

# IM1007

**HIGH PERFORMANCE MICROSTEPPING DRIVER**

## QUICK REFERENCE



### IM1007 Quick Reference/ Installation Guide

The primary function of this guide is to acquaint the user with the specifications, basic wiring and configuration of the IM1007 High Performance Microstepping 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](http://www.imshome.com)

### Notes And Warnings

Please observe the following when handling, connecting and using your IM1007 Driver. Failure to observe these points may result in damage. All warranty and disclaimer information is located in the full product manual and should be referenced for more information.

**WARNING!** The IM1007 Driver 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 you are using an open frame power supply to power the IM1007 Driver.

**WARNING!** Ensure that the Power Supply output voltage does not exceed the maximum input voltage of the IM1007 Driver.

**WARNING!** Do not operate the IM1007 Driver without a Current Adjustment Resistor!

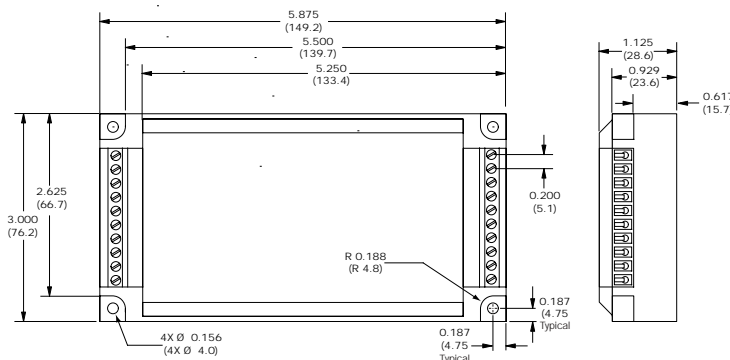
A resistor **MUST** be placed between the Current Adjust Input (Pin 4 on P2) and ground (Pin 5 on P2) to keep the IM1007 Driver and/or motor in a safe operating range.

### Thermal Specifications

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

### Mechanical Specifications

Dimensions in Inches (mm)

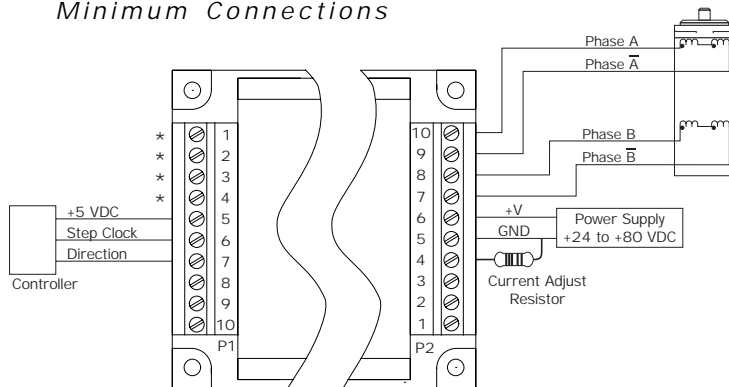


### Test Values

TEST CONDITION	MIN	TYP	MAX	UNITS
Input Voltage	24		80*	V
Phase Output Current (RMS)	2		7	A
Phase Output Current (Peak)			10	A
Quiescent Current (Outputs Floating)			85	mA
Active Power Dissipation ( $I_{OUT}=7A$ RMS)			19	W
Input Forward Current (Input Pins 1,2,3,4,6,7,8,9,10)		7.0	15	mA
Input Forward Voltage		1.5	1.7	V
Input Reverse Breakdown Voltage		5		V
Output Current (Fault, Full Step Outputs)			25	mA
Collector-Emitter Voltage (Fault Output)			140	V
Collector-Emitter Saturation Voltage Fault Output ( $I_{CS} = 25$ mA DC)			0.2	V
Drain-Source Voltage (Full Step Output)			100	V
Drain-Source On-Resistance Full Step Output ( $I_{CS} = 25$ mA DC)		6.5		$\Omega$

\* Includes back EMF of motor.

### Minimum Connections



\* A valid Microstep Resolution must be used on these Inputs.

