Studio5000环境下通过CPX-AP-I-4I0L控制SMS简易运动电缸



郑广亮 Festo 技术支持 2022 年 1 月 3 日

关键词:

SMS 简易运动电缸, IO-LINK 协议、Studio5000

摘要:

本文介绍了如何使用 Allen-Bradley PLC 控制 SMS 简易运动系列电缸,如 EPCE、EPCS-BS、EGSS、ELGS-BS/TB、ELGE、ERMS。

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 SMS 简易运动控制器以及 Rockwell Studio5000 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。

目录

1	说明]	4
	1.1	硬件和软件环境	4
	1.2	硬件接线(IO-LINK 模式)	4
	1.3	网络拓扑	5
2	硬件	-配置	5
	2.1	CPX-AP-I-EP 模块的 IP 地址设定	5
	2.2	CPX-AP-I-4IO-M12 IO-Link 主站端口配置	6
	2.2.	1 CPX-AP-I-EP 模块在线访问	6
	2.2.2	2 配置连接 SMS 驱动器的 CPX-AP-I-4IOL 模块	6
3	Stuc	lio5000 项目配置	7
	3.1	下载 EDS 文件	7
	3.2	下载功能块	7
	3.3	新项目文件	8
	3.4	安装 CPX-AP-I-EP 的 EDS 文件	8
	3.5	组态 CPX-AP-I-EP 模块	8
	3.6	导入功能块文件	10
	3.7	功能块调用与配置	10
	3.8	Read_MSG 指令组态	12
	3.9	Write_MSG 指令组态	13
	3.10	编译及下载程序	14
4	SMS	5_Festo_Advanced 功能块变量说明	15
	4.1	IO_Interface 变量说明	15
	4.2	Control 变量说明	15
	4.3	Monitor 变量说明	16
	4.4	MSG 变量说明	17
5	样例	程序	17
	5.1	初始设置	17
	5.2	回零操作(自带行程检测)	18
	5.3	定位到参考零点"LimIn(Ref))"	19
	5.4	定位到行程终点"LimOut"	20
	5.5	定位到中间位置"PosImp"	21
6	故障	近代码	21
7	附录	ξ A	22
8	附录	ξ B	23
9	附录	¢ C	24
10) 阶	†录 D	25

1 说明

本文介绍了如何使用 Allen-Bradley PLC 通过 IO-LINK 协议控制 SMS 简易运动系列电缸,如 EPCE、EPCS-BS、EGSS、ELGS-BS/TB、ELGE、ERMS。

1.1 硬件和软件环境

型号	说明	软件或固件版本
EPCS-BS	SMS电缸单元	V019.0.4.107_release
CPX-AP-I-4IOL-M12	费斯托IO-Link 主站模块	V1.4.13
CPX-AP-I-EP-M12	费斯托CPX-AP-I主站模块	V1.3.1
NEBC-D8G4-ES-0.3-N-S-D8G4-ET	CPX-AP模块通讯网线	
NEBL-M8G4-E-5-N-LE4	CPX-AP模块电源线缆	
Studio5000	PLC编程软件	V31.11
1769-L24ER-QB1B	PLC	V31.011
Festo Automation Suite	Festo调试软件	V2.3.710

1.2 硬件接线(IO-LINK 模式)



EPCS-BS 逻辑接口的 M12 插头是 A编码类型,只需要 1、3、4 三个针脚接线。

电源	
插头	
M12x1,4针,T编码,	符合 EN 61076-2-111
4	
$1\left(+\left \begin{array}{c}+\\+\\+\end{array}\right \right)$	

2

		使用 IO-Link	75 Alt
针脚	功能	针脚	切能
1	电源 (24 V DC)	1	L+ IO-Link 电源 (24 V DC)
2	参考电位,电源电压(GND)	3	C/O 通信, 连接 IO-Link 主站
3	保留,无需连接	4	L-参考电势,10-Link电源(0 V)
4	功能接地 (FE)	5	保留. 九斋连接
		6	保留,无需连接
		7	保留.无需连接
		8	L – 参考电位, IO-Link 电源 (0 V)

逻辑接口 插头

M12x1,8针,A编码,符合EN61076-2-101

CPX-AP-I-4IOL-M12 模块的接口是 B编码类型,接口定义如下:

10-Link Ports [X0] [X3] 接口							
M12 插座, 5 针, B	编码	信号					
2	1	L+	+24 V DC 工作电源 PS				
1000	2	P24	+24 V DC 负载电源 PL				
	3	L-	0 V DC 工作电源 PS				
5 4	4	C/Q	标准 IO(SIO 模式下)或 IO-Link 通信(IOL 模式				
			下)				
	5	N24	OVDC 负载电源 PL				

Type B 接口会比 Type A 接口的接线多出一路 24V 负载电。选型 IO-LINK 通讯线缆时只需要将两者的 1、3、4 脚连接, 2、5 需要断开, 否则有可能会烧坏 IO-LINK 从站硬件。

切勿选择 8080777(NEFC-M12G8-0.3-M12G5-LK) 直连 CPX-AP-I-4IOL 和 SMS 驱动单元(错误示范和解决方案请见附录 A)

1.3 网络拓扑



CPX-AP-I-4IOL(IO-LINK Master)

2 硬件配置

2.1 CPX-AP-I-EP 模块的 IP 地址设定

Festo Automation	」Suite 软件在线拍	∃描后,可以手动 [,]	修改 IP 地址						
AUTOMATION SUITE New Project	* 🔍 🚺								FE
evice Scan									
List					+	F	\mathcal{C}	> ap_i_ep	
Device Name	Device Туре	Address	Subnet Mask	Firmware				AP-I-EP	
▶ ap_i_ep	AP-I-EP	192.168.0.1	255.255.255.0	1.3.1-e07e61582.20210430	2			192.100.0.1	
				< Actions Network Settings					Actions
				DHCP: Enable				Device Details	
			4	Address: 192 . 168 . 0	. 1			Identification	
			-	Subnet Mask: 255 . 255 . 25	5.0			Reboot	
				Gateway: 192 . 168 . 0	. 1			Firmware	
				DNS: 0 . 0 . 0	. 0			Network Setting	ls 3
								Device Name	

2.2 CPX-AP-I-4IO-M12 IO-Link 主站端口配置

2.2.1 CPX-AP-I-EP 模块在线访问

AP Terminal - AP-I-EP	×	+					
ightarrow C G	▲ 不安全	192.1	68.0.1/cgi-bin/ap-t	erminal 1			
	AP-I-EP	AP	EtherNet/IP -	Modbus TCP -	Configuration -	System -	
	Termi	na	I		登录以访问此站点	ą	
					http://192.168.0.1 要 与此站点的连接不安	· 求进行身份验证 全	

1 I I	
5 - S	

 Imp// 12:100.1 要求正13 的强度
 2

 与此站点的连接不安全
 用户名 admin

 密码
 ·········

 密码
 ········

 修改参数时,该窗口会自动跳出
 登录 取消

Modules

Slot	Module	Code	FWVersion	Serial	Productkey
1	CPX-AP-I-EP-M12	8323	1.3.1	0x00008AF6	3S7PNW2LB48
2	CPX-AP-I-4IOL-M12	8212	1.4.13	0x00005FAF	3S7PNFF9T7S

- 1. 打开浏览器输入当前的 IP 地址
- 2. 账号登入

账户名: admin; 密码: 初始密码为 productkey (区别大小写)

productkey 可以在 CPX-AP-I-EP 模块侧面标签上找到,也可以扫描正面的二维码来获得。

Ser.	The submittee of the second second			
DI	CPX-AP-I-EP-M12 8086610 Rev 01 05-2021:13 MAC-ID 00-0E-F0-68-09-BC	Ta: -20°C+50°C	R-R-FTO-KC-2018-1091	STPNW2LB48
	XUD1 () Out: 3 XUD2 1 3 XUD2 1 4 0 0 3 3 XUD2 1 4 0 0 0 1 2 0 0 1 3 3 1 2 0 0 1 3 3 1 2 0 0 1 3 3 1 1 2 0 0 1 3 3 1 1 2 0 0 0 1 3 3 1 1 3 1 1 1 1 1 1 1 1 1 1 1		TP2 3	Festo SE & Co. KG DE-73734 Essilingen Made in Bulgaria

