

Q-series Stepper Driver Module HCQX-ST1505-D2

ST1505

ManualNo.	HPPP137000EN
Version	1.1
Date	November,2021

Thank you for purchasing and using the Q series remote extension modules HCQX-ST1505-D2 independently developed and produced by HCFA Corporation.

Applicable readers

For the users of HCFA Q series extension modules, refer to this manual to perform the wiring, installation, diagnosis and maintenance and requires the users to have the certain knowledge of electrical and automation.

This manual gives the necessary information for the use of HCFA Q series extension modules, please read this manual carefully before use and make the correct operation with full attention to safety.

1. Safety Precautions

1.1 Safety symbols

When using this product, please follow the following safety precautions and instructions strictly. Users can check more specific safety guidelines in sections such as mounting, wiring, communication, etc. In this manual, the following safety guidelines must be followed.

⚠ DANGER

- Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury or significant property damage

⚠ WARNING

- Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

⚠ CAUTION

- Indicates that incorrect handling may cause slight injury or property damage.

⚠ NOTE

- Indicates that incorrect handling may cause damage to the environment / equipment or data loss.

Note: Key points or explanations to help with better operation and understanding of product.

1.2 Safety precautions

STARTUP AND MAINTENANCE PRECAUTIONS

⚠ DANGER

- Do not touch any terminal while the PLC's power is on. Doing so may cause electric shock or malfunctions.
- Before cleaning or retightening terminals externally cut off all phases of the power supply. Failure to do so may cause electric shock.
- Before modifying or disrupting the program in operation or Forced output, RUN, STOP etc., carefully read through this manual and the associated manuals and ensure the safety of the operation. An operation error may damage the machinery or cause accidents. An operation error may damage the machinery or cause accidents

STARTUP AND MAINTENANCE PRECAUTIONS

⚠ CAUTION

- Do not disassemble or modify the PLC. Doing so may cause fire, equipment failures, or malfunctions. For module repair, contact our HCFA distributor.
- Turn off the power to the PLC before connecting or disconnecting any extension cable. Failure to do so may cause equipment failures or malfunctions
- Turn off the power to the PLC before attaching or detaching the following devices. Failure to do so may cause equipment failures or malfunctions
 - Display module, peripheral devices, expansion boards
 - Extension blocks and special adapters
 - Battery, terminal block and memory cassette

DISPOSAL PRECAUTIONS

⚠ CAUTION

- Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device.

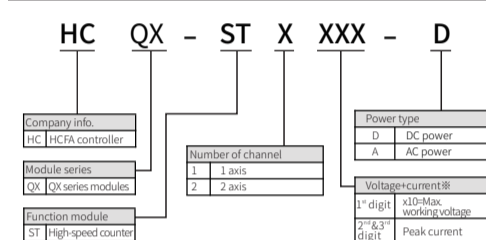
TRANSPORT AND STORAGE PRECAUTIONS

⚠ CAUTION

- The PLC is a precision instrument. During transportation, avoid impacts larger than those specified in Section 3.1. Failure to do so may cause failures in the PLC. After transportation, verify the operations of the PLC.

2. Product Overview

2.1 Model name description



Note: For example: 505 means that the maximum working voltage is 50V, and the output peak current is 5A

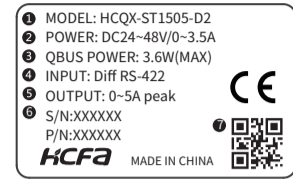
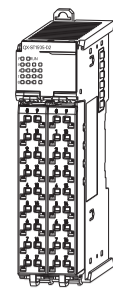


Figure 1 Model name and nameplate description

- Model name
- Working voltage and current
- QBUS power consumption
- Input parameters
- Output parameters
- Barcode, S/N&P/N
- QR code (model name, serial number)

2.2 Part name description

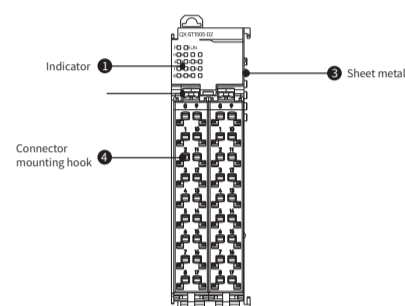


Figure 2 Interface diagram for HCQX-ST1505-D2

Table 1 HCQX-ST1505-D2interfacedescription

No.	Name	Function
(1)	Indicators	Used to display module and terminal status
(2)	Connector mounting hook	Fix the connector on the module
(3)	Sheet metal	Transmit QBUS signal and control circuit current, donot support hot swap
(4)	Terminal	Insert the cable, input/output signal

