

Control Modes

- Indexer, Point-to-Point, PVT
- Camming, Gearing
- Position, Velocity (Servo Mode)
- Position (Microstepping)

Command Interface

- CANopen
- ASCII and discrete I/O
- Stepper commands
- PWM velocity/torque command
- Master encoder (Gearing/Camming)
- $\pm 10V$ Position/Velocity/Torque command *

Communications

- CANopen
- RS-232

Feedback

- Digital Quad A/B encoder

I/O - Digital

- 12 inputs, 4 outputs

Dimensions: mm [in]

- 102 x 69 x 25 [4.0 x 2.7 x 1.0]

CANopen®



Model	Vdc	Ic	Ip
STM-075-07	20-75	5	7

DESCRIPTION

Stepnet is a stepper motor drive that combines CANopen networking with 100% digital control of stepper motors. When used with Copley's *Accelnet*™ and *Xenus*™ digital servo drives it enables brushless, brush, and now stepper motors to be controlled over the same distributed network.

In addition to CANopen motion commands, *Stepnet* can operate as a stand-alone drive. Inputs can be incremental position commands from controllers in Step/Direction or CU/CD format, as well as A/B quadrature commands from a master-encoder. Step to motor position ratio is programmable for electronic gearing.

The RoHS version has a $\pm 10V$ analog input for position/velocity/torque control. This enhances the ability of the driver to work with external motion controllers which can control steppers using *Stepnet* in servo-mode.

Set up is fast and simple using *CME 2*™ software operating under Windows® and communicating with *Stepnet* via an RS-232 link. CAN address selection is by digital inputs.

Stepnet operates as a Motion Control Device under the DSP-402 protocol of the CANopen DS-301 V4.01 (EN 50325-4) application layer. DSP-402 modes supported include: Profile Position Mode, Interpolated Position Mode (PVT), and Homing Mode.

Profile Position Mode does a complete motion index on command with S-curve acceleration & deceleration, top speed, and distance programmable. In PVT mode, the controller sends out a sequence of points each of which is an increment of a larger, more complex move than that of a single index or profile. The drive then uses cubic polynomial interpolation to “connect the dots” such that the motor reaches each point (Position) at the specified velocity (Velocity) at the prescribed time (Time). Homing mode is configurable to work with a combination of limit and home switches such that the drive moves the motor into a position that has an absolute reference to some part of the machine.

There are twelve logic inputs. Eleven are programmable as limit & home switches, stepper pulse inputs, A/B encoder, reset, or motor-temperature. Another dedicated input is for drive Enable. There are four programmable logic outputs for reporting a drive fault, or other status indications.

An Aux HV input is provided for “keep alive” power that preserves the drive data (e.g. current position) and CANopen operation if +HV has been removed as in an emergency-stop situation. This enables the control system to monitor drive status and to enable an orderly recovery without a full system reset, and “homing” of all axes.

Operation from transformer-isolated DC power supplies saves cost in multi-axis systems.

* Available on RoHS version (see page 12)

GENERAL SPECIFICATIONS

Test conditions: Load = 1mH per phase, ambient temperature = 25 °C. +HV = HV_{max}

MODEL	STM-075-07	
OUTPUT CURRENT		
Peak Current	7 (5)	A _{peak} (Arms, sinusoidal)
Peak time	1	s
Continuous current	5 (3.5)	A _{peak} (Arms)
INPUT POWER		
HV _{min} to HV _{max}	+20 to +75	V _{dc} , transformer-isolated
I _{peak}	8	Adc (1 sec)
I _{cont}	5.5	Adc
Aux HV	+20 to +75	V _{dc}
PWM OUTPUTS	Dual MOSFET H-bridges, 15 kHz center-weighted PWM, space-vector modulation	
Type	30 kHz	
PWM ripple frequency		
BANDWIDTH	2.5 kHz typical, bandwidth will vary with tuning & load inductance	
Current loop, small signal	Changes in HV do not affect bandwidth	
HV Compensation	15 kHz (66.7 μs)	
Current loop update rate	3 kHz (333 μs)	
Position loop update rate		
COMMAND INPUTS		
CANopen bus	Position Mode commands	Homing, Profile, and Interpolated profile modes
Digital position reference	Step/Direction, CountUp/CountDown	Stepper command pulses (2 MHz maximum rate)
	Quad A/B Encoder	2 Mline/sec, 8 Mcount/sec (after quadrature)
Analog ±10 Vdc	When operating in servo-mode with encoder feedback (RoHS version only) position/velocity/torque control, 5 kΩ differential input impedance	
DIGITAL INPUTS (NOTE 1)	12	
Number	Dedicated input for drive enable, active level programmable, GP type with 33 μs RC	
Enable [IN1]	General Purpose inputs with 33 μs (1 μs for [IN4]) RC filters, programmable functions, and active level select	
GP [IN2,3,4,5]	High-Speed Inputs with 100 ns RC filters, programmable functions, and active level select	
HS [IN6,7,8,9,10,11,12]	74HC14 Schmitt trigger operating from +5.0 V with RC filter on input, 10 kΩ pull-up to +5 Vdc	
All inputs	RC time-constants assume active drive on inputs and do not include 10 kΩ pull-ups.	
Logic levels	Vin-LO < +1.35 Vdc, Vin-HI > +3.65 Vdc, Maximum input voltage = 0~5 Vdc for HS inputs, 0~24 Vdc for GP	
DIGITAL OUTPUTS	4	
Number	Current-sinking MOSFET open-drain outputs with	
Type	1 kΩ pullup to +5 Vdc through diode, 300 mAdc sink max, +30 Vdc max.	
Functions	Programmable with CME 2™	
Active Level	Programmable to either HI (off, pull-up to +5 Vdc) or LO (on, current-sinking) when output is active	
RS-232 COMMUNICATION PORT	RxD, TxD, Gnd: DTE connections	
Signals	Full-duplex, serial communication port for drive setup and control, 9,600 to 115,200 Baud	
CANOPEN COMMUNICATION PORT	CANH, CANL, Gnd. 1 Mbit/sec maximum	
Signals	CANopen Application Layer DS-301 V4.01	
Protocol	DSP-402 Device Profile for Drives and Motion Control	
Device		
MOTOR CONNECTIONS	Outputs to 2-phase stepper motor, bipolar drive connected	
Motor A+, A-, B+, B-	Motor temperature sensor or switch. Any input [IN2~IN12] can be programmed for this function	
Motemp	Any digital output can be programmed for motor brake actuation	
Brake	External flyback diodes required if driving inductive loads	
PROTECTIONS		
HV Overvoltage	> +91 Vdc	Drive outputs turn off until +HV is < overvoltage
HV Undervoltage	< +20 Vdc	Drive outputs turn off until +HV >= +20 Vdc
Drive over temperature	PC Board > 70 °C.	Drive latches OFF until drive is reset, or powered off-on
Short circuits		Output to output, output to ground, internal PWM bridge faults
I ² T Current limiting		Programmable: continuous current, peak current, peak time
Latching / Non-Latching		Programmable

