

4.8V PULSED AUTOMATIC ON BOARD GLOW PLUG DRIVER SYSTEMS

MODEL#Mcd471-Mcd479

The ON BOARD GLOW PLUG DRIVERS will drive 1 to 18 glow plugs (depending upon model) as efficiently as the newer power panels you see on today's market. It switches a higher voltage at reduced amps for a very short time to each plug fooling the plugs into thinking they are getting regular power. We switch the plugs on and off so fast that they appear to stay on continuously. You can drive the plugs up to 12 feet apart with NO RFI or decrease in plug power. The plug wire length is no longer a problem and you can use it to your advantage for C.G purposes.

WARNING: NEVER RUN SERVO OR RECEIVER WIRING BESIDE PLUG WIRES. THEY MAY CAUSE JITTERS OR ERRATIC OPERATION. KEEP 6 INCH SEPARATION BETWEEN THE WIRING.

The driver uses the digital signal from your radio to turn on (and off) the glow plug(s) at a pre-set point determined by you. It will work from any receiver channel you select but was designed for operation in parallel with the throttle servo, via "Y" harness (not supplied). It can even function direct from your retract channel, making it the DRIVERS ON/OFF switch. Each driver has a missing pulse detector circuit that will shut down the glow driver when you turn off the receiver. Disconnect glow driver battery when not in use for extended period of time.

CONTENTS:Each DRIVER contains the following:

1. Fully assembled & tested Driver electronics.
2. Glow Plug adapter kit: one PlugLock per cylinder, one ground wire with ground lug per engine, MOLEX pins and housings.
3. 20ga. wire & Deans connector for battery.
4. Dean's 3pin connector for YOUR charger that mates to glow driver's charge jack.
5. Instructions with diagrams and spare parts.

The Glow Plug harness uses. 20ga. Mil/Spec TEFLON wire. It is light weight, strong, and has a SILVER plating over the copper that gives less resistance at a higher current carrying capacity. The TEFLON is fuel proof and will not melt if laid directly on a hot cylinder head.

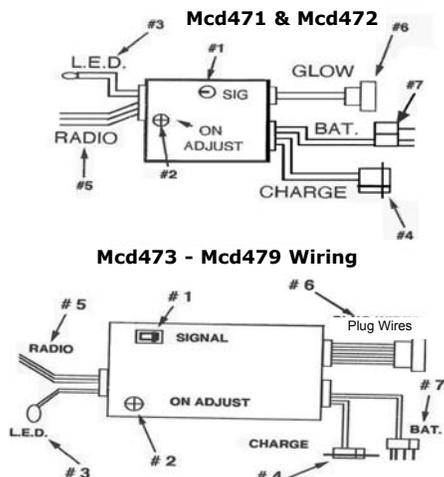
The L.E.D. "ON" indicator is extended 18" from the printed circuit board. You may mount this indicator in a place where it can be easily seen, ie. cockpit, dash board, etc.

The Deans External Charge Jack allows you to charge and read the voltage under load. It also allows you to "BOOST" the on-board pack with another 4.8V pack for ground starting.

MAKE SURE THAT YOU READ ALL OF THE INSTRUCTIONS BEFORE YOU ATTEMPT TO ASSEMBLE ANY PARTS.

WARNING: YOUR ENGINE CASE WILL BE AT (+) 4.8 VOLTS, ABOVE BATTERY GROUND. DO NOT ALLOW THE BATTERY TO COME INTO CONTACT WITH THE ENGINE AT ANY TIME OR YOU CAN SMOKE THE ENTIRE SYSTEM!! IF YOU REVERSE THE (+) and (-) LEADS, YOU WILL BLOW THE IC's. BE CAREFUL!

Get to know the GLOW DRIVER Features



1. **Servo Reversing Switch:** Allows you to reverse the direction of servo signal to the driver electronics. (See Note: Page 2, Col 1, "BENCH RUNNING")
2. **Potentiometer:** Allows you set "ON/OFF" window for glow plugs.
3. **Remote L.E.D.:** Shows that the radio is controlling the driver.
4. **Deans Charge Jack:** Used to charge the battery on board. This jack can also be used for external "BOOST" when starting.
5. **Radio Connector:** Universal connector for your radio system.
6. **Molex Connector:** Attaches the Glow Driver to your glow plugs.
7. **4.8V battery lead.** 3 pin on 471 & 472, 4 pin on 473 thru 488 MODELS. **WARNING:** NEVER USE SERVO WIRE ON BATTERY PACKS USED FOR GLOW PLUG POWER. IT WILL NOT CARRY THE CURRENT NECESSARY TO LIGHT YOUR GLOW PLUGS PROPERLY. USE THE 20GA. WIRE SUPPLIED. IT WILL CARRY THE HEAVY CURRENT NECESSARY.

