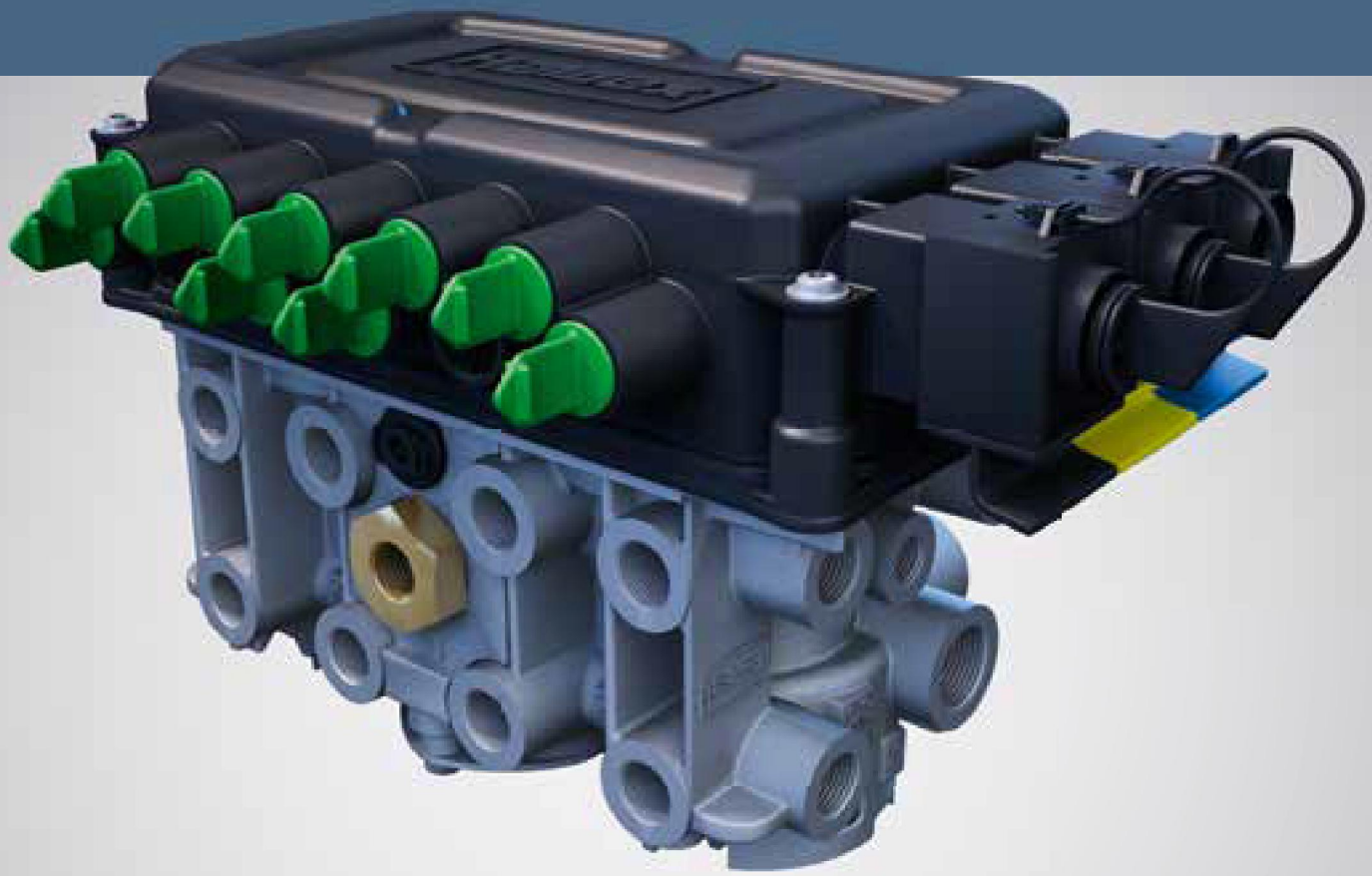
INSTALLATION GUIDE



EB+ GEN3 Electronic Braking System

Haldex

TRANSPORT EQUIPMENT AUSTRALIA

Notes on the use of this manual

This manual has been designed to assist personnel in satisfactory installation of Haldex EB+ Gen3 onto full, semi and centre axle trailers. The intention has been to illustrate various aspects of the 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+ Gen3 installation.

- 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
- No legal rights can be derived from the contents of the manual
- Duplication, translation and reprinting are prohibited without permission from Haldex Brake Products

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Contents

Introduction

System overview

The EB+ Gen3 system provides electro-pneumatic control of the trailer brakes for full, semi and centre-axle trailers with built in electronic load sensing and anti-lock functions. It provides the necessary components to enable compatibility with either an electronically and pneumatically signalled or a pneumatically only signalled towing vehicle.

In addition to normal service brake control, EB+ Gen3 also contains a roll stability system. This uses a lateral accelerometer, in addition to the existing sensed variables, to determine if the vehicle is close to its roll threshold. Low-level brake test pulses are also used as part of the detection process and automatically commanded braking is used to slow the vehicle below the roll threshold. The accelerometer may be external or internal to the ECU.

As well as providing the means for brake control the controller also contains auxiliary channels capable of providing ancillary functions, such as reset-to-ride height and a power / diagnostic link for use by other systems.

The main system package consists of an electronic control unit (ECU) / modulator assembly, containing a brake apply solenoid, twin solenoid operated relay valve(s) and pressure sensors for monitoring the pneumatic control line, brake delivery, reservoir and air suspension pressure.

Externally the system comprises two or four wheel speed sensors and optionally a pressure sensor sensing the pneumatic control transmission. When used the pressure sensor should be situated before an emergency valve (REV or EV) if fitted.

Trailers fitted with the system may only be towed behind vehicles fitted with an ISO 7638 connector (either 7 or 5-pin). When connected with a 7-pin connector the system receives brake demand data via the CAN data line in accordance with ISO 11992. When connected with a 5-pin connector the system determines brake demand by sensing the pneumatic control transmission.

Optionally an ISO 1185 (24N) or ISO 12098 (15 pole) stop light power back-up connection can be fitted. This provides anti-lock braking control and optionally dynamic load sensing in situations where the ISO 7638 connection is not functioning and is not intended as a normal operating mode.

The apportionment of braking under varying vehicle load conditions is implemented in software. The load sensing parameters, from the brake calculation, are programmed into the ECU using the system diagnostic link.

Product versions

There are two versions of EB+ Gen3, a Standard version offering 4-2S / 2M with Super AUX, a Premium version offering up to 4S / 3M with Super AUX and additional auxiliary input / output capability.

Feature	Standard	Premium
Wheel speed sensors	2 or 4	2 or 4
Modulators	2	2 or 3
Auxiliary inputs*	2 analogue, 3 digital	2 analogue, 5 digital
Auxiliary outputs*	3 outputs, 1 tacho	5 outputs, 1 tacho
Super AUX*	Yes	Yes
Roll-over control	Yes	Yes
Auxiliary power extension	No	Yes
Haldex CAN Hub	Yes	Yes
Power supply	8 - 32 V	8 - 32 V
Stop-lamp backup power	Yes	Yes

* Refer to the 'auxiliary operations' section for the function of the EB+ Gen3 auxiliaries.

EB+ Gen3 Standard [2M]

Independent EBS for semi and centre axle trailers. EB+ Gen3 2M, 2 modulators, 4 sensors, multiple auxiliary connections, integrated stability, maximum flexibility.

Benefits:

- Easy, logical vehicle installation
- Multi-voltage operation
- Integrated stability control
- Multiple auxiliary connections allow several devices to be fitted
- Functions and capabilities are upgradeable by software for longer operational life
- Connect multiple CAN devices, e.g. TPMS, Info Centre or telematics

Specifications:

- Integrated quick release valve
- Integrated anti-compound valve
- Service brake test ports
- ECU operates 8 - 32V
- EMC / RFI approved
- Reservoir M22 ports
- Valve integrated with electronic load sensing and roll-over control
- Delivery and suspension M16 ports
- External connections via up to 13 moulded plugs
- Plastic enclosure
- Dual reservoir connections

Part numbers:
Gen3 Standard: 823 008 xxx

EB+ Gen3 Standard is a 12 / 24 V EBS with integrated roll-over control, intended for fitment to semi and centre axle trailers using full air braking systems with air / mechanical suspension.

EB+ Gen3 Premium [2M or 3M]

Independent EBS for full, semi and centre axle trailers. An EB+ Gen3 3M system is possible, consisting of a Gen3 2M Master and a 1M Slave (3 modulators in total), 4 sensors, more auxiliary connections than standard, integrated stability, maximum flexibility.

Benefits:

- Easy, logical vehicle installation
- Multi-voltage operation
- Flexibility, with up to 5 input / output channels, 2 dedicated analogue channels and 3 dedicated digital inputs
- Load sensing for both Master and Slave to optimise brake efficiency and wear
- Connect multiple CAN devices, e.g. TPMS, Info Centre or telematics.

Specifications:

- Integrated quick release valve
- Integrated anti-compound valve
- Service brake test ports
- ECU operates 8-32V
- EMC / RFI approved
- Reservoir M22 ports
- Valve integrated with electronic load sensing and roll-over control
- Delivery and suspension M16 ports
- External connections via up to 14 moulded plugs
- Reservoir connections: 2 x Master, 1 x Slave

Part numbers:

Gen3 Master assembly	823 034 xxx
Gen3 Slave assembly	810 023 001

EB+ Gen3 Premium is a 12 / 24V EBS with integrated roll-over control, intended for fitment to full, semi and centre axle trailers using full air braking systems with air / mechanical suspension. A top of the range configuration delivers EBS braking with integrated ABS, electronic load-sensing, multiple CAN, 3 modulator configuration, a range of other inputs / outputs to control other functions and now with stop lamp power backup.

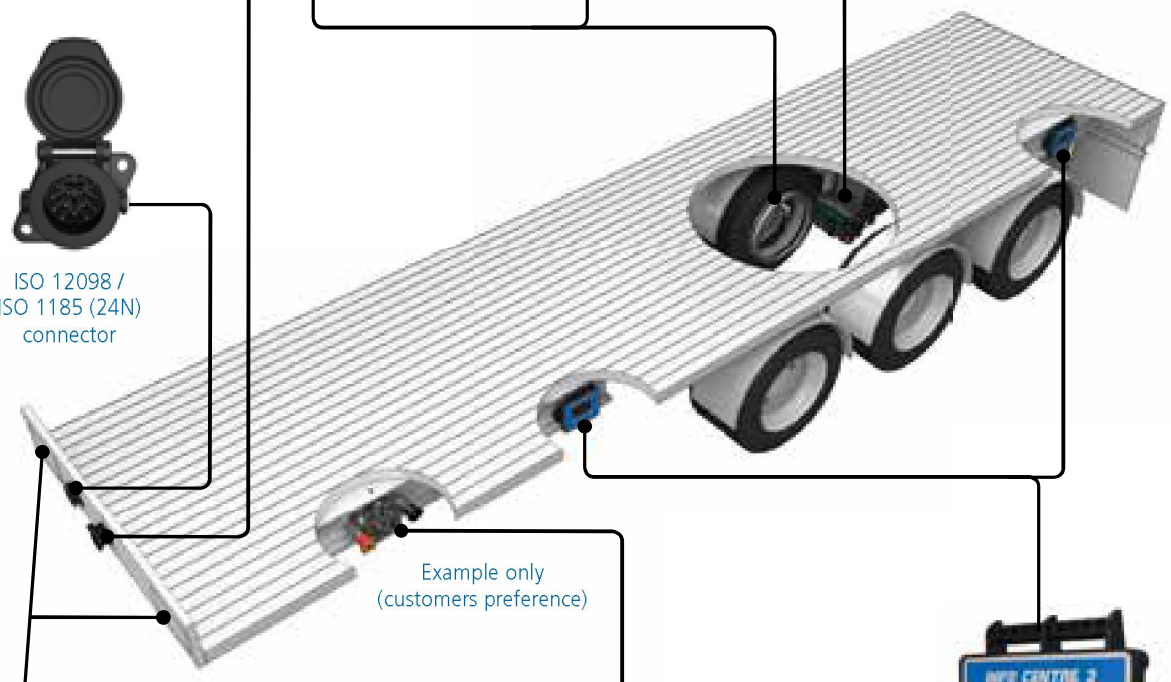
General components – 2M

ISO 7638 7-pin
socket assembly

Sensor and exciter
(fitted as required)

EB+ Gen3 2M
assembly

ISO 12098 /
ISO 1185 (24N)
connector



Example only
(customers preference)

Driver's information plate
(customers preference)

Info Centre 2
(customers preference)

(artists impression of layout)

Options

Option 1

TrCM+

Option 2

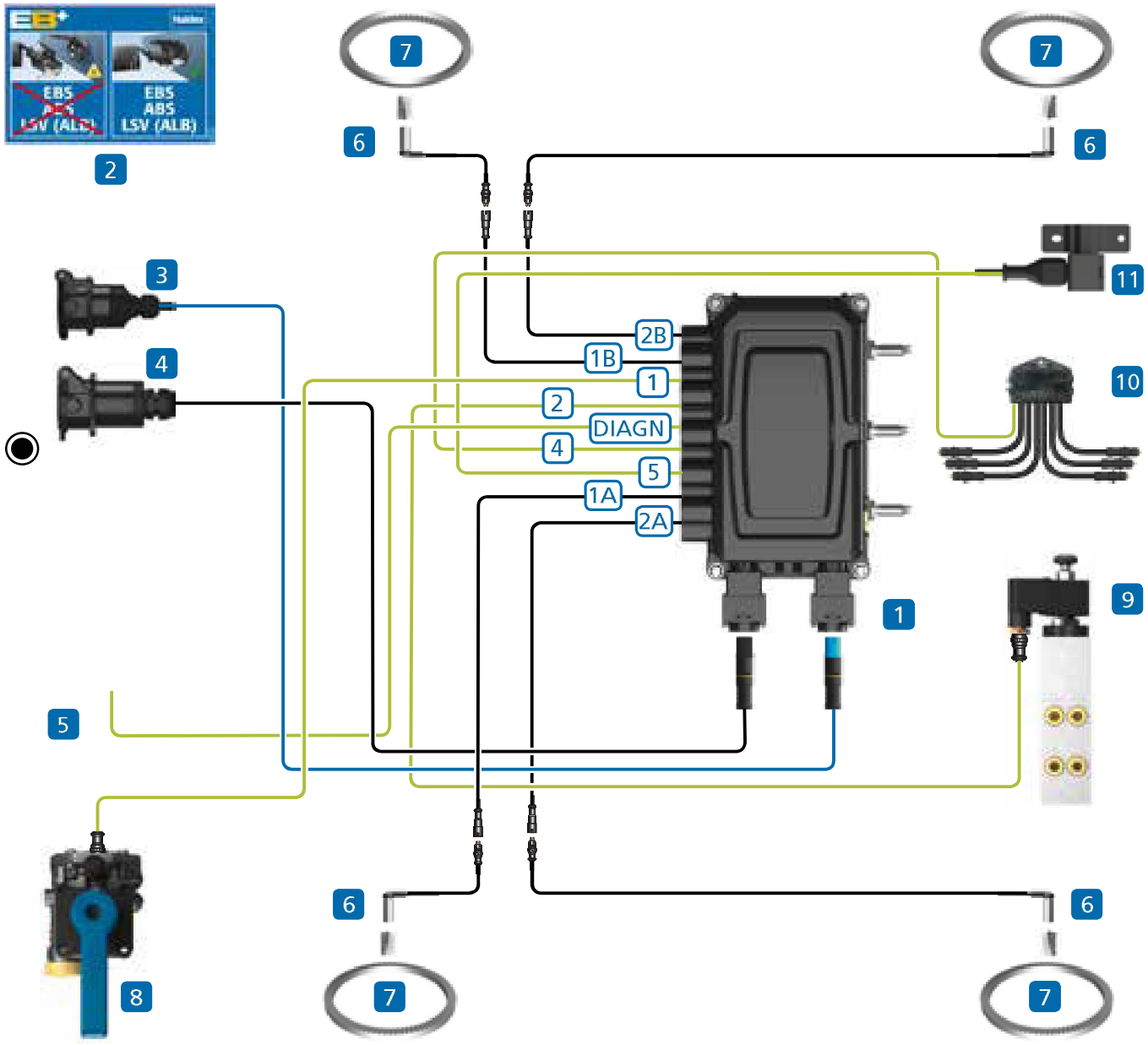
TEM®

Option 3

Relay Emergency Valve (REV)

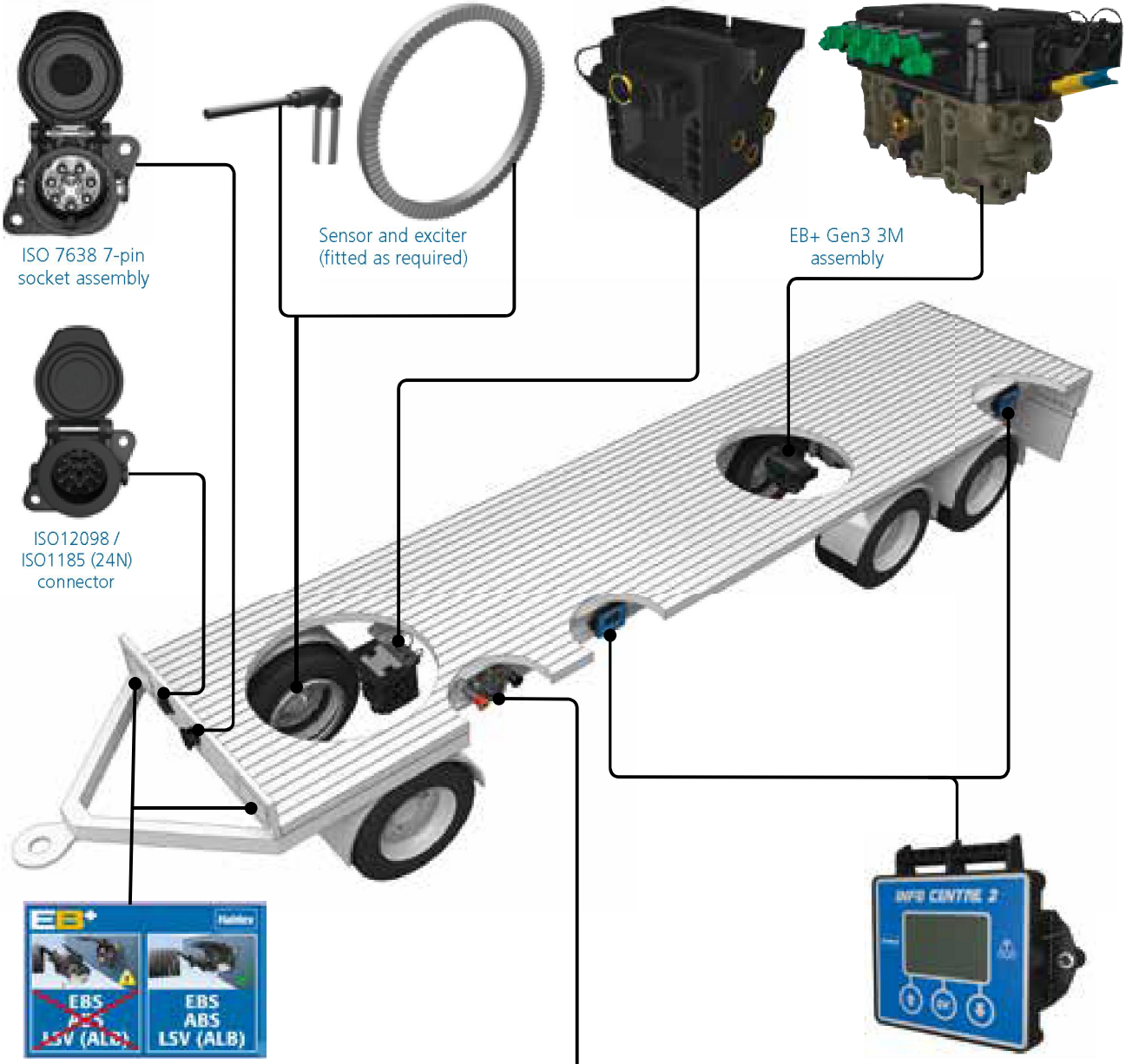
Park and shunt valve

2M chassis components



Item	Description	Notes
1	EB+ Gen3 assembly	Standard version shown
2	EB+ label	
3	ISO 7638 7-pin socket assembly	
4	ISO 12098 / ISO 1185 (24N)	Optional safety back up cable
5	Info Centre 2	
6	Sensor assembly	
7	Exciter	
8	COLAS$^{+}_{®}$	Programmable via DIAG+
9	ILAS®-E	Programmable via DIAG+
10	Lining Wear System (LWS)	Programmable via DIAG+
11	EB+ external stability sensor	Programmable via DIAG+

General components – 3M



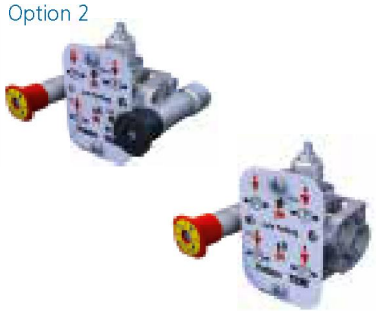
(artists impression of layout)

Options

Option 1

TrCM+

Option 2



TEM®

Option 3

Relay Emergency Valve (REV)

Park and shunt valve

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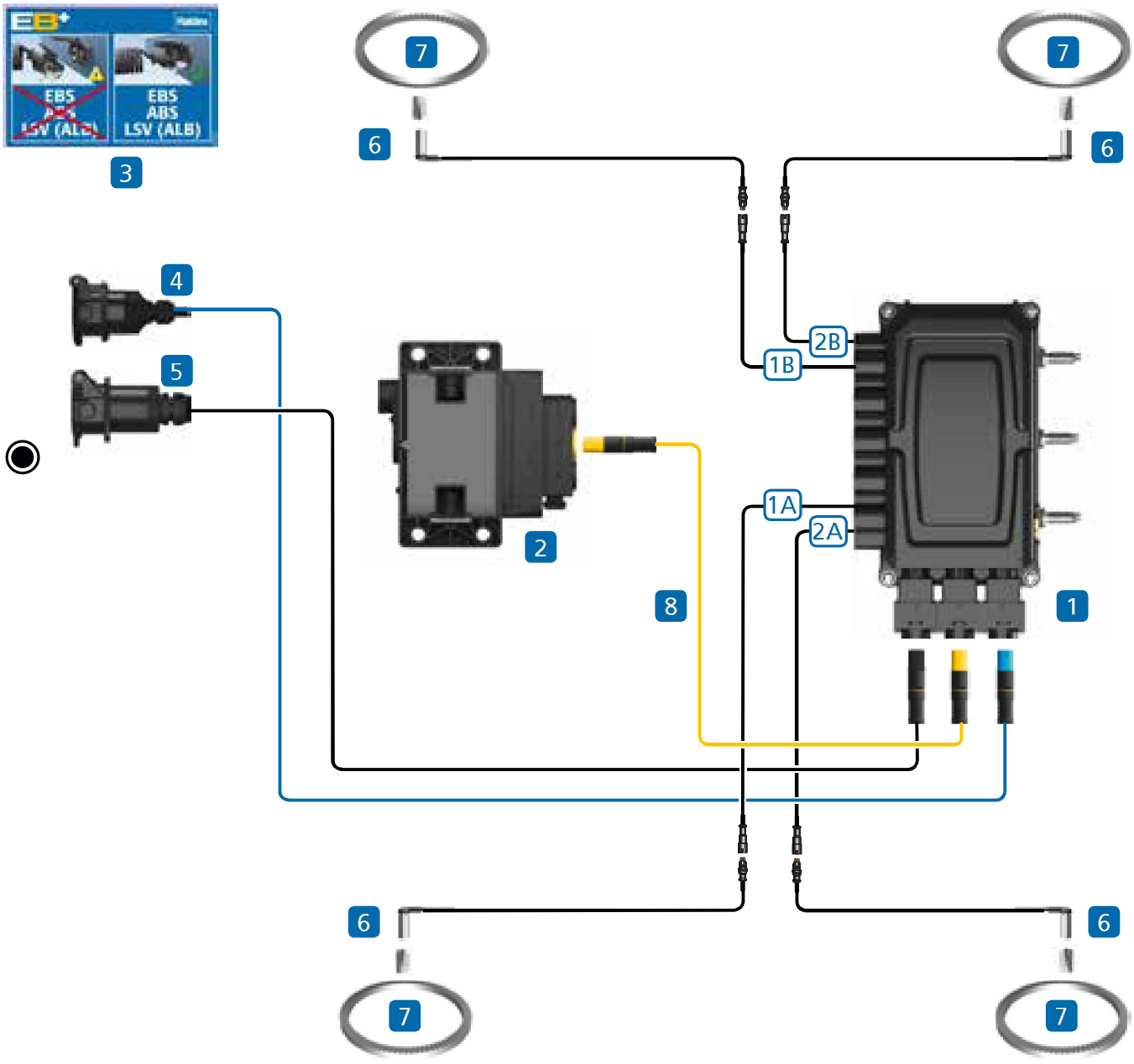
3M chassis components

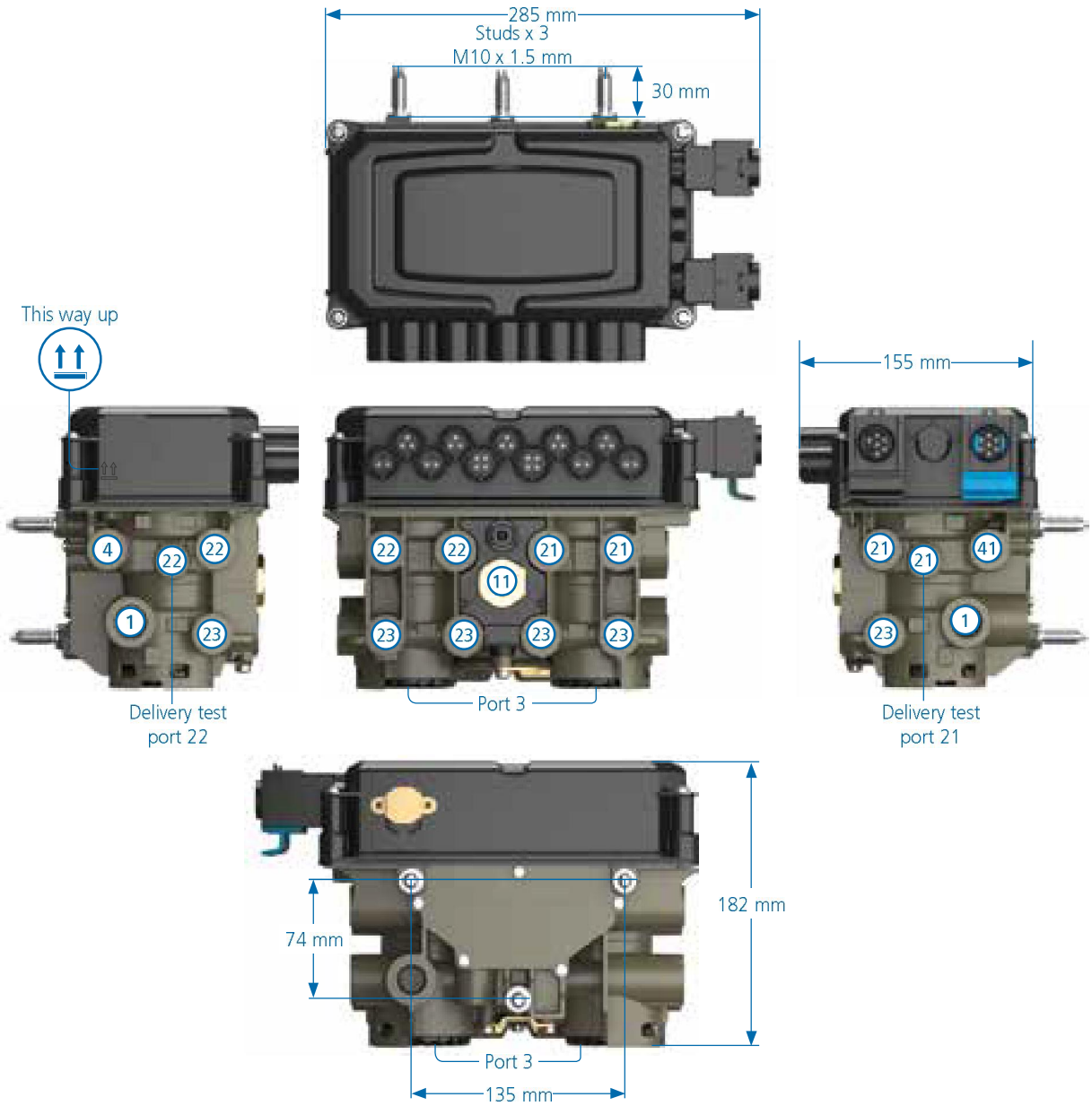


Note:
Auxiliary options as per semi-trailers

Item	Description	Notes
1	EB+ Gen3 assembly	Premium version shown
2	Slave assembly	
3	EB+ label	
4	ISO 7638 7-pin socket assembly	
5	ISO 12098 / ISO 1185 (24N)	Optional safety back up cable
6	Sensor assembly	
7	Exciter	
8	3M link cable	

