RELAY

FREEWheel

RELAY system

user guide & fitting instructions

"So eager to order this! Need to ditch my steering wheel umbilical as soon as possible!"

"Installation was really straight forward ... and the configuration software worked well"

"All installed and tested, works perfectly, insanely pleased :D"

"I cannot recommend the kit enough"

"my favourite upgrade yet.. get one."

"Absolutely amazing.. I'll be sure to recommend your product as it really is a fantastic piece of kit"

Thank you for purchasing FREEWheel!

FREEWheel, the most advanced wireless steering wheel system in the world.

Here's all the information you'll need.

CONTENTS

Relay Receiver and Transmitter

Battery (3V CR2 lithium) and USB cable

Optionally: 0.7m loom or connector & pins

Optionally: Easyfit Transmitter assembly or button plate bundle comprising IP67-rated OFF / [ON] momentary switches, nut covers, button plate, spacer disk, decals

YOU WILL NEED

IP67-rated OFF / [ON] momentary switches

USB configuration software from www.blinkstop.co.uk

Wire strippers, soldering iron (not Easyfit)

Optionally: hook-and-loop or servo tape, heat shrink

WARNINGS

Please check the contents and read the fitting instructions carefully before commencing

FREEWheel is rated for a maximum load of 15A per channel and MUST be used with additional relays for higher current loads (additional relays not supplied).

FEATURES

- *Wireless solution allows full push-button and paddle control with a detachable steering wheel*
- *Integrated BlinkSTOP and BeamSTOP functions – smart indicator cancelling and headlight control*
- *Integrated IVA fog mode – inhibits and resets fog lights when headlights are turned off*
- *Integrated racing features – two rainlight modes and Flash-to-Pass headlight mode*
- *Supports two simultaneous button presses – includes indicator channel hazard mode*
- *Uniquely, lets you use your choice of buttons, paddles and mounts. Don't be tied to a manufacturer's styling choices!*
- *Supports low or high-side switching of up to 15A at 12VDC using internal relays*
- *Choice of momentary and latching switch behaviour for all channels via USB configuration software*

TRANSMITTER INSTALLATION

SPECIFICATION

Compact case in flame-retardant ABS plastic. Requires one 3V CR2 lithium battery. Weight with battery: 61g

Robust performance even at 2.65V. Unique Transmitter ID prevents cross-talk from nearby kits.

No need to disconnect the Transmitter battery if the vehicle is off the road. The sleep drain of 0.9uA and 25mA drain per ~20msec button press allows over 6 million transmissions.

Tri-colour LED indicating performance state:

- *GREEN = Transmit OK. Transmission successfully received and acknowledged by the Receiver;*
- *ORANGE = Transmit Fail. Transmission not acknowledged by the Receiver. Possible causes are obstruction, lack of range or de-powered Receiver (e.g., vehicle ignition is off);*
- *RED = Low Battery <2.65V. Replace battery now.*

Transmission time of 6 milliseconds for a real-time response.

EASYFIT TRANSMITTER INSTALLATION INSTRUCTIONS

8-Channel Easyfit Transmitter shown

Easyfit Transmitter is supplied preassembled and configured to your specification.

The Easyfit Transmitter is pre-drilled to support standard 50 to 50.8mm, 70mm and 74mm PCD steering wheel bosses. The rear plate can be detached from the Transmitter and used as a guide to gently drill through the spacer disk, if required. Use a 6mm HSS drill bit with light pressure and low speed, with the parts securely clamped.

PIGTAILED TRANSMITTER INSTALLATION INSTRUCTIONS

Use of good quality, IP67 rated OFF / [ON] momentary switches is recommended, such as Multicomp's MCPAS6B2M1CE7, available from Farnell. Illuminated switches are not supported.

1. *Wiring*

DO NOT solder the switches while the Transmitter battery is fitted, as damage may occur.

The switches are all made to a common ground, so you can connect the ground wires as you wish.

***If used**, Left / Right Indicators, Main Beam and Fog MUST be connected to the wires shown because this is matched by the relay control software. See Figure 1 through Figure for suggested indicator and main beam wiring diagrams.*

When stripping the outer insulation, please take care not to damage the wires inside. Leave sufficient wire for future soldering of unused channels, and cover with heat-shrink.

