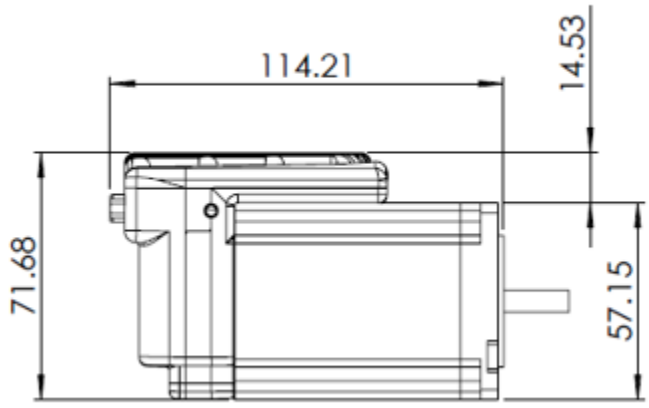
KOCO DINGS™
MOTION
...Intelligence in motion

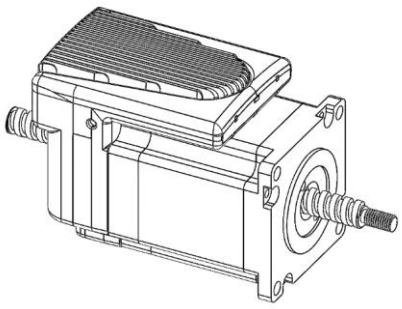
SERVOTRACK

Vector Integrated Motion Systems

Vector™ 23

HARDWARE MANUAL





ServoTrack Vector Hardware Manual Change Log		
Date	**Revision**	**Changes**
12-22-2016	A	Initial Release
6-22-2017	B	Added Specs

APPLICATION ENGINEERING SUPPORT:

MONDAY THROUGH FRIDAY

(8:00AM to 5:00PM Pacific Standard Time)

PH: (408)-612-4970

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Manual Revision Rev 1.0 ,December 2016

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APPLICATION ENGINEERING SUPPORT:

(408)-612-4970

8:00 AM TO 5:00 PM Pacific Standard Time USA

PART 1: GENERAL USAGE

1. VECTOR™ Integrated Motion Systems Introduction

The Vector 23 Integrated Systems are a **DYNAMIC CLOSED LOOP** Motion Control System with integrated driver AND Programmable controller.

The Vector 23 accepts a broad input voltage range, from +12 VDC, up to +48 VDC, delivering enhanced performance and speed. This product is constructed from industrial temperature-rated parts, –40°C to +85°C, providing long life and trouble-free service in demanding environments.

Vector Series features include:

- Rotary OR Linear Actuator Options
- Rotary Torque up to 300 oz-in
- Linear Force up to 200 lbs
- USB Programmable interface
- Six +5 -24 volt general purpose I/O lines; one 16 bit analog input; 0 to 2 MHz step clock rate; 7 microstep resolutions; up to 51,200 steps per revolution. (256 uSteps per Full Step).
- One 16 Bit Analog Input

- **SNAPTRACK™ BLOCK PROGRAMMING**

- Communication via RS485 utilizing one communication port.
- Distributed Motion for multi-axis control
- Multi-Function diagnostic LED
- HMI Interface Capability
- Secondary Encoder Input for Electronic Gearing or Camming
- Internal Encoder Pulses can be read externally, independent of the motor
- 5 VDC Output on board

1.1 SnapTrack Software

NOTE: Software Designed for Microsoft Windows ONLY!

The Vector Series is programmed via the USB connection.

A standard PC to micro USB cable is required. (included)

Please download the SnapTrack Programming software from our website at:
http://www.kocomotionus.com/servotrack

SNAPTRACK™ PROGRAMMING BRIEF OVERVIEW

- Simple and powerful programming
- "Block" programming
  Eliminates traditional "coding" and syntax learning
- Creates buttons with labels with underlying programs that can be executed with a simple click
- User-friendly software

