TOL-O-MATIC

Axidyne Multi-Axis System

Quick Reference Set Up Guide for Wiring, Tuning, Check Out & Testing

For a FREE Tol-O-Matic Hat Please Complete the Attached Reply Card

3600-4125_02

Axidyne®

SSC Servo System Setup

Axiom Drive
DV10 *#3604-0000*
DV20 *#3604-0001*
DV30 *#3604-0002*

20 gauge Wire
Customer Supplied
See Axiom Manual
#3600-4603
Page 11-2

22-26 gauge Wire
Customer Supplied
See Axiom Manual
#3600-4603
Page 9-3 thru 10-4

22-26 gauge Wire
Customer Supplied
See Axiom Manual
#3600-4603
Page 10-1, 10-2

12 AWG Wire Jumper

Axiom to Motor Encoder Cable
Part #3604-1196
#3604-1197
Included

Axiom to Motor Cable
Part # 3604-1190, 3604-1191, 3604-1192
3604-1193, 3604-1194, 3604-1195
Included

AC Power
Customer Supplied
See Axiom Manual
#3600-4603
Page 5-1 to 5-3

MRV Motor

Linear Actuator
EOT: End of Travel limit switch
HM: Home reference switch

Switch Part # 3600-9083, 3600-9082,
3600-9085, 3600-9084, 3600-9091,
3600-9090, 3600-9089, 3600-9088,
3600-9087, 3600-9086
Optional
See SSC Manual #3600-4608
Pages 4-2 to 4-4

J2 - Main
Breakout Box
Part #3600-1342
Included
See SSC Manual
#3600-4608
Page i,ii,
2-10, 2-12
4-4, 4-12

J3 - Aux Encoder
Breakout Box
Part #3600-1340
Optional
See SSC Manual
#3600-4608
Not required

J5 - General I/O
Breakout Box
Part #3600-1341
Included
See SSC Manual
#3600-4608
Page 4-6 to 4-10,
4-13,

J4 - Driver
Breakout Box
Part #3600-1340
Optional
See SSC Manual
#3600-4608
Page i, ii,
2-10. 2-12

NOTE: Red stripe on ribbon cable must be aligned with pin 1 on connector and SSC controller

J2 - Main
Ribbon Cable
Part #3600-1347
Included

J3 - Aux Encoder
Ribbon Cable
Part #3600-1345
Optional

J5 - Gen. I/O
Ribbon Cable
Part #3600-1346
Included

J4 - Driver
Ribbon Cable
Part #3600-1345
Included

Config. Code	X-Axis	Y-Axis	Z-Axis	W-Axis	Part #
SSC10	ST	-	-	-	3600-0110
SSC10	SV	-	-	-	3600-0210
SSC21	ST	ST	-	-	3600-0121
SSC21	SV	ST	-	-	3600-0221
SSC22	ST	SV	-	-	3600-0122
SSC22	SV	SV	-	-	3600-0222
SSC31	ST	ST	ST	-	3600-0131
SSC31	SV	ST	ST	-	3600-0231
SSC32	ST	ST	SV	-	3600-0132
SSC32	SV	ST	SV	-	3600-0232
SSC33	ST	SV	ST	-	3600-0133
SSC33	SV	SV	ST	-	3600-0233
SSC34	ST	SV	SV	-	3600-0134
SSC34	SV	SV	SV	-	3600-0234
SSC41	ST	ST	ST	ST	3600-0141
SSC41	SV	ST	ST	SV	3600-0241
SSC42	ST	ST	SV	SV	3600-0142
SSC42	SV	ST	SV	ST	3600-0242
SSC43	ST	SV	ST	ST	3600-0143
SSC43	SV	SV	ST	SV	3600-0243
SSC44	ST	SV	SV	SV	3600-0144
SSC44	SV	SV	SV	ST	3600-0244
SSC45	ST	ST	ST	ST	3600-0145
SSC45	SV	ST	ST	SV	3600-0245
SSC46	ST	SV	ST	ST	3600-0146
SSC46	SV	SV	ST	SV	3600-0246
SSC47	ST	SV	SV	SV	3600-0147
SSC47	SV	SV	SV	ST	3600-0247
SSC48	ST	SV	SV	SV	3600-0148
SSC48	SV	SV	SV	ST	3600-0248