Wire Colour	Function
BLACK	Ground
YELLOW	Ground
WHITE	Ground
ORANGE	Ground
RED	Ch1 or L Indicator
GREEN	Ch2 or R Indicator
BLUE	Ch3 or Main Beam
BROWN	Ch4 or Fog
GREY	Ch5
PINK	Ch6
CYAN	Ch7
PURPLE	Ch8 or Rainlight

Transmitter wiring key

2. *Nut Covers (if supplied)*

*Fit the nut covers to the rear of the switches. It is deliberately a tight, push fit. The covers can be secured in place with a little hot melt glue **once all testing is complete**.*

3. *Attach the Transmitter to the Steering Wheel*

The Transmitter can be easily attached to the reverse of the wheel or button plate using hook-and-loop pads or servo tape.

TRANSMITTER BATTERY & TESTING INSTRUCTIONS

1. *Battery Fitting and Removal*

Fit the CR2 battery to the transmitter battery housing, noting that the '+' end of the battery is nearest to the LED. As the battery is deliberately tightly fitted in the holder, exercise care when removing.

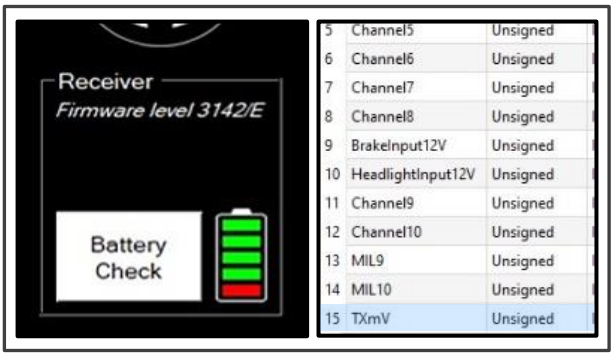
2. *IMPORTANT - Transmitter Testing*

Follow the Receiver Configuration Software instructions to connect the Receiver to your Windows PC or laptop and to verify that your button presses for each channel are being sent by the Transmitter.

3. *Battery Voltage*

With the Receiver connected to your Windows PC or laptop and communication with the Transmitter established, approximate battery strength can be checked using the Receiver Configuration Software.

Optionally, a more precise voltage can be obtained from the CAN signal in message TXmV, within the All_Compact_U8 frame in Byte 6 (scaling x10, offset 1000mV). The default is 3000mV until active communication starts. A suitable alarm value is 2700mV.



RECEIVER CONFIGURATION SOFTWARE

INSTALLATION AND USAGE INSTRUCTIONS

NOTE: DO NOT disconnect the USB power during programming or the chip memory may corrupt!

1. *Software Installation*

Connect the Receiver USB cable to the Windows PC. Windows 7, 8 and 10 are supported. Windows will auto-detect and install the FTDI Driver.

In the event the PC does not self-install the FTDI driver, download and install FTDI's VCP Virtual COM Port driver from: http://www.ftdichip.com/Drivers/VCP.htm

2. *Identify the correct COM port used by FREEWheel*

Open Windows Device Manager **[Start .. Run ..** *or* **Search ..** *and enter* **'Device Manager']**. *The port will disappear and reappear as you remove and insert the Receiver USB lead.*

Download, extract to Desktop and run the FREEWheel.exe program from the Downloads page at: https://www.blinkstop.co.uk/shop/downloads

3. *Using the Software*

Choose the correct COM port from the available drop list and click 'Connect'. The existing channel configuration and virtual relay states will be displayed (physical relays are not powered by USB).

Pressing steering wheel buttons connected to the Transmitter will illuminate the corresponding buttons and toggle or flash the virtual relay states on the software.

CHANNEL MAPPING CONFIGURATION (WHERE AVAILABLE)

4. *Select the Input Sources tab to map the channels*

Follow the on-screen instructions to assign channels to individual buttons.

CHANNEL BEHAVIOUR CONFIGURATION

5. *Select the Control Functions tab to set the channel behaviours*

Select the desired smart functions by checking the tick boxes and adjusting the duration sliders. Unchecking the tick boxes will allow a free choice of momentary or latching behaviour. Details of individual features can be found towards the end of these instructions.

Once done, click 'Program'. When successful, you will see 'Success' displayed.

To disconnect the Receiver from the USB software, press 'Disconnect' then 'Close'. Now you can safely disconnect the USB cable.

Proceed to Relay Receiver Installation.

