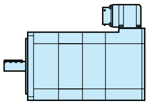
Products discontinued August 01, 2006:
SSC Multi-Axis Controller
Contact Tol-O-Matic for repair parts

Axidyne® Brushless Servo System



BRUSHLESS

- *MRV BRUSHLESS SERVO MOTORS*
- *AXIOM® DV SERVO DRIVE*
- *AXIOM® PV SERVO CONTROLLER/DRIVE*
- *SSC CONTROLLER*
- *JS JOYSTICK INTERFACE*
- *SIT HAND-HELD INTERFACE*

Products discontinued August 01, 2006:
SSC Multi-Axis Controller
Contact Tol-O-Matic for repair parts

Axidyne® Brushless Servo System

OVERVIEW

APPLICATION BENEFITS

- Extremely smooth and quiet operation
- Good for high torques [up to 45 in-lbs. (5.08 N-m) continuous, 140 in-lbs. (15.82 N-m) peak]
- Good for high speeds, up to 6,000 RPM
- High resolution, 4,000 counts per revolution
- Provide torque control
- Good for short, repetitive moves
- Maintenance free with no moving contacts

MOTOR

MRV - Brushless Servo Motors

- Rugged, with large shafts and bearings, IP65
- Convenient MS connectors
- Common flanges (NEMA 17, 23, 34 and 56)
- Integral temperature sensor and 1000 line encoder
- Gearhead reduction available in gear ratios of 5.5:1 and 10:1 when selected with Tol-O-Matic screw-drive actuators

DRIVE

Axiom DV - Servo Drive

- Designed to drive MRV motors
- Peak current ratings of 10A, 20A and 30A
- State-of-the-art vector commutation and current control for efficient high-bandwidth servo performance
- Simple Windows®-based software for set-up and installation

DRIVE - CONTROLLER

Axiom® PV Controller/Drive:

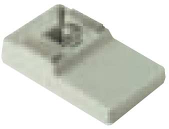
- Combines into one unit:
  - PLC: with real-time scan, 175 rung ladder logic
  - Motion Controller: with 1.5 axis, event triggering, motion pause and resume, point & click editor
  - Axiom drive: with all features listed above
- Includes Tol-O-Motion™ Axiom Motion Control Software and intuitive point and click sequential program and PLC ladder logic editors

CONTROLLER

SSC Controller:

- Performs any motion task including jogging, point-to-point positioning, linear and circular interpolation, electronic gearing, camming and contouring
- Multitasking feature permits simultaneous execution of four independent applications programs
- Tol-O-Motion SSC Motion Control Software allows setup & programming with easy-to-use Windows® interface
- Up to 4 axes per unit - up to 4 units can be daisy-chained
- 4M non-volatile EEPROM memory for executing custom application programs - permits stand-alone operation
- Relative and absolute positioning with more than ± 2,000,000,000 counts per move
- Inputs: opto-isolated dedicated for home, abort, forward and reverse limits, 8 uncommitted; 7 analog inputs
- Outputs: 8 programmable

INTERFACES



JS - Joystick

- Use with SSC joystick teach mode

SIT - Hand-held interface

- 45 key - keypad, LCD display
- for use with SSC

Host compatible PC

Products discontinued August 01, 2006:
SSC Multi-Axis Controller
Contact Tol-O-Matic for repair parts

Axidyne® MRV Brushless Servo Motors

FEATURES AND SPECIFICATIONS

COMPATIBILITY:

SYSTEM:	BRUSHLESS
MOTORS:	MRV
DRIVE:	AXIOM DV AXIOM PV
CONTROLLER:	SSC AXIOM PV
INTERFACE:	JS SIT

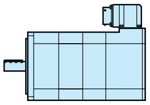
MRV Brushless Servo Motors

Tol-O-Matic's MRV series brushless servo motors provide a wide range of rated torques and speeds for applications requiring long life under continuous, difficult environment operation. These motors are designed for maximum power density. The MRV series motor come with an internally mounted 1000 line encoder.

FEATURES

- Rugged industrial enclosures
- Large shafts and bearings for longer life with high radial and axial loads
- Dual convenient MS connectors to simplify motor termination and provide excellent noise immunity
- Common industrial mechanical flanges (NEMA 17, 23, 34, 56)
- Integral 1000 line TTL encoder with differential line driver outputs
- Ideally suited for use with Axiom DV drives (motor parameters are stored with drive) – torque/speed curves shown on the following pages reflect MRV motors with Axiom drive performance.
- Internal thermal protection
- IP65* rated (except MRV11)

Totally protected against dust and low pressure jets of water.



BRUSHLESS

MRV Motors
- Features
- Specifications

SPECIFICATIONS

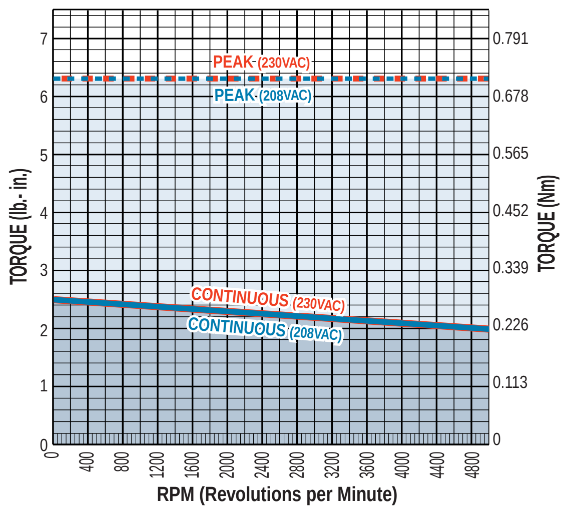
Model	KE (1)	KT (2)		Resistance (3)	Rotor Inertia		Thermal Resistance	Cont. Stall Torque		Peak Stall Torque		Max. Speed	Inductance (4)	Weight	
	Volts/1000RPM	lb-in/amp	N-m/amp	Ohms	lb-in²	kg-m² x 10^{-6}	°C/W	lb-in	N-m	lb-in	N-m	RPM	mH	lbs	kgs
MRV11	6.06	0.893	0.100	2.24	0.020	5.72	—	2.50	0.28	12.50	1.41	5,000	1.63	1.16	0.53
MRV21	8.80	1.290	0.144	2.22	0.053	15.58	1.80	3.75	0.42	11.31	1.28	6,000	1.81	2.20	1.00
MRV22	14.50	2.120	0.237	2.04	0.099	28.90	1.30	7.50	0.85	22.50	2.54	6,000	2.10	3.10	1.40
MRV23	21.80	3.190	0.357	2.73	0.143	41.70	1.23	11.25	1.27	33.81	3.82	6,000	2.95	4.00	1.80
MRV24	29.00	4.250	0.476	3.36	0.193	56.33	1.16	15.63	1.77	46.88	5.30	6,000	3.81	5.00	2.30
MRV31	14.80	2.170	0.243	1.10	0.386	112.85	0.72	17.00	1.92	85.00	9.60	6,000	2.60	8.00	3.60
MRV32	22.20	3.250	0.364	0.80	0.694	203.02	0.58	30.00	3.39	150.00	16.90	6,000	2.50	11.50	5.20
MRV33	25.90	3.790	0.424	0.60	1.006	294.47	0.56	44.00	4.97	220.00	24.90	6,000	2.10	14.00	6.35
MRV51	48.90	7.150	0.801	0.54	2.531	740.75	0.72	80.00	9.04	240.00	27.10	3,000	3.06	26.00	11.80

ALL RATINGS TYPICAL AND AT 77°F (25°C) UNLESS OTHERWISE NOTED. WINDING TEMPERATURE AT 257°F (125°C).
(1) L-L, RMS (±10%) (2) PER PHASE, RMS (±10%) (3) L-L DC RESISTANCE (±10%) (4) L-L (±15%)

