# Studio5000 环境下 EthernetIP 通讯控制 CPX-AP-A-EP&VTUG



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#### 关键词:

Stuido5000, AB PLC, Ethernet/IP, CPX-AP-A-EP, VTUG

#### 摘要:

本文介绍了使用 AB PLC 控制 CPX-AP-A-EP 的实例,通讯协议为 Ethernet/IP, PLC 编程软件为 Studio5000。文档主要 内容包括软硬件安装,Studio5000 环境中的配置,模块参数读写及相关诊断功能。

#### 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 AP 系统以及 AB 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。

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# 1 软件环境

Type/Name	Version Software/Firmware
Festo Automation Suite (以下简称 FAS)	V2.6.0.481
CPX-AP plug in	V1.5.0.251
Rockwell Studio - 5000	V32.11

# 2 硬件环境

Type/Name	Version Software/Firmware
CPX-AP-A-EP	V1.4.5
CPX-AP-A-8DI-M12-5P	V1.100
CPX-AP-A-16DI-D-M12-5P	V1.100
CPX-AP-A-8DO-M12-5P	V1.100
VAEM-L1-S-24-AP	V1.100
Allen-Bradley PLC 1769-L24ER-QB1B	V32.11



#### 2.1 硬件接口说明

CPX-AP-I-EP 模块配置



AP 系统通讯接口[XF20](必须使用 Festo 专用 AP 通讯线缆 NEBC-D8G4-ES-\*\*-N-S-D8G4-ET)

系统通信接口 [XF20]							
M8 插座, 4 针, D 约	编码	信号					
1	1	RX-	接收数据 -				
40002	2	TX+	发送数据 +				
	3	RX+	接收数据 +				
3	4	TX-	发送数据 -				

M12 插座, 4 针, D	编码	信号	
2	1	TD+	发送数据 +
	2	RD+	接收数据 +
	3	TD-	发送数据 -
	4	RD-	接收数据 -
	螺纹孔	屏蔽	功能接地 FE

## EtherNet/IP 网络接口 [TP2]

M12 插座, 4 针, D	编码	信号	
2	1	RD+	接收数据 +
	2	TD+	发送数据 +
	3	RD-	接收数据 -
	4	TD-	发送数据 -
	螺纹孔	屏蔽	功能接地 FE

#### 2.2 AP 系统拓扑(地址映射)

CPX-AP系统每次启动时会自动分配模块地址,总线接口模块地址根据所在机架的中的位置分配地址,先是机架内的模块 从左至右排序,然后排列分布式 IO 的地址。



1 号为 CPX-AP-A-EP, 2 号为 CPX-AP-A-8DI, 3 号为 CPX-AP-A-16DI-D, 4 号为 CPX-AP-A-4IOL, 5 号 VTUG-AP 阀岛。 IO-LINK 主站的 Port 0 连接压力传感器 SPAN-B2R-Q4。

# 3 IP 地址设置

## 3.1 DHCP/BOOTP 软件(出厂设置)

Add Relation		Discovery History					Clear History
Ethernet Address (MAC)	Туре	(hr:min:sec)	lostnam	e			
UU:UE:FU:84:U6:50	DHCP	14:05:51	39				_
		New Entr	у				×
		Ser	ver IP Addre	ss: 169.254	.73.186		
		Client.	Address (MA	C): 00:0E:F0	0:84:06:50	)	1
	-	Cli	ient IP Addre	ess: 192 .	168 .	1.5	
Ethernet Address (MAC)	Туре	<u>IP.</u>	Hostnar	me:			-
			Descripti	on:			-
				,			
		Г		7	Car		
ors and warnings		D-94-06-50	OK		Car	ncel	Relation
rors and warnings hable to service DHCP request fro able BOOTP/DHCP	om 00:0E:F0 ,设置	0:84:06:50. 星成静态 IP	<u>ОК</u>		Car		Relation 0 of 256
nors and warnings hable to service DHCP request fro cable BOOTP/DHCP BootP DHCP EtherNet/IP (	om 00:0E:F0 9,设置 Commissi	0:84:06:50. 2成静态 IP oning Tool	<u>OK</u>		Car	ncel	Relation 0 of 255
nors and warnings hable to service DHCP request fro cable BOOTP/DHCP BootP DHCP EtherNet/IP ( Tools Help	om 00:0E:F( ),设置 Commissi	0:84:06:50. 置成静态 IP oning Tool	<u>ОК</u>		Car	ncel	Relation 0 of 256
rors and warnings nable to service DHCP request fro able BOOTP/DHCP BootP DHCP EtherNet/IP ( Tools Help Add Relation	om 00:0E:F( ),设置 Commissi	0:84:06:50. 置成静态 IP oning Tool Discovery H	OK o		Car	ncel	Relation 0 of 256
nors and warnings hable to service DHCP request fro cable BOOTP/DHCP BootP DHCP EtherNet/IP ( Tools Help Add Relation Ethernet Address (MAC)	om 00:0E:F( 9,设置 Commissi	0:84:06:50. 星成静态 IP oning Tool Discovery H	OK Po History # IP.	Address	Car	Hostnam	Relation 0 of 255 Clear History
tors and warnings hable to service DHCP request for cable BOOTP/DHCP BootP DHCP EtherNet/IP ( Tools Help Add Relation Ethernet Address (MAC) 00:0E:F0:84:06:50	om 00:0E:F( ),设置 Commissi Type DHCP	0:84:06:50. 星成静态 IP oning Tool Discovery P [[tr:min:sec] 14:07:43	OK 	Address 2.168.1.5	Car		Relation 0 of 258 Clear History ee
tors and warnings hable to service DHCP request fro cable BOOTP/DHCP BootP DHCP EtherNet/IP ( Tools Help Add Relation Ethernet Address (MAC) 00:0E:F0:84:06:50	m 00:0E:F( ),设置 Commissi Commissi DHCP	0:84:06:50. 重成静态 IP oning Tool Discovery H [(hr:min:sec) 14:07:43	0K +istory # IP. 50 19;	Address 2.168.1.5	Car		Relation 0 of 256 Clear History
tors and warnings hable to service DHCP request fro cable BOOTP/DHCP BootP DHCP EtherNet/IP ( Tools Help Add Relation Ethernet Address [MAC] D0:0E:F0:84:06:50	om 00:0E:F( ),设置 Commissi Type DHCP	0:84:06:50. 全成静态 IP oning Tool Discovery H (hr:min:sec) 14:07:43 Entered Re	OK listory # IP. 50 19;	Address 2.168.1.5	Car L	Hostnam	Relation 0 of 258 Clear History IE
tors and warnings hable to service DHCP request for cable BOOTP/DHCP BootP DHCP EtherNet/IP ( Tools Help Add Relation Ethernet Address (MAC) Delete Relation Ethernet Address (MAC)	m 00:0E:F( ),设置 Commissi Type DHCP	0:84:06:50. 置成静态 IP oning Tool Discovery H [In:min:sec] 14:07:43 Entered Re IP Address	OK History # IP 50 19; Hations Er Hations Er	Address 2.168.1.5 nable BOOTP	Car /DHCP Dec.u	Hostnam Disable B	Clear History ee

#### 3.2 拨码开关(优先级最高)

旋转开关	
旋转开关 IP×100×10×1	<ul> <li>通过 3 个旋转开关可以设置 IP 地址的第 4 个八位组</li> <li>(192.168.1.XXX)。</li> <li>可能的设置: <ul> <li>0 = 通过 DHCP/BOOTP 进行动态地址设定(出厂设置)</li> <li>1 … 255 = 允许的地址范围</li> <li>有效值:</li> <li>EtherNet/IP (300 … 555): 期望值的最后一个八位组 +300,</li> </ul> </li> <li>例如 22 + 300 = 322 = 192.168.1.22 <ul> <li>Modbus TCP (600 … 855): 期望值的最后一个八位组 + 600,</li> <li>例如 51 + 600 = 651 = 192.168.1.51</li> <li>恢复至出厂设置: 900</li> <li> 位于 0 … 355 范围由时, 西众网络协议均均无关于动状态, 首先设置给出的网络协议具</li> </ul> </li> </ul>
	- 位于 0 ···· 255 泡围中时,两个网络协议均处于活动状态。自先设直输出的网络协议具有优先权。 数值无效时,会将 IP 参数重置为出厂设置。

例如: 在断电情况下,只将R1旋转开关拨到5的位置,模块上电后IP地址为192.168.1.5。如需要设置为其他网段,可以通过网页或者FAS调试软件修改。

# 4 Studio5000 软件组态

#### 有两种组态方式,EDS 文件和 L5X 文件。

#### 4.1 EDS 文件组态

### 4.1.1 导入 EDS 文件

#### a) 下载并安装 EDS 文件: <u>Download</u>

#### Downloads for EtherNet/IP 接口



Terms and conditions of use for electronic documentation

#### 4.1.2 硬件组态



192.168.1.5/cgi-bin/	ap-asm-show						A	
AP-A-EP AP	EtherNet/IP - Modbus	TCP - (	Configurati	on <del>-</del>				
Assembly	y View							
100 - Input Exact SIN	IT (39 Bytes)			Ŷ	$\cdot$			
100 - Input Exact SII 101 - Output Exact SI 102 - Input Exact IN 103 - Output Exact IN	NT (39 Bytes) SINT (38 Bytes) T (20 INT/40 Bytes) NT (19 INT/38 Bytes)			Î			Search:	
104 - Input Exact DI	NT (11 DINT/44 Bytes)			- 1	Datatype	Name		
110 - Input Fixed SIN	NT 16 Bytes (16 Bytes)			- 1	BOOL	Module 2 - CPX-AP-A-8DI-I	W12-5P - Input 0	
111 - Output Fixed S 112 - Input Fixed SIN	NT 32 Bytes (32 Bytes)			- 1	BOOL	Module 2 - CPX-AP-A-8DI-I	M12-5P - Input 1	
113 - Output Fixed S 114 - Input Fixed SI	VT 64 Bytes (64 Bytes)			- 1	BOOL	Module 2 - CPX-AP-A-8DI-M12-5P - Inp		
115 - Output Fixed S 120 - Input Fixed DI	SINT 64 Bytes (64 Bytes) NT 64 Bytes (16 DINT/64 B	ytes)			BOOL	Module 2 - CPX-AP-A-8DI-M12-5P - Inp Module 2 - CPX-AP-A-8DI-M12-5P - Inp Module 2 - CPX-AP-A-8DI-M12-5P - Inp		
121 - Output Fixed L 122 - Input Fixed DI	01NT 64 Bytes (16 DINT/64 NT 128 Bytes (32 DINT/128	Bytes) Bytes)			BOOL			
123 - Output Fixed L 124 - Input Fixed DI	DINT 128 Bytes (32 DINT/1. NT 488 Bytes (122 DINT/48	28 Bytes) 88 Bytes)			BOOL			
125 - Output Fixed L 129 - Diagnosis and	Status (72 Bytes)	496 Bytes)			BOOL	Module 2 - CPX-AP-A-8DI-I	W12-5P - Input 6	
7	(12 Bytes) 1	2	7	•	BOOL	Module 2 - CPX-AP-A-8DI-I	V12-5P - Input 7	
Module Definition						×		
Revision: 1	∨ 003 ≑							
Electronic Keying: Comp	atible Module	$\sim$						
Connections:								
Name	Remote Data	Size	т	ag Suff	x			
Exact VO size	Input:	39 SIN	т	1	AP_A_EP01:I1			
-	Output:	38		/	AP_A_EP01:01			
Diagnostic Data	Output:	0 SIN	ит	2	<none></none>			
Select a connection 🗸								
			OK	Ca	ancel H	Help		