Dimension and port identification

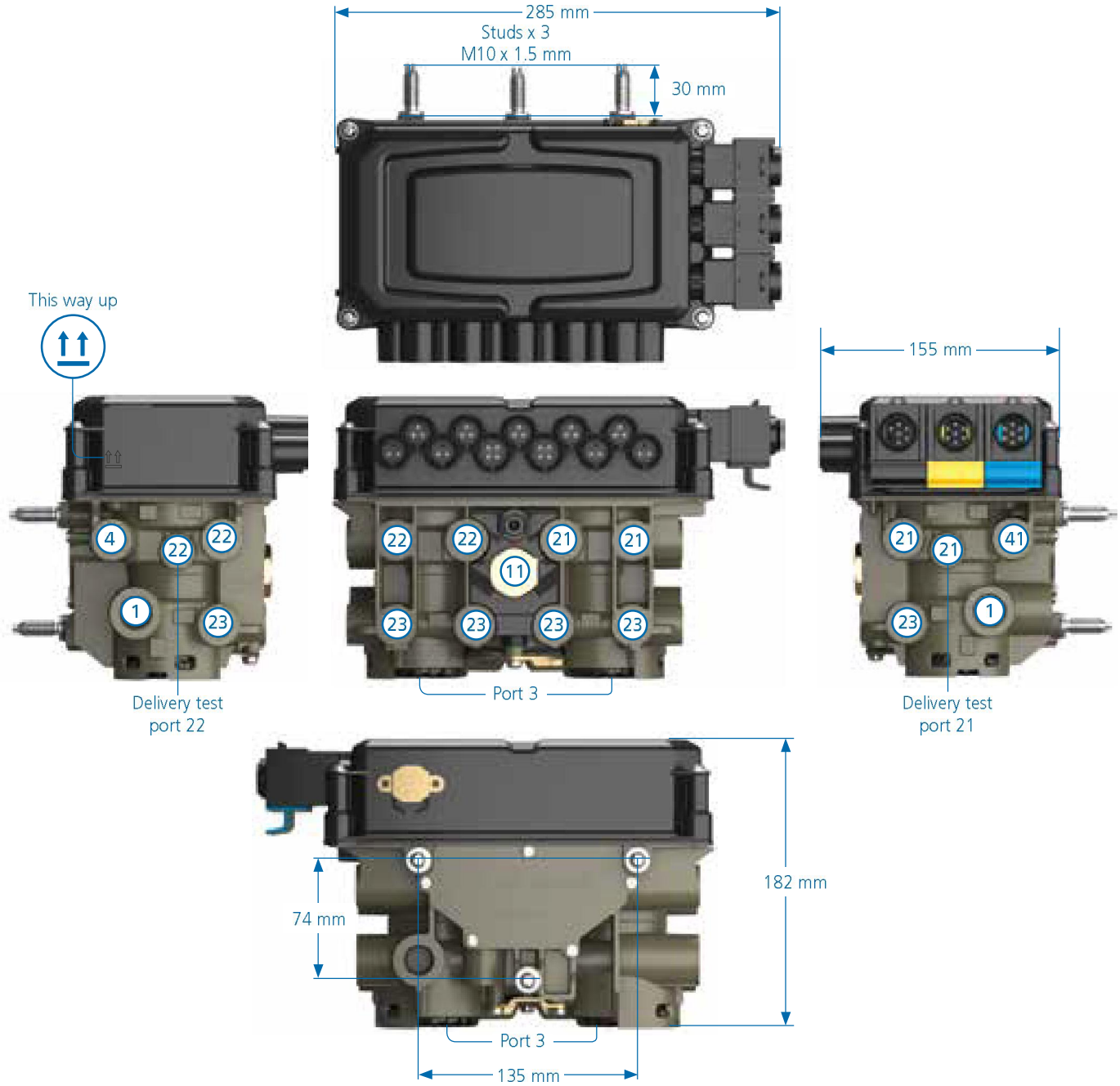
Standard assembly



Approximate mass of assembly: 5.75 Kg

Port	Description	Notes
1	Reservoir port	M22 x 1.5 mm
3	Exhaust port	
4	Control port	M16 x 1.5 mm
11	Anti - compounding port	M16 x 1.5 mm
21/22	Delivery ports	M16 x 1.5 mm
21/22	Test point port	M12 x 1.5 mm
23	Spring brake port	M16 x 1.5 mm
41	Air suspension port	M16 x 1.5 mm

Premium assembly



Approximate mass of assembly: 5.75 Kg

Port	Description	Notes
1	Reservoir port	M22 x 1.5 mm
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11	Anti - compounding port	M16 x 1.5 mm
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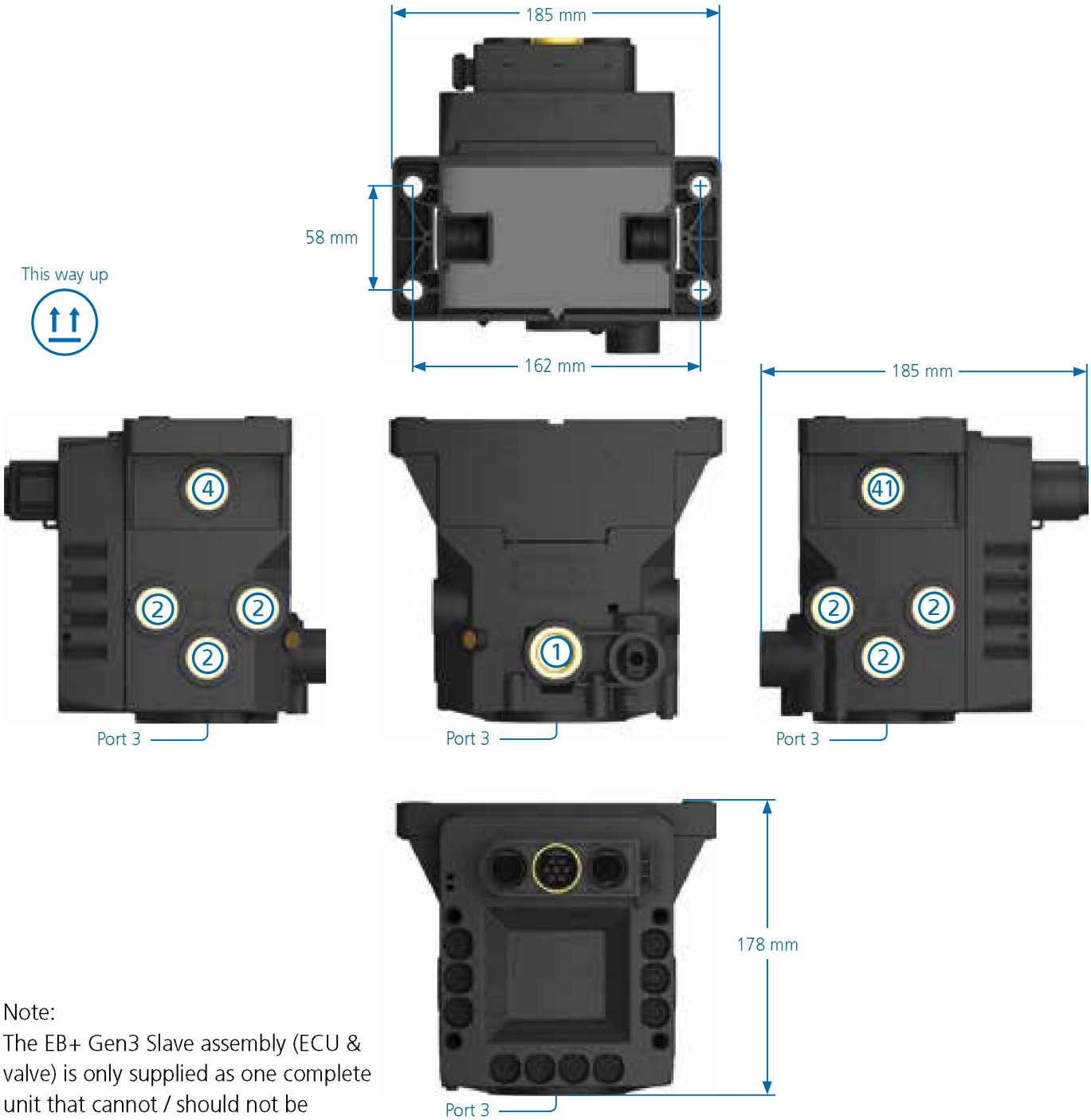
23	Spring brake port	M16 x 1.5 mm
41	Air suspension port	M16 x 1.5 mm

Slave assembly



Note:
The EB+ Gen3 Slave assembly (ECU & valve) is only supplied as one complete unit that cannot / should not be separated.

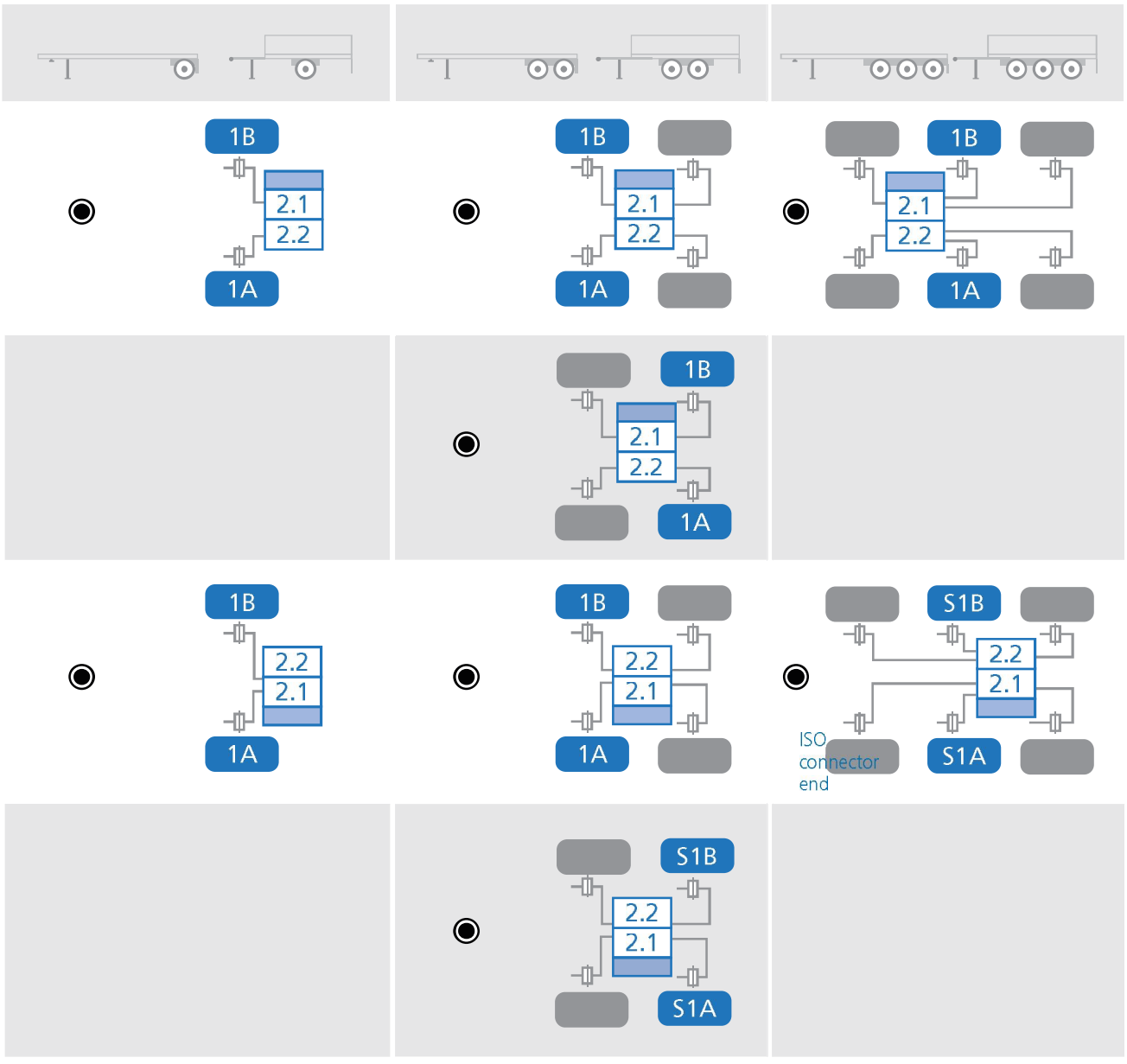
Approximate mass of assembly: 3.2 Kg

Port	Description	Notes
1	Reservoir port	M22 x 1.5 mm
2	Delivery ports	M16 x 1.5 mm
3	Exhaust port	-
4	Control port	M16 x 1.5 mm
41	Air suspension port	M16 x 1.5 mm

System configurations

Semi & centre axle trailers - side by side (SxS)

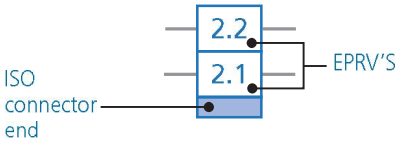
2S / 2M



Notes (applicable to all above diagrams):

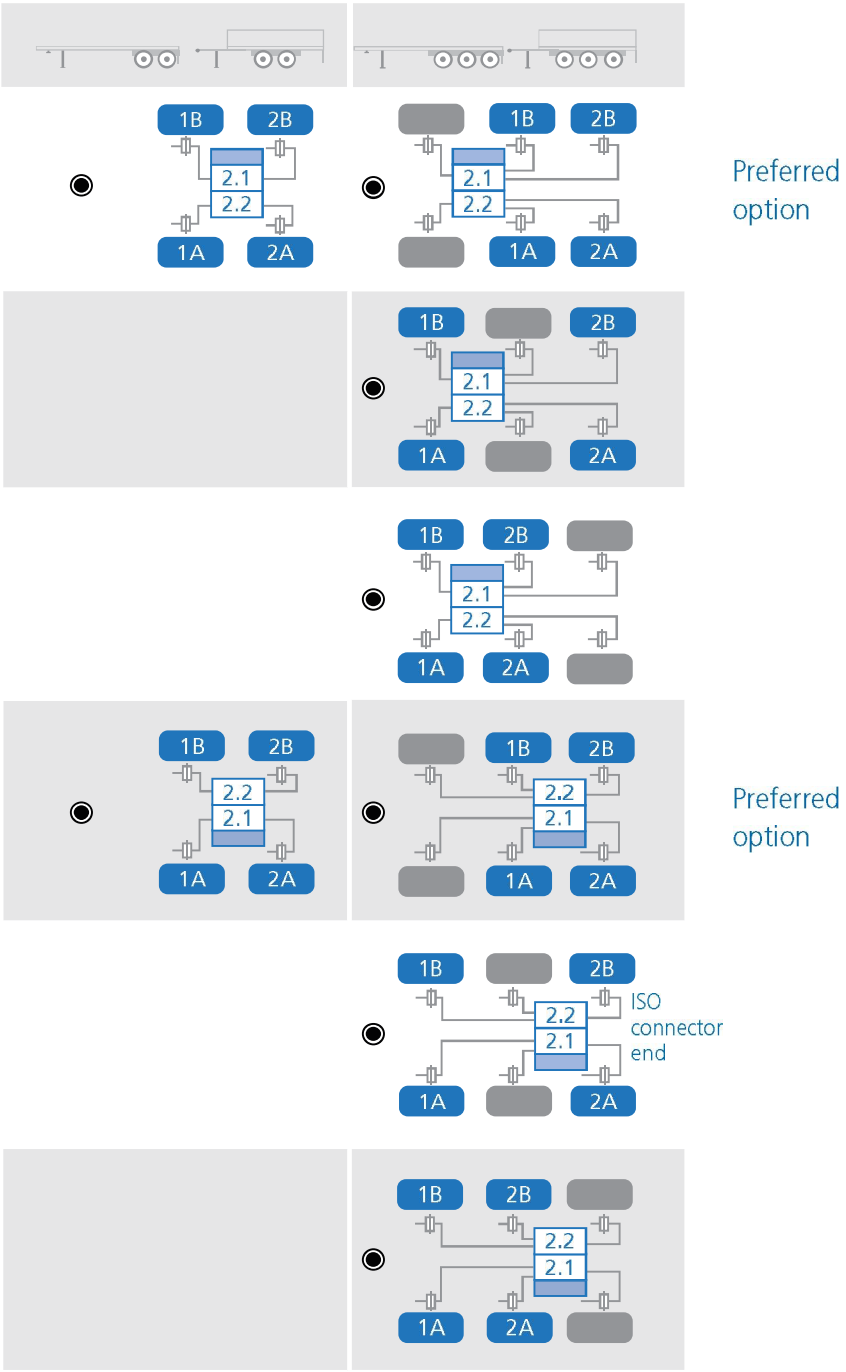
- Any axle without directly controlled wheels may be a lift axle
- Any axle may be a steered axle

Key



Semi & centre axle trailers - side by side (SxS)

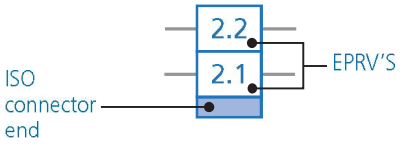
4S / 2M



Notes (applicable to all above diagrams):

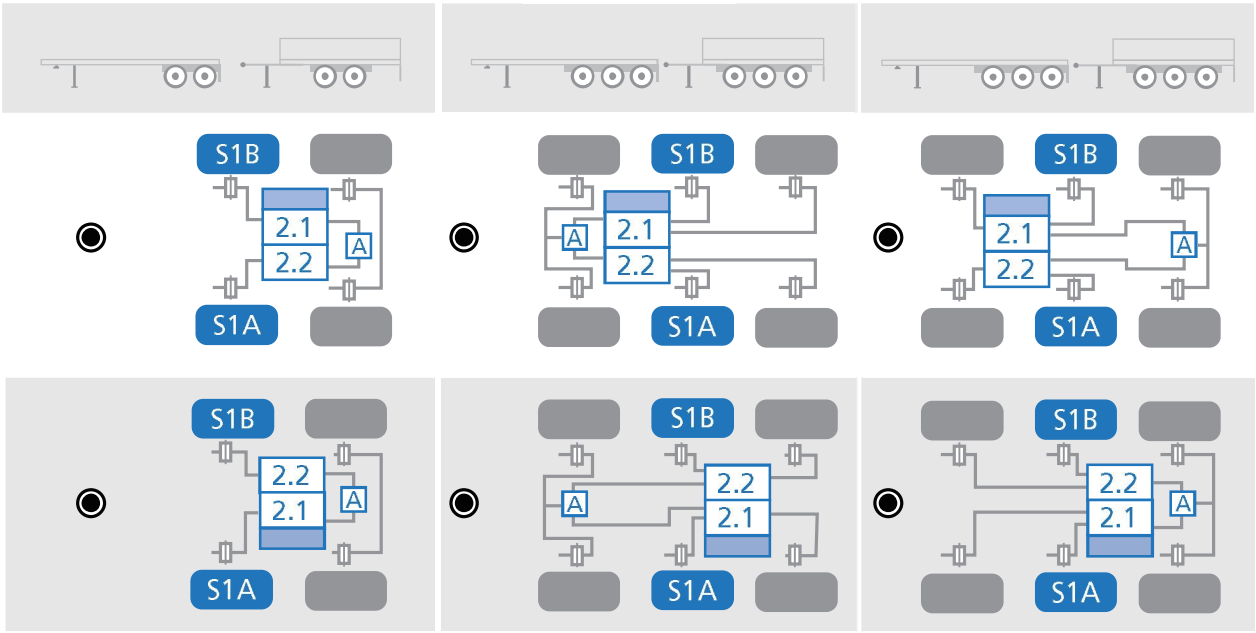
- Any axle (but only one at a time) directly controlled axle may be a lift axle
- Any axle may be a steered axle

Key



Semi & centre axle trailers - side by side (SxS) & select low valve (SL)

2S / 2M



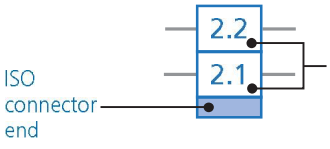
ISO connector end

2 Modulator ECU

Note (applicable to all above diagrams):

Any valve without directly controlled wheels may be a lift axle

Key

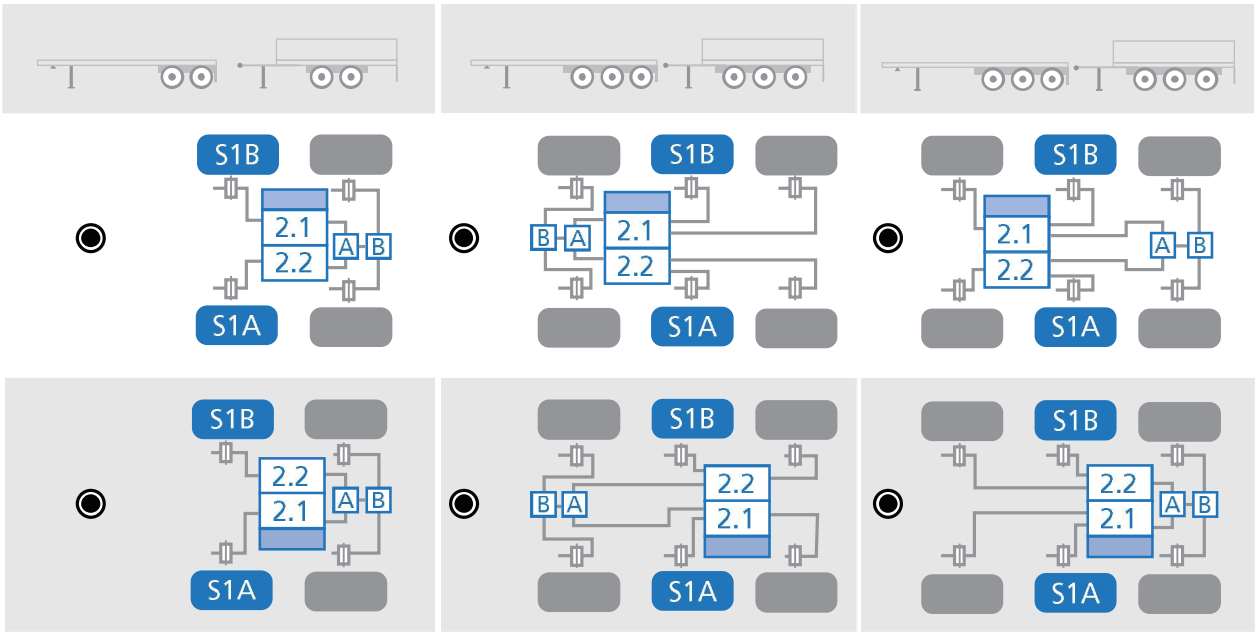


A = Select Low Valve

B = Relay Valve

Semi & centre axle trailers - side by side (SxS), select low valve (SL) & relay valve

2S / 2M



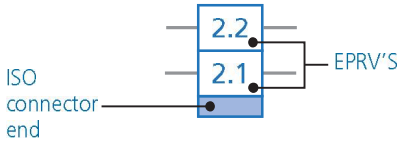
ISO connector end

2 Modulator ECU

Note (applicable to all above diagrams):

Any valve without directly controlled wheels may be a lift axle

Key

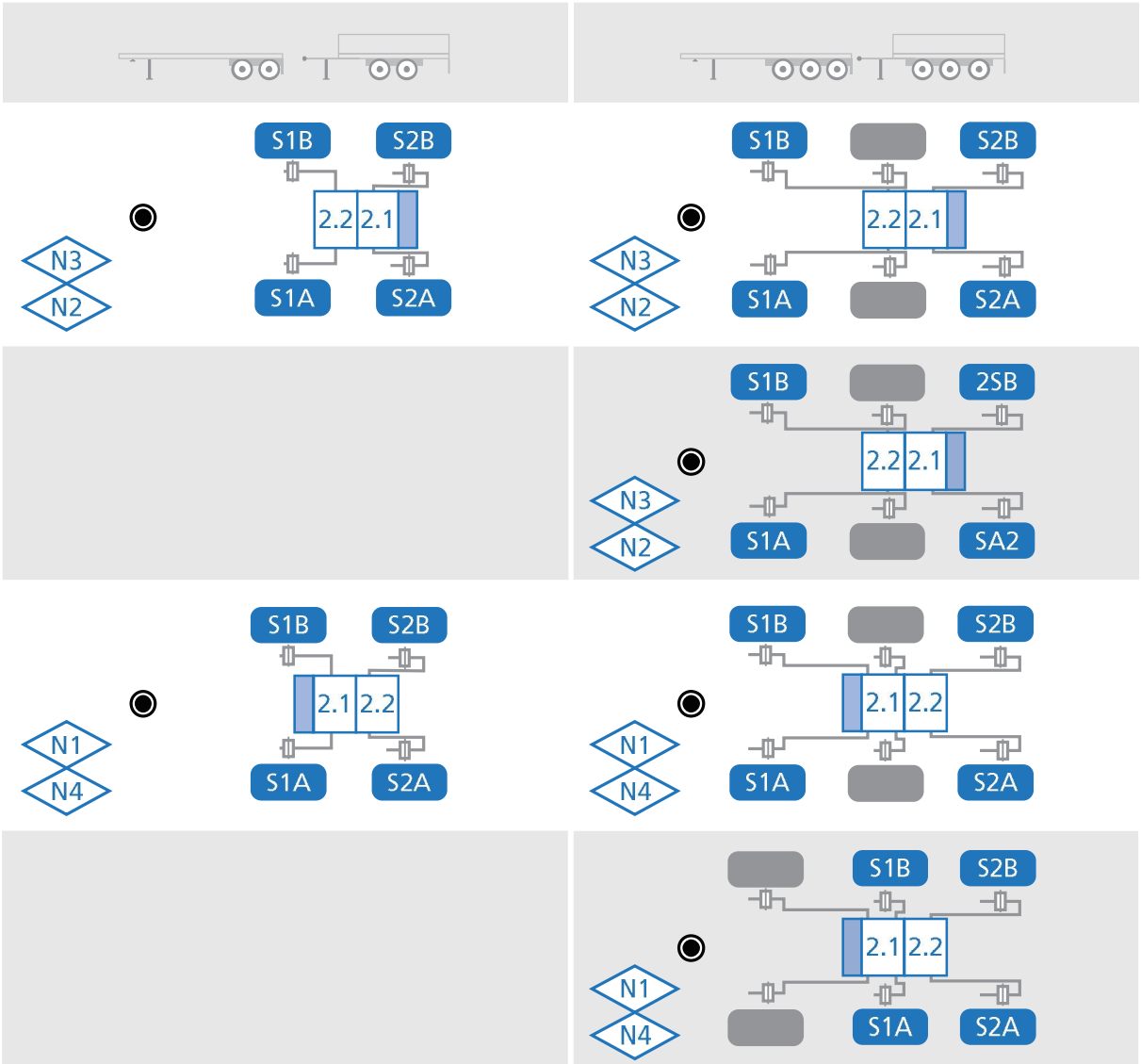


A = Select Low Valve

B = Relay Valve
B = Relay Valve

Semi & centre axle trailers - axle by axle ASC front, SL rear

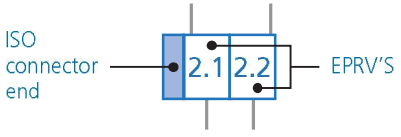
4S / 2M



Notes (applicable to all above diagrams):

- Sensed axles cannot be lifted
- Any axle without directly controlled wheels (not sensed) may be a lift axle
- Any axle may be a steered axle

