KEPServerEX V6 Modbus RTU Serial Driver

通讯实例

Modbus 协议是全球第一个真正用于工业现场的总线协议。Modbus 协议标准、开放,用户可以免费、 放心地使用 Modbus 协议,因此它被广泛应用到各种工业设备,包括 PLC、DCS、智能仪表等。

KEPServerEX 软件作为工业通讯解决方案,可以成功采集 Modbus 协议设备的数据,并转为 OPC 协议的数据给 OPC 客户端。KEPServerEX 有 5 种 Modbus 协议相关驱动,分别是 Modbus ASCII Serial、 Modbus Plus、Modbus RTU Serial、Modbus Slave RTU Serial、Modbus TCP/IP Ethernet driver。这些驱动都 包含在 Modbus Suite 中。

本文主要介绍 KEPServerEX V6 软件使用 Modbus RTU Serial 驱动连接 Modbus RTU 从站设备的连接过程。

◆ 设置 KEPServerEX V6

建立 KEPServerEX 的工程主要分为以下几项:新建通道: New Channel;新建设备: New Device; 新建标签组: New Tag Group (可选);新建标签: New Tag。





➢ 新建通道: New Channel

1. 打开 "KEPServerEX V6" 软件,点击 "File" -> "New",或者工具栏上的 "New Project",建立一个新

的工程。

KEPServerEX 6 Configuration [Cor File Edit View Tools Runtime	nnected to Runtime] <u>H</u> elp				
Project	Channel Name /	Driver	Connection	Sharing	
Aliases	Click to add a char	inel.			

2. 单击 "Click to add a channel" 或者工具栏上的 "new channel", 建立一个新通道。



3. 选择需要分配给本通道的设备驱动"Device driver",在下拉选项中选择"Modbus RTU Serial",单击"下

一步"。

the second second	
Add Channel Wizard	
Select the type of channel to be created:	
Modbus RTU Serial	• 0
64	
	下一步(N) 取消



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注意:如果用户在下拉列表里没有找到所要连接的设备驱动,可能是没有进行完全安装,用户应该对 KEPServerEX 进行修改安装(Modify),用户在安装可根据需要的安装所要用的设备驱动或者全部安装。

 修改通道名称 "Channel name",修改为想要的名称,这里我们改为 "Modbus RTU Serial",单击"下 一步"。

- ALLER COMPANY	
Add Channel Wizard	
Specify the identity of this object.	
Name:	
Modbus RTU Serial	0
-	27.2 P

5. 设置 Virtual Network, 默认即可, 点击"下一步"。

Virtual Network: None Specify the number of transactions to perform when a channel is given permission to communicate. Transactions per Cycle: 1 ©
None Specify the number of transactions to perform when a channel is given permission to communicate. Transactions per Cycle: 1
Specify the number of transactions to perform when a channel is given permission to communicate. Transactions per Cycle:

021-3126 5138

6. 设置 Communications——Connection type 可以选择 COM 口,或者以太网封装方式进行连接。此处选择 COM 口连接,并选择计算机有效连接的 COM 口 ID,根据 Modbus RTU 从站设备的波特率、数据位、奇偶校验位、停止位等参数,在此处选择正确的配置。设置完成点击"下一步"。

2		
	Select the hardware device type for data communications (or None).	*
202	Physical Medium:	
	COM Port 🔹 🕡	
		H
ŝ	Specify the physical port number.	
1000	COM ID:	
	1	
222	Select the communications speed of the hardware in bits per second.	
	Baud Rate:	
	9600 👻 🙆	
		-

7. 设置"Operational Behavior",保持默认参数,单击"下一步"

Choose whe	ther or not low-level communication errors are posted to the
event log.	Request failures and other errors are reported regardless.
Report Com	m. Errors:
Enable	
Enable Define the terminated	time, in seconds, a connection can be inactive before being
Idle lime	to Llose (s):



8. 设置优化,保持默认设置,单击"下一步"

