SERVO CNC KIT
REFERENCE MANUAL

Overview

This documentation describes the wiring of the various motors and drivers in our CNC kits. Please use this reference document as an aid to the additional manuals and datasheets associated with the relevant motors and drivers.

General Notes on Breakout Board

- CNC Kits from Ocean Controls come with a 4-axis Parallel Port Breakout Board (**KTx-205**). The interface is designed for buffering the signals in and out of the PC to provide Stepper Motor control signals among several additional features.
- The card takes external power, typically 12 or 24 VDC. The only difference between the 12 and 24 VDC versions are the relays loaded on the board. If the relays are never used, the board can be powered from 8 to 30 VDC.
- The main circuitry consists of two buffer ICs that boost the weak parallel port signals to a level high enough to drive Stepper Motor Driver Circuits using Opto-Couplers.
- The Breakout Board provides 9 buffered output signals to control up to 4 Stepper Motor Drivers, 5 digital inputs designed for use as limit switch or e-stop inputs, 2 Relay Outputs to control spindles, coolant or vacuums, and a spare output connected directly to the port (useable only in the version without charge pump).
- With the safety charge pump option the board also includes a microcontroller that monitors the CNC software and turns off the relays and output signals when the charge pump signal from the CNC software is lost. **PLEASE NOTE: The board will not do anything unless the charge pump signal is present on Pin 1 of the Parallel port.**

Features:

- 4 Axis CNC Breakout Board
- Step, Direction and Limit Switch Connections for Each Axis
- 2 Relays with indicator LED's for Spindle, Coolant or Vacuum Control
- 3 Extra IO for further Expansion
- 12V or 24V DC Power Option
- Charge Pump Safety Option

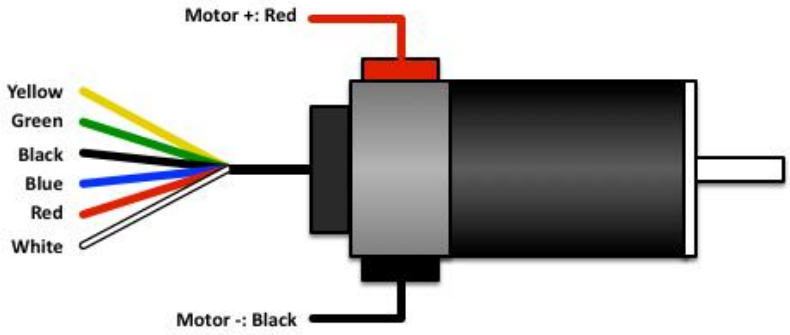
Finished Dimensions (mm): 85Wx88Lx25H

Available as:

- KT**A**-205 (12V Powered without Charge-Pump Circuit)
- KT**B**-205 (24V Powered without Charge-Pump Circuit)
- KT**C**-205 (12V Powered with Charge-Pump Circuit)
- KT**D**-205 (24V Powered with Charge-Pump Circuit)

SERVO MOTORS

MOT-260: DCM50202A-s1000



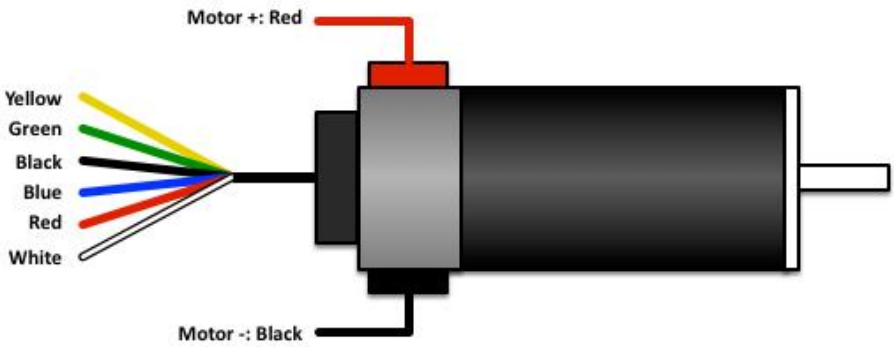
The **MOT-270** is a **50W** permanent magnet DC brush servo motor. It includes an attached 1000 line encoder that provides position feedback to the drivers. Rated current for the motor is **1.79A**.

RECOMMENDED DRIVERS

The recommended driver for this motor is the **SMC-245 (DCS303)**. This driver is typically powered by a **24 VDC** supply. As the **SMC-245** is a single-ended input driver, motor connections will correspond to the table below:

Single-ended Encoder Connection		
DRIVER	MOTOR	
EB		Blue
EA		Yellow
E+5V		Red
EGND		Black

