TECHNICAL DATA

<table>
<thead>
<tr>
<th>CDT 731-TG</th>
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<td>Valve</td>
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<td>Max. 4 speed sensors</td>
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- Speed measurement and valve control
- Drager- and power supply module
- Rotation speed sensor
- Controller
- Valve

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- 8-digit LED display
- RPM pulses/revolution
- 32-bit processor

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- 32-bit processor

- Digital frequency
- 3-axis integrated
- Breaker, worm gear box
- RPM resolution
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- RPM accuracy
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- Max. 4 WSP valves
- Max. operating pressure
- 6.8 bar

- Integrated direction detection
- Direction contaminants
- Standby 3 mA

- Separate channel speed measurement
- 2 separate rotational speed channels
- 90° phase-shifted signals for direction detection

- Max. 3 modules per system
- Module per system
- Max. 4 sensors per system
- Module per system
- Max. 3 modules per system

- Power supply voltage
- 24/36 VDC (with PSM module, also 72 V and 110 V)
- Ambient temperature class
- Tx -40 °C ... +70 °C

- UIC 541-05, EN 50155, EN 15595, TSI LOC&PAS 2008/57/EG

Refer to the system manuals for more information.
WHEEL SLIDE PROTECTION SYSTEM
UP TO SIX AXLES

SYSTEM OVERVIEW
WHEEL SLIDE PROTECTION SYSTEM

Train Control and Monitoring System (TCMS)
Wheel slide protection controller up to SIL 2
Vehicle Control Unit (VCU)

“SAFETY-RELEVANT ACCORDING TO ESTABLISHED RAIL STANDARDS”

A FLEXIBLE AND COMPLETE SOLUTION WITH WHEEL SLIDE PROTECTION CONTROLLER, ROTARY ENCODER, AND WSP VALVE MODULAR SYSTEM FOR STRAIGHTFORWARD IMPLEMENTATION ON YOUR RAIL VEHICLES

Significant Functions
- Wheel slide protection for vehicles with speeds up to 200 km/h
- Can be used both in new vehicles and for modernization
- High performance
- Control of up to 6 wheel slide protection valves per system
- Encoder failure monitoring
- Automatic activation in case of emergency
- Module for different wheel slide protection configurations
- Input of the wheel speed in the vehicle up to SIL 2
- Integration in rail vehicle control and management system for straightforward system diagnosis
- Flexible project planning
- Support in setting the control parameters
- Support for commissioning and approval
- Safety-oriented (SIL) valve outputs according to EN 61508, EN 50128, EN 50129
- Monitored counter inputs for speed measuring
- Calculation of speed and acceleration of the axle
- Can be expanded with max. 3 wheel slide protection modules (CDT 731-TG)
- Diagnosis and fault visualization
- Galvanically isolated power supply for the speed sensors
- Immunity to electrical noise

REFERENCES

BLS, EW II Stadler Rail, DOSTO
Stadler Rail, FLIRT

POSSIBLE SYSTEM ARCHITECTURE WITH SIX BOGIES

TCMS (Train Control and Monitoring System)
Vehicle Control Unit (VCU)
Remote I/O
Vehicle bus

Encoder
Wheel slide protection valve
Encoder
Wheel slide protection valve
Encoder
Wheel slide protection valve
Encoder
Wheel slide protection valve
WHEEL SLIDE PROTECTION SYSTEM UP TO SIX AXLES

**SYSTEM OVERVIEW**

**WHEEL SLIDE PROTECTION SYSTEM**

- Up to six axles
- Train Control and Monitoring System (TCMS)
- Wheel slide protection controller up to SIL 2
- Speed Encoder
- Vehicle Control Unit (VCU)
- 2x2 digital outputs
- Wheel slide protection valve
- Rotary encoders with 2-channel or individual pulse generators, maximum counter frequency $f_{\text{max}} = 45$ kHz

**POSSIBLE SYSTEM ARCHITECTURE WITH SIX BOGIES**

- Wheel slide protection for vehicles with speeds up to 200 km/h
- Can be used in new vehicles and for modernization
- TSI-compliant
- Control of up to 6 wheel slide protection valves per system
- Encoder broken wire monitoring
- Automatic reactivation in case of failure
- Modularly different wheel slide protection configurations
- Additional function for automatic activation in the event of breakdown
- Output of the vehicle speed on the vehicle bus up to SIL 2
- Integration in rail vehicle control and management system for straightforward system diagnosis
- Modular for different wheel slide protection configurations
- Output signals such as: door release, electromagnetic rail brake up to SIL 2
- Output of the vehicle speed on the vehicle bus up to SIL 2
- Integration in rail vehicle control and management system for straightforward system diagnosis
- Flexible project planning
- Support in setting the control parameters
- Support for commissioning and approval
- Safety-oriented (SIL) valve outputs according to EN 61508, EN 50128, EN 50129
- Monitored counter inputs for speed measuring
- Calculation of speed and acceleration of the axle
- Can be expanded with max. 3 wheel slide protection modules (CDT 731-TG)
- Diagnosis and fault visualization
- Independently isolated power supply for the speed sensors
- Wake-up circuit
- Input of wheel diameter
- Selectron, type REN 1.0.1.500 or others
- Knorr-Bremse valves or others

