



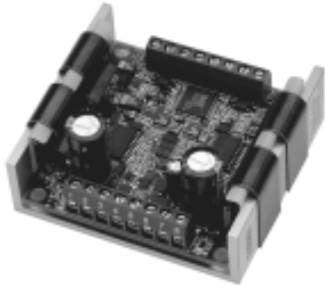
INTELLIGENT MOTION SYSTEMS, INC.

Excellence in Motion™

IM805

HIGH PERFORMANCE MICROSTEPPING DRIVER

QUICK REFERENCE



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IM805 Quick Reference/ Installation Guide

The primary function of this guide is to acquaint the user with the specifications, basic wiring and configuration of the IM805 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.

Notes And Warnings

Please observe the following when handling, connecting and using your IM805 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 IM805 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 IM805 Driver.



WARNING! Ensure that the Power Supply output voltage does not exceed the maximum input voltage of the IM805 Driver.



WARNING! Do not operate the IM805 Driver without a Current Adjustment Resistor!

A resistor **MUST** be placed between the Current Adjust Input (Pin 2 on P2) and ground (Pin 3 on P2) to keep the IM805 Driver and/or motor in a safe operating range.

IM805 Electrical Characteristics

Input Voltage24 to 75VDC*
Phase Output Current (RMS)1** to 5A
Phase Output Current (Peak)7 A
Quiescent Current
Inputs/Outputs Floating13mA
Active Power Dissipation ($I_{OUT}=4A$ RMS)9 W
Input Forward Current
Step Clock and Direction7.0 to 20mA
Input Forward Voltage
Step Clock and Direction1.4 to 1.7V
Input Forward Current [Enable and Reset]5.0 to 50mA
Input Forward Voltage [Enable and Reset]1.1 to 1.4V
Input Reverse Breakdown Voltage
Isolated Inputs5V
Output Current
Fault, Fullstep Outputs25mA
Drain-Source Voltage
Fault, Fullstep Outputs100 V
Drain-Source On Resistance
Fault, Fullstep Outputs
 $I_{OS} = 25mA$ DC6.5W

* Includes Motor Back EMF, Power Supply ripple, and High Line conditions.
** Lower currents may be used for current reduction.

Thermal Specifications

Ambient Temperature0° to +50°C
Storage Temperature-40° to +125°C
Maximum Plate Temperature+70°C

Recommended Power Supplies

IP804 Unregulated Linear Supply

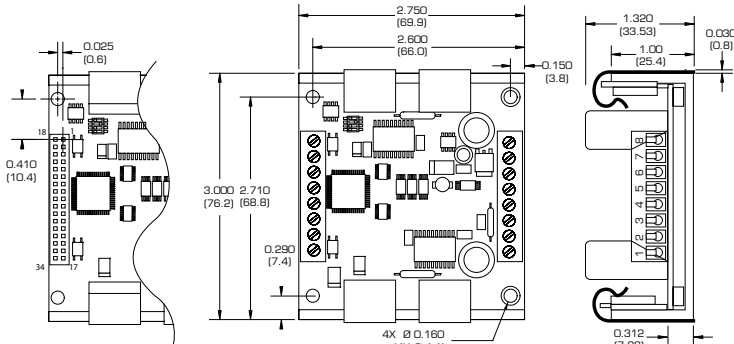
		Range
Input	120 VAC Version	102-132 VAC
	240 VAC Version	204-264 VAC
No Load Output Voltage*	.....	76 VDC @ 0 Amps
Continuous Output Rating*	.....	65 VDC @ 2 Amps
Peak Output Rating*	.....	58 VDC @ 4 Amps

ISP200-7 Unregulated Switching Supply

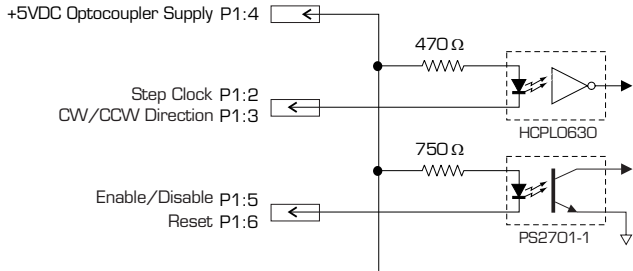
		Range
Input	120 VAC Version	102-132 VAC
	240 VAC Version	204-264 VAC
No Load Output Voltage*	.....	70 VDC @ 0 Amps
Continuous Output Rating*	.....	62 VDC @ 1 Amps
Peak Output Rating*	.....	59 VDC @ 2 Amps
* Measurements taken at 25°C, 120 VAC, 60 Hz.		