MOT-270: DCM50205D-1000



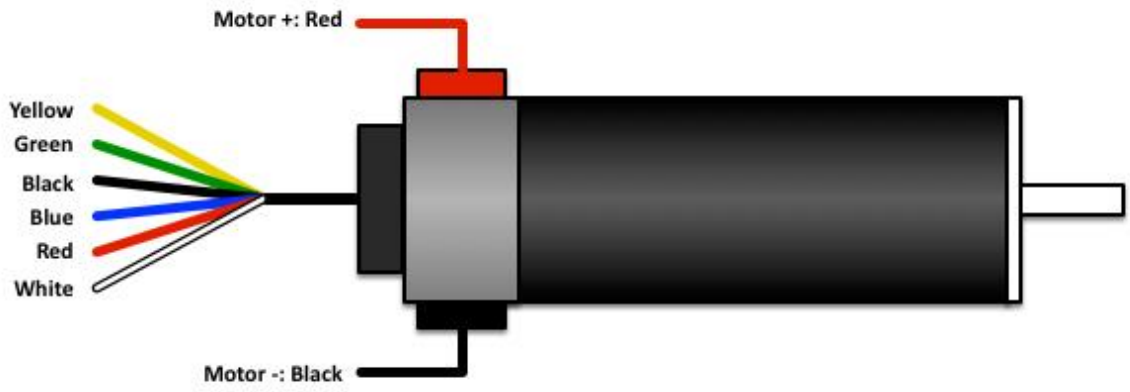
The **MOT-280** is an **80W** permanent magnet DC brush servo motor. It includes an attached 1000 line encoder that provides position feedback to the drivers. Rated current for the motor is **2.95A**.

RECOMMENDED DRIVERS

The recommended driver for this motor is the **SMC-242 (DCS810)**. This driver is typically powered by a **24 VDC** supply. As the **SMC-242** is a differential input driver, motor connections will correspond to the table below:

Differential Encoder Connection		
DRIVER	**MOTOR**	
Channel A+		Black
Channel A-		Blue
Channel B+		Yellow
Channel A-		Green
VCC		Red
Ground		White

MOT-280: DCM50207-1000



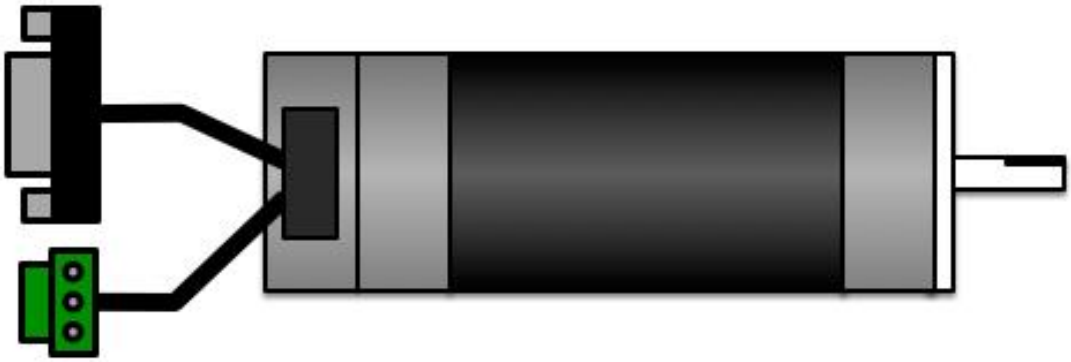
The **MOT-280** is an **120W** permanent magnet DC brush servo motor. It includes an attached 1000 line encoder that provides position feedback to the drivers. Rated current for the motor is **3.94A**.

RECOMMENDED DRIVERS

The recommended driver for this motor is the **SMC-242 (DCS810)**. This driver is typically powered by a **30 VDC** supply. As the **SMC-242** is a differential input driver, motor connections will correspond to the table below:

Differential Encoder Connection		
DRIVER	**MOTOR**	
Channel A+		Black
Channel A-		Blue
Channel B+		Yellow
Channel A-		Green
VCC		Red
Ground		White

MOT-400: BLM57180-1000

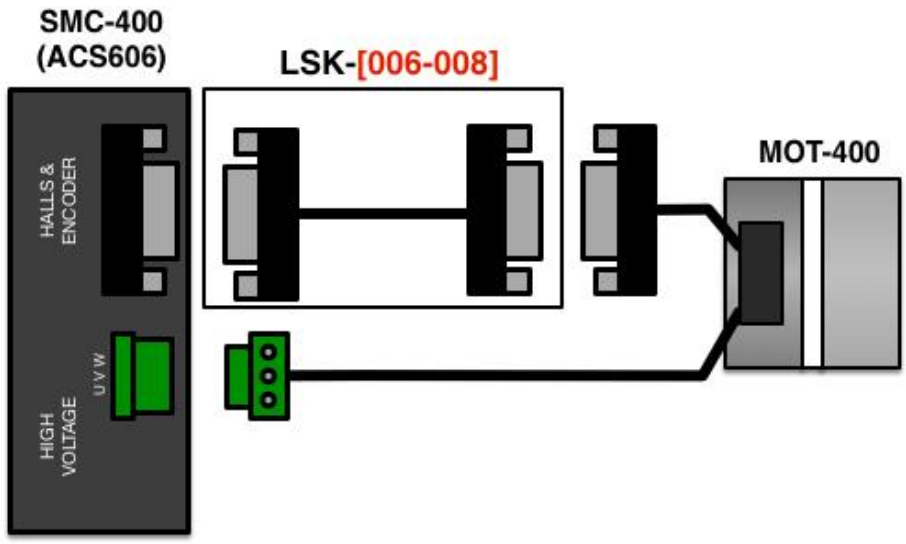


The **MOT-400** is an **180W** brushless DC servo motor. It includes an attached 1000 line encoder that provides position feedback to the drivers. Rated current for the motor is **6.7A**. This motor is flange mounted and compatible with NEMA23 standard sizing. The **MOT-400** has a shaft size of **⌀8.0 mm in diameter with a flat**.