NOTE: DRIVER ELECTRONICS SHOULD BE MOUNTED IN FOAM, JUST LIKE YOUR RECEIVER.

GETTING STARTED:

1. All units have a universal radio connector.
2. You may set up the system to operate from any channel you desire, however for all intents and purposes, we will set up using the throttle channel. YOU WILL NEED A SERVO TYPE "Y" HARNESS FOR THIS. (NOT SUPPLIED)

TEST FOR RADIO COMPATIBILITY: You do not need the glow plug harness or glow plug battery for this test.

1. Plug a "Y" harness into your receiver throttle channel, then plug the throttle servo and driver system into the plugs on the opposite end of the "Y" cord.
2. Turn on your radio system and check to make sure all servos are working properly. (No Jitters, etc.)
3. Set the stick to low throttle and the trim lever to high trim.
4. Observe the RED L.E.D. on the 18" extended wire. If it is ON, using a small screwdriver, turn the small variable resistor (accessible through the little round hole) clockwise or counter-clockwise until the L.E.D. just goes out. Now move the trim tab towards a lower setting a couple of clicks. The L.E.D. should come on. If it does, that's all that needs to be said here. It's set and will always come on at this point.
5. If it does not come on following the above procedure, or if the L.E.D. only wants to come on at HIGH throttle stick setting, you must REVERSE the signal to the digital driver by moving the small signal reversing switch, to its opposite position. This should allow the proper set-up if step "4" above is repeated.

This L.E.D. is only an indication that your radio is CONTROLLING the driver electronics. It is NOT an indication that there is power to the glow plugs, only that the radio is controlling the signal to the driver and it is listening!!

ASSEMBLY AND INSTALLATION: GLOW PLUG HARNESS SET UP: **WARNING:** We assume the engine is mounted and can be "run" where it sits. If not, BE CAREFUL you do not cut the adapter wires supplied TOO SHORT. (additional wires are available on spare parts list).

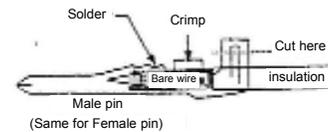
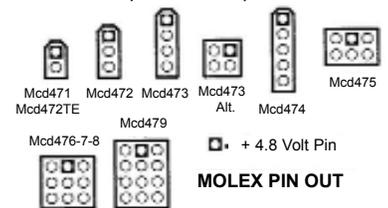
DO NOT INSERT THE PINS INTO THE MOLEX PLUG HOUSING UNTIL INSTRUCTED TO DO SO.

1. Attach the red wire with the # 6 ground lug to a good electronic ground on the engine. Try to locate it as central to the cylinders as possible. IT MUST BE ATTACHED DIRECTLY TO THE ENGINE, NOT THE MOTOR MOUNT!
2. Install ALL PlugLock adapters onto the glow plugs at this time making sure to route the wires to a central location on the fire wall. Drill a 1/4" to 3/8" hole in the fire wall in the area where you plan to locate the driver electronics assembly box. Make the hole large enough to accept ALL wires with the Molex pins but not the Molex housing attached.

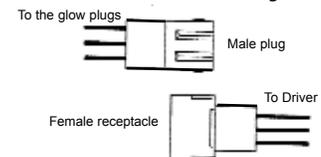
3. Bundle all the wires together (you can use nylon tie wraps, Heat Shrink, or any NON-INDUCTIVE material for this). Run the wires through the hole to make sure they are long enough to reach the driver box with 1 or 2 inches extra.

4. Cut all plug wires to length or leave full length (optional). Strip 1/8" insulation off Teflon wires and place into proper pin, for soldering. Pay close attention to the next step. (I would do the soldering before I put wires thru the firewall. It is much easier)

MOLEX PIN PREPARATION & INSTALLATION PROCEDURE. CAUTION use a low wattage soldering iron (15 to 35 watts) and Rosin Core 60/40 Electronic Solder ONLY!! Do not allow solder to flow down into the Molex pins. This will cause them not to mate properly. Solder only the wires where they touch the pins.



