SAF Holland Group

INSTALLATION GUIDE



ABS 4.0

Haldex

www.haldex.com

Notes on the use of this manual

This manual has been designed to assist personnel in satisfactory installation of Haldex ABS 4.0 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 ABS 4.0 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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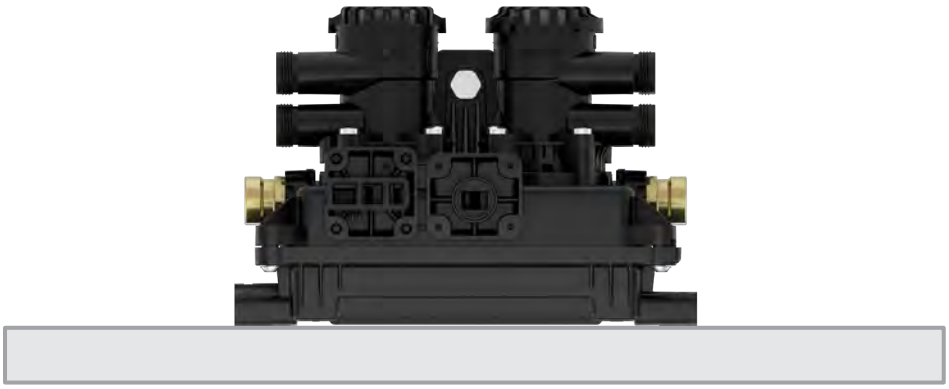
Safety guidelines

These safety guidelines apply to general service and diagnostics of braking and compressed air systems. Always consult axle or vehicle manufacturer guidelines, especially for jacking and securing vehicles. Follow these safety measures, with particular focus on visually inspecting components for damage and consulting a Haldex support centre if issues are found.

Careful handling of ABS units

› Keep ABS units in their original packaging until they are ready for installation to protect them from accidental damage or contamination.

› Once removed from the packaging, always rest the unit on its ECU lid.



Visual inspection and damage precautions

Inspect all components for damage

› Before starting work: Carefully check all hoses, pipes, fittings, and components for signs of damage, such as kinks, dents, cracks, abrasions, corrosion and wear. Do not proceed with work on damaged parts.

› Consult Haldex Technical Support: If any component is visually damaged or worn, consult a your local Haldex Technical Support Services for replacement advice. Do not attempt repairs on damaged parts unless directed by a Haldex Technical Support Services.

Secure all connections

› Ensure all hoses, tubes, and fittings are securely attached and free from wear or movement that could lead to abrasion or heat exposure. Any replacements must match the original specifications and be designed for air braking systems.

General safety precautions

Use protective gear:

› Always wear safety glasses when working with compressed air systems to protect your eyes from potential hazards.

Pressure management:

› Never exceed manufacturer-recommended air pressures. Avoid looking directly into air jets or directing them toward others.

Pressurized components handling:

› Do not connect or disconnect hoses or lines under pressure, as they may whip dangerously if air escapes.

› Confirm all system pressure is depleted before removing any device or pipe plug.

Vehicle safety measures:

› Park on a level surface, apply parking brakes, and chock the wheels before depleting air system pressure to prevent the vehicle from rolling.

Special precautions for air braking systems:

› When draining air from braking or auxiliary air systems, stay clear of brake actuator push rods and levers, as they may shift with pressure drops.

› Be cautious with vehicles that have an air dryer system, as it may still contain pressure even after draining the main reservoirs.

Engine and component safety

Engine shutdown precautions:

› When working near the engine, ensure it is off and the ignition key is removed. If the engine must run, use extreme caution around moving or heated parts. Place a clear warning sign near the steering wheel indicating work is in progress.

Damaged components handling:

› Replace any component with stripped threads, corrosion, or damage immediately. Repairs requiring machining or welding should only be done with manufacturer approval.

Installation and assembly

Follow correct procedures:

› Use proper tools and techniques as outlined in the service instructions. Ensure that any device position or pipework connections are documented before removal to allow for accurate reinstallation.

› Ensure adequate support or assistance when handling heavy components.

Use authorized replacement parts:

› Use only genuine Haldex parts, components, and kits to ensure safety and compatibility with your system.

Post-service checks

Final visual and functional inspection:

› Inspect all serviced or replaced components for damage and correct installation. Test any components that affect braking or system behaviour on a roller dynamometer.

› Ensure the entire brake system is leak-free and restored to full functionality before returning the vehicle to service.

Welding

The following precautions should be used during welding repairs or where heat is applied to the trailer for general repairs.

Haldex welding recommendations:

1. Disconnect any battery installed to the trailer and towing vehicle if connected.
2. Disconnect the ISO 7638 connector from the towing vehicle if connected.
3. Always connect the grounding electrode directly to the metal close as possible to the welding position when welding.
4. Remove paint and corrosion from the trailer where the ground electrode contact point.
5. Prevent heat from the welding process from damaging the cables and braking system Electronic Control Unit.
6. Warranty is void if parts are damaged by welding process.

Painting

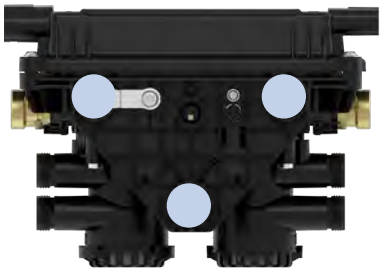
Masked areas

In the event of paint or coating work all none used connections, pneumatic ports and exhausts must be protected. These are indicated by the green shaded areas as shown. Adequate protection should be used to avoid penetration of the paint or coating.

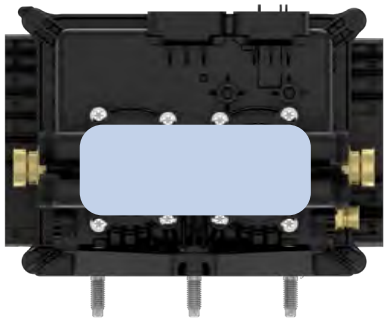
All electrical ports to have connectors / blanking plugs installed. Exhaust ports and connectors / locking areas to be masked during painting.

Painting recommendations: water based, baking for 1 hour at 100°C

Electro static painting: Haldex recommends that the ABS 4.0 assembly is fitted to the trailer after electro static painting.



Mounting face



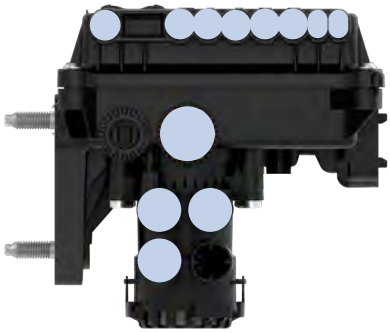
Underside



Front face



Left side



Right side

Introduction

System overview

The newly developed ABS 4.0 trailer brake platform utilises a modular design strategy, where several separate functional modules can be configured into a system with the desired functional scope.

Engineering grade plastic is used for most of the components in the new platform. That provides the end user with a weight advantage and contributes to a smaller CO_2 footprint.

The modular design also improves the serviceability of the system, by offering the possibility to replace modules, or retrofit them when demand arises in certain markets.

A trailer ABS, derived from the ABS 4.0 platform to replace U-ABS in UN R13 derived markets, with an enhanced version which adds roll-over control capability and replaces the apply function of Safety Module.

The ABS 4.0 (UN R13) is intended to be used globally where UN R13 derived regulations are applicable, but especially Asia and South America.

The ABS 4.0 system provides anti-lock control of the trailer brakes for full, semi and centre-axle trailers, with optional roll-over control.

The main system package consists of an electronic control unit (ECU) / modulator assembly, containing a brake apply solenoid (roll-over control variant only), twin solenoid operated relay valves (modulators) and pressure sensors for monitoring the pneumatic control line and air suspension pressure (roll-over control variant only). The ABS 4.0 system is available with a dual modulator valve (2M) and optionally one additional single modulator valve (3M).

Trailers fitted with the system may only be towed behind vehicles fitted with an ISO 7638 connector (either 7 pin or 5 pin). All controllers support ISO 11992 communications, but none support electric control line braking.

Optionally an ISO 1185 (24N), ISO 1724 (12N) or ISO 12098 (15 pole) stoplight power back-up connection can be fitted. This provides anti-lock braking control in situations where the ISO 7638 connection is not functioning and is not intended as a normal operating mode.

ABS 4.0 Part numbers

ABS

Description	ABS 4.0 Part no.	Notes
ABS 4.0 2M Basic	364 635 001	ISO 7638 7-pin
ABS 4.0 2M Premium	364 635 101	ISO 7638 7-pin
ABS 4.0 2M Premium (with roll-over control)	364 635 201	ISO 7638 7-pin
ABS 4.0 1M Slave (ABS version)	364 644 001	The ABS 4.0 Slave will work with all of the ABS master Premium units, including RoC.
EB+ 4.0 1M Slave (EBS version)	841 001 xxx	The EBS Slave will work with all of the EBS and ABS master Premium units.

Compatible Park & Shunt valves

Description	Part no.	Pressure protection valve	Safe Parking	Full Trailer	Emergency function	Material
Park & Shunt with REV	352 044 001	Without	Without	Yes	Service brake	Metal
Park & Shunt	352 046 001	Without	Without	No	Spring brake	Metal
TrCM	352 067 xxx	With	Without	Yes	Service brake	Metal
TrCM+	352 067 xxx	With	With	Yes	Service brake	Metal
TEM	352 075 xxx	With & Without	With	No	Spring brake	Metal
TEM+	352 091 xxx	Without	With	No	Spring brake	Plastic
TEM+	352 092 xxx	With	With	No	Spring brake	Plastic

Product variants

This table gives you an overview of the three main ABS variants, with their options and features.
In general, there are three 2M systems of Basic, Premium and Premium with roll-over control configuration.
Compared to the premium configuration, the basic system supports a limited number of electrical auxiliary ports and no 3M capability.

There is a 1M ABS Slave that can be used to create a 3M system layout.

Part numbers:

ABS 4.0 2M Basic	364 635 001
ABS 4.0 2M Premium	364 635 101
ABS 4.0 2M Premium (with roll-over control)	364 635 201
ABS 4.0 1M Slave	364 644 001
EB+ 4.0 1M Slave	841 001 xxx

Function		Basic ABS	Premium ABS	Premium ABS (with roll-over control)
Electronics and pressure distribution block	Sensor (S) / Modulator (M)	2S / 2M 4S / 2M	2S / 2M 4S / 2M 4S / 3M 6S / 3M	2S / 2M 4S / 2M 4S / 3M 6S / 3M
	Power	Pwr-A (7-pin) & Pwr-B	Pwr-A (7-pin) & Pwr-B	Pwr-A (7-pin) & Pwr-B
	AUX 1-3	1	1-3	1-3
	Wheel speed sensors	4	4	4
	Haldex CAN (H-CAN)	Y	Y	Y
	System CAN (S-CAN)	N	Y	Y
	Gateway R141	Y	Y	Y
Service Block	Modulators	2	2	2

System layout

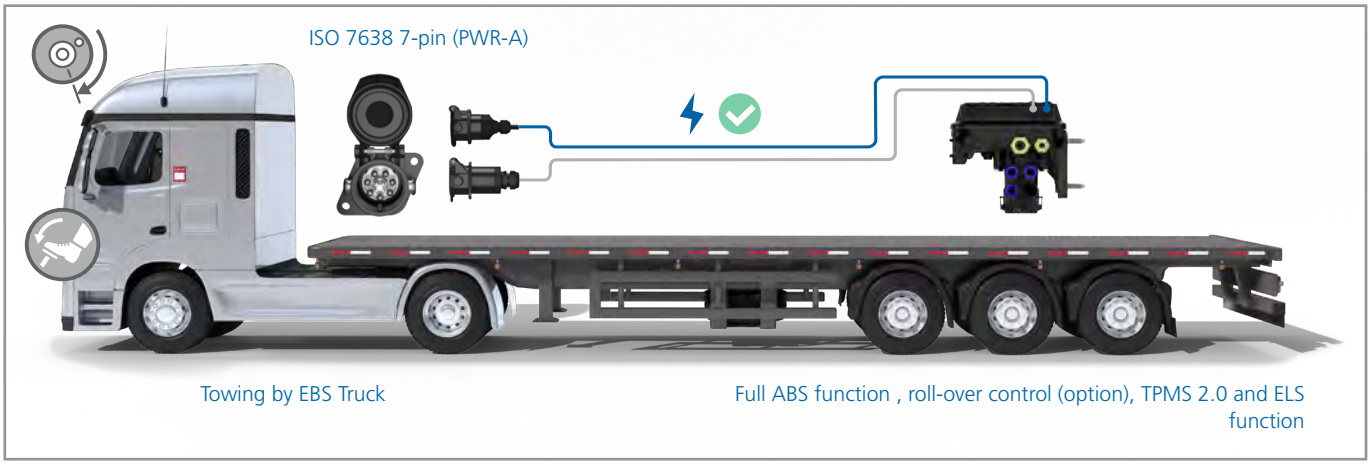
The system fitted to your trailer may have 2, 4 or 6 sensors and 2 or 3 modulators (EPRV's). The variants available being 2S / 2M to 6S / 3M. The system can be powered by the following methods:

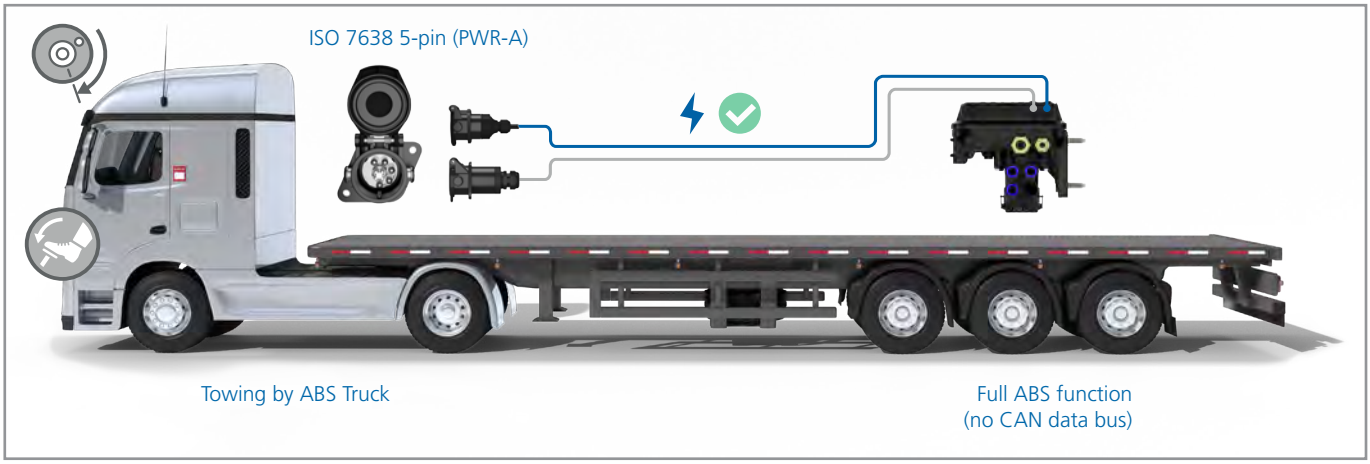
› ISO 7638 7-pin (PWR-A) - Premium (with roll-over control)

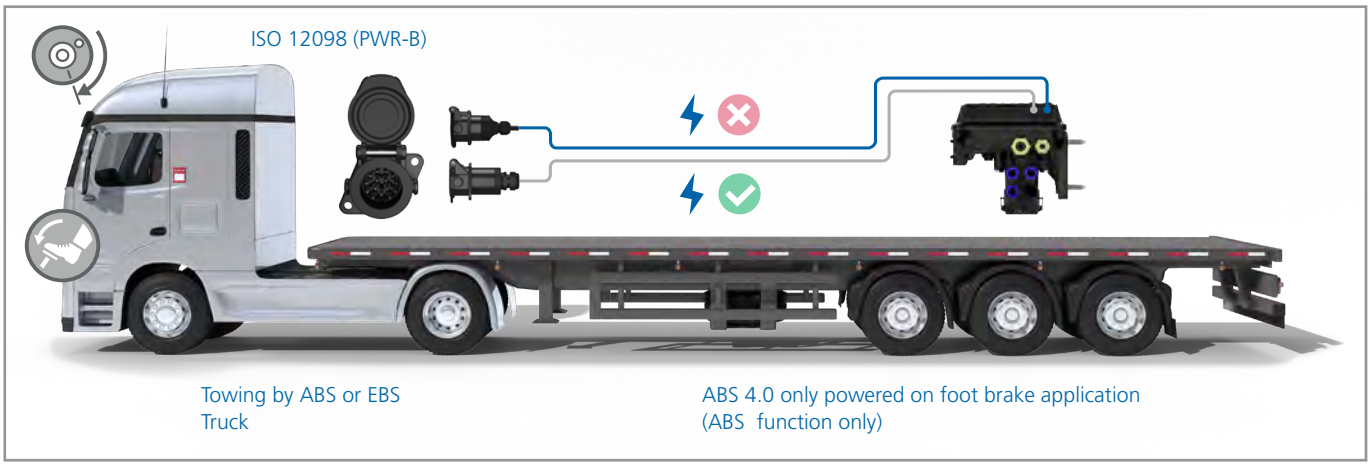
› ISO 7638 7-pin (PWR-A) - Basic & Premium versions

› ISO 12098 (PWR-B) - stop light powering provides ABS function

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







General components – 2M

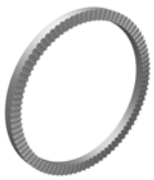
ISO 7638 7-Pin



ISO 12098 / ISO 1185 (24N)













Options

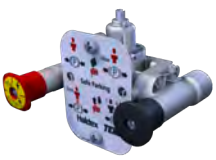
Option 1



TrCM and TrCM+

Part no. 352 067 xxx

Option 2



TEM

Part no. 352 075 xxx



TEM+

Part no. 352 091 xxx

Part no. 352 092 xxx

Option 3

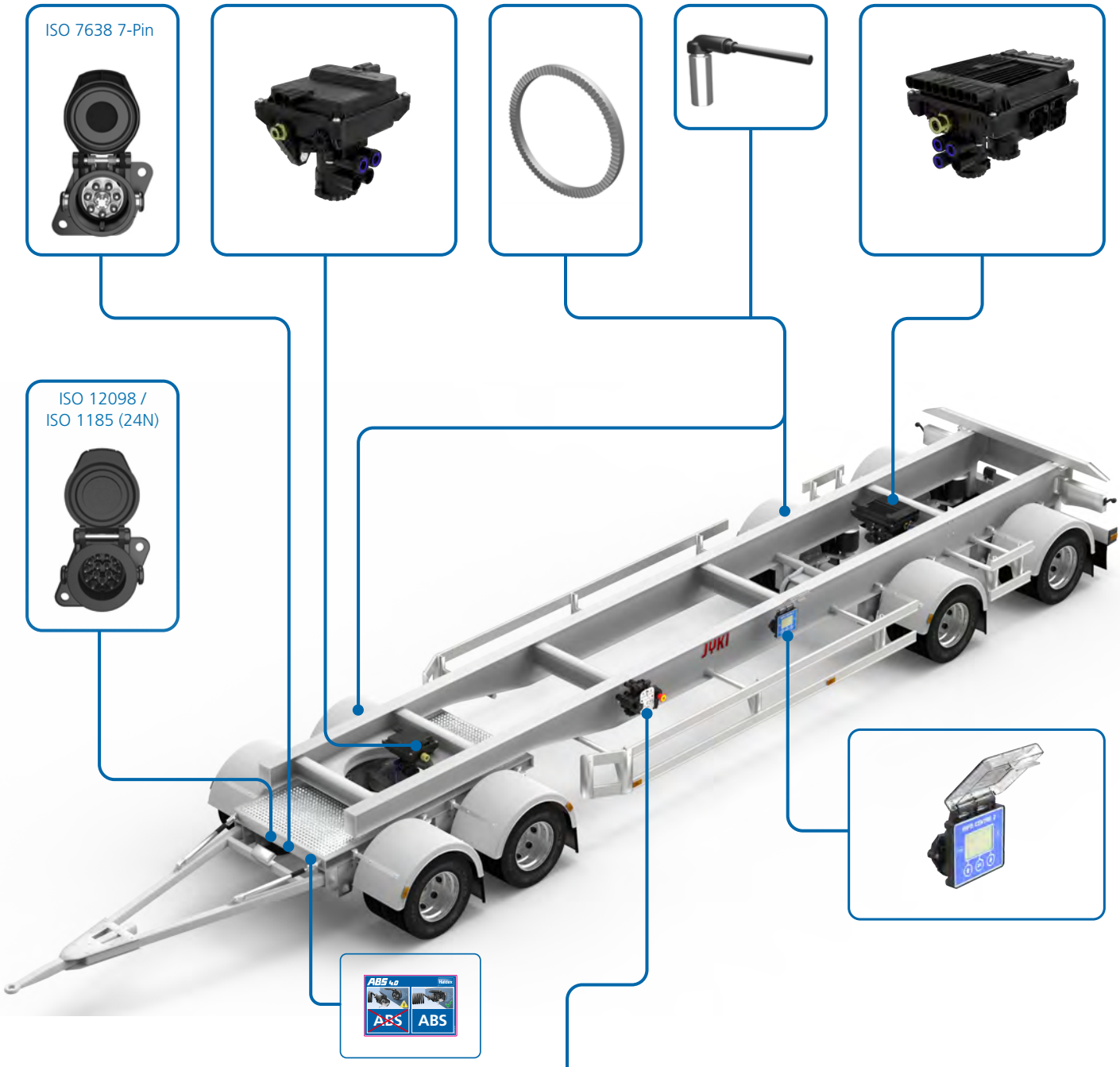


Relay Emergency Valve (REV)



Park and shunt valve

General components – 3M



Options

Option 1



TrCM and TrCM+

Part no. 352 067 xxx

Option 2



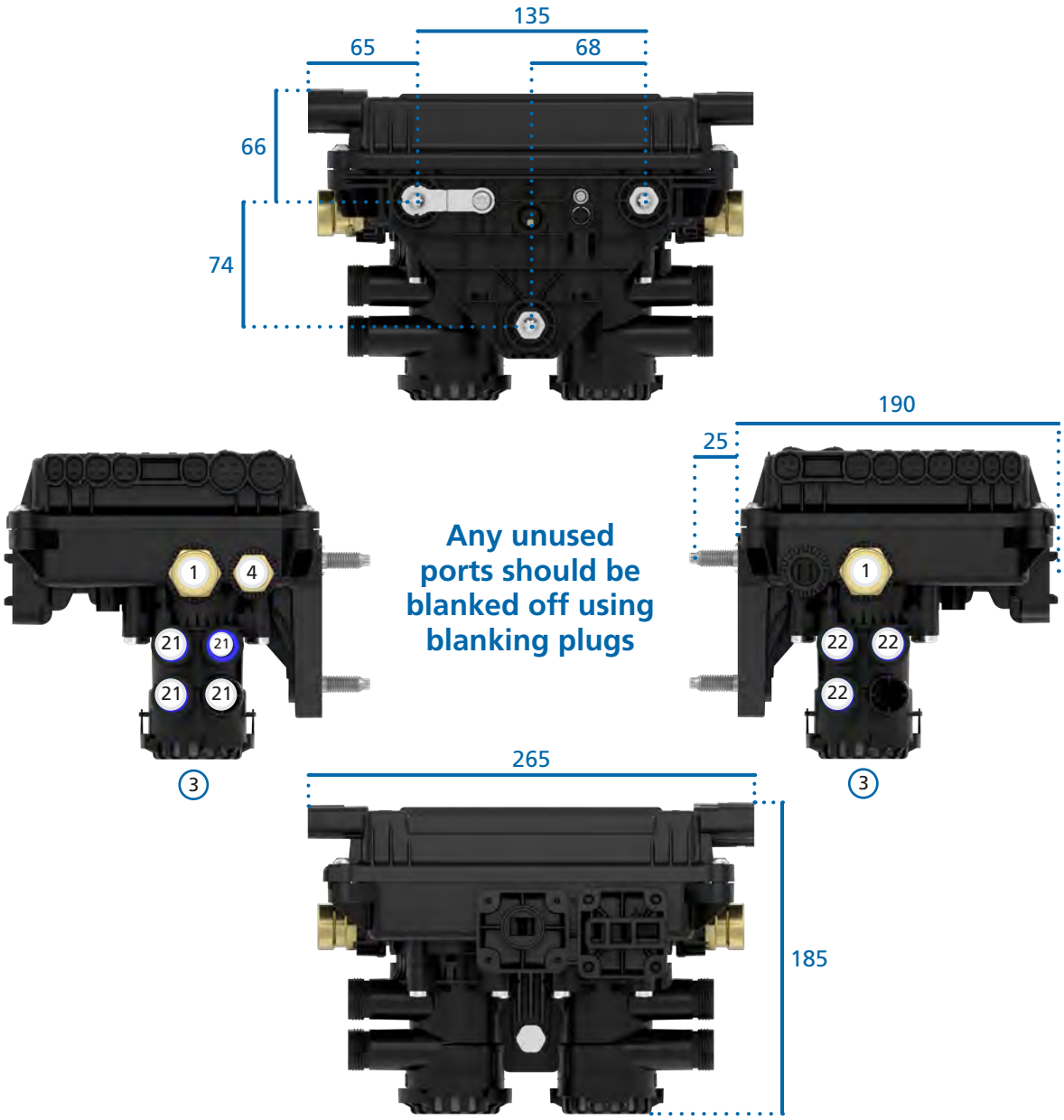
Relay Emergency Valve (REV)



