IMS™
INTELLIGENT MOTION SYSTEMS, INC.
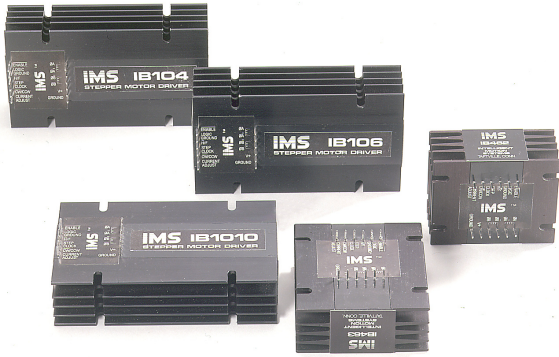### *Excellence in Motion*™
CE

IB SERIES
HALF/FULL STEP STEPPING MOTOR DRIVERS

QUICK REFERENCE

370 N. MAIN ST., PO BOX 457, MARLBOROUGH, CT 06447
PH: (860) 295-6102, FAX: (860) 295-6107
Internet: www.imshome.com, E-Mail: info@imshome.com

IB Series Drivers Quick Reference/Installation Guide

The primary function of this guide is to acquaint the user with the specifications, basic wiring and configuration of the IB Series Half/Full Step Stepping Motor 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 www.imshome.com.

Notes And Warnings

Please observe the following when handling, connecting and using your IB Series 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.

The IB series drives have components which 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 your IB series drive!

Ensure that the power supply output voltage does not exceed the maximum input voltage of the IB series drive that you are using!

A current limiting resistor is **required** when interfacing to the isolated inputs or damage will occur to the drive. See the Product Manual, Part 1, Section 5 for interface details.

Do not use any flux removers that contain trichloroethane or hydrochlorofluorocarbons (HCFCs) as corrosive damage will occur to the internal drive components!

Do not connect or disconnect power leads or motor leads when power is applied! Disconnect the AC power side to power down the DC power supply.

For battery operated systems, conditioning measures should be taken to prevent device damage cuased by in-rush current draws, transient arcs and high voltage spikes.

Thermal Specifications

Ambient Temperature ....0° to +50°C
Storage Temperature ....-40° to +125°C
Maximum Case Temperature ....+70°C

Mechanical Specifications

IB462 and IB463
dimensions in inches (mm)

IB104, IB106, and IB1010

> **For More Information:**
> See the complete IB Series Product Manual
> on the IMS Product CD or at www.imshome.com

Current Adjust Equations

| IB462	IB463	IB104	IB106	IB1010
+V ....+12 to +40VDC	+V ....+12 to +40VDC	+V ....+24 to +80VDC	+V ....+24 to +80VDC	+V ....+24 to +80VDC
Output Current........................ 2A	Output Current..................... 3.5A	Output Current........................ 4A	Output Current........................ 6A	Output Current........................ 9A
CURRENT ADJUST EQUATION	CURRENT ADJUST EQUATION	CURRENT ADJUST EQUATION	CURRENT ADJUST EQUATION	CURRENT ADJUST EQUATION
$R_{ADJ} = \dfrac{400}{(2/I_{RUN})-1}$ R_{ADJ}= Adjust Resistor I_{RUN} = Run Current	$R_{ADJ} = \dfrac{279}{(3.5/I_{RUN})-1}$ R_{ADJ}= Adjust Resistor I_{RUN} = Run Current	$R_{ADJ} = \dfrac{315}{(4/I_{RUN})-1}$ R_{ADJ}= Adjust Resistor I_{RUN} = Run Current	$R_{ADJ} = \dfrac{241}{(6/I_{RUN})-1}$ R_{ADJ}= Adjust Resistor I_{RUN} = Run Current	$R_{ADJ} = \dfrac{355}{(9/I_{RUN})-1}$ R_{ADJ}= Adjust Resistor I_{RUN} = Run Current