TYPICAL PROGRAMMING BLOCKS

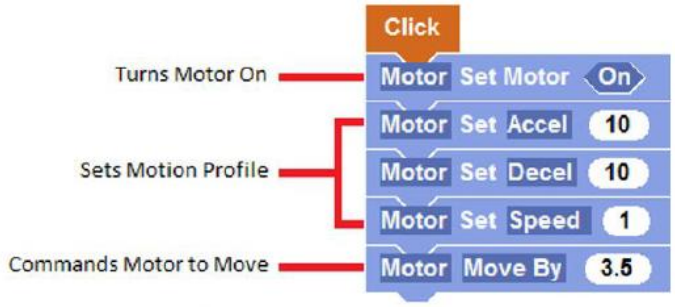
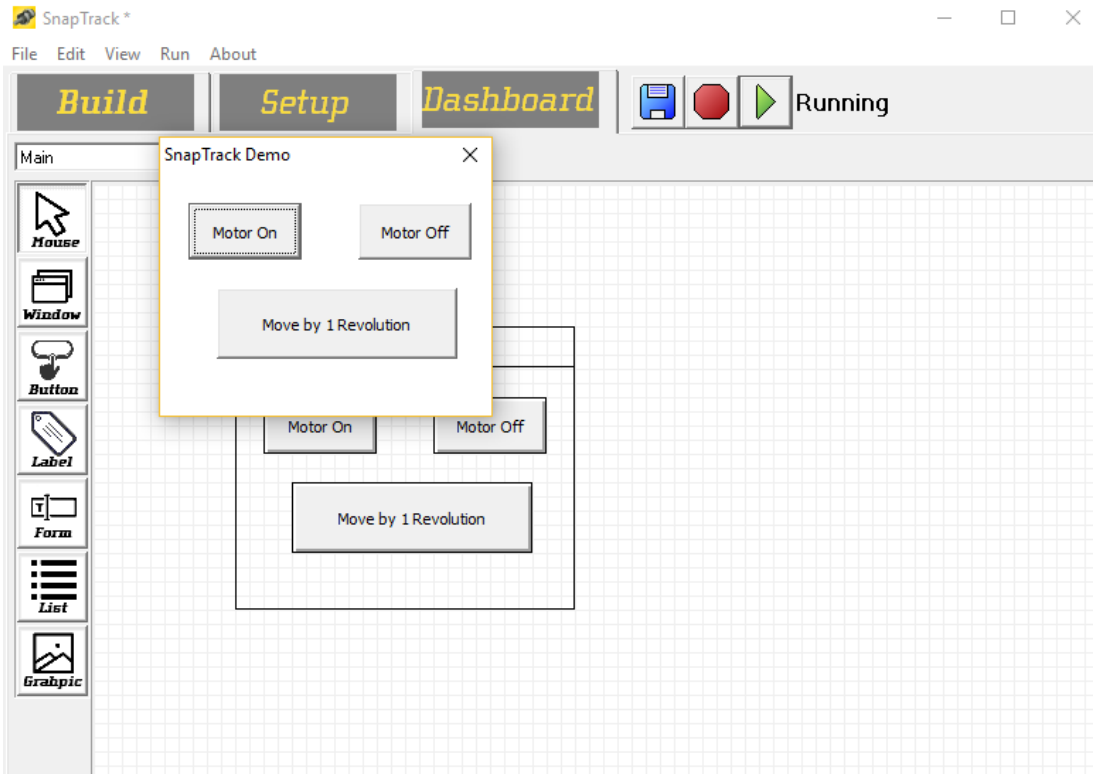


Figure 1. Push Button Block Program, Click and Set Motor

COMPUTER PROGRAMMING INTERFACE



1.3 Interfacing DC Power

MAXIMUM Voltage Input = 48VDC !!

CAUTION: DO NOT "HOT PLUG" THE DRIVER/CONTROLLER WHEN POWER IS APPLIED AS THIS CAN CAUSE DAMAGE TO THE ELECTRONICS!

NOTE: "Hot Plugging" means disconnecting or connecting the DC Power, Logic, or USB Communications from the System before turning off AC Power at the Power Supply.

AC power supply

The two types of power supplies commonly used are regulated and unregulated.
(Both can also be either switching or linear)
There are advantages and disadvantages depending on your application.

Please contact our Application Engineering Team for further guidance if needed.

