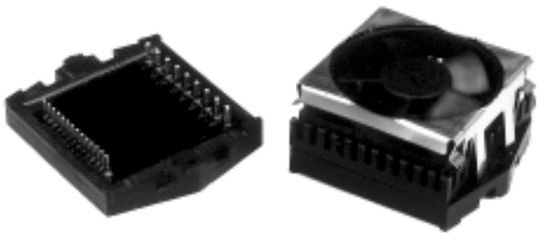
IM483H & IM805H

HYBRID MICROSTEPPING DRIVERS

QUICK REFERENCE



IM483H/IM805H Quick Reference/Installation Guide

The primary function of this guide is to acquaint the user with the specifications, basic wiring and configuration of the IM483H/IM805H Hybrid Microstepping Drivers. 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 http://www.imshome.com.

Notes And Warnings

Please observe the following when handling, connecting and using your IM483H/IM805H driver. 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.

WARNING! The IM483H/IM805H components are sensitive to Electrostatic Discharge (ESD). All handling should be done at an ESD protected workstation.

WARNING! Hazardous voltage levels may be present if using an open frame power supply to power the IM483H/IM805H!

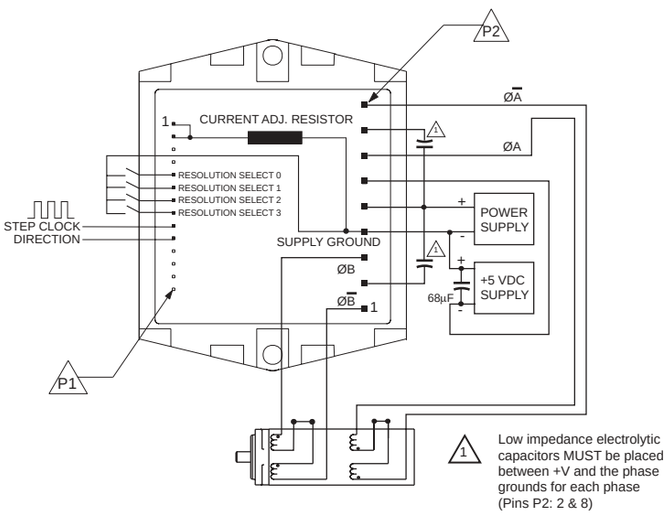
WARNING! Ensure that the power supply output voltage does not exceed the maximum input voltage of the IM483H/IM805H!

WARNING! Do not apply power to the IM483H/IM805H without proper heat sinking or cooling! A thermal pad or thermal grease **MUST BE** used between the IM483H/IM805H and the heat sink! The maximum rear plate temperature of the IM483H/IM805H is 70° C.

ATTENTION!
TN-22 THERMAL PAD – It is ESSENTIAL that the TN-22 Thermal Pad included with the IM483H/IM805H be placed between the ceramic plate of the hybrid and the heat sink. Use of this pad will improve thermal flow between the driver and the heat sink. When the plate temperature of the driver is greater than 50°C the material will begin to reflow. This forms a low bond strength interface that fully contacts both surfaces for a void-free thermal connection without the mess or inconsistency of thermal grease. *NOTE: The TN-22 material is quite fragile. Exercise care when placing this material.*

Minimum Connections

The following figure illustrates the minimum connection requirements for the IM483H and IM805H drivers.



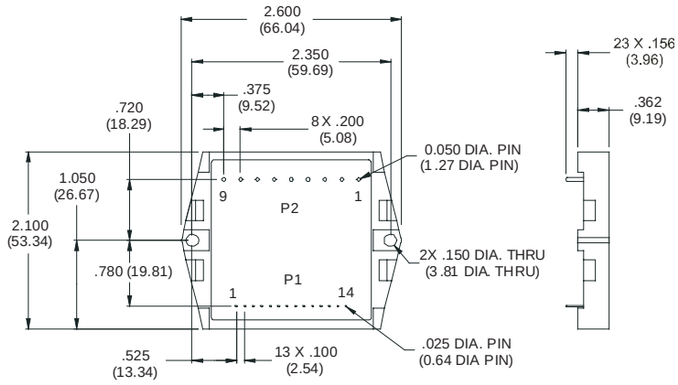
NOTE: If upgrading your system from an IM483H to an IM805H, or vice-versa, please note that the Phase A and Phase /A output pins (Pins 7 & 9) are reversed. This will cause the motor to turn in the opposite direction. To correct this condition swap the motor wires on Phase A.

