

VER 1.1 DINGS' Servo Studio Manual

DS-BVS/BVM-Series





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2. Screen Layout



Name	Description	
Ribbon Bar	Function Button Connection Parameter Management Servo Control Firmware Update. Scope Setting	
Caption Bar	Check important messages	
Device List	Check and select from list of connected drives	
Tool Pane	Menu selection Drive Setup: Motor & Feedback Settings, Tuning Motion: Motor Drive Object Dictionary: Load & Download Object List I/O: I/O Monitor & Test Motion List: Sequence Motion Modification & Drive Test	
Status Bar	Indicates device status	
Target Pane	Settings, Command Entry Window Differs with tool pane selection	Page 3
Log Message	Check device connection status and error messages	



3. Device Connection

3.1 Connecting CAN Communication

3.1.1 Connecting method for CAN communication

(1) Execute DINGS' Servo Studio and click [Connect] in the Ribbon Bar

\cap	DINGS' Servo Studio - 2.00.000									
•	Home	Scope								
Connec	Disconnect	Restore Import Export Save	Enable Halt QuickStop ErrorReset	rmware Object Scope Caption Log LogClear						
Co	nnection	Parameter	Servo Control Fri	imware View						

(2) Select Connection Type in the Connection Window

Select Type corresponding to Kvaser CAN, Peak-System CAN, or Zhcxgd CAN

Connection		×
Connection Type	Kvaser CAN V	
Channel	COM14 ~	
CAN Bitrate	1M bps $$	
Serial Baudrate	921600 bps ~	
ID Scan Range	1 ~ 3	
	OK Cancel	

(3) Select CAN bitrate (Default: 1M bps)

Set ID Scan Range. (Drive default ID = 1)

If the Device ID is known, set the range according to the ID.

To connect multiple drives, the ID must be set differently for each drive before connecting the drive.



- (4) Click OK
- (5) When the drive is connected, a connection message appears in the Log Message window, and a list of connected drives appears in the Device List window.

3.1.2 Changing CAN communication

- To connect multiple drives through CAN communication, set different ID for each drive. If the ID is duplicated, communication failure occurs.
- (1) Click [Object Dictionary] on the ribbon bar



- (2) Select Object Group as Drive Info
- (3) Modify the communication ID (Index: 0x5000) in the Object List and click the [Download] button. Communication ID can be set from 1 to 127

oject Group	Drive I	nfo	↓ Load	Down	load	
index	SubIndex	Item	Value	Unit	Range	Access
0x1000	0x00	Device Type		Number	Const	RW
0x1008	0x00	Device Name		-	-	RW
0x1009	0x00	H/W Version			÷	RW
0x100A	0x00	S/W Version		(* 1)	-	RW
0x1018	0x01	Vendor ID		Number	Const	RW
0x1018	0x02	Product Code		Number	Const	RW
0x1018	0x03	Revision Number		Number	Const	RW
0x1018	0x04	Serial Number		Number	Const	RW
∨ 0x5000	0x00	Communication ID	2	Number	1~127	RW
0x5001	0x00	UART Baudrate		Number	5=115.2k, 8=921	RW
0x5002	0x00	CAN Bitrate		Number	6=500k, 8=1M	RW

- (4) Click the [Save] button to save the changed ID
- (5) Drive Power OFF -> ON

3.1.3 Changing CAN Bitrate

(1) Click [Object Dictionary] on the ribbon bar



DINGS'	Servo	Studio	2.00.00

\cap				DIN	GS' Servo Studio - 2.00.0
Home	Scope				
Connect Disconnect	Restore Import Export Save	Enable Halt QuickStop ErrorReset	Firmware	Object	on Log LogClear
Connection	Parameter	Servo Control	Frimware	Vie	w

(2) Select Object Group as Drive Info

bject Group	Drive I	nfo	∼ Load	Down	load	
Index	SubIndex	Item	Value	Unit	Range	Access
0x1000	0x00	Device Type		Number	Const	RW
0x1008	0x00	Device Name		-	-	RO
0x1009	0x00	H/W Version		-	-	RW
0x100A	0x00	S/W Version		-	-	RW
0x1018	0x01	Vendor ID		Number	Const	RO
0x1018	0x02	Product Code		Number	Const	RW
0x1018	0x03	Revision Number		Number	Const	RW
0x1018	0x04	Serial Number		Number	Const	RO
0x5000	0x00	Communication ID		Number	1 ~ 127	RW
0x5001	0x00	UART Baudrate		Number	5=115.2k, 8=921	RW
V 0x5002	0x00	CAN Bitrate	3	Number	6=500k, 8=1M	RO

(3) Modify CAN Bitrate (Index: 0x5002) in the Object List and click the [Download] button..

Value	Description
0	None
1	10 kbps (Not Supported)
2	20 kbps
3	50 kbps
4	125 kbps
5	250 kbps
6	500 kbps
7	800 kbps(Not Supported)
8	1 Mbps

- (4) Click the [Save] button to save the changed CAN Bitrate.
- (5) Drive Power OFF -> ON

3.2 Connecting USB

• USB drive is installed under the condition of Internet connection.



- USB drives are installed differently depending on the servo drive model.
- When connecting the servo drive to the PC for the first time, check the USB drive installed in the Device Manager and connect it using the appropriate connection method for the installed USB drive as shown in the figure below.



USB Connection method 1

USB Connection method 2

3.2.1 USB Connection Method 1



- (1) Connect PC and servo drive with USB cable
- (2) After executing DINGS Servo Studio, click the [Connect] button on the Ribbon Bar.



6												DINGS	Serve	o Studio - 2.00.000	6
		Home	Scope												
	Connect	<u>C:</u> Disconnect		port Export	H Save	U Enable	e Halt	QuickStop ErrorReset	Firmware	D bject	Scope	Caption	Log	LogClear	
l	Conr	nection		Parameter			Ser	vo Control	Frimware			View			

- (3) In the Connection window, select the Connection Type as COM
- (4) Select Channel & Serial Baud rate then click OK Button (Default: 3Mbps)

If the connection is not possible at 3Mbps, change the serial transmission speed to 921600 bps and connect

Connection		Х
Connection Type	COM ~	
Channel	COM21 ~	
CAN Bitrate	1M BPS \sim	
Serial Baudrate	921600 ~	
ID Scan Range	. 1 ~ 3	
	OK Cancel	

3.2.2 USB Connection Method 2



- (1) Connect PC with drive USB cable
- (2) Select [Device Manager]-[Port]-[USB Serial Port Properties]-[Port Settings]-[Advanced]



📇 장치 관리자		
파일(F) 동작(A) 보기(V)	USB Serial Port(COM8) 속성	×
← → 〒 □ 2 □ >	일반 포트설정 드라이버 자세히 이벤트	
> IDE ATA/ATAPI 컨	비트/초(B): 9600 ~	
> _ 디스크 드라이브 > _ 디스크 드라이브 > _ 디스플레이 어댑테	데이터 비트(D): 8 ~	
> 🕕 마우스 및 기타 포 모니터	패리티(P): 없음	
> 🏺 범용 직렬 버스 컨	정지 비트(S): 1 ~	
> 때 사군드, 비디오 및 > 편 센서	흐름 제어(F): 없음 🗸 🗸	
 * ** 소프트웨어 구성 · * ** 소프트웨어 장치 * ** 시스템 장치 	고급(A) 기본값 복원(R)	
> 📢 오디오 입력 및 출 > 🚡 이미징 장치		
> 🖻 인쇄 대기열 > 🍇 저장소 컨트롤러		
> 🔜 컴퓨터 > 🚃 키보드		
✔ ₩ 포트(COM & LPT ₩ USB Serial Po ₩ 통신 포트(CO)		
> 🔲 프로세서 > 쨰 휴먼 인터페이스 -	확인	취소

(3) Set the response time adjustment in the BM-related settings to 1

COM8 고급 설정			?	×
COM 포트 번호(P):	COM8	× -	확인	_
USB 전송 크기			취소	
저속 통신에서 성능 문제 말 고속 전송을 원하면 높은값을	명시 낮은값을 설정하십시오. 을 설정하십시오.		기본값(D)
수신 (바이트):	4096 ~			
송신 (바이트):	4096 ~			
BM 관련 설정		기타 설정		
응답 지연 문제 발생시 낮은	값을 설정하십시오.	직렬 이뉴머레이터 직렬 프린터		
응답 시간 조정 (msec):	1 ~	전원 제거시 동작 취소 급제거시 이벤트 발생		
시간초과		종료시 RTS 설정		
읽기 시간 초과 최소값 (mse	c): 0 ~	초기 동작시 모뎀 제어 비활성 Enable Selective Suspend		
쓰기 시간 초과 최소값 (mse	c): 0 ~	Selective Suspend Idle Timeout (secs):	5	~

(4) Execute DINGS Servo Studio and click [Connect] in the Ribbon Bar

								DINGS' Serv	o Studio - 2.00	0.0006
	Home	Scope								
Connec	C: Disconnect		port Save	Enable H	alt QuickStop ErrorRe	set Firmware	Object Scope	Caption Log	LogClear	
Cor	nection	Paramet	ter		Servo Control	Frimware		View		

- (5) Select COM for the Connection Type in the Connection Window
- (6) Select Channel, select Serial Baud rate, and click OK (Default: 921600)



Connection		×
Connection Type	COM 🗸	
Channel	COM21 ~	
CAN Bitrate	1M BPS \sim	
Serial Baudrate	921600 ~	
ID Scan Range	1 ~ 3	
	OK Cancel	

If the USB does not connect, disconnect the USB cable from the USB port and reconnect

the cable.

3.2.3 Changing USB Band Rate

(1) Click Object Dictionary



(2) Select Object Group as Drive Info

Object Group	Drive I	nfo 🗸 🗸 🗸	Load	Downlo	bad	
Index	SubIndex	Item	Value	Unit	Range	Access
0x1000	0x00	Device Type		Number	Const	RW
0x1008	0x00	Device Name		-	-	RO
0x1009	0x00	H/W Version		-	-	RW
0x100A	0x00	S/W Version		-	-	RW
0x1018	0x01	Vendor ID		Number	Const	RO
0x1018	0x02	Product Code		Number	Const	RW
0x1018	0x03	Revision Number		Number	Const	RW
0x1018	0x04	Serial Number		Number	Const	RO
0x5000	0x00	Communication ID		Number	1~127	RW
V 0x5001	0x00	UART Baudrate	10	Number	5=115.2k, 8=921	RW
0x5002	0x00	CAN Bitrate		Number	6=500k, 8=1M	RW



(3) Modify the USB Baudrate (Index: 0x5001) in the Object List and click the [Download] button.

