

INVERTER

A510



Communication - Addendum

Profibus DP

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1.0 PROFIBUS high speed communication expansion card

1.0.1 Communication hardware and data structure

This product is the PROFIBUS high-speed communication expansion module; it can perform remote setting and communication functions through the PROFIBUS bus. It is used on the TECO A510s/F510 AC motor driver (hereinafter referred to as the “driver”), and allows the driver to operate on the PROFIBUS network.

1.0.2 Product specifications

PROFIBUS ports

Item	Specifications
Connector	DB-9
Transmission rate	9.6Kbit/s to 12Mbit/s (automatic detection of transmission rate)
Network protocols	PROFIBUS communication protocol

AC motor driver port

Item	Specifications
Connector	Control board CN2 connector
Transmission method	SPI high speed communication
Terminal functions	1. The communication module communicates with the AC motor driver through this interface. 2. The AC motor driver provides power to the communication module through this interface.
Communication protocols	TECO communication protocol

1.0.3 Installation instructions

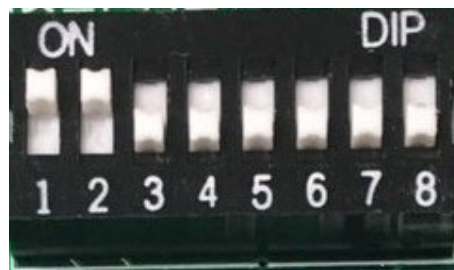
PROFIBUS network connection

Definitions of PROFIBUS DP communication port pins are as shown in the figure below.

	Pin	Definition	Description
	1~2	Not assigned	-
	3	RXD/TXD-P (B-Line)	Receive/Send data -P
	4	Not assigned	-
	5	DGND (2M)	Data reference potential
	6~7	Not assigned	-
	8	RXD/TXD-N (A-Line)	Receive/Send data -N
	9	Not assigned	-

PROFIBUS network connection

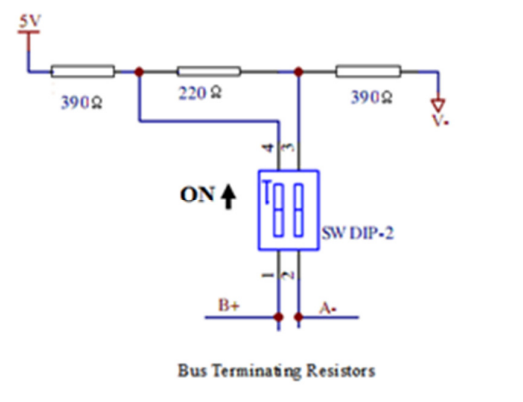
As shown in the figure below, ID addresses (1~125) correspond to SW1 b1~b7.



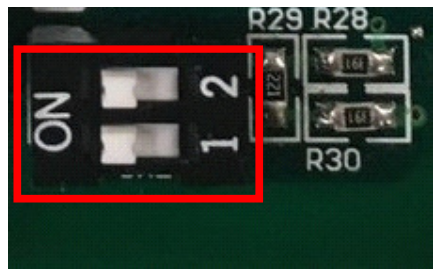
Function	DIP switch position	DIP switch status	Description
Network address setting	b1~b7	1000000	Network address is 1
		0100000	Network address is 2
		1100000	Network address is 3
	
		1011111	Network address is 125
No function	b8	-	-

Network address switch setting range: 1~125 (0, 128~255 cannot be used).

PROFIBUS bus terminal resistor



5V
390Ω
220Ω
390Ω
ON ↑
SW DIP-2
B+
A-
Bus Terminating Resistors



The first and last station of the PROFIBUS bus must be connected to the bus, and the bus terminal resistor must be turned on.

1.0.4 LED indicator descriptions

The module has two dual-color LED indicators built-in used to quickly diagnose and monitor the communication statuses between the module itself and the bus.

Module status LED (RUN LED & ERR LED)

Used to monitor whether the equipment is operating normally.

Indicator statuses	Description
Does not light up	Power not supplied
Orange light lights up	Communication with the frequency converter not established
Red light flashes (1 Hz)	Communication error with the frequency converter
Red light flashes (4 Hz)	Flip-switch ID address error
Green light flashes (4 Hz)	Power supply normal but DP communication not established
Green light lights up	DP communication normal

Network status LED (COMM LED)

Used to monitor the operability of the communication module PROFIBUS network.

