

Product Manual

System and Installation Instructions for KB4TA and KB4TA D



KB4TA and KB4TA D

- 24 Volt Multi-channel Trailer ABS
- Automatic anti-lock configuration to 2S/2M and 4S/2M
- Several diagnostic options available
- Retrofittable to existing trailers

KB4TA

- With integrated anti-compounding

KNORR-BREMSE



Revision Details

Rev. 000	July 2016	New document.
Rev. 001	September 2016	Changes made to suit the Brazilian market.

Introduction

This Product Manual is designed to provide an overview of the functions and features of the KB4TA and KB4TA D brake systems available from Knorr-Bremse. It is made up of individual documents, each covering a major module or feature of the system. These documents carry two forms of reference number:

- A Document Number, Y*****
- A Product Data Number, PD-***-***.

References within a document to other documents does not necessarily imply that those other documents are contained in this manual but generally they can be found on our website as described below.

Whilst every effort has been made to ensure the accuracy of the data in this manual, we reserve the right to amend or change this information without notice. The latest versions of individual documents and this manual can be found on our website: www.Knorr-BremseCVS.com in the Documentation Download section by entering either of the two forms of reference number in the search field. The documents can be downloaded free of charge.

Should you find any errors or omissions or have any comments regarding manual layout, please send the details to your local Knorr-Bremse representative.

Disclaimer

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Note: If service work is carried out on a vehicle based on information taken from this document, it is the responsibility of the workshop to ensure the vehicle is fully tested and in full functional order before the vehicle is returned into service. Knorr-Bremse accepts no liability for problems caused as a result of appropriate tests not being carried out.

This disclaimer is an English translation of a German text, which should be referred to for all legal purposes.

Any legal disputes arising from the use of this information shall be subject to German law.

Glossary of Abbreviations

Doc. No. Y250903 (EN - Rev. 000)
July 2016

ABS	Anti-lock Braking System
AUXIO	Auxiliary Input/Output
CAN	Controller Area Network
ECE	Economic Commission for Europe (United Nations)
ECU	Electronic Control Unit
EU	European Union (formerly EEC -European Economic Community)
GND	Ground
IAM	Independent Aftermarket
IGN	Ignition (vehicle power supply)
ISS	Integrated Speed Switch
MV	Modulator Valve
OE	Original Equipment
OEM	Original Equipment Manufacturer
RtR	Reset-to-Ride Height
TT CAN	Tractor Trailer CAN (ISO11992 24 v)
USB	Universal Serial Bus
WSS	Wheel Speed Sensor

Note: The safety advice listed below is applicable to general service and diagnostic work on braking systems. Also observe any recommendations from the axle or vehicle manufacturer concerning towing, jacking-up and securing the vehicle.

CAUTION: KNORR-BREMSE IS NOT LIABLE FOR ANY INJURIES OR DAMAGES CAUSED BY IMPROPER USE OF SPECIFIED SERVICE KITS AND/OR SERVICE TOOLS. FURTHERMORE, MISUSE OF TOOLS OR INCORRECT INSTALLATION OR APPLICATION OF SERVICE KITS MAY RESULT IN DAMAGE OR POTENTIALLY UNSAFE VEHICLE OPERATIONS. IN THIS CASE, KNORR-BREMSE DOES NOT HAVE ANY WARRANTY OBLIGATIONS.

Before and during working on or around compressed air systems and devices, the following precautions should be observed:

- 1 Always wear safety glasses when working with air pressure.
- 2 Never exceed the vehicle manufacturer's recommended air pressures.
- 3 Never look into air jets or direct them at anyone.
- 4 Never connect or disconnect a hose or line containing pressure; it may whip as air escapes.
- 5 When removing or servicing a product, ensure all pressure related to the specific system it is contained in has been depleted to 0 bar. Be aware that if the vehicle is equipped with an air dryer system, it can also contain air pressure along with its purge reservoir, if fitted, even after pressure has been drained from the other reservoirs.
- 6 If it is necessary to drain the air pressure from reservoirs, etc., keep away from brake actuator push rods and levers since they may move as system pressure drops. On vehicles fitted with air suspension, it is advised when undertaking such work, to support the chassis from sudden lowering and therefore prevent any possibility of being trapped between the chassis and axle or ground.
- 7 Park the vehicle on a level surface, apply the parking brakes, and always chock the wheels as depleting vehicle air system pressure may cause the vehicle to roll.
- 8 When working under or around the vehicle, and particularly when working in the engine compartment, the engine should be shut off and the ignition key removed. Where circumstances require that the engine be running, EXTREME CAUTION should be taken to prevent personal injury resulting from contact with moving, rotating, leaking, heated or electrically charged components. Additionally, it is advisable to place a clear sign on or near the steering wheel advising that there is work in progress on the vehicle.
- 9 When working on vehicles equipped with air suspension, to guard against injury due to unexpected downward movement of the chassis caused by sudden pressure loss in the suspension system, ensure that the vehicle chassis is mechanically supported with a 'prop' between the chassis and the axle or between the chassis and the ground.
- 10 Examine all pipework for signs of kinks, dents, abrasion, drying out or overheating. Be aware that kinks in pipework may result in air pressure being trapped in the pipework and associated equipment. Replacement hardware, tubing, hose, fittings, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems. Check the attachment of all pipework; it should be installed so that it cannot abrade or be subjected to excessive heat.
- 11 Components with stripped threads or damaged/corroded parts must be replaced completely. Do not attempt repairs requiring machining or welding unless specifically stated and approved by the vehicle or component manufacturer.
- 12 Never attempt to install, remove, disassemble or assemble a device until you have read and thoroughly understood the recommended procedures. Some units contain powerful springs and injury can result if not properly dismantled and reassembled. Use only the correct tools and observe all precautions pertaining to use of those tools.

- 13 Before removing any device note its position and the connections of all pipework so that the replacement/serviced device can be properly installed. Ensure that adequate support or assistance is provided for the removal/installation of heavy items.
- 14 Only use genuine replacement parts, components and kits as supplied by Knorr-Bremse or the vehicle manufacturer. Only use the recommended tools as specified in related Knorr-Bremse instructions.
- 15 The serviced or replaced product must be checked for correct function and effectiveness.
- 16 If products have been dismantled, serviced or replaced, whose performance could affect braking performance or system behaviour, this should be checked on a roller dynamometer. Bear in mind that a lower performance may be experienced during the bedding-in phase if new brake pads/linings and/or brake discs/drums have been fitted.
- 17 The use of impact screwdrivers or impact wrenches in conjunction with Knorr-Bremse service tools for air disc brakes is not permitted. The service tools are not designed for such use. It is likely that the tools or the vehicle will be damaged and there is a serious risk of injury – see **Caution** on previous page.
- 18 Do not use compressed air to clean the disc brake. Avoid air contamination of brake dust.
- 19 Prior to returning the vehicle to service, make certain that all components and the complete brake systems are leak free and restored to their proper operating condition.

Welding

To avoid damage to electronic components when carrying out electrical welding, the following precautions should be observed:

- 1 In all cases, before starting any electrical welding, remove all connections from any electronic control units or modules, noting their position and the order in which they are removed.
- 2 When re-inserting the electrical connectors (in reverse order) it is essential that they are fitted to their correct assigned position - if necessary this must be checked by PC Diagnostics.



Disposal of Waste Equipment by Business Users in the European Union

This symbol on the product, packaging or in user instructions, indicates that this product must not be disposed of with other general waste. Instead, it is your responsibility to dispose of the waste electrical and electronic parts of this product by handing them over to a company or organisation authorised for the recycling of waste electrical and electronic equipment. For more information about arrangements for waste equipment disposal please contact your Knorr-Bremse distributor or local Knorr-Bremse representative.

See Y075876 for latest revision.

Revision Details

Rev. 000 July 2016

New document

Title	Doc. No.	PD No.
KB4TA System Overview	Y250904	PD-203-400
KB4TA D System Overview	Y250905	PD-203-500
KB4TA ABS Module	Y250906	PD-203-430
KB4TA D ABS ECU	Y250907	PD-203-530
KB4TA/KB4TA D System Components	Y250908	PD-203-360
KB4TA/KB4TA D Cables	Y250909	PD-203-380
KB4TA/KB4TA D System Diagnostics	Y250910	PD-203-390
KB4TA System Diagrams	Y250911	PD-203-480
KB4TA D System Diagrams	Y250913	PD-203-580

Contents

Doc. No. Y251073 (EN - Rev. 000)
July 2016

Revision Details

Rev. 000	July 2016	New document.
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Function

The Knorr-Bremse **KB4TA module ES1305** (see PD-203-430, Document No. Y250908) is an integrated ABS electronic control unit and dual modulator valve for air braked trailers with mechanical or air suspension.

KB4TA is designed to work in trailer systems powered via ISO 7638 but the addition of ISO 1185 stop lamp powering is included as standard as a safety feature so, in the event that there is no ISO 7638 powering, the ABS function is maintained.

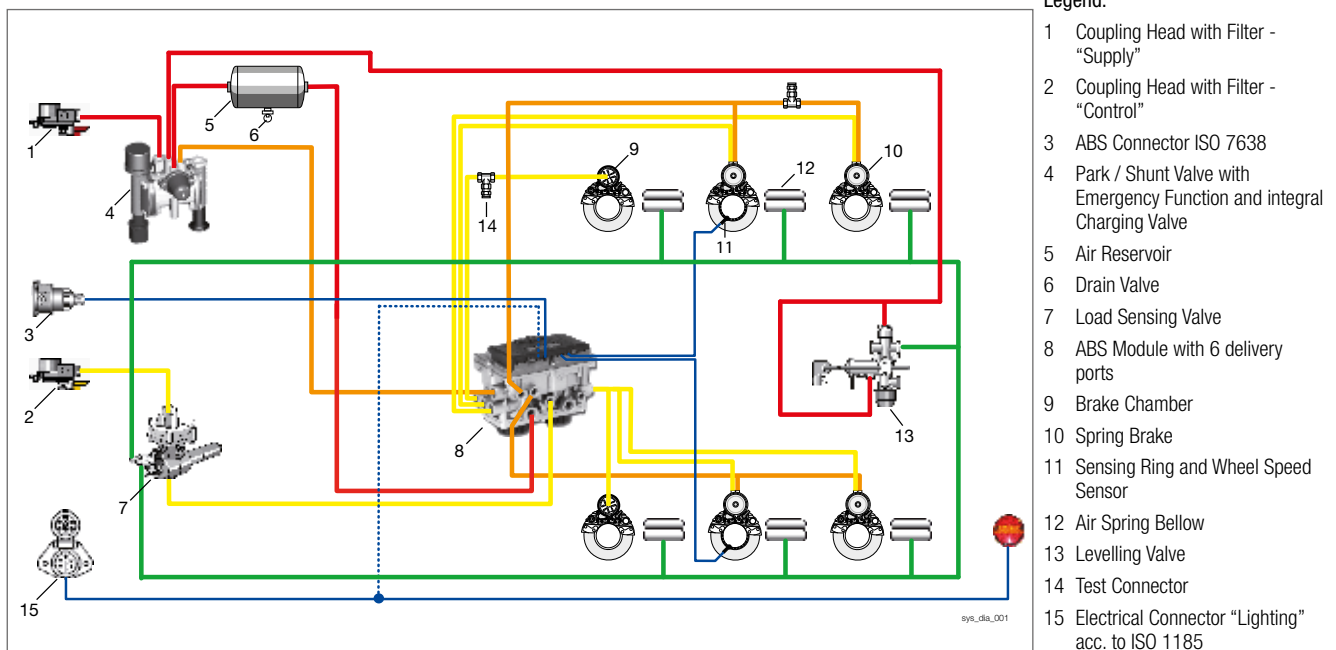
Note: Stop lamp powering should only be considered as a backup in the event of failure of the ISO 7638 connection.

The **KB4TA** module is designed for all normal system variants from 2S/2M up to 4S/3M. The configuration as supplied is 2S/2M, but with the integrated auto-configuration the module detects additional sensors and adjusts upward to 4S/2M automatically. Other configurations and additional functions can be quickly and effectively achieved using PC Software ECUTalk®. For 4S/3M applications an additional external (third) ABS modulator is necessary (see PD 203-360, Document No. Y250908).

The **KB4TA** brake system is capable of working with drum brake or disc brakes and the systems shown below are only typical. For more systems see PD-203-480, Document No. Y250911.



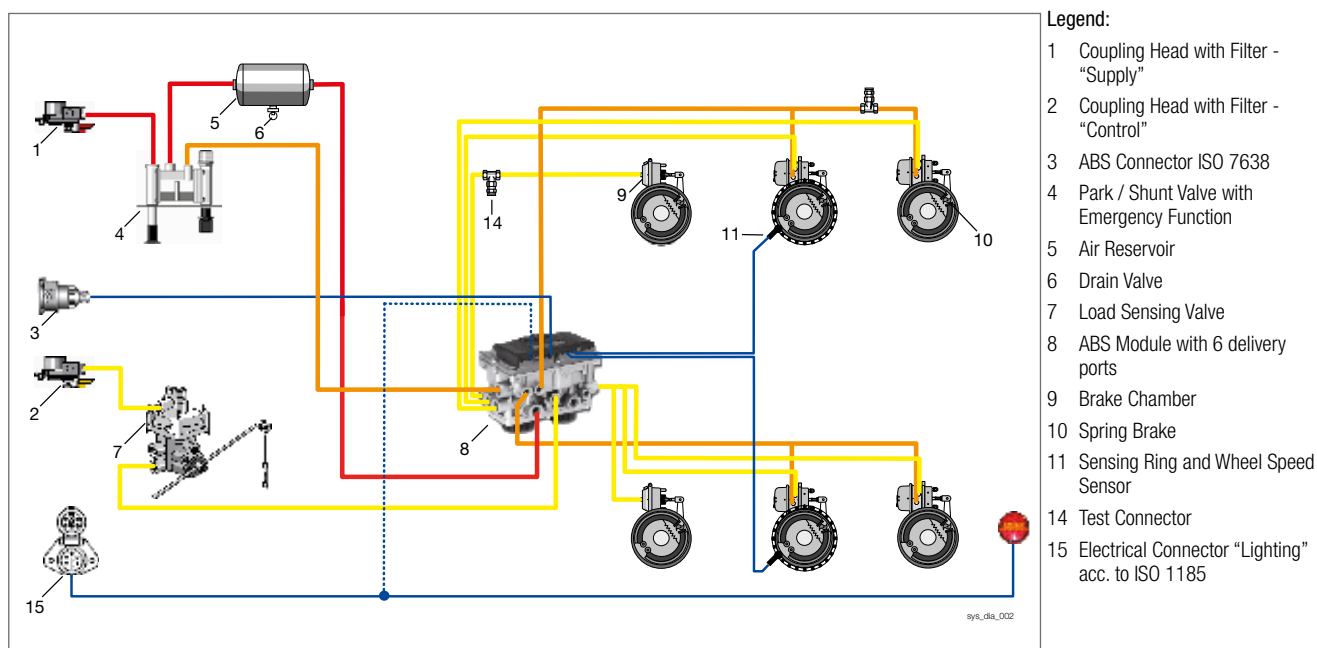
KB4TA System diagram (2S/2M) for semi-trailer with air suspension and disc brakes



KB4TA System Overview

Doc. No. Y250904 (EN - Rev. 000)
July 2016

KB4TA System diagram (2S/2M) for semi-trailer with mechanical suspension and drum brakes



System Description

Power up Sequence

At power up, the KB4TA module performs a series of self-checks that can assist a technician to determine the ABS system status and configuration.

Trailer ABS Warning Lamp

At power up (when no faults are detected) the trailer ABS warning lamp in the towing vehicle will turn on for approximately 2 seconds as a bulb check and then turn off. If a fault has been detected the bulb will remain on. The same warning lamp sequence is produced by the trailer mounted headboard warning lamp (when installed)

Modulator 'Chuff Test' at Power up

At power up, the KB4TA module activates a modulator 'chuff test'. This electrical and pneumatic ABS modulator test can help the technician identify problems with modulator installations and/or wiring.

With brake pressure applied, a properly installed modulator will generate five rapid audible 'chuffs' of air pressure on the left internal modulator followed by five 'chuffs' on the right modulator. There will then be five further 'chuffs' on the additional axle modulator if fitted.

If the modulator is wired incorrectly, the modulator will only produce one 'chuff', or no 'chuffs' at all. If a fault is detected during the modulator 'chuff test', compare the wiring and piping to the electrical system schematic and make any necessary alterations.

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Operation

KB4TA provides basic service braking in addition to the ABS function.

ABS Operation

The KB4TA module is used to prevent the wheels of a trailer locking whilst braking. The friction between the tyre and the road is created by relative movement between their two surfaces, i.e. difference in surface speeds of road and tyre and is referred to as 'slip'. It is well known that a wheel operating on a wet surface has reduced friction (adhesion) and hence can transmit reduced braking effort to the road.

The KB4TA module constantly monitors the rotational speed of all sensed wheels on the trailer by using the wheel speed sensor outputs. It then calculates an average of these wheel speeds (Reference Speed) and constantly compares it with the speed of each wheel.

During braking, if one or more wheels is on a slippery surface and is unable to support the level of braking that it is being asked to contribute, the wheel speed will drop relative to the Reference Speed, i.e. there will be 'slip', and deceleration of that wheel will increase. The KB4TA module will normally detect this during the application of the brake and, before the wheel becomes locked, send an electrical signal to the appropriate modulator to reduce the pressure in the service brake actuator(s) on that wheel or group of wheels. Once the wheel starts to accelerate and the slip is reduced, the KB4TA module will send an electrical signal to the modulator to gradually increase the pressure until either the wheel again starts decelerating or the requested level of braking is reached. It is therefore possible to maximise the utilisation of the available adhesion to improve stopping distance whilst maintaining stability.

Normal Braking

During normal braking, the KB4TA module system operates as two standard relay valves in parallel. If the ECU does not detect excessive wheel slip, ABS control will remain inactive while the vehicle is braked according to driver demand.

Odometer Function

Odometer

The KB4TA module has an odometer function to provide a means of storing the accumulated mileage of the trailer. The mileage is computed by utilizing information calculated from the wheel speed sensors. This feature will accurately store mileage information up to 1,000,000 km. The accuracy of readings higher than this cannot be guaranteed. The mileage can be displayed using PC diagnostics ECUtalk® or through blink codes.

Trip Counter

The KB4TA module provides a counter to record the trip mileage. The feature is accessed through PC diagnostics ECUtalk®.

Service Interval

The KB4TA module provides a feature that can be used to indicate a service interval for the trailer. The service interval can be accessed via PC diagnostics ECUtalk®. If configured, the KB4TA module can flash the warning lamp when the vehicle is at standstill and the ABS is first powered to indicate when the service interval has been exceeded. Configuration of the KB4TA Module.

KB4TA System Overview

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Configuration of the KB4TA Module

ABS Auto Configuration

When manufactured the KB4TA module has a default ABS configuration of 2S/2M. If the ABS configuration has not been manually set using the diagnostic tool ECUtalk® then, at power up, if the KB4TA detects additional sensors it will perform an auto-configuration. An auto-configuration only adjusts upward (e.g. from 2S/2M to 4S/2M). **A configuration will not be accepted if a wheel speed signal is generated at the time of configuration.**

A 4S/3M configuration cannot be realised automatically, this requires manual configuration with the diagnostic tool ECUtalk®.

ABS manual Configuration

Depending upon the required ABS configuration it may be necessary to use the diagnostic tool ECUtalk® to manually configure the KB4TA module, i.e. 4S/3M ABS configuration.

Once manually configured, the KB4TA module will no longer auto-configure, unless the "Reset ABS Configuration" option is used in the diagnostic tool ECUtalk®.

Auxiliary Configuration

The KB4TA module supports the configuration of auxiliary functions on AUXIO1 and AUXIO2 using the diagnostic tool ECUtalk®. However, the associated pins can only be configured as AUXIO if they are not already configured as 4S/3M and stop lamp power respectively.

Part number K004246 (ES1305) will only allow the AUXIO to be configured as headboard warning light, 24V (Power Supply) or OFF.

Part number K004236 (ES1305) will allow the AUXIO to be configured as headboard warning light, 24V (Power Supply), RtR, ISS, ABS Active or OFF.

Both part numbers additionally support configuration of the AUXIO as Pad Wear inputs.

Non Standard Tyre Sizes

The KB4TA module allows for tyre rolling radius and sensing ring tooth count parameters to be set for each axle using a diagnostic tool ECUtalk®. This setting is necessary for the module to accurately calculate the vehicle speed and determine the odometer mileage. Wheels of the same axle must be set to the same rolling radius and sensing ring tooth count. In most cases, these parameters are set by the trailer OEM and do not need to be adjusted. In the case of a service replacement unit, always check that these parameters are set to match the vehicle. Refer to the manufacturer's tyre specification for correct values. Sensing ring tooth count is defaulted to 100 teeth, but can be adjusted between 60 and 120 teeth.

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Error Detection

The KB4TA module contains self-testing diagnostic circuitry that monitors the ABS components and wiring. When the module senses an erroneous system condition, it activates the trailer ABS warning lamp in the towing vehicle (and headboard if installed), disables all or part of the ABS functions and stores the error in memory as a Diagnostic Trouble Code (DTC).

For some trouble codes, the KB4TA module will automatically reset and clear the “active” DTC once the error has been corrected. When an “active” DTC is cleared automatically, the error remains stored in memory as an „inactive“ DTC and can be viewed using blink code diagnostics or ECUTalk®. However repeated occurrences of certain errors will result in the DTC being “latched” which means the error remains “active” even if the condition is only intermittent.

Once the code is latched, a manual reset will be necessary. After the problem is resolved, trouble codes can be deleted using the diagnostic tool ECUTalk®.

ABS Shutdown

Depending on the detected error and the ABS configuration the ECU will either partially or totally disable the ABS function as follows:

- 2S/2M configurations: total shut down.
- 4S/2M configurations: Reduce to 2S/2M
- 4S/3M configurations: Reduce to 2S/2M.

The above shutdown modes are dependent on the type and location of the detected error. For more information see ABS Electronics Information Document Y023867. In all cases a warning signal will be transmitted to illuminate the trailer ABS warning lamp which will remain “ON” as long as the ignition is in the “RUN” position. In cases where the ABS is completely disabled, the vehicle reverts to normal braking (without ABS intervention).

ABS faults should be rectified at the earliest opportunity.

ECU Errors

If an ECU related problem is detected the ABS function is disabled while normal brake control remains available.

Low and High Voltage Operation

Should the supply voltage to the ECU be outside the defined voltage range (18 to 32V) the ABS function is disabled while normal brake control remains available.

For further information on diagnostics see PD-203-390, Document No. Y250910.

KB4TA System Overview

Doc. No. Y250904 (EN - Rev. 000)
July 2016

Other Documentation

- KB4TA Trailer anti-lock braking system test report (*RDW-20160001*)
- KB4TA ABS Information document (*Y023866*)
- KB4TA Electronics Information document (*Y023867*)
- Installation Instructions "Wiring/Harness, Modular System" (*Y011788*)

Revision Details

Rev. 000 July 2016 New document.



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Function

The Basic Knorr-Bremse **KB4TA D** brake system comprises a KB4TA D ECU ES1220 (see PD-203-530, Document No. Y250907) plus two ABS Modulator Valves (see PD-203-360, Document No. Y250908) and is designed for air braked trailers with mechanical or air suspension.

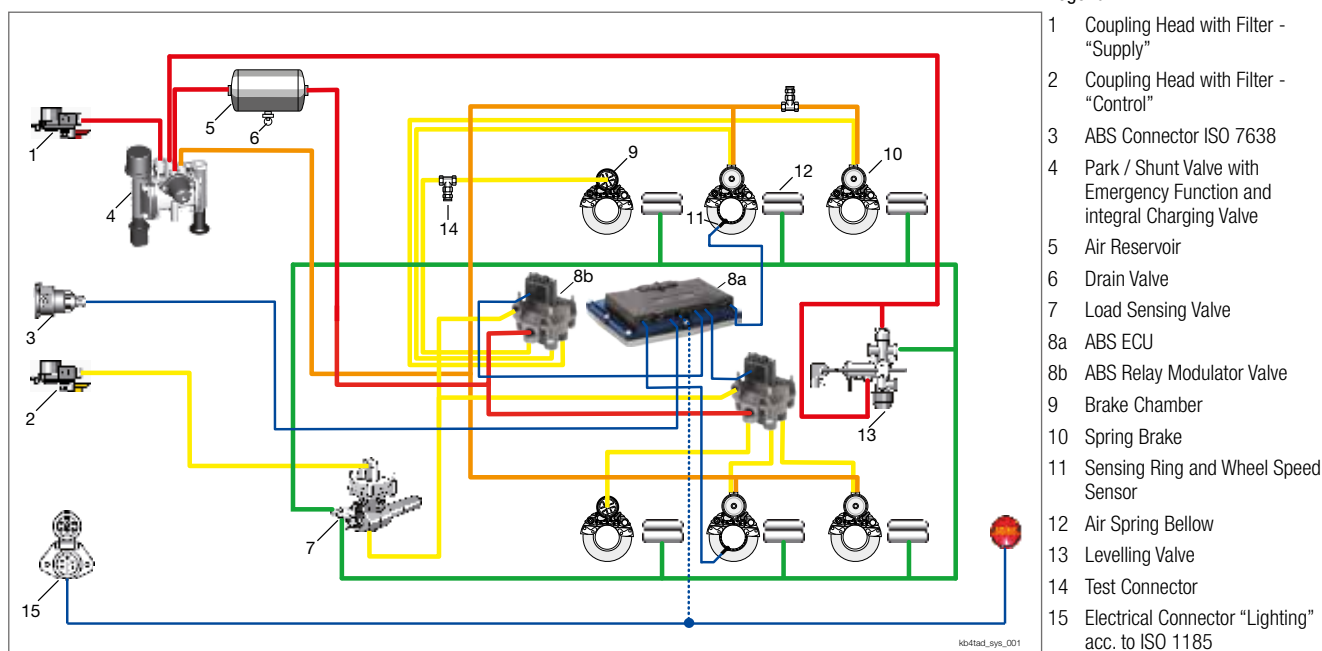
KB4TA D is designed to work in trailer systems powered via ISO 7638 but the addition of ISO 1185 stop lamp powering is included as standard as a safety feature so, in the event that there is no ISO 7638 powering, the ABS function is maintained.

Note: Stop lamp powering should only be considered as a backup in the event of failure of the ISO 7638 connection.

The **KB4TA D** ECU is designed for all normal system variants from 2S/2M up to 4S/3M. The configuration as supplied is 2S/2M, but with the integrated auto-configuration the ECU detects additional sensors and adjusts upward to 4S/2M automatically. Other configurations and additional functions can be quickly and effectively achieved using PC Software ECUTalk®. For 4S/3M applications an additional external (third) ABS modulator is necessary (see PD 203-360, Document No. Y250908).

The **KB4TA D** brake system is capable of working with drum brake or disc brakes and the systems shown below are only typical. For more systems see PD-203-580, Document No. Y250913.

KB4TA D System diagram (2S/2M) for semi-trailer with air suspension and disc brakes (ECU mounted above centre of bogie)

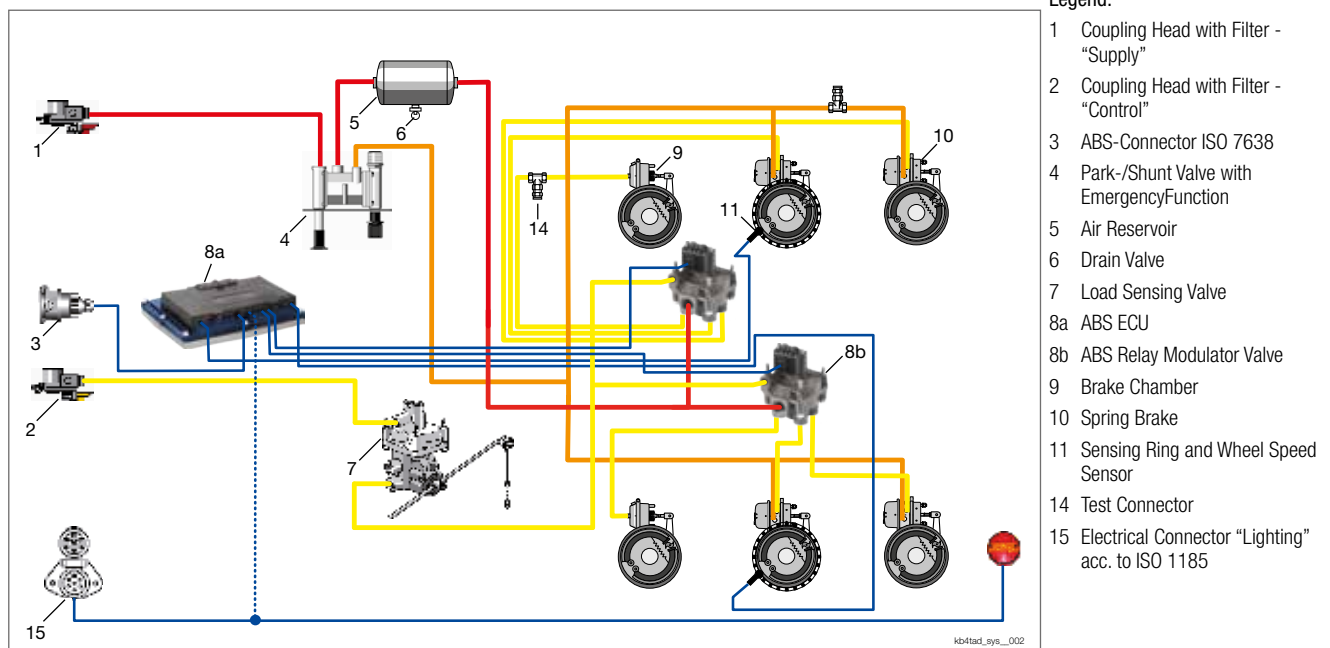


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KB4TA D System Overview

Doc. No. Y250905 (EN - Rev. 000)
July 2016

KB4TA D System diagram (2S/2M) for semi-trailer with mechanical suspension and drum brakes
(ECU mounted at front of trailer)



System Description

Power up Sequence

At power up, the KB4TA D ECU performs a series of self-checks that can assist a technician to determine the ABS system status and configuration.

