



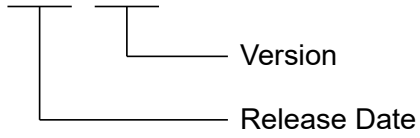
E2 Series Servo Drive

EtherNet/IP Communication Command Manual

Revision History

The version of the manual is also indicated on the bottom of the front cover.

MD44UE01-2403_V1.0



Release Date	Version	Applicable Product	Revision Contents
Mar. 01 st , 2024	1.0	E2 series servo drive	First edition.

Related Documents

Through related documents, users can quickly understand the positioning of this manual and the correlation between manuals and products. Go to HIWIN MIKROSYSTEM's official website → Download → Manual Overview for details (https://www.hiwinmikro.tw/Downloads/ManualOverview_EN.htm).

Table of Contents

1.	About this manual	1-1
1.1	Preface.....	1-2
1.2	Trademarks	1-2
2.	EtherNet/IP communication	2-1
2.1	Communication specification	2-2
2.2	Panel indicators	2-3
2.3	Cyclic I/O data format	2-5
3.	Drive profile	3-1
3.1	Finite State Automaton (FSA)	3-2
3.2	Profile position mode (PP)	3-5
3.3	Homing mode (HM)	3-12
3.4	Profile velocity mode (PV)	3-19
3.5	Profile torque mode (TQ)	3-21
3.6	Touch probe function	3-23
3.7	Object dictionary list.....	3-27

1. About this manual



1.	About this manual	1-1
1.1	Preface.....	1-2
1.2	Trademarks.....	1-2

1.1 Preface

This manual provides information necessary to operate HIWIN E2 series servo drive via EtherNet/IP communication. For further understanding of E2 series servo drive, please refer to related user manuals.

1.2 Trademarks

CIP and EtherNet/IP are trademarks of ODVA, Inc.

2. EtherNet/IP communication

2.	EtherNet/IP communication	2-1
2.1	Communication specification	2-2
2.2	Panel indicators	2-3
2.3	Cyclic I/O data format	2-5

2.1 Communication specification

Table 2.1.1

EtherNet/IP Communication Specification	
Communication protocol	EtherNet/IP adaptation of CIP
Device profile	Generic device
Physical layer	10BASE-T/100BASE-TX, full duplex
Auto-MDI/MDIX detection	Yes
Cable	CAT5e or CAT6 shielded
Node-to-node distance	Max. 100 m
Cyclic update period	Min. 1.0 ms
IP addressing mode	Static/DHCP/BOOTP
Data transmission mode	Cyclic I/O data, Explicit message
Supported network features	Link Layer Discovery Protocol (LLDP) Device Level Ring (DLR) Address Conflict Detection (ACD) Quality of Service (QoS) CIP Reset Services: Type 0, Type 1, Type 2
CIP objects	Identity Object (0x01) Message Router Object (0x02) Assembly Object (0x04) Connection Manager Object (0x06) Time Sync Object (0x43) Device Level Ring Object (0x47) QoS Object (0x48) TCP/IP Interface Object (0xF5) Ethernet Link Object (0xF6) LLDP Management Object (0x109) LLDP Data Table Object (0x10A)
Motion profile	CiA402: PP, PV, TQ, HM

2.2 Panel indicators

Figure 2.2.1 is the panel of E2 series servo drive. On this panel, the 7-segment display is used to display the drive's status and the current alarm/warning code, the LEDs are used to display the EtherNet/IP communication status, and the rotary switches are not functional here. The states of each LED are described in Table 2.2.1, and the states of 7-segment display are described in Table 2.2.2.

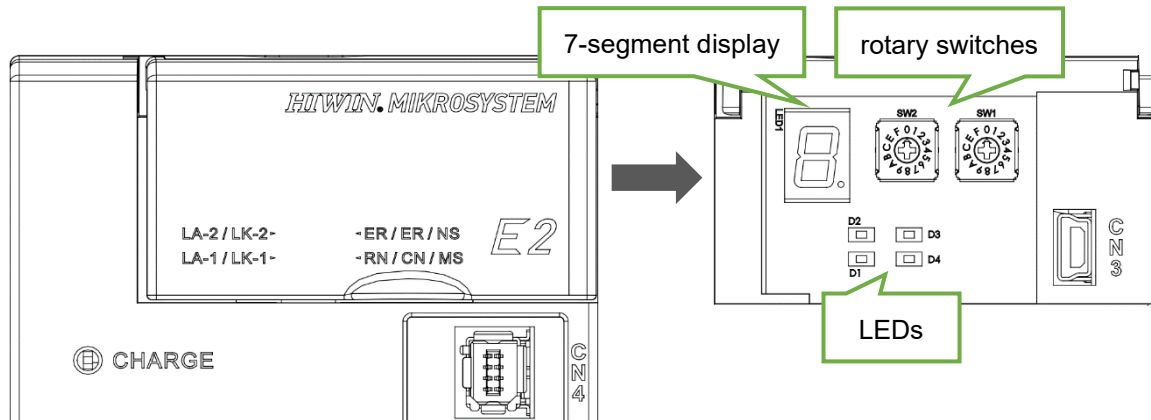


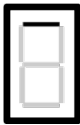
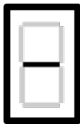
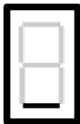

Figure 2.2.1

Table 2.2.1

Label	LED Mark	Name	Color	State	Description
LA-1 / LA-2	D1 / D2	Link status	Off	Power off, or link not established.	The drive is power off, or the port has no physical link.
			Steady Green	Link is established without traffic.	The physical link is created without data transmission.
			Flashing Green	Link is established with traffic.	The physical link is created with data transmission.
NS	D3	Network status	Off	Power off, or no IP address.	The drive is power off, or without IP configuration.
			Flashing Green	No connection	An IP address is configured, but CIP connection is not established.
			Steady Green	Connected	An IP address is configured, and a CIP connection is established.
			Flashing Red	Connection timeout	An IP address is configured, and a CIP connection has timeout. The network status goes to steady green when a CIP connection is re-established.
			Steady Red	Duplicate IP	The drive has detected that its IP address is already in use.
			Flashing Green/Red	Self-test	The drive is performing its power up testing.
MS	D4	Module status	Off	Power off	The drive is in power off state.
			Flashing Green	Drive not ready	The drive is not ready.
			Steady Green	Drive ready	The drive is in drive ready state.

Label	LED Mark	Name	Color	State	Description
			Steady Red	Drive alarm	The drive is in alarm state.
			Flashing Green/Red	Self-test	The drive is performing its power up testing.

Table 2.2.2

Display	Function Description
	Status of rotation detection output (TGON) signal Light up when the rotary velocity of the servo motor exceeds the setting value. (Set via Pt502 or Pt581. The default setting is 20 rpm or 20 mm/s.) Do not light up when the rotary velocity of the servo motor is below the setting value.
	Servo ready display Light up when servo OFF. Do not light up when servo ON.
	Display of command input Light up during command input.
	Display of connection Light up during connection.

2.3 Cyclic I/O data format

Table 2.3.1 shows the I/O data format of cyclic data transmission. The data format is 32-Byte input and 32-Byte output for data transmission between a drive and a controller.

Table 2.3.1

Byte	Command		Response	
	Name	Object No.	Name	Object No.
0	Mode of operation	6060h	Mode of operation display	6061h
1	Controlword	6040h	Statusword	6041h
2	Target position	607Ah	Position actual value	6064h
3				
4	Target velocity	60FFh	Velocity actual value	606Ch
5				
6	Target torque	6071h	Torque actual value	6077h
7	Controlword 2	-	Statusword 2	-
8	Profile velocity	6081h	Following error actual value	60F4h
9				
10	Profile acceleration	6083h	Digital input	60FDh
11			Drive alarm code	-
12	Profile deceleration	6084h	Drive warning code	-
13			Touch probe status	60B9h
14	Torque slope	6087h	Touch probe 1 positive edge	60BAh
15				
16	Digital output	60FE:01h	Touch probe 2 positive edge	60BCh
17	Touch probe function	60B8h		
18~31	Reserved		Reserved	

(This page is intentionally left blank.)

3. Drive profile

3.	Drive profile	3-1
3.1	Finite State Automaton (FSA).....	3-2
3.2	Profile position mode (PP)	3-5
3.3	Homing mode (HM)	3-12
3.4	Profile velocity mode (PV)	3-19
3.5	Profile torque mode (TQ).....	3-21
3.6	Touch probe function	3-23
3.7	Object dictionary list.....	3-27

E2 EtherNet/IP servo drive implements drive profile based on CiA402 standard. The applied Finite State Automaton (FSA) and the operation modes, including profile position mode (PP), profile velocity mode (PV), profile torque mode (TQ) and homing mode (HM), are described in this chapter.

3.1 Finite State Automaton (FSA)

Figure 3.1.1 defines FSA of E2 EtherNet/IP servo drive. The transitions between the states depend on the Controlword (6040h) from a host and the internal states of drive. The drive state is set to the Statusword (6041h) to respond to the host.

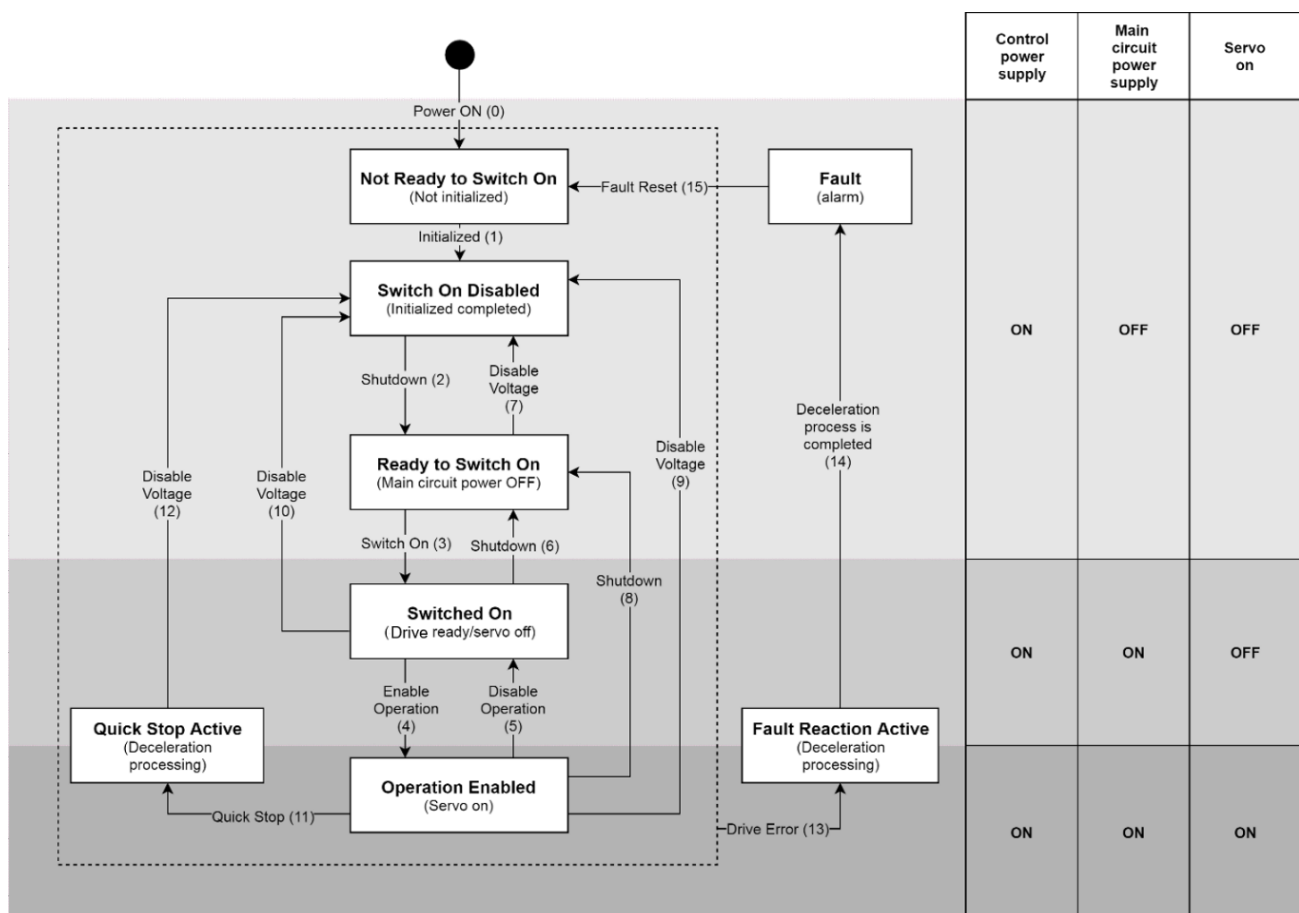


Figure 3.1.1

The events and actions in Figure 3.1.1 are described in Table 3.1.1.

Table 3.1.1

Trans	Event	Action
0	Control power is ON or drive is reset.	Drive performs initialization and self-test.
1	Initialization is completed.	Communication is activated.
2	Receive "Shutdown" command.	None
3	Receive "Switch on" command when high-level power is ON.	None
4	Receive "Enable operation" command.	The motor and the drive functions are enabled, and all command settings are cleared.
5	Receive "Disable operation" command.	The motor and the drive functions are disabled.
6	Receive "Shutdown" command.	None
7	1. Receive "Quick stop" or "Disable voltage" command. 2. ESM is in Init state.	None
8	Receive "Shutdown" command.	The motor and the drive functions are disabled.
9	Receive "Disable voltage" command.	The motor and the drive functions are disabled.
10	1. Receive "Quick stop" or "Disable voltage" command. 2. ESM is transited to Init state.	None
11	Receive "Quick stop" command.	"Quick stop" function starts.
12	An automatic transition when "Quick stop" function is completed	The motor and the drive functions are disabled.
13	The drive detects an error.	The drive-defined or user-configured fault reactions are executed.
14	An automatic transition after deceleration process is completed	The motor and the drive functions are disabled.
15	Receive "Fault reset" command.	Reset the fault state if the fault situation of drive is no longer stayed.

The command codes of Controlword corresponding to FSA transitions are described in Table 3.1.2.

Table 3.1.2

Command	Bits of 6040h (Controlword)					Transition
	Bit 7	Bit 3	Bit 2	Bit 1	Bit 0	
Shutdown	0	X	1	1	0	2, 6, 8
Switch on	0	0	1	1	1	3
Switch on + Enable operation	0	1	1	1	1	3+4*
Disable voltage	0	X	X	0	X	7, 9, 10, 12
Quick stop	0	X	0	1	X	7, 10, 11
Disable operation	0	0	1	1	1	5
Enable operation	0	1	1	1	1	4
Fault reset	0→1	X	X	X	X	15
*It will automatically transit to "Enable operation" after "Switched on" is executed.						

The state codes of Statusword corresponding to FSA states are described in Table 3.1.3.

