*PRODUCT***DATA**

OCTOBER 2019
Doc. No. Y095833 (EN- Rev. 006)

Smart Tire

Tyre Pressure Monitoring System (TPMS)

PD-551-000

Function

The **Tyre Pressure Monitoring System** (TPMS) is a system to alert the driver if any monitored tyre runs under its normal pressure or above its normal temperature. To do this a battery powered pressure sensor is rim mounted in each tyre. The sensor measures tyre pressure and temperature and sends the data wirelessly to a chassis mounted electronic control unit (ECU, Wireless Gateway Receiver). The ECU interprets the data from each tyre sensor and sends it to various user-selected devices. Possibilities are:

- via TEBS G2 * CAN on the trailer to the truck and then shown on the display

- via TEBS G2 * to a stand alone display

- via RS232 to an installed Telematic unit

- ECU*talk*® Diagnostics

- TIM G2

ECU, Wireless Gateway Receiver

External Antenna

Standard Tyre Sensor

Simultaneous communication with different systems is possible.
Using an external antenna optimises the wireless data transmission from sensor to final receiver.
The design and installation of the system means that all sensors are separately initialized. This prevents a false sensor signal and ensures that no signals from other systems on the trailer will be registered by the ECU.
* TPMS is supported by:

- TEBS G2.0 and TEBS G2.1 Brake Modules with "V04" in the Part Number or modules 'flashed' to Software version 700.124.1.8 or above

- All TEBS G2.2 Brake Modules
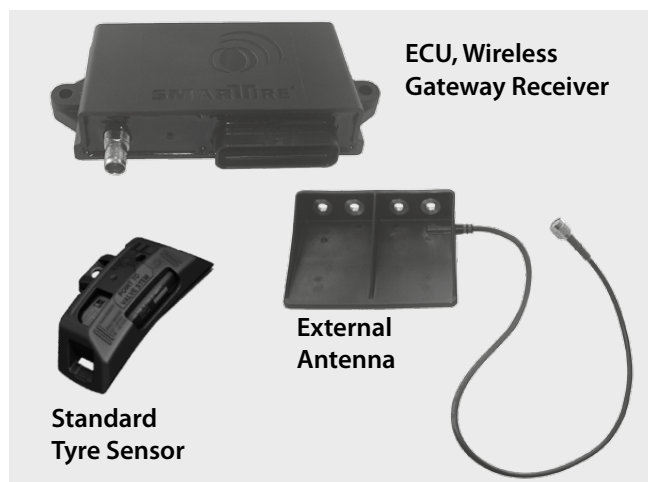
Technical Features

ECU, Wireless Gateway Receiver
Operating temperature range: -40 °C to +85 °C
Weight: 0.4 kg approx.
Voltage range: 9 to 36 V DC
Tyre Sensor
Operating temperature range: -40 °C to +120 °C
Weight: 0.05 kg approx.
Pressure range: 0 to 14 bar
External antenna
Operating temperature range: -40 °C to +85 °C
Weight: 0.2 kg approx.
Maintenance hand tool
Operating temperature range: -20 °C to +70 °C
Weight: 1.2 kg approx.

KNORR-BREMSE

*PRODUCT***DATA**

OCTOBER 2019
Doc. No. Y095833 (EN- Rev. 006)

Smart Tire

Tyre Pressure Monitoring System (TPMS)

PD-551-000

Range Overview

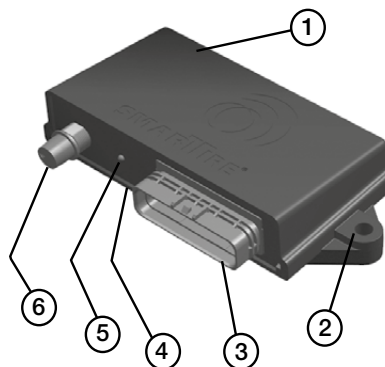| Part No.	Type No.	Description	
090.0011 [1] [3]	–	Maintenance Tool	
K141469	–	Tyre Sensor/Transmitter (black series), with Cradle, for ECU P/N 201.0014 V00 and V01 (replacement)	
K141466	–	Tyre Sensor/Transmitter black series, with Cradle, for ECU P/N 201.0014 V02 and higher (current ECU)	
201.0014 [2]	–	ECU - Wireless Gateway Receiver with UDS trailer	
240.0162	–	External Antenna	
260.0270	–	Coaxial cable 10FT TNC F / TNC M	Length 3 m
260.0254	–		Length 6 m
260.0266	–		Length 9 m
260.0232	–		Length 12 m
264.0228	–	Cradle for yellow sensor series	
K131302	–	Cradle for black sensor series (K141466)	
K092282	–	TNC T-piece to connect two antennae	
K126936	–	Strap, stainless steel clamp, suitable for wheel diameter 22.5 inch	
K126938	–	Strap, stainless steel clamp, suitable for wheel diameter 24.5 inch	

