SCE 培训资料

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博途 **(TIA Portal)** 模块 032-420 使用 SIMATIC S7-1500 通过网络进行诊断



57-1500

THA-BHAN

本培训资料适用于以下 SCE 教育培训产品

SIMATIC 控制系统

- SIMATIC ET 200SP Open Controller CPU 1515SP PC F 和 HMI RT SW 订货号: 6ES7677-2FA41-4AB1
- SIMATIC ET 200SP Distributed Controller CPU 1512SP F-1 PN Safety 订货号: 6ES7512-1SK00-4AB2
- SIMATIC CPU 1516F PN/DP Safety 订货号: 6ES7516-3FN00-4AB2
- SIMATIC S7 CPU 1516-3 PN/DP 订货号: 6ES7516-3AN00-4AB3
- SIMATIC CPU 1512C PN (带软件和 PM 1507) 订货号: 6ES7512-1CK00-4AB1
- SIMATIC CPU 1512C PN(带软件、PM 1507和 CP 1542-5 (PROFIBUS)) 订货号: 6ES7512-1CK00-4AB2
- SIMATIC CPU 1512C PN(帶软件) 订货号: 6ES7512-1CK00-4AB6
- SIMATIC CPU 1512C PN (带软件和 CP 1542-5 (PROFIBUS))
 订货号: 6ES7512-1CK00-4AB7

SIMATIC STEP 7 培训软件

- SIMATIC STEP 7 Professional V14 SP1 单独许可证 订货号: 6ES7822-1AA04-4YA5
- SIMATIC STEP 7 Professional V14 SP1 6 套课堂许可证包 订货号: 6ES7822-1BA04-4YA5
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WEB 服务器和高级诊断

1 目标

在本课程单元中,读者应当了解有助于错误搜索的更多工具。

还将向您介绍如何在博途 (TIA PORTAL) 中生成有关硬件错误及系统错误的自动报警文本。这些报警不只显示在博途 (TIA PORTAL) 中,还可以显示在 CPU 的显示屏中或通过 CPU 1516F-3 PN/DP 的 Web 服务器显示出来。同样也可以显示在人机界面系统的报警窗口中。

在接下来的课程单元中将介绍扩展的诊断功能。您可以在 SIMATIC S7-1500 上,使用课程单元 "SCE_ZH_032-410_Basics_Diagnostics"中的 TIA 项目来测试这些诊断功能。

可以使用第3章所述的 SIMATIC S7 控制器。

2 前提条件

本章以 SIMATIC S7 CPU1516F-3 PN/DP 的硬件组态为基础进行讲解,当然,这些诊断功能也可以在其他硬件组态条件下实现。为完成本章的学习,您可能需要重新温习如下项目:

SCE_ZH_032-410_Basics_Diagnostics_2_R1503.zap13

3 所需的硬件和软件

- 工程组态站:硬件和操作系统是工程组态站的前提
 (更多信息参见博途 (TIA Portal) 安装 DVD 里的自述文件)
- 2 博途 (TIA Portal) 中的 SIMATIC STEP 7 Professional 软件 V13 及以上版本
- 2 控制器 SIMATIC S7-1500/S7-1200/S7-300,例如 CPU 1516F-3 PN/DP –
 固件 V1.6 及以上版本,带存储卡和 16DI/16DO 以及 2AI/1AO
 提示:数字输入端应布线至开关面板。
- 4 工程组态站和控制器之间的以太网连接



4 理论

4.1 系统诊断: 自动创建错误报警

在博途 (TIA PORTAL) 中,设备和模块的诊断被概括在系统诊断这一概念之中。监控功能从硬件组态中自动得出。

所有 SIMATIC 产品均内置有诊断功能,可借此识别并排除故障。各个组件自动报告运行中可能 出现的故障,并提供额外的详细信息。通过全机组诊断可将计划外的停机时间降低至最短。

在运行的机组中,将由系统监控以下状态:

- 设备失灵
- -拔出/插入错误
- 模块错误
- 外围设备访问错误
- -通道错误
- 参数化错误
- 外部辅助电压中断

4.2 通过 Web 服务器进行诊断

Web 服务器的作用在于,让授权用户可以通过网络监控并管理 CPU。

由此即可实现远程评估和诊断。这样的话,便无需博途 (TIA PORTAL),只需要一个 Web 浏览器就可以进行监控及评估了。

CPU 交付时,Web 服务器处于被禁用状态。只有在加载了一个 Web 服务器激活的项目后,才 能通过 Web 浏览器进行访问。

Web 服务器可提供以下安全功能:

- 通过安全传输协议"https"进行访问
- 通过用户列表确定用户权限
- 限制访问特定接口

访问 CPU 的 HTML 页面时需使用 Web 浏览器。

下列 Web 浏览器已通过测试,可以与 CPU 进行通信:

- Internet Explorer (版本 8)
- Mozilla Firefox(版本 21)
- Mobile Safari (iOS5)

						12 English 💌
Name Log in	Alarms entries 1-5	50 🔻				🗑 🎜 <u>off</u> 昌
	AlarmNr.	Date	Time	Alarm text	State	Acknowledgement
► Start page	34	01/01/2012	12:25:02.177 am	Error: Supply voltage missing on Q0 CPU1516F / AQ 4xU/I ST_1.	incoming	,
▶ Diagnostics						
▶ Diagnostic Buffer						
Module information						
▶ Alarms						
► Communication						
► Topology						
▶ Tag status						
Watch tables	Details on a	larm number: 3	34			
	Short name	: AQ 4xU/I ST O	rder number: 6ES7 5	532-5HD00-0AB0		
▶ Customer pages						
	Incoming ev	/ent				

图 1: CPU 1516F-3 PN/DP 的 Web 服务器,带系统诊断报警文本

提示: 请注意, 应采取不同的技术手段, 保护 CPU 不被误操作, 避免对 CPU 进行未经授权的 访问(例如网络访问限制、使用防火墙)。

4.3 利用内置显示屏进行诊断

CPU S7-1500 配有一块包含显示屏和操作键的前盖板。在显示屏上,可以在不同的菜单中显示 出控制或者状态信息,或者进行多种不同的设置。通过控制键实现菜单之间的切换。

