E            | Busy                       |         |          |
| B            | Error                      |         |          |
| E            | ErrorID                    |         |          |
| B            | Velocity                   |         |          |
| E            | PathVelocity               |         |          |

### Appendix A 5.17. MC\_GroupReadActualAcceleration

| If Supported | MC_GroupReadActualAcceleration | Sup.Y/N | Comments |
|--------------|--------------------------------|---------|----------|
| VAR_IN_OUT   |                                |         |          |
| B            | AxesGroup                      |         |          |
| VAR_INPUT    |                                |         |          |
| B            | Enable                         |         |          |
| E            | CoordSystem                    |         |          |
| VAR_OUTPUT   |                                |         |          |
| B            | Valid                          |         |          |
| E            | Busy                           |         |          |
| B            | Error                          |         |          |
| E            | ErrorID                        |         |          |
| B            | Acceleration                   |         |          |
| E            | Path Acceleration              |         |          |

### Appendix A 5.18. MC\_GroupStop

| If Supported | MC_GroupStop   | Sup.Y/N | Comments       |
|--------------|----------------|---------|----------------|
| VAR_IN_OUT   |                |         |                |
| B            | AxesGroup      | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                |         |                |
| B            | Execute        | Y       |                |
| E            | Deceleration   | Y       |                |
| E            | Jerk           | Y       |                |
| E            | BufferMode     | Y       |                |
| VAR_OUTPUT   |                |         |                |
| B            | Done           | Y       |                |
| E            | Busy           | Y       |                |
| E            | Active         | Y       |                |
| E            | CommandAborted | Y       |                |
| B            | Error          | Y       |                |
| E            | ErrorID        | Y       |                |

### Appendix A 5.19. MC\_GroupHalt

| If Supported | MC_GroupHalt   | Sup.Y/N | Comments       |
|--------------|----------------|---------|----------------|
| VAR_IN_OUT   |                |         |                |
| B            | AxesGroup      | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                |         |                |
| B            | Execute        | Y       |                |
| E            | Deceleration   | Y       |                |
| E            | Jerk           | Y       |                |
| E            | BufferMode     | Y       |                |
| VAR_OUTPUT   |                |         |                |
| B            | Done           | Y       |                |
| E            | Busy           | Y       |                |
| E            | Active         | Y       |                |
| E            | CommandAborted | Y       |                |
| B            | Error          | Y       |                |
| E            | ErrorID        | Y       |                |

### Appendix A 5.20. MC\_GroupInterrupt

| If Supported | MC_GroupInterrupt | Sup.Y/N | Comments       |
|--------------|-------------------|---------|----------------|
| VAR_IN_OUT   |                   |         |                |
| B            | AxesGroup         | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                   |         |                |
| B            | Execute           | Y       |                |
| E            | Deceleration      | Y       |                |
| E            | Jerk              | Y       |                |
| VAR_OUTPUT   |                   |         |                |
| B            | Done              | Y       |                |
| E            | Busy              | Y       |                |
| E            | Command Aborted   | Y       |                |
| B            | Error             | Y       |                |
| E            | ErrorID           | Y       |                |

### Appendix A 5.21. MC\_GroupContinue

| If Supported | MC_GroupContinue | Sup.Y/N | Comments       |
|--------------|------------------|---------|----------------|
| VAR_IN_OUT   |                  |         |                |
| B            | AxesGroup        | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                  |         |                |
| B            | Execute          | Y       |                |
| VAR_OUTPUT   |                  |         |                |
| B            | Done             | Y       |                |
| E            | Busy             | Y       |                |
| E            | Command Aborted  | N       |                |
| B            | Error            | Y       |                |
| E            | ErrorID          | Y       |                |