### 4.1.3 下载并测试

### 网页可以查看各个模块占的地址长度。 例如下图所示,输出的总地址长度为 38bytes。其中 CPX-AP-A-4IOL 占前 32bytes,VAEM-L1-S-24-AP 占后 6 个 Bytes。

101 - Output Exac	ct SINT (38 Bytes)	-	~				
Copy CSV Offset (bit)	Bit length	Module	Channel	Datatype	Name	<u>32byte</u>	Search:
0	64	4	0	USINT[8]	Module 4	- CPX-AP-A-4IOL-	M12 - Port 0
64	64	4	1	USINT[8]	Module 4	- CPX-AP-A-4IOL-	M12 - Port 1
128	64	4	2	USINT[8]	Module 4	- CPX-AP-A-4IOL-	M12 - Port 2
192	64	4	3	USINT[8]	Module 4	- CPX-AP-A-4IOL-	M12 - Port 3
256	1	5	0	BOOL	Module 5	- VAEM-L1-S-24-A	P - Coil 0
257	1	5	1	BOOL	Module 5	- VAEM-L1-S-24-A	P - Coil 1

# 那么,对应 PLC 中的地址映射, VAEM-L1-S-24-AP 地址是从 AP\_A\_EP01:01,Data[32]开始

Controller OK	-	Path: AB_E1HIP-1\192.168.1.	20*		۰ 🛧 🖈			F +7F -(	)(0)(1
I/O OK	Rem Run	No Forces	▶ <sub>↓</sub> No E	Edits 🔒		i i i i i i i i i i i i i i i i i i i	vorites Add-On	Alarms	Bit Timer
Controller Organizer		<del>▼</del> ₽ ×	📙 Mair	nProgram - MainRoutine	🗸 Controller 1	Tags - CPX_	AP_A_Test(contro	oller) ×	
J 1			Scope:	: @CPX_AP_A_Test ~	Show: All Tags				
🔺 <u></u> Controller CPX	(_AP_A_Test -		Nar	me	== ▲ Value	+	Force Mask 🗧 🗧	Style	Data Ty
Controller	lags			▶ AP A EP01:01.Data[3]	11	0		Decimal	SINT
Controller	Fault Handi Handler	er		A AP A EP01-01 Data[3]	21	85		Decimal	SINT
Tasks	rianulei				-j			D : I	DOOL
A C Main Task				AP_A_EPUTOT.Data	1[32].0	1		Decimal	BOOL
🔺 🔓 MainPr	ogram			AP_A_EP01:O1.Data	[32].1	0		Decimal	BOOL
🗸 🖉 Para	ameters and	Local Tags	<b>V</b>	AP_A_EP01:O1.Data	[32].2	1		Decimal	BOOL
🗈 Mai	inRoutine	-		AP_A_EP01:O1.Data	[32].3	0		Decimal	BOOL
📕 Unschedul	ed			AP A EP01:01.Data	[32].4	1		Decimal	BOOL
🔺 <u> Motion</u> Groups	s			ΔP Δ FP01-01 Data	1321 5	0		Decimal	BOOL
Ungrouped	Axes				(02).0			D : I	DOOL
Assets				AP_A_EPUI:OT.Data	1[32].0	1		Decimal	BOOL
Logical Model				AP_A_EP01:O1.Data	[32].7	0		Decimal	BOOL
A m 1769 Bus	lion			AP_A_EP01:O1.Data[3]	3]	0		Decimal	SINT
In 1769 Dus	-L24ER-OB	1B CPX AP A Test		AP_A_EP01:O1.Data[3	4]	0		Decimal	SINT
🖌 🚄 Embede	ded I/O			AP_A_EP01:O1.Data[3]	5]	0		Decimal	SINT
ø [1] E	Embedded (	Discrete_IO		AP_A_EP01:O1.Data[3]	6]	0		Decimal	SINT
📕 📶 Expansi	ion I/O			▶ AP A EP01:01.Data[3]	71	0		Decimal	SINT
▲ 🚠 Ethernet						с. С.	( )	2 Connar	CDVAD
1769-L2	24ER-QB1B	CPX_AP_A Test		CPA_AP_A_Parameter		{····}	{}		СРААР
E CPX-AF	-A-EP AP_A	A_EPUI 🦉	• (	CPXAP_A_Diag		{}	{}		CPXAP

#### 强制阀片测试 OK。



#### 4.2 L5X 组态

#### a) FAS 软件离线组态 AP 拓扑

AUTOMATION SUIT		0	0										1	. –	• ×
New Project*	•	4	•											FE	STO
Project															
Navigator	< Topology	Editor		0	- 100 9	~ <i>C</i>	0	<u>0</u>	12	>		Q,			
▼ cpx_ap_ep										Plaz	so ont	D	evice Cata	alog	alact the
SPAN POR OA										dev	ice fron	n the de	evice catal	og below	/.
SPAN-B2R-Q4			•			•						CMMT-AS- 5340814	C2-3A-PN-S1 A743	•Order Code	2
						•			5			 8888 (	CE	Part Numb	er
	••	2	3 4			VAE	M-L1-S-	24-AP				35	7PL810PFQ		
		cpx_ap_ep								<u>م</u>	Order	Code/Par	t Number		
							○ 10-Li ANI DOD	ink		< D	evice Typ	pes	AP Device	e	
						36	AN-DZN	(-Q4		A	nalog M	odules			
										D	igital Mo	odules			
										IC	D-Link M	aster Mo	dules		
										Pr	neumatio	cs MPA-I			
										Pr	neumatio	cs VTUG			
b) 导出 L5X 文件															
$\leftarrow$	Expo	ort											-	F	ESTO
New New	Rockwel	I L5X	2	F	Rockwell	L5X									
┢ Open	Festo PC	СК		F (I	esto devices can UDTs) with meani	easily be int ngful tag na	tegrated ames, sta	into Rocl atus data	well cont array, an	trol syst d ladde	tems via E er logic to	EtherNexad transis v	t IO size, us way. Solenoi	er defined o d valves are	data types e boolean,
Information	Siemens	DB (S7-1500)		a	nalog input sign liagnostic array is	als are integ available to	gers, etc. detect p	. All IO a problems	re descri down to t	bed, an the mod	d easily dule and	associafine channa	ed in the pro	oject into a	iccount. A
	Ducient	)		C	One or several Eth	ernet/IP dev	/ices can	be select	ed below	and are	e then ind	ludedclud	led in the ex	port, too.	
B Save	Project A	Archive			6										
Save As					Suppor	ted D	evice	es		1 de	evice sele	cted			
					cpx_ap_ep	3									
Close Project															
u <b>≹u</b> Import															
L Export															
Repositories															
(h Evit															
U EXIL												4	۵	Expor	t

## c) 新建项目导入 L5X 文件



e) 将组态文件拷贝到调试的项目	目中使用				
Controller Organizer	▼ Ŧ ×	Module Pro	perties Report: Local (ETHER	NET-MODULE 1.001)	×
a 📲		General Con	nection Module Info		
<ul> <li>Controller b</li> <li>Controller Tags</li> <li>Controller Fault Handler</li> <li>Power-Up Handler</li> <li>Tasks</li> <li>MainTask</li> <li>MainProgram</li> <li>Unscheduled</li> <li>Motion Groups</li> <li>Ungrouped Axes</li> <li>Assets</li> <li>Logical Model</li> <li>I/O Configuration</li> <li>II 769 Bus</li> <li>[0] 1769-L30ER b</li> <li>Ethernet</li> <li>Ethernet</li> </ul>		Type: Vendor: Parent: Name: Description: Comm Format Address / H	ETHERNET-MODULE Generic Rockwell Automation/Allen-Brac Local cpx_ap_ep : Data - DINT - With Status Host Name ess: 192 . 168 . 1 . 5 me:	Ethemet Module diley Connection Para Input: Output: Configuration: Status Input: Status Output: OK	meters Assembly Instance: Size: 104 11
ETHERNET-MODULE cpx.	New Module				
	Discover Modules				
ж	Cut	Ctrl+X			
۵	Сору	Ctrl+C			
6	Paste	Ctrl+V			
T= Controller Organizer	Delete	Delete			

# 5 CPXAP\_Parameter (参数读写)

CPXAP\_Parameter 功能块用于读取和写入 CPX-AP 模块中的参数。



#### 5.1 CPXAP\_Parameter 功能块变量表

1) Control 变量表

Tag Name	Data Type	Function Description			
In_Execute	BOOL	Execution command for read or write Parameter			
In Write BOOL		False = Parameter Read Function			
		True = Parameter Write Function			
In_SlotNumber	INT	Enter slot number to perform read or write function			