2.2.2 Indicator arrangements for HCQX-ST1505-D2

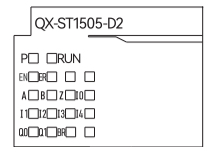


Table2 Indicator description for HCQX-ST1505-D2

Symbol	Indicator color	Indicator status	Channel description
P	Green	OFF	Control power error or main power supply not input
		ON	Power supply is normal
RUN	Red	OFF	Initial status or software upgrade status
		Flashing	PREOP status
		Single Flash	SAFEOP status
EN	Red	ON	OP status
		OFF	Motor not enabled
ER	Red	ON	Motor not enabled
		OFF	No alarms have occurred
		Flashing	Communication setting error
A	Red	ON	Event synchronization error
		ON	PDI error
B	Red	ON	Input indication of encoder A
		ON	Input indication of encoderB
Z	Red	ON	Input indication of encoderC
		ON	Digital input I0 is valid
I0	Red	ON	Digital input I1 is valid
		ON	Digital input I2 is valid
I1	Red	ON	Digital input I3 is valid
		ON	Digital input I4 is valid
I2	Red	ON	Digital input I3 is valid
		ON	Digital input I4 is valid
I3	Red	ON	Digital input I3 is valid
		ON	Digital input I4 is valid
I4	Red	ON	Digital input I4 is valid
		ON	Digital input Q0 is valid
Q0	Red	ON	Digital input Q1 is valid
		ON	Digital input Q1 is valid
Q1	Red	ON	Brake output is valid
		ON	Brake output is valid

2.2.3 HCQX-ST1505-D2 terminal description

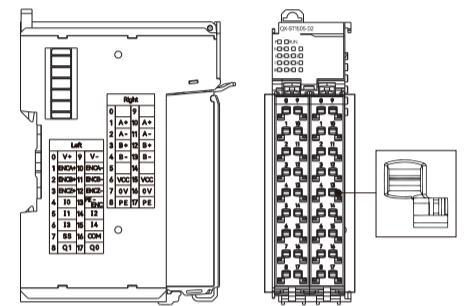


Figure3 Terminal description for HCQX-ST1505-D2

Table 3 Left terminals description for HCQX-ST1505-D2

CPU board terminals				
Description	Definition	NO	NO	Description
Encoder power 5V output	V+	0	9	Encoder power GND
Encoder A-phase differential positive input	ENCA+	1	10	Encoder A-phase differential negative input
Encoder B-phase differential positive input	ENCB+	2	11	Encoder B-phase differential negative input
Encoder Z-phase differential positive input	ENCZ+	3	12	Encoder Z-phase differential negative input
Low-speed input 0	IN0	4	13	PE-ENC
Low-speed input 1	IN1	5	14	IN2
Low-speed input 3	IN3	6	15	IN4
Input Common	SS	7	16	COM
General output 1	Q1	8	17	Q0