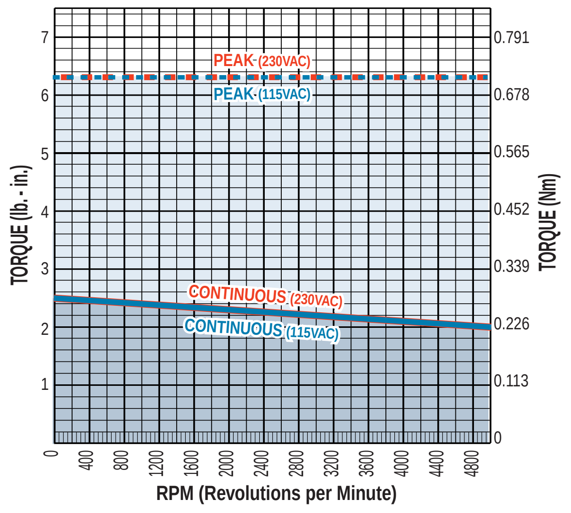
Axidyne® MRV Brushless Servo Motors

PERFORMANCE DATA WITH AXIOM® DV/PV DRIVES

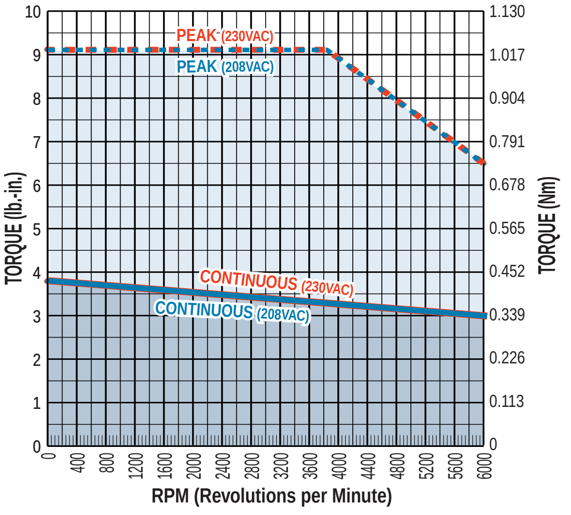
MRV11Y • DV/PV10 DRIVE • THREE-PHASE



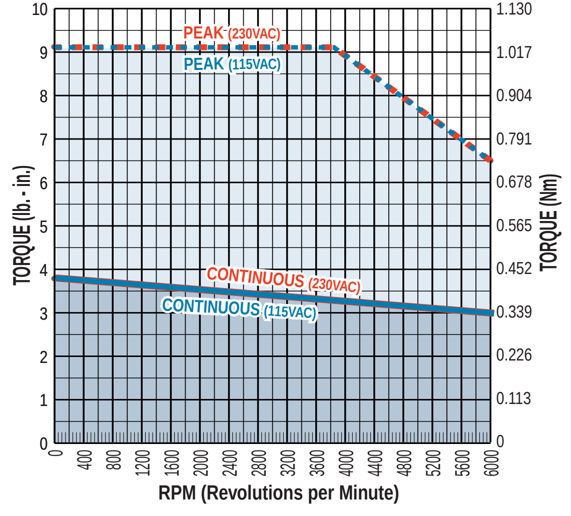
MRV11Y • DV/PV10 DRIVE • SINGLE-PHASE

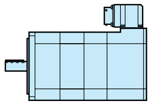


MRV21Y • DV/PV10 DRIVE • THREE-PHASE



MRV21Y • DV/PV10 DRIVE • SINGLE-PHASE



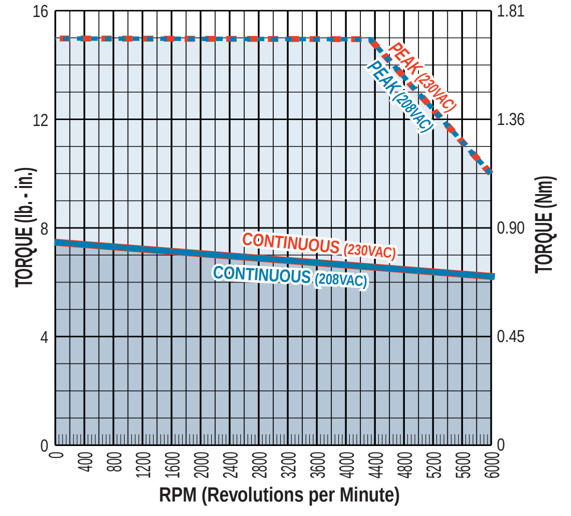


BRUSHLESS

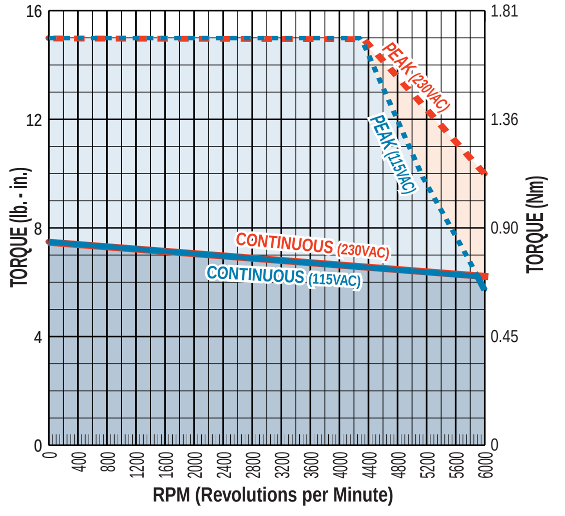
MRV Motors

- Performance data

MRV22Y • DV/PV10 DRIVE • THREE-PHASE



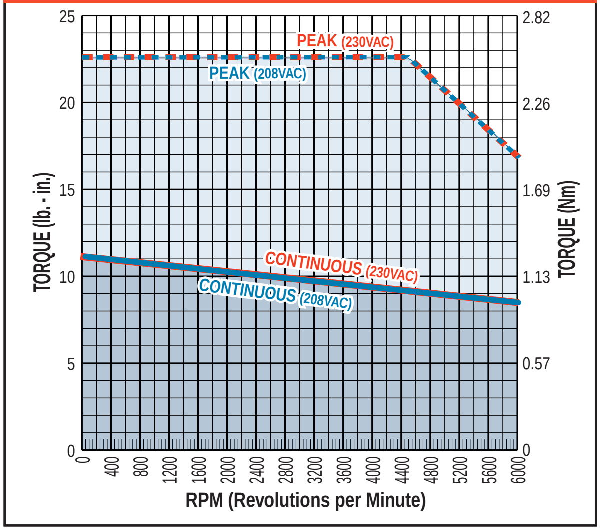
MRV22Y • DV/PV10 DRIVE • SINGLE-PHASE



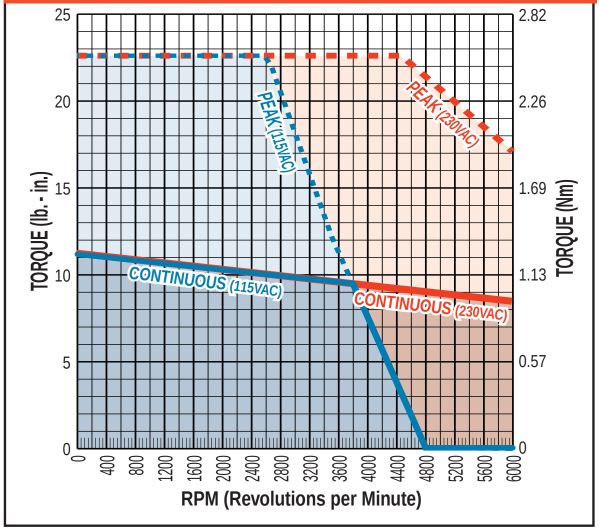
Axidyne® MRV Brushless Servo Motors

PERFORMANCE DATA WITH AXIOM® DV/PV DRIVES

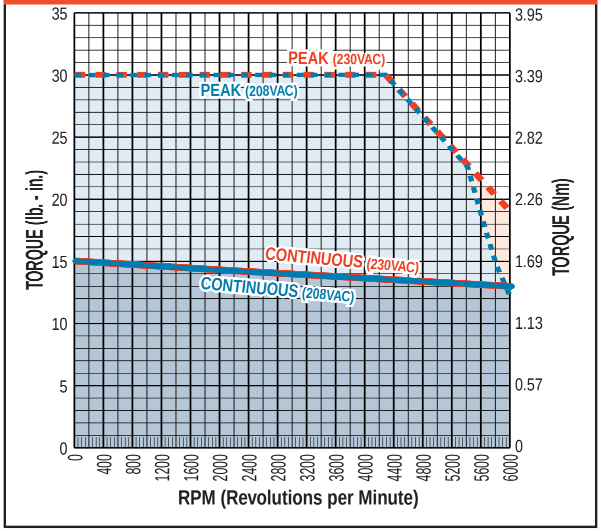
MRV23Y • DV/PV10 DRIVE • THREE-PHASE



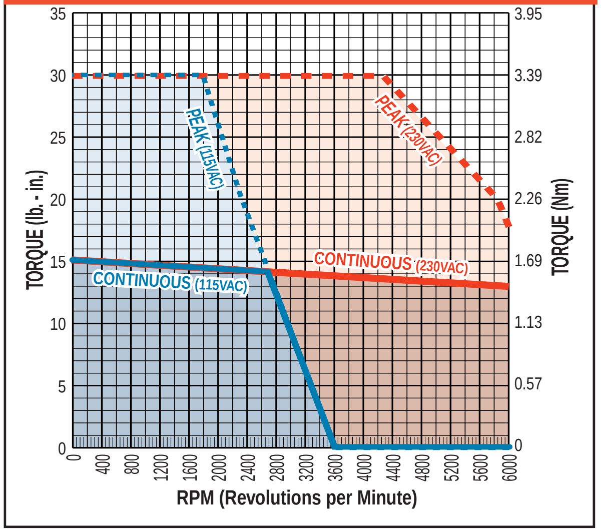
MRV23Y • DV/PV10 DRIVE • SINGLE-PHASE



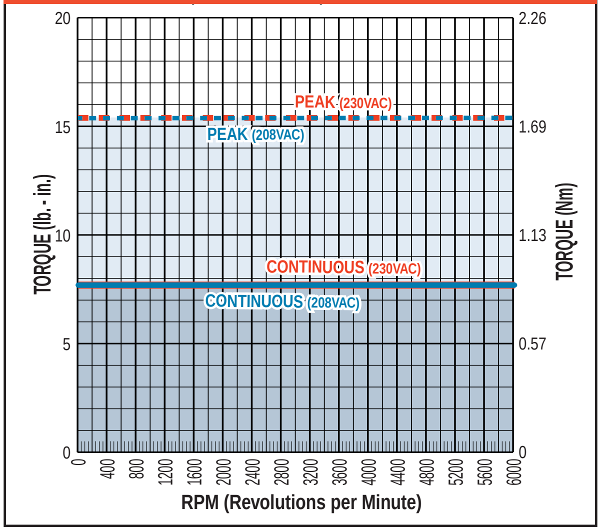
MRV24Y • DV/PV10 DRIVE • THREE-PHASE



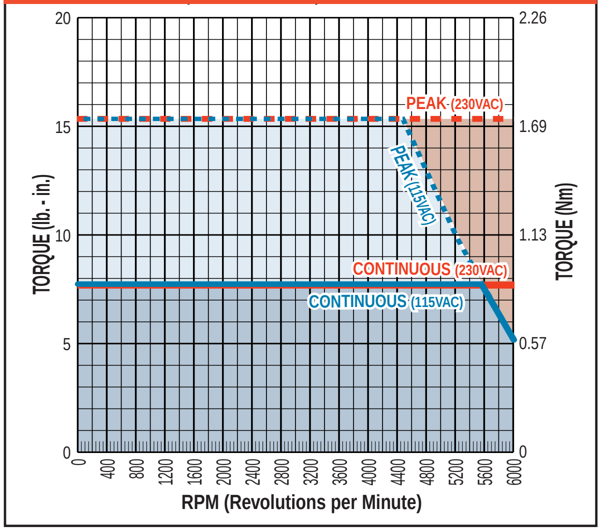
MRV24Y • DV/PV10 DRIVE • SINGLE-PHASE

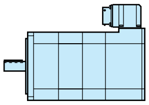


MRV31Y • DV/PV10 DRIVE • THREE-PHASE



MRV31Y • DV/PV10 DRIVE • SINGLE-PHASE





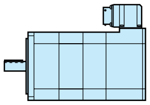
BRUSHLESS

MRV Motors

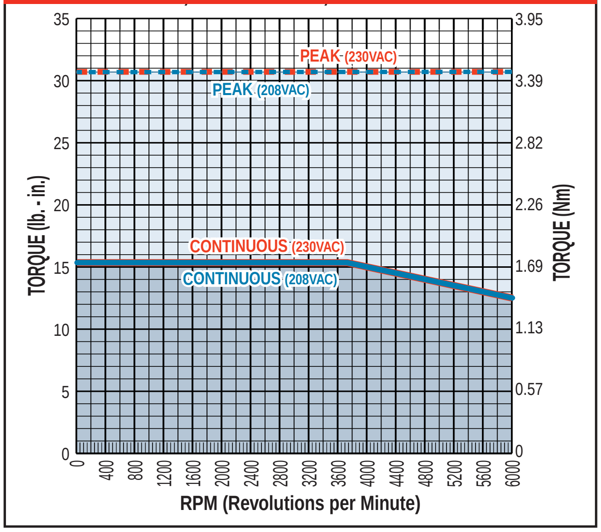
- Performance data

MRV Brushless Servo Motors

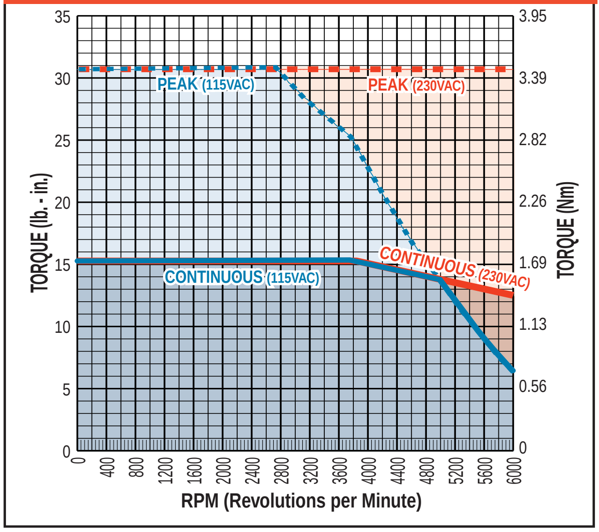
PERFORMANCE DATA WITH AXIOM® DV/PV DRIVES



