

Granning Axles UK
Additional Axle EBS
System

granning
axle and suspension solutions
Installation Manual

1. Details required off vehicle:

- **CONVERTER TO ENSURE CHASSIS DOES NOT HAVE ROLL STABILITY FITTED!! AND HAS TRAILER CONTROL VALVE BEFORE WORK COMMENCES**
- 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 & Load / suspension pressure measurements
- Conversion type tractor to rigid etc. (determines if TCV is present or is required)- also hand control valve –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.

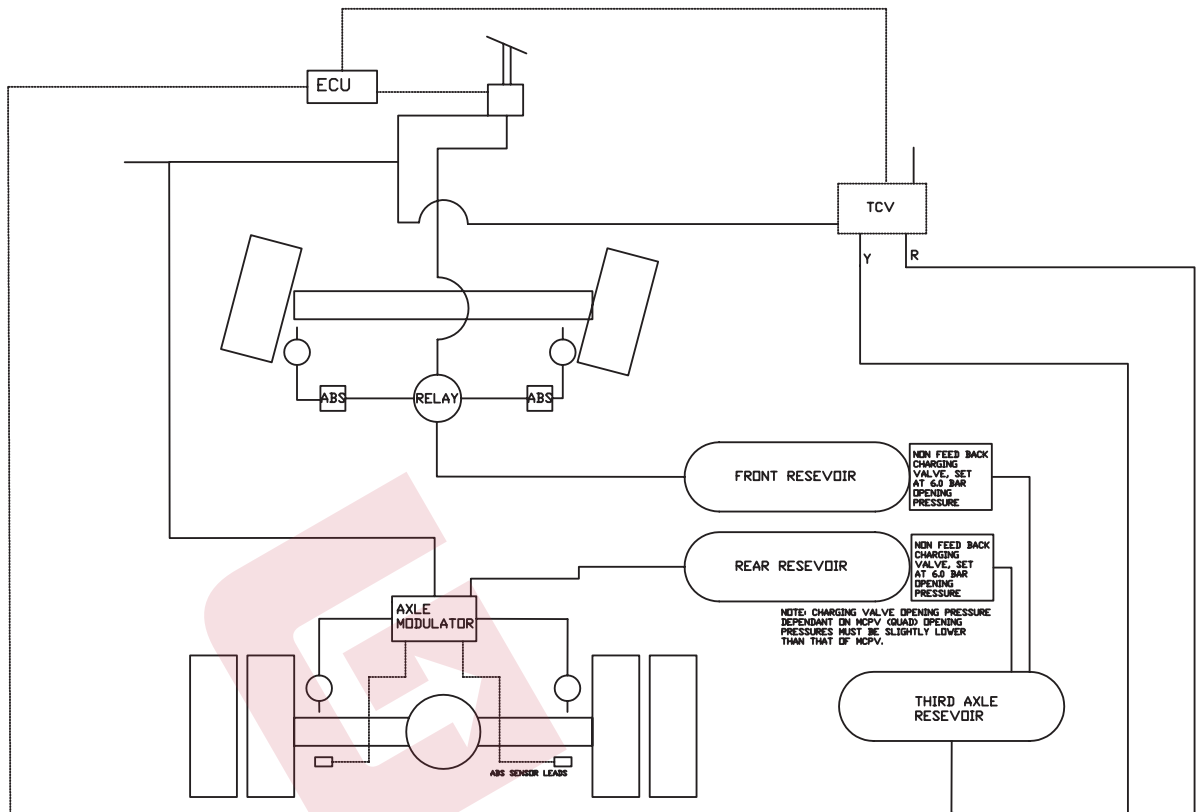
3. Kit content

– Unpack the system and check all components.

The kit should contain the following:

- Granning axle with Wabco abs sensors
- Suspension
- Granning auto lower system
- Brake chambers
- TEBS unit (Wabco or Knorr as appropriate)
- Correct fittings for TEBS unit to ensure correct pipe size used- some fittings are pre-installed in the valve.
- 2 charging valves set to appropriate opening pressure (Only if the vehicle details listed in section were supplied prior to kit dispatch)
- 3 electric relays for disconnection of feeds when axle lifted
- 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 OT TAG AXLE CONVERSIONS)



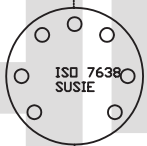
FRONT RESEVOIR
 NON FEED BACK CHARGING VALVE, SET AT 6.0 BAR OPENING PRESSURE

REAR RESEVOIR
 NON FEED BACK CHARGING VALVE, SET AT 6.0 BAR OPENING PRESSURE

NOTE: CHARGING VALVE OPENING PRESSURE DEPENDANT ON MCPV QUAD OPENING PRESSURES MUST BE SLIGHTLY LOWER THAN THAT OF MCPV.