External I/O wiring diagram

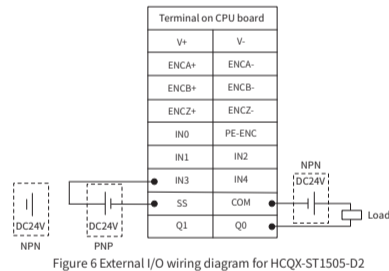


Figure 6 External I/O wiring diagram for HCQX-ST1505-D2

2.3.3 Encoder wiring diagram

Encoder internal circuit diagram

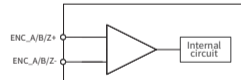


Figure7 Internal circuit diagram for HCQX-ST1505-D2

Encoder external circuit diagram

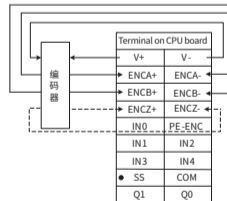


Figure 8 HCQX-ST1505-D2 encoder external circuit diagram

2.3.4 Stepper motor wiring diagram

Stepper motor wiring diagram

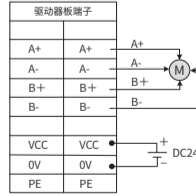


Figure 9 HCQX-ST1505-D2 stepper motor external wiring diagram

2.4 Product dimensions

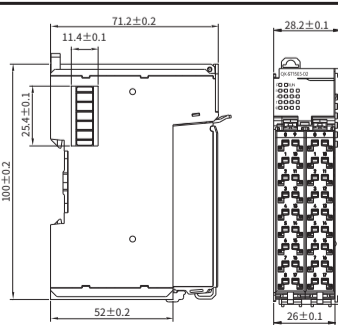


Figure 10 HCQX-ST1505-D2 terminal description (unit:mm)

2.3 Wiring Instruction

2.3.1 Cable selection

Item	Specification	
Mounting method	Push-in mounting	
Push-in force (single contact)	10N	
Cable Type	Copper wire only (aluminum wire not allowed)	
Cable Length	7-9 mm	
Cross Section	Single stranded wire	0.08-1.50 mm ² /28-16 AWG
	Multi-stranded wire	0.25-1.50 mm ² /24-16 AWG
Wiring Sleeve	0.25-0.75 mm ² /24-20 AWG	

2.3.2 Digital I/O wiring diagram

Input internal circuit diagram

Output internal circuit diagram

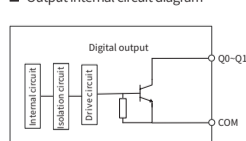
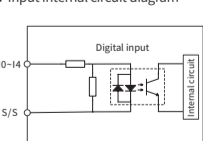


Figure 4 Input circuit diagram for HCQX-ST1505-D2

Figure 5 Output circuit diagram for HCQX-ST1505-D2

3. Specification parameters

3.1 Electrical specifications

Item	Specifications	
Electrical strength	Input to Output AC:500V-60s	
Insulation resistance	Input to Output 1MΩ	
Leakage current (input to case)	1mA	
Electromagnetic compatibility requirements	Electrostatic discharge	Contact ±4kV, Air ±8kV,
	Electric Fast Pulse Cluster	Control power ±4kV 5~100kHz
	Surge	Network cable, signal cable ±2kV 5~100kHz
	DC500V	

3.2 Environmental specifications

Item	Specifications
Operating temperature	0~55°C
Storage temperature	-25~75°C
Relative Humidity	95% non-condensation
Altitude	Under 2km
Atmospheric pressure	108kPa-66kPa
Noise resistance	±2kV 5~100kHz
Sine vibration	9Hz<f<100Hz, 1.0 acceleration, constant amplitude
Drop down	1m, 10 times during packaging and transportation

3.3 Power specifications

Item	Specifications
QBUS rated voltage	DC 12V
QBUS consumption current	Typ: 100mA (without encoder) Max: 300mA (with encoder)
Rated voltage at driver side	DC 24V-48V
Input Voltage Range	DC 20V-50V
Input current Ipeak	5A

3.4 Control specifications

Item	Specifications
Control Protocol	CIA402 protocol
Communication scan cycle	250μs, 500μs, 1ms, 2ms, 4ms, 8ms
Segmentation levels	32-256 step
Power supply to encoder	4.5-5V, 200mA (Max)
Encoder input type	Differential input
Encoder maximum response frequency	200kHz
Motor control mode	PP, PV, CSP, Homing
Digital input	I0-I4, Single-ended 24Vdc, Maximum pulse frequency 5kHz
Digital output	Q0-Q1, Collector open leakage, Maximum 30V/250mA, Maximum pulse frequency 2kHz
Motor parameters	Motor parameters are detected automatically

3.5 Drive specifications

Item	Specifications
Power output type	Dual H-Bridge
Current control	PWM frequency 25kHz
Output current	Continuous maximum peak current 5A
Input voltage	20Vdc-50Vdc
Protection	Overcurrent protection, undervoltage protection, overvoltage protection, overtemperature protection

