



www.alltraxinc.com

Operators Manual SPM/SPB



Alltrax Inc

1111 Cheney Creek Road, Grants Pass, OR 97527 Ph: 541-476-3565 Fax: 541-476-3566
Web Site: <http://www.alltraxinc.com>

Twitter: @AlltraxInc

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.

TABLE OF CONTENTS

FEATURES	4
SPM LAYOUT	5
SPM SPECIFICATIONS	6
INSTALLATION	7
INSTALLATION DRAWINGS	
E-Z-GO PRE-1994	11
E-Z-9IGO TXT 94-PRESENT	
CLUB CAR DS 95-PRESENT	13
YAMAHA G8, G9, G14 AND G16	14
GENERIC, PERM MAGNET MOTOR	15
GENERIC, PERM MAGNET MOTOR W/ REV	16
MOUNTING INSTRUCTIONS	17
BLINK CODES	18
WARRANTY STATEMENT	19

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 replacable 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

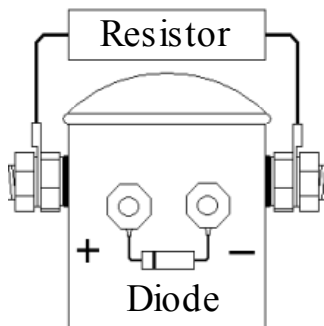
Note¹: SPB, EZ and HD Models have the same specifications as the parent model

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

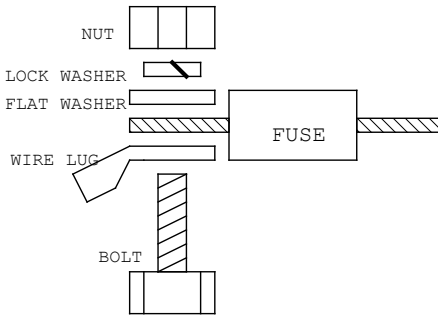


Diagram: Fuse terminal hardware

F/R Switch



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

INSTALLATION DRAWINGS

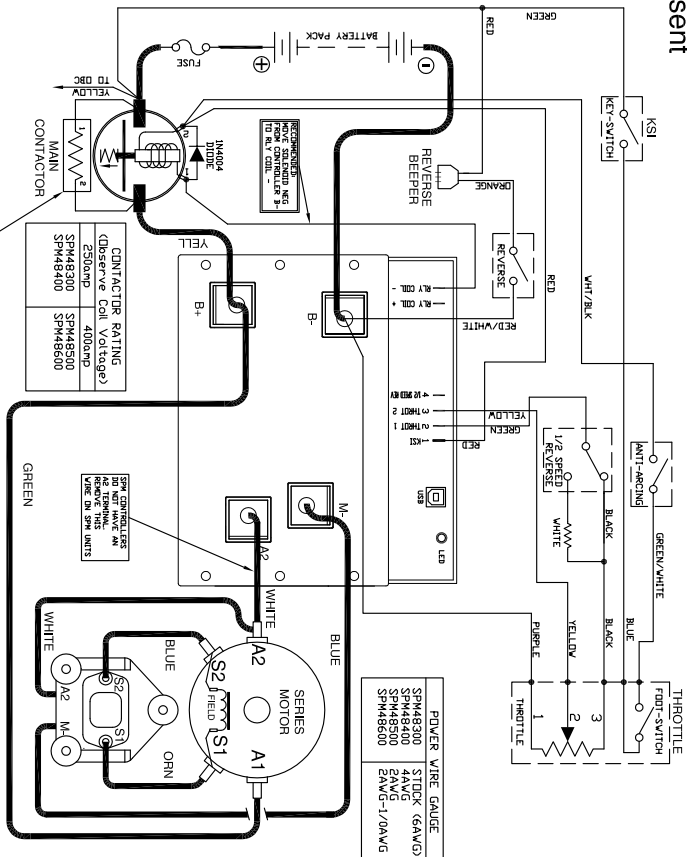
1994 AND NEWER CLUB CAR

SPM/SPB to CLUB CAR DS Year: 1994-Present SERIES MOTOR SPB MODEL SHOWN

TAB	FUNCTION
1	KSI VOLTAGE
2	THROTTLE
3	REVERSE
4	1/2 SPEED REVERSE
B+	BATTERY POSITIVE
B-	BATTERY NEGATIVE
M-	MOTOR MINUS