Electrical Specifications - All IB Drives

Driver	+V Motor Voltage (VDC)	I_i Input Current (A max)	I_Q Quiescent Current (mA)	V_{CE} sat(h) Source (V) (max)	V_{CE} sat(i) Source (V) (max)	R_{DS} High (Ω) (max)	R_{DS} Low (Ω) (max)	B_{VR} Input Reverse Breakdown (V min)	V_F Input Forward Voltage (V max)	I_F Input Forward Current (mA)	T_{CLK} Step Pulse Width (ms)	T_S Setup Time (ms)	T_H Hold Time (ms)	F_C Commutate Frequency (kHz)
IB462	12 - 40	2	75 (typ)	2.6	2.4			5	1.75	5 - 15	3	2	5.5	40
IB463	12 - 40	3.5	90 (typ)	2.4	2.3			5	1.75	5 - 15	3	2	5.5	40
IB104	24 - 80	4	144 (max)			0.20	0.20	5	1.75	5 - 15	3	2	5.5	250
IB106	24 - 80	6	144 (max)			0.117	0.77	5	1.75	5 - 15	3	2	5.5	250
IB1010	24 - 80	9	144 (max)			0.117	0.77	5	1.75	5 - 15	3	2	5.5	250

Pin Assignment and Description

PIN #	FUNCTION	DETAILS
1	Enable	When Logic LOW, the phase outputs are enabled
2	Logic Ground	Logic Signal Common. This pin is the return path for the logic inputs. In order to maintain isolation this pin should not be connected to pin 7 (Power Ground).
3	Half/Full Step Input	Half/Full Step select input. When in a Logic LOW state the drive will be in half step mode. When HIGH the drive will be operating in full step mode.
4	Step Clock Input	Step Clock input. An active HIGH pulse on this input advances the motor one increment. The step occurs on the falling edge of this signal.
5	CW/CCW Input	Clockwise/counterclockwise direction control input. Physical direction of motor rotation depends on the connection of the motor windings. This input is internally synchronized.
6	Current Adjust	Phase Current Adjustment input. A resistor is connected between this input and Power Ground (Pin 7) to adjust the phase current of the motor.
7	Power Ground	Power supply return (GND)
8	+V	Power supply input.
9	ØB	Motor phase B output
10	ØB̄	Motor phase B output.
11	ØA	Motor phase A output
12	ØĀ	Motor phase A output.

Motor Specifications

6 Lead Motors

Full Coil Configuration

PHASE A
NO CONNECTION
PHASE Ā
PHASE B
NO CONNECTION
PHASE B̄
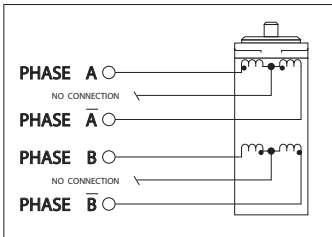
Motor Peak Current = Rated Amps/Phase

Half Coil Configuration
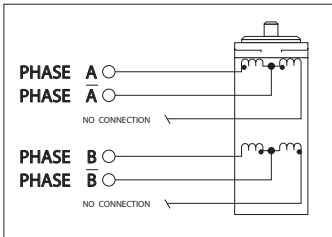
PHASE A
PHASE Ā
NO CONNECTION
PHASE B
PHASE B̄
NO CONNECTION

Motor Peak Current = Rated Amps/Phase x 1.4

4 Lead Motors

PHASE A
PHASE Ā
PHASE B
PHASE B̄
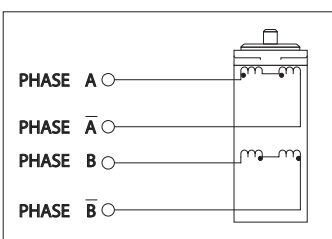
Motor Peak Current = Rated Amps/Phase x 1.4