Indicator statuses	Description
Does not light up	DP communication not established
Green light lights up	DP communication established and normal

1.0.5 Driver parameter setting descriptions

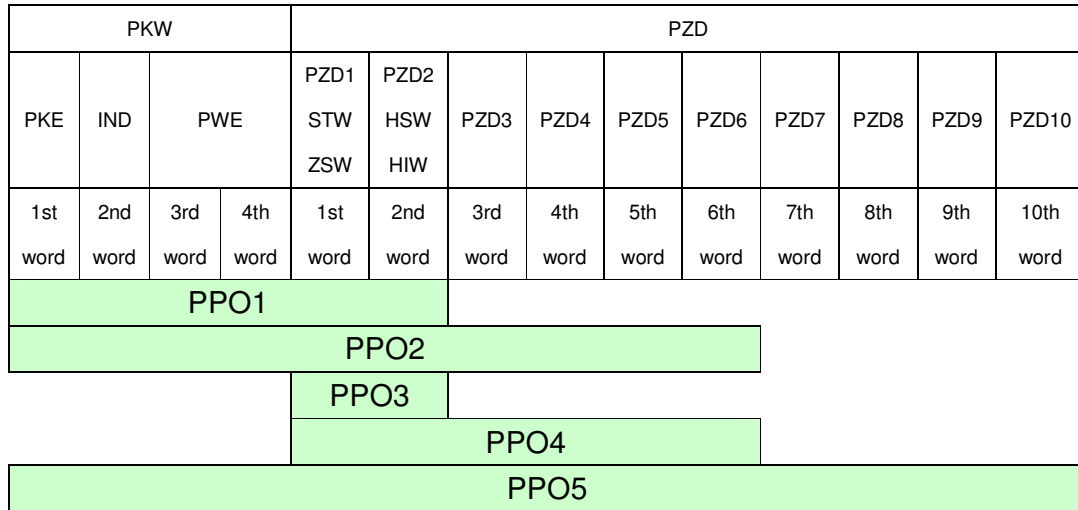
Used to monitor the operability of the communication module PROFIBUS network.

Users must first confirm related parameter settings on the driver in order to ensure that the communication module can connect normally.

Parameters	Parameter name	Settings	Settings descriptions
00-02	Operation command source	2	Communication control
00-05	Frequency command source	3	Communication control

1.0.6 Connection instructions

PPO communication



PKW: Parameter address/value	STW: Control word
PZD: Process data	ZSW: Status word
PKE: Parameter address	HSW: Main settings
IND: Subindex	HIW: Main actual value
PWE: Parameter value	

PZD Structure default

User parameters of the communication module configured through the GSD file. Default values of the PZD structure are as follows:

STW1 Control word; mapped to the MODBUS address 0x2501 of the driver.

HSW Main setting value; mapped to the MODBUS address 0x2502 of the driver.

ZSW1 Status word; mapped to the MODBUS address 0x2520 of the driver.

HIW Main actual value; mapped to the MODBUS address 0x2524 of the driver.

PLC Master station → driver slave station

PZD3/ PZD4: Not used.

Driver slave station → PLC master station

Driver output status; mapped to the MODBUS addresses 0x2520~0x252F of the driver.

The default values of PZD3/PZD4/PZD5/PZD6 are set as follows:

PZD3: Default multi-function terminal block on/off status; mapped to the MODBUS address 0x2522 of the driver.

PZD4: Default output current; mapped to the MODBUS address 0x2527 of the driver.

PZD5: Default output current; mapped to the MODBUS address 0x2521 of the driver.

PZD6: Default output current; mapped to the MODBUS address 0x2528 of the driver.

1.0.7 Meanings of each character

Control character

Bit	Description	1	0
0	Operation command	Operate	Stop
1	Reverse command	Reverse	Forward
2	External error	Error	-
3	Error reset	Reset	-
4~5	Reserved	-	-
6	Multi-function terminal S1	ON	OFF
7	Multi-function terminal S2	ON	OFF
8	Multi-function terminal S3	ON	OFF
9	Multi-function terminal S4	ON	OFF
A	Multi-function terminal S5	ON	OFF
B	Multi-function terminal S6	ON	OFF
C	Multi-function terminal S7	ON	OFF
D	Multi-function terminal S8	ON	OFF
E	Controller mode	ON	OFF
F	Communication setting torque command	ON	