1. After TEST routing the plug wires, cut any excess wire and discard. Strip approximately 3/16" of insulation from each wire. Using long nose pliers, crimp a FEMALE MOLEX pin on all BLACK Glow Plug adapter wires and solder. (You may want to cut off part (1/16") of the long tab that folds over the wire insulation at the end of the pin). **WARNING:** Do not attempt to seat the molex pins using long nose pliers, as this can damage the TEFLON insulation on the wire. Once the pins are inserted into the Molex Housing they CANNOT BE REMOVED without damaging them unless you have a special tool BE CAREFUL!!
2. Try inserting the EMPTY MOLEX (glow plug) connector housing into its mate on the Glow Driver before you insert the pins!! Pay close attention to the polarizing notches on the inside and outside of the Molex housings!!



3. The MALE Molex pin is attached to the end of the RED "+" wire. Solder the ground lug to the other end and cover with heat shrink. Attached the wire with ground lug to the engine case.

4. Insert the red (+) ground lug wire into the Molex housing first. This is the MALE pin that must mate with the Female pin in the driver box's connector housing. Push the pins into the housing with finger pressure only. Use the flat side of a small screwdriver blade to seat them securely, when necessary. Be sure to run the GLOWPLUG wires through the firewall before inserting them into the Molex housing. The hole you drilled is only large enough for the wires with pins, not the connector housings.

5. Now insert the BLACK Plug wires in the same manner as you did the RED wire in #4
6. Check to make sure GLOWPLUG harness is working properly.

A) Conn. Batt. Pack & Plug Harness to Glow Driver Box.

B) Conn. Glow Driver to receiver with "Y" cord as before.

C) Turn on your Radio System. Make sure servos move correctly and check to see that the L.E.D. (remote "ON" indicator) glows at low throttle setting.

D) Insert a spare glow plug into one of the PlugLock Adapters and hold it to the side of the engine with one hand while moving the throttle stick up & down with the other hand. The plug(s) should come on (glow) at the pre-set point selected in your set up procedures. (check each plug connector in turn).

E) Remove the spare glow plug from the adapter and connect that adapter onto an engine glow plug. (Do this for each cylinder).

F) After you are satisfied with your results, I recommend sealing the hole in the firewall with silicone rubber cement. This eliminates the possibility of fuel seepage.

7. You are now ready to test run your engine. Make sure you have fuel in the tank and that it flows when the prop is turned over by hand.

NOTE: BENCH RUNNING: (WITHOUT RADIO). You can test run your engine without the radio. You will need to plug the glow driver's radio pigtail into a 4.8V rec. battery pack. (You may need to make up a test pack, since the pigtails are not compatible.) With this done, simply slide the SIGNAL REVERSING switch to it's opposite setting. If the LED comes on, the driver will now drive the plugs. Plug the 4.8 volt glow plug battery into the glow plug power connector on the glow driver, the plugs will light. REMEMBER: If the LED is on, the driver is turned on.

RECOMMENDED BATTERY PACK:

Use NiCAD or NiMH Only. Do not use Lipos or Lipos with regulators! Use the Deans Battery wire and Charge Connector we supplied.

CAUTION: Always strip off the heat shrink from the battery pack and solder the 20ga. wire we supply, directly to the battery tabs. Servo wire will not carry the current needed for good operation!!

There are different chargers & battery packs available. For best performance of these products, please try to follow our charging advice. Overnight Chargers are C/10 charger's. DO NOT overcharge the batteries!!!

MODEL #471: Use a 4.8V 1500 or 2000ma battery pack. The A/C charger should charge at 4.8V 125 to 150ma. Charge batteries for 10 to 14 hours.

MODEL#472: Use a 4.8V 2000 to 3300ma battery pack. The charger required should charge at 4.8V 125 to 300ma for 10 to 12 hrs.

MODEL #473-474: Use 3300 - 4000ma battery pack. The charger should charge at 4.8V 300-400ma for 10 to 12 hours.

MODEL #Mcd475-#Mcd476 Use 4000 - 5000ma Battery pack. The charger should charge at 4.8V 300-400ma for 12 to 14 hours.