Tag Name	Data Type	Function Description
In_ParameterID	INT	Parameter ID (Available in web configuration portal in name of AP/ID) Parameter Object (0x0F) AP Instance Id/Instance 1 12000:0 2 12001:0
In_Instance	INT	Parameter Instance (Available in web configuration portal in name of AP/Instance) Parameter Object (0x0F) AP Instance Id/Instance 1 12000:0 2 12001:0
IO_Data	SINT[64]	Used to updates read parameter value during read function & feed the write parameter values during write function. Data has split into array of SINT.
In_Size	INT	Enter the number of bytes to write.
2) Status 变量表		
Tag Name	Data Type	Function Description
Sts_Done	BOOL	<b>True</b> = Read or Write execution completed successfully
Sts_Busy	BOOL	<b>True</b> = Read or Write execution in process
Sts_Error	BOOL	<b>True</b> = Read or Write execution completed with error
O_Error	INT	Error code of MSG Instruction
3) MSG 变量表	I	
Tag Name	Data Type	Function Description
MSG_Read_Data	MESSAGE	Read data message instruction
MSG_Write_Data	MESSAGE	Write data message instruction
MSG_Source_Data	SINT[64]	Message instruction source element tag
MSG_Destination_Data	SINT[64]	Message instruction destination element tag

#### 5.2 CPXAP\_Parameter 功能块组态

1) 导入功能块



# 3) 功能快新建标效夕

3) 功能块新建标签名					
🗏 MainProgram - MainRoutine* 🗙					-
● Q   H   L F, C E   100 H → ↔					
	New Tea		~	CPXAP_Parameter	^
	New Tag			_CPXAP_Paramo _C_o_n_t_r_o	New Tag
	Name:	CPX_AP_A_Parameter	Create 🔻 🕇	In_Execute	Cut Instruction Ctrl+X
	Description:	^	Cancel	In_SlotNumber	Copy Instruction Ctrl+C
			Lisla	In_Instance	Paste Ctrl+V
			нер	IO_Data	Delete Instruction Delete
		V		_M_o_n_i_t_o_ O_Error	Add Ladder Element Alt+Insert
	Usage:	<controller></controller>		_MSG_T_a_g_ MSG_Read_Da	Edit Main Operand Description Ctrl+D
	Type:	Base ~ Connection		MSG_Write_Da MSG_Source_	Save Instruction Defaults
	Alias For:	~		MSG_Destinati	Remove Force
	Data Type:	CPXAP_Parameter			Go To Ctrl+G
(End)	Parameter				Instruction Help F1
	Scone:				Remove Parameter
	External				Remove All Unknown Parameters
	Access:	Read/ write V			Open Instruction Logic
	Style:	~ ~			Properties
	Constant				
MainProgram - MainRoutine*     ×       Q     Q     H     III     III     III     III     III     III     III     III     III     IIII     IIII     IIII     IIII     IIII     IIII     IIII     IIII     IIII     IIIII     IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII				CP	X-AP Modules
				Parar	neter Read/Write Block
0 🔞	New Tag Name: Date Description:	Arrayl 2	3 × eate v Cancel Help	CPXAP_Parameter CPXAP_Parameter _C_o_n_t_o_l_a_i in_Execute In_Write In_SlotNumber In_ParameterID In_Instance In_Size IO_Data _M_o_n_i_t_o_T_a_	X_AP_A_Parameter s 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0 +
	Usage: <cor< th=""><th>ntroller&gt;</th><th></th><th>O_Error _MSG_T_a_g_s</th><th>₩ Cut Instruction Ctrl+X</th></cor<>	ntroller>		O_Error _MSG_T_a_g_s	₩ Cut Instruction Ctrl+X
	Times	Connection		MSG_Read_Data MSG_Write_Data	Copy Instruction Ctrl+C
	Alize Ferr		L	MSG_Source_Data MSG_Destination_Data	Delete Instruction Delete
	Avids FOF:	×			Add Ladder Element Alt+Insert
(End)	Data Type: SIN				Edit Main Operand Description
	Parameter Connection:	~			Save Instruction Defaults
	Scope:	CPX_AP_A_Test ~			Clear Instruction Defaults
	External Rea	d/Write 🗸			Remove Force
	Access: Style: Dec	imal 🗸			Go To Ctrl+G
					Instruction Help F1

# 5) MSG\_Source\_Data 新建标签名

🗏 MainProgram - MainRoutine* 🗙							-
🖗 Q 📋 🛅 🖓 🖓 🖓 🚥 🖓 🕬							
· · ·	New Tag		<mark>3</mark> ×	Pa CPXAP_Parameter CPXAP_Parameter	CPX-AP I ameter F Blo CPX_AP	/lodules Read/Write ck _A_Parameter	^
	Name:	Source_Para 2	Create 🔻	_C_o_n_t_r_o_I_T_ In_Execute In_Write In_SlotNumber	i_g_s	0 ← -{Sts_Don 0 ← 0 ← -{Sts_Bus	⊪)— y)—
	Deachpaon.		Help	In_ParameterID In_Instance In_Size IO_Data _M_o_n_i_t_o_r_T_ O_Froor	a_g_s	0 ← -{Sts_Erro 0 ← DataArray 16#0000 ←	~ ~
	Usage: Type:	<controller>  V Base V Connection</controller>		_MSG_T_a_g_s MSG_Read_Data MSG_Write_Data MSG_Source_Data MSG_Destination_D	ata	0 ← ? ? New Tag	
	Alias For: Data Type:	SINT[64]			ж cī	Cut Instruction Copy Instruction	Ctrl+X Ctrl+C
(End)	Parameter Connection:	~			â	Paste Delete Instruction	Ctrl+V Delete
	Scope: External Access:	Read/Write ~				Add Ladder Element Edit Main Operand Descrip	Alt+Insert
	Style:	Decimal $\checkmark$				Save Instruction Defaults	

#### 6) MSG\_Destination\_Data 新建标签名

🗏 MainPro	gram - MainRoutine* 🗙					-
	ti 🚡 🔨 🔓 🤮 abca 🔁 ab	* (0)				
					CPX-AP Parameter	Modules A Read/Write
		New Tag		<b>3</b> ×	CPXAP_Parameter	
0 😆		Name:	Destination Para	Create V	C_o_n_t_r_o_l_T_a_g_s	2_A_Parameter [] 0 ← -(Sts_Done)-
		Deservations.		Create V	In_Execute In_Write	0← -(Sts_Busy)
		Description:	^	Cancel	In_ParameterID	0 -(Sts_Error)-
				Help	In_Instance In_Size	0 🔶
			×		_M_o_n_it_o_r_T_a_g_s O Error	0
		Usage:	<controller> <math>\lor</math></controller>		_MSG_T_a_g_s MSG Read Data	0 🗭
		Type:	Base V Connection		MSG_Write_Data MSG_Source_Data	? Source Para
		Alias For:	~		MSG_Destination_Data	New Tag
		Data Type:	SINT[64]		ż	K Cut Instruction Ctrl+X
(End)		Parameter			C	] Copy Instruction Ctrl+C
		Connection:				Dalata Instruction Dalata
		Scope:	CPX_AP_A_Test ~			Add Ladder Element Alt+Insert
		Access:	Read/Write ~			Edit Main Operand Description
		Style:	Decimal $\lor$			Save Instruction Defaults
		Constant				Clear Instruction Defaults
7) MSG	_Read_Data 新建标题	签名				
	gram - Mainkoutine" 🗙	- (ab)				
					CPX-4	AP Modules
					Paramete	er Read/Write Block
0 😣		New Tag		3 ×	CPXAP_Parameter CPXAP_Parameter CPX_	AP_A_Parameter
		. Nat 2	Read_MSG_Para	Create 💌	_C_o_n_t_r_o_l_T_a_g_s In_Execute	0← -(Sts_Done)
		Description:		Cancel	In_Write In_SlotNumber	0 ← _(Sts_Busy) 0 ←
					In_ParameterID In_Instance	0 ← -(Sts_Error) 0 ←
				Неір	In_Size IO_Data	DataArray
			×		_M_O_N_I_t_O_r_I_a_g_s O_Error	16#0000 🗧
		Usage:	<controller></controller>		MSG_Read_Data	New Tag
		Туре:	Base ~ Connection		MSG_Source_Data	¥ Cut Instruction Ctrl+X
		Alias For:	~			Copy Instruction Ctrl+C
(7-1)		Data Type:	MESSAGE			Deste Ctrl+V
(End)		Parameter Connection:	~			Delete Instruction Delete Add Ladder Element Alt+Insert
		Scope:	CPX_AP_A_Test ~			Edit Main Operand Description
		External	Read/Write ~			Save Instruction Defaults
Sonvico	Codo Ov22(法 肥久/		• 0v0f	出生了中国		Clear Instruction Defaults
	ram - MainRoutine* ×		50001万回疋值,陕气	加加匹沃剂		
e e F						
					CPX-A	P Modules
					CRYAD Decemptor	Block
0 🕴		Message Configuration	- Read_MSG_Para	×	CPXAP_Parameter CPX_A	AP_A_Parameter
		Configuration* Comm	nunication Tag		In_Execute	
		Message Type: C	IP Generic 🗸		In_SlotNumber In ParameterID	0↓ 0↓ _(Sts Error)—
		Service Custom	Source Element	Source Para	In_Instance In_Size	0.
		Type:	Source Length:	1 (Bytes)	IO_Data _M_o_n_i_t_o_r_T_a_g_s	DataArray 0 🗢
		Service 32 (Hex) Code:	Class: f (Hex) Destination	Destination_Para 🗸	O_Error _MSG_T_a_g_s	16#0000 <del>•</del> 0 <del>•</del>
		Instance: 0 At	tribute: 0 (Hex) Element:	New Tag	MSG_Read_Data MSG_Write_Data	lead_MSG_Para
					MSG_Source_Data MSG_Destination_Data	Source_Para Destination_Para
(End)		-				
		Or-H Or H	1	Dear		
			vaiting ⊖ Start ⊃ Done	Done U Timed Or		
		Err@øde:				
		Error	確定 即迷	応用(ム) 非明		
			WOAL *X/F3	(H) (H)		