THIRD AXLE RESEVOIR

THIRD AXLE



FUSED ISO 7638 PINS 1-5, FROM EXISTING SUPPLY, PIN 5 WARNING LIGHT FOR 3RD AXLE
 RELAYS TO CUT POWER (PIN 2) AND WARNING LIGHT (PIN 5) WHEN AXLE LIFTED

PINS 6 + 7 SIGNAL

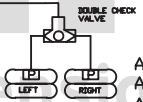
TEBS

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

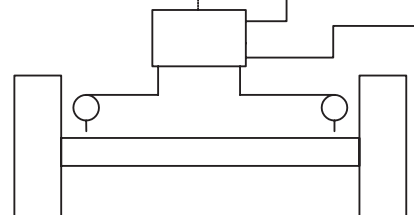
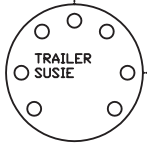
RELAY TO CUT PIN 5 OF DIAGNOSTICS SOCKET BRAKE LIGHT FEED, WHEN AXLE LIFTED



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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)



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. ECU Mounting Instructions.

The ECU/Modulator should be fastened to a suitable bracket (not supplied by Granning Lynx UK) or chassis cross member. If a bracket is used, it should be **strong enough** to support the weight of the unit and the connected pipe work see recommendations below.

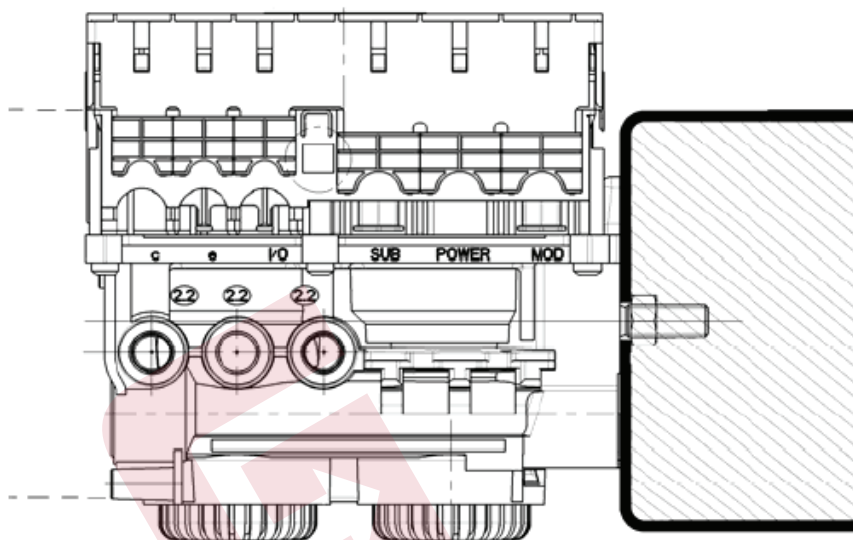


Fig.2 ECU mounting to cross member

- Mount the modulator on a sufficiently sized U-section, angle section, or a suitable reinforced member that is at least 4 mm thick (applies to steel sections).
- The height of the section must cover completely the bearing surface of the mounting flange. Shown in fig 3 below.
- Washers or spring lock washers are only permitted directly under the nut.
- The tightening torque of the nuts is 85 Nm