### Appendix A 5.22. MC\_GroupReadStatus

| If Supported | MC_GroupReadStatus | Sup.Y/N | Comments       |
|--------------|--------------------|---------|----------------|
| VAR_IN_OUT   |                    |         |                |
| B            | AxesGroup          | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                    |         |                |
| B            | Enable             | Y       |                |
| VAR_OUTPUT   |                    |         |                |
| B            | Valid              | Y       |                |
| E            | Busy               | Y       |                |
| B            | GroupMoving        | Y       |                |
| B            | GroupHoming        | Y       |                |
| B            | GroupErrorStop     | Y       |                |
| B            | GroupStandby       | Y       |                |
| B            | GroupStopping      | Y       |                |
| B            | GroupDisabled      | Y       |                |
| E            | ConstantVelocity   | Y       |                |
| E            | Accelerating       | Y       |                |
| E            | Decelerating       | Y       |                |
| E            | InPosition         | Y       |                |
| B            | Error              | Y       |                |
| E            | ErrorID            | Y       |                |
| V            | TimeStamp          | Y       |                |
| V            | ZeroSpeed          | Y       |                |
| V            | MotionInterrupted  | Y       |                |

### Appendix A 5.23. MC\_GroupReadError

| If Supported | MC_GroupReadError | Sup. Y/N | Comments       |
|--------------|-------------------|----------|----------------|
| VAR_IN_OUT   |                   |          |                |
| B            | AxesGroup         | Y        | AXES_GROUP_REF |
| VAR_INPUT    |                   |          |                |
| B            | Enable            | Y        |                |
| VAR_OUTPUT   |                   |          |                |
| B            | Valid             | Y        |                |
| E            | Busy              | Y        |                |
| B            | Error             | Y        |                |
| E            | ErrorID           | Y        |                |
| B            | GroupErrorID      | Y        |                |
| V            | TimeStamp         | Y        |                |

### Appendix A 5.24. MC\_GroupReset

| If Supported | MC_GroupReset | Sup. Y/N | Comments       |
|--------------|---------------|----------|----------------|
| VAR_IN_OUT   |               |          |                |
| B            | AxesGroup     | Y        | AXES_GROUP_REF |
| VAR_INPUT    |               |          |                |
| B            | Execute       | Y        |                |
| VAR_OUTPUT   |               |          |                |
| B            | Done          | Y        |                |
| E            | Busy          | Y        |                |
| B            | Error         | Y        |                |
| E            | ErrorID       | Y        |                |

### Appendix A 5.25. MC\_MoveLinearAbsolute

| If Supported | MC_MoveLinearAbsolute | Sup. Y/N | Comments       |
|--------------|-----------------------|----------|----------------|
| VAR_IN_OUT   |                       |          |                |
| B            | AxesGroup             | Y        | AXES_GROUP_REF |
| VAR_INPUT    |                       |          |                |
| B            | Execute               | Y        |                |
| B            | Position              | Y        |                |
| E            | Velocity              | Y        |                |
| E            | Acceleration          | Y        |                |
| E            | Deceleration          | Y        |                |
| E            | Jerk                  | Y        |                |
| E            | CoordSystem           | Y        |                |
| E            | BufferMode            | Y        |                |
| E            | TransitionMode        | Y        |                |
| E            | TransitionParameter   | Y        |                |
| VAR_OUTPUT   |                       |          |                |
| B            | Done                  | Y        |                |
| E            | Busy                  | Y        |                |
| E            | Active                | Y        |                |
| E            | CommandAborted        | Y        |                |
| B            | Error                 | Y        |                |
| E            | ErrorID               | Y        |                |

## Appendix A 5.26. MC\_MoveLinearRelative

| If Supported | MC_MoveLinearRelative | Sup.Y/N | Comments       |
|--------------|-----------------------|---------|----------------|
| VAR_IN_OUT   |                       |         |                |
| B            | AxesGroup             | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                       |         |                |
| B            | Execute               | Y       |                |
| B            | Distance              | Y       |                |
| E            | Velocity              | Y       |                |
| E            | Acceleration          | Y       |                |
| E            | Deceleration          | Y       |                |
| E            | Jerk                  | Y       |                |
| E            | CoordSystem           | Y       |                |
| E            | BufferMode            | Y       |                |
| E            | TransitionMode        | Y       |                |
| E            | TransitionParameter   | Y       |                |
| VAR_OUTPUT   |                       |         |                |
| B            | Done                  | Y       |                |
| E            | Busy                  | Y       |                |
| E            | Active                | Y       |                |
| E            | CommandAborted        | Y       |                |
| B            | Error                 | Y       |                |
| E            | ErrorID               | Y       |                |

