

# **HEDY**

## **HDOM-Profibus-V0**

***User Manual***

**(V1.0)**

**HEDY Industry Automation Control Co., Ltd.**

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# 1 Introduction

## 1.1 Product description

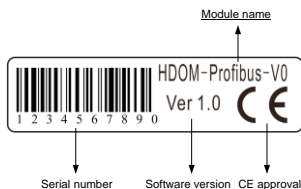
PROFIBUS-DP (Decentralized Peripherals) is used to operate sensors and actuators via a centralized controller in production (factory) automation applications.

The HDOM-Profibus-V0 is a fieldbus Solutions Module that can be installed to the expansion slot(s) in HD700 drives to provide PROFIBUS-DP slave connectivity.

The HDOM-Profibus-V0 module is suitable for HD700 drives that the control panel software version is V1.04 and above. The drives that the control panel software version is below V1.04, menu P19 parameters are not seen.

If you have any questions, please contact your nearest representative or call the technical support hotline: +86-4007-000-885.

## 1.2 HDOM-Profibus-V0 label



## 1.3 Technical specifications

### 1) Data rate and range

HDOM-Profibus-V0 automatically detects and adapts the data rate.

Supported data rates (kbits/s) and range as follows:

Rate (kbit/s)	12000	6000	3000	1500	500	187.5	93.75	45.45	19.2	9.6
Range (m)	100	100	100	200	400	1000	1000	1000	1000	1000

Table 1-1 Data rate and range

- 2) Support five types of PPO (Parameter Process data Object PPO1-PPO5) data format.
- 3) Support Profibus DP V0 protocol.
- 4) The HDOM-Profibus-V0 is powered from the host drive's internal power supply. The module output meets SELV safety level.

## 2 Mechanical installation

### 2.1 HD700 drive Extended Capabilities Port

The HD 700 drive has an expansion slot to make the HDOM-Profibus-V0 module installed on the drive. The installation of HDOM-Profibus-V module is illustrated in Figure 2-1.

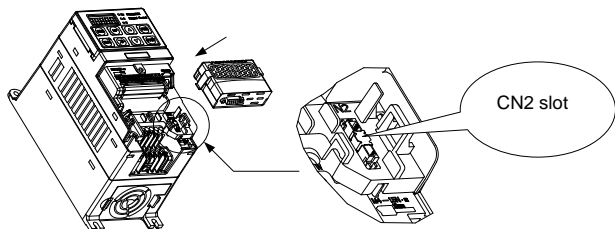


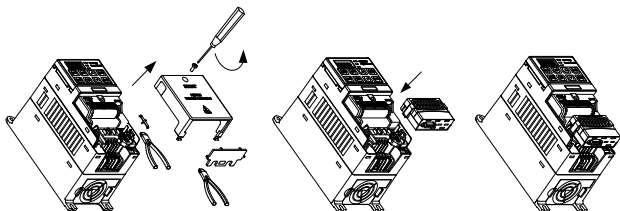
Figure 2-1 The expansion slot CN2

### 2.2 Dimensions

Model name	H (mm)	W (mm)	D (mm)
HDOM-Profibus-V0	70	45	23

### 2.3 Installation

- 1) Before installing the HDOM-Profibus-V0 module in any drive, ensure the AC supply has been disconnected for at least 10 minutes.
- 2) Check the module appearance. Please contact the supplier if there is any breakage.
- 3) Remove the drive terminal cover.
- 4) CN2 port has a plastic protective cover, please carefully cut it off.
- 5) Direct the back of the module to CN2.
- 6) Push this module into the CN2 slot located on the drive.



## 3 Electrical installation

### 3.1 HDOM-Profibus-V0 module

The HDOM-Profibus-V0 has a standard 9-way female D-type connector for the PROFIBUS-DP network, as shown in the figure 3-1.

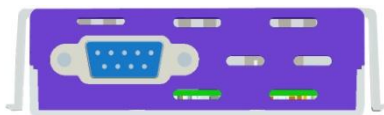


Figure 3-1 HDOM-Profibus-V0 terminals



Figure 3-2 HDOM-Profibus-V0 D-type connector pin out

Descriptions of D-type connections are shown in the table 3-1.