Choose how	write data is passed to the underlying communications driver
when more	than one write exists in the write queue.
Optimizati	on Method:
Write Onl	y Latest Value for All Tags 🔹 🔹 🕡
Sanai for Al	
Specify th	ne ratio of write operations to read operations, based on one
read per o	configurable number of writes.
Duty Cycle	::
Specify th	e ratio of write operations to read operations, based on one
read per o	configurable number of writes.
Duty Cycle	::
10	②
Specify th	ne ratio of write operations to read operations, based on one
read per o	configurable number of writes.
Duty Cycle	::
10	@
Specify th	ne ratio of write operations to read operations, based on one
read per o	configurable number of writes.
Duty Cyclo	::
10	②

9. 设置浮点型数据,这里我们保持默认,单击"下一步"

Choose b	ow to send inval -Point Velues:	lid floating-poin	t numbers to the	client.	
Replace	with Zero	• 💿			

10. 设置总结,单击"完成"。至此,我们的通道设置就完成了,在这里可以对之前的设置进行修改。

-	Identification			
	Name	Modbus RTU Serial		
	Description			
	Driver	Modbus RTU Serial		
Ξ	Diagnostics			
	Diagnostics Capture	Disable		
Ξ	Connection Type			
	Physical Medium	COM Port		
	Shared	No		
-	Serial Port Settings			
	COM ID	1		
	Baud Rate	9600		

11. 用户可以右键单击通道名称选择 "Properties..." 或者双击通道名称来修改通道参数。

😅 KEPServerEX 6 C	Configuration [C	onnected to Runtime]			
File Edit View	Tools Runtim	e Help			
🗋 🚰 🗃 🛃	🔅 🖪 🖾 🕅] 🚰 '9 % 🛍			
Project P	ty US DIT Constant Constant Constant Te Cut Ver Copy Te Copy Copy Copy Diagno Te Cut Copy Diagno Te Cut Copy Diagno Cut Copy Copy Copy Diagno Cut Copy Copy Cut Copy Copy Cut Copy Cut Copy Cut Copy Cut Copy Cut Copy Cut Copy Cut Copy Cut Copy Cut Copy Cut Copy Cut Cut Copy Cut Copy Cut Copy Cut Copy Cut Copy Cut Copy Cut Copy Cut Cut Copy Cut Cut Cut Conection Conection Cut Cut Cut Cut Cut Cut Cut Cut	Device Name Cick to add a devi evice Ctrl+X Ctrl+C Del estics	/ Model ce.	ID	Description
Date 🗸 Ti	ìme	Source	Event		4
 2017/1/3 9 	9:28:35	KEPServerEX\Runtime	Modbus RTU Serial device driver loaded succe	ssfully.	
•			m		•
View/edit the properties	s of the selected ob	ject.		Default User Clients: 0	Active tags: 0 of 0

Property Groups					
	Name	Modbus RTU Serial			
General Social Communications	Description				
Write Optimizations	Driver	Modbus RTU Serial			
Advanced	Diagnostics				
ommunication Serialization	Diagnostics Capture	Disable			
	Name Specify the identity of this o	nject.			
		OK Cancel Apply Help			

➤ 新建设备: New Device

1. 单击软件界面中的"Click to add a device"或者工具栏上的"New Device"进行设备设置。

KEPServerEX 6 Configuration [Conne	ected to Runtime]	Contraction of the local division of the loc	owned to be a first of
File Edit View Tools Runtime H	lelp		
- 🗋 💕 🗟 🛃 👯 🛅 🖏 ն 🕯	F 🤊 🕹 🗈 🛝 🗙		
Connectivity Modbus RTU Serial Miases Advanced Tags Aams & Events	Device Name	/ Model	ID

2. 修改设备名称 "Name", 修改为需要的名称, 这里我们改为 "Modbus", 然后单击 "下一步"。

Add Device Wizard	
Specify the identity of this object.	
Name:	
Nodbus	0

3. 设置 Device Model—设备模型,这里我们选择 Modbus。

~	
9	Add Device Wizard
	Select the specific type of device associated with this ID. Options depend on the type of communications in use.
	Model:
	Modbus 👻 😨
	下一步(N) 取消