NOTES:

- FUSES REQUIRED FOR ALL INSTALLATIONS
- BIDDIE REQUIRED ACCESS COILS / RELAYS
- RES-CHARGE RESISTOR REQUIRED
- > ALWAYS USE THE CORRECT THROTTLE DEF.
- > ALWAYS RESERVES THE RIGHT TO CHANGE DOCUMENTATION
- > WITHOUT NOTICE NO WARRANTY AS TO THE ACCURACY, SUFFICIENCY, OR SUITABILITY OF ANY TECHNICAL INFORMATION PROVIDED HEREIN.
- > SEE OTHER INFORMATION PROVIDED FOR MORE INFORMATION



PART NO. D0C110-002

REV. ECD		DATE		APPROV		DWG SCALE: 1:1		DOWNSHIFTING CHECKLIST (1/22/01)	

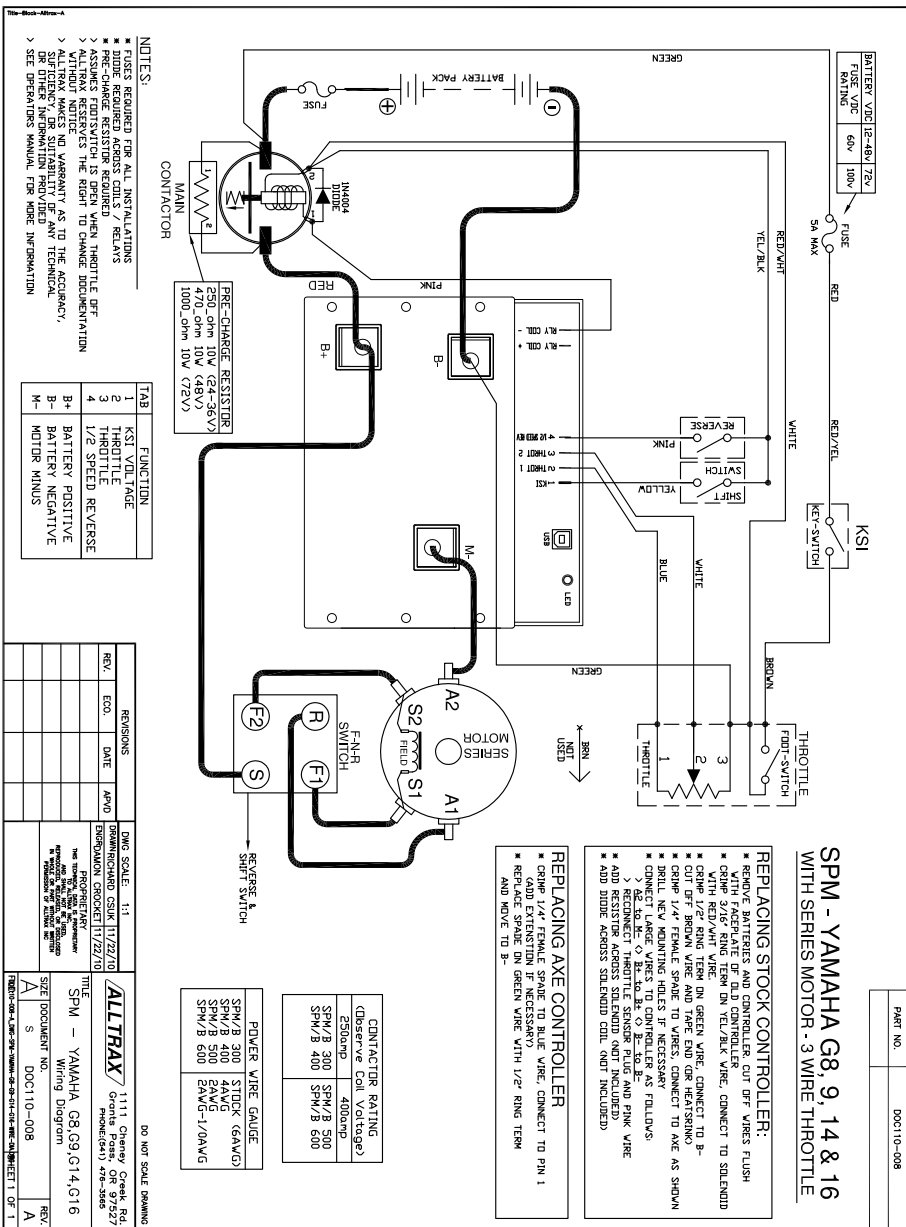
ALLTRAX 1111 Cheney Creek Rd
Mesa, AZ 85205
Tel: (480) 941-1111