Trailer ABS Warning Lamp

At power up (when no faults are detected) the trailer ABS warning lamp in the towing vehicle will turn on for approximately 2 seconds as a bulb check and then turn off. If a fault has been detected the bulb will remain on. The same warning lamp sequence is produced by the trailer mounted headboard warning lamp (when installed)

Modulator 'Chuff Test' at Power up

At power up, the KB4TA D ECU activates a modulator 'chuff test'. This electrical and pneumatic ABS modulator test can help the technician identify problems with modulator installations and/or wiring.

With brake pressure applied, a properly installed modulator will generate five rapid audible 'chuffs' of air pressure on the left internal modulator followed by five 'chuffs' on the right modulator. There will then be five further 'chuffs' on the additional axle modulator if fitted.

If the ECU is wired incorrectly, the modulator will only produce one 'chuff', or no 'chuffs' at all. If a fault is detected during the modulator 'chuff test', compare the wiring and piping to the electrical system schematic and make any necessary alterations.

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Operation

KB4TA D provides basic service braking in addition to the ABS function.

ABS Operation

The KB4TA D ECU is used to prevent the wheels of a trailer locking whilst braking. The friction between the tyre and the road is created by relative movement between their two surfaces, i.e. difference in surface speeds of road and tyre and is referred to as 'slip'. It is well known that a wheel operating on a wet surface has reduced friction (adhesion) and hence can transmit reduced braking effort to the road.

The KB4TA D ECU constantly monitors the rotational speed of all sensed wheels on the trailer by using the wheel speed sensor outputs. It then calculates an average of these wheel speeds (Reference Speed) and constantly compares it with the speed of each wheel.

During braking, if one or more wheels is on a slippery surface and is unable to support the level of braking that it is being asked to contribute, the wheel speed will drop relative to the Reference Speed, i.e. there will be 'slip', and deceleration of that wheel will increase. The KB4TA D ECU will normally detect this during the application of the brake and, before the wheel becomes locked, send an electrical signal to the appropriate modulator to reduce the pressure in the service brake actuator(s) on that wheel or group of wheels. Once the wheel starts to accelerate and the slip is reduced, the KB4TA D ECU will send an electrical signal to the modulator to gradually increase the pressure until either the wheel again starts decelerating or the requested level of braking is reached. It is therefore possible to maximise the utilisation of the available adhesion to improve stopping distance whilst maintaining stability.

Normal Braking

During normal braking, the KB4TA D ECU system operates as two standard relay valves in parallel. If the ECU does not detect excessive wheel slip, ABS control will remain inactive while the vehicle is braked according to driver demand.

Odometer Function

Odometer

The KB4TA D ECU has an odometer function to provide a means of storing the accumulated mileage of the trailer. The mileage is computed by utilizing information calculated from the wheel speed sensors. This feature will accurately store mileage information up to 1,000,000 km. The accuracy of readings higher than this cannot be guaranteed. The mileage can be displayed using PC diagnostics ECUtalk® or through blink codes.

Trip Counter

The KB4TA D ECU provides a counter to record the trip mileage. The feature is accessed through PC diagnostics ECUtalk®.

Service Interval

The KB4TA D ECU provides a feature that can be used to indicate a service interval for the trailer. The service interval can be accessed via PC diagnostics ECUtalk®. If configured, the KB4TA D ECU can flash the warning lamp when the vehicle is at standstill and the ABS is first powered to indicate when the service interval has been exceeded. Configuration of the KB4TA D ECU

KB4TA D System Overview

Doc. No. Y250905 (EN - Rev. 000)
July 2016

Configuration of the KB4TA D ECU

ABS Auto Configuration

When manufactured the KB4TA D ECU has a default ABS configuration of 2S/2M. If the ABS configuration has not been manually set using the diagnostic tool ECUTalk® then, at power up, if the KB4TA D detects additional sensors it will perform an auto-configuration. An auto-configuration only adjusts upward (e.g. from 2S/2M to 4S/2M). **A configuration will not be accepted if a wheel speed signal is generated at the time of configuration.**

A 4S/3M configuration cannot be realised automatically, this requires manual configuration with the diagnostic tool ECUTalk®.

ABS manual Configuration

Depending upon the required ABS configuration it may be necessary to use the diagnostic tool ECUTalk® to manually configure the KB4TA D ECU, i.e. 4S/3M ABS configuration.

Once manually configured, the KB4TA D ECU will no longer auto-configure, unless the "Reset ABS Configuration" option is used in the diagnostic tool ECUTalk®.

Auxiliary Configuration

The KB4TA D ECU supports the configuration of auxiliary functions on AUXIO1 and AUXIO2 using the diagnostic tool ECUTalk®. However, the associated pins can only be configured as AUXIO if they are not already configured as 4S/3M and stop lamp power respectively.

Non Standard Tyre Sizes

The KB4TA D ECU allows for tyre rolling radius and sensing ring tooth count parameters to be set for each axle using a diagnostic tool ECUTalk®. This setting is necessary for the ECU to accurately calculate the vehicle speed and determine the odometer mileage. Wheels of the same axle must be set to the same rolling radius and sensing ring tooth count. In most cases, these parameters are set by the trailer OEM and do not need to be adjusted. In the case of a service replacement unit, always check that these parameters are set to match the vehicle. Refer to the manufacturer's tyre specification for correct values. Sensing ring tooth count is defaulted to 100 teeth, but can be adjusted between 60 and 120 teeth.

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Error Detection

The KB4TA D ECU contains self-testing diagnostic circuitry that monitors the ABS components and wiring. When the ECU senses an erroneous system condition, it activates the trailer ABS warning lamp in the towing vehicle (and headboard if installed), disables all or part of the ABS functions and stores the error in memory as a Diagnostic Trouble Code (DTC).

For some trouble codes, the KB4TA D ECU will automatically reset and clear the "active" DTC once the error has been corrected. When an "active" DTC is cleared automatically, the error remains stored in memory as an „inactive“ DTC and can be viewed using blink code diagnostics or ECUTalk®. However repeated occurrences of certain errors will result in the DTC being "latched" which means the error remains "active" even if the condition is only intermittent.

Once the code is latched, a manual reset will be necessary. After the problem is resolved, trouble codes can be deleted using the diagnostic tool ECUTalk®.

ABS Shutdown

Depending on the detected error and the ABS configuration the ECU will either partially or totally disable the ABS function as follows:

- 2S/2M configurations: total shut down.
- 4S/2M configurations: Reduce to 2S/2M
- 4S/3M configurations: Reduce to 2S/2M.

The above shutdown modes are dependent on the type and location of the detected error. For more information see ABS Electronics Information Document Y023867. In all cases a warning signal will be transmitted to illuminate the trailer ABS warning lamp which will remain "ON" as long as the ignition is in the "RUN" position. In cases where the ABS is completely disabled, the vehicle reverts to normal braking (without ABS intervention).

ABS faults should be rectified at the earliest opportunity.

ECU Errors

If an ECU related problem is detected the ABS function is disabled while normal brake control remains available.

Low and High Voltage Operation

Should the supply voltage to the ECU be outside the defined voltage range (18 to 32V) the ABS function is disabled while normal brake control remains available.

For further information on diagnostics see PD-203-390, Document No. Y250910.

KB4TA D System Overview

Doc. No. Y250905 (EN - Rev. 000)
July 2016

Other Documentation

- KB4TA Trailer anti-lock braking system test report (*RDW-20160001*)
- KB4TA ABS Information document (*Y023866*)
- KB4TA Electronics Information document (*Y023867*)
- Installation Instructions "Wiring/Harness, Modular System" (*Y011788*)

Revision Details

Rev. 000 July 2016 New document.



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Function

The Knorr-Bremse **KB4TA module ES1305** is an integrated ABS electronic control unit and dual modulator valve for air braked trailers (semi-trailers, centre-axle trailers and full trailers) with mechanical or air suspension.

KB4TA is powered via ISO 7638. As an additional safety feature the ISO 1185 connection is included as standard so, in the event that there is no ISO 7638 powering, the ABS function is maintained.

Note: Stop lamp powering should only be considered as a backup in the event of failure of the ISO 7638 connection. Stop lamp powering is not available in the 4S/3M configuration.

The **KB4TA** module is designed for all normal system variants from 2S/2M up to 4S/3M. The configuration as supplied is 2S/2M, but with the integrated auto-configuration the module detects additional sensors and adjusts upward to 4S/2M automatically. Other configurations and additional functions can be quickly and effectively achieved using PC Software *ECUtalk®*. For 4S/3M applications an additional external (third) ABS modulator is necessary (see PD 203-360, Document No. Y250908).

Depending on the version, the **KB4TA** ECU has the option of various auxiliary functions:

- Odometer/trip counter/service interval
- Reset to Ride (RtR)
- Integrated Speed Switch (ISS)
- ABS Active
- Brake wear monitoring
- Stop lamp powering
- Headboard warning lamp ¹⁾
- 24V output

The **KB4TA** module incorporates an anti-compounding feature. If the service and parking brakes are applied at the same time, the anti-compounding feature prevents compounding of the forces applied to the foundation brake and possible damage.

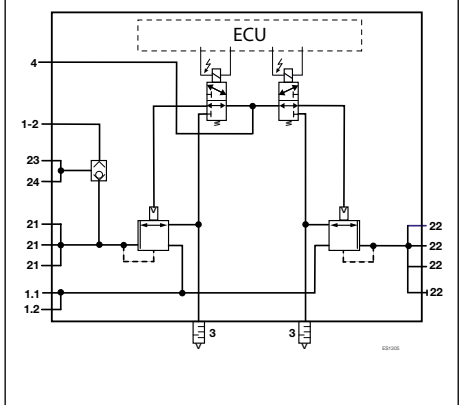
To ensure fast and effective trouble shooting, the **KB4TA** ECU can be used with a universal diagnostic interface which, with diagnostic software *ECUtalk®*, allows connection to a personal computer (PC) for fault diagnosis, odometer reading and velocity output parameter setting. Alternatively, a diagnostic blink code can be displayed on the towing vehicle's "in-cab" and/or the trailer headboard warning light. This can be activated via the stop lamp supply by depressing the foot brake valve in the towing vehicle.

The **KB4TA** module is designed to be used as the service replacement part for the Knorr-Bremse KB3TA, A9 & A18 trailer ABS modules.

¹⁾ **The use of a headboard mounted warning lamp is prohibited on vehicles approved to ECE Regulation 13 unless national requirements specifically allow the installation.**



Standard Symbol as DIN ISO 1219



ES1305

KB4TA ABS Module

Doc. No. Y250906 (EN - Rev. 000)
July 2016

Technical Features

Max. operating pressure:	12.5 bar
Operating temperature range:	-40 °C to +65 °C
Weight:	5.7 kg approx.
Degree of Protection:	DIN 40050 part 9 IP69K
Nominal voltage:	24 V DC

Range Overview

Part No.	Type No.	As supplied		
		Configuration	Stop Lamp Power	AUXIO 1
K004236	ES1305	2S/2M	Enabled	Return to ride height #
K004246*	ES1305	2S/2M	Enabled	Headboard warning lamp

* Will be replaced by K004236.

Configurable in ECUtalk®

Depending on the module and configuration, up to two outputs are available:

ES1305	Configuration	
	2S/2M - 4S/2M	4S/3M *
With stop lamp powering	1 output or 1 input	-
Without stop lamp powering	2 outputs or 1 output + 1 input	1 output or 1 input

* Auto-configuration not possible.

Parameterisation possible:

Outputs	K004236	K004246
Off	√	√
24 V	√	√
Trailer headboard warning lamp	√	√
RtR	√	
ISS	√	
ABS active	√	
Inputs	K004236	K004246
Brake pad wear sensing	√	√

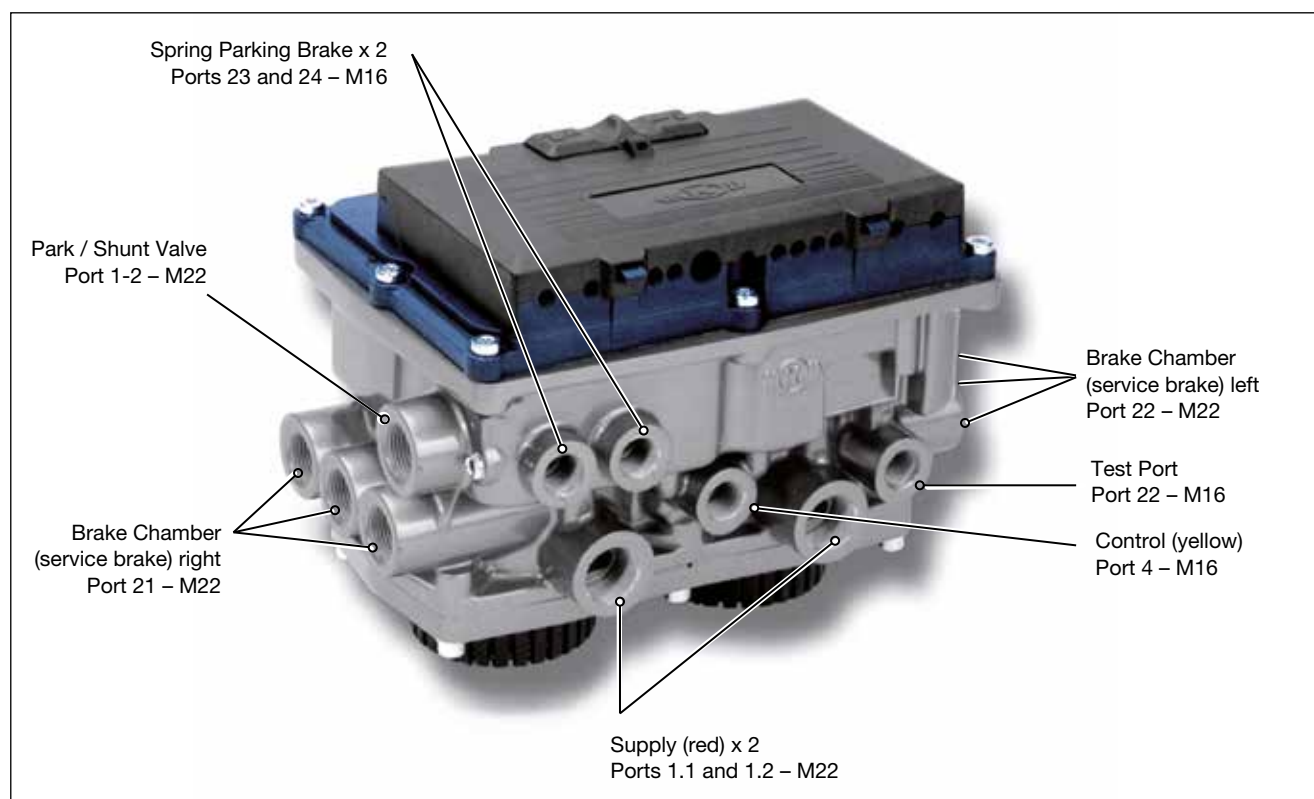
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Pneumatic Connections

Port	Used for	Port threads	Number of ports	Tightening torque max.
1.1 ¹⁾	Supply	M22x1.5	1	60 Nm
1.2 ¹⁾	Supply	M22x1.5	1	60 Nm
1-2	Connection to park/shunt valve	M22x1.5	1	60 Nm
21	Delivery to brake chambers (service brake)	M22x1.5	3	60 Nm
22	Delivery to brake chambers (service brake)	M22x1.5	3	60 Nm
	Test Connector (optional)	M16x1.5	1	45 Nm
23	Delivery to parking brake	M16x1.5	1	45 Nm
24	Delivery to parking brake	M16x1.5	1	45 Nm
4	Control	M16x1.5	1	45 Nm
42	Not used (plugged)	-	1	-

¹⁾ If only one port is used: use port 1.1 and plug port 1.2.



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ES1305

KB4TA ABS Module

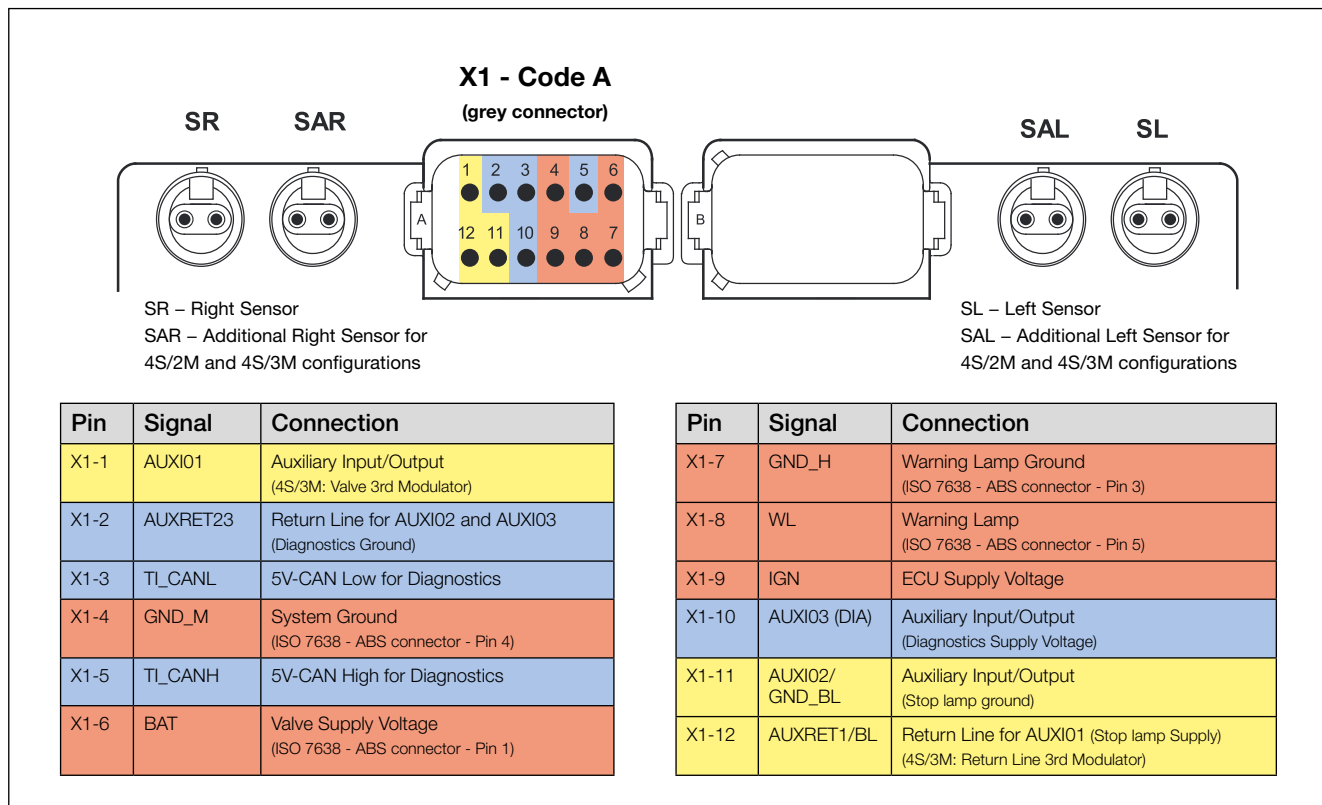
Doc. No. Y250906 (EN - Rev. 000)
July 2016

Electrical connections

The Knorr-Bremse KB4TA module ECU connectors use a 12-pin Deutsch DT series connector for ISO 7638 power supply, diagnostics and auxiliary I/Os like ISO 1185 stop lamp power supply, additional third modulator and one additional Input/Output.

The module also utilizes either two or four wheel speed sensor inputs:

- SL & SR are used for 2S/2M applications.
- SAL and SAR are additional connections for 4S/2M and 4S/3M applications, note: these sensors may be installed on lift axles in certain system applications.



ISO 7638 Connection (5 Pins)

- X1-4 = ISO 7638 Pin 4 valve ground
X1-6 = ISO 7638 Pin 1 valve supply
X1-7 = ISO 7638 Pin 3 ignition / warning lamp ground
X1-8 = ISO 7638 Pin 5 warning lamp
X1-9 = ISO 7638 Pin 2 ignition

Diagnostic Connector

KB4TA harnesses provide a 4-pin 5 Volt J1939 CAN diagnostic connection for a diagnostic tool. Remote diagnostic cables are available from Knorr-Bremse to provide a J1939 diagnostic port at the side of the trailer.

- X1-2 = Diagnostics ground
X1-3 = 5 Volt CAN low
X1-5 = 5 Volt CAN high
X1-10 = 24 Volt diagnostics supply

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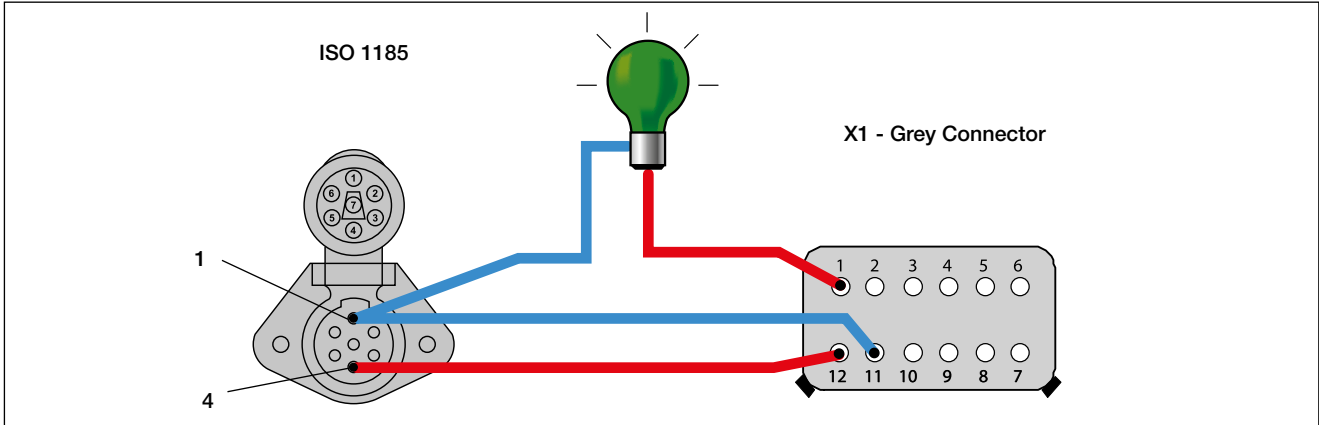
Stop Lamp Power

The KB4TA module provides a connection for stop lamp power, with an optional connection for a headboard mounted warning light.

Note:

A system configured for stop lamp power cannot support 4S/3M system configurations.

Installation: Stop Lamp Power with External Warning Lamp.



ISO 1185 Pin	Connection
1	Common return
2	Left-hand rear position and end outline marker light and rear registration plate illuminating device
3	Left-hand direction-indicator light
4	Stop lamp
5	Right-hand direction-indicator light
6	Right-hand rear position and end outline marker light and rear registration plate illuminating device
7	Connection "54g" – free

Note:

The use of a headboard mounted warning lamp is prohibited on vehicles approved to ECE Regulation 13 unless national requirements specifically allow the installation.

ES1305

KB4TA ABS Module

Doc. No. Y250906 (EN - Rev. 000)
July 2016

Diagnostics

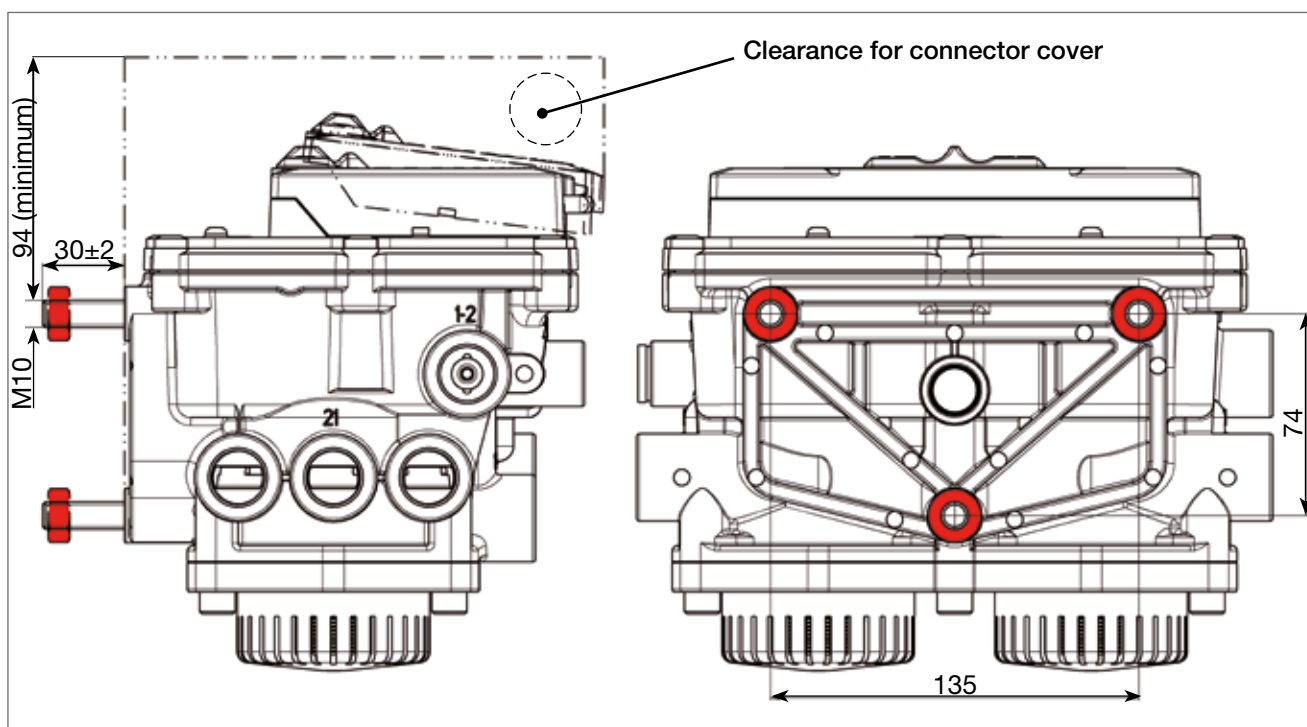
KB4TA offers two independent possibilities for diagnostics:

- Blink Code diagnostics (ABS warning lamp in the cab and/or headboard warning lamp). 4S/3M configuration and end of line testing (EOL) is not possible with this option
- direct access to the module via PC and software ECUtalk® (all relevant configurations and EOL are possible)

For more information see PD-203-390, Document No. Y205910.

Installation

Diagram showing fixings for the KB4TA Module



Note:

Tightening torque of the retaining nuts = 40 +5 Nm.

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- 1) Fit the KB4TA module to the trailer, normally on a cross member in the centre of the rear axle bogie.
- 2) If required fit the additional axle modulator, normally on a cross member in the centre of the front axle bogie.
- 3) Make the necessary pneumatic connections.
- 4) Make the necessary electrical connections - see PD-203-380, Document No. Y250909.

Required checks after installation

- 1) Before performing the checks, chock the wheels.
- 2) Fully charge air brake system and verify proper brake adjustment.
- 3) Make several trailer brake applications and check for prompt application and release at each wheel brake.
- 4) Check the module, modulator valve(s) and all air hose fittings for leakage using a soap solution.
- 5) Apply power and monitor the power-up sequence to verify proper system operation.
- 6) Determine the current ABS configuration by activating blink code diagnostics or using the PC diagnostic tool ECUTalk® (see PD-203-390, Document No. Y250910).
- 7) Where necessary configure the required ABS configuration and Auxiliary configuration using the diagnostic tool ECUTalk®.
- 8) It is recommended that a full EOL check is carried out using the diagnostic tool ECUTalk®.

Pipe sizes

The following table defines the minimum bore of piping to be used to connect the reservoir to the module and the module to the respective brake actuators.