- 4. 设置 Device ID,这里指的是连接的 Modbus RTU 从站设备的站 ID,例如是1号从站,设置如下,单击
 - "下一步"。

Indicate th	e format of the device	ID (set by t	ne driver by def	ault).
ID Format:				
Decimal				
Spacify the	device's driver-speci	fia station o	r nada	
ID:	device 5 uriver speci	THE STATION OF	node.	
1				

5. 选择扫描方式 "Scan Mode", 保持默认, 单击"下一步"。

		_
Add Dev	ce Wizard	
Specify the	method for determining how often tags in the dev	vice are
scanned.		
Scan Mode:		
Respect Cli	ent-Specified Scan Rate 🛛 🔻 🕢	
Initial Upda Disable	tes from Cache:	
	下	步(N) 取消

0

1

6. 设置通信的时间参数"Timing",保持默认值不变,单击"下一步"。

Spacify at	
waits for	. interval, in milliseconds, to determine how long the driver a response from the target device to indicate completion.
Request Ti	meout (ms):
1000	
Indicate 1	ow many times the driver sends a communications request before
Roturn Att.	g the request to have failed and the device to be in error.
netry Atte	mprs.
3	
Define her	long, in milliseconds, the driver waits before sending the
next reque	st to the target device.
next reque	st to the target device. est Delay (ms):

7. 设置失败降级"Demote on Failure",保持默认设置不变,单击"下一步"。

Automatical failures.	ly remove the devi	ce from the sc	an due to comm [.]	unication	
Demote on F	ailure:				
Disable	- 0				

8. 自动生成标签设置,这里我们保持默认设置,单击"下一步"。

Select the automatic On Device Startup:	: tag generation action to be taken on device startup.
Do Not Generate on	Startup 👻 🕢
Indicate the preferm On Duplicate Tag:	red method of avoiding creation of duplicate tags.
Delete on Create	

注意:如要自动生成 Tag, 需选择 "always generate on start up"。

9. 设置"Addressing",我们保持默认设置,单击"下一步"。

Specify if (Enable) or frames are doesn't fol	the address numbering convention for the device starts at zer one (Disable). By default, addresses have one subtracted whe constructed to communicate with a Modbus device. If the devic low this convention, choose Disable.	2
Zero-Based	Addressing:	
Enable		
Specify if (Disable) f as a Boolea within the	the first bit in a register address begins at O (Enable) or 1 for memory types that allow bits within words to be referenced n (<address). <bit=""> where <bit> represents the bit number word).</bit></address).>	
Kero-Dased	Dit Addressing:	
LUBDIE		

10. 设置 Modbus 字节顺序,这里保持默认设置,单击"下一步"。

	Wizard	
Select Enable to or Disable to us	o use Modbus byte ordering for Modbus-compatible devices se Intel byte ordering.	ļ
Modbus Byte Orde	er:	
Frahla .		
and the second s		
Modicon Modsoft assumed high. First Word Low:	programming software. If disabled, the first word is	
Enable -		
Indicate if 64-b disabled, the fi	bit data types use the convention of first DWord low. If irst DWord is assumed high.	
이렇게 아이에 집을 걸렸는 것이 하지 않아?	:	
Rivet Dward Laws	• •	

11. 选择输入输出数据块的大小,这里我们保持默认设置,单击"下一步"。

Specify the reads more can be redu- within the	number of coils (bits) in an output block. Higher block size data points from the device in a single request. Block size ced if data needs to be read from non-contiguous locations device.	
Output Coil:	5	
32		1
Specify the reads more Input Coils	number of coils (bits) in a input block. Higher block size data points from the device in a single request. :	
Specify the reads more of Input Coils 32	number of coils (bits) in a input block. Higher block size data points from the device in a single request. : @	
Specify the reads more of Input Coils 32	number of coils (bits) in a input block. Higher block size data points from the device in a single request. :	

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12. 选择导入 semicolon-delimited text .TXT 格式文件自动生成 tag, 可以不做选择, 这里我们直接单击"下

