Shiningintl Bidirectional communication protocol V1.5

目录

1   version information：

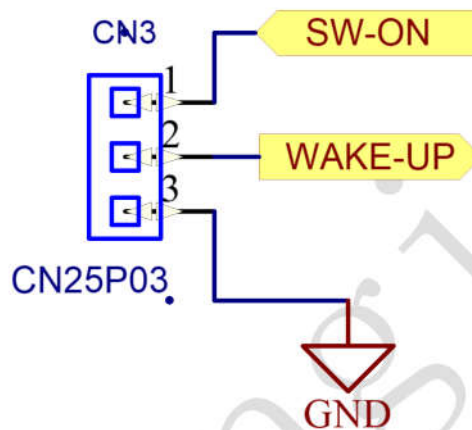| version	modification	approval
1.5	Renew the version	WXF 20230505
1.6	Change the communication port definition	WXF 20230730

2   document introduction

2.1   purpose

This document describes the Shiningintl bidirectional inverter serial communication (TTL level serial UART) protocol of our company.

3   protocol physical lay definition

3.1   Power interface

The power board CN3 is the boot interface, where:

Pin1: Inverter startup pin, this pin is the optocoupler input terminal, connected in series with a 510 Ω resistor. It is recommended to enable 5V high level. At 5V level, this pin consumes approximately 6mA of current, and it is necessary to ensure that the power supply pin can provide sufficient current

Pin2:   Wake up pin, which outputs a signal from the inverter to the outside. When the inverter is connected to the mains power, this pin will have a 12V level output, which can be used to wake up control circuits such as human-machine interfaces. It should be noted that the voltage fluctuation range of this level is 9-20V, and it can provide a maximum current of 10mA. It

should not be used as a power supply

Pin3： For reference purposes

The three pins of CN3 are located on the safe voltage side and can be directly
connected to the human-machine interface.

3.2 Communication interface

1. CN1 on the inverter is the   communication interface between the inverter and the control panel:
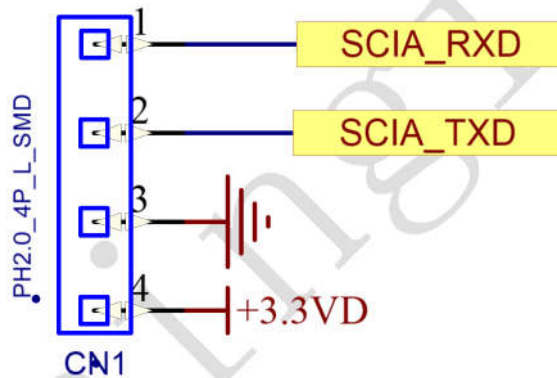
Physical interface for communication

where：

Pin1： RXD is the receiving pin of the inverter
Pin2： TXD is the sending pin of inverter
Pin3： GND for the inverter
Pin4： 3.3V power supply pin of inverter board

此通信接口基于属于逆变器侧功率参考地， 因此安规上不属于安全地， 用户可触及的操作界面与此通信接口应有安规隔离电路， 典型为光耦/容耦或变压器耦合电路。

2. 控制板 CN3 为逆变器与控制界面的隔离通信接口：

CN3 Definition of isolated communication port

This communication interface is equipped with NSI8242W digital isolator, which provides safety isolation and can directly connect with ultra-low voltage safety circuits such as human-machine interface
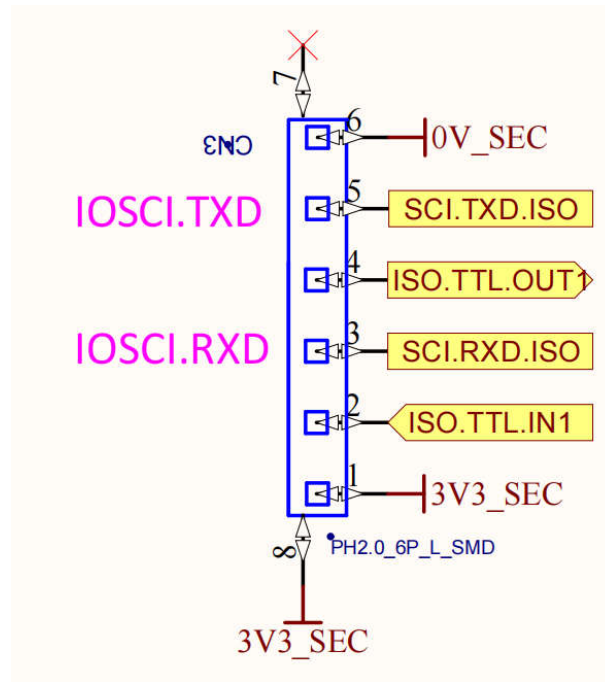(SELV) direct connection.
The interface definition is as follows:

Pin1: The positive input pin of the isolator power supply has a voltage range of 3.3~5V and needs to be powered by the safety low-voltage circuit side
Pin3: RXD is the communication sending pin for the inverter, through which the inverter receives data commands
Pin4: MAINS.FLAG is the mains power indicator, high when not connected to the mains power, low when connected to the mains power
Pin5: TXD is the receiving pin for inverter communication, and the pin for sending data from the inverter to the outside
Pin6: Isolator power reference ground

CN1 and CN3 support UART by default, and the protocol format instructions are defined later. If other communication protocol formats (SPI, MODBUS, etc.) are required,
Contact sales representatives (IIC, CAN) to negotiate customization.

The communication interface adopts 3.3V level and high level voltage efficiency.
Protocol lay definition：

Baud rate....................: 2400 bps
Data length.................: 8 bits
Stop bit.....................: 1 bit
check........................: NONE

This communication protocol sends and receives instructions and response data in ASCII code format without check bits.

4 Commands for communication

4.1 basic commands

4.1.1 Q6：status inquire command 6 状态查询指令 6

上位机(controller)：Q6 回车

逆变器(inverter board): (MMM.M PPPPP QQQQQ NN.N PPP.P III.I FF.FF RR.R QQQ --- --- VVV.V

TT.T III.I CCC KB P00000ff wwwwwwww 00 回车

	data	description	Notes
a	(	Begin mark	
b	MMM.M	Grid voltage	M 为 0 to 9 整数,单位为 V
c	PPPPP	Charging power rated	
d	QQQQQ	Power rated of the load	
e	NN.N	AC frequency	N 为 0 to 9 整数,单位为 Hz
f	PPP.P	Output voltage	P 为 0 to 9 整数,单位为 V
g	III.I	Battery discharging current	最高位 0:充电电流，1:放电电流
h	FF.FF	Eeprom frequency setting	
i	RR.R	Output frequency	R 为 0 to 9 整数,单位为 Hz
j	QQQ	Percentage of the output current	Q 为 0 to 9 整数,单位为 %
k	---	reserved	
l	xxx	Allow to charge command	xx1：allow to send charging command；xx0： Sending charging is invalid
m	VVV.V	Battery voltage :VVV.V	V 为 0 to 9 整数,单位为 V
n	VV.VV	Setting the charging voltage	VV.VV
o	TT.T	The highest temp in side	T 为 0 to 9 整数,单位为 °C

		the inverter	
p	Ⅲ.Ⅰ	Setting the charging current	
q	CCC	reserved	保留
r	K	Working mode of the inverter	逆变器工作模式 K: 0　grid mode(charging and supply power by the grid)市电模式（充电且旁路有输出） 1　battery mode, the inverter is outputing 电池模式（即逆变模式） 3　bypass mode, the grid to supply power, and don't charge 旁路模式（旁路输出，不充电） 4　standby mode 待机模式 5　Fault mode 故障模式 6　power on mode 上电模式 7　shutting down mode 关机进行中 8　charging mode, only charging , no power supply 充电模式（仅充电，无旁路输出） 9　battery self test mode 电池自检测模式
s	B	Mark for charging and discharging at the same time 边充边放标志	0　边充边放模式 7　其他模式
t	P00000	reserved 预留信息位	P：风扇档位 00000：预留
u	ff	Error code 故障代码	0　无故障 1　母线软启失败 2　母线过压 3　母线欠压 5　母线短路