RECOMMENDED DRIVERS

The recommended driver for this motor is the **SMC-400 (ACS606)**. This driver is typically powered by a **36 VDC** supply.

The **MOT-400** is included with a DE-15 Power & Encoder Signal Cable. This provides a means of connection for the motor to the **SMC-400 (ACS606)** servo drive. Refer to the table below for alternative length variations.



SKU	Length (m)	Compatible Drives	Compatible Motors	Description
LSK-006	3	SMC-400 (ACS606)	MOT-180 MOT-400	DE-15F to DE-15M encoder extension cable for three phase (smaller) Easy Servo motors
LSK-007	8			
LSK-008	10			

NOTES ABOUT EXTENDING POWER CABLE

If the option is taken to extend the length of the encoder cable (LSK-[006-009]), then it may eventuate in the need to similarly extend the power cable as well. As there no pre-manufactured cables for this purpose, the end-user can instead simply extend these wires themselves.

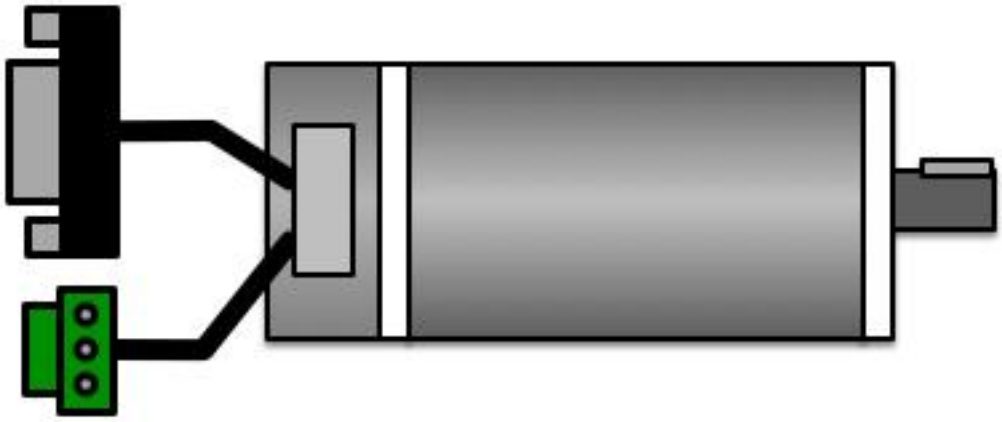
Step 1: Loosen the screw-down terminals on the GREEN pluggable connector and pull to remove.

Step 2: Clean/Strip/Prepare the power wires to be extended.

Step 3: Solder and join the extended wires up to the original power wires. Ensure there is a good connection and no shorts are present.

Step 4: Reconnect the pluggable connector ensuring all terminals are screwed down sufficiently.

MOT-455: ACM604V60-1-2500



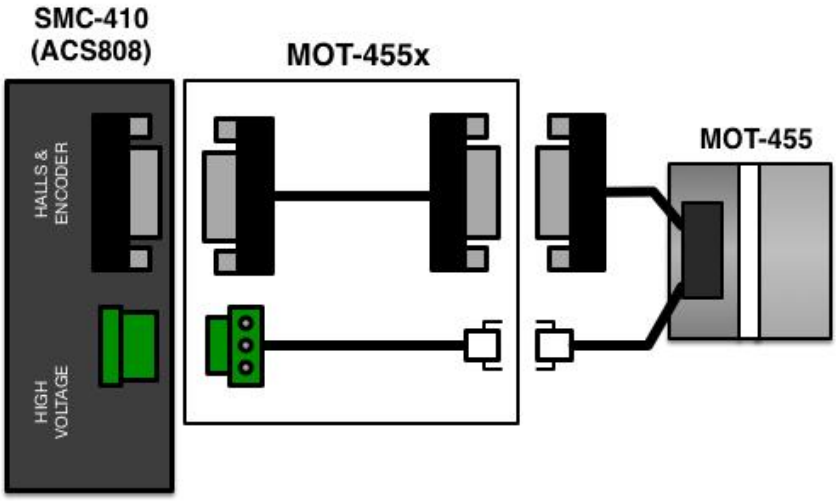
The **MOT-455** is a **400W** brushless AC servo motor. It includes an attached 2500 line encoder that provides position feedback to the drivers. Rated current for the motor is **8.4A**. The **MOT-455** has a shaft size of **⌀14 mm in diameter with a keyway**.