Key

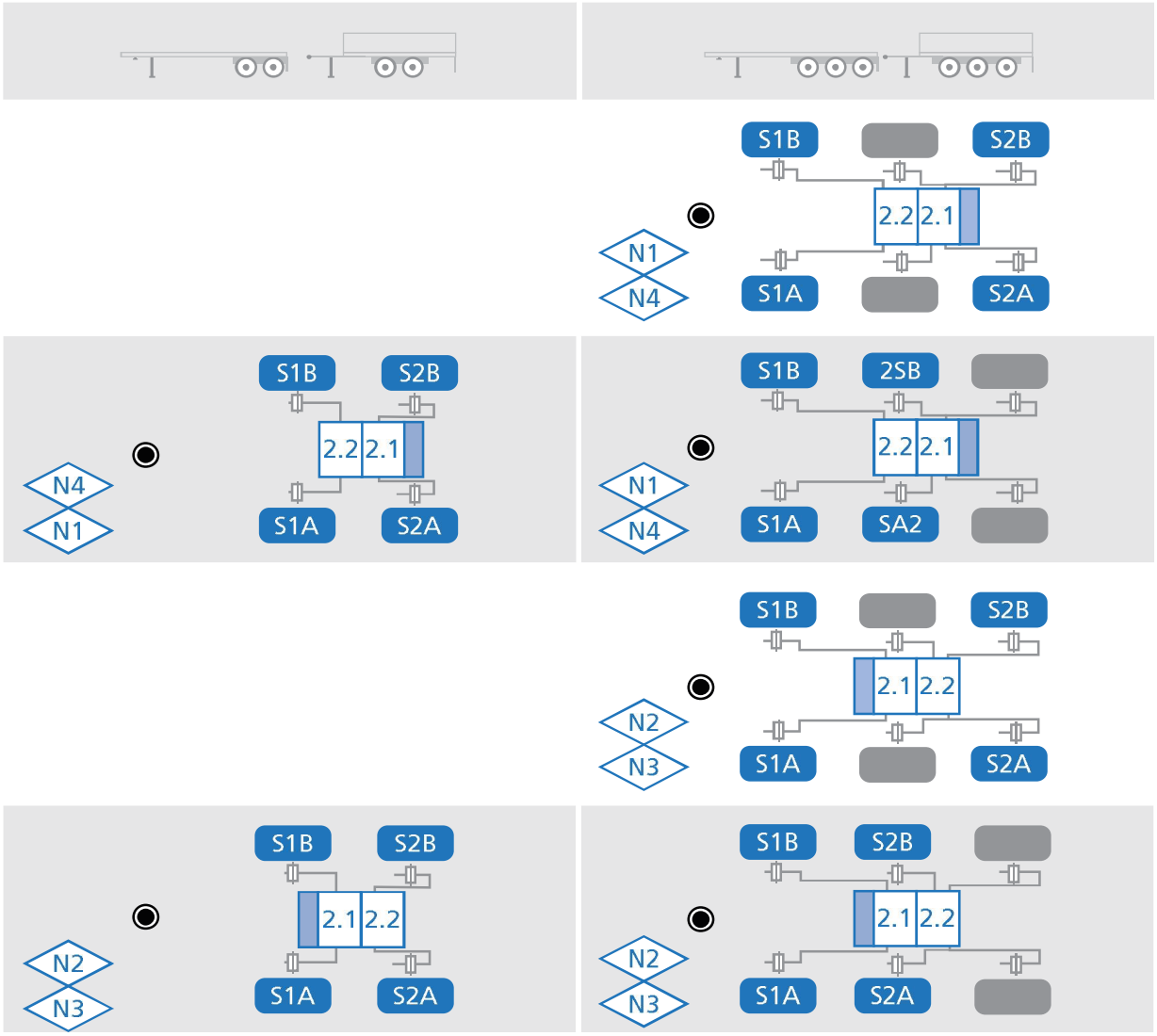


N1-N4 are selectable options set by Haldex or the vehicle manufacturer

- N1 Adaptive surface control 2.1 (ASC)
- N2 Select low 2.1 (SL)
- N3 Adaptive surface control 2.2 (ASC)
- N4 Select low 2.2 (SL)

Semi & centre axle trailers - axle by axle ASC front, SL rear

4S / 2M



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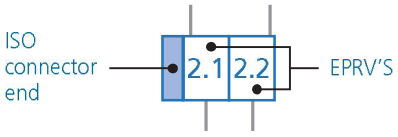
Key

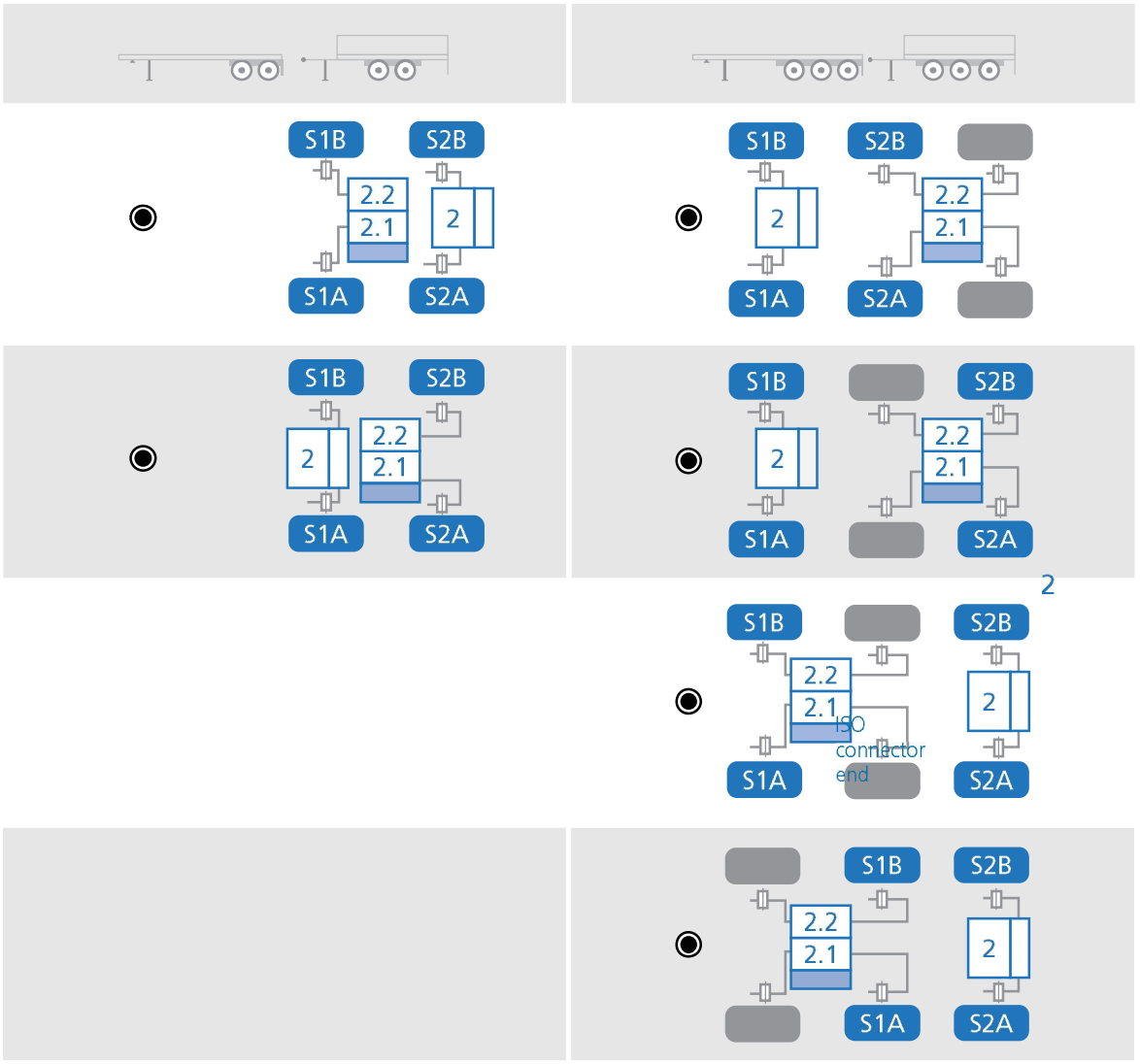


N1-N4 are selectable options set by Haldex or vehicle manufacturer

- N1 Adaptive surface control 2.1 (ASC)
- N2 Select low 2.1 (SL)
- N3 Adaptive surface control 2.2 (ASC)
- N4 Select low 2.2 (SL)

Semi & centre axle trailers

4S / 3M



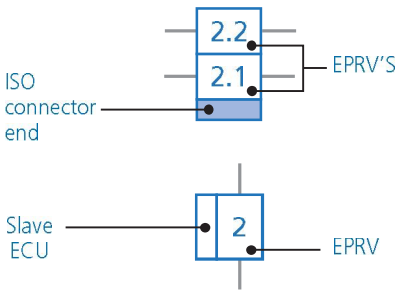
Notes (applicable to all above diagrams):

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

N1-N4 are selectable options set by Haldex or vehicle manufacturer

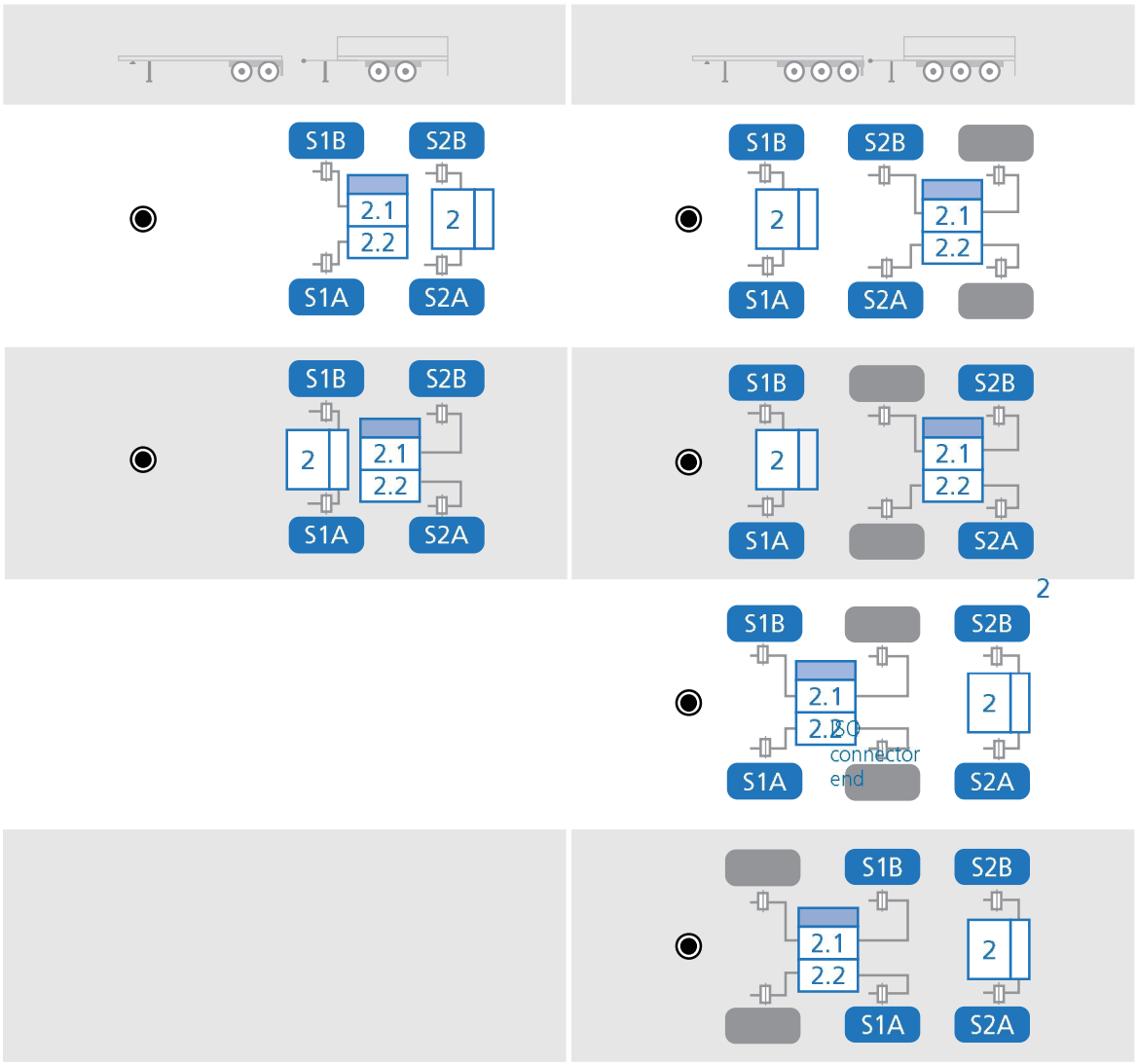
- N1 Master ECU is mounted to EPRV's 21/22. All sensors must be connected to this Master ECU
- N2 Directly controlled wheels connected pneumatically to EPRV's 21/22 cannot be lifted
- N3 Slave ECU is mounted to EPRV 2 and is controlled by Master ECU
- N4 Slave ECU / EPRV 2 is shown facing rear but can also be installed facing forward, left or right sensed wheel connected pneumatically to EPRV 2 can be lifted

Key



Semi & centre axle trailers

4S / 3M



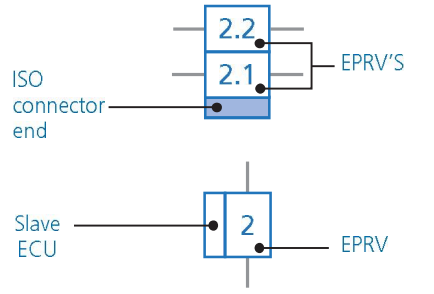
Notes (applicable to all above diagrams):

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

N1-N4 are selectable options set by Haldex or vehicle manufacturer

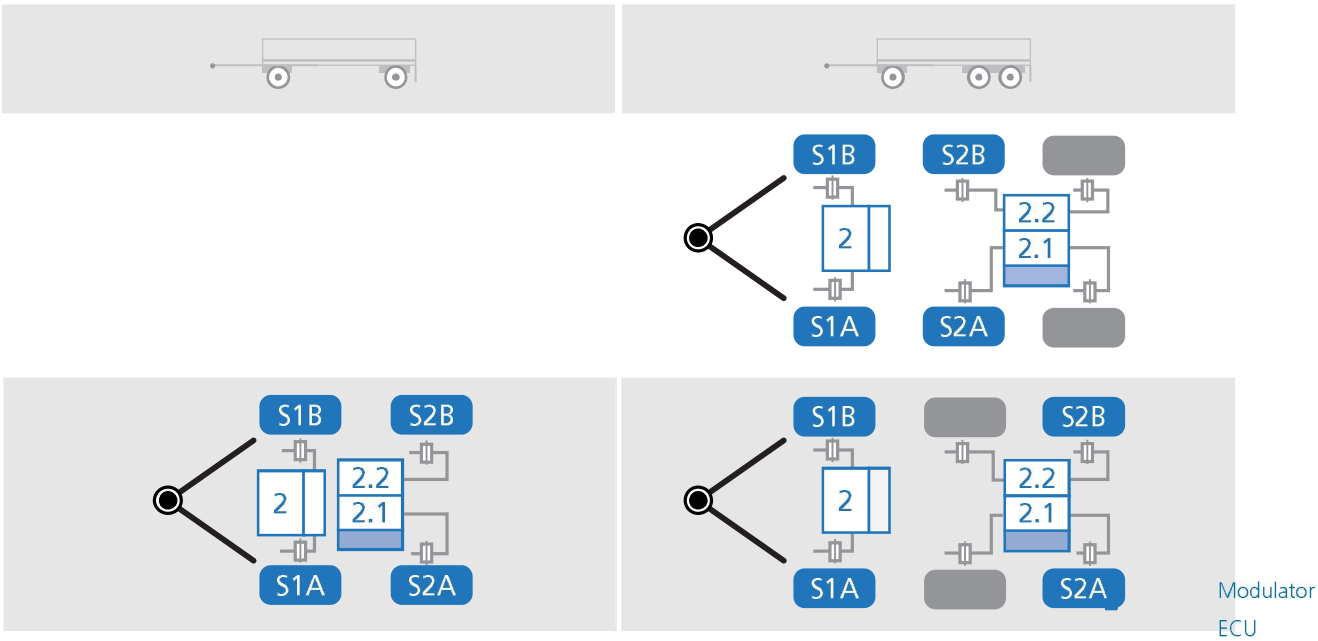
- N1 Master ECU is mounted to EPRV's 21/22. All sensors must be connected to this Master ECU
- N2 Directly controlled wheels connected pneumatically to EPRV's 21/22 cannot be lifted
- N3 Slave ECU is mounted to EPRV 2 and is controlled by Master ECU
- N4 Slave ECU / EPRV 2 is shown facing rear but can also be installed facing forward, left or right sensed wheel connected pneumatically to EPRV 2 can be lifted

Key



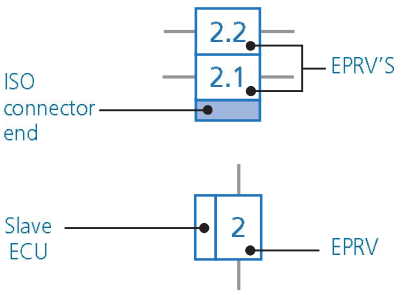
Full trailers

4S / 3M



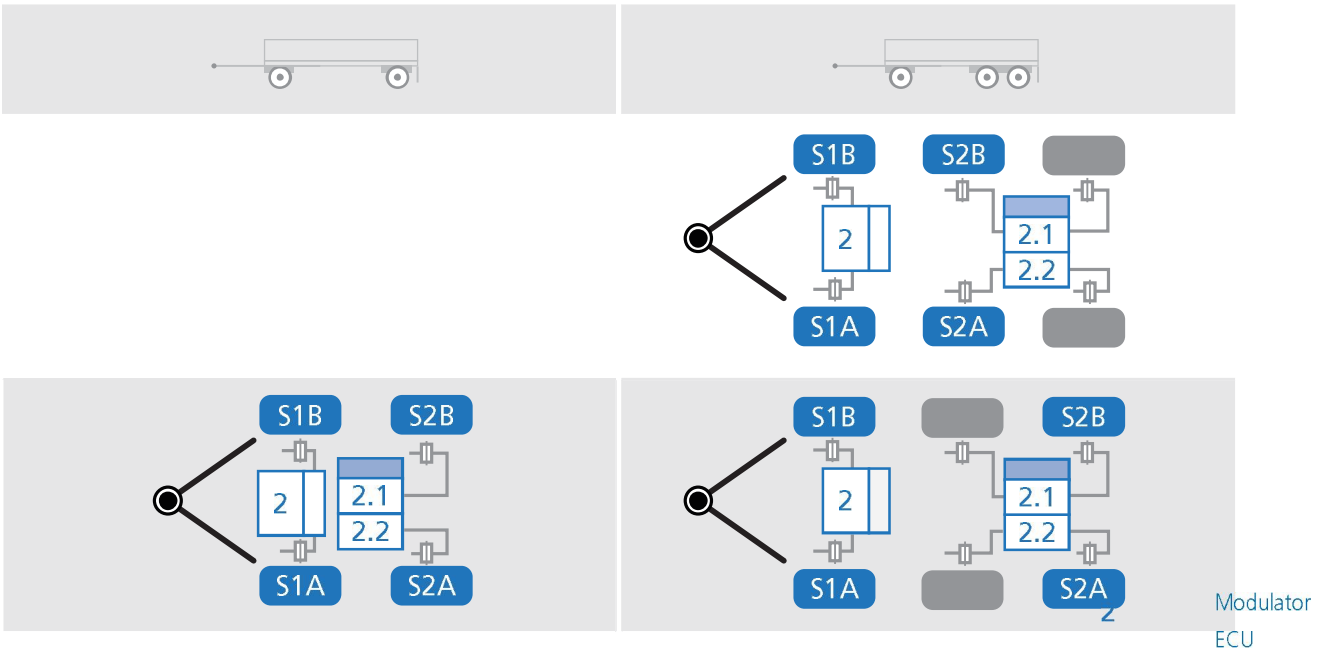
- Notes (applicable to all above diagrams):
- Sensed axles cannot be lifted
- Any axle without directly controlled wheels may be a lifted
- N1 Master ECU is mounted to EPRV's 21/22. All sensors must be connected to this Master ECU
- N2 Slave ECU is mounted to EPRV 2 and is controlled by Master ECU. Slave 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



Full trailers

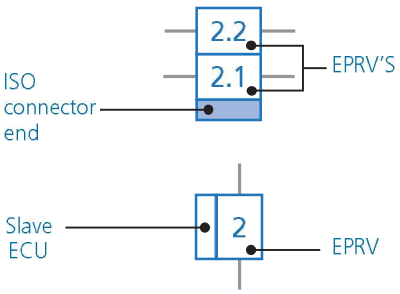
4S / 3M



Notes (applicable to all above diagrams):

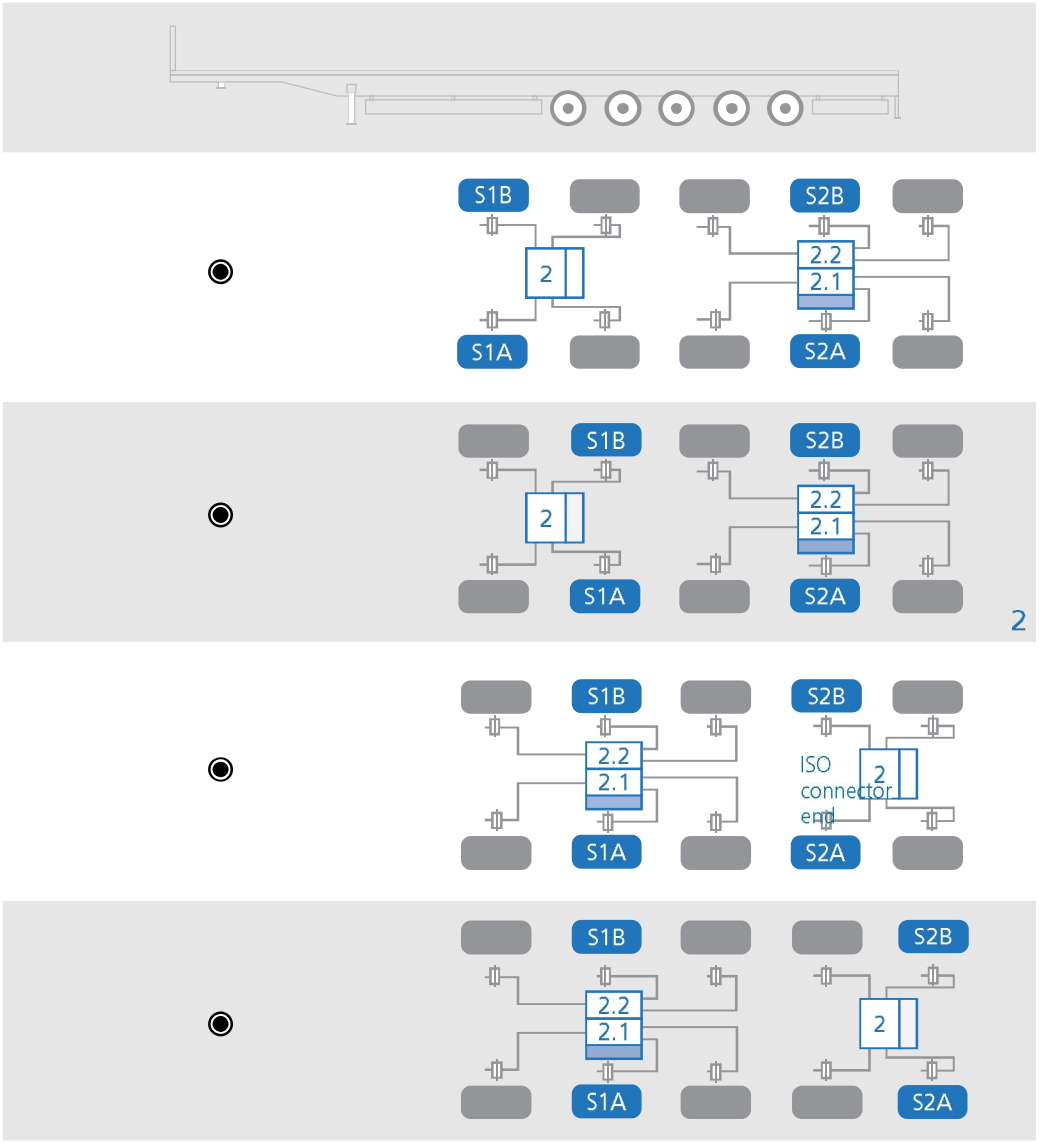
- Sensed axles cannot be lifted.
- Any axle without directly controlled wheels may be lifted.
- N1 Master ECU is mounted to EPRV's 21/22. All sensors must be connected to this Master ECU
- N2 Slave ECU is mounted to EPRV 2 and is controlled by Master ECU. Slave ECU / EPRV 2 is shown facing rear but can also be installed facing forward, left or right, as EPRV 2 is always select low control

Key



Semi trailers

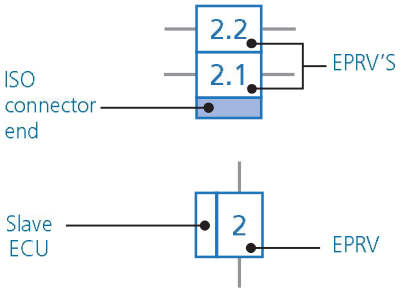
4S / 3M



Notes (applicable to all above diagrams):

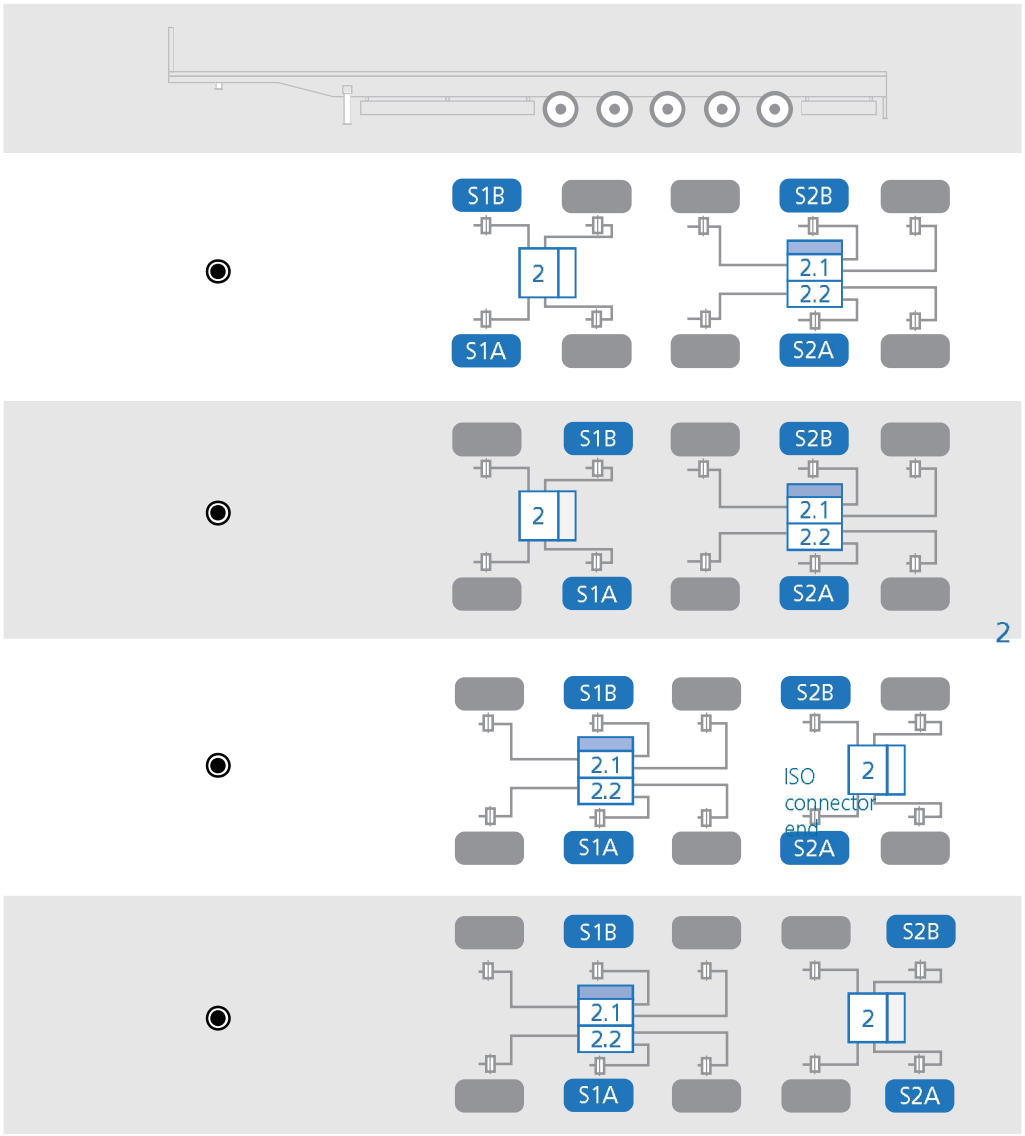
- N1 Master ECU is mounted to EPRV's 21/22. All sensors must be connected to this Master ECU
- N2 Directly controlled wheels connected pneumatically to EPRV's 21/22 cannot be lifted
- N3 Slave ECU is mounted to EPRV 2 and is controlled by Master ECU. Slave ECU / EPRV 2 is shown facing rear but can also be installed facing forward, left or right, as EPRV 2 is always select low control
- N4 Sensed wheels connected pneumatically to EPRV 2 can be lifted but corresponding indirectly controlled wheels must be lifted in parallel
- N5 Any axle without directly controlled wheels may be lifted
- N6 Any axle may be a steered axle

