HK50-DP-EN 网关操作指南

1 网关简介

本文以 HK50-DP-EN (图1)实现 PROFIBUS 与 Modbus/TCP 转换为例 · 介绍德国赫优讯 HK50 系列网关 的使用步骤。



图1 通过下载不同协议堆

栈,HK50-DP-EN 能够实现不同的协议转换,主要有:

- □ PROFIBUS 从站转 Modbus/TCP 主/从站
- □ PROFIBUS 从站转 Ethernet/IP 从站
- □ PROFIBUS 从站转 Ethernet/IP 主站(仅连接单个从站)
- PROFIBUS 从站转 PROFINET 从站
- □ PROFIBUS 从站转 PROFINET 主站(仅连接单个从站)
- □ PROFIBUS 主站(仅连接单个从站)转 Modbus/TCP 主/从站
- □ PROFIBUS 主站(仅连接单个从站)转 Ethernet/IP 从站
- □ PROFIBUS 主站(仅连接单个从站)转 PROFINET 从站

HK50 网关的典型应用如图 2 所示:

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图 2

2 软件安装

1) 在光驱中放入产品光盘 自动弹出安装对话框;或手动打开光盘根目录 双击 Gateway_Solutions.exe 文件,打开安装界面。单击 "SYCON.net Configuration and Diagnostic Tool Installation" ,开 始安装 SYCON.net 配置软件,如图 3 所示:

Gateway Solutions	A CONTRACTOR OF A DESCRIPTION OF A DESCRIPT
	107
SYCON.net Configuration and Diagnostic Tool Installation	the last
Documentation	
Drivers.	
Power Point Presentation	
	And the second sec
	netTAP
	netLINK
CONcorro Courtes -	
AS CC-LINK DeviceNet	Bonning Group EtherNat/IP-23 POWERLINK
ODOOD SERCOS	
Manager	
	hils
	COMP



2) 弹出语言选择对话框,选择英语,单击 OK,如图 4 所示:



3) 单击 Next,进行下一步安装,如图 5 所示:



4)选择已阅读信息,单击Next,进行下一步安装,如图 6所示:

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	Important Information
	Please read the followinig information carefully.
-	
	Notes about major changes in SYCON net V1 210 x x and
	V1.300.x.x
	Please read these notes carefully, since they contain important information about major changes in SYCON.net.
	Overview
	1. Concerns all supported Devices
	1.1. New Driver for serial/TCP/USB Interface (All devices)
	2 Concerns PC Cards CIFX and Communication Modules COMX
(I read the information
(I have not read the information yet
In	staliShield (2)
	Carrel
	< Barr Garra Cauca

5)选择接受授权协议,单击Next,进行下一步安装,如图 7所示:

(

Please read the following licer	nse agreement carefully.	
HILSCHER SOFTWARE LICENS	E AGREEMENT	
This document is a legally valid c Systemautomation mbH ("Hilsche	contract between you and Hilscher Gesellschaft für er").	
Please read through this License software. By installing the softw of the provisions of this Agreem	e Agreement carefully before installing and using the vare and using it, whether in whole or in part, you accept ent.	pt all
If you decline to accept these ter Instead, return it to us or the reta purchase price.	rms and conditions, please do not install the software. ailer from which you purchased it for a refund of the	
I accept the terms in the licen	se agreement	
	he linear announce	
I do not accept the terms in th	ne license agreemenc	

```
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```

6)填写用户名、公司名及软件使用者,单击Next,进行下一步安装,如图8所示:

i₿ SYCON.net for netX - InstallShield Wizard	
Customer Information Please enter your information.	14
User Name:	- 1
Organization:	
Hilscher GmbH	
Install this application for: (2) Anyone who uses this computer (all users) Only for <u>m</u> e (Hilscher)	
InstallShield	3 Next > Cancel

- 图 8
- 7)选择完整安装,单击Next,进行下一步安装,如图9所示:



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8) 单击 "Install",开始安装,如图 10 所示:

😼 SYCON.net for netX - InstallShield Wizard	×
Ready to Install the Program The wizard is ready to begin installation.	
Click Install to begin the installation. If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.	
InstallShield Cancel]

9) 完成安装·如图11 所示:



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在软件安装完成后,如果首次打开 SYCON.net,要求设置密码,如果不需要,直接点击 "OK"。在以后 打开 "SYCON.net" 时,都会要求输入密码,如果没有密码,直接点击 "OK"。

- 至此,完成了配置网关所需的软件安装,包括:
- □ SYCON.net:用于网关的参数配置与诊断。
- Ethernet Device Configuration: 设置网关 IP 地址及站名·这些设置需在使用 SYCON.net 软件 前完成。
- 3 网关配置
- 3.1 IP 地址设置

网关的默认IP为0.0.0.0,进行通讯前首先要通过Ethernet Device Setup软件手动设置一个IP地址。这样,才能进行下一步通过SYCON.net下载配置文件。

1) 打开Ethernet Device Setup软件,如图12所示:

💣 Ethernet Device C	onfiguration			
Eile Options ?				
Devices Online	Find:		Dext	previous
MAC Address	Device Type	Device Name	IP Address	Protocol
			Search Devices	<u>C</u> onfigure ▶
		-		

2) 单击Search Devices按钮,显示已经找到的网关,如图13所示:

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vices Online	Find:		next	previous
MAC Address	Device Type	Device Name	IP Address	Protocol
JU-U2-A2-21-C7-48	netTAP 50	netTAP 50 [SN=00020	0.0.0.0	NetIdent

图13

3) 单击Configure按钮,选择Set IP Address,弹出设置IP地址对话框,如图14所示:

File Options <u>?</u>	ce Configuration			
Devices Online	Find:		next	previous
MAC Address	Device Type	Device Name	IP Address	Protocol
00-02-A2-21-C7-4	8 netTAP 50 P Configuration for	netTAP 50 [SN=00020 00-02-A2-21-C7-48	0.0.0.0	NetIdent
	IP Address:	<u>0</u> , 0 <u>Q</u> K	. 0 . 0	
		Searc	h Devices	<u>⊂</u> onfigure ▶

图14

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4) 在此对话框中设置网关的临时IP地址,完成后单击OK,如图15所示:

i	Ethernet Dev	vice (onfiguration			
E	ile <u>O</u> ptions <u>?</u>					
	Devices Online		Find:		next	previous
	MAC Address		Device Type	Device Name	IP Address	Protocol
	00-02-A2-21-C7-	-48	netTAP 50	netTAP 50 [SN=00020	0.0.0.0	NetIdent
		IP Co	onfiguration fo	r 00-02-A2-21-C7-48	×	3
		IP A	ddress:	192 . 168	. 10 . 10	
				<u>O</u> K	Cancel	
				Searc	h Devices	Configure
-				图15		

5) 此时·网关的IP地址已改为设置的地址·如图16所示;也可再次单击Search Devices按钮进行检查。

