

Chapter 11 Communication

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11.1 485 Communication

The servo drive's upper computer communication uses the standard Modbus protocol based on the 485 interface.

Modbus is a serial, asynchronous communication protocol with a common language for its application to PLCs or other controllers. This protocol defines a message structure that a controller can recognize and use, regardless of the network via which it is transmitted. The Modbus protocol does not require a dedicated interface, and the typical physical interface is RS485.

The function codes of the servo drives are divided into 16-bit and 32-bit according to the data length. The Modbus RTU protocol enables data reading and writing operations to the function codes, and the command codes differ according to the data length when writing the function codes.

Command code	Description
03h	Read 16/32-bit function codes
06h	Read 16-bit function codes
10h	Write 32-bit function codes

10h

11.2 Canopen Communication

11.2.1 Canopen Performance Parameter

The second secon

1able 11-2 C	Any performance parameter description		
Designation	Description		
Link layer protocol	CAN bus		
Application layer protocol	Canopen protocol		
CAN-ID type	11bit-CAN2.0A		
	1Mbit/s(default) 500Kbit/s 250 Kbit/s 125Kbit/s 100		
Baud rate	Kbit/s、50 Kbit/s、20 Kbit/s		
Max. node number	63		
CAN frame length	0~8		
Application layer CAN frame type	Standard frame		
Terminal resistance	120Ω		
Sub protocol supported	CiA-301: Canopen application layer and communication		
Sub-protocol supported	protocols		
	NMT: Network Management Terminal		
Services supported	SDO: Service Data Object		
Services supported	PDO: Process Data Object		
	SYNC: Synchronization		
PDO transmission type	Time & event trigger, synchronous trigger		
PDO data supported	RPDO x4, TPDO x4		
SDO transmission method	Accelerated SDO transmission		
	Contour position mode		
	Contour speed mode		
Servo operation mode supported	Contour torque mode		
	Homing method		
	Interpolation mode		

able 11-2 CAN	performance	parameter	description
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The Canopen communication function of the servo drive supports the following different baud rates. The

communication distance is related to baud rate and the communication cable.

Data transmission rate	Bus length
1 Mbit/s	25
500kbit/s	100
250kbit/s	250
125kbit/s	500
50kbit/s	1000
25kbit/s	2500

Table 11- 4 Relationship among CAN communication transmission distance, rate and n
--

No.	Transmission distance	Speed rate	Node	Wire diameter
1	25m	1 Mbps	64	0.205mm ²
2	95m	500Kbps	64	0.34mm ²
3	560m	100Kbps	64	0.5mm ²
(4)	1100m	50Kbps	64	0.75mm ²

11.2.2 Communication Object

(1)SDO (Service Data Object)

- ① R-SDO (Receive- Service Data Object)and T-SDO (Transmit- Service Data Object);
- 2 Customers access to the device object dictionary via SDO when using indexes and sub-indexes;
- ③ Each SDO request and response message contains 8 bytes;

④ SDO is implemented through the CMS object in CAL, which can transmit data of different byte lengths and will actively split into groups of messages when the data exceeds 4 bytes.

(2)PDO (Process Data Object)

- ① R-PDO (Receive- Service Data Object) and T-PDO(Transmit- Service Data Object);
- 2 PDO data transmit 1 to 8 bytes real-time data to one or more receivers;

③ The communication parameters corresponding to the PDO determine synchronous or asynchronous transmission;

④ Each Canopen device contains four transmission PDO channels and four receiving PDO channels.

(3)SYNC (Synchronization)

The synchronizated object is a message broadcast periodically to the CAN bus by the Canopen master to implement the basic network clock signal. Each device can decide whether to use this event to synchronize communication with other network devices according to its own configuration.

(4)NMT(Network Management Terminal)

NMT includes boot-up messages, Heartbeat protocols and NMT messages. Based on master-slave communication mode, NMT is used to manage and monitor each node in the network mainly for three functions: node status control, error control and node startup.

(5)EMCY(Emergency Message)

Messages sent when inner device communication faulte or application failure error occures.

11.2.3 Network Parameter Configuration

11.2.3.1 Communication Object Identifier

The Communication Object Identifier (COB-ID) specifies object priority and object identification during communication. COB-ID corresponds to the 11-bit frame ID in CAN, and the 11-bit COB-ID consists of two parts, a 4-bit object function code and a 7-bit node address, as shown in Table 11-5.

10 9 8 7 6 5 4 3 2 1 0							0			
	Functio	on code					Node ID			

Table 11- 5 COB-ID composition description

Each communication object of Canopen has a default COB-ID, which can be read by SDO and partially modified by SDO. The list of objects is shown in Table 11-6 below.

Communication object	Function code	Node address	COB-ID	Corresponding object index
NMT	0000b	0	0h	-
Synchronized objects	0001b	0	80h	1005h,1006h
Emergency message	0001b	0~127	80h+Node-ID	1014h
TPDO1	0011b	0~127	180h+Node-ID	1800h
RPDO1	0100b	0~127	200h+Node-ID	1400h
TPDO2	0101b	0~127	280h+Node-ID	1801h
RPDO2	0110b	0~127	300h+Node-ID	1401h
TPDO3	0111b	0~127	380h+Node-ID	1802h
RPDO3	1000b	0~127	400h+Node-ID	1402h
Communication object	Function code	Node address	COB-ID	Corresponding object index
TPDO4	1001b	0~127	480h+Node-ID	1803h
RPDO4	1010b	0~127	500h+Node-ID	1403h
T-SDO	1011b	0~127	580h+Node-ID	1200h
R-SDO	1100b	0~127	600h+Node-ID	1200h
NMT error	1110b	0~127	700h+Node-ID	1016h,1017h

Example: COB-ID of the R-SDO of No. 2 slave node is 600h+2h=602h

11.2.3.2 System Parameter Setting

In order to enable the servo drive to access the Canopen fieldbus network, the relevant function codes of the servo drive need to be set. It is necessary to set Pn000=0.

Function code	Designation	Setting range	Value
Pn208	Internal command reception selection	0: External pulse input 1: Internal position command 2: Electronic cam 3: Reserve	4

Table 11-7 Function code table of system setting

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		4: CanOpen	
Pn080	Can Node-ID	1~127	1(Default)
Pn083	Can communication baud rate	0: 20kbit/s; 1: 50kbit/s 2: 100kbit/s; 3: 125kbit/s 4: 250kbit/s; 5: 500kbit/s 6: 1 Mbit/s	4(Default)

11.2.3.3 NMT Service

The Network Management System (NMT), part of the master-slave system, is responsible for initializing, starting and stopping the network. There is and only one Network Management System (NMT) host in the entire Canopen network that can configure the Canopen network including itself. Part of this conversion is automatically implemented internally and part of it must be implemented by the NMT messages sent from host.



Figure 11-1 NMT status

The Network Management System (NMT) message format is shown in Table 11-8.

Table 11-	8	NMT	message	format
-----------	---	-----	---------	--------

CORID	DTD	Data (bytes)			
COB-ID	KIK	0	1		
0x000	0	Command word	Node-ID		

COB-ID of NMT message is fixed to "0x000".

Data area consists of two bytes, the first one is a command word indicating the control role of that frame, as shown in Table 11-9.

Command word	Function code	Description
01h	1	Run command (all networks are running)
02h	2	Stop command (only NMT works in the whole network)
80h	3	Pre-run command (only SDO, heartbeat, NMT work)
81h	4)	Reset node command
82h	5	Reset communication command

Tabla	11_	o	NMT	massaga	command
Table	11-	Э	INIVIT	message	command

The second byte is the node address of Canopen, when it is "0", it is a broadcast message, which is valid for all slave devices in the network.

	Initialize	Pre-run	Run	Stop
PDO			0	
SDO		0	0	
SYNC		0	0	
EMCY		0	0	
Boot-Up	0			
NMT		0	0	0

Table 11- 10 Status table

Note: o means vaild

Example: If the SDO operation of the drive is turned on (drive node address is 1), a command word of 80H can be sent.

				Table	211-11					
Frame format	COB-ID	RTU	0	1	2	3	4	5	6	7
Data frame	00	0	80	01	-	-	-	-	-	-

11.2.3.4 NMT Error Control

NMT error control is mainly used to detect whether the devices in the network are online and their status including node protection/life protection and heartbeat. In practice, simultaneous life protection and heartbeat are prohibited, and the time of node protection/life protection and heartbeat should not be set too short to avoid increased network load.

(1) Node/lifetime protection

Node protection is that the NMT master periodically checks the NMT slaves' status via remote frames; lifetime protection is that the slaves indirectly monitor the status of the master via the interval of remote frames which are received originally to monitor the slave. Node protection follows a master-slave model, where each remote frame must be answered.

The objects associated with node/lifetime protection include the protection time 100Ch and the lifetime factor 100Dh. The value of 100Ch is the node protection remote frame interval in ms under normal conditions, and the product of 100Ch and 100Dh determines the latest time for host queries. Under normal conditions,

node protection is achieved. Lifetime protection is activated when both node 100Ch and 100Dh are not 0 and a node protection request frame is received.



The NMT master sends the remote frame of node protection every 100Ch, and the slave must response, otherwise the slave is considered to be disconnected; if the slave does not receive the node protection remote frame within 100Ch \times 100Dh, the master is considered to be disconnected. The NMT master sends remote frames in the format shown in Table 11-12.

Table 11-12 Remote frame messages of node protection				
COB-ID	RTR			
0x700 + Node-ID	1			

The response messages returned from the NMT slaves are shown in Table 11-13.

Table 11-	13	Node	protection	response	messages
-----------	----	------	------------	----------	----------

COB-ID	RTR	Data
0x700 + Node-ID	0	status word

Data segment is a one-byte status word with the data format shown in Table 11-14.

Table 11-14 Data segment description

rubie II I Duu beginein desemption				
Data bit	Description			
bit7	alternate "0" and "1" each time			
bit6~0	4: in stop state			
	5: in running state			
	127: in pre-running state			

(2) Heartbeat

Heartbeat is a producer-consumer model.

The Canopen device can send heartbeat messages according to the period set by the producer heartbeat interval object 1017h in ms. The node in the CAN network with the consumer heartbeat function monitors this producer according to the consumer time set by object 1016h and considers the node to be faulty once the producer heartbeat of the corresponding node is not received within the consumer heartbeat time range.

After configuring the producer heartbeat time interval 1017h, the node heartbeat function is activated and starts generating heartbeat messages. After configuring a valid subindex of consumer heartbeat 1016h, monitoring starts after a frame of heartbeat from the corresponding node is received.

Master sends heartbeat messages according to its producer time. If the slave of the monitoring master does not receive a heartbeat message within the object 1016h subindex time, the matster is considered disconnected. The object 1016h subindex time \geq host producer time \times 2, otherwise it causes the slave to mistakenly judge that the matster is disconnected.

Each object in 1017h time of the slave sends a heartbeat message to the master that monitors the slave, and if the heartbeat message is not received within the consumer time, the slave is considered to be disconnected. The heartbeat message format is shown in Table 11-18.

Table 11- 15 Heartbeat message format									
COB-ID	RTR	Data							
0x700 + Node-ID	0	status word							

The data segment has only one byte, and the highest bit is fixed to "0".

Table 11- 16 Data segment description						
Data bit	Description					
bit7	fixed to "0"					
	4: in stop state					
bit6~bit0	5: in running state					
	127: in pre-running state					

11.2.4 Service Data Object (SDO)

The Service Data Object (SDO) is linked to the object dictionary through object indexes and sub-indexes, through the object contents in the object dictionary can be read or partly modified if allowed via SDO.

11.2.4.1 SDO Transmission Mode

The SDO transmission follows the client-server mode, i.e., that is, the ask-and-answer mode, and SDO is initiated by the SDO client in the CAN bus network and answered by the SDO server; the data exchange between SDOs requires at least two CAN messages, and the CAN identifiers of the two CAN messages are not the same. The transmission mode is shown in the following figure:





11

11.2.4.2 SDO Transmission Format

SDO transmission is divided into object data transmission of no more than 4 bytes and higher than 4 bytes. The accelerated SDO transmission mode is used when it is not higher than 4 bytes, and the segmented transmission or block transmission mode is used when it is higher than 4 bytes. SD700 series drives only support accelerated SDO transmission mode. The SDO communication message is basically composed of COB-ID + command code + index + subindex + data. The data segments are arranged in the "little-endian ", mode where the lower bits are before the higher bits. SDO transmission message format is shown in Table 11-17.

COB-ID	0	1 2		3	4	5	6	7	
600h+Node-ID	command	index		subindex		data area			
580h+Node-ID	code	ir	ıdex	subindex		data area			

TT 1 1 1 1		- · ·	
	1.7	Tranemiceion	macconac
14010 11-	1/	riansmission	messages

For example, if the data area needs to send or receive data 32-bit 0x11223344, it is arranged as 44 33 22 11.

(1) SDO accelerated writing transmission message

For reads and writes not higher than 4 bytes, accelerated SDO transmission is used. The transmission messages vary according to the inconsistency of reading/writing method and data length. The format of the accelerated SDO write message is shown in Table 11-18.

	COB-ID	0	1 2	3	4	5	6	7
1	client	23H				d	ata	
chent	600h+Node-ID	2BH	index	subindex	data		-	-
\rightarrow	*	2FH			data	-	-	-
server	5901 - No. 1, ID	60H			-	-	-	-
←	580h+Node-ID ←		index	subindex		stop	code	

Table 11-18 Explanation of accelerated SDO message format

Note: 1. "-" means data is available but not considered, and it is recommended to write 0 when

writing data.

2. The servo drive currently supports the following command words

Table 11-19 SDO write command word

Command word	Description
2Fh	write 1 byte
2Bh	write 2 byte
23h	write 4 byte

Example 1: If the slave Node-ID is 1 and use SDO to write the object 100Dh(00), which is 8 bits, and write data 64h to this object, the data command is sent as:

Fable	11	20
rabie	. 11	- 20

14010 11 20													
Frame format	COB-ID	0	1	2	3	4	5	6	7				
Data frame	601	2F	0D	10	00	64	-	-	-				

If the parameter is written successfully, the returned data frame is:

Table 11- 21												
Frame format	COB-ID	0	1	2	3	4	5	6	7			
Data frame	581	60	0D	10	00	-	-	-	-			

Example 2: If the slave Node-ID is 1, and write the manufacturer parameter Pn500 [2003h(01)] with SDO, which is 16 bits, and the data 64h needs to be written to this object, the data command is sent:

Table	11-	22
10010		

Frame format	COB-ID	0	1	2	3	4	5	6	7
Data frame	601	2B	05	20	01	64	00	-	-

If the parameter is written successfully, the returned data frame is:

Table 11-23

Frame format	COB-ID	0	1	2	3	4	5	6	7
Data frame	581	60	05	20	01	-	-	-	-

(2) SDO accelerated reading transmission messages

The SDO data reading is accelerated when the object message is not higher than 4 bytes. The format of the accelerated SDO reading message is shown in Table 11-24.

Frame	COB-ID	0	1	2	3	4	5	6	7	
$client \rightarrow$	600h+Node-ID	40H	index		subindex	-	-	-	-	
server ← 580h+Nod		43H				data				
		4BH				data	a	-	-	
	580h+Node-ID	4FH	4FH ind	index	subindex	data	-	-	-	
		80H					stoj	o code		

Table 11- 24 Accelerated SDO message format description

Example 1: slave Node-ID 1, read object 100Dh(00) with SDO, sends the following command:

Table 11-25

Frame format	COB-ID	0	1	2	3	4	5	6	7
Data frame	601	40	0D	10	-	-	-	-	-

In normal cases, the returned data frame is:

Table	11-26
-------	-------

Frame format	COB-ID	0	1	2	3	4	5	6	7
Data frame	581	4F	0D	10	00	00	-	-	-

Example 2: slave Node-ID 1, read manufacturer parameter P204 [2002h(05)] with SDO, and send the following command:

Table 11- 27									
Frame format	COB-ID	0	1	2	3	4	5	6	7
Data frame	601	40	02	20	05	-	-	-	-

If the drive electronic gear ratio is 16777216:10000, that is, Pn204=16777216, then the data frame returned under normal conditions is: Table 11-28

Frame format	COB-ID	0	1	2	3	4	5	6	7
Data frame	581	4B	02	20	05	00	00	00	01

11.2.5 Procedure Data Object (PDO)

Procedure Data Object (PDO) are used to transmit real-time data and are the main data transmission mode in Canopen. Since PDO transmission does not require a response, and the PDO must be no longer than 8 bytes in length, the transmission is quite fast. The PDO mapping configuration process is as follows:





(1) PDO transmission mode

PDO uses a production-consumption-end mode, where each network node can listen to messages from the transmitting node and also determines whether a message needs to be processed after it is received. PDO data can be done on a one-to-one or one-to-many basis. Each PDO message contains a transmit PDO (TxPDO) and a receive PDO (RxPDO), and its transmission mode is defined in the PDO communication parameter index. The transmission mode is shown below:





(2) PDO object

PDO can be divided into the receive PDO (RPDO) and transmit PDO (TPDO). PDO is determined by communication parameters and mapping parameters simultaneously to decide the way and content of transmission. This servo drive is designed with 4 RPDOs and 4 TPDO to realize the data transmission of PDO,

and the list of related objects is shown in Table 11-29.

Desi	gnation	COB-ID	Communication object	Mapping objects	
	RPDO1	200h + Node-ID	1400h	1600h	
DDDO	RPDO2	300h + Node-ID	1401h	1601h	
RPDO	RPDO3	400h + Node-ID	1402h	1602h	
	RPDO4	500h + Node-ID	1403h	1603h	
	TPDO1	180h + Node-ID	1800h	1A00h	
TRDO	TPDO2	280h + Node-ID	1801h	1A01h	
IPDO	TPDO3	380h + Node-ID	1802h	1A02h	
	TPDO4	480h + Node-ID	1803h	1A03h	

Table	11-	29	PDO	obi	iect	list
raore	11	~	100	00	cou	mot

(3) PDO Communication Parameter

The COB-ID of the PDO contains control bits and identification data to determine the bus priority of this PDO. COB-ID is located on sub-index 01 of the communication parameters (RPDO: 1400h to 1403h; TPDO: 1800h to 1803h) and the highest bit determines whether this PDO is valid or not.

Table 11-30

MSB		LSB
31	30	0
0: on	$1400h{\sim}1403h+Node{-}ID$	
1: off	1800h~1803h + Node-ID	

For example, for the node with Node-ID 1, COB-ID is "80000201h" when RPDO is invalid, and writing "00000201h" to this COB-ID will activate RPDO1.

(4) PDO Transmission Type

The transmission type of PDO is located on sub-index 02 of the communication parameters (RPDO: 1400h to 1403h; TPDO: 1800h to 1803h).

Table 11- 31 PDO transmission type

Communication	Synchror	nization	A		
type value	Cyclic	Non-cyclic	Asynchronization		
0		0			
1~240	0	-	-		
241~253		-			
254/255	-	-	0		

When the transmission type of TPDO is 0, TPDO is sent if the mapping data is changed and a

synchronization frame is received;

When the transmission type of TPDO is 1 to 240, TPDO is sent when the corresponding number of synchronization frames is received;

When the transmission type of TPDO is 254 or 255, TPDO is sent when the mappping data is changed or the event timer arrives;

When the output type of the RPDO is 0 to 240, update the latest data of this RPDO to the application whenever a synchronization frame is received;

When the transmission type of RPDO is 254 or 255, update the received data directly to the application.

(5) Inhibit time

The inhibit time is set for TPDO and stored in subindex 03 of the communication parameter (1800h to 1803h) to prevent the CAN network from being occupied by PDOs with lower priorities. The time unit of this parameter is 125us. After setting the value, the transmission interval of the same TPDO should not be shorter than the corresponding time of this parameter.

For example, if the inhibit time of TPDO1 is 16, the minimum transmission interval of TPDO1 is 2ms.

Table 11- 32



• The inhibit time should not be too short, otherwise bus overload may be caused when the data keep changing. Please set the inhibit time properly.

(6) Event timer

For TPDO with asynchronous transmission (transmission type 254 or 255), define an event timer on subindex 05 of the communication parameter (1800h to 1803h). The event timer can also be seen as a trigger time (timer) that triggers the corresponding TPDO when the set time is reached.

(7) PDO mapping parameter

All PDO transmission data must be mapped to the corresponding index area through the object dictionary. During mapping, users need to configure indexes, subindexes, and mapping object lengths in the corresponding format. Each PDO data length cannot exceed 8 bytes for mapping one or more objects simultaneously. Index 0 records the number of objects mapped to the PDO, and subindexes 1 to 4 indicate the mapping content. The mapping parameters are defined as follows:

Table 11-	33 PDO	mapping	parameter	content	definition
I aoie II	55100	mapping	purumeter	content	aerinntion

Bit	31		16	15		8	7		0
Definition		index			subindex		Obje leng 081 101 201	ect 1 th 1 1 1	Bit ength 8 bits 16 bits 32 bits

For example:

Figure 11- 6 RPDO1 mapping object 6040h

	PDO1	0	1	2	3	4	5	6	7
	Value	0x11	0x22	0x33	0x44	0x55	0x66	0x7	7 0x88
							-		_
	Index	Sub-ind	ex	Definition	Va	lue	Read/Write Prope	rties	Size of data
	0x1600	0		Number of valid maj	DS .	1	R/W		Uint8
(0x1600	1		Mapping object	1 0x60)4000 <u>10</u>	R/W		Uint32
RPDO1	0x1600	2		Mapping object	2		R/W	/	Uint32
	0x1600	3		Mapping object	3		R/W		Uint32
	0x1600	4		Mapping object	4		R/W		Uint32
	-								
	0x6040	0		Control	0	2211	P /W		Uint16
	0x8040	0		word	- 03	2211	K/ W		(2 Bytes)

Figure 11-7 RPDO1 mapping object 6041h

	PDO1	0	1	2	3	4	5	6	7
	Value	0xBB	0xAA	. 0x33	0x44	0x55	0x66	0x77	0x88
	•			-					
	Index	Sub-inde	ex	Definition	Va	alue	Read/Write Prope	rties Si	ze of data
	0x1A00	0		Number of valid maps		1	R/W		Uint8
(0x1A00	1		Mapping object 1	0x60	410010	R/W		Uint32
TPDO1	0x1A00	2	1	Mapping object	2		R/W	/	Uint32
	0x1A00	3	N	lapping object ?	5		R/W		Uint32
	0x1A00	4	N	Aapping object	4		R/W		Uint32
	×								7
	0x6041	0		Control word	0xA	ABB	R/W		Uint16 (2 Bytes)

11.2.6 Synchronization (SYNC)

The servo drive can not only synchronize the consumer, but also the producer. The objects can be synchronizized are COB-ID (1005h) and cyclic period (1006h).

The second highest bit of the synchronization object COB-ID (1005h) determines whether the synchronization is activated or not:

Table 11	- 34
----------	------

MSB			LSB
31	30	29	0
0	0: off 1: on		0x80

Similar to PDO transmission, the output of synchronization objects follows the producer-consumer

mode. In a Canopen network, only one sends the synchronization object (SYNC), and the sender is the

producer while the receiver is the consumer, and the transmission framework is shown in Figure 11-8.





The synchronization in Canopen is realized by sending control data to each slave with PDO. Each slave that receives control commands from the master only saves the commands temporarily, and only after all the slave commands are sent will the master send out a synchronization (SYNC) broadcast message, and all slaves that support synchronization transmission mode will execute the previously received control commands at the same time after they have received the synchronization (SYNC) message.

PDO synchronization transmission is closely linked to synchronization frames and its specific application is shown below:

Communication	Synchror	Agreehyopization	
type value	Cyclic Non- cyclic		Asynchronization
0		0	
1~240	0	-	-
241~253		-	
254~255	-	-	0

Table 11-35 PDO trigger method

When the transmission type of TPDO is 0, the TPDO is sent if the mapping data is changed and a synchronization frame is received;

When the transmission type of TPDO is 1 to 240, the TPDO is sent when the corresponding number of synchronization frames is received;

When the transmission type of TPDO is 254 or 255, the TPDO is sent when the mapping data is changed or the event timer arrives;

When the output type of the RPDO is 0 to 240, update the latest data of the RPDO to the application whenever a synchronization frame is received;

When the transmission type of RPDO is 254 or 255, the received data is updated directly to the application.

11.2.7 Emergency (EMCY)

When a Canopen node fails, it sends an emergency message according to the table conversion mechanism. Emergency messages follow the producer-consumer model. After a node fault is sent, other nodes in the CAN network can choose to handle the fault. This servo driver only acts as an emergency message producer and does not process emergency messages from other nodes.

When a node fails, the drive updates the error register (1001h) and predefined error field (1003h) regardless of whether emergency messages are activated.

Users need to activate the emergency messages for use.

MSB		LSB
31	30	0
0: on 1: off	0x80+Node-ID)

The format of the emergency message sent by the servo drive is:

COB-ID	0	1	2	3	4	5	6	7
0x80+Node-ID	erro	or code	error register	NA		auxilia	ry byte	

Note: The error register is consistent with 1001h:

(1) The error code shall be consistent with the requirements of DS301, and the auxiliary byte shall be

zero in case of abnormal communication.

(2) In case of an exception specified by the user, the error code is 0xFF00, and the auxiliary byte

displays that specified code.

For example, enable emergency message on node 1(Pn080=1).

(1) Node pre-running (turning on SDO running is valid)

Table 11-38

Frame format	COB-ID	0	1	
Data frame	00	80	01	

Note: Here frames mean remote frames.

(2) Acticate the emergency message object 1014h, in which Bit31 is used to turn on /off the emergency

message. Accordingly, the data sent by the upper computer is: (Write data 0x00000081)

COB-ID	0	1	2	3	4	5	6	7
601H	23	14	10	00	81	00	00	00

Note: here frames mean data frames.

(3) Use the monitoring code Un031(the communication address is 0xE031) to check whether the drive has activated emergency messages.

11.2.8 Servo Stauts

11.2.8.1 Servo Stauts

The SD700 Canopen drive is controlled according to the standard CiA402 protocol. The overall running status diagram is as follows:



States in the figure above are described as follows:

CiA status	Description
Initialize	The drive is initialized and the internal self-inpection t is complete. Drive
	parameters cannot be set and drive does not run.
Servo no faults	The drive is fault free and the drive parameters can be set.
Switch On	The drive is ready and the drive parameters can be set.
Wait to enable servo	Drive is waiting for servo to be enabled and drive parameters can be set.
Enable Operation	The drive is running normally, a servo mode has been enabled, and the motor
	is powed. Drive parameters can be modified based on the specific mode.

Table 11-40 CiA States description table

1 Communication

Quick stop	Quick stop is activated and the drive is executing it. Drive parameters can be
	modified based on the specific mode.
CiA status	Description
Fault stop	Faults occur and drive is performing this function. Drive parameters can be
	modified based on the specific mode.
Fault	When the fault stop is completed and all functions of the drive are disabled,
	users can change the parameters of the corresponding drive to troubleshoot
	the fault.
	Example: For a resettable fault, run the control word 6040h=0x80 to reset the
	fault.

Control commands and status switching are shown in the following table:

CiA	402 status switching	6040h (control word)	6041h (status word)bit 0~9 ^[1]
0	Power-on \rightarrow Initialize	Natural transition, no control commands required.	0x0000
1	Initialize → Servo no fault	Natural transition, no control commands required. If an error occurs during the initialization, jump to Step 13	0x0250
2	Servo no fault→Switch on	0x06	0x0231
3	Switch on→Wait to enable servo	0x07	0x0233
4	Wait to enable servo→Enable operation	0x0F	0x0237
5	Enable operation→Wait to enable servo	0x07	0x0233
6	Wait to enable servo→Switch on	0x06	0x0231
7	Switch on→No faults	0x00	0x0250

Table 11-41

8	Enable	0x06	0x0231
	operation→Switch on		
9	Enable operation→No	0x00	0x0250
	faults		
10	Wait to enable	0x00	0x0250
	servo→Servo no fault		
11	Enable	0x02	0x0217
	operation→Quick stop		
12	Quick stop→No faults	No need any control commands,	0x0250
		natural transition after the quick	
		stop is complete.	
13	→Fault stop	No control command is required	0x021F
		and the system switches to the	
		fault stop state in face of faults	
CiA	402 status switching	6040h(control word)	6041h (status word) bit 0~9 ^[1]
14	Fault stop→Fault	No need any control command,	0x0218
		natural transition and self-	
		switching after the fault stop is	
		completed.	
15	Fault→Servo no fault	0x80 fault reset	0x0250
16	Ouick stop \rightarrow Enable	Send 0x0F when stop is completed	0x0237

Note: [1] Bit10 ~15 of 6041h status word is related to the running state of each servo mode, so it is represented by "0".