1) The part number may carry a suffix "F".
2) The part number of the module will carry two suffices, firstly "V##" which represents the software revision of the product, e.g. V01, V02 etc., and secondly "N##" which defines the packaging requirements of different market sectors, e.g. N00, N50. Example: 201.0014V00N00 - is supplied with software to revision 00 and is supplied without packaging.
3) Functional replacement of LF Tool (090.0021)

KNORR-BREMSE

PRODUCT**DATA**

OCTOBER 2019
Doc. No. Y095833 (EN- Rev. 006)

Smart Tire

Tyre Pressure Monitoring System (TPMS)

PD-551-000

Features

ECU, Wireless Gateway Receiver (201.0014VxxNxx)

1) **Housing**
Robust black nylon 6/6 plastic housing
2) **Mounting**
2 x Ø7.5 mm reinforced holes for chassis mounting
3) **Connector**
26-way TYCO AMP Superseal
4) **Potting**
Polyurethane material to ensure IP67 protection
5) **Diagnostic LED**
Red LED with blink codes for various diagnostic conditions
6) **Antenna connection**
TNC threaded connection to connect supplementary antenna

- Communication via J1939 interface (J1708 option)

- RS232 interface option (e.g. to Telematics unit, third party ECU or for testing)

- 3 control outputs to drive LED warning light, incandescent bulb, buzzer, or other control function (2 x 2A high-side, 1 x 100mA low-side)

- Weather-proof, robust chassis-mount enclosure (IP67 rating)

- Tested to SAE J1455 standards. Radio and EMC approvals in NAFTA, EU

- Retains alerts after power down and has on-board LED for advanced diagnostics

- Programmable pressure and temperature alert levels including temperature compensation

- Internal antenna plus connection for external antenna

On-board LED

MAIN CONNECTOR
TYPE: TYCO AMP 1473711-1

TNC Connector
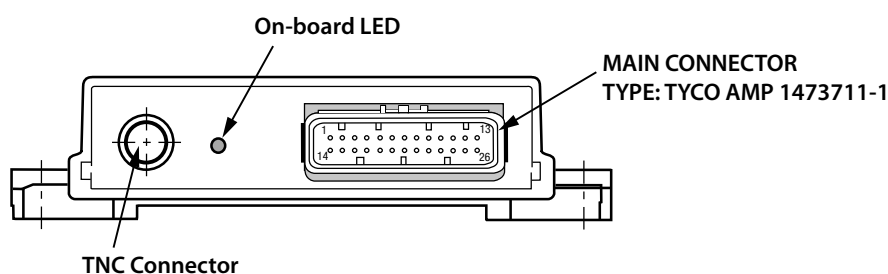
Line colours versus Pin Numbers for SmartWave Harnesses (configuration may vary by harness in terms of populated pins):

PIN	1	2	3	4	5	6	7	8	9	10	11	12	13
Line Colour	Black	Red	Orange	Red	Grey	Pink	White & RED	Purple	White	Blue	Green	Yellow	Black
PIN	14	15	16	17	18	19	20	21	22	23	24	25	26
Line Colour	Black	Red	Black	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Black	Clear or white	Black

The general purpose I/O lines are:

- 3 digital inputs 0 - 32 V (pins 4, 5 and 6)

- 2 high-side drivers, 2 A max. each (pins 7 and 8)

- 1 low-side LED driver, 0.15 A max. (pin 3)

