

ENERGY MANAGEMENT MODULE

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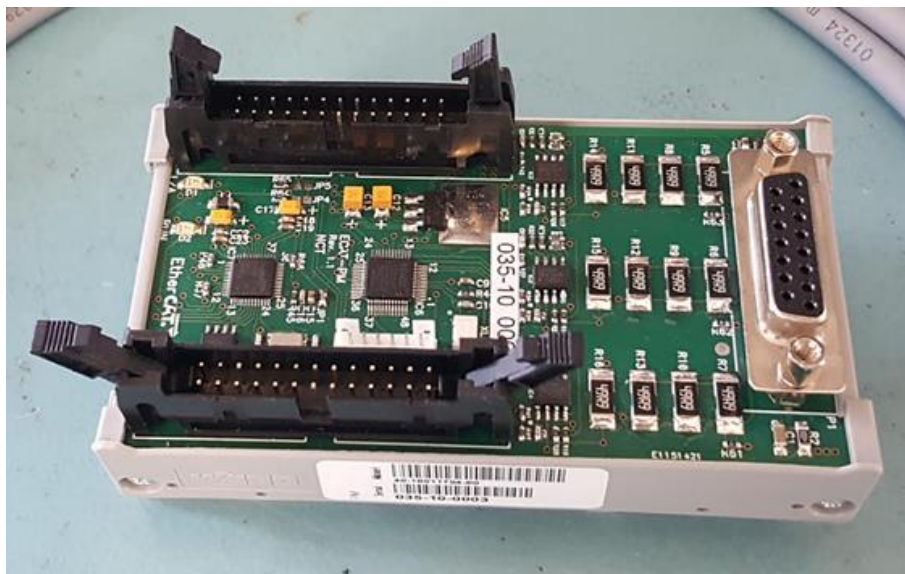
INTRODUCTION

The EtherCAT interface module is suitable in combination with the appropriate POWER module to measure mains voltage, current, power and other mains values, and transmit them via EtherCAT to the controller for further processing.

The power-current POWER module contains voltage dividers and current transformers. Its function is to convert the mains voltage and current levels into measurable analog voltage signals. These analog signals are connected via a cable to the input of the EtherCAT module.

There are currently 2 types of POWER modules operating with 75 A and 200 A maximum current.

EtherCAT module



POWER module 75 A



POWER module 200 A



Cable



1 CONNECTOR PIN ASSIGNMENT AND JUMPERS

P1 connector (EtherCAT module - DSUB 15 female)

Pin number	Signal name
1	I1_200A
2	I1_COM
3	
4	I2_75A
5	U2
6	I3_200A
7	I3_COM
8	
9	I1_75A
10	U1
11	I2_200A
12	I2_COM
13	
14	I3_75A
15	U3

Jumper settings

Jumper	Open	Closed
J4	75 A	200 A
J5	50 Hz	60 Hz

J1 connector (POWER module 75A - MOLEX)

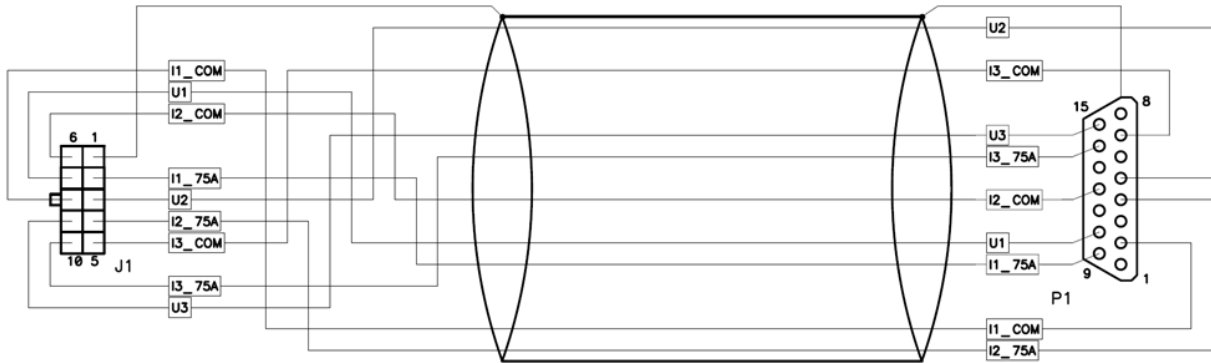
J1	Pin number	Signal name
	10	I3_75A
	9	U3
	8	I2_COM
	7	U1
	6	I1_COM
	5	I3_COM
	4	I2_75A
	3	U2
	2	I1_75A
	1	Shield

