

学习/培训资料

西门子自动化教育合作项目 (SCE) | V16 以上版本

TIA 博途模块 062-121 伺服驱动 S210 PN,基于 PROFINET IRT 使用 SIMATIC S7-1500 中的工艺目标

siemens.com/sce



本学习/培训文档适用于以下 SCE 教育培训产品

变频器 SINAMICS S210

• 采用 PROFINET 协议,输入电压为 1AC 200 - 240V 的 SINAMICS S210 伺服驱动 订货号: 6SL3080-8BB00-0AA0

备选**:**

• 采用 PROFINET 协议,输入电压为 3AC 380 - 480V 的 SINAMICS S210 伺服驱动,仅配备 S7-1500 订货号: 6SL3080-8BE00-0AA0

SIMATIC 控制器

- SIMATIC ET 200SP 开放式控制器, CPU 1515SP PC2 F, WinCC RT Advanced 512 PTs 系统 订货号: 6ES7677-2SB42-4AB1
- SIMATIC ET 200SP 分布式控制器 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, 带软件 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 培训用软件

- SIMATIC STEP 7 Professional V16 1 个许可证 订货号: 6ES7822-1AA06-4YA5
- SIMATIC STEP 7 Professional V16 6 个教室许可证 订货号: 6ES7822-1BA06-4YA5
- SIMATIC STEP 7 Professional V16 6 个升级许可证 订货号: 6ES7822-1AA06-4YE5
- SIMATIC STEP 7 Professional V16 20 个学生许可证 订货号: 6ES7822-1AC06-4YA5

请注意,必要时会使用后续培训产品代替本培训产品。 可通过以下网页获得最新的 SCE 可用培训产品概览: <u>siemens.com/sce/tp</u>

培训课程

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有关 SCE 的其它信息

siemens.com/sce

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伺服驱动系统 S210 PN 基于 PROFINET IRT,使用 SIMATIC S7-1500 中的工艺目标

1 目标

在这一章节中您将学习到,如何在使用 SIMATIC S7 控制器 - 例如通过 PROFINET – IRT (等时实时同步/时钟同步通信)进行通信的 CPU1516F-3 PN/DP - 的情况下,将变频器 SINAMICS S210 PN 投入运行。

此模块主要介绍在 TIA 博途中用 SINAMICS Startdrive 软件调试伺服驱动系统 S210 PN 的相关 信息。

之后还会逐步说明如何在 CPU1516F-3 PN/DP 的程序中,通过工艺目标控制和监控伺服电机。

可以使用第3章所列的 SIMATIC S7 控制器。

2 前提条件

此章节的基础是 SIMATIC S7 的"全局数据块"章节。学习本章内容时,可以参考以下项目: "032-600 全局数据块 ..."。

3 所需的硬件和软件

- 1 工程师站:硬件和操作系统是前提条件(其他相关信息,参见 TIA 博途安装 DVD 上的 Readme/自述文件)
- 2 TIA 博途中的软件 SIMATIC STEP 7 Professional V16 以上版本
- 3 TIA 博途中的软件 SINAMICS Startdrive V16 以上版本
- **4** SIMATIC S7-1500 控制系统,比如 CPU 1516F-3 PN/DP V2.8 以上版本固件,带存储卡和 16DI/16DO

提示: 数字量输入端应引到一个开关面板上。

- 5 伺服驱动系统:
 - 变频器 SINAMICS S210 带存储卡
 - 电动机 SIMOTICS S-1FK2
 - OCC MOTION-CONNECT 线路
- 6 以太网连接:工程师站和控制系统之间以及控制系统和变频器之间



4 理论

4.1 系统概览



1.	熔断器或断路器	2.	线路接触器(选配)
3.	线路滤波器(选配)	4.	外部制动电阻(选配)
5.	用于 IP65 的自紧油封(选配)	6.	伺服电机 1FK2
7.	OCC 延长线(选配)	8.	开关柜电缆管道安装件(选配)
9.	用于电机、电机抱闸和编码器的 OCC 连	10.	屏蔽端子
	接线		
11.	屏蔽板	12.	24 V 电源
13.	SD 存储卡(选配)	14.	调试设备,比如笔记本电脑
15.	控制系统,比如 SIMATICS S7-1500		

4.2 变频器接口和操作员控件



4.3 OCC 连接电缆



1.	M12 或 M17 圆形连接器,10 针	2.	MOTION-CONNECT OCC 线路
3.	屏蔽	4.	抱闸线路
5.	功率线	6.	西门子 IX 信号线插头

详细信息请登录网站 support.automation.siemens.com, 以查看相关手册

4.4 安全措施与警告

安装和调试 SINAMICS S210 前需注意下列安全和警告提示。

4.4.1 常规信息

▲ 警告

不遵守安全说明和安装指导会危及生命安全

快速安装指南只介绍安装变频器所需的最重要的信息。如不遵守操作说明书中所列举的安全说明和安装指导,可能导致重伤甚至死亡。

- 请注意遵守操作说明书中所列举的安全说明和安装指导: www.siemens.com/sinamics-s210。
- 同时,也请遵守设备内所集成的各项安全功能的安全说明。务必保证更换设备后,设备能 正常工作。

\Lambda 危险

DC 母线连接电容的剩余电荷可能导致电击,危及生命安全

切断供电电压5分钟后,DC母线连接电容上还留有危险电压。 触摸导电部件会导致重伤甚至死亡。

- 断电5分钟后,再打开设备的保护盖或端子盖。
- •开始工作之前,先通过全极检测检查有无电压,以及是否接地。
- 请确保张贴了以相应国家语言写就的警示牌。

提示:

接下来描述的操作步骤和任务,以与伺服电机预装配完成的变频器单元为基础。在进行电气安装时请注意制造商的安全规定和警告提示。针对设备安装和电气安装的说明和指令请参见
 SINAMICS S210 的手册。

4.5 消息帧

对于与变频器的 IRT 通信,有不同的消息帧可选,它们的过程数据长度和内容都不同。 这里使用标准消息帧 5。

4.5.1 使用标准消息帧 5 的 SINAMICS S210 过程数据

控制字和设定值 (PLC -> SINAMICS) 或状态字和实际值 (SINAMICS -> PLC) 可以随着过程数据进行传输。针对通过 PROFINET 实现的连接,过程数据范围的构成在消息帧 5 中如下所示:

	任务消息帧 (PLC -> SINAMICS)	应答消息帧 (SINAMICS -> PLC)
PZD1	控制字 1 (STW1)	状态字 1 (ZSW1)
PZD2	转速设定值 B(32 位) (NSOLL_B)	转速实际值 B(32 位) (NIST_B)
PZD3		
PZD4	控制字 2 (STW2)	状态字 2 (ZSW2)
PZD5	编码器控制字 1 (G1_STW)	编码器状态字 1 (G1_ZSW)
PZD2	位置偏差 (XERR)	编码器 1 的位置实际值 1 (G1_XIST1)
PZD3		
PZD2	位置调节器的增益系数 (KPC)。	编码器 1 的位置实际值 2 (G1_XIST2)
PZD3		

4.5.2 控制字 1 (STW1)

位	含义
00	开/关 1
01	关2
02	关3
03	释放运行
04	取消激活斜坡功能发生器
05	备用
06	释放转速设定值
07	应答故障
08	备用
09	备用
10	通过 PLC 控制
11	备用
12	打开抱闸
13	备用
14	扭矩/转速控制
15	备用

4.5.3 状态字 1 (ZSW1)

位	含义
00	准备好启动
01	准备就绪
02	已释放运行
03	故障生效
04	无惯性滑行激活
05	无快速停止激活
06	接通联锁激活
07	警告生效
08	调节器释放
09	已请求控制
10	达到/超过对比值
11	位 0 警告等级
12	位 1 警告等级
13	备用
14	扭矩控制激活
15	备用

4.5.4 转速设定值 B (32 位) (NSOLL_B)

转速设定值 B (NSOLL_B) 是一个 32 位字,用于将所需转速设定值传输给变频器。

设定值作为带正负号的整数传输。位 31 决定设定值的正负号:

- 位 **= 0 -->** 正设定值

- 位 **= 1** --> 负设定值

值 1,073,741,824 (4000 0000 十六进制) 对应参数 p2000 中的转速。

我们的应用程序将参数 p2000 设定为值 7300 1/min。

按照下列公式计算当前的转速设定值:

n_设定 = (N 设定_B x p2000) /1,073,741,824

4.5.5 转速实际值 B (32 位) (NIST_B)

转速实际值 B 是 32 位字,用于传输变频器的转速。该值的标准化设置与设定值 NSOLL_B 的标准 化设置相匹配。

4.5.6 控制字 2 (STW2)

位	含义
00	备用
01	备用
02	备用
03	备用
04	备用
05	备用
06	转速调节器积分器锁定
07	选择需停止的轴
08	运行到固定挡块
09	备用
10	备用
11	备用
12	位0控制器激活征象
13	位 1 控制器激活征象
14	位 2 控制器激活征象
15	位3控制器激活征象

4.5.7 状态字 2 (ZSW2)

位	含义
00	备用
01	备用
02	备用
03	备用
04	备用
05	打开抱闸
06	转速调节器积分器锁定
07	激活需停止的轴
08	运行到固定挡块
09	备用
10	备用
11	备用
12	位 0 设备激活征象
13	位1设备激活征象
14	位2设备激活征象
15	位3设备激活征象

4.5.8 编码器 1 控制字 (G1_STW)

位	含义
00	请求功能 1
01	请求功能 2
02	请求功能 3
03	请求功能 4
04	请求位0指令
05	请求位1指令
06	请求位2指令
07	模式
08	备用
09	备用
10	备用
11	备用
12	备用
13	请求周期绝对值
14	请求需停止的编码器
15	应答编码器故障

4.5.9 编码器 1 状态字 (G1_ZSW)

位	含义
00	功能 1 激活
01	功能2激活
02	功能3激活
03	功能 4 激活
04	值 1
05	值 2
06	值 3
07	值 4
08	探针1偏转
09	探针2偏转
10	备用
11	激活"应答编码器故障"
12	备用
13	周期绝对值
14	激活需停止的编码器
15	编码器故障

4.5.10 位置偏差 (XERR)

通过信号 XERR,将位置偏差作为右侧对齐的 32 位二进制值进行传输。

4.5.11 编码器 1 的位置实际值 1 (G1_XIST1)

通过信号 G1_XIST1,将测量系统当前的增量实际位置作为右侧对齐的 32 位二进制值进行输出 (不含正负号)。

4.5.12 位置调节器的增益系数 (KPC)

通过信号 KPC,将位置调节器的增益系数作为右侧对齐的 32 位二进制值进行传输。

4.5.13 编码器 1 的位置实际值 2 (G1_XIST2)

通过信号 G1_XIST2,将测量系统当前经过标定的绝对实际位置作为右侧对齐的 32 位二进制值进 行输出(不含正负号)。

4.6 SINAMICS S210 的调试工具 SINAMICS Startdrive

调试软件 SINAMICS Startdrive 可在网页中下载最新版本:

support.industry.siemens.com.

SINAMICS Startdrive 是一款集成在 TIA 博途中的工具,在结构和操作上与现有的 TIA 博途相一致。

SINAMICS Startdrive 的扩展包包含已支持的变频器 SINAMICS S210 的数据和视图。

因此,通过该工具可以方便地为变频器进行参数化设置并将其投入运行。在诊断和查找故障方面提 供大量的功能和辅助设置。

4.6.1 重置变频器并设置 IP 地址

变频器中央控制单元可以直接利用 TIA 博途中的 SINAMICS Startdrive 获得一个新的 IP 地址。现 在可以重置中央控制单元。

→ 为此,请双击调用全集成自动化端口。(→ TIA Portal V16)。



→ 之后点击 → "Online & Diagnostics" (在线 & 诊断)菜单项, 打开 → "Project view" (项目视图)。

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	Totally Integrated Automation PORTAL
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Motion & technology	
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 → 重新分配 IP 地址之前,建议先重置 PROFINET 接口参数。为此,请选择功能 → "Resetting the PROFINET interface parameters" (重置 PROFINET 接口参数)并点击 → "Reset" (重置)。

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→ 弹出询问是否确实需要重置时,单击 → "Yes" (是)确认

Online 8	k diagnostics (0241:000055) X
	This command resets the following data: - PROFINET device name - IP address - SNMP parameters - I&M data Do you really want to reset the module?
	Yes No

→ 重置成功后,可在 → "Message" (信息) → "General" (常规)窗口下的 "Show all messages" (显示所有信息)中查看相关信息。

				S. Prop	oerties	i Info	U Diagnostics	18	
G	eneral Cross-references Cor	npile							
٢	A Show all messages	•							
1	Message	Go to	?	Date	Time				
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<u>.</u>	The device Online & diagnostics was re	set,		7/26/2020	7:19:14	AM			-
<								>	Ť

→ 之后重新 → "Update accesible devices" (刷新可连接的节点)并选取所需变频器的 →
 "Online & Diagnostics" (在线 & 诊断)。请选择功能 → "Assign IP address" (分配 IP 地址)。请在此位置输入例如以下 IP 地址: → IP adress (IP 地址):192.168.0.21 →
 Subnet mask (子网掩码) 255.255.255.0。现在单击 → "Assign IP address" (分配 IP 地址),即可为变频器中央控制单元分配此新地址。

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Intel(R) Ethernet Connection (4) I219-LM Intel(R) Ethernet connection (4) I219-LM	100	IP address: 192 . 168 . 021 Subnet mask: 255 . 255 . 255 . 0	isks
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→ 成功分配 IP 地址后,会有一条消息出现在 → "Message" (信息) → "General" (常 规)中。

	9	Propertie	es 🛄 Inf	o 🕓 Diagnostics	
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The parameters were transferred successfully	1.		7/26/2020	7:22:21 AM	
					\sim

4.6.2 SINAMICS S210 恢复出厂设置

→ 在将变频器重置为出厂设置之前,必须再次 → "Update accesible devices"(刷新可连接的节点)并选取所需变频器的 → "Online & Diagnostics"(在线 & 诊断)。如需将变频器重置为出厂设置,请在 → "Backup/Restore"(备份/恢复)下选择 → "Restore factory resetting"(重置为出厂设置)并单击 → "Start"(启动)。

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	Card Reader/USB memory			
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→ 点击 ▲ 选项, "Also save RAM data retentively" (同时保存 RAM 数据),询问是否确 实要恢复出厂设置时,点击 → "Yes" (是)。

Restore fa	actory settings of the drive X
Do you	really want to restore the factory settings?
	Also save RAM data retentively
	OK Cancel

提示:

- 将变频器重置为出厂设置时,IP 地址和子网掩码等通信设置将予以保留。

4.6.3 读取 SINAMICS S210 的固件版本和订货号

→ 读取 SINAMICS S210 的固件版本和订货号之前,必须再次 → "Update accesible devices"
 (刷新可连接的节点)并选取所需变频器的 → "Online & Diagnostics" (在线 & 诊断)。
 在菜单项 → "Diagnostics" (诊断) → "General" (常规)中,可以读取简称、订货号、
 硬件版本和固件版本。

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Name	Active alarms	Component			
▼ 🖬 Online access	Alarm history				
Display/hide interfaces	Actual values	Short designation:	S210 PN		
COM [RS232/PPI multi-master cable]	Safety Integrated fu	Article number:	6SL3210-5HB10-4UF0		
🕨 🗎 ComSet	PROFINET interfac	Hardware:	3		
🔹 🔽 Intel(R) Ethernet Connection (4) I219-LM 💹	Functions	Firmura re :	V.S.D.		
Pupdate accessible devices	Backup/Restore	rinnvore.	V 5.2		
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cpu_1516f[192.168.0.1]		Module Information			
 Accessible device [192.168.0.21] 		Device name:			
😟 Online & diagnostics		benet in			
Intel(R) Dual Band Wireless-AC 8265		Module name:	Antrieb_S210		
Microsoft Wi-Fi Direct Virtual Adapter		Plant designation:			
Microsoft Wi-Fi Direct Virtual Adapter <		Location ID:			
PC internal [Local]		Installation date:		*	
PLCSIM (PN/E)		Additional information:			
TaleSenice (Automatic protocol detecti					
Card Reader/USB memory		Manufacturer information			
		Manufacturer description:	SIEMENS AG		
		Serial number:	ZVM4XVM008680		
		Profile:	16#3A00		
		Profile details:	16#0000		
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Portal view	Online & dia			🔜 < Retentive saving	completed successfully.

