



# Lichuan A6 Series AC Servo Driver

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## CANopen Communication Application Manual



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## Chapter 1 System Settings

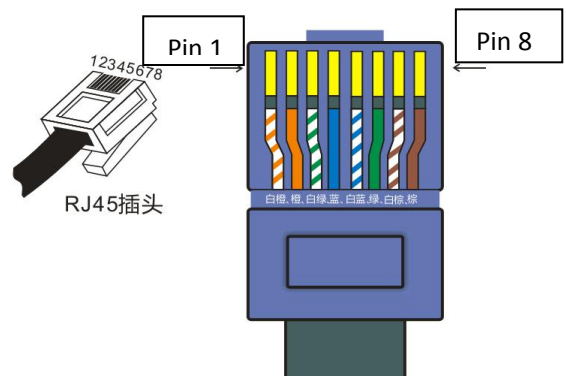
### 1.1 Servo CANopen function Supported description

- ◆ CANopen Protocol: NMT、SYNC、SDO、PDO、EMCY
- ◆ SDO transmission: Servo parameters can be set via SDO;
- ◆ TPDO/RPDO: Support time or event triggered transmission, synchronous transmission (cycle), synchronous transmission (no cycle)
- ◆ Heartbeat

### 1.2 Wiring instructions

#### 1.2.1 Servo communication terminal definition

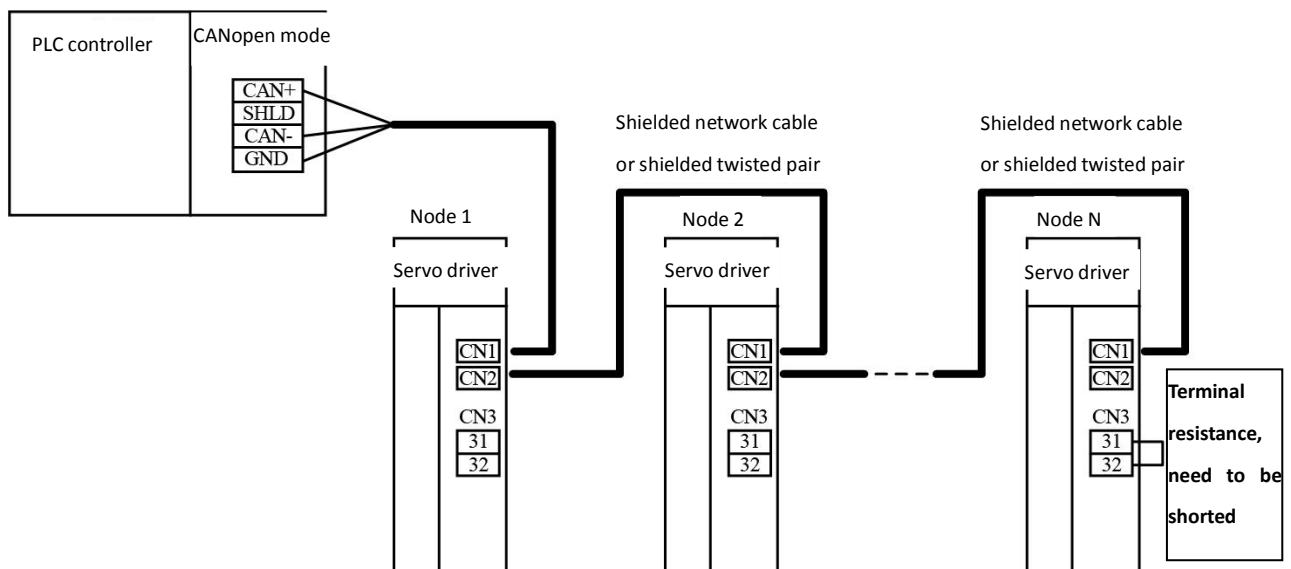
Pin	Network cable color	Signal definition
1	White /orange	CAN+
2	Orange	CAN-
3	White /green	GND
4	blue	485+
5	White blue	485-
6	green	NC
7	White brown	NC
8	Brown	NC



Crystal head pin order

#### 1.2.2 Installation and wiring instructions

The CAN bus uses a pair of differential cables as the transmission medium, and all nodes are directly connected to this pair of common transmission medium and arranged in parallel to receive or send data information. At both ends of the bus, terminal resistors are added to terminate them respectively to prevent the signal sent by the node on the network from being reflected when it reaches the end of the cable.



## Wiring diagram

## 1.2.3 Wiring length

Baud rate	Recommended maximum length
1Mbps	25m
750Kbps	50m
500Kbps	100m
250Kbps	250m
125Kbps	500m

## 1.2.4 External IO port

When in CANopen mode, DI port only can be use DI0~DI3, other DI port can not be used, The function configuration table is as follows:

Parameter No.	Parameter function	Parameter value	Description
PA_080	DI0 Configuration	21	Emergency stop
PA_081	DI1 Configuration	17	Origin signal
PA_082	DI2 Configuration	2	Clockwise travel limit
PA_083	DI3 Configuration	3	Counterclockwise travel limit

## 1.3 Servo parameter setting

Parameter address	parameter name	Set up range	Defaults	Function and meaning																								
PA_000	Communication address	0～32	1	<p>The address of the communication slave. CANopen and RS485 share this parameter.</p> <p>Note: This parameter is valid after power restart.</p>																								
PA_002	Control mode selection	0～5	0	<p>Set the control mode of servo driver</p> <p>Note: This parameter is valid after power restart.</p> <table><tr><th>PA_002 value</th><th>Control mode</th><th>Pattern code</th></tr><tr><td>0</td><td>Position mode</td><td>P</td></tr><tr><td>1</td><td>Speed mode</td><td>S</td></tr><tr><td>2</td><td>Torque mode</td><td>T</td></tr><tr><td>3</td><td>Position/speed mode</td><td>P/S</td></tr><tr><td>4</td><td>Position/torque mode</td><td>P/T</td></tr><tr><td>5</td><td>Speed/torque mode</td><td>S/T</td></tr><tr><td>10</td><td>CANopen mode</td><td>P/S/T</td></tr></table> <p>When CANopen Communication control , PA_002 needs to be set to 10, this parameter is valid after power restart.</p>	PA_002 value	Control mode	Pattern code	0	Position mode	P	1	Speed mode	S	2	Torque mode	T	3	Position/speed mode	P/S	4	Position/torque mode	P/T	5	Speed/torque mode	S/T	10	CANopen mode	P/S/T
PA_002 value	Control mode	Pattern code																										
0	Position mode	P																										
1	Speed mode	S																										
2	Torque mode	T																										
3	Position/speed mode	P/S																										
4	Position/torque mode	P/T																										
5	Speed/torque mode	S/T																										
10	CANopen mode	P/S/T																										

