



Installation Guide

EB+ Generation 2

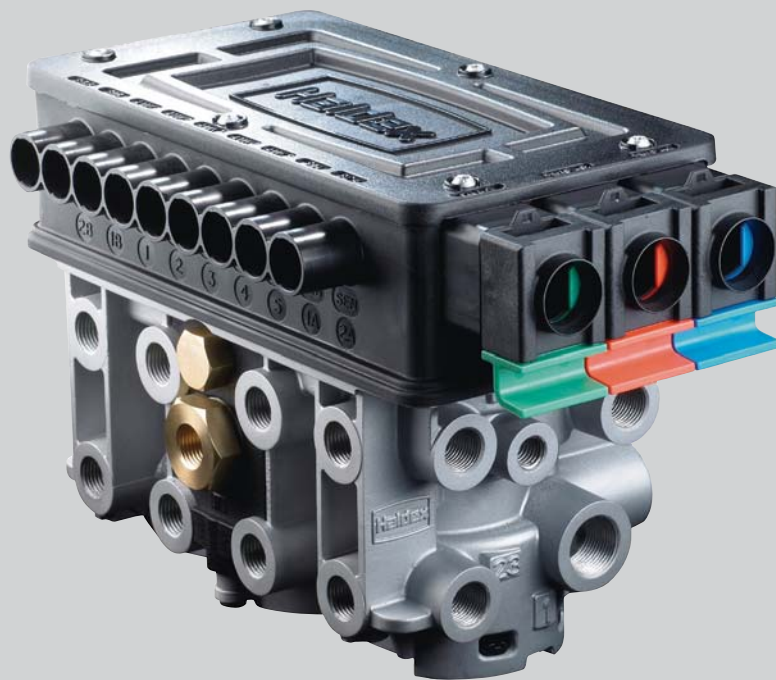


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Notes on the use of this manual

Document Registration



Preceding the Haldex EB+ main index sheet, this manual should contain the document registration form and an amendment record sheet. Both of these documents are intended to assist your Company and Haldex Brake Products Ltd in maintaining this manual in an up to date condition.

Please follow the instructions included on each sheet to ensure that we are able to give both yourself and your company the best product information support whenever the need may arise.

This manual has been designed to assist personnel in satisfactorily installing Haldex EB+ on Semi and Centre axle trailers.

The intention has been to illustrate the various areas of installation. It is expected that this manual will be in possession of the appropriate person throughout their 'training' and 'experience' and that the manual will be used as:

- a) A teaching aid following supervision of a HALDEX ENGINEER.
- b) A reminder of the correct procedure of Haldex EB+ installation.

For any other deviation consult
Haldex Brake Products Ltd. Moons Moat Drive,
Moons Moat North, Redditch, Worcestershire B98 9HA
Tel: +44 1527 499 499 Fax: +44 1527 499 500.

- Use appropriate spare-parts documentation when obtaining spare parts.
- Use only genuine Haldex parts in repairs.
- Due to continuous development the right is reserved to alter the specification without notice
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General Components Guide

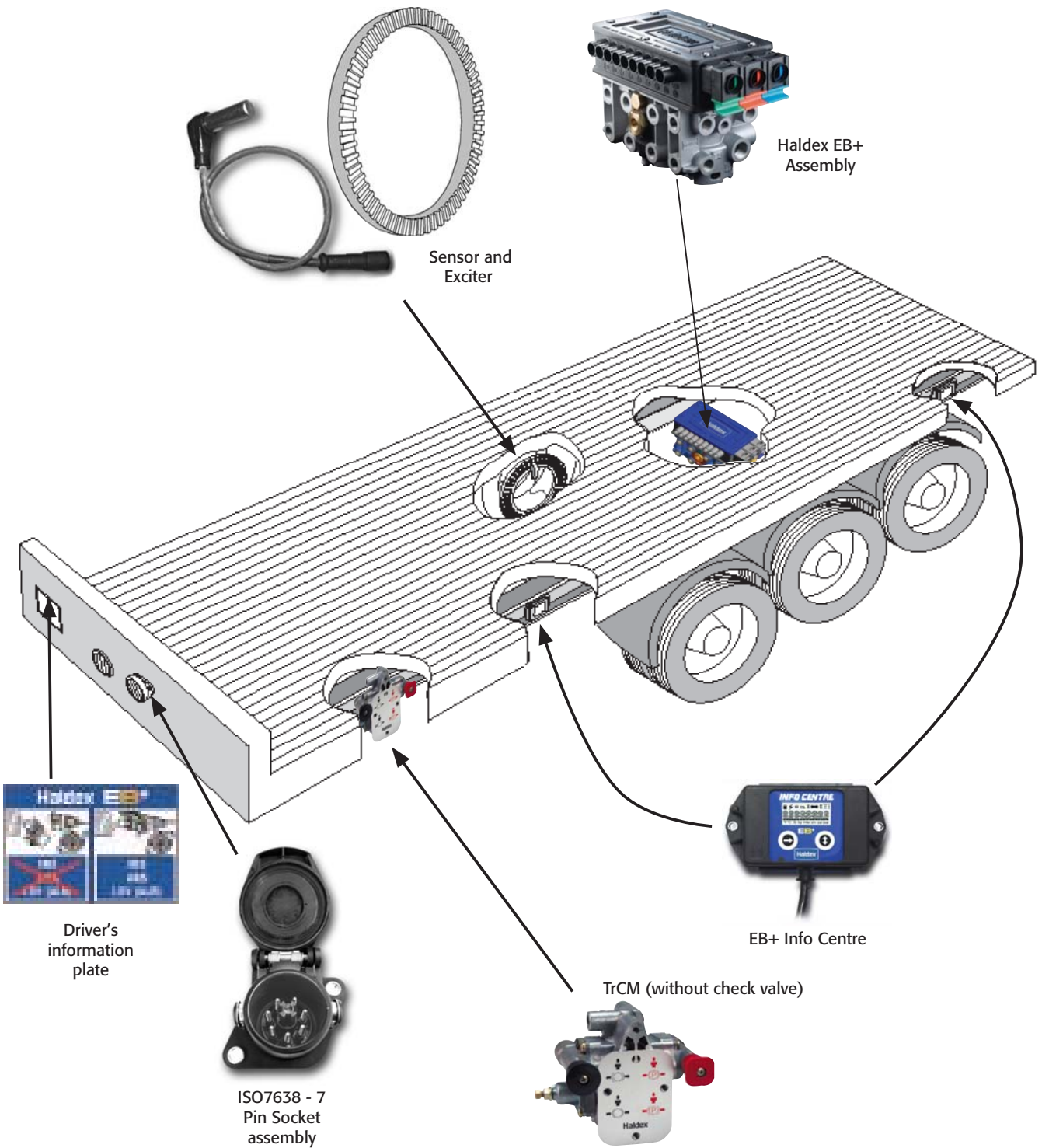


Fig. 1

Chassis components

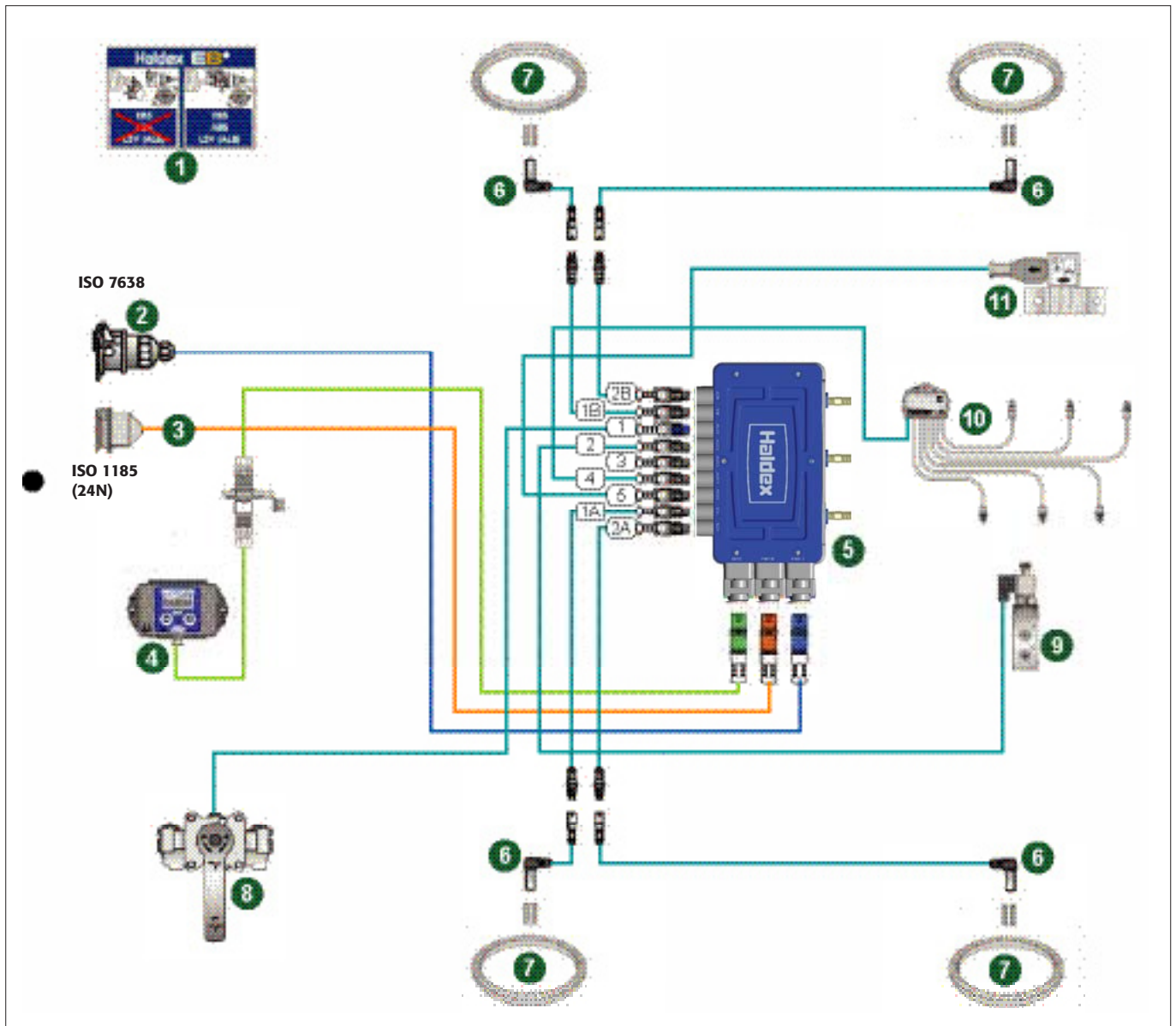


Fig. 2

Item	Description	Notes
1	EB+ Label	
2	ISO 7638 - 7 Pin Socket assembly	
3	Safety backup cable - ISO 1185 (24N)	
4	EB+ INFO CENTRE (side of vehicle connection)	
5	EB+ ECU and EPRV's assembly	
6	Sensor assembly	
7	Exciter	
8	COLAS®	Aux 1, 2 or 3
9	ILAS®-E	Aux 1, 2 or 3
10	Lining Wear Sensing (LWS)	Aux 4 ONLY
11	EB+ Stability	External Sensor Assembly - Aux 5 ONLY

N.B. Aux to be set in line with DIAG+

Assembly - EB+

Port identification

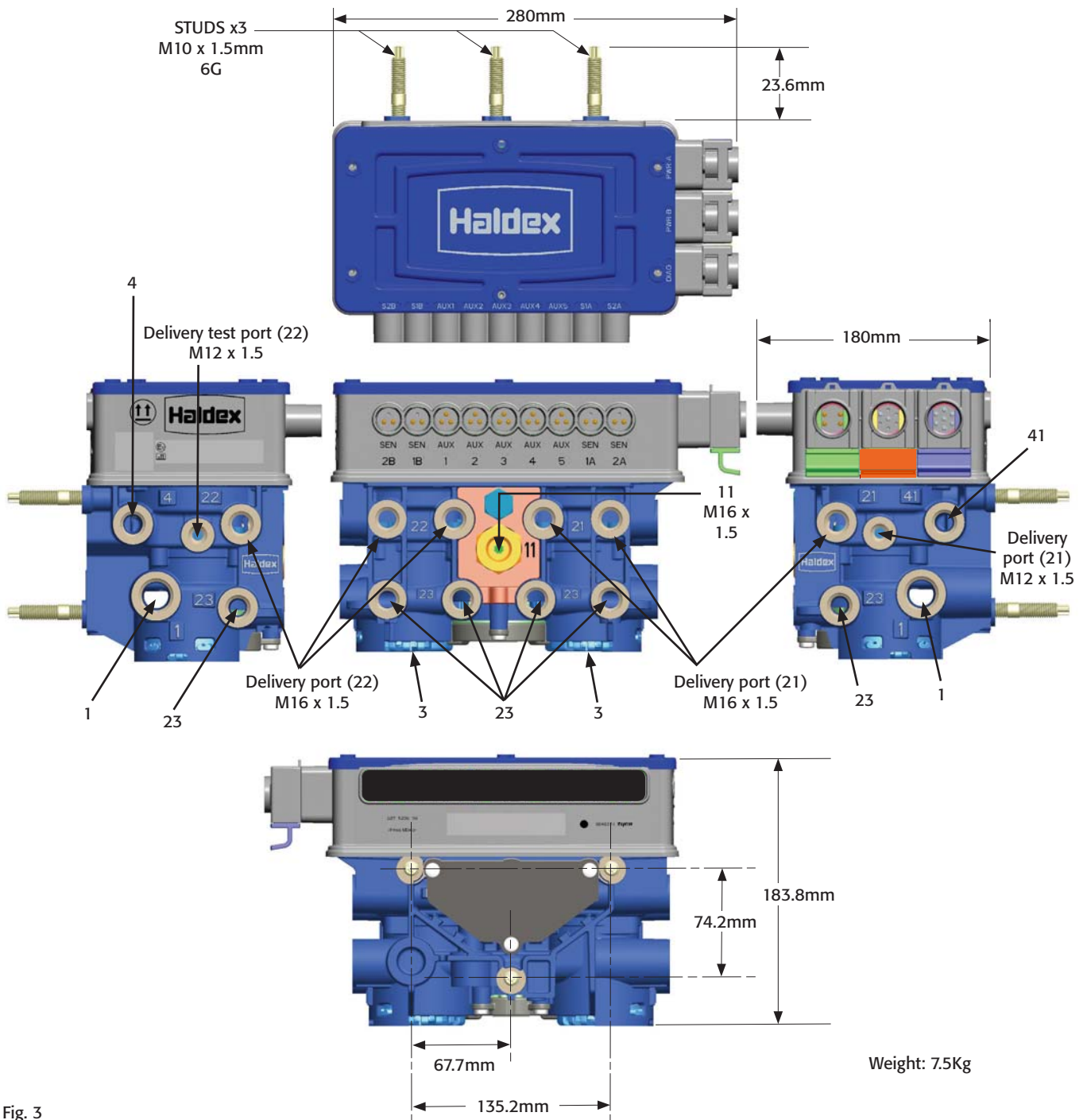


Fig. 3

Port No.	Description	Notes
1	Reservoir Port	
3	Exhaust Port	
4	Control Port	
11	Anti-Compounding Port	
21/22	Delivery Ports	
23	Spring Brake Port	
41	Air Suspension Port	

Installation options

Semi & Centre Axle Trailer - Side by Side

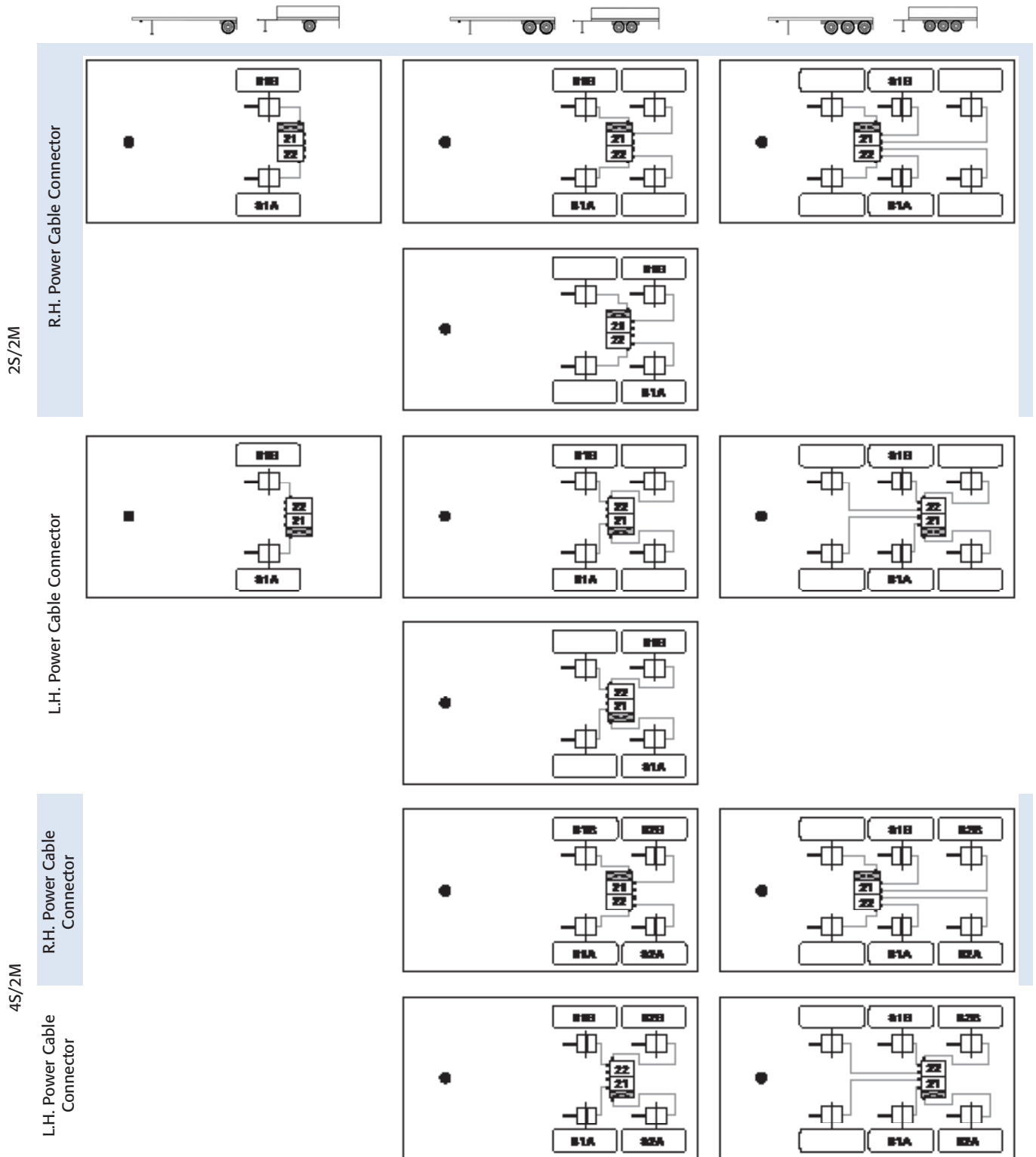
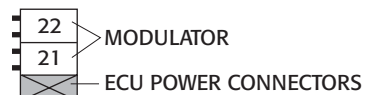


Fig. 4 - Side by side

- Either (but only one) directly controlled axle may be lifted
- Any axle without directly controlled wheels may be a lift axle
- Any axle may be a steered axle

Key



Installation options

Semi & Centre Axle Trailers - Side by side (SxS) 2S/2M + SL valve - Self-steered axle

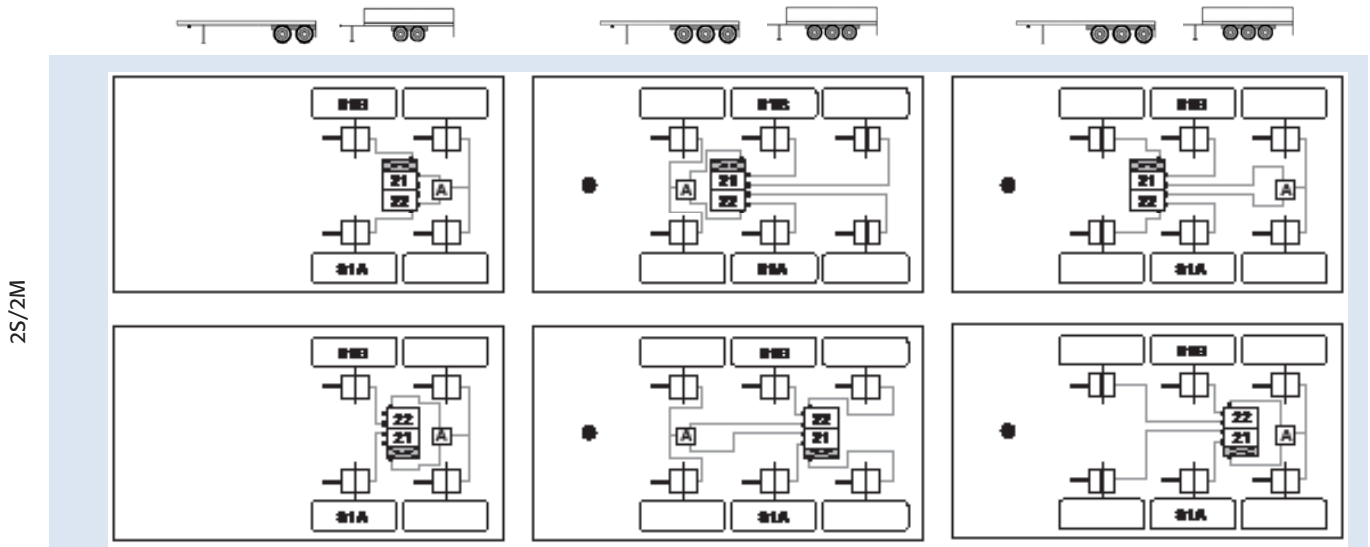
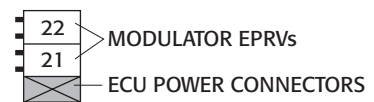


Fig. 5 - Side by side (SxS) 2S/2M + Select low valve

- Any axle without directly controlled wheels may be a lift axle.