D-type terminal	Function
1	PGND
2	NC
3	Positive data line (B) - Red
4	NC
5	GND isolated
6	+5V isolated

D-type terminal	Function
7	NC
8	Negative data line (A) - Green
9	NC

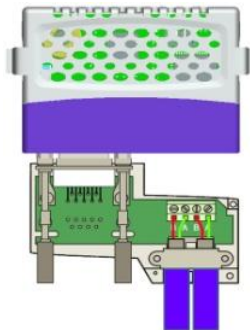
Table 3-1 D-type connections

## 3.2 PROFIBUS-DP connectors

There are many manufacturers of PROFIBUS-DP connectors. Always ensure that any connectors used on the network are fully approved for use with PROFIBUS-DP. Some of the connector types available include built in termination that allows the network to be isolated, this can be very useful when fault finding.

### **Note:**

Some connectors are incompatible with HDOM-Profibus-V0. Siemens connectors that part number are 6GK1500-0FC00 and 6GK1500-0EA00 can be used with HDOM-Profibus-V0 connection.



### 3.3 PROFIBUS-DP cable

PROFIBUS-DP cable is a bulk shielding twisted-pair cable.

PROFIBUS-DP networks can run at high data rates and require cable specifically designed to carry high frequency signals. Low quality cable will attenuate the signals, and may render the signal unreadable for the other nodes on the network. Cable specifications and a list of approved manufacturers of cable for use on PROFIBUS-DP networks are available on the PROFIBUS Nutzerorganization (PNO) web site at [www.profibus.com](http://www.profibus.com).

### 3.4 PROFIBUS-DP network termination

It is very important in high-speed communications networks that the network communications cable is installed with the specified termination resistor network at each end of each segment. This prevents signals from being reflected back down the cable and causing interference. Siemens connectors have the internal termination resistors and switch. The switch can enable or disable the internal resistors.

### 3.5 PROFIBUS-DP cable shielding

Correct shielding of the PROFIBUS-DP cable is required for reliable operation at high data rates; this can be achieved by exposing the cable shield of each PROFIBUS-DP cable and ensuring that they are clamped to the drive grounding metalwork as close as possible to the drive termination. Good ground connection can enhance the noise immunity of the system. When laying the PROFIBUS-DP cables, we should pay attention to the following matters:

- Do not directly lay against or parallel the power cable.
- PROFIBUS-DP cable and power cable are laid in their respective cable trough.
- The cable shield of each PROFIBUS-DP cable should ground as large as possible contact surface.



## 4 Getting started

### 4.1 Parameter setting step

- 1) The drive power on, access menu P19. At this time only P19.01 can be seen. Set P19.01 to 101, and then other parameters can be seen. P19.01=101 means that the option module is HDOM-Profibus-V0 module.
- 2) Set node address. Set node address parameter P19.02 (the default value is 124).
- 3) Set endian format according to the master. Set P19.08: set P19.08 to 0, High byte first Low byte second (default). Set P19.08 to 1, Low byte first High byte second.
- 4) Set data format. Set P19.09: 1-5 respectively correspond to PPO1-5. The default value of P19.09 is 3, select PPO3.
- 5) Set the trip time at communication interruptions. Set P19.07: the default value is 200 and the unit is millisecond (if detected PROFIBUS-DP network interruptions, the drive will stop according to P03.10 setting). Set P19.07 to 0, the function is disabled. The communication interruptions will not force the drive to stop.
- 6) The drive power off. Install the HDOM-Profibus-V0 and the drive power on.
- 7) At the beginning, the module indicator light displays red. This means communication has not been set up.
- 8) When the indicator light turns on green, the communication has been set up.
- 9) If the indicator keep on red (about 1-5 minutes), please check P19.05 and P19.06. According to the P19.05 and P19.06 descriptions check relevant configuration and installation.
- 10) If the indicator light flash red and green alternately, it means that the PROFIBUS-DP network trips. Please check the network connections (fieldbus connector or fieldbus cables).

## 4.2 Parameter descriptions

The following parameter description includes:

Parameter ID: parameter code

Parameter name: simple explanation of the parameter

Parameter range: This gives the range of the parameter and the values it can be adjusted to. In **【 】** is the default value.

Change mode: defines if the parameter can be modified and the parameter can be modified in what circumstances.

Stop Only     Write & Read can be done only at stopping.

Actual         Read only

Parameter ID	Parameter name	Range <b>【Default】</b>	Change mode
<b>P19.01</b>	Module ID code	0–255 <b>【0】</b>	Stop Only

The module ID code for HDOM-Profibus-V0 is 101.

Parameter ID	Parameter name	Range <b>【Default】</b>	Change mode
<b>P19.02</b>	Node address	0–125 <b>【124】</b>	Stop Only

Node address setting. Every node on a PROFIBUS-DP network must be given a unique network node address.