Table 3.1.3

6041h (Statusword)	FSA state
xxxx xxxx x0xx 0000b	Not ready to switch on
xxxx xxxx x1xx 0000b	Switch on disabled
xxxx xxxx x01x 0001b	Ready to switch on
xxxx xxxx x01x 0011b	Switched on
xxxx xxxx x01x 0111b	Operation enabled
xxxx xxxx x00x 0111b	Quick stop active
xxxx xxxx x0xx 1111b	Fault reaction active
xxxx xxxx x0xx 1000b	Fault

3.2 Profile position mode (PP)

PP mode is used for positioning with the setting of a profile velocity and a profile acceleration. Figure 3.2.1 shows the input and output objects of the structure of PP mode.

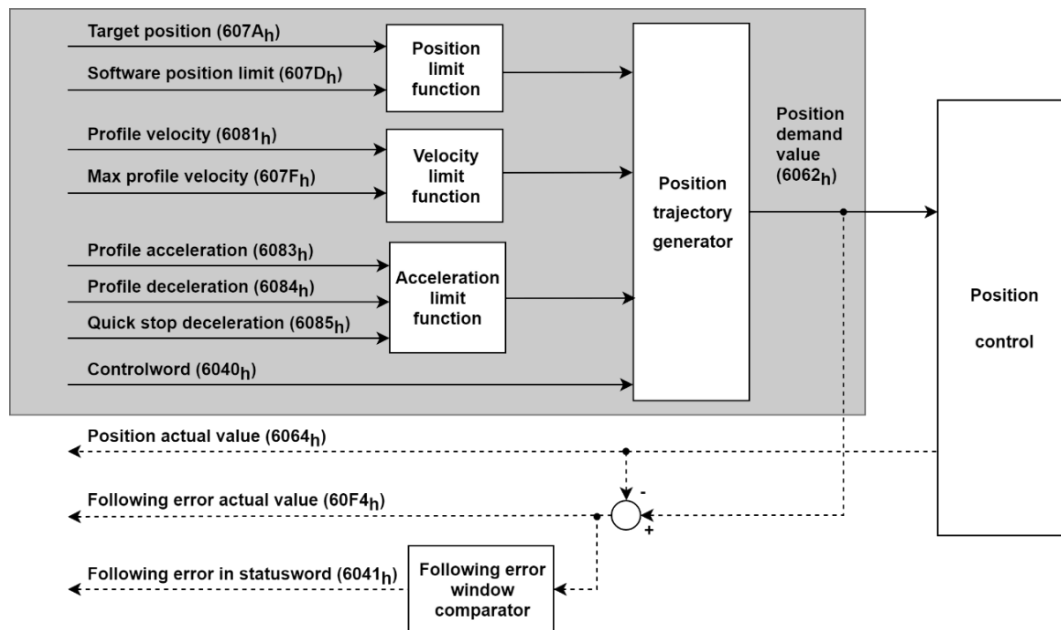


Figure 3.2.1

Note: When the motor is moving, the change of Profile acceleration (6083h) and Profile deceleration (6084h) will not be executed until the moving is done.

The related objects of PP mode are listed in Table 3.2.1.

Table 3.2.1

Index	Sub-Index	Name	Data type	Access	Valid value	Unit
6040h	00h	Controlword	U16	rw	0x0 ~ 0xFFFF	-
6041h	00h	Statusword	U16	ro	0x0 ~ 0xFFFF	-
605Dh	00h	Halt option code	I16	ro	1, 2	-
6062h	00h	Position demand value	I32	ro	-2147483648 ~ 2147483647	inc
6063h	00h	Position actual internal value	I32	ro	-2147483648 ~ 2147483647	count
6064h	00h	Position actual value	I32	ro	-2147483648 ~ 2147483647	inc
6065h	00h	Following error window	U32	rw	0 ~ 4294967295	inc
6066h	00h	Following error time out	U16	rw	0 ~ 65535	ms
6067h	00h	Position window	U32	rw	0 ~ 4294967295	inc
6068h	00h	Position window time	U16	rw	0 ~ 65535	ms
606Ch	00h	Velocity actual value	I32	ro	-2147483648 ~ 2147483647	inc/s
6072h	00h	Max torque	U16	rw	0 ~ 65535	0.1%

Index	Sub-Index	Name	Data type	Access	Valid value	Unit
6074h	00h	Torque demand	I16	ro	-32768 ~ 32767	0.1%
6076h	00h	Motor rated torque	U32	ro	0 ~ 4294967295	mNm
6077h	00h	Torque actual value	I16	ro	-32768 ~ 32767	0.1%
607Ah	00h	Target position	I32	rw	-2147483648 ~ 2147483647	inc
607Fh	00h	Max profile velocity	U32	rw	0 ~ 4294967295	inc/s
6081h	00h	Profile velocity	U32	rw	0 ~ 4294967295	inc/s
6083h	00h	Profile acceleration	U32	rw	0 ~ 4294967295	inc/s ²
6084h	00h	Profile deceleration	U32	rw	0 ~ 4294967295	inc/s ²
6085h	00h	Quick stop deceleration	U32	rw	0 ~ 4294967295	inc/s ²
60C5h	00h	Max acceleration	U32	rw	0 ~ 4294967295	inc/s ²
60C6h	00h	Max deceleration	U32	rw	0 ~ 4294967295	inc/s ²
60F4h	00h	Following error actual value	I32	ro	-2147483648 ~ 2147483647	inc
60FCh	00h	Position demand internal value	I32	ro	-2147483648 ~ 2147483647	count

■ Controlword (6040h) of PP mode

Table 3.2.2

Bit 9	Bit 5	Bit 4	Definition
change on set-point	change set immediately	new set-point	
0	0	0→1	Positioning is completed (target reached) before the next one gets started.
X	1	0→1	Immediately start next positioning.
1	0	0→1	Execute positioning with current profile velocity to the current set-point and then apply next positioning.

Table 3.2.3

Bit	Value	Definition
6	0	Target position is an absolute value.
(absolute / relative)	1	Target position is a relative value.
8	0	Execute or continue positioning.
(halt)	1	Axis is stopped according to 605Dh (halt option code).

■ Statusword (6041h) of PP mode

Table 3.2.4

Bit	Value	Definition
10	0	Halt (Bit 8 in Controlword) = 0: target position not reached
(target reached)	1	Halt = 1: axis decelerates
12	0	Halt = 0: target position reached
(set-point acknowledge)	1	Halt = 1: velocity of axis is 0
13	0	The last set-point is already processed.
(following error)	1	Wait for new set-point (the buffer is empty).
	0	Previous set-point is still in process.
	0	No following error
	1	Following error

■ Definition of Halt option code (605Dh)

Table 3.2.5

Value	Definition
0	Reserved
1	Axis is stopped according to 6084h (profile deceleration) and remains in Operation enabled state.
2	Axis is stopped according to 6085h (quick stop deceleration) and remains in Operation enabled state.

■ Example of setting basic set-point

- [1] The master sets 607Ah (target position), and then sets bit 4 of 6040h (Controlword) from 0 to 1 (edge trigger).
- [2] The drive acknowledges the new set-point by setting bit 12 of 6041h (Statusword) to 1. Then, the drive starts to move toward target position from 607Ah (target position).
- [3] The master sets bit 4 of 6040h (Controlword) to 0 after bit 12 of 6041h (Statusword) is set to 1.
- [4] The drive sets bit 12 of 6041h (Statusword) to 0 after bit 4 of 6040h (Controlword) is set to 0.
- [5] When the motor reaches the target position, the drive sets bit 10 of 6041h (Statusword) to 1.

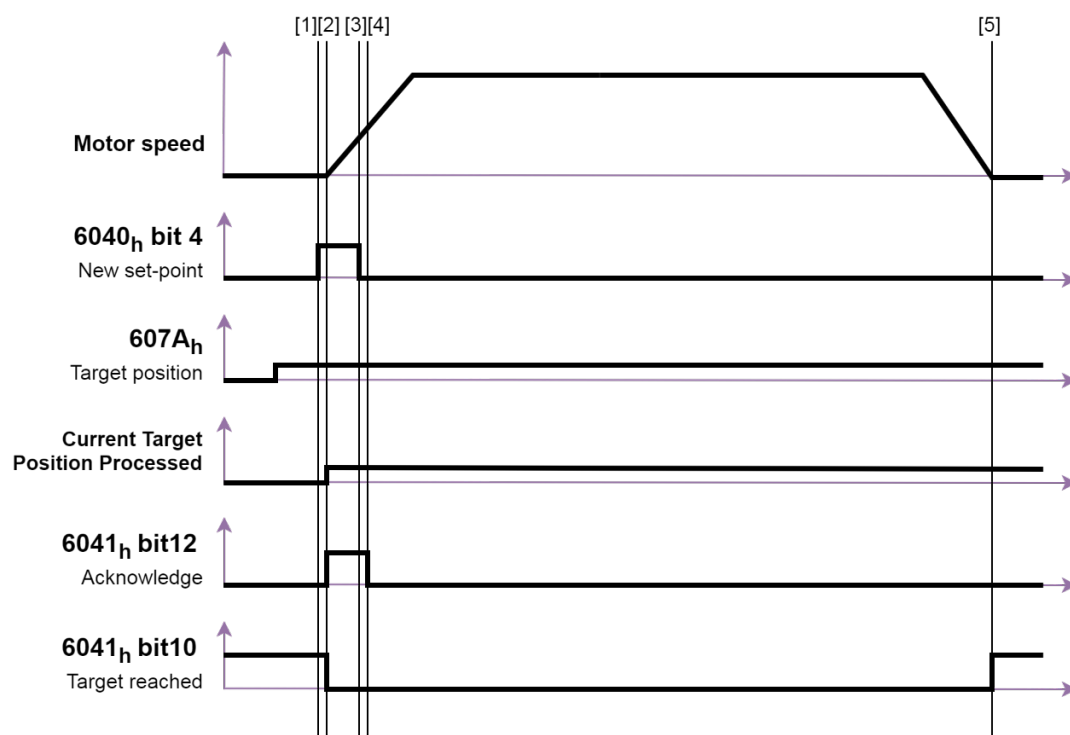


Figure 3.2.2

Note: The velocity of the motion is from 6081h (profile velocity), which is limited by 607Fh (max profile velocity).

■ Example of setting single set-point

When bit 5 of 6040h (Controlword) is 1, the new set-point is immediately validated by bit 4 of 6040h (Controlword). Thus, the set-point in progress will be interrupted.

- [1] After bit 12 of 6041h (Statusword) is set to 0, the master changes the value of 607Ah (target position) and sets bit 4 of 6040h from 0 to 1 (edge trigger).
- [2] The drive acknowledges the new set-point by setting bit 12 of 6041h (Statusword) to 1. Then, the drive starts to move toward the new target position from 607Ah (target position).
- [3] The master sets bit 4 of 6040h (Controlword) to 0 after bit 12 of 6041h (Statusword) is set to 1.
- [4] The drive sets bit 12 of 6041h (Statusword) to 0 after bit 4 of 6040h (Controlword) is set to 0.

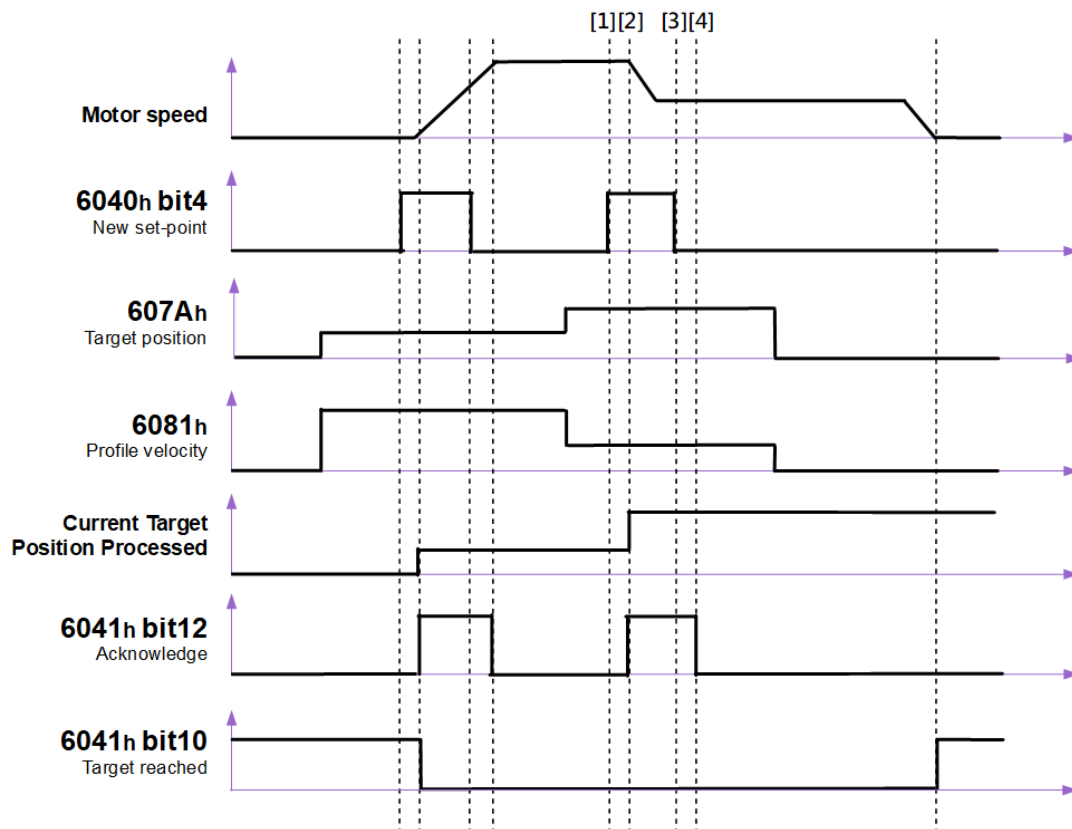


Figure 3.2.3

■ Example of setting set of set-points (change target during motion)

- [1] After bit 12 of 6041h (Statusword) is set to 0, the master changes the value of 607Ah (target position) and sets bit 4 of 6040h (Controlword) from 0 to 1 (edge trigger).
- [2] The drive acknowledges the new set-point by setting bit 12 of 6041h (Statusword) to 1. The drive buffers 607Ah (target position) as a new target position and continues the ongoing target position.
- [3] The master sets bit 4 of 6040h (Controlword) to 0 after bit 12 of 6041h (Statusword) is set to 1.
- [4] The drive starts to move to the new target position after the ongoing set-point is completed. Then, the buffer becomes empty, and bit 12 of 6041h (Statusword) is set to 0.