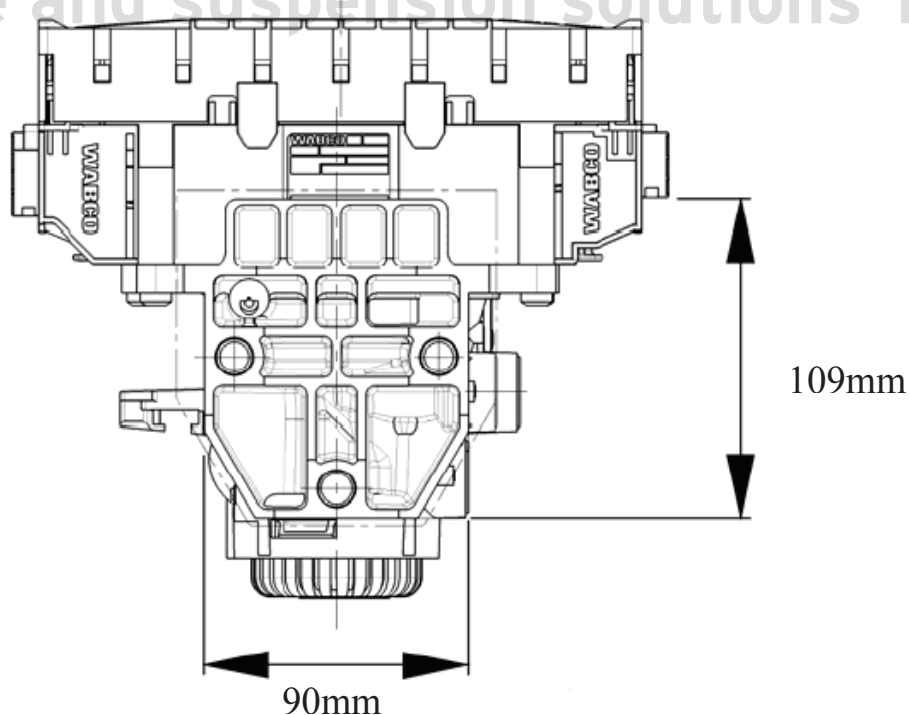


Fig. 3 bearing surface on mounting bracket

performance of the system. But needs to be known as it will affect the programming of the system and the ports used for piping.

There also must be enough clearance space around the ECU to allow the fitting of the cables as shown below in fig 4.

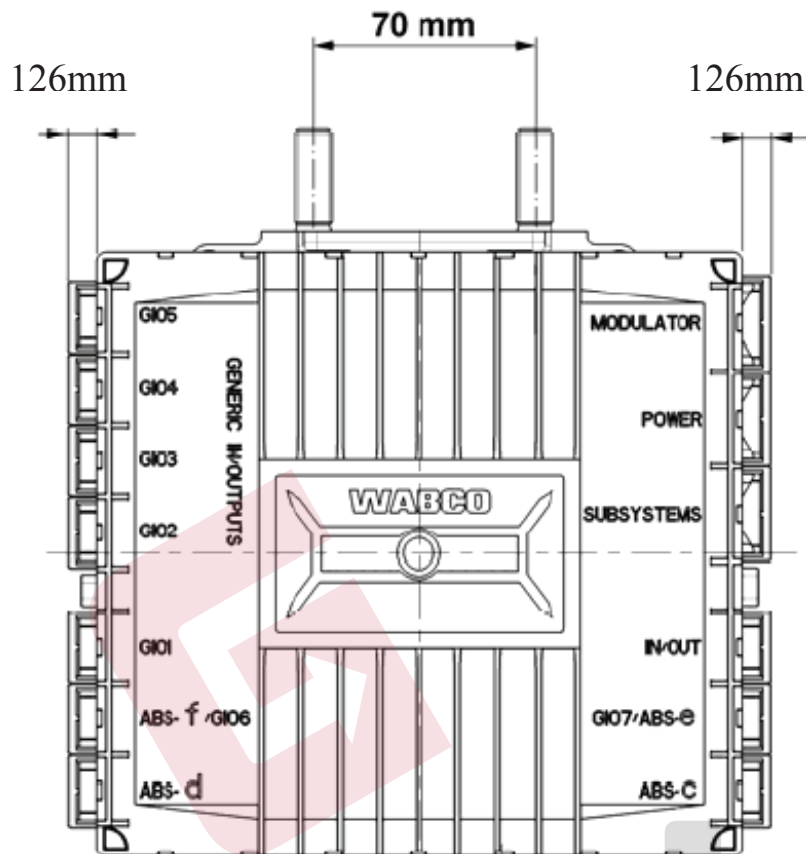


Fig 4: mounting clearance and mounting stud centre distance

- In order for the yellow locking of the ECU to be opened, there must be a clearance of at least 126 mm.
- Point of reference for measurement is the centre axis between the stud bolts.
- The hole centre distance between the stud bolts M12 is 70 mm.

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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:

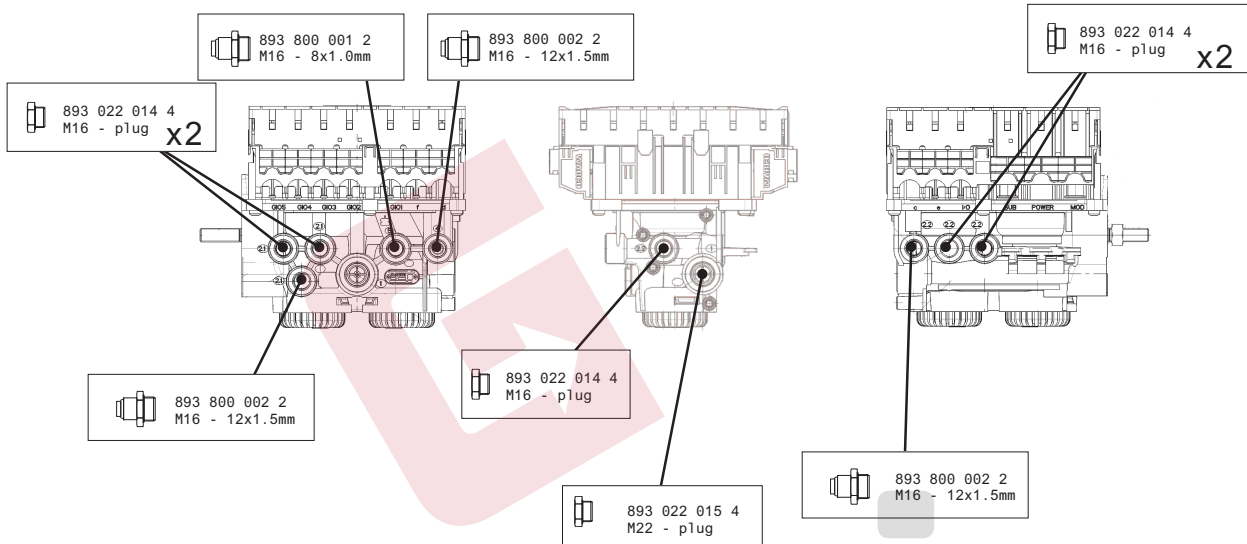
- The actuators on the nearside of the vehicle should be connected to ports 21.
- The actuators on the offside should be connected to ports 22.
- If the ECU is facing forwards, reverse the above.