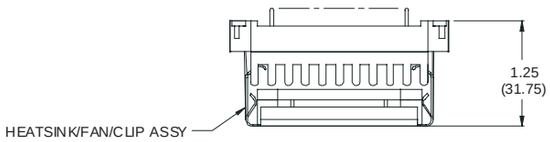
Thermal Specifications

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

IM483H/IM805H Dimensional Information

Dimensions in Inches (mm)





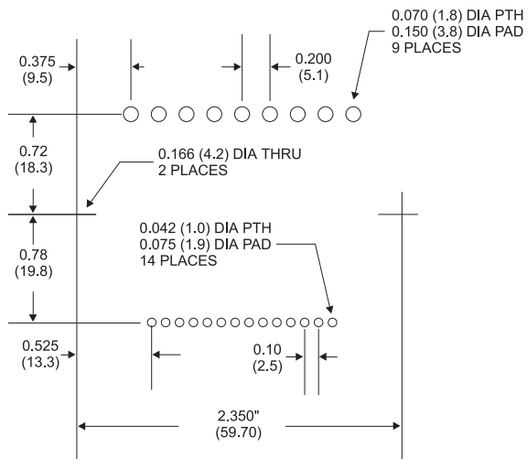
Soldering the IM483H/IM805H to a PC Board

The IM483H and IM805H hybrids are designed to be soldered directly to a PC board. Recommended soldering practices:

Max. Soldering Temp	315°C
Max. Soldering Time	10 sec.

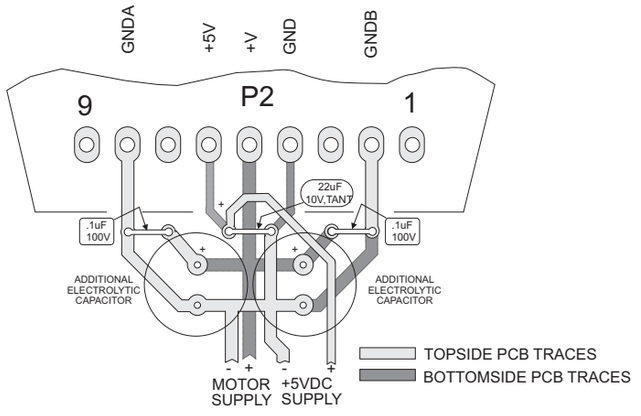
PCB Hole Pattern - Direction Mounting to a PC Board

Dimensions in Inches (mm)



CALCULATING THE VALUE OF THE INPUT CAPACITORS
EXAMPLE: 3.2A (Peak Output Current @ 45VDC) X 150µF = 480µF 63V