RECOMMENDED DRIVERS

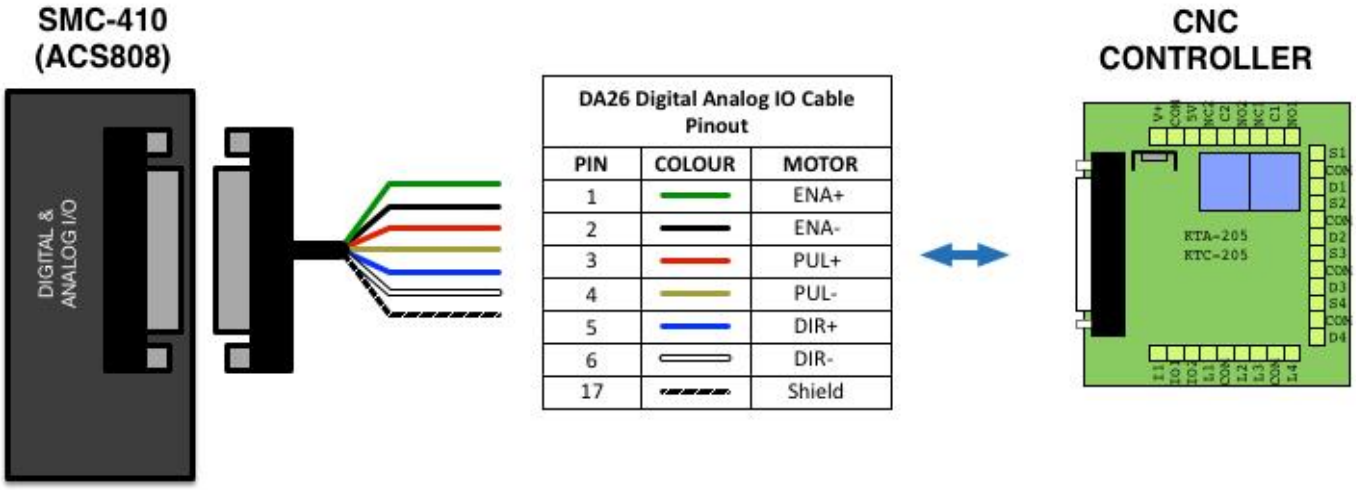
The recommended driver for this motor is the **SMC-410 (ACS806)**. This driver is typically powered by a **60 VDC** supply.

The **MOT-455** is included with a DB15 Power & Encoder Signal Cable (**MOT-455x**). This provides a means of connection from the **MOT-455** motor to the **SMC-410 (ACS808)** servo drive. There are 3 variations available depending on the length of cable required. See the table below for reference:

DB15 Power & Encoder Signal Cable (MOT-455x)	
MOT-455**1**	2 metres
MOT-455**2**	5 metres
MOT-455**3**	10 metres



A DA-26 Digital & Analog IO cable is also included with the **SMC-410 (ACS806)** drive. This provides a means of connection from the servo drive to the CNC controller. The pin-out for the DB26 plug is provided below. Check the **SMC-410 (ACS806)** datasheet for further detail.



DA26 Digital Analog IO Cable Pinout

PIN	COLOUR	MOTOR
1		ENA+
2		ENA-
3		PUL+
4		PUL-
5		DIR+
6		DIR-
17		Shield

SERVO MOTOR
WIRING DIAGRAMS

DIAGRAM OUTLINE

Diagram 1: Applies to our Servo CNC kits that utilise the **SMC-245 (DCS303)** servo drive utilising independent power supplies. This applies to kits: **CNC-013**.