账号登入后,网页会显示已连接模块详细信息:模块描述、固件详细信息、序列号和产品密钥。也可以进行更改参数、 更新固件等操作。

2.2.2 配置连接 SMS 驱动器的 CPX-AP-I-4IOL 模块

Port Mode (Port 0)选择 IOL_AUTOSTART 模式, IO-LINK 通讯口被激活

2	CPX-AP-I-4IC	DL-M12	8212	1.4.13	0x00005F	FAF 3S7PNFF9T7S OK	
	Parameter Object (0x0F) Instance	AP Id/Instance	Parameter		Startup	Value	
	10	20022:0	Setup monitoring load	supply (PL) 24 V DC	yes	Load supply monitoring active, diagnosis suppressed in case of switch-off	~
	11	20049:0	Nominal Cycle Time (I	Port 0)	yes	as fast as possible	~
	15	20050:0	Enable diagnosis of IC	D-Link device lost (Port 0)	yes		
	19	20071:0	Port Mode (Port 0)		yes	IOL_AUTOSTART	~
	20	20071:1	Port Mode (Port 1)		yes	DEACTIVATED	~

3 Studio5000 项目配置

3.1 7	下载 EDS 文件	
,О срх-/	AP-I-EP 1	×
产品1	支持/下载 20 2 78	

产品信息	5	Ŧ	文件类型	标题	版本	
技术文档	3		Firmware	Firmware	1.3.1 2021/4/30	~
Certificates	1			Supported systems: EtherNet/IP interface CPX-AP-I-EP-M12 (8086610)	, .,	
Software 3	2		设备描述文件	Ethernet/IP EDS	1.3	
专业知识	9			Supported systems:	2020/12/6	\sim
Training	0			EtherNet/IP interface CPX-AP-I-EP-M12 (8086610)		

下载链接: <u>https://www.festo.com.cn/cn/zh/search/?text=CPX-AP-I-EP&tab=DOWNLOADS</u>





▼ 文件类型	标题		版本	
	Simplified Motion Series "SMS" A brief explanation of the conten	its:		^
应用附注	标题: Simplified Motion Series Control wit	h Allen-Bradley PLC through IO-Lin	1.10 ik 2021/7/9	~
Reporter Nor FESTO Complete Name Not Nove (18 year) States	Master 副标题: SMS_Control by Allen Bradley, IO-Lir	nk		
The state is the formation of the state of t	描述: This Application Nata Explanation at	nout Simplified Motion		
	Series actuator units (EPCE, EPCS-BS ERMS) Axis IN/OUT Control, Read/W Diagnostic Data	S, EGSS, ELGS-BS/TB, ELGE, /rite Parameters & Read		_
	文档类型: 应用附注			
	语言	标题	文件大小	4
	English [en]	1.10 (2021/7/9)	4 MB	<u>+</u>
		文件类型 标题 Simplified Motion Series "SMS" A brief explanation of the contern Simplified Motion Series Control with Master 副标题: SMS, Control by Allen Bradley, IO-Lin 描述: This Application Note Explanation at Series actuator units (EPCE, EPCS-BU ERMS) Axis IN/OUT Control, Read/W Diagnostic Data 文档类型: 应用附注	▼ 文件类型 标题 Simplified Motion Series "SMS" A brief explanation of the contents: Simplified Motion Series Control with Allen-Bradley PLC through IO-Line Master ● ● <td>▼ 文件类型标题标题版本Simplified Motion Series "SMS" A brief explanation of the contents:1.10 2021/7/9应用附注 ● ● ● ● ● ● ● ●新題: Simplified Motion Series Control with HI-Bradley PLC through IO-Link 新题: SMS, Control by Allen Bradley, IO-Link 描述: This Application Note Explanation about SEGSS, ELGS-BS/TB, ELGS- BS/TB, ELGS-BS/TB, ELGS- BS/TB, ELGS-BS/TB, ELGS- BS/TB, ELGS- BS/TB, ELGS</br></br></br></br></br></br></br></br></br></br></br></br></br></br></br></br></br></br></br></br></td>	▼ 文件类型标题标题版本Simplified Motion Series "SMS" A brief explanation of the contents:1.10 2021/7/9应用附注 ● ● ● ● ● ● ● ●新題: Simplified Motion Series Control with HI-Bradley PLC through IO-Link 新题: SMS, Control by Allen Bradley, IO-Link 描述: This Application Note Explanation about SEGSS, ELGS-BS/TB, ELGS- BS/TB, ELGS-BS/TB, ELGS- BS/TB, ELGS-BS/TB, ELGS- BS/TB, ELGS-

下载连接: <u>https://www.festo.com.cn/cn/zh/search/?text=SMS&tab=DOWNLOADS</u>

3.3 新项目文件

Logix Designer - SMS_Test [1769-L24ER-QB1B 31.11	1]*			
FILE EDIT VIEW SEARCH LOGIC COMMUN	ICATIONS TOOLS WINDOW HEL	ELP		
New Ctrl+N	1	📴 🐂 🕞 😹 🗰 🕼 🕼 🕼 🕼		
Ctrl+O				
Close 1\19	92.168.0.20*		· ·(U)· ·(L)·	<u>+</u>
Save Ctrl+S proce	es 🕨 No Edits 🔒	Favorites Safety Alarms Bit	t Timer/Counter Input/Output Compare Compute/Math Move/Logical File/Misc. File/Shift Sequencer E	iq
C Save As ×	♂ 新建项目		× 💰 新建项目 ?	
New Component	3			
Import Component	项目类型	搜索	X 1769-124ER-QB1B CompactLogix [™] 5370 Controller	
Compact	A tanks in a		· · · · · · · · · · · · · · · · · · ·	
Dage Setue	Com Com	mpact GuardLogix® 5370 Safety Controller		
Generate Report	🕥 View	mpact GuardLogix® 5380 Safety Controller		
Print	4 Com	mpactLogix [™] 5370 Controller	安全授权(A): 无保护 🗸	
Print Options	· · · ·	1769-L16ER-BB1B CompactLogix [™] 5370 Controller	仅使用选定的安全授权进行身份验证和授权(U)	
	· · ·	1769-L18ER-BB1B CompactLogix [™] 5370 Controller	Secure With: O Logical Name <controller name=""></controller>	
1 SMS_Test.ACD	1	1769-L18ERM-BB1B CompactLogix [™] 5370 Controller	 Permission Set 	
		1769-L19ER-BB1B CompactLogix [™] 5370 Controller	治胆(刀).	
Exit		1769-L24ER-QB1B CompactLogix [™] 5370 Controller	W041(0).	
be Logical Model		1769-L24ER-QBFC1B CompactLogix [™] 5370 Controller		
🔺 📹 I/O Configuration	1	1769-L27ERM-QBFC1B CompactLogix [™] 5370 Controller		
▶ 1769 Bus	1	1769-L30ER CompactLogix™ 5370 Controller	v	
P at Ethernet				
	3 (A):	: SMS_Test		
	位置(L):	: C:\Users\Administrator\Desktop\资料\01 C ~ 浏览(R)		
				/
				载(E)
				w(*)

3.4 安装 CPX-AP-I-EP 的 EDS 文件



3.5 组态 CPX-AP-I-EP 模块

第一步: 网页查看数据长度

AP-I-EP AP	EtherNet/IP Modbus TCP C	configuration 👻	System -			
Assemb.,						
100 - Input Exact SIN	T (12 Bytes)					
101 - Output Exact SI 102 - Input Exact INT	NT (8 Bytes) (6 INT/12 Bytes)					Search:
103 - Output Exact IN 104 - Input Exact DIN	T (4 IN I/8 Bytes) T (3 DINT/12 Bytes)		Data	atype Na	ame	
110 - Input Fixed SIN	T 16 Bytes (16 Bytes)		USIN	T[2] Mo	dule 2 - CPX-AP-I-4IOL-M12	- Port 0
124 - Input Fixed DIN 125 - Output Fixed DIN	T 488 Bytes (122 DINT/488 Bytes)		USIN	T Moo	dule 2 - CPX-AP-I-4IOL-M12	- Port 4 - PQI
129 - Diagnosis and S 130 - Global Status (1	s <mark>tatus (36 Bytes)</mark> 2 Bytes)		USIN	T Moo	dule 2 - CPX-AP-I-4IOL-M12	- Port 5 - PQI
131 - Input Exact SIN 132 - Input Exact INT	T and Global Status (24 Bytes) and Global Status (12 INT/24 Bytes)		USIN	T Mo	dule 2 - CPX-AP-I-4IOL-M12	- Port 6 - PQI
133 - Input Exact DIN 134 - Input Fixed SIN	T and Global Status (6 DINT/24 Bytes) T 16 Bytes and Global Status (28 Bytes))	USIN	T Mo	dule 2 - CPX-AP-I-4IOL-M12	- Port 7 - PQI
第二步:软件组态						
	选择 Module 类型					
 Controller sms Controller Tags 	■ 目示 Module 发现 收藏夹					
Controller Fault Handler Power-Up Handler		青除过滤器(C)				
 Tasks MainTask 	Module Type Category Filters	↑ Module Type Vend	or Filters			
MainProgram Unscheduled	CIP Motion Converter	Cognex Corporatio	n			
 Motion Groups Ungrouped Axes 	Communications	V Endress+Hauser				
Assets Assets Assets						
✓ ⊆ I/O Configuration	Catalog Number Description Vend CPX-AP-I-EP CPX-AP-I-EP Fest	dor Category to Communications	Adapter			
100 bus 100 bus 100 1769-L24ER-QB1B sms						
Embedded I/O [1] Embedded Discret	E_1 1 / 535 Module 类型 已找到					
Expansion I/O	1 创建时关闭(L)	4	包服里			
Import Module						
Discover Module	55					
	Cutty					
New Module		🔳 Module	Definition*		×	
General* Connection Module Info Internet Type: CPX-AP-I-EP CPX-AP-I-EP	Protocol Port Configuration Network	Revision:	1 ~	001 ≑		
Vendor: Festo		Electronic Key	ing: Compatible Mod	dule	~	
Name: CPX_AP_I_EP	Ethernet Address	Connections:				
Description:	O Private Network: 192.168.1.	Name		Size	Tag Suffix	
	IP Address: 192 . 168 . 0	. 1	ize Sput:	12 SINT	CPX_AP_I_EP:I1	
	V Hoat Heline.		Output:	8	CPX_AP_I_EP:01	
Module Definition		Diagnostic	Data 9 utput:	36 SINT	2 CPX_AP_I_EP:12	
Bectronic Keying: Compatible Module			Juliout.			
Connections: VO Con. Fixed SINT 16			<u>`</u>			
7	Change					
itatus: Creating	OK Cancel	Help		ОК	Cancel Help	

