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IMS™

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IB462H

BIPOLAR STEPPING MOTOR DRIVER

QUICK REFERENCE



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IB462H Quick Reference / Installation Guide

The primary function of this guide is to acquaint the user with the specifications, basic wiring and configuration of the IB462H Bipolar Stepping Motor Driver. The full product manual is available in Acrobat PDF format on the IMS Product CD. It also may be downloaded from the IMS web site at www.imshome.com.

Notes And Warnings

Please observe the following when handling, connecting and using your IB462H Driver and INT-462 Interface Board. Failure to observe these points may result in damage to the drive. All warranty and disclaimer information is located in the full product manual and should be referenced for more information.

The IB462H and INT-462 components are sensitive to Electrostatic Discharge (ESD). All handling should be done at an ESD protected workstation.

Hazardous Voltage Levels may be present if using an open frame power supply to power the IB462H and INT-462.

The Power Supply output voltage must not exceed the maximum input voltage of the IB462H and INT-462.

Do not apply power to the IB462H without proper heatsinking or cooling. The maximum rear plate temperature of the IB462H is 70°C!

The rear mounting surface of the driver contains various voltages and must be kept isolated when attached to a conductive surface!

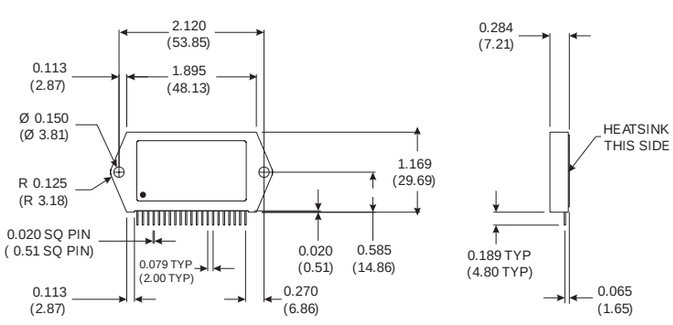
Thermal Specifications

	Range
Ambient Temperature	0 to +50°C
Storage Temperature	-40 to +125°C
Maximum Plate Temperature*	+70°C

** Additional cooling may be required to limit plate temperature to +70°C.*

IB462H Mechanical Specifications

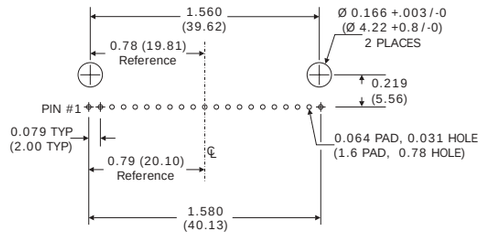
Dimensions in Inches (mm)



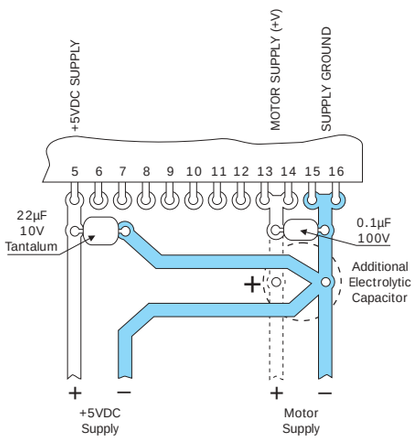
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Recommended Hole Pattern For PCB Mounting

Dimensions in Inches (mm)



Power Interface



Motor Supply

Pins 13&14 (+V) and Pins 15&16 (Ground) are used to connect the DC motor power to the IB462H Driver. Two local capacitors must be connected to Pins 13&14 and Pins 15&16. These capacitors must be located as close to the IB462H motor supply input pins as possible to ensure stable operation.

+5 VDC Input

The IB462H requires an external +5 VDC power supply which is connected between Pin 5 (+V) and ground. The +5 VDC supply ground and the motor supply ground must not be connected to each other at the power supplies. The +5 VDC ground must be connected to the ground pin of the electrolytic capacitor.

Required Capacitors

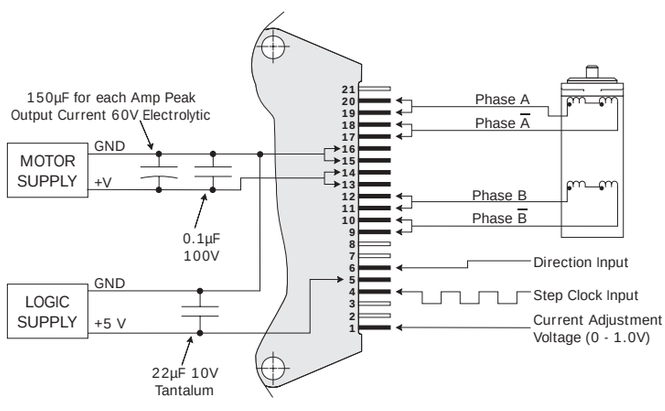
The first capacitor is a low impedance, aluminum electrolytic. The continuous operating voltage of the capacitor must exceed the maximum supply voltage as well as any back EMF voltage generated by the motor. The capacitance should be 150 µF for each amp of peak phase output current.