11.2.8.2 Status Word 6041h

Table 11-42

Object 6041h				PP	PV	РТ	HM	IP
Index	6041 _h							
Designation	Status	Word						
Object structure	VAR	Data type	Uint16	Data	range		0~6553	35
Mapping	Y	Access	RO	Factory	setting		0	

	Bit definit	tion of a status word:			
	Bit	Designation	Bit definition		
	0	Switch on	1: valid; 0: invalid.		
	1	Wait to enable servo	1: valid; 0: invalid.		
	2	Enable operation	1: valid; 0: invalid.		
	3	Fault	0: no faluts; 1: faults		
	4	Enable voltage	1: valid; 0: invalid.		
	5	Quick stop	0: vaild; 1: invalid.		
	6	Power-on and running allowed	1: valid; 0: invalid.		
	7	Warning	1: valid; 0: invalid.		
	8	Factory-defined			
	0	Romoto control	0: non-Canopen mode;		
	9	Keniote control	1: Canopen remote control mode.		
Function description	10	Target reached Software internal position exceeds the limit	Speed mode: 0: target speed is not reached; 1: target speed reached. Position mode: 0: target position is not reached; 1: target position is reached. 0: position command or feedback does not reach the internal position limit of the software; 1: position command or feedback reaches the internal position limit of the software.		
	12~13	Relate to control mode			
	14	NA			
	15	Home return completed	0: home return is notperformed or not completed.1: home return is completed and thereference point has been found.		

11.2.8.3 Stop Mode

SD700 CANopen supports the following stop methods:

(1) Disable the servo to stop

When servo is disabled OFF, servo stops running.

(2) Servo fault stop

When servo fault or warning occurs, servo automatically enters stop state.

(3) Quick stop

In the non-fault state, if the control word 6040h: bit2=1, quick stop function is performed and stop

method is selected via 605Ah.

Object 605Ah				PP	PV	РТ	HM	IP		
Index	605A _h									
Designation	Quick sto	Quick stop method selection								
Object structure	VAR	Data type	Int16	Data range			0~2			
Mapping	NO	Access	RW	Factory setting			2			
	Displayed	value	Control mode display							
	0		Free stop, and free runnining after free stop is completed							
Function description	1		Ramp stop at deceleration speed set at 6084h(hm: 609Ah), and free running after stop is completed;							
	2		Ramp stop at deceleration speed set at 6085h, and free running after stop is completed;					free		

Table 11-43

s selected via 003All.

(4) Halt stop (Not supported yet)

When the control word 6040h:bit8=1 in the non-fault state, stop will be halted, and the stop mode is selected via 605D.

Table 11-44

Object 605Dh					PP	PV	РТ	HM	IP
Index	605D _h								
Designation	Halt me	ethod selectio	n						
Object structure	VAR	AR Data type Int16 Data range					1~3		
Mapping	NO	Access RW			Factor	y setting		1	
	Displa	ayed value	Control mode display						
		1	Ramp stop as setting at 6084h/6087h(hm: 609Ah), and position is locked after stop is completed;						,
Function description		2		Ramp stop as setting at 6085h/6087h, and position is locked after stop is completed;					is
	3			Emergency torque stop, and position is locked after stop is completed;					

11.2.8.4 Servo Running Mode

SD700 CANopn supports 5 servo running modes.

Servo operation modes can be set by object dictionary 6060h. The current running mode of the servo can

be viewed through object dictionary 6061h.

(1)Mode selection at 6060h

Table	11-	45
-------	-----	----

Object 6060h			PP	PV	РТ	HM	IP
Index	6060 _h						
Designation	Runnin	g modes selection					

Object structure	VAR	Data type	Int8 Data range		0~7
Mapping	Y	Access	RW Factory setting		1
	Set serv	o running mode			
	Dis	olayed value	Con	trol mode display	
		0			
Function		1	Profile	e position mode (Pl	P)
description		3	Profile	velocity mode (P	V)
		4	Profile torque mode (PT))
		6	Homing method (HM)		
		7	Inter	polation mode (IP))

(2)Mode display 6061h

Table 11-46

Object 6061h					PP	PV	РТ	HM	IP		
Index	6061 _h										
Designation	Running 1	Running mode display									
Object structure	VAR	Data type			Data	range		0~7			
Mapping	Y	Access RO			Factor	y setting		0			
	Displa valu	iyed ie	Control mode display								
	0		NA								
Function	1			Profile po	sition mod	e (PP)					
description	3			Profile vel	locity mod	e (PV)					
	4				Profile torque mode (PT)						
	6			Homing	method (I	HM)					
	7			Interpola	ation mode	e (IP)					

11.2.8.5 Conversion Factor Setting

• Encoder unit: drive drives the motor directly, and position feedback of the motor is pulse quantity, and the encoder unit is the pulse unit.

 Command unit: control commands of the drive and the commands from CanOpen are usually used as command units. The command units and encoder units are converted by the servo-end gear ratio 6091h.

 User unit: users usually use the actual load displacement, velocity, and acceleration units for convenience. User units and command units are converted by the user scaling ratio.

Figure 11- 10



When the encoder unit, command unit and user unit do not match, it will cause the motor to run incorrectly. Therefore, before running the servo drive, the conversion factor must be set correctly, and the ratio between encoder units and user units must be decided by the conversion factor.

• When using a 23-bit motor in profile position mode and gear ratio is set to 1:1, if the motor requires 10 turns of motion, motor speed is 600 rpm, user acceleration is 600 rpm/s, and user deceleration is 300 rpm/s.

Target position: 607Ah =10*8388608 ;

Profile velocity: 6081 = 600*8388608/60;

Profile acceleration: 6083 = 600*8388608/60;

Profile deceleration: 6084 = 300*8388608/60;

And so:

Acceleration time $=\frac{6081}{6083} = 1s$; Acceleration time $=\frac{6081}{6084} = 2s$; (1) Gear ratio: 6091(Pn204: Pn206)

Gear ratio is essentially the motor displacement (in encoder units) corresponding to a load shaft displacement of 1 command unit.

The gear ratio consists of 6091-01 (Pn204 electronic gear ratio numerator) and 6091-02 (Pn206 electronic gear ratio denominator), through which the proportional relationship between load shaft displacement (command unit) and motor displacement (encoder unit) can be established as follows:

The motor is connected to the load by means of a gearbox and other mechanical transmission mechanisms. Therefore, the gear ratio is related to the mechanical reduction ratio, mechanical dimensionrelated parameters, and motor resolution. The calculation is as follows:

gear ratio = $\frac{\text{motor resolution}}{\text{load resolution}}$

Object 6091h				PP	PV	РТ	HM	IP			
Index	6091 _h	6091 _h									
Designation	Gear Ra	Gear Ratio									
Object structure	ARR	ARR Data type Uint32 Data range Uint32									
Mapping	Y	Y Access RW Factory setting -									
Function description	Position between Motor c (6091) Motor s	n factor is used to n load displacem lisplacement (mo peed (rpm) VS h motor speed	b) establish a usent and motor ptor unit) = loa pad shaft spee $l(rpm) = \frac{loan}{2}$	ser-specifie displaceme d displacer d (p/s): d shaft spe encoder	d propor ent: nent (use eed * ge resoluti	tional re er unit) > ar ratio on	lationshir < gear rati * 60	0			

Table 11-47

Motor acceleration (rpm/ms) VS load shaft acceleration (command unit $/s^2$):			
Motor acceleration (rpm/ms) = $\frac{\text{load shaft speed } * \text{ gear ratio}}{\text{encoder resolution}} * 1000/60$			

Table 11-48

Sub-index	00h					
Designation	Number	umber of sub-indexes				
Object structure	VAR	Data type	Uint8	Data range	2	
Mapping	Y	Access	RO	Factory setting	2	

Tabl	le 1	11-	49

Sub-index	01 _h					
Designation	Motor r	Motor revolutions				
Object structure	VAR	Data type	Uint32	Data range	Uint32	
Mapping	Y	Access	RW	Factory setting	1	

Table 11- 50

Sub-index	02h					
Designation	Shaft re	Shaft revolution				
Object structure	VAR	Data type	Uint32	Data range	Uint32	
Mapping	Y	Access	RW	Factory setting	1	

(2) Scaling ratio (User ratio)

The scaling ratio is set by the user of the upper computer, through which the proportional relationship between the load shaft displacement (user unit) and the motor displacement (command unit) can be established:

Motor displacement (command unit) = load shaft displacement (user unit) × scaling ratio

11.2.9 Control Mode

11.2.9.1 Profile Position Mode (PP)

When in profile position mode, the master sends a dictionary of relevant objects such as the required target position (absolute or relative), velocity, acceleration and deceleration of the position profile to the servo drive, which generates the target profile command based on the relevant data and commands received.



Figure 11- 11 Profile position mode control diagram

The conversion of user and encoder unit in profile position mode via 0x6091 is illustrated as follows:

Figure 11-12



 $0x6091(gear ratio) = \frac{motor resolution}{load resolution}$. 0x6063(motor position feedback) and 0x6064(user location feedback) relationship is : $0x6063(encoder unit)=0x6064(command unit)\times gear ratio$.

Relationship of 0x6081 (profile speed), 0x607F (user maximum speed) and motor maximum speed after conversion is as follows:





Motor speed (rpm) versus load shaft speed (command unit/s):

motor speed (rpm) = $\frac{\text{load shaft speed} \times 6091\text{h}}{\text{encoder resolution}} \times 60$

 $Relationship \ between \ 0x6083/0x6084 \ (\ profile \ acceleration/deceleration) \ and \ 0x60C5/0x60C6 \ (\ profile \ acceleration) \ between \$

maximum acceleration/deceleration) is as follows:

Communication

Figure 11- 14



Example: If a 23-bit motor is used and the gear ratio is set to 1:1, if the motor is required to move 10 turns, then the motor speed is 600 rpm, the user acceleration is 600 rpm/s, and the user deceleration is 300 rpm/s.

Target position: 607Ah =10*8388608 ;

Profile speed:6081 = 600*8388608/60;

Profile acceleration:6083 = 600*8388608/60;

Profile deceleration: $6084 = 300 \times 8388608/60$.

Related object dictionaries:

Table 11- 51

	Control word 6040h					
Bit	Designation	Description				
0	Servo ready (Switch on)	0: invalid; 1: valid.				
1	Power on the main circuit (Enable voltage)	0: invalid; 1: valid.				
2	Quick stop	0: valid; 1: invalid.				
3	Servo running (Enable operation)	0: invalid; 1: valid.				
4	New target posotopm (New set- point)	Rising edge triggers a new target position.				
5	Change setting immediately	0: non-immediate change; 1: immediate change.				
6	Abs/Rel	0: target position is an absolute position command;1: target position is a relative position command.				

Table 11	- 52
----------	------

Status word 6041h					
Bit Designation		Description			
10	Torrest months d	0: target position not reached;			
10	Target reached	1: target position reached;			
12	Charge target resition (Set reint colors ulades)	0: target position changeable;			
12	Change target position(Set point acknowledge)	1: target position unchangeable;			
12		0: no excessive position deviation fault;			
13	Following error	1: excessive position deviation fault;			

15	Home rature (Home find)	0: home return not completed;
15	Home feturit (Home find)	1: home return completed;

Index	Sub- index	Designation	Read/ Write	Data type	Unit	Range
0x603F	00	Error code	RO	RO UINT16		0~65535
0x6040	00	Control word	RW	UINT16	-	0~65535
0x6041	00	Status word	RO	UINT16	-	0~65535
0x6060	00	Running Mode	RW	INT8	-	0~7
0x6061	00	Mode display	RO	INT8	-	0~7
0x6062	00	Position command	RO	INT32	Command unit	-231 ~(231-1)
0x6063	00	Motor position feedback	RO	INT32	Encoder unit	-2 ³¹ ~(2 ³¹ -1)
0x6064	00	User position feedback	RO	INT32	Command unit	$-2^{31} \sim (2^{31} - 1)$
0x606C	00	Real speed feedback	RO	INT32	Command unit/s	-2 ³¹ ~(2 ³¹ -1)
0x607A	00	Target position	RW	INT32	Command unit	$-2^{31} \sim (2^{31} - 1)$
0x6081	00	Profile speed	RW	UINT32	Command unit/s	0~(2 ³² -1)
0x6083	00	Acceleration	RW	UINT32	UINT32 Command unit/s ²	
0x6084	00	Deceleration	RW	UINT32	Command unit/s ²	0~(2 ³² -1)

Table 11- 53

The following table shows the steps for setting up the profile position running mode:

Table	11-	54
Table	11-	54

Item	Step	Parameter input	Status word display (6041h)
	0	607Ah = 10000	0x0250
Profile position parameter	1	6081h = 1000	0x0250
assignment	2	6083h = 200	0x0250
	3	6084h = 200	0x0250

Control mode switching	4	6060h = 0x01	0x0250
	5	6040h = 0x06	0x0231
Servo enabling	6	6040h = 0x07	0x0233
	7	6040h = 0x0F	0x0637
Absolute/relative position selection	8	6040h Bit6 set 1 (relative position)	0x0637
Position command triggering	9	6040hBit4 set 1 (rising edge)	0x1237
Positioning completed	10	6041h Bit10 set 1	0x0637
Bit reset triggering for next use	11	6040hBit4 reset	0x0637

Description of control word 6040h and status word 6041h in profile position mode:

Table 11- 55

Object 6040h						РТ	HM	IP
Index	6040 _h							
Designation	Control V	Control Word						
Object structure	VAR	Data type	Uint 16	Da	Data range		0~65535	
Mapping	Y	Access	RW	Fact	ctory setting 0			
	Bit definit	ion of the control	word:					
	Bit	Desig	nation			Desci	ription	
	0	Servo ready			0: invalid;	1: valid.		
	1	Turn on the n electricity	Turn on the main circuit electricity			1: valid.		
	2	Quick stop	Quick stop			0: valid.		
3		Enable operation	Enable operation			0: invalid; 1: valid.		
Function description	4	Enable the new position command		n	0→1: when there is a new segn position instruction to be chan; whether it is valid or not is det by the servo status; 1→0: change 6041h: bit12 from 0, whether success is determin servo status.		egment of anged, letermined rom 1 to ined by	
	5		Position command (change mode)		0: non-immediate change; 1: immediate update.			
	6	Position command (typ		be)	0: 607Ah indicates an absolute position command; 1: 607Ah indicates a relative per command.		ute e position	
	7	Fault reset	Fault reset		bit7 rising edge is valid; bit7 is held to 1. All other control commands are invalid.		ontrol	
	8	Halt			0: invalid;	1: valid.		
	9~10	NA						

11~15	Factory-defined			
Note: each bit in the control word needs to be used together with other bits to				
form a control command.				

Table	11-	56
inoic		20

Object 6041h				PP	PV	РТ	HM	IP	
Index	6041 _h								
Designation	Status	Status Word							
Object structure	VAR	Data type	Data type Uint16			Data range 0~65535			
Mapping	Y	Access	RO	Factor	y setting		0		
	Bit defi	inition of status w	ord:						
	Bit	Designatio	on	Description					
	0	Servo ready	0	0: invalid; 1: valid.					
		Waiting to turn	on						
	1	servo enable	U	0: invalid; 1: valid.					
	2	Servo operation	0	: invalid; 1	: valid.				
	3	Faults	0	no faults;	: faults.				
	4	Turn on the mai	n	. :	1: .1				
	4	circuit power	U	: invand; i	: vand.				
	5	Quick stop 0:		: valid; 1: i	nvalid.				
6		Power-on and ru	unning 0	0: invalid: 1: valid.					
		allowed		, 					
	7 Warning		0	0: invalid; 1: valid.					
	8	Factory-defined							
	9	Remote control 0: non-Canopen mode;				trol me	ode		
Function			1	0: target position not reached:					
description	10	Target reached	1: target position reached.						
			0	0: position command or feedback does			ack does	not	
		Software internal position exceeds the		reach the internal position limit of the					
	11			software;					
		limit	limit 1:		1: position command or feedback reaches				
			t	the internal position limit of the software.				re.	
	12	Position comma	ind 0	: new posit	ions allowe	ed;			
		change signal		: new posi	ion not allo	owed;			
13 Position dev			0	: position o	leviation w	ithin 60)65h		
		Position deviation	on r	ange;			0.671		
		status	1	: position c	leviation of	itside 6	065h		
	14	NT A	r	ange.					
	14	INA							
		II and a mature	U.	: nome retu	im not peri	ormed	or not		
	15	nome return	ome return completed;						
		completed	1 r	oint found			reference	5	

When running in the profile position mode, there are two ways to change the commands, namely, immediate change and non-immediate change. The specific process of implementing these two ways is explained below.

(1) Absolute position command or relative position command, immediate change

Figure 11-15 Timing sequence of relative position command value in immediate change mode



0x6040: bit5=1 immediate change mode ,run the 1st stage S1 position command, and before its completion, 0x6040: bit4 and then bit12 are changed into 0 from 1, this means new position command S2 needs to be changed. When 0x6040:bit4 and then bit 12 are changed into 1 from 0, that means new position command is changed and will be performed immediately.

0x6040: bit6=1 relative position command, when the 2^{nd} segment position command is completed, the total displacement command = 1^{st} segment 0x607A target position + 2^{nd} segment 0x607A target position.

0x6040: bit6=0 absolute position command, when the 2^{nd} segment position command is completed, the total displacement command = 2^{nd} segment 0x607A target position.

Running steps corresponding to the order shown in Figure 11.15 are shown in the following table

Table	11- 57
-------	--------

Step	Control word (6040h)	Status word (6041h)	Description (relative position mode)
1	0x0006	0x1231	No new commands can be received, servo ready.
2	0x0007	0x1233	No new commands can be received, the servo is ready and waiting to enable the servo.
3	0x006F	0x0637	New command can be received, servo enabled. (Note 1: 6040h: bit5=1 means the position command is changed immediately, bit6=1 means it is a relative position command) (Note 2: At this time 6041h: bit10=1 since the initial target position is 0, target position is

			reached by default)
			The servo has received the profile target
		0x1237	position (607Ah), the profile target running
4	0x007F		speed (6081h), the profile acceleration (6083h),
			and the profile deceleration (6084h), and runs
			them immediately.
	If there are no new po	sition commands to be	changed immediately, proceed to step 6 and wait
5	for the end.		
	If there is a new posit	ion command that needs	s to be changed immediately, proceed to step 7.
6	0-0075	0.1627	6041h:bit10=1 target position is reached and
6 0X007F		0X1037	the running is over.
Step	Control word	Status word	Description (relative position mode)
	(6040h)	(6041h)	
			6040h: bit10 changed into 0 from 1, and then
7	0x006F	0x0237	6041h: bit12 changed into 0 from 1, a new
			position command can be received.
			The servo has received a new position
			command, and immediately changes and runs
			the relevant position command, cycling from
8	0x007F	0x1237	step 5. (Note: If there are only two segment
			commands: relative position target = 1^{st}
			segment relative position + 2nd segment relative
			position)

Table 11-58

Step	Control word (6040h)	Status word (6041h)	Description (absolute position mode)
1	0x0006	0x1231	No new commands can be received, servo ready.
2	0x0007	0x1233	No new commands can be received, the servo is ready and waiting to enable the servo.
3	0x002F	0x0637	New command can be received, servo enabled. (Note 1: 6040h: bit5=1 means the position command is changed immediately, bit6=0 means it is an absolute position command) (Note 2: at this time 6041h: bit10=1 since the initial target position is 0, target is reached by default)
4	0x003F	0x1237	The servo has received the relevant commands for profile target position (607Ah), profile target running speed (6081h), profile acceleration (6083h), and profile deceleration (6084h), and runs them immediately.
5	If there are no new po for the end.	osition commands to be	changed immediately, proceed to step 6 and wait

	If there is a new position command that needs to be changed immediately, proceed to step 7.			
6	0x002E	0.1627	6041h:bit10=1 target position is reached and	
0	0x005F	0X1637	the running is over.	
			6040h: bit10 changed into 0 from 1, and then	
7	7 0x002F	0x0237	6041h: bit12 changed into 0 from 1, a new	
		position command can be received.		
		0.1007	The servo has received a new position	
			command, and immediately changes and runs	
0	0-002E		the relevant position command, cycling from	
8 00005	0x005F	0X1257	step 5. (Note: If there are only two segment	
			commands: the absolute position target =2nd	
			segment absolute position)	

(2) Absolute position command or relative position command, non-immediate change

Figure 11- 16 Timing sequence for non-immediate change mode of relative position command value



When 0x6040: bit5=1 immediate change mode, run the 1st segment S1 position command, 0x6040: bit4 and then bit12 are changed into 0 from 1 before the command is not finished, it means that there is a new position command S2 needs to be changed. When 0x6040: bit4 and then bit12 are changed into 1 from 0, it means that the new position command has been changed, but it is necessary to wait until the 1st segment position command is finished before running the 2nd segment position command.

Corresponding running steps to Figure 11.16 are shown in the following table.

Step	Control word (6040h)	Status word (6041h)	Description (relative position mode)
1	0x0006	0x1231	No new commands can be received, servo ready.
2	0x0007	0x1233	No new commands can be received, the servo is ready and waiting to enable the servo.
---	---	---	--
3	0x004F	0x0637	New command can be received, servo enabled. (Note 1: 6040h: bit5=0 means the position command is not changed immediately, bit6=1 means it is a relative position command) (Note 2: At this time 6041h: bit10=1 since the initial target position is 0, target position is reached by default)
4	0x005F	0x1237	The servo has received the relevant commands for profile target position (607Ah), profile target running speed (6081h), profile acceleration (6083h), and profile deceleration (6084h), and runs them immediately.
5	If there are no new po If there is a new posit	sition commands to be ion command, proceed	changed, proceed to step 6 and wait for the end. to step 7.
6	0x005F	0x1637	6041h:bit10=1 target position is reached and the running is over.
7	0x004F	0x0237	6040h :bit10 changed into 0 from 1, and then 6041h: bit12 changed into 0 from 1, a new position command can be received.
8	0x005F	0x1237	The servo has received a new position command, and runs the next command after the 1 st segment command is over, cycling from step 5. (Note: If there are only two segment commands: relative position target = 1 st segment relative position + 2 nd segment relative

Tabl	e 11	- 60

Step	Control word (6040h)	Status word (6041h)	Description (absolute position mode)
1	0x0006	0x1231	No new commands can be received, servo ready.
2	0x0007	0x1233	No new commands can be received, the servo is ready and waiting to enable the servo.
3	0x000F	0x0637	New command can be received, servo enabled. (Note 1: 6040h: bit5=0 means the position command is not changed immediately, bit6=0 means it is an absolute position command) (Note 2: At this time 6041h: bit10=1 since the initial target position is 0, target position is reached by default)
4	0x001F	0x1237	The servo has received the relevant commands for profile target position (607Ah), profile

		target running speed (6081h), profile acceleration (6083h) and profile deceleration		
			(6084h), and runs them immediately.	
5	If there are no new po	osition commands to be	changed, proceed to step 6 and wait for the end.	
5	If there is a new posit	ion command, proceed	to step 7.	
6	0-001E	0-1627	6041h:bit10=1 target position is reached and	
0	0x001F 0x1637		the running is over.	
			6040h :bit10 changed into 0 from 1, and then	
7	0x000F	0x0237	6041h: bit12 changed into 0 from 1, a new	
			position command can be received.	
			The servo has received a new position	
			command, and runs the next command after the	
			1st segment command is over, cycling from step	
8	0x001F	0x1237	5. (Note: If there are only two segment	
			commands: absolute position target = 1^{st}	
			segment absolute position $+2^{nd}$ segment	
			absolute position)	

11.2.9.2 Profile Velocity Mode (PV)

In profile velocity mode, the master transmits the required target velocity, acceleration time and deceleration time to the servo drive, which performs the speed and torque adjustment.

Figure 11- 17 Profile velocity mode control diagram



The conversion of user units and encoder units in profile velocity mode via 0x6091 is illustrated below:

Figure 11- 18



 $0x6091(gear ratio) = \frac{motor resolution}{load resolution}$. Relationship between 0x6063 (motor position feedback) and

0x6064 (user position feedback): 0x6063 (encoder unit) = 0x6064 (command unit) \times gear ratio.

Relationshop of 0x60FF (target speed), 0x607F (user maximum speed) and the corresponding motor maximum speed after conversion as follows:





Motor speed (rpm) versus load shaft speed (command unit/s):

motor speed(rpm) = $\frac{\text{load shaft speed} \times 6091\text{h}}{\text{encoder resolution}} \times 60$

Example: gear ratio = 1:1, with 23-bit encoder. Motor speed = 500rpm (corresponding to 0x60FF (load shaft speed)) = 500*8388608/60 = 69905066 (command unit/s).

Relationship between 0x6083/0x6084 (profile acceleration/deceleration) and 0x60C5/0x60C6 (profile maximum acceleration/deceleration) is as follows:





Example: gear ratio = 1:1, with 23-bit encoder. Motor speed = 600rpm, motor acceleration/deceleration

= 1200rpm/s.

Target speed: 0x60FF = 600*8388608/60;

Profile acceleration: 0x6083 = 1200*8388608/60;

Profile deceleration: 0x6084 = 1200*8388608/60;

Table 11-61 Related	object	dictionaries:
---------------------	--------	---------------

Indov	Sub-	Designation	Read/ Data		Tu:t	Donos	
Index	index	Designation	Write	type	Omt	Kange	
0x603F	00	Error code	RO	UINT16	-	0~65535	
0x6040	00	Control word	RW	UINT16	-	0~65535	
0x6041	00	Status word	RO	UINT16	-	0~65535	
Index	Sub-	Designation	Read/	Data	Unit	Range	

1 Communication

	index		Write	type		
0x6060	00	Running mode	RW	INT8	-	0~7
0x6061	00	Mode display	RO	INT8	-	0~7
0x606C	00	Real speed feedback	RO INT32		Command unit/s	-
0x607F	00	Maximum profile speed	RW	UINT32	Command unit/s	0~(2 ³² -1)
0x6083	00	Acceleration	RW	UINT32	Command unit /s ²	0~(2 ³² -1)
0x6084	00	Deceleration	RW	UINT32	Command unit /s ²	0~(2 ³² -1)
0x60FF	00	Target speed	RW	INT32	Command unit /s	$-2^{31} \sim (2^{31} - 1)$

Note: The speed limit value is determined by the smaller of 0x607F and the maximum motor speed.

The operating procedure for the profile velocity mode is shown in the following table:

Item	Step	Parameter input	Status word display (6041h)
Des Classes la sites	1	6083h = 200	0x1250
Profile velocity	2	6084h = 200	0x1250
parameter assignment	3	60FFh = 10000	0x1250
Control mode selection	4	6060h = 0x03	0x1250
	5	6040h = 0x06	0x1231
Servo enabling	6	6040h = 0x07	0x1233
	7	6040h = 0x0F	0x0637

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Description of control word 6040h and status word 6041h in the profile velocity mode:

Object 6040h				PP	PV	РТ	HM	IP
Index	6040 _h							
Designation	Control V	Control Word						
Object structure	VAR	Data type	Uint16	Da	ita range		0~655	35
Mapping	Y	Access	RW	Fact	ory setti	ng	0	

	Bit definition of the control word:						
	Bit	Designation	Description				
	0	Servo ready	0:invalid; 1:valid.				
		Turn on the					
	1	main circuit	0:invalid; 1:valid.				
		electricity					
	2	Quick stop	1:invalid; 0:valid.				
	3	Enable operation	0:invalid; 1:valid.				
Function	4~6	NA					
description			bit7 rising edge valid;				
	7	Fault reset	bit7 is held to 1, and all other control				
			commands are invalid.				
	8	Halt	0:invalid; 1:valid.				
	9~10	NA					
	11~15	Factory-defined					
	Note: each	bit in the control wo	rd needs to be used together with other bits to form a				
	control command.						

