

KST CAN Bus Servo User Manual

(Standard Frame)

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RN	Date	Author	Modifications
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1.Instructions

1.1 Default value

This manual provides instructions only for CAN communication servos (using software version V3.72 as an example). Before operating the servo, ensure that the power supply and communication cables are properly connected. This document assumes the servo is configured with the Standard Frame format, Baud Rate: 500 kbps, and a default Node ID of 0x25 (valid range: 1–127; 0 represents the broadcast address).

1.2 Debugging Device Instructions

The CAN Analyzer (Chuangxin Technology), as shown in the figure below (Figure 1), is used for all debugging and configuration operations described in this manual in conjunction with the CANALYST-II analyzer and its test software. Before proceeding, verify in your computer's Device Manager that the CAN Analyzer driver is correctly installed. (Connect the servo's CANH and CANL wires to the ports marked with red circles in Figure 2.)



Figure 1





Figure 2

1.3 Command Frame Instructions

Send the corresponding communication commands to the servo via the host computer. Note that the Frame ID (HEX) format is: Command ID + Node ID

Example: The Frame ID for the Start Reporting Command is 0x00000000 + Node ID. If the Node ID of the servo to be configured is 0x25, the Frame ID should be 0x00000025.

A complete data frame consists of the Frame ID and the data payload. For details, refer to the document: **KST Servo CAN Bus Communication Protocol (Standard Frame) V3.72**.

All Frame IDs in subsequent sections assume a default Node ID of 0x25. The Frame ID format and calculation method follow the same rules as described above and will not be reiterated.

2.Servo wiring

2.1 CAN Bus Servo Harness Introduction

The servo has four cables in total for power and communication: DC+, DC-, CAN_H, and CAN L.

DC+ connects to the positive terminal of the power supply.

DC- connects to the negative terminal of the power supply.

CAN_H connects to the bus's CAN_H line.

CAN_L connects to the bus's CAN_L line.

Note: Termination resistors are not pre-installed inside the servo. Users must install them based on the bus topology and specific application requirements.



2.2 Wiring Diagram See Figure 1.0.1 (taking HS30 servo as an example)



Figure 1.0.1

3.Servo configuration

3.1 Baud Rate Configuration

3.1.1: Send the corresponding command frame (Figure 1.0.2).

3.1.2: X is the baud rate setting byte, and the baud rate setting reference table is shown in Figure 1.0.2.

3.1.3: Receiving the corresponding reply frame indicates a successful setting (Figure 1.0.2).

3.1.4: Send the save command to save the configured baud rate. Note that the lower-level device does not need to respond to this command (Figure 1.0.3).

3.1.5: An example is provided to illustrate how to set the baud rate to 250K and save it (Figures 1.0.4-1.0.5).

Note: The default baud rate is 500K. After any changes, the save command must be used to save the settings, and the changes will only take effect after a restart.



2.6 Baud rate setting command

The default baud rate is 500K. Use the set command to set the baud rate to an optional value in the comparison table

a state of the state of the state of the	ē								
ID	Length	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x 00 00 06 00 +NodeID	8	22	01	30	00	x	00	00	00

"X" is the baud rate setting byte. The baud rate setting comparison table is as follows:

A DESCRIPTION OF A DESC				and the second				
Х	00	01	02	03	04	05	06	07
Baud	20K	50K	100K	125K	250K	500K	800K	1000K

The following reply indicates that the operation is successful:

ID	Length	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x 00 00 05 80 +NodeID	8	60	01	30	00	00	00	00	00

The baud rate change must be saved by using the Save command and will not take effect until it is restarted.

Figure	1.0).2

2.10 Save command

ID	Length	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
0x 00 00 06 00 +NodeID	8	22	10	10	01	73	61	76	65
0 1 1	1 1		1 1		1	1			

Save node number, baud rate, etc. (the lower computer does not need to answer)

Figure 1.0.3

-Cand I					. –							
Send	Jala			2.0.1			1				-	
Form	at: Standard 🖂	Type: Dat	a VÇAD	TID (HEX): 00 00 06 2	5 Channel	.: 1 🗠	Number	to send:	1		UID 1	nc.
Data(HE	x): 22 01 30 00	04 00 00 00	Send				Sen	d Cycle	10	ms	Date	Inc.
CAN Ro	uting	ID File	ter		Frm	saved: 0			Stop s	end	Send f	ile
	Unused	CANI	settings	CAN2 settings	C	Receive E	nable		Cles	ar	Save	2
Statis	stics:Ch1 🦳				Statist	ics:Ch2						
Statis Frm/s I	sties:Ch1 A: 0 F:	rm/s T: 0			Statist Frm/s R:	ics:Ch2	Frm/s 1	: 0		x		
Statis Frm/s I index	stics:Ch1 8: 0 F: System Time	rm/s T: 0 Time Stamp	Channel	Directio Frame ID	Statist Frm/s R: Type	ics:Ch2 0 Format	Frm/s] DLC]	: 0 Data		×		
Statis Frm/s H index 000000	stics:Ch1 R: 0 F: System Time 18:36:41.166	rm/s T: 0 Time Stamp -	Channel ch1	Directio Frame ID Send 0x0625	Statist Frm/s R: Type Data	i cs:Ch2 0 Format Standar	Frm/s 1 DLC 1 0x08 :	: 0 Data (22 01	30 00 0	X	00 00	
Statis Frm/s F Index 00000 00001	stics:Ch1 &: 0 F: System Time 18:36:41.166 18:36:41.174	rm/s T: 0 Time Stamp - 0x10A60B6C	Channel ch1 ch1	Directio Frame ID Send 0x0625 Receive 0x05A5	Statist Frm/s R: Type Data Data	i cs:Ch2 0 Format Standar: Standar:	Frm/s 1 DLC 1 0x08 : 0x08 :	C: 0 Data (22 01 (60 01	30 00 0	X 04 00	00 00	5

2. Receiving the response frame confirms that the baud rate configuration was successful.

K٩		KS	r cai	N Bu	s Se	rvo	User	M	anua	al				Pag 7
				(Sta	ndar	d Fr	ame)							
USB-	CAN Tool V9.11	· CANalyst-II - :	SN:Serial nu	umber: 31F0	0001F9B8, fi	rmware ver	ion numbe	er: V3.4	1 - CHUA	NGXI				×
Device(D)	Operation(C) Settings(<u>S</u>) Inform	ation()	View(V) H	Help <mark>(H)</mark> L	anguage(<u>l</u>)						
Send D	Data													
Forma	at: Standard 🗸	Type: Dat	a VCA	NID (HEX) :	00 00 06 2	5 Channel	1 ~	Number	to send	l: 1			O ID I	nc.
D . (100		30.01.30.05						-	1 - 1	10		-	.	Ŧ
Data(HE)	(): 22 10 10 01	(3 61 /6 65	Send					S	and Cycl	e: 10	_	ms	Ullata	i inc.
CAN Rou	iting	ID Fil-	er			Frm	e orad. D			Sta		4	Sond f	1.
	Unused	CANI	settings	CAN2 s	ettings					DEC	h ver			116
	onuseu			(<u>(</u>			Keceive 1	inable		C	lear		Save	1
Statis	tics:Ch1					Statist	.cs:Ch2							
Frm/s R	: 0 F1	rm/s T: 0				Frm/s R:	0	Frm/s	T: 0					
Index	System Time	Time Stamp	Channel	Directio	Frame ID	Туре	Format	DLC	Data					1
00000	18:36:41.166	-	ch1	Send	0x0625	Data	Standar	0x08	x 22 0	01 30 0	0 04	00 00	00 0	
00001	18:36:41.174	0x10A60B6C	ch1	Receive	0x05A5	Data	Standar	0x08	x 60 C)1 30 0	0 00	00 00	00 00	
	18-40-14 34E		chi	Send	0x0625	Data	Standar	0x08	x 22 1	0 10 0	1 73	61 76	65	

3.It is essential to send the save command to preserve the new baud rate, and the baud rate configuration will only take effect after the device is restarted.