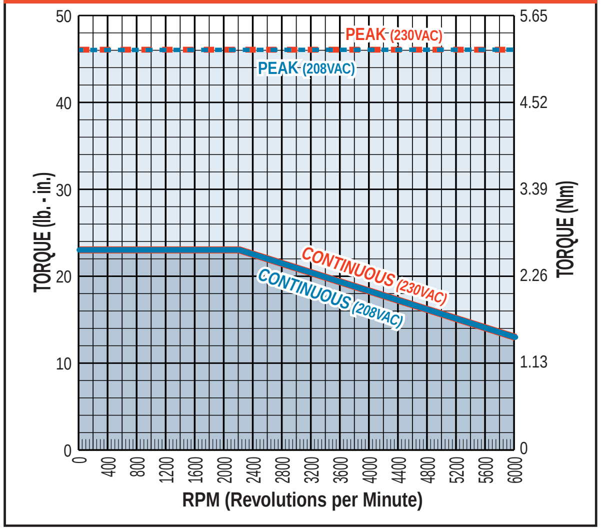
MRV31Z • DV/PV20 DRIVE • THREE-PHASE



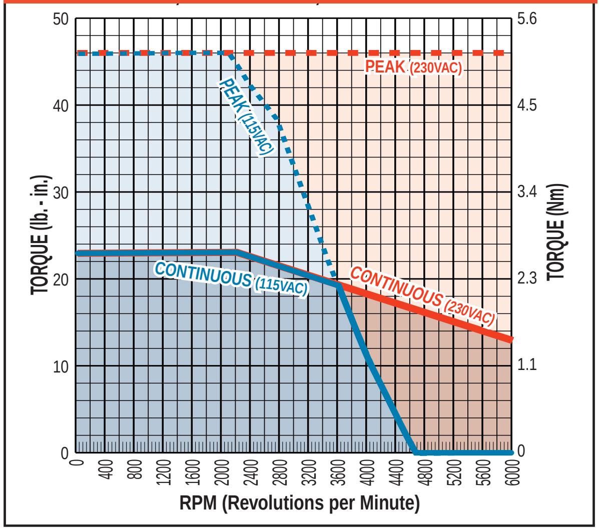
MRV31Z • DV/PV20 DRIVE • SINGLE-PHASE



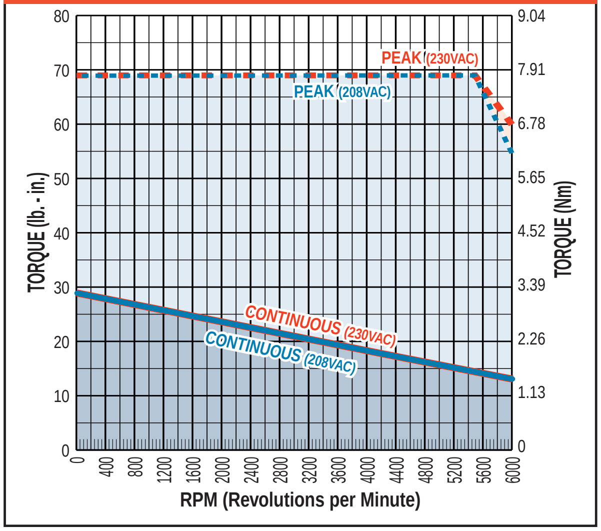
MRV32Y • DV/PV20 DRIVE • THREE-PHASE



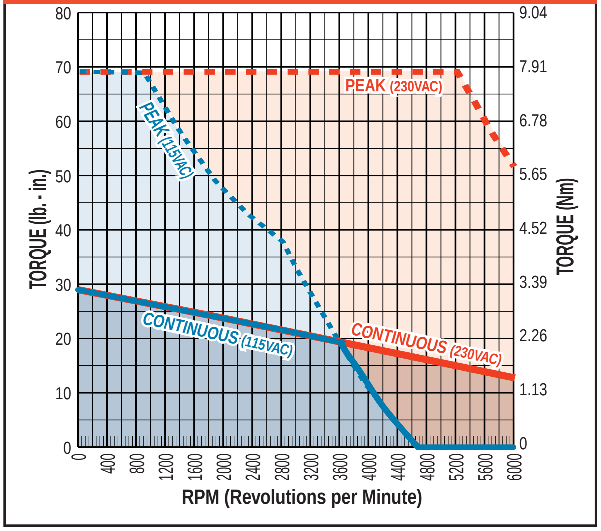
MRV32Y • DV/PV20 DRIVE • SINGLE-PHASE



MRV32Z • DV/PV30 DRIVE • THREE-PHASE



MRV32Z • DV/PV30 DRIVE • SINGLE-PHASE

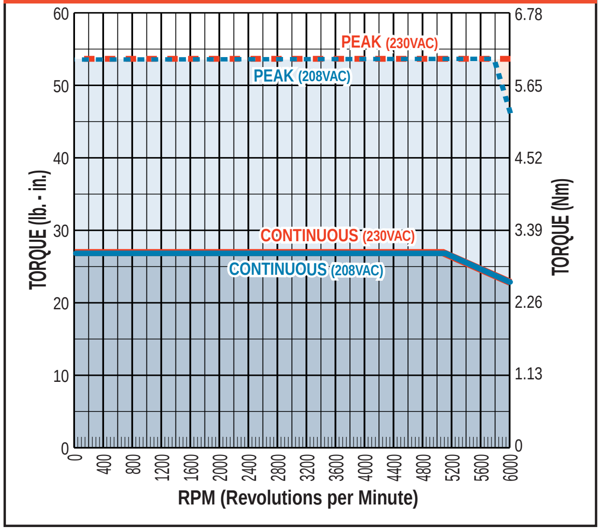


Axidyne®

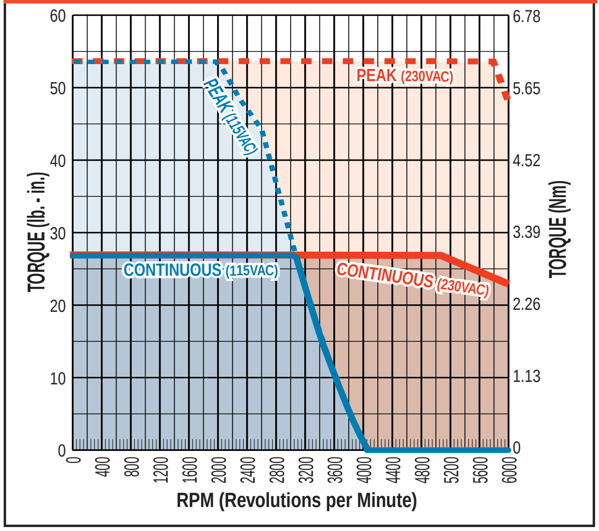
MRV Brushless Servo Motors

PERFORMANCE DATA WITH AXIOM® DV/PV DRIVES

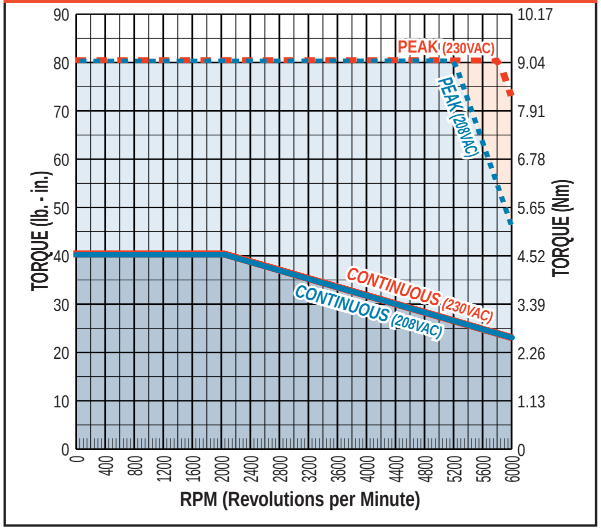
MRV33Y • DV/PV20 DRIVE • THREE-PHASE



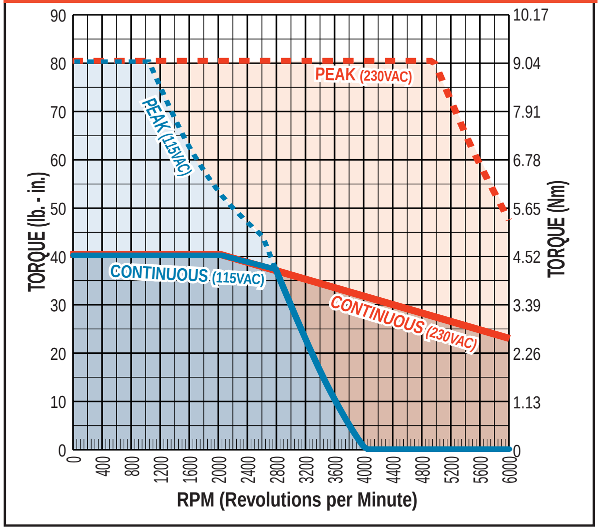
MRV33Y • DV/PV20 DRIVE • SINGLE-PHASE



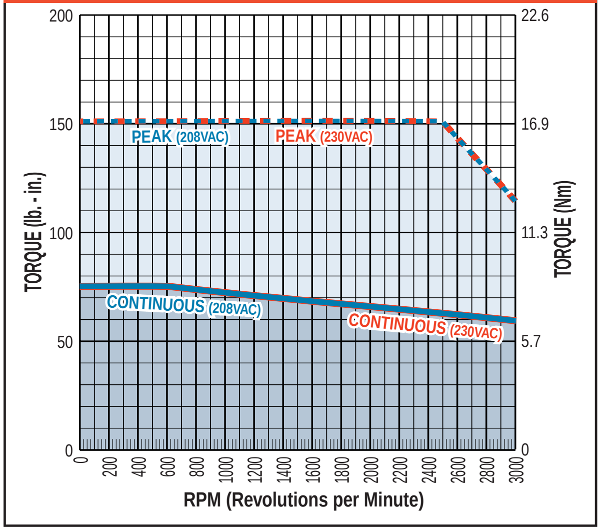
MRV33Z • DV/PV30 DRIVE • THREE-PHASE



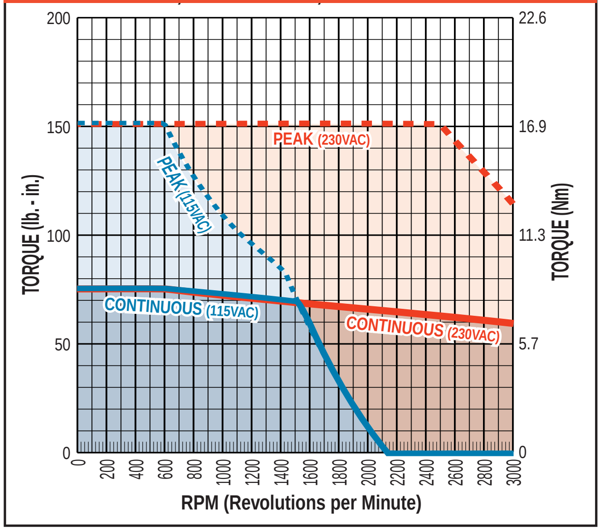
MRV33Z • DV/PV30 DRIVE • SINGLE-PHASE

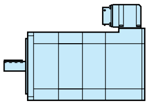


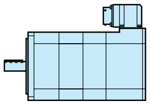
MRV51Y • DV/PV30 DRIVE • THREE-PHASE



MRV51Y • DV/PV30 DRIVE • SINGLE-PHASE





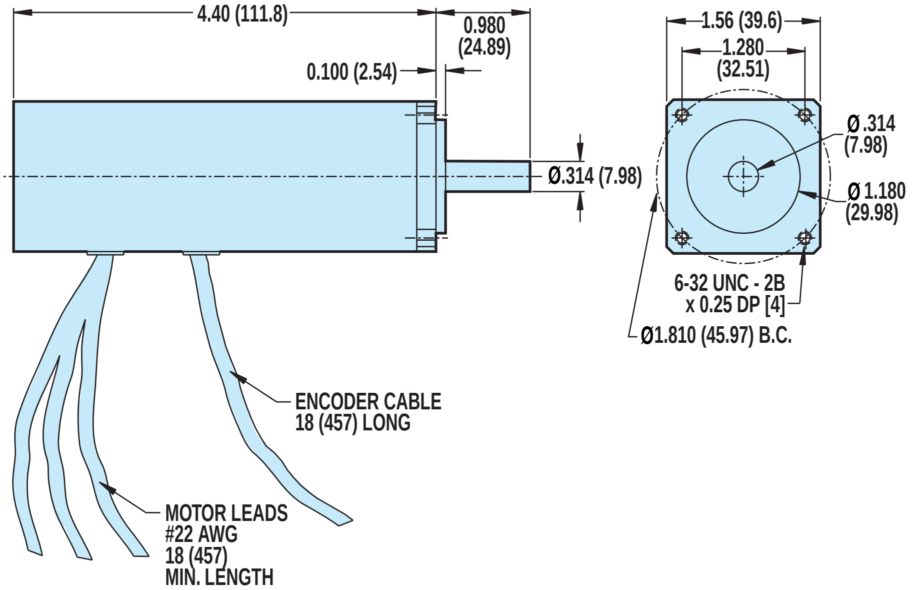


BRUSHLESS

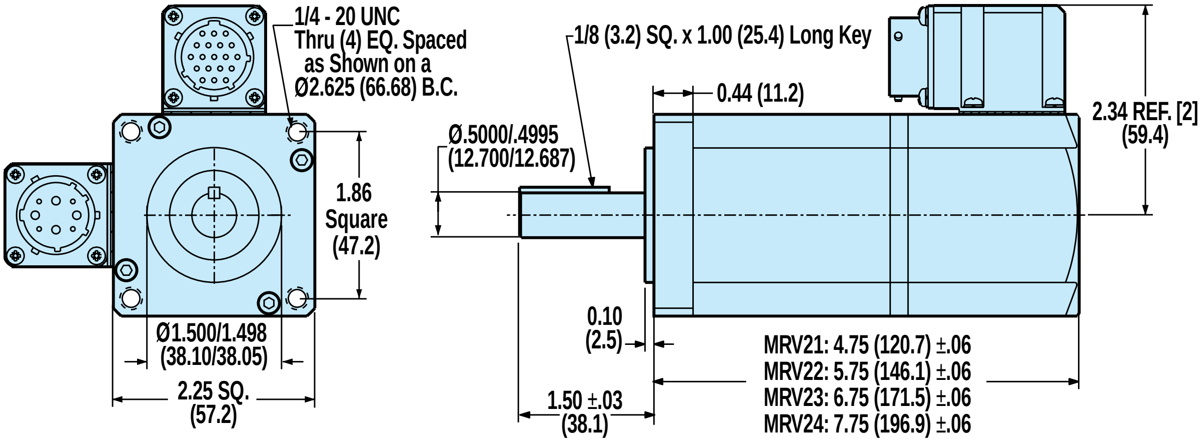
MRV Motors

- Dimensions

MRV11



MRV21, 22, 23, 24

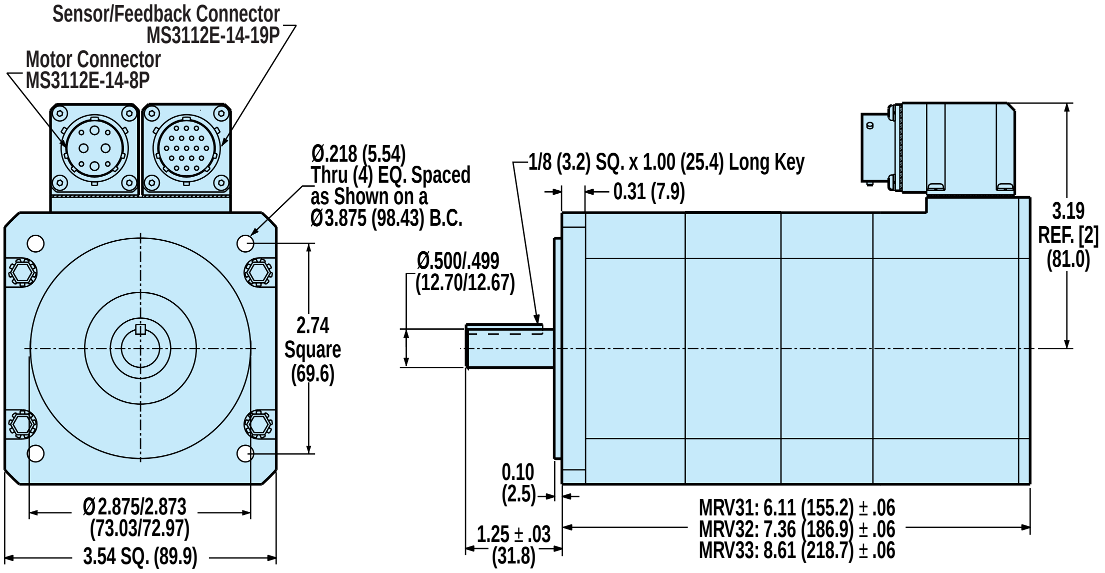


Unless otherwise noted, all dimensions shown are in inches (Dimensions in parenthesis are in millimeters)

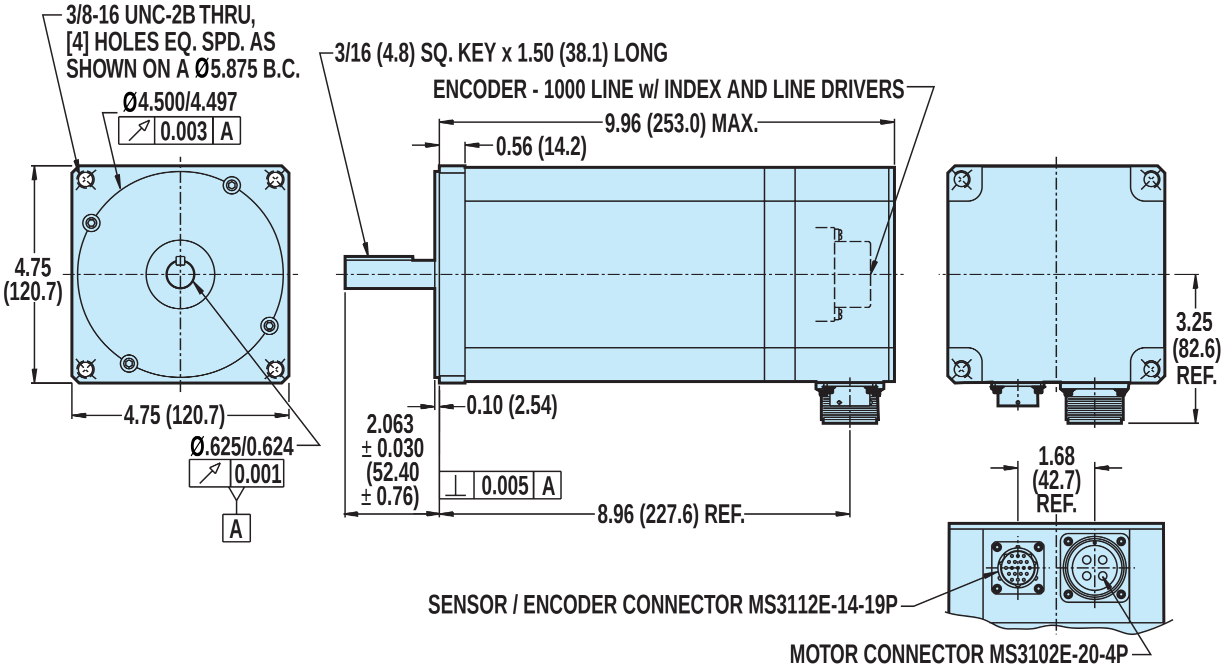
MRV Brushless Servo Motors

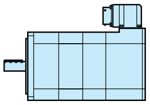
DIMENSIONS

MRV31, 32, 33



MRV51





BRUSHLESS

MRV Motors

- Dimensions

Products discontinued August 01, 2006:
SSC Multi-Axis Controller,
Stepper Motors & Control Products,
Brushed DC Motors & Control Products
Contact Tol-O-Matic for repair parts

Axidyne® Gearhead Reduction

SPECIFICATIONS AND DIMENSIONS

COMPATIBILITY:
SYSTEM: BRUSHLESS
MOTORS: MRV
ACTUATORS: ALL TOL-O-MATIC SCREW DRIVES

COMPATIBILITY:
SYSTEM: STEPPER
MOTORS: MRS
ACTUATORS: ALL TOL-O-MATIC SCREW DRIVES

COMPATIBILITY:
SYSTEM: BRUSHED DC
MOTORS: MRB
ACTUATORS: ALL TOL-O-MATIC SCREW DRIVES

For those applications requiring reduction for inertia matching or higher torque at lower speeds, Tol-O-Matic offers high efficiency, single stage, true planetary gearheads. Gear ratios of 5.5:1 and 10:1 are available and are compatible with 23- and 34-frame MRV Brushless Servo, MRS Microstepping and Brushed DC motors.

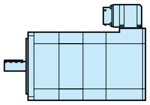
SPECIFICATIONS

Efficiency:	85%
Backlash:	less than 10 arc minutes
Max. Input Speed:	5000 RPM

CONFIG NO.	PART NO.	FRAME SIZE	GEAR RATIO	REFLECTED INERTIA*		INPUT SHAFT DIA. (in)	WEIGHT	
				lb-in^2	kg-m^2		lbs	kgs
GHJ20	3600-6151	23	5.5 :1	0.0213	6.22	0.500	2.00	0.91
GHJ21	3600-6152	23	10 :1	0.0181	5.30	0.500	1.98	0.90
GHJ30	3600-6154	34	5.5 : 1	0.1131	33.09	0.500	4.60	2.09
GHJ31	3600-6155	34	10 : 1	0.0888	25.96	0.500	4.78	2.17
GHJ32§	3600-6156	34	10: 1	0.0888	25.96	0.500	4.81	2.18

⚠ ** Reflected inertia is inertia at motor side of gearhead.*
§ Only available on RSA64 LMI

For a complete part listing of screw-drive motor and gearhead mounting kits referencing actuator/motor/coupler compatibilities, refer to document 3600-4631 available on the Literature/Axidyne/Part Sheet section of our web site at: www.tolomatic.com.

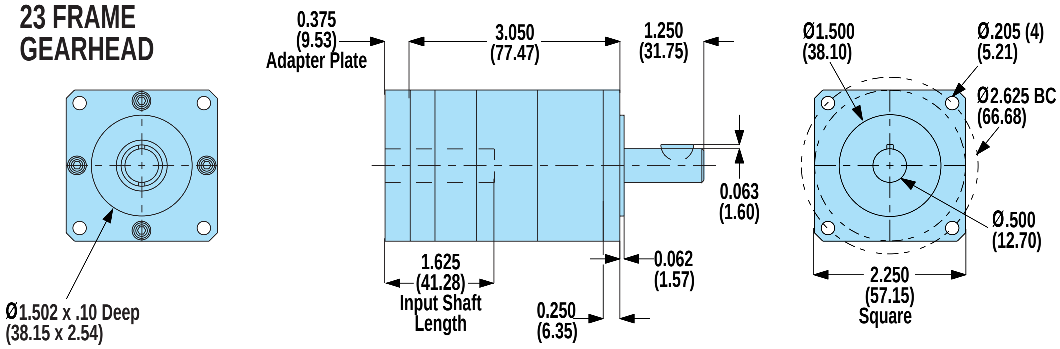


BRUSHLESS

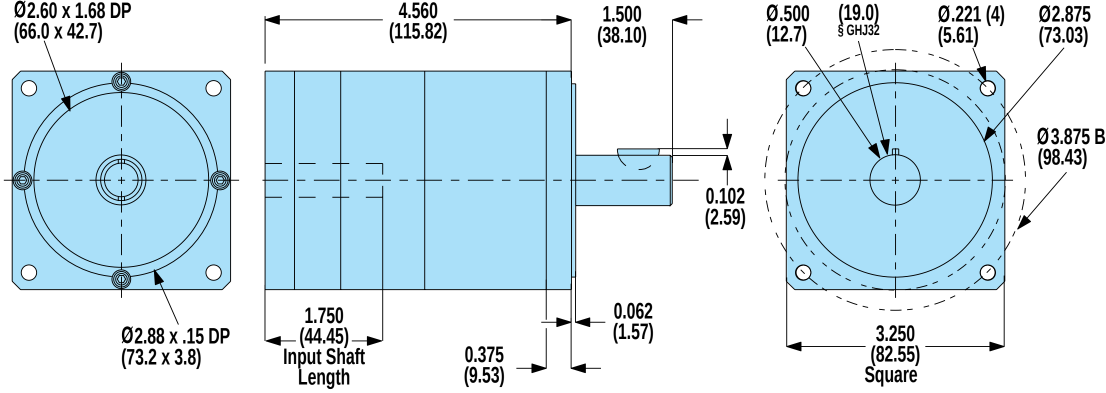
Gearhead Reduction
- Specifications
- Dimensions

23- AND 34-FRAME GEARHEADS

23 FRAME GEARHEAD



34 FRAME GEARHEAD



Unless otherwise noted, all dimensions shown are in inches (Dimensions in parenthesis are in millimeters)

Products discontinued August 01, 2006:
SSC Multi-Axis Controller
Contact Tol-O-Matic for repair parts

AXIOM® DV Brushless Servo Drive

FEATURES

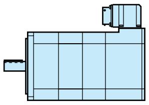
COMPATIBILITY:
SYSTEM: BRUSHLESS
MOTORS: MRV
DRIVE: AXIOM DV
CONTROLLER: SSC
INTERFACE: JS
SIT

• CONSIDER THE AXIOM PV FOR ALL OF THE FEATURES OF THE AXIOM DV, PLUS AN INTEGRAL CONTROLLER, & PLC ELIMINATING THE NEED FOR THE SSC CONTROLLER

The Axiom series of brushless and brushed servo drives combine high-speed accuracy with user friendly set-up and diagnostics. The Axiom DV series is a state-of-the-art DSP controlled digital vector commutated drive for a full range of brushless servo motors. DV series drives are available in 10, 20 and 30 Amp peak ratings (3 sec). All come with convenient pluggable screw terminal connectors and offer fast, easy set-up and installation for use in a wide variety of applications.

AXIOM® DV DRIVE FEATURES

- Space vector commutation provides better bus voltage utilization than traditional sine drives for improved speed/torque curves
- Flux vector current control provides more accurate high bandwidth control of torque producing current for better efficiency and more torque over the full speed range than with traditional sine drives
- Drives MRV series brushless servo motors
- Autophasing eliminates the need for Hall sensors in motors
- Pluggable screw terminal connectors eliminate the need for special connectors and secondary breakout terminal strips
- 115/208-230Vac input, single or 3-phase
- Short circuit, over current and over voltage protection prevents drive damage
- 25W or 50W internal regeneration
- External regeneration connections
- Analog torque and velocity command (±) 10V or step and direction (CW/CCW) position control
- Feedback from differential A+B and index channel optical encoder (5V)
- Maximum line count of 500,000/motor commutation cycle
- CW/CCW travel limit inputs
- Drive enable input
- Fault, enabled, and in-position outputs
- 3A brake relay
- 3 second peak ratings



BRUSHLESS

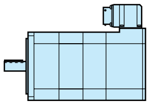
Axiom DV Drive
- Features

AXIOM® DV Brushless Servo Drive

SPECIFICATIONS

AXIOM® DV SPECIFICATIONS

SPECIFICATIONS	Axiom™ DV and DB Series Drives		
Power	**DV10**	**DV20**	**DV30**
Continuous Current Rating:	5 Amps	10 Amps	15 Amps
Peak Current Rating (3 sec):	10 Amps	20 Amps	30 Amps
Max Input Current (single phase):	12.5 Amps	25 Amps	37.5 Amps
Input Voltage (single/3-phase):	95Vac -130Vac / 190Vac - 250Vac (voltage range is switch selectable)		
Input Frequency:	47Hz - 63Hz		
Command Sources			
Analog Torque/Velocity Input:	± 10V, 16.4K ohm impedance		
Step and Direction or Step CW/Step CCW:	1 MHz maximum, 5V differential or single ended drivers		
Serial Communication Port			
Type:	RS232		
Baud Rate:	19,200 baud		
Control Loops			
Type:	All digital		
Loop Modes:	Torque, Velocity and Position Control		
Torque Update Rate:	10KHz		
Velocity Update Rate:	5Khz		
Position Update Rate:	2.5Khz		
Inputs and Outputs			
Dedicated Optically Isolated Inputs:	5Vdc - 25Vdc, 2.7ma - 15ma ENABLE, CW LIMIT and CCW LIMIT. Can be configured to source or sink current.		
Dedicated Optically Isolated Outputs:	3 optically isolated, 25Vdc max., 50ma max. IN POSITION, ENABLED and FAULT. Can be configured to source or sink current.		
1 Dedicated Brake Relay Output:	N.O. contact, 24Vdc, 115/230Vac, 3A max.		
Motor Feedback:	Incremental encoder, 5Vdc, differential 4Mhz max., A/B/I channels 250 line min. with a 4 pole motor 125 line min. with a 2 pole motor		
Encoder Output:	Differential, 5Vdc, A/B/I channels		
Connectors			
Serial:	9 pin D-Sub.		
Control and Feedback:	15 pin D-Sub.		
Power, Motor, Brake Relay, Regen:	Screw terminal block		
All Others:	Pluggable screw terminal blocks		
Approvals	UL, CUL, CE		
Environmental			
Storage Temperature:	-40°C to 70°C		
Operating Temperature:	0°C to 50°C		
Humidity:	5% to 95%, non-condensing		
Weight:	DV10	DV20	DV30
	8 lbs	12 lbs	12 lbs
	(3.7 Kg	(5.5 Kg)	(5.5 Kg)



BRUSHLESS

Axiom DV Drive
- Specifications

Axiom® DV Brushless Servo Drive

CONNECTORS

AXIOM® DV CONNECTORS

TB1 - BRAKE/REGEN

1 - Brake	4 - External Regen
2 - Brake	5 - Internal Regen
3 - Regen Common	

TB2 - MOTOR

1 - Motor R	3 - Motor T
2 - Motor S	4 - Motor Ground

TB3 - AC POWER

1 - L3	3 - L1
2 - L2	4 - Ground

J3 - OUTPUTS

1 - In Position +	4 - Enabled Out -
2 - In Position -	5 - Fault Out +
3 - Enabled Out +	6 - Fault Out -

J4 - INPUTS

1 - CW Limit	6 - Step/Step CW +
2 - CCW Limit	7 - Step/Step CW -
3 - Limit Common	8 - Direction/Step CCW +
4 - Enable +	9 - Direction/Step CCW -
5 - Enable -	

J6 - ANALOG INPUT COMMAND

1 - Analog Common	3 - Analog -
2 - Analog +	4 - Shield

J7 - MOTOR ENCODER

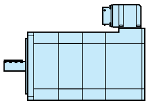
1 - Encoder +5V	6 - I+
2 - A+	7 - I-
3 - A-	8 - Common/Shield
4 - B+	9 - Motor Temp
5 - B-	

P1 - BUFFERED ENCODER OUTPUT

1 - Reserved	8 - Common
2 - Reserved	9 - Encoder Out A+
3 - Reserved	10 - Encoder Out A-
4 - Reserved	11 - Encoder Out B+
5 - Reserved	12 - Encoder Out B-
6 - Reserved	13 - Encoder Out I+
7 - Reserved	14 - Encoder Out I-

P2 - COMMUNICATIONS

1 - Reserved	6 - Reserved
2 - RS-232 TX	7 - Reserved
3 - RS-232 RX	8 - Reserved
4 - Reserved	9 - +5Vdc (30ma MAX.)
5 - Common	



Axidyne®

Axiom® DV Brushless Servo Drive

SET-UP / CONFIGURATION

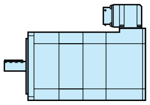
Axiom® Windows®-based PC setup software with a “control-panel” approach, makes it easy to get up and running fast. All set-up and configuration functions are performed using two main control-panel screens. Simple mouse-click commands automatically configure the control functions, eliminating layers of screens and menus. This approach also allows more relevant diagnostic information to be displayed simultaneously. All control screens include a command menu at the upper left to permit convenient selection of high-level functions and options.