Park and shunt valve

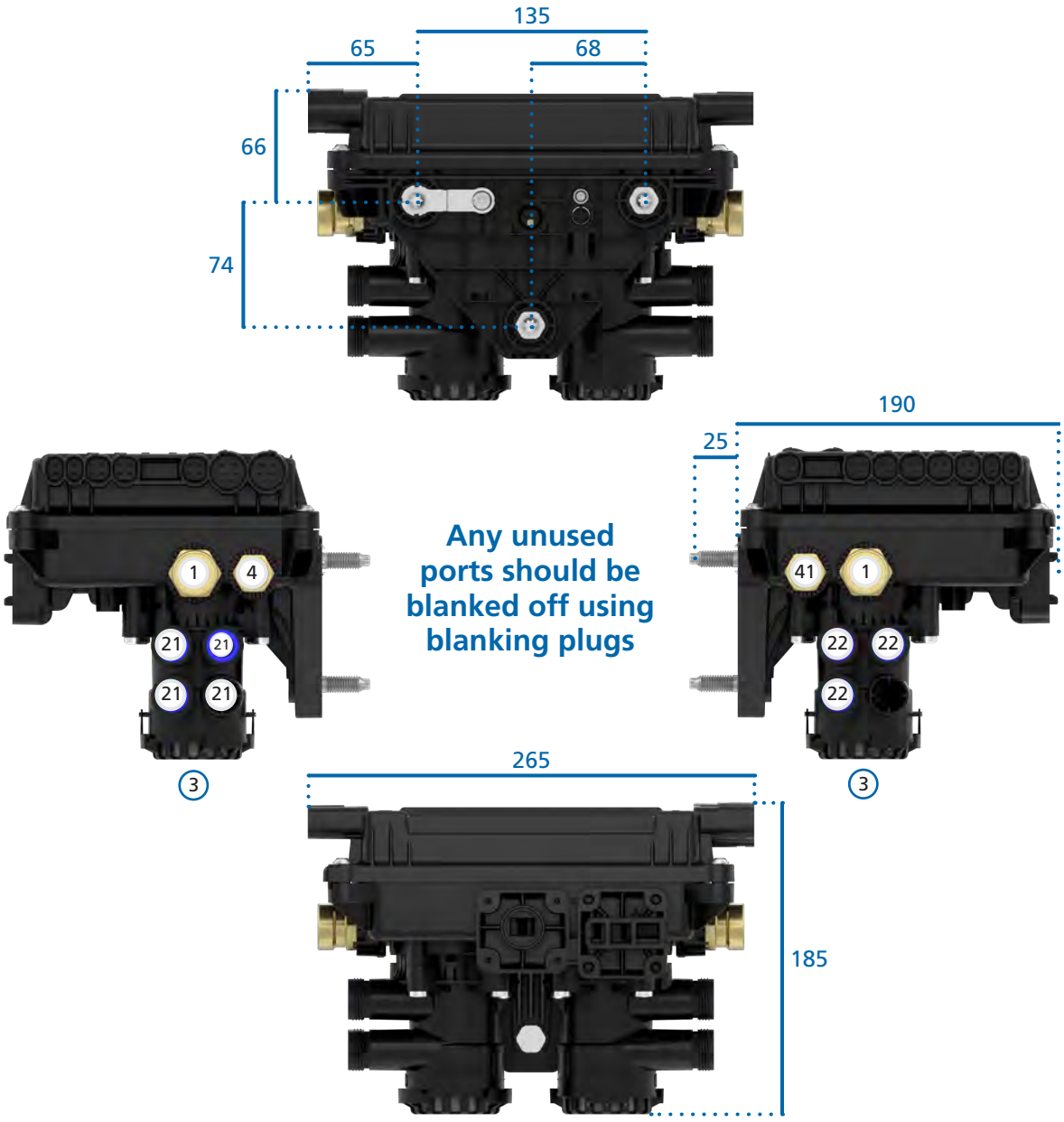
Dimension and port identification

2M Basic & Premium assembly



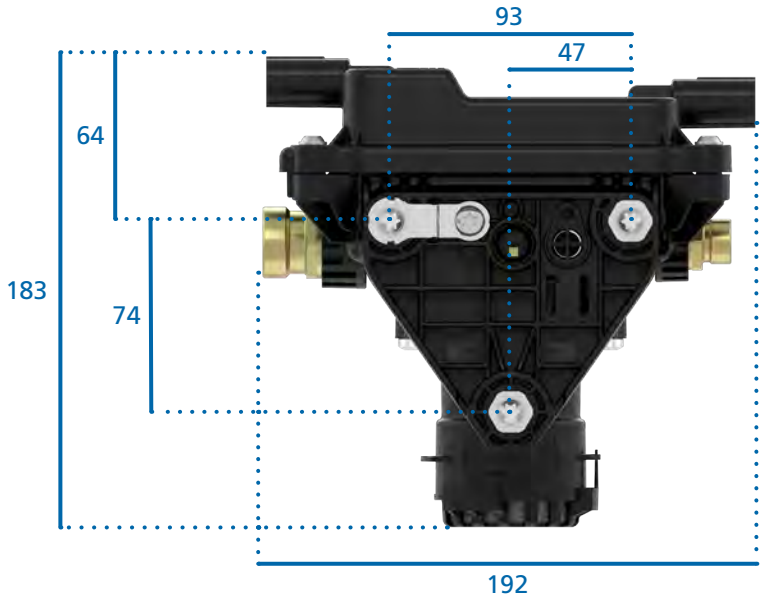
Port	Description	Type	Torque	Size
1	Reservoir port	PTC (Screwed)	15 Nm	15 x 1.5 mm (with filter)
3	Exhaust port			
4	Control port	PTC (Screwed)	10 Nm	8 x 1 mm
21/22	Delivery ports	PTC		12 x 1.5 mm
21	Test point port	PTC		8 x 1 mm

2M Premium (with roll-over control) assembly



Port	Description	Type	Torque	Size
1	Reservoir port	PTC (Screwed)	15 Nm	15 x 1.5 mm (with filter)
3	Exhaust port			
4	Control port	PTC (Screwed)	10 Nm	8 x 1 mm
21/22	Delivery ports	PTC		12 x 1.5 mm
21	Test point port	PTC		8 x 1 mm
41	Air suspension port	PTC (Screwed)	10 Nm	8 x 1 mm

1M Slave assembly





Any unused ports should be blanked off using blanking plugs





Port	Description	Type	Torque	Size
1	Reservoir port	PTC (Screwed)	15 Nm	15 x 1.5 mm (with filter)
2	Delivery ports	PTC		12 x 1.5 mm
3	Exhaust port			
4	Control port	PTC (Screwed)	10 Nm	8 x 1 mm

Open port blanking plug

Any open / unused ABS 4.0 ports should be blanked off using the appropriate size PTC push-in plugs.

Standard port plug

8 x 1 mm & 12 x 1.5 mm port blanking plug.



Push-in blanking plugs

Port size	Port Number	Haldex part no.	Raufoss part no	Notes
8 x 1 mm	4	RTCP008	96210008	Available from Haldex.com
12 x 1.5 mm	21 & 22	RTCP012	96210012	Available from Haldex.com

System Schematics (Appendix 1)

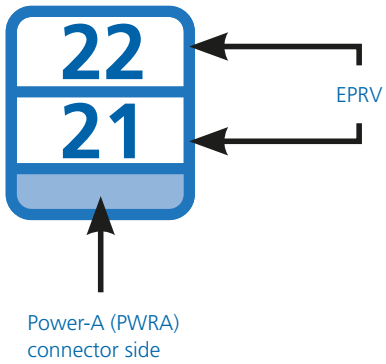
There are three ABS 4.0 systems of Basic, Premium and Premium (with roll-over control) configuration.
All ABS 4.0 systems can be is capable of reading up to 4 sensor signals on the Master unit. Additionally the Slave can read 2 Sensors. The Premium and Premium (with roll-over control) can be connected to one Slave valve, so the max configuration is 6S / 3M - Master with 4S / 2M and one Slave with 2S / 1M.
The Premium ABS only, can be used on system configurations involving the 1M Slave ABS.

Key description

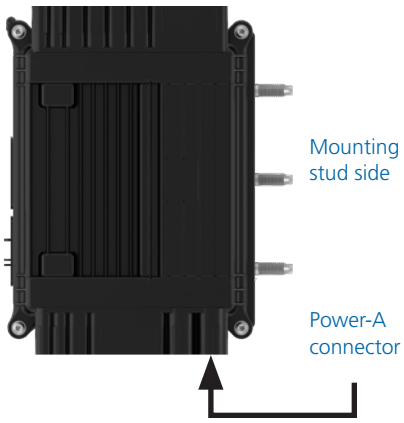
The key description should be used as a reference to fully understand the system schematic drawings, in addition to how the ABS is installed on the trailer.

