

ServoChoke[®]/Encoder Configuration Using a Siemens Drive



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1 Basic integration of a Siemens Drive to a Tolomatic ServoChoke®/SICK encoder combination

Please note: This tech note and associated testing was developed using Siemens Sinamics S120 version: 04703562. Using an older version of the firmware on the control unit and accompanying modules may result in faulty operation.

Hardware:	Software	
Tolomatic ServoChoke	 Sinamics STARTER 	
 Siemens Control Unit (CUA31) 		
 Siemens Encoder Module (SMC20) 		
 Siemens Power Module (PM240-2) 		
Line Reactor		
SICK Encoder		
• PC		

Siemens Encoder Module	Sick Encoder	
1	Red	
2	Blue	
3	Gray	
4	Green	
5	-	
6	Pink	
7	Black	
8	-	
9	-	
10	Yellow	
11	-	
12	Violet	
13	-	
14	Jump to Pin 1	
15	White	
16	Jump to Pin 2	
17	-	
18	-	
19	-	
20	-	
21	-	[
22	-	[
23	Brown	[
24	-	[
25	-	[
SH	Shield	

Siemens Power Module/CU	ServoChoke
U2	White
V2	Red
W2	Black
÷	Shield/Ground
V+	+24V Brake
0V	0V Brake





2 Setting up a new project

2.1 Creating a new project

Open the Siemens Starter software.



Click on "Project", select "New ... ".



2.2 Selecting "Accessible nodes"

From the menu bar, select the "Accessible nodes" icon.





A list of Accessible Nodes will populate the window. Select the intended Drive, and then click "Accept".

z STARTER - Tech_Note - [Accessible nodes - TCP/IP(Auto) -> Intel(R) 82577LC Gigab]
Project Edit Target system View Options Window Help
Accestible nodes Insert single drive unit SINAMICS LIBRARIES MONITOR
Extended settings Access point: DEVICE (STARTER, SCOUT) Interface parameterization used: TCP/IP(Auto) -> Intel(R) 82577LC Gigab IP address of the sought node:
Do you want to accept the selected drive units into the project? Accept Select drive units Update
Project Accessible nodes
ress.F1 to open Help display. ISO Ind

*Note: you may need to disable your firewall in order to view the drive

The Software will verify that the drive units have been transferred to the project.





2.3 Bringing the drive online

Bring the drive online by selecting "Connect to selected target devices" icon.

170324 SVC Insert single driv Drive_unit_1 Configure d Since the single drive single drive single drives SINAMICS LIBRA MONITOR	ve unit rive unit ation t at components tion ARIES	Accessible modes Accessible modes Drive_unit_1 (address = 165	rget devices
		Extended settings Access point:	DEVICE (STARTER,
		Interface parameterization used:	TCP/IP(Auto) -> Intel
		IP address of the sought node:	
		Do you want to accept the selected drive u	nits into the project?
		Accept Select drive units	Update
Project		Accessible nodes	
Project		Accessible nodes	
Project × ① @ orror(s)	☑ 0 warning(s)	Accessible nodes	
× 0 error(s)	v 0 waming(s) Message	Accessible nodes	
Project	✓ 0 warning(s) Message All	Accessible nodes	



Then, connect to assigned devices...

vice in the project	Accessible nodes
_1	Drive_unit_1 (address = 169.2



Select "Download to target device" to move forward with setting up the new project. *Please note: this will overwrite any configuration currently present on the drives memory. Make sure to save the present configuration to a separate file if you intend to use it again in the future.

Online/offline compa	rison	×
The online config	guration of Drive_unit_1 (SINAMICS S120 CU320-2	2 DP V4.7) is the same as the project saved offline.
Offline	Online	Differences
Adjust via:	Download to target device	
	Load to PG	
Drive_unit_1		
		Close Help

2.4 Configuring the drive

First double click the "Automatic Configuration" tab; using Drive Cliq, to locate compatible Siemens devices connected to the system.

STARTER - Tech_Note	Automatic Configuration
Project Edit Target system View Options Window Help	
Image: Second Secon	Configure drive unit automatically The DRIVE-CLiQ topology is determined and the electronic type plates are read out. The data is then loaded to the PG and replaces the configuration in the project. "Restore factory settings" is performed first for the target device Status of the drive unit: Initialization finished Running operation: Waiting for START Statt Cancel



You will receive a prompt: "Reset Device Configuration?" Select "Yes". This will reset any internal DRIVE-CLiQ device topology that is currently saved in the drive.

Auto	matic Config	uration		X
	Restore Fac	tory Settings	tally.	×
		Reset device configu Some parameters (e.g. bus ad	uration dress, baud rate, etc.)	are not reset.
		Save device parameterization to ROM after completion Do you really want to restore the factory settings?		
		Yes	No	Help
		Start	Cancel	



Select "Servo" as the default setting in the Automatic Commissioning drop down; click create.