Parameter ID	Parameter name	Range <b>【Default】</b>	Change mode
<b>P19.03</b>	Network data rate	0–9, 15	Actual

The PROFIBUS-DP network data rate is controlled by the master controller. The HDOM-Profibus-V0 will automatically detect the PROFIBUS-DP network data rate and synchronize to it. P19.03 will indicate the data rate that has been detected by the HDOM-Profibus-V0.

A value of 15 indicates that the HDOM-Profibus-V0 has not detected any activity on the PROFIBUS-DP network and is waiting for the master controller to start communicating.

<b>P19.03</b>	<b>Bit/s</b>
15	Auto-detecting
0	12M

<b>P19.03</b>	<b>Bit/s</b>
1	6.0M
2	3.0M
3	1.5M
4	500k
5	187.5k
6	93.75k
7	45.45k
8	19.2k
9	9.6k

<b>Parameter ID</b>	<b>Parameter name</b>	<b>Range 【Default】</b>	<b>Change mode</b>
<b>P19.04</b>	Re-initializing PROFIBUS-DP network	0-1 【0】	Stop Only

Changes to the HDOM-Profibus-V0 configuration will not take effect until the PROFIBUS-DP network has been re-initialized.

To re-initialize the PROFIBUS-DP network:

- Set P19.04 to 1.
- Pressing the PRG key, when the sequence has been completed, P19.04 will be reset to 0 automatically.

**Note:**

This sequence does NOT store the HDOM-Profibus-V0 configuration parameters in the HDOM-Profibus-V0 EEPROM.

<b>Parameter ID</b>	<b>Parameter name</b>	<b>Range 【Default】</b>	<b>Change mode</b>
<b>P19.05</b>	Operating status	0-4 【0】	Actual

<b>P19.05</b>	<b>Parameter</b>	<b>Description</b>
0	No module detected	Indicates that HDOM-Profibus-V0 is not installed in the drive.
1	MCU has been initialized	Indicates that MCU has been initialized correctly, and is waiting for the PROFIBUS-DP master to initialize communications.

<b>P19.05</b>	<b>Parameter</b>	<b>Description</b>
2	PROFIBUS-DP master has been initialized	Indicates that PROFIBUS-DP master has been initialized correctly, and is detecting baud rate.
3	Baud rate has been detected	Indicates that PROFIBUS-DP master has detected baud rate correctly, and is waiting for parameter message and configuration message.
4	Data transfer	Indicates that the PROFIBUS-DP master has established communications with the HDOM-Profibus-V0.

<b>Parameter ID</b>	<b>Parameter name</b>	<b>Range 【Default】</b>	<b>Change mode</b>
<b>P19.06</b>	HDOM-Profibus-V0 error codes	0-8 【0】	Actual

If the HDOM-Profibus-V0 detects an error during operation, it will force a trip on the drive and update the error code parameter, P19.06.

The following table shows the possible HDOM-Profibus-V0 error codes.

<b>Error code</b>	<b>Fault</b>	<b>Description</b>
0	No error detected	Indicates that the HDOM-Profibus-V0 module is ok. It is possible to trip the drive externally via various communication channels.
1	MCU out of memory	Indicates that MCU of the HDOM-Profibus-V0 initialization sequence was not successful.
2	Memory check error	Memory check error
3	Parameter overrun	HDOM-Profibus-V0 parameter setting error
4	Configuration error	Node address P19.02 and node address of master configuration are different.
5	Configuration error	PPO and P19.09 data format are different.
6	Network interruptions	When watchdog time-out has occurred, PROFIBUS-DP network is interrupted.

Error code	Fault	Description
7	Internal communication error	The drive and HDOM-Profibus-V0 communications stop.
8	EEPROM read-write error	HDOM-Profibus-V0 module cannot load or read data from EEPROM.

**Note:**

These faults can only be looked up in this parameter. P19.04 can reset faults 2 to 6. P19.29 can reset all faults. Suggest that using P19.04 reset faults 2 to 6 at first.

Parameter ID	Parameter name	Range 【Default】	Change mode
<b>P19.07</b>	Trip time set at communication interruptions	0-3000ms 【200】	Stop Only

When the drive detects the PROFIBUS-DP network interrupted or communicates with HDOM-Profibus-V0 stopping, communications fail to restore within setting time, and then the drive will stop. If P19.07 is set to 0, the function is disabled. The communication interruptions will not force the drive to stop. The unit is millisecond (ms).