Figure 1.0.5

3.2 Node ID Configuration

3.2.1: Send the corresponding command frame (Figure 1.0.6).

3.2.2: X is the new node ID.

3.2.3: Receiving the corresponding reply frame indicates a successful setting (Figure 1.0.6).

3.2.4: Send the save command to save the configured node ID. Note that the lower-level device does not need to respond to this command.

3.2.5: An example is provided to illustrate how to set the node ID to 0x20 and save it (Figures 1.0.7-1.0.8).

Note: Any changes to the node ID must be saved using the save command, and the changes will only take effect after a restart.

2.7 Node number The default node	e r setting number i	<mark>comman</mark> s 0x25.	d						
ID	Length	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x 00 00 06 00 +NodeID	8	22	00	30	00	x	00	00	00
"X" is the new no	ode numb	er.					÷		•

The following reply indicates that the operation is successful:

ID	Length	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
0x 00 00 05 80 +NodeID	8	60	00	30	00	00	00	00	00
The change of	node nu	mber mu	st be sav	ed with	the Save	comman	d and wi	ll not tak	e effect

until it is restarted.

DAN LISP CAN Tool VO		AN Bus Se (Standar	rvo User Manua d Frame)		Page 8/2
Device(D) Operation Send Data Format: Standar	11 - CANalyst-II - SN:Serial on(O) Settings(S) Infor d V Type: Data V(number: 31F0001F9B8, f mation(]) View(V)	irmware version number: V3.41 - CHUANG Help(H) Language(L) 25 Channel: 1 Viumber to send:		×
Data(HEX): 22 10 1	0 01 73 61 76 65 Se	nd	Send Cycle:	10 ms 🗍 Data J	Inc.
CAN Routing	ID Filter				
Unused	CAN1 setting	s CAN2 settings	frm saved: U	Stop send Send fil	e
				Clear Save	
Frm/s R: 0	Frm/s T: 0		Frm/s R: 0 Frm/s T: 0		
ndex System Tim 00000 18:24:22.7 00001 18:24:22.7 00002 18:25:16.6	e Time Stamp Channe 40 - chi 68 0x10358516 chi 13 - chi	l Directio Frame ID Send 0x0625 Receive 0x05A5 Send 0x0625	Type Format DLC Data Data Standar: 0x08 x 22 00 3 Data Standar: 0x08 x 60 00 3 Data Standar: 0x08 x 60 00 3	0 00 20 00 00 00 0 00 00 00 00 00 0 01 73 61 76 65	
USB-CAN Tool V9 levice(D) Operation Send Data Format: Standar	.11 - CANalyst-II - SN:Serial on(Q) Settings(S) Infor d v Type: Data v	Figur number: 31F0001F9B8, f mation() View(V)	re 1.0.7 irmware version number: V3.41 - CHUANG Help(H) Language(L) 15 Channel: 1 Vumber to send:	XI — —	×
Data(HEX): 22 10 1) 01 73 61 76 65 Se	nd	Send Cycle:	10 ms 🗆 Data J	Inc.
CAN Routing Unused	ID Filter	cAN2 settings	Frm saved: 0	Stop send Send fil Clear Save	e
Statistics:Ch1 Frm/s R: 0	Frm/s T: 0		Statistics:Ch2 Frm/s R: 0 Frm/s T: 0	X	
	e Time Stamp Channe 40 - ch1	l Directio Frame ID Send Ox0625	Type Format DLC Data Data Standar 0x08 x 22 00 3	0 00 20 00 00 00	
index System Tin 00000 18:24:22.7 00001 18:24:22.7 00002 18:25:16.6	68 0x10358516 ch1 13 - ch1	Receive OxO5A5 Send OxO625	Data Standar: 0x08 x 60 00 3 Data Standar: 0x08 x 22 10 1	0 00 00 00 00 00 00 0 01 73 61 76 65	



4.Servo function settings

4.1 Reporting Interval Configuration

4.1.1: Locate the corresponding command frame in the protocol.

4.1.2: The setting range is $10\sim255$ ms, where X is the hexadecimal number corresponding to the time interval to be set.

4.1.3: Receiving the corresponding reply frame indicates a successful setting (Figure 1.0.9). Please note the following:

1.After a successful setting, the interval change takes effect immediately.

2. If the change is not saved using the save command, it will be lost after a restart.

4.1.4: An example is provided to illustrate how to set the reporting interval to 100ms and save it (Figures $1.0.10 \sim 1.0.11$).

2.5 Report interval setting command

The default reporting interval is 50ms. With the setting command, the interval can be set to $10 \sim 255$ ms.

ID	Length	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x 00 00 06 00 +NodeID	8	22	00	22	00	X	00	00	00

"X" sets bytes for reporting interval. For example, 0x32 corresponds to 50ms, 0x64 to 100ms, and 0x0A to 10ms.

The following reply indicates that the operation is successful:

ID	Length	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x 00 00 05 80 +NodeID	8	60	00	22	00	00	00	00	00

After the setting is successful, the interval change will take effect immediately. If the changes are not saved with the Save command, the changes will be lost after restart.

KS	5T [®]	KS	T CA	N Bus Se (Standar	rvo d Fr	User ame)	Manu	al		Page 10/2
Bevice(D)	CAN Tool V9.11 · Operation(<u>C</u>	- CANalyst-II - : 2) Settings(S	5N:Serial n) In <mark>form</mark>	umber: 31F0001F9B8, fi ation(<u>)</u> View(<u>V</u>)F	rmware ver Help(<u>H</u>) I	sion number: \ .anguage(L)	/3.41 - CHUA	ANGXI —		×
Send E Forma Data(HE)	Data at: Standard ~ (): 22 00 22 00	Type: Dat	a 🗸 ÇA Send	NID (HEX): 00 00 06 24	5 Channel	l: 1 - Nu	nber to sen Send Cycl	d: 1 e: 10 n] [] ID In ns [] Data :	c. Inc.
CAN Rot	uting Unused	ID Fil	ter settings	CAM2 settings	Frm	saved: 0	ole	Stop send	Send fil	.e
Statis Frm/s R	tics:Ch1	rm/s T: 0			Statist Frm/s R:	ics:Ch2 0 Fr	m/s T: 0	×		
index	System Time	Time Stamp	Channel	Directio Frame ID	Туре	Format DI	C Data			
00000	18:12:17.102 18:12:17.122	- 0xFC6F279	ch1 ch1	Send 0x0625 Receive 0x05A5	Data Data	Standar: 0x Standar: 0x	:08 x 22 0 :08 x 60 0	00 22 00 64 1 00 22 00 00 0	0 00 00	
1.Send that th	I the comm e reporting	and frame time inter	to set t val is se	he reporting int et to 100ms.	erval, w	here the X	byte is s	et to 0x64	4, indicati	ng

