TOUCH BASIC-6   P/N 100935

The **Touch Basic-6** is a microprocessor driven and networked programmable **electrical switching control system**. Utilizing multiplexed technology the Touch Basic-6 system offers many advantages over typical circuit breaker and switch panel assemblies. The modular nature of the system allows the PDC[i] (Power Distribution Center) to be mounted near the devices that it is to control, thereby providing easier installation with shorter wire runs and quick logical access for testing. Working in concert with the vehicles switch panel and or electrical wiring the unit can control auxiliary lighting and other electrical devices such as a PTO, Strobes, buzzers or even hydraulic valves.

The unit is designed to operate in vehicles with 12VDC (-negative ground) electrical systems and will operate with battery voltage fluctuations between 9v and 15v. If battery voltage drops below this threshold the unit shuts off isolating the outputs from the battery, providing additional circuit protection and saving a low battery from potentially complete discharge.

The system is comprised of an intelligent PDC-8 (a PDC with 8 outputs) wired to a function configurable KP-6[ii] (6-position touch-pad style) Keypad. The Keypad's small size and modern appearance allows it to fit and blend into almost any vehicle's dash or console. The system is shipped[iii] with 20 feet of 4-conductor communications wire, a keypad hardware mounting kit, a keypad legend sheet with a pair of keypad legend insert strips, and a set of installation instructions.

Each of the 8 outputs from the unit is individually switch through a relay and protected with a thermal circuit breaker rated at 20 amps. The entire unit is rated to switch a current of 80 amps total. Next to each relay inside the unit there is a red output indicator LED and an output override switch located to the side of the corresponding output terminal stud. The output indicator LED displays whether an output is on, off, or if the circuit is not functioning properly. The keypad's Red indicator LEDs operate the same as the red indicator LEDs at the PDC outputs. If the LED is off, the output is "Off" (not active, dead). If an indicator LED is "On" solid, then that output is "On" (active, hot) and is operating correctly. If the LED is flashing, then one of several fault conditions is present. 1) An output is "Off" because an overload or short has tripped the circuit breaker open, or. 2) An output override switch is being used to force an otherwise "Off" output "On".

To reset a tripped circuit breaker, first cycle the corresponding switch off, and then after a few seconds back on again. If the fault persists then check the output for overloading, clear any shorts if found. Double check that an output override switch was not accidentally turned "On" and forgotten.

Caution: The output override switches are used to manually turn on an output in the event of an input or system failure. They should be used in an emergency situation only. Once an output that has been overridden "On", it can **only** be turned back "Off" by using the same override switch, next to the corresponding output terminal stud inside the unit.

Installation Information

The importance of good wiring practices and proper grounding **cannot** be over emphasized. The PowerUp Customer Service Department routinely encounters field failures with symptoms of; improper functioning, intermittents, unusual behavior, and even complete failure to turn on, that consistently are found to be the direct result of poor wiring practices and/or bad grounding. These types of problems cause much frustration for everyone and yet are unnecessary and completely avoidable if attention is given to basic electrical wiring practices. Following these guidelines should aid in the successful installation and maximize the performance of the entire vehicles electrical system.

Ground is Ground, is Ground, right? Well yes in theory but not always in practice. Like the hydraulic system that electron movement is named after, whatever the current that leaves the battery is the same current that needs to return. A Mechanical "Ground" to a painted toolbox may fail to provide this needed electrical return path. A "Ground" to a clean welded stud on the body may be very good but the connection from the body to a cross-member and frame might be made only with a few rusty bolts. The electrical ground from the cross-member to the frame might be provided with only a small gage static wire. These kinds of conditions are common and wholly inadequate to provide proper operation of the electrical system.

In order for any electrical device to operate reliably, it needs more than just a good connection to the battery. It also needs an equally good return path "Ground" free of resistance. A complete and proper installation involves more than just hooking up the power wires, it requires that the whole circuit be checked for an adequate current path. Careful installation with solid crimped wire connectors and a cleanly dressed wiring harness will minimize potential problems and optimize the performance of both the Touch Basic 6 and all of the other electrical devices on the vehicle.