Key



Semi trailers

4S / 3M



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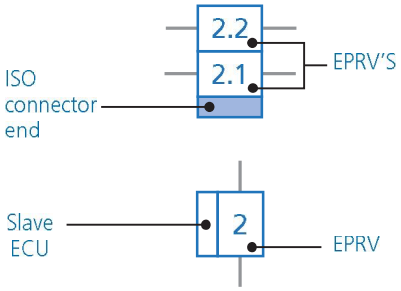
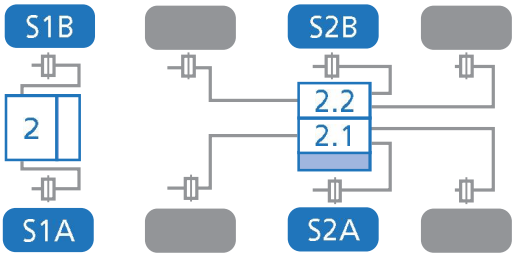


Semi trailers

4S / 3M



2 Modulator ECU

ISO connector end

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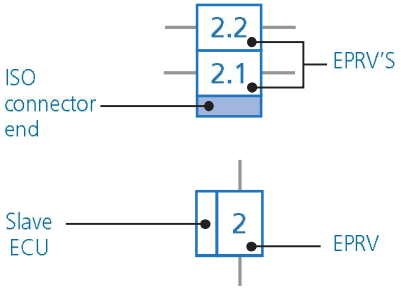

Semi trailers

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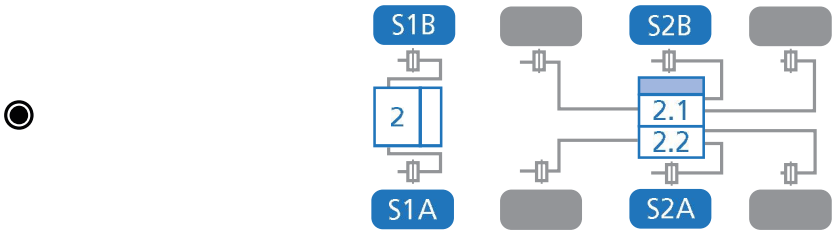

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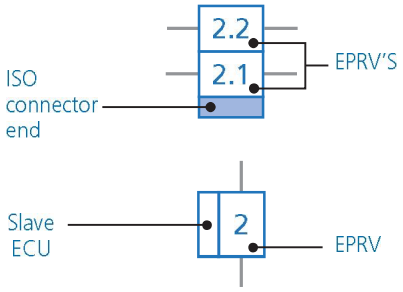
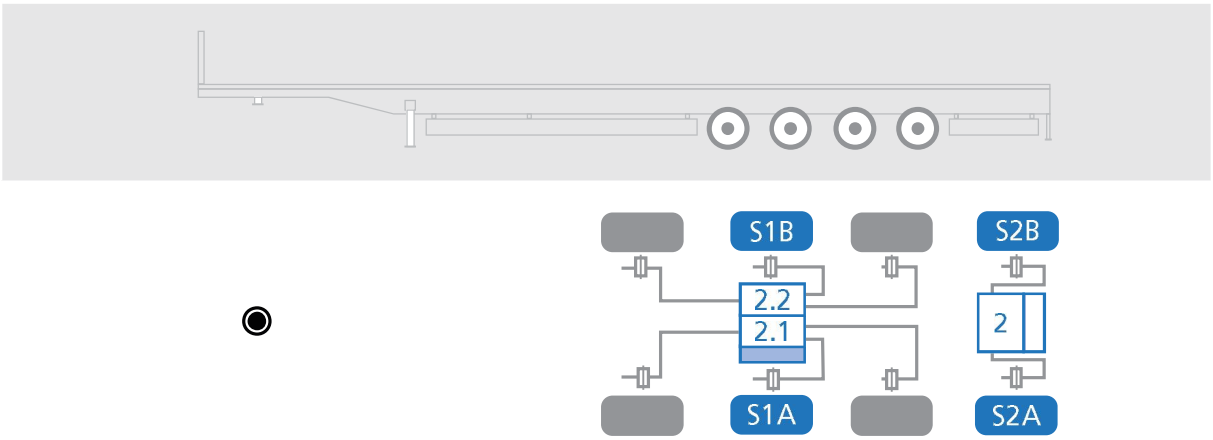


Semi trailers

4S / 3M



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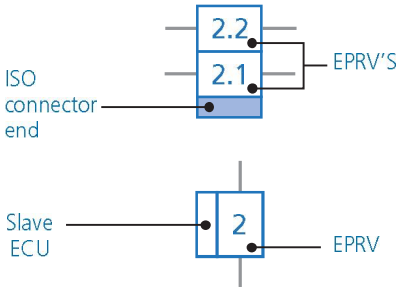
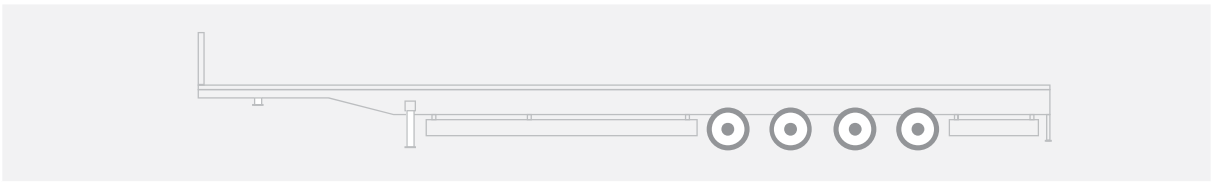
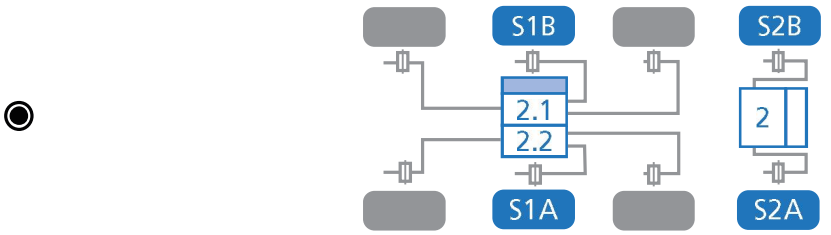


Semi trailers

4S / 3M





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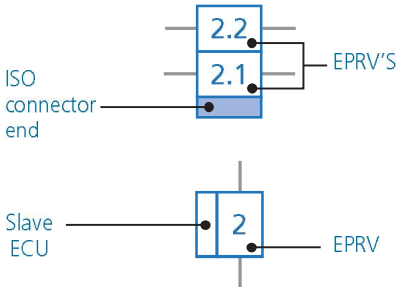
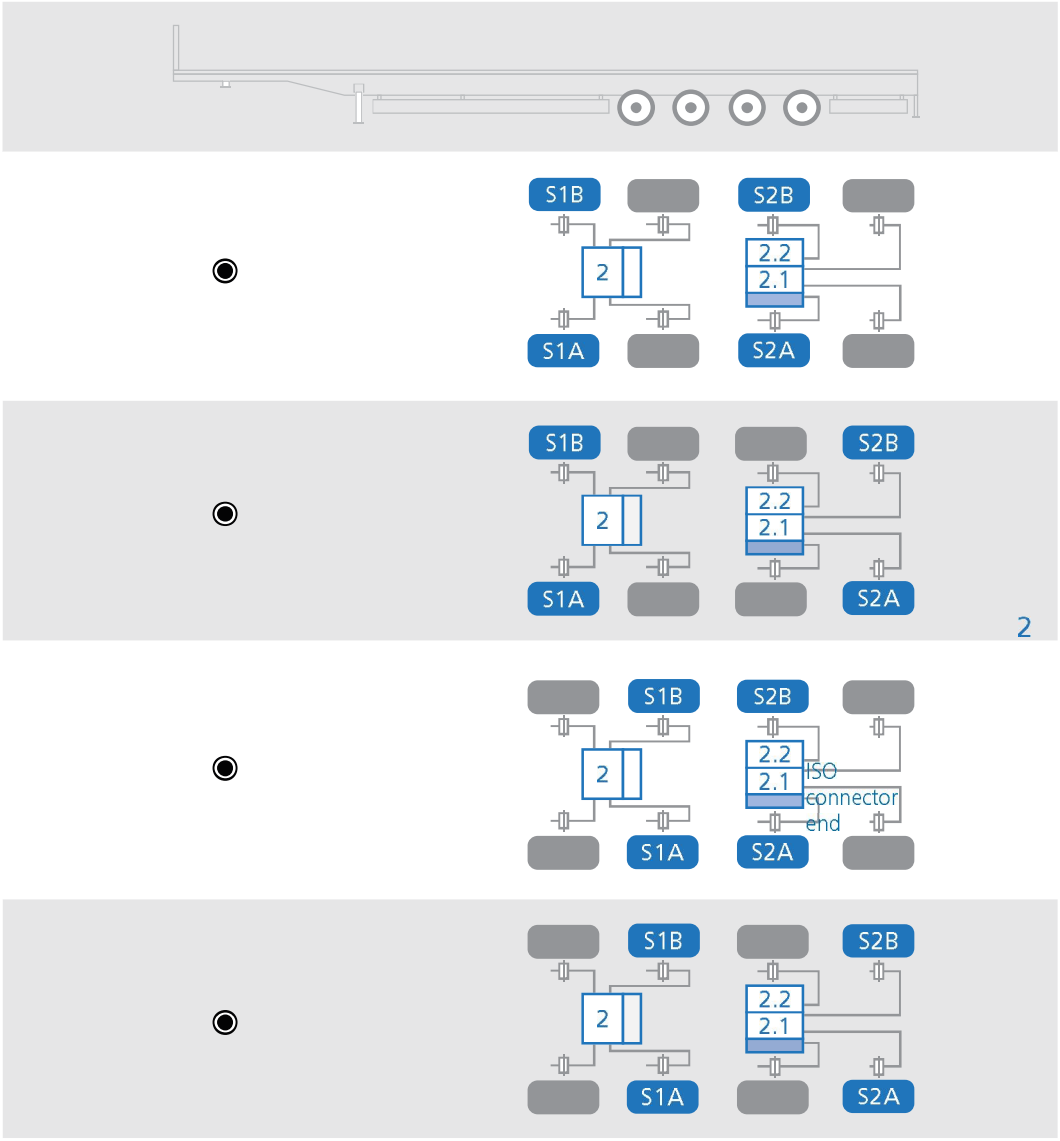


Semi trailers

4S / 3M



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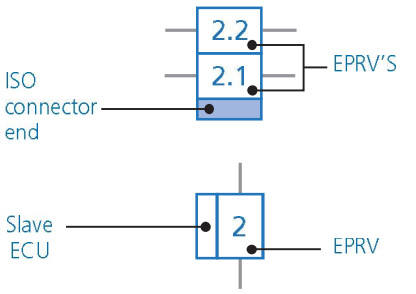

Semi trailers

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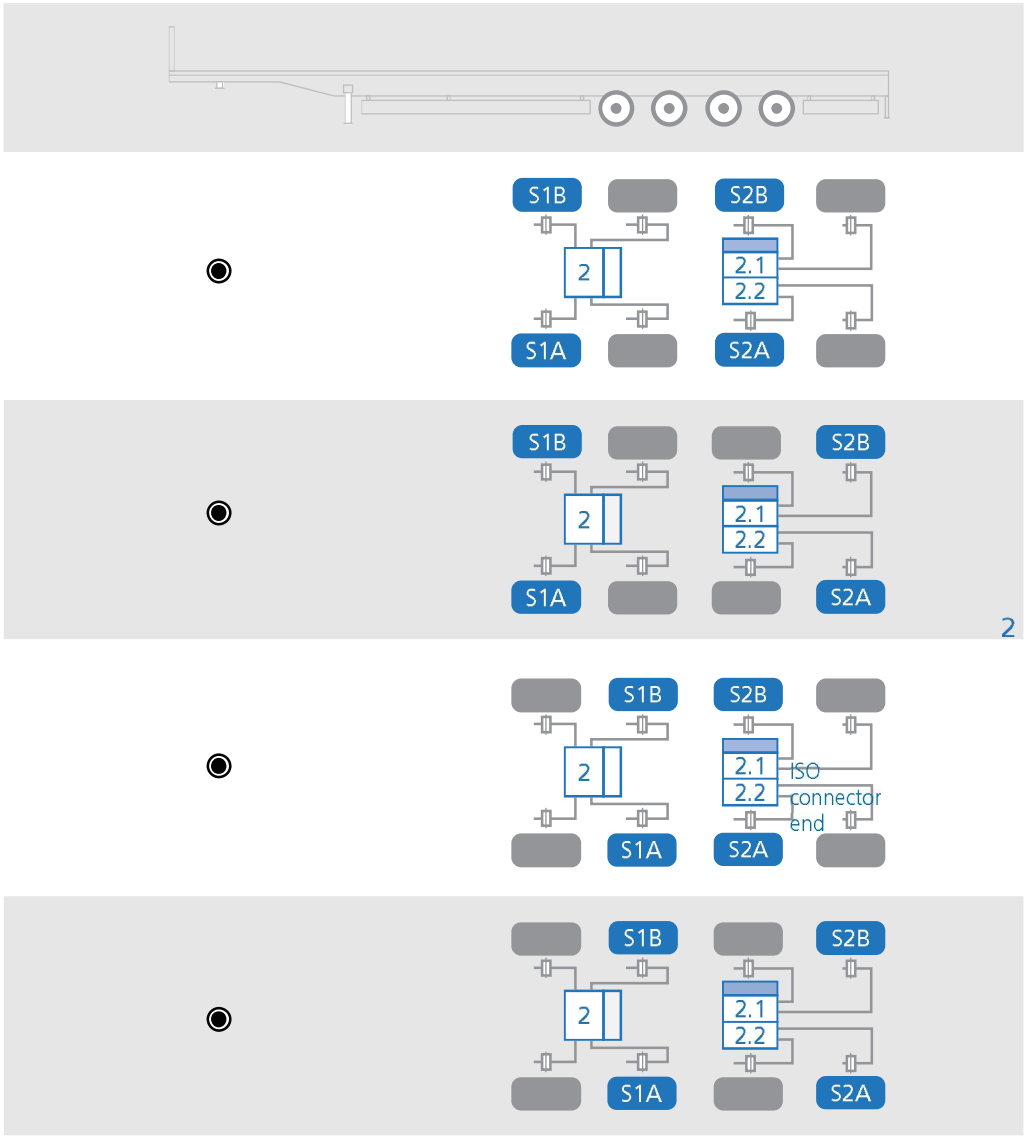

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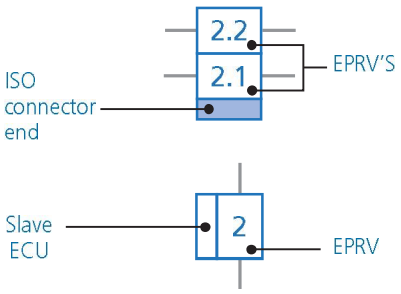
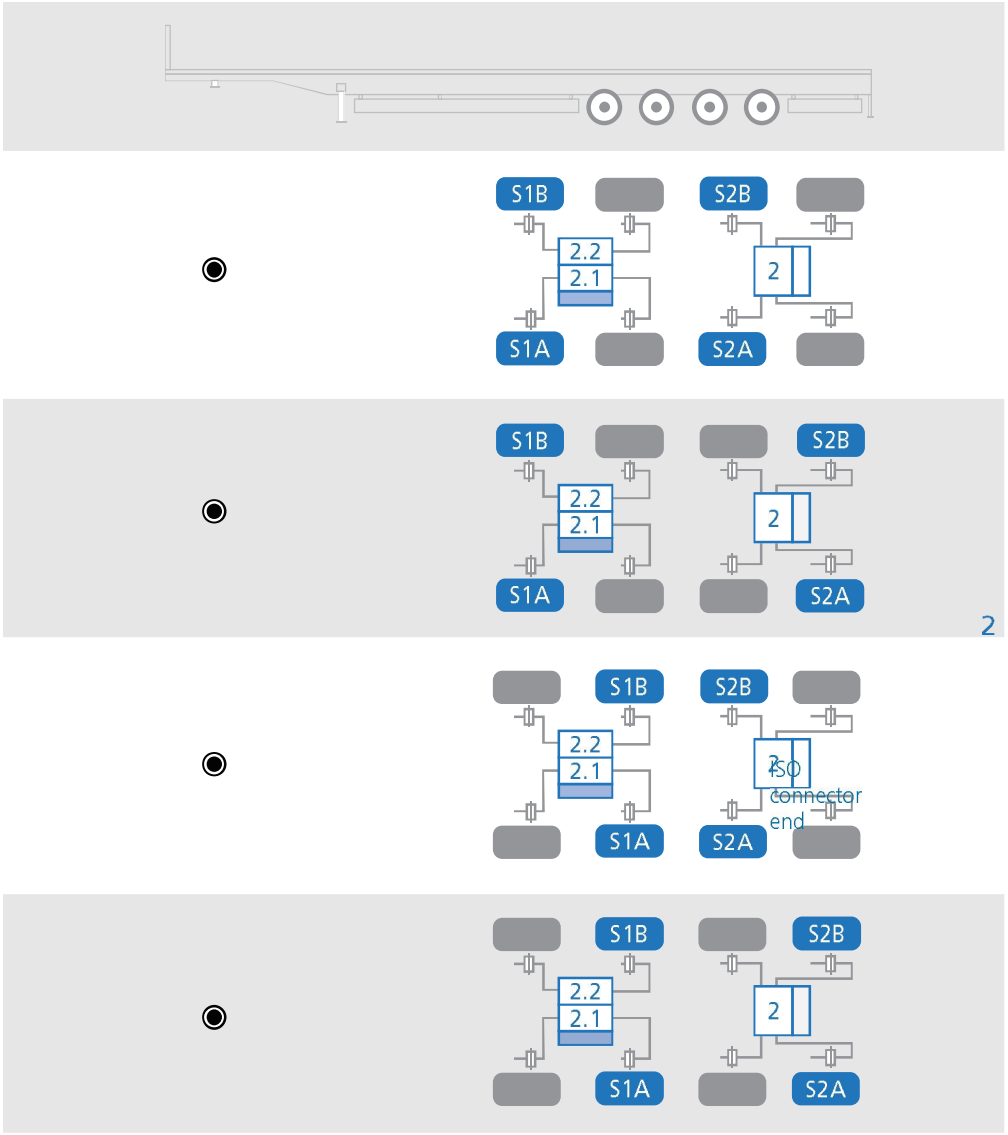


Semi trailers

4S / 3M



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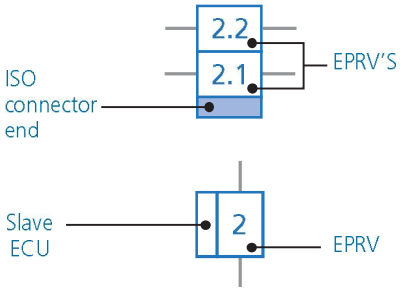

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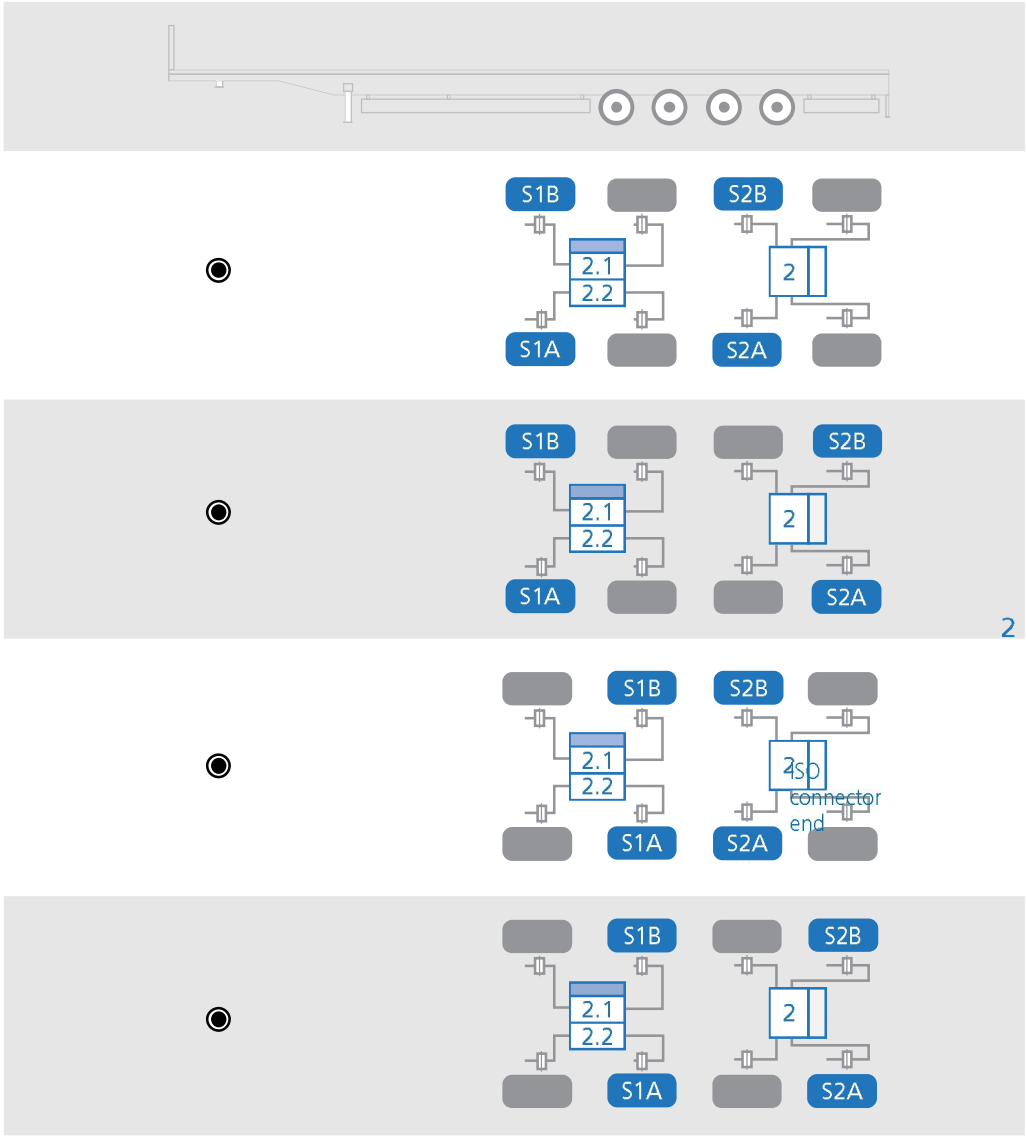

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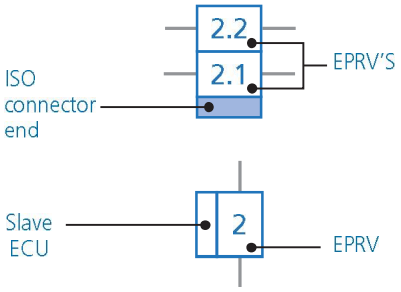
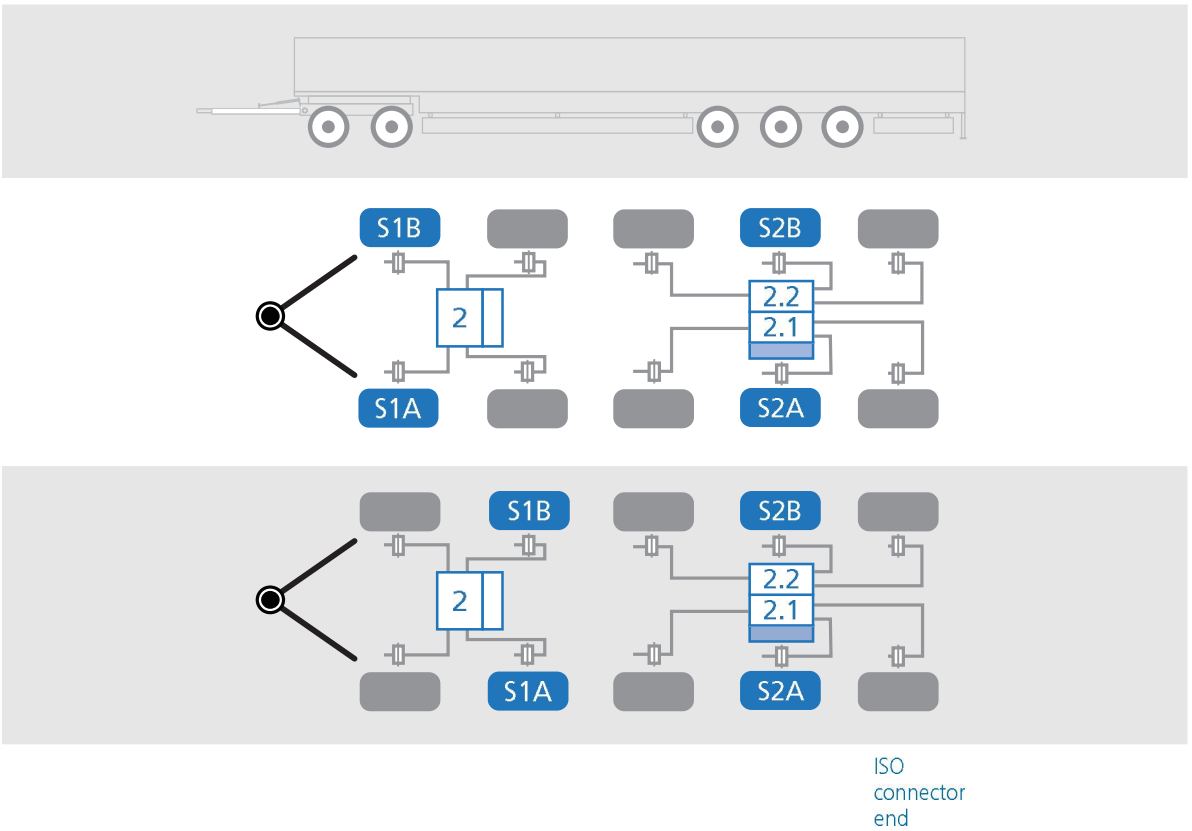


Full trailers

4S / 3M



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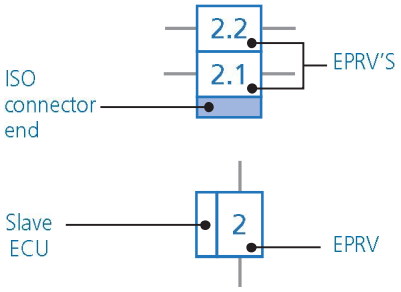

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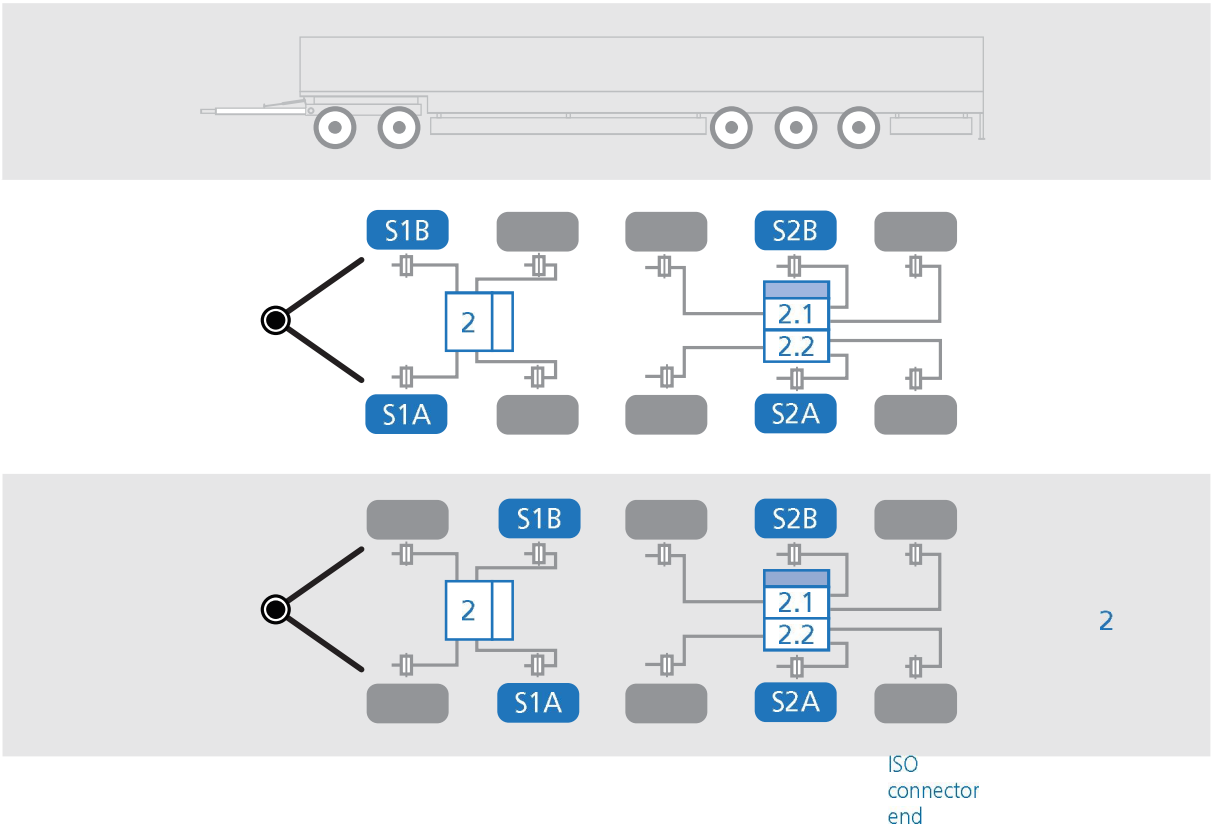

