

Steering Wheel Z1 · Z3 · Z5 · Z7



Version 3



Z1/Z3

Z5/Z7

■ **Integrated steering systems to measure:**

- Steering torque
- Steering angle
- Steering speed
- Steering acceleration
- Vibrations

■ **Applicable into passenger cars, trucks, ...**

■ **Easy exchangeable car- adaptors to install on different car-types**

■ **Maintenance-free continuous operation, by touchless data transfer and inductive supply**

■ **Automatic comparison functions by keys on Control unit**

■ **Z1... Z7 surrogated the original steering wheel**

■ **Datatransfer by CAN-Interface or USB-Interface possible.**

Steering columns adaptor Z1...Z7

Z1 · Z3 · Z5 · Z7



Technical Data

Steering wheel		Z1 / Z3 passenger car	Z5 / Z7 truck
Steering wheel unit			
Steering torque			
Sensor		integr. Sensor with 16 active strain gages, temperature compensated	
Maximum load		temporary, dynamically overload 100Nm; break 500Nm	
Range, bipolar;	Zx-1 Zx-2	10Nm +/-0.2Nm; 100Nm +/-0.2Nm; internally 16Bit solution	
Drift		10Nm +/-0.4Nm; 200Nm +/-0.4Nm (overload 20%); internally 16Bit solution +/-0.02Nm/K	
Bandwidth		0...800Hz / 4,000Sample/s	
Steering angle			
Sensor		inductive-incremental angle encoder	
Range, bipolar		1,000° +/-0.036°	1,200° +/-0.037°
Bandwidth		0...800Hz / 4,000Sample/s	
Steering speed			
Sensor		Calculated from steering angle	
Range, bipolar		1,000°/s +/-1°/s 0...800Hz	
Bandwidth		4,000Sample/s	
Steering acceleration (only Z3 and Z7)			
Sensor		piezoelectrically transducer	
Range, bipolar		10,000°/s² +/-100°/s ²	
Drift		+/-5°/s ² /K	
Bandwidth		1...120Hz / 4,000Sample/s	
Vibrations in x-, y-, z-direction (only Z3 and Z7)			
Sensor		3-axial, piezoelectrically transducer	
Range, bipolar		per each 5g +/-0.05g	
Drift		+/-2.5mg/K	
Bandwidth		1...120Hz / 4,000Sample/s	
Horn		Horn key at steering wheel	Horn key at steering wheel
Adjustment functions, Test functions		automatical Zero adjustment of angle and torque; shunt-calibration for torque	
Special functions		4 free key functions *)	
Operating temperature		-10°C...80°C; optionally Z-t -30°C...80°C	
Mechanical data			
Adaptation		with tooth system plug-in adaptors customizable to different car types	
Outer diameter; Height without adapt.		380mm; 148mm	450mm; 175mm
Weigh; Moment of inertia		3.4kg; 290kgcm ²	4.0kg; 320kgcm ²
Reproducer			
Signal output	-analog -digital	Per channel BNC-socket on frontplate; +/-10V voltage level, single-ended optionally CAN (C) or USB (U)	
Monitor, Display		dot matrix LED-display with switch; Synchronisation-LED	
Power supply		9...32VDC; about 10W	
Dimensiones (LxWxH); weight		200mm x 105mm x 85mm (robust compact housing); 1.2kg	
Operating temperature		0...60°C	
Special functions		*) 4 relay contacts, 12V/1A	
Horn		Switchable with potential free relay contact at rear; 12V/16A	
Accessories, Set of delivery, options			
Steering wheel with reproducer			
DC-supply cable, 2m; connection cable, 6m			
Steering coloumns adaptor for car type X			
Documentation, Calibration sheet, Transport suitcase optionally: ESP extension for adaptor CAN interface with CAN software USB interface with USB driver			

Installation, introduction, adjustment

Opening the steering wheel

Z1/Z3: remove cover forward



Z5/Z7: open the hook-and-loop tape and draw off cover forwards.



