

IMA / Encoder Configuration Using a Control Techniques M700 Drive



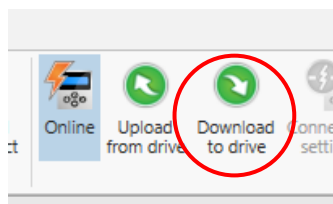
Contents

1	Basic Configuration	
1.1	Configuring a new motor.....	2
1.2	Setting up the feedback device.....	4
2	Running Autotune	
2.1	Set-up.....	5
2.2	Reviewing Values.....	7

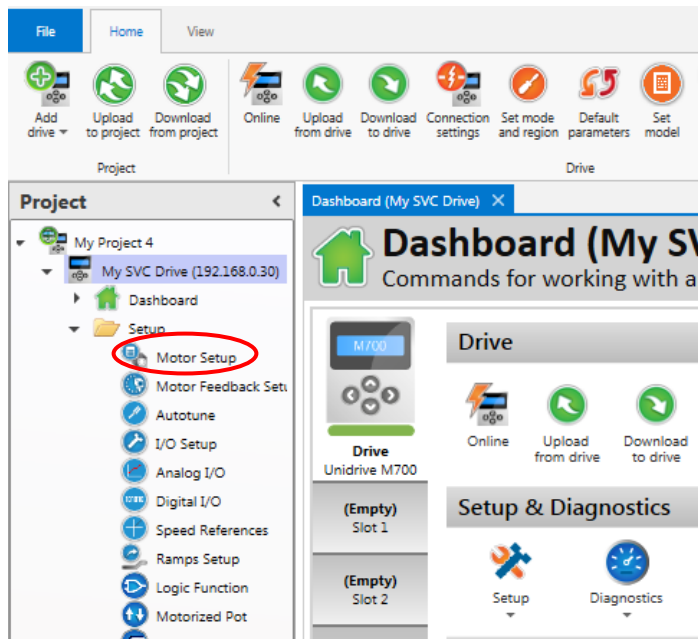
1 Basic integration of a Control Techniques M700 Drive to a Tolomatic IMA/SICK encoder combination (DE1A1_)

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 Specifications:

WINDING/MOTOR VOLTAGE	IMA22				IMA33				IMA44		IMA55		
	MV21	MV41	MV23	MV43	MV21	MV41	MV23	MV43	MV23	MV43	MV23	MV43	
TORQUE CONSTANT (Kt)	<i>N-m/A Peak</i>	0.37	0.74	0.49	0.93	0.61	1.21	0.62	1.21	0.61	1.20	0.76	1.51
	<i>in-lb/A Peak</i>	3.3	6.6	4.3	8.2	5.4	10.7	5.5	10.7	5.4	10.6	6.7	13.4
VOLTAGE CONSTANT (Ke)	<i>V/Krpm Peak</i>	51	102	61	122	81	160	79.8	154	78.1	153.1	100	201
	<i>N-m</i>	0.85	0.85	1.50	1.50	1.8	1.8	4.4	4.3	8.4	8.5	12.7	12.7
CONTINUOUS STALL TORQUE	<i>in-lb</i>	7.5	7.5	13.3	13.3	16	16	39	38	74	75	112	112
	<i>A_{RMS}</i>	1.6	0.8	2.2	1.15	2.1	1.1	5	2.5	9.7	5	11.8	5.9
PEAK TORQUE	<i>N-m</i>	2.54	2.54	4.5	4.5	5.4	5.4	13.2	12.9	25.1	25.4	31.6	31.6
	<i>in-lb</i>	22.5	22.5	39.9	39.9	48	48	117	114	222	225	280	280
PEAK CURRENT	<i>A_{RMS}</i>	4.8	2.4	6.6	3.45	6.3	3.3	15	7.5	29.1	15	29.5	14.8
RESISTANCE	<i>Ohms</i>	18.1	72.4	7.1	28.3	10	40.1	2.07	8.3	0.58	2.32	0.57	2.93
INDUCTANCE	<i>mH</i>	10.7	42	4.5	18	13.6	54.1	3.8	15	2.75	11.5	1.4	5.8
BUS VOLTAGE	<i>V_{RMS}</i>	230	460	230	460	230	460	230	460	230	460	230	460
SPEED @ RATED V	<i>RPM</i>	4,264				4,264		3,500		3,500		2,400	
NO. OF POLES		8											

