

System 2000 On-Board Electronics

Type 9891A...

Digital Electronics and Transmission Components for Wheel Measuring Systems

High-end, fully digital, measurement transmission and electronics system for the 6-component RoaDyn® measuring wheel systems. This system has been designed to consistently reflect customer requirements. Although preferably used for on-road testing, it can also be equipped for laboratory applications.

- Automatic identification of measuring wheel components
- Digital conversion of measuring signals prior to data transmission
- Separate calibration of single load cells enables increased accuracy in any loading situation
- Telemetry transmission to in-board and out-board of wheel available
- Digital and analog outputs
- Quality down to the last detail
- Clear, intuitive menus
- Ease of handling and operation
- Clear and comprehensive documentation

Description

In the Type 5241A... wheel electronics unit System 2000 acquires the analog output signals of the load cells on the rotating measuring wheel. It digitizes and encodes this measurement data for onward digital telemetry transmission. The transmission module, which consists of a Type 5242A... rotor (ring antenna) and Type 5240A... stator, transmits the data to the inside of the wheel. For special cases necessitating external transmission, the Type 5248A... module is used. The measurement data is transmitted digitally and wireless. In the Type 9891A... System 2000 on-board electronics the signals are converted online into a non-rotating coordinate system, and the moments acting on the wheel are calculated with reference to the wheel center. Digital signal processors (DSP) provide effective synchronous data management.

The Master-DSP transmits the data from up to four measuring wheels plus supplementary channels via a bus to the data outputs. The digital data output is made available in various formats.

The Type 5685A2 remote control unit makes it easy to set the system parameters and read out settings and data. It is only one of a range of diagnostic tools offered.

Small asymmetries and the channel zeros of the individual load cells, which have been saved in an electronic chip on the cell during calibration, plus the geometric and organizational data



of other components, which are stored in ID modules on the measuring wheel, are retrieved and taken into account when the on-board electronics system is switched on. Load cells and components can be replaced without impairing the overall quality of the system, as their individual data is stored on their respective ID chips. The original load cell signals may be read out with the remote control unit. Malfunctioning components are detected and indicated before corrupted measurement data will be acquired.

Additional signals can be fed into the wheel electronics unit on the rotating wheel with either optional Type 2237A... amplifier modules, or, if located on non-rotating vehicle parts, using the Type 5293A... plug-in analog input cards. Both units are available as an optional extra. These signals can be individually amplified and recorded together with the signals measured on the measuring wheel.

With the data acquisition systems currently on the market, the measurement data is usually recorded digitally. The data is acquired with, for example, a desktop PC or notebook via a CAN- or Ethernet interface.

Naturally the use of analog and digital filters leads to a delay in the measurement data. As only filter components with constant delay are used, a synchronisation with data from other sensors may be accomplished.

The Type 5241A... wheel electronics unit is available in models with 12 ... 24 channels. The S6xy and V6HT measuring wheels require the standard versions taking into account the number of required input channels. Special versions are available for the RoaDyn P6xy measuring wheels including charge amplifiers.

The transmission unit (in-board transmission) has a rotating part (rotor) and a stationary part (stator). The two matched components contain function modules for transmitting the supply voltage and the flow of data. The rotor also has a number of magnets used to determine the exact angular position. The rotor is bolted to the inside of the measuring wheel, whereas the stator is to be fixed on the wheel mounting or the shock strut unit, or in some other suitable position on the vehicle. The gage Type Z39911 for RoaDyn S6xy respectively Type Z17019-10 for RoaDyn P6xy is necessary for accurate positioning and alignment. The out-board transmission Type 5248A... unit is offered for the S6HT measuring wheels and special configurations.

Applications

System 2000 has been developed for transmitting and processing the load signals from the RoaDyn P625, P650, S625, S635, S650 und S6HT measuring wheel systems. This means all of these measuring wheels can be operated with one and the same on-board electronics that also allows transmission and recording of additional data.

Technical Data

Wheel Electronics Unit Type 5241A... (Housing CFC with AI-Cover)

Weight	kg	0,34
Temperature range	°C	-20 ... 80
Mounting	four M5x8 Phillips screws	
Number of channels		12 ... 24
A/D conversion		
Resolution	bit	16
Sampling rate (f _s)	Hz	2 000
Anti-aliasing filter		
Butterworth		6 pin
Cutoff frequency -3 dB (f _c)	Hz	500

Stator Type 5240A...

Dimensions (HxLxW)	mm	18,5x98x55
Weight of stator		
with 1 m cable and heat shield	kg	0,26
Operating temperature range	°C	-20 ... 120

Transmission Ring Type 5242A...

Weight		
Transmission ring (e.g. Type 5242A1250)	kg	0,30
Heat shield 16"	kg	0,14
Power transmission		inductive
Data transmission	Mbit/s	2
Angular measurement		permanent magnets

On-Board Electronics System Type 9891A...