A main menu is provided which allows selection of the main control panel functions, active comm port, etc. Tutorial selections are provided which emulate the main control-panel functions in an off-line manner and provide “help” text and function definitions/ descriptions so that users can actively familiarize themselves with the software without actually connecting a drive.

The software communicates with the drive using a standard RS-232 connection operating at 19,200 baud, using either comm port 1 or 2 of the PC. It can be installed and executed from any PC running Windows 95, 98, NT, 2000 or XP.

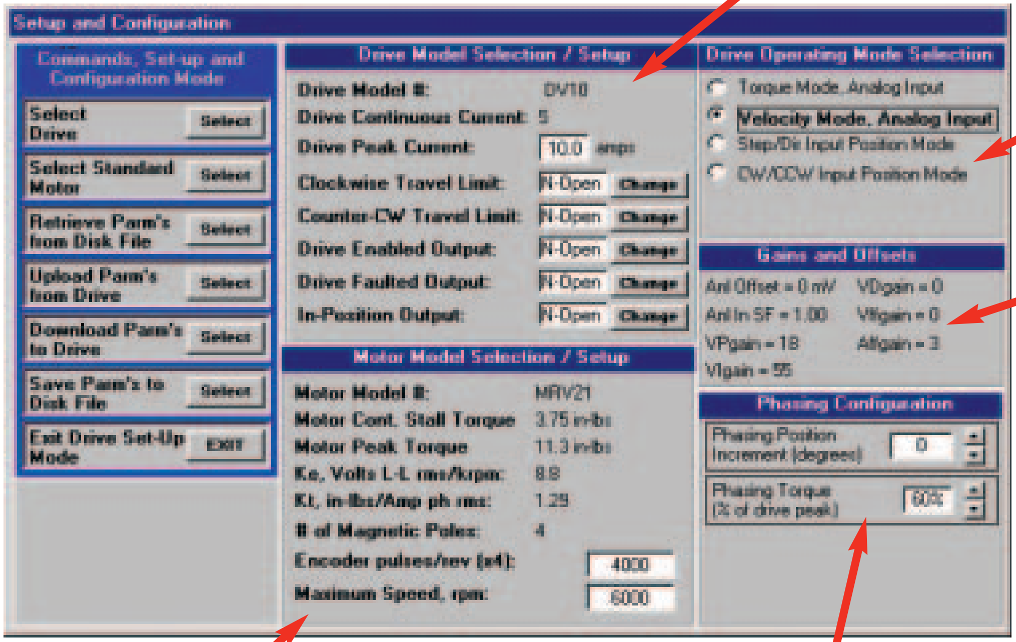
SET-UP CONFIGURATION

Drive operating mode and other options can all be selected/enabled from this screen. All set-up parameters can be uploaded and downloaded with a single click of the mouse. The parameter set can be saved to or retrieved from a disk file. Once downloaded to the drive, all parameters are stored in non-volatile EEPROM memory.



BRUSHLESS

Axiom DV Drive
- Set-up / configuration



Drive Model #: DV10
Drive Continuous Current: 5
Drive Peak Current: 10.0 amps
Clockwise Travel Limit: N-Open
Counter-CW Travel Limit: N-Open
Drive Enabled Output: N-Open
Drive Faulted Output: N-Open
In-Position Output: N-Open

Motor Model #: MRV21
Motor Cont. Stall Torque 3.75 in-lbs
Motor Peak Torque 11.3 in-lbs
Ke, Volts L-L rms/krpm: 8.8
Kt, in-lbs/Amp ph rms: 1.29
# of Magnetic Poles: 4
Encoder pulses/rev (x4): 4000
Maximum Speed, rpm: 6000

○ Torque Mode, Analog Input
● Velocity Mode, Analog Input
○ Step/Dir Input Position Mode
○ CW/CCW Input Position Mode

AnI Offset = 0 mV
AnI In SF = 1.00
VPgain = 18
VIgain = 55
VDgain = 0
VIIgain = 0
AIIgain = 3

Phasing Position Increment (degrees) 0
Phasing Torque (% of drive peak) 60%

DRIVE MODEL # DISPLAY AND PARAMETER CONFIGURATION.

DRIVE MODE SELECTION.

DISPLAY OF TUNING AND OFFSET PARAMETERS FOR REFERENCE PURPOSES (SET IN TUNING CONTROL SCREEN).

MOTOR SELECTION AND CONFIGURATION.

CONFIGURATION/SET-UP FOR AUTO-PHASING FUNCTION INCLUDING INDEX PULSE MONITORING FOR COMMUTATION ACCURACY AND FASTER DETECTION OF FEEDBACK ERRORS.

Axiom® DV Brushless Servo Drive

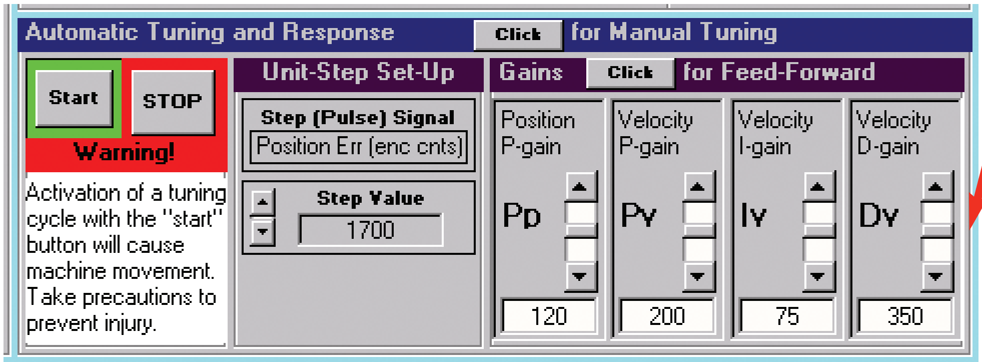
SET-UP / CONFIGURATION

TUNING AND DIAGNOSTICS

Use the 4-channel oscilloscope display for analysis of motion response when tuning and diagnosing. Scaling and format of the displayed traces can be easily modified. Values can be read directly off the traces at any point. Continuously updated bar graph displays allow important data to be viewed while motion is occurring. These displays are configured automatically based on drive operating mode they include peak detection functions and numeric displays. A status section of this control screen displays the current state of I/O and fault information.

Selecting "Drive-Tuning" from the command menu activates and displays the control functions for manual and automatic drive tuning. Use these controls to set-up and start actuation of an appropriate unit-step motion command and then enable automatic tuning parameter adjustment. Manual adjustments to tuning parameters can be easily accomplished.

The oscilloscope functions are used in conjunction with tuning, ensuring desired response goals are achieved. All tuning parameters are updated and activated immediately in the drive when modified (and also stored in EEPROM memory).



Activation of a tuning cycle with the "start" button will cause machine movement. Take precautions to prevent injury.

Step (Pulse) Signal: Position Err (enc cnts)

Step Value: 1700

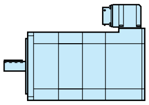
Position P-gain (Pp): 120

Velocity P-gain (Pv): 200

Velocity I-gain (Iv): 75

Velocity D-gain (Dv): 350

TUNING CONTROLS ALLOW USER CONFIGURABLE UNIT-STEP ACTUATION. AUTOMATIC AND MANUAL TUNING FUNCTIONS ARE PROVIDED. OPTIONAL VALUES FOR FEED FORWARD GAINS AND ANALOG OFFSETS CAN ALSO BE ENTERED.

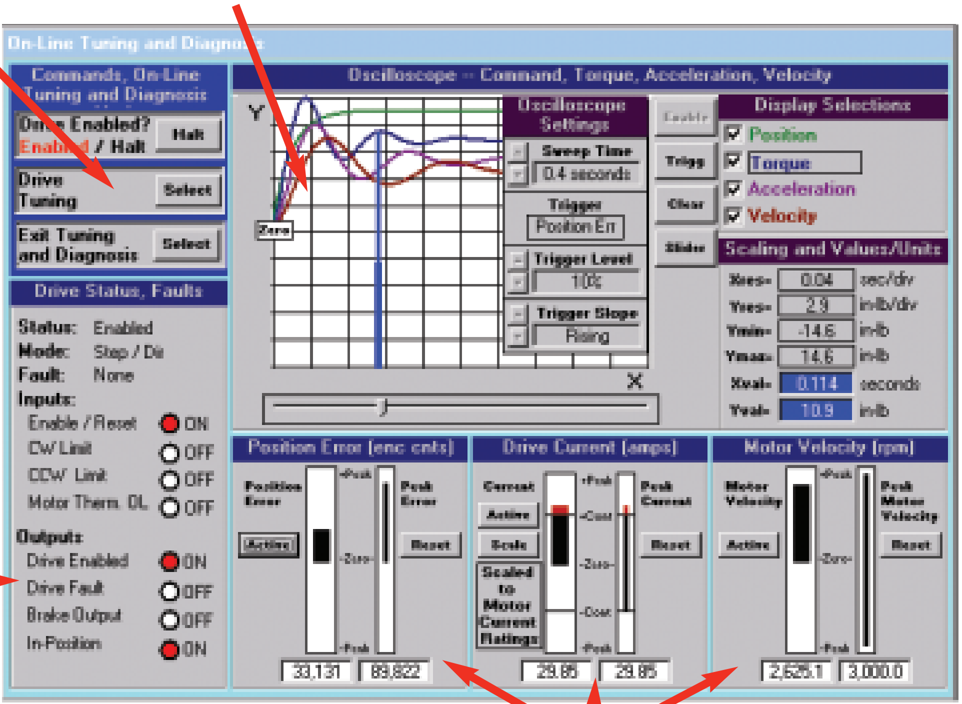


BRUSHLESS

Axiom DV Drive
- Set-up / configuration

4-CHANNEL OSCILLOSCOPE DISPLAY FOR SET-UP/TUNING AND SUBSEQUENT DIAGNOSIS. FLEXIBLE DISPLAY CONFIGURATION AND SLIDING VALUE INDICATOR, MAKE ANALYSIS QUICK AND EASY. INCLUDES USER CONTROLLED TRIGGER FUNCTIONS.

ALL SOFTWARE SCREENS INCLUDE SEPARATE MENUS OF HIGH-LEVEL FUNCTIONS IN THE UPPER LEFT CORNER TO FACILITATE QUICK TRANSITIONS BETWEEN SCREENS AND FUNCTIONS.



Status: Enabled
Mode: Step / Dir
Fault: None

Inputs:
Enable / Reset ● ON
CW Limit ○ OFF
CCW Limit ○ OFF
Motor Therm. OL ○ OFF

Outputs:
Drive Enabled ● ON
Drive Fault ○ OFF
Brake Output ○ OFF
In-Position ● ON

Sweep Time: 0.4 seconds
Trigger: Position Err
Trigger Level: 10%
Trigger Slope: Rising

☑ Position
☑ Torque
☑ Acceleration
☑ Velocity

Xres= 0.04 sec/div
Yres= 2.9 in-lb/div
Ymin= -14.6 in-lb
Ymax= 14.6 in-lb
Xval= 0.114 seconds
Yval= 10.9 in-lb

Position Error: 33,131 | Peak Error: 89,822

Drive Current: 29.85 | Peak Current: 29.85

Motor Velocity: 2,625.1 | Peak Motor Velocity: 3,000.0

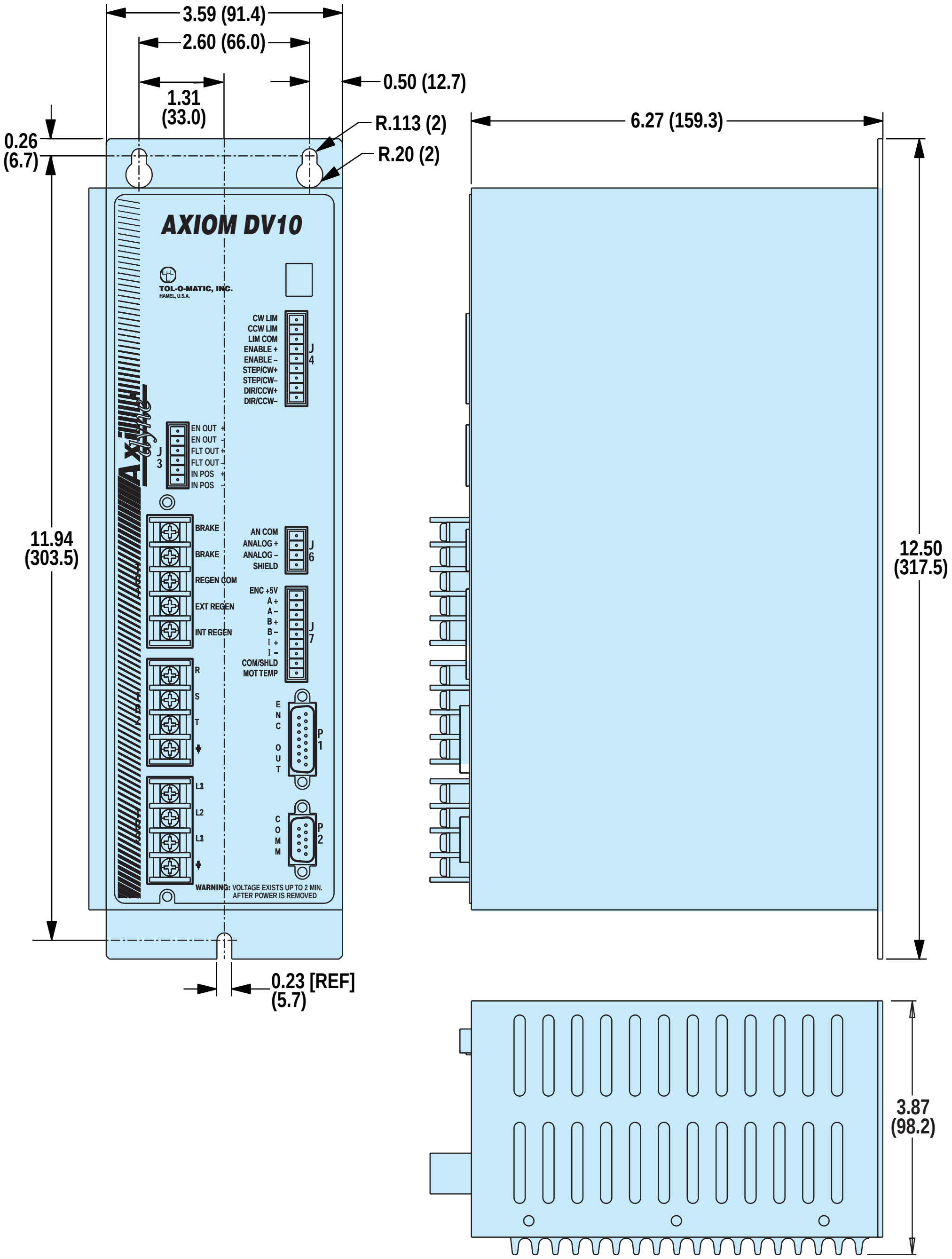
CONTINUOUS DISPLAY OF CRITICAL DRIVE STATUS INFORMATION AS WELL AS PHYSICAL STATE OF I/O.

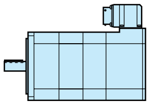
DIAGNOSTIC BAR GRAPH DISPLAYS OF CRITICAL SYSTEM VALUES, UPDATED CONTINUOUSLY. INCLUDES PEAK DETECTION AND NUMERIC DISPLAY.