Motor Setup

Enter motor parameters or choose a motor from a list

Choose a motor + Save as custom motor

Motor 1 | Motor 2

Rated Current: A

Rated Speed: rpm

Rated Voltage: V

Kt: Nm/A

Ke: V

Motor Thermal Time Constant: s

Stator Resistance: Ω

Ld: mH

Number of Motor Poles: Poles

Note: *Rated Current* entered in Connect Software corresponds to the IMA *Continuous Stall Current*

The IMA actuator as configured (DE1A1_) 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
03.128	P2 Revolution/ Pole Ditch Counter	0

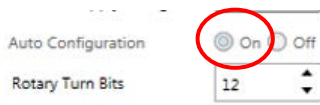
Wiring of the thermal switch can be done based upon your desired logic control to safely shut down the drive in the event of a thermal switch trip.

1.2 Setting up the feedback device

Select "Motor Feedback Setup" from the left pane, then select "SC Hiperface"
Set type to "Rotary" and set Encoder Supply Voltage to "8V"

The screenshot displays the 'Motor Feedback Setup' configuration window. In the left-hand project tree, 'Motor Feedback Setup' is highlighted. The main configuration area shows 'Motor feedback device connected to: Drive P1'. Under the heading 'What type of encoder is attached to the drive?', 'Encoder type' is set to 'SC Hiperface' and the 'Rotary' radio button is selected. The 'Rotary SC Hiperface configuration' section includes: 'Encoder setup' with 'Encoder supply voltage' set to '8V', 'Auto Configuration' set to 'On', 'Rotary Turn Bits' set to '12', 'Rotary Lines Per Revolution' set to '1024', 'Comms Bits' set to '27', and 'Comms Baud Rate' set to '500k'. The 'Error detection' section has all checkboxes disabled. The 'Advanced Features' section has 'Additional power up delay' at '0.0 s', 'Feedback Filter' set to 'Disabled', 'Normalisation Turns' at '16', and 'Feedback Reverse' set to 'Off'.

Make sure that "Auto Configuration" is "On"

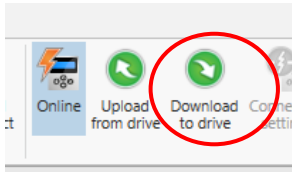


The drive will determine the remaining values during the auto tune process.

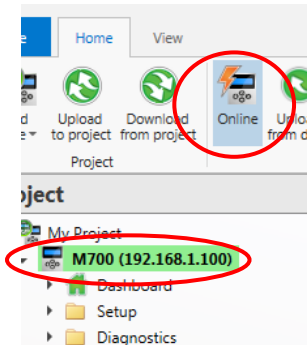
2. Running Autotune

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



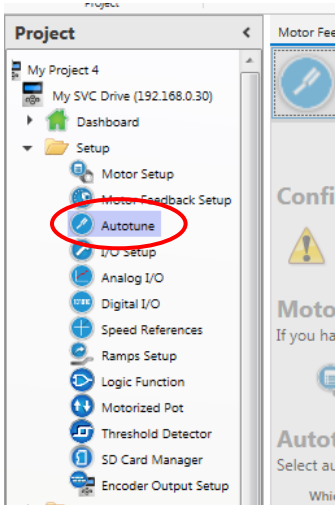
Navigate to Menu 11, parameter 047 and set it to "STOP"

