

IM481H

**HIGH-PERFORMANCE
ULTRA-MINIATURE
MICROSTEPPING DRIVER**

FEATURES

- Very Low Cost
- Ultra Miniature (1.1 x 2.7 x 0.175 inches)
(28 x 69 x 4.4 mm)
- Advanced Hybrid Design
- High Input Voltage (+12 to +48 VDC)
- High Output Current (1.5 Amps RMS, 2.1 Amps Peak)
- Replaces Mechanical Gearing for Smoothness and Positioning
- Up to 51,200 Step/Rev with 1.8° Motor
- No Minimum Inductance
- 14 Selectable Microstepping Resolutions can be Changed On-the-Fly
- Automatically Switches Between Slow and Fast Decay for Unmatched Performance
- Adjustable Automatic Current Reduction
- Short Circuit and Over Temperature Protection
- Fault Output
- At Full Step Output

DESCRIPTION

The IM481H is a high performance, yet low cost microstepping driver that utilizes advanced hybrid technology to greatly reduce size without sacrificing features. The IM481H is exceptionally small, easy to interface and use, yet powerful enough to handle the most demanding applications.

The IM481H has 14 built-in microstep resolutions (both binary and decimal). The resolution can be changed at any time without the need to reset the driver. This feature allows the user to rapidly move long distances, yet precisely position the motor at the end of travel without the expense of high performance controllers.

With the development of proprietary and patented circuits, ripple current has been minimized to reduce motor heating common with other designs, allowing the use of low inductance motors to improve high speed performance and system efficiency.

The IM481H, because of its ultra small size and low cost, can be used to increase accuracy and smoothness in systems using higher step angle motors. In many instances mechanical gearing can be replaced



with microstepping, reducing cost and eliminating potential maintenance.

The IM481H was developed to provide designers with affordable, state-of-the-art technology for the competitive edge needed in today's market.

OPTIONS

The INT-481 is an optional plug-on interface board which can be used with the IM481H to facilitate testing, or in situations where panel mounting the IM481H is preferred. The INT-481 contains extra circuitry which includes +5 VDC supply, opto isolators for step clock, direction, enable and reset, along with extra fault detection circuits, input capacitor, and fault and power LED's. Wiring is done through a 19 pin screw terminal. A four position dip switch is supplied for microstep resolution selection.

The H-481 is a small, optional heat sink which mounts easily to the IM481H or the INT-481H/IM481H combination. Its compact size consumes only 4.3 cubic inches (70.5 cubic cm) of space. All required mounting hardware is included with the heat sink kit.



INT-481 Interface Board

PIN ASSIGNMENTS

PIN#	FUNCTION	PIN#	FUNCTION
1	Phase A	12	V+ (+12 to 48VDC)
2	Phase /A	13	Reset
3	Current Reduction Adjustment	14	+5VDC
4	Current Reference	15	Step Clock
5	Current Adjustment	16	Direction
6	Fault In	17	Enable
7	Resolution Select 0	18	On Full Step
8	Resolution Select 1	19	Fault Out
9	Resolution Select 2	20	Phase B
10	Resolution Select 3	21	Phase /B
11	Ground		

ELECTRICAL SPECIFICATIONS

Input Voltage +12 to +48 Volts (Includes Back EMF and Power Supply Ripple)

Output Current* 0.14 to 2.1 A Peak (Max 1.5 A RMS)

Step Frequency (Max) 10 MHz

Steps per Revolution (1.8° Motor) 400, 800, 1000, 1600, 2000, 3200, 5000, 6400, 10000, 12800, 25000, 25600, 50000, 51200

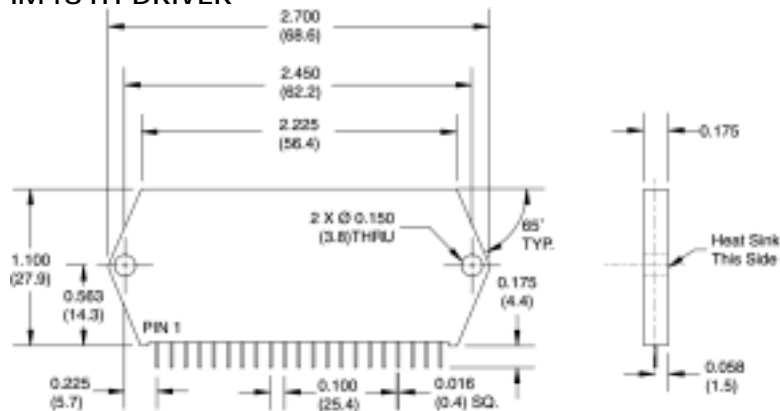
Protection Thermal, Phase to Phase, V+ to Phase

Current Reduction* 0.5 Sec. After Last Step Input

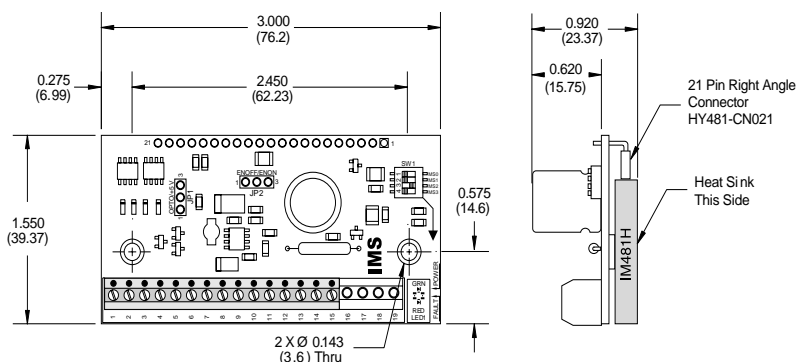
*Resistor Selectable

MECHANICAL SPECIFICATIONS

IM481H DRIVER



INT-481 INTERFACE BOARD



TEMPERATURE

Storage -40 to +125° C

Rear Mounting

Surface (Max)* 0 to +70° C

*External heat sink may be required to maintain mounting surface below 70°C. Isolating thermal pad is required when using additional heat sink.