## Appendix A 5.27. MC\_MoveCircularAbsolute

| If Supported | MC_MoveCircularAbsolute | Sup.Y/N | Comments       |
|--------------|-------------------------|---------|----------------|
| VAR_IN_OUT   |                         |         |                |
| B            | AxesGroup               | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                         |         |                |
| B            | Execute                 | Y       |                |
| B            | CircMode                | Y       |                |
| B            | AuxPoint                | Y       |                |
| B            | EndPoint                | Y       |                |
| E            | PathChoice              | Y       |                |
| V            | Turns                   | Y       |                |
| E            | Velocity                | Y       |                |
| E            | Acceleration            | Y       |                |
| E            | Deceleration            | Y       |                |
| E            | Jerk                    | Y       |                |
| E            | CoordSystem             | Y       |                |
| E            | BufferMode              | Y       |                |
| E            | TransitionMode          | Y       |                |
| E            | TransitionParameter     | Y       |                |
| VAR_OUTPUT   |                         |         |                |
| B            | Done                    | Y       |                |
| E            | Busy                    | Y       |                |
| E            | Active                  | Y       |                |
| E            | CommandAborted          | Y       |                |
| B            | Error                   | Y       |                |
| E            | ErrorID                 | Y       |                |

## Appendix A 5.28. MC\_MoveCircularRelative

| If Supported | MC_MoveCircularRelative | Sup.Y/N | Comments       |
|--------------|-------------------------|---------|----------------|
| VAR_IN_OUT   |                         |         |                |
| B            | AxesGroup               | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                         |         |                |
| B            | Execute                 | Y       |                |
| B            | CircMode                | Y       |                |
| B            | AuxPoint                | Y       |                |
| B            | EndPoint                | Y       |                |
| E            | PathChoice              | Y       |                |
| V            | Turns                   | Y       |                |
| E            | Velocity                | Y       |                |
| E            | Acceleration            | Y       |                |
| E            | Deceleration            | Y       |                |
| E            | Jerk                    | Y       |                |
| E            | CoordSystem             | Y       |                |
| E            | BufferMode              | Y       |                |
| E            | TransitionMode          | Y       |                |
| E            | TransitionParameter     | Y       |                |
| VAR_OUTPUT   |                         |         |                |
| B            | Done                    | Y       |                |
| E            | Busy                    | Y       |                |
| E            | Active                  | Y       |                |
| E            | CommandAborted          | Y       |                |
| B            | Error                   | Y       |                |
| E            | ErrorID                 | Y       |                |

## Appendix A 5.29. MC\_MoveDirectAbsolute

| If Supported | MC_MoveDirectAbsolute | Sup.Y/N | Comments       |
|--------------|-----------------------|---------|----------------|
| VAR_IN_OUT   |                       |         |                |
| B            | AxesGroup             | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                       |         |                |
| B            | Execute               | Y       |                |
| V            | DirectMode            | Y       |                |
| B            | Position              | Y       |                |
| V            | Velocity              | Y       |                |
| V            | Acceleration          | Y       |                |
| V            | Deceleration          | Y       |                |
| V            | Jerk                  | Y       |                |
| E            | CoordSystem           | Y       |                |
| E            | BufferMode            | Y       |                |
| E            | TransitionMode        | N       |                |
| E            | TransitionParameter   | N       |                |
| VAR_OUTPUT   |                       |         |                |
| B            | Done                  | Y       |                |
| E            | Busy                  | Y       |                |
| E            | Active                | Y       |                |
| E            | CommandAborted        | Y       |                |
| B            | Error                 | Y       |                |
| E            | ErrorID               | Y       |                |

