



www.alltraxinc.com

Operators Manual SPM/SPB



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WARNINGS



Safety Notes:

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.

Note:

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

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FEATURES

- **Supports 10 Different Throttles**

The SPM/SPB features 10 throttles including all of the common golf cart throttles and some speciality throttles such as pump mode, 0-5v and a USB throttle.

- **Main Solenoid Control**

This controller offers main relay control for safety. When the solenoid is wired to the Rly Coil + and - tabs, the main relay drive is hardware interlocked microcontroller supervisor.

- **Adaptive “Auto Calibrate” Throttle**

Auto range throttle learns the actual throttle range of the sensor and scales to this.

Eliminates dead band in throttle response at both ends of pedal travel. The throttle can also be manually with the Absolute Throttle Mode.

- **USB Programming Port**

USB interface is high speed, and you can program the controller without an external power supply - unit is USB powered for programming.

- **High Speed Current Limit**

The SPM features a high speed 3 stage current limit architecture that can detect an over current event in less than 5 microseconds (0.000005 seconds).

- **Programmable Throttle and Brake Curves**

The SPM now has the ability to provide independent torque (current) control or speed (voltage) control to the motor at any throttle position.

- **Programmable Battery Current Limit**

For applications where battery current limiting is critical, the SPM now has a adjustable battery current limit setting. As the controller approaches the battery current limit, it will start to back off on the output power to keep the battery current under the limit setting.

- **Color Coded Power Terminals**

To aid in installation, the B+, M- and B- are color coded. The B+ is Red, the B- is Black and the M- is Blue.

- **Integrated Heatsink with Active Fan Cooling**

Thermostatically fan cooled, no external heatsink required. Dramatically increases continous power compared to conduction cooled drives. Fan is field replaceable with 1 screw and fastons.

- **Flexi-Mount System**

With no fixed holes for mount, the Flexi-mount system allows for an almost infinite combination of mounting options.

- **Feature Rich HD Models Available**

The SPM/SPB has Feature Rich Models available with sealed connectors, speed sensor inputs and rev limiting.

SPM LAYOUT



SPM SPECIFICATIONS



Model	Peak (Amps)	2 Min (Amps)	5 Min (Amps)	Continuous (Amps)
SPM48300 ¹	300/350 ²	300	250	220
SPM48400 ¹	400/460 ²	400	320	280
SPM48500 ¹	500/575 ²	500	420	400
SPM72300 ¹	300/350 ²	300	250	220
SPM72400 ¹	400/460 ²	400	320	280

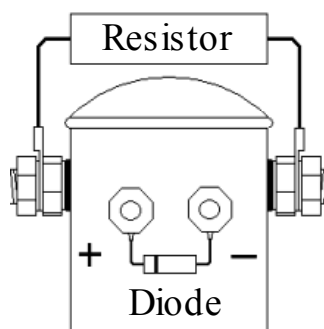
Note¹: SPB, EZ and HD Models have the same specifications as the parent model

Note²: The larger number represents the value when the "Peak Amp Mode" is enabled in the Alltrax Toolkit program.

Type:	Series Motor Controller
Operating Frequency:	18kHz
Voltage Drop @ 100A:	< 0.18V
Controller Voltage, KSI & Reverse:	SPM48XXX 24-48V nom, 62V max SPM72XXX 24-72V nom, 90V max
Operating Temperature:	-25°C to 85°, shutdown @ 95°C
Standby Current (Power up):	<35mA (nom)
Reverse Pin Input Current:	<0.02A
Relay Drive Current:	5A peak, 0.5A Cont.
Plug Brake Current:	100A current limited

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
70-200A Solenoid	1N4004	1A
400 Solenoid	1N5408	3A

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 and reduces peak currents in the controller.

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

Wire and Batteries:

Wiring and battery health in an electric vehicle are very important and overlooked during performance upgrades. Wiring size is important, see the tech note for details on batteries.