Example: 1.4A peak @ 40 VDC x 150 µF = 220 µF 60V.

A 0.1 µF 100V capacitor must be used to filter high frequency noise. It must be placed between the motor power input pins 13&14 (+V) and 15&16 (ground) and the electrolytic capacitor. The continuous operating voltage of this capacitor must exceed the maximum supply voltage as well as any back EMF voltage generated by the motor.

The +5 VDC supply requires a 22 µF 10V Tantalum capacitor to be installed as close to the IB462H Driver as possible between Pin 5 (+5V) and ground.

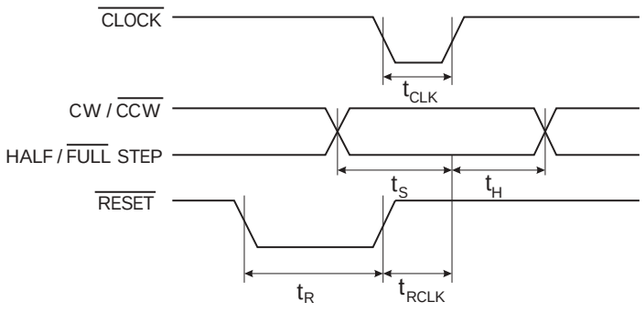
Minimum Required Connections



The diagram above illustrates the minimum connections that are required to operate the IB462H driver.

For More Information:
See the complete IB462H Product Manual
on the IMS Product CD or at www.imshome.com

Timing



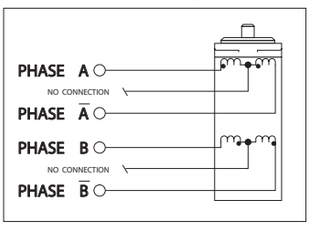
Timing Parameters (Minimum)

t_{CLCK} - Clock Time ..... 0.5 µs
t_S - Setup Time ..... 1 µs
t_H - Hold Time ..... 4 µs
t_{RLCK} - Reset to Clock Delay ..... 3 µs
t_R - Reset Time ..... 1 µs

Connecting the Motor

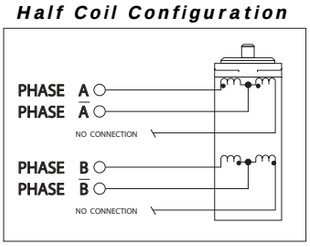
6 Lead Motors

Full Coil Configuration



Motor Peak Current = Rated Amps / Phase

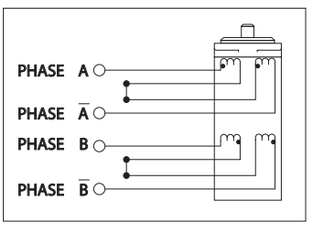
Half Coil Configuration



Motor Peak Current = Rated Amps / Phase x 1.4

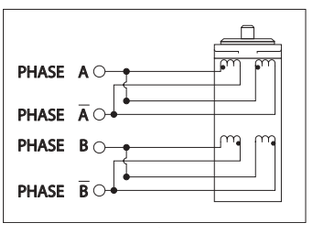
8 Lead Motors

Series Connection



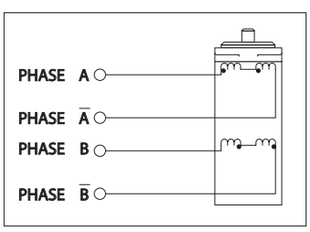
Motor Peak Current = Rated Amps / Phase
or
Motor Peak Current = Bipolar Current Rating x 1.4

Parallel Connection



Motor Peak Current = Rated Amps / Phase x 2
or
Motor Peak Current = Bipolar Current Rating x 1.4

