Applied Motion Products

Si 2035 Programmable Stepper Drive

Description

The Si2035 is a programmable stepper drive/ indexer packaged in a rugged steel case . Integral heat sink, mounting brackets, switch covers and connectors are included with each Si2035. The drive/indexer has been matched with nine recommended NEMA 11, 14, 17 and 23 motors and comes with all operating software necessary to create a complete stepper motion solution.

The Si2035 includes Applied Motion Products' , Microsoft Windows based, Si™ software language for quick set up and ease of use. The Si™ is ideal for stand-alone operation. For more experienced users, with software development expertise, the Si2035 also comes with Applied' s Si Command Language (SCL) programming instruction set. SCL allows for control of the Si™ drive from a host PC or PLC thus permitting the user to perform a variety of motion, I/O tasks and system status retrieval via the host.

Multiple axis applications are handled by our SiNet™ Hub Programmer, which gives you the ability to control up to 8 Si™ drives, either stepper or servo on the same hub. Not only can you coordinate up to eight motors, the hub also has access to the inputs and outputs of all the drives, providing your program with up to 64 inputs and 24 outputs. You can also use Applied' s MMI which allows the machine operator to enter specific motion commands. Factory set to operate at 110-volt input; the Si2035 can be set by the user to operate at 220-volt input by a simply switch selection.

Pluggable screw terminal blocks are provided for the I/O, motor and AC power inputs. Mating connectors, programming cable with computer interface connector as well as all operating software are provided with each Si™ drive.

Features:

- Si™ , Si Command Language (SCL) or SiNet Hub programming languages included with drive

- AC input 110V or 220V switch selectable, 50-60 Hz

- DC bus voltage 28 VDC full load, 35 VDC nominal

- Software selectable motor current from 0.2 - 2.0 amps/ phase

- Software selectable motor resolution from 2,000 to 50,800 steps per revolution

- Software selectable idle current reduction 0, 25%, 50% or 100%

- Eight optically isolated programmable inputs 12 – 24 VDC. 2,200 ohms internal resistance. Can be configured for sinking (NPN) or sourcing (PNP) signals.

- Three optically isolated programmable outputs 30V max VDC, 100mA maximum

- One 0 - 5 VDC analog input (supported by SCL only)

- RS-232 for PC/MMI communications

- Dual H-bridge, pulse width modulated amplifier switching at 26 KHz

Si 2035 Technical Specifications

POWER AMPLIFIER SECTION:

AMPLIFIER TYPE	Bipolar Darlington dual H-Bridge.
CURRENT CONTROL	Recirculating, pulse width modulated, switching at 26 KHz.
OUTPUT CURRENT	0.2–2.0 amps, software selectable.
DC BUS VOLTAGE	35 VDC.
AC INPUT VOLTAGE	110 or 220 VAC (switch selectable) 50/60 Hz.
MAXIMUM OUTPUT POWER	70 Watts.
IDLE CURRENT REDUCTION	0%, 25%, 50%, or 100% software selectable.
MOTOR RESOLUTION	13 resolutions. Steps per revolution with 1.8° motor: 2000, 5000, 10000, 12800, 18000, 20000, 21600, 25000, 25400, 25600, 36000, 50000, 50800, software selectable.
STATUS LED'S	AC power (red).

CONTROLLER SECTION:

SERIAL COMMUNICATION	RS-232 programming and MMI port.
INPUTS	8 user programmable inputs. Can be used for triggering, sensing, homing, branching, jogging, limits or interrupts. 12-24 VDC.
OUTPUTS	3 general purpose, optically isolated 30 VDC outputs for interfacing to other equipment. Open collector and emitter. 100 mA max.
PARAMETER RANGES	Distance: 1 to 16,000,000 steps. Speed: .025 to 50 revolutions per second (in any microstep resolution). Acceleration: 1 to 3,000 rev/sec/sec. Deceleration: 1 to 3,000 rev/sec/sec (set independently from acceleration). Time Delays: 0.01 to 300 seconds. Output Pulse Widths: 2 to 500 milliseconds. Iterations per repeat loop: 1 to 65,535.
OPERATOR INTERFACE (MMI)	NEMA 4/12 rated (splash proof & dust proof). 4 x 20 characters liquid crystal display (LCD)standard or backlit. 20 key membrane keypad. Overall size: 4.9 x 4.9 x 1.42 inches.