3.6 导入功能块文件

Energy Storage	Offline	🛛 🗸 No Forces	► N	n Edits 🔒		()∍ [:] es Add-On	Alarms Bit	Timer/Counter	Input
Controller Organizer		▼ ₽ ×	💰 Import Ac	ld-On Instruction			×		
a =			Look in	: AOI		- 🗈 📂 🛄 -			
Controller SMS	_Test		_	名称	^	修改日期			
Motion Groups				SMS_Festo_	Advanced.L5X 2	2021/7/5 6	:32		
🔺 <u></u> Assets			快速访问	SMS_Festo_	Basic.L5X	2021/7/5 6	:32		
Add-On In Add-On In Time Data Types Trends Trends Trends	New Add Import A	I-On Instruction dd-On Instruction.		SMS_Festo_I	IO.L5X	2021/7/5 6	:32		
🔺 <u> </u>	О Сору			<			>		
▲ 1769 Bus	Paste			File name:	SMS_Festo_Advanced	3	Open		
⊿ ⊆ Embed	Paste Wi	th Configuration		Files of type:	Logix Designer XML Files (* L	5X) 🗸	Cancel		
[1]	Prin 💷	mport Configurati	on - SMS_Fes	to_Advanced.L5X					
⊿ 器 Ethernet		×		80.86					
😳 1769-L2	4ER-QB1 🐣	Tind Wathing Fit	- Norra		Find/Replace				
an CPX-AP	-I-EP CP.	Find Within: Fir	nai Name						
	Impo	ort Content:		Configure Add-C)n Instruction Properties				
		SMS_Festo	_Advanced	Import Name:	SMS Festo Advanced				
		- Paramete	ers and Local Tag	ps Operation	Grante				
		Reference	ies	Operation:	References will be impo	orted as			
	-		Turner		configured in the Refer	rences folders			
		Errors/Warnings	Types	Final Name:	SMS_Festo_Advanced	✓ Pr	operties		
				Description:		0			
				Revision:	v2.3				
				Revision Note:	AOI Updated for Latest Fin	mware Version			
				Vendor:	Festo SE Co.KG				
							ОК	1	
<							UK		

3.7 功能块调用与配置

第一步:	添加功能块	:										
J = 585.7	SMS_7							×.				
s Add-On S	AS_I vanced v2.3 SMS_resto_Advanced	功能块	添加到程序	pite/Math Move	/Logical File/M	isc. File/Shift	Sequend	er i				
ainProgram -	SMS_Festo_Advanced	?	(Sta Enabled)									-
	abiNPUTS	?	-(Sts_Enabled)				t- 1-1					
		??	-(Sts_StateIn)		功能块	创建标签	ÈΆ_					
	abourpuis	??	-(Sts_StateIntermediate)	New Tag				4 ×	SMS_Festo_Advanced			^
	In Enable	??	-(Sts StateOut)				_		10 Interfac 2		New Tag	
	In_MovelN	??	-	Nam 🔁	SMS_Driver_0	4		Create 🔻	abINPUTS		-	
	In_MoveIntermediate	??	-(Sts_StateMove)		-					ж	Cut Instruction	Ctrl+X
	In_QuitError	??	-(Sts_WriteActive)	Description:			~	Cancel	aboutputs	гЛ	Copy Instruction	Ctrl+C
	In_PowerSMS	??							ControlTags	5	Paste	Ctrl+V
	In_UserInterTaceLock	22	-(Sts_WriteDone)					Help	In Enable		<u>-</u> usto	Curre V
	In_SpeedIN	??	-(Sts_ReadActive)						In_MovelN		Delete Instruction	Delete
	In_Force	??	(0) 5				\sim		In_MoveIntermediate		Add Ladder Element	Alt+Incert
	In_ReferenceDirection	22	-(Sts_Error)						In_MoveOut			Alternaert
	In_StartPressPosition	??		Usage:	<controller></controller>		\sim		In_QuitError		Edit <u>M</u> ain Operand Des	cription
	In_IntermediatePosition	??					_		In UserInterfaceLock		Save Instruction Defaul	lt.e
	In_EndPosition	22		Type:	Base	✓ Connec	ction		In SpeedOut		Save instruction belau	its
	In_StoreParameters	??							In_SpeedIN		Clear Instruction Defau	lts
	In_ReadDiagnosticData In_ResetCounterMileage	?? ??		Alias For:			~		In_Force In ReferenceDirection		R <u>e</u> move Force	
	_M_o_n_it_o_r_T_a_g_s	??		Data Type:	SMS_Festo_A	dvanced			In_ExecuteReference			
	O CurrentSpeed	??							In_StartPressPosition		<u>G</u> o To	Ctrl+G
	O_CurrentForce	??		Parameter			~		In_IntermediatePosition		Instruction Help	
	O_DDTemprature	??		Connection:					In_EndPosition			
	O DDVoltage	??		Scope:	SMS Test		~		In StoreParameters	L.	Remove Parameter	
	O_DDCyclesTotal	??							In_ReadDiagnosticData	E.	Remove All Unknown F	Parameters
	O_DDCyclesSinceReset	??		External	Read/Write		\sim		In_ResetCounterMileage			
	O_DDMieagesSinceReset	??		Access:					_M_o_n_it_o_r_T_a_g_s		Open Instruction Logic	
	O_NumOfStorageOperation	n ??		Style:					O_CurrentPosition		Open Instruction Defin	ition
646 . IL	IO ErrorCode	?	 	terre to de t				_ \	O_CurrentSpeed			

第二步:输入输出硬件接口地址映射(如何映射正确的地址,见附录 B)