5 任务要求

下文为"032-600_全局_数据块"章节中的项目补充了一个变频器 S210 PN。 可以在传送带末端,通过一个伺服定位装置快速且精确地为塑料件设置刀库的两个不同位置。 在此过程中,使用一个工艺目标,通过 PROFINET IRT 实现对伺服驱动的控制。

6 规划

通过变频器 SINAMICS S210 控制由伺服电机驱动的定位装置。

此变频器必须在项目中创建、参数化设备和投入运行。

使用 SINAMICS Startdrive 软件在线完成变频器的参数化设置,这时会从中央控制单元读入基础数据。

通过 DRIVE-CLiQ 接口自动识别伺服电机的电机数据和编码器数据。

使用运动控制工艺目标"TO_PositioningAxis"(TO_定位轴),通过 PROFINET IRT 控制变频器。 工艺目标必须与伺服驱动 S210 绑定并进行参数化设置。

之后创建一个具有数据库功能的功能块"MC_magazine"(MC_刀库),通过这个功能块可以执行下列运动控制指令:

- 应答故障

- 向上(正转速/右)/向下(负转速/左)点动运行
- 指定参考点,以固定挡块(下)作为参考基准
- 定位在位置 00 并指定位置值
- 定位在位置 01 并指定位置值
- 定位在位置 02 并指定位置值

调用组织块"Main"(主要)[OB1]中的"MC_magazine"(MC_刀库)功能块时,将指定参考 点和位置值。

启动命令切换到输入端。

6.1 技术示意图

请在此位置查看任务要求的技术示意图。



图 3: 技术示意图

Schalter der Sortieranlage	Automatikbetrieb		Handbetrieb / Manual mode
Switches of sorting station	Automatic mode		-S3 Tippbetrieb -M1 vorwärts/
-P1 ein/on	-P5 gestartet/started		 Manual -M1 forwards
-Q0 Hauptschalter/Main switch	-S1 Start/start		-S4 Tippbetrieb -M1 rückwärts/
-P4 aktiviert/active			Manual -M1 backwards
-A1 NOTHALT/Emergency stop	-S2 Stopp/stop		-P7 ausgefähren/extended
	_		-S6 Zylinder -M4 austahren/
-S0 Betriebsart/operating mode			-P6 eingefahren/retracted
			cylinder -M4 retract
		1 1	

图 4: 操作面板

6.2 交叉参考表

在该任务中需要使用以下信号作为全局操作数。

DI	类型	标识	功能	NC/NO
1 0.0	BOOL	-A1	报告急停 ok	NC
I 0.1	BOOL	-K0	"启动"装置	NO
10.2	BOOL	-S0	运行选择开关手动 (0) / 自动 (1)	手动 = 0 自动 = 1
10.3	BOOL	-S1	自动模式启动按键	NO
10.4	BOOL	-S2	自动模式停止按键	NC
1 0.5	BOOL	-B1	"气缸 -M4 已缩回"传感器	NO
I 1.0	BOOL	-B4	"滑道已占用"传感器	NO
I 1.3	BOOL	-B7	"有部件在输送带末端"传感器	NO
E 2.0	BOOL	-S10	应答按钮	NO
E 2.1	BOOL	-S11	"向上点动运行"按钮	NO
E 2.2	BOOL	-S12	"向下点动运行"按钮	NO
E 2.3	BOOL	-S13	"设置参考点"按钮	NO
E 2.4	BOOL	-S14	"开始定位在位置 00" 按钮	NO
E 2.5	BOOL	-S15	"开始定位在位置 01" 按钮	NO
E 2.6	BOOL	-S16	"开始定位在位置 02" 按钮	NO

分配列表图例

DI	数字量输入	DO	数字量输出
AI	模拟量输入	AO	模拟量输出
I	输入	0	输出

- NC 常闭触点 (Normally Closed)
- NO 常开触点 (Normally Open)

7 结构化分步指导

以下是帮助您实现规划的引导指南。如果您已经掌握了相关的知识,只需要使用带标号的步骤标题 作为参考。否则,也可以简单地跟随指南中的图示一步步操作。

7.1 恢复现有项目

→ 开始扩展 "032-600_全局_数据块"章节的 "032-600-全局数据块…"项目之前,必须先 将其恢复。恢复现有项目时,必须在 → Project (项目) → Open (打开) 下的项目视图中 找到相应的归档。接着点击打开您的选择。(→ Project (项目) → Open (打开) → Selection of a .zap archive (选择一个 .zap 归档) → Open (打开))



→ 接下来,您可以选择用来保存恢复项目的目标目录。点击"OK" (确定)确认选择。
 (→目标目录 → 确定 (OK))

→ 将已打开的项目以"062-121 Servo S210 IRT TO S7-1500"为名称进行另存。
 (→ Project (项目) → Save as... (另存为...) → 062-121 Servo S210 IRT TO S7-1500 → Save (保存))



7.2 在 TIA 博途中创建伺服驱动系统

 → 为了将 SINAMICS S210 的伺服驱动系统与 CPU1516F-3 PN/DP 连接在一起,必须切换到 "Network view"(网络视图)界面。在这里,可以操作鼠标拖放,将所需的"SINAMICS S210"拖到网络视图中。(→ Devices & networks(设备和网络)→ Network view(网络 视图)→ Drives & starters(驱动结构和起动器)→ SINAMICS drives(SINAMICS 驱动) → SINAMICS S210→200-240V 1AC, 0.4kW → article no.(文件编号):6SL3210-5HB10-4xFx → Version 5.2(版本 5.2)。



→ 之后在 "S210 PN"的 "PROFINET interface [X1]" (PROFINET 接口 [X1]) 属性中,设置一个与 CPU 相匹配的 IP 地址。(→ S210 PN → PROFINET interface[X1] (PROFINET 接口 [X1]) → Properties (属性) → Ethernet addresses (以太网地址) → IP protocol (IP 协议) → IP address (IP 地址): 192.168.0.21)

No. Siemens C:\Users\mde\Documents\At Project Edit View Insert Online Op Image: Signal Attribute Save project Image: Save project <th>tions To</th> <th>n\062-121 Servo S210 IRT TO S7-1 ols Window Help (4 ± 🗟 🕕 🎧 🚇 🙀 🎺 Go</th> <th>500\062-</th> <th>121 Servo S210 IRT TO S7-1500</th> <th>∃ ∏ •</th> <th>Totally Integ</th> <th>rated Automation PORTAL</th>	tions To	n\062-121 Servo S210 IRT TO S7-1 ols Window Help (4 ± 🗟 🕕 🎧 🚇 🙀 🎺 Go	500\062-	121 Servo S210 IRT TO S7-1500	∃ ∏ •	Totally Integ	rated Automation PORTAL
Project tree		062-121 Servo S210 IRT TO S7	-1500	Devices & networks			_ # =×
Devices				E T	opology view	h Network view	Device view
TEN .		Network Connections	connect	ion 🔽 📅 🖬 🖽	€ ±		
온				1 - 1 0			^
Name							
• 062-121 Servo S210 IRT TO S7-1500	^						z
Add new device		CPU1516F	D	rive unit_1			• two
B Bevices & networks		CPU 1516F-3 PN	S	210 PN			Ē Ž
CPU1516F [CPU 1516F-3 PN/DP]							ia ta
Device configuration			N	ot assigned			
😵 Online & diagnostics	=						
Software units		PN/IE_1					~
🕨 🛃 Program blocks		<			> 100	D%	
Technology objects		Drive unit_1 [S210 PN]			Properties	🚺 Info 🚺 🛛 Diag	nostics
External source files		Canada					
PLC tags		General					
PLC data types		▼ General	^	Ethernet addresses			^
Watch and force tables		Project information					
Online backups		Catalog information		Interface networked with			
🕨 🔀 Traces		Identification & Mainten					
OPC UA communication		▼ PROFINET interface [X150]		Subne	et: Not network	ed	
Device proxy data		General	= 5		Add n	ew subnet	
Program info		Ethernet addresses	-				
PLC supervisions & alarms		 Telegram configuration 		IP protocol			
PLC alarm text lists		Drive control-Telegrams	-	•			
Local modules		Advanced options		IP addres	s: 192 . 168	. 0 21	
Drive unit_1 [S210 PN]		Module parameters		Subpetmar	k. 255 255	255 0	
Ungrouped devices		Time synchronization / Tim		Sublet mas	200 . 200	. 200.0	
Security settings	~	Ethernet commissioning int	~		Synchron	ize router settings with IO	controller
> Details view		<	>		Use route	r	*
Portal view Overview	đ.	Devices & ne			A 🖪	Failed to enable IRT synchr	onization roles

7.3 通过 DRIVE-CLiQ 接口读入伺服电机数据和编码器数据

→ 如果使用紧凑型 S210 PN 伺服驱动系统,引导启动时会通过 X100 处的 DRIVE-CLiQ 接口 自动识别到伺服电机数据和编码器数据。这些数据可以轻松地通过中央控制单元 S210 PN 上传。(→ Drive unit 1(驱动装置 1)→ Upload from device(从装置加载))



提示:

- 在启动过程中,SINAMICS S210 会读取所连接 1FK2 电机的电子版发动机铭牌并执行一次电机调试。如果没有电机,就无法完成电机调试,也就无法完成自动调试。这种状态下无法对变频器进行参数化设置。只有诊断、复位等寥寥几项功能可以使用。
 - → 在接下来显示的对话框中选择 PG/PC 接口并点击"Start search"(开始搜索)。接着, 就可以看到"SINAMICS drive"(SINAMICS 驱动结构)并选择其作为目标设备了。然后 点击"Load"(加载)。(→ Type of the PG/PC interface (PG/PC 接口类型):PN/IE → PG/PC interface (PG/PC 接口):...→ Connection to subnet (连接子网):Directly at slot
 'CU X150'(直接连接"CU X150"插槽)→ Start search (开始搜索)→ S210 PN → Upload (加载))

学习/培训资料 | TIA 博途模块 062-121, 版本 2020/10 | Digital Industries, FA

	Device	Device typ	e Slot	Interface type	Address		Subnet	
	Drive unit_1	S210 PN	CU X150	PN/IE	192.168.0.21	1		
		S210 PN	CU X127	PN/IE	169.254.11.2	22		
		Type of the F	PG/PC interface:	🖳 PN/IE 问 Intel(R) Ethern	et Connection ((4) 1219-LM	 ▼ ▼]
		Connection to int	terface/subnet:	Direct at slot 'CU	X150'		-	0
			1st gateway				-	
						-		
	Device Antrieb \$210	Device type	Interface type PN/IE	Address	1	Target devi	ce 10	
1	Device Antrieb_S210 	Device type S210 PN —	Interface type PN/IE PN/IE	Address 192.168.0.2 Access addr	1 ress	Target devi Antrieb_S2 	ce 10	
Flash LED	Device Antrieb_S210 	Device type S210 PN -	Interface type PN/IE PN/IE	Address 192.168.0.2 Access add	1 ress	Target devi Antrieb_S2 	ce 10	
Flash LED	Device Antrieb_S210 	Device type S210 PN —	Interface type PN/IE PN/IE	Address 192.168.0.2 Access add	1 ress	Target devi Antrieb_S2 	ce 10 <u>S</u> tart :	search
Flash LED	Device Antrieb_S210 	Device type S210 PN -	Interface type PN/IE PN/IE	Address 192.168.0.2 Access add	1 ress Display only	Target devi Antrieb_52 	ce 10 <u>Start</u> s	search
Flash LED	Device Antrieb_S210 — n: compatible devices	Device type S210 PN - s of 1 accessible de	Interface type PN/IE PN/IE	Address 192.168.0.2 Access add	1 ress	Target devi Antrieb_52 error messa	ce 10 <u>S</u> tart : iges	search
Flash LED	Device Antrieb_S210 	Device type S210 PN 	Interface type PN/IE PN/IE	Address 192.168.0.2 Access add	1 ress Display only	Target devi Antrieb_S2 	ce 10 Start :	search

说明

重置 PROFINET 接口参数,恢复驱动结构的出厂设置之后,之前组态的模块名称可能会保留
 并作为设备名称进行分配。稍后再进行更改。

→ 现在电机和编码器 (Encoder) 均显示在设备组态界面上。请保存项目和之前所加载的数

据。 (\rightarrow Device configuration (设备组态) \rightarrow 🔚 Save project)



7.4 电机和编码器的详细信息

→ 所选择的电机可以显示在设备组态的属性中。(→ Device configuration(设备组态)→
 Properties(属性)→General(常规)→Motor - selection - 1FK2(电机选择 1FK2))

062-121 Servo S210 IRT TC	S7-1500 Antrieb_S	5210 [S210 PN]				-	
		e de la companya de la	Topology v	view 🔥	Network view	Device	view
Antrieb_S210 [S210 PN]		🔲 🔍 ±					a 🔲
Mot							Device data
SM 2500			>	100%			~
Motor_SMI_5 [Drive contro	1]		Propert	ties 🛄	nfo 🛛 🕄 Diagi	nostics	∎∎▼
General IO tags	System constants	Texts					
General Motor - selection - 1FK2	Motor - selection - 1	FK2					- =
Motor details Rating plate values Optional motor data	Basic param	neterization: 💌					
Encoder 4 [ENC]	Colorador Aug	Para de la compañía d	Presidence of	Based and an	Friender		
	Selection Artic	ers 🗐	Filters	n 40kw	Filter		
		2104-4AK1x-xDxx	3.000.0rpm	0.40kW	DRIVE-CLiO encod	er AM22, Mul	
	O 1FK	2104-4AK0x-xMxx	3,000.0rpm	0.40kW	DRIVE-CLiQ encod	er AM22, Mul	
	IFK:	2104-4AK1x-xMxx	3,000.0rpm	0.40kW	DRIVE-CLiQ encod	er AM22, Mul	
	0 1FK	2203-4AG0x-xCxx	3,000.0rpm	0.40kW	DRIVE-CLiQ encod	er AS22, Sing	
	○ 1EKC	2203-4AG1x-xCxx	3.000.0rpm	0.40kW	DRIVE-CLiO encod	er AS22, Sing	~

→ 已知电机的详细信息可以显示在这里。(→ Device configuration (设备组态) →
 Properties (属性) → General (常规) → Motor details (电机详细信息))