RELAY RECEIVER INSTALLATION

SPECIFICATION

4-CHANNEL RECEIVER:

- *Weight with/without 0.7m loom: 300g/135g.*
- *Wiring loom uses 14-pin sealed, genuine TE connector and 18AWG heat resistant, high temperature, thin wall wires with tinned copper.*

8-CHANNEL RECEIVER:

- *Weight with/without 0.7m loom: 385g/220g.*
- *Wiring loom uses 23-pin sealed, genuine TE connector and 18AWG heat resistant, high temperature, thin wall wires with tinned copper.*

ALL SYSTEMS:

Internal relays are rated for maximum switching current 15A at 12VDC and support low- or high-side switching.

Relays are open circuit by default at ignition ON and are switched by the Transmitter.

Channels are configured using the FREEWheel USB *software and have behaviour options of:*

- *ALL: momentary [ON] (Transmitter button follower)*
- *ALL: latching [ON] / OFF with each separate Transmitter button press*
- *Channels 1 & 2: indicator control*
- *Channel 3: high and low beam function with Flash-to-Pass feature*
- *Channel 4: IVA fog function*
- *Channels 5, 6: inverted momentary function (8-Channel Receiver only)*
- *Channel 5: single button hazard function*
- *Channel 6: intermittent wiper function*
- *Channel 7: flash function*
- *Channel 8: rainlight race function (8-Channel Receiver only)*

4-Channel Receiver

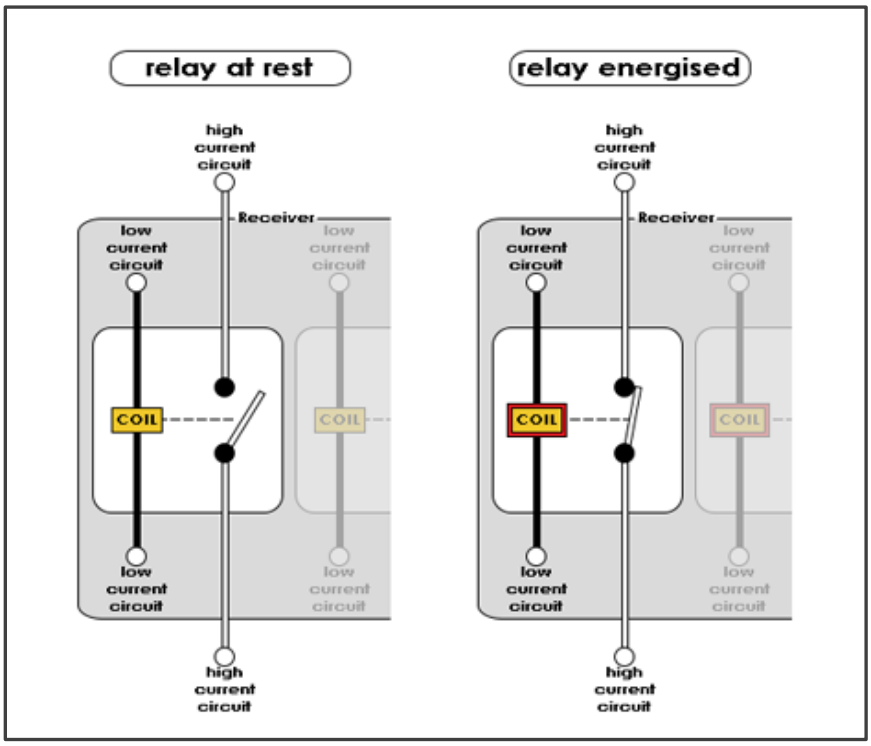
8-Channel Receiver

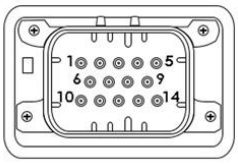
RELAY RECEIVER INSTALLATION INSTRUCTIONS

Inside the FREEWheel Receiver are the relays and 'low current circuits' that control the relay coils. The white pair from the receiver for each channel is the 'high current circuit' pair shown.

The white pair can be used to switch up to 15A and can be wired in parallel with the existing dashboard switches, or the switches can be removed, if preferred.