CPU 的显示屏具有如下功能:

- 可以选择六种不同的显示语言。
- -明文显示诊断报警。
- 可以在现场更改接口设置
- 可以通过博途 (TIA Portal) 为显示屏操作设置密码保护。

RUN		A
💎 AI	arms	
Incoming		
00:32:01 A	M	01/21/2012
Fault: Hare	dware com	ponent r
ESC	1/1	ок

图 2: CPU 1516F-3 PN/DP 的显示屏,带系统诊断报警文本

5 任务要求

在本章中应展示并测试以下诊断功能:

- 配置 CPU 1516F-3 PN/DP 的 Web 服务器
- 配置 CPU 1516F-3 PN/DP 的显示屏
- 利用系统诊断创建有关硬件错误及系统错误的报警
- 通过 CPU 1516F-3 PN/DP 的 Web 服务器显示报警
- 通过 CPU 1516F-3 PN/DP 的内置显示屏显示报警

6 规划

例如要对一个已完成的项目上执行诊断功能。为此在博途 (TIA Portal) 中需打开一个已加载到控制器上的项目。在我们的例子中,启动博途 (TIA Portal) 之后需取回一个已创建的项目并将其加载到所属的控制器中。

之后可在博途 (TIA PORTAL) 中执行对 Web 服务器、显示屏和系统诊断的配置。为测试系统诊断, 需将所监控的模拟输出模块与其电源断开。

7 结构化的逐步式引导指南

以下是帮助您实现规划的引导指南。如果您已经充分了解,只需要使用带标号的步骤标题作为 参考。否则,则需要遵从引导指南以下步骤中的详细说明。

7.1 取回一个现有项目

0

→ 在开始通过 Web 服务器进行诊断前,需要使用"SCE_ZH_032-410 Basics_Diagnostics"课 程单元中的一个项目,(例如 SCE_ZH_032-410_Basics_Diagnostics_2_R1503.zap13)

为了取回现有项目,必须在项目视图中通过 → 项目 → (Project) 搜索相应的压缩文件包。 然后用"打开"(Open)确认您的选择。

VA	Sieme	ens					
Pro	oject	Edit	View	Insert	Online	Option	ıs
1	New						<u>9</u> !
	Open.					Ctrl+O	Π
	Migra	te proj	ect				
	Close					Ctrl+W	
	Save					Ctrl+S	1
	Save	a s			Ctrl-	-Shift+S	
	Delete	e proje	ct			Ctrl+E	
	Archiv	/e					
	Retrie	ve					
-	Card F	Reader	/USB me	emory		•	
17	Memo	ory card	l file			•	
	Upgra	de					
	D:\Aut	omatio	on\\03	2_200_FE	B-Program	ming	-
	D:\Aut	omatio	onl\03	2_100_F	C-Program	ming	
	D:\Aut	omatio	on\SKG_	Bregal1\	SKG_Breg	al1	
	D:\Aut	omatio	on\Proje	kt1\Proje	kt1		
	Exit						
							- Contract (1997)

(→ 项目 → 取回 → 选择一个 .zap 文件包 → 打开)

→ 接下来可以选择用于保存取回项目的目标目录。用"确定"(OK) 按钮确认您的选择。
 (→目标目录 → 确定)

7.2 组态 Web 服务器

→ 为组态 Web 服务器,需打开 CPU 1516F-3 PN/DP 的设备组态 (Device configuration)。(
 → CPU_1516F [CPU 1516F-3 PNDP] → 设备组态)



→ 选中 CPU, 并在属性 (Properties) 中选择 Web 服务器 (Webserver) 菜单项。

(→ CPU_1516F → 属性 → Web 服务器)

M Siemens - G:\Automation\032_200_FB-Program	ming\032_200_FB-Programming				_ • >
Project Edit View Insert Online Options To	ools Window Help			Totally Integrated Automat	ion
📑 📑 🔚 Save project 🚊 🐰 🗐 🗎 🗙 🍤 🛨	(* 🗄 🗓 🌆 🖳 🐺 💋 Go online	e 🖉 Gooffline h 🖪 🖪 🛣 🚽 🛄		PO	RTAL
Project tree 🛛 🕄 🗸	032_200_FB-Programming CPU	1516F [CPU 1516F-3 PN/DP]		- 7	≣× (
Devices			Topology view	A Network view	ew 🗏
	34 CRU15165				
	Ph 1000 Linear	and a stand and a stand a			vare catalog
Contine & disgnostics Y = 0 fine & disgnostics Y = 0 fine a disgnostics Y = 0 fine disgnostics Y = 0 fine a disgnostics Y = 0 fine disgnostics Y					vice data
Watch and force tables					v 🗄
Conline backups	<		> 75	»	
 Image and the second sec	CPU1516F [CPU 1516F-3 PN/DP]		@ Properties	1 Info (1) 2 Diagnostics	I VISKS
Device proxy data	Connect IO to as Suntan	anatasia Tauta			
PLC alarms	Communication load System and clock me	Veb server			
Local modules Gommon data En Documentation settings	System diagnostics Web server	ieneral			artes
Languages & resources	Automatic undate	Activate web server on this module			
Gonline access Gard Reader/USB memory	User management	Permit access only with HTTPS			
	User-defined Web p Av Entry page	utomatic update			
> Details view	Overview of interfaces	Enable automatic update			~
Portal view Overview	CPU1516F			Project 032_200_FB-Programming ope	

→ 现在勾选"在该模块上激活 Web 服务器"(Activate web server on this module),并确认安全 提示。

CPU1516F [CPU	1516F-3 PI	N/DP]			💁 Properti	es 🚺	Info i 🗓	Diagnostics	∎∎▼	
General IC	D tags	Syste	m constants	Texts						
Communication I	load	^	Wab conver						^	
System and clock	k memory		web server							
System diagnosti	ics		General							
▼ Web server			General							
General										
Automatic upd	date				🗹 Activate we	b server o	n this module			
User manager	ment		Permit access only with HTTPS							
Watch tables										
User-defined Web pages			Automatic update							
Entry page		4								
Overview of in	terfaces			ved server						
Display		_		<u> </u>						
User interface lar	nguages	=			Security note					
Time of day					and the second					
Protection			User manage		Activating the Web serve	er reduces	protection from ata on this CPU	n unauthorized in	ternal or	
System power su	pply		User manage							
Configuration cor	ntrol									
Connection resou	urces		Name						OK	
Overview of addr	esses	~	Everyt						3	
<	3		<add me<="" td=""><td>w user></td><td></td><th></th><td></td><td></td><td>~</td></add>	w user>					~	