Cabling Recommendations:

Do not exceed 50 feet of length from the Power Supply to the **VECTOR™ Series**
Shielded and Twisted Pairs are highly recommended
Recommended wire gauge = 18-20 AWG

1.4 Interfacing USB communications

USB Cable with a micro USB at one end.
Download SnapTrack programming software

1.6 Interfacing I/O

The general purpose I/O is tolerant to +24VDC.
The follow listed I/O points are TTL level (low logic), 5VDC:

1. Remote encoder input
2. Optional Step and Direction Inputs

The functions of the I/O must be configured in the SnapTrack programming software. For detailed directions, please reference the SnapTrack programming manual.

I/O States

Active high and low?

0. to 0.8 VDC	Active Low
2 to 5VDC	Active High

NOTE:
General Purpose Inputs Sinking Inputs
General Purpose Outputs are Sinking and Sourcing Outputs

Analog Input (16 Bit)

Options:
Voltage (0-20VDC Scalable)
Scalable to (i.e, 0-5VDC, 0-10VDC, etc.)
Current (0.1-20mA)

The analog input allows for the ability to receive a variable input from temperature, pressure, and other forms of sensors and then control an event based on that input. With DYNAMIC closed loop control of the Vector, it can also be applied to variable torque control OR linear force control with a linear actuator.

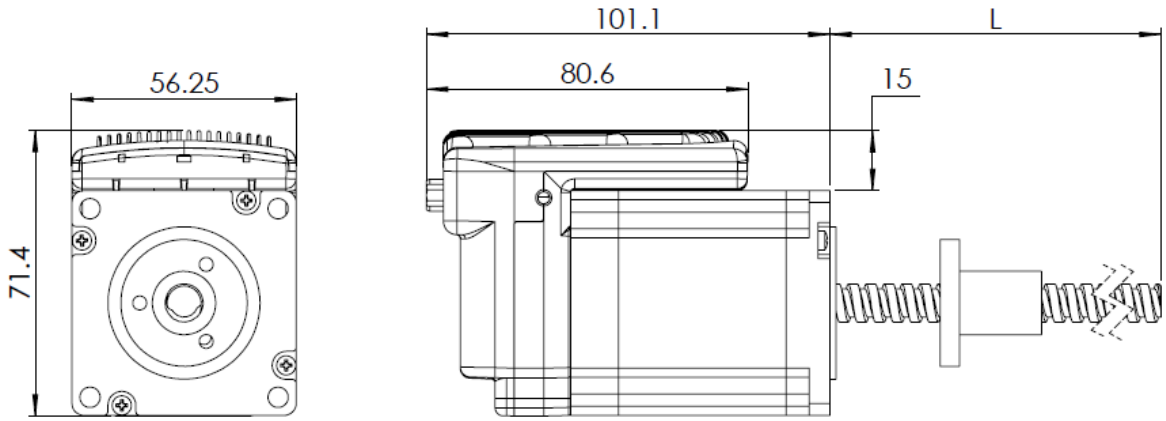
NOTE: Analog input can be programmed / scaled to correspond to motor position; e.g. (10V = 0-25 motor revs)