**REFERENCES**

**TCMS (Train Control and Monitoring System)**

- Vehicle Control Unit (VCU)
- Remote I/O

**Wheel slide protection controller, SIL 2**

- Vehicle bus
- Encoder
- Wheel slide protection valve

**REFERENCES**

- Gräubler AG, FLIRT
- THW, DOSTO
- transport publics fribourgois
**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>CDT 731-TG</th>
<th>PST 731-TG</th>
<th>DSN 704-TG (SIL)</th>
<th>CPU 83x-TG</th>
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</tr>
</tbody>
</table>

- **Max. 4 speed sensors**
- **Digital encoder display**
- **30 pulses per revolution**
- **128 memory**
- **Max. operating pressure 8 bar**

- **Max. 2 WSP valves**
- **Standby only**
- **Power consumption**
- **24 V DC**
- **Voltage tolerance +25% / –30%**

- **Max. 1 9-pin valve coil**
- **Display and power supply module**
- **Rotation speed sensor**
- **Controller valve**
- **200 pulses per revolution**
- **32-bit µprocessor**

- **Max. 4 speed sensors**
- **4 digit 7 segment display**
- **200 pulses per revolution**
- **32 Bit µprocessor**

- **Input frequency**
- **Max. 45 kHz**
- **5 button keypad**
- **Broken wire detection**
- **64 MB memory**

- **Max. operating pressure**
- **8.5 bar**
- **Max. 2 WSP valves**
- **Standby: only 10mA**
- **Low power wake-up circuit**

- **Digital V-level for direct relay control**
- **2x CAN**
- **1 x RS 485**

- **Voltage tolerance**
- **+25% / –30%**
- **Max. 1 A per valve coil**
- **Digital wake-up input**
- **Low power wake-up circuit**

- **Valve monitoring SIL 2**
- **Wake-up input from rotary encoder**
- **Current consumption 45 mA**
- **CBus for extension modules**
- **Nominal power (for each coil) 7 W**

- **Intelligent direction detection**
- **Current consumption standby 3 mA**
- **Current consumption 45 mA**
- **Current consumption 45 mA**
- **Current consumption 45 mA**

- **Max. 2 speed sensors per system**
- **Max. 4 valves per system**
- **2 separate rotational speed channels**
- **90° phase-shifted signals for direction detection**
- **Max. 6 sensors per system**

- **Max. 3 modules per system**
- **Max. 6 sensors per system**
- **Max. 6 sensors per system**
- **Max. 6 sensors per system**

- **Supply voltage 24/36 VDC (with PSM module, also 72 V and 110 V)**
- **Ambient temperature class**
- **–40 °C ... +70 °C**
- **UIC 541-05, EN 50155, EN 15595, TSI LOC&PAS 2008/57/EG**

**Refer to the system manuals for more information.**
**TECHNICAL DATA**

<table>
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<tr>
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<tr>
<td>PST 731-TG</td>
<td>Display and power supply module</td>
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<tr>
<td>PST 734-TG/144/16K</td>
<td>Rotating speed sensor</td>
</tr>
<tr>
<td>CPU 83x-TG</td>
<td>Controller</td>
</tr>
<tr>
<td>GV12 - 3</td>
<td>200 pulses/revolution</td>
</tr>
</tbody>
</table>

**Max. 4 speed sensors**
- Displays speed sensor
- 200 pulses/revolution
- 20 MHz processor

**Input frequency**
- Max. 45 kHz

**Keypad**
- 5 button keypad

**Sensor monitoring**
- 90° phase-shifted signals for direction detection

**Max. 3 modules per system**
- 90° phase-shifted signals for direction detection
- 2 separate rotational speed channels

**Max. 1 valve system per system**
- 2 separate rotational speed channels
- 90° phase-shifted signals for direction detection

**Max. 6 sensors per system**
- 2 separate rotational speed channels
- 90° phase-shifted signals for direction detection

**Max. 6 valves per system**
- 2 separate rotational speed channels
- 90° phase-shifted signals for direction detection

**Voltage tolerance**
- +25% / –30%

**Nominal power**
- (for each coil) 7 W

**Current consumption**
- 45 mA

**IP**
- IP30

**Supply voltage**
- 24/36 VDC (with PSM module, also 72 V and 110 V)

**Ambient temperature class**
- Tx –40 °C ... +70 °C

**Certified**
- UIC 541-05, EN 50155, EN 15595, TSI LOC&PAS 2008/57/EG

Refer to the system manuals for more information.