ST = Stepper SV = Servo

SSC Software
Part # 3604-1349
Included

Axiom Software
Part # 3604-1229
Included

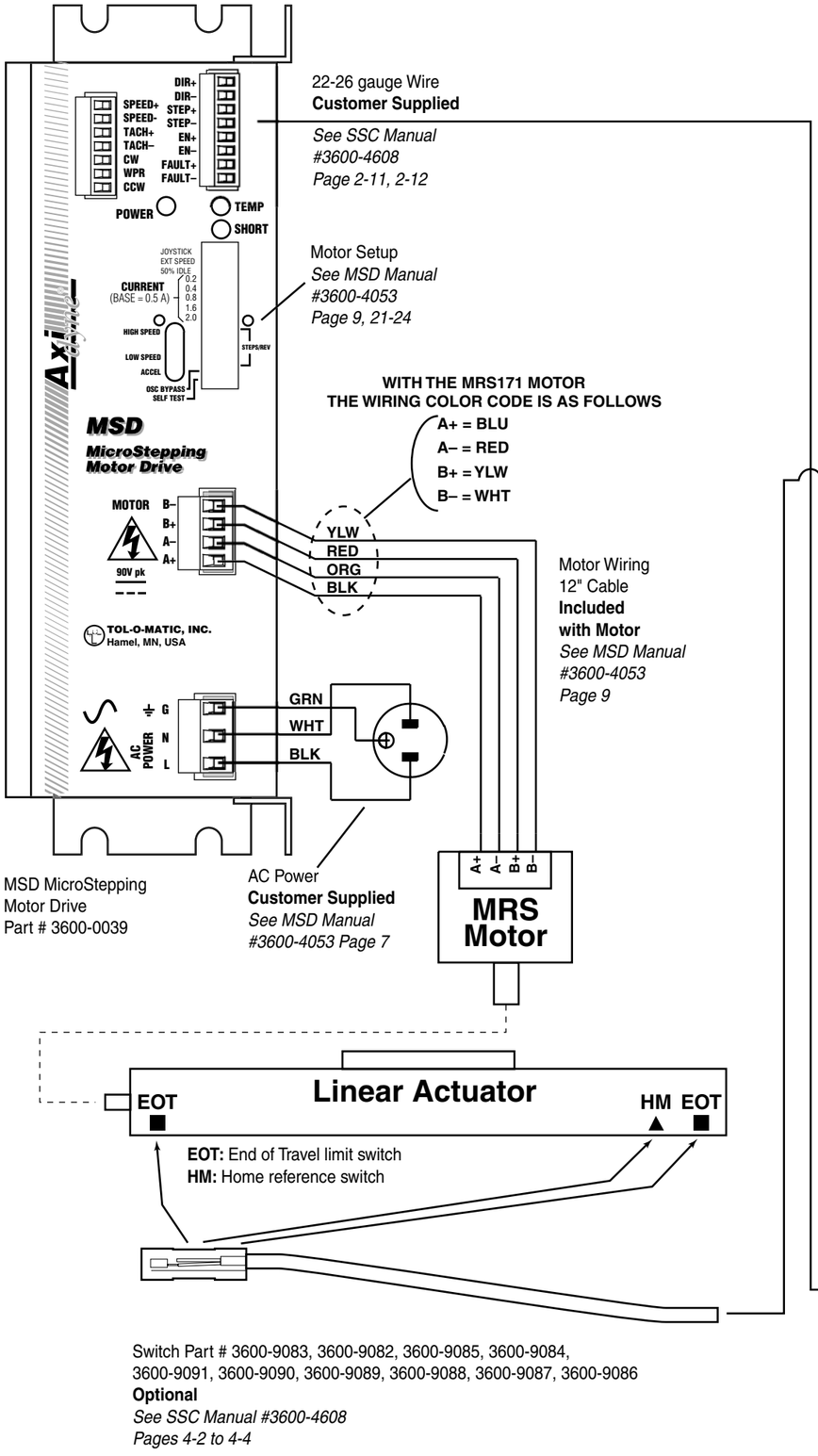
Computer with
Windows 95/98
Customer Supplied

RS232 Serial Communication Cable
Optional
Part # 3600-1172
Connect to "Main Serial" Port