1) Securely mount the Touch Basic-6's PDC case to the vehicle using the 4 mounting flanges. The PDC case is weather resistant, NOT waterproof and should be installed in a protected location with the cable glands down. So mounted the wires exiting from the bottom of the case form a drip loop.
    a) The preferred installation location is inside the cab behind the seat.
    b) Do NOT install the PDC inside an engine compartment, as the excess heat may damage the enclosure and/or the circuit board.
    c) Do NOT install the PDC inside a battery box; acid fumes will damage the electronics inside.
    d) When externally mounting the PDC in a toolbox, it is recommend that a silicon sealant be used around the wires where they enter the PDC through the cable glands.
2) Install an 80 amp circuit breaker in-line from the Battery "+" terminal to the central power stud inside the PDC. Use a Red 6AWG wire for this. Do not skimp on the wire size, as all of the controlled outputs will be powered through this one run of wire.

3) Run a Black 18AWG or heavier wire from a good electrical ground such as the battery's "**-**" ground strap stud to the "GND" (ground) stab inside the unit.
4) Run a Red 18 AWG or heavier wire from a fused ignition source to the "IGNITION" stab on the IIR Daughter Board[1] inside the unit.
5) Locate a suitable location inside the cab for the Touch Basic Keypad, on the dash or in the overhead area is an ideal spot.
6) Drill a ¾" clearance hole for the keypad's mini-cable gland and for the network cable to feed through.
7) Holding the keypad in place. Mark the locations of the, 4, keypad mounting holes and drill holes using the appropriate size drill bit.
   a) If using the provided #6 machine screws and nuts for mounting the keypad, drill thread clearance holes using Fractional sizes as 11/64" & 3/16" or Number drill bit sizes #13 – #19.
   b) If using #6 X 1-1/2" stainless steel sheet metal screws to mount the keypad, drill a screw pilot hole with a 3/32" or #40 bit.
8) Plug the white Molex connector from the communication cable into the connector from the keypad.
9) Feed the free end of the communication cable from the keypad location to the PDC.
10) Leave just enough slack communication cable sticking out from the dash at the keypad end to provide easy access to the Molex connecter.
11) At the PDC, feed the communication cable through a cable gland into the enclosure and up to the 4 communication stabs. Provide enough slack that the wires exiting from the bottom of the case can form a drip loop and cut off any excess cabling.
12) Carefully cut back about 2 inches of the cable jacket to expose the four wires inside. Strip off ¼" of insulation from each wire and crimp on an insulated ¼" push-on connector. (18-22 AWG (Red))
13) Connect the four wires onto the appropriate ¼" stabs location inside the PDC. See the following chart.

Wire Color	Location / (Stab#)
RED	V+ / (J13)
GREEN	DATA A / (J14)
BLACK	DATA B / (J15)
YELLOW	V- / (J16)

14) Turn on the ignition. When the Touch Basic System is first powered on, the PDC output and the keypad LED's will do a quick "lamp test" and then go out.
   a) Check the "STATUS" LED on the PDC. If the PDC is operating correctly, the "STATUS" led will be on solid.
   b) If the "STATUS" LED is out, the PDC may not be properly connected.[2]
   c) The keypad backlighting should come on. Then check that the "SYS" light on the keypad and make sure it is neither on nor flashing.

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[1] The power for the Touch Basic is controlled by the vehicle's ignition. An internal Ignition Isolation Relay (IIR) Daughter Board should be inside the PDC to isolate the PDC's logic from potential troubling electrical noise on the ignition circuit.

[2] When troubleshooting a problem with the PDC, always check for proper battery voltage, adequate ground, and power on the "IGNITION" stab. If the problem persists and you suspect that it might be something overlooked with the PDC. Contact Power Up Products for service

d) If the PDC "STATUS" or the Keypad "SYS" LED is blinking, then the PDC has lost communication with the Keypad.[3]

15) Test the Touch Basic System. Notice, which output(s) turn on with each key press.