Value	Description
0	None
1	9600 bps
2	19200 bps
3	38400 bps
4	57600 bps
5	115200 bps
6	230400 bps
7	460800 bps
8	921600 bps
9	1 Mbps
10	3 Mbps

- (4) Click the [Save] button to save the changed ID
- (5) Drive Power OFF -> ON

3.3 Disconnect

(1) Click [Disconnect] in the Ribbon Bar





4. Drive Setup

- Motor, Feedback, and Brake Settings
 - (1) Click [Drive Setup] in the Tool Pane. Set Motor, Feedback, and Brake in the Target Pane.

0				DIN	GS' Servo Studio - 2.00	.0006
Home Scope	or import Dayout Save	U 😄 😳 Enable Hat QuickStep	ErrorReset	Diject Scope Capti	on Log LogClear	
Drive	Motor Feedback Unit Brake MotorType Rated Current Maximum Current Maximum Motor Speed Motor Rated Torque Torque Constant Back-EMF Constant Resistance Inductance (Q-Axis Inductance) D-Axis Inductance Pole Pair	Current Tuning Velooty Tuning Sinusoidal PM BL Motor 10000 2000 3150 1300 12000 123000 123000 697 505 505 4 Apply] mA] 0.1% RPM mVm uVm/A uV(rod/s) uH uH			
Control Device	Log Message Code Desc	ription				3 X
Motion	4					
MotionList Disconnected	N K P H Output	_	_		_	,



4.1 Motor Setting

			DINGS' Servo Studio - 2.00.0006
Connect Disconnect Rest	or import Export Sare	Huit QuickStop ErrorReset	Firmware Object Scope Caption Log LogClear
Connection	Parameter	Servo Control	Frimware View
DINGS	Servo Off		
Device	Motor Feedback Unit Brake	Current Tuning Velocity Tuning	
	MotorType	Sinusoidal PM BL Motor	~
	Rated Current	2000	mA
	Maximum Current	4000	mA
	Maximum Motor Speed	3100	RPM
	Motor Rated Torque	1300	mhim
	Torque Constant	61000	A/m/A
	Back-EMF Constant	61000	uV(rad/s)
	Resistance 🗹	1222	mΩ
	Inductance (Q-Axis Inductance)	407	uн
	D-Axis Inductance	407	uH
	Pole Pair	4	
		Apply	
Control Device	Log Message		9
	Code Descriptio	n	
Q Drive Setup	Device Co	nnetted	
Motion			
₩ 10			
MotionList	<		
Disconnected			

- (1) Select the [Motor] tab in Drive Setup
- (2) Input motor information
 - Please enter the unit carefully
 - Motor information with a check box such as Torque Constant, Back-EMF Constant, Resistance, and Inductance - is checked when the motor specifications are known and data is entered
 - Torque Constant and Back-EMF Constant are automatically changed to the values calculated by the following formula when the check box is cleared.
 - Torque Constant (µNm/A or µN/A)
 - = Motor Rated Torque (mNm or mN) x 1000 / Rate Current (mA) x 1000
 - Resistance, Inductance (Q-Axis Inductance) and D-Axis Inductance are automatically measured during Current Auto Tuning. The values do not need to be entered separately.
 - If there is no Back-EMF Constant in the motor specification, input the same value as



Torque Constant.

- Pole is the number of poles of a permanent magnet, and the number of pole pairs is half of the number of poles.
- (3) After inputting the motor information, click [Apply] to apply the motor information to the drive.
- (4) To save the currently applied parameters to drive flash memory, click [Save] in the Ribbon Bar.

4.1.1 Refer to Motor Type

- Brushed DC Motor
 For Rotary DC Motor, select Brushed DC Motor Type.
- Sinusoidal PM BL Motor
 Synchronous brushless motor with sine wave back EMF.
 For Rotary PMSM or BLDC Motor, select Sinusoidal PM BL Motor Type
- Trapezoidal PM BL Motor
 Synchronous brushless motor type with trapezoidal back EMF.
 For Rotary BLDC Motor, select Trapezoidal PM BL Motor Type.
- Linear Brushed DC Motor
 For Linear DC Motor, select Linear Brushed DC Motor Type
- Linear Sinusoidal PM BL Motor
 Synchronous brushless motor with sine wave back EMF
 For linear PMSM or BLDC motors, select the linear sinusoidal PM BL motor type.
- Trapezoidal PM BL Motor
 Synchronous brushless motor type with trapezoidal back EMF.
 For Linear BLDC Motor, select Linear Trapezoidal PM BL Motor Type.
- Linear Voice Coil Motor

It is the same as the principle of a permanent magnet speaker. When a current flows through a coil of a magnetic field by a permanent magnet, a force is generated and it goes straight.





4.1.2 Motor information input example

(1) Sinusoidal PM BL Motor

Motor	Manual	DINGS' Servo Studio Parameter			
Item	Value [unit]	Item	Value [unit]		
Motor Type	Rotary Servo Motor	Motor Type	Rotary Sinusoidal PM BL Motor		
Rated Current	5.2 [A]	Rated Current	5200 [mA]		
Peak Current	15.6 [A]	Maximum Current	15600[mA]		
Motor Rated Torque	0.32 [Nm]	Motor Rated Torque	320 [mNm]		
Torque Constant	0.061 [Nm/A]	Torque Constant	61000 [uNm/A]		
Voltage Constant	3.8 [V(rms)/Krpm]	Back_EMF	3.3/(2π/60*1000) = 61000 [V/(rad/s)]		
Poles	8	Pole Pair	4		
Winding Resistance	0.48 [Ω]	Resistance	480 [mΩ]		
Winding Inductance	0.58 [mH]	D Axis Inductance	580 [uH]		
Winding modelance	o.oo [mn]	Q Axis Inductance	580 [uH]		

• Maximum Current =15.6 (Peak Current) / 5.2 (Rated Current) x 1000

- Torque Constant =
- 320 mNm (Motor Rated Torque) x 1000 / 5200 mA (Rated Current) x 1000
- Back-EMF Constant = Torque Constant
- Pole Pair = 4 (8 Pole Motor)





- (1) Select the [Feedback] tab in Drive Setup
- (2) Select Single Feedback or Dual Feedback
 - When using Dual Feedback, Feedback1 is used for voltage, current, and speed control.
 Feedback2 is used for position control.
- (3) Input Feedback Information
 - Position displays the current position value
 - Select Feedback Type. (Refer to the next page for setting according to Feedback Type)
 - When Direction Invert is set to true, the direction of the position data is reversed.
 - When using Incremental Encoder, set the resolution to CPR: Count per Revolution. In the case of Rotary Motor, resolution is set in units of count/revolution. For linear motor, it is set in count/m unit (1 um, 1,000,000 setting)
 PPR(Pulse per Revolution) * 4 = CPR(Count per Revolution)
- (4) After inputting the feedback information, click [Apply] to apply the feedback information to the drive.
- (5) To save the currently applied parameters to drive flash memory, click [Save] in the Ribbon Bar.



4.2.1 Setting according to Feedback Type

(1) Incremental Encoder

Incremental Encoder is a position sensor that measures the amount of change in position by

receiving A and B phases.

Motor	Feedba	ck	Unit	Brake	Curre	nt Tuning	Velocity Tuning	
Fee (dback Co Singe F	nfig Fee	uration - dback	ODua	l Feed	back		
Pos	sition	0				cou	ints	
	Sensor Direction Resolut counts/r	Pa	ramet vert lution	er	r	False 10000		
						Apply		

(2) Incremental Encoder with Index

It uses Incremental Encoder and Index pulse, and Index pulse provides a single pulse per rotation.

Motor	Feedback	Unit	Brake	Curre	ent Tuning	Velocity Tuning			
Fee (Feedback Configuration Singe Feedback Dual Feedback 								
Pos	sition 0				COL	unts			
Feed	back1 Inc	rementa	l Encode	r with I	index	~			
	Sensor Pa Direction In	aramet vert	er		False				
⊟ F	Resolution	n 1			10000				
C	counts/revo	Diution			10000				
					Apply				



(3) Hall Sensor

Only Hall Sensor is used as Feedback.

Resolution = Pole pair x 6 is automatically set. (Pole Pair is set in the Motor setting window)

Motor	Feedback	Unit	Brake	Curre	ent Tuning	Velocity Tuning	
Fee (dback Config Singe Fee	guration edback	ODua	l Feed	back		
Pos	sition 0				COL	ints	
Feed	back1 Ha	all Sensor					~
	Sensor P: Direction In Resolutio counts/rev	aramet vert n olution	er		False 24		
Hall S	ensor(5-1-3	-2-6-4)	7		Apply		

(4) Incremental Encoder & Hall Sensor

As Feedback, Incremental Encoder and Hall Sensor are used. Hall sensor is used to find the initial electric angle of the motor

Μ	otor	Feedba	ck	Unit	Brake	Curre	nt Tuning	Velocity Tuning	
	Fee (dback Co) Singe I	nfig Fee	uration dback	ODua	Feed	back		
	Pos	ition	0				cou	ints	
	Feed	back1	Inc	rementa	l Encoder	& Hal	Sensor		~
		ensor lirection lesolut ounts/r	Pa Inv ion evo	ramet vert Iution	er		False 10000		
	COL	ints/re	vol	ution					
	Hall Se	ensor(5-1	1-3-3	2-6-4)	7		Apply		

When moving the motor, Hall sensor data must be changed in the order of 5-1-3-2-6-4 or 4-6-2-3-1-5 for proper operation.



(5) Incremental Encoder with Index & Hall Sensor

Hall Sensor is used to find the initial electric angle of the motor. Other than that, it is the same as Incremental Encode with Index encoder.

Ν	Motor Feedba		ck U	Init	Brake	Curre	ent Tuning	Velocity Tuning	
	Fee (dback Cor Singe F	nfigur Feedb	ation ack	ODua	Feed	back		
	Pos	ition	0				COL	ints	
	Feed	back1	Incre	menta	l Encoder	with 1	index & Hal	Sensor	\sim
	Sensor Parameter Direction Invert						False		
	E F	lesolut :ounts/r	ion evolu	ition			10000		
	Hall Se	ensor(5-1	-3-2-	6-4)	7		Apply		

When moving the motor, Hall sensor data must be changed in the order of 5-1-3-2-6-4 or 4-6-2-3-1-5 for proper operation.

