



Granning Lynx UK
Additional Axle EBS
System

8x2
Installation manual



1. Details required off vehicle:

- Make and model of vehicle, with chassis number
- MCPV (Quad) manufacturer and Part number from valve. – To identify opening pressure
- Axle weights for brake calc & equivalent Lsv plate or Load / suspension pressure measurements
- Conversion type tractor to rigid etc. (determines if TCV is present or is required)- also hand control vale –2 position or 3.
- Accurate vehicle dimensions OAS and BS

2. Unit fitting requirements:

- Granning will supply EBS additional axle kit as detailed below in equipment section.
- Granning system installation diagram will be supplied and must be followed with out variation unless discussed with Granning UK engineering. Shown in section 4 on page 2.
- Granning will be required to view every EBS additional axle installation and parameterise the system (system sign off / EOL test)
- Converter must ensure that suspension is set-up correctly with regards to weight distribution on drive air suspension vehicles, correct pressure ratios used.

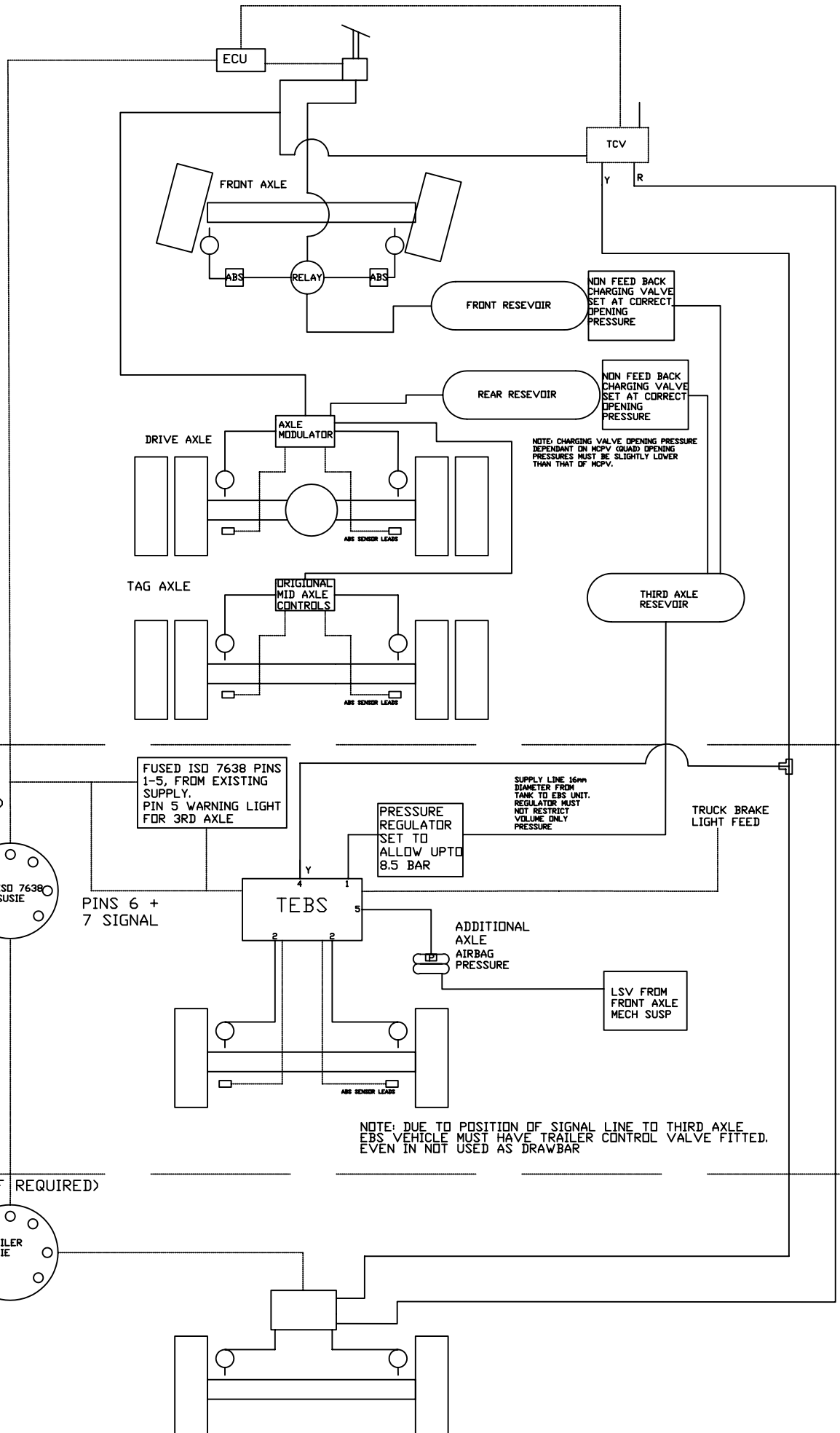
3. Kit content

– Unpack the system and check all components.