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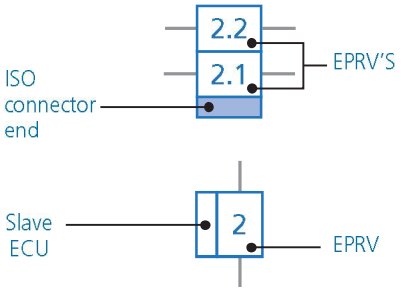

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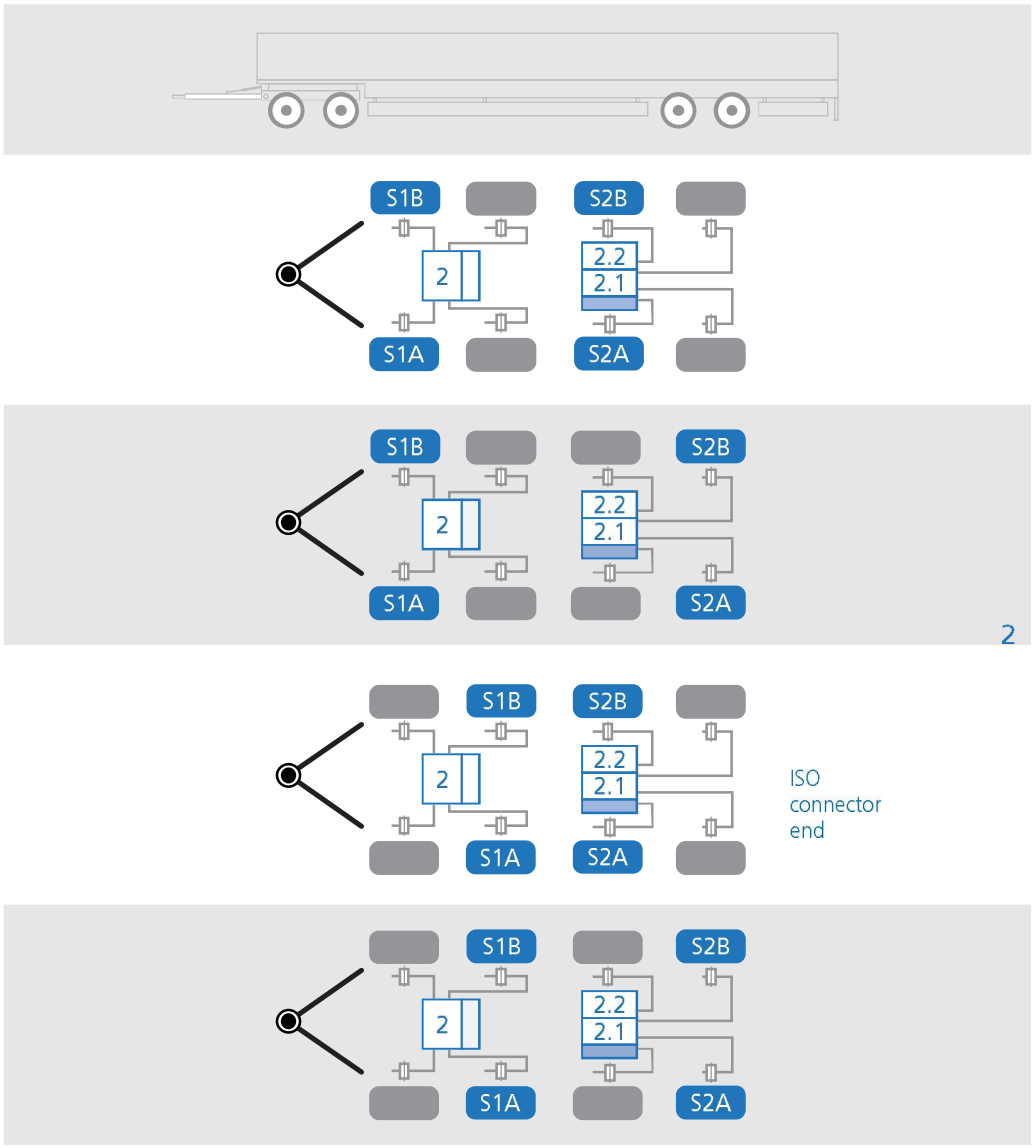

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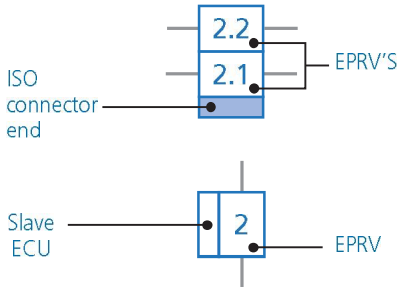

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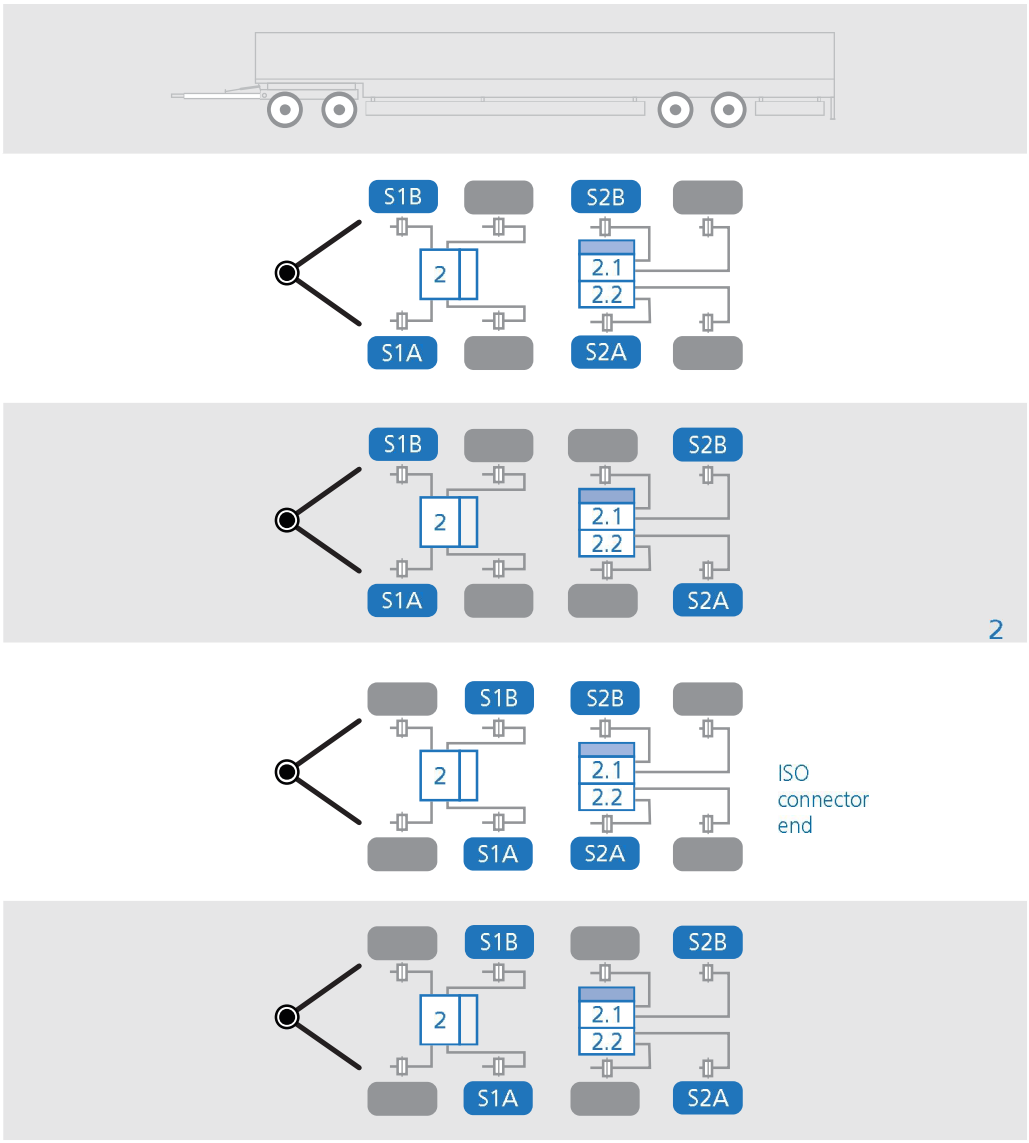

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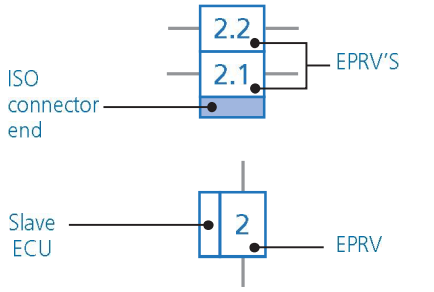


Chassis installation

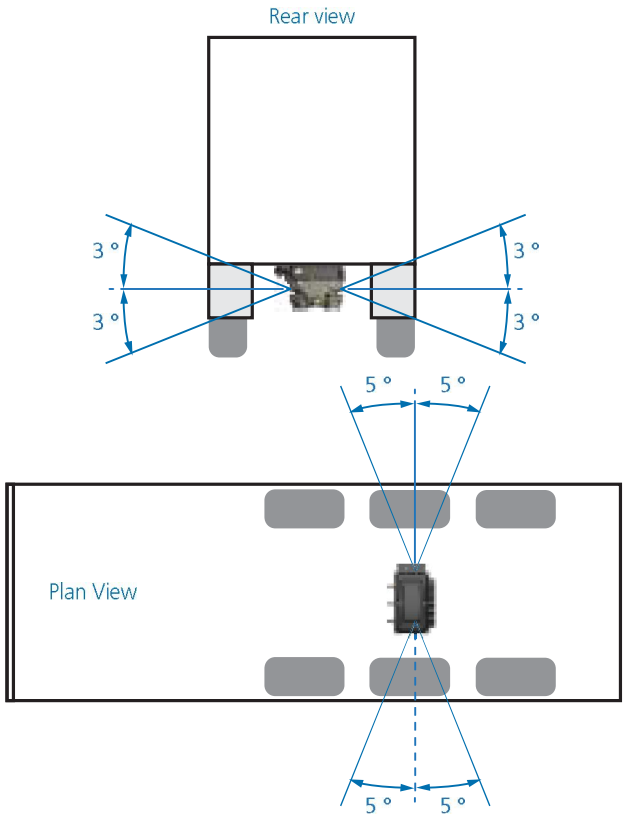
Position of EB+ Gen3 assembly

The following installation parameters are required for correct stability operation.

Roll angle : ± 3 ° (1:20)

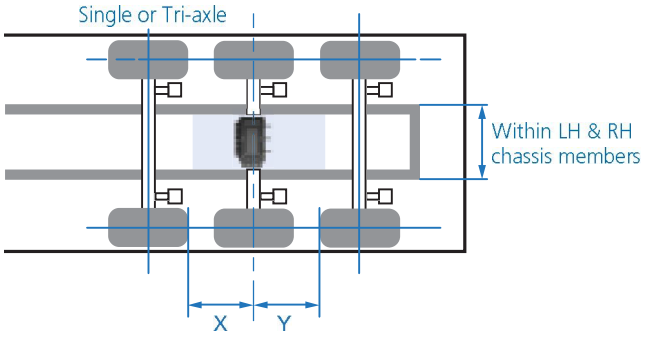
Yaw angle : ± 5 °

The EB+ Gen3 system is to be mounted within distance X & Y from the centre line of the rear axle group / bogie (includes lift axles).



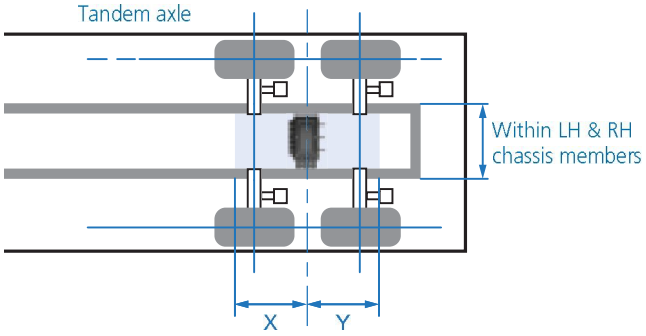
Trailer	X	Y
Semi	1.5 m	1.5 m
Centre-axle	1.5 m	1.5 m
Full	3.0 m	1.5 m

Haldex recommended position for maximum stability performance. Fitment of EB+ Gen3 outside of this area may affect the stability performance.



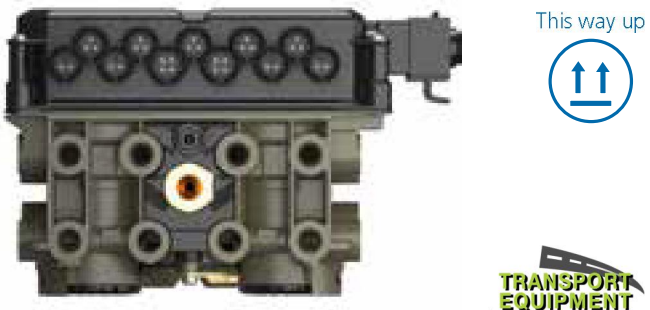
The EB+ Gen3 assembly to be within the main left hand (LH) and right hand (RH) chassis members of the vehicle.

For any other applications please refer to Haldex Technical Services.

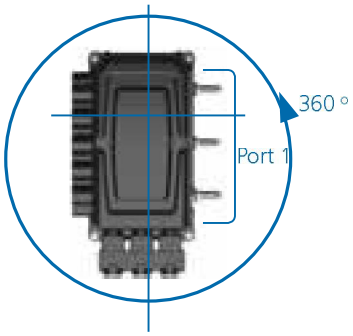


Pitch angle: assembly must be mounted vertically.

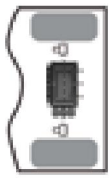
The assembly should not be in direct spray or splash water area and should be protected against high pressure cleaning.

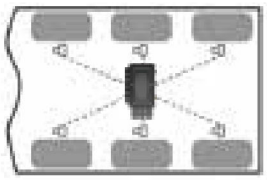


For optimum performance the valve should be mounted centrally to the brake chambers thus giving the shortest delivery pipe lengths.
The pipe length between the air reservoir and the valve ports 1 (x2) should be as short as possible.

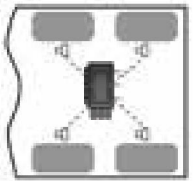


Mount modulator valves centrally to the brake chambers.


Single axle

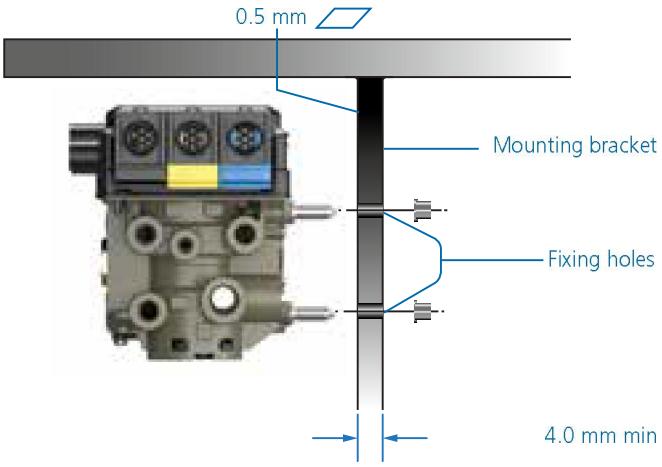

Tri-axle

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


Tandem axle


Full trailer

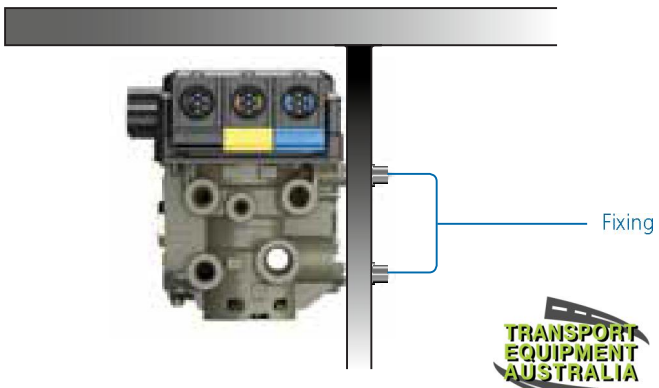
Additional bracket design to be as rigid as possible.
The mounting fixing must provide an electrical connection between ECU / modulator bracket and vehicle chassis.
Mounting bracket flatness to be not more than 0.5 mm deviation from its true plane (i.e. the surface must lie between two parallel planes 0.5 mm apart).



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

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

The fastener to be protected from corrosion to give 200 hours salt spray resistance.



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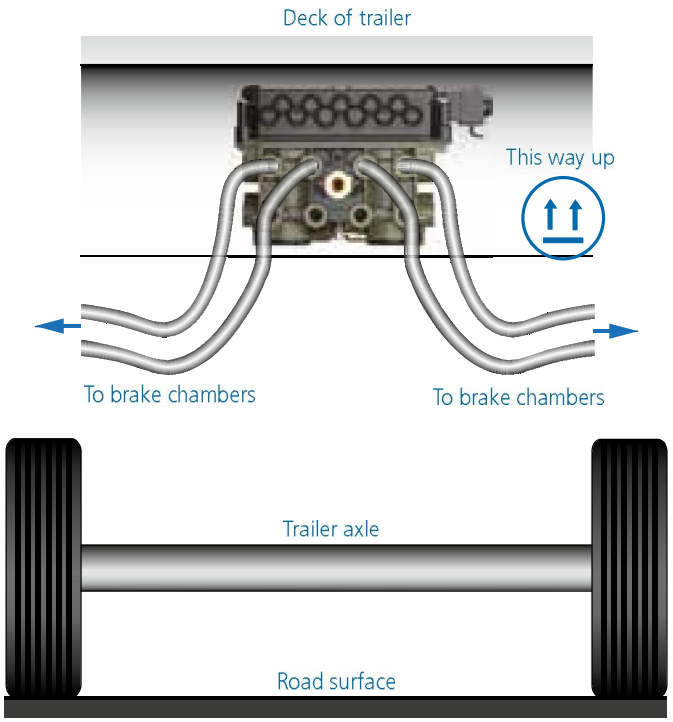
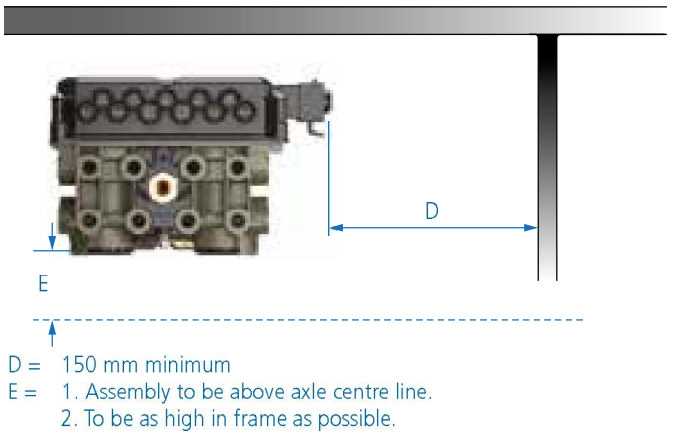
Pitch angle: assembly must be mounted vertically.



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



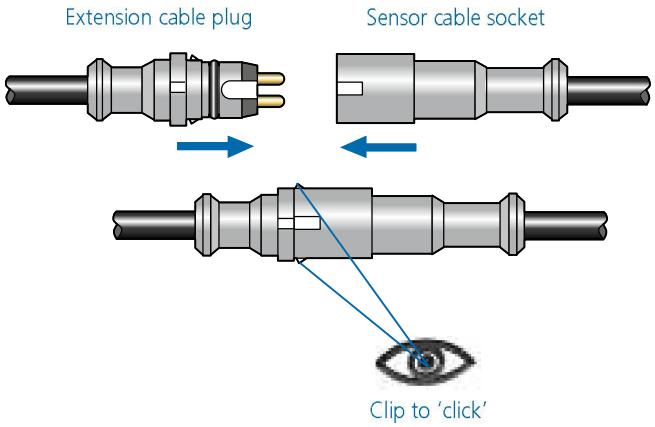
Check continuity between ECU / EPRV bracket and vehicle.

Resistance (R) to be less than 5 ohms
0 < R < 5 ohms

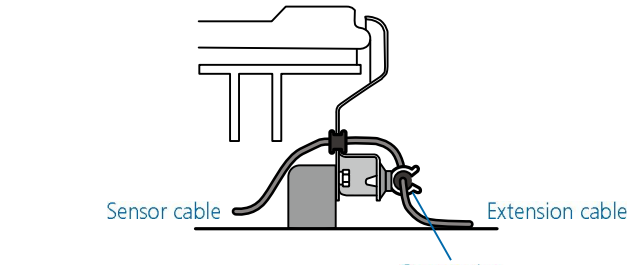
Sensor connection

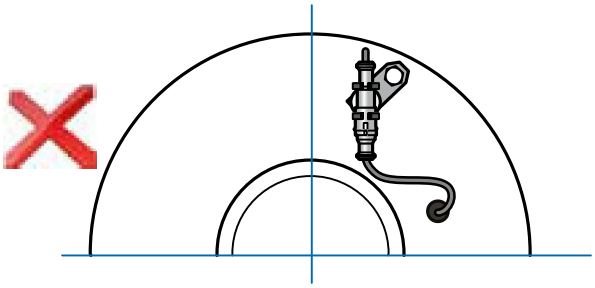
Sensor extension cable socket must be pushed fully into sensor cable plug till they clip into place to prevent falling out with axle vibration.

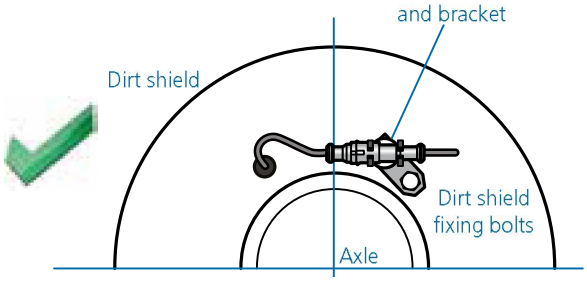
Haldex recommend that all electrical components are greased prior to assembly using the appropriate electrical grease.



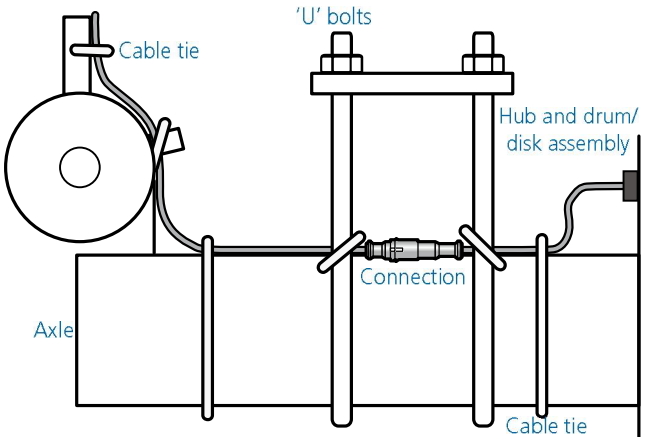
Where possible use a clip and bracket to secure sensor cable connection.
The female connector of the sensor cable should always be horizontal or pointing downward to reduce the possibility of water ingress.







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



Sensor / COLAS®/ ILAS®-E connection

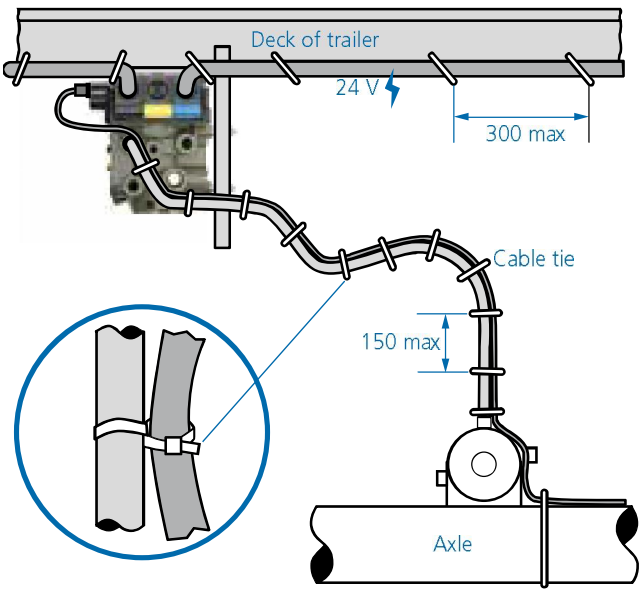
Sensor cable route should follow the centre line or outer radius of pipe or hose.

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.

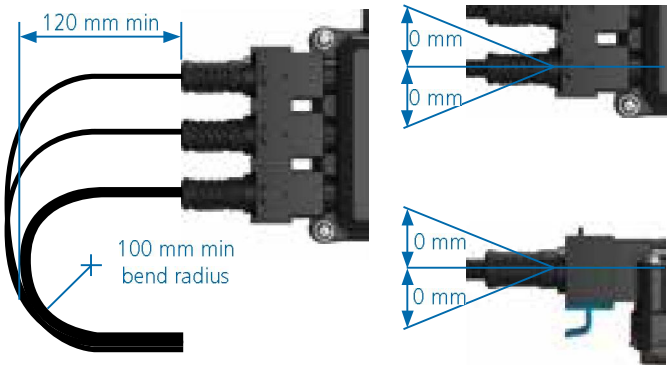
Power leads should be secured down the chassis rail in trunking or to piping and should be secured with 300 mm maximum intervals.

All cables should run 'up to' ECU connections.



The route of all of the cables from the connector should not start to bend so that the connectors are strained.

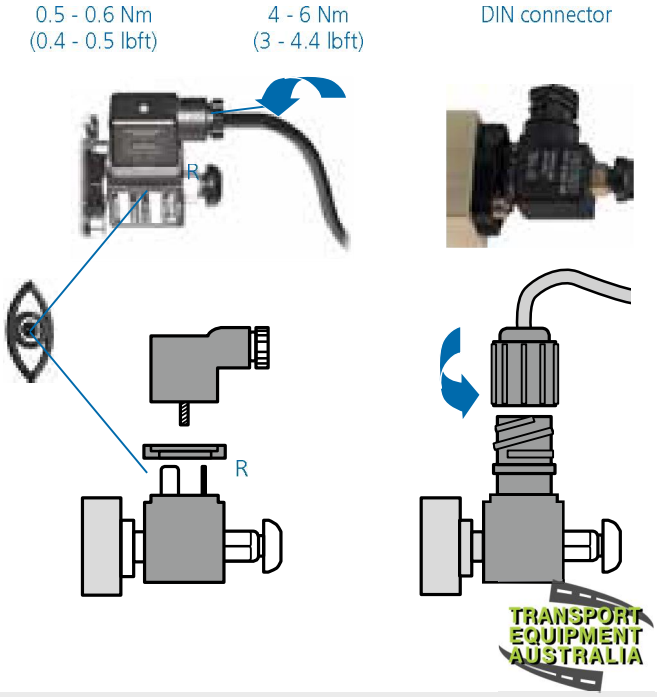
Allow distance of 120 mm (minimum) before bending of cable.



Cable should be secured down the chassis rail to existing piping and should be secured with 300 mm maximum intervals or inside trunking.

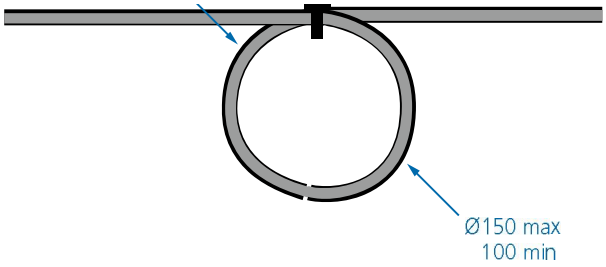
Position rubber gasket 'R' in position shown.

Note:
All cables should run 'up to' connector.