Keypad Switch #s (Read L to R) / PDC-8 Output #s		
S1 / Output 1 & 3	S2 / Output 5	S3 / Output 7
S4 / Output 2 &4	S5 / Output 6	S6 / Output 8

16) Map what switches that you would like to have control which outputs of the PDC
17) Select the Output Function Labels from the provided "Sticker Sheet". (P/N 8100150 Label Set) to match your application.
18) Apply the labels to the Legend Strip[4] from left to right, placing them squarely into the outline on the Legend Strips. Use the all black sticker for an unused output.
19) Insert the Legend Strip into the channel hidden below the surface of the Keypad's faceplate, making the legends viewable under the faceplate's protective window.
   a) Hold the Keypad right side up in your left hand with your thumb located between the "PTO" and "SYS" lights.
   b) With the Legend Strip right side up in your right hand hold it mostly flat against the front face of the keypad.
   c) Slide one of the Legend Strip's pointy corners along the crack that circles the front of the faceplate. On the right side the tip of the Legend Strip will slip into the mouth of its channel, hidden below the surface of the faceplate.
   d) Straighten the labeled legend strip to be inline with this channel and then it can slide completely under the surface of the Keypad's faceplate.
   e) Most Keypads shipped will have flag to remove that indicates the location of the legend strip opening.
20) Install the Keypad into its mounting location using the provided mounting hardware.
21) Turn off the ignition. The Touch Basic System should turn off.
22) Turn off power to the PDC.
23) Connect the vehicle loads to the appropriate output posts at the PDC. Terminate each of the wires with a #10 insulated ring lug. Tighten all KEP-Nuts securely.
24) Make sure the box is free of wire trimmings and other foreign objects before turning the system back on. Replace the cover on the PDC. Screws need to be snug. *DO NOT OVER TIGHTEN.*
25) Return main power to the PDC.
26) Turn "On" the ignition.
27) With the keypad verify that all the functions are activating the correct outputs. (Upper Work turns on the upper work lights etc.)
28) Charge the Battery and gas up the vehicle.
29) You are done. Be sure to check all connections before moving onto your next project.

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[3] Check the communication cable for proper installation. Having Data "A" and "B" reversed is a common cause of this problem.

[4] The two Keypad Legend Strips (P/N 8100125) each have been imprinted with three sticker outlines from left to right and have a blank space on what is their far right end.

Output Switching Function

Each switch on the keypad can be programmed to change the function of its corresponding PDC output. The factory default configuration is to have all switches set to operate in a latching mode. Reconfiguring any output's function to operate as either a momentary switch, or as a latching switch is equally straightforward. To configure any key switch's function you must first place the keypad in the programming mode:

Keypad Programming

To reconfigure a switch as momentary or latching, do the following:

1) Turn off the ignition (or unplug the keypad) powering down the system for about 10 seconds.
2) Press and hold switch #6 (this is in the lower right hand corner of the keypad) and then turn "On" the ignition (or plug the keypad back in) thereby powering down the system
3) Continue to press and hold the switch until after the keypad completes its power on "lamp test", the keypad will go into program mode.
4) Release key #6 now. The indicator LEDs for each switch will display the current configuration of the switch. If the LED is on solid then the key is in latching mode. If the Led is blinking then the key is in momentary mode.
5) To change the operating mode of a key, press and hold the key until a beep is heard and the LED toggles it's state. Do this for all keys you wish to configure.
6) To exit the program mode simply leave the keypad alone for about 15 seconds and it will automatically exit program mode saving any changes to the configuration.

Notice
Effective January 1st. 2011
Touch Basic 6 – Rev. 2.0
P/N 100935
NOTE – New Alarm Features in Rev. 2.0

Reference figure 1:

The new revision touch basic 6 now has 8 input alarm codes available.

These can be triggered with a positive signal or with a negative signal depending on the program switch settings.

Inputs A through H can be all negative or all positive or A through D can be positive while E through H are negative or the reverse of this configuration is available also.