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	2 AWG	1/0 AWG
650A	1/0 AWG	2/0 AWG

Contactors (Solenoids)

Standard Duty— Flat lands with speed and torque moderate performance expectations



Stock 70 AMP

Used with OEM Stock
Controllers.

**DO NOT Use with
Alltrax Controller**



Stock 100 AMP

Use with Stock
Controllers 300
AMPS and below

Heavy Duty— Maximum 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

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.



Controller Amperage	Fuse Rating
400A or less	250A
450A or more	400A

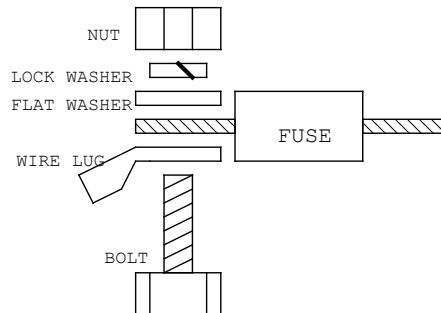


Diagram: Fuse terminal hardware

F/R Switch

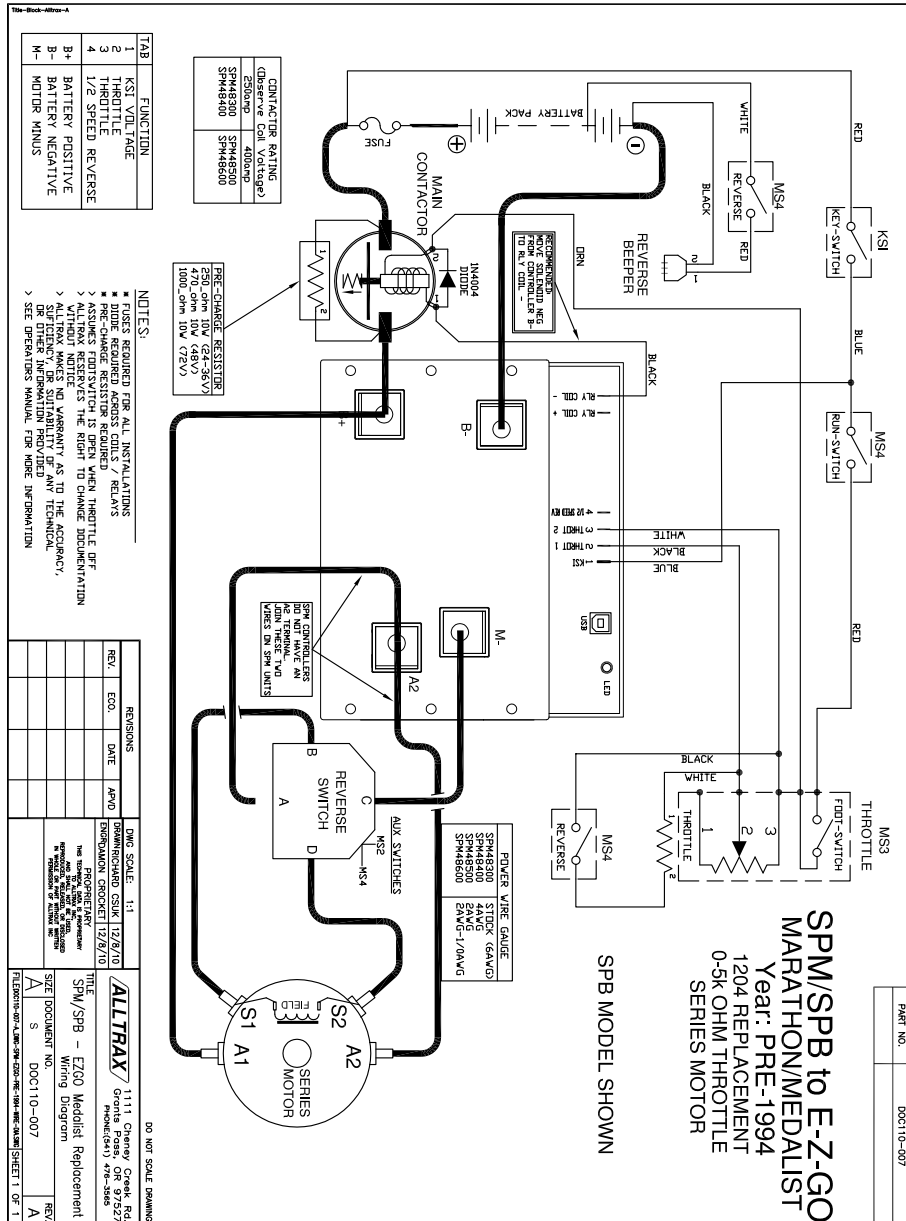


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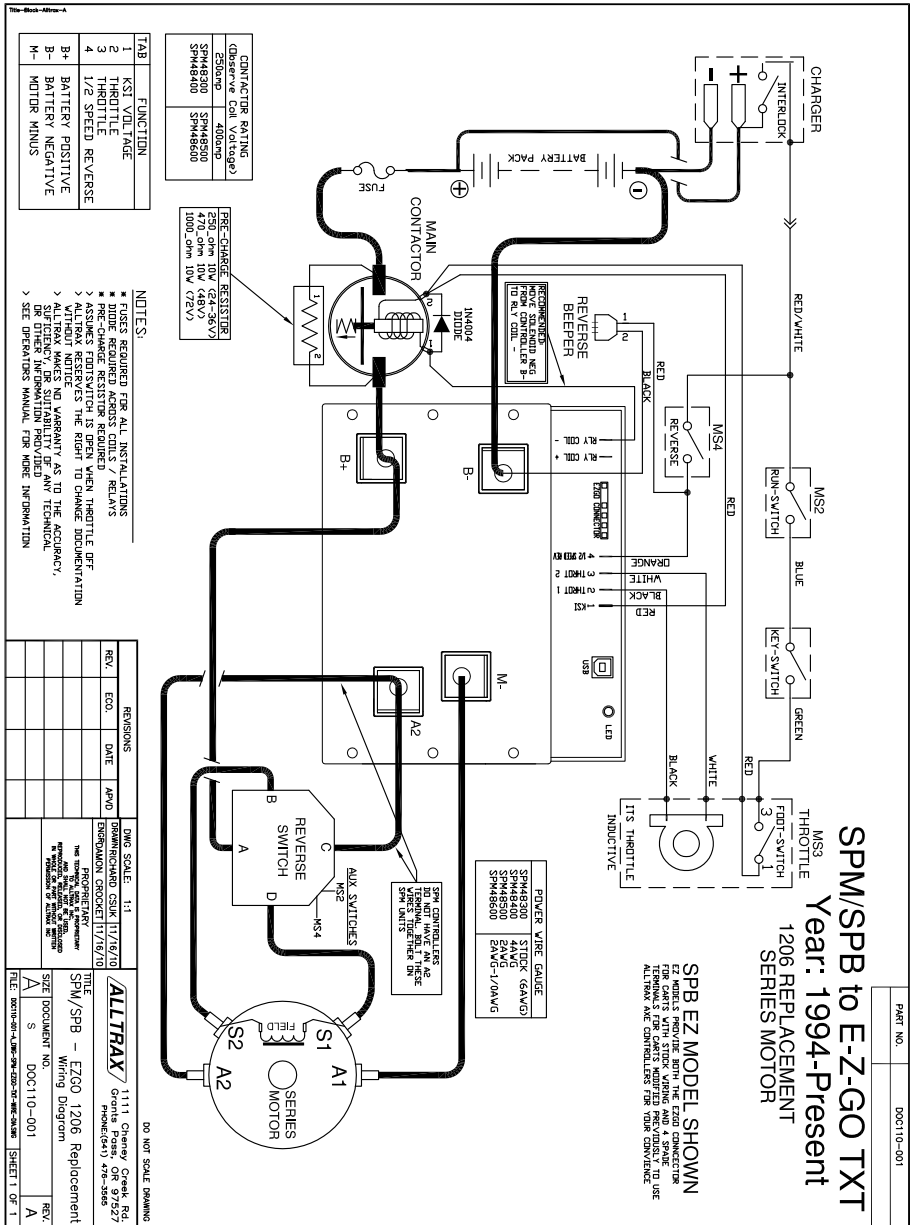
Controller Amperage	F/R Size
400A or less	Stock/HD
450A or more	Heavy Duty