Motor_SMI_5 [Drive co	ntrol]	Properties	L Diagnostics	
General IO tags	System constants Texts			
General	Basic parameterization: 💌			^
Motor - selection - 1FK2				
 Motor details 	Rating plate values			220
Rating plate values				
Optional motor data				
Motor brake		Rated motor voltage:	124	Vrms
Encoder_4 [ENC]		Rated motor current:	2.40	Arms
		Rated motor speed:	3,000.0	rpm
		Maximum motor speed:	8,000.0	rpm
		Maximum motor current:	8.70	Arms
	Optional motor data	Pated motor power:	0.40	
		Rated motor power.	0.40	KYV
		Rated motor torque:	1.27	Nm
		Motor stall current:	2.40	Arms
		Motor stall torque:	1.27	Nm
		Motor moment of inertia:	0.000035	kgm ²

→ 编码器详细信息也可以显示在这里。(→ Device configuration(设备组态)→ Properties
 (属性)→ General(常规)→ Encoder_4(编码器_4)→ General(常规)→
 Measuring system – Selection – Drive-CliQ(测量系统 – 系统 – Drive-CliQ))

General 10 tags System constants Texts General Motor -selection - 1FK2 General Motor details Basic parameterization: Image: Constant in the	Motor_SMI_5 [Drive c	ontrol]	Q Properties	Info	L Diagnostics	
General Motor - selection - 1FK2 Motor details Rating plate values Optional motor data Motor brake Encoder_4 [ENC] General Measuring system -S Measuring system de SMDXC_3 [SM] Name: Encoder_4 Author: mde Comment: Comment: Short designation: DRIVE-CLiQ encoder Description: Encoder aMI22, Multitum 4096 Article number: IFK2104-4AK1xxMAx	General IO tags	System constants Texts				
 Motor details Rating plate values Optional motor data Motor brake Encoder_4 [ENC] Secure 3 Measuring system -5 Measuring system de SMIXX_3 [SM] Name: Encoder_4 Author: mde Comment: Comment: Short designation Short designation: DRIVE-CLiQ encoder DRIVE-CLiQ encoder DRIVE-CLiQ encoder AM22, Multitum 4096 Article number: 1FK2104-4AK1xsMAx 	General Motor - selection - 1FK2	General				
	 Motor details Rating plate values Optional motor data Motor brake Encoder_4 [ENC] General Measuring system -S Measuring system de SMIXX_3 [SM] 	Basic parameterization: Project information Name: Author: Comment:	Encoder_4 mde			
Short designation: DRIVE-CLIQ encoder Description: Encoder with integrated encoder evaluation and DRIVE-CLiQ interface. DRIVE-CLIQ encoder AM22, Multiturn 4096 Article number: 1FK2104-4AK1xxMAx		Catalog information				v
Article number: 1FK2104-4AK1x-MAx		Short designation: Description:	DRIVE-CLiQ encoder Encoder with integrated encoder eval DRIVE-CLiQ encoder AM22, Multiturn 41	uation and 096	DRIVE-CLiQ interface.	~
		Article number:	1FK2104-4AK1x-xMAx			

Motor_SMI_5 [Drive control]		Reperties	1 Info	Diagnostics	
General IO tags System constan	ts Texts				
General Motor - selection - 1FK2	Measuring syste	em - Selection - DRIVE-CLiQ			<u>^</u>
 ✓ Motor details Rating plate values Optional motor data Motor brake 	Basic p	parameterization: 🔎			
▼ Encoder_4 [ENC]	Selection	Encoder type selection			
▶ General	Y Y	<filter></filter>			
Measuring system - Selection - DRIVE-CLiQ Measuring system details SMIXX_3 [SM]	•	DRIVE-CLiQ encoder AM22, Multitu	urn 4096		

→ 测量系统详细信息显示在其它子菜单中。(→ Device configuration (设备组态)→
 Properties (属性)→General (常规)→Encoder_4 (编码器_4)→General (常规)→
 Measuring system details (测量系统详细信息))

Motor_SMI_5 [Drive control]		Roperties	Info Diagnosti	ics 📑 🗖 🗖 🤝
General IO tags Sys	tem constants Texts			
 General Motor - selection - 1FK2 	Measuring system details			
 Motor details Rating plate values Optional motor data 	Basic parameterization:			
Motor brake • Encoder_4 [ENC]	Encoder type DRIVE-CLiQ			
 General Measuring system - Select Measuring system details Encoder type DRIVE-CLIQ 		● Motor encoder [♥]	⊙ rotary ○ linear	 absolute incremental
Resolution Absolute protocol SMIXX_3 [SM]	Resolution			
	Pulses/revolution:	2,048		
	Absolute protocol			
	Multiturn: Singleturn resolution: Multiturn resolution:	Yes Tes 4,194,304 Steps 4,096 Revolution		

→ 这里也可以显示编码器评估装置。(→ Device configuration(设备组态)→ Properties
 (属性)→General(常规)→Encoder_4(编码器_4)→SMXX_3)

Motor_SMI_5 [[Drive cont	roi]			Properties	i Info	L Diagnostics	
General	IO tags	System constants	Texts					
General			- f					
Motor - selection	n - 1FK2	> > Catalog I	niormation					
 Motor details 								
Rating plate	values		Short designation:	DQConnecto	r			
Optional mot	tor data		Description	Motor-integra	ated encoder eva	luation unit		
Motor brake			Description.		notor integrated encoder evaluation unit			1.000
 Encoder_4 [ENC 	:]							
General								
Measuring sy	stem - Seleo	:t						
 Measuring sy 	stern detail:	5						~
Encoder ty	ype DRIVE-CL	.iQ	Article number:	1FK2104-4A	(1x-xMAx			
Resolution	1							
Absolute p	protocol							
▼ SMIXX_3 [SM]]							
Project	information							
Catalog	g informatio	n						
Encoder e	valuation - S	5						

7.5 驱动结构参数化设置

→ 要继续为变频器进行参数化设置,请双击打开"Drive_S210... [S210 PN](驱动_S210...[S210 PN])"的"Parameters"(参数)并在"Function view"(功能视图)界面中点击"Basic parameterization"(基础参数化设置)。在这里,我们先设置"Motor ambient temperature"(电机环境温度)和极限值。(→ Drive_S210...[S210 PN](驱动_S210...[S210 PN])→Parameterization(参数化设置)→Function view(功能视图)→Basic parameterization(基础参数化设置)→Motor(电机)→Motor ambient temperature(电机环境温度):25°C→Limits(极限值))



		Bar Function view	Parameter view
1 5			
Basic parameteriz	R		
Safety Integrated			
Digital inputs	Basic parameterization		
]
	Limitations		
	Positive speed limit		
	4,000.000 rpm	/	
	Negative speed limit		
	-4,000.000 rpm		
	Torque limit upper		
	1.00 Nm		
	Torque limit lower		
	-1.00 Nm		
	Quick stop (Off3 ramp-down time)		
	1.000 s		

Frei verwendbar 或研发机构自由使用。© Siemens 2020。保留所有权利。 sce-062-121-servo-s210-pn-irt-to-s71500_r2008-zh.docx → 在"Function view"(功能视图)界面中,也可以设置"Safety Integrated"(安全集成)和 "Inputs/outputs"(输入端/输出端)。(→ Drive_S210...[S210 PN](驱动_S210...[S210 PN))
 → Parameters (参数) → Function view (功能视图) → Safety Integrated (安全集成)→Inputs/outputs (输入端/输出端)→Digital inputs (数字输入端))

062-121 Servo S210 IRT TO	S7-1500 →	Antrie	b_\$210 [\$21	0 PN] + Drive control [S210 PN] +	Parameterizati	on	_ 🖬 🖬 🗙
						Base Function view	Parameter view
■ K Basic parameteriz ▼ Safety Integrated Function selection Enter password	∂ ∂∎ Digital in	puts	5				
Digital inputs	Specify	the fu	nction of the dig	ital inputs.			
	L+	۲	_			DI2+	
	DIO	۲		Activate measuring probe 1 [210] DI 0 (X130 / 1.2)	•	DI2-	
	• M	۲	_	Activate equivalent zero mark		DI3+	F-DI
	- L+	۲	_	[0] No zero mark substitute	-	DI3-	=
	DI1	۲		Activate measuring probe 2 [211] DI 1 (X130 / 1.5)	•	● -L+	Activate overtemperat
	м	۲	_			DI4	external brake resistor [0] no
		X130				X130	
	6	No Safe	ety Integrated Fu	inctions have been selected.			~
< III >	<						>

→ 在"Parameter view"(参数视图)界面,可以在不同的列表中查看所有参数,并根据访问权限和驱动结构状态进行更改(→ Parameter view(参数视图))

				₽0→ Function view	Param	eter view	
Parameter list							
B B	<u> 해</u> ±	🕀 ± 📕 😘					
All parameters	1	Number	Parameter text	Value	Unit	Data set	
Interlocking parameters		r2	Operating display	[42] Switching on inhibited - set "OC/OF			1
Commissioning		p9	Drive commissioning parameter filter 1	[0] Ready			
Save & reset		p10	Drive commissioning parameter filter 2	[0] Ready			
System identification		r20	Speed setpoint smoothed	0.0	rpm		
Universal settings		r21	Actual speed smoothed	0.0	rpm		
Inputs/outputs		r26	DC link voltage smoothed	323.5	V		
Communication		r27	Absolute actual current smoothed	0.00	Arms		
Power unit		r31	Actual torque smoothed	-0.02	Nm		
• Motor		r32	Active power actual value smoothed	0.00	kW		
Drive control		r34	Motor utilization thermal	0	%		
Drive functions		r37[0]	Drive temperatures, Inverter maximum value	35	°C		
 Safety Integrated 	-	r39[0]	Energy display, Energy balance (sum)	0.14	kWh		
Diagnostics		r44	Thermal converter utilization	0.00	%		
	-	▶ r46	Missing enable signal	50001C0FH			
		r61[0]	Actual speed unsmoothed, Encoder 1	0.00	rpm		
		r62	Speed setpoint after the filter	0.00	rpm		
		r63	Actual speed smoothed	-0.23	rpm		
		r68	Absolute current actual value	0.00	Arms		
		r70	Actual DC link voltage	323.50	V		
		r76	Current actual value field-generating	0.00	Arms		
		r77	Current setpoint torque-generating	0.00	Arms		
		r78[0]	Current actual value torque-generating, Unsm.	. 0.00	Arms		
		r79[0]	Torque setpoint total, Unsmoothed	0.00	Nm		
		r80	Torque actual value	-0.02	Nm		~
→ 在将参数加载到"Drive_S210...[S210 PN]"中之前,再次保存项目,"Ⅰ 。
(→ □ Save project → Drive_S210...[S210 PN](驱动_S210...[S210 PN]) → □)

₩ Siemens - C:\Users\mde\Documents\Autor	mation\062-121 Servo S210 IRT T	TO \$7-1500062-121 Servo \$210 IRT TO \$7-1500 _ 0
Project Edit View Insert Online Option	s loois Window Help りまでま 副 🎚 🏠 🖳 🐕	💋 Go online 🖉 Go offline 🎄 🖪 🖪 🛪 🚽 🛄 🕓 esearch in project>
Project tree 🔲 🖣	062-121 Servo S2 Download to	o device 0 → Antrieb_S210 [S210 PN] → Drive control [S210 PN] → Parameterization _ D = I = X
Devices		🛱 Function view
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 %	
	Basic parameteriz	2 A
Name	✓ Safety Integrated	
T 062-121 Servo S210 IRT TO S7-1500	Function selection	Basic parameterization
😤 🌁 Add new device	Enter password	
📥 Devices & networks	Digital inputs	
CPU1516F [CPU 1516F-3 PN/DP]		Limitations
Antrieb_S210 [S210 PN]		Protitive read limit
Device configuration		n state speed mint
😵 Online & diagnostics		4,000.000 rpm
2 Parameterization		
Commissioning		Negative speed limit
Acceptance test	-	4,000,000 mm
Traces	•	
Logrouped devices		
Security settings	- A	Torque limit upper M
Cross-device functions		1.00 Nm
Unassigned devices		
Common data		
Languages & resources		
Version control interface		-1.00 Nm
Online access		Quick stop (Off3 ramp-down time)
Card Reader/USB memory		
		1.000 5
	< III >	
> Details view		📴 Properties 🚺 Info 🖳 Diagnostics 💷 🖻 🔺
Portal view Overview	Drive control	🔜 🗹 The project 062-121 Servo S210 IRT TO

→ 开始加载前,再次显示总览以检查需执行的步骤。现在点击"Save parameterization retentively"(同时保存参数化设置)并点击"Load"(加载)。(→ Save parameterization retentively(同时保存参数化设置)→Load(加载))

ntrieb_S210 7 Drive parameteriz.	Ready for loading. Please note the following information: Save the parameterization retentively after the download	Load 'Antrieb_S210'
Drive parameteriz	Please note the following information: Save the parameterization retentively after the download	Save
	Save the parameterization retentively after the download	Save
		parameterization retentively

说明

- 建议同时保存参数,这样即便断电也不会丢失参数。

7.6 用控制面板测试和调试变频器

→ 为便于在没有 PLC 程序的情况下测试之前的参数化设置,请在 "Drive_S210...[S210 PN]"
 (驱动_S210...[S210 PN])的 "Commissioning" (调试)菜单下打开 "Control panel" (控制面板)。之后点击 " Go online "。 (→ Drive_S210...[S210 PN] (驱动_S210...[S210 PN]) → Commissioning (调试) → Control panel (控制面板) → Go online)

VA Siemens - C:\Users\mde\Documents\Auton	nation\062-121 Servo S	210 IRT TO \$7-1500\062-121 Se	rvo S210 IRT TO S7-1500			_ 🗆 X
Project Edit View Insert Online Options	Tools Window He	lp			Totally Integrated Auto	mation
📑 📑 🔚 Save project 📑 🐰 🏥 🗎 🗙	🍤 ± @ ± 🖥 🛄 🚺	🛯 🖳 💋 Go online 💋 Go of	fline 🔐 🖪 🖪 🗶 🖃	📙 < earch in project>	rotally integrated Auto	PORTAL
Project tree 🔲 🖣	062-121 Servo S210	IRT TO S7-1500 ▶ Antrieb_S	210 [S210 PN] + Drive co	ntrol [S210 PN] > Commission	ning .	_ # = X 📢
Devices	1 This function is on	ly available online.				× 🔋
1						Tas
	Control pa	Control nanel				
Name	One Butto					
• 062-121 Servo S210 IRT TO S7-1500						^ F
Add new device		Master control		Drive enables		ibr
Devices & networks		Activate 40-6	Deactivate	Set Set	Reset	arie
CPU1516F [CPU 1516F-3 PN/DP]						s
Antrieb_S210 [S210 PN]						
Device configuration		Control				
🖳 Online & diagnostics						d
🚰 Parameterization				Off Stop	Backward	ing ing
👬 Commissioning						
 Acceptance test 				Jog backward	Jog fo	erward =
🕨 🔄 Traces	•					
Ungrouped devices						
Security settings						
Cross-device functions		Drive status		Act	tual values	
Unassigned devices						
Common data						
Documentation settings					Speed actual value:	
Languages & resources						
Version control interface					DC link voltage:	
Online access						
Card Reader/USB memory		Fault	🔑 Missing ena	bles	Absolute current value:	
					Torque actual value:	
	<	<				>
> Details view				Q Properties	Linfo Diagnostics	
Portal view Overview	Real Prive control				Loading completed (errors: 0; warning	

→ 在控制面板中,首先必须激活 " [●] Activate master control" (控制权)。接着监控 PC 和 变频器之间的通信。此时需要至少每隔 10000ms 进行一次成功的通信。否则,电机将停止, 释放将重置。(→ Master control (控制权): [●] Activate → 10000ms → OK)