Pipe size for the connection between the air reservoir and the module		
Plastic pipe	Minimum inside diameter 12 mm It is recommended that both Supply ports are used and each is connected to the reservoir.	
Pipe size for the connection between the module and the service brake actuators		Maximum length
Plastic pipe	Minimum inside diameter 9 mm	5 m
Rubber hose	Minimum inside diameter 11 mm	

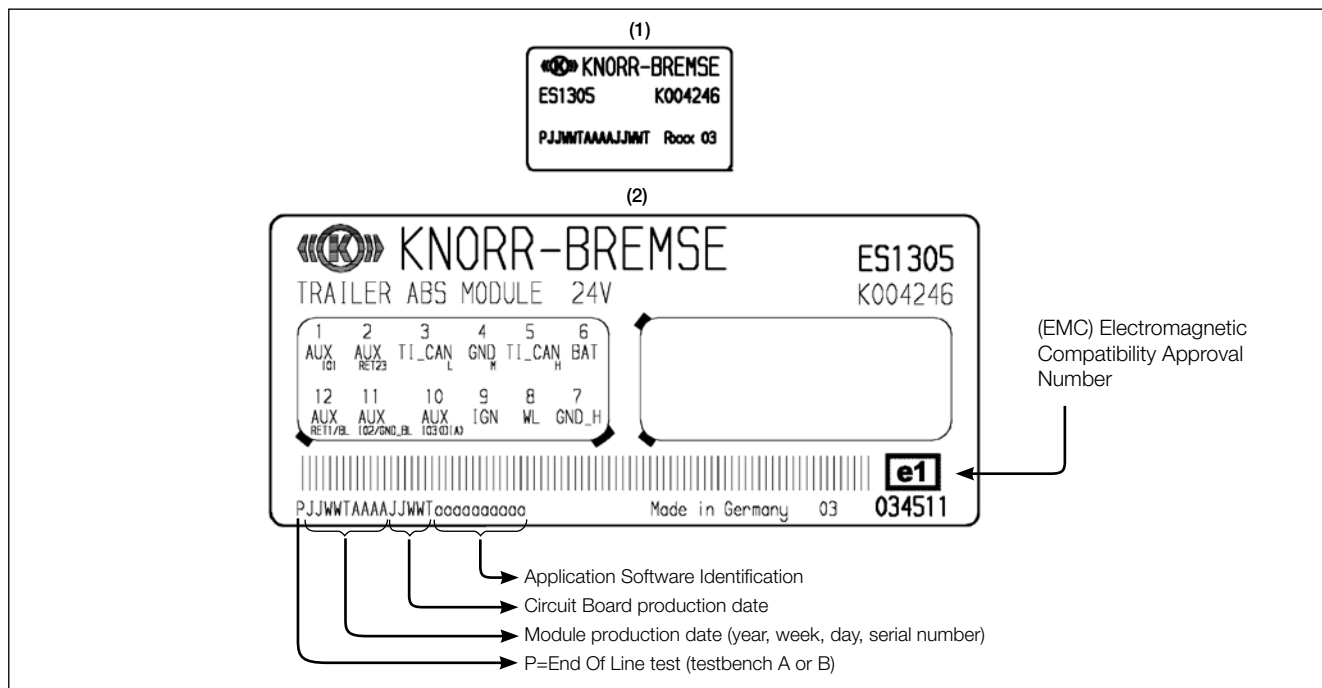
ES1305

KB4TA ABS Module

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July 2016

Label Information

The small identification label (1) is located on the top of the module. A further label (2) containing additional information is located under the removable cover of the KB4TA module. If the part number label is not readable or is painted over, the ECU part number and revision can be read using the PC diagnostic tool *ECUtalk®*. The number of the initial software loaded on the ECU is also indicated. The module part number, and pin-out information is shown on the label beneath the removable cover.



Revision Details

Rev. 000 July 2016

New document.



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Knorr-Bremse Group

Function

The Knorr-Bremse **KB4TA D ECU ES1220** is designed for air braked trailers (semi-trailers, centre-axle trailers and full trailers) with mechanical or air suspension.

KB4TA D is powered via ISO 7638. As an additional safety feature the ISO 1185 connection is included as standard so, in the event that there is no ISO 7638 powering, the ABS function is maintained.

Note: Stop lamp powering should only be considered as a backup in the event of failure of the ISO 7638 connection.

The **KB4TA D ECU** is designed for all normal system variants from 2S/2M up to 4S/3M. The configuration as supplied is 2S/2M for use with two external ABS modulators (see PD 203-360, Document No. Y250908), but with the integrated auto-configuration the module detects additional sensors and adjusts upward to 4S/2M automatically. Other configurations and additional functions can be quickly and effectively achieved using PC Software *ECUtalk®*. For 4S/3M applications an additional external (third) ABS modulator is necessary (see PD 203-360, Document No. Y250908).

Depending on the version, the **KB4TA D ECU** has the option of various auxiliary functions:

- Odometer/trip counter/service interval
- Reset to Ride (RtR)
- Integrated Speed Switch (ISS)
- ABS Active
- Brake wear monitoring
- Stop lamp powering
- Headboard warning lamp ¹⁾
- 24V output

To ensure fast and effective trouble shooting, the **KB4TA D ECU** can be used with a universal diagnostic interface which, with diagnostic software *ECUtalk®*, allows connection to a personal computer (PC) for fault diagnosis, odometer reading and velocity output parameter setting. Alternatively, a diagnostic blink code can be displayed on the towing vehicle's "in-cab" and/or the trailer headboard warning light. This can be activated via the stop lamp supply by depressing the foot brake valve in the towing vehicle. For more information see PD-403-390, Document No. Y250910.

The **KB4TA D ECU** with external ABS modulators is designed to be used as the service replacement part for the Knorr-Bremse KB3TA, A9 & A18 trailer ABS modules.

- ¹⁾ **The use of a headboard mounted warning lamp is prohibited on vehicles approved to ECE Regulation 13 unless national requirements specifically allow the installation.**



ES1220

KB4TA D ABS ECU

Doc. No. Y250907 (EN - Rev. 001)
September 2016

Technical Features

Operating temperature range:	-40 °C to +65 °C
Weight:	1.2 kg approx.
Degree of Protection:	DIN 40050 part 9 IP69K
Nominal voltage:	24 V DC
Voltage range:	19 to 32 V

Part No.	Type No.	As supplied			
		Configuration	Stop Lamp Power	AUXIO 1	Comments
K068353	ES1220	2S/2M	Enabled	Configurable in ECUtalk®	2)
K140786 ¹⁾	ES1220	2S/2M			For Brazil - use with junction box on 4S/3M systems ³⁾
K146282 ¹⁾	ES1220	2S/2M			For Brazil - use with standard wiring on 4S/3M systems ³⁾

¹⁾ Part No. may carry a suffix.

²⁾ Use only with external ABS Modulator Relay Valve K019290.

³⁾ Use only with external ABS Modulator Relay Valve K019299. Sales/usage is restricted to Brazil only.

ES1220	Configuration	
	2S/2M - 4S/2M	4S/3M *
With or without stop lamp powering	1 output or 1 input	1 output or 1 input

* Auto-configuration not possible.

Parameterisation possible:

Outputs	
Off	√
24 V	√
Trailer headboard warning lamp	√
RtR	√
ISS	√
ABS active	√
Inputs	
Brake pad wear sensing	√

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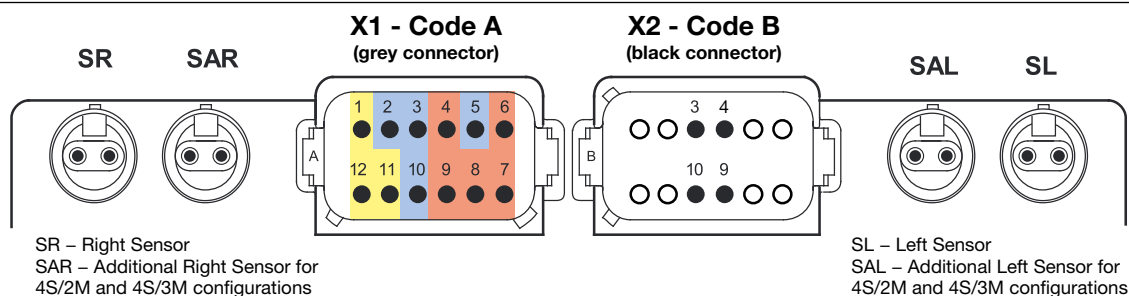
Electrical connections

The Knorr-Bremse KB4TA D ECU connectors use a 12-pin Deutsch DT series connector (Code A) for ISO 7638 power supply, diagnostics and auxiliary I/Os such as ISO 1185 stop lamp power supply, additional third modulator and one additional Input/Output. Also a Code B connector for the connections to the ABS Relay Modulators.

The ECU also utilizes either two or four wheel speed sensor inputs:

- SL & SR are used for 2S/2M applications.
- SAL and SAR are additional connections for 4S/2M and 4S/3M applications, note: these sensors may be installed on lift axles in certain system applications.

For ECUs K068353 and K146282:

**X1 Connector**

Pin	Signal	Connection
X1-1	AUXI01	Auxiliary Input/Output (4S/3M: Valve 3rd Modulator)
X1-2	AUXRET3	Return Line for AUXI03 (Diagnostics Ground)
X1-3	TL_CANL	5V-CAN Low for Diagnostics
X1-4	GND_M	System Ground (ISO 7638 - ABS connector - Pin 4)
X1-5	TL_CANH	5V-CAN High for Diagnostics
X1-6	BAT	Valve Supply Voltage (ISO 7638 - ABS connector - Pin 1)

Pin	Signal	Connection
X1-7	GND_H	Warning Lamp Ground (ISO 7638 - ABS connector - Pin 3)
X1-8	WL	Warning Lamp (ISO 7638 - ABS connector - Pin 5)
X1-9	IGN	ECU Supply Voltage (ISO 7638 - ABS connector - Pin 2)
X1-10	AUXI03 (DIA)	Auxiliary Input/Output (Diagnostics Supply Voltage)
X1-11	GND	Stop Lamp Ground
X1-12	BL	Stop Lamp Supply

X2 Connector

Pin	Signal	Connection
X2-3	MV1 (SL side)	24V Modulator 1 (pin 6.3)
X2-4	MV2 (SR side)	24V Modulator 2 (pin 6.3)

Pin	Signal	Connection
X2-9	LSS1	GND Modulator 1 and 2 (pin 6.2) *
X2-10	LSS1	AUXIORET1 (4S/3M: Valve 3rd Modulator Ground) *

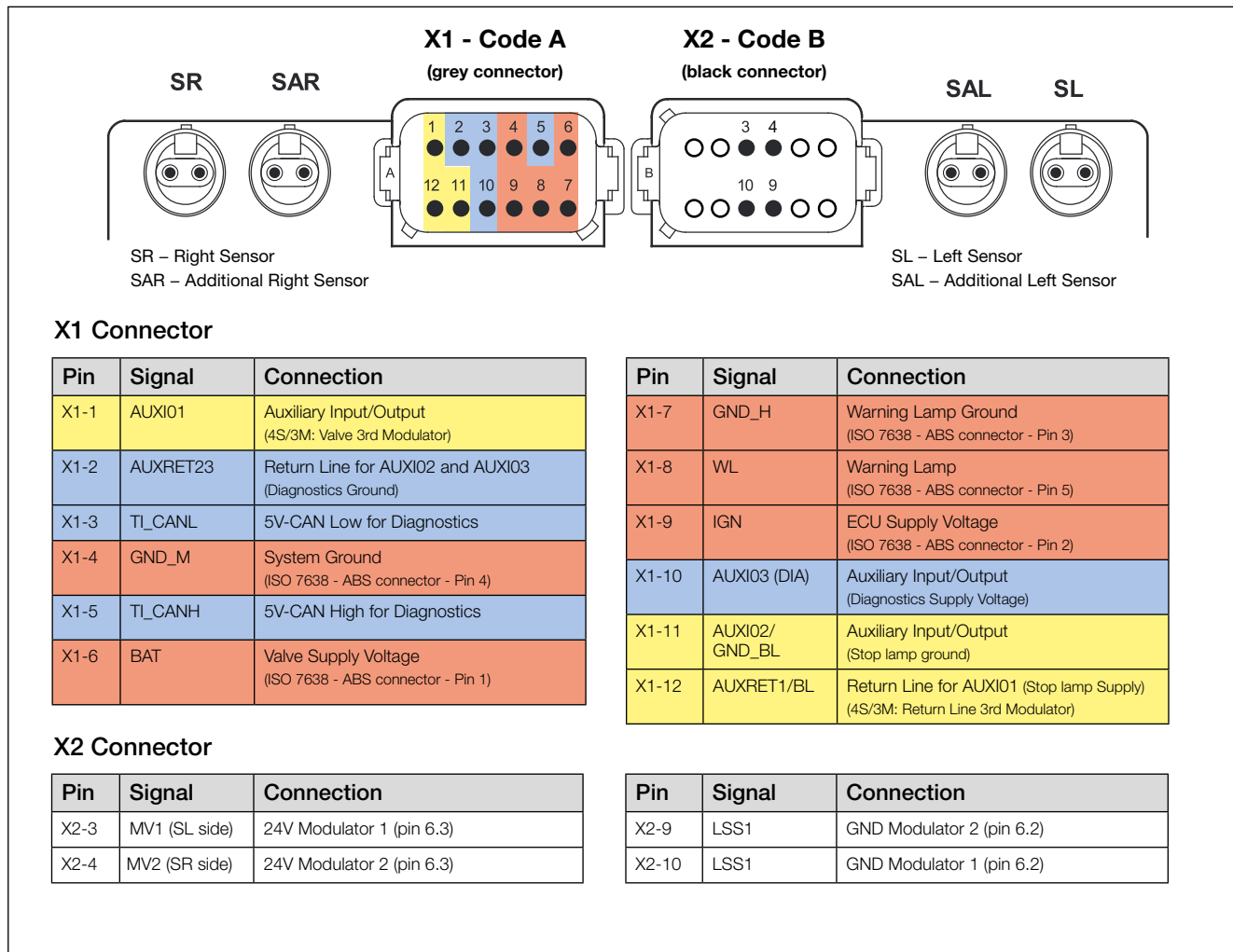
* Connections on X2-9 and X2-10 are interchangeable.

ES1220

KB4TA D ABS ECU

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September 2016

For ECU K140786:



For all ECUs:

ISO 7638 Connection (5 Pins)

- X1-4 = ISO 7638 Pin 4 valve ground
- X1-6 = ISO 7638 Pin 1 valve supply
- X1-7 = ISO 7638 Pin 3 ignition / warning lamp ground
- X1-8 = ISO 7638 Pin 5 warning lamp
- X1-9 = ISO 7638 Pin 2 ignition

Diagnostic Connector

KB4TA D harnesses provide a 4-pin 5 Volt J1939 CAN diagnostic connection for a diagnostic tool. Remote diagnostic cables are available from Knorr-Bremse to provide a J1939 diagnostic port at the side of the trailer.

- X1-2 = Diagnostics ground
- X1-3 = 5 Volt CAN low
- X1-5 = 5 Volt CAN high
- X1-10 = 24 Volt diagnostics supply

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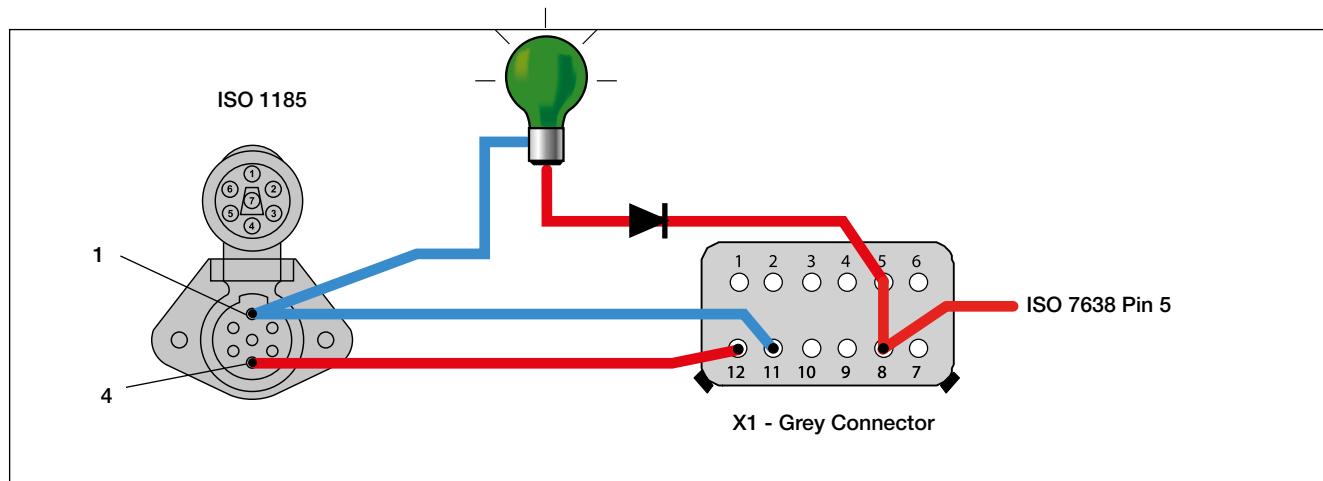


Knorr-Bremse Group

Stop Lamp Power

The KB4TA D ECU provides a connection for stop lamp power, with an optional connection for a headboard mounted warning light.

Installation: Stop Lamp Power with External Warning Lamp.



ISO 1185 Pin	Connection
1	Common return
2	Left-hand rear position and end outline marker light and rear registration plate illuminating device
3	Left-hand direction-indicator light
4	Stop lamp
5	Right-hand direction-indicator light
6	Right-hand rear position and end outline marker light and rear registration plate illuminating device
7	Connection "54g" – free

Note:

The use of a headboard mounted warning lamp is prohibited on vehicles approved to ECE Regulation 13 unless national requirements specifically allow the installation.

Diagnostics

KB4TA D offers two independent possibilities for diagnostics:

- Blink Code diagnostics (ABS warning lamp in the cab and/or headboard warning lamp). 4S/3M configuration and end of line testing (EOL) is not possible with this option
- direct access to the module via PC and software ECUTalk® (all relevant configurations and EOL are possible)

For more information see PD-203-390, Document No. Y205910.

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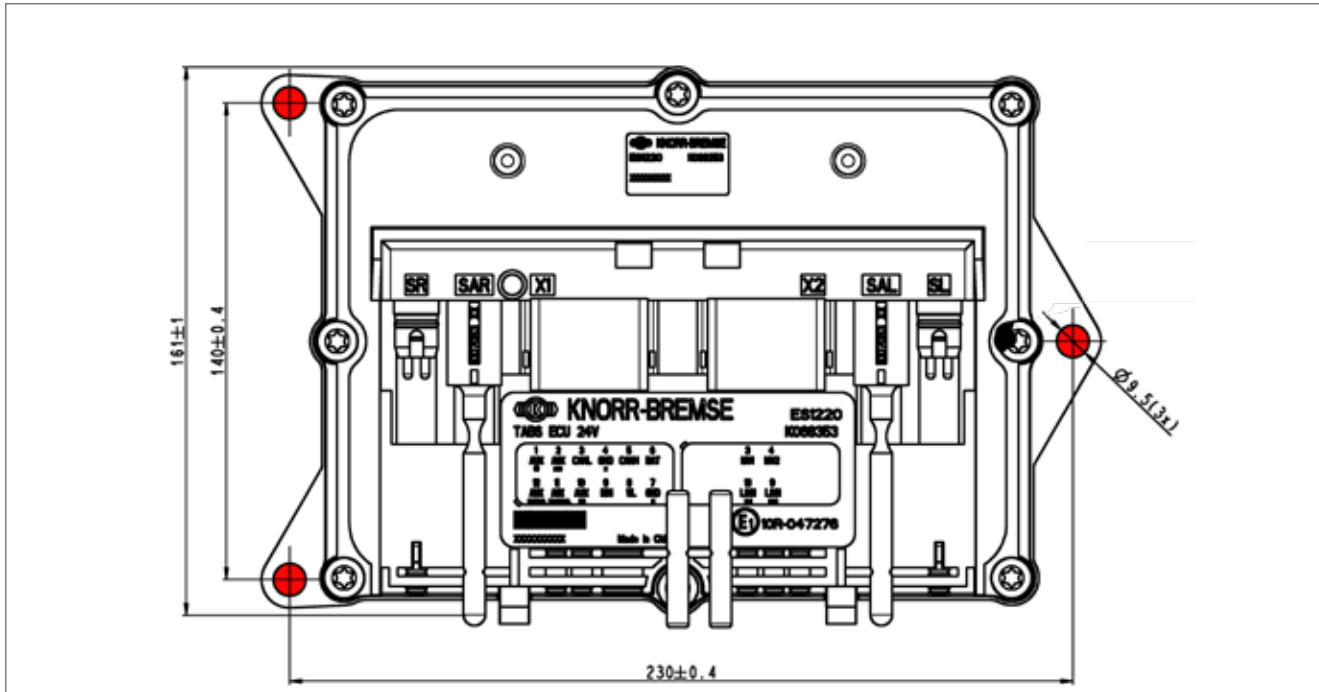
ES1220

KB4TA D ABS ECU

Doc. No. Y250907 (EN - Rev. 001)
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Installation

Diagram showing fixings for the KB4TA D ECU (view without Cover)



Notes:

Tightening torque of the M8 retaining nuts/screws = 24 +/- 4.8 Nm.

The ECU should be mounted on a flat surface. The cable entries must not point upwards.

The pressure compensation hole on the back must not be blocked.

- 1) Fit the KB4TA D ECU to the trailer either:
 - on a cross member in the centre of the rear axle bogie **or**
 - on the trailer headboard.
 If required fit the additional axle modulator, normally on a cross member in the centre of the front axle bogie.
- 2) Make the necessary pneumatic connections between the pneumatic components.
- 3) Make the necessary electrical connections - see PD-203-380, Document No. Y250909.

Required checks after installation

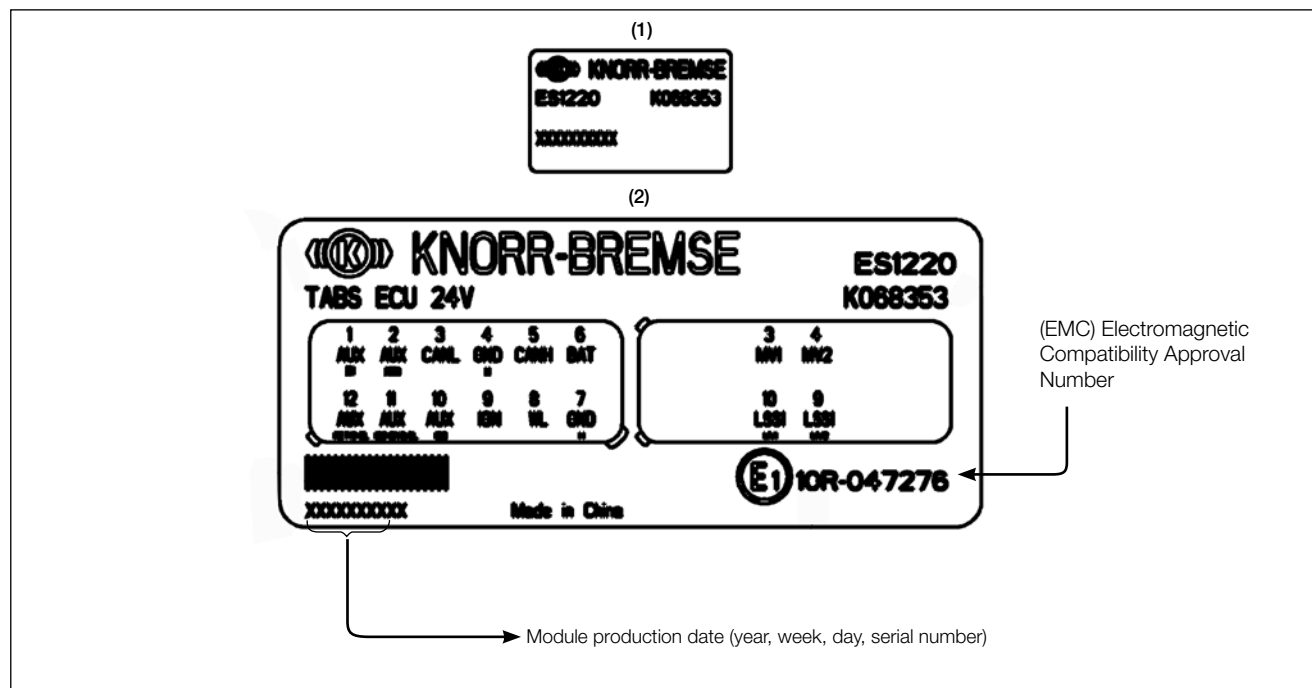
- 1) Before performing the checks, chock the wheels.
- 2) Fully charge air brake system and verify proper brake adjustment.
- 3) Make several trailer brake applications and check for prompt application and release at each wheel brake.
- 4) Check the module, modulator valve(s) and all air hose fittings for leakage using a soap solution.
- 5) Apply power and monitor the power-up sequence to verify proper system operation.
- 6) Determine the current ABS configuration by activating blink code diagnostics or using the PC diagnostic tool ECUTalk® (see PD-203-390, Document No. Y250910).
- 7) Where necessary configure the required ABS configuration and Auxiliary configuration using the diagnostic tool ECUTalk®.
- 8) It is recommended that a full EOL check is carried out using the diagnostic tool ECUTalk®.

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Label Information

The small identification label (1) is located on the top of the ECU. A further label (2) containing additional information is located under the removable cover of the KB4TA D ECU. If the part number label is not readable or is painted over, the ECU part number and revision can be read using the PC diagnostic tool ECUTalk®. The ECU part number, and pin-out information is shown on the label beneath the removable cover.



ES1220

KB4TA D ABS ECU

Doc. No. Y250907 (EN - Rev. 001)
September 2016

Revision Details

Rev. 000	July 2016	New document.
Rev. 001	September 2016	Added ECUs for Brazilian market.

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Knorr-Bremse Group

Function

The Knorr-Bremse **KB4TA** and **KB4TA D** brake systems are comprised of the KB4TA module/ECU plus pneumatic components, such as the Park/Shunt Valve and Load Sensing Valve, which allow complete control of the service and parking brakes on the trailer.

Each of these components is described briefly in this document. For more information on components for trailer see the Trailer Catalogue, Document No. Y007570.



For information on wiring harnesses and cable see PD-203-380, Document No. Y205909.

KB4TA/KB4TA D System Components

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September 2016

Coupling Heads

Features:

Coupling heads are used to connect the braking system of the towing vehicle and trailer. An integral filter protects the air braking system and the auxiliary system of the trailer from non liquid contamination.

Each coupling has an integrated filter which in the case of the filter becoming blocked provides a by-pass to enable the trailer brakes to be applied and released.

Coupling heads are colour coded to indicate the control (yellow) and supply (red) air line connections and are designed, as defined in DIN ISO 1728, to prevent wrong connection.

The versions for semi-trailers are designed to prevent the rotation of the coupling head when connecting or disconnecting the air line.

Technical Data:

- Maximum operation pressure: 8,5 bar
- Operating temperature range: . . . -40 °C to +80 °C
- Filter: Integrated

KU1401 (Supply - Red)



KU1413 (Control - Yellow)



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Park / Shunt Valve

Valve for trailers with air suspension

Features:

- Incorporates emergency brake function
- Priority to service braking system during charging
- Spring brakes held off during energy consumption test
- Spring brakes are fully applied when either the supply line or reservoir pressure < 2.5 bar
- Charging Valve closing pressure 5.4 bar

Technical Data:

- Maximum operation pressure: 10.0 bar
- Operating temperature range: . . . -40 °C to +80 °C



Valve for trailers with mechanical suspension

Features:

- Incorporates emergency brake function
- Priority to service braking system during charging
- Spring brakes held off during energy consumption test
- Spring brakes are fully applied when either the supply line or reservoir pressure < 2.5 bar

Technical Data:

- Maximum operation pressure: 10.0 bar
- Operating temperature range: . . . -40 °C to +80 °C



KB4TA/KB4TA D System Components

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September 2016

Load Sensing Valve

Valve for trailers with air suspension

Features:

The load sensing valve is used to modify the applied service brake pressure in relation to the load imposed on the vehicle's axles. The air suspension load sensing valve uses the pressure in the suspension air springs to "sense" the load imposed on the axles and determine the valve's braking ratio.

Versions of the valve are available with or without relay and emergency features, and with static or dynamic operation. A static valve uses the load sensing ratio at the point of brake application which remains constant throughout the brake application while a dynamic valve continually adjusts the load sensing ratio throughout the brake application and therefore takes account of any load transfer.

A trailer mounted data plate, showing the settings of the load sensing valve is required by ECE Regulation 13 and Directive 71/320/EEC.

Technical Data:

- Maximum operation pressure: 8,5 bar
- Operating temperature range: . . . -40 °C to +80 °C

Valve for trailers with mechanical suspension

Function:

The load sensing valve is used to adjust the applied service brake pressure in relation to the load imposed on the vehicle's axles. The mechanical suspension load sensing valve uses the movement between the vehicle's chassis and axles to „sense“ the load imposed on the axles.

The valve is installed on the chassis and a linkage is required to connect the control arm of the valve to the axle(s). Any movement of the chassis changes the position of the valve's control arm which, in turn, alters the ratio of input pressure to output pressure.