4 Lead Motors



Motor Peak Current = Rated Amps / Phase x 1.4

MAXIMUM Motor Inductance (mH / Phase) = 0.2 x Minimum Supply Voltage

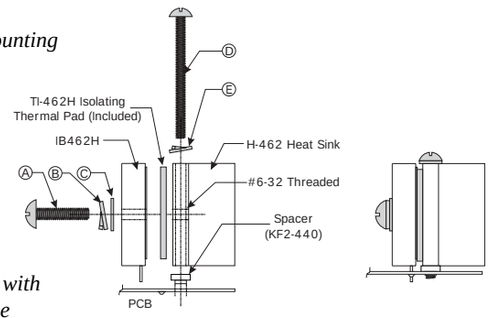
Electrical Specifications

Specification	Test Condition	Min.	Typ.	Max.	Unit
Input Voltage		12		40	V
Phase Output Current	Per Phase			2	A
Quiescent Current (+V)	Outputs Floating			4	mA
Quiescent Current (+5V Input)	Outputs Floating		50	80	mA
Current Adjust Input Voltage				1.0	V
Low Level Input Voltage	SCLK, DIR, H/F, Reset			0.6	V
High Level Input Voltage	SCLK, DIR, H/F, Reset	2		5	V
Low Level Input Current	SCLK, DIR, H/F, Enable			-1.2	mA
Low Level Input Current	Reset Input Only			-200	µA
High Level Input Current	SCLK, DIR, H/F, Enable			10	µA
Enable Low Level Input Voltage	Enable Input Only			1.3	V
Enable High Level Input Voltage	Enable Input Only	2		5	V
Input Pull-up Resistance	SCLK, DIR, H/F, Enable	4.5	4.7	4.9	kΩ
Input Pull-up Resistance	Reset Input Only	50	51	52	kΩ

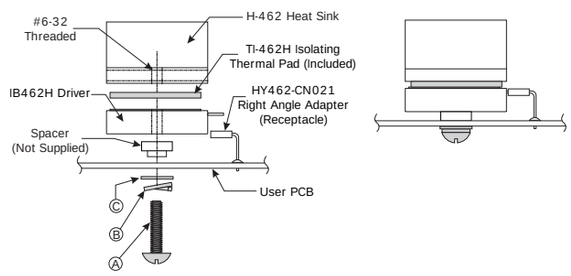
Mounting the IB462H

Heat sinking and the use of the included insulating thermal pad are **ABSOLUTELY REQUIRED** for the IB462H driver at all power levels. Below are some examples of mounting configurations.

Direct PCB Mounting



PCB Mounting with a Receptacle



The torque specification for the mounting screws is 5.0 to 7.0 lb-in (0.60 to 0.80 N-m)

WARNING! The mounting surface of the Heat Sink must be a smooth, flat surface with no burrs, protrusions, cuttings, or other foreign objects.

Pin Configuration

PIN #	FUNCTION	DETAILS
1	Current Adjust	Phase current adjustment pin. A voltage must be applied to this pin to set the phase output current.
2	$\overline{\text{Reset}}$	Reset Input. An active LOW pulse resets the driver.
3	Half / $\overline{\text{Full}}$ Step	Selects Half or Full Step HIGH = Half Step Operation / LOW = Full Step Operation
4	$\overline{\text{Step Clock}}$	An active LOW pulse advances the motor one increment. The step occurs on the falling edge of the signal.
5	+5 VDC	The +5 VDC supply input.
6	Direction	Clockwise / Counterclockwise direction control input. Physical direction depends on the connection of the motor.
7	Enable	Enables / disables the output section of the driver. When in a logic HIGH state, (not connected) the driver outputs are enabled. Sinking this input will disable the drives.
8	Sense B	Phase B current sense output.
9 & 10	Phase $\overline{\text{B}}$	Phase $\overline{\text{B}}$ of the stepping motor.
11 & 12	Phase B	Phase B of the stepping motor.
13 & 14	+V	+12 to + 48 VDC motor power supply input.
15 & 16	GND	Power supply return (ground).
17 & 18	Phase $\overline{\text{A}}$	Phase $\overline{\text{A}}$ of the stepping motor.
19 & 20	Phase A	Phase A of the stepping motor.
21	Sense A	Phase A current sense output.

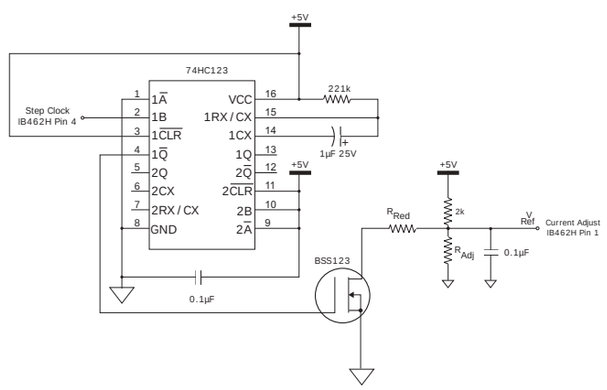
Reducing the Current Output

$$R_{Adj} = 2000 \times \frac{I_{Run}}{(10 - I_{Run})}$$

I_{Run} is the desired running current. The range is 0.1A to 2A per phase.

$$R_{Red} = 2000 \times \frac{I_{Run} \times I_{Hold}}{(I_{Run} - I_{Hold})}$$

I_{Hold} is the desired holding current. The range is 0A to 2A per phase.



Current Adjust / Reduction Circuit

IB462H Options and Accessories

INT-462 ..... Interface Board
H-462H ..... Heat Sink
TI-462H ..... Isolating Thermal Pad
HY462-CN021 ..... 21 Pin Right Angle Connector
MB-21 ..... "L" Mounting Bracket
OSC-462H ..... Analog Speed Control Board
OSC-CC100-000 ..... Parameter Setup Cable

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