NOTES

1. [IN1] is not programmable and always works as drive Enable. Other digital inputs are programmable.

AGENCY STANDARDS CONFORMANCE

EN 55011 : 1998	CISPR 11 (1997) Edition 2/Amendment 2: Limits and Methods of Measurement of Radio Disturbance Characteristics of Industrial, Scientific, and Medical (ISM) Radio Frequency Equipment
EN 61000-6-1 : 2001	Electromagnetic Compatibility Generic Immunity Requirements
Following the provisions of EC Directive 89/336/EEC:	
EN 60204-1 : 1997	Safety of Machinery - Electrical Equipment of Machines
Following the provisions of EC Directive 98/37/EC:	
UL 508C : 1996	UL Standard for Safety for Power Conversion Equipment

FEATURES

Stepnet is a DSP based drive for two-phase step motors that operates as a node on a CAN bus or as a stand-alone drive that takes step motor pulses to command motor position. It operates from line-isolated DC power supplies and mounts directly to PC boards that simplify internal machine wiring for multi-axis systems.

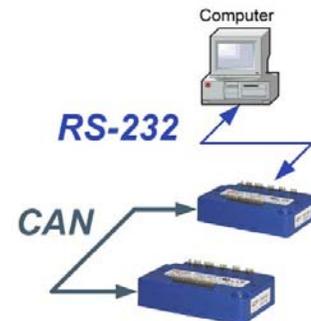
As a CAN node it operates under the CANOpen protocol DSP-402 for motion control devices. The functions supported include Profile Position Mode, Interpolated Position Mode, and Homing Mode. In Profile Position Mode a single PDO (Process Data Object) can command a position profile with programmable acceleration, deceleration, maximum speed, and target position. The acceleration can be trapezoidal or S-curve. Interpolated Position Mode works with multiple PDO's each of which specifies position, velocity, and time. For this reason this mode is sometimes called PVT (Position, Velocity, Time) mode. The drive uses a cubic-interpolation algorithm to connect the PVT points such that the motor satisfies the PVT parameters at each point while moving along a path that connects the points smoothly. In PVT mode long moves of complex shapes can be performed.

Multiple axes can be synchronized so that moves are coordinated. This emulates the functions normally performed by motion-controller cards or chips which can now be eliminated in many cases reducing cost and system complexity.

As a stand-alone drive it can take digital signals in Pulse/Direction or Count-Up/Count-Down format to control position or a ± 10 Vdc analog signal can control torque, velocity, or position.

RS-232 COMMUNICATION

Stepnet is configured via a three-wire, full-duplex RS-232 port that operates from 9,600 to 115,200 Baud. CME 2™ software provides a graphic user interface (GUI) to set up all of Stepnet features via a computer serial port. Once configured, Stepnet can be used in stand-alone mode, or as a networked drive on a CAN bus. The RS-232 signals are configured as DTE (Data Terminal Equipment) types. A single RS-232 port can communicate with multiple Stepnet drives by setting the CAN address of the drive connected to the computer to "0", making it a CAN bus master. Then, connect the CAN signals of the master to the other drives and set each of them to a non-zero, unique CAN address.

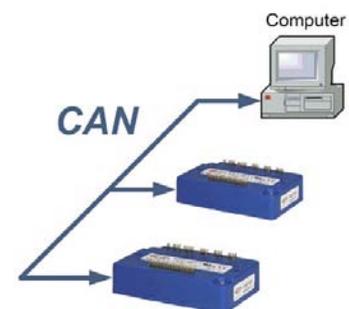


CANOPEN COMMUNICATION

Stepnet uses the CAN physical layer signals CANH, CANL, and GND for connection, and CANOpen protocol for communication.

Before connecting Stepnet to the CAN network, it must be assigned a CAN address. This is done via the RS-232 port, which is also used for general drive setup. The CAN address is a combination of an internal address stored in flash memory, and digital inputs which have been configured to act as CAN address bits. A maximum of 127 CAN devices are allowed on a CAN bus network, so this limits the input pins used for this purpose to a maximum of seven, leaving five inputs available for other purposes. If an address is stored in flash, then the address range controlled by digital inputs should never exceed a value that, when added to the flash address, produces a sum greater than 127. If the address is determined only by the flash memory value then it can be from 1 to 127.