ORDERING INFORMATION

Name Part Number

Microstepping Driver (Includes Thermal Pad) IM481H

Isolating Thermal Pad TI-481

Interface Board INT-481

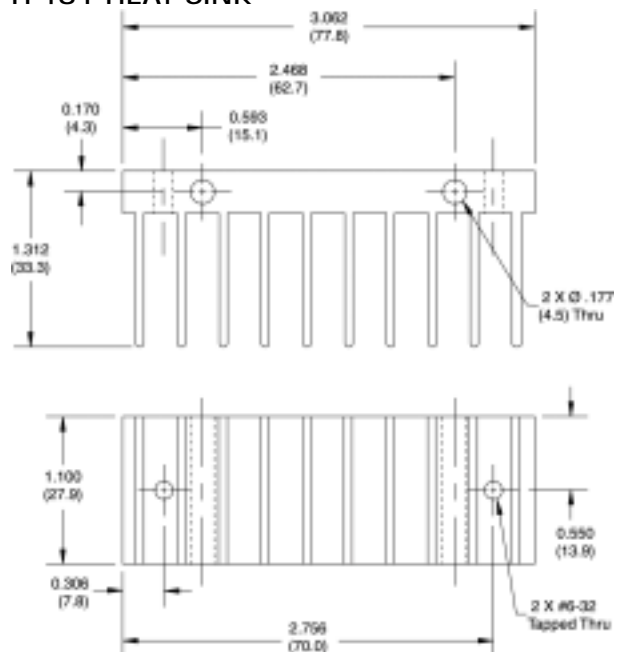
Heat Sink Kit (Includes Mounting Hardware) H-481

21 Pin Right

Angle Connector HY481-CN021

Small End Screwdriver SD1

H-481 HEAT SINK



Dimensions in Inches (mm)

IM483H AND IM805H

**HIGH-PERFORMANCE
ULTRA-MINIATURE
MICROSTEPPING DRIVER**

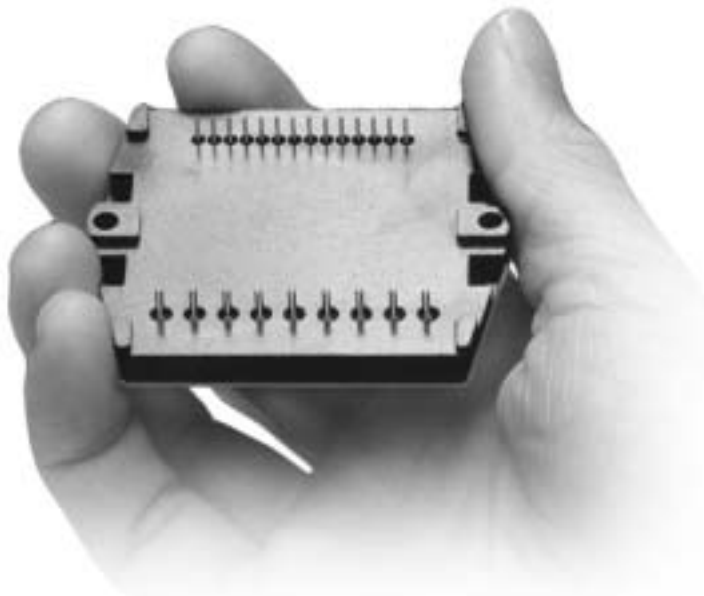
FEATURES

- Very Low Cost
- Ultra Miniature Size
(2.10 x 2.6 x 0.362 inches)
(53.34 x 66.04 x 9.19 mm)
- Advanced Hybrid Design
- High Input Voltage (+12 to +48VDC/+24 to +75VDC)
- High Output Current (3A RMS, 4A Peak/5A RMS, 7A Peak)
- Up to 10MHz Step Clock Rate
- No Minimum Inductance
- FAULT Input and Output
- Short Circuit and Over Temperature Protection
- Microstep Resolution to 51,200 Step/Rev. (1.8° Motor)
- Microstep Resolutions can be Changed "On-The-Fly" Without Loss of Motor Position
- 20 kHz Chopping Rate
- Automatically Switches Between Slow and Fast Decay for Unmatched Performance
- 14 Selectable Resolutions Both in Decimal and Binary
- Adjustable Automatic Current Reduction
- At Full Step Output
- Optional Cooling Fan (HFC-22)
- Optional Receptacle Carrier (PR-22)

DESCRIPTION

The IM483H and IM805H are high performance, low-cost microstepping drivers that utilize advanced hybrid

OPTION: Hybrid Mounted with Optional HFC-22 Heat Sink/Fan/Clip Assembly.



technology to greatly reduce size without sacrificing features. Both are exceptionally small, easy to interface and use, and yet powerful enough to handle the most demanding applications.

The IM483H and IM805H have 14 built-in microstep resolutions (both binary and decimal). The resolution can be changed at any time without the need to reset the driver. This feature allows the user to rapidly move long distances, yet precisely position the motor at the end of travel without the expense of high-performance controllers. In many instances mechanical gearing can be replaced with microstepping. This reduces cost and system size, and eliminates potential maintenance while increasing accuracy and smoothness.

With the development of proprietary and patented circuits, ripple current has been minimized to reduce the motor heating that is common with other designs. This feature allows the use of low inductance motors to improve high-speed performance and system efficiency.

The IM483H/IM805H microstepping hybrids are designed to be soldered directly into a PC board. This eliminates the need for wiring and mounting, thus saving design and assembly time, reducing system cost and increasing reliability.

