PROFIBUS-DP User's Manual

Estun Limited Warranty

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Chapter 1：Preface

This manual mainly introduces the wiring, configuration, function and software protocol of PROFIBUS.

- Chapter 2: Brief introduction to PROFIBUS.
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- Chapter 7： LED instruction and troubleshooting
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Chapter 2: Brief introduction to PROFIBUS

2.1 PROFIBUS general introduction

PROFIBUS is an international, open sourced and vendor-independent communication protocol, which is widely used in manufacturing, production, converting, building automation and other automation control industries.

According to different demand and requirement on PROFIBUS, there are mainly three types, PROFIBUS-DP, PROFIBUS-PA and PROFIBUS-FMS.

- PROFIBUS-DP（Decentralized Periphery）：PROFIBUS-DP is a communication system with fast transferring speed and low cost, which is especially designed for high-speed date transferring. PROFIBUS-DP is widely applied, especially in remote I/O system, motor control center and frequency inverters. The optimum effect could be achieved when connecting automation system to periphery decentralized devices by PROFIBUS-DP communication.

- PROFIBUS-PA（Process Automation）：PROFIBUS-PA(usually MBP-IS communication technology attached)is a PROFIBUS communication system for process automation. Based on PROFIBUS-DP, PROFIBUS-PA extends PROFIBUS-DP communication protocol's data transferring to essential safety explosion application by MBP-IS interface of essential safety explosion, which is used in areas with risk of explosion. PROFIBUS-PA could be used to connect sensors and controllers to the bus.

- PROFIBUS-FMS（Fieldbus Message Specification: PROFIBUS-FMS is a multiple master communication system designed especially for cell-level communication, which supplies aperiodic or periodical middle-level rate of data transferring between controller and cell-level controller. PROFIBUS-FMS could supply a big amount of data transferring service. With strong mechanism and elasticity, PROFIBUS-FMS could meet wide application demand.

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2.2 PROFIBUS-DP general introduction

PROFIBUS DP is an international open field bus standard defined by standards as below…
- ➢ Europe field bus EN 50170 Part 2
- ➢ DIN19245 Part 1, 3
- ➢ IEC 61158

PROFIBUS-DP is the most suitable communication system for high speed, low time-consuming and low cost data transferring requirement in PROFIBUS communication protocol. Easy to operate, it could be applied to replace traditional expensive multiple distribution system with 24V in the application of automation manufacturing. In process automation applications, it could be used to replace original analog 4(0) ~ 20 mA system.

The length of transmission line should be chosen by transmit rate. PROFIBUS-DP's transmit rate ranges from 9.6kbps to 12Mkbps and its transmission distance ranges from 100m to 1,200m.

Baud Rate (bps)	9.6K	19.2K	93.75K	187.5K	500K	1.5M	12M
Length (m)	1200	1200	1200	1000	400	200	100

2.3 Version of PROFIBUS-DP Protocol
PROFIBUS DP-V0
DP-V0 is a basic communication protocol version with sole support to periodical data communication (MS0 communication). It is only facilitated with basic configuration, parameter defining and simple trouble shooting functions.
PROFIBUS DP-V1
DP-V1 is the extension of DP-V0, with aperodical communication (MS1 and MS2 communication) added. Besides, trouble shooting function is independent with state management (unconfirmed) and alarm management (confirmed).
PROFIBUS DP-V2
DP-V2 is the extension of DP-V0 and DP-V1，with the functions of synchronous data exchange function(IsoM). Besides, broadcasting message communication between sub-stations is available.

Chapter 3: Production introduction

To supply better and more integrated industrial automation system solution, ESTUN has developed a latest communication device-PROFIBUS-DP communication module.

3.1 Appearance.
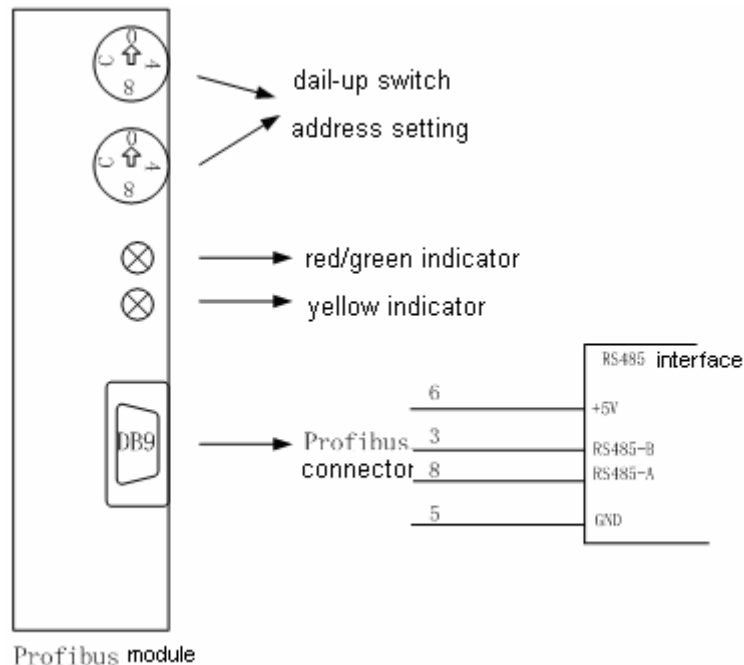
- There are two LED indicator in PROFIBUS-DP module. The two lights are used to indicate the communication states of PROFIBUS-DP module.

  ALM LED： Red/Green indicator，indicates the working state of PROFIBUS-DP.

  COMM LED： Yellow indicator, indicates the connection state between PROFIBUS-DP module and PROFIBUS-DP.

  Note: Please refer to the seventh chapter, Error indicating and trouble shooting for more instructions about LED indication.

- PROFIBUS-DP module supplies two rotatable address setting buttons to set the communication address in the PROFIBUS-DP network.

  The two buttons contain ADDH and ADDL. The former is used to set the 4 high bits and the latter is used to set the 4 low bits of the communication address.

  NOTE-> Please refer to the fifth Chapter, PROFIBUS-DP communication for further instruction of communication address setting button.

  DB9 (9-PIN connector), is a standard PROFIBUS-DP interface to connect PROFIBUS-DP network.