Axiom® DV Brushless Servo Drive

DIMENSIONS

AXIOM DV10





BRUSHLESS

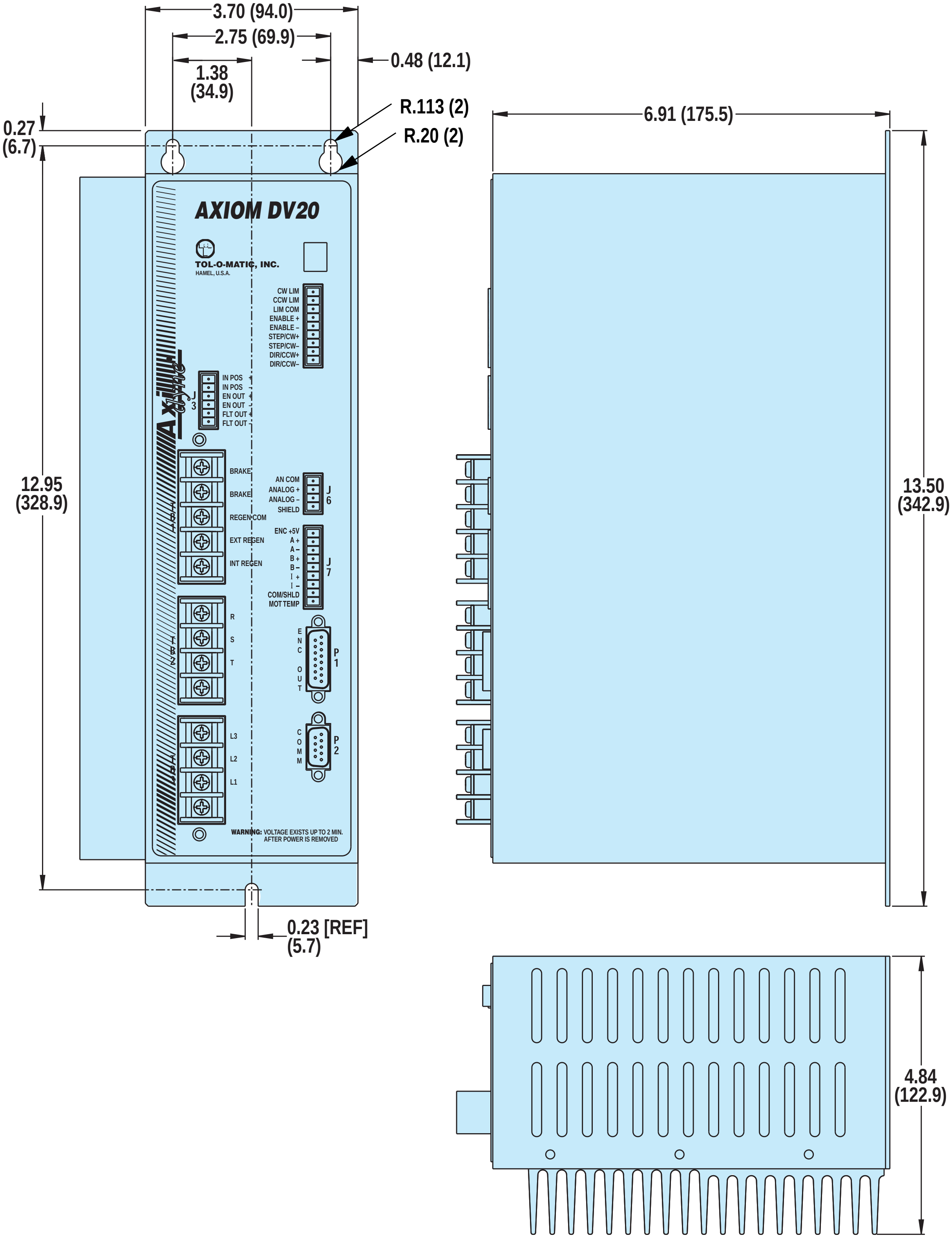
Axiom DV Drive
- Dimensions

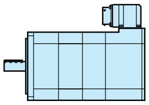
Unless otherwise noted, all dimensions shown are in inches (Dimensions in parenthesis are in millimeters)

Axiom® DV Brushless Servo Drive

DIMENSIONS

AXIOM DV20, DV30





BRUSHLESS

Axiom DV Drive
- Dimensions

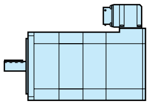
Axidyne® Axiom® PV Servo Drive/Controller

FEATURES

The Axiom PV sequential motion controller offers intuitive yet sophisticated functionality. The integrated PLC performs real-time scans on a separate thread and communicates through software rather than physical wiring. Windows®-based software utilizes a point and click sequential program and PLC ladder logic editor, allowing programming without learning code. The Axiom PV incorporates the same vector drive technology used in our Axiom DV drive. It is price competitive with integrated motion controllers/drives that do not offer PLC capability.

COMPATIBILITY:

SYSTEM:	BRUSHLESS
MOTORS:	MRV
DRIVE:	AXIOM PV
CONTROLLER:	AXIOM PV
INTERFACE:	JS SIT



AXIOM® PV FEATURES

PLC:

- Real-time scan supervisory function continuous from power-up
- Typical scan time of 2-4 milliseconds
- Ladder logic allows 175 rungs, 4 lines deep, 5 input operations, and an output coil
- Operations include: normally-open, normally-closed, logical invert, one-shot, output coil, latch, unlatch, timers and counters
- 64 character rung descriptor downloaded and uploaded with program
- Internal bit-flags for information transfer between controller and PLC

MOTION CONTROLLER:

- 1.5 axis (gearing to auxiliary axis)
- Commands include: absolute, incremental and velocity moves, branch to labels, subroutine calls, repeat loops, time delays, wait on conditions/inputs, output/flag control and parameter value changes including torque limit, following error, position band, follower gear ratio, and maximum velocity
- Event triggering based on intermediate positions
- Motion pause and resume
- Comment lines and labels down-loaded and uploaded with program

DRIVE:

- PV series drives use space vector commutation providing better bus voltage utilization than traditional sine drives for improved speed/torque curves
- Flux vector current control provides accurate high bandwidth control of torque producing current for better efficiency and more torque over the full speed range than with traditional sine drives
- Drives MRV series brushless servo motors or can be configured for customer specified linear or rotary 3-phase brushless servo motors
- Autophasing eliminates the need for Hall sensors in motors
- Drive enable input

GENERAL:

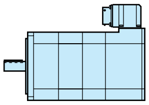
- Modbus RTU and ASCII interface
- Pluggable screw terminal connectors eliminate the need for special connectors and secondary breakout terminal strips
- Short circuit, over current and over voltage protection prevents drive damage
- 25W or 50W internal regeneration
- External regeneration connections
- CW/CCW travel limit inputs
- Fault, enabled, and in-position outputs
- 3A brake relay
- 3 second peak ratings

Axiom® PV Servo Drive/Controller

SPECIFICATIONS

AXIOM® PV SPECIFICATIONS

SPECIFICATIONS	**Axiom® PV Series Drives**		
Power	**PV10**	**PV20**	**PV30**
Peak Output Current:	10 Amps	20 Amps	30 Amps
Continuous Output Current:	5 Amps	10 Amps	15 Amps
Continuous Output Power:	1.4 kW	2.8 kW	4.2 kW
Input Voltage:	95 Vac -250 Vac 1Ø; 95 Vac - 250 Vac 3Ø (voltage range is switch selectable)		
Input Frequency:	47Hz - 63Hz		
User Programming			
Language/Programming Environment:	Tol-O-Motion™ windows-based software with point and click sequential program and PLC ladder logic editors		
Firmware Field Upgradeable:	YES		
User Program Storage Capacity:	500 lines of graphic-based, high-level sequential motion and control instructions with unlimited subroutine calls.		
PLC			
Connection/Capabilities:	Internal PLC with typical real-time scan of 2-4 msec, 10-12 msec for programs of maximum capacity; 15 inputs		
Interface			
Interfaces supported:	Modbus RTU ASCII		
Inputs/Outputs			
General-Purpose Digital Inputs:	15 optically isolated 5-25 Vdc		
Inputs/Outputs:	Sinking/sourcing selectable		
General-Purpose Digital Outputs:	8 optically isolated, 5-25 Vdc, 20 mA maximum		
Communications:	Serial: RS-232, 19,200 baud rate		
Motor Feedback			
Input Modes:	Incremental with index		
Maximum Input Frequency:	4 MHz (post-quadrature)		
Commutation Startup:	Auto-phase - no Hall sensors required		
Connectors			
Auxiliary Feedback, I/O, Analog I/O:	Wire trap screw terminals		
Motor Feedback:	Wire trap screw terminals		
Serial Port:	9-pin D-sub		
Main AC, Motor Power and DC Bus:	Screw terminal block		
Approvals:	UL, CUL, CE		
Environmental			
Storage Temperature:	-40°C to 70°C (-40°F to 158°F)		
Operating Temperature:	0°C to 50°C (32°F to 126°F)		
Humidity:	5% to 95% noncondensing		
Weight	PV10	PV20	PV30
	8.5 lbs (3.85 kg)	12.5 lbs (5.66 kg)	12.5 lbs (5.66 kg)



BRUSHLESS

Axiom PV Drive/Controller

- Specifications

Axiom® PV Servo Drive/Controller

CONNECTORS

AXIOM® PV CONNECTORS

TB1 - BRAKE/REGEN

1 - Brake	2 - Brake
3 - Regen Com	4 - External Regen
5 - Internal Regen	

TB2 - MOTOR

1 - Motor R	2 - Motor S
3 - Motor T	4 - Motor Ground

TB3 - AC POWER

1 - L3	2 - L2
3 - L1	4 - Ground

J1 - Outputs

1 - Output 1 +	2 - Output 1 -
3 - Output 2 +	4 - Output 2 -
5 - Output 3 +	6 - Output 3 -

J2 - OUTPUTS

1 - +24Vdc	2 - 24Vdc Return
3 - Output 4 +	4 - Output 4 -
5 - Output 5 +	6 - Output 5 -

J3 - OUTPUTS

1 - Output 6 +	2 - Output 6 -
3 - Output 7 +	4 - Output 7 -
5 - Output 8 +	6 - Output 8 -

J4 - INPUTS

1 - +24Vdc	2 - 24Vdc Return
3 - Com 1 - 6	4 - Input 1
5 - Input 2	6 - Input 3
7 - Input 4	8 - Input 5
9 - Input 6	

J5 - INPUTS

1 - +24Vdc	2 - 24Vdc Return
3 - Com 7 - 12	4 - Input 7
5 - Input 8	6 - Input 9
7 - Input 10	8 - Input 11
9 - Input 12	

J6 - INPUTS

1 - Com 13 - 15	2 - Input 13
3 - Input 14	4 - Input 15

J7 - MOTOR ENCODER

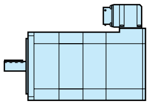
1 - Encoder +5V	2 - A +
3 - A -	4 - B +
5 - B -	6 - I +
7 - I -	8 - Com/Shld
9 - Motor Temp	

P1 - Buffered encoder out/auxiliary encoder

1 - +5V Encoder	2 - Aux Encoder A +
3 - Aux Encoder A -	4 - Aux Encoder B +
5 - Aux Encoder B -	6 - Aux Encoder I +
7 - Aux Encoder I -	8 - Encoder Common
9 - Motor Encoder Out A +	
10- Motor Encoder Out A -	
11- Motor Encoder Out B +	
12- Motor Encoder Out B -	
13- Motor Encoder Out I +	
14- Motor Encoder Out I -	
15- Reserved	

P2 - COMMUNICATIONS

1 - Reserved	2 - RS-232 TX
3 - RS-232 RX	4 - Reserved
5 - Common	6 - Reserved
7 - Reserved	8 - Reserved
9 - +5Vdc (30mA Max.)	



BRUSHLESS

Axiom PV Drive/Controller

- Connectors

Axidyne® Axiom® PV Servo Drive/Controller

PLC / Sequential program editors

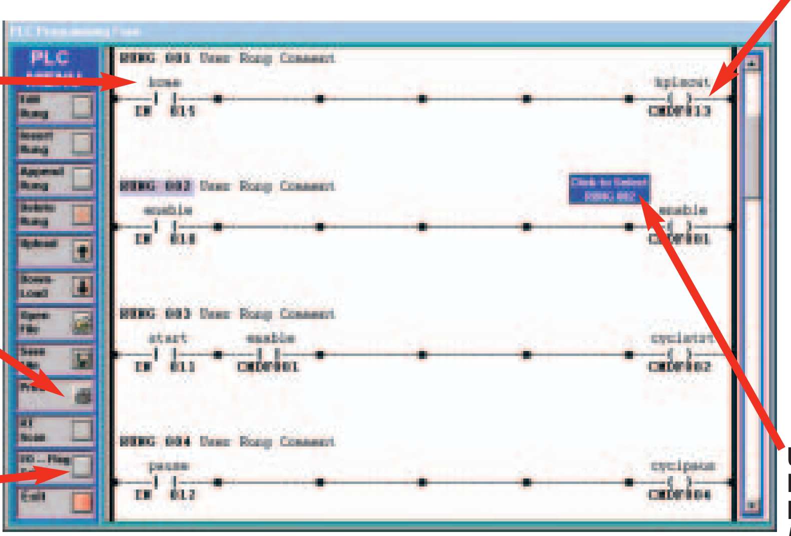
Axiom® PV set-up and configuration software has a similar look and feel to the Axiom DV software. A configuration option for motor selection and related parameters is included, along with a tuning and diagnostic mode. Help menus and control loop description information can be accessed from the main menu.

The Axiom PV also includes a point and click sequential program and PLC ladder logic editor. Instructions include incremental and absolute motion commands, branching (conditional and unconditional), subroutine calls, repeat loops, I/O control, time delays, etc. Use the PLC editor to enter and edit PLC programs, which run using an independent scan. The PLC program accesses all 15 inputs and 8 outputs of the Axiom PV, including general purpose and dedicated internal flags.

Both of these editors utilize easy icon/text driven selections, making the creation of motion profiles a snap (no code memorization required).

AXIOM® PV PLC EDITOR

The PLC Editor main menu allows user access to all editing functions along with a 175 rung ladder display. Rungs can be inserted at any point in the program and are easily edited by simply double-clicking with the mouse and selecting the desired functions from subsequent menus. The PLC program's real-time scan is continuous upon power-up and ranges from 2-4 milliseconds for a typical application, with 10-12 milliseconds for a maximum-length program.



ALL USER COMMENTS ARE STORED WITH THE PLC PROGRAM WHEN DOWNLOADED TO THE AXIOM PV.

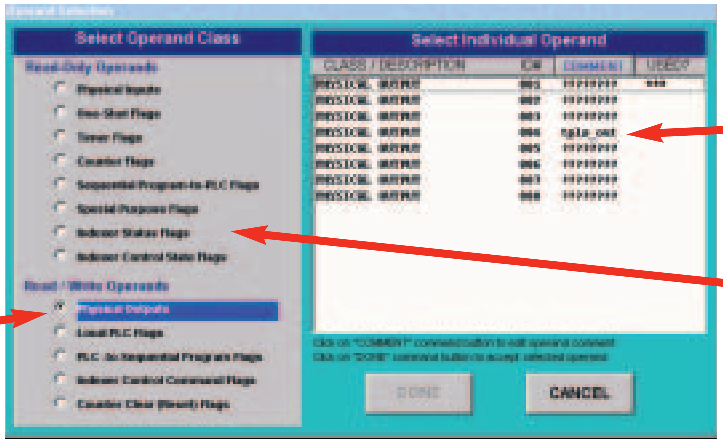
COMPLETE LADDER LISTING ALONG WITH I/O FLAGS CAN BE PRINTED OUT FOR REFERENCE.

REAL-TIME SCAN FUNCTION CONNECTS TO AXIOM PV AND MONITORS LOGICAL STATE OF ALL I/O AND FLAGS IN PLC PROGRAM.

UP TO 500 LINES OF GRAPHIC-BASED, HIGH-LEVEL SEQUENTIAL MOTION AND CONTROL INSTRUCTIONS, WITH UNLIMITED SUBROUTINE CALLS.

EACH RUNG CAN BE 4 LINES DEEP AND 5 INPUT OPERATIONS IN WIDTH, PLUS THE OUTPUT COIL.

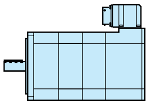
UP TO 64 CHARACTERS DESCRIPTION FOR EACH RUNG FUNCTION AND 8 CHARACTERS FOR OPERAND COMMENTS.



OPERANDS ARE EASILY SELECTED WITH USER COMMENTS AND "IN-USE" DESIGNATION DISPLAYS.

OPERATIONS SUPPORTED INCLUDE: NORMALLY-OPEN, NORMALLY-CLOSED, LOGICAL INVERT, ONE-SHOT, OUTPUT COIL, LATCH, UNLATCH, TIMERS, AND COUNTERS.

OPERANDS ARE EASILY SELECTED WITH USER COMMENTS AND "IN-USE" DESIGNATION DISPLAYS.



BRUSHLESS

Axiom PV Drive/Controller

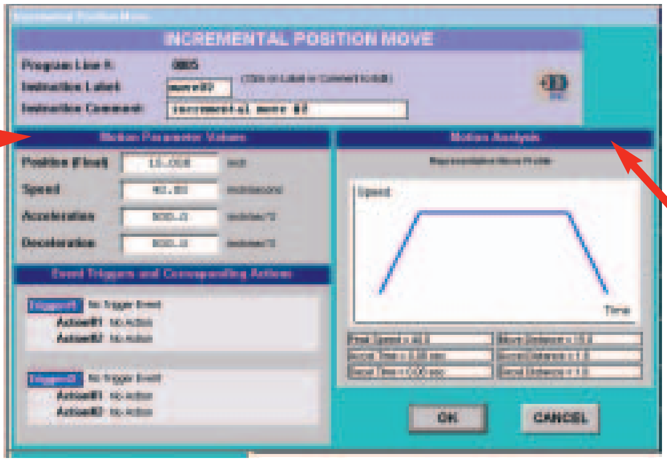
- PLC / sequential program editors

Axiom® PV Servo Drive/Controller

PLC / Sequential program editors

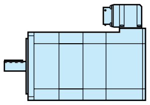
AXIOM® PV SEQUENTIAL PROGRAM EDITOR

The Sequential Editor main menu provides easy access to all essential program and display functions. Using a series of menus, the program guides the user through instruction selection. The Incremental Position Move window allows two separate trigger moves to be defined based on incremental position reached, physical input transition or flag from the PLC. Two actions can be commanded for each trigger event including torque limit or velocity change, output control or flag passing to PLC. This functionality allows an almost limitless combination of functions associated with a single move, while the PLC facilitates real-time control.