Versions of the valve are available with or without relay and



Trailer Data Plate

 KNORR-BREMSE AG			Automatisch-Lastabhängige Bremskraftregelrichtung (ALB) für Typ: _____ Load Sensing Device for Type: _____ Dispositif de correction automatique de freinage pour type: _____		
			Eingangsdruck, Input Pressure _____ bar Pression d'entrée _____		
Vorderachse, Front Axle, Essieu avant			Hinterachse, Rear Axle, Essieu arrière		
Ventile Nr. Valves No			Ventile Nr. Valves No		
Achslast Axle Load Charge essieu kg	Federungsdruck Suspension Pressure Pression de suspension bar	Ausgangsdruck Output Pressure Pression de sortie bar	Achslast Axle Load Charge essieu kg	Federungsdruck Suspension Pressure Pression de suspension bar	Ausgangsdruck Output Pressure Pression de sortie bar

VF 00075/9



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KB4TA/KB4TA D System Components

emergency features, and with static or dynamic operation. A static valve uses the load sensing ratio at the point of brake application which remains constant throughout the brake application while a dynamic valve continually adjusts the load sensing ratio throughout the brake application and therefore takes account of any load transfer.

A trailer mounted data plate, showing the settings of the load sensing valve is required by ECE Regulation 13 and Directive 71/320/EEC.

Technical Data:

- Maximum operation pressure: 8,5 bar
- Operating temperature range: . . . -40 °C to +80 °C

Trailer Data Plate

 KNORR-BREMSE AG		Automatisch-Lastabhängige Bremskraftregelrichtung (ALB) for Type: _____ Load Sensing Device for Type: _____ Dispositif de correction automatique de freinage pour type: _____			
Vorderachse, Front Axle, Essieu avant		Hinterachse, Rear Axle, Essieu arrière			
Feder-Nr Spring No Ressort No		Feder-Nr Spring No Ressort No			
Ventile Nr Valves No Valves No		Ventile Nr Valves No Valves No			
 $\leq$ _____ mm		 $\leq$ _____ mm			
Eingangsdruk Input Pressure Pression de entrée		Eingangsdruk Input Pressure Pression de entrée			
Achslast Axle Load Charge essieu kg	Ausgangsdruk Output Pressure Pression de sortie bar	Weg s am Hebel Stroke s at Lever Course s ou Levier mm	Achslast Axle Load Charge essieu kg	Ausgangsdruk Output Pressure Pression de sortie bar	Weg s am Hebel Stroke s at Lever Course s ou Levier mm

VF 00075/31

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KB4TA/KB4TA D System Components

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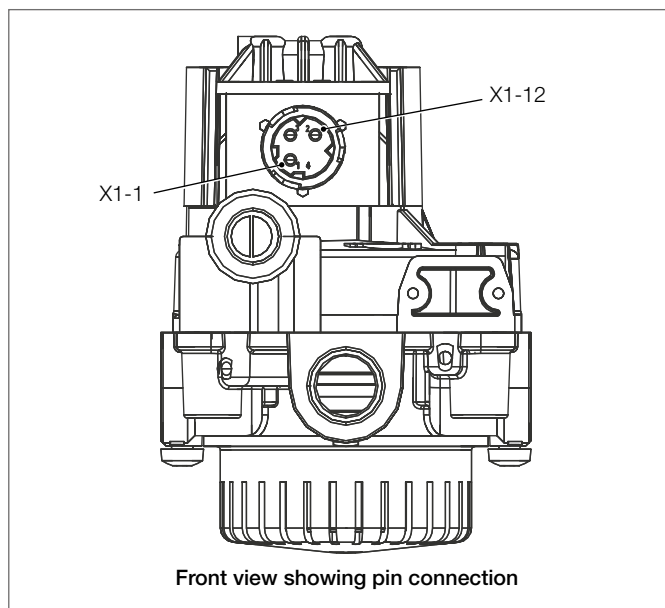
ABS Modulator Relay Valve

Function KB4TA:

An additional axle modulator valve (BR9234) is required for 4S/3M ABS applications. This is an electro-pneumatic control valve and is the last valve that air passes through on the way to the brake chambers. In case of an ABS intervention, the ECU will energise only the exhaust solenoid to modify or hold the brake actuator pressure. During normal braking, the BR9234 operates as a standard relay valve. As the brake control is applied or released by the driver, the pneumatic control signal from the tractor causes the BR9234 to apply proportional pressure to the trailer brake actuators.

Connections to ECU:

- X1-1 Connection to exhaust solenoid of BR9234
- X1-12 Connection to Common (GND)



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Function - KB4TA D:**2S/2M and 4S/2M Systems**

Two ABS relay modulator valves (K019290 or K019299 depending on the ECU) are used in the systems to control the flow of air to and from the brake actuators during an ABS intervention. One valve is used to control the brake actuators on each side of the trailer. The relay modulator valves are electro-pneumatic control valves and are the last valves that air passes through on the way to the brake actuators.

During normal braking, the valve operates as a standard relay valve. As the brake control is applied or released by the driver, the pneumatic control signal from the tractor causes the valve to apply proportional pressure to the trailer brake actuators.

In the case of an ABS intervention, the ECU will energise only the exhaust solenoid to modify or hold the brake actuator pressure.

4S/3M Systems

An additional axle modulator valve (K019290 or K019299 depending on the ECU) is required for 4S/3M ABS applications. This is same control valve as is used in the 2M systems and is used to control the flow of air to the brake actuators on both sides of one axle (typically the rearmost axle on a semi-trailer or the front axle of a drawbar trailer).

Technical Data:

- Maximum Pressure: 10 bar
- Operating Temperature Range: . . -40 °C to +75 °C

Connections to ECUs K068353 and K146282:

- 6.2 (Common (GND)) to X2-9 connection for 2M systems and X2-10 Connection for the 3rd modulator in 3M systems.
- 6.3 (Exhaust solenoid) to X2-3 and X2-4 connections for 2M systems and X1-1 Connection for the 3rd modulator in 3M systems.



K019290 and K019299*

* K019299 is specifically designed for the Brazilian market.

Notes:

The mixing of K019290 and K019299 valves on one trailer is strictly prohibited!

Use of K019299 in conjunction with ECU K068353 is strictly prohibited!

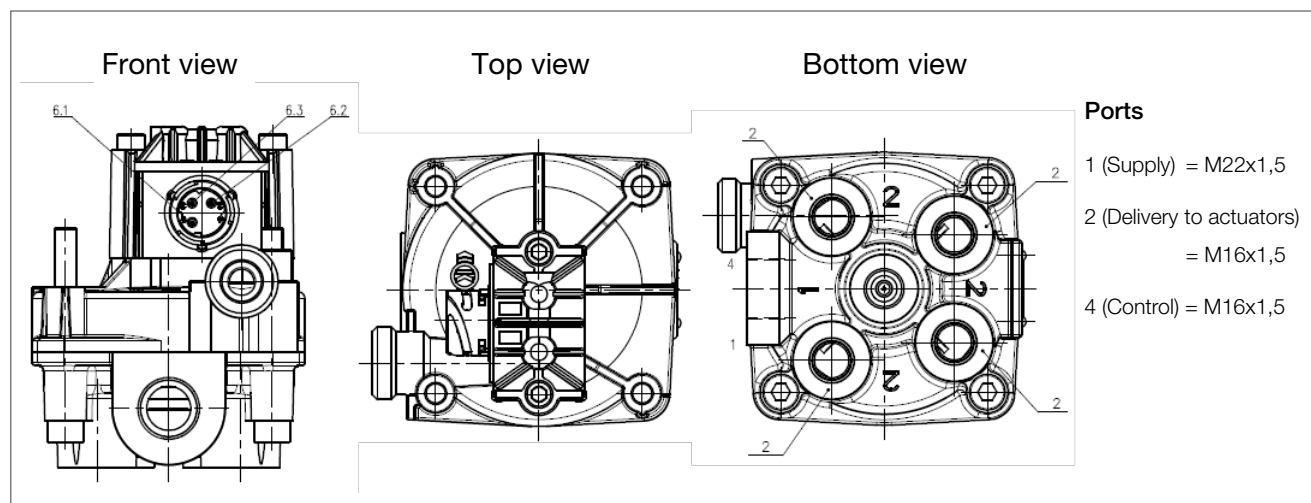
Note:

For information on cables, connections and troubleshooting for the K019299 valve in other documents use the references to K019290.

Connections to ECU K140786:

- 6.2 (Common (GND)) to X2-9 and X2-10 connections for 2M systems and X1-12 Connection for the 3rd modulator in 3M systems
- 6.3 (Exhaust solenoid) to X2-3 and X2-4 connections for 2M systems and X1-1 Connection for the 3rd modulator in 3M systems

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Wheel Speed Sensor

Function:

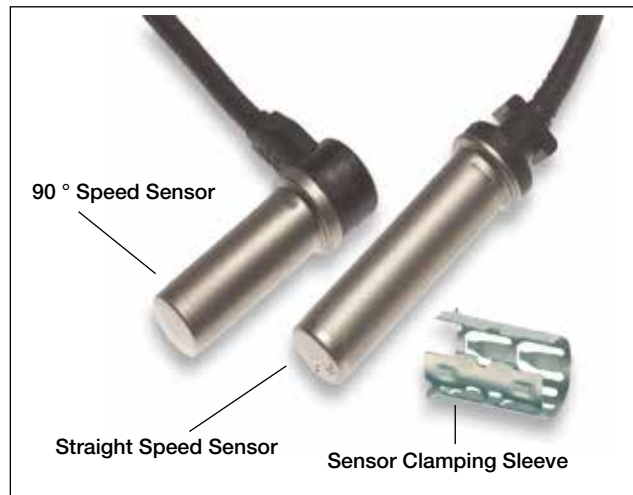
The wheel speed sensor is mounted, using a spring-loaded bush, in a housing on the axle in such a position that the end of the sensor is as close as possible to the teeth of the sensing ring. The wheel speed sensor contains an internal permanent magnet whose magnetic field extends a short distance beyond the end of the sensor case. A coil is wrapped around a soft iron core, which is attached to the magnet. This coil is connected to the output cable.

When a wheel rotates, the teeth of the sensing ring pass in turn through the magnetic field of the sensor magnet and disturb the field thereby creating an induced voltage in the sensor coil. This voltage is monitored by the KB4TA/KB4TA D module via the output cable. The voltage generated takes the form of a sine wave with both the voltage and frequency increasing as the rotational speed of the wheel increases. The module requires a minimum voltage before it recognises the signal from the wheel speed sensor and thereafter it uses the frequency of the signal to monitor the rotational speed of the wheel. The voltage generated by the coil is dependent not only on the rotational speed of the wheel but also on the gap between the end of the wheel speed sensor and the teeth of the sensing ring: the larger the gap the lower the generated voltage. It is important, therefore, that the gap is kept as small as possible to ensure that sufficient voltage is generated to maintain low speed ABS performance.

Technical data:

Operating temperature range:

- Speed sensor: -40 °C to +160 °C
- Cable: -40 °C to +180 °C
- Plug: -40 °C to +80 °C



Installation instruction

Typically, the wheel speed sensor is installed in a mounting block that is welded to the axle housing. Wheel speed sensors are protected by a stainless steel sheath. They are designed to be used with a clamping sleeve (sometimes referred to as a “retainer bushing”, “friction sleeve” or “clip”). The clamping sleeve provides a friction fit between the mounting block bore and the sensor.

A proper sensor installation is critical for correct ABS operation.

- 1) For increased corrosion protection it is recommended that a high temperature rated silicon or lithium based grease be applied to the interior of the mounting block, the wheel speed sensor, and to the new clamping sleeve. Recommended grease - Part No. I90693.
- 2) Push the new clamping sleeve fully into the block, with the retaining tabs toward the inside of the vehicle. Please note that wheel speed sensors must use the correct clamping sleeve. Failure to do so may result in reduced retention force, allowing sensor movement resulting in ABS failure.

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- 3) Gently push (DO NOT STRIKE) the wheel speed sensor into the clamping sleeve until it contacts the face of the sensing ring. Secure the sensor cable to the knuckle/ axle housing or the brake hose 10-15 cm from the sensor.
- 4) During cable installation it is important that maximum distance from the heat radiating components (foundation brake) is achieved.
- 5) Apply a moderate amount of dielectric non-conductive grease to both the sensor connector and harness connector.
- 6) Engage the connectors, and push together until the lock tab snaps into place.
- 7) The sensor cable and extension cable should be fixed on either side of the connection.
- 8) Fasten cables using cable clips (not supplied by KB), individual suspension travel should be taken into account to avoid possible damage. If necessary the cable should be secured in the back plate of the foundation brake with a cable grommet!

NOTE: It is important for the wheel bearings to be adjusted in accordance with the manufacturer's recommendations.

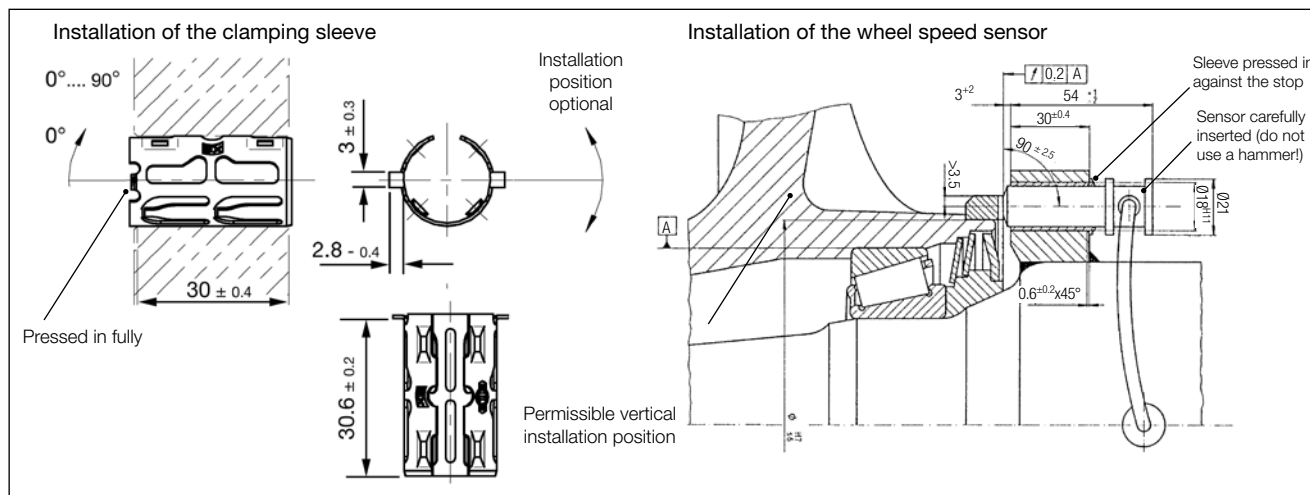
The friction fit allows the wheel speed sensor to slide back and forth under force but to retain its position when the force is removed. When the sensor is inserted all the way into the mounting block and the drum or hub is installed on the axle, the sensing ring contacts the sensor and normal bearing clearance will push the sensor away from the sensing ring, which will establish a running clearance (air gap) between the sensor and sensing ring.

Excessive bearing clearance will result in the sensor being pushed further away from the sensing ring and can result in ABS failure.

If the air gap is >1 mm, resulting in a low output signal, the speed sensor has to be adjusted.

If the wheel speed sensor becomes damaged during installation it must be replaced. It is recommended that the clamping sleeve is also replaced (Part No. II16774) whenever the sensor is replaced.

Diagram showing mounting of clamping sleeve and wheel speed sensor



Revision Details

Rev. 000	July 2016	New document.
Rev. 001	September 2016	ABS Modulator Relay Valve K019299 added.



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Function

Cables are used in trailer ABS systems to:

- provide electrical power to the components in the system.
- communicate signals to the ECU from sensors monitoring trailer characteristics.
- communicate control commands from the ECU to modulators to enable any required braking intervention.
- communicate faults signals to the towing vehicle.

Power Supply Cables are used to distribute electrical power from the towing vehicle to electrically powered braking and auxiliary equipment on the trailer. The main power supply to the trailer is through a plug or socket according to ISO 7638.

The cables are available in various lengths.

Modular Cables / Wiring Harnesses are available in many configurations and are used to supply electrical signals and power to auxiliary equipment including the external third modulator on 4S/3M systems.

Wheel Speed Sensor Cables are used to connect the ECU to the wheel speed sensors so that their wheel speed signals can be sent. The wheel speed sensor is supplied with only a short length of cable and so will often require a **Wheel Speed Sensor Extension Cable** to enable connection.

NOTES: *The text in the 'Comments' columns describes the typical usage. Other connections are possible for most cables.*

**Technical Features**

Operating Temperature Range: -40 °C to +80 °C

See tables for other features.

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Cables for KB4TA/KB4TA D

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Colour Coding used in this document

BK	Black	GN	Green	YE	Yellow
BN	Brown	RD	Red		
BU	Blue	WH	White		

Other Documentation

For information on systems and components mentioned in this document please refer to:

KB4TA/KB4TA D System Components	PD-203-360, Document No. Y250908
KB4TA System Overview	PD-203-400, Document No. Y250904
KB4TA ABS Module	PD-203-430, Document No. Y250906
KB4TA D System Overview	PD-203-400, Document No. Y250904
KB4TA D ABS ECU	PD-203-530, Document No. Y205907

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Cables for KB4TA/KB4TA D

Installation of wheel speed sensor extension cables and modulator connection cables

The rotation angle of the fifth wheel and the suspension travel must be taken into account when determining cable length and also during installation.

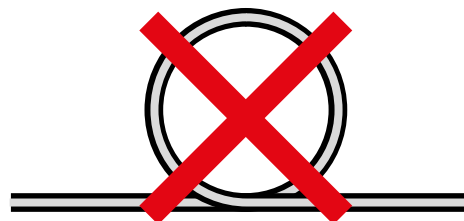
To reduce the risk of damage and subsequent faults in the system, Knorr-Bremse recommends the following:

- 1) Lay the modulator cable and the wheel speed sensor cables separately on the vehicle frame. The sensor cable should have a minimum distance to other cables of approximately 5 – 10 cm.
- 2) Cables installed in conduit must be protected at entry and exit with cable grommets.
- 3) It is **not permitted** to 'lose' any excessive length of the extension and connection cables in circular loops or ring form. Excess cable should be detoured or folded (see diagram).

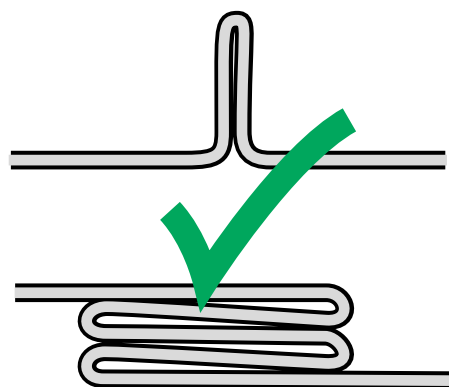
Wire cross section

- Modulator cable: 1.0 mm²
- Wheel speed sensor cable: 0.75 mm²

Installation of excess cable length



Circular looping is **not** permissible



Permissible methods

All cables are environmentally sealed at the connector interface and are clearly labelled for correct installation.

Because of the moulded design of the KB4TA module/KB4TA D ECU wiring harnesses and individual cables, Knorr-Bremse recommends that a complete harness or cable be replaced if damage or corrosion occurs.

When troubleshooting ABS wiring, some general rules should be followed where applicable:

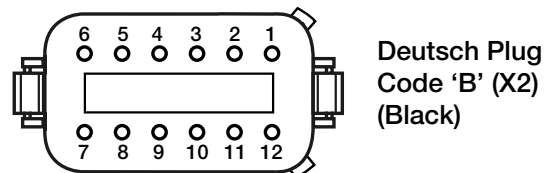
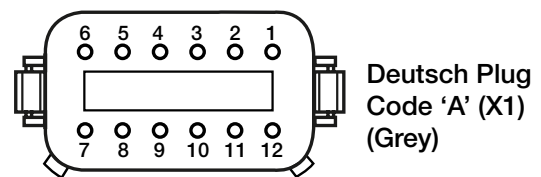
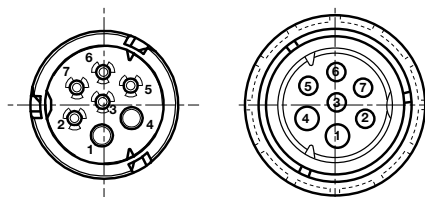
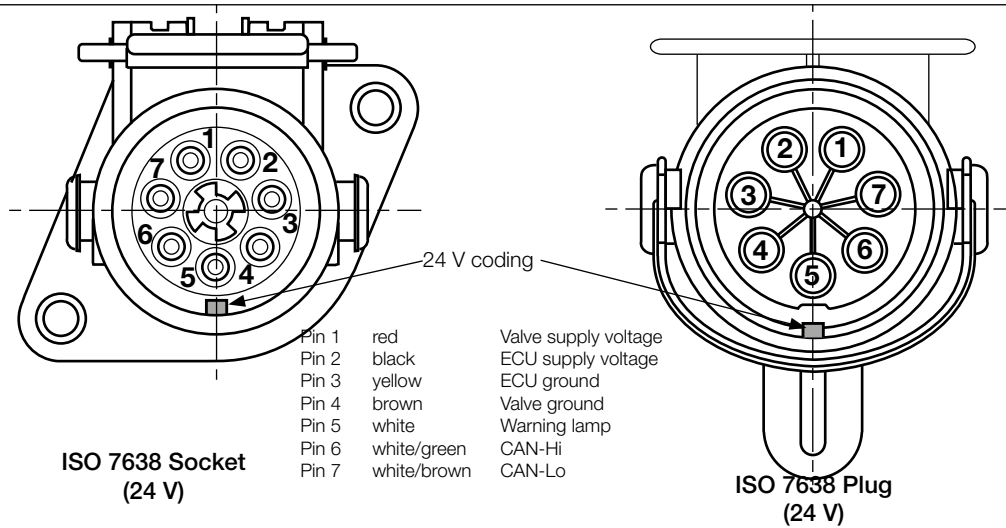
- 1) Check all wiring and connectors to ensure they are secure and free from visible damage (e.g. cuts, abrasions, etc.).
- 2) Check for evidence of wire chafing due to poor routing, or poor securing of wires.
- 3) Check connectors for proper insertion and locking.
- 4) Connector terminals must not show signs of corrosion or exposure to the environment.
- 5) Never pierce wire insulation when checking for continuity.
- 6) Do not deform individual pins or sockets during probing with a volt/ohm meter.
- 7) It is strongly recommended to properly secure all wiring harness and sensor leads at least every 45 cm.

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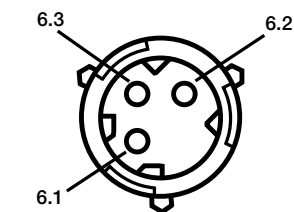
Cables for KB4TA/KB4TA D

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Pin Configurations

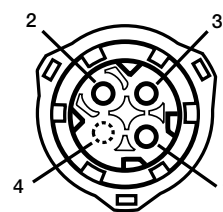


Modulator connectors



DIN72585 Bayonet Socket

6.1 - Release Valve
6.2 - Common
6.3 - Hold Valve



DIN72585 Bayonet Plug

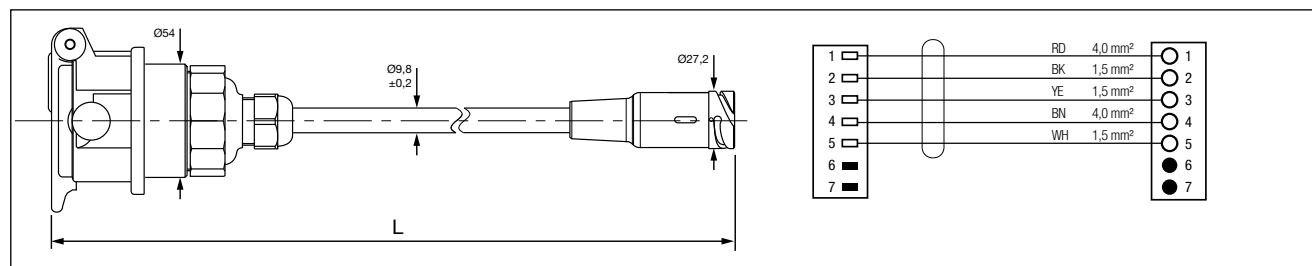
1 - Release Valve
2 - Common
3 - Hold Valve
4 - not connected

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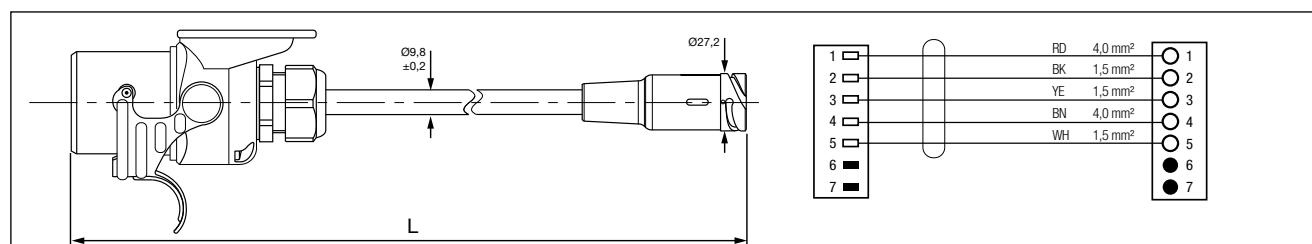
Cables for KB4TA/KB4TA D

Power Supply Cable (for semi-trailers) with ISO 7638 Socket



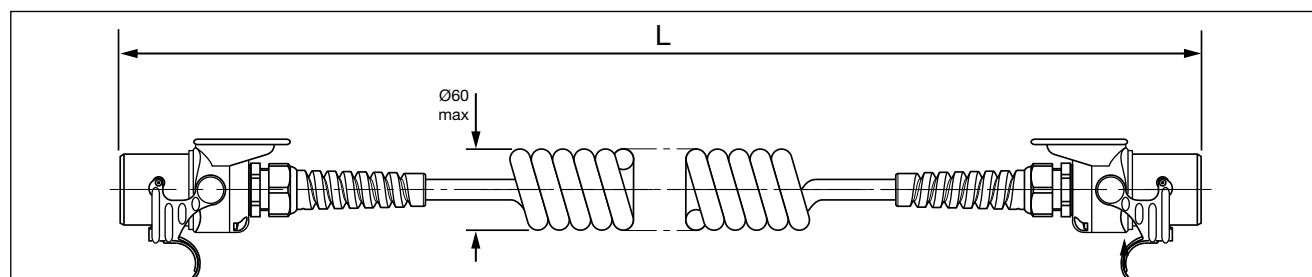
Part No.	Type No.	Cable length L [m]	Comments
K022269 ¹⁾	-	8.0	Use with Power Supply Wiring Harness (page 6 and 8)
K022270 ¹⁾	-	12.0	
K022271 ¹⁾	-	14.0	

Power Supply Cable (for drawbar and centre-axle trailers) with ISO 7638 Plug



Part No.	Type No.	Cable length L [m]	Comments
K022273 ¹⁾	-	8.0	Use with Power Supply Wiring Harness (page 6 and 8)
K022274 ¹⁾	-	10.0	

Power Connecting Cable - towing vehicle to trailer



Part No.	Type No.	Cable length L [m]	Comments
K004098 ¹⁾	EK3150	1.0 - 4.0	With 7 pin connectors, for connecting ABS or EBS With buckling protection

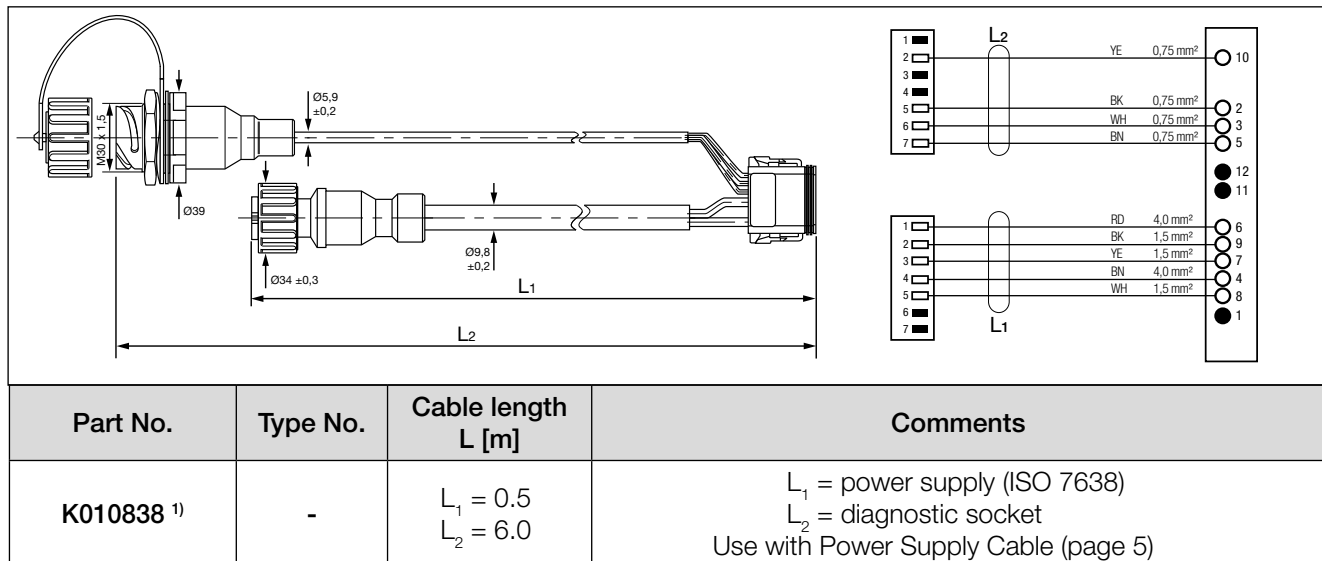
¹⁾ The part number will carry a suffix "N00" which defines that it is supplied without packaging. Example K004098N00