PA_00C	CANopen Baud rate setting	0~6	3	<p>Used to set the CANopen baud rate</p> <p>0: 20Kbps 1: 50Kbps 2: 125Kbps 3: 250Kbps 4: 500Kbps 5: 750Kbps 6: 1Mbps</p> <p>Note: This parameter is valid after power restart</p>
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## Chapter 2 CANopen control mode description

### 2.1 Controlword Control command word (6040h) description

#### 2.1.1 Controlword Bit Function Description

Bit15 ~Bit9	Bit8	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
N/A	Halt	Fault reset	Operation Mode Specific			Enable Operation	Quick Stop	Enable Voltage	SWITCH ON

Command word control bit	Control mode	
	Position control mode	Zero return mode
Bit4	Set a new point (Rising edge trigger)	Zero start (Rising edge trigger)
Bit5	Change settings now	N/A
Bit6	Absolute positioning (0)/relative positioning (1)	N/A

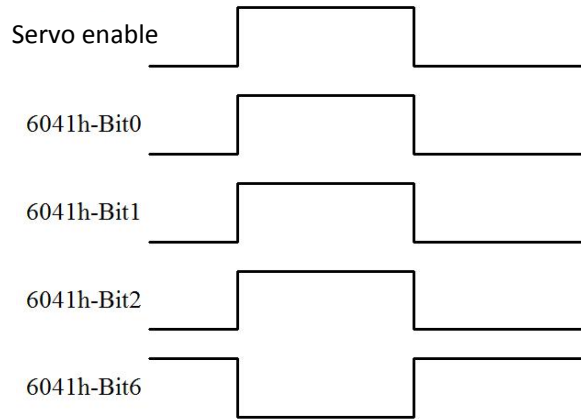
#### ◆ Servo enable control steps

1) when set control mode in **【Mode of operations:6060h】**, The corresponding table of parameter values and control modes is as follows:

Mode of operations:6060h Parameter value	Control mode
1	Contour position mode
3	Speed mode
4	Torque mode
6	Zero return mode
7	Interpolation position mode

2) Write 6, 7, 15 in order to Controlword: 6040h, The interval is about 10ms, the motor can be enabled after the writing is completed;

3) Servo enable and **【Statusword: 6041h】** state sequence logic。



#### ◆ Servo emergency stop

When the servo is running, turn on Bit2 to make the motor stop urgently, and at the same time, Bit5 of [Statusword: 6041h] will be turned OFF.

#### ◆ Suspended

During the servo operation, turn on Bit8 to stop the motor. At this time, the motor is in the enabled state. Turn Bit8 off, and the motor will continue to run with the previous command.

#### ◆ Alarm reset

When the servo has an alarm, you can turn on Bit7 to reset the drive. Note that some alarms cannot be reset, such as over-current alarms, encoder failures, etc.

## 2.2 Profile Position Mode Contour position mode (6060h = 1)

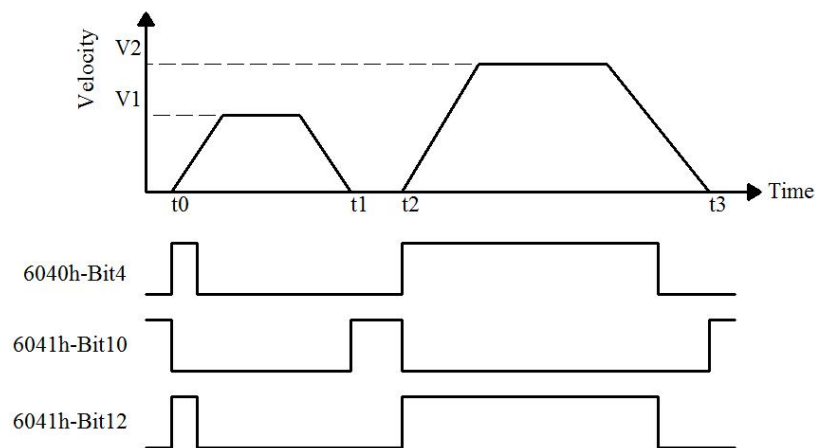
### 2.2.1 Related parameters

Index (16/ Hexadecimal)	Data name	Description	type of data	Attributes
6040h	Controlword	Control command word	UNSIGNED16	RW
6041h	Statusword	Servo status word	UNSIGNED16	RO
6060h	Modes of operation	Servo working mode setting	INTEGER8	RW
6061h	Modes of operation display	Monitor servo working mode	INTEGER8	RO
607Ah	Target position	Target location	INTEGER32	RW
6081h	Profile velocity	Target speed (0.1 rpm)	UNSIGNED32	RW
6083h	Profile acceleration	Acceleration time	UNSIGNED32	RW
6084h	Profile deceleration	Deceleration time	UNSIGNED32	RW
6063h	Position actual value[inc]	Servo position feedback (relative position)	INTEGER32	RO
6064h	Position actual value[PUU]	Servo position feedback (absolute position)	INTEGER32	RO
6093h	Position factor	Position factor (electronic gear ratio)	UNSIGNED32	RW
6062h	Position demand value[PUU]	Internal position command value (absolute position)	INTEGER32	RO
60FCh	Position demand value[inc]	Internal position command value	INTEGER32	RO

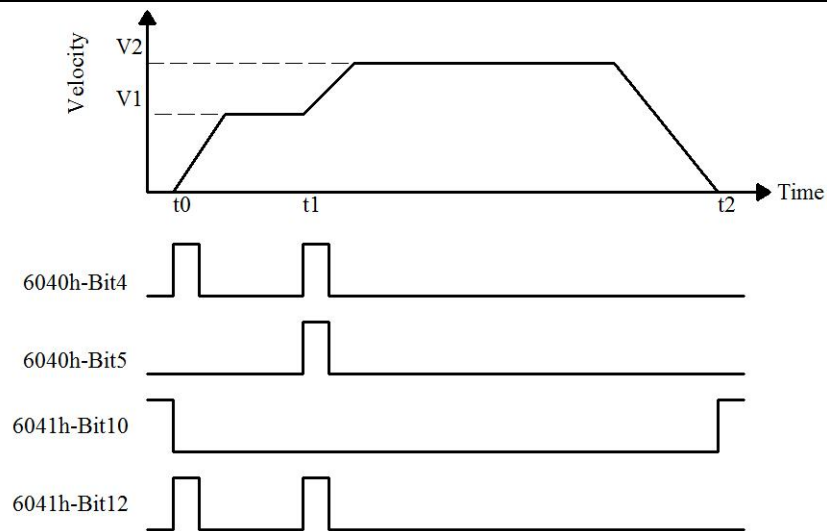
		(relative position)		
60F4h	Following error actual value[PUU]	Current value of position deviation	INTEGER32	RO
6065h	Following error window	Position deviation alarm threshold	UNSIGNED32	RW
6067h	Position window	Positioning complete pulse range	UNSIGNED32	RW
6068h	Position window time	Positioning completion time	UNSIGNED16	RW

