SysmacStudio 环境下 EtherCAT 通讯控制 CMMT-EC



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关键词:

Sysmac Studio, omron, EtherCAT

摘要:

文档介绍欧姆龙 NJ 系列 PLC 通过 EtherCAT 通讯控制 CMMT-EC 控制器,PLC 软件为 SysmacStudio。内容包括轴 对象的配置、运动控制功能库的引用、服务对象读写以及 Festo 功能库的运用等。

目标群体:

本文仅针对有一定自动化设备调试基础的工程师,需要对 Festo 伺服以及 Sysmac Studio 有一定了解。

声明:

本文档为技术工程师根据官方资料和测试结果编写,旨在指导用户快速上手使用 Festo 产品,如果发现描述与官 方正式出版物冲突,请以正式出版物为准。

我们尽量罗列了实验室测试的软、硬件环境,但现场设备型号可能不同,软件/固件版本可能有差异,请务必在 理解文档内容和确保安全的前提下执行测试。

我们会持续更正和更新文档内容, 恕不另行通知。

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	所用软/硬件

1 所用软/硬件

型号/名称	软/固件版本
CMMT-AS	V16.0.10_release
Festo Automation Suite	1.3.1.57
CMMT-AS Plug-In	1.3.0.46
NJ301-1100 O欧姆龙 PLC	1.13
Sysmac Studio	Ver.1.20

2 下载 XML 设备描述文件

上 Festo 官网"支持和下载"页面下载 CMMT 设备描述文件,下载链接如下(2020.8.27 更新):

https://www.festo.com/net/en-gb_gb/SupportPortal/Downloads/477680/525654/CMMT-AS-EC%20FW%20V018.0.5.zip

	<mark>,</mark> Смм	т		
	产品 3	支持/下载 136	主题 5	
Firmware Firmware and E	therCAT XML ESI data	a for the servo drive CMMT	-ASEC (EtherCAT)	
New Features: • Homing wi	thout Power ON			
Fixed Bugs: Master / Si Touch-prof Dropping co Wrong calo Correction	lave jump in target po be position calculatio of Z-axis when enabli culation of the modul of CiA402 PDO mapp	osition on error ng the drive o function oing		
Supported syst • servo drive • servo drive • servo drive • servo drive • servo drive • servo drive • servo drive	ems: CMMT-AS-C2-3A-EC- CMMT-AS-C4-3A-EC- CMMT-AS-C2-11A-P3 CMMT-AS-C3-11A-P3 CMMT-AS-C5-11A-P3 CMMT-AS-C7-11A-P3 CMMT-AS-C12-11A-P3	S1 (5340819) S1 (5340820) -EC-S1 (5340821) -EC-S1 (5340822) -EC-S1 (5340823) -EC-S1 (8133354) '3-EC-S1 (8133355)		

► V018.0.5

(valid since 19/06/2020)

CMMT-AS-EC FW Vo18.0.5.zip 56 MB

3 新建 PLC 项目

Sysmac Studio		-	×
		_	
Offline New Project Open Project Import Export Online Connect to Device	Project Properties Project name CMMT_EC Author cn0shnwn Comment Type Standard Project		
Version Control Explorer License License	Select Device Category Controller Device NJ301 - 1100 • Version 1.13 • Create		

4 设定 PLC EtherNet/IP 端口地址

Multiview Explorer 🗸 🗸 🗸	💕 Built-in Eth	erNet/IP Port S X
new_Controller_0	TCP /IP	TCP/IP Settings
Therefore and setup		▼ IP Address
CPU/Expansion Racks	LINK	Fixed setting
▼ I/O Map ▼ II Controller Setup		Subnet mask 255.255.2550
L 🕼 Operation Settings		Default gateway
📕 🗆 🖉 Built-in EtherNet/IP F	FTP	Obtain from BOOTP server. Figure the ID address obtained from POOTP conver
Motion Control Setup		
Cam Data Settings		▼ DNS
Event Settings	NTP	DNS 📀 Do not use 🛛 🕒 Use
🖏 Task Settings		Priority DNS server
Data Trace Settings		Secondary DNS server
Programming	€÷	Domain name
	SNMP	▼ Host Name - IP Address
		Host Name IP Address

5 安装从站描述文件



将 XML 格式的从站描述文件复制到 ESI 文件目录

⊇ = Use	rEsiFiles					_	o x
File Home	Share	View					~ 🕐
$\leftarrow \rightarrow \cdot \uparrow$	« Prog	ram Files (x86) → OMRON → Sysmac Studio → IO	DeviceProfiles > EsiFiles	> UserEsiFiles	✓ Ö Sear	rch UserEsiFiles	Q
	^	Name		Date modified	Туре	Size	
A Quick access		Festo CTEU-EtherCAT Fix - 20151019.xml		10/19/2015 9:14 PM	XML Document	89 KB	
Desktop	*	Festo CTEU-EtherCAT Modular - 20180719.xml		7/19/2018 3:49 PM	XML Document	594 KB	
🕂 Downloads	*	Festo_CMMP-AS_V4p0_FHPP_ARRAY_OMRON.	kml	9/15/2015 2:17 PM	XML Document	300 KB	
Documents	*	Festo-CMMT-AS-CiA402-20180822.xml		8/22/2018 5:01 PM	XML Document	1,360 KB	
Pictures	*	Festo-CMMT-AS-CiA402-20190627.xml		6/27/2019 7:57 PM	XML Document	1,826 KB	
Festo CTEU-El	P -	Festo-CMMT-AS-EC.xml		4/26/2018 6:01 PM	XML Document	3,571 KB	
Lib		Festo-CPX-E-EC-20170425.xml		4/27/2017 1:51 PM	XML Document	1,003 KB	
Patch EPLAN	P8						
	×						
7 items 3 items se	lected 6	.59 MB					

不同日期标示的 XML 文件匹配 CMMT 不同版本的固件。建议更新 CMMT 固件并使用最新日期的 XML 文件。或者将所有版本 的 XML 均放在此目录下,以确保设备扫描时匹配到正确 XML 的版本。老版本的 XML 设备描述文件可在下载包的 Archive 文 件夹下找到。

注意:存放好 XML 文件后重启 Sysmac Studio 软件才生效。

6 连接 PLC



注意:选择直连 Direct connectionvia Ethernet 连接 PLC 时,不需要知道 PLC 地址,也不需要 PLC 与 PC 的 IP 同网段。如果选择了 hub 连接,则必须确保 PLC 与 PC 的 IP 地址同网段。如果总是通讯失败,建议检查 PC 的服务列表,确认下图中标示的 欧姆龙通讯服务是否安装并运行。