Key



A SELECT LOW VALVE

Installation options

Semi & Centre Axle Trailers - Integrated Axle by Axle, ASC Front, SL Rear

4S/2M

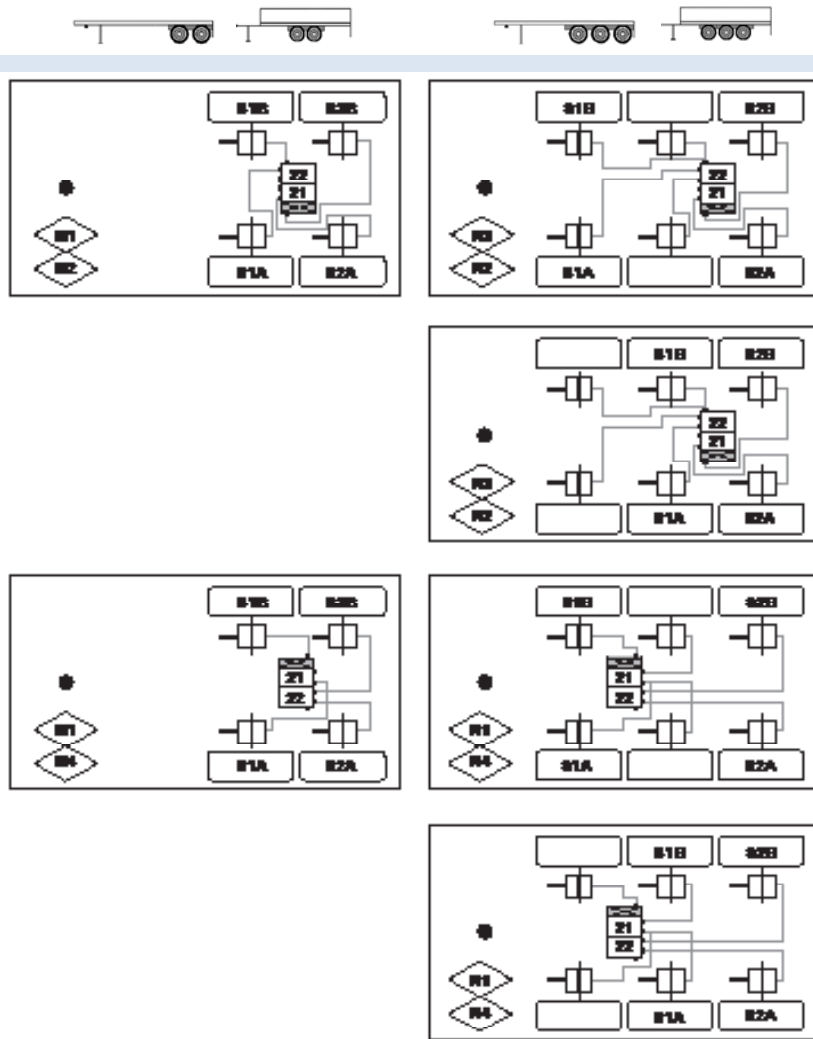


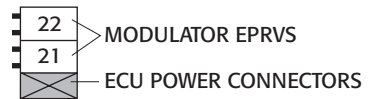
Fig. 6 - Axle by Axle

Sensed axles cannot be lifted

Any axle without directly controlled wheels (un-sensed) may be lifted
Any axle may be a steered axle

- N1 - N4 Selectable options set by Haldex or Vehicle Manufacturer
- N1 Adaptive surface control (ASC)2.1
- N2 Select Low (SL)2.1
- N3 Adaptive surface control (ASC)2.2
- N4 Select Low (SL)2.2

Key



Installation options

Semi & Centre Axle Trailers - Integrated Axle by Axle, ASC Rear, SL Front

4S/2M

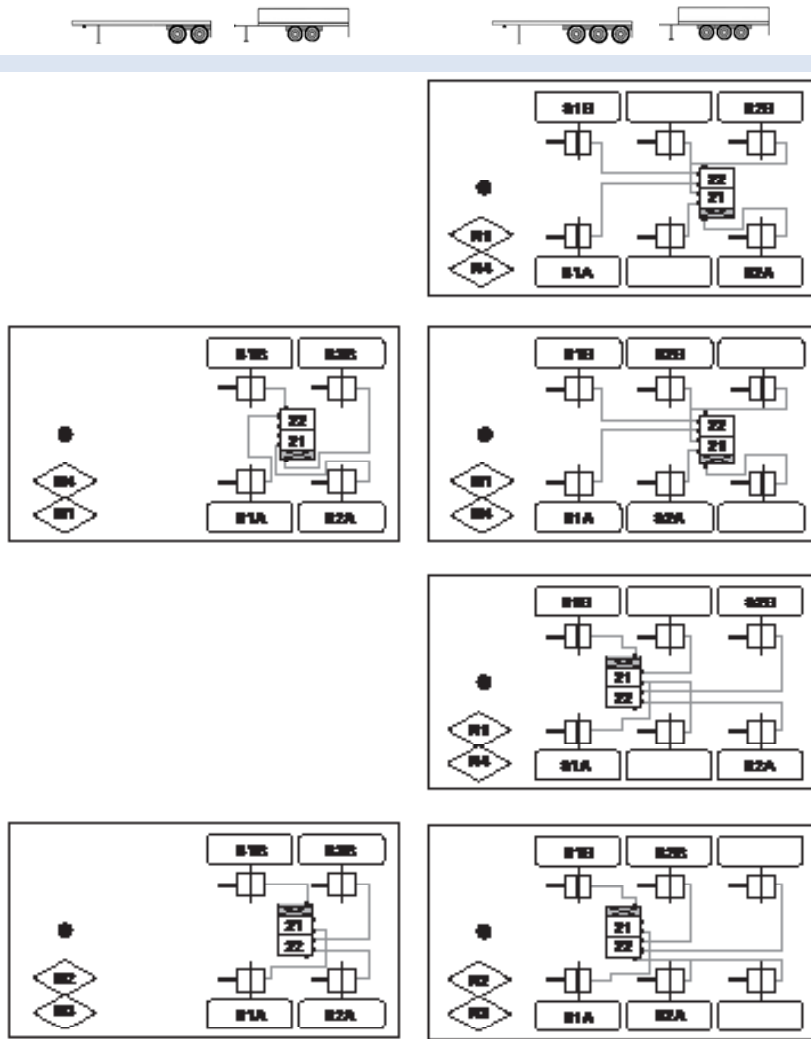


Fig. 7 - Axle by Axle

Sensed axles cannot be lifted

Any axle without directly controlled wheels (un-sensed) may be a lift axle
Any axle may be a steered axle

N1 - N4 Selectable options set by Haldex or Vehicle Manufacturer

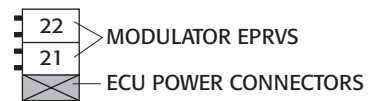
N1 Adaptive surface control 2.1

N2 Select Low 2.1

N3 Adaptive surface control 2.2

N4 Select Low 2.2

Key



Installation options

Full Trailers

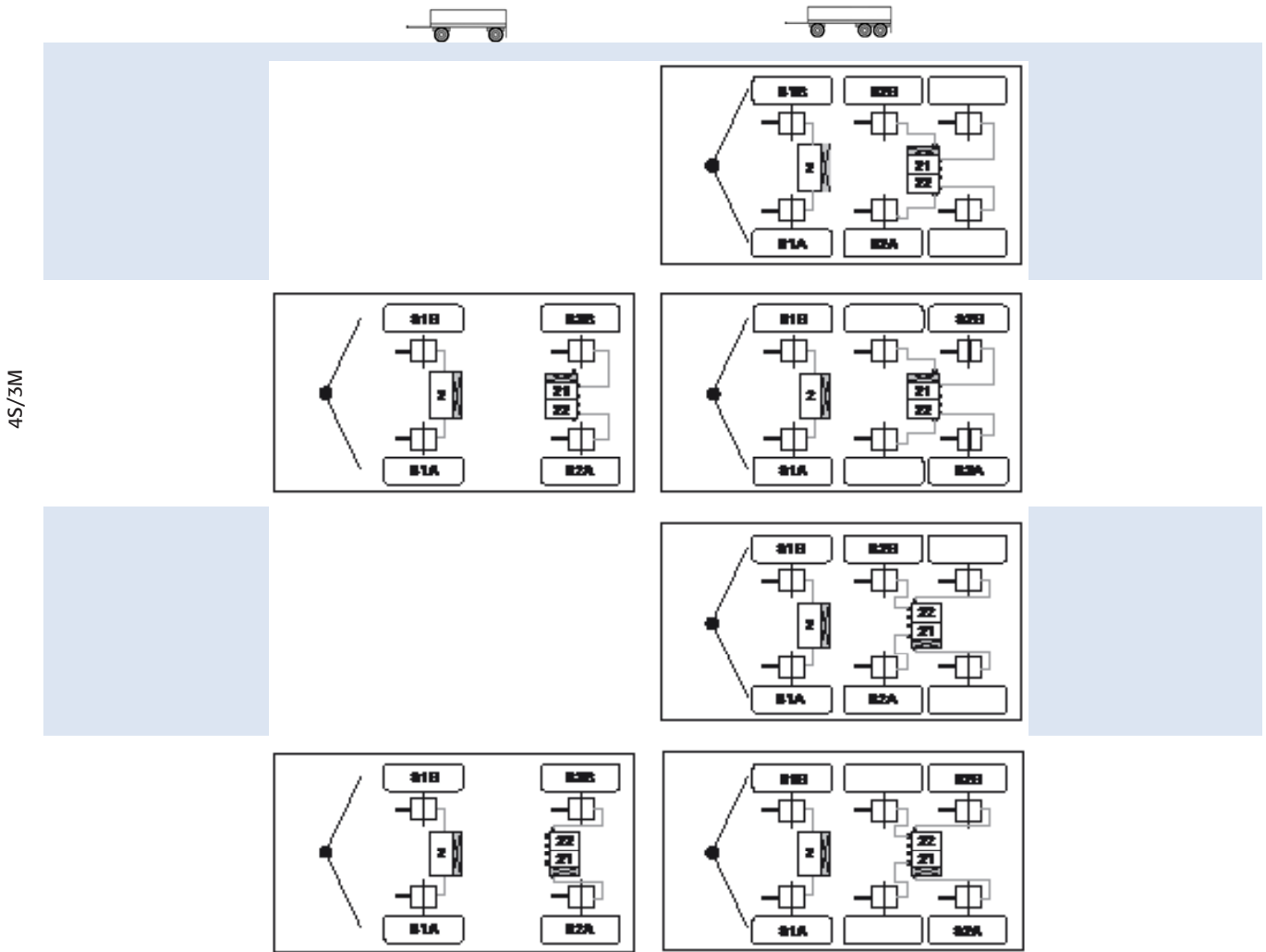


Fig. 8 - Side by Side

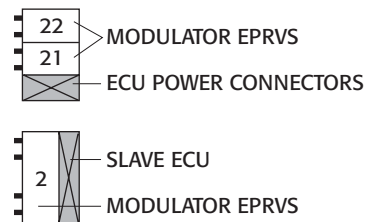
Sensed axles cannot be lifted

Any axle without directly controlled wheels (un-sensed) may be a lift axle

N1 Master ECU is mounted to EPRV's 21/22. All Sensors must be connected to this Master ECU.

N2 Slave ECU is mounted to EPRV 2 and is controlled by Master ECU. Slave ECU/EPRV 2 is shown facing rear but can also be installed facing forward, left or right, as EPRV 2 is always select low control.

Key



Chassis installation

Position of EB+ assembly

Position of EB+ assembly

The following installation parameters are required for correct STABILITY operation.

Roll angle : $\pm 3^\circ$ (1:20).

Yaw angle : $\pm 5^\circ$.

The EB+ Assembly to be mounted within ± 1 m of the centre of the axle(s), (Includes any lift axles).

The EB+ Assembly to be within the main Left Hand (LH) and Right Hand (RH) chassis members of the vehicle.

For any other applications please refer to Haldex Technical Services.

Pitch Angle:
Assembly must be mounted vertically.

The assembly should not be in **direct spray or splash water area** and should be **protected against high pressure cleaning**.

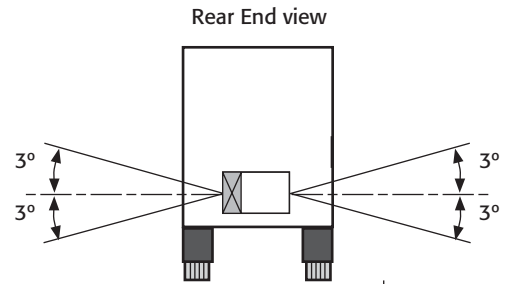


Fig 9

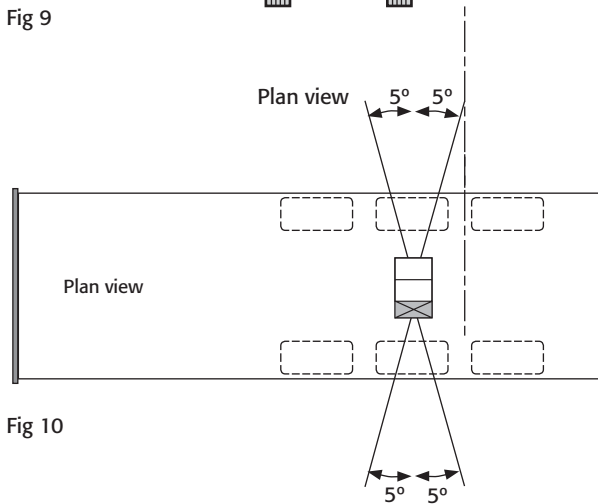


Fig 10

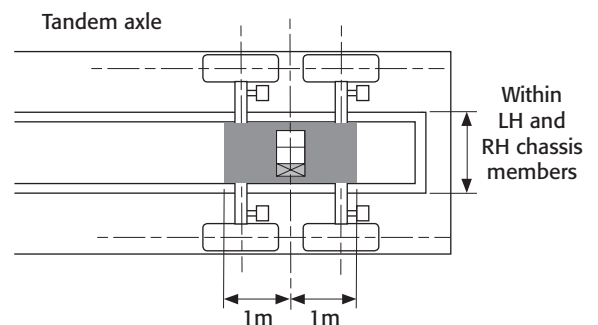
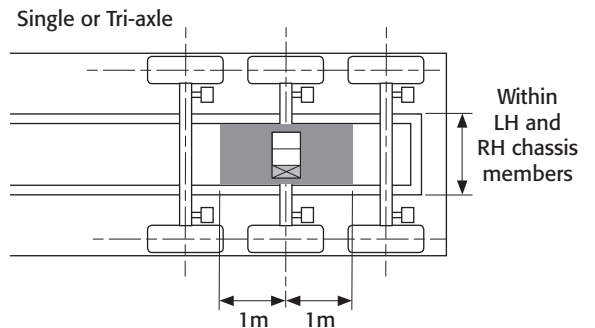


Fig 11



Fig 12

Chassis installation

Position of EB+ assembly

N.B. The Following are applicable to ALL OTHER Installations and Configurations.

The preferred assembly orientation should be positioned so that the **Power Cable connections face towards the required configuration installation option (configuration) of the trailer. Ref. Figs 4 to 7.** The distance between port (1) and the air reservoir to be as short as possible.

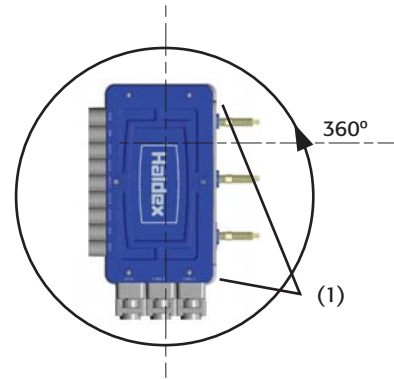


Fig 13

Mount Modulator Valves centrally to the brake chambers (refer to Installation Options Figs 4 to 7).

- A** : Single axle
- B** : Tandem axle
- C** : Tri-axle

If mounting to stainless steel, then a suitable membrane must be used.

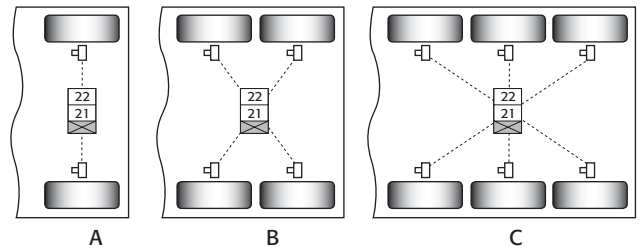


Fig 14

Additional bracket design to be as rigid as possible. The mounting fixing must provide an electrical connection between ECU/Modulator bracket and vehicle chassis.

Mounting bracket flatness to be not more than 0.5mm deviation from its true plane - i.e. the surface must lie between two parallel planes 0.5mm apart.

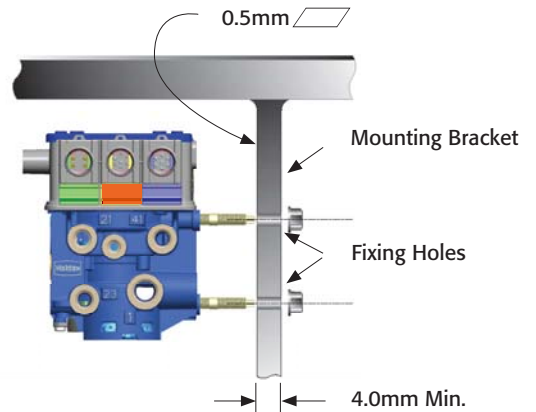


Fig 15

Use **NONCORROSIVE** 10mm nuts, torque to 35-45Nm.

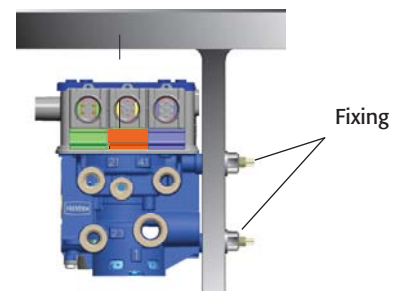


Fig 16

Care should be taken to provide reasonable access to the ECU/valve for replacement of cables.

- D**= 150mm minimum
- E**= 1. Assembly to be above axle centre line.
2. To be as high in frame as possible.

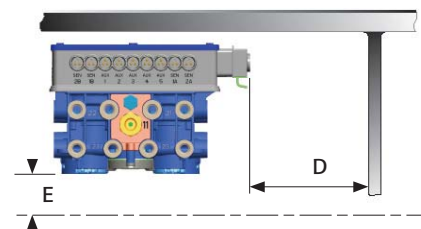


Fig 17

Chassis installation

Electrical wiring - Power/DIAG connections

Check earth continuity between ECU/EPRV/Bracket and vehicle chassis

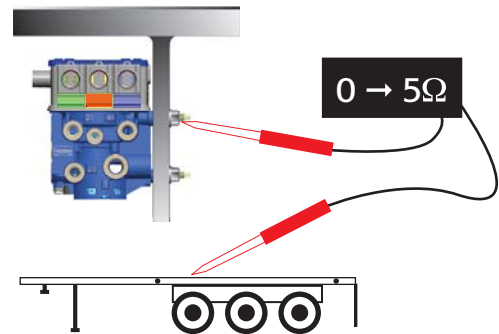


Fig 18

Position assembly as high as possible in the chassis to provide as much protection to the assembly from direct spray and other road debris. Also to achieve an acceptable hose routing.

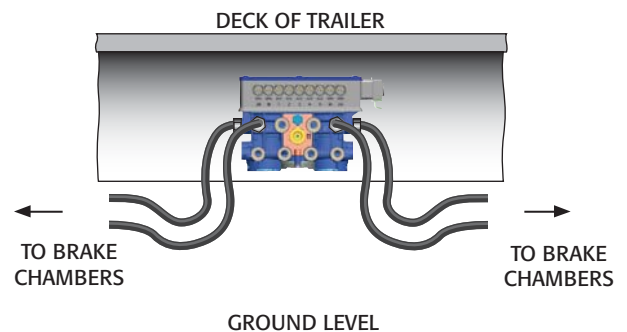


Fig 19

Electric wiring power connection

From the slide lock housing 'F' (top horizontal connector housing) **Remove** transit cover from POWER 'A' position.

Unlock the housing by sliding down lever 'G'.

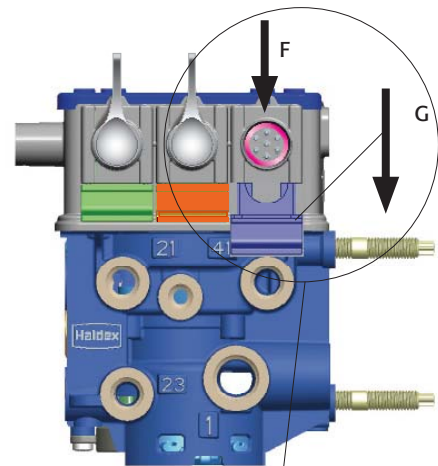


Fig 20

Make sure slider is in the unlock position 'H'

Ensure contact pins and seal are kept clean and free of any contamination prior to installation.

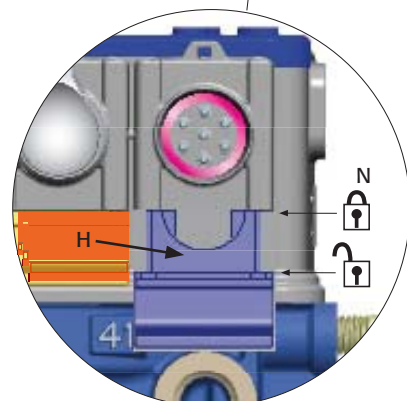


Fig 21

Chassis installation

Electrical wiring - Power 'A' (ISO 7638) connection

Connections

Make sure that all connections (socket and plug) are clean and dry before assembly.

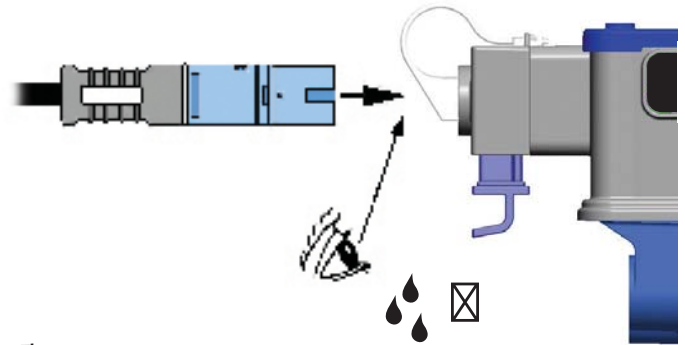


Fig 22

POWER 'A', POWER 'B' and DIAG CONNECTION

Feed all connectors through the chassis with the protective cap in place to avoid connector sockets being contaminated.

Remove protective cap from end of connector before connecting into the ECU.

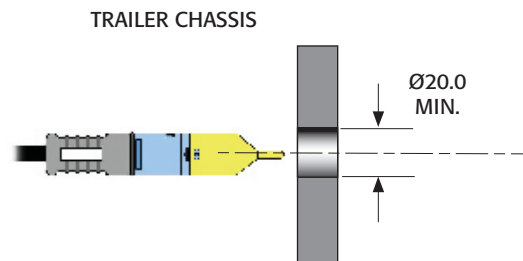
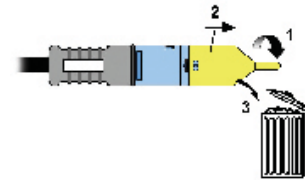


Fig 23



POWER 'A' (ISO 7638)

Identify orientation 'L' of the ISO 7638 **Blue** coloured connector.

Ensure contact pins and seal are clean and free of any contamination prior to installation.

In position 'POWER A', on the slide lock housing, insert connector fully home.

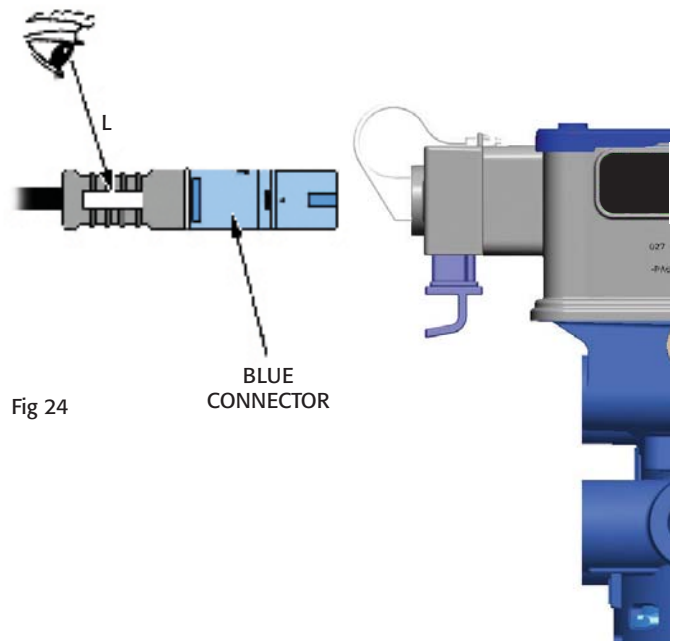


Fig 24

Chassis installation

Electrical wiring - Power 'B' (ISO 1185, 24N) connection

POWER 'B' (ISO 1185, 24N)

Remove blanking plug from position POWER 'B'.

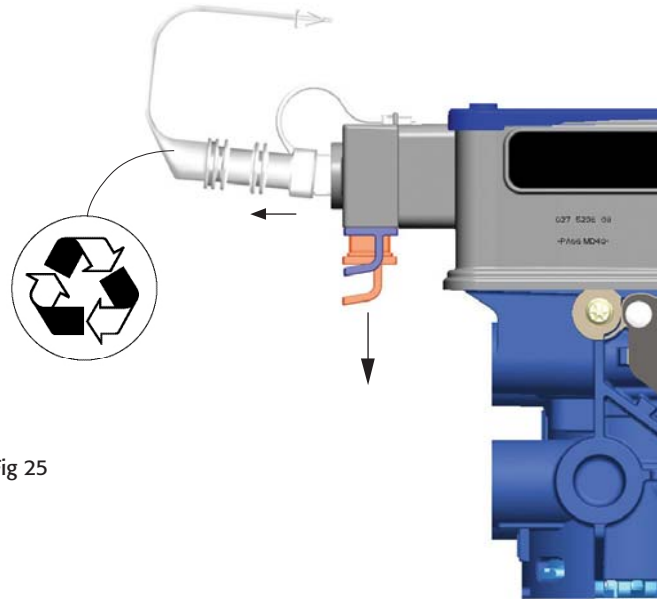


Fig 25

Identify orientation 'L' of the ISO 1185 **Orange** coloured connector.