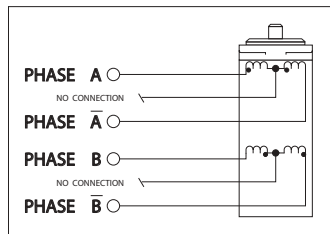
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### Connecting the Motor

#### 6 Lead Motors

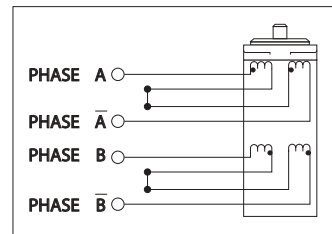
##### Full Coil Configuration



Motor Peak Current = Rated Amps/Phase

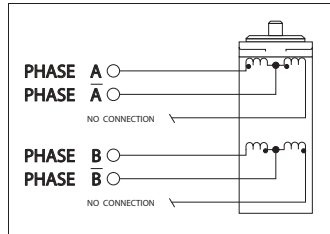
#### 8 Lead Motors

##### Series Connection



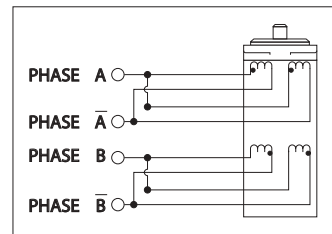
Motor Peak Current = Rated Amps/Phase  
or  
Motor Peak Current = Bipolar Current Rating x 1.4

##### Half Coil Configuration



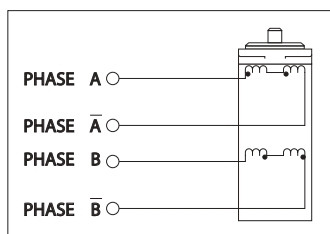
Motor Peak Current = Rated Amps/Phase x 1.4

##### 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

## Pin Assignments

### Connector P1

PIN #	PIN NAME	DESCRIPTION
1,2,3,4	Microstep Select Inputs (0-3)	These Inputs select the number of Microsteps per step. They are optically isolated, binary coded Inputs.
5	+ 5 VDC	Supplies current to the Isolated Inputs. A higher voltage may be used but care must be taken to limit the current through the optocoupler.
6	Step Clock Input	A positive going edge on this Isolated Input advances the motor one increment. The size of the increment is dependent on the Microstep Select Inputs.
7	Direction Input	This Isolated Input is used to change the direction of the motor. Physical direction also depends on the connection of the motor windings.
8	Reset Input	When LOW this Isolated Input will reset the driver (the Output will be disabled). When released (HIGH) the driver will be at its initial state.
9	Enable Input	Used to enable/disable the output section of the driver. A HIGH (open) enables the driver output but does not disable the Step Clock. Therefore, when enabled, the outputs will update by the number of clock pulses (if any) applied to the driver while it was disabled.
10	Current Reduction Input	This Isolated Input is used to switch in and out of the Current Reduction Resistor on Connector P2, Pins 3 & 4. When this Input is LOW, the Current Reduction Resistor is switched on.

### Connector P2

PIN #	PIN NAME	DESCRIPTION
1	Fullstep Output	An Open Collector Output that indicates when the driver is positioned at a full step. This Output can be used to count the number of full steps the motor has moved regardless of the number of microsteps. This Output is active LOW.
2	Fault Output	An Open Collector Output that indicates a fault has occurred such as a short, over temperature, or over voltage. This Output is active LOW.
3	Reduction Adjust Input	Phase Current Adjustment Input. A resistor between Pin 3 and Pin 4 of Connector P2 will proportionately reduce the current in both windings when selected at Pin 10 on Connector P1.
4	Current Adjust Input	Phase Current Adjustment Input. A resistor connected between Pin 4 and Pin 5 of Connector P2 will adjust the maximum phase current in the motor. A resistor <b>MUST</b> be connected to the input.
5	Ground	The Supply Voltage Ground.
6	+ V Input	The Supply Voltage +V input.
7	B Phase	The B Phase of the Stepping Motor connects here.
8	B Phase	The B Phase of the Stepping Motor connects here.
9	A Phase	The A Phase of the Stepping Motor connects here.
10	A Phase	The A Phase of the Stepping Motor connects here.

