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WIRING SCHEMATICS

ON-ROAD VEHICLE CONVERSION SINGLE AND DUAL MOTOR APPLICATION

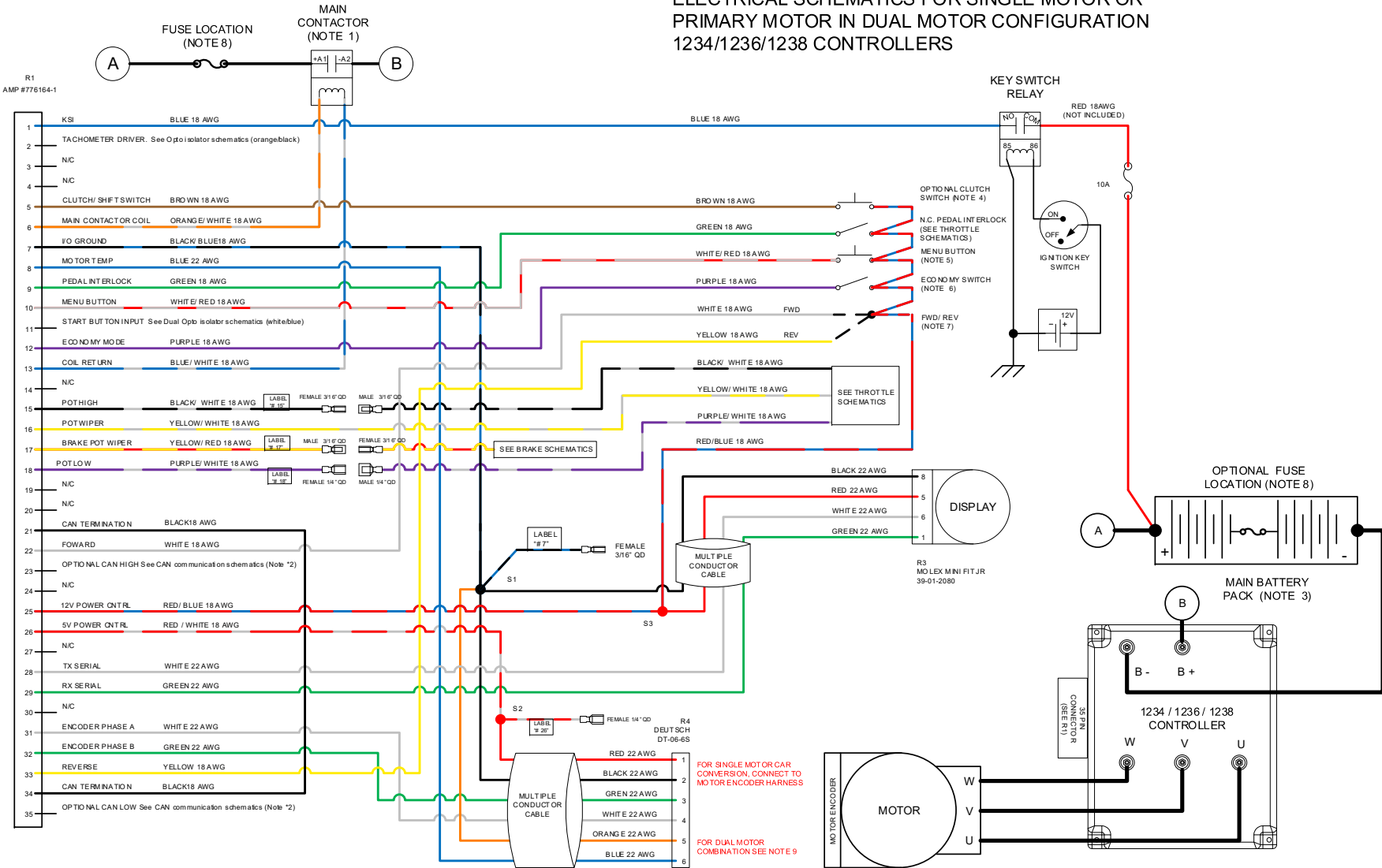
FOR SOFTWARE VERSIONS 5.00 TO 5.12

FOR CURTIS CONTROLLERS 1234/1236/1238

Date: 4/30/21

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ELECTRICAL SCHEMATICS FOR SINGLE MOTOR OR PRIMARY MOTOR IN DUAL MOTOR CONFIGURATION 1234/1236/1238 CONTROLLERS



