

ARTU-KJ8 遥信遥控组合单元

ARTU-KJ8 Remote Communication&Control Unit

安装使用说明书 V1.0

User's Manual V1.0

安科瑞电气股份有限公司

ACREL Co., Ltd.

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1 概述 Overview

ARTU-KJ8 遥信遥控组合单元是专为智能配电、工业自动化等领域开发的开关量采集和远程继电器输出组合单元，经由通讯实现和上位机监控系统的数据交换。

ARTU-KJ8 remote communication& control unit is designed particularly for acquisition of switching value and remote relay output in applications like intelligent distribution and industrial automation. It implements the data exchange through communication and upper computer monitoring system.

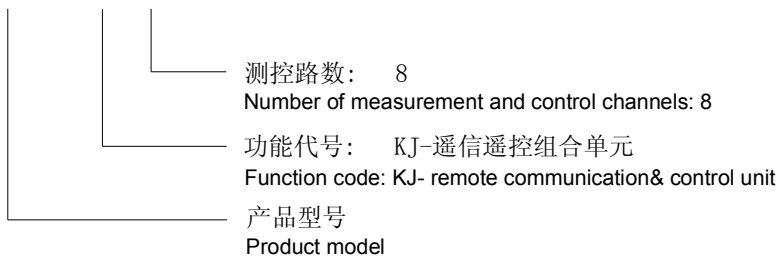
符合标准Reference standard:

JB/T 10388-2002 带总线通信功能的智能测控节点产品通用技术条件general technical requirements of intelligent measurement and control node with bus communication function

GB/T 13729-2002 远动终端设备 Remote Terminal Unit Equipment

2 型号说明 Model description

ARTU - □ □



3 产品特点 Product features

1) 产品具有通道状态指示灯和通信状态指示灯。

It is equipped with channel state indicator and communication state indicator.

2) 产品采用软硬件“看门狗”技术，防止死机现象。

It applies both software and hardware Watchdog in order to prevent the system halting.

3) 产品体积小,安装方便。

Its size is small, and easy to install.

4 使用条件 Working conditions

1)辅助电源: 24VDC (±10%)

220VAV,允许 AC/DC 85~265V

Auxiliary power supply: 24VDC (±10%)

220VAV,allow AC/DC AC/DC 85~265V

2)功 耗: ≤5W

Power consumption: ≤5W

3)工作环境: -5~+55℃

Working temperature: -5℃-+55℃

4)相对湿度: ≤95%RH, 不凝露, 无腐蚀性气体

Relative humidity: ≤95%RH, free of condensate or aggressive gases

5)存储温度: -25~+70℃

Storage temperature: -25℃-+70℃

6)海拔高度: ≤2500m

Altitude: ≤2500m

7)绝缘强度: 电源/继电器和电源//通讯//开关量输入之间 2kV/1min, 50Hz

注: 辅助电源为 DC 24V 时, 电源与其它端子之间耐压仅为 1kV。

Insulating strength:2kV/1min, 50Hz between the the power supply/ relay and power supply/
communication/switching value

Note: When the auxiliary power supply is 24V, the withstand voltage between the power supply
and other terminals is 1kV

8) 安装方式 DIN35mm 导轨安装

Installation method: installed with DIN 35mm guide rail

9) EMC 性能满足下列标准要求:

The EMC property meets requirements of following standards:

GB/T 17626.2 静电放电抗扰度试验 等级 4

Electrostatic Discharge Immunity Test—Grade 4

GB/T 17626.3 射频电磁场辐射抗扰度试验 等级 3

Radiated Radio-frequency Electromagnetic Field Immunity Test---Grade 3

GB/T 17626.4 电快速瞬变脉冲群抗扰度试验 等级 4

Electrical Fast Transient/Burst Immunity Test---Grade 4

GB/T 17626.5 冲击(浪涌)抗扰度试验 等级 3 (ARTU-KJ8 试验等级为 1 级)