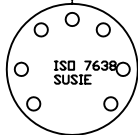
The kit should contain the following:

- Granning axle (with Wabco abs sensors)
- Suspension
- Brake chambers
- TEBS unit (Wabco or Knorr as appropriate)
- Correct fittings for TEBS unit to ensure correct pipe size used
- 2 charging valves set to appropriate opening pressure
- Fuse box to separate Granning system from truck systems, easy trouble shooting
- 1 pressure protection valve for Tebs supply line
- Warning lamp for additional axle system (must be separate to truck trailer warning system)
- Additional 40-litre air reservoir.
- System hand book for each vehicle (driver instructions / trouble shooting)
- Labels to easily identify fuse box, auto lower ecu and third axle warning lamp

GRANNING LYNX STAND ALONE EBS SYSTEM DIAGRAM
 (COVERING TRACTOR TO RIGID/DB, RIGID TO RIGID AND RIGID TO RIGID DB)
 (ALSO COVERS TRACTOR TO TRACTOR MID OR TAG AXLE CONVERSIONS)



THIRD AXLE (SECOND STEER)



PINS 6 + 7 SIGNAL

FUSED ISO 7638 PINS 1-5, FROM EXISTING SUPPLY. PIN 5 WARNING LIGHT FOR 3RD AXLE

PRESSURE REGULATOR SET TO ALLOW UPTO 8.5 BAR

SUPPLY LINE 16mm DIAMETER FROM TANK TO EBS UNIT. REGULATOR MUST NOT RESTRICT VOLUME ONLY PRESSURE.

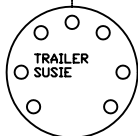
TRUCK BRAKE LIGHT FEED

ADDITIONAL AXLE AIRBAG PRESSURE

LSV FROM FRONT AXLE MECH SUSP

NOTE: DUE TO POSITION OF SIGNAL LINE TO THIRD AXLE, EBS VEHICLE MUST HAVE TRAILER CONTROL VALVE FITTED, EVEN IN NOT USED AS DRAWBAR

TRAILER (IF REQUIRED)



5. Positioning of components

The position of the ECU/Modulator assembly on the vehicle is critical to the operation of the EBS system. It should be mounted in a central position above the axle to be controlled or as near as possible.

6. Fitting the system

The ECU/Modulator should be fastened to a suitable bracket (not supplied by Granning Lynx UK) or chassis cross member. A template for drilling the mounting holes is available.

If a bracket is used, it should be **strong enough** to support the weight of the unit and the connected pipe work.

The unit can be mounted with the ECU facing forwards or backwards. This does not affect the performance of the system. But needs to be known as it will affect the programming of the system and the ports used for piping.

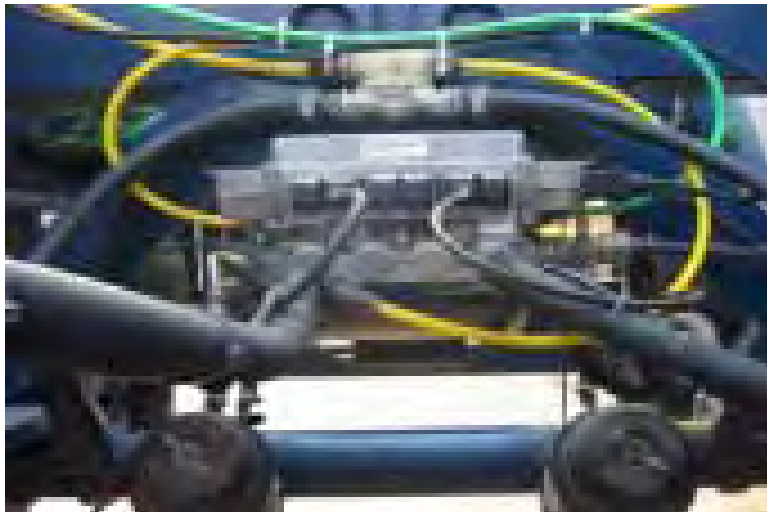


Fig. 2 Modulator/ECU

7. Pneumatic Pipe connections as per Granning Lynx UK system diagram

IMPORTANT NOTE: when piping the system, make sure that no angled screw fittings are used to connect the supply to the supply lines between the tanks and the modulator as such fittings can significantly impair flow characteristics reducing system performance

– The pneumatic pipes and hoses can now be connected. The pipes or hoses that feed the brake actuators should be connected first.

It is critical to the operation of the EBS system that these pipes and hoses are connected to the correct ports.

If the ECU is facing backward:

- The actuators on the nearside of the vehicle should be connected to ports 21.
- The actuators on the offside should be connected to ports 22.
- If the ECU is facing forwards, reverse the above.

These output ports are M 22x1.5 thread. Hoses, pipes and fittings with good flow characteristics should be used. As supplied in the kit Am703k



Fig. 3 Output ports 21 & 22

The next pipe to be connected should be the feed from the reservoir via the pressure protection valve mounted directly to the TEBS unit. This enters the unit at Port 1. A Port no. 1 is located at each end of the unit. Both ports are common. Either can be used and the redundant port should be plugged.

- The pipe used should be 16 mm diameter nylon pipe as per the supplied fittings to give the correct volume of air the system requires.