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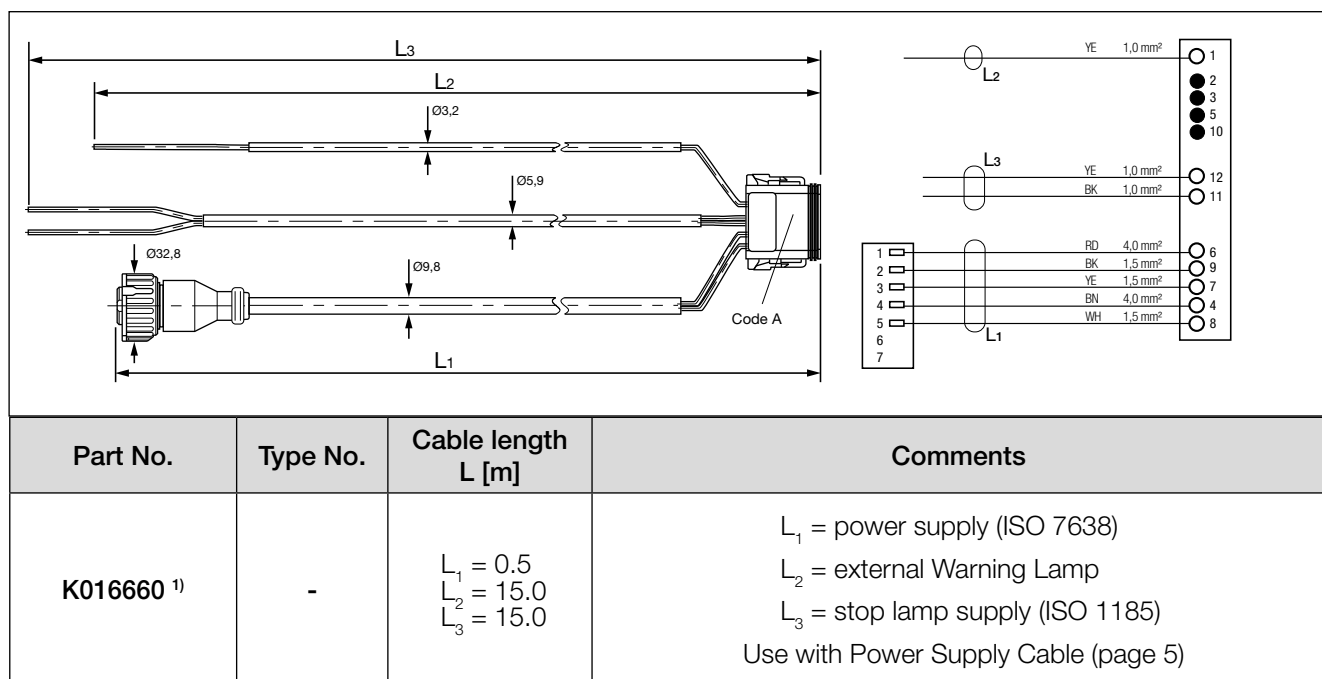
Cables for KB4TA/KB4TA D

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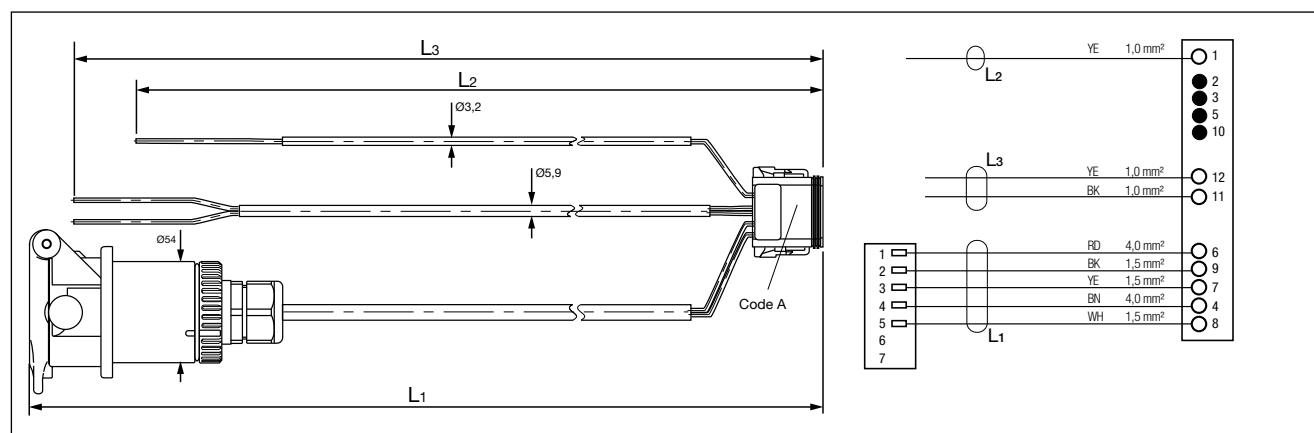
Power Supply Wiring Harness (ISO 7638 only) with Diagnostic Socket



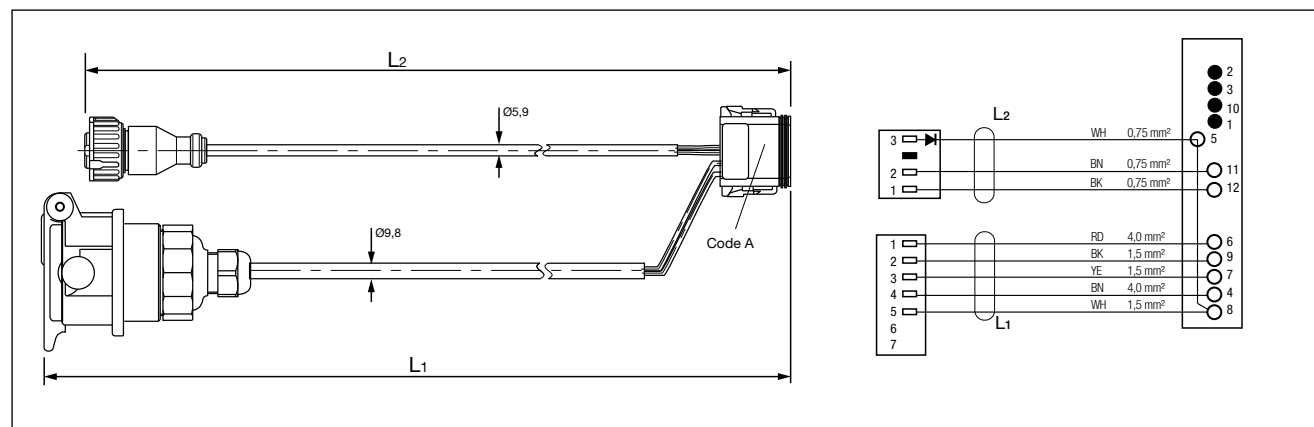
KB4TA Power Supply Wiring Harness (ISO 7638 and ISO 1185) with external Warning Lamp

¹⁾ The part number will carry a suffix "N00" which defines that it is supplied without packaging. Example K016660N00

KB4TA D Power Supply Wiring Harness (ISO 7638 and ISO 1185) with external Warning Lamp



Part No.	Type No.	Cable length L [m]	Comments
K070461 ¹⁾	-	L ₁ = 12.0 L ₂ = 12.0 L ₃ = 12.0	L ₁ = power supply (ISO 7638) L ₂ = external Warning Lamp L ₃ = stop lamp supply (ISO 1185)
K120121 ¹⁾	-	L ₁ = 1.5 L ₂ = 1.5 L ₃ = 4.0	For KB4TA D only K120121 for ECU headboard installations



Part No.	Type No.	Cable length L [m]	Comments
K127982	-	L ₁ = 1.0 L ₂ = 1.0	L ₁ = power supply (ISO 7638) L ₂ = stop lamp supply (ISO 1185) and external Warning Lamp For KB4TA D only

¹⁾ The part number will carry a suffix "N00" which defines that it is supplied without packaging. Example K120121N00

Cables for KB4TA/KB4TA D

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KB4TA Power Supply Wiring Harness (ISO 7638 only) with Diagnostic Socket and 3rd Modulator

Part No.	Type No.	Cable length L [m]	Comments
K016991 ¹⁾	-	$L_1 = 0.5$ $L_2 = 6.0$ $L_3 = 10.0$	L_1 = power supply (ISO 7638) L_2 = diagnostic socket L_3 = 3rd modulator (4S/3M system) Use with Power Supply Cable (page 5)

Power Supply Cable (for semi-trailers) with ISO 7638 Socket and ISO 1185 Connection

Part No.	Type No.	Cable length L [m]	Comments
K015313 ¹⁾	-	$L_1 = 12.0$ $L_2 = 12.0$	L_1 = power supply (ISO 7638) L_2 = stop lamp supply (ISO 1185)

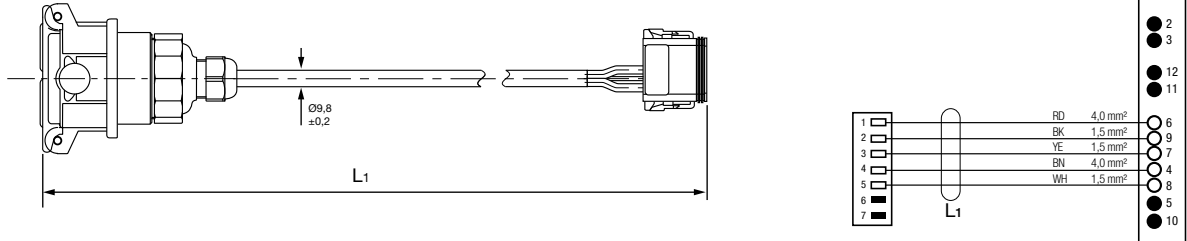
¹⁾ The part number will carry a suffix "N00" which defines that it is supplied without packaging. Example K015313N00

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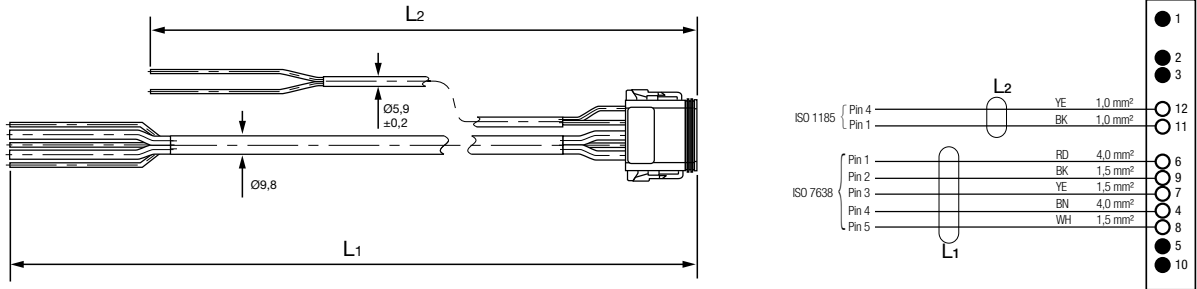
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Cables for KB4TA/KB4TA D

Power Supply Cable (for semi-trailers) with ISO 7638 Socket

			
Part No.	Type No.	Cable length L [m]	Comments
K070459 ¹⁾	-	L ₁ = 12.0	L ₁ = power supply (ISO 7638)

Power Supply Cable with ISO 7638 and ISO 1185 Connections

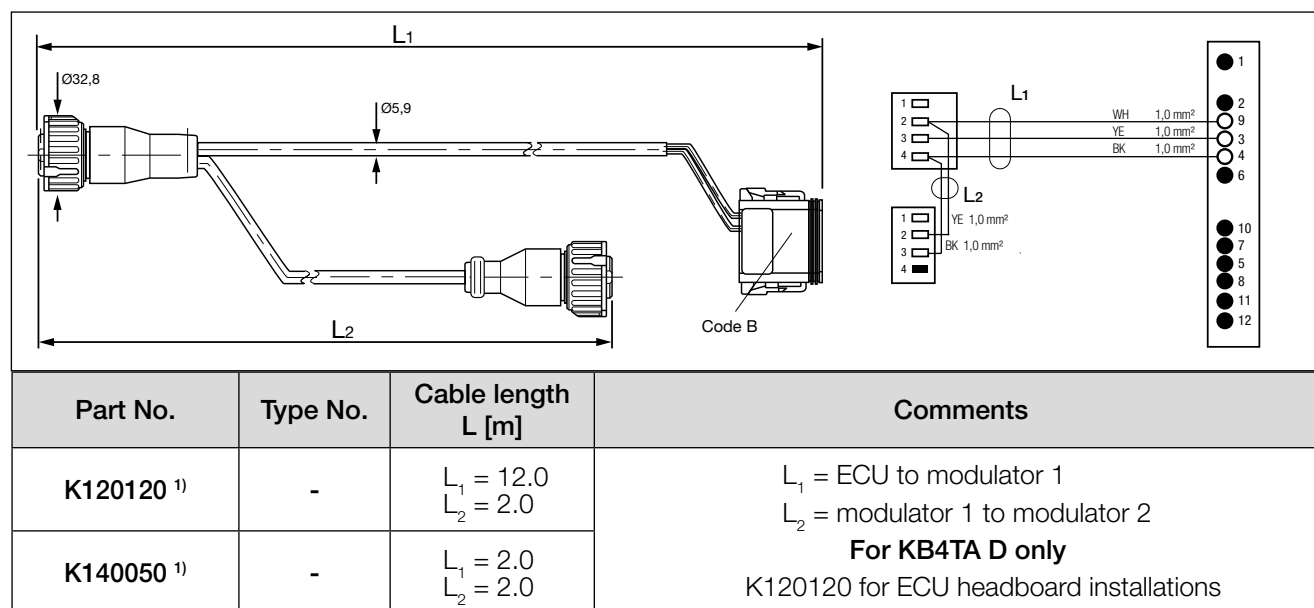
			
Part No.	Type No.	Cable length L [m]	Comments
K015468 ¹⁾	-	L ₁ = 12.0 L ₂ = 12.0	L ₁ = power supply (ISO 7638) L ₂ = stop lamp supply (ISO 1185) Use with ISO 7638 Plug or Socket (page 14)

¹⁾ The part number will carry a suffix "N00" which defines that it is supplied without packaging. Example K015468N00

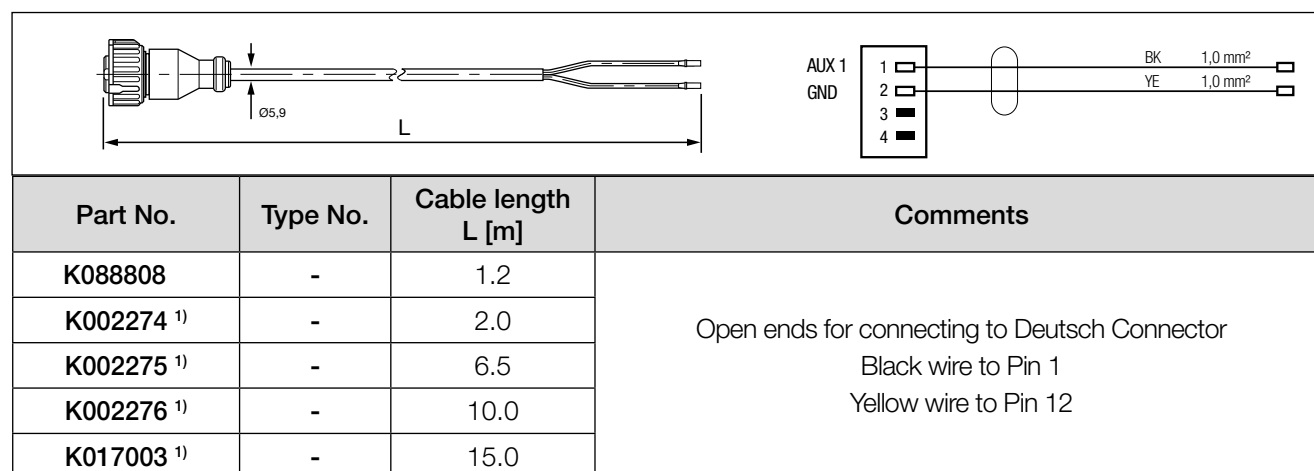
Cables for KB4TA/KB4TA D

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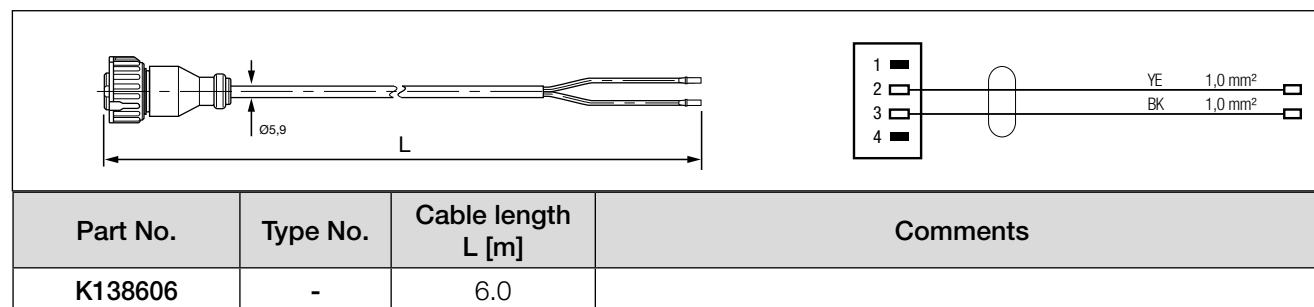
KB4TA D Modulator Wiring Harness



3rd Modulator cable for BR9324 - II37091



3rd Modulator cable for K019290

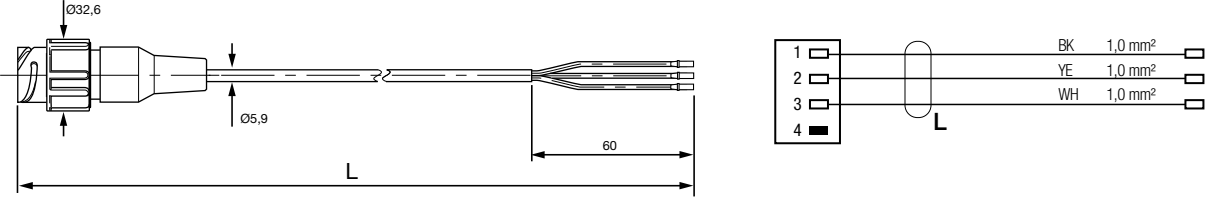


¹⁾ The part number will carry a suffix "N00" which defines that it is supplied without packaging. Example K017003N00

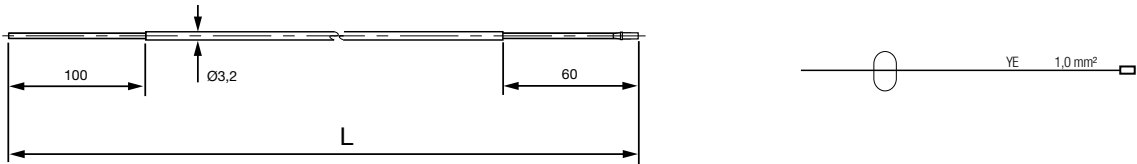
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Cables for KB4TA/KB4TA D

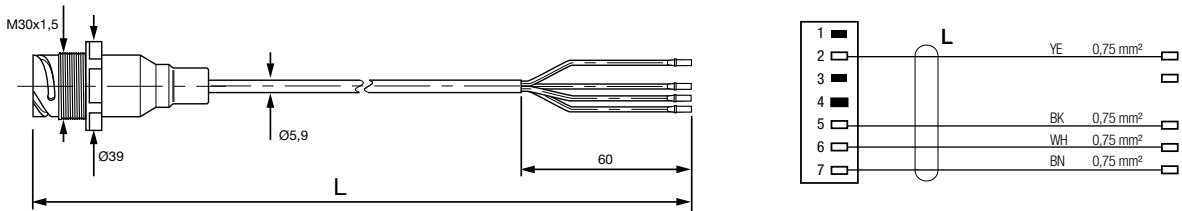
Stop Lamp Supply and external Warning Lamp with open ends

			
Part No.	Type No.	Cable length L [m]	Comments
K010715 ¹⁾	-	1.0	Open ends for connecting to Deutsch Connector
K010716 ¹⁾	-	7.0	

External Warning Lamp Cable

			
Part No.	Type No.	Cable length L [m]	Comments
K016629 ¹⁾	-	7.0	Open end for connecting to Deutsch Connector Pin 1 - AuxIO 1 or Pin 11 - AuxIO 2
K016630 ¹⁾	-	15.0	

Connecting Cable for Diagnostic Socket

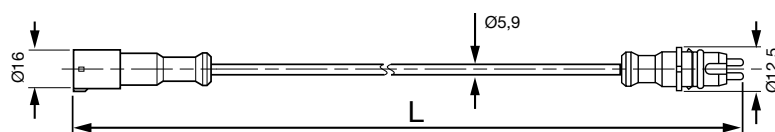
			
Part No.	Type No.	Cable length L [m]	Comments
K013194 ¹⁾	-	4.0	Open end for connecting to Deutsch Connector

¹⁾ The part number will carry a suffix "N00" which defines that it is supplied without packaging. Example K013194N00

Cables for KB4TA/KB4TA D

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Wheel Speed Sensor Extension Cable

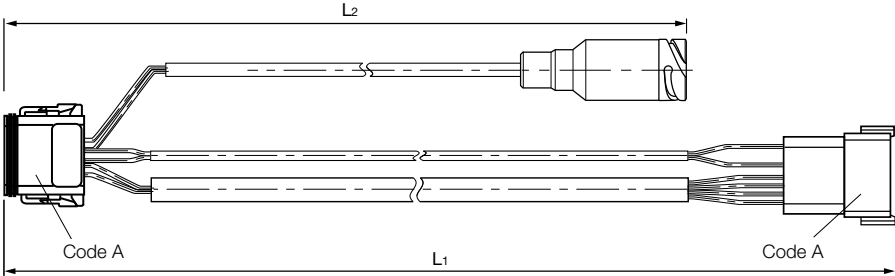


Part No.	Type No.	Cable length L [m]	Comments
II367562000	EK3130	2.0	For extending the wheel speed sensor cable to enable connection to the brake module
II367563000		3.0	
II367564000		4.0	
II367565000		5.0	
II367566000		6.0	
II367568000		8.0	
II3675610000		10.0	
II3675612000		12.0	
II3675615000		15.0	

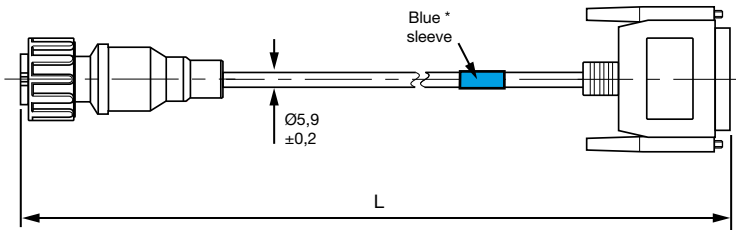
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Diagnostic Cable for 5V CAN Diagnostics

			
Part No.	Type No.	Cable length [m]	Comments
K119198	-	$L_1 = 0.4$ $L_2 = 0.3$	

Diagnostic Plug (Bayonet) to UDIF Cable

			
Part No.	Type No.	Cable length [m]	Comments
K010837 ¹⁾	EZ1037	3.0	* Blue identification sleeve on cable UDIF Connector is Sub-D 25-pin

¹⁾ The part number will carry a suffix "N00" which defines that it is supplied without packaging. Example K010837N00

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Cables for KB4TA/KB4TA D

Doc. No. Y250909 (EN - Rev. 000)
July 2016

Accessories

	<table><tr><th>Part No.</th><th>Type No.</th><th>Description</th></tr><tr><td>K002290</td><td>-</td><td>ISO 7638 Socket (7 pin)</td></tr></table>	Part No.	Type No.	Description	K002290	-	ISO 7638 Socket (7 pin)
Part No.	Type No.	Description					
K002290	-	ISO 7638 Socket (7 pin)					
	<table><tr><th>Part No.</th><th>Type No.</th><th>Description</th></tr><tr><td>K002291</td><td>-</td><td>ISO 7638 Plug (7 pin)</td></tr></table>	Part No.	Type No.	Description	K002291	-	ISO 7638 Plug (7 pin)
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K002291	-	ISO 7638 Plug (7 pin)					
	<table><tr><th>Part No.</th><th>Type No.</th><th>Description</th></tr><tr><td>K002287 ¹⁾</td><td>-</td><td>12-pin Deutsch Plug (Code B for X2) includes: 1 x Deutsch plug 1 x Locking wedge 12 x Blanking plugs</td></tr></table>	Part No.	Type No.	Description	K002287 ¹⁾	-	12-pin Deutsch Plug (Code B for X2) includes: 1 x Deutsch plug 1 x Locking wedge 12 x Blanking plugs
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	<table><tr><th>Part No.</th><th>Type No.</th><th>Description</th></tr><tr><td>K091439 ¹⁾</td><td>-</td><td>12-pin Deutsch Plug (Code A for X1) includes: 1 x Deutsch plug 1 x Locking wedge 10 x Blanking plugs</td></tr></table>	Part No.	Type No.	Description	K091439 ¹⁾	-	12-pin Deutsch Plug (Code A for X1) includes: 1 x Deutsch plug 1 x Locking wedge 10 x Blanking plugs
Part No.	Type No.	Description					
K091439 ¹⁾	-	12-pin Deutsch Plug (Code A for X1) includes: 1 x Deutsch plug 1 x Locking wedge 10 x Blanking plugs					
	<table><tr><th>Part No.</th><th>Type No.</th><th>Description</th></tr><tr><td>K005378</td><td>-</td><td>Mounting kit for Diagnostic Socket</td></tr></table>	Part No.	Type No.	Description	K005378	-	Mounting kit for Diagnostic Socket
Part No.	Type No.	Description					
K005378	-	Mounting kit for Diagnostic Socket					

¹⁾ The part number will carry a suffix "N00" which defines that it is supplied without packaging. Example K091439N00

Revision Details

Rev. 000 July 2016

New document

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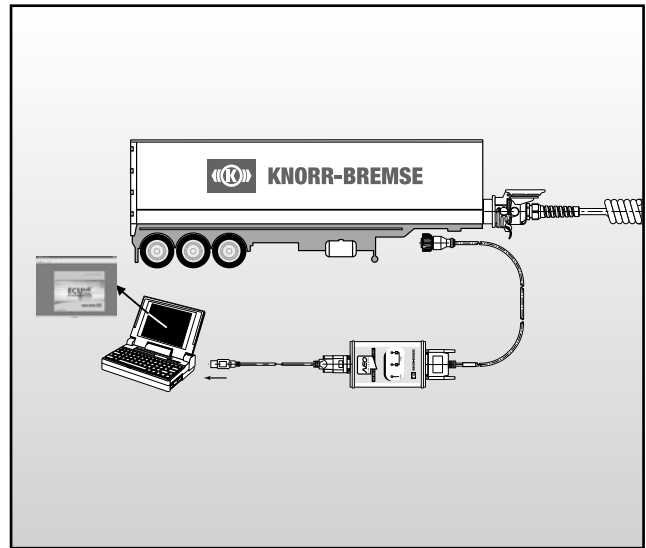
Knorr-Bremse Group

Function

The term '*Diagnostics*' is an all-embracing name which may be applied to any device or program which is able to provide status information in a format that is understandable to the user. With respect to the KB4TA/KB4TA D the following options provide different levels of diagnostics:

- Warning lamps
- ECUTalk® diagnostic program

Initial indication of a potential error or condition is generally displayed to the driver by means of a warning lamp(s) in the cab of the towing vehicle. This includes detectable faults within the braking system and auxiliary functions.



Operation

Warning lamp signals

It is a requirement that towing vehicles shall have a yellow warning lamp that is controlled by the trailer braking system or anti-lock braking system via Pin 5 of the ISO 7638 connector.

Diagnostic Program ECUTalk®

ECUTalk® is a software platform produced specifically to assist the user in the configuration, fault diagnosis and system check of KB4TA/KB4TA D and other Knorr-Bremse trailer electronically controlled products. Its functionality includes:

- System parameterisation
- Reading configuration data from the ECU.
- End of Line (EOL) test
- Fault diagnosis
- Trouble shooting by use of the "System Check" function
- Reading of "Operational Data"
- Creation and storing of EOL test reports, fault records and load sensing plate labels.

