

福氏技术控制平台CT65基础编程手册

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- ▶ 新建第一个工程
- ➤ CT65模块应用

➢ CoDeSys IDE介绍

CT65控制器编程环境由工业自动化中广泛使用的CoDeSys IDE提供。PRACTEK基于CoDeSys V3设计 了CT65的相关PLC功能,以方便用户使用。

CoDeSys IDE支持IEC61131-3编程标准的所有五种编程语言,包括:

- 指令表(IL)
- 结构化文本(ST)
- 梯形图(LD)
- 功能块图(FBD)
- 顺序功能图(SFC)

➢ CoDeSys IDE介绍

在代码开发电脑中安装了CoDeSys IDE并运行后,将显示下图所示的编程环境画面。



➢ CoDeSys IDE介绍

编程套件,包括各种手册及在线帮助由CoDeSys提供,均包含了英文,德文以及中文三种语言版本。如

下图所示。



➢ CoDeSys IDE介绍

CoDeSys IDE包含但不限于以下功能:

- 监控所有变量
- 强制变量值并写入控制器进行
- 调试项目(断点、步进、单周期、呼叫堆栈)
- POUs和数据的无中断在线更改
- 采样跟踪
- 用户定义库的管理
- 离线模拟
- 图形PLC配置
- OPC服务器

➢ CoDeSys IDE介绍

控制器中安装有CoDeSys实时运行系统,使用CoDeSys IDE或其他基于CoDeSys的产品编写的程序可以从其他PLC平台移植到CT65中。但通常代码在平台之间移植会有一些变化,较为普遍的是原平台库文件以及驱动程序中在CT65中不存在,需要重新开发。另外HMI会议问兼容性问题而需要全部重写。基于 CoDeSys V2编写的PLC程序可以在CoDeSys V3中导入(仅在CoDeSys V3.4具有该功能),同样需要一些 适应性更改。

➤ CoDeSys库管理及标准库

CoDeSys IDE包含各种库文件方便用户使用,依据所需功能可以在项目中的库管理器(Library

Manager)中进行添加,下图展示了新建项目中的库管理器的位置。



➢ CoDeSys库管理及标准库

CoDeSys V3提供的标准库如下表所示,这些库不是AWP100新建项目默认添加的库文件,如有需要需要用户手动添加进项目中。

库名称	功能
SysCom.library	与目标设备进行串行同步通讯
SysComAsync.library	与目标设备进行串行异步通讯
SysCpuHandling.library	IEC功能调用、测试和复位
SysDir.library	目标设备上的同步文件管理器
SysDirAsync.library	目标设备上的异步文件管理器
SysEvent.library	IEC任务事件
SysFile.library	目标设备同步文件处理系统
SysFileAsync.library	目标设备异步文件处理系统

➢ CoDeSys库管理及标准库

库名称	功能
SysInt.library	基于SysMem.library内存管理器提供终端功能
SysPci.library	连接到系统的PCI总线的访问权限
SysPort.library	通过端口地址(例如实时时钟等)与外部硬件模块同步通讯
SysPortAsync.library	通过端口地址(例如实时时钟等)与外部硬件模块异步通讯
SysProcess.library	目标系统上的流程处理
SysSem.library	创建、使用同步任务信号
SysSemProcess.library	创建、使用异步任务信号
SysShm.library	创建和访问共享内存
SysSocket.library	通过TCP/IP和UDP访问sockets上的同步通讯
SysSocketAsync.library	通过TCP/IP和UDP访问sockets上的异步通讯
SysTask.library	任务管理
SysTime.library	用于读取控制器实时时钟等

➢ CoDeSys库管理及标准库

库名称	功能
SysTimer.library	实现触发调用函数事件的分时器
SysTypes.library	实时系统平台综合

➢ CoDeSys库管理及标准库

CoDeSys V3系统库中兼容了一部分CoDeSys V2系统库,相关的库在添加库Sys/SysLibs23目录项下,如下图,如有需要可在项目中添加调用相关库文件。

ocation	System	~	Edit Locations
	(C: \ProgramData \CODESYS \Managed Libraries)		
Installed libr	aries:		Install
Company	(All companies)	~	Uninstall
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➢ PRACTEK开发库

PRACTEK针对包括AWP100在内的控制器产品开发了相关的系统功能库。

其中较为重要的是Pcm51Clib,它可以对磁盘空间进行监控,并实现CoDeSys实时系统的退出(将导致系统重启),以及实现系统重启功能。包含表2.3.1所示的函数:

函数名称	功能
Pcm51DiskFree('/app')	该函数反馈设备磁盘空闲的字节数,/app表示Application文件系统的根目 录,/mmc表示MMC/SD卡文件系统的根目录,/tmp表示RAM临时文件的 根目录
Pcm51Exit()	退出CoDeSys实时系统,运行该函数将导致设备重启
Pcm51Reboot()	设备重启

▶ Task任务看门狗功能

CT65具备对某一Task任务运行是否时间过长或导致CPU超载的检测和控制功能,其可以通过下图所示的看门狗设置功能启动。

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- Device (AWC 500 PCHS-2)			
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- Application	Type		
Lines Harden	(Cycle	- 3marcal (e.g. 1#200ma) 20	100.00
PLC_PRG (PRG)	10000		
	Wwitchdag		
	d Etrable		
	Tirre(e.a	1#200+s) [1#200ms	Test In
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	(Module)	100	
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> Task任务看门狗功能

操作方法步骤如下:

- 勾选Wathdog下的Enable复选框
- 设置时间,例如T#200ms
- 设置敏感值,例如10

■ 看门狗设置时间必须大于Task任务运行周期

• 触发机制:例如:设置时间为T#200ms,敏感值为10,当单次任务运行时间超过200ms*10
 时,或当连续10次任务运行时间均超过200ms时,将导致看门狗触发

➤ Task任务看门狗功能

当看门狗异常触发时,数字输出的状态将被设置为默认状态。 禁用或重新使能看门狗功能也可以通过接口函数的方式在程序内部进行设置。

hlecTask := lecTaskGetCurrent(0);

lecTaskDisableWatchdog(hlecTask);

... // Code that is protected against watchdog

lecTaskEnableWatchdog(hlecTask);

➤ Task任务看门狗功能

当包括看门狗在内的系统故障触发时,实时系统将停止运行并触发Exception故障,此时程序内变量将保持故障前状态不变。

		•	看门狗的触发通常是由于代码中含有对空指针的调用、死循环、除零等异常情况。
	0	•	请务必评估当Exception故障时系统的输出是否会产生严重意外,并酌情进行必要的规避
-			和处理

➤ Task任务看门狗功能

针对异常系统故障的处理,可以使用CoDeSys IDE提供的接口回调程序,并在回调程序中设置当出现异常系统故障是采用何种操作处理,例如重启。



▶ 默认IO输出状态

对于IO输出,当异常系统故障发生时可以被设置为默认状态,如下图所示,在Device页面PLC Setting 项下:

- 使能Update IO while in stop
- 设置Behaviour for outputs in Stop为Set all outputs to default即可。

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> 硬件属性及状态监控

AWP100提供全系列产品的硬件属性及状态监控功能,常用功能块如表2.6所示。

功能块	参数/属性	功能/返回值
IoDrvEtherCAT	NumberActiveSlaves	返回实际连接的从站数量
	xConfigFinished	返回配置是否完成的状态
	xError	返回EtherCAT总线错误或故障
	LastMessage	返回EtherCAT总线最新的消息
ETCSlave	VendorID	返回供应商ID
	ProductID	返回产品ID
	wState	返回从站当前状态。枚举值如下:
		0:ETC_SLAVE_BOOT
		1:ETC_SLAVE_INIT
		2:ETC_SLAVE_PREOPERATION
		4:ETC_SLAVE_SAFEOPERATION
		8:ETC_SLAVE_OPERATION

▶ 硬件属性及状态监控

功能块	参数/属性	功能/返回值
AIO6·1	Al x Under range	当输入值低于通道检测下限时返回TURE
	Al x Over range	当输入值高于通道检测上限时返回TURE
	Al x Error	通道故障(包括超过通常检测上下限等故障时)
TIM6·1	RTD x Under range	无效
	RTD x Over range	当输入值高于通道检测上限时返回TURE
	RTD x Error	通道故障(包括超过通常检测上限等故障时)

> 控制器负载监控

在CoDeSys中,可以通过Task Configuration/Monitor中查看任务周期时间和统计数据,如下图

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▶ 控制器负载监控

或者,也可以测量每个子系统的执行时间。 //循环时间统计的方法1, 手动计时计算循环时间 //在任务代码开始和末尾分别获取时间戳然后做减法得到实际运行时间 //Task开始时间戳 SysTimeCore.SysTimeGetUs(pUsTime := start); //循环时间统计的方法2,获取系统统计的循环时间结果,单位us hTask := CmpIecTask.lecTaskGetCurrent(pResult:=ADR(Result)); IF hTask <> ISysTypes.RTS INVALID HANDLE AND hTask <> 0 THEN pTaskInfo2 := CmpIecTask.IecTaskGetInfo3(hIecTask:=hTask, pResult:=ADR(Result)); dwInterval:= pTaskInfo2^.dwInterval; dwCycleTime := pTaskInfo2^.dwCycleTime; dwMinCycleTime := pTaskInfo2^.dwMinCycleTime; dwMaxCycleTime := pTaskInfo2^.dwMaxCycleTime; dwAvgCycleTime := pTaskInfo2^.dwAverageCycleTime; ELSE dwCycleTime := 20000; dwMinCycleTime := 3000; dwMaxCycleTime := 3000; dwAvgCycleTime := 3000; END IF; //循环消耗时间,增加代码运行时间 IF test THEN FOR cnt := 1 TO 65534 DO END FOR END IF //Task 结束时间戳 SysTimeCore.SysTimeGetUs(pUsTime := end); //Task 实际时间消耗,单位us cycletime := end - start;

需要确保实时运行任务的实际运行时间消耗小于任务运行周期,并尽可能的短,这是保证系统不至于因为任务超时导致系统故障的有效方法。

▶ 控制器负载监控

在Debug或测试时,PLC的负载情况也可通过PLC Shell、网页或通过SSH登录到Linux系统后运行top 指令查看。



▶ 控制器负载监控

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login a	s: root						~
root@19	2.168.20	.13's pass	word:				
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BusyBox	v1.25.1	(2021-02-	17 16:3	4:25	UTC)	built-in shell (ash)	
~ # top							
Mem: 11	1120K us	ed, 917600	K free,	932K	shre	1, 17408K buff, 37568K cached	
CPU: 4	.5% usr	9.0% sys	0.0% n	ic 86	.3% i	idle 0.0% io 0.0% irq 0.0% sirq	
Load av	verage: 0	.28 0.23 0	.18 1/1	89 15	99		
PID	PPID USE	R STAT	VSZ	%VSZ	%CPU	COMMAND	
1159	1158 roo	t S	32184	3.1	8.1	./codesyscontrol	
1599	1596 roo	ot R	2676	0.2	5.4	top	
685	395 roo	t S	38424	3.7	0.0	fnvramd -1 -f -t 60 /nvram /data/.nvra	
745	400 roo	t S	11480	1.1	0.0	netc daemon -c /etc/netc.json -r 6	
607	409 roo	ot S	10048	0.9	0.0	reset-button -s reset-button-system-re	
861	398 roo	t S	5032	0.4	0.0	lighttpd -D -f /etc/lighttpd.conf	
1590	815 roo	ot S	4604	0.4	0.0	sshd: root@pts/0	
815	404 roo	ot S	4604	0.4	0.0	/usr/sbin/sshd -D -e	
905	883 nob	ody S	2684	0.2	0.0	tr -d	
1596	1590 roo	ot S	2676	0.2	0.0	-sh	
770	764 roo	ot S	2676	0.2	0.0	/sbin/getty 115200 /dev/console	
225	211 roo	ot S	2584	0.2	0.0	s6-fdholderd -l -i data/rules	
1592	793 roo	ot S	2544	0.2	0.0	sleep 300	
1593	794 roo	ot S	2544	0.2	0.0	sleep 300	
1597	795 roo	ot S	2544	0.2	0.0	sleep 30	
633	392 roo	t S	2544	0.2	0.0	inotifyd dupdate-inotifyd-agent /tmp/f	4

▶ 控制器负载监控

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n Home	Modules Info Tools	Applications			
Firmware					
OS version: Bootloader version:	0.1.0.0-34-g94f9de 0.1.0.0	e			
Resources					
CPU load:	15% (cpu0: 14% cpu1: 15%)				
Memory:	891 MB free, 8% used				
Diskspace:	3029 MB available, 1% used				
upanie.	nour / minutes Jo seconds				
Version: 0.1.0.0-34-g94f9dee	Temperature: 51 °C		Hushame: pan61-sn20100022400013	Time: 2000-01-01T09:07:43+0800	User

➢ EtherCAT硬件扫描

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CT65系列产品支持模块配置的扫描功能, 省去了手动逐个添加硬件模块的烦恼。方法如下:

- 新建工程,选择默认的Standard project
- 添加设备,选择EtherCAT并选中EtherCAT Master
- 修改配置为Select network by name,并将Network Name修改为ecat0

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默认的以MAC来搜索网络会使得开发的工程只能应用去该MAC地址设备,无法部署到其 他设备中。这不利于工程的现场应用。

- ➢ EtherCAT硬件扫描
- Login, 但不要运行工程
- 右击EtherCAT_Master选中Scan for Devices



> EtherCAT硬件扫描

• 所有在线设备将自动被扫描出来,点击Copy All Devices to Project,相关配置将被导入到工程中。如下图

Device name	Device type	Alias Address 0	
Attention! The device was not found in the repository	Vendorcode: 0xD0F, Productcode: 0x795B3326, Revision: 0x2		
- PCM61	PCM6.1 Computer Module	0	
DIO61	DIO6.1 Digital Input and Output Module	0	
AIO61	AIO6.1 Analogue I/O Module	0	
IFM61	IFM6.1 Interface and Fieldbus Module	0	
SIM62	SIM6.2 Station Interface Module	0	

0

不是所有的硬件设备都能被正确的扫描并添加入工程中,设置因为设备故障导致其他设备 不能被添加入工程。因此仍然建议核对已扫描添加的设备或手动添加设备。

> EtherCAT硬件扫描持久型变量(Persistent variables)

需要分配掉电不丢失的参数时可将其声明为持久型变量,这些变量会被实时储存,防止意外导致数据丢 失。

这些变量需要在Persistent Variables块内被声明才具有上述功能,添加Persistent Variables的方法如下图所示。

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	Call Yes Synthed Cardigat	ana.		• •

> EtherCAT硬件扫描持久型变量(Persistent variables)

虽然持久型变量具有不易丢失的特性,但仍然建议在此基础上将相关数据保存在备份文件中,以防备可能的器件损坏,工程误更新等导致数据丢失。



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必须将程序生成启动应用,否则重启后程序丢失,persistent变量也不复存在。

▶ HMI创建及设置

CoDeSys IDE支持创建和编辑HMI,并支持通过网页对HMI的访问。在工程中添加HMI的方法如下:

- 新建工程,选择默认的Standard project
- 右击Application, 并添加Visualization Manager, 如图2.10.1



> HMI创建及设置

• 默认选择直到VisualizationManger被加入到工程中



• 双击VisualizationManager,勾选Visible,并设置HMI存储区大小



≻ HMI创建及设置

右击Application添加Visualization

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		Cal 14 al POU a d Symb S	Symbol Configuration Text Ust Trend Hacording Manager Unit Conversion				•1

> HMI创建及设置

- 对其命名,并开始编辑界面
- 双击VisualizationManager下的WebVisu,可通过修改Start visualization来设置当用户登录到HMI界面 时首先显示哪个界面。同时在WebVisu中还可对界面的刷新频率,界面缓存等参数进行设置。
- 编辑完成后将代码下载到控制器并运行,然后用户可通过访问控制器IP地址打开控制器网页



≻ HMI创建及设置

➢ 在Home标签下点击右侧Web visu即可进入用户界面



更多关于界面的设计,可以在CoDeSys IDE画面编辑中尝试使用CoDeSys提供的Visualization Toolbox 中的多种组件实现。
➤ HMI的交互语言

在项目开发过程中,添加到HMI中的所有静态文本都会在默认语言下自动添加到带有ID的全局文本列表中。图2.11展示了如何添加全局文本列表。



≻ HMI的交互语言

其他语言可作为新列添加到此列表中,并可设置切换语言。



> 创建启动应用及生成启动项目包

工程调试完毕正常运行后可通过菜单栏Online/Create Boot Application生成启动应用,之后控制器断 电并重新上电原工程将自动运行。

为方便将工程部署到更多的设备当中,AWP100提供了制作启动项目包的工具: bootappBuilder

bootappBuilder_v9.0.0.1.zip

该工具是免安装的,解压后可直接使用,在config.txt中将IP地址修改为需要制作启动项目包的目标 控制器,然后保存,双击运行批处理程序create_dupdate.bat,待运行完成将在同级文件夹内生成 application_xxx_xxx.dupdate(xxx为生成的时间戳),该文件即为启动项目包

> 部署启动项目包

AWP100提供了两种启动项目包的部署方法,其一是通过控制器网页更新,方法如下:

- 通过输入IP进入控制器网页界面,并转到Tools/Firmware update
- 在Update项下单击Choose File按钮并找到启动项目包路径,选中启动项目包
- 点击Upload



▶ 部署启动项目包

• 更新完成后将显示绿色更新成功提示。



▶ 部署启动项目包

点击Reboot



输入成功后点击Reboot重启控制器即可



> 多应用编程及监控

AWP100支持多Application同时运行在系统中,并且可以实现Application间的相互监控,当某一个 Application出现异常时可由其他Application实现对异常Application的重启。



≻ 新建一个CoDeSys工程

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≻ 添加CT65设备

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≻ 添加CT65设备





≻ 添加CT65设备

添加完工程如下图所示

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➢ 添加EtherCAT Master

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≻ 添加EtherCAT Master

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➢ 添加EtherCAT Master

添加完EtherCAT Master, 工程如下图所示





▶ 和CT65建立连接

双击CT65设备,可以看到一个已经存在的Gateway,默认IP地址: Localhost; 你也可以新建一个新的 Gateway,点击Gateway -> Add new gateway。

• * ×	PCHS_1_Practack x	
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▶ 和CT65建立连接

输入控制器的IP,例如: 192.168.20.13。





≻ 和CT65建立连接

新建完新的Gateway后,点击Scan network,扫描CT65网络。

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P		tor device ten he served. Lawrence,	



▶ 和CT65建立连接

选择对应的设备,点击OK。





≻ 和CT65建立连接

连接完成后,工程界面如下。

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双击EtherCAT_Master。

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点击Browse...