A	Automatic Commissioning					
	During the automatic commissioning, components have been found that cannot be clearly assigned to a drive object type. Please select the drive object type that is to be created for the components.					
	Default setting for all o	components:	Servo	_		
	Component	Drive Object Type		Identification		
	Drive 1	Servo	•	Identification via LED		
	·					
		Create		Help		



Then, follow the prompts to bring the drive offline.

Automatic Configuration	Automatic Configuration				
Automatic configuration completed					
Please remember also to complete the configuration of the motors on the following drives or the infeed:					
SERVO_02					
To do this, go offline and run through the relevant wizard. If there is an infeed, configure further properties (e.g. line filter).					
Do you want to go OFFLINE (only with this drive unit)?					
Go OFFLINE Stay ONLINE					

2.5 Opening the Drive Tree

Open the "Drives" tree, then double-click on the drive folder (labeled "Servo_02" below) and select "Configure DDS".

STARTER - 170209SiemensSVCbackup - [Drive_un	it_1.SERVO_02 - Configu	ration]				10 Mar 10		
Project Edit Target system View Options	Window Help							_ 8 ×
	? XIXE 5	12% <u>++111*</u>		<u> </u>	114 <u> </u>	▨ෳ₮₢⊵₨๏		
x introduction in the interview in the interview in the interview in the interview int	Display data set	Drive data set: DDS 0 Command data set: CDS 0	Configure DD	S Ad	d DDS Remove DC	05 05		J
	Mamo		- Drive ahir	de hune:	111950/0			
	ivalle.	penvo_oz		ors ope.				
Infeeds	Drive object no.:	<	Control typ		[21] Speed control (with en	coderj		
Incoder Drives	Function extensions	Configuration scripts		re telegram:	[333] Free telegram configu	ration with BILU		
		SERVD_02.Motor_Module_2 (Power_ur Component number: Power module adapter:	ik) 2 65L3040-0PA00-0Axx	SERV0_02.Enco	der_4 (Encoder 1) ner SMx	Encoder data 3		
> Expert list	3 702	Power unit type:	Power module	Encoder evaluari	on:	SM_3 SMC20		=
Drive navigator Control logic		Order no.:	SL3210-1PB17-4UL0	Order no.:		6SL3055-0AA00-5Bxx		
E >> Technology		Power unit rated power:	1.50 kW		DRIVE-CLiQ			
Open-loop/closed-loop con Superiopr		Current power unit operatir	ng values		Identification via L	.ED		
Messages and monitoring		DRIVE-CLiQ		Enc. type:		rotary, (SSI, 5V) (9999)		
		Identification via LE	D	Order no.:		×Exxxxx-xxxxx-xxxx		
Communication		SEBVD_02 Motor_5 (Motor)	Motor data	Resolution:		1024		
B CRIPTS		Mot. type:	21 Synchronous motor	Singletum resolut	10n:	1024		
Documentation	1	No list data is available for the motor		Encoder data and	n. weeker	4036		
		Speed:	3000.0 rpm	Encoder data set	Transa.	,		
		Torque:	0.00 Nm					
		Current	3.00 Arms					Ψ.
< •		UDS: 0 V MDS: 0				*	Close	Help
Project	SERVO_02							
Press F1 to open Help display.				ISO	Ind. Ethernet -> Intel(R) 8.	2577LC Gic Offline mode		



Under Function Modules select "Basic Positioner". Under Control Type, select "Speed Control (with encoder)".





Refer to the selections below for the Tolomatic ServoChoke. Click "Next" once all of the information is correct. Repeat this step for the next page.

control structure	Drive: SERV0_02, DDS ()	
Power unit Motor	Configure the power secti	on component:	
Motor holding brake Encoder	Component name:	Motor_Module_2	
Measurement system	Connection voltage:	, 380 - 480 3-phase VAC	
Process data exchang	Connection voltage.		
Summary	Cooling method:	Internal air cooling	•
	Туре:	Blocksize AC power mod	tule 💌
4 III	6SL3210-1SE11-3Uxx 6SL3210-1SE11-7Uxx SSL3210-1SE11-7Uxx	0.37 kW 1.3 A 0.55 kW 1.7 A	AC/AC
	Order no.	Rated po Rated cu	r Execution
	6SL3210-1SE11-3Uxx	0.37 kW 1.3 A	AC/AC E
4	65L3210-15E11-7UXX 6SL3210-15E12-20100	0.00 KW 1.7 A 0.75 kW 2.2 A	
	6SL3210-1SE13-1Uxx	1.1 kW 3.1 A	AC/AC
	6SL3210-1SE14-1Uxx	1.5 kW 4.1 A	AC/AC
State	6SL3210-1SE11-3Axx	0.37 kW 1 A	AC/AC
2 31	6SL3210-1SE11-7Axx	0.55 kW 1.5 A	AC/AC
1 1	6SL3210-1SE12-2Axx	0.75 kW 1.9 A	AC/AC
=	6SL3210-1SE13-1Axx	1.1 kW 2.7 A	AC/AC
	6SL3210-1SE14-1Axx	1.5 kW 3.5 A	AC/AC
	6SL3210-1SE16-0Uxx	2.2 kW 5.9 A	AC/AC