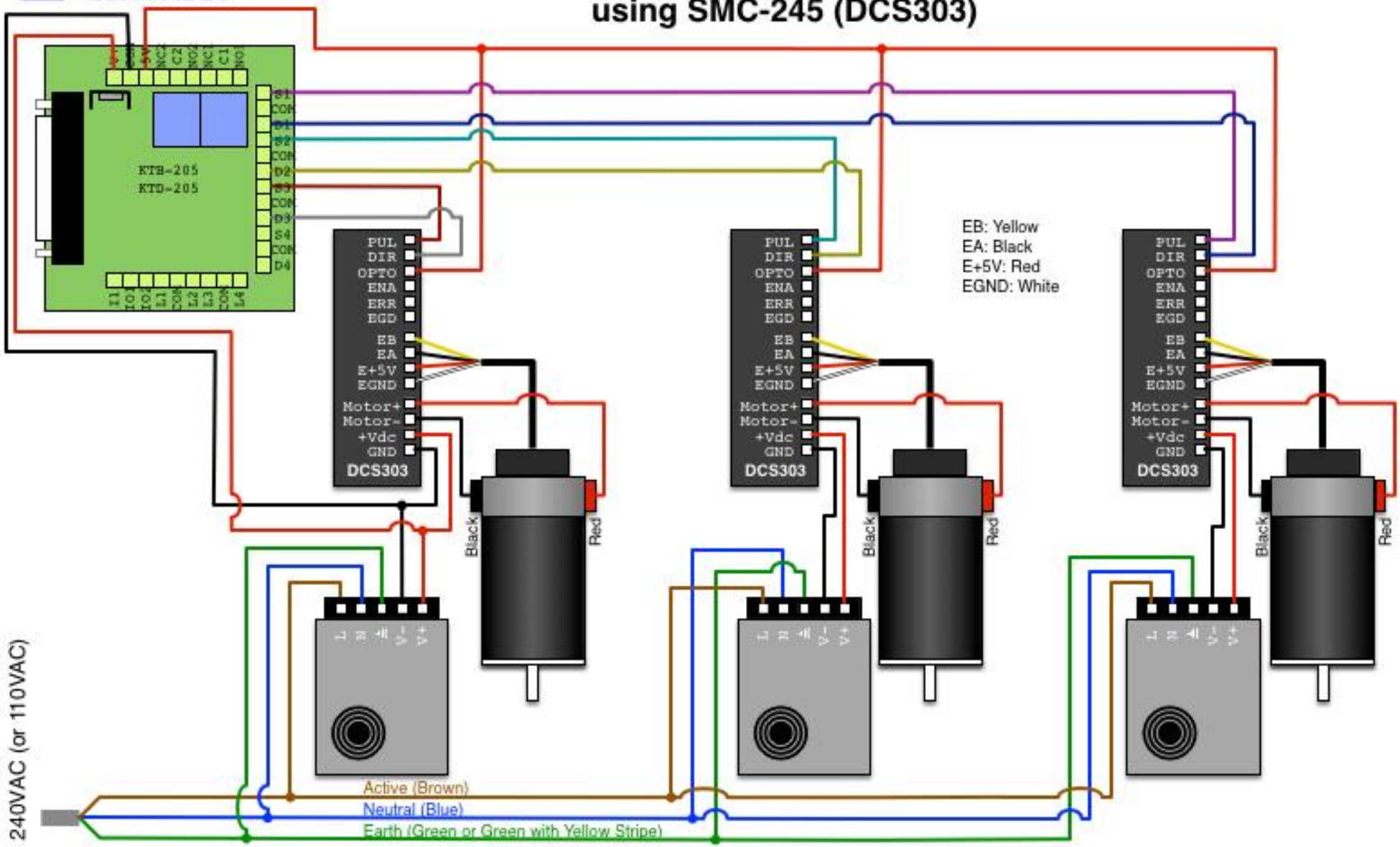
Diagram 2: Applies to Servo CNC kits that utilise the **SMC-242 (DCS810)** servo drive utilising independent power supplies. This applies to kits: **CNC-014**.

Diagram 3: Applies to Servo CNC kits that utilise the **SMC-242 (DCS810)** servo drive utilising a dual power supply configuration. This applies to kits: **CNC-015**.

Diagram 4: Applies to Servo CNC kits that utilise the **SMC-400 (ACS606)** servo drive utilising independent power supplies. This includes the following kits: **CNC-016**.

Diagram 5: Applies to Servo CNC kits that utilise the **SMC-410 (ACS806)** servo drive utilising dual-series power supplies per motor. This apples to the following kits: **CNC-017**.

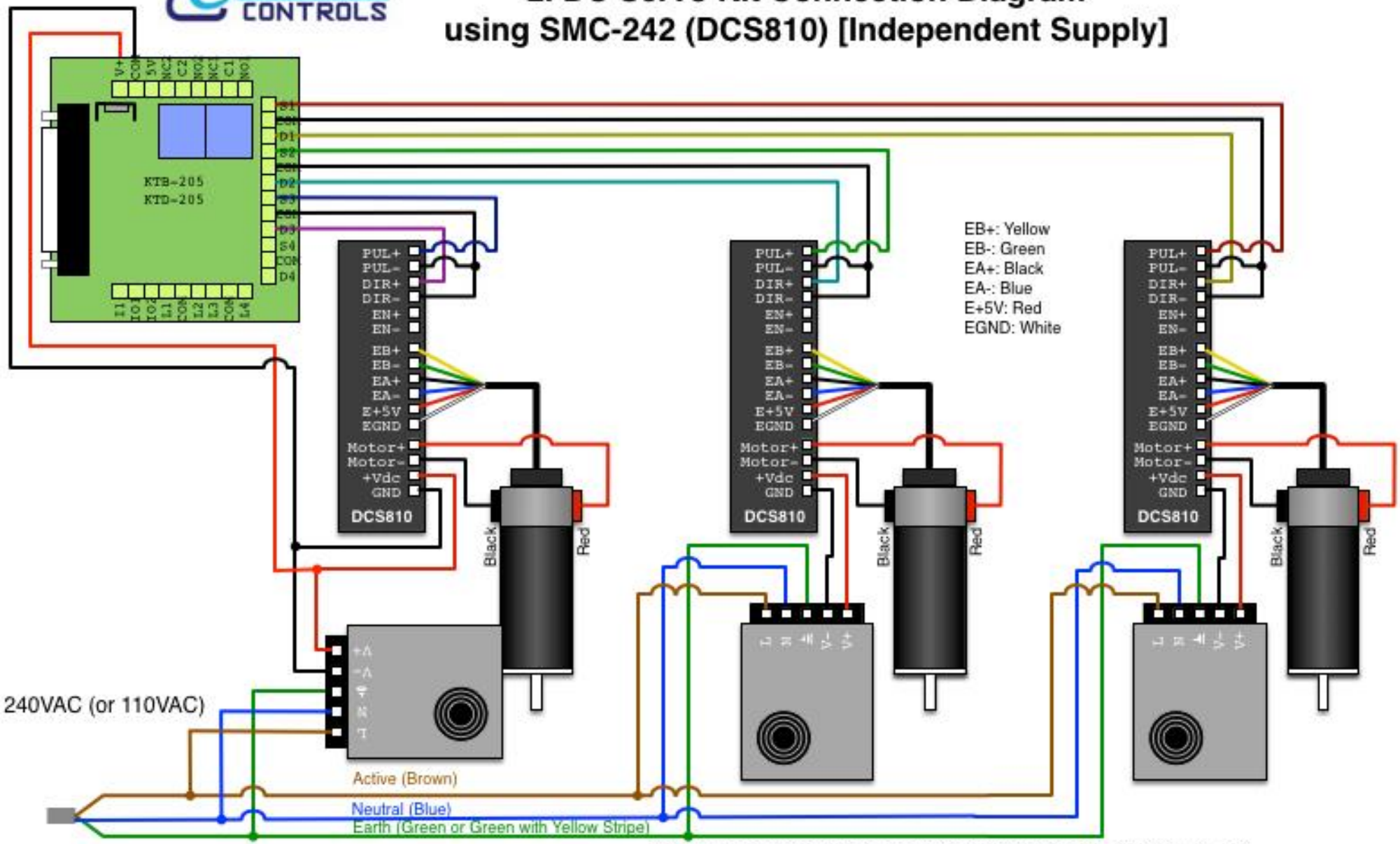
1. DC Servo Kit Connection Diagram using SMC-245 (DCS303)