(→ 🗹 在该模块上激活 Web 服务器 → 确认)

→ 勾选 **一**"激活自动更新"(Enable automatic update),为用户"Everybody"选择安全设置。为 该用户勾选所有可用的权限,并应用这些设置。

$(\rightarrow$	~	\checkmark	\rightarrow	()								
----------------	----------	--------------	--------------	--------------	--------------	--------------	--------------	--------------	--------------	---------------	------------	--

CPU1516F [C	PU 1516F-3 PI	N/DP]						
				The user is authorized to				
General	IO tags	Syste	m constants Texts	🛃 query diagnostics				
Communicat	ion load	^	Web soprer	🖌 read tags	^			
System and o	lock memory			write tags				
System diagr	nostics		General					
▼ Web server				read tag status				
General				write tag status				
Automatic	update			acknowledge alarms				
User management				🛃 open user-defined web pages				
Watch tab	Watch tables			write in user-defined web pages				
User-defined Web pages		-	Automatic undate	🔽 read files				
Entry page		4		write/delete filer				
Overview	ofinterfaces							
Display		_		change operating mode				
User interfac	e languages	=	Update inte	🛃 flash LEDs				
Time of day				🛃 perform a firmware update				
Protection			liser management	Change system parameters				
System power	er supply			Change application parameters				
Configuration control								
Connection r	esources		Name	X				
Overview of a	ddresses	~	Everybody	Minimum 👻				
<			<add new="" user=""></add>		· · · · · · · · · · · · · · · · · · ·			

提示:可在此处创建多名不同的授权用户。每名用户分别需要一个密码。

→ 通过释放权限,会为用户"Everybody"自动分配"Administrativ"访问级。

r management				
Name	Access level	Password		
Even/body	Administrative	-	-	
Liverybody	Authinisticuve	-		
<add new="" user=""></add>				

→ 在"监控表格"(Watch tables) 菜单项中,现在可在 Web 服务器中添加

"Watch table_Cylinder"注册项。

 $(\rightarrow \text{Watch table}_Cylinder} \rightarrow \square)$

CPU1516F [CPU 1516F-3	PN/DP]					🔍 Properties	🔄 🛄 Infe	o 追 🗓	Diagnostics	▋■■▼
General IO tags	Syste	em consta	ants	Texts						
Cycle	^	Watch	tables	·						
Communication load		watch	lables .							
System and clock memory										
 System diagnostics 			Name		A	ccess				
✓ Web server			Watch ta	ble_Cylinder	R	ead	-			
General			E For	ce table						
Automatic update			III Wa	tch_table_Cyl	inder					
User management				2						
Watch tables										
User-defined Web pages										
Entry page	-									
Overview of interfaces							Add	new		
Display	= -	1								
User interface languages										
Time of day										
Protection										
 System power supply 										
Configuration control										
Connection resources										
Overview of addresses										
	~									
<	>									

→ 访问权限只能设置为只读。(→ Read)

/atch	tables		
	Name	Access	
	Watch table_Cylinder 🛛 🔜	Read	-
	<add new="" table="" watch=""></add>	Read	
		12	

→ 此处无法创建用户自定义网页。出于系统安全/安全性的原因仅在"启用访问 Web 服务器
 "(Enabled web server access) 下勾选 PROFINET interface_1。

(→ 启用访问 Web 服务器 →	\checkmark	PROFINET interface_	1)
-------------------	--------------	---------------------	----

CPU1516F [CPU 1516F-3	PN/DP]			Q Properties	🔄 Info	 Diagnostics 		•
General IO tags	Syste	m constants	Texts					
PROFINET interface [X2]	^		Default HTML page:	index.htm				^
DP interface [X3]			Application name:					
Startup			Statur					
Cycle			status.			_		
Communication load		Gene	erate blocks	Delete b	locks			
System and clock memory								
 System diagnostics 		 Advanced 						-
✓ Web server								
General		Files wit	th dynamic content:	htm: html				
Automatic update		THES W	an aynamic content.	andrijandini				
User management	-	Web DB number: 333						
Watch tables	4	Fragme	nt DB start number:	334		•		
 User-defined Web pages 	=							
Entry page		Entry page _						_
Overview of interfaces								
Display								
User interface languages			Select entry page:	Intro page			-	
Time of day								
Protection		Overview of in	nterfaces					-
 System power supply 								
Configuration control		Device		Interface	Ena	bled web center access		
Connection resources		CPU151	65	PROFINET interface	1	bled web server access		
Overview of addresses	~	CPU151	6F	PROFINET interface	, 1,			
<	>	Cionsi	0.	normerintenace_	- 0			~

7.3 组态显示屏

→ 在 CPU 1516F-3 PN/DP 的内置显示屏上可以修改诊断数据的显示设置。首先在显示屏 (Display) 的常规 (General) 中如下进行预设置。

(→显示屏→常规)

CPU1516F [CPU 1516F-3	PN/DP] Stagnostics	
General IO tags	System constants Texts	
General	Display	^
▶ Fail-safe		=
PROFINET interface [X1]	General	
PROFINET interface [X2]		
DP interface [X3]	Display standby mode	
Startup		
Cycle	Time to standby mode: 30 minutes	-
Communication load		
System and clock memory	Energy saving mode	
 System diagnostics 		
Web server	Time to energy saving mode: 15 minutes	•
 Display 		
General	Display language	
Automatic update		
Password	Default language on display: English	
Watch tables	N2	
User-defined logo	Automatic update	
User interface languages		
Time of day		-
Protection	Time until update: 5 seconds	
 System power supply 		*