Drive: SERVO_02, DDS 0

Configure the power section	n component:	
Component name:	Motor_Module_2	Ĩ
Connection voltage:	380 - 480 3-phase VAC 🔹	I
Cooling method:	Internal air cooling 🔹 💌	1
Туре:	Blocksize AC power module	I



Configuration - Drive_unit	1 - Power unit supplementary da	ta
Control structure Power unit	Drive: SERVO_02, DDS 0	
Power unit supplement Motor	Power unit	
Motor holding brake	Order no. 6SL3210-1PB17-4ULx	Code number 5417
Mechanics Process data exchang Summary	No filter/choke	
	C Sine-wave filter	
	C Output choke	
	Voltage sensing module	
4 III +		
4	Selection of the component attache	ed to the power unit:
=	CUA31	
	< Back Nex	t> Cancel Help

Selection of the component attached to the power unit:





2.6 Entering Motor Data

Select "[2] Synchronous Motor" for Motor Type; Check the "Enter motor data" tab. Then, enter the motor data for the Tolomatic ServoChoke[®] unit. Refer to the table below for the specific motor data.



'aramete	Parameter text	Value	Unit
p305[0]	Rated motor current	2.50	Arms
p311[0]	Rated motor speed	3000.0	rpm
p314[0]	Motor pole pair number	9	
p316[0]	Motor torque constant	2.01	Nm/A
p322[0]	Maximum motor speed	3000.0	rpm
p323[0]	Maximum motor current	3.00	Arms
p338[0]	Motor limit current	3.00	Arms
p341[0]	Motor moment of inertia	0.003300	kgm²



Next, select: "Enter the optional motor data", click "Next". Enter the motor data for the Tolomatic ServoChoke unit. Refer to the table below for the specific motor data.

Configuration - Drive_unit_	1 - Equivalent Circuit Diagram Data		
Control structure	Drive: SERV0_02, DDS 0, MDS 0		
Power unit Power unit supplement Motor Motor data Optional Motor Data Calculation of the Moto Calculation of the Moto Motor holding brake Encoder Measurement system Mechanics Drive functions Process data exchang Summary	Repres. of equiv. circuit diag. data: System of units, physical Motor data, Synchronous motor (rotary): aramete Parameter text Value D350[0] Motor stator resistance cold 2.00000 ohm p356[0] Motor stator leakage inductance 12.20000 mH		
	The equivalent circuit diagram data must be entered completely!	arameter taxt	Ilait
		arameter Parameter text Value U	Unit
	< Back Next > Cancel Help	p356[0] Motor stator leakage inductance 12,20000 mi	н

Select "Complete calculation without..."; then, select the appropriate brake settings. Please note: Your brake settings may vary based on equipment.





2.7 Configuring the Encoder

To configure the encoder, select "Enter Data" on the window below. Then, click "Encoder Data".



Select: "Absolute SSI protocol sin/cos" for the encoder type.

Encoder Data		× X
General Details		
Encoder type		
Rotary Measuring system:		
No encoder Resolver Incremental sine/cosine Absolute EnD at protocol Incremental HTL/TTL Absolute SSI protocol HTL/TTL Absolute SSI protocol sin/cos		
	OK Cancel	Help



Enter the encoder data as it is listed in the graphic below.

Encoder type Rotary Measuring system: Absolute SSI protocol sin/cos Encoder evaluation: SMC20	SSI protocol Code: • Gray Multitum: • Yes Single-turn resolution: 1024 Steps Multitum resolution: 1024 Steps Multitum resolution: 4096 Revolution Baud rate: 600 KHz
	Incremental tracks Pulses/revolution: 1024

incoder type	SSI protocol			
	Code: 💿 Gray	C Binary	0 1 2 MSB	LSB
Rotary	Multiturn: 💽 Yes	C No		ы ын Гээ 🕇
deasuring system:			Position length	
	Single-turn resolution:	1024	Steps Bits before pos.	: 0
Absolute SSI protocol sin/cos 💌	Multiturn resolution:	4096	Bevolution Bits behind pos	.: 11
Incoder evaluation:		4000		1
SMC20	Baud rate:	600	kHz	



Click the Next button at the bottom of the screen a series of times to verify that the information shown in the screens below are correct.