AC Power
Customer Supplied
See SSC Manual
#3600-4608
Page i

Servo Axis
3600-4125_02

SSC Stepper System Setup



22-26 gauge Wire
Customer Supplied

See SSC Manual
#3600-4608
Page 2-11, 2-12

Motor Setup
See MSD Manual
#3600-4053
Page 9, 21-24

WITH THE MRS171 MOTOR
THE WIRING COLOR CODE IS AS FOLLOWS

A+ = BLU
A– = RED
B+ = YLW
B– = WHT

YLW
RED
ORG
BLK

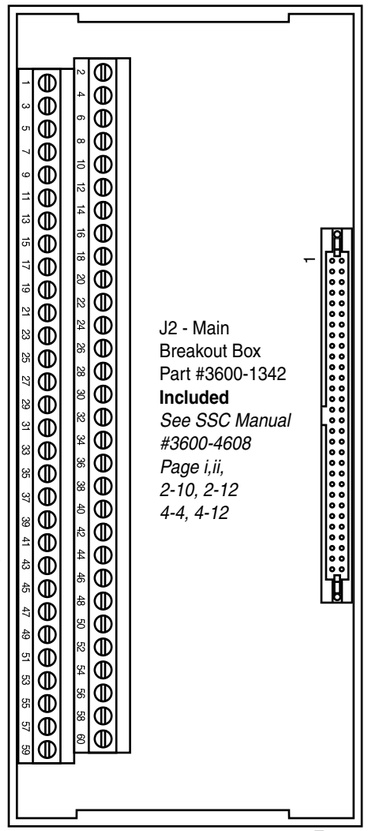
Motor Wiring
12" Cable
Included
with Motor
See MSD Manual
#3600-4053
Page 9

MSD MicroStepping
Motor Drive
Part # 3600-0039

AC Power
Customer Supplied
See MSD Manual
#3600-4053 Page 7

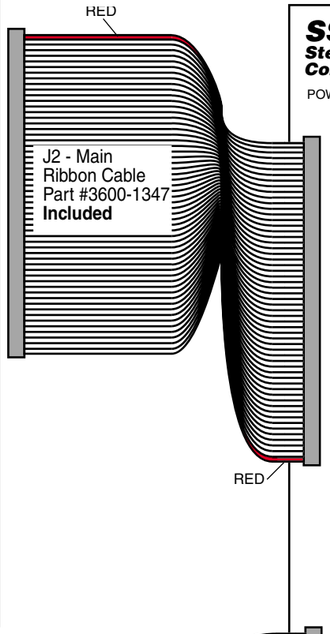
EOT: End of Travel limit switch
HM: Home reference switch

Switch Part # 3600-9083, 3600-9082, 3600-9085, 3600-9084,
3600-9091, 3600-9090, 3600-9089, 3600-9088, 3600-9087, 3600-9086
Optional
See SSC Manual #3600-4608
Pages 4-2 to 4-4



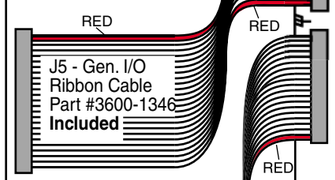
J2 - Main
Breakout Box
Part #3600-1342
Included
See SSC Manual
#3600-4608
Page i,ii,
2-10, 2-12
4-4, 4-12

NOTE: Red stripe on ribbon cable must be aligned with pin 1 on connector and SSC controller

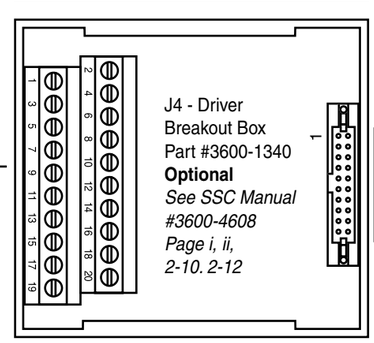


J2 - Main
Ribbon Cable
Part #3600-1347
Included

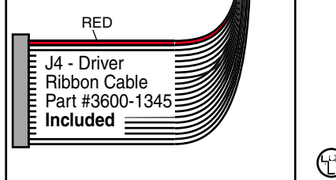
J5 - General I/O
Breakout Box
Part #3600-1341
Included
See SSC Manual
#3600-4608
Page 4-6 to 4-10,
4-13,



