



www.alltraxinc.com

Operators Manual SR



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WARNINGS



Safety Notes:

When working on electric vehicles, sudden unexpected events can occur, it's recommended to:

- Place the drive axle on jack stands—wheels off the floor.
- When working on wiring or batteries, always remove rings and watches.
- Use the proper safety equipment, eye protection, and insulated tools.
- Never connect a computer while the vehicle is being charged.
- Disconnect batteries before installing or working on the controller.
- Wear safety glasses.
- Because hydrogen can build up due to gassing from the batteries, work in a well ventilated area.
- Make sure the battery pack is fused.
- Do not clean the controller with a high PSI pressure washer.
- When cleaning batteries, take precautions to keep the battery acid from splashing on the controller.

Note:

It is the installer's responsibility to ensure the correct equipment (ie. wire, motor, solenoid, fuse etc) is installed in the car.

READ AND SAVE THESE INSTRUCTIONS

USABILITY STATEMENT

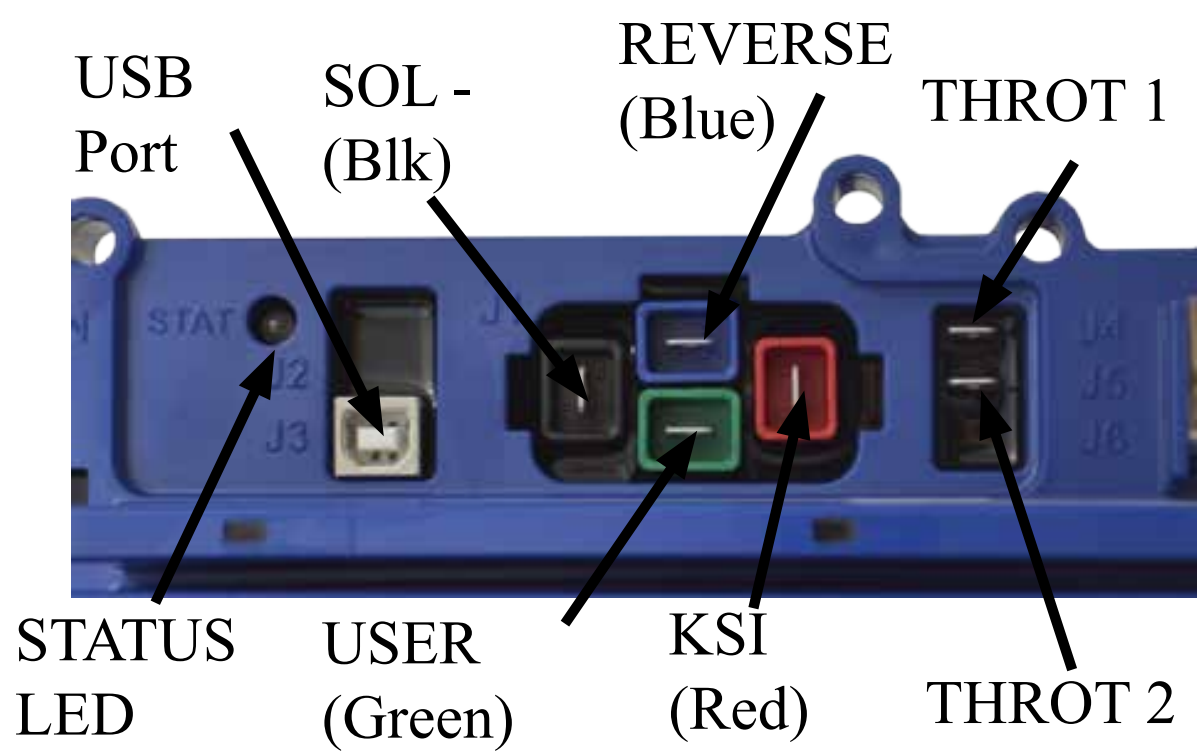
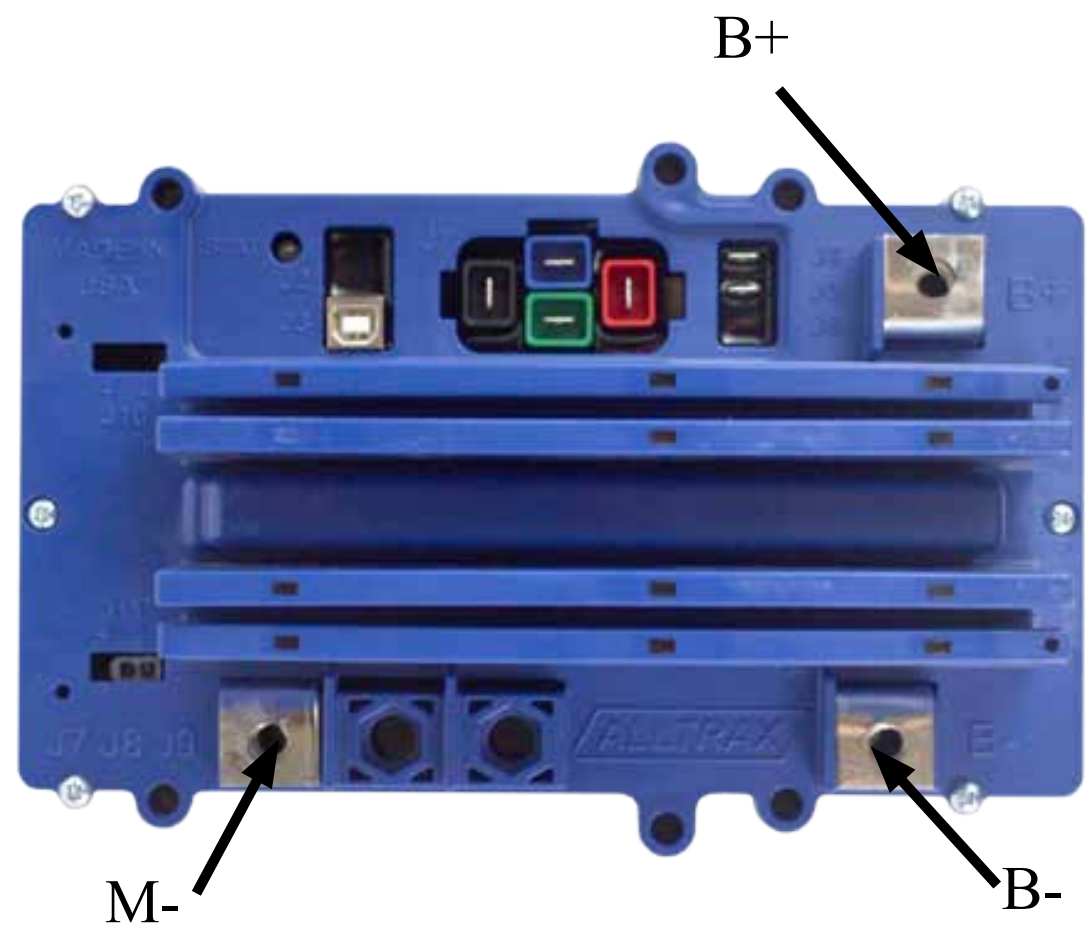


Alltrax Inc's lines of Series and Shunt Motor Controllers are intended for use with motors only. Any application or usage that does not meet these criteria WILL NOT be covered by warranty. Also, any requests for design assistance or technical support outside the scope of the product intended use may be denied. Alltrax assumes no liability for any damage or injury as a result of use of the motor controllers in a non-traction or process motor application.

WARNING: Use of this product for other than these specified uses may be highly dangerous and lead to serious injuries or death.

WARNING: The use of this product for the production of Plasma Assisted Hydrogen, Brown's Gas, HHO (H₂O Hydrogen Electrolysis) or any other type of gas is prohibited. Generation and storage of these gasses is extremely dangerous and poses a significant risk of explosion, fire, property damage and serious injury or death.