evices Online	Find:		next	previous
MAC Address	Device Type	Device Name	IP Address	Protocol
10-02-A2-21-C7-48	netTAP 50	netTAP 50 [SN=00020	192.168.10.10	NetIdent



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- 6) 关闭Ethernet Device Setup软件,完成网关IP地址设置。
- 3.2 网关参数配置
- 1) 打开 SYCON.net 配置软件,如图 17 所示:

SYCON.net - [Untitled.spj]	
Eile View Device Network Extras Help	
🗅 🚅 🖬 🕄 古 古 🗟 3: 🍩 📇 팩, 팩, 팩,	
netProject A X netDevice	× ×
Project: Untitled	
x wopuly address of the second	4
Ready	Administrator
图 17	

2) 在软件界面右侧选择Fieldbus栏,将 "Open Modbus/TCP"(或 "PROFIBUS DPVO") "Gateway / Stand-Alone Slave" 文件夹展开,将HK50图标拖放至界面中间的灰线处,如图18所示:

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SYCON.net - [Untitled.spj] *		
Eile View Device Network Extras Help		
D 📽 🖬 Q 😫 🕾 🕲 3: 🔘 🛅 5: 5; 5;		
netProject 🔺 🖈	netDevice	* ×
E Project: Unitided ProtTAP(NT 50-30-30)(<>(#)))	netTAP[NT 50-XX-XX]<>(#1) ●	
*		F
Pearly	Administrator .	
(cool)	Administration (1. 1. 1

图 18

3) 双击该图标,弹出配置对话框,选择 "netX Driver" 栏中 "TCP Connection" 页,确保 "Enable TCP Conector" 前已经打勾(打勾后需重启软件),如图 19 所示:

脖 netDevice - Gateway n	etTAP[NT 50-XX-XX]<>(#1)		
IO Device: NT Vendor: Hil	S0-XX-XX cher GmbH	Device ID: Vendor ID:	- 0x011E
Navigation area	USB/R5232 Connection TCP Connection Enable TCP Connector (Restart of ODM required) Select IP Range: IP Range Configuration Disable IP Range IP Address Use IP Range TCP P O . O . O O . O . O . O . O . O . O . O	etX Driver	Save
		ОК	Cancel Apply Help
	图 19		

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4)单击蓝色加号·添加进行扫描的 IP 地址。如果仅连接了一个网关·可以设置一个确定的 IP 地址; 更多情况下·连接了多个网关·此时可以设置一个 IP 网段·如图 20 所示·完成后单击 "Save" 保存。

脖 netDevice - Gateway n	etTAP[NT 50-XX-XX]<>(#1)		
IO Device: NT Vendor: Hils	50-XX-XX scher GmbH	Device ID: Vendor ID:	- 0x011E
Navigation area Settings Image: Settings Image: Settings Configuration Settings Signal Mapping	USB/RS232 Connection TCP Connection I Disable TCP Connector (Restart of ODM required) Select IP Range: IP RANGEO IP Range Configuration Disable IP Range IP Address I Use IP Range IP 2.168.10.1 - 192.168.10.20: Send Timeout: 1000 Image Set Timeout: 1000 Image Set Timeout: 1000 Image Set Timeout: 1000	Ver DO Address Count 20 DOO Restore OK	Save Save All
	图 20		

5)选择"Device Assignment"栏·单击 Scan按钮·扫描到网关硬件,勾选该网关并单击 Apply按钮 保存,如图 21 所示。

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		14299						
lavigation area	Scan	progress: 2/2 De	vices (Current device: -)		Device A	ssignment		
Driver netX Driver Device Assignment	Devic	e selection:	suitable only					Scan
Settings		Device	Hardware Ports 0/1/	Slot nu	Serial nu	Driver	Channel Protocol	Access path
Signah®apping		NT 50-RS-EN	Ethernet/Serial/-/-	n/a	20016	netX Driver	Gateway	\192.168.20.
	Acces	s path:	{B54C8CC7-F333-413	5-8405-6E12	PC88EE62}\1	92.168.20.250:5011	1\afX0_Ch2	

- 图 21
- 6) 选择 "Settings" 栏·Port X2 选择 PROFIBUS-DP Slave 协议·Port X3 选择 Open Modbus/TCP 协议·如图 22 所示。选中对应的 Available Firmware 单击右侧的 Download 按钮·下载对应的固件。固件下载完成后,单击 OK 按钮退出该对话框。

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Not Device - Gateway	netTAP[NT 50-XX-XX]<>(#1)				
IO Device: N Vendor: H	IT 50-XX-XX tilscher GmbH		Device ID: Vendor ID:	- 0x011E	FDT
Navigation area	General Description: Protocol Combinations Primary network (Port X2): Required gateway: Required gateway: Required license: Available Firm <u>w</u> are:	netTAP PROFIBUS-DP Slave PROFIBUS-DP Slave NT 50-DP-EN None NSDPSOMBI.NXF	Settings Secondary network (Port X3):	Open Modbus/TCP	Browse Download
