S8000
ADVANCED CONTROL SYSTEM

Installation Guide

Contents:

IMPORTANT! FULLY READ THESE INSTRUCTIONS PRIOR TO INSTALLATION.

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Introduction: S8000 Control System (EM725)

The S8000 is a 10-30v multi-output power controller operated by a remote keypad. It has been designed with a revolutionary inbuilt LED backlight for legend illumination. The keypad is splash resistant and very durable. Each of the 8 switches has LED signal illumination for the operators convenience. Having being designed with tactile switching the device has a physical on/off touch as well as an integrated piezo sounder for audible signal.

The handset has been designed to be completely user friendly with a simple set-up procedure – each key can be formatted to have a 'latching or momentary' function via a dipswitch row on the main control board – you can also set vehicle voltage and '999' functionality with a simple dipswitch selection – this is a major benefit of using the S8000 - unlike many systems on the market, there is no need for a computer to configurate the controller.

The unit can either be handheld or fixed format and will come complete with a cradle for the keypad. The Main control pcb can be mounted elsewhere in the vehicle and is linked to the keypad via a standard RJ45 connector system (a 5metre RJ45 extension cable is provided within the kit - see section 1.1).

The major benefit to utilising the Redtronic S8000 control system is that it completely eliminates the need to use relays for power switching. The on-board control circuitry uses MOSFET packages to allow high current switching via software control - not only does this decrease the installation time and wiring, it also significantly increases the reliability of the product.

Specification:

- Voltage: 10-30v DC
- Switch contacts: 8
- Amperage rating: 4 x 15 amp +ve outputs, 4 x 5 amp +ve outputs
- Low operating current on standby
- Auto shutdown on overload
- Auto shutdown at critical supply levels - allows vehicle restart on low voltage
- '999' optional switch – activate multiple functions via a single switch
- LED backlighting
- LED switch indication
- Piezo buzzer sounder (can be deactivated)
- Walk Test activation (tests all channels)
- Minimal wiring for installation (maximum 13 wires including inputs and outputs)
- RJ45 Connection to keypad
- Keypad size: 140mm x 60mm x 30mm (length x width x height)
- Control board box size: 156 x 118 x 32 mm (length x width x height - size includes fixing flanges)
- 2 Year Full UK Warranty

1 .0 Unpacking & pre-installation

Carefully remove the S8000 control box and keypad and place them on a flat surface, taking care not to scratch the units or damage the cable coming from the gland on the keypad. Examine the unit for transit damage, scratched labels, loose screws etc. Report any damage to the applicable carrier service and keep the shipping carton.

Standard S8000 controllers are built to operate on 11 - 30 volt D.C. negative ground (-ve earth) vehicles. This will require setting upon installation to ensure the unit functions correctly. (See section 3.1)

1.1 Description of parts

1. 1 x EM725-C8: S8000 control box
2. 1 x EM725-K8: S8000 keypad with cable (RJ45 connection) (A)
3. 1 x EM725-5M: 5 metre RJ45 extension cable
4. 1 x EM275-PWBK: 30cm black (-ve ground) cable with ring terminal (B)
5. 1 x EM275-PWR: 30cm +VE red- 21 amp max rating (E)
6. 1 x 20 amp fuse and inline 'splashproof' connector
7. 1 x EM275-CR2: 30cm 2 way connector pre-crimped (C)
8. 1 x EM275-CR8: 30cm 8 way connector pre-crimped (D)
9. 1 x EM725-CRC: S8000 keypad cradle
10. 1 x EM725-DEC: sheet of 100 decal labels (for KEYPAD)
11. 1 x Instruction manual

If any of the parts named above are not in the kit you have received please contact the factory. Do not attempt to utilise inferior product to install in the vehicle.

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2.0 Cable colours & operations

Power specification:
Operating current: Load current (of devices) plus up to 100mA for control circuit when operating, 15mA in standby.

Output Current: 80A MAX. Up to 15A each on channels 1-4, 5A each on channels 5-8; with safety cut-out. Cut-out is triggered by load current exceeding between 5% and 25% above rated current.
Exclusion: *Current rating of channels driving dichroic bulbs is halved to 2.5A channels (1-4) and 7.5A (channel 5-8) due to their very low starting resistance which causes initial current flow to be typically up to ten times the normal running current.*

Supply voltage: 10V – 30V. The unit shuts down when supply voltage drops below the selected voltage and shows a low battery warning 0.5volts before this point. Tolerance +/- 5%.