### 2.2.2 Control steps

- 1) set **【Mode of operations:6060h】** to 1;
- 2) Refer to chapter 2.1 to set the control command word [Controlword: 6040h] to enable the drive;
- 3) Set the target position **【Target position:607Ah】** , (unit: pulse);
- 4) Set target velocity [Profile velocity: 6081h] (unit: 0.1RPM)
- 5) Set acceleration slope **【Profile acceleration:6083h】**;
- 6) Set deceleration slope **【Profile deceleration:6084h】**;
- 7) To trigger a new position command, turn on Bit 4 of the control command word [Controlword: 6040h] to trigger the motor to run to the target position. Note that Bit 4 must be manually reset after being turned on.



- 8) Steps to update the position command immediately: Repeat steps 3 to 6 to set the new target position, target speed, acceleration slope and deceleration slope, and then turn on Bit4 and Bit5 of [Controlword:6040h] simultaneously to update the position command immediately .



## 2.3 Profile Speed Mode (6060h = 3)

### 2.3.1 Related parameters

Index (Hexadecimal)	Data name	Description	type of data	Attributes
6040h	Controlword	Control command word	UNSIGNED16	RW
6041h	Statusword	Servo status word	UNSIGNED16	RO
6060h	ModesOfOperation	Servo working mode setting	INTEGER8	RW
6061h	ModesOfOperation display	Monitor servo working mode	INTEGER8	RO
60FFh	TargetVelocity	Target speed (0.1 rpm)	INTEGER32	RW
6083h	Profile acceleration	acceleration time	UNSIGNED32	RW
6084h	Profile deceleration	deceleration time	UNSIGNED32	RW
606Ch	VelocityActualValue	Real-time speed monitoring (0.1 rpm)	INTEGER32	RO
606Dh	VelocityWindow	Speed reach range (0.1 rpm)	UNSIGNED16	RW
606Eh	VelocityWindow time	Speed arrival time	UNSIGNED16	RW
606Fh	VelocityThreshold	Zero speed offset value (0.1 rpm)	UNSIGNED16	RW
606Bh	VelocityDemandValue	Internal speed command value (0.1 rpm)	INTEGER32	RO

### 2.3.2 Control steps

- 1) set 【Mode of operations:6060h】 to 3;
- 2) Refer to chapter 2.1 to set the control command word [Controlword: 6040h] to enable the drive;
- 3) Set acceleration slope [Profile acceleration:6083h];
- 4) Set the deceleration slope [Profile deceleration: 6084h];
- 5) Set the target velocity [Target velocity: 60FFh] and the motor can run.

## 2.4 Profile Torque Mode (6060h = 4)

### 2.4.1 Related parameters



Index (Hexadecimal)	Data name	Description	type of data	Attributes
6040h	Controlword	Control command word	UNSIGNED16	RW
6041h	Statusword	Servo status word	UNSIGNED16	RO
6060h	ModesOfOperation	Servo working mode setting	INTEGER8	RW
6061h	ModesOfOperation display	Monitor servo working mode	INTEGER8	RO
6071h	Target torque	Target torque	INTEGER16	RW
6074h	Torque demand value	Internal torque command value	INTEGER16	RO
6077h	Torque actual value	Actual torque monitoring value	INTEGER16	RO
6078h	Current actual value	Actual current monitoring value	INTEGER16	RO
6087h	Torque slope	Torque slope	UNSIGNED32	RW
2056h	Speed Limit of Torque Mode	Torque mode speed limit value	UNSIGNED16	RW

## 2.4.2 Control steps

- 1) set **【Mode of operations:6060h】** to 4;
- 2) Refer to chapter 2.1 to set the control command word [Controlword: 6040h] to enable the drive;
- 3) Set the torque slope [Torque slope:6087h];
- 4) Set target torque [Target torque:6071h] and the motor can run

## 2.5 Homing Mode (6060h = 6)

### 2.5.1 Related parameters

Index (Hexadecimal)	Data name	Description	type of data	Attributes
6040h	Controlword	Control command word	UNSIGNED16	RW
6041h	Statusword	Servo status word	UNSIGNED16	RO
6060h	ModesOfOperation	Servo working mode setting	INTEGER8	RW
6061h	ModesOfOperation display	Monitor servo working mode	INTEGER8	RO
607Ch	Home offset	Origin offset	INTEGER32	RW
6093h	Position factor	Position factor (electronic gear ratio)	UNSIGNED32	RW
6098h	Homing method	Home mode	INTEGER8	RW
6099h	Homing speeds	Zero return speed (1 rpm)	ARRAY	RW
609Ah	Homing acceleration	Zero acceleration	UNSIGNED32	RW

### 2.5.2 Control steps

- 1) set **【Mode of operations:6060h】** to 6;
- 2) Refer to chapter 2.1 to set the control command word [Controlword: 6040h] to enable the drive;
- 3) Set origin offset **【Home offset:607Ch】**;
- 4) Set zero return method **【Homing method:6098h】**;
- 5) Set high-speed zero return speed **【Homing speeds:6099h Sub-1 】**;
- 6) Set crawl speed **【Homing speeds:6099h Sub-2 】**;

## 7) Set zero acceleration 【Homing acceleration:609Ah】;

8) Turn on Bit4 of the control command word [Controlword:6040h] to trigger the motor zero return action;

注意:

1. Please refer to the appendix of the servo operation manual for the zero return method.
2. If the homing motion parameters are not saved to the drive (steps for saving parameters: write 65766173H into [Store parameters: 1010h-01h]), after the drive restarts, the controller needs to set the homing motion parameters first 0, and then reset the corresponding parameters before writing to the drive.