WARNING: LINE VOLTAGES ARE DANGEROUS

If you are not confident about working with mains voltages, get a licensed electrician to check your work before connecting power.

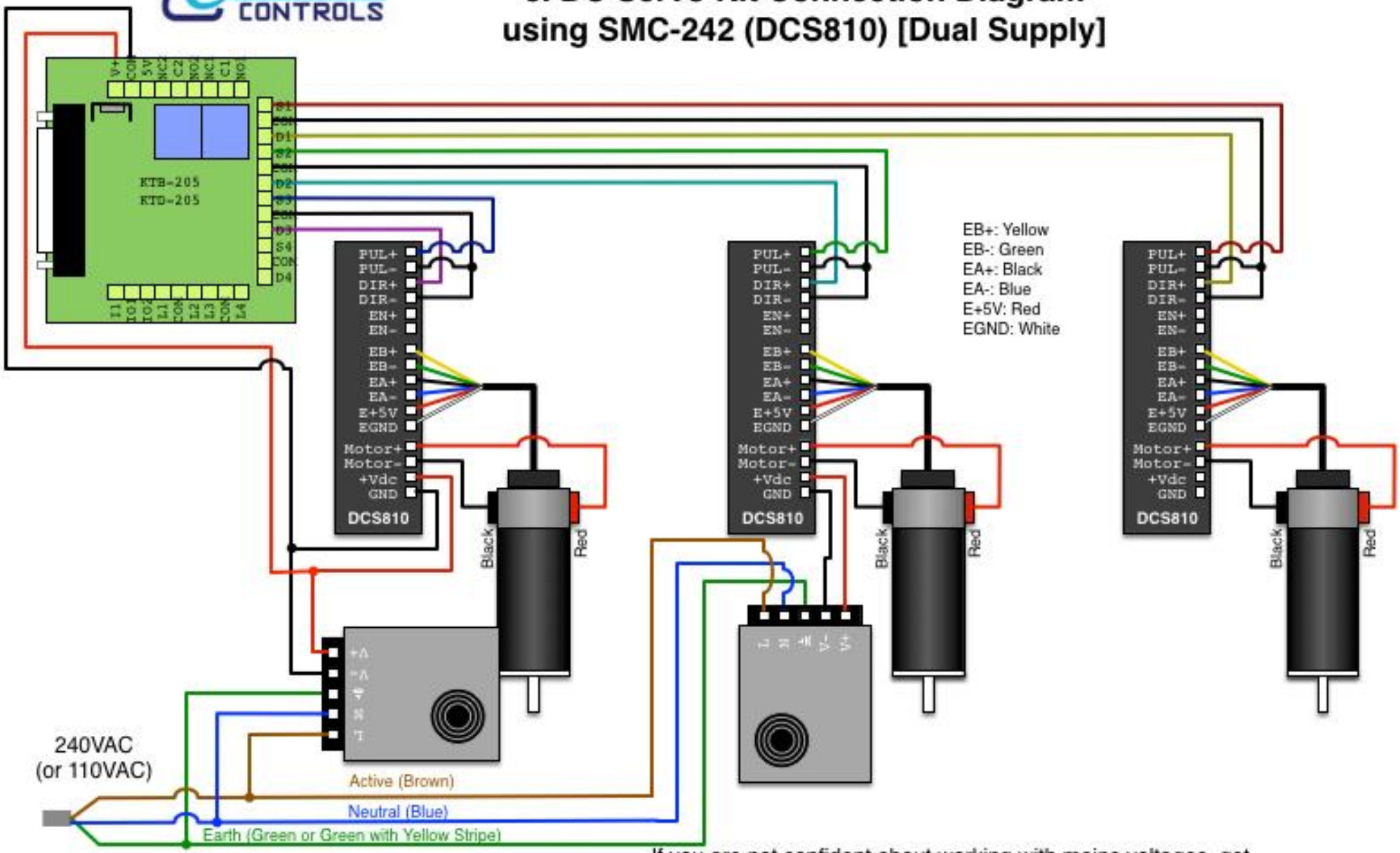
2. DC Servo Kit Connection Diagram using SMC-242 (DCS810) [Independent Supply]