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KB4TA / KB4TA D System Diagnostics

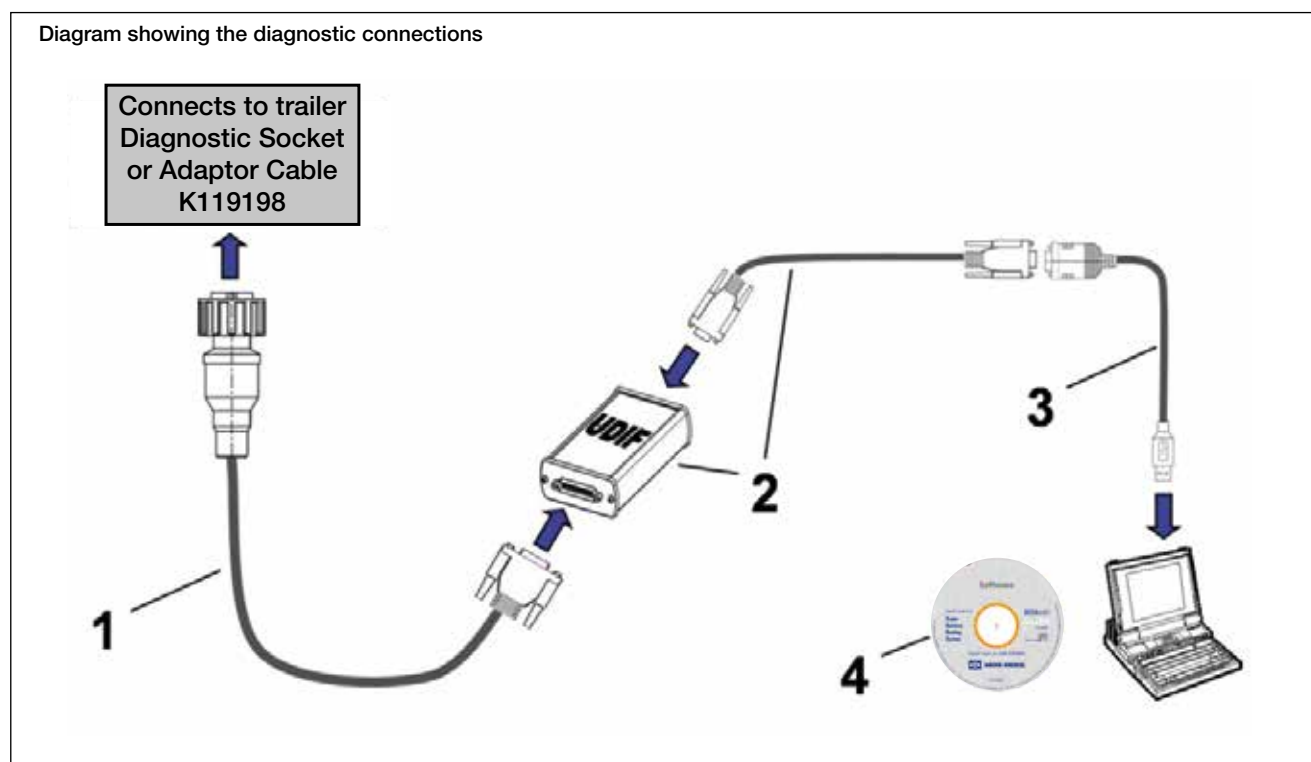
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September 2016

Diagnostic Components/Tools

In order to configure the KB4TA, carry out 'End Of Line' testing and system checks – additional hardware and software is required as listed below:

Pos.	Name	Part No.	Type No.	Description
1	Diagnostic cable	K010837	EZ1037	length = 3m
2	Diagnostic Set UDIF ¹⁾	II39809F	EZ1031	includes connecting cable Z005474 (9-pin sub-D-plug and 9-pin sub D-socket)
3	Connecting cable	Z007887		optional for USB-connection to PC
4	Diagnostic software			"ECUtalk® KB4TA" Software - download from: www.Knorr-BremseCVS.com

1) UDIF = Universal Diagnostic Interface



For information on cables see PD-203-380, Document No. Y250909.

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Blink Code Diagnostics

The KB4TA module/KB4TA D ECU provides diagnostic and configuration functions through blink code diagnostics. This means that the technician, even without diagnostic tools, can read a series of blinks of the ABS warning lamp(s) (in the cab of the towing vehicle and/or on the trailer headboard) to diagnose the trouble codes being generated. However to enter this diagnostic mode the KB4TA module/KB4TA D ECU must be wired to accept both a permanent and stop lamp power supply.

The blink code diagnostics mode is entered by providing constant power to the ignition circuit and by switching the stop lamp power input supply "ON" and "OFF" a number of times (see Diagnostic Trouble Codes). With a parked towing vehicle attached to the trailer, this is achieved by switching on the ignition and, after the power up sequence is complete, applying and releasing the brake pedal a number of times (see Diagnostic Trouble Codes). Depending on the blink code mode activated, the KB4TA module/KB4TA D ECU will blink the trailer ABS warning lamp(s) to display:

- active faults
- inactive faults (fault history)
- ABS configuration
- odometer mileage.

Wait until after the modulator 'chuff test' before activating the stop lamp power. Following a single display of all available messages, the trailer ABS warning lamp(s) will remain on for five seconds and then return to normal operating mode.

Blink code diagnostics can only be activated following a power up, where wheel speeds have not been detected. If a wheel speed signal is generated during the blink code diagnostics mode, the module will cancel the blink code diagnostics and return to normal operating mode. Blink code diagnostics must be activated within the first 15 seconds of ignition power being applied.

If stop lamp power is continuously applied for longer than five seconds, blink code diagnostics will be disabled until the next time the ignition power is cycled.

Diagnostic Trouble Codes (DTCs)

Display "Active" DTCs

To display "active" codes, switch on the ignition and apply/release the brake pedal three times within 15 seconds. Following activation, there will be a five second delay followed by a blink code display of all "active" trouble codes.

Display "Inactive" DTCs

To display "inactive" trouble code history, switch on the ignition and apply/release the brake pedal four times within 15 seconds. Following activation, there will be a five second delay followed by a blink code display of all "inactive" trouble codes held in the ECU memory.

KB4TA / KB4TA D System Diagnostics

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ABS Configuration

To display the ABS configuration, switch on the ignition and apply/release the brake pedal six times within 15 seconds. The first blink code defines the number of sensors (2 or 4), the second defines the number of modulators (2 or 3) and the third defines the control mode which can be ignored.

Display Odometer Mileage

To display the trailer odometer mileage, switch on the ignition and apply/release the brake pedal seven times within 15 seconds. Following activation, there will be a five second delay followed by a blink code display of the odometer information (x1000). Example: 152.431 km will be displayed as 152 (x1000); i.e. one blink (pause), five blinks (pause), two blinks. Zeros will be displayed by the ABS warning lamp blinking twice. Odometer mileage cannot be altered with blink code diagnostics. Complete odometer information can be retrieved using the PC diagnostic tool ECUTalk®.

Blink Code Label

ABS sign attached to the vehicle showing the DTCs

1st Blink Code		2nd Blink Code	
Code	Location	Code	Description
1	All	1	No faults present
2	Sensor SL	1	Wheel speed sensor air gap too big
3	Sensor SR	2	Loss of wheel speed sensor signal
4	Sensor SAL	3	Noisy wheel speed sensor signal
5	Sensor SAR	4	Short or open circuit wheel speed sensor
		5	Tyre size differential out of range
		6	Wheel speed sensor configuration error
6	Power	1	Voltage too high
		2	Voltage too low
		3	Excessive resistance on ISO 7638 Pin1
7	Modulator 22	2	Exhaust solenoid short or open circuit
8	Modulator 21	3	ABS valve installation error
9	AUXIO1 / Modulator 2	4	Valve configuration error
10	Common	1	Internal short to ground
		2	AUXIO1 or Modulator 2 short to ground
		3	ABS valve dynamic error – all valves
		4	Excessive ABS activity
		5	AUXIO1 or Modulator 2 short to battery
11	ECU	1	Internal error
		2	Configuration error
12	AUXIO1	1	Short or open circuit
13	AUXIO2		
14	System	2	Service interval exceeded



Trailer-ABS KB4TA

To read current and stored faults:

1. Ensure that the ABS is powered via the ISO 7638 connection.
2. Apply and release the brake pedal at 1 second intervals:
 - a) 3 times to read current faults
 - b) 4 times to read stored faults.
3. After a period of 5 seconds the blink codes will be displayed.
4. Observe the trailer ABS lamp in the towing vehicle and record the blink code sequence.
5. A description of each blink code is shown in the table.
6. After rectifying any faults, check that the trailer ABS warning lamp in the towing vehicle is not illuminated after turning the ignition off and on. This may necessitate driving the vehicle at a speed >10km/h.

Note: Blink code information is only available when the Stop Lamp power option and either 2S/2M or 4S/2M ABS are configured.



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Diagnostic Trouble Codes — Blink Code Quick Reference

1st Blink Code		2nd Blink Code		Information on action required
Code	Location	Code	Description	
1	All	1	No Faults	System fully operational - no faults detected
2	Sensor SL	1	Wheel speed sensor air gap is too big	Go to Chart 5
3	Sensor SR	2	Loss of wheel speed sensor signal	Go to Chart 5
4	Sensor SAL	3	Noisy wheel speed sensor signal	Go to Chart 5
5	Sensor SAR	4	Short or open circuit wheel speed sensor	Go to Chart 5
		5	Tyre size differential out of range	Verify correct tyre size, proper tyre inflation & correct number of sensing ring teeth. Verify that the ECU has the correct tyre size settings.
		6	Wheel speed sensor configuration error	Verify correct ABS configuration.
6	Power Supply	1	Voltage too high	Go to Chart 4
		2	Voltage too low	Go to Chart 4
		3	Excessive resistance ISO 7638 pin 1	Go to Chart 4
7	Modulator M22	2	Exhaust solenoid shorted or open circuit	Go to Chart 6
8	Modulator M21	3	ABS valve installation error	Go to Chart 6
9	AUXIO1 / Modulator	4	Valve configuration error	Verify correct ABS configuration.
10	Common	1	Internal short to ground	Check for damaged or corroded connectors. Check for damaged wiring. After corrections or if no issues found, then clear trouble codes. If problems return, replace the module.
		2	AUXIO1 or modulator 2 short to ground	Go to Chart 6
		3	ABS modulator dynamic error - all valves	Go to Chart 6
		4	Excessive ABS activity	Go to Chart 4 or Chart 6
		5	AUXIO1 or modulator 2 short to battery	Go to Chart 6
11	ECU	1	Internal error	Check for damaged or corroded connectors. Check for damaged wiring. After corrections or if no issues found, then clear trouble codes. If problems return, replace the module.
		2	Configuration error	Verify correct ABS configuration.
12	AUXIO2	1	Shorted or open circuit	Check for corroded/damaged wiring or connectors
13	AUXIO3	1	Shorted or open circuit	Check for corroded/damaged wiring or connectors
14	System	2	Service Interval Exceeded	...

To Read Diagnostic Trouble Codes (DTCs):

- 1) Apply constant power to the trailer (towing vehicle ignition switch).
- 2) Within 15 seconds, apply/release the brake pedal at 1 second intervals:
 - (a) 3 times for displaying "Active" DTCs.
 - (b) 4 times for displaying "Inactive" DTCs.
- 3) Observe the dashboard mounted ABS warning lamp and record blink code(s).
- 4) Refer to blink code chart for description.
- 5) After resolving problems, verify that the warning lamp is no longer illuminated.

KB4TA / KB4TA D System Diagnostics

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September 2016

Diagnostic Troubleshooting Flow Charts

Diagnostic trouble code information can be retrieved from the KB4TA module/KB4TA D ECU by using blink code diagnostics or the PC diagnostic tool ECUTalk®. The following troubleshooting flow charts will help the technician isolate the cause of the problem and confirm whether the problem lies in the component, wiring or connectors.

Troubleshooting should always begin by observing the dashboard or trailer-mounted ABS warning lamp during the KB4TA module/KB4TA D ECU's power-up sequence.

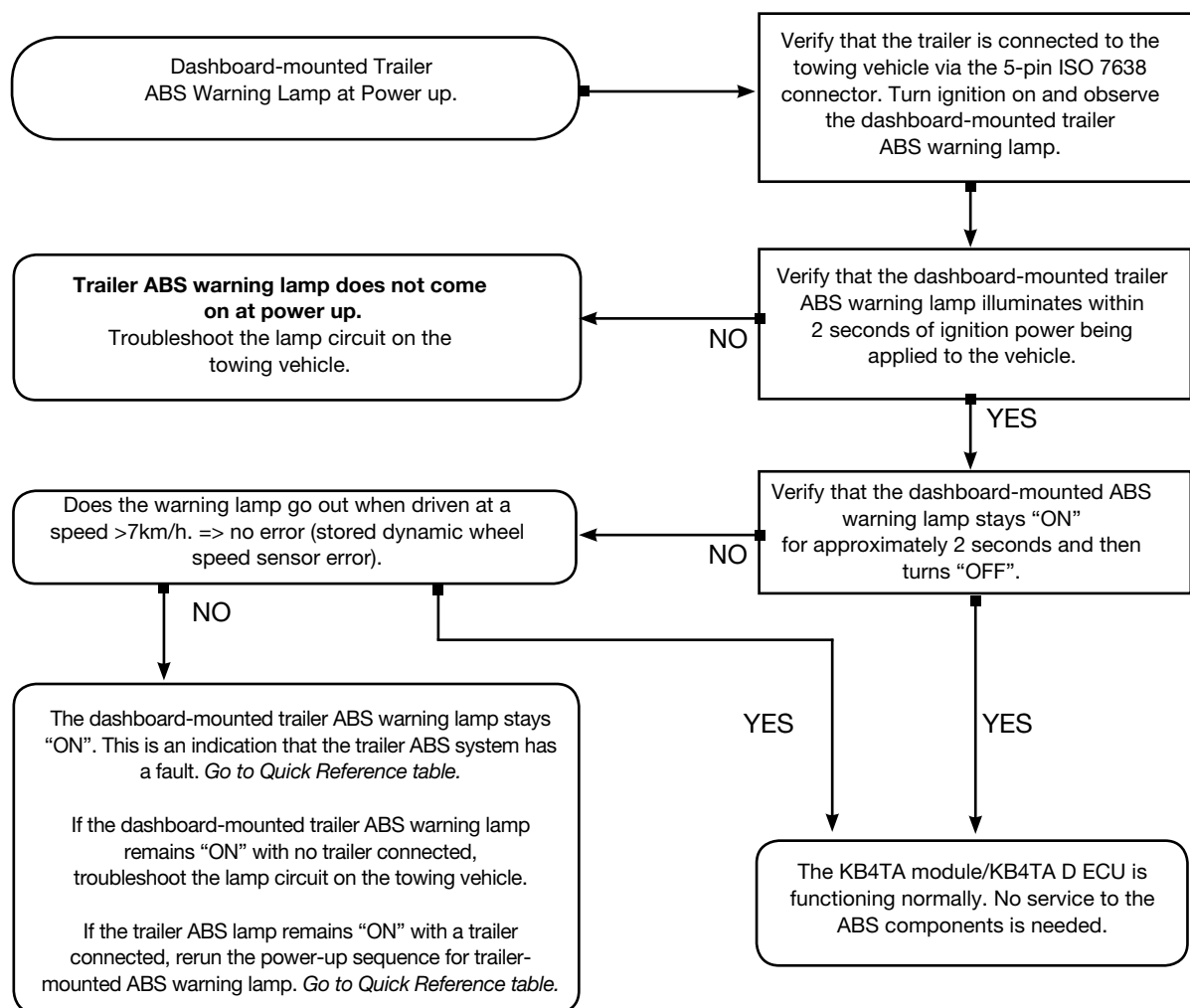
If it is necessary to make electrical measurements, always begin by taking voltage and resistance measurements at the 12-pin ECU harness connector.

Once the circuit problem is found, isolate the area needing attention by repeating the measurements at all connections in the affected circuit working towards the modulator, wheel speed sensor, etc.

No voltage or resistance measurements must be made on the X1 connector pins of the KB4TA module/KB4TA D ECU.

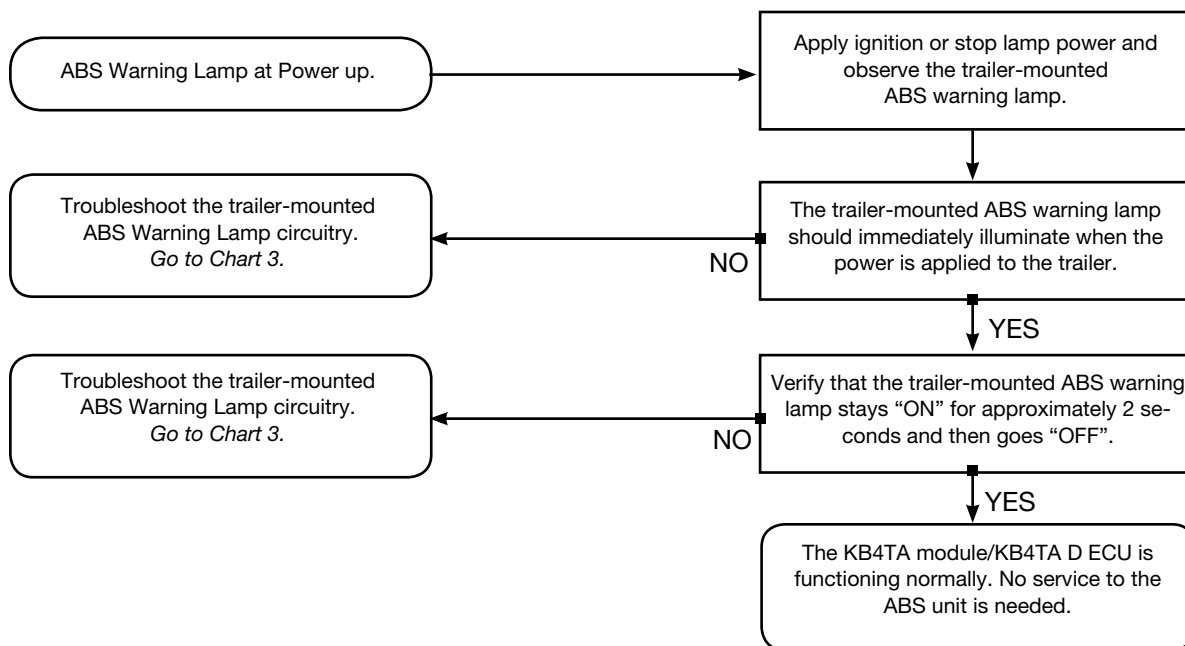
The following pages contain detailed information.

Chart 1 Power-up Sequence – Dashboard mounted ABS Warning Lamp



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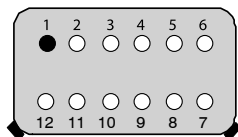
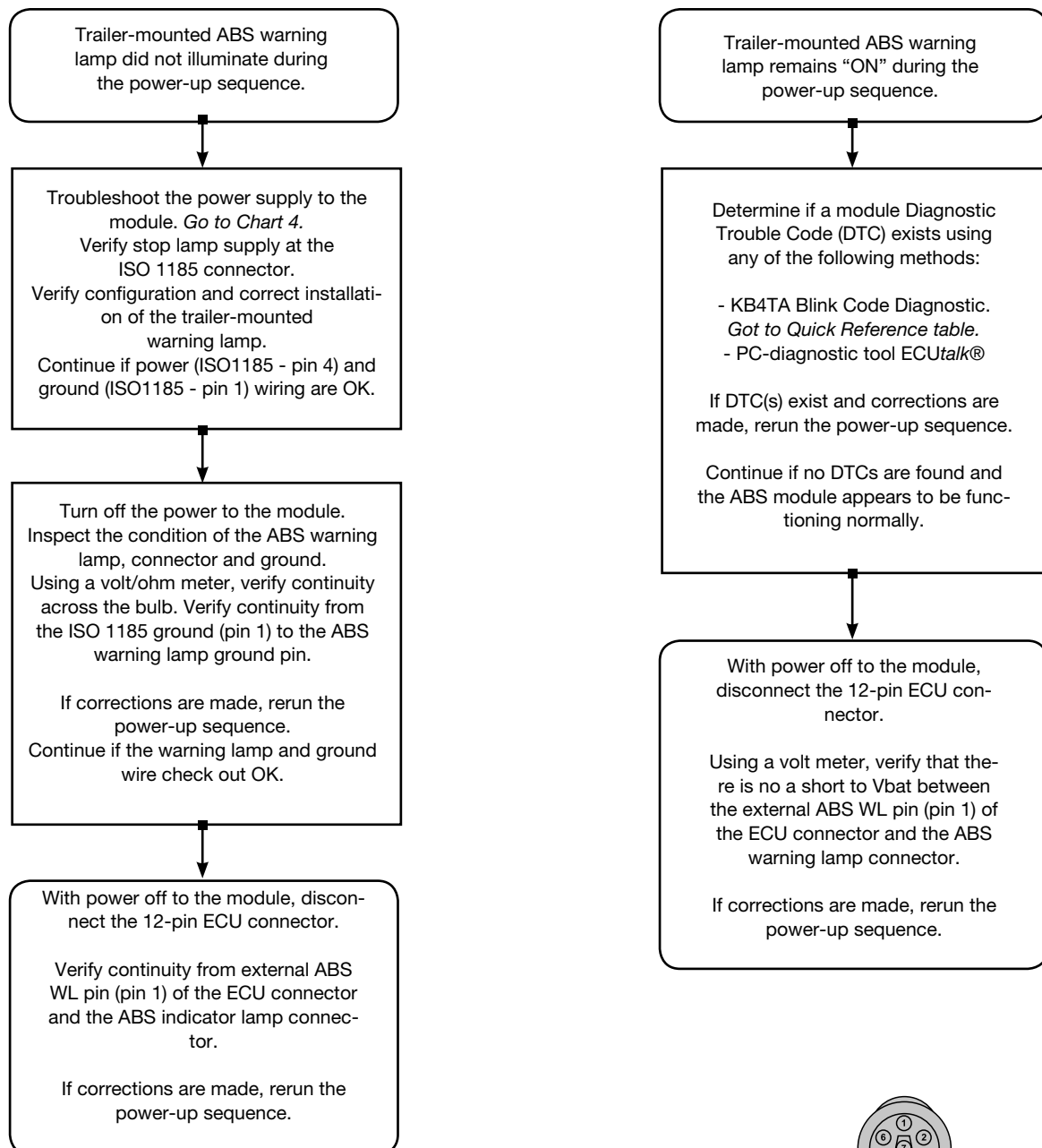
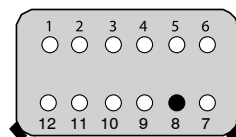
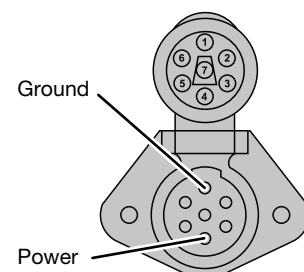
Chart 2 Power-up Sequence – Trailer-mounted ABS Warning Lamp



KB4TA / KB4TA D System Diagnostics

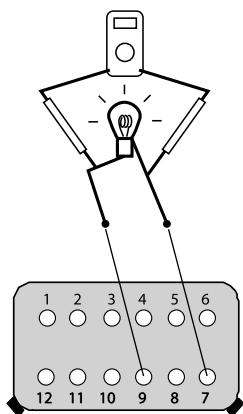
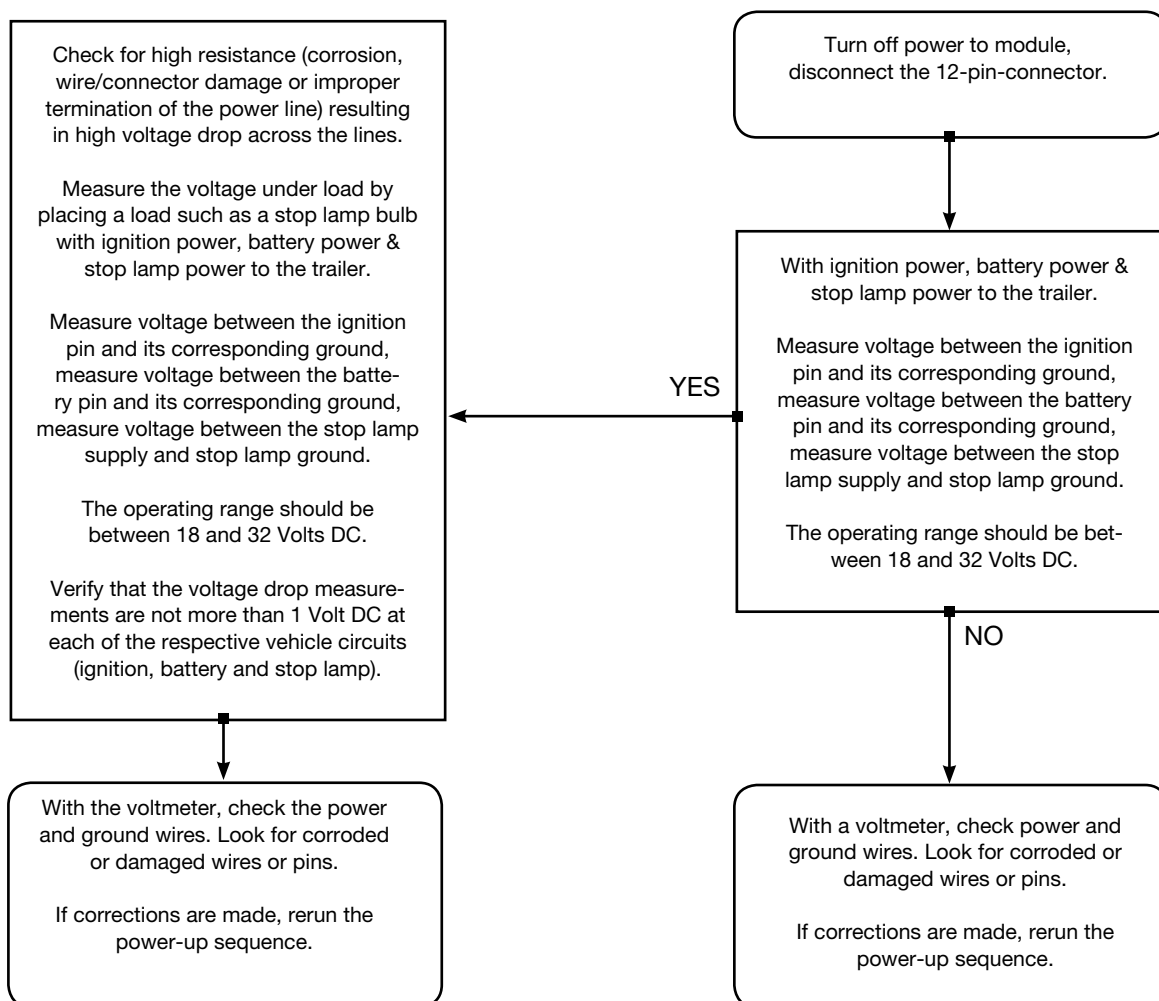
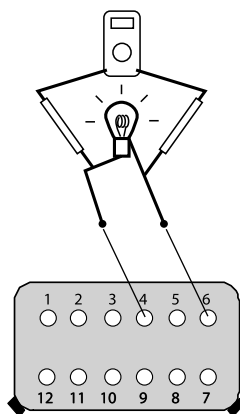
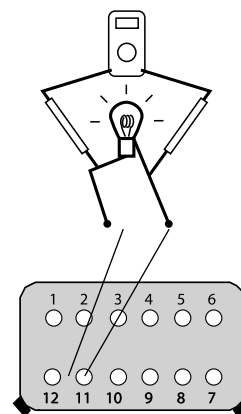
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Chart 3 Troubleshooting the Trailer-mounted ABS Warning Lamp Circuitry

KB4TA Module - X1 Wiring Harness
(Pin 1 - ABS Warning Lamp)KB4TA D Module - X1 Wiring Harness
(Pin 8 - ABS Warning Lamp)ISO1185-connector
(Pin 1 - ground / Pin 4 - stop lamp power)