(6) Incremental Encoder with Index shared Hall Sensor

Motor	Feedba	ck	Unit	Brake	Curre	ent Tuning	Velocity Tunin	g	
Fee (dback Co Singe I	nfig Fee	juration dback	ODua	l Feed	back			
Pos	ition	0				cou	unts		
Feed	back1	Inc	rement	al Encode	r with I	Index share	ed Hall Sensor	\sim	
 Sensor Parameter Direction Invert Shared Hall Parameter Hall Ready Time Hall Valid Time 						False 470 25			
	ncoaer: Resolut	He tior	аду н т	me		100			
	counts/r	evo	olution			1000			
Apply									

It is an encoder in which Hall Sensor signal and Encoder with Index signal are output on the same line. When the power is applied, the Hall sensor signal is output for a certain period of time and then the encoder signal is output.

In general, the index signal and the electric angle 0 degree are matched to accurately detect the electric angle.





Set Hall Ready Time, Hall Valid Time, Encoder Ready Time(refer to the following figure)

(7) Analog Hall Sensor

When Feedback is selected as Analog Hall Sensor, the resolution is automatically calculated as follows.

Rotary Motor: Resolution = (16384 * Pole Pair)

Linear Motor: Resolution = 16384 * (1000/Magnetic Pitch)

Analog Hall sensor signals have different signal levels (voltage) depending on the product or product status, so the motor must be moved manually so that the analog Hall sensor signals can change one or more cycles. When the motor moves, the drive finds the maximum/minimum value of the signal.

Motor	Feedback	Unit	Brake	Curre	ent Tuning	Velocity Tuning
Fee (dback Confi Singe Fee	guration edback	ODua	l Feed	back	
Pos	sition 0				COL	unts
Feed	back1 Ar	nalog Hall	Sensor			~
- ? [- F c	Gensor Pa Direction In Resolutio counts/rev	aramet vert n olution	er		False 65536	
				Apply		



(8) Sin/Con Encoder

If you select Sin/Con Encoder as Feedback and input Sin/Cos Pitch information, the resolution is automatically calculated as follows.

```
Rotary Motor: Resolution= (16384 * (SinCos Cycle/Revolution))
```

Linear Motor: Resolution = (16384 / (Pitch/ SinCos Cycle)) x 1000000

The signal of Sin/Cos encoder has different signal level (voltage) according to the product or product status, so you need to move the motor manually so that the sin/Cos encoder signal can change more than one cycle.

When the motor moves, the drive finds the maximum/minimum value of the signal.

In order to use the index signal as a home signal in a linear system, the motor must be moved until the index signal is detected.

Motor Feedb	ack Unit Brake Cun	rent Tuning Velocity Tuning	Motor Feedba	k Unit Brake	Current Tuning Velocity Tuning
Feedback C Singe	onfiguration Feedback ODual Fee	dback	Feedback Co Singe F	nfiguration eedback ODu	al Feedback
Position	2048	counts	Position	2048	counts
Feedback1 Sin/Cos Encoder 🗸		Feedback1	Sin/Cos Encoder	~	
⊡ Senso Directio	r Parameter n Invert	False	Sensor Direction	Parameter Invert	False
⊟ SinCos Cycle/f □ Besolu	SinCos Info Cycle/Revolution 4			Info)/cycle ion	800
counts/	/revolution	65536	counts/n	ואו	20480000
					Apply

[Rotary Motor]

[Linear Motor]



(9) BiSS Absolute Encoder

If Single Turn and Multi Turn information is selected, the resolution is automatically calculated as 2⁽(Single Turn).

If only single turn is used, multi turn is set to 0.

Encoder Bitrate should be set below the speed allowed by the product.

Motor	Feedba	ck	Unit	Brake	Curre	ent Tuning	Velocity Tuning	
Fee	dback Co Singe F	nfig Feer	uration dback	ODua	l Feed	back		
Po	sition	-68	26			COL	ints	
Feed	back1	BiS	S Absolu	ite Encod	ler			\sim
 Sensor P Direction Ir Encoder Bi Single Turi MultiTurn Resolutio counts/rev 			ramet vert rate	er		False 1 MHz 14 16		*
Mu	ltiTurn							

- (10) SSI Absolute Encoder
 - SSI has different protocols for each manufacturer, so the supported models are limited. The supported models are as follows.
 - General SSI-SSI encoder using only data without using Status bit
 - SIKO-NSA111C
 - Renishaw-Orbis

Select the corresponding [SSI Manufacturer] and [SSI Mode], and select Single Turn and Multi Turn.



Motor Feedb	ack Unit Brake Our	ent Tuning Velocity Tuning	Motor Feedb	ack Unit Br	ake Ourrent Tu	ning Velocity Tuning
Feedback C	onfiguration Feedback ODual Feed	lback	Feedback C	Configuration Feedback) Dual Feedback	
Position	-6826	counts	Position	-6826		counts
Feedback1 SSI Absolute Encoder \checkmark			Feedback1	eedback1 SSI Absolute Encoder		
 Senso Directio Encode SSI Ma SSI Mo Single MultiTu Resolu counts/ 	 Sensor Parameter Direction Invert False Encoder Bitrate 1 MHz SSI Manufaurer General SSI SSI Model General model Single Turn 16 MultiTurn Besolution counts/revolution 65536 			r Parameter n Invert er Bitrate nufaurer del Turn rn ution Yrevolution	Fals 1 MF Ren Orbi 14 0	e 1z i shaw ~ s
			SSI Man	ufaurer		
		Apply			App	bly

- (11) Dual Feedback encoder correspondence table
 - Encoder correspondence table that can be used with dual feedback

Feedback2 Feedback1	Incremental Encoder	Incremental Encoder with Index	Hall Sensor	Sin/Cos Encoder	BiSS/SSI	Analog Hall Sensor
Incremental Encoder	0	0	х	0	0	0
Incremental Encoder with Index	0	0	х	0	0	0
Incremental Encoder & Hall Sensor	0	0	х	0	0	0
Incremental Encoder with Index & Hall Sensor	ο	0	х	ο	0	0
Incremental Encoder with Index shared Hall Sensor	0	0	х	0	0	0
Sin/Cos Encoder	0	0	х	х	0	0
BiSS/SSI	0	0	х	0	х	Х
Analog Hall Sensor	0	0	х	х	0	х
TAMAGAWA Encoder	0	0	х	0	x	х

• When using dual feedback, only one encoder with Hall sensor can be selected.



4.3 Unit Setting

- Unit of data can be set by changing Unit and Notation.
- Express the exponent by setting Notation.
- Click the [Apply] button to check the data unit set in the Display Unit.

0	DINGS' Servo Studio - 2.00.0006
Connect Disconnect Res	tore import Export Save Enable Halt QuickStop ErroReset
Connection	Parameter Servo Control Trimware View
DINGS	🔞 Servo Off
Precision Motion Specialist Device	Motor Feedback Unit Brake Current Tuning Velocity Tuning
	Gear Ratio 1
	Position Unit count v Position Notation 0 v
	Velocity Unit Rpm V Velocity Notation 0 V
	Acceleration Unit R9M/sec v Acceleration Notation 0 v
Control Doctory	Doplay Units Poston: counts Velocity: RPH Acceleration: RPH/s Deceration: RPH/s Jerk: RPH/s^2 Apply
Control Device	Code Description
Orive Setup	
Motion	
≒ 10	
MotionList	< > >
Disconnected	

- For rotary motors:
 - Position Unit: Count, degree can be selected. ex) If Position Unit is selected as degree and Notation is -3, Position data unit is deg*10^-3. If the position data is 1 deg*10^-3, it means 1000 degree.
 - Velocity Unit: RPM, degree/sec selectable
 - Acceleration Unit: RPM/sec, degree/sec^2
- For linear motors:
 - Position Unit: Selectable count or meter. Ex) If you select meter for Position Unit and -3 as Notation, the unit of Position data is mm.
 - Velocity Unit: Unit meter/sec is used, change notation to select m, cm, mm
 - Acceleration Unit: Unit meter/sec² is used, if notation is changed, it can be selected in units of m, cm, and mm



4.4 Brake Setting

C

isconnect Rest	ore Import Export Save En	able Halt QuickStop E	rrorReset Firmware Obj	ect Scope Caption Lo	g LogClear
JGS'	Servo Off				
otion Specialist	Motor Feedback Unit Bra	ske Current Tuning Velo	city Tuning		
	Brake Type	Digital Output bit0	~		
	Brake Polarity	None Inverting	~		
	Brake Release Delay Time	100	ms		
	Brake Holding Delay Time	200	ms		
	Turn On Voltage	12	v		
	Hold On Voltage	6	v		
	Min.Motor Speed for Brake On	0	RPM		
		Apply			
60e	10g Metsage	Apply			
ice	Log Message Code Desci	Apply			
ice	Lög Message Code Desic Devic	Apply iption e Connected			
ice Setup	Ling Message Code Desic Desic	Apply iption e Connected			

- (1) Select the [Brake] tab in Drive Setup
- (2) Input the Brake information
 - Select Brake Type
 - None: No brake is used
 - Digital Output bit0: Sends a signal to Digital output bit0 to Servo on/off.
 - Voltage Control: When Servo On, the set voltage of Turn on voltage is output to the brake output terminal, and the set voltage of Hold on voltage is maintained after 1 second
 - Brake Polarity: Non Invert is set as default
 - Non Invert: Digital output signal goes high when Servo On, and digital output signal goes low when Servo Off.
 - Invert: Digital output goes Low when Servo On, and Digital output goes High when Servo Off.
 - Brake Release Delay Time: Set the time to release the brake after Servo On is commanded. (If set to 100, release the brake after 100msec after Servo on.)
 - Brake Holding delay Time: Set the time to Servo Off after the brake is held when Servo Off is commanded.(If set to 100, the brake is maintained and the servo turns off after 100msec)
- (3) After inputting the brake information, click [Apply] to apply the brake information to the drive.
- (4) To save the currently applied parameters to drive flash memory, click [Save] in the Ribbon Bar.



5. Tuning

• The drive consists of three types of control loops: position loop, velocity loop and current loop.



- Bandwidth is the control period inside the servo drive. Bandwidths are determined by the minimum/maximum values by the control period.
- The higher the bandwidth, the higher the gain of the controller, so the control response can be increased. However, if this value is too large, it may cause noise or vibration, so you need to set an appropriate bandwidth for your system.
- Before tuning, proceed after checking whether motor information is correctly entered.