Surge Immunity Test---Grade 3 (grade 1 for ARTU-KJ8)

GB/T 17626.6 射频场感应的传导骚扰抗扰度试验 等级 3

Immunity to Conducted Disturbances Induced by Radio-frequency Fields---Grade 3

GB/T 17626.12 振荡波抗扰度试验 等级 3

Oscillatory Wave Immunity Test----Grade 3

5 产品规格 Product specification

性能 Property	指 标 Index	
	开关量输入 Switching input	继电器输出 Relay output
输入/输出回路 Input/ output circuit	8	8
输入/输出方式 Input/output mode	无源干接点 Passive dry contact	8 路继电器输出 (脉冲或保持方式) 8-channel relay output (pulse or holding mode)
总线方式 Bus mode	半双工 RS485 (Modbus RTU), 建议采用三芯屏蔽线 Half-duplex RS485 (Modbus RTU), 3-core shielded line recommended	半双工 RS485 (Modbus RTU), 建议采用三芯屏蔽线 Half-duplex RS485 (Modbus RTU), 3-core shielded line recommended
总线容量	≤32	≤32

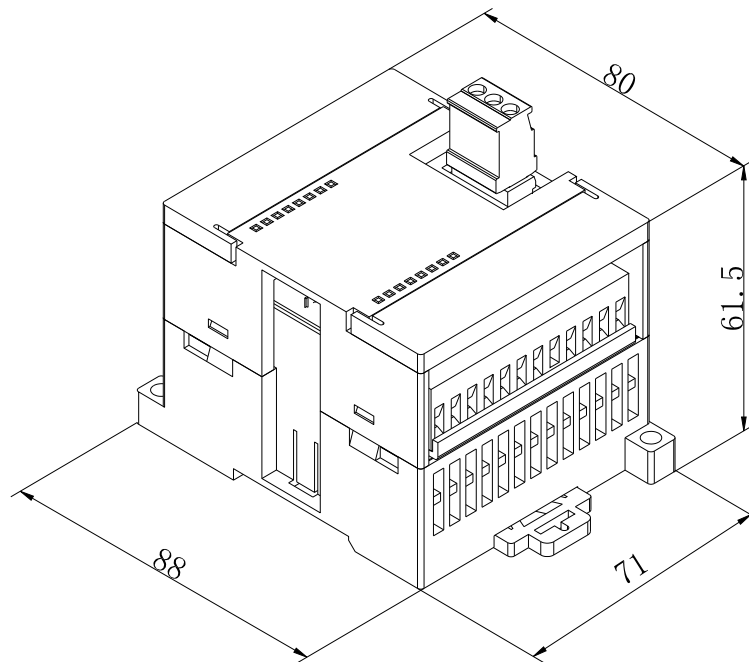
Bus capacity		
开关量事件分辨率 Resolution of switching event	多接点相继变位的区分能力，任两个接点变位时间间隔大于 1 毫秒。 Ability to differentiate the successive displacement of multiple contacts, displacement interval between any two contacts: >1ms	/
遥信扫查速度 Remote communication scanning speed	所有通道扫描一周所需时间 1ms Scanning cycle of all channels: 1ms	/
遥信去抖时间 Debouncing time of remote communication	所有通道采用统一的去抖时间 1ms(可设置) Debouncing time for all channels: 1ms (adjustable)	/

