



Instruction manual of the CAN-Switchbox from serial number (S/N) #600

(OrderCode#4010)

(Keyless-Version)

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Thank you for choosing a quality product made in Germany by TLT-Moto. This product has been and will be constantly tested and developed by engineers and technicians who ride motorcycles themselves.

Please read the instructions and observe them when mounting and connecting the CAN-Switchbox.

1. function of the CAN-Switchbox

The CAN-Switchbox is able to simulate and replace the original handlebar controls as well as the speedometer on the current Sportster®, Dyna® and Softail® models with HD-LAN.

This way you are able to use the push button fittings, tachometers or foreign speedometers offered by different manufacturers. It is important that all functions of the original Harley® version are maintained with our CAN-Switchbox. With most custom conversions one tries to achieve a CLEAN condition. Here the compact design of the box with only 70x50x20mm is very helpful. It can actually be installed at any point in the motorcycle, preferably in the frame triangle behind the steering head bearing. This would have the advantage of being directly at the original connection point of the fittings. The connector can thus be used directly, preferably from the right side.

2. connection

The connection of our box is not witchcraft, but should be done by a professional for warranty reasons alone. All buttons or switches which are installed need to be connected simply against ground (GND) to the CAN-Switchbox on the appropriate slot. The outputs of the CAN-Switchbox switch +12 volts. The outputs for indicator LEDs [R7 - R12] switch ground (GND). Which you can see in the circuit diagram and the pin assignment.

As power supply for the high-power outputs (supply line [M10]) +12 volts from the ignition should be used.

For correct function a good connection to vehicle ground is very important, therefore at least one of the two hexagonal threaded bolts should be firmly connected to ground.

2.1 Pin assignment

The exact pin assignment of the CAN-Switchbox is described in more detail in the following table. The pin assignment is shown in Figure 2.1 and in the following table.

Connector strip left (input)			
	Pin number	Function	Connection
Button input	L1 - GND	Ground (GND)	
	L2 - Turn Left	Turn signal left on / off	Push Button Turn Left
	L3 - Turn Right	Turn signal right on / off	Push Button Turn Right
	L4 - Start	Engine start	Button Start
	L5 - Kill/RUN	Ignition on/off (start/stop)	Kill/RUN button
	L6 - Clutch	Coupling	Clutch switch
	L7 - Break	Brake	Pushbutton brake lever
	L8 - High Beam	High beam on / off	High beam button
	L9 - Horn	Horn	Pushbutton horn
	L10 - Trip	Trip	Pushbutton Trip
	L11 - Flash	Headlight flasher	Button flasher
	L12 - EMC	Hazard warning lights	Button warning flasher

Connector strip right (low power output)			
	Pin number	Function	Connection
	R1 - GND	Ground (GND)	[22B-1] 2 Black Ground
	R2 - +12V	+12 Volt Plus Battery	[22B-1] 1 Red +12V
	R3 - CAN L	CAN_Low	[22B-1] 4 green CAN Low
	R4 - CAN H	CAN_High	[22B-1] 3 yellow CAN High
	R5 - Speed Out	Speedometer Speed to output	output ext. speedometer Speed
	R6 - RPM Out	Speedometer RPM to output	output ext. tachometer RPM
LED outputs	R7 - Turn Left LED	Turn left LED to ground	Only for LED (switched GND)
	R8 - Turn Right LED	Turn right LED to ground	Only for LED (switched GND)
	R9 - ABS LED	ABS LED to ground	Only for LED (switched GND)
	R10 - Neutral LED	Neutral LED to ground	Only for LED (switched GND)
	R11 - OIL LED	Oil pressure LED to ground	Only for LED (switched GND)
	R12 - HIGH BEAM LED	High beam LED to ground	Only for LED (switched GND)

Middle terminal block (high power output)			
	Pin number	Function	Connection
Power outputs	M1 - GND	Ground (GND)	Here the mass can
	M2 - Turn Left Power	+12V Power Output 36Watt	Output turn signal right
	M3 - Turn Right Power	+12V Power Output 36Watt	Output turn signal right
	M4 - ABS Power-Output	+12V Power Output 36Watt	Output ABS indicator light
	M5 - Neutral Power	+12V Power Output 36Watt	Output Neutral indicator light
	M6 - Oil Power-Output	+12V Power Output 36Watt	Output high beam control light
	M7 - High Beam Power	+12V Power Output 36Watt	Output oil indicator light
	M8 - reserved		
	M9 - reserved		
	M10 - +12 Volt Power	+12V input for M2 - M9	Please connect with ignition
	M11 - Trip SwitchOut		Original Trip switch Output
	M12 - RUN	RUN	[22B-2] Energy Stop