SYSTEM SPECIFICATIONS:

OVERALL SIZE	1.75" x 4.00" x 6.80"
CHASSIS MATERIAL	Aluminum, black anodized with integral Transfer Plate.
CASE	Steel with black paint and white epoxy silk screen.
WEIGHT	3 Lbs.
AMBIENT TEMPERATURE	0° to 50°C (32° to 122°F)
HUMIDITY	Maximum of 90% non-condensing.
CONNECTORS	Screw terminal connectors for input power and motor. DB25 for input/output signals. Mating connectors included.
MOTORS	Can drive 4, 6 or 8 lead motors, NEMA sizes 8, 11, 17 and smaller 23 frame size motors.

Sold & Serviced By:

ELECTROMATE

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www.electromate.com
sales@electromate.com

Si™ and SCL Software

Si™ (Simple Indexer) software is used in applications requiring stand-alone operation in either single or multi-axes environments. Programs are constructed then stored in the drive and can be executed upon power up or upon a trigger signal. Programming is accomplished through the use of graphical motion commands selected in a point and click manner. Once an instruction is selected, a "fill-in the blanks" format is used to input motor and motion parameters.

Constructing a *Si™* program requires no prior programming experience nor does it require learning a programming language. *Si™,* based upon user input, generates the actual motion program, thereby eliminating syntax errors. Once completed, programs are easily stored, edited and recalled.