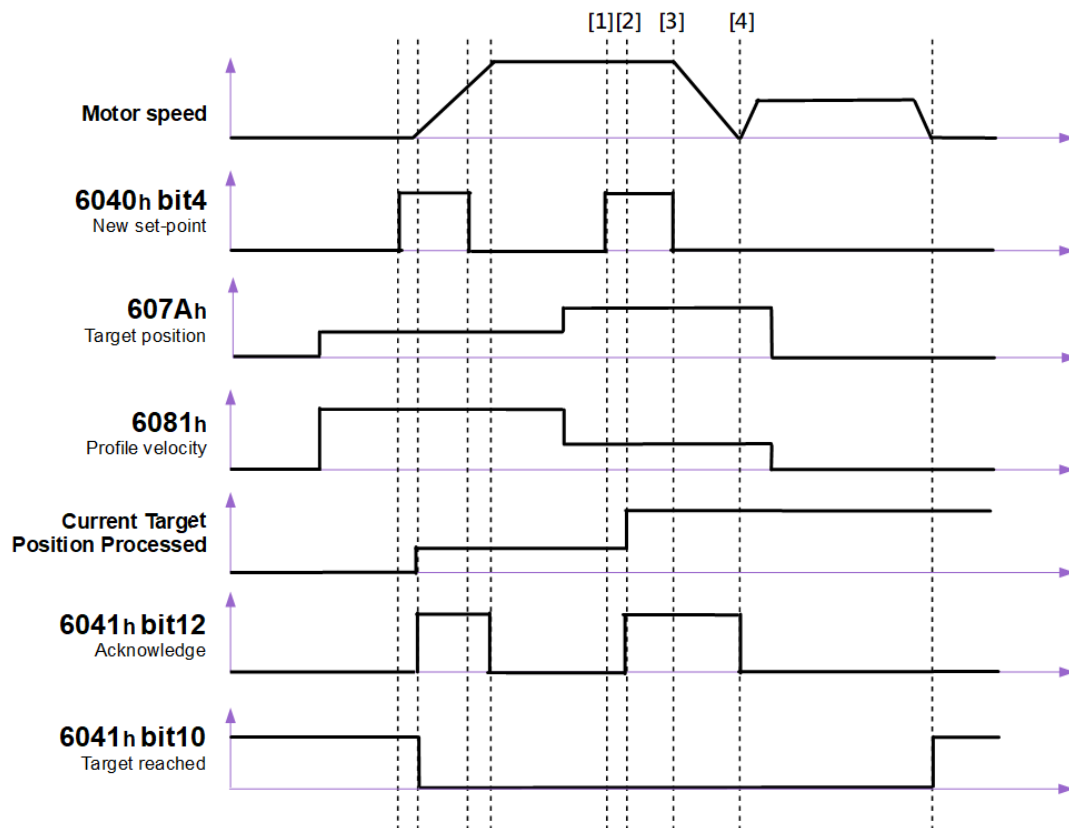


Figure 3.2.4

Note: If the new target position is in the opposite direction, the motor will complete the movement of the current target position first and then execute the reverse movement.

■ Example of buffering set-points

E2 EtherNet/IP servo drive only supports 2 set-points maximum. The handling of the set-points is shown as follows.

- [1] When there is no set-point in progress, a new set-point A is immediately effective.
- [2] When there is a set-point in progress, the new set-point B and C are stored in the buffers.
- [3] When all set-point buffers are all in use (bit 12 of 6041h is 1), the new set-point D is discarded.
- [4] When all set-point buffers are all in use (bit 12 of 6041h is 1) and bit 5 of 6040h (Controlword) is set to 1, the new set-point E is immediately processed as a single set-point. All previous setpoints are discarded.
- [5] Bit 10 of 6041h (Statusword) remains 0 until all set-points are processed.

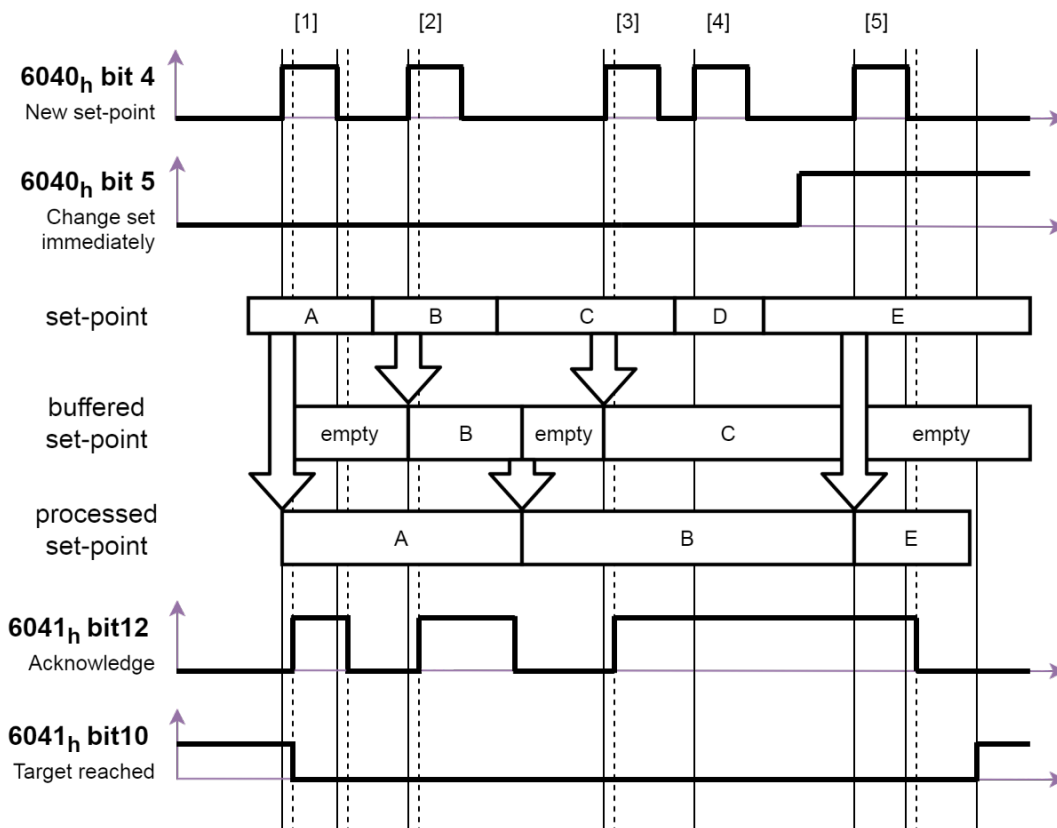


Figure 3.2.5

■ Example of halt bit

When bit 8 of 6040h (Controlword) is set to 1 in PP mode, the motion will be temporarily stopped. After bit 8 of 6040h (Controlword) returns to 0, unfinished set-points will be resumed.

- [1] When there is no set-point in process, the new set-point A is taken immediately.
- [2] When set-point A is still in process, the new set-point B is stored if the buffer is empty.
- [3] When set-point A is still in process but bit 8 of 6040h (Controlword) is set to 1, the motion is halted. After the motor speed decelerates to 0, bit 10 of 6041h (Statusword) changes to 1.
- [4] When bit 8 of 6040h (Controlword) returns to 0, the motion towards set-point A is resumed. Bit 10 of 6041h (Statusword) changes to 0.
- [5] After set-point A is reached, set-point B is processed.
- [6] Bit 10 of 6041h (Statusword) remains 0 until all set-points are processed.

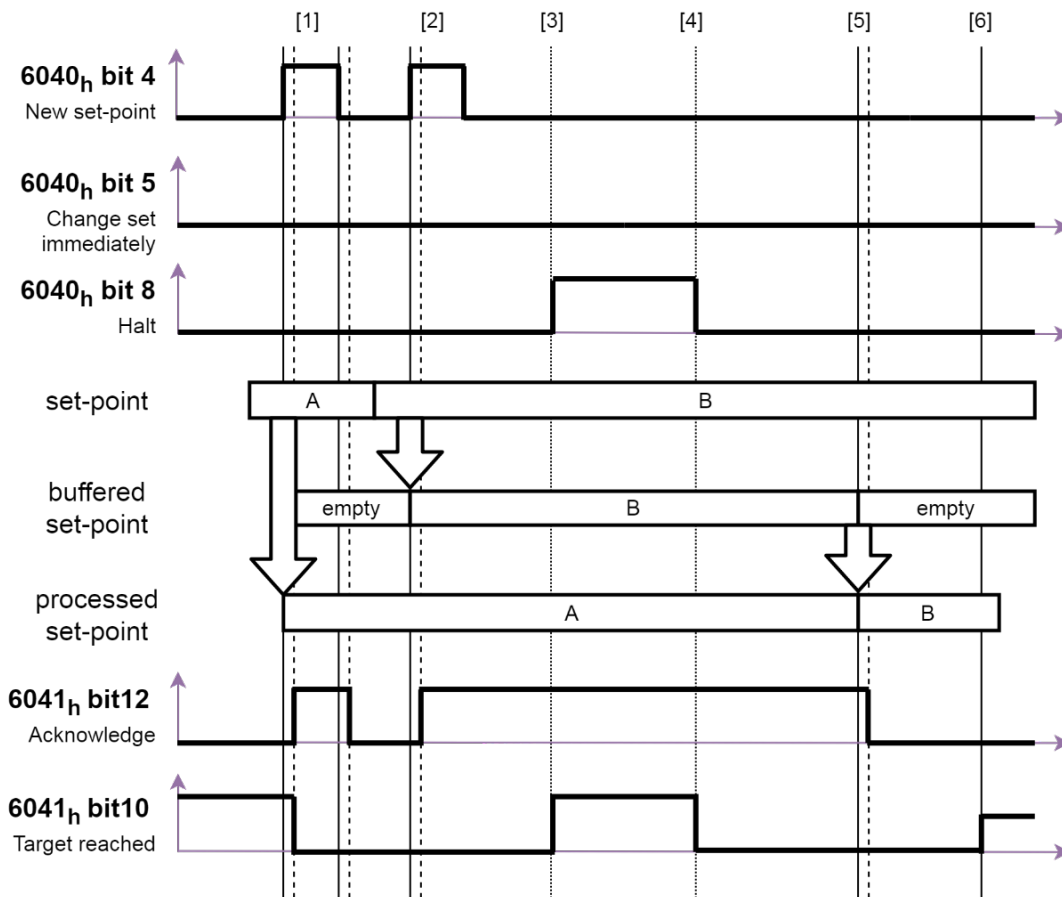


Figure 3.2.6

3.3 Homing mode (HM)

This mode is for incremental encoder. After homing procedure is done, the home position of the machine will be defined. To make position zero offset from the home position, set an offset value to the object 607Ch. After homing is completed, the values of the following position objects will be recalculated accordingly.

6062h (position demand value) = 6064h (position actual value) = 607Ch (home offset)

6063h (position actual internal value) = 60FCh (position demand internal value) = 0

The input and output objects of HM mode are shown in Figure 3.3.1.

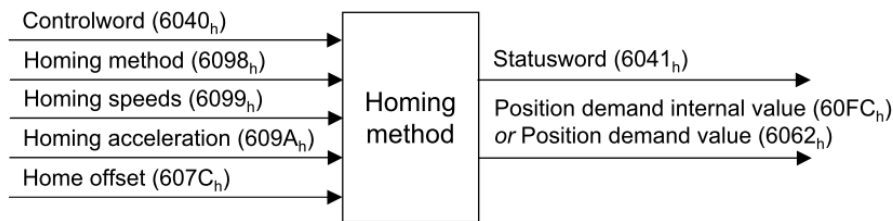


Figure 3.3.1

The related objects of HM mode are listed in Table 3.3.1.

Table 3.3.1

Index	Sub-Index	Name	Data type	Access	Valid value	Unit
6040h	00h	Controlword	U16	rw	0x0 ~ 0xFFFF	-
6041h	00h	Statusword	U16	ro	0x0 ~ 0xFFFF	-
6062h	00h	Position demand value	I32	ro	-2147483648 ~ 2147483647	inc
6063h	00h	Position actual internal value	I32	ro	-2147483648 ~ 2147483647	count
6064h	00h	Position actual value	I32	ro	-2147483648 ~ 2147483647	inc
606Ch	00h	Velocity actual value	I32	ro	-2147483648 ~ 2147483647	inc/s
6072h	00h	Max torque	U16	rw	0 ~ 65535	0.1%
6074h	00h	Torque demand	I16	ro	-32768 ~ 32767	0.1%
6076h	00h	Motor rated torque	U32	ro	0 ~ 4294967295	mNm
6077h	00h	Torque actual value	I16	ro	-32768 ~ 32767	0.1%
607Ch	00h	Home offset	I32	rw	-2147483648 ~ 2147483647	inc
607Fh	00h	Max profile velocity	U32	rw	0 ~ 4294967295	inc/s
6085h	00h	Quick stop deceleration	U32	rw	0 ~ 4294967295	inc/s ²
6098h	00h	Homing method	I8	rw	-128 ~ 127	-
6099h	-	Homing speeds	-	-	-	-
	00h	Number of entries	U8	ro	2	-
	01h	Speed during search for switch	U32	rw	0 ~ 4294967295	inc/s
	02h	Speed during search for zero	U32	rw	0 ~ 4294967295	inc/s
609Ah	00h	Homing acceleration	U32	rw	0 ~ 4294967295	inc/s ²

Index	Sub-Index	Name	Data type	Access	Valid value	Unit
60C5h	00h	Max acceleration	U32	rw	0 ~ 4294967295	inc/s ²
60C6h	00h	Max deceleration	U32	rw	0 ~ 4294967295	inc/s ²

■ Controlword (6040h) of HM mode

Table 3.3.2

Bit	Value	Definition
4 (homing operation start)	0	Do not start homing procedure.
	1	Start or continue homing procedure.
8 (halt)	0	Enable bit 4.
	1	Stop axis.

■ Statusword (6041h) of HM mode

Table 3.3.3

Bit 13	Bit 12	Bit 10	Definition
homing error	homing attained	target reached	
0	0	0	Homing procedure is in progress.
0	0	1	Homing procedure is interrupted or not started.
0	1	0	Homing is attained, but target is not reached.
0	1	1	Homing procedure is successfully completed.
1	0	0	Homing error occurs, and velocity is not 0.
1	0	1	Homing error occurs, and velocity is 0.
1	1	X	Reserved

Note:

- Bit 12 will be cleared to zero in the following cases.
 - The drive is power cycled.
 - The operation mode is changed to other modes.
- If multi-turn absolute encoder is used, bit 12 will always be 1.

■ Example of successful homing procedure

- [1] Set 6098h (homing method) to the required homing method. Homing methods supported by E2 EtherNet/IP servo drive are given in Table 3.3.4.
- [2] Accordingly set homing parameters, 609Ah (homing acceleration), 6099:01h (speed during search for switch), 6099:02h (speed during search for zero) and 607Ch (home offset).
- [3] Set bit 4 of 6040h (Controlword) from 0 to 1. Then, the homing procedure starts.
- [4] When the homing procedure is successfully completed, the drive sets bit 10 and bit 12 of 6041h (Statusword) to 1.

