



**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    | KINGSTAR                   |
| Supplier address | 200 Fifth Avenue           |
| City             | Waltham, MA                |
| Country          | USA                        |
| Telephone        | +1 781-996-4481            |
| Fax              |                            |
| Email address    | kingstarsales@kingstar.com |
| Product Name     | KINGSTAR                   |
| Product version  | 4.3                        |
| Release date     | 23 September 2022          |

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): Terri Hawker

Date of signature (dd/mm/yyyy): 9/22/2022

Signature: 

## Appendix 1.2. 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       | SINT                                  |

**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   | Yes       |                     |
| IDENT_IN_GROUP_REF              | MC_AddAxisToGroup<br>MC_RemoveAxisFromGroup  | Yes       |                     |
| MC_BUFFER_MODE                  | In all buffered FBs  | Yes       |                     |
| MC_KIN_REF                      | MC_SetKinTransform<br>MC_ReadKinTransform  | Yes       |                     |
| MC_EXECUTION_MODE               | MC_SetKinTransform   | Yes       |                     |
| MC_COORD_REF                    | MC_SetCoordinateTransformation   | No        |                     |
| MC_GROUP_BUFFER_MODE            | MC_MoveLinearAbsolute<br>MC_MoveCircularAbsolute   | No        | MC_BUFFER_MODE used |
| MC_TRANSITION_MODE              | MC_MoveLinearAbsolute<br>MC_MoveLinearRelative<br>MC_MoveCircularAbsolute<br>MC_MoveCircularRelative | Yes       |                     |
| MC_CIRC_PATHCHOICE              | MC_MoveCircularAbsolute<br>MC_MoveCircularRelative   | Yes       |                     |
| MC_PATH_DATA_REF<br>MC_PATH_REF | MC_PathSelect<br>MC_MovePath   | No        |                     |

**Table 2: Supported derived datatypes**

## Appendix 1.3. Supported Buffer Modes

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

**Table 3: Overview of buffer modes**

## Appendix 1.4. Supported Transition Modes

| No.      | MC_TRANSITION_MODE      | Supported |
|----------|-------------------------|-----------|
| 0        | TMNone                  | Yes       |
| 1        | TMMaxVelocity           | No        |
| 2        | TMDefinedVelocity       | No        |
| 3        | TMCornerDistance        | Yes       |
| 4        | TMMaxCornerDeviation    | Yes       |
| 5 - 9    | Reserved by PLCopen     | No        |
| 10 - ... | Supplier specific modes | No        |

**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                  | Yes                       |                                  |
| MC_RemoveAxisFromGroup             | Yes                       |                                  |
| MC_UngroupAllAxes                  | Yes                       |                                  |
| MC_GroupReadConfiguration          | Yes                       |                                  |
| MC_GroupEnable                     | Yes                       |                                  |
| MC_GroupDisable                    | Yes                       |                                  |
| MC_GroupHome                       | No                        |                                  |
| MC_SetKinTransform                 | Yes                       |                                  |
| MC_SetCartesianTransform           | Yes                       |                                  |
| MC_SetCoordinateTransform          | No                        |                                  |
| MC_ReadKinTransform                | Yes                       |                                  |
| MC_ReadCartesianTransform          | Yes                       |                                  |
| MC_ReadCoordinateTransform         | No                        |                                  |
| MC_GroupSetPosition                | Yes                       |                                  |
| MC_GroupReadActualPosition         | Yes                       |                                  |
| MC_GroupReadActualVelocity         | Yes                       |                                  |
| MC_GroupReadActualAcceleration     | Yes                       |                                  |
| MC_GroupStop                       | Yes                       |                                  |
| MC_GroupHalt                       | Yes                       |                                  |
| MC_GroupInterrupt                  | No                        |                                  |
| MC_GroupContinue                   | No                        |                                  |
| MC_GroupReadStatus                 | Yes                       |                                  |
| MC_GroupReadError                  | Yes                       |                                  |
| MC_GroupReset                      | Yes                       |                                  |
| MC_MoveLinearAbsolute              | Yes                       |                                  |
| MC_MoveLinearRelative              | Yes                       |                                  |
| MC_MoveCircularAbsolute            | Yes                       |                                  |
| MC_MoveCircularRelative            | Yes                       |                                  |
| MC_MoveDirectAbsolute              | Yes                       |                                  |
| MC_MoveDirectRelative              | Yes                       |                                  |
| MC_PathSelect                      | No                        |                                  |
| MC_MovePath                        | No                        |                                  |
| MC_GroupSetOverride                | Yes                       |                                  |
|                                    |                           |                                  |
| <b>Coordinated</b>                 | <b>Supported Yes / No</b> | <b>Comments (&lt;= 48 char.)</b> |
| MC_SyncAxisToGroup                 | No                        |                                  |
| MC_SyncGroupToAxis                 | No                        |                                  |
| MC_SetDynCoordTransform            | No                        |                                  |
| MC_TrackConveyorbelt               | No                        |                                  |
| MC_TrackRotaryTable                | No                        |                                  |