*In **ALL** cases, additional relays **MUST** be used for current loads above 15A (not supplied).*

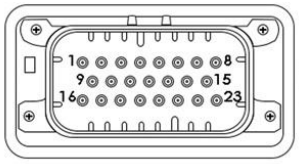




14-PIN AMPSEAL CONNECTOR PIN-OUT DIAGRAM

PIN	COLOUR	FUNCTION / CHANNEL
1	WHITE	CH1 OR LEFT INDICATOR RELAY PAIR
2	WHITE	CH1 OR LEFT INDICATOR RELAY PAIR
3	WHITE	CH2 OR RIGHT INDICATOR RELAY PAIR
4	WHITE	CH2 OR RIGHT INDICATOR RELAY PAIR
5	-	-
6	WHITE	CH4 OR FOG RELAY PAIR
7	RED	12V IGNITION POWER
8	BLACK	VEHICLE GROUND
9	GREEN	BRAKE LIGHT 12V SENSE
10	WHITE	CH4 OR FOG RELAY PAIR
11	BLUE & BROWN	CH3 (NC) OR HEADLIGHT SWITCHED SUPPLY
12	WHITE & BROWN	CH3 (NO) OR HEADLIGHT FUSED SUPPLY
13	BLUE & RED	CH3 (NC) OR LOW (DIPPED) BEAM
14	WHITE & BLUE	CH3 (NO) OR HIGH(MAIN) BEAM

4-Channel Relay Receiver wiring key



23-PIN AMPSEAL CONNECTOR PIN-OUT DIAGRAM

PIN	COLOUR	FUNCTION / CHANNEL
1	WHITE	CH1 OR LEFT INDICATOR RELAY PAIR
2	WHITE	CH1 OR LEFT INDICATOR RELAY PAIR
3	WHITE	CH2 OR RIGHT INDICATOR RELAY PAIR
4	WHITE	CH2 OR RIGHT INDICATOR RELAY PAIR
5	BLUE & BROWN	CH3 (NC) OR HEADLIGHT SWITCHED SUPPLY
6	WHITE & BROWN	CH3 (NO) OR HEADLIGHT FUSED SUPPLY
7	BLUE & RED	CH3 (NC) OR LOW (DIPPED) BEAM
8	WHITE & BLUE	CH3 (NO) OR HIGH(MAIN) BEAM
9	WHITE	CH8 OR RAINLIGHT RELAY PAIR
10	RED	12V IGNITION POWER
11	BLACK	VEHICLE GROUND
12	GREEN	BRAKE LIGHT 12V SENSE
13	WHITE	CAN LOW (OPTIONAL)
14	WHITE	CAN HIGH (OPTIONAL)
15	WHITE	CH4 OR FOG RELAY PAIR
16	WHITE	CH8 OR RAINLIGHT RELAY PAIR
17	WHITE	CH7 RELAY PAIR
18	WHITE	CH7 RELAY PAIR
19	WHITE	CH6 RELAY PAIR
20	WHITE	CH6 RELAY PAIR
21	WHITE	CH5 RELAY PAIR
22	WHITE	CH5 RELAY PAIR
23	WHITE	CH4 OR FOG RELAY PAIR

8-Channel Relay Receiver wiring key

1. *Wiring*

Identify an ignition-switched circuit that can be used for the power supply to FREEWheel. The FREEWheel Receiver draws little current (<500mA typically), so will not increase the circuit load significantly.

Identify a suitable Ground connection, ideally direct to the vehicle chassis. Identify the existing circuits and schematics. These will be critical to successful installation.

See Figure 1 through Figure for suggested indicator and main beam wiring diagrams. Some vehicles as standard do not provide high beam flashing unless headlamps are ON (e.g., Westfields), so use the elements of the diagrams applicable to your vehicle.

Choose a cool location for the Receiver inside the car, with minimal (metal) obstructions between Receiver and Transmitter. Behind the dashboard is normally an ideal place.

***With the vehicle battery disconnected**, connect Receiver Power and Ground to the previously identified wires.*

2. *Receiver Testing*

Re-connect the vehicle battery and check the relays can be heard to click when the steering wheel Transmitter buttons are pressed.

Check that the Transmitter light is reliably GREEN on button presses. ORANGE means that there is a probable obstruction to two-way communication. You can test the range of the system using this light for indication.

Once you have reliable communication between Transmitter and Receiver, connect the Windows PC to the USB connector and use the FREEWheel software to configure the channels, if you have not already done so (see Receiver Configuration Software). The software will show the live state of the relays and button presses and the Transmitter battery voltage status.

*Now **disconnect the vehicle battery** and complete the installation of the desired integrated functions.*

INTEGRATED BlinkSTOP FUNCTION

CHANNELS 1 AND 2 SET TO [INDICATORS]

INSTRUCTIONS FOR OPERATION

An indicator can be toggled ON and OFF with each press of a button. Flash rate can be controlled by FREEWheel to 60, 75, 90, 105 or 120 flashes per minute or by your flasher relay (user-configurable).