SR LAYOUT



SR SPECIFICATIONS

Model	Peak (Amps)	2 Min (Amps)	5 Min (Amps)	Continuous (Amps)
SR48300	300/350 ¹	300 (1.5min)	230	125
SR48400	400/460 ¹	400	300	140
SR48500	500/575 ¹	500	350	175
SR48600	600/690 ¹	600	425	210
SR72300	300/350 ¹	300	275	130
SR72400	400/460 ¹	400 (1.5min)	300	150
SR72500	500/575 ¹	500	400	210

Note¹: The larger number represents the value when the "Peak Amp Mode" is enabled in the Alltrax Toolkit program.

All ratings are at 25°C with nominal rated voltages at 50% PWM. Actual currents are ±5% listed rating

Type: Series Motor Controller

Operating Frequency: 18kHz

Controller Voltage, KSI & Reverse:

SR48XXX 12-48V nom, 62V max

SR72XXX 12-72V nom, 90V max

Controller Operating Temp: -20°C to 75°C, shutdown @ 85°C

Environmental Operating Temp: -20°C to 50°C

Stand by Power (Power up): <1W nom, <8W Fan on

Stand by Current: <20mA

Relay Drive Current: 5A peak, 1A Cont.

KSI Peak In Rush: 60V = 9A, 30V = 4A, 9.5V = 2A

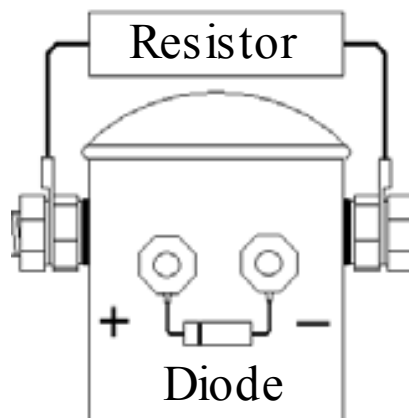
Throttles Supported: 0-5k, 5k-0, E-Z-GO ITS, Club Cart 5k-0 3 Wire (MCOR), 0-5v, Taylor Dunn 6v-10.5v, USB Throttle, Absolute Mode

Terminal Torque: Torque to 60-80 in.lb (5-7 ft/lb, 6.77-9.4Nm)

Mounting Bolt Torque: Torque bolts to 15-20 in.lb (1.25-1.75 ft.lb, 1.7-2.25nm)

INSTALLATION

Resistor & Diode Mounting



The diode across the coil terminals safely dissipates the energy when the coil is turned off. Installation Dependant, refer to applicable drawing.



Contactor Size	Diode	Diode Current
70A-200A Solenoid	1N4004	1A
400A-550A Solenoid	1N5408	3A
600A or larger Solenoid	MR754	6A

The resistor typically seen across the contactors big terminals pre-charges the filter capacitors in the controller. This minimizes arcing across the contactor terminals when closing.

Battery Voltage	Resistor
12-36V	220-250 Ohm 10W
48V	470 Ohm 10W
72V	1000 Ohm 10W



F/R Switch

The forward/reverse switch is an often overlooked part of the upgrade process. In a series motor, all of the motor current will pass through the F/R switch. An undersized F/R Switch is as bad as an undersized solenoid or small wire gauge.

For higher amperage controllers (>600A), it is suggested that a change-over contactor set up be used. These are large enough to handle the higher currents without over heating the contacts and they provide the user the ability to change direction by flipping a switch.

Controller Amperage	F/R Size
400A or less	Stock/HD
450A to 650A	Heavy Duty/Change-Over Contactor
650A or more	Change-Over Contactor



Change-over contactors are multiple contactors bound together that allow the user to change the polarity of the voltage going to the motor thus reversing direction. It works exactly the same as the manual F/R switch, except that it uses coil drive contactors. See the installation drawings for how to wire up a change-over contactor.

Contactors (Solenoids)



The solenoid is the primary disconnect of the battery pack in the case of the an emergency. In order to be effective, the solenoid needs to be properly rated for the current that will be drawn from the batteries. It is VERY important that the solenoid be rated correctly. It is the only way to disconnect the batteries from the motor/controller loop in case of a failure. Too small of a solenoid increases the likelihood that the contacts will weld together and not be able open.

UNACCEPTABLE



Stock 70 AMP

Used with older ClubCars vehicles

DO NOT Use with Alltrax Controller

STANDARD DUTY

Flat lands with moderate speed and torque performance expectations.



Stock 100 AMP

Use with 300A controllers.

HEAVY DUTY

High performance, high speed, maximum torque, pulling loads, hilly terrain or Hunting Buggies.



Performance 200 AMP
(600amp Inrush) Use with 300
and 400 AMP Controllers



Heavy Duty 200 AMP
(800A surge) Use with 300 to
500 AMP Controllers



Heavy Duty 400 AMP
(1000A surge) Use with 500 and
600 AMP Controllers
Suggested types:
SW200
MZJ400 (Shown)

EXTREME DUTY



Extreme Duty 600A+ AMP
(1000A + surge) Use with 600
AMP or bigger Controllers.

Fuse

Any application where there is a battery pack, a fuse must be installed. A fuse will open the battery circuit and prevent any serious damage from occurring.

The fuse should be installed on or between the battery terminals. The main B+, B- or in-between 2 batteries is an acceptable location. The fuse must be rated for pack voltage and fault current.



Controller Amperage	Fuse Rating
400A or less	250A
450A to 650A	400A
650A or more	600A

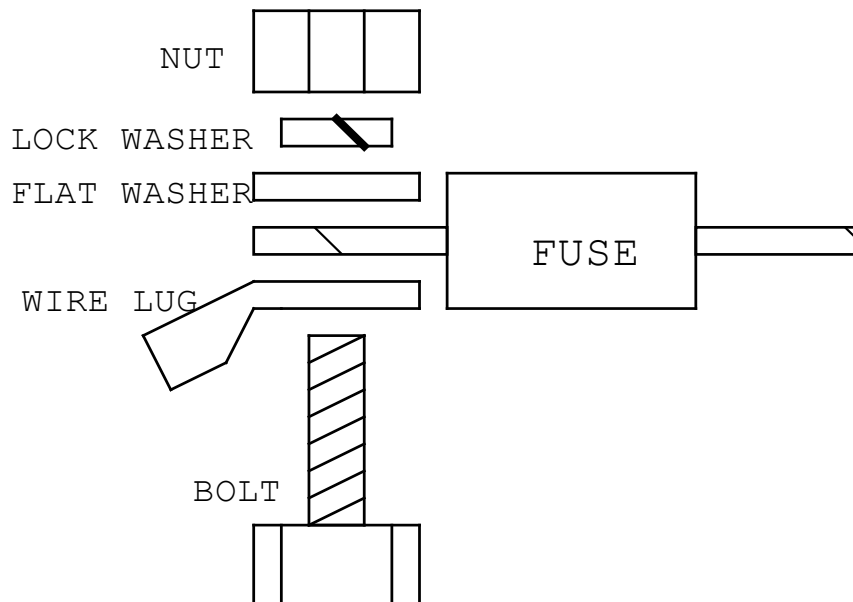


Diagram: Fuse terminal hardware

Wiring

Wiring and battery health in an electric vehicle are very important and overlooked during performance upgrades. Wiring size is important for safety and proper operation of the vehicle. Undersized wires will affect the performance of controllers and can overheat. Wires should be crimped with proper sized terminals and tools to provide a clean low resistance connection.

Controller	Min. Wire AWG Standard Duty	Min. Wire AWG Heavy Duty
300A	OEM -6 AWG	4 AWG
400A	4 AWG	4 AWG
500A	2 AWG	1/0 AWG
600A	1/0 AWG	2/0 AWG

Power Wiring

When running wiring for the vehicle care must be taken for proper wire routing. Power wiring should be of proper sizing and ran as low in the framework of the vehicle as practical. Lengths of power wire runs need to be kept short and pairs of wires from common circuits should be grouped together to reduce EMC emissions. Secure all power wiring to the vehicle framework.