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选择ecat0,点击OK。

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		CK	Abort				



选择Select Network by Name,工程如下图。

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> PLC Settings

点击设备PCM61_1_Practek->PLC Settings,我们推荐把Bus cycle task 设置为EtherCAT_Master,同时用户可以根据需求设置Update IO while in stop、Behavior of the outputs at stop、Always update variables。

- 3 X	Vig mecan, successful	🗿 Uteckt/Hate 🖉 🗿 PDMLL/Hwitek 🛪 🤹 Uteckt/Jak 🛛 📓 Taal Configuration								
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≻ 扫描模块

首先login











≻ 扫描模块

右击EtherCAT_Master,选择Scan For Devices...



新建第一个CoDeSys工程

≻ 扫描模块

可能无需登录CT65就可以扫描设备,它要求EtherCAT Master在CT65上运行就可以扫描。

如果扫描失败,请执行Login和Reset cold,然后重新扫描。

新建第一个CoDeSys工程

扫描到的模块会被显示出来,选择Copy ALL Devices to Project。

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添加完模块,工程如下。





添加完模块,工程如下。





轮流选中刚添加的模块,点开EtherCAT I/O Mapping界面,将右下角的Always update variables,由 Use parent device setting设置为Enabled 2 (always in bus cycle task)。

Always update variables也可以保持默认设置Use parent device setting,但是需要设置 PCM61_1_Practek->PLC Settings中的Always update variables,设置为Enabled 2 (always in bus cycle task)。



20 Years and an and an	I TOTAL A								
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≻ 编写程序

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≻ 编写程序

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Structured Text (ST)	\sim
○ Function	
Return type	
Implementation language	
Structured Text (ST)	~
	Add Cancel



≻ 编写程序

编写代码





≻ 添加task

Task Configuration -> Add Object -> Task....





Add Task		×
An IEC task		
Name		
Task		
		İ
	Add Cance	el l

新建第一个CoDeSys工程

nvices • 0	X @ PCM61 @ 01001 @ 41061 @ TIM61 @ PLC PR6 & Task X	
(a) Unoted 1	Configuration	
= POME_1_Practek (PCM6.1 Practek)		
+ IOH PLCLoge	Priority (8.31); 1 Task Group (EC-Tasks v	
Library Manager	Type	1 annual
PLC_PRG (PRG)	(Ochart - Intervel (e.g. t#210ms) 40	(MC10)
= 🧱 Task Configuration	Watchdog	
St EtherCAT_Task (IEC-Tasks)	□ Enable	
EtherCAT_Master (EtherCAT Master)	Time (e.g. t#200me)	70 ~
= 💮 PCH61 (PCH6.1 Computer Module)	Sentitivity 1	
DDO61 (DD06.1 Digital Evolutiand	104	
TIM61 (TIM6.1 Temperature Inc		
	Add Call Temove Call of Change Call + Move Up. + Move Down ***Open POU	
	POU Comment	

新建第一个CoDeSys工程

enkes 🔹 🗸 🗸	Text Search Categories		
Closed Constant Cons	Programs Name = Application	Type Origin	
	Stuctured view	Inset with arguments Draint with nervegace prefix	
	Documentation PROGRAM PLC_PRG *		

新建第一个CoDeSys工程

-	4 X PONEL CLOEL ALGEL TUNEL REC. PRG STask X	
Chatteds	Configuration	
= D PONS_1 (Vactor (PONS, 1 Practor)	Protects (2, 1) b	
· O Application		
Ebrary Hanager	Pype Phyph	(institution)
PLC_PRG (PRG)	The same is a measure of the second of the	- Contraction
= 🙀 Task Configuration	Watchdog	
EtherCAT_Task (IEC-	Tasis)	
direct eng	Time (e.g. (#210mg)	PR
a 🔄 EtherCAT_Nester (EtherCAT Mast	(e) Sensitivity 1	
🗟 🗊 PCM61 (PCM6, 1 Computer Mo	die)	
DIDEL (DIDE. L Digital Inp	nut and Ou	
A1061 (A206-1 Analogue	10 Modul 💠 Add Call 🗙 Remove Call 📝 Change Call 🔅 Move Up. 🔺 Move Down 🔭 Open POU	
D that fine rieibean	POU Comment	
	创 PLC_PRG	
	3	



≻ 添加task

根据需要设置priority、type和Watchdog

es •	1 K @ POM61 00061 @ A0061 @ T0M61 @ PLC_PRG & Task x	
3 Chested1	Configuration	
= 💮 PCMS_1_Practak (PCMS.1Practak)		
= MH PLC Logic	Priority (0.31)	
· O Application		
B Put Phil delit	Cyclic v Internal (e.g. s#200ms) 20	20.0
= 📷 Teek Configuration		
S EfterCAT_Task (IEC-Ta	and Transformed	
= (S Task (EC-Taska)		1.000
- 셴] 카.C. 카이	Time (a.g. tr 221ms) (1240ms	1912
EtherCAT_Master (EtherCAT Master)	Senitative ID	
 Diolal (2006) a Dantal Invest 		
AIDEL (ADE. 1 Analogue 1/	0 %bch4	
I 10461 (1046.1 Temperature	Add CaE (2), Remove Call (2) Change Call (3) More Op. (4) More Down (17) Open POU	
	POU Comment	
	el PLC_PRG	



≻ 连接IO变量

在EtherCAT I/O Mapping界面,选择通道,点击...图标。

evicei + 0 X	- POME1	🗙 👩 Aldel 👘 TIMEL 👔 PLC_PRG	FIT I			
D Unbled1	General	Find	Filter Show all	1		- & Add #8 for IO Channel T So to Instance
= III PON6_1_Practes (PON6.1 Practes)	Los and the	Walabla Macalta	Channel	Address	Time	Halt Description
- Mi fucinge	Process Data	in any in the second se	Changes	Auguress	1994	con Description
- O Appication	Internet up Manual		001	Teges a	-	DOS (MITTER 1)
Litrary Manager	control to mapping		DOE	740/01	807	DO2 (terminal 2)
E PLC_PRO (PRU)	EtherCAT IEC Objects		DOS	90013	801	DOS (Semeral 3)
Task Configuration	and entrances		00+	16001.3	001	DO4 (terminal 4)
(dis EtherCAT_Task (DEC-Tasks)	Satur		DOS	Ardatra	601	DOS (terminel 1)
= (SI Task (BC-Tasks)	and the second se		DOE	NQXL3	661	DO6 (terminal 16)
UEI PLC_PRG	automation		007	*LXQ4P	BET	DO7 (terminal 17)
* [] EtherCAT_Mexter (EtherCAT Hester)			DOB	%QX1.7	841	DOS (terminal III)
POHL1 (PDHL1 Computer Module)			DOB	44QC2.0	EET.	DO9 (terminal 12)
DID61 (DID6.1 Digital Diput and Du			DO3D	%Q(2.1	6DT	DO 10 (terminal 20)
📑 A3061 (A306, 1 Analogue I/O Nodul			Output status	%X1.6	BET	Oulput status (false if the output drivers are overloades)
TIM61 (T2H6.1 Temperature Input I		*	DEI	%DC2.0	RET	D11 (terminal 7)
		1 N 1	012	9602.5	BET	DIII (berminal 8)
			00	%2X2.2	807	DL3 (berninal 9)
		- *	014	%DX2.3	ET.	D(4 (berwarial 30)
		12.00	DIS .	9400.4	857	DIS (terminal 11)
		*	DIS	%b23	EET	DHi (terrinial 12)
			017	%2X2.6	851	D17 (berminel L1)
		*	DIS	%0.2.7	BET	DIB (terminal 14)
			DEP	%20(3.0	897	DIS (terminal 22)
		*	0130	94X3.1	607	D110 (terwinal 23
		*	0411	%001.2	807	DI11 (bernitivel 24)
			0112	1003.3	BET	D112 (terwinal 25)
		*	0113	503.4	801	DE13 (bernarial 26)
			NT4.2	3 5 5 7	0.00	5147A (178
		001 (terminal 1)	- Ar	aut Marring.		s up date van dt les Enabled 3 (always in teus cycle task)



≻ 连接IO变量



新建第一个CoDeSys工程

≻ 连接IO变量

nces • • ×	PCH51 DI061	X ALOGI TIMBI P	LC_PRG					
🔆 United / 💌	General	Find	Filter	Show all				- 🛧 Add FB for IO Channel *1 Go to Instance
= M PLCLock	Provide Carte	Variable	Mapping	Channel	Address	Type	Unit	Description
· O Application	Process Data	Application PLC PRG Dout1	3	001	44QH1-0	BET		DO1 (terminel 1)
Library Manager	EtherCAT UO Mapping	19		002	%QX1.1	BIT		DO2 (terminal 2)
PLC PRG (PRG)	Construction and the second			003	%QX1.2	BCT		DO3 (terminal 3)
- Tesk Configuration	EtherCAT IEC Objects			004	%QXL3	BET		DO4 (terminal 4)
B EfferCAT_Task (IEC-Taska)	Subs.	- 10		005	%QX1.4	BET		DDS (terminal 5)
- 🚯 Task (IEC-Tasks)	and a second	*9		DO6	%QX1.5	BET		DO6 (terminal 36)
D PLC_PRG	Information	- "0		007	%QX1.6	BET		DD7 (terminal 17)
= 🛐 EtherCAT_Naster (EtherCAT Master)		*o		008	%QX1.7	BET		DOB (terminal 18)
😑 📑 PCM61 (PCM6.1 Computer Module)		19		009	%QX2.0	BET		DO9 (terminal 19)
DIDEL (DIDE. 1 Digital Input and Ou				0010	%QX2.1	BET		DD30 (terminal 20)
A1061 (A106.1 Analogue I/O Modul		- 10		Output status	%D1.6	BET		Output status (false if the output drivers are overloaded)
🚽 🗐 TIM61 (TIM6.1 Temperature Input I		- 19		011	%D.2.0	BET		OII (terminal 7)
		19		012	%D(2,1	BET		012 (terminal 8)
		19		D13	%DX2.2	BET		OI3 (terminal 9)
		10		014	%D(2.3	6LT		OI4 (terminal 10)
				DIS	%DC2.4	BET		DIS (terminal 11)
		**		D16	%D(2.5	BLL		O16 (terminal 12)
				017	%DC2.6	BET		DI7 (terminal 13)
		- 19		DIS	%D/2.7	BET		OIB (terminal 14)
		- 10		019	%D(3.0	BET		DI9 (terminal 22)
		-9		0110	%D(3.1	BET		0110 (terminal 23
		19		0[11	%D(3.2	BIT		DI11 (terminal 24)
		- 19		DI12	%203.3	BIT		0112 (terminal 25)
		e **		0113	457Y3-4	AFT		0113 Darminal 363
		10000000000000000000000000000000000000		Ha Mill Orthonology	erezonie -			

新建第一个CoDeSys工程

≻ 连接IO变量

连接完所有的变量

G ***	PCH61 01061	* AlCel 100 TIME1 P	LC_PRG					
🗿 chested i 💌 💌	General	Find	Filter	Show all			1	- & Add FB for 10 Channel
= 01 PLC Logic	Process Data	Variable	Mapping	Channel	Address	Туре	Unit	Description
Chray Manager	EtherCAT 1/0 Mapping	Acobiation PLC PRG.Dout2	5	002	44083-1	BET		DD2 (terminal 2)
1 PLC PRG (PRG)		Application, PLC, PRG, Dout3	3	003	41001.2	BUT .		DO3 (terminal 3)
- 24 Task Configuration	EtherCAT MC Objects	Application PLC PRG Dout4		004	40K1-3	BUT		DO4 (terminal 4)
EtherCAT Task (IEC-Tasks)	and a second			005	%QX1.4	BIT		DOS (terminal 5)
= QS Task (IEC-Tasks)	Statut	1.		006	MOXLS	au t		DO6 (terminal 36)
H PLC PRS	Information	10		007	%QX1.6	BET		DO7 (terminal 17)
= I EtherCAT Master (EtherCAT Master)	0			008	96QX1.7	BIT		DC8 (terminal st)
= 10 PCM51 (PCM5.1 Computer Module)				009	%QX2.0	DUT		DO9 (terminal 19)
00051 (0106.1 Digital Input and				0035	%QN2.1	BET		DO10 (terminal 20)
ALOS1 (AID6.1 Analogue 1/O Modul				Output status	\$501.6	877		Output status (false if the output drivers are overloaded)
T3M61 (T3M6.1 Temperature Input F		* Application PLC_PRG.Din	3	001	4020	BET		DTL (terminal 7)
		19		062	%D(2.1	BUT		DI2 (terminal 8)
		- 14		063	%3X2.2	BUT		D13 (terminal 9)
		- 19		DE4	%DX2.3	BOT		D1+ (terminal 10)
		- 19		005	%02.4	BUT		DIS (terroral 11)
		19		D05	%DXZ.5	811		D16 (terminal 12)
		- 19		007	%DX2.6	BIT		DI7 (terminal 13)
		**		008	%DC2.7	BUT		D18 (terminal 14)
		- 19		009	%0(3.0	BUT		019 (terminal 22)
		**		0630	%D(3.1	BET		DEt/D (terminal 23
		19		0011	%03.2	BUT		DI11 (terminal 24)
		*		0012	%DX3.3	स्टर		0E12 (terminal 25)
				0(13)	45773-8	RT		DITS (hermonal 36)
		1.2						



≻ 登录Login

Onling -> Login

I C B B P P A B B X	C Log	n sit	AH+FB Cul+FB	Application (PCM6_1 Practels PLC Logic) - ସ ସ ସ + = 4(1(3 ≤ 1 ≤ 2 ≤ 2) + ■ w' 5.	
vezes	Crea Dow Onlin Sour	te Boot Application nload se Change se Download to Conne	nted Device	Task Group EC-Tasks	
O Application Idrary Manager Int.C. JRIG (INC) O Task Configuration St Energy Analogy O Task (INC-Tasks)	Mult Reso Reso Sim	iple Doverload t Warm t Cold t Origin Mation		g. tr200es) [20	1903
હીં શાળ છે	Dee	nty rating Mode			0.4
CharCAT Visite (CharCAT Ha PON61 PON61 Computer M DIO61 PON61 Computer M DIO61 (00061 Dipte) In AID61 (A0061 Arelogue Trans Comp	odule) put and Ou e I/O Podul	Add Call ≥ Rem	ove Call of Char	ge Call # Move Up - 4 Move Down * Open POU	
 EtherCAT, Value (EtherCAT Ha Hows1 POHs1 Camputer M D1065 (2006-1.0pinb) AID61 (AD61 AA360pa T3461 (T346, 1 Temperal 	oduke) post and Ou e I/O Modul ture Imput R	Add Cal > Rem POU	we Cell of Cher	ge Cal (* Move Up, * Move Dover, **)Open POU Comment	



➢ 登录Login





≻ 登录Login

	* # X	PCM61 01061	A1061 1	19462 🚺 PLC	PRG X			
S Cheerer Constant Second	Different a Department.	POHIL_1_Practek.Applicate	onPLC_PRG	1.000.000	120250.you111	100 J 200 J	0.0000000	
B M R Close	d fundor summer	Expression	Туре	Value	Prepared value	Address	Comment	
= O Andication (ston)		Oin	BOOL	FALSE				
Chrany Manager		Doutt	900L	FALSE				
E RC PRG (PRG)		Dout2	8001	FALSE				
= III Task Configuration		Dout3	800L	FALSE				
GIS ERWCAT T	ask (IEC-Tasks)	P 00004	BOOL	MLSE				
= G th Task DEC-T	asis]	9 mt	247					
dit PLC PRG	224	· frettime	BOOL	THERE				
Const (PCMs. 1 Con Const (pCMs. 1 Co	npuner moduler) Digital Input and Output Module) Analogue I/O Module) Pemperature Input Module)	B A B IT CALL B A B A B A B A B A B A B A B A B A	SO THEN 1- DOUTS PALSE: - DOUTS PALSE: - DOUTS PALSE: - DOUTS PALSE: - NOT (DOUTS (NOTE)) - 0:					
	npuner moduke) Digital Inguit and Output Module) Analogue I/O Nodule) Temperature Inguit Module)	E C TITELING BOIT DOULATION C DOULATION C	50 THEN 1- DOUTS 20053 : 1-					