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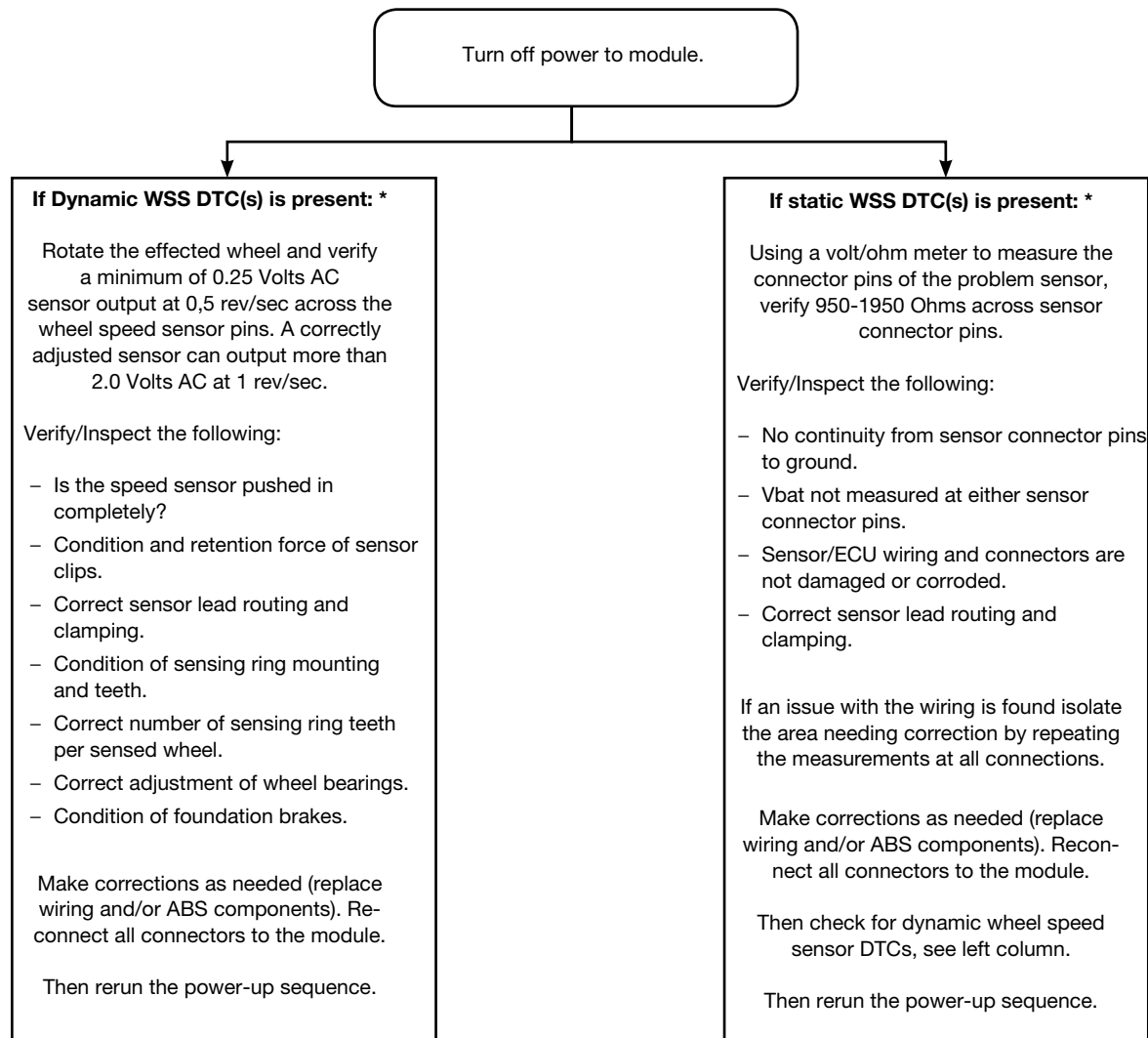
Chart 4 Troubleshooting the ISO 7638 (and ISO 1185 if connected) Power Supply

KB4TA/KB4TA D Module Wiring Harness,
ECU X1 Connector - measure:
Pin 9 (Ignition Power) to Pin 7 (ground)KB4TA/KB4TA D Module Wiring Harness,
ECU X1 Connector - measure:
Pin 6 (Battery Power) to Pin 4 (ground)KB4TA/KB4TA D Module Wiring Harness,
ECU X1 Connector - measure:
Pin 12 (Stop lamp Power) to Pin 11 (ground)

KB4TA / KB4TA D System Diagnostics

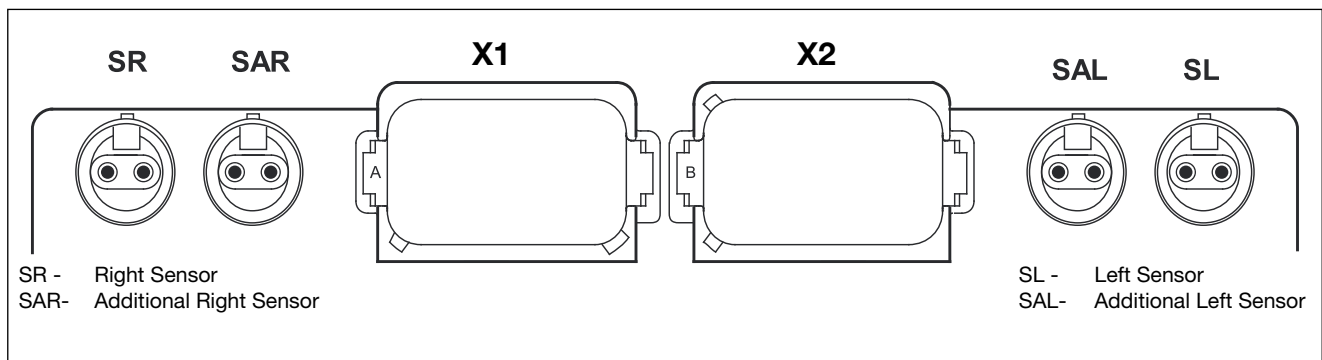
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September 2016

Chart 5 Troubleshooting the Wheel Speed Sensors



*** Note:** Both static and dynamic wheel speed sensor DTCs may be present.

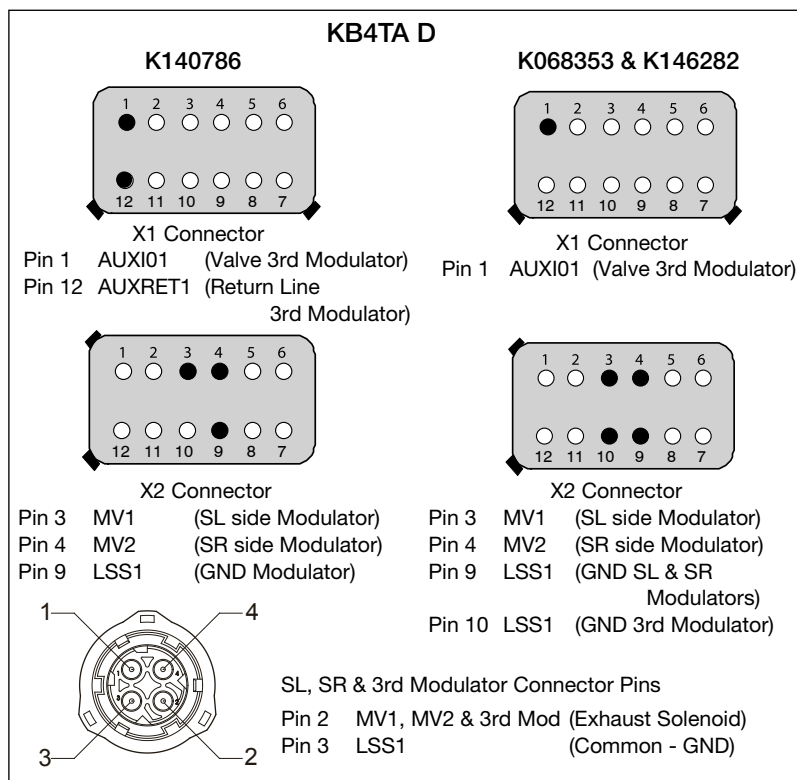
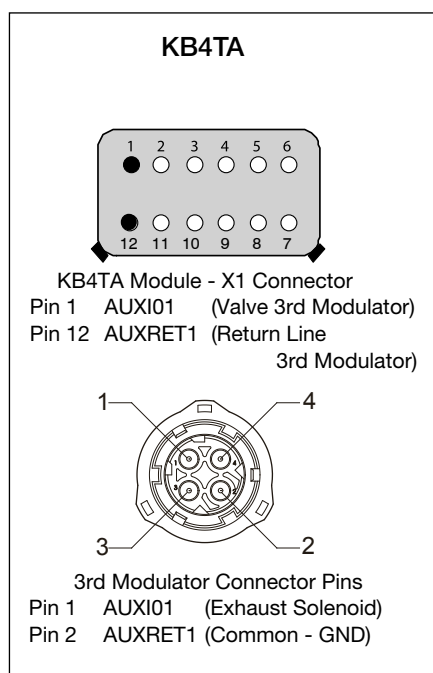
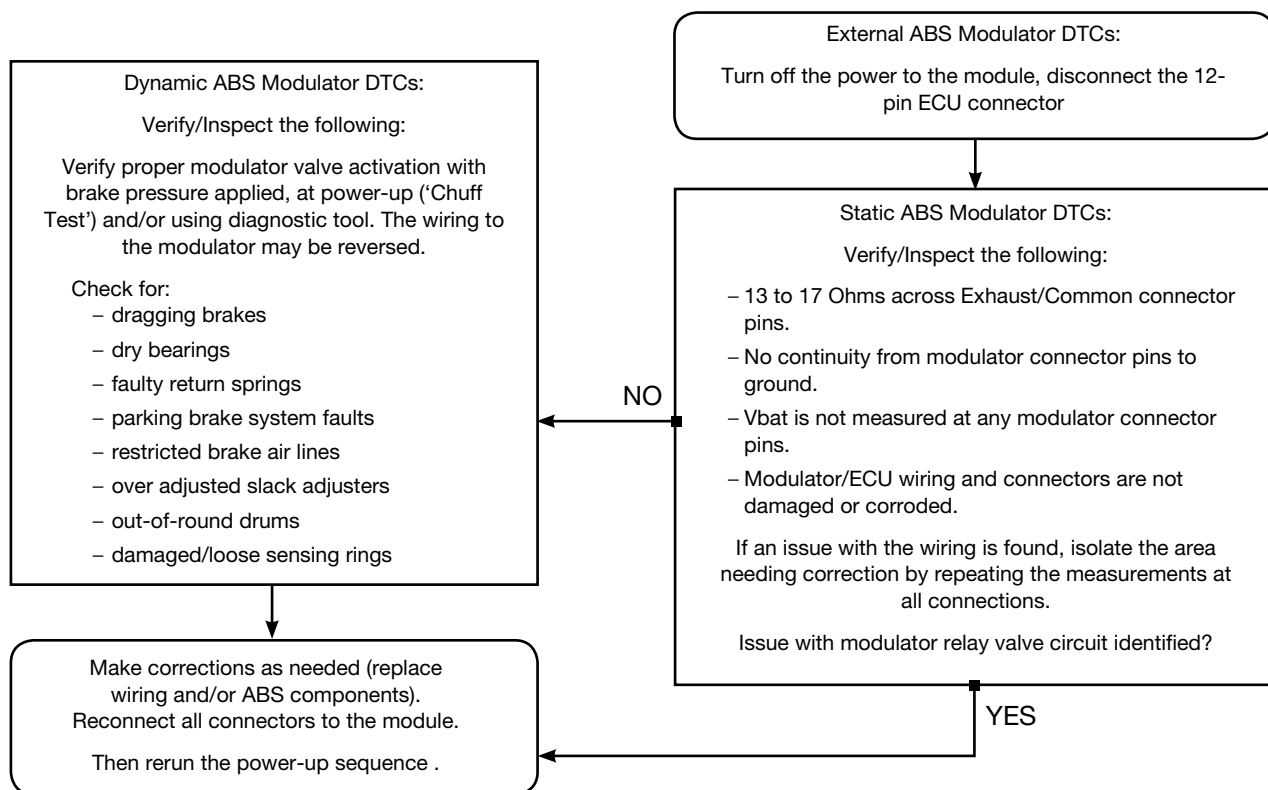
KB4TA and KB4TA D Modules - WSS Pinning



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Chart 6 Troubleshooting the Modulator Relay Valve (BR9234, K019290 and K019299)



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KB4TA / KB4TA D System Diagnostics

Doc. No. Y250910 (EN - Rev. 001)
September 2016

Revision Details

Rev. 000	July 2016	New document
Rev. 001	September 2016	Page 11 amended to include more KB4TA ECUs and Modulator Relay Valve.

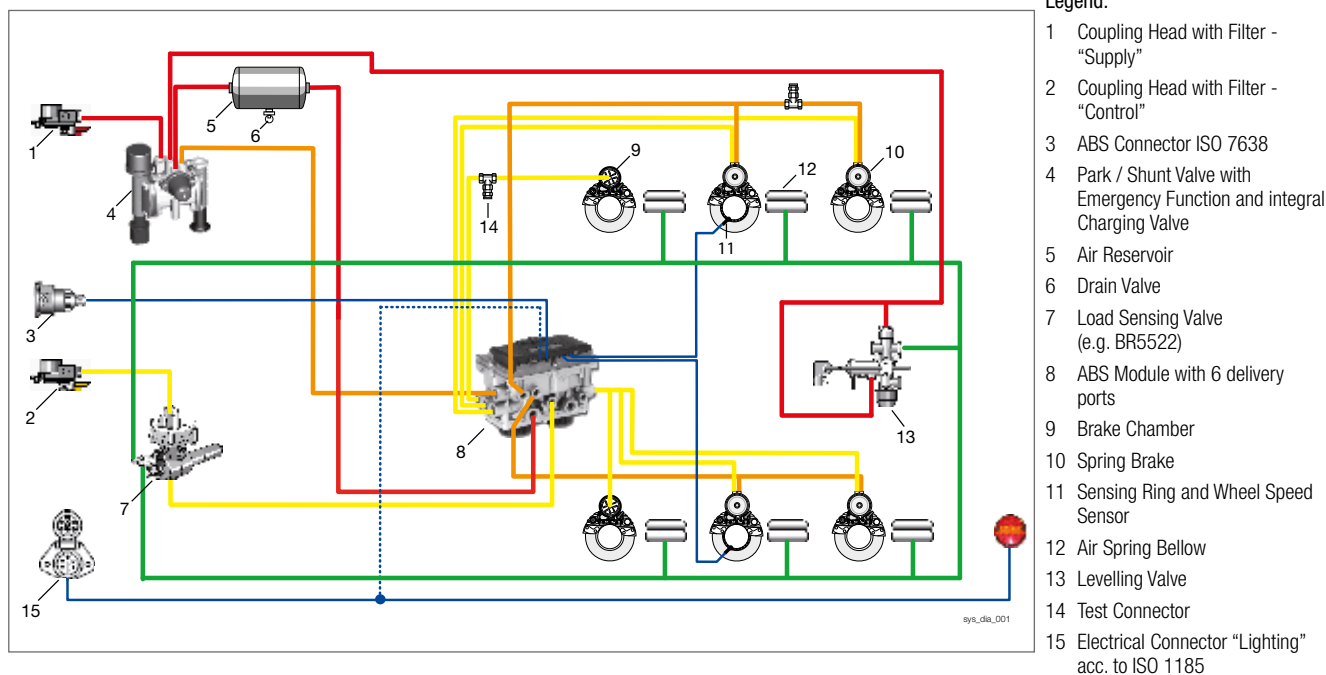
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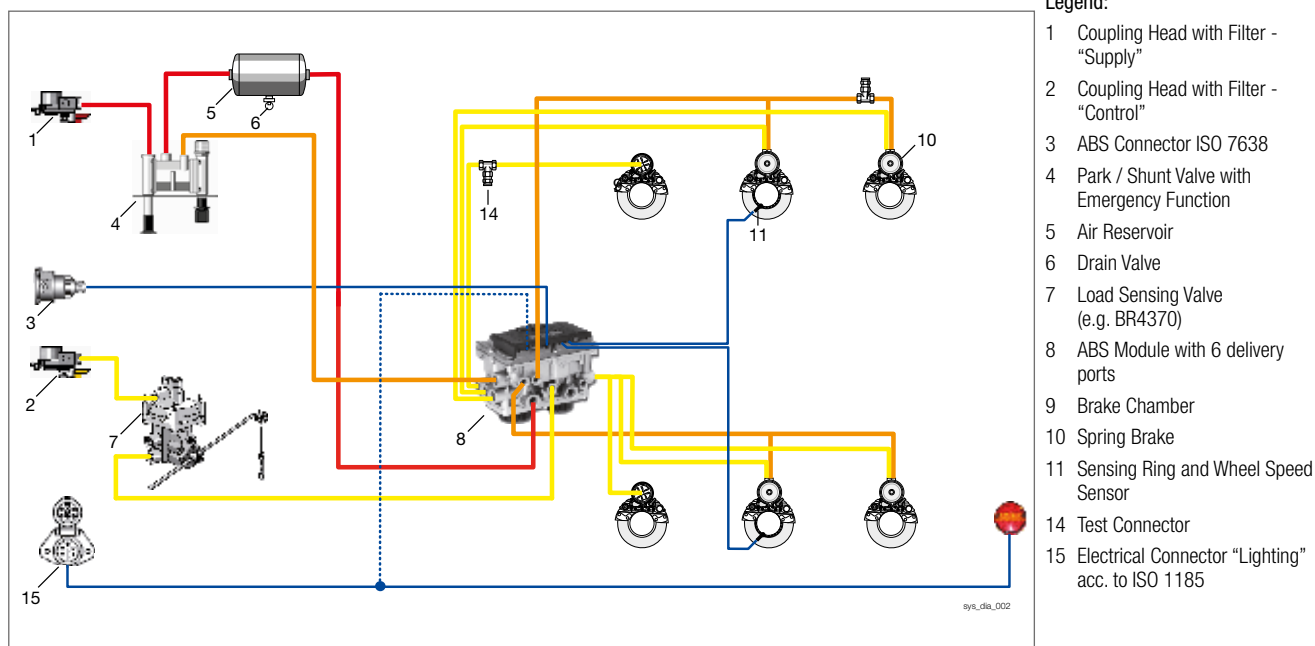


The KB4TA components are capable of working in systems with air or mechanical suspension and with disc or drum brakes. This document shows a range of typical systems. For more information please contact your local Knorr-Bremse representative.

KB4TA System diagram (2S/2M) for semi-trailer with air suspension and disc brakes



KB4TA System diagram (2S/2M) for semi-trailer with mechanical suspension and disc brakes

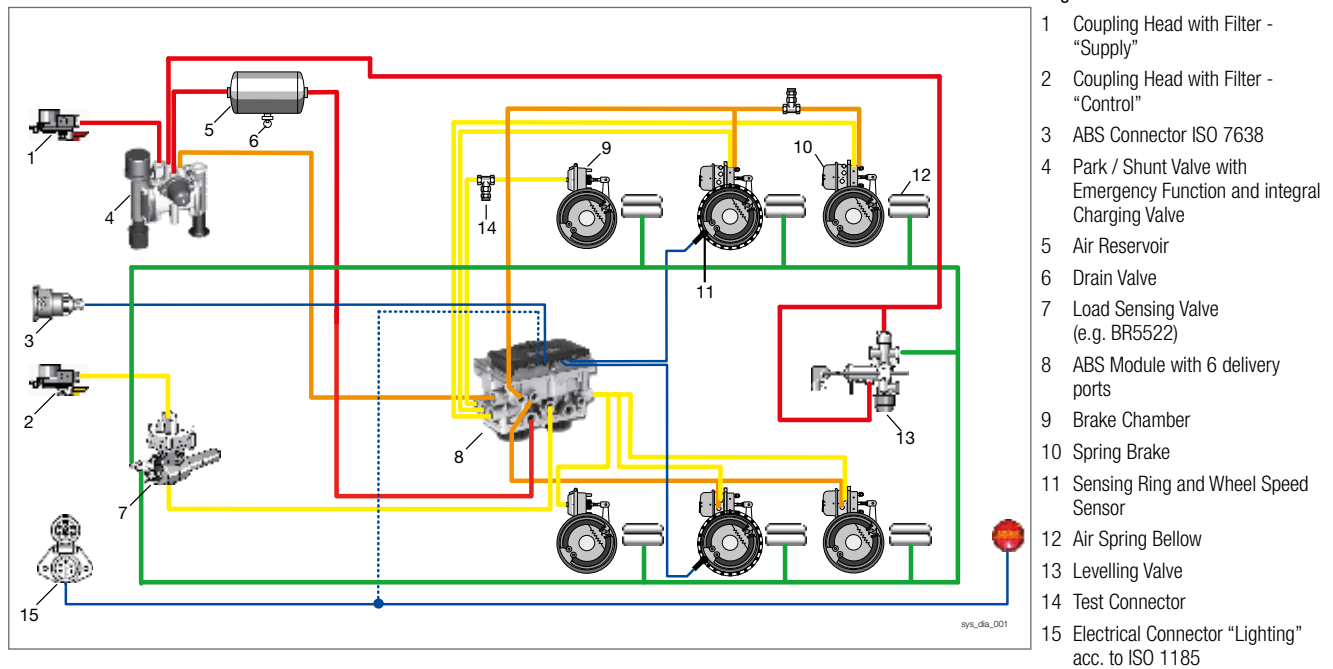


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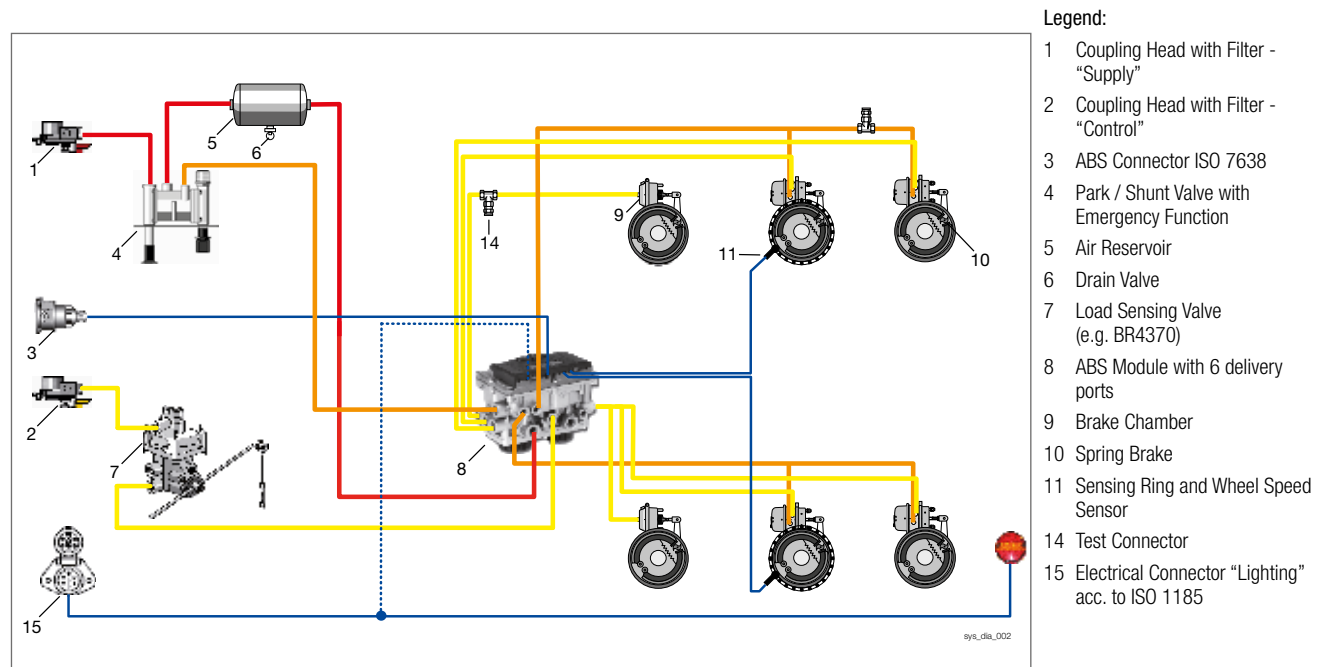
KB4TA System Diagrams

Doc. No. Y250911 (EN - Rev. 000)
July 2016

KB4TA System diagram (2S/2M) for semi-trailer with air suspension and drum brakes



KB4TA System diagram (2S/2M) for semi-trailer with mechanical suspension and drum brakes

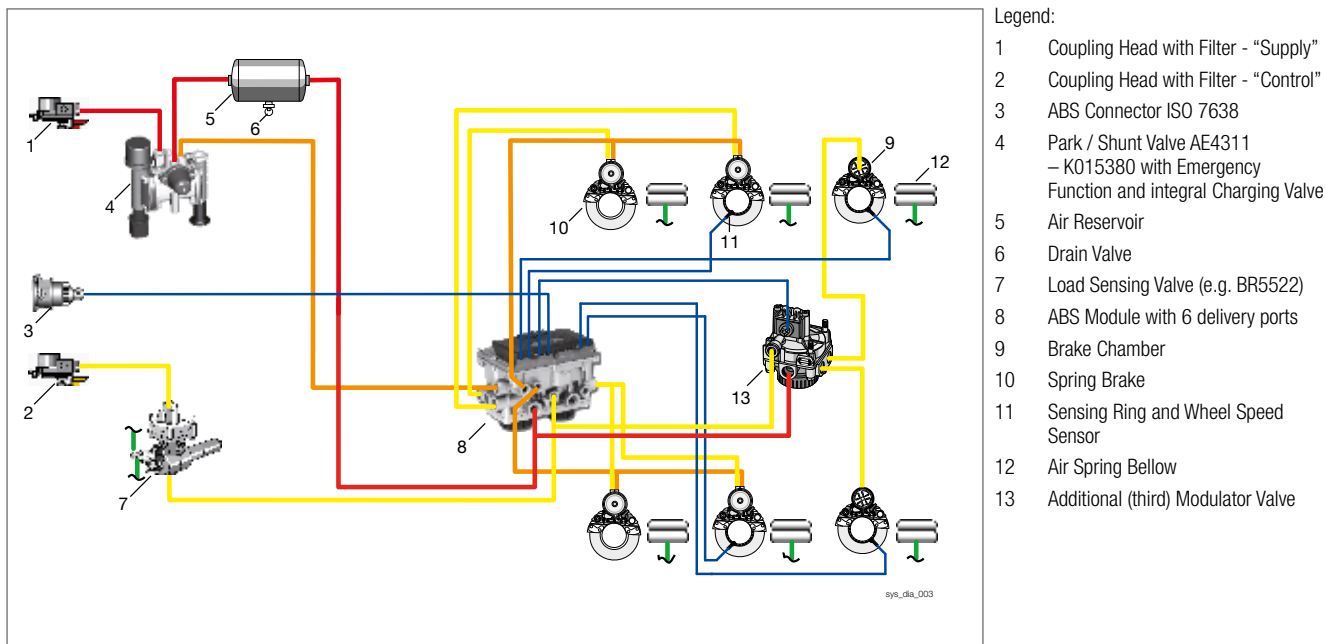


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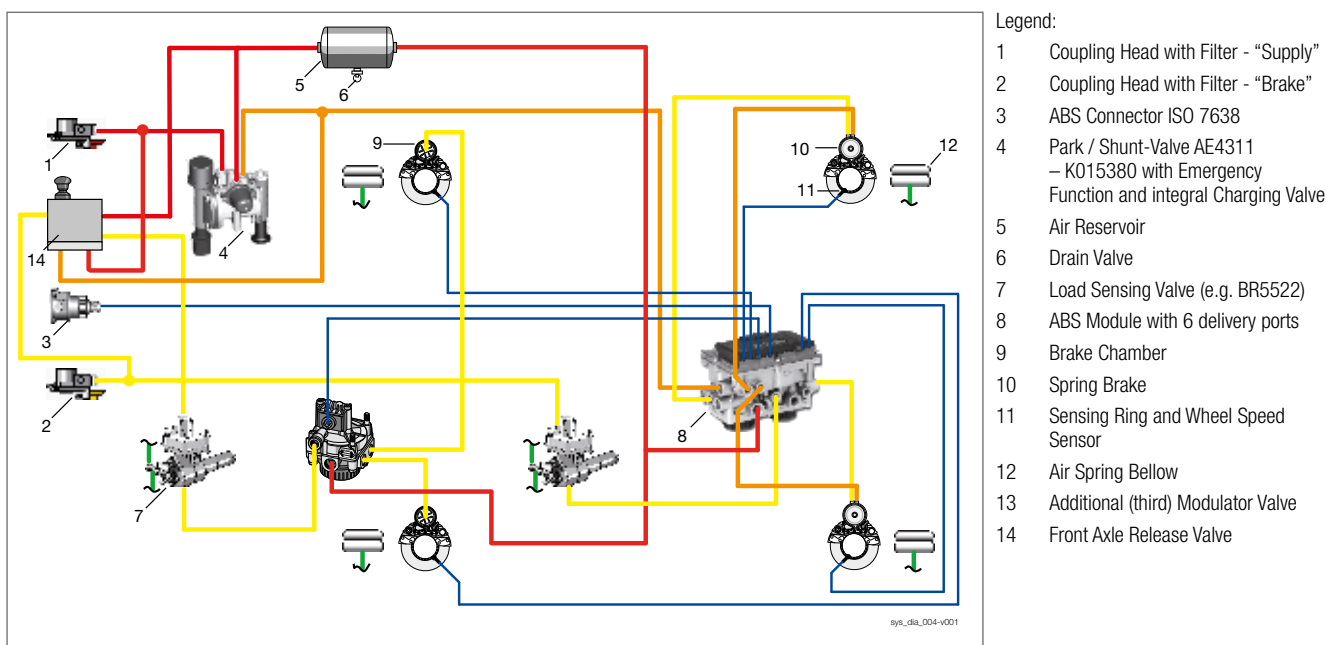
Doc. No. Y250911 (EN - Rev. 000)
July 2016

KB4TA System Diagrams

KB4TA System diagram (4S/3M) for semi-trailer with air suspension and disc brakes



KB4TA System diagram (4S/3M) for full trailer with air suspension and disc brakes



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KB4TA System Diagrams

Doc. No. Y250911 (EN - Rev. 000)
July 2016

Revision Details

Rev. 000 July 2016 New document.