The next pneumatic connection is to Port 4 of the unit. The pipe that connects to Port 4 is the signal pipe (usually 10 mm diameter) from the output port of the trailer control valve yellow line port 42 As per the Granning Lynx UK system diagram.

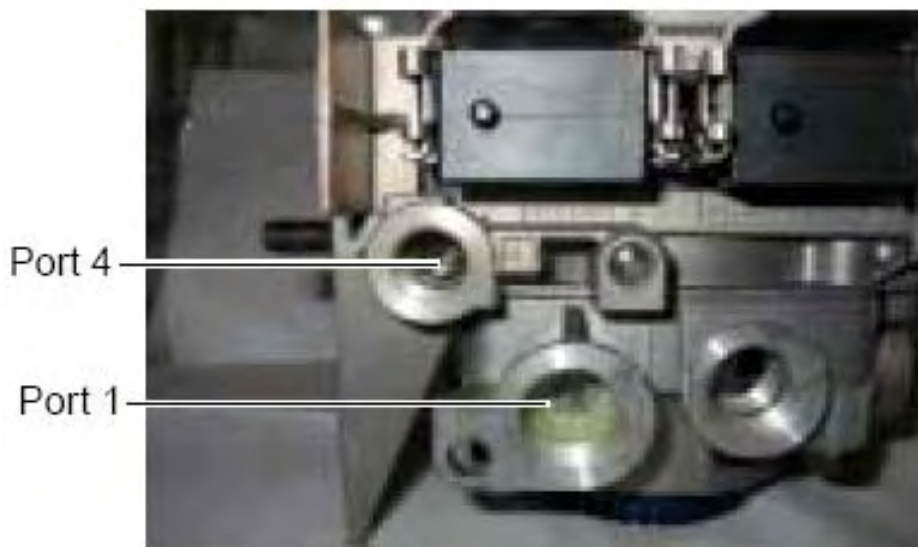


Fig. 4 Port 4 & Port 1

8. Signal from Air Suspension

– A signal pipe from the vehicle air suspension should be fitted to Port 5 of the EBS modulator. The pipe diameter should be a minimum of 6 mm. But 10mm is preferred as per supplied fitting.

This signal should be taken from an air bag connection on one side of the vehicle, but not from the lift axle circuit.