- PROFIBUS-DP module supports the communication transmission speed from 9.6kbaud to 12 Mbaud

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3.2 General information of DP100 module
3.2.1 General information

PROFIBUS-DP module is an internationally recognized open and standard field bus module. It is specified in EN 50170 of Europe field bus standard.

The optimized PROFIBUS-DP is applied to fast and time-consuming field data transmission. Field bus module is used to transmit periodical and non-periodical data between principal control module and responsive subordinate control module. It makes communication as below possible …

   ✧ Periodical communication- Transmission of processed real data(PZD communication)
      ➤ According to the functions of standard DP
         New cycling is started after the old cycling.
      ➤ Function of synchronization to clock circulating.
         As to clock synchronization operations, new cycling is started with TP clock's cycling.
   ✧ Non-periodical communication—access to the drive parameter
      When applying parameterized tool and initiating control software (Currently TwinCAT v2 of BACKHOFF), the Non-periodical communication is applied.

3.2.2 Principal control board and subordinate control board.
As to the PROFIBUS, there are differences between principal control board and subordinate control board.

- Master station(Positive bus station)

This device appears as the master station and also the sponsor of communication. - Subordinate station(Negative bus station)

This device is to receive and confirm information. Besides, when the master station assigns some mission to operate, this device will give order to complete the assignment.

3.2.3 Data transmission, baud rate
PROFIBUS DP100 module supports the data transmission through RS485 and it could detect the bus data transmission rate automatically after power on.

Baud rate as below is available …

9.6 K baud，19.2 K baud，93.75K baud，187.5K baud，500K baud，1.5M baud，3.0 M baud，6.0M baud，12M baud and so on.

3.2.4 Data transmission through PROFIBUS
Data is transferred between principal control module and subordinate control module according to the principle of Principle – subordinate. Because drive is always subordinate, data transmission is extremely fast. Besides, non-periodical communication function could be applied to handle the parameterization of periodical data transmission, diagnosis and process of faults or breakdown between drives.
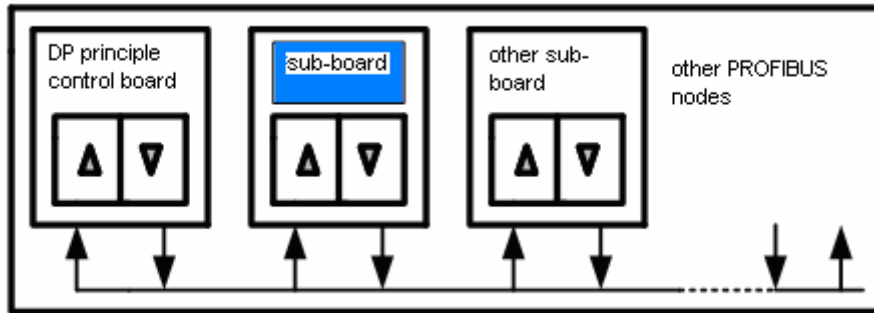
5-1 Data transmission though Profibus

3.2.5   The transmission of multi-words and double words.

All the transmit format of applied word and double words is Endian, that is, firstly high bits and then low bits. High bytes or bits are transmitted earlier and then low bytes or bits.

3.2.6   Features of DP100：

1)   According to different versions of host machines (DPV0,DPV1 and DPV2), the drive will configure the matching modes automatically. (PKW+PZD is available in DPV0. PZD and non-periodical parameter's access is available in DPV1. Profibus-MC is available in DPV2).
2)   Periodical data exchange (PZD) is through channel DPV0.
3)   The access of periodical and non-periodical parameter is available. Periodical parameter access is through DPV0 channel and non-periodical parameter access is through DPV1 channel.
4)   DPV2 is supportable. Through time synchronization, different servo drives could synchronically sample and control.
5)   Address could be randomly set in PROFIBUS-DP module and it will keep effective after power off, so data could be transmitted to any servo drives.

Chapter 4: Installation

Please make sure to power off the drive and keep the drive inactive at the process of installation or remove of PROFIBUS-DP module.

4.1 Installation of PROFIBUS-DP module.

Impropriate or incorrect installation will reduce the life cycle of products extremely.

● Module could only be plunged into the drive under the circumstance of drive power off.

● Power supply: The power supply of PROFIBUS-DP module is from the connected servo drive so no independent external power supply is required. Please apply standard communication cables to connect the servo drive with the PROFIBUS-DP module when wiring. When the servo drive is power on, the PROFIBUS-DP is activated simultaneously.

● When the servo drive is power on, the connected PROFIBUS-DP module could start to operate. The twinkling of ERR green LED indicates the PROFIBUS-DP module is working well.

4.2 PROFIBUS-DP interface (DB9)

One PROFIBUS-DP module supplies a 9-pin outlet (DB9) to connect the PROFIBUS-DP system.
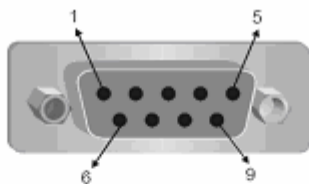
terminal No.	Name	Def./instruction
1	-	reserved
2	-	reserved
3	Rxd/TxD-P	receive/send data P (B)
4	-	reserved
5	DGND	(Data reference potential (C))
6	VP	positive voltage
7	-	reserved
8	RxD/TxD-N	receive/send data N (A)
9	-	reserved

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Chapter 5: Communication

Before you start the chapter, please make sure you have read the chapter 4 and understand how to install the PROFIBUS-DP module.

5.1 PROFIBUS communication address

● PROFIBUS-DP module supplies two rotatable address setting buttons to set the communication address in the PROFIBUS-DP network, which is also the only way to set its communication address. The two buttons contain ADDH and ADDL. The former is used to set the higher 4 bits and the latter is used to set the lower 4 bits of the hex communication address.

Address	Meaning
1..0x7D	Effective PROFIBUS communication adds.
0 0r 0x7E..0xFF	Ineffective PROFIBUS communication adds

NOTE->When the address is changed, the new address will be effective only after the reactivate of PROFIBUS-DP module by power off and then on. When PROFIBUS-DP module is in operation, changing address won't be effective.

5.2   Basic function of DPV0 Periodical data transmission

One servo drive needs information including parameters and process data to control the process. Parameters belong to non-periodical data to transmit command and drive configuration. Process data is non-periodical data to control servo drive.