3.6 Terminal and Wiring specifications

Item	Specifications
QBUS interface	QBUS IN-, QBUS_OUT
Encoder interface	V+, V-, ENA+, ENA-, ENB+, ENB-, ENZ+, ENZ-
Digital input	I0, I1, I2, I3, I4, S/S
Digital output	Q0, Q1, COM
Drive output	A+, A-, B+, B-
Drive power input	VCC-, 0V, PE

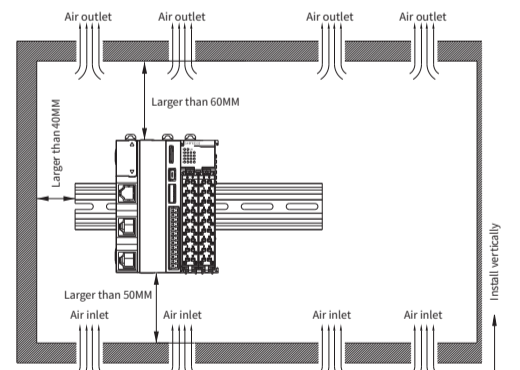
4. Installation Instructions

4.1 Installation Instructions

4.1.1 Control cabinet installation

When performing installation inside the equipment control cabinet, please pay attention to the following matters.

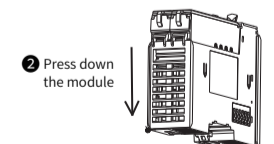
- Please make sure the installation direction is perpendicular to the wall, use natural convection or fan to cool the equipment, and mount the module firmly on the 35MM international rail through the snap mechanism.
- To ensure that cooling can be carried out by natural convection or fan, please refer to the following diagram and leave enough space around the equipment. In order not to make the ambient temperature of the equipment appear locally too high, the temperature inside the electric cabinet needs to be kept even.
- When installed side-by-side, it is recommended to leave more than 10mm spacing on each side (if the installation space is limited, you can choose not to leave spacing).



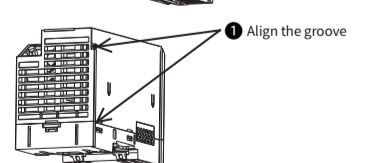
4.1.2 Module mounting and dismounting

Module installation

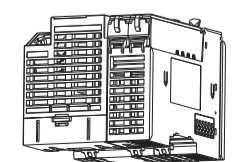
- Align the extension module side slots with the Q-Series controller slots, then lower it as shown and gently press the extension module.



- Press down the module

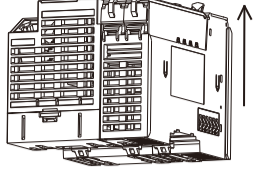


- After the installation is completed, the following figure shows.



• Module dismounting

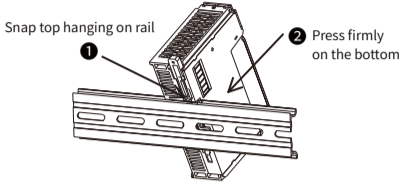
When disassembly is required, press the Q series controller on the left side by hand and pull out the module vertically upward by applying force from the bottom to the top (direction shown in the figure).



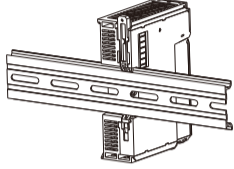
4.1.3 (Un)Installation of guide rails

• Guide rail installation

1 The bottom part of the extension module rail slot aligned with the 35MM international rail, so that the upper part of the snap hanging on the international rail, and then press the bottom of the extension module, when you can clearly hear the "click" sound, indicating that the bottom of the snap has been snapped together with the international rail, at this time the extension module installation is complete (installation should ensure that the snap is in a contracted state, otherwise may lead to installation failure).

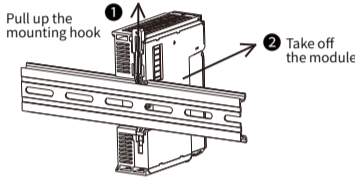


2 After the installation is completed, the following figure shows:



• Guide rails uninstallation

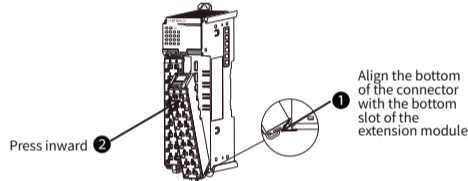
When disassembly is required, pull up the snap for about 5.8MM (when clearly hear the "click" sound, indicating that the snap has been pulled). At this time, the machine can be removed directly to complete the disassembly of the machine (auxiliary tools can be used when pulling the two-way linkage snap, such as: screwdriver, etc.).