Toggling to ON begins a cancel timer. Indicating will auto-cancel once the timer has elapsed (6 to 30 seconds, user-configurable). Indicator auto-cancelling is inhibited while the brakes are pressed, and afterwards for a short time so that the indicators can remain ON in traffic or while waiting to turn.

To change indicator, push the opposite button once. The current indicator will cancel, and the opposite indicator will toggle to ON and begin flashing. The cancelling timer will reset.

To use the Hazard function, push both buttons together at the same time. To cancel, press either button.

For a suggested wiring plan, see Figure 1(4-channel) and Figure 2 (8-channel) on the following pages.

INTEGRATED BeamSTOP HEADLIGHT FUNCTION

CHANNEL 3 SET TO [MAIN]

INSTRUCTIONS FOR OPERATION

BeamSTOP allows full control of headlight main (high) beam and dipped (low) beam.

IF the headlights are OFF, the main beam will light for the duration of the button press. If the headlights are ON, BeamSTOP allows each button press to alternate between latched-dipped and latched-main beam.

If Flash-to-Pass is enabled, a half-second press will trigger 5 seconds of rapid flashing of the main beam.

For a suggested wiring plan, see Figure 3 (4-channel) and Figure 4 (8-channel) on the following pages.

INTEGRATED FOG LIGHT 'IVA' FUNCTION

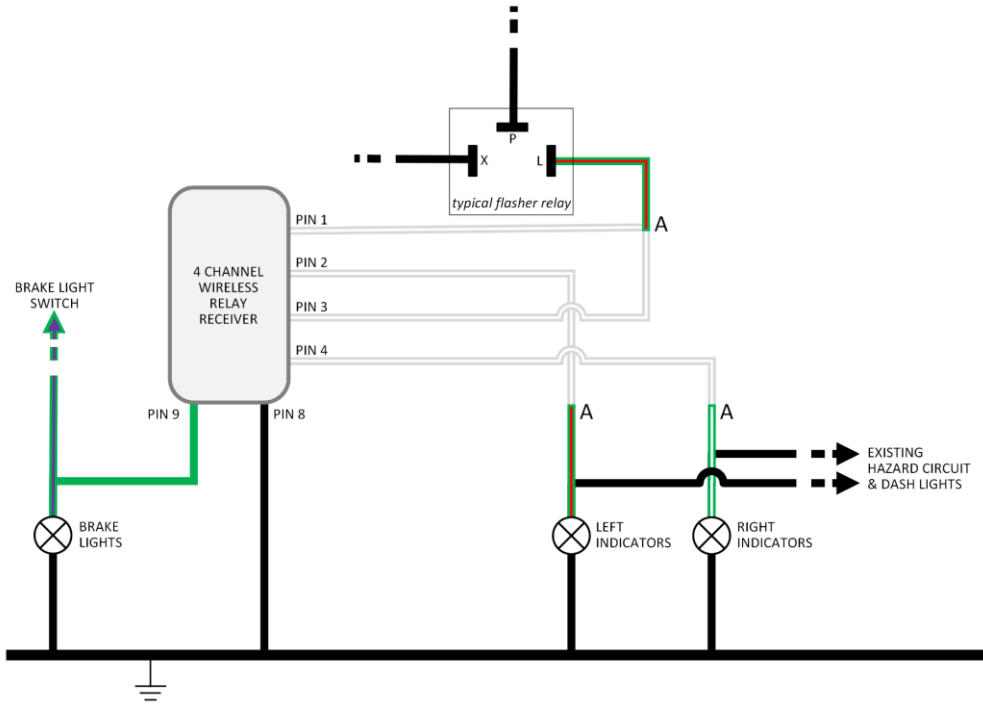
CHANNEL 4 SET TO [FOG]

INSTRUCTIONS FOR OPERATION

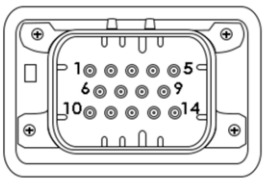
Channel 4 can be used as an auto-cancelling fog light channel. When suitably connected and the headlights are OFF, the fog light will automatically cancel and is inhibited from operation by button press.

WIRING: Connect the blue/brown wire to the headlight switch, as shown in Figure 3 (4-channel, pin 11) and Figure 4 (8-channel, pin 5).