## Microstep Resolution Select Inputs (MSEL)

### Binary

RESOLUTION (Microsteps Per Step)	STEPS/REVOLUTION (1.8° Step Motors)	MICROSTEP Select 1	MICROSTEP Select 2	MICROSTEP Select 3	MICROSTEP Select 4
2	400	*Ground	Ground	Ground	Ground
4	800	**Floating	Ground	Ground	Ground
8	1600	Ground	Floating	Ground	Ground
16	3200	Floating	Floating	Ground	Ground
32	6400	Ground	Ground	Floating	Ground
64	12800	Floating	Ground	Floating	Ground
128	25600	Ground	Floating	Floating	Ground
256	51200	Floating	Floating	Floating	Ground

### Decimal

RESOLUTION	STEPS/REVOLUTION	MICROSTEP Select 1	MICROSTEP Select 2	MICROSTEP Select 3	MICROSTEP Select 4
5	1000	Ground	Ground	Ground	Floating
10	2000	Floating	Ground	Ground	Floating
25	5000	Ground	Floating	Ground	Floating
50	10000	Floating	Floating	Ground	Floating
125	25000	Ground	Ground	Floating	Floating
250	50000	Floating	Ground	Floating	Floating

## Invalid Settings may Cause Erratic Operation

		Ground	Floating	Floating	Floating
		Floating	Floating	Floating	Floating

\* **DO NOT** connect Inputs to **POWER GROUND** (Connector P2, Pin 5) or loss of isolation will occur. These inputs must be connected to **LOGIC GROUND**.

\*\* Leaving the Inputs **FLOATING** is equivalent to +5 VDC (logic) being connected to the input.

**For More Information:**  
See the complete IM1007 Product Manual

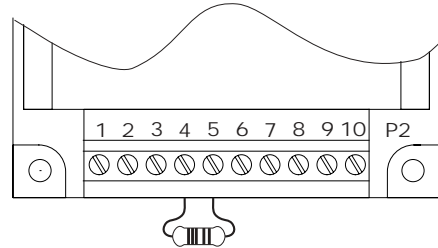
## Setting Output Current

The Output Current on the IM1007 Driver is set by an external 1/8 Watt or higher resistor placed between Pin 4 and Pin 5 on Connector P2. This resistor determines the per phase peak output of the driver. The IM1007 uses a 1mA current source to establish the reference voltage needed to control the output current. The relationship between the output current and the resistor value is as follows:

Output Current (Amps) = .003 x Resistor Value (Ohms)  
(See the table below).

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Setting Output Current on the IM1007 Driver

## Output Current / Resistor Table

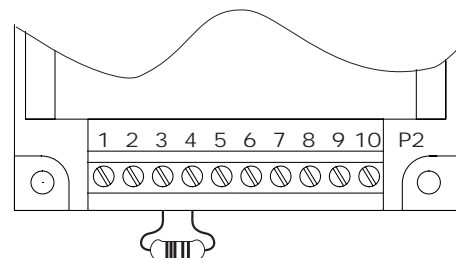
OUTPUT CURRENT (A)	RESISTOR VALUE Ω	OUTPUT CURRENT (A)	RESISTOR VALUE Ω
2.0	665	5.6	1870
2.2	732	5.8	1910
2.4	787	6.0	2000
2.6	866	6.2	2050
2.8	931	6.4	2100
3.0	1000	6.6	2150
3.2	1070	6.8	2260
3.4	1130	7.0	2320
3.6	1180	7.2	2370
3.8	1270	7.4	2430
4.0	1330	7.6	2490
4.2	1400	7.8	2610
4.4	1470	8.0	2670
4.6	1500	8.5	2800
4.8	1580	9.0	3010
5.0	1650	9.5	3160
5.2	1690	10.0	3320
5.4	1780		

## Automatic Current Reduction

The IM1007 Driver has the ability to automatically reduce the current in the motor windings after the completion of a move. The reduction occurs approximately 0.5 seconds after the last positive edge of the Step Clock Input. The IM1007 Driver will then revert back to the original current setting at the next positive edge of the Step Clock Input. To utilize this feature, the current reference output must be used by connecting a resistor between Pin 3 and Pin 4 on Connector P2.

$$\text{Output Current Reduced (Amps)} = \frac{.003 \times R (\text{CurrentAdjust}) \times R (\text{CurrentReduction})}{R (\text{CurrentAdjust}) + R (\text{CurrentReduction})}$$

$$R (\text{CurrentReduction}) = \frac{\text{Output Current Reduced} \times R (\text{CurrentAdjust})}{.003 \times R (\text{CurrentAdjust}) - \text{Output Current Reduced}}$$



Setting the Automatic Current Reduction on the IM1007 Driver

## IM1007 Options and Accessories

Heat Sink ..... H-1000  
Thermal Pad ..... TN-1000  
10 Pin Terminal Strips (pair) ..... TS-10  
IM1007 with Noise Reduction (filter) ..... IM1007-NR