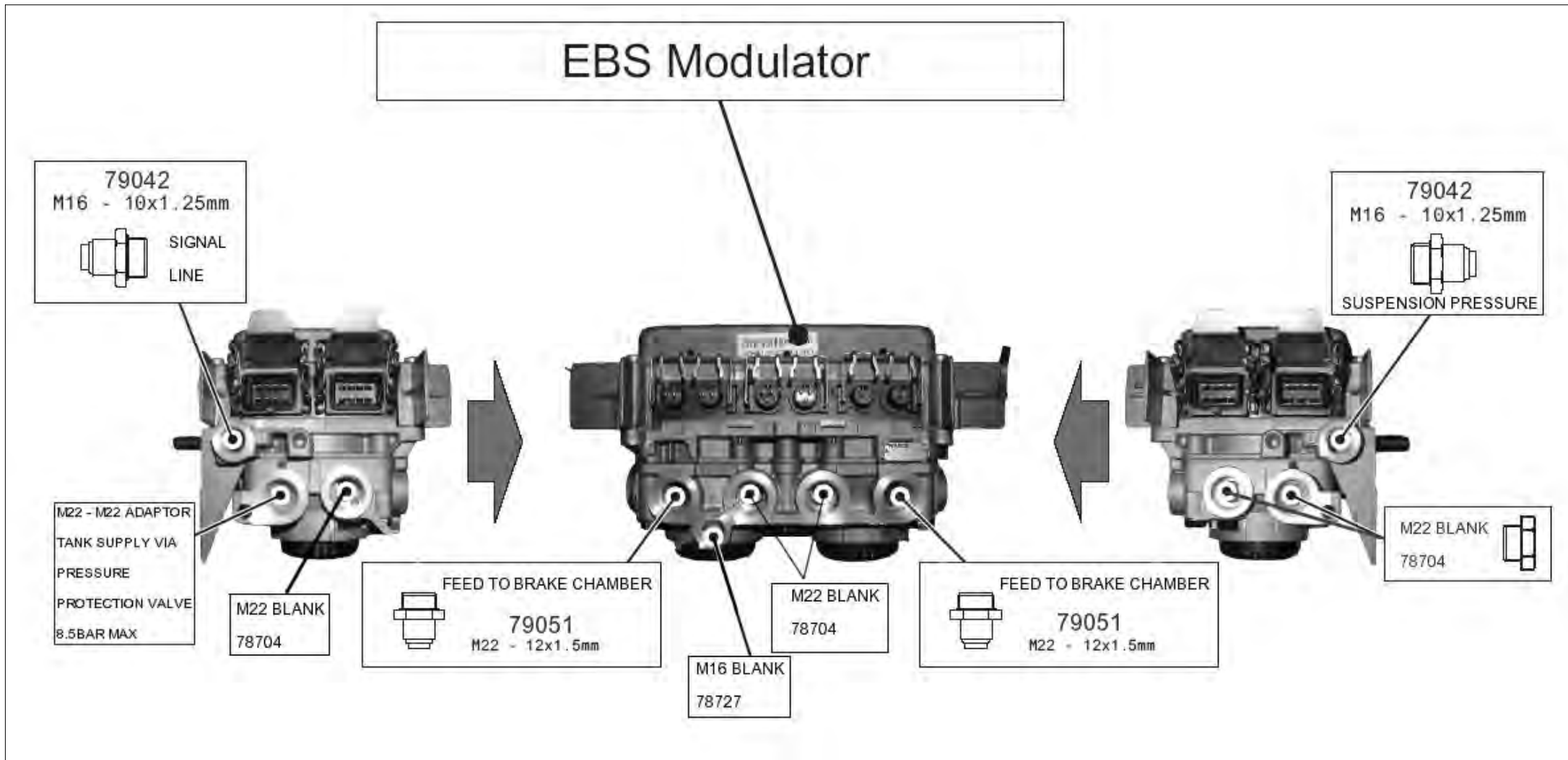
Fig. 10 Port 5

TEBS Unit Pipe Sizes Chart

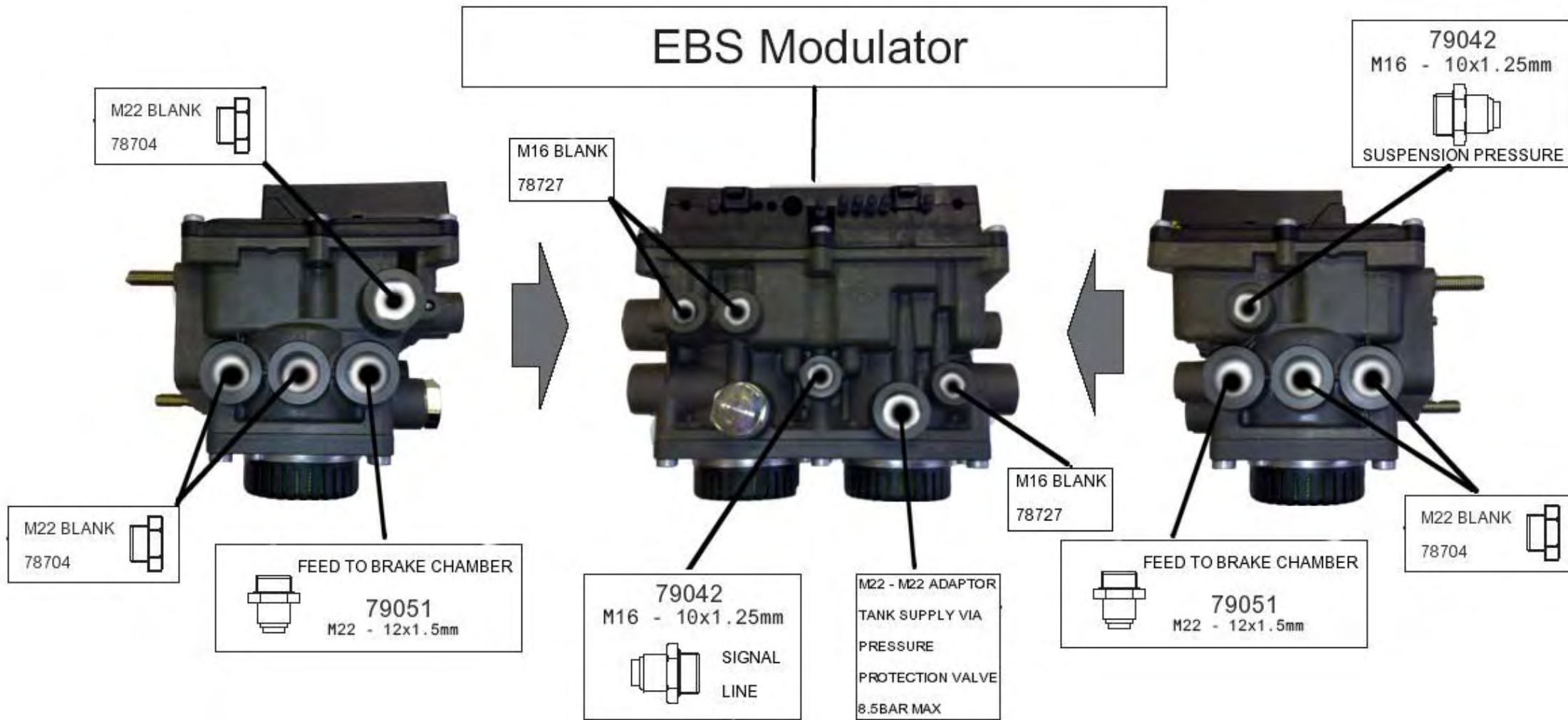
| <u>Knorr Port No.</u> | <u>Wabco Port No.</u> | <u>Port size</u> | <u>Min. Pipe Size Diameter</u> | <u>Connects To</u> |
|----------------------------------|----------------------------------|-----------------------------|---|---|
| 1.1 | 1 | M22 | 16mm | Tank supply via pressure protection valve |
| 21+22 | 2 | M22 | 12mm | Direct to service chambers |
| 4 | 4 | M16 | 10mm | Signal from TCV output yellow line |
| 42 | 5 | M16 | 10mm | Additional axle suspension bellows |