Output voltage: 10V – 30V. All 8 outputs are +ve outputs between 10-30v DC (however is limited to the input voltage e.g 12v input all outputs will produce 12v), if you require a –ve (0v) output to operate a product then you will require a diode protected relay to convert the +ve signal to a –ve signal. This will only be required for very rare cases as most outputs normally require +ve signals (such as lightbars, siren etc) however there may be some cases whereby a load is managed by a –ve trip.

Protection: The unit is protected against reverse polarity via a series diode, preventing damage to the controller logic, however current may flow to any connected load, which could cause overheating and damage to the controller's output transistors which act as diodes when reverse-connected.

The S8000 has been designed to ensure there is no need to utilise external relays to drive high current devices. The unit has inbuilt MOSFET circuitry that will allow 4 x 15amp outputs and 4 x 5amp outputs.

There is no need for any external fusing to each auxiliary device as the S8000 control box provides all the hardware in order to drive the associated products and will shutdown the output if it sees a short circuit or fault.

This unit requires no computer aided integration in order to set-up the controller for functionality (See section 3.0). The set-up is completely software driven utilising the onboard circuitry.

Please ensure this diagram is interpreted correctly before connecting inputs. Failure to do so could void warranty.

2.1 Connections on control pcb (see fig 1.0)

A: KEYPAD: RJ45 connector to link to KEYPAD

B: -VE: 0V EARTH

C: BACKLIGHT: 2way TYCO connector: LED backlight illumination option 1 (see 3.6)

D: POWER OUTPUTS: 8way connector: Outputs for auxhiliary devices to be powered by S8000

1. Blue - 15A max per channel
2. Brown - 15A max per channel
3. Green - 15A max per channel
4. Grey - 15A max per channel
5. Orange - 5A max per channel
6. Purple - 5A max per channel
7. Yellow - 5A max per channel
8. White - 5A max per channel

E: +VE SUPPLY: +12V (or +24v) supply (should be suitable for all current requirements) ***NOTE: This output will require external fuse for total current requirement (supplied with 20amp fuse and holder as standard. See 1.1).***

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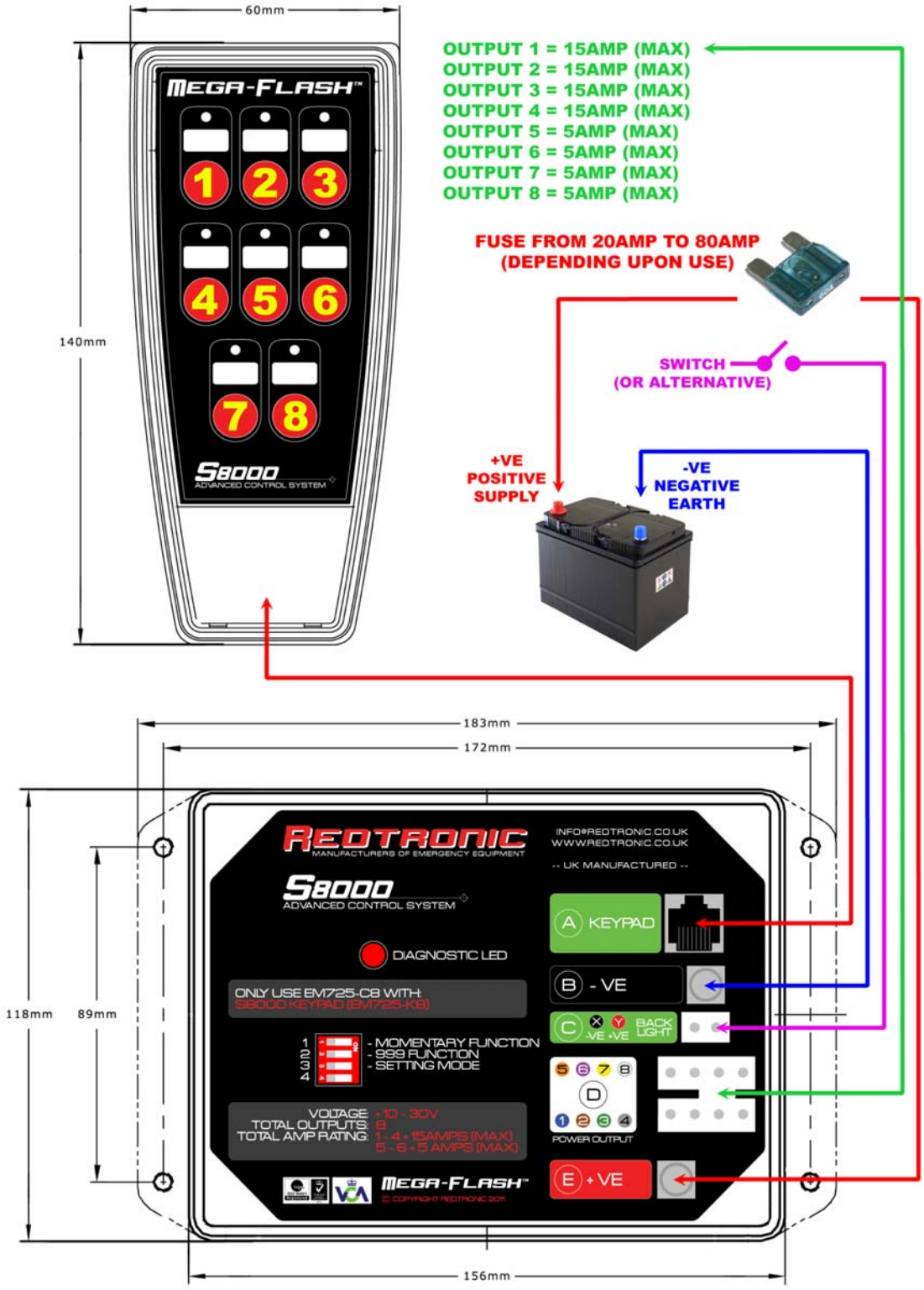
2.2 Fig.1