Figure 1.0.10

31500015000 0

) Operation(C	2) settings(3	g informa	uon(j) V	new(<u>v</u>) r	ер(<u>п</u>) г	anguage()					
Send	Data												
Form	at: Standard 🗸	Type: Dat	a – CANI	D(HEX):	00 00 06 29	5 Channel	: 1 🗸	Number	to sen	d: 1			ID Inc.
Data(HE	X): 22 10 10 01	73 61 76 65	Send					Se	end Cycl	e: 10)	ms	🗌 Data Ir
CAN Ro	uting	ID Fil	ter			Frm	saved: 0			S	top se	nd	Send file
	Unused	CANI	settings	CAN2 se	ettings	~	Receive E	nable		C	Clear		Save
Statio	stics:Ch1					Statist	ics:Ch2						
Drace.						Frm/s R:	0	Frm/s	T: 0				
Frm/s 1	R: 0 F:	rm/s T: 0											
Frm/s 1	R: 0 F: System Time	rm/s T: 0 Time Stamp	Channel	Directio	Frame ID	Туре	Format	DLC	Data				
Frm/s 1 ndex	R: 0 F: System Time 18:12:17.102	rm/s T: 0 Time Stamp -	Channel ch1	Directio Send	Frame ID Ox0625	Type Data	Format Standar	DLC 0x08	Data x 22	00 22	00 64	00 0	0 00
Frm/s 1 ndex 000000	R: 0 F: System Time 18:12:17.102 18:12:17.122	rm/s T: 0 Time Stamp - 0xFC6F279	Channel chi chi	Directio Send Receive	Frame ID Ox0625 Ox05A5	Type Data Data	Format Standar Standar	DLC 0x08 0x08	Data x 22 x 60	00 22 00 22	00 64	00 0	0 00

Figure 1.0.11

4.2 Motion Range Configuration

4.2.1: Locate the corresponding command frame in the protocol.

4.2.2: Command description: This function sets the motion range limit within $\pm 100^{\circ}$ (positive range: $0 \sim +100^\circ$, negative range: $0 \sim -100^\circ$, factory default range is $\pm 100^\circ$). After the range setting command is successfully sent, the save command must be sent, and the set motion range will take effect after a restart. Once the motion range is successfully set, if the position command sent exceeds the servo's motion range, the servo will not move and will only return an error code in response.



4.2.3: Pay attention to the difference between the command frames for setting the positive range and the negative range (Figures 1.0.12~1.0.13).

4.2.4: The definitions of the High and Low bytes in the command are shown in Figure 1.0.14.

4.2.5: An example is provided to illustrate how to set the reporting interval to $\pm 50^{\circ}$ and save it(Figures1.0.15~1.0.16).

ID	Length	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x 00 00 06 00 +NodeID	8	22	0A	30	00	Low	High	00	00

Reply to the following command to indicate that the setting is successful

		· · · · · · · · · · · · · · · · · · ·	Second and a second second		Surger and a second	· · · · · · · · · · · · · · · · · · ·	and the second	-	
ID	Length	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x 00 00 05 80 +NodeID	8	60	0A	30	00	00	00	00	00

Figure 1.0.12

2 15 2 Setting positive range

2.15.2 Setting	positive	ange							
ID	Length	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x 00 00 06 00 +NodeID	8	22	0B	30	00	Low	High	00	00

Reply to the following command to indicate that the setting is successful

ID	Length	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x 00 00 05 80 +NodeID	8	60	0B	30	00	00	00	00	00
High and los	w bytes a	re the san	ne as that	of setting	nosition	comman	d		

as that of setting position command. ingn

Figure 1.0.13

The position data precision that can be set is 0.1 °, the range is - 100 ° to + 100 ° and the negative value is expressed by complement code as follows:

Position	-100°	-50°	-10.9°	-0.8°	0°	0.8°	10.9°	50°	100°
High	0xFC	0xFE	0xFF	0xFF	0x00	0x00	0x00	0x01	0x03
Low	0x18	0x0C	0x93	0xF8	0x00	0x08	0x6D	0xF4	0xE8

K۵	5T [®]	KS	T CA	N Bu (Sta	ıs Se Indar	rvo d Fr	User ame)	Ma	anua				Page 12/24
Device(D	CAN Tool V9.11 · Operation(C	· CANalyst-II - S)) Settings(<u>S</u>	SN:Serial nu) Inform	umber: 31F	0001F9B8, fi View(<u>V)</u> F	irmware ve Help(<u>H</u>) I	rsion numb L <mark>anguage(</mark>	er: V3.41 <u>L</u>)	I - CHUAN	GXI	-		×
Send [Form: Data(HE)	Data at: Standard ~ (): 22 OA 30 00	Type: Dat	a ~CA Send	NID (HEX) :	00 00 06 2	5 Channe	1: 1 🗸	Number Se	to send: nd Cycle:	1	ms	□ID In □Data D). Inc.
CAN Rot	uting Unused	ID File	ter settings	CAN2 :	settings	Fra	n saved: 0	Enable		Stop s Clea	end r	Send fil	e
Statis Frm/s F	tics:Ch1	rm/s T: 0				Statis Frm/s R:	tics:Ch2	Frm/s	T: 0	tow	H	nigh	
Index 00000	System Time 17:51:15.278	Time Stamp -	Channel ch1	Directi Send	o Frame ID Ox0625	Type Data	Format Standar	DLC • 0x08	Data x 22 OA	30 00	C FE	00 00	

1.Send the command frame to set the negative range, where the low byte is set to 0x0C and the high byte is set to 0xFE. These two bytes indicate that the negative range is set to -50°.

2.Receiving the response frame confirms that the setting was successful. The next step is to save the configuration.

Figure 1.0.15

USB-CAN Tool V9.11 - CANalyst-	II - SN:Serial number: 31F00	001F9B8, firmware ver	sion number: V3.41 - CHU	ANGXI —	
Device(D) Operation(O) Setting	js(<u>S)</u> Information(<u>I)</u> Vi	iew(<u>V)</u> Help(<u>H</u>) L	anguage(<u>L</u>)		
Send Data					
Format: Standard 🗸 Type:	Data CANID(HEX): 00	0 00 06 25 Channel	: 1 vNumber to sen	d: 1	DID Inc.
Data(HEX): 22 OB 30 00 F4 01 00	00 Send		Send Cycl	.e: 10 ms	🗌 Data Inc.
CAN Routing ID 1	Filter	Frm	saved: 0	Stop send	Send file
Unused	AN1 settings CAN2 set	ttings 🛛	Receive Enable	Clear	Save
Statistics:Ch1		Statist	ics:Ch2		
Frm/s R: 0 Frm/s T: 0		Frm/s R:	0 Frm/s T: 0	low h	igh
Index System Time Time Star	np Channel Directio	Frame TD Type	Format DLC Data		
🛑 00000 18:02:07.323 -	ch1 Send	OxO625 Data	Standar 0x08 x 22	OB 30 00 F4 01	00 00
● 00001 18:02:07.329 0xF6A0720	ô ch1 Receive	0x05A5 Data	Standar: 0x08 x 60	08 30 00 00 00	00 00

1.Send the command frame to set the positive range, where the low byte is set to 0x0C and the high byte is set to 0xFE. These two bytes indicate that the positive range is set to +50°.