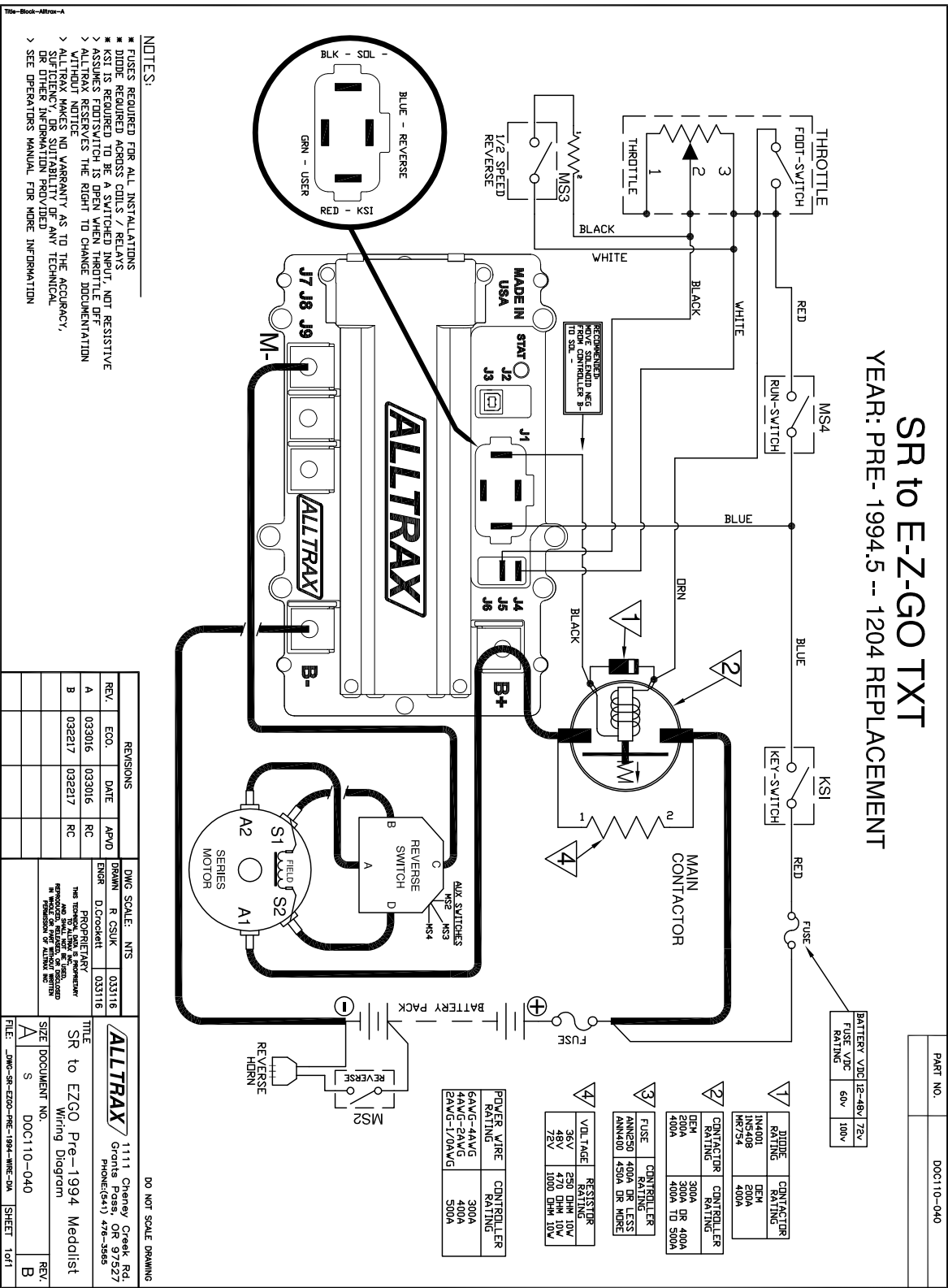
Signal Wiring

Signal wires should be keep as short as practical. Care should be taken to protect the wires sharp edges and rubbing. Consider the use of split loom or braided wire sheathing. Fasten bundles securely to framework. Do not route the signal wires together in the same bundle with power wires. All safety interlocks (KSI, Footswitch, etc) need to be mechanical switches or electromechanical relay.

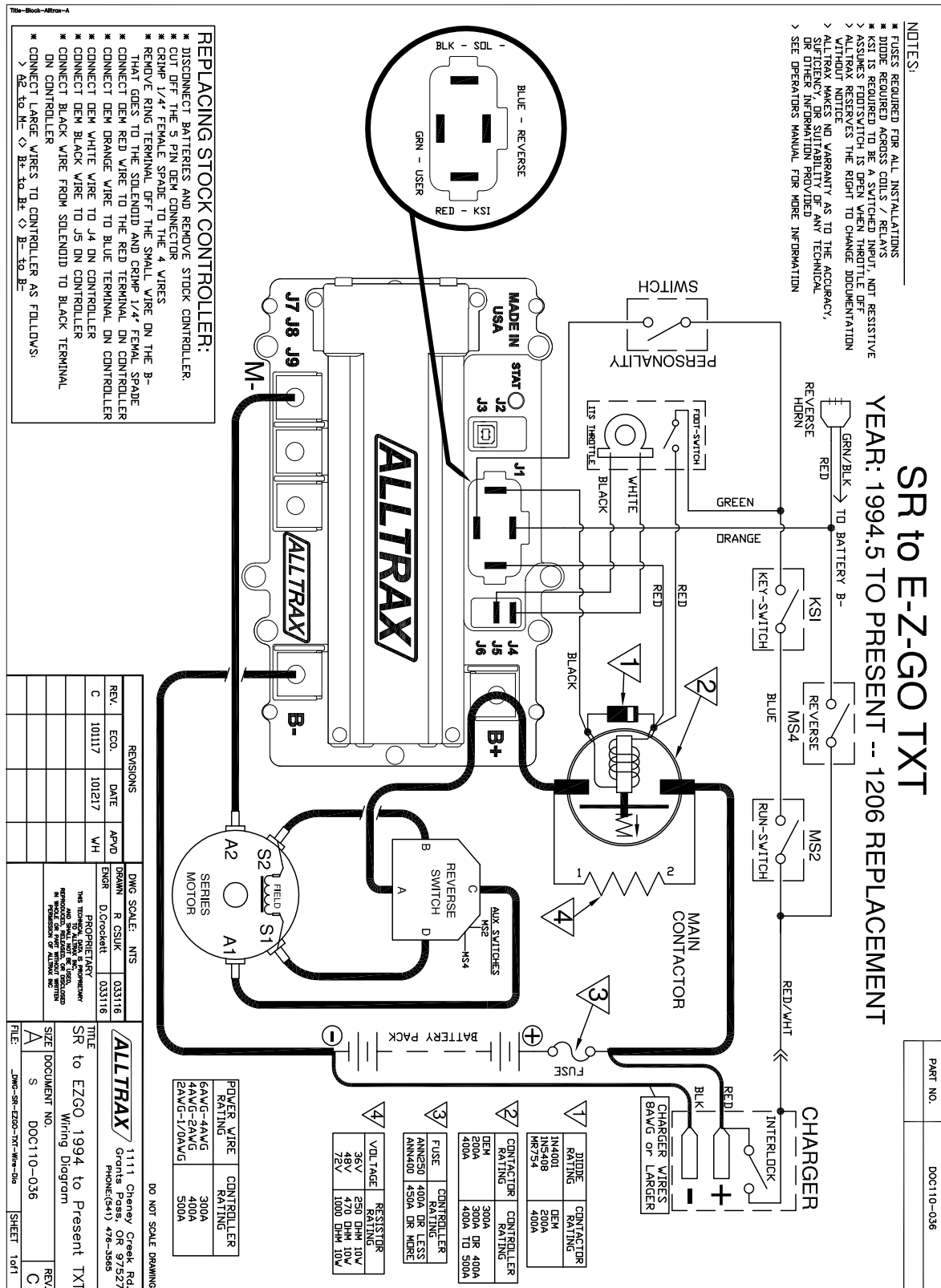
INSTALLATION DRAWINGS

See our Website more drawings:
Full Sized & Updated
Other OEM Drawings
More Generic Wire Diagrams
Non Standard Throttle Wiring