🞥 Computer Management				- 🗆	×
File Action View Help					
🗢 🏟 🖄 📅 🐻 🧕	🛛 🖬 🕨 🖬 🕪				
🜆 Computer Management (Local	O Services	_		Actions	
> 🎁 System Tools	OMRON Ethernet Direct Connection	Name	Description ^	Services	•
 Services and Applications 	Manager	🖏 Office 64 Source Engine	Saves instal	More Actions	►
Services	Stop the service	Offline Files	The Offline This service	OMRON Ethernet Direct Co	. 🔺
	ine service	OMRON USB Connection Manager	This service	More Actions	►
	Description:	OMRON USB Serial Connection Manager	This service		
	This service manages Ethernet direct connections to Omron device	Peer Name Resolution Protocol	Enables serv		
		🌼 Peer Networking Grouping	Enables mu		
		🍓 Peer Networking Identity Manager	Provides ide		
		🍓 Performance Counter DLL Host	Enables rem		
		Oken Performance Loas & Alerts	Performanc ♥ >		
< >	Extended Standard				

点击菜单栏的 online 或者闪电快捷图标使 PLC 在线

CMME_EC - new_Controller_0 - Sysmac Studio							
File Edit View Insert Project	Controller Simulation Tools H	Help					
	Communications Setup Change Device	🚺 🛦 🍕 🖡 💼					
Multiview Explorer 🚥 🗸 🗸	Online	Ctrl+W erCAT ×					
new_Controller_0 🔻	Offline	Ctrl+Shift+W					
	C	Carl M					

在线后工具栏下面会显示长条黄线。

File	Edit	View	/ In	sert	Proje	ect	Со	ntrolle	er S	imula	tion	Tool	s He	elp	-	-		-	-	-	-	-	-
X	٩	P	Ŵ	\$	ぐ	?		ð	く	2	69	5	63 ML	Ä	0	R		4	8		∳ ∂	e,	ť,
Mult	tiview E	xplore	: r 2000		× 🗸	ф,	elP	Built-i	in Eth	erNet	:/IP Pc	ort S	÷	I/O	Map	諁	Eth	erCAT	×				
nev	Contr	oller (No	de Ado	dress	Netw	ork co	onfigu	ration							I			

7 扫描 PLC 硬件

CMME_EC - new_Controller_0 - Sysmac Studio



8 扫描 EtherCAT 网络

CMME_EC - new_Controller_0 - Sysmac Studio File Edit View Insert Project Controller Simulation Tools Help 🖪 🗛 🔛 🗔 🖼 🗡 🖪 🔺 🔌 68 🍄 🋸 📬 🔿 🔛 😭 📌 I/O Map 🐺 EtherCAT 🗙 🔄 CPU/Expansion Racks Multiview Explorer ः 🗸 म् FIP Built-in EtherNet/IP Port S.. Node Address Network configuration new_Controller_0 🔻 88 Master Configurations and Setup EtherCAT ▶ 🔄 CPU/Expansion Racks 🔹 I/O Map Controller Setup ▶ ۞ Motion Control Setup 🞸 Cam Data Settings Event Settings 🗟 Task Settings 🗠 Data Trace Settings Programming Write Slave Node Address 2 Compare and Merge with Actual Network Configuration Get Slave Serial Numbers Display Diagnosis/Statistics Information Display Production Information Display Packet Monitor Display ESI Library

Compare and Merge with Actual Network Configuration

Node Address Network configuration on Sysmac Studio	Node address Actual network configuration	Netw	Comparison result	Actua	Lower Configuration
Master Master	Master	Mast	Matched	Mast	
	1 CMMT-AS Rev:0x000000		Added	1 : C	
_	_				
2 Apply actual net	twork configuration				
Some slaves such as Power Supply Units are not included in	the actual network configuration.				
	Close				

欧姆龙 PLC 中,必须手动为 EtherCAT 从站站点设置 Node address 节点地址,即 EtherCAT 通讯中的站别名 Station Alias。 如果 CMMT 初次使用在欧姆龙 EtherCAT 系统中,初始 Node address 为 0,扫描会报错:



 \times

Failed to get the production information. Reason : The actual network configuration has a slave whose node address is outside the range. Correct the node address by writing a valid node address to the slave.

Close

这时候需要先改写 Node address

Multiview Explorer	Built-in EtherNet/IP Port S	🛃 👉 I/O Map	🚟 EtherCAT 🗙 🔄 CPU/Expansion Racks	
	Node Address Network configu	ration	1	
		Master		
Configurations and Setup		Cut		
EtherCAT		Сору		
CPU/Expansion Racks		Paste		
↓ I/O Map		Delete		
Controller Setup		Undo		
▶ 尊 Motion Control Setup		Redo		
🖋 Cam Data Settings		Expand All		
Event Settings		Collapse All		
Task Settings		Calculate Tr		-
☑ Data Trace Settings				-
Programming		Import Slav		
		Export Slave		
	1	Write Slave	Node Address	
	-	Compare ar	nd Merge with Actual Network Configuration	
		Get Slave S	erial Numbers	
		Clear All Se	ttings	
		Display Dia	gnosis/Statistics Information	
		Display Pro	duction Information	
		Display Pac	ket Monitor	
		Display ESI	Library	
		Export Conf		
		Output to E		
		Export All C		
		Assign Driv		

Node address: 对于 NJ 系列 PLC 可支持站号范围为 1~192。

Slave Node Address Writing	-		×
Present value Set value Actual network configuration			I
Master			
0 1 CMMT-AS Rev:0x00000003			
Node addresses are set for slaves. When any value other than 0 is set to a slave whose node address can be set from hardware, the setting has priority. In otl set here are applicable.	her cases,	, the addr	esses
	Write	e Ca	ncel

写入完成后必须重启 CMMT 从站,写入地址才会生效。



9 DC 同步

离线,激活分布时钟同步,即选择 Enabled (DC for synchronization)

CMME_EC - new_Controller_0 - Sysmac Studio



10 配置轴

CMME_EC - new_Controller_0 - Sysmac Studio File Edit View Insert Project Controller Simulation Tools Help - A 🔉 🗔 🗟 州 🚇 X 🗐 🛍 🖄 Ċ ? ĸ A Multiview Explorer **-** 4 new_Controller_0 🔻 Configurations and Setup ► 🚟 EtherCAT ► 🔄 CPU/Expansion Racks 🚽 I/O Map Controller Setup 🔻 🔅 Motion Control Setup Axis Settings L 🎕 Axes Group Se Add Motion Control Axis 🖌 Cam Data Settings Event Settings 🗟 Task Settings Axis Setting Table M Data Trace Setting • Programming