2M Master ABS front facing

Drawing symbol

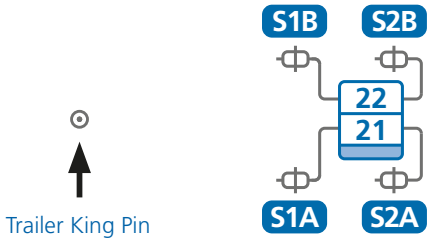


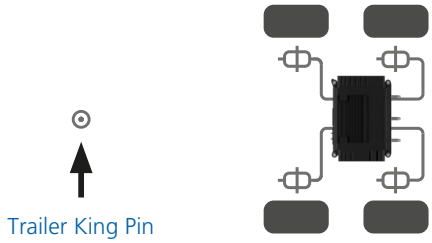
2M Master ABS



Front facing example

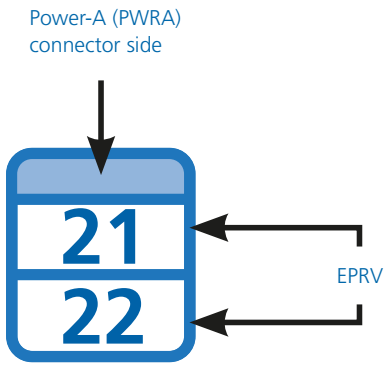
ABS is mounted in front of the cross beam, facing to the front of the trailer



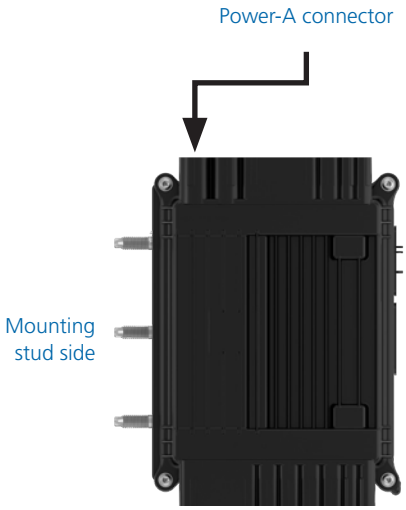


2M Master ABS rear facing

Drawing symbol

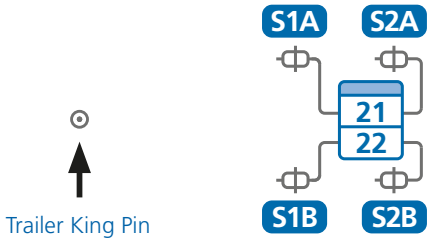


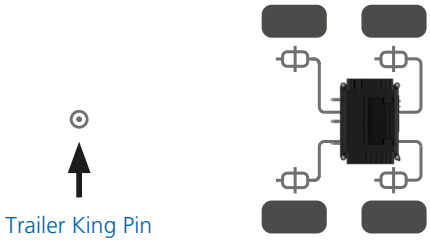
2M Master ABS



Rear facing example

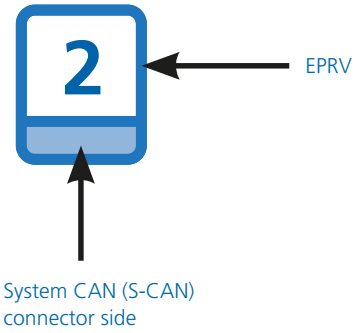
ABS is mounted on the back of the cross beam, facing to the rear of the trailer



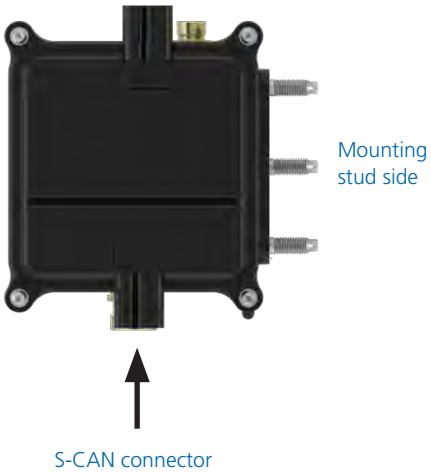


1M Slave ABS front facing

Drawing symbol

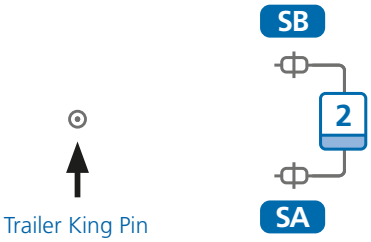


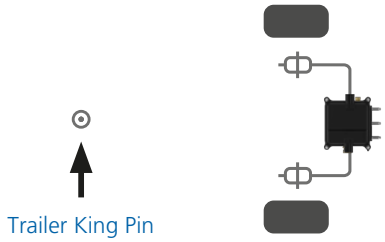
1M Slave ABS



Front facing example

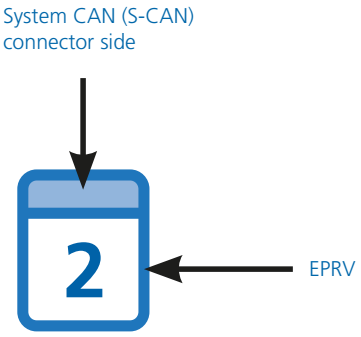
ABS is mounted in front of the cross beam, facing to the front of the trailer



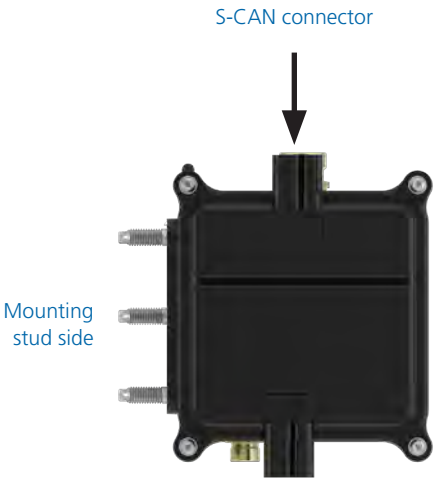


1M Slave ABS rear facing

Drawing symbol

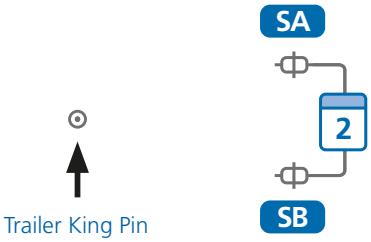


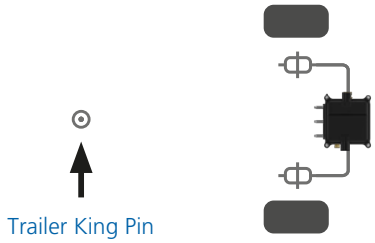
1M Slave ABS



Rear facing example

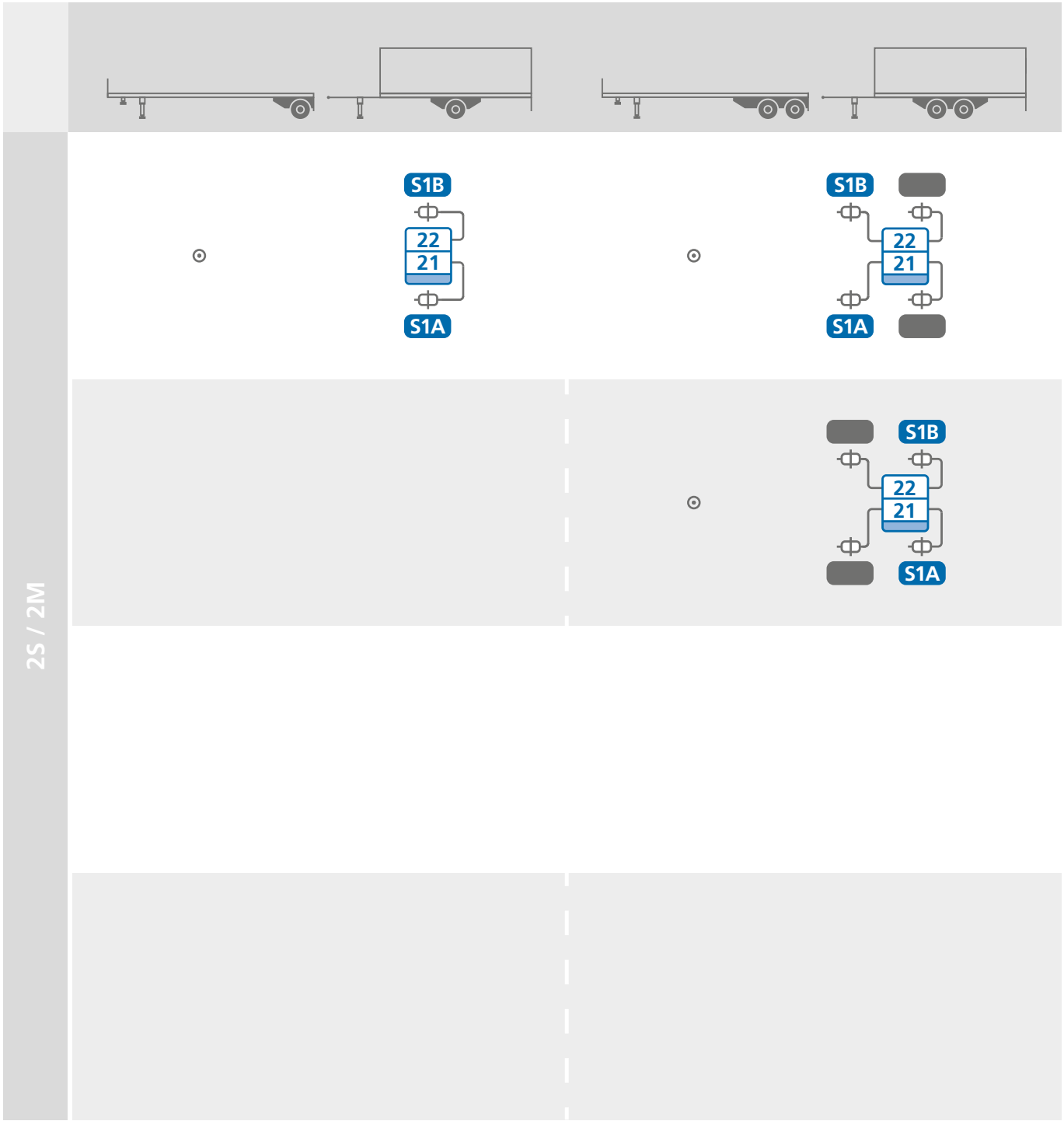
ABS is mounted on the back of the cross beam, facing to the rear of the trailer





Semi trailers / Centre axle trailers

ABS front facing

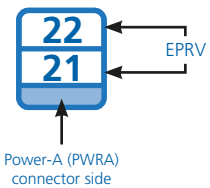


Application notes

N1 – Master ECU is mounted to Electronic Pneumatic Relay Valves (EPRV's) 21/22.
N2 – Directly controlled wheels connected to EPRV's 21/22 cannot be lifted.
N3 – Any axle may be a command steered axle. Self steer axles are subject to axle manufacturers recommendations.
N4 – Wheel sensor to EPRV relationship must be maintained.
N5 – Pipe lengths see Appendix 2.

Key

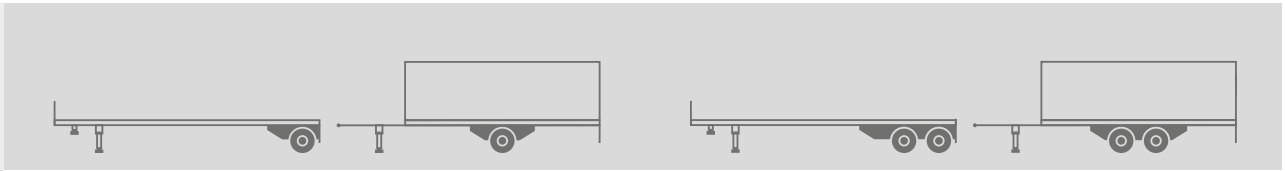
2M Master ABS



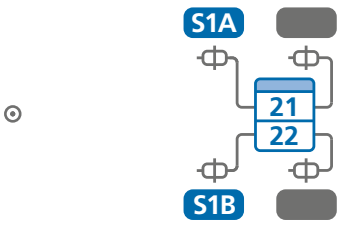
Semi trailers / Centre axle trailers

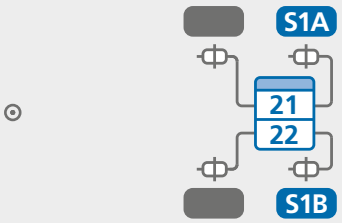
ABS rear facing

2S / 2M







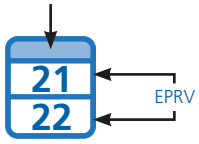


Application notes

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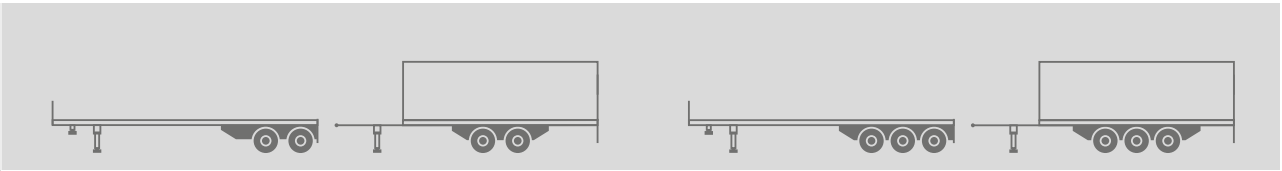
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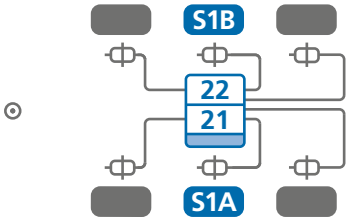
2M Master ABS