Parameter ID	Parameter name	Range 【Default】	Change mode
<b>P19.08</b>	Data endian select	0-1 【0】	Stop Only

The parameter is used to select data endian format. Most PROFIBUS-DP master controllers use big endian format (High byte first Low byte second) by default, many also support little endian (Low byte first High byte second), however some older PLCs do not offer the facility to select big endian format. Please contact the master controller supplier to know the data endian format that can be used.

0: High byte first Low byte second (default)

1: Low byte first High byte second

Parameter ID	Parameter name	Range 【Default】	Change mode
<b>P19.09</b>	PPO select	0–5 【3】	Stop Only

The parameter is used to select type of Parameter Process data Object (PPO).

There are five types. The default PPO type is PPO3.

Please set the parameter according to the PPO type of the master controller configuration. See *Chapter 5 Data format* for more information.

Parameter ID	Parameter name	Range 【Default】	Change mode
<b>P19.10–P19.17</b>	Cyclic data IN channel	00.00–18.08 【00.00】	Stop Only
<b>P19.18–P19.25</b>	Cyclic data OUT channel	00.00–18.08 【00.00】	Stop only

Cyclic data IN and OUT channel

According to the PPO type of configuration, these parameters are mapped to cyclic PPO data words 2 to 9.

See *Chapter 5 Data format* for more details.

Parameter ID	Parameter name	Range 【Default】	Change mode
<b>P19.26</b>	Restore defaults	0–1 【0】	Stop Only

If the host drive is defaulted it will also clear the current configuration for the slot HDOM-Profibus-V0 is installed to. Setting P19.26 to 1 additionally clears the backup copy of the HDOM-Profibus-V0 configuration stored in the module.

This can be performed as follows:

- Stop the drive (if the motor is running).
- Set P19.26 to 1.
- Press PRG key, and the HDOM-Profibus-V0 will reset using the default values. P19.26 will be reset to 0 automatically.
- Set P19.04 to 1, and the PROFIBUS-DP network will re-initialise using the default value after pressing PRG key. P19.04 will be reset to 0 automatically.

Parameter ID	Parameter name	Range 【Default】	Change mode
<b>P19.27</b>	Store P19 parameters to HDOM-Profibus-V0 EEPROM	0-1 【0】	Stop Only

P19 parameters are stored in the host drive EEPROM and HDOM-Profibus-V0 will always use these values during initialisation to configure itself.

Using P19.27 (if P19.27 is set to 1) it is possible to store the parameter configuration as a backup copy in the HDOM-Profibus-V0 EEPROM.

This allows the module to contain a backup copy of its configuration that may be restored using P19.28 (for details please refer to the description for P19.28). This is of particular use when setting up a module to send to site as a replacement or as a method of keeping a backup copy of the HDOM-Profibus-V0 settings that may be used in the event of a drive failure.

Storing the parameter configuration to HDOM-Profibus-V0 module may affect PROFIBUS-DP network communications, but the impact time is usually very short and then the communications will automatically return to normal.

To store HDOM-Profibus-V0 parameters in the HDOM-Profibus-V0 EEPROM:

- Stop the drive (if the motor is running).
- Set P19.27 to 1.
- After pressing PRG key, P19 parameters store to the HDOM-Profibus-V0 module from the drive EEPROM. P19.27 will be reset to 0 automatically.

The drive will perform a drive save and copy the settings from the slot menu associated with the HDOM-Profibus-V0 into the HDOM-Profibus-V0 EEPROM.

Parameter ID	Parameter name	Range【Default】	Change mode
<b>P19.28</b>	Restore the previous parameter configuration from HDOM-Profibus-V0 EEPROM	0-1 【0】	Stop Only

When P19.28 is set to 1 (ON), the HDOM-Profibus-V0 will transfer the configuration parameters from its EEPROM to the host drive over-writing the existing values in the host drive. Then set P19.04 to 1 and PROFIBUS-DP network will re-initialize.

The full sequence of events for restoring values from a HDOM-Profibus-V0 is as follows:

- Stop the drive (if the motor is running).
- Set P19.28 to 1.
- Press PRG key and the HDOM-Profibus-V0 will overwrite all P19 parameters with the values stored in its EEPROM. P19.28 will be reset to 0 automatically.
- Set P19.04 to 1 or restart the drive, and re-initialize PROFIBUS-DP network. P19.04 will be reset to 0 automatically.

Parameter ID	Parameter name	Range 【default】	Change mode
<b>P19.29</b>	Re-initializing the HDOM-Profibus-V0	0-1 【0】	Stop Only

When there is an error between HDOM-Profibus-V0 and the drive communications (P19.06=7), using P19.29 can re-initialize HDOM-Profibus-V0 without having to make the drive to power on.