6 安装与接线 Installation and wiring

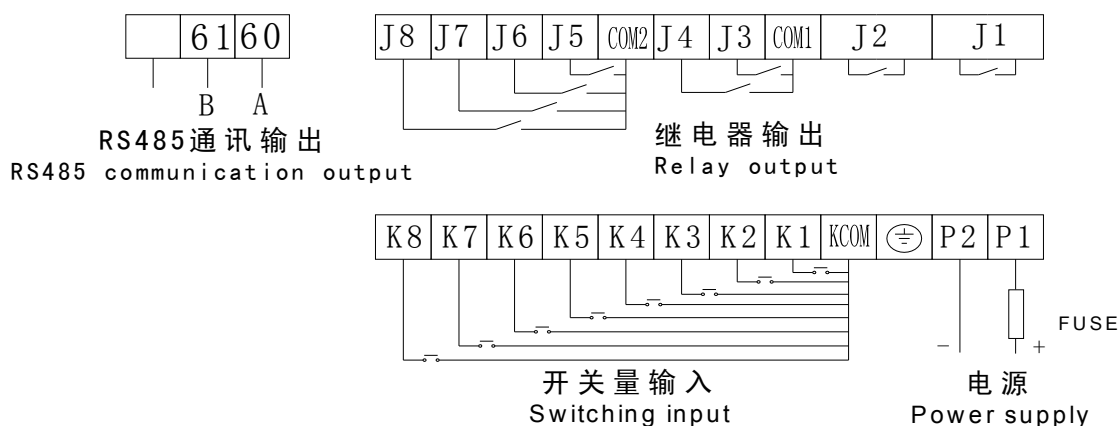
6.1 安装与外形尺寸 Installation and overall dimensions

标准卡轨 DIN 35mm，尺寸如下：

Standard DIN 35mm guide rail with dimensions as follows:



6.2 接线端子编号 Number of wiring terminals



7 通信说明 Communication explanation

7.1 读写寄存器内容 Register reading and writing

使用 Modbus 功能码 03 (03H)、04 (04H) 可访问地址表中的所有内容，使用功能码 16 (10H) 可写连续寄存器数据。

Items in the address list are available with Modbus function codes 03 (03H) and 04 (04H). Data can be written in the register continuously with function code 16 (10H).

数据地址 Data address	数据内容 Data content	数据类型 Data type	读/写 Reading / writing	命令字 Command word	数据长度 (byte) Data length
00	仪表识别码# Instrument identification code #	定点数 Fixed-point number	R	03、04	2
01	版本号 Version number	定点数 Fixed-point number	R	03、04	2
02	地址 (1~247) Address: 1- 247	定点数 Fixed-point number	R/W	03、04/16	2
03	通信波特率 Communication baud rate (38400、19200、9600、4800、 2400、1200)	定点数 Fixed-point number	R/W	03、04/16	2
04	通信校验模式 (注 1) Communication check code (Note 1)	定点数 Fixed-point number	R/W	03、04/16	2
05-11	保留 Reserved	定点数 Fixed-point number	R	03、04	2
12	遥控通道当前状态 (注 2) 高 8 位 DI, 低 8 位 DO, bit0~bit7 对应 DO1~DO8 bit8~bit15 对应 DI1~DI8 Current state of remote control	定点数 Fixed-point number	R/W		2

	channels (Note 2) DI: higher 8 bits; DO: lower 8 bits bit0-bit7: DO1- DO8 bit8-bit15: DI1- DI8				
13-15	保留 Reserved	定点数 Fixed-point number	R	03、04	2
16	遥信通道当前状态 (注 2) Current state of remote communication channels (Note 2) Bit0 为 DI1 第 1 通道, Bit1 为 DI2 第 2 通道, 依次类推 Bit 0: 1 st channel DI1; Bit 1: 2 nd channel DI2, and the like	定点数 Fixed-point number	R	03、04	2
17	遥控通道当前状态 (注 2) Bit0 为 DO1 第 1 通道, Bit1 为 DO2 第 2 通道, 依次类推 Current state of remote control channels (Note 2) Bit 0: 1 st channel DI1; Bit 1: 2 nd channel DI2, and the like	定点数 Fixed-point number	R/W	03、04/16	2
18	遥信通道去抖时间 (1~1000ms) Debouncing time of remote communication channels	定点数 Fixed-point number	R/W	03、04/16	2
19	保留 Reserved	定点数 Fixed-point number	R/W	03、04/16	2
20	数字输出 DO1 持续时间 (注 3) Duration of digital output DO1 (Note 3)	定点数 Fixed-point number	R/W	03、04/16	2
21	数字输出 DO2 持续时间 Duration of digital output DO2	定点数 Fixed-point number	R/W	03、04/16	2
22	数字输出 DO3 持续时间 Duration of digital output DO3	定点数 Fixed-point number	R/W	03、04/16	2
23	数字输出 DO4 持续时间 Duration of digital output DO4	定点数 Fixed-point number	R/W	03、04/16	2
24	数字输出 DO5 持续时间 Duration of digital output DO5	定点数 Fixed-point number	R/W	03、04/16	2
25	数字输出 DO6 持续时间 Duration of digital output DO6	定点数 Fixed-point number	R/W	03、04/16	2
26	数字输出 DO7 持续时间	定点数	R/W	03、04/16	2