The ECU valve block comes pre-fitted with suitable fittings to accept 12x1.5mm nylon brake pipe

DIAGRAM OF ALL PORT LOCATIONS ON NEXT PAGE FOR REFERANCE

No. 400 651 252 0

EBS Modulator (premium) 480 102 060 0



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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. Port 1 is located on the left side of the valve block and is supplied without any pre-fitted fitting, there is an alternate Port 1 located on the end of the valve which is pre-fitted with a blanking plug. See diagram on previous page. This port can be used instead if it allows a better and easier pipe installation. However these two ports are common and therefore the blanking port will need to be refitted in the other port.

- The pipe used should be 16x2 mm diameter nylon pipe as per the supplied fitting 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 from the output port of the trailer control valve yellow line port 42 As per the Granning Lynx UK system diagram.

- This port is pre-fitted with a suitable air fitting to take the most common pipe size of 12x1.5mm nylon pipe.

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 8mm is preferred as per fitting installed.

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

9. Electrical cable connections

IMPORTANT: please read information on correct operation of cable locking mechanism and cable fixing below, as damage can be caused to the unit by improper installation, which may cause poor connections and unreliable system operation.

Cable assembly - locking mechanism

Opening the locking mechanism/ removing the protection cap

- Open the yellow locking sides of the ECU for assembling the cables. An open-end spanner size 13 is best suited for this purpose.
- Reach underneath the U-shaped yellow plastic locking mechanism with the spanner mouth from either the top or the bottom to open the plug connection.
- Having opened the connectors, remove the protection cap and fit the cable. Inserting and detaching cables or end caps (4/8 pins)
- Before you can insert or remove the cable plugs from the matching slot on the ECU frame, you must move the yellow locking slider to the open position. If the slider is in the locked end position (condition at delivery), you can use a size 13 open-end spanners to release the notch from either the top or from below (1a), see Fig 5 below.
- You then pull out the slider up to the cover end stop by hand in order to permit access to the plug guide.
- In a second step, insert the cable end (or protective caps) perpendicularly into the corresponding slot of the ECU. Ensure that the correct polarity and coding (connector-slot) is adhered to. They must only be inserted if the two parts match. The black protective caps are not coded and fit on every slot.
- Press the cable end into the slot (2) with a little initial force and move the locking slider back to its initial position (3), see following images. In this procedure, the latch hook of the slider latches in the ECU frame.

- The correct latching of the slider is confirmed by an audible "click" sound. Hereby the slider has also reached the end position of the stop and is aligned with the other closed locking mechanisms.