配置轴基本设置,位置模式的	内 PDO 映身	时如下图:					
Multiview Explorer 👻 🗸	WC_Axis000	0 (0) ×					
new_Controller_0 ▼ ▼ Configurations and Setup	\$	🍂 Axis Ba	sic Settings				
► ₩ EtherCAT		Axis number	0				
CPU/Expansion Racks	<u>mm</u>	Axis use	Used axis 🔹 🔻				
🛹 I/O Map	+++++	Axis type	Servo axis 🔹 🔻				
Controller Setup		Feedback control	No control loop				
▼ ☆ Motion Control Setup		Input device 1	<not assigned=""> 🔻</not>			Channel	
▼ @ Axis Settings		Input device 2	<not assigned=""></not>			Channel	
MC Axis000 (0)		Input device 3	<not assigned=""></not>				
L & Aver Group Settings		Output device 1	<pre>Node : T CMIMIT-AS(EU </pre>			Channel	
L % Axes Group Settings		Output device 2	<not assigned=""></not>			Channel	
Cam Data Settings							
Event Settings		 Detailed Setting 	S		_		
Task Settings		Reset to Default					
☑ Data Trace Settings	E A	Fu	nction Name	Device		Process Data	
Programming		- Output (vord	Node : 1 CMMT-AS(E001)		6040h-00.0(Outputs Controlword 6040.00)	
		* 3. Target r	iosition	Node : 1 CMMT-AS(E001)		607Ah-00.0(Outputs Target position 607A 00)	
		5. Target v	elocity	<not assigned=""></not>		<not assigned=""></not>	
		7. Target t	orque	<not assigned=""></not>		<not assigned=""></not>	T
		9. Max pro	file Velocity	<not assigned=""></not>	-	<not assigned=""></not>	-
		11. Modes	of operation	Node : 1 CMMT-AS(E001)	•	6060h-00.0(Outputs_Modes of operation_6060_00)	
	177	15. Positiv	e torque limit value	<not assigned=""></not>	-	<not assigned=""></not>	T
		16. Negat	ve torque limit value	<not assigned=""></not>		<not assigned=""></not>	V
		21. Touch	probe function	<not assigned=""></not>		<not assigned=""></not>	_
	I ·	44. Softwa	re Switch of Encoder's li	<not assigned=""></not>		<not assigned=""></not>	
	ā	- Input (De	vice to Controller)	Node : 1 CMMT-AS(E001)		60/1h-00.0/Inputs Statusword 60/1.00	
		★ 23. Positio	n actual value	Node : 1 CMMT-AS(E001)		6064h-00.0(Inputs_Statusword_cov+1_cov)	
		24. Velocit	v actual value	<not assigned=""></not>		<not assigned=""></not>	
		25. Torque	actual value	<not assigned=""></not>		<not assigned=""></not>	T
		27. Modes	of operation display	Node : 1 CMMT-AS(E001)	-	6061h-00.0(Inputs_Modes of operation display_6061_00	D) 🔻
		40. Touch	probe status	<not assigned=""></not>	-	<not assigned=""></not>	T
		41. Touch	probe pos1 pos value	<not assigned=""></not>	-	<not assigned=""></not>	T
		42. Touch	probe pos2 pos value	<not assigned=""></not>		<not assigned=""></not>	
	-	43. Error c	ode	<not assigned=""></not>	•	<not assigned=""></not>	
	-	45. Status	of Encoder's Input Slave	<not assigned=""></not>		<not assigned=""></not>	
		40. Refere	nce Position for csp	<ivot assigned=""></ivot>		<pre>>vot assigned></pre>	
		A The combination	s of MC Function Module	e functions and process data a	re chan	aed.	

设置位置比例系数,这里需与 CMMT 总线系数组配置保持一致

MC_Axis0	
ţ,	Unit Conversion Settings
	Vinit
**	Unit of display 🌑 pulse 🜔 mm 🔍 um 🔍 nm 🕒 degree 🌑 inch
	▼ Travel Distance
	Command pulse count per motor rotation // 1000000 pulse/rev (1)
\odot	O Do not use gearbox Work travel distance per motor rotation (1) mp//rev (2)
	CReference: Unit conversion formula
_	Number of pulses [pulse] = (1) Command pulse count per motor rotation [UDINT] * Travel distance [Unit of display] (2) Work travel distance per motor rotation [LREAL]
	● Use gearbox
E A	Work travel distance per work rotation 10000 mm/rev (3) (Calculated from the Module maximum (aniinter in Bacilian Court Estimar if the sound mode in Batany mode)
比如:	

Automation Suite 中 Position 系数设置为-9,即 10⁻⁹,单位 m。

Sysmac Studio 中 Travel Distance 对应设置系数为 1000,000 和 1, 单位 mm。

AUTOMATION SUITE New Project*	A Q 🕜 X-Axis	×		- • × FESTO
PARAMETERISATION	CONTROL DIAGNOSIS			
CMMT-As-C2-3A-EC- Path: 192.168.0.12 Disconnected	51 Connect Plug-in PLC Control	Enabled Disabled Powerstage Stop	Acknowledge all	Reinitialize
Parameter pages <	Fieldbus			
Drive configuration				
Device settings		Factor group		
Fieldbus 2				
Digital I/O		Current user unit	Metric [m, m/s,] (6)	
Analogue I/O		Position	0 -9 =	
Encoder interface				
 Axis 1 11 		Velocity	-3	
Operator unit		Acceleration	-3	
Parameter list 12		Jerk	-3	

注意: 从字面 pulse/rev 和 mm/rev 这两个单位前需要填入编码器一圈脉冲数以及电缸进给常数,如果伺服输出单位为脉冲量是可以这样理解。而 CMMT 自带系数转换,输出到总线的数据已转换为 mm 单位。所以这里只需要比值与 CMMT 中设置相同即可。

最大速度等信息需要根据实际设备设置

Multiview Explorer 👻 🗸	🔆 MC_Axis000 (0) 🗙	•
new_Controller_0 Configurations and Setup	🕵 💽 Operation Settings	
► ₩ EtherCAT	▼ Velocity/Acceleration/Deceleration	
CPU/Expansion Racks VO Map Controlling Seture	Maximum velocity 40000000 mm/s Velocity warning value 0 HHH Start velocity 0 mm/s Maximum in velocity 1000000 mm/s	
Controler Setup ✓	Maximum acceleration 0 mm/s ² Acceleration warning value 0 % Maximum deceleration 0 mm/s ² Deceleration warning value 0 % Maximum deceleration 0 mm/s ² Deceleration warning value 0 % Acceleration/deceleration over Use rapid acceleration/deceleration (Blending is changed to Buffered) •	
L 卷 Axes Group Settings ℓ' Cam Data Settings ► Event Settings	Positive torque warning value 0 % Negative torque warning value 0 %	
Task Settings	▼ Monitor	
Data Trace Settings Programming	In-position range 10 mm In-position check time 0 ms Actual velocity filter time constant 0 ms Zero position range 10 mm	
		