To re-initialize HDOM-Profibus-V0:

- Set P19.29 to 1.
- When the sequence has been completed, P19.29 will be reset to 0.
- The HDOM-Profibus-V0 will re-initialise using the updated configuration.

**Note:**

- Using this function will make PROFIBUS-DP network re-initialized.



- Using this function will reset the faults P19.06 displaying. See the description for P19.06.

Parameter ID	Parameter name	Range 【default】	Change mode
<b>P19.30</b>	HDOM-Profibus-V0 software version	00.00–02.99 【00.00】	Actual

00XX: indicates that the Profibus module supports Profibus DP V0.

01XX: indicates that the Profibus module supports Profibus DP V0, V1.

02XX: indicates that the Profibus module supports Profibus DP V0, V1, V2.

XX: indicates Profibus software version.

Parameter ID	Parameter name	Range 【default】	Change mode
<b>P19.31</b>	HDOM-Profibus-V0 firmware version	00.00–99.99 【00.00】	Actual

## 5 Data format

**Note:** The term OUT data refers to data that is transmitted out of the master to the slave. The term IN data refers to data that is returned from a slave into the master.

HDOM-Profibus-V0 supports Profibus DP V0 protocol (The subsequent version will support Profibus DP V1, V2). Cyclic data transfer occurs between HDOM-Profibus-V0 and PROFIBUS-DP master controller. The data be defined as (Parameter Process data Object) **PPO**. HDOM-Profibus-V0 supports all five types of PPO: PPO1–PPO5, as table 4-1 shows:

PPO type	Parameter data			
	Acyclic PPO data word			
	Word 0	Word 1	Word 2	Word 3
PPO1				
PPO2				
PPO3				
PPO4				
PPO5				

PPO type	Process data									
	Cyclic PPO data word									
	Word 0	Word 1	Word 2	Word 3	Word 4	Word 5	Word 6	Word 7	Word 8	Word 9
PPO1										
PPO2										
PPO3										
PPO4										
PPO5										

Table 4-1 PPO types

The Black blocks indicate the data length of different PPO types.

- PPO1: parameter data contain 4 acyclic PPO data words, and process data contain 2 cyclic PPO data words.

- PPO2: parameter data contain 4 acyclic PPO data words, and process data contain 6 cyclic PPO data words.
- PPO3: parameter data contain 0 acyclic PPO data word, and process data contain 2 cyclic PPO data words.
- PPO4: parameter data contain 0 acyclic PPO data word, and process data contain 6 cyclic PPO data words.
- PPO5: parameter data contain 4 acyclic PPO data words, and process data contain 10 cyclic PPO data words.

## 5.1 Cyclic PPO data word

The process data is defined as **cyclic PPO data word**.

Cyclic data transfer is a method of transferring data on a regular time period, often known as 'polled data'. High-speed data transfer is achieved by transmitting only data bytes over the PROFIBUS-DP network and using local mapping information within the HDOM-Profibus-V0 and PROFIBUS-DP master controller to ensure that the correct data is sent to the correct locations. The flexibility of the HDOM-Profibus-V0 means that each cyclic data OUT channel can be directed to any read/write drive parameter. Similarly each cyclic data IN channel can use any drive parameter as a source of data.

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The cyclic PPO data words of PPO1-PPO5 have different length, but contain two words at least: word 0 and word 1. The two words are mapped to specified parameters and cannot be changed by the user.

- Output: word 0 is a control word, and word 1 is frequency set value.
- Input: word 0 is a status word, and word 1 is frequency actual value.

The user can define other cyclic PPO data words mapped to other parameters. When the user configures these words, it will take effect immediately if PROFIBUS-DP communication has been established. Therefore, PROFIBUS-DP master controller can only access to cycle PPO data word mapping internal parameters.

## 5.2 Non-cyclic PPO data word

The parameter data is defined as **non-cyclic PPO data word**.

Non-cyclic data allows access to any parameter without the need to use cyclic data transfers. This is particularly useful when accessing many different parameters for setup or archiving of drive settings.

Only PPO1, PPO2 and PPO5 have non-cyclic PPO 4 data words.

## 5.3 PPO format

PPO IN and OUT data formats are the same.

Parameter data: OUT data is the request access to parameter. IN data is the response to the request returned into the master.

Process data: The term OUT data refers to data that is transmitted out of the master to the slave. The term IN data refers to data that is returned from a slave into the master. There is no request and response relationship between OUT and IN data.