### Appendix A 5.30. MC\_MoveDirectRelative

| If Supported | MC_MoveDirectRelative | Sup.Y/N | Comments       |
|--------------|-----------------------|---------|----------------|
| VAR_IN_OUT   |                       |         |                |
| B            | AxesGroup             | Y       | AXES_GROUP_REF |
| VAR_INPUT    |                       |         |                |
| B            | Execute               | Y       |                |
| V            | DirectMode            | Y       |                |
| B            | Distance              | Y       |                |
| V            | Velocity              | Y       |                |
| V            | Acceleration          | Y       |                |
| V            | Deceleration          | Y       |                |
| V            | Jerk                  | Y       |                |
| E            | CoordSystem           | Y       |                |
| E            | BufferMode            | Y       |                |
| E            | TransitionMode        | N       |                |
| E            | TransitionParameter   | N       |                |
| VAR_OUTPUT   |                       |         |                |
| B            | Done                  | Y       |                |
| E            | Busy                  | Y       |                |
| E            | Active                | Y       |                |
| E            | CommandAborted        | Y       |                |
| B            | Error                 | Y       |                |
| E            | ErrorID               | Y       |                |

### Appendix A 5.31. MC\_PathSelect

| If Supported | MC_PathSelect   | Sup.Y/N | Comments |
|--------------|-----------------|---------|----------|
| VAR_IN_OUT   |                 |         |          |
| B            | AxesGroup       |         |          |
| B            | PathData        |         |          |
| B            | PathDescription |         |          |
| VAR_INPUT    |                 |         |          |
| B            | Execute         |         |          |
| E            | CoordSystem     |         |          |
| VAR_OUTPUT   |                 |         |          |
| B            | Done            |         |          |
| E            | Busy            |         |          |
| B            | Error           |         |          |
| E            | ErrorID         |         |          |



## Appendix A 5.32. MC\_MovePath

| If Supported | MC_MovePath         | Sup.Y/N | Comments       |
|--------------|---------------------|---------|----------------|
| VAR_IN_OUT   |                     |         |                |
| B            | AxesGroup           | Y       | AXES_GROUP_REF |
| B            | PathData            | Y       | PATH_REF       |
| VAR_INPUT    |                     |         |                |
| B            | Execute             | Y       |                |
| V            | EndCurveNumber      | Y       |                |
| E            | CoordSystem         | N       |                |
| E            | BufferMode          | Y       |                |
| E            | TransitionMode      | Y       |                |
| E            | TransitionParameter | Y       |                |
| VAR_OUTPUT   |                     |         |                |
| B            | Done                | Y       |                |
| E            | Busy                | Y       |                |
| E            | Active              | Y       |                |
| E            | CommandAborted      | Y       |                |
| B            | Error               | Y       |                |
| E            | ErrorID             | Y       |                |

### Appendix A 5.33. MC\_GroupSetOverride

| If Supported | MC_GroupSetOverride | Sup. Y/N | Comments |
|--------------|---------------------|----------|----------|
| VAR_IN_OUT   |                     |          |          |
| B            | AxesGroup           |          |          |
| VAR_INPUT    |                     |          |          |
| B            | Enable              |          |          |
| B            | VelFactor           |          |          |
| E            | AccFactor           |          |          |
| E            | JerkFactor          |          |          |
| VAR_OUTPUT   |                     |          |          |
| B            | Enabled             |          |          |
| E            | Busy                |          |          |
| B            | Error               |          |          |
| E            | ErrorID             |          |          |

### Appendix A 5.34. MC\_SyncAxisToGroup

| If Supported | MC_SyncAxisToGroup | Sup. Y/N | Comments |
|--------------|--------------------|----------|----------|
| VAR_IN_OUT   |                    |          |          |
| B            | AxesGroup          |          |          |
| B            | SlaveAxis          |          |          |
| VAR_INPUT    |                    |          |          |
| B            | Execute            |          |          |
| E            | RatioNumerator     |          |          |
| E            | RatioDenominator   |          |          |
| E            | Acceleration       |          |          |
| E            | Deceleration       |          |          |
| E            | Jerk               |          |          |
| E            | CoordSystem        |          |          |
| E            | BufferMode         |          |          |
| VAR_OUTPUT   |                    |          |          |
| B            | InSync             |          |          |
| E            | Busy               |          |          |
| E            | Active             |          |          |
| E            | CommandAborted     |          |          |
| B            | Error              |          |          |
| E            | ErrorID            |          |          |

