Subset of the

Technical Specification
PLCopen - Technical Committee 2 – Task Force

Function blocks for motion control

Version 1.0

Appendix A :

Compliance Procedure and Compliance List

Appendix A. <u>Compliance Procedure and Compliance List</u>

Listed in this Appendix are the requirements for the compliance statement from the supplier of the Motion Control Function Blocks. The compliance statement consists of two main groups: supported data types (see Appendix A 2 Supported data types) and supported Function Blocks, in combination with the applicable inputs and outputs (see Appendix A 3 Overview of the Function Blocks and its paragraphs). The supplier has to fill out the tables for the used data types and Function Blocks, according to their product, committing their support to the specification.

By submitting these tables to PLCopen, and after approval by PLCopen, the list will be published on the PLCopen website, www.plcopen.org , as well as a short form overview, as specified in Appendix A 2 Supported data types and Appendix A 3 Overview of the Function Blocks here below.

In addition to this approval, the supplier gets access and usage rights of the PLCopen Motion Control logo, as described in chapter Appendix A 4 The PLCopen Motion Control Logo and Its Usage.

Data types

The data type REAL listed in the Function Blocks and parameters (e.g. for velocity, acceleration, distance, etc.) may be exchanged to SINT, INT, DINT or LREAL without to be seen as incompliant to this standard, as long as they are consistent for the whole set of Function Blocks and parameters.

Implementation allows to extend 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, with at least the **basic** input and output variables, marked as "**B**" in the tables. These inputs and outputs have to be supported to be compliant.
For higher-level systems and future extensions any subset of the **extended** input and output variables, marked as "**E**" in the tables can be implemented.
Vendor specific additions are marked with "**V**", and can be listed as such in the supplier documentation.

- **Basic** input/output variables are mandatory	Marked in the tables with the letter "**B**"
- **Extended** input /output variables are optional	Marked in the tables with the letter "**E**"
- **Vendor Specific** additions	Marked in the vendor's compliance documentation with "**V**"

Appendix A 1. Statement of Supplier

Supplier name	ISG – Industrielle Steuerungstechnik GmbH
Supplier address	Rosenbergstrasse 28
City	70174 Stuttgart
Country	Germany
Telephone	0049-(0)711/ 2 29 92 30
Fax	0049-(0)711/ 2 29 92 25
Email address	info@isg-stuttgart.de
Product Name	ISG Motion Control Platform (ISG-MCP)
Product version	V263
Release date	January 2009

I herewith 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): Dr. Dieter Scheifele

Date of signature (dd/mm/yyyy):

Signature:

Appendix A 2.   Supported data types

Defined data types with MC library:	Supported	If not supported, which data type used
BOOL	Yes	
INT	Yes	
WORD	Yes	
REAL	Yes	
ENUM	Yes	

Table 1: Supported data types

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

Derived data types:	Where used	Supported	Which structure
Axis_Ref	Nearly all FBs	Yes	
MC_Direction (extended)	MC_MoveAbsolute MC_MoveVelocity	Yes	
MC_TP_REF	MC_PositionProfile	No	In work
MC_TV_REF	MC_VelocityProfile	No	In work
MC_TA_REF	MC_AccelerationProfile	No	In work
MC_CAM_REF	MC_CamTableSelect	Yes	
MC_CAM_ID (extended)	MC_CamTableSelect MC_CamIn	Yes Yes	
MC_StartMode (extended)	MC_CamIn	Yes	

Table 2: Supported derived data types

Appendix A 3.   Overview of the Function Blocks

Single Axis Function Blocks	Supported Yes / No	Comments (<= 48 char.)
MC_MoveAbsolute	Yes	
MC_MoveRelative	Yes	
MC_MoveAdditive	Yes	
MC_MoveSuperimposed	Yes	
MC_MoveVelocity	Yes	
MC_Home	Yes	
MC_Stop	Yes	
MC_Power	Yes	
MC_ReadStatus	Yes	
MC_ReadAxisError	Yes	
MC_Reset	Yes	
MC_ReadParameter	Yes	
MC_ReadBoolParameter	Yes	Covered by MC_ReadParameter
MC_WriteParameter	Yes	
MC_WriteBoolParameter	Yes	Covered by MC_WriteParameter
MC_ReadActualPosition	Yes	Covered by MC_ReadStatus
MC_PositionProfile	No	In work
MC_VelocityProfile	No	In work
MC_AccelerationProfile	No	In work
Multi-Axis Function Blocks	**Supported Yes / No**	**Comments (<= 48 char.)**
MC_CamTableSelect	Yes	
MC_CamIn	Yes	
MC_CamOut	Yes	
MC_GearIn	Yes	
MC_GearOut	Yes	
MC_Phasing	Yes	