**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        |          |
| B            | Axis              | Y        |          |
| 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        |          |
| 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        |          |
| 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        |          |
| VAR_INPUT    |                           |          |          |
| B            | Enable                    | Y        |          |
| B            | IdentInGroup              | Y        |          |
| E            | CoordSystem               | Y        |          |
| VAR_OUTPUT   |                           |          |          |
| B            | Axis                      | Y        |          |
| 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        |          |
| VAR_INPUT    |                |          |          |
| B            | Execute        | Y        |          |
| VAR_OUTPUT   |                |          |          |
| B            | Done           | Y        |          |
| E            | Busy           | 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        |          |
| VAR_INPUT    |                 |          |          |
| B            | Execute         | Y        |          |
| VAR_OUTPUT   |                 |          |          |
| B            | Done            | Y        |          |
| E            | Busy            | 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        |          |
| VAR_INPUT    |                    |          |          |
| B            | Execute            | Y        |          |
| E            | KinTransform       | Y        |          |
| E            | ExecutionMode      | Y        |          |
| VAR_OUTPUT   |                    |          |          |
| B            | Done               | Y        |          |
| E            | Busy               | Y        |          |
| E            | Active             | N        |          |
| E            | CommandAborted     | N        |          |
| 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                | Y        |          |
| VAR_INPUT    |                          |          |          |
| B            | Execute                  | Y        |          |
| B            | TransX                   | Y        |          |
| B            | TransY                   | Y        |          |
| B            | TransZ                   | Y        |          |
| B            | RotAngle1                | Y        |          |
| B            | RotAngle2                | Y        |          |
| B            | RotAngle3                | Y        |          |
| E            | ExecutionMode            | Y        |          |
| VAR_OUTPUT   |                          |          |          |
| B            | Done                     | Y        |          |
| E            | Busy                     | Y        |          |
| E            | Active                   | N        |          |
| E            | CommandAborted           | N        |          |
| B            | Error                    | Y        |          |
| E            | ErrorID                  | Y        |          |

### Appendix A 5.10. MC\_SetCoordinateTransform

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



### Appendix A 5.11. MC\_ReadKinTransform

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

### Appendix A 5.13. MC\_ReadCoordinateTransform

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

### Appendix A 5.14. MC\_GroupSetPosition

| If Supported | MC_GroupSetPosition | Sup. Y/N | Comments            |
|--------------|---------------------|----------|---------------------|
| VAR_IN_OUT   |                     |          |                     |
| B            | AxesGroup           | Y        |                     |
| VAR_INPUT    |                     |          |                     |
| B            | Execute             | Y        |                     |
| B            | Position            | Y        |                     |
| E            | Relative            | Y        |                     |
| E            | CoordSystem         | Y        | Ignored ACS is used |
| 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 5.15. MC\_GroupReadActualPosition

| If Supported | MC_GroupReadActualPosition | Sup. Y/N | Comments            |
|--------------|----------------------------|----------|---------------------|
| VAR_IN_OUT   |                            |          |                     |
| B            | AxesGroup                  | Y        |                     |
| VAR_INPUT    |                            |          |                     |
| B            | Enable                     | Y        |                     |
| E            | CoordSystem                | Y        | Ignored ACS is used |
| VAR_OUTPUT   |                            |          |                     |
| B            | Valid                      | Y        |                     |
| E            | Busy                       | Y        |                     |
| B            | Error                      | Y        |                     |
| E            | ErrorID                    | Y        |                     |
| B            | Position                   | Y        |                     |

### Appendix A 5.16. MC\_GroupReadActualVelocity

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

### Appendix A 5.17. MC\_GroupReadActualAcceleration

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

### Appendix A 5.18. MC\_GroupStop

| If Supported | MC_GroupStop   | Sup. Y/N | Comments                                       |
|--------------|----------------|----------|--|
| VAR_IN_OUT   |                |          |  |
| B            | AxesGroup      | Y        |  |
| VAR_INPUT    |                |          |  |
| B            | Execute        | Y        |  |
| E            | Deceleration   | Y        |  |
| E            | Jerk           | Y        |  |
| E            | BufferMode     | N        | Removed to match the single axis MC_Stop usage |
| 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        |          |
| 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         |          |          |
| VAR_INPUT    |                   |          |          |
| B            | Execute           |          |          |
| E            | Deceleration      |          |          |
| E            | Jerk              |          |          |
| VAR_OUTPUT   |                   |          |          |
| B            | Done              |          |          |
| E            | Busy              |          |          |
| E            | Comman Aborted    |          |          |
| B            | Error             |          |          |
| E            | ErrorID           |          |          |