一步"。

Add Devic	e Wizard
Add Devic	e wizard
Define the ex to use for Au	act location of the Concept or ProWORX variable import file tomatic Tag Database Generation.
Variable Impo	rt File:
*. txt	
Choose to loa	d and display tag descriptions when the file is imported.
Choose to loa Include Descr Enable	d and display tag descriptions when the file is imported. iptions: 💌 😰
Choose to loa Include Descr Enable	d and display tag descriptions when the file is imported. iptions: 💌 🕡

点击省略号,即可选择需要导入的文件:

组织 ▼ 新建文件夹		133 🔻 📶 🌘
▲ 名称 ▲ 家庭组	* 修改日期 没有与搜索条件匹配的项。	类型
 ↓ 计具机 ▲ 本地磁盘 (C:) → 本地磁盘 (D:) ↓ 360Download ↓ 360g全浏览器 ↓ KEPSeverEX v ↓ KEPSeverEX v ↓ Program Files ↓ STEP7 ↓ 应用软件 		
┌── 本地磁盘 (F:) ▼	m	

注意: KEPServerEX 支持从工程文件中自动生成 tag ,选择相应的路径,并在 tag generation 中选择

"always generate on start up".

13. 设置"Leading Bytes",我们保持默认值不变,单击"下一步"。

Add Device Wiz	ard	
Specify the number	of bytes to attach to the beginning of Modbus	
Leading Bytes:		
	୭	
Trailing Bytes:	Di bytes to attach to the end of moubus respon	

14. 设置"Error Handing"错误处理,保持默认设置,单击"下一步"。

)	Add Device Wizard
	Stop polling a block of data if a Modbus exception code 2 (illegal address) or 3 (illegal data) is returned. Disable to continue polling that data block.
1	Deactivate Tags on Illegal Address:
[Enable 👻 🕝
: : :	Select Enable for the driver to interpret a repeated message as an invalid response and retry the request. Select Disable if the driver should accept repeated messages. Reject Repeated Messages:
ſ	Dirahla -
્ર	DISADLE V
	下一步(N) 取消



15. 设置总结,单击"完成"。在这里可以对之前的设置进行修改。

Modbus	
	Name
	Description
Modbus RTU Serial	Channel Assignment
Modbus RTU Serial	Driver
Modbus	Model
Decimal	ID Format
1	ID
	Operating Mode
Enable	Data Collection
No	Simulated
	Scan Mode
Decimal 1 Enable No	ID Format ID Operating Mode Data Collection Simulated Scan Mode

用户可以右键单击设备名称选择"Properties"或者双击设备名称来修改设备参数。

Property Groups	Identification	
Property Groups General Scan Mode Timing Auto-Demotion Tag Generation Settings Block Sizes Variable Import Settings Framing Error Handling Redundancy	□ Identification Name Description Channel Assignment Driver Model ID ID Format ID □ Operating Mode Data Collection Simulated	Modbus Modbus RTU Serial Modbus RTU Serial Modbus Decimal 1 Enable No



> 新建标签: New Tag

1. 单击软件界面中的"Click to add a static tag",或者工具栏中的"New Tag"新增标签。

ile Edit View Tools Runtim	e Help		
) 🐸 🗟 🛃 🛱 🛱 🔀 😨	3 🐼 🔄 🚰 🤊 🐰	🗅 🕰 🗙 🖭	
□··(間) Connectivity	Tag Name	/ Address	Data Type
Modbus RTU Serial Modbus Modbus Miases Aliases	Click to add a static	tag. Tags are not required, but are bro	wsable by OPC clients

如果有需要建立标签组,也可以在新建标签之前先建立 New Tag Group,单击工具栏"New Tag Group"。



2. 设置 Tag 属性:

Property Groups		
General	Name	
Scaling	Description	
oodiing	Data Properties	
	Address	
	Data Type	Default
	Client Access	Read/Write
	Scan Rate (ms)	100
	1	