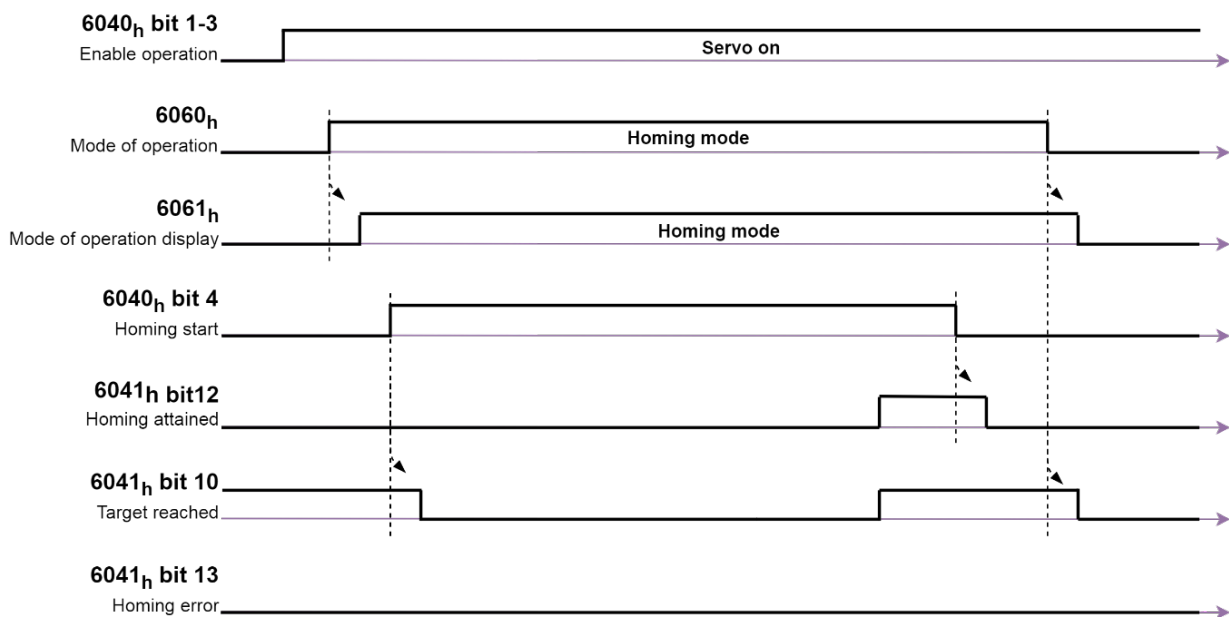
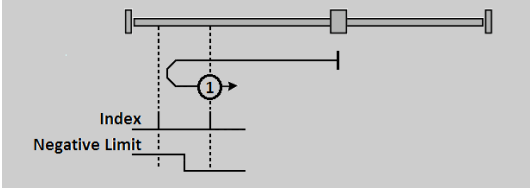
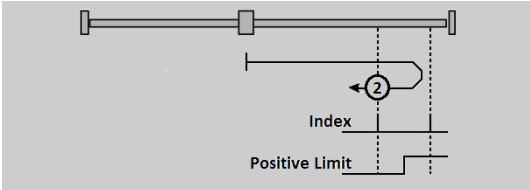
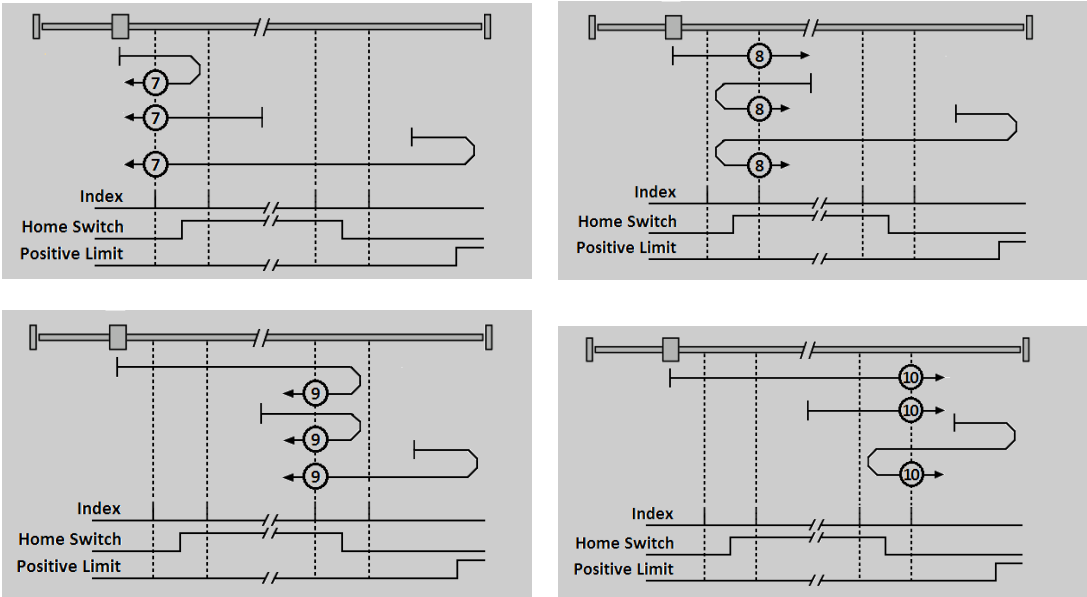
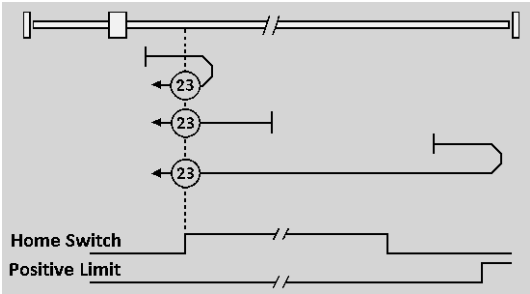
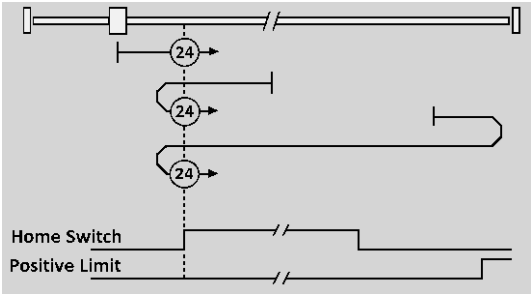
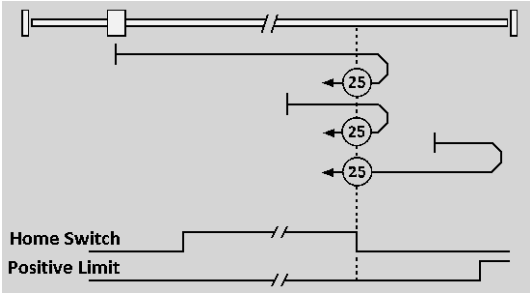
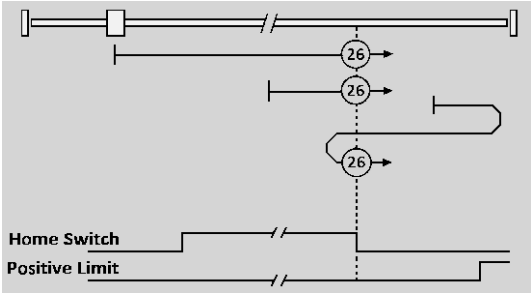
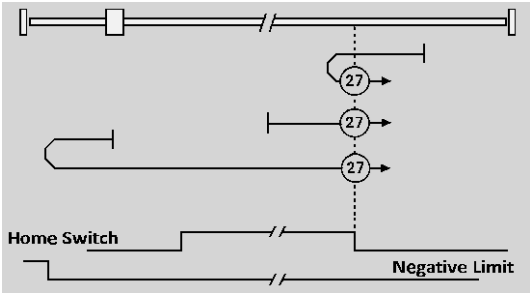
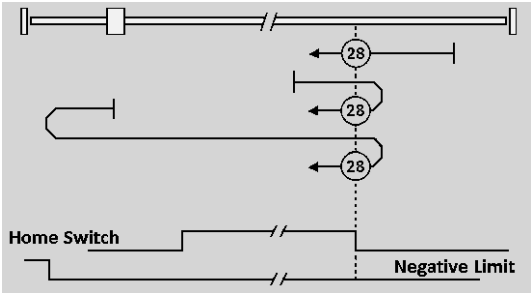
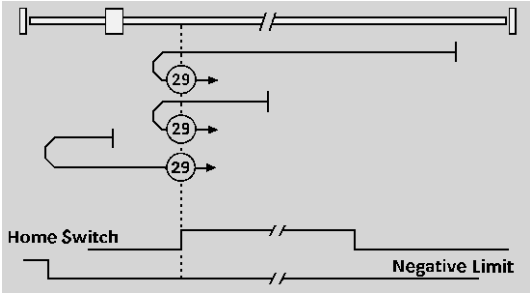
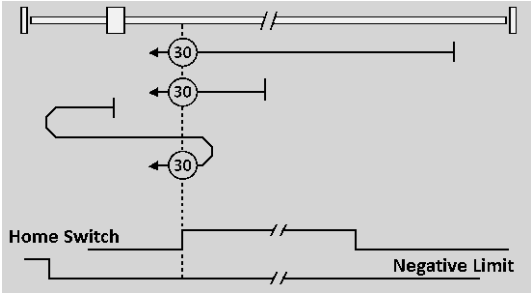


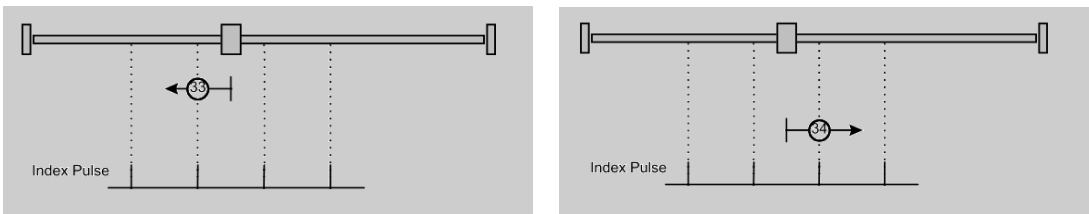
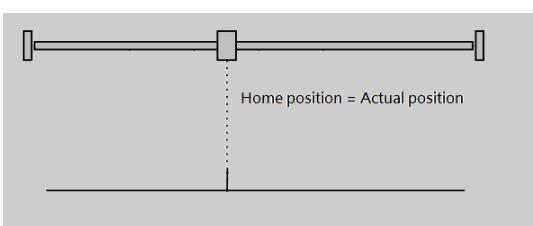
Figure 3.3.2

Table 3.3.4

Method	Description
1	<p>Homing on negative limit switch and index pulse</p> <p>If the negative limit switch is inactive, the initial direction of the movement is leftward. The home position is at the first index pulse to the right of the position where the negative limit switch becomes inactive. If the negative limit is not assigned, homing will fail.</p> 
2	<p>Homing on positive limit switch and index pulse</p> <p>If the positive limit switch is inactive, the initial direction of the movement is rightward. The home position is at the first index pulse to the left of the position where the positive limit switch becomes inactive. If the positive limit is not assigned, homing will fail.</p> 
7~10	<p>Homing on home switch and index pulse – positive initial direction</p> <p>The initial direction of the movement depends on the home switch edge being sought. If the home switch is active at the beginning, the initial direction of method 7 and 8 is negative. The initial direction of all other cases is positive. If the home switch and the positive limit are not assigned, homing will fail.</p> 

Method	Description
11~14	<p>Homing on home switch and index pulse – negative initial direction</p> <p>The initial direction of the movement depends on the home switch edge being sought. If the home switch is active at the beginning, the initial direction of method 11 and 12 is positive. The initial direction of all other cases is negative.</p> <p>If the home switch and the negative limit are not assigned, homing will fail.</p>
17	<p>Homing on negative limit switch</p> <p>If the negative limit switch is inactive, the initial direction of the movement is leftward. The home position is at the right of the position where the negative limit switch becomes inactive.</p> <p>If the negative limit is not assigned, homing will fail.</p>
18	<p>Homing on positive limit switch</p> <p>If the positive limit switch is inactive, the initial direction of the movement is rightward. The home position is at the left of the position where the positive limit switch becomes inactive.</p> <p>If the positive limit is not assigned, homing will fail.</p>

Method	Description
23~26	Homing on home switch – positive initial direction The initial direction of the movement depends on the home switch edge being sought. If the home switch is active at the beginning, the initial direction of method 23 and 24 is negative. The initial direction of all other cases is positive. If the home switch and the positive limit are not assigned, homing will fail.
	
	
	
	
27~30	Homing on home switch – negative initial direction The initial direction of the movement depends on the home switch edge being sought. If the home switch is active at the beginning, the initial direction of method 27 and 28 is positive. The initial direction of all other cases is negative. If the home switch and the negative limit are not assigned, homing will fail.
	
	
	
	

Method	Description
33~34	<p>Homing on index pulse The direction of homing is negative (33) or positive (34) respectively. The home position is at the index pulse found in the selected direction.</p> 
37	<p>Homing on current position Current position of the motor is defined as the home position. In this method, the drive does not need to be in Operation enabled state. Objects are initialized as follows.</p> <p>6062h (position demand value) = 6064h (position actual value) = 607Ch (home offset) 6063h (position actual internal value) = 60FCh (position demand internal value) = 0</p> 

3.4 Profile velocity mode (PV)

The motor speed is output according to the profile acceleration and the profile deceleration until it reaches the target velocity. Figure 3.4.1 shows the input and output objects of the structure of PV mode.

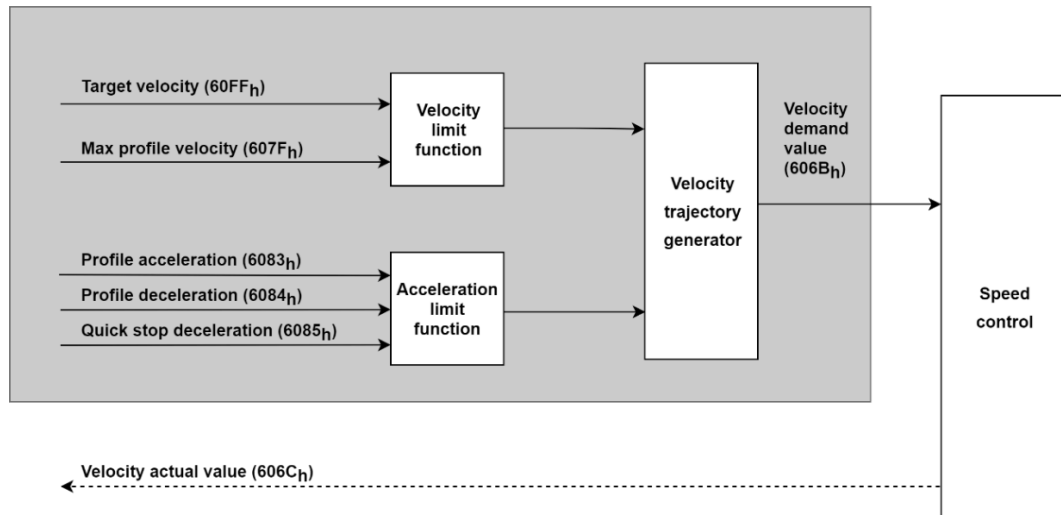


Figure 3.4.1

Note: When the motor is moving, the change of Profile acceleration (6083h) and Profile deceleration (6084h) will not be executed until the moving is done.