Table 3: Short overview of the Function Blocks

Appendix A 6.1 MoveAbsolute

If Supported	MC_MoveAbsolute	Sup.Y/N	Comments
VAR_IN_OUT			
B	Axis	Yes	
VAR_INPUT			
B	Execute	Yes	
B	Position	Yes	
E	Velocity	Yes	
E	Acceleration	Yes	
E	Deceleration	Yes	
E	Jerk	Yes	
E	Direction	Yes	
VAR_OUTPUT			
B	Done	Yes	
E	CommandAborted	Yes	
B	Error	Yes	
E	ErrorID	Yes	

Appendix A 6.2 MoveRelative

If Supported	MC_MoveRelative	Supported Y/N	Comments
VAR_IN_OUT			
B	Axis	Yes	
VAR_INPUT			
B	Execute	Yes	
B	Distance	Yes	
E	Velocity	Yes	
E	Acceleration	Yes	
E	Deceleration	Yes	
E	Jerk	Yes	
VAR_OUTPUT			
B	Done	Yes	
E	CommandAborted	Yes	
B	Error	Yes	
E	ErrorID	Yes	

Appendix A 6.3 MoveAdditive

If Supported	MC_MoveAdditive	Suported Y/N	Comments
VAR_IN_OUT			
B	Axis	Yes	
VAR_INPUT			
B	Execute	Yes	
B	Distance	Yes	
E	Velocity	Yes	
E	Acceleration	Yes	
E	Deceleration	Yes	
E	Jerk	Yes	
VAR_OUTPUT			
B	Done	Yes	
E	CommandAborted	Yes	
B	Error	Yes	
E	ErrorID	Yes	

Appendix A 6.4 MoveSuperimposed

If Supported	MC_MoveSuperimposed	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Yes	
VAR_INPUT			
B	Execute	Yes	
B	Distance	Yes	
E	VelocityDiff	Yes	
E	Acceleration	Yes	
E	Deceleration	Yes	
E	Jerk	Yes	
VAR_OUTPUT			
B	Done	Yes	
B	Busy	No	In work
E	CommandAborted	Yes	
B	Error	Yes	
E	ErrorID	Yes	

Appendix A 6.5 MoveVelocity

If Supported	MC_MoveVelocity	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Yes	
VAR_INPUT			
B	Execute	Yes	
E	Velocity	Yes	
E	Acceleration	Yes	
E	Deceleration	Yes	
E	Jerk	Yes	
E	Direction	Yes	
VAR_OUTPUT			
B	InVelocity	Yes	
E	CommandAborted	Yes	
B	Error	Yes	
E	ErrorID	Yes	

Appendix A 6.6 Home

If Supported	MC_Home	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Yes	
VAR_INPUT			
B	Execute	Yes	
B	Position	No	In work
VAR_OUTPUT			
B	Done	Yes	
E	CommandAborted	Yes	
B	Error	Yes	
E	ErrorID	Yes	

Appendix A 6.7 Stop

If Supported	MC_Stop	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Yes	
VAR_INPUT			
B	Execute	Yes	
E	Deceleration	Yes	
E	Jerk	Yes	
VAR_OUTPUT			
B	Done	Yes	
B	Error	Yes	
E	ErrorID	Yes	

Appendix A 6.8 Power

If Supported	MC_Power	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Yes	
VAR_INPUT			
B	Enable	Yes	
E	Enable_Positive	No	Not supported by SERCOS
E	Enable_Negative	No	Not supported by SERCOS
VAR_OUTPUT			
B	Status	Yes	
B	Error	Yes	
E	ErrorID	Yes	