- Pins 1, 14, 24, 26, 13: Common Grounds

LEFT

Ground	14	1	Ground
Ignition ON Voltage	15	2	Ignition ON Voltage
Ground	16	3	Led Output
X	17	4	Auxiliary Input 2
X	18	5	Auxiliary Input 1
X	19	6	Lift Axle Position
X	20	7	Auxiliary Output
X	21	8	LAMP Output
X	22	9	RS-232 Receive
X	23	10	RS-232 Transmit
Ground	24	11	CAN Low
CAN Shield	25	12	CAN High
Ground	26	13	Ground

RIGHT

KNORR-BREMSE

PRODUCT**DATA**

## Smart Tire

Tyre Pressure Monitoring System (TPMS)

Tyre Pressure and Temperature Sensor/Transmitter (without Cradle)

1) **Housing**
   Lightweight, 2 piece plastic housing
2) **Battery**
3) **Shock sensor**
   Senses vehicle motion and wheel rotation direction
4) **ASIS**
   Application Specific Integrated Sensor – pressure and temperature sensor that also provides the processing of the data
5) **LF Coil**
   Acts as pick-up for the hand-tool signal to cause an activation of a transmission or change modes

- Measures air pressure, temperature, internal battery voltage and detects motion of the wheel
  - Operating pressure accuracy ±0.165 bar (±2.4 psi)
  - Operating temperature accuracy ±3 °C @ -20 to 70 °C
- Sensor function:
  - Measures pressure & temperature every 12 seconds; transmits immediately if pressure difference is greater than 0.2 bar (3 psi), otherwise every 3 to 5 minutes
- Universal attachment to wheel via stainless steel strap
- Self contained lithium battery power with life >5 yrs
- Transmits data to receiver wirelessly on 433.92 MHz
- Tested and proven with unmatched environmental resistance
- Can be activated by hand-tool for manual pressure checks

External Antenna (240.0162)
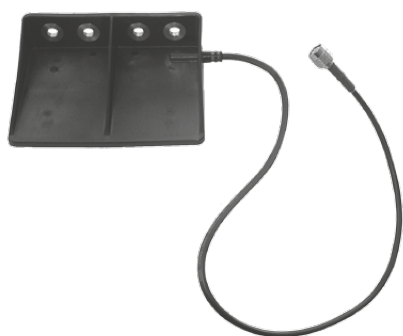
- Receives the RF data from the wheel modules and transmits to the receiver
- Robust, easy to install and inexpensive solution

Antenna T-piece (K092282)

- Permits two antennae to be linked on trailers where the body or load may diminish the signal, such as steel carrying vehicles

KNORR-BREMSE

PRODUCT **DATA**

OCTOBER 2019
Doc. No. Y095833 (EN- Rev. 006)

Smart Tire

Tyre Pressure Monitoring System (TPMS)

PD-551-000

Maintenance Tool (090.0011) [1]

On/Off
Button

Antenna

Flash
Connector

Display
Screen

Selection
Buttons

- Robust service and maintenance tool to support the TPMS
- Used in conjunction with sensors to check pressure and temperature of tyre
- Displays and records sensor ID, pressure, temperature and battery status
- Can be used to learn new sensor IDs and program them into the receiver
- Adaptable for altitude compensation
- Ability to add new features via software upload

Cradle for yellow sensor series (264.0228)

- Replacement Cradle for yellow Tyre Sensor/Transmitter

Cradle for black sensor series (K131302)

- Replacement Cradle for black Tyre Sensor/Transmitter

Note:
When working on a trailer ensure that all typical safety instructions are followed - see Document No. Y075876.
For further instructions and information please contact your Knorr-Bremse representative.

1)   The part number may carry a suffix "F".