062-121 Servo S2	10 IRT TO \$7-1500 → Antrieb_\$210 [\$210 PN] → Drive control [\$210 PN] → Commissioning	_ I‼ ■ ×
. 1 6		
Control pa	Control panel	
One Butto	Activate master control X	
	Master control Image: Control Activate Activate Image: Control Activate Control The master control of the control panel will be activated. This function is only suitable for commissioning, diagnostic and service purposes and may only be used by authorized personnel. Control The following applies when the control panel is active: The safety shutdowns from the higher-level controller have no effect. Speed The "Stop with spacebar" function is active. Pressing the spacebar triggers a quick stop, which however cannot be guaranteed for all operating conditions. Therefore a hardware solution must be implemented for the emergency stop circuit. You must take the required measures. Note: A quick stop is also triggered when you switch to another application or open dialog boxes (e.g., loading of another station).	
	Drive status Non-observance can result in injury and material damage. Drive status The connection between the PC and drive is monitored. If no sign-of-life is received from the PC during this monitoring time, the master control is returned for safety reasons and a coast down of the axis triggered.	0.0
	Monitoring time: 10000 ms	32
	Fault OK Cancel	0.00
	Occupies divelop [42] Switching on inhibited -set "OC(OFE2" = "1" Active power actual value:	0.0
		>
< III >		

→ 要启动电机,首先必须使驱动器使能置位 Set 。一般情况下,置位自动完成。之后
 电机可以以所选的转速 Forward 或 ▲Backward 启动。 (→ Speed (转
 速):1000.00 rpm → Forward)

062-121 Servo S2	210 IRT TO \$7-1500 ► Antrieb_\$210 [\$210 PN] ► Drive control [\$210 PN] ► Cor	nmissioning ///////////////////////////////////
Control pa One Butto	Control panel	
	Master control Drive e	nables
	Control	
	Speed 1,000.00 rpm of Job	Stop Backward Forward
	Drive status	■ Actual values
	Ready for switching on Operation enabled	Speed actual value: 0.0 rpm
	Fault Missing enables	DC link voltage: 321.9 V Absolute current value: 0.00 Arms
	Operating display: [31] Ready for switching on - set "ON/OFF1" = "0/1"	Torque actual value: -0.02 Nm Active power actual value: 0.00 kW
	Active fault:	Motor utilization thermal: 12 %

→ 单击 '¹, 可以关闭驱动结构。测试完成后必须重新 ¹ Deactivate</sup> 控制权。

 $(\rightarrow \square \rightarrow \textcircled{} Deactivate)$

062-121 Servo S210	IRT TO \$7-1500 → Antrieb_\$210 [\$210 PN] → Drive control [\$210 PN] → Com	missioning 🛛 🖉 🖉 🖉 🖉 🖉 🖉 🖉
Control pa One Butto	Control panel	
	Master control Drive ena	bles Set Reset
	Control	
	Speed 1,000.00 rpm	Stop Backward Forward
4	Drive status	≡ Actual values
	Ready for switching on Operation enabled	Speed actual value: 1,000.0 rpm
		DC link voltage: 320.2 V
	🔄 Fault 🥕 Missing enables	Absolute current value: 0.14 Arms
		Torque actual value: 0.07 Nm
	Operating display: [0] Operation - everything enabled	Active power actual value: 0.01 kW
	Active fault:	Motor utilization thermal: 12 %
< III >	۲	>

062-121 Servo S2	10 IRT TO \$7-1500 ▶ Antrieb_\$210 [\$210) PN] ► Drive control [S210 PN] ► Comm	issioning	//// _ !! = ×
Control pa One Butto	Control panel			
	Master control	Drive enab	t Reset	<u>^</u>
	Control Dee Speed 1.00 Drive status	Activate control panel The master control of the control p All enables are deleted before returning y Setpoints and commands then come froi again (e.g. via the fieldbus or terminals). If a setpoint and ON command are prese immediately. This can represent a danger for personne Do you want to deactivate the master co	Annel will be deactivated.	onvard
	Fault	Missing enables	Absolute current value:	0.0 rpm 321.4 V 0.00 Arms
	Operating display: [42] Sv	vitching on inhibited - set *OC/OFF2* = *1*	Torque actual value:	0.00 Nm
< III >	Active fault:	- 	Motor utilization thermal:	12 %

学习/培训资料 | TIA 博途模块 062-121, 版本 2020/10 | Digital Industries, FA

Yes Sector Sinde Occurrent State Project Edit View Insert Online Options Tools Wir Image: Save project	1 Servo S210 IRT TO S7-1500062-121 Servo S2 dow Help I 🚺 🚺 🔛 📪 🚿 Go online 📝 Go offline	210 IRT TO S7-1500	Totally Integrated Auton	nation PORTAL
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Bag Security settings Bag Security settings Unassigned devices Bag Common data Bag Common data Common data Common data Content attain settings Card seaders & resources Card seaders & resources Card Reader/USB memory	Drive status Ready for switching on Fault	Operation enabled Missing enables	Actual values Speed actual value: DC link voltage: Absolute current value:	

7.7 将伺服驱动作为 IRT 设备分配给 CPU1516F-3 PN/DP

→ 为了将 SINAMICS S210 作为 IRT 设备分配给 CPU1516F-3 PN/DP,必须切换到 "Network view" (网络视图)界面。在这个界面操作鼠标,将 S210 PN 的中央控制单元

与 CPU1516F-3 PN/DP 通过以太网接口连接在一起。(\rightarrow 早 Ethernet (以太网) \rightarrow 早 Ethernet (以太网))

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	Devices & networks	CPU 1516F-3 PN 5210 PN		- Berlin - B	1
e l	CPU1516F [CPU 1516F-3 PN/DP]				
	Antrieb_S210 [S210 PN]	Not assigned		8	
	Device configuration	DURE 1		<u>9</u>	2
	Q Online & diagnostics	PN01E_1		ine	
	2 Parameterization			5	5
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	Unassigned devices				
	🕨 🙀 Common data				ן
	Documentation settings				
	Languages & resources			ari	-
	Version control interface			es	;
	Online access				4
	Card Reader/USB memory			A	2
				id-i	2
					5
		K III > 100%			-
	> Details view	Properties	fo 😨 Diagnostic	s IIA	
	Portal view	Devices & ne	on to Drive unit 1 termin	ated	

→ 进行 IRT 连接的另外一个前提条件,是按照规定将 S210 PN 中央控制单元的各个接口分配
 给 CPU1516F-3 PN/DP 的接口。在此处通过操作鼠标连接相应接口 1。(→ Topology view (拓扑视图) → Port_1 (接口_1) → Port_1 (接口_1))

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111	E 🖶 🔳 🗉 🔲 Q t			Topology overview	Topolog	y compar	ison	
Name			~					
 062-121 Servo \$210 IRT TO \$7-1500 			=	Device / port		Slot	Partner station	Par
Add new device	CPU1516F	Antrieb_S210		 \$71500/ET200M 	IP station_1			
Bevices & petworks	CPU 1516F-3 PN	S210 PN		CPU1516F		1		
CPU1516E [CPU1516E-3 PN/DP]				 PROFINET 	interface_1	1 X1		
Antrieb \$210 [\$210 PN]		CPU1516F		Port_1		1 X1 P1		
Device configuration				Port_2		1 X1 P2		
Q Online & diagnostics				 PROFINET 	interface_2	1 X2		
Parameterization			1	Port_1		1 X2 P1		
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Cross-device functions	1							
Common data	1							
Documentation settings								
Languages & resources	1							
Version control interface								
Online access								
Card Reader/USB memory								
			~					_
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→ "Topology overview" (拓扑概览)可以显示拓扑分配的详细信息。 (→ Topology view
 (拓扑视图) → Topology overview (拓扑概览))

Via Siemens - C:\Users\mde\Documents\Autor	nation\062-121 Servo S210 IRT	TO \$7-1500\062-121 Servo \$2	10 IRT TO \$7-1500					
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Name		^						vare
062-121 Servo S210 IRT TO S7-1500		=	Pevice / port	Slot	Partner station	Partner devic	Partner port	t [
Add new device	CPU1516F	Antrieb_S210	 S71500/ET200MP station 	_1				alc
Devices & networks	CPU 1516F-3 PN	S210 PN	▼ CPU1516F	1				ŝ
CPU1516F [CPU 1516F-3 PN/DP]			 PROFINET interfac 	e_1 1 X1				
Antrieb_S210 [S210 PN]		CPUISIOF	Port_1	1 X1 P1	SINAMICS S_1	Antrieb_S210	Port_1	8
Device configuration			Port_2	1 X1 P2	1		Any partner	r c
Q Online & diagnostics			 PROFINET interfact 	e_2 1 X2				
Parameterization			Port_1	1 X2 P1	8		Any partner	r a
A Commissioning			✓ SINAMICS S_1					9
 Acceptance test 			 Antrieb_S210 	CU				
Traces			 PROFINET interfact 	e CU X1				-
Ungrouped devices			Port_1	CU X1	. \$71500/ET20	CPU1516F	Port_1	3
Security settings			Port_2	CU X1			Any partner	r
Cross-device functions								29
Common data								
Documentation settings								L
Languages & resources								100
Version control interface								9
Online access								co.
Card Reader/USB memory								
	< III > 100%		<					>
> Details view			Q.	roperties	i, Info	B Diagnostic	is 🗆 🗆 🗉	4
A Portal view	Devices & ne				Connection to D	rive unit 1 termin	nated	

→ 返回"Network view"(网络视图),驱动的设备名称已分配在"General"(常规)下。
 (→ Network view(网络视图)→General(常规)→Name(名称):Drive_S210_magazine
 (驱动_S210_刀库))

🕒 🔒 Save project 📑 🐰 🗎	ũΧ	🎝 ± (여 ± 🗄 🗉 🖬 🖉 🌽	Go onli	ne 🖉 Go offline	å? ₪ ₪ × 0		I otally Inte	grated Automation PORT
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062-121 Servo S210 IRT TO S7-	1500	CDU15165			uring \$210 m			_
Add new device		CPU 1516F-3 PN			210 PN			4
Devices & networks					ň o			
CPU1516F [CPU 1516F-3 PI	N/DPJ				PU1516E			+
Drive_S210_magazine [S2	TO PNJ							
Online & diagnostics			CPU15	16F.PROFINET	D-S			
Parameterization					An			~
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Cross-device functions		Project information		-				
Common data		Catalog Information		Project info	mation			
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Languages & resources		General			Name:	Drive S210 magazing	,	
Version control interface		Ethernet addresses			indifie.	Diric_5210_inugutin	Name	
Online access		 Telegram configuration 		•	Author:	mde	Marine	
Caro Readerioss memory		Drive control-Telegrams			Comment:			^
		Advanced options						
	>	Module parameters	~					
			The second second					

→ 务必保证在 "S210 PN"的 "PROFINET interface" (PROFINET 接口)的
 "PROFINET"项下,该名称已自动应用为 PROFINET 设备名称。(→ PROFINET interface (PROFINET 接口)→ Ethernet addresses (以太网地址)→ PROFINET →
 Generate PROFINET device name automatically (自动生成 PROFINET 设备名称))

062-121 Servo S210 IRT TO S7-	1500 ► D	evices & networks			_ - - - ×
Network Connections	connection		Topology view	Network view	Device view
CPU1516F CPU 1516F-3 PN	CPU1516	Drive_S210_m S210 PN CPU1516F	₽ IO system	: CPU1516F.PROFINET	IO-System (100)
< .			> 1009	6 💌	
Drive_S210_magazine [S210 Pl	N]		Q Properties	🗓 Info 🖳 Diag	nostics 🛛 🗖 🖃 🥆
✓ General Project information Catalog information		Router address :	Use router		·
Identification & Maintenance PROFINET interface [X150] General Ethernet addresser	-	PROFINET	Generate PROFINET dev	vice name automatically	
 Telegram configuration Drive control-Telegrams Advanced options 	<u>*</u>	PROFINET device name: Converted name: Device number:	drive_s210_magazine drivexbs210xbmagazineb	e3d	
Module parameters	× >		-L.,		 \

→ 现在可以对 "PROFINET interface" (PROFINET 接口)进行 "Real time settings" (实时设置)。首先,针对这个应用,在同步选项卡下选择 "IRT" (Isochronous Real Time,等时实时)这个实时类并确定域设置。 (→ PROFINET interface (PROFINET 接口) → Advanced options (高级选项) → Real time settings (实时设置) → Synchronization (同步) → RT class (实时类): IRT → Domain settings (域设置) → cpu_1516f.profinet-interface_1 (cpu 1516f.profinet 接口 1):SyncMaster → Send clock (发送时钟):2,000 ms)

062-121 Servo S210 IRT TO S7-1	1500 Devices & networ	ks			_ 7 =
			🚽 Topology view	h Network view	Device view
Network Connections	connection 💌 🕎		€ ±		
			₽ IO system	n: CPU1516F.PROFINET	IO-System (100) 🛆
CPU1516F	Drive	_\$210_m			
	5210				1
	CPU15	516F 🏭			
	-				
	CPU1516F.PROFINET IO-S				
			100		V
rive \$210 magazine [\$210 D	ul .			* U	
nve_5210_magazine [5210 PN	1		S Properties	Linfo C Diag	inostics
General					
General	>> Synchroni	zation			
Ethernet addresses					
Telegram configuration					
Drive control-lelegrams		Sync domain:	Sync-Domain_1		omain settings
 Advanced options 		RT class:	O RT		
Interface options			(IRT		
Media redundancy	- +				
Isochronous mode	Syn	chronization role:	Sync slave		
 Real time settings 					
IO cycle					
Synchronization					
			_		
N/IE_1 [Industrial Ethernet]			Reperties	Linfo Dia	gnostics
General IO tags Syste	m constants Texts				
PROFINETSubnet	Sunc Domain 1				
General	sync-bomain_r				
▼ Domain management					
 ▼ Domain management ▼ Sync domains 	Sync dom	ain: Sync-Domai	n_1		
 Domain management Sync domains Sync-Domain_1 	Sync dom Converted na	nain: Sync-Domai	n_1 nxb19998]
Domain management Sync domains Sync-Domain_1 MRP domains	Sync dom Converted na Send c	nain: Sync-Domai	n_1 nxb19998		mt 💌
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Domain management Sync domains Sync-Domain_1 MRP domains Overview isochronous mode CPU1516F.PROFINETIO-Syste	Sync dorr Converted na Send c	nain: Sync-Domai ime: sync-domai clock 2.000 @ Default d	n_1 nxb19998 omain		ms 💌
Domain management Sync domains Sync-Domain_1 MRP domains Overview isochronous mode CPU1516F.PROFINET IO-Syste	Sync dorr Converted na Send c	nain: Sync-Domai me: Sync-domai clock 2.000 Ø Default d Make 'hig	n_1 nxb 19998 omain Jh performance' possible		ms 💌
Domain management Sync domains Sync-Domain_1 MRP domains Overview isochronous mode CPU1516F.PROFINETIO-Syste	Sync dorr Converted na Send c	aain: Sync-Domai ame: Sync-domai clock 2.000 Default d Make 'hig Allows th	n_1 nxb19998 omain yh performance' possible e use of 'fast forwarding'		ms 💌
Domain management Sync domains Sync-Domain_1 MRP domains Overview isochronous mode CPU1516F.PROFINET IO-Syste	Sync dorr Converted na Send c	aain: Sync-Domai ame: sync-domai clock 2.000 Default d Make 'hig Allows th	n_1 nxb19998 omain jh performance' possible e use of 'fast forwarding'		ms 🔻
Domain management Sync domains Sync-Domain_1 MRP domains Overview isochronous mode CPU1516F.PROFINETIO-Syste	Sync dorr Converted na Send c	aain: Sync-Domai ame: Sync-domai clock 2.000	n_1 nxb19998 omain gh performance' possible e use of 'fast forwarding'		ms 💌
Domain management Sync domains Sync-Domain_1 MRP domains Overview isochronous mode CPU1516F.PROFINETIO-Syste	Sync dorr Converted na Send c > > > Devices IO system	aain: Sync-Domai ume: sync-domai clock 2.000 V Default d Make 'hig Allows th	n_1 nxb19998 omain yh performance' possible e use of 'fast forwarding'		ms 💌
Domain management Sync domains Sync-Domain_1 MRP domains Overview isochronous mode CPU1516F.PROFINETIO-Syste	Sync dorr Converted na Send o > > > Devices IO system IO system	aain: Sync-Domai ume: sync-domai clock 2.000 I Default d Make 'hig Allows th	n_1 nxb19998 omain yh performance' possible e use of 'fast forwarding' Sync master		ms