Ensure contact pins and seal are clean and free of any contamination prior to installation.

In position 'POWER B', on the slide lock housing, insert connector fully home.

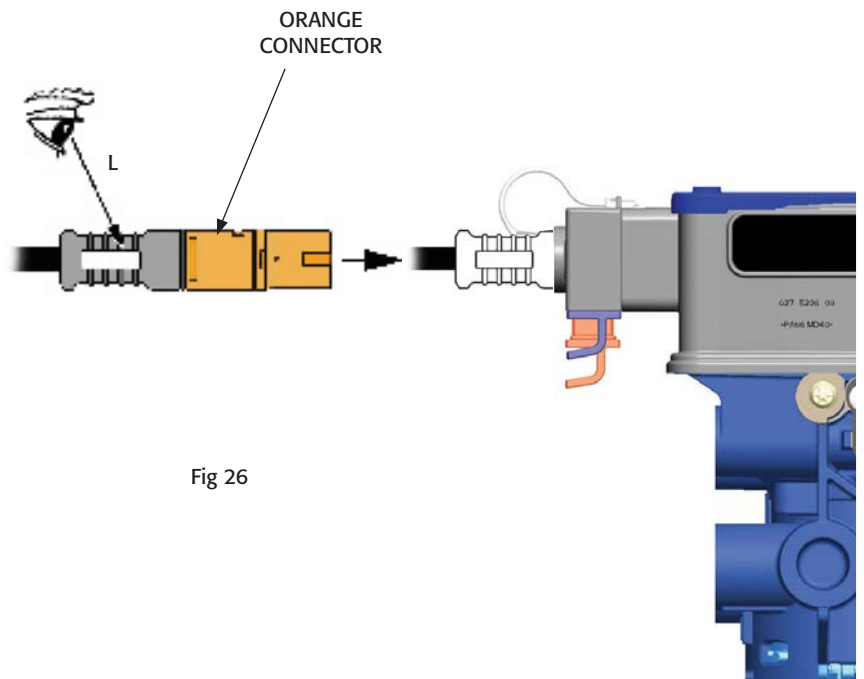


Fig 26

Chassis installation

Electrical wiring - 'DIAG' connection

Diagnostic 'DIAG' connection - Option 1

If **NO** diagnostic units are to be installed retain blanking plug in position marked 'DIAG'.

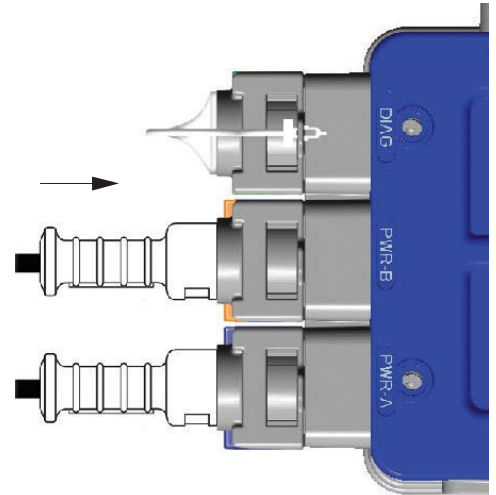


Fig 27

Diagnostic 'DIAG' connection - Option 2

If a remote mounted EB+ Info Centre is installed remove blanking plug 'K'.

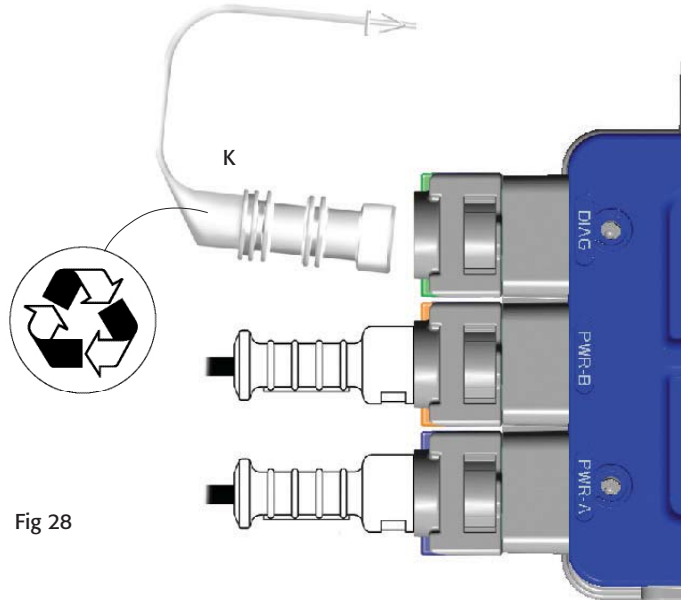


Fig 28

Identify orientation 'L' of the DIAGNOSTIC Green coloured connector.

Ensure contact pins and seal are clean and free of any contamination prior to installation.

In position 'DIAG', on the slide lock housing, insert connector fully home.

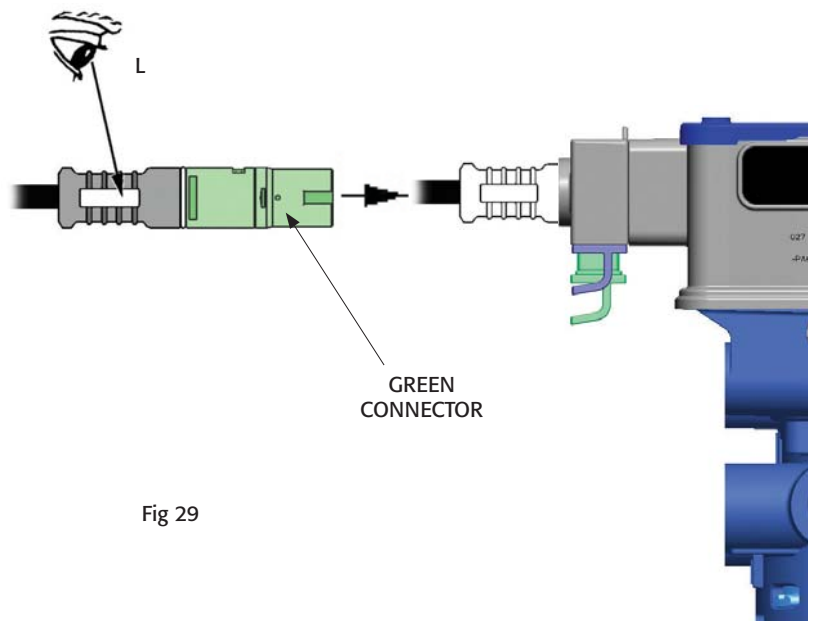


Fig 29

Chassis installation

Electrical wiring - Connectors/blanking plugs

Make sure that all connectors/blanking plugs are all fully inserted into the ECU slide lock housing.

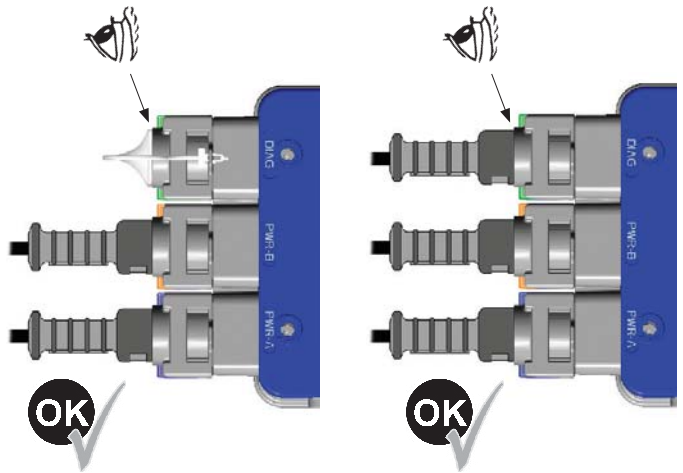


Fig 30

Push in lock slider 'M' to secure in place all plugs/connectors.
Note: Do not use extreme force to push in slider.

Make sure slider is in the lock position 'N'

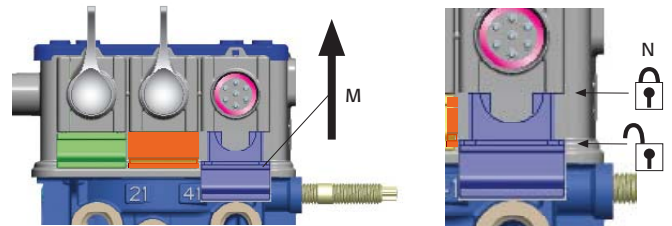


Fig 31

WARNING

If difficulty is encountered in locking the slider, check plug or connector for correct fitment.

If the white o-ring is visible, the plug is not installed correctly and slider will not lock into position.

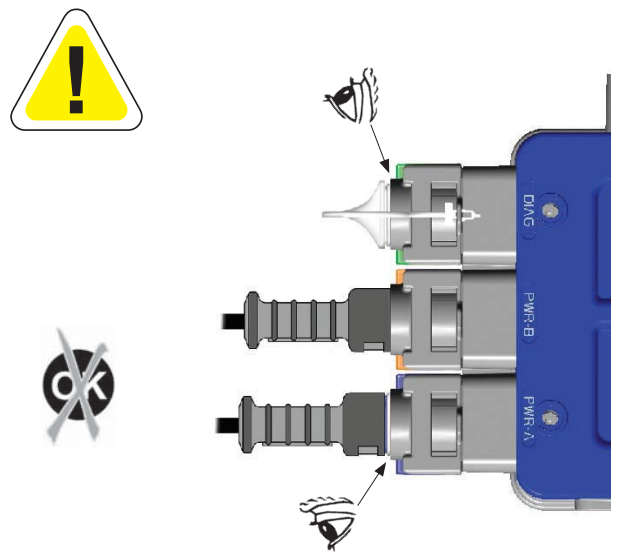


Fig 32

Chassis installation

Electrical wiring - SENSOR/AUX plugs

Sensor Plug

Identification tags are incorporated on either side of the sensor/ECU connector. These **MUST** be removed to identify the appropriate sensor before connecting into the ECU.

ECU Identification	Tags Removed								Component	
	1	2	3	4	A	B	P	5		
S1A		✂	✂	✂	✂		✂	✂	✂	Sensor 1A
S1B		✂	✂	✂	✂			✂	✂	Sensor 1B
S2A	✂		✂	✂	✂		✂	✂	✂	Sensor 2A
S2B	✂		✂	✂	✂			✂	✂	Sensor 2B

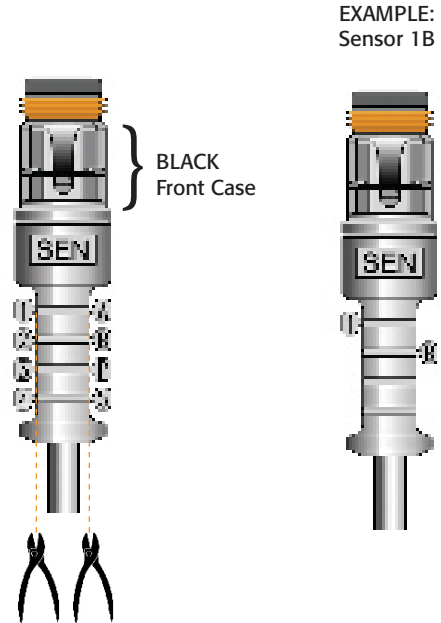


Fig 33

Auxiliary Plug

Identification tags are incorporated on either side of the Auxiliary connector. These **MUST** be removed to identify the appropriate usage before connecting into the ECU.

ECU Identification	Tags Removed								Component Example only	
	1	2	3	4	A	B	P	5		
AUX 1		✂	✂	✂	✂	✂	✂	✂	✂	COLAS®
AUX 2	✂		✂	✂	✂	✂	✂	✂	✂	ILAS®-E
AUX 3	✂	✂		✂	✂	✂	✂	✂	✂	Warning lamp
AUX 4	✂	✂	✂		✂	✂	✂	✂	✂	LWS
AUX 5	✂	✂	✂	✂	✂	✂	✂		✂	Stability
PSW	✂	✂	✂	✂	✂	✂		✂		Pressure switch

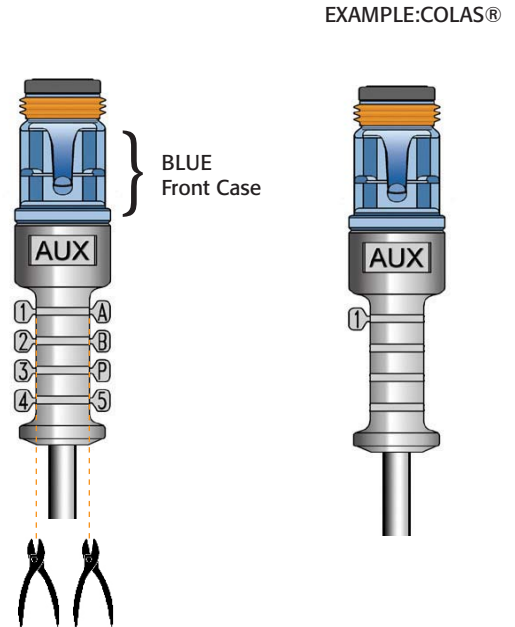


Fig 34

Chassis installation

Electrical wiring - SENSOR/AUX/DIAG connections

SENSOR/AUX Connection

The ECU is supplied with blanking plugs in positions indicated. These require to be removed to allow fitment of additional sensors or permitted ancillary equipment.

Transit plugs (T) are used in ports S1A and S1B.

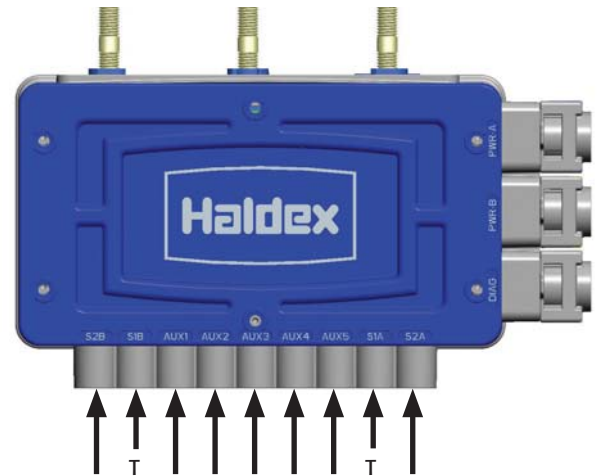


Fig 35

Example - AUX 1 connection

Identify the AUX 1 position on the top or front face of the ECU. Note the locking tag 'O' position.

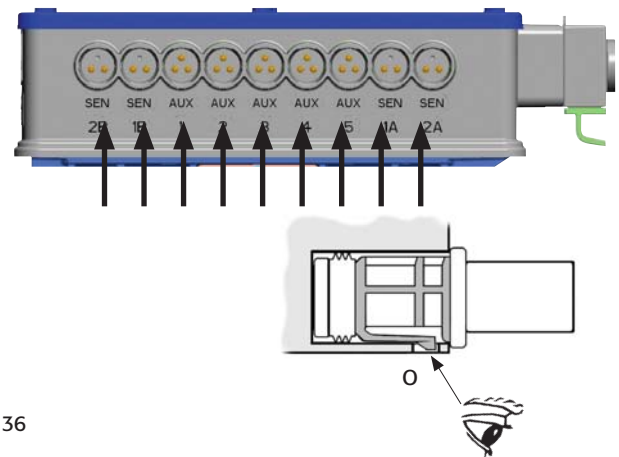


Fig 36

With a tool 'P' having a flat end of Ø3-2mm insert and press in locking tab of plug. While depressed pull out plug from housing.

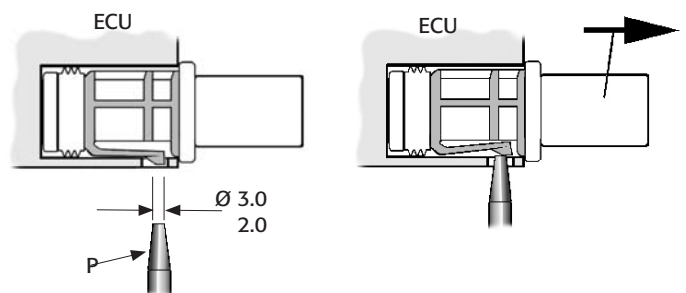


Fig 37

Identify orientation of the:

- Sensor **Black body** connector
- Auxiliary **Blue body** connector

Ensure contact pins and seal are kept clean and free of any contamination prior to installation. Insert fully home in the ECU's housing into appropriate marked positions.

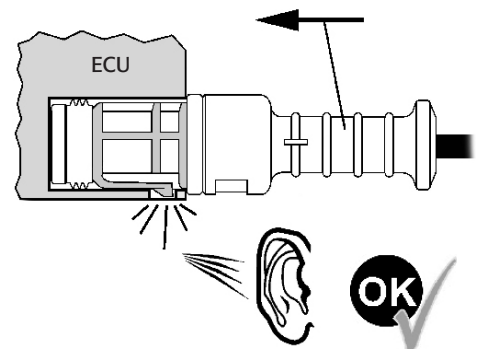


Fig 38

Chassis installation

Electrical wiring - SENSOR connection

Sensor Connection

Sensor extension cable socket must be pushed fully into sensor cable plug till they clip into place to prevent falling out with axle vibration.

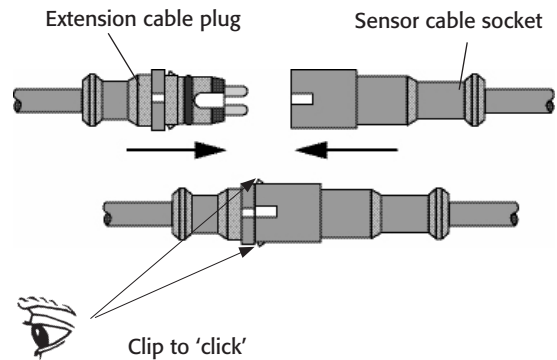


Fig 39

Where possible use a clip and bracket to secure sensor cable connection.

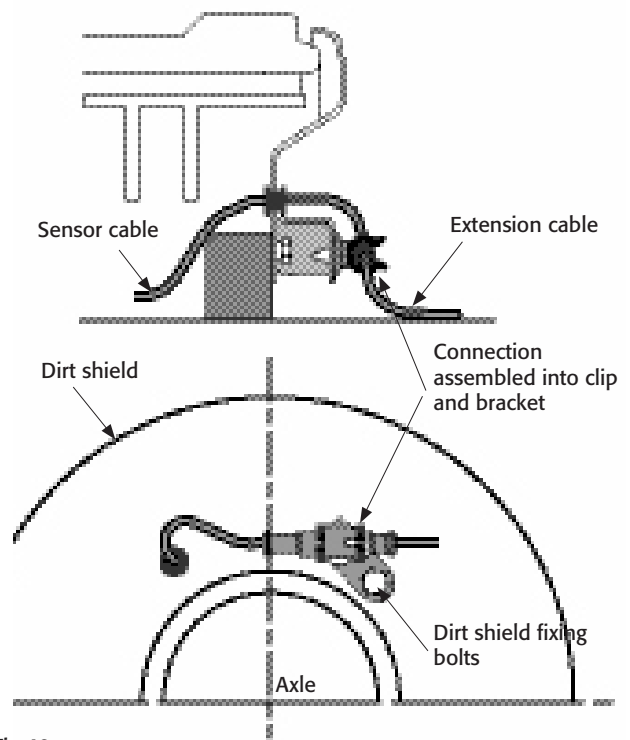


Fig 40

Alternatively: Sensor cable connection to be positioned on axle or between axle 'U' bolts and supported with cable ties within 50mm of each end.

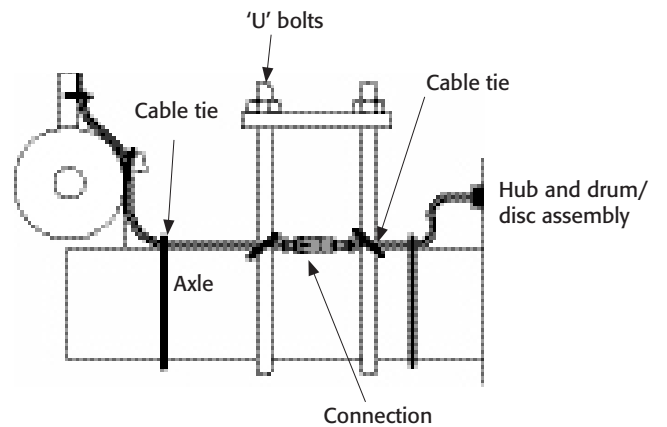


Fig 41

Chassis installation

Electrical wiring - COLAS® / ILAS®-E connection

Sensor cable route should follow the centre line or outer radius of pipe or hose.

Tie wraps not to be over tightened because on brake application rubber hose expands, i.e. tie could damage the hose and sensor cable.

Do NOT run sensors leads in spiral wrapping on hoses.

Power leads should be secured down the chassis rail in trunking or to piping and should be secured not less than 400mm intervals.

NOTE: All cables should run 'UP TO' ECU connections.

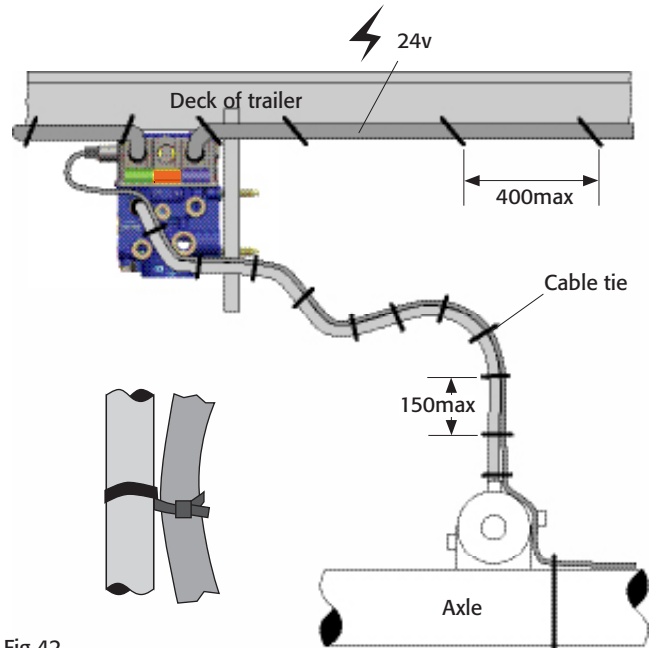


Fig 42

All Cables - the route of the cable from the connector should not start to bend so that the connector/s are strained.

Allow distance before bending of cable as shown in Fig 42.

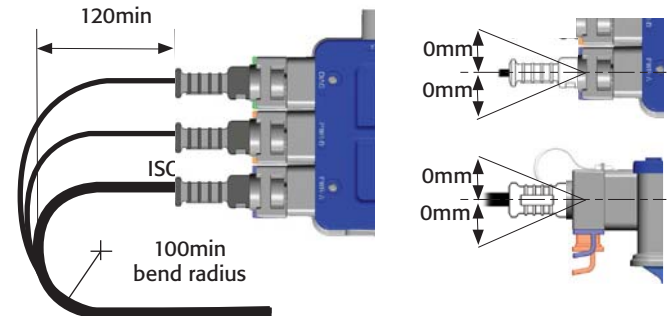


Fig 43

COLAS® / ILAS®-E connection

Cable should be secured down the chassis rail on piping and should be secured not less than 400mm intervals.

NOTE: All cables should run 'UP TO' connector

Position rubber gasket 'R' in position shown.