4.1.4 (Un)Installation of connector

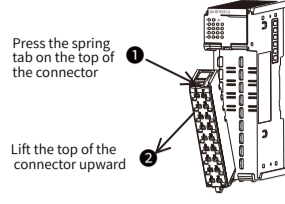
• Connector installation

Align the bottom of the connector with the bottom slot of the extension module, align and insert it, press down above the terminal in the direction shown below, and when you hear the "click" that completes the assembly of the connector.

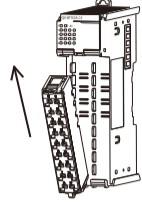


• Connector uninstallation

1 Press the spring tab on the top of the connector firmly with the index or middle finger downward to disengage the top of the connector from the extension module, and hold the rear part of the connector with the thumb and lift the top of the connector upward while pressing the spring tab to completely disengage the top of the connector.



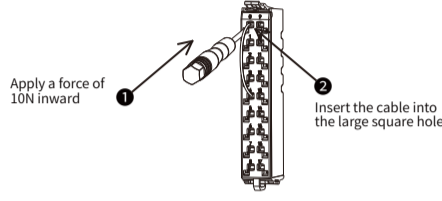
2 Lift the top of the connector so that the connector is at an angle greater than 45° to the extension module, and finally remove the connector in an oblique upward direction, until the connector is completely removed.



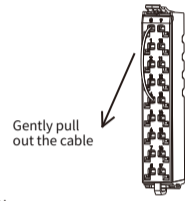
4.1.5 (Dis)connection of cables

• Cable connection

1 First insert the small screwdriver into the small square hole, apply a force of 10N inward, and subsequently insert the cable into the large square hole. After the cable is inserted, pull out the small screwdriver.

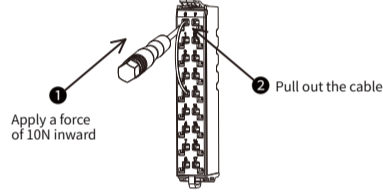


2 After the installation is completed, gently tug the cable, the cable does not fall off, then the installation is complete.



• Cable disconnection

First insert the screwdriver into the small square hole, apply a force of 10N inward, and subsequently pull out the cable and finally pull out the screwdriver.