Si™ Drives in SCL Mode

SCL mode (*Si™* Control Language) is used for applications requiring control of motion on a real time basis from a host PC or PLC. SCL allows the host computer to direct the drive to perform a variety of motion and I/O tasks while retrieving system status information. SCL requires a high level of software programming experience and the ability to construct a program using ASCII characters over a serial port. SCL is a versatile and powerful tool for an experienced system developer. The drive is connected directly to a PC or PLC's serial port for single axis applications. In the SCL mode, as
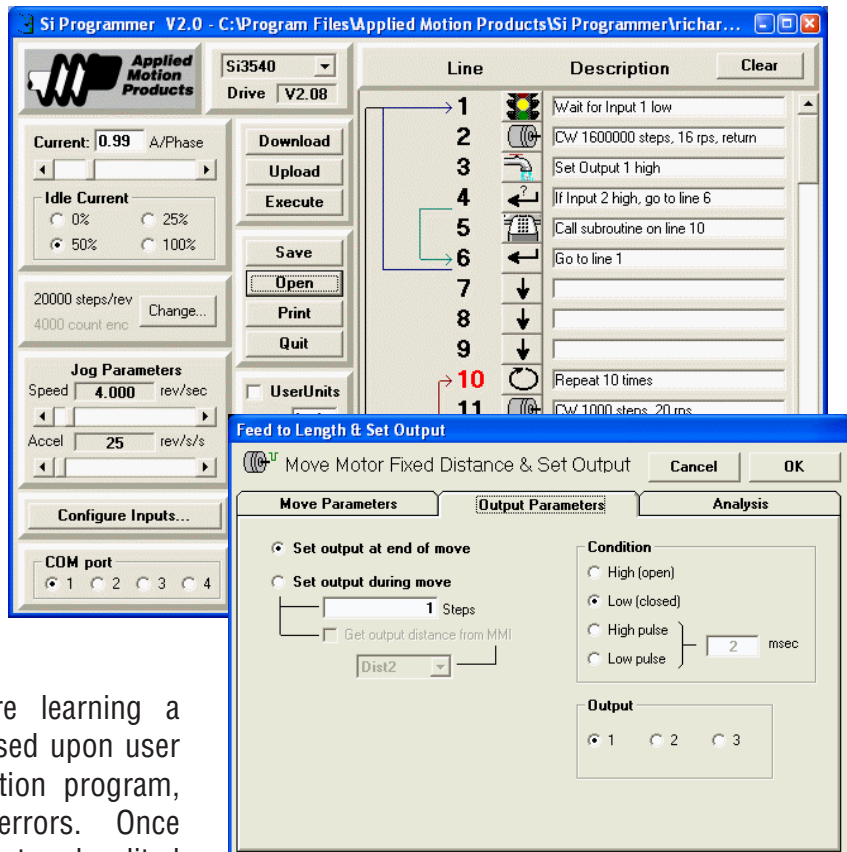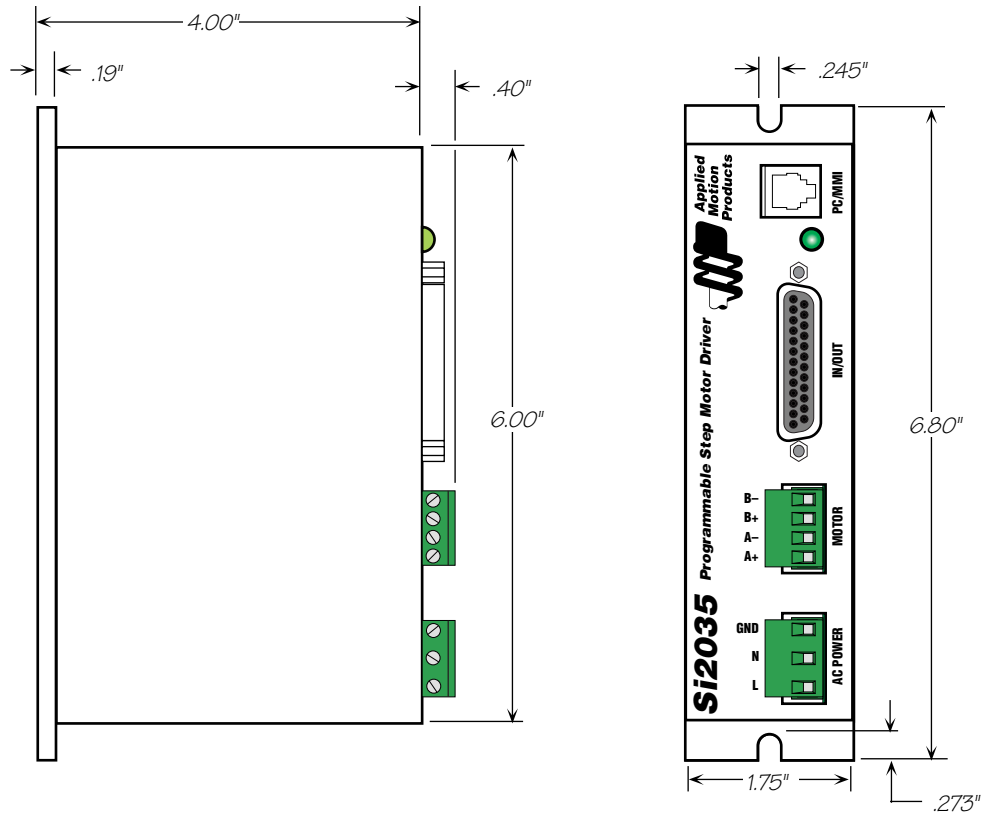
in *Si™* mode, the user can address their multi-axis applications with either the *SiNet™* Hub or *SiNet™* Hub 444, up to 8 drives can be connected to a host's serial port through one Hub.
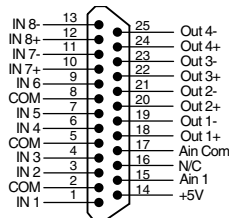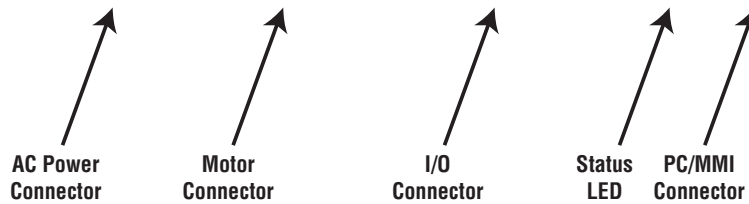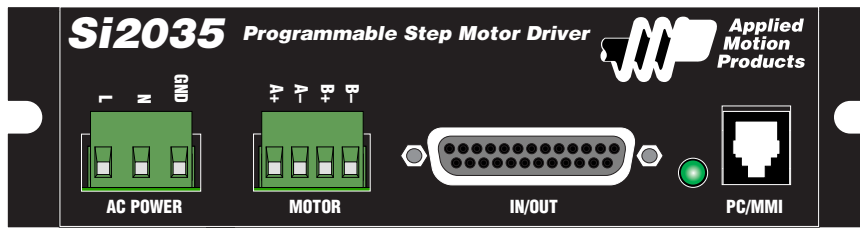
In SCL mode, the Hub functions as a router relaying SCL commands to the appropriate drive or drives. This permits real time control from a host PC or PLC for up to 8 axes from a single serial port. You can also use an Applied Motion MMI, which allows the machine operator to enter specific motion commands. Both Hub products can move motors independently or simultaneously in absolute, incremental or "sensor seeking" modes. All Hub programs can access up to 50 MMI variables.