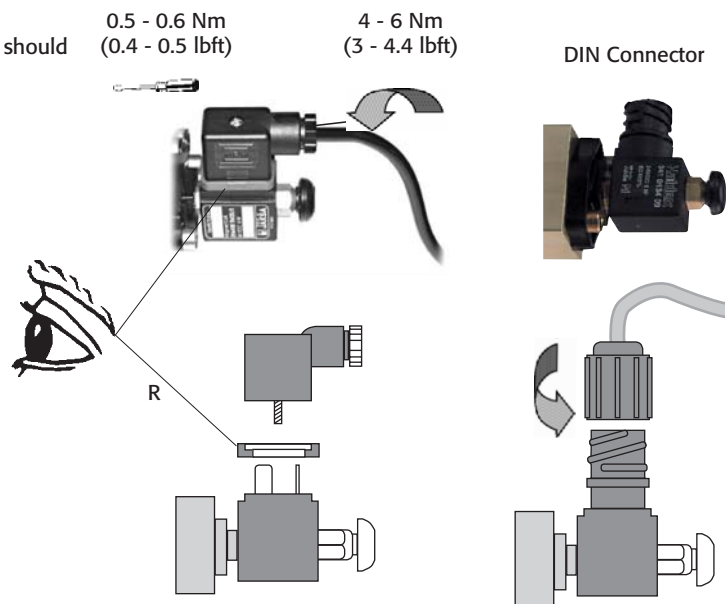


Fig 44

Chassis installation

Painting - masked areas

Painting

In the event of paint/coating work all none used connections, pneumatic ports and exhausts **MUST** be protected.

These are indicated by the shaded areas in the figure to the right.

Adequate protection should be used to avoid penetration of the paint/coating.

All electrical ports to have connectors/blanking plugs installed.

All pneumatic ports to have pipe fittings/blanking plugs installed.

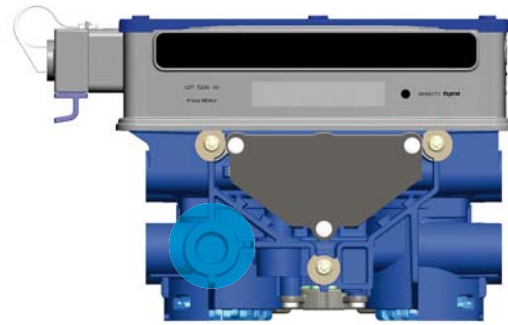
Exhaust ports and connector/s locking areas to be masked during painting.

Painting recommendations:

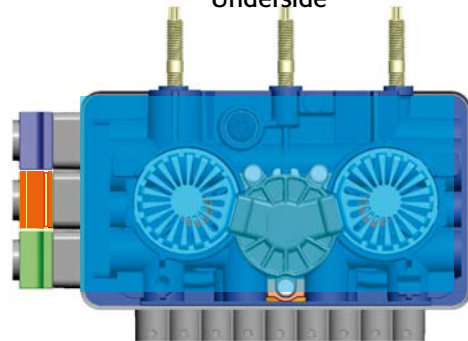
Water based, baking for 1 hour @ 100°C.

 Indicates masked areas

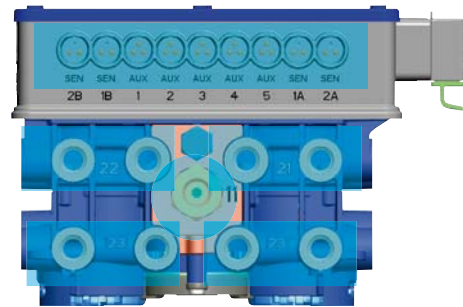
Mounting face



Underside



Front face



Left side



Right side

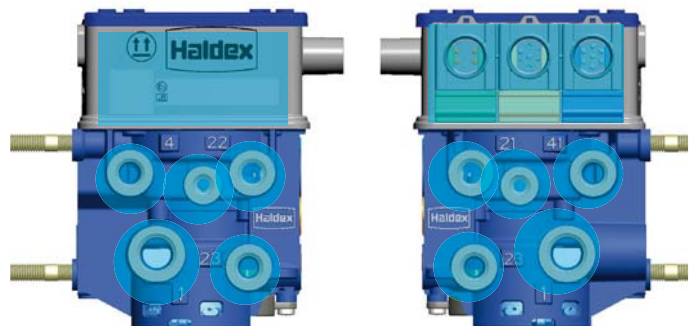


Fig 45

Chassis installation

Electrical wiring - ISO 7638 - 7 Pin Socket Assembly - 24V

Pin detail and identification key location.

Pin No.	Designation	
1	Red (RD) 4mm ²	B+ BATT
2	Black (BK) 1.5mm ²	B+ IGN
3	Yellow (YE) 1.5mm ²	B+ EARTH
4	Brown (BN) 4mm ²	B- EARTH
5	White (W) 1.5mm ²	LAMP
6	White/Green (W/GN) 1.5mm ²	CAN HI
7	White/Brown (W/BN) 1.5mm ²	CAN LO

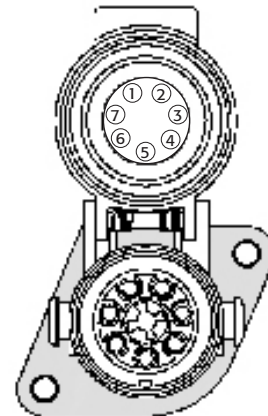


Fig 46

Clearance dimensions.

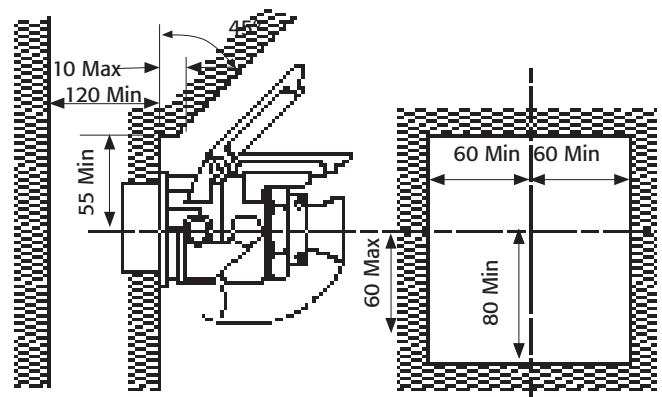


Fig 47

Socket mounting dimensions.

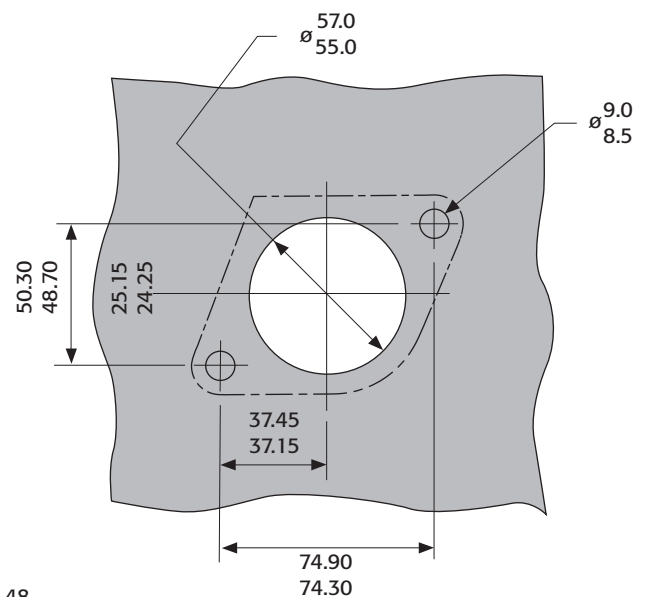


Fig 48

General chassis installation

Electrical wiring - Anti-vibration support

Anti-vibration support

Excess cable must not be allowed to hang free, but must be attached to the chassis to prevent damage due to vibration and abrasion.

Excess cable

Cable lengths LESS than 1m to be coiled into loops of 100mm minimum and 150mm maximum diameter.

Excess length which will not form a complete loop may be left to hang in partial loops having a cable bend radius of 50mm minimum.

Cable lengths GREATER than 1m to be coiled and then flattened in the centre 'B' to produce a 'dog bone' shape.

The resulting loops at the end must have a minimum bend radius of 50mm. Cable ties are to be used to fix the cable in the flattened loop shape.

More than **one** looped cable **must not** be looped together.

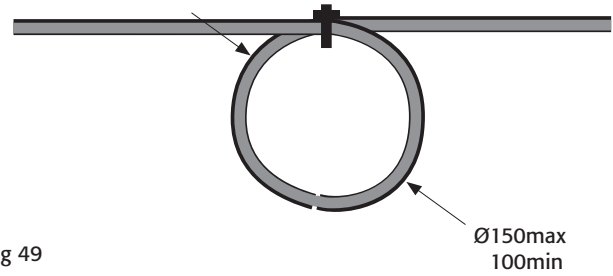


Fig 49

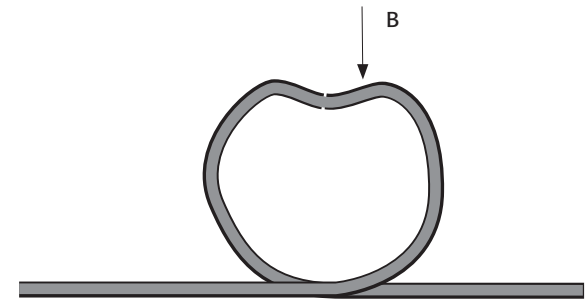


Fig 50

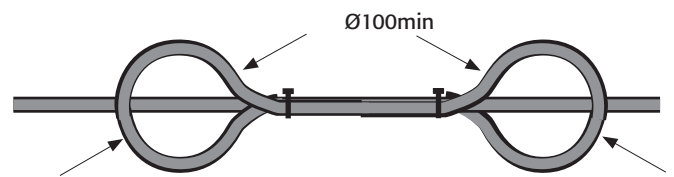


Fig 51

ISO 7638 Connector

Should be positioned/grouped with other electrical connections.

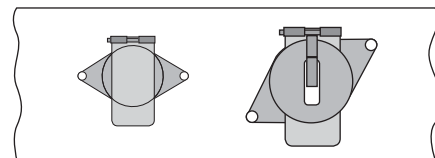


Fig 52

When installing ISO 7638 it is important that sufficient extra length of cable is allowed to expose the socket assembly for replacement in service.

It will be necessary to pull the ISO 7638 socket clear from the trailer headboard to undo the gland nut.

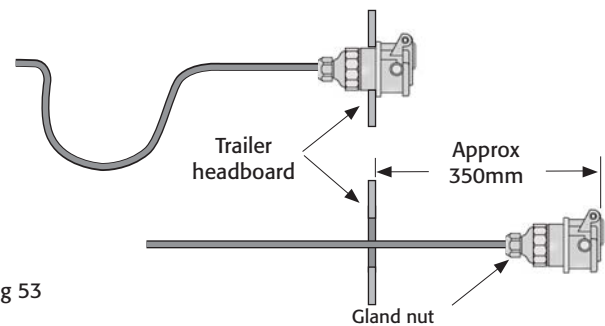


Fig 53

General chassis installation

Electrical wiring - Junction box

Junction box

Should be mounted on a flat surface.
Mounting holes to be drilled 6.25mm diameter to avoid stress at the box from incorrect location.
Ensure cables runs are **UP TO** the junction box.

Drain hole to be shielded by chassis as shown to provide as much protection from direct spray and other road debris.

Ensure outer insulation of the cable is inside junction box by 5mm Minimum.

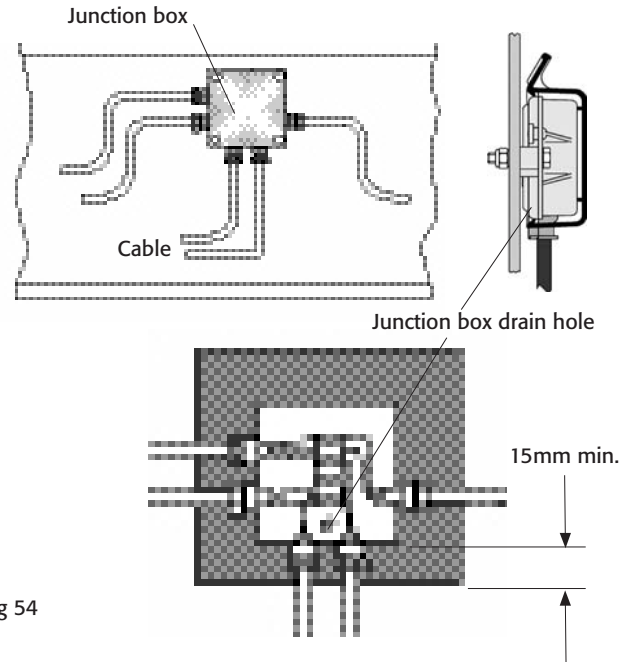


Fig 54

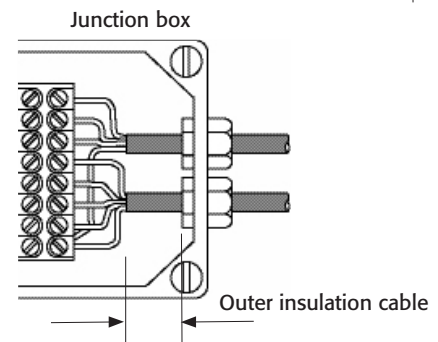


Fig 55

Piping

Avoid elbows as much as possible. If essential, use swept type elbow.

Inside diameter of fitting should be the same as the pipe diameter it is serving.

Position of additional valves

Preferred position of RELAY EMERGENCY VALVE.

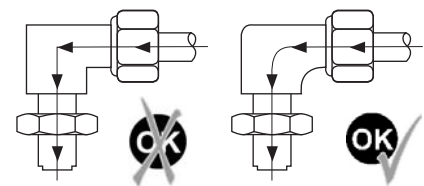


Fig 56

Optional

Suppression Emergency Braking - refer to 000 700 240.

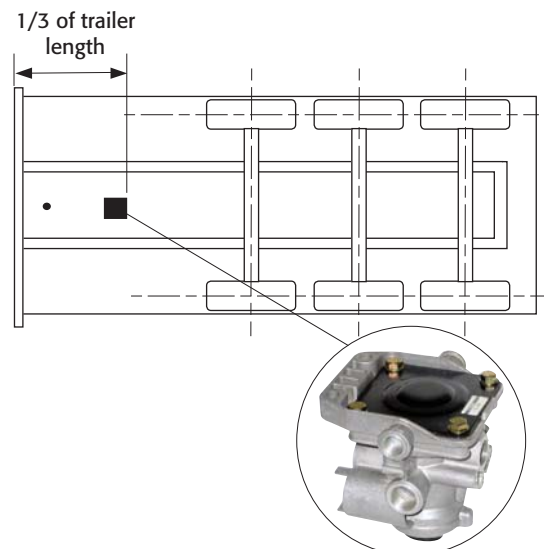


Fig 57

General Chassis installation

Electrical wiring - 'DIAG' Side of vehicle connection

Diagnostic 'DIAG' - side of vehicle connection - Option 3

Clearance and mounting dimensions.
Shaded area around hole to be flat and free from raised markings or surface imperfections which may prevent flush fitting of the connector.

Mount the diagnostic connector on the outside of the main chassis rail. The position **MUST** be in an accessible area but **NOT** in the direct spray of the wheels.

The connector must be mounted horizontally.

Tighten nut 'R' to a torque of 3-4Nm (2-3 lbf).

ECU connection is as Fig 28.

Cable to run **UP TO** connector and secured to the chassis, or appropriate cable or pipe runs, with cable ties at 400mm intervals.

Note:
For Installation of **INFO CENTRE** refer to Instructions **000 700 271** Leaflet.

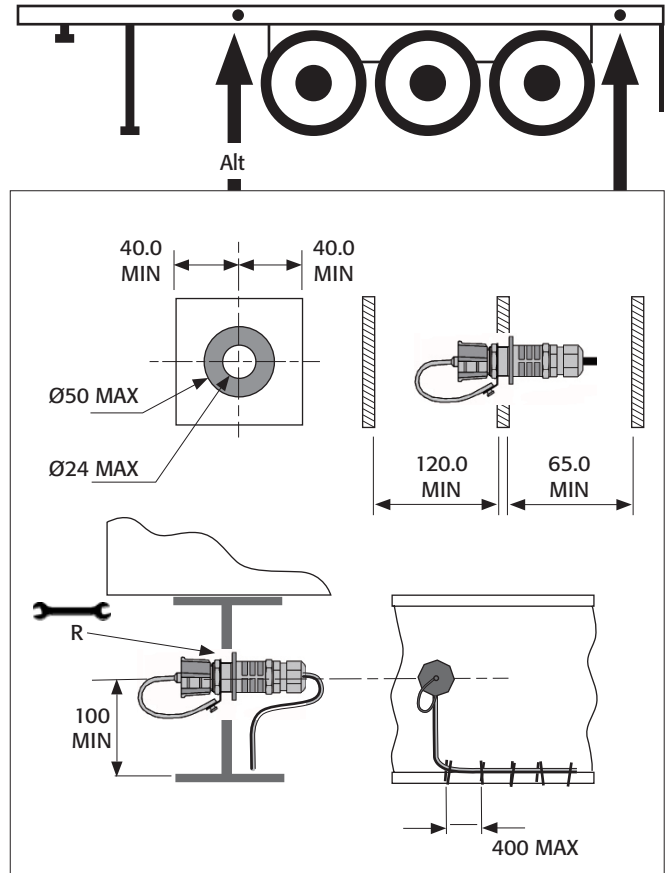


Fig 58

Ensure that the cover is fitted and correctly 'locked' in place.

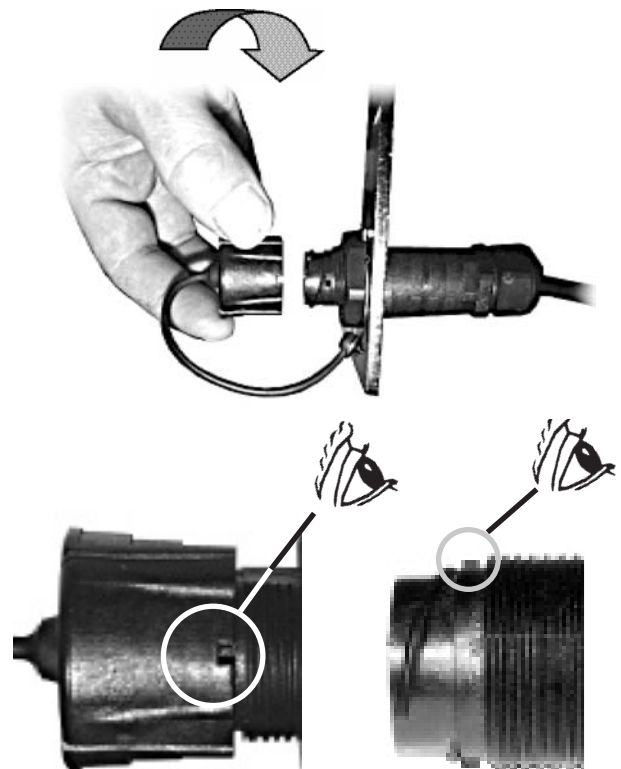


Fig 59

Pipe recommendations

2M system, Side by Side, 3 axle Semi-Trailer - 2 line air brake - S/D brake chambers

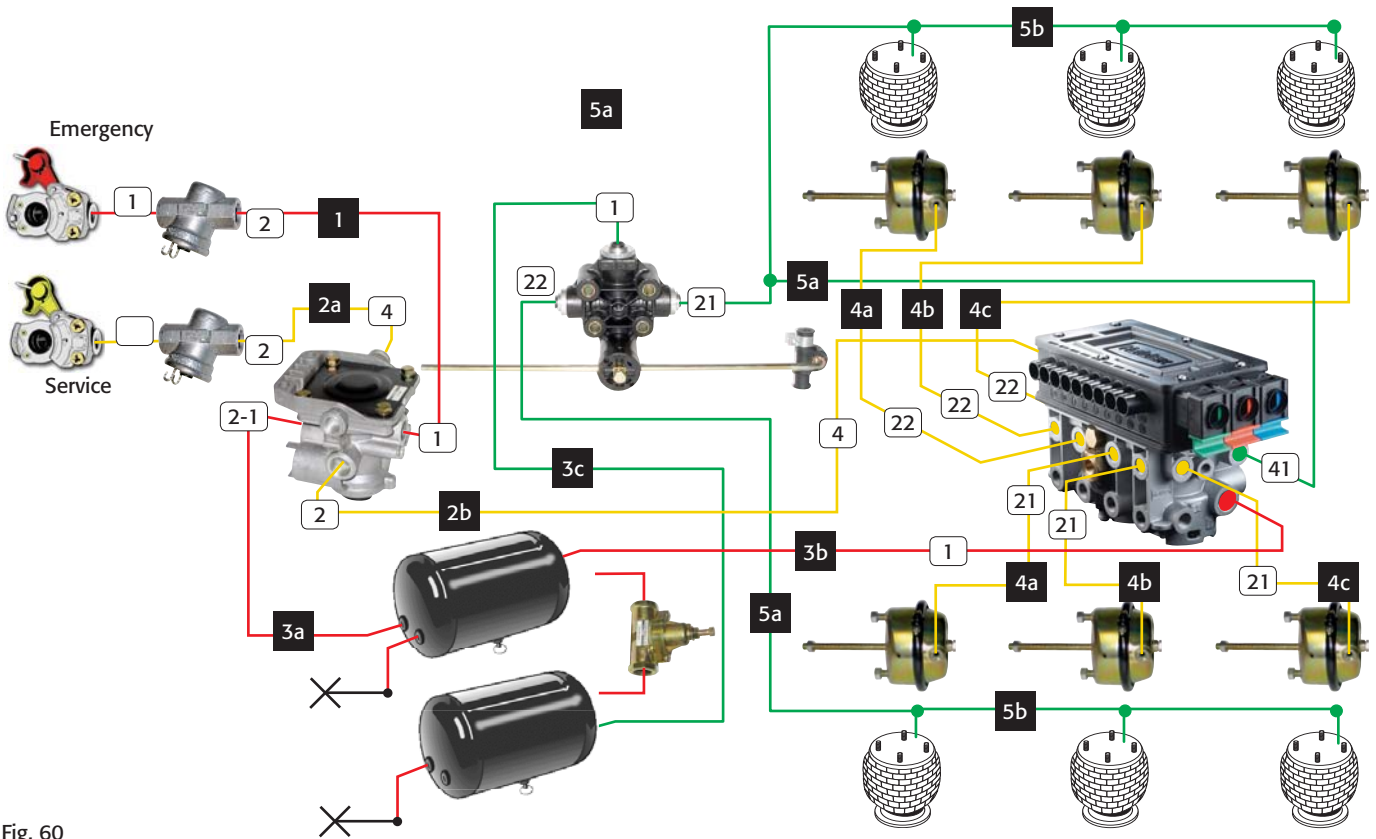


Fig. 60

2M system, Side by Side configuration,
3 axle Semi-Trailer - 2 line air brake system - S/D brake chambers

Item	Description	Material	Size	Remark
1	Emergency pipe	Nylon	8 X 1 10 X 1 / 1.25 12 X 1.5	
2a	Service pipe	Nylon	8 X 1 Pref 10 X 1 Alt 10 X 1.25 Alt	2a to be 1/3 total trailer length
2b	Service pipe	Nylon	8 X 1 10 X 1 10 X 1.25	
3a	Reservoir pipe	Nylon	12 X 1.5 Pref 15 X 1.5 Alt	
3b	Reservoir pipe	Nylon	15 X 1.5 16 x 2 18 X 2	Short as possible 1.0m Max Short as possible 3.0m Max.
3c	Reservoir pipe	Nylon	8 x 1 10 X 1.25	
4a	Brake pipe	Nylon	12 X 1.5 or	4a and 4c to be similar in length,
4c	Brake pipe	Rubber hose	I.D. 11.0 I.D. 13.0	4b to be as short as possible
5a	Suspension pipe	Nylon	*	*As per Suspension Manufacturers recommendations
5b	Suspension bellows	Nylon	*	*As per Suspension Manufacturers recommendations

Pref = Preferred Alt = Alternative
All pipe and rubber hose to comply with recognised international standards. Nylon pipe to DIN 73378 or DIN 74324-1, Rubber hose to SAE 1402. The above pipe sizes are defined as guide lines only.