### Appendix A 5.35 MC\_SyncGroupToAxis

| If Supported | MC_SyncGroupToAxis | Sup.Y/N | Comments |
|--------------|--------------------|---------|----------|
| VAR_IN_OUT   |                    |         |          |
| B            | Master             |         |          |
| B            | AxesGroup          |         |          |
| B            | PathData           |         |          |
| VAR_INPUT    |                    |         |          |
| B            | Execute            |         |          |
| E            | Mode               |         |          |
| E            | TuCNumerator       |         |          |
| E            | TuCDenominator     |         |          |
| E            | Acceleration       |         |          |
| E            | Deceleration       |         |          |
| E            | Jerk               |         |          |
| E            | CoordSystem        |         |          |
| E            | BufferMode         |         |          |
| VAR_OUTPUT   |                    |         |          |
| B            | InSync             |         |          |
| E            | Busy               |         |          |
| E            | Active             |         |          |
| E            | CommandAborted     |         |          |
| B            | Error              |         |          |
| E            | ErrorID            |         |          |

### Appendix A 5.36. MC\_SetDynCoordTransform

| If Supported | MC_SetDynCoordTransform | Sup.Y/N | Comments |
|--------------|-------------------------|---------|----------|
| VAR_IN_OUT   |                         |         |          |
| B            | AxesGroup               |         |          |
| B            | MasterAxesGroup         |         |          |
| B            | CoordTransform          |         |          |
| VAR_INPUT    |                         |         |          |
| B            | Execute                 |         |          |
| E            | Mode                    |         |          |
| E            | CoordSystem             |         |          |
| E            | BufferMode              |         |          |
| VAR_OUTPUT   |                         |         |          |
| B            | Done                    |         |          |
| E            | Busy                    |         |          |
| E            | Active                  |         |          |
| E            | CommandAborted          |         |          |
| B            | Error                   |         |          |
| E            | ErrorID                 |         |          |

### Appendix A 5.37. MC\_TrackConveyorBelt

| If Supported | MC_TrackConveyorBelt  | Sup.Y/N | Comments |
|--------------|-----------------------|---------|----------|
| VAR_IN_OUT   |                       |         |          |
| B            | AxesGroup             |         |          |
| E            | ConveyorBelt          |         |          |
| VAR_INPUT    |                       |         |          |
| B            | Execute               |         |          |
| B            | ConveyorBeltOrigin    |         |          |
| E            | InitialObjectPosition |         |          |
| E            | CoordSystem           |         |          |
| E            | BufferMode            |         |          |
| VAR_OUTPUT   |                       |         |          |
| B            | Done                  |         |          |
| E            | Busy                  |         |          |
| E            | Active                |         |          |
| E            | CommandAborted        |         |          |
| B            | Error                 |         |          |
| E            | ErrorID               |         |          |

### Appendix A 5.38. MC\_TrackRotaryTable

| If Supported | MC_TrackRotaryTable   | Sup.Y/N | Comments |
|--------------|-----------------------|---------|----------|
| VAR_IN_OUT   |                       |         |          |
| B            | AxesGroup             |         |          |
| E            | RotaryTable           |         |          |
| VAR_INPUT    |                       |         |          |
| B            | Execute               |         |          |
| B            | RotaryTableOrigin     |         |          |
| E            | InitialObjectPosition |         |          |
| E            | CoordSystem           |         |          |
| E            | BufferMode            |         |          |
| VAR_OUTPUT   |                       |         |          |
| E            | Done                  |         |          |
| E            | Busy                  |         |          |
| E            | Active                |         |          |
| E            | CommandAborted        |         |          |
| B            | Error                 |         |          |
| E            | ErrorID               |         |          |

## Appendix 1.6. 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.