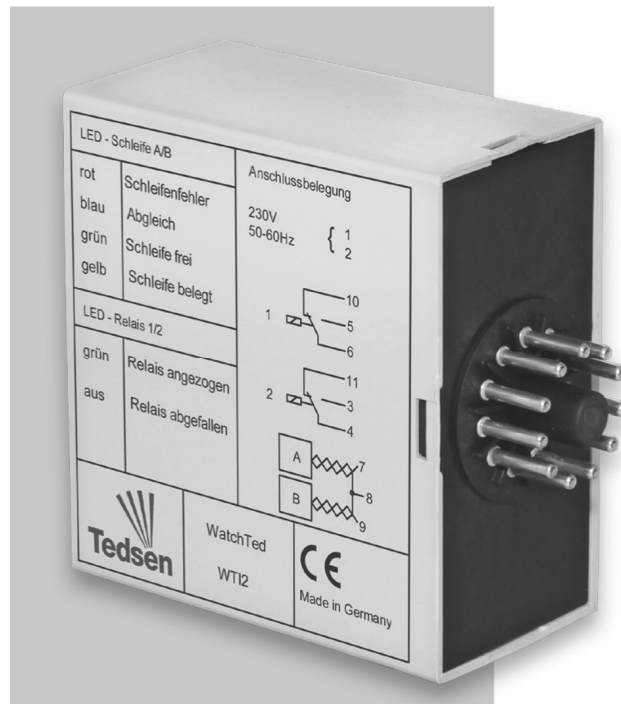# WatchTed®

Tedsen

Operating Instructions

Induction Loop Detector

2-Channel

Directional Logic

WTI2

04 / 2012

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1.0 Safety-relevant regulations and information

The induction loop detector WTI2 has been developed and constructed in accordance with the following regulations :

EMC	EN61000-6-1:2007-10	Generic standards, immunity for residential environments
	EN61000-6-2:2006-3	Generic standards, immunity for industrial environments
	EN61000-6-3:2007-09	Emission standard for residential and light-industrial environments
	EN61000-6-4:2007-09	Emission standard for industrial environments
Safety	DIN EN 60335-1:2010-11	Electrical household and similar appliances

- **The user must follow all information in these instructions at all times. Only skilled electricians may work on electrical systems. They must be familiar with the relevant regulations, recognise possible hazard sources and be able to implement suitable safety measures.**

- **The operational safety of the WTI2 is guaranteed only if it is used properly.**

- **The safety and accident-prevention regulations that apply in individual cases must be observed during installation, putting into operation, maintenance and inspection of the loop detector.**

- **This product was designed and built strictly for the use indicated in this documentation. Any other use could compromise the service life/operation of the product and/or be a source of danger.**

- **All power wiring should be on a dedicated circuit and well protected. The location of the power disconnect should visible and clearly labeled. All power and control wiring must be run in separate conduit.**

- **Do not modify, open or drop the loop detector. Make sure that the WTI2 will be operated in a dry environment. (it is not waterproof)**

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2.0 Features

- Evaluation of one or two induction loops
- Detection of vehicle presence or direction (directional logic)
- Two potential free relay contacts (pulse output)
- Installation with plug-in base (11-pin) on DIN-rail profile
- 16 operation modes
- DIP switch setting
- Sensivity adjustable in 4 steps for each channel
- USB port and PC software for service / diagnosis
- Status LED (4 colors) for each loop

3.0 Connections

Input	Plug-in base (11-pin) connector number	Function
L1	1	230VAC, 50Hz
N	2	
loop A	7	loop A connected to pin no#7 and pin no#8
loop B	9	loop B connected to pin no#9 and pin no#8
loop A+B	8	combined pin for both loops
USB	USB connector, type B	USB port for diagnosis