→ 在"监控表格"(Watch tables) 菜单项中,现在可在显示屏中添加

"Watch table_Cylinder"注册项。

 $(\rightarrow \text{Watch table}_Cylinder} \rightarrow \square)$

CPU1516F [CPU 1516F-3	PN/DP]		Properties	🗓 Info 🚺 🗓 Diagnostics		
General IO tags	System constan	ts Texts				
General	Password	i i				^
Fail-safe	Display	vorotection				
PROFINET interface [X1]	Dispia	protection				
PROFINET interface [X2]			Enable displ	avprotection	1	
DP interface [X3]				-,,		Ē
Startup		Passi	word:			
Cycle		Confirm passi	word:			
Communication load	Tir	ne until automatic le	ogoff: 15 minutes		-	
System and clock memory						
System diagnostics	Watch tak	oles				
Web server						
▼ Display	•					
General	Na	me	Access			
Automatic update	W	atch table_Cylinder	Read	-		
Password		Force table				
Watch tables		Watch table_Cyli	nder			
User-defined logo		13				
User interface languages						
Time of day						
Protection	└			🗳 Add new 🖌 🖌		~

→ 如果需要,还可以在显示屏上显示用户自定义的 Logo (User-defined logo)。

 $(\rightarrow$ User-defined Logo)

CPU1516F [CPU 1516F-3	PN/DP] 🖳 Properties 🚺 Info 👔 🗓 Diagnostics 📰 🖃	1
General IO tags	System constants Texts	
General	User-defined logo	^
Fail-safe	User-defined logo	
 PROFINET interface [X1] 		
 PROFINET interface [X2] 	User-defined logo page	
 DP interface [X3] 		
Startup	Adapt logo	
Cycle	Resolution: 240 x 260 pixels 👻	
Communication load	Background color:	
System and clock memory		
 System diagnostics 	Opload image lie: Browse	
 Web server 	Preview:	
	SIEMENS SIMAIL	
General	57-1500	
Automatic update		
Password	RUN	
Watch tables		
User-defined logo		
User interface languages		

7.4 组态系统诊断

→ 确保高效检测错误的一大重要功能就是内部集成系统诊断。其在 SIMATIC S7-1500 中始终处于激活状态。在报警设置中可以选择报警类别,需要时可规定是否需要"确认"(Acknowledgement)。

CPU1516F [C	PU 1516F-3	PN/DP]				C Properties	🔄 Info	٤	🞖 Diagnostics	∎∎▼
General	IO tags	Syste	m constants	Texts						
GeneralFail-safe			System diagno	stics						
 PROFINET inte PROFINET inte 	rface [X1] rface [X2]		General	General						
 DP interface [Startup Cycle 	X3]		Activate system diagnostics for this device							
Communicat System and c	on load lock memory		Alarm settings							
General Alarm sett	ings		Category Fault		Alarm	Alarm class No Acknowledge	ment 💌		Acknowledgement	
 Web server Display User interface 	languager		Maintenance Maintenance Info	demanded required		No Acknowledge No Acknowledge No Acknowledge	ment ment ment			
Time of day	enanguages				45					

提示: 在操作面板(例如 TP1500、TP700 等...)的报警窗口中进行选择时,所显示的报警等级很重要。

7.5 激活模拟输出模块上的电压诊断并加载 PLC

→ 在控制器中组态了 Web 服务器、显示屏和系统诊断之后,还可在此处激活针对模拟输出模 块电压的诊断功能。之后可以选择控制器并与所创建的程序一起加载。

(→ 设备组态 → AQ 4xU/I ST_1 → 输出 0 – 3 → 输出 → 通道 0 → 诊断 → 🗹 缺失电压 L+ → CPU_1516F [CPU 1516F-3 PN/DP]→ 🛄)

Project Edit View Insert Online Image: Project Edit View Insert Image: Project Edit View Insert Image: Project Edit View Insert Image: Project Edit View Insert	Options Tools Window	Help	ダ Go online 🖉 Go	offline 👬 🖪 🖪	* 🗆 🗉		Totally Inte	grated Automati PO	ion RTA	L
Project tree	□ 032_200_	-Programmi	ng 🕨 CPU1516F [(PU 1516F-3 PN/DP]	1			_ •	∎×	
Devices	L L L L L L L L L L L L L L L L L L L	ownload to de	vice			🚽 Topology view	h Network view	Device vie	ew	
8 8	🔲 📸 👉 СРО1510	5F	• 📰 🖽	S I Q 1					^	Hardwa
S 032_200_FB-Programming		19024	11516t Eran 32	a sunt. suit					=	5
Add new device		644	a, a, a,	* 💞 🔡						Ĩ
Devices & networks				•	~ ~ ~					1.
CPU1516F [CPU 1516F-3 PN/C	P] Ra	iLo •	1 2 3	4 5 6 7	15				1	
Device configuration										
S Online & diagnostics					8 16 24				18	
Frogram blocks										ΙĔ
Fitemology objects					15 23 31					Re
Pl C taos										1 de
PLC lags				فيعيز فعصن				•	~	1 S
Watch and force tables	<					> 759	6 🔻		•	
Online backups	AO 4x11/1 ST	1 [AO 4xU/	ST]			Properties	Diag	nostics		1
Traces			5.j			- roperties		nosues		Tas
Program info	General	IO tags	System constan	ts Texts						ks
Device proxy data	General		Chan	al 0					^	•
PLC alarms	Module para	meters	, Chann	ero					_ 2	- 🗆
Text lists	 Output 0 - 3 									١÷
Local modules	General			Parameter setting	gs: Manual			-		a
🕨 🙀 Common data	 Outputs 		Diag	oostice						ies
Documentation settings	Chann	el 0	· Diag	1051105						
Languages & resources	Chann	el 1			No supply voltage L+					
Online access	Chann	el 2	•		ino supply tollage 21					
Card Reader/USB memory	Chann	el 3			Wire break					
	I/O addre	sses			Short circuit to ground					
	Hardware	dentifier			Overflow					
					Underflow					
> Details view									v	1