Actual sizes need to be optimised for a given trailer to meet system response time requirements.
It is the vehicle manufacturers ultimate responsibility to ensure their systems comply with applicable regulations.

Brake and Suspension piping layout

2M, Side-by-Side, with R.E.V., and Single Diaphragm Brake Chambers

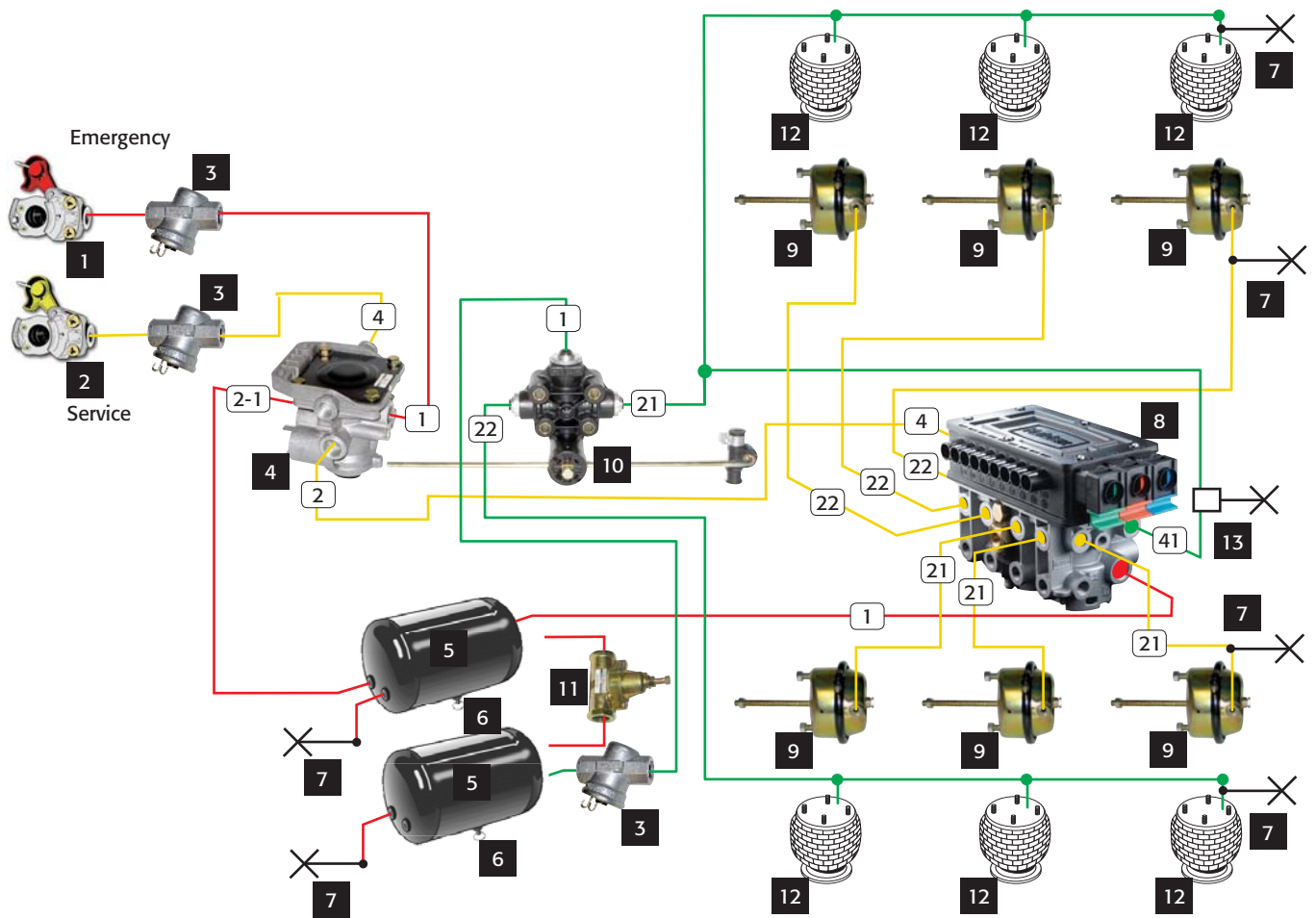


Fig. 61

2M system, Side by Side configuration,
3 axle Semi-Trailer - 2 line air brake system - S/D brake chambers

Item	Description	Notes
1	Emergency coupling	
2	Service coupling	
3	Pipe filter	
4	Relay Emergency Valve	
5	Air reservoir	
6	Drain valve	
7	Test point	
8	EB+ Assembly	
9	Single Diaphragm Brake chamber	
10	Levelling valve	
11	Pressure protection valve	
12	Suspension bellows	
13	Test point simulator	

Brake piping layout

2M, Side-by-Side, with Combined Park and Shunt valve (352-046-001)

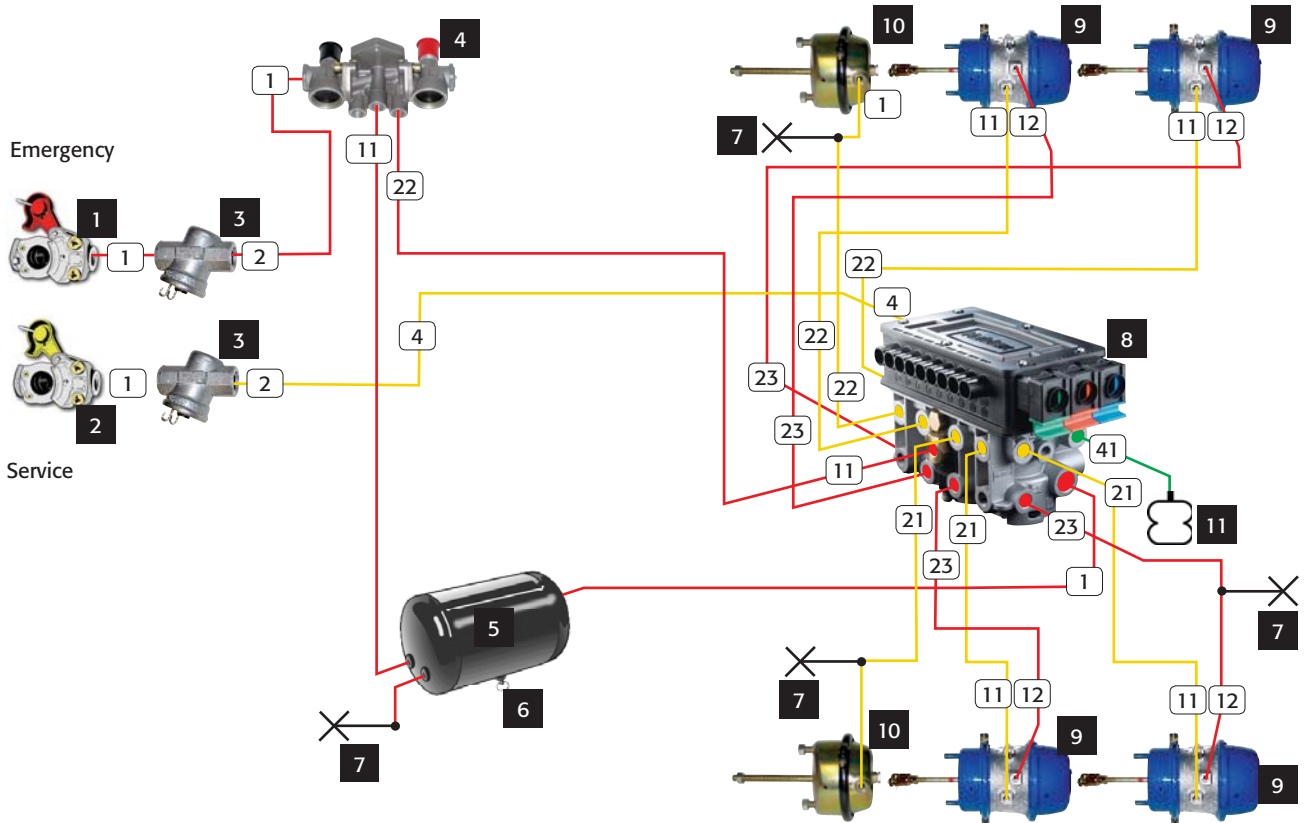


Fig. 62

Side by Side configuration,
3 axle Semi-Trailer - 2 line air brake system - Spring brake chambers

Item	Description	Notes
1	Emergency coupling	
2	Service coupling	
3	Pipe filter	
4	Combined Park and Shunt valve	352-046-001
5	Air reservoir	
6	Drain valve	
7	Test point	
8	EB+ Assembly	
9	Spring Brake Chamber	
10	Single Diaphragm Brake Chamber	
11	Suspension Bellows	

Brake piping layout

2M, Side-by-Side with TrCM (without check valve) and Spring brake chambers

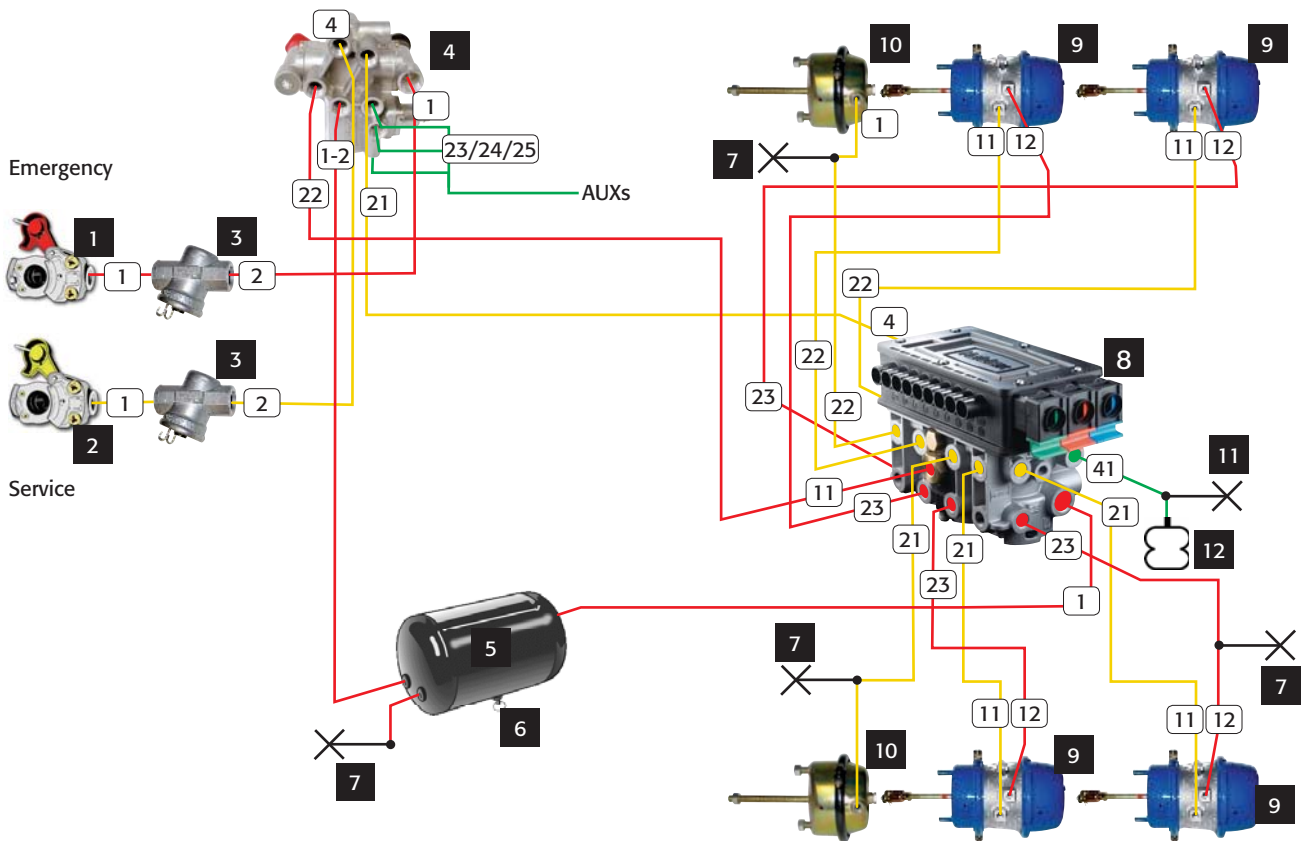


Fig. 63

Side by Side configuration,

3 axle Semi-Trailer - 2 line air brake system with Trailer Control Module (without check valve) - Spring brake chambers

Item	Description	Notes
1	Emergency coupling	
2	Service coupling	
3	Pipe filter	
4	Trailer Control Module	TrCM (without check valve)
5	Air reservoir - service	
6	Drain valve	
7	Test point	
8	EB+ Assembly	
9	Spring Brake Chamber	
10	Single Diaphragm Brake Chamber	
11	Test Point Simulator	
12	Suspension Bellows	

Brake piping layout

Axle by Axle with R.E.V. and Combined Park and Shunt valve (352-044-001)

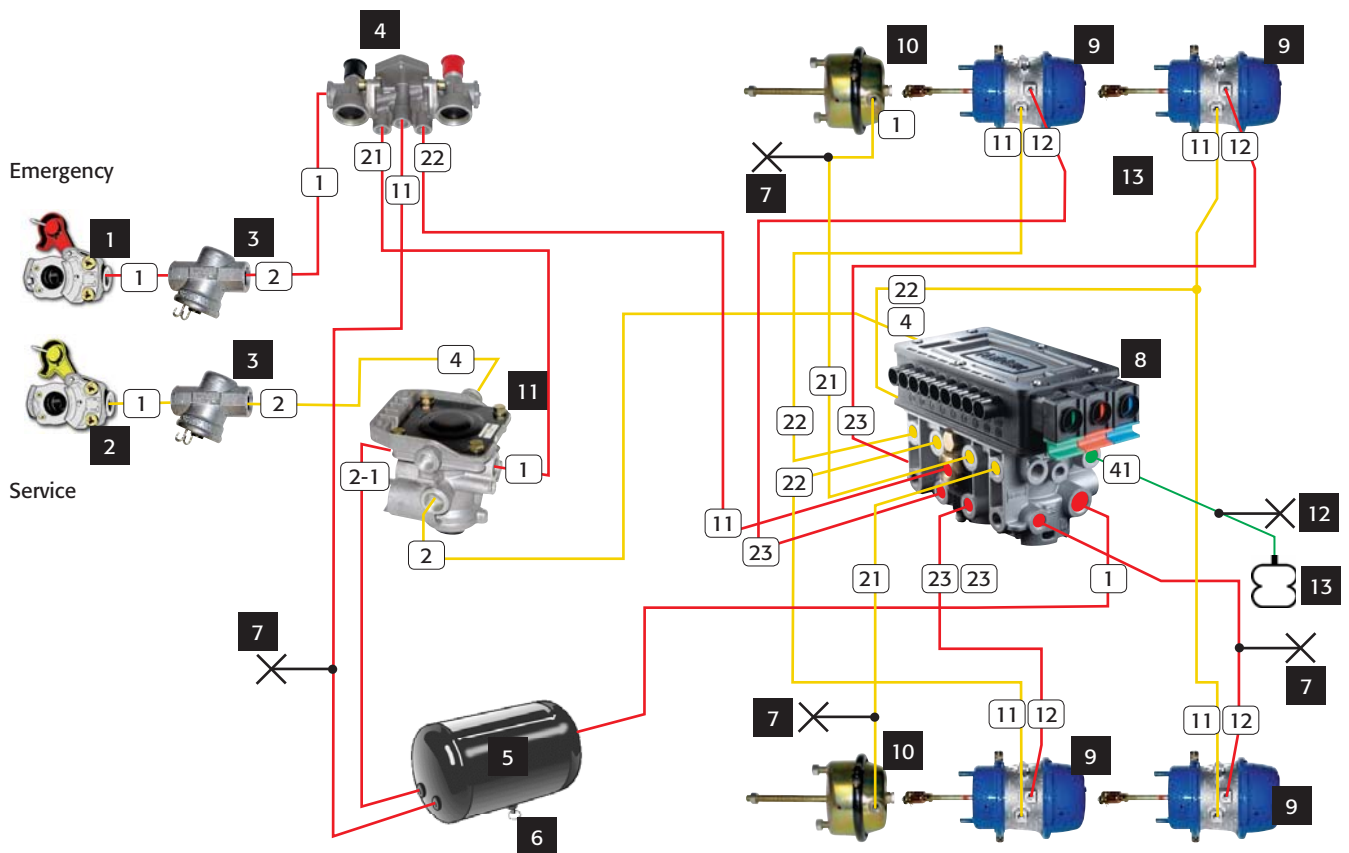


Fig. 64

Axle by axle configuration,
3 axle Semi-Trailer - 2 line air brake system - Spring Brake chambers - **Combined Park and Shunt valve**

Item	Description	Notes
1	Emergency coupling	
2	Service coupling	
3	Pipe filter	
4	Park & Shunt Valve	352-044-001
5	Air Reservoir	
6	Drain valve	
7	Test Point	
8	EB+ Assembly	
9	Spring Brake Chamber	
10	Single Diaphragm Brake Chamber	
11	Relay Emergency Valve (REV)	
12	Test Point Simulator	
13	Suspension Bellows	

Brake piping layout

Side by Side with R.E.V. and Combined Park and Shunt valve

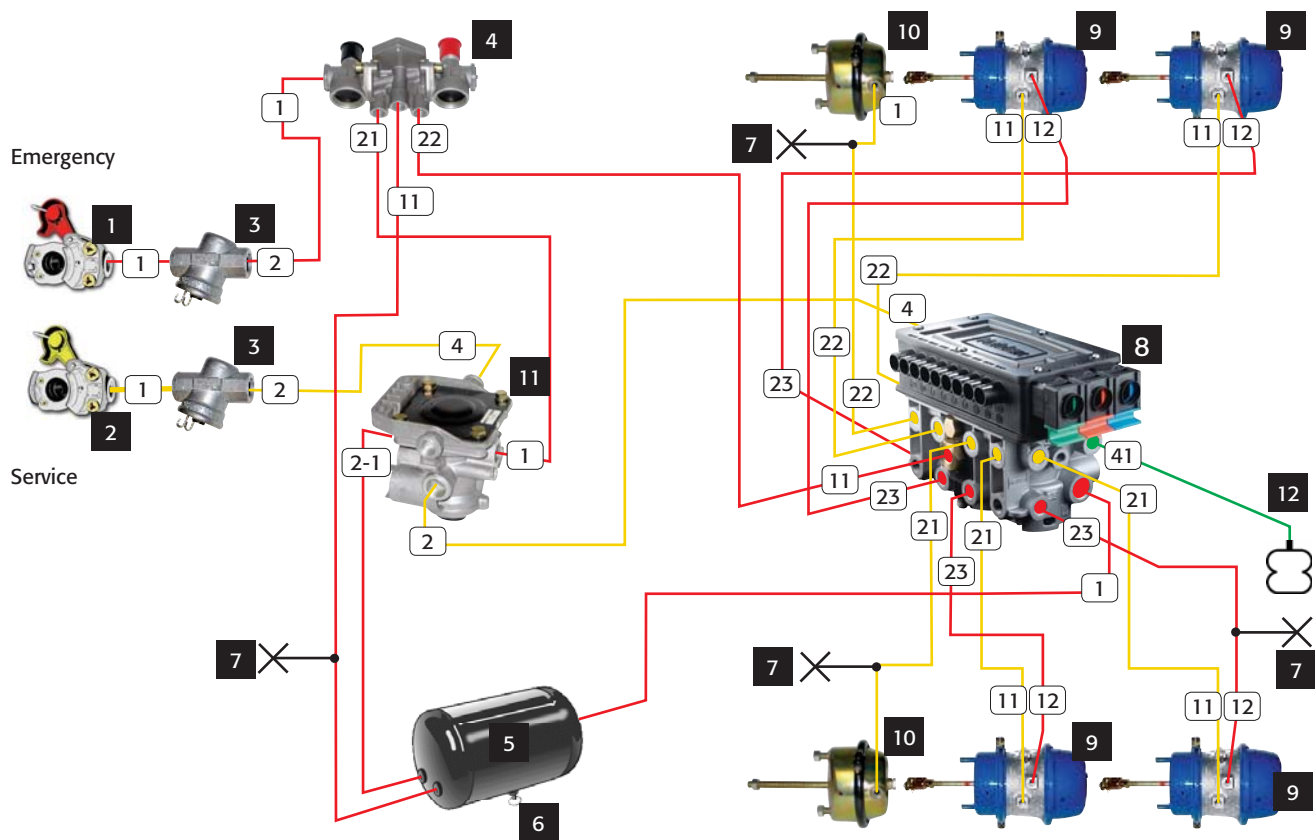


Fig. 65

Side by Side configuration,

3 axle Semi-Trailer - 2 line air brake system - Spring Brake chambers - Combined Park and Shunt valve

Item	Description	Notes
1	Emergency Coupling	
2	Service Coupling	
3	Pipe Filter	
4	Combined Park and Shunt Valve	352-044-... / 352-045-...
5	Air Reservoir	
6	Drain Valve	
7	Test Point	
8	EB+ Assembly	
9	Spring Brake Chamber	
10	Single Diaphragm Brake Chamber	
11	Relay Emergency Valve	
12	Suspension Bellows	

Suspension system piping layout with Levelling valve

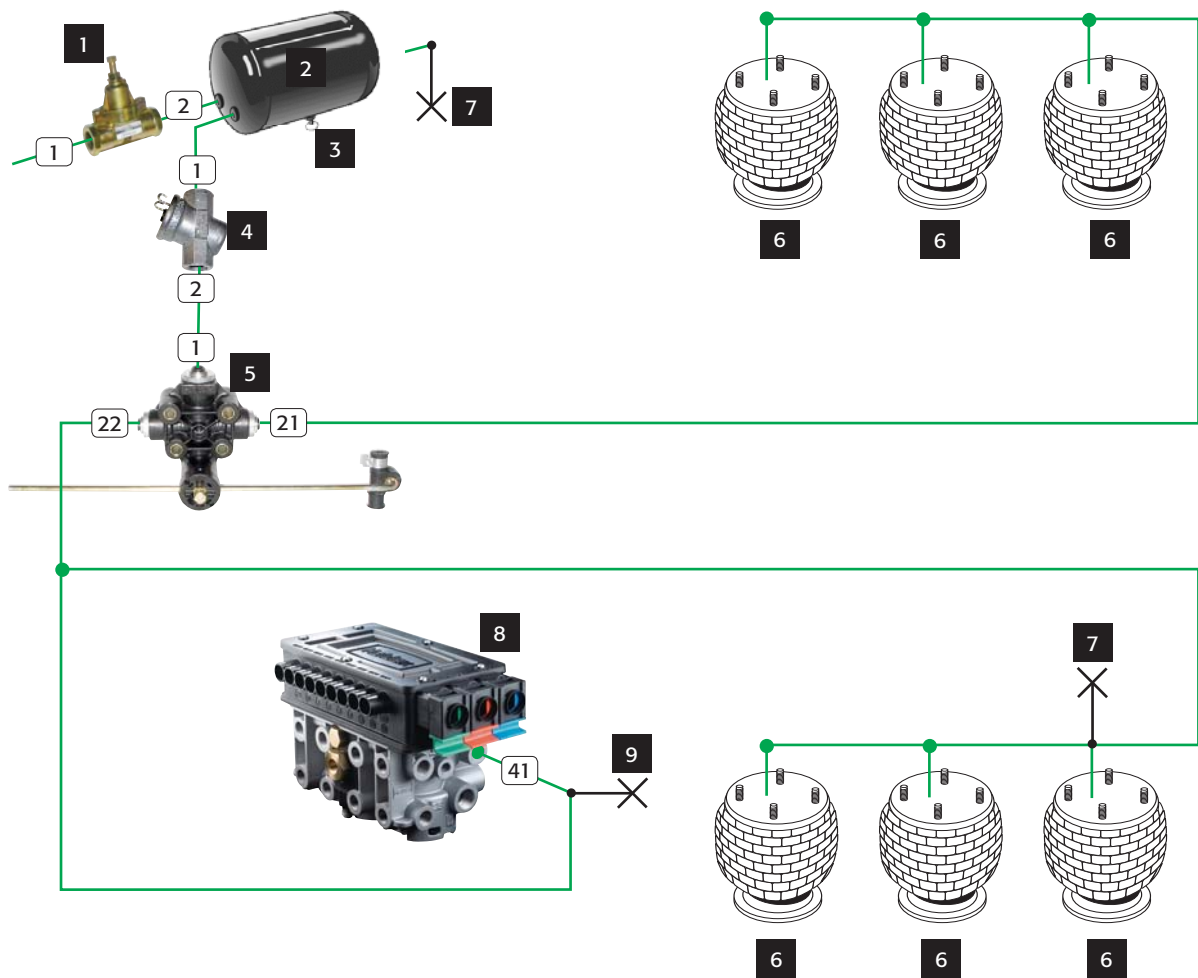


Fig. 66

Levelling valve

Item	Description	Notes
1	Pressure protection valve	
2	Air reservoir	
3	Drain valve	
4	Pipe filter	
5	Levelling valve	
6	Air bellows	
7	Test point	
8	EB+ Assembly	
9	Test point simulator	