3.1 Relay connections

Input	Plug-in base (11-pin) connector number	Function
relay 1 nc	10	relay 1 open
relay 1 no	5	relay 1 close
relay 1 com	6	relay 1 common
relay 2 nc	11	relay 2 open
relay 2 no	3	relay 2 close
relay 2 com	4	relay 2 common

3.2 Status LED

Description	Color	Function	
Vp	yellow	power supply connected	
loop A loop B	multi-color	red	loop A/B defective not working
		blue	loop A/B calibration
		green	loop A/B no detection (free)
		yellow	loop A/B detection (not free)
		red flashing	error : DIP switch was changed
relay 1 relay 2	green	relay 1 / 2 in operation	

4.0 Operation mode setup

There are two DIP-switches for each loop. You can easily setup the operation mode of the relay (1/2) and the physical parameters of the loop (like frequency, sensivity and hold time).

All DIP-switch settings will be stored permanently after power-off. When changing the DIP-settings the LED´s for loop A & B will flash red.

Always press the calibration button to save the new settings. (LED will light up blue)

Setup of loop A & B			
	1st DIP-switch		**Settings**
loop A sensivity	DIP1	DIP2	
	OFF	OFF	1:400
	OFF	ON	1:1800
	ON	OFF	1:5000
	ON	ON	1:12800
loop A hold time	DIP3		
	OFF		5 min
	ON		infinite
loop A frequency range	DIP4		
	OFF		high frequency
	ON		low freuency
loop B sensivity	DIP5	DIP6	
	OFF	OFF	1:400
	OFF	ON	1:1800
	ON	OFF	1:5000
	ON	ON	1:128000
loop B hold time	DIP7		
	OFF		5 min
	ON		infinite
loop B frequency range	DIP8		
	OFF		high frequency
	ON		low freqeuncy

4.1 Relay operation mode

	2nd DIP-switch				Function
No.	DIP4	DIP3	DIP2	DIP1	DIP switches for relay 1
	DIP8	DIP7	DIP6	DIP5	DIP switches for relay 2
0	OFF	OFF	OFF	OFF	pulse signal when presence on loop A
1	OFF	OFF	OFF	ON	pulse signal when loop A gets free
2	OFF	OFF	ON	OFF	permanent signal when presence on loop A
3	OFF	OFF	ON	ON	permanent signal when loop A gets free
4	OFF	ON	OFF	OFF	pulse signal when presence on loop B
5	OFF	ON	OFF	ON	pulse signal when loop B gets free
6	OFF	ON	ON	OFF	permanent signal when presence on loop B
7	OFF	ON	ON	ON	permanent signal when loop B gets free
8	ON	OFF	OFF	OFF	pulse signal when loop A is passed and loop B is triggered A → B direction detection
9	ON	OFF	OFF	ON	pulse signal when loop A and loop B are passed A → B direction detection
10	ON	OFF	ON	OFF	permanent signal ON when loop A is passed and loop B is triggered. When loop B gets free permanent signal OFF
11	ON	OFF	ON	ON	permanent signal OFF when loop A is passed and loop B is triggered. When loop B gets free permanent signal ON
12	ON	ON	OFF	OFF	pulse signal when loop B is passed and loop A is triggered B → A direction detection
13	ON	ON	OFF	ON	pulse signal when loop B and loop A are passed B → A direction detection
14	ON	ON	ON	OFF	permanent signal ON when loop B is passed and loop A is triggered. When loop A gets free permanent signal OFF
15	ON	ON	ON	ON	permanent signal OFF when loop B is passed and loop A is triggered. When loop A gets free permanent signal ON