第五步: Write_MSG 创建变量名

					_		_
	New Tag		×	In_UserInterfaceLock In_SpeedOut		New Tag 2	
				In_Force	ж	Cut Instruction C	trl+X
	Name:	Write_Parameter	Create 🔻	In_ReferenceDirection	ŋ	Copy Instruction C	trl+C
	Desident			In_ExecuteReference	ñ	Paste C	trl+V
	Description:	^	4 8	In_IntermediatePosition		Delete Instruction	olete
			Help	In_EndPosition		Add Loddon Flowards	leiele
			Help	In StoreParameters		Add Ladder Element Alt+I	Insert
				In_ReadDiagnosticData		Edit Main Operand Description C	trl+D
	United			In_ResetCounterMileage		Save Instruction Defaults	
	Usage:	<controller></controller>		O_CurrentPosition		Clear Instruction Defaults	
	Type:	Base ~ Connection		O_CurrentSpeed			
				O_DDTemprature		Remove Force	
	Alias For:	~		O_DDCurrent		Go To C	trl+G
	Data Tunai	MESSAGE		O_DDVoltage O_DDCvclesTotal		Instruction Help	
	Data Type:			O_DDCyclesSinceReset			
	Parameter	~		O_DDMileageTotal	L3	Remove Parameter	
	Connection:			O_NumOfStorageOperation	E:	Remove All Unknown Parameters	
	Scope:	Test_SMS V		IO_ErrorCode E		Open Instruction Logic	
	External	D I AMA		U_LocalError MSG T a g s		Open Instruction Definition	
	Access:	Read/Write V		Read MSG Read		Propertie	
				Write_MSG	-		
				MSG_Destination_Element		?	
笜-	计中,M	SC Source Element Alla	事行效力				
 寿/	ハ少: MS	SG_Source_Eternent 函复	主你金石	III_USEIIIIIEITAUELUUK	_		
	New Tag		×	In_SpeedOut		New Tag	
	News			In_Force	¥	Cut Instruction	Ctrl+X
	Name:	MSG_SourceArray	Ureate 🔻	In_ReferenceDirection	-11	Copy Instruction	Ctrl+C
	Description:		4	In_ExecuteReference	5	Paste	Ctrl+V
				In_IntermediatePosition			Carry
			Help	In_EndPosition		Delete Instruction	Delete
				In_StoreParameters		Add Ladder Element Alt+	Insert
		×		In_ReadDiagnosticData		Edit Main Operand Description	Ctrl+D
	Usage:	<controller></controller>		_M_o_n_it_o_r_T_a_g_s		Save Instruction Defaults	
				O_CurrentPosition		Clear Instruction Defaults	
	Type:	Base ~ Connection		O_CurrentSpeed O_CurrentForce			
	Alias For:			O_DDTemprature		Remove Force	
				O_DDCurrent O_DDVoltage		Go To (Ctrl+G
	Data Type:	SINT[48]		O_DDCyclesTotal		Instruction Help	
	Parameter			O_DDCyclesSinceReset			
	Connection:	`		O_DDMileagesSinceReset	C	Remove Parameter	
	Scope:	Test SMS 🗸		O_NumOfStorageOperation	E	Remove All Unknown Parameters	
		•		O_LocalError	1	Open Instruction Logic	
	Access:	Read/Write ~		_MSG_T_a_g_s		Open Instruction Definition	
	Style	Decimal		Write MSG	C_F	Properties	
		Decima		MSG_Source_Element			
	Constant			MSG_Destination_Element		?	
第-	七步: MS	SG_Source_Element 创奏	圭标签名				
	New Tag		×	In_SpeedOut		New Tag	
				In_Force			
	Name:	MSG_DestinationArray	Create 🔻	In_ReferenceDirection	9	Cut Instruction	Ctrl+X
				In StartPressPosition	Ć	Copy Instruction	Ctrl+C
	Description:	^	Cancel	In_IntermediatePosition	6	Paste	Ctrl+V
			Halp	In_EndPosition			Delete
			Help	In_StoreParameters		Add Ladder Element	Uncort
		~ · · · · · · · · · · · · · · · · · · ·		In_ReadDiagnosticData		Edit Main Onemad Description	-msen
	Lleage:	da a akas llanti		_M_o_n_it_o_r_T_a_g_s		Eur Main Operand Description	CIII+D
	Usaye.	<controller> ~</controller>		O_CurrentPosition		Save Instruction Defaults	
	Type:	Base ~ Connection		O_CurrentSpeed O CurrentForce		Clear Instruction Defaults	
				O_DDTemprature		Remove Force	
	Alias For:	<u> </u>		O_DDCurrent O_DDVoltage			
	Data Type:	SINT[48]		O_DDCyclesTotal		Go To	Ctrl+G
				O_DDCyclesSinceReset		Instruction Help	
	Parameter Connection:	~		O_DDMileagesSinceReset		Remove Parameter	
	o connection.			O_NumOfStorageOperation		Remove All Unknown Parameters	
	Scope:	Test_SMS ~		O_LocalError			
	External	Read/Write ~		_MSG_T_a_g_s		Open Instruction Logic	
	Access:			Read_MSG Rea Write MSG Write	ad_ e F	Open Instruction Definition	
	Style:	Decimal \checkmark		MSG_Source_Element MSG_S	Sou	Properties	
				MSG_Destination_Element		<u> </u>	

3.8 Read_MSG 指令组态

单击 Read_Parameter 组态按钮,进入组态界面:

		T Enter Name Filter V Show: All Tags	~
In_SpeedIN 1+		Name II Data Type	~
In_Force 1		MSG SourceArray SINT[48]	-
In_ReferenceDirection 0			_
		MSG_SourceArray[0] V SN 3	
In_StartPressPosition 1.0	Message Configuration - Read_Paramter	MSG_SourceArray[1] SINT	
In_IntermediatePosition 5.0		MSG SourceArray[2] SINT	
In_EndPosition 10.0	Configuration* Communication Tag	MSG_SourceArray(3)SINT	
In_AutoStoreActive	Communication rug		
		MSG_SourceArray[4] SIN1	
In DesetCounterMileane	Message Type: CIP Generic V	MSG_SourceArray[5] SINT	
MonitorTags 04		MSG SourceArrav[6] SINT	~
O CurrentPosition	Service Ouetom Source Element:	MSG SourceArray[0]	
O CurrentSpeed 04	Type:		
O CurrentForce 04	Source Length:	1 (Bytes)	
O DDTemprature 0 +	Service (h (Hex) Class: 10b (Hex)		
O DDCurrent 0 ←	Code: 40 (IEX) Class. 100 (IEX) L Classon	_DestinationArray[0] 🗸	
O_DDVoltage 0 (+	Instance: 0 Attribute: 0 (Hex)	Color Name Char	1
O_DDCyclesTotal 0 (- , , ,	T Enter Name Filter Snow: All Tags	~
O_DDCyclesSinceReset 0 (News and Data Tura	_
O_DDMileageTotal 0 (Name Data type	_^
O_DDMileagesSinceReset 0 +		MSG_DestinationArray SINT[48]	
O_NumOfStorageOperation 0 +		MSG_DestinationArray[0] USIN 4	
IO_ErrorCode Error_List		MSG DestinationArray[1] SINT	_
O_LocalError 0 (MSG Destination Array [2] SINT	
_MSG_T_a_g_s 0	○ Enable ○ Enable Waiting ○ Start ○ Done [De Moo Destination Array (2) ONT	
Read_MSG Read_Paramter	ол л — — — — Г	MSG_DestinationArray[3] SINT	
Write_MSG Write_Parameter	O Error Coi Extended Error L	MSG_DestinationArray[4] SINT	
MSG_Source_Liement MSG_SourceArray	Error	MSG_DestinationArray[5] SINT	
MSG_Destination_clement_MSG_DestinationArray	Error	HOO Destination (0) ONT	\sim
-			
	确定 取消 应	立用(A) 帮助	

建立通讯路径

Message Path Browser X	Message Configuration - Read_Paramter X
Path: CPX_AP_I_EP	Configuration Communication Tay
CPX_AP_I_EP	Pat <mark>1: CPX_AP_LEP.3.1 Browse 2 </mark>
⊖-∰ 1769 Bus -∰ [0] 1769-L24ER-QB1B Test_SMS	CPX_AP_LEP, 3, 1
Embedded I/O	Communication Method ⊚ CIP → DH+ Channel: "A" → Destination Link: 0 ♦
Ethemet	CIP Wth Source ID Source Link: 0 Destination Node: 0 (Octal)
	Connected Cache Connections + Large Connection
OK Cancel Help	○ Enable ○ Enable Waiting ○ Start ○ Done Done 0
	O Error Coi Extended Error □Timed O(●
	Error CPX AP EP. 3. 1 Error
	确定 取消 应用(A) 帮助

红色标记是主站模块

绿色标记3为固定值

紫色标记 1 为 CPX-AP-I-4IOL 模块的第 1 个端口号(中间使用逗号隔开) 举例: 如果有两个 CPX-AP-I-4IOL,则第一个模块号是 1 到 4,第二个模块号是 5 到 8。

3.9 Write_MSG 指令组态

单击 Write_Parameter 组态按钮,进入组态界面:

		T_ Enter Name Filter V Show: All Tags
		Name
O_DDCyclesSinceReset O_DDMileageTotal O_DDMileageTotal O_DDMileageSinceReset O_NumOfStorageOperation O_ErrorCode IO_ErrorCode MSG_T_a_g_s Read_MSG Read_MSG Write_MSG Write_MSG MSG_SourceArray MSG_Destination_Element MSG_Destination_Array	Message Configuration - Write_Parameter Configuration* Communication Message Type: CIP Generic Service Custom Type: Source Element: Service Source Length: Service For (Hex) Instance: 0 Attribute: 0 (Hex) Element:	MSG_SourceArray[0] SINT MSG_SourceArray[1] SINT MSG_SourceArray[2] SINT MSG_SourceArray[3] SINT MSG_SourceArray[4] SINT MSG_SourceArray[5] SINT MSG_SourceArray[6] SINT MSG_SourceArray[6] SINT MSG_SourceArray[6] SINT MSG_SourceArray[0] \vee 1 DestinationArray[0] \vee 1
		T_ Date Heile Fried Sintw. All tags Name
	⊖ Enable ⊖ Enable Waiting ⊖ Start ⊖ Done Do ⊖ Error Co: Extended Error □ Error Error	MSG_DestinationArray[2] SINT MSG_DestinationArray[3] SINT MSG_DestinationArray[4] SINT MSG_DestinationArray[5] SINT MSG_DestinationArray[6] SINT