KNORR-BREMSE ((K))

PRODUCT*DATA*

OCTOBER 2019
Doc. No. Y095833 (EN- Rev. 006)

Smart Tire

Tyre Pressure Monitoring System (TPMS)

PD-551-000

Dimensions (mm)

ECU, Wireless Gateway Receiver (201.0014VxxNxx)

152.40

89.41

168.15

40.13

13.72
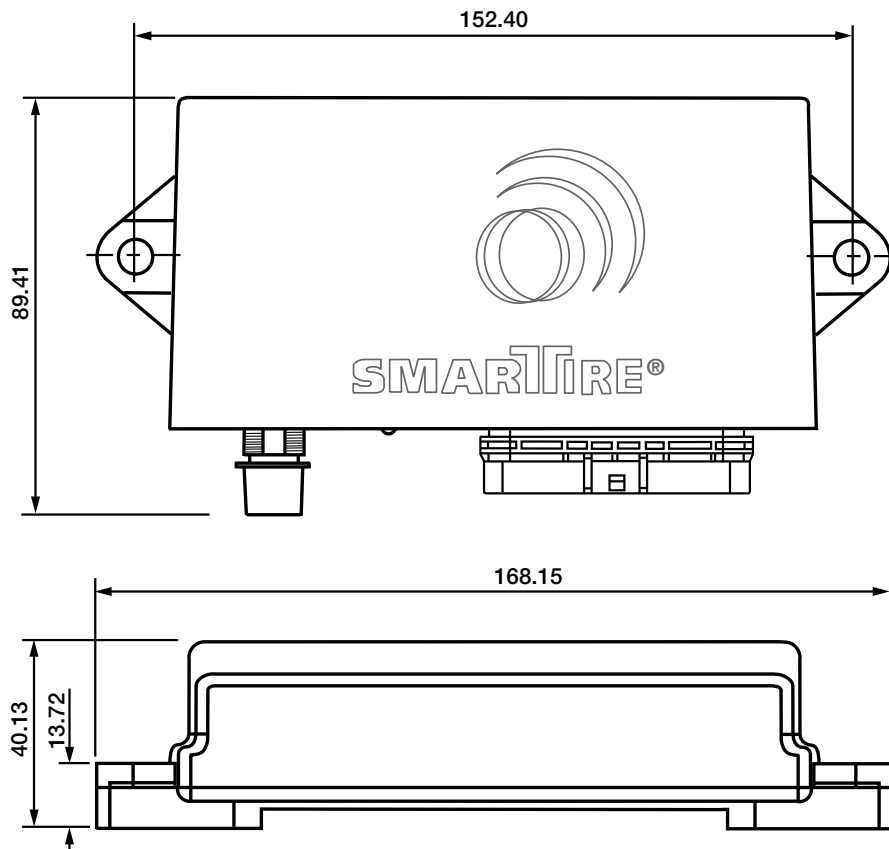
Tyre Sensor, Transmitter with Cradle (K141466)

30mm

35mm

91mm

KNORR-BREMSE

PRODUCT **DATA**

OCTOBER 2019
Doc. No. Y095833 (EN- Rev. 006)

Smart Tire

Tyre Pressure Monitoring System (TPMS)

PD-551-000
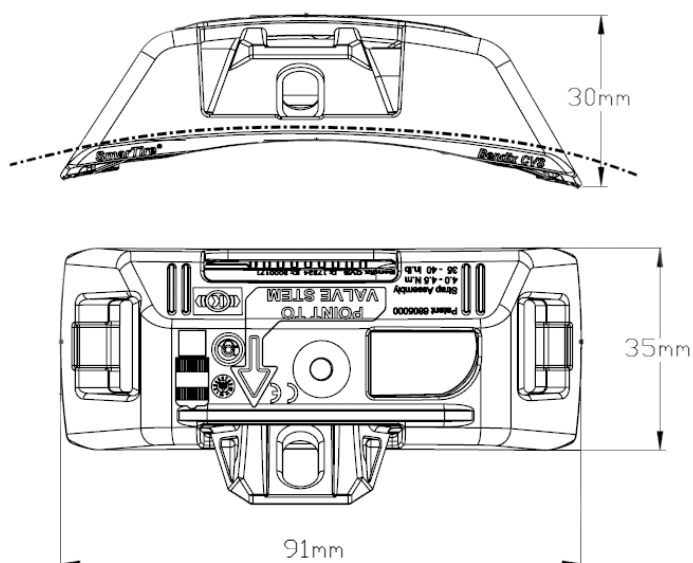
External Antenna (240.0162)

Antenna T-piece (K092282)