5.1 Phase Auto Tuning

- When using DC Motor or VCM, skip Phase Auto Tuning.
- Phase Auto Tuning automatically finds the UVW phase of the motor.
- The algorithm to find the phase is different according to the type of feedback sensor.
- In the case of a system with high friction due to a load installed outside the motor, an error may occur between the measured electric angle and the actual electric angle, resulting in a decrease in output torque efficiency. Therefore, it is recommended to proceed without external load when performing Phase Auto Tuning.

Connection	Parameter	Servo Contr	9	Frimware View		
INGS	(1) Servo Off					
sion Motion Specialist	Motor Feedback Uni	t Brake Current Tuning	Velocity Tuning			
	Phase Auto Tuning S	tart Current Tuning Mod	e Auto Current	Tuning V Apply Cu	rent Tuning Start	Halt
	Actual Data	0x0240		Tuning Parameter		
	Positi			Soft	Hard	
	Veloc	ity 0 mm/s		Current Bandwidth		3000
	Curre	ent -31 mA				
				Q-axis Current Control	er	
	Tuning Motion Param	eter		Proportional Gain (P)	1776	
				Integral gain (I)	2940	
	Current Amplitude	0 100%	20 %	D-axis Current Controlle	a	
	Content Ampirade		500 mA	Proportional Gain (P)	1776	
				Integral gain (I)	2940	
				Electric Angle Offset	-185	
rol Device	Log Message					9
	Code	Description				
Delara Catalan		Dente connected				
Unive setup						
	1					
Motion						

- (1) Select the [Current Tuning] tab in Drive Setup
- (2) Click [Phase Auto Tuning]. Click [Yes] in the pop-up window to start the motor and execute Phase Auto Tuning.
 - Search for Motor Phase, Position Sensor1 Polarity, and Electrical Angle Offset while forcibly moving the motor. For details on each item, see the reference manual.
- (3) When tuning is completed, a message window appears.



5.2 Current Tuning

5.2.1 Auto Current Tuning

					DINGS' S	iervo Studio - 2.0	0.0006
Home Scope Connect Disconnect Connection	tore import Export Save	Chable Halt QuickStop	ErrorReset	musare Object	Scope Caption	Log LogCear	
DINGS' Problem Kosten Kaschäfter Deniter	Servo Off Motor Feedback Unit Phase Auto Tuning Start Actual Data Status Position Velocity Current Tuning Motion Parameter 0 Current Amplitude	Brake Current Tuning Node Ox0240 O counts O mm/s -31 mA	20 % 500 mA	uning V Tuning Parame Current Bandw Q- f f D- f	Apply Cu ter Soft iddh internet Controll Proportional Gain (P) Integral gain (I) Axis Current Controll Proportional Gain (P) Integral gain (I) Electric Angle Offset	Hard Hard 1776 2940 er 1776 2940 -185	3000 Hz
Control Device Q Drive Setup	Log Message Code De De	scription vice Connected					a x
MotionList	K N K F H Output	_					

- (1) Select the [Current Tuning] tab in Drive Setup
- (2) Select Current Tuning Mode as Auto Current Tuning.
- (3) Adjust the Current Controller Bandwidth using the slide bar
 - Current Controller Bandwidth sets the responsiveness of Current Controller
 - Motor information is corrected by estimating resistance and inductance during current tuning.
 - P and I Gain are calculated from resistance, inductance, and bandwidth.
 - The higher the bandwidth, the better the responsiveness, but noise and vibration may occur. The lower the bandwidth, the less the noise and vibration but the less responsiveness.
- (4) Click [Current Tuning Start]. Click [Yes] in the pop-up window to start the motor and execute Current Auto Tuning.
- (5) When tuning is completed, a message window appears
- (6) To save the currently applied parameters to drive flash memory, click [Save] in the Ribbon Bar.



NGS	3 Servo Off	Servo Co	ntrol	Frimware	View		
Motion Specialist	Motor Feedback Unit	Brake Current Tuni	19 Velocity Tuning				
	Phase Auto Tuning Start	Current Tuning M	Node Manual Curre	ent Tuning] ~	Apply (Current Tuning Start	Ha
	Actual Data Status	0x0240		Tuning Param	eter		
	Position	0 coun	3		Soft	Hard	
	Velocity	0 mm/s		Current Band	width	3	000
	Current	26 mA					
	T-charles Marker Descent			9	-axis Current Contr	oler	
	Tuning Motion Parameter				Proportional Gain (>) 1776	
		100%			Integral gain (1) 2940	
	Current Amplitude		20 %	D	-axis Current Contro	oller	
			500 mA		Proportional Gain (n 2040	
					integral gain (1) [2940	
					Electric Angle Offse	-185	
Device	Log Message						
	Code D	escription					
	D	evice Connected					
we setup							

5.2.2 Manual Current Tuning

- (1) Select the [Current Tuning] tab in Drive Setup
- (2) Select Current Tuning Mode as Manual Current Tuning.
- (3) Adjust the slide bar of Current Amplitude of Tuning Motion Parameter. Current Amplitude is set by default as a current value of 20% of the rated current, and it is repeatedly driven with the set Current Amplitude.
- (4) Adjust the Current Controller Bandwidth by using the slide bar or directly input the Gain value.
 - Current Controller Bandwidth sets the responsiveness of Current Controller.
 - The higher the bandwidth, the better the responsiveness, but noise and vibration may occur. The lower the bandwidth, the less the noise and vibration but the less responsiveness.
- (5) Click the [Apply] button and then the [Current Tuning Start] button. If you click the [Yes] button in the pop-up window, it runs repeatedly with the set Current Amplitude.
- (6) At this time, perform current tuning by changing the Current Controller Bandwidth or Gain value. After changing the value, it is applied to the drive only by clicking the [Apply] button.
- (7) When tuning is complete, press the [Halt] button to stop the motor.
- (8) To save the currently applied parameters to drive flash memory, click [Save] in the Ribbon Bar.



5.3 Velocity Tuning

Home Scope Critical Res Scoped Disconnect Res	tore import Export Save	Cruble Hat	QuickStop ErrorReset	Firmulare	Object Scope	Caption Log	OLogClear
INGS	Motor Feedback Brake Tuning Mode Auto Veloci Actual Data Status Poston Velocity Current Tuning Motion Parameter Tuning Target Position 1 Tuning Target Position 1 Tuning Target Position 2 Tuning Acceleration Jerk Wait Time	Current Tuning by Tuning 0x:1040 41 00 -477 15000 41 1000 3000 0 0	Velocity Tuning	Apply Tuning P Velo Ve	Start arameter kity Controller Banc Velocity Controller J Velocity Controller Socity Feed-Forwar cceleration Feed-Fo Position Controller F	Halt Soft 200 P-Gain 39280 1-Gain 2618 3 Gain 0 0 P-Gain 50000	Hard Hz % (Interia) % (Ineria)
bil Device Drive Setup Motion	Code I	Description Device Connecte	d				

5.3.1 Velocity Auto Tuning Mode

- (1) Select [Auto Velocity Tuning] for the Tuning Mode in the [Velocity Tuning] tab.
- (2) Input Tuning Motion Parameter. Input Target Positions, Velocity, and Acceleration values of the Profile Position Motion. In Velocity Auto Tuning, it operates only with trapezoidal profile.
 (±Move as much as Target Position1 value set based on the current position)
- (3) Adjust the Velocity Controller Bandwidth using the slide bar.
 - If you change the bandwidth, the Velocity Controller P-Gain and I-Gain values are changed.
 - The Gains are calculated by Torque Constant, Inertia, and Bandwidth.
 - Velocity Controller Bandwidth determines how quickly the Velocity Controller responds to changes in the controlled velocity.
 - If the inertia of the system is high, set a high bandwidth within a range that does not vibrate. (In a system with a large inertia, it is recommended to operate by increasing the Velocity Bandwidth from 100Hz. If vibration occurs even after setting to 100Hz, it should be run gradually lowering it)



- Hard Bandwidth increases the response speed of the system, but the system becomes unstable.
- (4) Click [Apply] and then [Start] to execute Velocity Auto Tuning.

			Printer V	
DINGS	Servo Off			
ce	Motor Feedback Unit	Brake Current Tuning Velocity Tu	ning	
	Tuning Mode Auto Velocit	y Tuning 🗸 🗸	Apply Start	Halt
	Actual Data Status	0x0240	Tuning Parameter	
	Position	0 counts	Velocity Control Mode Commo	n Mode v Parameter Set 0
	Velocity	0 RPM	Velocity Bandwidth	302 H
	Current	0 mA	Soft	Hard
			Velocity Control P.Gain	80368
	Tuning Motion Parameter		Velocity Control I-Gain	4854
	Prohie Type	Sinusoial Profile V	Velocity Feed-Forward Gain	50 % (firtion)
	Tuning Position	counts	Acceleration Feed-Forward	100 % (Incoth)
	Position2	0 counts	Position Controller P-Gain	250000
	Tuning Velocity	1000 RPM	System Inertia	162333 mg*cm2
	Tuning Acceleration	3000 RPM/s	Coulomb(Static) Firction	10930 uNm
	Jerk	300000 RPM/s^2	Viscos Firction	76 uNm/(rad/s)
	Wait Time	10 msec		
trol Device	Log Message			3
	Code D	escription		
	1	evice Connected		
Drive Setup				
Motion				
10				
MotionList	K Distant			

- (5) As Auto Tuning starts, the [Start] button changes to Tuning, and once Tuning is completed, it changes back to Start.
- (6) Once Tuning is completed, to save the currently applied parameters to drive flash memory, click [Save] in the Ribbon Bar.