	Software class: Software version: Basic Settings Mapping Cycle time:	Multi protocol (combinable) Gateway 1.0.9.0	Mapping mode:	Default	Y
			ОК	Cancel Apply	Help
					h.
		图 22			

7) 右击网关图标 ·选择 "Configuration" "PROFIBUS-DP Slave" ·弹出对话框 ·设置网关作为 PROFIBUS 从站的参数 · 如: 站地址、输入输出字节等 · 如图 23 所示。

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IO Device: NT 50-DP-EN Vendor: Hischer GmbH Device ID: 0x011e Configuration Configuration Signal Configuration Signal Configuration Signal Configuration Bus Station Address: Signal Configuration Bus Freeze supported IV DeVit Enable IV Extras: Signal Configuration Data Dulput Input Module Type Size 1 Byte 0 3 Byte 0 4 Byte Conf	PROFIBUS	DP Slave netTAP[NT 50-DP-EN]<2>(#1)		
Navigation area	IO Device: NT Vendor: Hil	50-DP-EN scher GmbH	Device ID: 0x049f Vendor ID: 0x011e	For
Extras: Sync supported Image: Sync supported DPV1 Enable Image: Sync supported File Safe supported Address change not allowed Image: Sync supported Image: Sync	Navigation area Configuration Configuration Signal Configuration	Ident Number: 0x00000009 Bus Station Address: 5 Baud Bater Auto Detect	Configuration	
Data Output Input Module Type Size 1 Byte 32 2 Byte 0 3 Byte 0 4 Byte 0 Configuration Data: 809F409F OK Cancel Apply		Extras: Sync supported V Freeze supported V Fail Safe supported V	DPV <u>1</u> Enable ⊽ Address change no <u>t</u> allowed ⊽	
Configuration Data: 809-409 Manual Input: OK Cancel Apply Help		Data Output Module Type Size 1 Byte 32 4 Byte 0 4 Byte 0 4	Input Module Type Size 5 Byte • 32 • 6 Byte • 0 • 7 Byte • 0 • 8 Byte • 0 •	
		Configuration Data:	809F409F Manual Input	
	-3D- 🖌 🗌		OK Cancel Apply	

8) 右击网关图标 ·选择"Configuration" "Open Modbus/TCP" ·弹出对话框 ·设置网关作为 Modbus/TCP 从站 (Server)的参数 · 如: Map FC1 and FC3 (这样 · Modbus/TCP 主站可以通过 FC1 读取网关的 位数据 · 通过 FC3 读取寄存器数据) · IP 地址 (去掉 DHCP 的选项 · 并选择 IP 地址和子网掩码的选 项)等 · 如图 24 所示。

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😽 netDevice - Open Mod	lbus/TCP netTAP[NT 50-DP-EN]<5>(#	/1)	-			
IO Device: N Vendor: H	T 50-DP-EN lischer GmbH			Device ID: Vendor ID:	- 0x011e	TOT
Navigation area						
	Interface					<u> </u>
Signal Configuration	<u>B</u> us Startup:	Automatic				
	Watchdog Time:	1000	ms			
	Protocol <u>M</u> ode:	IO Server 💌				
	Data S <u>w</u> ap:	Yes				
	Map FC1 and FC3	V				
	Bus					
	Provided Server Connections:	4				
	Client Connection Watchdog Time:	1000	ms			
	Response Timeout:	2000	ms			
	Send Acknowledgement Timeout:	31000	ms			
	Connect Acknowledgement Timeout:	31000	ms			
	Close Acknowledgement Timeout:	13000	ms			
	IP Address:	192 . 168 . 10 . 10	🔽 Enable			
	<u>N</u> etmask:	255 . 255 . 255 . 0	🔽 Enable			
	Gateway:	0.0.0.0	🔲 Enable			
	Extras:	Boot <u>P</u> D <u>H</u> CP				
		T 100MBit T Full Duple				~
				ОК	Cancel Apply	Help
				d		
			1.04			

9) 再次双击网关(或右击网关·选择 "Configuration" "Gateway")·弹出对话框·选择 "Signal Mapping" 项,进行数据映射,如图 25所示。

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Not Device - Gateway	netTAP[NT 50-DP-EN]<5>(#1)					
IO Device: M Vendor: H	NT 50-DP-EN tilscher GmbH				Device ID: - Vendor ID: 0x011E	For