The Alarm codes flash in the keypad code window as follows:

Input A – Keypad beeps 1 long, 1 short and the Code window flashes 1 long, 1 short.
Input B – Keypad beeps 1 long, 2 short and the Code window flashes 1 long, 2 short.
Input C – Keypad beeps 1 long, 3 short and the Code window flashes 1 long, 3 short.
Input D – Keypad beeps 1 long, 4 short and the Code window flashes 1 long, 4 short.
Input E – Keypad beeps 1 long, 5 short and the Code window flashes 1 long, 5 short.
Input F – Keypad beeps 1 long, 6 short and the Code window flashes 1 long, 6 short.
Input G – Keypad beeps 1 long, 7 short and the Code window flashes 1 long, 7 short.
Input H – Keypad beeps 1 long, 8 short and the Code window flashes 1 long, 8 short.

To set for negative or positive triggering see the chart below.

INPUT	For Positive Trigger		For Negative Trigger	
	Program Dip Switch	Input Select Switch Setting	Program Dip Switch	Input Switch Setting
A	Position 1 ON *	Input A switch to +	Position 1 OFF	Input A switch to -
B	Position 1 ON	Input B switch to +	Position 1 OFF	Input B switch to -
C	Position 1 ON	Input C switch to +	Position 1 OFF	Input C switch to -
D	Position 1 ON	Input D switch to +	Position 1 OFF	Input D switch to -
E	Position 2 ON	Input E switch to +	Position 2 OFF	Input E switch to -
F	Position 2 ON	Input F switch to +	Position 2 OFF	Input F switch to -
G	Position 2 ON	Input G switch to +	Position 2 OFF	Input G switch to -
H	Position 2 ON	Input H switch to +	Position 2 OFF	Input H switch to -

 * Note on Program Dip Switch - The arrow points to the ON position

The Program Dip Switch positions 1, 2, and 3 are set to off at the factory
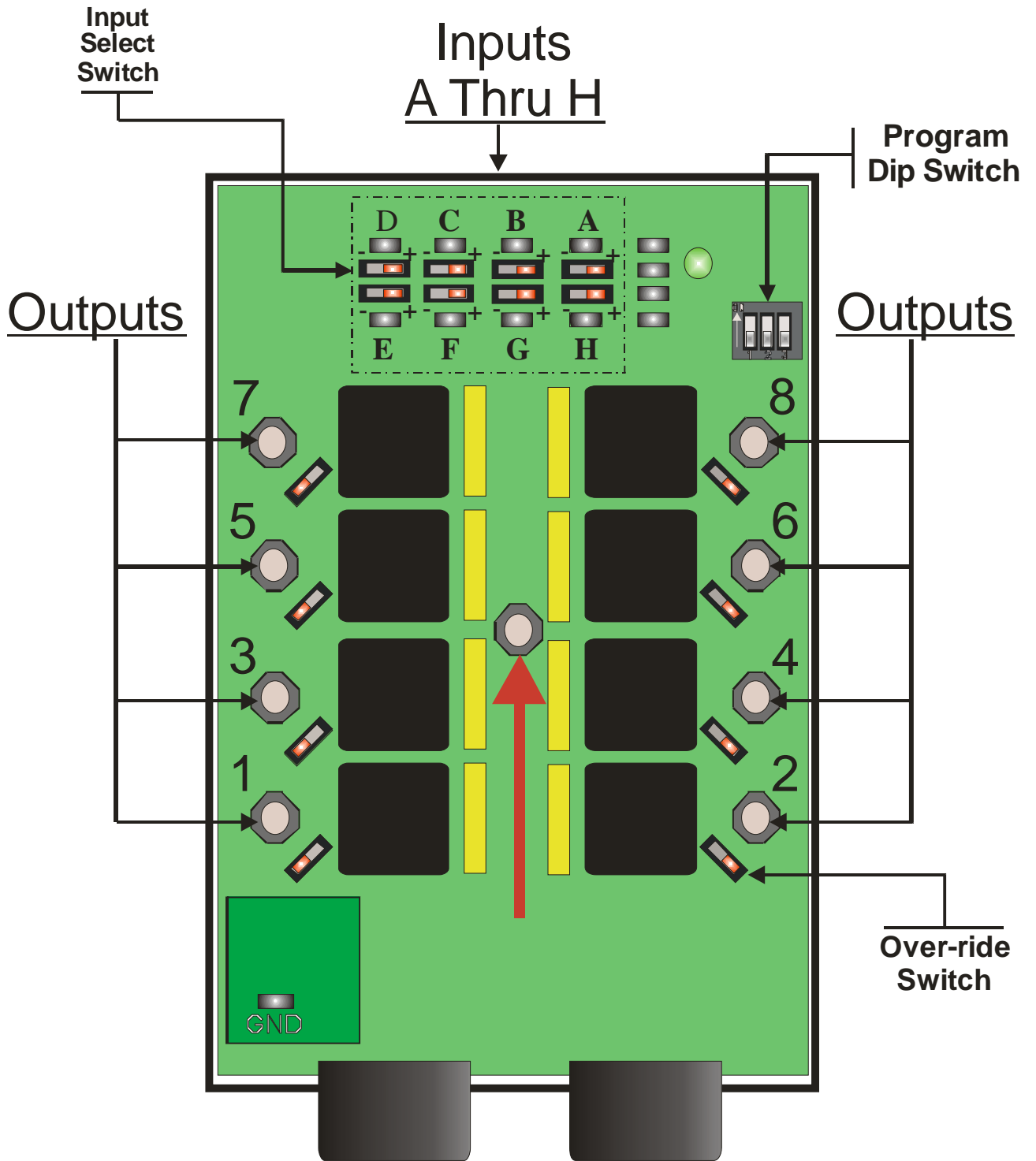The input switches A through H are all set to negative (–) at the factory.