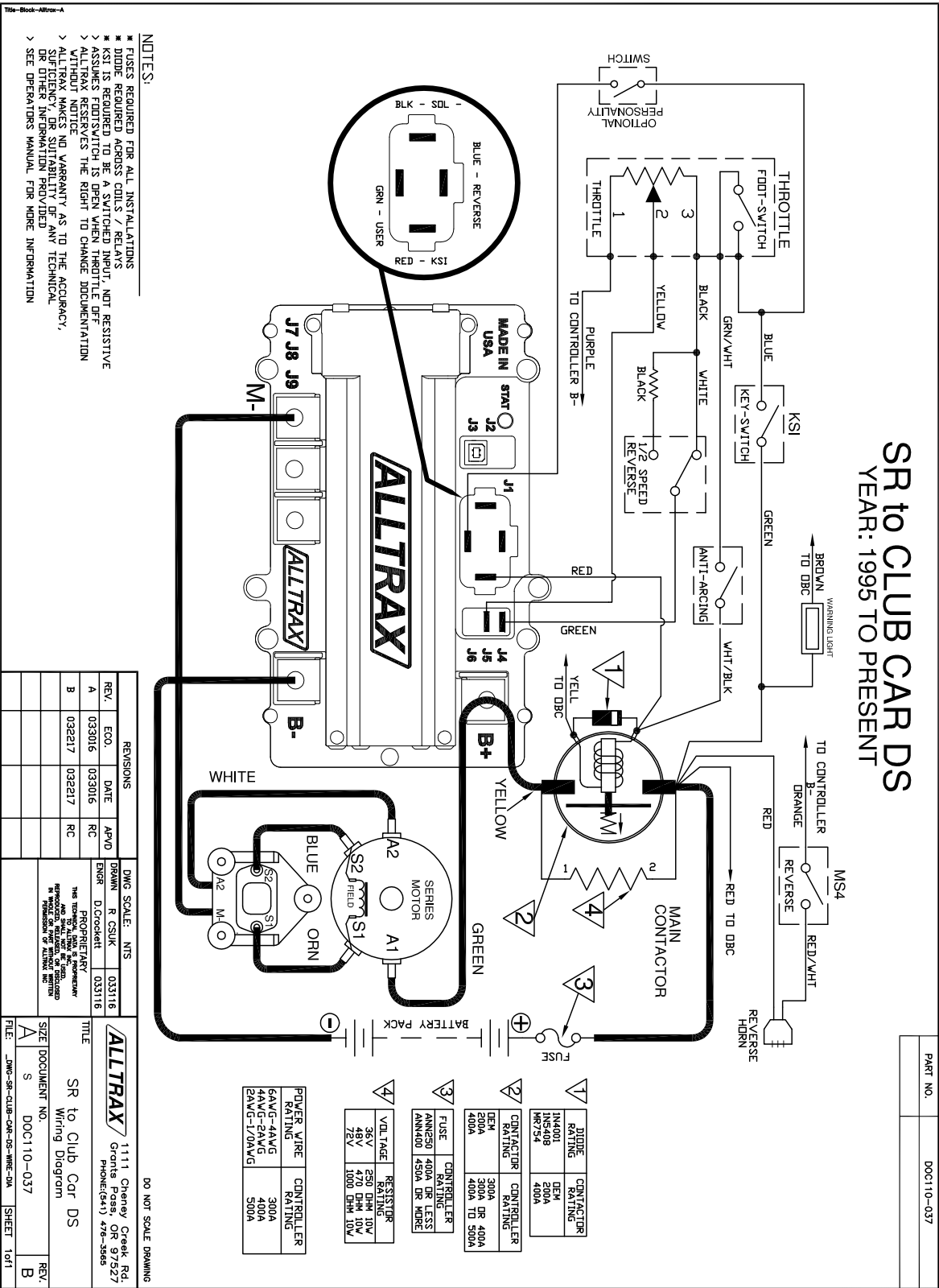
PRE-1994 EZGO



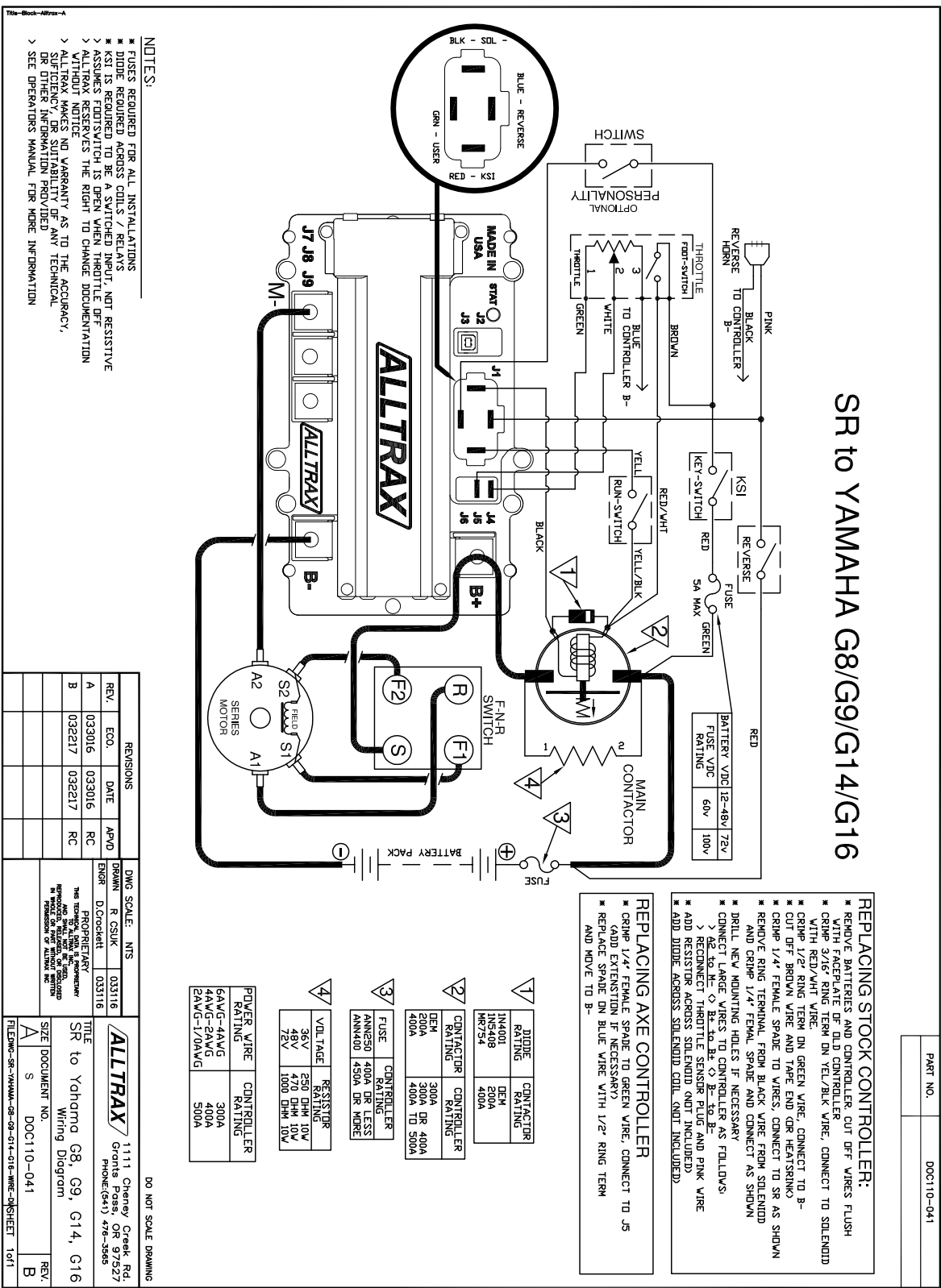
1994 AND NEWER EZGO



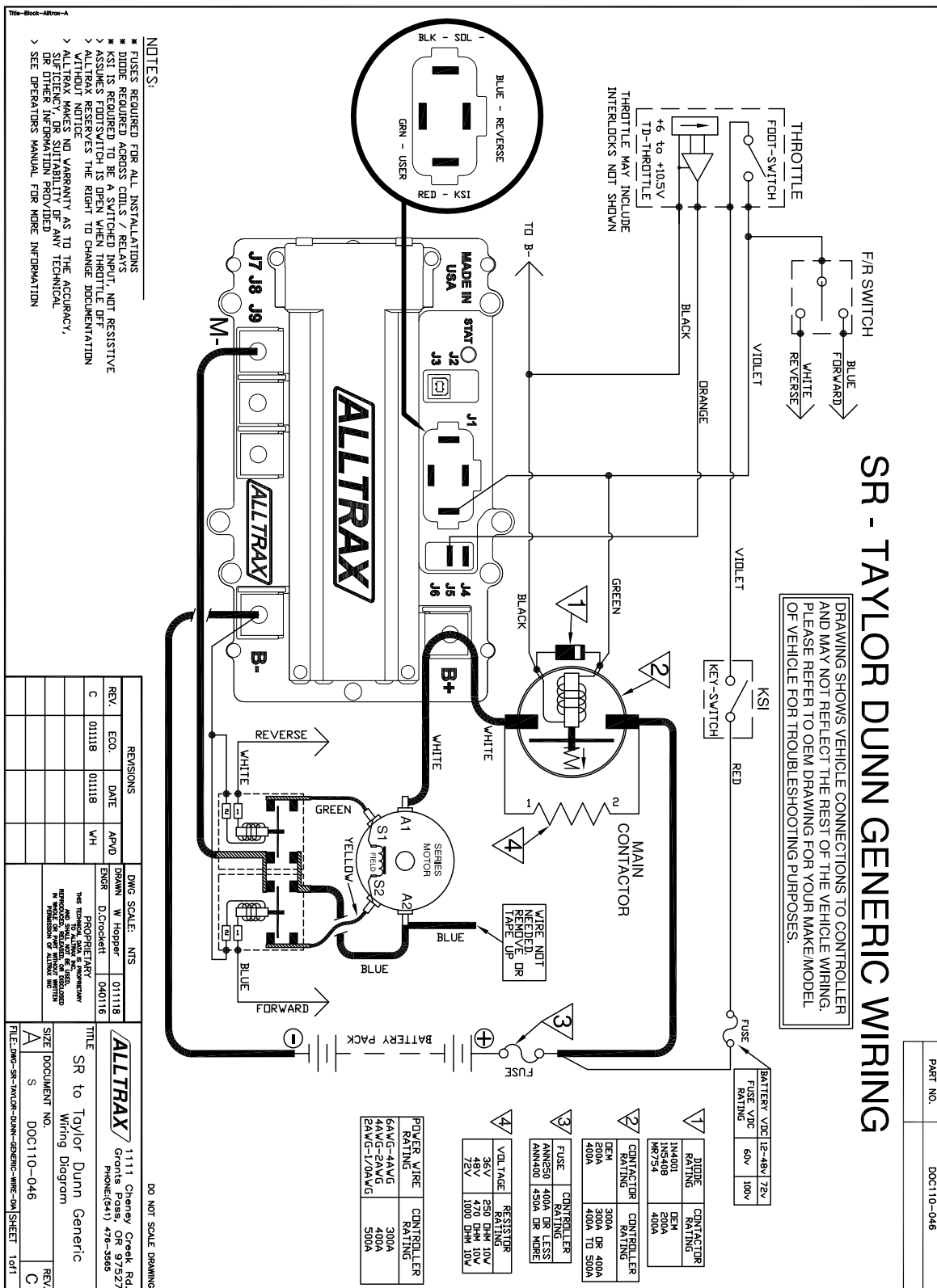
1994 AND NEWER CLUB CAR



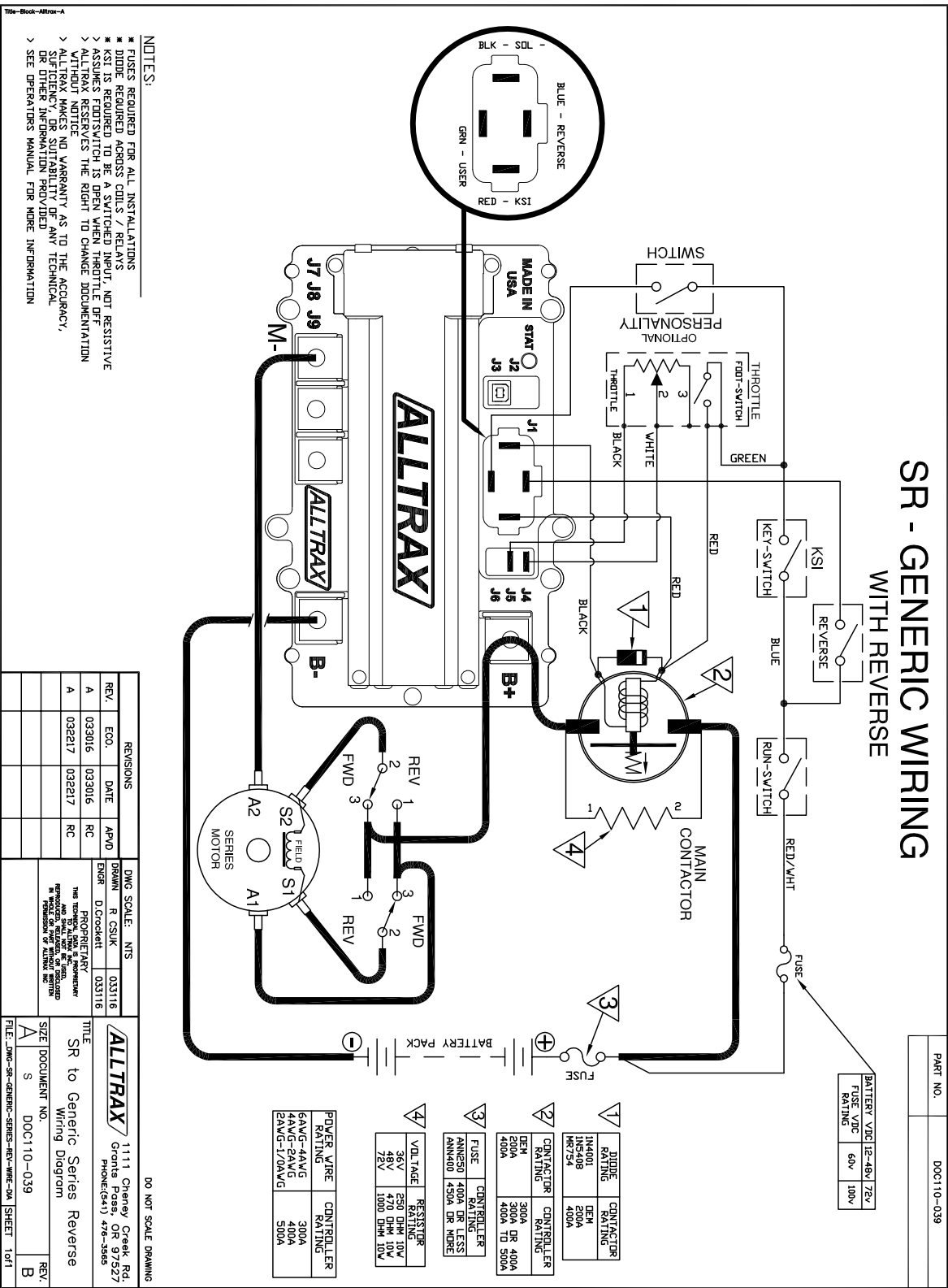
YAMAHA - G8, G9, G14, G16



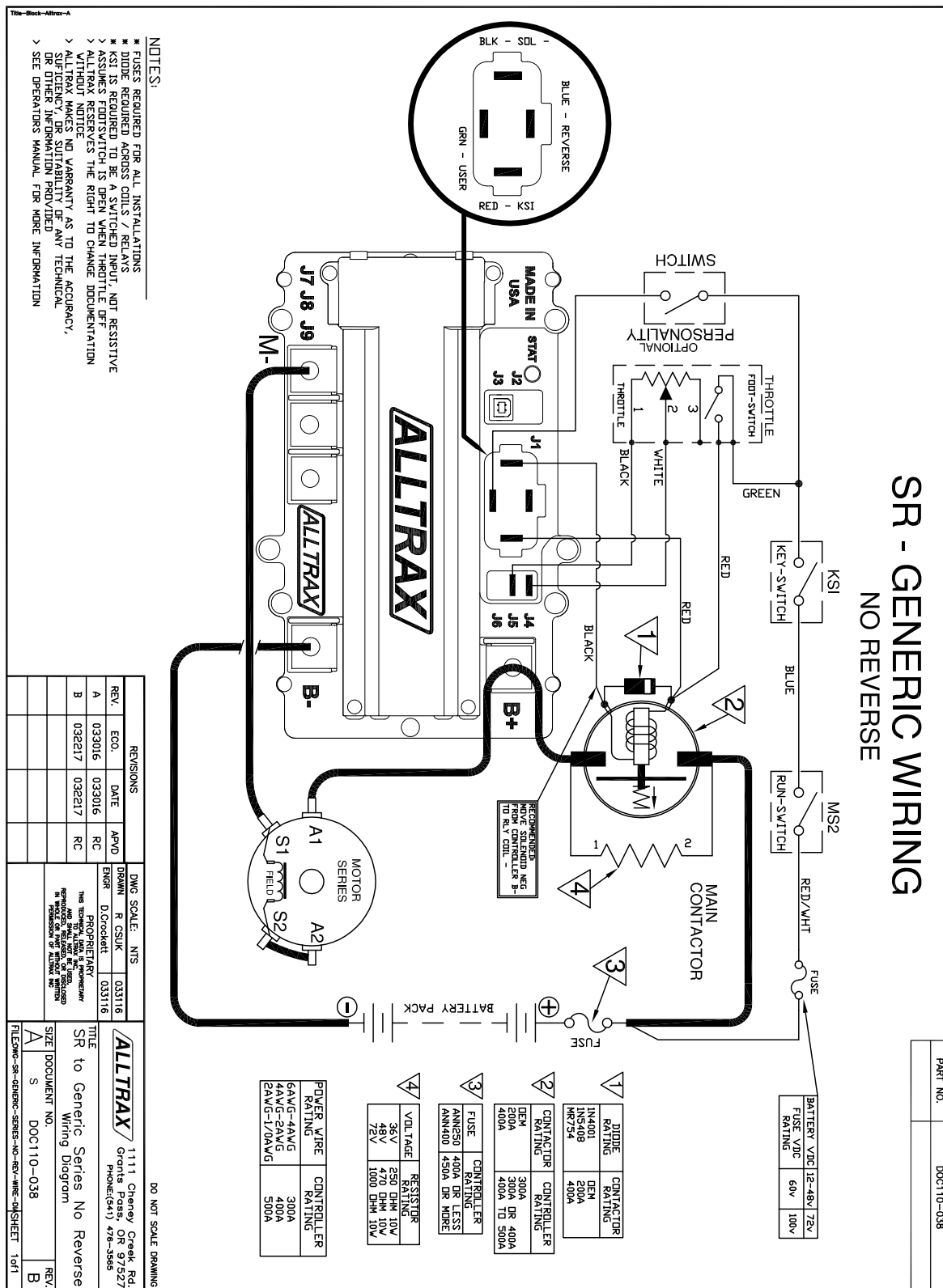
TAYLOR DUNN GENERIC WIRING



GENERIC, SERIES WITH REVERSE



GENERIC, SERIES W/O REVERSE



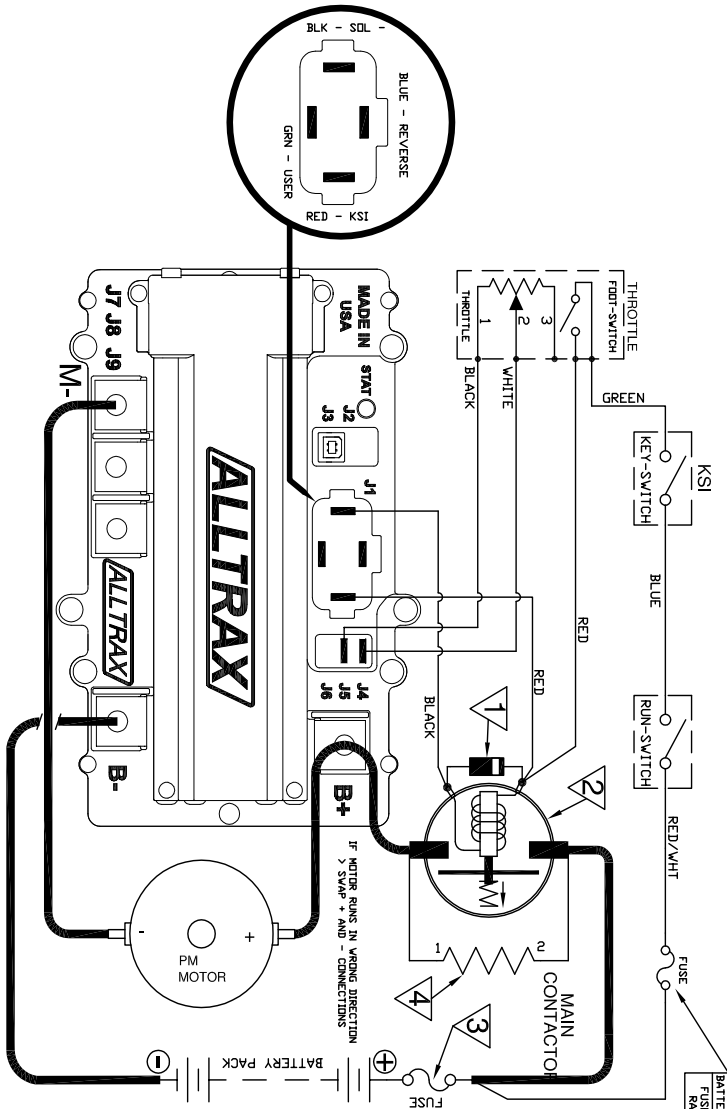
SR - GENERIC SERIES WIRING
WITH SW202 REVERSE
ON SWITCH
PLER,