	Parameter	Servo Control	Frimware	v	ew.	
n Motion Specialist	Motor Feedback Unit	Brake Current Tuning Velocity Ti	uning		_	
	Tuning Mode Manual Velo	xcity Tuning	Apoly	Start	Halt	
	Actual Data Status	0x0240	Tuning F Velocity	Parameter Control Mode Commo	in Mode	✓ Parameter Set 0
	Velocity Current	0 RPM	Velocity	Bandwidth		Hard 100
	Tuning Motion Parameter			/elocity Control P-Gain Velocity Control I-Gain	26548 530	
	Profile Type Tuning Start Position	40000 counts	Veloc	ity Feed-Forward Gain	0	% (friction)
	Tuning End Position	1625 counts	Acce	leration Feed-Forward sition Controller P-Gain	0	% (Inertia)
	Tuning Velocity Tuning Acceleration	3000 RPM/s		System Inertia	161945	mg*cm2
	Jerk	30000 RPM/s^2	c	oulomb(Static) Firction Viscos Firction	10438	uNm uNm/(rad/s)
	Wait Time	10 msec				
Device	Log Message Code D	escription				
ive Setup	ľ					
	4					

5.3.2 Manual Velocity Tuning

- (1) Select Manual Velocity Tuning for the Tuning Mode in the Velocity Tuning tab.
- (2) Input Tuning Motion Parameters. Input the Target Position, Acceleration, Velocity, jerk, and wait time values of Profile Position Motion to be executed during tuning. When using the trapezoidal profile, the value of Jerk is ignored.
- (3) Click [Start] to repeatedly drive TargetPosition1 \leftrightarrow TargetPosition2.
- (4) Use the slider to change Velocity Controller Bandwidth
- (5) If the Bandwidth is changed, the Velocity Controller P-Gain and I-Gain values are changed. The values of the PI Gain can be modified directly.
 - P-Gain determines the correction signal to reduce the error. As P-Gain increases, the control system response speed increases. However, if the P-Gain is too large, the vibration increases and the system become unstable.
 - I-Gain outputs a value proportional to the sum of the accumulated errors. If I-Gain increases, responsiveness increases, but oscillation and instability occur.
 - After changing Feed Forward Gain and Position Controller Gain, click the [Apply] button to apply to the drive.



- As the control system does not vibrate because it is not affected by Feed Forward Gain feedback, it does not affect stability and improves system response.
- Feed Forward Gain improves system responsiveness and is stable because it operates outside the loop.
- Velocity Feed Forward Gain is used to compensate for static friction and motion friction measured through Velocity Auto Tuning. Set the percentage of friction compensation.
- Acceleration Feed Forward is used to compensate for the inertia measured through Velocity Auto Tuning. It sets what % to compensate for inertia.
- (6) After changing tuning parameter, click [Apply] to apply them to the drive.
- (7) Once Tuning is completed, to save the currently applied parameters to drive flash memory, click [Save] in the Ribbon Bar.

5.3.3 Multi Gain

• User can select and use multiple speed control parameters.





- (1) Select Velocity Control Mode.
 - Common Mode: Use only the control parameters set in Parameter Set0, the basic speed control parameter.
 - Separated Mode: The trajectory control section is controlled by Parameter Set0, and the In position section after the trajectory is completed is controlled by Parameter Set1. In the stop state within 1 pulse after completion of In Position, it is controlled using the control parameter of Parameter Set3.
 - Dual Mode: It is controlled by Parameter Set0 or Parameter Set2 until in position, and after completion of in position, it is controlled by the control parameter of Parameter Set1 or Parameter Set3. Parameter Set0 and Parameter Set1 form a pair, and Parameter Set2 and Parameter Set3 form a pair.
 - Index Mode: Set 4 parameter sets and the user selects and uses them.
- (2) After selecting the parameter to be used from Parameter Set0 to Parameter Set3, proceed with Auto Tuning and Manual Tuning. After changing a parameter in each parameter set, it is applied only by pressing the [Apply] button.
- (3) In Dual Mode, if you select Parameter Set0 or Parameter set1, Parameter set0 & Parameter set1 are used, and if you select Parameter set2 or Parameter set3, Parameter set2 & Parameter set3 are used.
- (4) Once Tuning is completed, to save the currently applied parameters to drive flash memory, click [Save] in the Ribbon Bar.



6. Parameter

6.1 Parameter File Import

(1) Click [Import] in the Ribbon Bar

					DING	iS' Servo Studio - 2.0	0.0006
	Home	Scope	-				
	Connect Disconnect	Restore Import Save	Enable Halt QuickStop ErrorReset	Firmware	Dijett Scope Captio	n Log LogClear	
	Connection	Parameter	Servo Control	Frimware	View		
(2)	Select *.ws	spf (DINGS' Sei	rvo Parameter File	e) and	click Oper	۱	

한 열기				>
← → * ↑ □ > 4 PC >	Data (D:) > 1_ServoDrive	~ Ö	Parameter 검색	م ر
구성 새 몰더			8:	- 🗆 🕜
	이름 ^	수정한 날파	유형	크기
🖈 물격찾기	defaultParam.wspf	2019-10-14 오후	WSPF 파일	9KB
LE PC				
> 🧊 3D 개제				
> 🕹 다운로드				
🔚 동영상				
> 🗎 문서				
> 🔜 바탕 화면				
> 📰 사진				
> 🎝 음악				
> 🏪 로컬 디스크 (C:)				
> Data (D:)				
👉 네트워크				
	List in the			
파일 이름(N)	C defaultParam.wspf	`	Servo Project File	(*.wspf) ~

(3) The Parameter List of the imported parameter file is displayed.

rive Produ	ict Code: 0x	00022415 Revision Number: 0x0134	16BA File	Product Code: 0x000024	03 Revision Number: 0x01	34154
Index	SubIndex	Item	Value	Unit	Range	
✓ 0x4000	0x00	Resistance	1350	mΩ	1~65535	
✓ 0x4001	0x00	Q-Axis Inductance	4100	uH	1~4294967295	
∕ 0x4002	0x00	D-Axis Inductance	4100	uH	1~4294967295	
∕ 0x4003	0x00	Torque Constant	84057	uNm/A	1 ~ 4294967295	
0x4004	0x00	Back-EMF Constant	84034	uV/(rad/s) or uV/(mm/s)	1 ~ 4294967295	
0x4005	0x00	System Inertia	165092	mg*cm^2 or mg	1~4294967295	
∕ 0x4006	0x00	Coulomb Friction	5384	uNm or uN	1~4294967295	
0x4007	0x00	Viscos Friction	14	uNm/(rad/s) or uN/(mm/s)	1~4294967295	
0x4008	0x00	Position Sensor Type	3	Number	Position Sensor Type	
0x4009	0x00	Position Sensor Polarity	2	Number	Position Sensor Polarity	
0x400A	0x00	Pole Pair Number	2	Number	0~255	
0x400B	0x01	Hall Sensor Ready Time	0	msec	0~65535	
0x400B	0x02	Hall Sensor Valid Time	0	msec	0~65535	
0x400B	0x03	Encoder Ready Time	0	msec	0~65535	
0x4010	0x00	Position Sensor Config	1	Number	Position Sensor Config	
0x4011	0x00	Position Sensor2 Type	1	Number	Position Sensor Type	
0x4012	0x00	Position Sensor 2 Polarity	0	Number	Position Sensor Polarity	
0x4013	0x01	Position Encoder 2 Resolution	4096	Count	6~4294967295	
0x4013	0x02	Position Encoder 2 Revolution	1	Count or mm	1~4294967295	
0x4014	0x01	Hall Sensor 2 Ready Time	0	msec	0~65535	
0x4014	0x02	Hall Sensor 2 Valid Time	0	msec	0~65535	
7	o oo	e Loo Le	-		0 CEEDE	_

- (4) To apply the parameters to the drive, check the checkboxes of the parameters to download and click [Download Data].
- (5) After downloading the parameters, click [Write Flash] to save them to the drive flash memory.



6.2 Parameter File Export

(1) Click [Export] in the Ribbon Bar

Home	Scor	2e				
Connect Discon	ined R	C H H H extore import Export Save	Enable Hat QuickStep I	DrovReset Firmware Co) m () () jet Scope Caption Log	LogCles
Click [Sa	ave F	-ile] to save the	e parameter fil	e.		
Drive Paramete	er Dialog					×
Drive Product	Code: 0	00022415 Revision Number	0x013416BA			
Drive Product	code. 0	Kevision Number.	0.0134100A		T. La marca	
Index S	SubIndex	Item	Value	Unit	Range	^
0x4000 0	0x00	Resistance	1084	mΩ	1~65535	
0x4001 0	0x00	Q-Axis Inductance	470	uH	1~4294967295	
0x4002 0	0x00	D-Axis Inductance	470	uH	1~4294967295	
0x4003 0	0x00	Torque Constant	35000	uNm/A	1 ~ 4294967295	
0x4004 0	0x00	Back-EMF Constant	35000	uV/(rad/s) or uV/(mm/s)	1~4294967295	
0x4005 0	0x00	System Inertia	81506	mg*cm^2 or mg	1 ~ 4294967295	
0x4006 0	0x00	Coulomb Friction	0	uNm or uN	1 ~ 4294967295	
0x4007 0	0x00	Viscos Friction	73	uNm/(rad/s) or uN/(mm/s)	1~4294967295	
0x4008 0	0x00	Position Sensor Type	3	Number	Position Sensor Type	
0x4009 0	0x00	Position Sensor Polarity	6	Number	Position Sensor Polarity	
0x400A 0	0x00	Pole Pair Number	4	Number	0~255	
0x400B 0	x01	Hall Sensor Ready Time	0	msec	0~65535	
0x400B 0	x02	Hall Sensor Valid Time	0	msec	0~65535	
0x400B 0	x03	Encoder Ready Time	0	msec	0~65535	
0x4010 0	0x00	Position Sensor Config	1	Number	Position Sensor Config	
0x4011 0	0x00	Position Sensor 2 Type	73	Number	Position Sensor Type	
0x4012 0	0x00	Position Sensor 2 Polarity	0	Number	Position Sensor Polarity	
0x4013 0	x01	Position Encoder 2 Resolution	131072	Count	6~4294967295	
0x4013 0	x02	Position Encoder 2 Revolution	1	Count or mm	1 ~ 4294967295	
0x4014 0	x01	Hall Sensor 2 Ready Time	0	msec	0~65535	

6.3 Parameter Save (Write Flash)

Save File

Upload Data

(1) Click [Save] in the Ribbon Bar. The data set in the drive is saved to the drive flash memory.

WriteFlash

OK

Cancel



Download Data

6.4 Parameter Restore

Import File

- (1) Click the [Restore] button on the Ribbon Bar. The data set in the drive is initialized. Click the [Save] button to save the initial status to the drive flash memory.
- (2) If you press the [Restore] button only and turn the power off without pressing the [Save] button, the parameters saved in the drive before initialization are maintained.