If Profibus communication is limited to DPV0, then just periodical data could be transmitted as the format as below …

PKW	PZD

PKW, as the special data area to transmit non-periodical data, is used to configure the parameters of the servo drive. It could read data from the drive or write data into the drive. PZD data area is used to transmit periodical data like output of control word, objective position and objective speed or feedback of status word, position of the motor's shaft, speed of the motor.

The format of PKW message is as below：

PKW								
PKW number（byte）	1	2	3	4	5	6	7	8
	PKE		IND		PWE			

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The format of PKE message is as below：

	PKE															
bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	AK				SPM	PNU										

AK's mission ID：

Master station ——〉 Subordinate station		Subordinate station ——〉 Master station	
Mission ID	Function	Positive response ID	Negative response ID
0	No mission	0	0
1	Apply to read the parameters	1，2	7
2	Revise parameter(one word)	1	7
3	Revise parameter(double words)	2	7

AK's response ID instruction：

0	No duty
1	Transmit parameter（one word）
2	Transmit parameter（double words）
7	No response to the mission

Message format of IND：

	IND															
bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	IND								Reserved							

SPM is not considered.

PNU is parameter No.

IND is temporarily reserved.

DP100 supports the standard message 3 of speed control mode defined in PROFIdrive Profile v3.2.1

The message format of PZD is as below …

PZD number	1	2	3	4	5				
Setpoint	STW1	NSOLL_B		STW2	G1_STW				
PZD number	1	2	3	4	5	6	7	8	9
Actual value	ZSW1	NIST_B		ZSW2	G1_ZSW	G1_XIST1		G1_XIST2	

Signal No.	Significance	Abbreviation	Length 16-/32 bit	Sign
1	Control word1	STW1	16	
2	Status word1	ZSW1	16	
3	Control word2	STW2	16	
4	Status word2	ZSW2	16	
5	Speed setpoint B	NSOLL_B	32	with
6	Speed actual value B	NIST_B	32	with
7	Sensor 1 control word	G1_STW	16	
8	Sensor 1 status word	G1_ZSW	16	
9	Sensor 1 position actual value1	G1_XIST1	32	
10	Sensor 1 position actual value2	G1_XIST2	32	

5.3   Basic function of DPV1 non-periodical data transmission

The access to non-periodical parameters could be through DPV1 parameter channel according to the definition in the protocol of PROFI drive Profile. But it is not compatible to PKW (NO.of Parameters=1)and doesn't support parameter array.

Parameter reading could be achieved through parameterized tool by inputting parameter number directly.

Parameter writing could be achieved through parameterized tool by inputting the parameter number and parameter value.

5.2.1   DPV1 parameter message

DPV1 parameter message below is used to transmit a request of parameter and its response.

1)   Write the request to transmit parameters by DPV1

DPV1 Write Header	Function_Num=0x5F(write)	Slot Num = 0
	Index=47	Length = (data)
DPV1 data(Length)	Parameter Request…	
	…	

2)   Write the response to the request of transmitting the parameters by DPV1.

DPV1 Write Header	Function_Num=0x5F(write)	Slot Num = (mirrored)
	Index=（mirrored）	Length = (mirrored)

3)   Read the response to the request of transmitting the parameters by DPV1.

DPV1 Write Header	Function_Num=0x5E(read)	Slot Num = 0
	Index=47	Length = MAX

4)   Read the request to transmit parameters by DPV1

DPV1 Write Header	Function_Num=0x5E(read)	Slot Num = （mirrored）
	Index=（mirrored）	Length = (data)
DPV1 data(Length)	Parameter Response…	
	…	

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5.2.2 Parameter request and response.

1) Parameter request

Request Header	Request Reference	Request ID
	Axis-No./DO-ID	No.of Parameters=n
1st Parameter Address	Attribute	No.of Elements
	Parameter Number(PNU)	
	Subindex	
nth Parameter Address	…	
1st Parameter Value(s)（only for request "modify"）	Format	No.of Values
	Values	
	…	
nth Parameter Value(s)	…	

Note：For the software version of 0.03， NO.of Parameter=1，No.of Elements=1 and Subindex=0 are supported.

2) Parameter response

Response Header	Request Reference.mirrored	Response ID
	Axis-No./DO-ID mirrored	No.of Parameters=n
1st Parameter Values	Format	No.of Values
	Values or Error Values	
	…	
nth Parameter Value(s)	…	

3) Explain of different areas in parameter request message and parameter response message.

Area	Data format	Value		Description
Request Reference	Unsigned8	0x00 0x01..0xFF	reserved	
Request ID	Unsigned8	**0x01** **0x02**	**Request parameter** **Change parameter**	
Response ID	Unsigned8	**0x01** **0x02** **0x81**	**Request parameter(+)** **Change parameter(+)** **Request parameter(-)**	

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		0x82 Change parameter(-)	
Axis/DO-ID	Unsigned8	0x00 device representative **0x01..0xFE DO-ID-Number** 0xFF reserved	
NO.of Parameters	Unsigned8	0x00 reserved **0x01..0x27 Quantity 1..39** 0x28..0xFF reserved	Version 0.03 No.of Parameters=1
Attribute	Unsigned8	0x00 reserved **0x10 Value**	
No.of Elements	Unsigned8	**0x01..0xEA Quantity 1..234**	Version 0.03 No.of Elements =1
Parameter Number	Unsigned16	0x0000 reserved **0x0001...0xFFFF Number 1.. 655350**	Refer to the parameter table
Subindex	Unsigned16	**0x0000...0xFFFF Number 0.. 655350**	0 in version 0.03
Format	Unsigned8	**0x41 Byte** **0x42 Word**	
No.of Values	Unsigned8	**0x00..0xEA Quantity 0..234** 0xEB..0xFF reserved	The value is limited to the length of DPV1 message. Maximum 4 bytes in version 0.03,that is：4 when Format=0x41 And 2 for Format=0x42

5.3   Basic function of periodical data transmission

PROFIBUS-DP module could be controlled by periodical data exchange channel to control the servo drive.

DP100 could support the standard message 3 of speed control mode defined in PROFIdrive Profile v3.2.1.