ENTERED MOTION PARAMETERS INSTANTLY UPDATE MOTION PROFILE TO SHOW MOVE TRAJECTORY

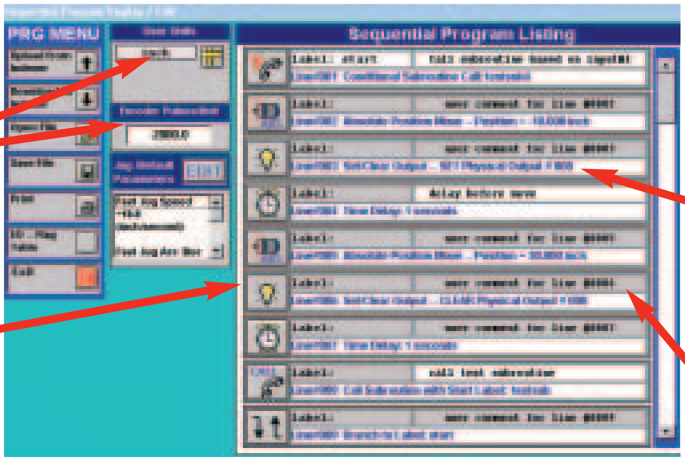
ENTERED MOTION PARAMETERS INSTANTLY UPDATE MOTION PROFILE TO SHOW MOVE TRAJECTORY



BRUSHLESS

Axiom PV Drive/Controller

- PLC / sequential program editors

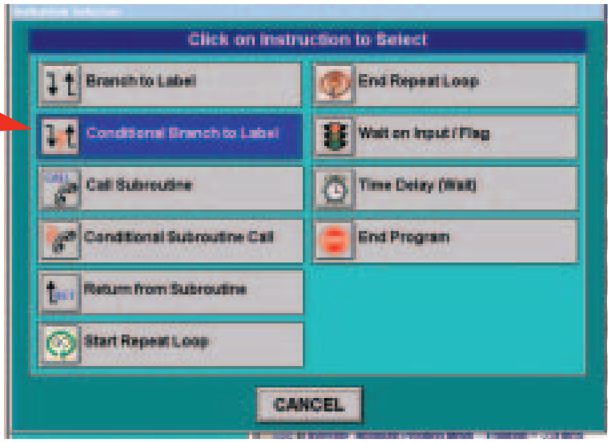


DECIMAL PRECISION USER UNITS AND TWO JOG SPEEDS.

CLICK DESIRED AREA OF DISPLAY TO EDIT

ALL USER COMMENTS AND LABELS ARE STORED WITH THE PROGRAM WHEN DOWNLOADED TO THE AXIOM PV.

EACH INSTRUCTION INCLUDES AN 8 CHARACTER LABEL USED FOR BRANCHING, SUBROUTINE CALL DESTINATIONS AND A 32 CHARACTER USER COMMENT.

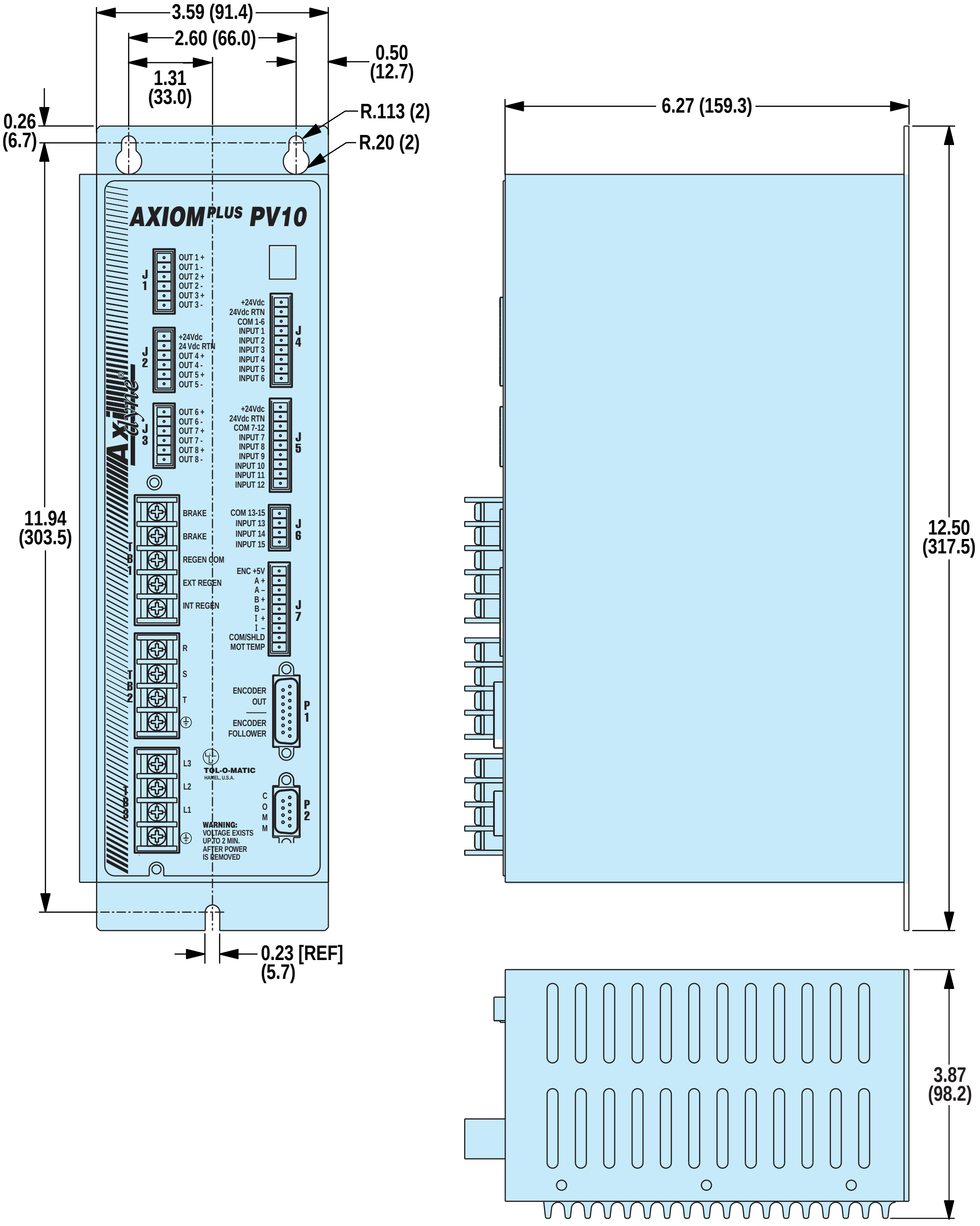


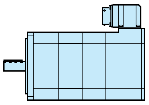
SERIES OF INSTRUCTION MENUS MAKE EASY SELECTION OF PROGRAM CONTROL, MOTION COMMANDS, ETC.

Axiom® PV Servo Drive/Controller

DIMENSIONS

AXIOM PV10





BRUSHLESS

Axiom PV Drive/Controller

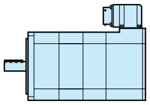
- Dimensions

Unless otherwise noted, all dimensions shown are in inches (Dimensions in parenthesis are in millimeters)

Axiom® PV Servo Drive/Controller

DIMENSIONS

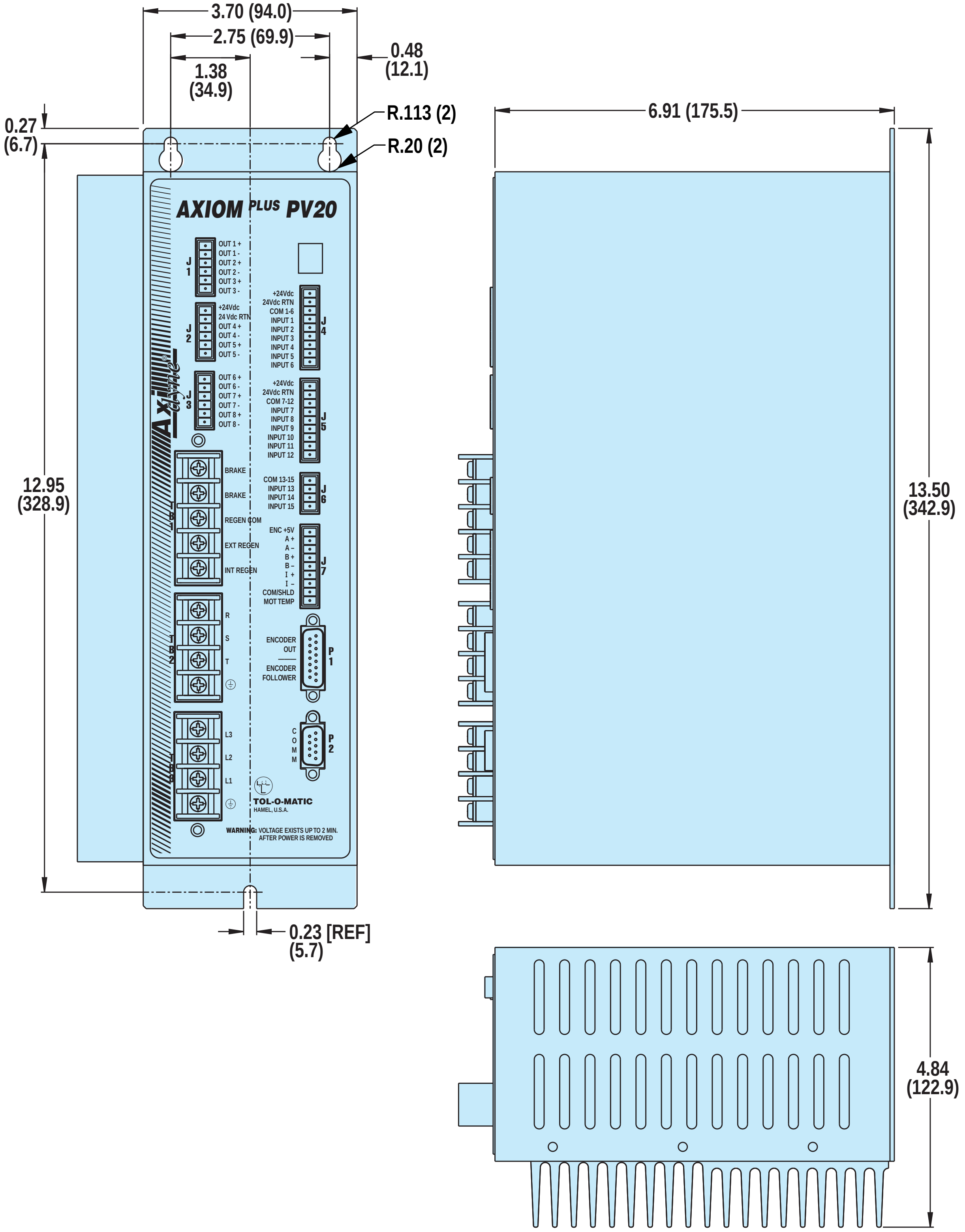
AXIOM PV20, PV30



BRUSHLESS

Axiom PV Drive/Controller

- Dimensions



Products discontinued August 01, 2006:
SSC Multi-Axis Controller
Contact Tol-O-Matic for repair parts

Axidyne® SSC Multi-axis Servo/Stepper Controller

FEATURES

COMPATIBILITY:
SYSTEM: BRUSHLESS
MOTORS: MRV
DRIVE: AXIOM DV
CONTROLLER: SSC
INTERFACE: JS
SIT

COMPATIBILITY:
SYSTEM: STEPPER
MOTORS: MRS
DRIVE: MSD
CONTROLLER: SSC
INTERFACE: JS
SIT

COMPATIBILITY:
SYSTEM: BRUSHED DC
MOTORS: MRB
DRIVE: AXIOM DB
CONTROLLER: SSC
INTERFACE: JS
SIT

The SSC is a high-performance, state-of-the-art motion controller designed for stand-alone operation. This cost effective controller uses a 32-bit microprocessor, a sub-micron gate array, and Tol-O-Motion SSC software, to provide DSP performance without sacrificing ease of use.

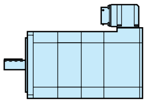
Available with up to 4 axes per unit, purchase only the number of axes required. It can simultaneously control stepper and /or servo systems.

Designed to solve complex motion problems with superior precision, the SSC can be used for applications requiring jogging, vector positioning of multi-axis, 2-dimensional linear or circular interpolation, contouring and electronic gearing.

With the Tol-O-Motion SSC software there is no need to learn programming language. Complex motion control is made easy with an interface that streamlines the entire programming process from setup to execution.

SSC FEATURES

- High performance motion control packaged in an industrial enclosure
- Uses a 32-bit specialized microcomputer and custom, submicron gate array for highest performance and speed
- Up to 4 axes per unit — up to 8 units can be daisy-chained
- 125 µsec per axis servo update rate for high bandwidth
- Controls servo motors and/or step motors
- Sophisticated PID filter with velocity and acceleration feed forward for optimum precision
- 16 bit DAC for fine resolution control
- 256K RAM memory for holding and running active program up to 1000 lines x 80 characters
- 4M EEPROM memory for non volatile storage of custom application programs, parameters and arrays (8000 array elements x 30 arrays) — permits stand-alone operation
- Multitasking feature permits simultaneous execution of four independent applications programs
- Programmable acceleration and deceleration with profile smoothing to eliminate jerk
- Continuous vector feed of infinite number of linear and arc segments for smooth motion
- Selectable linear scale simplifies linear motion programming
- Contour mode for profiling along computer generated paths such as parabolic or spherical profiles
- Performs any motion task including jogging, point-to-point positioning, linear and circular interpolation, electronic gearing, cam and contouring
- Dedicated opto-isolated inputs for home, abort, forward and reverse limits — noise immune
- Position feedback for each axis can be from analog signal or encoder
- Auxiliary encoder inputs and dual-loop damping — ideal for backlash compensation
- Programmable event triggers for monitoring elapsed time, position, speed, and motion complete
- I/O functions, timers, and logic functions for executing PLC tasks
- 254 symbolic variables and 8000 element array space for data storage
- Internal, universal switching power supply for direct connection to AC outlet (115V or 230V)
- IDC connectors on front panel connect to DIN rail mounted screw terminal breakouts included
- Additional I/O available on request



Products discontinued August 01, 2006:
SSC Multi-Axis Controller
Contact Tol-O-Matic for repair parts

Axidyne® SSC Multi-axis Servo/Stepper Controller

SPECIFICATIONS

SSC SPECIFICATIONS

Performance

Servo Loop Cycle Time:	SSC 1: 250 µsec; SSC 2: 375 µsec SSC 3: 500 µsec; SSC 4: 500 µsec
Block Execution Time:	In contour mode, up to 1000 blocks (moves)/sec with full trajectory calculation
Position Accuracy:	±1 quadrature count
Velocity Accuracy:	Long-term: phase-locked, better than 0.003% Short-term: system dependent
Synchronization:	All axes in the same unit are perfectly synchronized and share the same servo cycle.
Position Capture Accuracy:	25 µsec with opto-isolation; 1 µsec if by-pass opto-isolation.

Parameter Ranges

Position Range:	±2,147,483,647 counts/move; automatic rollover; no limit in jog or vector modes.
Velocity Range:	Up to 8,000,000 counts/sec
Acceleration/deceleration:	1,024 to 67,107,840 c/sec2
Error Limit:	±32,767 counts
Gear Ratio:	±127.9999
Filter Constants:	Kp: 0 to 1023.875 Kd: 0 to 4095.875 Ki: 0 to 2047.875
Motor Command Resolution:	16-bits or .0003 V
Step Motor Control Mode:	Full, half or microstep
Step Pulse Frequency:	2,000,000 pulse/sec
Number of Variables:	254
Array Memory Size:	8000 elements in up to 30 arrays
Program Memory Size:	1000 lines x 80 characters

Mechanical

Dimensions:	13" high x 2.5" wide x 6.6" deep
Weight:	6 lbs.

Inputs/Outputs

Feedback:	Two channels of A/B quadrature per axis with third channel for index. In servo mode, includes auxiliary encoder inputs for each axis. Single ended or differential. Can be configured for quadrature, pulse and direction, or from analog inputs.
General Purpose Inputs:	8 opto-isolated inputs
General Purpose Outputs:	8 TTL outputs
General Purpose Analog Inputs:	7, ±10 V; 12-bit resolution (16-bit optional)
Dedicated Inputs per Axis:	Forward and reverse limits, home.
Dedicated Outputs per Axis:	Analog motor command, pulse and direction, amplifier enable

Available Power to Drive External Devices

+5 V 1.5 Amp	+12 V 750 mA	-12 V 200 mA

Environment

Operating Temperature:	32° to 158° F (0° to 70° C)

Communication Interface

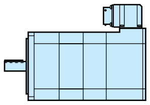
Selectable Baud Rate:	300, 1200, 4800, 9600, 19200, 38400. Handshake mode available.

I/O Description (Inputs)

Encoder, A+, B+:	Position feedback from incremental encoder with two channels in quadrature. The encoder can be (±12V) or TTL. Note: Encoders that produce output in a pulse and direction format can also be used.
Encoder Index I+:	Once-per-revolution encoder pulse; used in Homing sequence or Find Index command. Minimum index pulse width is 120 nsec.
Encoder, A-, B-, I-:	Optional differential inputs from encoder; used for enhanced noise immunity.
Auxiliary Encoder:	Inputs for additional encoder; used when encoders on both the motor and the load are required.
Abort #:	Stops commanded motion instantly and also aborts application program.
Reset #:	System reset.
Forward and Reverse Limit Switch #:	When active, inhibits motion in forward or reverse direction and also causes the limit switch subroutine #LIMSWI to execute.
Home Switch #:	Input for Homing (HM) and Find Edge (FE) instructions.
Input 1 - Input 8#:	Uncommitted inputs; can be defined by the user to trigger events or interrupt program.
Latch#:	High-speed position latch to capture axis position within 25 µsec (bypass opto-isolation for .1 µsec capture). AL command arms latch. Input 1, 2, 3, 4 latches X, Y, Z, W respectively.
Analog 1 - Analog 7:	Analog inputs that can be connected to external analog signals such as force or pressure transducers. Can also be used for position feedback. 12-bit resolution ADC for ±10 V input.