11.046	Defaults Previously Loaded	1244
11.047	Onboard User Program: Enable	Stop
11.048	Onboard User Program: Status	2

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

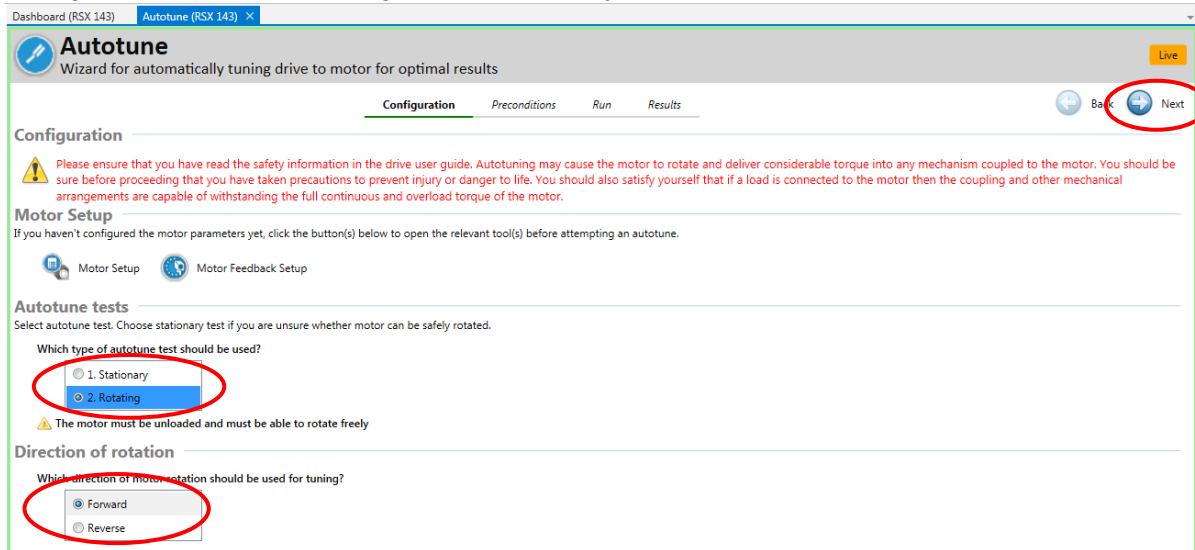
Parameter	Caption	Categories	Value
31.000	Parameter mm.000		0
31.001	AMC Select		<input type="checkbox"/> Off
31.002	AMC Absolute Mode Enable		<input checked="" type="checkbox"/> On
31.003	AMC Incremental Position Reset Mode		<input type="checkbox"/> Off

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

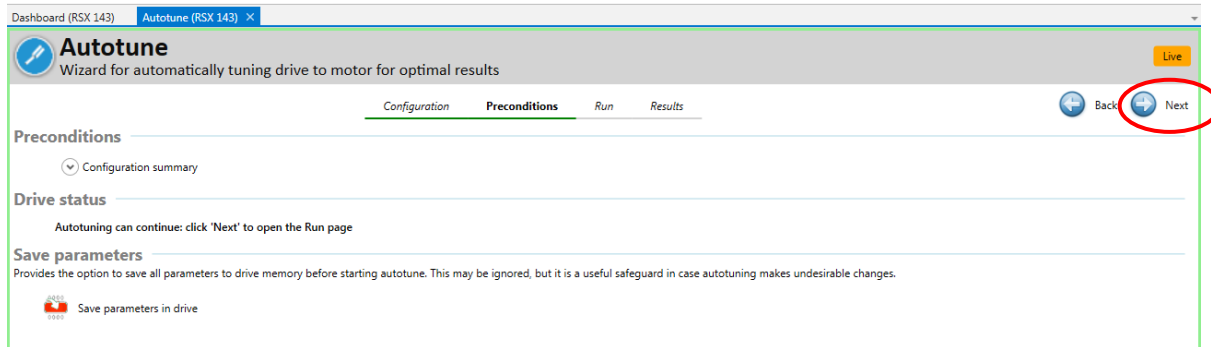


Verify that the enable switch/input is disabled. Drive should display Inhibit "Inh"