TEBS E Modulator - Plugs and dismantling of cables and protective caps

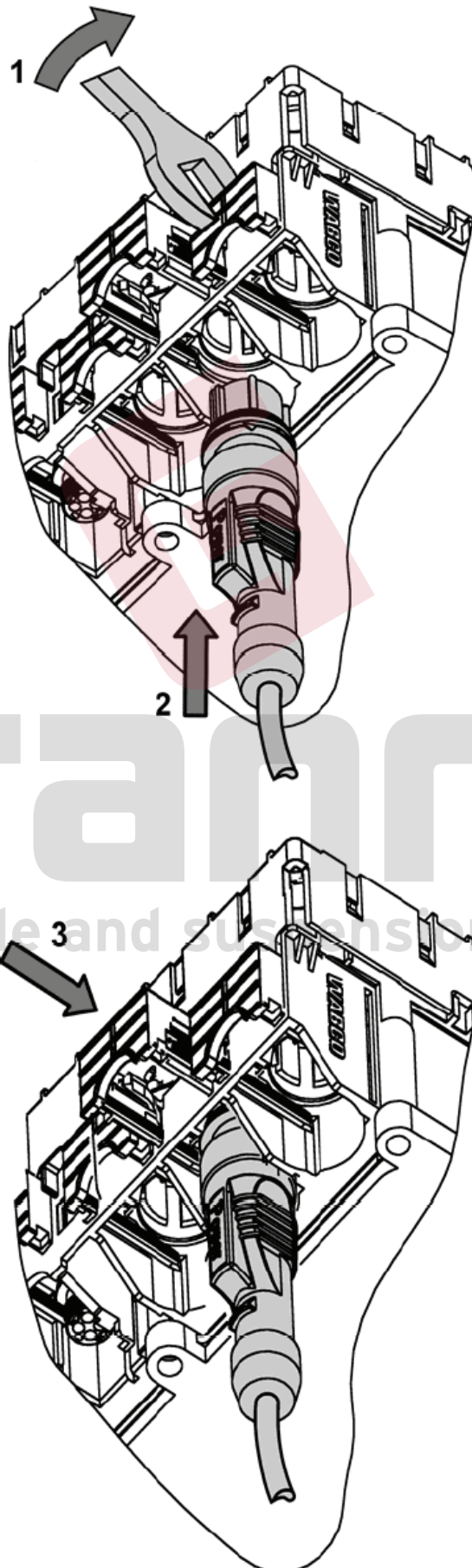
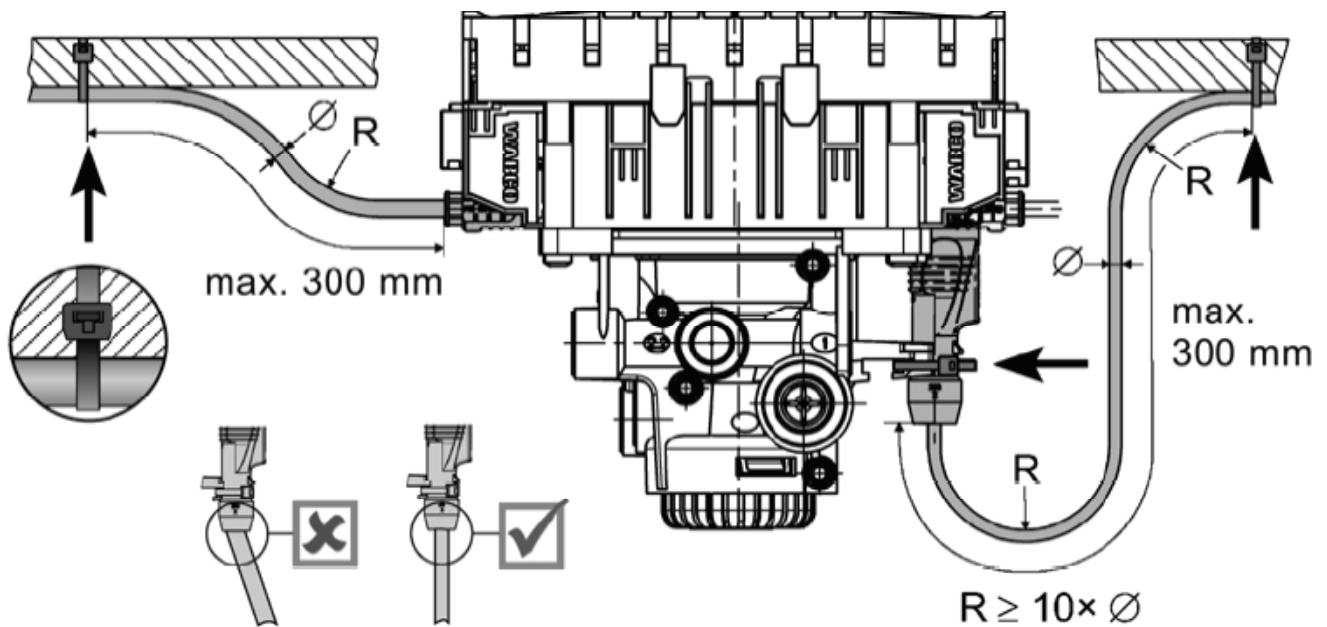


Fig 5 Cable locking mechanism operation



The ridge on the connector housing is designed as a slip-resistant surface. This facilitates pushing the connector into the ECU slot.

- Fix the cables (max. 300 mm cable length distance to the ECU) using cable ties. The 8-pin cables of the ports POWER, SUBSYSTEMS and MODULATOR must be fixed on the TEBS E using the fixing points provided.