Object 6041h					PP	PV	РТ	HM	IP
Index	6041 _h								
Designation	Status Wo	d							
Object structure	VAR	Data type	Uint16		Data	Data range		0~65535	
Mapping	Y	Access	RO		Factory	setting		0	
	Bit definiti	on of status word	:						
	Bit	Designa	ation			Descri	ption		
	0	Servo r	eady	0:in	nvalid; 1:va	ılid.			
	1	Wait to enal	ble servo	0:invalid; 1:valid.					
	2	Enable op	Enable operation		0:invalid; 1:valid.				
	3	Faul	Faults 0:		0: no faults; 1: faults.				
	4	Enable v	Enable voltage 0:ir		0:invalid; 1:valid.				
Function	5 Quick		stop	0:valid; 1: invalid					
description	6	Power-o	n and	Orinvalid: 1 valid					
	0	running a	running allowed		O.invanu, 1.vanu.				
	7	Warn	Warning 0:		0:invalid; 1:valid.				
	8	Factory-d	lefined						
	0	Pamota	pontrol	0: non-Canopen mode;					
	у	Remote C	.011101	1: Canopen remote control mode.					
	10	Target re	ached	0: target position not reached;					
	10	Target le	Target reached		1: target position reached.				

Communication

11	Software internal position exceeds the limit	0: position command or feedback does not reach the internal position limit of the software; 1: position command or feedback reaches
		the internal position limit of the software.
12	Zero-speed signal	1: user speed is zero.
13~14	NA	
15	Home return completed	0: home return not performed or not completed; 1: home return completed and reference
		point found.

In profile velocity mode, the velocity command is changed immediately, and its timing sequence diagram is shown in Figure 11.21.





The timing diagram shown in Figure 11.21 corresponds to the operation steps shown below:

Table 11-65

Step	Item	Operation
1	Speed command giving	After the speed command is given, the servo-controlled motor runs at the set speed
2	Speed command change	After the speed command changes, the servo-controlled motor changes speed to the set speed.

11.2.9.3 Profile Torque Mode (PT)

In profile torque mode, the master sends the target torque command 6071h and torque ramp constant 6087h to the servo drive, and the torque regulator is performed internally by the servo drive. When the speed reaches the maximum speed limit, it will enter the speed regulation phase.





Index	Sub- index	Designation	Read/ Write	Data type	Unit	Range
0x603F	0x00	Error code	RO	UINT16	-	0~65535
0x6040	0x00	Control word	RW	UINT16	-	0~65535
0x6041	0x00	Status word	RO	UINT16	-	0~65535
0x6060	0x00	Running Mode	RW	INT8	-	0~7
0x6061	0x00	Mode display	RO	INT8	-	0~7
0x606C	0x00	Real speed feedback	RO	INT32	Command unit /s	-
0x6071	0x00	Target torque	RW	INT16	0.1%	- 3000~3000
0x6072	0x00	Maximum torque	RW	UINT16	0.1%	0~3000
0x6074	0x00	Torque command	RO	INT16	0.1%	-
0x6077	0x00	Real torque	RO	UINT16	0.1%	-
0x6087	0x00	Torque ramp time	RW	UINT32	ms	$0 \sim (2^{32} - 1)$

Table 11- 66 Related object dictionaries

The steps for the profile torque mode are shown in the following table:

Item	Step	Parameter input	Status word display (6041h)
Profile torque parameter	1	6071h = 50	0x0250
assignment	2	6087h = 50	0x0250
Control mode switching	3	6060h = 0x04	0x0250
	4	6040h = 0x06	0x0231
Servo enabling	5	6040h = 0x07	0x0233
	6	6040h = 0x0F	0x0637

Description of control word 6040h and status word 6041h in the profile torque mode:

Object 6040h				PP	PV	РТ	HM	IP
Index	6040 _h							
Designation	Control V	Vord						
Object structure	VAR	Data type	Uint16	5	Data ran	ige	0~655	35
Mapping	Y	Access	RW]	Factory se	tting	0	
	Bit defini	tion of the control	word:					
	Bit	Designati	on		D	escripti	on	
	0	Servo rea	dy	0: inv	alid; 1: val	id.		
	1	Turn on the main		0: invalid; 1: valid.				
		circuit electricity						
	2	Quick stop		1: invalid; 0: valid.				
	3	Enable oper	ation	0: invalid; 1: valid.				
Function	4~6	NA						
description				bit7 rising edge is valid;				
	7	Fault res	et	bit7 is held to 1. All other control				
				commands are invalid.				
	8	Halt		0: invalid; 1: valid.				
	9~10	NA						
	11~15	5 Factory-defined						
	Note: eac	h bit in the control	word need	ls to be	used toget	her with	other bits	to
	form a co	ntrol command.						

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Table 11- 69

Object				PP	PV	РТ	HM	IP
6041h								
Index	6041 _h							
Designation	Status Wor	d						
Object	VAD	Data	Llint16	De	to nongo		0 6552	5
structure	VAK	type	Unit16	Da	ta range		0~05555	
Mapping	Y	Access	RO	Facto	ory setting	5	0	

	Bit definition of status word:						
	Bit	Designation	Description				
	0	Servo ready	0: invalid; 1: valid.				
	1	Wait to enable servo	0: invalid; 1: valid.				
	2	Servo operation	0: invalid; 1: valid.				
	3	Faults	0:no faults;1: faults.				
	4	Enable voltage	0: invalid; 1: valid.				
	5	Quick stop	0: valid; 1: invalid.				
	6	Power-on and running allowed	0: invalid; 1: valid.				
	7	Warning	0: invalid; 1: valid.				
	8	Factory-defined					
Function	9	Pamota control	0: non-Canopen mode;				
description		Keniote control	1: Canopen remote control mode.				
ucseription	10	NA					
	11	Software internal position exceeds the limit	0: position command or feedback does not reach the internal position limit of the software;1: position command or feedback reaches the internal position limit of the software.				
	12~14	NA					
	15	Home return completed	0: home return not performed or not completed; 1: home return completed and reference point found.				

The running steps of the profile torque mode are shown in the following table:

Fab	le	11-	70

Item	Step	Parameter input	Status word display (6041h)
Profile torque parameter	0	6087h = 100	0x0250
assignment	1	6071h = 500	0x0250
Control mode switching	2	6060h = 0x04	0x0250
	3	6040h = 0x06	0x0231
Servo enabling	4	6040h = 0x07	0x0233
	5	6040h = 0x0F	0x0637

11.2.9.4 Homing method (HM)

The homing method is used to find the mechanical home point and the position relationship between the mechanical home point and mechanical zero point.

Mechanical home: a fixed position on the machinery, corresponding to a certain determined home position signal switch.

Mechanical zero: mechanical zero point = mechanical home + 0x607C (home offset), if 0x607C = 0, the mechanical zero point is equal to the mechanical home point.

The servo drive will stop at the mechanical zero point after the home return return is completed, and

adjust the position relationship between the mechanical home point and the mechanical zero point by setting the value of 0x607C in the object dictionary.





The conversion of user unit and encoder unit in home return mode via 0x6091 is illustrated as follows:

Figure 11- 24



 $0x6091(gear ratio) = \frac{motor resolution}{load resolution}$

Relationship between 0x6063(motor position feedback) and 0x6064(user position feedback):

0x6063(encoder unit)=0x6064(command unit)×gear ratio.

The relationship between 0x6099-01 (search deceleration point speed), 0x6099-02 (search home

speed) and the corresponding maximum speed of the motor after transformation exists as follows:

Figure 11-25



Motor speed (rpm) versus load shaft speed (command unit/s):

Motor speed(rpm) = $\frac{\text{load shaft speed} \times 0x6091\text{h}}{\text{encoder resolution}} \times 60$

Example: gear ratio = 1:1 with 23-bit encoder. Motor speed = 500rpm (corresponding to 0x6099 (load shaft speed)) = 500*8388608/60 = 69905066 (command unit/s).

The following relationship exists between 0x609A (home return acceleration/deceleration) and

0x60C5/0x60C6 (maximum profile acceleration/deceleration):



Example: gear ratio = 1:1 with 23-bit encoder. Motor deceleration = 500 rpm/s (corresponding to 0x609A (load axis deceleration)) = 500*8388608/60 = 69905066 (command unit/s2).

Index	Sub-index	Designation	Read/ Write	Data type	Unit	Range
0x603F	0x00	Error code	RO	UINT16	-	0~65535
0x6040	00	Control word	RW	UINT16	-	0~65535
0x6041	00	Status word	RO	UINT16	-	0~65535
0x6060	00	Running Mode	RW	INT8	-	0~7
0x6061	00	Mode display	RO	INT8	-	0~7
0x6064	00	Real position feedback	RO	INT32	Command unit	-
0x606C	00	Real speed feedback	RO	INT32	Command unit /s	-
0x6098	00	Home return method	RW	INT8	-	1~35
0-000	01	High-speed search for deceleration points	RW	UINT32	Command unit /s	0~65535
0x6099 02		Low speed search for home signal	RW	UINT32	Command unit /s	1~500
0x609A	00	Home return Acceleration/deceleration	RW	UINT32	Command unit /s ²	0~(2 ³² -1)

Table 11-71 Related	Object Dictionaries
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Description of control word 6040h and status word 6041h in the homing method:

Object 6040h			РР	PV	РТ	HM	IP
Index	6040 _h						
Designation	Control Wo						

Object structure	VAR	Data type	Uint16	Data range	0~65535			
Mapping	Y	Access	RW Factory setting 0					
	Bit definition	Bit definition of the control word:						
	Bit	Designation	Description					
	0	Servo ready	0: invalie	l; 1: valid.				
	1	Turn on main circuit power	0: invalid; 1: valid.					
	2	Quick stop	p 0: valid; 1: invalid.					
	3	Enable operation	0: invalid; 1: valid.					
Function description	4	Enable home return	0: home return not enabled; 0→1: home return enabled; 1: home return in operation; 1→0: halt home return;					
	5~6	NA						
	7	Fault reset	bit7 rising edge is valid; bit7 is held to 1. All other control instructi are invalid.		rol instructions			
	8	Halt	0: invalic	l; 1: valid.				
	9~10	NA						
	11~15	Factory-defined						

Table 11-73

Object 6041	h					PP	PV	РТ		HM	IP
Index		6041	lh								
Designation	L	Status Word									
Object structure		VAI	R Data type	Data type Uir		Data range			0~65535		5
Mapping		Y	Access	ŀ	RO	Facto	ry setting	5	0		
	Bit	definiti	ion of status word:								
		Bit	Designation				Descrip	otion			
		0	Servo ready		0: inva	lid; 1: vali	d.				
		1	Wait to enable set	Wait to enable servo 0: inv			d.				
		2	Servo operation	Servo operation		0: invalid; 1: valid.					
		3	Faults		0:no faults;1: faults.						
Eurotion		4	Turn on the main cipower	ircuit	0: inva	lid; 1: vali	d.				
Function		5	Quick stop	0: valid; 1: invalid.							
description		6	Power-on and run allowed	Power-on and running allowed			0: invalid; 1: valid.				
		7	Warning		0: invalid; 1: valid.						
		8	Factory-defined	d							
		9	Remote contro	1	0: non-Canopen mode; 1: Canopen remote control mode.						
		10	Target reached	Target reached			0: target position not reached; 1: target position reached.				

11	Software internal position exceeds the limit	0: position command or feedback does not reach the internal position limit of the software;1: position command or feedback reaches the internal position limit of the software.
12	Home return completed	0: home return not completed; 1: home return completed;
13	Home return error	0: no error occurred; 1: home return error at the origin.
14	NA	
15	Home return completed	0: home return not performed or not completed; 1: home return completed and reference point found.

The steps to turn on the home return mode are shown below:

Item	Step	Parameter input	Status word display (6041h)
	0	609Ah = 1000	0x0250
Home return parameter	1	6099_01h =1000	0x0250
assignment	2	6099_02h = 100	0x0250
	3	6098h=0x01	0x0250
Control mode selection	4	6060h =0x06	0x0250
	5	6040h = 0x06	0x0231
G 11	6	6040h = 0x07	0x0233
Servo enabling	7	6040h = 0x0F	0x0637
	8	6040h = 0x1F	0x0237
Home found	10	6040h = 0x1F	0x9637

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11.2.9.5 Interpolation (IP)

In interpolation position mode, the upper computer sends a position value (corresponding to the object dictionary [0x60C1]) during every synchronization cycle, which takes the value of the object dictionary 0x60C1 as the absolute position. For example, if the value of 0x60C1 is 0 at the beginning, then that's the starting point of the absolute positiont. After the servo drive receives the interpolated position value in the first cycle, it starts to plan the curve path; when the second cycle comes and a new position value is sent, the path curve planned in the previous cycle is sent to the servo unit for running, and at the same time, it starts to plan a new position curve.



User Location Motor position 0x60FC 0x6062 Command command Motor position User Location 0x6063 0x6064 Feedback command 6091h User position Deviation of 0x60F4 motor position deviation

The conversion of user unit and encoder unit in interpolation mode via 0x6091 is illustrated below: Figure 11- 28

As shown in Figure 11.29, at the moment t0, the upper computer sends an interpolated position command value, and the servo drive plans the motion trajectory POS0 according to the received interpolated position value and sends the motion trajectory POS0 to the execution unit at the moment t1, and at the same time plans the motion trajectory POS1 according to the new interpolated position value. At t2 the motion trajectory POS1 is executed again and at the same time the motion trajectory POS2 is planned and so on. The drive always plans the motion trajectory at the current moment for the next moment to ensure the smooth operation of the servo motor.





Index	Sub- index	Designation	Read/ Write	Data type	Unit	Range
0x603F	00	Error code	RO	UINT16	_	0~65535
0x6040	00	Control word	RW	UINT16	_	0~65535
0x6041	00	Status word	RO	UINT16	_	0~65535
0x6060	00	Running mode	RW	INT8	_	0~7
0x6061	00	Operation mode display	RO	INT8	_	0~7
0x6064	00	Real position value	RO	INT32	Command unit	$-2^{31} \sim (2^{31} - 1)$
0x6065	00	Excessive position deviation threshold	RW	UINT32	Command unit	0~(2 ³² -1)
0x6067	00	Position reach threshold	RW	UINT32	Command unit	0~(2 ³² -1)
0x6068	00	Position reach time	RW	UINT16	ms	0~65535
0x607A	00	Target position value	RW	INT32	Command unit	$-2^{31} \sim (2^{31} - 1)$
0607D	01	Min. software limit	RW	INT32	Command unit	$-2^{31} \sim (2^{31} - 1)$
0x007D	02	Max. software limit	RW	INT32	Command unit	$-2^{31} \sim (2^{31} - 1)$
0x60C1	01	Absolute interpolation position value	RW	INT32	Command unit	-2 ³¹ ~(2 ³¹ -1)
0x60C2	01	Interpolation cycle value	RW	UINT8	_	1~20
	02	Interpolation cycle unit	RW	INT8		-3

Table 11-75 Related object dictionaries

Description of control word 6040h and status word 6041h in interpolation mode:

Object 6040h						P	P	PV	РТ	HM	IP
Index	6	040 _h									
Designation	Co	ntrol V	Vore	1							
Object structure	V	'AR	D	ata type	Uint	16	Da	ta range		0~65535	
Mapping		Y		Access RW		Factory setting					
	Bit	definit	ion	of the contro	ol word:						
		Bit		Designation			Description				
T (1		0		Servo ready			0: invalid; 1: valid.				
Function description		1		Turn on the main circuit electricity		1 /	0: invalid; 1: valid.				
		2		Quick	stop		1:ir	nvalid; 0:v	alid		
		3		Enable o	peration	1	0: invalid; 1: valid.				

4	Enable interpolation mode	0: halt interpolation;		
5~6	NA	The man merponation		
7	Fault reset	bit7 rising edge is valid; bit7 is held to 1. All other control instructions are invalid.		
8	Halt	0: invalid; 1: valid.		
9~10	NA			
11~15	Factory-defined			
Note: each bit in the control word needs to be used together with other bits to				
form a contro	ol command.			

Object 6041h				PP	PV	РТ	HM	IP		
Index	6041h									
Designation	Status Word									
Object structure	VAR	Data type	Uiı	nt16	Data	range		0~65535		
Mapping	Y	Access	Access R(v setting		0		
	Bit definit	ion of status word:								
	Bit	Designation	1			Descript	ion			
	0	Turn on the main circuit power		0: inv	valid; 1: vali	d.				
	1	Wait to enable s	ervo	0: inv	alid; 1: vali	d.				
	2	Servo operatio	on	0: inv	alid; 1: vali	d.				
	3	Faults	0:no faults;1: faults.							
	4	Turn on the ma circuit powe	0: invalid; 1: valid.							
	5	Quick stop	0: val	id; 1: invali	d.					
Ennetion	6	Power-on and running allow	0: invalid; 1: valid.							
runction	7	Warning	0: invalid; 1: valid.							
description	8	Factory-define								
	9	Remote contr	Remote control			0: non-Canopen mode; 1: Canopen remote control mode.				
	10	Target reache	d	0: target position is not reached; 1: target position is reached.						
	11	Software internal position exceeds the limit		0: position command or feedback does not reach the internal position limit of the software; 1: position command or feedback reaches the internal position limit of the software					ne	
	12	Enable interpola mode	ation	0: in 1: in	terpolation terpolation	mode not mode en:	t enableo abled.	1;		

13~14	NA	
		0: home return is not performed or not
15	Home return	completed.
15	completed	1: home return is completed and the reference
		point has been found.

The interpolation command value is planned by the upper computer planning during each synchronization cycle, and sends it through PDO to the servo driver to control the motor running. The interpolation mode is shown in the following table:

Item	Step	Parameter input	Status word display (6041h)
Interpolation cycle	0	$60C2_01h = 200(\text{or } 0xC8)$	0x0250
assignment	1	$60C2_02h = -3(or 0xFD)$	0x0250
Interpolation position assignment	2	60C1h = 10000	0x0250
Control mode selection	3	6060h = 0x07	0x0250
	4	6040h = 0x06	0x0231
C	5	6040h = 0x07	0x0233
Servo enabling	6	6040h = 0x0F	0x0637
	7	6040h = 0x1F	0x0237
Positioning completed	8	6040h = 0x1F	0x0637

Table	11-	78
-------	-----	----

11.2.10 Object Dictionary

11.2.10.1 Description of Object Properties

Explanation of terms

Index: specifies the position of each object in the object dictionary, in hexadecimal (h). Data type: See Table 11-79 for details.

Data type	Range	Data length	DS301 value
Int8	-128~127	1 byte	2
Uint8	0~255	1 byte	5
Int16	-32768~+32767	2 bytes	3
Uint16	0~65535	2 bytes	6
Int32	-2147483648~+2147483647	4 bytes	4
Uint32	0~4294967295	4 bytes	7
String	ASCII	-	9

Table 1	1-79	Data	type	description
---------	------	------	------	-------------

"Read/Write Type": Please refer to Table 11-80 for details.

Table 11-80 Read and write type description

D 1/07/ 1/	
Read/ write	Description

RW	Read and write			
WO	Write only			
RO	Read only			
CONST	Constant, read only			

"Object structure": please refer to Table 11-81 for details.

Table 11-81	Description	of the object	structure
-------------	-------------	---------------	-----------

Object structure	Description	DS301 value
VAR	Simple values containing the data types in Table 3-1	7
ARR	Data blocks of the same type	8
REC	Data blocks of different types	9

11.2.10.2 1000h Group Object List

Index	Sub- index	Designation	Object structu re	Data type	Read/ Write	Mappi ng
1000h	-	Device type	VAR	Uint32	RO	Ν
1001h	-	Error register	VAR	Uint8	RO	Ν
1003h - 1005h -	-	Predefined error field	ARR	Uint32	RO	Ν
	1~4 _h	Error field	-	Uint32	RW	Ν
1005h	-	COB-ID SYNC message	COB-ID SYNC message VAR Uint32 RW SYNC cycle VAR Uint32 RW			Ν
1006h	-	SYNC cycle VAR Uint32 RW		Ν		
100Ch	-	Node guarding time VAR Uint16 RW		RW	Ν	
100Dh	-	Lifetime factor VAR Uint8		RW	Ν	
10101	-	Save parameters	ARR	Uint32	RW	Ν
1010h	1_{h}	Save all object parameter	-	Uint32	RW	Ν
1011h -	-	Restore default parameter	ARR	Uint32	RW	Ν
	1_{h}	Save all object parameter	-	Uint32	RW	Ν
1014h	-	Emergency message COB-ID	VAR	VAR Uint32 RO		Ν
	-	Consumer heartbeat time	ARR	-	-	-
	O _h	Maximum subindex supported	-	Uint8	RO	Ν
101.0	1_{h}	Consumer heartbeat time	-	Uint32	RW	Ν
10160	2_{h}	Consumer heartbeat time	-	Uint32	RW	Ν
	3 _h	Consumer heartbeat time	-	Uint32	RW	Ν
	$4_{\rm h}$	Consumer heartbeat time	-	Uint32	RW	Ν
1017h	-	Producer heartbeat time	VAR	Uint16	RW	Ν
	-	Device object description	REC	-	-	-
	Oh	Maximum subindex supported	-	Uint8	RO	Ν
1018h	1_{h}	Manufacturer ID	-	Uint32	RO	Ν
	2 _h	Device code	-	Uint32	RO	Ν
	$3_{\rm h}$	Device revision number	-	Uint32	RO	Ν
1029h	-	Error behavior object	ARR	-	-	-

	0 _h	Maximum subindex supported	-	Uint8	RO	Ν
	1_{h}	Communication error	- Uint8 RW		Ν	
	-	SDO server parameter	REC	-	-	-
12001	0 _h	Maximum subindex supported	-	Uint8	RO	Ν
1200h	1_{h}	Client-to-Server COB-ID	-	Uint32	RO	Ν
1200h 1400h 1401h 1402h 1402h	2 _h	Server-to-Client COB-ID	-	Uint32	RO	Ν
	-	RPDO1 mapping parameter	REC	-	-	-
	0 _h	RPDO1 maximum subindex	-	Uint8	RO	Ν
	1_{h}	RPDO1 COB-ID	-	Uint32	RW	Ν
1400h	2 _h	RPDO1 transmission type	-	Uint8	RW	Ν
	3 _h	Inhibit time (not supported)	-	Uint16	RW	Ν
	$4_{\rm h}$	NA	-	Uint8	RW	Ν
	5 _h	Event timer (not supported)	-	Uint16	RW	Ν
	-	RPDO2 mapping parameter	REC	-	-	-
	0 _h	RPDO2 maximum subindex	-	Uint8	RO	Ν
	1_{h}	RPDO2 COB-ID	-	Uint32	RW	Ν
1401h	2 _h	RPDO2 transmission type	-	Uint8	RW	Ν
	3 _h	Inhibit time (not supported)	-	Uint16	RW	Ν
	4 _h	NA	-	Uint8	RW	Ν
	5 _h	Event timer (not supported)	-	Uint16	RW	Ν
	-	RPDO3 mapping parameter	REC	-	-	-
	0 _h	RPDO3 maximum subindex	-	Uint8	RO	Ν
	1_{h}	RPDO3 COB-ID	-	Uint32	RW	Ν
1402h	2 _h	RPDO3 transmission type	-	Uint8	RW	Ν
	3 _h	Inhibit time (not supported)	-	Uint16	RW	Ν
	$4_{\rm h}$	NA	-	Uint8	RW	Ν
	5 _h	Event timer (not supported)	-	Uint16	RW	Ν
	-	RPDO4 mapping parameter	REC	-	-	-
	0 _h	RPDO4 maximum subindex	-	Uint8	RO	Ν
	1_{h}	RPDO4 COB-ID	-	Uint32	RW	Ν
1403h	2 _h	RPDO4 transmission type	-	Uint8	RW	Ν
	3 _h	Inhibit time (not supported)	-	Uint16	RW	Ν
	4 _h	NA	-	Uint8	RW	Ν
	5 _h	Event timer (not supported)	-	Uint16	RW	Ν
	-	RPDO1 mapping parameter	REC	-	-	-
	0 _h	RPDO1valid mapping number	-	Uint8	RW	Ν
1600h	1_{h}	RPDO1 mapping object 1	-	Uint32	RW	Ν
100011	2 _h	RPDO1 mapping object 2	-	Uint32	RW	Ν
	3 _h	RPDO1 mapping object 3	-	Uint32	RW	Ν
	$4_{\rm h}$	RPDO1 mapping object 4	-	Uint32	RW	Ν
	-	RPDO2 mapping parameter	REC	-	-	-
16015	0 _h	RPDO2 valid mapping number	-	Uint8	RW	Ν
100111	1_{h}	RPDO2 mapping object 1	-	Uint32	RW	Ν
	2 _h	RPDO2 mapping object 2	-	Uint32	RW	Ν

	3 _h	RPDO2 mapping object 3	-	Uint32	RW	Ν
	4 _h	RPDO2 mapping object 4	-	Uint32	RW	Ν
	-	RPDO3 mapping parameter	REC	-	-	-
	0 _h	RPDO3 valid mapping number	-	Uint8	RW	Ν
1602h	1_{h}	RPDO3 mapping object 1	-	Uint32	RW	Ν
	2 _h	RPDO3 mapping object 2	-	Uint32	RW	Ν
	$3_{\rm h}$	RPDO3 mapping object 3	-	Uint32	RW	Ν
	$4_{\rm h}$	RPDO3 mapping object 4	-	Uint32	RW	Ν
	-	RPDO4 mapping parameter	REC	-	-	-
	0 _h	RPDO4 valid mapping number	-	Uint8	RW	N
1603h	$1_{\rm h}$	RPDO4 mapping object 1	-	Uint32	RW	N
100511	2 _h	RPDO4 mapping object 2	-	Uint32	RW	Ν
	3 _h	RPDO4 mapping object 3	-	Uint32	RW	N
	4 _h	RPDO4 mapping object 4	-	Uint32	RW	N
	-	TPDO1 parameter	REC	-	-	-
	0 _h	TPDO1 maximum subindex	-	Uint8	RO	Ν
	1_{h}	TPDO1 COB-ID	-	Uint32	RW	Ν
1800h	2 _h	TPDO1 transmission type	-	Uint8	RW	Ν
	3 _h	Inhibit time	-	Uint16	RW	Ν
	4 _h	NA	-	Uint8	RW	Ν
	5 _h	Event timer	-	Uint16	RW	Ν
	-	TPDO2 parameter	REC	-	-	-
	0 _h	TPDO2 maximum subindex	-	Uint8	RO	Ν
	1 _h	TPDO2 COB-ID	-	Uint32	RW	Ν
1801h	2 _h	TPDO2 transmission type	-	Uint8	RW	Ν
	3 _h	Inhibit time	-	Uint16	RW	Ν
	4 _h	NA	-	Uint8	RW	Ν
	5 _h	Event timer	-	Uint16	RW	Ν
	-	TPDO3 parameter	REC	-	-	-
	0 _h	TPDO3 maximum subindex	-	Uint8	RO	Ν
	1_{h}	TPDO3 COB-ID	-	Uint32	RW	N
1802h	2 _h	TPDO3 transmission type	-	Uint8	RW	N
	3 _h	Inhibit time	-	Uint16	RW	N
	4 _h	NA	-	Uint8	RW	N
	5 _h	Event timer	-	Uint16	RW	Ν
	-	TPDO4 parameter	REC	-	-	-
	Oh	TPDO1 maximum subindex	-	Uint8	RO	N
	1_{h}	TPDO4 COB-ID	-	Uint32	RW	N
1803h	2 _h	TPDO4 transmission type	-	Uint8	RW	N
	3 _h	Inhibit time	-	Uint16	RW	N
	$4_{\rm h}$	NA	-	Uint8	RW	Ν
	5 _h	Event timer	-	Uint16	RW	Ν
1A00b	-	TPDO1 mapping parameter	REC	-	-	-
TAUUI	0 _h	TPDO1 valid mapping number	-	Uint8	RW	Ν

	1	TDDO1 monning shipst 1		L1::::::::::::::::::::::::::::::::::::	DW	N
	Ih	TPDOT mapping object 1	-	Uint32	KW	IN
	2 _h	TPDO1 mapping object 2	-	Uint32	RW	N
	3 _h	TPDO1 mapping object 3		Uint32	RW	Ν
	$4_{\rm h}$	TPDO1 mapping object 4	-	Uint32	RW	Ν
	-	TPDO4 mapping parameter	REC	-	-	-
	0 _h	TPDO2 valid mapping number	-	Uint8	RW	Ν
14011	1_{h}	TPDO2 mapping object 1	-	Uint32	RW	Ν
IA0In	2 _h	TPDO2 mapping object 2	-	Uint32	RW	Ν
	3 _h	TPDO2 mapping object 3	-	Uint32	RW	Ν
	$4_{\rm h}$	TPDO2 mapping object 4	-	Uint32	RW	Ν
	-	TPDO3 mapping parameter	REC	-	-	-
	0 _h	TPDO3 valid mapping number	-	Uint8	RW	Ν
14.02h	1_{h}	TPDO3 mapping object 1	-	Uint32	RW	Ν
1A02h	2 _h	TPDO3 mapping object 2	-	Uint32	RW	Ν
	3 _h	TPDO3 mapping object 3	-	Uint32	RW	Ν
	$4_{\rm h}$	TPDO3 mapping object 4	-	Uint32	RW	Ν
	-	TPDO4 mapping parameter	REC	-	-	-
	0 _h	TPDO4 valid mapping number	-	Uint8	RW	Ν
14.021	1_{h}	TPDO4 mapping object 1	-	Uint32	RW	Ν
1A03h	2 _h	TPDO4 mapping object 2	-	Uint32	RW	Ν
	3 _h	TPDO4 mapping object 3	-	Uint32	RW	Ν
	$4_{\rm h}$	TPDO4 mapping object 4	-	Uint32	RW	Ν

11.2.10.3 2000h Group Object List

2000h group object dictionary is the mapping of internal parameters of the drive. The object dictionaries 2000h~2007h correspond to the parameter groups of Pn0xx~Pn7xx respectively; 2E00h~2E03h correspond to the monitoring parameters of Un0xx~Un3xx. The specific function code of the drive corresponds to the sub-index of the object dictionary of the 2000h group, and the specific correspondence rule is that the last two digits of the function code plus 1 is the corresponding object dictionary sub-index.

