RD11 option EtherCat Extension Card
Operating Instructions

RD11 EtherCAT Extension Card Operating Instructions

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Thank you for using the network communication extension card of VEDA-in DRIVES, LLC. The communication extension card can be used with the RD11 inverters to achieve EtherCAT communication.

Please read this manual carefully before using this card.

1. Hardware Description

This communication card cooperates with the EtherCAT master station, which can realize the command and status acquisition of the inverter, so as to achieve the purpose of driving the inverter. The schematic diagram of its appearance is shown below.

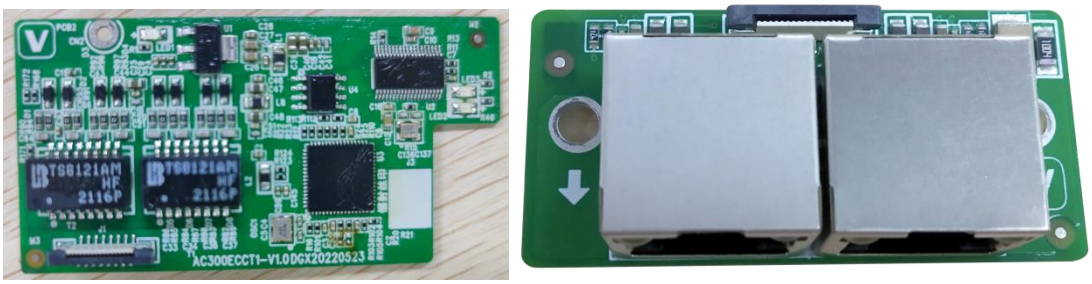

Figure 1.1 RD11 EtherCAT communication extension card

There are multiple LEDs on this communication card to indicate the communication status of the extension card, and Table 1.1 shows the description of each LED indicator.

Table 1.1 LEDs Indicator light description

Indicator light	Function	Describe
LED1	Power Indicator	1.On means the power supply is normal; 2.Off means the power supply is abnormal;
LED2	Program running indicator	1.Blinking means normal(slower blinking when OP, faster blinking when non-OP). 2.Always on or off means the program is running abnormally;
LED3	Error indicator	1.Constant light indicates a board error; 2.Continuous slow flashing means EEPROM loading error; 3.Two consecutive flashes indicate abnormal communication with frequency inverter; 4.After flashing for 3 times, it is always off to indicate an error in reading and writing the inverter; 5.4 consecutive flashes indicate that the main station is disconnected; 6.5 consecutive flashes indicate that the communication card test byte fails;

2. Wiring Instructions

The topological structures supported by EtherCAT include bus type, star type, tree type, etc., and the device connection is very flexible. The bus type connection is a common connection, and the connection topology is as follows (RD11 EtherCAT extension card right RJ45for input, left

RJ45for output).