Mechanical Specifications

Dimensions In Inches (mm)



Optically Isolated Input Diagram



Connector P1-8 And P1-34 Pin Assignments *

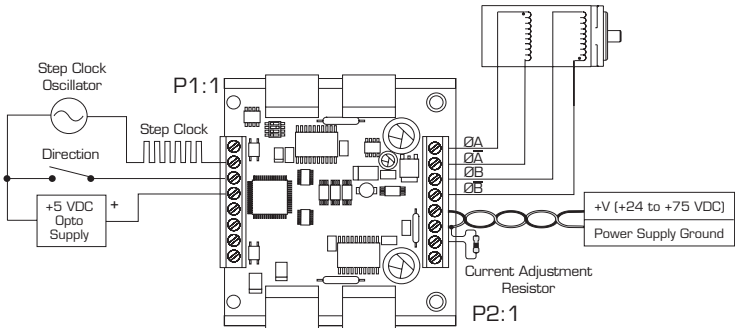
8 Pin #	34 Pin #	Pin Name	Function
	3	Resolution Select: 3	Microstep Resolution Select: 3 Input.
2	4	Step Clock Input	A positive going edge on this input advances the motor one increment. The size of the increment is dependent upon the settings of the resolution select switch SW1.
3	6	Direction Input	This input is used to change the direction of the motor. Physical direction also depends upon the connection of the motor windings.
4	8	Opto Supply	This +5VDC input is used to supply power to the isolated logic inputs. A higher voltage may be used, but care must be taken to limit the current through the opto-coupler.
5	10	Enable/Disable Input	This input is used to enable/disable the output section of the driver. When in a Logic HIGH state (open), 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.
6	12	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).
7	14	Fault Output	This output indicates that a short circuit condition has occurred. This output is active LOW.
8	16, 26	On-Full-Step Output	This open collector 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 LOW.
	21	Step Clock Output	Non-isolated step clock output follows step input.
	22	Direction Output	Non-isolated direction output follows direction input.
	23	Resolution Select: 0	Microstep Resolution Select: 0 Input.
	24	Resolution Select: 2	Microstep Resolution Select: 2 Input.
	25	Resolution Select: 1	Microstep Resolution Select: 1 Input.
	27	Ground	Non-isolated ground. Common with power ground.

* Pins not shown are "No Connect".

Connector P2

Pin #	Pin Name	Function
1	Current Reduction Adjust	Phase Current Reduction Adjustment Input. A resistor connected between this pin and pin 2 will proportionately reduce the current in both motor windings approximately .5 seconds after the last positive edge of the step clock input. The amount of current reduced will depend upon the value of the resistor used.
2	Current Adjustment	Phase Current Adjustment. A resistor is connected between this pin and P2:3 (GND) to adjust the maximum phase current in the motor. A resistor MUST be connected to this input or the IM805 WILL latch into fault.
3	GND	Power Ground. The ground, or return, of the power supply is connected here.
4	+V	Motor Supply Voltage. +24 to +75VDC.
5	Phase B̄	Phase B̄ of the stepping motor.
6	Phase B	Phase B of the stepping motor.
7	Phase Ā	Phase Ā of the stepping motor.
8	Phase A	Phase A of the stepping motor.

Minimum Connections

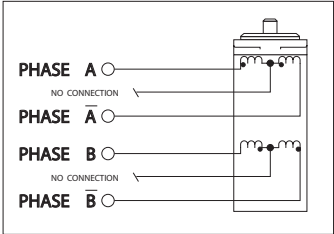


SUPPLY AND MOTOR WIRING:
Use 18 AWG (Belden #9740 or equivalent) shielded, twisted pair when ≤ 4 amps.
Use AWG 16 (Belden #8471 or equivalent) shielded, twisted pair when ≥ 4 amps.
TORQUE:
Maximum torque on terminal screws is 4.5 lbs-in (0.5 N-m). **DO NOT** Overtighten!

Connecting The Motor

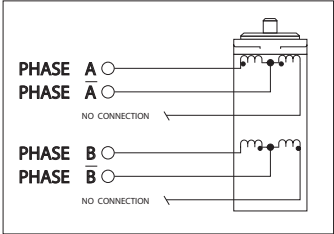
6 Lead Motors

Full Coil Configuration



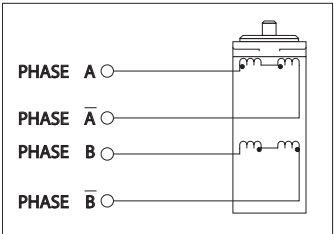
Motor Peak Current = Rated Amps/Phase

Half Coil Configuration



Motor Peak Current = Rated Amps/Phase x 1.4

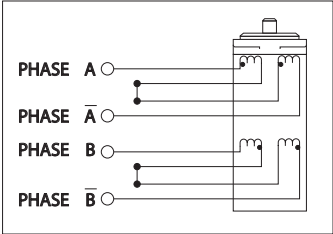
4 Lead Motors



Motor Peak Current = Rated Amps/Phase x 1.4

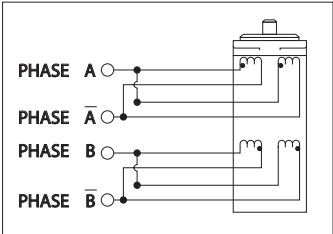
8 Lead Motors

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

Supply Voltage (+V)	Max. Inductance (Per Phase)
+24 VDC	5 mH
+40 VDC	8 mH
+48 VDC	10 mH
+75 VDC	15 mH

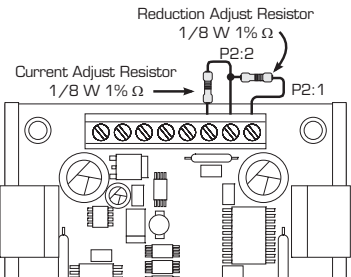
Maximum Motor Inductance
mH per Phase = 0.2 X Supply Voltage

Adjustable Output Current/Current Reduction

WARNING! Do not operate the IM805 Driver without a Current Adjustment Resistor!