KNORR-BREMSE

PRODUCT DATA

Smart Tire

Tyre Pressure Monitoring System (TPMS)
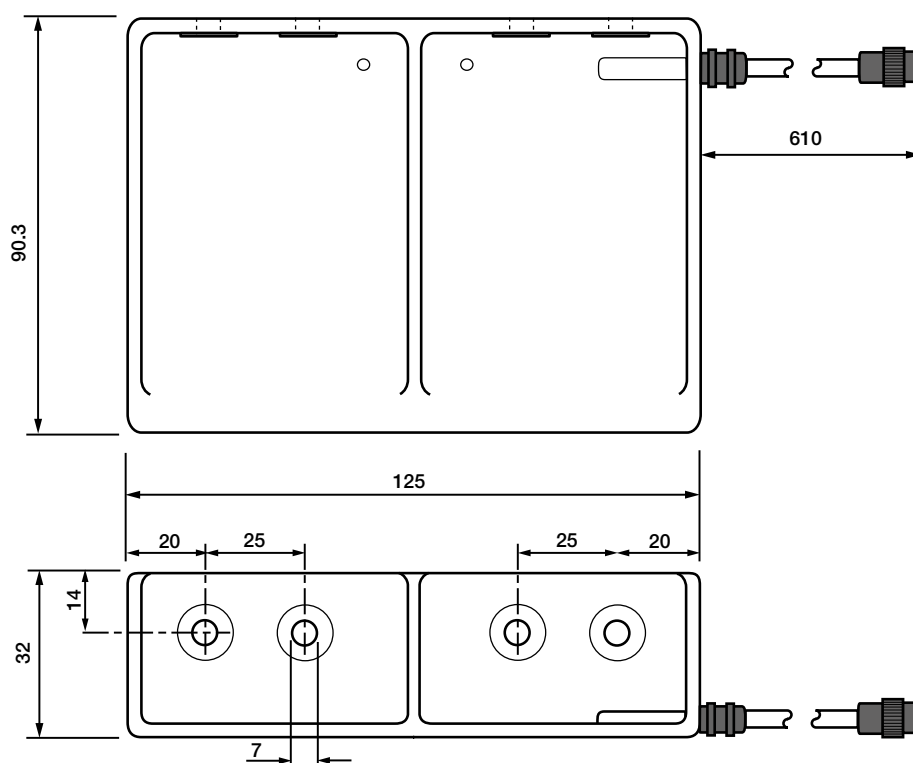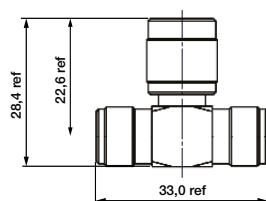
Monitoring / Diagnostic

Several methods of monitoring the tyre pressure and temperature are available:

Directly on the trailer

- Knorr-Bremse offers the TIM G2 (Part No. K009166; see PD-273-920, Document No. Y050665) as a trailer monitoring system for tyre pressure and temperature

- Graphical display

- Simple operation (3 buttons)

- Individual tyre pressure read out

- Tyre temperature

- Deviation from nominal pressure (incl. temperature compensation)
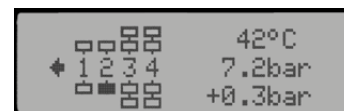
and / or

Via TEBS G2.0 / G2.1 / G2.2 and CAN to display in the cab

- If you require this variant, for further information please contact your truck partner or local Knorr-Bremse representative.

and / or

Via Telematic link

- There are two posibilities:
  - via RS232 (by arrangement with your Telematic supplier - additional cables required)
  - via J1939 (by arrangement with your Telematic supplier - installation required)

and

Diagnostics via ECU*talk*®
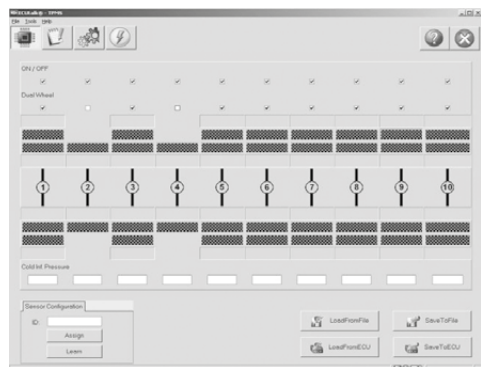
- This platform runs all Knorr-Bremse diagnostic programs (for TEBS4, TEBS G2, TIM, TIM G2, TRM, etc.) and from Version 2.2.4.3 via this diagnostic tool it is possible to access the tyre pressure monitoring system.