### 5.3.1 Parameter data format

The parameter data format (PPO1, PPO2 and PPO5) as follows:

OUT data word	Function		
	B15–b12	B11–b8	B7–b0
Non-cyclic PPO word 0	TASK ID	Reserved	MENU
Non-cyclic PPO word 1	PARAMETER		Reserved
Non-cyclic PPO word 2	DATA HIGH word		
Non-cyclic PPO word 3	DATA LOW word		

The PPO 4 Word protocol is controlled by the TASK ID and RESPONSE ID; the TASK ID specifies the transaction required and the remainder of the data words carry the data for the transaction. Table 8.9 lists the possible TASK ID codes.

Word 0 HIGH 4 bits refer to the TASK ID. When TASK ID = 5H, is reading request. When TASK ID = 6H, is writing request. Bit 8-11 are reserved.

Word 0 low bits refer to MENU number.

Word 1 HIGH bits refer to the parameters accessed to. LOW bits are reserved.

The definition of a data word is 16 bits. Word 2 and 3 constitute double words (32 bits), so there is no need to operate word 2 (DATA HIGH word). At reading operation, word 2 and 3 are irrelevant. At writing operation, word 3 data is written to the request parameter.

IN data word	Function		
	B15-b12	B11-b8	B7-b0
<b>Non-cyclic PPO word 0</b>	RESPONSE ID	Reserved	MENU
<b>Non-cyclic PPO word 1</b>	PARAMETER		RESPONSE STATUS
<b>Non-cyclic PPO word 2</b>	DATA HIGH word		
<b>Non-cyclic PPO word 3</b>	DATA LOW word		

Word 0 high 4 bits refer to RESPONSE ID. RESPONSE ID = AH, reading response. RESPONSE ID = BH, writing response. Bit 8-11 are reserved.

Word 0 low bits refer to MENU number.

Word 1 HIGH bits refer to the parameters accessed to. Low bits refer to the response status to the master request.

The RESPONSE ID indicates the success or otherwise of the requested transaction.

The possible RESPONSE ID codes:

05H: The parameter that the master access to does not exist.

06H: At writing operation, the written value exceeds the maximum or minimum value of the accessed parameter.

07H: Error - read only parameter. Target parameter specified is read only, and cannot be modified.

08H: The operation is unsuccessful.

09H: The operation is successful.

The definition of a data word is 16 bits. Word 2 and 3 constitute double words (32 bits), so there is no need to operate word 2 (DATA HIGH word). At writing operation, word 2 and 3 are irrelevant. At reading operation, word 2 data is invalid and word 3 data is returned to the master.

**For example:**

The master read the parameter P04.01, P04.01=5.00Hz:

Parameter data output is:

Word 0: 5004H (read menu P04)

Word 1: 0100H (access parameter P04.01)

Word 2: 0000H (no need to operate)

Word 3: 0000H (no need to operate)

After reading successfully, parameter data input is:

Word 0: A004H (read menu P04)

Word 1: 0109H (access parameter P04.01 successfully)

Word 2: 0000H (invalid data)

Word 3: 01F4H=500D (P04.01=5.00Hz, frequency scaling is 1:100)

**Note:**

- Reserved, irrelevant, invalid or needless operating data is dealt as 0.
- If RESPONSE STATUS  $\neq 9$ , the returned word 2 and 3 are invalid data.

**5.3.2 Process data format**

Process data format as follows:

OUT data	Process data (cyclic PPO data word)									
	Word 0	Word 1	Word 2	Word 3	Word 4	Word 5	Word 6	Word 7	Word 8	Word 9
PPO1	Control word	Frequency set	-							
PPO2	Control word	Frequency set	User configurable mapping using P19.10 to P19.13				-			
PPO3	Control word	Frequency set	-							
PPO4	Control word	Frequency set	User configurable mapping using P19.10 to P19.13				-			
PPO5	Control word	Frequency set	User configurable mapping using P19.10 to P19.17							

Word 0 and 1 are mapped to a drive control word and frequency set parameter and this cannot be modified. User can define other words mapping to any other parameter using P19.10 to P19.17 according to the selected PPO types.

IN data	Process data (cyclic PPO data word)									
	Word 0	Word 1	Word 2	Word 3	Word 4	Word 5	Word 6	Word 7	Word 8	Word 9
PPO1	Status word	Actual frequency	-							
PPO2	Status word	Actual frequency	User configurable mapping usingP19.18 to P19.21				-			
PPO3	Status word	Actual frequency	-							
PPO4	Status word	Actual frequency	User configurable mapping using P19.18 to P19.21				-			
PPO5	Status word	Actual frequency	User configurable mapping using P19.18 to P19.25							

Word 0 and 1 are mapped to a drive status word and frequency actual value parameter and this cannot be modified. User can define other words mapping to any other parameter using P19.18 to P19.25 according to the selected PPO types.