建立通讯路径

Path: CPX_AP_LEP CPX_AP_LEP CPX_AP_LEP CPX_AP_LEP CPX_AP_LEP CPX_AP_LEP CPX_AP_LEP CPX_AP_LEP CPX_AP_LEP CPX_AP_LEP CPX_AP_LEP CPX_AP_LEP CPX_AP_LEP 3	Configuration* Communication* Tag 1 Path: CPX_AP_LEP.3.1 CPX_AP_LEP.3.1 Broadcast: Communication Method © CIP © DH+ Channet: M* Destination Link: CIP WDH Source Link: 0 \$ Destination Node: 0 \$ (Octal) Connected
OK Cancel Help	○ Enable ○ Enable Waiting ○ Start ○ Done 0 ○ Error Co: Extended Error □ Timed O: Error Error Error Ma定 取消 应用(A) 審助

3.10 编译及下载程序



4 SMS_Festo_Advanced 功能块变量说明

4.1 IO_Interface 变量说明

变量名称	数据类型	功能描述
abINPUT	INT	SMS 发送到 PLC 的数据
abOUTPUT	INT	PLC 发出的数据到 SMS

4.2 Control 变量说明

变量名称	数据类型	功能描述
In_Enable	BOOL	True - Enable AOI function
In_MoveIN	BOOL	Control command for executing the motion "MovIn" to the inner (reference) end
		position "LimIn(Ref)"
		TRUE - Actuator unit moves to inner end position "LimIn(Ref)"
		FALSE - Actuator unit stops
		Note: The control command only works in combination with the bits MoveOUT and
т. м. т., 1. ,	DOOL	MoveIntermediate.
in_moveintermediate	BOOL	Control command for executing the movement movimp to the in-termediate position
		TRIF - Actuator unit moves to Intermediate Position "PosImp"
		FALSE - Actuator unit stops
		Note: The control command only works in combination with the bits MoveIN and
		MoveOUT.
In_MoveOut	BOOL	Control command for executing the motion "MovOut" to the outer end position "LimOut"
		TRUE - Actuator unit moves to outer end position "LimOut"
		FALSE - Actuator unit stops
		Note: The control command only works in combination with the bits MovelN and
Tr. OuitEnner	DOOL	MoveIntermediate.
III_QuitError	DUUL	TRIE - Start error acknowledging errors
		FALSE - Do not start error acknowledgement
In PowerSMS	BOOL	Control command for switching on the power stage.
		TRUE - Enable power stage of actuator unit
		FALSE - Disable power stage of actuator unit
In_UserInterfaceLock	BOOL	TRUE - Access to display and operating components (HMI) on control unit locked
		FALSE - Access to display and operating components (HMI) on control unit enabled
In_SpeedOut	SINT	Speed for movement "MovOut" towards inner outer end position "LimOut"
		1 - 10% (default)
		··· 10 - 100%
In SpeedIN	SINT	Speed for movement "MovIn" towards inner (reference) end posi-tion "LimIn(Ref)"
III_opeculit	01111	1 - 10% (default)
		· · · · · · · · · · · · · · · · · · ·
		10 - 100%
In_Force	SINT	Force for force controlled movement "MovOut" from position "PosS-tartPress"
		towards outer end position "LimOut"
		1 - 10% (default)
		···
In ReferenceDirection	BOOI	Position of the reference and position "Ref" after howing has been carried out
In_kererencebireetion	DOOL	Linear drive systems:
		TRUE: Facing away from motor
		FALSE: Facing motor
		Rotary drive systems (ERMS: view of the rotating plate)
		TRUE: Right
		FALSE: Left
In_ExecuteReference	BOOL	Command for executing the homing with end position detection (detection of the
		mechanical end positions)
		FALSE - Do not start homing
		Note: Take effect only when falling to raising edge when AOI is enable state
In StratPressPosition	REAL	Stroke or angle of rotation distance from the "Start Press" posi-tion to the
		reference end position "Ref".
		Defines point on stroke, actuator starts force controlled move-ment.
		Linear actuator unit:-unit: [mm]-gradient: 0.01
		Rotative actuator unit:-unit: [°]-gradient: 0.1
In_IntermediatePosition	REAL	Stroke or rotation angle distance of the intermediate position "PosImp" to the
		reference end position "Ref".

		Defines intermediate point on stroke, actuator movement stops and waits for next
		motion command.
		Linear actuator unit:-unit: [mm]-gradient: 0.01
		Rotative actuator unit:-unit: [°]-gradient: 0.1
In_EndPosition	REAL	Stroke or rotation angle distance of the "LimOut" end position to the reference end
		position "Ref"
		Defines end point on stroke, actuator movement stops and waits for next motion
		command.
		Linear actuator unit: -unit: [mm] -gradient: 0.01
		Rotative actuator unit:-unit: [°] -gradient: 0.1
In_AutoStoreActive	BOOL	Control command for activating automatic and permanent saving of parameters in the
		flash memory
		TRUE - Automatic saving activated (default)
		FALSE - Automatic saving deactivated
		Note: When changing parameters frequently, make sure to deac-tive auto store to
		avoid damages to the flash memory by exceed-ing 100.000 write cycles.
In_StoreParameters	BOOL	Control command for single and conscious permanent saving of parameters in the flash
		memory
		TRUE - Manually stores the last downloaded parameters in the flash memory
		FALSE - Parameters are temporarily saved in RAM.
		Note: Take effect only when falling to raising edge when AOI is enable state.
In_ReadDiagnosticData	BOOL	TRUE - Update value of outputs:
		0_DDTemperature
		0_DDCurrent
		0_DDVoltage
		0_DDCyclesTotal
		0_DDCyclesSinceReset
		0_DDMileageTotal
		0_DDMileageSinceReset
In_ResetCounterMileage	BOOL	TRUE - Resets values of parameters "0_DDCyclesSinceReset"

4.3 Monitor 变量说明

变量名称	数据类型	功能描述
Sts_Enabled	BOOL	TRUE - AOI function enabled.
Sts_WriteDone	BOOL	TRUE - Last parameter wrote successfully.
Sts_WriteActive	BOOL	TRUE - Executing parameter write function.
Sts_ReadActive	BOOL	TRUE - Parameter read function is active.
Sts_Error	BOOL	TRUE - Actuator unit in error state.
Sts_StateIn	BOOL	Status at inner (reference) end position "LimIn(Ref)"
		TRUE - Inner (reference) end position "LimIn(Ref)" reached
		FALSE - Inner (reference) end position "LimIn(Ref)" not reached
Sts_StateIntermediate	BOOL	Status at intermediate position "PosImp"
		TRUE - Intermediate position "PosImp" reached
		FALSE - Intermediate position "PosImp" not reached
Sts_StateOut	BOOL	Status at outer end position "LimOut"
		TRUE - Outer end position "LimOut" reached
		FALSE - Outer end position "LimOut" not reached
Sts_StateMove	BOOL	Status of the actuator unit
		TRUE - Actuator unit in moving condition
		FALSE - Actuator unit in standstill condition
O_CurrentPosition	DINT	Actuator unit current position feedback
		Linear actuator unit: - unit: [mm] - gradient: 0.01
		Rotative actuator unit: - unit: [°] - gradient: 0.1
0_CurrentSpeed	DINT	Actuator unit current speed feedback
		Linear actuator unit: - unit [mm/s] -gradient: 0.01
		Rotative actuator unit: - unit [rpm] -gradient: 0.1
0_CurrentForce	DINT	Actuator unit current feed force feedback
		Linear actuator unit: - unit [N] -gradient: 0.01
		Rotative actuator unit: - unit [Nm] -gradient: 0.1
O_DDTemperature	INT	Actuator unit current temperature feedback
		Unit: [°C].
O_DDCurrent	DINT	Actuator unit present value of current
		Unit: [A].
O_DDVoltage	DINT	Actuator unit present voltage feedback
		Unit: [V].
O_DDCyclesTotal	DINT	Number (dec) of completed movement cycles of the actuator unit since delivery
O_DDCyclesSinceReset	DINT	Number (dec) of completed movement cycles of the actuator unit since last reset
		command

O_DDMileageTotal	DINT	Mileage of the actuator unit since delivery					
		Linear actuator unit: unit [km], 0.000001.					
		Rotative actuator unit: unit [r], 0.001.					
O_DDMileageSinceReset	DINT	Mileage of the actuator unit since last reset command					
		Linear actuator unit: unit [km], 0.000001.					
		Rotative actuator unit: unit [r], 0.001.					
0_NumOfStorageOperation	DINT	Total number of permanent storage processes in the flash memory since delivery					
0_ErrorCode	INT[16]	Error code of actuator unit					
0_LocalError	INT	AOI Local Error					
		1001 - "In_SpeedIN" Parameter limit out of range error.					
		1002 - "In_SpeedOut" Parameter limit out of range error.					
		1003 - "In_Force" Parameter limit out of range error.					
		1004 - "Read_MSG" Error. Check read message error code.					
		1005 - "Write_MSG" Error. Check write message error code.					