	Duration of digital output DO7	Fixed-point number			
27	数字输出 DO8 持续时间 Duration of digital output DO8	定点数 Fixed-point number	R/W	03、04/16	2

#: 仪表识别码: ARTU-K8J8 为 204 (0xC8)

#: instrument identification code: ARTU-K8J8 为 204 (0xC8)

注 1: 地址 04 (通信校验模式说明):

Note 1: address 04 (in the communication check mode)

0: 1 位起始位, 8 位数据位, 1 位停止位

0: 1 start bit, 8 data bits, 1 stop bit

1: 1 位起始位, 8 位数据位, 2 位停止位

1: 1 start bit, 8 data bits, 2 stop bits

2: 1 位起始位, 8 位数据位, 偶校验, 1 位停止位

2: 1 start bit, 8 data bits, even, 1 stop bit

3: 1 位起始位, 8 位数据位, 奇校验, 1 位停止位

3: 1 start bit, 8 data bits, odd, 1 stop bit

注 2: 通道当前状态说明: 1 为 ON 表示闭合, 0 为 OFF 表示断开。

Note 2: current statue of channel: 1 indicates ON, i.e. closed; 0 indicates OFF, i.e. open.

注 3: 数字输出持续时间说明: 设置范围0~10,000ms, 出厂默认为0ms。可以通过设置输出持续时间来改变数字输出的模式。持续时间为0为普通继电器模式; 持续时间大于0, 数字输出为脉冲继电器模式,输出持续时间为设置的时间长度。

Note 3: duration of digital output: setting range from 0ms (default) to 10,000ms, digital output mode adjustable with setting of such duration. If the duration is 0, it indicates the common relay output mode. If the duration is above 0, it indicates the pulse relay output mode. The duration of digital output is a time setting.
DO 状态的读取:

Reading of DO state

用 MODBUS 的 01 号命令读取 DO 状态。

Read the DO state with MODBUS command 01.

其中 1=ON, 0=OFF

1= ON, =OFF

数据地址 Data address	数据内容 Data content	数据类型 Data type	读/写 Reading/writing	命令字 Command word	数值范围 Rang of value
0000H	DO1	BIT	R	01	1=ON, 0=OFF
0001H	DO2	BIT	R	01	1=ON, 0=OFF
0002H	DO3	BIT	R	01	1=ON, 0=OFF
0003H	DO4	BIT	R	01	1=ON, 0=OFF
0004H	DO5	BIT	R	01	1=ON, 0=OFF
0005H	DO6	BIT	R	01	1=ON, 0=OFF
0006H	DO7	BIT	R	01	1=ON, 0=OFF

0007H	DO8	BIT	R	01	1=ON, 0=OFF
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DO 状态的设置:

Setting of DO state

开关量输出控制采用 MODBUS 05 号命令写入。

Write the switching output control with MODBUS command 05.

开关量输出数值存储地址，数据帧中每个地址为 1 位存储（1bit）。

Memory address of switching output. Each address in the data frame indicates 1 bit.