PZD number	1	2	3	4	5				
Setpoint	STW1	NSOLL_B		STW2	G1_STW				
PZD number	1	2	3	4	5	6	7	8	9
Actual value	ZSW1	NIST_B		ZSW2	G1_ZSW	G1_XIST1		G1_XIST2	

Signal No.	Significance	Abbreviation	Length 16-/32 bit	Sign
1	Control word1	STW1	16	
2	Status word1	ZSW1	16	
3	Control word2	STW2	16	

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4	Status word2	ZSW2	16	
5	Speed setpoint B	NSOLL_B	32	with
6	Speed actual value B	NIST_B	32	with
7	Sensor 1 control word	G1_STW	16	
8	Sensor 1 status word	G1_ZSW	16	
9	Sensor 1 position actual value1	G1_XIST1	32	
10	Sensor 1 position actual value2	G1_XIST2	32	

5.4 Control word and status word of speed control mode.

Bit assignments of the control word and status word supported by ESTUN PROFIBUS-DP module.

● **Control word STW1**

（Control word，data is from Profibus-DP master board to Estun ProNET series DP100 subordinate boards. ）

Bit	Significance
0	On/OFF
1	No Coast Stop/Coast Stop
2	No Quick Stop/Quick Stop
3	Enable operation/Disable operation
4	Enable Ramp Generator / Reset Ramp Generator
5	Unfreeze Ramp Generator /Freeze Ramp Generator
6	Enable Setpoint / Disable Setpoint
7	Fault Acknowledge (0 -> 1)
8	Jog 1 ON / Jog 1 OFF
9-15	Reserved

● **Control word STW2**

（Control word，data is from Profibus-DP master board to Estun ProNET series DP100 subordinate board. ）

Bit	Significance
0-11	Reserved
12-15	Master Sign-of-Life

● **Status word ZSW1**

（Status word，data is from Estun ProNET series DP100 subordinate board to Profibus-DP master board）

Bit	Significance
0	Ready To Switch On /Not Ready To Switch On
1	Ready To Operate / Not Ready To Operate
2	Operation Enabled (drive follows setpoint) / Operation Disabled
3	Fault Present / No Fault

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4	**Coast Stop Not Activated / Coast Stop Activated**
5	**Quick Stop Not Activated / Quick Stop Activated**
6	**Switching On Inhibited / Switching On Not Inhibited**
7	**Warning Present / No Warning**
8	**Speed Error Within Tolerance Range /** **Speed Error Out Of Tolerance Range**
9	**Control Requested / No Control Requested**
10	**f Or n Reached Or Exceeded /f Or n Not Reached**
11-15	Reserved

- **Status word ZSW2**

（Status word，data is from Estun ProNET series DP100 subordinate board to Profibus-DP master board）

Bit	Significance
0-11	Reserved
12-15	Master Sign-of-Life

5.5   Synchronization

- **Periodical mode**
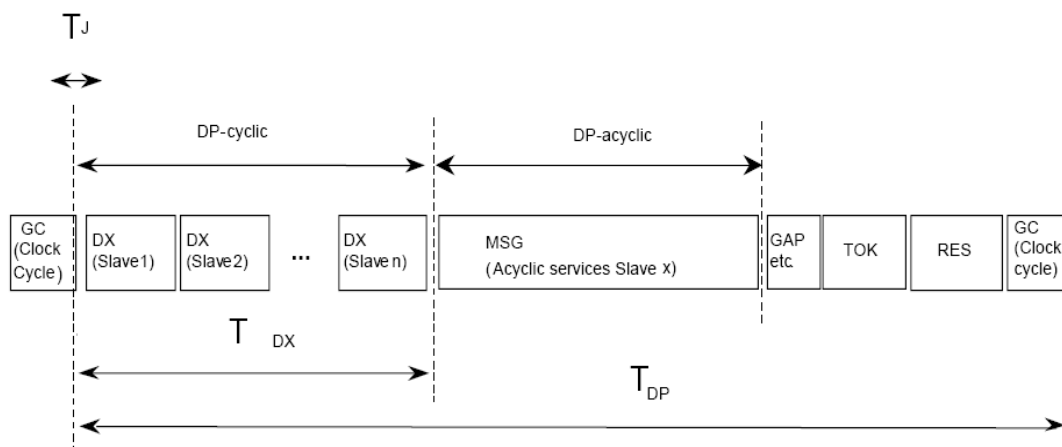
T_{DP}：Bus period

- At the synchronization mode, time between two neighboring GC (global command) should be identical to each other. All the subordinate boards could receive GC to achieve the precise synchronized control of the servo drives.

5.6   Note for communication

When Profibus-DPV0、Profibus-DPV1 are used to communicate, the parameter Pn006.0 should be set as 1 in ProNet servo drive. When Profibus-DPV2 is used, Pn006.0 should be set as 2.

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Chapter 6：The introduction of GSD file and parameter setting

GSD file, as one kind of character file, is applied to detect PROFIBUS-DP devices (master station or subordinate station). It contains all necessary information for configuring a DP subordinate station in a standard DP master station. GSD file basically contains vendor profiles, supportable communication speed, timing information, supportable features and accessories, available I/O information. GSD file is the basic structure for the master station's parameter record.

```
；****** GSD-Datei for VPC3   application *************************************
；* Vendor:    ESTUN
；* Function: for Estun ProNet
；*history
；*2008.08.12[V2.00] Version
#Profibus_DP


.*********************************************************************************
;
;General DP Keywords
.*********************************************************************************
;

GSD_Revision = 5
Vendor_Name = "ESTUN"
Model_Name = "ESTUNV2"
Revision = "2.00"
Ident_Number = 0xAFFE
Protocol_Ident = 0
Station_Type = 0
FMS_supp = 0
Hardware_Release = "V1.00"
Software_Release = "V1.00"
Redundancy = 0
Repeater_Ctrl_Sig = 2
24V_Pins = 0



.*********************************************************************************
;
; Supported   baudrates
.*********************************************************************************
;

9.6_supp = 1
```

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```
19.2_supp = 1
45.45_supp = 1
93.75_supp = 1
187.5_supp = 1
500_supp = 1
1.5M_supp = 1
3M_supp = 1
6M_supp = 1
12M_supp = 1

MaxTsdr_9.6=15
MaxTsdr_19.2=15
MaxTsdr_45.45=15
MaxTsdr_93.75=15
MaxTsdr_187.5=15
MaxTsdr_500=15
MaxTsdr_1.5M=20
MaxTsdr_3M=35
MaxTsdr_6M=50
MaxTsdr_12M=95



;*********************************************************************************************
;Slave specific values
;*********************************************************************************************