▶ 运行程序

Debug -> Start





> 运行程序

Devices - 3 X	PCM61 E DID61	A1061 🗐 1	1961 📄 PLC_	PRG X			
= 🛞 Unoted)	PCH6_1_Practick.Applicate	m.PLE_PRG			-		
Constant Jornettel (PCML1 Practin) PC Logc Copc C	Expression Dix Douti Dout2 Dout3 Dout4 ord ort ort firstime If firstime If firstime SND IF Dout4 (Min Dout4 (Min D	Type BOOL BOOL BOOL BOOL BOOL BYT BOOL BYT BOOL ST THEN ST THEN	Value FALSE FALSE FALSE FALSE FALSE	Prepared value	Address	Comment	
C 3 Messages - Total Exercic), Examining [a], Emessage(s), C Wetch (Device user: Anomenous Lastbaldi O 0 0 0 F	Bankarita 🔐 Crossilela recorde 🖌 🔒 💼 📾	enceList	arem is edied	Prost	an unthanded	Protect user: (robodv)	100 % @



点击Online -> Logout登出程序,点击Application -> Add Object -> Visualization...,创建界面

nates -	* 4 X				RC.MG					
3 Liniteri		4.000		Tiel	The	(Balant)			· de Add IB for 20 Channel	
= I POME_1_Packs(POME = IN PLC Logic	i.1.Pracidi)	Process Data		Variable	Mepping	Channel	Address	Туре	Unit Description	
- C Applea X	Cut		huine	Appendicute Provident		001	Augura a	861	COLDENDED D	
1 and 10	Copy		arter a	Application P.C. 200 Con 43	-	002	SCOL 3	arr.	DOI (service of the	
	Faste		letts	A topication & C 985 Poulti		004	m.cont.o	RIT	DOst Designed 40	
x at	Delete					DOS	5001.4	817	DOS (terminal S)	
- 69	Refectoring			5		006	1001.5	SIT	DO6 Devrinal 160	
	Contraction of the second		-	19		007	16081.6	811	007 (terminal 17)	
H IEI Etwicat H	Properties			10		DOB	%QX1.7	817	DOB (terminal 18)	
= (POME)	Add Object		🗃 Alarm Co	niguration_		009	%QX2.0	BET	009 (termai 19)	
iii no 😂	Add Folder		Application			0048	16002.1	ALL.	0010 (terrintal 20)	
CIGLA E	Edit Object		Data Sou	rtes Marager		Output status	%LX1.6	607	Output status (false if the output drivers are overloaded	
III 124	Edit Object with_		2 DUT		*	011	1000	BIT .	OEL (terminal 7)	
00	loain		Giobal Variable List			012	9402.1	BIT	002 (terminal 8)	
		Construction of the				013	1602.2	887	OED (herminal 9)	
	Delete application fro	Giobel V		riable List (backlocal)		014	%ix2.3	807	004 (terreval 10)	
			(Image Po	aL		015.	%0(2.4	BET	CES (terminal 11)	
			wo interface.	-		Ólfe	Wax2.5	8IT	006 (terminal 12)	
			Metwork	Variable List (Receiver)		017	1602.8	817	OI7 (terminel LS)	
			Network	Variable List (Sender)		018	%D2.7	BIT	008 (terminal 14)	
			T Persistent	Variables_		019	1603.0	811	C09 (terminal 22)	
			en pou.	en staar se st		0110	%DX3.1	817	01.00 (terriniai 23	
			di POU fer i	molicit checks		0111	%2(3.2	SIT	OE11 (terrenal 24)	
			Recipe M	anaper_		08.12	%D(3.3	RT	OCL2 (berninal 25)	
			dl Redundar	ncy Configuration		19115	10111	. 417	PETERMENTAL 265	
		Sembol Configuration			Rend M	anna i		standahlar Buddat (Marsana karanda tati)		
			Text List.	Room Nepping Always up Cata seriables Endded 2 (always in bus			compare a feature core seet			
1000			ef Trace.		🖗 + Hapto e	muting variable				
Devices [1] POV		The last	Trend Res	cordina Manager.						
Mexicages - Notel Elemon(b) I	warest@cs), 10 mmtaa24	50) B (Dee)	The Link Com	ercine.			0.000000000		CONTRACTOR CONTRACTOR CONTRACTOR	
		100	GT Upgelbar			Last	built O 0 1	D Pre	comple 🗸 🍯 Project user: (nobody)	
			and a substituted							



(T T A	PCM61 00061	X AJC61 TIM61	PLC_PRG				
)) Unoteos	General	Find	Filter Show all			Add FB for IO Channel * Go to Initiance	
= (() POM0_1_Practek (POM0.1Practek) = () PUC Logic	Process Data	Add Viscelization	×	Address	Type U	it Description	
= O Application	E CONSIGN C			ectres.	BIT	DO1 (terminal 1)	
Library Manager	EtherCAT 1/0 Mapping	Creates a visualization object		%Q#1-1	BIT	DO2 (terminal 2)	
(DR9) DR9_DJ9 (8	Disartat WC Objects				817	DO3 (terminal 3)	
🖹 😹 Task Configuration	ENDIGHT IDE VOJEUS			%QX6:8	BIT	DO4 (terminal 4)	
EtherCAT_Task (EC-Taska)	Statue	Namei		%QXL4	BIT	DOS (terminal 1)	
= 🕼 Task (IEC-Taska)	and the second sec	veuelaston		NQK1.5	HIT .	DO5 (terminal 26)	
(B) PLC_PRG	Information	Symbol libraries	Active	NQX1.6	817	D07 (terminal 17)	
= BetterCAT_Master (EtherCAT Master)		- I Va Syntols (System)		%QXL7	813	DOB (terminal 18)	
B 💮 POM61 (POM6.1 Computer Module)				%QX2.0	BIT	DO9 (terminal 19)	
DICE1 (DICE.1 Digital Struct and Cu				%QX2.1	BET	DO 10 (terminal 20)	
AJO61 (AJD6.1 Analogue LiO Modul				%D1.6	<u>811</u>	Output status (false if the output drivers are overloaded)	
TIM61 (TIM6.1 Temperature Input)				%3K2-0	HIT	DE1 (terminal 7)	
				%D/2:1	807	DE2 (terminal 8)	
			1	%02.2	BIT	DE3 (terninal 9)	
				%DX2.3	BIT	D04 (terninal 30)	
		A visualization symbol library is graphics and graphical objects.	a CODESYS library with If the visualization symbol	%02.4	811	DCS (terminal 11)	
		library is assigned the library is	edded into the POUs library	%Ix2.5	817	D65 (terminal 12)	
		toolbox when a visualization edit	tor is the active editor.	%D2.6	BIT	DC7 (terminal 13)	
				%0.2.7	BIT	D08 (terminal 34)	
				%D(3.0	BIT	D09 (terminal 22)	
			Add Cancel	%D3.1	WT .	DE30 (terminal 23	
		1	- Garren	ND(3.2	817	DE11 (Jarminal 24)	
			0112	NDX3.3	BIT	DE12 (terminal 25)	
			7113	95111.4	817	FX13 /herminal 341	
		1090					



- CoDeSys HMI
 - 拖一个Eclipse控件





设置Eclipse控件大小属性, Width 150, Height 150。





设置Toggle color,关联程序PLC_PRG中的变量Dout1。

• # ¥ ¥	I PCHE1 I D	061 📑 A5061	19461 👔 R	C_FRG (a) Visuali	ration × •	Propertax	* *
Lineshof J PCM6, 1_Paccel (PCM6, 1 Paccel) PC, PSC (PCM6, 1 Paccel) PC, PSC (PSC) PC, PSC (PSC) PC, PSC (PSC) PC, PSC (PSC) PC, PSC PC, PSC						V Filter + *\$ Sortby + 24-Sort Property Element name Type of element + Position + Colore + Colore + Colore - Colore- - Colore - Colore	ander + El Advanced Value Gardlandrut, J Elipse Illinear, Black, Well PLC, FRG. Jouki PLC, FRG. Jouki
Devices A FOM		_			70 1 10 1	a) Hauslanton Tastitus 🕼 Proper	Sei .



设置Colors的Alarm state。





复制三个Eclipse控件,Toggle Color分别关联程序PLC_PRG中的变量Dout2、 Dout3、 Dout4。





添加一个Rectangle空间,设置Position, Texts, Text variables。





➢ Web Visu设置

设置Start Visualization

Devices + # ¥	WebVas X		
Inster/ POM_1Pactor (POM_1Pactor) POM_1Pactor (POM_1Pactor) POM_1Pactor (POM_1Pactor) POM_2Pactor (POM_1Pactor) POM_2Pactor (POM_1Pactor) Pomor (Pomor) Pomor (Start visualization Name of Jon file Update inte (m) Default communication buffer size Soling Options I mass I in the part Clear with Clear with Clear with Default Test Dout Joput with	Visualization interest interest	



- ≻ Web Visu设置
 - 设置Start Visualization





➢ Web Visu设置

设置Update rate (ms) 和Default communication buffer size。

Chromotic Proble_1, Practice (PCMs. 1 Practice) Proble_2, Practice (PCM: 1 Practice) Proble_3,	rices + 4 X	😸 WebVisu 🗴 🏭 Vaualaston	Manager			
Stating Options Stating Option	Chested? Chested: Chested:	Set visualization Name of Jon file Update rate (mc) Defeut communication buffer aue	Vauelzebon Instrumu Charat default pape 200 50000			
Construction - Structure Structure Module) Structure Module) Structure Module) Structure Module) Structure Module) Structure Module) Structure Module Structure Structure Module Structure Module S	응 Ether CAT_Task (EC-Tasks) = 아 Task (EC-Tasks) 의 PLC_PRG = 아 HSU_TASK (EC-Tasks) 관 Visualization: Manager 이 Visualization: Manager 이 Visualization: Manager	Scaling Options O Prived O textropic Use scaling options for duidops O text with O text with O text height Presentation Options	Showland) Anisotropic 1000 1024	Amunifications		
	EherCAT / Marine (EHerCAT Marine) Errors (FOME 1 Computer Module) FOME (FOME 1 Computer Module) FOME (STORE 1 Computer Module) AIOE (ALOEA, 1 Analogue I/O Modul TIME ((TIME 1 Temperature Input F	Arti alianad drawing Default Test Input Input Input Input Input	Pauhareen	v		



➢ Web Visu设置

设置Scaling options,调节界面显示效果。

vices v 9 X	😸 WebWas 🗙 🙀 Visualization Harvager	
Destinut estinut Destinut Destinut Destinut Destinut Destinut Destinut Destinut Destinut Destinut	Start vacualization Vacualization Name of Attr file Arebrau Disc as default page Disc as default page Update rate (ms) 200 Default conversionation buffer size 50000 Ratio Qubote Securit control conversionation buffer size Finding Qubote Beautimetric conversionation buffer size On the security of the s	
Brooker (NUCLA)	bput wth	



➢ Visualization Manager设置

勾选Use unicode strings,可以使用unicode编码格式的字符串。





▶ 重新登录

点击登录按钮。





▶ 重新登录

弹出窗口,选择Login with download。





- ➤ Start程序
 - 点击,按钮,运行程序。



新建第一个CoDeSys工程

➤ Start程序





> 创建启动应用

点击Online -> Create Boot Application,创建启动应用,每次断电重启后,控制器自动运行应用程序。




首先,程序创建启动应用,解压bootappBuilder_v9.0.0.1压缩包。

📕 tools	2018/9/14 17:12	文件夹	
config.txt	2023/6/29 10:22	文本文档	1 KB
🖭 create_dupdate.bat	2018/9/14 17:16	Windows 批处理文件	1 KB



打开config.txt文件,将ip修改为控制器的IP,例如: 192.168.20.13。





双击create_dupdate.bat文件。

📜 tools	2018/9/14 17:12	文件夹	
config.txt	2023/12/5 16:12	文本文档	1 KB
💿 create_dupdate.bat	2018/9/14 17:16	Windows 批处理文件	1 KB



在弹出如下窗口后,回车。





dupdate文件包生成。

📕 tools	2018/9/14 17:12	文件夹	
🔇 application 20231205 161514.dupdate	2023/12/5 16:15	DUPDATE 文件	2,562 KB
config.txt	2023/12/5 16:12	文本文档	1 KB
create_dupdate.bat	2018/9/14 17:16	Windows 批处理文件	1 KB



➢ 浏览器访问CodeSys Web界面

打开浏览器,推荐火狐浏览器,在导航栏输入<u>https://192.168.20.13:8443/webvisu.htm</u>。

第一次连接时会弹出如下界面,点击高级。



您的连接不是私密连接

攻击者可能会试图从 192.168.20.13 窃取您的信息 (例如:密码、通讯内容或信用卡信息)。 了解详情

NET::ERR_CERT_AUTHORITY_INVALID

Q 如果您想获得 Chrome 最高级别的安全保护,请<u>开启增强型保护</u>

e .		
	回纵	





➢ 浏览器访问CodeSys Web界面

选择继续前往192.168.20.13(不安全)。



您的连接不是私密连接

攻击者可能会试图从 192.168.20.13 窃取您的信息 (例如:密码、通讯内容或信用卡信息)。了解详情

NET::ERR_CERT_AUTHORITY_INVALID

Q 如果您想获得 Chrome 最高级别的安全保护,请<u>开启增强型保护</u>



返回安全连接

此服务器无法证明它是**192.168.20.13**;您计算机的操作系统不信任其安全证书。出现此问题的原因可能是配置有误或您的连接被拦截了。





➢ 浏览器访问CodeSys Web界面

界面如下。





➢ DIO6·1

DIO6·1是数字量输入输出模块,拥有10路数字量输出通道,16路数字量输入通道。







➢ DIO6·1 -DI

➢ DI通道变量映射

	Find	Filt	er Show only i	nputs			→ Add FB for IO Channel → Go to Instance
	Variable	Mapping	Channel	Address	Туре	Unit	Description
Dess Data			Output status	%IX1.6	BIT		Output status (false if the output drivers are overloaded)
nerCAT I/O Mapping	Application.PLC_PRG.Din	°ø	DI1	%IX2.0	BIT		DI1 (terminal 7)
	•		DI2	%IX2.1	BIT		DI2 (terminal 8)
nerCAT IEC Objects	• • • • • • • • • • • • • • • • • • •		DI3	%IX2.2	BIT		DI3 (terminal 9)
tus	*		DI4	%IX2.3	BIT		DI4 (terminal 10)
	• • • • • • • • • • • • • • • • • • •		DI5	%IX2.4	BIT		DI5 (terminal 11)
ormation	***		DI6	%IX2.5	BIT		DI6 (terminal 12)
	*		DI7	%IX2.6	BIT		DI7 (terminal 13)
	***		DI8	%IX2.7	BIT		DI8 (terminal 14)
	***		DI9	%IX3.0	BIT		DI9 (terminal 22)
	¥p		DI 10	%IX3.1	BIT		DI10 (terminal 23
	¥p		DI11	%IX3.2	BIT		DI11 (terminal 24)
	¥p		DI12	%IX3.3	BIT		DI12 (terminal 25)
	¥p		DI13	%IX3.4	BIT		DI13 (terminal 26)
	¥p		DI14	%IX3.5	BIT		DI14 (terminal 27)
	¥p		DI15	%IX3.6	BIT		DI15 (terminal 28)
	*		DI 16	%IX3.7	BIT		DI16 (terminal 29)