The following table shows the correspondence between the 2000h object dictionary index number and the function code of the drive, the specific meaning of the function code is detailed in <u>"Chapter 9 Parameter</u>" <u>Description"and "Chapter 8 Monitoring Parameters"</u>.

Cautions					
\wedge	• The last two digits of the function code correspond to the subindex. The function				
<u>.</u>	code is a hexadecimal number, and so is the subindex.				
	Example: When reading or writing function code Pn299, the corresponding object				

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dictionary is 2002_9Ah.

11.2.10.4 6000h Group Object List

The Canopen6000h group object dictionary assignment is shown in the following table:

Index	Sub- index	Designation	Access	Мар	Data type	Unit	Range
603Fh	00	Error code	RO	Y	UINT16	-	UINT16
6040h	00	Control word	RW	Y	UINT16	-	UINT16
6041h	00	Status word	RO	Y	UINT16	-	UINT16
605Ah	00	Quick stop method	RO	Y	INT16		INT16
605Dh	00	Halt stop method	RO	Y	INT16		INT16
6060h	00	Running mode	RW	Y	INT8	-	INT8
6061h	00	Mode display	RO	Y	INT8	-	INT8
6062h	00	User position command	RO	Y	INT32	Command unit	INT32
6063h	00	Motor position feedback	RO	Y	INT32	Encoder units	INT32
6064h	00	User position feedback	RO	Y	INT32	Command unit	INT32
6065h	00	Excessive position deviation threshold	RW	Y	UINT32	Command unit	UINT32
6067h	00	Position reach threshold	RW	Y	UINT32	Command unit	UINT32
6068h	00	Position reach time	RW	Y	UINT16	ms	UINT16
606Bh	00	Speed command value	RO	Y	INT32	Command unit /s	INT32
606Ch	00	Real speed feedback value	RO	Y	INT32	Command unit /s	INT32
606Dh	00	Speed reach threshold	RW	Y	UINT16	0.1rpm	UINT16
606Eh	00	Speed reach time window	RW	Y	UINT16	ms	UINT16
606Fh	00	Zero-speed threshold	RW	Y	UINT16	0.1rpm	UINT16

6070h	00	Zero-speed time window	RW	Y	UINT16	ms	UINT16
6071h	00	Target torque	RW	Y	INT16	0.1%	INT16
6072h	00	Maximum torque	RW	Y	UINT16	0.1%	UINT16
6074h	00	Torque command	RO	Y	INT16	0.1%	INT16
6075h	00	Rated current	RO	Y	UINT32	mA	UINT32
6076h	00	Rated torque	RO	Y	UINT32	mNm	UINT32
6077h	00	Real torque	RO	Y	INT16	0.1%	INT16
6078h	00	Real current	RO	Y	INT16	0.1%	INT16
607Ah	00	Target position	RW	Y	INT32	Command unit	INT32
607Ch	00	Home return bias	RW	Y	INT32	Command unit	INT32
607Dh	01	Min. software limit	RW	Y	INT32	Command unit	INT32
607Dn	02	Max. software limit	RW	Y	INT32	Command unit	INT32
607F	00	Max speed limit	RW	Y	UINT32	Command unit /s	UINT32
6080h	00	Max. motor speed	RO	Y	UINT32	rpm	UINT32
6081h	00	Profile position target speed	RW	Y	UINT32	Command unit /s	UINT32
6083h	00	Profile acceleration	RW	Y	UINT32	Command unit /s ²	UINT32
6084h	00	Profile deceleration	RW	Y	UINT32	Command unit /s ²	UINT32
6085h	00	Profile emergency stop deceleration	RW	Y	UINT32	Command unit /s ²	UINT32
6086h	00	Motor running profile type	RW	Y	UINT16		UINT16
6087h	00	Torque smoothing time	RW	Y	UINT16	ms	UINT16
6001b	01	Electronic gear numerator	RW	Y	UINT32	-	UINT32
00911	02	Electronic gear denominator	RW	Y	UINT32	-	UINT32
6098h	00	Home return method	RW	Y	UINT8	-	UINT8
6099h	01	Home return high speed setting	RW	Y	UINT32	Command unit/s	UINT32
	02	Home return low speed setting	RW	Y	UINT32	Command unit/s	UINT32

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609Ah	00	Zero return acceleration/dece leration	RW	Y	UINT32	Command unit/s ²	UINT32
60C1h	01	Absolute interpolation position value	RW	Y	INT32	Command unit	INT32
60C2h	01	Interpolation cycle	RW	Y	UINT8	-	UINT8
60C2fi	02	Interpolation cycle unit	RW	Y	INT8	-	INT8
60C5h	00	Max. profile acceleration	RW	Y	UINT32	Command unit/s ²	UINT32
60C6h	00	Max. profile deceleration	RW	Y	UINT32	Command unit/s ²	UINT32
60E0h	00	Forward torque limit	RW	Y	UINT16	0.1%	UINT16
60E1h	00	Reverse torque limit	RW	Y	UINT16	0.1%	UINT16
60F4h	00	User position deviation	RO	Y	INT32	Command unit	INT32
60FCh	00	Motor position command	RO	Y	INT32	编码器单位	INT32
60FDh	00	Digital input status	RO	Y	UINT16	-	UINT16
COPEL	00	No. of digital output	RO	N	UINT8	-	1
60FEn	01	Digital output status	RO	Y	UINT16	-	UINT16
60FFh	00	Profile speed target value	RW	Y	UINT32	Command unit/s	UINT32
6502h	00	Running mode of servo drive	RO	Y	UINT16	-	UINT16

11.2.10.5 1000h Detailed Object Description

Table 11-85

Object 1000h					
Index	1000 _h				
Designation	Device Typ	be			
Object structure	VAR	Data type	Uint32	Data range	Uint32
Mapping	NO	Access	RO	Factory setting	0x20192

	The Device type parameter is used to describe the device subprotocol or								
	applicati	ion specification	l.						
Function	Bi	t Des	signation		Ι	Descripti	on		
description	0~1	5 Device	sub-protoco	ol	402(0x192): device sub-protocol		sub-protocol		
	16~2	23	Туре		02: servo drive		lrive		
	25~3	31	Mode		Fa	ctory-def	fined		
Object 1001h									
Index	1001 _h								
Designation	Error Re	gister					1		
Object structure	VAR Data typ		Uint8		Data rai	nge	Uint8		
Mapping	NO	Access	RO		Factory se	etting	0x0		
	Contain er	rror type informa	ation by bit,	as sh	nown in the fol	lowing t	able:		
	Bit	Designation	Bit	D	esignation				
	0	General	4	Co	ommunicatio n				
Function	1	Current	5	Sı	ub-protocol				
description	2	Voltage	6		NA				
-	-	_	_		Factory-				
	3	Temperature	7		defined				
	When an e	error occurs, the	correspondi	ng b	it of the error i	s "1", an	d bit 0 must be		
	"1".	"1".							
Object 1003h									
Index	1003_{h}								
Designation	Pre-defi	ined Error Field	d						
Object structure	ARR	Data type	Uint32		Data ran	ge	Uint32		
Mapping	NO	Access	RO		Factory set	ting	-		
Sub-index	00 h								
Designation	Number	r of Errors							
Object structure	-	Data type	Uint32		Data rang	e	0~4		
Mapping	NO	Access	RW		Factory sett	ing	0x0		
Function	Only 0 c	an be written he	ere, and all e	rror	records are cle	ared.			
description									
Sub-index	1~4 _h								
Designation	Standar	rd Error Field		_			1		
Object structure	-	Data type	Uint32	_	Data ran	ge	Uint32		
Mapping	NO	Access	RW		Factory set	ting	0x0		
	When	the subindex is	0, it is not re	eadat	ole; when there	e is an eri	ror, the		
Function	error i	s stored in the fo	ollowing for	nat:					
description	MSB				_		LSB		
-	31	Proton	16	1)	1	0		
		Factory error c	code		Standard	a error co	bae		
Object 1005h	1007								
Index	1005h								
Designation	COB-II	COB-ID SYNC Message							

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Object structure	VAD	Data trun a	LE::::420	Data namas		U:=+22		
Object structure	VAK	Data type	DIII	Data Talige		0.00		
Mapping	NO	Access	RW	Factory settin	g	0x80		
	Only 0x	80 and 0x40000	080 can be v	vritten.				
Function	When UX8U is written, synchronization is off;							
description	When 0x40000080 is written, synchronization is on.							
····· •	The syne	chronization cyc	ele 1006h mu	ist be configured to b	be non-ze	ero before		
	activatin	ig synchronizati	on.					
Object 1006h	r	l						
Index	1006 _h							
Designation	SYNC C	Cycle		-		-		
Object structure	VAR	Data type	Uint32	Data rang	ge	Uint32		
Mapping	NO	Access	RW	Factory sett	ting	0x0		
Function	Cycle tin	me in units of 12	25us for sync	chronization.				
description								
Object 1008h								
Index	1008h							
Designation	Manufa	cturer Device I	Name					
Object structure	REC	Data type	Uint8	Data range		-		
Mapping	NO	Access	RO	Factory settin	g Servo Device			
Object 100Ah								
	100A							
Index	h							
Designation	Softwar	e Version						
Object structure	REC	Data type	Uint8	Data range		-		
Mapping	NO	Access	RO	Factory setting	Detern	nined by model		
Object 100Ch	1	•	11		1	-		
Index	100C _h							
Designation	Guard 7	Гіте						
Object structure	VAR	Data type	Uint16	Data range		Uint16		
Mapping	NO	Access	RW	Factory settin	g	0x0		
Function	For SYN	IC only in ms. U	Jsed in conju	inction with lifetime	factor fo	r node		
description	protectio	on.						
Object 100Dh								
Index	100D _h							
Designation	Lifetime	e Factor						
Object structure	VAR	Data type	Uint8	Data range	,	Uint8		
Mapping	NO	Access	RW	Factory setti	ng	0x0		
Function	Must be	larger than 1 w	hen used.	· ·				
description		-						

Object 1010h		
Index	1010 _h	
Designation	Save Pa	arameters

								~.	
Object structure	ARR	Data type	U	int32		Data range		U	int32
Mapping	NO	Access]	RW	F	actory settir	ıg		0x0
	Save parameter is to save the current value to EEPROM, and the next time the EEPROM is loaded (re-powered, node or communication reset), the saved value will be loaded. When users need to save a parameter, write "save" according to ASCII code								at time the saved CII code
	in addition to specifying the subindex corresponding to the save area. Other values written will not save the parameters successfully. The correspondence of writing is as follows:								
		MSB							
						LSI	3		
	A	ASCII	e	v		а		s	
	Hex	adecimal	65h	76		61h	7	73h	
	The c	orresponding	subind	lex read	return	value			1
	indicates how the parameter is saved in the								
Function	subine	subindex. Return value format and meaning is as							
description	follows: LSB								
-	MSB								
	31					1		0	
	2								
		N	А			0/1	1	0/1	
									_
	Va	lue			Desci	escription			
	(0 No automatic saving of parameters, and no							
		sav	saving of parameters by command						
		1 Sav	e parai	meters b	y com	nmand only, r	io aut	omatic	
	-	sav	ing						-
		2 Onl	y save	paramet	ers au	itomatically,	no sa	ving of	
		para	ameters	s by con	nmand	1			-
	3 Save parameters by command and automatically								
Object 1011h									
Index	1011 _h								
Designation	Restore	e Default Par	amete	rs					
Object structure	ARR	Data type	U	int32]	Data range			-
Mapping	NO	Access	1	RW	Fa	ctory setting	y I		

Function	Restoring default parameters is restoring the default parameters to the EEPROM and does not take effect immediately. Next time when EEPROM is loaded (power-on, node or communication reset), the default values (factory settings) are loaded. To restore the default parameters, in addition to specifying the sub-index of the recovery area, users need to write "load" according to ASCII code, and writing other values will not restore the default values successfully. The correspondence of writing is as follows: MSB LSB ASCII d a Hexadecim 64b 61b							
description	al							
	The cor	responding sub	-index rea	d retur	n value indica	tes the w	ay the sub-	
	index saves the parameters. Return format and meaning are as follows:							
	MSB				LSB			
	31		1		0			
	NA 0/1							
	Volue Description							
	0	Ĭ	Default pa	ameter	rs cannot be re	stored		
	1		Default p	aramet	ers can be rest	ored		
Object 1014h								
Index	1014 _h							
Designation	COB-II	D Emergency	Message					
Object structure	VAR	Data type	Uint32		Data range		Uint32	
Mapping	NO	Access	RW	1	Factory settin	ig 0	x80+Node-ID	
	0 on E	Bit31 means Er	nergency (EMCY	') function is c	on (servo	will	
	1 on F	Sit31 means Er	nergency()	EMCY) function is o	ff (servo	will	
Function	not se	nd EMCY con	imand).		, runetion 15 o			
description	MSB		,					
	LSB							
	31	30		11	10		0	
	0/1		0x0		11-bits veri	ified COI	3-ID	
	When a	n emergency n	nessage tal	tes effe	ct, its COB-II	O must be	e consistent	
Object 1016b	with thi	s object.						
UDject 1016h	1016							
Designation	Consum	ner Heartheat	Time					
Object structure	ARR	Data type	Lint32		Data rano	76	Llint32	
o sjeet bit ucture		Sum type	Cintoz				011102	

	The p	arameters inclu	de the address	s of the monitored no	de and			
	the ac	tual consumer	time, and this	time must be greater	than the			
	hearth	eat producer ti	me (in ms) of	the corresponding no	ode. It is			
	not possible to set two consumer times for the same node.							
	The parameters are as follows:							
Function	MSB							
description	LSB	LSB						
	31	31 24 23 16 15 0						
	N	A Mon	itored address	Monitored	time			
	The cor	responding sub	-index read re	turn value indicates	which way the sub-			
	index re	estores the defa	ult parameters		2			
Sub-index	00 _h		1					
Designation	Entry r	number						
Object structure	-	Data type	Uint8	Data range	1			
Mapping	NO	Access	RO	Factory setting	1			
Function	Only 0	can be written,	and all error r	ecords are cleared.				
description								
Sub-index	01 _h							
Designation	Consur	Consumer Heartbeat Time						
Object structure	-	Data type	Uint32	Data range	Uint32			
Mapping	NO	Access	RW	Factory setting	0			
Function	Save all parameters of the object dictionary list.							
description								
Object 1017h								
Index	1017 _h							
Designation	Produc	er Heartbeat	Гіте					
Object structure	VAR	Data type	Uint16	Data range	Uint16			
Mapping	NO	Access	RW	Factory setting				
Function	Unit (m	s).						
description								
Object 1018h	I							
Index	1018							
Index	h							
Designation	Device	Object Descri	ption					
Object structure	REC	Data type	Uint16	Data range	-			
Mapping	NO	Access	RO	Factory setting				
Sub-index	00h							
Designation	Entry r	number						
Object structure	-	Data type	Uint8	Data range	3			
Mapping	NO	Access	RO	Factory setting	3			
Sub-index	01 _h							
Designation	Manufa	acturer ID						
Object structure	-	Data type	Uint32	Data range	Uint32			
Mapping	NO	Access	RO	Factory setting	0x3B9			

Function	A uniqu	A unique number assigned by the CiA.								
description										
Sub-index	02h									
Designation	Device	Code								
Object structure	-	Data type	Uint32	Data range	Uint32					
Mapping	NO	Access	RO	Factory setting	-					
	The equipment code corresponds to the product series and product model on									
	the elec	tronic label, an	d the corresp	ondence is as follows:						
Function	MSB	I								
description	31		16	15	0					
		Product Seri	1							
Sub index	03.									
Designation	Dovice	Povision Num	bor							
Object structure	Device	Dete trme	Uimt22	Data yanga	11:					
Object structure	-	Data type	01111.52		UIIII.52					
Mapping	NO	Access	RO	Factory setting	-					
	Corresp	ond to the soft	ware version	number 100Ah, the spec	ific meaning is as					
E	follows	:								
Function	MSB				LSB					
description	31		16	15	0					
		<u>31 16 15 0</u> Main ravision varsion								

Object 1029h							
Index	1029 _h						
Designation	Error B	ehavior	Object	t			
Object structure	ARR	Data	type	Uint8	Data range	Uint8	
Mapping	NO	Acc	ess	RW	Factory setting	-	
	The state automati different	e state control to which the NMT of Canopen communication needs to omatically shift when different types of errors occur. NMT shifts to ferent states according to different values.					
Function description	Value			Description			
	(0 Turns to the pre-running state from the current running state.			t		
	1	1 Keep the current state.					
	2	2 Enter the stop state.					
	Oth	ners	NA.				
Sub-index	00h						
Designation	Largest	Sub-inc	dex Sup	oported			
Object structure	-	Data	type	Uint8	Data range	Uint8	
Mapping	NO	Acc	ess	RO	Factory setting	1	
Sub-index	01 _h						
Designation	Commu	nication	ı Error				
Object structure	-	Data	type	Uint8	Data range	Uint8	

Mapping	NO	Access	RW		Factory setting	0		
Function	Commu	nication errors in	ncluded includ	le: N	MT error control	timeout, PDO		
description	length er	rror, bus detachr	nent, etc.					
Object 1200h								
Index	1200 _h							
Designation	SDO Se	SDO Server Parameter						
Object structure	REC	Data type	-		Data range	-		
Mapping	NO	Access	RO	F	actory setting	-		
	The highest bit is "0" to indicate that the SDO is valid, and the highest							
bit is "1" to indicate that the SDO is invalid. The default SDO is always								
Function	present and is a read-only constant.							
description	MSB					LSB		
uescription	31	30	1	11	10	0		
	0/1		0x0		11-bits verifie	d COB-ID		
Sub-index	00h							
Designation	Entry n	umber		r				
Object structure	-	Data type	Uint8		Data range	Uint8		
Mapping	NO	Access	RO	RO Factory setting		2		
Sub-index	01ь							
	01h			P	actory setting	-		
Designation	01 _h Client-t	o- Server(rx) C	OB-ID		actory setting	_		
Designation Object structure	01h Client-t	o- Server(rx) C Data type	OB-ID Uint32		Data range	Uint32		
Designation Object structure Mapping	01h Client-t - NO	o- Server(rx) C Data type Access	OB-ID Uint32 RO	F	Data range actory setting	Uint32 0x600+Node-ID		
Designation Object structure Mapping Sub-index	01 _h Client-t - NO 02 _h	o- Server(rx) C Data type Access	OB-ID Uint32 RO	F	Data range actory setting	Uint32 0x600+Node-ID		
Designation Object structure Mapping Sub-index Designation	01 _h Client-t - NO 02 _h Server-t	o- Server(rx) C Data type Access o-Client(tx) CC	OB-ID Uint32 RO DB-ID	F	Data range actory setting	Uint32 0x600+Node-ID		
Designation Object structure Mapping Sub-index Designation Object structure	01h Client-t - NO 02h Server-t	o- Server(rx) C Data type Access o-Client(tx) CC Data type	OB-ID Uint32 RO DB-ID Uint32	F	Data range actory setting Data range	Uint32 0x600+Node-ID Uint32		
Designation Object structure Mapping Sub-index Designation Object structure	01h Client-t - NO 02h Server-1	o- Server(rx) C Data type Access to-Client(tx) C(Data type	OB-ID Uint32 RO DB-ID Uint32	F	Data range actory setting Data range	Uint32 0x600+Node-ID Uint32 0x580+Node-		

Object1400h: RPDO1 Communication Parameter									
Object1402h: RPDO2 Communication Parameter									
Object1403h: RPI	Object1403h: RPDO3 Communication Parameter								
Object1404h: RPDO4 Communication Parameter									
Index	1400 _h ~	1400 _h ~1403 _h							
Designation	signation RPDO Message COB-ID								
Object structure	REC	Data type	-	Data range	-				
Mapping	NO	Access	RW	Factory setting	-				
Sub-index	00 _h								
Designation	Largest	Sub-index Sup	oported						
Object structure	-	Data type	Uint8	Data range	0~2				
Mapping	NO	Access	RO	Factory setting	2				
Sub-index	01 _h								
Designation	RPDO	COB-ID							

Object structure	_	Data type	Llint32	Data range	Llint32
Object structure	-	Data type	011132	Data Talige	
Mapping	NO	Access	RW	Factory setting	See Function
11 8					description
	Only t	he highest bit ca	in be changed.	A "0" indicates that th	e PDO is
	valid,	and a "1" indica	tes that the PD	O is invalid.	
	MSB				LSB
	31	30		11 10	0
Function	0/1		0	11-bits verified	COB-ID
description	Factory	setting: (Node-I	D default valu	e is 1):	
	1400h:	0x80000200 +	Node-ID		
	1401h:	0x80000300 + 3	Node-ID		
	1402h	0x80000400 + 1	Node-ID		
	1402h	0	Node ID		
a 1 + 1	140311:	0x80000500 +	Node-ID		
Sub-index	02h				
Designation	RPDO I	Reception type			
Object structure	-	Data type	Uint8	Data range	Uint8
Mapping	NO	Access	RW	Factory setting	0
	This val	ue can only be r	nodified when	the PDO is invalid.	
	Differen	t values represe	nt different PE	O transmission types,	as in the
	followin	g table:			
Function		Value		Desi	gnation
description		0		Synchrono	ous non-cycle
		1~240		Synchro	onous cycle
		254.254	=	Assessment	ana nan anala
	11	254,253)	Asynchron	ous non-cycle

Tabl	le	11	l -	89	

Object 1600h: R	PDO1 Map	ping Parameter			
Object 1601h: R	PDO2 Map	ping Parameter			
Object 1602h: R	PDO3 Map	ping Parameter			
Object 1603h: R	PDO4 Map	ping Parameter			
Sub inder	1600h~1	.6			
Sub-index	03 _h				
Designation	RPDO N	RPDO Mapping Parameter			
Object structure	REC	Data type	-	Data range	-
Mapping	NO	Access	RW	Factory setting	-
Function description	This object mapped supporte	This object can be modified only when PDO is off. The total bit length of the mapped object must not exceed 64 bits, and only per-byte mapping is supported not per-bit mapping.			
Sub-index	00 _h				
Designation	Number	of valid mappe	d objects in I	PDO	
Object structure	-	Data type	Uint8	Data range	0~4
Mapping	NO	Access	RW	Factory setting	-
Function	When we	riting 0, other sul	b-index mapp	ing object is invalid.	
description					
Sub-index	1 _h ~4 _h				

Designation	RPDO Mappe	d Object					
Object structure	-	Data type	Uint32	Data ran	ige Uir	1t32	
Mapping	NO	Access	RW	Factory set	tting	-	
Function	The mapped dictionary list sub-index in	The mapped object content, index and sub-index must exist in the object dictionary list, in writable state and be mappable. Write the corresponding sub-index in the following format:					
description	MSB				LSB	_	
	31 1	16 15	8	7	0		
	Index Sub-index Object length						

RPDOdefault mapping content:

(1)RPDO1(1600_h)

Table 11-90

Sub-index	ex Value Description		
0	1	Map one object	
1	0x60400010	Command word	

 $(2) RPDO2 (1601_h)$

Table 11-91

Sub-index	Value	Description
0	2	Map two objects
1	0x60410010	Control word
2	0x60600008	Running mode selection

(3)RPDO3(1602h)

Table 11-92

Sub-index	Value	Description
0	2	Map two objects
1	0x60410010	Control word
2	0x607A0020	Target position (position command)

(4)RPDO4(1603h)

Table 11-93

Sub-index	Value	Description
0	2	Map two objects
1	0x60410010	Control word
2	0x60FF0020	Target speed (speed command)

Table 11-94

Object1800h:	TPI	OO1 Communica	ation Parameter		
Object1801h:	TPI	O2 Communication Parameter			
Object1802h:	TPI	PDO3 Communication Parameter			
Object1803h:	TPI	OO4 Communica	ation Parameter		
		1800h~1803			
Index		h			
Designation	1	TPDO Comm	unication Parameter		

11 Communication

Object structure	REC	Data type	-]	Data range	-
Mapping	NO	Access	RW	Factory setting		-
Sub-index	00 _h					
Designation	Largest	t Sub-index S	upported			
Object structure	-	Data type	Uint8]	Data range	0~4
Mapping	NO	Access	RO	Fa	actory setting	5
Sub-index	01 _h					
Designation	TPDO	COB-ID				
Object structure	-	Data type	Uint32]	Data range	Uint32
Mapping	NO	Access	RW	Factory setting		See Function description
	Only	the highest bit	can be char	iged. A "	'0" indicates that the	TPDO is
	valid,	and a "1" indi	cates that th	e PDO is	s not valid.	
	MSB				T	LSB
	31	30		11	10	0
Function	0/1		0		11-bits verified	COB-ID
description	Factory	setting: (Node	e-ID default	is 1):		
	1800h:	0x80000180	+ Node-ID			
	1801h:	0x80000280	+ Node-ID			
	1802h:	0x80000380	+ Node-ID			
	1803h:	0x80000480	+ Node-ID			
Sub-index	02h					
Designation	TPDO '	Transmission	type			
Object structure	-	Data type	e Uint	3	Data range	Uint8
Mapping	NO		RW		Factory sotting	255
	NO	Access	Rtt		Factory setting	235
	This val	Access	e modified i	f the PD	O is invalid. Differe	nt values
	This val	Access lue can only be nt different F	e modified i DO transmi	f the PD	O is invalid. Differe	nt values following table:
Function	This val	Access lue can only be nt different F Value	e modified i DO transmi	f the PD	O is invalid. Differe pes, as shown in the Description	nt values following table:
Function description	This val	Access lue can only be nt different F Value 0	e modified i PDO transmi	f the PD	O is invalid. Differe pes, as shown in the Description Synchronous non-cy	t values following table:
Function description	This val	Access lue can only be nt different F Value 0 1~240	e modified i PDO transmi	f the PD	O is invalid. Differe pes, as shown in the Description Synchronous non-cy Synchronous cycl	nt values following table: ycle
Function description	This val	Access lue can only but different F Value 0 1~240 255	e modified i PDO transm	f the PD	O is invalid. Differe pes, as shown in the Description Synchronous non-cy Synchronous cycl Asynchronous cyc	t values following table: ycle
Function description Sub-index	This val represer	Access lue can only be nt different F Value 0 1~240 255	e modified i PDO transmi	f the PD	O is invalid. Differe pes, as shown in the Description Synchronous non-cy Synchronous cycl Asynchronous cycl	following table:
Function description Sub-index Designation	This val represer	Access lue can only be nt different F Value 0 1~240 255 Time	e modified i PDO transmi	f the PD ission typ	O is invalid. Differe pes, as shown in the Description Synchronous non-cy Synchronous cycl Asynchronous cycl	traines following table: ycle le
Function description Sub-index Designation Object structure	This val represer	Access Access lue can only be at different F Value 0 1~240 255 Time Data type	Uint1	f the PD assion typ 6	O is invalid. Differe pes, as shown in the Description Synchronous non-cy Synchronous cycl Asynchronous cycl Data range	t values following table: ycle e le Uint16
Function description Sub-index Designation Object structure Mapping	NO This val represent 03h Inhibit - NO	Access Access Access Access Access Access Access	Uint1 RW	6	O is invalid. Differe pes, as shown in the Description Synchronous non-cy Synchronous cycl Asynchronous cycl Data range Factory setting	Uint16
Function description Sub-index Designation Object structure Mapping Function	NO This val represer 03h Inhibit - NO This ob	Access lue can only be nt different F Value 0 1~240 255 Time Data type Access ject can only be ichibit time	Uint1 RW Uint1 RW e modified	6 when the	O is invalid. Differe pes, as shown in the Description Synchronous non-cy Synchronous cycl Asynchronous cycl Data range Factory setting e PDO is invalid. un	t values following table: ycle le Uint16 8 it is 125us.
Function description Sub-index Designation Object structure Mapping Function description	NO This val represer 03h Inhibit - NO This ob Note: T	Access lue can only be nt different F Value 0 1~240 255 Time Data type Access ject can only be he inhibit time	Uint1 Uint1 RW	6 when the	O is invalid. Differe pes, as shown in the Description Synchronous non-cy Synchronous cycl Asynchronous cycl Asynchronous cycl Data range Factory setting e PDO is invalid. un to 0.	t values following table: ycle le le Uint16 8 it is 125us.
Function description Sub-index Designation Object structure Mapping Function description Sub-index Designation	NO This val represer 03h Inhibit - NO This ob Note: T 04h Reserve	Access lue can only be nt different F Value 0 1~240 255 Time Data type Access ject can only b he inhibit time	Uint1 Uint1 RW	6 devhen set	O is invalid. Differe pes, as shown in the Description Synchronous non-cy Synchronous cycl Asynchronous cycl Asynchronous cycl Data range Factory setting e PDO is invalid. un to 0.	t values following table: ycle le Uint16 8 it is 125us.
Function description Sub-index Designation Object structure Mapping Function description Sub-index Designation	NO This val represer 03h Inhibit - NO This ob, Note: T 04h Reserve	Access lue can only be nt different F Value 0 1~240 255 Time Data type Access ject can only b he inhibit time ed Data type Data type	Uint1 Uint1 RW e modified is invalid v	6 6 when the vhen set	O is invalid. Differe pes, as shown in the Description Synchronous non-cy Synchronous cycl Asynchronous cycl Asynchronous cycl Data range Factory setting e PDO is invalid. un to 0.	Lint8
Function description Sub-index Designation Object structure Mapping Function description Sub-index Designation Object structure Mapping	NO This val represer 03h Inhibit - NO This ob Note: T 04h Reserve - NO	Access lue can only be nt different F Value 0 1~240 255 Time Data type Access ject can only b he inhibit time ed Data type Access	Uint1 RW Uint1 RW e modified is invalid v	6 when the 3	O is invalid. Differe pes, as shown in the Description Synchronous non-cy Synchronous cycl Asynchronous cycl Asynchronous cycl Data range Factory setting e PDO is invalid. un to 0. Data range Factory setting	Uint16 8 it is 125us.
Function description Sub-index Designation Object structure Mapping Function description Sub-index Designation Object structure Mapping Sub-index	NO This val represer 03h Inhibit - NO This ob Note: T 04h Reserve - NO 05h	Access lue can only be at different F Value 0 1~240 255 Time Data type Access ject can only b he inhibit time ed Data type Access	Uint1 RW Uint1 RW e modified is invalid v RW	6 when the yhen set	O is invalid. Differe pes, as shown in the Description Synchronous non-cy Synchronous cycl Asynchronous cycl Asynchronous cycl Data range Factory setting e PDO is invalid. un to 0. Data range Factory setting	255 nt values following table: ycle le le Uint16 8 it is 125us. Uint8 0
Function description Sub-index Designation Object structure Mapping Function description Sub-index Designation Object structure Mapping Sub-index Designation	NO This val represer 03h Inhibit - NO This ob Note: T 04h Reserve - NO 05h	Access lue can only be nt different F Value 0 1~240 255 Time Data type Access ject can only b he inhibit time ed Data type Access i i i i i i i i i i i i i i i i i i	Uint1 Uint1 RW Uint1 RW Uint1 RW Uint1 RW	6 when the 3	O is invalid. Differe pes, as shown in the Description Synchronous non-cy Synchronous cycl Asynchronous cycl Asynchronous cycl Data range Factory setting e PDO is invalid. un to 0. Data range Factory setting	Uint16 Uint16 Uint8 0

Mapping	NO	Access	RW	Factory setting	2			
Function	This obj	This object can be modified only when the PDO is invalid. unit is 1ms.						
description	Note: wl	Note: when set to 0, the time timer is invalid.						