Message Cor	nfiguration - Read_MSG_Par	а	×				
Configuratio	on* Communication Tag						
Protect     P	Message Path Browser Path: AP_A_EP01 AP_A_EP01 AP_A_EP01 IT59 Bus Fig: 101 1759-124ER- Expansion I/O Fig: 111 Embedded I/O Fig: 11259-124ER- Expansion I/O Fig: 11259-124ER- CPX-AP-AEP AI OK Extended Error	QB1B CPX_AP_A_Test ed Discrete_IO 11B CPX_AP_A_Test P_A_EP01 Cancel Hel □ Time 取消 应用(A)	Browse (Octal) nection ed O(*				
8) MSG_	_Write_Data 新建	标签名					
MainProgr	ram - MainRoutine* 🗙						-
●	i i 7, 2, 2, <mark>10</mark>	db *		<b>3</b>	CPXAP Paramet	CPX-AP Modules Parameter Read/Write Block	Î
0 <table-cell> –</table-cell>		New Tag Name: Description: Usage:	Write_MSG_Para 2	Create V Cancel Help	CPXAP_Paramet <u></u> In_Execute In_Stottumber In_Stottumber In_Instance In_Size IO_Data <u></u> O_Error MSG_T_a_g_s MSG_Read_Data MSG_Write_Data	er CPX_AP_A_Parameter T_a_g_s 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-(Sts_Done)— -(Sts_Busy)— -(Sts_Error)—
(End) —		Alias For: Data Type: Parameter Connection:	MESSAGE		MSG_Source_Dr MSG_Destination	ta     New Tag       Data     & Cut Instruction       ①     Copy Instruction       ①     Paste       Delete Instruction     Delete Instruction	in Ctrl+X Ctrl+C Ctrl+V ion Delete
		Scope: External Access: Style:	CPX_AP_A_Test  Read/Write			Add Ladder Ele Edit Main Oper Save Instruction Clear Instruction	ment Alt+Insert and Description n Defaults in Defaults
Service C	Lode 0x33(写-服约	务代码 51)和 Cla	ss 0x0f 为固定值,读	写地址区映射			
🗄 MainProgr	ram - MainRoutine* X						· · · · · · · · · · · · · · · · · · ·
0 - 0		Message Configuration         Configuration*       Comm         Message Type:       Cll         Service       Custom         Type:       Service         Service       33         Code:       33         Instance:       0	- Write_MSG_Para unication Tag <sup>D</sup> Generic Class: f (Hex) ibute: 0 (Hex)	Source_Para v 1 v (Bytes) Destination_Para v New Tag	CPXAP_Paramet CPXAP_Paramet _C_o_n_tro_l In_Execute In_Write In_SlotNumber In_Instance In_Instance In_Size IO_Data _M_o_n_i_to_r _MSG_T_a_g_s MSG_Read_Data MSG_Source_Data MSG_Destination	CPX-AP Modules Parameter Read/Write Block ar CPX_AP_A_Parameter 0 ← 0 ← 0 ← 0 ← 0 ← 0 ← 0 ← 0 ← 0 ← 0 ←	-(Sts_Done) -(Sts_Busy) -(Sts_Error)
(End)		⊖ Enable ⊖ Enable W ⊖ Error Err6øde: Error	'aiting ○Start ○Done Extended Error	Done 0 Timed Or			

应用(A)

帮助

取消

确定

## 关联路径

<b>NHNHITL</b>	
Message Con	figuration - Write_MSG_Para X
Configuratio	n* Communication Tag
Path:	Browse
Broad	I Message Path Browser X
Commun	Path: AP_A_EP01
. CIP	AP_A_EP01
	I/O Configuration       If 1769 Bus       If 1769 Bus       If I Trop Structure       If I I Embedded I/O       If I I Embedded Discrete_IO       If I Trop Structure       If I Trop Structure       If I Structure
O Enable	
⊖ Error Err <b>G</b> øde: Error	Extended Error Timed Or
	确定 取消 应用(A) 帮助

#### 5.3 CPXAP\_Parameter 功能块演示

1) **写参数:** 激活 DHCP enable 功能(<mark>该功能慎用,会导致 IP 地址丢失</mark>) 通过网页或者手册查询 ParameterID 和 Instance.

# Modules

ſ	Slot	Module	Code	FWVersion	Serial	Productkey	Identify	Diagnosis
	1	CPX-AP-A-EP-M12	12421	1.4.5	0x00058EED	CX0JKD2CJ46		ОК
		Parameter Object (0x0F) AP Instance Id/instance	rID Instance	Startu	ıp Value			
		1 12000 <mark>:0</mark> [	DHCP enable					
		2 12001:0 I	IP address		192.168.1.5			

#### 设置 In\_ParameterID 为 12000, In\_Instance 为 0, In\_Size 为 1(占用 1 个 Byte)

🚦 Module I	roperties: Local (CPX-AP-A-EP 1.003) 🔋 🗎 MainProgram - MainRoutine* 🗙	•
• •		
	CPX-AP Modules Parameter Read/Write Block	^
	CPXAP_Parameter	
0	CPXAP_Parameter CPX_AP_A_Parameter	
	_C_o_n_t_r_o_l_T_a_g_s 0 (Sts_Done)	
	In_Execute 0+	
	In_Write 1 -(Sts_Busy)-	
	IO Data DataArray	
	MonitorTags 0+	
	O_Error 16#0000 ←	
	_MSG_T_a_g_s 0 <b>4</b>	
	MSG_Read_Data Read_MSG_Para	
	MSG_Write_Data Write_MSG_Para	
	MSG_Source_Data Source_Para	
	MSG_Destination_Data Destination_Para	

۶

#### DHCP enable 数据类型为 Bool, DataArray 中设置如下

▲ DataArray	{}	{}	Decimal	SINT[64]
▲ DataArray[0]	1		Decimal	SINT
DataArray[0].0	1		Decimal	BOOL
DataArray[0].1	0		Decimal	BOOL
DataArray[0].2	0		Decimal	BOOL
DataArray[0].3	0		Decimal	BOOL
DataArray[0].4	0		Decimal	BOOL
DataArray[0].5	0		Decimal	BOOL
DataArray[0].6	0		Decimal	BOOL
DataArray[0].7	0		Decimal	BOOL

#### 写入成功,DHCP enable 功能被激活,固态 IP 丢失,需要重新设定 IP 地址。 🛾 MainProgram - MainRoutine\* 🛛 🗙 白鹭莺 网络 医肠 医 CPX-AP Modules ٨ Parameter Read/Write Block CPXAP\_Parameter CPXAP\_Parameter CPX\_AP\_A\_Parameter ... \_C\_o\_n\_t\_ro\_l\_T\_a\_g\_s 0 0¢ 1¢ 1¢ 1¢ (Sts\_Done) In\_Execute In\_Write In\_SlotNumber (Sts\_Busy)-In\_ParameterID 12000 🗢 (Sts\_Error) In\_Instance 0 🕈 In\_Size IO\_Data 1 🕈 DataArray 0 ← 16#0000 ← \_M\_o\_n\_it\_o\_r\_T\_a\_g\_s O\_Error \_MSG\_T\_a\_g\_s MSG\_Read\_Data MSG\_Source\_Data MSG\_Dartice\_Data 0 🕈 Read\_MSG\_Para [ Write\_MSG\_Para ... Source\_Para MSG\_Destination\_Data Destination\_Para (End) 2) 读参数:负载电压监控设定

#### Modules

Slot	Module	Code	FWVersion	:	Serial	Productkey	Identify	Diagnosis
1	CPX-AP-A-EP-M12	12421	1.4.5	(	0x00058EED	CX0JKD2CJ46		OK
	Parameter Object ParameterID Ins (0x0F) AP Instance Id/Instance Parame	tance ter		Startup	Value			
	9 20022:0 Setup n	nonitoring load supply	y (PL) 24 V DC	yes	Load supply monit	toring active, diagnosis suppre	ssed in case of sv	vitch-off 🗸

1

#### 功能块参数设置及执行,DataArray地址区读取参数值为1。此时该参数设定为出厂设置。

				CPX-AP Modules Parameter Read/Write Block
DataArray DataArray[0] DataArray[0].0 DataArray[0].1 DataArray[0].2 DataArray[0].3 DataArray[0].4 DataArray[0].5 DataArray[0].7 DataArray[0].7 DataArray[1] DataArray[2] DataArray[3]	{}	{} Decimal	SINT[64] SINT BOOL BOOL BOOL BOOL BOOL BOOL SINT SINT	DIUCK         DIUCK         CPXAP Parameter        C_o_n_t_r_o_la_g_S       0*         In_Execute       1*         In_Write       0*         In_SlotNumber       1*         In_Instance       0*         In_Size       1*         IO_Data       DataArray        Mo_n_i_t_o_r_T_a_g_S       0*         O_Error       16#0000*         MSG_Read_Data       Read_MSG_Para         MSG_Source_Data       Source_Para         MSG Destination Data       Destination_Para
<ul> <li>DataArray[4]</li> <li>DataArray[5]</li> </ul>	0	Decimal	SINT	
DataArray[6]	0	Decimal	SINT -	

#### 参数说明

20022	负载电源 PL 电压监控配置 - 0: 负载电压监控未激活
	<ul> <li>- 1: 负载电源监控激活,在关断时抑制</li> <li>诊断(出厂设置)</li> </ul>
	- 2: 负载电压监控激活

# 6 CPXAP\_Diag 功能块(诊断)

该功能块用来读取网络中 AP 模块的详细诊断信息。

CPXAP_Diag		
 CPXAP_Diag	?	
IO_Status_First_Element	?	-(Sts_Enabled)
_C_o_n_t_r_o_l_T_a_g_s	??	
In_Enable	??	-(Sts_Busy)
_M_o_n_it_o_r_T_a_g_s	??	
O_ActiveModules	??	-(Sts_Error)
O_ActiveDiag	??	
O_ModuleLatestDiag	??	
O_LatestDiagCode	??	
IO_GlobalDiagnostic	?	
_MSG_T_a_g_s	??	
MSG_01	?	