Most installations will use less than the maximum number of CAN devices, in which case the number of inputs used for a CAN address can be less than seven, leaving more inputs available for other functions.



DIGITAL INPUTS

There are twelve digital inputs to *Stepnet*, eleven of which can be programmed to a selection of functions. The Enable input which controls the on/off state of the PWM outputs is fixed to [IN1] as a safety measure so that a drive cannot be programmed in such a way that, once installed, it could not be shut down by the controller. The other inputs can be set to a selection of functions. Two types of RC filters are used: GP (General-purpose) and HS (High Speed). The input time-constants apply when driven by active sources (CMOS, TTL, etc). All inputs have 10 kΩ pull-up resistors to +5 Vdc.

Input functions such as Step/Direction, CountUp/CountDown, Quad A/B must be wired to inputs having the HS filters, and inputs with the GP filters can be used for general purpose logic functions, limit switches, and the motor temperature sensor.

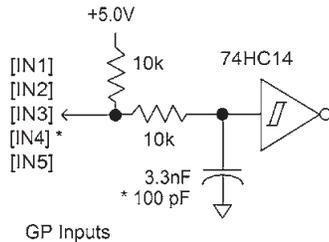
Programmable functions of the I/O inputs include:

- CAN address
- Drive Reset
- Motion Abort
- PWM sync
- Step/Direction, or CU/CD stepper position pulses
- Positive Limit switch
- Negative Limit switch
- Home switch
- Motor temperature sensor input
- Quad A/B master encoder input for camming

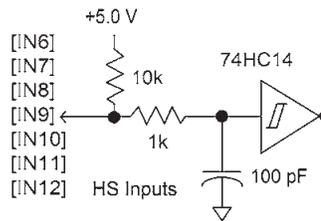
In addition to the selection of functions, the active level for each input is individually programmable.

Drive reset takes place on transitions of the input and is programmable to 1/0 or 0/1. The motor temp sensor function will disable the drive if a switch in the motor opens or closes when the motor overheats.

GP INPUTS 1, 2, 3, 4, 5
+24 VDC MAX



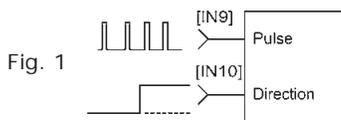
HS INPUTS 6, 7, 8, 9, 10, 11, 12
+5 VDC MAX



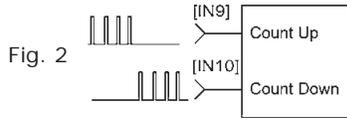
COMMAND INPUTS

As a network drive, the primary command input is the CANopen bus. But, *Stepnet* can also operate in stand-alone mode, taking commands from a motion controller. These commands can control position when operating as a stepper drive. In servo-mode, digital PWM inputs can control velocity or torque and the ±10V analog input can control position, velocity, or torque. The figures below show the input types. Digital inputs are programmable for active-level selection. The pulses shown are normally-low, high-going, but can be programmed to be normally-high, low-going.

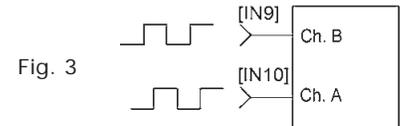
PULSE-DIRECTION



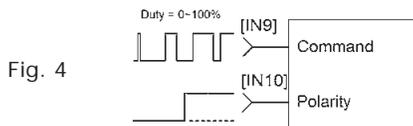
COUNT-UP / COUNT-DOWN



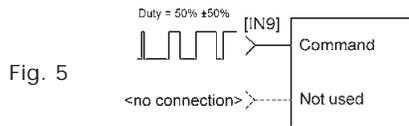
QUAD A/B ENCODER



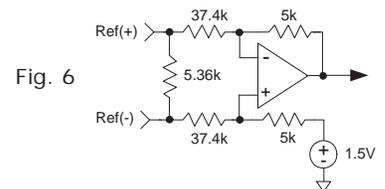
COMMAND / POLARITY



COMMAND 50%



ANALOG COMMAND



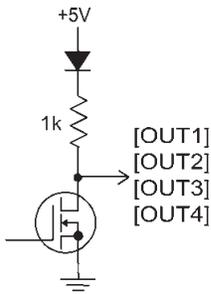
DIGITAL OUTPUTS

Digital outputs [OUT1~4] are open-drain MOSFETs with 1 kΩ pull-up resistors in series with a diode to +5 Vdc. They can sink up to 100 mA_{dc} from external loads operating from power supplies to +30 Vdc.

The outputs are typically configured as drive fault and motor brake. Additional functions are programmable.

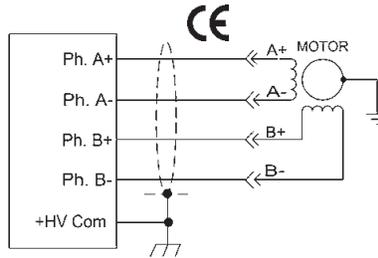
As an drive fault output, the active level is programmable to be HI or LO when a fault occurs. As a brake output, it is programmable to be either HI or LO to release a motor brake when the drive is enabled.

When driving inductive loads such as a relay, an external fly-back diode is required. A diode in the output is for driving PLC inputs that are opto-isolated and connected to +24 Vdc. The diode prevents conduction from +24 Vdc through the 1 kΩ resistor to +5 Vdc in the drive. This could turn the PLC input on, giving a false indication of the drive output state.