! Fasten the cables and connectors in such a way that no tensile strains or transverse forces act on the plug connections. Fix the cable ties in such a way that the cables are not damaged (if you are using tools, please observe the instructions of the manufacturer of the cable tie). Avoid laying cables across sharp edges or near aggressive media (acids for example).

Fig 6, Cable fixing instructions

- Firstly 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. (ie connected to closest sensor and corresponding chamber

If the ECU is facing backwards (Power plug off side):

- 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 (Power plug Near side):

- 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 and invalidate warranty.

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. (PLEASE follow cable-fixing details above in Fig 6 to ensure correct operation.

– 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, properly insulating and water proofing the joints.

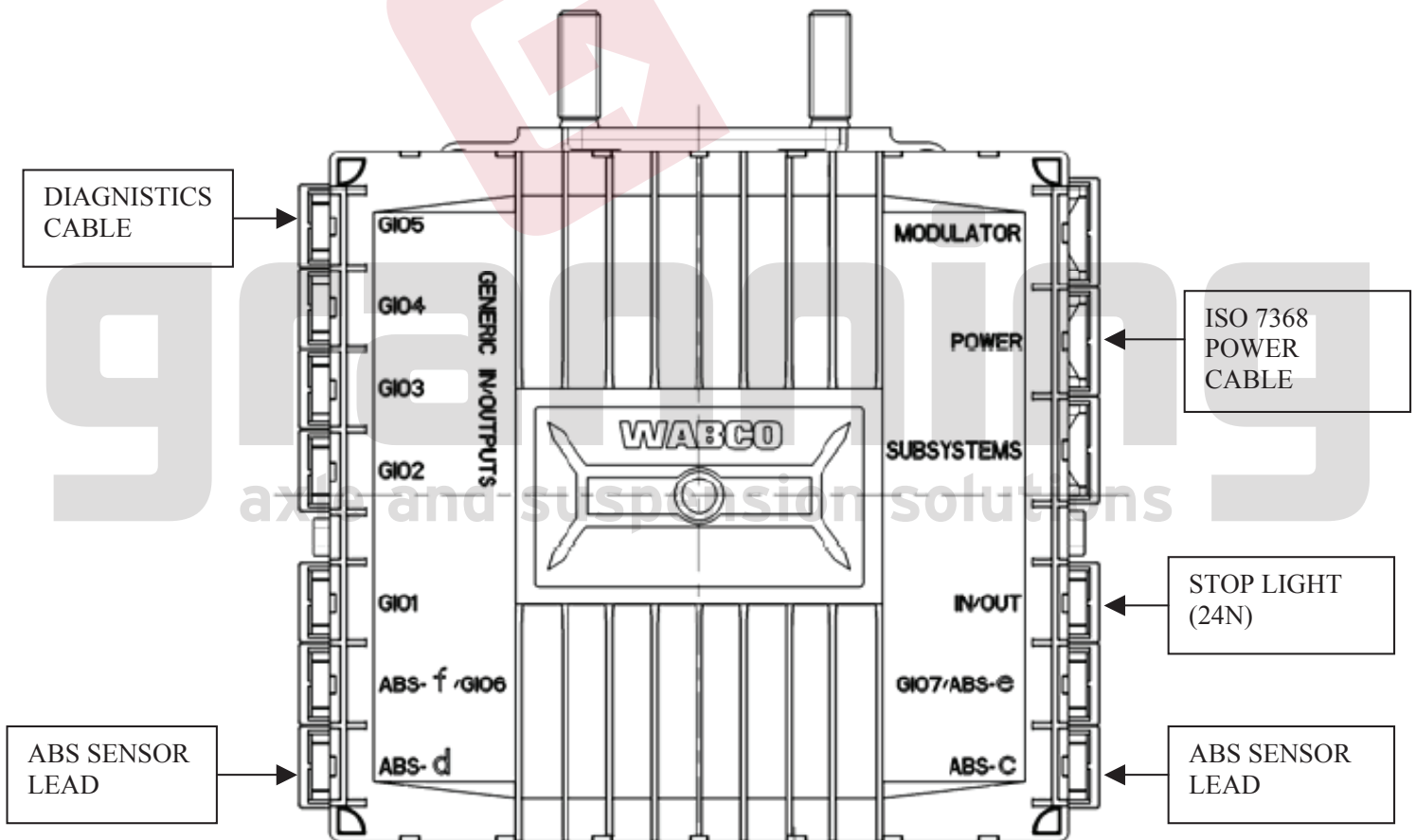
Diagnostics cable

– Plug this cable into the ECU at connection marked GIO5 and the other end yellow cap should be mounted on bracket to body with easy access (recommended near to battery box or behind the cab for consistency) Ensure cap is not lost or over painted to ensure easy identification and diagnostics if ever required.

