

# CTS8/CTS7/CTS5TW Firmware

## General

The firmware update program overwrites the firmware of the CTS electronic boxes *CTS8*, *CTS7G*, *CTS7F*, *CTS7*, and *CTS5TW*, and requires Windows 8/7/Vista/XP/2000/NT4/Me/98/95.

Alternatively, the update program may also be called with the name of a configuration file as argument (e.g. the name of the configuration file can be clicked with the mouse, and dragged/dropped onto the name of the update program).

## Linux

In some circumstances, the firmware update program can be started under Linux (with Wine):

```
sudo adduser username dialout
```

Log out and log in again, then:

```
ln -sf /dev/ttyUSB0 ~/.wine/dosdevices/com1
wine cts.exe
```

## CTS Firmware

### CTS V7.0.21

- Timing improved (minimal engine speed).

### CTS V7.0.20

- If an ignition cut-off was prevented due to too low engine speed then the force sensor must be released before continuing with an ignition cut-off.

### CTS V7.0.19

- Timing improved.

### CTS V7.0.18

- Improved behavior for worn-out pawls.

### CTS V7.0.17

- Timing for pawl-on-pawl position improved.
- The possibly available sensor element "pawls are partially in contact" is now entirely ignored. (That means that in the case of adjusting the position sensor, the slow blinking of the end stop position follows directly after the fast blinking.)

### CTS V7.0.16

- Timing for pawl-on-pawl position improved.

### CTS V7.0.15

- Support for a rev bar display (= additional mode for the flash lamp with multiple levels of brightness; see *RbdBegin*, *RbdEnd*). The default value of *GsfOff* and *RlfOff* was changed from 98 % to 95 %. Timing for pawl-on-pawl position improved.

### CTS V7.0.14

- Additional values for *MaxBreakDuration*.

### CTS V7.0.13

- Max. allowed duration for restart slightly prolonged.

### CTS V7.0.12

- Additional restart modes (→ *RestartMode* = 3, *RestartMode* = 4)

### CTS V7.0.11

- The timing has been slightly improved for non-zero engine speed settings (→ *IgnitionCount*, *IgnitionCycleSize*), otherwise the timing from firmware V7.0.7 is used.

### CTS V7.0.9

- The timing has been slightly improved.

### CTS V7.0.8

- The timing has been slightly improved.

### CTS V7.0.7

- The CTS is optionally only activated at a minimum engine speed (→ *MinEngineSpeed*).

### CTS V7.0.6

- Sensor activity is displayed, as long as there is no engine speed signal, even if GSF and RLF are deactivated.
- The flash frequency of the LED and of the flash lamp are adjusted. (Pawl-on-pawl position: flash frequency is reduced by half. End stop position: Slow blinking – 0.4 seconds turn-on time and 0.1 seconds turn-off time.)

### CTS V7.0.5

- Support for rev limiter flash

### CTS V7.0.4

- Sensor activity is displayed as long as there is no engine speed signal. (Force sensor: single flash; pawl-on-pawl position: flash series; end stop position: continuous light)

### CTS V7.0.3

- Support for longer max. break durations (especially for Supermoto)

### CTS V7.0.2

- Support for GSF (= gear shift flash) mode (the flash lamp needs then to be connected to the 3 pin programming socket)

## Serial Programming Cable

The serial programming cable *RS232/B719S3* has a 3 pin plug of type *Binder Series 719* (see also <http://tellert.de/?product=b719>) and is assigned as follows:

Pin	Description	9 pin D-sub socket (PC)
1	TX	Pin 2
2	Ground	Pin 5
3	RX	Pin 3

## USB Programming Cable

The USB programming cable *USBSE/B719S3* provides the PC with a virtual serial port, and requires online access to the Windows update server in order to install the device driver (but only for the first time when the cable is connected to the PC). Alternatively, the device driver for *FT232R USB UART* can also be installed manually (see <http://tellert.de/?product=usbser>).

## Hardware Notes

The **CTS electronic box should be turned off** while

- the **PC is (re)started**
- the **port is (re)connected to the PC**
- the **gear shift flash lamp is attached to the CTS electronic box**

While the PC is (re)started, or the serial port is (re)connected to the PC, a false detection of a "Microsoft Serial BallPoint" mouse device may occur if the CTS electronic box is already turned on. A symptom is a randomly moving mouse pointer (because the incoming data is wrongly interpreted as mouse movement).

The CTS electronic box tests on turning on, whether there is a gear shift flash lamp connected to the programming connector, and automatically switches from programming mode to gear shift lamp mode. The short activation of the gear shift flash lamp on turning on is caused by the dual function of the programming/GSF lamp connector.

## Troubleshooting

When the mouse pointer moves randomly on the screen, first the ignition has to be turned off, and then the USB programming cable needs to be detached from the PC, and then again attached to the PC.

When the firmware update program hangs during programming, it is possibly due to the motorbike's power supply which might not be able to properly turn the CTS box on. In this case, first close the firmware update program's window by clicking the upper right *Close* button. Then, disconnect the 6-pin CTS connection. During a further programming attempt, when you are asked to turn the ignition on, it is not enough to turn the ignition on, but it is then also required (after a short period of time) to reconnect the 6-pin plug with the CTS box.

## Configuration File

The configuration file supplements the firmware (starting with firmware version 7.0) with special motorbike-dependent properties, and is composed like an INI file (as described by [http://en.wikipedia.org/wiki/INI\\_file](http://en.wikipedia.org/wiki/INI_file)).