Suspension system piping layout with Levelling valve and COLAS[®]

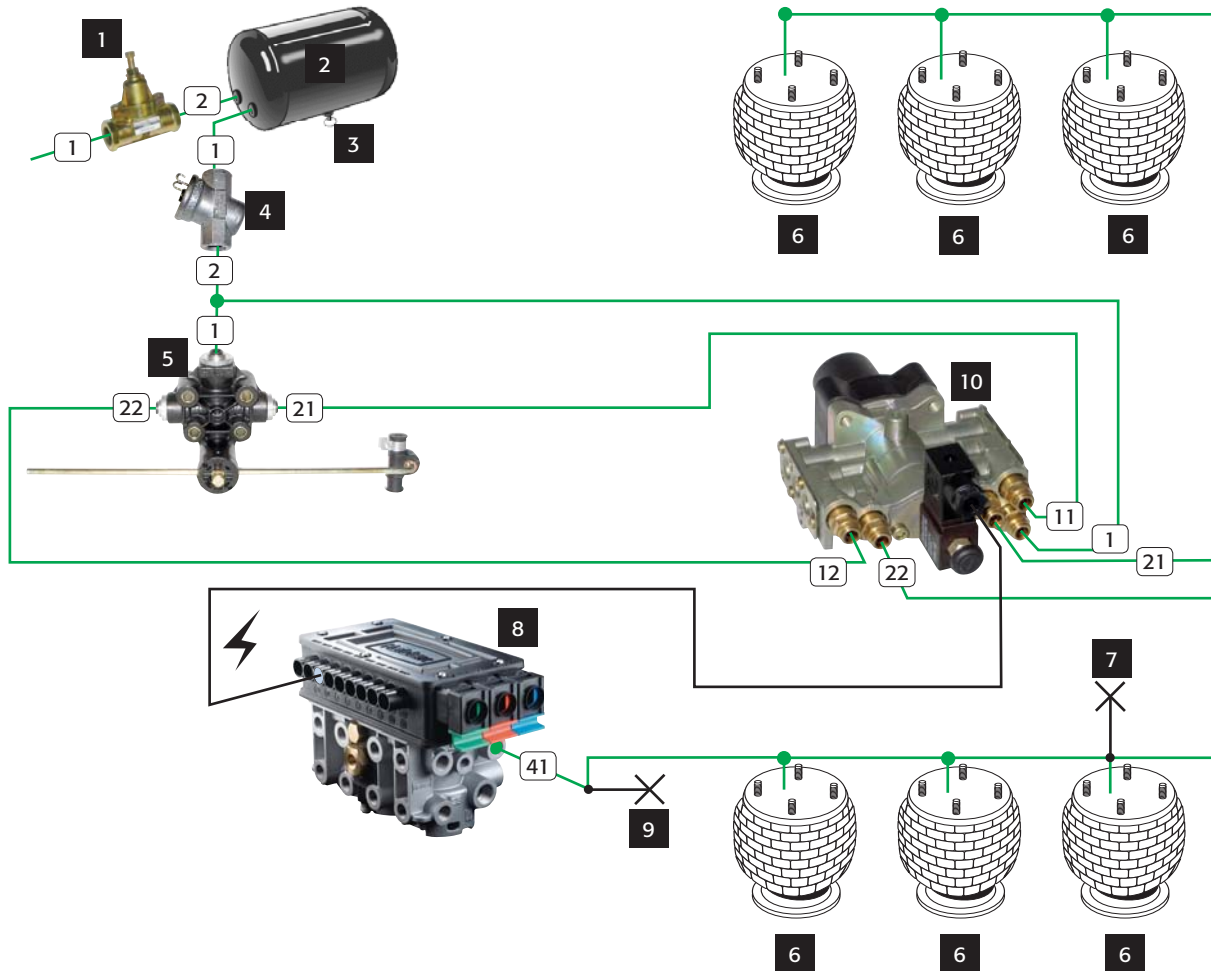


Fig. 67

Levelling valve, Colas[®] (auto reset to ride)

Item	Description	Notes
1	Pressure protection valve	
2	Air reservoir	
3	Drain valve	
4	Pipe filter	
5	Levelling valve	
6	Air bellows	
7	Test point	
8	EB ⁺ Assembly	
9	Test point simulator	
10	Colas [®]	

Suspension system piping layout with COLAS® and Ilas®-E

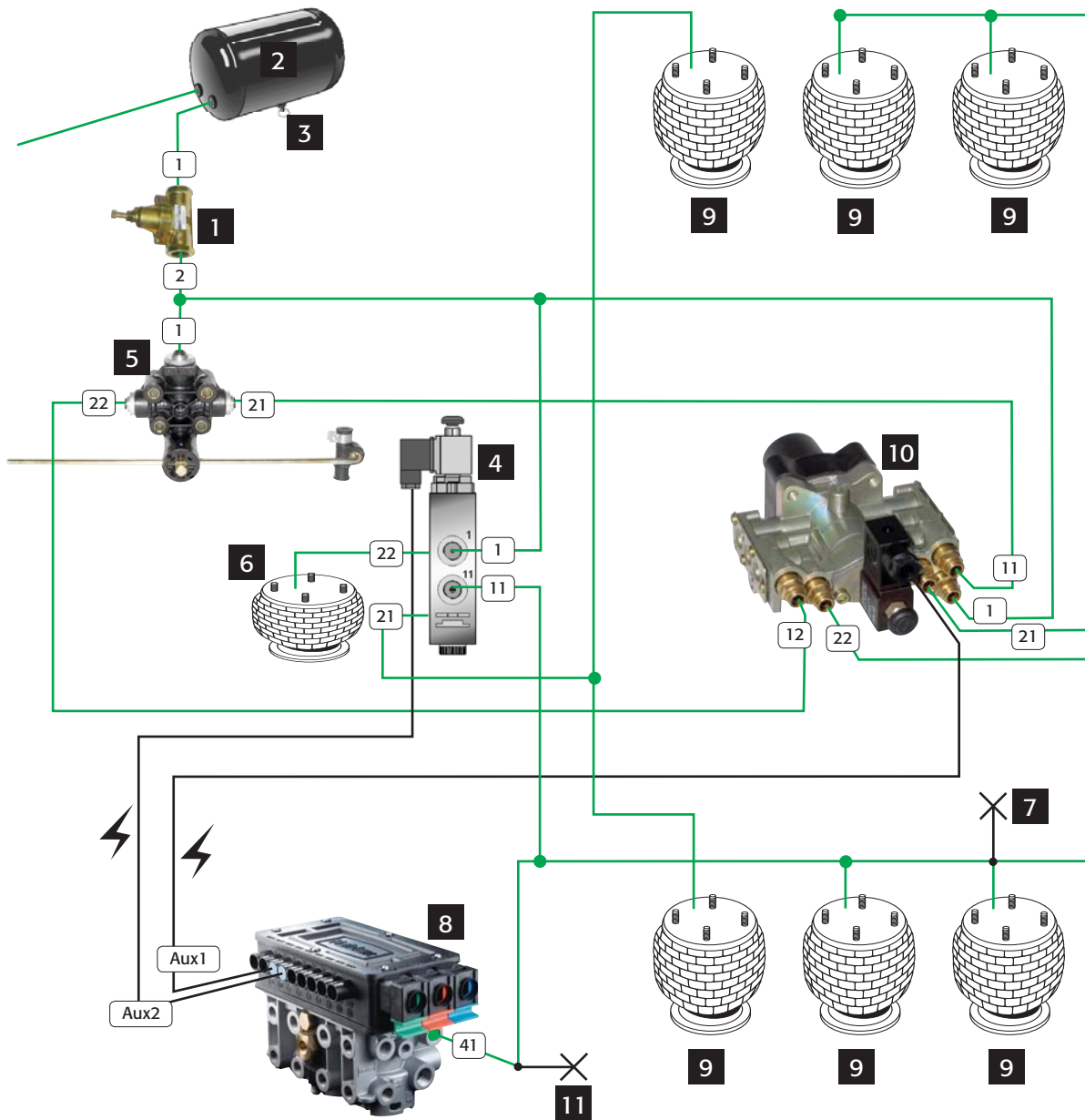


Fig. 68

3 axle Semi-Trailer, Colas® with auto reset to ride, ILAS®-E, Levelling valve

Item	Description	Notes
1	Pressure protection valve	
2	Air reservoir	
3	Drain valve	
4	ILAS®-E	
5	Levelling valve	
6	Air bellows	
7	Test point	
8	EB+ Assembly	
9	Suspension bellows	
10	Colas®	
11	Test Point Simulator	

Suspension system piping layout with COLAS[®], Height Limitation and D.C.V. - Option 1 (Preferred)

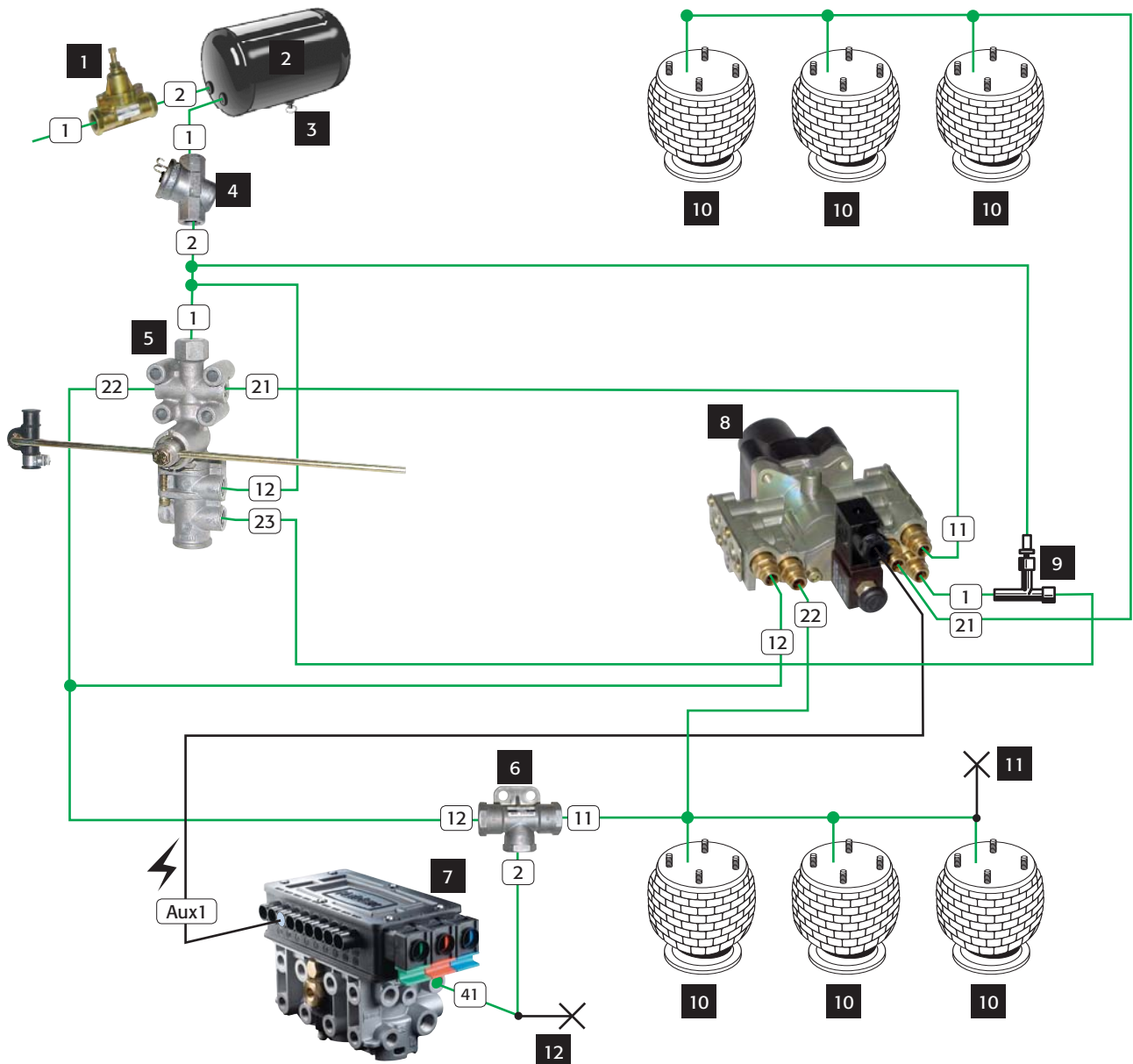


Fig. 69

3 axle Semi-Trailer, Colas[®] with height limitation and auto reset to ride

Item	Description	Notes
1	Pressure protection valve	
2	Air reservoir	
3	Drain valve	
4	Pipe filter	
5	Levelling valve with height limitation	
6	Double check valve (Piston type preferred)	
7	EB ⁺ Assembly	
8	Colas [®]	
9	Throttle	
10	Air bellows	
11	Test point	
12	Test point simulator	

Suspension system piping layout with COLAS® and Height Limitation - Option 2

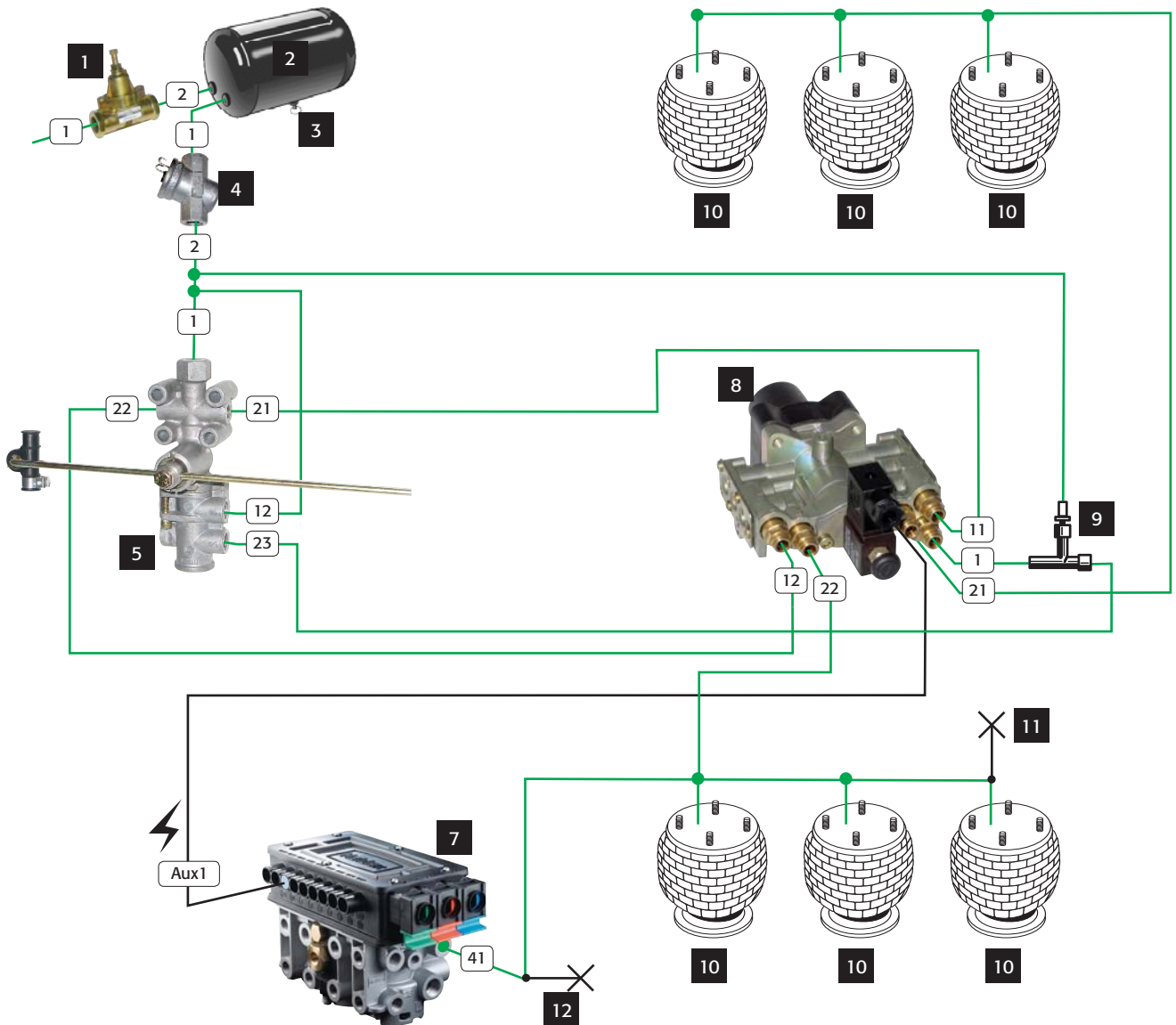


Fig. 70

3 axle Semi-Trailer, Colas® with height limitation and auto reset to ride

Item	Description	Notes
1	Pressure protection valve	
2	Air reservoir	
3	Drain valve	
4	Pipe filter	
5	Levelling valve with height limitation	
6	-	
7	EB+ Assembly	
8	Colas®	
9	Throttle	
10	Air bellows	
11	Test point	
12	Test point simulator	

Brake piping layout

3M, 3 axle Semi-Trailer - 2 line air brake, Spring brake chambers with Combined Park and Shunt valve

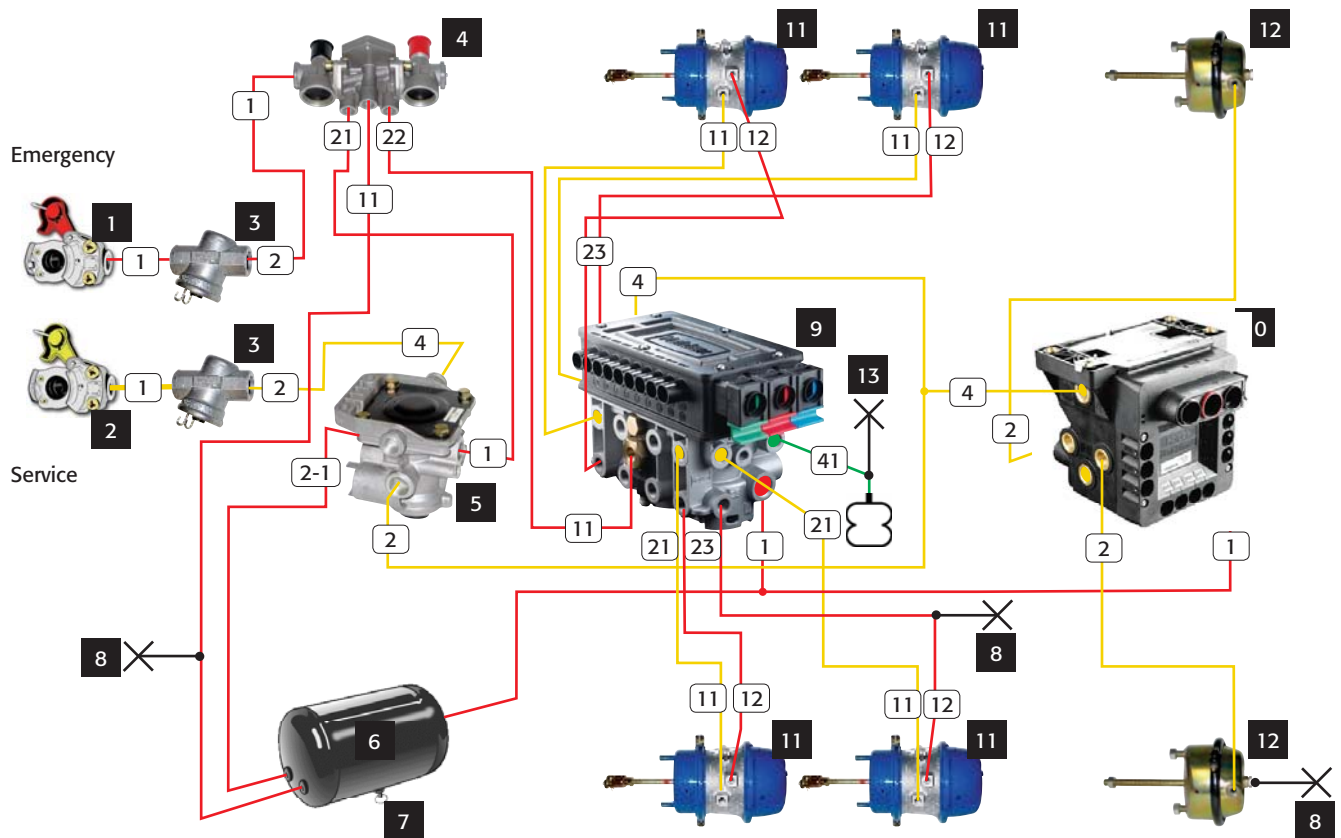


Fig. 71

Side by Side configuration,

3 axle Semi-Trailer - 2 line air brake system - Spring Brake chambers - Combined Park and Shunt valve

Item	Description	Notes
1	Emergency Coupling	
2	Service Coupling	
3	Pipe Filter	
4	Combined Park and Shunt Valve	352-044-... / 352-045-...
5	Relay Emergency Valve	
6	Air Reservoir	
7	Drain Valve	
8	Test Point	
9	EB+ Assembly Master ECU	
10	EB+ Assembly Slave ECU	
11	Spring Brake Chamber	
12	Single Diaphragm Brake Chamber	
13	Test Point Simulator	