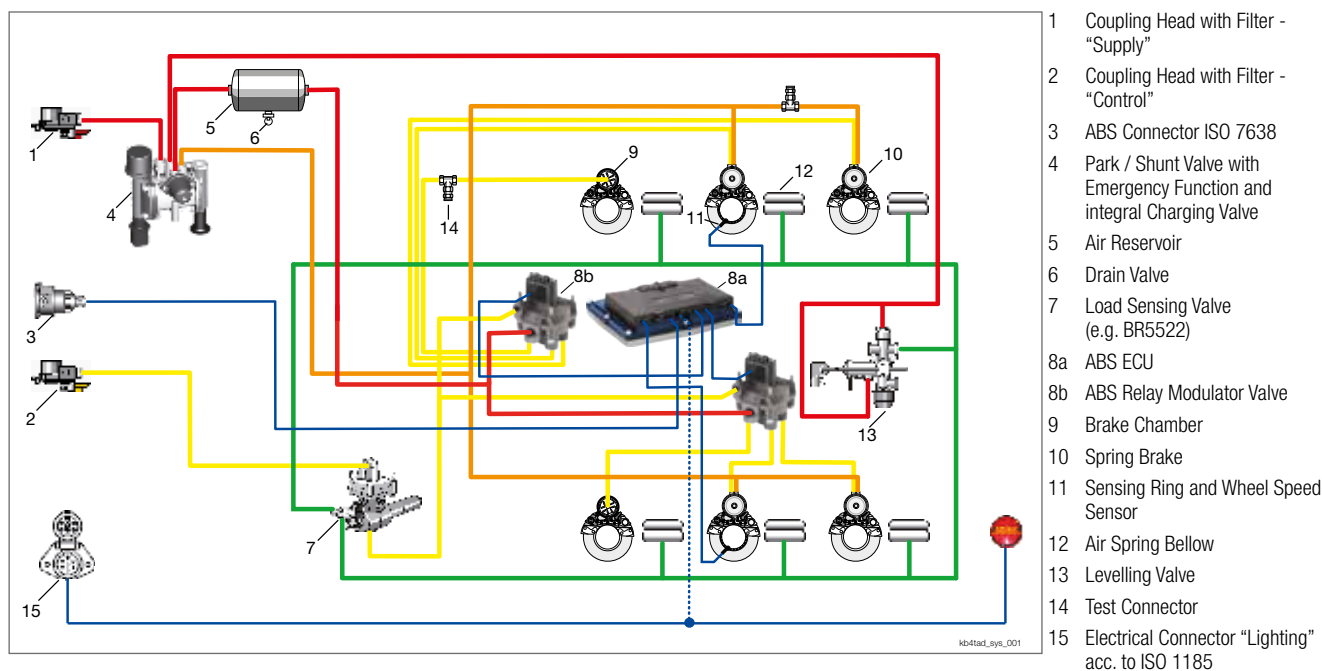
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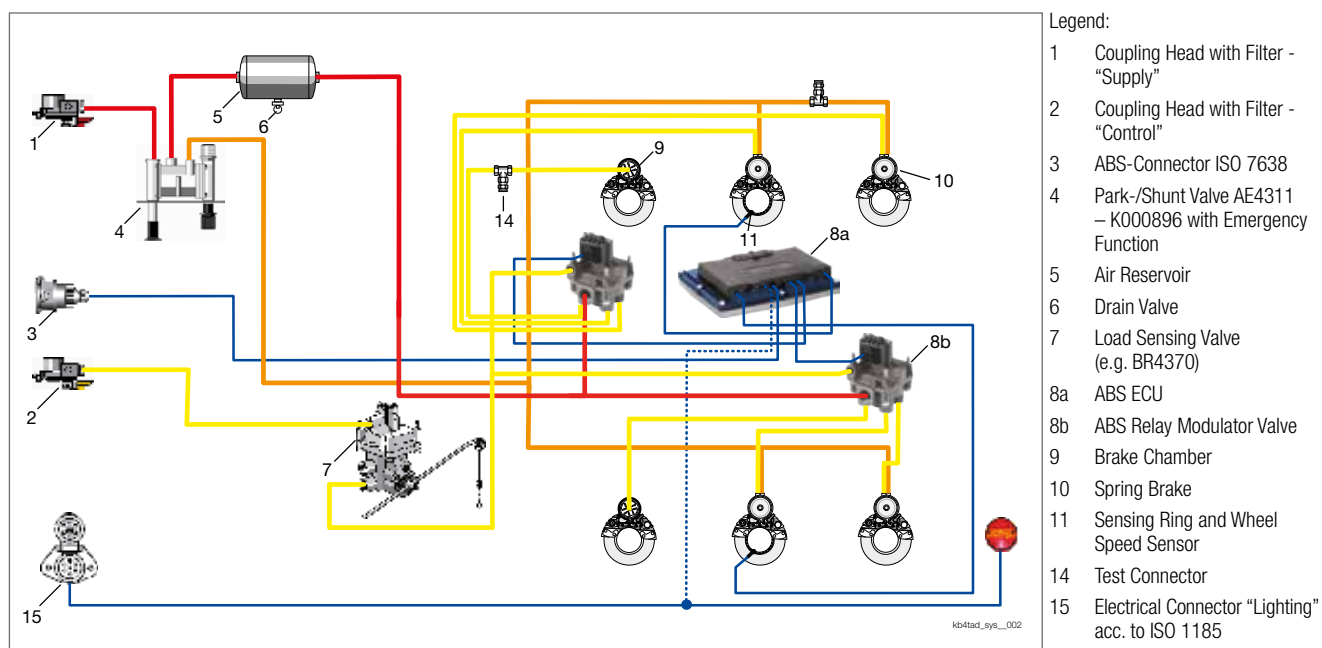


The KB4TA D components are capable of working in systems with air or mechanical suspension and with disc or drum brakes. This document shows a range of typical systems. For more information please contact your local Knorr-Bremse representative.

KB4TA D System diagram (2S/2M) for semi-trailer with air suspension and disc brakes
(ECU mounted above centre of bogie)

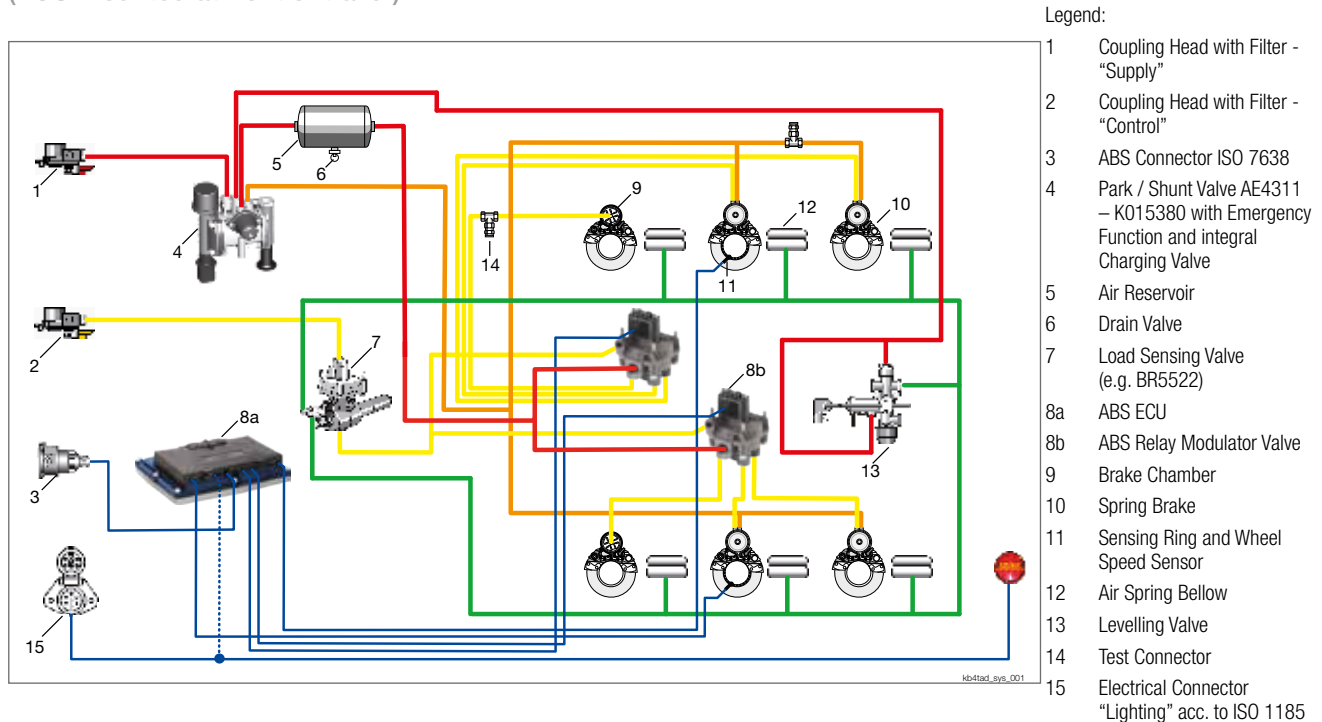
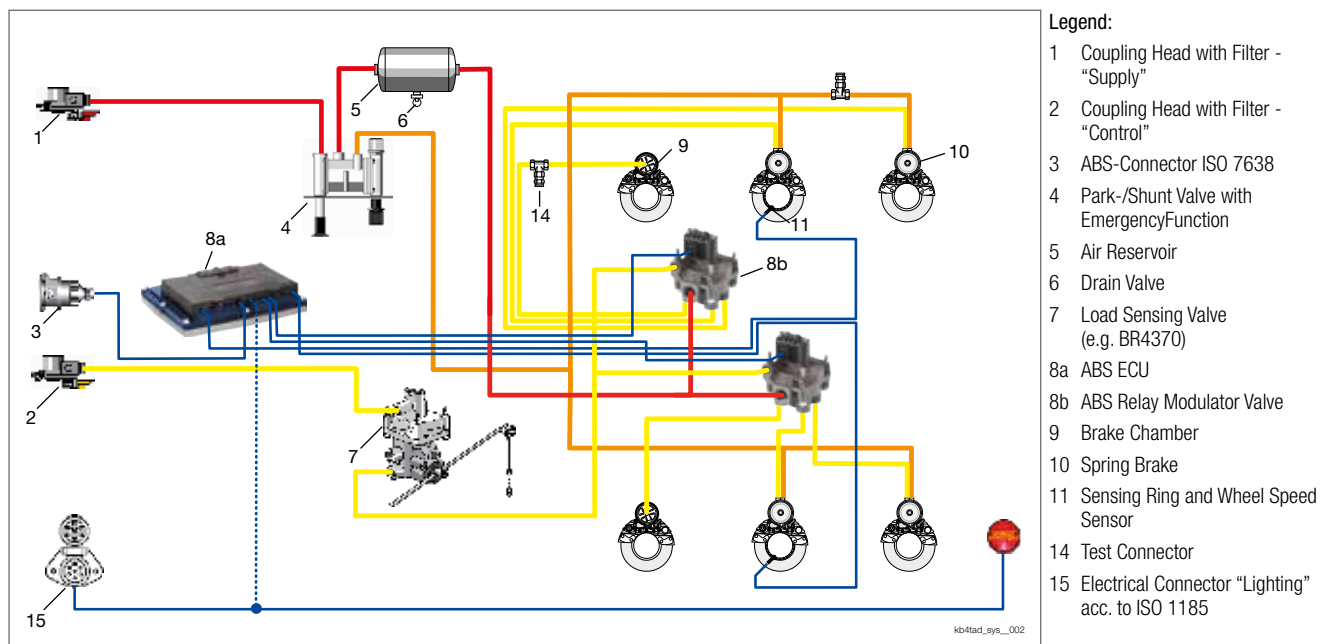


KB4TA D System diagram (2S/2M) for semi-trailer with mechanical suspension and disc brakes
(ECU mounted above centre of bogie)



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KB4TA D System Diagrams

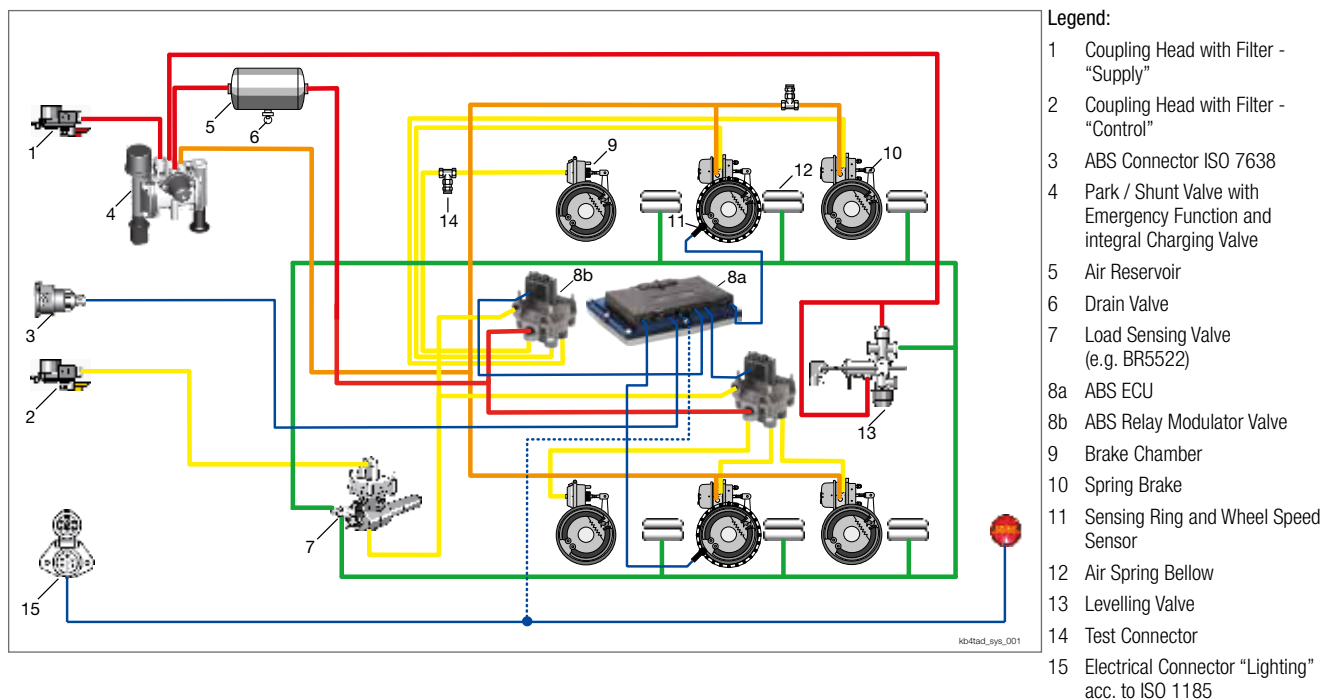
Doc. No. Y250913 (EN - Rev. 000)
July 2016KB4TA D System diagram (2S/2M) for semi-trailer with air suspension and disc brakes
(ECU mounted at front of trailer)KB4TA D System diagram (2S/2M) for semi-trailer with mechanical suspension and disc brakes
(ECU mounted at front of trailer)

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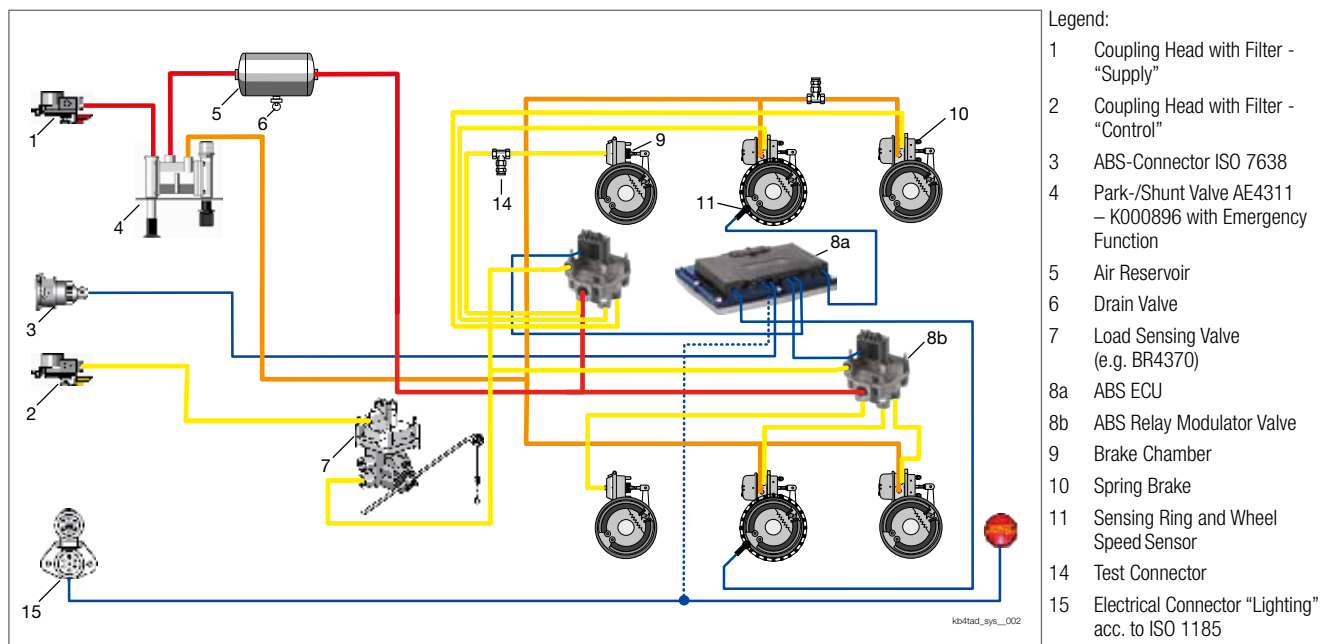
Doc. No. Y250913 (EN - Rev. 000)
July 2016

KB4TA D System Diagrams

KB4TA D System diagram (2S/2M) for semi-trailer with air suspension and drum brakes
(ECU mounted above centre of bogie)

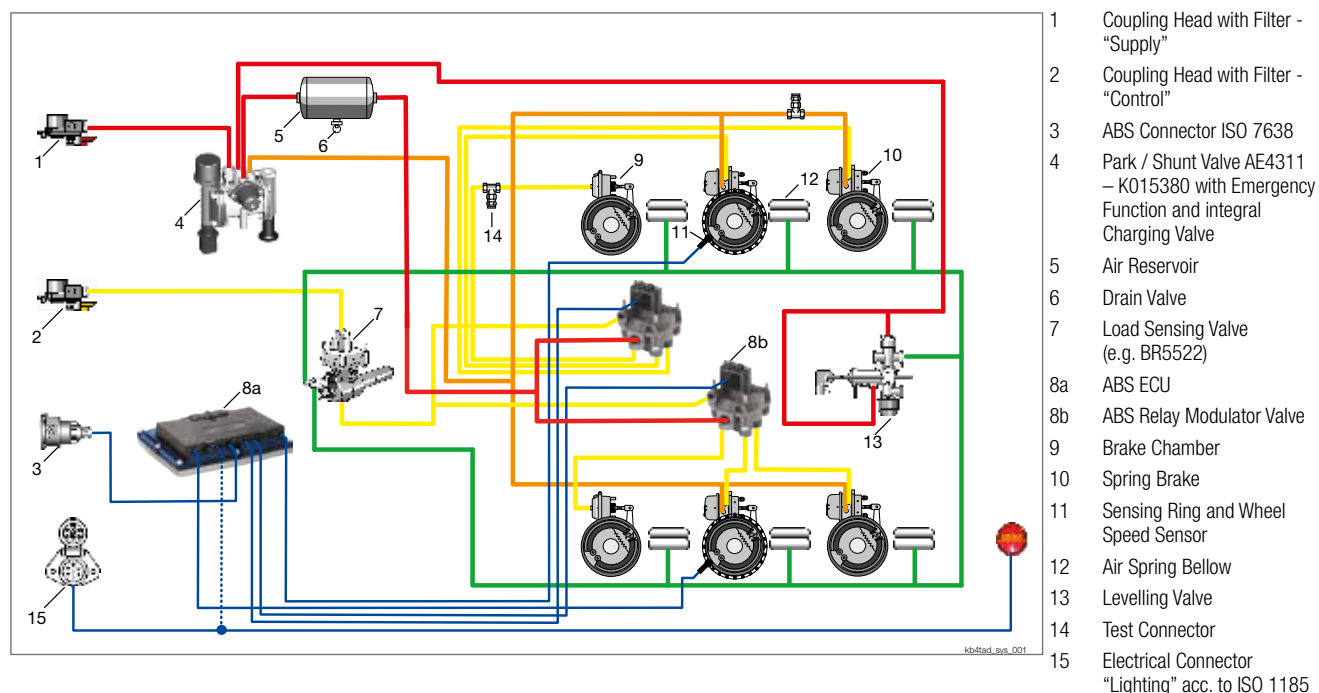
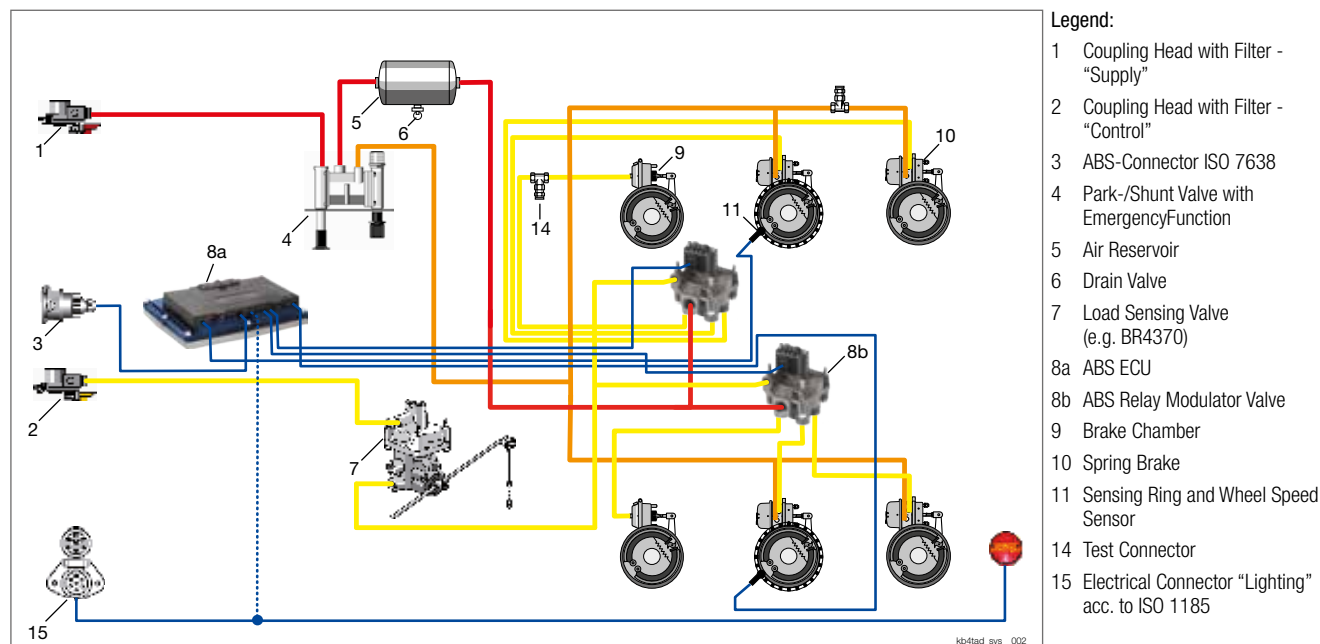


KB4TA D System diagram (2S/2M) for semi-trailer with mechanical suspension and drum brakes
(ECU mounted above centre of bogie)



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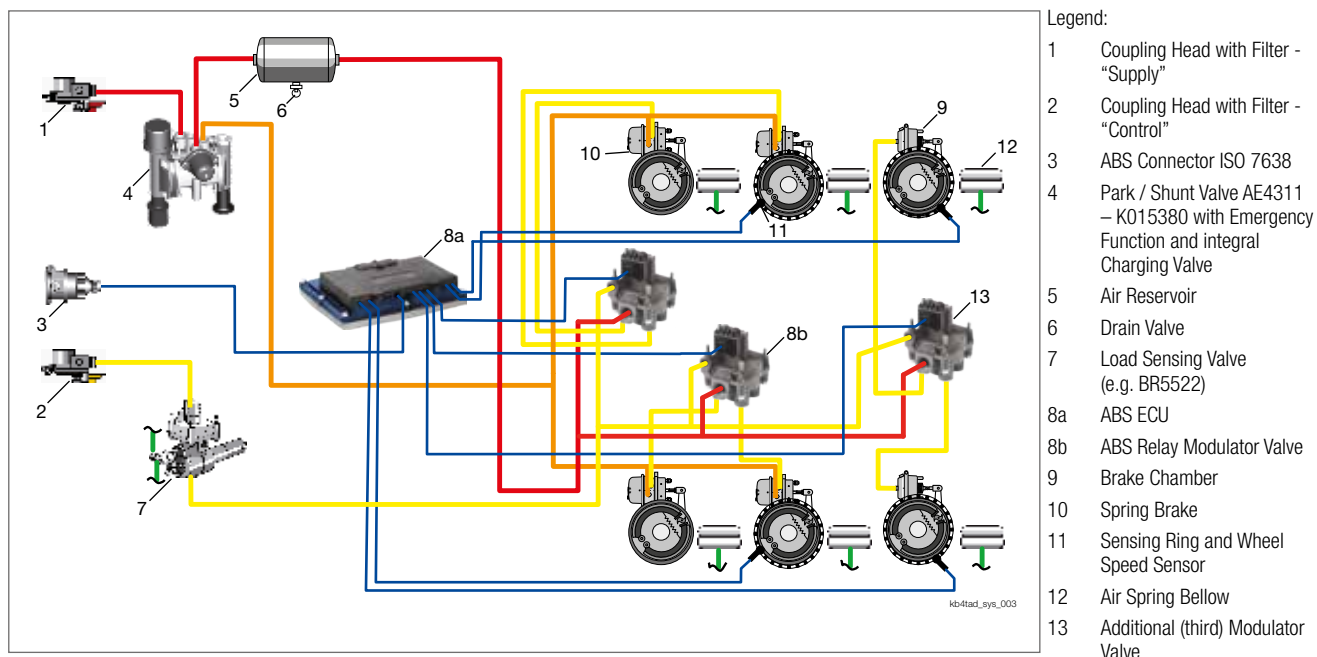
Doc. No. Y250913 (EN - Rev. 000)
July 2016KB4TA D System diagram (2S/2M) for semi-trailer with air suspension and drum brakes
(ECU mounted at front of trailer)KB4TA D System diagram (2S/2M) for semi-trailer with mechanical suspension and drum brakes
(ECU mounted at front of trailer)

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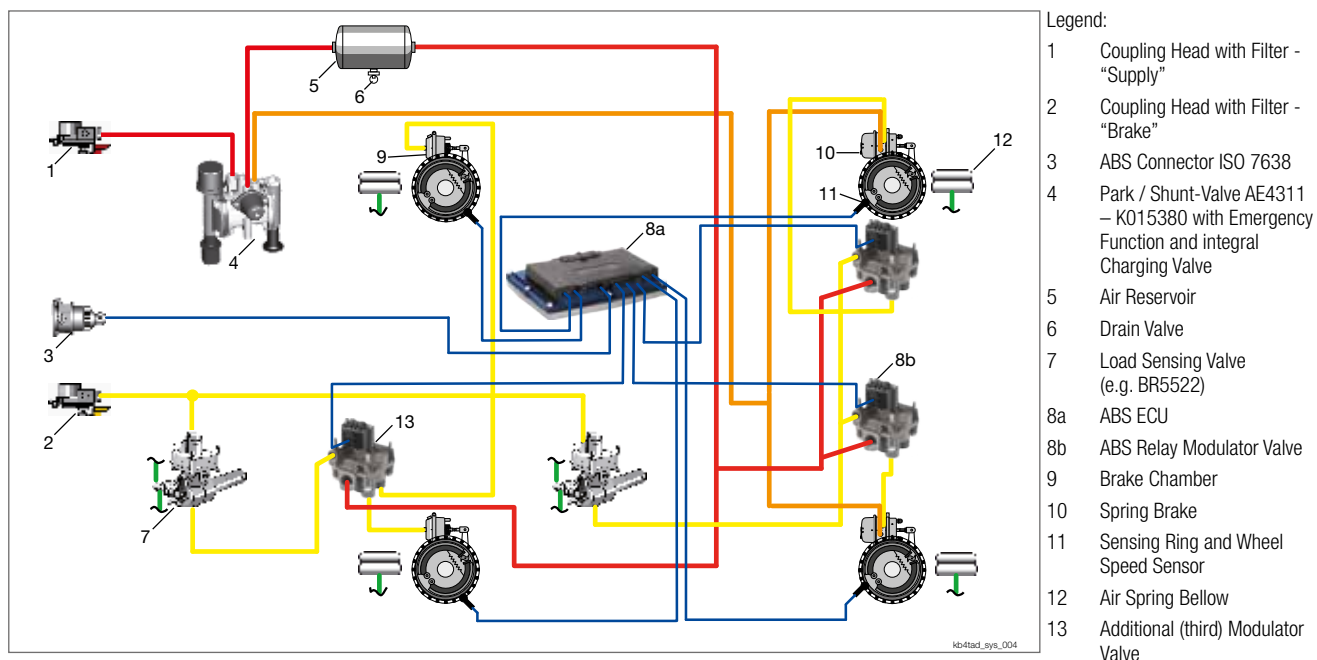
Doc. No. Y250913 (EN - Rev. 000)
July 2016

KB4TA D System Diagrams

KB4TA D System diagram (4S/3M) for semi-trailer with air suspension and drum brakes



KB4TA D System diagram (4S/3M) for full trailer with air suspension and drum brakes



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Doc. No. Y250913 (EN - Rev. 000)
July 2016

Revision Details

Rev. 000 July 2016 New document.

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