4.4 MSG 变量说明

变量名称	数据类型	功能描述			
Read_MSG	INT	Read message instruction.			
Write_MSG	INT	Write message instruction.			
MSG_Source_Element	SINT[48]	Message instruction source elements array.			
MSG_Destination_Elements	SINT[48]	Message instruction destination elements array.			

5 样例程序

5.1 初始设置

SMS_Festo_Advanced			SMS_Festo_Advanced		
SMS_Festo_Advanced	SMS_Drive_01		SMS_Festo_Advanced	SMS_Drive_01	
IO Interface	0 🖛	-(Sts_Enabled)	_IO_I_n_t_e_r_f_a_c_e	0 🖛	Sts_Enabled)
abINPUTS CF	PX AP EP:I1.Data[1]		abINPUTS	CPX_AP_I:I1.Data[1]	
	0.	-(Sts StateIn)		8 🖛	-(Sts_StateIn)
abOUTPUTS CP	X AP EP:01.Data[1]		abOUTPUTS	CPX AP I:01.Data[1]	
	0.	-(Sts_StateIntermediate)			(Sts StateIntermediate)
ControlTags	0 🛨	< <u>-</u>	ControlTags	0 🖛	
In Enable	0 🕇	-(Sts_StateOut)	In Enable	1 🖛	-(Sts_StateOut)
In MovelN	0 🕇	(olo_oldioodi)	In MovelN	0 🖛	(<u>-</u>
In MoveIntermediate	04	Ste StateMove	In MoveIntermediate	0.4	-(Sts_StateMove)
In MoveOut	ů.	(SIS_SILICINOVC)	In MoveOut	0.4	(0.0_0.0.000)
In OutError	ů.	Ste WriteActive	In QuitError	0.4	Sts WriteActive
In DoworSMS		(SIS_WITEACTIVE)	In DowerSMS	14	(dis_mic/convey
II_POWEISMS	0	(Sta WetaBaaa)	In Ligariatorfacel ook	0.	Sta WriteDone
In_OserInternaceLock	0	-(Sis_whieDone)	In_OSERINCETACELOCK	14	
In_SpeedOut	1-	(Ohn Dread Anthread)	In_SpeedOut		Cto DeedActive
In_SpeedIN	1+	-(SIS_ReadActive)	In_Speedin		 Sis_ReadActive)
In_Force	1+	(9) 5 3	III_FOICE	1•	(Cha Erran)
In_ReferenceDirection	0 🖛	-(Sts_Error)	In_ReferenceDirection	0	-(Sts_Error)-
In_ExecuteReference	0 🖛		In_ExecuteReference	0	
In_StartPressPosition	1.0 🖛		In_StartPressPosition	9500.0 🖛	
In_IntermediatePosition	5.0 🖛		In_IntermediatePosition	5000.0 🖛	
In_EndPosition	10.0 🖛	Defe	In_EndPosition	10000.0 🕈	A (1
In_AutoStoreActive	0 🔶	Before	In_AutoStoreActive	0 🖛	Atter
In_StoreParameters	0 🔶		In_StoreParameters	0 🖛	
In_ReadDiagnosticData	0 🖛		In_ReadDiagnosticData	0 🖛	
In_ResetCounterMileage	0 🖛		In_ResetCounterMileage	0 🖛	
_M_o_n_it_o_r_T_a_g_s	0 🖛		_M_o_n_it_o_r_T_a_g_s	0 🖛	
O CurrentPosition	0 🖛		O_CurrentPosition	10087 🖛	
O CurrentSpeed	0 🖛		O_CurrentSpeed	11 🖛	
O CurrentForce	0 🖛		O_CurrentForce	0 🖛	
O DDTemprature	0 🕈		O DDTemprature	0 🗲	
O DDCurrent	0 🗢		O DDCurrent	0 🖛	
O DDVoltage	0 🗲		O DDVoltage	0 🗲	
O DDCvclesTotal	0 🗲		O DDCvclesTotal	0 🗲	
0 DDCvclesSinceReset	0 🖛		O DDCyclesSinceReset	0 🕈	
O DDMileageTotal	0 📥		O DDMileageTotal	0 🖛	
O DDMileagesSinceReset	0 📥		O DDMileagesSinceReset	0 🖛	
0 NumOfStorageOperation	0 🕇		O NumOfStorageOperation	0 🔶	
IO_ErrorCode	Error List		IO ErrorCode	Err list	
0 LocalError	04		O LocalError	0 🖕	
MSG T a d s	04		MSG T a g s	04	
Dead MSC	Dead Paramter		Read MSG	Read Para	
Write MSC	Write Parameter		Write MSG	Write Dara	
MCO Courses Element	MCO SourceArror		MSC Source Element	MSG SourceArray	
MSG_Source_Element	MSG_SourceArray		MSG Destination Element	MSG Decidation Array	
mag_Destination_Element N	ISG_DestinationArray		moo_Destination_clement	moo_DesinationArray	

- In_Enable 从 False 切换到 True, 功能块使能。
- In_PowerSMS 从 False 切换到 True,SMS 驱动单元使能。
- In_SpeedOut, 、In_SpeedIN、In_Force、In_StartpressPosition 、 In_EndPosition 填入设定值
- 上述参数写入成功后, Sts_WriteDone 变为 Ture。

5.2 回零操作(自带行程检测)

SMS_Fest	o_Advanced			SMS_Festo_Advanced		
SMS_Fest	o_Advanced	SMS_Drive_01		 SMS_Festo_Advanced	SMS_Drive_01	
_IO_I_n_t	e_r_f_a_c_e	0 💠	Sts_Enabled)	_10_1_n_t_e_r_f_a_c_e	0 🖛	<pre>Sts_Enabled)</pre>
abINPUTS	CP	K_AP_I:I1.Data[1]		abINPUTS	CPX_AP_I:I1.Data[1]	
		12 💠	-(Sts_StateIn)-		8 🗭	-(Sts_StateIn)
abOUTPUT	IS CPX	_AP_I:01.Data[1]		abOUTPUTS	CPX_AP_I:01.Data[1]	
		0 💠	<pre>-(Sts_StateIntermediate)</pre>		0 🖛	-(Sts_StateIntermediate)
_C_o_n_t	<u>rolTag</u> s	0 💠		_C_o_n_t_r_o_l_T_a_g_s	0 🖛	
In_Enable		1 🗭	-(Sts_StateOut)	In_Enable	1 🕈	-(Sts_StateOut)
In_MovelN		0 🕈		In_MovelN	0 🖛	
In_Moveln	termediate	0 🕈	<pre>Sts_StateMove)</pre>	In_MoveIntermediate	0 🖛	-(Sts_StateMove)
In_MoveO	ut	0 🕈		In_MoveOut	0 🖛	
In_QuitErro	or	0 🕈	-(Sts_WriteActive)	In_QuitError	0 🖛	-(Sts_WriteActive)
In_PowerS	SMS	1 🗭		In_PowerSMS	1 🕈	
In_UserInt	erfaceLock	0 🕈	Sts_WriteDone	In_UserInterfaceLock	0 🖛	<pre>Sts_WriteDone)</pre>
In_Speed0	Dut	1 🗭		In_SpeedOut	1 🕈	
In_SpeedI	N	1 🗭	Sts_ReadActive)	In_SpeedIN	1 🕈	<pre>Sts_ReadActive)</pre>
In_Force		1 🗭		In_Force	1 🕈	
In_Referen	nceDirection	0 🕈	-(Sts_Error)-	In_ReferenceDirection	0 🖛	-(Sts_Error)
In_Execute	eReference	<u>1</u> +		In_ExecuteReference	1+	
In_StartPre	essPosition	9500.0		In_StartPressPosition	9500.0 🗲	
In_Interme	diatePosition	5000.0 🖛		In_IntermediatePosition	5000.0 🖛	
In_EndPos	ition	10000.0 🖛		In_EndPosition	10000.0 🖛	
In_AutoSte	oreActive	0 🖛		In_AutoStoreActive	0 🖛	
In_StorePa	arameters	0 💠	寻苓过程屮	In_StoreParameters	0 🖛	目電社市
In_ReadDi	agnosticData	0 💠		In_ReadDiagnosticData	0 🖛	寸令 '1木
In_ResetC	ounterMileage	0 🕈		In_ResetCounterMileage	0 🖛	
_M_o_n_i	<u>torTag</u> s	0 💠		MonitorTags	0 🖛	
O_Current	Position	8182 💠		O_CurrentPosition	10087 🖛	
O_Current	Speed	-1084 🗢		O_CurrentSpeed	16 🕈	
O_Current	Force	-24 🗭		O_CurrentForce	0 🕈	
O_DDTem	prature	0 🕈		O_DDTemprature	0 🕈	
O_DDCurr	ent	0 🕈		O_DDCurrent	0 🕈	
O_DDVolta	age	0 🕈		O_DDVoltage	0 🕈	
O_DDCycl	esTotal	0 🗭		O_DDCyclesTotal	0 🗭	
O_DDCycl	esSinceReset	0 🕈		O_DDCyclesSinceReset	0 🕈	
O_DDMiles	igeTotal	0 🗭		O_DDMileageTotal	0 🗭	
O_DDMilea	igesSinceReset	0 🗭		O_DDMileagesSinceReset	0 🗭	
O_NumOf	storageOperation	0 🗢		O_NumOfStorageOperation	0 🖛	
IO_ErrorCo	ode	Err_list		IO_ErrorCode	Err_list	
O_LocalEr	ror	0 🕈		O_LocalError	0 🖛	
_MSG_T_	a_g_s	0.		_MSG_T_a_g_s	0	
Read_MS0	j	Read_Para		Read_MSG	Read_Para	
Write_MS0	j	Write_Para		Write_MSG	Write_Para	
MSG_Sou	rce_Element MS	SG_SourceArray		MSG_Source_Element	MSG_SourceArray	
MSG_Des	tination_Element MSG	DesinationArray		MSG_Destination_Element	MSG_DesinationArray	