设置软限位

Multiview Explorer 👻 👎	🕼 MC_Axis00	00 (0) ×
new_Controller_0 Configurations and Setup	ţ,	C Limit Settings
► ₩ EtherCAT		▼ Software Limit
CPU/Expansion Racks		Software limits Disabled
🗢 I/O Map	HHH	Positive software limit 2147483647 mm
Controller Setup		Negative software limit -2147483648 mm
🔻 🕸 Motion Control Setup		▼ Following Error
	3	Following error over value 0 mm
L & Axes Group Settings		
🖌 Cam Data Settings		
Event Settings		
🖡 Task Settings		
☑ Data Trace Settings	A	
Programming		

寻零设置,这里设置的是 PLC 控制的寻零参数。默认寻零方式为 Zero position preset。对于 Festo 多圈编码器电机,可在 CMMT 调试时使用调试软件寻零一次,以后直接使用不再寻零。

WIC_AXISU	100 (0) ×		
ţ,	Homing Settings		
	▼ Homing Method	_	
₩ ₩ ₩	Homing method Zero p Home input signal Use Z Homing start direction Positive Home input leterction direction Positive	position preset -phase input as home ve direction ve direction	Operation selection at positive limit input Reverse turn/immediate stop Operation selection at penative limit input Reverse turn/immediate stop
☜	Hom	ne proximity signal	
		Z-phase input	
<₽		Positive limit input	
	N	legative limit input	
\mathfrak{O}		-	
#		_	
123			
ā			

如果是支持掉电保存位置的多圈绝对值编码器电机,需在这里选中 Absolute encoder。

Multiview Explorer +	MC_Axis000 (0) ×	-
new_Controller_0 Configurations and Setup	Rest Position Count Settings	
All EtherCAT All EtherCAT Discrete CPU/Expansion Racks I/O Map I/O Map Il Controller Setup	Count mode C Linear mode Rotary mode Modulo maximum position setting value Modulo minimum position setting value Encoder type Absolute encoder	
L ≪ Axes Group Settings & Cam Data Settings ► Event Settings Task Settings	*	
 ☑ Data Trace Settings ▶ Programming 	O	
	中	

11 运动控制指令

单轴控制使用软件自带的基于 PLCopen 的 MotionControl 库,控制同一轴,轴对象应相同。功能块的具体应用请参照 Omron 运动控制指令手册。

注意:实际位置、实际速度、实际扭矩参数,可以通过轴对象的 ACT 参数获得。



12 调试运行

CMMT_EC_CMMTHoming - new_Controller_0 - Sysmac Studio

File Edit View Insert Project Controller Simulation Tools H	ielp
	# 9 ₹ ▲ ¾ & ቇ ኈ ☜ Ο 맢 ㅠ [] @ @ %
Multiview Explorer 观察表	Section0 - Program X
▼ Configurations and Setup 故障处理	
✓	a MC_Axis000 Axis MC_Reset Axis MC_Axis000
► I/O Man	Execute Done

13 读写 CMMT 驱动器参数

通过 EtherCAT 总线读写 CMMT 驱动器参数,需要用到 Sysmac Studio 自带的 FB_EcCoeSdoRead 和 FB_EcCoeSdoWrite 功能 块,用以访问 EtherCAT 从站设备的 SDO 对象(Service Data Object)。

13.1 功能块说明



NodeAdr: EtherCAT 网络扫描时设置的 EtherCAT 站点号 Node address,本例为 1。

SdoObj:将访问的服务对象的结构体变量,索引值需要查询CMMT软件手册。

Index: 主索引

Subindex: 子索引

IsCompleteAccess: 是否访问整个索引。单参数读写时均保持默认值 False。

TimeOut: 默认超时时间为 2s,不赋值即采用默认值。

ReadData/WriteData:从 CMMT 读入数据和写到 CMMT 的数据存放的缓存区,可以定义任意数据类型的变量。 ReadSize/WriteSize:读/写数据的长度,以byte为单位。

ErrorID:

EtherCAT 通信			16#0400	超出输入值范围
指令			16#1800	EtherCAT 通信错误
			16#1801	EtherCAT 从站不存
	EC_CoESDOWrite	CoE SDO 写入	10#1001	在
			16#1802	EtherCAT 超时
			16#1804	SDO 中止错误
			16#1808	通信资源超限
			16#0400	超出输入值范围
			16#1800	EtherCAT 通信错误
			16#1801	EtherCAT 从站不存
	EC_CoESDORead	(255 850 法职	10#1001	在
		COE SDO 读取	16#1802	EtherCAT 超时
			16#1803	接收缓存超限
			16#1804	SDO 中止错误
			16#1808	通信资源超限

13.2 如何查找参数索引

鼠标悬停在 FestoAutomationSuite 中参数右侧的小方框上,会提示其数据类型和 P 参数,本例读写参数:轴正向扭矩限制。



查询 CMMT 软件手册,在 EtherCAT 对象列表中查找 P 参数对应的主索引和子索引。下图中高亮行的 0x2168.04 列为索引,其中 0x2168 为 16 进制的主索引,04 为 16 进制的子索引。

🔊 CM File E	IMT-AS-SW_description_2019-08c_8117800g1.pdf - Adobe Acro dit View Window Help	bat Reader DC							- 🗆 X
Hon	ne Tools CMMT-AS-SW_des ×							?	Sign In
B	☆ ♠ 🖶 🖂 🗨 🕥	769 / 1090	k 🖑 (→ 150% → □	₩ ₽	O Du			🎝 Share
ß	Bookmarks >	:	0x2166.57	Damping time torque utiliz- ation	FLUAT32	rw	RX	Find	× ^
			0x2167.01	Device control status	UINT32	ro	Тх	Bravious	344
Ø	> 🔲 Diagnostics and Fault Clearance	^	0x2168.01	Lower limit value velocity (closed loop controller)	FLOAT32	rw	Rx		
	> 🔲 CDSB Operator Unit		0x2168.02	Upper limit value velocity (closed loop controller)	FLOAT32	rw	Rx	P1.851.0.0	
	GeneralETG standards		0x2168.03	Lower limit value torque (closed loop controller)	FLOAT32	rw	Rx	P1.852.0.0	
	 EtherCAT communication EtherCAT final state machine 		0x2168.04	Upper limit value torque (closed loop controller)	FLOAT32	rw	Rx	P1.853.0.0	
	 Sync Manager Distributed clocks DC (Distributed Clocks) 	4	0x2168.05	Lower limit value active current (closed loop con- troller)	FLOAT32	rw	Rx	P1.854.0.0	•
	CiA 402 Finite State Machine Process data communication Mailbox Computation		0x2168.06	Upper limit value active current (closed loop con- troller)	FLOAT32	rw	Rx	P1.855.0.0	
	Objects Reference List		0x2168.07	Limit value total current (closed loop controller)	FLOAT32	rw	Rx	P1.856.0.0	
	> EtherNet/IP	✓ 5.82 x 8.26 in	0x2168.08	Resulting lower limit value velocity (closed loop con- troller)	FLOAT32	ro	Tx	P1.6100.0.0	