J1 connector (POWER module 200A - MOLEX)

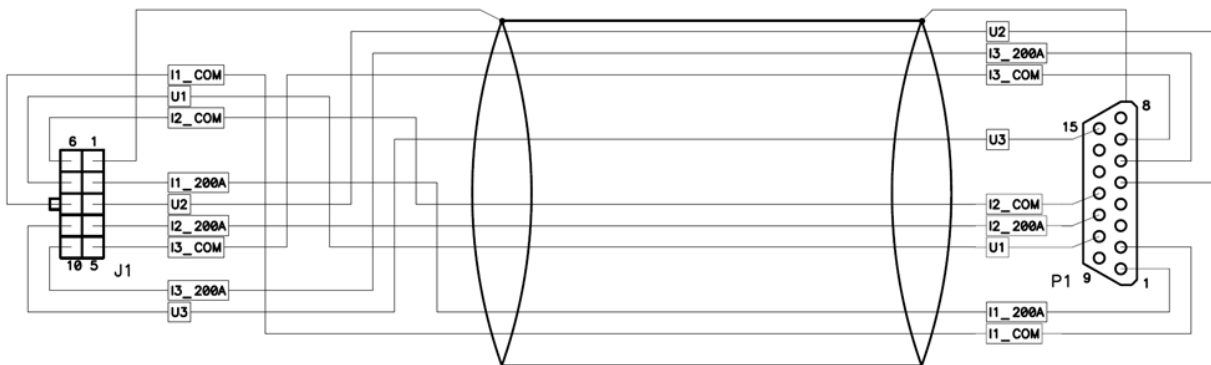
J1	Pin number	Signal name
	10	I3_200A
	9	U3
	8	I2_COM
	7	U1
	6	I1_COM
	5	I3_COM
	4	I2_200A
	3	U2
	2	I1_200A
	1	Shield

2 CABLE CONNECTION

Cable connection between the EtherCAT module and POWER 75A module



Cable connection between the EtherCAT module and POWER 200A module



3 THREE-PHASE VOLTAGE SIGNAL INPUT

It is an input with a 12-bit A/D converter suitable to receive analog signals in the range of 0~5 V. It is connected to the voltage signal output of the POWER module.

4 THREE-PHASE CURRENT SIGNAL INPUT

It is an input with a 12-bit A/D converter suitable to receive analog signals in the range of 0~5 V. It is connected to the current signal output of the POWER module.

5 ETHERCAT INTERFACE

This module communicates with the control system via EtherCAT-LVDS bus. It has to be connected, via the LVDS input, to the EPU unit or to a module already connected to the EPU. A following module can be connected to the LVDS output connector.

LEDs on the card and their functions

Link/Act In: the EtherCAT input port works

Link/Act Out: the EtherCAT output port works

Run: when the LED light is off: the unit is in INIT status
 when the LED light is blinking: the unit is in PRE-OPERATIONAL status
 when the LED light flashes: the unit is in SAFE-OPERATIONAL status
 when the LED light is on: the unit is in OPERATIONAL status

6 ETHERCAT PDO DATA

6.1 CONTROLWORD (OUT)

Data type: UINT16

Control word

6.2 V1 (IN)

Data type: REAL32

Phase voltage 1

6.3 V2 (IN)

Data type: REAL32

Phase voltage 2

6.4 V3 (IN)

Data type: REAL32

Phase voltage 3

6.5 I1 (IN)

Data type: REAL32

Phase current 1

6.6 I2 (IN)

Data type: REAL32

Phase current 1

6.7 I3 (IN)

Data type: REAL32

Phase current 1

6.8 V12 (IN)

Data type: REAL32

Line voltage 1

6.9 V23 (IN)

Data type: REAL32

Line voltage 2

6.10 V31 (IN)

Data type: REAL32

Line voltage 3

6.11 P (IN)

Data type: REAL32

Three-phase effective power

6.12 Q (IN)

Data type: REAL32

Three-phase reactive power

6.13 S (IN)

Data type: REAL32

Three-phase apparent power

6.14 POWERFACTOR (IN)

Data type: REAL32

Cosine phi

6.15 FREQUENCY (IN)

Data type: REAL32

Measured frequency

6.16 TEMPERATURE (IN)

Data type: REAL32

Ambient temperature of the PM module

6.17 STATUSWORD (IN)

Data type: UINT16

Status word

bit 8 : 0 phase sequence 123

1 phase sequence 132