Object 1A00h: TP	DO1 Map	ping Parame	eter			
Object 1A01h: TP	DO2 Map	ping Parame	eter			
Object 1A02h: TP	DO3 Map	ping Parame	eter			
Object 1A03h: TP	DO4 Map	ping Paramo	eter			
Index	1A00h~	1A03h				
Designation	TPDO N	Mapping Par	ameter			
Object structure	REC	Data type	-	I	Data range	-
Mapping	NO	Access	RW	Fa	ctory setting	-
Function	This object can be modified only when the PDO is invalid. The total bit length					
description	of the m	of the mapped object must not exceed 64 bits, and only per-byte mapping is				
	supported, not per-bit mapping.					
Sub-index	00 _h					
Designation	Number	r of valid maj	oped objects in l	PDO		
Object structure	-	Data type	Uint8	I	Data range 0~4	
Mapping	NO	Access	RW	Fa	ctory setting	-
Function	When w	ritten 0, the su	ıb-index mappin	g objec	et is invalid.	
description						
Sub-index	1 _h ~4 _h					
Designation	TPDO N	Mapped Obje	ect(Application	Object	:)	
Object structure		Dete tour	Llin+22		Data manga	Llint22
Object structure	-	Data type	01111.52		Data Tange	Unit52
Mapping	NO	Access	RW	F	actory setting	-
Mapping	NO The m	Access apped object	RW content, index an	Fa Ind subin	actory setting ndex, must exist in	- the object
Mapping	NO The m diction	Access apped object on ary list, write	RW content, index and ble mappable.	F ad subin	actory setting	- the object
Mapping Function	NO The m diction Write t	Access apped object of ary list, writa the correspond	RW content, index an ble mappable. ding mapped Ob	F ad subin	actory setting ndex, must exist in the following form	- the object
Mapping Function description	NO The m diction Write t MSB	Access apped object of nary list, writa the correspond	RW content, index an ble mappable. ding mapped Ob	Fa nd subin ject in	actory setting ndex, must exist in the following form	the object at:
Mapping Function description	NO The m diction Write t MSB 31	Access apped object of ary list, writa the correspond	RW content, index an ble mappable. ding mapped Ob	Fail Subin ject in 5	actory setting ndex, must exist in the following form 7	the object at: LSB

TPDOdefault mapping content: (1)TPDO1(**1A00**_h)

Table 11-96

Sub-index	Value	Description				
0	1	Map one object				
1	0x60410010	Status word				

 $(2) TPDO2 (1A01_h) \\$

Table 11- 97

Sub-index	ex Value Description				
0	2	Map two objects			

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1	0x60410010	Status word				
2	0x60610008	Current running mode				

 $(3) TPDO3 (1A02_h) \\$

Table 11-98

Sub-index	Value	Description				
0	2	Map two objects				
1	0x60410010	Status word				
2	0x60640020	Current position				

 $(4) TPDO4 (1A03_h) \\$

Table 11-99

Sub-index	Value	Description				
0	2	Map two objects				
1	0x60410010	Status word				
2	0x606C0020	Current speed				

11.2.10.6 6000h Detailed Object Description

Object 603Fh				PP	PV	РТ	HM	IP						
Index	603F _h													
Designation	Error Code													
Object structure	VAR	Data type	Uint16	Dat	ta range		0~65535							
Mapping	Y	Access	RO	Facto	ory setting		-							
Function description	The fault code is the error that occurred the last time. See the fault list for details.													
Object 6040h				PP	PV	РТ	HM	IP						
Index		6040 _h												
Designation	Control Word													
Object structure	VAR	Data type	Uint16	Data	Data range 0~65535		35							
Mapping	Y	Access	RW	Factor	Factory setting		0							
	Bit defi	definition of control word:												
-------------------------	----------	-----------------------------	--------------------------------------	-----------	--------	----------------	---	----------------------	---------------	--------	-----------	-------------------	-----------	----------
	Bit		Designa	ati	on			De	escri	ption				
	0		Servo rea	dy		0:	invalid; 1:	valid.						
	1		Turn on the main circ electricity	he uit		0:	invalid; 1:	valid.						
	2		Quick Shutdowr	n		1:	invalid;	0: valid	••					
	3		Servo ope	era	tion	0:	invalid; 1:	valid.						
					Bit			Ru	nniı	ng me	ode			
					DR		PP		P	V	РТ	Н	Μ	
					4		New posit rising edg triggered	tion je	N	ΙA	NA	Ho: retu on	me 1rn	
Function description	4~6	5	Mode- related		5		0:non- immediate update 1:immedi update	e ate	N	IA	NA	Z	ÍA	
					6		0:absolute position 1:relative position	2	N	IA	NA	N	ÍA	
	7		Fault rese	et		bi bi in	t7 rising ed t7 is held to valid	ge is va 1, all c	lid; other	conti	ol instru	ction	is are	<u> </u>
	8		Halt			0:	invalid; 1:	valid.						
	9~1	0	NA											
	11~1	5	Factory-d	lefi	ined									
	Note: e	ach cont	bit in the co rol comma	ont nd	rol wo	ord r	eeds to be	used tog	gethe	er wit	h other b	oits to)	
Object 6041h	iorin a	5.5m					PP	PV		РТ	HM		IP	
	6041													
Index	h													
Designation	Status	Wor	ď											-
Object structure	VAR	D	ata type		Uint1	6	Data	range			0~65	535		
Mapping	Y		Access		RO		Factor	y settin	g		0			

	Bit definition	of status word:	
	Bit	Designation	Bit definition
	0	Servo ready	0: invalid;1: valid.
	1	Wait to enable servo	0: invalid;1: valid.
	2	Servo operation	0: invalid;1: valid.
	3	Fault	0: no faults; 1:faults.
	4	Turn on the main circuit electricity	0: invalid;1: valid.
	5	Quick stop	0: valid; 1: invalid.
	6	Power-on and running allowed	0: invalid;1: valid.
	7	Warning	0: invalid;1: valid.
	8	Factory-defined	
	9	Remote control	0: non-Canopen mode;1: Canopen remote control mode.
'unction scription	10	Target reached	Speed mode: 0: target speed not reached; 1: target speed reached. Position mode: 0: target position not reached; 1: target position reached.
	11	Software internal position exceeds the limit	0: position command or feedback does not reach the software internal position limit; 1: position command or feedback reaches the software internal position limit.
	12~13	Control mode-related	<u> </u>
	14	NA	
	15	Home return completed	0: home return not performed or not completed. 1: home return completed and

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Object 605Ah				PP	PV	РТ	HM	IP
Index	605A h							
Designation	Quick S	top Selection						
Object structure	VAR	Data type	Int16	Data	a range		0~2	

Mapping	NO	Access	RW	Facto	ry setting	5	2	
	Value		Con	trol mode	display			
	0	Free stop, k	eep free runni	ng after th	e stop is c	complet	ed	
Function description	1	Stop at the keep free ru	set deceleration	on ramp of opping is c	6084h (hi completed	m: 609/	Ah) and	
	2	Stop at the after the sto	deceleration ra	amp set at d.	6085h and	d keep f	free runni	ing
Object 605Dh				PP	PV	РТ	HM	IP
Index	605D _h							
Designation	Halt Sto	p Selection		-			-	
Object structure	VAR	Data type	Int16	Da	ata range		1~3	3
Mapping	NO	Access	RW	Fact	tory settir	ng	1	
	Value		Cor	ntrol mod	e display			
Free off or	1	Stop at the and lock th	set deceleration be position after	on ramp o er stopping	f6084h/60 g is comple)87h(hn eted.	n: 609A	h)
description	2	Stop at the and lock th	set deceleration be position after	on ramp o er stopping	f6084h/60 g is comple)87h(hn eted.	n: 609A	h)
	3	Stop via er completed.	nergency torq	ue and loc	k the posit	tion afte	er stoppir	ng is

Table 11- 102

Object 6060h					P P	PV	РТ	HM	IP
Index	6060 _h				-				
Designation	Running	Mode Selecti	on						
Object structure	VAR	Data type	Int8	1	Data 1	range		0~7	
Mapping	Y	Access	RW		Fact sett	tory ing		1	
	Set runnir	ng mode:							
	Valu	1e		Des	script	ion			
	0				NA				
Function	1		Profile	e pos	sition	mode (P	P)		
description	3		Profile	e vel	ocity	mode (P	V)		
	4		Profil	le to	rque r	node (PT	")		
	6		Но	ming	g mod	le (HM)			
	7		Inter	pola	tion r	node (IP))		
Object 6061b					Р	PV	РТ	НМ	IP
					P	1 1			
Index	6061 _h								
Designation	Modes D	isplay							
Object structure	VAR	Data type	Int8		Data	range		0~7	

Mapping	Y	Acc	ess	RO	Fa se	ctory tting		0	
	Val	ue		Conti	rol moo	le display	y		
	0				NA	<u> </u>			
	1			Profile	positio	n mode (F	PP)		
Function	3	3 Profile velocity mode (PV					V)		
description	4			Profile	torque	mode (P	Г)		
	6			Hom	ing mo	de (HM)	/		
	7			Interp	olation	mode (IP	')		
Object 6062h			<u>.</u>	1			рр	HM	IP
Index	6062 _b								
Designation	Position	Comm	and						
Object structure	VAR	Data	type	Int 32	Data	range		$-2^{31} \sim (2^3)^{-2}$	¹ -1)
o sjeet stractare	, inter	Duu	-JPC	int 02	Fa	ctory		2 (2	1)
Mapping	Y	Acc	ess	RO	se	tting		0	
Function					50				
description	Position c	comman	ıd value	e (Unit: Con	nmand	unit).			
Object 6063h					Р	PV	РТ	HM	IP
					Р				
Index	6063 _h								
Designation	Motor Po	osition 1	Feedba	ck					
Object structure	VAR	Data	type	Int32	Dat	ta range		$-2^{31} \sim (2)^{-2}$	³¹ -1)
					F	actory		X	
Mapping	Y	Acc	ess	RO	s	etting		0	
Function									
description	Reflect re	al-time	motor	absolute pos	sition fe	edback (i	n enco	oder units).
Object 6064h					PP	PV	РТ	HM	IP
Index	6064 _h								
Designation	User Posi	ition Fe	edbacl	ĸ					
Object structure	VAR	Data	type	Int32		Data ran	ge	-231~	$(2^{31}-1)$
Mapping	Y	Acc	ess	RO	Fa	actory set	ting		0
Function	Real-time	e absolu	te moto	or position fe	edback	k (Unit: C	omma	nd unit).	
Function	User posi	tion fee	dback 6	5064h ×Gea	ur ratio	(6091h) =	= Moto	or position	1
description	feedback	6063h.							
Object 6065h						PP		HM	IP
Index	6065 _h								
Designation	Excessive	e Positi	on Dev	iation Thre	shold				
Object structure	VAR	Dat	a type	Uint32		Data ran	ge	0~(2 ³¹ -1)
Mapping	Y	A	ccess	RW	Fa	actory set	tting	384	10000
	Set the ex	cessive	positio	on deviation	thresho	old (Unit:	Comn	nand unit).
Function	If the diff	erence l	betweer	n user positi	on com	mand 606	52h an	d user po	sition
description	feedback	6064h e	exceeds	±6065h, an	excess	ive positi	on dev	viation fat	ılt
	(FR d00)	occurs							

	When 60	65h is set to 42	94967295, t	he serv	vo does n	ot moni	tor ex	cessi	ve
	position	deviation.							
Object 6067h					PP		$\mathbf{H}\mathbf{M}$		IP
Index	6067 _h								
Designation	Position	Reach Thresh	old						
Object structure	VAR	Data type	Uint32		Data ra	nge	()~(2 ³	³¹ -1)
Mapping	Y	Access	RW	F	actory se	etting		10	0
	Set the the The diffe	rreshold value t rence between	for position 1 the user pos	eachin	g (unit: C ommand	Commai 6062h a	nd uni and the	t). e acti	ual
Function	user posi	tion feedback 6	5064h is with	nin ±60)67h, and	the pos	ition i	is	
description	considere	ed to be reache	d when the ti	me rea	ches 606	8h, and	status	s woi	rd
	6041 bit1	10=1 of in pro	ofile position	mode					
Object 6068h					PP	HN	Л		IP
Index	6068 _h								
Designation	Position	Reach Time V	Vindow						
Object structure	VAR	Data type	Uint16	D	ata rang	e	0	~655	35
Mapping	Y	Access	RW	Fac	tory sett	ing		0	
	Set the ti	me window (ui	nit: 2ms) for	judgin	g the vali	idity of	the po	ositio	n
	arrival.								
Function	The diffe	erence between	the user pos	ition co	ommand	6062h a	and the	e acti	ual
description	user posi	tion feedback 6	5064h is with	nin ±60	67h, and	the pos	ition i	is	
	considered	ed to have arriv	red when the	time r	eaches 60)68h, ar	d the	statu	is word
	6041h bi	t10=1 in the pr	ofile position	n mode					
Object 606Bh				PP	PV	PT	HN	1	IP
Index	606B _h								
Designation	User Act	tual Speed Cor	nmand						
Object structure	VAR	Data type	Int32	D	ata rang	e	-23	$^{1}\sim(2^{2})^{1}$	³¹ -1)
Mapping	Y	Access	RO	Fac	tory sett	ing		-	
	Reflect the	he actual user s	peed comma	ınd (un	it: Comn	nand un	it/s).		
Function	In positio	on-related mode	es, it reflects	the sp	eed comr	nand co	rrespo	ondir	ng to
description	the outpu	it of the positio	n regulator;						
	In speed-	-related modes,	it reflects th	e inpu	t commar	nd of the	e spee	d reg	gulator.
Ubject 606Ch	(0)(7)			PP	PV	PT	H	VI	IP
Index	000Ch								
Designation	User Act	tual velocity r	ееараск					- 03	1 (03)
Object structure	VAR	Data type	Int32		Data ra	ange		-23	1~(2 ⁵¹ -
Mapping	Y	Access	RO	I	Factory s	setting			-
Function	reflecting	the actual use	r speed feed	hack w	alue (unit	· Comp	nand u	mit/e)
description	Tenteeting	g the actual use	r speed leed	Jack Va	ande (unit	. Comm		init/ S	
Object 606Dh									PV
Index	606Dh								
Designation	Velocity	Reach Thresh	old						
Object structure	VAR	Data type	Uint16		Data ra	nge		0~	65535
Manufactor	v	Access	PW	1	Factory s	otting			100

Function description	Set the the When the speed 606 considere speed mo	reshold value f difference bet 5Ch is within ± d to be reached de. Conversely	for speed rea ween the tar £06Dh and t d and status 7, status word	ching (unit: 0.1 rpm). get speed 60FFh and the act the time reaches 606Eh, the word 6041h bit10 = 1 in the d 6061h bit10 = 0.	tual user speed is profile					
Object 606Eh					PV					
Index	606E _h									
Designation	Velocity 1	Reach Windo	w Time							
Object structure	VAR	Data type	Uint16	Data range	0~65535					
Mapping	Y	Access	RW	Factory setting	0					
Function description	Set the tir If the diff 606Ch is considere speed mo	ne window (ur erence betwee within ±606Dl d to be reached de. Otherwise,	hit: ms) for junt the target s in and the time d, and status status word	udging the speed arrival vali- speed 60FFh and the actual is a reaches 606Eh, the speed word 6041h bit 10 =1 in the 6061h bit 10 =0.	idity. user speed is e profile					
Object 606Fh					PV					
Index	606Fh									
Designation	Zero-spe	ed threshold								
Object structure	VAR	Data type	Uint16	Data range	0~65535					
Mapping	Y	Access	RW	Factory setting	10					
Function description	Set the tir User spee value mea = 1; either at this tim	Y Access RW Factory setting 10 Set the time window used to judge whether the user speed is 0 (unit: 2ms). Jser speed feedback 606Ch within \pm 606Fh, and the time reaching 6070h set value means that the user speed is 0, at this time the status word 6041h bit12 = 1; either of the two conditions nor met means that the user speed is not 0, this is not the user speed is 00 (unit: 2ms).								

Table	11-	103
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Object 6070h					PV
Index	6070 _h				
Designation	Zero-spee	ed Window Ti	me		
Object structure	VAR	Data type	Uint16	Data range	0~65535
Mapping	Y	Access	RW	Factory setting	0
Function description	Set the tin User speed value mea either of th time the	ne window use d feedback 606 uns that the use he two conditions status word 60	to judge wh 5Ch within ±6 r speed is 0, a ons nor met m 041h bit12 of	ether the user speed i 06Fh, and the time re t this time the status v leans that the user spe = $0.$	s 0 (unit: 2ms). aching 6070h set word 6041h bit12 = 1; eed is not 0, at this
Object 6071h					РТ
Index	6071 _h				
Designation	Target to	rque			
Object structure	VAR	Data type	Int16	Data range	-5000~5000
Mapping	Y	Access	RW	Factory setting	0

Function	For comm	anding the targ	et value (unit	: 0.1%) i	in profile	e torq	ue mo	de and	cycle
description	synchrono	ous torque mode	e.						
Object 6072h		-		PP	P	V	РТ	HM	IP
Index	6072 _h								
Designation	Maximur	n torque	-	T					
Object structure	VAR	Data type	Uint16	Dat	a range		-	5000~5	5000
Mapping	Y	Access	RW	Facto	ry setti	ng		3000)
Function	Set the ma	aximum output	torque value	of the se	rvo (uni	t• 0.1	%)		
description	Bet the Int	ixiniuni output	torque value	or the se	rvo (um	t. 0.1	/0).		
Object 6074h				PP	PV	7	РТ	HM	IP
Index	6074 _h								
Designation	Torque co	ommand							
Object structure	VAR	Data type	Uint16	D	ata ranș	ge		-5000	~5000
Mapping	Y	Access	RO	Fac	tory set	ting			-
Function	Display th	e current torau	e command (unit: 0.19	%)				
description	Display u	le current torqu	e command (unit. 0.1	/0).				_
Object 6075h				PP	Р	V	РТ	HM	IP
Index	6075 _h								
Designation	Motor ra	ted current		1			-		
Object structure	VAR	Data type	Uint 32	Da	ta rang	e		Uint	32
Mapping	Y	Access	RO	Facto	ory setti	ng		0	
Function	The rated	current (in mA) on the moto	r namep	late. All	curre	nt-rela	ted par	ameters
description	are related	l to this parame	ter.						
Object 6076h				PP	PV	P .	Г	HM	IP
Index	6076 _h			PP	PV	P'.	Γ	HM	IP
Index Designation	6076 _h Motor ra	ted torque		PP	PV	P'.	r	HM	IP
Object 60/6h Index Designation Object structure	6076 _h Motor ra VAR	ted torque Data type	Uint32	PP D	PV ata rang	ge	<u>r</u>	HM Uin	IP t32
Object 60/6n Index Designation Object structure Mapping	6076 _h Motor ra VAR Y	ted torque Data type Access	Uint32 RO	PP D Fac	PV ata rang tory set	ge ting		HM Uin	IP t32
Object 60/6h Index Designation Object structure Mapping Function	6076 _h Motor ra VAR Y The rated	ted torque Data type Access torque (in mNr	Uint32 RO n) on the mot	PP D Fac	ata rang tory set	ge ting	T Jue rela	HM Uin (ated pa	IP t32) rameters
Object 6076h Index Designation Object structure Mapping Function description	6076h Motor ra VAR Y The rated	ted torque Data type Access torque (in mNr	Uint32 RO n) on the mot	PP D Fac	ata rang tory set	ge ting 1 torq	I	HM Uin (ated pa	IP t32) rameters
Object 6076h Index Designation Object structure Mapping Function description	6076h Motor ra VAR Y The rated are related	ted torque Data type Access torque (in mNr I to this parame	Uint32 RO n) on the mot ter.	PP D Fac tor name	PV ata rang tory set plate. Al	ge ting 1 torq	r Jue rela	HM Uin (ated pa	IP t32) rameters
Object 6076h Index Designation Object structure Mapping Function description	6076h Motor ra VAR Y The rated are related	ted torque Data type Access torque (in mNr I to this parame	Uint32 RO n) on the mot ter.	PP D Fac tor name	PV ata rang tory set plate. Al PV	ge ting l torq	r lue rela	HM Uin (ated pa HM	IP t32) rameters IP
Object 6076h Index Designation Object structure Mapping Function description Object 6077h Index	6076h Motor ra VAR Y The rated are related 6077h	ted torque Data type Access torque (in mNr I to this parame	Uint32 RO n) on the mot ter.	PP D Fac for name	PV ata rang tory set plate. Al PV	ge ting 1 torq	r lue rel:	HM Uin (ated pa HM	IP t32) rameters IP
Object 6076h Index Designation Object structure Mapping Function description Object 6077h Index Designation	6076h Motor ra VAR Y The rated are related 6077h Motor fee	ted torque Data type Access torque (in mNr to this parame edback torque	Uint32 RO n) on the mot ter.	PP D Fac for name	PV ata ranș tory set plate. Al PV	ge ting 1 torg	r jue rela	HM Uin (ated pa HM	IP t32) rameters IP
Object 6076h Index Designation Object structure Mapping Function description Object 6077h Index Designation Object structure	6076h Motor ra VAR Y The rated are related 6077h Motor fee VAR	ted torque Data type Access torque (in mNr I to this parame edback torque Data type	Uint32 RO n) on the mot ter. Int16	PP D Fac or name PP Dat	PV ata rang tory set plate. Al PV a range	ge ting l torq	r Jue rel:	HM Uin (ated pa HM Int16	IP t32) rameters IP
Object 6076h Index Designation Object structure Mapping Function description Object 6077h Index Designation Object structure Mapping	6076h Motor ra VAR Y The rated are related 6077h Motor fee VAR Y	ted torque Data type Access torque (in mNr to this parame dback torque Data type Access	Uint32 RO n) on the mot ter. Int16 RO	PP D Fac or name PP Dat Facto	PV ata rang tory set plate. Al PV a range ry settin	ge ting 1 torq P ng	r jue rela	HM Uin (ated pa HM Intl6 0	IP t32) rameters IP 5
Object 6076h Index Designation Object structure Mapping Function description Object 6077h Index Designation Object structure Mapping Function Object structure Mapping Function	6076h Motor ra VAR Y The rated are related 6077h Motor fee VAR Y Reflect th	ted torque Data type Access torque (in mNr to this parame edback torque Data type Access	Uint32 RO n) on the mot ter. Int16 RO torque outpu	PP D Fac cor name; PP Dat Facto tof the s	PV ata rang tory set plate. Al PV a range ry settin servo mo	P?	r jue rela	HM Uin (ated pa HM Int16 0 .1%).	IP t32) rameters IP 5
Object 6076h Index Designation Object structure Mapping Function description Object 6077h Index Designation Object structure Mapping Function description	6076h Motor ra VAR Y The rated are related 6077h Motor fee VAR Y Reflect th	ted torque Data type Access torque (in mNr to this parame Collection Data type Data type Access e instantaneous	Uint32 RO n) on the mot ter. Int16 RO torque outpu	PP D Fac or name; PP Dat Facto	PV ata rang tory set plate. Al PV a range ry settin servo mo	ge ting_ 1 torq P'	r uue rela r unit: 0	HM Uin (ated pa HM Int16 0 .1%).	IP t32) rameters IP j
Object 6076h Index Designation Object structure Mapping Function description Object 6077h Index Designation Object structure Mapping Function description Object structure Mapping Function description Object 6078h	6076h Motor ra VAR Y The rated are related 6077h Motor fee VAR Y Reflect th	ted torque Data type Access torque (in mNr to this parame baback torque Data type Access e instantaneous	Uint32 RO n) on the mot ter. Int16 RO torque outpu	PP D Fac ior name; PP Dat Facto it of the s PP	PV ata rang tory set plate. Al PV a range ry settin servo mo servo mo	ge ting l torq P otor (1	r uue rela	HM Uin (ated pa HM Int16 0 .1%).	IP (132) rameters IP IP
Object 6076h Index Designation Object structure Mapping Function description Object 6077h Index Designation Object structure Mapping Function description Object structure Mapping Function description Object 6078h Index	6076h Motor ra VAR Y The rated are related 6077h Motor fee VAR Y Reflect th 6078h	ted torque Data type Access torque (in mNr to this parame dback torque Data type Access e instantaneous	Uint32 RO n) on the mot ter. Int16 RO torque outpu	PP D Fac or name PP Dat Facto t of the s PP	PV ata rang tory set plate. Al PV a range ry settin servo mo servo mo	ge ting l torq PT	r uue rela r	HM Uir Uirated pa Uirated pa HM Int1(0) 1.1%). HM	IP t32) rameters IP 5 IP
Object 6076h Index Designation Object structure Mapping Function description Object 6077h Index Designation Object structure Mapping Function description Object 6078h Index Designation	6076h Motor ra VAR Y The rated are related are related 6077h Motor fee VAR Y Reflect th 6078h	ted torque Data type Access torque (in mNr to this parame dback torque Data type Access e instantaneous eous current o	Uint32 RO n) on the molecter. Int16 RO torque output	PP Dat PP Dat Facto t of the s PP	PV ata rang tory set plate. Al PV a range ry settin servo mo PV	ge ting l torq P btor (t P	r uue rela r	HM Uirin () ated pa HM Int1(0) 0 .1%). HM	IP t32) rameters IP 5 IP
Object 6076h Index Designation Object structure Mapping Function description Object 6077h Index Designation Object structure Mapping Function description Object 6078h Index Designation Object 6078h Index	6076h Motor ra VAR Y The rated are related are related 6077h Motor fee VAR Y Reflect th 6078h Instantan	ted torque Data type Access torque (in mNr to this parame dback torque Data type Access e instantaneous eous current o Data type	Uint32 RO n) on the mot ter. Int16 RO torque outpu torque outpu	PP Dat Dat Dat Dat	PV ata rang tory set plate. Al PV a range ry settin servo mo PV a range	ge ting 1 torq P' otor (1	r uue rela r	HM Uiri ((ated pa HM Int1(0 .1%). HM	IP (132) rameters IP 5 5
Object 6076h Index Designation Object structure Mapping Function description Object 6077h Index Designation Object structure Mapping Function description Object 6078h Index Designation Object 6078h Index Designation Object structure Mapping	6076h Motor ra VAR Y The rated are related 6077h Motor fee VAR Y Reflect th 6078h Instantan VAR Y	ted torque Data type Access torque (in mNr to this parame dback torque Data type Access e instantaneous cous current o Data type Access	Uint32 RO n) on the mot ter. Int16 RO torque outpu torque outpu utput Int16 RO	PP Dat Facto Dat Facto Dat Facto	PV ata rang tory set plate. Al PV a range ry settin servo mo PV a range ry settin	p? ge ting l torq p? ag otor (t p?	r uue rel:	HM Uir (() () () () () () () () () (IP (132) rameters IP 5 5