Table title: **Setup relay operation mode (relay 1 & 2)**

5.0 Front panel and connection diagram

The following pictures are showing the front panel and the connection diagram of the WTI2.
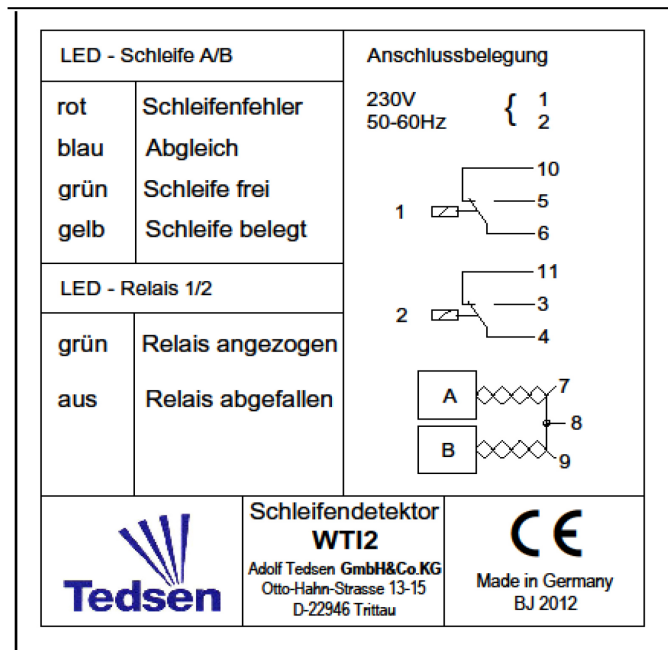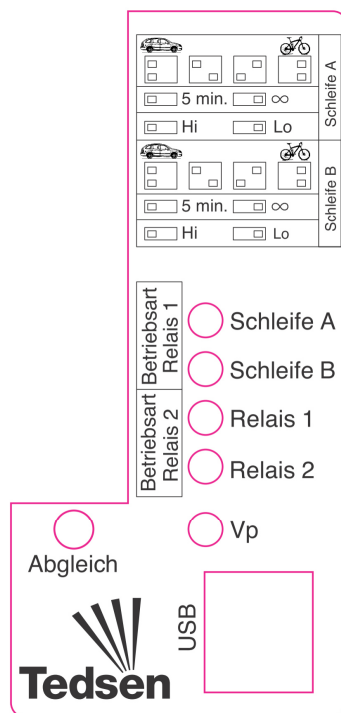
6.0 Initial operation

Please connect the WTI2 as shown on the connection diagram and choose your correct DIP switch settings for the detection loops and relay operation mode.

Connect 230 VAC main power to the WTI2, if the LED´s for loop A and loop B are flashing please press the button „Abgleich" (calibration) one time. During the calibration process the LED´s are illuminated blue, after the calibration is done successfully the LED´s turn from blue to green light.

The WTI2 can also be used with only one loop, the LED for the not used loop will light up red. If using only one loop the relay operation modes for the missing loop and direction detetction are not available

7.0 USB interface for diagnostics

The WTI2 provides PC diagnostics via an USB-interface on the front panel of the detector.