The ultra-small size reduces the overall space required in your system. In addition, each unit is 100% tested and comes with a 2-year warranty.

Available as options for the IM483H/IM805H are the HFC-22 Heat Sink/Fan/Clip assembly and the PR-22 Pin Receptacles with throwaway carrier. The HFC-22 provides a unique cooling solution and was designed specifically for the IM483H and IM805H Microstepping Hybrid Drivers. The HFC-22 will easily maintain a reliable rear plate temperature without using large heat sinks and cumbersome mounting hardware. The heat sink and fan are easily mounted to the driver by means of a removable clip developed by IMS, and when fully assembled with the IM483H or IM805H takes up only 6.8 cubic inches of space!

For applications where ease of removal is required, the PR-22 provides a reliable, high quality receptacle which comes attached to a high temperature plastic throwaway carrier that facilitates wave soldering.

These drives, because of their ultra-small size, advanced technology and low-cost, provide designers with affordable state-of-the-art solutions for the competitive edge needed in today's market.

IM483H/IM805H SPECIFICATIONS

ELECTRICAL

Input Voltage (Motor)* +12 to +48 VDC/+24 to +75 VDC
 Input Voltage (Logic) +5 VDC
 Output Current (Per Phase) 0.4 to 4 A Peak (Max 3 A RMS)/
 1 to 7 A Peak (Max 5 A RMS)
 Step Clock Frequency (Max) 10MHz
 Steps per Revolution (1.8° Motor) 400, 800, 1000, 1600,
 2000, 3200, 5000, 6400, 10000,
 12800, 25000, 25600, 50000, 51200
 Protection Thermal, Phase to Phase, V_{IN} to Phase
 *Includes motor back EMF, Power Supply Ripple and High Line.

TEMPERATURE

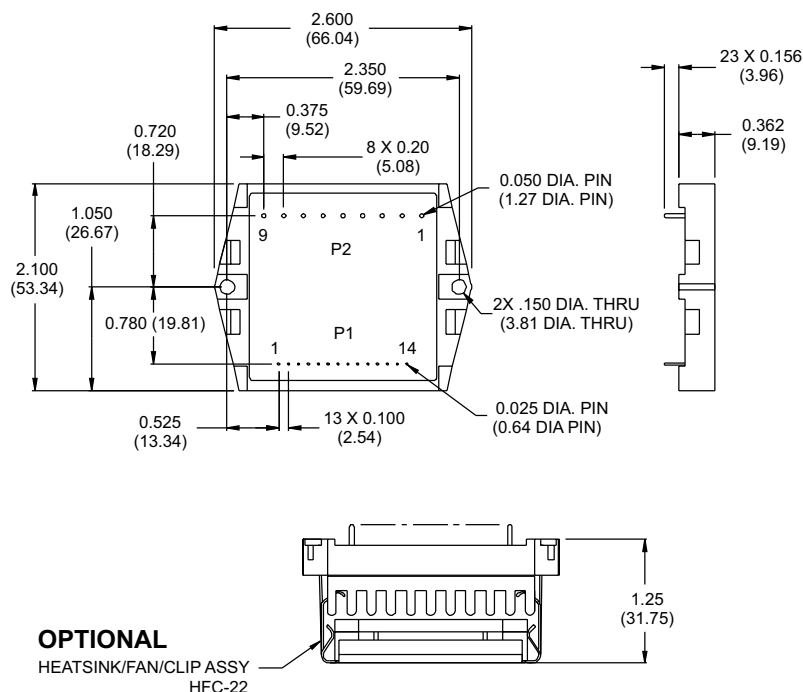
Storage -40 to +125° C
 Rear Mounting Surface 0 to +65° C

OPTIONS

TN-22H Thermal Pad (Included with Driver)
 HFC-22 Heat Sink/Fan/Clip Assembly
 INT-483H/INT-805H Driver Interface Board
 IM483H/IM805H-DK1 Developer's Kit
 (Includes Driver, Interface Board,
 Heat Sink/Fan/Clip Assembly)
 PR-22 23 Pin Receptacles with
 Thruway Carrier
 PB-22 Small Pry Bar (To Remove
 Thruway Carrier/Driver
 From Pin Receptacles)
 OSC-805H Analog Speed Control Board for IM805H Driver
 MB-22 Mounting L-Bracket

MECHANICAL SPECIFICATIONS

Dimensions in Inches (mm)