此处的 Tag 地址应参照帮助文件的地址格式来填写。如何查看 tag 的 Address 填写规则,点击上图



Address 后面的"…",弹出"Hints"界面,如下:

ints	-	×
000001#01-065521#01000001#16-065521#16 Word		ОК
000001-065536 Boolean 100001#01-165521#01100001#16-165521#16 Word	E	Cancel
100001-165536 [r][c] Boolean 100001-165536 Boolean		<u>H</u> elp
300001.0-365536.0300001.15-365536.15 Boolean 300001.2H-365536.240H String		
300001.2L-365536.240L String 300001-365533 [r][c] Double		
300001-365533 Double 300001-365535 [r][c] DWord		
300001-365535 [r1]c1 Float	-	

点击"Help"按钮,可查看地址填写规则,如下:

23 (中 中) 13 (中 中) 13 (市 中 中) 13 (市 中 中) 13 (市 中 中) 13 (市 中)						
目录 ① 索引 ④ 搜索 ② 收 • •	Modbus Addressing	g				
Getting Started	The default data types fo decimal.	or dynamically defined tags	s are shown in	bold. The Function	Codes are displ	layed in
Automatic Tag Database Gen	• For more information, refer to Function Codes Description.					
Data Types Description Address Descriptions	5-Digit Addressing vs. 6-Digit Addressing					
Agnetek GPD 515 Drive / Bliott Flow Computer Addi Daniels S500 Flow Computer Addi Dynamic Fluid Meter Addre Omni Flow Computer Addi Function Codes Descriptic Statistics Items Event Log Messages Server Help	device's data item. The t driver requires six digits t devices may not suppor device, this driver "pads primary table type is foll extra zeroes, to five (5) o does not change. Intern representations of an ad	maximum value of the data to represent the entire add the full range of the data " the address (adds a digit) owed by up to 4 digits (exa digits. If a primary table type ally, addresses entered as 4 Idress specifying primary ta	a item is a two ress table and item. To avoid according to mple: 4x, 4xx, e is followed b 41, 401, 4001, 4 ble type 4 and	-byte unsigned inte item. It is important I confusion when en what was entered 4xxx or 4xxxx), the c y five (5) digits (ex 0001 or 400001 are d data item 1.	eger (65,535). In: to note that r notering an addr in the address f address stays at ample: 4xxxx), all equivalent	ternally, this many Modbus ess for such a field. If a or pads, with the address
			Output Co	on Sils		
	1		Input Coils			
	3		Internal Re	egisters		
	4		Holding Re	egisters		
	Modbus Addressing	in Decimal Format		12	2)	
	Modbus Addressing Address	in Decimal Format		Data Type	Access*	Function Code
	Modbus Addressing Address Output Coils	in Decimal Format Range 000001-065536		Data Type Boolean	Access* Read/Write	Function Code 01, 05, 15
	Modbus Addressing Address Output Coils Input Coils	in Decimal Format Range 000001-065536 100001-165536		Data Type Boolean Boolean	Access* Read/Write Read Only	Function Code 01, 05, 15 02

以英格索兰的空压机为例,下面表格是该空压机的读写数据的地址表格,按照这个表格设置 tag。

Register (40XXX)	Variable	Read/White	Range	Notes
001	001 Status/Control			See FIGURE 1
003	003 Discharge Pressure			
004	004 2nd Stage Inlet Pressure			
005	2nd Stage Discharge	R		
006	Inlet Vacuum	R		Value Divided by 10



例如第一个地址 40001,在 KEPServerEX 中该地址是 6 位数,400001,这两个没有差别,相同作用。

KEPServerEX 中直接填写 40001 也是可以的。

Property Groups	Identification		
General	Name	Tag1	
Sepling	Description	Status/Control	
scaling	Data Properties	171.61	
	Address	400001	
	Data Type	Word	
	Client Access	Read/Write	
	Scan Rate (ms)	100	
	Data Type Select the format of the incoming t	ad data.	