2.Receiving the response frame confirms that the setting was successful. The next step is to save the configuration.

Figure 1.0.16

4.3 Midpoint Configuration

4.3.1: Locate the corresponding command frame in the protocol (Figure 1.0.17).

4.3.2: Command description: The set midpoint command is used to set the current position as the midpoint. This command is used for fine-tuning the midpoint and is limited to a range of $\pm 20^{\circ}$. For example, to set the position at 5° as the midpoint, first send the command to set the position to 5°, and then send the set midpoint command, which will set the position at 5° as the midpoint.



+NodeID

Byte7

00

Byte8

00

4.3.3: Once the midpoint is successfully set, it takes effect immediately. If the save command is not used to save the setting, the midpoint will revert to its original position after a restart.

4.3.4: An example is provided to illustrate how to set $+0.8^{\circ}$ as the midpoint (Figure 1.0.18).

30

2.9 Set midpoint	t comman	nd					
ID	Length	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6
0, 00 00 06 00							

22

09

г.		~	
Figure	Т.	.υ.	. Τ /

00

00

00

Send I	Data			TD (1072) - [00 00 00 9			b 1	. 1			Ŧ
Data(HE	at. Standard ~ X): 22 09 30 00	Iype: Dat	sa VAN		00 00 08 29) Channel	.: [1]~	Number Se	to send nd Cycle	1	ms Da	ta Inc.
CAN Ro	uting	ID Fil	ter			Frm	saved: 0			Stop sen	d Send	file
	Unused	CAN	settings	CAN2 s	ettings		Receive B	Inable		Clear	_ □s	ive
Statis	stics:Ch1					Statist	ics:Ch2					
frm/s i	K: 0 F:	rm/s T: 0				Frm/s R:	0	Frm/s	T: 0			
Index	System Time	Time Stamp	Channel	Directio	Frame ID	Туре	Format	DLC	Data			24
00000	17:37:08.450	-	ch1 1.	Send	0x0625	Data	Standar	0x08	x 22 03	60 00 08	00 00 00	
00001	17:37:49.442		ch1 2.	Send	0x0625	Data	Standar	0x08	x 22 09	30 00 00	00 00 00	1
00002	17:37:49.449	OxE8BD8C4	ch1 3.	Receive	0x05A5	Data	Standar	0x08	x 60 09	30 00 00	00 00 00	

2.Send the command to set the midpoint.

8

3. Receiving the response frame confirms that the midpoint setting was successful.

Figure 1.0.18

4.4 Guard Function Configuration

4.4.1: Locate the corresponding command frame in the protocol (Figure 1.0.19).

4.4.2: Function Description: The watchdog function is designed to monitor communication integrity between the host computer and the servo. Its operational principle is as follows: the host computer periodically sends request commands. If the servo detects a command within the preset time interval, communication is deemed normal. If no valid command is detected within the set time, communication is considered abnormal, and the servo will move to a predefined position. When the watchdog interval is set to "0", the watchdog function is disabled. (Default watchdog interval at power-on is "0", indicating the function is inactive).

4.4.3: Watchdog Interval: Represented by two bytes (High and Low), in milliseconds (ms), with a valid range of 100ms–5000ms.

4.4.4: Example: Instructions for setting the watchdog time to 100ms and reading the watchdog interval (Figure 1.0.20).



2.18.1 Read g	lard inte	rval											
ID	Length	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8				
0x 00 00 06 00 +NodeID	8	40	0C	10	00	00	00	00	00				
Reply to the	following	g comma	nd to indi	cate that	the opera	tion is su	ccessful.						
ID	Length	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8				
0x 00 00 05 80 +NodelD 8 4B 0C 10 00 Low High 00 00													
The guard time is represented in two bytes, High and Low, with a unit of ms and a range of 100ms-5000ms.													
2.18.2 Setting	Guardia	n Interva	al										
ID	Length	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8				
0x 00 00 06 00 +NodeID	8	22	0C	10	00	Low	High	00	00				
Low, High I	nave the	same de	efinition a	as the re	ad guard	d interva	1.						
							-						
Reply to the	following	g comma	nd to indi	cate that	the settin	g is succe	essful.						
ID	Length	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8				
0x 00 00 05 80 +NodelD 8 60 0C 10 00 00 00 00 00 00													
				Eigung 1	0.10		•						
USR-CAN Tool VO 11	CANabet-II -	SN/Serial pu	mban 315000	1EQR9 firmur	.U.19	mber 1/2 /1 .	CHUANGY						
Device(D) Operation(C)) Settings(S) Informa	ntion(I) Vie	w(V) Help(H) Langua	ae(L)	CHOANGA!.						
Send Data		2/				5-02							
Format: Standard 🗸	Type: De	ita 🗸 CAN	ID (HEX): 00	00 06 25 C	hannel: 1	∼ Number t	o send: 1		ID Inc.				
Data(HEX): 40 OC 10 OC	00 00 00 00	Send				Send	ł Cycle: 10	ms 🗆	Data Inc.				
CAN Routing	ID Fi	lter			Frm saved	. 0	Sto	p send Se	nd file				
Unused		11 settings	CAN2 sett	ings	🕝 Recei	ve Enable	C	lear	Save				
Statistics:Ch1				S	tatistics:Ch	2	10	w Hiał					
Frm/s R: 0 F	rm/s T: 0			Fra	/s R: 0	Frm/s T	: 0						
Index System Time	Time Stamp	Channel	Directio Fr	ame TD T	vpe Form	at NLC D	ata	<u> </u>	_				
00000 17:20:46.407	~	ch1	Send Ox	:0625 D	ata Stan	dar 0x08 x	22 00 10 0	10 64 00 00 C	0				
00001 17:20:46.421	OxDEFEFA5	ch1	Receive Ox Send Ox	05A5 D	ata Stan ata Stan	dar: 0x08 x							
00003 17:21:12.099	OxDF3D953	ch1	Receive Ox	:05A5 D	ata Stan ata Stan	dar 0x08 x	4B OC 10 C	0 64 00 00 0	io l				
									_				
1 Cond the commo	und from o	to cot th	o avand ii	atomial in	have the		luglus of	the bigh	Q. Law				
hytes is 0x64 which	th convert	ts to the	e guaru ii tecimal n	umber 10	0 indicat	ing that t	be quard	interval i	s set to				
100ms. Receiving	the respo	nse frame	confirms	s that the	setting w	as succes	sful.	intervar i	5 500 10				
2.Dispatch the cor	nmand fr	ame to re	trieve the	quard in	terval W	ithin the	orrespor	dina resr	onse				
frame, the amalga	mated va	lue of the	high and	low byte	es is 0x64	, which eq	quates to	the decin	nal				
numeral 100, deno	oting that	the retrie	eved guar	d interva	l is 100ms	5.							



4.5 Factory Reset

4.5.1: Locate the corresponding command frame in the protocol.

4.5.2: Function Description: This function allows the host computer to send a command to restore the servo's configuration data to factory default settings.