The related objects of PV mode are listed in Table 3.4.1.

Table 3.4.1

Index	Sub-Index	Name	Data type	Access	Valid value	Unit
6040h	00h	Controlword	U16	rw	0x0 ~ 0xFFFF	-
6041h	00h	Statusword	U16	ro	0x0 ~ 0xFFFF	-
6062h	00h	Position demand value	I32	ro	-2147483648 ~ 2147483647	inc
6063h	00h	Position actual internal value	I32	ro	-2147483648 ~ 2147483647	count
6064h	00h	Position actual value	I32	ro	-2147483648 ~ 2147483647	inc
606Bh	00h	Velocity demand value	I32	ro	-2147483648 ~ 2147483647	inc/s
606Ch	00h	Velocity actual value	I32	ro	-2147483648 ~ 2147483647	inc/s
606Dh	00h	Velocity window	U16	rw	0 ~ 65535	inc/s
606Eh	00h	Velocity window time	U16	rw	0 ~ 65535	ms
6072h	00h	Max torque	U16	rw	0 ~ 65535	0.1%
6076h	00h	Motor rated torque	U32	ro	0 ~ 4294967295	mNm
6077h	00h	Torque actual value	I16	ro	-32768 ~ 32767	0.1%
607Fh	00h	Max profile velocity	U32	rw	0 ~ 4294967295	inc/s
6083h	00h	Profile acceleration	U32	rw	0 ~ 4294967295	inc/s ²
6084h	00h	Profile deceleration	U32	rw	0 ~ 4294967295	inc/s ²
6085h	00h	Quick stop deceleration	U32	rw	0 ~ 4294967295	inc/s ²

Index	Sub-Index	Name	Data type	Access	Valid value	Unit
60C5h	00h	Max acceleration	U32	rw	0 ~ 4294967295	inc/s ²
60C6h	00h	Max deceleration	U32	rw	0 ~ 4294967295	inc/s ²
60FFh	00h	Target velocity	I32	rw	-2147483648 ~ 2147483647	inc/s

■ Controlword (6040h) of PV mode

Table 3.4.2

Bit	Value	Definition
8 (halt)	0	Execute or continue the motion.
	1	Axis is stopped according to 605Dh (halt option code).

■ Statusword (6041h) of PV mode

Table 3.4.3

Bit	Value	Definition
10 (target reached)	0	Halt (Bit 8 in Controlword) = 0: target velocity not reached Halt = 1: axis decelerates
	1	Halt = 0: target velocity reached Halt = 1: velocity of axis is 0
12 (speed)	0	Speed is not equal to 0.
	1	Speed is equal to 0.

3.5 Profile torque mode (TQ)

The torque is output up to the target torque according to the torque slope setting. Torque command is generated from 6071h (target torque) and 6087h (torque slope), as Figure 3.5.1 shows.

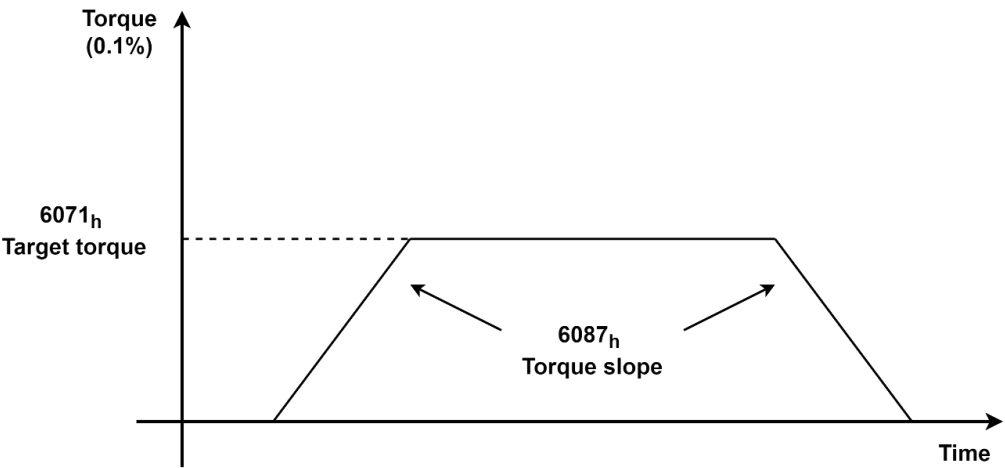


Figure 3.5.1

Figure 3.5.2 shows the input and output objects of the structure of TQ mode.

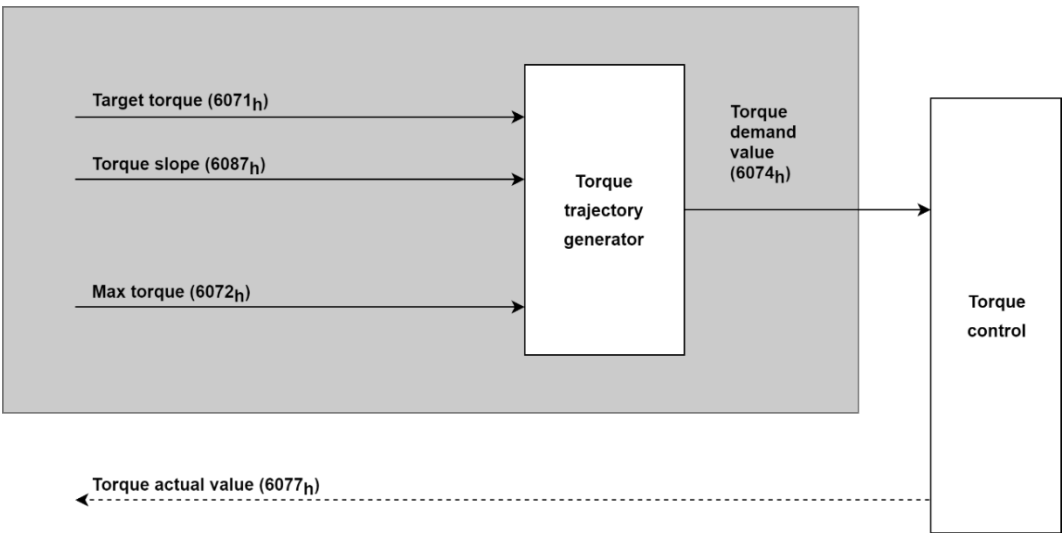


Figure 3.5.2

The related objects of TQ mode are listed in Table 3.5.1.

Table 3.5.1

Index	Sub-Index	Name	Data type	Access	Valid value	Unit
6040h	00h	Controlword	U16	rw	0x0 ~ 0xFFFF	-
6041h	00h	Statusword	U16	ro	0x0 ~ 0xFFFF	-
6063h	00h	Position actual internal value	I32	ro	-2147483648 ~ 2147483647	count
6064h	00h	Position actual value	I32	ro	-2147483648 ~ 2147483647	inc
606Ch	00h	Velocity actual value	I32	ro	-2147483648 ~ 2147483647	inc/s
6071h	00h	Target torque	I16	rw	-32768 ~ 32767	0.1%
6072h	00h	Max torque	U16	rw	0 ~ 65535	0.1%
6074h	00h	Torque demand	I16	ro	-32768 ~ 32767	0.1%
6075h	00h	Motor rated current	U32	ro	0 ~ 4294967295	mA
6076h	00h	Motor rated torque	U32	ro	0 ~ 4294967295	mNm
6077h	00h	Torque actual value	I16	ro	-32768 ~ 32767	0.1%
6087h	00h	Torque slope	U32	rw	0 ~ 4294967295	0.1%/s
60B2h	00h	Torque offset	I16	rw	-32768 ~ 32767	0.1%
60E0h	00h	Positive torque limit value	U16	rw	0 ~ 65535	0.1%
60E1h	00h	Negative torque limit value	U16	rw	0 ~ 65535	0.1%

■ Controlword (6040h) of TQ mode

Table 3.5.2

Bit	Value	Definition
8 (halt)	0	Execute or continue the motion.
	1	Axis is stopped according to 605Dh (halt option code).

■ Statusword (6041h) of TQ mode

Table 3.5.3

Bit	Value	Definition
10 (target reached)	0	Halt (Bit 8 in Controlword) = 0: target torque not reached Halt = 1: axis decelerates
	1	Halt = 0: target torque reached Halt = 1: velocity of axis is 0

3.6 Touch probe function

Touch probe function is used to latch the position of a designated input signal. The input signal can be an encoder index signal (Z-phase signal) or an external probe signal (EXT-PROBE1 signal).

Some functions may not be supported by E2 EtherNet/IP servo drive. See the description of object 60B8h for the settings of available functions.

The related objects of touch probe function are listed in Table 3.6.1.

Table 3.6.1

Index	Sub-Index	Name	Data type	Access	Valid value	Unit
60B8h	00h	Touch probe function	U16	rw	0 ~ 65535	-
60B9h	00h	Touch probe status	U16	ro	0 ~ 65535	-
60BAh	00h	Touch probe 1 positive edge	I32	ro	-2147483648 ~ 2147483647	inc
60BBh	00h	Touch probe 1 negative edge	I32	ro	-2147483648 ~ 2147483647	inc
60BCh	00h	Touch probe 2 positive edge	I32	ro	-2147483648 ~ 2147483647	inc
60BDh	00h	Touch probe 2 negative edge	I32	ro	-2147483648 ~ 2147483647	inc

■ Object 60B8h: Touch probe function

Table 3.6.2

Bit	Value	Definition
0	0	Switch off touch probe 1.
	1	Enable touch probe 1.
1	0	Trigger first event. (Single latch)
	1	Continuous latch.
2, 3	00	Trigger with touch probe 1 input. (by external probe signal)
	01	Trigger with zero impulse signal. (by encoder index signal)
	10	(Not support)
	11	Reserved
4	0	Switch off sampling at positive edge of touch probe 1.
	1	Enable sampling at positive edge of touch probe 1.
5	0	Switch off sampling at negative edge of touch probe 1.
	1	Enable sampling at negative edge of touch probe 1.
6, 7	-	Reserved
8	0	Switch off touch probe 2.
	1	Enable touch probe 2.
9	0	Trigger first event. (Single latch)
	1	Continuous latch.
10, 11	00	(Not support)
	01	Trigger with zero impulse signal. (by encoder index signal)
	10	(Not support)
	11	Reserved

Bit	Value	Definition
12	0	Switch off sampling at positive edge of touch probe 2.
	1	Enable sampling at positive edge of touch probe 2.
13	0	Switch off sampling at negative edge of touch probe 2.
	1	Enable sampling at negative edge of touch probe 2.
14, 15	-	Reserved

Note:

1. E2 EtherNet/IP servo drive does not support enabling touch probe 1 and touch probe 2 at the same time. In this case, only touch probe 1 will be executed.
2. Do not enable sampling at positive edge and negative edge (bit 4 and bit 5, bit 12 and bit 13) at the same time. Otherwise, only positive edge sampling will be executed.

■ Object 60B9h: Touch probe status

Table 3.6.3

Bit	Value	Definition
0	0	Touch probe 1 is switched off.
	1	Touch probe 1 is enabled.
1	0	Touch probe 1 no positive edge value stored.
	1	Touch probe 1 positive edge value stored.
2	0	Touch probe 1 no negative edge value stored.
	1	Touch probe 1 negative edge value stored.
3~7	-	Reserved
8	0	Touch probe 2 is switched off.
	1	Touch probe 2 is enabled.
9	0	Touch probe 2 no positive edge value stored.
	1	Touch probe 2 positive edge value stored.
10	0	Touch probe 2 no negative edge value stored.
	1	Touch probe 2 negative edge value stored.
11~15	-	Reserved

Note:

When touch probe 1 is switched off (bit 0 of object 60B8h is 0), bit 1 and bit 2 are set to 0.

When touch probe 2 is switched off (bit 8 of object 60B8h is 0), bit 9 and bit 10 are set to 0.

■ Example of touch probe 1 triggering first event

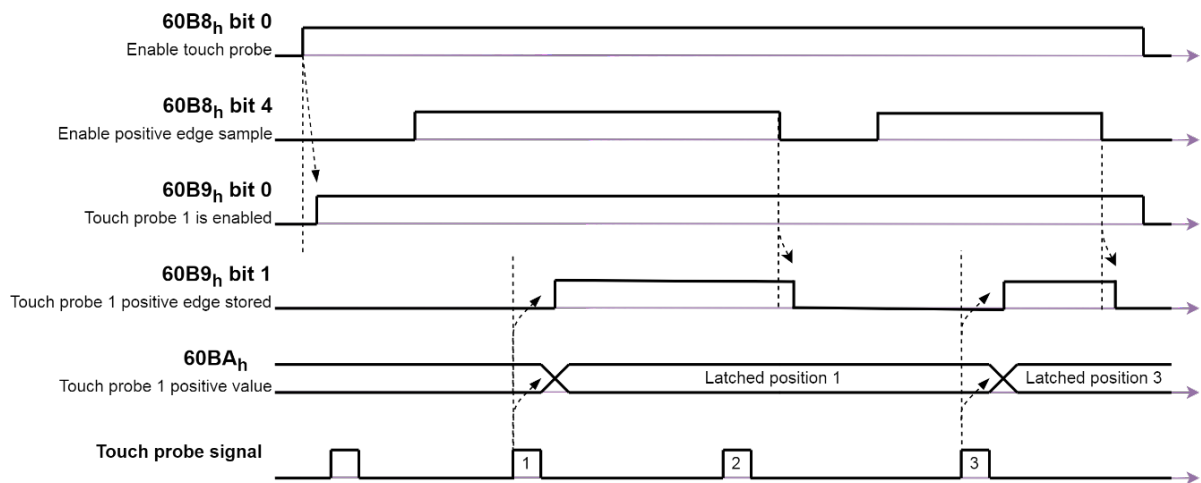


Figure 3.6.1

Table 3.6.4

#	Value	Description
(1)	60B8h bit 0 = 1 60B8h bit 1 = 0 60B8h bit 4 = 1	Touch probe 1 is enabled. First event is triggered. Touch probe 1 positive edge is configured and enabled.
(2)	→ 60B9h bit 0 = 1	Status "Touch probe 1 is enabled" is set to 1.
(3)		There is a positive edge in external touch probe signal.
(4)	→ 60B9h bit 1 = 1 → 60BAh	Status "Touch probe 1 positive edge stored" is set to 1. Touch probe position 1 positive value is stored.
(5)	60B8h bit 4 = 0	Positive edge sampling is switched off.
(6)	→ 60B9h bit 1 = 0 → 60BAh	Status "Touch probe 1 positive edge stored" is reset to 0. Touch probe position 1 positive value is not changed.
(7)	60B8h bit 4 = 1	Positive edge sampling is enabled.
(8)		There is another positive edge in external touch probe signal.
(9)	→ 60B9h bit 1 = 1 → 60BAh	Status "Touch probe 1 positive edge stored" is set to 1. New touch probe position 1 positive value is stored.
(10)	→ 60B8h bit 0 = 0	Touch probe 1 is switched off.
(11)	→ 60B9h bit 0 and bit 1 = 0	Status bits are reset.

