

## ServoChoke®/Motor Configuration Using a Control Techniques M700 Drive



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# 1 Basic integration of a Control Techniques M700 Drive to a Tolomatic ServoChoke<sup>®</sup>/SICK encoder combination

#### 1.1 Configuring a new motor

Before proceeding, make sure to download parameters to the drive



Once communication and drive configuration has been established, open the Setup tab and open "Motor Setup"





Enter motor values per the table shown below:

Motor / Feedback / Brake - Specifications:

	CEDIEC	SVC 7k	SNC 15k	Elda Manue Manu
	SERIES	SVG /K	SVC ISK	
PEAK SPEED	RPM	3,000	3,000	Add Linkad Deveload Deveload Connection Set mode Default Set Reset Seve parameter
Kt (trap)	oz-in/amp DC	232.03	232.03	drive * to project from project from drive to drive settings and region parameters model in drive Project Drive
Kt (sine)	Nm/Arms	2.007	2.007	Project C Dashboard (My SVC Drive) Motor Setup (My SVC Drive) X Menu 03 : Spen
Ke	Vrms/krpm	121.34	121.34	Inst 4 -SVC Drive (192168.0.30) Enter motor parameters or choose a motor
DC BUS VOLTAGE	Vdc	365	365	Setup Choose a motor 2 Save as custom motor
WINDING Resistance	Ohms	2.0	2.0	
INDUCTANCE	mH	12.2	12.2	Analog I/O     PI Thermistre The Threshold 3300      Ω
MOTOR THERMAL TIME CONSTANT	minutes	108.0	108.0	Construction     C
CONT. CURRENT	Amp	3.0	3.0	Image: Constraint of the
	٩F	302	302	SD Card Manager     Rated Voltage     460      V
MAX. MUTUR TEMP	٥°	150	150	Diagnostics Kt 2.00 ↓ Nm/A Parameters V
NUMBER OF POLES		18	18	Menu 00 : Quick Setup E Motor Thermal Time Constant 90.0 \$
	lb-in <sup>2</sup>	11.3	11.3	■         Menu 02 : Speed Ramps         Stator Resistance         2.000000 ♀ Ω           ■         Menu 03 : Speed Control and Pot         Ld         12.200 ♀ mH
RUTUR INERTIA	kg-cm <sup>2</sup>	33.0	33.0	Menu 04 : Torque and current co     Number of Motor Poles     Menu 05 : Motor Control

The ServoChoke SVC actuators do not have a Thermistor but come with a Thermal switch. Verify Menu 3, parameter 123 is set to "None" for Thermistor Fault Detection as shown below:

03.118	P1 Thermistor Type	DIN44082
03.119	P1 Thermistor Feedback	0 Ω
03.120	P1 Thermistor Trip Threshold	5000 Ω
03.121	P1 Thermistor Reset Threshold	1800 Ω
03.122	P1 Thermistor Temperature	0 °C
03.123	P1 Thermistor Fault Detection	None
03.127	P2 Speed Feedback	0.0 rpm
03 1 28	P2 Revolution/Pole Pitch Counter	0

Wiring of the thermal switch can be done based upon your desired logic control to safely shut down the drive in the event of a thermal switch trip.

### 1.2 Setting up the feedback device

Select "Motor Feedback Setup" from the left pane, then Select either "SC Hiperface" or "SC SSI"





#### Set type to "Rotary" and set Encoder Supply Voltage to "8V"

Drive P1	Drive P2			
What typ	e of enco	oder is attached to the dr	ive?	
Encoder	type: SC	SSI    Rot	tary 🔘 Linear	
Rotary SC	SSI conf	iguration:		
Encoder	setup:		$\frown$	
		Encoder supply voltage	8V 🔻	)
		Auto Configuration	🔘 On 🔘 Off	
		Rotary Turn Bits	12	
		Rotary Lines Per Revolution	1024 🛟	
		Comms Bits	27	
		Comms Baud Rate	300k •	Baud

Make sure that "Auto Configuration" is "On"



The drive will determine the remaining values during the auto tune process.





## 2. Running Autotune

### 2.1 Set-up

Before proceeding, make sure to download parameters to the drive



Verify the drive is connected and online. "Online" and Drive Name will be highlighted



1.8

Navigate to Menu 11, parameter 047 and set it to "STOP"

11.046	Defaults Previously Loaded	1244	
11.047	Onboard User Program: Enable	Stop	)
11.048	Onboard User Program: Status		

Navigate to Menu 31, parameter 001 and set it to "off"

				_
Parameter	Caption	Categories	Value	3
31.000	Parameter mm.000		0	
31.001	AMC Select	(	Off Off	D
31.002	AMC Absolute Mode Enable		V On	ſ
31.003	AMC Incremental Position Reset Mode		Off Off	



On the left pane select "Autotune" from the Setup folder



Verify that the enable switch/input is disabled. Drive should display Inhibit "Inh"

Change the autotune to "Rotating Autotune", select your direction, and then click next.