Semi trailers / Centre axle trailers

ABS front facing





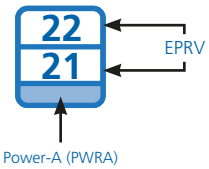
2S / 2M

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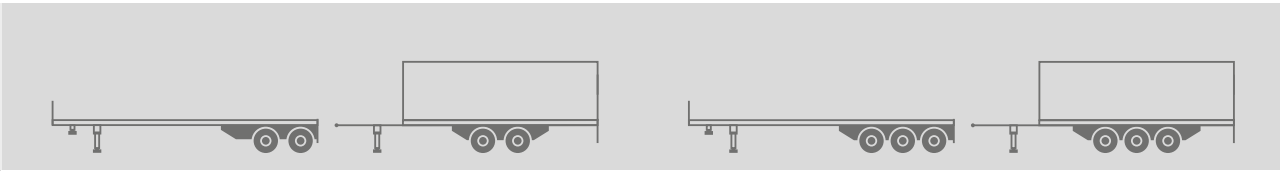
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2M Master ABS

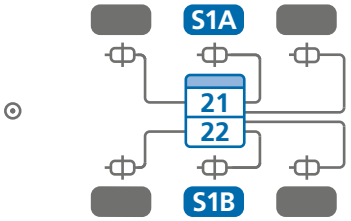


Semi trailers / Centre axle trailers

ABS rear facing



2S / 2M

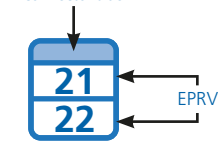


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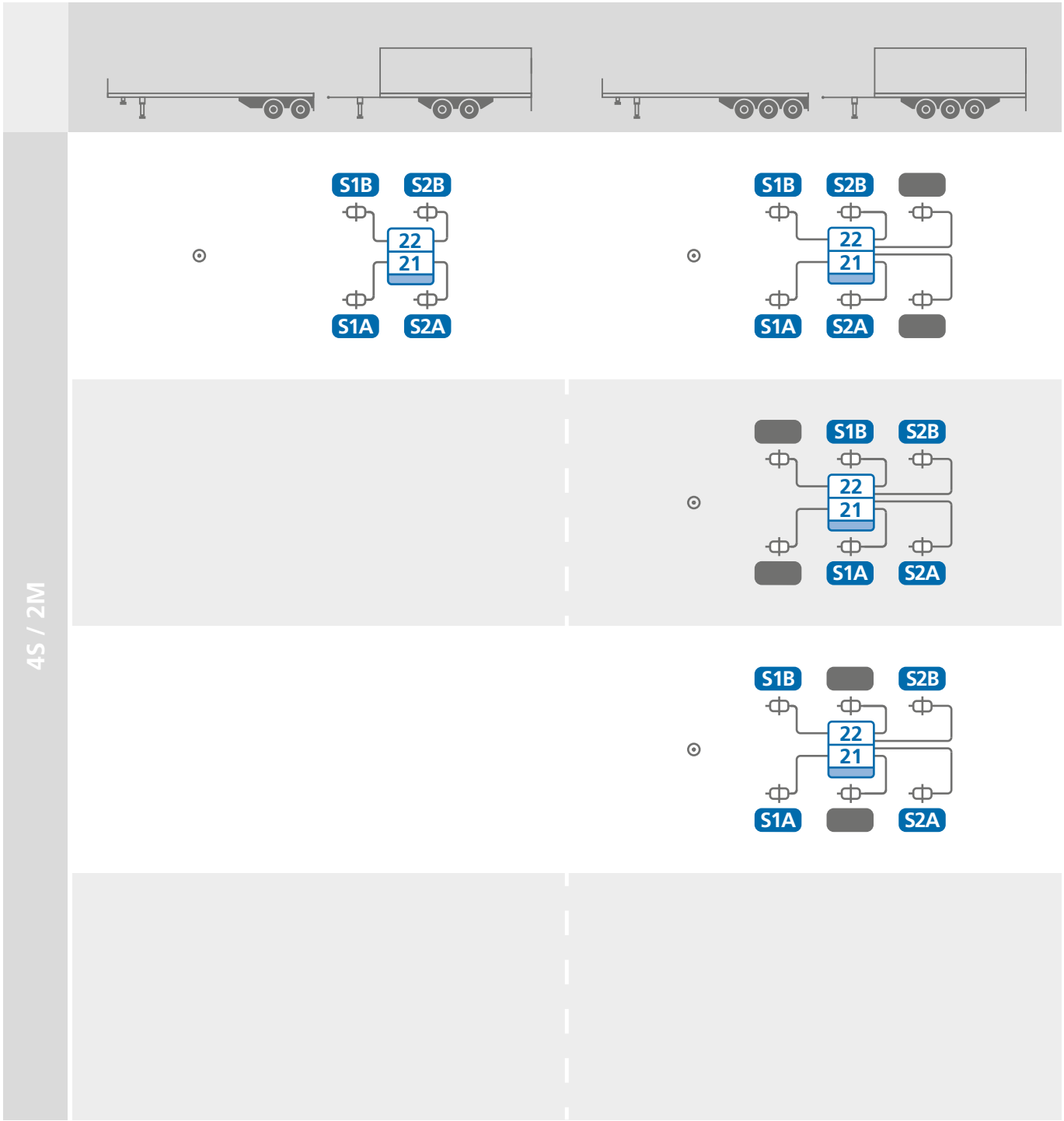
Key

2M Master ABS



Semi trailers / Centre axle trailers

Basic & Premium 2M ABS front facing

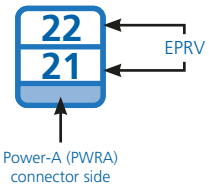


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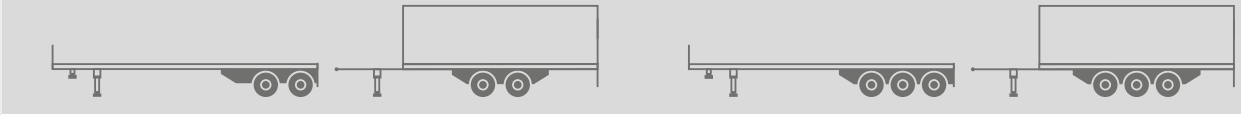
2M Master ABS

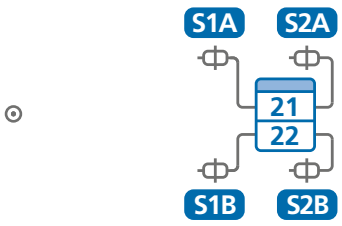


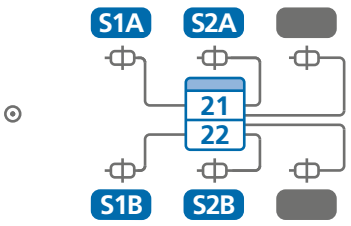
Semi trailers / Centre axle trailers

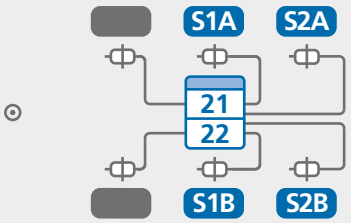
Basic & Premium 2M ABS rear facing

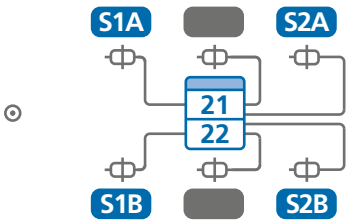
4S / 2M









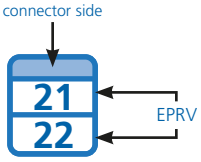


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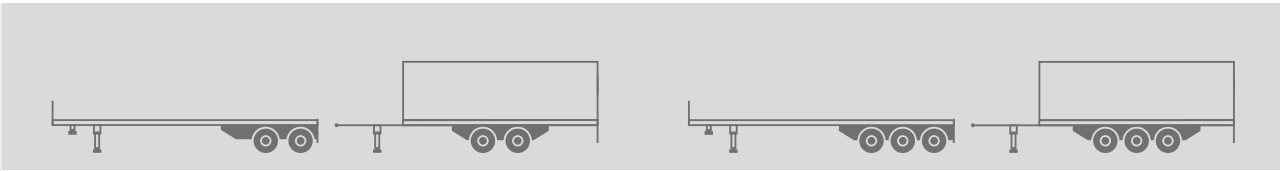
2M Master ABS

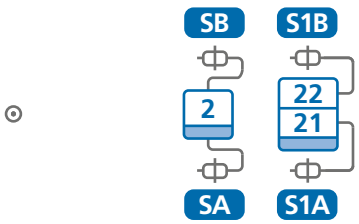


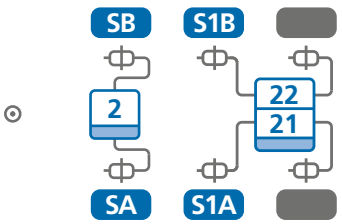
Semi trailers / Centre axle trailers

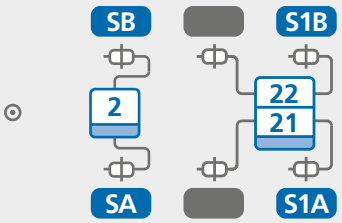
Premium 3M ABS front facing

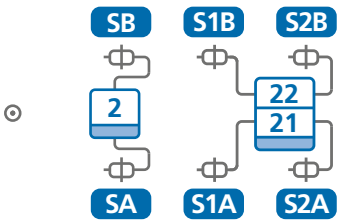
6S / 3M & 4S / 3M





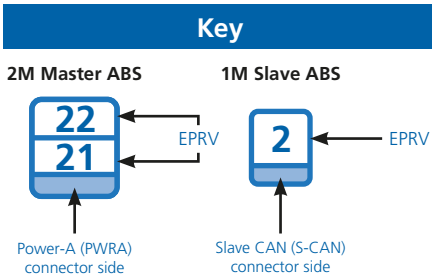






Application notes

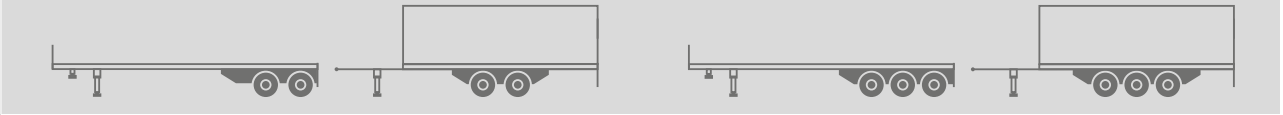
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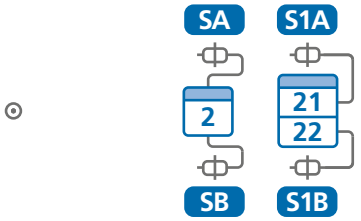