RT class Synchronization role

Sync slave

IO devices

PROFINET device name

drive_s210_magazine

cpu1516f.profinet interface_1 RT... 💌 Sync master

IRT

DFP group

Redundancy level

No redundancy

-

→ 现在必须为"Drive_S210_magazine"(驱动_S210_刀库)设置时钟同步运行。(→
 Drive_S210_magazine(驱动_S210_刀库)→ PROFINET interface(PROFINET 接口)→
 Advanced options(高级选项)→ Isochronous mode(等时模式)→ Isochronous mode(等时模式))

Drive_S210_magazine [S210 Pt	۱]		Properties 🗓 Info 🗓 Diag	jnostics		
General						
▼ General	~	a la colora e constato			4	-
Project information		Isochronous mode				
Catalog information		Isochronous mode for local i	nodules			
Identification & Maintenance						
▼ PROFINET interface [X150]			Sochronous mode			
General		Send clock:	2,000	ms	7	
Ethernet addresses	=					
 Telegram configuration 		Application cycle:	2.000	ms		
Drive control-Telegrams	-	Ti/To values:	Automatic minimum			
 Advanced options 		Time Ti (read in process	· · · · · · · · · · · · · · · · · · ·			
Interface options	-	values):	0 ms 🖨			
Media redundancy		Intervals:	0.125	1	ms	
Isochronous mode		Time To (output process				
 Real time settings 		values):	0 ms 🌲			
IO cycle		Intervals:	0.125		ms	
Synchronization						
• Port [X150 P1]	~	Detail overview				1

 → 针对 PLC 和变频器之间的"Cyclic data exchange"(周期性数据交换),规定 使用"Standard telegram 5"(标准消息帧 5)。(→ PROFINET interface[X150]
 (PROFINET 接口 [X150]) → Cyclic data exchange(周期性数据交换) → Send
 (Actual value)(发送(实际值)):Standard telegram 5(标准消息帧 5) → Receive
 (Setpoint)(接收(设定值)):Standard telegram 5(标准消息帧 5))



→ 地址范围可选择 "I 256...264"和 "Q 256 ... 264"。(→ PROFINET interface[X150]
 (PROFINET 接口 [X150]) → Cyclic data exchange (周期性数据交换) → Send (Actual value)(发送(实际值)) → Start address I 256 (起始地址 I 256) → Receive (Setpoint)
 (接收(设定值)) → Start address Q 256 (起始地址 Q 256))



→ 必须给时钟同步运行下的"Drive_S210_magazine"(驱动_S210_刀库)分配一个时钟同步组织块。取消勾选 "Add new and open"(新添加并打开)。(→ PROFINET interface[X150](PROFINET 接口 [X150])→ Cyclic data exchange(周期性数据交换)→
 Send (Actual value)(发送(实际值))→ Organization block(组织块)→ Add new → MC-Servo(MC 伺服)→ Add new and open(新添加并打开)→ OK)

Drive_S210_magazine [S210	PN] (None)		i -
General			
▼ General			^
Project information			
Catalog information			
Identification & Mainten			
▼ PROFINET interface [X150]			
General			
Ethernet addresses			
 Telegram configuration 			
 Drive control-Telegrams 			
Send (Actual value)			
Receive (Setpoint)			
 Advanced options 			🚰 Add new 🚽 🗙
Interface options	Organization block		(Automatic update)
Media redundancy	Process image		Automatic undata
Isochronous mode	Process image		Automatic update
Name: MC-Servo			
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	🛀 MC-Servo	Language:	LAD 🔻
	Synchronous Cycle		
-OB		Number:	91
Organization			Manual
block			() Wallout
			 Automatic
		Provintion	
		Description:	
		The organization used for S7-1500 such as I/O acces control. It is called with a If the Motion IO is isochronous IO s defines the cycle cycle time via the Servo [OB91].	block MC-Servo [OB 91] is Motion Control functions ss, signs of life and position constant bus cycle time. soperated in an ystem, the bus cycle clock time. You can also set the properties of the OB MC-
		more	
> Additional informat	ion		
			OK Cancel
			Cancer

→ 自动把时钟同步组织块分配给接收消息帧。现在保存项目及上述设置。(→ PROFINET interface[X150](PROFINET 接口 [X150]) → Cyclic data exchange(周期性数据交换) →
 Receive (Setpoint)(接收(设定值)) → Organization block(组织块) → MC-Servo (MC 伺服) → Seve project)

White Sector C:\Users\mde\Documents\Autor Project Edit View Insert Online Option: String Save project Image: Save project	nation\062-121 Servo S210 IRT To s Tools Window Help	57-1500\062-1	21 Servo S210 IRT TO S7-15	00 }	Fotally Integrated Automation	
Project tree I <	062-121 Servo S210 IRT TO S7	-1500 > Devi	es & networks			X
Save project				Topology view	work view	
1943 III 🖬	R Network	I connection] ⊕ ↓		Ha
s t				I IO system: CBI1516	E PROFINET IO-System (100)	rdw
Name						are
au 3 062-121 Servo S210 IRT TO 57-1	CPU1516F-3 PN	CPU1516F.PR	Drive_\$210_m \$210 PN <u>CPU1516F</u> OFINET IO-S			Catalog Donli Network data
Program blocks				100%	×	ne
Add new block				100%	· · · · · · · ·	too
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MC-Servo [OB91]	General					
MOTOR_SPEEDCONTR	▼ General			Drive	Partner	~ 1
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MOTOR_AUTO [FB1]	Catalog information			once contor relegions	cronologi complete co	ks
MAGAZINE_PLASTIC [Identification & Mainten		Role	Device	Controller	=
MOTOR_AUTO_DB [DB	▼ PROFINET interface [X150]		IP address	192 . 168 . 0 . 21	192.168.0.1	
SPEED_MOTOR [DB2]	General	=	Telegram	Standard telegram 5	•	E:
Technology objects	Ethernet addresses		Slot	3		ran
External source files	 Telegram configuration 	•	5101			es
PLC tags	 Drive control-Telegrams 	-	Start address	PZD 1	1256	
PLC data types	Send (Actual value)	•	Length	9 words	9 words	
Watch and force tables	Receive (Setpoint)		Extension	_	-	Ado
Online backups	 Advanced options 					
🕨 🔀 Traces	Interface options					S
OPC UA communication	Media redundancy		Organization block		MC-Servo	
	Is ochronous mode		Process image		PIP OB Servo	
Details view	▼ Real time settings					~
	10 orda	•			,	2
Portal view Discrete Overview	m Devices & ne			i On IO device	e Drive_S210_magazine, th	

7.8 在 CPU1516F-3 PN/DP 中创建工艺目标

 → 为了控制伺服驱动中的定位应用,我们需要在 CPU1516F-3 PN/DP 中创建一个新的工艺目标。为此,在"Motion Control"(运动控制)下选择工艺目标"TO_PositioningAxis" (TO_定位轴)。(→ CPU1516F-3 PN/DP → Technology objects(工艺目标)→ Add new object(添加新目标)→ Motion Control(运动控制)→TO_PositioningAxis(TO_定 位轴)→ PositioningAxis_magazine(定位轴_刀库)→ OK)



Use position values with higher resolution

Enable modulo

Activate simulation

-

•

-

mm

mm

→ 现在工艺目标的"Function view"(功能视图)自动打开。此时先选择此处所显示的
 "Basic parameters"(基础参数)。(→ Function view(功能视图)→ Basic parameters(基础参数))

062-121 Servo S210 IRT TC	0 \$7-15 00	• CPU1516F [CPU 15	516F-3 PN/DP] 🕨 T	echnology objects 🕨	PositioningAxis_ma	igazine [DB4]	_ ₪■×
						Function view	Parameter view
						_	
Basic parameters							~
Hardware interface	8	Basic parameters _					
Leading value settings	0						
Extended parameters	0			Name: PositioningAx	s_magazine		
				PLC			
					N		
					·	_	
			User program	Technologyobject	Drive	Motor	
				axis	Dilve	Wotor	
	-	Axis type					
				Virtual ax	s		
				Linear			
				Rotary			
				Onotary			
				_			
						666.	
							~
		x					1
062-121 Servo S210 IRT TC	S7-1500	• CPU1516F [CPU 15	516F-3 PN/DP] 🕨 T	echnology objects 🕨	PositioningAxis_ma	igazine [DB4]	_ II I ×
						Function view	Parameter view
ᅇ ഥ 는 눈							
				-			
Basic parameters				 Linear 			<u>^</u>
 Hardware interface Leading value settings 				O Rotary			
Extended parameters	ĕ						
, and provide the					And the second se		
							-
		Units of measure	e				

Unit of measure for position: mm

Unit of measure for velocity: mm/s

Unit of measure for torque: Nm Unit of measure for force: N

Modulo start value: 0.0

Modulo length: 1000.0

Modulo

Simulation

→ 之后在 "Drive_S210_magazine" (驱动_S210_刀库)中选择 "Drive control" (驱动控制)作为工艺目标的 "Hardware interface" (硬件接口)。 (→ Hardware interface (硬件接口)→Drive (驱动结构) → PROFINET IO-System(100) (PROFINET IO 系统 (100)) →
 Drive_S210_magazine (驱动_S210_刀库) → Drive control (驱动控制) → ▼)

062-121 Servo S210 IRT TO S7-1500	CPU1516	SF [CPU 1516F-3 PN/DP] → Te	echnology objects 🕨 Pos	sitioningAxis_magazine [DB4]	_ II 🛛 ×
				Function view	Parameter view
Basic parameters Hardware interface Leading value settings Extended parameters Construction of the settings Extended parameters Construction of the settings Construction of the setting Construction of the s	Hardware	interface			
Time CPU1516F [CPU 1516F Time CPU1516F Time CPU1516F [CPU 1516F Time CPU1516F [CPU 1516F Time CPU1516F [CPU 1516F [CPU 151	3 PN/DP] (100) jazine	Name Drive control	Device type Standard tel.	Power Encoder Motor	
Show all modules		Drive:	✓elect drive>	Encoder data	
	<	m			×

062-121 Servo S210 IRT TO S7	-1500	CPU1516F [CPU 1516F-3 PN/DP] Technology objects PositioningAxis_magazine [DB4]	_ ⊫∎×
		Function view	Parameter view
Basic parameters	2	Hardware interface	^
 Hardware interface 	×		
Encoder	ŏ	Drive	
Data exchange with the drive	ŏ		
Data exchange with encoder	õ		
Leading value settings	0	Drive	
	•	PLC PLC Encoder Motor Data exchange Encoder data	
		Drive type: PROFidrive	
		Data connection: Drive	
		Drive: <u>control_Standard_telegram_5</u> Device configuration	
	_	Drive configuration	
			~
		×	>

→ 自动应用编码器数据。 (→ Hardware interface (硬件接口) → Encoder (编码器))

062-121 Servo S210 IRT TO S7-	-1500	CPU1516F [CPU 1516F-3 PN/DP] Technology objects PositioningAxis_magazine [DB4] _ ■ ■ X
		Function view Parameter view
** 🖶 🖻 🛅		
Basic parameters	0	The second s
✓ Hardware interface	0	Encoder
Drive	0	
Encoder	0	
Data exchange with the drive	0	Drive
Data exchange with encoder	0	
Leading value settings	0	Power
Extended parameters	0	PLC
		Encoder - Mator
	_	
	-	
	•	
		★ ★★
	•	
		Data exchange Encoder data
		Data connection: Encoder
		Encoder: Drive_S210_magazine.Drive_d III Device configuration
		Encoder type: Cyclic absolute
		< m >

→ 保留用于与驱动结构进行数据交换的数值。(→ Hardware interface (硬件接口) → Data
 exchange with the drive (与驱动结构的数据交换))

062-121 Servo S210 IRT TO S7-	-1500	▶ CPU1516F [CPU 1516F-3 PN/DP] ▶ Technole	ogy objects → PositioningAxis_magazine [DB4] _ LE ■ X
			Function view Parameter view
* 🖶 🗄			
Basic parameters	0	Data exchange with the drive	×
✓ Hardware interface	0		<u> </u>
Drive	2		
Encoder	×		Drive
Data exchange with encoder	ŏ		
Leading value settings	õ		Power
Extended parameters	0	PLC	
			Encoder Motor
			Ji un 🔤
		<u>+</u>	† †
	Ī	Data	exchange Encoderdata
		Drive data	
		Drive telegram: Sta	ndard telegram 5
			Automatically apply drive values during configuration (offline)
			Automatically apply drive values at runtime (online)
		Reference speed: 800	0.0 1/min
		Maximum speed: 800	0.0 1/min
			×
		N	2

→ 保留用于与编码器进行数据交换的数值。(→ Hardware interface (硬件接口)→ Data exchange encoder (编码器数据交换))

062-121 Servo S210 IRT TO S7-1500	▶ CPU1516F [CPU 1516F-3 PN/DP] ▶ Tech	nology objects 🔸 PositioningAxis_magazine [DB4] 🛛 🗕 📕 🗮 🗙
		Function view Parameter view
* + = =		
Basic parameters ♀ ▼ Hardware interface ♀	Data exchange with encoder	
Drive		
Data exchange with the drive		Drive
Extended parameters	FLC	Power Encoder Encoder data Image: Encoder data Standard telegram 5 Image: Encoder values during configuration Automatically apply encoder values during configuration (offline) Automatically apply encoder values during runtime (online) Rotary 2048 4096
	< m	× •

 → 在"Extended parameters"(高级参数)下,可以根据规定的"Drive mechanism"(驱 动机械结构)进行调整。在这里选择所显示的设置。(→ Extended parameters(高级参 数)→ Mechanics(机械结构)→ Drive mechanism(驱动机械结构))

062-121 Servo \$210 IRT TO \$7-1	1500 🕨	CPU1516F [CPU 1516F-3 PN/DP] • Tec	hnology objects → PositioningAxis_n	nagazine [DB4]	_ II I X
				Function view	Parameter view
Basic parameters			20,		^
✓ Hardware interface	0				
Drive	0		No.		
Encoder	0				
Data exchange with the drive	0				
Data exchange with encoder	0				
Leading value settings	0				I
 Extended parameters 	0				
Mechanics	0	Encoder			
Dynamic default values	0				
Emergency stop	0	Encoder mounting type:	On motor shaft		
	0		Invert encoder direction		
Position limits	0				
Dynamic limits	0				
Torque limits	0.				
Fixed stop detection					
Homing	0	Drive mechanism			
Active homing	0		Invert rotation direction of drive		
Passive homing	0	Landman			
 Position monitoring 	0	Load gear			
Position monitoring	0	Number of motor revolutions:	1		
Following error	0	Number of load revolutions:	1		
Standstill signal	0	Position parameters			
Control loop	0	Leadscrew pitch:	10.0 mm/rot		
					~
	<				>

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 → 在"Extended parameters"(高级参数)下,可以对机械结构、动态响应默认设置、极限 值、参考设置、位置监控等进行设置。(Extended parameters(高级参数)→Dynamic default values(动态响应默认设置)→...)