Si2035 Outline Drawings

4.00"

.19"

.40"

.245"

6.00"

6.80"

PC/MMI

IN/OUT

B−
B+
A−
A+
MOTOR

GND
N
L
AC POWER

Si2035 Programmable Step Motor Driver

Applied Motion Products

1.75"

.273"

Si2035 Connections

Si2035 *Programmable Step Motor Driver*

Applied Motion Products

L N GND
AC POWER

A+ A− B+ B−
MOTOR

IN/OUT

PC/MMI

AC Power Connector

Motor Connector

I/O Connector

Status LED

PC/MMI Connector

IN 8−	13	
IN 8+	12	25 Out 4−
IN 7−	11	24 Out 4+
IN 7+	10	23 Out 3−
IN 6	9	22 Out 3+
COM	8	21 Out 2−
IN 5	7	20 Out 2+
IN 4	6	19 Out 1−
COM	5	18 Out 1+
IN 3	4	17 Ain Com
IN 2	3	16 N/C
COM	2	15 Ain 1
IN 1	1	14 +5V

NEMA 11, 14 and 17 Motor Data

Motor part No		HT11-012	HT11-013	5014-842	HT17-068	HT17-071	HT17-075
RECOMMENDED MOTORS FOR Si2035							
Motor Current	A	1.00	1.00	1.00	1.34	1.70	1.70
Holding Torque	oz-in	7.4	15.3	26	31.4	51	62.6
Resistance	ohm	1.4	2.0	4.3	2.1	1.7	1.7
Rotor Inertia	oz-in^2	0.044	0.098	0.109	0.19	0.29	0.37
Bearings Thrust Load Radial Load Radial Play	in/lbs	3.0 5.0 0.001 max @1lb	3.0 5.0 0.001 max @1lb	3.0 5.0 0.001 max @1lb	3.0 5.0 0.001 max @1lb	3.0 5.0 0.001 max @1lb	3.0 5.0 0.001 max @1lb
End Play		0.003 max @1lb	0.003 max @1lb	0.003 max @1lb	0.003 max @1lb	0.003 max @1lb	0.003 max @1lb
Weight	lbs	0.26	0.39	0.47	0.44	0.57	0.73

Motor current, resistance and torque ratings are with parrallel connection.

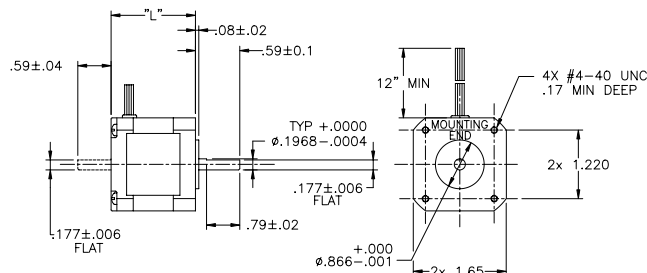## NEMA 11, 14, 17 Motor Dimensions

NEMA 11

Model	L
HT11-012	1.32"
HT11-013	1.87"
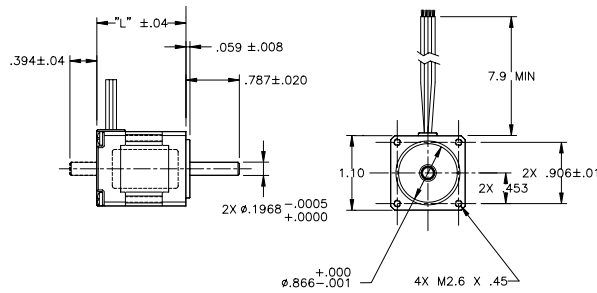
NEMA 14