;OrderNumber="PA006300, PA7062"
Slave_Family = 0@VPC3+
Implementation_Type = "VPC3+C"
Info_Text="ESTUN: ProNet_EDB-50AM servo drive PROFIBUS-DPV2"

Freeze_Mode_supp=1
Sync_Mode_supp=1
Fail_Safe=1
Auto_Baud_supp=1
Set_Slave_Add_supp=0

Min_Slave_Intervall=1

Modular_Station=1
Max_Module=1
Modul_Offset=1
Max_Input_Len=26
Max_Output_Len=18
```

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Max_Data_Len=44
Max_Diag_Data_Len=6

```
.*********************************************************************************************
;
; User-Prm-Data
.*********************************************************************************************
;

Max_User_Prm_Data_Len = 31
Ext_User_Prm_Data_Const(0)= 0x00,0x00,0x00


.*********************************************************************************************
;
;Module-Definition-List
.*********************************************************************************************
;

Module="PKW + PZD " 0xC1,0xC8,0xCC,0x01
1
;Ext_Module_Prm_Data_Len=9
;Ext_User_Prm_Data_Const(0)=0x09,0x01,0x00,0x00,0x01,0xFF,0xFF,0x00,0x00
EndModule


;Module="PZD " 0xC1,0xC4,0xC8,0x02
;Ext_Module_Prm_Data_Len=9
;Ext_User_Prm_Data_Const(0)=0x00,0x01,0x00,0x00,0x01,0xFF,0xFF,0x00,0x00
;2
;EndModule
.*********************************************************************************************
;
;DPV1 KEY WORDS
.*********************************************************************************************
;