➢ DIO6·1 -DI

➤ DIO6·1 DI Mapping 通道定义

通道名称	类型	描述
Dlx	BIT	DI的数字量数值,激活状态(PNP高电平)数值为TRUE



➢ DIO6·1 -DO

➢ DIO6·1 DO 变量映射

ral	Find	Filt	er Show all				► Add FB for IO Channel → Go to Instan
an Data	Variable	Mapping	Channel	Address	Туре	Unit	Description
ess Data	Application.PLC_PRG.Dout1	~>	DO1	%QX1.0	BIT		DO1 (terminal 1)
CAT I/O Mapping	Application.PLC_PRG.Dout2	~⊘	DO2	%QX1.1	BIT		DO2 (terminal 2)
	Application.PLC_PRG.Dout3	~ >	DO3	%QX1.2	BIT		DO3 (terminal 3)
CAT IEC Objects	Application.PLC_PRG.Dout4	~ >	DO4	%QX1.3	BIT		DO4 (terminal 4)
5	* @		DO5	%QX1.4	BIT		DO5 (terminal 5)
3	* @		DO6	%QX1.5	BIT		DO6 (terminal 16)
mation	* @		DO7	%QX1.6	BIT		DO7 (terminal 17)
	· · · · · · · · · · · · · · · · ·		DO8	%QX1.7	BIT		DO8 (terminal 18)
	* @		DO9	%QX2.0	BIT		DO9 (terminal 19)
	K ø		DO10	%QX2.1	BIT		DO10 (terminal 20)
	🍫		Output status	%IX1.6	BIT		Output status (false if the output drivers are overloaded)
	Application.PLC_PRG.Din	~⊘	DI1	%IX2.0	BIT		DI1 (terminal 7)
	🍫		DI2	%IX2.1	BIT		DI2 (terminal 8)
	*		DI3	%IX2.2	BIT		DI3 (terminal 9)
	🍫		DI4	%IX2.3	BIT		DI4 (terminal 10)
	* >		DI5	%IX2.4	BIT		DI5 (terminal 11)
	* ø		DI6	%IX2.5	BIT		DI6 (terminal 12)
	¥ø		DI7	%IX2.6	BIT		DI7 (terminal 13)
	***		DI8	%IX2.7	BIT		DI8 (terminal 14)
	₩		DI9	%IX3.0	BIT		DI9 (terminal 22)
	***		DI 10	%IX3.1	BIT		DI10 (terminal 23
	↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓		DI11	%IX3.2	BIT		DI11 (terminal 24)
	*		DI12	%IX3.3	BIT		DI12 (terminal 25)
	No. 10		DI13	%IX3.4	BIT		DI13 (terminal 26)
	DI16 (terminal 29)		Reset	Mapping	Alwaysu	pdateva	ariables Enabled 2 (always in bus cycle task)



➢ DIO6·1 -DO

➤ DIO6·1 DO Mapping 通道定义

通道名称	类型	描述
DOx	BIT	DO的数字量数值,激活状态(PNP高电平)数值为TRUE
Output status	BIT	FALSE值表示DO输出过载,典型的过载工况为短路

CT65模块应用

> AIO6·1

AIO6·1是模拟量输入输出模块,拥有2路模拟量输出通道(0至20 mA / 4至20 mA / 0至10 V), 16路模拟量输入通道(0至20 mA / 4至20 mA / 0至10 V)。



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AI06-1



≻ AIO6·1 - AO

➤ AO通道

AIO6·1拥有2路AO通道,可以通过启动参数设置为0至20 mA / 4至20 mA / 0至10 V。

eics - I X	3 Al061 X								
	General Process Deta	♦ Add of set >> 0 Line IndexSobi	den 9 month 4 Iden Name Valu	kort Dove n Bit Leng	rth Abort	on Err Jump	to Line on Er New	t Line Comment	
	Startup Parameters	Telect Item from	Object Directory						
🗐 2006 1 (2006, 1 Digital Digital And Ou	PiterC473/0 Materian								
IPALIE (ALOS, 1 Analogue I/O Modul TIMS: (TIMS, 1 Temperature Imputit	Eterce7.80 Objects	IndexSubindex * 16410F3164	Name 00 Diagnoss History	F	ags Type	Default		·*	
		* 1641013-164	00 ForPDO-Amign						
	D iformation	* 16#7000:16#	00 AO 1						
	S	* 16#7030-16#	so Ao a						
		= 16+8030:16+	00 AO 1 Advenced a	ettinge					
		125#11	AO I Output tip	8	W USBNT	35#0e			
		* 10400271104	00 NO I windor data						
		18.011	AO 3 Output ton	and the second se	a unair	15.40+			
		* 16+90 27:16#	00 AO 2 windor data	2	-	1.555			
		* 18+630D:36+	00 All 1 Advanced as	tings					
		# 164530P:104	00 AT 1 vendor data						
		* 164811D:264	00 At 2 Advanced in	tings.				~	
		have	AD 1 Output type				1		
		Index: 16#	8000	inter .			08		
		Subfades: 164	11 2	Value	Dec. to M			and the second se	
			Takte enter		0 - 20 mA		Catr		



- ≻ AIO6·1 AO
- ➤ AO通道

启动参数定义

名称	类型	枚举名	值
		0-10V	14
AO x Output type	USINT	0-20mA	18
		4-20mA	19



➢ AIO6·1 - AO

➢ AO通道变量映射

Jeneral	Find		Filter Sho	ow only outputs			🗣 Add F8 for IO Channel	Instance
Process Data	Variable	Mapping	Channel AO I Value	Address	Туре	Unit	Description A0 1 Value	
Rartup Parameters	1. To		AO 2 Value	e %QW3	DAL		AO 2 Value	
therCAT I/O Mapping								
RherCAT IEC Objects								
Ratus								
nformation								
				Reset Mapping	liverys und	atevariah	les Enabled 2 (always in him circle task)	
		1015			en al s obo	and the reside	In strong of fundaments of some choic game)	



- ➢ AIO6·1 AO
- ➢ AO通道变量映射

通道名称	类型	描述
	INIT	AO的模拟量数值,根据设定参数不同,数值0~32767线性对应全量程
AO value		0~10V、0~20mA、4~20mA。



- > AIO6 · 1 AI
- ≻ Al通道

AIO6·1拥有16路AI通道,可以通过启动参数设置为0至20 mA / 4至20 mA / 0至10 V。

General	4 Add	Eat X Delete	# Movetto # Mo	E DOWN					
Process Data	Line	IndexSubinde	n Nome	Value	Bit Len	gth Abort on E	rror Jump to Line on Err	Next Line	Comment
Startup Parameters	Se	lect item from O	bject Directory						
InerCAT I/O Mapping						P. (.).			
thatCAT IEC Objects		index:Subindex	Name	F14	de làbe	Detault			
Districted and objects		15#8009:15#00	AO 1 vendor data						
tatus		16#8010:16#00	AO 2 Attranced as	rttings			10		
		15#801P:16#00	AO 2 vendor data	-					
formation		16#8100:16#00	AI 1 Advanced set	cangs		and a			
		116#11	AI 1 Input type	RW	USINT	16#0e			
		16#810F:16#00	Al 1 vendor data				100		
		e 16#8110/16#00	AL 2 Advanced set	taigs.					
		16#8110-16#00	AL 2 VENDOR DATA						
		16#812016#00	AI 3 Advanced set	tai@s					
		164812916400	41.3 95100 0818	-					
		16#8130:16#00	AL 4 Advanced set	cango					
		10.401.07-10.400	AL Y VENDOR CALL	No. or					
		1648144.16400	ALS NOVARCED SET	cange.					
		104014 : Made	with statements on the				*		
		Name	Al 1 Input type						
		Index: 16#	s100	Bit lengt	1	(4)	OK		
		Publishers 144		i indus	(- 16.0			
		ORDINDER: YOM	**	1 Velos	9 - 10 V	1.14	Cancel		
			Byte array		0 · 20 mA				
	-				4 - 20 mA		1	4	



≻ AlO6·1 - Al

≻ AI通道

启动参数定义。

名称	类型	枚举名	值
		0-10V	14
Al Input type	USINT	0-20mA	18
		4-20mA	19



➢ AIO6·1 - AI

➢ AI通道变量映射

General	Find		Filter Show only in	outs			- 🕂 Ada
Den anna Data	Variable	Mapping	Channel	Address	Туре	Unit	Description
rocess Data			AI 1 Under range	%IX4.0	BIT		AI 1 Under rand
artup Parameters			AI 1 Over range	%IX4.1	BIT		AI 1 Over range
			AI 1 Error	%IX4.6	BIT		AI 1 Error
herCAT I/O Mapping	*		AI 1 TxPDO State	%IX5.6	BIT		AI 1 TxPDO State
harCAT IEC Objects	***		AI 1 TxPDO Toggle	%IX5.7	BIT		AI 1 TxPDO Toggle
lercar inconjects			AI 1 Value	%IW3	INT		AI 1 Value
atus	* ø		AI 2 Under range	%IX8.0	BIT		AI 2 Under range
			AI 2 Over range	%IX8.1	BIT		AI 2 Over range
ormation	¥ø		AI 2 Error	%IX8.6	BIT		AI 2 Error
	¥ø		AI 2 TxPDO State	%IX9.6	BIT		AI 2 TxPDO State
	- *		AI 2 TxPDO Toggle	%IX9.7	BIT		AI 2 TxPDO Toggle
	🖮 🍫		AI 2 Value	%IW5	INT		AI 2 Value
			AI 3 Under range	%IX12.0	BIT		AI 3 Under range
	🍗		AI 3 Over range	%IX12.1	BIT		AI 3 Over range
	* ø		AI 3 Error	%IX12.6	BIT		AI 3 Error
	* >		AI 3 TxPDO State	%IX13.6	BIT		AI 3 TxPDO State
	*		AI 3 TxPDO Toggle	%IX13.7	BIT		AI 3 TxPDO Toggle
	1		AI 3 Value	%IW7	INT		AI 3 Value
	* >		AI 4 Under range	%IX16.0	BIT		AI 4 Under range
	1 *		AI 4 Over range	%IX16.1	BIT		AI 4 Over range
	* >		AI 4 Error	%IX16.6	BIT		AI 4 Error
	* ø		AI 4 TxPDO State	%IX17.6	BIT		AI 4 TxPDO State
	* >		AI 4 TxPDO Toggle	%IX17.7	BIT		AI 4 TxPDO Toggle
	🚊 🍫		AI 4 Value	%IW9	INT		AI 4 Value

- ≻ AlO6·1 Al
- ➢ AI通道变量映射

通道名称	类型	描述
AI x Under range	BIT	TRUE值表示超出测量下限
Al x Over range	BIT	TRUE值表示超出测量上限
Al x Error	BIT	Under range或Over range触发时,Al Error触发,TRUE值表示Error
AI x TxPDO State	BIT	备用,暂无实际意义
AI x TxPDO Toggle	BIT	当AI数据更新时,TRUE / FALSE跳反变化
AI x value	INT	AI的模拟量数值,根据设定参数不同,数值0~32767线性对应全量程 0~10V、0~20mA、4~20mA。



≻ TIM6·1

TIM6·1 是温度输入模块,可以测量14路两线PT100输入或者6路三线制PT100。

两线制接线图:



Temperature inputs 1 to 8 (Pt100)



Temperature inputs 9 to 14 (Pt100)





≻ TIM6·1

三线线制接线图:





Temperature input 3 wire Pt100



➤ TIM6·1 - 两线制

▶ 启动参数设置

General Process Data	+ Add of the 20 Da	in . It Merelan . It Merelleren				
Blattup Persenters EtherCAT I/O Mooping EtherCAT IEC Objects Status Information	Eelest Ham from Index Subinder + 16 - 107 16 - 16574 + 16 - 107 16 - 16574 + 16 - 107 16 - 16574 + 16 - 107 16 - + 16 - 107 16 - - 17 - 107 16 - - 17 - 107 - - 17 - 107 - - 17 - 107 - - 17 - -	Name Value Bit Leng Deject Directory Name Name Name Name Name Name Name Name	ngth Abort	en Err. Jump to Lin Type Default UBM 29:4000	e on Er, Next Line Co	mound
	EherCAT IEC Objects EherCAT IEC Objects Bittes (Information	EherCAT UD Moobing EherCAT UD Moobing Batas (styrmation (styrmation) EberCAT UD Objects (styrmation) Energy 104 (styrmation) EberCAT UD Moobing (styrmation) EberCAT UD Moobing (styrmation) E	EtherCAT UD Macoling EtherCAT EtC Objects EtherCAT	EtherCAT ES Objects EtherC	EtherCAT UD Mooping EtherCAT UD Mooping EtherCAT US Objects Blates Information Blates Information Info	EtherCAT IDD Macosing IndexCauthindex Name Flags Type Default * EtherCAT ES Objects Sit and Sit Sector 31.6403 Diagnoss History Sit Sector 31.6403 Diagnoss History Sit Sector 31.6403 Diagnoss History Sit Sector 31.6403 Sit Sector 31.6403



➤ TIM6·1 - 两线制

▶ 启动参数设置

启动参数	类型	枚举值	值
RTD 1~14 Connection		Two-wire connection	0
technology		Not connected	3

➤ TIM6·1 - 两线制

▶ 变量映射

General	Find		Filter Show all			• & Add FB for 10 Channel	instance
Decrees Data	Variable	Mapping	Channel	Address	Type Unit	Description	1
richana bana	- *		RTD 1 Under range	%DX58.0	BET .	RTD 1 Under range	
Startup Parameters			RTD 1 Over range	%D058.1	817	RTD 1 Over range	
	*		RTD 1Error	%1068.6	BIT	RTD 1 Error	
BherCAT VO Mapping	- 10		RTD 1 TxPDO State	%IX69.6	8CT	RTD 1 TXPDO State	
TherCAT IEC Objects	- 19		RTD 1 TxPDO Toggle	%Dx69.7	BIT	RTD 1 TxPDO Toggle	
and over all objects	8.9		RTD 1 Value	%10/35	INT	RTD 1 Value	
katua	- 10		RTD 2 Under range	%IX72.0	807	RTD 2 Under range	- 1
aper cont	- 10		RTD 2 Over range	%IX72.1	BIT	RTD 2 Over range	
nformation	- 7		RTD 2.Empr	%D(72.6	807	RTD 2 Error	
			RTD 2 TxPDO State	%DX73-6	8IT	RTD 2 TyPDO State	
			RTD 2 TXPDO Toggle	%D(73.7	BIT	RTD 2 TXPDO Toggle	
	* *		RTD 2 Value	%JW37	INT	RTD 2 Value	
	*		RTD 3 Under range	%IX76.0	807	RTD 3 Under range	
	- 10		RTD 3 Over range	%JX76.1	BIT	RTD 3 Over range	
	- 19		RTD 3 Error	%IX76.6	BIT	RTD 3 Error	
	- 10		RTD 3 TxPDO State	%1x77.6	BIT	RTD 3 TxPDO State	
			RTD 3 TXPDO Toggle	%DX77.7	817	RTD 3 TXPDO Toggle	
	H 19		RTD 3 Value	%IW39	INT	RTD 3 Value	
	- 54		RTD 4 Under range	%IX80.0	80	RTD 4 Under range	
	- *		RTD 4 Over range	%D080.1	61T	RTD 4 Over range	
	*		RTD 4Enor	%DX80.6	607	RTD 4 Error	
			RTD 4 TxPDO State	%D(81,6	807	RTD 4 TxPDO State	
	*		RTD 4 TxPDO Toggle	%D081.7	807	RTD 4 TxPDO Toggle	
	* *		RTD 4 Value	%1W41	INT	RTD 4 Value	
			Reset May	Alw prints	eys update variab	en Enabled 2 (always in bus cycle task)	

➤ TIM6·1 - 两线制

▶ 变量映射

通道名称	类型	描述
Under range	BIT	超出测量下限,TRUE值报警
Over range	BIT	超出测量上限,TRUE值报警
Error	BIT	Under range或Over range值触发时, Error值触发, TRUE值报警
TxPDO State	BIT	暂无实际意义
TxPDO Toggle	BIT	数据刷新标识,数据更新时TRUE/FALSE值翻转。
Value	INT	温度采集的值(实际值的10倍)



➤ TIM6·1 - 三线制

▶ 需要更新TIM6.1固件,设置启动参数

neral	Add Cdt > Dele	e di Move Up la Nove De	WIT .	_				
ocess Data	Line Index:Subinde	x Name Value Bit	Length	Abort o	n Error Jun	ap to Line on Er	rr Next Line Co	hmen
tup Parameters	Select Item from	Object Directory						
erCAT DO Mapping	Index Subinder	Name	Flant	Tune	Default			
archTIEC Objects	# 16.81/F3-168	05 Diamonic History	riags	()pe	Desaut		10	
ser sec objects	- 1548100-164	00 Diagnosis Fastory						
	- 15#16	RTO L Connection be	PW .	(mer-	14,40000			
	* 16#800F:16#	00 RTD 1 vendor data						
mation	+ 15#8010:15#	00 RTD 2 Settings						
	* 15#001P116#	00 RTD 2 vendor data						
	# 15#9020:16#	00 RTD 3 Settings						
	# 15#802F: 15#	00 RTD 3 vendor data						
	₩ 15#8030:36#	00 RTD 4 Settings						
	* 16#803Fi 16#	00 RTD 4 vendor data						
	* 15#8040:16#	00 RTD 5 Settings						
	# 15#804P:15#	00 RTD 5 vendor data						
	* 15#8050;16#	00 RTD 6 Settings						
	* 16#809Ft16#	00 RTD é vendor data					4	
	Name	RTD 1 Connection technolog	W.					
	Index: 16#	8000	Bit length	15		4	OK .	
	SubIndex: 15#	14	Value	THOWAR	e connection	~	Cated	
		Syte array		Two-wire Not com	e connection lected			



- ➤ TIM6·1 三线制
- ▶ 启动参数设置

RTD 1~12 Connection technology参数可选Two-wire connection/Three-wire connection/ Not connected,对应的TEMP接线方式两线制/三线制/不使用。

当使用三线制时,固定的两路两线制合并成为一个三线制。如:使用1/15/3/17,将TEMP1和TEMP3合并为一路三线制TEMP,需要将TEMP1和TEMP3的启动参数都修改为Three-wire connection。