Model	L
5014-842	1.57"
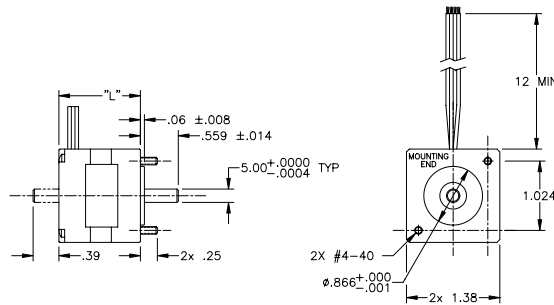
NEMA 17

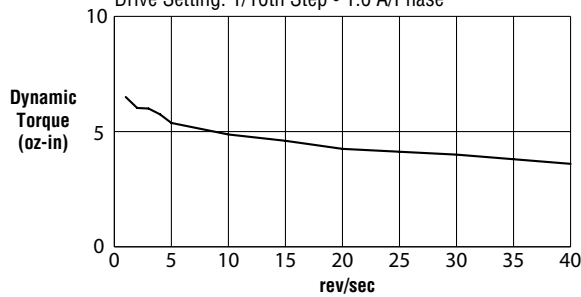| Model	L
HT17-068	1.30"
HT17-071	1.54"
HT17-075	1.85"

Torque Curves
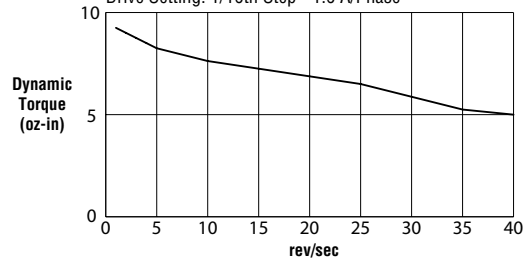## Si 2035 with NEMA 11, 14, 17 Step Motors

HT11-012 MOTOR
Motor Connection: 4 Lead Bipolar
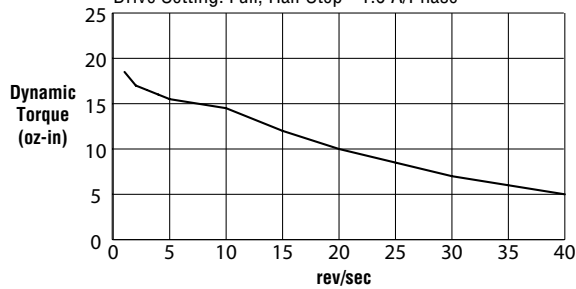Drive Setting: 1/10th Step • 1.0 A/Phase

HT11-013 MOTOR
Motor Connection: 4 Lead Bipolar
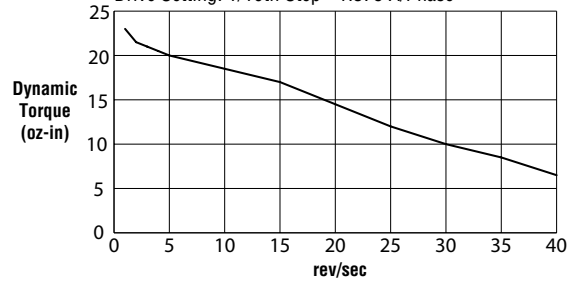Drive Setting: 1/10th Step • 1.0 A/Phase