I/O Description (Outputs)

Analog Motor Command:	±10 V range signal for driving servo amplifiers; 16-bit resolution or .0003 V, 3 mA.
Amp enable:	Signal to disable and enable an amplifier. Amp enable goes low when a motor-off condition occurs. For step motors, this pin provides for reduced current when low.
Step Out:	Pulses for input to a step motor driver. The pulses can be either active low or high. Upon Reset, the output will be low if the SM jumper is on, Tristate if off. The STEP OUT pin also provides the PWM signal for servo motors.
Direction:	Used with the STEP OUT signal to give direction to step motors or servo motors in the sign magnitude mode.
Error:	The signal goes low when the position error on any axis exceeds the limit specified by the error command, ER.
Output 1 - Output 8:	These 8 TTL outputs are uncommitted and can be designated by the user to toggle relays and trigger external events. The output lines are toggled by Set Bit (SB), Clear Bit (CB), Define Bit (OB), and OP instructions. Upon reset these signals will be low.



Products discontinued August 01, 2006:
SSC Multi-Axis Controller
Contact Tol-O-Matic for repair parts

Axidyne® SSC Multi-axis Servo/Stepper Controller

CONNECTORS

SSC CONNECTORS

SSC J2 Main; 60-Pin IDC;

1 Ground	2 5 V
3 Error	4 Reset
5 Switch Common	6 Forward Limit - X
7 Reverse Limit - X	8 Home - X
9 Forward Limit - Y	10 Reverse Limit - Y
11 Home - Y	12 Forward Limit - Z
13 Reverse Limit - Z	14 Home - Z
15 Forward Limit - W	16 Reverse Limit - W
17 Home - W	18 Output 1
19 Input Common	20 Latch X or Input 1
21 Latch Y or Input 2	22 Latch Z or Input 3
23 Latch W or Input 4	24 Abort Input
25 Motor Command X	26 Amp Enable X
27 Motor Command Y	28 Amp Enable Y
29 Motor Command Z	30 Amp Enable Z
31 Motor Command W	32 Amp Enable W

33 A+ X	34 A- X	35 B+ X	36 B- X
37 I+ X	38 I- X	39 A+ Y	40 A- Y
41 B+ Y	42 B- Y	43 I+ Y	44 I- Y
45 A+ Z	46 A- Z	47 B+ Z	48 B- Z
49 I+ Z	50 I- Z	51 A+ W	52 A- W
53 B+ W	54 B- W	55 I+ W	56 I- W
57 +12 V	58 -12 V	59 5 V	60 Ground

SSC J5 General I/O; 26-Pin IDC;

1 Analog 1	2 Analog 2
3 Analog 3	4 Analog 4
5 Analog 5	6 Analog 6
7 Analog 7	8 Ground
9 5 V	10 Output 1
11 Output 2	12 Output 3
13 Output 4	14 Output 5
15 Output 6	16 Output 7
17 Output 8	18 Input 8
19 Input 7	20 Input 6
21 Input 5	22 Input 4 (Latch W)
23 Input 3 (Latch W)	24 Input 2 (Latch W)
25 Input 1 (Latch W)	26 Input Common (Isolated 5 V)

SSC J3 Auxiliary Encoder; 20-Pin IDC;

1 Sample Clock	2 Reserved
3 B- Aux W	4 B+ Aux W
5 A- Aux W	6 A+ Aux W
7 B- Aux Z	8 B+ Aux Z
9 A- Aux Z	10 A+ Aux Z
11 B- Aux Y	12 B+ Aux Y
13 A- Aux Y	14 A+ Aux Y
15 B- Aux X	16 B+ Aux X
17 A- Aux X	18 A+ Aux X
19 5 V	20 Ground

SSC J4 Driver; 20-Pin IDC;

1 Motor Command X	2 Amp Enable X
3 PWM X/Step X	4 Sign X/Dir X
5	6 Motor Command Y
7 Amp Enable Y	8 PWM Y/Step Y
9 Sign Y/Dir Y	10
11 Motor Command Z	12 Amp Enable Z
13 PWM Z/Step Z	14 Sign Z/Dir Z
15 5 V	16 Motor Command W
17 Amp Enable W	18 PWM W/Step W
19 Sign W/Dir W	20 Ground

AC Power INputs; 4-PIN Detachable Screw Type:

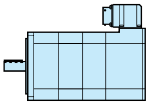
Hot	Connects to 110 or 220 AC
NC	No Connect
Neutral	Return for AC
Earth	Chassis input

RS232 - Main Port; 9-PIN:

1 CTS - output	2 Transmit data
3 Receive data	4 RTS - input
5 Ground	6 CTS - output
7 RTS - input	8 CTS - output
9 5 V	

RS232 - Auxiliary Port; 9-PIN:

1 CTS - input	2 Receive data -
3 Transmit data	4 RTS - output
5 Ground	6 CTS - input
7 RTS - output	8 CTS - input
9 5 V	



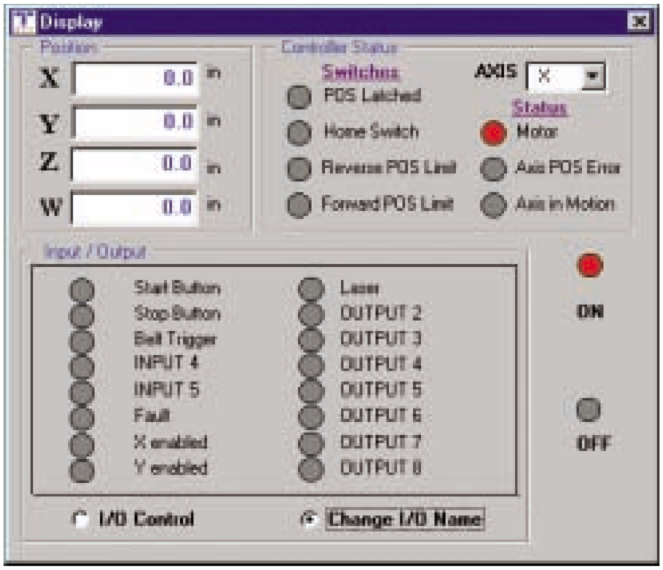
**Products discontinued August 01, 2006:
SSC Multi-Axis Controller
Contact Tol-O-Matic for repair parts**

Axidyne® SSC Multi-axis Servo/Stepper Controller

PROGRAMMING SOFTWARE

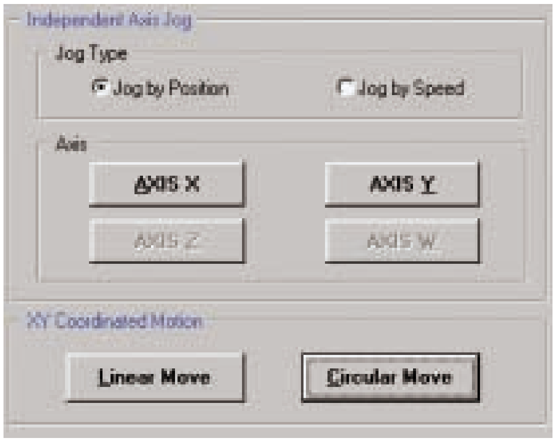
SSC PROGRAMMING SOFTWARE

Programming is accomplished through RS232 connection to a PC running Windows 95, 98, NT, 2000 or XP. Visual Basic panels guide the user through the complete setup process including communications and axis configuration. The user can then use other program options including Display, Jog, Teach, Programmer, Tune and Data Acquisition.



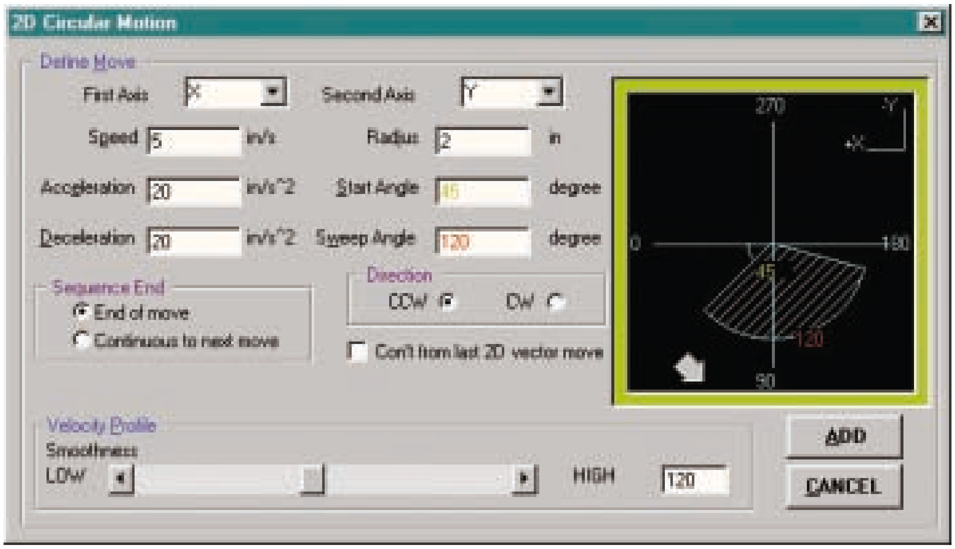
X 0.0 in
Y 0.0 in
Z 0.0 in
W 0.0 in
AXIS X
○ I/O Control ● Change I/O Name

Display
The Display panel (shown above) allows the user to identify axis locations and status faults, limits, and I/O.



● Jog by Position ○ Jog by Speed

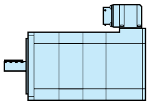
Jog
The Jog panels allow the user to easily setup independent motion or coordinated motion.



First Axis X
Second Axis Y
Speed 5 in/s
Radius 2 in
Acceleration 20 in/s^2
Start Angle 45 degree
Deceleration 20 in/s^2
Sweep Angle 120 degree
Sequence End
● End of move
○ Continuous to next move
Direction
CCW ● CW ○
☐ Con't from last 2D vector move
LOW HIGH 120

CIRCULAR MOTION

The added feature of 2-dimensional circular programming, assists you in selecting start and sweep angles.



BRUSHLESS

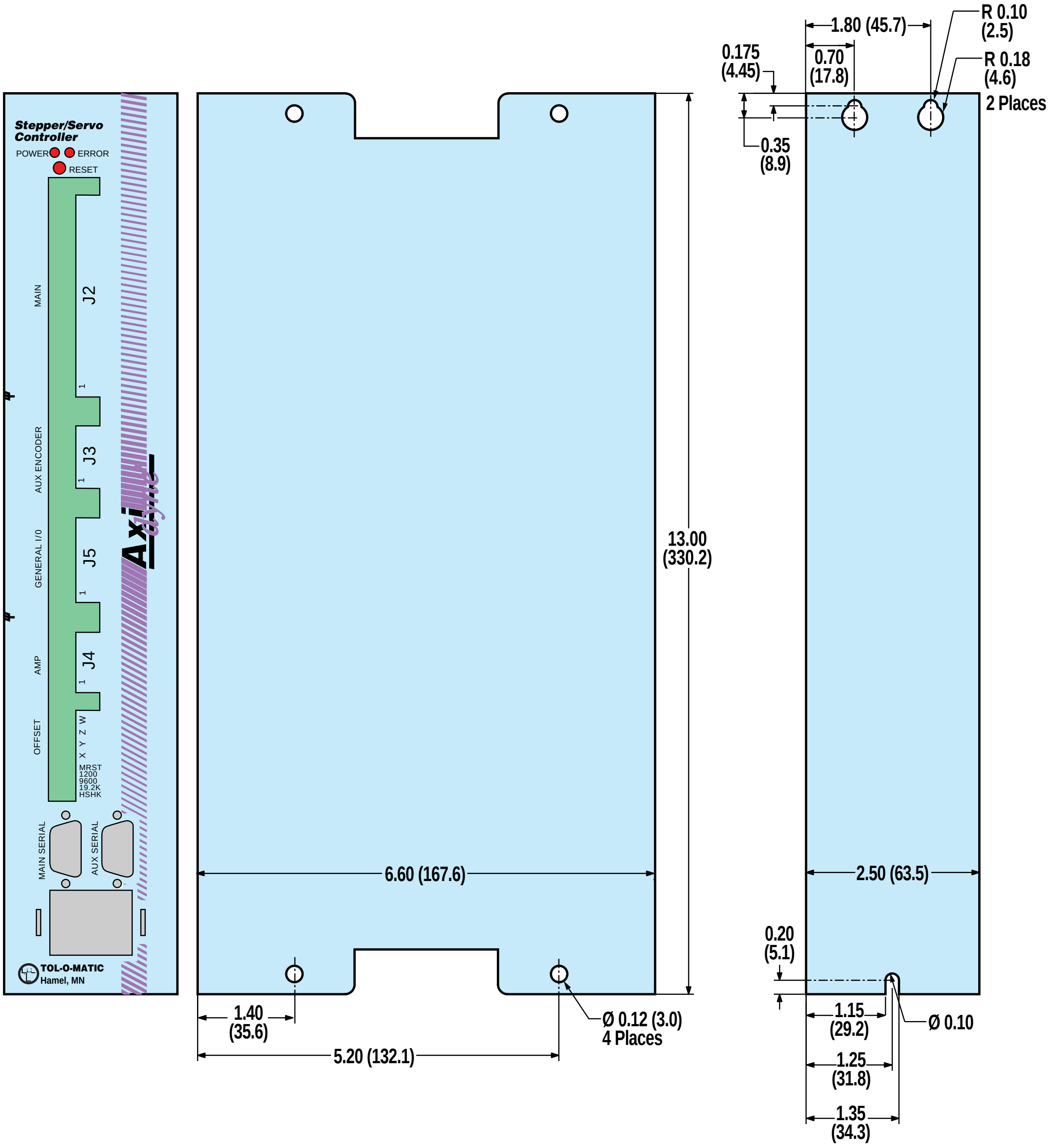
SSC Servo/Stepper Controller
- Programming

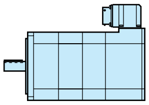
Products discontinued August 01, 2006:
SSC Multi-Axis Controller
Contact Tol-O-Matic for repair parts

Axidyne® SSC Multi-axis Servo/Stepper Controller

DIMENSIONS

SSC (MULTI-AXIS SERVO/STEPPER CONTROLLER)





BRUSHLESS

SSC
Servo/Stepper
Controller
- Dimensions

Unless otherwise noted, all dimensions shown are in inches (Dimensions in parenthesis are in millimeters)

Products discontinued August 01, 2006:
SSC Multi-Axis Controller,
Stepper Motors & Control Products,
Brushed DC Motors & Control Products
Contact Tol-O-Matic for repair parts

Axidyne® JS – Joystick User Interface

SPECIFICATIONS AND DIMENSIONS

COMPATIBILITY:
SYSTEM: BRUSHLESS
MOTORS: MRV
DRIVE: AXIOM DV
CONTROLLER: SSC
INTERFACE: JS
SIT

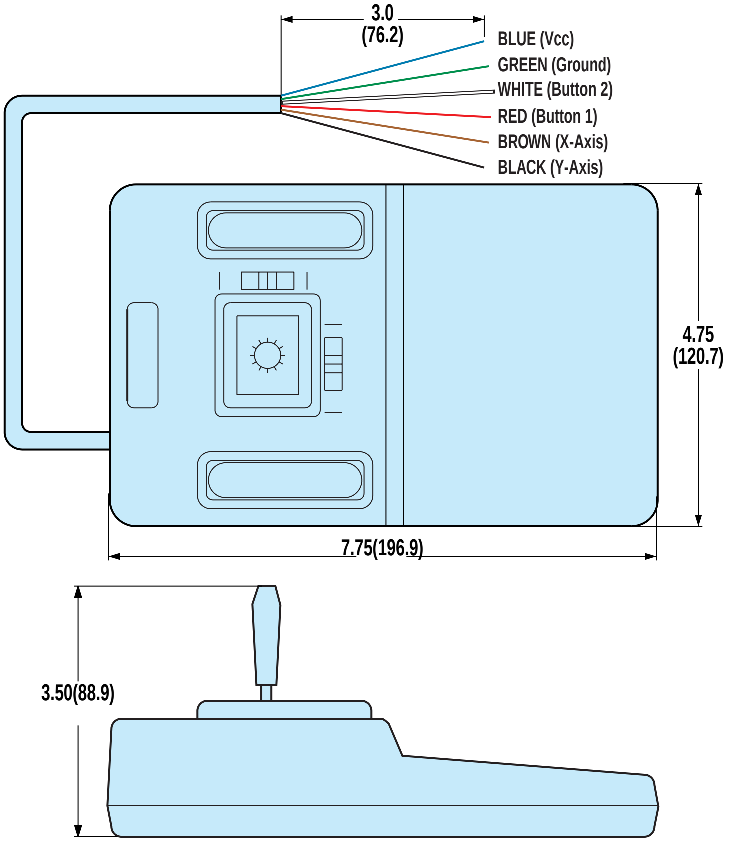
COMPATIBILITY:
SYSTEM: STEPPER
MOTORS: MRS
DRIVE: MSD
CONTROLLER: SSC
INTERFACE: JS
SIT

COMPATIBILITY:
SYSTEM: BRUSHED DC
MOTORS: MRB
DRIVE: AXIOM DB
CONTROLLER: SSC
INTERFACE: JS
SIT

For simple setup of the SSC controller the JS joystick provides 2-axis manipulation. Used with the Joystick Teach mode of the Tol-O-Motion SSC software, moves can be made with velocity control, and then stored using a separate button integrated into the joystick housing.