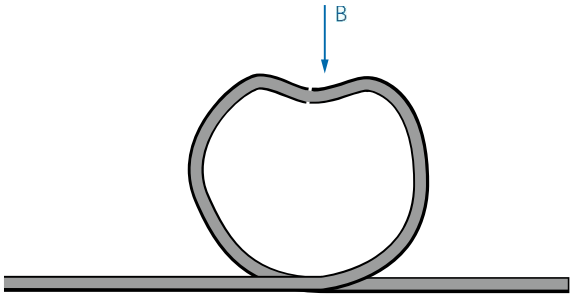
Excess cable

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

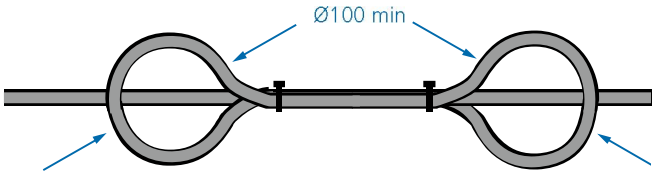


Cable lengths less than 1 m to be coiled into loops of 100 mm minimum and 150 mm maximum diameter.

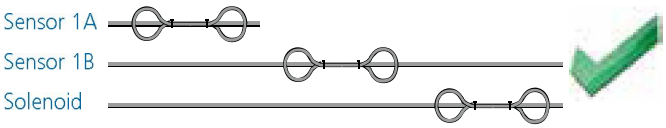
Excess length which will not form a complete loop may be left to hang in partial loops having a cable bend radius of 50 mm minimum.

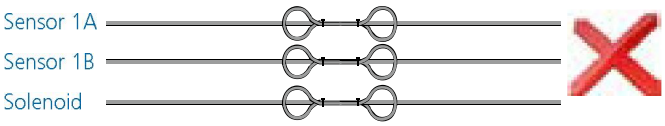


Cable lengths greater than 1 m to be coiled and then flattened in the centre 'B' to produce a 'dog bone' shape.
The resulting loops at the end must have a minimum bend radius of 50 mm. Cable ties are to be used to fix the cable in the flattened loop shape.



More than one looped cable must not be looped together.





'DIAG' side of vehicle connection

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.

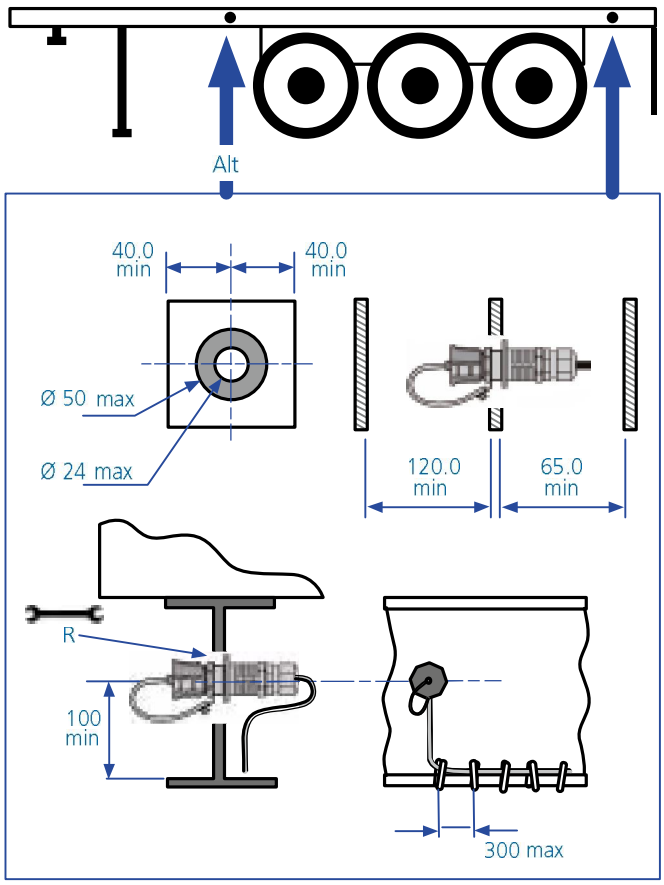
Mount the diagnostic connector on the outside of the main chassis rail. The position must be in an accessible area but not in the direct spray of the wheels.

The connector must be mounted horizontally.

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

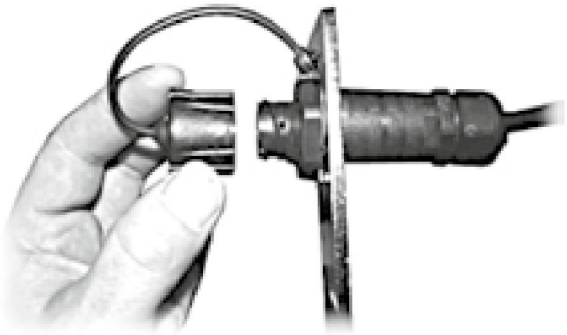
ECU connection is as right.

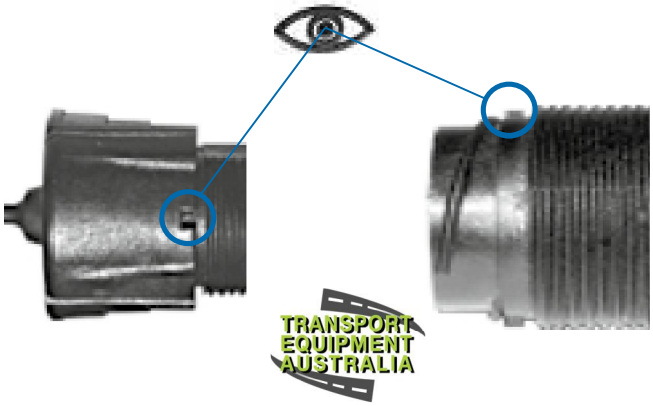
Cable to run up to connector and secured to the chassis, or appropriate cable or pipe runs, with cable ties at 300 mm maximum intervals.



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

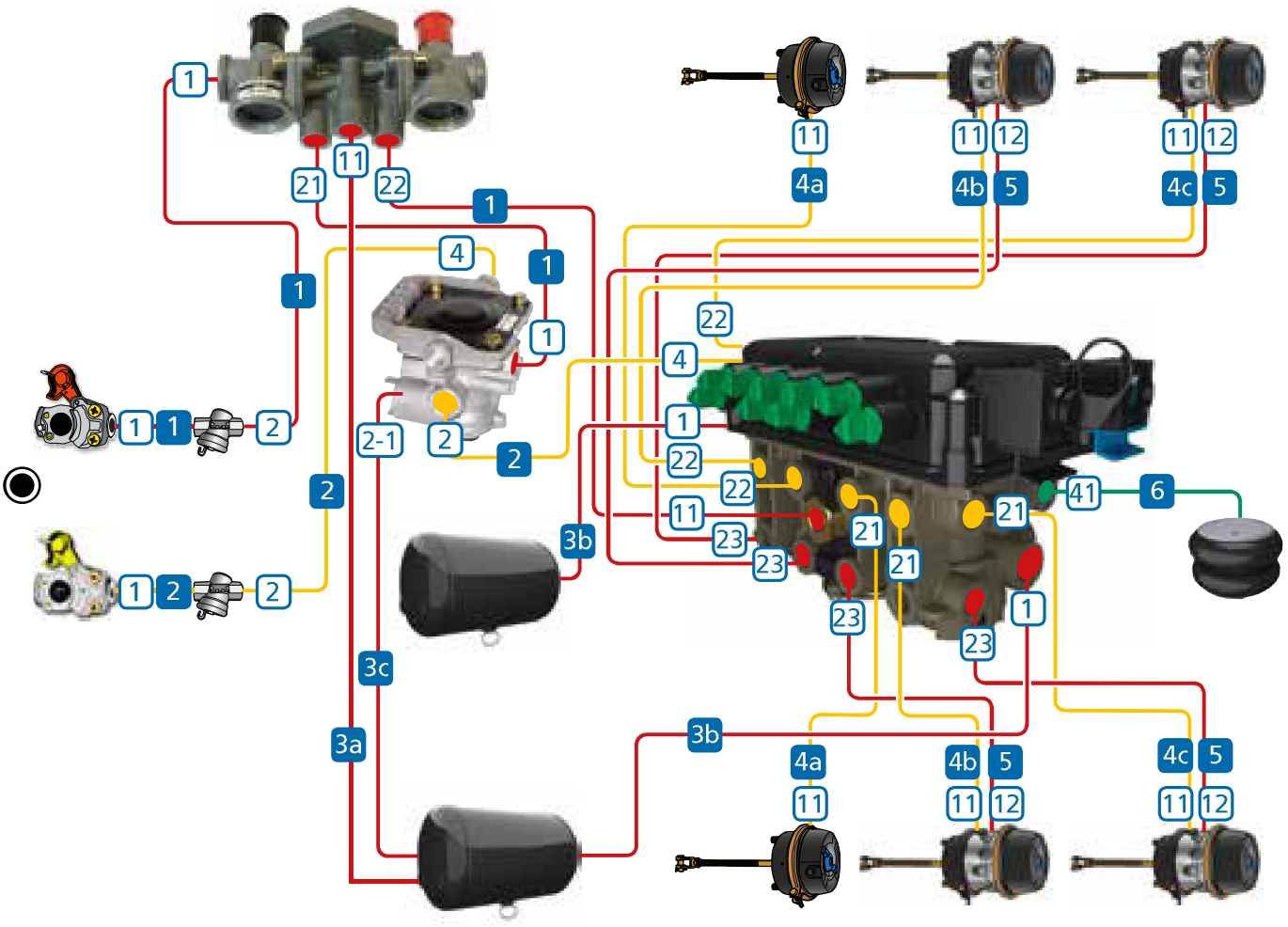
Ensure that the cover is fitted and correctly 'locked' in place.





Note:
For Installation of Info Center refer to Instructions 006 300 000.

Piping recommendations



Note:
EB+ Gen3 should be supplied with clean / dry air.

Key

1 Port number

1 Components

Item	Description	Material	Size	Remark
1	Emergency pipe	Nylon	8 x 1, 10 x 1, 10 x 1.25, 12 x 1.5	
2	Service pipe	Nylon	8 x 1, 10 x 1, 10 x 1.25, 12 x 1.5	
3a	Reservoir pipe	Nylon	8 x 1, 10 x 1, 10 x 1.25, 12 x 1.5	
3b	Reservoir pipe	Nylon	15 x 1.5 15 x 1.5 x 2 off (preferred) 18 x 2	Short as possible 1.0m max. Short as possible 4.0m max.
3c	Reservoir pipe	Nylon	12 x 1.5	
4a 4b 4c	Brake delivery pipe	Nylon or Rubber hose	12 x 1.5 or I.D. 11.0, I.D. 13.0	4a, 4b and 4c to be as short as possible.
5	Emergency pipe	Nylon Rubber hose	8 x 1, 10 x 1.25, 12 x 1.5 I.D 11.0, I.D. 13.0	
6	Suspension pipe	Nylon	As per suspension manufacturers recommendations.	

Piping information

- Actual pipe sizes need to be optimized for individual trailer response time requirements
- All pipe and rubber hose to comply to recognized international standards
- Nylon pipe to DIN 73378, rubber hose to SAE 1402
- The referenced sizes are defined as guide lines only
- For optimum performance all pipe lengths should be as short as possible

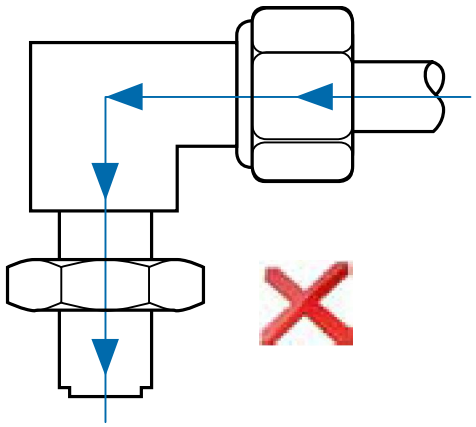
Pipe fittings

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

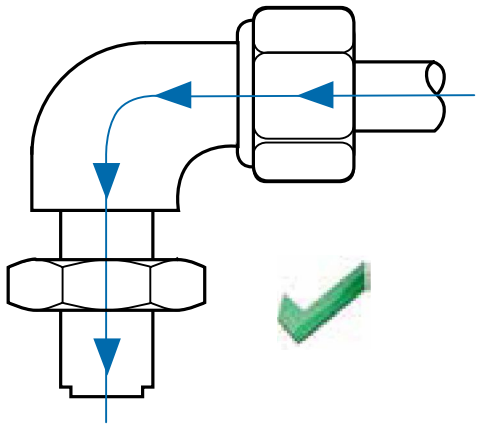
Inside diameter of fitting should be the same as the inside pipe diameter it is serving.

On metric (parallel thread) pipe fitting a backing washer and 'O' ring should be used.

The use of tape (PTFE) must not be used.

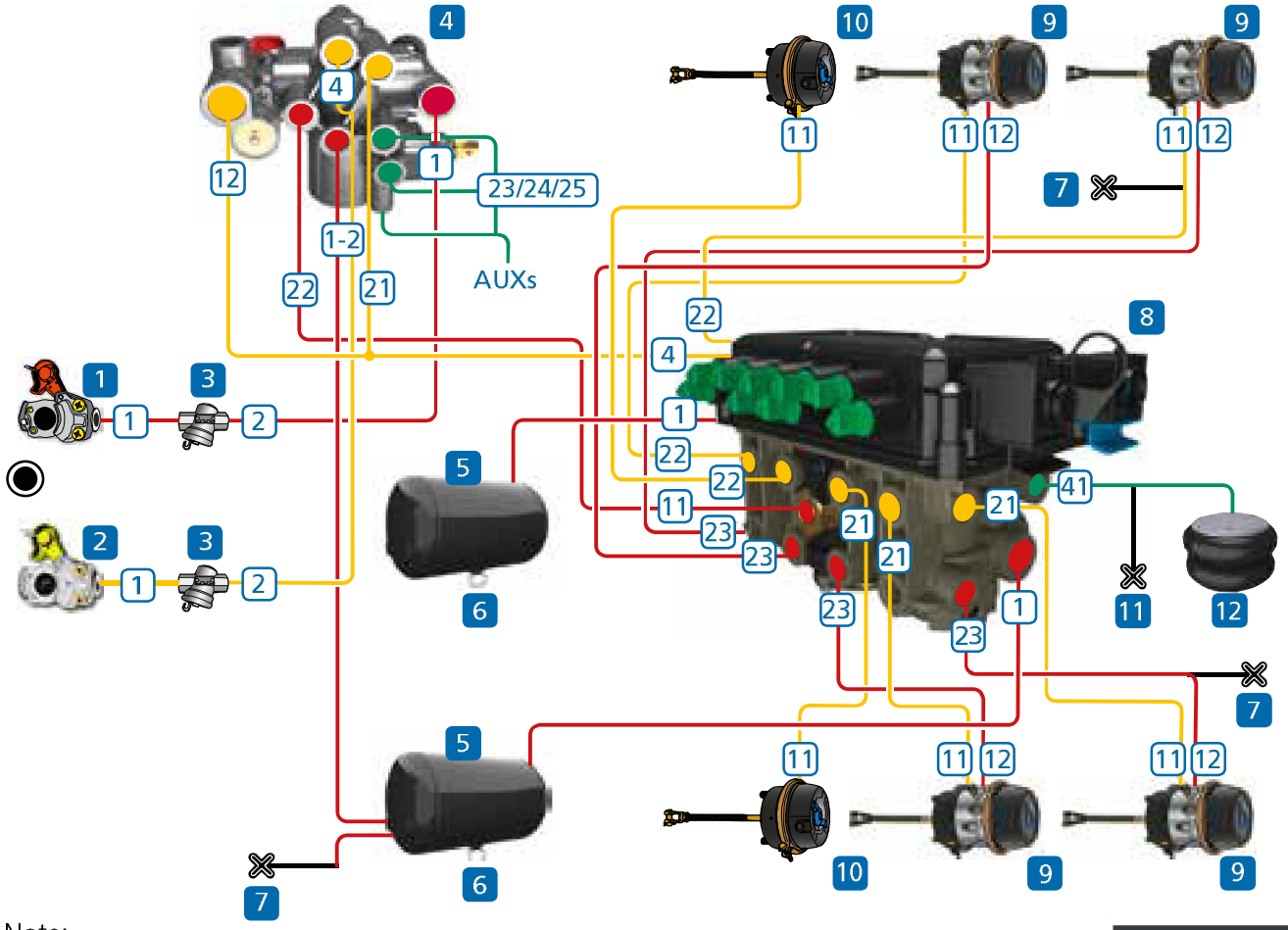


Note:
No pipe sealant or tape (PTFE) must be used during the installation of EB+ Gen3. No warranty claims will be accepted on pipe sealant or tape induced faults.



Piping layout – 2M brake

2M, side by side with TrCM+



Note:
EB+ Gen3 should be supplied with clean / dry air.

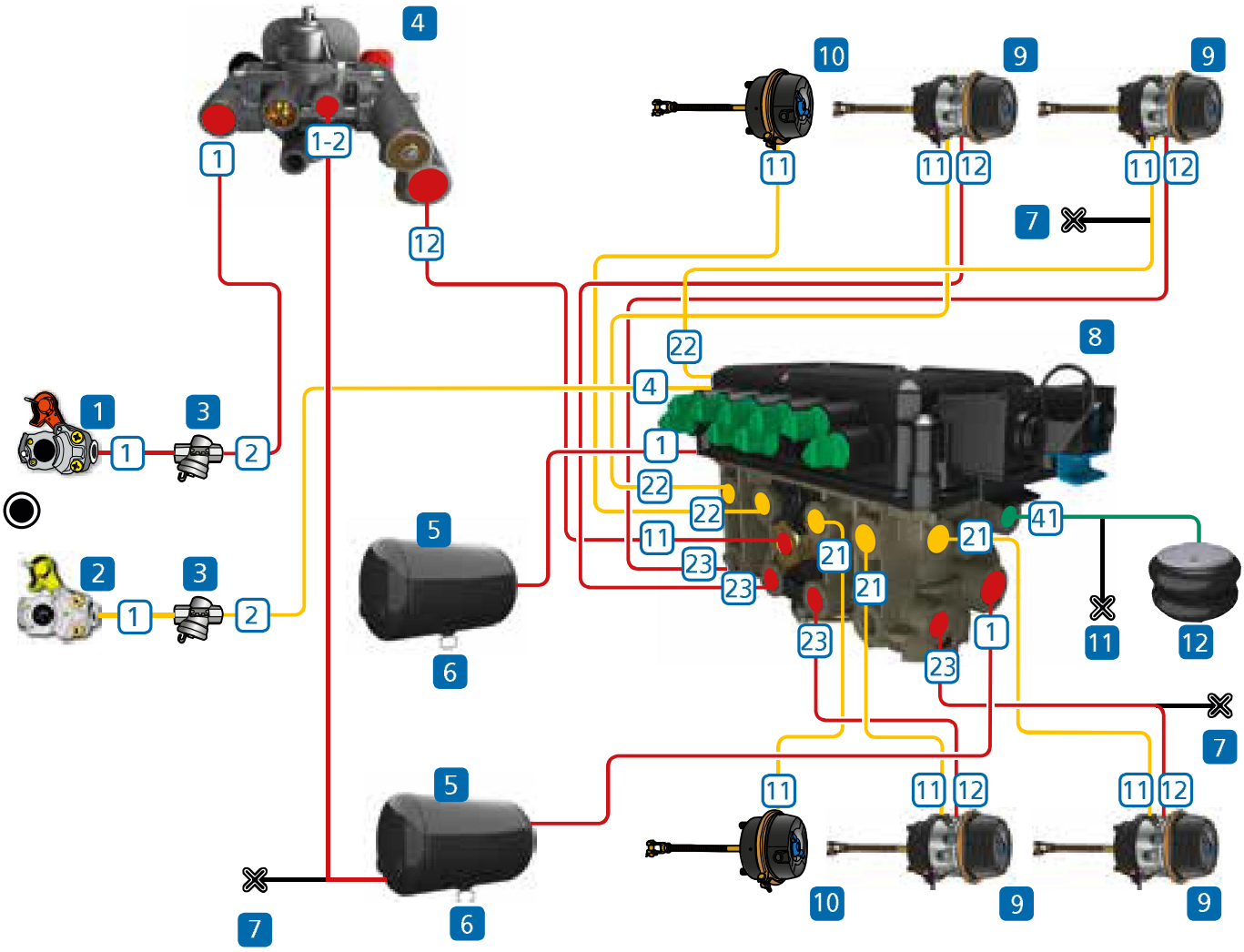
Key

1 Port number

1 Components

Item	Description	Notes
1	Emergency coupling	
2	Service coupling	
3	Pipe filter	
4	TrCM+	
5	Air reservoir - service	
6	Drain valve	
7	Test point	
8	EB+ Gen3 assembly	
9	Spring brake chamber	
10	Single diaphragm brake chamber	
11	Test point simulator	
12	Suspension bellows	

2M, side by side, with TEM®



Note:
EB+ Gen3 should be supplied with clean / dry air.

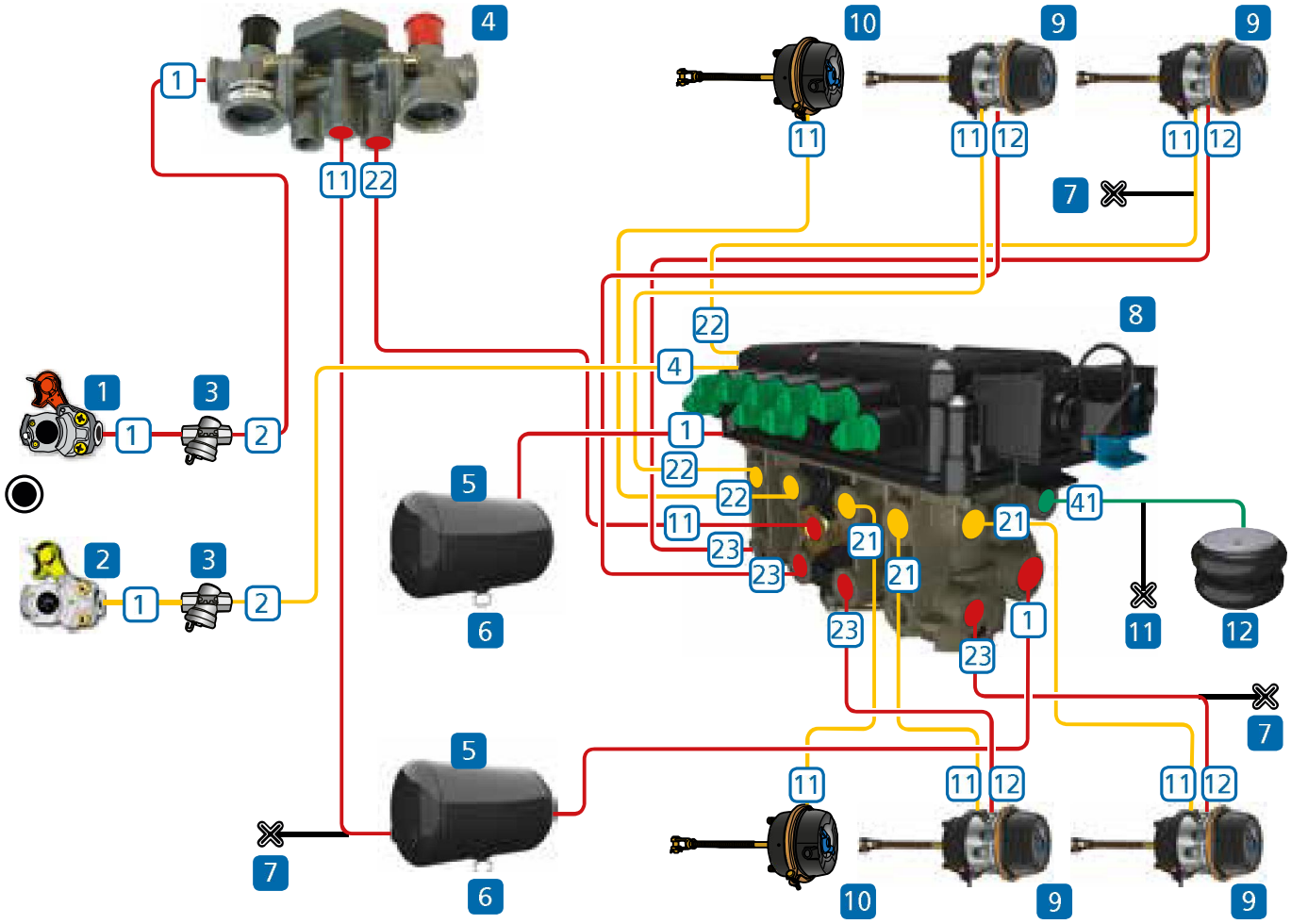
Key

1 Port number

1 Components

Item	Description	Notes
1	Emergency coupling	
2	Service coupling	
3	Pipe filter	
4	TEM®	
5	Air reservoir - service	
6	Drain valve	
7	Test point	
8	EB+ Gen3 assembly	
9	Spring brake chamber	
10	Single diaphragm brake chamber	
11	Test point simulator	
12	Suspension bellows	

2M, side by side, with combined park & shunt valve



Note:
EB+ Gen3 should be supplied with clean / dry air.

Key

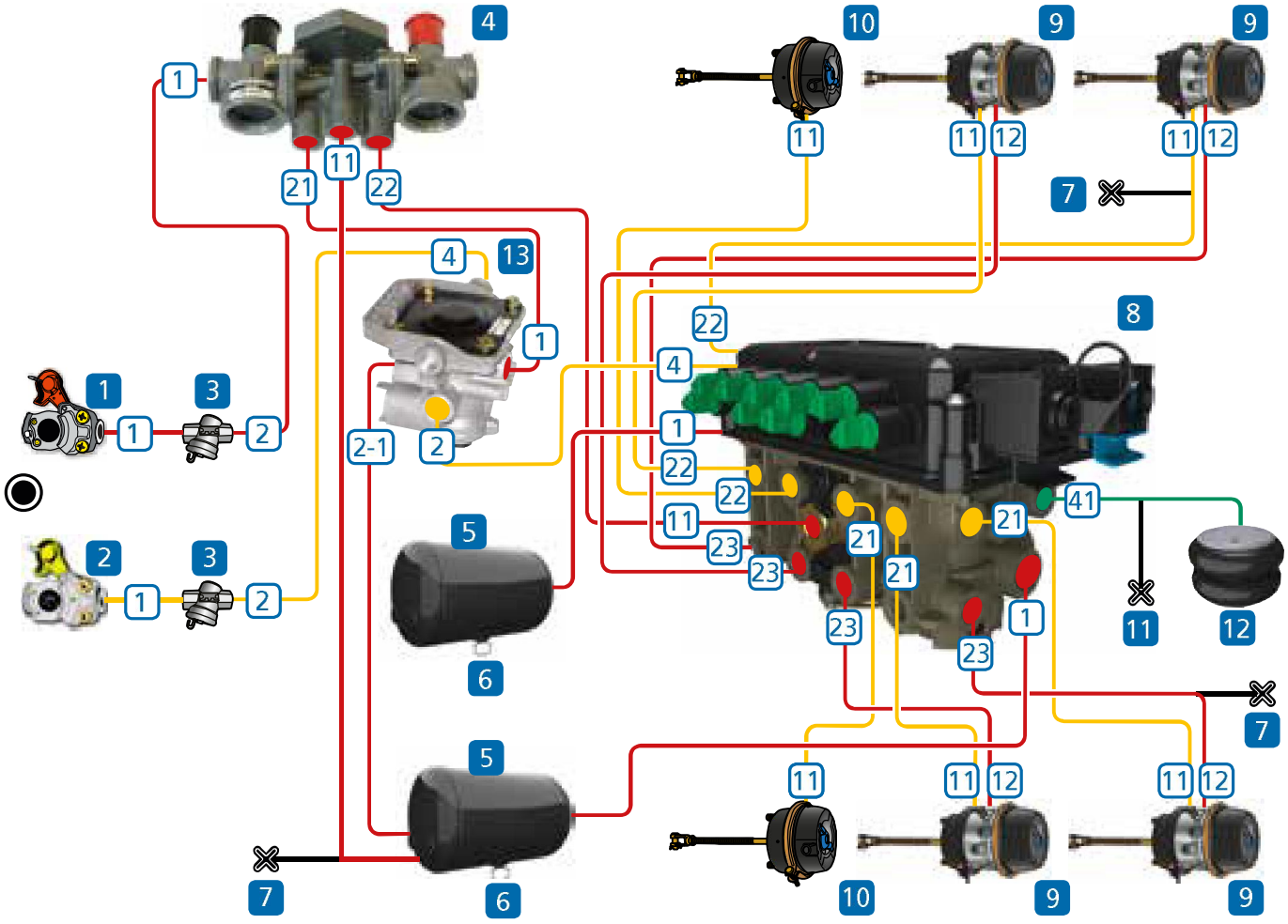
1 Port number

1 Components

Item	Description	Notes
1	Emergency coupling	
2	Service coupling	
3	Pipe filter	
4	Combined park & shunt valve	352 046 001
5	Air reservoir - service	
6	Drain valve	
7	Test point	
8	EB+ Gen3 assembly	
9	Spring brake chamber	
10	Single diaphragm brake chamber	
11	Test point simulator	
12	Suspension bellows	

TRANSPORT EQUIPMENT AUSTRALIA

2M, side by side, REV with combined park & shunt valve



Note:
EB+ Gen3 should be supplied with clean / dry air.