Technical Note

Configuration - Drive_unit_	1 - Summary	
Control structure	The following data of the drive has been entered:	
Control structure Power unit Equivalent Circuit Diag Calculation of the Mate Calculation of the Mate Calculation of the Mate Mater holding brake Encoder Mechanics Process data exchang Suruntag	The following data of the drive has been entered: Control structure: Control structure: Control type: [21] Speed control (with encoder) Function modules: Basic positioner Power unit: Component type: AC-Power Module_2 Component type: AC-Power Module Order no:: 65L3210-1PB17-4ULx Rated power: 1.5 kW Rated current: 7.4 A Power unit supplementary data: No filter/choke Adapter module: CUA31 Motor: Motor name: Motor_5 Motor type: [2] Synchronous motor Motor data: p305(0): Rated motor speed 3000.0 rpm p314(0): Motor speed 3000.0 rpm p314(0): Motor for current 3.00 Arms p311(0): Rated motor speed 3000.0 rpm p314(0): Motor for current 5.00 Arms p338(0): Motor timic current 6.00 Arms p338(0): Motor filter Current 6.00 Arms p358(0): Motor stator resistance cold 2.00000 ohm p356(0): Motor stator resistance cold 2.00000 ohm p356(0): Motor stator resistance cold 2.00000 ohm p356(0): Motor stator resistance cold 2.00000 hm p356(0): Motor stator re	E
	4	
	Copy text to clipboard	
	< Back Finish Cancel He	elp

Click finish and select "Go Online".





2.8 Downloading Data to Target Device

Select "Download to target device" in order to save the new information to the drive.

SERVO_02	SERV0_02	Units/structure inconsistency
dust via:	t adjusted, the online representation may b	e incomplete.
	Load to PG	



Follow the prompt below and select "Yes"

Offline		Differences
1	The project will be saved and the driv the target device!	ve unit data do w nloaded to
	 Store additional data on the target device Including DCC chart data After loading, copy RAM to RDM 	
	Start download?	
	Yes N	lo Help

After downloading to the target device, take the drive "offline". Then, perform a complete power cycle on the drive. The power must remain off for a minimum of 15 seconds to dissipate any remaining internal charge. Once it has powered back up, bring the drive back online.

The ServoChoke unit is now ready for motor and encoder tuning.



3 Tuning

3.1 Adjusting the P Gain

Please Note: The ServoChoke brake must be powered and disengaged prior to tuning.

In order to ensure proper operation, it is necessary to first properly adjust the P Gain feedback of the system. First, navigate to the 'Measuring Function' within the drive tree.

Project Edit Target system View Options Wind	dow Help					
	X1 XE 🔚 🏙 🏜 👫	11 - 11 - 11 - 11 - 11 - 11 - 11 - 11			≝⊮₽₩₩₩⊡⊡	
Drives Drives Drives Drives Drives Drives Insert DCC chat Configuration Sepert list Drive navigator S control logic Wrechanology Wessages and monitoring Device trace S function generator Stationary/turning m Communication Technology						
Component:	All		🔽 Display info	nation Acknowle	dge all Acknowledge	Help for event
Level Time [mm/dd/yy h:m:s:ms xx] Sou	rce	Component Mess	age			
Information 03/07/17 11:49:23:000 am Driv	e_unit_1	OK				
		m				×
Alarms						



4

Next, under Measuring Function select: 'Current controller set point jump (after current setpoint filter)'

Project Measuring function Edit Target system	View Options Window Help		_ 6 ×
	<u>XIXE</u> Salate Salate Salate Sa		
Drives SERVO_02 Se	Measuring function inactive Drive_unit_1 suring function Measurements Time diagram FFT diagram Image: Second controller second in the second controller second in the speed control in the speed controller second in the speed control in the speed conthe sp	Assume Control Priority	E
> Stationary/turning me > Communication	No. Active Signal	Comment	Color
V 0 entro(s) V 0 waming(s) V	₹ Dirformation		

AJR Siemens ServoChoke F14

Navigate to the 'FFT Diagram' tab on the top of the current screen.





Assume Control Priority of the system.



Enable the Drive, and select 'Yes' after reviewing the prompt.