13.3 操作实例

本例访问的参数主索引为 16 进制 0x2168,子索引为 04,数据类型为 Float32,访问类型为 RW 即可读可写。 PLC 中定义对它进行读写的数据 ReadData 和 WriteData 为 REAL 类型,其 Size 为 4byte。

5 EC_COESDOWrite0		SDOWrite0								
9 EC_CC			SDOWrite						_	
	3		Execute	Done		•				_
	•		1 NodeAdr	Busy Enter V						_
			riable SdoObj	Error Enter V						_
			riable TimeOut	ErrorID Enter V						
		(12.3) DataWrite	_REAL WriteDat	AbortCode Enter V						
			4 WriteSize							
<										
Watch (Project)1 00000000	***************************************							******************************	🛨 🛨 🗙
Watch (I D	Project)1 20000000 evice name	Name	<u> </u> On	line valen 🕴 🕴	Modify	Comment I	Data type	AT	Display format	····· ↓ ×
Watch (I Do new_C	Project)1 evice name ontroller_0	Name Program0.DataWrite_REAL	On 12.3	line vali I I	Modify I 12.3	Comment R	Data type	AT	Display format	↓ ↓ ×
Watch (I D new_C new_C	Project)1 evice name ontroller_0 ontroller_0	Name Program0.DataWrite_REAL Program0.EC_CoESDOWrite0	On 12.3	line val	Modify 1 12.3	Comment R	Data type I EAL C_CoESDOWrite	AT	Display format Real	····· + # X I I I
Watch (I Dr new_C new_C	Project)1 evice name ontroller_0 ontroller_0	I Name Program0.DataWrite_REAL ▼ Program0.EC_CoESDOWrite0 Execute	On 12.3	line val	Modify 12.3 JE FALSE	Comment R R E B	Data type	AT	Display format Real Boolean	, т т х Г
Watch (I Do new_C new_C	Project)1 evice name ontroller_0 ontroller_0	I Name Program0.DataWrite_REAL ▼ Program0.EC_CoESDOWrite0 Execute NodeAdr	On 12.3 True 1		Modify I 12.3 JE FALSE	Comment I R E B U	Data type I EAL C_CoESDOWrite OOL IINT	AT	Display format Real Boolean V Decimal V	, т х
Watch (I Dr new_C new_C	Project)1 evice name ontroller_0 ontroller_0	I Name Program0.DataWrite_REAL ▼ Program0.EC_CoESDOWrite0 Execute NodeAdr ▼ SdoObj	On 12.3 True 1		Modify I 12.3 JE FALSE	Comment I R E B U J	Data type I IEAL C_CoESDOWrite OOL IINT sSDO_ACCESS	AT	Display format Real Boolean V Decimal V	+ # ×
Watch (I D new_C new_C	Project)1 evice name ontroller_0 ontroller_0	I Name Program0.DataWrite_REAL ▼ Program0.EC_CoESDOWrite0 Execute NodeAdr ▼ SdoObj Index	0n 12.3 True 1 2186		Modify I 12.3 JE FALSE 2186	Comment I R B U U U U U U	Data type IEAL C_CoESDOWrite OOL IINT SSDO_ACCESS IINT	AT	Display format Real Boolean V Decimal V	+ # ×
Watch (I	Project)1 evice name ontroller_0 ontroller_0	Name Program0.DataWrite_REAL ▼ Program0.EC_CoESDOWrite0 Execute NodeAdr ▼ SdoObj Index Subindex	0n 12.3 True 1 2186 04		Modify 12.3 12.3 12.3 12.3 12.3 12.3 12.3 12.3	Comment R E B U U U U U U U U U U U U U U	Data type 1 IEAL C_CoESDOWrite OOL IINT SSDO_ACCESS IINT ISINT	AT	Display format Real Boolean V Decimal V Hexadecimi V	+ # ×
Watch (I	Project)1	Name Program0.DataWrite_REAL ▼ Program0.EC_CoESDOWrite0 Execute NodeAdr ▼ SdoObj Index Subindex IsCompleteAccess	On 12.3 True 1 2186 04 False		Modify 12.3 12.3 12.3 12.3 12.3 12.3 12.3 12.3	Comment R E B U U U U U U U U U U U U U U U U U U	Data type IEAL C_CoESDOWrite OOL IINT ISSDO_ACCESS IINT ISSINT OOL	AT	Display format Real Boolean V Decimal V Hexadecim: V Hexadecim: V Boolean V	
Watch (i	Project)1 evice name ontroller_0 ontroller_0	Name Program0.DataWrite_REAL ▼ Program0.EC_CoESDOWrite0 Execute NodeAdr ▼ SdoObj Index Subindex IsCompleteAccess TimeOut	0n 12.3 True 1 2186 04 False 0		Modify 12.3 12.3 12.3 12.3 12.3 12.3 12.3 12.5 12.5 12.5 12.5 12.5 12.5 12.5 12.5	Comment R E U U U U U U U U U U U U U U U U U U	Data type I EAL C_CoESDOWritz OOL JINT sSDO_ACCESS JINT JINT OOL JINT	AT	Display format Real Boolean V Decimal V Hexadecim: V Hexadecim: V Boolean V Decimal V	

4 5		EC_CoESDORead0 EC_CoESDORead Execute	Done					
	1_	NodeAdr	Busy Enter Variable					_
	Enter Variable	SdoObj	Error Enter Variable					_
	Enter Variable	TimeOut Ei	rrorID = Enter Variable					- D
	(12.3) DataRead_REAL	ReadDat ——— Rea	adDat <mark>=</mark> DataRead_RE	AL (12.3)				
		Abort	tCode - Enter Variable					_
		Rea	dSize Enter Variable					
<						_		>
Watch (Project)1								- 4 ×
Device name	Name	Online value	Modify	Comment	Data type	I AT	Display format	^
new_Controller_0	Program0.DataRead_REAL	12.3			REAL		Real	
new_Controller_0	Program0.EC_CoESDORead0				EC_CoESDORead			
	Execute	True	TRUE FALSE		BOOL		Boolean 🔻	
	NodeAdr	1			UINT		Decimal 🔻	
	▼ SdoObj				_sSDO_ACCESS			
	Index	2186	2186		UINT		Hexadecim; 🔻	
	Subindex	04 4	4		USINT		Hexadecim; 🔻	
	IsCompleteAccess	False	TRUE FALSE		BOOL		Boolean 🔻	
	TimeOut	0			UINT		Decimal 🔻	
	Done	True	TRUE FALSE		BOOL		Boolean 🔻	
	Busy	False	TRUE FALSE		BOOL		Boolean v	