Input Select Switch

Inputs A Thru H

Program Dip Switch

Outputs

Outputs

D C B A

E F G H

7

5

3

1

8

6

4

2

GND

Over-ride Switch

Figure 1

Notice to **<u>Tow Truck</u>** assemblers – For **<u>PTO</u>** alarm setting.

Set the Program dip switch position 1 (one) to the on position. Position the Input Select Switches A through D to the positive position. Attach the positive feedback wire from the PTO output to Input stab A. This will make the PTO light and the code light flash on the keypad, and the alarm will sound 1 long 1 short when the PTO is engaged.

Clutch Pump Alarm

To accommodate those vehicles that use a Clutch Pump use the "Positive" Switch configuration and the "INPUT A" stab.

Cautionary Note. Fly-back voltage from the Clutch Pump can damage the PDC's output. The use of an inline diode, such as P/N 300120 Diode Kit, for the protection of the PDC is **strongly** recommended.

Miscellaneous Extra Notes

PDC-8 End User Serviceable / Installable Hardware and Parts:

4 each required - P/N 4200100 - PDC Enclosure Cover Screw, #12 X 2" Pan Head Philips sheet metal screw - Do not over tighten
8 each required - P/N 4202810 Output Post Nut, #10 X 32 kep-nut.
8 each required - P/N 2600400 Relay - 40A - 12 VDC
8 each required - P/N 2500120 Circuit Breaker - 20A

Power On Lamp Tests

The PDC
The PDC "lamp test" momentarily flashes all the Output LED indicator lights on, and then off. The green "STATUS" LED light will be on solid if the PDC is operating correctly. If the "STATUS" light is blinking, the PDC has lost communication with the keypad. If the "STATUS" led is out, the PDC may not be properly connected to Battery or Ground.

The Keypad
The Keypad "lamp test" momentarily sequences through the Red LED key lights. Then flashes the "PTO", "SYS" and all the key lights together synchronously while momentarily blinking the back lighting off. When the keypad is powered on in the ready state, the "SYS" light on the keypad should be off. If it is flashing, the keypad is not able to communicate with the PDC. Check the communication cable for proper installation

Communication Cable Assembly

Communication Cable with Molex connector installed onto one end.
Communication Wire - 20 Feet - P/N 1600125
4 Position Male Connector Housing (X1) P/N 1900104
Female crimp pins (X4) P/N 1800202

Connector to cable printout
The Red wire goes into connector position #4
The Green wire goes into connector position #2
The Black wire goes into connector position #1
The Yellow wire goes into connector position #3