FIGURE 1 // 4-CHANNEL RELAY SYSTEMS – SUGGESTED INDICATOR WIRING PLAN



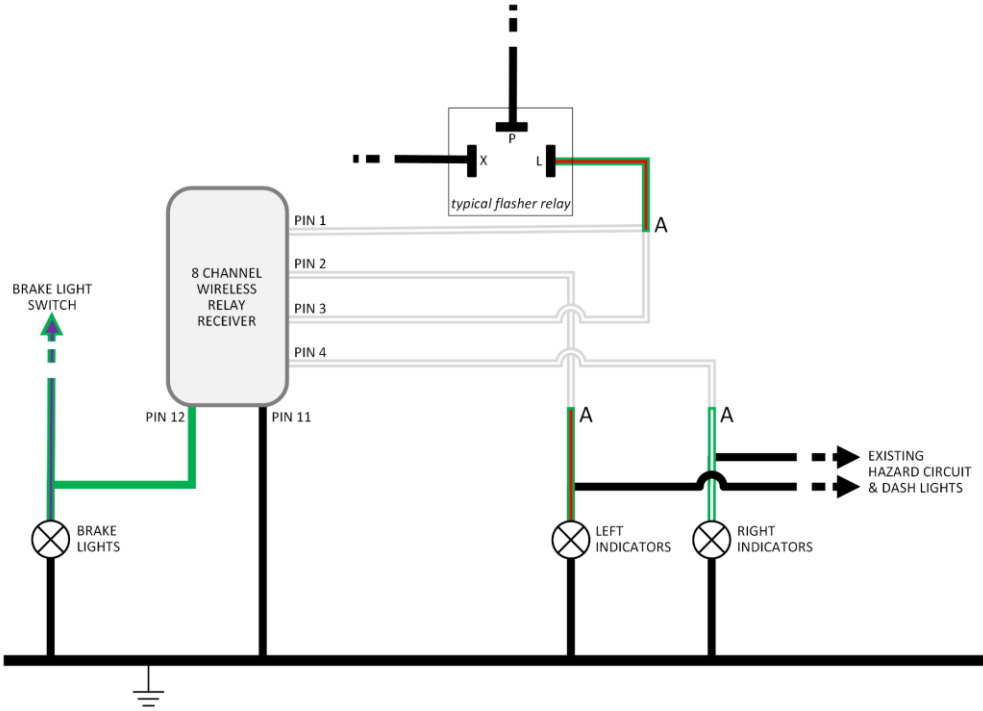
14-PIN LAYOUT (MALE)



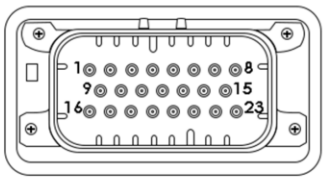
NOTES

- 4 channel relay receiver only
- numbers shown are connector pins
- wires marked A previously connected to dash switch
- if flasher relay is not fitted, connect pin 1 and pin 3 wires to a fused 12V supply and enable Flash option using the USB configuration tool