→ 请选择正确的接口并点击"开始搜索"(Start search)。

(→ PN/IE → 选择 PG/PC 的网卡 → 直接插到插槽"1 X1"上 → 开始搜索)

在扫描和信息请求完成之后,单击"加载"(Load)。

(→加载)

Extended download to	device		_				×
	Configured access nod	les of "CPU1516F"					
	Device	Device type	Slot	Туре	Address	Subnet	
	CPU1516F	CPU 1516F-3 PN/	1 X3	PROFIBUS	2		
		CPU 1516F-3 PN/	1 X1	PN/IE	192.168.0.1	PN/IE_1	
		CPU 1516F-3 PN/	1 X2	PN/IE	192.168.1.1		
		Tune of the PG/PC inte	da ca:	Ph//E			1
		type of the FG/PC inte	face.)) 🝙 🗔 .
	6	rd/rc inte	hace.	NUM 76AX8877	ZA.DeviceDesc%] 🔍 🖳
	Conn	ection to interface/su	ibnet:	PN/IE_1] 🔍
		1st gat	eway:			· · · · · · · · · · · · · · · · · · ·] 🛡
					Show all compati	tible devices	
	Compatible devices in	target subnet:			Show an compar	uble devices	
	Device	Device type	Туре		Address	Target devi	ce
	CPU1516F	CPU 1516F-3 PN/	. PN/IE		192.168.0.1	CPU1516F	
	-		PN/IE		Access address	-	
° E (
Flash LED							
						<u>S</u> tart	search
Online status information	:						
PRetrieving device info	ormation						^
Scan and information	n retrieval completed.						
							*
Display only error me	ssages						
						ad <u>C</u> a	incel

→ 加载之前,可能还需要选择执行其他一些操作。然后重新点击"加载"(Load)

(→ 🗹 全部覆盖 → 加载)

Status +	! • • • •	Target ▼ CPU1516F	Message Ready for loading.	Action
	•	Stop modules	The modules are stopped for downloading to device.	Stop all
	•	Software	Download software to device	Consistent download
<			1111	>

→ 加载之后,勾选"全部启动"(Start all),接着单击"完成"(Finish)。

(→ 🗹 全部启动 → 完成)

oad res	sults			
? :	tatus	and actions after downloa	iding to device	
Status	1	Target	Message	Action
4	%	▼ CPU1516F	Downloading to device completed without error.	
	Δ	 Start modules 	Start modules after downloading to device.	🛃 Start all
	1		The module "CPU1516F" can be started.	🛃 Start
1				
•			888	
			Finish	Load Cancel

7.6 触发错误报警

→ 通过馈电元件的端子 41-44 为模拟输出模块供电。如图所示将馈电元件从正面插接器上拔下,以获得错误报警。结果是,CPU 上的红色 ERROR LED 亮起,错误报警触发。下面将向您介绍显示错误报警的位置及方式。



7.7 在"在线和诊断"中显示报警

(→ CPU_1516F → 在线 & 诊断 → 在线访问 → 报警 → 🗹 接收报警)

W	Siemens - G:\Automation\032_200_FB-Programm	ning\032_200_FB-Programming					- 1	١X
P	roject Edit View Insert Online Options Too	ols Window Help			Те			
	· 📑 📑 Save project 📇 🐰 🗐 👔 🗙 🐑 ± (역 호 🛗 🔃 🔐 🔛 🔛 🕼 Go on	line 🖉 Go offline 🔚 🖪 🖪 🗰 🗶 🚍 🛄		10	tany integrated Aut	PORTAI	
	Project tree 🔲 🖣	032_200_FB-Programming > 0	CPU1516F [CPU 1516F-3 PN/DP]				_ # = ×	4
	Devices							l.
	B 0 0 E B	Online access	Opline access				^	i Pi
÷		 Diagnostics 	Online access					Ē
S O E	▼ 3032_200_FB-Programming	 Functions 	Status					8
<u>1</u>	Add new device							۱°
	h Devices & networks		Offline					
2	CPU1516F [CPU 1516F-3 PN/DP]							E
닅	T Device configuration							ask
0	😵 Online & diagnostics			r				S
	🔻 🛃 Program blocks							
	🗳 Add new block				Flash LED			Ľ
	🖀 Main [OB1]							İbr
	MOTOR_AUTO [FB1]							E.
	MOTOR_AUTO_DB1 [DB1]							S
	Technology objects		Online access					
	External source files							
	PLC tags		Type of the PG/PC interface:	PNI/IE		.		
	PLC data types		spectral and the fine face.					
	Watch and force tables		PG/PC Interface:	Max88772A.DeviceD	esc%			
	Online backups		Connection to interface/subnet:	PN/IE_1		-		
	Traces		1st gateway:			- 💿		
	📴 Program info		Device address:	192 168 0 1	5			
	Device proxy data			19211001011				
	PLC alarms			🥰 Calastina				
	Text lists			Go online				
	Local modules							
	Common data							
	Documentation settings		Alarms					
	Longuages & resources		Select "Receive alarms"					
	Indiane access		Receive alarms					
	C Dicolavíbida interfacer		43				~	1
	> Details view			Prop	erties 1 Info	B Diagnostics		1

→ 接着请选择正确的接口并单击"上线"(Go online)。

(→上线)

Online access		
Type of the PG/PC interface:	PN/IE	•
PG/PC interface:	M %AX88772A.DeviceDesc%	- 💎 🖸
Connection to interface/subnet:	PN/IE_1	▼ 💎
1st gateway:		▼ 💎
Device address:	192.168.0.1	
	Go online	

→ 在"诊断"(Diagnostics)项下,现在可在"报警显示"(Alarm display)中查看错误报警。(→诊断→报警显示)