### Appendix A 5.21. MC\_GroupContinue

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

### Appendix A 5.22. MC\_GroupReadStatus

| If Supported | MC_GroupReadStatus | Sup. Y/N | Comments |
|--------------|--------------------|----------|----------|
| VAR_IN_OUT   |                    |          |          |
| B            | AxesGroup          | Y        |          |
| 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       | N        |          |
| E            | Decelerating       | N        |          |
| E            | InPosition         | N        |          |
| B            | Error              | Y        |          |
| E            | ErrorID            | Y        |          |

### Appendix A 5.23. MC\_GroupReadError

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

### Appendix A 5.24. MC\_GroupReset

| If Supported | MC_GroupReset | Sup. Y/N | Comments |
|--------------|---------------|----------|----------|
| VAR_IN_OUT   |               |          |          |
| B            | AxesGroup     | Y        |          |
| 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        |                     |
| VAR_INPUT    |                       |          |                     |
| B            | Execute               | Y        |                     |
| V            | ContinuousUpdate      | Y        |                     |
| B            | Position              | Y        |                     |
| E            | Velocity              | Y        |                     |
| E            | Acceleration          | Y        |                     |
| E            | Deceleration          | Y        |                     |
| E            | Jerk                  | Y        |                     |
| E            | CoordSystem           | Y        | Ignored ACS is used |
| 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        |                     |
| VAR_INPUT    |                       |          |                     |
| B            | Execute               | Y        |                     |
| V            | ContinuousUpdate      | Y        |                     |
| B            | Distance              | Y        |                     |
| E            | Velocity              | Y        |                     |
| E            | Acceleration          | Y        |                     |
| E            | Deceleration          | Y        |                     |
| E            | Jerk                  | Y        |                     |
| E            | CoordSystem           | Y        | Ignored ACS is used |
| 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        |          |
| VAR_INPUT    |                         |          |          |
| B            | Execute                 | Y        |          |
| V            | ContinuousUpdate        | Y        |          |
| B            | CircMode                | Y        |          |
| B            | AuxPoint                | Y        |          |

|            |                     |   |                     |
|------------|---------------------|---|---------------------|
| B          | EndPoint            | Y |                     |
| E          | PathChoice          | Y |                     |
| E          | Velocity            | Y |                     |
| E          | Acceleration        | Y |                     |
| E          | Deceleration        | Y |                     |
| E          | Jerk                | Y |                     |
| E          | CoordSystem         | Y | Ignored ACS is used |
| 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        |                     |
| VAR_INPUT    |                         |          |                     |
| B            | Execute                 | Y        |                     |
| V            | ContinuousUpdate        | Y        |                     |
| B            | CircMode                | Y        |                     |
| B            | AuxPoint                | Y        |                     |
| B            | EndPoint                | Y        |                     |
| E            | PathChoice              | Y        |                     |
| E            | Velocity                | Y        |                     |
| E            | Acceleration            | Y        |                     |
| E            | Deceleration            | Y        |                     |
| E            | Jerk                    | Y        |                     |
| E            | CoordSystem             | Y        | Ignored ACS is used |
| 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        |          |
| VAR_INPUT    |                       |          |          |
| B            | Execute               | Y        |          |
| B            | Position              | 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 5.30. MC\_MoveDirectRelative

| If Supported | MC_MoveDirectRelative | Sup. Y/N | Comments |
|--------------|-----------------------|----------|----------|
| VAR_IN_OUT   |                       |          |          |
| B            | AxesGroup             | Y        |          |
| VAR_INPUT    |                       |          |          |
| B            | Execute               | Y        |          |
| B            | Distance              | 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 5.31. 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           |          |          |
| B            | PathData            |          |          |
| VAR_INPUT    |                     |          |          |
| B            | Execute             |          |          |
| E            | CoordSystem         |          |          |
| E            | BufferMode          |          |          |
| E            | TransitionMode      |          |          |
| E            | TransitionParameter |          |          |
| VAR_OUTPUT   |                     |          |          |
| B            | Done                |          |          |
| E            | Busy                |          |          |
| E            | Active              |          |          |
| E            | CommandAborted      |          |          |
| B            | Error               |          |          |
| E            | ErrorID             |          |          |

### Appendix A 5.33. MC\_GroupSetOverride

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

### 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.