Power Interface



For More Information:
See the complete IM483H/IM805H Product Manual

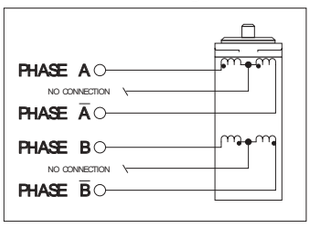
Pin Assignment And Description

IM483H/IM805H Connector P1 Configuration		
PIN #	**FUNCTION**	**DETAILS**
1	Current Reference Output	Phase Current Reference Output. A resistor is connected between this 1mA current source output and the ground pin (P2:4) to generate the reference voltage used to set the peak phase current in the motor.
2	Current Adjustment Input	Phase Current Adjustment Input. A voltage applied to this input sets the peak phase current in the motor.
3	Current Reduction Adjust Input	Phase Current Reduction Adjustment Input. A resistor connected between this pin and P1:2, if used to set the motor phase current, will proportionately reduce the current in both motor windings approximately .5 seconds after the last positive edge of the step clock input.
4	Fault Input	A logic LOW signal on this input will generate a latched FAULT condition.
5	Resolution Select 0	Microstep Resolution Select Inputs. Used to select the number of microsteps per step of the motor.
6	Resolution Select 1	
7	Resolution Select 2	
8	Resolution Select 3	
9	Step Clock Input	A positive going edge on this input advances the motor one increment. The size of the increment is dependant upon the settings of the resolution select inputs.
10	Direction Input	This input is used to change the direction of the motor. Physical direction also depends upon the connection of the motor windings.
11	Enable/Disable Input	This input is used to enable/disable the output section of the driver. When in a Logic HIGH state, the outputs are enabled. However, this input does not inhibit the step clock, therefore, the outputs will update by the number of clock pulses (if any) applied to the driver while it was disabled.
12	On-Full-Step Output	This output indicates when the driver is positioned at full step. This output can be used to count the number of full steps the motor has moved, regardless of the number of microsteps in between. This output is active HIGH.
13	Fault Output	This output indicates that either a short circuit condition has occurred or a LOW signal was detected on the fault input. This output is active HIGH.
14	Reset Input	When LOW, this input will reset the driver (phase outputs will disable). When released, the driver will be at its initial state (Phase A OFF, Phase B ON).

Motor Specifications

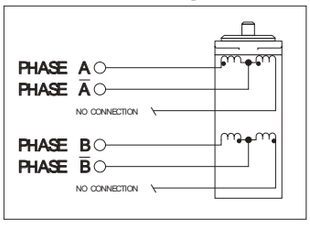
6 Lead Motors

Full Coil Configuration



Motor Peak Current = Rated Amps/Phase

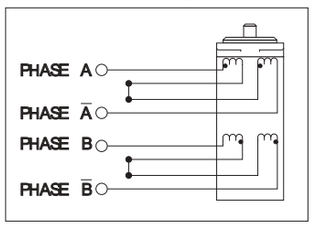
Half Coil Configuration



Motor Peak Current = Rated Amps/Phase x 1.4

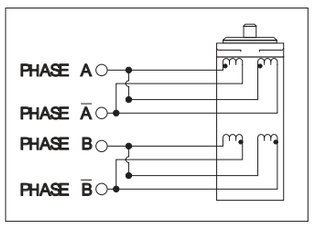
8 Lead Motors

Series Connection



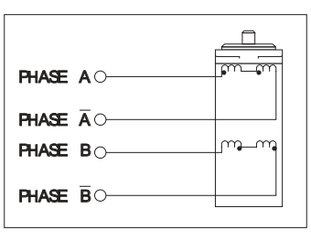
Motor Peak Current = Rated Amps/Phase
or
Motor Peak Current = Bipolar Current Rating x 1.4

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

IM483H/IM805H DC Electrical Specifications						
Specification	**Test Condition**	**Driver**	**Min**	**Typ**	**Max**	**Unit**
Input Voltage		483H	12	45	48	V
		805H	24		75	V
Phase Output Current	RMS	483H	0.4		3	A
		805H	1		5	A
Phase Output Current	Peak	483H			4	A
		805H			7	A
Supply Current (+5VDC P2:6)	Inputs/Outputs Floating	483H		100		mA
		805H		200		mA
Active Power Dissipation	Iout=3A RMS	483H			12	W
	Iout=5A RMS	805H			25	W
Low Level Input Voltage	All Inputs	Both			0.8	V
High Level Input Voltage	All Inputs Except Reset	Both	2.0			V
High Level Input Voltage	Reset Input	Both	2.3			V
Input Pull-Up Resistance	Fault Input, MSEL0-3, Enable	Both	4.94	4.99	5.03	kW
Input Pull-Up Resistance	Step Clock, Direction	Both	2.19	2.21	2.23	kW
Input Pull-Up Resistance	Reset Input Only	Both	0.9	1.0	1.1	kW
Low Level Output Current	Fault, Fullstep	Both			-6	mA
High Level Output Current	Fault, Fullstep	Both			3	mA
Low Level Output Voltage		Both			0.4	V
High Level Output Voltage		Both	4.5			V
Fan Operating Voltage		Both	4.3	5	5.7	V
Fan Operating Current		Both		0.17		MA