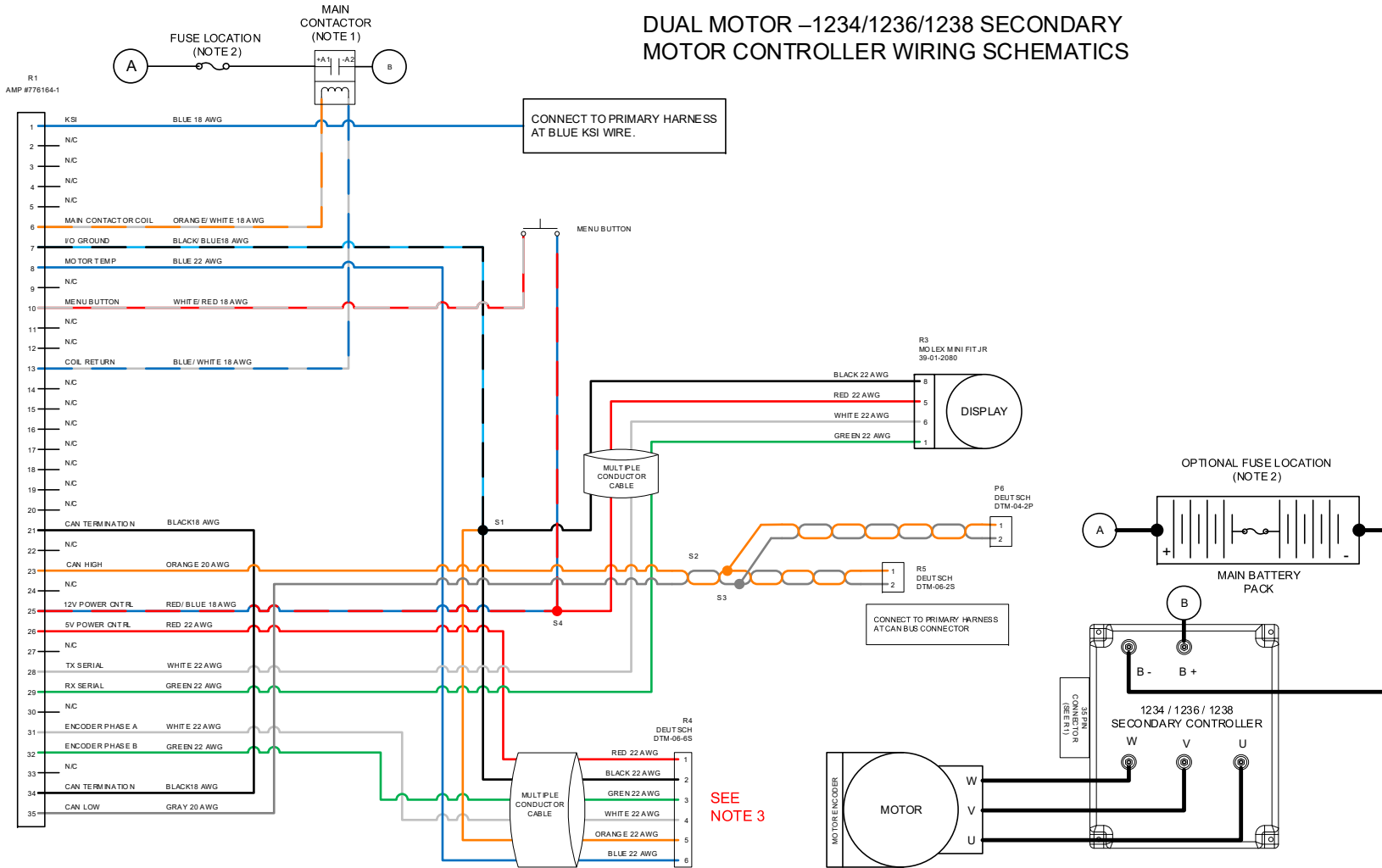
NOTES:

- (1) Use supplied Contactor (GIGAVAC Part #GV20QA-1). Use only a Contactor WITHOUT PWM AND COIL SUPPRESSION. FAILURE TO DO SO CAN CAUSE CONTROLLER FAILURE AND WILL VOID WARRANTY.
- (2) The Controller CAN Communication needs to be isolated from other CAN based components. A CAN isolator may be needed. Possible source of CAN isolator is CANOP from B&B Electronics (www.bb-elec.com)
- (3) A Battery Management System (BMS) is strongly recommended if Lithium Ion batteries are used. Possible source of BMS is Ewert Energy System's ORION BMS (www.orionbms.com)
- (4) Install the Clutch/ Shift Switch so that is ON when the clutch pedals is pressed. When clutch pedal is pressed the Regen setting is changed to Shift Neutral Braking Parameter to prevent the motor from stalling during gear shifting. In a Clutch-less system, this allows you to set the coast down rate of the motor so that the gears align properly. See Instructions on SHIFT-NEUTRAL BRAKING PARAMETERS.
- (5) Gives access to Drive System information. Required to access Programming and Diagnostic modes. See Programming Instructions.
- (6) Allows the use of ECONO Mode Parameters. See Programming Instructions.
- (7) Forward is CLOKWISE motor rotation from Encoder end view. Depending on Transmission configuration, use either wire to obtain desired rotation. Use FWD & REV Switch in direct drive applications.
- (8) Use suitable rated fuse. For Dual motor application, each controller's must be fused.
- (9) For dual motor application, see dual motor encoder isolator schematics on page 4 for details.