4.5.3: Example: Instructions on how to restore factory configuration (Figure 1.0.21).

Send I Form	Data at: Standard 🗸	Type: Dat	a VÇAJ	AID (HEX) :	00 00 06 29	5 Channel	: 1 Vun	per to sen	.d: 1	DID Inc.
Data(HE	x): 22 11 10 01	6C 6F 61 64	Send					Send Cycl	.e: 10 ms	5 🗌 Data Inc
CAN Ro	uting Unused	ID Fil	ter settings	CAN2 s	ettings	Frm	saved: 0 Receive Enab	Le	Stop send	Send file
Stati: Frm/s I	stics:Ch1 R: 0 Fr	rm/s T: 0	Chappel	Directio	Ryona TD	Statist Frm/s R:	i os:Ch2 0 Frm	/s T: 0		
	16:34:51 180	-	chi	Send	0x0625	Data	Standari Oxf	8 x 22	11 10 01 6C 6F	61 64
00001	16:34:51.249	OxC4COBFE	ch1	Receive	0x05A5	Data	Standar, OxC	8 x 60	11 10 01 00 00	00 00
1.Sen	d the comn	nand frame	e to rest	ore fact	ory setti	ings. settings	were succe	ssfully	applied	

Figure 1.0.21

4.6 Enable Reporting Function

4.6.1: Locate the corresponding command frame in the protocol.

4.6.2: Send the corresponding communication command to the servo via the host computer (Figure 1.0.22).

4.6.3: Data reporting initiates, indicating successful startup. Continuous reception of data frames is now enabled (Figure 1.0.23).

2.1 Start reporting									
ID	Length	Byte 1	Byte 2						
0x 00 00 00 00	2	01	00						
+NodeID	2	01	00						

KS	5T ®	KS	T CA	N Bus ((Standa	Servo ard Fi	User rame)	Manua	al		Page 16/24
EN USB-	CAN Tool V9.11	- CANalyst-II -	SN:Serial n	umber: 31F0001F9I	38, firmware ve	rsion number:	V3.41 - CHUAI	NGXI	- 0	×
Device(D) Operation(() Settings(§) Inform	nation(I) View(V) Help(<u>H</u>)	Language(<u>L</u>)				
Send [Data									
R						1. 1				
rorm	at. Standard	Type: Dai		MID (MEX). 00 00 (JU 20 Lhanne		umber to send	1	UID Inc	
Data(HE)	X): 01 00		Send	1	1		Send Cycle	: 10	ms 🗌 Data I	nc.
-		Send o	omm	and frame	/			<u></u>		
CAN Roy	uting	ID Fil	ter		Fri	n saved: O		Stop sen	d Send file	
	Unused	CAN	settings	CAN2 setting						_
	Cor	tinuous re	contion	of more a do	indicator	Keceive En:	able Loctivation	Clear	Save	
Statis	stics:Ch1	itinuous re	ception	rormessages	Statis	tics:Ch2	i activatioi	1 OF Gata	reporting	•
Run (n. K					Run /n P					
110751	. <u>o</u> r	111/5 1.0			110/51		110/51.0			
Index	System Time	Time Stamp	Channel	Directio Frame	ID Type	Format I)LC Data			
00000	15:45:00.667	-	ch1	Send 0x002	5 🌂 Data	Standar: C	x02 x 01 00)		
00001	15:45:00.699	OxA8448FD	ch1	Receive OxO5A	5 Data	Standar: C	0x04 x B3 FH	00 00		
00002	15:45:00.729	0xA844AF0	ch1	Receive Ox05A	5 Data	Standar: C	x04 x B2 FH	00 00		
00003	15:45:00.790	OxA844CE4	ch1	Receive OxO5A	5 Data	Standar, C	0x04 x B3 FH	00 00		
00004	15:45:00.849	OxA844ED7	ch1	Receive OxO5A	5 Data	Standar: C)x04 x B3 FH	00 00		3
00005	15:45:00.880	0xA8450CA	ch1	Receive OxO5A	5 Data	Standar: C	0x04 x B2 FH	00 00		
00006	15:45:00.939	OxA8452BE	ch1	Receive OxO5A	5 Data	Standar: C	0x04 x B2FH	00 00		
00007	15.45.00.999	0v48454B1	ch1	Receive Ov054	5 Doto	Standar, C	1v04 v B2 FF			

Figure **1.0.23**

4.7 Disable Reporting

4.7.1: Locate the corresponding command frame in the protocol.

4.7.2: Send the corresponding communication command to the servo via the host computer (Figure 1.0.24).

4.7.3: Data reporting stops, indicating successful termination (Figure 1.0.25).

2.2 Stop reporting	g		
ID	Length	Byte 1	Byte 2
0x 00 00 00 00	2	02	00
+NodeID	2	02	00

Figure **1.0.24**

K	5T ®	KS	T CAI	N Bu (Sta	s Se ndar	rvo d Fr	User M ame)	lanua l	Page 17/24
USB-	-CAN Tool V9.11	- CANalyst-II - S	5N:Serial nu	mber: 31F0	0001F9B8, fii	rmware ver	sion number: V3.4	41 - CHUANGXI — 🗆	×
Device(D) Operation() Settings(S) Inform	ation(I)	/iew(V) H	lelp(<u>H</u>) L	.anguage(<u>L</u>)		
Send	Data		2.5						
Form	at: Standard 🗸	Type: Dat	a CAN	IID (HEX) :	00 00 00 25	Channel	.: 1 - Numbe	r to send: 1 ID I	nc.
Data(HE	x): 02 00	R2	Send		1		5	and fuels: 10 ms Data	Inc
		Sen	t comm	and fran	ne		5		
CAN Ro	uting	ID Fil-	ter	and nai	iic.	Frem	royad: 0	Cr.,	1.
	Unused]		CANO -		1111	saveu. [0	Stop send Send I	.ie
	Unused		Settings	CAM2 S	ettings	E	Receive Enable	Clear Save	
Stati	stics:Ch1		After	the cor	nmand	was issu	ied, the data	stopped being reported	ł.
Rue /a	P. 0 F.					Run /n P.	0 Rue /	T. 0	
rim/s.	n. 0 r.	111/5 1. 0	1.1			FIM/S R.	0 Frinys	. 1. 0	
Index	System Time	Time Stamp	Channel	Directio	Frame ID	Туре	Format DLC	Data	
00069	16:03:20.529	0xB2BE6FA	ch1	Receive	0x05A5	Data	Standar: 0x04	x B2 FF 00 00	
00070	16:03:20.590	OxB2BE8ED	ch1	Receive	0x05A5	Data	Standar: 0x04	x B3 FF 00 00	
00071	16:03:20.650	OxB2BEAE1	ch1	Receive	0x05A5	Data	Standar: 0x04	x B3 FF 00 00	
00072	16:03:20.679	OxB2BECD4	ch1	Receive	0x05A5	Data	Standar, 0x04	x B2 FF 00 00	
00073	16:03:20.740	OxB2BEEC7	ch1	Receive	0x05A5	Data	Standar: 0x04	x B2 FF 00 00	
00074	16:03:20.769	OxB2BF0BB	ch1	Receive	0x05A5	Data	Standar: 0x04	x B2 FF 00 00	
00075	16:03:20.830	OxB2BF2AE	ch1	Receive	0x0545	Data	Standar: 0x04	x B3 FF 00 00	
00076	16:03:20.890	0xB2BF4A1	ch1	Receive	0x05,5	Data	Standar: 0x04	x B2 FF 00 00	
00077	16:03:20.920	0xB2BF695	ch1	Receive	0x05A5	Data	Standar: 0x04	x B3 FF 00 00	
00078	16:03:20.979	0xB2BF888	ch1	Receive	0x05A	Data	Standar: 0x04	x B3 FF 00 00	
00079	16:03:21.039	0xB2BFA7C	ch1	Receive	0x05A5	Data	Standar: 0x04	x B3 FF 00 00	
00080	16:03:21.069	OxB2BFC6F	ch1	Receive	0x05A5	Data	Standar: 0x04	x B3 FF 00 00	
00081	16:03:21.130	OxB2BFE62	ch1	Receive	0x05A5	Data	Standar: 0x04	x B2 FF 00 00	1
00082	16:03:21.189	0xB2C0055	ch1	Receive	0x05A5	Data	Standar: 0x04	x B3 FF 00 00	
00083	16:03:21.212	-	ch1	Send	0x0025	Data	Standar: 0x02	x 02 00	