MOTOR CONNECTIONS

There are four motor output terminals: A+, A-, B+, and B-. These outputs drive the two independent coils of a 2-phase step motor with windings configured for bipolar drive mode.

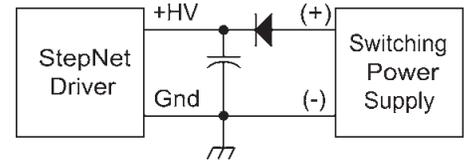


CE = Shielded cables required for CE compliance

POWER SUPPLIES

Stepnet operates typically from transformer-isolated, unregulated DC power supplies. These should be sized such that the maximum output voltage under high-line and no-load conditions does not exceed the drives maximum voltage rating. Power supply rating depends on the power delivered to the load by the drive.

Operation from regulated switching power supplies is possible if a diode is placed between the power supply and drive to prevent regenerative energy from reaching the output of the supply. If this is done, there must be external capacitance between the diode and drive. The minimum value required is 330 μF per drive mounted no more than 12 inches from the drive.



PWM SYNCHRONIZATION

Multiple drives can synchronize their PWM frequencies which can reduce the noise emission to nearby equipment. This is done by connecting the output of one drive the an input on the other drives in a group. When the output and inputs are programmed as PWM Sync, one drive becomes a PWM Sync master and the PWM Sync slaves then synchronize their PWM frequencies exactly to that of the master. This feature is particularly useful when mounting multiple Stepnet drives on a single PC board. Any output can be used as a PWM Sync master, and any high speed input can be used for a PWM Sync slave.

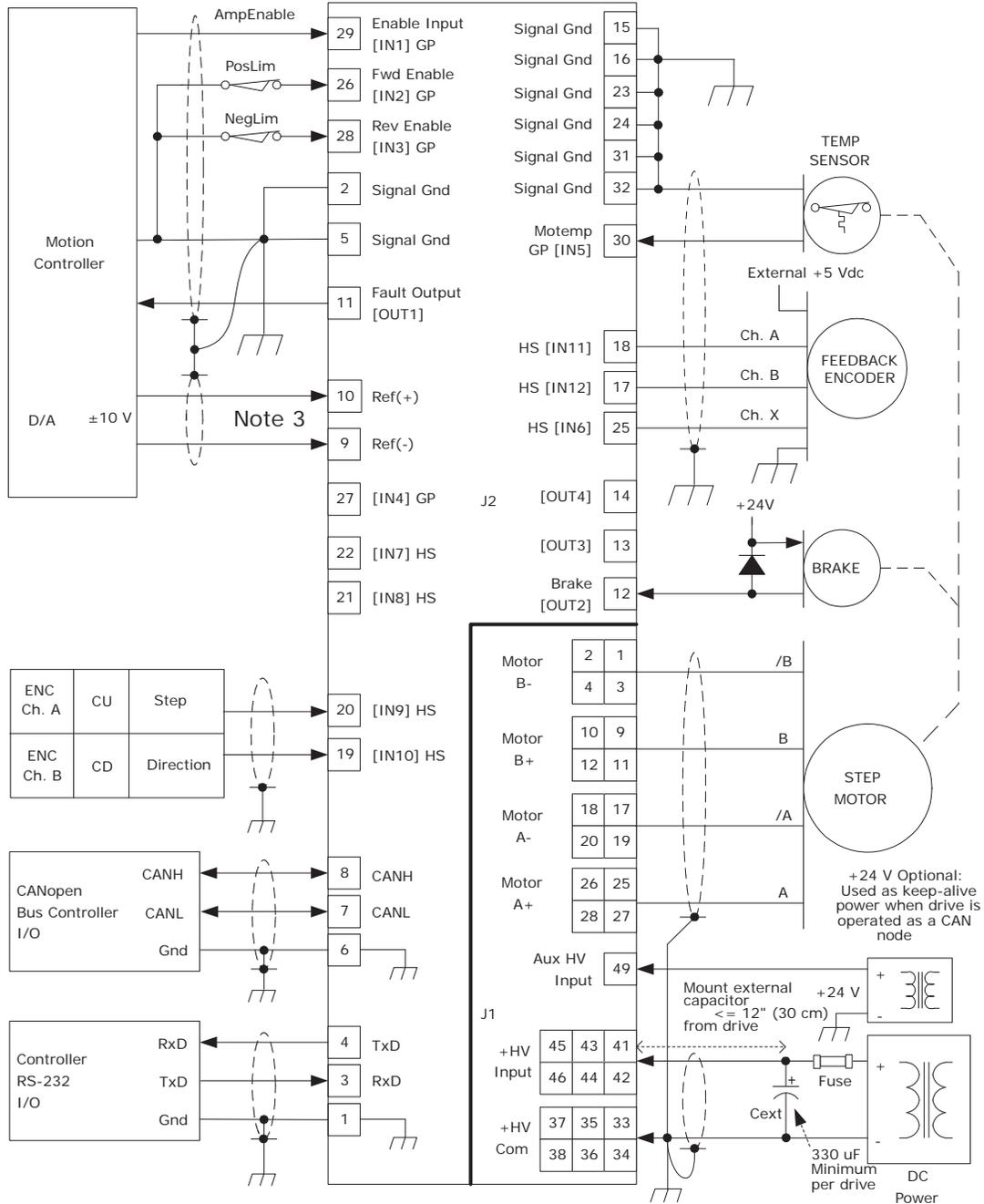


AUX HV (OPTIONAL)

CANopen communications with Stepnet can be maintained when +HV is turned off by using the Aux HV input. The voltage has the same range as +HV, and can be greater or less than +HV.