Object 607Ah								РР
Index	607Ah							
Designation	Target Po	osition						
Object structure	VAR	Data type	Int32	Data	range		-231~(23	¹ -1)
Mapping	Y	Access	RW	Factor	y setting		0	
	Set the set	rvo target posit	ion (unit: C	ommand un	it) in profil	e pos	ition mod	le.
T 4	When con	trol word 6040)h bit 6 is 0,	607Ah is th	e absolute	targe	t position	of the
Function	current se	gment;						
description	When con	trol word 6040)h bit 6 is 1,	607Ah is th	e target ind	creme	ntal	
	displacem	ent of the curre	ent segment					
Object 607Ch								HM
Index	607C _h							
Designation	Home Of	fset						
Object structure	VAR	Data type	Int32	Data	range		-231~(23	³¹ -1)
Mapping	Y	Access	RW	Factory	setting		0	
	In the pos	ition-related co	ontrol mode	, the mecha	nical zero p	ooint	deviates f	from the
	physical p	osition of the r	notor origin	(unit: Com	mand unit)			
	Mechanic	al zero point =	mechanical	home posit	ion + 607C	h (ho	me offset). When
	set to 0, th	ne home point i	s not offset.					
Function			Mechanical origin	6070				
description								
				Me	chanical			
) -	Zero			
			<u> </u>					
Object 607Dh		1		PP	PV	РТ	HM	IP
Index	607D _h							
Designation	Software	absolute posit	ion limit			-		
Object structure	ARR	Data type	Int32	Data	range		Int32	2
Mapping	Y	Access	RW	Factor	y setting		0	
	Set the mi	nimum and ma	aximum valı	ue of the sof	tware abso	lute p	osition li	mit.
	Minimum	absolute posit	ion limit = (607D-01h)				
	Maximum	absolute posit	tion limit =	(607D-02h)				
	Software	absolute position	on limit sett	ng:				
	1.When b	oth (607D-01h) and (607D	-02h) are se	t to the def	fault v	alue, the	
Function	software 1	imit is invalid.						
description	2.When the	ne minimum ab	solute posit	ion limit (60	07D-01h) is	s grea	ter than t	he
ucscription	maximum	absolute posit	ion limit (60	07D-02h), tl	ne software	inter	nal	
	automatic	ally adjust its v	/alue.					
	3.When the	ne position com	nmand or po	sition feedb	ack reache	s the	software	limit
	value, the	servo will take	e the positio	n limit as th	e target pos	sion ii	n position	mode,
	and stop v	when it reaches	the position	limit, and	hen promp	t the	overtrave	1
	warning.	Input reverse co	ommand to	exit position	n exceeding	g state	of motor	:

	4. Absolut	e position lin	nit is relative t	o the m	otor feedbacl	k positio	on 6064h	(user
	unit).							
Sub-index	00h							
Designation	Sub-index	x Number						
Object structure	VAR	Data type	Uint8	D	ata range		2	
Mapping	Y	Access	RO	Fac	ctory setting		2	
Sub-index	01h							
Designation	Minimun	ı Software A	bsolute Positi	on Lim	nit	_	_	
Object structure	VAR	Data type	Int32	D	ata range		Int32	
Mapping	Y	Access	RW	Fac	ctory setting		-231	
Sub-index	02h							
Designation	Maximur	n Software A	Absolute Posit	ion Lin	nit			
Object structure	VAR	Data type	Int32	D	ata range		Int32	
Mapping	Y	Access	RW	Fac	ctory setting		231	
Object 607Eh				PP	PV	РТ	HM	IP
Index	607E _h							
Designation	Comman	d Polarity						
Object structure	VAR	Data type	Uint8	D	ata range		Int8	
Mapping	Y	Access	RW	Fac	ctory setting		0	
	Set the	polarity of po	sition comma	nd, spee	ed command	and tore	ļue	
	comman	nd.						
	1							
	MSB						LSB	
	MSB	7	6		5	4	LSB	0
	MSB positio	7 n polarity	6 speed polarit	y to	5 orque polarity	4	LSB NA	0
Function	MSB position	7 n polarity	6 speed polarit	y to	5 orque polarity	4	LSB NA	0
Function description	MSB position Bit7 = 1, s	7 n polarity standard posi	6 speed polarit tion mode, rev	y to erses th	5 orque polarity ne motor as th	4 7 ne positi	LSB NA	0 and ×
Function description	MSB position Bit7 = 1, s (-1).	7 n polarity standard posi	6 speed polarit tion mode, rev	y to erses th	5 orque polarity ne motor as th	4 7 ne posit	LSB NA	0 and ×
Function description	MSB positio Bit7 = 1, s (-1). In profile	7 n polarity standard posi position mod	6 speed polarit tion mode, rev le and synch	y to erses th	5 orque polarity ne motor as th cycle position	4 7 ne positi n mode,	LSB NA ion comm	0 and ×
Function description	MSB positio Bit7 = 1, s (-1). In profile command	7 n polarity standard posi position moc and target p	6 speed polarit tion mode, rev le and synch osition are revo	y to erses th ronous e ersed.	5 orque polarity ne motor as the cycle position	4 7 ne positi	LSB NA ion comm	0 and ×
Function description	MSB positio Bit7 = 1, s (-1). In profile command Bit6 = 1, s	7 n polarity standard posi position mod and target po speed mode,	6 speed polarit tion mode, rev le and synch osition are revo speed commar	y to erses the ronous of ersed. ad (60F)	5 orque polarity ne motor as the cycle position Fh) \times (-1), re	4 ne positi n mode, verse th	LSB NA ion comm the positi the motor.	0 and ×
Function description	MSB positio Bit7 = 1, s (-1). In profile command Bit6 = 1, s Bit5 = 1, s	7 n polarity standard posi position mod and target p speed mode, torque mode,	6 speed polarit tion mode, rev le and synch osition are reve speed commar torque comma	y to erses th cronous ersed. d (60Fi and ×(-	5 orque polarity ne motor as the cycle position Fh) ×(-1), re -1).	4 7 ne positi n mode, verse th	LSB NA ion comm the positi ie motor.	0 and × ion
Function description Object 607Fh	MSB positio Bit7 = 1, : (-1) . In profile command Bit6 = 1, : Bit5 = 1, !	7 n polarity standard posi position mode and target pu speed mode, torque mode,	6 speed polarit tion mode, rev le and synch osition are revo speed commar torque comma	y to erses th ersed. ad (60F) and × (- P)	5 orque polarity ne motor as the cycle position Fh) ×(-1), re -1). P PV	4 7 he posit n mode, verse th PT	LSB NA ion comm the positi ie motor. HM	0 and × ion IP
Function description Object 607Fh Index	MSB positio Bit7 = 1, s (-1). In profile command Bit6 = 1, s Bit5 = 1, t	7 n polarity standard posi position mode and target po speed mode, torque mode,	6 speed polarit tion mode, rev le and synch osition are revo speed commar torque comma	y to erses the conous dersed. and $(60F)$ and $\times (-$ PI	5 orque polarity ne motor as the cycle position Fh) ×(-1), re -1). P PV	4 ne positi n mode, verse th PT	LSB NA ion comm the positi te motor. HM	0 and × ion IP
Function description Object 607Fh Index Designation	MSB positio Bit7 = 1, 9 (-1). In profile command Bit6 = 1, 9 Bit5 = 1, 1 Bit5	7 n polarity standard posi position mod and target po speed mode, torque mode, ille Velocity Data target	6 speed polarit tion mode, rev le and synch osition are revo speed commar torque commar	y to erses the conous of ersed. and (60F) and × (- P)	5 orque polarity ne motor as the cycle position Fh) ×(-1), re -1). P PV	4 ne posit n mode, verse th PT	LSB NA ion comm the positi te motor. HM	0 and × ion IP
Function description Object 607Fh Index Designation Object structure Mapping	MSB positio Bit7 = 1, 4 (-1). In profile command Bit6 = 1, 4 Bit5 = 1, 4 Bit5 = 1, 4 607F h Max Prof VAR	7 n polarity standard posi position mod and target pos posed mode, torque mode, tor	6 speed polarit tion mode, rev le and synch: osition are reve speed commar torque commar torque commar	y to erses the ronous densed. and (60F) and ×(- PI	5 orque polarity ne motor as the cycle position Fh) × (-1), re -1). P PV ata range tory setting	4 ne position mode, verse the pr	LSB NA ion comm the positi e motor. HM 0~(2 ³¹ - 2388608	0 and × ion 1P
Function description Object 607Fh Index Designation Object structure Mapping	MSB positio Bit7 = 1, 4 (-1). In profile command Bit6 = 1, 4 Bit5 = 1, 4 Bit5 = 1, 4 607F h Max Prof VAR Y	7 n polarity standard posi position mod and target pos posed mode, torque mode, ile Velocity Data type Access viewum runn	6 speed polarit tion mode, rev le and synch osition are reve speed commar torque commar torque commar <u>Uint32</u> RW	y to erses the ersed. and ×(- PI	5 orque polarity orque polarity tory cycle position Fh) $\times (-1)$, re -1). P PV ata range tory setting tory setting	4 ne position mode, verse the provide the provided the	LSB NA ion comm the positi e motor. HM $0\sim(2^{31}-$ 8388608	0 and × ion IP
Function description Object 607Fh Index Designation Object structure Mapping	MSB positio Bit7 = 1, s (-1). In profile command Bit6 = 1, s Bit5 = 1, s Bit5 = 1, s 607F _h Max Prof VAR Y Set the ma	7 n polarity standard posi position mod and target pos peed mode, torque mode, ile Velocity Data type Access uximum runn	6 speed polarit tion mode, rev le and synch osition are reve speed commar torque commar torque commar <u>Uint32</u> <u>RW</u> ing speed (unit	y to erses the ronous of ersed. ad (60F, and × (- Pl Date Factor :: Comm	5 orque polarity ne motor as the cycle position Fh) $\times (-1)$, restrict P PV ata range tory setting nand unit/s).	4 7 ne posit n mode, verse th PT	LSB NA ion comm the positi ie motor. HM 0~(2 ³¹ - 8388608	0 and × ion 1) 000
Function description Object 607Fh Index Designation Object structure Mapping	MSB positio Bit7 = 1, $:$ (-1). In profile command Bit6 = 1, $:$ Bit5 = 1, $:$ 607F _h Max Profive VAR Y Set the matching The set variable.	7 n polarity standard posi position mod and target pu speed mode, torque mode, ile Velocity Data type Access uximum runn lue is valid w	6 speed polarit tion mode, rev le and synch osition are reve speed commar torque commar torque commar <u>Uint32</u> RW ing speed (unit when the slave	y to erses the ronous of ersed. ad (60F) and × (- PI PI Ersect :: Commission speed c	5 orque polarity ne motor as the cycle position cycle position Fh) $\times (-1)$, restrict P PV ata range tory setting nand unit/s). command is c	4 7 ne posit n mode, verse th PT hanged	LSB NA ion comm the positi ie motor. HM 0~(2 ³¹ - 8388608	0 and × ion 1) 00
Function description Object 607Fh Index Designation Object structure Mapping	MSB positio Bit7 = 1, s (-1). In profile command Bit6 = 1, s Bit5 = 1, s 607F h Max Prof VAR Y Set the ma The set va	7 n polarity standard posi position mod and target pospeed mode, torque mode, torque mode, ile Velocity Data type Access uximum runn lue is valid w	6 speed polarit tion mode, rev le and synch osition are revo speed commar torque commar Uint32 RW ing speed (unit when the slave	y to erses th ersed. ad (60F) and ×(- Pl Fac: c Comr speed c	5 orque polarity ne motor as the cycle position cycle position Fh) $\times (-1)$, refult -1). P ata range tory setting nand unit/s). command is c $607Fh \times \frac{6}{2}$	4 7 ne positi n mode, verse th PT hanged.	LSB NA ion comm the positi ae motor. HM 0~(2 ³¹ - 8388608	0 and × ion 1) 500
Function description Object 607Fh Index Designation Object structure Mapping Function	MSB positio Bit7 = 1, 1 (-1). In profile command Bit6 = 1, 1 Bit5 = 1, 1 607Fh Max Prof VAR Y Set the ma The set va	7 n polarity standard posi position mod and target po speed mode, torque mode, ile Velocity Data type Access uximum runn lue is valid w Maximum p	6 speed polarit tion mode, rev le and synch osition are revo speed commar torque commar Uint32 RW ing speed (unit when the slave	y to erses the conous descent ad (60F) and × (- PI Factor speed construction speed construction rpm) =	5 orque polarity ne motor as the cycle position Fh) ×(-1), reference 1). P PV ata range tory setting nand unit/s). command is c $\frac{607Fh \times \frac{6}{6}}{encoder reference $	4 ne positi n mode, verse th PT hanged	LSB NA ion comm the positi ie motor. HM $0\sim(2^{31}-$ 8388608	0 and × ion 1) 00
Function description Object 607Fh Index Designation Object structure Mapping Function description	MSB positio Bit7 = 1, 1 (-1). In profile command Bit6 = 1, 1 Bit5 = 1, 1 607Fh Max Prof VAR Y Set the ma The set va	7 n polarity standard posi position mod and target po speed mode, torque mode, ille Velocity Data type Access uximum runn lue is valid w Maximum p	6 speed polarit tion mode, rev le and synch osition are revo speed commar torque commar Uint32 RW ing speed (unit when the slave	y to erses the conous densed. Ind (60F) and × (- PI PI Fac speed construction speed construction (construction)	5 orque polarity ne motor as the cycle position Fh) ×(-1), reference (-1), ref	4 ne position n mode, verse th PT hanged. 091-01h 091-02h solution	LSB NA ion comm the positi at motor. HM $0\sim(2^{31}-$ 8388608	0 and × ion 1P
Function description Object 607Fh Index Designation Object structure Mapping Function description	MSB positio Bit7 = 1, 1 (-1). In profile command Bit6 = 1, 1 Bit5 = 1, 1 Bit5 = 1, 1 Bit5 = 1, 1 Other VAR Y Set the ma The set va Note: in v	7 n polarity standard posi position moc and target po speed mode, torque mode, torque mode, ile Velocity Data type Access uximum runn lue is valid w Maximum p 'arious mode 8 in addition	6 speed polarit tion mode, rev le and synch osition are revo speed commar torque comma	y to erses the conous dersed. Ind (60F) and × (- Pr Factor speed control rpm) = m runn limit 7	5 orque polarity ne motor as the cycle position Fh) × (-1), reference -1). P P ata range tory setting nand unit/s). command is c $\frac{607 Fh \times \frac{6}{6}}{encoder rest}$ ing speed is The smaller command is compared.	4 7 ne posit n mode, verse th PT hanged. 091-01h 091-02h solution limited f the ty	LSB NA ion comm the positi e motor. HM $0\sim(2^{31}-$ 8388608 1×60 by the fit	0 and × ion 1P 1) 000

		-	Table 11- 104					
Object 6080h				PP	PV	РТ	HM	IP
Index	6080 _h							
Designation	Max M	otor Speed						
Object structure	VAR	Data type	Uint32	Data r	ange		Uint32	
Mapping	Y	Access	RO	Factory	setting	Maxir	num spee	d limit
Function	The ma	ximum allowab	le running spe	eed of the m	notor can	be obtai	ned from	the
description	servo m	notor manual (un	nit: rpm).					
Object 6081h								PP
Index	6081h							
Designation	Position	n Profile Speed	l					
Object structure	VAR	Data type	Uint32	Data r	ange		$0 \sim (2^{31} - 1)$	
Mapping	Y	Access	RW	Factory	setting		8388608	
	The rur	ning speed (in	command un	it/s) reache	s the spe	ed of	uniform s	section
	- C (1-						1.	
Function	after the	e completion of	acceleration s	section in pi	offle posi	ition mo	de.	
description				6081h	$\times \frac{6091 - 01}{1}$	h		
		motor	speed(rpm)	$=\frac{1}{\text{encoder}}$	resolutio	$\frac{h}{2} \times 60$		
Object (002h						-	DD	DV
Index	6092						rr	rv
Designation	Drofilo	accolonation ti	-					
Object structure	VAD	Dete type	Llint32	Doto r	ongo		$0.(2^{31} 1)$	
Monning	VAR		DW/	Factory	ange		0~(2 -1))
Mapping	I Sat tha	Access	KW	ractory	setting	la nasiti	on mode	ond
	profile	speed mode	int. Command	unit/s2) uu	ning prom	ie positi	on mode	anu
	In posit	ion profile mod	e the change	is offective	before th	is soom	ent comm	and is
Function	triggere	and after this	segment con	mand is tri	gaered it	is valid	when the	
description	current	segment is finis	shed	initialità 15 tri	550100, 10	15 vund	when the	
	In profi	le speed mode.	it takes effect	immediate	v.			
	When t	he parameter is	set to 0, it is f	orced to 1 i	nternally	by the s	oftware.	
Object 6084h		*					PP	PV
Index	6084 _h							
Designation	Profile	Deceleration 7	Time					
Object structure	VAR	Data type	Uint32	Data r	ange		$0 \sim (2^{31} - 1)$	
Mapping	Y	Access	RW	Factory	setting		83886080)
	Set the	deceleration rat	e (unit: comm	nand unit/s2) during p	profile p	osition m	ode
Function	and pro	file speed mode	e.					
description	Effectiv	ve immediately	in profile spe	ed mode.				
	When t	he parameter is	set to 0, it is i	forced to 1 i	nternally	by the s	oftware.	
Object 6085h				PP	PV	РТ	HM	IP
Index	6085 _h							
Designation	Profile	Quick Stop De	celeration					
Object structure	VAR	Data type	Uint32	Data r	ange		$0 \sim (2^{31} - 1)$	
Mapping	Y	Access	RW	Factory	setting	2	14748364	17

Function	valid wl	hen quick stop 6	040h: bit2=0	and when 605Ah(Qu	iick stop mode)=2, it			
description	runs at t	he speed of dec	eleration sect	ion.				
Object 6086h					PP PV			
Index	6086h							
Designation	Motion	otion Running Profile Type						
Object structure	VAR	Data type	Int16	Data range	Int16			
Mapping	Y	Access	RW	Factory setting	-			
Function description	Profile	type of motor po	osition comm	and or speed comma	nd			
Object 6087h					РТ			
Index	6087 _h							
Designation	Torque	ramp time						
Object structure	VAR	Data type	Uint32	Data range	0~65535			
Mapping								
· · · · · · · · · · · · · · · · · · ·	Y	R Data type Oint32 Data range 0~65535 Access RW Factory setting 1000 the torque command acceleration in profile torque mode, which indicates orque command increment per second (0.1%/s). Number of the second (0.1%/s).						

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Object 6091h				PP	PV	РТ	HM	IP
Index	6091 _h							
Designation	Gear Rat	io						
Object structure	ARR	Data type	Uint32	Data r	ange		Uint32	
Mapping	Y	Access	RW	Factory	setting		-	
Function description	The positi user-spect Motor di factor The setti paramete The calcu	tion factor is us rified load disp splacement (me ng of the positi rs related to the alation is as fol position	ted to establi lacement and otor units) = on factor is r e mechanical lows: factor = $\frac{m}{m}$	sh the propo I the motor load displace elated to the dimension otor resolu loace	pritional r displacer cement (u e mechan s and the tion $\times \frac{1}{8}$ I feeding	elationsl nent: iser unit: ical redu motor re gear rati	nip between s) x positi action rati esolution. <u>0</u>	on io, the
Sub-index	00h							
Designation	Sub-ind	ex Number						
Object structure	VAR	Data type	Uint8	Data	range		2	
Mapping	Y	Access	RO	Factor	y setting		2	
Sub-index	01 _h							
Designation	Motor R	evolution	T					
Object structure	VAR	Data type	Uint32	Data	range		Uint32	2
Mapping	Y	Access	RW	Factor	y setting		1	

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Sub-index	02 _h				
Designation	Shaft R	evolution			
Object structure	VAR	Data type	Uint32	Data range	Uint32
Mapping	Y	Access	RW	Factory setting	1

Object6098h						HM			
Index	6098 _h								
Designation	Homing M	ode							
Object structure	VAR	Data type	Int8	Data range	0~35				
Mapping	Y	Access	RW	Factory setting	0				
	Select the h	oming method:							
	Value	Description							
	1	Home in face	e of revers	e limit switches and Z	pulse signals				
	2	Home in face	e of forwa	rd limit switches and Z	-pulse signals				
	3,4	Home in face	e of forwa	rd home switches and 2	Z pulse signals				
Function	5,6	Home in face	e of revers	e home switches and Z	pulse signals				
description	7~14	Home in face	e of home	switches and Z pulse s	ignals				
	15~16	NA							
	17~30	Home without	ut reference	ce to the Z-pulse signal	s				
	31~32	NA							
	33~34	Home without	ut referend	e to the Z-pulse signal	s				
	35	Current posit	ion as zei	o point					
		Ca	utions						
<u>!</u>	●ER.E03 ala	arm occurs wh	en setting	data other than those a	bove.				

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Object 6099h						HM	
Index	6099 _h						
Designation	Homing S	Speed					
Object structure	ARR	RR Data type Uint8 Data range Uint32 V Access DW Footow setting					
Mapping	Y	Access	RW	Factory setting	-		
Function description	The 2 spec 6099-01h 6099-02h	ed value settings search for decele search for the ho	included in th eration point si me signal spe	e home mode: gnal speed (unit: com ed (unit: command un	nmand unit/s); hit/s).		
Sub-index	00 h						
Designation	Sub-inde	x Number					
Object structure	VAR	Data type	Uint8	Data range	2		
Mapping	Y	Access	RO	Factory setting	2		

Sub-index	01 _h						
Designation	Search Fo	or Decelerati	on Point Sign	al Speed			
Object structure	VAR	Data	Uint32	Data range	0~2 ³² -1		
object structure	WIIC	type	011102	Dum runge	021		
Mapping	Y	Access	RW	Factory setting	27962027		
Function	This subir	dex is used to	o set the search	h deceleration point si	gnal speed, this speed		
description	can be set	to a higher va	alue to preven	t too long homing time	e which may result in		
ueseription	home retu	rn timeout fau	ılts.				
Sub-index	02h						
Designation	Search fo	earch for home signal speed					
Object structure	ect structure VAR Data Uint32 Data rang		Data range	1~500			
o ogeet bit acture		type	011102	2 um runge	1 000		
Mapping	Y	Access	RW	Factory setting	5592405		
			Cautions				
	• When h	ome returning	g, the slave sta	tion will decelerate ru	nning after finding the		
\land	decelerati	on point;					
	• During deceleration, the slave station shields the change of the home signal, and						
	in order to	avoid meetir	g the home si	gnal during deceleration	on, the switch position		
	of the dec	eleration poir	t signal shoul	d be set reasonably; s	uch as leaving enough		
	decelerati	on distance ar	nd increasing t	he acceleration of retu	ırning, etc.		
Object609Ah		1			HM		
Index	609Ah						
Designation	Homing A	Acceleration/	Homing Dec	eleration	•		
Object structure	VAR	Data type	Uint32	Data range	0~2 ³² -1		
Mapping	Y	Access	RW	Factory setting	83886080		
Function	Set the ac	celeration and	deceleration	in home return mode ((unit: command		
description	unit/s2).						