Appendix A 6.9 ReadStatus

If Supported	MC_ReadStatus	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Yes	
VAR_INPUT			
B	Enable	Yes	
VAR_OUTPUT			
B	Done	Yes	
B	Error	Yes	
E	ErrorID	Yes	
B	Errorstop	Yes	
B	Stopping	Yes	
B	StandStill	Yes	
B	DiscreteMotion	Yes	
B	ContinuousMotion	Yes	
E	SynchronizedMotion	Yes	
E	Homing	Yes	
E	ConstantVelocity	Yes	
E	Accelerating	No	In work
E	Decelerating	No	In work

Appendix A 6.10 ReadAxisError

If Supported	**MC_ReadAxisError**	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Yes	
VAR_INPUT			
	Enable	Yes	
VAR_OUTPUT			
B	Done	Yes	
B	Error	Yes	
B	ErrorID	Yes	

Appendix A 6.11 Reset

If Supported	**MC_Reset**	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Yes	
VAR_INPUT			
B	Execute	Yes	
VAR_OUTPUT			
B	Done	Yes	
B	Error	Yes	
B	ErrorID	Yes	

Appendix A 6.12 ReadParameter

If Supported	**MC_ReadParameter**	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Yes	
VAR_INPUT			
B	Enable	Yes	
B	ParameterNumber	Yes	Identification by name
VAR_OUTPUT			
B	Done	Yes	
B	Error	Yes	
E	ErrorID	Yes	
B	Value	Yes	

Appendix A 6.13 ReadBoolParameter

If Supported	MC_ReadBoolParameter	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Yes	
VAR_INPUT			
B	Enable	Yes	
B	ParameterNumber	Yes	
VAR_OUTPUT			
B	Done	Yes	
B	Error	Yes	
E	ErrorID	Yes	
B	Value	Yes	

Name	B/E	R/W	Supp. Y/N	Comments
CommandedPosition	B	R	Yes	Covered by MC_ReadStatus
SWLimitPos	E	R/W	Yes	
SWLimitNeg	E	R/W	Yes	
EnableLimitPos	E	R/W	Yes	Automatically enabled after MC_Home
EnableLimitNeg	E	R/W	Yes	Automatically enabled after MC_Home
EnablePosLagMonitoring	E	R/W	Yes	Dedicated FB MC_PosLagMonitor
MaxPositionLag	E	R/W	Yes	
MaxVelocitySystem	E	R	Yes	
MaxVelocityAppl	B	R/W	Yes	
ActualVelocity	B	R	Yes	Covered by MC_ReadStatus
CommandedVelocity	B	R	Yes	Covered by MC_ReadStatus
MaxAccelerationSystem	E	R	Yes	
MaxAccelerationAppl	E	R/W	Yes	
MaxDecelerationSystem	E	R	Yes	
MaxDecelerationAppl	E	R/W	Yes	
MaxJerk	E	R/W	Yes	

Table 4: Parameters for ReadParameter and WriteParameter

Appendix A 6.14 WriteParameter

If Supported	MC_WriteParameter	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Yes	
VAR_INPUT			
B	Execute	Yes	
B	ParameterNumber	Yes	Identification by name
B	Value	Yes	
VAR_OUTPUT			
B	Done	Yes	
B	Error	Yes	
E	ErrorID	Yes	

Appendix A 6.15 WriteBoolParameter

If Supported	MC_WriteBoolParameter	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Yes	
VAR_INPUT			
B	Execute	Yes	
B	ParameterNumber	Yes	
B	Value	Yes	
VAR_OUTPUT			
B	Done	Yes	
B	Error	Yes	
E	ErrorID	Yes	

Appendix A 6.16 ReadActualPosition

If Supported	MC_ReadActualPosition	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Yes	
VAR_INPUT			
B	Enable	Yes	
VAR_OUTPUT			
B	Done	Yes	
B	Error	Yes	
E	ErrorID	Yes	
B	Position	Yes	