#### 6.1 CPXAP\_Diag 功能块变量表

1) Control 变量说明

Tag Name	Data Type	Function Description
In_Enable	IO_Status_First_Element	Enable the diagnostic process
IO_Status_First_Element	SINT[5]	Module diagnostic data input array
2) Monitor 变量说明		
Tag Name	Data Type	Function Description
O_ActiveModules	INT	Total number of active module connected in network

Tag Name	Data Type	Function Description
O_ActiveDiag	INT	Count of currently active diagnosis
O_ModuleLatestDiag	INT	Module which has latest diagnosis
O_LatestDiagCode	INT	Latest diagnosis code
Sts_Enable	Bool	AOI Enabled feedback
Sts_Busy	Bool	Diagnostic active feedback
Sts_Error	Bool	Diagnostic data reading error feedback
stGlobalDiagnostic	UDT_CPX_API_Diagnos_Sts	Diagnostic data structure. Refer Chapter – 5.3.1.
3) UDT_CPX_AP_Diagnos_	Sts Data Type 变量说明	
Tag Name	Data Type	Function Description
dwGlobalDiagState	DINT	Global diagnosis state
wActiveDiag	INT	Count of currently active diagnosis
wModuleLatestDiag	INT	Module which has latest diagnosis
dwLatestDiagCode	INT	Latest diagnosis code
Module_01 to 80	UDT_CPX_API_Module_Sts	Array of Module Diagnosis with module number (=n) as index
4) UDT_CPX_API_Module_	Sts 变量说明	
Tag Name	Data Type	Function Description
Module_No	SINT	Module position number
SubModule_No	SINT	Submodule number
Channel	SINT	Channel number
Present_State	SINT	Module present state
Diagnosis_State	DINT	Module diagnosis state
Diagnosis_Code	DINT	Diagnosis Code
5) CPXAP_Diag AOI MSG 🖗	变量说明	
Tag Name	Data Type	Function Description
MSG_01	MESSAGE	MSG instruction for read number of active modules connected in network

## 6.2 CPXAP\_Diag 功能块组态

### 1) 功能块导入



## 2) 功能块新建变量名

MainProgram	n - MainRoutine* 🗙							-
●	1 abed 20 ob							
1 😣		New Tag		<u>3</u> ×	CPXAP_Diag CPXAP_Diag	Г	New Tag	^
		Name: Description: Usage: Type:	CPXAP_A_Diag 2	Cancel Help	IO_Status_First_Element _C_o_n_t_r_o_T_a_g_s In_Enable _M_o_n_i_t_o_r_T_a_g_s O_ActiveModules O_ActiveDiag O_ModuleLatestDiag O_LatestDiagCode IO_GlobalDiagnostic _MSG_T_a_g_s MSG_01	¥ ت	Cut Instruction Copy Instruction Paste Delete Instruction Add Ladder Element Edit Main Operand Descriptio Save Instruction Defaults Clear Instruction Defaults	Ctrl+X Ctrl+C Ctrl+V Delete Alt+Insert in Ctrl+D
(End)		Alias For: Data Type: Parameter Connection: Scope: External Access:	CPXAP_Diag CPXAP_Diag CPX_AP_A_Test ~ Read/Write ~				Remove Force Go To Instruction Help Remove Parameter Remove All Unknown Parame Open Instruction Logic	Ctrl+G F1



	CPX-AP Modules Error Diagnostic Block	
CPXA CPXA IO_St C o	P_Diag P_Diag CPXAP A Diag [] atus_First_Element AP_A_EP01:I2.Data[0] v -(Sts_Enabled)-	
In_En _M_o O_Ac	Y. Enter Name Filter     V     Show: All Tags       Name     Image: Image	~
O_Ac O_Mc O_La	□         AP_A_EP01:12         _001A:CPX_AP_A_EP_1C0E3404:10           □         AP_A_EP01:12.ConnectionFaulted         BOOL           □         AP_A_EP01:12.Data         SINT[72]	
IO_GI _MSG MSG	AP_A_EP01:12.Data[0]         SINT           AP_A_EP01:12.Data[1]         SINT	~
	Show Controller tags ✓ Show MainProgram tags	
	Show parameters from other program:	

## 4) IO\_GlobalDiagnostic 新建变量名

🗏 MainProgram	n - MainRoutine* 🗙		-
0 🔍 🔍 🕅	La T. C. C. Abra 🎝		
1 😒		New Tag       3 ×       CPX-AP Modules Error Diagnostic Block         Name:       DiagnosticDatal       2       Create         Description:       Cancel       In_Enable       0 +	<sts_enabled)— (Sts_Busy)—</sts_enabled)— 
(End)		Weight of the second	(Sts_Error)
		Access: Clear In Remove	rstruction Defaults re Force

#### 5) MSG\_01 新建变量名

🗏 MainProgram - MainRoutine 🗙		-
● ● ■ 1 1 5 6 8 🔤 🖏 🖇		
1 😧	CPX-AP Modules Error Diagnostic Block         New Tag         Name:       MSG_Read_Diag         Q       Create I         Description:       Cancel	-
	Usage: controller> Usage: controller> Connection  Usage: controller> Connection  Usage: controller> Connection  Usage: controller> Connection  C	Ctrl+X
(End)	Data Type:     MESSAGE       Parameter     Delete Instruction	Ctrl+C Ctrl+V Delete
	Scope:     Image: CPX_AP_A_Test     Add Ladder Element     A       Edemail Access:     Read/Write     Save Instruction Defaults       Style:     Clear Instruction Defaults	lt+Insert n ►

Service Code 0x0e 和 Class 0x10 为固定值;新建变量 Dummy(DINT)关联 Souce Element, Destination Element 关联 CPXAP\_A\_Diag(功能块名).MSG\_01\_Destination\_Value;

Message Configuration - MSG_Rea Configuration* Communication Message Type: CIP Generic	id_Diag Tag	2			
Service Custom Type: Custom Service e (Hex) Class: 10	Source Elemen Source Length (Hex) Destination Element:	t: Dummy V 1 (Bytes) 1_Destination_Value V		Message Path Browser	×
	(riex)	Name         ©         PXAP_A_Diag.O_ActiveModules         ©       CPXAP_A_Diag.O_ActiveDiag         ©       CPXAP_A_Diag.O_ModuleLatestDiag         ©       CPXAP_A_Diag.O_ModuleLatestDiagCode         ©       CPXAP_A_Diag.O_LatestDiagCode         ©       CPXAP_A_Diag.MSG_T_a_g_s         ©       CPXAP_A_Diag.MSG_01_Destination         ©       P DataArray         •       Destination_Para         Show controller tags	Show: All Tags INT INT INT DINT BOOL n_Value V DINT SINT[64] SINT[64]	Path: AP_A_EP01 AP_A_EP01 AP_A_EP01 Provide the second	
○Enable ○Enable Waiting ○ ○Error Extended E Err@øde:	Start O Done	Do Show program tags			57

#### 6.3 功能块演示

功能块使能,手动将 VTUG 阀岛 AP 网线拔掉模拟故障



## DiagnosticData 杏看百详细的故障

e: @CPX_AP_A_Test ~ Show: All Tags					✓ T <sub>→</sub> Diag
ame <u>-</u> E	🖌 Value 🗧 🗧	Force Mask	Style	Data Type	Description
DiagnosticData	{]	} {.	.}	UDT_CPX_API_Diagnos_Sts	
DiagnosticData.dwGlobalDiagState	16#0000_0100	)	Hex	DINT	Global Diagnosis State
DiagnosticData.wActiveDiag	1		Decimal	INT	Count of Current Active Diag
DiagnosticData.wModuleLatestDiag	5	5	Decimal	INT	Module Which has Last Diag
DiagnosticData.dwLatestDiagCode	16#0801_0127	7	Hex	DINT	Latest Diagnosis Code
<ul> <li>DiagnosticData.Module_01</li> </ul>	{	} {.	.}	UDT_CPX_API_Module_Sts	
DiagnosticData.Module_01.Module_No	1		Decimal	SINT	Module Number
DiagnosticData.Module_01.SubModule_No	C	)	Decimal	SINT	Sub-Module Number
DiagnosticData.Module_01.Channel	C	)	Decimal	SINT	Channel
DiagnosticData.Module_01.Present_State	16#01		Hex	SINT	Module Present State
DiagnosticData.Module_01.Diagnosis_State	16#0000_0001		Hex	DINT	Module Diagnosis State
DiagnosticData.Module_01.Diagnosis_Code	16#0000_0000	)	Hex	DINT	Diagnosis Code
DiagnosticData.Module_02	{]	} {.	.}	UDT_CPX_API_Module_Sts	
DiagnosticData.Module_03	{]	} {.	.}	UDT_CPX_API_Module_Sts	
DiagnosticData.Module_04	{]	} {.	.}	UDT_CPX_API_Module_Sts	
<ul> <li>DiagnosticData.Module_05</li> </ul>	{]	} {.	.}	UDT_CPX_API_Module_Sts	
DiagnosticData.Module_05.Module_No	5	5	Decimal	SINT	Module Number
DiagnosticData.Module_05.SubModule_No	C	)	Decimal	SINT	Sub-Module Number
DiagnosticData.Module_05.Channel	C	)	Decimal	SINT	Channel
DiagnosticData.Module_05.Present_State	16#00	)	Hex	SINT	Module Present State
DiagnosticData.Module_05.Diagnosis_State	16#0000_0100	)	Hex	DINT	Module Diagnosis State
DiagnosticData.Module_05.Diagnosis_Code	16#0801_0127	7	Hex	DINT	Diagnosis Code
DiagnosticData.Module_06	{]	} {.	.}	UDT_CPX_API_Module_Sts	
DiagnosticData.Module_07	{]	} {.	.}	UDT_CPX_API_Module_Sts	
DiagnosticData.Module_08	{]	} {.	.}	UDT_CPX_API_Module_Sts	
DiagnosticData.Module_09	{]	} {.	.}	UDT_CPX_API_Module_Sts	
DiagnosticData.Module_10	{	} {.	.}	UDT_CPX_API_Module_Sts	

#### 网页验证

AP-A-EP

AP

EtherNet/IP - Modbus TCP - Configuration -System -

# Terminal



# Modules

Slot	Module	Code	FWVersion	Serial	Productkey	Identify	Diagnosis
1	CPX-AP-A-EP-M12	12421	1.4.5	0x00058EED	CX0JKD2CJ46		ОК
2	CPX-AP-A-8DI-M12-5P	12297	1.100.10	0x0004F33B	DBPKCHTGN1D	$\bigcirc$	ОК
3	CPX-AP-A-16DI-D-M12-5P	12289	1.100.10	0x00051ABA	GH0BK5WSTP2		ОК
4	CPX-AP-A-8DO-M12-5P	12293	1.100.13	0x00056639	C5267RBGDH4	$\bigcirc$	ОК
5	VAEM-L1-S-24-AP	8204	1.100.13	0x000028C5	3S7PN4K4S07	$\bigcirc$	Over the context of t

