

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

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Appendix A. 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 datatypes (see Appendix A 2 Supported Datatypes) 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 datatypes and Function Blocks, according to their product, committing their support to the specification.

By submitting these tables to PLCopen, and after approval by PLCopen, the list will be published on the PLCopen website, www.plcopen.org, as well as a shortform overview, as specified in Appendix A 2 Supported Datatypes 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.

Datatypes

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 noncompliant 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	ICS Triplex ISaGRAF
Supplier address	555 d'Auvergne
City	Longueuil
Country	Canada
Telephone	+1 450 674 7774
Fax	+1 450 674 7344
Email address	dlavallee@icstriplex.ca
Product Name	ISaGRAF 4 (with Motion Control Add-on)
Product version	4
Release date	December 2004

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):

Denis Lavallee

Date of signature (dd/mm/yyyy):

November 17, 2004

Signature:

Appendix A 2. Supported Datatypes

Defined datatypes with MC library:	Supported	If not supported, which datatype used
BOOL	Y	
INT	Y	
WORD	Y	
REAL	Y	
ENUM	N	Word + define Word

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
Axis_Ref	Nearly all FBs	Y	
MC_Direction (extended)	MC_MoveAbsolute MC_MoveVelocity	Y	
MC_TP_REF	MC_PositionProfile	Y	
MC_TV_REF	MC_VelocityProfile	Y	
MC_TA_REF	MC_AccelerationProfile	Y	
MC_CAM_REF	MC_CamTableSelect	Y	
MC_CAM_ID (extended)	MC_CamTableSelect MC_CamIn	Y	
MC_StartMode (extended)	MC_CamIn	Y	

Table 2: Supported derived datatypes

Appendix A 3. Overview of the Function Blocks

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

Table 3: Short overview of the Function Blocks

Appendix A 3.1 MoveAbsolute

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

Appendix A 3.2 MoveRelative

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

Appendix A 3.3 MoveAdditive

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

Appendix A 3.4 MoveSuperimposed

If Supported	MC_MoveSuperimposed	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Execute	Y	
B	Distance	Y	
E	VelocityDiff	Y	
E	Acceleration	Y	
E	Deceleration	Y	
E	Jerk	Y	
VAR_OUTPUT			
B	Done	Y	
B	Busy	Y	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	Y	

Appendix A 3.5 MoveVelocity

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

Appendix A 3.6 Home

If Supported	MC_Home	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Execute	Y	
B	Position	Y	
VAR_OUTPUT			
B	Done	Y	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	Y	

Appendix A 3.7 Stop

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

Appendix A 3.8 Power

If Supported	MC_Power	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Enable	Y	
E	Enable_Positive	Y	
E	Enable_Negative	Y	
VAR_OUTPUT			
B	Status	Y	
B	Error	Y	
E	ErrorID	Y	

Appendix A 3.9 ReadStatus

If Supported	MC_ReadStatus	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
VAR_INPUT			
B	Enable	Y	
VAR_OUTPUT			
B	Done	Y	
B	Error	Y	
E	ErrorID	Y	
B	Errorstop	Y	
B	Stopping	Y	
B	StandStill	Y	
B	DiscreteMotion	Y	
B	ContinuousMotion	Y	
E	SynchronizedMotion	Y	
E	Homing	Y	
E	ConstantVelocity	Y	
E	Accelerating	Y	
E	Decelerating	Y	

Appendix A 3.10 ReadAxisError

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

Appendix A 3.11 Reset

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

Appendix A 3.12 ReadParameter

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

Appendix A 3.13 ReadBoolParameter

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

Name	B/E	R/W	Supp. Y/N	Comments
CommandedPosition	B	R	Y	
SWLimitPos	E	R/W	Y	
SWLimitNeg	E	R/W	Y	
EnableLimitPos	E	R/W	Y	
EnableLimitNeg	E	R/W	Y	
EnablePosLagMonitoring	E	R/W	Y	
MaxPositionLag	E	R/W	Y	
MaxVelocitySystem	E	R	Y	
MaxVelocityAppl	B	R/W	Y	
ActualVelocity	B	R	Y	
CommandedVelocity	B	R	Y	
MaxAccelerationSystem	E	R	Y	
MaxAccelerationAppl	E	R/W	Y	
MaxDecelerationSystem	E	R	Y	
MaxDecelerationAppl	E	R/W	Y	
MaxJerk	E	R/W	Y	

Table 4: Parameters for ReadParameter and WriteParameter

Appendix A 3.14 WriteParameter

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

Appendix A 3.15 WriteBoolParameter

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

Appendix A 3.16 ReadActualPosition

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

Appendix A 3.17 PositionProfile

If Supported	MC_PositionProfile	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
B	TimePosition	Y	CUSTOM IMPLEMENTATION
VAR_INPUT			
B	Execute	Y	
B	ArraySize	Y	
E	Scale	Y	
E	Offset	Y	
VAR_OUTPUT			
B	Done	Y	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	Y	

Appendix A 3.18 VelocityProfile

If Supported	MC_VelocityProfile	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
B	MC_TimeVelocity	Y	CUSTOM IMPLEMENTATION
VAR_INPUT			
B	Execute	Y	
B	ArraySize	Y	
E	Scale	Y	
E	Offset	Y	
VAR_OUTPUT			
B	Done	Y	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	Y	

Appendix A 3.19 AccelerationProfile

If Supported	MC_AccelerationProfile	Sup. Y/N	Comments
VAR_IN_OUT			
B	Axis	Y	
B	MC_TimeAcceleration	Y	CUSTOM IMPLEMENTATION
VAR_INPUT			
B	Execute	Y	
B	ArraySize	Y	
E	Scale	Y	
E	Offset	Y	
VAR_OUTPUT			
B	Done	Y	
E	CommandAborted	Y	
B	Error	Y	
E	ErrorID	Y	

Appendix A 3.20 CamTableSelect

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

Appendix A 3.21 CamIn

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

Appendix A 3.22 CamOut

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

Appendix A 3.23 GearIn

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

Appendix A 3.24 GearOut

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

Appendix A 3.25 Phasing

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

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.