

Modbus Protocol of Aislu Power Module

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Version: AD78201.094

Communication Basic:

Master as upper computer;

Slave as Aislu Power Module

- 1) Data format: 1 bit start, 8bits data, 2bits stop, No even parity check
- 2) Baud rate: 9600BPS
- 3) Slave Address: manual setup
- 4) Modbus-RTU, 'CRC16' check
- 5) Master polling interval \geq 100ms
- 6) Slave received correct data from Master, delay 40ms return data
- 7) Slave received wrong data from Master, no responses, delay 40ms, and re-receiving data from Master
- 8) Master and Slave communication form tables and function code:

<Remark: MK30330 communication similar with MK10525, but add one detail: if slave has not receive any data from up-computer within 30 sec, judge as communication error, LED flashing N=8, slave stop working>

Table 1	Function code = 1,	
	Master send data to Slave	
Slave Address		0x01
Function Code		0x01
Start Address Hi		0x00
Start Address Lo		0x00
NO. Of Points Hi		0x00
NO.Of Points Lo		0x07
CRC Lo		0xC8(or auto)
CRC Hi		0x7D(or auto)

Remark: This function for check the MK10525 driver protection state. Slave return data please see table 2.

01 01 00 00 00 07 7D C8 Fixed command string

Table 2	Function code = 1,	
	Slave return data to Master	
Slave Address		0x01
Function Code		0x01
Byte Count		0x01
Data		Data Bit0 – Bit7 see <i>table2 appendix</i> protection code
CRC Lo		Depend on system
CRC Hi		Depend on system

Table 2 appendix		Table 2 appendix, Data value represents meaning	
Content	Description	Protection state	
Bit0	IPM Protection	0:No	1: Yes
Bit1	PFC Protection	0:No	1: Yes
Bit2	Speed discord protection	0:No	1: Yes
Bit3	Voltage protection(too high or too low)	0:No	1: Yes
Bit4	Over-current protection	0:No	1: Yes
Bit5	Over-Temperature protection	0:No	1: Yes
Bit6	Step-out protection	0:No	1: Yes
Bit7	/ (or reserved bit)	/ (or reserved bit)	

Table 1, Table 2 and Table 2 appendix three tables for use for check driver protection state. And for use function code=1 .

Table 3	Function code =3,	
	Master send data to Slave	
Slave Address	0x01	
Function Code	0x03	
Start Address Hi	0x00	
Start Address Lo	0x0A(fixed value)	
NO. Of Points Hi	0x00	
NO.Of Points Lo	0x03	
CRC Lo		
CRC Hi		

Remark: CRC is automatic generated by master modbus protocol.

01 03 00 0A 00 03 25 C9 Fixed command string

Table 4	Function code =3,	
	Slave return data to Master	
Slave Address	0x01	
Function Code	0x03	
Byte Count	0x06	
Data Hi	0x00	
Data Lo	Compressor frequency on running (nv)*	
Data Hi	0x00	
Data Lo	Input Current (nv)*	
Data Hi	0x00	
Data Lo	DC Voltage (nv)*	
CRC Lo		
CRC Hi		

Remark:

(nv) means the numerical value salve returned.

Compressor frequency on running (nv) = Actual compressor working frequency on running.

Input Current (nv) = Actual working current * 5

DC Voltage (nv) = Actual voltage / 2

Table 3 and Table 4 tables for use for check compressor state. And for use function code=3 .

Table 5	Function code = 10, (HEX)	
	Master send data to Slave	
Slave Address	0x01	
Function Code	0x10	
Start Address Hi	0x00	
Start Address Lo	0x00(fixed value)	
NO. Of Registers Hi	0x00	
NO. Of Registers Lo	0x06	
Byte Count	0x0C	
Data Hi	0x00	
Data Lo	Compressor target run-frequency	
Data Hi	0x00	
Data Lo	Stop current	
Data Hi	0x00	
Data Lo	Reduce frequency current	
Data Hi	0x00	
Data Lo	Restore current	
Data Hi	0x00	
Data Lo	(00 or reserved bit)	
Data Hi	0x00	
Data Lo	(00 or reserved bit)	
CRC Lo		
CRC Hi		

Remark:

Compressor target run-frequency = Actual compressor working frequency(Hz);

Stop current = Actual driver stop current(A) * 5

Reduce frequency current = Actual reduce frequency current * 5

Restore current = Actual restore current * 5

Control state, see below table

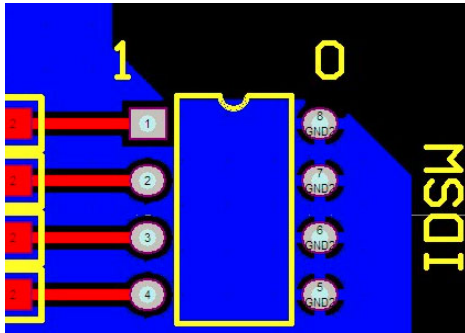
Content	Description	Remark
Bit 0		0 : NO 1 : YES
Bit 4	Preheat control	0 : NO 1 : YES
Bit 5	Force PFC control	0 : NO 1 : YES

Stop current, reduce frequency current, restore current are calculated by MK10525 software and are not precise value, there is no electronic circuit or equipment for measuring the current value on MK10525 driver.

Table 6	Function code = 10,	
	Slave return data to Master	
Slave Address	0x01	
Function Code	0x10	
Start Address Hi	0x00	
Start Address Lo	0x0F	
NO. Of Registers Hi	0x00	
NO. Of Registers Lo	0x06	
CRC Lo		
CRC Hi		

9) IDSW/MODESW setup (Not available in sample version, compressor code and slave address fixed)

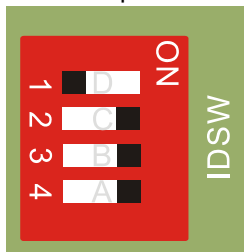
Setup slave address by dip switch IDSW:



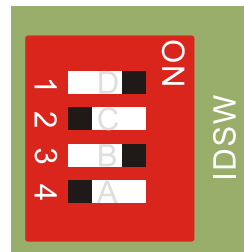
Pin Position		Value when pin at this position		Value when pin at this position	
1	D	8	1	0	0
2	C	7	1	0	0
3	B	6	1	0	0
4	A	5	1	0	0

Dip Switch IDSW = Binary Value (ABCD)

For example:

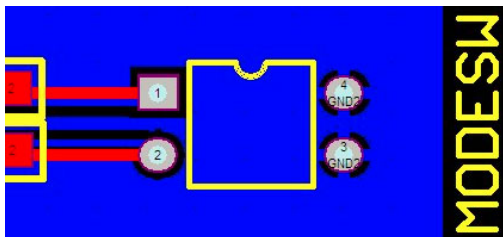


Dip switch IDSW=ABCD = 0001



Dip switch IDSW=ABCD = 1010

Setup/select compressor by dip switch MODESW:

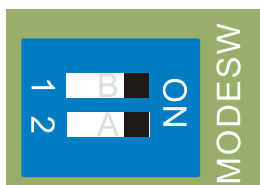


MODESW pin switch is manufacturer's setup for compressor code, change value could cause compressor curve wrong.

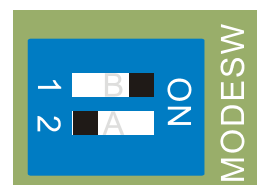
Pin Position		Value when pin at this position		Value when pin at this position	
1	B	4	1	0	0
2	A	3	1	0	0

Dip Switch MODESW = Binary Value (AB)

For example:



Dip switch MODESW=AB = 00



Dip switch MODESW=AB = 10

10) LED1, LED2 indicator lamp:

LED1, chips power indicator, normally on.