Project Edit Target system View Options Window Help Point Stranget system View Options Window Help Solution Stranget	Mathematical State State </th <th></th> <th>E ×</th>		E ×
Measuring function	Measuring Function Image: Comparison of the measuring function! Image: Comparison of the measuring the measurement. When performing the measurement, the drive produces a movement when the axes are not firmly braked, in accordance with the parameterization of the measuring function [e.g. drive], amplitude, measuring time). Please ensure that no personnel are in the endangered area and that no damage to your plant or machine can result from these movements (e.g. from the mechanical endstops). Ensure that hanging axes are firmly braked!		
× C 0 emor(s) C 0 warning(s) C 3 information Level Message	Do you want to continue? Yes No	-	
Tig Aii 1 Information Drive_unit_1: Trace parameterization faultess. 2 Information Drive_unit_1: Download trace parameterization. 3 Information Drive_unit_1: Trace parameterization successfu	y downloaded.		
Press.F1 to open Help display.	Control priority (Measuring function) - stop with spacebar. ISO Ind. Ethernet -> Intel((R) 82577LC Gic <mark>Online mode</mark>	



Resulting graph should appear similar to the illustration below.





If graph does not appear to match, adjust the P gain in the motor menu until the measurement produces sufficient results.



Once the P gain has been properly adjusted, we are ready to move on to tuning.



3.2 Stationary Tuning

In the project tree, navigate to the 'Commissioning' tab.

Project Edit Targetsystem View Options Window Help	
Input/output components Encoder Encoder Inver SFSV0_02 Inver SFSV0_02 Inver DCC chart Configuration Expert list Drive revivator Some source of the second sec	
× Component: All Display information	Acknowledge all Acknowledge Help for event
Level Time [mm/dd/yy htm:sms.xx] Source Component Message	
Information 03/07/17 09:26:46:000 am Drive_unit_1 OK	
€₩	•
Press r1 to open Heip display. ISO	Ind. Ethernet -> Intel(K) 825771C Gic Unline mode

In the project tree within the 'Commissioning' tab, double-click on 'Control panel' to open the control panel menu.





Next, Select 'Stationary/tuning measurement' within the commissioning tab.

Project Edit Target system View Options	Window Help		_ 8 ×
	? X X 📴 🏙 🎕 🗰 🏜 📽 🔡 😫 🔛 🖼 🖼	E BORLEDE	
× i-D Input/output components i-D Encoder	Stationary/turning measurement	125	10 us
🖻 🫅 Drives	Meas. type:	120	
E → B SERVO_02 -	Complete calculation of the motor/control parameters	✓ Next measurement	
→ Expert list → Drive navigator → Control logic			E
⊕–≫ Technology ⊕–≫ Open-loop/closed-loop c ⊕–≫ Functions			
Messages and monitoring Source lange			
-> Device trace -> Function generator		Activate measuremen	R.
Automatic controller Stationary/turning me			
Communication	The following parameters are determined or changed with the motor data identification:		
	Parameter Parameter text	Value	nit 👻
			🕸 🚺 Close Help
Project	SERVO_02		
V Drive_unit_1 - SERV0_02	T 🚺 🗱 Help		
Assume Control Priority	n = rpm	0% n x 100 % = 200%	
L Enables DDS: 0		rpm	-
🛛 🚰 Alarms 💋 Control panel			
Press F1 to open Help display.		ISO Ind. Ethernet -> Intel(R) 82577LC Gic	Online mode

Then, select 'Stationary measurement' in the drop down.

Project Edit Target system View Options	Window Help
: D 📽 🗏 🐘 🎒 🐰 🗎 🛍 🖬 🖉 🕬 🕅	
×	
Input/output components	Stationaly/turning measurement
🕀 💭 Encoder	125.00 µs
	Meas. type:
Insert DCC chart	Complete calculation of the motor/control parameters Next measurement
Configuration	None Complete calculation of the motor/control parameters
> Expert list	Stationary measurement
🌺 Drive navigator	Encoder adjustment Turning messurement =
> Control logic	
Pechnology Open-loop/closed-loop c	
E Sentions	
Messages and monitoring	
E ≫ Commissioning	
> Control panel	Activate measurement
> Device trace	
Punction generator Measuring function	
> Automatic controller	
Stationary/turning me	
> Communication	The following parameters are determined or changed with the motor data identification:
Diagnostics Documentation	Parameter Parameter text Value Unit
Project	6 SERVD_02
Drive_unit_1 - SERV0_02	- 02 8a Hep
Assume Control Priority	n setpoint specification
	n=
Enables DDS: 0	
	· · · · pm · · ·
Press F1 to open Help display.	ISO Ind. Ethernet -> Intel(R) 82577LC Gic Online mode



Assume Control Priority and check the 'Enables' box.