Appendix: Object dictionary list

Object dictionary	Sub-index	Name	Properties	Type	Range	Default Value	Unit	Remarks
0x1000	00	Device type	R	UDINT	0-32767	0x40912	--	402
0x1001	00	Error Register	R	USINT	0-255	0	--	HCQX_ST1505-02
0x1008	00	Device name	R	STRING	0-32767	--	--	HCQX_ST1505-02
0x1009	00	Hardware Version	R	STRING	0-32767	--	--	--
0x100A	00	Software Version	R	STRING	0-32767	--	--	--
0x1600	00	Number of sub-indices	R/W	USINT	0-32767	3	--	Group 1 Number of default mapped objects
0x1600	01-12	RXPDO Mapped Object Group 1	R/W	UDINT	0-0FFFFFFF	Omitted	--	Group 1 Default RXPDO mapping object
0x1601	00	Number of sub-indices	R/W	USINT	0-32767	6	--	Group 2 Number of default mapped objects
0x1601	01-12	RXPDO mapped object group 2	R/W	UDINT	0-0FFFFFFF	Omitted	--	Group 2 default RXPDO mapped objects
0x1602	00	Number of sub-indices	R/W	USINT	0-32767	5	--	Group 3 Number of default mapped objects
0x1602	01-12	RXPDO mapped object group 2	R/W	UDINT	0-0FFFFFFF	Omitted	--	Group 3 Default RXPDO Mapped Objects
0x1603	00	Number of sub-indices	R/W	USINT	0-32767	7	--	Group 4 Number of default mapped objects
0x1603	01-12	RXPDO mapped object group 3	R/W	UDINT	0-0FFFFFFF	Omitted	--	Group 4 default RXPDO mapped objects
0x1A00	00	Number of sub-indices	R/W	USINT	0-32767	7	--	Group 1 Number of default mapped objects
0x1A00	01-12	TXPDO mapped object group 1	R/W	UDINT	0-0FFFFFFF	Omitted	--	Group 1 default TXPDO mapped objects
0x1A01	00	Number of sub-indices	R/W	USINT	0-32767	0	--	Group 2 Number of default mapped objects
0x1A01	01-12	TXPDO mapped object group 2	R/W	UDINT	0-0FFFFFFF	Omitted	--	Group 1 default TXPDO mapped objects
0x1C00	00	Number of sub-indices	R	USINT	0-32767	4	--	N/A
0x1C00	01	Mailbox output type	R	USINT	0-32767	1	--	N/A
0x1C00	02	Mailbox output type	R	USINT	0-32767	2	--	N/A
0x1C00	03	Process data output type	R	USINT	0-32767	3	--	N/A
0x1C00	04	Process data input type	R	USINT	0-32767	4	--	N/A
0x1C12	0-04	RXPDO distribution	R/W	UINT	0-32767	1600	--	N/A
0x1C13	0-02	TXPDO distribution	R/W	UINT	0-32767	1A00	--	N/A
0x1C32	0-0A	RXPDO management parameters	R	UINT	0-32767	Omitted	--	N/A
0x1C33	0-0A	TXPDO management parameters	R	UINT	0-32767	Omitted	--	N/A
0x2001	00	Motor full step pulse number	R/W	UINT	0-51200	200	--	Sets the full step resolution of the motor connected to the drive. It defaults to 200, as most motors are 1.8°
0x2002	00	Fine fraction	R/W	UINT	0-8	0	--	0-256 1-128 2-64 3-32 4-16 5-8 6-4 7-2 8-Whole step Default 0:256 subdivision. If the full step of the motor is 200, it takes 200*256=51200 pulses to rotate one revolution after subdivision
0x2003	00	Current global scaling	R/W	UINT	32-255	0	--	0: Full range 1-31: invalid 32-255: 32 / 256... 255 / 256 of the maximum current
0x2004	00	Holding current	R/W	UINT	0-31	0	--	Motor current ratio at standstill (0=1/32... 31=32/32) Example: When the global current = full range, the maximum drive current = 4.6A, set theratio to 6 Then the current = 4.6 * 7/32 Note: The maximum drive current is determined by the hardware and is fixed
0x2005	00	Run current	R/W	UINT	0-31	100	--	Motor running current ratio (0=1/32... 31=32/32) Conversion method is the same as holdingcurrent
0x2006	00	Delay time between when the motor stops and when the current starts to drop	R/W	UINT	2-255	10	2^18 tCLK	The delay time between when the motor comes to rest and when the motor starts to drop current.
0x2007	00	Number of cycles of current drop when the motor stops	R/W	UINT	0-15	2	2^18 tCLK	The number of clock cycles after the motor stops and the current starts to drop. This avoids motor jumps caused by current changes when the motor is not really stopped. (Duration) 0: instantaneous current drop 1-15: decaying current every 2^18 clock multiples
0x2008	00	Motor running direction	R/W	UINT	0-1	0	--	0- the direction of operation remains unchanged; 1- the direction of operation is reversed
0x2009	00	Driver chip version number	R	UINT	0-255	0	--	Driver internal driver chip version number 0x30
0x200A	00	Over-temperature alarm level	R/W	UINT	0-2		--	00: 150°C 01: 143°C 02: 136°C (not recommended when VSA > 24V)
0x200B	00	Motor reference speed	R	UINT	0-65535	0	pps	Motor rotating speed
0x200C	00	Actual measurement time between two stepper input signals TSTEP	R	DINT	0-(2^20)-1	-	--	In units of 1 / tCLK and 256 microsteps Note: Valid in PP/PV mode
0x2010	00	A1	R/W	UINT	0-(2^16)-1	-	--	Acceleration between start-up speed and V1 Note: Valid in PP/PV mode
0x2011	00	V1	R/W	DINT	0-(2^20)-1	-	--	First acceleration/deceleration phase threshold speed 0: A1 and D1 are invalid, only acceleration and deceleration speeds are used Note: Valid in PP/PV mode
0x2012	00	D1	R/W	UINT	0-(2^16)-1	-	--	Acceleration between stop speed and V1 Note: Valid in PP/PV mode
0x2013	00	Motor starting speed	R/W	DINT	0-(2^18)-1	0	--	Start-up speed Valid in PP/PV mode
0x2016	00	FILT_ISENSE	R/W	USINT	0-3	0	--	The filtering time constant of the sampling opamp. If motor chopping noise is generated due to crosscoupling of the two coils, increase the setting 00: Low- 100ns