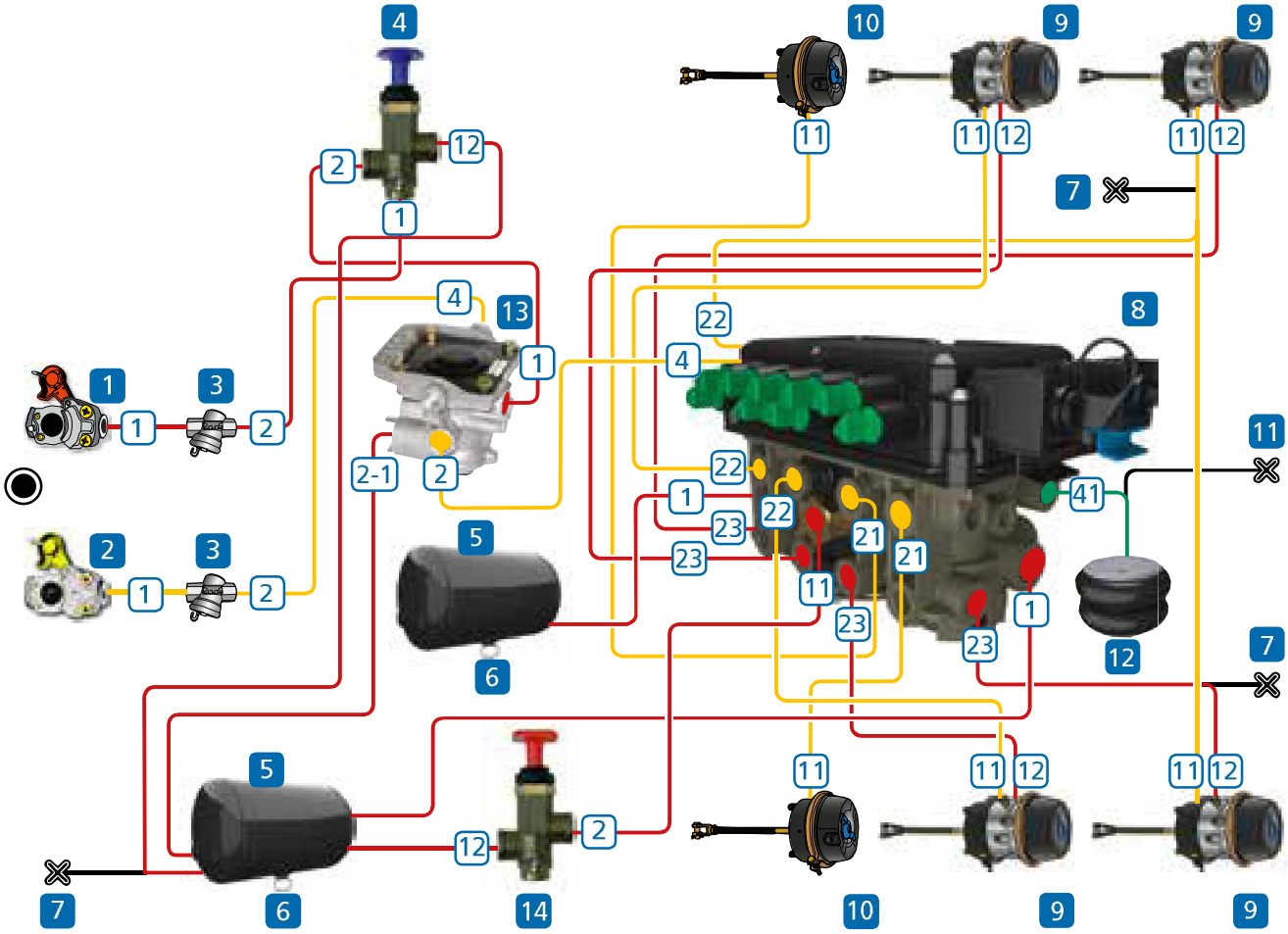
Key

1 Port number

1 Components

Item	Description	Notes
1	Emergency coupling	
2	Service coupling	
3	Pipe filter	
4	Combined park & shunt valve	352 044 001
5	Air reservoir - service	
6	Drain valve	
7	Test point	
8	EB+ Gen3 assembly	
9	Spring brake chamber	
10	Single diaphragm brake chamber	
11	Test point simulator	
12	Suspension bellows	

2M, axle by axle, REV and individual park & shunt valves



Note:
EB+ Gen3 should be supplied with clean / dry air.

Key

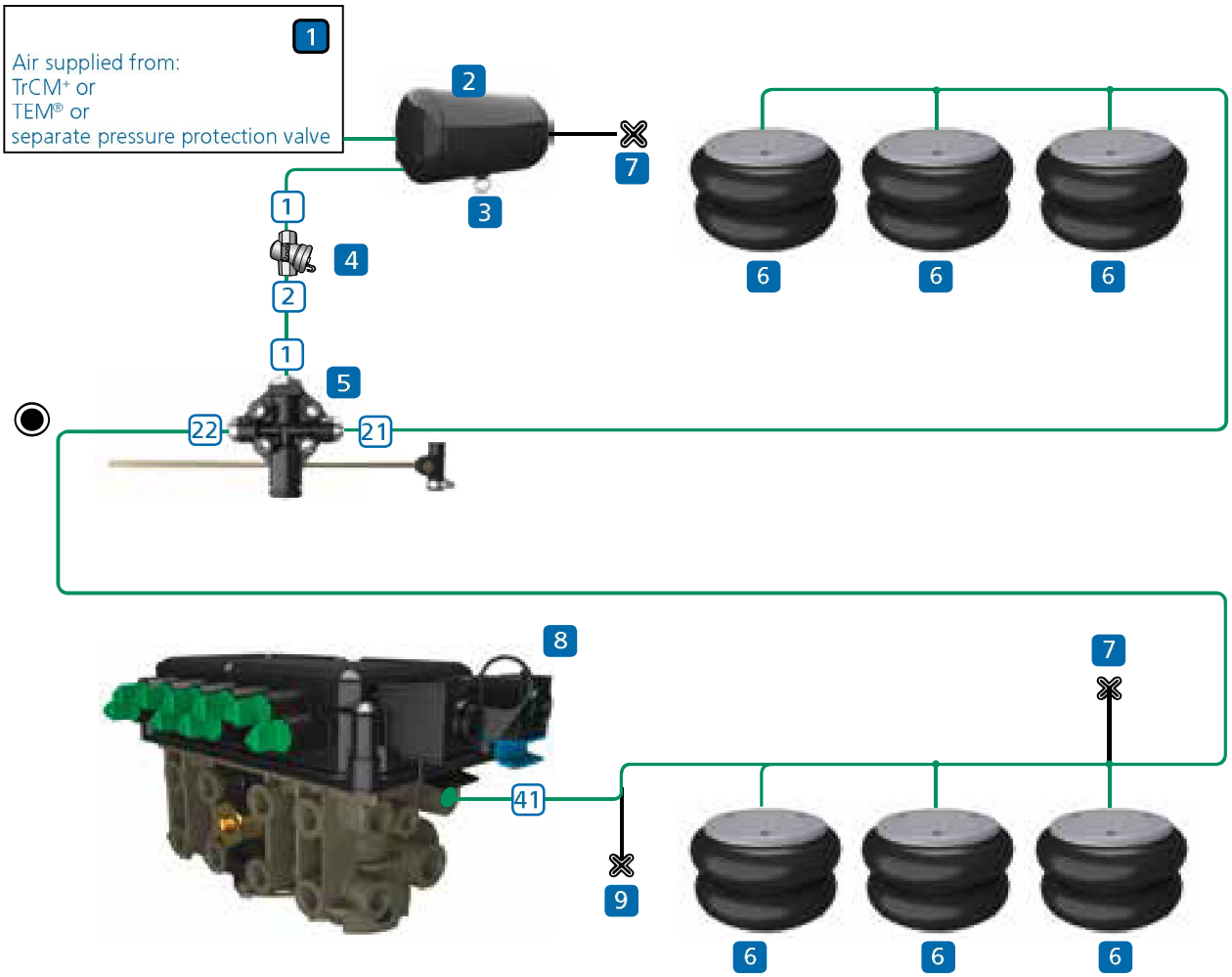
1 Port number

1 Components

Item	Description	Notes
1	Emergency coupling	
2	Service coupling	
3	Pipe filter	
4	Shunt valve	352 018 xxx
5	Air reservoir	
6	Drain valve	
7	Test point	
8	EB+ Gen3 assembly	
9	Spring brake chamber	
10	Single diaphragm brake chamber	
11	Test point simulator	
12	Suspension bellows	
13	Relay Emergency Valve (REV)	
14	Park valve	352 019 xxx

Piping layout – 2M suspension

2M, levelling valve



Note:
EB+ Gen3 should be supplied with clean / dry air.

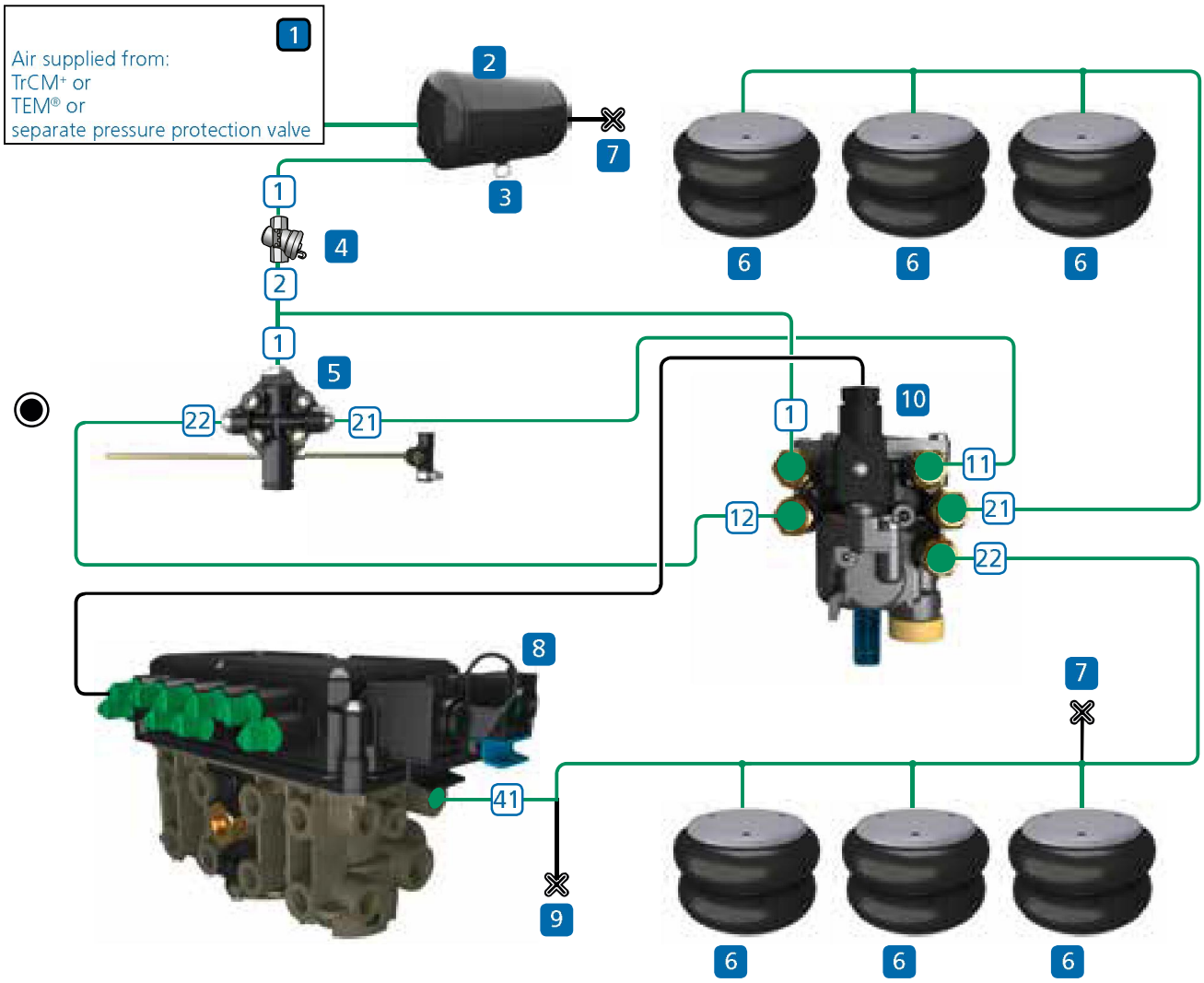
Key

1 Port number

1 Components

Item	Description	Notes
1	Air suspension supply	Air supplied from TrCM+, TEM® or separate pressure protection valve
2	Air suspension reservoir	
3	Drain valve	
4	Pipe filter	
5	Levelling valve	
6	Suspension bellows	
7	Test point	
8	EB+ Gen3 assembly	
9	Test point simulator	

2M, levelling valve and COLAS®



Note:
EB+ Gen3 should be supplied with clean / dry air.

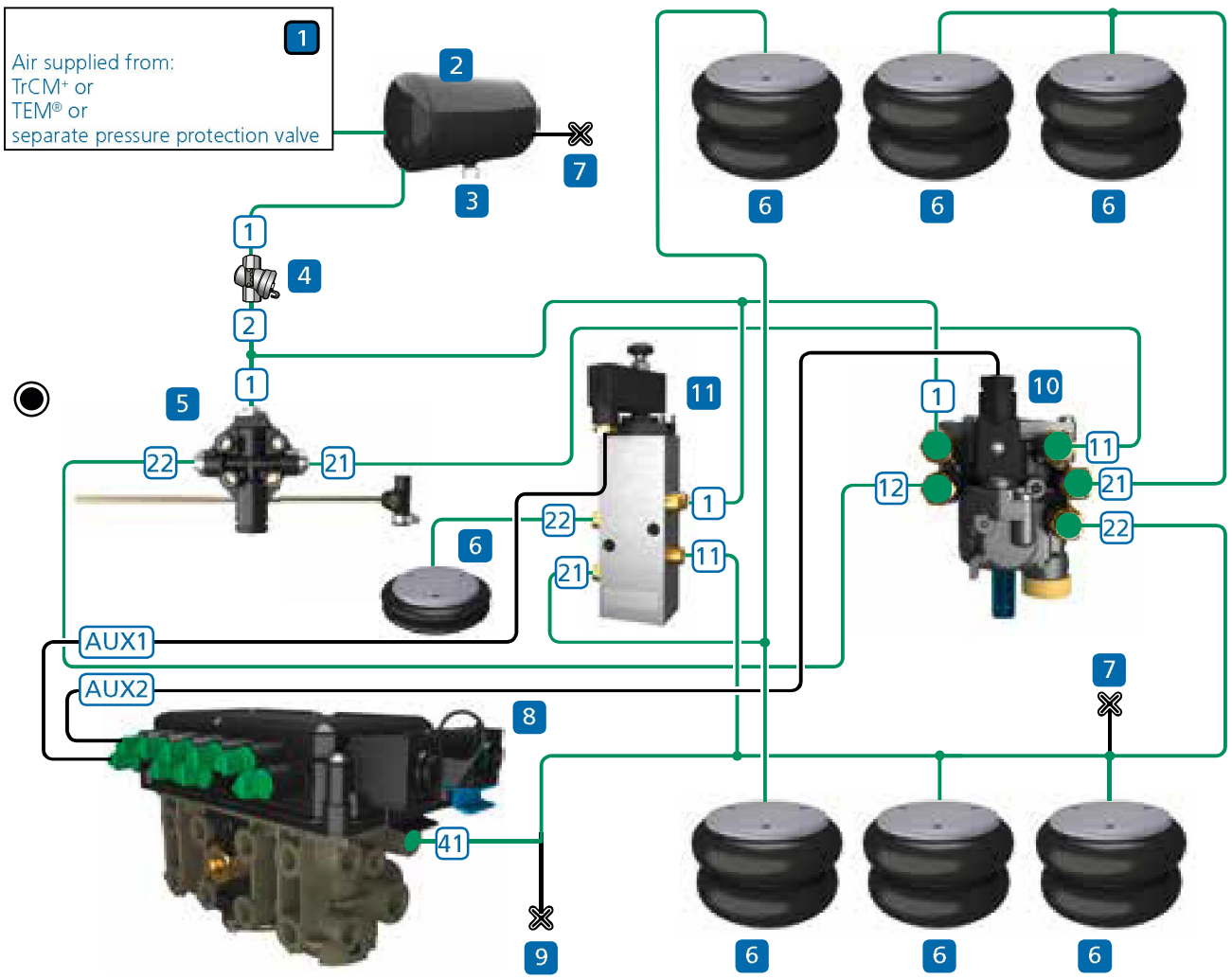
Key

1 Port number

1 Components

Item	Description	Notes
1	Air suspension supply	Air supplied from TrCM+, TEM® or separate pressure protection valve
2	Air suspension reservoir	
3	Drain valve	
4	Pipe filter	
5	Levelling valve	
6	Suspension bellows	
7	Test point	
8	EB+ Gen3 assembly	
9	Test point simulator	
10	COLAS®	

2M, COLAS+® and ILAS®-E



Note:
EB+ Gen3 should be supplied with clean / dry air.

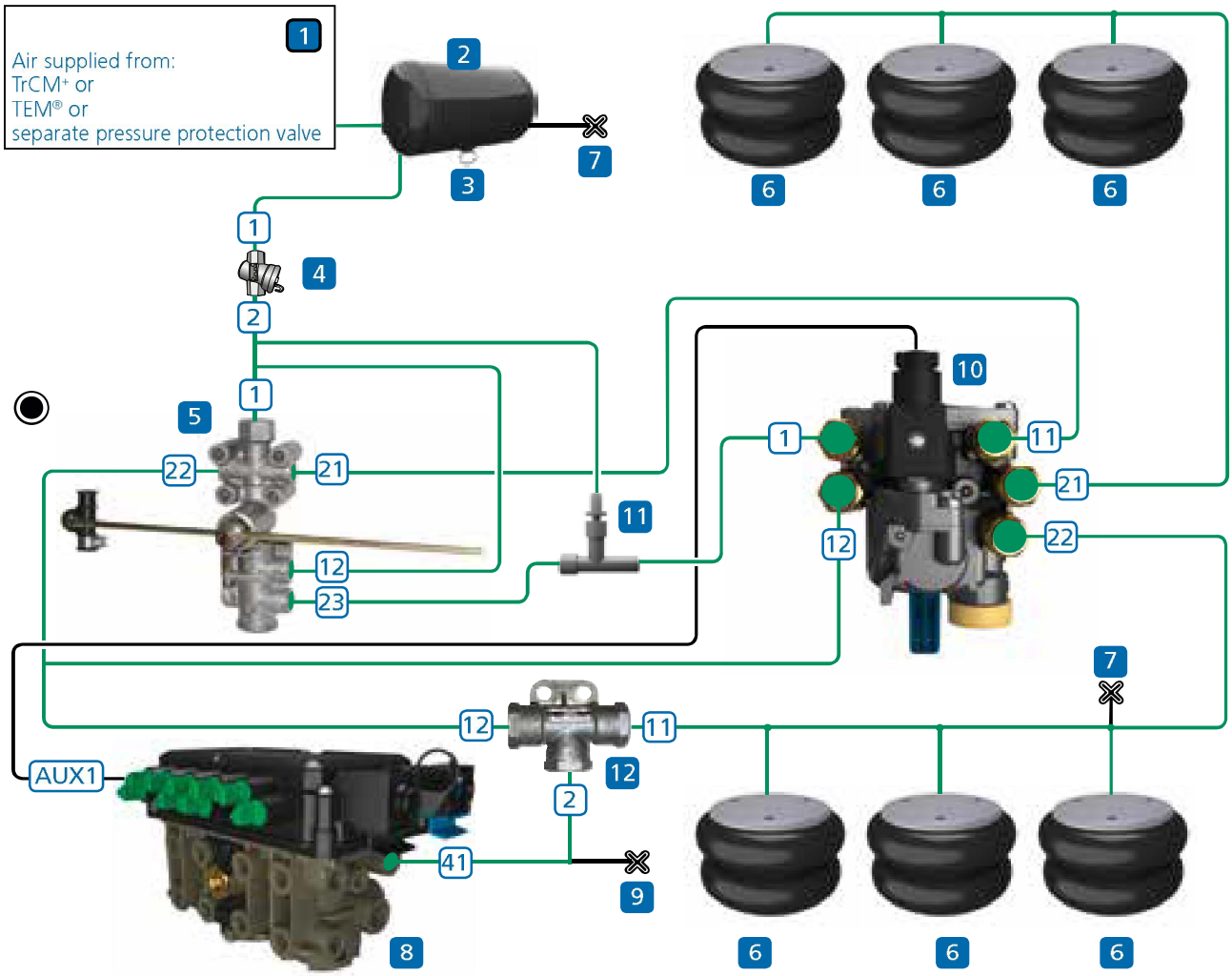
Key

1 Port number

1 Components

Item	Description	Notes
1	Air suspension supply	Air supplied from TrCM+, TEM® or separate pressure protection valve
2	Air suspension reservoir	
3	Drain valve	
4	Pipe filter	
5	Levelling valve	
6	Suspension bellows	
7	Test point	
8	EB+ Gen3 assembly	
9	Test point simulator	
10	COLAS+®	
11	ILAS®-E	

2M, COLAS®+, height limitation, option 1 preferred (with DCV)



Note:
EB+ Gen3 should be supplied with clean / dry air.

Key

1 Port number

1 Components

Item	Description	Notes
1	Air suspension supply	Air supplied from TrCM+, TEM® or separate pressure protection valve
2	Air suspension reservoir	
3	Drain valve	
4	Pipe filter	
5	Levelling valve	With height limitation
6	Suspension bellows	
7	Test point	
8	EB+ Gen3 assembly	
9	Test point simulator	
10	COLAS®+	
11	Throttle restrictor	Optional upon installation specification
12	Double check valve (DCV)	Optional fitment

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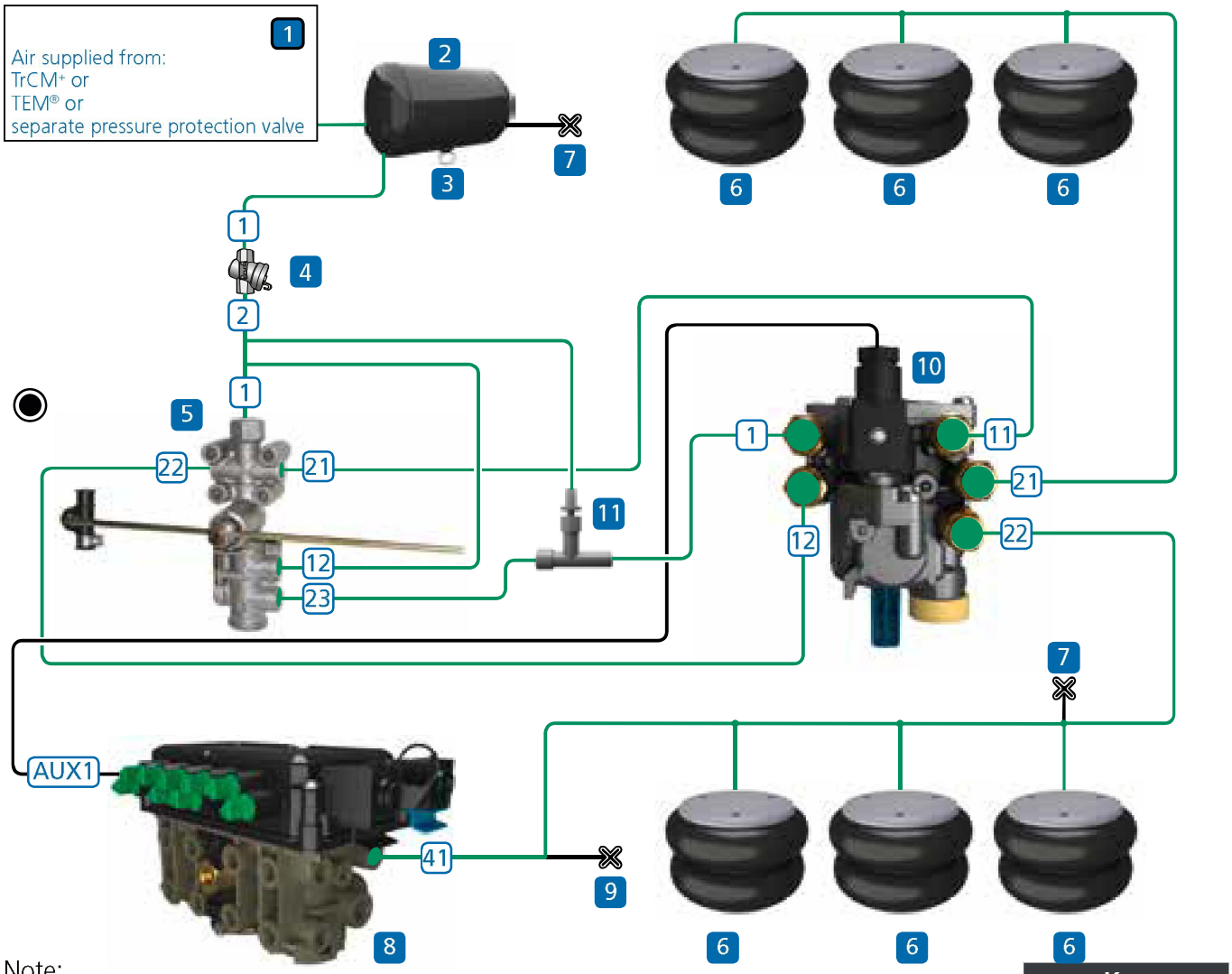
2M, COLAS®+, height limitation - option 2 (without DCV)



Note:
EB+ Gen3 should be supplied with clean / dry air.

Key

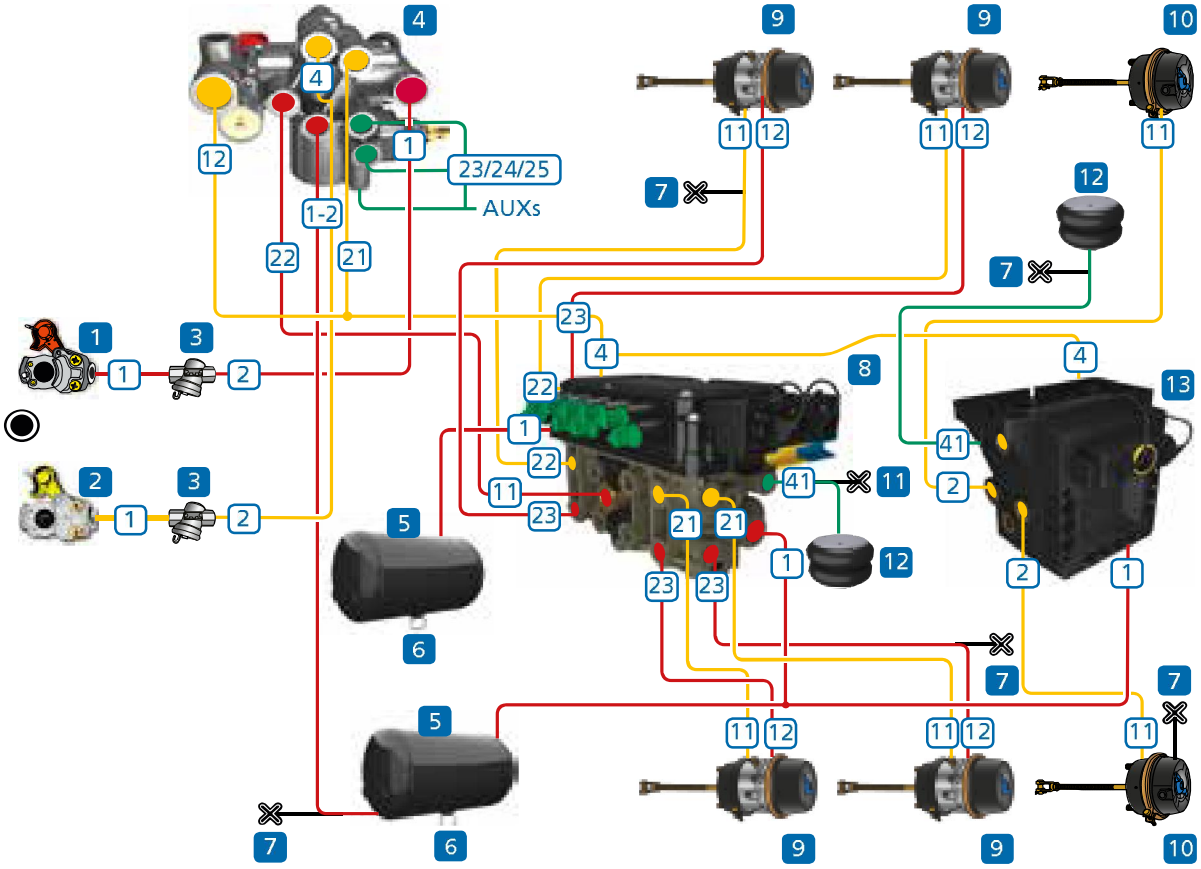
1 Port number

1 Components

Item	Description	Notes
1	Air suspension supply	Air supplied from TrCM+, TEM® or separate pressure protection valve
2	Air suspension reservoir	
3	Drain valve	
4	Pipe filter	
5	Levelling valve	With height limitation
6	Suspension bellows	
7	Test point	
8	EB+ Gen3 assembly	
9	Test point simulator	
10	COLAS®+	
11	Throttle restrictor	Optional upon installation specification

Piping layout – 3M brake

3M, with TrCM+



Note:
EB+ Gen3 should be supplied with clean / dry air.