启动参数	类型	枚举值	值
DTD 1-1/ Connection		Two-wire connection	0
RID 1~14 Connection	UINT(16位)	Three-wire connection	1
technology		Not connected	3

RTD 13, 14只可作为两线制TEMP使用。

➤ TIM6·1 - 三线制

▶ 变量映射

General	Find		Filter Show all			26	Add FB for 10 Channel	to instance
Discase Data	Variable	Mapping	Channel	Address	Type L	Joit	Description	-
riopean pare			RTD 1 Under range	%JX68.0	807		RTD 1 Under range	
Startup Parameters	- 14		RTD 1 Over range	%D068.1	807		RTD 1 Over range	
			RTD 1 Error	%1X68.6	8IT		RTD 1 Error	
BherCAT VO Mapping	- 10		RTD 1 TxPDO State	%IX69.6	8TT		RTD 1 TxPDO State	
PriverCAT SEC Diviserts	*		RTD 1 TxPDO Toggle	%Dx69.7	BIT		RTD 1 TxPDO Toggle	
and and and angless	1. 19		RTD 1 Value	%7///35	par		RTD 1 Value	
Ratus			RTD 2 Under range	%IX72.0	807		RTD 2 Under range	
and the second	- 19		RTD 2 Over range	%1X72.1	BIT		RTD 2 Over range	
Information			RTD 2.Empr	%DX72.6	807		RTD 2 Error	
	*		RTD 2 TxPDO State	%DX73-6	807		RTD 2 TyPDO State	
	*		RTD 2 TXPDO Toggle	%D(73.7	BIT		RTD 2 TXPDO Toggle	
	* *		RTD 2 Value	%JW37	INT		RTD 2 Value	
	*		RTD 3 Under range	%EX76.0	807		RTD 3 Under range	
			RTD 3 Over range	%IX76.1	8IT		RTD 3 Over range	
			RTD 3 Error	%IX76.6	BIT		RTD 3 Error	
	- 19		RTD 3 TxPDO State	%2X77.6	BIT		RTD 3 TxPDO State	
			RTD 3 TXPDO Toggle	%DX77.7	100		RTD 3 TXPDO Toggle	
	H 10		RTD 3 Value	%IW39	DAL		RTD 3 Value	
	- **		RTD 4 Under range	%IX80.0	8IT		RTD 4 Under range	
			RTD 4 Over range	%INB0.1	61T		RTD 4 Over range	
	*		RTD 4 Error	%DX80.6	BUT		RTD 4 Error	
			RTD 4 TxPDO State	%D(81.6	807		RTD 4 TxPDO State	
	*		RTD 4 TxPDO Toggle	%3X81.7	811		RTD 4 TxPDO Toggle	
			RTD 4 Yake	%IW41	INT		RTD 4 Value	
			Reset May	Aha Aha	eys updateve	riables	Enabled 2 (always in bus cycle task)	-

➤ TIM6·1 - 三线制

▶ 变量映射

通道名称	类型	描述
Under range	BIT	超出测量下限,TRUE值报警
Over range	BIT	超出测量上限,TRUE值报警
Error	BIT	Under range或Over range值触发时, Error值触发, TRUE值报警
TxPDO State	BIT	暂无实际意义
TxPDO Toggle	BIT	数据刷新标识,数据更新时TRUE/FALSE值翻转。
Value	INT	温度采集的值(实际值的10倍)



➢ IFM6·1

IFM6·1模块拥有两个Profibus DP Master和两个RS-485接口







IFM6·1 - Profibus-DP Master

IFM6·1模块拥有两个Profibus DP Master接口,每个接口可以连接最多五个DP slave。

> IFM6·1 - Profibus-DP Master

▶ 重置过程数据

IFM6.1 通信模块具有 2 个 Profibus DP Master 端口,在进行 Profibus DP 变量链接之前,需要进行 Process Data 设置。IFM6.1 提供一个默认 122 字节的数组来实现与Profibus DP 子站的数据交互,该数组 与 Profibus 通信数据的映射是由 PDO 实现的。

Process Data 设置需要将"16#1702"替换成"16#1600"(用于 slave1)、"16#1601"(用于 slave2)、 "16#1602"(用于slave3)、"16#1603"(用于slave4)、"16#1604"(用于slave5);

- > IFM6·1 Profibus-DP Master
- ▶ 重置过程数据

Profibus Outputs									
16#1702					16#1703				
16#1600	16#1601	16#1602	16#1603	16#1604	16#1640	16#1641	16#1642	16#1643	16#1644
DP1 Slave1	DP1 Slave2	DP1 Slave3	DP1 Slave4	DP1 Slave5	DP2 Slave1	DP2 Slave2	DP2 Slave3	DP2 Slave4	DP2 Slave5
IFM6·1 - Profibus-DP Master

▶ 重置过程数据

单击"IFM61"、"Process Data"进入 Process Data 配置页面。在"select the Outouts"分组内取消 "16#1702"和"16#1703"的勾选,勾选"16#1600"和"16#1640",这样就设置了 Profibus Outputs 的 DP1 slave1 和 DP2 slave1。如果有两个子站同时连接主站,那么需要继续勾选"16#1601"和"16#1641",设置 Profibus Outputs 的 DP1 slave2 和 DP2 slave2。

> IFM6·1 - Profibus-DP Master

▶ 重置过程数据

Devices • U X	👔 PLC_PRG 🚯 ManTask	Device I EtherCAT_Master	100	Library Manager 📝 🗐 1FH61	×	
G Test Project	General	Select the Outputs			Select the Inputs	
P.C.Logic Application Discrete Processor P.C.2PRG (PRG) P.C.2PRG (PRG) P.C.2PRG (PRG) P.Matrask (DEC-Tasks) P.Matrask (DEC-Tasks) Discrete Processor Discrete Processor P.C.2PRG Discrete Processor P.C.2PRG Discrete Processor P.C.2PRG Discrete Processor P.Matrask (DEC-Tasks) Discrete Processor P.Matrask (DEC-Tasks) Discrete Processor P.C.2PRG Discrete Processor Discrete Processor	Process Data Startup Parameters EtherCAT UO Mapping EtherCAT UO Mapping EtherCAT IEC Objects Status Information	Name COM2 Data out 30 COM2 Data out 30 COM3 Data out 3 (DP 1) outputs COM3 Data out 0 COM3 Data out 1 COM3 Data out 2 COM3 Data out 3 COM3 Data out 3 COM3 Data out 4 COM3 Data out 5 COM3 Data out 5 COM3 Data out 5 COM3 Data out 7 COM3 Data out 7 COM3 Data out 7 COM3 Data out 9 COM3 Data out 9 COM3 Data out 9 COM3 Data out 10 COM3 Data out 11 COM3 Data out 12 COM3 Data out 13 COM3 Data out 13 COM3 Data out 15	Type BYTE BYTE BYTE BYTE BYTE BYTE BYTE BYTE	Index ↑ 16477610:22 16477610:22 16477620:01 16477620:02 16477620:02 16477620:05 16477620:05 16477620:05 16477620:01 16477620:01 16477620:01 16477620:11 16477620:12 16477620:13 16477620:13 16477620:13 16477620:13 16477620:13 16477620:13 1647620:15 1647620:17	Name Type Ide1A00 DP 1 imputs slave 1 (ex DP1 SI Byte array slave-out/master-I ARRAY [DP1 SI Byte array slave-out/master-I ARRAY [DP1 SI Dyte array slave-out/master-I ARRAY [DP1 SI Byte array slave-I SI Byte ARRAY [DP1 SI Byte ARRAY [DP1 Byte A	Inde 11#600000 11#601000 11#601000
	1	COM3 Data out 16 COM3 Data out 17 COM3 Data out 18 COM3 Data out 19 COM3 Data out 20 COM3 Data out 21 16#1703 COH 4 (OP 2) outputs	SYTE SYTE SYTE SYTE SYTE	16#7820:18 16#7820:19 16#7820:20 16#7820:21 16#7820:21 16#7820:22 16#7820:23		16#6040.0

> IFM6·1 - Profibus-DP Master

▶ 重置过程数据

Devices	* # X	PLC_PRG 🔂 MainTas	k 💮 Device 🏹 EtherCAT_Master	Library Manager	2 🕤 IFM61	×
Test Project Device (PCM6.1 Practek) Device (General	Select the Outputs	Select the Outputs		
		Process Data	Name ✓ 16#1600 DP 1 outputs slave 1	Type		Name
		Startup Parameters	DP1 S1 Byte array slave-in/master-out	ARRAY [0121] OF BYTE	16#7000	DP1 S3 Byte array slave-out/mas
	C-Tasks)	EtherCAT I/O Mapping	2			
MainTask (IEC-Task	(s)	EtherCAT IEC Objects				- 16#1A03 DP 1 inpots slave 4
EtherCAT_Master (EtherCAT Master) EtherCAT_Master (EtherCAT Master) Effect (EtherCAT Module) If PC61 (IPM6.1 Interface and File	aster)	Status	DP1 S2 Byte array slave-in/master-out	ARRAY [0.,121] OF BYTE	16#7010:	DP1 54 Byte array slave-oul/mas
	puter Module) Iterface and Fieldo	Information	-			
						1.2
			IG#1602 DP 1 outputs slave 3 DP1 S3 Byte array slave in/master-out	ARRAY [0121] OF BYTE	16#7020	16#1A04 DP 1 inputs slave 5 DP135 Byte array slave-out/max
			DP1 S4 Byte array slave-in/master-out	ARRAY [0121] OF BYTE	16#7030:	DP2 51 8yte stray slave-out/mast
			DP1 55 Byte array slave-in/master-out	ARRAY [0121] OF BYTE	16#7040	DP2 52 Byte array slave-out/mas
			¢		>	-

> IFM6·1 - Profibus-DP Master

▶ 重置过程数据

将"16#1B02"替换成"16#1A00"(用于slave1)、"16#1A01"(用于slave2)、"16#1A02"(用于 slave3)、"16#1A03"(用于slave4)、"16#1A04"(用于slave5),完成 Profibus DP1的slave 1、slave 2、slave 3、slave 4、slave 5 的 Process Data 设置。"16#1703"和 "16#1B03"设置方法与上面相同,用 于 Profibus DP2 的数据通信。

- > IFM6·1 Profibus-DP Master
- ▶ 重置过程数据

	Profibus Inputs										
16#1B02							16#1B03				
16#1A00	16#1A01	16#1A02	16#1A03	16#1A04	16#1A40	16#1A41	16#1A42	16#1A43	16#1A44		
DP1 Slave1	DP1 Slave2	DP1 Slave3	DP1 Slave4	DP1 Slave5	DP2 Slave1	DP2 Slave2	DP2 Slave3	DP2 Slave4	DP2 Slave5		

IFM6·1 - Profibus-DP Master

▶ 重置过程数据

单击"IFM61"、"Process Data"进入 Process Data 配置页面。在"select the Inputs"分组内取消 "16#1B02"和"16#1B03"的勾选,勾选"16#1A00"、"16#1A40"。这样就设置了Profibus Inputs 的 DP1 slave1 和 DP2 slave1。如果有两个子站同时连接主站,那么需要继续勾选"16#1A01"和"16#1A41",设置 Profibus Inputs 的 DP1 slave2 和 DP2 slave2。

> IFM6·1 - Profibus-DP Master

▶ 重置过程数据

Devices - 4 X	MainTask	Device 👔 Library Manager 🗿 PCP	61 EtherCAT_Master	IFM61 ×	i l
Test Project	General	Select the Outputs	Select the Inputs		
Device (PCMb, 1Practex)		Name Type Inde A	Name	Type	Inde
= O Application	Process Data	16#1600 DP 1 outputs	COM2 Data in 21	BYTE	15#6810
il Library Manager		DP1 S1 Byte array slave-in ARRAY [15#7000-0	16#1802 COM 3 (DP 1) inputs	C. C. C. C. C.	
PLC PRG (PRG)	Startup Parameters		COM3 Status	UINT	16#6820
= 144 Task Configuration	Phone 17 110 Managing	1.00	COM3 Data in 0	BYTE	16#6820
EtherCAT Task (IEC-Task	EtherCAT (/O Plapping		COM3 Data in 1	BYTE	16#6820
E S MainTask (IEC-Tasks)	PtherCAT IEC Objects		COM3 Data in 2	BYTE	16#6820
dl PLC PRG	the set all supers	16#1601 DP 1 outputs	COM3 Data in 3	BYTE	16#6820
EtherCAT Master (EtherCAT Master)	Status	DP1 S2 Byte array slave-in ARRAY [16#7010:0	COM3 Data in 4	BYTE	16#6820
= R PCM61 (PCM6, 1 Computer Module)			COM3 Data in 5	BYTE	16#6820
IFM61 (IFM6.1 Interface and F	Information	-	COM3 Data in 6	BYTE	16#6820
-			COM3 Data in 7	BYTE	16#6820
1.5			COM3 Data in 8	BYTE	16#6820
		16#1602 DP 1 outputs	COM3 Data in 9	BYTE	16#6820
		DP1 53 Byte array slave-in ARRAY [16#7020:0	COM3 Data in 10	BYTE	16#6820
			COM3 Data in 11	BYTE	16#6820
		2.000	COM3 Data in 12	BYTE	16#6820
			COM3 Data in 13	BYTE	16#6820
			COM3 Data in 14	BYTE	16#6820
		16#1603 DP 1 outputs	COM3 Data in 15	BYTE	16#6820
		DP1 S4 Syte array slave-in ARRAY [15#7030:0	COM3 Data in 16	BYTE	16#6820
			COM3 Data in 17	BYTE	16#6820
			COM3 Data in 18	BYTE	16#6820
		1000	COM3 Data in 19	BYTE	16#6820
			COM3 Data in 20	BYTE	16#6820
		16#1604 OP I outputs	COMO Data in 21	BYTE	16#6820
		DP1 55 Byte array slave-in ARRAY [16#7040:0	16#1803 COM 4 (DP 2) inputs		
			COM4 status	UINT	16#6830
		< >	COM4 Data in 0	BYTE	16#6830

> IFM6·1 - Profibus-DP Master

▶ 重置过程数据

在"select the Inputs"分组内勾选"16#1A84"、"16#1AC4",这样就设置了Profibus Inputs 的 DP1 和 DP2 子站通信状态。

IFM6·1 - Profibus-DP Master

▶ 重置过程数据

evices 🔹 🕈 🗙	MainTask DLC_PRG	💮 Device 👔 Library Manager 👔 PC	M61 🔄 EtherCAT_Master 🔄 IFM61 🗙	
Test Project	General	Select the Outputs	Select the Inputs	
PLC Logic	Process Data	Name Type Inde '	Name Type	Inde
Ubrary Manager	Startup Parameters	DP1 S1 Byte array slave-in ARRAY [16#700010	DPI 52 Status USINT	16#F102:0 16#F102:0
 Task Configuration EtherCAT_Task (IEC-Task) 	EtherCAT 1/0 Mapping		DP1 SJ Status USINT DP1 S4 Status USINT	16#F102:0
AlanTask (BC-Tasks)	EtherCAT IEC Objects		DP1 S5 Status USINT	16#F102:0
EtherCAT_Master (EtherCAT Master) POM61 (PCM6.1 Computer Module) PM61 (IPM6.1 Interface and F	Status	DP1 52 Byte array slave-in ARRAY [16#7010:0	DP1 Bus error counter UINT	16#F101:0
	Information	-	DP1 Cycle counter UINT DP1 Slave status counter UINT	16#F101:0 16#F101:0
		2	DP1 Cycle time UINT	16#F101:0
		DPI S3 Byte array slave-in ARRAY [15#702010	DP1 Repeat counter UINT DP1 Device diag BIT	16#F101:0
			DP1 Sync error BIT	16#F101:2
		-	DPI Cycle state BIT	16#F101:2
		DP/ 54 Pute server sizes in ADRAY (15 #20000	16#1AC3 DP 2 slave diag flags	
		-	DP2 S1 Dieg flag BIT	16#F107:0
			DP2 S3 Diag flag BIT DP2 S3 Diag flag BIT	16#F107:0 16#F107:0
		-	DP2 S4 Diag flag BIT	16#F107:0
		DP1 55 Byte array slave-in ARRAY [15#7040:0]	DP2 55 Diag flag BIT	16#F107:0
		-	✓ 16#1AC4 DP 2 slave status	

> IFM6·1 - Profibus-DP Master

▶ 设置启动参数

例程中与子站某品牌变桨控制器通信的Profibus DP启动参数设置,关于变桨控制器配置需要如下必须 信息:

从站的站号,该品牌变桨控制器的站号为1;

Ident Number, 该品牌变桨控制器的Ident Number为0x1810;

ParametersData, 主要为需要设置通讯中的watchdog参数, 包含watchdog1和watchdog2两个参数, 满足持续时间 = Watch Dog1 * Watch Dog2 * 10ms, 本例中设置watchdog1和watchdog2均为10, 需要 设置的ParametersData即为0x88 0x0A 0x0A 0x0B 0x18 0x10 0x00; 其中0x88为固定参数, 0x0A和0x0A 分别为watchdog1和watchdog的值, 0x0B为固定参数。0x18 0x10为Ident Number, 0x00也为固定参数。