A 1/8 Watt or higher, 1% resistor **MUST** be placed between the Current Adjust Input (Pin 2 on Connector P2) and ground (Pin 3 on Connector P2) to keep the IM805 Driver and/or motor in a safe operating range.

In addition, the output current may be reduced to the level needed to maintain motor holding torque by means of a 1/8 watt or higher, 1% resistor connected between the Reduction Adjust Input (Pin 1 on Connector P2) and Current Adjust Input (Pin 2 on Connector P2).



NOTE: Keep the resistor leads as short as possible to minimize the amount of noise coupled to the IM805 Driver.

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

Current Reduction Calculation

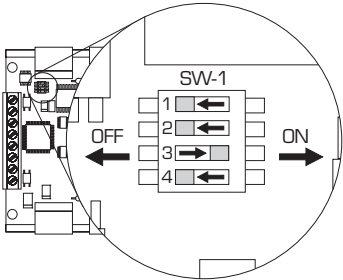
I_{Run} is the desired peak running current. Range 1.0 to 7A Peak
 I_{Hold} is the desired peak holding current. Range 0.5A to 7A Peak

For More Information: See the complete IM805 Product Manual on the IMS Product CD or at www.imshome.com

IM805 Current Adjust Resistor Values

Output Current (Amps Peak)	Resistor Value (Ohms 1%)	Output Current (Amps Peak)	Resistor Value (Ohms 1%)
1.4	698	4.4	2210
1.6	806	4.6	2320
1.8	909	4.8	2370
2.0	1000	5.0	2490
2.2	1100	5.2	2610
2.4	1210	5.4	2670
2.6	1300	5.6	2800
2.8	1400	5.8	2870
3.0	1500	6.0	3010
3.2	1580	6.2	3090
3.4	1690	6.4	3240
3.6	1780	6.6	3320
3.8	1910	6.8	3400
4.0	2000	7.0	3480
4.2	2100	—	—

Controlling Microstep Resolution



MSEL Switch Shows 50 Microsteps/Step Selected

Resolution		Microstep Select DIP Switch Settings			
Microsteps/Step	Steps/Rev	SW 1:1 (MSEL0)	SW 1:2 (MSEL1)	SW 1:3 (MSEL2)	SW 1:4 (MSEL3)
Binary Microstep Resolution Settings (1.8° Motor)					
2	400	ON	ON	ON	ON
4	800	OFF	ON	ON	ON
8	1,600	ON	OFF	ON	ON
16	3,200	OFF	OFF	ON	ON
32	6,400	ON	ON	OFF	ON
64	12,800	OFF	ON	OFF	ON
128	25,600	ON	OFF	OFF	ON
256	51,200	OFF	OFF	OFF	ON

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

Invalid Resolution Settings: May Cause Erratic Operation					
		ON	OFF	OFF	OFF
		OFF	OFF	OFF	OFF

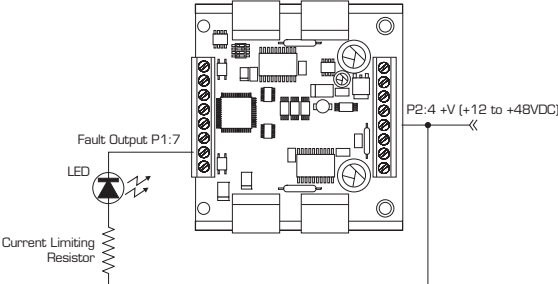
Connecting And Using The Fault Output

The IM805 has an open collector fault output located on P1:7. This output is non-isolated and has the ability of sustaining maximum driver voltage. It can sink a maximum of 25mA, which is sufficient to drive an LED or a small relay.

This output is active when in a LOW state. The following conditions will cause this output to become active:

- 1) Phase-to-phase short circuit.
- 2) Phase-to-ground short circuit.
- 3) Phase over-current condition.

When the fault output becomes active, it disables the driver outputs and latches in this condition. It can only be cleared by toggling the reset input LOW, or by powering OFF then powering ON the drive.



Fault Output Circuit

Options

- TN-48 Thermal Pad
- H-4X Heat Sink
- 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 Connector for the -PLG option.
- HS 10 MHz Step Clock Unit
- U3-CLP Side Mounting Clip Set