13.4 永久保存参数更改

通过以上方式修改的 CMMT 驱动器的参数,掉电后不会保存。如需要永久保存,需要调用 CMMT 内部方法。以写参数的方式,对索引 0x2005,子索引为 1,写入值 1。

3.1.5.6 Save parameter set

CiA402

Method	Object	Function	Description
Save parameter set	0x2005.01	Controlling method	Value = 1: execute method
	0x2005.02	Method status	Status
	0x2005.03	Method transfer value	Value = 1
	0x2005.04	Method return value	Return code
	0x2005.05	Method return value	Value = 1

Tab. 108 Save parameter set



注意: 写入成功后不要重复执行写入, 否则 Errorld 会报 1804。这时将值写为 0, 之后再写为 1 报错可清除。

若要验证保存参数是否生效,需要断电重启 CMMT 驱动器。可以调用以下重启指令。

3.1.5.1 **Reset device**

CiA402

Method	Object	Function	Description
Reset Device	0x2000.01	Controlling method	Value = 1: execute method

注意:执行这个指令后 CMMT 重启, Errorld 会报 1800 即通讯错误。

14 Festo 功能库

Festo 针对 Omron 开发了 Cia402 的功能库。作为 Omron 运动控制库的扩展,其内容包括读取 Festo 伺服报错信息以及调用 Festo 伺服的寻零功能。

14.1 安装 Festo 功能库

到 Festo 官网"支持和下载"页面下载 Festo 针对 Omron 开发的 Cia402 功能库 https://www.festo.com/net/en-gb_gb/SupportPortal/Downloads/416958/445923/Festo_MotionControl_Omron_V3.0.2.zip



Function blocks Omron

CiA 402 function blocks for motor controller - Sysmac Studio Function blocks CiA 402 motion library for Omron PLCs to support the drive-controlled homing with motor controller from Festo.

Supported systems:

- Servo drive CMMT-ST-C8-1C-EC-So (8084005)
- Servo drive CMMT-AS-C2-3A-EC-S1 (5340819)
- Servo drive CMMT-AS-C4-3A-EC-S1 (5340820)
- ٠ Servo drive CMMT-AS-C2-11A-P3-EC-S1 (5340821)
- Servo drive CMMT-AS-C3-11A-P3-EC-S1 (5340822)
- Servo drive CMMT-AS-C5-11A-P3-EC-S1 (5340823)
- Integrated Drive EMCA-EC-67- (1509036)
- Motor controller CMMP-AS-C1o-11A-P3-M3 (15o1328)
 Motor controller CMMP-AS-C15-11A-P3-M3 (3215473)
- Motor controller CMMP-AS-C2-3A-M3 (1501325)
- Motor controller CMMP-AS-C5-11A-P3-M3 (1501327)
- Motor controller CMMP-AS-C5-3A-M3 (1501326)

3.0.2

(valid since 25/02/2020)

导入 Festo 功能库

CMMT_EC_CMMTHoming	- new_Controller_0 - Sy	/smac Studio		
File Edit View Insert	Project Controller	Simulation Too	ols Help	
X 🛍 🛱 🕏	Check All Programs Check Selected Prog	F7 rams Shift+F7	🕺 🗚 🗕	 Ř 4
Multiview Explorer	Build Controller	F8	🝷 🕂 🚭 Section	0 - Program(
new_Controller_0 🔻	Rebuild Controller		Variable	es
Configurations and Setu	Abort Build	Shift+F8		
▼ 🞆 EtherCAT	Memory Usage			
∟-□ Node1 : CM	Online Edit	•		
CPU/Expansion	Library	•	Show Reference	25
🔻 🔣 Controller Setup			Library Setting	Axis000
∟ 🖪 Operation Set	ttings		Create Library	
1 *9 Duilt in Ethori	Not/ID Dort Sottings			

🖶 Section0 - Program0 🗙 👸	MC_Axis000 (0)					▼ Toolbox ▼
Variables						<search></search>
Library Reference				_	• × 5	Festo_MotionControl_CiA402
Library name Elibrary name Elibrary name	Name Sp rol_CiA402	pace Version Author Company Date 3.0.1 chmm Festo AG & Co. KG	e Created Date Modified Comment Library for enablin	Attached Files ID d7c8005a-e274-4eaa-95c2-	844414022e0a	F ErrorList_CMMP (FMC) F ErrorList_CMMT (FMC) FB Festo_MC_Power_Home FB Festo_MC_ReadAxisErro
3	📓 Refer to Library Fi	File			×	Analog Conversion
	← → ~ ↑	« cn0shnwn > Desktop > CMMT_EC > F	esto_MotionControl_Omron_V3.0.1 > Library	✓ ♂ Search Library		BCD Conversion
+ 🗑 🔿	Organize 🔻 Ne	vew folder		l≡ - [1 (2) ID	Bit String Processing
1	This PC	^ Name	Date modified Type	Size		Communications
	Desktop	2 Festo_MotionControl_CiA402.slr	7/4/2019 7:14 PM SLR File	71 KB	_	Conversion
	Documents					Counter
	Downloads					Data Movement
	Pictures					Data Type Conversion
	Videos					► FCS
	Local Disk (C	~ ~				Ladder Tools
MC_Axis000— Axis		File name: Festo_MotionControl_CiA402.slr		 Sysmac studio library File 	(*.slr) 🗸	► Math
Pos				3 Open Ca	ncel	Motion Control
JVeg— Velocit	ty	Error Enter Variable				Program Control
<			1		2	SD Memory Card

14.2 读取轴故障信息

v 0 ol_CiA40 V Fe VFMC\Festo_MC_ReadAxisError Enable Valid Err En BCD Co ErrorIE Bit String Pr ErrorString . ₽× Modify Comment
TRUE FALSE As long as "Enable" is true, axis De Name Data lay fo Enable BOOI n 🔻 NodeAc nal 🔻 TRUE FALSE TRUE FALSE . True False an 🔻 Valid If true, a valid set of outputs i BOOI BOOL Busy n 🔻 of axis e or is activ UDINT STRING[80] ۵ Value l 🔻 AxisErrorSt Velocit String with axis e STRING[80] BOOL WORD STRING[80] DWORD Controller Status **–** I TRUE FALSE False 0000 ErrorID Error ide tification of function block im: 🔻 ONLINE 🔍 ERR/ALM 📕 192.168.0.100 RUN mode String Idecimi 🔻 ina v d error ir 0000 0000 ek i ntroller_0 ect)1 Bu