By using the WTI2 diagnostic software you will get a vsiual picture of what is happening at the loop and will help you to troubleshoot any problems you may experience during installation or operation.
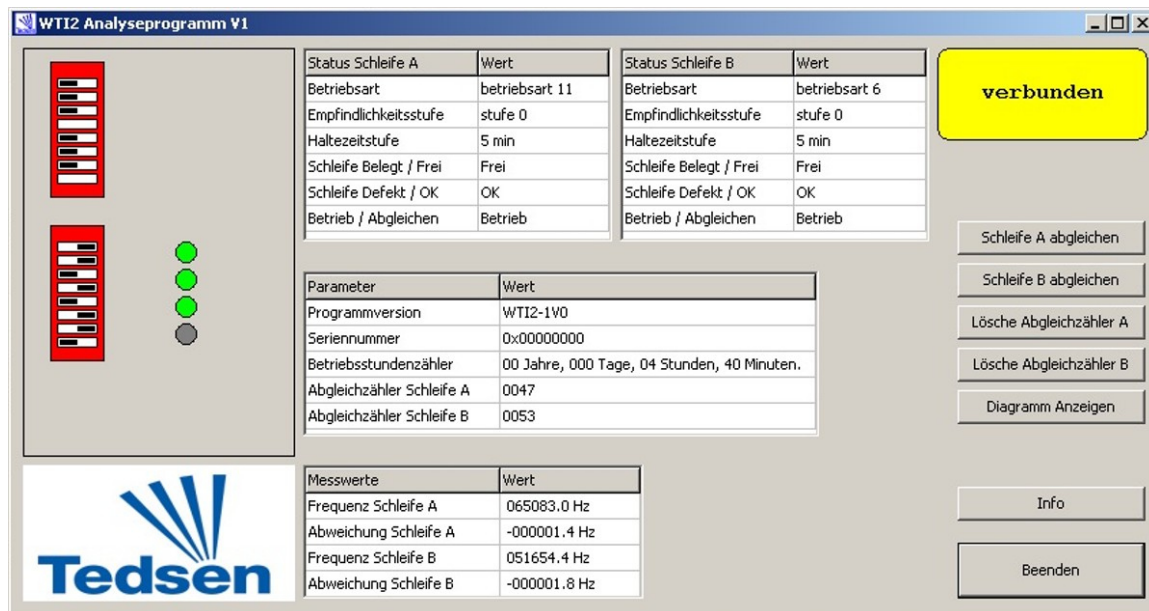
You can download the self extracting software from here :

http://www.tedsen.com/download/software/WTI2.exe

Just start the „WTI2_Analysator_V1.exe" file on your PC and connect an USB-cable between your PC and the WTI2. An installation of a specific USB driver is not necessary.

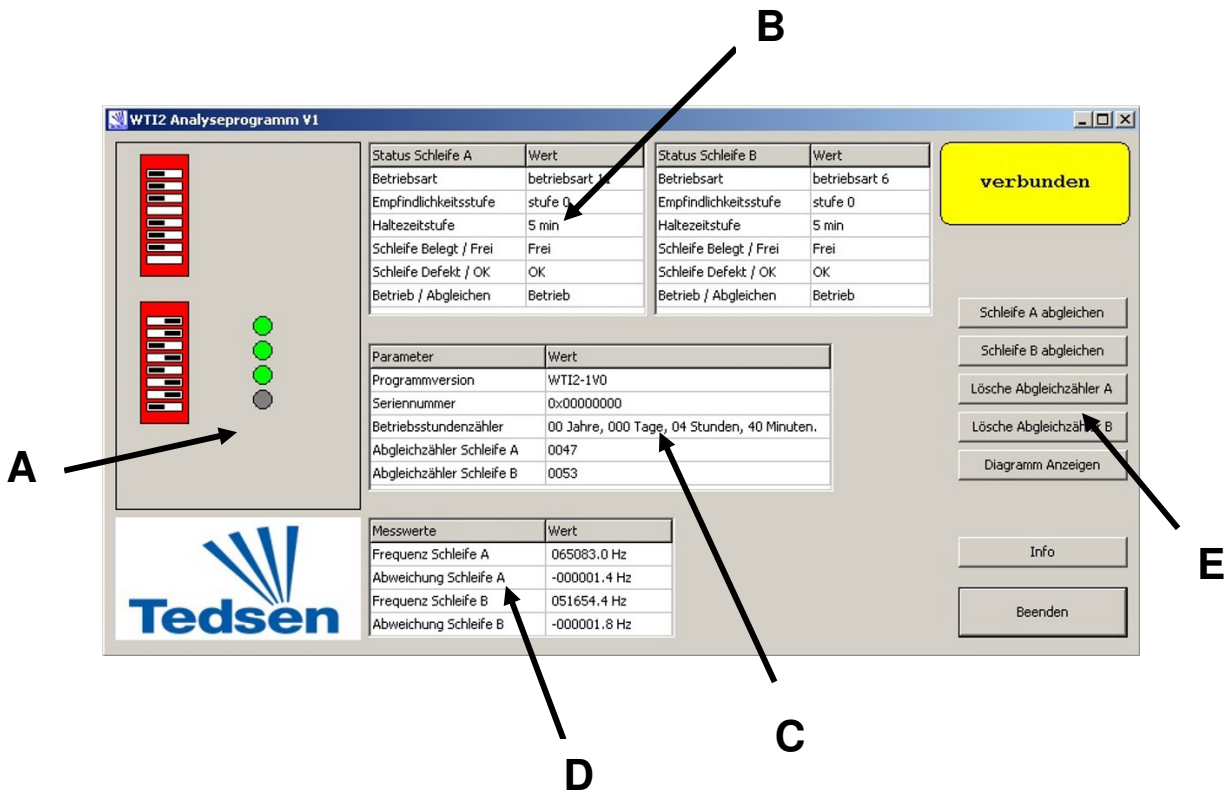**Please note : only one PC can control one WTI2 via USB.**