FIGURE 2 // 8-CHANNEL RELAY SYSTEMS – SUGGESTED INDICATOR WIRING PLAN



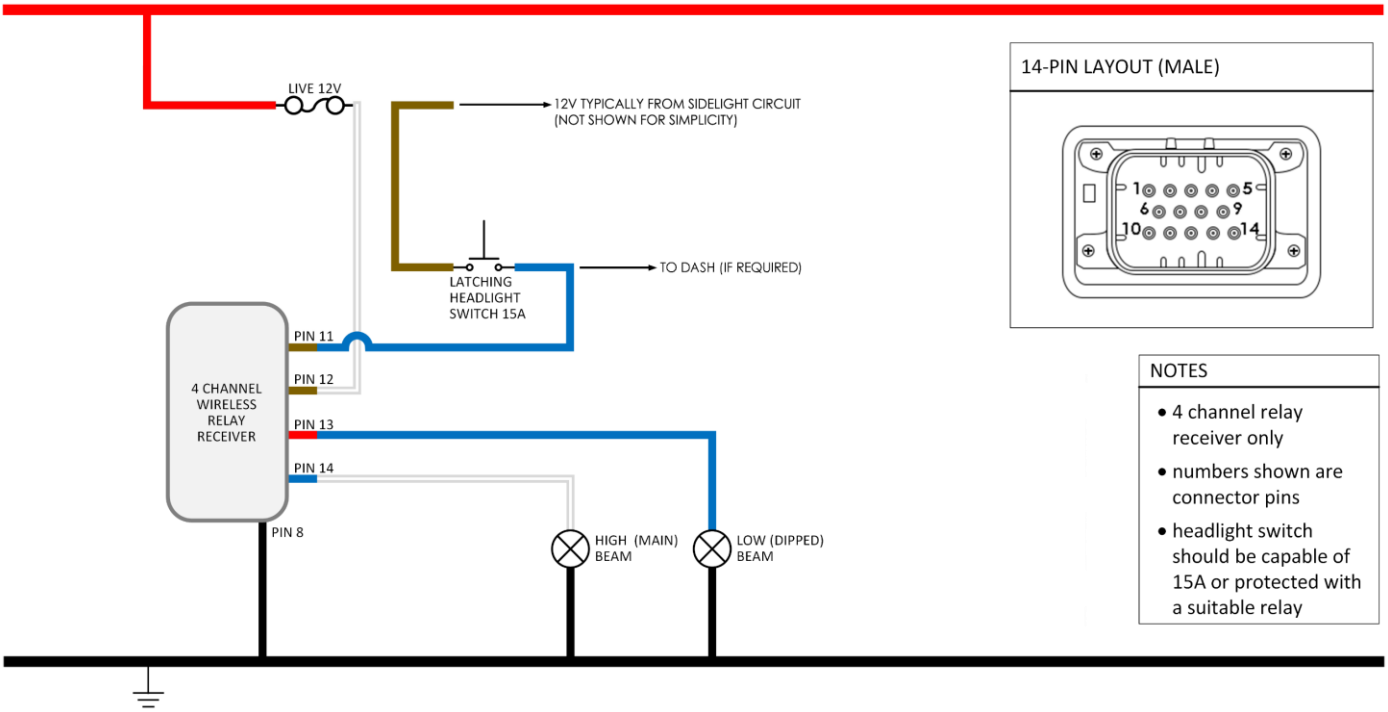
23-PIN LAYOUT (MALE)



NOTES

- 8 channel relay receiver only
- numbers shown are connector pins
- wires marked A previously connected to dash switch
- if flasher relay is not fitted, connect pin 1 and pin 3 wires to a fused 12V supply and enable Flash option using the USB configuration tool