DPV1_Slave                = 1
C1_Read_Write_supp        = 1
C2_Read_Write_supp        = 1
C1_Max_Data_Len           = 240
C2_Max_Data_Len           = 240
C1_Response_Timeout       = 300
C2_Response_Timeout       = 300
C1_Read_Write_required    = 0
C2_Read_Write_required    = 0
C2_Max_Count_Channels     = 3
Max_Initiate_PDU_Length   = 52
DPV1_Data_Types           = 0
WD_Base_1ms_supp          = 1
Check_Cfg_Mode            = 0
```

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Publisher_supp   = 1

Diagnostic_Alarm_supp   = 0
Process_Alarm_supp   = 0
Alarm_Type_Mode_supp   = 0

;Ident_Maintenance_supp   = 1   ;I&M fuctions supported

;**
;
Prm_Block_Structure_supp = 1
Prm_Block_Structure_req   = 0
; isochronous mode
Isochron_Mode_supp   = 1
Isochron_Mode_required   = 0
TBASE_DP   = 1500   ; * 1/12 us   =   125 us
TDP_MIN   = 8   ; * TBASE_DP   = 1000 us
TDP_MAX   = 256   ; * TBASE_DP
T_PLL_W_MAX   = 12   ; * 1/12 us   =   1 us
TBASE_IO   = 1500   ; * 1/12 us   =   125 us
TI_MIN   = 1   ; * TBASE_IO
TO_MIN   = 1   ; * TBASE_IO

Chapter 7：LED instruction and troubleshooting

7.1　LED instruction

There are two LEDs, ALM LED and COMM LED in Profibus-DP module to indicate the status of PROFIBUS-DP module.

It will be reset after power off and then power on. Yellow and red lights will flash simultaneously.

- COMM LED

COMM status	ALM status	Function description	Solution
Dark	Dark	Module out of work	1. power off to check connection between the drive and the module 　2. Power off again and reactivate
Yellow light flashes	Red light flashes and then turns into green	Module reactivated	
Yellow light is dark	Random	Out of access to PROFIBUS	1.check the network connection 　2.check if PROFIBUS master station is operating normally. 　3. check the address button 　4. Power off and reactivate
Yellow light flashes	Random	PROFIBUS Communication operates normally	Profibus data is exchanging normally
Random	Red light is on	RAM error	1.Reset 2.Repair
Random	Red light flashes	DPRAM data exchange error	1. Check if the power supply is OK. 　2. check connection between the drive and the module 　3. Power off again and reactivate
Random	Green light flashes	DPRAM data exchanges normally.	Communication operates normally.

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Chapter 8：Parameter mode/Object dictionary

Every parameter could be considered as a variable. Parameter could be seen as the name in PROFIBUS system, which is the same as the definition of the object in CANopen or other system. There is a description list about the parameters in the drive to configure and process the parameter. Chapters below will include the information of these parameters and brief introduction of their structure.

Exchange information in PROFIBUS PZD standard message is called signal. They are as same as parameters. Only a few of parameters could be transmitted periodically. They are listed in the signal list. You could refer to this list for more information about the parameters. Detailed information of one parameters contains …

   Identical parameter number.（PNU）

   Value of the parameter（PWE）

   Description（PBE）

   Optional: backup information.

All the parameters are organized in a parameter list and each parameter obtains an identical parameter number which is called PNU.

PNU range	Description
0 ~ 686	Parameter for servo drive(Please refer to servo drive user 's manual for detailed information)
687 ~ 899	Parameter for servo drive(Reserved)
900 ~ 999	General parameter supplied by servo drive manufacturer
1000 ~ 59999	Parameter for servo drive(for extended use)
60000 ~ 65535	General parameter supplied by servo drive manufacturer(for extended use and reserved currently)

Parameter could be a simple variable(sole variable) or complex variable(variable array). When the variable array is used, the array member variable uses index to identify itself.

8.1 Parameter structure

Please refer to parameter description chapter for the total parameter list

Pn1400 – control word   -> PNU Number and description

     Unit: -   -> The unit of the parameter

     Read/Write type: R/W   -> R/W means Read/Write and RO means read only

     Data type: Uint16   -> Please refer to the data type part as below

     Range of value: 0x0 ... 0xFFFF -> lower limit and upper limit

     Defalut value: 0x0   -> default value

     If effective after power off:yes   ->whether or not the power should be shutdown and then on to activate the revised parameter.

8.2 Datatype

All the data types used in the drives are as below …

Data type	Brief description	range
Bit	Binary parameter	0000Bit … 1111Bit
Hex	Hex parameter	0000Hex … FFFFHex
Int16	Signed hex parameter	-32768 … +32767
Uint16	Unsigned hex parameter	0 … 65535
Int32	Signed 32-bit parameter	-2147483648 …+2147483647
Uint32	Signed 32-bit parameter	0 … 4294967295

8.3 Parameter objective dictionary

List below shows all the parameters used in our servo drive. Please refer to chapter nine Parameter descriptions.

PNU	Description	Unit	Read/Write type	Data type	Range of value	Default
0		-	R/W	Bit	0000 ~ 1111	0
∘∘∘	Please refer to the user's	-	R/W	∘∘∘	∘∘∘	∘∘∘
4	manual or parameter	-	R/W	Hex	0x0000~0x3435	0x0000
∘∘∘	descriptions.	-	R/W	∘∘∘	∘∘∘	∘∘∘
686		rpm	R/W	Uint16	0 ~ 6000	30
687 ~ 910	Reserved					
911	PPO type，3 for our drive	-	RO	Uint32	-	3
912 ~ 917	Reserved					
918	Servo drive axis address	-	RO	Uint32	0 ~ 126	-
919 ~ 962	Reserved					
963	Communicate baud rate	-	RO	Uint32	-	-
964 ~ 1009	Reserved					
1010	present speed reference	0.1rpm	R/W	Int32	-30000 ~ 30000	0
1011	actual speed of servo motor	0.1rpm	RO	Int32	-30000 ~ 30000	0
1012 ~ 1399	Reserved					
1400	STW1	-	R/W	Uint16	0x0 ~ 0xFFFF	0
1401 ~ 1402	Reserved					
1403	ZSW1	-	RO	Uint16	0x0 ~ 0xFFFF	0
1404 ~ 1405	Reserved					
1406	Encoder feedback	1 pulse	RO	Uint32	0 ~ 0xFFFFFFFF	0
1407 ~ 1599	Reserved					
1600	Present input signal	-	R/W	Uint16	0x0 ~ 0x00FF	0
1601	Torque of the motor	0.1Nm	RO	Int16		0
1602 ~ 65535	Remain Unused					

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Chapter 9： Parameter description