Object dictionary	Sub-index	Name	Properties	Type	Range	Default Value	Unit	Remarks
0x2017	00	Dead-zone time	R/W	USINT	0-24	0	--	01: ~200ns 10: ~300ns 11: High- 400ns The minimum setting according to the switching time is safe and avoids a direct pass of the bridge arm. Keep a margin of approx. 30 % 0=minimum (100ns) ... 16 (200ns) ... 24=maximum (375ns), not recommended Settings larger than 24
0x2018	00	Enable PWM mode	R/W	USINT	0-1	1	--	StealthChop mode switch Note: Switching in stationary state
0x2019	00	Enables automatic current regulation	R/W	USINT	0-1	1	--	Automatic current regulation is recommended
0x2020	00	PWM frequency	R/W	USINT	0-3	0	--	%00: fPWM=2/1024 tCLK (reset default value) %01: fPWM=2/683 tCLK %10: fPWM=2/512 tCLK %11: fPWM=2/410 tCLK
0x2021	00	Custom PWM amplitude	R/W	USINT	0-255	0	--	User-defined, velocity-dependent gradient for adjusting PWM amplitude
0x2022	00	Custom PWM Amplitude Offset	R/W	USINT	0-255	30	--	User-defined PWM Amplitude Offset (0-255)
0x2025	00	Intelligent current speed threshold	R/W	DINT	0-2^20-1		--	CoolStep will be enabled when the actual speed (0x200C value) exceeds this speed. Page51 is not enabled when the actual speed is lower than this value Note: Adjust this value according to the value of 0x200C when using.
0x2026	00	Low-speed silent mode (StealthChop mode) speed threshold	R/W	DINT	0-2^20-1		--	When the actual speed (value of 0x200C) exceeds this speed, turn off the silent chopper mode and switch to the periodic chopper mode Note: Adjust this value according to the value of 0x200C when using.
0x2027	00	THIGH	R/W	DINT	0-(2^20)-1	0	--	TSTEP <= THIGH: CoolStep off StealthChop off If vhighchm is set, the chopper will switch to chm = 1, TFD = 0 (constant off time for slow decay only) If vhighis is set, the motor runs in full-step mode and the blocking detection switches switch to DcStep stall detection
0x2028	00	Chopper off time TOFF	R/W	USINT	0-15	5	--	Duration of slow decay phase NCLK= 24 + 32*TOFF %0000: Drive output off, all bridge arms off %0001: 1- only if TBL >= 2 %0010...%1111: 2... 15
0x2029	00	Hysteresis start value HSTRT	R/W	USINT	0-7	4	--	
0x2030	00	Hysteresis end value HEND	R/W	USINT	0-15	1	--	
0x2031	00	Extinction time TBL	R/W	USINT	0-3	2	--	Extinction time
0x2039	00	Encoder position	R	DINT	-2^31-(2^31)-1	0	--	Actual encoder position, with symbol
0x2040	00	Encoder accumulation constants	R/W	UINT	0-65535	0	--	--
0x2041	00	Overpressure threshold	R/W	UINT	0-65535	5000	--	Input voltage maximum, exceeding will alarm, 5000=50V
0x2042	00	Drive Global Alarm Register	R/W	USINT	0-255	0	--	Bit0: Bit1: Bit2: This register can be viewed when the drive is in alarm
0x2043	00	Drive error status register	R	DINT	0-2^31	--	--	This register can be viewed when the drive is in alarm
0x2057	00	Clear current alarm	R/W	USINT	0-1	0	--	0: Do not clear 1: Clear the current alarm
0x2152	01	Enter 1 Select	R/W	UINT	0-255	0x17	--	0x00:Invalid 0x17:Probe 1 0x18:Probe 2 0x16:Home input 0x01:Positive limit 0x02:Negative limit 0x14:Emergency stop 0x19:Custom
0x2153	02	Enter 2 Select	R/W	UINT	0-255	0x18	--	--
0x2153	03	Enter 3 Select	R/W	UINT	0-255	0x16	--	--
0x2153	04	Enter 4 Select	R/W	UINT	0-255	0x01	--	--
0x2153	05	Enter 5 Select	R/W	UINT	0-255	0x02	--	--
0x2153	01	Input 1 Filter time	R/W	UINT	50-60000	50	ms	Set the input port filter time
0x2153	02	Input 2 Filter time	R/W	UINT	50-60000	50	ms	Set the input port filter time
0x2153	03	Input 3 Filter time	R/W	UINT	50-60000	50	ms	Set the input port filter time
0x2153	04	Input 4 Filter time	R/W	UINT	50-60000	50	ms	Set the input port filter time
0x2153	05	Input 5 Filter time	R/W	UINT	50-60000	50	ms	Set the input port filter time
0x2154	00	Input IO polarity configuration	R/W	UINT	0-65535	0	--	0: Normally open, 1 normally closed Polarity control, bit0 corresponds to input 1, and so on
0x2155	00	Input IO Physical Status	R	UINT	0-255	0	--	Level state, bit0 corresponds to input 1, and so on
0x2156	01	Output port 1 Function selection	R/W	USINT	0-255	1	--	0:Invalid 1: Alarm output 4: In place output 8: Hold output 16: Custom output
0x2156	02	Output port 2 Function selection	R/W	USINT	0-255	4	--	--
0x2156	03	Output port 3 Function selection	R/W	USINT	0-255	8	--	--