## 2.6 Interpolation Position Mode (6060h = 7)

### 2.6.1 Related parameters

Index (Hexadecimal)	Data name	Description	type of data	Attributes
6040h	Controlword	Control command word	UNSIGNED16	RW
6041h	Statusword	Servo status word	UNSIGNED16	RO
6060h	ModesOfOperation	Servo working mode setting	INTEGER8	RW
6061h	ModesOfOperation display	Monitor servo working mode	INTEGER8	RO
6093h	Position factor	Position factor (electronic gear ratio)	UNSIGNED32	RW
60C0h	Interpolation sub mode select	Interpolation mode, this parameter is fixed to 0, it is linear interpolation mode	INTEGER16	RW
60C1h	Interpolation data record	Interpolation data record	ARRAY	RW
60C2h	Interpolation time period	Interpolation cycle	ARRAY	RW

### 2.5.2 Control steps

- 1) set 【Mode of operations:6060h】 to 6;
- 2) Refer to chapter 2.1 to set the control command word [Controlword: 6040h] to enable the drive;
- 3) Set to the interpolation period [Interpolation time period: 60C2h], the unit is ms, (this value means that the interpolation period must be the same as the synchronization period value of the master station);
- 4) Send interpolation instructions. Periodically write position command value to 【Interpolation data record:60C1】.

Note:

1. The master station must configure synchronization commands. Otherwise, the instruction is not executed.
2. The synchronization cycle of the master station and the interpolation cycle must be the same.

## Chapter 3 CANopen Object Dictionary Parameter Table

### 3.1 2000hManufacturer parameter address

The relationship between parameter address and CANopen index number:  $2000 + \text{offset address} = \text{CANopen index number}$ , sub-index numbers are all 0.

For example:

PA\_002, the corresponding CANopen index number is:  $2000+02 = 2000$ , and the sub index number is 0.

PA\_0A4, the corresponding CANopen index number is:  $2000+164=2164$ , and the sub index number is 0.

### 3.2 1000h Group object details

#### Object 1000<sub>h</sub>: Device Type

This object describes the logical device type and its function. It consists of two 16-bit fields, one describes the device protocol or application protocol used, and the other gives additional function information of the logical device.

INDEX	1000h
Name	device type
Object Code	VAR
Data Type	UNSIGNED32
Access	RO
PDO Mapping	No
Value Range	UNSIGNED32
Default Value	04020192 h

#### Object 1001<sub>h</sub>: Error Register

This object provides an error information record, and the CANopen device maps internal error records to this object, which is part of the emergency object.

INDEX	1001h
Name	error register
Object Code	VAR
Data Type	UNSIGNED8
Access	RO
PDO Mapping	Yes
Value Range	UNSIGNED8
Default Value	0

#### Object 1003<sub>h</sub>: Pre-defined Error Field

This object expresses the error generated on the CANopen device, is compiled by the emergency object, and provides an error history record.

INDEX	1003h
Name	pre-defined error field
Object Code	ARRAY
Data Type	UNSIGNED32
Access	RW

PDO Mapping	No
Sub-Index	0
Description	number of errors
Data Type	UNSIGNED8
Access	RW
PDO Mapping	No
Value Range	0~5
Default Value	0
Sub-Index	1~5
Description	standard error field
Data Type	UNSIGNED32
Access	RO
PDO Mapping	No
Value Range	UNSIGNED32
Default Value	0

**Object 1005h: COB-ID SYNC message**

INDEX	1005h
Name	COB-ID SYNC message
Object Code	VAR
Data Type	UNSIGNED32
Access	RW
PDO Mapping	No
Value Range	UNSIGNED32
Default Value	80 h

**Object 1006h: Communication Cycle Period**

This object defines the SYNC interval.

INDEX	1006h
Name	communication cycle period
Object Code	VAR
Data Type	UNSIGNED32
Access	RW
PDO Mapping	No
Value Range	UNSIGNED32
Default Value	0
Comment	Unit: microsecond

**Object 1009h: hardware Verison**

INDEX	1009h
Name	Hardware Version
Object Code	VAR
Data Type	UNSIGNED16
Access	RO
PDO Mapping	No

Value Range	UNSIGNED16
Default Value	0x1000
Comment	

**Object 100Ah: software Verison**

INDEX	100Ah
Name	software Version
Object Code	VAR
Data Type	UNSIGNED16
Access	RO
PDO Mapping	No
Value Range	UNSIGNED16
Default Value	0x1000
Comment	

**Object 100Ch: Guard Time (unit: ms) (Now not support)**

INDEX	100Ch
Name	guard time
Object Code	VAR
Data Type	UNSIGNED16
Access	RW
PDO Mapping	No
Value Range	UNSIGNED16
Default Value	0
Comment	Unit: millisecond

**Object 100Dh: Life Time Factor (unit: ms) (Now not support)**

INDEX	100Dh
Name	life time factor
Object Code	VAR
Data Type	UNSIGNED8
Access	RW
PDO Mapping	No
Value Range	UNSIGNED8
Default Value	0

**Object 1010h: Store parameters**

This object controls to save the parameters to the non-volatile memory, write "save" to 1010-01 to save the parameters

INDEX	1010h
Name	store parameters
Object Code	ARRAY
Data Type	UNSIGNED32
Access	RW

PDO Mapping	NO
Sub-Index	0
Description	Largest sub-index supported
DataType	UNSIGNED8
Access	RO
PDOMapping	No
ValueRange	1
DefaultValue	1
Sub-Index	1
Description	save all default parameters
DataType	UNSIGNED32
Access	RW
PDOMapping	No
ValueRange	UNSIGNED32
DefaultValue	1

The hexadecimal value corresponding to "save" is as follows:

ASCII 码	e	v	a	s
HEX	65h	76h	61h	73h

#### Object 1011<sub>h</sub>: Restore default parameters

Use this object to restore the parameter default values according to the protocol, device protocol and application protocol, write "load" to 1011-01 to restore the factory parameters

INDEX	1011 <sub>h</sub>
Name	Restore default parameters
ObjectCode	ARRAY
DataType	UNSIGNED32
Access	RW
PDOMapping	No
Sub-Index	0
Description	largestsub-indexsupported
DataType	UNSIGNED8
Access	RO
PDOMapping	No
ValueRange	1
DefaultValue	1
Sub-Index	1
Description	restorealldefaultparameters
DataType	UNSIGNED32
Access	RW
PDOMapping	No
ValueRange	UNSIGNED32
DefaultValue	1

The hexadecimal value corresponding to "load" is as follows:

ASCII 码	d	a	o	l
HEX	64h	61h	6Fh	6Ch

**Object 1014<sub>h</sub>: COB-ID Emergency Object**

This object expresses the configured EMCY write service COB-ID.