注意:填写 Address (地址)时,必须确保填写的内容是硬件设备内部允许访问的地址。

Scaling 设置:这里我们保持默认值。

Property Groups	Scaling		
General	Туре	None	
Scaling			

将上面的地址全都建立 Tag, 如下:

KEPServerEX 6 Configuration [Co	onnected to Runtime]		_	
<u>File Edit View Tools Runtime</u>	<u>H</u> elp			
0 🐸 3 📓 🏶 🗂 🖏 🐿	I 🤬 🔂 🚰 🛛 🖌	🖻 🗈 🗙 🗡 🔛		
Connectivity	* Tag Name	/ Address	Data Type	Scan Rate
Modbus RTU Senal	🗂 😡 Tag1	400001	Word	100
Aliases	💶 Tag3	400003	Word	100
Advanced Tags	Cag4	400004	Word	100
Alarms & Events	💶 Tag5	400005	Word	100
Add Area	Tag6	400006	Word	100
🖻 📲 Data Logger	111			
Add Log Group				
Add Poll Group				
DF for Splunk				
Add Splunk Connection				
E 🕂 loT Gateway				
Add Agent				
			E	
	•	1		
Date $ abla Time $	Source	Event		^
(i) 2016/12/29 8:59:02	KEPServerEX\Runtime	loT Gateway V6.0.2107.0		
i) 2016/12/29 10:45:43	KEPServerEX\Runtime	Runtime performing exit processing.		
10:45:45	KEPServerEX\Runtime	Runtime shutdown complete.		
(1) 2016/12/30 9:08:48	KEPServerEX\Runtime	Kepware Industrial Connectivity Platform 6.0		
0 2016/12/30 9:09:21	KEPServerEX\Runtime	Runtime service started.		-
•		m		•
Ready			Default User Clients	. 0 Active tage: 0 of 0

至此,我们的 KEPServerEX 服务器端设置完成了。

连接测试 ♦

- 1. 首先将空压机的的串口正确的连接在计算机的有效 COM 口上,打开空压机,使其处于正常的通讯状态。
- 点击已设置完成的 KEPServerEX 工具栏中的 "QC",或者点击界面中的 "Tools→Launch OPC Quick Client"进行测试。

e Edit View 🛛	ools Runtime Help		
) 😂 🗟 🛃	Event Log	• 🗈 🖄 🗙 🛛	
・ ・ ・ で ・ で に し Connectiv し ・ で し ・ で し 、 し の の の し し し の し の し の し の し の し の し の し の し の し の し の し の し の し の し の し し し し し し し し し し し し し	Launch OPC Quick Client	/ Address	Data Type
	o.:	400001	Word
	Options	400003	Word
Aliases	💶 Tag4	400004	Word
Advanced Tags		400005	Word
Alams & Ev	entsTag6	400006	Word

调试界面如下:

file <u>E</u> dit <u>V</u> iew <u>I</u> ools <u>H</u> elp									
) 🛎 🔲 🛫 💣 🖆 🖡 🖻 🖻	X			\sim (\frown	\mathbf{b}			
⊡ ::: Kepware.KEPServerEX.V6	Item ID	/ Data Type	Value	Timestamp	Quality	Update Count			
DataLogger	Modbus RTU Serial.Modbus.Tag1	Word	94	13:27:50.591	Good	48			
System	Modbus RTU Serial.Modbus.Tag3	Word	222	13:27:13.072	Good	2			
Modbus RTU Serial _Communicatio	Modbus RTU Serial.Modbus.Tag4	Word	0	13:26:30.416	Good	1			
Modbus RTU Serial_Statistics	Modbus RTU Serial.Modbus.Tag5	Word	17	13:27:34.365	Good	2			
Modbus RTU Serial Modbus	Modbus RTU Serial.Modbus.Tag6	Word	0	13:26:30.416	Good	1			
Modbus RTU Serial Modbus Statis									
Modbus RTU Serial Modbus, Syste									

如上图所示,当 Quick Client 界面中 Quality 项显示"Good"时表示 KEPServerEX 与 Modbus RTU 从

站之间的连接已建立,在"Value"中显示的就是读取到的数据。