In_ExecuteReference 从 False 切换到 True,SMS 驱动单元开始执行回零动作且 Sts_StateMove 为 True,第一次撞击确定参考零点,然后反方向继续移动直到第二次撞击行程终点,第一次撞击和第二次撞击之间行走的距离就是整个工作行程。寻零结束后 Sts_StateOut 为 Ture,然后很快变为 False。

- 可以通过 In_ReferenceDirection 变量修改寻零方向
- 上图样例显示行程范围是 100.87mm
- 撞击点可以由客户定义(外部加硬挡块也行),不一定是电缸的起始端和完全伸出端
- 注:不需要每次上电寻零

假设设备断电时,电缸停在中间位置 50mm,设备上电后 SMS 驱动单元会自动控制电缸从 50mm 走到参考零点位置,然后在反方向走 50mm 距离停下。

5.3 定位到参考零点"Limin(Ref))"





定位到行程终点"LimOut" 5.4

SMS_Festo_Advanced		SMS_Festo_Advanced		
- SMS_Festo_Advanced SMS	S_Drive_01	SMS_Festo_Advanced	SMS_Drive_01	
_IO_I_n_t_e_r_f_a_c_e	0 🗢 🔤 (Sts_Enabled)	_IO_I_n_t_e_r_f_a_c_e	0 🖛	<pre>Sts_Enabled)</pre>
abINPUTS CPX_AP_	_l:I1.Data[1]	abINPUTS	CPX_AP_I:I1.Data[1]	
	9 🗧 🧧 (Sts_StateIn)		10 🖛	-(Sts_StateIn)
abOUTPUTS CPX_AP_I:	:O1.Data[1]	abOUTPUTS	CPX_AP_I:01.Data[1]	
	0 + (Sts_StateIntermediate)-	-	2 🖛	-(Sts_StateIntermediate)-
_C_o_n_t_r_o_l_T_a_g_s	0 🖛	_C_o_n_t_r_o_l_T_a_g_s	0 🖛	
In_Enable	1 + (Sts_StateOut)-	In_Enable	1 🗭	Sts_StateOut)
In_MovelN	0 🖛	In_MovelN	0 🖛	
In_MoveIntermediate	0 + (Sts_StateMove)-	In_MoveIntermediate	0 🖛	-(Sts_StateMove)
In_MoveOut	0	In_MoveOut	1 🖛	
In_QuitError	0 < <p>O Sts_WriteActive)—</p>	In_QuitError	• 0	-(Sts_WriteActive)
In_PowerSMS	1 🗭	In_PowerSMS	1 🗭	
In_UserInterfaceLock	0 🗢 🔤 Sts_WriteDone)	In_UserInterfaceLock	0 🖛	<pre>Sts_WriteDone</pre>
In_SpeedOut	1 🗢	In_SpeedOut	1 🗭	
In_SpeedIN	1 🗧 Sts_ReadActive)	In_SpeedIN	1 🗭	<pre>Sts_ReadActive)</pre>
In_Force	1 🗭	In_Force	1 🗭	
In_ReferenceDirection	0 C (Sts_Error)	In_ReferenceDirection	0 🖛	-(Sts_Error)-
In_ExecuteReference	1 🕈	In_ExecuteReference	1 🗭	
In_StartPressPosition	9500.0 🗲	In_StartPressPosition	9500.0 🖛	
In_IntermediatePosition	5000.0 🗲	In_IntermediatePosition	5000.0 🗲	
In_EndPosition	10000.0 🗲	In_EndPosition	10000.0 🖛	
In_AutoStoreActive	0 🕈	In_AutoStoreActive	0 🖛	
In_StoreParameters	0 🕈	In_StoreParameters	0 🖛	
In_ReadDiagnosticData	0 🕈	In_ReadDiagnosticData	0 🖛	
In_ResetCounterMileage	0 🕈	In_ResetCounterMileage	0 🖛	
_M_o_n_it_o_r_T_a_g_s	0 🕈	MonitorTags	0 🖛	
O_CurrentPosition	0 Before	O_CurrentPosition	10000 🖛	Aftor
O_CurrentSpeed	32	O_CurrentSpeed	-32 🖛	Alter
O_CurrentForce	-15 🕈	O_CurrentForce	-6 🖛	
O_DDTemprature	0 🗭	O_DDTemprature	0 🖛	
O_DDCurrent	0 🖛	O_DDCurrent	0 🖛	
O_DDVoltage	0 🖛	O_DDVoltage	0 🖛	
O_DDCyclesTotal	0	O_DDCyclesTotal	0 🖛	
O_DDCyclesSinceReset	0.	O_DDCyclesSinceReset	0 🖛	
	0	O_DDMileageTotal	0-	
O_DDMileagesSinceReset	0	O_DDMileagesSinceReset	0-	
O_NumOfStorageOperation		O_NumOfStorageOperation	n U 	
	Err_list	IO_ErrorCode	Err_list	
			0	
_mou_l_a_g_s	Deed Deep		Deed Dec	
Write MSG	Wete Para	Read_MSG	Read_Para	
MSC Source Element	vvrite_Para	MSC Source Element	write_Para	
MSG_Source_Element MSG_So	ourceArray	MSG_Source_Element	MSG_SourceArray	
MSG_Destination_Liement MSG_Desin	lationArray	MSG_Destination_Element	mog_DesinationArray	1

将"In_MoveOut"从 False 切换为 True, SMS 驱动单元向外伸出。到达位置后"O_StateOut"将为 True。



5.5 定位到中间位置 "PosImp"



将 "In_MoveIntermediate"从 False 切换为 True, SMS 驱动单元向中间位置移动。到达中间位置后 "Sts_StateMedinteral"将为 True。

6 故障代码

SMS_Festo_Advance 功能块中 IO_ErrorCode 变量显示 SMS 驱动单元的故障代码 举例:

💰 Logix Designer - S	5MS_Test [17	69-L24ER-	QB1B 31.11]*									
FILE EDIT VIEW	SEARCH	LOGIC	COMMUNICA	ATIONS T	TOOLS W	INDOW H	IELP					
🗄 🏜 💾 🖶 🗍	¥ 🗗 🙃	2 6	XstateDevice	-	~	م م م	D= h	. D. B.	📩 🕺 🕻	2 16	66	
Run Mode	Ξſ	Path: AB_	_ETHIP-1\192.1	.68.0.20*				옷 놂	•			-()(U)-
I/O OK	Rem Run		No Forces		No Edits	2				▶ Favo	orites Add-On Alar	ms Bit Tir
Controller Organizer			▼ ₽ ×	📙 Main	Program - N	MainRoutin	e 📙 Ma	ain Progran	n - SMS_A	dvance*	Controller Tags -	SMS_Test(co
J =				Scope:	E SMS_T	est ~	Show:	All Tags				
🔺 🚄 Controller SM	S_Test			Nan	ne				리스	Value	+	Force Mask
Controller	Tags			h	i+0						0	
Controller	Fault Handl	er									()	
Power-Up	Handler				PX_AP_III						{}	
A Tasks				> C	PX_AP_1:12						{}	
A Nain lask				▶ C	PX_AP_I:O1						{}	
	rogram ameters and	Local Tag		▲ E	rr_list						{}	
↓ Var	inRoutine	Local lag	·		Err list[0]						4096	
⊨ SM	S Advance				E C (134[0]						-1050	
Unschedu	led				En_list(i)						U	
🔺 <u> Motion Group</u>	s			Þ	Err_list[2]						0	
📕 Ungroupe	d Axes			Þ	Err_list[3]						0	
4096 换算成:	16 讲制	: 100	он									