写入 0XFF00 为 ON（闭合），0X0000 为 OFF（断开），其他数值不会影响 DO。

0XFF00 indicates ON (closed) while 0X0000 indicates OFF (open). Other values will not influence DO.

数据地址 Data address	数据内容 Data content	读/写 Reading/ writing	命令字 Command word	数值范围 Range of value
0000H	DO1	W	05	0XFF00=ON, 0X0000=OFF
0001H	DO2	W	05	0XFF00=ON, 0X0000=OFF
0002H	DO3	W	05	0XFF00=ON, 0X0000=OFF
0003H	DO4	W	05	0XFF00=ON, 0X0000=OFF
0004H	DO5	W	05	0XFF00=ON, 0X0000=OFF
0005H	DO6	W	05	0XFF00=ON, 0X0000=OFF
0006H	DO7	W	05	0XFF00=ON, 0X0000=OFF
0007H	DO8	W	05	0XFF00=ON, 0X0000=OFF

DI 状态的读取：（允许操作端口 COMM1）

Reading of DI state: (operation port COMM1 enabled)

用 MODBUS 的 02 号命令读取 DI 状态。

Read the DI state with MODBUS command 02.

其中 1=ON, 0=OFF

1= ON, =OFF

数据地址 Data address	数据内容 Data content	数据类型 Data type	读/写 Reading/writing	命令字 Command word	数值范围 Rang of value
0000H	DI1	BIT	R	02	1=ON, 0=OFF
0001H	DI2	BIT	R	02	1=ON, 0=OFF
0002H	DI3	BIT	R	02	1=ON, 0=OFF
0003H	DI4	BIT	R	02	1=ON, 0=OFF
0004H	DI5	BIT	R	02	1=ON, 0=OFF
0005H	DI6	BIT	R	02	1=ON, 0=OFF
0006H	DI7	BIT	R	02	1=ON, 0=OFF
0007H	DI8	BIT	R	02	1=ON, 0=OFF

7.2 通信举例 Communication examples

例 1：读取仪表地址为 2 的遥信单元当前开关状态

Example 1: Read the current switching state of remote communication unit with the instrument address 2

发送：0x02,0x03,0x00,0x0C,0x00,0x01,0x44,0x3A

Send: 0x02, 0x03, 0x00, 0x0C, 0x00, 0x01, 0x44, 0x3A

返回: 0x02, 0x03, 0x02, 0x03, 0x00, 0xFC, 0xB4

Receive: 0x02, 0x03, 0x02, 0x03, 0x00, 0xFC, 0xB4

说明: 仪表地址为 2 的遥信单元第一、二通道开关闭合。

Explanation: channels 1 and 2 of remote communication unit with the instrument address 2 are closed.

例 2: 读取 1 至 5 开关量状态

Example 2: Read the switching state of channels 1 to 5

发送: 0x01, 0x02, 0x00, 0x00, 0x00, 0x05, 0xB8, 0x09

Send: 0x01, 0x02, 0x00, 0x00, 0x00, 0x05, 0xB8, 0x09

返回: 0x01, 0x02, 0x01, 0x10, 0xA0, 0x44

Receive: 0x01, 0x02, 0x01, 0x10, 0xA0, 0x44

说明: 0x10 转化成二进制数为 0001,0000, 即第 5 路开关量闭合状态, 其它都是断开状态。

Explanation: 0x10 is 0001,0000 in the binary system, indicating that the channel 5 is closed and other channels are open.