CAD TYPE	VISIO	APPLICABLE SOFTWARE	VERSION 5.00 to 5.12
UNIT	NONE	DRAWING	1010-AUTO-CONVERSION
DRW SIZE	A	TITLE	
DATE	2/12/13	ON-ROAD VEHICLE CONVERSION / PRIMARY DUAL MOTOR SCHEMATICS	
SUPPLIER PART	HW-AUTOCONVERSION-HPG		
SCALE	1:1	SHEET 1 OF 1	REVISION C HPEVS

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DUAL MOTOR –1234/1236/1238 SECONDARY MOTOR CONTROLLER WIRING SCHEMATICS

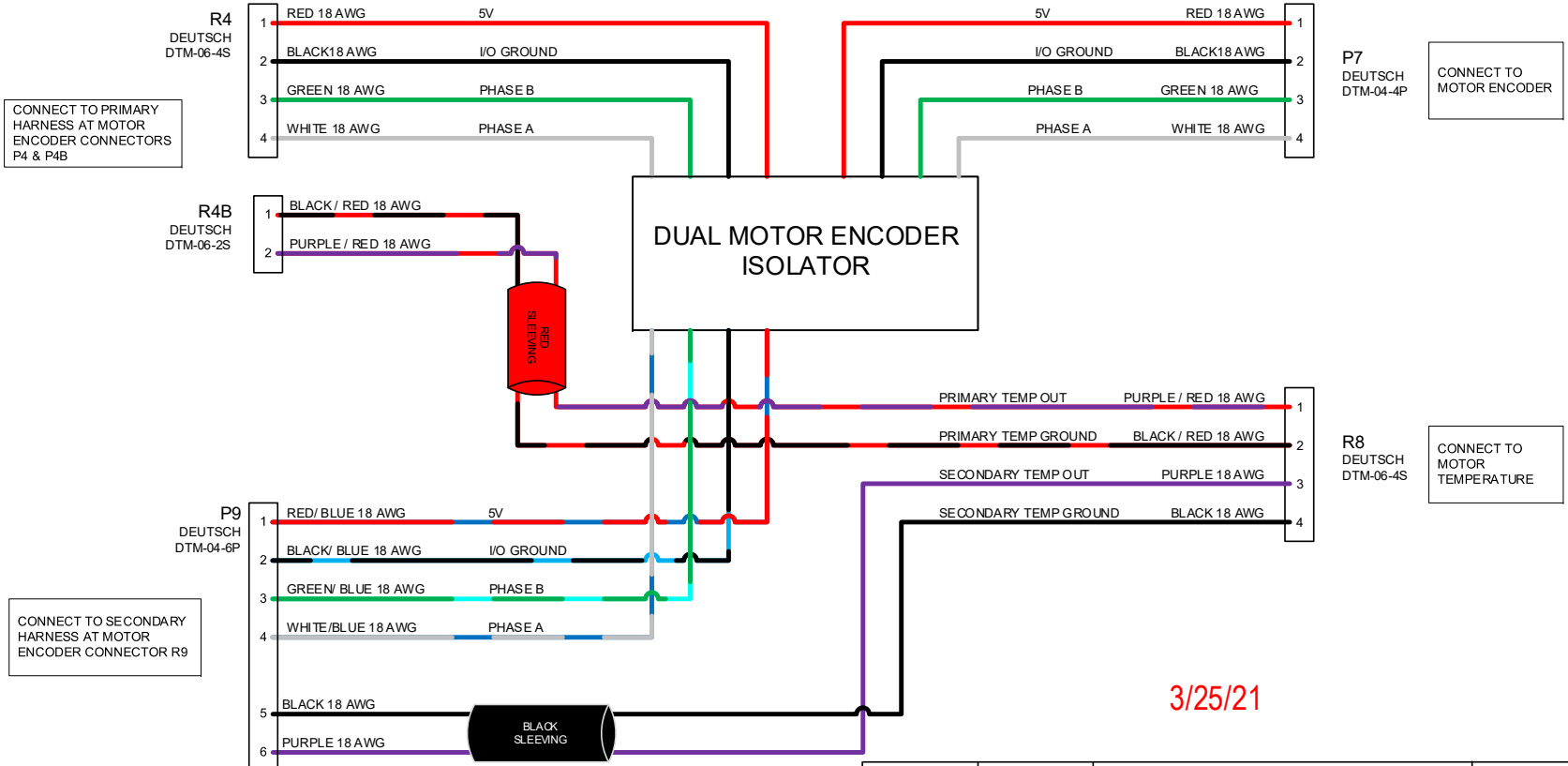


NOTES:

- (1) Use supplied Contactor (GIGAVAC Part #GV200QA-1). Use only a Contactor WITHOUT PWM AND COIL SUPPRESSION. FAILURE TO DO SO CAN CAUSE CONTROLLER FAILURE AND WILL VOID WARRANTY.
- (2) USE SUITABLE RATED FUSE. FOR DUAL MOTOR APPLICATION, EACH CONTROLLER MUST BE FUSED.
- (3) Encoder isolator MUST BE USED. See encoder Isolator schematics on Page 4 for details.