## 6 Control and status words

### 6.1 Control word

The user can use communication control word parameter P03.27 controlling the drive, such as run and direction. Process data OUT data word 0 (OUT cyclic PPO data word 0) is directly mapped to P03.27 and cannot be modified. To enable the word, the user must set control word enable parameter P03.28 to 1 and set control mode parameter P00.03 (P10.07) to 2 (communications control mode). See *HD700 user manual* or *HD700 advanced user manual* for more information.

Control word P03.27 bit functions are shown in the following table.

Bit	Function	Description
0	ENABLE	Set to 1 to enable the drive. Resetting to 0 will immediately disable the drive, and the motor will coast to a stop.
1	RUN	The lowest priority operation instruction. Set to 1 to run the motor in the forward direction. When reset to 0, the drive will decelerate the motor to a controlled stop. ( with RUN FWD/REV is not set to 1)
2	NOT STOP	3-wire enabled. In the communication control mode, this bit is meaningless.
3	RUN FWD	Set to 1 (with ENABLE set to 1) to run the motor in the forward direction. When reset to 0, the drive will decelerate the motor to a controlled stop.
4	RUN REV	Set to 1 (with ENABLE set to 1) to run the motor in the reverse direction. When reset to 0, the drive will decelerate the motor to a controlled stop.



Bit	Function	Description
5	FWD/REV	This signal needs to be used in conjunction with the RUN bit set to 1. Set to 1 to select the reverse direction. Set to 0 to run in the forward direction. The RUN signal is used to start and stop the motor.
6	JOG FWD	Set to 1 to jog the motor forward. When reset to 0, the drive will decelerate the motor to a controlled stop.
7	JOG REV	Set to 1 to jog the motor reverse. When reset to 0, the drive will decelerate the motor to a controlled stop.
8	RESET	A 0-1 transition of the RESET bit will reset the drive from a trip condition. ( If the reason for the trip disappears and the trip code < F030 )
9	Saving parameters	A 0-1 transition of bit 9 will store the parameters to EEPROM.
10	Trip recording reset	A 0-1 transition of bit 10 will reset the trip recording.
11	Enable comms to write parameters	A 0-1 transition of bit 11 will enable the function selector parameters.
12-15	Reserved	—

P03.27 commonly used Settings as follows (only list low 8 bit), can be used directly:

P03.27=1 (00000001)	enable
P03.27=8 (00001000) or P03.27=2 (00000010)	run forward
P03.27=16 (00010000) or P03.27=34 (00100010)	run reverse
P03.27=64 (01000000)	jog forward
P03.27=128 (10000000)	jog reverse

Please see description for P03.27 in *HD700 advanced manual* for further details.

## 6.2 Status word

HD700 drive status word parameter P10.14 indicates the drive's state of health and operational condition, such as drive ok, drive at speed, etc. Process data IN data word 0 (IN cyclic PPO data word 0) is directly mapped to P10.14 and cannot be modified.

See the following table for the individual bit function descriptions of status word P10.14.

Bit	Function	Description
0	Drive ok	Bit 0 = 0: Drive not ok (tripped). Bit 0 = 1: Drive ok.
1	Drive active	When bit 1 = 0, the drive is in stop state. When bit 1 = 1, the drive is in run mode.
2	100% load	0: The output current is below the rated output current. 1: The output current reaches the rated output current.
3	Frequency reached	0: The output frequency is below the set frequency. 1: The output frequency reaches the set frequency.
4	Zero speed	0: not at zero speed. 1: at zero speed.
5	Running reverse	0: forward direction or in stop state 1: reverse direction
6	Current limit	0: The output current is below the current limit. 1: The output current reaches the current limit.
7	Set time reached	0: not to the set time 1: to the set time
8	control channel switched to terminal	0: The control channel is not switched to terminal. 1: The control channel is switched to terminal.
9	Under voltage	0: DC bus voltage is in a normal level. 1: DC bus voltage is under the limit.
10	Overload detected	0: not overload 1: Overload signal is detected, H002 alarm.

Bit	Function	Description
11	Alarm	0: no alarm 1: The drive alarms.
12	Length reached	0: The length is below the set value. 1: The length reaches the set value.
13	Counting reached	0: The counting is below the set value. 1: The counting reaches the set value.
14	PLC running completed	0: unfinished 1: finish
15	PLC running	0: PLC is not running. 1: PLC is running.