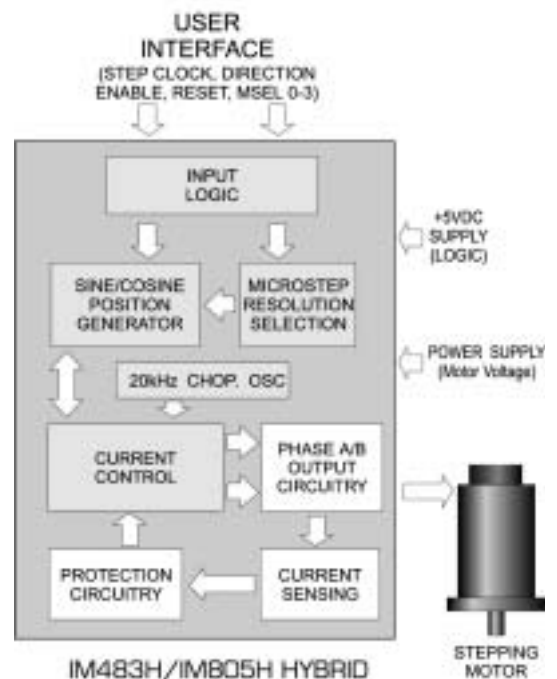


IM483H/IM805H

Pin Assignments and Functions

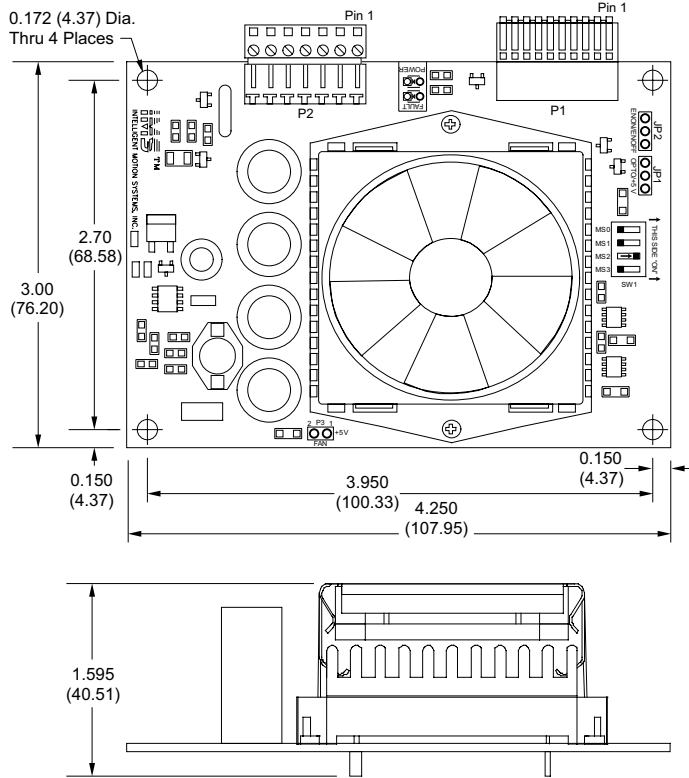
CONNECTOR P1: 14 PIN		
PIN #	FUNCTION	
1	Current Reference	
2	Current Adjust	
3	Current Reduction	
4	Fault Input	
5,6,7,8	Resolution Select 0-3	
9	Step Clock	
10	Direction	
11	Enable	
12	On Full Step	
13	Fault Output	
14	Reset	
CONNECTOR P2: 9 PIN		
PIN #	FUNCTION	
	IM483H	IM805H
1	Phase B	Phase B
2	GND B	GND B
3	Phase \bar{B}	Phase \bar{B}
4	GND	GND
5	+V	+V
6	+5V Input	+5V Input
7	Phase A	Phase \bar{A}
8	GND A	GND A
9	Phase \bar{A}	Phase A

BLOCK DIAGRAM



DEVELOPER'S KIT/INTERFACE BOARD

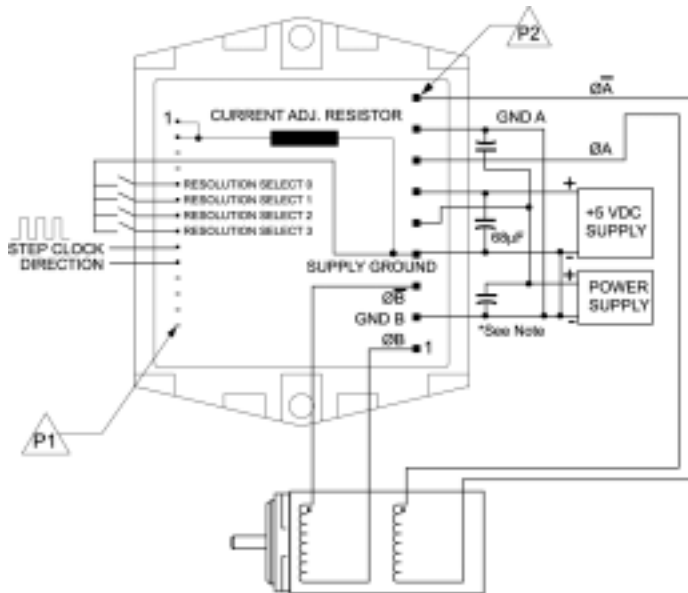
The Developer's Kit provides all of the tools needed for rapid prototyping and product evaluation of the IM483H/IM805H Hybrid Drivers. Included in the Kit are a Driver, an Interface Board and its schematic, and an HFC-22 assembly. The INT-483H/INT-805H interface board features an on-board +5V supply, additional fault protection, opto isolation for logic inputs, and removable screw terminals for easy prototyping. The interface board schematic provides a useful guide for PC board layout when completing a system design using the IM483H/IM805H Hybrid. The HFC-22 Heat Sink/Fan/Clip assembly is designed specifically for use with the IM483H/IM805H and provides a unique, compact cooling solution.



INT-483H/INT-805H Pin Assignments and Descriptions

CONNECTOR P1: 10 POSITION PHOENIX		
PIN#	PIN NAME	DESCRIPTION
1	Opto Supply	+5 to +24 VDC
2	Current Reduction	Phase Current Reduction Input
3	Current Adjust	Phase Current Adjust Input
4	GND	Ground
5	Reset	Active LOW Reset Input
6	Enable	Active HIGH Motor Phase Enable Input
7	Direction	Motor Direction Input
8	Step Clock	Motor Step Clock Input
9	Full Step	Open Drain on Full Step Output
10	Fault	Open Drain Fault Output
CONNECTOR P2: 7 PIN SCREW TERMINAL		
PIN#	PIN NAME	DESCRIPTION
1, 2	Phase A	Phase A Output
3, 4	Phase B	Phase B Output
5, 6	Ground	Supply Voltage Ground (Return)
7	+V	Supply Voltage Input