例 3: 读取 1 至 5 继电器状态

Example 3: Read the relay status of channels 1 to 5

发送: 0x01, 0x01, 0x00, 0x00, 0x00, 0x05, 0xFC, 0x09

Send: 0x01, 0x01, 0x00, 0x00, 0x00, 0x05, 0xFC, 0x09

返回: 0x01, 0x01, 0x01, 0x0C, 0x51, 0x8D

Receive: 0x01, 0x01, 0x01, 0x0C, 0x51, 0x8D

说明: 0C 转化成二进制数为 01100, 即第 3、4 路继电器为闭合状态, 其他 3 路为开路状态, 高 3 位为被填充的 0 不代表任何含义。

Explanation: 0C is 01100 in the binary system, indicating that relays of channels 3 and 4 are closed and other three channels are open. The top 3 bits are 0 so that they have no meaning.

例 4: 闭合第 1 路继电器

Example 4: Close the relay of channel 1

发送: 0x01, 0x05, 0x00, 0x00, 0xFF, 0x00, 0x8C, 0x3A

Send: 0x01, 0x05, 0x00, 0x00, 0xFF, 0x00, 0x8C, 0x3A

返回: 0x01, 0x05, 0x00, 0x00, 0xFF, 0x00, 0x8C, 0x3A

Receive: 0x01, 0x05, 0x00, 0x00, 0xFF, 0x00, 0x8C, 0x3A

例 5: 设置第一路继电器为 3 秒的脉冲输出, 即通讯控制闭合后 3 秒自动断开

Example 5: Set the relay of channel 1 to be a pulse output for 3s (i.e. communication control is open automatically in 3s after being closed)

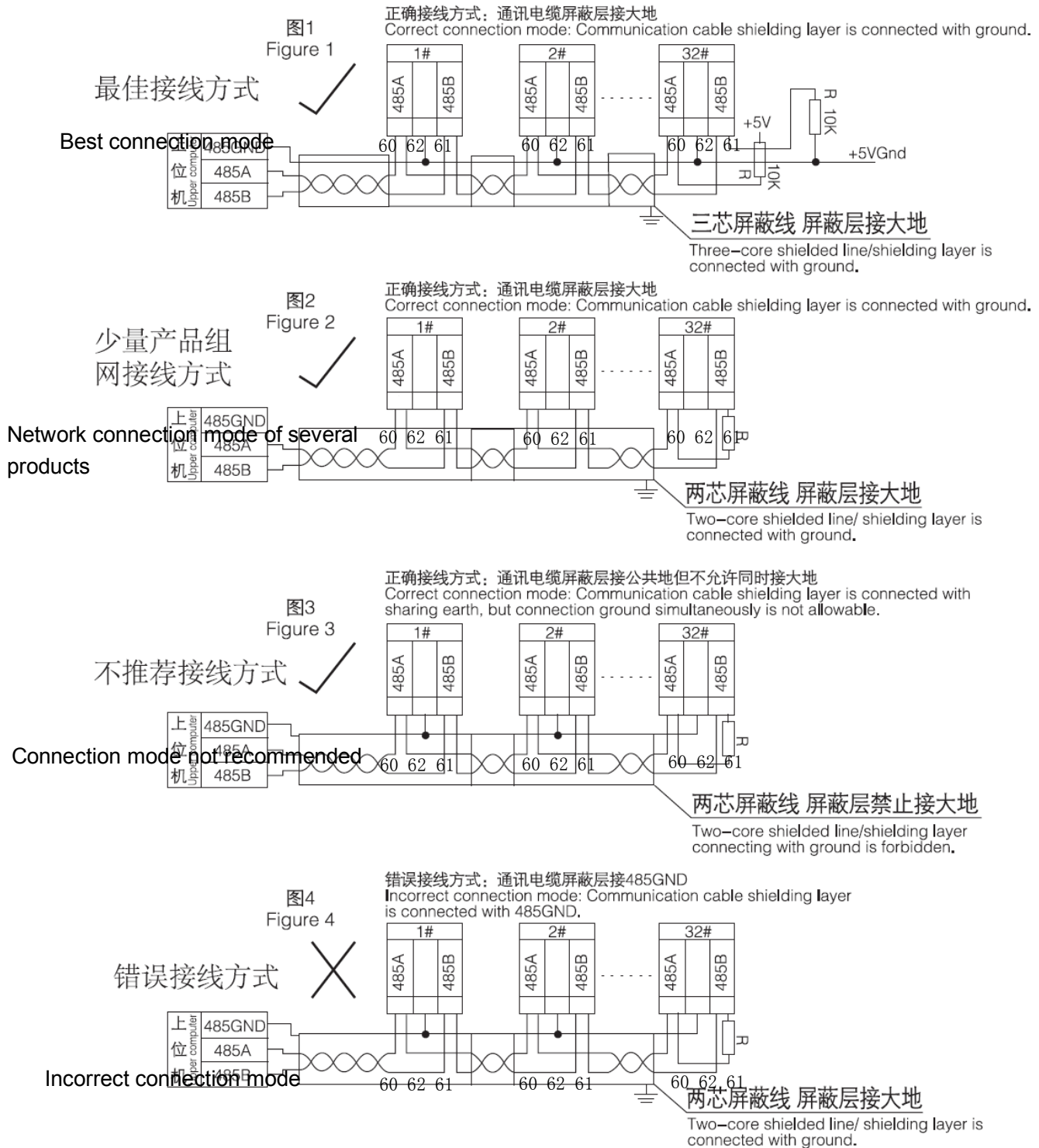
发送: 0x01, 0x10, 0x00, 0x14, 0x00, 0x01, 0x02, 0x0B, 0xB8, 0xA2, 0x06