Casing		
Dimensions without handles (LxWxH)	mm	450x275x139
Weight (without ANI modules)	kg	8,4
Power supply		
Voltage	V	10,5 ... 40
Power consumption	W	<150
Temperature range	°C	5 ... 50

Analog Inputs (optional) Type 5293A...

Channels/wheel, single ended/differential		4
Resolution	bit	16
Sampling rate (f _s)	Hz	2 000
Input voltage	V	max. 10
Gain		1/2/4/8
or		1/10/100/1 000
Sensor excitation selectable, unipolar	V	2,5/5/10
or bipolar	V	2,5/5/10
Connector, LEMO 1B (single ended/differential)		
or BNC (single ended only)		

Analog Outputs

Channels/wheel		8
Output sensitivity selectable with remote control unit		
Resolution	bit	14
Output rate	kHz	2
Time delay	ms	2,6
Output signals		freely selectable
Connector		D-Sub, neg., 25 pin

Digital Outputs

Channels/wheel selectable		max. 40
with 4 wheels		max. 160
Interface (1/system) alternatives: PC parallel port/CAN/ADITEC/MegaDac/Ethernet		others available on request
Output rate	Hz	60 ... 1 000
(dependent on data acquisition)		
Digital filter automatically adjusted to output rate f _a		
Type		FIR low pass
Characteristic		cos ² roll-off
Pass band, times output rates	f _a	0,35
Time delay	ms	2,6
additional cycles (x ¹ /f _a)		16

Remote Control Unit Type 5685A2

Dimensions	mm	223x138x46
Weight	kg	1,1



Fig 1: Compatibility RoaDyn® System 2000

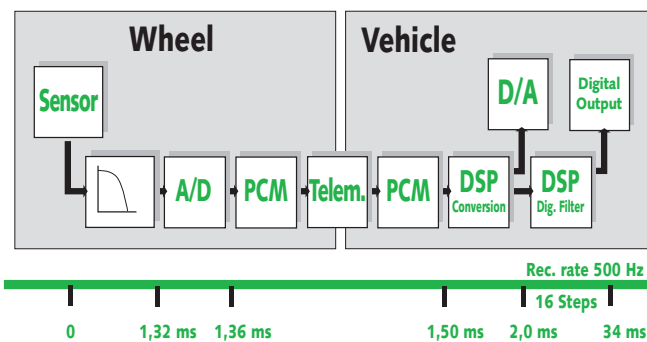


Fig. 2: Electronic components of telemetry transmission system System 2000

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Mounting

The on-board electronics system is installed in a suitable location in the vehicle. It must not become detached or slip during maneuvers. A secure connection to a 12 ... 40 VDC supply system must be ensured. The system is connected to the stator using the Type Z30430A... extension cable, which is available in various lengths. The remote control unit is connected to the MDSP card via a D-Sub connector.

Included Accessories

On-Board Electronics System

- | | |
|---|----------|
| • Casing incl. | Z30694 |
| • DC power supply, 10 ... 40 V,
1 unit houses 1 ... 4 measuring
wheel systems | |
| • DC cable | Z30626 |
| • PDA card, 1 per measuring wheel | 5619 |
| • SPC card, 1 per measuring wheel | 5291 |
| • SDSP card, 1 per measuring wheel | 5287 |
| • AUO card, 1 per measuring wheel | 5289 |
| • Data acquisition card
alternatives: EPP, CAN, ADITEC,
MEGADAC, CAN, CAN with external
trigger and Ethernet
(1 card serves 1 ... 4 measuring
wheel systems) | 5621A... |
| • MDSP card
(1 card serves 1 ... 4 measuring
wheel systems) | Z30116 |
| • Remote control unit incl.
Type 1700A101 cable
(must be ordered separately) | 5685A3.1 |

Optional Accessories

On-Board Electronics System

- | | |
|---|---------|
| • ANI card, gain 1/2/4/8
(1 card per measuring wheel) | 5293A11 |
| • ANI card, gain 1/10/100/1 000
(1 card per measuring wheel) | 5293A21 |
| • Programmer modules | 2883A |

ID components, programming tool

- | | |
|--|-----------|
| • RoaDyn System 2000
configuration software | 2885A |
| • RoaDyn remote control emulation software | 2887A |
| • RoaDyn DAQ-Software | 2837A... |
| • Transportation box for on-board
electronics System 2000 | V712.0005 |

Analog Input Box

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|--|----------|
| • Case in power supply without ANI cards | 9885A |
| • Remote control unit | 5685A1 |
| • Cable | 1700A101 |

Ordering Key

Type 9891A		<input type="checkbox"/>	<input type="checkbox"/>
Number of measuring wheels: 1	1	↑	↑
Number of measuring wheels: 2	2		
Number of measuring wheels: 4	4		
EPP Interface card	1	↑	↑
ADITEC Interface card	2		
MEGADAC Interface card	3		
CAN Interface card	4		
CAN with external Trigger	6		
Ethernet Interface card	7		