Kiemens - G:\Automation\032_200_FB-Progra	mingl032_200_FB-Programming	_ ¤ ×
Project Edit View Insert Online Options	ools Window Help	Totally Integrated Automation
📑 📑 🔚 Save project 📑 🐰 💷 🗔 🗙 🏷	C ⁺ ± 🔂 🛄 🖆 🖳 🌽 Go online 🌌 Go offline 🏪 🌆 🐺 🔚 🛄	PORTAL
Project tree	032_200_FB-Programming CPU1516F [CPU 1516F-3 PN/DP]	_ = = × <
Devices		0
	Online access Disgnostics Online access	
O32_200_FB-Programming	Functions Status	200
Add new device		
CPUIDS16E [CPUIDS16E-3 PN/DP]	Online	
		Tas
5 Quine & diagnostics		le la
Program blocks		
Add new block	Flash LED	l 🖳
📲 Main [OB1]		Ē
MOTOR_AUTO [FB1]		91.
MOTOR_AUTO_DB1 [DB1]		✓ es
Technology objects	Properties	Linfo Diagnostics
External source files	Device information Connection information Alexandiadau	
🕨 🎝 PLC tags 🛛 🔵	Device information Connection Information Alarm display	
PLC data types		
Watch and force tables	Source Date Time St Event text Info t	ext Help
Online backups	1 \$71500/ET2 1/1/2012 1:10:26:958 AM I Error: Supply voltage missing on Q0 CPU1516F / AQ 4xU/I ST_1. Short	t name: AQ 4xU/I ST Order number:
Traces		
Program info		
Device proxy data		
> Details view	K	>
Portal view	CPU1516F 🔹 Main 😨 Online & dia	Connected to CPU1516F, address IP=1 III III

7.8 通过网络进行针对 S7-1500 的诊断

→ 为访问 CPU 315F-2 PN/DP 的 Web 服务器, 需在通过 TCP/IP 与 CPU 相连的一台 PC 上 , 打开任意一个 Web 浏览器。



→ 在浏览器中输入 CPU 1516F-3 PN/DP 的 IP 地址。(→ 192.168.0.1)



→ 在所显示的页面上首先选择语言,然后点击"**继续**"。

(→简体中文→继续)



→ 在"首页"(Start page) 中包含有关 PLC 及其状态的常规信息。

(→首页)

			12:20:20 am	01/01/2012	English	•
Name	CPU1516F					
Log in					2 <u>Off</u>	3
Start page	15 16 F-3 PN/DP	Conoral				
▶ Diagnostics		TIA Portal:	V13.0 SP1			
Diagnoodoo		Sten 7 Safety				
Diagnostic Buffer	S7-1500	Station name:	S71500/ET200MP station 1			
► Module information	CPU 1516F-3 PN/DP	Module name:	CPU1516F			
· module mornadon		Module type:	CPU 1516F-3 PN/DP			
▶ Alarms						
▶ Communication		Status:				
Communication		Operating Mode:	RUN			
► Topology		Status:	😳 Error			
▶ Tag status	6ES7 516-3FN00-0AB0	Mode selector:	RUN			
· Tug otatuo						
▶ Watch tables						
Customor pages		Fail-sate:				
v customer pages		Sarety mode:				
▶ Filebrowser		Collective signature:				
Datal one		Lastransale modification.		-		
P DataLogs		CPII operator panel				
		or o operator parter	RUN			
▶ Introduction			STOP			
Warten auf 192.168.0.1			LED flashes			

→ 硬件、固件版本、序列号和内存占用等其他信息将在"诊断"(Diagnostics) 中显示 (→诊断)

Name Log in	Diagnostics			
► Start page	Identification Memory			
Diagnostics	Identification:			
Diagnostic Buffer	Plant designation:			
P Diagnosae Dunei	Location identifier:			
Module information	Serial number: S C-F2SE01192015			
▶ Alarms	Order number:			
▶ Communication	Hardware: 6ES7 516-3FN00-0AB0			
▶ Topology	Version:			
▶ Tag status	Hardware: 3			
	Firmware: V 1.7.0			
Watch tables	Bootloader: V 1.0.2			

Name	Diagnostics				
Log in					
	Identification Memory				
 Start page 					
► Diagnostics	Load memory				
b Disensetis Duffer	1.2% in use				
Diagnosuc Burler	23.72 MB free of 24.01 MB				
Module information					
	Code work memory				
▶ Alarms	0.0% in use				
▶ Communication	1.50 MB free of 1.50 MB				
▶ Topology	Data work memory				
h Tag status	0.0% in use				
r Tay status	5.00 MB free of 5.00 MB				
Watch tables					
	Retentive memory				
Customer pages	0.0% in use				
► Filebrowser	472.66 KB free of 472.66 KB				

→ 在"诊断缓冲区"(Diagnostic Buffer)中可以看到 CPU 中全部事件的文本信息。事件报警记录在循环缓冲区中。最新的报警显示在最上方的行中。
 (→诊断缓冲区)

					12:25:44 am 01/01/2012 English 💌
Name	Diagn	ostic Buffer			
Log in	Diagno	ostic buffer entrie	es 1-50 💌		🛗 😂 <u>Off</u> 📑
	Number	Time	Date	State	Event
 Start page 	1	12:25:06.003 am	01/01/2012	incoming event	Communication initiated request: WARM RESTART Pending startup inhib - No startup inhibit set - CPU changes from STARTUP to RUN mode
▶ Diagnostics	2	12:25:05.982 am	01/01/2012	incoming event	Communication initiated request: WARM RESTART Pending startup inhib - No startup inhibit set - CPU changes from STOP to STARTUP mode
N Disgnostic Buffor	3	12:25:02.177 am	01/01/2012	incoming event	Supply voltage missing
P Diagnostic builet	4	12:25:01.475 am	01/01/2012	outgoing event	Supply voltage missing
Module information	5	12:25:01.389 am	01/01/2012	incoming event	Communication initiated request: STOP Pending startup inhibit(s): - No startup inhibit set - CPU changes from RUN to STOP mode
▶ Alarms	6	12:23:51.030 am	01/01/2012	incoming event	Supply voltage missing
► Communication	7	12:23:46.084 am	01/01/2012	outgoing event	Supply voltage missing
► Topology	8	12:19:21.717 am	01/01/2012	incoming event	Follow-on operating mode change Power-on mode set: WARM RESTART to RUN (if CPU was in RUN before Pending startup inhibit(s): - No startup inhibit set - CPU changes from STARTUP to RUN mode
▶ Tag status	•				Follow-on operating mode change
▶ Watch tables	Details:	3	a aa 00, 00, 111		Event ID: 16# 08:0011
➤ Customer pages	incoming a	went	g on QU CPU1:	510F7AQ 4XU/I S1_	1.