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#### 6.4 AP 通讯故障复位(SSV 指令)

当 AP 网络通信出现故障后,通信无法自动恢复,需要借助指令将 CPX-AP-A-EP 与 PLC 的通信切断并重连后才会恢复。 上一章节中第 5 个模块 AP 通讯丢失后,在确认 AP 网线恢复连接后,使用 SSV 指令 Mode 模式,将 Bit2 位置 1,禁用 CPX-AP-A-EP 模块与 PLC 的连接,然后再将 Bit2 位置 0 后,重新启用 CPX-AP-A-EP 模块连接。

Mode	INT	GSV	指定 Module 对象的当前模式。					
		SSV	位 含义 0 置位后,如果在控制器处于运行模式时 Module 对象 连接发生故障,将导致生成主要故障。					
			2 如果置位,则在关闭与模块的所有连接后, Module 对象将进入 "已禁止"状态。					

#### BIT2 置位,禁用模块通信



# 7 CPXAP\_IOLink\_Parameter(IO-LINK 参数读写)

该功能块用来读取和写入连接在 CPX-AP-A-4IOL-M12 上的 IO-LINK Device 的参数。



#### 7.1 CPXAP\_IOLink\_Parameter 功能块变量表

Control 变量说明

Tag Name	Data Type	Function Description
In_Execute	BOOL	Execution command for read or write Parameter
In_Write	BOOL	False = Parameter Read Function True = Parameter Write Function
In_IOLink_Master_Count	INT	Enter sum value of CPX-AP-I-4IOL-M12 module connected in network. Refer below note to know about how to find sum value of IO-Link module.
In_PortNumber	INT	Enter the port number of IO-Link device connected.
In_Index	INT	Refer IO-Link device ISDU manual for find parameter index number.
In_SubIndex	INT	Refer IO-Link device ISDU manual for find parameter Sub-Index number.
IO_Data	SINT[64]	Used to updates read parameter value during read function & feed the write parameter values during write function. Data has split into array of SINT.
In_Size	INT	Enter the number of bytes to write.

注: 例如用户在 AP 网络中有 3 个 CPX-AP-I-4IOL-M12 模块,具有不同的插槽位置(即 Slot-2、Slot-5 和 Slot-6)。如果用 户想读取或写入 Slot-6、Port-2 IO-link 设备中的参数。然后用户必须设置 AOI 输入"In\_IOLink\_Master\_Count=3"(表示 第三个 IO-LINK 主站)和"In\_PortNumber=2"(第二个 IO-LINK 口)。

#### Monitor 变量说明

Tag Name	Data Type	Function Description
Sts_Done	BOOL	<b>True</b> = Read or Write execution completed successfully
Sts_Busy	BOOL	<b>True</b> = Read or Write execution in process
Sts_Error	BOOL	<b>True</b> = Read or Write execution completed with error
O_Error	INT	Error number of MSG Instruction

MSG 变量说明

Tag Name	Data Type	Function Description
MSG_Read_Data	MESSAGE	Read data message instruction
MSG_Write_Data	MESSAGE	Write data message instruction
MSG_Source_Element	SINT[64]	Message instruction source element tag
MSG_Destination_Element	SINT[64]	Message instruction destination element tag

## 7.2 CPXAP\_IOLink\_Parameter 组态

#### 1) 导入功能块



New Tag		×	CPXAP_IOLink_Para	<b>F</b>	New Tag	
Name:	CPXAP_IOLink_01_Para	Create 🔻	In_Execute	ж	Cut Instruction	
Description:		Cancel	In_IOLink_Master_Co	ŋ	Copy Instruction	
			In_PortNumber	đ	Paste	(
		Help	In_SubIndex		Delete Instruction	I
	~		IO_Data		Add Ladder Element	Alt+
Usage:	<controller></controller>		_M_o_n_i_t_o_r_T_a	L.	Edit Main Operand Description	n (
_			_MSG_T_a_g_s		Save Instruction Defaults	
Туре:	Base V Connection		MSG_Read_Data MSG_Write_Data	1	Clear Instruction Defaults	
Alias For:	~		MSG_Source_Elemen		Remove Force	
Data Type:	CPXAP_IOLink_Parameter		MSG_Destination_Er		Go To	(
Parameter					Instruction Help	
Connection:		-		<b>C</b> .	Remove Parameter	
Scope:	😳 CPX_AP_A_Test 🗸 🗸			E:	Remove All Unknown Paramete	ers
External	Read/Write ~				Open Instruction Logic	

New Tao		<b>3</b> ×	CPX-AP-I-1 IO-Link Sub-M Parameter Rea Block CPXAP_IOLink_Parameter	IOL odule id/Wri	s ie	
Name: Description	DdataArray1 2	Create V Cancel Help	CPXAP_IOLink_Parameter CPXAP_ C_o_n_t_r_o_I_T_a_g_s In_Execute In_Write In_IOLink_Master_Count In_PortNumber In_Index In_SubIndex In_Size IO_Data	OLini	Col_Para 0 ← -{Sts_Don 0 ← -{Sts_Bus 0 ← -{Sts_Bus 0 ← -{Sts_Erro 1 ← -{Sts_Erro 1 ← -{Sts_Erro 1 ← -{Sts_Erro 1 ← -{Sts_Erro	іе)— у)— иг)—
Usage: Type: Alias For:	<controller>        Base        Connection</controller>		_M_o_n_it_o_r_T_a_g_s O_Error _MSG_T_a_g_s MSG_Read_Data MSG_Write_Data MSG_Source_Element MSG_Source_Element		Cut Instruction Copy Instruction Paste	Ctr Ctr Ctr
Data Type Parameter Connectio Scope:	: SINT[64] n: CPX_AP_A_Test	_	MSG_Desunation_Element		Delete Instruction Add Ladder Element Edit Main Operand Descr Save Instruction Defaults	Del Alt+Ins ription
External Access: Style: G_Source_El	Read/Wite v Decimal v ement 新建标签名				Remove Force	, ,
Compare Compute	Math Move/Logical File/Misc. File/Si	► hift Sequencer E		*	New Tag 1 Cut Instruction	Ctr
			CPX-AP-I-4IOL IO-Link Sub-Mod	6	Paste Delete Instruction Add Ladder Element	Ctri
New Teg		-0	Parameter Read/\ Block		Edit Main Operand Descri	Alt+In:
Name:	Source Tag 1 2	Create V	CPXAP_IOLink_Parameter CPXAP_IOLink_Parameter CPXAP_IOL _C_o_n_tr_o_I_T_a_g_s In Execute	i	Save Instruction Defaults Clear Instruction Defaults	Alt+In:
Name:	SourceTag1 2	Create 🖵 Cancel Help	CPXAP_IOLink_Parameter CPXAP_IOLink_Parameter CPXAP_IOL _C_o_n_t_r_o_l_T_a_g_s In_Execute In_Write In_IOLink_Master_Count In_PortNumber In_Index In_SubIndex In_Size		Save Instruction Defaults Clear Instruction Defaults Remove Force Go To Instruction Help Remove Parameter	Alt+In: ption Ctrl
Name: Description: Usage: Type:	SourceTag1 2	Create V Cancel	CPXAP_IOLink_Parameter CPXAP_IOLink_Parameter CPXAP_IOL _C_o_n_t_r_o_I_T_a_g_s In_Execute In_Write In_IOLink_Master_Count In_PortNumber In_Index In_SubIndex In_SubIndex In_Size IO_Data _M_o_n_i_t_o_r_T_a_g_s O_Error _MSG_T_a_g_s MSG_Read_Data		Save Instruction Defaults Clear Instruction Defaults Remove Force Go To Instruction Help Remove Parameter Remove All Unknown Para Open Instruction Logic Open Instruction Definitio	Alt+In: ption Ctrl ameters
Name: Description: Usage: Type: Alias For: Data Type:	SourceTag1 2	Create V Cancel Help	CPXAP_IOLink_Parameter CPXAP_IOLink_Parameter CPXAP_IOL _C_o_n_t_r_o_I_T_a_g_s In_Execute In_Write In_IOLink_Master_Count In_PortNumber In_Index In_SubIndex In_SubIndex In_Size IO_Data _M_o_n_i_t_o_r_T_a_g_s O_Error _MSG_T_a_g_s MSG_Read_Data MSG_Write_Data MSG_Destination_Element		Save Instruction Defaults Clear Instruction Defaults Remove Force Go To Instruction Help Remove Parameter Remove All Unknown Para Open Instruction Logic Open Instruction Definitio Properties	Alt+In: ption Ctrl ameters



Access:

#### 7) Read\_MSG1组态

	nProgram - N	/lainRoutine* ×				
् <b>स</b> ्ट	<b>.</b>   141   121		<b>2</b> ab ▼ (0b)			
	l I					
2	Message Co	onfiguration - Rea	d_MSG1	×	Message Configuration - Read_MSG1	×
	Configurat	ion* Communica	tion T 3		Configuration* Communication Tag	
	Path:			Browse	Message Type: CIP Generic	~
		Message Pat	h Browser	×	Service out-	
	O Broad				Type:	Source Length: 1 (Bytes)
	Commun	AP A EP01			Service 4b (Hex) Class: 10b (Hex	Destination DestinationTag1
			iration	(Octal)	Instance: 0 Attribute: 0 (Hex	Element: New Tag
	Sourc	i - ∰ 1769 E		(00(0))		
	Conr		1/65-L24ER-QBTBCFA_AF_A_Test bedded I/O	inection	<b>U</b>	2
		Ex	[1] Embedded Discrete_IO pansion I/O			-
		Ethem	et 69-124ER-OB1BCPX AP A Test			
(End		CF	X-AP-A-EP AP_A_EP01	-	-	-
	OEnable		OK Cancel He		○Enable ○Enable Waiting ○Start	ODone Done 0
	OError	Exter	ded Error 🗌 Tim	ed Or	O Error Extended Error	Timed Or
	Err <b>G</b> øde: Error				Err@øde:	
	2.1.01	ā	触定 取消 应用(A)	帮助	确定	取消 应用(A) 帮助
0) M		a Data 站石	+ 与效力			
6) IVI	SG_WIII	e_Data 利迫	<b>乏</b> 你 金 石		/	NewTag
nter Inj	put/Output	Compare Compu	te/Math Move/Logical File/Misc. F	ile/Shift Sequencer	E	
						Cut Instruction Ctrl+X
						Paste Ctrl+V
						Delete Instruction Delete
					CPX-AP-I-4IO	L Add Ladder Element Alt+Insert
					IO-Link Sub-Mod Parameter Read/	W Edit Main Operand Description
					Block	Save Instruction Defaults
		New Tag		<b>3</b> × _	CPXAP_IOLINK_Parameter CPXAP_IO	Li Clear Instruction Defaults
		Name:	Write_MSG1 2	Create 🔻	_C_o_n_t_r_o_I_T_a_g_s In_Execute	Remove Force
		Description:		Canaal	In_Write	Go To Ctrl+G
		Decomption.	^	Cancer	In_PortNumber	Instruction Help F1
				Help	In_Index In_SubIndex	Remove Parameter
			~		In_Size IO Data	E Remove All Unknown Parameters
		Usage:	<controller></controller>		_M_o_n_i_t_o_r_T_a_g_s	Open Instruction Logic
		Tuno:	Pres		_MSG_T_a_g_s	Open Instruction Definition
		Type:	Dase V Connection		MSG_Read_Data MSG_Write_Data	Properties
		Alias For:	~		MSG_Source_Element	SourceTag1
		Data Type:	MESSAGE			oundaonragi