Navigation area Settings → Driver netX Driver Device Assignment → Configuration Settings → Signal Mapping	Available Signals Port X2 (PROFIBUS-DP) Port X2 Signals A Port X2 Signals A Receive Outbyte_DC Receive Outbyte_DC Receive Outbyte_DC Receive Outbyte_DC Receive Outbyte_DC Receive Outbyte_DC Port X2 (PROFIBUS-DP) Port X2 (PROFIBUS-DP) Port X2 (PROFIBUS-DP)	<pre><addr 5=""> 1> ></addr></pre>	Signal Ma	Pping	(Open Modbus/TCP) <192.168.10.1 Registers In <slot d=""> 5 Registers Out <slot d=""> 256 Registers Out <slot d=""> 256 Registers In <slot d=""> 255 InWORDs (NORD _0001 ~256 InWORDS.WORD _0001 ~256 InWO</slot></slot></slot></slot>	02 Data type
	Manual Ma	pping: Map signals	<u>R</u> emove lin	k	Auto Mapping: Off	•
					OK Cancel	Apply Help
						10

图 25

10) 数据映射的一般规则是总是把 Receive 的数据映射至 Send 的数据 ·Receive 的方向是网关上某一个接口接收数据 · Send 的方向是网关上另一个接口发送数据 · 因为 PROFIBUS-DP 通讯的数据以字节为单位 · 而 Modbus/TCP 通讯的数据以字为单位 · 因此需要将 PROFIBUS-DP 通讯的两个 Receive 数据 · 映射至 Modbus/TCP 通讯的一个 Send 数据 ;而反方向的话 软件会自动将 Modbus/TCP 通讯的一个 Receive 数据 · 映射至 PROFIBUS-DP 通讯的两个 Send 数据 · 因此先选中 Port X2 中的 "OutByte_0000" · 按住 Ctrl 键再选择 "OutByte_0001" · 再选中 Port X3 中的 "~256 InWords.WORD_0000" · 单击 Map signals 按钮 · 完成一次数据映射 · 如图 26 所示 •

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א netDevice - Gateway	netTAP[NT 50-DP-EN]<5>(#1)						
IO Device: M Vendor: H	NT SO-DP-EN ilischer GmbH				Device ID: - Vendor ID: 0x011E		For
Navigation area	Available Signals						
Inter netX Driver Device Assignment Configuration	Comparison of the second		<	Port	: X3 (Open Modbus/TCP) <192.168.10.1) 256 Registers In <slot 0=""> 256 Registers Out <slot 0=""></slot></slot>)>	
Sectings	Port X2 Signals ▲ 32 Bytes Out <slot 1=""> Receive OutByte_0002 Receive OutByte_0003 Receive Descrive OutByte_0004 Receive</slot>	Data type	•	Port X3 Send Send Send	Signals ▲ 256 Registers In <slot 0=""> 256 InWORDs 256 InWORDs.WORD_0001 ~256 InWORDs.WORD_0002</slot>	Data type	_256
	Mapped Signals	3		<	: X3 (Open Modbus/TCP) <192.168.10.1 256 Registers In <slot 0=""></slot>		
	Port X2 (PROFIBUS-DP)	.0001		Port X:	256 Registers Out, «Slot D> 3 (Open Modbus/TCP) agisters In «Slot O: /~256 InWORDs WO)	RD 0000	
	Manual Mapping: Map	signals Remo	ove lir	ik	Auto Mapping: Off	Ŧ	
					OK Cancel	Apply H	Help
XD 🕕 🖊		图 26					11

11) 可以通过 Ctrl 键或 Shift 键选中多个 Receive 数据。还可以在 Auto Mapping 中·通过选择 "From Port3 to Port2",并单击 Apply按钮,来进行数据自动映射,如图 27 所示。

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🏲 netDevice - Gateway	netTAP[NT 50-DP-EN]<5>(#1)							
IO Device: M Vendor: H	NT 50-DP-EN Hilscher GmbH				Device ID: Vendor ID:	- 0x011E		FDI
Navigation area	Available Signals	5>	Signal Ma	pping — 🔚 Port X3	i (Open Modbus/TCP)	<192.168.10.10)>	~
Device Assignment	- 🔚 32 Bytes Out <slot 1=""> - 🔚 32 Bytes In <slot 2=""></slot></slot>			256 256	5 Registers In <slot 0<br="">5 Registers Out <slot< td=""><td>I> 0></td><td></td><td></td></slot<></slot>	I> 0>		
Settings	Port X2 Signals	Data type	~	Port X3	Signals 🔺		Data type	^
	Generated Communication Cha Generated Communication Stal Generated Communication Error	ange of State UNSIGNED32 te UNSIGNED32 pr UNSIGNED32		Receive Receive Receive	256 OutWORDs ~256 OutWORD ~256 OutWORD ~256 OutWORD	os.WORD_0016 os.WORD_0017 os.WORD_0018	WORD_ARF WORD WORD WORD	XAY_256
	Mapped Signals							
	Port X2 (PROFIBUS-DP) <addr 32 Bytes Out <slot 1=""> 32 Bytes In <slot 2=""></slot></slot></addr 	Port X2 (PROFIBUS-DP) <addr 5=""> 2 2 2 2 32 Bytes Out <slot 1=""> 2 32 Bytes In <slot 2=""></slot></slot></addr>		►)>	^ ~