SR - GENERIC PERMANENT MAGNET WIRING WITH REVERSE

Permanent Magnet no Reverse

SR - GENERIC WIRING PERMENANT MAGNET WITH NO REVERSE



- NOTES:
- * FUSES REQUIRED FOR ALL INSTALLATIONS
 - * DIODE REQUIRED ACROSS COILS / RELAYS
 - * ASSUMES REQUIRED TO BE INSTALLED THROTTLE OFF
 - > ALTRAX RESERVES THE RIGHT TO CHANGE DOCUMENTATION WITHOUT NOTICE
 - > ALTRAX MAKES NO WARRANTY AS TO THE ACCURACY, COMPLETENESS OR SUITABILITY OF ANY INFORMATION PROVIDED OR OTHER INFORMATION PROVIDED
 - > SEE OPERATORS MANUAL FOR MORE INFORMATION

REVISIONS				DWG SCALE: NTS	
REV.	ECO.	DATE	AP'D	DRAWN	DATE
A	033016	033016	RC	ENGR	04/01/16
B	032217	032217	RC		

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TITLE		SR to Generic PM No Reverse		1111 Cheney Creek Rd. Grants Pass, OR 97527 PHONE: (541) 476-3565	
SIZE		DOCUMENT NO.		DOC110-044	
REV.		REV.		B	

FILE: DWG-SR-GENERIC-PM-NO-REV-WIRE-04A	SHEET	1 of 1
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DIODE	CONTACTOR
1N4001	DEM
1N5408	200A
HR754	400A