These pipes with connector sizes and part numbers, as well as where the ports connect to for each specific Wabco or Knorr TEBS module can be found on the following pages (please note some ports will need to be blanked off as they are not used in the Granning Lynx UK system, and these are diagrammed on these pages only)

WABCO EBS UNIT CONNECTIONS



KNORR-BREMSE EBS UNIT CONNECTIONS



9. Electrical connections

– Connect the sensor extension cables to the ends of the sensors.

It is **important** to connect the extension cables to the ECU at the correct channels.

If the ECU is facing backwards:

– The nearside (left) wheel sensor should be connected into position **d** on the ECU.

– The offside (right) wheel sensor should be connected into position **c** on the ECU.

If the ECU is mounted facing forwards:

– Reverse the above.

The ECU has two sensor connections for each channel; however use only channels c and d for the system installation leaving the others plugged with the provided covers.

It is **important** that the blanking covers are retained, for the sensor inputs that are not used.

Failure to observe this may cause water to enter the ECU.



Fig. 11 Sensor d and c

An ISO 7638 power cable is provided in the kit.

– This should be installed carefully in the chassis and connected to the ECU at the connection marked POWER.

– The ISO socket should be removed from the other end of the lead. The 7 pins should be snipped off, Making note which wire related to which pin connections. These wires will be joined or spliced into the trucks ISO connection as per the Granning Lynx UK system diagram (pins 1 to 5 via the supplied fuse box and relays fitted where appropriate from the diagram) making sure these connections are done to a high standard as per the truck manufacturers bodybuilders instructions and properly insulating and water proofing the joints.

An alternative power supply can be connected into the ECU using the power / diagnostic cable. One leg of the cable has the diagnostic socket fitted. The other cable has four bare wires (stop light feed)

– Plug this cable into the ECU at connection marked DIAGN.

– Locate the diagnostic socket on to a suitable bracket or hole in a chassis on the outside of the vehicle.

This will avoid having to gain access to the underside of the vehicle in order to carry out diagnostic work in the future.

The cable with the bare wires should be routed to a place where the alternative power supply can be connected e.g. chassis mounted junction box. The supply used is 24N. The colours of the wires are as follows:

- Red wire connects to the stop lamp feed (Pin 4 of the 24N socket).
- Brown wire connects to the earth circuit (Pin 1 of the 24N Socket).
- Green wire powers switched output 1 (Not used).
- Blue wire powers switched output 2 (Not used)

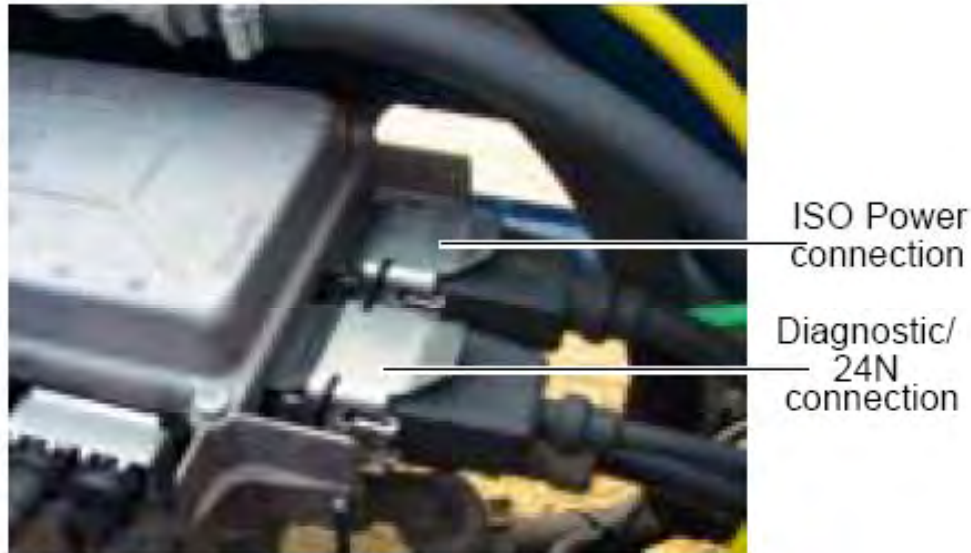


Fig. 12 Socket connections and function of ISO cable

Details of both the Wabco and Knorr wiring connections can be found on the following pages as well as the layout and fuses for the fuse box supplied through which pins 1 to 5 of the ISO socket and the auto lift system fuse are run. The figures in the manual are generally of the Wabco TEBS product.