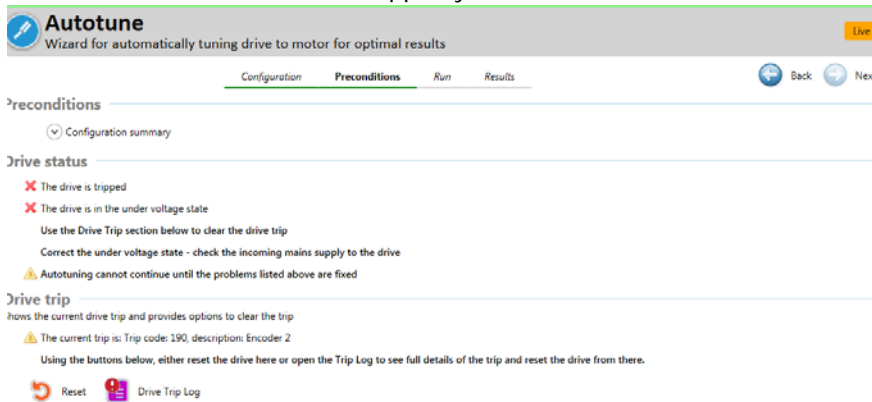
Change the autotune to "Rotating Autotune", select your direction, and then click next.



Click "Next" again



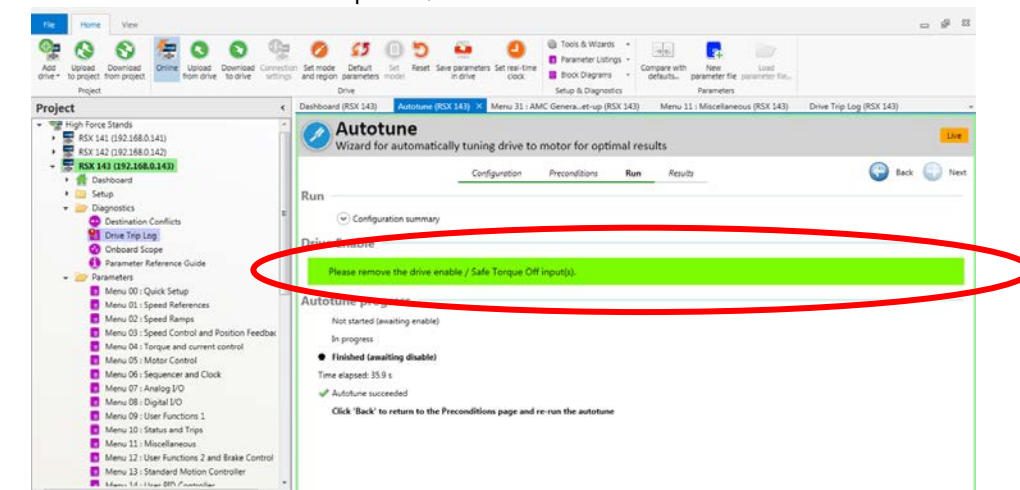
As shown below, if the drive is tripped you will not be able to continue until the trip has been fixed