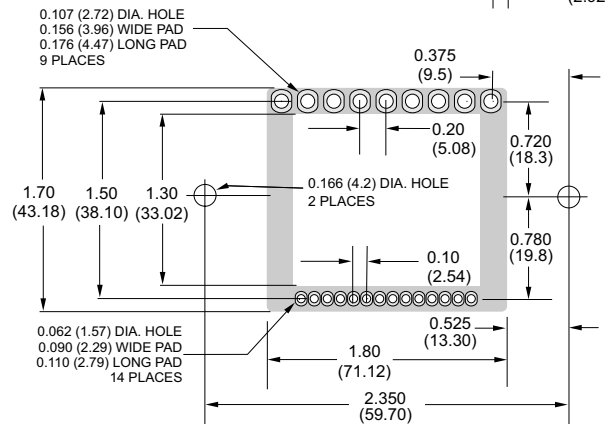
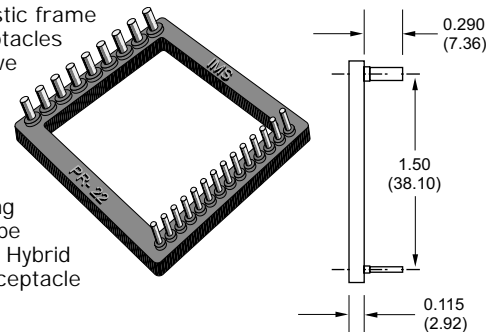
MINIMUM CONNECTIONS



NOTE: Low impedance electrolytic capacitors MUST be placed between +V and the phase grounds for each phase (Pins P2: 2 & 8). In addition, a 68mF electrolytic capacitor MUST be placed between the +5 VDC output of the +5 volt supply and ground. Capacitors should be placed as close as possible to the driver.

PR-22 RECEPTACLE CARRIER

Disposable plastic frame holds 23 receptacles in place for wave or hand solder, then simply pry the plastic frame free and throw away.
NOTE: Mounting screws MUST be used to secure Hybrid when using Receptacle Carrier.



Dimensions in Inches (mm)

IB462H

**ULTRA-MINIATURE
BIPOLAR STEPPING
MOTOR DRIVER**

FEATURES

- Very Low Cost
- Ultra Miniature (1.2 x 2.4 x 0.28 inches)
(30 x 61 x 7.1 mm)
- Advanced Hybrid Design
- Full or Half Step
- High Input Voltage (+12 to +40 VDC)
- High Output Current (2A Per Phase)
- 20 kHz Chopping Rate
- Alternative to Chipsets

DESCRIPTION

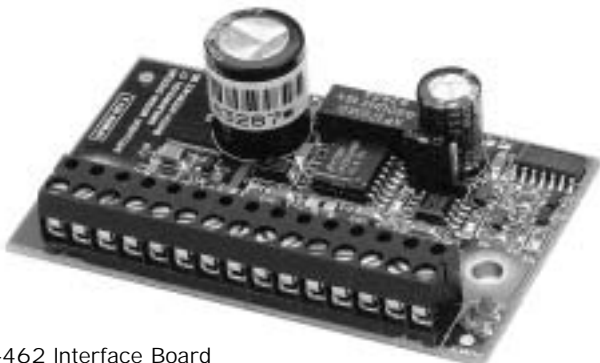
Based upon our popular IB462 Half/Full Step Driver, the IB462H is a low cost, high performance alternative to larger drives. The small size of the IB462H makes it ideal for system designs where space is at a premium without sacrificing performance as a result.

The IB462H operates between +12 and +40 VDC. This high voltage allows for greater speeds at higher torque. Combine this with 2A per phase of output current and 160 watts of power and you have a low cost alternative to chipsets, all contained in a package that minimizes expensive real estate!

The IB462H is our smallest and lowest priced drive. It will reduce time to market, increase reliability, and it comes with a 2 year warranty. The IB462H represents affordable, state-of-the-art technology for the competitive edge needed in today's market.

OPTIONS

The INT-462 is an optional plug-on interface board which can be used with the IB462H to facilitate testing, or in situations where panel mounting the IB462H



INT-462 Interface Board



is preferred. The INT-462 is much more than a simple pluggable interface. It adds a dynamic array of features to the IB462H that are found only on larger more expensive drives. Features such as a +5 VDC switching power supply, +5 to +40 VDC opto-isolated inputs which are internally limited to 8mA, automatic current reduction, over current and short circuit protection, input capacitor, and fault and power LEDs. Wiring is done through a 15 pin removable screw terminal.



OSC-462H Speed Control Board

The OSC-462H analog speed control board is an option for adding low cost, intelligent velocity control to the IB462H driver. The OSC-462H is powered by a single +12 to +40 VDC power supply, which will also provide power for the IB462H. The control board features a digital oscillator for accurate velocity control with an output frequency of up to 60 kilohertz. The IB462H driver plugs easily into a 21 pin receptacle attached to the OSC-462H. This device allows for a simple, cost effective solution in applications requiring variable velocity control.

Also available is the new H-462H heat sink, which only adds 2.21 cubic inches (36.1 cubic cm) to the overall footprint of the IB462H.