> IFM6·1 - Profibus-DP Master

▶ 设置启动参数

CfgData, 其为正常通讯后传输的数据的类型, 根据通讯协议, 该品牌变桨控制器传输内容数据类型 配置为: 16#10,16#10,16#10,16#5F,16#5F,16#5F,16#53,16#20,16#20,16#20,16#67,16#61,16#60

General	Add	Add 🔀 Edit 🗙 Delete 👔 Move Up 🐥 Move Down									
Process Data	Line	Index:Subindex	Name	Value	Bit Length	Ab					
	- 1	16#8822:16#01	Termination	True	8						
Startup Parameters	- 2	16#8822:16#02	Bias	True	8						
	- 3	16#F800:16#01	Master address	1	ð						
EtherCAT Parameters	- 4	16#F800:16#02	Data rate	1.5 MBaud	8						
	- 5	16#8000:16#01	Station address	40	16						
EtherCAT I/O Mapping	- 6	16#8000:16#04	Ident number	16#06,16#FC	16						
	7	16#8001:16#00	DP 1 PRM data slave 1	16#88, 16#01, 15#64, 16#08, 16#06, 16#FC, 16#00, 16#C0, 16#00, 16#08, 16#0C	88						
EtherCAT IEC Objects	8	16#8002:15#00	DP 1 CFG data slave 1	16#C0, 16#00, 16#08, 16#0C	32						
Status											

> IFM6·1 - Profibus-DP Master

▶ 设置启动参数

名称	类型		说明			
Termination	USINT(8位)	终端电阻,true	为开启,false为关闭			
Master address	USINT(8位)	主	站地址			
Station address	UINT(16位)	从站地址				
			枚举名	值		
			9.6 kBaud	0		
			19.2 kBaud	1		
	USINT(8位)		93.75 kBaud	2		
			187.5 kBaud	3		
Data rate		波特率	500 kBaud	4		
			1.5 MBaud	6		
			3 MBaud	7		
			6 MBaud	8		
			12 MBaud	9		
			45.45 kBaud	11		
Ident number	UDINT(16位)	厂商识别号				
PRM data	BYTE(88位)	需要设置通讯中的watchdog参数,包含watchdog1和 watchdog2两个参数,满足持续时间 = Watch Dog1 * Watch Dog2 * 10ms				
CFG data	BYTE(32位)	正常通讯后传输的数据的类	型			

> IFM6·1 - Profibus-DP Master

▶ 链接变量

在EtherCAT I/O Mapping页中链接DP Byte array slave-out/master-in和DP Byte array slavein/master-out数组及DP Status变量。

General	Find	Filter Show all			hannel 😁 Go t	o Instance
Process Data	Variable		Mapping	Channel	Address	Туре
FIOLESS Data	* * Application.PLC_PRG.P	ProfibusDP_MasterOUT_DP1S1	*	DP1S1Byte array slave-in/master-out	%QB2	ARRAY [0
Startup Parameters	* Application.PLC_PRG.P	ProfibusDP_MasterOUT_DP1S2	~	DP1S2Byte array slave-in/master-out	%Q8124	ARRAY [0
	Application.PLC_PRG.P	ProfibusDP_MasterOUT_DP1S3	~	DP1S3Byte array slave-in/master-out	%QB246	ARRAY [0
EtherCAT Parameters	Application.PLC_PRG.F	ProfibusDP_MasterOUT_DP1S4	~	DP1 S4 Byte array slave-in/master-out	%QB368	ARRAY [0
	Application.PLC_PRG.P	ProfibusDP_MasterOUT_DP1S5	۵	DP1S5Byte array slave-in/master-out	%Q8490	ARRAY [0
EtherCAT I/O Mapping	Application.PLC_PRG.P	ProfibusDP_MasterOUT_DP2S1	~	DP2 S1 Byte array slave-in/master-out	%Q8612	ARRAY [0
8 1 2	Application.PLC_PRG.P	ProfibusDP_MasterOUT_DP2S2	~>	DP2 S2 Byte array slave-in/master-out	%Q8734	ARRAY [0
EtherCAT IEC Objects	Application.PLC_PRG.P	ProfibusDP_MasterOUT_DP2S3	ه	DP2 S3 Byte array slave-in/master-out	%QB856	ARRAY [0
0 -1-1	Application.PLC_PRG.P	ProfibusDP_MasterOUT_DP2S4	~>	DP2 S4 Byte array slave-in/master-out	%Q8978	ARRAY [0
Status	🗷 🍫 Application.PLC_PRG.P	ProfibusDP_MasterOUT_DP2S5	۵	DP2 S5 Byte array slave-in/master-out	%Q81100	ARRAY [0
oformation				COM1 Ctrl	%QW611	UINT
anomation	😟 - * ø			COM1 Data out 0	%QB1224	BYTE
				COM1 Data out 1	%QB1225	BYTE
	di Ka					

> IFM6·1 - Profibus-DP Master

▶ 链接变量

General	Find	Filter Show all		→ Add FB for IO C	hannel → 🗍 Go t	o Instance
Process Data	Variable		Mapping	Channel	Address	Туре
riocess bata	- *			COM2 Data out 20	%QB1268	BYTE
Startup Parameters	🕮 - *			COM2 Data out 21	%QB1269	BYTE
	Application.PLC_PRG.Pr	ofibusDP_MasterIN_DP1S1	~ *	DP1S1Byte array slave-out/master-in	%IB2	ARRAY [0
EtherCAT Parameters	Application.PLC_PRG.Pr	ofibusDP_MasterIN_DP1S2	*	DP1S2Byte array slave-out/master-in	%IB124	ARRAY [0
	Application.PLC_PRG.Pr	ofibusDP_MasterIN_DP1S3	~	DP1S3Byte array slave-out/master-in	%IB246	ARRAY [0
EtherCAT I/O Mapping	Application.PLC_PRG.Pr	ofibusDP_MasterIN_DP1S4	~	DP1S4Byte array slave-out/master-in	%IB368	ARRAY [0
	🗷 🏘 Application.PLC_PRG.Pr	ofibusDP_MasterIN_DP1S5	~ @	DP1S5Byte array slave-out/master-in	%IB490	ARRAY [0
EtherCAT IEC Objects	🖲 🍫 Application.PLC_PRG.Pr	ofibusDP_MasterIN_DP2S1	~	DP2 S1 Byte array slave-out/master-in	%IB612	ARRAY [0
Chabura	Application.PLC_PRG.Pr	ofibusDP_MasterIN_DP2S2	~ø	DP2 S2 Byte array slave-out/master-in	%IB734	ARRAY [0
Status	Application.PLC_PRG.Pr	rofibusDP_MasterIN_DP2S3	~	DP2 S3 Byte array slave-out/master-in	%IB856	ARRAY [0
Information	Application.PLC_PRG.Pr	ofibusDP_MasterIN_DP2S4	~	DP2 S4 Byte array slave-out/master-in	%IB978	ARRAY [0
Included	Application.PLC_PRG.Pr	ofibusDP_MasterIN_DP2S5	~ >	DP2 S5 Byte array slave-out/master-in	%IB1100	ARRAY [0
	Application.PLC_PRG.Pr	ofibusDP_Status_DP1S1	~>	DP1S1Status	%IB1222	USINT
	🗷 🕸 Application.PLC_PRG.Pr	ofibusDP_Status_DP1S2	~	DP1 S2 Status	%IB1223	USINT
	Application.PLC_PRG.Pr	ofibusDP_Status_DP1S3	~>	DP1 S3 Status	%IB1224	USINT
	Application.PLC_PRG.Pr	ofibusDP_Status_DP1S4	~>	DP1 S4 Status	%IB1225	USINT
	- * Application.PLC_PRG.Pr	rofibusDP_Status_DP1S5	۵.	DP1S5Status	%IB1226	USINT
	🗷 🦘 Application.PLC_PRG.Pr	ofibusDP_Status_DP2S1	~	DP2 S1 Status	%IB1228	USINT

IFM6·1 - Profibus-DP Master

▶ 解析数据

链接到DP1 S1 Byte array slave-in/master-out地址的ProfibusDP_MasterOUT_DP1S1变量数组,即为 第一个DP接口上主站发送给第一个子站的数据,在程序中为这个变量数组赋值,即可将数据发送到子站。 链接到DP1 S1 Byte array slave-out/master-in地址的ProfibusDP_MasterIN_DP1S1变量数组,即为第 一个DP接口上第一个子站发送给主站的数据,在程序中读取这个数组中的数值,即可获取子站发送的数据。 通讯建立后通过查看DP Status的值判断通讯状态,比如DP1 S1 Status为第一个DP接口第一个子站的通 讯状态。DP Status数值为0,表示通信已正常连接进行数据交换。DP Status具体数值以及相对应的含义见 下图。

- > IFM6·1 Profibus-DP Master
- ▶ 解析数据

DP Status	+#+>+
枚举值	油 还
0	通讯正常
1	从站未使能
2	从站无响应
3	从站正与其他主站交换数据
4	不正确的从站响应,例如数据交互时,未激活服务
5	从站报告 prm 参数错误,通常是由于主站配置了错误的 ident number 或者 user
•	parameter
6	从站报告 DP 函数不支持
7	从站报告配置错误,通常是由于配置了错误的CFG参数,例如添加了错误的 modules
8	从站未准备好数据交互
9	从站报告静态诊断

- > IFM6·1 Profibus-DP Master
- ▶ 解析数据

DP Status	+# 2+					
枚举值	田之					
10	备用					
11	总线错误,例如 party 或者 checksum 错误,可能时总线受到干扰,出现错误帧					
12~13	备用					
14	响应错误,例如请求位被置位					
15	从站报告无资源,通常是由于过长的PRM 或者 CFG 参数导致					
16	从站报告 DP 服务未激活					
17	意外的远程帧,例如等待从站响应时发现总线被占用,有可能是总线中存在其他主站 或其他 节点发出的消息等					
18	从站已经准备好进行数据交互,但没有数据通过 Ethercat 交互					
19~255	备用					



> IFM6·1 – Modbus RTU

▶ 设置启动参数

应按照串口实际使用情况设置启动参数中的终端电阻、偏置电阻、波特率及帧格式。

各个通讯站点的波特率及帧格式应一致,通讯线路末端的站点应配置终端电阻。



- > IFM6·1 Modbus RTU
- ▶ 设置启动参数

索引名称			子索引名称	类型	描述
COM *			Termination	USINT(8位)	终端电阻,true为开启,false为关闭
feature bits			Bias	USINT(8位)	偏置电阻,true为开启,false为关闭
				枚举名	值
				2400bps	2400
				4800bps	4800
				9600bps	9600
СОМ *	Baud	UDI	波特举	19200bps	19200
baudrata	rato	NT(32	默认值为	38400bps	38400
baud rate	Tale	位)	9600bps	45450bps	45450
				57600bps	57600
				115200bps	115200
				230400bps	230400
				460800bps	460800



- > IFM6·1 Modbus RTU
- ▶ 设置启动参数

索引名称	子索引名称	类型	İ	描述	
				7EVEN1	0
				7EVEN2	1
				70DD1	2
				70DD2	3
COM * data	Eromo format		帧格式	8NONE1	4
frame	i rame i ormat	031141 (01)	默认值为7ODD1	8NONE2	5
				8EVEN1	6
				8EVEN2	7
				80DD1	8
				80DD2	9



> IFM6·1 – Modbus RTU

▶ 变量链接

在变量定义文件中,将Modbus RTU库中的通讯变量使用AT硬件地址的方式链接到设备通道。

BLC_FBS.ModbuskTubi パー酸性対応、UFI、方 FLC_FBS.ModbuskTubi パー酸性がない。1091方 パーロデオー、1091万日 メールTFL、1091可能量 END_VAR	anter_IPE1_228.Comin / ITNN:1部第一COMI COStation Anter_IFE51_228.ComOut IFNN:1個第一COMI COSTAL (第日見ITNN:1年前台里。)	NY 1191 : ADDAY () いかだめ、 創ビタクロ AT VON : ADDAY : だだ、 創ビタクロン に 豊か 所不可、 用き		1±848 648						
FM61 General	Find		Filter Show all				. +/	dd FB for 10 Channel	" Go to Instance	
Process Data	Variable	Mapping	Channel	Address	Туре	Unit	Descri	ption		
	+ **		CON1 CH	16QWX	UTNT		COMIC	141		
	+ **		COMIData out 0	NQ84	BYTE		COMIC	Data out 0		
Startup Parameters					BVPE		009410	late cost 7		
Startup Parameters			COM1 Date out 1	14Q85	Dive.			And a state of		
Startup Parameters EtherCAT Parameters			COM1 Date out 1 COM1 Date out 2	16265	BYTE		COM10	Nata out 2		
Btartup Parameters EtherCAT Parameters	1		COM1 Data out 1 COM1 Data out 2 COM1 Data out 3	%Q85 %Q86 %Q87	BYTE		COM10	Nata out 2 Nata out 3		
Ratup Parameters EtherCAT Parameters EtherCAT UO Mapping			COM1 Date out 1 COM1 Date out 2 COM1 Date out 3 COM1 Date out 4	%Q85 %Q86 %Q87 %Q88	BYTE BYTE BYTE BYTE		COM10 COM10 COM10	Nata out 2 Nata out 3 Nata out 4		
Ratup Parameters EtherCAT Parameters EtherCAT UO Mapping			COM1 Data out 1 COM1 Data out 2 COM1 Data out 3 COM1 Data out 4 COM1 Data out 5	14Q85 14Q86 14Q87 14Q88 14Q89	BYTE BYTE BYTE BYTE BYTE		COM10 COM10 COM10 COM10	Jata out 2 Jata out 3 Jata out 4 Jata out 5		
Startup Parameters EtherCAT Farameters EtherCAT UO Mapping EtherCAT UC Objects			COM1 Date out 1 COM1 Date out 2 COM1 Date out 3 COM1 Date out 4 COM1 Date out 5 COM1 Date out 5	14Q85 14Q86 14Q87 14Q88 14Q89 14Q89 14Q830	BYTE BYTE BYTE BYTE BYTE BYTE		COM10 COM10 COM10 COM10 COM10	lata out 2 lata out 3 lata out 4 lata out 5 lata out 5		
Startup Parameters EtherCAT Parameters EtherCAT UID Mapping EtherCAT IEC Objects			COMI Data out 1 COMI Data out 2 COMI Data out 3 COMI Data out 4 COMI Data out 4 COMI Data out 5 COMI Data out 5 COMI Data out 5	%Q85 %Q86 %Q87 %Q88 %Q89 %Q830 %Q830 %Q831	BYTE BYTE BYTE BYTE BYTE BYTE BYTE		COM10 COM10 COM10 COM10 COM10 COM10	Aata out 2 Nata out 3 Nata out 3 Nata out 6 Nata out 6		
Startup Parameters EtherCAT Parameters EtherCAT (I/O Mapping EtherCAT (I/O Objects Statue			COMI Data out 1 COMI Data out 2 COMI Data out 3 COMI Data out 4 COMI Data out 4 COMI Data out 5 COMI Data out 5 COMI Data out 7 COMI Data out 8	14Q85 14Q86 14Q87 14Q88 14Q89 14Q830 14Q831 14Q832	BYTE BYTE BYTE BYTE BYTE BYTE BYTE BYTE		COM10 COM10 COM10 COM10 COM10 COM10 COM10	late out 2 Jata out 2 Jata out 3 Jata out 4 Jata out 6 Jata out 6 Jata out 7		
Rantup Parameters EtherCAT Parameters EtherCAT (JO Mapping EtherCAT (EC Objects Status Information			COMI Date out 1 COMI Date out 2 COMI Date out 3 COMI Date out 4 COMI Date out 5 COMI Date out 5 COMI Date out 5 COMI Date out 6 COMI Date out 8 COMI Date out 9	NQ85 NQ87 NQ87 NQ88 NQ89 NQ810 NQ811 NQ811 NQ812 NQ813	BYTE BYTE BYTE BYTE BYTE BYTE BYTE BYTE		COM10 COM10 COM10 COM10 COM10 COM10 COM10 COM10	Nata out 2 Nata out 3 Nata out 4 Nata out 5 Nata out 6 Nata out 7 Nata out 9		