■ Example of touch probe 1 continuous latch

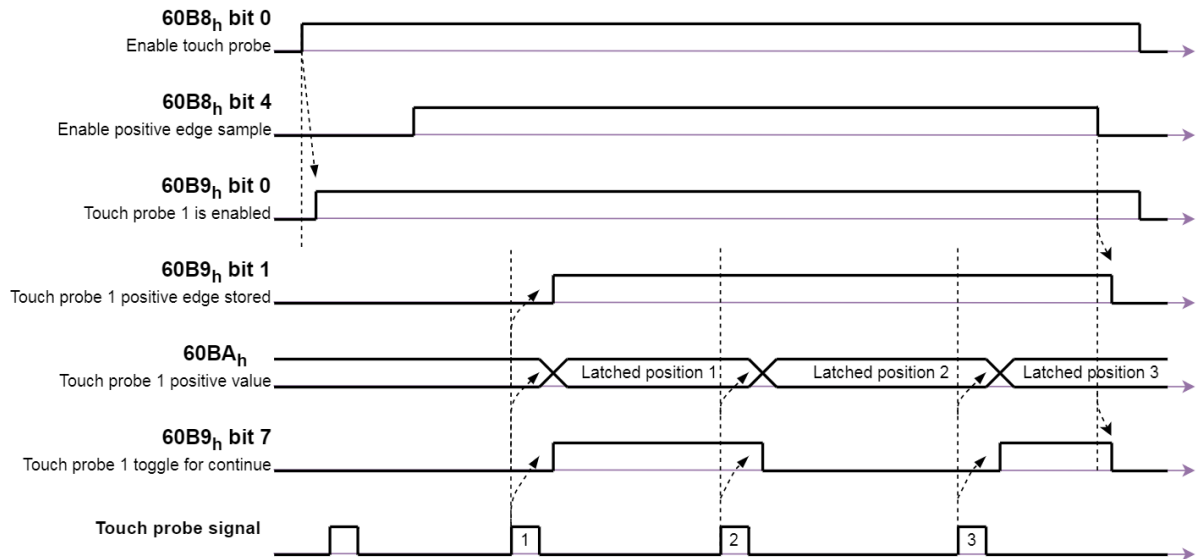


Figure 3.6.2

Table 3.6.5

#	Value	Description
(1)	60B8h bit 0 = 1 60B8h bit 1 = 1 60B8h bit 4 = 1	Touch probe 1 is enabled. Continuous latch. Touch probe 1 positive edge is configured and enabled.
(2)	→ 60B9h bit 0 = 1	Status "Touch probe 1 is enabled" is set to 1.
(3)		There is a positive edge in external touch probe signal.
(4)	→ 60B9h bit 1 = 1 → 60B9h bit 7 = 1 → 60BAh	Status "Touch probe 1 positive edge stored" is set to 1. Touch probe 1 positive edge is updated. Touch probe position 1 positive value is stored.
(5)		There is the 2nd positive edge in external touch probe signal.
(6)	→ 60B9h bit 7 = 0 → 60BAh	Touch probe 1 positive edge is updated. The 2nd touch probe position 1 positive value is stored.
(7)		There is the 3rd positive edge in external touch probe signal.
(8)	→ 60B9h bit 7 = 1 → 60BAh	Touch probe 1 positive edge is updated. The 3rd touch probe position 1 positive value is stored.
(9)	60B8h bit 4 = 0	Positive edge sampling is switched off.
(10)	→ 60B9h bit 1 = 0 → 60B9h bit 7 = 0 → 60BAh	Status "Touch probe 1 positive edge stored" is reset to 0. Continuous latch status is reset to 0. Touch probe position 1 positive value is not changed.
(11)	→ 60B8h bit 0 = 0	Touch probe 1 is switched off.
(12)	→ 60B9h bit 0 = 0	Status bit is reset.

3.7 Object dictionary list

Table 3.7.1

Index	Sub-Index	Name	Data type	Access	Valid value	Unit																																															
2000h 2FFFh	00h	The 2000h series objects are from servo Pt parameters. Please refer to the chapter “List of parameters” in “E2 Series Servo Drive User Manual”.The mapping relationship between servo Pt parameter numbers and object indexes is as follows: Object index = 2000h + servo Pt parameter number Example: Servo drive’s parameter Pt100 is “Velocity loop gain”, and its corresponding object is 2100h.																																																			
3000h	00h	Motor type	U16	ro	0 ~ 2	-																																															
		Motor type used with the drive 0: Linear motor (LM) 1: Direct drive motor / Torque motor (DM / TM) 2: AC servo motor (AC)																																																			
3001h	00h	Inner encoder resolution	I32	ro	-2147483648 ~ 2147483647	-																																															
		Encoder resolution for internal loop																																																			
3056h	00h	Software state[12]	U16	ro	0 ~ 0xFFFF	-																																															
		Software state table. The state corresponding to each bit is described as follows.																																																			
		<table><tr><th>Bit</th><th>State Name</th><th>State Definition</th></tr><tr><td>0</td><td>Reserved</td><td>N/A</td></tr><tr><td>1</td><td>Reserved</td><td>N/A</td></tr><tr><td>2</td><td>Reserved</td><td>N/A</td></tr><tr><td>3</td><td>Homing state</td><td>0: Homing not executed 1: Homing in process</td></tr><tr><td>4</td><td>Position trigger function state</td><td>0: Position trigger function not enabled 1: Position trigger function enabled</td></tr><tr><td>5</td><td>Communication state of gantry control system</td><td>0: No communication for gantry control system 1: Normal communication for gantry control system</td></tr><tr><td>6</td><td>Motor power state of gantry yaw axis</td><td>0: Motor without power supply for gantry yaw axis 1: Motor with power supply for gantry yaw axis</td></tr><tr><td>7</td><td>Alarm state of gantry yaw axis</td><td>0: No alarm in gantry yaw axis 1: An alarm occurs in in gantry yaw axis</td></tr><tr><td>8</td><td>Activated state of gantry control system</td><td>0: Gantry control system not activated 1: Gantry control system activated</td></tr><tr><td>9</td><td>Homing state of gantry yaw axis</td><td>0: Gantry yaw axis homing not completed 1: Gantry yaw axis homing completed</td></tr><tr><td>10</td><td>Near home sensor state of gantry yaw axis</td><td>0: Gantry yaw axis not in the range of near home sensor 1: Gantry yaw axis in the range of near home sensor</td></tr><tr><td>11</td><td>Regulation state of gantry yaw axis</td><td>0: Gantry yaw axis regulation not completed 1: Gantry yaw axis regulation completed</td></tr><tr><td>12</td><td>In-position state of gantry yaw axis</td><td>0: Gantry yaw axis not in-position 1: Gantry yaw axis in-position</td></tr><tr><td>13</td><td>Ready state of gantry yaw axis</td><td>0: Drive not ready for gantry yaw axis 1: Drive ready and STO not triggered for gantry yaw axis</td></tr><tr><td>14</td><td>Reserved</td><td>N/A</td></tr><tr><td>15</td><td>Reserved</td><td>N/A</td></tr></table>	Bit	State Name	State Definition	0	Reserved	N/A	1	Reserved	N/A	2	Reserved	N/A	3	Homing state	0: Homing not executed 1: Homing in process	4	Position trigger function state	0: Position trigger function not enabled 1: Position trigger function enabled	5	Communication state of gantry control system	0: No communication for gantry control system 1: Normal communication for gantry control system	6	Motor power state of gantry yaw axis	0: Motor without power supply for gantry yaw axis 1: Motor with power supply for gantry yaw axis	7	Alarm state of gantry yaw axis	0: No alarm in gantry yaw axis 1: An alarm occurs in in gantry yaw axis	8	Activated state of gantry control system	0: Gantry control system not activated 1: Gantry control system activated	9	Homing state of gantry yaw axis	0: Gantry yaw axis homing not completed 1: Gantry yaw axis homing completed	10	Near home sensor state of gantry yaw axis	0: Gantry yaw axis not in the range of near home sensor 1: Gantry yaw axis in the range of near home sensor	11	Regulation state of gantry yaw axis	0: Gantry yaw axis regulation not completed 1: Gantry yaw axis regulation completed	12	In-position state of gantry yaw axis	0: Gantry yaw axis not in-position 1: Gantry yaw axis in-position	13	Ready state of gantry yaw axis	0: Drive not ready for gantry yaw axis 1: Drive ready and STO not triggered for gantry yaw axis	14	Reserved	N/A	15	Reserved	N/A
		Bit	State Name	State Definition																																																	
		0	Reserved	N/A																																																	
		1	Reserved	N/A																																																	
		2	Reserved	N/A																																																	
		3	Homing state	0: Homing not executed 1: Homing in process																																																	
		4	Position trigger function state	0: Position trigger function not enabled 1: Position trigger function enabled																																																	
		5	Communication state of gantry control system	0: No communication for gantry control system 1: Normal communication for gantry control system																																																	
		6	Motor power state of gantry yaw axis	0: Motor without power supply for gantry yaw axis 1: Motor with power supply for gantry yaw axis																																																	
		7	Alarm state of gantry yaw axis	0: No alarm in gantry yaw axis 1: An alarm occurs in in gantry yaw axis																																																	
		8	Activated state of gantry control system	0: Gantry control system not activated 1: Gantry control system activated																																																	
		9	Homing state of gantry yaw axis	0: Gantry yaw axis homing not completed 1: Gantry yaw axis homing completed																																																	
		10	Near home sensor state of gantry yaw axis	0: Gantry yaw axis not in the range of near home sensor 1: Gantry yaw axis in the range of near home sensor																																																	
		11	Regulation state of gantry yaw axis	0: Gantry yaw axis regulation not completed 1: Gantry yaw axis regulation completed																																																	
		12	In-position state of gantry yaw axis	0: Gantry yaw axis not in-position 1: Gantry yaw axis in-position																																																	
13	Ready state of gantry yaw axis	0: Drive not ready for gantry yaw axis 1: Drive ready and STO not triggered for gantry yaw axis																																																			
14	Reserved	N/A																																																			
15	Reserved	N/A																																																			
3057h	00h	Application mode of gantry system	U16	rw	1, 2, 11	-																																															
		Application mode setting of gantry control system. The applicable modes are as follows. Please refer to “E Series Servo Drive Gantry Control System User Manual” for detailed settings. 1: Ativate gantry control system 2: Deactivate gantry control system 11: Execute yaw axis regulation																																																			
3058h	00h	Yaw target position	I32	rw	-2147483648 ~ 2147483647	inc																																															
		Target position for gantry yaw axis																																																			
3059h	00h	Yaw feedback position	I32	ro	-2147483648 ~ 2147483647	inc																																															
		Feedback position for gantry yaw axis																																																			
3060h	00h	Use touch probe enable specific function	U16	rw	0x0 ~ 0x3	-																																															
		Enable specific function with Touch probe homing.																																																			