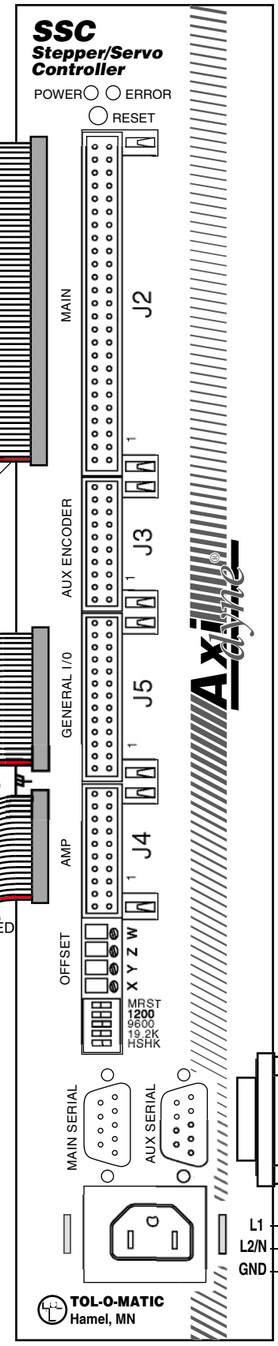
J5 - Gen. I/O
Ribbon Cable
Part #3600-1346
Included



J4 - Driver
Breakout Box
Part #3600-1340
Optional
See SSC Manual
#3600-4608
Page i, ii,
2-10. 2-12



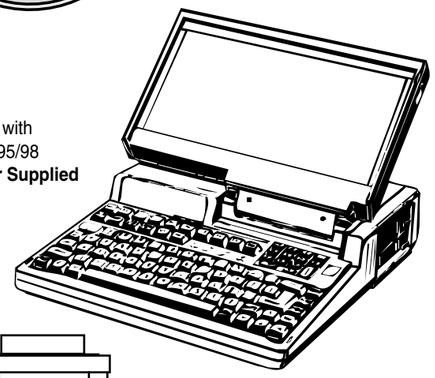
J4 - Driver
Ribbon Cable
Part #3600-1345
Included



Config. Code	SSC10	SSC10	SSC21	SSC21	SSC22	SSC22	SSC31	SSC31	SSC32	SSC32	SSC33	SSC33	SSC34	SSC34	SSC41	SSC41	SSC42	SSC42	SSC43	SSC43	SSC44	SSC44	SSC45	SSC45	SSC46	SSC46	SSC47	SSC47	SSC48	SSC48
X-Axis	ST	SV	ST	SV	ST	SV	ST	SV	ST	SV	ST	SV	ST	SV	ST	SV	ST	SV	ST	SV	ST	SV	ST	SV	ST	SV	ST	SV	ST	SV
Y-Axis	-	-	ST	ST	SV	SV	ST	ST	ST	ST	SV	SV	SV	SV	ST	ST	ST	ST	ST	ST	ST	ST	SV	SV	SV	SV	SV	SV	SV	SV
Z-Axis	-	-	-	-	-	-	ST	ST	SV	SV	ST	ST	SV	SV	ST	ST	ST	ST	ST	SV	SV	SV	ST	ST	ST	ST	SV	SV	SV	SV
W-Axis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ST	ST	SV	SV	ST	ST	SV	SV	ST	ST	SV	SV	ST	ST	SV	SV
Part #	3600-0110	3600-0210	3600-0121	3600-0221	3600-0122	3600-0222	3600-0131	3600-0231	3600-0132	3600-0232	3600-0133	3600-0233	3600-0134	3600-0234	3600-0141	3600-0241	3600-0142	3600-0242	3600-0143	3600-0243	3600-0144	3600-0244	3600-0145	3600-0245	3600-0146	3600-0246	3600-0147	3600-0247	3600-0148	3600-0248

ST = Stepper SV = Servo

SSC Software
Part # 3604-1349
Included



Computer with
Windows 95/98
Customer Supplied

RS232 Serial Communication Cable
Customer Supplied
Part # 3600-1172
Connect to "Main Serial" Port

AC Power
Optional
See SSC Manual
#3600-4608
Page i

Stepper Axis
3600-4125_02

3600-4125_02

Initial Axidyne Multiaxis Start Up Guide

WIRING

- [ ] Connect the power cord, ribbon cables and breakout boxes to the SSC as shown in the Servo System Setup diagram

- [ ] Determine whether each axis is to be **stepper** (MSD) or **servo** (Axiom).

  If the axis is to be servo, then determine the required operating mode (Torque, Velocity or Position) by referring to page F-1 in the Axiom Users Manual.

Wire the drive for each axis to the SSC according to the appropriate section below
Note:
Each axis of the SSC should be factory pre-configured for either **Step & Direction** or **Analog** command signal. If changes are necessary refer to page 2-2 of the SSC Users Manual for directions on how to reconfigure each axis.