提示:

- 关于各项设置的详细信息,请参阅在线帮助和手册。

7.9 加载 CPU1516F-3 PN/DP 和为驱动结构分配设备名称

→ 现在保存项目并将包含设备组态、变频器 S210 PN(作为设备)和工艺目标的 CPU1516F 3 PN/DP 加载到 "CPU_1516F [CPU1516F-3 PN/DP]"中。(□ Save project → CPU_1516F
 [CPU1516F-3 PN/DP] → □)

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🕸 🎦 🗔 Save project 📃 🗶 🛍 🕅	XD±CH±	🔚 🔃 🟠 🛄 🔝 🎺 Go of	nline 🖉 Go offline 🛔 🌆 🌆 🗶 🖂	m •	Totally integ	POF	TAL	
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				-	1	120.0		
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■ 062-121 Servo S210 IRT TO S7-1500	~					=	6	1
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🕴 📥 Devices & networks	CPL	J 1516F-3 PN	S210 PN				ġ	1
🖉 🔻 📊 CPU1516F [CPU 1516F-3 PN/DP]			8					
Device configuration			CPU1516F	1			ų	9
😵 Online & diagnostics	=						9	2
Software units			PN/IE_1				5	ġ.
🕨 🔂 Program blocks						_	e 10	÷
Technology objects						_	2 0	2
🕨 🐻 External source files						_	1	
PLC tags								1
PLC data types							A data	4
Watch and force tables							12 B	5
Online backups							S	ĩ
🕨 🔛 Traces								4
OPC UA communication								2
Device proxy data								1
Program info							an	2
🖙 PLC supervisions & alarms							es	;
PLC alarm text lists						_		
Local modules								
Distributed I/O								
▼ 2 Drive_\$210_magazine [\$210 PN	4]					~		
Device configuration	~ <	1111		> 100%				5
Dotails view				Properties		postics		
> Details view				- rioperties		nostics		1
Portal view	di Device	es a ne		🔜 🗹 Th	e project 062-121 Servo	S210 IRT TO		

→ 此外还必须给作为 CPU_1516F 的 IO 设备的变频器 S210 分配设备名称。为此,先选中
 "Drive_S210_magazine" (驱动_S210_刀库)并点击" W Assign device name"
 (分配设备名称)。(→ Drive_S210_magazine(驱动_S210_刀库)→ Assign device name(分配设备名称))

Siemens - C:\Users\mde\Documents\Automatic	1062-121 Servo S210 IRT TO S7-15001062-121 Servo S210 IRT TO S7-1500 📃 🗆	×
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Of62-121 Servo 5210 IRT TO 57-1500 Of62-121 Servo 5210 IRT TO 57-1500 Of62-121 Servo 5210 IRT TO 57-1500 Office & Add new device Oevice configuration Option 6 diagnostics Office & diagnostics Office & diagnostics Office & diagnostics Office & Configuration Office & Configu	CPU1516F CPU 1516F-3 PN	
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PLC supervisions & alarms		
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> Details view	🖸 Properties 🛛 🗓 🗓 Diagnostics 🚽 💷 🛆	-
Portal view 🗮 Overview 📩	Devices & ne	

 → 在接下来的对话框中先选择"PG/PC interface" (PG/PC 接口),之后再选择 "drive_s210_magzine" (驱动_s210_刀库)和"Assign name' (分配名称)。
 (→ PROFINET device name (PROFINET 设备名称):Drive_s120_magazine (驱动 _s120_刀库)→SINAMICS S210→Assign name (分配名称))

Assign	PROFINET devic	e name.		_			_		×
			Configured PRO	FINET de	vice				
			PROFINET devid	ce name:	drive s210	magazine		-	
			Dev	vice type:	5210 PN				
			Online access		L				
			Type of the PG/PC i	interface:	PN/IF				
			PG/PC i	interface:	Intel(R) F	thernet Connectio	n (4) 1219	-IM 🔽 🗑 🖸	31
									2
	طي ا		Device filter						
	~		Only show	devices of	the same typ	e			
			Only show	devices wi	th bad param	eter settings			
				devices wi	thout names				
			Contyshow	devices wi	thout names				
		Accessible devi	ces in the network:						
		IP address	MAC address	Device		PROFINET device	ename	Status	
		192.168.0.21	00-1C-06-5A-6A-F7	SINAMICS	\$210				
	Flash LED						1		
		<							>
						Updat	e list	Assign nan	ne
								Assign device	0.000
								Assignitevice	name
O. I.									
G	Search complete	1: d. 0. of 2 devices we	re found						
Ă	Search completer	d. 0 012 devices we	ie iouna.						
	Search completer	d. 1 of 2 devices we	re found.						
~				111					Ň
								Close	- I

提示:

– 如网络中有多个 IO 设备,可以根据压印的 MAC 地址或 "Flash LED"(闪烁 LED)识别设备。

→ 如组件显示过多,可以单击'仅显示同类型设备'(Only show devices of the same type) 筛选 视图。如设备名分配成功,将在状态栏 (Status) 中显示 'OK'。 (→ 关闭 (Close))

Assign PROFINET device name.					×
	Configured PROI	FINET devi	ce		
	PROFINET device	e name:	drive_s210_magazine		•
\rightarrow	Devi	ice type:	S210 PN		
	Online access				
	Type of the PG/PC in	nterface:	PN/IE		
	FGIPC II	nterrace:	Intel(R) Ethernet Conn	ection (4) 1219-LM	
	Device filter				
	💽 Only show	devices of th	e same type		
	Only show	devices with	bad parameter settings		
	Only show	devices with	out names		
Accessible	devices in the network:				
IP address	MAC address	Device	PROFINET device name	Status	
192.168.0	0.21 00-1C-06-5A-6A-F7	SINAMICS	drive_s210_magazine	🔮 ок	
Hash LED					
<				de de	>
			U	pdate list	Assign name
Online status information:					
 Search completed. 0 of 1 devic Search completed. 0 of 1 devic 	es were found.				
Search completed. 0 of 1 devic	es were found.				-
<		1111			>
					Close
					K

7.10 测试和调试工艺目标

 → 为了测试工艺目标,请在工艺目标 "PositioningAxis_magazine"(定位轴_刀库)的
 "Commissioning"(调试)菜单中打开 "Axis control panel"(轴控制面板),在那里
 Activate 控制权。(→ CPU_1516F [CPU1516F-3 PN/DP] → Technology objects (工 艺目标) → PositioningAxis_magazine (定位轴_刀库) → Commissioning (调试) → Axis
 control panel (轴控制面板) → Master control (控制权): Activate → 2000ms → OK)

me 1 062-121 Servo 5210 IRT TO 57-1500 2 Add new device 2 Devices & networks 2 (Drugs E (PU 75167-3 PWDP) 1 Device configuration 2 Online & diagnostics 3 Seg Software units 4 Program blocks	Avis control panel Tuning	Axis control panel	Axis:	Disable	Operating mode: Speed setpoint	
me ☐ 062-121 Serve S210 IRT TO S7-1500 Add new device CPUIS16F [CPU IS16F-3 PN/DP] Polices & networks Online & diagnostics Online & diagnostics Software units Forgram blocks		Master control: Activate Deactivate Take over master control for	Axis:	🔇 Disable	Operating mode: Speed setpoint	_
me 062-121 Servo S210 IRTTO S7-1500	-	Continue Control for Take over master control for	Enable	😢 Disable	Speed setpoint	· ·
Add new device Devices & networks CarcentSeff (CPU 51616-3 PW/DP) Device configuration U Online & diagnostics) CarcentSeff (CPU 51616-3 PW/DP) Device configuration Device Conf	_	Take over master control for				
Devices & networks Devices & networks Device configuration Dev	_	Take over master control fo				
CPU1516F [CPU 1516F-3 PN/DP] Device configuration Gonfiguration Software units Software units Pagram blocks	=	LODITOL	or axis control panel			
 Device configuration Online & diagnostics Big Software units Grogram blocks 						
Goftware units Goftware blocks		Velocity setpoint:	Accelera		Backward	Forward
Program blocks			Decelera		Stop	
				Jerk:		
 Technology objects 					Commentanting	
Add new object		Axis status			Current values	
 Configuration 		Drive ready	Enabled			
Commissioning		Error	Homed	More	Position:	
U. Diagnostics					Velocity:	
Qutput cam						
Keasuring input External source files						
PLC tags		Confirm				
Ce PLC data types		Alarm display 🔎				
Watch and force tables						
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Details view				Q Properties	Info 🔒 🛽 Diagnost	ics 🗌 🗆 🖛
and machines. Do you want to use t PositioningAxis_mag	the master control to azine?	control the axis				
This function is only suitab purposes. The function ma	ble for commissioning, dia ay only be used by authori	agnostics and test zed personnel.				
You can control the axis w panel has master control. program) has no effect wh	ith the control panel as lo Changing at another locat nile the control panel is op	ng as the control ion (e.g. in the user erating.				
As soon as master control values of the control pane values (e.g. from the user	is once again passed to th I and the tuning are discar program) become active a	ie user program, the ded. The original igain.				
If this axis is used as the le axes along with it.	ading axis, moving it can	move the following				
You can only control the a from your TIA Portal to the	uxis manually if there is a d e controller. This direct cor not received from the prog	lirect connection nnection is monitored pramming device/PC				

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Monitoring time: 2000

ms

Yes

No

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È. (→Axis (轴) . Enable → Pending errors (待解決的故障) : Confirm I Succes S210 Int 10 57:500 * CRUISIEF [CRUISIEF] * Technology objects * ParticularyAdds_magazine [DRUI ///	→ 为此,	必须先" 😪 Enable 🔜 "轴,启动电机。可以在这里 💱 Confirm 🦳 待	解决的故
Jerres 2410 Bit 10 57:1500 + CPUISIEF [CPU 1516-3 PADD] + Technology objects + PositioningAde, megazine [DBI] /// - 21 × Nitic control panel	障。(-	→ Axis(轴): <mark>冬 Enable</mark> → Pending errors(待解决的故障): <mark>零 Confirm</mark>	
Missic control panel	1 Servo S210 IRT TO	9 \$7-1500 → CPU1516F [CPU 1516F-3 PN/DP] → Technology objects → PositioningAxis_magazine [DB4]	7 _ ¤∎×
 → 之后电机可以以所选的转速 Forward 或 Backward 启动,点击 Stop 可 以停止运行。(→ Speed (转速):500.0 mm/s → Forward → Stop) Servo 5210 IRI TO 57-1500 + CPU1516F [CPU 1516F 3 PN/DP] + Technology objects + PositioningAxis_magazine [DB4 /// - E * X Axis control panel Naster control: ************************************	Axis control panel Tuning	Axis control panel Master control: Axis: Operating mode: Speed setpoint Starts enable Starts enabling of the technology object Control Velocity setpoint: 50.0 mm/s Acceleration: 1000.0 mm/s2 Backward Forward Deceleration: 1000.0 mm/s2 Jerk: 200000.0 mm/s2 Stop Jerk: 200000.0 mm/s2 Stop Jerk: 200000.0 mm/s2 Stop Jerk: 200000.0 mm/s2 Position: 20332.706 Velocity: 0.00119209:mm Active errors: Alarm display	nm m/s
Axis control panel Axis control panel Axis: Velocity setpoint: Speed setpoint Velocity setpoint: S00.0 Maxis status Control Velocity: S00.0 Maxis status Current values Position: 21654.456 More Position: Active errors: Confirm Velocity: S00.0133282 mm/s	→ 之后电: 以停止:	机可以以所选的转速 ► Forward 或 < Backward 启动,点击 	可)
Axis control panel Tuning Axis control panel Axis control panel Axis control panel Axis control Axis control Velocity setpoint: 500.0 mm/s Acceleration: 1000.0 mm/s Control Velocity setpoint: 500.0 mm/s Deceleration: 1000.0 mm/s Stop Jerk: 2000000 mm/s Stop Velocity: 500.0138282 mm/s Active errors: Active		n	
	Axis control panel Tuning	Axis control panel Mester control: Axis: Operating mode: Pactivate Enable Operating mode: Speed setpoint Velocity setpoint: 500.0 Maxis status Drive ready Enabled Position: 200000.0 More Position: 21654.456 Velocity: 500.0138282 mm	nm m/s

 → 进行绝对定位之前,必须先"Set home position"(指定参考点)。在某个位置设置一 个位置值,即可设定参考点,最好设在固定挡块处。(→ Operating mode(运行方 式):Set home position(指定参考点)→ Control(控制)→ Position 0.0 mm(位置 0.0 mm)→ Start

is control panel	Axis control panel			
	Master control:	Axis :	Operating mode: Set home position	
	Control Position: 0.0	mm	Start	
	Axis status Drive ready Error	 Enabled Homed 	Current values Position: 0.0 Velocity: 0.00	mm 1192092 mm/s

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 → 如果参考了轴,会在轴控制面板中显示该轴。现在可以使用这里所显示的值启动绝对定位 并进行观察。(→ Operating mode(运行方式):Absolute positioning(绝对定位)→
 Target position(目标位置):1000.0 mm → Velocity(速度):500.00 →

a	Axis control panel					
9	Master control:		Axis:	_	Operating mode:	
	👋 Activate 🛛 隆 D	eactivate	🖉 Enable 🛛 😣 🕻	Disable	Positioning absolute	•
	Control					
	Position:	1000.0 mm	Acceleration:	1000.0 m	nm/s² 🕨 Start	Stop
	Velocity:	500.0 mm/s	Deceleration: Jerk:	1000.0 m 200000.0 m	nm/s² nm/s²	
	Axis status				Current values	
	Drive ready] Enabled			
	Error		Homed	More	Position:	0.0 mm
					Velocity.	0.0 mms
	Active errors:					
		Confirm				
vo \$210 IRT TO	Alarm display	PU 1516F-3 PN/D	P] ► Technology a	bjects 🕨 Pos	itioningAxis_magazine	[DB4] /// –
vo S210 IRT TO	Alarm display	DU 1516F-3 PN/D	P] 🕨 Technology a	bjects ⊧ Pos	itioningAxis_magazine	[DB4] /// –
vo S210 IRT TO ontrol panel g	Alarm display	PU 1516F-3 PN/D	P] ▶ Technology o	bjects ▶ Pos	itioningAxis_magazine	[DB4] /// –
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ontrol panel	Alarm display	PU 1516F-3 PN/D eactivate 1000.0 mm/s 500.0 mm/s	P] → Technology o Axis: Enable	bjects Pos Disable Disable More	itioningAxis_magazine Operating mode: Positioning absolute nm/s2 Current values Position: Velocity:	[DB4] -
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→ 最后还需要" ^{I Go offline} "并再次保存项目, " <mark>.</mark> Save project"	
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 $(\rightarrow^{\swarrow} Go \text{ offline} \rightarrow \square Save project})$

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7.11 创建用于控制伺服电机的程序

 → 现在我们来创建用于控制伺服电机的程序。在这之前,先用这里所显示的变量新建一个 "Tag table_servo_magazine"(变量表_伺服_刀库)。(→ CPU_1516F [CPU1516F-3 PN/DP] → PLC tags (PLC 变量) → Add new tag table (添加新变量表) → Tag table_servo_magazine (变量表_伺服_刀库))