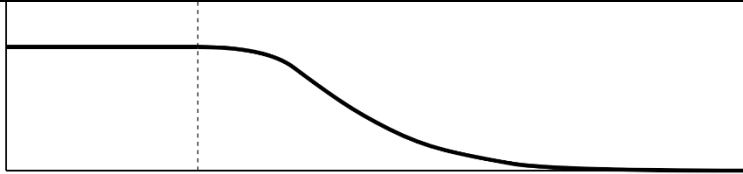
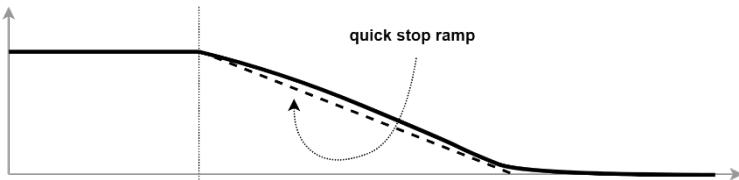
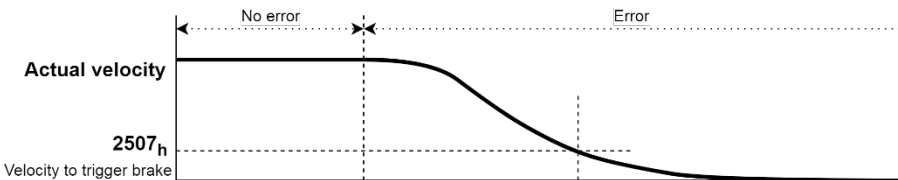
Index	Sub-Index	Name	Data type	Access	Valid value	Unit																	
		<table><tr><th>Bit</th><th>Function</th><th>Definition</th></tr><tr><td>0</td><td>Error map</td><td>0: Do not use Touch probe homing to enable error map. 1: Use Touch probe homing to enable error map.</td></tr><tr><td>1</td><td>Position trigger function</td><td>(Before using this function, set Pt00E = t.1□□□.) 0: Do not use Touch probe homing to enable position trigger function. 1: Use Touch probe homing to enable position trigger function.</td></tr><tr><td>2~15</td><td>Reserved</td><td>N/A</td></tr></table> <p>For the details of error map and position trigger function, please refer to "E2 Series Servo Drive User Manual".</p>					Bit	Function	Definition	0	Error map	0: Do not use Touch probe homing to enable error map. 1: Use Touch probe homing to enable error map.	1	Position trigger function	(Before using this function, set Pt00E = t.1□□□.) 0: Do not use Touch probe homing to enable position trigger function. 1: Use Touch probe homing to enable position trigger function.	2~15	Reserved	N/A					
Bit	Function	Definition																					
0	Error map	0: Do not use Touch probe homing to enable error map. 1: Use Touch probe homing to enable error map.																					
1	Position trigger function	(Before using this function, set Pt00E = t.1□□□.) 0: Do not use Touch probe homing to enable position trigger function. 1: Use Touch probe homing to enable position trigger function.																					
2~15	Reserved	N/A																					
3061h	00h	Enable position trigger function	U16	rw	0 ~ 1	-																	
		Enable position trigger function. For the details of position trigger function, please refer to "E2 Series Servo Drive User Manual". 0: Disable position trigger function 1: Enable position trigger function																					
3062h	00h	Overtravel stop mode selection	U16	rw	0 ~ 1	-																	
		Parameter setup of overtravel stop 0: When overtravel happens, the motor stops accoring to the current setting of object 6085h (quick stop deceleration), and the original quick stop deceleration of the motion will not be affected. 1: When overtravel happens, the motor stops accoring to the current setting of object 6085h (quick stop deceleration), and the original quick stop deceleration of the motion will be modified.																					
3063h	00h	Velocity analog input voltage	I16	ro	-10000 ~ 10000	mV																	
		Control signal's velocity analog input (V_REF) Formula: Object 3063h = Actual voltage - Object 3064h																					
3064h	00h	Velocity analog input voltage offset	I16	rw	-10000 ~ 10000	mV																	
		Velocity analog input's offset																					
3065h	00h	Torque analog input voltage	I16	ro	-10000 ~ 10000	mV																	
		Control signal's torque analog input (T_REF) Formula: Object 3065h = Actual voltage - Object 3066h																					
3066h	00h	Torque analog input voltage offset	I16	rw	-10000 ~ 10000	mV																	
		Torque analog input's offset																					
3067h	00h	Analog output 1 voltage	I16	rw	-10000 ~ 10000	mV																	
		Control signal's analog output 1 (AO1) When Pt006 = t.□□17 is set, users can control analog output 1 with this object.																					
3068h	00h	Analog output 2 voltage	I16	rw	-10000 ~ 10000	mV																	
		Control signal's analog output 2 (AO2) When Pt006 = t.□□17 is set, users can control analog output 2 with this object.																					
3069h	00h	Position trigger array value	I32	rw	-2147483648 ~ 2147483647	inc																	
		Position trigger array's value																					
306Ah	00h	Position trigger array index	U16	rw	0 ~ 255	-																	
		Position trigger array's index value																					
306Bh	00h	Position trigger array control object	U16	rw	0 ~ 65535	-																	
		Writing procedure of operating position trigger array Set 0x0001~0x0080 to select the writing procedure. The writing result will be displayed by 0x1000~0x2000.																					
		<table><tr><th>Value</th><th>Definition</th><th>Category</th></tr><tr><td>0x0001</td><td>Write the value of object 3069h to the "position array" corresponding to object 306Ah. (At this time, object 306Ah cannot exceed 255.)</td><td rowspan="4">Command</td></tr><tr><td>0x0008</td><td>Set all the values in the "position array" to 0.</td></tr><tr><td>0x0010</td><td>Write the value of object 3069h to the "status array" corresponding to object 306Ah. (At this time, object 306Ah cannot exceed 7.)</td></tr><tr><td>0x0080</td><td>Set all the values in the "status array" to 0.</td></tr><tr><td>0x1000</td><td>The writing succeeds.</td><td rowspan="2">Result</td></tr><tr><td>0x2000</td><td>The writing fails. Refer to object 306Ch for the reason.</td></tr></table>					Value	Definition	Category	0x0001	Write the value of object 3069h to the "position array" corresponding to object 306Ah. (At this time, object 306Ah cannot exceed 255.)	Command	0x0008	Set all the values in the "position array" to 0.	0x0010	Write the value of object 3069h to the "status array" corresponding to object 306Ah. (At this time, object 306Ah cannot exceed 7.)	0x0080	Set all the values in the "status array" to 0.	0x1000	The writing succeeds.	Result	0x2000	The writing fails. Refer to object 306Ch for the reason.
Value	Definition	Category																					
0x0001	Write the value of object 3069h to the "position array" corresponding to object 306Ah. (At this time, object 306Ah cannot exceed 255.)	Command																					
0x0008	Set all the values in the "position array" to 0.																						
0x0010	Write the value of object 3069h to the "status array" corresponding to object 306Ah. (At this time, object 306Ah cannot exceed 7.)																						
0x0080	Set all the values in the "status array" to 0.																						
0x1000	The writing succeeds.	Result																					
0x2000	The writing fails. Refer to object 306Ch for the reason.																						
306Ch	00h	Position trigger function error code	U16	ro	0 ~ 65535	-																	
		The error reason returned when the writing of position trigger array fails																					

Index	Sub-Index	Name	Data type	Access	Valid value	Unit	
		Bit	Definition				
		0	Fixed interval PT mode does not support the writing of position trigger array.				
		1	Wrong index value of array (object 306Ah)				
		2	Undefined command (object 306Bh)				
		3~15	Reserved				
3110h	00h	Drive warning events 1		U16	ro	0 ~ 0xFFFF	-
		Warning state table 1. The warning corresponding to each bit is described as follows. It is recommended to replace this object with the object 4096h (warning code).					
		Bit	Waning No.	Warning Name			
		0	AL.900	Position deviation overflow			
		1	-	Reserved			
		2	AL.910	Overload			
		3	-	Reserved			
		4	-	Reserved			
		5	-	Reserved			
		6	-	Reserved			
		7	AL.923	Internal fan stop			
		8	AL.930	Encoder battery malfunction			
		9	AL.941	Change of parameters and functions with save and restart requirement			
		10	AL.971	Undervoltage			
		11	AL.9A0	Overtravel detected when servo ON (P-OT or N-OT signal is received.)			
		12	AL.9A1	P-OT signal is received.			
		13	AL.9A2	N-OT signal is received.			
		14	-	Reserved			
		15	-	Reserved			
		When the value of the bit is 1, the warning occurs.					
3111h	00h	Drive warning events 2		U16	ro	0 ~ 0xFFFF	-
		Warning state table 2. The warning corresponding to each bit is described as follows. It is recommended to replace this object with the object 4096h (warning code).					
		Bit	Waning No.	Warning Name			
		0	AL.9F0	Servo voltage too big			
		1	AL.943	Fieldbus synchronous cycle time warning			
		2	AL.944	System warning			
		3	AL.945	Torque limit warning			
		4	AL.946	Encoder communication warning			
		5	AL.947	Multi-motion malfunction warning			
		6	AL.924	I ² T			
		When the value of the bit is 1, the warning occurs.					
3200h	00h	Absolute encoder initialization		I32	rw	0 ~ 1	-
		Initialize absolute encoder. When it is set to 1, the multi-turn data of motor will be cleared. Keep servo off during the execution. The object will set the value according to the execution state:					
		Value	Definition				
		0	Not in operation.				
		1	Send the command of clearing multi-turn data.				
		2	The command of clearing multi-turn data is being executed.				
		4	The command of clearing multi-turn data is successfully executed.				
		16	Do not clear multi-turn data when the motor is enabled. Please disable the motor before issuing the command again.				
		32	Fail to execute the command of clearing multi-turn data.				
		3201h 3209h	00h	General object i1 ~ i9		I32	rw
Self-defined object with data type of DINT							

Index	Sub-Index	Name	Data type	Access	Valid value	Unit
3210h 3214h	00h	General object f0 ~ f4	F32	rw	-3.40282e+38 ~ 3.40282e+38	-
		Self-defined object with data type of REAL				
3215h	00h	Reset drive	I16	rw	0 ~ 1	-
		Reset the drive. When it is set to 1, the drive will be reset. After it is done, the object will be automatically set to 0.				
3216h	00h	Send parameter to flash	-	rw	0 ~ 1	-
		Save parameters to drive. When it is set to 1, the current drive parameters will be saved. After it is done, the object will be automatically set to 0.				
4000h 4FFFh	00h	<p>The 4000h series objects are from servo Ut parameters. Users can read more information of servo drive from this series of objects. Please refer to the chapter "List of panel monitoring parameters" in "E2 Series Servo Drive User Manual". The mapping relationship between servo Ut parameter numbers and object indexes is as follows: Object index = 4000h + servo Ut parameter number Example: Servo drive's panel monitoring parameter Ut095 is "Alarm code", and its corresponding object is 4095h.</p>				
603Fh	00h	Error code	U16	ro	0x0 ~ 0xFFFF	-
		<p>Display the last error that occurs. The value of the error code is FF**h, where ** is the error code from E2 series servo drive. Take FF10h as an example. 10h = 16d → Error 16 occurs.</p>				
		0x603F Error Code mapping table				
		0x603F Error Code (hex)	Alarm No.	Alarm Name		
		FF04	AL.024	System alarm 1		
		FF05	AL.025	System alarm 2		
		FF06	AL.030	Main circuit detector error		
		FF07	AL.040	Parameter setting error		
		FF0B	AL.050	Combination error		
		FF0C	AL.070	Motor type change detected		
		FF0E	AL.0b0	Invalid Servo ON command alarm		
		FF0F	AL.100	Over current detected		
		FF10	AL.320	Regenerative overload		
		FF11	AL.400	Over voltage		
		FF12	AL.410	Under voltage		
		FF13	AL.510	Over speed		
		FF14	AL.511	Encoder output pulse overspeed		
		FF18	AL.710	Instantaneous overload		
		FF19	AL.720	Continuous overload		
		FF1D	AL.7A1	Drive overload		
		FF1E	AL.7A2	Internal overheat error 2 (power board)		
		FF21	AL.800	Data backup error		
		FF22	AL.810	Battery error		
		FF23	AL.820	Encoder com. error		
		FF24	AL.830	Encoder data error		
		FF25	AL.840	Encoder crc error		
		FF26	AL.850	Encoder counting error		
		FF27	AL.860	Write data fail error		
		FF28	AL.870	Encoder over heat error		
		FF29	AL.880	Encoder sensor phase error (AqB)		
		FF2A	AL.890	ESC ALM - Incremental encoder cable not connected		
		FF2B	AL.8A0	ESC ALM - CH1 ESC side error		
		FF2C	AL.8b0	ESC ALM - CH1 Encoder side error		
		FF2D	AL.8C0	ESC ALM - CH2 ESC side error		
		FF2E	AL.8d0	ESC ALM - CH2 Encoder side error		
		FF2F	AL.8E0	Digital encoder cable not connected		
		FF30	AL.8F0	ESC ALM - Internal fault		
		FF31	AL.861	Motor overheated		
		FF32	AL.b10	Speed reference A/D error		
		FF34	AL.b20	Torque reference A/D error		
		FF35	AL.b33	Current detection error		
		FF36	AL.C10	Servomotor out of control		
		FF37	AL.C20	Phase detection error		
		FF38	AL.C21	Polarity sensor error (Hall sensor)		
		FF3A	AL.C50	Polarity detection failure		
		FF3B	AL.C51	Overtravel detected during polarity detection		
		FF3C	AL.C52	Polarity detection not completed		
		FF3E	AL.d00	Position error too big		
		FF41	AL.d10	Hybrid deviation error (motor to load)		
		FF42	AL.Eb0	Safety function alarm		

Index	Sub-Index	Name		Data type	Access	Valid value		Unit	
		FF43	AL.Eb1	Safety function signal input timing error					
		FF44	AL.Eb2	Safety function self-check error					
		FF45	AL.F10	Power supply line open phase					
		FF46	AL.F50	Servomotor main circuit cable disconnection (motor maybe disconnected)					
		FF47	AL.FA0	Power supply for encoder error (5V card fail)					
		FF48	AL.FB0	FieldBus Hardware Fault					
		FF49	AL.FB1	FieldBus Communication Fault					
		FF4A	AL.FC0	Group Communication Fault					
		FF4B	AL.FC1	Gantry system slave alarm					
		FF4C	AL.891	Incremental encoder signal error					
		FF4D	AL.FB2	Fieldbus communication setup error					
		FF4F	AL.Fd0	Electronic cam control system alarm					
		FF50	AL.EF9	Multi-motion alarm					
6040h	00h	Controlword			U16	rw	0x0 ~ 0xFFFF		-
		The object controls the transition of the drive's FSA and the commands of a specific operation mode. The details of the bits are described as follows.							
		7	6	5	4	3	2	1	0
		Fault reset	Operation mode specific			Enable operation	Quick stop	Enable voltage	Switch on
		15	14	13	12	11	10	9	8
		Reserved						Operation mode specific	halt
		Bit 8 (halt): If it is set to 1, the motor decelerates and stops according to object 605Dh (halt option code). Setting the bit to 0 will resume the halt operation. It is only applicable in PP, PV, TQ and HM mode.							
		Bit 7, 3~0: FSA transition requests. The codes of the commands are described in section 3.1.							
		Bit 9, 6~4 (operation mode specific): The availability of each bit in each mode is listed as follows.							
		Op mode	Bit 9		Bit 6		Bit 5		Bit 4
PP	change on set-point		absolute / relative		change set immediately		new set-point		
PV	-		-		-		-		
TQ	-		-		-		-		
HM	-		-		-		homing operation start		
6041h	00h	Statusword			U16	ro	0 ~ FFFFh		-
		The object provides the state of FSA and the information of a specific operation mode. The details of the bits are described as follows.							
		7	6	5	4	3	2	1	0
		Warning	Switch on disabled	Quick stop	Voltage enabled	Fault	Operation enabled	Switched on	Ready to Switch on
		15	14	13	12	11	10	9	8
		Reserved		Operation mode specific		Internal limit active	Target reached	Remote	Reserved
		Bit 6, 5, 3~0: FSA states. The codes of the states are described in section 3.1.							
		Bit 4 (voltage enabled): If the main power normal input is normal, the bit should be 1.							
		Bit 5 (quick stop): If FSA is reacting on a quick stop request, the bit is set to 0.							
		Bit 7 (warning): If the bit is 1, it indicates a warning occurs. FSA does not change and the operation of the motor continues during warning (no error occurs).							
Bit 9 (remote): Controlword is processed if the bit is set to 1. It will be set to 1 after ESM state becomes PreOp (SDO available).									
Bit 10 (target reached):									
Value		Definition							
0		Halt (Bit 8 in Controlword) = 0: target not reached							
		Halt = 1: axis decelerates							
1		Halt = 0: target reached							
		Halt = 1: axis stops (velocity = 0)							

Index	Sub-Index	Name	Data type	Access	Valid value	Unit																				
		Bit 11 (internal limit active): The bit is set to 1 if one of the following conditions occurs.																								
		<table><tr><th>Op mode</th><th>Condition</th></tr><tr><td>PP</td><td>Hardware limit, Torque limit</td></tr><tr><td>PV</td><td>Hardware limit, Torque limit</td></tr><tr><td>TQ</td><td>Hardware limit, Torque limit</td></tr><tr><td>HM</td><td>Torque limit</td></tr></table>	Op mode	Condition	PP	Hardware limit, Torque limit	PV	Hardware limit, Torque limit	TQ	Hardware limit, Torque limit	HM	Torque limit														
Op mode	Condition																									
PP	Hardware limit, Torque limit																									
PV	Hardware limit, Torque limit																									
TQ	Hardware limit, Torque limit																									
HM	Torque limit																									
		Bit 13, 12, 10 (operation mode specific): The availability of each bit in each mode is listed below.																								
		<table><tr><th>Op mode</th><th>Bit 13</th><th>Bit 12</th><th>Bit 10</th></tr><tr><td>PP</td><td>following error</td><td>set-point acknowledge</td><td>target reached</td></tr><tr><td>PV</td><td>max slippage error</td><td>speed</td><td>target reached</td></tr><tr><td>TQ</td><td>-</td><td>-</td><td>target reached</td></tr><tr><td>HM</td><td>homing error</td><td>homing attained</td><td>target reached</td></tr></table>	Op mode	Bit 13	Bit 12	Bit 10	PP	following error	set-point acknowledge	target reached	PV	max slippage error	speed	target reached	TQ	-	-	target reached	HM	homing error	homing attained	target reached				
Op mode	Bit 13	Bit 12	Bit 10																							
PP	following error	set-point acknowledge	target reached																							
PV	max slippage error	speed	target reached																							
TQ	-	-	target reached																							
HM	homing error	homing attained	target reached																							
		Quick stop option code	I16	rw	2	-																				
		The object indicates the action when quick stop function is executed. E2 series servo drive only supports <u>option 2: slow down</u> according to 6085h (quick stop deceleration). FSA (PDS state) changes to Switch on disabled.																								
605Ah	00h																									
		Shutdown option code	I16	rw	0	-																				
		The object indicates the action when FSA transits from Operation enabled to Ready to switch on. E2 series servo drive only supports <u>option 0: Disable drive function</u> . FSA (PDS state) changes to Ready to switch on.																								
605Bh	00h																									
		Disable operation option code	I16	rw	0	-																				
605Ch	00h	The object indicates the action when FSA transits from Operation enabled to Switched on. E2 series servo drive only supports <u>option 0: Disable drive function</u> . FSA (PDS state) changes to Switched on.																								