24N (Stop light redundancy)

The back up system power supply for the unit is achieved via the stoplight (24n) connection cable. This should be installed as per cable fixing instructions and via relays provided when lift system is installed.

- Cable is connected at ECU socket labeled IN/OUT, on right hand side of unit
- Wire assignment as follows – blue wire is for stoplight positive, - brown is ground.



- Blanks and connector covers for TEBS electrical connections should not be removed, unless necessary to connect equipment + they should always be replaced afterwards. This protects the Wabco EBS unit to from the ingress of water as this could result in shorting across pins which will result in:
 - o Unit not functioning correctly

- Increased system degradation
- Adversely affecting service life and any warranty claims.

System relays (for lifting axle fitted with granning system)

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.

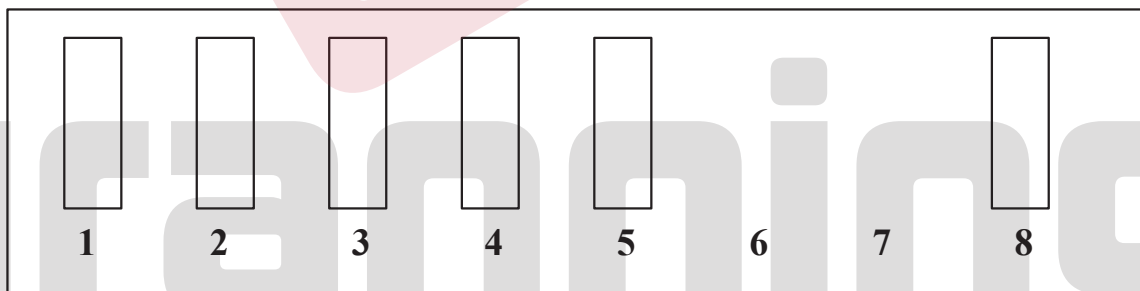
There are three relays, which need to be installed within the system for it to function correctly. These are all signalled from the lift system solenoid.

- Relay disconnects pin 2 (power) supply to TBES unit when axle is lifted. (ISO 7368)
- Relay disconnects pin 5 (warning lamp) when axle is lifted (ISO7368)
- Relay disconnects pin 1 of stop light 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.

Granning Lynx UK additional axle fuse box layout

Fuse positions



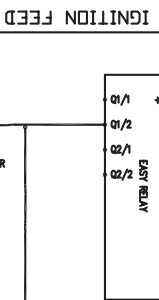
<u>Fuse Number</u>	<u>Fuse Colour</u>	<u>Fuse Rating</u>	<u>System Related</u>
1	Neutral	25Amp	EBS solenoid valve electrics Positive
2	Blue	15Amp	EBS electronics Positive
3	Blue	15Amp	EBS electronics Negative (Ground)
4	Neutral	25Amp	EBS solenoid valve electrics Negative
5	Blue	15Amp	EBS warning lamp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

