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 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 web-site, 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 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	Parker Hannifin GmbH
Supplier address	Robert-Bosch-Strasse 22
City	D-77656 Offenburg
Country	Germany
Telephone	+49 781 509 0
Fax	+49 781 509 176
Email address	Sales.hauser@parker.com
Product Name	Compax3 Servo Drive
Product version	
Release date	01.01.2003

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): Henry Claussnitzer

Date of signature (dd/mm/yyyy): 04.08.2003

Signature:

Appendix A 2. Supported Datatypes

Defined datatypes with MC library:	Supported	If not supported, which datatype used
BOOL	YES	
INT	YES	
WORD	YES	
REAL	YES	
ENUM	NO	INT

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	YES	INT (PREDEFINED CONSTANT)
MC_Direction (extended)	MC_MoveAbsolute MC_MoveVelocity	YES	INT (PREDEFINED CONSTANT)
MC_TP_REF	MC_PositionProfile	NO	
MC_TV_REF	MC_VelocityProfile	NO	
MC_TA_REF	MC_AccelerationProfile	NO	
MC_CAM_REF	MC_CamTableSelect	YES	INT (PREDEFINED CONSTANT)
MC_CAM_ID (extended)	MC_CamTableSelect MC_CamIn	NO	
MC_StartMode (extended)	MC_CamIn	NO	

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

Table 3: Short overview of the Function Blocks

NOTE: ALL ACCELERATION / DECELERATION AND JERK VALUES ARE DINT!

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	DINT
E	Deceleration	YES	DINT
E	Jerk	YES	DINT
E	Direction	NO	
VAR_OUTPUT			
B	Done	YES	
E	CommandAborted	YES	
B	Error	YES	
E	ErrorID	NO	

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	DINT
E	Deceleration	YES	DINT
E	Jerk	YES	DINT
VAR_OUTPUT			
B	Done	YES	
E	CommandAborted	YES	
B	Error	YES	
E	ErrorID	NO	

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	DINT
E	Deceleration	YES	DINT
E	Jerk	YES	DINT
VAR_OUTPUT			
B	Done	YES	
E	CommandAborted	YES	
B	Error	YES	
E	ErrorID	NO	

(*) VENDOR SPECIFIC VAR_INPUT "JERKDECEL" (DINT)

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	Additional Deceleration Jerk Input
VAR_OUTPUT			
B	Done	YES	
B	Busy	YES	
E	CommandAborted	YES	
B	Error	YES	
E	ErrorID	NO	

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	DINT
E	Deceleration	NO	
E	Jerk	NO	
E	Direction	YES	
VAR_OUTPUT			
B	InVelocity	YES	
E	CommandAborted	YES	
B	Error	YES	
E	ErrorID	NO	

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	YES	
VAR_OUTPUT			
B	Done	YES	
E	CommandAborted	YES	
B	Error	YES	
E	ErrorID	NO	

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	DINT
E	Jerk	YES	DINT
VAR_OUTPUT			
B	Done	YES	
B	Error	YES	
E	ErrorID	NO	

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	
E	Enable_Negative	NO	
VAR_OUTPUT			
B	Status	YES	
B	Error	YES	
E	ErrorID	NO	

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	NO	
B	Errorstop	YES	
B	Stopping	YES	
B	StandStill	YES	
B	DiscreteMotion	YES	
B	ContinuousMotion	YES	
E	SynchronizedMotion	YES	
E	Homing	YES	
E	ConstantVelocity	NO	
E	Accelerating	NO	
E	Decelerating	NO	

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		
VAR_INPUT			
B	Enable		
B	ParameterNumber		
VAR_OUTPUT			
B	Done		
B	Error		
E	ErrorID		
B	Value		

Appendix A 6.13 ReadBoolParameter

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

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

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		
VAR_INPUT			
B	Execute		
B	ParameterNumber		
B	Value		
VAR_OUTPUT			
B	Done		
B	Error		
E	ErrorID		

Appendix A 6.15 WriteBoolParameter

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

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	NO	
B	Position	YES	

Appendix A 6.17 PositionProfile

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

Appendix A 6.18 VelocityProfile

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

Appendix A 6.19 AccelerationProfile

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

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	NO	
E	SlaveAbsolute	NO	
VAR_OUTPUT			
B	Done	YES	
B	Error	YES	
E	ErrorID	NO	
E	CamTableID	NO	

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	NO	
E	SlaveOffset	NO	
E	MasterScaling	NO	
E	SlaveScaling	NO	
E	StartMode	NO	
E	CamTableID	NO	
VAR_OUTPUT			
B	InSync	YES	
E	CommandAborted	YES	
B	Error	YES	
E	ErrorID	NO	
E	EndOfProfile	YES	

Appendix A 6.22 CamOut

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

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	NO	
E	Jerk	NO	
VAR_OUTPUT			
B	InGear	YES	
E	CommandAborted	YES	
B	Error	YES	
E	ErrorID	NO	

Appendix A 6.24 GearOut

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

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	Additional Deceleration Jerk Input
VAR_OUTPUT			
B	Done	YES	
E	CommandAborted	YES	
B	Error	YES	
E	ErrorID	NO	

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.