INDEX	1014h
Name	COB-ID Emergency message
Object Code	VAR
Data Type	UNSIGNED32
Access	RO
PDO Mapping	No
Value Range	UNSIGNED32
Default Value	80 h + Node-ID

**Object 1016<sub>h</sub>: Consumer Heartbeat Time**

This object is the desired heartbeat cycle, and the heartbeat producer is monitored from the first heartbeat received.

INDEX	1016h
Name	Consumer Heartbeat Time
Object Code	VAR
Data Type	UNSIGNED16
Access	RW
PDO Mapping	No
Value Range	UNSIGNED16
Default Value	0

**Object 1017<sub>h</sub>: Producer Heartbeat Time**

This object is the configuration of the heartbeat cycle.

INDEX	1017h
Name	Producer Heartbeat Time
Object Code	VAR
Data Type	UNSIGNED16
Access	RW
PDO Mapping	No
Value Range	UNSIGNED16
Default Value	0

**Object 1018<sub>h</sub>: Identity Object**

This object provides the identification information of the CANopen device.

INDEX	1018h
Name	Identity Object
Object Code	RECORD
Data Type	Identity
Access	RO
PDO Mapping	No
Sub-Index	0
Description	number of entries
Data Type	UNSIGNED8

Access	RO
PDO Mapping	No
Value Range	3
Default Value	3
Sub-Index	1
Description	Vendor ID
Data Type	UNSIGNED32
Access	RO
PDO Mapping	No
Value Range	UNSIGNED32
Default Value	0x000001DD
Sub-Index	2
Description	Product code
Data Type	UNSIGNED32
Access	RO
PDO Mapping	No
Value Range	UNSIGNED32
Default Value	0, 6030h : M Series
Sub-Index	3
Description	Revision number
Data Type	UNSIGNED32
Access	RO
PDO Mapping	No
Value Range	UNSIGNED32
Default Value	0
Sub-Index	4
Description	serial number
Data Type	UNSIGNED32
Access	RO
PDO Mapping	No
Value Range	UNSIGNED32
Default Value	0

**Object 1200h: Server SDO Parameter**

INDEX	1200h
Name	Server PDO parameter
Object Code	RECORD
Data Type	SDO Parameter
Access	RO
PDO Mapping	No
Sub-Index	0
Description	number of entries
Data Type	UNSIGNED8
Access	RO
PDO Mapping	No



Value Range	2
Default Value	2
Sub-Index	1
Description	COB-ID Client->Server (rx)
Data Type	UNSIGNED32
Access	RO
PDO Mapping	No
Value Range	UNSIGNED32
Default Value	Index 1200 h: 600 h + Node-ID
Sub-Index	2
Description	COB-ID Server->Client (tx)
Data Type	UNSIGNED32
Access	RO
PDO Mapping	No
Value Range	UNSIGNED32
Default Value	Index 1200 h: 580 h + Node-ID

**Object 1400h ~ 1403h: Receive PDO Communication Parameter**

INDEX	1400h ~ 1403h
Name	Receive PDO parameter
Object Code	RECORD
Data Type	PDO CommPar
Access	RW
PDO Mapping	No
Sub-Index	0
Description	largest sub-index supported
Data Type	UNSIGNED8
Access	RO
PDO Mapping	No
Value Range	5
Default Value	5
Sub-Index	1
Description	COB-ID used by PDO
Data Type	UNSIGNED32
Access	RW
PDO Mapping	No
Value Range	UNSIGNED32
Default Value	Default Node-ID: 0
	Index 1400 h: 200 h + Node-ID
	Index 1401 h: 300 h + Node-ID
	Index 1402 h: 400 h + Node-ID
	Index 1403 h: 500 h + Node-ID
Sub-Index	2
Description	Reception type
Data Type	UNSIGNED8

Access	RW
PDO Mapping	No
Value Range	UNSIGNED8
Default Value	0
Sub-Index	3
Description	inhibit time (not used for RPOD)
Data Type	UNSIGNED16
Access	RW
PDO Mapping	No
Value Range	UNSIGNED16
Default Value	0
Sub-Index	4
Description	compatibility entry
Data Type	UNSIGNED8
Access	RW
PDO Mapping	No
Value Range	UNSIGNED8
Default Value	0
Sub-Index	5
Description	event timer (not used for RPDO)
Data Type	UNSIGNED16
Access	RW
PDO Mapping	No
Value Range	UNSIGNED16
Default Value	0

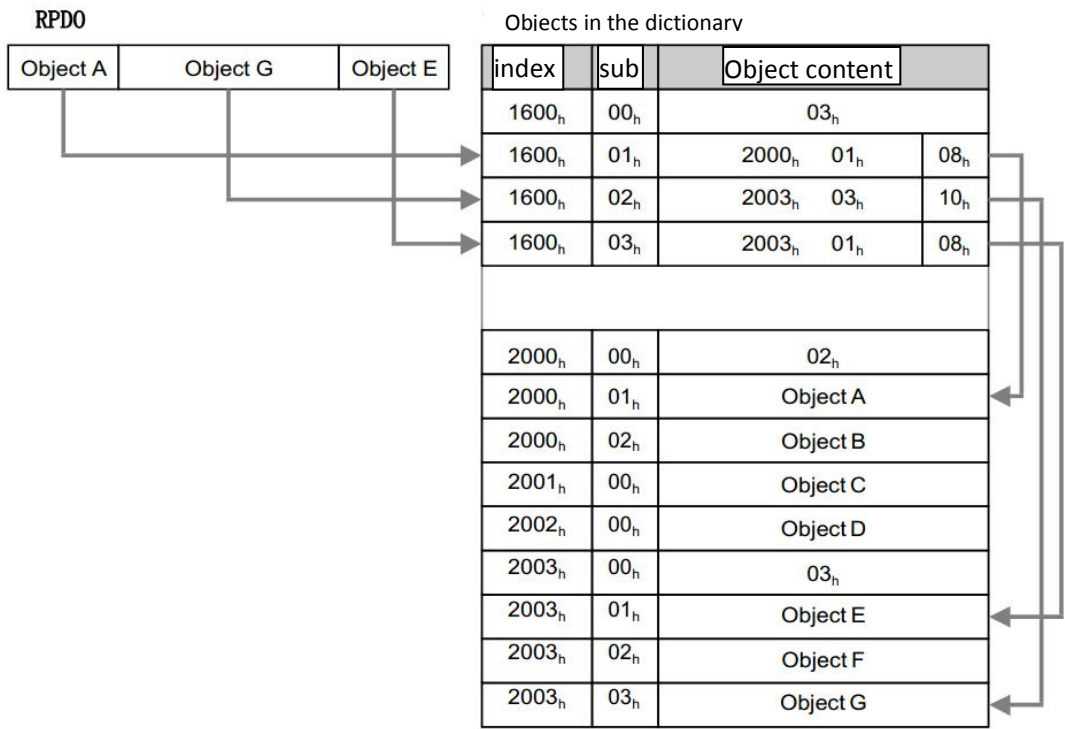
Sub-1bit description	Bit31	Bit30~ Bit 11	Bit 10~ Bit 0
	valid	0000 0000 0000 0000 0000	11-bit Identifier COB-I D

A valid value of 0 means that the PDO function is turned on, and a valid value of 1 means that the PDO function is turned off.