- > IFM6·1 Modbus RTU
- ▶ 建立通讯

使用Modubus RTU库中的函数读写Modbus寄存器,如下图所示,使用ReadHoldingRegisters函数读取 33号子站的保持寄存器。





IFM6·1 – Modbus RTU

▶ 建立通讯

Modbus RTU库所有的寄存器和线圈读取动作(Action)如下图所示,请根据实际的应用选择正确的动作。





➢ IFM6·2

IFM6·2拥有两个CAN口,两个SSI,两个FI功能。







> IFM6·2 – CANopen Master

当使用CAN口作为CANopen主站时,按以下使用方法操作。

▶ 设置启动参数

在IFM6.2的启动参数中为使用的CAN口设置波特率及终端电阻。

Demo_PM62 v1.0.0.0	General	- Add	ZEdit X Delete		Down		
= D PLC Logic		Line	Index:Subindex	Name	Value	Bit Length	Abort on Error
🖻 🔘 Application	Process Data		16#8017:16#01	Termination	True	1	
💼 Library Manager	Startun Parameters	- 2	16#F800:16#01	Baud rate	250 kbaud	8	n
IFM62_FI (PRG)	Surrup Perceberers	3	16#8002:16#01	Termination	True	1	ň
PLC_PRG (PRG)	EtherCAT Parameters	- 4	16#8020:16#11	Frame size	25	16	
🚊 🧱 Task Configuration		5	16#8020:16#12	Data length	25	16	
EtherCAT_Task (IEC-Tasks)	EtherCAT I/O Mapping	6	16#F810:16#01	Baud rate	250 kbaud	8	Ē
🖷 🥵 MainTask (IEC-Tasks)		a second delighter					
D PLC_PRG	EtherCAT IEC Objects						
EtherCAT_Master (EtherCAT Master)	and the second se						
PCM61 (PCM6.1 Computer Module)	Status						
 IFM62 (IFM6.2 Interface and Fieldbus Module (2 CAN 10 messages)) CAN 1 	Information						
GANopen_Manager (CANopen_Manager) GO CANopenDevice (CANopenDevice)							
E CAN 2							



- > IFM6·2 CANopen Master
- ▶ 设置启动参数

请注意在IFM6.2板卡的CAN port上也可为该CAN口设置波特率,当启动参数中未设置波特率时,CAN port上的波特率生效,如两处都设置的话,则需保证设置值一致。

evices	• 0 × 🛐 IFM62	CANopen_Manager	CANopen_D	levice 💦 🏅	CAN 1 X
Demo_JFM62 v1.0.0.0 Device (PCM6.1 Practek)	General	G	eneral		
PLC Logic	CAN 1 Paramete	175	Network	2 🖨	
Library Manager IFIM62_FI (PRG)	CAN 1 1/O Mapp	ling	Baudrate (kbit/s)	250	¥
PLC_PRG (PRG) Task Configuration	CAN 1 IEC Object	cts			
EtherCAT_Task (IEC-Tasks) S MainTask (IEC-Tasks)	Status				
PIC_PRG	Information				
Bereckinaster (Edericki Plaster) Bereckinaster) Bereckinaster (Edericki Plaster) Bereckinaster (Edericki Plaster)	Sperior 20				
IFM62 (IFM6.2 Interface and Fieldbus Module (2 CAN 10 m a CAN 1	nessages))				
 CANopen_Manager (CANopen_Manager) CANopenDevice (CANopenDevice) 					
GAN 2					



- > IFM6·2 CANopen Master
- ▶ 设置启动参数

CAN port上的Network数值无实际意义,但是不恰当的设置该值会导致下载程序时弹窗警告。可按以下规则进行设置:

- Network的0值与1值被预留给PCM板卡,无论PCM板卡中的CAN口是否使用,IFM6.2板卡中的CAN port不应使用0与1。
- 第一块IFM6.2板卡上的CAN1 port的Network值应设置为2, CAN2 port的Network值应设置为3; 第二 块IFM6.2板卡则应顺延为4, 5。依次向下排列。



- > IFM6·2 CANopen Master
- CANopen Manager

在CAN port上右击,选择Add Device,在弹出的设备选择窗口中选择CANopen - CANopenManager

- CANopen_Manager,点击窗口下方Add Device按钮,即可在CAN port上添加CANopen Manager。

ame CANopen_Manager_1				
Action				
Append device () Trian Device () This	uterite () standardenie (
String for a fulfext search	Vendor kull vendors>	_		
Name	Vendor	Version	Description	
= 💮 Feldbuses				
· CIR CANopert				
 CIB CANoperManager 				
CAlkapen_Manager	35 - Smart Software Solutions GmbH	3-5.10.0	CANopen Manager	
CAllopen_Manager	35 - Smart Software Solutions GmbH	3.5.15.0	CANopen Manager	
CANopen_Manager	35 - Smart Software Solutions GebH	3.8.17.0	CANopen Hanaper	
CANopen_Manaper_S1.2	25 - Smart Software Solutions Gebrt	3.5.15.0	CANapen_Manager_S1.2	
Barnet CANapen Nenager	(for eithers any) [] Crebitly accored real	016		
Vendor: 35 - Smart Software Solutions (Gerbert			
Categories: C/VicperManager Version: 3, 5, 15, 0				
Order Bumber:				~
Description: CANopen Nanoger				
Append selected device as last child of				
CAN 1				
• (You can select another larget node in th	Energy as welcome this window is open.]			



- > IFM6·2 CANopen Master
- CANopen Manager

CANopen Manager - General页可对CANopen通讯主站进行各项设置。

Seneral	General					
Log	Node ID 127	0	Check and Fix Co	onfiguration	ANODE	n
CANopen I/O Mapping	Autostart CANopen	Manager	Polling of optiona	slaves		
CANopen IEC Objects	Start Slaves		NMT error behaviour	Restart Slave		
Status	NMTstart all (if p	ossible)				
Information	∠ Guarding	oducing				
	Node ID	127	*			
	Producer time (ms)	200	•			
	# SYNC			# TIME		
	Enable SYNC produ	cing		Enable TIME prod	lucing	
	COB ID (Hex) 16#	80	\$	COB ID (Hex) 15	# 100	-
	Cycle period (µs)	1000		Producer time (ms)	1000	
	Window length (µs)	1200	*			
	Enable SYNC consur	ning				



IFM6·2 – CANopen Master

➤ CANopen Manager - General区域

Node ID: 主站站点号, 默认127。Node ID的数值会包含在通讯报文COB-ID中, 用以标识报文源/目标站点, 所以在同一网络中, 各设备Node ID不可相同。

Check and Fix Configuration: 用以检查整个CANopen网络中是否存在Node ID重复或COB-ID重复。

Autostart CANopen Manager:用以配置主站是否自动切换至OP。当该选项勾选时,如果所有的子站配置完成进入OP状态,则主站自动进入OP状态;当该选项未勾选时,所有子站OP后,主站也不会自动进入OP状态,可以在代码中使用CiA405.NMT库切换主站的状态。当主站未OP时,所有的PDO都不会发送。

Polling of optional slaves: 该选项勾选时,如果一个子站未响应配置,主站会以每秒一次的频率询问该子站。这种周期性询问会降低CANopen网络的实时性,在实时性要求高的网络中可以关闭该选项。当该选项关闭时,需要子站自动发送一个CANopen节点启动信息,主站才能侦测到该子站。



- IFM6·2 CANopen Master
- ➤ CANopen Manager General区域

Start slaves: 当该选项勾选时,主站会启动子站;否则需要在代码中使用CiA405.NMT库去启动子站。 NMT start all: 当该选项勾选时,如果所有可选子站都就绪,则会使用NMT Sart ALL指令启动所有子站,如果有子站未就绪,则单独启动每个子站;

NMT error behavior: 可以选择在发生NMT Error Event后对子站进行的操作,如选择Restart slave, 则会使用NMT Rest + SDO Configuration + NMT start去启动子站;如选择Stop slave,在发生NMT Error Event后主站不再操作该子站,需要在代码中使用CiA405.NMT库手动管理子站。



- IFM6·2 CANopen Master
- ➤ CANopen Manager Guarding区域

Enable hearbeat producing: 勾选后主站发送心跳信号,信号发送周期由Producer time定义。如果 子站的EDS中列明子站支持心跳信号消费功能,则子站中可配置心跳消费(下图右侧Heartbeat consuming(1/1 active)除)。请注意下图左侧的主站生产心跳信号,和下图右侧的子站Heartbeat consuming心跳消费为对应的成对功能,实现主站发送,子站消费的心跳检测功能。下图右侧的子站 Enable heartbeat producing指的是子站发送心跳,和它下方的Heartbeat consuming子站消费心跳是没 有功能关系的。

Guarding			/ Guarding					
Enable heartbeat producing		Enable nodeguar	ding	Enable heartbeat producing				
Node ID	127		Guard time (ms)	0	*	Producer time (ms)	100	-
Producer time (ms)	100	*	Life time factor	0	*	Heartbeat const	uming (1/1 ad	tive)



> IFM6·2 – CANopen Master

➤ CANopen Manager - Guarding区域

Node ID: 心跳信号的节点标识(主站发出的心跳信号,可以通过此处设置一个不同于主站节点号的标识号,此不同有何用处? 建议不要修改该ID号,使用主站节点号即可)

Producer time(ms): 心跳信号发送周期



- IFM6·2 CANopen Master
- ➤ CANopen Manager SYNC区域

Enable SYNC producing: 勾选后主站发送SYNC同步报文,如子站PDO存在同步刷新类型,则需激 活该功能。

COB ID: 同步报文ID号, 各设备一般按默认16#80配置。

Cycle period: 同步报文发送周期。

Window length: 同步报文时间窗口, 该参数为同步PDO接收有效期, 即主站在发送同步报文后, 在 该有效期内收到的PDO被视为有效数据, 超出时间窗口后收到的PDO会被判定无效, 进行丢弃处理。 Window length和Cycle period不存在倍数关系, 只需关注同步报文发送至从站, 从站发送PDO传输至主 站所需的时限。

Enable SYNC consuming: 主站作为同步信号消费者, 由其他设备发送同步信号。

- ➢ IFM6·2 − CANopen Master
- ➤ CANopen Manager TIME区域

Enable TIME producing: 主站发送时间报文。

COB ID: 时间报文的cob id。

Producer time(ms):时间报文的发送周期。

- ➢ IFM6·2 − CANopen Master
- ➢ 为CANopen协议栈设置循环任务

在CANopen Manager的CANopen I/O Mapping页中可以为CANopen协议栈设置循环任务,建议 CANopen协议栈任务的循环时间与EtherCAT总线同周期时长,也可直接使用EtherCAT总线循环任务。

Demo_IFM62 v1.0.0.0		2012/02/02/02/02			
E Device (PCM6.1 Practek)	General	Bus Cycle Options		100	
🗏 🗐 PLC Logic	Common CANhur Parameters	bus cycle task	EtherCal_lask	~	
= 🔘 Application	Common.CANDas Parameters				
Ibrary Manager IPM62_FI (PRG)	Log				
PLC_PRG (PRG) Task Configuration	CANopen I/O Mapping				
EtherCAT_Task (IEC-Tasks)	CANopen IEC Objects				
Phan (ask (JCC-(asks)) Dec_PRG	Status				
EtherCAT_Master (EtherCAT Master) PCM61 (PCM6.1 Computer Module)	Information				
IFM62 (IFM6.2 Interface and Fieldbus Module (2 CAN 10 messages))					
A CAN I A CAN I A CAN I A CAN I A CAN I A CAN I					
CANopenDevice (CANopenDevice)	1				
= > CAN 2					
CANopen Device (CANopen Device)					


- > IFM6·2 CANopen Master
- ➢ 添加CANopen remote device

在CANopen Manager上右击,选择Add device,在弹出的设备选择窗口中选择CANopen – Remote Device下希望添加的子站设备,点击窗口下方的Add Device,即可在CANopen Manager下添加子站设备。

ne ARS2102_SoftMotion				
ction				
Append device Colorent device Collegine	👘 🔘 Update dev	ice		
ring for a fulltext search	Vandor <all th="" vend<=""><th>0/8></th><th></th><th></th></all>	0/8>		
lame		Vendor	Version	Description
Fieldbuses				
= CA CANopen				
 Sin Remote Device 		10000000		C10
APS2102_Softwater		Metropic Cable	440.0	CAlipter Remote Device
ARS2107 SoftMation		Metronix GrobH	4.4.0.0	CAllopen Remote Device
			2010	,
Group by category Display all versions (fo	r experts only)	Naplay outdated versions		
Name: A852102 SoftMoton				
Vendor: Metrurix Griph				
Categories: Renote Device				
Order Number: 2005				
Description: CANopen Remote-Device ARS	2102 imported from A	R52102.ED6		
ppend selected device as last child of Miopen_Manager				
	avigator while this w	ndow is open.3		
ENGLI FRO CALLET REAFFORTHOUT TO AN INTER O		move to open a		



- > IFM6·2 CANopen Master
- ➢ 添加CANopen remote device

在子站设备General页,可以对子站的CANopen通讯进行各项设置。

General	General					
PDOs	Node ID 1		SDO Channels	s (1/1 active)	CANop	SU
SDOs	Enable expert se	ttings 🗌	Optional device			
Log	Enable SYNC pro	ducing [No initialisation	Reset node		4
CANopen 1/0 Mapping	d Guarding			4 <u>-11</u> 17774231231313131012004.00.00		
CANonen IEC Objects	Enable nodegua	rding		Enable heartbeat ;	producing	
compensate objects	Guard time (ms)	0	+	Producer time (ms)	100	÷
Status	Life time factor	0	÷.	🧹 Heartbeat cons	uming (1/1 active)	
Information	# Emergency (EMC	Y)		.4 TIME		
	Enable emergene	ty (EMCY)		Enable TIME prod	ucing	
	COB ID	\$NODEID+	16#80	COB ID (Hex) 16#	100	٥
				Enable TIME const	paimu	
	I Checks at Startup	-				
	Check vendor ID	Che	ck product number	r 🔄 Check revision nu	mber	



- IFM6·2 CANopen Master
- ➤ CANopen remote device General区域

Node ID: 子站站点号

SDO Channels(1/1 active): SDO通道配置

Enable expert settings: 使能专家模式, 勾选后可以看到所有选项(只是影响显示, 不会影响是否生效)

Optional device: 勾选后子站被作为可选设备对待,该子站的状态不再影响主站切换到运行模式。 **Enable SYNC producing:** 子站作为同步报文生产者,需在主站激活Enable SYNC consuming并设置 同步报文相关参数。



- > IFM6·2 CANopen Master
- ➤ CANopen remote device General区域

No initialization:勾选该选项后,主站不会对站点进行NMT管理,也不会通过SDO进行参数配置。 PDO刷新和心跳、节点守卫功能会正常按配置生效。节点可以自动运行,或经由代码执行CiA.NMT库相关 功能进行控制。

Reset node: 当该选项被勾选时,依赖于右侧下拉框中的选项,有一部分参数不会被配置。Sub001:所 有参数不可配置; Sub002:通讯参数不可配置(1000h-1FFFh); Sub003:应用参数不可配置(6000h-9FFFh); Sub004-Sub127:生产商指定区域不可设置; Sub128-Sub254:预留。



- IFM6·2 CANopen Master
- > CANopen remote device Guarding区域

Enable node guarding: 该子站启动节点保护功能,勾选后主站以Guard time中设置的周期向该子站 发送节点保护报文,如未收到子站回复,则重复发送,重复发送节点保护报文的次数由Life time factor参 数设定,发送报文达到上限还未收到子站回复后,主站判定子站通讯故障。节点保护与心跳保护为互斥性 设置,激活一个后,另一个设能设置变为灰色,不可激活。

Guard time(ms):当节点保护功能开启后,主站以这个设定为周期发送节点保护询问报文。

Life time factor: 当主站无法收到从站对节点保护报文的响应时, 重复发送节点保护询问报文的次数。

Enable heartbeat producing: 勾选后子站发送心跳报文,主站按Producer time * 1.5作为心跳超时 的判断依据。

CT65模块应用

- ➢ IFM6·2 − CANopen Master
- ➤ CANopen remote device Guarding区域

Producer time(ms): 子站发送心跳报文的周期。

Heartbeat consuming: 勾选后子站作为主站心跳报文的消费者。当该选项为灰色时,是因为子站 EDS文件中1016h缺乏相应配置,默认该子站不支持心跳报文消费功能。当Heartbeat consuming为可操作 状态时,可点击该选项打开配置框进行设置: Enable勾选时使能心跳消费; Node ID of guarded Node设 置该子站消费哪个cob id的心跳信号(一个CAN网络中可能有多个设备发出心跳,作为心跳信号消费者, 子站只能检测一个设备的心跳,一般检测主站心跳); Consumer time为心跳消费时间,默认该值为主站 心跳周期的1.5倍。

Heartbeat Consuming Properties

Enable	Node ID of guarded Node	Consumer time (ms)	
\checkmark	125	150	



- > IFM6·2 CANopen Master
- ➤ CANopen remote device Emergency区域

Enable emergency(EMCY): 当勾选该选项后,子站在发生内部错误时会发出一个紧急报文,可使用 CiA405功能库读取该报文。

COB ID: 紧急报文cob id号。

CT65模块应用

- ➢ IFM6·2 − CANopen Master
- ➢ CANopen remote device TIME区域

Enable TIME producing: 勾选后该子站发送时间报文。

COB ID(Hex): 时间报文的cob id。

Enable TIME consuming: 勾选后子站作为时间报文消费者。



> CANopen remote device - Checks at Startup区域

Check vendor ID: 检查设备供应商ID, 勾选后, SDO通讯配置阶段, 主站会检查EDS文件中配置的 ID是否与设备实际ID一致, 如不一致, 则报错并中断通讯配置。

Check product number: 检查设备产品类型号码,勾选后,主站会检查EDS文件中配置的产品类型 号与实际设备是否相符。

Check revision number:检查设备产品版本号,勾选后,主站会检查EDS文件中配置的产品版本号 与实际设备是否相符。



> CANopen remote device - Checks at Startup区域

Check vendor ID: 检查设备供应商ID, 勾选后, SDO通讯配置阶段, 主站会检查EDS文件中配置的 ID是否与设备实际ID一致, 如不一致, 则报错并中断通讯配置。