2. Specifications

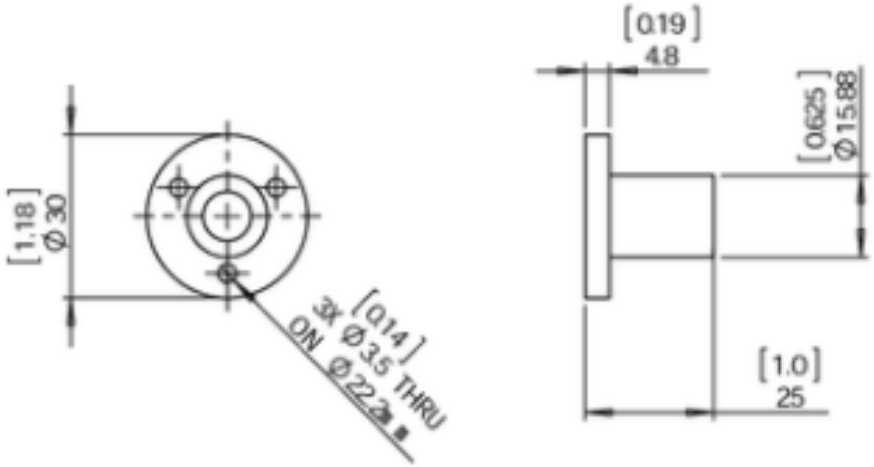
2.1 Mechanical Specifications

CAD MODELS AVAILABLE

Vector™ 23 External Version

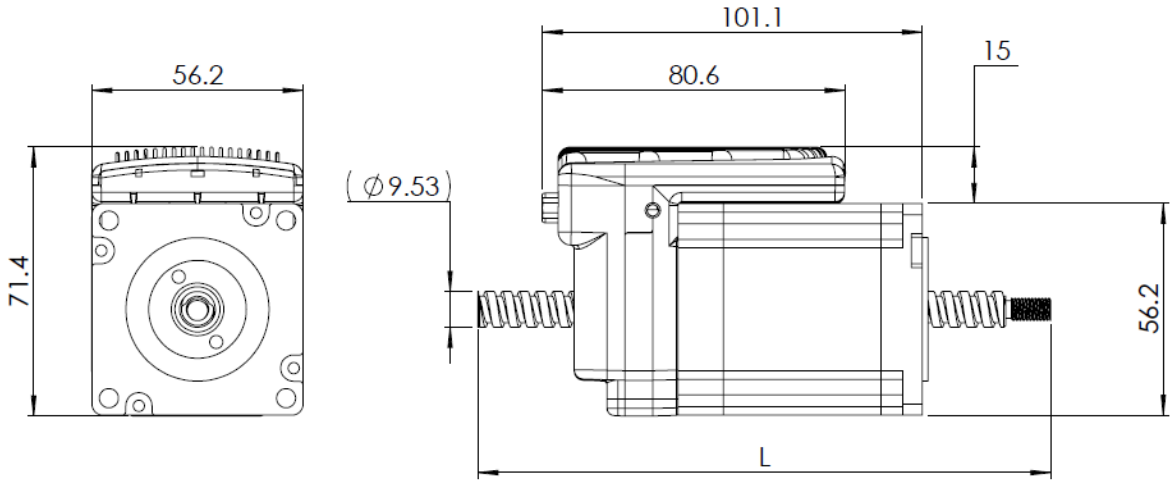


*L dimension will depend on stroke specification.



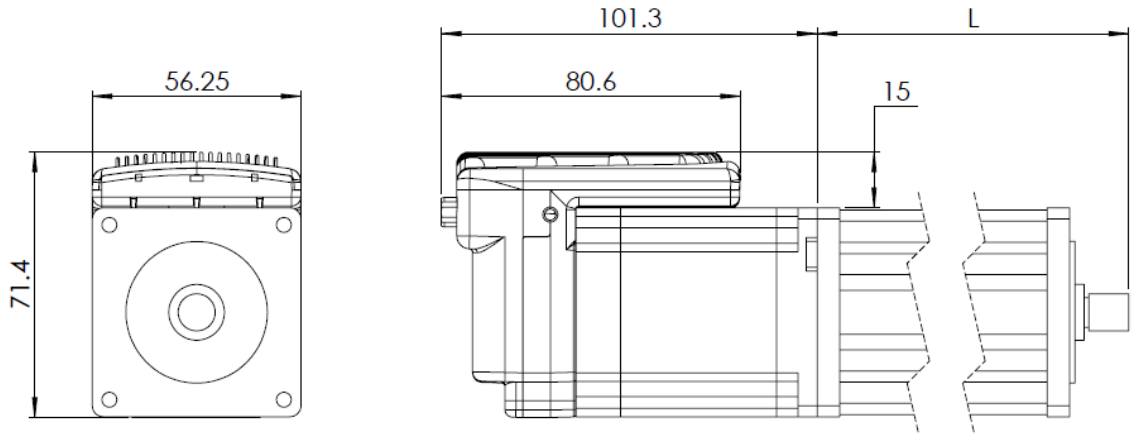
FREE WHEELING NUT DIMENSIONS

Vector™ 23 Non-Captive Version



*L dimension will depend on specification.