SPM/SPB - CLUB CAR DS
Wiring Diagram

SIZE DOCUMENT NO. D0C110-002

REV. A

YAMAHA - G8, G9, G14, G16



PART NO. D0C110-008

NOTES:

- FUSES REQUIRED FOR ALL INSTALLATIONS
- BIDDIE REQUIRED ACROSS COILS / RELAYS
- PRE-CHARGE RESISTOR REQUIRED
- SPEED CONTROLLER WHEN THROTTLE OFF
- ALLTRAX RESERVES THE RIGHT TO CHANGE DOCUMENTATION
- > **VENDOR NOTE:**
- > SUFFICIENCY OR SUITABILITY OF ANY TECHNICAL, SEE OTHER INFORMATION PROVIDED
- > SEE OTHER INFORMATION FOR FURTHER INFORMATION

TAB	FUNCTION
1	KSI VOLTAGE
2	THROTTLE
3	1/2 SPEED REVERSE
4	BATTERY POSITIVE
B+	BATTERY POSITIVE
B-	BATTERY NEGATIVE
M-	MOTOR MINUS

REVISIONS

REV.	ECO.	DATE	APPD.

DRG. SCALE: 1:1

DESIGNED BY	CSJK 11/22/10
ENGINEERING CHECKED BY	1/22/10
PROF. BY	
DATE	

ALLTRAX

1111 Cherry Creek Rd.
 Grants Pass, OR 97527
 Phone: (541) 476-3866

TITLE: SPM - YAMAHA G8, G9, G14, G16

SEE INQUIRY FOR Wiring Diagram

REV: A

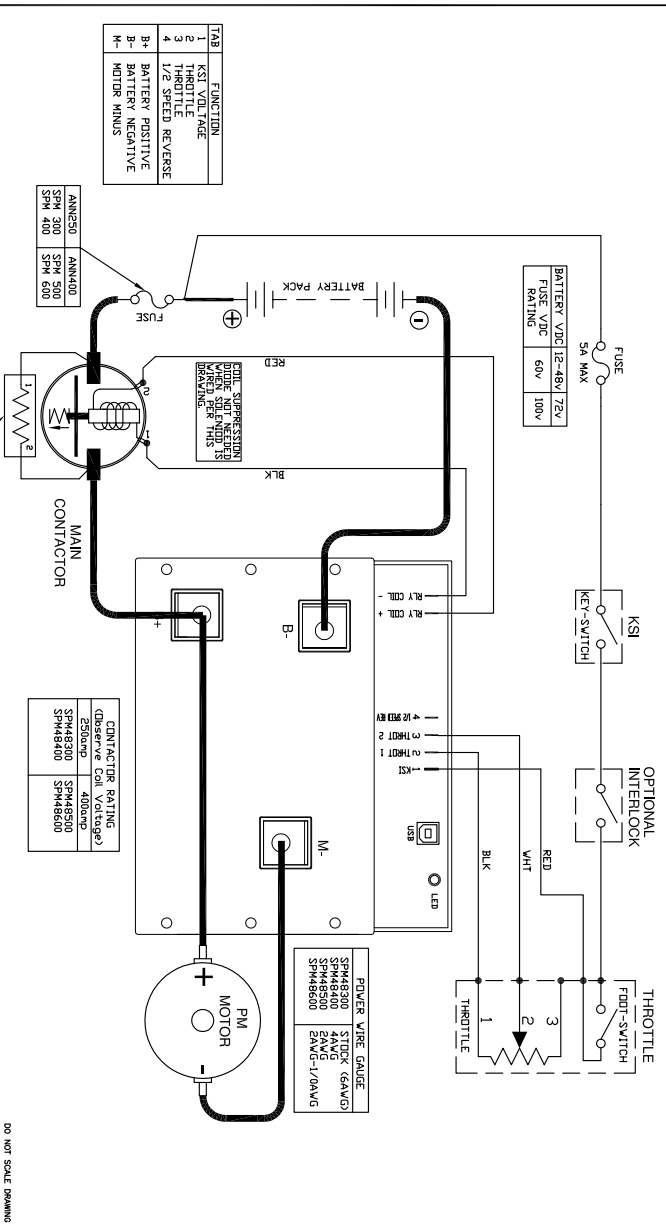
CONTRACTOR RATING	OPERATOR RATING
250ohm	400ohm
SPW/B 300	SPW/B 500
SPW/B 400	SPW/B 600
SPW/B 500	2AWG-1/0AWG
SPW/B 600	