Dismantling of original steering wheel and separation of interwirings to the steering floor



without ESP-Extension

Remove clockspinn



put steering columns adaptors from below into tothing

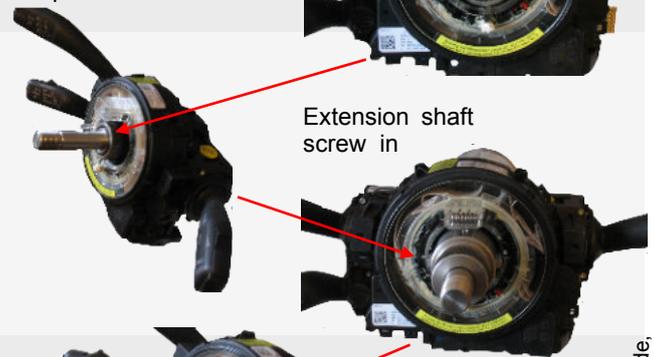


with ESP-Extension

put steering columns adaptors on shaft



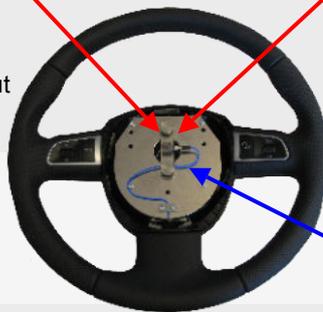
Extension shaft screw in



Adaptor extension and friction disk put on; fix with grub screw

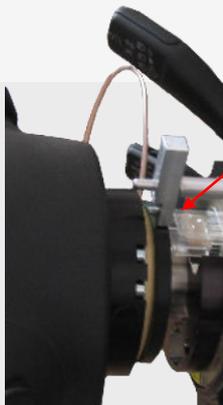


Measuring steering wheel on shaft put on and screw together; Cover put on.



Measuring steering wheel on extension put on and screw together; Cover put on.

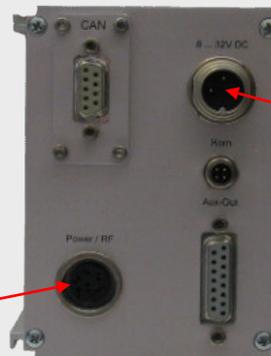
Model Z3 / Z7: Triax- ICP-sensor turn on the side after loosening of knurled screw



The fixing flap of the stators **is free of load** to fix in the vehicle.

For this 2 tapped holes M4 and an extension with guide bore is available for the easy mount.

Connection cable at the back plate of the reproduction unit plug in.



Supply cable at the back plate of the reproduction unit plug in.

Connect and switch on the power supply. Banana jack **“red” is “+”** und **“black” is “-”** ;

Digital display shines and green LED at the front panel signals synchronised data

AZ-W = Automatic zero adjustment of angle: Steering wheel bring in "straight ahead-position"; front panel button press

AZ-M = Automatic zero adjustment of moment: Steering wheel do not load; front panel button press

Cal-R = an internal Shunt puts out of tunes the 10Nm-range about 80%; front panel button press

Key Functions Z1...Z7

The key functions of the original steering wheel can be used, as far as this fits to the LIN-Bus system of the user. (Z1 / Z3 VW-Group, Z5/Z7 Daimler AG).

Optionally the possibility exists to use 4 keys of the steering wheel for switch functions which are available about relay contacts free of potential -changeover contact - in the reproduction system.

The functions of the keys 1... 4 are to be taken from the table to the allocation of the back-sided plug connector "Aux-Out".

The implementation of the key function is to agree and to fix with the order.