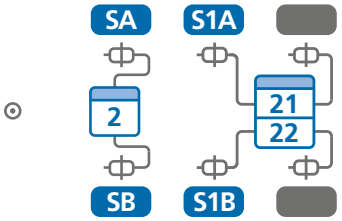
Semi trailers / Centre axle trailers

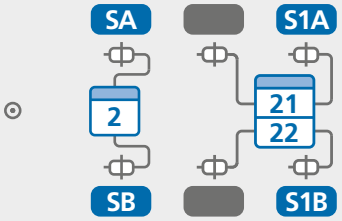
Premium 3M ABS rear facing

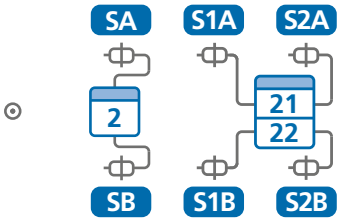
6S / 3M & 4S / 3M





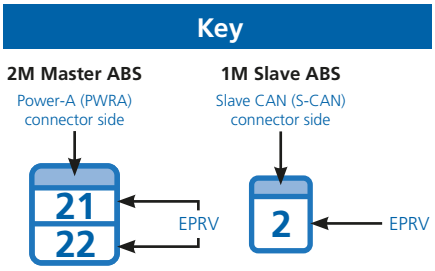






Application notes

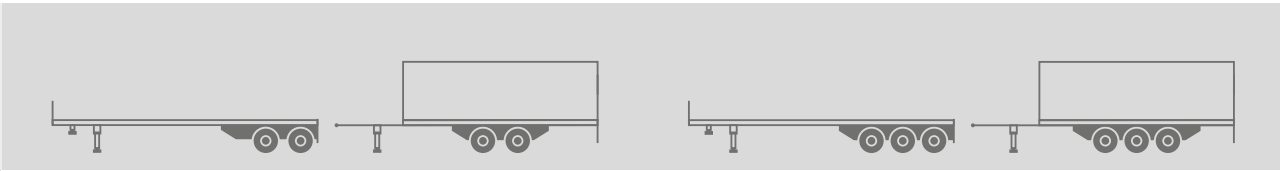
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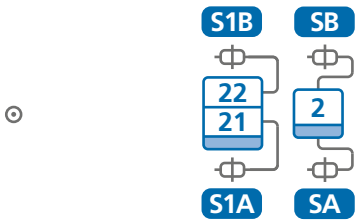


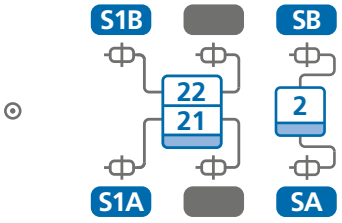
Semi trailers / Centre axle trailers

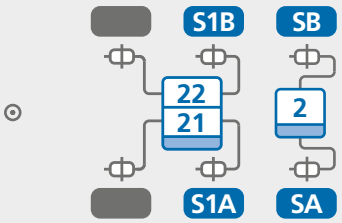
Premium 3M ABS front facing

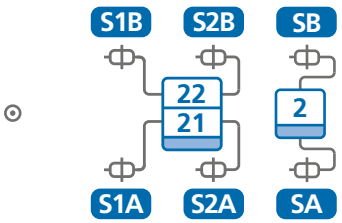
6S / 3M & 4S / 3M







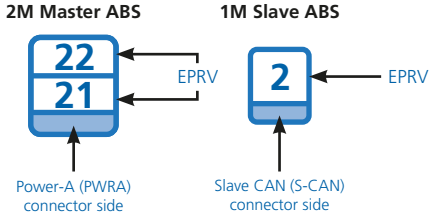




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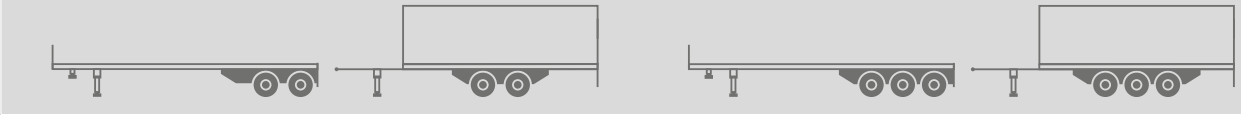
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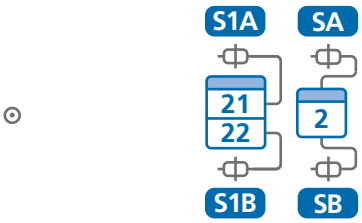


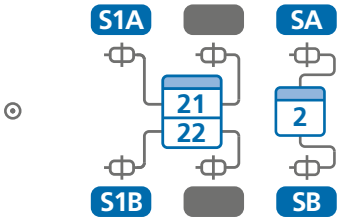
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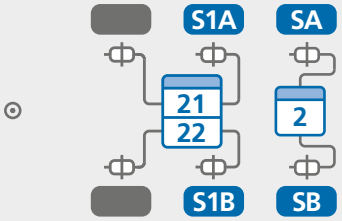
Premium 3M ABS rear facing

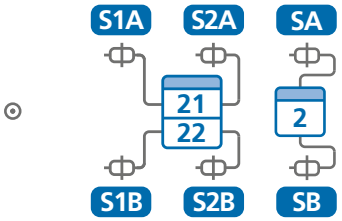
6S / 3M & 4S / 3M





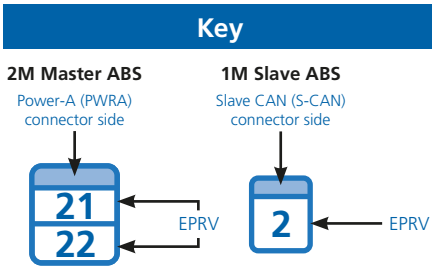






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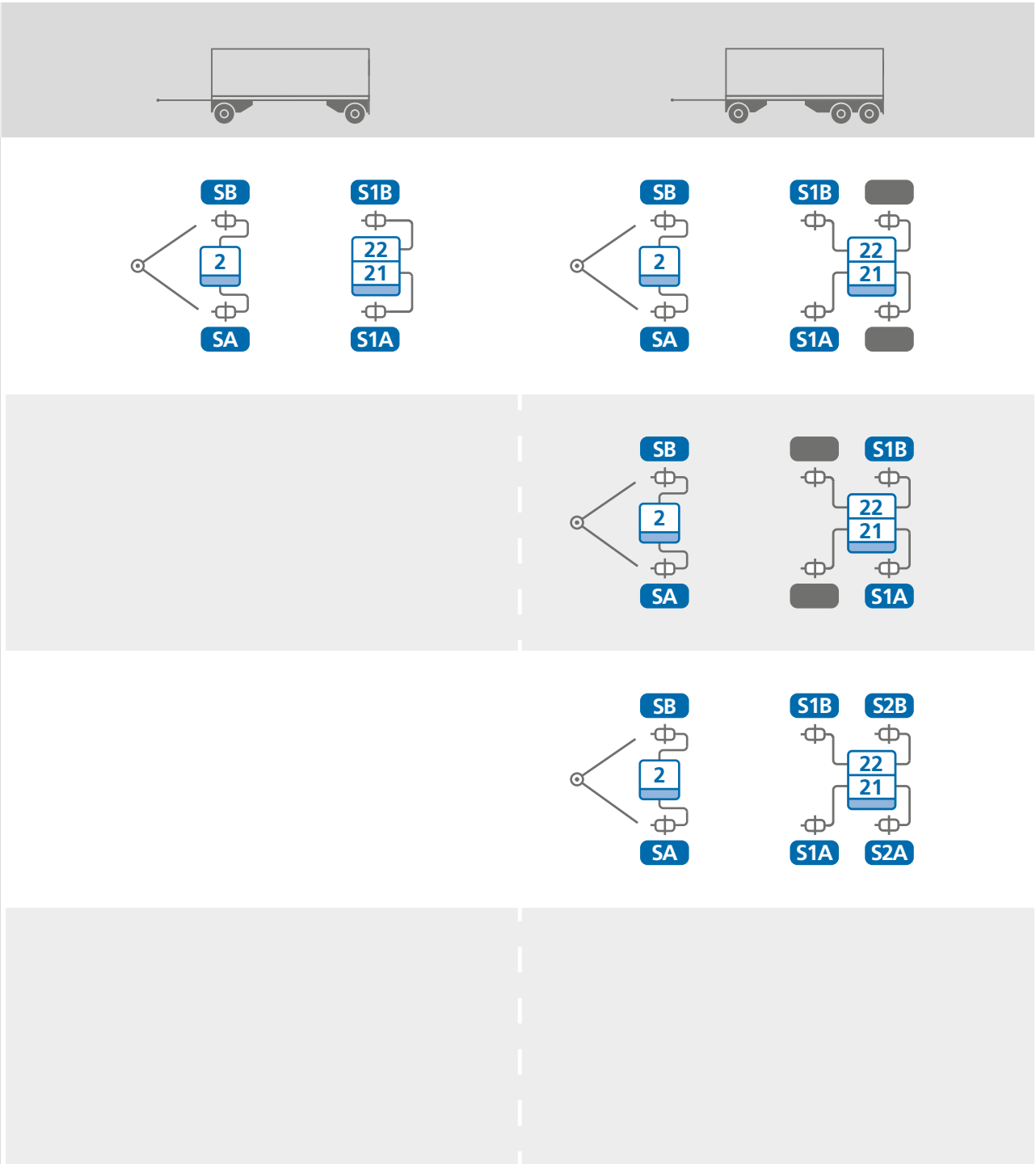
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Full trailers

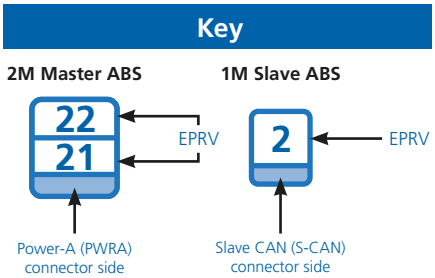
Premium 3M ABS front facing

4S / 3M



Application notes

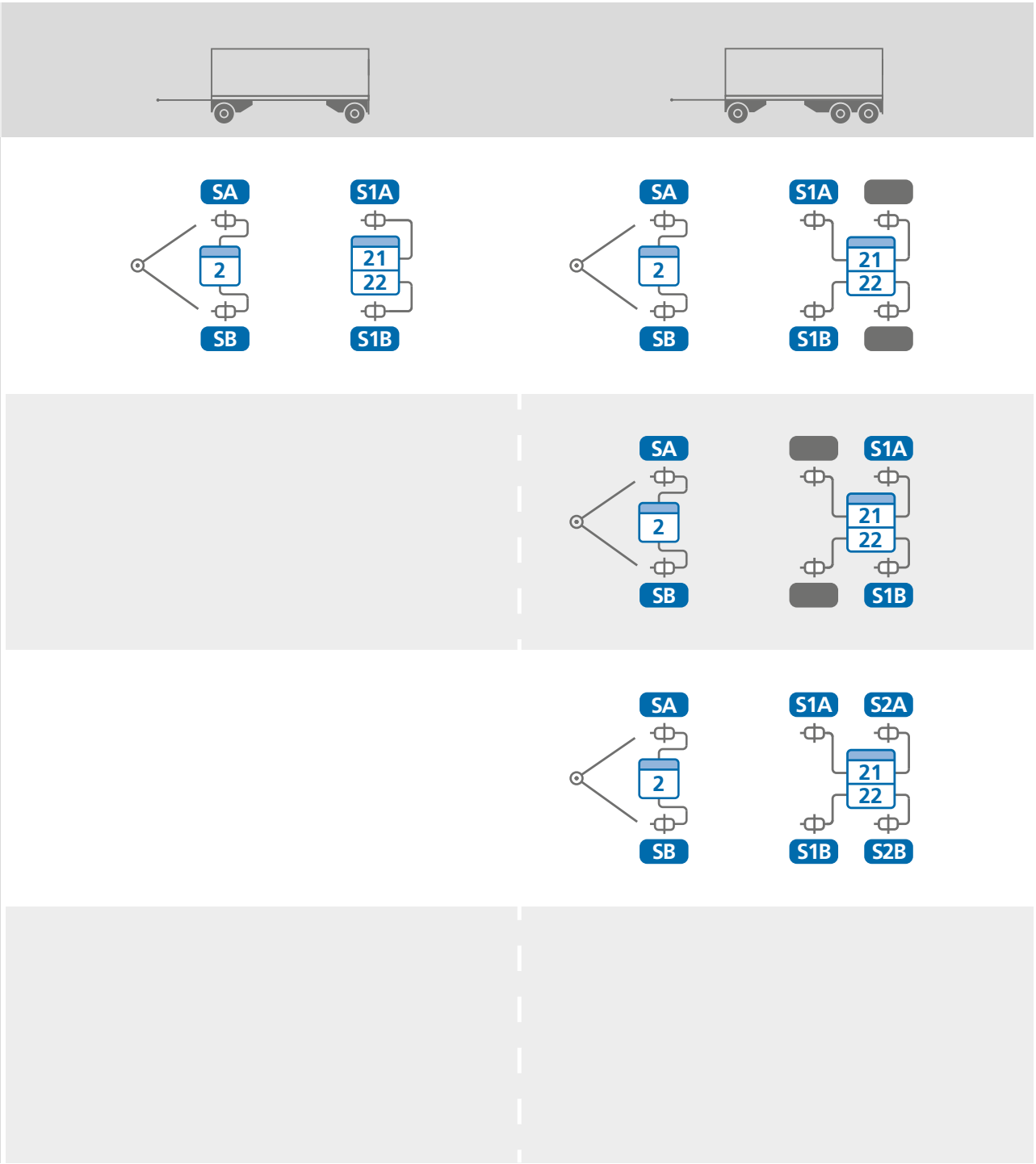
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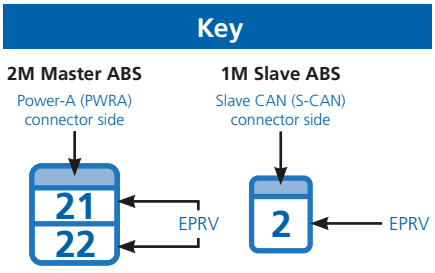
Premium 3M ABS rear facing

4S / 3M



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Chassis installation

Position of ABS 4.0 assembly

The following installation parameters are required for correct ABS (all versions) and stability (Premium with roll-over control) operation.