- Blanks and connector covers for TEBS electrical connections should not be removed, unless necessary to connect equipment + they should always be replaced afterwards. This applies for both the Wabco and Knorr EBS units to ensure the ingress of water is prevented as this could result in shorting across pins which will result in:
 - Unit not functioning correctly
 - Increased system degradation
 - Adversely affecting service life and any warranty claims.

System relays

As per Granning Lynx UK system diagram found at the start of this manual section 4 on page 2. There are a number of relays supplied in the kit that must be wired in to connect the functions of the EBS braking unit and the auto lower system.

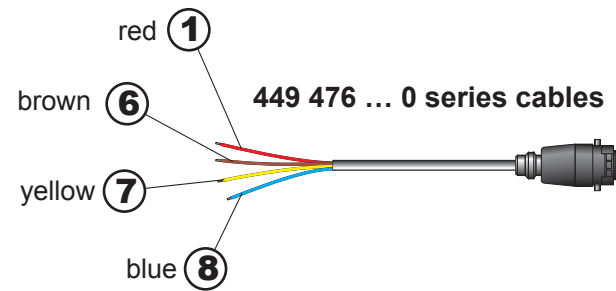
There are three relays, which need to be installed within the system for it to function correctly. These are all signalled from the lift system solenoid.

- Relay disconnects pin 2 (power) supply to TBES unit when axle is lifted.
- Relay disconnects pin 5 (warning lamp) when axle is lifted
- Relay disconnects pin 5 of diagnostics connection lead, cutting the brake light feed to the system when axle is lifted

Failure to fit these correctly will cause the system to illuminate the warning light and also could cause the system to be unpredictable.

IN/OUT2

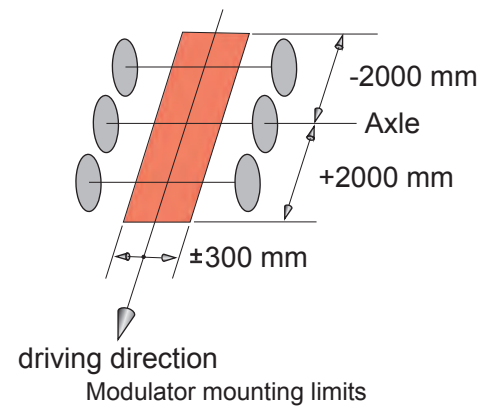
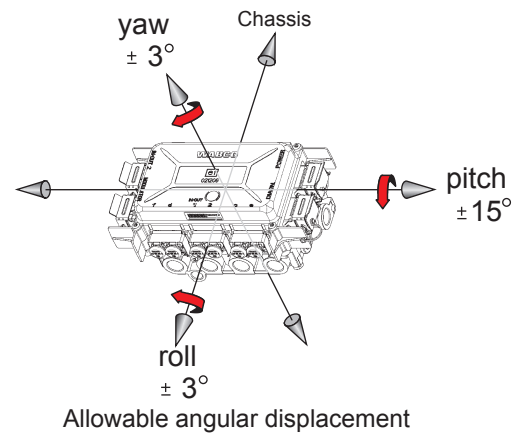
external demand sensor / telematics



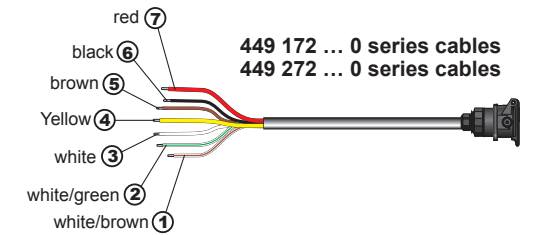
- ① Switched Output 3 / External Demand Sensor (KI15, 3A)
- ② Ground ECU
- ③ Input - External Demand sensor
- ⑤ KI30 (not fused)
- ⑥ Ground ECU
- ⑦ CAN 2 - Hi
- ⑧ CAN 2 - Lo

RSS Installation Requirements

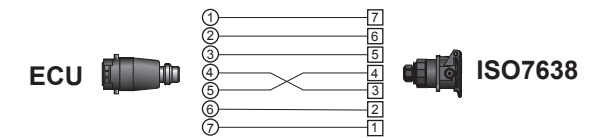
Limits required to guarantee correct RSS function
- for modulator 480 102 014 0



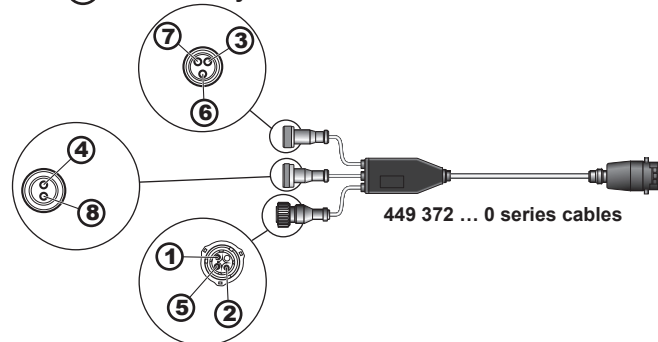
POWER - ISO 7638 / TCE



- ① ISO7638 CAN Lo (standard 24v , TCE 5v)
- ② ISO7638 CAN Hi (standard 24v , TCE 5v)
- ③ ISO7638 Warning Lamp (Not with TCE version)
- ④ ISO7638 Ground (Not with TCE version)
- ⑤ ISO7638 Solenoid Ground (KI 31) (GND with TCE version)
- ⑥ ISO7638 24v ECU (KI 15) (Not with TCE version)
- ⑦ ISO7638 24v KI 30 (Plus with TCE Version)