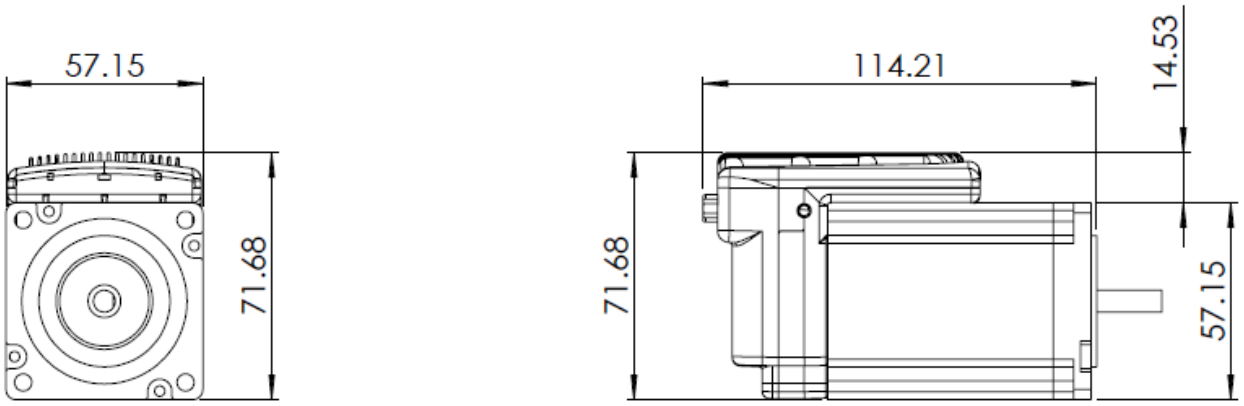
Vector™ 23 Electric Cylinder Version



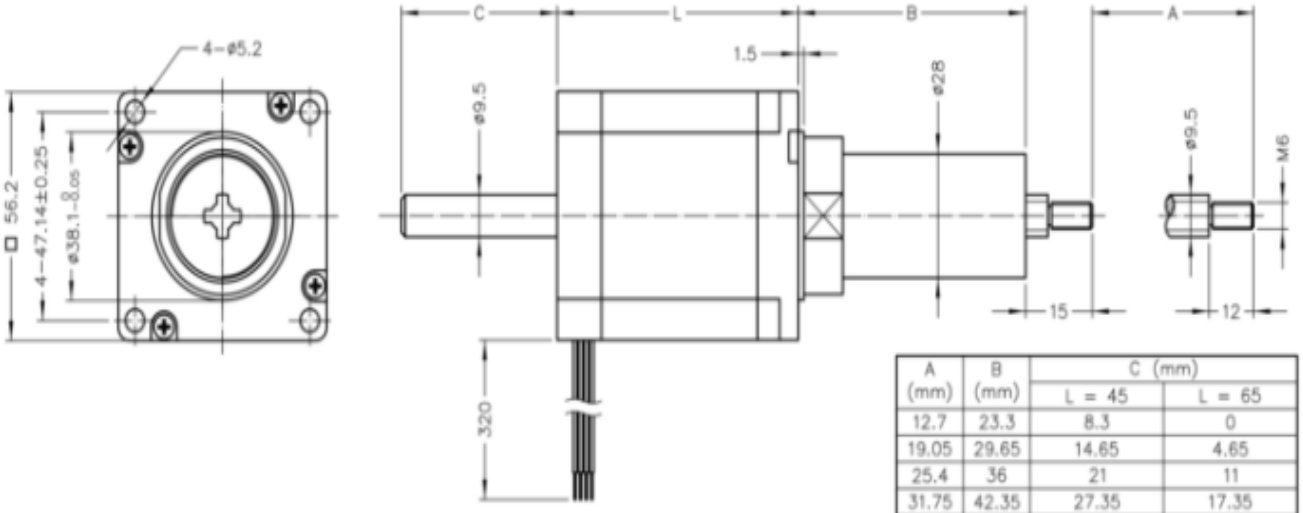
*L dimension will depend on specification.

Stroke B inch (mm)	Dimension A (mm)	Dimension L (mm)	
0.5 (12.7)	45.7	Single stack motor 47 mm	Double stack motor 66 mm
0.75 (19.05)	52.05		
1.0 (25.4)	58.4		
1.25 (31.8)	64.8		
1.5 (38.1)	71.1		
2.0 (50.8)	83.8		
2.5 (63.5)	96.5		

VECTOR 23 Rotary Version



VECTOR 23 Kaptive VERSION



A (mm)	B (mm)	C (mm)	
		L = 45	L = 65
12.7	23.3	8.3	0
19.05	29.65	14.65	4.65
25.4	36	21	11
31.75	42.35	27.35	17.35
38.1	48.7	33.7	23.7
50.8	61.4	46.4	36.4
63.5	74.1	59.1	49.1