Appendix A 6.17 PositionProfile

If Supported	MC_PositionProfile	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	No	In work
B	TimePosition	No	In work
VAR_INPUT			
B	Execute	No	In work
B	ArraySize	No	In work
E	Scale	No	In work
E	Offset	No	In work
VAR_OUTPUT			
B	Done	No	In work
E	CommandAborted	No	In work
B	Error	No	In work
E	ErrorID	No	In work

Appendix A 6.18 VelocityProfile

If Supported	MC_VelocityProfile	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	No	In work
B	MC_TimeVelocity	No	In work
VAR_INPUT			
B	Execute	No	In work
B	ArraySize	No	In work
E	Scale	No	In work
E	Offset	No	In work
VAR_OUTPUT			
B	Done	No	In work
E	CommandAborted	No	In work
B	Error	No	In work
E	ErrorID	No	In work

Appendix A 6.19 AccelerationProfile

If Supported	MC_AccelerationProfile	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	No	In work
B	MC_TimeAcceleration	No	In work
VAR_INPUT			
B	Execute	No	In work
B	ArraySize	No	In work
E	Scale	No	In work
E	Offset	No	In work
VAR_OUTPUT			
B	Done	No	In work
E	CommandAborted	No	In work
B	Error	No	In work
E	ErrorID	No	In work

Appendix A 6.20 CamTableSelect

If Supported	MC_CamTableSelect	Sup. Y/N	Comments
VAR_IN_OUT			
B	Master	Yes	
B	Slave	Yes	
B	CamTable	Yes	
VAR_INPUT			
B	Execute	Yes	
E	Periodic	Yes	
E	MasterAbsolute	Yes	
E	SlaveAbsolute	Yes	
VAR_OUTPUT			
B	Done	Yes	
B	Error	Yes	
E	ErrorID	Yes	
E	CamTableID	Yes	

Appendix A 6.21 CamIn

If Supported	MC_CamIn	Sup. Y/N	Comments
VAR_IN_OUT			
B	Master	Yes	
B	Slave	Yes	
VAR_INPUT			
B	Execute	Yes	
E	MasterOffset	Yes	
E	SlaveOffset	Yes	
E	MasterScaling	Yes	
E	SlaveScaling	Yes	
E	StartMode	Yes	
E	CamTableID	Yes	
VAR_OUTPUT			
B	InSync	Yes	
E	CommandAborted	Yes	
B	Error	Yes	
E	ErrorID	Yes	
E	EndOfProfile	Yes	

Appendix A 6.22 CamOut

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

Appendix A 6.23 GearIn

If Supported	MC_GearIn	Sup. Y/N	Comments
VAR_IN_OUT			
B	Master	Yes	
B	Slave	Yes	
VAR_INPUT			
B	Execute	Yes	
B	RatioNumerator	Yes	
B	RatioDenominator	Yes	
E	Acceleration	Yes	
E	Deceleration	Yes	
E	Jerk	Yes	
VAR_OUTPUT			
B	InGear	Yes	
E	CommandAborted	Yes	
B	Error	Yes	
E	ErrorID	Yes	

Appendix A 6.24 GearOut

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

Appendix A 6.25 Phasing

If Supported	MC_Phasing	Sup. Y/N	Comments
VAR_IN_OUT			
B	Master	Yes	
B	Slave	Yes	
VAR_INPUT			
B	Execute	Yes	
B	Phase	Yes	
E	Acceleration	Yes	
E	Deceleration	Yes	
E	Jerk	Yes	
VAR_OUTPUT			
B	Done	Yes	
E	CommandAborted	Yes	
B	Error	Yes	
E	ErrorID	Yes	

Appendix A 4.   The PLCopen Motion Control Logo and Its Usage

For quick identification of compliant products, PLCopen has developed a logo for the motion control Function Blocks:

Figure 1: The PLCopen Motion Control Logo

This motion control logo is owned and trademarked by PLCopen.

In order to use this logo free-of-charge, the relevant company has to fulfill all the following requirements:
1. the company has to be a voting member of PLCopen;
2. the company has to comply to 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 is done 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 statement on this from PLCopen in written form. 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 as long as the original scale and color setting is kept.
6. the logo has to be used in the context of Motion Control.