Figure 1.0.25

4.8 Save Command

4.8.1: Send the corresponding command frame.

4.8.2: Function Description: This command is used to save the node ID, baud rate, and other parameters. (No response required from the subordinate device).

4.9 Read Node ID

4.9.1: Send the corresponding command frame.

4.9.2: Receive the corresponding response frame, where X represents the read node ID (Figure 1.0.26).

4.9.3: Example: Instructions on how to read the node ID (Figure 1.0.27).

2.11 Read node number												
ID	Length	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8			
0x 00 00 06 00 +NodeID	8	40	00	30	00	х	00	00	00			

reply:

ID	Length	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
0x 00 00 05 80 +NodeID	8	4F	00	30	00	x	00	00	00

Figure **1.0.26**

K٢	ST [®]	KST	r ca	N Bus (Stan	Se Idar	rvo d Fr	User M ame)	anua	al		Page 18/24
Device(D) Send D Form Data(HE) CAN Roo	CAN Tool V9.11 -) Operation(Data at: Standard (): 40 00 30 00 ating Unused tios:Ch1	CANalyst-II - 5) Settings(S Type: Dat 00 00 00 00 ID Fil CAN1	SN:Serial nu) Inform a CA Send settings	umber: 31F00 hation(1) Vi NID (HEX): 00 1 1 send com CAN2 set	01F988, fir ew(<u>V</u>) H 00 06 25	rmware ver lelp(H) L Channel frame Frm Statist	sion number: V3.4 anguage(L) :: 1 Viumbe: S saved: 0 Receive Enable ics: Ch2	1 - CHUA r to send end Cycle	NGXI	DID Inc Data I Send fil Save	× 5. [nc.
Frm/s B	t: 0 F1	rm/s T: 0				Frm/s R:	0 Frm/s	T: 0			
Index	System Time	Time Stamp	Channel	Directio H	'rame ID	Туре	Format DLC	Data		_	
 00000 00001 	16:10:51.831 16:10:51.849	- Oxb70AEB5	ch1 ch1	Send (Receive ()x0625)x05A5	Data Data	Standar: 0x08 Standar: 0x08	x 40 0 x 4F 0	0 30 00 00 00 0 30 00 25 00 This byt	00 00 00 00	ents
1.Sen 2.Upc	d the comm	hand to rea the respo	nd the n	node ID, w ne, it indi	/ith X b cates a	ytes set success	to 00. sful read, wit	h the X	X. (bytes der	noting th	at
the no	ode ID is 0x	25.									

Figure 1.0.27

4.10 Function Enable Configuration

4.10.1: Command Description: This command is used to enable/disable specific system functions. First, read the enablement byte data, then modify only the corresponding bit(s) to activate/deactivate the desired function (other bits remain unchanged). Default state: "1" indicates enabled, "0" indicates disabled.

4.10.2: Read Command and Response Frame: Note that modifying reserved bits may cause servo malfunctions.

4.10.3: Modify Enablement and Response Frame: Ensure to save changes after modification (Figure 1.0.28).

4.10.4: Example: Instructions for enabling the reverse function (Figures 1.0.29–1.0.30). Logic Reverse Function Description:

This function is implemented by setting the "Reverse" bit in the enablement byte.

When the "Reverse" bit is "0", the position returned by the read command is positive.

When the "Reverse" bit is "1", the position returned is negative.

Example: If the current position is 50°:

With the "Reverse" bit set to "0", the read command returns "50°".

With the "Reverse" bit set to "1", the read command returns "-50°".

Direction Inversion Function Description:

This function is implemented by setting the "Invert" bit in the enablement byte.

When the "Invert" bit is "0", the servo rotates in the default direction.

When the "Invert" bit is "1", the servo rotates in the opposite direction of the default.



The read enable command is as follows:												
ID	Length	Byte1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8			
0x 00 00 06 00 +NodeID	8	40	0F	30	00	00	00	00	00			

reply:

ID	Length	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x 00 00 05 80 +NodeID	8	4B	0F	30	00	X1	X2	00	00

X1,X2 is the enable byte of read back, and each bit has the following functions:

Bit	7	6	5	4	3	2	1	0
Function (X1)	X	logic reverse	Low voltage alarm	X	X	X	X	X
Bit	7	6	5	4	3	2	1	0
Function (X2)	X	X	Х	x	X	X	X	motion reverse

X: Indicates the reserved bit. If the user rewrites it, the function of the servo will be abnormal;

The rewrite enable command is as follows: X1,X2 is the data written by the user

ID	Length	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
	Longin	29.01	29.42	29.00	- Jack	2 July 2	29.00	D J C I	27.00
0x 00 00 06 00	8	22	OF	30	00	X 1	X2	00	00
+NodeID	0		01	50	00	AI	712	00	00

The following reply indicates that the operation is successful:

ID	Length	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x 00 00 05 80 +NodeID	8	60	0F	30	00	00	00	00	00

The rewrite function will take effect immediately after it is successful. If you do not save with the Save command, it will return to the original state after restart.