SPECIFICATIONS	JS Joystick
Joystick Travel	27° from design center in all directions
Mechanical Life Cycle	5 million (minimum)
Trim Movement (Optional)	±7° (total trim 14°) for each axis
Main Ball Pivot	Precision ground stainless steel
Stick Shaft	3/16" brass plated
Potentiometers	Set at center of resistance
Potentiometer Calibration	Thumb tab provides up to 114° of potentiometer calibration
Return to Center Repeatability	±1%
Deflection Force	0.14 lbs. at 27° at 2-7/8" from pivot point
Switches	2 elongated push-button switches
Cable	Integrated 7' (2.1m) cable with strain relief

JS (JOYSTICK) DIMENSIONS



Unless otherwise noted, all dimensions shown are in inches (Dimensions in parenthesis are in millimeters)

Products discontinued August 01, 2006:
SSC Multi-Axis Controller,
Stepper Motors & Control Products,
Brushed DC Motors & Control Products
Contact Tol-O-Matic for repair parts

Axidyne® SIT – Hand-held, user interface

FEATURES AND DIMENSIONS

COMPATIBILITY:
SYSTEM: BRUSHLESS
MOTORS: MRV
DRIVE: AXIOM DV
CONTROLLER: SSC
INTERFACE: JS
SIT

COMPATIBILITY:
SYSTEM: STEPPER
MOTORS: MRS
DRIVE: MSD
CONTROLLER: SSC
INTERFACE: JS
SIT

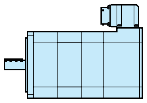
COMPATIBILITY:
SYSTEM: BRUSHED DC
MOTORS: MRB
DRIVE: AXIOM DB
CONTROLLER: SSC
INTERFACE: JS
SIT

For user interaction with the SSC 1-4 axis multi-function controllers the SIT hand held user interface provides flexibility and setup simplicity. The Tol-O-Motion SS software (included with the SSC 1-4 controllers) has a setup page for use with the SIT to allow the controller to status the user, or to prompt the user for information, eliminating the need for a PC following setup.

FEATURES:

- 45 key, alpha-numeric tactile keypad
- 4 row by 20 character LCD display
- Rugged, high impact ABS housing
- 7 foot (2.1m) RS232 cable with 9-pin “D” connector for connection to the SSC 1-4
- 5 Vdc power supplied from SSC 1-4 controller over RS232

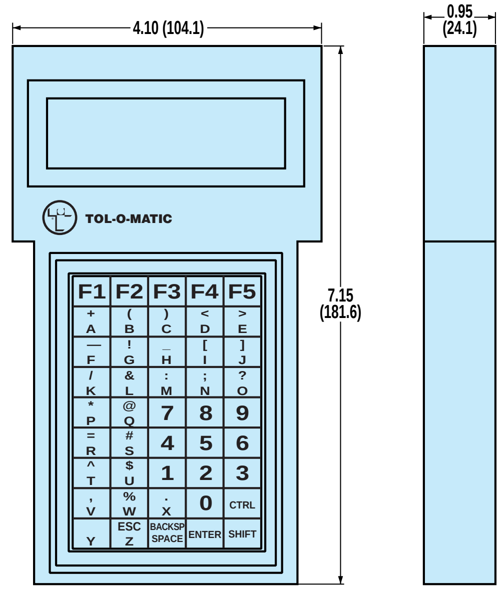
SPECIFICATIONS	JS Joystick
Weight	8.0 oz. (.23 Kg.)
Character Set	ASCII with upper case transmit, upper and lower case receive
Case	Molded, high impact ABS with retractable hanger
Keypad	15 user-programmable function keys
Display	Transreflective LCD with 5 by 7 character font
Power Requirements	30 mA maximum, regulated, 5 Vdc ±5% (Received through RS 232 cable)
Speaker	Audible key click, bell and alert
Storage Temperature	-4° F (-20° C) to 158° F (+70° C)
Operating Temperature	32°F (0° C) to 122° F (+50° C)
Relative Humidity	10% to 90% non-condensing



BRUSHLESS

SIT Hand-held
User Interface
- Features
- Specifications
- Dimensions

SIT (HAND-HELD INTERFACE)

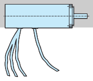


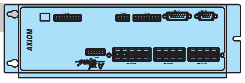
Axidyne® Brushless Servo System

CABLES

MRV MOTORS TO AXIOM DV DRIVE & AXIOM PV DRIVE/CONTROLLER

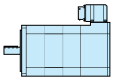
MRV11 **TO:** **AXIOM DV10, AXIOM PV10**

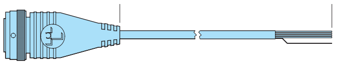


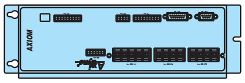


Config Code	Replacement Part Number	Included with Drive	Type	Description	Cable Length	Motor Size	CONNECTORS AT		Axiom DV/PV Size
							Motor	Axiom DV/PV 10	
–	–	YES	Power		18 in	All	Flying leads	Screw terminal	10
–	–	YES	Encoder		18 in	All	Flying leads	Screw terminal	10

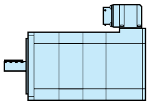
MRV21, MRV22, MRV23, MRV24
MRV31, MRV32, MRV33, MRV51 **TO:** **AXIOM DV10, AXIOM DV20, AXIOM DV30**
AXIOM PV10, AXIOM PV20, AXIOM PV30





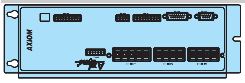


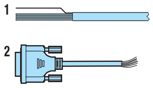
Config Code	Replacement Part Number	Included with Drive	Type	Description	Cable Length	Motor Size	CONNECTORS AT		Axiom DV/PV Size
							Motor	Axiom DV/PV 10	
CR6	3604-1190	Optional	Power		6m	21 to 24	MS	Screw terminal	10
CR15	3604-1191	Optional	Power		15m	21 to 24	MS	Screw terminal	10
CR6	3604-1192	Optional	Power		6m	31 to 33	MS	Screw terminal	20
CR15	3604-1193	Optional	Power		15m	31 to 33	MS	Screw terminal	20
CR6	3604-1194	Optional	Power		6m	31 to 33	MS	Screw terminal	30
CR15	3604-1195	Optional	Power		15m	31 to 33	MS	Screw terminal	30
CR6	3604-1196	Optional	Encoder		6m	All	MS	Screw terminal	All
CR15	3604-1197	Optional	Encoder		15m	All	MS	Screw terminal	All

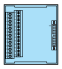


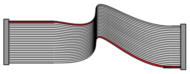
AXIOM DV DRIVE TO SSC CONTROLLER

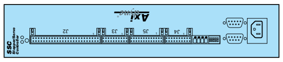
AXIOM DV10, AXIOM DV20, AXIOM DV30 **TO:** **SSC**







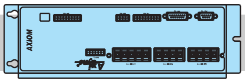


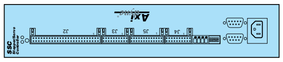


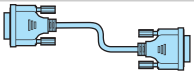
Config Code	Replacement Part Number	Included with SSC	Type	Description	Cable Length	Drive Sizes	CONNECTORS AT		SSC Size
							Drive	SSC	
–	3600-1347 3600-1342	YES YES	Main/Driver Signals	Ribbon Breakout	1m	All	Screw terminals [1]	IDC	All
–	3600-1346 3600-1341	YES YES	I/O	Ribbon Breakout	1m	All	Screw terminals [1]	IDC	All
–	3604-1213	YES	Controller Encoder	Encoder Feedback	3m	All	DB15 [2]	Screw terminals at breakout box	All

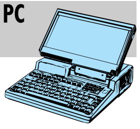
CONTROLLER TO IBM COMPATIBLE PC

AXIOM PV10, AXIOM PV20
AXIOM PV30 or SSC **TO:** **PC**









Config Code	Replacement Part Number	Included with SSC	Type	Description	Cable Length	Drive	CONNECTORS AT		PC Size
							SSC	PC	
CRZ	3600-1172	Optional	Comm		2m	AxiomPV	DB9	DB9	All
CRZ	3600-1172	Optional	Comm		2m	SSC	DB9	DB9	All

Products discontinued August 01, 2006:
SSC Multi-Axis Controller,
Stepper Motors & Control Products,
Brushed DC Motors & Control Products
Contact Tol-O-Matic for repair parts

Axidyne® Brushless Servo System
ORDERING

MOTOR STYLE, SIZE AND GEARHEAD REDUCTION **CONTROLLER** **CABLES, CONNECTIONS & INTERFACE**

MRV 31Y☐ GHJ30 PV☐☐☐ CR15 CRZ ☐☐☐ ☐☐☐

MOTOR TYPE

MRV	Brushless Servo Motor

MOTOR SIZE / DRIVE SIZE

MODEL	FRAME SIZE	STACK SIZE	DRIVE SIZE
11Y	17	1	Axiom DV10
21Y	23	1	Axiom DV10
22Y	23	2	Axiom DV10
23Y	23	3	Axiom DV10
24Y	23	4	Axiom DV10
31Y	34	1	Axiom DV10
31Z	34	1	Axiom DV20
32Y	34	2	Axiom DV20
32Z	34	2	Axiom DV30
33Y	34	3	Axiom DV20
33Z	34	3	Axiom DV30
51Y	56	1	Axiom DV30

Once motor type and frame size is selected, the appropriate adapter and couplers required are automatically chosen.

NO DRIVE OPTION

X	Replace Y or Z with X if motor drive is NOT required (do not put 'Y' or 'Z' in string)

NO MOTOR OPTION

XY*	Motor(s) supplied by customer, Tol-O-Matic to mount using standard hardware and couplers
XJ*	Motor(s) supplied and mounted by customer, Tol-O-Matic to furnish standard hardware and couplers

* NOTE: For XY and XJ options, a full end-face and shaft dimensional drawing must accompany the order for the actuator. Customer motors must be directly interchangeable with Tol-O-Matic motors.

GEARHEAD REDUCTIONS

(For In-line or Direct-Drive mounting configurations only)

MODEL	INPUT DIA.	MOTOR SIZE	REDUCTION RATIO
GHJ20	1/2-inch	23	5.5
GHJ21	1/2-inch	23	10
GHJ30	1/2-inch	34	5.5
GHJ31	1/2-inch	34	10

CONTROLLER OR DRIVE COMBINATION

SINGLE AXIS APPLICATIONS

PV	Axiom®Plus Controller/Drive (Drive size is determined by "Y" or "Z" in motor code)
SSC10	**Stepper/Servo Controller, 1 axis application

** A 15 pin D-sub 36" connector cable for each servo axis will be included with the SSC controller when ordered with Axiom drive

MULTI AXIS APPLICATIONS

2 Axis Application

	1st Axis	2nd Axis
SSC21	Servo	Stepper
SSC22	Servo	Servo

3 Axis Application

	1st Axis	2nd Axis	3rd Axis
SSC31	Servo	Stepper	Stepper
SSC32	Servo	Stepper	Servo
SSC33	Servo	Servo	Stepper
SSC34	Servo	Servo	Servo

4 Axis Application

	1st Axis	2nd Axis	3rd Axis	4th Axis
SSC41	Servo	Stepper	Stepper	Stepper
SSC42	Servo	Stepper	Stepper	Servo
SSC43	Servo	Stepper	Servo	Stepper
SSC44	Servo	Stepper	Servo	Servo
SSC45	Servo	Servo	Stepper	Stepper
SSC46	Servo	Servo	Stepper	Servo
SSC47	Servo	Servo	Servo	Stepper
SSC48	Servo	Servo	Servo	Servo

Product discontinued February 01, 2006:
B3B/M3B Belt Drive Actuator
>> REPLACED WITH B3W/M3W <<
>> SEE BROCHURE 3600-4148 <<
Contact Tol-O-Matic for repair parts

CABLES

FOR AXIOM DV OR AXIOM PV MUST SPECIFY ENCODER, POWER CABLE LENGTH

CR6	6-meter encoder cable, power cable
CR15	15-meter encoder cable, power cable

⚠ MRV11 motor has flying leads, special cables are not required.

FOR SSC CONTROLLERS

CRZ	If a 2-meter 9-pin RS232 cable is desired

⚠ If ordering with AXIOM drive, controller encoder cables are included for each axis.

Indicate if breakout terminal and ribbon cables are needed.

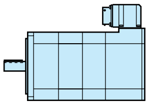
BON	No breakout terminals
BOY***	With breakout terminals

***BOY option includes:

- 60 pin/18" (457mm) ribbon cable & 60 pin breakout
- 26 pin/18" (457mm) ribbon cable & 26 pin breakout
- If any axis configured w/ step & direction output — 20 pin/18" (457mm) ribbon cable & 20 pin breakout

USER INTERFACE

SIT	Hand-held user interface
JS	Joy Stick



BRUSHLESS

System Ordering

TO ORDER ACTUATORS

- B3S/M3S SERIES (SEE PAGE C-30)
- B3B/M3B SERIES (SEE PAGE C-50)
- TKS SERIES (SEE PAGE C-81)
- TKB SERIES (SEE PAGE C-104)
- BCS/MCS SERIES (SEE PAGE C-128)
- SLS/MLS SERIES (SEE PAGE C-138)
- RSA/RSM SERIES (SEE PAGE D-53)
- GSA/GSM SERIES (SEE PAGE E-36)

⚠ ***Not all codes listed are compatible with all options.***

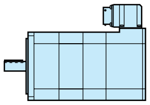
Use the Tol-O-Motion™ Sizing Software to determine available options and accessories based on your application requirements.

User manuals and software CD-ROM is included with any controller or drive ordered. Manuals and software are also available for download at www.tolomatic.com

Products discontinued August 01, 2006:
SSC Multi-Axis Controller,
Stepper Motors & Control Products,
Brushed DC Motors & Control Products
Contact Tol-O-Matic for repair parts

Axidyne® Brushless Servo System

FIELD RETROFIT ORDERING



*SSC 1-4 CONTROLLERS

Code	X-Axis	Y-Axis	Z-Axis	W-Axis	Part #
SSC10	Servo	-	-	-	3600-0210
SSC21	Servo	Stepper	-	-	3600-0221
SSC22	Servo	Servo	-	-	3600-0222
SSC31	Servo	Stepper	Stepper	-	3600-0231
SSC32	Servo	Stepper	Servo	-	3600-0232
SSC33	Servo	Servo	Stepper	-	3600-0233
SSC34	Servo	Servo	Servo	-	3600-0234
SSC41	Servo	Stepper	Stepper	Stepper	3600-0241
SSC42	Servo	Stepper	Stepper	Servo	3600-0242
SSC43	Servo	Stepper	Servo	Stepper	3600-0243
SSC44	Servo	Stepper	Servo	Servo	3600-0244
SSC45	Servo	Servo	Stepper	Stepper	3600-0245
SSC46	Servo	Servo	Stepper	Servo	3600-0246
SSC47	Servo	Servo	Servo	Stepper	3600-0247
SSC48	Servo	Servo	Servo	Servo	3600-0248

NOTE: Any axis of the SSC may be changed by the insertion or removal of a jumper, see SSC manual #3600-4608
*Includes user manual and software CD-ROM

*AXIOM PV CONTROLLER / DRIVE

Config. Code	Includes	Part #
PV10	Controller/Drive (order cables below)	3604-0008
PV20	Controller/Drive (order cables below)	3604-0009
PV30	Controller/Drive (order cables below)	3604-0010

*Includes user manual and software CD-ROM

*AXIOM DV DRIVE

Config. Code	Includes	Part #
DV10	Drive only (order cables below)	3604-0000
DV20	Drive only (order cables below)	3604-0001
DV30	Drive only (order cables below)	3604-0002
DB20 cables are included as motor flying leads		3604-0003

*Includes user manual and software CD-ROM

MRV BRUSHLESS SERVO MOTORS

Config. Code	Part #
MRV11**	3600-6239
MRV21	3600-6240
MRV22	3600-6241
MRV23	3600-6242
MRV24	3600-6243
MRV31	3600-6244
MRV32	3600-6245
MRV33	3600-6246
MRV51	3600-6247

** For RSA Rod Screw Actuators only

USER INTERFACES

Config. Code	Part #
SIT	3600-9161
JS	3600-9162

CABLES

Config Code	Item	Part #
	20 pin breakout	3600-1340
	26 pin breakout	3600-1341
	60 pin breakout	3600-1342
	20 pin ribbon cable	3600-1345
	26 pin ribbon cable	3600-1346
	60 pin ribbon cable	3600-1347
CRZ	RS232 Cable	3600-1172
	SSC Encoder cable	3604-1213
	RS232 - 9 Pin Adapter for MSS/MSD	3600-1186
	RS232 Cable Only for MSS/MSD	3600-1187
CR6 (DV10)	6m Motor Cable	3604-1190
CR6 (DV10)	6m Encoder Cable	3604-1196
CR15 (DV10)	15m Motor Cable	3604-1191
CR15 (Dv10)	15m Motor Cable	3604-1197
CR6 (DV20)	6m Motor Cable	3604-1192
CR6 (DV20)	6m Encoder Cable	3604-1196
CR15 (DV20)	15m Motor Cable	3604-1193
CR15 (DV20)	15m Encoder Cable	3604-1197
CR6 (DV30)	6m Motor Cable	3604-1194
CR6 (DV30 & MRV51)	6m Motor Cable	3604-1202
CR6 (DV30)	6m Encoder Cable	3604-1196
CR15 (DV30)	15m Motor Cable	3604-1195
CR15 (DV30 & MRV51)	15m Motor Cable	3604-1203
CR15 (DV30)	15m Encoder Cable	3604-1197

FIELD RETROFIT ORDERING
STEPPER (SEE PAGE G-24)
BRUSHED DC (SEE PAGE H-27)