- To do this it is necessary to obtain the Knorr-Bremse diagnostic hardware and software and additionally a PIN for using the ECU*talk*®

- Diagnostic platform for programming via 9-pin J1939 connection

- Program new pressure sensors

- Changing tyre pressure and temperature parameters

- Fault report

- To activate the link between ECU*talk*® and TPMS, in ECU*talk*® use the "Change Configuration" button and navigate to find the "TPMS connected" option. Select "Yes" then "OK".

KNORR-BREMSE

PRODUCT**DATA**

Smart Tire

Tyre Pressure Monitoring System (TPMS)
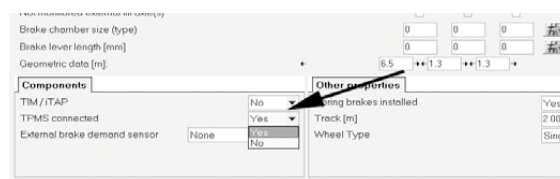
## Diagnostics directly at the ECU, Wireless Gateway Receiver

- If there is no ECU*talk*® available, you also can diagnose the system at the ECU directly. An LED for that purpose is installed.

- If the LED is blinking and there is no data being transmitted from the receiver, but the display is powered and has initialized, check the blink code:

Alarms	Priority	On-board LED	Solution
No alarm	0	Off	
Second level low pressure (SAL)	13	Off	
Previous SAL	13	Off	
SAL cleared	0	Off	
First level high pressure (FAL)	11	Off	
First level low pressure (FAL)	11	Off	
FAL cleared	0	Off	
High temperature	9	Off	
Previous high temperature	9	Off	
High temperature cleared	0	Off	
RF sub-section fault	7	Pattern flashing code: 7	Replace ECU, Wireless Gateway Receiver
Internal error	7	Pattern flashing code: 7	Replace ECU, Wireless Gateway Receiver
ROM to both copy performed	5	Pattern flashing code: 5	Check settings with DDT
Set up fault	5	Pattern flashing code: 5	Check settings with DDT
Sensor fault set	3	Pattern flashing code: 3	Diagnose sensor fault
Previous sensor fault	3	Pattern flashing code: 3	Diagnose sensor fault
Sensor fault cleared	0	Off	
Factory to custom copy performed	1	Pattern flashing code: 1	Normal operation
Custom to factory copy performed	1	Pattern flashing code: 1	Normal operation
Black box initialized	1	Pattern flashing code: 1	Normal operation
Watchdog reset	1	Pattern flashing code: 1	Normal operation
Autolearn complete	1	Pattern flashing code: 1	Normal operation

Note:
The flash pattern will have periods of 0.3 seconds ON and 0.3 seconds OFF repeating every 6 seconds. The number of ON phases in every 6-second period will identify the code.

Example

ON

1   **2**   Code = 2

OFF

0.3 s | 0.3 s | 0.3 s   6 s
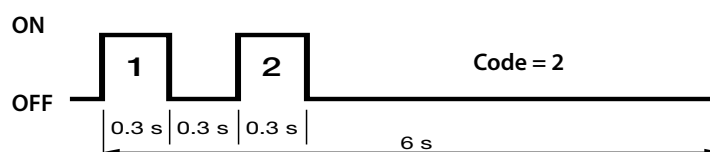
Note:
For further instructions and information please contact your Knorr-Bremse representative.