In operation, the Aux HV keeps the drive logic and control circuits active so it is always visible as a node on a CAN bus. The current-position data is maintained making 'homing' unnecessary after system power is re-enabled. If Stepnet is operating as a stand-alone drive, Aux HV is not necessary but can be useful if the controller is monitoring drive digital outputs.

TYPICAL DRIVE CONNECTIONS

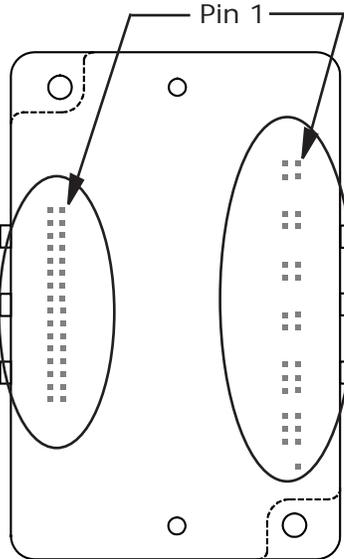
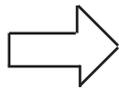


NOTES

- [IN1] always functions as Drive Enable with programmable active level
[IN2]~[IN12] have programmable functions and active level
- HS inputs [IN6,7,8,9,10,11,12] are for high-speed signals and have 100 ns RC filters.
GP inputs [IN1,2,3, & 5] have 33 μ s filters, [IN4] has a 1 μ s filter.
RC filter time constants apply when inputs are driven by active sources and do not include the 10 k Ω pull-up resistors.
- The analog reference input is only available on RoHS versions of the drive.

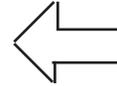
DRIVE PC BOARD CONNECTORS

J2: Signal
Dual row, 0.1" centers
32 position female header
SAMTEC SSW-116-01-S-D



Drive viewed from above looking down on the PC board on which it is mounted. Pins and housing shapes are shown in phantom view.

J1: +HV, Gnd, & Motor Outputs
Dual row, 0.1" centers
50 position female header
SAMTEC SSW-125-01-S-D



Note 2

Signal	J2 Pin		Signal
Signal Ground	2	1	Signal Ground
TS-232 TxD	4	3	RS-232 RxD
Signal Ground	6	5	Signal Ground
CANH	8	7	CANL
Analog Ref(+)	10	9	Analog Ref(-)
[OUT2]	12	11	[OUT1]
[OUT4]	14	13	[OUT3]
Signal Ground	16	15	Signal Ground
HS Input [IN11]	18	17	[IN12] HS Input
HS Input [IN9]	20	19	[IN10] HS Input
HS Input [IN7]	22	21	[IN8] HS Input
Signal Ground	24	23	Signal Ground
GP Input [IN2]	26	25	[IN6] HS Input
GP Input [IN3]	28	27	[IN4] GP Input
GP Input [IN5]	30	29	[IN1] Enable Input
Signal Ground	32	31	Signal Ground

Note 2

Signal	J1 Pin		Signal
Motor B-	2	1	Motor B-
	4	3	
No Connection	6	5	No Connection
	8	7	
Motor B+	10	9	Motor B+
	12	11	
No Connection	14	13	No Connection
	16	15	
Motor A-	18	17	Motor A-
	20	19	
No Connection	22	21	No Connection
	24	23	
Motor A+	26	25	Motor A+
	28	27	
No Connection	30	29	No Connection
	32	31	
Ground	34	33	Ground
	36	35	
	38	37	
No Connection	40	39	No Connection
+HV	42	41	+HV
	44	43	
	46	45	
No Connection	48	47	No Connection
	50	49	

NOTES

1. Signals are grouped for current-sharing on the power connector. When laying out PC board artworks, all pins in groups having the same signal name must be connected.
2. The analog reference inputs are only available on RoHS versions of the drive.

PC BOARD DESIGN

The peak voltage between adjacent etches on the PC board is equal to the +HV power. Peak input current is 8 Adc, continuous current is 5.5 Adc. A trace width of 0.175", plating thickness of 3 oz. copper, and spacing of 0.025" is adequate for Stepnet. As shown on p. 7, connections to J1 use multiple pins for current-sharing. PC board connections should connect these pins.

Printed circuit board layouts for *Stepnet* drives should follow some simple rules:

1. Install a low-ESR electrolytic capacitor not more than 12 inches from the drive. PWM drives produce ripple currents in their DC supply conductors. *Stepnet* drives do not use internal electrolytic capacitors as these can be easily supplied by the printed circuit board. In order to provide a good, low-impedance path for these currents a low-ESR capacitor should be mounted as close to the drive as possible. 330 μ F is a minimum value, with a voltage rating appropriate to the drive model and power supply.

2. Connect J1 signals (A+, A-, B+, B- outputs, +HV, and +HV Common) in pin-groups for current-sharing. The signals on J1 are all high-current types. To carry these high currents (up to 7 Adc peak) the pins of J1 must be used in multiples to divide the current and keep the current carrying capacity of the connectors within specification. The diagram on page 6 shows the pin groups that must be interconnected to act as a single connection point for PC board traces.

3. Follow IPC-2221 rules for conductor thickness and width of J1 signals.

Minimum trace width, and copper plating thickness should follow industry-standards (IPC-2221). The width and plating depend on the maximum voltage, and maximum current of the drive. Power supply traces (+HV, +HV Common) should be routed close to each other to minimize the area of the loop enclosed by the drive DC power. Noise emission or effects on nearby circuitry are proportional to the area of this loop, so minimizing it is good layout practice.