Parameter Connection:

Scope:

CPX\_AP\_A\_Test

 $\sim$ 

 $\sim$ 

#### 9) Write\_MSG1 组态

📙 MainProgram - MainRoutine* 🗙	
👰 🔍 🐂 🛗 🖓 🕞 acc 🐉 🛶 🔹	
2 Message Configuration - Write_MSG1 X	Message Configuration - Write_MSG1
Path:     Browse	Message Type: CIP Generic ~
Broad         Path:         AP_A_EP01           © CIP         AP_A_EP01           © CIP         Generation           © CIP         I/Configuration           © CiP         I/Configuration           I/Configuration         I/Configuration	Service Custom Type: Source Element: SourceTag1 Source Lement: SourceTag1 New Tag
Conf Conf	2
O Enable	⊖Enable ⊖Enable Waiting ⊖Start ⊖Done Done 0
○ Error Extended Error □ Timed Or ErrGøde: Error	O Error Extended Error ⊡Timed Oi♥ Erropde: Error
确定 取消 应用(A) 帮助	确定 取消 应用(A) 帮助

#### 7.3 CPXAP\_IOLink\_Parameter 演示

1) 读参数: SPAN (Index 0x0118 / Length 2 Byte / UINT)

输入 Index 号,功能块执行读操作后,在 DataArray 数组中可查看读取的数值为 1。

					CF IO-Lir	PX-AP-I-4IOL nk Sub-Modules	
					Paran	neter Read/Write	
					ODVAD JOLisk Deservator	Block	1
20000	Scope: DCPX_AP_A_Te	st 🗸 Show: All	Tags	_	CPXAP_IOLink_Parameter	CPXAP IOLink 01 Para	
FESTO		and Malace	+ F M-	L <b>A</b>	<u>ControlTag</u> s	0 🕈	-(Sts_Done)
	Name		<ul> <li>Force Mas</li> </ul>	K 🗧	In_Execute	0 🕈	Colo Dunià
	▲ DataArray1		{}	{}	In_Write	04	CSts_Busy}
KP <sub>0</sub>	DataArray1[0]		1		In PortNumber	1.	-(Sts Error)-
	DataArray1[1]		0	2	In_Index	16#0118 🕈	1
	DataArrav1[2]		0		In_SubIndex	16#0000 🗢	-
	DataArrav1[3]		0		IO_Data	DataArray1	
1000	N Data Association		-		_M_o_n_i_t_o_r_T_a_g_s	0 🕈	
	V DataArray [4]		0		O_Error	16#0000	
	DataArray1[5]		0		MSG Read Data	Read MSG1	
	DataArray1[6]		0		MSG_Write_Data	Write_MSG1	
	DataArray1[7]		0		MSG_Source_Element	SourceTag1	
					MSG_Destination_Element	Destination (ag1	
- (m)		(1.5.1.14)					
	o, allways blue	(default)					
	1, red if $Out = 0$	0					
- 110mt @ ( )	2. red if $Out = 1$	1					
	2,10011000	-					

LED 红灯显示,与 red if out=0 状态一致。

#### 2) 写参数: SPAN (Index 0x0118/ Length 2 Byte / UINT) 输入 Index 号,在 Data Array[0]中写入 0,功能块执行写操作后,LED 显示蓝色。



## 8 Webserver 功能

#### 8.1 网页浏览

在浏览器中输入模块 IP 地址,可在线查看模块的详细信息。Slot 号即模块在 AP 网络中的编号

AP T	erminal - Al	P-A-EP	×	+						
С	ଜ	▲	192.16	6 <b>8.1.5</b> /c	gi-bin/	ap-terminal				
			AP-A	-EP	AP	EtherNet/IP -	Modbus TCP 🗸	Configuration -	System -	

Terminal



## Modules

Slot	Module	Code	FWVersion	Serial	Productkey
1	CPX-AP-A-EP-M12	12421	1.4.5	0x00058EED	CX0JKD2CJ46
2	CPX-AP-A-8DI-M12-5P	12297	1.100.10	0x0004F33B	DBPKCHTGN1D
3	CPX-AP-A-16DI-D-M12-5P	12289	1.100.10	0x00051ABA	GH0BK5WSTP2
4	CPX-AP-A-4IOL-M12	12300	1.5.12	0x0006F1AB	MST7CF5DFJS
5	VAEM-L1-S-24-AP	8204	1.100.13	0x000028C5	3S7PN4K4S07

#### 8.2 账号登入



#### 8.3 IP 修改

手动修改 IP 地址,提示写入成功。

	AP-A-EP	AP EtherNet/I	P - Modbus TCF	P - Co	nfiguration + Sys	tem +			FEST	ГО
ameter write success										
	wodule	5								1
	Slot Module			Code	FWVersion	Serial	Productkey	Identify	Diagnosis	
	1 CPX-AF	-A-EP-M12		12421	1.4.5	0x00058EED	CX0JKD2CJ46		OK	
	Param	eter								
	Object (0x0F) Instan	AP ce Id/Instance	Parameter		Star	rtup Value				
	Object (0x0F) Instan	AP Id/Instance	Parameter DHCP enable		Star	rtup Value				
	Object (0x0F) Instan 1 2	AP Id/Instance 12000:0 12001:0	Parameter DHCP enable IP address		Sta	Ttup Value				
	Object (0x0F) Instan 1 2 3	AP Id/Instance 12000:0 12001:0 12002:0	Parameter DHCP enable IP address Subnet mask		Sta	Value           192.168.1.15           255.255.255.0	]			
	CDject (0x0F) Instan 1 2 3 4	AP Id/Instance 12000:0 12001:0 12002:0 12003:0	Parameter DHCP enable IP address Subnet mask Gateway address		Sta	Value           192.168.1.15 I           255.255.255.0           192.168.1.1				
	Dijec (0x0F) Instan 1 2 3 4 5	AP Id/Instance           12000:0           12001:0           12002:0           12003:0           12004:0	Parameter DHCP enable IP address Subnet mask Gateway address Active IP address		Star	Value           Image: Description of the second se	]			

#### 8.4 IO-Link port 激活

# 激活模块 4 的 Port0 端口

4	CPX-AP-A-4	OL-M12	1	2300	1.5.12	0x00	06F1AB	MST7CF5DFJS		OK	
	Parameter Object (0x0F) Instance	AP Id/Instance	Parameter			Startup	Value				
	12	20022:0	Setup monitoring I	oad supply	(PL) 24 V DC	yes	Load supply m	onitoring active, diagnosis	s suppressed in case	of switch-off	~
	13	20049:0	Nominal Cycle Tin	ne (Port 0)		yes	as fast as poss	sible			~
	14	20049:1	Nominal Cycle Tin	ne (Port 1)		yes	as fast as poss	sible			~
	15	20049:2	Nominal Cycle Tim	ne (Port 2)		yes	as fast as poss	sible			~
	16	20049:3	Nominal Cycle Tim	ne (Port 3)		yes	as fast as poss	sible			~
	17	20050:0	Enable diagnosis	of IO-Link d	evice lost (Port 0)	yes					
	18	20050:1	Enable diagnosis	of IO-Link d	evice lost (Port 1)	yes					
	19	20050:2	Enable diagnosis	of IO-Link d	evice lost (Port 2)	yes					
	20	20050:3	Enable diagnosis	of IO-Link d	evice lost (Port 3)	yes					
	21	20071:0	Port Mode (Port 0)	)		yes	IOL_AUTOSTA	ART			~
	22	20071:1	Port Mode (Port 1)	)		yes	DEACTIVATED	)			~
	23	20071:2	Port Mode (Port 2)	)		yes	DEACTIVATED	)			~
	24	20071:3	Port Mode (Port 3)	)		yes	DEACTIVATED	)			~

#### 8.5 过程数据查看

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192.168.1.5/	cgi-bin/	ap-terminal#				$\forall j$	Q		ø	¢
AP-A-EP	AP	EtherNet/IP -	Modbus TCP -	Configuration -	System <del>-</del>			FE	этс	נ

# Terminal



# Modules

Slot	Module	Code	FWVersion	Process Data In (hex)	Process Data Out (hex)	Iden	Show
1	CPX-AP-A-EP-M12	12421	1.4.5			Q	Process Data 🗸
2	CPX-AP-A-8DI-M12-5P	12297	1.100.10	00		Ο	Supply Voltages Cable Information
3	CPX-AP-A-16DI-D-M12-5P	12289	1.100.10	00 00		0	OK
4	CPX-AP-A-4IOL-M12	12300	1.5.12	7e e0 00 00 00 00 00 00 00 00 00 00 00 00 00	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\bigcirc$	OK
5	VAEM-L1-S-24-AP	8204	1.100.13		00 00 00 00 00 00		OK

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#### 8.6 供电电压监控

× +										
192.168.1.5/0	gi-bin/	ap-terminal#				$\forall_{\not P}$	Q	☆	U	¢
AP-A-EP	AP	EtherNet/IP -	Modbus TCP -	Configuration -	System +			FE	<b>ST</b> (	כ