K٩	5T [®]	KS	T CA	N Bus Se (Standar	ervo User N d Frame)	lanua l	Page 20/2
Device(D	-CAN Tool V9.11) <mark>Operation((</mark>	- CANalyst-II - 5 <u>)</u> Settings(<u>S</u>	SN:Serial nu) Inform	umber: 31F0001F9B8, i nation(]) View(V)	iirmware version number: V3. Help(<u>H)</u> Language(<u>L</u>)	41 - CHUANGXI —	
Send Form	Data at: Standard 🗸	Type: Dat	a VCAJ	NID(HEX): 00 00 06 :	25 Channel: 1 Viumb	er to send: 1	DID Inc.
Data(HE	X): 22 OF 30 00	0 40 01 00 00	Send			Send Cycle: 10 ms	5 🗌 Data Inc.
Data(HE	X): 22 OF 30 00 uting Unused	10 40 01 00 00 ID Fil CAN1	Send ter settings	CAN2 settings	Frm saved: 0	Send Cycle: 10 ms Stop send e Clear	Send file
Data(HE CAN Ro Statis Frm/s 1	X): 22 OF 30 00 uting Unused stics:Ch1 R: 0 F	0 40 01 00 00 ID Fil: CAN1 rm/s T: 0	Send ter settings	CAN2 settings	Frm saved: 0 Receive Enable Statistics:Ch2 Frm/s R: 0 Frm/	Send Cycle: 10 ms Stop send e Clear	s Data Inc. Send file Save
Data(HE CAN Ro Stati: Frm/s D Index	<pre>X): 22 OF 30 OC uting Unused stics:Ch1 R: 0</pre>	0 40 01 00 00 ID Fil- CAN1 rm/s T: 0 Time Stamp	Send ter settings Channel	CAN2 settings Directic Frame ID	Frm saved: 0 Frm saved: 0 Statistics:Ch2 Frm/s R: 0 Type Format DLC	Send Cycle: 10 ms Stop send Clear 's T: 0	s Data Inc. Send file Save

1.Read the enable bits, and find that the X1 byte of the response frame is 0x40 and the X2 byte is 0x00, indicating that both the reverse bit and the inversion bit are 0, meaning neither the reverse function nor the inversion function is enabled.

Receive 0x05A5

Receive Ox05A5

0x0625

Data

Data

Send

2.Send the command to set the enable bits, set the X1 byte to 0x40 to set the reverse bit to 0, and set the X2 byte to 0x01 to set the inversion bit to 1. At this point, the reverse function is disabled, and the inversion function is enabled. Receiving the response frame indicates that the settings were successfully applied.

					Figur	e 1.0.2	9						
USB	-CAN Tool V9.11	- CANalyst-II - :	SN:Serial nur	mber: 31F(0001F9B8, fi	rmware ver	rsion numbe	r: V3.4	1 - CHUAN	IGXI			×
Device(L) Operation(C) Settings(S) Informa	tion()	View(V)	telp(<u>H</u>) L	anguage(L)					
Send	Data												
Form	at: Standard 🗸	Type: Dat	a VCAN	CD (HEX) :	00 00 06 2	5 Channel	L: 1 🔍	Number	to send:	1	0]ID In	с.
Data(HE	X): 22 10 10 01	73 61 76 65	Send					S	end Cycle:	10	ms (Data :	Inc.
CAN Re	uting	ID Fil	ter			Frm	saved: 0			Stop sen	d :	Send fil	e
	Unused	CANI	settings	CAN2 s	ettings	C	Receive E	nable		Clear		Save	
	-+												
Stati	STICS.UNI					Statist	ics:Ch2						
Statı Frm/s	R: 0 F:	rm/s T: 0				Statist Frm/s R:	tics:Ch2	Frm/s	T: 0				
Stati Frm/s Index	R: 0 F: System Time	rm/s T: 0 Time Stamp	Channel	Directio	Frame ID	Statist Frm/s R: Type	cics:Ch2 0 Format	Frm/s DLC	T: O Data				
Stati Frm/s Index	R: 0 F: System Time 16:57:39.391	rm/s T: 0 Time Stamp -	Channel ch1	Directio Send	Frame ID Ox0625	Statist Frm/s R: Type Data	tics:Ch2 0 Format Standar:	Frm/s DLC Ox08	T: 0 Data x 40 OF	30 00 00	00 00	00	_
Stati Frm/s Index 00000 00001	R: 0 F: System Time 16:57:39.391 16:57:39.399	rm/s T: 0 Time Stamp - 0xD1C8E02	Channel ch1 ch1	Directio Send Receive	Frame ID 0x0625 0x05A5	Statist Frm/s R: Type Data Data	ics:Ch2 0 Format Standar Standar	Frm/s DLC 0x08 0x08	T: 0 Data x 40 OF x 4B OF	30 00 00 1 30 00 40	00 00	00	-
Stati Frm/s Index 000000 00001 000002	R: 0 F: System Time 16:57:39.391 16:57:39.399 16:58:17.650	rm/s T: 0 Time Stamp - 0xD1C8E02 -	Channel ch1 ch1 ch1	Directio Send Receive Send	Frame ID 0x0625 0x05A5 0x0625	Statist Frm/s R: Data Data Data	ics:Ch2 0 Format Standar: Standar: Standar:	Frm/s DLC 0x08 0x08 0x08	T: 0 Data x 40 OF x 4B OF x 22 OF	30 00 00 30 00 40 30 00 40	00 00 00 00 01 00	00 00 00	
Stati Frm/s 00000 00001 00002 000002	R: 0 F: System Time 16:57:39.391 16:57:39.399 16:58:17.650 16:58:17.679	rm/s T: 0 Time Stamp - 0xD1C8E02 - 0xD2262AC	Channel ch1 ch1 ch1 ch1 ch1	Directio Send Receive Send Receive	Frame ID 0x0625 0x05A5 0x0625 0x0625	Statist Frm/s R: Data Data Data Data	tics:Ch2 0 Format Standar, Standar, Standar, Standar,	Frm/s DLC 0x08 0x08 0x08 0x08 0x08	T: 0 Data x 40 OF x 4B OF x 22 OF x 60 OF	30 00 00 30 00 40 30 00 40 30 00 00	00 00 00 00 01 00 00 00	00 00 00 00	
Stati Frm/s 00000 00001 00002 00003 00003	System Time 16:57:39.391 16:55:17.650 16:56:17.679 17:15:57.644	rm/s T: 0 Time Stamp - 0xD1C8E02 - 0xD2262AC -	Channel chi chi chi chi chi chi	Directio Send Receive Send Receive Send	Frame ID 0x0625 0x05A5 0x0625 0x05A5 0x0625	Statist Frm/s R: Data Data Data Data Data	i cs: Ch2 0 Format Standar, Standar, Standar, Standar, Standar,	Frm/s DLC 0x08 0x08 0x08 0x08 0x08	T: 0 Data x 40 OF x 4B OF x 22 OF x 60 OF x 22 10	30 00 00 30 00 40 30 00 40 30 00 00 10 01 73	00 00 00 00 01 00 00 00 61 76	00 00 00 00 65	

Figure 1.0.30

00003 16:58:17.679 0xD2262AC

00002 16:58:17.650 -

ch1

ch1

Standar, 0x08 x 4B 0F 30 0C 40 00 00 00

Standar 0x08 x 22 0F 30 00 40 01 00 00 Standar 0x08 x 60 0F 30 00 00 00 00 00



5. Servo Function Testing

5.1 Set Position

5.1.1: Function Description: As shown in the figure below, note that the position data resolution is 0.1° , with a range of -100° to $+100^{\circ}$. Negative values are represented in two's complement (Figure 1.0.31).

5.1.2: Example: Instructions for setting the position to -0.8° and reading the configured position (Figure 1.0.32).