60mm
140mm
MEGA-FLASH
1
2
3
4
5
6
7
8
S8000
ADVANCED CONTROL SYSTEM
OUTPUT 1 = 15AMP (MAX)
OUTPUT 2 = 15AMP (MAX)
OUTPUT 3 = 15AMP (MAX)
OUTPUT 4 = 15AMP (MAX)
OUTPUT 5 = 5AMP (MAX)
OUTPUT 6 = 5AMP (MAX)
OUTPUT 7 = 5AMP (MAX)
OUTPUT 8 = 5AMP (MAX)
FUSE FROM 20AMP TO 80AMP
(DEPENDING UPON USE)
SWITCH
(OR ALTERNATIVE)
+VE
POSITIVE
SUPPLY
-VE
NEGATIVE
EARTH
183mm
172mm
118mm
89mm
156mm
REDTRONIC
MANUFACTURERS OF EMERGENCY EQUIPMENT
INFO@REDTRONIC.CO.UK
WWW.REDTRONIC.CO.UK
-- UK MANUFACTURED --
S8000
ADVANCED CONTROL SYSTEM
DIAGNOSTIC LED
ONLY USE EM725-C8 WITH:
S8000 KEYPAD (EM725-KB)
- MOMENTARY FUNCTION
- 999 FUNCTION
- SETTING MODE
VOLTAGE: +10 - 30V
TOTAL OUTPUTS: 8
TOTAL AMP RATING: 1 - 4 = 15AMPS (MAX)
5 - 8 = 5 AMPS (MAX)
MEGA-FLASH
A KEYPAD
B - VE
C -VE +VE BACK LIGHT
D
POWER OUTPUT
E + VE

3.0: Software set-up
The S8000 is extremely intelligent and utilises its onboard circuitry to set-up the functional parameters of each switch in order to get the most economic power requirements from the unit.

In order to set these functions please follow the steps for 3.1 to 3.6 in corresponding order.

3.1: Setting the voltage
The unit will operate within a 10-30v supply range however it does require setting to the appropriate supply voltage level (either 12v or 24v) for the vehicle. This is done very simply by following this sequence:

1. SET DIPSWITCH 3 (on main control box) to 'ON' position
2. On the keypad, you then select whether the unit is 12 or 24v. Use KEYPAD switch 1 for this mode (SEE 2.2 Fig.1).

SUMMARY OF FUNCTION	KEYPAD SWITCH 1
12v SUPPLY VOLTAGE	OFF
24v SUPPLY VOLTAGE	ON

Example: If you are in 12v mode no LED indicators should be lit, if you are in 24v mode the LED indicator for Keypad switch 1 should be 'illuminated'.

Please proceed to 3.2 without modifying the DIPSWITCHES.

3.2: Setting the voltage cut-out
You should have now set the supply voltage (if you haven't, go back to 3.1).

The next step is to set the voltage cut-out level in order to allow your vehicle to restart should the battery level get *too low* due to extended operation of your auxiliary equipment.

What happens if the voltage is getting too low?