2.2 General Specifications

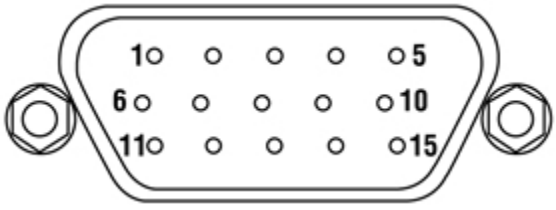
2.2.1 Electrical Specifications

	Condition	Min	Type	Max
Input Voltage Range	--	+12.5	--	+48
Power Supply Current	--	--	--	6.0
Output Current	RMS	--	--	4.0*
	Peak	--	--	5.7

**Actual current depends upon voltage and load*

DB15 (DE-15) PINOUT FUNCTIONS:

TOP



FROM REAR OF VECTOR 23 (FEMALE PINS)

Pin #	Function
1	General Purpose Output #1 +
2	General Purpose Output # 2 +
3	+5VDC Out
4	Rx
5	General Purpose Input #1 (OR Secondary Encoder Input, Single Ended)
6	General Purpose Output #1 -
7	General Purpose Output #2 -
8	General Purpose Output #3 +
9	N/A
10	Tx
11	General Purpose Input #2 (Or Secondary Encoder Input, Single Ended)
12	General Purpose Output #3 -
13	General Purpose Input #2
14	GND
15	Analog Input

NOTE 1: USING PINS 5 AND 11 FOR A SECONDARY ENCODER INPUT WILL REDUCE THE NUMBER OF INPUTS DOWN TO ONE.

NOTE 2: Step and Direction Inputs can accept 24V, however, exposure to absolute maximum-rated conditions for extended periods of time may affect device reliability,

Note 3: Outputs have two (2) terminals each to allow for the User to supply your own voltage source and also to allow for sinking and sourcing circuits.

NOTE: WE RECOMMEND PURCHASING THE BREAKOUT BOARD (Part # VBB-1).

DB15 PIN BREAKOUT BOARD FOR EASY RAPID PROTOTYPING !

Part # = VBB-1

NOTE: NOT DESIGNED FOR PRODUCTION ENVIRONMENT

The optional breakout board is ideal for rapid prototyping and proof of concept designs. The breakout board may be plugged directly into the ServoTrack, or panel mounted using the included spacers.

Signals are accessed via a pluggable 15-pin Phoenix clamp-type terminal connector