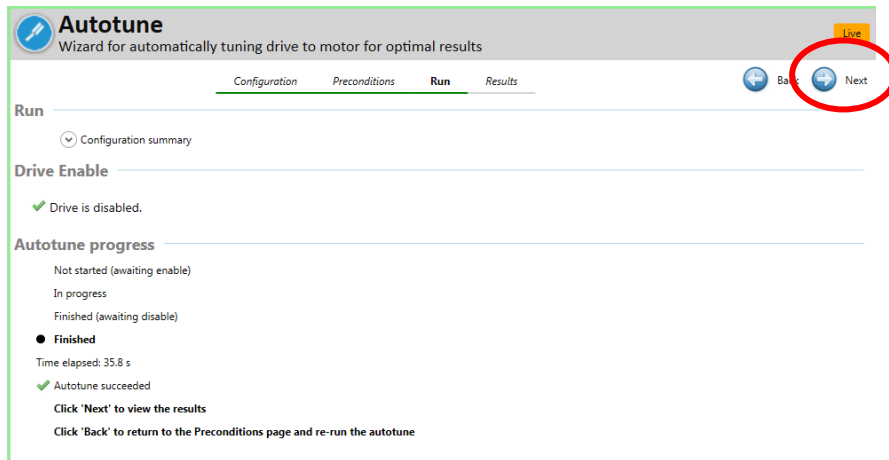
Enable the drive to start the Autotune

2.2 Reviewing tuning values

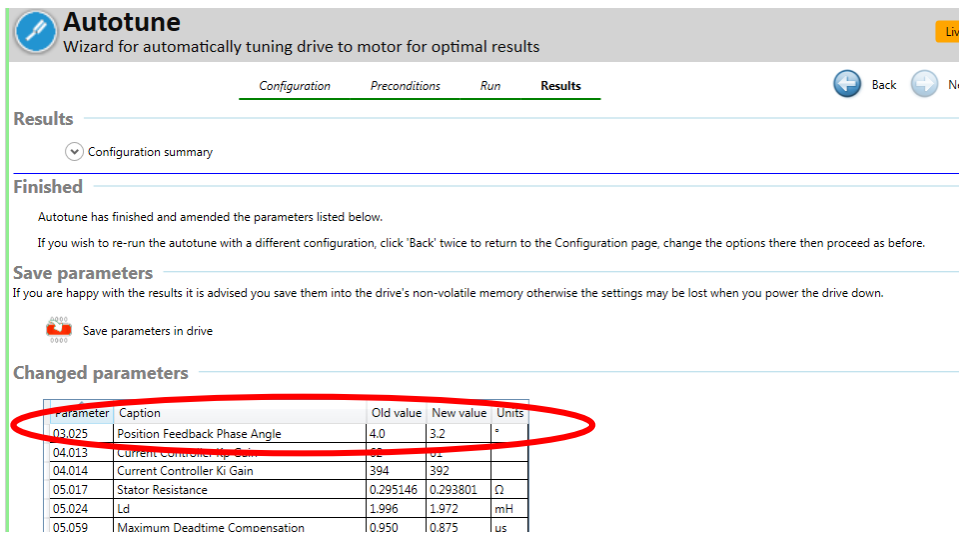
Once the autotune has completed, the drive enable will need to be removed



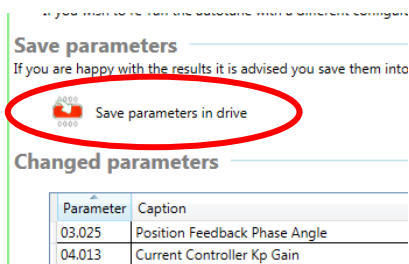
Click Next to view the calculated values for the IMA actuator



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.



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



COMPANY WITH
QUALITY SYSTEM
CERTIFIED BY DNV GL
= ISO 9001 =
Certified site: Hamel, MN

USA

3800 County Road 116
Hamel, MN 55340, USA
Phone: (763) 478-8000
Fax: (763) 478-8080
Toll-Free: **1-800-328-2174**
sales@tolomatic.com
www.tolomatic.com

CHINA

**Tolomatic Automation Products
(Suzhou) Co. Ltd.**
(ServoWeld® inquiries only)
No. 60 Chuangye Street, Building 2
Huqiu District, SND Suzhou
Jiangsu 215011 - P.R. China
Phone: +86 (512) 6750-8506
Fax: +86 (512) 6750-8507
ServoWeldChina@tolomatic.com

EUROPE

Tolomatic Europe GmbH
Elisabethenstr. 4 & 8
D-65428 Rüsselsheim
Germany
Phone: +49 6142 17604-0
EuropeSales@tolomatic.com

All brand and product names are trademarks or registered trademarks of their respective owners. Information in this document is believed accurate at time of printing. However, Tolomatic assumes no responsibility for its use or for any errors that may

appear in this document. Tolomatic reserves the right to change the design or operation of the equipment described herein and any associated motion products without notice. Information in this document is subject to change without notice.

Visit www.tolomatic.com for the most up-to-date technical information