8 Lead Motors

Series Connection

PHASE A
PHASE Ā
PHASE B
PHASE B̄
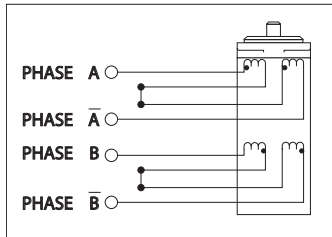
Motor Peak Current = Rated Amps/Phase
or
Motor Peak Current = Bipolar Current Rating x 1.4

Parallel Connection

PHASE A
PHASE Ā
PHASE B
PHASE B̄
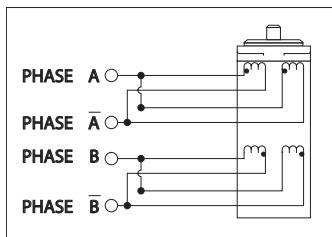
Motor Peak Current = Rated Amps/Phase x 2
or
Motor Peak Current = Bipolar Current Rating x 1.4

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

Basic Connections

DASHED LINE INDICATES THAT THE CONNECTION OF THIS INPUT IS NOT REQUIRED FOR DRIVER TO OPERATE.
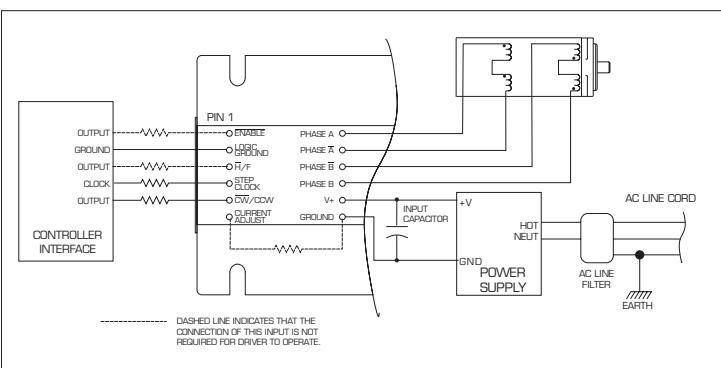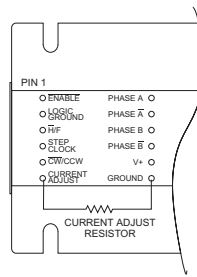
> **WARNING!** A current limiting resistor or recommended interface is required in series with the logic inputs! Use of these inputs without this resistor or recommended interface will result in damage to the drive!
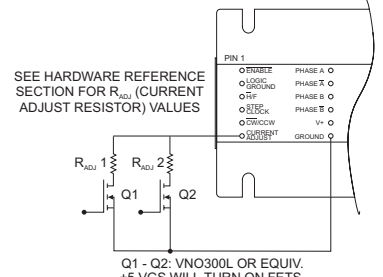
Controlling the Output Current

The IB Series Drivers are configured internally to operate at full current. A resistor must be placed between Pin 6 (Current Adjust) and Pin 7 (Power Ground). The resistor value will be different for each Drive model and desired current. Refer to the charts in Part II (Hardware Reference) of the IB Series Manual.
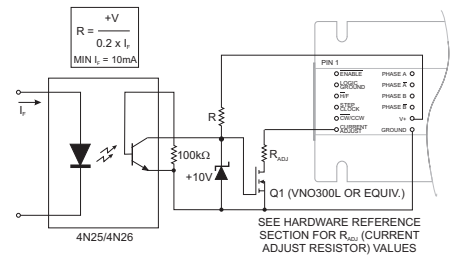
The Output Current can be set at a fixed value by placing a resistor between Pin 6 and Pin 7. It is also possible to switch the Current Adjust Resistor value from one setting to another. Two circuit examples are shown below.