- ① Switched Output 3 (KI15, 3A)
- ② Ground ECU
- ③ Exhaust solenoid +24v
- ④ Redundancy Valve +24v
- ⑤ Input - Pressure Sensor EBS Relay Valve
- ⑥ Solenoid Valve - Ground
- ⑦ Inlet Solenoid +24v
- ⑧ Redundancy Valve - Ground



MODULATOR - 3rd modulator

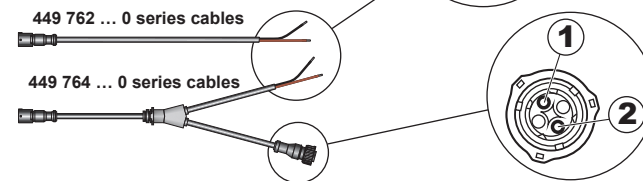
WABCO Vehicle Control Systems
An American Standard Company
www.wabco-auto.com



wheel speed sensors f,d

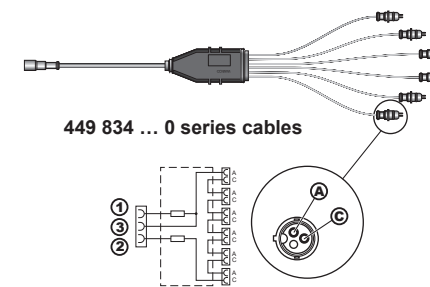
wheel speed sensors c,e

- ① Switched Output 5 (24v)
- ② ECU Ground
- ③ Input Axle load Sensor / Traction Help



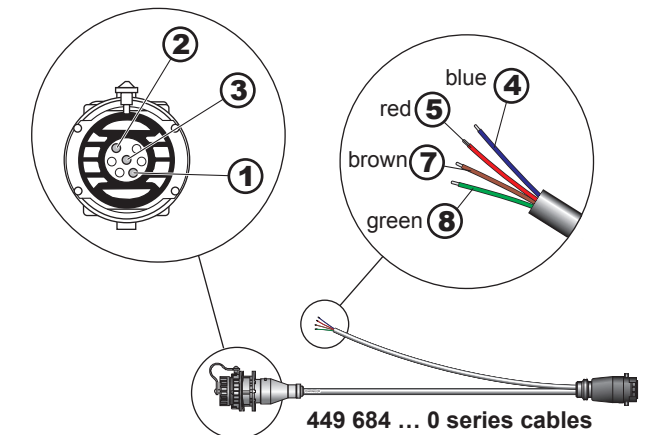
IN/OUT1 - traction help

- ① 5v
- ② ECU Ground
- ③ Input wear sensor



⊙ - wear indication

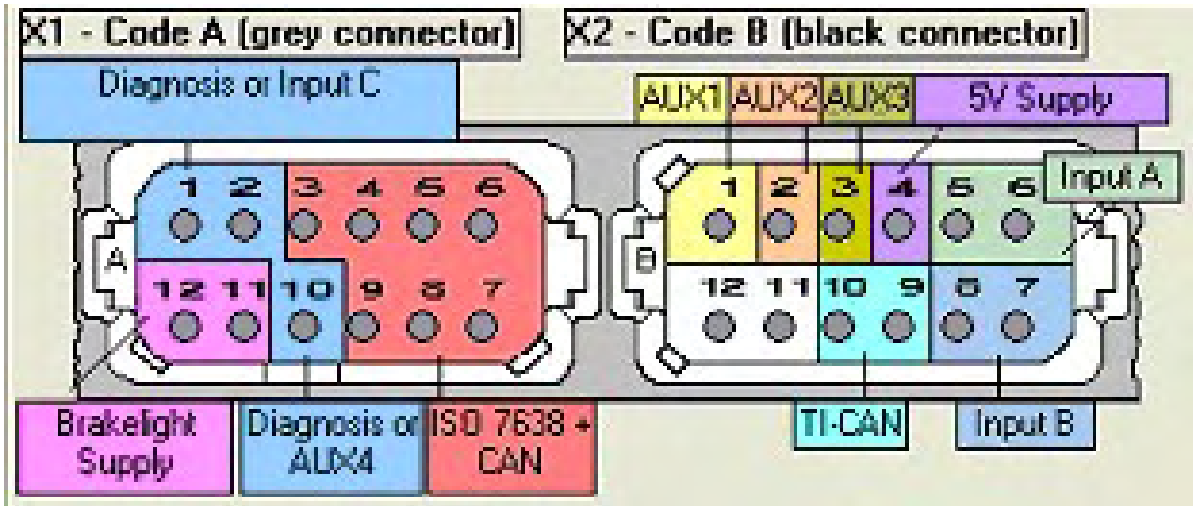
- ① ISO9141 K-Line
- ② Switched Output 4 (Diagnostic Supply)
- ③ ECU Ground
- ④ Switched Output 2 (ECAS/ELM/ILS2)
- ⑤ Stoplight ⊕
- ⑥ Battery Load Output (ECAS)
- ⑦ ECU Ground (Stoplight ⊖)
- ⑧ Switched Output 1 (ISS/ILS 1)



DIAGN.