Project Control panel Edit Target system View Options Window Help			_ 8 ×
	▩◗◾▻▻ຩ๒២	≟ऄॣढ़ढ़ॾॖॖॖ®	
Stationary/turning measurement			1
-> Control logic		125.00 µs	Â
	Nederse		
E → Functions	▼ Next meas	urement	_
Messages and monitoring The following parameters have to be configured before the measurement:			=
E→ Commissioning Parameter + Parameter text	Value	Unit	
p352[0] Cable resistance	0.00000	ohm	
5 Succing generator	0.000	mH	
Massing function	9.50	Arms	
Automatic controller 195900 Rotation measurement confounding	0ee7H		
Stationary/furging m			
Diagnostics			
B Status: [0] No measurement	Activate me	asurement	
			•
✓		₽ 5	Close Help
Project			· · · · · · · · · · · · · · · · · · ·
X Drive_unit_1 - SERVO_02			
Give up control priority	_ _		*
	100 % = 200.0		
Enables DDS: 0	rpm		=
Enables available [31] Ready for switching on - set "ON/OFF1" = "0/1" (p0840)			
Dispersive Dispersive Dispersive Actual Output frequency smoo	othed 📃		
Speed: 0.0 0.0 rpm	0.0 Hz		
			*
Alarms 💋 Control panel			
Press F1 to open Help display. Control priority [Drive control panel] - stop with spacebar	ISO Ind. Ethernet -> Intel(R) 8257	7LC Gic Online mode	

Click 'Activate measurement'. Review and close the prompt.

Project Edit Target system View Options V	Vindow Help	×
	Stationary/turning measurement 125.00 µs Meas. type: 125.00 µs Stationary measurement Next measurement The following parameters have to be configured before the measurement.	- III
→ Control panel → Device trace → Function generator → Measuring function → Statomaic controller → Statomaic controller → Statomaic controller → Statomaic controller → Statomaic controller → Documentation ⊕ SNAAMICS LIBRARIES ⊕ MONITOR	Parameter * Parameter * 055200 Post and the stationary measurement with synchronous motor ohm 05400 Pisson A motor identification (stationary measurement) is performed once at the drive enable. 01 The motor is under current and may turn up to three quarters of a revolution! 11 a brake is used and the stationary measurement performed with closed brake, the commutation angle and the encoder sign alignment are not performed. 22.2 SERVO_0	•
× Drive_unit_1 · SERV0_02		
Give up control priorityl	Image: securitication	•
C Enables available [31] Ready fr Diagnostics O DFF1 enable CCC2 available C Control panel	Specified Actual Output frequency smoothed Image: Constraint of the system of the	•
Press F1 to onen Heln disnlav	Control priority (Drive control panel) - stop with spacebar IRO Ind Ethernet -> Intel(R)825771C Gir Online mode	



Turn the drive on by clicking the green box to perform the measurement. The drive will automatically power down after completing the measurement, this should take >5 seconds.

Project Control panel Edit Target system	m View Options Window Help			_ 8 ×
			▝▋▓ĹĹĹ≦▋❹▌▋	
Drive navigator	Stationary/turning measurement			
> Control logic			125.00 µs	Â
E≫ Open-loop/closed-loop c	Meas: wpe.	Next measur	ement	
	The following parameters have to be configured before the measurement:			=
Commissioning	Parameter + Parameter text	Value	Unit	
> Control panel	p352[0] Cable resistance	0.00000	ohm	
	p353[0] Motor series inductance	0.000	mH	
> Punction generator	p640[0] Current limt	9.50	Arms	
Automatic controller	p1909[0] + Motor data identification control word	2/00H		
Automatic controller		ocorn		
Communication				
Diagnostics			1	
Documentation	Status: [40] MotID: Commutating angle step 1	Deactivate mea	isurement	
SINAMICS LIBRARIES				
	A more second car is in a constant of the second constant of the sec			Ψ
	T		☆ 	Close Help
Project	SERVO_02			
Drive unit 1 - SERVO 02	- Help			
Give up control priority	0 💉 n setpoint specification			- All
	n= 🚺 rpm 0% n x 100 % =	200%		
	Drive ON			E
	0.00 rpm			
Castles sustation [31] 6	Pearty for switching on - set "ON/OFE1" - "0/1" (p0840)			
	Output frequency smoothed	•		
Diagnostics	Specified Actual 0.0 mm			
🖉 🔘 OFF1 enable	speeu. UU 1 -UU mm 0.01/2			
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Lontrol panel				
Press F1 to open Help display.	Control priority (Drive control panel) - stop with spacebar ISO Ind. Etherne	et -> Intel(R) 82577L	C Gic Online mode	

Scroll to the bottom of the measurement window and select: 'Accept values'.