				6	逆变软启失败
				7	逆变高压
				8	逆变欠压
				10	输出短路
				22	过载
				23	过温
				38	充电过流
				45	Eerpom 故障
				55	温度传感器开路
				59	充电过压
v	wwwwwwww	Warning code 告警代码			
w	00	--			

实例：

上位机(controller)指令: Q6<回车>

逆变器回应:(235.8 00333 00555 50.0 237.4 120.5 FF.FF 50.0 000 --- --1 218.5 ---.- 26.3 99999 100 00 10000000 00000000 11

释义：

Input voltage 输入电压：235.8V

Charging power rate 充电功率：333W

Output power rate 输出功率：555W

Input frequency 输入频率：50.0Hz

Output voltage 输出电压：237.4

Discharging current 放电电流：20.5

Frequency set 设定频率：50.00Hz

Output frequency 输出频率： 50.0HZ

Output current percentage 输出电流百分比：000

reserved 保留 ---

allow to send charging command 允许发送充电命令：--1

battery voltage 电池电压：218.5

internal temperature 机器内部温度 26.3 度

capacity percentage 预估容量百分比　100%

inverter working mode 逆变器工作模式：　0　　市电模式

AC charging and DC discharging at same time 边充边放标志：　0　　边充边放模式

Fan level 风扇档位：1　　　　1 档

reserved 预留：00000

error code 故障代码：00　　无故障

warning code 警告代码：00000000　　无警告

reserved 保留：00

4.1.2 **CHGON1: connect to grid and begin the charging 市电正常时开充电指令**

上位机(controller)： CHGON1 回车

逆变器(inverter board)： correctly connect to grid, feed back "ACK" if not charging, otherwise feedback "NAK"市电正常且充电器未开则回复 ACK，否则回复 NAK

结果(result)：on standby mode or bypass mode, send "CHGON1" to start charging 在旁路模式或市电正常下的 Standby 模式下，发 CHGON1，充电器打开。

4.1.3 **CHGON0: turn off charging 关闭充电**

上位机(controller)： CHGON0 回车

逆变器(inverter board)： feed back "ACK" when charging is operating, otherwise feed back "NAK"充电器工作则回复 ACK,否则回复 NAK。

结果(Result)：if the inverter is in grid bypass and charging mode, it will set to stop charging and bypass mode , if inverter in charging mode, it will set to standby mode.若此时为旁路加充电模式则回到旁路模式。若此时为充电模式，则回到待机模式。

4.1.4 **CHGV: correctly connect to grid, set the battery max charging voltage 市电正常时充电终止电压设置**

上位机(controller)： CHGVxxxx 回车

xxxx = 电压设定值(the voltage want to set) * 100

逆变器(inverter board)： feedback "ACK" when connecting to grid and in standby mode or bypass mode, otherwise feedback "NAK"市电正常待机模式或旁路模式下回复 ACK，否则回复 NAK

结果(Result)：when Setting the charging voltage , please make sure the charging is off, otherwise it can't succeed 设定充电电压，需要在充电关闭的情况下发送设置值，否则不生效

例如：充电电压要设置为 25.96V 时，先发送 CHGON0 关闭充电，再发送 CHGV2596 回车，代表设置充电终止电压为 25.96V，然后发送 CHGON1 开启充电。

4.1.5 CHGI: set current of **Constant current charging 市电正常时恒流充电电流设置**

上位机(controller)：CHGIxxx 回车

xxx = 充电电流 * 10

逆变器(inverter board)： connect to grid and in standby mode or bypass mode, it will feed back "ACK", otherwise it will reply "NAK"市电正常待机模式或旁路模式下回复 ACK，否则回复 NAK

结果(Result)：Set the charging current, the setting should be set when in off charging status, otherwise it will not succeed 设定充电电流，需要在充电关闭的情况下发送设置值，否则不生效

例如：想要设置充电电流为 20A 时，先发送 CHGON0 关闭充电，再发送 GHGI200 回车，代表设置恒流充电电流为 20A，然后发送 CHGON1 开启充电。