Motor signals should also be routed close together. Output pairs (A & /A, B & /B) should be routed as closely as possible to form a balanced transmission path. Keeping these traces as closely placed as possible will again minimize noise radiation due to motor phase currents.

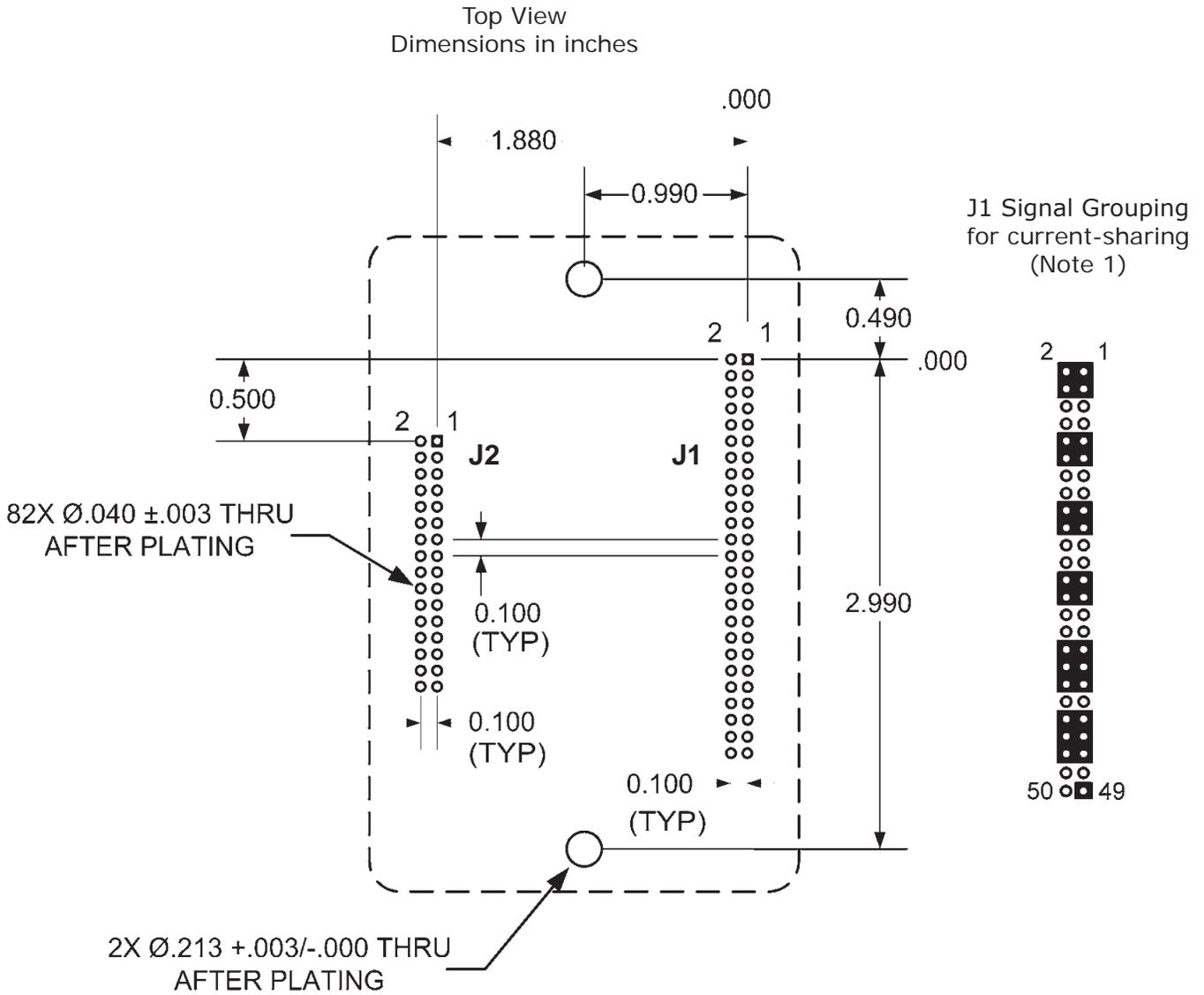
Stepnet circuit grounds are electrically common, and connect internally. However, the J1 signals carry high currents while the grounds on J2 (signal ground) carry low currents. So, J2 signals should be routed away from, and never parallel to the signals on J1.

The drive heatplate is electrically isolated from all drive circuits. For best noise-immunity it is recommended to connect the standoffs to frame ground and to use metal mounting screws to maintain continuity between heatplate and standoffs.

MOUNTING AND COOLING

Stepnet mounts on PC boards using two, dual-row, 0.1" female headers. These permit easy installation and removal of the drive without soldering. Threaded standoffs should be swaged into the PC board provide positive retention of the drive and permit mounting in any orientation. Cooling configurations are: no heatsink, low-profile, and standard heatsinks.

PC BOARD MOUNTING FOOTPRINT



Stepnet Mounting Hardware:

Qty	Description	Mfgr	Part Number	Remarks
1	Socket Strip	Samtec	SSW-116-01-S-D	J2
1	Socket Strip	Samtec	SSW-125-01-S-D	J1
2	Standoff 6-32 X 3/8"	PEM	KFE-632-12-ET	

NOTES

1. J1 pins with the same signal name must be connected for current-sharing.
2. To determine copper width and thickness for J1 signals refer to specification IPC-2221. (Association Connecting Electronic Industries, <http://www.ipc.org>)
3. Standoffs should be connected to etches on PC board that connect to frame ground for maximum noise suppression and immunity.