1. *If the supply voltage is low, indicator lamps for active channels will flash at a moderate rate;*
2. *a critically low supply voltage will shut down all outputs and backlight.*
3. *When supply voltage is below critical level, pressing any switch flashes the indicator LED with a double flash pattern to indicate the problem but does not activate any output.*
4. *The unit will go back into 'standby mode' until it can achieve a suitable voltage.*
5. *If the supply voltage rises above critical level, flashing changes to a rapid flash to signal that the user may now activate the channel.*

(If you want to skip this step as you do not want ANY low voltage protection please go to step 3.3).

You should still have DIPSWITCH 3 in the 'ON' position, set the following KEYPAD switches in the appropriate format (SEE 2.2 Fig.1):

SUMMARY OF FUNCTION	KEYPAD SWITCH 2	KEYPAD SWITCH 3
VOLTAGE CUT-OUT 10V (or20v)	OFF	OFF
VOLTAGE CUT-OUT 10.5V (or21v)	OFF	ON
VOLTAGE CUT-OUT 11V (or22v)	ON	OFF
VOLTAGE CUT-OUT 11.5V (or23v)	ON	ON

You have now set the voltage cut-out threshold. Turn the DIPSWITCH 3 into the 'OFF' position on the main control box.

Now proceed to 3.3.

3.3: Setting momentary / latching switches
The S8000 utilises 8 tactile switches covered with a membrane label to offer splash-proof mechanical switches. Although these are as standard a 'momentary switch' *(or 'push switch')* the function can be set to give them either a 'momentary' or 'latching' *(or 'push-to-make, push-to-break' switch)* output.

As most switch functions are generally 'latching' functions the default setting for each of the 8 switches is 'latched'. You would use a 'momentary' switches for functions such as 'pattern select' or 'siren tone trigger' (as examples).

(If you want to skip this step as you do not want ANY momentary actions please go to 3.4).

It is very simple to change the switch function from latching to momentary (and vice versa). This is done by following this sequence:

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1. SET DIPSWITCH 1 ONLY (on main control box) to 'ON' position.
2. On the keypad, you then select whichever switches you want to activate as 'momentary' (SEE DIAGRAM 1). When a switch has been activated, the LED indicator will illuminate – these are now set as 'momentary'.

To end this setting procedure, simply turn DIPSWITCH 1 into the 'OFF' position.

Now proceed to 3.4.

3.4: Setting '999' mode
Many Emergency vehicle users will require standard actions when they are on a responding to an emergency. The S8000 provides a '999' function which will activate multiple outputs via the activation of a single switch (switch 8 – see 2.2 Fig.1).

The setting mode is extremely simple by performing the following action:
1. SET DIPSWITCH 2 ONLY (on main control box) to 'ON' position.
2. On the keypad, you then select whichever switches you want to activate in '999 mode' (SEE 2.2 Fig.1). When a switch has been activated, the LED indicator will light up – these are now set as '999'.

Note: You will still be able to activate each function separately when the unit is in 'normal' mode, this just activates a 'quick start' function for all selected outputs if selected.

To end this setting procedure, simply turn DIPSWITCH 2 into the 'OFF' position.

Now proceed to 3.5.

3.5: Keypad sounder on / off
A piezoelectric sounder in the keypad gives an audible feedback of switch selections. This can be useful for users who are visually impaired or in high daylight applications.

In the event of an overloaded output which has been shut down, the sounder gives a constant sound until the button for the failed channel has been selected.

Although this function is extremely widely used, some users may not require it, so this sounder can be deactivated using the following sequence:
1. SET DIPSWITCH 3 (on main control box) to 'ON' position
2. On the keypad, you then select switch 4.
3. The indication LED will illuminate for this switch.
4. The sounder is now disabled.

To reverse this at any time (and reactivate the sounder), simply follow the steps above and when switch 4 is not illuminated this means the buzzer will sound once more when you have exited 'setup mode'.

Turn DIPSWITCH 3 into the 'OFF' position on the main control box.

Now proceed to 3.6.

3.6: LED back-light illumination set-up
The LED back-light illumination on the keypad has two activation options.

a. You can activate via a +12v (or +24v) input on the main control box;
To activate in this format, simply apply a +ve (and –ve) signal into input 'C' on the MAIN CONTROL BOX with the supplied 2 way connector contact (EM275-CR2: ensure polarity is correct). This will illuminate the led back-light whenever this signal is supplied.

You could wire this into your vehicle side-light circuit, ignition circuit or other activation system to ensure the backlight is only 'activated' when you want it to be.