Figure A.1: ServoTrack Breakout Board

A.2 Mechanical Specifications

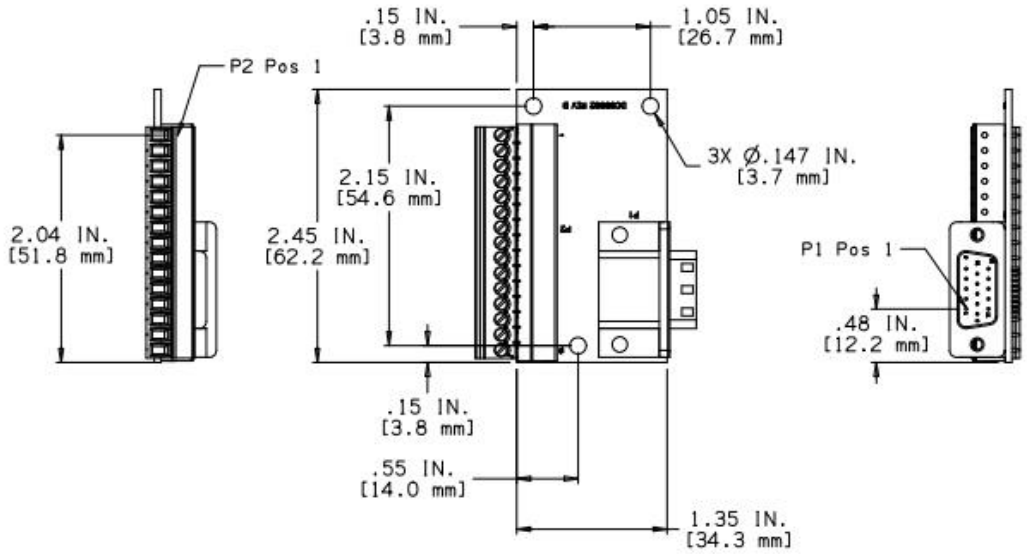


Figure A.2: Breakout Board Dimensions

2.2.2 I/O Specifications

Qty 6 I/O points configurable as sinking or sourcing inputs or sinking outputs

Optically Isolated Outputs

	Condition	Min	Type	Max	Unit
General Purpose I/O (Electrical)					
Inputs	TTL to 2VDC	2	--	+24	VDC
Sinking Outputs*	--	5	--	+24	VDC
Output Sink Current	Per Channel	--	--	50	mA
Analog Input (16 Bit)					
Range**	Voltage Mode	--	--	0-+5 VDC, 0 to 10 VDC	VDC
	Current Mode	--	--	4 to 20mA, 0 to 20mA	mA

** Inputs are high impedance, and are no current draw.*

*** With scaling*

2.2.3 Serial Communication Specifications

	Condition	Min	Type	Max	Unit
RS-485 (Standard)					
BAUD Rate	--	--	--	9600	bps

2.2.4 Thermal Specifications

	Condition	Min	Type	Max	Unit
Heat Sink Temperature	Non-condensing humidity	-40	--	+85	^{o}C

2.2.5 Motion Specifications

Microstep Resolution						
Number of Microstep Resolutions	7					
Available Microsteps per Revolution (1.8^{o} Motor)						
800	1600	3200	6400	12800	25600	51200

2.2.6 Software Specifications

Program Storage Type / Size	TBD
Math, Logic, and Conditional Functions	+, -, x, ÷, <, >, =, ≤, ≥, AND, OR, XOR, NOT
Distributed Motion Mode Addresses	62
Encoder Functions	Dynamic Closed Loop, Stall PREVENTION / Detection and Position Maintenance

DISTRIBUTED MOTION CONTROL:

The ServoTrack™ Vector Series is capable of Distributed Motion Control (For multi-axis control) through ST484 Master and Slave assignments.

For more information / details, **contact our Application Engineering Department** (***available 8:00 a.m. to 5:00 p.m. PST***):

Phone: (408) 612-4970

RS485 SERIAL COMMAND STRUCTURE AND DLL'S

Please reference this link on our website for this document:

www.kocomotionus.com

2.2.6 Connectivity Specifications / Pin Assignments – Communications:

RS-485 Communications

Pin Number	Function	Description
14	GND	Communications ground ONLY
4	RX	Receive
10	TX	Transmit

2.2.7 Connectivity Specifications / Pin Assignments – Power and I/O:

DC Input Power

Pin Number	Function	Description
1	GND (Typically Black Wire Color)	Power supply return
2	PWR Input Voltage (Typically Red Wire Color)	+12.5 – 48 VDC

Many machine control applications require various types of simple high-speed monitoring and control. These applications usually involve some type of motion control or high-speed interrupts for time-critical events.

*** HIGH SPEED CAPTURE INPUTS**

There is a provision in the VECTOR SERIES hardware for "capture" operations. Axis position is latched and retained in response to an input. There are two capture inputs:

Note: All Outputs are Opto-isolated

Please contact our Application Engineering Team for assistance with this Option.
408-612-4970 (8AM to 5:00PM Monday-Friday PST)

3. Recommended Wiring Specifications:

Layout and Interface Guidelines:

Logic-level cables must be shielded to reduce the chance of EMI induced noise. This shield must be grounded to earth at the signal source. The shield's other end must be allowed to float (do NOT tie / connect to anything). This allows the shield to act as a drain.

Power supply leads to the ST484 should be twisted. If more than one driver is to be connected to the same power supply, run separate power and ground leads from the power supply to each drive.

3.1 Recommended Wiring / Cabling Specifications:

Logic Wiring	22 AWG
Wire Strip Length	0.25" (6.0 mm)
Power and Ground	20 AWG
Motor Wiring	20 AWG

3.2 Interfacing DC Power:

CAUTION OVER VOLTAGE:

VECTOR SERIES **MAXIMUM** DC voltage is +48 VDC.

Allow 6.0 A maximum power supply output current in the system per Vector Unit. Actual power supply current will depend upon voltage and load.