4.1.6 **CHGOVP: over voltage protection setting** 市电正常时充电电压的过压保护值设置

上位机(controller)： CHGOVP xxxx 回车

xxxx = 过压点设定值 * 100

逆变器(inverter board)：connect to grid and in standby mode or bypass mode, it will feed back "ACK", otherwise it will reply "NAK"市电正常待机模式或旁路模式下回复 ACK，否则回复 NAK

结果(Result)： the board should be in off charging status when setting the protection voltage, otherwise the setting will not succeed 设定充电电压保护点，需要在充电关闭的情况下发送设置值，否则不生效

例如：想要设置充电电压高于 28.55V 关充电，先发送 CHGON0 关闭充电，再发送 GHGOVP2855 回车，然后发送 CHGON1 开启充电。

4.1.7 FPS：fan speed control command 风扇转速控制指令

上位机(controller)：FPSx 回车

xx = fan level 风扇档位(4 is maximum, 0 is minimum 最大为 4，最小为 0)

逆变器(inverter board)：reply "ACK" when succeeding, reply "NAK" when failing 设置成功回复 ACK，失败则回复 NAK

结果(Result)：If the set gear is greater than the gear calculated by the system itself, it will be updated to the set gear. If the set gear is not 0, the inverter will not enter ShutDown mode and will continue low-power standby. If the set gear is 0, it will enter ShutDown mode and turn off the power.

若设置的档位大于系统自身计算出的档位，则更新为设置的档位，若设置的档位不为 0，则逆变器不会进入 ShutDown 模式，持续低功耗待机，若设置的档位为 0，则会进入 ShutDown 模式，熄灭电源。

例如：想设置风扇档位为 3 档，则发送指令 FPS3，若此时系统自身计算出的档位 2 档，则最终的风扇档位为 3 档，若系统自身计算出的档位为 4 档，则最终风扇档位为 4 档。

4.2 Set control parameters 参数控制设定指令

4.2.1 VS<rrr>: set the rated power voltage 输出额定电压设定指令

上位机(controller): VS<rrrr>回车

rrrr：为 100/110/115/120/127 或 200/208/220/230/240 对应输出额定电压

逆变器(inverter board): (V100 回车

需要在旁路模式或待机模式下使用，电池模式下关机后存入逆变器内存

4.2.2 FS?: inquire the output frequency 额定输出频率查询指令

上位机(controller): FS?回车

逆变器(inverter board): (NN 回车

Data and format 数据内容及格式	description 含义	notes 注释
(	The start bit 起始位	
NN	The value of rated frequency 额定输出频率	50Hz/ 60Hz. Unit: Hz

4.2.3 **FS<nn>:　set the output frequency** 设定额定输出频率指令

上位机(controller): FS<kk>回车

逆变器(inverter　board): (kk 回车

Data and format 数据内容及格式	description 含义	notes 注释
(	The start bit 起始位	
kk	The value to set for the rated output frequency 额定输出频率设定值	00/50Hz/ 60Hz. 单位: Hz When inputting FS00, the machine will automatically detect the input frequency. If the input frequency is detected as 50HZ for the system, the rated output frequency will be set to 50HZ. If the input frequency is detected as 60Hz for the system, the rated output frequency will be set to 60Hz When inputting FS50, the rated output frequency is forcibly set to 50HZ, regardless of the input frequency. When inputting FS60, the rated output frequency is forcibly set to 60HZ, regardless of the input frequency. 输入 FS00 时，机器将自动检测输入频率，检测到输入频率为 50HZ 系统，则将额定输出频率设定为 50HZ，检测到输入频率为 60HZ 系统， 则将额定输出频率设定为 60HZ 输入 FS50 时，则将额定输出频率强制设定为 50HZ，无论输入频率为多少。 输入 FS60 时，则将额定输出频率强制设定为 60HZ，无论输入频率为多少。

4.3 Error clearance 故障清除指令

4.3.1 error clearance command ZCF 故障清除指令 ZCF

　　上位机(controller)：ZCF 回车

　　逆变器回复(inverter　board)：ACK

　　结果(result)：If there is a fault code reported in the current fault mode, the current fault will be cleared and enter standby mode 如果当前是故障模式有故障代码上报，则会清除当前故障，进入待机模式