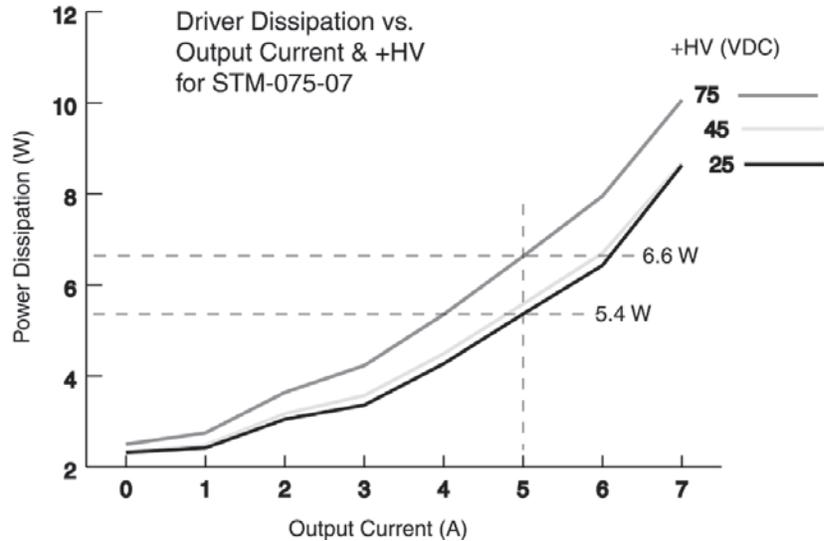
POWER DISSIPATION

The chart on this page shows the internal power dissipation for *Stepnet* under differing power supply and output current conditions. The output current is calculated from the motion profile, motor, and load conditions. The values on the chart represent the rms (root-mean-square) current that the drive would provide during operation. The +HV values are for the average DC voltage of the power supply.

When +HV and drive output current are known, the drive power dissipation can be found from the chart. The next step is to determine the temperature rise the drive will experience when it's installed. For example, if the ambient temperature in the enclosure is 40 °C, and the heatplate temperature is to be limited to 65 °C to avoid shutdown, the rise would be 25 °C *above ambient*.

Divide the temperature rise by the power dissipation will yield a result in units of °C/W. For a *Stepnet* operating at 75 Vdc and outputting 5 Arms, the dissipation would be about 6.6 W. This would give 25 °C/6.6W, or 3.8 °C/W as the maximum thermal resistance (R_{th}) of a heatsink.

From the illustrations on the opposite page, if it is desired to use the drive without fan cooling, the -HS heatsink option would work as it has an R_{th} of 2.2 °C/W.

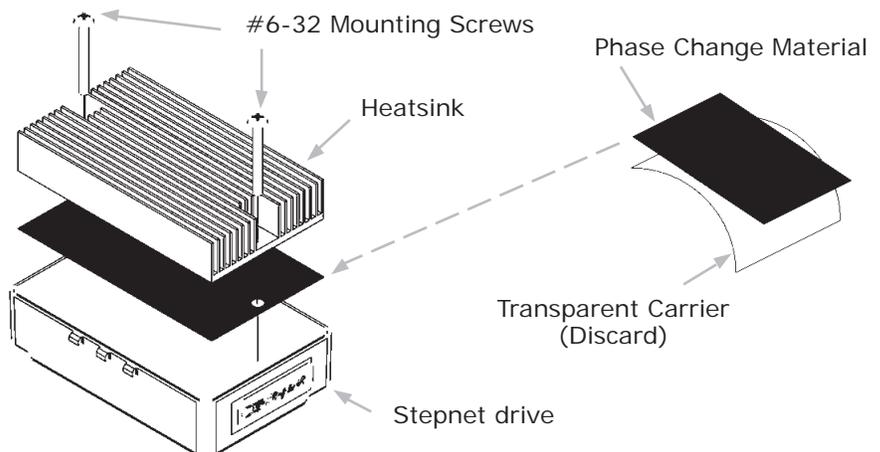


HEATSINK INSTALLATION

If a heatsink is used it is mounted using the same type of screws used to mount the drive without a heatsink but slightly longer. Phase change material (PSM) is used in place of thermal grease. This material comes in sheet form and changes from solid to liquid form as the drive warms up. This forms an excellent thermal path from drive heatplate to heatsink for optimum heat transfer.

STEPS TO INSTALL

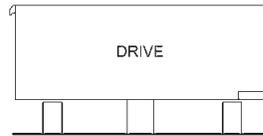
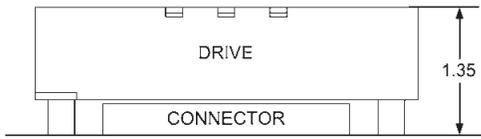
1. Remove the PSM (Phase Change Material) from the clear plastic carrier.
2. Place the PSM on the *Stepnet* aluminum heatplate taking care to center the PSM holes over the holes in the drive body.
3. Mount the heatsink onto the PSM again taking care to see that the holes in the heatsink, PSM, and drive all line up.
4. Torque the #6-32 mounting screws to 8~10 lb-in (0.9~1.13 N·m).



HEATSINK OPTIONS

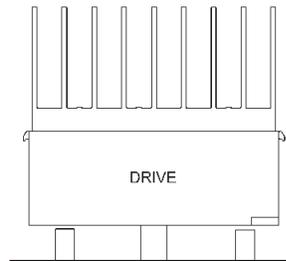
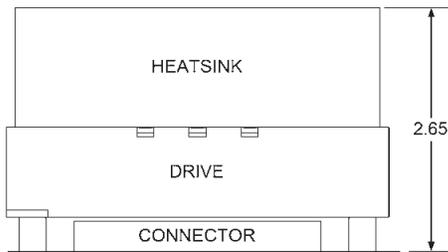
Rth expresses the rise in temperature of the drive per Watt of internal power loss. The units of Rth are °C/W, where the °C represent the rise above ambient in degrees Celsius. The data below show thermal resistances under convection or forced-air conditions for the no-heatsink, HL, and HS heatsinks.