EASY RELAY DETAIL
FROM DRAWING
18839

TRUCK
STOP LIGHT
FEED +VE

STOP LIGHT LEAD
BLUE WIRE PIN 1

BROWN WIRE - STOP LIGHT
NEGATIVE



RED WIRE

TEBS ECU POWER RELAY PIN 2

POWER

TEBS

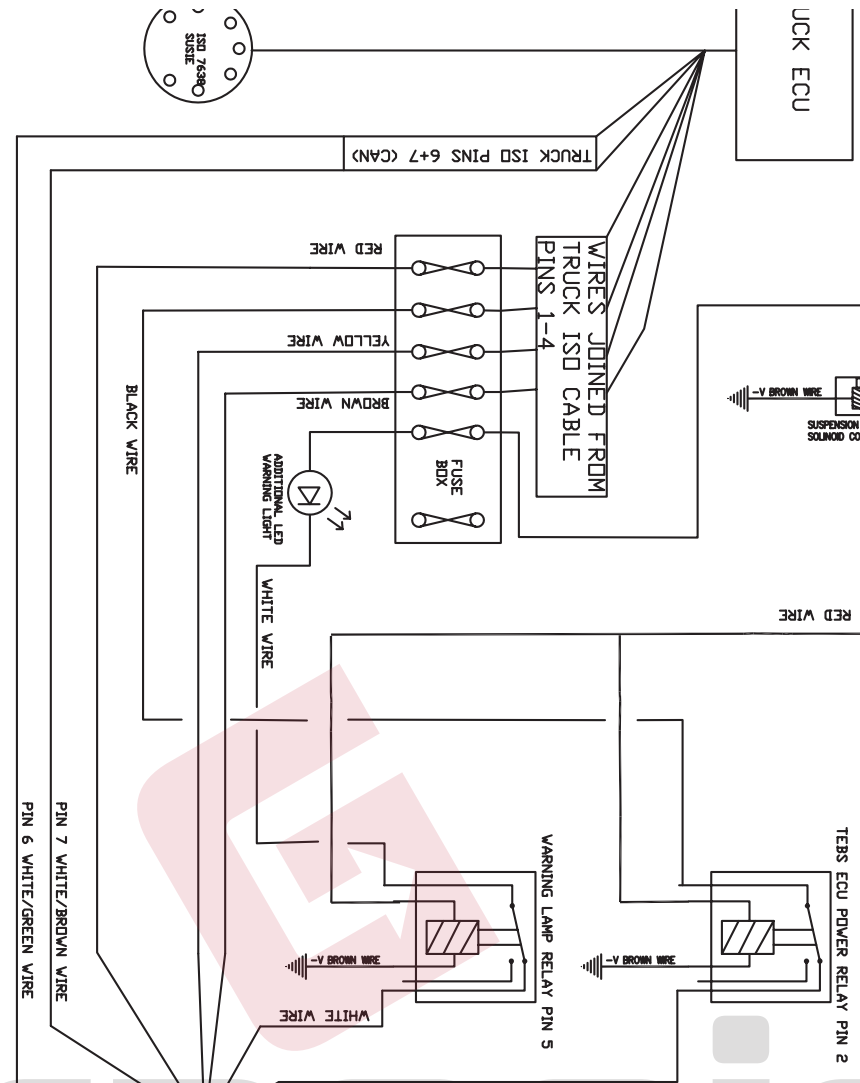
IN/OUT

BLACK WIRE

WARNING LAMP RELAY PIN 5

12M ISD CABLE
PROVIDED IN KIT

PIN 7 WHITE/BROWN WIRE
PIN 6 WHITE/GREEN WIRE



B	TEBS E	-	ENGPS
A	1ST ISSUE	-	ENGPS
SUFT CHANGE & REASON [DISP] [DATE] MODIFICATIONS GRANLINIX Granlinix UK Ltd. Unit 27, Leval Road, West, Woking, Surrey, GU24 0BB GRANLINIX UK LTD. CLAIMS PROPRIETARY RIGHTS TO ALL THE INFORMATION DISCLOSED ON THIS DRAWING. IT IS NOT TO BE REPRODUCED OR USED OR DISCLOSED TO ANY THIRD PARTY WITHOUT OUR WRITTEN PERMISSION. MATERIAL FINISH			

DO NOT SCALE IF IN DOUBT ASK ALL DIMENSIONS ARE IN MILLIMETRES ORIGINAL FRAME SIZE 562mm X 390mm	DESIGNED FOR GRANLINIX UK EBS ADDITIONAL AXLE SYSTEM	UNSPECIFIED TOLERANCES NO DECIMALS ONE TWD ANGULAR $\pm 0^\circ - 3'$	DRAWN BY P. SLATOR DATE 18/02/08	AUTHORIZED CHECKED SCALE N/A SUPERSEDES
TITLE GUK EBS SYSTEM WIRING DRAWING NO. 18871 SHEET 1 OF 1	ALL COMPONENTS TO CARRY AT LOCATION PART NO. BATCH DATE SUPPLIER CODE BURRS AND SHARP EDGES TO BE REMOVED	ALL ALTERATIONS TO BE VIA CAD WEIGHT ESTIMATED ACTUAL	DISPOSITION 1 - USE WITHOUT OBSOLESCENCE 2 - MODIFY STOCK 3 - SCRAP STOCK	FINISH

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 brightly with the ignition switch and the warning light will then glow dim 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 come on brightly, then glow dim after approximately three seconds, and will only come back on brightly 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.

NOTE:

WARNING LAMP IS ILLUMINATED DIMLEY AT ALL TIMES WHEN SYSTEM IS ON (AXLE NOT LIFTED), THIS IS CORRECT OPERATION. HOWEVER IF WARNING LAMP IS BRIGHTLY ILLUMINATED AS SEEN BEFORE PROGRAMMING SYSTEM HAS FAULT TO BE INVESTIGATED.

-Warning indication may just be a temporary fault, as the Granning warning light does not distinguish like it does on a truck between red and yellow faults. So problem may just be a fault like Abs sensor gap and will disappear once corrected, with out requiring diagnosis.

11. Repairs and Diagnostics

NOTE: Trained Wabco 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 for TEBS E, 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 them 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:
 - Port sizes should not be reduced as this will affect the air systems volume availability and will impair system function
 - 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:
 - The valve must be a Non-Feedback type valve
 - The valve should be fitted directly to the front or drive service tanks.
 - All fittings should be of comparable quality to originals.
 - Failure to replace the valves correctly will void Granning Lynx UK liability for this system.
 - Valves to be set to correct pressure – information can be obtained from Granning UK engineering.
- 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.