Failure to follow these instructions can result in equipment damage.

3.2.1 Recommended Power Supply Characteristics

Voltage Range	+12 to +48 VDC
Type	Unregulated linear
Ripple	Or switching ±5%
Output Current	6.0 A (per ST484)

SERVOTRACK ST484 STANDALONE ALSOAVAILABLE:

4. Warranty:

- **Warranty Limitations:** Koco Motion US LLC | DINGS' WARRANTS ITS PRODUCTS DELIVERED HEREUNDER TO CONFORM TO FINAL SPECIFICATIONS, DRAWINGS, OR OTHER DESCRIPTIONS APPROVED IN WRITING BY SELLER AND TO BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP. THIS WARRANTY SHALL EXTEND TO BUYER AND / OR ITS CUSTOMERS, AND WILL BE **IN EFFECT FOR A PERIOD OF TWO (2) YEARS AS OF PRODUCT SHIP DATE**. THIS WARRANTY SHALL NOT APPLY TO ANY PRODUCT THAT HAS BEEN IMPROPERLY INSTALLED, SUBJECTED TO MISUSE OR NEGLECT, OR WHICH HAS BEEN REPAIRED OR ALTERED EXCEPT BY SELLER'S ACCREDITED REPRESENTATIVE, NOR TO ANY PRODUCT WHICH HAS BEEN SUBJECTED TO ACCIDENT. NO WARRANTY IS GIVEN WITH RESPECT TO ANY APPARATUS, INSTRUMENT, COMPONENT OR ACCESSORY NOT MANUFACTURED BY SELLER, OR AS TO ANY PRODUCT WHICH IS MANUFACTURED BY SELLER BUT WHICH IS INSTALLED OR OTHERWISE SUBJECTED TO USAGE WITH ANY APPARATUS, INSTRUMENT, COMPONENT OR ACCESSORY NOT MANUFACTURED BY SELLER AND NOT APPROVED IN WRITING BY SELLER AS APPROPRIATE FOR USAGE WITH SELLER'S PRODUCTS. EXCEPT AS EXPRESSLY STATED HEREINABOVE IN THIS PARAGRAPH AND NOTWITHSTANDING ANYTHING TO THE CONTRARY CONTAINED IN THESE "TERMS AND CONDITIONS" OR OTHERWISE, SELLERS PRODUCTS ARE OFFERED AND SOLD WITHOUT ANY WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS, OR OF ANY OTHER KIND WHATSOEVER PERTAINING THERETO.

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  - REPAIR OF DEFECTIVE OR NON-CONFORMING PRODUCTS, OR

  - REPLACEMENT OF DEFECTIVE OR NON-CONFORMING PRODUCTS, OR

  - REFUND OF THE PURCHASE PRICE PAID FOR DEFECTIVE OR NON-CONFORMING PRODUCTS

  - SELLER'S LIABILITY AS AFORESAID SHALL BE APPLICABLE ONLY AS REGARDS SUCH DEFECTIVE OR NON-CONFORMING PRODUCTS AS ARE RETURNED TO SELLER WITHIN SIX (6) MONTHS OF THE DATE OF SHIPMENT. THE REMEDIES PROVIDED HEREIN SHALL CONSTITUTE BUYER'S SOLE AND EXCLUSIVE REMEDIES FOR LOSS OR DAMAGE ARISING OUT OF, RESULTING FROM, OR CONCERNING ANY ASPECT OF THE

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- **Obtaining Warranty Service:**

  - **NOTE: OPENING THE SERVOTRACK VECTOR HOUSING WILL VOID THE WARRANTY !!**

  - To obtain warranty service, contact Koco Motion US LLC | DINGS' for a Return Material Authorization (RMA). Please contact Customer Service at customerservice@kocomotionus.com, or (408) 612-4970 (Pacific Time Zone) USA.

  - Customer shall prepay shipping charges for Products returned to Koco Motion US LLC | DINGS' for warranty service; Koco Motion US LLC | DINGS' shall pay for return of Products to Customer via ground transportation. Customer is responsible for all shipping charges, duties and taxes relating to Product returns to Koco Motion US LLC | DINGS' originating outside the United States.

    ATTN: RMA # _____

    Koco Motion US LLC | DINGS'

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    Morgan Hill, CA 95037 USA

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