INSTALLATION DRAWINGS

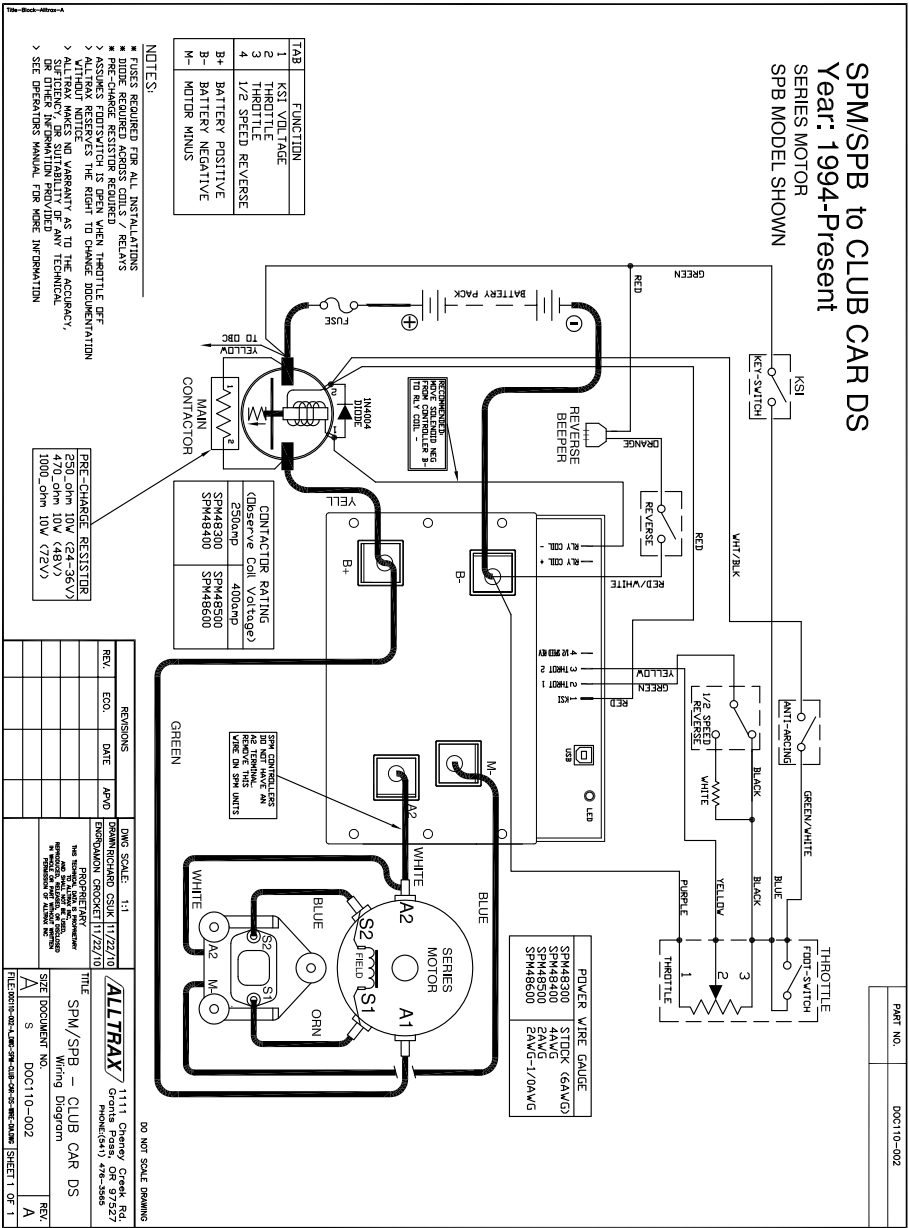
PRE-1994 EZGO



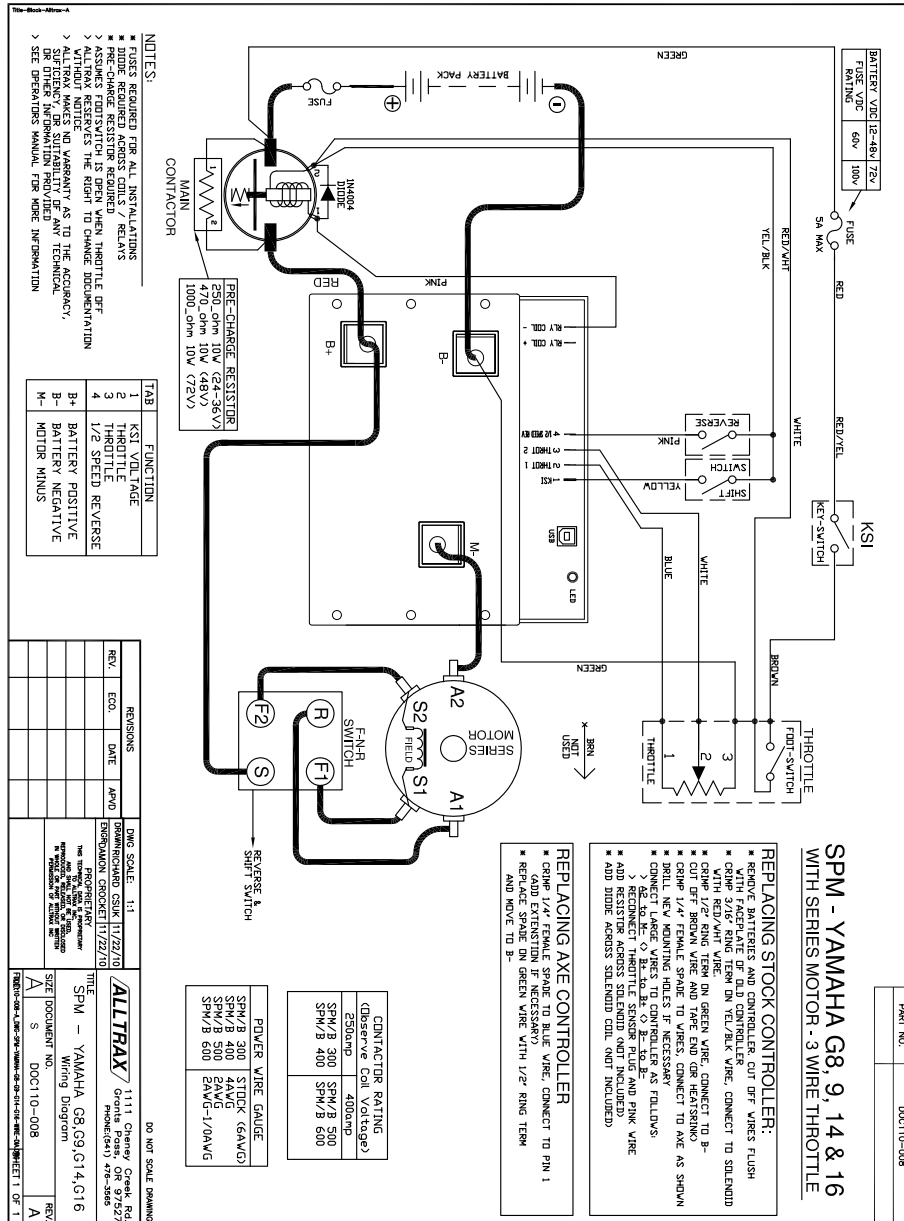
1994 AND NEWER EZGO



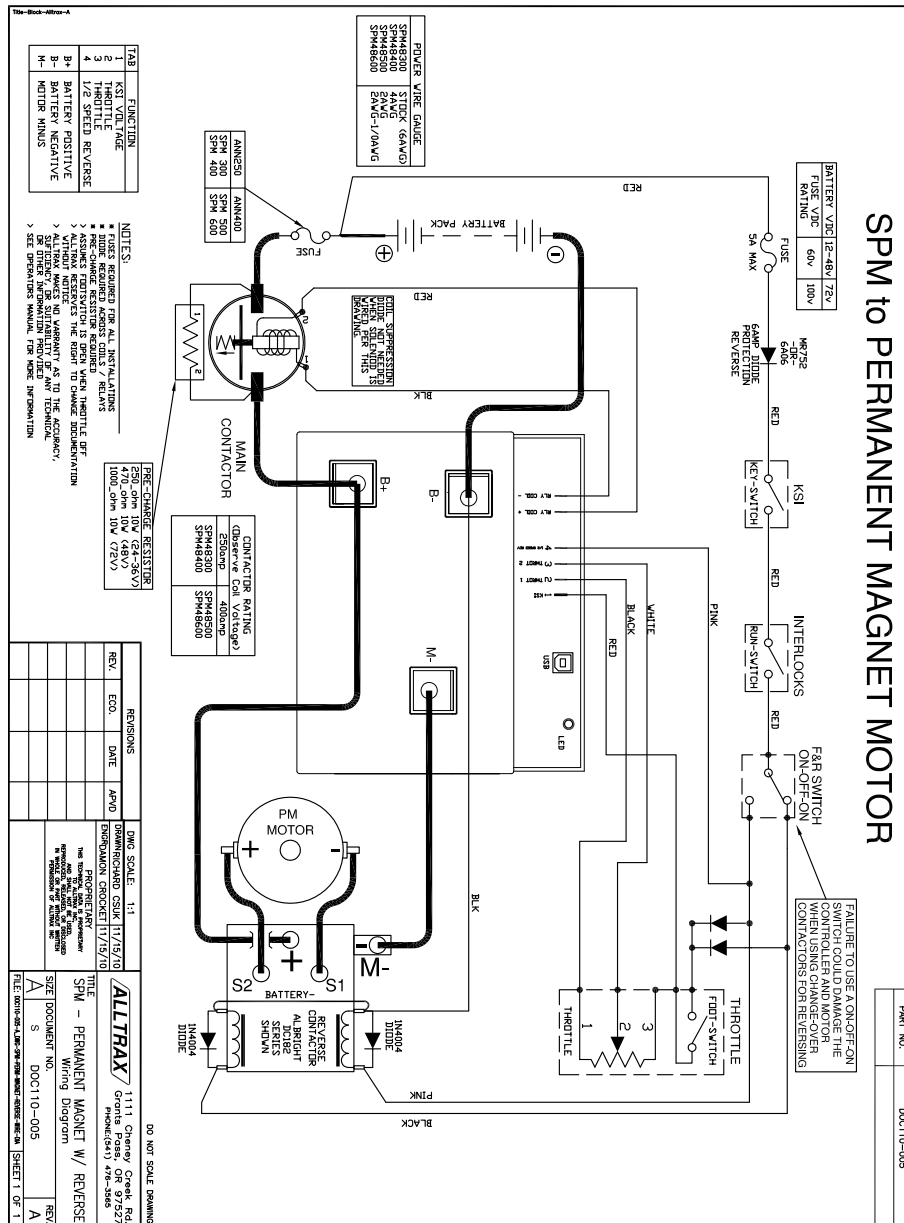
1994 AND NEWER CLUB CAR