MODEL #Mcd477-#Mcd479 Use 5000ma or higher Battery pack. The charger should charge at 4.8V 400-500ma for 10 to 12 hours.

CHARGERS: When selecting a charger for any battery pack make sure that the charger is capable of charging the pack in 10 to 12 hours.

You may want larger cells depending on how much time you need for starting, taxiing, landing, etc. You can use smaller packs and charge between flights using a fast charger.

Warnings: Use the Deans charge jack we installed on the Driver. It will prevent reverse connection. Do not plug in charger without the battery pack attached.

WEIGHT & RUN TEST TIMES: (Fox, K&B, O.S. & Sonic-Tronics Glow Devil Glow Plugs were used). The run times listed here are BENCH times and may vary slightly. Most glow plugs tested consumed any where from .65 to 1.75 amps per plug (an AVERAGE of 1.00 AMP) @4.8 Volts.

The weights listed by each model, include suggested 4.8 Volt battery pack, plug harness and driver assembly for that model.

Model	Cyl.	Weight	Batt	Approx. Run Time
471	1	6 oz.	1500 ma/hr 2/3 "A"	90 min.
472	2	8 oz.	2000 ma/hr 4/5 "A"	60 min.
473	3	8 oz.	3000 ma/hr sub "C"	60 min.
474	4	9 oz.	3000 ma/hr sub "C"	45 min.
475	5	10 oz.	4000 ma/hr sub "C"	48 min.
476	6	10 oz.	5000 ma/hr sub "C"	50 min.
477	7	11 oz.	5000 ma/hr sub "C"	43 min.
479	9	11 oz.	5000 ma/hr sub "C"	33 min.

Run times can be increased with larger cells

NOTE: The above run times are estimated for continuous operation of the glow driver. Please keep in mind the glow driver is only "ON" for starting, idling, taxiing of the model and during the lower speed operation of the engine.

CHARGE CONNECTOR ASSEMBLY: (3pin Deans, Polarized) Battery Packs and chargers pre-wired for the glow drivers are available separately (see spare/replacement parts list), but since we do not supply a charger or battery pack with the glow driver, we have included a Deans 3pin polarized connector to attach to your charger and a 3 or 4pin Deans connector with 20ga. wire for your 4.8V battery pack. (USE IT!)

NOTE: If you use a servo pigtail, that matches your radio system, you can adapt the Polarized Deans Conn. so it will plug into your radio charger's 4.8volt output jack. This way you can charge through the side of the aircraft, using your radio charger.

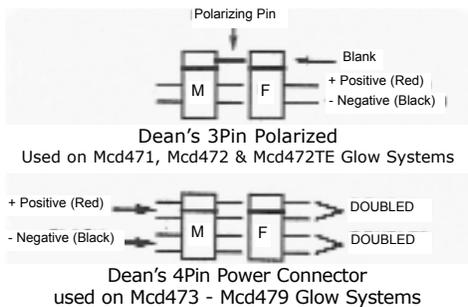
1. Determine the negative & positive leads on your charger.
2. Slide one piece of Heat shrink (included) over the negative lead & one over the positive lead.
3. Solder negative lead to pin #3 on the Deans 3pin Polarized connector. This is the outside pin.
4. Solder positive lead to pin #2 on the Deans 3 pin male connector. This is the center pin.
5. After solder has cooled, slide heat shrink up over the solder connections and shrink, using monokote gun.

WARNING: Remove existing wires from battery pack, and solder directly to the terminals on the cells. **THIS IS A MUST!!!**

BATTERY PACK CONNECTOR ASSEMBLY: Use 4.8V Battery Pack only (471 through 479) Red & black 20ga. wire has been included to install on your 4.8V battery pack. DO NOT USE YOUR OWN WIRE, Use the wire we have supplied, it will carry the necessary current to heat your glow plugs properly.

This connector has been pre-assembled at factory for your convenience. USE IT!!

1. Solder the black wire to NEGATIVE terminal of the 4.8V pack
2. Solder the red wire to POSITIVE terminal of 4.8V pack
3. Cover battery pack with heat shrink or other non-conductive material (not included).
4. 480/84/88 systems are 6.0 volt systems, but wired the same!! Use caution and be sure to observe polarity. Always solder to battery tabs.