CONTACTOR	CONTROLLER
RATING	RATING
DEM 200A	300A OR 400A
1N5408 200A	400A TO 500A
HR754 400A	400A TO 500A

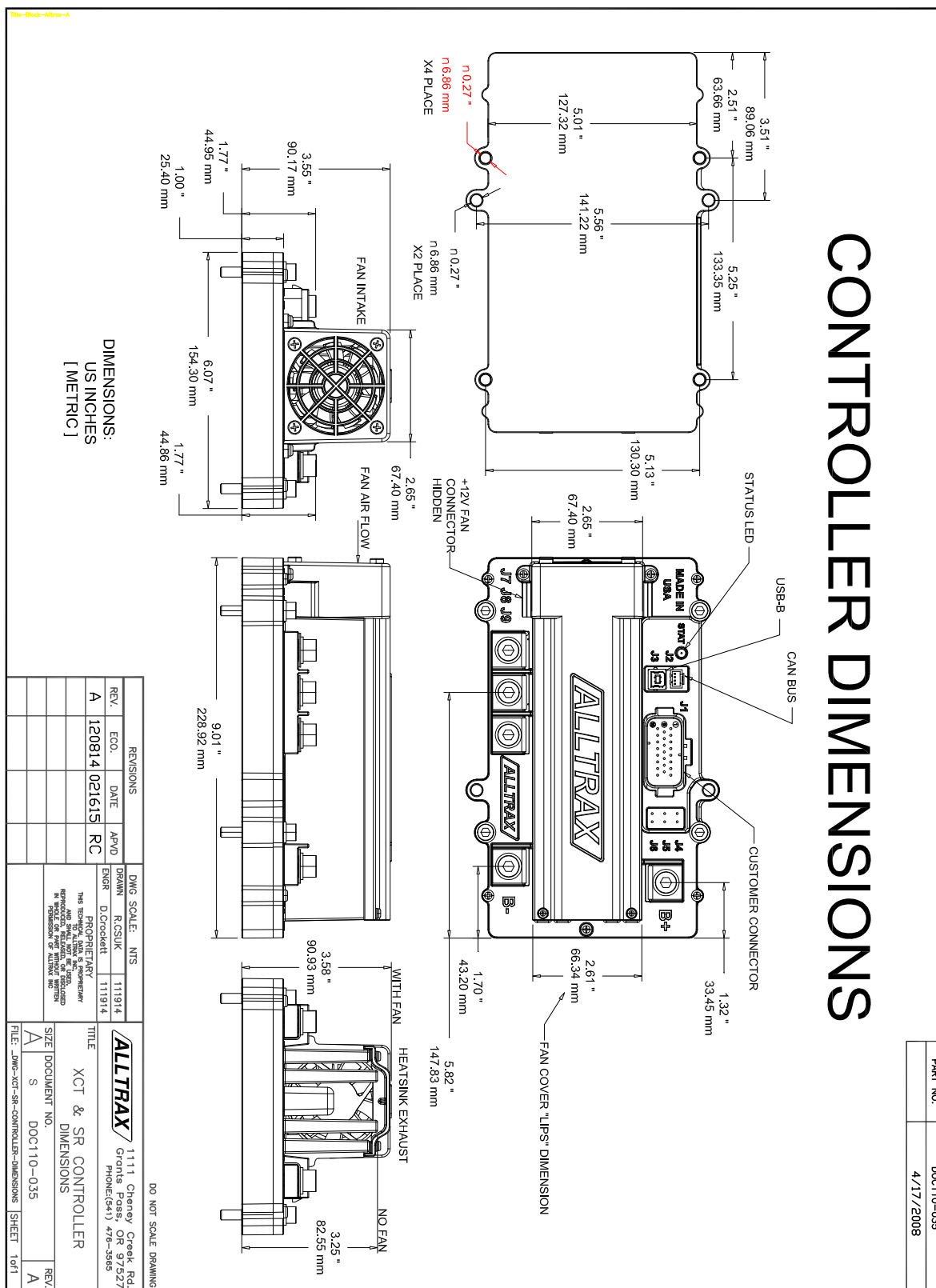
FUSE	CONTROLLER
ANNE20	400A OR LESS
ANNE40	450A OR MORE

VOLTAGE	RESISTOR
36V	250 OHM 10W
48V	470 OHM 10W
72V	1000 OHM 10W

POWER WIRE	CONTROLLER
RATING	RATING
6AWG-4AWG	300A
4AWG-2AWG	400A
2AWG-1/0AWG	500A

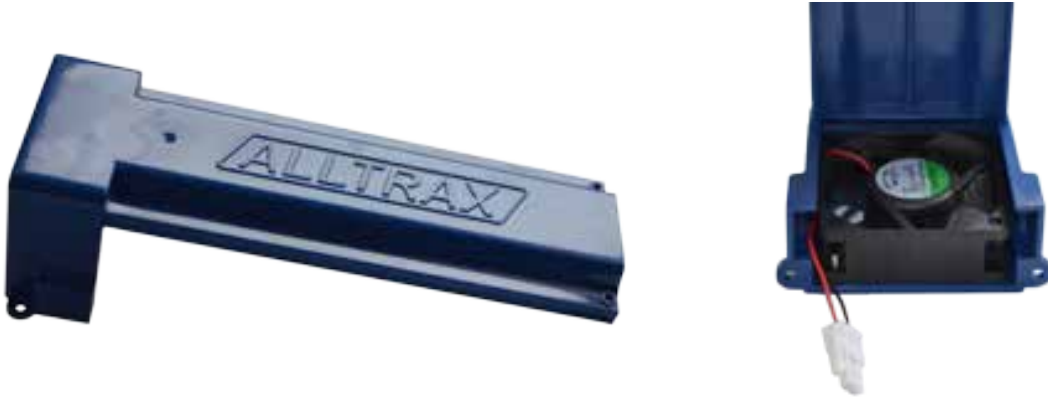
CONTROLLER DIMENSIONS

Note: Customer and Power Connectors vary depending on controller model. For sizing and mounting reference only.



FAN COVER (OPTIONAL)

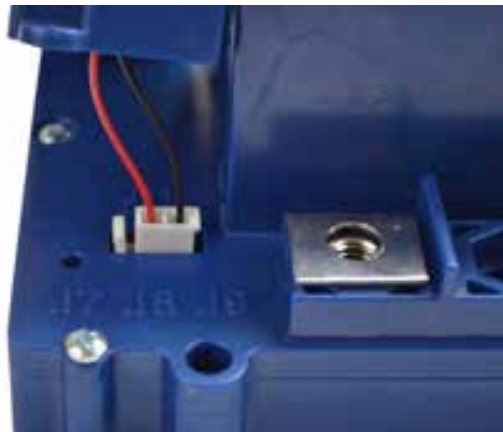
The XCT family of controllers also includes an optional Fan Cover. This cover comes standard on the 500A & 600A controllers.



Installation:

- 1) Plug Fan Cover into controller fan port. (See picture)
- 2) Fasten cover down with the four (4) supplied screws.

Note: Make sure wires are tucked out of the way and are not being pinched by the cover.