Check product number: 检查设备产品类型号码,勾选后,主站会检查EDS文件中配置的产品类型 号与实际设备是否相符。

Check revision number:检查设备产品版本号,勾选后,主站会检查EDS文件中配置的产品版本号 与实际设备是否相符。



CANopen remote device - PDO Properties

	CAllopenDevice x						
Cense, privade 2 v (J. 0.0 C	General PDOs SDOs Cag CANopers DD Mapping CANopers IDC Objects Stotus Sriftematter	Roome PCCs (Nactor +> Slavs) Add/PCC (Nactor +> Slavs) Add/PCC +> Add/Naccorg > Date Name Solution/Word(_) PCC Properties COB ID Probations (x 188µs) Transmission(xpe Namber of synce Event time (x 188µs) Bornes by CANaperMane	X Delete 1 Have Lip Object Bit Starzot (\$40000000-18.6 Bit Starzot (\$40000000-18.6 Bit Starzot (\$40000000-18.6 Bit Starzot (\$40000000-18.6 Bit Starzot (\$4000000-18.6 Bit Starzot (\$50) \$200 Bit \$200 Starzot (\$50) \$200 Bit \$200 Starzot (\$50) \$200 Bit \$200<	specific (7)	Transmit PDCs (Saver +> Made Add/SOC +> Add/Memory Name ¥ 36#1808: TPD0 commu Birtha-Wanti _1 X net 255) >> Cancel	d Chiject NCALE 168183 (SNOORID+16 IS#1800(SLPC)	Dit lengt
-		x			x		



CANopen remote device - PDO Properties

COB ID:通讯对象标识(Communication Object Identifier),可以设置绝对数值,比如16#181,也可以设置公式,比如\$NODEID+16#180,NODEID为该PDO所属站点号

RTR: TxPDO可勾选该选项,勾选后该PDO可由远程帧触发。

Inhibit time(x 100us):抑制时间,该选项规定了两次PDO发送之间的最小时间间隔。仅在传输模式254, 255中生效。传输模式254,255仅由事件驱动,如果事件触发频繁,PDO可能会以极高频率发送,造成 CAN网络拥堵,故此需要这个参数来限制PDO最小发送间隔。

CT65模块应用

- > IFM6·2 CANopen Master
- CANopen remote device PDO Properties

Transmissiontype: 传输类型。下拉可选acyclic-synchronous(Type 0),同步非循环模式,事件发生之后,站点在收到同步信号后会传输数据,典型事件为数据变化或定时器中断; cyclic- synchronous(Type 1-240),同步循环模式,在收到N个同步信号后发送数据,N由Number of syncs设置,设置范围1-240; synchronous-RTR only(Type 252),同步RTR,收到同步信号后PDO更新但不发送,收到远程帧后发送数据; asynchronous-RTR only(Type 253),异步RTR,收到远程帧后更新PDO并发送数据; asynchronous-manufacturer specific(Type 254),供应商定义事件触发,通常是数据发生变化或达到定时时间; asynchronous-device profile specific(Type 255), CiA协议规范指定事件触发。



- > IFM6·2 CANopen Master
- CANopen remote device PDO Properties

Number of syncs,同步信号数量

Event time(x 1ms):事件计时器。仅在传输模式254,255中生效。传输模式254,255仅由事件触发, 当事件一直不触发时,可通过设置该参数强制PDO每隔一段时间发送一次。当计时器未溢出,事件触发后, 计时器清零。

Process by CANopenManager:默认勾选,取消后CANopen Manager不再处理这个PDO,PDO不再自动发送或接收。

CT65模块应用

> IFM6·2 – CANopen Master

▶ 链接变量

在添加的子站设备CANopen I/O Mapping页中,可以为子站链接变量,地址为%Q类型的变量为 RxPDO相关数据,如截图中所示Digtal_Outputs1_1,在程序中向对应的变量写入数值,数值即由主站传输 到子站;地址为%I类型的变量为TxPDO相关数据,如截图中所示Digtal_Inputs1_1,在程序中读取对应的 变量值,即获取到由子站传输给主站的数据。





> IFM6·2 – CANopen Slave

当使用CAN口作为CANopen子站时,按以下使用方法操作。



- FIFM6·2 CANopen Slave
- ▶ 设置启动参数

与主站操作相同,请参考本文档内相关内容。





- > IFM6·2 CANopen Slave
- ➢ 添加CANopen Device

在CAN port上右击,选择Add Deive,在弹出的设备选择窗口中选中CANopen – Local Device – CANopen Device设备,点击窗口下方的Add Device按钮,即添加了CANopen子站。





- FIFM6·2 CANopen Slave
- ➢ 添加PDO / SDO

在CANopen Device的General页,点击Edit I/O Arean按钮可编辑PDO,点击Edit设置SDO。点击添加,设置接收或者发送,并输入名称,该名称不可包含中文,若包含中文,则确定键为灰色。配置数据类型以及是否强制新PDO,在配置完成后,点击确定,完成PDO或SDO的添加。





- > IFM6·2 CANopen Slave
- ≻ 添加PDO / SDO

PDO和SDO配置页面描述可参考下表:

名称	Name	描述
发送	Transmit	主站接收数据,子站发送数据
接收	Receive	主站发送数据,子站接收数据
范围名称	Range name	自定义数据名称
计数	Count	选择每组数据数量
数据类型	Data type	选择每组数据类型
强制新PDO	Force new PDO	勾选表示新建一组数据,否则在原数据组添加



- FIFM6·2 CANopen Slave
- ≻ 生成EDS文件

在General页面,点击Export EDS file导出从站的 EDS 文件,以提供给主站配置使用。Vendor name、 Product name 等信息可根据实际情况进行配置。

/endor name	3S - Smart Softw	are Solutions GmbH	
Vendor number	801		
Product name	CANopenDevice		
Product number	1	-	
Revision number	1	-	
Revision number	1		
Install to Devic	e Repository	Export EDS File	



- FIFM6·2 CANopen Slave
- ➢ 为CANopen device链接变量

在CANopen I/O Mapping页中,可为添加的PDO / SDO链接变量,即可在程序中读取由主站发送给子站的PDO / SDO数据;写入由子站发送给主站的PDO / SDO数据。



- ➢ IFM6·2 − SSI
- ▶ 设置启动参数

Devices + P X	IFH62 X CANope	n_Manager	CANopen_De	vice 3 C	AN1 SC	AN 2	ANopenDevice	PLC_PRG	IFM62_FI
 Demo_JPMS2 v1.0.0.0 B gg Device (PCH6, 1 Practek) 	General	💠 Add	af Edit 🗡 Deletis	# Nove Up 8	Move Down				
S 10 PLC Logic	Printer Date	Line	Index:Subindex	Name	Value	Bit Length	Abort on Error	Jump to Line on Error	Next Li
= O Application	PTOCRES Data		15#9012:16#01	Termination	True	1			0
1 Library Manager	Startup Parameters	- 2	16#9800:16#01	Baud rate	250 kbaud	0		0	0
IFM62_FI (PRG)		- 3	16#8002:16#01	Termination	True	1			ō
PLC_PRG (PRG)	EtherCAT Parameters	- 4	16#8020:16#11	Frame size	25	15			0
= 💥 Task Configuration	a constant of	5	15#8020:16#12	Data length	25	15			0
EtherCAT_Task (IEC-Tasks)	EtherCAT UD Mapping	6	15#F810:16#01	Baud rate	250 kbaud	8			0
Mani task (ICC-Tasks) Mani task (IC	EtherCAT IEC Objects Status Information								

请按照实际设备的情况,设置对应的启动参数,如上图所示,设置SSI通信波特率250k,数据长度25 位。



- ➢ IFM6·2 − SSI
- ▶ 链接变量并使用

Oevos - 9 x	19962 X Chiep	en_Manager 🔄 CANopen_Device 🎝 CAN 1	> CAN 2	CANoperDevice	PLC_PRG	17 19M62 FT
Demo_PM62 v1.0.0.0 Device (POML) Practek)	General	Find Filter Sho	lia we		- I Add FB for I	Channel_ *
平 副 PLC Lopic	Bencare Data	Variable	Mapping	Channel	Address	Туре
= O Application	milless Gala	* *		CAN 1 Tx error counter	%18219	USINT
1 Ubrary Manager	Startup Parameters	- 10		CAN 2 Ack error	%JX221.3	BIT
IFME2_FI (PRG)				CAN 2 Tx overflow	%D(271.4	BUT
PLC_PRG (PRG)	EtherCAT Parameters	*		CAN 2 Rx overflow	%JX221.5	BIT
= 🗃 Task Configuration				CAN 2 Warning limit reached	%D(221.6	BIT
EtherCAT_Task (IEC-Tasks)	EtherCAT VO Mepping	- 10		CAN 2 Bus-off	%IX221.7	BIT
in 🕼 MainTaak (IEC-Taaks)		* *		CAN 2 Rx error counter	%38222	USINT
一些 PLC_PRG	EtherCAT IEC Objects	+ 10		CAN 2 Tx error counter	%38223	USINT
= I EtherCAT_Master (EtherCAT Master)	and a second second second second second second second second second second second second second second second	- *		SSI 1 Data error	%EX224.0	BIT
Computer Module)	20.00 as	- **		SSE 1 Frame error	%D(224.1	BIT
IFM62 (JFM6.2 Interface and Fieldbus Module (2 CAN 10 messages))	Information	- 19		SSI 1 Data menatch	%JX224.2	BIT
- 3 CAN 1	and an instance of	- *9		SSE 1 TXPDO State	%0(225.6	BIT
CANopen_Manager (CANopen_Manager)		*		SSI 1 TxPDO Toggie	%DX225.7	BIT
CANoperDevice (CANoperDevice)		+ * Application.PLC_PRG.IFM62_SSI_1_Countervalue		SSI 1 Counter value	442967	UDDIT
- 2 CM 5		- **		SSI 2 Data error	%JX232.0	BIT
CANopen_Device (CANopen Device)		- *		SSE 2 Frame error	%DX222.1	BIT
		- 19		SSI 2 Data resnatch	%0X232.2	BIT
		- 19		SSI 2 TxPDO State	%DX233.6	BIT
		Ha Ha		SSI 2 TyPDO Tonnie	%DX233.7	BIT

在EtherCAT I/O Mapping页中链接变量SSI Counter value,该变量即为传感器传回的编码器数值,正确的解析该变量即可获得编码器位置。



≻ IFM6·2 – FI

通过Ethercat I/O Mapping页中FREQ Counter value及FREQ Period value通道数值即可计算FI信号的 频率(Hz)及转速值(RPM)。

General	Find Filter Show	lla v		- 🗣 Add FB for II	O Channel Go to in
Process Data	Variable	Mapping	Channel	Address	Туре
100000 0000	- 10		SSI 1 Data error	%2X224.0	BIT
Startup Parameters			SSI 1 Frame error	%DX224.1	BIT
151			SSI 1 Data mamatch	%IX224.2	BIT
EtherCAT Parameters			SSI 1 TxPDO State	%bX225.6	BIT
operative sectors			SSI 1 TxPDO Toggie	%IX225.7	BIT
EtherCAT I/O Mapping	Application.PLC_PRG.IFM62_SSI_1_CounterValue		SSI 1 Counter value	%ID57	UDENT
			SSI 2 Data error	%EX232.0	BIT
EtherCAT IEC Objects	- **		551 2 Frame error	%JX232.1	BIT
			SSI 2 Data mismatch	%IX232.2	BIT
Status			SSI 2 TxPDO State	%2X233.6	BIT
Informations			SSI 2 TxPDO Toggle	%DX233.7	BIT
an orneat point	Application.PLC_PRG.IFM62_SSI_2_CounterValue		SSI 2 Counter value	968059	UDINT
			FREQ 1 State	%EX240.0	BIT
			FREQ 1 TxPDO State	%JX241.6	BIT
	- *		FREQ 1 TXPDO Toggle	%IX241.7	BIT
	Application.JFM62_FI.JFM62_FI_1_CounterValue		FREQ 1 Counter value	468061	UDENT
	Application.JFM62_FI.JFM62_FI_1_PeriodValue		FREQ 1 Period value	468062	UDINT
	- *		FREQ 2 State	%EX252.0	BIT
			FREQ 2 TxPDO State	%IX253.6	BIT
	- *		FREQ 2 TxPDO Toggie	%IX253.7	BIT
	+ * Application.IFM62_FI.IFM62_FI_2_CounterValue		FREQ 2 Counter value	44064	UDINT
	Application.JFM62 FI.JFM62 FI. 2 Period/alue	*	FRED 2 Period value	44065	UDINT



➢ IFM6·2 − FI

FI计算代码示例如下:



当FI有新的上电沿产生时,FREQ Counter value产生变化,新的周期及转速值可计算。FREQ Period value值为两个FI信号上电沿之间的时间片计数,单个时间片为10ns,故如上图所示,使用10E8除以 Period Value值即可得FI信号频率值,通过频率值和传感器单圈信号分辨率(PPR)即可算得实时转速。



CMM6.1有两路高频模拟输入。









▶ 启动参数

CMM6.1需要设置4个启动参数,分别为Input type、Sensor excitation、Input range、Sample frequency。启动参数的详细可参见下表:

索引名	子索引名	类型	枚举名	值	描述
Input type		USINT	AC mode	0	设置外界传感器输入信号(交
Ch1~2	input type	(8位)	DC mode	1	流或直流)
Sensor			0 mA	0	
	Sensor	USINT	2 mA	1	<u> </u>
excitation	excitation	(8位)	4 mA	2	设直 [[[悠 츎 响]]]》也
Ch1~2			6 mA	3	



▶ 启动参数

索引名	子索引名	类型	枚举名	值	描述			
						-10+20V DC	0	
					-1010V	1		
			-5+5V	2				
			-2.5+2.5V	3				
			-1.25+1.25V	4				
input range	Input range		-0.62+0.62V	5	需设置测量范围。			
Ch1~2		(81立)	-0.31+0.31V	6				
			-0.16+0.16V	7				
			-0.08+0.08V	8				
			-0.04+0.04V	9				
			-0.02+0.02V	10				



▶ 启动参数

索引名	子索引名	类型	枚举名	值	描述				
			58.6KSMPS	0					
							39.3KSMPS	1	
					11.7KSMPS	2			
			5.86KSMPS	3					
Sampla			2.34KSMPS	4					
Sample	Sample	USINT	1.17KSMPS	5					
frequency	frequency	(8位)	586SMPS	6	设直米件妙谐。				
Ch1~2			234SMPS	7					
			117SMPS	8					
			58.6SMPS	9					
			29.3SMPS	10					
			11.7SMPS	11					



CMMM6·1

▶ 变量映射

CMM6.1提供如下图所示数据通道,各通道含义如下所示

Sequence:数据序列值,当数据更新时,该数值自增
Size:更新数据数量,比如Size值为50,代表Data1~Data50中数值为本次更新数值
Error:错误标识位,当CMM6.1模块运行/采集数据错误时,Error数值为TRUE
Data:数据数组,Data1~Data122,提供振动数据通道。



▶ 变量映射

🕤 CMM61 🗙 🎑 GVL_b	uf 🏾 ੱ 🖉 GVL_sl 🖉 📄 I	PLC_PRG					
General	Find		Filter Show all		•	🕆 Add F	B for IO Channel.
Process Data	Variable	Mapping	Channel	Address	Туре	Unit	Description
	🖳 🕀 🖓		Sequence	%IB4	USINT		Sequence
artup Parameters	😟 🎽		Size	%IB5	USINT		Size
	😐 🦄		Error	%IW3	UINT		Error
erCAT Parameters	😟 🎽		Data 1	%ID2	DINT		Data 1
	🖏		Data 2	%ID3	DINT		Data 2
ierCAT I/O Mapping	😟 🎽		Data 3	%ID4	DINT		Data 3
therCAT IEC Objects	🖹 🎽		Data 4	%ID5	DINT		Data 4
	😟 🎽		Data 5	%ID6	DINT		Data 5
Status	😟 🎽		Data 6	%ID7	DINT		Data 6
	😟 ᡟ		Data 7	%ID8	DINT		Data 7
Information	😟 🎽		Data 8	%ID9	DINT		Data 8
	😟 🎽		Data 9	%ID10	DINT		Data 9
	😟 🦄		Data 10	%ID11	DINT		Data 10
	💷 😟		Data 11	%ID12	DINT		Data 11
	😟 🎽		Data 12	%ID13	DINT		Data 12
	😟 🍬		Data 13	%ID14	DINT		Data 13
	😟 🎽		Data 14	%ID15	DINT		Data 14
	😟 🍬		Data 15	%ID16	DINT		Data 15
	😟 🎽		Data 16	%ID17	DINT		Data 16
	II 📩 🍬		D-1- 17	0/10:10	DINT		D-1- 17



▶ 代码示例

用户需要通过Sequence变化判断是否有数据更新,通过Size数值判断当前循环更新数据数量,再从 Data中读取正确长度的数据。然后对累积的数据进行FFT等频谱分析,福氏提供了FFT库进行相应计算。



PRACTEK 远见・互重・雄心