Autotune			live
Wizard for automatically tuning drive to mo	otor for optimal results		
	Configuration Preconditions Run	n Results	🕒 Bark 🍚 Next
Configuration			
Please ensure that you have read the safety information sure before proceeding that you have taken precaution: arrangements are capable of withstanding the full conti	in the drive user guide. Autotuning may cause the s to prevent injury or danger to life. You should als nuous and overload torque of the motor.	e motor to rotate and deliver con so satisfy yourself that if a load is	siderable torque into any mechanism coupled to the motor. You should be connected to the motor then the coupling and other mechanical
Motor Setup If you haven't configured the motor parameters yet, click the button(	s) below to open the relevant tool(s) before attempting	g an autotune.	
Notor Setup 🚯 Motor Feedback Setup			
Autotune tests	r motor zan ho zafoli rotatad		
Which type of <u>autotune</u> test should be used?	r motor can be salely rotated.		
<ul> <li>1. Stationary</li> <li>2. Rotating</li> </ul>			
▲ The motor must be unloaded and must be able to rotate fr	eely		
Direction of rotation			
Which effection of motion estation should be used for tuning?			



#### Click "Next" again

Dashboard (RSX 143) Autotune (RSX 1	143) ×	<b>.</b>
Wizard for automatically	ly tuning drive to motor for optimal results	Live
	Configuration Preconditions Run Results	🕞 Back 🕞 Next
Preconditions		
<ul> <li>Configuration summary</li> </ul>		
Drive status		
Autotuning can continue: click 'N	Next' to open the Run page	
Save parameters Provides the option to save all parameters	s to drive memory before starting autotune. This may be ignored, but it is a useful safeguard in case autotuning makes undesirable changes.	
Save parameters in drive		

As shown below, if the drive is tripped you will not be able to continue until the trip has been fixed



Enable the drive to start the Autotune

#### 2.2 Reviewing tuning values

Once the autotune has completed, the drive enable will need to be removed

Home Vew	- # #
Constant Storm project     Project	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
oject <	Deshboard (KSX 143) Autotime (KSX 143) × Menu 31 : AMC GeneraLet-up (KSX 143) Menu 11 : Miscellaneous (KSX 143) Drive Trip Log (KSX 143) +
High Force Stands - RSX 141 (192168.0.141) RSX 142 (192268.0.142)	Autotune     Wizard for automatically tuning drive to motor for optimal results
- TRSX 143 (192.168.0.143)	Configuration Preconditions Run Results 🚱 Back 🌍 Next
Tashboard	
<ul> <li>Setup</li> <li>Descention</li> </ul>	Run
Destination Conflicts	Configuration summary
PI Drue Trip Log	
Onboard Scope	Daine investe
Parameter Reference Guide	
- 🥶 Parameters	Please remove the drive enable / Safe Torque Off input(s).
Menu 00 : Quick Setup	
Menu 01 : Speed References	Autotune program
Menu 02 : Speed Ramps	Not started (awaiting enable)
Menu 03 : Speed Control and Position Feedbac	In process
Menu 04 : Torque and current control	
Menu 05 : Motor Control	<ul> <li>Finished (awarding disable)</li> </ul>
Menu 06 : Sequencer and Clock	Time elapsed: 35.9 s
Menu 07 : Analog I/O	Autoture succeeded
Menu 08 : Digital I/O	Click 'Back' to return to the Preconditions page and re-run the autotune
Menu 09: User Functions 1	
Menu 10 : Status and Trips	
Menu 11 : Miscellaneous	
Menu 12: User Functions 2 and Brake Control	
Metro 14 Here MD Controller	



Click Next to view the calculated values for the ServoChoke actuator

	Configuration	Preconditions	Run	Results	🕞 вак 🌔
Run					
<ul> <li>Configuration summary</li> </ul>					
Drive Enable					
Drive is disabled.					
Autotune progress					
Not started (awaiting enable)					
In progress					
Finished (awaiting disable)					
Finished					
Time elapsed: 35.8 s					
Autotune succeeded					
(Relative and the second secon					

It is advisable that this process is repeated multiple times, and note the phase angle variation from one autotune to the next. Large angle variations (> 10 degrees) may be a sign of significant electrical noise that may prohibit consistent operation.

Auto     Wizard	<b>Dtune</b> I for automatically tuning drive	to motor for	r optimal	resul	ts	
	Configuration	Precondition	ons R	un	Results	🕒 Back 🍚
Results						
🕑 Conf	ïguration summary					
Finished —						
Autotune has	finished and amended the parameters liste	ed below.			the Conference	1 <sup></sup>
If you wish to	re-run the autotune with a different config	uration, click ba	ck twice to r	return to	o the Configura	ition page, change the options there then proceed as before.
Save param	eters	nto the drive's no	n volatilo m		athonuico tho c	attings may be last when you never the drive down
.agoo	tin the results it is advised you save them it	nto the drive sinc	n-volatile in	lemory	outerwise ute s	ettings may be lost when you power the time down.
Save Save	parameters in drive					
ch						
changed pa	rameters					
Parameter	Caption	Old value	New value	Units		
03.025	Position Feedback Phase Angle	4.0	3.2	•		
04.013	Current controller type com	62	01			
04.014	Current Controller Ki Gain	394	392			
05.017	Stator Resistance	0.295146	0.293801	Ω		
05.024	Ld	1.996	1.972	mH		
05.059	Maximum Deadtime Compensation	0.950	0.875	115		

Once the motor phase angle appears to be stable, click "Save parameters in drive"



You are now ready to proceed with testing jog functionality, motion control set-up and programming



# Technical Note

	EXCEL	LENCE IN MOTIO	No	CERTIFIED BY DNV GL = ISO 9001 =
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