PNU	Description	unit	Read/Write	Data type	Range of value	Default	Effective after reboot
Pn000	Pn000.0: parameter servo ON [0] Outside S-ON valid [1] Outside S-ON invalid, motor excitation signal turned on automatically after S-RDY output Pn000.1 Forward direction input prohibited [0] Outside P-OT valid, it moves according to the Pn004.0 setting time sequence when it reaches the travel limit. [1] Outside P-PT invalid. Pn000.2 Reversed direction input prohibited [0] Outside N-OT valid, it moves according to the Pn004.0 setting time sequence when it reach the travel limit. [1] Outside P-PT invalid. Pn000.3 Momentary power off alarm output [0] No alarm in one momentary power off circle [1] Alarm in one momentary power off circle.	-	R/W	Bit	0000 ~ 1111	0	**yes**
PNU	**Description**	**unit**	Read/Write	**Data type**	**Range of value**	**Default**	**Effective after reboot**
Pn101	Load rigid selection	-	R/W	Uint16	0 ~ 15	5	No
Pn102	Speed loop gain	Hz	R/W	Uint16	1 ~ 2500	160	No
Pn103	Speed loop integral time	0.1ms	R/W	Uint16	1 ~ 4096	200	No

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PNU	Description	unit	Read/Write	Data type	Range of value	Default	Effective after reboot
Pn104	position loop gain	Hz	R/W	Uint16	0 ~ 1000	40	No
Pn105	Torque instruction filter constant	0.1ms	R/W	Uint16	0 ~ 250	4	No
Pn106	Load inertia percentage	-	R/W	Uint16	0 ~ 20000	0	No
Pn107	The second speed loop gain	Hz	R/W	Uint16	1 ~ 2500	16	No
Pn108	The second speed loop integral time constant	0.1ms	R/W	Uint16	1 ~ 4096	20	No
Pn109	The second loop gain	Hz	R/W	Uint16	0 ~ 1000	40	No
Pn110	The second torque instruction filter constant	0.1ms	R/W	Uint16	0 ~ 250	150	No
Pn111	Speed offset	rpm	R/W	Uint16	0 ~ 300	0	No
Pn112	Feed forward	%	R/W	Uint16	0 ~ 100	0	No
Pn113	Feed forward filtering	0.1ms	R/W	Uint16	0 ~ 640	0	No
Pn114	Torque feed forward	%	R/W	Uint16	0 ~ 100	0	No
Pn115	Torque feed forward filtering	0.1ms	R/W	Uint16	0 ~ 640	0	No
Pn116	P/PI switch conditions 0: torque instruction percentage 1: offset counter value 2: setting acceleration value 3: setting speed value 4: fixed PI	-	R/W	Uint16	0 ~ 4	0	**Yes**
Pn117	Torque switch threshold	-	R/W	Uint16	0 ~ 300	200	No
Pn119	Setting acceleration switch threshold	10rpm/s	R/W	Uint16	0 ~ 10000	0	No
Pn120	Setting speed switch threshold	rpm	R/W	Uint16	0 ~ 3000	0	No
Pn122	switch delay time	0.1ms	R/W	Uint16	0 ~ 20000	0	No
Pn123	Switch threshold level	-	R/W	Uint16	0 ~ 20000	0	No
Pn124	Speed gain integral switch time	0.1ms	R/W	Uint16	0 ~ 20000	0	No
Pn125	Position gain switch time	0.1ms	R/W	Uint16	0 ~ 20000	0	No
Pn126	Hysterics switch	-	R/W	Uint16	0 ~ 20000	0	No
PNU	**Description**	**unit**	**Read/Write**	**Data type**	**Range of value**	**Default**	**Effective after reboot**

PNU	Description	unit	Read/Write	Data type	Range of value	Default	Effective after reboot
Pn128	Real time adjustment speed gain increase relationship 0 = Kv : Kp-->1 1 = Kv : Kp-->2 2 = Kv : Kp-->3 3 = Kv : Kp-->4	-	R/W	Uint16	0 ~ 3	3	No
Pn129	Low speed verifying constant	-	R/W	Uint16	0 ~ 30000	0	No
Pn200	PG frequency division	Puls	R/W	Uint16	16 ~ 16384	16384	yes
Pn201	The first electrical gear numerator	-	R/W	Uint16	1 ~ 65535	1	yes
Pn202	Electrical gear denominator	-	R/W	Uint16	1 ~ 65535	1	yes
Pn203	The second electrical gear numerator	-	R/W	Uint16	1 ~ 65535	1	yes
Pn204	Position instruction filtering time constant	0.1ms	R/W	Uint16	0 ~ 32767	0	No
Pn205	Selection of position instruction filtering mode	-	R/W	Uint16	0 ~ 1	0	yes
Pn300	Speed instruction input gain	rpm/v	R/W	Uint16	0 ~ 3000	150	No
Pn301	Inside speed 1	rpm	R/W	Uint16	0 ~ 6000	100	No
Pn302	Inside speed 2	rpm	R/W	Uint16	0 ~ 6000	200	No
Pn303	Inside speed 3	rpm	R/W	Uint16	0 ~ 6000	300	No
Pn304	Parameter speed	rpm	R/W	Uint16	0 ~ 6000	300	No
Pn305	JOG speed	rpm	R/W	Uint16	0 ~ 6000	300	No
Pn306	Soft reset acceleration time	ms	R/W	Uint16	0 ~ 3000	0	No
Pn307	Soft reset deceleration time	ms	R/W	Uint16	0 ~ 3000	0	No
Pn308	Speed filtering time constant	ms	R/W	Uint16	0 ~ 3000	0	No
Pn309	S curve rising time	ms	R/W	Uint16	0 ~ 3000	0	No
Pn311	Selection of S shape	-	R/W	Uint16	0 ~ 2	0	No
Pn400	Torque instruction gain	0.1V/100%	R/W	Uint16	33~100	33	No
Pn401	forward rotation torque inside limit	%	R/W	Uint16	0~300	300	No

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PNU	Description	unit	Read/Write	Data type	Range of value	Default	Effective after reboot
Pn403	Forward rotation outside torque limit	%	R/W	Uint16	0~300	100	No
Pn404	Backward outside torque limit	%	R/W	Uint16	0~300	100	No
Pn405	Plug braking torque limit	%	R/W	Uint16	0~300	300	No
Pn406	Torque control speed limit	rpm	R/W	Uint16	0~6000	1500	No
Pn500	Position error	Puls	R/W	Uint16	0~5000	10	No
Pn501	Same speed error	rpm	R/W	Uint16	0~100	10	No
Pn502	Zero clamping rotating speed	rpm	R/W	Uint16	0~3000	10	No
Pn503	Rotation inspection speed TGON	rpm	R/W	Uint16	0~3000	20	No
Pn504	Offset counter overflow alarm	256Puls	R/W	Uint16	1~32767	1024	No
Pn505	Servo-on waiting time	ms	R/W	Uint16	0~2000	200	No
Pn506	Basic waiting course	10ms	R/W	Uint16	0~500	0	No
Pn507	Braking waiting speed	rpm	R/W	Uint16	10~100	10	No
Pn508	Braking waiting time	10ms	R/W	Uint16	10~100	10	No
Pn509	Match the port to hex signals. Every 4 bit for one port	-	R/W	Hex	0~0x9999	0x3210	No
Pn510	Match the port to hex signals. Every 4 bit for one port	-	R/W	Hex	0~0x9999	0x7654	No
Pn511	Input signal allocation hex00:1CN78 hex01:1CN12 hex02:1CN56 [0:COIN,1:TGON, 2:S-RDY,3:CLT,4:BRK]	-	R/W	Hex	0~0x0444	0x0210	No
Pn512	Bus_io_LEn	-	R/W	Bit	0000~1111	0	No
Pn513	Bus_io_HEn	-	R/W	Bit	0000~1111	0	No
Pn515	Internal signal filtering	0.2ms	R/W	Uint16	0 ~ 3	1	No
Pn516	negate the input port singal	-	R/W	Uint16	0000~1111	0	No
Pn517	negate the input port signal	-	R/W	Uint16	0000~1111	0	No
Pn518	DB time	ms	R/W	Uint16	50 ~ 2000	125	No
PNU	Description	unit	Read/Write	Data type	Range of value	Default	Effective after reboot

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PNU	Description	unit	Read/Write	Data type	Range of value	Default	Effective after reboot
Pn600	Demonstrated position pulse	10000P	R/W	Int16	-9999~9999	0	No
Pn601	Demonstrated position pulse	1P	R/W	Int16	-9999~9999	0	No