Status character

Bit	Meaning	1	0
0	Operation status	Operate	Stop
1	Direction status	Reverse	Forward
2	Frequency converter operation preparation status	Preparation complete	Not yet prepared
3	Error	Abnormal	Normal
4	Warning	ON	OFF
5	Zero speed	ON	OFF
6	Model 440	ON	OFF
7	Frequency reached	ON	OFF
8	Any frequency reached	ON	OFF
9	Frequency detection one	ON	OFF
A	Frequency detection two	ON	OFF
B	Low voltage	ON	OFF
C	Frequency converter no output	ON	OFF
D	Frequency not according to communication	ON	OFF
E	SeqNotFromComm	ON	OFF
F	Over-torque	ON	OFF

1.0.8 PKW regional access parameters

The driver can provide request and response information. Due to the request and response mechanism, the master station must send requests until a communication response is received. The 4 characters of the PKW region are as follows:

Word 1	Parameter ID(PKE)		
bit	15	12	11 0
	AK		Parameter number(PNU)
Word 2	IND Reserved		
Word 3	PWE1		
bit	15	8	7 0
	Reserved		Fault number
Word 4	PWE2 Read/Write parameters		

PKE

Bit 0~11 (PNU): Parameter address/MODBUS address that includes related parameters.

Parameter address/MODBUS address: Please refer to the MODBUS communication protocol description chapter in the driver manual for the register numbers, registers and data format that corresponds to the operation parameters.

Bit 12~15 (AK): Includes the identification characters of requests or responses.

Request character AK

PLC master station → driver slave station

Request Identifier	Description
0	No request
1	Read parameter value
2	Modify parameter value

Response character AK

Driver slave station → PLC master station

Request Identifier	Description
0	No response
1	Request parameter value processed
7	Request parameter value cannot process

Error character

If the request parameter value was not processed, then the error codes that will be kept in the low-bit PWE1 set are as follows:

Error code	Description
0	Parameter does not exist
1	The current status parameter cannot be read/written
2	Parameter value not within range
101	Other SP communication error occurred, such as: response timeout

PWE

Driver parameters are sent through PWE2 (4th word). In the following example, PWE1 (3rd word) must be set as 0 in the PROFIBUS master station.

Example of the PKW mechanism:

For example: Read parameters 00-05 (frequency command source).

Read the values of 00-05; first set the request identification character as 1, and then refer to the MODBUS communication protocol description chapter in the driver manual to find out that the address of 00-05 is 0x0005, then the data sequences are as follows:

PLC master station → driver slave station: 1000 0005 0000 0000

Driver slave station → PLC master station: 1000 0005 0000 0004

Request	
1st word (PKE)	1000
2nd word (IND)	0005
3rd word (PWE1)	0000
4th word (PWE2)	0000

Response	
1st word (PKE)	1000
2nd word (IND)	0005
3rd word (PWE1)	0000
4th word (PWE2)	0004

1.0.9 Troubleshooting

There are two indicators on top of the PROFIBUS communication module; when malfunction occurs, the cause of the malfunction can be confirmed based on the indicator statuses, and troubleshoot the error by following the descriptions below.

Indicator troubleshooting

Module status LED

Indicator statuses	Status name	Troubleshooting method
Does not light up	Power not supplied to the communication module	<ol style="list-style-type: none"> 1. Confirm whether the driver power is normal. 2. Confirm whether the power terminal of the communication module is connected to the driver.
Red and green light flashes alternately	Self-check	<ol style="list-style-type: none"> 1. The host is under self-check; if it flashes continuously, disconnect the power and then reconnect it. 2. Confirm whether the driver communication connection parameters are properly set (19200, 8, N, 1)
Green light flashes	the communication module standby	<ol style="list-style-type: none"> 1. Not yet connected with the driver.

Network status LED

Indicator statuses	Status name	Description
Does not light up	Power not supplied	<ol style="list-style-type: none"> 1. Confirm whether the driver power is normal. 2. Confirm whether the power terminal of the communication module is connected to the driver.
	Standby	<ol style="list-style-type: none"> 1. Not yet connected with the PROFIBUS host terminal.

1.0.10 GSD File

When using the Profibus communication module, if the GSD description file (JN5-CMHI-PDP_V (latest version).GSD) is needed, please download it from the TECO official website or request for it from your purchasing sales channel.

2.0 I/O expansion card

2.0.1 Hardware and data structure

This product is an I/O expansion module; it allows performing of I/O expansion functions through the SPI bus. Used with the TECO A510s/F510 AC motor driver (hereinafter referred to as a driver).

2.0.2 Product specifications

I/O ports

Item	Specifications
Connector	TB1 7 external contacts

AC motor driver port

Item	Specifications
Connector	Control board CN2 connector/CN5 connector
Transmission method	SPI high speed communication
Terminal functions	TB1 7 external contacts

TECO   **Westinghouse**

INVERTER

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