

CLS-E - Steering Effort Sensor



Data Sheet Version 1.3

The steering effort sensor CLS-E can be integrated directly in the airbag compartment of the original steering wheel of most standard vehicles. All other functions of the standard steering wheel are preserved completely (excluding airbag).

Besides the parameters torque, steering angle and rotational velocity, the sensor optionally also acquires accelerations in the center of the steering column (x-, y- and z direction) as well as rotational acceleration. Measurement data are digitized for a highly fail-safe data transfer, with a resolution of 16 bits (internally: 24 bits). Precision of torque measurement is 0.1% FS. Contactless power supply by induction.

Highlights

- Steering torque range ± 100 Nm or ± 200 Nm
- Steering angle range $\pm 1474,56^\circ$
- Rotational velocity range $\pm 1000^\circ/\text{sec}$
- Acceleration in x, y, z (optional)
- Rotational acceleration (optional)
- CAN and analog output
- Online monitoring of all channels in physical values
- Inductive power supply by control unit

For data output, the receiver and control unit offers both analog and digital interfaces (CAN, Ethernet). At the OLED display integrated in the control unit, all measurement values are displayed in physical dimensions. Autozero of torque and angle is triggered directly at the control unit or by remote control.

Overview of available variants

Order Code		article number
H-SEN-CMX-CLS-E100	Steering wheel CLS-E Steering Effort Sensor 100 Nm	1380013
H-SEN-CMX-CLS-E200	Steering wheel CLS-E Steering Effort Sensor 200 Nm	1380014
Integrated; modification removing the airbag of an existing vehicle steering wheel supplied by the customer. (requirement: enough space for integration for the Steering Effort Sensor)		
H-SEN-CMX-CLS-E-ACC	Upgrade for CLS-E Steering Effort Sensor 100 Nm or 200 Nm with sensors for x, y, z acceleration and rotational acceleration	1380015

Included accessories

Remote control for autozero including Remote cable,
Ethernet cable,
Receive unit,
SD card 2 GB,
Power adapter,
Mounting unit for the angle encoder bracket to a fix zero position.

Optional accessories

H-TEL-CMX-DX-FRAME	Mounting frame for one receiver unit	1350239
Mounting frame for one receiver unit. Optionally with protection cap for thumbwheel.		



D-SEN-CMX-CLS-KAL	Calibration of a steering effort sensor CLSx or CLS-E Recommended every year	1380018
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Technical Specs - CLS-E

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Steering torque		
Parameter	Value	Remarks
Measuring principle	temperature compensated strain gauge application	
Measurement range	± 100 Nm or ± 200 Nm	choose when ordering
Accuracy	0.1 % FS	
Bandwidth	0 to 800 Hz	sampling rate 5 kHz

Steering angle		
Parameter	Value	Remarks
Measuring principle	incremental angle encoder	
Measurement range	$\pm 1475.56^\circ$	
Accuracy	0.045 °	
Bandwidth	0 to 800 Hz	sampling rate 5 kHz

Angle speed		
Parameter	Value	Remarks
Measuring principle	Calculated from angle	
Measurement range	CAN: $\pm 1000^\circ/\text{s}$	
Bandwidth	0 to 800 Hz	sampling rate 5 kHz

Acceleration		
Acceleration	in the center of the steering column, measurement range up to 5 g in x, y and z direction	
Rotational acceleration	measurement range $\pm 10000^\circ/\text{sec}^2$	

General Data		
Parameter	Value	Remarks
Overload	>100 % of the measurement range	
Mech. breaking torque	>500 Nm	mechanical protection at breakage
Adaption	special adaption sets for any car or truck manufacturer available	
Working temperature	-20 °C to +80 °C	

Control Unit		
Power supply	9 to 36 V DC	
CAN-Output	freely configurable CAN output for the data transmission	
Analog output		
Torque:	± 10 V ($=\pm 100$ Nm or ± 200 Nm)	
Angle:	± 10 V ($=\pm 1474,56^\circ$)	
Accelerations:	± 10 V ($=\pm 5$ g)	
Auto zero	with push-button for torque and angle at the panel	