WARNING: LINE VOLTAGES ARE DANGEROUS

If you are not confident about working with mains voltages, get a licensed electrician to check your work before connecting power.

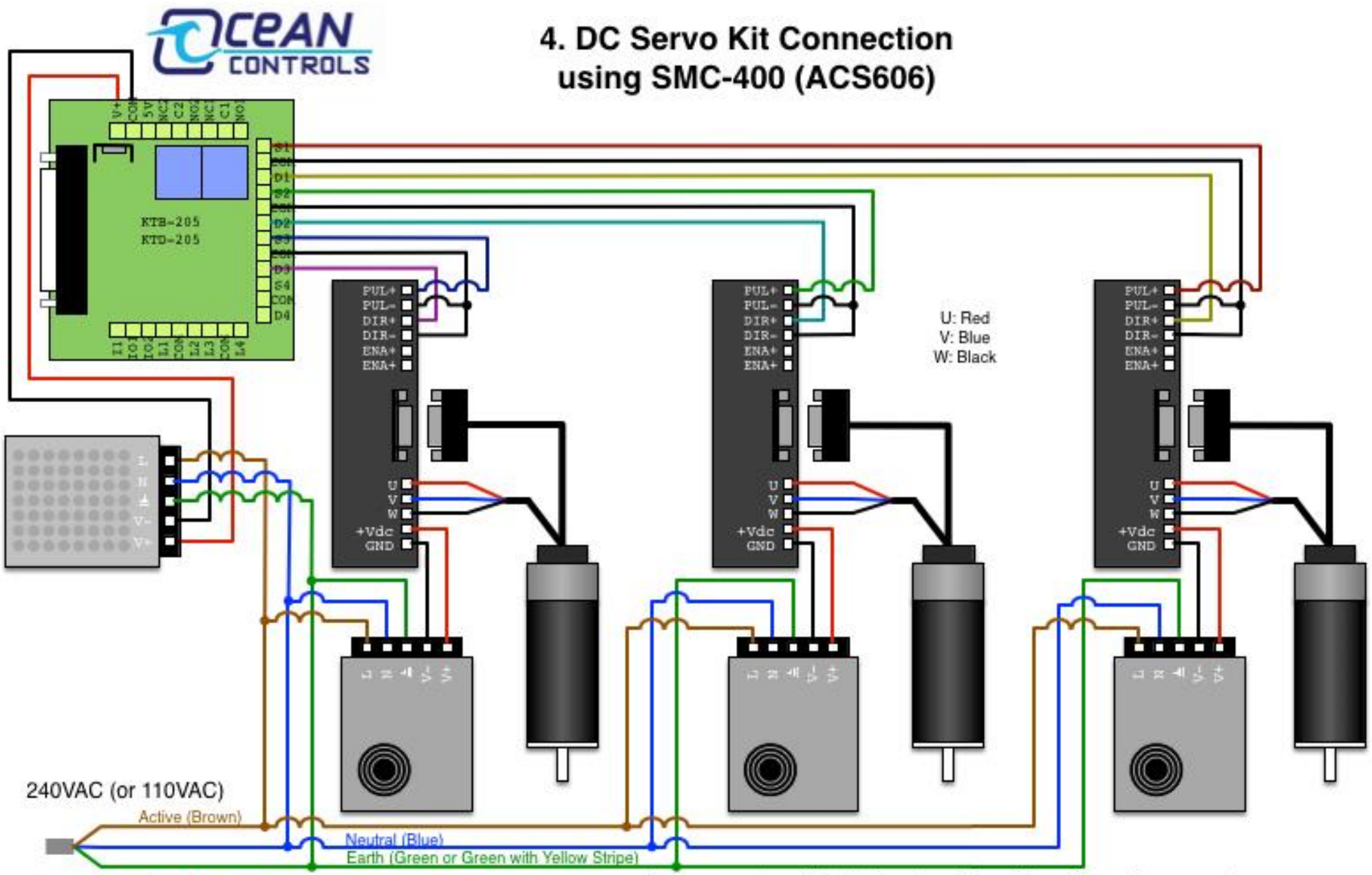
3. DC Servo Kit Connection Diagram using SMC-242 (DCS810) [Dual Supply]



WARNING: LINE VOLTAGES ARE DANGEROUS

If you are not confident about working with mains voltages, get a licensed electrician to check your work before connecting power.