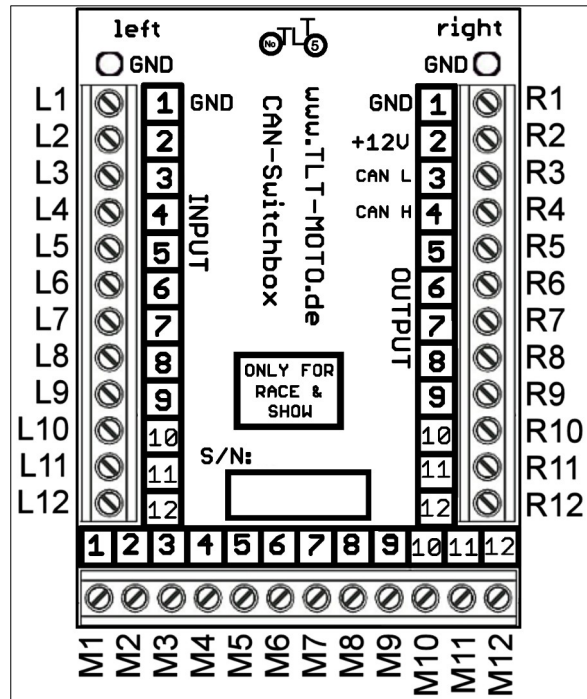


Figure 2.1 Pin assignment

2.2 Connection of the CAN-Switchbox

The CAN-Switchbox is connected to the motorcycle with the contacts **[M12]** (RUN), **[R1]** (GND), **[R2]** (+12V), **[R3]** (CAN-Low) and **[R4]** (CAN-High). These signals are located on the connectors for the original handlebar fittings. A corresponding set of connectors is available from TLT-Moto (see Figure 3.1). If the motorcycle is not operated, the CAN-Switchbox switches itself off (the Power LED goes out). The CAN-Switchbox switches itself on when needed.

2.3 Connecting the pushbuttons

As already mentioned, the buttons are connected to the corresponding input of the CAN-Switchbox. One pole of the button is connected to the input of the box and the other pole to the ground (GND) of the vehicle. You do not have to pay attention to the polarity of the button.

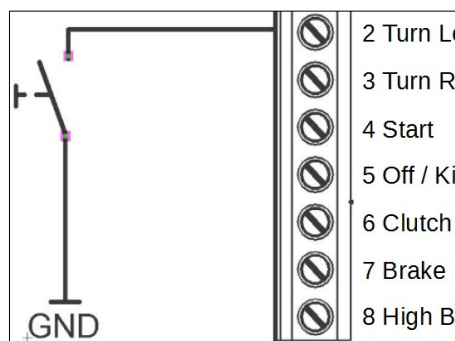


Figure 2.3 Connecting the pushbuttons

2.4 Connecting the LED indicator lights

The CAN-Switchbox switches ground (GND) for the LED control lamps. These are the outputs [R7] to [R12]. See also chapter 2.6.

Thus the + pole (anode) of the control LEDs must be connected to +12 volts and the cathode to the corresponding output of the CAN-Switchbox. The CAN-Switchbox switches on the GND-signal. With 12 volt LEDs no series resistor is necessary. Otherwise a series resistor is needed, see figure 2.4. Please make sure that all outputs [R5 - R12] are not loaded with more than 100 mA.

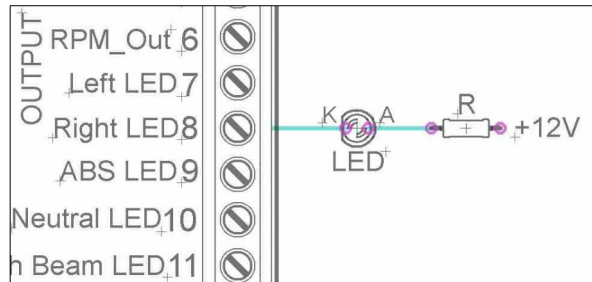


Figure 2.4 Connection of the LED indicator lights

2.5 Connecting the indicators

The + pole of the turn signals is connected to the corresponding output [M2 + M3] of the CAN-Switchbox. The other pole must be connected to ground (GND) of the vehicle. The connection of 12 Volt LED turn signals is possible without load resistor. Note that these outputs are supplied by a common lead [M10]. This should be connected +12Volt from the ignition.