Brake piping layout

3M, 2 axle Full Trailer - 2 line air brake, Spring brake chambers

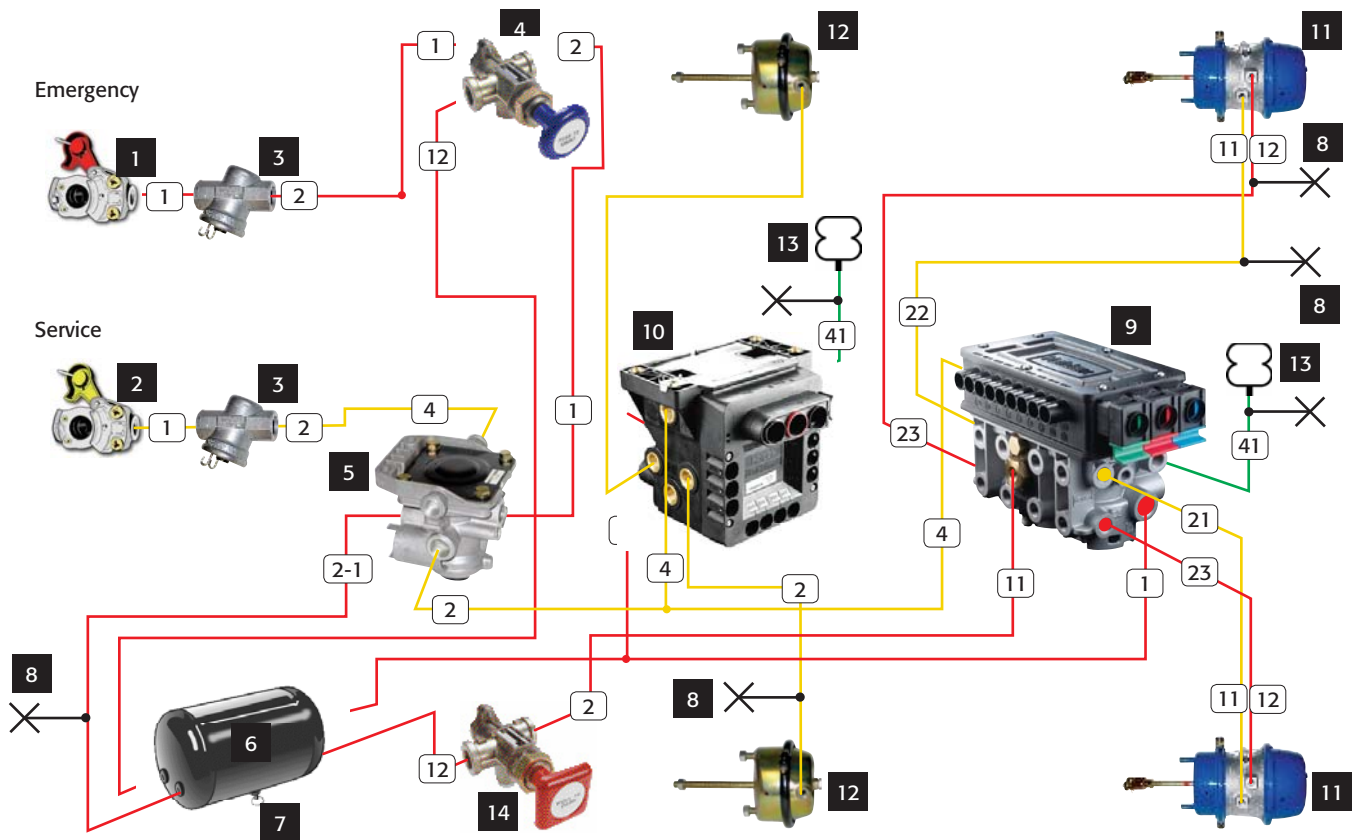


Fig. 72

Side by Side configuration,
3 axle Full Trailer - 2 line air brake system - Spring Brake chambers

Item	Description	Notes
1	Emergency Coupling	
2	Service Coupling	
3	Pipe Filter	
4	Shunt Valve	
5	Relay Emergency Valve	
6	Air Reservoir	
7	Drain Valve	
8	Test Point	
9	EB+ Assembly 2 M (Master ECU)	
10	EB+ Assembly 1 M (Slave ECU)	
11	Spring Brake Chamber	
12	Single Diaphragm Brake Chamber	
13	Test Point Simulator	
14	Park Valve	

Wiring schematic

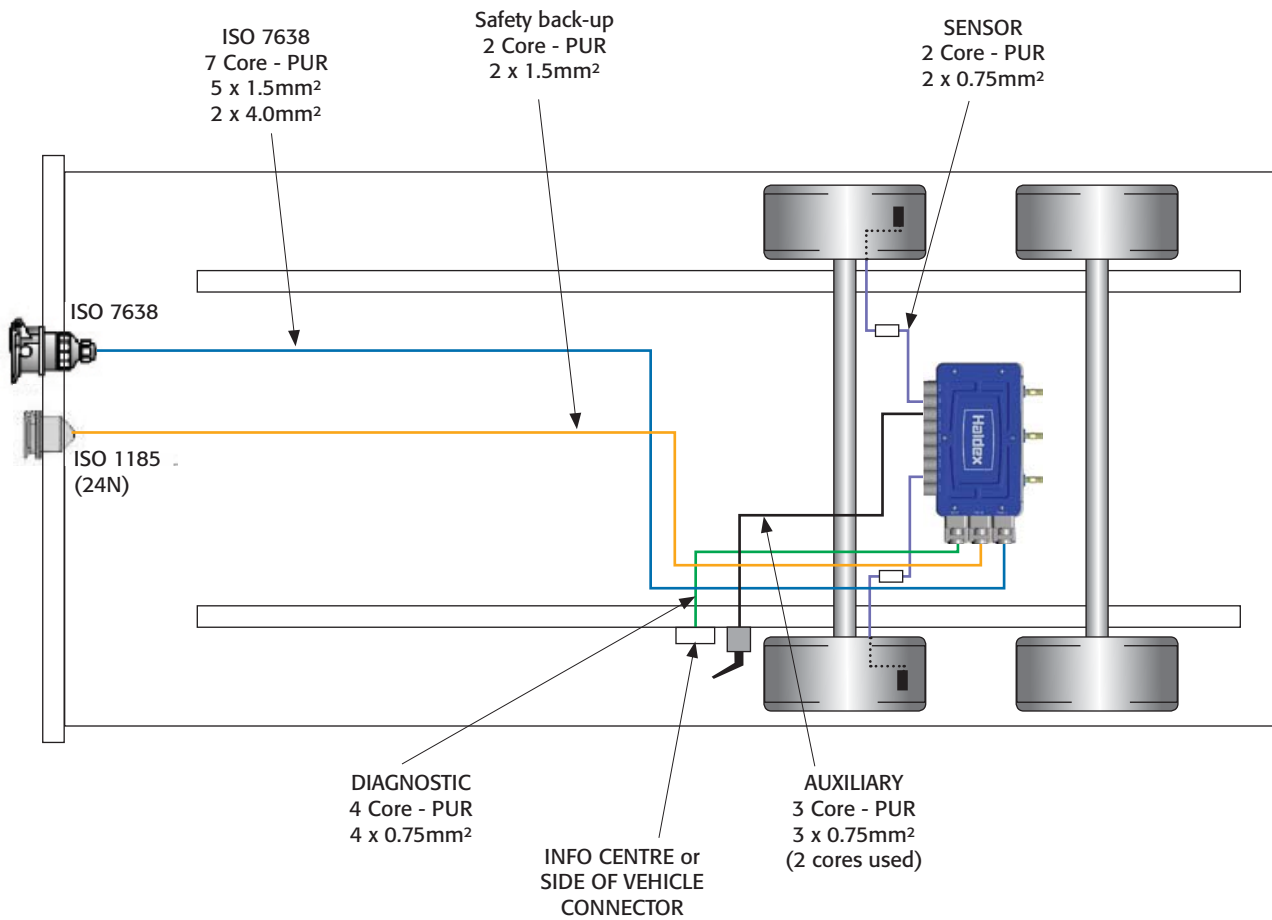


Fig. 73

Semi-Trailer and Centre Axle Trailer Installation Option

N1 MAXIMUM length of cable between ISO 1185(24N) connector and front junction box to be 1m.

Failure to comply with the above recommendation may result in insufficient voltage at the ECU.

Wiring diagram

2 Sensors + ISO7638 & ISO1185 with Info Centre (3 Aux's fitted)

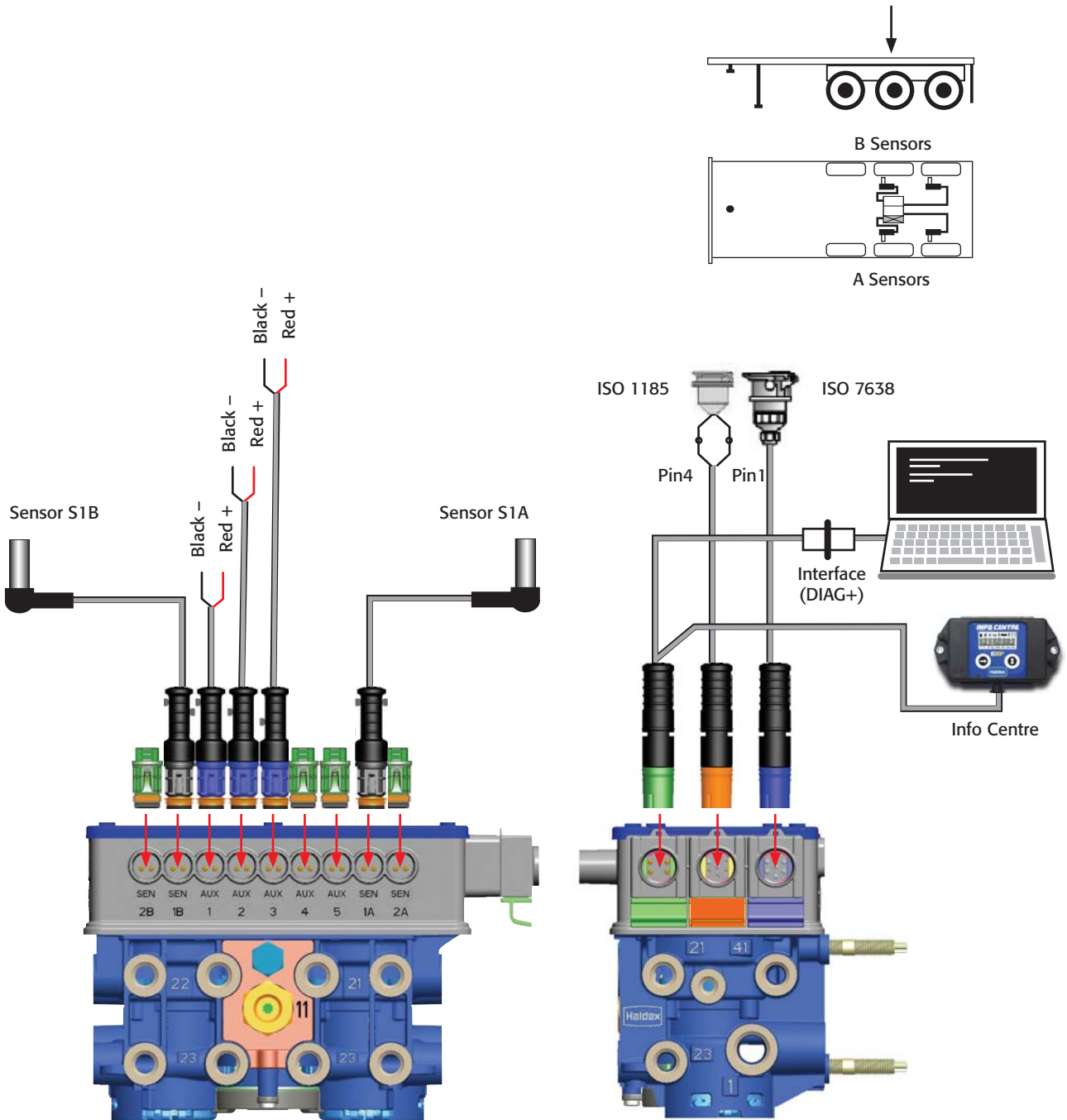


Fig. 74

ISO7638	ISO1185	DIAG	S1A	S1B	S2A	S2B	AUX 1	AUX 2	AUX 3	AUX 4	AUX 5
3	3	3	3	3			3	3	3		

Auxiliary equipment wiring

2 Sensors + ISO7638 & ISO1185 with Info Centre & LWS (3 Aux's fitted)

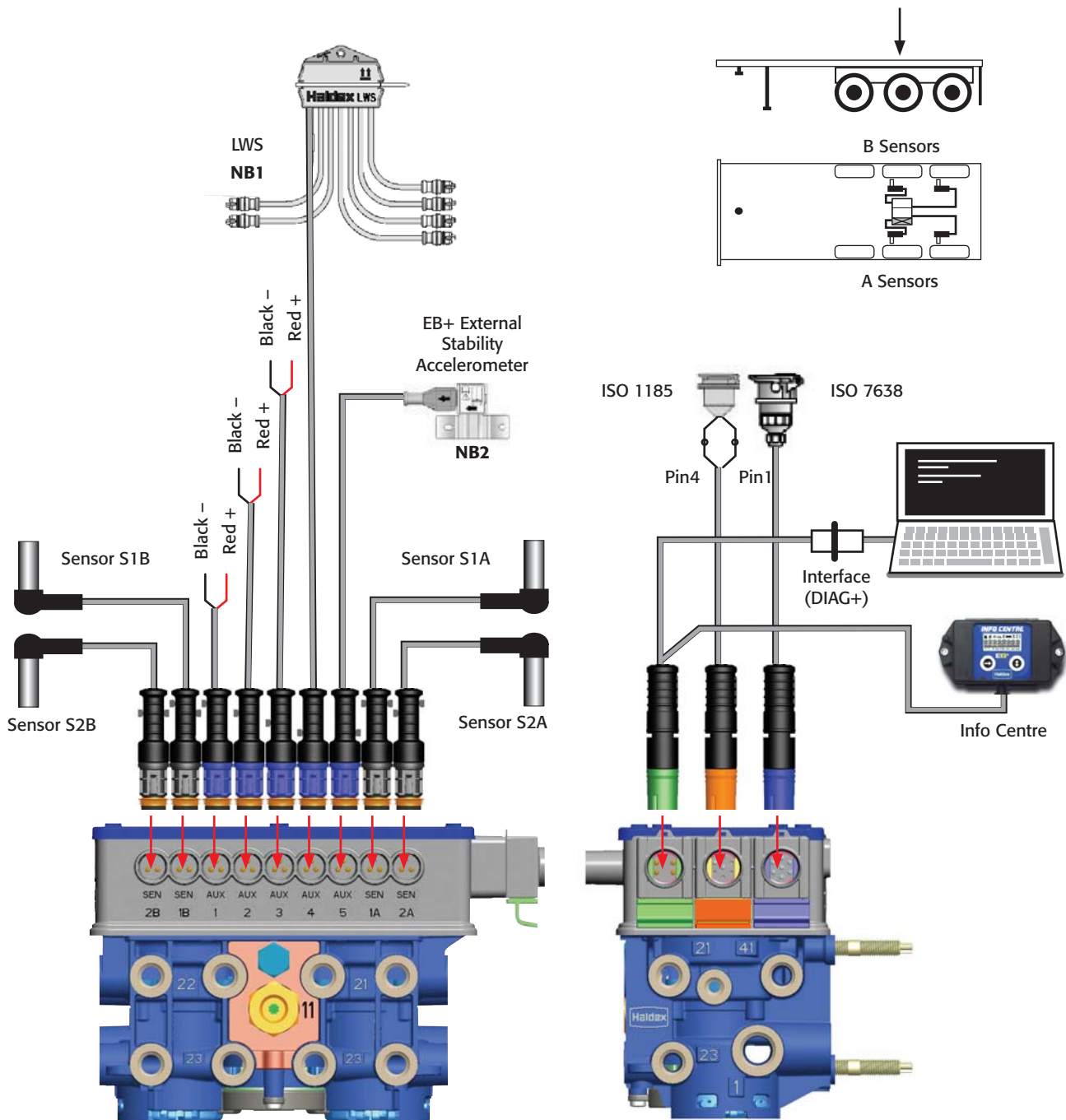


Fig. 75

ISO7638	ISO1185	DIAG	S1A	S1B	S2A	S2B	AUX 1	AUX 2	AUX 3	AUX 4	AUX 5
3	3	3	3	3	3	3	3	3	3	3	3

NB1 - Lining Wear Sensor to be fitted in AUXs 4 only

NB2 - External Stability Accelerometer to be fitted in AUXs 5 only

Auxiliary equipment wiring

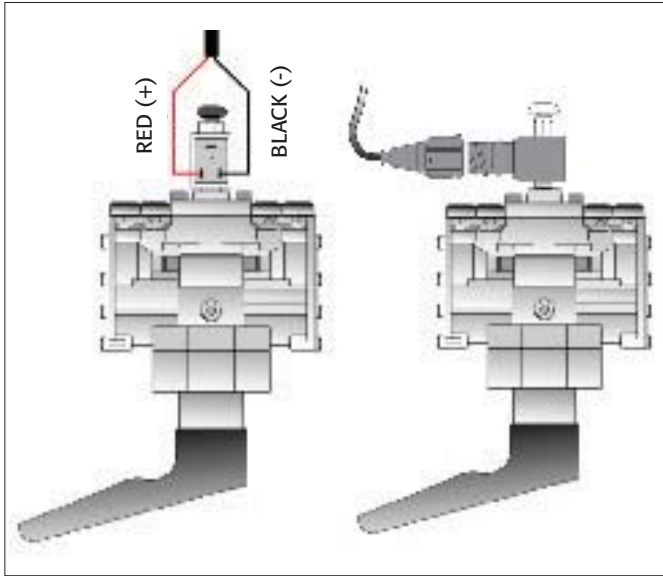


Fig 76 - COLAS®

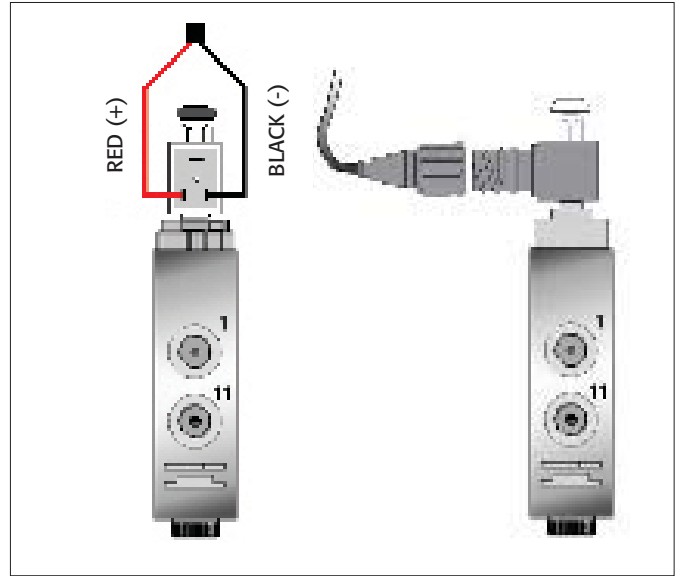


Fig 77 - ILAS®-E

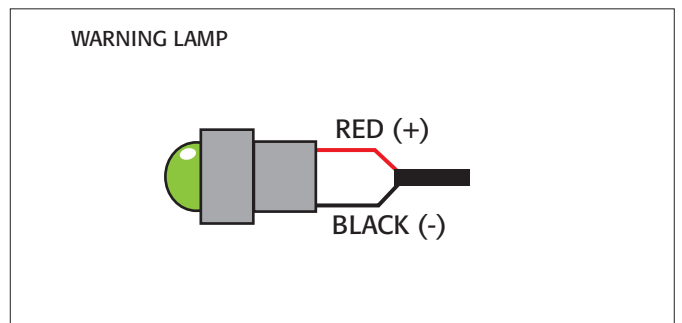


Fig 78 - Warning lamp

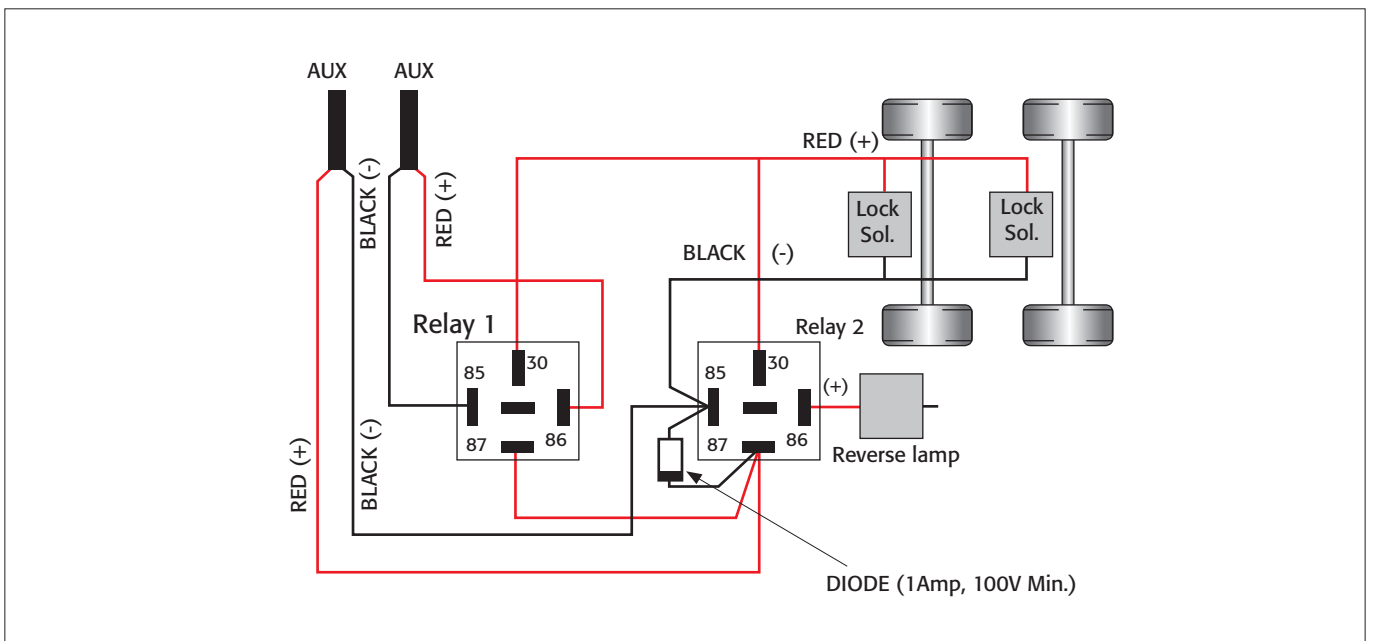


Fig 79 - STEER AXLE LOCK (inc. Reversing axle lock)

Auxiliary equipment wiring

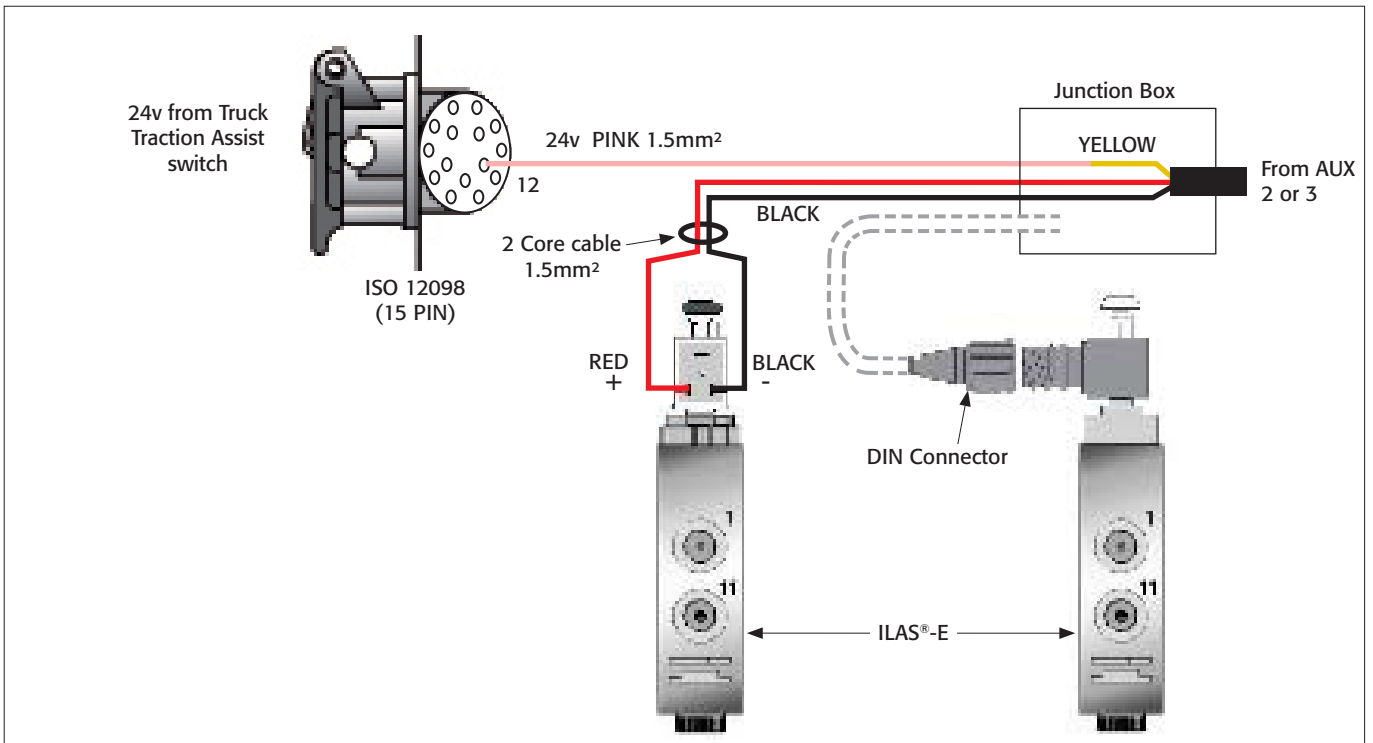


Fig 80 - Traction Assist using ILAS®-E

Traction assist is made operative by a 24v (constant or intermittent) supply to the yellow wire in the 3 core auxiliary cable connected to AUX 2 or AUX 3 and programmed as ILAS-E Front.