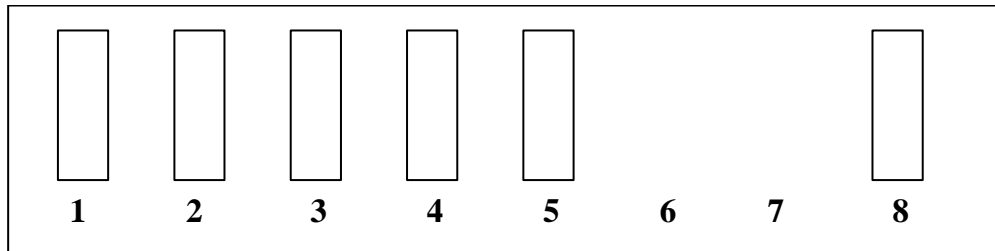
diagnostics/stoplight/ISS/ILS/ECAS/ELM/battery

Knorr-Bremse EBS unit wiring allocations



Granning Lynx UK additional axle fuse box

Fuse positions



| <u>Fuse Number</u> | <u>Fuse Colour</u> | <u>Fuse Rating</u> | <u>System Related</u> |
|--------------------|--------------------|--------------------|---------------------------------------|
| 1 | Neutral | 25Amp | EBS solenoid valve electrics Positive |
| 2 | Blue | 15Amp | EBS electronics Positive |
| 3 | Blue | 15Amp | EBS electronics Negative (Ground) |
| 4 | Neutral | 25Amp | EBS solenoid valve electrics Negative |
| 5 | Blue | 15Amp | EBS warning lamp |
| 6 | NONE | - | |
| 7 | NONE | - | |
| 8 | Tan | 5Amp | Auto lower system |

10. Commissioning

The system must now be programmed by a Granning Lynx UK engineer.

- The data from the software calculation is entered along with other parameters, and a system function test performed.

Immediately after the system has been programmed:

Four clicks will be heard from the modulator valves. This is the system checking itself.

The dashboard-warning lamp will come on with the ignition switch and the warning light will go out after the vehicle has moved at more than 7KPH. This is to check the Function of the wheel speed sensors.

When the system is next powered and every time there after the lamp will go out after approximately three seconds, and will only come back on if a fault occurs.

The system also requires testing using the alternative power supply done by:

- Depressing the footbrake and switch on ignition.

The self-check clicks will be heard.

The programming and system approval can only be performed, by a Granning Lynx UK engineer who will sign off the vehicle and along with the converter completing the necessary documentation for submission with the vehicle type approval.

11. Repairs and Diagnostics

NOTE: Trained Wabco or Knorr-Bremse agents can be used to diagnose system faults indicated by the red light. BUT the system parameters should only be changed by or under direct instruction / authorisation of Granning Lynx UK Engineering Failure to do so will result in voiding Granning Lynx UK liability for this product.

- At NO time should the RSS function within the Trailer EBS units (TEBS) be switched on.
- Faults that occur can generally be diagnosed by a trained EBS service centre by reference to the Wabco or Knorr reference guide, by using the trouble shooting section of this manual or by contacting Granning Lynx UK engineering department.
- If the TEBS unit is to be removed due to a hardware fault, the ECU data file should be copied exactly to the new unit and Granning Lynx UK informed of this action. If the system data is unrecoverable Granning Lynx UK Engineering should be contacted to supply the original data file for uploading.
- Also for a unit change, note the installation position of the unit, as this is critical to the system program. Also please note pipe sizes and fittings that were fitted at installation, as these can be critical to system function especially the additional axle tank supply line to the TEBS unit via the pressure protection valve. Correct fittings are diagrammed previously in this manual.
- If fittings are to be changed or replaced then exact replacements or fittings of similar quality should be used as not to impair the systems integrity.
- If the pressure protection valve fails, a direct replacement should be installed or an alternative valve could be utilised adhering to the following conditions:
 - o Port sizes should not be reduced as this will affect the air systems volume availability and will impair system function
 - o Max pressure output of the valve should be fixed at 8.5bar
- If the charging valves are replaced then the replacements should be set to the correct opening pressure as detailed at the front of this manual and these pressures are vehicle specific, and the following conditions also adhered to:
 - o The valve must be a Non-Feedback type valve
 - o The valve should be fitted directly to the front or drive service tanks.
 - o All fittings should be of comparable quality to originals.
 - o Failure to replace the valves correctly will void Granning Lynx UK liability for this system.
- The data and Granning Lynx UK additional axle system are unique to the conversion at the time of installation. The vehicle configuration, type and dimensions should not be altered in any way without written confirmation from Granning Lynx UK.