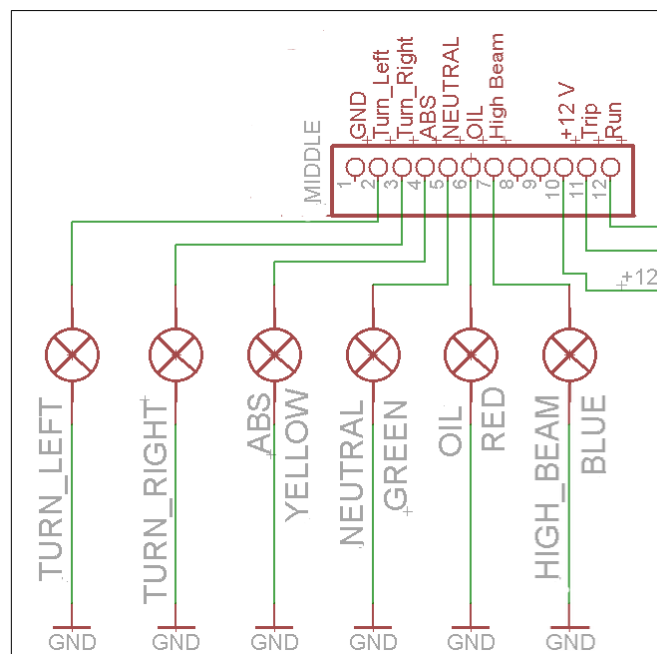


Figure 2.5 Connecting the turn signals and indicator lights

free page

free page

2.6 Connection of a new speedometer or tachometer e.g. from motogadget®.

The CAN-Switchbox provides a pulse signal for the external tachometer [R5] and also a pulse signal for a tachometer [R6]. Thus, no pulse generators have to be installed. The CAN-Switchbox provides a pulsed ground (GND). This signal corresponds to that of most tachometers in the accessories (e.g. motoscope® or Chromclassic® from motogadget®). In some cases, the supplied pull-up resistors must be connected to the operating voltage and the SpeedOut or RPMOut outputs (see Figure 2.6), so that the tachometer interprets the signal correctly.

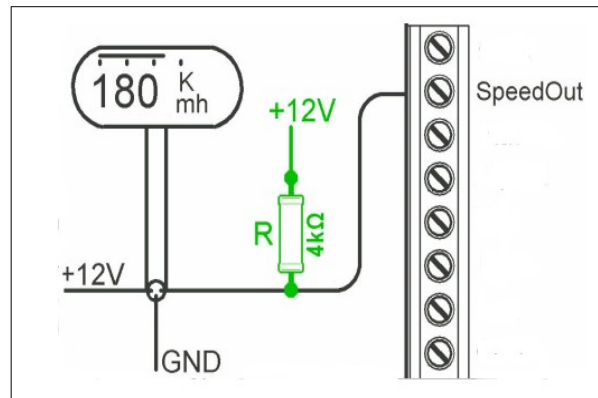


Figure 2.6 Connection without resistor or with an approx. 4,7 kΩ pull-up

If the menu button of the new tachometer should not be operated by an additional button, the trip input of the tachometer (e.g. mg-scope-mini the green line) can be connected to [M11] of the CAN-Switchbox.

There is no problem to connect the 6-fold LED bar from Thunderbike or the motosign-mini.

For example:

Thunderbike 6x LED-Leiste		
color	function	CAN-Switchbox
white	turn left	R7
gray/pink	turn right	R8
black	abs	R9
gray	neutral	R10
blue	oil	R11
green	high beam	R12

connect brown, yellow, pink, red, violett, red/blue to switched +12V

motosign mini (5x LED-Leiste)		
color	function	CAN-Switchbox
red	turn left or right	M2 + M3 via two diodes
blue	abs	M4
white	neutral	M5
brown	oil	M6
green	high beam	M7

connect orange, yellow, black and violett to [M1] or ground
connect switched +12V to [M10]

2.7 CAN-Switchbox for replacing the original speedometer

If only the original speedometer unit should be replaced, for example the CAN-Switchbox can be connected in its place as shown in Figure 2.7.