Display functions

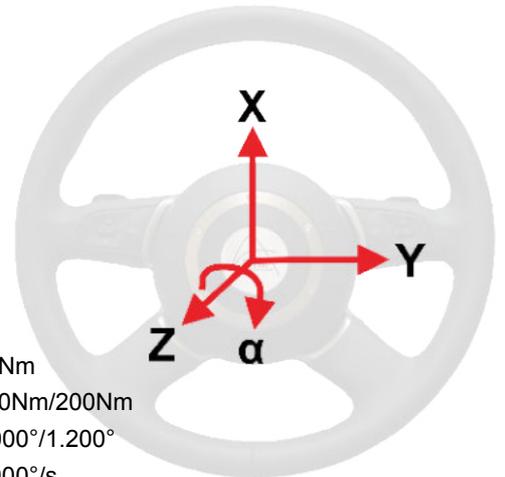


Monitor display

- physical units
- 2 channels displayed at once
- channel selector

Analog outputs

- | | | |
|---------------------|-------------------------|------------------------|
| 1 | Steering-torque | 10Nm |
| 2 | Steering-torque | 100Nm/200Nm |
| 3 | Steering-angle | 1.000°/1.200° |
| 4 | Steering-speed | 1.000°/s |
| Models.Z3andZ7.only | | |
| 5 | Vibrations x-direction | 5g |
| 6 | Vibrations y -direction | 5g |
| 7 | Vibrations z -direction | 5g |
| 8 | Rotary acceleration | 10.000°/s ² |



Pinout connectors at reproducer

CAN SubD-9 socket at rear plate			
Contact	Signal	Contact	Signal
2	CAN-Low	7	CAN-High

9...32V DC On cable Binder 680 0306-00-03	
Contact	Signal
1	+ supply
3	- supply

Aux-Out SubD-15 socket at rear plate			
Key	Opener	Centre contact	Closer
1	Pin 9	Pin 1	Pin 2
2	Pin 3	Pin 10	Pin 11
3	Pin 12	Pin 4	Pin 5
4	Pin 6	Pin 13	Pin 14

Horn (internally relay)	
On cable; Binder 711 2 99-0080-00-04	
Contact	Signal
1,2	closer contact 1a
3,4	closer contact 1b

Servicing hints, Recalibration cycle, CE-Conformity

Devices Z1/Z3/Z5/Z7 have no special service hints. Recalibration cycle: recommendation is 2 years.

Design of devices Z1... Z7 correspondents to EC guidelines: EN 300 220-3, EN 60 950, EN 301 489-01/-03
 Devices were tested in typically situations.

Steering Wheels Z1/Z3/Z5/Z7



EC – Certificate of Conformity



The company

Rainer Thomas Messtechnik GmbH
Wiesseer Str. 1
D-83703 Gmund / Germany

herewith explains, that the telemetry devices **Type Z1 / Z3 / Z5 / Z7**
in from it implementation brought in the traffic fulfils the regulations of the following
appropriate harmonisation regulations of the community:

EMV-Richtlinie 2014/30/EU
DIN EN 61326-1; VDE 0843-20-1:2013-07 Elektrische Mess-, Steuer-, Regel- und Laborgeräte -
EMV-Anforderungen - Teil 1:Allgemeine Anforderungen (IEC 61326-1:2012);
Deutsche Fassung EN 61326-1:2013

The protective aims of the low-voltage directive 2014 / 35 / EU are kept.

Commissioned person for the arrangement of the technical documents:

Rainer Thomas, company RTM GmbH, Wiesseer Str.1, D-83703 Gmund

Commissioned testing centre / accredited lab:
Schwille-Elektronik GmbH, Benzstr.1A, D-85551 Kirchheim, M.Schiedrich

The following basic norms were applied:

- IEC 61000-4-2
- IEC 61000-4-3

- IEC 61000-4-4
- IEC 61000-4-5
- IEC 61000-4-6
- IEC 61000-4-8
- CISPR 55011

A handwritten signature in black ink, appearing to read 'R. Thomas', written in a cursive style.

Rainer Thomas, GF

Gmund, Apr. 9th. 2015