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Object 60C1h					IP
Index	60C1h				
Designation	Interpola	tion Data Reco	rd)		
Object structure	ARR	Data type	Int32	Data range	Int32
Mapping	Y	Access	RW	Factory setting	0
Function	Tution 1.4				
description	Interpolati	ion mode comm	and parame	eter setting.	
Sub-index	00 _h				
Designation	Sub-inde	x Number			

Object structure	VAR	Data type	Uint8	Ι	Data range		3	
Mapping	Ν	Access	RO	Fa	ctory setting		3	
Sub-index	01 _h							
Designation	Absolute	position comma	and					
Object structure	VAR	Data type	Int32		Data range		Int3	32
Mapping	Y	Access	RW	F	Factory settir	ng	0	
Function	In terms alor	ion mode cheele						
description	interpola	ion mode absolu	te position c	comma	nd value, un	t. com	manu unit.	
Object 60C2h								IP
Index	60C2h							
Designation	Interpola	tion Cycle						
Object structure	ARR	Data type	Uint8]	Data range		Uint	8
Mapping	Y	Access	RW	Fa	actory setting	g	0	
Sub-index	00h							
Designation	Sub-inde	x Number						
Object structure	VAR	Data type	Uint8		Data range		2	
Mapping	Ν	Access	RO	F	actory settin	g	2	
Function	Number	f subindayas of	the Object d	iction	ry for the int	rnolat	ion quala	
description	Number (of sublidexes of	lile Object u	letiona	uy for the filt	rpola	ion cycle.	
Sub-index	01 _h							
Designation	Interpola	tion Cycle Time	e Constant					
Object structure	VAR	Data type	Uint8		Data range		Uint	8
Mapping	Y	Access	RW]	Factory setting	ng	1	
	The interp	polation cycle tin	ne unit is giv	ven by	60C2_02h.			
Function	Example:	If 60C2_02h is -	-3, and 60C2	2_01h i	is 1, it means	the int	erpolation	ı
description	period cu	rrently set is 1ms						
	Note: The	e interpolation cy	cle and the	synchr	onization cyc	le mus	t be the sa	ime.
Sub-index	02 _h							
Designation	Interpola	tion Cycle Time	e Index	<u> </u>				
Object structure	VAR	Data type	Int8		Data rang	ge	Int8	\$
Mapping	Y	Access	RW		Factory set	ing	-3	
	Set interp	olation period ur	nit.					
Function	Give -3, t	he interpolation	period unit i	s ms.				
description	Give -4, t	he interpolation	period unit i	s 0.1m	s.			
	Give -2, t	he interpolation	period unit i	s 10ms	3.			
Object 60C5h				PF	P PV	РТ	HM	IP
Index	60C5 h							
Designation	Max Pro	file Acceleration	<u> </u>					
Object structure	VAR	Data type	Uint3	2	Data rang	ge	$0 \sim (2^{32})^{32}$	-1)
Mapping	Y	Access	RW		Factory set	ing	167772	216
Function	Drofile m	ovimum occelere	tion (unity)	Comm	and $unit/c^2$			
description	r tottie m		aton (unit: (comma	and unit/ s)			
Object 60C6h				PF	P PV	РТ	HM	IP

	60C6									
Index	h									
Designation	Max P	rofile Decelerati	on							
Object structure	VAR	Data type		Uint32		Data ra	nge		0~(23	² -1)
Mapping	Y	Access		RW		Factory se	etting	3	16777	216
Function	Profile	maximum decele	ration (mit: co	mmand	unit/s ²)				
description	Tionic	inaxinium decele	faction (init. co	iiiiiana	unit/s).				
Object 60E0h		-			PP	PV	P	Г	HM	IP
Index	60E0 _h									
Designation	Forwar	rd torque limit v	alue							
Object structure	VAR	Data type	Ui	nt16	D	ata range			Uint16	5
Mapping	Y	Access	F	W	Fac	tory settin	ıg		3000	
Function	L imit th	o movimum volu	a of for	vord to	orano (n	nit: () 1%)				
description	Linntu	le maximum valu		waru u	nque (u	IIIt. 0.1%)	•			
Object 60E1h					PP	PV	P	Г	HM	IP
Index	60E 1 _h									
Designation	Negativ	ve torque limit								
Object structure	VAR	Data type	Uint	Uint16 Data range				Uint16		
Mapping	Y	Access	RW		Fac	tory settin	ng	g 3000		
Function							0			
description	Limit th	ne maximum valu	ie of neg	ative to	orque (1	init: 0.1%)).			
-										
Object60F4h]	PP	HM	I P
Object60F4h Index	60F4 _h]	PP	HM	I P
Object60F4h Index Designation	60F4 _h User po	osition deviation						PP	HM	I P
Object60F4h Index Designation Object structure	60F4 _h User po VAR	sition deviation Data type	Int32		Data	range		PP -2 ³	HM	I P
Object60F4h Index Designation Object structure Mapping	60F4h User po VAR Y	Disition deviation Data type Access	Int32 RO		Data Factor	range y setting		PP -2 ³	HM ¹² ~(2 ³² -1 0	I P
Object60F4h Index Designation Object structure Mapping Function	60F4h User po VAR Y	Data type Access	Int32 RO		Data Factor	range y setting		PP -2 ³	HM $\frac{12}{(2^{32}-1)}$	I P
Object60F4h Index Designation Object structure Mapping Function description	60F4h User po VAR Y Real-tin	Data type Access	Int32 RO tion (un	it: user	Data Factor unit).	range y setting		PP -2 ³	HM ¹² ~(2 ³² -1 0	I P
Object60F4h Index Designation Object structure Mapping Function description Object 60FCh	60F4h User po VAR Y Real-tin	Desition deviation Data type Access ne position devia	Int32 RO tion (un	it: user	Data Factor unit).	range y setting	P	PP -2 ³	HM ¹² ~(2 ³² -1 0	I P
Object60F4h Index Designation Object structure Mapping Function description Object 60FCh	60F4h User po VAR Y Real-tin	Distion deviation Data type Access ne position devia	Int32 RO tion (un	it: user	Data Factor unit).	range y setting	P	РР -2 ³ РР	HM ¹² ~(2 ³² -1 0 HM	I P I I P
Object60F4h Index Designation Object structure Mapping Function description Object 60FCh Index	60F4 _h User po VAR Y Real-tin 60FC _h	Desition deviation Data type Access ne position devia	Int32 RO tion (un	it: user	Data Factor unit).	range y setting	P	PP -2 ³	HM ¹² ~(2 ³² -1 0 HM	I P I I P
Object60F4h Index Designation Object structure Mapping Function description Object 60FCh Index Designation	60F4h User po VAR Y Real-tin 60FCh Motor	psition deviation pata type Access ne position devia position comma	Int32 RO tion (un	it: user	Data Factor unit).	range y setting	P	PP -2 ³ PP	HM ²² ~(2 ³² -1 0 HM	I P I P
Object60F4h Index Designation Object structure Mapping Function description Object 60FCh Index Designation Object structure	60F4h User pr VAR Y Real-tin 60FCh Motor VAR	Disition deviation Data type Access ne position devia position comma Data type	Int32 RO tion (un nd Int33	it: user	Data Factor unit). Data	range y setting	P	PP -2 ³ PP -2 ³²	HM ¹² ~(2 ³² -1 0 HM	I P
Object60F4h Index Designation Object structure Mapping Function description Object 60FCh Index Designation Object structure Mapping	60F4h User p VAR Y Real-tin 60FCh Motor VAR Y	position deviation Data type Access ne position devia position comma Data type Access	Int32 RO tion (un nd Int32 RO	it: user	Data Factor unit). Data 1 Factory	range y setting range setting	P	PP -2 ³ PP -2 ³²	HM $2^{2} (2^{32} - 1)$ 0 HM $2^{2} (2^{32} - 1)$ 0	I P I I P P
Object60F4h Index Designation Object structure Mapping Function description Object 60FCh Index Designation Object structure Mapping Function	60F4h User p VAR Y Real-tin 60FCh Motor VAR Y Real-	position deviation Data type Access ne position devia position comma Data type Access time motor positi	Int32 RO tion (un nd Int32 RO ion corr	it: user I I I I I I I I I I I I I I I I I I I	Data Factor unit). Data 1 Factory (unit: er	range y setting range setting coder unit	P () () ()	PP -2 ³²	HM $\frac{12}{2} (2^{32} - 1)$ 0 HM $\frac{12}{2} (2^{32} - 1)$ 0	I P I I I P I P
Object60F4h Index Designation Object structure Mapping Function description Object 60FCh Index Designation Object structure Mapping Function description	60F4h User pr VAR Y Real-tin 60FCh Motor VAR Y Real- User comma	position deviation Data type Access The position devia Data type Dotation devia Data type Access time motor posit position comman d (60FCh)	Int32 RO tion (un Int32 RO ion com nd (6062	it: user H mand (h) × E	Data Factor unit). Data 1 Factory (unit: er lectroni	range y setting range setting coder unit c gear ratio	P P (1) (1) (1) (1) (1) (1) (1) (1)	-2 ³	HM $\frac{12}{2}(2^{32}-1)$ 0 HM $\frac{1}{2}(2^{32}-1)$ 0 position	I P I) I) I) I) I) I) I) I I I I I I I I I
Object60F4h Index Designation Object structure Mapping Function description Object 60FCh Index Designation Object structure Mapping Function description Object 60FDh	60F4h User p VAR Y Real-tin 60FCh Motor VAR Y Real- User comma	sition deviation Data type Access ne position devia position comma Data type Access time motor posit position comman nd (60FCh)	Int32 RO tion (un nd Int32 RO ion com nd (6062	it: user Immand (h) × E	Data Factor unit). Data u Factory unit: er lectroni PP	range y setting range setting ccoder unit c gear ratio	P1	-2 ³²	HM ¹² ~(2 ³² -1) 0 HM ¹ ~(2 ³² -1) 0 position HM	I P I P I P I P I P I P I P I P
Object60F4h Index Designation Object structure Mapping Function description Object 60FCh Index Designation Object structure Mapping Function description Object 60FDh Index	60F4h User p VAR Y Real-tin 60FCh Motor VAR Y Real- User comma 60FDh	sition deviation Data type Access ne position devia position comma Data type Access time motor posit position comma nd (60FCh)	Int32 RO tion (un nd Int32 RO ion com nd (6062	it: user H mand (h) × E	Data Factor unit). Data n Factory (unit: er lectroni PP	range y setting range setting coder unit c gear ratio	P (1) (1) (1) (1) (1) (1) (1) (1)	РР -2 ³ РР -2 ³² Лоtor	HM $\frac{12}{2}(2^{32}-1)$ 0 HM $\frac{12}{2}(2^{32}-1)$ 0 position HM	I I P I I P I I P I P I I P I I P I I P I I P
Object60F4h Index Designation Object structure Mapping Function description Object 60FCh Index Designation Object structure Mapping Function description Object 60FDh Index Designation	60F4h User pe VAR Y Real-tin 60FCh Motor VAR Y Real- User comma 60FDh Digital	sition deviation Sition deviation Access The position devia Data type Solution devia Data type Access The motor position comman (60FCh) Input	Int32 RO tion (un nd Int32 RO ion com nd (6062	it: user I I mand (h) × E	Data Factor unit). Data n Factory (unit: er lectroni PP	range y setting range setting ccoder unit c gear ration PV	P (). (). (). (). (). (). (). ().	PP -2 ³² PP -2 ³²	HM ¹² ~(2 ³² -1 0 HM ² ~(2 ³² -1 0 position HM	I P I P I P I P I P I P I P I P
Object60F4h Index Designation Object structure Mapping Function description Object 60FCh Index Designation Object structure Mapping Function description Object structure Mapping Function description Object 60FDh Index Designation Object 60FDh Index Designation	60F4h User pr VAR Y Real-tin 60FCh Motor VAR Y Real- User comma 60FDh Digital VAR	sition deviation Sition deviation Data type Access ne position devia position comma Data type Access time motor posit position comman nd (60FCh) Input Data type Data type Data type	Int32 RO tion (un nd Int32 RO ion com nd (6062	it: user it:	Data Factor unit). Data D Factory (unit: er lectroni PP	range y setting range setting ccoder unit c gear ratio PV	P (),),(PP -2 ³ -2 ³² -2 ³² -2 ³² -2 ³² -2 ³²	HM $\frac{1}{2} \sim (2^{32} - 1)$ HM $\frac{1}{2} \sim (2^{32} - 1)$ position HM	I P I P I P I P I P I P I P I P

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Function	Reflects the current DI terminal logic of the drive, 0 means invalid, 1 means valid The DI signals indicated by each of them are as follows: MSB LSB						ans SB			
description	31 1	6 15	4	3	2	1				
userpion	Factory- defined	NA	τ	Indefined	Undefined	Forw overti swi	vard ravel tch	Revers overtrav switch	e vel 1	
Object 60FEh			PP PV PT		HM	IP				
Index	60FE _h									
Designation	Digital O	utput			1					
Object structure	ARR	Data type Uint32 Data range Uint32								
Mapping	Y	Acces	ss	RO	Factory s	setting	0			
Sub-index	00h									
Designation	Sub-inde	x Numbe	er							
Object structure	VAR	Data ty	ype	Uint8	Data ra	ange	1			
Mapping	Ν	Acces	ss	RO	Factory s	setting	1			
Sub-index	01 _h									
Designation	Physical	Output								
Object structure	VAR	Data ty	ype	Uint32	Data ra	ange	Uint32			
Mapping	Y	Acces	ss	RO	Factory s	setting 0				
Function	Reflects indication MSB	lects the drive's current DO terminal logic, 0 indicating invalid and 1 cating valid. B LSB				l 3				
description	31	16	15				1	0		
	Fact defi	ory- NA Holding brake ned NA output			brake 1t					
Object 60FFh									P V	
Index	60FF _h									
Designation	Target Ve	elocity								
Object structure	VAR	Data ty	ype	Int16	Data ra	nge	-2	$32 \sim (2^{32} - 1)$		
Mapping	Y	Acces	ss	RW	Factory s	etting		0		
Function description	User spee	ed comma	nd (u	nit:comma	nd unit/s) in	profile sp	eed mo	de.		

Table	11-	108

Object 6502h: Running Mode Supported						
Index	6502 _h					
Designation	Running Mode Supported					
Object structure	VAR	Data type	Uint16	Data range	Uint16	
Mapping	Y	Access	RO	Factory setting	$1B_h$	

BitDescriptionValue0Profile position mode11NA02Profile speed mode13Profile torque mode14NA15Homing mode16Interpolation mode1		Running Mode Supported, 0 means not supported, 1 means supported.				
0 Profile position mode 1 1 NA 0 2 Profile speed mode 1 3 Profile torque mode 1 4 NA 5 Homing mode 1 6 Interpolation mode 1		Bit	Description	Value		
I NA 0 2 Profile speed mode 1 3 Profile torque mode 1 4 NA 1 5 Homing mode 1 6 Interpolation mode 1		0	Profile position mode	1		
Function 2 Profile speed mode 1 description 3 Profile torque mode 1 4 NA 5 Homing mode 1 6 Interpolation mode 1		1	NA	0		
description 3 Profile torque mode 1 4 NA 5 Homing mode 1 6 Interpolation mode 1	Function	2	Profile speed mode	1		
4 NA 5 Homing mode 6 Interpolation mode	description	3	Profile torque mode	1		
5Homing mode16Interpolation mode1		4	NA			
6 Interpolation mode 1		5	Homing mode	1		
		6	Interpolation mode	1		
7~15 NA 0		7~15	NA	0		

11.2.11 Canopen Transmission Halt Code

Table 11- 109

Halt Code	Description
0x05040001	Control commands are invalid (SDO only supports 0x40, 0x2F, 0x2B, 0x23
	commands)
0x06010002	Attempting to write a read-only object
0x06020000	The object in the object dictionary does not exist
0x06040041	The object cannot be mapped to PDO
0x06040042	Number and length of mapped objects exceed the PDO length
0x06070010	Inconsistent written length (the length of the object dictionary definition does not
	match that of the written object)
0x06070012	Inconsistent data type, Inconsistent service parameter length
0x06090011	Sub-index does not exist
0x06090031	Written parameter value is too large
0x06090032	Written parameter value is too small

11.3 Canopen Troubleshooting Information

Table 11- 110

Display	Designation	Error code	Auxiliary code
Er.020	Abnormal user function code parameters and parity	0x6000	0x00000020
Er.021	Abnormal function code parameter formatting	0x6001	0x00000021
Er.022	Abnormal manufacturer parameters and parity	0x6002	0x00000022
Er.023	Abnormal communication between MCU and FPGA	0x6003	0x00000023
Er.030	FPGA backup program	0x6004	0x0000030
Er.040	Abnormal function code parameter setting	0x6005	0x00000040
Er.042	Abnormal combination of parameters	0x6007	0x00000042
Er.050	Inconsistent drive and motor voltage or power difference of more than 4 times	0x6009	0x00000050
Er.0B0	Invalid servo ON command	0x600D	0x00000B0
Er.100	Drive overcurrent (software)	0x600E	0x00000100

Er.101	Drive overcurrent (hardware)	0x600F	0x00000101
Er.320	Regenerative overload	0x6010	0x00000320
Er.400	Overvoltage	0x6012	0x00000400
Er.410	Undervoltage	0x6013	0x00000410
Er.42A	KTY type temperature sensor over-temperature	0x6014	0x0000042A
Er.450	Repeated digital input terminal X function assignment	0x6015	0x00000450
Er.451	Repeated digital input terminal Y function assignment	0x6016	0x00000451
Er.452	Abnormal distribution of analog signal AI in torque mode	0x6017	0x00000452
Er.520	Vibration fault	0x6018	0x00000520
Er.521	Vibration in adjustment-free mode	0x6019	0x00000521
Er.710	Instantaneous drive overload	0x601A	0x00000710
Er.711	Instantaneous motor overload	0x601B	0x00000711
Er.720	Drive continuous overload	0x601C	0x00000720
Er.721	Motor continuous overload	0x601D	0x00000721
Er.730	DB overload	0x601E	0x00000730
Er.7A0	Drive overtemperature	0x6020	0x000007A0
Er.810	Abnormal multi-turn data in absolute encoder	0x6023	0x00000810
Er.820	Abnormal data parity in absolute encoder	0x6024	0x00000820
Er.830	Abnormal battery of absolute encoder	0x6025	0x00000830
Er.840	Abnormal direction at the upper limit of encoder turns	0x6026	0x00000830
Er.860	Over temperature in absolute encoder	0x6028	0x00000860
Er.890	Motor code does not exist	0x6029	0x00000890
Er.8A1	Home return timeout	0x602C	0x000008A1
Er.B31	Abnormal U-phase circuit	0x6034	0x00000B31
Er.B32	Abnormal V-phase circuit	0x6035	0x00000B32
Er.B33	STO input protection	0x6036	0x00000B33
Er.BF0	Abnormal system running		
Er DE?		0x6039	0x00000BF0
ELDI'Z	MCU data writing to FPGA exception	0x6039 0x603B	0x00000BF0 0x00000BF2
Er.BF3	MCU data writing to FPGA exception Abnormal pulse command source selection	0x6039 0x603B 0x603C	0x00000BF0 0x00000BF2 0x00000BF3
Er.BF3 Er.C10	MCU data writing to FPGA exception Abnormal pulse command source selection Stall detected	0x6039 0x603B 0x603C 0x603E	0x00000BF0 0x00000BF2 0x00000BF3 0x00000C10
Er.BF3 Er.C10 Er.C21	MCU data writing to FPGA exception Abnormal pulse command source selection Stall detected Absolute encoder multi-turn overflow	0x6039 0x603B 0x603C 0x603E 0x6040	0x00000BF0 0x00000BF2 0x00000BF3 0x00000C10 0x00000C21
Er.BF2 Er.C10 Er.C21 Display	MCU data writing to FPGA exception Abnormal pulse command source selection Stall detected Absolute encoder multi-turn overflow Designation	0x6039 0x603B 0x603C 0x603E 0x6040 Error code	0x00000BF0 0x00000BF2 0x00000BF3 0x00000C10 0x00000C21 Auxiliary code
Er.BF3 Er.C10 Er.C21 Display Er.C80	MCU data writing to FPGA exception Abnormal pulse command source selection Stall detected Absolute encoder multi-turn overflow Designation abnormal incremental encoder frequency division setting	0x6039 0x603B 0x603C 0x603E 0x6040 Error code 0x6047	0x00000BF0 0x00000BF2 0x00000BF3 0x00000C10 0x00000C21 Auxiliary code 0x00000C80
Er.BF3 Er.C10 Er.C21 Display Er.C80 Er.C90	MCU data writing to FPGA exception Abnormal pulse command source selection Stall detected Absolute encoder multi-turn overflow Designation abnormal incremental encoder frequency division setting Encoder disconnected	0x6039 0x603B 0x603C 0x603E 0x6040 Error code 0x6047 0x6048	0x00000BF0 0x00000BF2 0x00000BF3 0x00000C10 0x00000C21 Auxiliary code 0x00000C80 0x00000C90
Er.BF3 Er.C10 Er.C21 Display Er.C80 Er.C90 Er.C91	MCU data writing to FPGA exception Abnormal pulse command source selection Stall detected Absolute encoder multi-turn overflow Designation abnormal incremental encoder frequency division setting Encoder disconnected Abnormal encoder acceleration	0x6039 0x603B 0x603C 0x603E 0x6040 Error code 0x6047 0x6048 0x6049	0x00000BF0 0x00000BF2 0x00000BF3 0x00000C10 0x00000C21 Auxiliary code 0x00000C80 0x00000C90 0x00000C91
Er.BF3 Er.C10 Er.C21 Display Er.C80 Er.C90 Er.C91 Er.C92	MCU data writing to FPGA exception Abnormal pulse command source selection Stall detected Absolute encoder multi-turn overflow Designation abnormal incremental encoder frequency division setting Encoder disconnected Abnormal encoder acceleration Incremental encoder Z signal loss	0x6039 0x603B 0x603C 0x603E 0x6040 Error code 0x6047 0x6048 0x6049 0x6049	0x00000BF0 0x00000BF2 0x00000BF3 0x00000C10 0x00000C21 Auxiliary code 0x00000C80 0x00000C90 0x00000C91 0x00000C92
Er.BF3 Er.C10 Er.C21 Display Er.C80 Er.C90 Er.C91 Er.C92 Er.C95	MCU data writing to FPGA exception Abnormal pulse command source selection Stall detected Absolute encoder multi-turn overflow Designation abnormal incremental encoder frequency division setting Encoder disconnected Abnormal encoder acceleration Incremental encoder Z signal loss Abnormal encoder UVW signal	0x6039 0x603B 0x603C 0x603E 0x6040 Error code 0x6047 0x6048 0x6049 0x604A 0x604B	0x00000BF0 0x00000BF2 0x00000BF3 0x00000C10 0x00000C21 Auxiliary code 0x00000C80 0x00000C90 0x00000C91 0x00000C92 0x00000C95
Er.BF3 Er.C10 Er.C21 Display Er.C80 Er.C90 Er.C91 Er.C92 Er.C95 Er.D00	MCU data writing to FPGA exception Abnormal pulse command source selection Stall detected Absolute encoder multi-turn overflow Designation abnormal incremental encoder frequency division setting Encoder disconnected Abnormal encoder acceleration Incremental encoder Z signal loss Abnormal encoder UVW signal Excessive position deviation	0x6039 0x603B 0x603C 0x603E 0x6040 Error code 0x6047 0x6048 0x6049 0x604A 0x604B 0x604B	0x00000BF0 0x00000BF2 0x00000BF3 0x00000C10 0x00000C21 Auxiliary code 0x00000C80 0x00000C90 0x00000C91 0x00000C91 0x00000C95 0x00000C95
Er.BF3 Er.C10 Er.C21 Display Er.C80 Er.C90 Er.C91 Er.C92 Er.C95 Er.D00 Er.D01	MCU data writing to FPGA exception Abnormal pulse command source selection Stall detected Absolute encoder multi-turn overflow Designation abnormal incremental encoder frequency division setting Encoder disconnected Abnormal encoder acceleration Incremental encoder Z signal loss Abnormal encoder UVW signal Excessive position deviation Excessive position deviation	0x6039 0x603B 0x603C 0x603E 0x6040 Error code 0x6047 0x6048 0x6049 0x6048 0x604B 0x604B 0x6050 0x6051	0x00000BF0 0x00000BF2 0x00000BF3 0x00000C10 0x00000C21 Auxiliary code 0x00000C80 0x00000C90 0x00000C91 0x00000C92 0x00000C95 0x00000D00
Er.BF3 Er.C10 Er.C21 Display Er.C80 Er.C90 Er.C91 Er.C92 Er.C95 Er.D00 Er.D01 Er.D02	MCU data writing to FPGA exception Abnormal pulse command source selection Stall detected Absolute encoder multi-turn overflow Designation abnormal incremental encoder frequency division setting Encoder disconnected Abnormal encoder acceleration Incremental encoder Z signal loss Abnormal encoder UVW signal Excessive position deviation Excessive position deviation Excessive position deviation during servo is ON Excessive position deviation due to speed limit when servo is ON	0x6039 0x603B 0x603C 0x603E 0x6040 Error code 0x6047 0x6048 0x6049 0x6048 0x6049 0x604A 0x604B 0x6050 0x6051 0x6052	0x00000BF0 0x00000BF2 0x00000BF3 0x00000C10 0x00000C21 Auxiliary code 0x00000C80 0x00000C90 0x00000C91 0x00000C92 0x00000C95 0x00000C95 0x00000D00 0x00000D01 0x00000D01

	position and optical scale deviation are too large)		
Er.D04	Electronic gear ratio setting over limit	0x6054	0x00000D04
Er.E03	Abnormal home return	0x6058	0x00000E03
Er.E05	Running modes not supported by the drive	0x605A	0x00000E05
Er.E20	CAN master disconnected (lifetime factor)	0x6064	0x00000E20
Er.E21	CAN master disconnected (consumer time)	0x6065	0x00000E21

11.4 Homing Mode Description

11.4.1 Mode 1(6098h = 1)

Home signal: Z signal

Deceleration point signal: N-OT (reverse overtravel) signal

(1) The deceleration point signal is OFF during homing

Trajectory: N-OT=0, homing starts at reverse high speed until the rising edge of N-OT, and then decelerates \rightarrow reverses \rightarrow forwards at low speed, and stop at the first Z signal after the falling edge of N-OT.

NOTE

NOTE: "H" in the figure is search for high speed of deceleration point =6099-01h, "L" represents the search for low speed of home signal =6099-02h $_{\circ}$

 $6099 - 01h = \frac{H \times M}{60}(p/s), \ 6099 - 02h = \frac{L \times M}{60}(p/s), \ 609Ah = \frac{J \times M}{60}(p/s^2).$

H: homing high speed; L: homing low speed; J: acceleration; M: Determined by encoder bits.

Example: H =100 (rpm), L=10 (rpm), J=100 (rpm/s), M=17 for 17-bit encoder.

 $6099 - 01h = \frac{H \times M}{60} = 218453(p/s), \quad 6099 - 02h = \frac{L \times M}{60} = 21845(p/s), \quad 609Ah = \frac{J \times M}{60} = 1000$

 $218453(p/s^2)_{\circ}$





a.6098h=1,initial deceleration point signal =OFF

(2) The deceleration point signal is ON during homing

Trajectory: N-OT=1 when homing, it starts directly at forward low speed, and stops at the first Z signal

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after the falling edge of N-OT.



$t_2 = \frac{6099 - 02h}{609Ah}$ (s)

b.6098h=1,initial deceleration point signal =ON

11.4.2 Mode 2(6098h = 2)

Home signal: Z signal

Deceleration point signal: P-OT (forward overtravel) signal

(1) The deceleration point signal is OFF when homing

Trajectory: P-OT=0 when homing starts at forward high speed until the rising edge of P-OT, and then decelerates \rightarrow reverses \rightarrow reverses at low speed, and stops at the first Z signal after the falling edge of P-OT.





(2) The deceleration point signal is ON when homing

P-OT=1 when homing, it starts directly at reverse low speed, and stops at the first Z signal after the

falling edge of P-OT.



$t_2 = \frac{6099 - 02h}{609Ah}$ (s)

b.6098h=2,initial deceleration point signal=ON

11.4.3 Mode 3(6098h = 3)

Home signal: Z signal

Deceleration point signal: HW (home switch) signal

(1) The deceleration point signal is OFF during homing

Trajectory: HW=0 when homing starts at forward high speed until the rising edge of HW, decelerates \rightarrow reverses \rightarrow reverses at low speed, and stops at the first Z signal after the falling edge of HW.





a.6098h=3, initial deceleration point signal=OFF

(2) The deceleration point signal is ON during homing

Trajectory: HW=1 when homing starts directly at reverse low speed, and stops at the first Z signal after the falling edge of HW.



 $t_2 = \frac{6099 - 02h}{609Ah}$ (s)

b.6098h=3,initial deceleration point signal=ON

11.4.4 Mode 4(6098h = 4)

Home signal: Z signal

Deceleration point signal: HW (home switch) signal

(1)The deceleration point signal is OFF during homing

Trajectory:HW=0 when homing starts at forward high speed until the rising edge of HW, and then decelerates \rightarrow reverses \rightarrow reverses at low speed until the falling edge of HW, decelerates \rightarrow reverses \rightarrow that is, resumes forward low speed running, and stops at the first Z signal after the rising edge of HW.





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$$t_1 = \frac{6099 - 01h}{609Ah}$$
(s), $t_2 = \frac{6099 - 02h}{609Ah}$ (s)

a.6098h=4,initial deceleration point signal=OFF

(2)The deceleration point signal is ON during homing

Trajectory: HW=1 when homing starts at reverse low speed until the falling edge of HW, and decelerates \rightarrow reverses \rightarrow forwards at low speed, and stops at the first Z signal after the rising edge of HW.





$$t_2 = \frac{6099 - 02h}{609Ah}$$
 (s)

b.6098h=4, initial deceleration point signal=ON

11.4.5 Mode 5(6098h = 5)

Home signal: Z signal

Deceleration point signal:H HW (home switch) signal

(1)The deceleration point signal is OFF during homing

Trajectory: HW=0 when homing starts at reverse high speed until the rising edge of HW, and then decelerates \rightarrow reverses \rightarrow forwards at low speed until the rising edge of HW, decelerates \rightarrow reverses \rightarrow forwards at low speed and stops at the first Z signal after the falling edge of HW.



a.6098h=5, initial deceleration point signal=OFF

(2)The deceleration point signal is ON during homing

Trajectory: HW=1 when homing starts directly at forward low speed, and stops at the first Z signal after the falling edge of HW.







b.6098h=5, initial deceleration point signal=ON

11.4.6 Mode 6(6098h = 6)

Home signal: Z signal

Deceleration point signal: HW (home switch) signal

(1)The deceleration point signal is OFF during homing

Trajectory: HW=0 when homing starts at reverse high speed until the rising edge of HW, and then decelerates \rightarrow reverses \rightarrow forwards at low speed until the falling edge of HW, decelerates \rightarrow reverses \rightarrow that

is resumes reverse low speed running, and stops at the first Z signal after the rising edge of HW.



$$t_1 = \frac{6099 - 01h}{609Ah}$$
(s), $t_2 = \frac{6099 - 02h}{609Ah}$ (s)

a.6098h=6, initial deceleration point signal=OFF

(2)The deceleration point signal is ON during homing

Trajectory:HW=1 when homing starts directly at forward low speed until the HW falling edge, and then decelerates \rightarrow reverses \rightarrow reverses at low speed, and stops at the first Z signal after the rising edge of HW.





b.6098h=6, initial deceleration point signal=ON

11.4.7 Mode 7(6098h = 7)

Home signal: Z signal

Deceleration point signal: HW (home switch) signal

(1)The deceleration point signal is OFF during homing without forward limit signal

Trajectory: HW=0 when homing starts at forward high speed until the rising edge of HW if there is no

limit switch in-between, and then decelerates \rightarrow reverses \rightarrow reverses at low speed, and stops at the first Z signal after the falling edge of HW.



$$t_1 = \frac{6099 - 01h}{609Ah}(s), t_2 = \frac{6099 - 02h}{609Ah}(s)$$

a.6098h=7,initial deceleration point signal=OFF without forward limit signal (2)The deceleration point signal is OFF during homing without forward limit signal

Trajectory: HW=0 when homing starts at forward high speed, and if there is a limit switch, reverses automatically at high speed until the rising edge of HW, and then decelerates and goes on reserse running at low speed until the falling edge of HW, decelerates again and reverses, goes on forward running at low speed until the HW rising edge, decelerates and reverses running until it stops at the first Z signal after the falling edge of HW.