Send: 0x01, 0x10, 0x00, 0x14, 0x00, 0x01, 0x02, 0x0B, 0xB8, 0xA2, 0x06

返回: 0x01, 0x10, 0x00, 0x14, 0x00, 0x01, 0x41, 0xCD

Receive: 0x01, 0x10, 0x00, 0x14, 0x00, 0x01, 0x41, 0xCD

7.3 通讯连接方式 Communication connection modes



当多个 ARTU 组网使用时，最后一个的 RS485 的 A 和 B 端子上应并接一个终端匹配电阻 R，以保证通讯阻抗匹配，终端匹配电阻一般在 120Ω-10kΩ 之间，布线不同终端匹配电阻可能会不同。上图为使用三芯屏蔽线的示意图，屏蔽层接大地，各个设备的 G1 端子并接。

If several ARTU units are networked for use, terminals A and B of the last RS485 must be connected with a terminal matching resistor in parallel in order to guarantee the matching of communication impedance. The terminal matching resistance is generally between 120Ω and 10kΩ. The resistance varies with the wiring mode. The figure above is the wiring diagram of 3-core shielded line. The shielding layer is connected with ground and the terminal G1 of all units are connected in parallel.

总部：安科瑞电气股份有限公司

地址：上海市嘉定区育绿路 253 号

电话：(86)021-69158300 69158301 69158302

传真：(86)021-69158303

服务热线：800-820-6632

网址：www.acrel.cn

邮箱：ACREL001@vip.163.com

邮编：201801

Headquarters: Acrel Electric Holding Co., Ltd.

Address: Yulv Road 253, Madong Industrial Park, Jiading, Shanghai

Tel.: (86)021-69158300 69158301 69158302

Fax: (86)021-69158303

Service hotline: 800-820-6632

Website: www.acrel.cn

E-mail: ACREL001@vip.163.com

P.C.: 201801

生产基地：江苏安科瑞电器制造有限公司

地址：江阴市南闸街道东盟路 5 号

电话(传真)：(86)0510-86179970

邮编：214405

邮箱：JY-ACREL001@vip.163.com

Production base: Jiangsu Acrel Electric Appliances Manufacturing Co., Ltd,

Address: Dongmeng Road 5, Nanzha Street, Jiangyin City

Tel./fax: (86)0510-86179970

P.C.: 214405

E-mail: JY-ACREL001@vip.163.com