5014-842 MOTOR
Motor Connection: Parallel
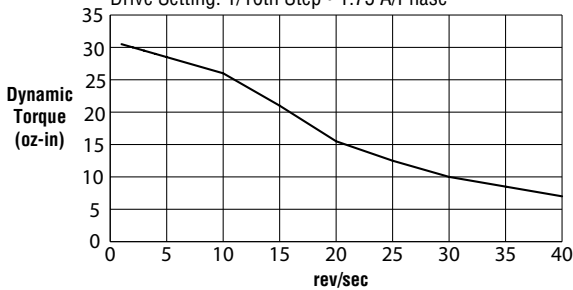Drive Setting: Full, Half Step • 1.0 A/Phase

HT17-068 MOTOR
Motor Connection: Parallel
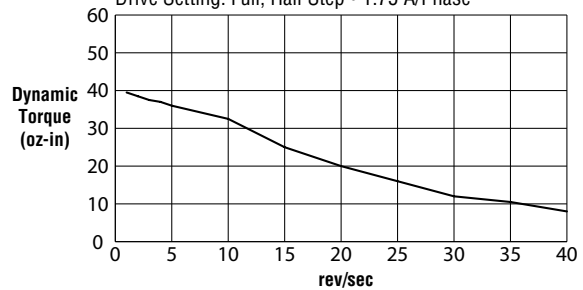Drive Setting: 1/10th Step • 1.375 A/Phase

HT17-071 MOTOR
Motor Connection: Parallel
Drive Setting: 1/10th Step • 1.75 A/Phase

HT17-075 MOTOR
Motor Connection: Parallel
Drive Setting: Full, Half Step • 1.75 A/Phase

NEMA 23 Motor Data

| RECOMMENDED MOTORS FOR Si2035		
Motor part No		HT23-394
Motor Current	A	2.83
Holding Torque	oz-in	77
Resistance	ohms	0.7
Rotor Inertia	oz-in^2	0.66

Bearings
  Thrust Load
  Radial Load
  Radial Play
	in/lbs	25
		15
		0.01 max
		@1lb

End Play		0.003 max @2.2lb
Weight	lbs	1.00

Motor current, resistance and torque ratings
are with parrallel connection.

NEMA 23 Motor Dimensions

Model   L
HT23-394   1.54"
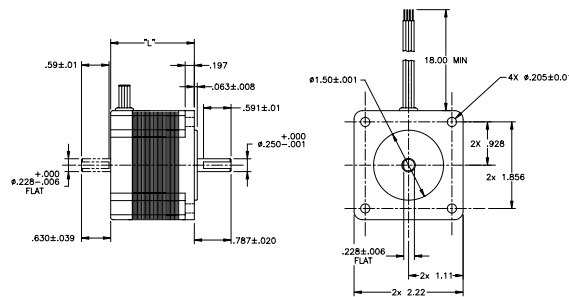
Torque Curves
Si 2035 with NEMA 23 Step Motors

HT23-394 MOTOR
Motor Connection: Parallel
Drive Setting: 1/10th Step • 2.0 A/Phase
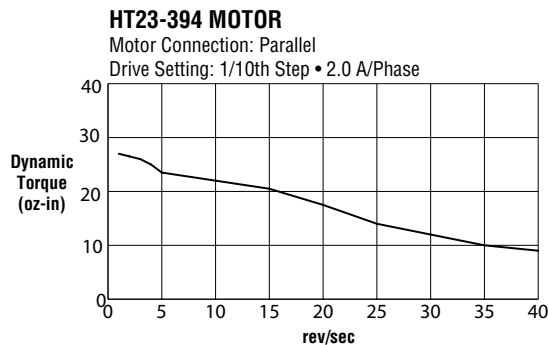
Accessories

Optional MMI

The MMI-01 is an easy to use, flexible device that allows an operator to enter move speeds, move distances or repeat loop counts. Messages can also be displayed and the program can be paused until the user presses a key, such as ENTER, YES or NO. Program branching can be accomplished based on the response of YES or NO.

Connection to any of our "Si" or "i" indexer drives is accomplished by the standard programming cable that is supplied with every drive. This cable also supplies power to the MMI-01 so that no additional power supply or wiring is needed.

Setup and programming of the MMI-01 is fast and easy. Our programmable "Si" or "i" drives are furnished with Applied Motion's Si™ Programmer software, which allows the user to easily program instructions for the terminal. Complex, confusing items like baud rate, parity and cursor positioning are handled automatically by the software.

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