Image: Status Image: Status Image: Status Image: Status Image: Status Image: Status	Project Edit Target system View Options	ns Window Help	_ 8 ×			
Prive analyster -> Centrol topic -> Centrol para -> Centrol						
g: > Open-loop/closed-loop c g: > Devictions g: > Measures text Commission in g: > Control panel g: > Devicticac g: > Sectionary/Juming multiple g: > Sectionary/Juming multiple g: > Sectionary/Juming multiple g: > Devicticac g: > Devicticac g: > Sectionary/Juming multiple g: > Devicticac g: > Sectionary/Juming multiple g: > Devicticac l: > Devicticac g: > Devicticac g: > Devicticac g: > Devictia	→ Drive navigator → Control logic → > Technology	Stationary/turning measurement The following parameters are determined or changed with the motor data identification:				
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© Enables available [31] Ready for switching on - set "ON/OFFI" = "0/1" (p0840) Diagnostics Specified Actual Output frequency smoothed O OFFI enable OFFI enable OFFI enable Torque -0.00 -0.00 Nm O OFFI enable OFFI ena	Parameter Derive and the second					
🖌 💼 Alarms 🌈 Control panel 🚔 Trace time diagram 🌐 Target system output 🌐 Compile/check output 🌐 Load to PG output 🛗 Trace info 🎬 BICO server 🏠 Diagnostics overview	Enable: available Diagnostics OFF1 enable OFF2 enable OFF2 enable DEF3 enable DEF	ady for switching on - set "ON/OFF1" = "0/1" (p0840) Output frequency smoothed Specified Actual Specified 0.0 Torque: -0.00 Nmm C0: Dutput voltage smoothed				
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The Encoder can now be adjusted.



3.3 Encoder Adjustment

Set the encoder counts to zero and navigate to 'Homing' in the 'Basic positioner' tab under the 'Technology' tree.

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Component	: All	Display information Acknowledge all	Acknowledge Help for event
Level Time [mm/dd/yy 1xm::ms xa]	Source Component Message Drive_unit_1:SERVD_02 - 7965:Driv	e: Save required	
			4
Alarms			
Press F1 to open Help display.		ISO Ind. Ethernet -> Intel(R) 82577LC Gic O	Inline mode

Select the 'Active Homing' graph illustration



3600-4006_02 • ServoChoke/Encoder Configuration using Siemens Drive



Click 'Preform absolute value calibration' to calibrate the encoder. Select 'Yes' in the prompt in order to save the data to the drive.

Absolute encoder adjustment Perform absolute value calibration Absolute value calibration Absolute value calibrated Forme assister encoder is calibrated Tome assister encoder is calibrated Tome assister assister to save the data in the drive unit [copy RAM to RDM]? Yes No Copy		3	23	
Absolute encoder adjustment	C Passive homing			
	Perform absolute value calibration Absolute value calibration status: Absolute encoder is calibrated			
	Home position coordinate Copy RAM to ROM (ISDRA-20593)			
	The data have been changed! Do you want to save the data in the drive unit (copy RAM to RDM)?			
		Close	Help	_

After it has been saved, close the 'Homing' screen.

🖞 Project Edit Targetsystem View Options Window Help 📃 🖉 🗶
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Homing/configuration Homing/configuration Inset: DCC chart Configuration Stephent list Drive asylator Control logic Separe list Dire asylator Separe list Separe list Separe list Position control Basic positioner Siming Set position control Basic positioner Siming Basic positioner Basic positiner
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Project 6 SERVO_02
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Filtering through selection of a predefined filter or input of a character string.
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ress_El to open Help display. [ISO Ind. Ethernet -> Intel(R) 82577LC Gis



Performing the measurement

Under Commissioning, open the control panel and navigate to the 'Stationary/tuning measurement' tab.

Project Edit Target system View Options Window Help
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Drive_unit_1-SERV0_02 Hep
Assume Control Priority I 0 avg n selpoint specification • Image: CDS: 0 0 0 x n x 100 x 2002 Image: Enables DDS: 0 0 000 rpm 0.00 rpm 100 rpm
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Press.FL to open Help display. ISO Ind. Ethernet -> Intel(R) 82377LC Git Online mode

In the 'Meas. type' menu, select 'Encoder adjustment'.

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Tachandom Stationary/turning measurement	
→ Nonen-long/closed-long c	*
Functions Meas type 125.00 µs	
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Complete calculation of the motor/control parameters	
-> Device trace Stationary measurement Value Unit •	
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-> Measuring function p1981[0] PolID distance max 10 *	
Automatic controller p325(0) Motor pole position identification current 1st phase 0.000 Arms	
Stationary/turning me p329(0) Motor pile poston deministration current 0.00 Arms Della motione based current 2.40 Arms	
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P1995[0] PolD motion-based gain 3.329 Nms/rad *	
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- 22:2 CDS [0 (Activ - DDS) [0 (Activ - MDS) [0 (Active) - MDS] [0 (Active)	Close Help
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Versenable coeration 0.0 Vms	-
🛛 🚺 Alarms 💋 Control panel 🛛 Trace time diagram 🔠 Target system output 🔛 Comple/check output 🔛 Load to PG output 🔛 Trace info	
Press El topone Hela disalav.	