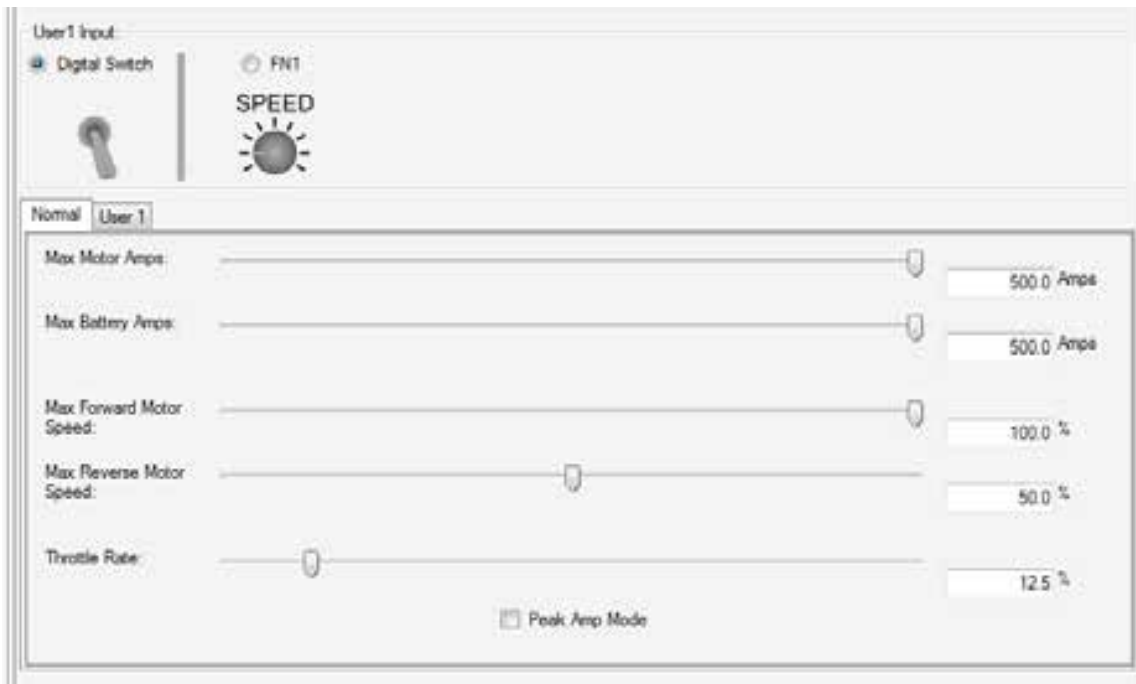
USER (PERSONALITY) TAB

Alltrax SR controllers come equipped with a User Input tab to switch between 2 different personality profiles. The User Mode can be activated by a simple toggle switch (see drawings for wiring). User personality profiles are programmed via the Alltrax Toolkit software.

Adjustable settings include:

- Max Motor Amps
- Max Battery Amps
- Max Forward Motor Speed
- Max Reverse Motor Speed
- Throttle Rate
- Peak Amp Mode

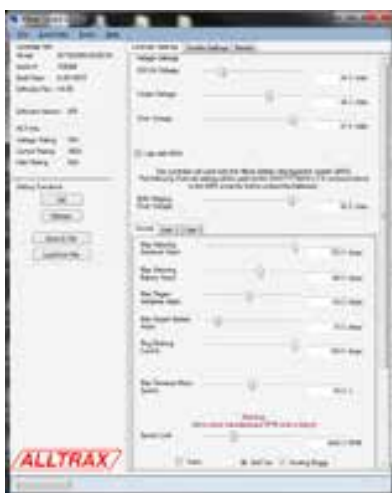
Visit our website for more information on programming the controller including the Alltrax Toolkit Manual (DOC113-002) and instructional videos.



PROGRAMMING THE CONTROLLER

Controllers ordered for stock configurations are pre-programmed from Alltrax and it is not necessary to re-program unless the customer has specific needs. If the controller does need to be programmed it can be done via a USB A to B cable and the Alltrax Toolkit program. Visit our website for more information on programming the controller including the Alltrax Toolkit Manual (DOC113-002) and instructional videos.

Settings Screen



Controller Info Tab



The cable needed is the USB-A to B. This is the most common USB printer style cable

Throttle Screen



Monitor Screen



BLINK CODES

The throttle code blinks on controller power up and alarm codes blink when the alarm happens. All alarms are self clearing so when the alarm event is over, the controller resumes normal operation, except for the Short Circuit alarm that needs a power off cycle to clear the alarm.

Throttle codes:

1 Green LED Flash	=	0-5k throttle
2 Green LED Flash	=	5K-0 throttle
3 Green LED Flash	=	0-5V throttle
4 Green LED Flash	=	EZGO ITS throttle
5 Green LED Flash	=	0-1k Yamaha throttle
6 Green LED Flash	=	6 to 10.5 Taylor Dunn throttle
7 Green LED Flash	=	Club Car 5k-0 3 wire throttle
8 Green LED Flash	=	Reserved
9 Green LED Flash	=	Pump
10 Green LED Flash	=	USB Throttle
11 Green LED Flash	=	Absolute Throttle

Normal Display Status:

Solid Green Light	=	Controller Ready to Run
Solid Red Light	=	Controller in programming mode
Solid Yellow Light	=	Throttle is wide open and the controller is <u>NOT</u> in Current Limit
Blinking Yellow Light	=	Throttle is wide open, but the controller is in Current Limit

Error Codes:

SR error codes are different than the AXE/DCX alarm codes in that they will flash Green and Red, instead of just Red.

1 Green and 1 Red LED Flash	=	Short Circuit
1 Green and 2 Red LED Flash	=	Battery Under Voltage
1 Green and 3 Red LED Flash	=	Battery Over Voltage
1 Green and 4 Red LED Flash	=	M- Over temperature
1 Green and 5 Red LED Flash	=	Bus Bar Over temperature
1 Green and 6 Red LED Flash	=	Pre-charge Failure
2 Green and 1 Red LED Flash	=	Under Temp
2 Green and 2 Red LED Flash	=	Not Used
2 Green and 3 Red LED Flash	=	High Throttle Over range
2 Green and 4 Red LED Flash	=	High Throttle Under range
2 Green and 5 Red LED Flash	=	Low Throttle Over range
2 Green and 6 Red LED Flash	=	Low Throttle Under range
3 Green and 1 Red LED Flash	=	Uncalibrated throttle
3 Green and 2 Red LED Flash	=	Bad Variable Set Loaded

Error Code Definitions:

- **Short Circuit/Output Fault:**
Controller detected a short circuit or other fault on the output circuit.
Check wiring.
- **Battery Under Voltage:**
B+ Voltage lower than Low Voltage Battery Setting. Check pack voltage or program settings.
- **Battery Over Voltage:**
B+ Voltage Higher than Over Voltage Battery Setting. Check pack voltage or program settings
- **Over temperature:**
Busbar temperature exceeds 85°C. Let controller cool and/or add fan.
- **Motor Field Failure:**
Controller detected a short in the field circuit. Check motor resistance and or replace field wires.
- **Pre-charge Failure:**
B+ voltage and KSI voltage differ by more than 5v. Stuck solenoid.
- **Under Temp:**
Busbar Temperature reads less than -20°C
- **High Throttle Over range & High Throttle Under range:**
High Side of throttle signal is outside of acceptable window for that throttle type. Check and/or replace throttle. Change throttle type to correct throttle installed on car.
- **Low Throttle Over range & Low Throttle Under range:**
Low Side of throttle signal is outside of acceptable window for that throttle type. Check and/or replace throttle. Change throttle type to correct throttle installed on car.
- **Uncalibrated throttle:**
Throttle boundaries not found. In Toolkit program, select another throttle then re-select correct throttle type.
- **Bad Variable Set Loaded:**
Alltrax loaded variable data is missing or corrupted. Contact Alltrax.

WARRANTY STATEMENT

Alltrax, Inc., (hereafter Alltrax) warrants that the product purchased is free from defects in materials or workmanship for a period of 2 years from the date of manufacture. This warranty does not apply to defects due directly or indirectly to misuse, abuse, negligence, accidents, repairs, improper installation, submersion, alterations or use contrary to any instructions provided by Alltrax in verbal or written form.

In the event you should need warranty repair, contact Alltrax at (541) 476-3565 to receive warranty service authorization instructions for returning the defective product to Alltrax for evaluation. Products or parts shipped by customer to Alltrax must be sent postage paid and packaged appropriately for safe shipment. Alltrax is not responsible for customer products received without warranty service authorization and may be rejected.

Alltrax reserves the right to repair or replace merchandise at its option at no cost to the customer, except for shipping costs of sending the defect item to Alltrax. Replacement shall mean furnishing the customer with a new equivalent product to the defective item. Alltrax also reserves the right to make changes to any of its products or specifications without notice.

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