ELECTRICAL SPECIFICATIONS

Input Voltage (Motor)	+12 to +40 VDC
Input Voltage (Logic)	+5 VDC
Output Current (Per Phase)	1.0 to 2.0 Amps
Step Clock Frequency (Max.)	40 kHz

ORDERING INFORMATION

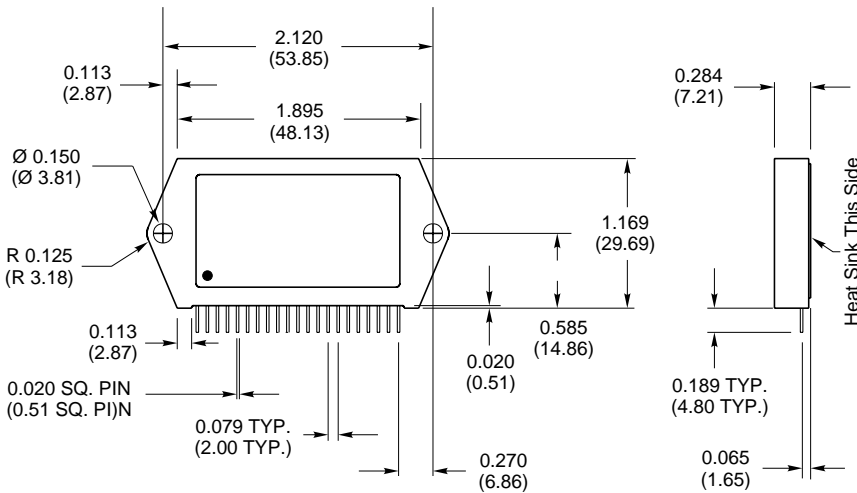
Name	Part Number
Stepping Motor Driver (Includes Thermal Pad)	IB462H
Isolating Thermal Pad	TI-462H
Heatsink	H-462H
Interface Board	INT-462
21 Pin Right Angle Connector	HY462-CN021
Analog Speed Control Board	OSC-462H
Mounting L-Bracket	MB-21
Analog Speed Control Board Parameter Setup Cable	OSC-CC100-000
Small End Screwdriver	SD1

PIN ASSIGNMENTS

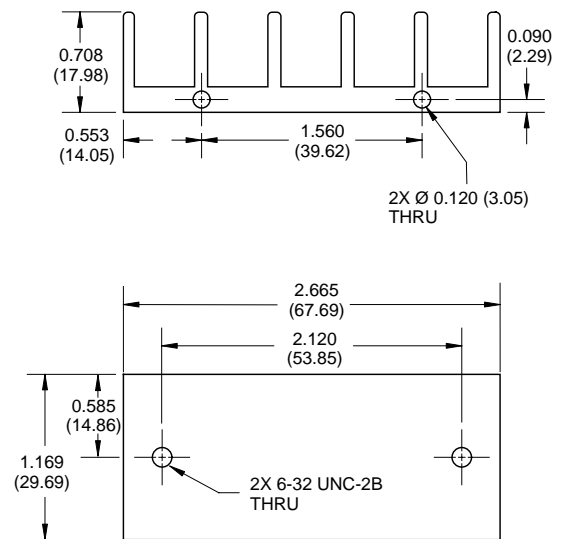
PIN#	FUNCTION
1	Current Adjust
2	Reset
3	Half/Full Step
4	Step Clock
5	+5V Supply In
6	Direction
7	Enable
8	Sense B
9, 10	Phase B
11, 12	Phase B
13, 14	+12 to +40 VDC (+V)
15, 16	Power Ground
17, 18	Phase A
19, 20	Phase A
21	Sense A

MECHANICAL DRAWINGS

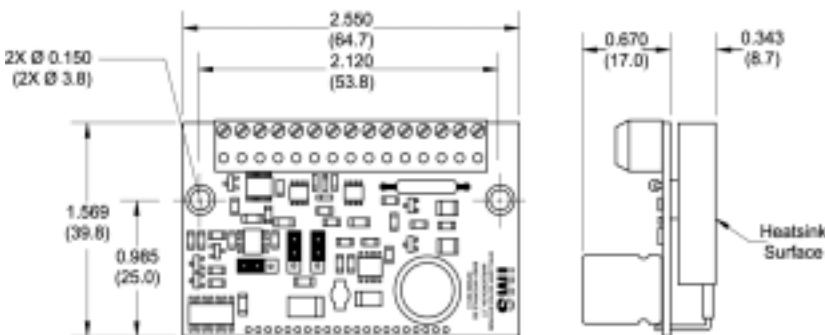
IB462H DRIVER



H-462H HEAT SINK



INT-462 INTERFACE BOARD



Dimensions in Inches (mm)

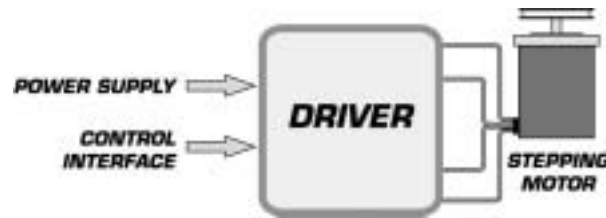


IM483

HIGH PERFORMANCE MICROSTEPPING DRIVER

FEATURES

- Low Cost
- Extremely Small (2.7 x 3.0 x 1.2 inches) (70 x 69 x 31 mm)
- High Input Voltage (48V)
- High Output Current (3 Amps RMS, 4 Amps Peak)
- Advanced Surface Mount and ASIC Technology
- No Minimum Inductance
- Single Supply
- Up to 10 MHz Step Clock Rate
- Opto-Isolated Inputs
- Fault Output
- Short Circuit and Over Temperature Protection
- Up to 51,200 Steps/Rev
- Microstep Resolutions Can Be Changed On-The-Fly without Loss of Motor Position
- 20 kHz Chopping Rate
- Automatically Switches Between Slow and Fast Decay for Unmatched Performance
- 14 Selectable Resolutions Both in Decimal and Binary
- Adjustable Automatic Current Reduction
- At Full Step Output
- Optional On-board Indexer and Encoder Feedback



BLOCK DIAGRAM



DESCRIPTION

The IM483 is a high performance, low cost microstepping driver that incorporates advanced surface mount and ASIC technology. The IM483 is small, easy to interface and use, yet powerful enough to handle the most demanding applications.

The IM483 has 14 different resolutions (both in binary and decimal) built into the driver. These resolutions can be changed at any time. There is no need to reset the driver.