CAN-Switchbox		Speedometer [39B]	
Ground (GND) Battery Fuse, but better use switch +12V	R1	 BK/GN	7 Ground (GND)
	R2	 R/O	5 +12V, Battery Fuse
CAN Low	R3	 W/BK	8 CAN Low
CAN High	R4	 W/R	2 CAN High

Figure 2.7 Excerpt from the flow chart of a Dyna® Model 2012

The original speedometer, which is no longer present, is automatically detected by the CAN-Switchbox furthermore our box starts to simulate the speedometer. It sends all necessary signals to the on-board electronics and the BCM does not detect any difference to the original version. So there are no error messages and the motorcycle can be operated with a foreign speedo. Figure 2.7 shows the connector [39B] of the original speedometer and which wires have to be connected where.

2.8 Special functions and key combinations

When converting the original handlebar fittings, the number of controls/buttons are usually reduced. Therefore, some buttons have additional functions so that you can even reproduce all original functions with a total of 6 buttons.

Thus, the following is possible:

Instrument panel-left 3 buttons: turn left, high beam, horn
Instrument panel-right 3 buttons: turn right, KILL/RUN (+Start), trip

Here is a list of the implemented additional functions:

Transport mode: press both turn-signals-buttons simultaneously

Emergency lights: with handbrake held, press both turn-buttons simultaneously

KILL/RUN button: by briefly pressing the KILL/RUN button you switch between KILL and RUN mode. In RUN mode, the ignition is switched on and the low beam is switched on lights up and the fuel pump works. In KILL mode, the output LED on the CAN switch box flashes very quickly (approx. 4Hz). The motorcycle switches off the ignition and everything turns off completely after a while. If the engine has been running before, it will stop

Start engine with Kill/RUN: long press the KILL/RUN button (approx. 2-3 sec.) simulates pressing the start button and the engine starts.

Trip/Menu button simulation: If the speedometer has been replaced, the so-called Menu button of the new speedometer can be operated via the CAN-Switchbox. For example just connect the green line of the mg-scope-mini to the [M11] of the CAN-Switchbox. By pressing the trip, the menu button is pressed if you have an original handlebar fitting.

Attention, this only works with menu buttons after Switch ground.

2.9 What do the LEDs of the CAN-Switchbox mean?

The three LEDs on the board facilitate the connection of the CAN-Switchbox. The POWER LED is located in the upper part of the board, it lights up as soon as the circuit is connected to 12 volts (Figure 2.9).

On the left side of the top of the CAN-Switchbox there is the input LED. It lights up as soon as one of the numerous inputs is connected to ground, but only if the box is connected to the BCM. This means that the Input-LED does not light up although for example the Trip-Input is connected to ground, but the CAN is not or wrongly connected.

On the right side there is the output LED, which is only on / off alternately in time with the original turn signal lights. When the turn signal is on, the output LED flashes very fast and the CAN-Switchbox is in kill/stop mode.