As soon as the USB-connection is ready the display in the upper right corner of the software UI will change from „Kein Kontakt" (no contact) to „Verbunden" (connection established).

A : Actual settings of the DIP-switches and the LED status of the connected WTI2

**B:** All specific operation data and parameter of the connected loops

- Operation mode, sensivity and hold time
- Loop free or busy
- Loop defective or OK
- Calibration

C : Serial number, software version, operation-hour counter, calibration counter

D : Actual loop frequency and average deviation

E : Click buttons : new calibration of loop A/B, reset of the calibration counter and display the analysis diagram.

8.0 Analysis diagram
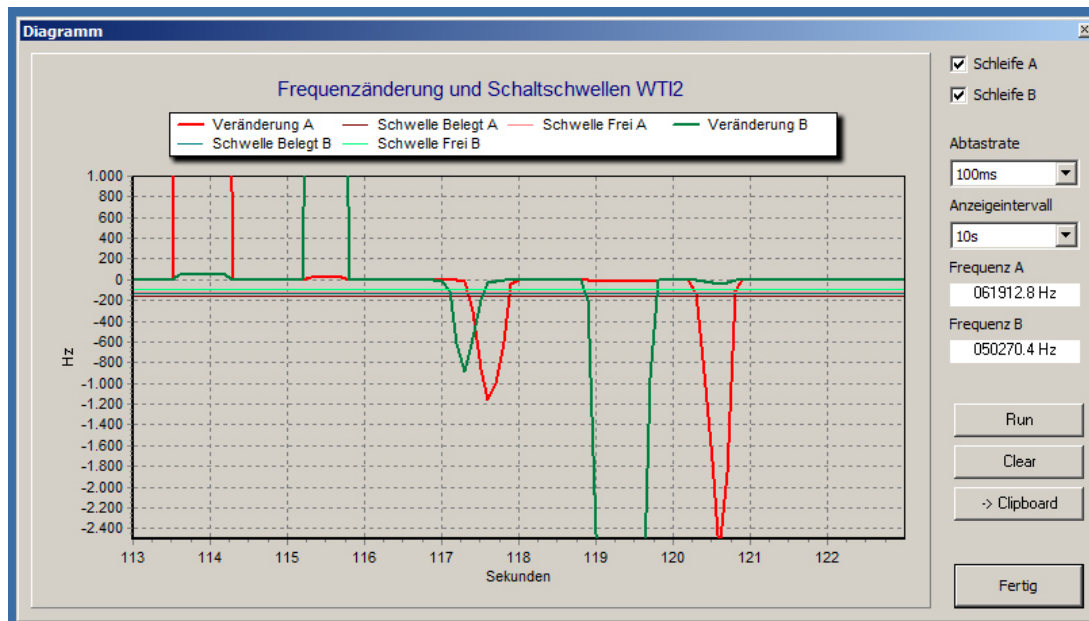
The displayed diagram indicates the actual frequency changes and switching threshold of the connected loops for a specified time period. Sampling rates and interval can be set individually.