Index	Sub-Index	Name	Data type	Access	Valid value	Unit																		
		<div>Actual velocity</div> <div>6040_h<div>Enable operation</div><div>Disable operation</div></div> <div>PDS state<div>Operation enabled</div><div>Switched on</div></div>																						
605Dh	00h	<div>Halt option code</div> <div>I16</div> <div>rw</div> <div>1, 2</div> <div>-</div> <div>The object indicates the action when halt function is executed. E2 series servo drive only supports <u>option 2: Slow down on quick stop ramp</u>. FSA (PDS state) stays in Operation enabled. Note: Only PP mode can set the object to 1. The motor will be stopped according to 6084h (profile deceleration).</div> <div>Actual velocity</div> <div>6040_h<div>Enable operation</div><div>Halt</div></div> <div>PDS state<div>Operation enabled</div></div>																						
605Eh	00h	<div>Fault reaction option code</div> <div>I16</div> <div>rw</div> <div>0 ~ 2</div> <div>-</div> <div>The object indicates the action during Fault reaction. The supported values are described as follows. 0: Disable drive function. The motor is free to rotate. 2: Slow down according to 6085h (quick stop deceleration). FSA (PDS state) changes to Fault.</div> <div>Actual velocity</div> <div>2507_h<div>Velocity to trigger brake</div></div> <div>6040_h<div>Enable operation</div><div>Disable operation</div></div> <div>PDS state<div>Operation enabled</div><div>Fault reaction active</div><div>Fault</div></div>																						
6060h	00h	<div>Modes of operation</div> <div>I8</div> <div>rw</div> <div>0 ~ 6</div> <div>-</div> <div>Set the operation mode of the drive. The supported operation modes are listed as follows.</div> <table><thead><tr><th>Value</th><th>Op mode</th><th>abbreviation</th></tr></thead><tbody><tr><td>0</td><td>no mode change / assigned</td><td>-</td></tr><tr><td>1</td><td>profile position</td><td>PP</td></tr><tr><td>3</td><td>profile velocity</td><td>PV</td></tr><tr><td>4</td><td>profile torque</td><td>TQ</td></tr><tr><td>6</td><td>homing</td><td>HM</td></tr></tbody></table> <div>The default value is 0. If the object is set to 0 or an unsupported value, there will be no mode change. Stop the motor before switching the operation mode. If the operation mode is changed during motion, the behavior will not be guaranteed. If dual-loop control is adopted, only PP and HM modes can be used.</div>	Value	Op mode	abbreviation	0	no mode change / assigned	-	1	profile position	PP	3	profile velocity	PV	4	profile torque	TQ	6	homing	HM				
Value	Op mode	abbreviation																						
0	no mode change / assigned	-																						
1	profile position	PP																						
3	profile velocity	PV																						
4	profile torque	TQ																						
6	homing	HM																						
6061h	00h	<div>Modes of operation display</div> <div>I8</div> <div>ro</div> <div>0 ~ 6</div> <div>-</div> <div>The actual operation mode in the drive. The object will change to the commanded mode after internal mode is successfully changed. If the commanded mode is not supported, the object will remain unchanged.</div>																						

Index	Sub-Index	Name	Data type	Access	Valid value	Unit
6062h	00h	Position demand value	I32	ro	-2147483648 ~ 2147483647	inc
		The required position value.				
6063h	00h	Position actual internal value	I32	ro	-2147483648 ~ 2147483647	count
		The actual value of motor position. In dual-loop control, the value is from external scale unit.				
6064h	00h	Position actual value	I32	ro	-2147483648 ~ 2147483647	inc
		The actual value of motor position.				
6065h	00h	Following error window	U32	rw	0 ~ 4294967295	inc
		The threshold of 60F4h (following error actual value). When 60F4h (following error actual value) exceeds 6065h, bit 13 of 6041h (Statusword) will be 1. If the object is set to 0, a following error will always occur.				
6066h	00h	Following error time out	U16	rw	0 ~ 65535	ms
		Refer to description of 6065h (following error window).				
6067h	00h	Position window	U32	rw	0 ~ 4294967295	inc
		If the difference between 6062h (position demand value) and 6064h (position actual value) is within 6067h (position window) for longer than the time set by 6068h (position window time), bit 10 of 6041h (Statusword) will be set to 1. Once the position deviation exceeds 6067h, bit 10 of 6041h (Statusword) will be set to 0.				
6068h	00h	Position window time	U16	rw	0 ~ 65535	ms
		Refer to description of 6067h (position window).				
606Bh	00h	Velocity demand value	I32	ro	-2147483648 ~ 2147483647	inc/s
		Internal command velocity.				
606Ch	00h	Velocity actual value	I32	ro	-2147483648 ~ 2147483647	inc/s
		The actual velocity of the motor.				
606Dh	00h	Velocity window	U16	rw	0 ~ 65535	inc/s
		If the difference between 60FFh (target velocity) + 60B1h (velocity offset) and 606Ch (velocity actual value) is within 606Dh (velocity window) for longer than the time set by 606Eh (velocity window time), bit 10 of 6041h (Statusword) will be set to 1. Once the velocity deviation exceeds 6067h (position window), bit 10 of 6041h (Statusword) will be set to 0.				
606Eh	00h	Velocity window time	U16	rw	0 ~ 65535	ms
		Refer to description of 606Dh (velocity window).				
6071h	00h	Target torque	I16	rw	-32768 ~ 32767	0.1%
		Torque command. The value is limited by 6072h (max torque). Output target torque (force) of the drive = motor torque (force) constant x motor rated current x object 6071h (target torque) / 1000				
6072h	00h	Max torque	U16	rw	0 ~ 65535	0.1%
		The configured maximum torque. The value is limited by the motor's ability.				
6074h	00h	Torque demand	I16	ro	-32768 ~ 32767	0.1%
		Internal torque command.				
6075h	00h	Motor rated current	U32	ro	0 ~ 4294967295	mA
		The rated current of the motor.				
6076h	00h	Motor rated torque	U32	ro	0 ~ 4294967295	mNm
		The rated torque of the motor.				
6077h	00h	Torque actual value	I16	ro	-32768 ~ 32767	0.1%
		The value is given per thousand of rated torque. The value is only for reference.				
607Ah	00h	Target position	I32	rw	-2147483648 ~ 2147483647	inc
		Position command.				
607Ch	00h	Home offset	I32	rw	-2147483648 ~ 2147483647	inc
		After homing procedure is done, the detected index position is set to the value of 607Ch (home offset). Zero position = home position + home offset				

Index	Sub-Index	Name	Data type	Access	Valid value	Unit
						
607Fh	00h	Max profile velocity	U32	rw	0 ~ 4294967295	inc/s
		The configured maximum velocity. The value is limited by the motor's ability.				
6081h	00h	Profile velocity	U32	rw	0 ~ 4294967295	inc/s
		The velocity during profile motion. The value is limited by 607Fh.				
6083h	00h	Profile acceleration	U32	rw	0 ~ 4294967295	inc/s ²
		The configured acceleration of profile motion.				
6084h	00h	Profile deceleration	U32	rw	0 ~ 4294967295	inc/s ²
		The configured deceleration of profile motion.				
6085h	00h	Quick stop deceleration	U32	rw	0 ~ 4294967295	inc/s ²
		The deceleration is used to stop the motor when quick stop function is activated and 605Ah (quick stop option code) is set to 2 or 6. Quick stop deceleration is also used when 605Dh (halt option code) and 605Eh (fault reaction option code) is 2.				
6087h	00h	Torque slope	U32	rw	0 ~ 4294967295	0.1%/s
		The rate of change of torque.				
6098h	00h	Homing method	I8	rw	-128 ~ 127	-
		The homing method used in HM mode. The homing method can not be changed during homing. The supported homing methods are method 1, 2, 7~14, 17, 18, 23~30, 33, 34 and 37. If homing procedure starts with unsupported homing method, bit 13 of 6041h (Statusword) will be set to 1.				
6099h	-	Homing speeds	-	-	-	-
		The velocity during HM mode.				
	00h	Number of entries	U8	ro	2	-
	01h	Speed during search for switch	U32	rw	0 ~ 4294967295	inc/s
		The velocity during searching for switch signal.				
	02h	Speed during search for zero	U32	rw	0 ~ 4294967295	inc/s
609Ah	00h	Homing acceleration	U32	rw	0 ~ 4294967295	inc/s ²
		The acceleration and deceleration in HM mode.				
60B1h	00h	Velocity offset	I32	rw	-2147483648 ~ 2147483647	inc/s
60B2h	00h	Torque offset	I16	rw	-3000 ~ 3000	0.1%
60B8h	00h	Touch probe function	U16	rw	0 ~ 65535	-
		Refer to section 3.6 for the details of command settings.				
60B9h	00h	Touch probe status	U16	ro	0 ~ 65535	-
		Refer to section 3.6 for the bit definition of status feedback.				
60BAh	00h	Touch probe 1 positive edge	I32	ro	-2147483648 ~ 2147483647	inc
		The position value of touch probe 1 at positive edge.				
60BBh	00h	Touch probe 1 negative edge	I32	ro	-2147483648 ~ 2147483647	inc
		The position value of touch probe 1 at negative edge.				
60BCh	00h	Touch probe 2 positive edge	I32	ro	-2147483648 ~ 2147483647	inc
		The position value of touch probe 2 at positive edge.				
60BDh	00h	Touch probe 2 negative edge	I32	ro	-2147483648 ~ 2147483647	inc
		The position value of touch probe 2 at negative edge.				
60C5h	00h	Max acceleration (not implemented)	U32	rw	0 ~ 4294967295	inc/s ²
60C6h	00h	Max deceleration (not implemented)	U32	rw	0 ~ 4294967295	inc/s ²

Index	Sub-Index	Name	Data type	Access	Valid value	Unit																																															
60E0h	00h	Positive torque limit value	U16	rw	0 ~ 65535	0.1%																																															
		The configured maximum positive torque in the motor.																																																			
60E1h	00h	Negative torque limit value	U16	rw	0 ~ 65535	0.1%																																															
		The configured maximum negative torque in the motor.																																																			
60F4h	00h	Following error actual value	I32	ro	-2147483648 ~ 2147483647	inc																																															
		60F4h (following error actual value) = 6062h (position demand value) – 6064h (position actual value)																																																			
60FCh	00h	Position demand internal value	I32	ro	-2147483648 ~ 2147483647	count																																															
		Internal command position.																																																			
60FDh	00h	Digital inputs	U32	ro	0 ~ FFFFFFFFh	-																																															
		The input status of external input signal. The definition of each bit is as follows.																																																			
		<table><tr><td colspan="8">15 ... 3</td><td>2</td><td>1</td><td>0</td></tr><tr><td colspan="8">Reserved</td><td>Home switch</td><td>Positive limit switch</td><td>Negative limit switch</td></tr><tr><td>31 ... 26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td><td>16</td></tr><tr><td>Reserved</td><td>SF2</td><td>SF1</td><td>I8</td><td>I7</td><td>I6</td><td>I5</td><td>I4</td><td>I3</td><td>I2</td><td>I1</td></tr></table>								15 ... 3								2	1	0	Reserved								Home switch	Positive limit switch	Negative limit switch	31 ... 26	25	24	23	22	21	20	19	18	17	16	Reserved	SF2	SF1	I8	I7	I6	I5	I4	I3	I2	I1
		15 ... 3								2	1	0																																									
		Reserved								Home switch	Positive limit switch	Negative limit switch																																									
		31 ... 26	25	24	23	22	21	20	19	18	17	16																																									
		Reserved	SF2	SF1	I8	I7	I6	I5	I4	I3	I2	I1																																									
The value of each bit is defined as follows. 0: switched off 1: switched on																																																					
Note: When SF1 and SF2 are both OFF, STO status is ON.																																																					
60FEh		Digital outputs	-	-	-	-																																															
		They are used to control the external output signal.																																																			
		<table><tr><td>31 ... 21</td><td>20</td><td>19</td><td>18</td><td>17</td><td>16</td><td>15 ... 0</td></tr><tr><td>Reserved</td><td>O5</td><td>O4</td><td>O3</td><td>O2</td><td>O1</td><td>Reserved</td></tr></table>								31 ... 21	20	19	18	17	16	15 ... 0	Reserved	O5	O4	O3	O2	O1	Reserved																														
		31 ... 21	20	19	18	17	16	15 ... 0																																													
	Reserved	O5	O4	O3	O2	O1	Reserved																																														
	- This object controls the status of the general-purpose output signals from CN6 on E2 series servo drive. Subindex 1 is used to control the status of the output signals. Subindex 2 determines which output signals in subindex 1 are enabled. If drive status outputs are assigned to O1~O5 signals in object 3514h, 3515h and 3516h, the status of this object will be output in the logic of ORs. If any of these signals is assigned to functions that are enabled with object 3514h, 3515h, or 3516h, use Bit Masks in subindex 2 to disable the corresponding signal. By doing so, the signal will not be duplicated.																																																				
	Brake can only be controlled by this object when servo is not on.																																																				
	00h	Number of entries	U8	ro	2	-																																															
	01h	Physical outputs	U32	rw	0 ~ FFFFFFFFh	-																																															
		Control the output of the external signal. The value of each bit is defined as follows. 0: switched off 1: switched on																																																			
02h	Bit mask	U32	rw	0 ~ FFFFFFFFh	-																																																
	The output signal mask. The value of each bit is defined as follows. 0: disable output 1: enable output																																																				
60FFh	00h	Target velocity	I32	rw	-2147483648 ~ 2147483647	inc/s																																															
		Velocity command. The value is limited by 607Fh (max profile velocity).																																																			