Festo_MC_ReadAxisErrorg 功能块用来读取 CMMT 当前报错代码以及故障描述。

HUTOMATION SUITE	4	h q,	0	Y-Axis	×				
PARAMETERISATION	CO	NTROL	DIAGNOSIS						
Y-Axis CMMT-AS-C4-3A-EC- Path: 192.168.0.102 Error	S1	Disconnect		Plug-in PLC Control	Enabled Disabled Powerstage	C Stop	Acknowledge all	Store on device (🗊 Restart d
Diagnosis pages <	Device	state							
Device state I/O state Error log Error classification Trace configuration	2	Gervo drive	Process D0.08 04	data not receive 1/00281.0	d at Sync time	Axis	Velocity: follo D1.07 02 00127	wing error .0	
Trace display		A	cknowledge all						
Auto tuning	Status	Category		ID		Name		Timestamp	
		Information	(4)	D1.07 0	2 00125.0	Standstill reached and in	standstill window	34.17:20:45.795	
		Information	(4)	D1.07 0	2 00124.0	Standstill reached		34.17:20:45.795	
		Information	(4)	D1.07 0/	2 00122.0	Target velocity reached		34.17:20:48.033	
		Information	(4)	D1.07 0/	2 00121.0	Target position reached		34.17:20:49.454	-
	•	Stop catego	ry 1 (256)	D1.07 0	2 00127.0	Velocity: following error		34.17:20:52.007	-
		Warning (16	5)	D1.05[0	2 00065.0	Task ignored due to moti	on task error	34.17:20:52.442	
		Stop catego	ry 1 (256)	D0.08 0-	4 00281.0	Process data not received	l at Sync time	34.18:05:48.903	-
		Stop catego	ry 1 (256)	D0.08 0-	4 00143.0	EtherCAT process data co	ommunication failed	34.18:05:48.906	-

用 Festo Automation Suite 软件监控 CMMT 状态如下图:

注意:

- 此功能块仅读取"故障",即"Category"列显示为 Stop category 0、1或2的行,不会读取 warning 和 information。
 如果当前有多个故障未被复位,功能块读取的是最早发生的故障行。
- 3. 功能块仅读取了 ID 列中故障代码的部分,如 ID: D1.07l02l00127.0,功能块仅读取了故障代码 00127,故障的大类和 小类 07l02 未读取。不过,编号是唯一的不会重复。

14.3 CMMT 控制寻零

推荐用户使用 Omron Motion Control 库中的 MC_Home 功能块,这是由 Omron 开发的基于 PLCopen 的寻零方式。寻零开关 接到 PLC,由 PLC 控制寻零。

如果用户需要使用更多样化的寻零方式,可以调用 CMMT 自带的寻零。这时需要将寻零开关接到 CMMT,且额外使用 Festo 提供寻零的功能块。

注意:本节内容介绍使用 Festo 寻零方式,如果使用 Omron PLC 控制寻零请不需要做这些操作。

14.3.1 设置寻零参数

首先在 Festo Automation Suite 中设置好寻零方式、寻零速度等参数,并测试寻零无异常。

AUTOMATION SUITE	# 9, 00	X-Axis ×								
PARAMETERISATION	CONTROL DIAGNOSIS									
CMMT-AS-C2-3A-EC-S Path: 192.168.0.12 Connected	Disconnect	Plug-in Enabled PLC Disabled Control Powerstage	Stop	Acknowledge all	Store on device Load	d factory settings Re	initialize Restart	device St	art first setup Correct	t para
Parameter pages <	Axis									
Drive configuration										
Device settings										
Fieldbus 2				Working stro	ke: 300.00 mm]	
Digital I/O										
Analogue I/O	\oplus									
Encoder interface	0 10	20 30 40 50 60 70	0 80 90 100 1	10 120 130 140	150 160 170 180 19	90 200 210 220 2	30 240 250 260 2	70 280 290		
 Axis 1 11 		սիստիստիստիստիստիստիստիստիստի	ոսիսվավարհավուրակո	hadaalaadaalaadaadaad	udaalaalaalaalaalaalaalaalaal	lan hadaa daa daa daa daa	hadaadaadaadaadaadaada	վափակակակա		
Motor										
Gearbox										
Axis 10										
Record list	Homing method				Homing parameters					
Monitoring functions 1						Vala site fas (s)	A and [m (s ²]	lask [
Closed loop					Crawl	0.005	= 100	Jerk [m/s]	100.00	
Auto tuning	Method	Current position (37)		•	-	0.005				
Notch filter			•		Search	0.01	= 1.00	•	100.00 =	
Feed forward control	Move to axis zero point	after 🗸 Active			Running	0.05	= 1.00	=	100.00 =	
 Cam controller 	noming									
 Touch probe 					Nominal current limit	value scaling factor		0.30	-	
Jog mode					Limit position detectio	on time monitoring windo	N	0.20 s		
Operator unit					Homing timeout			60.00 s		
Parameter list 12					J					

参数设置也可以通过 EtherCAT 总线 COE 功能来写 SDO 参数。寻零相关参数主索引为 0x2172,操作方法见<u>读写 CMMT 驱动</u>器参数。

Parameters	Index.Subindex	Name	Data type
8411	0x2172.0C	Search for move to axis zero point setpoint jerk	FLOAT32
8412	0x2172.0D	Maximum search stroke in positive direction	SINT64
8413	0x2172.0E	Maximum search stroke in negative direction	SINT64
8414	0x2172.0F	Nominal current limit value scaling factor	FLOAT32
8415	0x2172.10	Limit position detection time monitoring win- dow	FLOAT32
8416	0x2172.11	Axis zero point offset	SINT64
8417	0x2172.12	Referencing method	SINT32
8418	0x2172.13	Status state machine homing	UINT32
8421	0x2172.16	Deactivate encoder emulation during homing	BOOL

840	0x2172.01	Referencing status	UINT32
841	0x2172.02	Move to axis zero point after homing	BOOL
842	0x2172.03	Homing timeout	FLOAT32
843	0x2172.04	Search for reference mark setpoint velocity	FLOAT32
844	0x2172.05	Search for reference mark setpoint accelera- tion	FLOAT32
845	0x2172.06	Search for reference mark setpoint jerk	FLOAT32
846	0x2172.07	Setpoint reference mark creeping velocity	FLOAT32
847	0x2172.08	Setpoint reference mark creeping acceleration	FLOAT32
848	0x2172.09	Setpoint reference mark creeping jerk	FLOAT32
849	0x2172.0A	Move to axis zero point setpoint velocity	FLOAT32
8410	0x2172.0B	Move to axis zero point setpoint acceleration	FLOAT32