(3)The deceleration point signal is ON during homing without forward limit signal

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Trajectory: HW=1 when homing starts directly at reverse low speed, and stops at the first Z signal after the falling edge of HW



c.6098h=7, initial deceleration point signal=ON without forward limit signal

11.4.8 Mode 8(6098h = 8)

Home signal: Z signal

Deceleration point signal: HW (home switch) signal

(1)The deceleration point signal is OFF during homing without forward limit signal

Trajectory: HW=0 when homing starts at forward high speed until the rising edge of HW if there is no limit switch in-between, and then decelerates \rightarrow reverses \rightarrow reverses at low speed until the falling edge of HW, and then reverses \rightarrow forwards at low speed, and stops at the first Z signal after the rising edge of HW.

Figure 11-44





(2)The deceleration point signal is OFF during homing with forward limit signal

Trajectory: HW=0 when homing starts at forward high speed, and if there is a limit switch, reverses automatically at high speed until the rising edge of HW, and then decelerates and goes on reserse running at low speed until the falling edge of HW, reverses again and goes on forward running at low speed, and stops at the first Z signal after the rising edge of HW.





(3)The deceleration point signal is ON during homing without forward limit signal

Trajectory: HW=1 when homing starts directly at reverse low speed until the HW falling edge, and then reverses and goes on forward running at low speed, and stops at the first Z signal after the rising edge of HW.

Figure 11-46



c.6098h=8,initial deceleration point signal=ON without forward limit signal

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11.4.9 Mode 9(6098h = 9)

Home signal: Z signal

Deceleration point signal: HW (home switch) signal

(1)The deceleration point signal is OFF during homing without forward limit signal

Trajectory: HW=0 when homing starts at forward high speed until the rising edge of HW if there is no limit switch in-between, and then decelerates, goes on forward running at low speed until the HW falling edge, reserves and goes on reverse running at low speed, and stops at the first Z signal after the rising edge of HW.





$$t_1 = \frac{6099 - 01h}{609Ah}(s), t_2 = \frac{(6099 - 01h) - (6099 - 02h)}{609Ah}(s), t_3 = \frac{6099 - 02h}{609Ah}(s)$$

a.6098h=9,initial deceleration point signal=OFF without forward limit signal (2)The deceleration point signal is OFF during homing with forward limit signal

Trajectory: HW=0 when homing starts at forward high speed, and if there is a limit switch, reverses automatically and goes on reverse running at high speed until the rising edge of HW, and then decelerates and reverses and resumes forward running at low speed until the falling edge of HW, reverses and goes on reverse running at low speed until the first Z signal after the rising edge of HW.





$$t_1 = \frac{6099 - 01h}{609Ah}$$
(s), $t_2 = \frac{6099 - 02h}{609Ah}$ (s)

b.6098h=9,initial deceleration point signal=OFF with forward limit signal

(3)The deceleration point signal is ON during homing without forward limit signal

Trajectory: HW=1 when homing starts directly at forward high speed until the HW falling edge, and then decelerates, reverses and goes on reverse running at low speed, and stops at the first Z signal after the rising edge of HW.

Figure 11-49



$$t_2 = \frac{6099 - 02h}{609Ah}$$
(s)

c.6098h=9,initial deceleration point signal=ON without forward limit signal

11.4.10 Mode 10(6098h =10)

Home signal: Z signal

Deceleration point signal: HW (home switch) signal

(1)The deceleration point signal is OFF during homing without forward limit signal

Trajectory: HW=0 when homing starts at forward high speed until the rising edge of HW, and then decelerates and forwards at low speed until the falling edge of HW, and then decelerates and goes reverse at low speed to the rising edge of HW, decelerates and reverses again, runs forward at low speed and stops at the first Z signal after the falling edge of HW.



a.6098h=10,initial deceleration point signal=OFF without forward limit signal

(2)The deceleration point signal is OFF during homing with forward limit signal

Trajectory:HW=0 when homing starts at forward high speed, and reverses automatically if there is no limit switch in-between, goes on reverse running at high speed until the rising edge of HW, and then decelerates \rightarrow reverses \rightarrow that is resumes forward running at low speed, and stops at the first Z signal after the falling edge of HW.





b.6098h=10,initial deceleration point signal=OFF with forward limit signal

(3)The deceleration point signal is ON during homing without forward limit signal

Trajectory: HW=1 when homing starts directly at forward low speed, and stops at the first Z signal after

100

the falling edge of HW





 $t_2 = \frac{6099 - 02h}{609Ah}$ (s)

c.6098h=10,initial deceleration point signal=ON without forward limit signal

11.4.11 Mode 11(6098h=11)

Home signal: Z signal

Deceleration point signal: HW (home switch) signal

(1)The deceleration point signal is OFF during homing without the reverse limit signal

Trajectory: HW=0 when homing starts at reverse high speed until the rising edge of HW if there is no limit switch in-between, and then decelerates, goes on forward running at low speed, and stops at the first Z signal after the falling edge of HW.





a.6098h=11,initial deceleration point signal=OFF with the reverse limit signal

(2)The deceleration point signal is OFF during homing with the reverse limit signal

Trajectory: HW=0 when homing starts at reverse high speed, and if there is a limit switch, reverses automatically, forwards at high speed until the rising edge of HW, and then decelerates and goes on forward running at low speed until the falling edge of HW, decelerates again and reverses, goes on reverse running at low speed until the HW rising edge, decelerates and reverses to forward at low speed, and stops at the first Z signal after the falling edge of HW.





b.6098h=11,initial deceleration point signal=OFF with the reverse limit signal (3)The deceleration point signal is ON during homing without the reverse limit signal

Trajectory: HW=1 when homing starts directly at forward low speed, and stops at the first Z signal after the falling edge of HW.





c.6098h=11,initial deceleration point signal=ON without the reverse limit signal

11.4.12 Mode 12(6098h =12)

Home signal: Z signal

Deceleration point signal: HW (home switch) signal

(1)The deceleration point signal is OFF during homing without the reverse limit signal

Trajectory: HW=0 when homing starts at reverse high speed until the rising edge of HW if there is no limit switch in-between, and then decelerates \rightarrow reverses forwards at low speed until the HW falling edge, then reverses runs reversely at low spee and stops at the first Z signal after the rising edge of HW.





 $t_1 = \frac{6099 - 01h}{609Ah}(s), t_2 = \frac{6099 - 02h}{609Ah}(s)$

a.6098h=12,initial deceleration point signal=OFF with the reverse limit signal

(2)The deceleration point signal is OFF during homing, with the reverse limit signal

Trajectory: HW=0 when homing starts at reverse high speed, and if there is a limit switch, reverses automatically and forwards at high speed until the rising edge of HW, and then decelerates and goes on forward running at low speed until the falling edge of HW, reverses again and goes on reverse running at low speed, and stops at the first Z signal after the rising edge of HW.





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$$t_1 = \frac{6099 - 01h}{609Ah}(s), t_2 = \frac{(6099 - 01h) - (6099 - 02h)}{609Ah}(s), t_3 = \frac{6099 - 02h}{609Ah}(s)$$

b.6098h=12,initial deceleration point signal=OFF with the reverse limit signal

(3)The deceleration point signal is ON during homing without the reverse limit signal

Trajectory: HW=1 when homing starts at forward low speed until the falling edge of HW, and then reverses \rightarrow runs reversely at low speed, and stops at the first Z signal after the rising edge of HW.





 $t_2 = \frac{6099 - 02h}{609Ah}$ (s)

c.6098h=12, initial deceleration point signal=ON without the reverse limit signal

11.4.13 Mode 13(6098h =13)

Home signal: Z signal

Deceleration point signal: HW (home switch) signal

(1)The deceleration point signal is OFF during homing without the reverse limit signal

Trajectory: HW=0 when homing starts at reverse high speed until the falling edge of HW if there is no limit switch in-between, and then reverses and goes on forward running at low speed, and stops at the first Z signal after the rising edge of HW.




$$t_1 = \frac{6099 - 01h}{609Ah}(s), t_2 = \frac{(6099 - 01h) - (6099 - 02h)}{609Ah}(s), t_3 = \frac{6099 - 02h}{609Ah}(s)$$

a.6098h=13,initial deceleration point signal=OFF with the reverse limit signal (2)The deceleration point signal is OFF during homing with the reverse limit signal

Trajectory: HW=0 when homing starts at reverse high speed, and if there is a limit switch, reverses automatically and forward at high speed until the rising edge of HW, and then decelerates \rightarrow reverses \rightarrow and goes on reserse running at low speed until the falling edge of HW, reverses again \rightarrow goes on forward running at low speed until it stops at the first Z signal after the rising edge of HW.





$$t_1 = \frac{6099 + 01h}{609Ah}(s), t_2 = \frac{6099 + 02h}{609Ah}(s)$$

b.6098h=13,initial deceleration point signal=OFF with the reverse limit signal (3)The deceleration point signal is ON during homing without the reverse limit signal

Trajectory: HW=1 when homing starts directly at reverse low speed until the HW falling edge, and then reverses and goes on forward running at low speed, and stops at the first Z signal after the rising edge of HW.





c.6098h=13,initial deceleration point signal=ON without the reverse limit signal

11.4.14 Mode 14(6098h =14)

Home signal: Z signal

Deceleration point signal: HW (home switch) signal

(1)The deceleration point signal is OFF during homing without the reverse limit signal

Trajectory: HW=0 when homing starts at reverse high speed until the rising edge of HW, and then decelerates \rightarrow runs reversely at low speed until the falling edge of HW, decelerates \rightarrow reverses \rightarrow forwards at low speed until the HW rising edge, decelerates \rightarrow reverses \rightarrow runs reversely at low speed, and stops at the first Z signal after the falling edge of HW.





a.6098h=14, initial deceleration point signal=OFF with the reverse limit signal

(2)The deceleration point signal is OFF during homing with the reverse limit signal

Trajectory: HW=0 when homing starts at reverse high speed, and if there is a limit switch, reverses

automatically, forwards at high speed until the rising edge of HW, and then decelerates \rightarrow reverses \rightarrow and runs reversely at low speed until the falling edge of HW, and stops at the first Z signal.





 $t_1 = \frac{6099 - 01h}{609Ah}(s), t_2 = \frac{6099 - 02h}{609Ah}(s)$

b.6098h=14, initial deceleration point signal=OFF with the reverse limit signal

(3)The deceleration point signal is ON during homing without the reverse limit signal

Trajectory: HW=1 when homing starts directly at reverse low speed, and stops at the first Z signal after the falling edge of HW.



c.6098h=14,initial deceleration point signal=ON without the reverse limit signal

11.4.15 Mode 15(6098h =15)、16(6098h =16)

These two modes of zero return are not defined in the standard 402 protocol.

11.4.16 Mode 17(6098h = 17)

Home signal:N-OT signal (reverse overtravel) falling edge

Deceleration point signal:N-OT signal (reverse overtravel)

(1)The deceleration point signal is OFF during homing

Trajectory:N-OT=0 when homing starts at reverse high speed until N-OT rising edge, and then decelerates \rightarrow reverses \rightarrow forwards at low speed until it stops immediately at the N-OT falling edge.





a.6098h=17, initial deceleration point signal=OFF

(2) The deceleration point signal is ON during homing

Trajectory:N-OT=1 when homing starts directly at forward low speed until it stops immediately at the N-OT falling edge.



$$t_2 = \frac{6099 - 02h}{609Ah}(s)$$

b.6098h=17, initial deceleration point signal=ON

11.4.17 Mode 18(6098h = 18)

Home signal:P-OT signal (forward overtravel) falling edge

Deceleration point signal:P-OT signal (forward overtravel)

(1)The deceleration point signal is OFF during homing

Trajectory: P-OT=0 when homing starts at forward high speed until P-OT rising edge, and then decelerates \rightarrow reverses \rightarrow runs reversly at low speed until it stops immediately at the P-OT falling edge.



Figure 11- 67

 $t_1 = \frac{6099 - 01h}{609Ah}(s), t_2 = \frac{6099 - 02h}{609Ah}(s)$

a.6098h=18,initial deceleration point signal=OFF

(2)The deceleration point signal is ON during homing

Trajectory: P-OT=1 when homing starts directly at reverse low speed until it stops immediately at the P-OT falling edge.







11.4.18 Mode 19(6098h = 19)

Home signal:HW (home switch) signal falling edge

Deceleration point signal:HW (home switch) signal

(1)The deceleration point signal is OFF during homing

Trajectory: HW=0 when homing starts at forward high speed until the rising edge of HW, decelerates \rightarrow

reverses \rightarrow runs reversely at low speed, and stops at the falling edge of HW.





a.6098h=19,initial deceleration point signal=OFF

(2) The deceleration point signal is ON during homing

Trajectory: HW=1 when homing starts directly at reverse low speed until it stops immediately at the HW falling edge.



b.6098h=19, initial deceleration point signal=ON

11.4.19 Mode 20(6098h = 20)

Home signal:HW (home switch) signal rising edge

Deceleration point signal:HW (home switch) signal

(1)The deceleration point signal is OFF during homing

Trajectory:HW=0 when homing starts at forward high speed until the rising edge of HW, decelerates \rightarrow reverses \rightarrow runs reversely at low speed until the falling edge of HW, and decelerates \rightarrow reverses \rightarrow resumes forward low speed running and it stops immediately at the HW rising edge.



Figure 11- 71

a.6098h=20,initial deceleration point signal=OFF

(2) The deceleration point signal is ON during homing

Trajectory: HW=1 when homing starts directly at reverse low speed until the HW falling edge, and then decelerates \rightarrow reverses \rightarrow forwards at low speed and it stops immediately at the HW rising edge.

Figure 11-72



$$t_2 = \frac{6099 - 02h}{609Ah}$$
(s)

b.6098h=20, initial deceleration point signal=ON

11.4.20 Mode 21(6098h = 21)

Home signal:HW (home switch) signal falling edge

Deceleration point signal:HW (home switch) signal

(1)The deceleration point signal is OFF during homing

Trajectory: HW=0 when homing starts at reverse high speed until the rising edge of HW, decelerates \rightarrow

reverses \rightarrow forwards at low speed and it stops immediately at the HW falling edge.





 $t_1 = \frac{6099 - 01h}{609Ah}(s), t_2 = \frac{6099 - 02h}{609Ah}(s)$

a.6098h=21, initial deceleration point signal=OFF

(2)The deceleration point signal is ON during homing

Trajectory: HW=1 when homing starts directly at forward low speed, and it stops immediately at the HW falling edge.





 $t_2 = \frac{6099 - 02h}{609Ah}$ (s)

b.6098h=21, initial deceleration point signal=ON

11.4.21 Mode 22(6098h = 22)

Home signal:HW (home switch) signal rising edge

Deceleration point signal:HW (home switch) signal

(1)The deceleration point signal is OFF during homing

Trajectory: HW=0 when homing starts at reverse high speed until the rising edge of HW, decelerates \rightarrow reverses \rightarrow forwards at low speed until the HW falling edge, decelerates \rightarrow reverses \rightarrow resumes reverse rumming at low speed and it stops immediately at the HW rising edge.





 $t_1 = \frac{6099 - 01h}{609Ah}(s), t_2 = \frac{6099 - 02h}{609Ah}(s)$

a.6098h=22,initial deceleration point signal=OFF

(2)The deceleration point signal is ON during homing

Trajectory: HW=1 when homing starts at forward high speed until the falling edge of HW, decelerates \rightarrow reverses \rightarrow runs reversely at low speed, and it stops immediately at the HW rising edge.

Figure 11-76



 $t_2 = \frac{6099 - 02h}{609Ah}(s)$

b.6098h=22, initial deceleration point signal=ON

11.4.22 Mode 23(6098h = 23)

Home signal:HW (home switch) signal falling edge

Deceleration point signal:HW (home switch) signal

(1)The deceleration point signal is OFF during homing without forward limit signal

Trajectory: HW=0 when homing starts at forward high speed until the rising edge of HW if there is no limit switch, and then decelerates \rightarrow reverses \rightarrow runs reversely at low speed and it stops immediately at the HW falling edge.



a.6098h=23,initial deceleration point signal=OFF without forward limit signal

(2) The deceleration point signal is OFF during homing with forward limit signal

Trajectory: HW=0 when homing starts at forward high speed if there is a limit switch, decelerates \rightarrow reverses \rightarrow runs reversely at high speed until the rising edge of HW, decelerates and runs reversely at low speed until the falling edge of HW, decelerates \rightarrow reverses \rightarrow forwards at low speed until the rising edge of HW, decelerates and runs reversely at low speed, and then stops immediately at the HW falling edge.

Figure 11-78



b.6098h=23, initial deceleration point signal=OFF without forward limit signal

(3) The deceleration point signal is ON during homing without forward limit signal

Trajectory: HW=1 when homing starts directly at reverse low speed, and it stops immediately at the HW falling edge.



c.6098h=23, initial deceleration point signal=ON without forward limit signal

11.4.23 Mode 24(6098h = 24)

Home signal:HW (home switch) signal rising edge

Deceleration point signal:HW (home switch) signal

(1)The deceleration point signal is OFF during homing without forward limit signal

Trajectory: HW=0 when homing starts at forward high speed until the rising edge of HW if there is no limit switch, decelerates \rightarrow reverses \rightarrow runs reversely at low speed until the falling edge of HW, and reverses \rightarrow forwards at low speed and it stops immediately at the HW rising edge.



a.6098h=24, initial deceleration point signal=OFF without forward limit signal

(2)The deceleration point signal is OFF during homing with forward limit signal

Trajectory: HW=0 when homing starts at forward high speed if there is a limit switch, decelerates \rightarrow reverses \rightarrow runs reversely at high speed until the rising edge of HW, decelerates and runs reversely at low speed until the falling edge of HW, reverses \rightarrow forwards at low speed until the rising edge of HW and then stops immediately.





b.6098h=24, initial deceleration point signal=OFF with forward limit signal (3)The deceleration point signal is ON during homing without forward limit signal

Trajectory: HW=1 when homing starts directly at reverse low speed until the falling edge of HW, reverses and forwards at low speed, , and stops immediately at the rising edge of HW.





c.6098h=24,initial deceleration point signal=ON without forward limit signal

11.4.24 Mode 25(6098h = 25)

Home signal: HW (home switch) signal rising edge

Deceleration point signal:HW (home switch) signal

(1)The deceleration point signal is OFF during homing without forward limit signal

Trajectory: HW=0 when homing starts at forward high speed until the rising edge of HW if there is no limit switch, decelerates \rightarrow forwards at low speed until the falling edge of HW, and reverses \rightarrow runs reversely at low speed and it stops immediately at the HW rising edge.





$$t_1 = \frac{6099 - 01h}{609Ah}(s), t_2 = \frac{(6099 - 01h) - (6099 - 02h)}{609Ah}(s), t_3 = \frac{6099 - 02h}{609Ah}(s)$$

a.6098h=25, initial deceleration point signal=OFF without forward limit signal (2)The deceleration point signal is OFF during homing with forward limit signal

Trajectory: HW=0 when homing starts at forward high speed, and if there is a limit switch, reverses automatically and goes on reverse running at high speed until the rising edge of HW, and then decelerates and reverses and resumes forward running at low speed until the falling edge of HW, reverses and goes on reverse running at low speed until it stops at the rising edge of HW.







(3)The deceleration point signal is ON during homing without forward limit signal

Trajectory: HW=1 when homing starts at forward high speed until the falling edge of HW, decelerates

 \rightarrow reverses \rightarrow runs reversely at low speed, and it stops immediately at the HW rising edge.

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Figure 11- 85



 $t_2 = \frac{6099 - 02h}{609Ah}$ (s)

c.6098h=25, initial deceleration point signal=ON without forward limit signal

11.4.25 Mode 26(6098h =26)

Home signal: Z signal

Deceleration point signal:HW (home switch) signal

(1)The deceleration point signal is OFF during homing without forward limit signal

Trajectory: HW=0 when homing starts at forward high speed until the rising edge of HW, decelerates \rightarrow forwards at low speed until the falling edge of HW, and decelerates \rightarrow reverses \rightarrow runs reversely at low speed until the rising edge of HW, decelerates \rightarrow reverses \rightarrow reseumes forward low speed running until the HW falling edge, and it stops immediately.



a.6098h=26,initial deceleration point signal=OFF without forward limit signal (2)The deceleration point signal is OFF during homing with forward limit signal

Trajectory: HW=0 when homing starts at forward high speed, and if there is a limit switch, reverses automatically and goes on reverse running at high speed until the rising edge of HW, and then decelerates and reverses and reverses and resumes forward running at low speed until the falling edge of HW, and then it stops immdiately.





b.6098h=26,initial deceleration point signal=OFF with forward limit signal

(3)The deceleration point signal is ON during homing without forward limit signal

Trajectory: HW=1 when homing starts directly at forward low speed, and it stops immediately at the HW falling edge.

Figure 11-88



$$t_2 = \frac{6099 - 02h}{609Ah}$$
(s)

c.6098h=26,initial deceleration point signal=ON without forward limit signal

11.4.26 Mode 27(6098h =27)

Home signal:HW (home switch) signal falling edge

Deceleration point signal:HW (home switch) signal

(1)The deceleration point signal is OFF during homing without the reverse limit signal

Trajectory: HW=0 when homing starts at reverse high speed until the rising edge of HW if there is no limit switch, decelerates \rightarrow reverses \rightarrow forwards at low speed until the HW falling edge, and it stops

immediately.





 $t_1 = \frac{6099 - 01h}{609Ah}(s), t_2 = \frac{6099 - 02h}{609Ah}(s)$

a.6098h=27, initial deceleration point signal=OFF with the reverse limit signal

(2)The deceleration point signal is OFF during homing with the reverse limit signal

Trajectory: HW=0 when homing starts at reverse high speed, if there is a limit switch, decelerates \rightarrow reverses \rightarrow forwards at high speed until the HW rising edge, decelerates \rightarrow forwards at low speed until the HW falling edge, decelerates \rightarrow reverses \rightarrow runs reversely at low speed until the HW rising edge, decelerates \rightarrow reverses and forwards at low speed until the HW falling edge, and it stops immediately.

Figure 11-90



b.6098h=27,initial deceleration point signal=OFF with the reverse limit signal (3)The deceleration point signal is ON during homing without the reverse limit signal

Trajectory: HW=1 when homing starts directly at forward low speed, and stops immediately at the falling edge of HW.





c.6098h=27, initial deceleration point signal=ON without the reverse limit signal

11.4.27 Mode 28(6098h =28)

Home signal:HW (home switch) signal falling edge

Deceleration point signal:HW (home switch) signal

(1)The deceleration point signal is OFF during homing without the reverse limit signal

Trajectory: HW=0 when homing starts at reverse high speed until the rising edge of HW if there is no limit switch, decelerates \rightarrow reverses \rightarrow forwards at low speed until the HW falling edge, reverses to run reversely at low speed until the the rising edge of HW, and it stops immediately.





$$t_1 = \frac{6099 - 01h}{609Ah}(s), t_2 = \frac{6099 - 02h}{609Ah}(s)$$

a.6098h=28,initial deceleration point signal=OFF with the reverse limit signal (2)The deceleration point signal is OFF during homing with the reverse limit signal Trajectory: HW=0 when homing starts at reverse high speed, and if there is a limit switch, reverses

automatically and it turns to high speed forward running until the rising edge of HW, and then decelerates and goes on forward running at low speed until the falling edge of HW, reverses and runs reversely at low speed

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until the HW rising edge, and then it stops.

Figure 11-93



b.6098h=28,initial deceleration point signal=OFF with the reverse limit signal (3)The deceleration point signal is ON during homing without the reverse limit signal

Trajectory: HW=1 when homing starts directly at forward low speed until the HW falling edge, and then reverses \rightarrow runs reversely at low speed, and then stops at the rising edge of HW.





c.6098h=28,initial deceleration point signal=ON without the reverse limit signal

11.4.28 Mode 29(6098h = 29)

Home signal: HW (home switch) signal rising edge

Deceleration point signal:HW (home switch) signal

(1)The deceleration point signal is OFF during homing without the reverse limit signal

Trajectory:HW=0 when homing starts at reverse high speed until the falling edge of HW if there is no limit switch in-between, and then reverses \rightarrow forwards at low speed until the rising edge of HW, and it stops.





$$t_1 = \frac{6099 - 01h}{609Ah}(s), t_2 = \frac{(6099 - 01h) - (6099 - 02h)}{609Ah}(s), t_3 = \frac{6099 - 02h}{609Ah}(s)$$

a.6098h=29,initial deceleration point signal=OFF with the reverse limit signal (2)The deceleration point signal is OFF during homing with the reverse limit signal

Trajectory: HW=0 when homing starts at reverse high speed, and if there is a limit switch, decelerates and reverses automatically and it turns to high speed forward running until the rising edge of HW, and then decelerates and reverses, so it turns into reverse running at low speed until the falling edge of HW, reverses again and forwards at low speed until the HW rising edge, and then it stops.







(3)The deceleration point signal is ON during homing without the reverse limit signal

Trajectory: HW=1 when homing starts directly at reverse low speed until the falling edge of HW, and reverses and forwards at low speed, and it stops immediately at the rising edge of HW.

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c.6098h=29,initial deceleration point signal=ON without the reverse limit signal

11.4.29 Mode 30(6098h =30)

Home signal:HW (home switch) signal falling edge

Deceleration point signal:HW (home switch) signal

(1)The deceleration point signal is OFF during homing without the reverse limit signal

Trajectory: HW=0 when homing starts at reverse high speed until the rising edge of HW, decelerates \rightarrow runs reversely at low speed until the HW falling edge, decelerates \rightarrow reverses \rightarrow runs forward at low speed until the HW rising edge, decelerates \rightarrow reverses \rightarrow reverse running at low speed until the HW falling edge, and it stops.





$$t_1 = \frac{6099 - 01h}{609Ah}(s), t_2 = \frac{(6099 - 01h) - (6099 - 02h)}{609Ah}(s), t_3 = \frac{6099 - 02h}{609Ah}(s)$$

a.6098h=30,initial deceleration point signal=OFF with the reverse limit signal (2)The deceleration point signal is OFF during homing with the reverse limit signal

Trajectory: HW=0 when homing starts at reverse high speed, and if there is a limit switch, decelerates and reverses automatically and it turns to high speed forward running until the rising edge of HW, and then decelerates and reverses, so it turns into reverse running at low speed until the falling edge of HW, and then it stops.

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b.6098h=30,initial deceleration point signal=OFF with the reverse limit signal

(3)The deceleration point signal is ON during homing without the reverse limit signal

Trajectory: HW=1 when homing starts directly at reverse low speed until the falling edge of HW, and it stops immediately.





$$z_2 = \frac{6099 - 02h}{609Ah}$$
 (s)

c.6098h=30,initial deceleration point signal=ON without the reverse limit signal

11.4.30 Mode 31(6098h =31), 32(6098h =32)

These two modes are not defined in the standard 402 protocol.

11.4.31 Mode 33(6098h =33)

Home signal: Z signal

Deceleration point signal: none

Trajectory: reverse low speed running until the first Z signal.





11.4.32 Mode 34(6098h =34)

Home signal: Z signal

Deceleration point signal: none

Trajectory:Forward low speed running until the first Z signal.



Figure 11- 102

11.4.33 Mode 35(6098h =35)

Take the current position as the mechanical home position, and after triggering homing mode, the user position (6064h) = home position offset (607Ch).