CAD TYPE	APPLICABLE SOFTWARE	VERSION 5.00 – 5.12	
VISIO	DRAWING	1010-AUTO-CONVERSION-TWIN MOTOR	
UNIT	NONE		
DRW SIZE	TITLE		
A	SECONDARY DUAL MOTOR SCHEMATICS		
DATE	SCALE	SHEET	REVISION
4/30/21	1:1	1 OF 1	C
			HPEVS

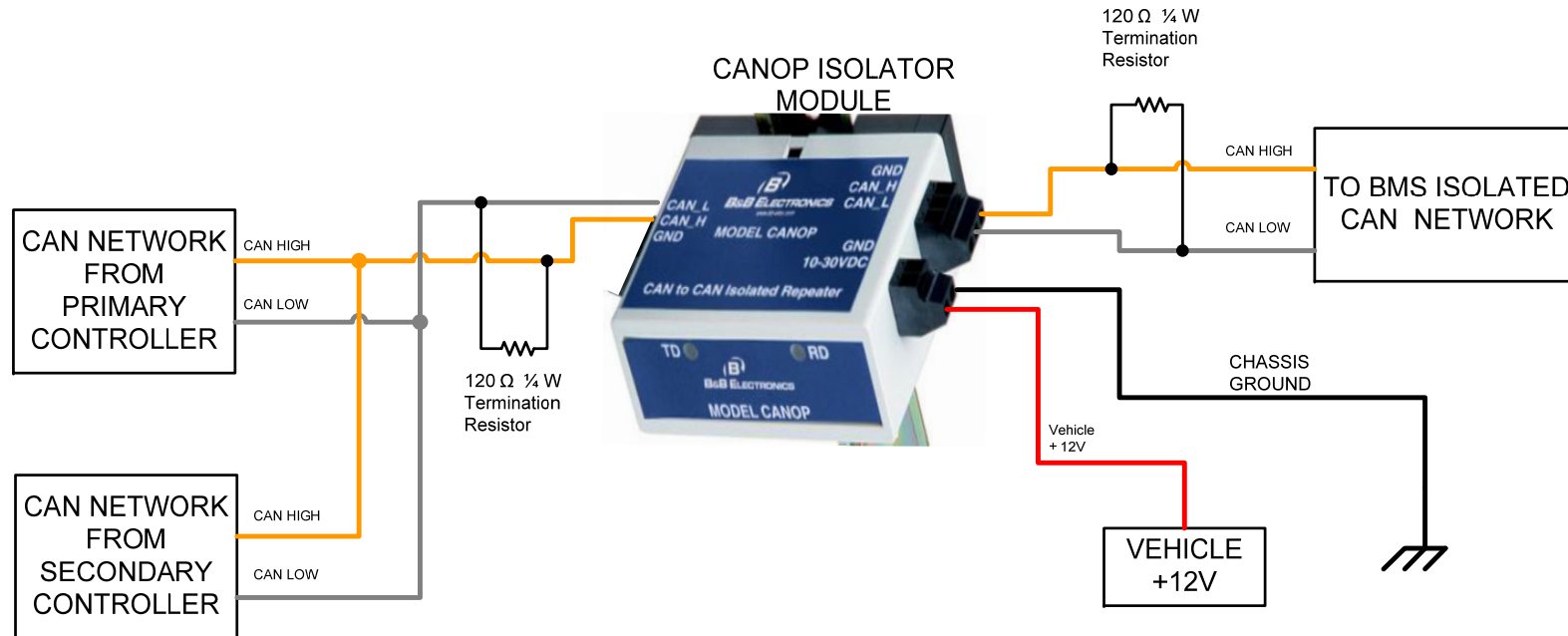
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CAD TYPE VISIO	CAD LOC.	APPLICABLE SOFTWARE	DRW SIZE B
OPER. NO.	UNIT	DRAWING 1010-TWIN-ENCODER-ISOLATOR	
DESIGN	DETAIL	TITLE DUAL MOTOR ENCODER ISOLATOR SCHEMATICS	
CHECKED	SAFETY		
SCALE NONE	DATE 3/25/21	REVISION D SHEET 1 OF 1	HPEVS

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REVISIONS		
REV	DESCRIPTION	APPROVED
A	INITIAL RELEASE	3/11/2013
B	Revision for clarification	10/30/2013