Roll angle: ± 3°

Yaw angle: ± 5°

The ABS 4.0 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 ABS 4.0 outside of this area may affect the stability performance.

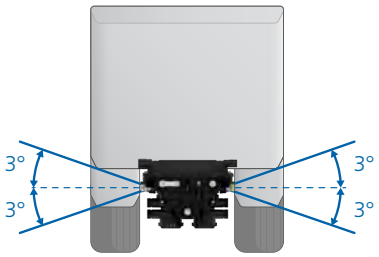
The ABS 4.0 assembly to be within the main left hand (LH) & right hand (RH) chassis members of the vehicle.

Pitch angle: assembly must be mounted vertically.

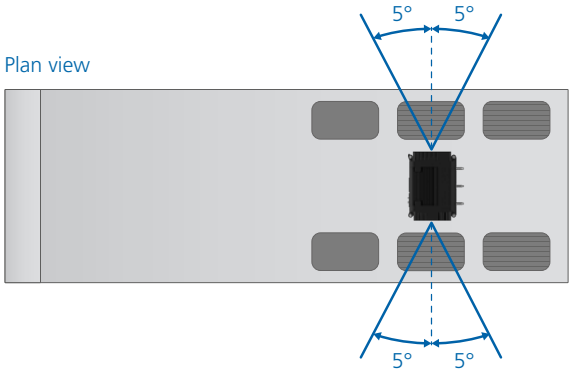
For any other applications please refer to Haldex Technical Services.

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

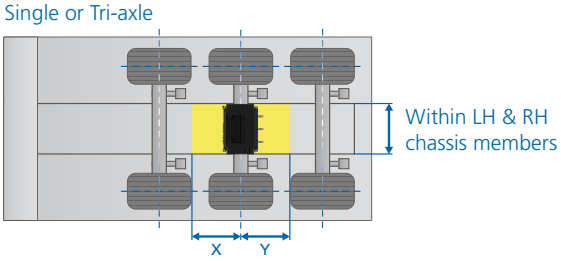
Rear view



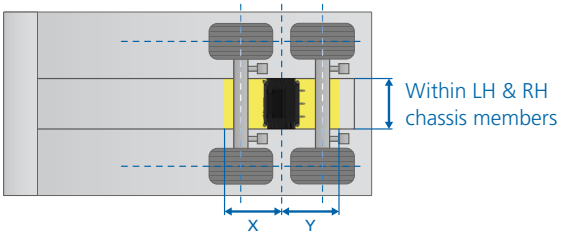
Plan view



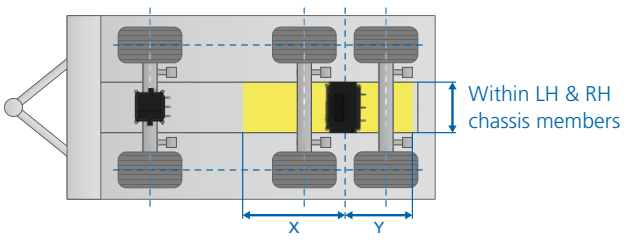
Single or Tri-axle



Tandem axle



Full axle





This way up



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.

Front facing



Rear facing

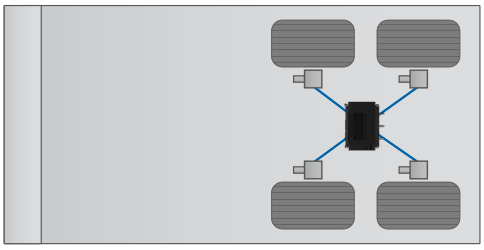


Mount modulator valves centrally to the brake chambers.

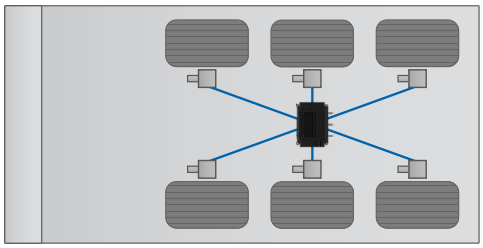
If mounting to stainless steel, then a suitable membrane must be used.



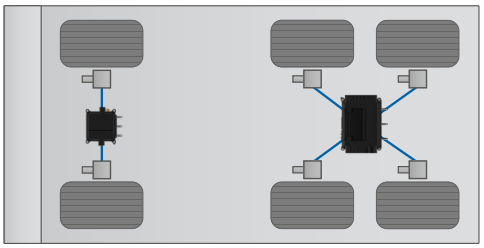
Single axle



Tandem axle



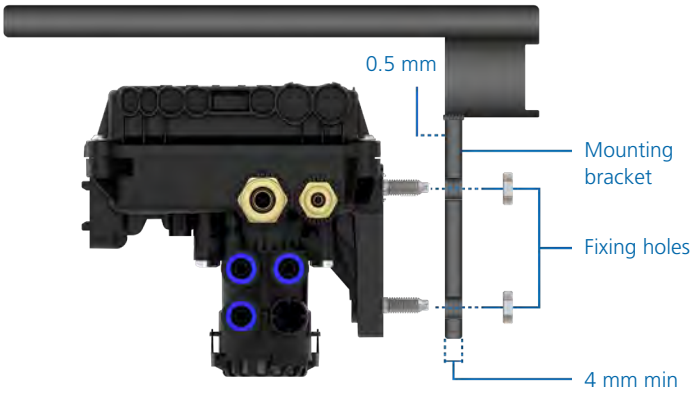
Tri-axle



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.

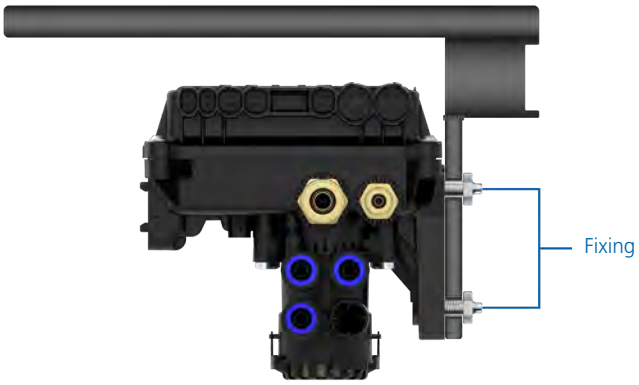
Mounting bracket flatness to be not more than 0.5 mm deviation from its true plane (i.e. the surface must lie between two parallel planes 0.5 mm apart).



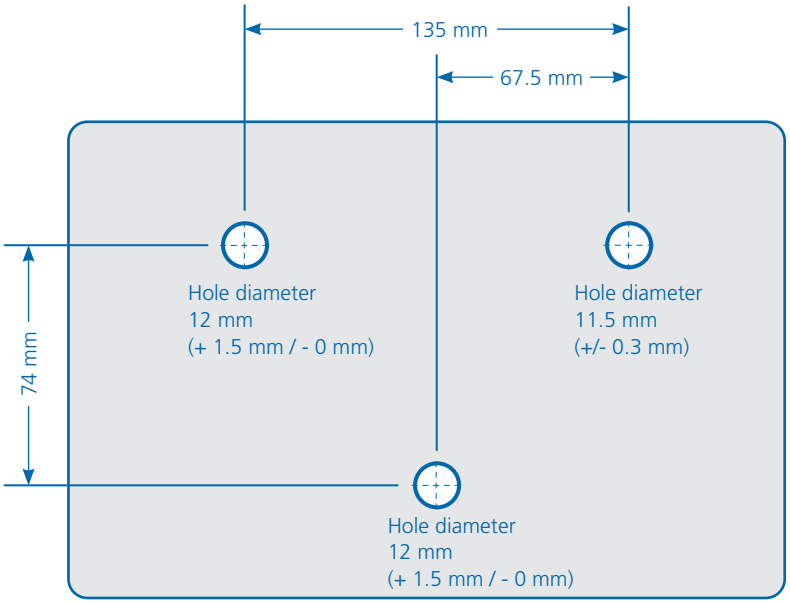
Position assembly as high as possible in the chassis to provide as much protection to the assembly from direct spray and other road debris and to achieve an acceptable hose routing.

Use non corrosive M10 nuts (8.8 grade material), torque to 35-45 Nm.

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



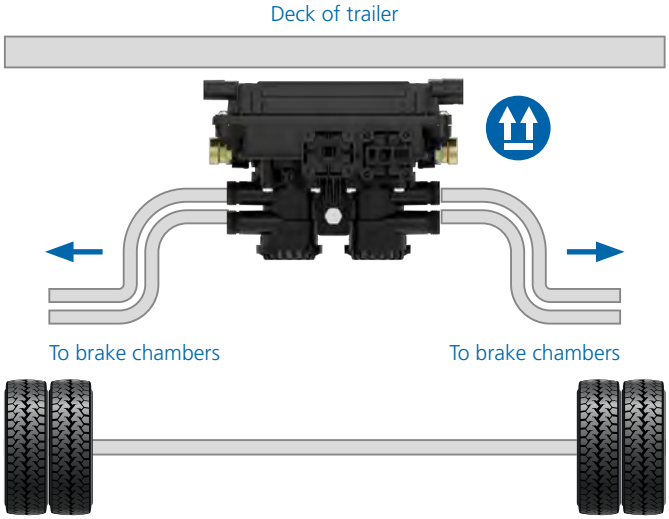
Recommended mounting hole pattern



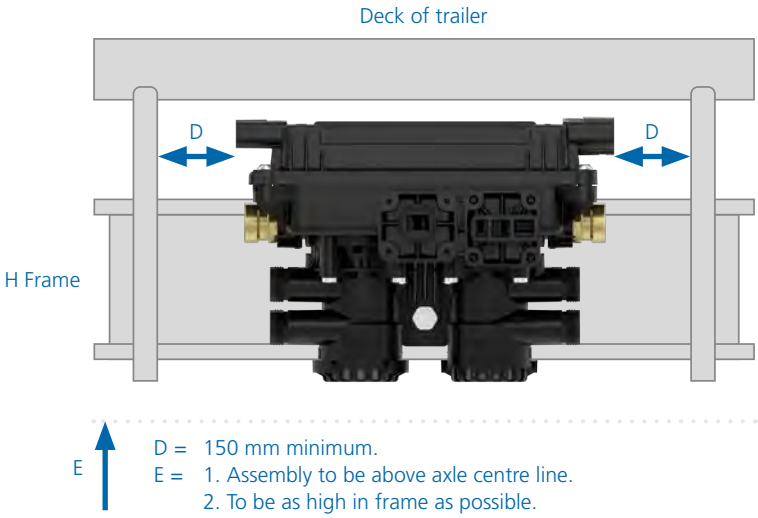
Note: Refer to the EB+ 4.0 customer drawing (part no. 842 100 002) for further mounting instructions.

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.

Pitch angle: assembly must be mounted vertically.