# Terminal



# Modules

Slot	Module	Code	FWVersion	U Sen/El.	U Load	Identify	Show
1	CPX-AP-A-EP-M12	12421	1.4.5	23.627 V	24 V		Process Data
2	CPX-AP-A-8DI-M12-5P	12297	1.100.10	24.123 V	0 V	$\bigcirc$	Supply Voltages  Cable Information
3	CPX-AP-A-16DI-D-M12-5P	12289	1.100.10	24.189 V	0 V		OK
4	CPX-AP-A-4IOL-M12	12300	1.5.12	24.189 V	24.072 V	$\bigcirc$	ОК
5	VAEM-L1-S-24-AP	8204	1.100.13	24.255 V	24.166 V		ОК

## 8.7 AP 网线长度查看

192.168.1.5/c	gi-bin/	ap-terminal#				A»	Q	$\overleftrightarrow$	۵	Ç
AP-A-EP	AP	EtherNet/IP -	Modbus TCP -	Configuration -	System -			FE	STO	כ

# Terminal

•		==	PESTO	
•••	•••	•••	•	

# Modules

Slot	Module	Code	FWVersion	Cable Length	Identify	Show
1	CPX-AP-A-EP-M12	12421	1.4.5			Process Data
2	CPX-AP-A-8DI-M12-5P	12297	1.100.10		$\bigcirc$	Supply Voltages
3	CPX-AP-A-16DI-D-M12-5P	12289	1.100.10		$\bigcirc$	OK
4	CPX-AP-A-4IOL-M12	12300	1.5.12		$\bigcirc$	ОК
5	VAEM-L1-S-24-AP	8204	1.100.13	0.4 m		ОК

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# 附录 A -LED 诊断

模块诊断 [MD]		
LED(红色, 绿色)	含义	补救方法
0	逻辑电源 PS 不可用。	检查逻辑电源 PS 的连接。
熄灭		
→ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	未激活模块诊断	-
→ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	模块诊断激活 严重程度"信息" 例如关断负载电源 PL	-
频率闪烁		
红灯以 0.5 Hz 频率闪烁	模块诊断激活 严重程度"警告" 例如参数设置错误	执行相应的补救措施, 例如检查参数设置。
	模块诊断激活 严重程度"错误" 例如逻辑电源 PS 欠压	执行相应的补救措施, 例如检查逻辑电源 PS。
	模块启动尚未完成。 系统通信尚未初始化。	-
	模块识别(服务功能)	-
频率闪烁		
系统诊断 [SD]		
LED(红色,绿 色)	含义	补救方法
白灰	逻辑电源 PS 不可用。	检查逻辑电源 PS 的连接。
绿灯亮	未激活系统诊断	-
绿灯以 0.5 Hz 频率闪烁	系统诊断激活 严重程度"信息" 例如模块上的负载电源 PL 不可用或模 块上的固件更新已激活。	-
红灯以 0.5 Hz 频率闪烁	系统诊断激活 严重程度"警告" 例如模块参数设置错误。	
	系统诊断激活 严重程度"错误" 例如模块上的传感器电源短路。	
绿灯以 2 Hz 频率快速闪烁	模块识别(服务功能)	-

负载电源 [PL]		
LED(红色,绿 色)	含义	补救方法
绿灯亮	负载电源 PL 可用。	-
绿灯以 0.5 Hz 频率闪烁	负载电源 PL 不可用。	检查负载电源 PL。
红灯以 0.5 Hz 频率闪烁	负载电源 PL 超出公差范围。	检查负载电源 PL。
维护 [MT]		
LED 指示灯 (黄色)	含义	补救方法
	不需要维护。	-
高起	CPX-AP 自动化系统中至少有一个模块 需要维护。	执行必要的补救措施 → 相关模块的指 南。
模块状态 [MS]		
<b>模块状态 [MS]</b> LED 指示灯 (绿色/红 色)	含义	补救方法
<b>機块状态 [Jus]</b> LED 指示灯 (绿色/红 色)	含义 正常运行状态	补救方法 -
<b>機块状态 [JIS]</b> LED 指示灯 (绿色/红 色) ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	含义 正常运行状态 CPX-AP 自动化系统配置不完整或不正 确	补救方法 - 完成或纠正 CPX-AP 自动化系统的配 置。
<b>機块状态 [JIS]</b> LED 指示灯 (绿色/红 色)	含义 正常运行状态 CPX-AP 自动化系统配置不完整或不正 确 不可排除的故障	<ul> <li>补救方法</li> <li>-</li> <li>完成或纠正 CPX-AP 自动化系统的配置。</li> <li>请与 Festo 的维修部门联系</li> <li>→ www.festo.com。</li> </ul>
機築状态[US] LED 指示灯 (绿色/红 色) 绿灯亮 绿灯亮 近灯亮 红灯亮 红灯亮	含义 正常运行状态 CPX-AP 自动化系统配置不完整或不正 确 不可排除的故障 可排除的故障	<ul> <li>补救方法</li> <li>-</li> <li>完成或纠正 CPX-AP 自动化系统的配置。</li> <li>请与 Festo 的维修部门联系</li> <li>→ www.festo.com。</li> <li>检查 CPX-AP 自动化系统的配置。</li> </ul>
機块状态 [JIS] LED 指示灯 (绿色/红 色) ↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓↓	含义 正常运行状态 CPX-AP 自动化系统配置不完整或不正 确 不可排除的故障 可排除的故障	<ul> <li>补救方法</li> <li>-</li> <li>完成或纠正 CPX-AP 自动化系统的配置。</li> <li>请与 Festo 的维修部门联系</li> <li>→ www.festo.com。</li> <li>检查 CPX-AP 自动化系统的配置。</li> <li>-</li> </ul>

网络状态 [NS]		
LED(绿色、 红色、 <mark>橙</mark> 色)	含义	补救方法
绿灯亮	CPX-AP 自动化系统在线并具备网络连 接(正常运行状态)。	-
绿灯闪烁	CPX-AP 自动化系统在线并获得一个 IP 地址,但无已配置的网络连接。	检查 CPX-AP 自动化系统的配置,可能 未将 CPX-AP 自动化系统系统分配给主 站设备/扫描仪。
紅炉亮	通信失败。 设定了已在网络中使用的不允许的 IP 地址。	更正 IP 地址。
紅灯闪烁	一个或多个"I/O-Connections"处于 "超时状态"。	检查与主站设备/扫描仪的物理连接。
红灯/绿灯交 替闪烁	CPX-AP 自动化系统正在自检。	-
) 熄灭	CPX-AP 自动化系统离线。 未分配 IP 地址或未从 DHCP 服务器获 取 IP 地址。	检查网络连接。 检查 IP 地址设定的设置。
连接状态 [TP1]	\. [TP2]	
LED 指示灯 (绿色)	含义	补救方法
熄灭	无网络连接。	检查网络连接。
绿灯闪烁	网络连接正常。 正在进行数据传输。	-
绿灯亮	网络连接正常。 无数据传输。	-

# 附录 B-Assembly 对象说明

实例	内容	数据类型	
100	Exact Input data size	SINT	
101	Exact Output data size	SINT	
102	Exact Input data size	INT	<i>准确</i> /
103	Exact Output data size	INT	任朔下戊
104	Exact Input data size	DINT	
105	Exact Output data size	DINT	
110	Fixed Input data size (16 bytes)	SINT	
111	Fixed Output data size (16 bytes)	SINT	
112	Fixed Input data size (32 bytes)	SINT	
113	Fixed Output data size (32 bytes)	SINT	
114	Fixed Input data size (64 bytes)	SINT	
115	Fixed Output data size (64 bytes)	SINT	
120	Fixed Input data size (64 bytes)	DINT	固定长度

实例	内容	数据类型	
121	Fixed Output data size (64 bytes)	DINT	
122	Fixed Input data size (128 bytes)	DINT	
123	Fixed Output data size (128 bytes)	DINT	
124	Fixed Input data size (488 bytes)	DINT	
125	Fixed Output data size (496 bytes)	DINT	
129	Status & Diag - Global + Module	STRUCT	全局诊断+模块诊断
130	Status & Diag - Global Only	STRUCT	全局诊断
131	Global Status & Diag + Exact Input data size	SINT	全局诊断+准确长度
132	Global Status & Diag + Exact Input data size	INT	
133	Global Status & Diag + Exact Input data size	DINT	
134	Global Status & Diag + Fixed Input data size (16 bytes)	SINT	
135	Global Status & Diag + Fixed Input data size (32 bytes)	SINT	全局诊断+固定长度
136	Global Status & Diag + Fixed Input data size (64 bytes)	SINT	
137	Global Status & Diag + Fixed Input data size (64 bytes)	DINT	
138	Global Status & Diag + Fixed Input data size (128 bytes)	DINT	
139	Global Status & Diag + Fixed Input data size (488 bytes)	DINT	
140	Configuration assembly	STRUCT	
254	Heartbeat	-	
255	ListenOnly	-	

#### 1) 数据类型 DataType

使用何种数据类型视系统而定。数字量模块常用 SINT,模拟量模块常用 INT,密集型数据模块(比如 IO-Link)常用 DINT。值得注意的是,每个模块地址长度是定义的数据类型的整数倍。比如数据类型为 DINT,一个模块即使只有 3 个 bit 过程数据,地址空间依然要占用一个 DINT。

#### 2) 精确长度实例 Exact Input/Output

配置必要的数据长度。各个模块的数据紧凑排布,占用最小的地址空间。

#### 3) 固定长度实例 Fixed Input/Output

分配固定的数据长度,除了必要的数据长度之外,留有部分空余空间。优势在于添加模块 IO 时无须更改 PLC 组态,也不影响后续模块的地址。缺点在于始终占用较大的地址空间。

#### 4) 全局诊断

CPX-AP-A-EP 节点全局诊断,包括全局状态、当前故障总数、最新故障代码及其发生的模块号,占用 12Bytes 地址空间。

#### 5) 模块诊断

每个模块(包括 CPX-AP-A-EP-M12 总线节点)的诊断数据,包括模块号、子模块号、通道号、当前状态、模块诊断状态和故障代码。每个模块诊断占用 12byte 地址空间。