You could also connect this to a low-power output on the control box (outputs 5-8) so you can select the backlight on/off on the relevant keypad switch.

OR

b. You can permenantly illuminate the LED back-light whenever the unit is in use.
This is done very simply by following this sequence:
1. SET DIPSWITCH 3 (on main control box) to 'ON' position
2. On the keypad select switch 5.
3. The indication LED will illuminate for this switch and the illuminated panels will light up.

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You have now set the LED back-light to illuminate permenantly.
Turn the DIPSWITCH 3 into the 'OFF' position on the main control box.

In either mode: To ensure the backlight does not illuminate when the switch panel functions are unused for extended time periods, the backlight will have a timeout of two hours from powering up or from the last operation and the unit will go into standby mode. After timeout, any switch selection will reactivate the backlight without actioning the switch function. The next selection would activate the function. This would prevent accidental triggering of the incorrect function.

3.7 Summary Chart

	KEYPAD				
SUMMARY OF FUNCTION	SWITCH 1	SWITCH 2	SWITCH 3	SWITCH 4	SWITCH 5
12v SUPPLY VOLTAGE	OFF				
24v SUPPLY VOLTAGE	ON				
VOLTAGE CUT-OUT 10V (or20v)		OFF	OFF		
VOLTAGE CUT-OUT 10.5V (or21v)		OFF	ON		
VOLTAGE CUT-OUT 11V (or22v)		ON	OFF		
VOLTAGE CUT-OUT 11.5V (or23v)		ON	ON		
KEYPAD SOUNDER OFF				ON	
PERMENANT ILLUMINATION					ON

4.0 Walk test
As a daily safety test, the S8000 has a software driven 'walk test' procedure in order to pre-test all auxiliary equipment before using the vehicle to ensure it is in full working order.

This tests all 'outputs' (see 2.1 'D')
The setting mode is extremely simple by performing the following procedure:

1. On the KEYPAD hold switch 1 for 4 seconds.
2. All connected power outputs will activate (the lightbar will flash, alley lights will turn on, etc)
3. If there is a fault with any of the outputs the auxiliary item will not function – please check for fault
4. To deactivate 'walk test' simply hold switch 1 again for 4 seconds.

Note: This procedure can/should be a daily test to ensure the safety of the user.

The unit is now in full working order.

5.0 Decal labels
The KEYPAD is enabled with LED back-light when activated. In order to understand what functions are activated by each switch (See 2.2 Fig.1).The S8000 kit contains a DECAL sheet with 100 labels. These are to be carefully attached on the top of the KEYPAD label.

Do not remove the main 'S8000 membrane' label - this would invalidate the warranty of the product.

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6.0 Warning Regarding Operation

The use of this or any REDTRONIC warning device does not ensure that all drivers can or will observe or react to an emergency warning signal. Never take the right-of-way for granted. It is your responsibility to be sure you can proceed safely before entering an intersection, driving against traffic, responding at a high rate of speed, or walking on or around traffic lanes.

The effectiveness of this warning control device is highly dependent upon correct mounting and wiring. Read and follow the manufacturer's instructions before installing or using this device. The vehicle operator should ensure daily that all features of the device operate correctly (see 4.0 Walk Test). In use, the vehicle operator should ensure the projection of the warning signal is not blocked by vehicle components (i.e.: open trunks or compartment doors), people, vehicles, or other obstructions.

This equipment is intended for use by authorised personnel only. It is the user's responsibility to understand and obey all laws regarding emergency warning devices. The user should check all applicable country laws.

REDTRONIC LTD assumes no liability for any loss resulting from the use of this warning device. Proper installation is vital to the performance of this warning device and the safe operation of the emergency vehicle. It is important to recognise that the operator of the emergency vehicle is under psychological and physiological stress caused by the emergency situation. The warning device should be installed in such a manner as to:

A) Not reduce the output performance of the system,

B) Place the controls within convenient reach of the operator so that he can operate the system without losing eye contact with the roadway.

Emergency warning devices often require high electrical voltages and/or currents. Properly protect and use caution around live electrical connections. Grounding or shorting of electrical connections can cause high current arcing, which can cause personal injury and/or severe vehicle damage, including fire.

PROPER INSTALLATION COMBINED WITH OPERATOR TRAINING IN THE PROPER USE OF EMERGENCY WARNING DEVICES IS ESSENTIAL TO INSURE THE SAFETY OF EMERGENCY PERSONNEL AND THE PUBLIC.

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