#### Object 1600h ~ 1603h: Receive PDO Mapping Parameter

INDEX	1600h ~ 1603h
Name	Receive PDO mapping
Object Code	RECORD
Data Type	PDO Mapping
Access	RW
PDO Mapping	No
Sub-Index	0
Description	Number of mapped application objects in PDO
Data Type	UNSIGNED8
Access	RW
PDO Mapping	No
Value Range	0: deactivated, 1~8: activated

Default Value	0
Sub-Index	1~8
Description	PDO mapping for the nth application object to be mapped
Data Type	UNSIGNED32
Access	RW
PDO Mapping	No
Value Range	UNSIGNED32
Default Value	0



RPDO 映射规则

Object 1800h ~ 1803h: Transmit PDO Communication Parameter (TPDO)

INDEX	1800h ~ 1803h
Name	transmit PDO parameter
Object Code	RECORD
Data Type	PDO CommPar
Access	RW
PDO Mapping	No
Sub-Index	0
Description	largest sub-index supported
Data Type	UNSIGNED8
Access	RO
PDO Mapping	No
Value Range	5
Default Value	5
Sub-Index	1
Description	COB-ID used by PDO

Data Type	UNSIGNED32
Access	RW
PDO Mapping	No
Value Range	UNSIGNED32
Default Value	Default Node-ID: 0
	Index 1800 h: 180 h + Node-ID
	Index 1801 h: 280 h + Node-ID
	Index 1802 h: 380 h + Node-ID
	Index 1803 h: 480 h + Node-ID
Sub-Index	2
Description	Transmission type
Data Type	UNSIGNED8
Access	RW
PDO Mapping	No
Value Range	UNSIGNED8
Default Value	0
Sub-Index	3
Description	inhibit time
Data Type	UNSIGNED16
Access	RW
PDO Mapping	No
Value Range	UNSIGNED16
Default Value	0
Sub-Index	4
Description	reserved
Data Type	UNSIGNED8
Access	RW
PDO Mapping	No
Value Range	UNSIGNED8
Default Value	0
Sub-Index	5
Description	event timer
Data Type	UNSIGNED16
Access	RW
PDO Mapping	No
Value Range	0: not used, UNSIGNED16
Default Value	0

Sub-1 bit  
description

Bit31	Bit30~ Bit 11	Bit 10~ Bit 0
valid	0000 0000 0000 0000 0000	11-bit Identifier COB-I D

A valid value of 0 means that the PDO function is turned on, and a valid value of 1 means that the PDO function is turned off.

**Object 1A00h ~ 1A03h: Transmit PDO Mapping Parameter (TPDO)**

INDEX	1A00h ~ 1A03h
Name	Transmit PDO mapping
Object Code	RECORD
Data Type	PDO Mapping
Access	RW
PDO Mapping	No
Sub-Index	0
Description	Number of mapped application objects in PDO
Data Type	UNSIGNED8
Access	RW
PDO Mapping	No
Value Range	0: deactivated 1~8: activated
Default Value	0
Sub-Index	1~8
Description	PDO mapping for the nth application object to be mapped
Data Type	UNSIGNED32
Access	RW
PDO Mapping	No
Value Range	UNSIGNED32
Default Value	0

### 3.3 6000h Group object details

**Object 603Fh: Error code (error code of CANopen defined)**

INDEX	603Fh
Name	Error code
Object Code	VAR
Data Type	UNSIGNED16
Access	RO
PDO Mapping	Yes
Value Range	UNSIGNED16
Default Value	0

**Object 6040h: Controlword**

INDEX	6040h
Name	Controlword
Object Code	VAR
Data Type	UNSIGNED16
Access	RW
PDO Mapping	Yes
Value Range	UNSIGNED16
Default Value	0

Bit definition table

15 bit ~9 bit	8 bit	7 bit	6 bit	5 bit	4 bit	3 bit	2 bit	1 bit	0bit
N/A	Halt	Fault reset	Operation Mode Specific			Enable Operation	Quick Stop	Enable Voltage	Switch on

**Object 6041h: Statusword**

INDEX	6041h
Name	Statusword
Object Code	VAR
Data Type	UNSIGNED16
Access	RO
PDO Mapping	Yes
Value Range	UNSIGNED16
Default Value	0

Value	State description				
0	Ready to switch on				
1	Switch on				
2	Operation enabled (status of servo on)				
3	Fault (Drive will servo off)				
4	Voltage enabled				
5	Quick stop				
6	Switch on disabled				
7	Warning (drive still servo on)				
8	N/A				
9	Remote				
10	Target reached				
11	Internal limit active (Not supported)				
	Contour position mode	Home mode	Interpolation position mode	Speed mode	Torque mode
12	Set-point acknowledge	Homing attained	IP mode active	Zero Speed	N/A
13	Following error	Homing error	N/A	N/A	N/A
14	N/A	N/A	N/A	N/A	N/A
15	N/A	N/A	N/A	N/A	N/A

**Object 605Ah: Quick stop option code**

INDEX	605Ah
Name	Quick stop option code
Object Code	VAR
Data Type	INTEGER16
Access	RW

PDO Mapping	Yes
Value Range	INTEGER16
Default Value	0
Comment	2: slow down on quick stop ramp

**Object 605B<sub>h</sub>: Shutdown option code**

INDEX	605Bh
Name	Shutdown option code
Object Code	VAR
Data Type	INTEGER16
Access	RW
PDO Mapping	Yes
Value Range	INTEGER16
Default Value	0
Comment	0: Servo Off, free run

**Object 605E<sub>h</sub>: Fault reaction option code**

INDEX	605Eh
Name	Fault reaction option code
Object Code	VAR
Data Type	INTEGER16
Access	RW
PDO Mapping	Yes
Value Range	INTEGER16
Default Value	2
Comment	0: Servo Off, free run
	1: slow down/ Curve stop (not supported)
	2: quick stop/ Curve stop (not supported)