	-	Name	Data type	Address	Re	Acc	Writ	Visi	Sup	Comment
1	-	-510	Bool	%12.0						pushbutton acknowledgement motion control axis magazine
2	-	-511	Bool	%I2. <mark>1</mark>						pushbutton jog upwards motion control axis magazine
З	-	-\$12	Bool	%12.2						pushbutton jog downwards motion control axis magazine
4	-	-\$13	Bool	%12.3						pushbutton set home position motion control axis magazine
5	-	-514	Bool	%12.4						pushbutton start positioning position 00 motion control axis magazine
5	-	-S15	Bool	%12.5						pushbutton start positioning position 01 motion control axis magazine
7	-	-516	Bool	%12.6						pushbutton start positioning position 02 motion control axis magazine

→ 下一步创建功能块 "MOTION_CONTROL_MAGAZINE"(运动_控制_刀库)。(→ Add new block(添加新块)→ FB → MOTION_CONTROL_MAGAZINE(运动_控制_刀库)→ FBD(功能块图)→ OK)



→ 如图所示,记录功能块 "MOTION_CONTROL_MAGAZINE"(运动_控制_刀库)的接口。
 (→ "MOTION_CONTROL_MAGAZINE" [FB2](运动_控制_刀库) → Block interface
 (块接口))

	MOTION_CONTROL_MAGAZINE									
	-	Na	ime	Data type	Default value	Retain	Accessi	Writa	Visible in	Setpoint
1	-	•	Input							
2	-		Servo_Achse_TO_PositioningAxis	TO_PositioningAxis	1	v				
3	-		Acknowledgement	Bool	false	Non-retain				
4	-		qu_pol	Bool	false	Non-retain				
5	-		Jog_down	Bool	false	Non-retain				Ā
6	-00		Pushbutton set home position	Bool	false	Non-retain				ñ
7			Pushbutton start position00	Bool	false	Non-retain				
8	-		Pushbutton start position01	Bool	false	Non-retain				- ñ
9	-		Pushbutton start position02	Bool	false	Non-retain				
10	-		Position home	LReal	0.0	Non-retain				ñ
11	-		Position00	LReal	0.0	Non-retain				ñ
12	-		Position01	LReal	0.0	Non-retain				
13	-		Position02	l Real	0.0	Non-retain				Ä
14	-	-	Output	Lincor	0.0	Honretan				i H
15	-		<add news<="" td=""><td></td><td></td><td></td><td></td><td>Ä</td><td></td><td></td></add>					Ä		
16	-	-	InOut							- H
17			<add news<="" td=""><td></td><td></td><td></td><td></td><td>- D</td><td></td><td></td></add>					- D		
14			shau news							
							_		_	
4	-	•	Static							
5		•	MC_RESET_Done	Bool	false	Non-retain				
6			MC_RESET_Busy	Bool	false	Non-retain				
7			MC_RESET_COmmandAborted	Bool	false	Non-retain				
8		E	MC_RESET_Error	Bool	false	Non-retain				
9			MC_RESET_ErrorId	Word	16#0	Non-retain				
10	-		MC_POWER_Status	Bool	false	Non-retain				
11	-00		MC_POWER_Busy	Bool	false	Non-retain				
12	-		MC_POWER_Error	Bool	false	Non-retain				
13	-	-	MC_POWER_Errirld	Word	16#0	Non-retain				
14	-		MC_MOVEJOG_InVelocity	Bool	false	Non-retain				
15	-		MC_MOVEJOG_Busy	Bool	false	Non-retain				
16	-		MC_MOVEJOG_CommandAborted	Bool	false	Non-retain				
17	-		MC_MOVEJOG_Error	Bool	false	Non-retain				
18		=	MC_MOVEJOG_ErrorId	Word	16#0	Non-retain				
19	-		MC_HOME_ReferenceMarkPosition	LReal	0.0	Non-retain				
20	-		MC_HOME_Done	Bool	false	Non-retain				
21	-		MC_HOME_Busy	Bool	false	Non-retain				
22	-		MC_HOME_CommandAborted	Bool	false	Non-retain				
23	-		MC_HOME_Error	Bool	false	Non-retain				
24	-00		MC_HOME_Errirld	Word	16#0	Non-retain				
25	-		MC_MOVEABSOLUTE_Done_00	Bool	false	Non-retain				
26	-	-	MC_MOVEABSOLUTE_Busy_00	Bool	false	Non-retain				
27	-		MC_MOVEABSOLUTE_CommandAborted_00	Bool	false	Non-retain				
28	-		MC_MOVEABSOLUTE_Error_00	Bool	false	Non-retain				
29	-		MC_MOVEABSOLUTE_ErrorId_00	Word	16#0	Non-retain				
30	-		MC_MOVEABSOLUTE_Done_01	Bool	false	Non-retain				
31	-		MC_MOVEABSOLUTE_Busy_01	Bool	false	Non-retain				Ā
32	-		MC_MOVEABSOLUTE_CommandAborted_01	Bool	false	Non-retain				Ē
33		-	MC_MOVEABSOLUTE_Error_01	Bool	false	Non-retain				
34	-	-	MC_MOVEABSOLUTE_ErrorId_01	Word	16#0	Non-retain				Ā
35	-		MC_MOVEABSOLUTE_Done_02	Bool	false	Non-retain				Ā
36	-		MC_MOVEABSOLUTE_Busy_02	Bool	false	Non-retain				Ā
37	-	-	MC_MOVEABSOLUTE_CommandAborted 02	Bool	false	Non-retain				Ä
38	-		MC_MOVEABSOLUTE Error 02	Bool	false	Non-retain				Ā
39	-		MC_MOVEABSOLUTE_ErrorId_02	Word	16#0	Non-retain				Ā

→ 通过拖放操作,将"MC_RESET"(MC_复位)指令从"Technology"(技术) "Instrucions"(指令)下的"Motion Control"(运动控制)选项内拖至第一个网络中并为此创建"MC_RESET_Instance"(MC_复位_背景)多重背景。(→ Instructions(指令)→Technology(技术)→Motion Control(运动控制)→MC_RESET(MC_复位)→Multi-instance(多重背景)→MC_RESET_Instance(MC_复位_背景)→OK)



→ 标记网络 1 并如下所示连接 "MC_RESET" (MC_复位) 块。



→ 在网络 2 中通过多重背景对 "MC_POWER" (MC_电源) 块的调用进行编程,如此处所示。(→ Instructions (指令) → Technology (技术) → Motion Control (运动控制) → MC_POWER (MC_电源))



→ 在网络 3 中通过多重背景对 "MC_MOVEJOG" (MC_运动点动) 块的调用进行编程, 如
 当前所示。(→ Instructions (指令) → Technology (技术) → Motion Control (运动控制) →
 MC_MOVEJOG (MC_运动点动))



→ 在网络 4 中通过多重背景对 "MC_HOME" (MC_原点) 块的调用进行编程,如下所示。
 (→ Instructions (指令) → Technology (技术) → Motion Control (运动控制) →
 MC_HOME (MC_原点))



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→ 在网络 5 中通过多重背景对"MC_MOVEABSOLUTE" (MC_绝对运动) 块的调用进行编程,如当前所示。(→ Instructions (指令) → Technology (技术) → Motion Control (运动控制) → MC_MOVEABSOLUTE (MC_绝对运动))



→ 在网络 6 中通过多重背景对 "MC_MOVEABSOLUTE" (MC_绝对运动) 块的调用进行编程,如下所示。(→ Instructions (指令) → Technology (技术) → Motion Control (运动控制) → MC_MOVEABSOLUTE (MC_绝对运动))



→ 在网络 7 中通过多重背景对 "MC_MOVEABSOLUTE" (MC_绝对运动) 块的调用进行编程,如此处所示。(→ Instructions (指令) → Technology (技术) → Motion Control (运动控制) → MC_MOVEABSOLUTE (MC_绝对运动))



→ 打开 "Main[OB1]" (主要 [OB1])组织块,之后在网络4中调用 "MOTION_CONTROL_
 MAGAZINE[FB2]" (运动_控制_刀库 [FB2])功能块。(→ Main[OB1](主要 [OB1]) →
 MOTION_CONTROL_MAGAZINE[FB2](运动_控制_刀库 [FB2]))



→ 创建背景数据块作为单个背景。(→ Single instance (单个背景) → -MOTION_
 CONTROL_MAGAZINE_DB (-运动_控制_刀库_DB) → OK)



→ 如图所示连接块并标记网络 4。



7.12 将程序加载到 SIMATIC S7 CPU 1516F-3 PN/DP

→ 将更改过的和新建的"Program blocks"(程序块)加载到 CPU 1516F-3 PN/DP "**见**" 之前,再次保存项目。(→ **Save project** → Program blocks(程序块)→ **见**)

强 🖬 Save project 📑 🐰 🏥 📺 🗙 🍤	± (° ^{al} ±	🖥 🛄 🚹 🚆 🐺 💋 Go online 🖉 Go offline 🛔 🖪 🖪 📲 🗶 🛨 🛄 🍾	ORTAL
oject tree		12 Download to device TO S7-1500 + CPU1516F [CPU 1516F-3 PN/DP] + Program blocks + Main [OB1] i	
Devices			
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		Block interface	
me			
062-121 Servo S210 IRT TO S7-1500	^	a >=1 <u>1??</u> ; ⊣ −0 → ⊣=1 ⊣s1 ⊣R1	
💕 Add new device		▼ Block title: "Main Program Sweep (Cycle)"	^
Devices & networks		Comment	
CPU1516F [CPU 1516F-3 PN/DP]	=		_
T Device configuration	-	Network 1: Speed monitoring conveyor motor	
Conline & diagnostics		Network 2: Speed control analog oputput conveyor motor	=
Ba Software units		Network 3: Control conveyor motor forwards in automatic mode	
Gregram blocks		 Network 4: Control of such a law, which i "Partition in Aris, managina". 	
Main [OB1]		Network 4: Control of technology object: PostuonigAxis_magazine	
MC-Interpolator [OB92]			
MC-Servo [OB91]		%DB5 *MOTION	
MOTOR SPEEDCONTROL [FC10]		CONTROL	
MOTOR_SPEEDMONITORING [FC11]		MAGAZINE_DB"	
TION_CONTROL_MAGAZINE [FB2]		%FB2	
MOTOR_AUTO [FB1]		"MOTION_CONTROL_MAGAZINE"	
MAGAZINE_PLASTIC [DB3]		— EN	
MOTION_CONTROL_MAGAZINE_DB [.		%DB4 Servo Achse	
MOTOR_AUTO_DB [DB1]		"PositioningAvisTO	
SPEED_MOTOR [DB2]		magazine" — PositioningAxis	
System blocks	~	922.0 Acknowledgem	~
	>	< III > 100%	
Detellenden		@ Properties 1 Info (1) Diagnostics	

7.13 SIMATIC S7 CPU 1516F-3 PN/DP 程序内的诊断

→ 为了通过程序诊断伺服驱动的控制情况,可以对 "MOTION_CONTROL_MAGAZINE[FB2]"

(运动_控制_刀库 [FB2])功能块进行观测。单击图标 🎬 启动或关闭观测。

(→ MOTION_CONTROL_MAGAZINE[FB2] (运动_控制_刀库 [FB2]) → 🕎)



→ 为了诊断 "PositioningAxis_magazine" (定位轴_刀库) 工艺目标中的值,可以在观测表
 和程序中访问相关数据块中的数据。(→ Add new watch table (添加新观测表) → Watch table_servo_magazine (观测表_伺服_刀库) → Technology object (工艺目标) →
 PositioningAxis_ Magazine[DB4] (定位轴_刀库 [DB4]) →.ActualSpeed (实际速度) →
 Position (位置) → .ActualPosition (实际位置) →)

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Devices				ten and for	ce tables 🕐 Watch ta	ble_servo_maga		27
5		i	Name	Address	Display format	Monitor value	Modify value	sting
Name		1	"PositioningAxis_magazine".ActualSpeed		Floating-point number	0.0		_
E 062-121 Servo S210 IRT TO S7-1500	2 • ^	2	"PositioningAxis_magazine".Position		Floating-point number	300.0		
Add new device		з	"PositioningAxis_magazine".ActualPosition		Floating-point number	300.0		-
E Devices & networks		4		🔳 <add nev<="" td=""><td>v</td><td></td><td></td><td>ask</td></add>	v			ask
👻 🔻 🚺 CPU1516F [CPU 1516F-3 PN/DP]	2							60
Device configuration								
🖳 Online & diagnostics	=							1
Software units								ibr
Program blocks	•							ari
🔻 📴 Technology objects	•							Sa
💕 Add new object								
PositioningAxis_magazine [DB4]								Þ

提示:

- 建议以只读方式访问这些数据。

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7.14 PositioningAxis_magazine(定位轴_刀库)工艺目标中的诊断

 → 在 "PositioningAxis_magazine"(定位轴_刀库)工艺目标中,在诊断下可提供多种视图 以为诊断提供支持。下面先介绍"Status and error bits"(状态和错误位)视图。
 点击 Ĩ 可以打开和关闭监视器。(→Technology objects(工艺目标)→
 PositioningAxis_magazine(定位轴_刀库)→Diagnostics(诊断)→Status and error bits
 (状态和错误位)→Ĩ)



→ 其他视图还包括"Motion status"(运动状态)和"PROFIdrive telegram"
 (PROFIdrive 消息帧)。(→ Motion status (运动状态) → PROFIdrive telegram
 (PROFIdrive 消息帧))

/o \$210 IRT TO \$7-15	500 + CPU1516F [CPU 1516F-3 PN/DP] + Techr	ology objects 🔸 PositioningA	xis_magazine [DB4]	_∎∎×
-				
00				
Status and error bits	Motion status			
PROFIdrive telegram	Setpoints			
	Target position:	0.0 mm		
	Position setpoint:	23215.911 mm		
	Velocity setpoint:	0.0 mm/s]	
	Velocity override:	100.0 %	ļ	
	Current values			
	Operative encoder:]	
	Actual position:	300.001 mm]	
-	Actual velocity:	0.0 mm/s]	
	Following error:	0.0 mm]	
	Dynamic limits			
	Velocity:	500.0 mm/s	ļ	
	Acceleration:	10000.0 mm/s ²		
	Deceleration:	10000.0 mm/s ²		
	Jerk:	200000.0 mm/s³	1	
<				

tion status	PROFIdrive teleg	jram																
DFIdrive telegram	Drive																	
	Bit		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	Status word 1 (2	ZSW1)	1	1	1	0	1	0	1	1	0	1	0	0	0	0	0	0
	Status word 2 (2	ZSW2)	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		Speed setpoint (NSET)	0.000					%	1	0	.000				1/min			
										-								
	Encodor	Actual speed (NACT)	0.003					%		-0	.227				1/	/min		
	Encoder	Actual speed (NACT)	0.003					%]	-0	.227				1)	/min		
4	Encoder	Actual speed (NACT)	0.003	14	13	12	11	%	9	-0	7	6	5	4	3	/min 2	1	0
	Encoder Bit Status word (Gx	Actual speed (NACT)	0.003	14 0	13 0	12 0	11 0	% 10 0	9	-0 8 0	7	6	5	4	1) 3 0	/min 2 0	1	0
	Encoder Bit Status word (Gx Position	Actual speed (NACT) _ZSW) n actual value 1 (Gx_XIST1)	0.003 15 0	14 0 B2E_	13 0	12	11 0	10 0 (Hex)	9 0	80	7 0 3724	6 0	5 0	4	3 0 ((2 0 Dec)] 1 0	0