IF AXIS IS USING THE MSD STEPPER DRIVE:

- [ ] Wire the **Step & Direction** signals of the MSD to the SSC J4 referring to the Stepper System diagram and **page 2-12 of the SSC** Users Manual

- [ ] Wire the **Enable (EN +/-)** signals of the MSD to the SSC Amp Enable output on J4 referring to **page 12 of the MSD** Users Manual and **page 2-10 of the SSC** Users Manual

- [ ] Wire the **Limit & Home** switches on the actuator to J2 of the SSC according to the diagram on **page 4-4 of the SSC** Users Manual

- [ ] Wire the AC power and motor connections to the MSD referring to the Stepper System diagram
  Make sure the drive is set for the correct input voltage – Page 7 of MSD Users Manual

- [ ] Set the MSD for the appropriate **run and idle current** using the DIP switches located on the front of the drive and referring to **page 21 of the MSD** Users Manual

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MSD Stepper Wiring - Continued

- [ ] Set the MSD for the appropriate **microstepping resolution** using the DIP switches located on the front of the drive and referring to **page 23 - 24 of the MSD** Users Manual

- [ ] Make sure the MSD is set for **Pulse & Direction** mode.
Refer to **page 4 of the MSD** Users Manual

- [ ] Verify operation using the **Self-Test** mode.
Refer to **page 4 of the MSD** Users Manual

- [ ] Repeat this procedure for any remaining stepper axis,
then proceed to Axiom wiring instructions.

If all axis have been completed, proceed to SSC Software Setup instructions.

IF AXIS IS USING THE AXIOM SERVO DRIVE IN POSITION MODE (STEP & DIRECTION)

- ☐ Wire the **Step & Direction** signals of the Axiom J4 to the SSC J4 referring to the diagram on **page 10-4 of the Axiom** Users Manual, "Controller with sinking outputs"
- ☐ Wire the **Enable +/-** signal of the Axiom J4 to Amp Enable on the SSC J4. Refer to the diagram on page **10-4 of the Axiom** Users Manual, "Controller with sinking outputs", and wire similar to the Step/CW +/-

  If hardware Enable desired, refer to page *i* of the SSC Users Manual
- ☐ Wire the **Limit & Home** switches on the actuator to J2 of the SSC according to the diagram on **page 4-4 of the SSC** Users Manual
- ☐ Wire AC power to the Axiom referring to the Servo System diagram
- ☐ Connect the **motor cable** to the motor then wire to the Axiom drive TB2 referring to **Page 6-2 of the Axiom** Users Manual or the Servo System Setup diagram
- ☐ Connect the **motor encoder cable** to the motor then wire to the Axiom drive J7 referring to **Page 6-2 of the Axiom** Users Manual or the Servo System Setup diagram
- ☐ Install the **Current Regeneration** jumper or resistor on the Axiom drive referring to the Servo System diagram and **page 11-2 of the Axiom** Users Manual
- ☐ Repeat this procedure for all axis using Position mode.

  If complete and axis remain to be wired for Torque or Velocity mode proceed to that section

  If all axis have been wired, proceed to Axiom Software Setup instructions.

IF AXIS IS USING THE AXIOM SERVO DRIVE IN VELOCITY OR TORQUE MODE (ANALOG)

- ☐ Wire the **Analog Command** signal input on the Axiom J6 to the Motor Command signal on the SSC J2. Refer to **page 10-1 of the Axiom** Users Manual

- ☐ Wire the **Enable +/-** signal of the Axiom J4 to Amp Enable on the SSC J4. Refer to the diagram on page **10-4 of the Axiom** Users Manual, "Controller with sinking outputs", and wire similar to the Step/CW +/-

  If hardware Enable desired, refer to page *i* of the SSC Users Manual

- ☐ Wire the **Limit & Home** switches on the actuator to J2 of the SSC according to the diagram on **page 4-4 of the SSC** Users Manual

- ☐ Wire AC power to the Axiom referring to the Servo System diagram

- ☐ Connect the **motor cable** to the motor then wire to the Axiom drive TB2 referring to **Page 6-2 of the Axiom** Users Manual or the Servo System Setup diagram

- ☐ Connect the **motor encoder** cable to the motor then wire to the Axiom drive J7 referring to **Page 6-2 of the Axiom** Users Manual or the Servo System Setup diagram

- ☐ Install the **Current Regeneration** jumper or resistor on the Axiom drive referring to the Servo System diagram and page **11-2 of the Axiom** Users Manual

- ☐ Connect the **Encoder Out** cable to the Axiom P1 and wire to the SSC J2 referring to **page 2-11 of the SSC** Users Manual

- ☐ Repeat this procedure for all axis using Torque or Velocity mode.