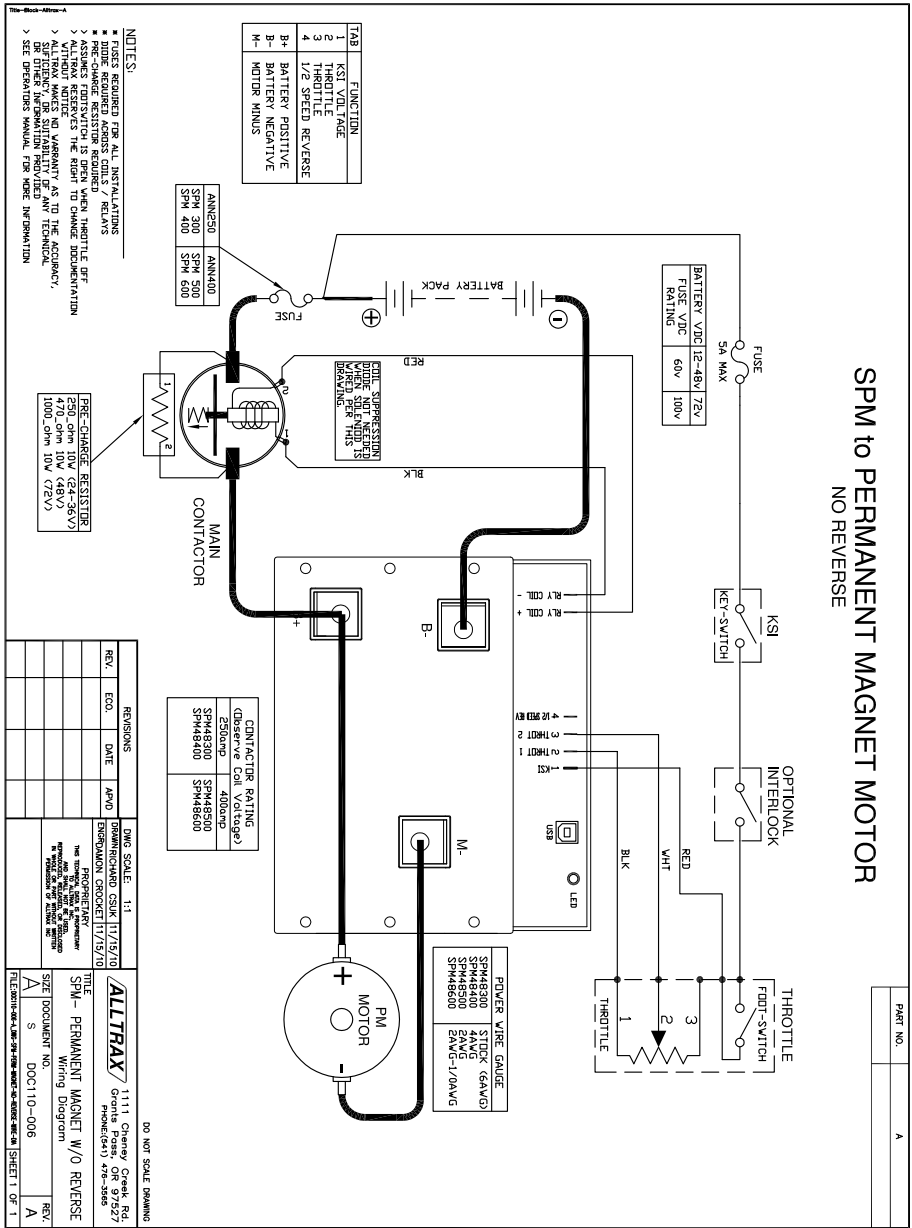
YAMAHA - G8, G9, G14, G16



GENERIC, SERIES WITH REVERSE



GENERIC, SERIES W/O REVERSE



CONTROLLER MOUNTING

The SPM/SPB uses a universal mounting system. The mounting feet of the controller can be placed in numerous positions to deal with most installations.

There are 2 types of mounting feet:

One mounts the grill, the others mount to the front and rear as shown.



Flexi-mount system

U Clip mounted on controller



Clip mounted on controller

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

Error Codes:

SPM 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

WARRANTY STATEMENT

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