This feature can help you to determine the correct settings for the setup of the inductive loops.

The click button „Run" starts the analysis procedure, by clicking on „Clear" the diagram will be deleted. „Clipboard" inserts the actual diagram into the Windows clipboard and save it as a bitmap (*bmp) file to the WTI2 folder. To exit this window you have to click on „Fertig".

Please note: fast sampling rates (Abtastrate) and long display intervals (Anzeigeintervall), can spend a lot of CPU performance of your PC.

9.0 Installation of induction loops

Please note that:

- The size of the loops should have the same size of the cars or trucks

- For a better detection of bikes or motocycles it is better to install the loop diagonally.

- The distance of two working loops should be 100cm or more

- Parallel connection cables of two loops should have a distance of 50cm or more

- For a direction detection two loops must be installed so that a passing vehicle can trigger both loops

- Please avoid any power cables close and below of the loops

- Please take care about a proper installation of the induction loops
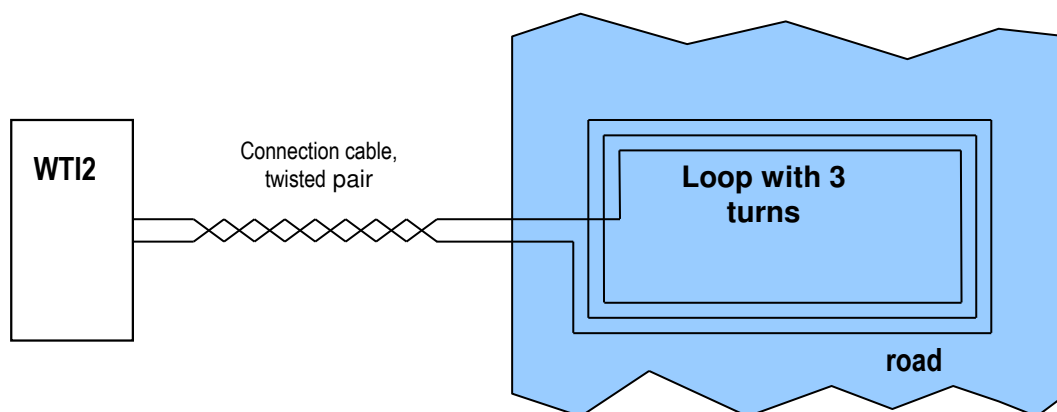
- A saw-cut loop is used when the pavement is already in place. For the installation a loop shape rectangle needs to sawed in the pavement (depth 50mm width 8mm).

- Remove sharp inside corners that can damage the loop wire insulation

- A correct installation of the loop will give optimum detection performance

- Place the loop wire in the slot and apply a resistant sealant.

- The selant should have good adhering properties with similar contraction and expansion characteristics as the pavement material.

- The wire must be twisted together from the end of the saw cut to the detector

Depending on the loop perimeter, there are 2 up to 4 turns necessary.

Perimeter length of the loop	Number of turns
5m up to 6m	4
6m up to 15m	3
15m up to 25m	2

10.0 Technical Specifications

Dimensions (WxHxD)	38mm x 76mm x 85mm (with 11-pin socket)		
Protection class	IP 40		
Power consumption	2W		
Power supply	230VAC +/- 10% 50/60Hz		
Weight	180g		
Operating temperature	-10°C up to + 50°C		
Humidity	max. 95%		
Loop inductance	30uH up to 450uH, recommended 50uH up to 300uH		
Loop resistance	< 8 Ohm incl.connection cable		
Response		level	Sensivity
		1	1:400
		2	1:1800
		3	1:5000
		4	1:12800
Hold time	5 minutes or infinite		
Relay	potential free contact (max. 24 V 1A)		
Impulse mode	200ms		
USB	Type B, for diagnostics with PC software		
Installation	11-pin „plug-in-base"		

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