CAD TYPE VISIO	CAD LOC.	CAD FILE	DRW SIZE A
OPER. NO.	UNIT	DRAWING 1010-CAN-OP-ISOLATOR	
DESIGN	DETAIL	TITTLE	
CHECKED	SAFETY	CAN ISOLATOR DUAL 1238 CONTROLLER	
SCALE NONE	DATE 4/17/13	REVISION B SHEET 1 OF 1	HPEVS

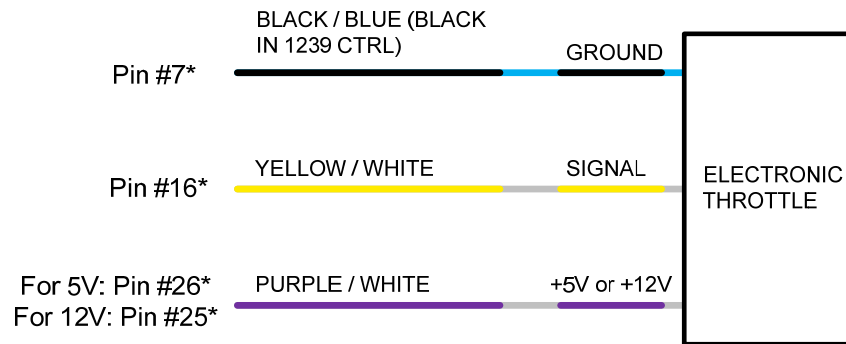
THROTTLE CONFIGURATION

Depending on the type of throttle used for the application, the different types of throttle configurations are listed in the table below. Electrical schematics are also included in the following pages.

THROTTLE CONFIGURATION	TYPE
ELECTRONIC without SWITCH	TYPE 1
2 WIRE with SWITCH 0-5k Ω	TYPE 2
3 WIRE with SWITCH 0-5k Ω	TYPE 3
CURTIS PB8 THROTTLE ASSEMBLY	TYPE 3

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REV	DESCRIPTION	APPROVED
A	INITIAL RELEASE	1/22/2013



TYPE 1 ELECTRONIC THROTTLE**

* Typical connection, verify correct voltage and connection in throttle documents or instructions.

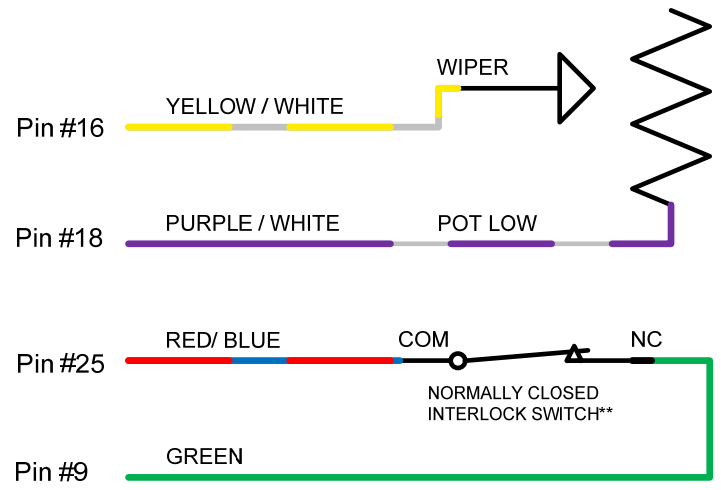
Not all Electronic Throttles supported

** When an electronic throttle is used, the GREEN wire from the pedal interlock does not need to be connected.

CAD TYPE VISIO	APPLICABLE SOFTWARE		
UNIT NONE	DRAWING 1010-THROTTLE-001		
DRW SIZE A	TITLE		
DATE 1/22/13	ELECTRONIC THROTTLE		
SUPPLIER PART			
SCALE NONE	SHEET 4 OF 4	REVISION B	HPEVS

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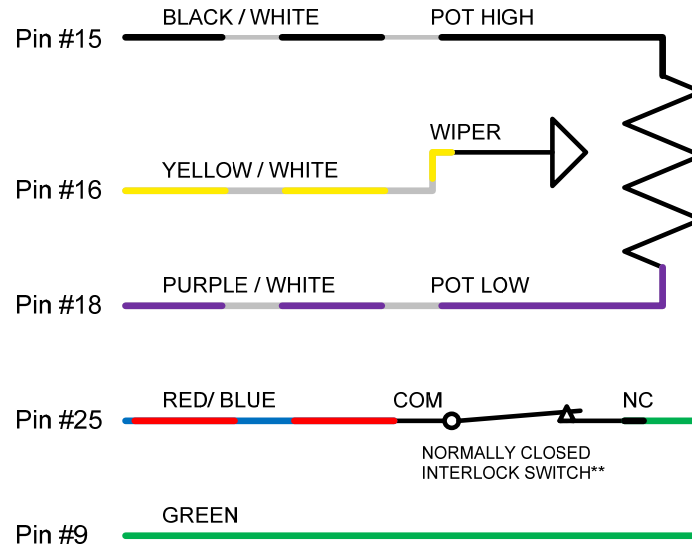
2 WIRE TYPE 2 THROTTLE

** When the accelerator pedal IS PRESSED the interlock switch is released to its NORMAL position (switch not activated) thus completing the circuit since its green wire is connected to the normally closed (NC) connection.