Pn602	position control position pulse	10000P	R/W	Int16	-9999~9999	0	No
Pn603	position control position pulse	1P	R/W	Int16	-9999~9999	0	No
Pn605	position control position pulse	1P	R/W	Int16	-9999~9999	0	No
Pn606	position control position pulse	10000P	R/W	Int16	-9999~9999	0	No
Pn607	position control position pulse	1P	R/W	Int16	-9999~9999	0	No
Pn608	position control position pulse	10000P	R/W	Int16	-9999~9999	0	No
Pn609	position control position pulse	1P	R/W	Int16	-9999~9999	0	No
Pn610	position control position pulse	10000P	R/W	Int16	-9999~9999	0	No
Pn611	position control position pulse	1P	R/W	Int16	-9999~9999	0	No
Pn612	position control position pulse	10000P	R/W	Int16	-9999~9999	0	No
Pn613	position control position pulse	1P	R/W	Int16	-9999~9999	0	No
Pn614	position control position pulse	10000P	R/W	Int16	-9999~9999	0	No
Pn615	position control position pulse	1P	R/W	Int16	-9999~9999	0	No
Pn616	position control position pulse	10000P	R/W	Int16	-9999~9999	0	No
Pn618	position control position pulse	10000P	R/W	Int16	-9999~9999	0	No
Pn619	position control position pulse	1P	R/W	Int16	-9999~9999	0	No
Pn620	position control position pulse	10000P	R/W	Int16	-9999~9999	0	No
Pn621	position control position pulse	1P	R/W	Int16	-9999~9999	0	No
PNU	**Description**	**unit**	**Read/Write**	**Data type**	**Range of value**	**Default**	**Effective after reboot**

PNU	Description	unit	Read/Write	Data type	Range of value	Default	Effective after reboot
Pn623	position control position pulse	1P	R/W	Int16	-9999~9999	0	No
Pn624	position control position pulse	10000P	R/W	Int16	-9999~9999	0	No
Pn625	position control position pulse	1P	R/W	Int16	-9999~9999	0	No
Pn626	position control position pulse	10000P	R/W	Int16	-9999~9999	0	No
Pn627	position control position pulse	1P	R/W	Int16	-9999~9999	0	No
Pn628	position control position pulse	10000P	R/W	Int16	-9999~9999	0	No
Pn629	position control position pulse	1P	R/W	Int16	-9999~9999	0	No
Pn630	position control position pulse	10000P	R/W	Int16	-9999~9999	0	No
Pn631	position control position pulse	1P	R/W	Int16	-9999~9999	0	No
Pn632	position speed control	rpm	R/W	Uint16	0 ~ 6000	500	No
Pn633	position speed control	rpm	R/W	Uint16	0 ~ 6000	500	No
Pn634	position speed control	rpm	R/W	Uint16	0 ~ 6000	500	No
Pn635	position speed control	rpm	R/W	Uint16	0 ~ 6000	500	No
Pn636	position speed control	rpm	R/W	Uint16	0 ~ 6000	500	No
Pn637	position speed control	rpm	R/W	Uint16	0 ~ 6000	500	No
Pn638	position speed control	rpm	R/W	Uint16	0 ~ 6000	500	No
Pn639	position speed control	rpm	R/W	Uint16	0 ~ 6000	500	No
Pn640	position speed control	rpm	R/W	Uint16	0 ~ 6000	500	No
Pn641	position speed control	rpm	R/W	Uint16	0 ~ 6000	500	No
Pn642	position speed control	rpm	R/W	Uint16	0 ~ 6000	500	No
Pn643	position speed control	rpm	R/W	Uint16	0 ~ 6000	500	No
Pn646	position speed control	rpm	R/W	Uint16	0 ~ 6000	500	No
Pn647	position speed control	rpm	R/W	Uint16	0 ~ 6000	500	No
Pn648	point position once filtering	0.1ms	R/W	Uint16	0 ~ 32767	0	No
Pn649	point position once filtering	0.1ms	R/W	Uint16	0 ~ 32767	0	No
Pn650	point position once filtering	0.1ms	R/W	Uint16	0 ~ 32767	0	No
Pn651	point position once filtering	0.1ms	R/W	Uint16	0 ~ 32767	0	No
PNU	**Description**	**unit**	**Read/Write**	**Data type**	**Range of value**	**Default**	**Effective after reboot**

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PNU	Description	unit	Read/Write	Data type	Range of value	Default	Effective after reboot
Pn653	point position once filtering	0.1ms	R/W	Uint16	0 ~ 32767	0	No
Pn654	point position once filtering	0.1ms	R/W	Uint16	0 ~ 32767	0	No
Pn655	point position once filtering	0.1ms	R/W	Uint16	0 ~ 32767	0	No
Pn656	point position once filtering	0.1ms	R/W	Uint16	0 ~ 32767	0	No
Pn657	point position once filtering	0.1ms	R/W	Uint16	0 ~ 32767	0	No
Pn658	point position once filtering	0.1ms	R/W	Uint16	0 ~ 32767	0	No
Pn659	point position once filtering	0.1ms	R/W	Uint16	0 ~ 32767	0	No
Pn660	point position once filtering	0.1ms	R/W	Uint16	0 ~ 32767	0	No
Pn661	point position once filtering	0.1ms	R/W	Uint16	0 ~ 32767	0	No
Pn662	point position once filtering	0.1ms	R/W	Uint16	0 ~ 32767	0	No
Pn663	point position once filtering	0.1ms	R/W	Uint16	0 ~ 32767	0	No
Pn664	position stop time	50ms	R/W	Uint16	0 ~ 300	10	No
Pn665	position stop time	50ms	R/W	Uint16	0 ~ 300	10	No
Pn666	position stop time	50ms	R/W	Uint16	0 ~ 300	10	No
Pn667	position stop time	50ms	R/W	Uint16	0 ~ 300	10	No
Pn668	position stop time	50ms	R/W	Uint16	0 ~ 300	10	No
Pn669	position stop time	50ms	R/W	Uint16	0 ~ 300	10	No
Pn671	position stop time	50ms	R/W	Uint16	0 ~ 300	10	No
Pn672	position stop time	50ms	R/W	Uint16	0 ~ 300	10	No
Pn673	position stop time	50ms	R/W	Uint16	0 ~ 300	10	No
Pn674	position stop time	50ms	R/W	Uint16	0 ~ 300	10	No
Pn675	position stop time	50ms	R/W	Uint16	0 ~ 300	10	No
Pn676	position stop time	50ms	R/W	Uint16	0 ~ 300	10	No
Pn677	position stop time	50ms	R/W	Uint16	0 ~ 300	10	No
Pn678	position stop time	50ms	R/W	Uint16	0 ~ 300	10	No
Pn679	position stop time	50ms	R/W	Uint16	0 ~ 300	10	No
Pn680	Select single/Cycle, start/reference point	-	R/W	Uint16	0 ~ 3	0	No
PNU	**Description**	**unit**	**Read/Write**	**Data type**	**Range of value**	**Default**	**Effective after reboot**
Pn682	Programming method	-	R/W	Uint16	0 ~ 1	0	No

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Pn683	programming start step	-	R/W	Uint16	0 ~ 15	0	No
Pn684	programming stop step	-	R/W	Uint16	0 ~ 15	1	No
Pn685	Search travel speed	rpm	R/W	Uint16	0 ~ 3000	1500	No
Pn901	Soft version of module board	-	RO	Uint16	-		No
Pn911	PPO type，3 for our servo drive	-	RO	Uint16	-	3	No
Pn918	axis address of servo drive	-	RO	Uint16	-	-	No
Pn963	Communication baud rate	-	RO	Uint16	-		No
Pn1010	present speed reference	0.1rpm	R/W	Int32	-30000 ~ 30000	0	No
Pn1011	actual motor speed	0.1rpm	RO	Int32	-30000 ~ 30000	0	No
Pn1400	Control word STW1	-	R/W	Uint16	0x0 ~ 0xFFFF	0	No
Pn1403	Control word ZSW1	-	RO	Uint16	0x0 ~ 0xFFFF	0	No
Pn1406	Encoder feedback	1pulse	RO	Uint32	0 ~ 0xFFFFFFFF	0	No
Pn1600	Present input signal	-	R/W	Uint16	0x0 ~ 0x00FF	0	No
Pn1601	Motor torque	0.1Nm	RO	Int16		0	No

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