DO NOT SCALE DRAWING

GENERIC, SERIES W/O REVERSE

SPM to PERMANENT MAGNET MOTOR NO REVERSE

PART NO. A



NOTES:

- ◆ FUSES REQUIRED FOR ALL INSTALLATIONS
- ◆ FUSES REQUIRED ACROSS COILS / RELAYS
- ◆ ASSUMES POSITION 1 IS OPEN WHEN THROTTLE OFF
- > ALTRAX RESERVES THE RIGHT TO CHANGE DOCUMENTATION
- ◆ ALTRAX MAKES NO WARRANTY AS TO THE ACCURACY, OR OTHER INFORMATION PROVIDED
- > SEE OPERATORS MANUAL FOR MORE INFORMATION

PRE-CHARGE RESISTOR

250 ohm 10W (24-36V)
470 ohm 10W (48V)
100 ohm 15W (72V)

REVISIONS

REV.	EQD.	DATE	APPD.	DESCRIBTION

ALLTRAX 1111 Chapel Creek Rd
Grants Pass, OR 97527
Phone: (541) 478-3866

TITLE: SPM - PERMANENT MAGNET W/O REVERSE
SEE DOCUMENT NO. D00C110-006
REV. A

DO NOT SCALE DRAWING
SHEET 1 OF 1

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.

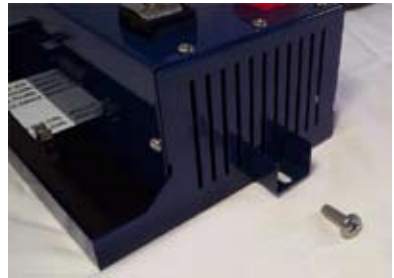
There are 2 types of mounting feet:

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

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.

Alltrax assumes no liability for applications assistance or customer product design. Customers shall be responsible for evaluating the appropriateness of the use of any Alltrax product in any application. Customers shall provide adequate design and operating safeguards that are in compliance with standard practices of other similar applications or any standards of any governing agency.

THIS IS ALLTRAX INC.'S, SOLE WARRANTY.

NO REPRESENTATIVE EMPLOYEE, DISTRIBUTOR OR DEALER OF ALLTRAX HAS THE AUTHORITY TO MAKE OR IMPLY ANY WARRANTY, REPRESENTATION, PROMISE OR AGREEMENT, WHICH IN ANY WAY VARIES THE TERMS OF THIS LIMITED WARRANTY.

ALLTRAX PRODUCTS SOLD TO CUSTOMER ARE INTENDED TO BE USED ONLY IN THE APPLICATION SPECIFIED BY THE CUSTOMER TO ALLTRAX. ANY OTHER USE RENDERS THE LIMITED WARRANTY EXPRESSED HEREIN AND ALL IMPLIED WARRANTIES NULL AND VOID AND SAME ARE HEREBY EXCLUDED.

DISCLAIMER OF IMPLIED WARRANTIES

ALLTRAX, INC., SHALL IN NO EVENT BE LIABLE FOR DEATH, INJURIES TO PERSONS OR PROPERTY, OR FOR INCIDENTAL, CONTINGENT, OR CONSEQUENTIAL DAMAGES ARISING FROM THE USE OR MISUSE OF OUR PRODUCTS.

EXCEPT SPECIFICALLY PROVIDED HEREIN, THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. HOWEVER, SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE PRECEDING EXCLUSION MAY NOT APPLY TO YOU.