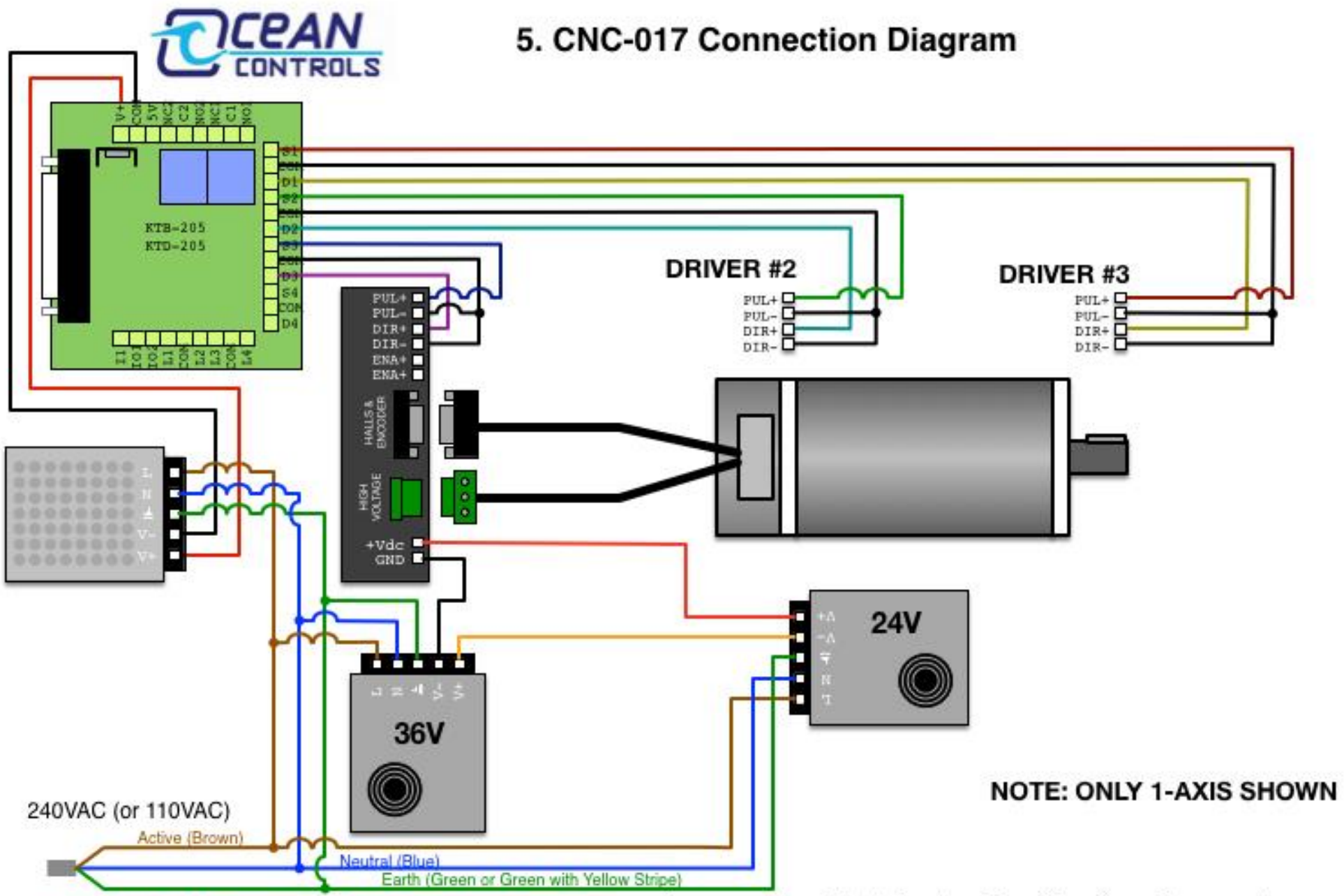
4. DC Servo Kit Connection using SMC-400 (ACS606)



WARNING: LINE VOLTAGES ARE DANGEROUS

If you are not confident about working with mains voltages, get a licensed electrician to check your work before connecting power.

5. CNC-017 Connection Diagram



NOTE: ONLY 1-AXIS SHOWN

WARNING: LINE VOLTAGES ARE DANGEROUS

If you are not confident about working with mains voltages, get a licensed electrician to check your work before connecting power.

CONTACT US

Visit: 14 Miles Grove, Seaford, VIC 3198, Australia

(Near the corner of Miles Grove and Wise Ave)

Business Hours: 9 AM to 5 PM, Monday to Friday (except public holidays)

Phone: +61 3 9782 5882

Fax: +61 3 9782 5517

Email Us: info@oceancontrols.com.au