Select '[10] Motion-based' technique under the value parameter selection menu.

Project Edit Target system View Option	ns Window Help	×
Drives	Stationary/turning measurement	
SERVO_02	Maar Inner	i
Configuration	Encoder adjustment Next measurement	
	The following parameters have to be configured before the measurement:	-
	Parameter + Parameter text Value Unit n199000 PolD technique f100 technique	
	p1981(0) PolD distance max (0) Saturation-based 1st + 2nd harmonics * Endstructurent 1st phase (11) Saturation-based 1st harmonics / Arms	
Messages and monitoring Commissioning	p329(0) Meter pole position identification current (4) Saturation based 2-stage Arms of 993(0) PolD motion-based current (10) Metion-based Arms	
> Control panel	p1994(0) PolD motion-based rise time [20] Easticity-based ms p1995(0) PolD motion-based gain [99] No technique selected [99] No technique selected [90] Nordina -	
> Function generator	Statue: [0] No measurement Activate measurement	
Automatic controller		
Stationary/turning me Communication	22: 2 CDS: [0 [Activ -] DDS: [0 [Activ -] MDS: [0 [Active]]	1
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Press El to open Help direlay	ISO Ind. Ethamat as Inda/DI 925721.C Gir Online mode	_
Freati t to ober rielo disoldy.	150 Ind. Ethernet ** Internet 62577EC OK CHARTE INTER	

Activate the measurement, review and close the prompt.

🙍 Project Edit Targetsystem View Options Window Help
Stationagy/turning measurement Stationagy/turning measurement Stationagy/turning measurement Stationagy/turning measurement Meas: type: Stationagy/turning measurement
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Drive_unit_1 - SERVO_02 Image: Imag
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Assume Priority control

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Press F1 to open Help display. ISO Ind. Ethern	net -> Intel(K) 8257/LC Gig Unline mode

Check 'Enables' and turn the drive on by pressing the green 'I' box to perform measurement. The drive will momentarily turn on to initiate the measurement.

🏦 Project Control panel Edit Target system View Options Window Help			_ 8 ×
	*[<u>[</u>]	₩ ₩	
Image: Stationary/tuning measurement Image: Stationary tuning measurement Image: Station	[Next measu	125.00 μs rement	
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Device trace Device trace Device trace Parameter + Parameter text P180(0) PolD technique P180(0) PolD technique P180(0) PolD technique p1981(0) PolD moton-based current p1981(0) PolD moton-	Value [10] Motion-be 10 0.000 0.00 2.40 100 3.329 Deactivate mea	Unit Arms Arms Arms Ms Nms/rad	· ·
→ →			🕸 💋 Close Help
X Drive_unit_1 - SERVO_02 X Rep Give up control priority In setpoint specification In = 0% n x 100 % = 2 Image: CDS: 0 Image: CDS: 0 Image: CDS: 0% n x 100 % = 2	00%		
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Press El to open Help display.	-> Intel(R) 82577L	 C Giç <mark>Onli</mark>	ne mode



Scroll to the bottom of the 'Stationary/tuning measurement' screen and confirm that an 'Angular commutation offset' has been identified.

Project Edit Target system View Options	Window Help - 6
Drives Drives Drives Drives Drives SERVO_02 Drives Sconfiguration Sconfiguration Sconfiguration Sconfiguration	Stationary/turning measurement Image: The drive must be switched on, e.g. via the control panel, to start the measurement.
Control logic Control logic Soften Control logic Soften Copy/closed-loop c Soften Copy/closed-loop c Soften Control	Parameter Parameter Value Unit p431[0] Angular commutation offset 38.76 *
Stationary/turning me Scommunication Project	22:2 CDS: 0 (Activ → DDS: 0 (Activ → MDS: 0 (Active) ★ Close Help
X Trive_unit_1 - SERVO_02 Give up control pionity	▼ 8 Help 0 ▲▼ In selpoint specification ▼ n = 0 rpm 0% n ≤ 200% 0.000 rpm 0.000 rpm 0.000 rpm
Enables available Diagnostics Differenable OFF1 enable OFF1 enable Control panel Control panel	Specified Actual Output frequency smoothed ▼ Specified Actual 0.0 0.0 0.0 • Toronace 0.00 0.00 Nm •0.0 Hz •
Press F1 to open Help display.	Control priority (Drive control nanel) - stop with snacebar ISO Ind. Ethernet -> Intel(R) 82577LC Gir Online mode

Tuning is now complete.