  If complete and axis remain to be wired for Position mode proceed to that section

  If all axis have been wired, proceed to Axiom Software Setup instructions.

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Initial Axidyne Startup Guide

Software

AXIOM SOFTWARE SETUP

- [ ] Turn to page 8 – 1 of the Axiom Users Manual and follow the directions for **Initial Check Out** and drive configuration

  Note: When selecting the **Drive Operating Mode** (Torque, Velocity, Position)
  Position Mode may only be selected if system is wired using the Step and Direction Inputs
  Torque and Velocity Modes require an analog command signal
  (*See page 12-1 of Axiom Users Manual for description of modes*)

- [ ] After the drive has been configured, power must be cycled for parameters to take effect

- [ ] Apply the Enable signal to the drive
  Note:
  If using Analog mode, disconnect J6 from the Axiom first to eliminate possible runaway due to offset.

- [ ] Does the digital readout on the front of the drive display a “P” then an “E”?

  If not, re-check wiring and try again

- [ ] Re-start the Axiom configuration software

- [ ] Click on the **On-Line Tuning and Diagnosis** button

- [ ] Under the **Automatic Tuning and Response** section Click on **Step Cmd**

- [ ] Click on the **Step CW** button

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AXIOM SOFTWARE SETUP - CONTINUED

- ☐ Does the motor move?

  If not, re-check the wiring and try again

- ☐ The drive is wired and working properly.

  Replace connector J6 if it was removed.

- ☐ Follow **Tuning Procedure** on page 12 – 3 in the **Axiom Users Manual**

- ☐ **Proceed to SSC Software Setup**

  ⇩

SSC SOFTWARE SETUP

- ☐ Remove communications cable from the Axiom drive and connect it to the SSC controller
- ☐ Apply power to the SSC controller
- ☐ Enter the SSC programming software and verify communications.
  Note: Screen will display the message “Uploading Drive Parameters” if communications are established
- ☐ Click on the **Setup** icon then select the **Scaling** and **User Units** appropriate for your system
- ☐ Select the **Signal Type** for each axis.
  When selecting **Analog**, a screen will come up with the gain parameters for P, I and D

  If the Axiom drive for that axis is set for **Velocity mode**, reduce the Ki & Kd to zero and only adjust the Kp.

  Kp can be determined, without tuning the SSC, by first tuning the Axiom in Position mode then using the Pp parameter of the Axiom in the following formula:

  Kp (SSC) = (12,288 / (4000 * Maximum motor RPM)) * Pp (Axiom)

  If using this technique remember to set the Axiom back to Velocity mode after tuning.

  For **Torque mode** follow the tuning instructions **page 5 – 82 of the SSC** Users Manual
- ☐ Select the **Jog** icon, select an axis to test, enter **Step Size, Speed and Accel/Decel** parameters then verify motion by clicking the **<<** or **>>** buttons.

You are now ready for application programming.

NOTE: Hookup of power, limit switches and enable function together with application programming for safety is the responsibility of the system integrator or customer. All local codes and good wiring practice should be followed.

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SALES ORDER#: .....

DATE: .....

NAME: .....

TITLE: .....

DEPARTMENT: .....

COMPANY: .....

ADDRESS: .....

CITY: .....

STATE: ..... ZIP: .....

PHONE: .....

FAX: .....

EMAIL: .....

☐ Please add me to your email news group.

☐ Please have a sales engineer contact me.

Product Satisfaction Inquiry

We have received our Axidyne Multi Axis System. Our experience has been as follows:

Selection and Ordering:	☐ Easy	☐ Average	☐ Difficult
Delivery:	☐ Early	☐ On Time	☐ Late
Condition at Receipt:	☐ Excellent	☐ Good	☐ Less than Expected

Reason: .....

Hookup, Initial Run:	☐ Easy	☐ Average	☐ Difficult
Startup Documents:	☐ Useful	☐ OK	☐ Confusing
Local Product Support:	☐ Excellent	☐ Good	☐ Less than Expected

Other Comments: .....

.....

Send Tol-O-Matic Literature

☐ Tol-O-Matic Interactive CD-ROM #9900-9073
(includes CAD files and electronic versions of all catalogs)

☐ Pneumatic Products Overview, 12 pgs. #9900-9075

☐ "Electric Linear Motion Solutions", 12 pgs. #9900-9074

☐ "Power Transmission Solutions", 8 pgs. #9900-9076

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