**Object 6060<sub>h</sub>: Modes of operation**

INDEX	6060h
Name	Modes of operation
Object Code	VAR
Data Type	INTEGER8
Access	RW
PDO Mapping	Yes
Value Range	INTEGER8
Default Value	0
Comment	0:Reserved
	1:Profile position mode
	3:Profile velocity mode
	4:Profile torque mode
	6:Homing mode
	7:Interpolated position mode

**Object 6061<sub>h</sub>: Modes of operation display**

INDEX	6061h
Name	Modes of operation display
Object Code	VAR
Data Type	INTEGER8
Access	RO
PDO Mapping	Yes
Value Range	INTEGER8
Default Value	0

**Object 6062<sub>h</sub>: Position demand value (PUU)**

INDEX	6062h
Name	Position demand value
Object Code	VAR
Data Type	INTEGER32
Access	RO
PDO Mapping	Yes
Value Range	INTEGER32
Default Value	0
Comment	Unit: PUU

**Object 6063<sub>h</sub>: Position actual value (inc)**

INDEX	6063h
Name	Position actual value*
Object Code	VAR
Data Type	INTEGER32
Access	RO
PDO Mapping	Yes
Value Range	INTEGER32
Default Value	0
Comment	Unit: increments

**Object 6064<sub>h</sub>: Position actual value(PUU)**

INDEX	6064h
Name	Position actual value
Object Code	VAR
Data Type	INTEGER32
Access	RO
PDO Mapping	Yes
Value Range	INTEGER32
Default Value	0
Comment	Unit: PUU

**Object 6065<sub>h</sub>: Following error window**

INDEX	6065h
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Name	Following error window
Object Code	VAR
Data Type	UNSIGNED32
Access	RW
PDO Mapping	Yes
Value Range	UNSIGNED32
Default Value	3840000
Comment	Unit: PUU

**Object 6066<sub>h</sub>: Following error time out**

INDEX	6066h
Name	Following error time out
Object Code	VAR
Data Type	UNSIGNED16
Access	RW
PDO Mapping	Yes
Value Range	UNSIGNED16
Default Value	0
Comment	Unit: millisecond

**Object 6067<sub>h</sub>: Position window**

INDEX	6067h
Name	Position window
Object Code	VAR
Data Type	UNSIGNED32
Access	RW
PDO Mapping	Yes
Value Range	UNSIGNED32
Default Value	100
Comment	Unit: PUU (Positioning completion range)

**Object 6068<sub>h</sub>: Position window time**

INDEX	6068h
Name	Position window time
Object Code	VAR
Data Type	UNSIGNED16
Access	RW
PDO Mapping	Yes
Value Range	UNSIGNED16
Default Value	0
Comment	Unit: millisecond

**Object 606B<sub>h</sub>: Velocity demand value**

INDEX	606B <sub>h</sub>
Name	Velocity demand value
Object Code	VAR
Data Type	INTEGER32
Access	RO
PDO Mapping	Yes
Value Range	INTEGER32
Comment	Unit: 0.1 rpm

**Object 606C<sub>h</sub>: Velocity actual value**

INDEX	606C <sub>h</sub>
Name	Velocity actual value
Object Code	VAR
Data Type	INTEGER32
Access	RO
PDO Mapping	Yes
Value Range	INTEGER32
Comment	Unit: 0.1 rpm

**Object 606D<sub>h</sub>: Velocity window**

INDEX	606D <sub>h</sub>
Name	Velocity window
Object Code	VAR
Data Type	INTEGER16
Access	RO
PDO Mapping	Yes
Value Range	0~3000
Default Value	100
Comment	Unit: 0.1 rpm

**Object 606E<sub>h</sub>: Velocity window time**

INDEX	606E <sub>h</sub>
Name	Velocity window time
Object Code	VAR
Data Type	UNSIGNED16
Access	RW
PDO Mapping	Yes
Value Range	UNSIGNED16
Default Value	0
Comment	Unit: millisecond

**Object 606F<sub>h</sub>: Velocity threshold**

INDEX	606F <sub>h</sub>
Name	Velocity threshold

Object Code	VAR
Data Type	UNSIGNED16
Access	RW
PDO Mapping	Yes
Value Range	0~2000
Default Value	100
Comment	Unit: 0.1rpm

**Object 6071<sub>h</sub>: Target torque**

INDEX	6071 <sub>h</sub>
Name	Target torque
Object Code	VAR
Data Type	INTEGER16
Access	RW
PDO Mapping	Yes
Value Range	-3000~3000
Default Value	0
Comment	Unit: per thousand of rated torque

**Object 6074<sub>h</sub>: Torque demand value**

INDEX	6074 <sub>h</sub>
Name	Torque demand value
Object Code	VAR
Data Type	INTEGER16
Access	RO
PDO Mapping	Yes
Value Range	INTEGER16
Default Value	0
Comment	Unit: per thousand of rated torque

**Object 6077<sub>h</sub>: Torque actual value**

INDEX	6077 <sub>h</sub>
Name	Torque actual value
Object Code	VAR
Data Type	INTEGER16
Access	RO
PDO Mapping	Yes
Value Range	INTEGER16
Default Value	0
Comment	Unit: per thousand of rate torque

**Object 6078<sub>h</sub>: Current actual value**

INDEX	6078 <sub>h</sub>
Name	Current actual value
Object Code	VAR

Data Type	INTEGER16
Access	RO
PDO Mapping	Yes
Value Range	INTEGER16
Default Value	0
Comment	Unit: per thousand of rated current

**Object 607Ah: Target position(support)**

INDEX	607Ah
Name	Target position
Object Code	VAR
Data Type	INTEGER32
Access	RW
PDO Mapping	YES
Value Range	INTEGER32
Default Value	0
Comment	For Profile position mode 6060h=1 Unit:PUU

**Object 607Ch: Home offset (support)**

INDEX	607Ch
Name	Home offset
Object Code	VAR
Data Type	INTEGER32
Access	RW
PDO Mapping	Yes
Value Range	INTEGER32
Default Value	0
Comment	Unit:PUU

**Object 6081h: Profile velocity**

INDEX	6081h
Name	Profile Velocity
Object Code	VAR
Data Type	UNSIGNED32
Access	RW
PDO Mapping	Yes
Value Range	UNSIGNED32
Default Value	10000
Comment	For Profile position mode 6060h=1 Unit: 0.1RPM