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→ "Axis status" (轴状态)和 "Current values" (当前值)也可在工艺目标
 "PositioningAxis_magazine" (定位轴_刀库)中 "Axiscontrol panel" (轴控制面板)
 的 "Commissioning" (调试)下进行观测。(→ Technology objects (工艺目标) →
 PositioningAxis_magazine (定位轴_刀库) → Commissioning (调试) → Axis control panel (轴控制面板))

) ± (#±		Go online 🦉 Go offline 🚮? 📑 📑	< 📃 🛄 Search in pro	ject>		PORT
		121 Servo S210 IR					14] 💶 🗖 🗖
Devices							
11		Axis control panel Tuning	Axis control panel				
Name			Master control:	Axis:		Operating mode:	
 062-121 Servo S210 IRT TO S7-1500 Add new device 			Notivate	Enable	Disable	Speed setpoint	T
Devices & networks			Control				
 CPU1516F [CPU 1516F-3 PN/DP] 							
Device configuration	=		Velocity setpoint: 50.0	mm/s Acceleratio	n: 1000.0 mm/s	2 ABackward F	orward
Online & diagnostics				Deceleratio	n: 1000.0 mm/s	2 Stop	
Software units				le.	k. [200000.0 mm/s		
Program blocks					K. 2000000 mm/3		
 Technology objects 	•					C	
Add new object			Axis status			Current values	
 R PositioningAxis_magazine [DB4] 	•		Drive ready	Enabled			
Configuration							
Commissioning			Error	Homed	More	Position: 300.	J01 mm
Se Diagnostics						Velocity: 0.00	1192092 mm/s
Output cam							
Measuring input			Active errors:				
External source files							
🕨 🛺 PLC tags			Confirm				
PLC data types			Alarm display 🎮				
Watch and force tables							
🕨 🙀 Online backups							
Traces							
OPC UA communication	~				Q Properties	1 Info & Diagnost	ics 🛛 🗆

→ "Tuning"(优化)功能可在确定最佳预控制和轴位置调节增益(Kv 系数)时为您提供支持。
 在可预定义的定位运动过程中,可以使用跟踪功能记录轴的速度曲线。之后可以对记录进行
 评估,并对预控制和增益进行相应的调整。(→Technology objects(工艺目标)→
 PositioningAxis_magazine(定位轴_刀库)→Commissioning(调试)→Tuning(优化))



提示:

- 开始优化之前,应该先在驱动结构内执行一次"One Button Tuning"(一键优化)。

7.15 使用 SINAMICS Startdrive 诊断伺服驱动 S210

 → 变频器中可以显示 "Active alarms" (当前警告)和 "Active faults" (当前故障)。控制/ 状态字 (Control/status word) 在 'Online & diagnostics' (在线 & 诊断)中查找。点击
 Details, 可在消息显示界面下方显示这些信息,在此处点击 "♀" 图标也可进行应 答。(→ ♀ Go online → Drive_S210... (驱动结构_S210...) → Online & Diagnostics (在 线 & 诊断) → Diagnostics (诊断) → Active alarms (当前警告) → □etails → ♀

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Project Edit View Insert Online O	ptions ×	5	ools Window Help	🗊 Gi	o online 📓 Go off	line 87 19 1		⊲earch in pro	Totally Ir	itegrated Automatio POR	TAL
Project tree		4								_ = i	■ × 4.
Devices											8
STITE Name		•	Online access Diagnostics General		Active alarms						< III
O62-121 Servo S210 IRT TO S7-1 Add new device Add new device Devices & networks	D	^	Active alarms Alarm history Actual values		Fa ults						ols
 ↓ □ CPU1516F [CPU 1516F-3 PN ↓ □ Drive_S210_magazine [S21 □ □ Drive configuration 	3	III	Safety Integrated functio PROFINET interface [X150] Functions Backup/Bactors	•	Fault b 1 Fault 1 2 Fault 2	uffer	Fault code 1912 1910	Message PN: Clock syr Fieldbus: set	nchronous operation sign-o tpoint timeout	f-life missing	Tasks
Online & diagnostics Parameterization A Commissioning			License		3 4 5						🕀 Librai
Acceptance test			<	>	< III 6					[> ies
Graces Graces Graces Graces Graces Graces Graces Graces			Device information	Conr	ection informati	on Alarr	m display	🔍 Properti	ies 🐮 Info 🖞 D	iagnostics 🔹 🗖	Ade
Cross-device functions			🛃 Current alarms 📴 Alarm are	hive	Receiv	e alarms: Driv	e_S210_magazine [S	210 PN 👻 [👔 🚰 Freeze alarms	S Acknowl	edge
Documentation settings			Source Date		Time	Status	Acknowledge	Alarm cla	ass na Event text	Acknowledg	e
Version control interface			1 Drive_S210 1/3/2000 2 Drive_S210 1/3/2000		2:39:22:638 AM	Outgoing	Required	-	F01912: PN: Cloc E01910: Eieldhu	k synchronous operation	n si
< III	>		3 Drive_\$210 1/3/2000		2:39:22:838 AM	Incoming	_	-	A01980: PN: cycl	ic connection interrupte	d (0)
> Details view			<				III				>
Portal view		8	Online & dia						Connected to Drive_S2	10_magazine, vi 📕	

→ "Actual values" (实际值)下显示伺服驱动的重要值。(→ Drive_S210...(驱动结构_S210...)→ Online & Diagnostics (在线 & 诊断)→ Diagnostics (诊断)→ Actual values (实际值)→ Actual values (实际值))

Online access					
 Diagnostics 	> Act	uai values			
General					
Active alarms					
Alarm history		Parameter text	Value	Unit	
 Actual values 		Speed setpoint after the filter	0.00	rpm	
Actual values		Speed actual value	0.0	rpm	
Status bits		DC link voltage	317.4	V	
Safety Integrated functio		Absolute current value	0.00	Arms	
PROFINET interface [X150]	1	Current actual value torque-generating, Smoothed	0.00	Arms	
Functions		Torque actual value	0.02	Nm	
Backup/Restore		Drive temperatures, Inverter maximum value	33	°C	
License		Motor utilization thermal	9	%	

→ 此处也可观测伺服驱动的"Status bits"(状态位)。(→ Drive_S210...(驱动结构_S210...)→ Online & Diagnostics(在线&诊断)→ Diagnostics(诊断)→ Actual values (实际值)→ Status bits(状态位))

062-121 Servo S210 IRT TO S	i7-1500 ▶ Drive_\$210_magazine [\$210 PN]	_ II I ×
Online access Online access Diagnostics General Active alarms Alarm history Actual values Status bits Safety Integrated functio PROFINET interface [X150] Functions Backup/Restore License	7-1500 > Drive_S210_magazine [S210 PN] > Status bits Ready for switching on Ready Operation enabled Fault present Coast down active Quick stop active Switching on inhibited active Alarm present Command open brake	
< III	Safety enable missing	~

→ "Diagnostics"(诊断)下也可显示 "Safety Integrated function status"(安全集成功能状态)。(→ Drive_S210...(驱动结构_S210...) → Online & Diagnostics(在线&诊断)→
 Diagnostics(诊断)→ Safety Integrated function status(安全集成功能状态))

062-121 Servo S210 IRT TO S7-1500	Drive_S210_magazine [S210 PN]	_ № ■ ×
Online access	Color have a first starting	^
✓ Diagnostics	Safety integrated function status	
General		
Active alarms		
Alarm history		
	V	
Actual values	STO active	
Status bits		
Safety Integrated function status		
PROFINET interface [X150]		
Functions	SS1 active	
Backup/Restore		
License		
		~
	< III	>

 → 可在"Receive direction"(接收方向)和"Send direction"(发送方向)中观测通信的 消息帧数据。(→ Drive_S210...(驱动结构_S210...)→ Online & Diagnostics(在线 & 诊断)→ Diagnostics(诊断)→ PROFINET interface(PROFINET 接口)→ Communication(通信)→ Send direction(发送方向)→ Receive direction(接收方向))

 Diagnostics 	^					
General		s Receive direction				
Active alarms						
Alarm history						
 Actual values 		Telegram configuration				
Actual values		PROFIdrive				
Status bits		Thornanye				
Safety Integrated function st	4	[5] Standard telegram 5, PZD	-9/9			
 PROFINET interface [X150] 		PZD 1	0000 0100 0000 0000	bin	-	STW1
Ethernet address	۲					NCOLL D
 Communication 		P2D 2 + 3	0	dec		NSOLL_B
Receive direction		PZD 4	0110_0000_0000_0000	bin	-	STW2
Send direction		PZD 5	0000	hex	-	G1_STW
Functions		P7D 6 + 7	0000 0000	hey	-	XERR
Backup/Restore			0000_0000			
License	_	PZD 8 + 9	0000_0000	hex	-	KPC

→ 在"Parameter view"(参数视图)和"Parameter"(参数)的"Function view"(功能视图)中,也可在线观测参数值。(→ Parameter (参数)→ Function view(功能视图) →
 Parameter view(参数视图))

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Project tree	◀ 062-121 Servo \$210 IRT TO	\$7-1500 > Drive	S210_magazine [S210 PN] → Drive control	[S210 PN] > Parameterization	-	
Devices				Para Punction view	ameter v	view
	Parameter list					
		6 1 0 + 5	1			-
lame				No. 1		
• 1 062-121 Servo S210 IRT TO S7-1	All parameters	Number	Parameter text	Value	Unit	ata
Add new device	Interlocking parameters	12	Operating display	[42] Switching on inhibited - set		
Devices & networks	Commissioning	p9	Drive commissioning parameter filter 1	[0] Ready		
CPU1516F [CPU 1516F-3 PN	Save & reset	p10	Drive commissioning parameter filter 2	[U] Ready		
- Drive 5210 magazine [521	System identification	r20	Speed setpoint smoothed	0.0	rpm	
Device configuration	Universal settings	r21	Actual speed smoothed	0.0	rpm	
9 Online & diagnostics	Inputs/outputs	r26	DC link voltage smoothed	320.7	v	
2 Parameterization	Communication	r27	Absolute actual current smoothed	0.00	Arms	
t Commissioning	Power unit	r31	Actual torque smoothed	0.01	Nm	
Acceptance test	► Motor	r32	Active power actual value smoothed	0.00	kW	
Traces	Drive control	r34	Motor utilization thermal	8	%	
Ingrouned devicer	Drive functions	- • r37[0]	Drive temperatures, Inverter maximum value	34	°C	
Security settings	 Safety Integrated 	▶ r39[0]	Energy display, Energy balance (sum)	0.14	kWh	
Cross device functions	 Diagnostics 	r44	Thermal converter utilization	0.00	%	
Common data		▶ r46	Missing enable signal	50001C0FH		
Documentation settings		▶ r61[0]	Actual speed unsmoothed, Encoder 1	0.00	rpm	
Languages & resources		r62	Speed setpoint after the filter	0.00	rpm	
Verrien central interface		r63	Actual speed smoothed	-0.23	rpm	
		r68	Absolute current actual value	0.00	Arms	
2 III S	<u> </u>	< -70	Assess DC listensises	330.40		>
Details view	-	the second	O Property	2 Info II Diamanti		-
Details view			Properti	es 🔄 Inio 📡 Diagnostio	5	Contraction of the

→ 在 "Commissioning" (调试)下的 "Control panel" (控制面板)中,可以观测状态和当前值。(→ Commissioning (调试) → Control panel (控制面板))

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Devices						1
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Add new device						bra
			Actual values			ries
T Drive S210 magazine [S210 PN]						
Device configuration		Operation enabled				
Q Online & diagnostics			Speed actual value:	600.0 rpm		Ado
Parameterization						-
Commissioning			DC link voltage:	319.2 V		S
 Acceptance test 						
🕨 🔄 Traces		Missing enables	Absolute current value:	0.12 Arms		
Engrouped devices			Torque actual value	0.06 Nm		
🕨 🚟 Security settings			loique actual value.	0.00 1411	=	
Cross-device functions		[0] Operation - everything enabled	Active power actual value:	0.00 kW		
🕨 🉀 Common data						
Documentation settings			Motor utilization thermal:	7 %		
Languages & resources						
Version control interface		Acknowledge faults				
Online access					~	
Card Reader/USB memory			Ш		>	
		2			-	-
> Details view	0		Properties 1 Inf	o 🔂 Diagnostics		
Portal view Dverview	🕈 Drive control 🕴 Dr	ive control	📑 🔽 Connected	to Drive_S210_magazine, vi		

7.16 项目归档

 → 最后我们要将整个项目归档。在菜单项 → '项目'(Project)选择 → '归档'(Archive...)。
 打开归档项目的文件夹,并将项目保存为文件格式 'TIA Portal project archive' (TIA 博 途项目归档)。(→ Project (项目) → Archive (归档) → TIA Portal project archive (TIA 博 遠项目归档) → 062-121-servo-s210-irt-to-s7-1500... → Save (保存))

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Close Delete project Save Save as Archive	Ctrl+W Ctrl+E Ctrl+S Ctrl+Shift+S		Retwork Connections HM connection	Hardware c		
Project server Toject server Card Reader/USB memory Memory card file Control interviewing the set	•		CPU1516F CPU 1516F-3 PN	atalog		
Start basic integrity check	Ctrl+P		192.168.1.1 PN/IE_1 169.254.11.22 PN/IE_1: 192.168.0.1 2 PN/IE_1: 192.168.0.21	G Online to		
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Exit	Alt+F4			Libraries		
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> Details view			🔍 Properties 🚺 Info 👔 🗓 Diagnostics 💷	•		
🖣 Portal view 🔚 Overview 🏦 Devices & ne						

7.17 检查清单

编号	描述	已检查
1	已在 TIA 博途中创建 SINAMICS S210 伺服驱动系统并使用 SINAMICS Startdrive 进行参数化设置。	
2	已通过控制面板成功完成 SINAMICS S210 伺服驱动系统测试。	
3	已将伺服驱动 SINAMICS S210 作为 IRT 设备分配给 CPU1516F-3 PN/DP。	
4	已在 CPU1516F-3 PN/DP 中创建"TO_PositioningAxis" (TO_定位 轴) 工艺目标。	
5	已将包含 SINAMICS S210 伺服驱动(作为 IRT 设备)的设备组态成功 加载到 CPU1516F-3 PN/DP 中。	
6	已为 SINAMICS S210 伺服驱动分配设备名称。	
7	已通过轴控制面板成功完成工艺目标测试。	
8	已创建功能块"MOTION_CONTROL_MAGAZINE"(运动_控制_刀 库)[FB2]并在"Main [OB1]"(主要 [OB1])中进行了调用。	
9	已成功完成程序块的编译和加载且未报告错误消息。	
10	短按"Acknowledge"(应答)按钮 (-S10 = 1),确认故障。	
11	操作向下"Jog"(点动)按钮 (-S12 = 1),将刀库驶至固定挡块处。	
12	操作 "Home position" (参考点) 按钮 (-S13 = 1), 以固定挡块的位置 作为参考基准。	
13	现在可以操作按钮 开始定位在位置 00 (-S14 = 1) 开始定位在位置 01 (-S15 = 1) 开始定位在位置 02 (-S16 = 1) 驶至相应所需位置。	
14	项目成功归档。	

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,单击链接:

驱动结构

预览"其它信息"

入门指南、视频、辅导材料、APP、手册、试用版软件/固件

- > TIA 博途视频
- > TIA 博途中心课堂
- > 入门指南
- > 编程指南
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