Following entries in section *Settings* are supported:

### Explanation of the entries within the conf. file

**Parameter name (default value):** The **parameter name** specifies the name of an entry within the configuration file. If this entry is missing, and if there is a gray **default value** available, the gray **default value** is used instead.

### General Settings

**Id:** Entry with the value {6CA2B223-69BD-45dc-B27D-3D22763EEC06} which identifies the file as a CTS configuration file.

**Title:** Title with up to 79 characters which is displayed by the firmware update program. If the entry *Title* is missing, the file name of the configuration is used instead.

### General CTS Settings

**Comment:** Comment with up to 73 characters which is stored inside the electronic box together with the other parameters. If the entry *Comment* is missing, the file name of the configuration is used instead.

**CylinderCount:** Defines the symmetry properties of the firing order, and, in case of an asymmetric firing order, it also defines the number of cylinders. Possible values:

- 1: Engine with symmetric firing order
- 2: 2 cylinder engine with uneven firing order
- 3: 3 cylinder engine with uneven firing order
- 4: 4 cylinder engine with uneven firing order

**MaxBreakDuration (0):** Defines the max. break duration. Possible values:

- 0: Standard max. break duration
- 1: Long max. break duration (Supermoto)
- 2: Extra long max. break duration (Supermoto)
- 3: Special setting (longer than MaxBreakDuration=2)
- 4: Special setting (longer than MaxBreakDuration=3)
- 5: Special setting (longer than MaxBreakDuration=4)

**MinEngineSpeed (0):** Minimum engine speed in rpm for activating the CTS mode. Possible values are integers from 500 to 20,000. A non-zero value requires the definition of the engine speed settings ( $\rightarrow$  *IgnitionCount*, *IgnitionCycleSize*). A value of 0 activates the CTS mode permanently.

**RestartMode (3):** Defines the softness of restarting the engine. Possible values:

- 0: Extra hard restart
- 1: Hard restart (e. g. for single cylinder engine)
- 2: Soft restart (standard value for 3 cylinder and 4 cylinder engines)
- 3: Alternative restart, softer than 1 (standard value for single cylinder and 2 cylinder engines)
- 4: Alternative restart, softer than 2

### Engine Speed Settings (for RBD/GSF/RLF)

**IgnitionCount (1):** Number of ignition pulses per ignition cycle. Possible values are integers from 1 to 255. A typical value is the cylinder count.

**IgnitionCycleSize (0):** Crankshaft rotation in degree for the entire ignition cycle. Possible values are integers from 1 to 65,535. Typical values are 360 and 720.

### Settings for RBD (= rev bar display)

**RbdBegin (0):** Start engine speed in rpm from which on the bar display is lighted (or the GSF lamp is turned on with minimal brightness). Possible values are integers from 1,000 to 20,000. A value of 0 rpm deactivates the RBD mode, and the conventional GSF mode (with one brightness level only) is used instead.

**RbdEnd:** End engine speed in rpm from which on the bar display is fully lighted (or the GSF lamp is lighted with maximal brightness). Possible values are integers from 1,000 to 20,000.

### Settings for GSF (= gear shift flash)

**GsfOn (0):** Lower threshold for engine speed in rpm from which on the GSF mode is activated. Possible values are integers from 1,000 to 20,000. A value of 0 deactivates the GSF mode completely.

**GsfOff (95%):** Upper threshold for engine speed in rpm from which on the GSF mode is terminated. Possible values are integers which satisfy  $0 \leq GsfOff \leq GsfOn$ .

Alternatively, also a percentage of *GsfOn* can be specified (with the suffixed % symbol) in the range from 0 % to 100 %. A typical value is 95 %.

**GsfT0 (0):** Duration in msec of a lightning flash lamp directly after the electronic box has been started.

**GsfT1:** Duration in msec of main flash. A missing entry *GsfT1* (or the definition of *GsfMode=0*) indicates a permanent GSF mode, meaning that the flash lamp is lightened with the start-up engine speed, and turned off with the shut-off engine speed.

**GsfT2:** Duration in msec of pause. If the permanent GSF mode is not selected, and if the entry *GsfT2* is missing (or *GsfMode=1* is defined), then a single flash mode is used (without a 2<sup>nd</sup> flash)

**GsfT3:** Duration in msec of 2<sup>nd</sup> flash.

### Settings for RLF (= rev limiter flash)

**RlfOn (0):** Lower threshold for engine speed in rpm where the RLF is activated. Possible values are integers from 1,000 to 20,000 which satisfy  $GsfOn < RlfOn$  (because the rev limiter flash mode has priority over the gear shift flash mode). A value of 0 deactivates the RLF completely.

**RlfOff (95%):** Upper threshold for engine speed in rpm where the RLF is deactivated. Possible values are integers which satisfy  $0 \leq RlfOff \leq RlfOn$ .

Alternatively, also a percentage of *RlfOn* can be specified (with the suffixed % symbol) in the range from 0 % to 100 %. A typical value is 95 %.

**RlfT1:** Turn-on time of the RLF in msec. A missing entry *RlfT1* (or *RlfMode=0* is defined) indicates a permanent RLF.

**RlfT2:** Turn-off time of the RLF in msec.

The following priority is used: RLF > GSF > RBD.