This feature allows the user to rapidly move long distances, yet precisely position the motor at the end of travel without the expense of high performance controllers.

The development of proprietary circuits has minimized ripple current while maintaining a 20 kHz chopping rate. This prevents additional motor heating that is common with drivers requiring higher chopping rates. Now low inductance stepper motors can be used to improve high speed

performance and system efficiency. The IM483 also comes with an optional on-board indexer to provide design engineers with versatility and power unmatched in today's industry.

The IM483 is priced lower to provide customers with affordable state-of-the-art technology for that competitive edge needed in today's market.

S P E C I F I C A T I O N S

ELECTRICAL

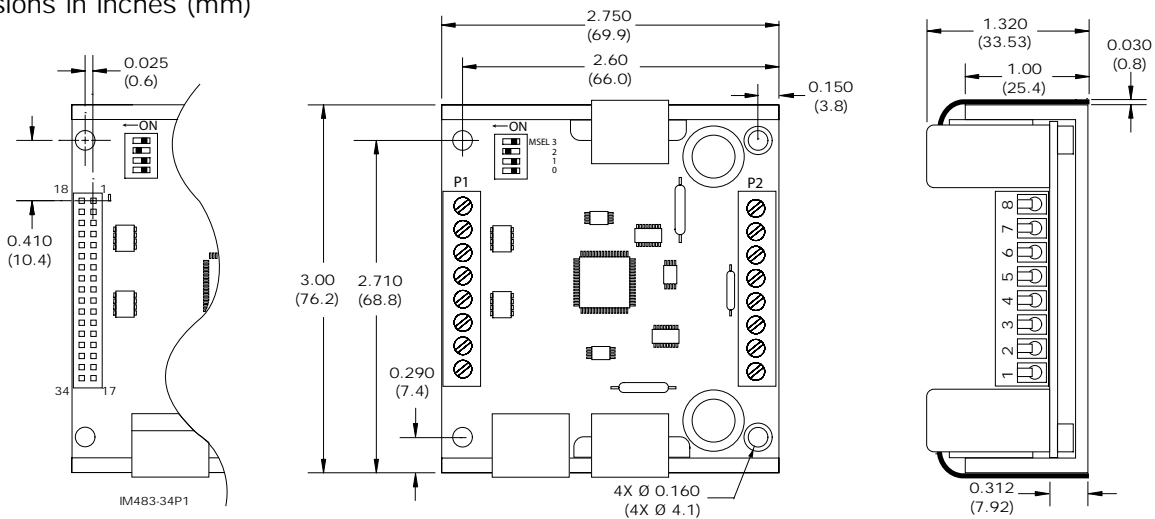
IM483

Input Voltage	+12 to 48 Volts*
Drive Current (Per Phase)	0.4 to 4 Amps Peak (Max 3 Amps RMS)
Isolated Inputs	Step Clock, Direction, Enable & Reset
Step Frequency (Max)	10 MHz (1.8 MHz -NR Option)
Steps per Revolution (1.8° Motor)	400, 800, 1000, 1600, 2000, 3200, 5000, 6400, 10000, 12800, 25000, 25600, 50000, 51200
Protection	Thermal and All Way Short Circuit

*Includes Motor Back EMF, Power Supply Ripple and High Line Conditions. Recommended Power Supply: ISP200-4

MECHANICAL

Dimensions in Inches (mm)



TEMPERATURE

Storage	-40 to +125° C
Case* (Max)	0 to +70° C

*External heat sink may be required to maintain case temperature.

OPTIONS

-NR	Noise Reduction Inputs (1.8 MHz)
H-4X	Heat Sink
TN-48	Thermal Pad
-8P2	8 Position 0.045" sq Pin P2 Connector with 8 Position 0.025" sq Pin P1 Connector
-34P1	34 Position 0.025" sq Pin P1 Connector
-PLG	Plug Type Terminal Strip for P1 and P2 Connectors
PLG-R1/2	Mating Connectors for the -PLG Option
U3-CLP	Side Mounting Clip Set

PIN FUNCTIONS

Connector P1 (8 Pin)

1. No Connection
2. Step Clock
3. Direction
4. Opto Supply
5. Enable
6. Reset
7. Fault
8. On Full Step

Connector P1* (34 Pin)

- | | |
|------------------------|-------------------------|
| 3. Resolution Select 3 | 16, 26. On Full Step |
| 4. Step Clock In | 21. Step Clock Out |
| 6. Direction In | 22. Direction Out |
| 8. Opto Supply | 23. Resolution Select 0 |
| 10. Enable | 24. Resolution Select 2 |
| 12. Reset | 25. Resolution Select 1 |
| 14. Fault | 27. Ground |

*Pins not shown are no connections.

Connector P2

8. Phase A
7. Phase A
6. Phase B
5. Phase B
4. V+ (12V to 48V)
3. Ground
2. Current Adjust
1. Reduction Adjust

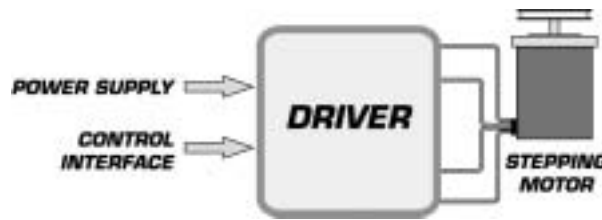


IM805

HIGH VOLTAGE MINIATURE MICROSTEPPING DRIVER

FEATURES

- Low Cost
- Extremely Small (2.7 x 3.0 x 1.3 inches) (69.9 x 76.2 x 33 mm)
- Pin and Footprint Compatible with the IM483
- High Input Voltage (75V)
- High Output Current (5 Amps RMS, 7 Amps Peak)
- Advanced Surface Mount and ASIC Technology
- Designed for High Performance, Low Inductance Motors
- Single Supply
- Up to 10 MHz Step Clock Rate
- Opto-Isolated Inputs
- Fault Output
- Short Circuit and Over Temperature Protection
- Up to 51,200 Steps/Rev
- 14 Selectable Microstepping Resolutions May Be Changed On-The-Fly Without Loss of Motor Position
- 20 kHz Chopping Rate
- Automatically Switches Between Slow and Fast Decay for Unmatched Performance
- Adjustable Automatic Current Reduction
- At Full Step Output
- Fault and Power LED's



BLOCK DIAGRAM



DESCRIPTION

The IM805 is a high performance, low cost microstepping driver that incorporates advanced surface mount and ASIC technology. The IM805 is small, easy to interface and use, yet powerful enough to handle the most demanding applications.