7. Motion

7.1 Servo Control

Hame	Score		_	DINGS' Servo Studio - 2.00.00
Connect Disconnect		Cubie Hat QuickStop ErrorReset	Firmware	Dijett Scope Caption Log LogClear
Connection	Parameter	Servo Control	Frimware	View

Button	Description
Enable/Disable	Operation Enable/Disable
Quick Stop	Quick Stop
HALT	Stop
Fault Reset	Error Reset when an error occurs

(1) Servo On: Click [Enable] on the Ribbon Bar to switch to Servo On state. The button will turn orange.

Home	Scope				DINGS' Servo	Studio - 2.00.0006
Connect Disconnect	Restore Import Export Save	Enable Hat QuickStop ErrorReset	Firmware Firmware	Object Scope (Caption Log	LogClear
Home	Scope		_		DINGS' Servo	Studio - 2.00.0006
Connect Disconnect	Restore Import Export Save	Disable Halt QuickStop ErrorReset	Firmware	Object Scope (Caption Log	OLogClear
Connection	Parameter	Servo Control	Trimware		View	

(2) Servo Off: Click [Disable] on the Ribbon Bar to switch to Servo Off state. The button will turn black.

Hune	(1000 a		_	DINGS' Servo Studio - 2.	00.0006
Connect Disconnect	Restore Import Export Save	Disable Hat QuickStop ErrorReset	Firmware	Dijett Scope Caption Log LogClear	
0				DINGS' Servo Studio - 2.00/	0006
Home	kope				



7.2 Motion

- Execute Motion by mode
 - (1) Click [Motion] in the Tool Pane to display the window for executing Motion in the Target Pane.

		ofile Position		~							
Actual Data	_						Current				
Status word	0x02	10	000	2			0				
Position	0		counts	counts				Current(mA) 100	Set	0	Set
Velocity	0		RPM				Torque(%»)	100	Set	0	Set
Current	0		mA				Voltage(mV)	100	Set	0	Set
PositionError	0		counts								
PositionVeloc	ty			_			Homing				
Profile	Туре	Sinusoial Pr	ofie	~					Parameter Se	t Hor	ming Start
Absolute Pos	ition 1	1000	counts	►	Re	peat	Homin	Method	Homing Method	137	~
Absolute Pos	ition2	0	counts	►	Go 0	0	Hon	e Offset	0	cour	nts
DelativeDe	sition	1000	counts	•			Speed Switz	h Search	100	0.04	
Reduvert		2000	RPM	•		0	opeco omiti			KPM	
Jog Ve	loaty		=				Speed	for Zero	10	RPM	
Jog Ve	ration	10000	RPM/s								
Jog Ve Accele	ration	10000	RPM/s				Acc	eleration	5000	RPM	l/s

7.2.1 Profile Position Mode

	Parameter	Servo (control Fi	imware		View		_
on Motion Specialist	Servo Off		_		_	_	_	
	Operation Mode	Position	~	Orrent				
	Status word 0x0240	00	0	current				
	Position 0	counts		Current(mA)	100	Set	0	Set
	Velocity 0	RPM		Torque(%)	100	Set	0	Set
	Current 0	mA		Voltage(mV)	100	Set	0	Set
	PositionError 0	counts						
	Position <u>V</u> elocity			Homing				
	Profile Type Sinu	soial Profile	~			Parameter Se	et Homing	Start
	Absolute Position 1 100	counts	Repeat	Homing	g Method	Homing Metho	d 37	~
	Absolute Position2 0	counts	► Go 0 0	Horr	ne Offset	0	counts	
	RelativePosition 100	counts		Speed Swite	h Search	100	RPM	
	Jog Velocity 200	RPM		Speed	for Zero	10	RPM	
	Deceleration 100	00 RPM/s		Acc	eleration	5000	RPM/s	
	Jerk 300	000 RPM/s^2		π	hreshold	0	mA	
Denire	Log Message				_	_	_	
- octobe	Code	Description						
		Device Connected						
brive Setup								
	-							



- (1) Select Profile Position for the Operation Mode.
- (2) When the Position / Velocity Parameter input window is activated, input the parameter values.
- (3) Click [Enable] on the Ribbon Bar to switch to Servo On state, after which Motion is executed.
- (4) Click Absolute Position button [>] to move to the inputted Absolute Position. Check Repeat and then click Absolute Position button [>] to repeatedly move between Position1↔Position2.
- (5) Click the [0] button to set the current position to 0.
- (6) Click [Go 0] to move to the position at which Absolute Position is 0.
- (7) Click Relative Position button [>] to move in the positive direction from the current position by the Relative Position value, and click [<] to move in the negative direction.</p>

INGS	Parameter		Servo Control	Frimware	_	View		
0	Operation Mode Actual Data	ofile Velocity		Current				
	Position 0		counts	Current(mA)	100	Set	0	Set
	Velocity 0		RPM	Torque(%)	100	Set	0	Set
	Current 7		mA	Voltage(mV)	100	Set	0	Set
	PositionError 0		counts					
	PositionVelocity			Homing				
	Profile Type	Sinusoial Pr	ofile ~			Parameter Se	t Homing	Start
	Absolute Position1	1000	counts Re	Homing	g Method	Homing Metho	d 37	~
	Absolute Position2	0	counts Go 0	0 Hon	e Offset	0	counts	
	RelativePosition	2000	counts	Speed Switz	h Search	100	RPM	
	Jogvelocity	10000	RPM RPM/r	Speed	for Zero	10	RPM	
	Deceleration	10000	DPM/c	Acc	eleration	5000	RPM/s	
	Jerk	300000	RPM/s^2	π	hreshold	0	mA	
ol Device	Log Message			_	_	_	_	
	Code	Descrip	tion					
		Device	Connected					
Drive Setup								

7.2.2 Profile Velocity Mode



- (1) In the Motion execution window, select Profile Velocity for the Operation Mode.
- (2) When the Velocity Parameter input window is activated, input the parameter values.
- (3) After changing to Servo On, click [>] to drive the motor in the positive direction of the inputted speed, and click [<] to drive in the negative direction.
- (4) Click [0] to reduce the speed to 0 and stop.
- (5) Checking Jog drives the motor at the input speed only while pressing [<] or [>].

NGS	(1) Target Reached	_		and tes	-0104				****	
Motion Specialist	Operation Mode Cu	rrent Mode		~						
	Actual Data					Current				
	Status word 0x04	10				Current(mA)	100	Set	0	Set
	Velocity 0		counts			Terma(%,.)	100	Cal	0	Cal.
	Current -6		mà			Holigon (mit)	100	Set	•	361
	PositionError 0		counts			voitage(mv)	100	Set	0	Set
	Decilierative activ					Harriso				
	Profile Type	Sinusoial Pr	rofile			noming		Parameter Set	Homing S	tart
	Absolute Position 1	1000	counts		Repeat	Homin	g Method	Homing Method	37	~
	Absolute Position2	0	counts		0	Hor	ne Offset	0	counts	
	RelativePosition	1000	counts	•	•	Speed Swith	th Search	100	RPM	
	Jog Velocity	2000	RPM	•	▶ 0	Speed	for Zero	10	RPM	
	Acceleration	30000	RPM/s			AO	eleration	5000	RPM/s	
	Deceleration	30000	RPM/s			т	hreshold	0	mA	
	Jerk		iongs 2							
evice	Log Message									
	Code	De	scription							
		De	vice Connect	ed						
e Setup										

7.2.3 Current / Torque / Voltage Mode

(1) Select Current/Torque/Voltage for the Operation Mode.

The mode can be changed to Current, Torque, or Voltage only in the Servo Off state.

(2) When the Parameter input window is activated, input the parameter values. After changing to Servo On, click [Set] to execute Motion for the inputted parameter values according to the mode.



1.2.4 Homing would	7.2.4	Homing	Mode
--------------------	-------	--------	------

IGS	Parameter		Servo Con	trol	Frimwa	17E	_	View	
ion Specialist	Operation Mode Homin	ng Mode	v						
	Actual Data				Current				
	Status word Dx0040	00	0		Current(mA)	100	Cat	0	Cat
	Position 8	counts			-				
	Velocity 0	RPM			Torque(‰)	100	Set	0	Set
	Current 8	mA			Voltage(mV)	100	Set	0	Set
	Postorena 0	counts							
	PositionVelocity Profile Type Sin	usoial Profile	~		Homing		Daramatar Ca	Hamina St	**
	Absolute Position1 10	00 counts		Repeat	Homin	a Method	Homing Method	137	ar v
	Absolute Position2 0	counts	•	0			noning rector		-
	RelativePosition 10	00 counts	4	•	Plot	ne Oriset	<u> </u>	counts	
	Jog Velocity 20	00 RPM	4	▶ 0	Speed Swite	th Search	100	RPM	
	Acceleration 30	000 RPM/s			Speed	for Zero	10	RPM	
	Deceleration 30	000 RPM/s			Act	eleration	5000	RPM/s	
	Jerk ³⁰	000 RPM/s^2			т	hreshold	0	mA	
ce.	Log Message								
	Code	Description							
etup									

- (1) Select Homing for the Operation Mode
- (2) When the Homing Parameter input window is activated, select the Homing Method and input the parameter values.
- (3) Click [Parameter Set] to set the parameter values in the drive, and click [Homing Start] to execute Homing.
 - Please refer to the Reference Manual regarding the Homing Method.



8. Object Dictionary

• Load / Download the drive-supported objects.

in Specialist	Object Group	Posito						X
	Object Group	Posto			a 1.1	_		
	Index	-	n Control	Load	Download			_
		SubIndex	Item	Value	Unit	Range	Access	^
	0x4400	0x01	Position Controller P-Gain	200000	10^-3	0~100000000	RW	
	0x4400	0x02	Position Controller I-Gain	0	10^-3	0~100000000	RW	
	0x4400	0x03	Position Controller D-Gain	0	10^-3	0~100000000	RW	
	0x4408	0x01	Operation Mode of Position Control	4294967295			RW	
	0x4408	0x02	Index of Position Control Paramete	255	0	0~3	RW	
	0x4409	0x01	Position Controller P-Gain2	4294967295	10^-3	0~100000000	RW	
	0x4409	0x02	Position Controller I-Gain2	0	10^-3	0~100000000	RW	
	0x4409	0x03	Position Controller D-Gain2	0	10^-3	0~100000000	RW	
	0x440A	0x01	Position Controller P-Gain3	4294967295	10^-3	0~100000000	RW	
	0x440A	0x02	Position Controller I-Gain3	0	10^-3	0~100000000	RW	
	0x440A	0x03	Position Controller D-Gain3	0	10^-3	0~100000000	RW	- 11
	0x4408	0x01	Position Controller P-Gain4	4294967295	10^-3	0~100000000	RW	
	0x4408	0x02	Position Controller I-Gain4	0	10^-3	0~100000000	RW	
	0x4408	0x03	Position Controller D-Gain4	0	10^-3	0~100000000	RW	
	0x6040	0x00	Control Word	128		CIA-402	RW	
	0x6041	0x00	Status Word	32832		CIA402	RW	
	0x6060	0x00	Modes of Operation	-128		CIA402	RW	
	0x6061	0x00	Modes of Operation Display	-128		CIA402	RW	
	0x6062	0x00	Position Demand Value	-7658	counts or mm	CIA402	RW	
	0x6063	0x00	Position Actual Internal Value	-7658	counts or mm	-2147483648 ~ 214748	RW	~
1	Log Messag	e .						
	Code		Description					
tup								
_								

- Select the group of objects to check or change to display the Object List corresponding to the group.
- (2) Click [Load] to read the values of the object list from the drive.
- (3) After changing the object value, check the checkbox for the corresponding object and click [Download] to apply the value of the checked object to the drive.
- (4) After changing the object value, click [Save] in the Ribbon Bar to save the applied value to the drive flash memory.