Function: On request for traction assist, front axle lifts. The front axle drops when either :-

- The vehicle speed exceeds 30kph or
- The suspension pressure reaches more than 130% of the laden bag pressure

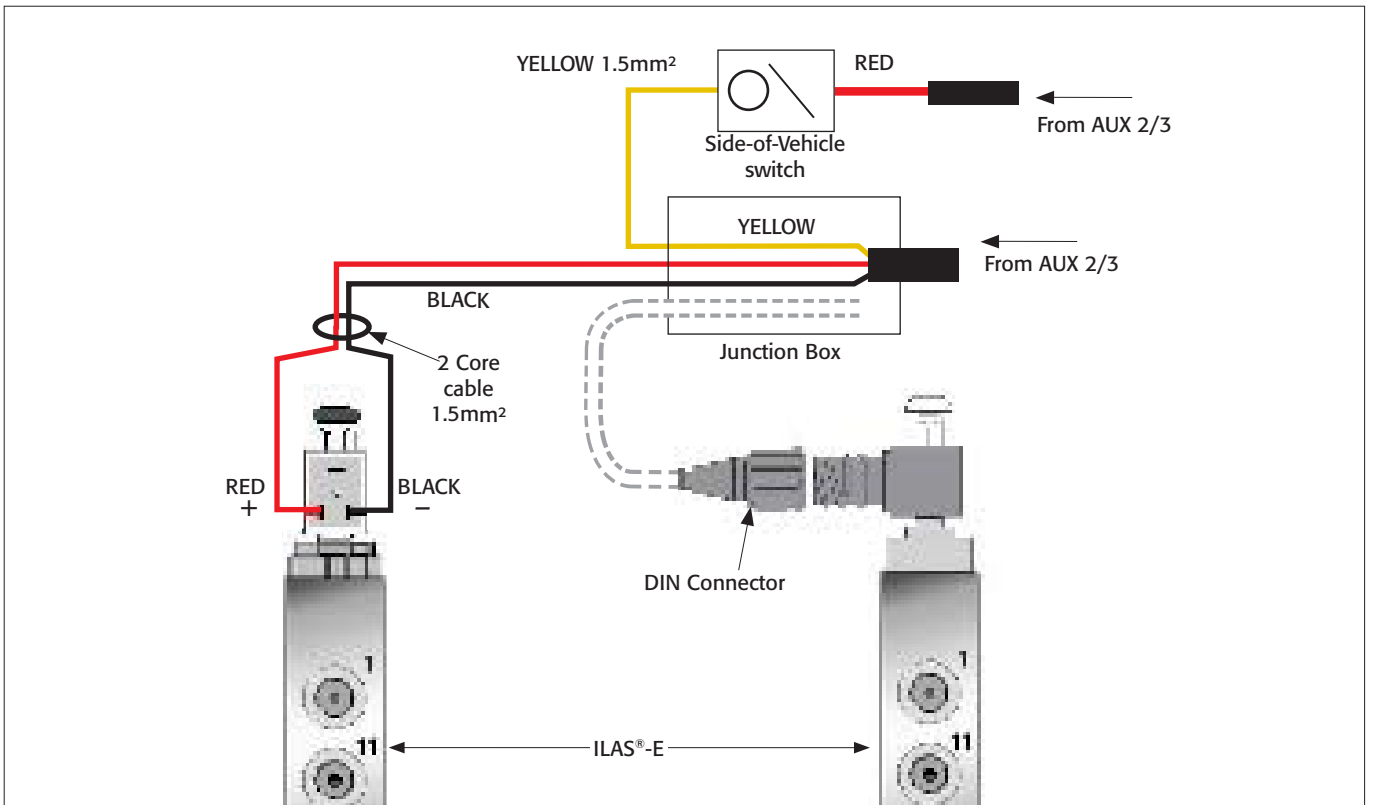
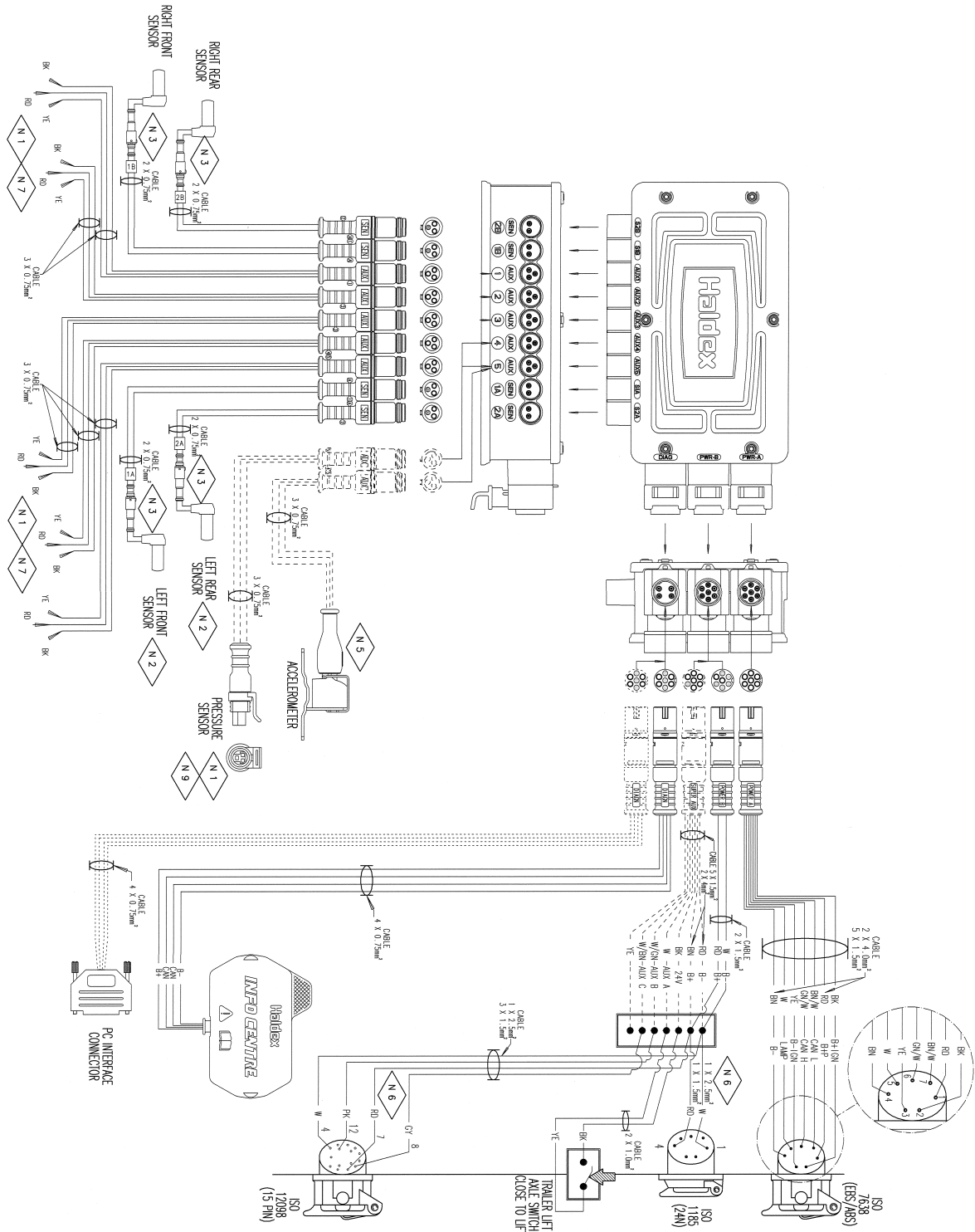


Fig 81 - ILAS®-E (Traction Assist - option)

Wiring diagram

Full System information (911-440-001)



N 1 AUXILIARY CABLING TERMINATION IS GIVEN IN THE TABLE BELOW:-

WIRE COLOUR	AUX 1	AUX 2	AUX 3	AUX 4	AUX 5
RED	O/P	O/P	O/P	5VOLT	5VOLT
BLACK	B-	B-	B-	B-	B-
YELLOW	TACHO	1/P	1/P	A/D	A/D

AVAILABILITY OF AUXILIARIES AND PRESSURE SENSOR FUNCTION DEPEND ON ECU VARIANT AND CONFIGURATION:-

- N 2 RIGHT IS VIEWED SITTING IN THE DRIVER SEAT FACING FORWARD.
- N 3 SENSOR CONNECTOR.
- N 4 KEY:-
 - W - WHITE
 - BN - BROWN
 - BU - BLUE
 - RD - RED LOW
 - GN - GREEN
 - PK - PINK
 - GY - GREY
- N 5 ROLL STABILITY FUNCTION ACCELEROMETER IF FITTED, MUST BE PLUGGED INTO AUX 5.
- N 6 MOUNTING ORIENTATION OF ACCELEROMETER MUST BE AS PER INSTRUCTIONS SUPPLIED BY HALDEX.
- N 7 CABLE LENGTH JUNCTION BOX TO ISO1185 (24N) OR ISO12098 (15 PIN) MUST NOT EXCEED 4M MAX. MAXIMUM LOAD FROM ANY AUXILIARY OUTPUT NOT TO EXCEED 1A.
- N 8 FOR APPLICATIONS REQUIRING HIGHER LEVELS REFER TO APPLICATION MANUAL FOR WIRING INSTRUCTIONS. ELECTRICALY TO ECU MUST BE D.O.D.E SUPPRESSED.
- N 9 IF THE SOLENOID IS NOT APPROVED BY HALDEX, FIT A 14M, 100 VOLT MINIMUM, DIODE AS SHOWN.
- N 9 PRESSURE SENSOR CAN BE FITTED TO AUX 4 OR 5

Fig 82 - Wiring Diagram (911-440-001)

Hazardous Goods/ADR Installations

Introduction

Vehicles equipped to transport hazardous goods or explosive substances are required to have electrical systems with specified levels of safety and protection. These requirements are defined in the European Agreement on International Transport of Dangerous Goods by Road (ADR 2007)'.
 The ADR requirements apply to the following classes of dangerous load carrying vehicles: EX/II, EX/III, FL, OX, and AT.

The following key points should be observed on Hazardous Goods/ADR trailer installations.

Trailer load pressure data

The print out of the Load Plate Pressure Data from the DIAG+ programme MUST HAVE the ADR/GGVs certificate number as indicated.

Cable routes

Sensor cable route should not be installed to brake air pipes. Do NOT run sensors leads in spiral wrapping on hoses. Cables should be securely fastened to prevent abrasion and positioned to protect against mechanical and thermal stress. It is recommended that the cables are either run in trunking or secured at no less than 400mm intervals.

NOTE: All cables should run 'UP TO' ECU connections.

Brake lamp back-up power supply

The brake lamp power supply can be either ISO 12098 or ISO 1185 (24N) connector. These Connectors MUST BE fully approved for use on an ADR vehicle.

Warning lamps

It is the installers responsibility to ensure that the Green Trailer Warning Lamp if fitted is fully approved for use on an ADR vehicle.

The warning lamp bulb MUST BE twin pole bayonet type.

ADR/GGVs: ---/---/---

EB+		Haldex	
PROLET WAGENKLEBER TABLETAGESSCHLITZE PROTECTOR DE VEHICULO		BREMSE OUFREIHE SERIEBREMSE/ACHTMANN REIHE DE FREMPE	
DRUCKSIGNAL SIGNAL DE PRESION		TYP TYP	
DRUCKWERT / DRUCKWERT PRESSION O PRESION [bar]		DRUCKWERT / DRUCKWERT PRESSION O PRESION [bar]	
ADR / GGVs: ABC1234/D4		UNLADEN / LEER / A VIDE	
TYP: PRESION DRUCKWERT: PRESION O DRUCK [bar]		TYP: PRESION DRUCKWERT: PRESION O DRUCK [bar]	
AUSLESE LERNEN DRUCKWERT: [bar]		AUSLESE LERNEN DRUCKWERT: [bar]	
TYP: PRESION DRUCKWERT: PRESION O DRUCK [bar]		TYP: PRESION DRUCKWERT: PRESION O DRUCK [bar]	
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Fig 83

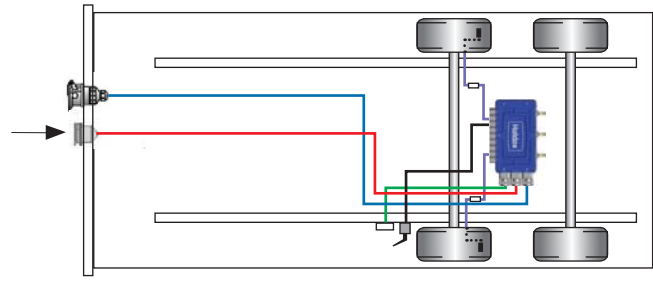


Fig 84

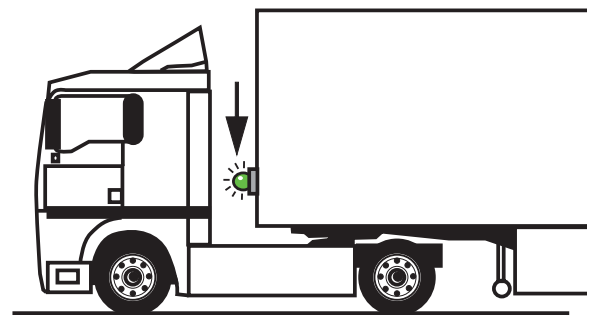


Fig 85

Hazardous Goods/ADR Installations

Junction box

Any wiring required to a junction box (for brake lamp power supply) **MUST BE** fully approved for use on an ADR vehicle.

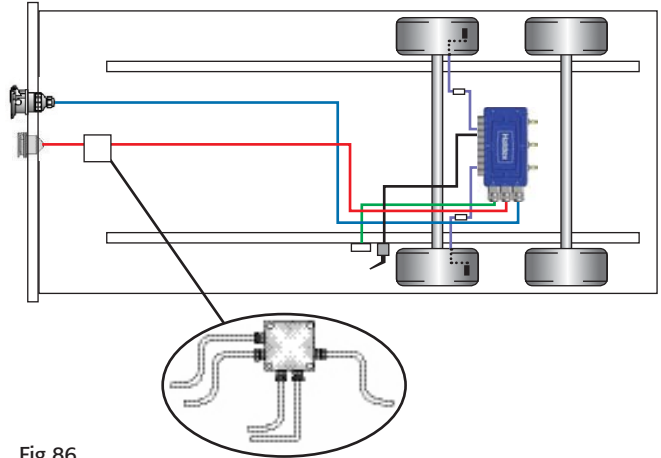


Fig 86

Auxiliary connections

It is the installers responsibility to ensure that the Auxiliary component fitted, the connector and cable **MUST BE** sealed in accordance with ADR requirements.

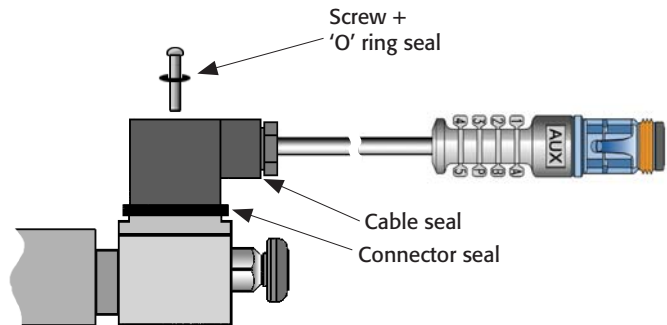


Fig 87

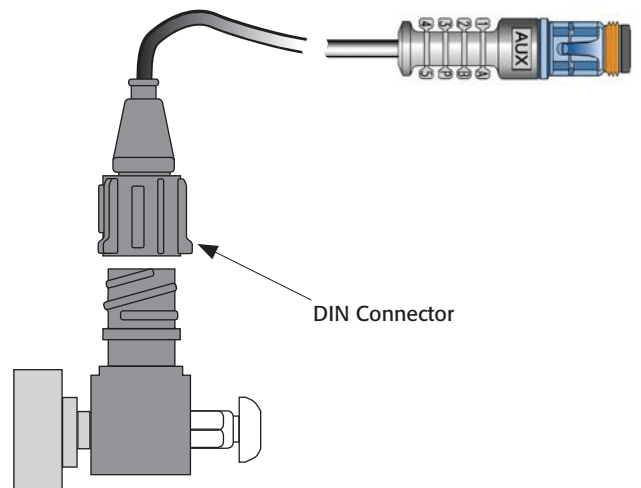


Fig 88

Towing vehicles

Towing vehicles in categories EXIII and FL must have a battery master switch fitted so that all electrical loads including the trailer are connected to the non-battery side of the master switch.



**To complete the EB⁺ installation
the ECU must be programmed
using DIAG⁺ software.**

Refer to DIAG⁺ User Guide 000 700 255 for further information.

Multimeter readings

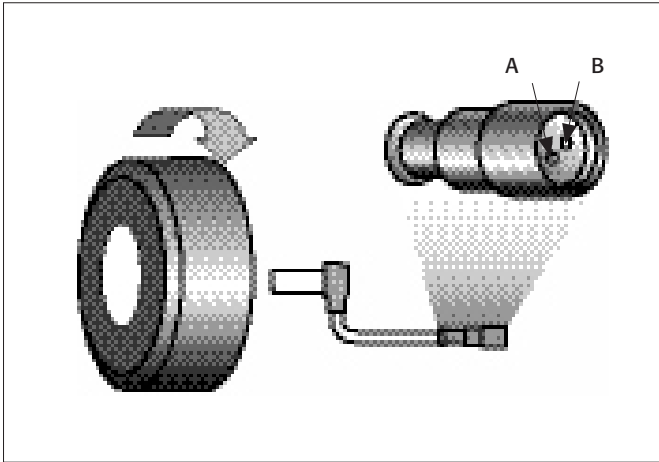


Fig. 89 - Sensor connector

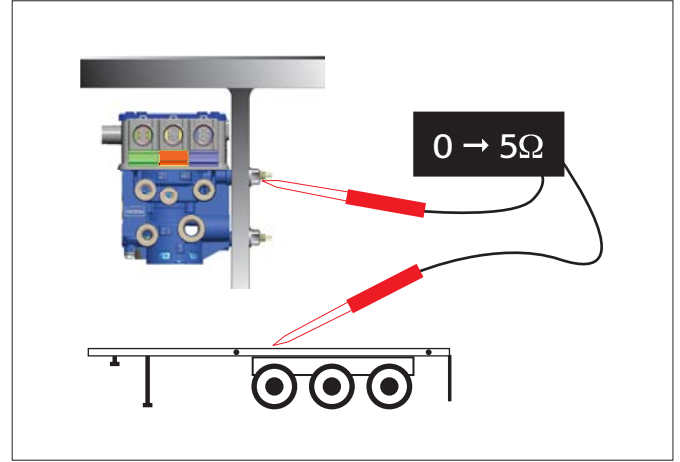


Fig. 90 - Earth continuity

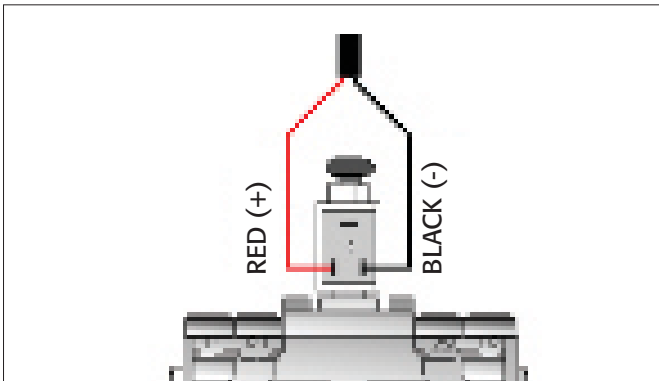


Fig. 91 - COLAS® connector

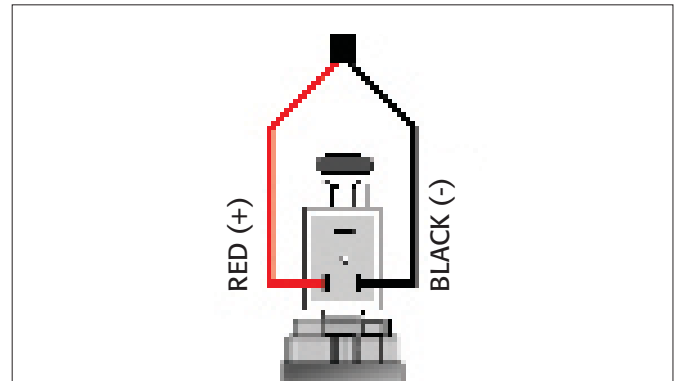


Fig. 92 - ILAS®-E connector

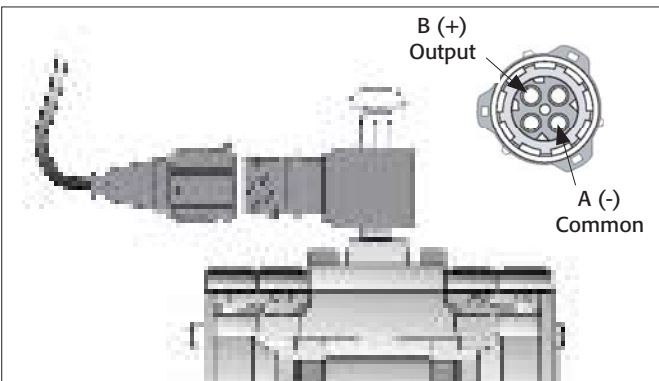


Fig. 93 - COLAS® DIN connector

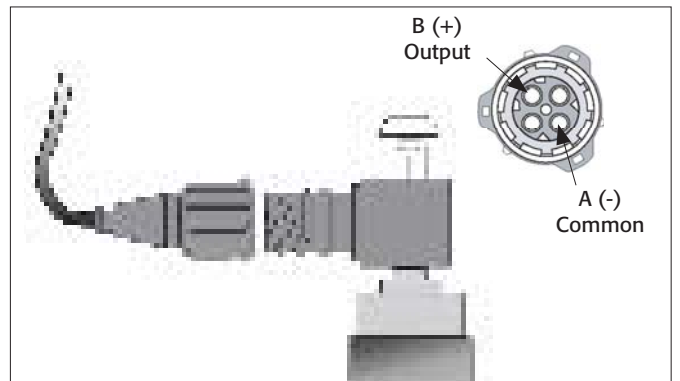


Fig. 94 - ILAS®-E DIN connector

Checking position	Measure between	Correct value	Remarks	Fig
Sensor output	A B	0.2V AC Min	Sensor 1A, 1B or 2A, 2B Sensor disconnected from ECU Wheel rotated at 1 rev/2 sec.	86
Sensor resistance	A B	>1.0 <2.4 kohm	Sensor 1A, 1B or 2A, 2B Sensor disconnected from ECU	86
Earth continuity	ECU/EPRV Bracket and chassis	0 ohms <5 ohms		87
COLAS® Solenoid resistance	+ -	>79 <96 ohms	Cable disconnected	88 & 90
ILAS®-E Solenoid resistance	+ -	>79 <96 ohms	Cable disconnected	89 & 91

Haldex (www.haldex.com), headquartered in Stockholm, Sweden, is a provider of proprietary and innovative solutions to the global vehicle industry, with focus on products in vehicles that enhance safety, environment and vehicle dynamics.

Haldex is listed on the Stockholm Stock Exchange. Haldex has a yearly turnover of close to 5.6 billion SEK and employs 4,300 people.

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