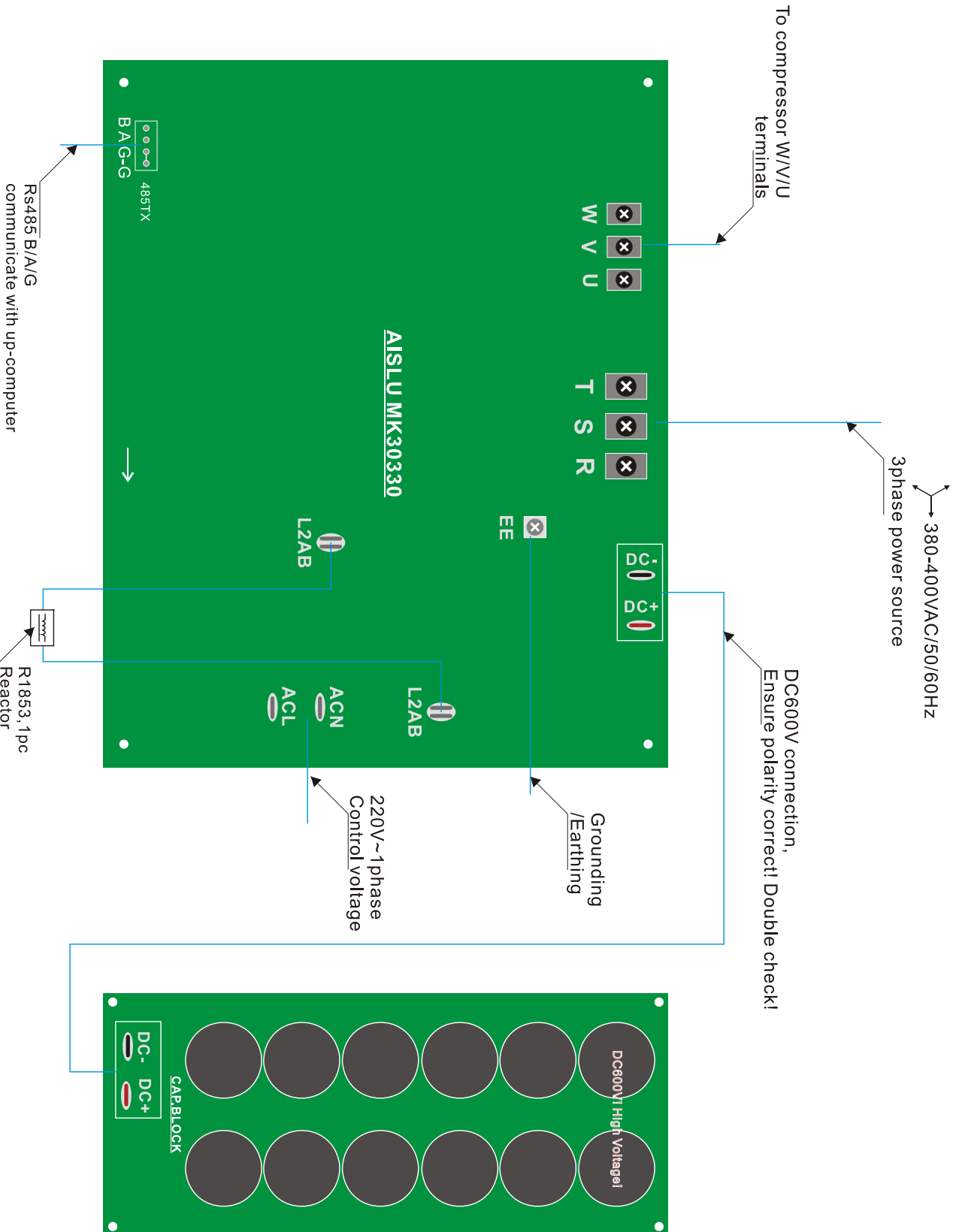
LED2, Control state indications:

LED2 indicates working or error states through illuminate, light out, flash actions;

- (1) Stand By State: Compressor stop (Or unconnected compressor), 0.5Hz Flashing.
- (2) Working/Running state: Compressor running, illuminate always.
- (3) Error/Failure State: Light out 1 second and illuminate 1 second, then 2Hz flash N times, loop execution, (N times refer below table)

Flash N time, N= (times)	Failure/Error/Description
1	IPM protection
2	PFC protection
3	Driving un-normal
4	Input current over-current protection
5	Voltage protection
6	Module over-heating protection
7	-
8	Communication error, or have not received communication from up-computer
9	U over-current
10	V over-current
11	W over-current
12	Stalled protection
13	Step out protection
14	Current offset
15	Compressor phase loss

11) Wiring:



Please ensure DC600V power wiring connection absolutely correct. Wrong connection will cause capacitors breakdown, and could cause PIM module damaged.