CAD TYPE VISIO	CAD LOC.	CAD FILE	DRW SIZE A
OPER. NO.	UNIT	DRAWING 1010-THROTTLE-001	
DESIGN	DETAIL	TITLE	
CHECKED	SAFETY	2 WIRE TYPE 2 THROTTLE	
SCALE NONE	DATE 1/22/13	REVISION A	HPEVS
		SHEET 1 OF 3	

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A	INITIAL RELEASE	1/22/2013



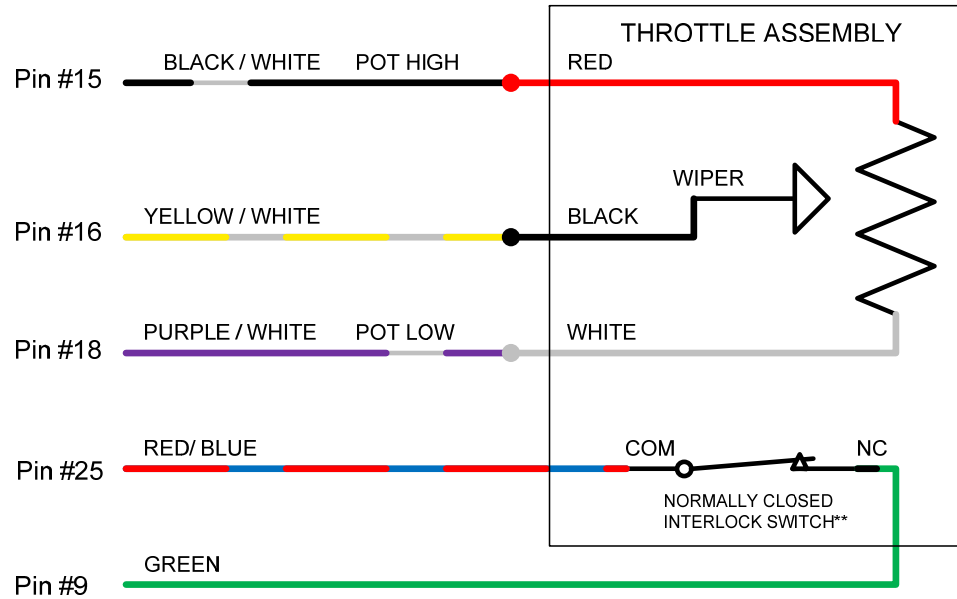
**3 WIRE TYPE 3
THROTTLE**

** When the accelerator pedal IS PRESSED the interlock switch is released to its NORMAL position (switch not activated) thus completing the circuit since its green wire is connected to the normally closed (NC) connection.

CAD TYPE VISIO	CAD LOC.	CAD FILE	DRW SIZE A
OPER. NO.	UNIT	DRAWING 1010-THROTTLE-001	
DESIGN	DETAIL	TITLE	
CHECKED	SAFETY	3 WIRE TYPE 3 THROTTLE	
SCALE NONE	DATE 1/22/13	REVISION A SHEET 2 OF 3	HPEVS

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CURTIS PB8 THROTTLE ASSEMBLY