	Port X2 (PROFIBUS-DP)			Port X3 (Op	en Modbus/TCP)			<u> </u>
	 32 Bytes Dut <slot 1="">/DutByte_D000</slot> 32 Bytes Dut <slot 1="">/DutByte_D002</slot> 32 Bytes Out <slot 1="">/DutByte_D004</slot> 32 Bytes Dut <slot 1="">/DutByte_D004</slot> 	J - OutByte_0001 2 - OutByte_0003 4 - OutByte_0005 5 - OutByte_0007	1	 256 Registe 256 Registe 256 Registe 256 Registe 	ers In <slot 0="">/~256 h ers In <slot 0="">/~256 h ers In <slot 0="">/~256 h ers In <slot 0="">/~256 h</slot></slot></slot></slot>	nWORDs.WORD nWORDs.WORD nWORDs.WORD nWORDs.WORD	_0000 _0001 _0002 00003	
	32 Bytes Out <slot 1="">/OutByte_0008 32 Bytes Out <slot 1="">/OutByte_0010 32 Bytes Out <slot 1="">/OutByte_0012</slot></slot></slot>	3 - OutByte_0009) - OutByte_0011 2 - OutByte_0013		 256 Registe 256 Registe 256 Registe 	ers in <slot 0="">/~256 h ers in <slot 0="">/~256 h ers in <slot 0="">/~256 h</slot></slot></slot>	nWORDs.WORD nWORDs.WORD	0004	
	32 Bytes Out <slot 1=""> /OutByte_0014 32 Bytes Out <slot 1=""> /OutByte_0016 32 Bytes Out <slot 1=""> /OutByte_0016</slot></slot></slot>	4 - OutByte_0015 5 - OutByte_0017 8 - OutByte_0019		 256 Registe 256 Registe 256 Registe 	ers In <slot 0="">/~256 h ers In <slot 0="">/~256 h ers In <slot 0="">/~256 h</slot></slot></slot>	nWORDs.WORD nWORDs.WORD	_0007 _0008	
	32 Bytes Out <slot 1="">/OutByte_0010</slot>	1 - OutBote 0021		256 Registe	ers in <slot 0="">/~256 li</slot>	nWORDs.WORD	0010	~
	Manual Mapping:	Map signals	<u>R</u> emove link	<	Auto Mapping:	Off	•	
					ОК	Cancel	Apply	Help

图 27

12)至此·完成了网关的所有配置。右击网关·选择 Download 将配置文件下载到网关中。根据所下载的固件和配置文件·网关就可以根据这些参数开始工作。

4 网关诊断

可以通过网关上的 SYS LED 灯及 APL LED 灯对网关状态进行快速判断,如图所示:

LED	Color	State	Meaning
SYS	Duo LED ye	llow/green	
1	🍳 (green)	On	Operating System running. further diagnostic see APL LED.
	🧼 (yel- low)	On	This state may occur only briefly. If this LED stays permanently yellow, then a hardware failure is possible.
	(yellow (green)	Flashing yellow/green	Error state! Boot loader active.
	(off)	Off	Power supply for the device is missing or hardware failure.

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传真: 020-3874 3233
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LED	Color	State	Meaning
APL	Duo LED r	ed/green	
2	(green)	On	The communication on X2 and X3 is in cyclic data exchange and the gateway function is executed
	(green)	Blinking with 2 s off, 0,5 s on	netTAP is initialized, but the communication on X2 is not in cyclic data exchange.
	(green)	Blinking with 2 s off, 0,5 s on, 0,5 s off, 0,5 s on,	netTAP is initialized, but the communication on X3 is not in cyclic data exchange.
	(red)	Blinking with 2 s off, 0,5 s on	netTAP is initialized, but the configuration for the communication protocol on X2 is missing or has an error
	(red)	Blinking with 2 s off, 0,5 s on, 0,5 s off, 0,5 s on,	netTAP is initialized, but the configuration for the communication protocol on X3 is missing or has an error
	(red)	On	netTAP has detected an error during the ini- tialization: Missing configuration, error in con- figuration or internal error

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工业通讯事业部

事业部网站: <u>www.hongconsys.com</u> 微信公众号: 工业通讯 产品及方案:

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- > TSN 时间敏感网络开发方案及应用方案
- ▶ INtime 实时操作系统(提升 windows 实时性)
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