→ 在"模块信息"(module information) 视图中,将显示各个模块(此处为 SIMATIC S7-1500) 的状态及更多详细信息。

(→模块信息)

						12:27:19 am	01/01/2012 E	nglish 💌
Name	Mo	dule informat	ion					
Log in								C Off 昌
	\$7150)/FT200MP statio	1 . \$71500/ET200MP station 1					
▶ Start page								
	Slot	State	Name	Dataila	Order number	laddress	Q address	Comment
Diagnostics	1			Details	6ES7 516-3FN00-0AB0	0		
/ Diagnostics	2		DI 32X24VDC HF_1	Details	6ES7 521-18L00-0AB0	U	0	
Diseasetia Duffee	3			Details	6ES7 531-7KE00-0AB0	64	0	
 Diagnostic Butter 	5		AQ 4xU/I ST 1	Details	6ES7 532-5HD00-0AB0	04	64	
Modulo information								
 Module information 								
* Alamis								
• Communication								
▶ Communication								
h Topology								
r Topology								
 Tag status 								
r Tay status	_							
 Match toblas 	State	Identification F	irmware					
vvalen tables								
h Cuotomor pagao	Erro	r: Supply voltage n	nissing on Q0 CPU1516F / AQ 4xU/I S	ST 1.				
 Customer pages 			-	-				

→ 在"报警"(Alarms) 中包含在 CPU 1516F-3 PN/DP 中所生成的报警文本。

(→报警)

					12:28:13 am 01/01/20	12 English 💌
Name	Alarms					
Log in	entries 1-5	0 🔻				📳 😂 Off 昌
	AlarmNr.	Date	Time	Alarm text	State	Acknowledgement
► Start page	34	01/01/2012	12:25:02.177 am	Error: Supply voltage missing on Q0 CPU1516F / AQ 4xU/I ST_1.	incoming	
▶ Diagnostics						
Diagnostic Buffer						
▶ Module information						
► Alarms						
▶ Communication						
► Topology						
▶ Tag status						
	Details on a	larm number: 3	34			
vvatch tables	Short name:	AQ 4xU/I ST Or	der number: 6ES7 5	32-5HD00-0AB0		
► Customer pages						
	Incoming ev	ent				

提示:此处我们将看到模拟输出模块上的电压故障及所激活的诊断报警。

→ 在"通信"(Commucation) 中显示有关通信设置和通信错误的详细信息。

(→通信)

Name	Communic	ation						
Log in								
	Darameter Sta	tistics Resou		inections				
Start page	Parameter	iusues Nesou		mecuons				
Diagnostics	PROFINET Inte	erface [X1]:						
b Diagnostic Buffor								
Diagnosuc Buner	Network connection:							
Module information	MAC address: 28-63-36-87-F3-05							
	Name: cpu1516f.profinet interface_1							
► Alarms								
		IP para	meter:					
Communication	IP Address: 192.168.0.1							
×pologoT 4	Subnet mask: 255.255.255.0							
ropology	IP settings: IP address set in project							
▶ Tag status								
	Physical prop	erties:						
Watch tables	Port number	Link status	Settings	Mode	Connection medium			
 Customor pages 	X1 P1	OK		100 MBit/s full-duplex	Conner cable			
r customer pages	X1 P2	disconnected			Copper cable			

	_						
Name	Commu	nication					
Log in							
	Parameter	Statistics	Resources	Connec	tions		
 Start page 							
▶ Diagnostics					Total	statistics	
Disguastic Duffer			Sent data pa	ckages:			
 Diagnostic Butter 			Sent without	ut errors:	3243	312 Bytes	
Module information		Collision d	uring sending	attempt:	0		
▶ Alarme		Canceled due to other errors: 0					
r Alamis	Received data packages:						
Communication	Received without errors: 755370 Bytes					70 Bytes	
h Topology			Rejected due	to error:	0		
ropology	Re	jected due f	o resource bo	ttleneck:	0		
▶ Tag status							
Match tables			Caref data an		Statis	stics X1 P1	
· watch tables			Sent data pa	ickages:			
Customer pages	Sent without errors:				3242	928 Bytes	
. Filebasses		Collision d	uring senaing	attempt	0		
▶ Fliebrowser		Cancel	ed due to othe	er errors:	0		
▶ DataLogs		Rec	erved data pa	ickages:	7550	70 Diteo	
		R	Dejected Withou	ut errors:	1553	10 Byles	
	-		Rejected due	to error:	0		
► Introduction	Re	ejected due f	o resource bo	meneck:	0		

Name	Communication						
Log in							
	Parameter	Statistics	Resources	Connections			
 Start page 							
► Diagnostics		Number o	fconnections	5:			
		Maximur	n connections	256			
Diagnostic Buffer	Connections not in use: 250						
► Module information							
► Alarms							
			Connections	c reserve	d in use		
Communication		ES o	ommunicatio	n 4	0		
		HMI d	ommunicatio	n 4	0		
Topology		S7 c	ommunicatio	n 0	0		
		OpenUser o	ommunicatio	n 0	0		
▶ Tag status		Webo	ommunicatio	n 2	6		
		Other	ommunicatio	n	0		

							2:32:27 am 01/01/2012	English	•
Name Log in	Commu	nication						2 <u>off</u>	
	Parameter	Statistics	Resourc	es Connections					
 Start page 	State			Local ID (Hex)	Slot of Gateway	Remote address type	Remote address	Туре	Туре
	Connecti	on is establi	ished	0		IPv4	192.168.0.108	Adhoc	WEB
Diagnostics	Connecti	on is establi	ished	0		IPv4	192.168.0.108	Adhoc	WEB
	Connecti	Connection is established		0		IPv4	192.168.0.108	Adhoc	WEB
Diagnostic Buffer	Connecti	on is establi	ished	0		IPv4	192.168.0.108	Adhoc	WEB
-	Connecti	on is establi	ished	0		IPv4	192.168.0.108	Adhoc	WEB
Module information	Connecti	on is establi	ished	0		IPv4	192.168.0.108	Adhoc	WEB
► Alarms									
► Communication									