SPARE/REPLACEMENT PARTS

Replacement part #'s probably won't be necessary, as you can ask for them by name.

1) MOLEX .062 PINS are used through-out this assembly.

R2490 Male pin	\$.35
R2491 Female pin	\$.35

2) NYLON M & F MOLEX HOUSINGS: Ask for housings by model number of your Driver system (pins are not included).

R2492M 2pin male Molex	\$ 1.30
R2492F 2pin female Molex	\$ 1.25
R2493M 3pin male Molex	\$ 1.55
R2493F 3pin female Molex	\$ 1.50
R2494M 4pin male Molex	\$ 1.95
R2494F 4pin female Molex	\$ 1.90
R2495M 5pin male Molex	\$ 2.30
R2495F 5pin female Molex	\$ 2.25
R2496M 6pin male Molex	\$ 2.30
R2496F 6pin female Molex	\$ 2.25
R2497M 9pin male Molex	\$ 2.55
R2497F 9pin female Molex	\$ 2.50
R2498M 12pin male Molex	\$ 2.95
R2498F 12pin female Molex	\$ 2.90

3) PLUGLOCK ADAPTERS & WIRE

R2448B 5/8" adpt w/18" blk Teflon wire \$ 7.00
 R2449B 1.0" adpt w/18" blk Teflon wire \$ 7.50
 PlugLock adapter wires available in longer lengths upon request.

4) CHARGERS AVAILABLE: (connector installed)
 Mcd435:4.8V 125ma AC charger \$29.95
 Mcd438:4.8V 300ma. AC charger \$39.95

5) BATTERY PACKS: (connector installed)
 Mcd622 4.8V 1500ma 2/3 A w/3pin Deans \$29.95
 Mcd624 4.8V 2000ma 4/5 A w/3pin Deans \$34.95
 Mcd626 4.8V 3300ma Sub C w/3pin Deans \$40.95
 Mcd628 4.8V 3300ma Sub C w/4pin Deans \$40.95
 Mcd630 4.8V 4000ma Sub C w/4pin Deans \$56.95
 Mcd632 4.8V 5000ma Sub C w/4pin Deans \$68.95

DEANS BATTERY CONNECTORS:

R2450 Deans 3pin female w/wire	\$ 4.95
R2451 Deans 4pin female w/wire	\$ 5.95
R2452 Deans 3pin male w/wire	\$ 4.95
R2453 Deans 4pin male w/wire	\$ 5.95
R2454 Deans Charge jack w/wire	\$ 6.95
R2455 Deans L.E.D. w/wire	\$ 3.95

OPTIONAL ITEMS:

You can order additional plug harness assembly, for your particular model driver. Price includes PlugLock adapters, ground lug and MOLEX connector with pins.

MODEL PRICE

R2471 (Mcd471)	\$12.95
R2472 (Mcd472)	\$19.95
R2472TE (Mcd472TE)	\$34.95
R2473 (Mcd473)	\$24.95
R2473SE (Mcd473SE)	\$34.95
R2474 (Mcd474)	\$29.95
R2474TE (Mcd474TE)	\$39.95
R2474QE (Mcd474QE)	\$54.95
R2475 (Mcd475)	\$39.95
R2476 (Mcd476 dual plug 3 Cyl.)	\$44.95
R2477 (Mcd477)	\$49.95
R2479 (Mcd479)	\$59.95

WARRANTY & LIABILITY: All drivers have been fully tested prior to shipment. All parts are guaranteed to work and will do the job well. Sonic-Tronics Inc assumes NO liability whatsoever for the use of this product and disclaims any liability beyond repair or replacement (our option) for a period of 180 days from date of sale to original purchaser. No Warranties, including the IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS extend beyond the description on the face here of NO OTHER LIABILITY INTENDED OR IMPLIED. Units will NOT be warranted against crash damage or abuse. No Units will be warranted against unauthorized modifications by anyone except manufacturer. Warranty void if FACTORY SEALS ARE BROKEN!!

WARNING!! If you change the wiring to types other than what we have specified, there will be a \$25.00 charge to convert back to original wiring so we can check it out on the bench!! This is in addition to repairs and shipping charges for the return to you. If you need help, please call during business hours 10am to 4pm Mon- Fri.

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