Key

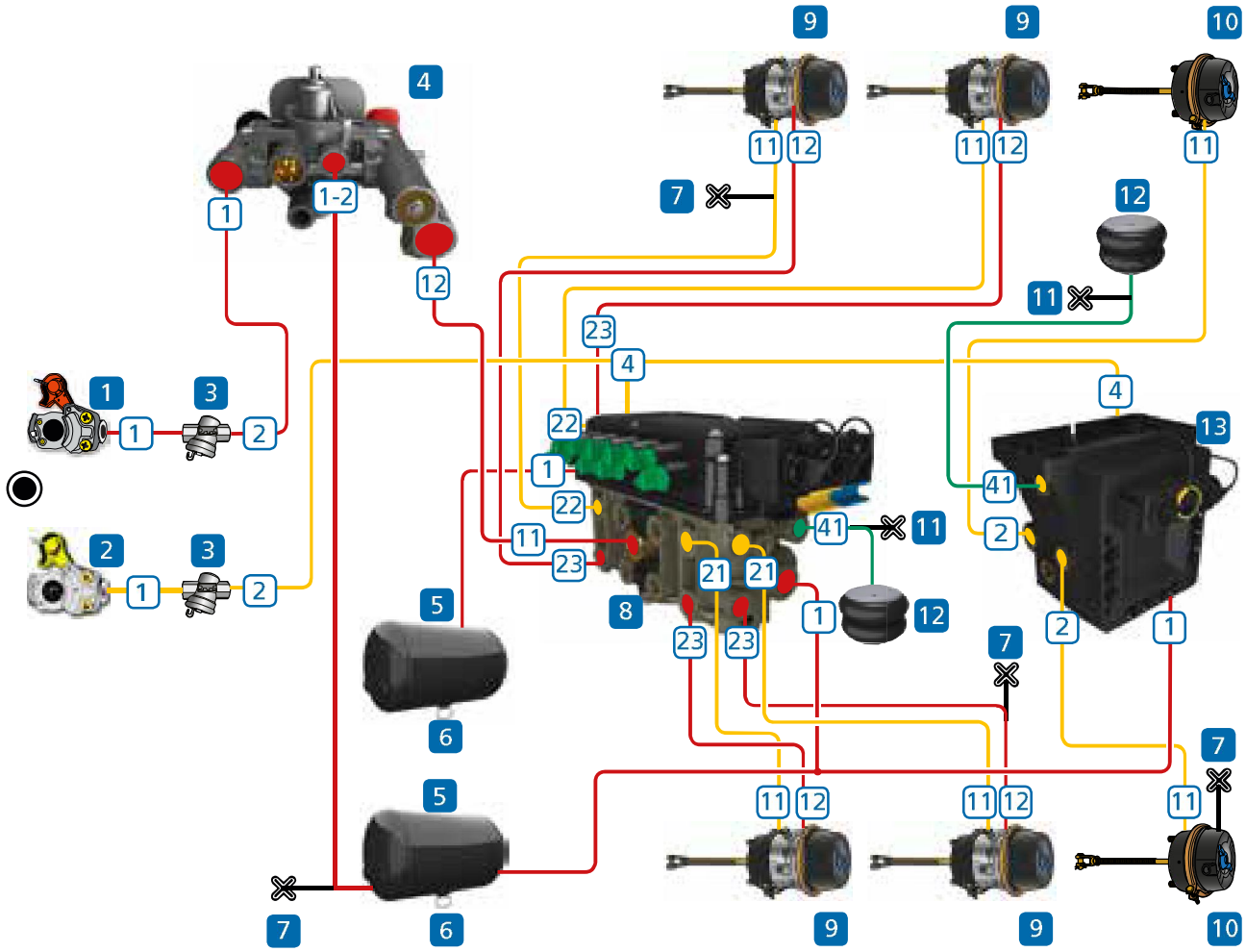
1 Port number

1 Components

Item	Description	Notes
1	Emergency coupling	
2	Service coupling	
3	Pipe filter	
4	TrCM+	
5	Air reservoir	
6	Drain valve	
7	Test point	
8	EB+ Gen3 assembly	Use Premium version
9	Spring brake chamber	
10	Single diaphragm brake chamber	
11	Test point simulator	
12	Suspension bellows	
13	EB+ Gen3 Slave assembly	

TRANSPORT EQUIPMENT AUSTRALIA

3M, with TEM®



Note:
EB+ Gen3 should be supplied with clean / dry air.

Key

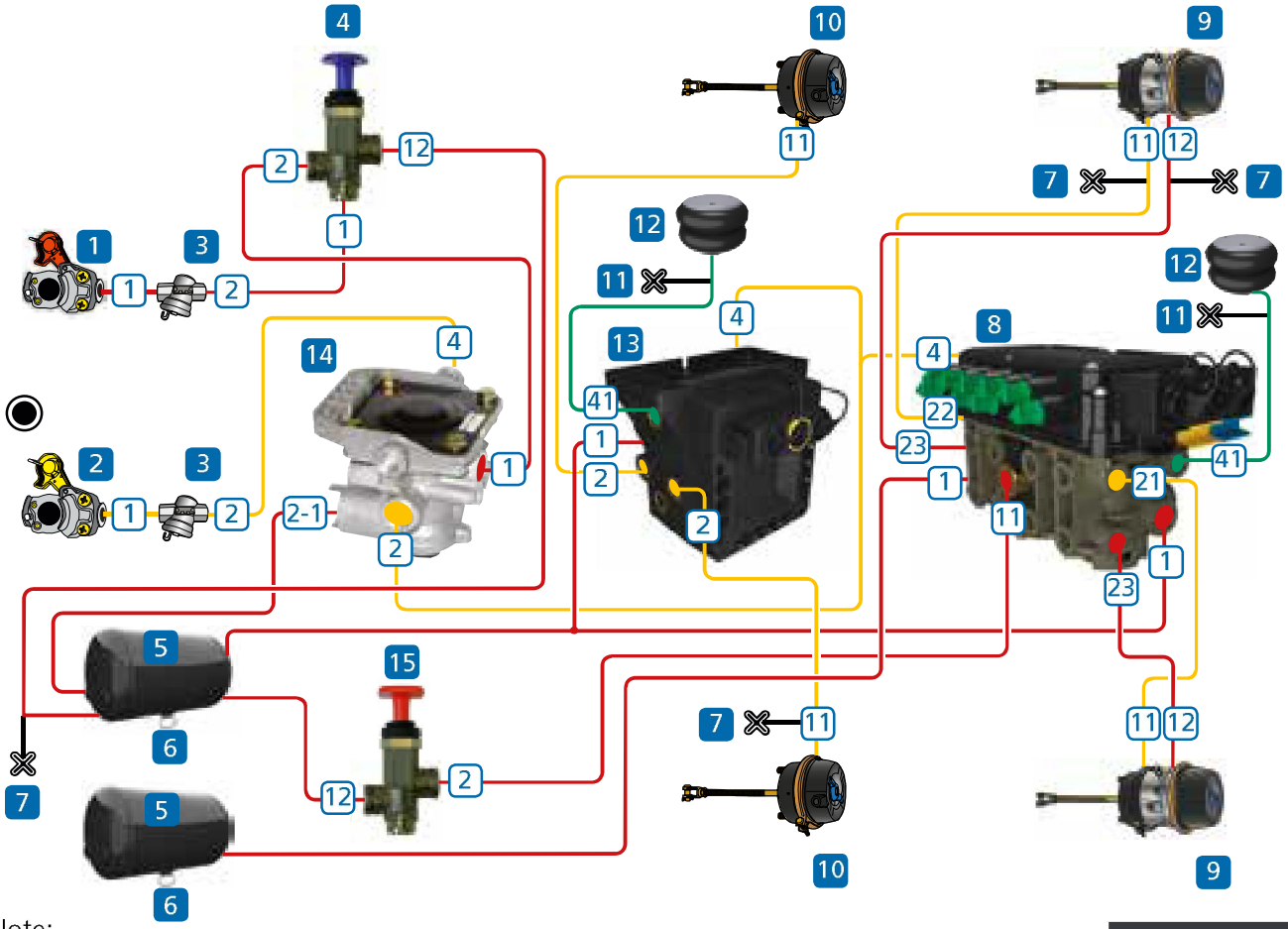
1 Port number

1 Components

Item	Description	Notes
1	Emergency coupling	
2	Service coupling	
3	Pipe filter	
4	TEM®	
5	Air reservoir	
6	Drain valve	
7	Test point	
8	EB+ Gen3 assembly	Use Premium version
9	Spring brake chamber	
10	Single diaphragm brake chamber	
11	Test point simulator	
12	Suspension bellows	
13	EB+ Gen3 Slave assembly	

TRANSPORT EQUIPMENT AUSTRALIA

3M, full trailer with REV and individual park & shunt valves



Note:
EB+ Gen3 should be supplied with clean / dry air.

Key

1 Port number

1 Components

Item	Description	Notes
1	Emergency coupling	
2	Service coupling	
3	Pipe filter	
4	Shunt valve	
5	Air reservoir	
6	Drain valve	
7	Test point	
8	EB+ Gen3 master assembly	Use Premium version
9	Spring brake chamber	
10	Single diaphragm brake chamber	
11	Test point simulator	
12	Suspension bellows	
13	EB+ Gen3 Slave assembly	
14	Relay Emergency Valve (REV)	
15	Park valve	

System layout

The system fitted to your trailer may have 2 or 4 sensors and 2 or 3 modulators (EPRV's). The variants available being 2S / 2M, 4S / 2M and 4S / 3M.The system can be powered by the following methods.

ISO 7638 7-pin - Full EBS function fig 1.
ISO 7638 5-pin (no CAN data bus) - ABS + ELS function only fig 2.
ISO 12098 / ISO 1185 (24N) - stop light powering provides ABS function fig 3.

Note:
The ISO 7638 controls a trailer warning device in the driver's console.

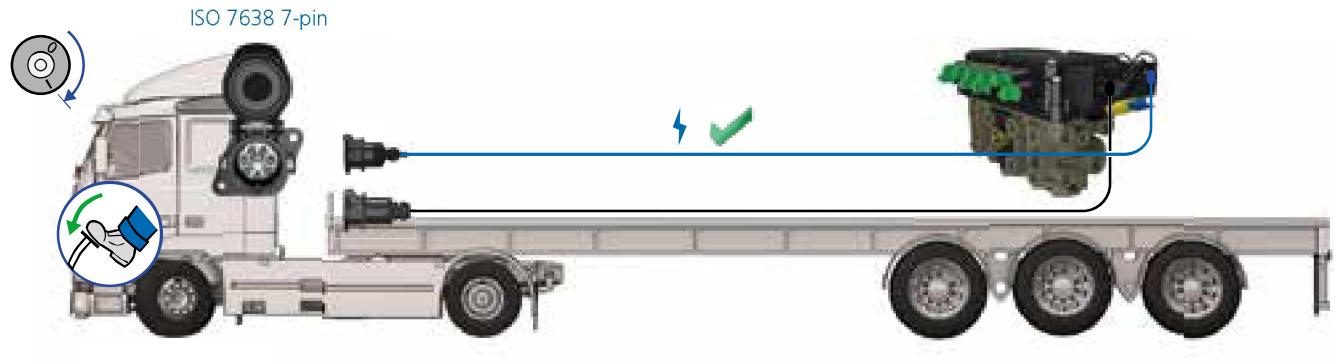


Fig 1

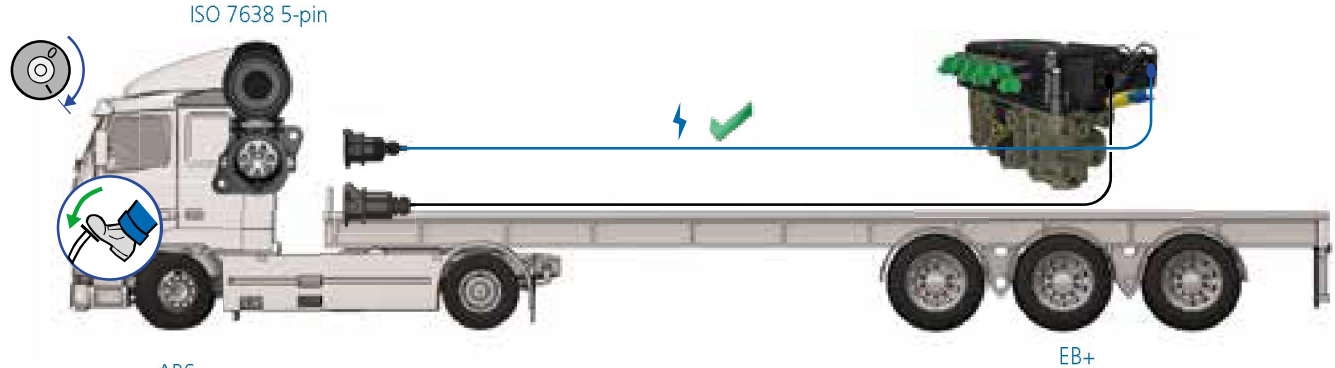


Fig 2

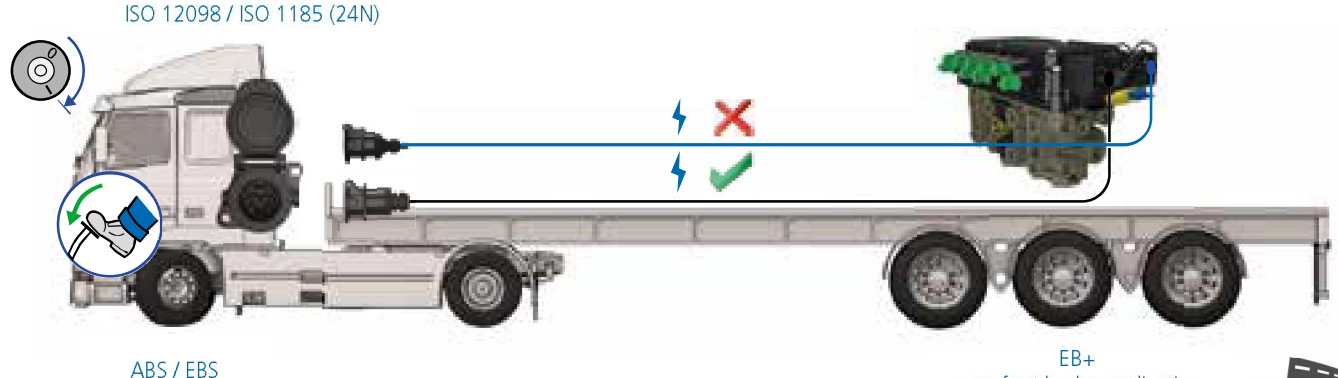
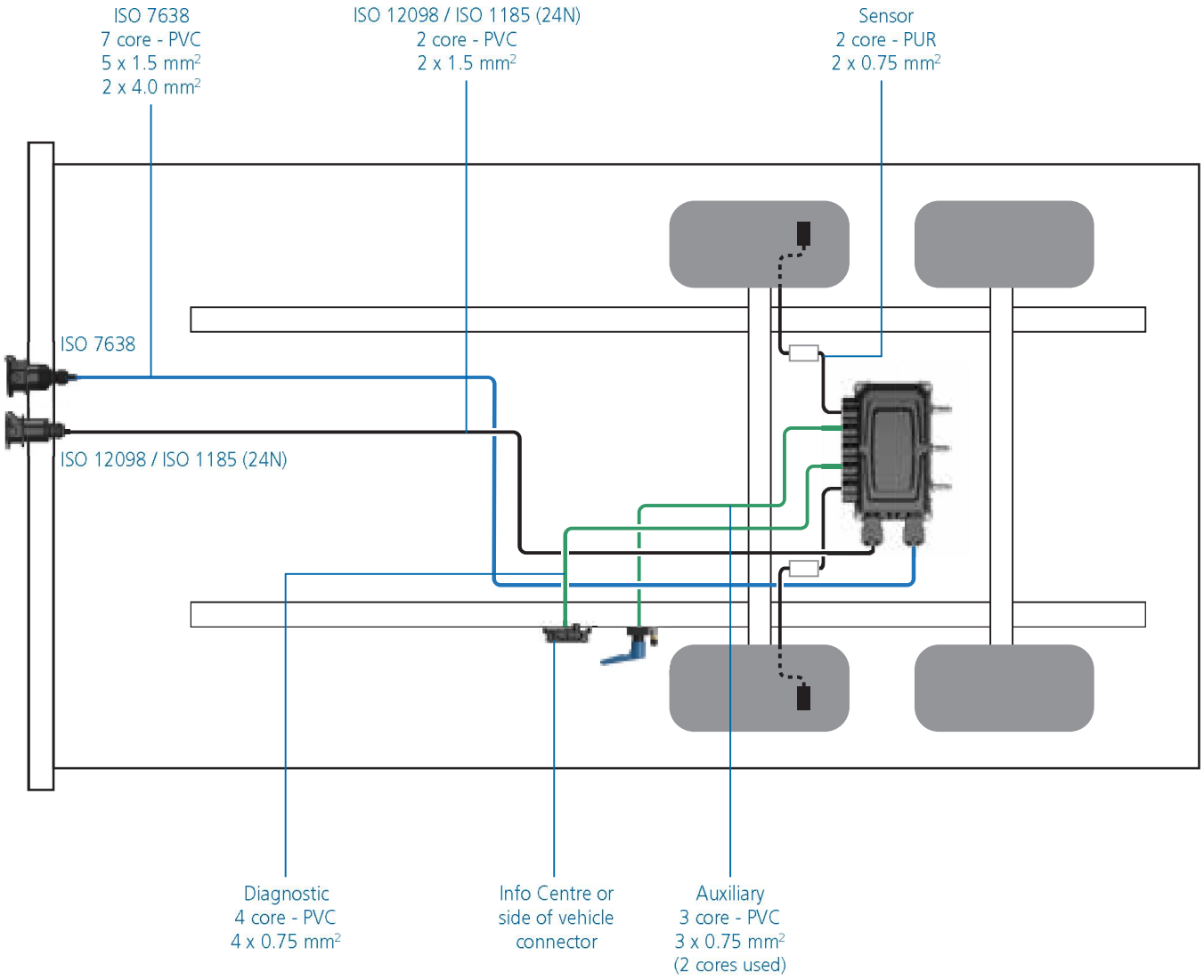


Fig 3

Wiring schematic



ISO 7638 socket assembly

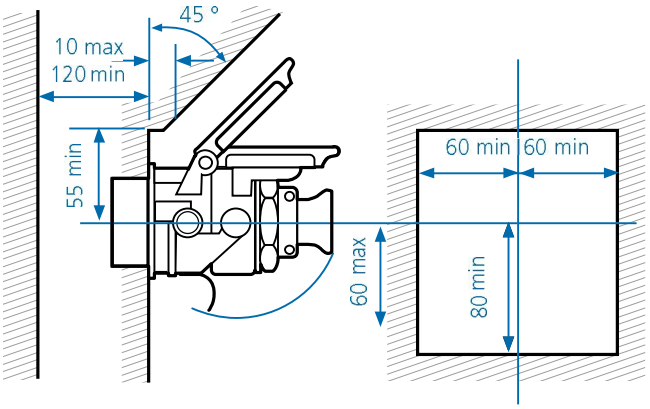
ISO 7638 5-pin

Pin no	Description	Notes
1	Red (RD) 4 mm²	B+ batt
2	Black (BK) 1.5 mm²	B+ ign
3	Yellow (YE) 1.5 mm²	B- earth
4	Brown (BN) 4 mm²	B- earth
5	White (W) 1.5 mm²	Lamp

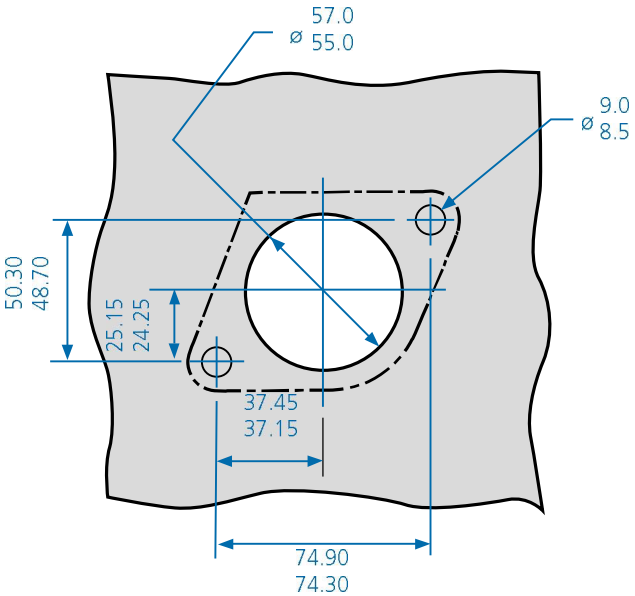
Pin detail and identification key location

ISO 7638 7-pin

Pin no	Description	Notes
1	Red (RD) 4 mm²	B+ batt
2	Black (BK) 1.5 mm²	B+ ign
3	Yellow (YE) 1.5 mm²	B- earth
4	Brown (BN) 4 mm²	B- earth
5	White (W) 1.5 mm²	Lamp
6	White / green (W / GN) 1.5 mm²	CAN hi
7	White / brown (W / BN) 1.5 mm²	CAN lo

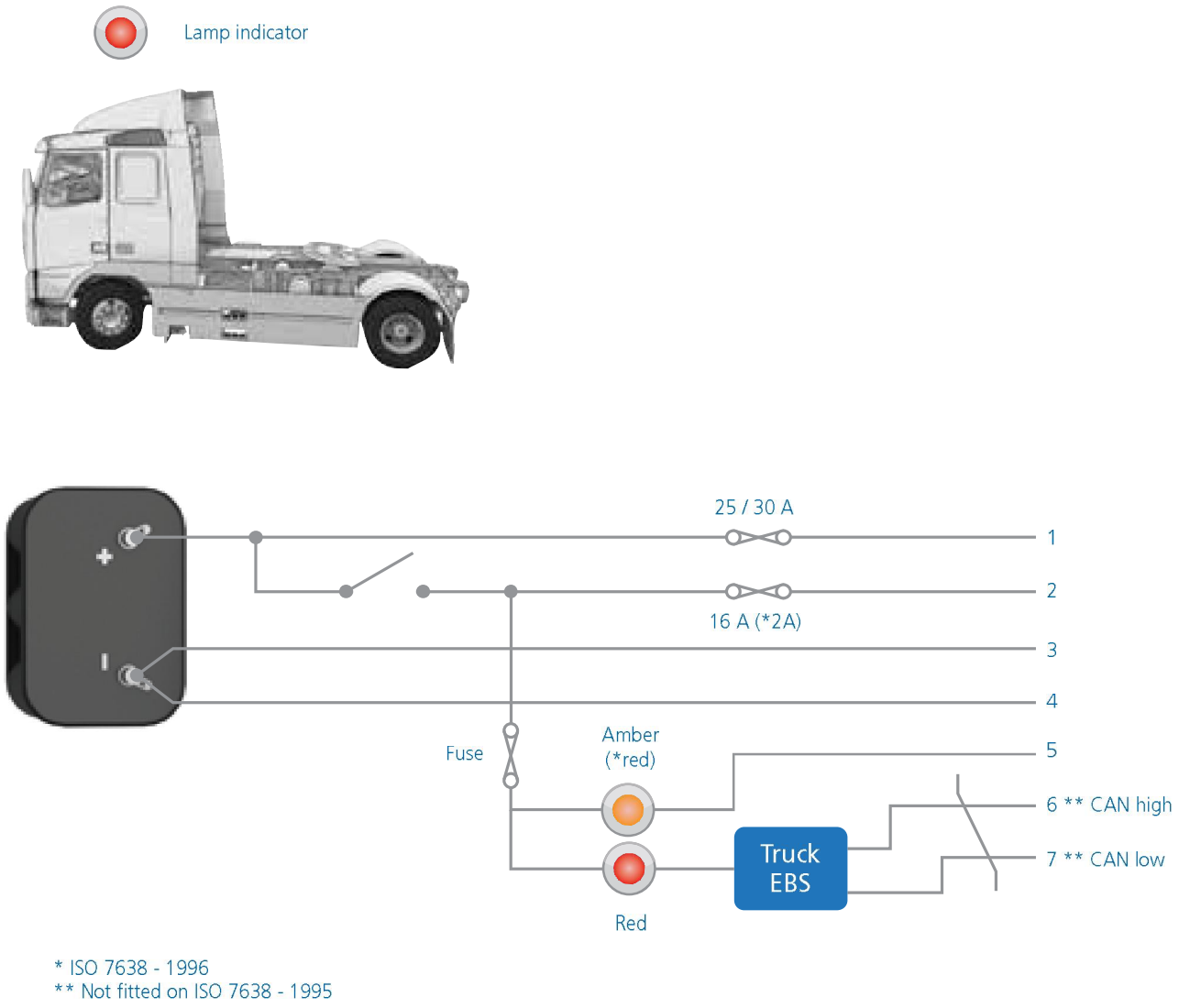


Clearance dimensions



Socket mounting dimensions

Towing vehicle EBS / ABS ISO 7638 wiring



* ISO 7638 - 1996
** Not fitted on ISO 7638 - 1995

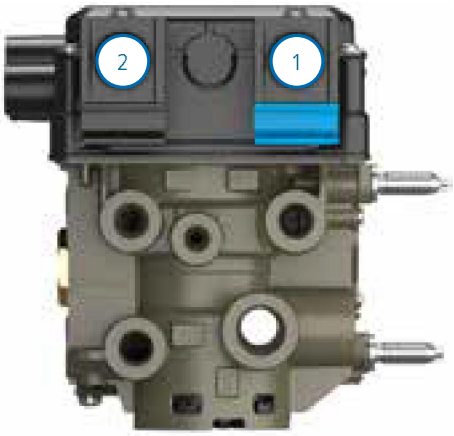
ISO 7638 7-pin

Pin no	Description	Notes
1	Red (RD) 4 mm²	B+ batt
2	Black (BK) 1.5 mm²	B+ ign
3	Yellow (YE) 1.5 mm²	B- earth
4	Brown (BN) 4 mm²	B- earth
5	White (W) 1.5 mm²	Lamp
6	White / green (W / GN) 1.5 mm²	CAN hi
7	White / brown (W / BN) 1.5 mm²	CAN lo

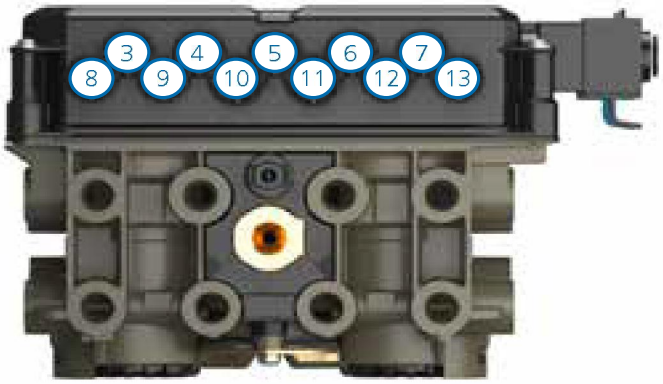
ECU connections - 2M

1	ISO 7638
2	ISO 12098 / ISO 1185 (24N)
3	AUX 1
4	AUX 2
5	AUX 3
6	AUX 4
7	AUX 5
8	Sensor S2B
9	Sensor S1B*
10	DIAGN
11	DIAGN
12	Sensor S1A*
13	Sensor S2A

* minimum requirement for a 2S / 2M system



EB+ Gen3 2M



Power up the EB+ ECU. During the self check procedure the system displays the following functions: the trailer EBS warning light comes 'On' and stays 'On'. One audible cycle is produced by the EPRV's (EBS valves).

At the same time the led on the USB dongle will illuminate 'red / green' to show that is receiving a power supply from the ECU.

Red / green led

Note:
It is possible to use the DIAG+ software to set the ECU parameters with only the power supply ISO 7638 and interconnection cable (Master to Slave ECU) connected. But diagnostic codes will be logged and will require to be deleted on the final vehicle installation.