2.8 Position setting command

ID	Length	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
0x 00 00 06 00 +NodeID	8	22	03	60	00	Low	High	00	00

(the lower computer does not need to answer)

The position data precision that can be set is 0.1 °, the range is - 100 ° to + 100 ° and the negative value is expressed by complement code as follows:

Position	-100°	-50°	-10.9°	-0.8°	0°	0.8°	10.9°	50°	100°
High	0xFC	0xFE	0xFF	0xFF	0x00	0x00	0x00	0x01	0x03
Low	0x18	0x0C	0x93	0xF8	0x00	0x08	0x6D	0xF4	0xE8

(If the position command exceeds the range, the current device returns an error code)

Figure **1.0.31**

🚟 USB-CAN Tool V9.11 - CANalyst-II - SN:Serial number: 31F0001F9B8, firmware version number: V3.41 - CHUANGXI... X Device(D) Operation(O) Settings(S) Information(I) View(V) Help(H) Language(L) Send Data Format: Standard - Type: Data CANID(HEX): 00 00 06 25 Channel: 1 ✓ Number to send: 1 ID Inc. Data(HEX): 40 02 60 00 00 00 00 00 Send Send Cycle: 10 ms 🗌 Data Inc. CAN Routing ID Filter Frm saved: O Stop send Send file Unused CAN1 settings CAN2 settings 🔽 Receive Enable Clear Save Statistics:Ch1 Statistics: Ch2 High Low Frm/s R: 0 Frm/s R: 0 Frm/s T: 0 Frm/s T: 0 Format DLC Index Channel Directio Frame ID System Time Time Stamp Type Data Standar 0x08 x 22 03 60 00 F8 FF 00 00 00000 16:41:54.579 ch1 Send 0x0625 Data -0x0625 Standar, 0x08 x 40 02 60 00 00 00 00 00 00001 16:42:58.119 ch1 Send Data 00002 16:42:58.149 0xC963FBA Receive Ox05A5 Standar, 0x08 x 4B 02 60 00 F4 FF 00 00 ch1 Data

1.Send the command to set the position, and calculate the target position as -0.8 by combining the Low & High bytes.

2.Send the command to read the position; receiving the response frame indicates a successful read, and the read position value of -1.1 is obtained by combining the Low & High bytes in the response frame (± 0.5 is within the normal error range).



5.2 Read Position

5.2.1: Send the command frame to read position information (Figure 1.0.33).

5.2.2: Response Confirmation: Receiving the corresponding response frame indicates a successful read. Note that the High and Low bytes for the read position follow the same data structure as those used in position setting commands.

5.2.3: Example: Instructions for reading the current position information (Figure 1.0.34).

212	Read	location	
4.14	Ittau	Incation	

ID	Length	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
0x 00 00 06 00 +NodeID	8	40	02	60	00	00	00	00	00

reply:

	20	g;	5N					1	
ID	Length	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
0x 00 00 05 80 +NodeID	8	4B	02	60	00	Low	High	00	00
ETHAN I HAVE A REAL PROPERTY AND	100 Cav	1111	2010/02/01/01	30 30	200 18 00.07	0.202	2552		

The read position is the same as the high and low byte definition of the set position.

Figure 1.0.33

Send I	D <mark>a</mark> ta											
Form	at: Standard 🗸	Type: Dat	a vCAN	ID (HEX) :	00 00 06 29	5 Channel	: 1 🗸	Number	to send	1		ID Inc.
Data(HE	X): 40 02 60 00	00 00 00 00	Send					Se	nd Cycle	: 10	ms	🗌 Data Ir
CAN Ro	uting	ID Fil	ter			Frm	saved: 0			Stop s	end	Send file
	Unused	CANI	settings	CAN2 s	ettings	C	Receive E	nable		Clea	ur	Save
Statis	stics:Chi	em/s T: 0				Statist Frm/s R:	ics:Ch2	Frm/s	T: 0	Low	1	High
Frm/s I					Transformer and the second second		Farmet	DIC	Dete	ſ		1
Frm/s I Index	System Time	Time Stamp	Channel	Directio	Frame ID	Type	rormat	DLL	Data			
Frm/s H index 00000	System Time 16:41:54.579	Time Stamp -	Channel ch1	Directio Send	Frame ID Ox0625	Type Data	Standar:	0x08	x 22 03	3 60 00 H	78 FF	00 00
Frm/s H index 00000 00001	System Time 16:41:54.579 16:42:58.119	Time Stamp - -	Channel ch1 ch1	Directio Send Send	Frame ID 0x0625 0x0625	Type Data Data	Standar: Standar:	0x08 0x08	x 22 03	3 60 00 F	78 FF 00 00	00 00

Low & High bytes.

2.Send the command to read the position; receiving the response frame indicates a successful read, and the read position value of -1.1 is obtained by combining the Low & High bytes in the response frame (± 0.5 is within the normal error range).



6. Servo Status Reading

6.1 Current and Temperature Reading

6.1.1: Send the read command and parse the response frame as shown in the figure (Figure 1.0.35).

6.1.2: Example: Instructions for reading current and temperature (Figure 1.0.36).

6.1.3: Based on the data read in Step 2, calculate the results using the formula defined in the command frame:

- 1.Current: 0x0000 converted to decimal is 0, with a unit of 10mA.
- 2.Temperature: 0x1E converted to decimal using two's complement calculation results in 30.

2.13 Read status

ID	Length	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
0x 00 00 06 00 +NodeID	8	40	05	60	00	00	00	00	00

reply:

ID	Length	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8		
0x 00 00 05 80 +NodeID	8	43	05	60	00	X1	X2	X3	00		
"X1" and "X2" o	"X1" and "X2" denote the working current (accuracy $\pm 5\%$ or 0.01A) in 10mA for example:										

X2	0x00	0x00	0x00	0x01	0x01
X1	0x32	0x4B	0x64	0x00	0xF4
Current	0.50A	0.75A	1.00A	2.56A	5.00A

xpressed by complement iperature (temperatur code, for example:

X3	0xD8	0xF6	0x00	0x19	0x78
Temperature	-40°C	-10°C	0°C	25°C	120°C

K٩	5T [®]	KS	T CA	N Bus Se (Standar	rvo d Fr	User Man ame)	ual	Page 24/24
Device(D Send I Form Data(HE)	CAN Tool V9.11) Operation(Data at: Standard X): 40 05 60 00	- CANalyst-II - : 2) Settings(S - Type: Dat	SN:Serial n) Inform a ~CA Send	umber: 31F0001F9B8, fi nation(1) View(V) F NTD (HEX): 00 00 06 2	rmware ve lelp(<u>H</u>) 5 Channe	rsion number: V3.41 - Cl Language(L) 1: 1 Viumber to Send C	HUANGXI — — — — — — — — — — — — — — — — — —	X Inc. ta Inc.
CAN Ro Statis Frm/s I	uting Unused stios:Ch1 A: 0 F	ID Fil CANI rm/s T: 0	ter settings	CAN2 settings	Fr Statis Frm/s R	n saved: 0 Receive Enable tics:Ch2 : 0 Frm/s T: 0	Stop send Send Clear Sa	file
Index	System Time	Time Stamp	Channel	Directio Frame ID	Туре	Format DLC Dat:	a	
00000	16:24:11.047	-	ch1	Send 0x0625	Data	Standar: 0x08 x 4	40 05 60 00 00 00 00 00	
00001	16:24:11.049	OxBEA7BA9	ch1	Receive OxO5A5	Data	Standar: 0x08 x 4	43 05 60 00 00 00 18 00	
1.Sen 2.Rec	d the comn eiving the r	nand frame esponse fr	e to read ame inc	d the status. dicates a success	ful read	d.	x1 x2 x	3

Figure **1.0.36**

END