**Object 6083h: Profile acceleration**

INDEX	6083h
Name	Profile acceleration

Object Code	VAR
Data Type	UNSIGNED32
Access	RW
PDO Mapping	Yes
Value Range	1~ 65500
Default Value	200
Comment	For Profile position mode (6060h = 1) Profile Velocity mode (6060h=3) Unit: millisecond (time from 0 rpm to 1000 rpm)

**Object 6084h: Profile deceleration**

INDEX	6084h
Name	Profile deceleration
Object Code	VAR
Data Type	UNSIGNED32
Access	RW
PDO Mapping	Yes
Value Range	1~ 65500
Default Value	200
Comment	For Profile position mode (6060h = 1) Profile Velocity mode (6060h = 3) Unit: millisecond (time from 0 rpm to 1000 rpm)

**Object 6085h: Quick stop deceleration**

INDEX	6085h
Name	Quick stop deceleration
Object Code	VAR
Data Type	UNSIGNED32
Access	RW
PDO Mapping	Yes
Value Range	1~65500
Default Value	200
Comment	Unit: millisecond (time from 0 rpm to 3000 rpm)

**Object 6087h: Torque slope**

INDEX	6087h
Name	Torque slope
Object Code	VAR
Data Type	UNSIGNED32
Access	RW
PDO Mapping	Yes
Value Range	0~ 65500
Default Value	200
Comment	Unit: millisecond (time from 0 to 100% rated torque)

**Object 6093h: Position factor**

INDEX	6093h
Name	Position factor
Object Code	ARRAY
Data Type	UNSIGNED32
Access	RW
PDO Mapping	Yes
Comment	Position factor =
	Numerator / Feed_constant
Sub-Index	0
Description	Number of entries
Data Type	UNSIGNED8
Access	RO
PDO Mapping	No
Value Range	2
Default Value	2
Sub-Index	1
Description	Numerator
Data Type	UNSIGNED32
Access	RW
PDO Mapping	Yes
Default Value	1
Comment	Same as P1-44
Sub-Index	2
Description	Feed_constant
Data Type	UNSIGNED32
Access	RW
PDO Mapping	Yes
Default Value	1
Comment	Same as P1-45

**Object 6098h: Homing method**

INDEX	6098h
Name	Homing method
Object Code	VAR
Data Type	INTEGER8
Access	RW
PDO Mapping	Yes
Value Range	0~35
Default Value	0

**Object 6099h: Homing speeds**

INDEX	6099h
Name	Homing speeds
Object Code	ARRAY

Data Type	UNSIGNED32
Access	RW
PDO Mapping	Yes
Sub-Index	0
Description	Number of entries
Data Type	UNSIGNED8
Access	RO
PDO Mapping	Yes
Value Range	2
Default Value	2
Sub-Index	1
Description	Speed during search for switch
Data Type	UNSIGNED32
Access	RW
PDO Mapping	Yes
Value Range	1~2000rpm
Default Value	100
Comment	Uint:rpm
Sub-Index	2
Description	Speed during search for zero
Data Type	UNSIGNED32
Access	RW
PDO Mapping	Yes
Value Range	1~500rpm
Default Value	20
Comment	Uint:rpm

**Object 609Ah: Homing acceleration**

INDEX	609Ah
Name	Homing acceleration
Object Code	VAR
Data Type	UNSIGNED32
Access	RW
PDO Mapping	Yes
Value Range	UNSIGNED32
Default Value	100
Comment	Unit: millisecond (time of acc from 0 rpm to 1000 rpm)

**Object 60C0h: Interpolation sub mode select**

INDEX	60C0h
Name	Interpolation sub mode select
Object Code	VAR
Data Type	INTEGER16
Access	RW
PDO Mapping	Yes

Value Range	INTEGER16
Default Value	0
Comment	0: Linear interpolation Others: Reserved

**Object 60C1h: Interpolation data record**

INDEX	60C1h
Name	Interpolation data record
Object Code	ARRAY
Data Type	INTEGER32
Access	RW
PDO Mapping	Yes
Comment	Before receiving SYNC message, PDO sets this record every Tmsec; T value is determined by 60C2h:01h
Sub-Index	0
Description	Number of entries
Data Type	UNSIGNED8
Access	RO
PDO Mapping	No
Value Range	2
Default Value	2
Sub-Index	1
Description	Pos_Cmd
Data Type	INTEGER32
Access	RW
PDO Mapping	Yes
Value Range	INTEGER32
Default Value	0
Comment	Unit: 32-bit CMD_PUU

**Object 60C2h: Interpolation time period**

INDEX	60C2h
Name	Interpolation time period
Object Code	RECORD
Data Type	UNSIGNED8
Access	RW
PDO Mapping	Yes
Comment	Unit: 10interpolation time index seconds
Sub-Index	0
Description	Number of entries
Data Type	UNSIGNED8
Access	RO
PDO Mapping	No
Value Range	2
Default Value	2
Sub-Index	1



Description	Interpolation time units
Data Type	UNSIGNED8
Access	RW
PDO Mapping	Yes
Value Range	UNSIGNED8
Default Value	1
Sub-Index	2
Description	Interpolation time index
Data Type	INTEGER8
Access	RW
PDO Mapping	Yes
Value Range	-3(Fixed and cannot be modified), the unit of interpolation time is $10^{-3}$ S, namely 1mS
Default Value	-3

**Object 60F4h: Following error actual value**

INDEX	60F4h
Name	Following error actual value
Object Code	VAR
Data Type	INTEGER32
Access	RO
PDO Mapping	Yes
Value Range	INTEGER32
Default Value	0
Comment	Unit: PUU

**Object 60FC<sub>h</sub>: Position demand value\***

INDEX	60FC <sub>h</sub>
Name	Position demand value*
Object Code	VAR
Data Type	INTEGER32
Access	RO
PDO Mapping	Yes
Value Range	INTEGER32
Default Value	0
Comment	Unit: increment

**Object 60FF<sub>h</sub>: Target velocity**

INDEX	60FF <sub>h</sub>
Name	Target velocity
Object Code	VAR
Data Type	INTEGER32
Access	RW
PDO Mapping	Yes
Value Range	INTEGER32
Default Value	0
Comment	Unit: 0.1rpm

**Object 6502<sub>h</sub>: Supported drive modes**

INDEX	6502h
Name	Supported drive modes
Object Code	VAR
Data Type	UNSIGNED32
Access	Ro
PDO Mapping	Yes
Value Range	UNSIGNED32
Default Value	6Dh

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