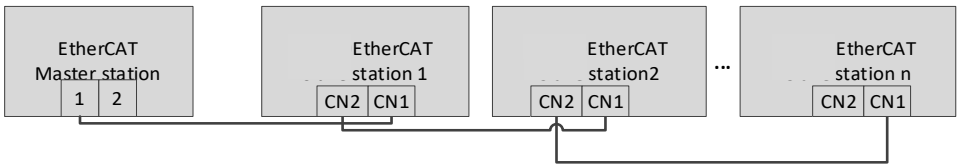

Figure 2.1 EtherCAT bus type wiring topology

3. RD11 inverter related parameter description

3.1 RD11 setting parameters

Table 4.1RD11 Function code setting

Function code	Name	Set range	Set value	Meaning
F01.01	Run command selection	0: keyboard given 1: Terminal given 2: RS485 given 3: Optional card given 4: Terminal switching command given	3	The run command is given by the EtherCAT card
F01.02	Frequency given source channel	0: keyboard number given 1: Keyboard analog potentiometer given … 10:optional card	10	The frequency command is given by the EtherCAT card
F01.11	Upper limit frequency source selection	Select the given source of the upper limit frequency of the inverter. 0: upper limit frequency digital given 1: reserved 2: Voltage analog VS given 3: Current/voltage analog AI given 4: Current analog quantity AS given 5: Terminal pulse PUL given 6: RS485 communication given 7: Optional Cards	-	If you want to use the EtherCAT card to limit the upper limit frequency, you need to set this to 7
F03.41	Torque command given	0: keyboard number 1: keyboard potentiometer given … 7: Optional card	-	If the torque command is to be given by the RD11 Profinet card, set it to 7
F03.54	Torque control forward speed limit selection	0: Function code F03.56 setting; 1: reserved … 7: Optional card*F03.56	-	Set to 7 if the speed needs to be limited by the EtherCAT card
F03.55	Torque control reverse speed limit selection	0: Function code F03.57set up; 1: reserved … 7: Optional card*F03.57	-	Set to 7 if the speed needs to be limited by the EtherCAT card

F03.56	Torque control forward rotation maximum speed	0.0~100.0%	-	Relative maximum output frequency (F01.10)
F03.57	Torque control reverse maximum speed	0.0~100.0%	-	Relative maximum output frequency (F01.10)
F12.32	Pn card and inverter disconnection processing method	0: do not detect 1: Alarm and free parking 2: warn and continue		The processing method after the EtherCAT card detects that it is disconnected from the control board (Ebus4/A.buS)
F12.41	Site alias	1-247	1	
F12.43	Master-slave communication fault action	0: do not detect 1: Alarm and free parking 2: warn and continue	-	When the master-slave communication fails, the processing method (the PLC is disconnected from the device or the PLC downloads the program or the PLC is in the stop state, reports Ebus3/A.buS)
F12.50	Extension card communication disconnection processing method (inverter processing)	Ones place: EX-A disconnection handling Tens place: EX-B disconnection processing 0: do not detect 1: Alarm and free parking 2: warn and continue	-	The communication between the EtherCAT card and the inverter is faulty, and the processing method is selected. (The inverter itself detects and processes it, and reportsEbus1/A.buS)

3.2 RD11 Communication Control Group Parameters

Table 4.2 RD11 Communication control group address description

Address definition	Function Description	Description of data meaning	R/W characteristics
0x3100	Communication given frequency	Unit 0.01Hz, such as 5000corresponds to 50.00Hz	R/W
0x3101	Communication command setting	0: no command 1: Forward running 2: Reverse operation 3: Forward jog 4: reverse jog 5: Decelerate to stop 6: Free stop 7: fault reset 8: run the forbidden command 9: run the allow command	R/W
0x3104	Communication given upper limit frequency (0.01Hz)	Unit 0.01Hz	R/W
0x3105	Communication torque setting (0.1%)	Unit 0.1%	R/W
0x3106	Torque control positive maximum frequency limit (0.1%)	Unit 0.1%	R/W
0x3107	Torque control reverse maximum frequency limit (0.1%)	Unit 0.1%	R/W
0x3108	Communication given PID setting value (0.1%)	Unit 0.1%	R/W
0x3109	Communication given PID feedback value (0.1%)	Unit 0.1%	R/W

0x310A	Voltage-frequency separation voltage value setting (0.1%)	Unit 0.1%	R/W
0x310B	Tension setting	0~maximum tension	R/W
0x310C	Roll diameter setting	0~Maximum roll diameter	R/W
0x310D	Line speed setting	0~Maximum line speed	R/W
0x310E	Acceleration time 1	Set the unit through function code F01.21	R/W
0x310F	Deceleration time 1	Set the unit through function code F01.21	R/W
0x3111	Torque current component	0~4000(corresponding to 0.0%~400.0%)	R/W
0x3112	Torque filter time	0~6000(correspond0.000-6.000s)	R/W
0x3113	Tension PID feedback	0~1000(corresponding to 0.0%~100.0%)	R/W
0x3114	Communication given jog torque limit	0~4000(corresponding to 0.0%~400.0%)	R/W
0x3115	Communication given generator torque limit	0~4000(corresponding to 0.0%~400.0%)	R/W