IM483H/IM805H AC Electrical Characteristics					
Specification	**Test Condition**	**Min**	**Typ**	**Max**	**Unit**
Reset Pulse Width		1.0			µS
MSEL, Direction Setup Time			100		nS
Step Clock Pulse Width		50			nS
Step Clock Execution Time	No Direction or MSEL Change		100		nS
Step Clock Execution Time	Direction or MSEL Change		200		nS
Step Clock to Full-Step Output			75		nS
Step Clock Input Frequency				10	MHz
PWM Chopper Frequency			20		kHz

Limiting Output And Holding Current

IM483H

$$R_{Adj} = \frac{I_{Run}}{0.002}$$

I_{Run} is the desired peak running current. Range 0.4A to 4A Peak.

R_{Adj} is the resistor value (Ohms) to limit running current.

$$R_{Red} = 500 \times \frac{I_{Run} \times I_{Hold}}{(I_{Run} - I_{Hold})}$$

R_{Red} is the resistor value (Ohms) to limit the holding current.

I_{Hold} is the desired peak holding current. Range 0.2A to 4A Peak.

IM805H

$$R_{Adj} = 150 \times I_{Run}$$

I_{Run} is the desired peak running current. Range 1.0A to 7A Peak.

R_{Adj} is the resistor value (Ohms) to limit running current.

$$R_{Red} = 150 \times \frac{I_{Run} \times I_{Hold}}{(I_{Run} - I_{Hold})}$$

R_{Red} is the resistor value (Ohms) to limit running current.

I_{Hold} is the desired holding current. Range 0.5A to 7A Peak.

Microstep Resolution Select Inputs (MSEL)

Resolution		Microstep Select Line States			
Microsteps/ Step	**Microsteps/ Rev**	**MSEL 0**	**MSEL 1**	**MSEL 2**	**MSEL 3**
Binary Microstep Resolution Settings (1.8° Motor)					
2	400	GND	GND	GND	GND
4	800	OPEN	GND	GND	GND
8	1,600	GND	OPEN	GND	GND
16	3,200	OPEN	OPEN	GND	GND
32	6,400	GND	GND	OPEN	GND
64	12,800	OPEN	GND	OPEN	GND
128	25,600	GND	OPEN	OPEN	GND
256	51,200	OPEN	OPEN	OPEN	GND

Decimal Microstep Resolution Settings (1.8° Motor)					
5	1,000	GND	GND	GND	OPEN
10	2,000	OPEN	GND	GND	OPEN
25	5,000	GND	OPEN	GND	OPEN
50	10,000	OPEN	OPEN	GND	OPEN
125	25,000	GND	GND	OPEN	OPEN
250	50,000	OPEN	GND	OPEN	OPEN

Invalid Resolution Settings: May Cause Erratic Operation					
		GND	OPEN	OPEN	OPEN
		OPEN	OPEN	OPEN	OPEN

IM483H/IM805H Options And Accessories

Part #	**Description**
INT-483H/805H	Interface Board
HFC-22	Heat Sink/Fan/Clip Assembly
TN-22	Thermal Pad
PR-22	23 Pin Receptacles with Carrier
PB-22	Pry Bar for PR-22
IM483H-DK1	IM483H Developer's Kit: Driver/InterfaceBoard/HFC-22
IM805H-DK1	IM805H Developer's Kit: Driver/InterfaceBoard/HFC-22

Revision 02052003