Wire Color	Position
Red	4
Green	2
Black	1
Yellow or White	3

Screw and Legend Kit

Kitted in a 6" Zip-lock bag
Legend Sticker Sheet Label Set (X 1) - P/N 8100150
Legend Strips (X 2) - P/N 8100125
Push-On - 1/4" 18-22 AWG (X 4) P/N 1700900
#6 X 1-1/4" Black PHP - SS (X 4) P/N
#6-32 X 1 1/4" Black PHP - SS (X 4) P/N 4200610
#6 KEP-NUTS (X 4) P/N 4203710

Touch Basic-6 Packing List

PDC 8 Brain (X1)

6 Function Keypad (X1)

Communication wire assembly, 20 foot with Molex connector attached on one end (X1)

Legend and Screw Kit (X1)

Touch Basic-6 Installation Instruction Sheets (X1)
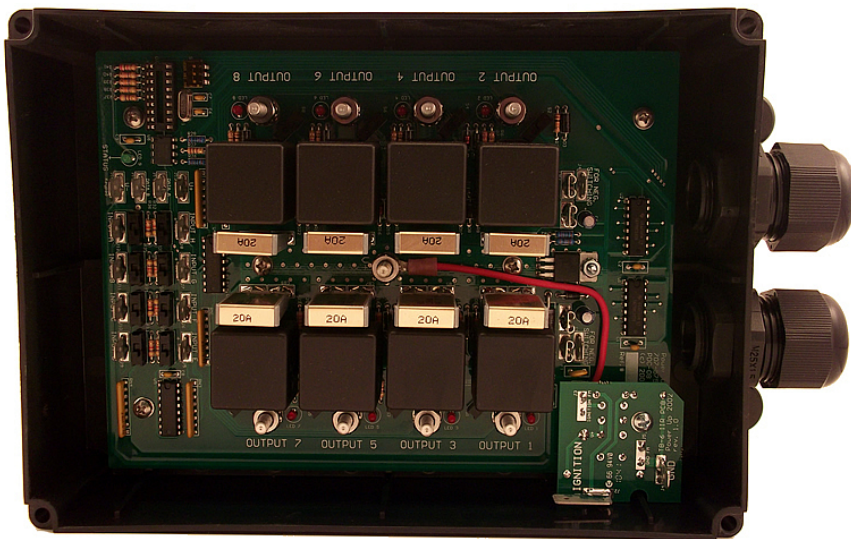
Power Up Products

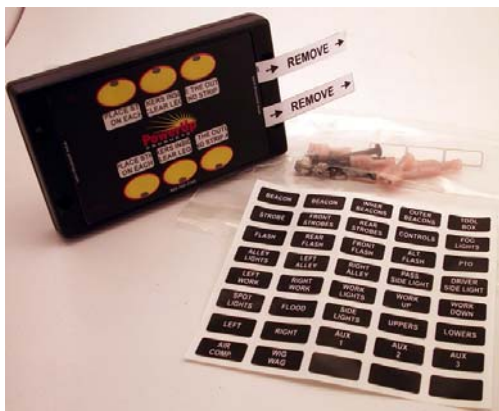82 Hardy Dr.
Sparks, Nevada 89431
FAX 775-336-2404   www.powerup.com
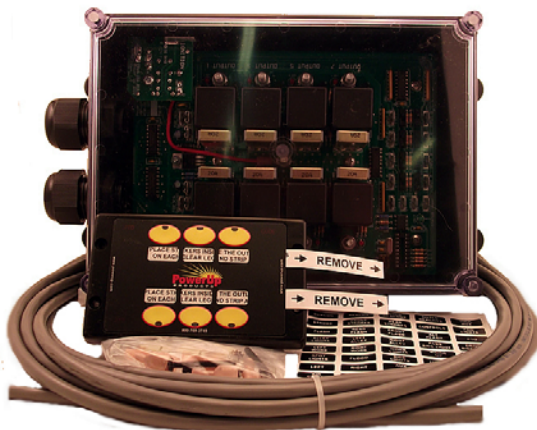**775-336-2400**   **Order Toll-Free 1-800-769-3749**

i)

PDC-8 Brain

ii)

TB-6 Keypad, with sample legend layout installed

iii)

Complete System as shipped