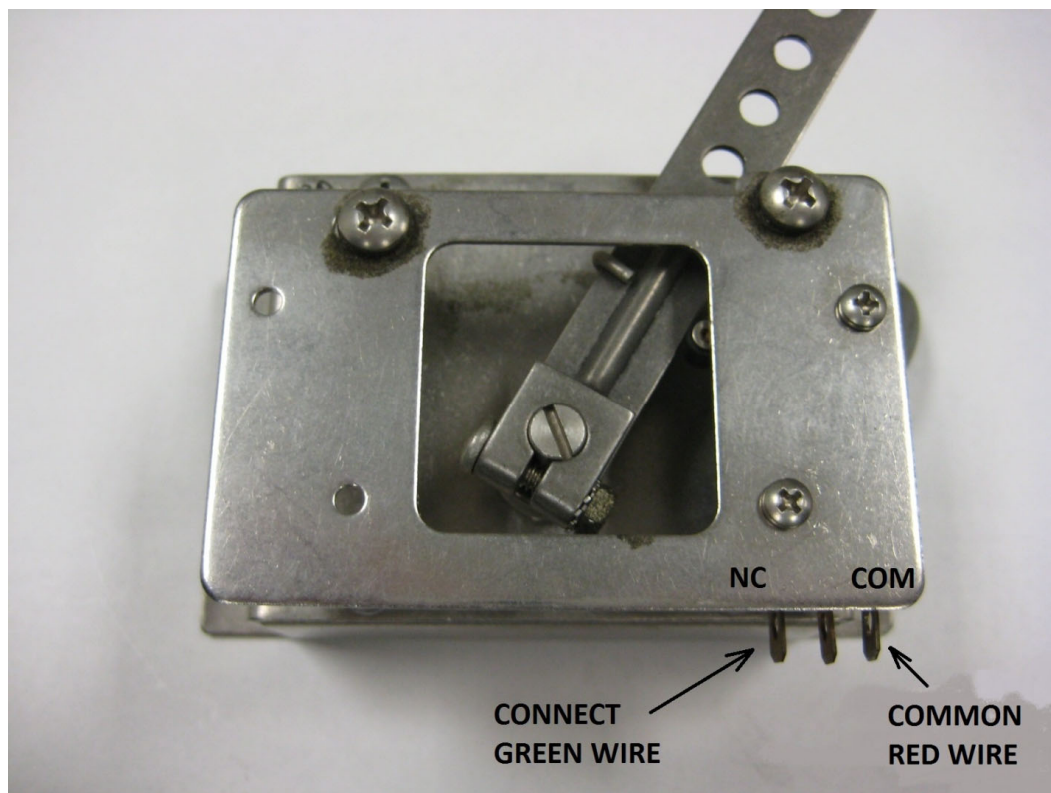
** When the accelerator pedal IS PRESSED the interlock switch is released to its NORMAL position (switch not activated) thus completing the circuit since its green wire is connected to the normally closed (NC) connection.

CAD TYPE VISIO	APPLICABLE SOFTWARE		
UNIT NONE	DRAWING 1010-THROTTLE-001		
DRW SIZE A	TITLE CURTIS PB8 THROTTLE ASSEMBLY		
DATE 1/22/13			
SUPPLIER PART			
SCALE NONE	SHEET 3 OF 4	REVISION A	HPEVS

PEDAL INTERLOCK CONNECTION

The pedal interlock connection is required for both 2 and 3 wire throttle pot assemblies. The Green wire is connected to the Normally Closed tab. The red/blue wire is connected to the common tab. See picture below.

NOTE: when the accelerator pedal IS PRESSED the interlock switch is released to its NORMAL position (switch not activated) thus completing the circuit since its green wire is connected to the normally closed (NC) connection.



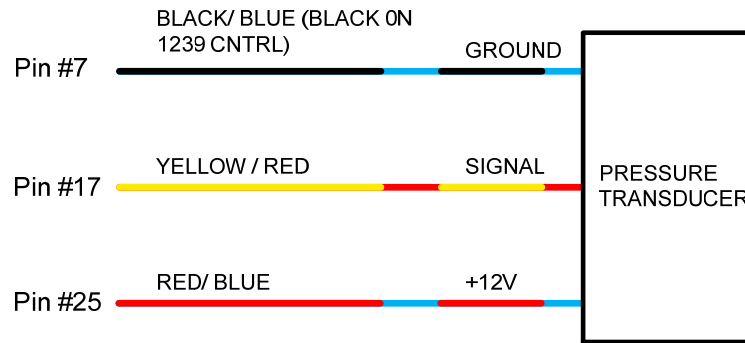
BRAKE INPUT CONFIGURATION

Depending on the type of brake input used for the application, the different types of brake input configurations are listed in the table below. Electrical schematics are also included in the following pages.

BRAKE INPUT CONFIGURATION	TYPE
PRESSURE TRANSDUCER/ ELECTRONIC 0-5V INPUT	TYPE 1
2 WIRE 0-5k Ω	TYPE 2

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REV	DESCRIPTION	APPROVED
A	INITIAL RELEASE	2/19/2013



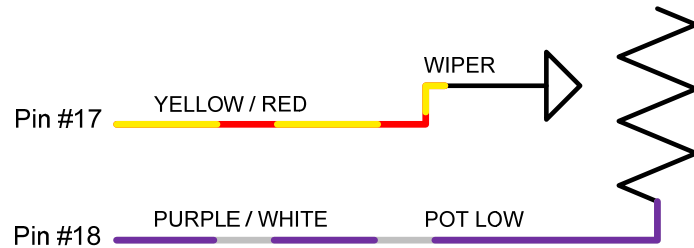
TYPE 1 PRESSURE TRANSDUCER

** Typical Pressure Transducer Ratings
 8-30 Volt Input
 1-5 Volt Output
 2500 PSI

CAD TYPE VISIO	CAD LOC.	CAD FILE	DRW SIZE A
OPER. NO.	UNIT	DRAWING 1010-BRAKE	
DESIGN	DETAIL	TITTLE	
CHECKED	SAFETY	PRESSURE TRANSDUCER	
SCALE NONE	DATE 2/19/13	REVISION A SHEET 2 OF 2	HPEVS