9. I/O

- Digital Input Function Settings
- I/O Test



- (1) Click [I / O] in the Tool Pane to display the I/O window in the Target Pane.
- (2) For the Digital Inputs, the Polarity and Function can be set. After setting the Polarity and Function, click [Apply].
- (3) Digital Output can be executed by checking or unchecking the Digital Output checkbox.



10. Motion List (Motion Sequence)

- Define the motion table to perform motions according to the conditions
- Input the motion parameters for each motion (Motion0 Motion7) to generate the Motion List.
- Motion Sequence Modification and Drive Test

dion	Parameter			rivo Contro		TOTAL			View	-
ICC/						ing Colomana		_		
AG2	U Servo Off									
otion specialist	Upload Down	oad S	tart	Halt	A:	tual Motion In	dex : Motion	8		
	Axis 0		Motion 0	Motion 1	Motion 2	Motion 3	Motion 4	Motion 5	Motion 6	Motion 7
	Mode		HM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
	Target		35	1000000	0	1000000	0	0	0	0
	Parameter0		1000	1500	1500	2500	2500	0	0	0
	Parameter1		17000	10000	10000	10000	10000	0	0	0
	Parameter2		17000	10000	10000	10000	10000	0	0	0
	Parameter3		0	10000	10000	10000	10000	0	0	0
	Next Motion Condition	on Type0	7	2	2	2	2	0	0	0
	Next Motion Condition	on Value0	1	100000	100000	100000	100000	0	0	0
	Index of Next Motion	0	Motion 1	0	0	0	0	0	0	0
	Next Motion Condition	on Type1	7	7	7	7	7	0	0	0
	Next Motion Condition	on value1	8	2	4	2	4	0	0	0
	Index of Next Motion	1	Motion 3	Motion 2	Motion 1	Motion 4	Motion 3	0	0	0
	Mode	HOMENG		~		ext Motion Co	odition Type0	7.dgital inp	ut	~
	Haming Mathad			=			indicial in prov			=
	Fighting Piecelou	Homing Met	hod 1	~	N	ext Motion Co	ndition Value0	1		
	Switch Search Velocity	1000		RPM		Index of	next Motion0	Motion 1		~
	Zero Search Velocity	17000		-		aut Mation Co	edites Turnel	7 doital ino	.t	_
				KPM		extributined	nuioun ryper			4
	Homing Acceleration	17000		RPM/s	N	ext Morion Co	ndition Value 1	8		
	Homing Position Offset	0		counts		Index of	next Motion1	Motion 3		~
	Lon Message									
nce										
	Code	Descop	tion							
Setup										
m	1									

- Motion List button
 - Upload: Loads the Motion List from the drive
 - **Download**: Download the changed Motion List to the Drive.
 - **Start**: After selecting the motion to start, click [Start] to execute from the selected motion.
 - Halt: Stop Motion



10.1.1 Motion List Edit

 Select the Motion List column to display the parameters for the selected motion at the bottom of the list, which can be modified.

Axis 0		Motion 0	Motion 1	Motion 2	Motion 3	Motion 4	Motion 5	Motion 6	Motion 7
Mode		PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
Taroet		1000	0	0	0	0	0	0	0
Parameter0		500	0	0	0	0	0	0	0
Parameter1		1000	0	0	0	0	0	0	0
Parameter2		1000	0	0	0	0	0	0	0
Parameter3		1000	1	1	1	1	1	1	1
Next Motion Conditio	0 OsdvT no	1	0	0	0	0	0	0	0
Next Motion Conditio	n Value0	0	0	0	0	0	0	0	0
Index of Next Motion	0	Motion 1	0	0	0	0	0	0	0
Next Motion Conditio	n Type1	0	0	0	0	0	0	0	0
Next Motion Conditio	n value1	0	0	0	0	0	0	0	0
Index of Next Motion	1	0	0	0	0	0	0	0	0
Mode	PROFILE_PO	SITION	~		Next Motion Co	ndition Type0	1.Target Re	ached	~
Target position	1000		pulse		Next Motion Co	ndition Value0	0		
profile velocity	500		mm/s		Index of	next Motion0	Motion 1		~
Profile Acceleration	1000		mm/s*	<u>^2</u>	Next Motion Co	ndition Type 1	0.None		~
Profile Deceleration	1000		mm/s	2	Next Morion Co	ndition Value 1	0		
Des file inde	1000				Index of	next Motion 1	0. Motion Co	molete	~

- (2) After modifying the motion parameters, click [Download] to apply the changed parameters to the drive.
- (3) After modifying each motion, click [Download] to apply the modifications to the drive.

Name	Description
Mode	Mode of motion
mode	Homing /Profile Position/Profile Velocity/Current
Target	
Parameter0	Torret and Describes 0.0 was described as the Made
Parameter1	larget and Parameter 0-3 vary depending on the Mode.
Parameter2	
Parameter3	
Next Motion Condition Type 0	The conditions under which the next motion is executed
Next Motion Condition Value 0	The values corresponding to the conditions under which the
	next motion is executed
Index of Next Motion 0	The index of the next motion
Next Motion Condition Type 1	The conditions under which the next motion is executed
Next Motion Condition Value 1	The values corresponding to the conditions under which the
Next Motion Condition Value 1	next motion is executed
Index of Next Motion 1	The index of the next motion



10.1.2 Motion Mode

The table below shows the operation modes that can be set in the motion table.

Value	Description
6	Homing Mode (HM)
3	Profile Velocity Mode (PVM)
1	Profile Position Mode (PPM)
-12	Current Regulation Mode (CRM)

10.1.3 Motion Parameter

- Target and Parameter 0-3 vary depending on the Motion Mode.
- The Target Value is the target value according to the operation mode. When the Modes of Operation is Homing mode, the Target Value is Homing Method. Parameter0, Parameter1, Parameter2, and Parameter3 are the control parameters required for each operation mode. The following table shows the definitions of Target Value, Parameter0, Parameter1, Parameter2, and Parameter3 according to the Modes of Operation.

Sub-index	Profile Position Mode	Profile Velocity Mode	Torque Regulation Mode	Homing Mode
Modes of Operation	1	3	-12	6
Target Value	Target Position	Target Velocity	Target Current	Homing Method
Parameter0	Profile Velocity	Profile Acceleration	-	Switch Search Velocity
Parameter1	Profile Acceleration	Profile Deceleration	-	Zero Search Velocity
Parameter2	Profile Deceleration	-	-	Homing Acceleration
Parameter3	Profile Jerk	-	-	Home Offset

• Homing Mode Parameter

- The homing function is executed according to the set homing method, speed, acceleration, and offset

Mode	HOMING ~		Next Motion Condition Type0	1.Target Reached \checkmark
Homing Method	Homing Method 1 $$		Next Motion Condition Value0	0
Switch Search Velocity	100	mm/s	Index of next Motion0	Motion 1 ~
Zero Search Velocity	200	mm/s	Next Motion Condition Type1	0.None ~
Homing Acceleration	1000	mm/s^2	Next Morion Condition Value 1	0
Homing Position Offset	2000	Pulse	Index of next Motion 1	0.Motion Complete ~



Homing Mode	Homing Mode Parameter			
Object	Data	Description	Unit	
Target	Homing Method	Settings for homing execution method	Number	
Parameter0	Switch Search Velocity	Speed to move to home position	RPM, mm/s	
Parameter1	Zero Search Velocity	Movement speed to Home Offset	RPM, mm/s	
Parameter2	Homing Acceleration	Acceleration used in Homing Mode	RPM/s, mm/s ²	
Parameter3	Homing Position Offset	The home position setting after moving the amount of the set value at the end of the homing sequence. Negative when Homing Method is -3 and positive when -4	Pulse	

• Profile Position Mode Parameter

- Creates a profile with the profile velocity, acceleration, and deceleration data and drives based on the target position

Mode	PROFILE_POSITION -		Next Motion Condition Type0	1.Target Reached	•
Target position	100000	pulse	Next Morion Condition Value0	22	
profile velocity	1500	RPM	Index of next Motion0	Motion 0	•
Profile Acceleration	6000	RPM/s	Next Motion Condition Type1	0.None	•
Profile Deceleration	5000	RPM/s	Next Morion Condition Value1	0	
Profile jerk	1300	RPM/s	Index of next Motion 1	0.Motion Complete	•

Profile Position Mode		
Object	Data Name	Unit
Target	Target Position	Pulse
Parameter0	Profile Velocity	RPM or mm/s
Parameter1	Profile Acceleration	RPM/s or mm/s ²
Parameter2	Profile Deceleration	RPM/s or mm/s ²
Parameter3	Profile Jerk	RPM/ ² or mm/s ³

• Profile Velocity Mode Parameter

- Creates a profile with the profile velocity, acceleration, and deceleration data and drives based on the target speed

Mode	PROFILE_VELOCITY ~		Next Motion Condition Type0	1.Target Reached \lor
Target Velocity	1000	mm/s	Next Motion Condition Value0	0
Profile Acceleration	0	mm/s^2	Index of next Motion0	Motion 1 V
Profile Deceleration	0	mm/s^2	Next Motion Condition Type1	0.None v
	0		Next Morion Condition Value 1	0
	0		Index of next Motion 1	0.Motion Complete V



Profile Velocity Mode			
Object	Data Name	Unit	
Target	Target Position	Pulse	
Parameter0	Profile Velocity	RPM or mm/s	
Parameter1	Profile Acceleration	RPM/s or mm/s ²	
Parameter2	Profile Deceleration	RPM/s or mm/s ²	
Parameter3	-	-	

• Current Regulation Mode Parameter

- Perform current control by the target current value

Current Mode			
Object	Data Name	Unit	
Target	Target Current	mA	
Parameter0	-	-	
Parameter1	-	-	
Parameter2	-	-	
Parameter3	-	-	

10.1.4 Next Motion Parameter

Two conditions can be set to execute the next motion.