 → 在"拓扑"(Topology) 中可显示与 CPU 1516F-3 PN/DP 各个端口相连的设备及其寻址的详 细信息。为此会显示出不同视图。网络结构较大时此处可在图中示出整个机组的完整网络 结构,并在状态中显示出错误的连接,前提是各个组件支持。
 (→ 拓扑)

Name	Тороlogy
Log in	
	Graphic view Table view Status overview
Start page	cout516f
Diagnostics	S71500/ET20
Diagnostic Buffer	P1 P1
	P2
Module information	
▶ Alarms	
▶ Communication	
Topology	

				12:3	4:58 am 01/01/2012	English 💌
Name	Topology					
Log in						😂 <u>Off</u> 📕
	Graphic view T	able view Status o	verview			
 Start page 	Port				Partner port	
	State	Name	Module type	Port	Name	Port
Diagnostics	I 🖌 🛛 😦	cpu1516f	S71500/ET200MP station			
				port-001	svensons	port-001
Diagnostic Buffer				port-002		
	2	svensons				
Module information				port-001	cpu1516f	port-001
▶ ∆larms						
· Marino						
Communication						
Communication						
Topology						

Name		Topology	_	_
	<u>Log in</u>			
		Graphic view	Table view	Status overview
 Start page 				
▶ Diagnostics		⊻ • S715	00/ET200	
▶ Diagnostic Buffer				
 Module informatio 	n			
▶ Alarms				
Communication				
Topology				

→ 各个变量的值可显示在"变量状态"(Tag status) 中。

(→变量状态)

Name Log in	Tag status		
	Enter the address of a tag here whi	ch you want to monitor	
Start page	Address	Display format	Value
	-КО	Bin	2#0
▶ Diagnostics	-A1	BOOL	FALSE
Diagnostic Buffer	New variable	•	
Module information	Apply		
► Alarms			
▶ Communication			
► Topology			
▶ Tag status			

→ 还可用图示出与 Web 服务器关联的"变量表格"(Watch table)

(例如"Watch table_Cylinder")。

(→ 变量表格 → Watch table_Cylinder)

Name	Watch table	s		
Log in	Watch table_Cylinder			
	Watch table_C	ylinder		
 Start page 	Name	Address	Format	Value
	"-B1"	%E0.5	BOOL	FALSE
Diagnostics	"-B2"	%E0.6	BOOL	FALSE
) Dissessio Duffes	"-M2"	%A0.3	BOOL	FALSE
Diagnosuc Burler				
Module information				
▶ Alarms				
▶ Communication				
► Topology				
► Tag status				
Watch tables				

→ 可在"用户页面"(Customer pages) 中查看针对可视化及过程操作而自定义创建的页面。

(→用户页面)

Name		Customer pages
	Log in	
▶ Start page		The page is not available.
▶ Diagnostics		
► Diagnostic Buffer		
Module information	n	
▶ Alarms		
▶ Communication		
▶ Topology		
▶ Tag status		
▶ Watch tables		
Customer pages		

→ 借助"文件浏览器"(Filebrowser),数据可以直接存储在 CPU 上的内存卡中,或从内存卡中 加载数据。

(→文件浏览器)

Name	Filebrowser				
Log in	1				
	1				
Start page	Name	Size	Changed	Delete	Rename
	LOG	32768	12:25:42 pm 07/19/2015		
 Diagnostics 	crdinfo.bin	512	12:25:42 pm 07/19/2015		
Diagnostic Buffor					
Diagnostic Dunei	Directory operations:				
Module information	birottory operations.		Páž		
▶ Alarms	Search No	File selected.	Upload file		
Communication					
Topology					
T					
lag status					
Watch tables					
Waten tables					
Customer pages					
Filebrowser					

→ 在"数据日志"(DataLogs) 中,无需使用博途 (TIA Portal) 即可读取或编辑由 CPU 写入的日 志文件。(→数据日志)

			12:4	40:57 am 01/01/2012	English	•
Name	DataLogs				~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	_
Log in					<u>υπ</u>	-
	Name	Size	Changed	Retrieve and clear		
 Start page 	No entries currently available					
▶ Diagnostics						
 Diagnostic Buffer 						
Module information						
▶ Alarms						
▸ Communication						
A Topology						
, topology						
▶ Tag status						
Watch tables						
Customer pages						
▶ Filebrowser						
► DataLogs						

7.9 通过内置显示屏进行针对 S7-1500 的诊断

→ 通过显示屏,用户可以调用大量诊断信息。例如可在"诊断"(Diagnostics) 菜单中"报警"(Alarms)项下显示通过系统诊断生成的报警文本。

(→诊断→报警)



7.10检查清单

编号	说明	已检查
1	项目 032-410_Basics_Diagnostics_2 已成功取回。	
2	已经为项目 032-410_Basics_Diagnostics_2 中的 CPU 1516F 成功组态了 Web 服务器。	
3	已经为项目 032-410_Basics_Diagnostics_2 中的 CPU 1516F 成功组态了显示屏。	
4	已经为项目 032-410_Basics_Diagnostics_2 成功组态了针 对 CPU 1516F 的系统诊断。	
5	针对模拟输出模块的电压诊断已激活。	
6	出自项目 032-410_Basics_Diagnostics_2 的 CPU 1516F 已 成功加载。	
7	己断开模拟输出模块的电源。	
8	在博途 (TIA Portal) 的报警显示中显示系统诊断的报警文本。	
9	通过 CPU 1516F 的 Web 服务器显示系统诊断的报警文本。	
10	通过 CPU 1516F 的显示屏显示系统诊断的报警文本。	

8 更多相关信息

为帮助您进行入门学习或深化学习,您可以找到更多指导信息作为辅助学习手段,例如:入门指南、视频、辅导材料、APP、手册、编程指南及试用版软件/固件,请单击链接获取相关资料:

www.siemens.com/sce/s7-1500