Object dictionary	Sub-index	Name	Properties	Type	Range	Default Value	Unit	Remarks
0x2158	00	Output port output polarity configuration	R/W	UINT	0-255	0	--	Polarity control, bit0/bit corresponds to output 1/2
0x2159	00	Action when not enabled	R/W	UINT	0-1	0	--	0:Motor not locked; 1:Motor locked;
0x2203	00	Bus voltage value	R	USINT	--	--	V	Current driver supply voltage, expanded 100 times
0x2210	00	ESC port 0 receive error count register	R	USINT	0-255	0	--	For debugging
0x2211	00	ESC port 1 receive error count register	R	USINT	0-255	0	--	For debugging
0x2212	00	ESC port 2 receive error count register	R	USINT	0-255	0	--	For debugging
0x2213	00	ESC port 3 receive error count register	R	USINT	0-255	0	--	For debugging
0x2214	00	ESC port 4 receive error count register	R	USINT	0-255	0	--	For debugging
0x2215	00	ESC port 5 receive error count register	R	USINT	0-255	0	--	For debugging
0x2216	00	ESC port 6 receive error count register	R	USINT	0-255	0	--	For debugging
0x2217	00	ESC port 0 lost link count register	R	USINT	0-255	0	--	For debugging
0x2218	00	ESC port 1 lost link count register	R	USINT	0-255	0	--	For debugging
0x2219	00	ESC watchdog count register	R	USINT	0-255	0	--	For debugging
0x221A	00	ESC register F28_F31-1	R	USINT	0-255	0	--	For debugging
0x221B	00	ESC register F28_F31-1	R	USINT	0-255	0	--	For debugging
0x221C	00	ESC register F28_F31-1	R	USINT	0-255	0	--	For debugging
0x221D	00	ESC register F28_F31-1	R	USINT	0-255	0	--	For debugging
0x4003	00	Release delay time of holding brake	R/W	UINT	0-3000	50	ms	Enable to release holding signal time
0x4004	00	Locking time delay of holding brake	R/W	UINT	0-3000	50	ms	Time from non-enabling to holding brake lock
0x5000	00	Target arrival status	R	USINT	0-255	--	--	Bit0=0: not arrived Bit0=1: Arrived Bit1=0: no blocking occurred Bit1=1: blocking occurred
0x5001	01-06	Firmware compilation date time	R	UINT	0-32767	--	--	--
0x6040	00	Control word	R/W	UINT	0-65535	0	--	--
0x6041	00							