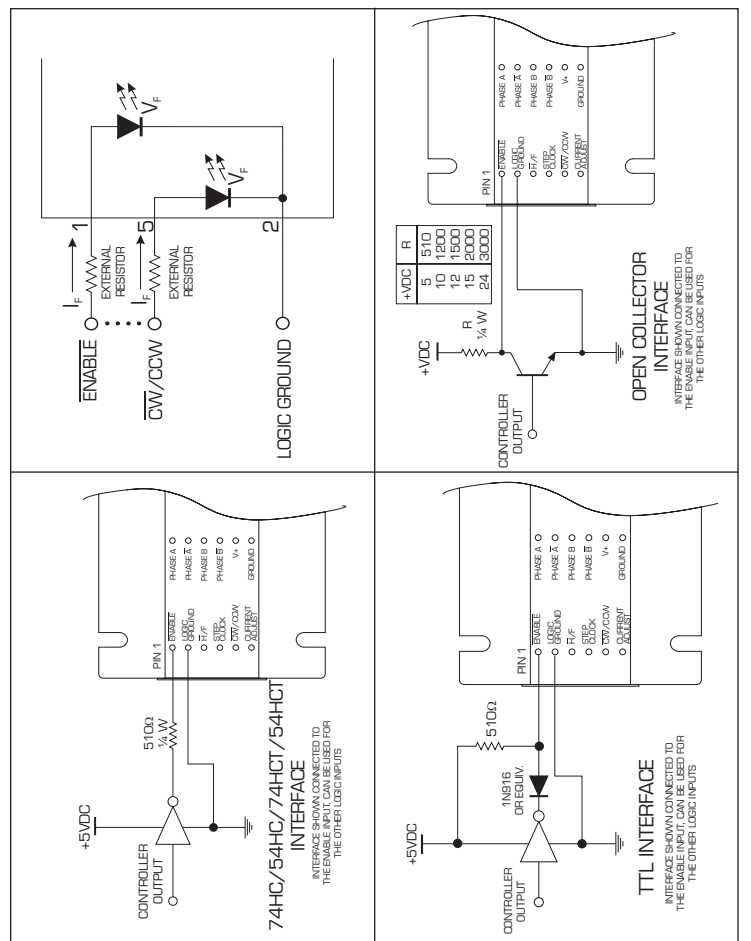
Fixed Value Current Adjust Resistor

Switching Phase Currents

Q1 - Q2: VNO300L OR EQUIV.
+5 VGS WILL TURN ON FETS

$$R = \frac{+V}{0.2 \times I_P} \quad MIN \ I_L = 10mA$$

Q1 (VNO300L OR EQUIV.)

SEE HARDWARE REFERENCE SECTION FOR R_{ADJ} (CURRENT ADJUST RESISTOR) VALUES

4N25/4N26

Isolated Switching of Phase Currents

> WARNING: If a resistor is not placed between Pins 6 and 7, the drive will be at full current. Ensure it does not exceed the motor specifications.

Logic Interface Example Circuits

ENABLE
CW/CCW
LOGIC GROUND

OPEN COLLECTOR INTERFACE
INTERFACE SHOWN CONNECTED TO THE ENABLE INPUT CAN BE USED FOR THE OTHER LOGIC INPUTS

+VDC	R
5	51Ω
10	120Ω
12	150Ω
15	200Ω
24	330Ω

74HC/54HC/74HCT/54HCT INTERFACE
INTERFACE SHOWN CONNECTED TO THE ENABLE INPUT CAN BE USED FOR THE OTHER LOGIC INPUTS

TTL INTERFACE
INTERFACE SHOWN CONNECTED TO THE ENABLE INPUT CAN BE USED FOR THE OTHER LOGIC INPUTS

IB Series Options and Accessories

IB462S .... Sinking Inputs Version of IB462
IB463S .... Sinking Inputs Version of IB463
OPT140 .... Interface Board for IB462/463, IB104/106/1010
TS-6 .... 6 Pin Terminal Strips (Pair)
H-4X .... Heat Sink for IB462/463
TN-462/463 .... Non-Isolating Thermal Pad for IB462/463
TI-462/463 .... Isolating Thermal Pad for IB462/463
H-100 .... Heat Sink for IB104/106/1010
TN-100 .... Non-Isolating Thermal Pad for IB104/106/1010