3.3 RD11 Communication monitoring group parameters

Table 4.3 RD11 Communication monitoring table

Parameter code (address)	**Name**	**Instruction**		**R/W**
0x3102	Inverter status	Bit0	0:shutdown state, 1:Operating status	R
		Bit1	0:non-accelerated theme, 1:Accelerated state	
		Bit2	0:non-decelerating state, 1:deceleration state	
		Bit3	0:positive, 1:reverse	
		Bit4	0:no fault, 1:Inverter fault	
		Bit5	0:GPRS non-locking machine, 1:GPRS lock	
		Bit6	0:no warning, 1:Inverter warning	
		Bit7	0: no-ready, 1: ready	
		Bit8	0: Communication with the control board is not faulty 1: Communication failure with the control board	
0x3110	Reserve	-		R
0x3118	Reserve	-		R
0x3119	Reserve	-		R
0x311A	Reserve	-		R
C00.00(0x2100)	Given frequency	0.01Hz		R
C00.01 (0x2101)	Output frequency	0.01Hz		R
C00.02 (0x2102)	Output current	0.1A		R
C00.03 (0x2103)	Input voltage	0.1V		R
C00.04 (0x2104)	The output voltage	0.1V		R
C00.05 (0x2105)	Mechanical speed	1rpm		R
C00.06 (0x2106)	Given torque	0.1%		R
C00.07 (0x2107)	Output torque	0.1%		R
C00.08 (0x2108)	PID given amount	0.1%		R
C00.09 (0x2109)	PID feedback amount	0.1%		R
C00.10 (0x210A)	Output Power	0.1%		R
C00.11 (0x210B)	Bus voltage	0.1V		R

C00.12 (0x210C)	Module temperature 1	0.1℃	R
C00.13 (0x210D)	Module temperature 2	0.1℃	R
C00.14 (0x210E)	Input terminal X on state	-	R
C00.15 (0x210F)	Output terminal Y on state	-	R
C00.16 (0x2110)	Analog AI1 input value	0.001V/0.001mA	R
C00.17 (0x2111)	Analog AI2 input value	0.001V/0.001mA	R
C00.18 (0x2112)	Reserve	-	R
C00.19 (0x2113)	Pulse signal PUL input value	0.001kHz	R
C00.20 (0x2114)	Analog output AO1	0.01V/0.01mA/0.01kHz	R
C00.21 (0x2115)	Analog output AO2	0.01V/0.01mA/0.01kHz	R
C00.22 (0x2116)	counter count value	1	R
C00.23 (0x2117)	The running time of this power-on	0.1Hour	R
C00.24 (0x2118)	The cumulative running time of the machine	Hour	R
C00.25 (0x2119)	Inverter power class	0.1kW	R
C00.26 (0x211A)	Inverter rated voltage	V	R
C00.27 (0x211B)	Inverter rated current	0.1A	R
C00.28 (0x211C)	Software version	-	R
C00.29 (0x211D)	PG feedback frequency	0.01Hz	R
C00.30 (0x211E)	Timer time	seconds/minutes/hours	R
C00.31 (0x211F)	PID output value	0.01%	R
C00.32 (0x2120)	Inverter software subversion	-	R
C00.33 (0x2121)	Encoder feedback angle	0.1°	R
C00.34 (0x2122)	Z pulse cumulative error	1	R
C00.35 (0x2123)	Z pulse count	1	R
C00.36 (0x2124)	Fault warning code	0~63fault number, 64~128warning number	R
C00.37 (0x2125)	Cumulative power consumption (low)	1°	R
C00.38 (0x2126)	Cumulative power consumption (high)	10000°	R
C00.39 (0x2127)	Power factor angle	0.1°	R

4. Communication Instructions

4.1 PDO data description

PDO realizes the periodic data exchange between the master station and the slave station. The PDO mapping object can add or reduce mapping parameters through the master station (the maximum number of mapping variables for TPDO and RPDO is 10 respectively). The default mapping of PDO mainly includes the following:

Inverter control command, target frequency given.

The current status and running frequency of the inverter can be read in real time.

4.2 Mailbox data SDO

Mailbox data SDO is used to transmit non periodic data, such as the configuration of communication parameters, the configuration of inverter operation parameters, etc. Types of CoE services include:

1. Emergency
2. SDO request
3. SDO response
4. TPDO
5. RPDO
6. SDO information, etc.