NO HEATSINK



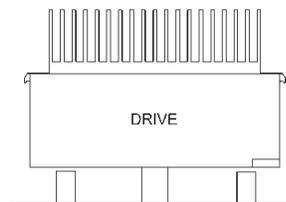
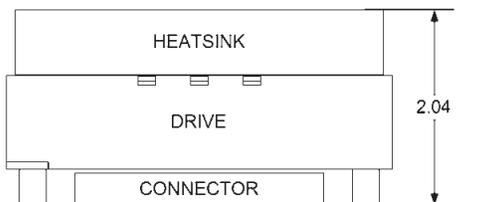
NO HEATSINK	°C/W
CONVECTION	6.2
FORCED AIR (300 LFM)	2.1

STANDARD HEATSINK (STM-HS)



STM-HS HEATSINK	°C/W
CONVECTION	2.2
FORCED AIR (300 LFM)	0.5

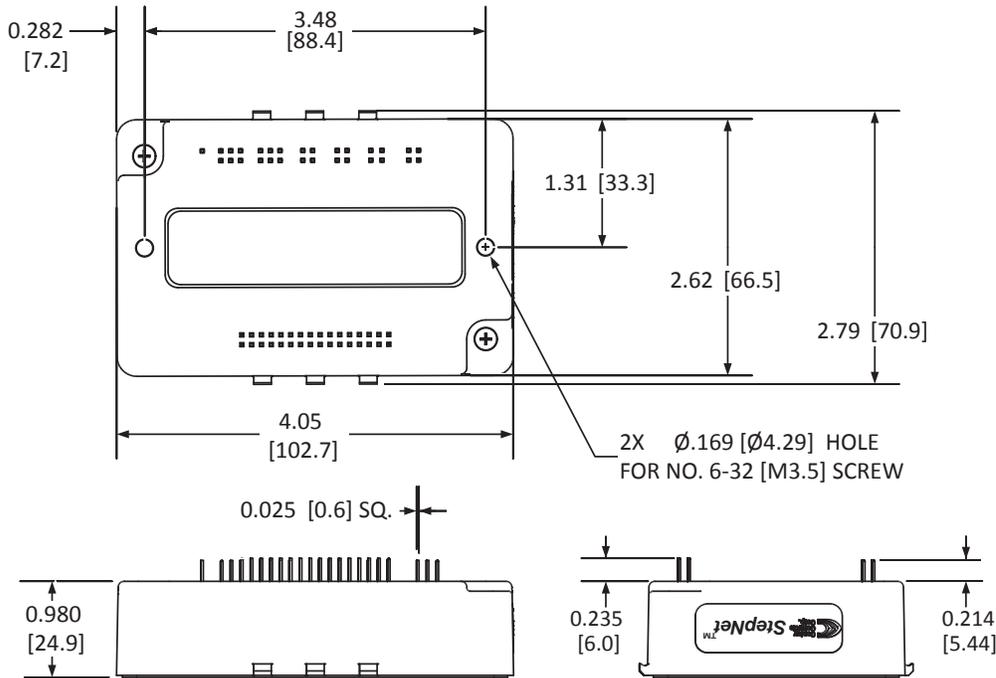
LOW-PROFILE HEATSINK (STM-HL)



STM-HL HEATSINK	°C/W
CONVECTION	4.0
FORCED AIR (300 LFM)	0.9

Dimensions in inches
using recommended connectors and standoffs (see page 9)

DIMENSIONS



NOTES

1. Dimensions shown in inches [mm].

ORDERING GUIDE

PART NUMBER	DESCRIPTION
STM-075-07	Stepnet Stepper drive 5/7 Adc @ 75 Vdc
TDK-075-01	Stepnet Development Kit
TDK-CK	Stepnet Development Kit Connector Kit
STM-HL	Stepnet Stepper Drive Low Profile Heatsink Kit
STM-HS	Stepnet Stepper Drive Standard Heatsink Kit
CME2	CME 2 Drive Configuration Software CD-ROM
SER-CK	Serial Cable Kit for Development Kit

ORDERING INSTRUCTIONS

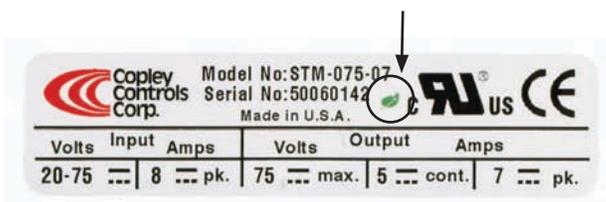
Example: Order 1 STM-075-07 drive with Standard Heatsink, Development Kit, and Development Kit Connector Kit

Qty	Item	Remarks
1	STM-075-07	Stepnet drive
1	STM-HS	Standard Heatsink Kit
1	TDK-075-01	Stepnet Development Kit
1	TDK-CK	Connector Kit for Development Kit
1	CME2	CME 2™ CD
1	SER-CK	Serial Cable Kit

NOTES

1. Heatsink kits are ordered separately and assembled by the customer, not at the factory.

The RoHS version is identified by the green leaf symbol on the product identification tag. This model has the $\pm 10V$ analog input for position/velocity/torque control.



Note: Specifications subject to change without notice

Rev 7.01_tu 11/29/2011