The IM805 has 14 different resolutions (both in binary and decimal) built into the driver. These resolutions can be changed at any time. There is no need to reset the driver. This feature

allows the user to rapidly move long distances, yet precisely position the motor at the end of travel without high expense.

The development of proprietary circuits has minimized ripple current while maintaining a 20 kHz chopping rate. This prevents additional motor heating that is common with drivers requiring higher chopping rates. Now low inductance stepper motors can be used to improve high speed performance and system efficiency.

The IM805 is pin and footprint compatible with our IM483 drive, which has an output current of 3A RMS and 4A peak. This allows the same mechanical configuration to be used with systems that may utilize different power requirements.

The IM805 is priced lower to provide customers with affordable state-of-the-art technology for that competitive edge needed in today's market.

S P E C I F I C A T I O N S

ELECTRICAL

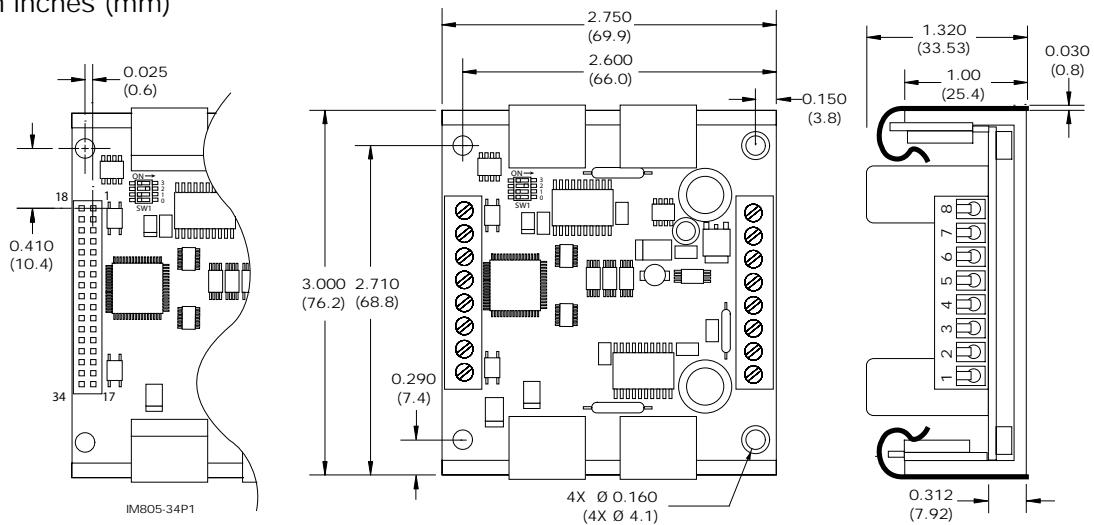
IM805

Input Voltage	+24 to 75 Volts*
Drive Current (Per Phase)	1.0 to 7 Amps Peak (Max 5 Amps RMS)
Isolated Inputs	Step Clock, Direction, Enable & Reset
Step Frequency (Max)	1.8 MHz (10 MHz -HS Option)
Steps per Revolution (1.8° Motor)	400, 800, 1000, 1600, 2000, 3200, 5000, 6400, 10000, 12800, 25000, 25600, 50000, 51200
Protection	Thermal and All Way Short Circuit, Over/Under Voltage
Indicators	Fault (Red) and Power (Green) LED's

*Includes Motor Back EMF, Power Supply Ripple and High Line Conditions. Recommended Power Supply: ISP200-7

MECHANICAL

Dimensions in Inches (mm)



TEMPERATURE

Storage _____ -40 to +125° C

Case* (Max) _____ 0 to +70° C

*External heat sink may be required to maintain case temperature.

OPTIONS

- HS High Speed Inputs (10 MHz)
- H-4X Heat Sink
- TN-48 Thermal Pad
- 8P2 8 Position 0.045" sq Pin P2 Connector with 8 Position 0.025" sq Pin P1 Connector
- 34P1 34 Position 0.025" sq Pin P1 Connector
- PLG Plug Type Terminal Strip for P1 and P2 Connectors
- PLG-R1/2 Mating Connectors for the -PLG Option
- U3-CLP Side Mounting Clip Set

PIN FUNCTIONS

Connector P1 (8 Pin)

1. No Connection
2. Step Clock
3. Direction
4. Opto Supply
5. Enable
6. Reset
7. Fault
8. On Full Step

Connector P1* (34 Pin)

3. Resolution Select 3
4. Step Clock In
6. Direction In
8. Opto Supply
10. Enable
12. Reset
14. Fault
- 16, 26. On Full Step
21. Step Clock Out
22. Direction Out
23. Resolution Select 0
24. Resolution Select 2
25. Resolution Select 1
27. Ground

*Pins not shown are no connections.

Connector P2

8. Phase A
7. Phase \bar{A}
6. Phase B
5. Phase \bar{B}
4. V+ (24V to 75V)
3. Ground
2. Current Adjust
1. Reduction Adjust