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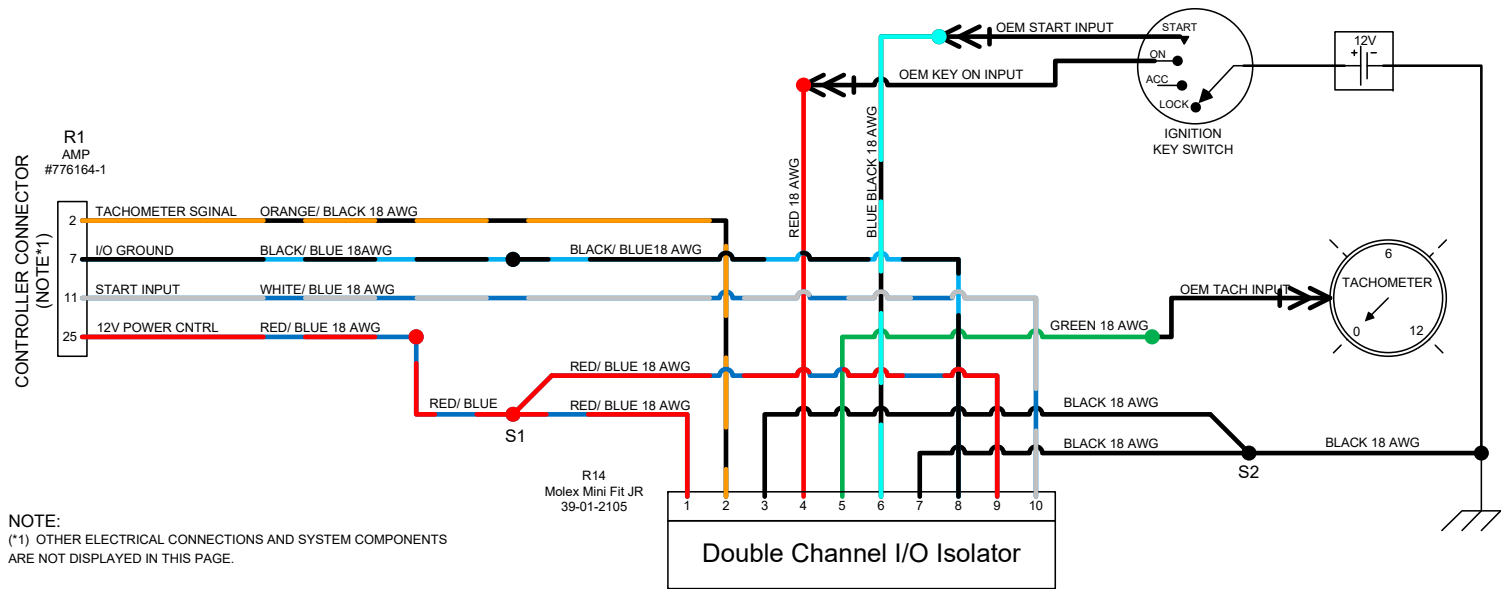
REVISIONS		
REV	DESCRIPTION	APPROVED
A	INITIAL RELEASE	2/19/2013



**TYPE 2
2 WIRE BRAKE POT**

CAD TYPE VISIO	CAD LOC.	CAD FILE	DRW SIZE A
OPER. NO.	UNIT	DRAWING 1010-BRAKE	
DESIGN	DETAIL	TITLE	
CHECKED	SAFETY	2 WIRE BRAKE POT	
SCALE NONE	DATE 2/19/13	REVISION A SHEET 1 OF 2	HPEVS

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NOTE:
(*1) OTHER ELECTRICAL CONNECTIONS AND SYSTEM COMPONENTS ARE NOT DISPLAYED IN THIS PAGE.

I/O ISOLATOR PIN FUNCTION

- 1 – CHANNEL 1 CONTROLLER 12V
- 2 – CHANNEL 1 TACHOMETER SIGNAL
- 3 – CHANNEL 1 GROUND
- 4 – CHANNEL 1 VEHICLE 12V
- 5 – CHANNEL 1 OUTPUT TO TACHOMETER
- 6 – CHANNEL 2 IGNITION KEY INPUT
- 7 – CHANNEL 2 GROUND
- 8 – CHANNEL 2 CONTROLLER I/O GROUND
- 9 – CHANNEL 2 CONTROLLER 12V
- 10 – CHANNEL 2 CONTROLLER START INPUT

CAD TYPE VISIO	CAD LOC.	CAD FILE	DRW SIZE B
OPER. NO.	UNIT	DRAWING 1010-2CH-ISOLATOR-001	
DESIGN	DETAIL	TITLE DUAL CHANNEL OPTO-ISOLATOR SYSTEM SCHEMATICS	
CHECKED	SAFETY		
SCALE NONE	DATE 4/19/12	REVISION B SHEET 1 OF 1	HPEVS