KNORR-BREMSE «(K)»

System Configurations
Directly on the trailer

No.	Description	Length
1	Diagnostic cable K022272	4 m or 6 m
2	5 V CAN Splitter cable K027815	1 m + 3 m
3	TIM G2 K009166	1m
4	TPMS cable K027823	0.9 m

ECU, Wireless Gateway Receiver

TIM G2

TEBS G2
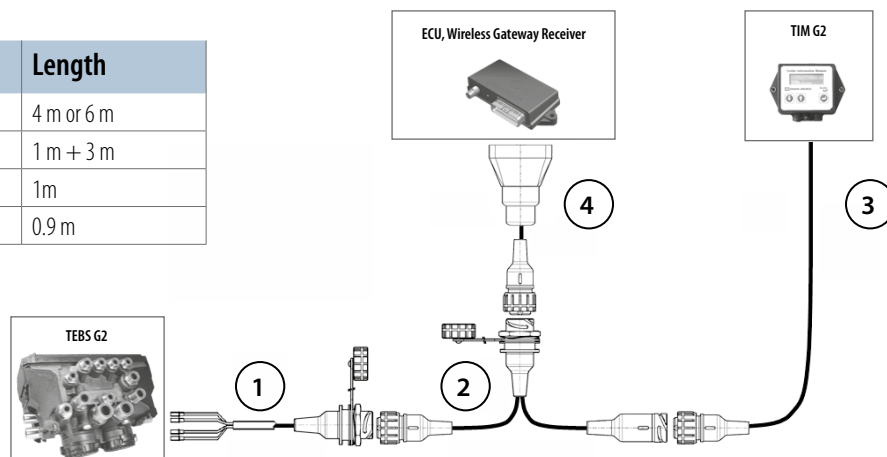
For drawbar trailers

No.	Description	Length
1	Diagnostic cable K022272	4 m or 6 m
2	5 V CAN Splitter cable K027815	1 m + 3 m
3	Power + CAN for TEPM *	3 m
4	TIM G2 K009166	1m
5	TPMS cable K027823	0.9 m
*	See PD-272-020, Document No. Y107795	

ECU, Wireless Gateway Receiver

TIM G2

TEPM-S or -P

TEBS G2

KNORR-BREMSE «(K)»

PRODUCT*DATA*

OCTOBER 2019
Doc. No. Y095833 (EN- Rev. 006)

Smart Tire
Tyre Pressure Monitoring System (TPMS)

PD-551-000
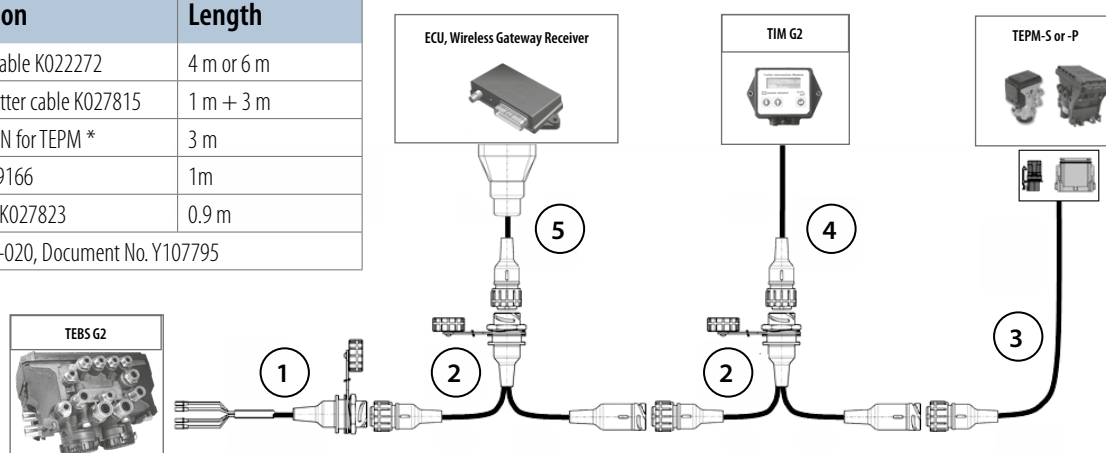
Revision Details

Rev. 005	January 2019	New Layout
Rev. 006	October 2019	New part numbers added on page 2

Knorr-Bremse Group

Knorr-Bremse Systems for Commercial Vehicles
Moosacher Strasse 80 | 80809 Munich | Germany
Tel: +49 89 3547-0 | Fax: +49 89 3547-2767
WWW.KNORR-BREMSECVS.COM

Up-to-date information on our products can be found on our website www.knorr-bremsecvs.com