After comparing the Next Motion Condition Type0, if the conditions are not correct, then compare Next Motion Condition Type1. Set the conditions for executing the next motion through the Next Motion Condition Type, and input the settings for executing the next motion according to the Next Motion Condition Type. For the next motion index, input the motion or motion index to be executed when the set conditions are satisfied.



Value	Name	Description	
0	None	The next motion is not performed.	
1	Target Reached	When the current motion is completed, the next motion is performed.	
2	Target Reached and Wait	When the current motion is completed, the system waits for the time set in sub index 0x08 and then performs the next motion.	
3	Less than position	If the current position is smaller than the value set in Next Motion Condition Value, the next motion is performed.	
4	More than position	If the current position is larger than the value set in Next Motion Condition Value, the next motion is performed.	
5	Duration	After the current motion is completed, the next motion is executed after the time set in Next Motion Condition Value.	
6	External Load Torque/ Force	If the external load is larger than the value set in Next Motion Condition Value, the next motion is performed.	
7	Digital Input	If the data received through the digital input port is equal to the set Next Motion Condition Value, then the next motion is performed.	

• Next Motion Condition Value

Next Motion Condition Value			
Condition Type	Next Motion Condition Value	Value Unit	
None	-	Ignored	
Target Reached	-	Ignored	
Target Reached and Wait	Wait time after target completion	ms	
Less than position	Location data	pulse	
More than position	Position data	Pulse	
Duration	Current duration in the current mode	ms	
Load Torque	Torque data	mNm or mN	
Digital Input	Digital input setting	Digital Input Status	

• Index of Next Motion

Index of Next Motion		
Value	Name	Description
0x0000	Motion Complete	Motion is completed at the set next motion condition
0x0001	Quick Stop	Motion is stopped at the set next motion condition
0x0002	Disable Operation	Operation is disabled at the set next motion condition
0x0003	Shutdown	Status changes to Servo Off at the set next motion condition
0x4710~0x4719 (Index0~Index 9)	Motion Index	Motion of the inputted index is executed at the set next motion condition
Other value	Motion Complete	Motion is completed



Next Motion Condition Value			
Condition Type	Next Motion Condition Value	Value Unit	
None	-	Ignored	
Target Reached	-	Ignored	
Target Reached and Wait	Wait time after the target is reached	ms	
Less than position	Position data	pulse	
More than position	Position data	Pulse	
Duration	Duration to maintain the Current Mode	ms	
Load Torque	Torque data	mNm or mN	
Digital Input	Enable/disable Digital Input	Digital Input Status	

• Index of Next Motion

Index of Next Motion		
Value	Name	Description
0x0000	Motion Complete	Complete the motion when the Next Motion Condition is met
0x0001	Quick Stop	Stop the motion when the Next Motion Condition is met
0x0002	Disable Operation	Disable the operation when the Next Motion Condition is met
0x0003	Shutdown	Turn the servo off when the Next Motion Condition net
0x4710~0x4719 (Index0~Index 9)	Motion Index	Execute the Motion entered in the index when the Next Motion Condition is met
Other value	Motion Complete	Complete the Motion

10.1.5 Motion List Example



- Motion0: Moves to Target1 (-13000), waits for 500 ms after reaching the target position, and executes Motion1
- Motion1: Moves to Target2 (-6000), waits for 500 ms after reaching the target position, and executes Motion0
- (1) As follows, select Motion and input the parameters.
- (2) After inputting the parameters, click [Download]



Item	Motion0 Value	Motion1 Value
Mode	Profile Position Mode	Profile Position Mode
Target Position	-13000	-6000
Profile Velocity	5000	5000
Profile Acceleration	1000000	1000000
Profile Deceleration	1000000	1000000
Profile Jerk	1000000	1000000
Next Motion Condition Type 0	1.Target Reached and Wait	1.Target Reached and Wait
Next Motion Condition Value 0	0	0
Index of Next Motion 0	Index 1	Index 1
Next Motion Condition Type 1	0.None	0.None
Next Motion Condition Value 1	0	0
Index of Next Motion 1	0	0

(3) For the test, after changing to Servo On, click [Start].

(4) To first execute Motion1(Index1), select Index1 for Index in the Motion Edit window, and click [Start]. Index1 will execute first, after which the connected Motion0(Index0) motion will execute.



11. Scope

(1) If there is no Scope window, click [Scope] in the Ribbon Bar to display the Scope window. If Scope window is open, click [Scope] in the Ribbon Bar to hide the Scope window.

0		DINGS' Servo Studio - 2.00.0006
Home Scope		
Connect Disconnect	Chable Hait QuickStop ErrorReset	Object Scope Daption Log LogClear
Scope	ά×	
k 🔂 😑 🕞 🛟 🛱 🕕		
- Current Actual Value - Velocity Actual Value - Position Ac	ual Value	
	Terr. 0.27	
1000	Current Actual Value: -168.00 Velocity Actual Value: -202.00	
	Position Actual Value: -803.00	
800		
600		
400		
-200		
00:00.400 00:00.18)0 00:00.400 00:00.	5 0.600 00:00.800 00:01.000	

(2) Select the [Scope] tab in the Ribbon Bar

0						
	Home	Scope				
		IntervalTime	1.0	* msec	TrackLine1	
		Buffer Size	1000	*	TrackLine2	
Svae	Channel	RecordingTime				
Scope File	Channel	Т	ime Setting		View Option	

- Save: Save the graph data as a CSV file
- Channel: Select the data to monitor and the scale and color of the displayed graph.
- Interval Time: Set the interval time for storing the data to monitor in the drive buffer.
- Buffer Size: When saving the data to monitor in the drive buffer, set the buffer size to save.
- Recording Time(msec) = Interval Time * Buffer Size
- Track Line: When checked, the track line will appear on the graph, showing the data of the checked track line position.
- Synchronize: If checked, when there are multiple graphs, the track line time is synchronized.



(3) Click [Channel] on the Ribbon Bar to display the window to select the Scope Channel.

Ξ,	lome	Scope					
		IntervalTime	1.0	- n	isec	TrackLine1	
Contract of the second	Changel	Buffer Size	1000	٣		✓ TrackLine2	
Svae	Channel	RecordingTime					
Scope File	Channel	Ti	ime Setting			View Option	

(4) In the Scope Channel window, select the data to monitor and check the checkbox. After setting the scale and color of the data to display on the graph, click [OK].

Scope Chan	nel						×
	Channel		Sub	Scale		Color	
Graph1:	Current Actual Value	~	0	x1	\sim		
Graph2:	Velocity Actual Value	~	0	x1	\sim		
Graph3:	Position Actual Value	~	0	x1	~		
Graph4:	(none)	~	0	/1000	\sim		
Graph5:	(none)	~	0	/1000	\sim		
Graph6:	(none)	~	0	/1000	\sim		
Graph7:	(none)	~	0	/1000	\sim		
Graph8:	(none)	~	0	/1000	\sim		
			[OK		Cancel	

(5) Use the buttons in the Scope window to execute Scope.







- Select: When the graph is enlarged, the position can be moved or the Track Line can be selected.
- Zoom In/Out: After clicking [Zoom In] or [Zoom Out], click the left mouse button, move the mouse cursor inside the graph, and use the mouse wheel to zoom in our out.
- Start: Periodically reads data from the connected communication method and draws the graph of the data to monitor. (Not Real Time)
- Read buffer: Reads the data saved in the drive buffer once for the set Interval Time period according to the set Buffer Size and shows it in the graph. If the Interval Time and Buffer Size are large, the graph takes a long time to update.
- Read buffer repeatedly: Repeatedly reads the data saved in the drive buffer for the set Interval Time period according to the set Buffer Size and shows it in the graph. If the Interval Time and Buffer Size are large, the graph takes a long time to update.



12. Firmware

- Download drive firmware
- (1) Click [Firmware] in the Ribbon Bar.

Home	Scope		~ ~ ~	
00	王玉玉の	ሮ 😑 💿 🔒	1	i) 🜌 😁 🗩 🚺
Connect Disconnect	Restore Import Export Save	Enable Halt QuickStop ErrorReset	Firmware	Object Scope Caption Log LogClear
Connection	Parameter	Servo Control	Frimware	View

(2) Load the firmware file.

elect the frimware hie to download and cir	ix [Next] button to select the communication port.
Firmware file info.	Target Device firmware info.
Firmware(bin)	
Device Name:	
Hardware Version:	1.20
Software Version:	0.10
Vendor ID:	0000007
Product ID:	0x00002403
Revision Number:	20190427
Serial Number:	0000001
L	

(3) Click [Next]

elect the frimware file	e to download and dick [Next] butt	on to select the communication port.
Firmware file info.		Target Device firmware info.
Firmware(bin)	D:\#1_ServoDrive\#Firmware	
Device Name:	WelConSystems-Servo	
Hardware Version:	1.20	1.20
Software Version:	0.10	0.10
Vendor ID:	0000007	00000007
Product ID:	0x00002403	0x00002403
Revision Number:	20190427	20190427
Serial Number:	00000001	00000001

* A message box occurs when device name and product ID are inconsistent (Check Firmware.)





(4) Click [Erase] - Delete the drive firmware and then download.

Communication Port.	PCAN_USBB	US1	
Communication Speed:	1000000	bps	START App. Program
Timeout:	5000	ms	
Firmware(bin)	0x00002403	3_20190427.bin	

(5) Click [Download].

Constanting Dark		1101	
Communication Port:	PCAN_USBB		CTADT Ann Deserve
Communication Speed: Timeout:	5000	bps	START App. Program
Firmware(bin)	0x00002403	3_20190427.bin	
	- C		OAD hutten!!

(6) When the firmware download is complete, click [Yes (Y)] in the pop-up window that appears to execute the drive program.

Communica	TqServoControlUI	×
Communicati		RT App. Program
	OK Firmware download completed. Do you want to restart the program	n?
Download informatio		
Firn	예(Y) 아니요	L(N)



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