FIGURE 3 // 4-CHANNEL RELAY SYSTEMS – SUGGESTED MAIN BEAM WIRING PLAN

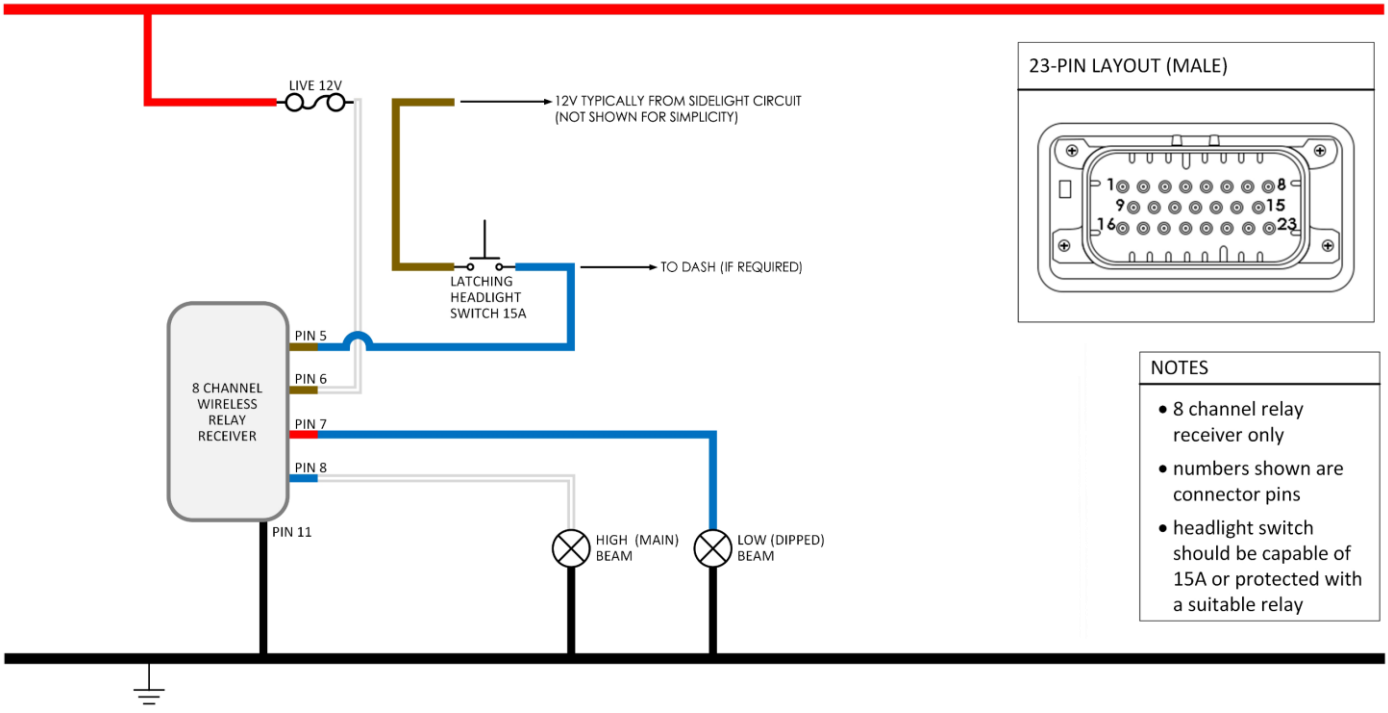


14-PIN LAYOUT (MALE)

NOTES

- 4 channel relay receiver only
- numbers shown are connector pins
- headlight switch should be capable of 15A or protected with a suitable relay

FIGURE 4 // 8-CHANNEL RELAY SYSTEMS – SUGGESTED MAIN BEAM WIRING PLAN



23-PIN LAYOUT (MALE)

NOTES

- 8 channel relay receiver only
- numbers shown are connector pins
- headlight switch should be capable of 15A or protected with a suitable relay

HAZARD FUNCTION

CHANNEL 5 SET TO [HAZARD]

INSTRUCTIONS FOR OPERATION

Channel 5 can be used as a single button hazard channel and requires channels 1 and 2 to be configured for the BlinkSTOP indicator function. A single button press will cause the indicator outputs to be live; flash rate can be controlled by FREEWheel to 60, 75, 90, 105 or 120 flashes per minute, or by your flasher relay.

NOTE: To comply with UK MOT/IVA requirements, hazard lights should be operable by a single lit button when the ignition is off, therefore this feature is recommended for off-road use.

WIPER FUNCTION

CHANNEL 6 SET TO [WIPER]

INSTRUCTIONS FOR OPERATION

A short press will toggle between [OFF] and latched [ON]. A one-second press will trigger an intermittent [ON]/[OFF] with the durations configurable to 250ms, 500ms, 1s, 2s, 4s, 7s and 10s. A subsequent one-second press will cancel the intermittent mode and return to the previous state.

WIRING: Connect the Receiver channel wire to the wiper's low speed and park circuit.

INVERTED MOMENTARY FUNCTION

CHANNELS 5 AND / OR 6 SET TO MOMENTARY [INVERTED]

INSTRUCTIONS FOR OPERATION

Channels 5 and 6 can be used as inverted momentary channels, i.e., normally closed. The channel will be open at power up with normally closed behaviour starting once power-on checks are completed (<50ms).

FLASH FUNCTION

CHANNEL 7 SET TO [FLASH]

INSTRUCTIONS FOR OPERATION

A short press will trigger a 1Hz flashing mode. A subsequent press cancels and returns to the previous state.

INTEGRATED RAINLIGHT RACE FUNCTION

CHANNEL 8 SET TO [RAINLIGHT]

INSTRUCTIONS FOR OPERATION

Channel 8 can be used as a racing mode rainlight. A short press of the steering wheel button will latch the rainlight ON and a longer, one-second press will trigger the 'Rain Hazard' 4Hz flashing mode.

A subsequent one-second press will cancel the Rain Hazard mode and return to the previous state.

WIRING: Connect the Receiver channel wire to the rainlight's power circuit.

RELAY

GUARANTEE

All our products come with a two-year guarantee, except our batteries which have a five-year guarantee.

RETURNS & EXCHANGES

You can return many of our products within 14 days from delivery, however customised goods and bespoke hardware, firmware and software cannot be returned or exchanged.

GOT A PROBLEM OR CHANGED YOUR MIND?

In all cases, we will be reasonable and responsive and will endeavour to give an excellent service. Please see blinkstop.co.uk/shop for further details.

BlinkSTOP.co.uk

Contact:

info@blinkstop.co.uk

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