同样也可以通过网页访问查看故障代码:

Terminal



Modules

Slot	Module	Code	FWVersion	Serial	Productkey	Identify	Diagnosis
1	CPX-AP-I-EP-M12	8323	1.3.1	0x00008AF6	3S7PNW2LB48		ОК
2	CPX-AP-I-4IOL-M12	8206	1.4.13	0x00005FAF	3S7PNFF9T7S		Seneral malfunction IO-Link Device EventCode=0x1000 (0x0d000141)

故障查询路径: Festo_A5_1spaltig

>			IO-Link devi	ce event codes		
<i>.</i>	Parameterisation	•	IO-Link event code hex	Diagnostics ID hex	Message	Description
~	 Diagnostics and fault clearance Diagnostic messages LED displays 		1000h	0D 00 0141	General malfunction of IO-Link device	General malfunction – Unknown error of the IO-Link device. Remedy – Check IO-Link device.
	Event codes					Diagnost- Information ic status
	Disposal		1806h 1807h	01 01 010B	Short circuit/overload in sensor supply	The connected sensor is defective or gener- ates too much load on its channel.
	Technical data					Remedy – Check sensor for correct func- tion, in particular for current consumption. – Check sensor cabling.

7 附录A

IO-LINK 通讯 CPX-AP-I-4IOL-M12 主站模块连接从站模块 EPCS-BS 单元选用 8080777(NEFC-M12G8-0.3-M12G5-LK) 电缆 直连, 2 号脚也被连接,此时多出一路 24V 供给 SMS,有可能会烧坏 SMS 驱动单元。

Electrical conn Field device sid	ection 1 le	Electrical connection 2 Controller side				
1 Socket	Pin SMS	Pin CPX-AP-I-4IOL	2 Plug con- nector			
$ \begin{array}{c} 2 \\ 8 \\ 1 \\ 0 \\ 7 \\ 6 \end{array} $	1 L+ 2 Do not connect 3 C/Q 4 L- 5 m 8 not assigned	1 L+ 2 Load voltage 4 C/Q 3 L- 5 not assigned	$\begin{array}{c}2\\3++\\5\\4\end{array}$			

解决方案:

如果已经选购 8080777,建议增加选购 8091511(NEBU-M12G5-K-1-N-M12G3),避开 2 号脚。

Festo 技术支持

FESTO

1

NEBU-M12G5/W5M12G3/W3									
	1	BN	1						
00	3	BU	3						
1(000)3	4	ВК	4	3(+ +)1					
				+					
4				4					

8 附录 B

如何映射正确的输入输出硬件接口地址?

1. 报文长度(SMS 驱动单元过程数据输入输出各占 2 个 byte(Firmware V19) Tab. 47: Process data

'ProcessDataInput'	Bit	Bit								
	15		5	4 ¹⁾	3	2	1	0		
Control data	_			'State "Inter- mediate" ,	'State "Device"'	'State "Move"'	'State "Out"'	'State "In"'		
Index.Subindex				0x0028.5 (40.5)	0x0028.4 (40.4)	0x0028.3 (40.3)	0x0028.2 (40.2)	0x0028.1 (40.1)		

1) From firmware version v19.0.4.107_release

Tab. 48: Telegram structure 'ProcessDataInput'

'ProcessDataOut-	Bit									
put'	15		5	4 ¹⁾	3	2	1	0		
Status data	-		'Move "Inter- mediate" ,	_	'Quit Error'	'Move "Out"'	'Move "In"'			
Index.Subindex				0x0029.5 (41.5)	-	0x0029.3 (41.3)	0x0029.2 (41.2)	0x0029.1 (41.1)		

1) From firmware version v19.0.4.107_release

Tab. 49: Telegram structure 'ProcessDataOutput'

2. WEB 浏览

EtherNet/IP-Assembly

AP-I-EP	AP	EtherNet/IP -	Modbus TCP 👻	Configuration \bullet	System -	
Term	nina	Assembly View EDS File Rockwell L5X Pro	Dject			
Slot	Module		Code	FWVersion	Serial	Productkey
1	CPX-AP-	-I-EP-M12	8323	1.3.1	0x00008AF6	3S7PNW2LB48
2	CPX-AP-	-I-4IOL-M12	8206	1.4.13	0x00005FAF	3S7PNFF9T7S

Assembly View

100 - Input Exact SINT (12 Bytes)

					Search:
Offset (bit)	Bit length	Module	Channel	Datatype	Name
0	16	2	0	USINT[2]	Module 2 - CPX-AP-I-4IOL-M12 - Port 0
16	16	2	1	USINT[2]	Module 2 - CPX-AP-I-4IOL-M12 - Port 1
32	16	2	2	USINT[2]	Module 2 - CPX-AP-I-4IOL-M12 - Port 2
48	16	2	3	USINT[2]	Module 2 - CPX-AP-I-4IOL-M12 - Port 3
64	8	2	4	USINT	Module 2 - CPX-AP-I-4IOL-M12 - Port 4 - PQI
72	8	2	5	USINT	Module 2 - CPX-AP-I-4IOL-M12 - Port 5 - PQI
80	8	2	6	USINT	Module 2 - CPX-AP-I-4IOL-M12 - Port 6 - PQI
88	8	2	7	USINT	Module 2 - CPX-AP-I-4IOL-M12 - Port 7 - PQI

 \sim

如图可以看出 CPX-AP-I-4IOL 的 Port0 占组态地址中的第一个和第二个 Byte。

3. 对应 PLC 组态

{}	{}	Decimal	SINT[12]
0		Decimal	SINT
10		Decimal	SINT
0	1	Decimal	SINT
0		Decimal	SINT
0		Decimal	SINT
CPX-AP ₀	I-4IOL Port0	氟品地址	SINT
0		Decimal	SINT
0		Decimal	SINT
-96		Decimal	SINT
0		Decimal	SINT
0		Decimal	SINT
0		Decimal	SINT
{}	{}		_001A:CPX_A
{}	{}	Decimal	SINT[8]
0		Decimal	SINT
0		Decimal	SINT
0	<u> </u>	Decimal	SINT
0		Decimal	SINT
CPX-AP-9	4101 Port04	(Redimalb t) -	SINT
0	10210104	Decimal	SINT
0		Decimal	SINT
	{} 0 10 0 0 0 0 CPX-AP 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	{} {} 0 0 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	۱۰۰ ۱۰۰ Decimal 0 Decimal 10 Decimal 0 Decimal 10 Decimal 0 Decimal

测试结果 PLC 的地址高低字节和报文是相反的,但是由于实际输入输出只用到 Bit0 至 Bit4,PLC 组态时可以选择高 8 位 也可以正常使用。当然也用使用移位指令进行高低字节调换。本文样例如下:



9 附录 C

Web网页组态 CPX-AP-I-4IOL 每个端口地址长度后无法修改怎么办?

Modules

Slot	Module		Code	FWVersion	Serial	Product	(ey	Identify	Diagnosis
1	CPX-AP-I-EF	P-M12	8323	1.3.1	0x00008AF6	3S7PNW	2LB48		OK
2	CPX-AP-I-410	OL-M12	8206	1.4.13	0x00005FAF	3S7PNFF	-9T7S		ОК
	Parameter Object (0x0F) Instance	AP Id/Instance	Parameter		Startup	Value			
	64	20109:1	OutputDataLeng	th (Port 1)		0			
	65	20109:2	OutputDataLeng	th (Port 2)		0			
	66	20109:3	OutputDataLeng	th (Port 3)		0			
	-	20090:0	Variant selection		yes	CPX-AP-I-4IOL-M12 (not changeable - Sto	Variant 2 pred Parameter active)		
可以	进行删除矿	存储后,重	新设置参数	解决。					
AP-I-	EP AP	EtherNet/IP 👻	Modbus TCP	Configuration	System 👻				
Sto Use	ored P ed Men	Parame	eter	Username/Passw Firmware SNMP Stored Parameter	r				
1%									
			Action	 Restore defau values, too) Store/Update Delete stored Download stored Upload stored 	It parameter value current parameter values red values I values from file	es (delete stored values			
		Stored paran	neter values file	提交查询内容		Browse			

10 附录 D

SMS 驱动单元上电后自动使能,为了保持一致,需要将 PLC 功能块中 In_PowerSMS 使能标签默认值设为 1



SMS 重新上电后,功能块需要重新使能后,读写参数才正常,否则会报 1004 故障。