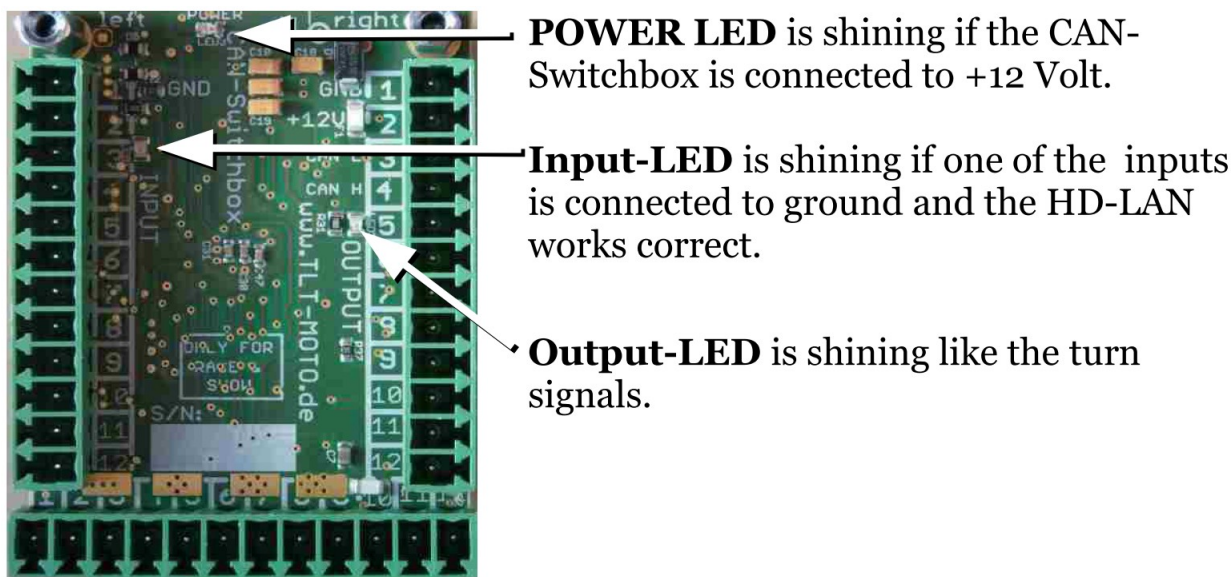


Figure 2.9 The LEDs on the CAN-Switchbox

3 optional accessories

To facilitate the connection to the existing motorcycle electronics we offer a cable connection kit. These kits are optional and must be ordered separately. The following pictures show the two available cable connection kits for direct connection to the original, existing HD connectors.

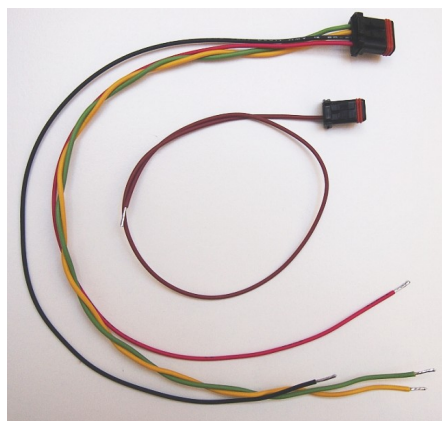


Figure 3.1 Handlebar cable kit [22B]
(Order code #3001)

TLT-Cable-Kit	
R1	blue (ground)
R2	red (+12V)
R3	green (can-L)
R4	yellow (can-H)

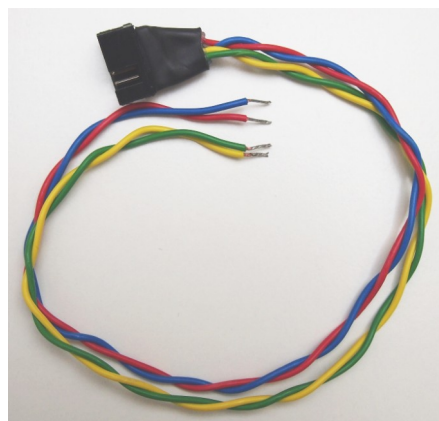


Figure 3.2 Speedometer cable kit [39B]
(Order code #3002)

4 Technical data

Length / Width / Depth: 70 mm / 50 mm / 20 mm

Weight: approx. 35 g

Mounting holes: 2 x M3 10 mm deep

Current consumption: approx. 28 mA (logic), standby approx. 9 μ A

Operating voltage: 7 - 18V

Operating temperature: -20° + 80°C

5 Disclaimer

THE CAN SWITCHBOX SHOULD NEVER BE OPENED OR CHANGED, IN THIS EVENT WILL VOID ANY WARRANTY. TLT-MOTO SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY KIND ARISING OUT OF THE USE, INSTALLATION OR CONNECTION OF CAN-SWITCHBOX OR DELIVERED EQUIPMENT. INCLUDING, BUT ALL DAMAGE TO PERSONS AND PROPERTY DAMAGE OF. THE USE IN THE FIELD OF PUBLIC TRAFFIC IS AT YOUR OWN RISK.

Last but not least

If you have a motorcycle equipped with the CAN-Switchbox, we are looking forward to a photo of your machine to publish it in our gallery

Please email photos to mail@tlt-moto.de.

www.tlt-moto.de



rev. 4.9

Connect:

	function	color
L1	ground	_____
L2	turn left-switch	_____
L3	turn right-switch	_____
L4	start-switch	_____
L5	kill/run-switch	_____
L6	clutch-switch	_____
L7	break-switch	_____
L8	highbeam-switch	_____
L9	horn-switch	_____
L10	trip-switch	_____
L11	flashlight-switch	_____
L12	emergency-switch	_____

	function	color
R1	ground	_____
R2	+12 Volt	_____
R3	hd-can low	_____
R4	hd-can high	_____
R5	speed-out	_____
R6	rpm-out	_____
R7	turn left led	_____
R8	turn right led	_____
R9	abs led	_____
R10	neutral led	_____
R11	oil led	_____
R12	highbeam led	_____

	function	color
M1	ground	_____
M2	turn left power out	_____
M3	turn right power out	_____
M4	abs power output	_____
M5	power output	_____
M6	power output	_____
M7	power output	_____
M8	reserved	_____
M9	reserved	_____
M10	+12Volt power input	_____
M11	trip switch output	_____
M12	RUN-control	_____