14.3.2 寻零功能块

Festo_MC_Power_Home 功能块同时具备使能和寻零功能,使用它替换掉 Omron 的 MC_Power 和 MC_Home。

使用定位模式时,SetModesOfOperation 直接置 8,即 cyclic synchronous position mode。

🖶 Sectio	on0 - Program0 🗙				
Varial	bles				
Name	espace - Using				
Internals	Name	I Data Type	Initial Value		
Externals	Festo_MC_Power_Home0	FMC\Festo_MC_Power_Home			
	bStartHoming	BOOL			
	bHomingValid	BOOL			
	uModesOfOperation	USINT			
	uModesOfOperationDisplay	USINT			
	<				
			1		
2		Festo_MC_Power_Hom.		1	
	MC_Axis0	00—Axis — — —	Axis	-MC_Axis000	
	C	Enable	Status		
	1 1	8 SetModecOfOneration Modes		-uModesOfOperation	
		betwoodsoroperation modes	oroperation_r boood	amodesoroperation	
	uModesOfOperationD	ModesOfOperationDisplay_PDO6061	HomingValid	—bHomingValid	
	bStartHomir	ng— StartHoming	Busy	-Enter Variable	
			Error	-Enter Variable	
			ErrorID	—Enter Variable	
			InternInfo	—Enter Variable	

接下来要将由 MC 轴对象控制的操作模式,改由 Festo_MC_Power_Home 功能块控制,将读和写操作模式的两个变量转移到全局变量区.

🖶 Sectio	n0 - Program0 🗙				
Variab	oles				
Name	space - Using				
Internals	Name	I Data	а Туре	Initial Value	1
Externals	Festo_MC_Power_Home0	FMC\Festo_MC_Power	_Home		
	bStartHoming	BOOL			
	bHomingValid	BOOL			
	uModesOfOperation	USINT	Carata Naw		
	uModesOfOperationDisplay	USINT	Move to Global		
			MOVE to Global		
			Cut		
0	MOVE		Сору		
	EN E	NO	Paste		
	MC_Axis000.Act.Pos—In 0	Out ActPosition	Delete		

在伺服驱动器设置页将 PDS	control m	nethod 改为用	户程序控制,并且	且选中 do not	detect
Multiview Explorer 🚥 🗸 🗸 🔮	• Section0 -	Program0 🛛 🖨 I/	O Map 🛛 👹 MC_Axis00)0 (0) ×	
new_Controller_0 🔻	**	Servo	Drive Settings		
✓ Configurations and Setup	202		Dine Settings		
▼ iiii EtherCAT		▼ Modulo Positi	on Settings	_	
L 📼 Node1 : CMMT-AS (E	uuuu ★ ↑	Modulo maximum	position setting value	2147483647 p	ulse
CPU/Expansion Racks	нн	Modulo minimum	position setting value	-2147483648 p	ulse
ar I/O Map		Detailed Settir	igs		
Controller Setup		PDS	state control method	PDS state is contr	olled by user program 🔻
L Built-in EtherNet/IP I		Main circuit power	supply OFF detection	Detect	Do not detect
▼ ☆ Motion Control Setup					
▼ @ Axis Settings	. 🔿				
MC Axis000 (0)	(
L 🍓 Axes Group Settings					
🞸 Cam Data Settings	(A				
Event Settings	9				
🗟 Task Settings					
🖂 Data Trace Settings	_				
Programming	-##-				
V 📋 POUs					
▼ 🗐 Programs					
V 💀 Program0	123				
L 🔄 Section0					
L 🕃 Function Blocks	\bigcirc				

取消 MC 轴中 mode of operation 的关联 ■ CMMT_EC_CMMTHoming - new_Controller_0 - Sysmac Studio

File Edit View Insert Project	Controller Sim	nulation lools Help			
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在 IO 映射表里将两个关于操作模式的变量链接到寻零功能块的两个相应变量

Multiview Explorer 👻 🖣	- Section0) - Program0 🚽 I/O Map 🗙 🐼 MC_Axis000 (0)						i i i i i i i i i i i i i i i i i i i	
	Position	Port	Description	R/W	Data Type	Variable	Variable Comment	Variable Type	
new_controller_0		EtherCAT Network Configuration							
Configurations and Setup	Node1	▼ CMMT-AS							
▼ ₩ EtherCAT		Outputs_Controlword_6040_00		W	UINT				
L ·□ Node1 : CMMT-AS (E		Outputs_Modes of operation_6060_00		W	SINT	uModesOfOperation		Global Variables	
CPU/Expansion Racks		Outputs_Target position_607A_00		W	DINT				
/O Map		Outputs_Profile velocity_6081_00		W	UDINT				
Controller Setup		Outputs_Target velocity_60FF_00		W	DINT				
V Ex Controller Setup		Outputs_Target torque_6071_00		w	INT				
L 🕼 Operation Settings		Outputs_Velocity offset_60B1_00		w	DINT				
∟ 🗗 Built-in EtherNet/IP I		Outputs_Torque offset_60B2_00		w	INT				
🖉 🐺 🕸 Motion Control Setup		Inputs_Statusword_6041_00		R	UINT				
🔻 🕸 Axis Settings		Inputs_Modes of operation display_6061_00		R	SINT	uModesOfOperationDisplay		Global Variables	
∟		Inputs_Position actual value_6064_00		R	DINT				
L 偽 Axes Group Settings		Inputs_Velocity actual value_606C_00		R	DINT				
Cam Data Settings		Inputs_Torque actual value_6077_00		R	INT				
► Event Settings		CPU/Expansion Racks							
Trail Cattings	CPU Rac	CPU Rack 0							
Task Settings									
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			MC Avis000	Avic	\\FMC\Festo_MC_F	Power_Home	Avie	MC Avis000	
	c		MIC_AX13000	-A13			0,13	MIC_AXI3000	
				Enable			Status		
			8	SetModesOfOperat	tion	ModesOfOp	eration_PDO6060	uModesOfOperation	(8)
		(8)	NodesOfOperationDi	ModesOfOperation	nDisplay_PDO6061		HomingValid	bHomingValid	(True)
		True 🔻	bStartHoming	StartHoming			Busy	Enter Variable	
	True False					Error Enter Variable			
							ErrorID	Enter Variable	
							Interninfo	Enter Variable	
2	2 MC. Reset()								

14.3.3 保存编码器零点偏移

对于 Festo 绝对值多圈编码器电机(尾缀带 M),带断电保存位置功能。 但仅使用以上功能块寻零,断电后零点偏移不会自动保存。如需永久保存位置,需要调用 CMMT 零点保存功能。 通过 EtherCAT 总线的 COE 功能,写 SDO 参数,给索引 0x2002.01 一个上升沿来完成。

3.1.5.3 Saving zero point offset

CiA402

Method	Object	Function	Description		
Save zero point offset	0x2002.01	Controlling method	Value = 1: execute method		
	0x2002.02	Method status	Status		
	0x2002.03	Method return value	Return code		

注意:保存编码器零点偏移时需要取消软件使能,包括 FestoAutomationSuite 和 PLC 功能块控制的使能。