See descriptions for P10.14 in HD700 advanced user manual for further details.

## 6.3 HD700 drive fieldbus reference channel and frequency actual value

HD700 drive fieldbus reference channel cannot be seen by the user. Process data IN data word 1 (IN cyclic PPO word 1) is directly mapped to the channel. To select PROFIBUS-DP fieldbus reference channel, the user need to set P00.04 (or P01.01) to 7.

Process data IN data word 1 (IN cyclic PPO word 1) is directly mapped to parameter P05.11 (drive output frequency). After the network is started, the P05.11 value is continuously sent to the master corresponding input buffer address and the user can directly read drive output frequency.

## 6.4 Scaling definition

- Frequency rate: 1:100

If the drive reference is 50.00Hz, then it is written as 1388H in hexadecimal format.

- Time rate: 1:10

If the acceleration time is 10.0s, then it is written as 0064H in hexadecimal format.

- Current rate: 1:10

If current is 30.0A, then it is written as 012CH in hexadecimal format.

- Voltage rate: 1:1

If voltage is 380V, then it is written as 017CH in hexadecimal format.

- Percentage rate: 1:10

100.0%, it is written as 03E8H in hexadecimal format.

## 7 GSD files

GSD files are text files that are used by the PROFIBUS-DP network configuration software tools. They contain information about the device timings, supported features and available data formats for the PROFIBUS-DP device.



HD700.GSD

## 8 Parameter list

Parameter	Name	Range	Step	Default	Change mode
P19.01	Module ID code	0–255	1	0	Stop only
P19.02	Node address	0–125	1	124	Stop only
P19.03	Network data rate	0–9, 15	1	Actual	Actual
P19.04	Re-initializing PROFIBUS-DP network	0–1	1	0	Stop only
P19.05	Operating status	0–4	1	0	Actual
P19.06	HDOM-Profibus-V0 error codes	0–8	1	0	Actual
P19.07	Trip time set at communication interruptions (ms)	0–3000	1	200	Read only
P19.08	Data endian select	0–1	1	0 (MSB first)	Stop only
P19.09	PPO selected	1–5	1	3	Stop only
P19.10	IN cyclic mapping 0	P00.00–P18.08	00.01	P00.00	Stop only
P19.11	IN cyclic mapping 1	P00.00–P18.08	00.01	P00.00	Stop only
P19.12	IN cyclic mapping 2	P00.00–P18.08	00.01	P00.00	Stop only
P19.13	IN cyclic mapping 3	P00.00–P18.08	00.01	P00.00	Stop only
P19.14	IN cyclic mapping 4	P00.00–P18.08	00.01	P00.00	Stop only
P19.15	IN cyclic mapping 5	P00.00–P18.08	00.01	P00.00	Stop only
P19.16	IN cyclic mapping 6	P00.00–P18.08	00.01	P00.00	Stop only
P19.17	IN cyclic mapping 7	P00.00–P18.08	00.01	P00.00	Stop only
P19.18	OUT cyclic mapping 0	P00.00–P18.08	00.01	P00.00	Stop only
P19.19	OUT cyclic mapping 1	P00.00–P18.08	00.01	P00.00	Stop only
P19.20	OUT cyclic mapping 2	P00.00–P18.08	00.01	P00.00	Stop only
P19.21	OUT cyclic mapping 3	P00.00–P18.08	00.01	P00.00	Stop only
P19.22	OUT cyclic mapping 4	P00.00–P18.08	00.01	P00.00	Stop only

Parameter	Name	Range	Step	Default	Change mode
P19.23	OUT cyclic mapping 5	P00.00–P18.08	00.01	P00.00	Stop only
P19.24	OUT cyclic mapping 6	P00.00–P18.08	00.01	P00.00	Stop only
P19.25	OUT cyclic mapping 7	P00.00–P18.08	00.01	P00.00	Stop only
P19.26	Restore defaults	0–1	1	0	Stop only
P19.27	Store P19 parameters to HDOM-Profibus-V0 EEPROM	0–1	1	0	Stop only
P19.28	Restore the previous parameter configuration from HDOM-Profibus-V0 EEPROM	0–1	1	0	Stop only
P19.29	Re-initializing the HDOM-Profibus-V0	0–1	1	0	Stop only
P19.30	HDOM-Profibus-V0 software version	00.00–02.99	0.01	00.00	Actual
P19.31	HDOM-Profibus-V0 firmware version	00.00–99.99	0.01	00.00	Actual

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K07HHD0MXX100R