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

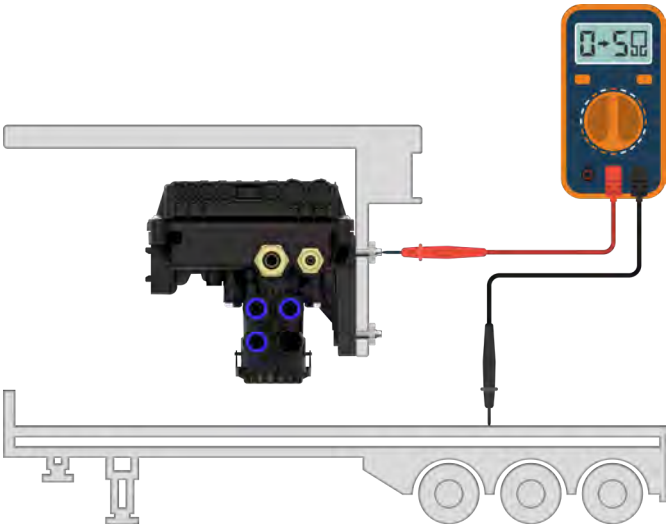


D = 150 mm minimum.
E = 1. Assembly to be above axle centre line.
2. To be as high in frame as possible.

Check continuity between ECU / EPRV bracket and vehicle.

Resistance (R) to be less than 5 ohms

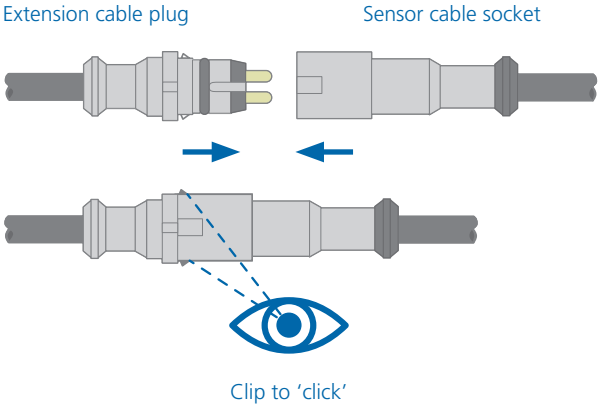
0 < R < 5 ohms



Sensor connection

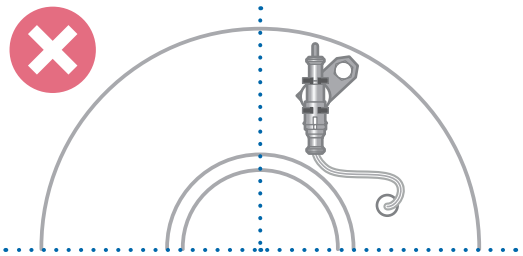
Sensor extension cable socket must be pushed fully into sensor cable plug till they clip into place to prevent falling out with axle vibration.

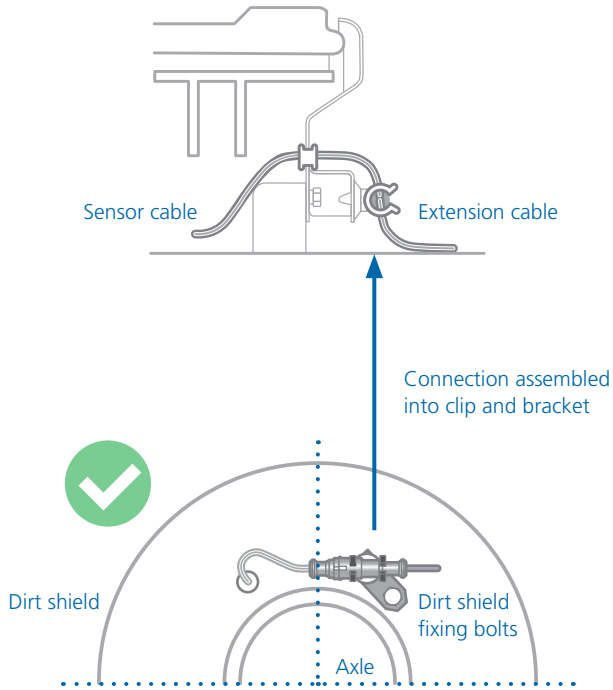
Haldex recommend that all connecting electrical components are greased prior to assembly using Truck Lite NYK 77 electrical grease (consumable no. 905 100 499).



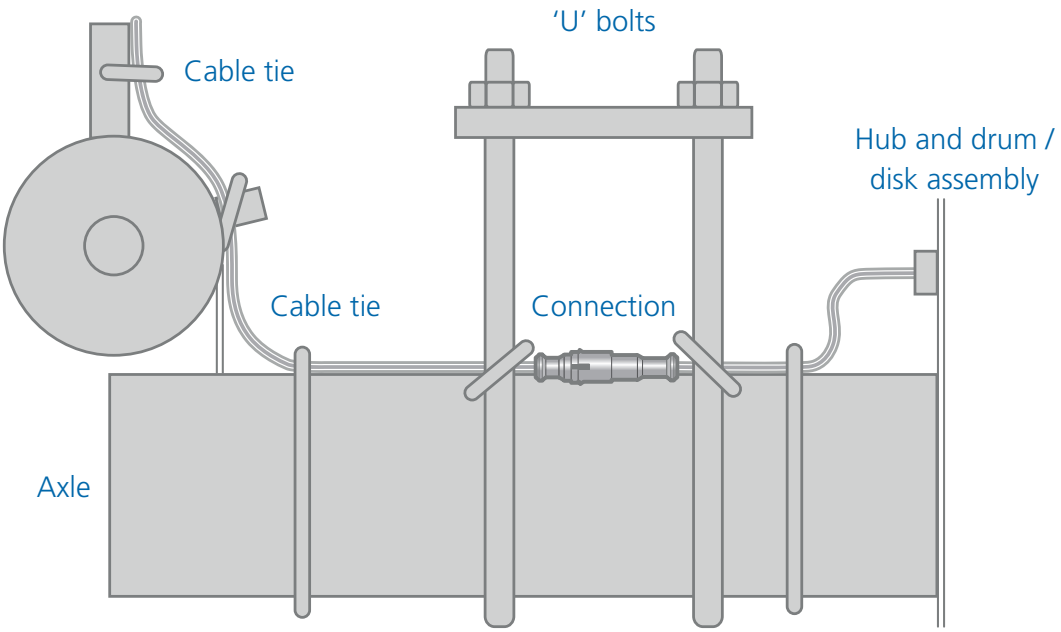
Where possible use a clip and bracket to secure sensor cable connection.

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.



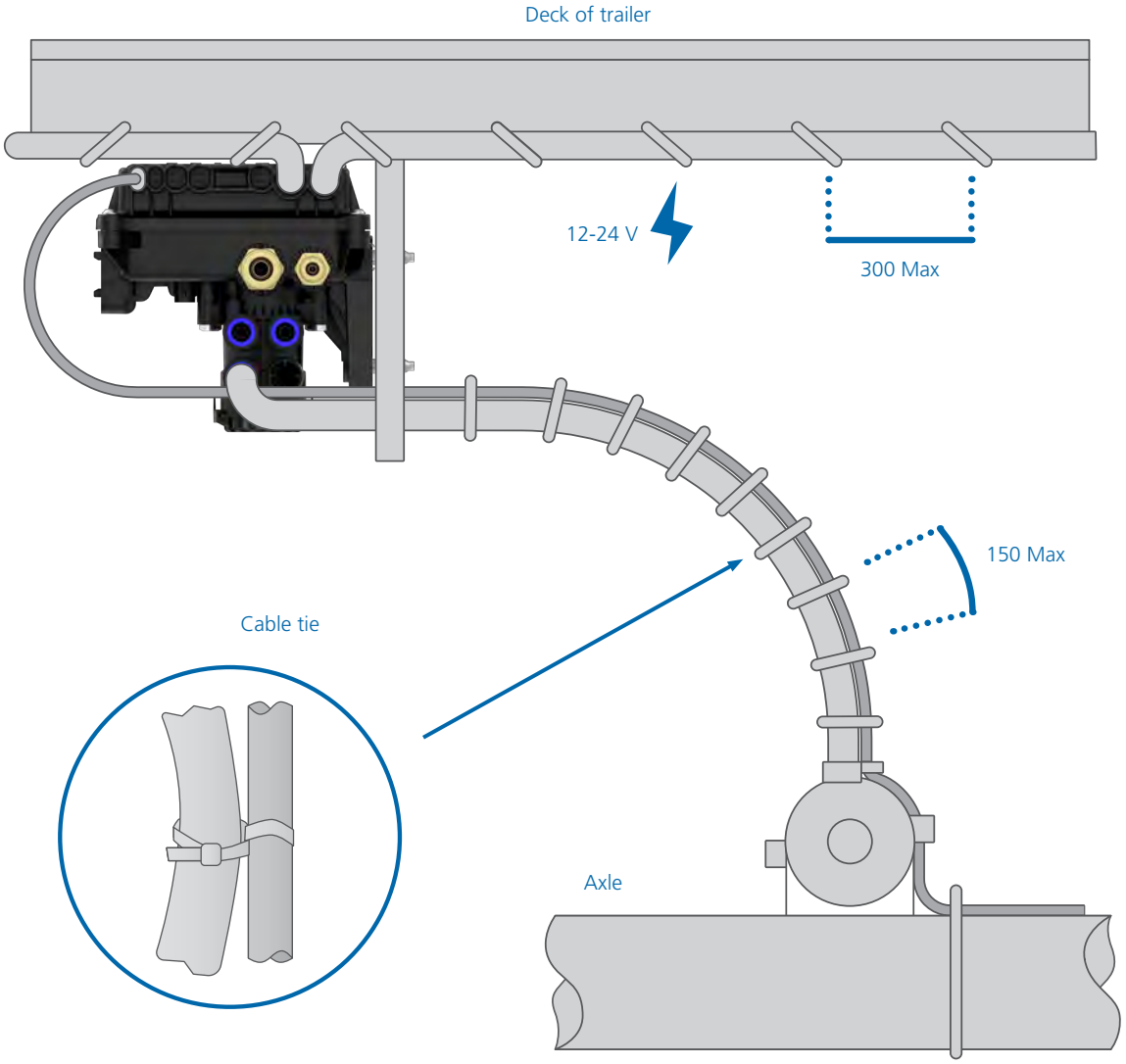
Sensor cable route should follow the centre line or outer radius of pipe or hose.

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.

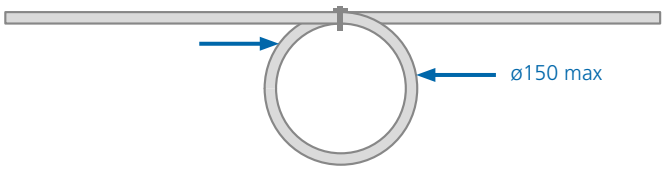
All cables should run ‘up to’ ECU connections.

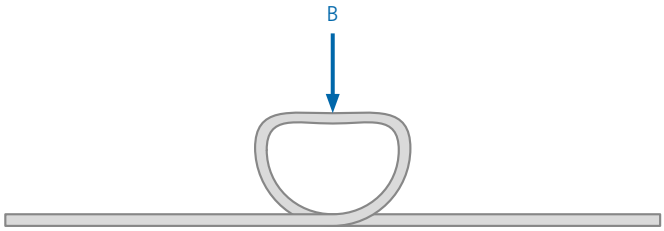


The axle shown here does not represent its actual orientation (i.e. for illustration purposes, the axle is rotated by 90 degrees).

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.



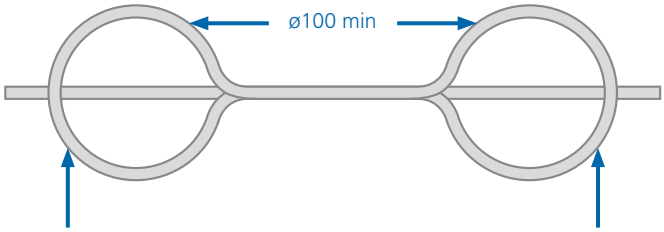


Cable lengths less than 1 m to be coiled into loops of 100 mm minimum and 150 mm maximum diameter.

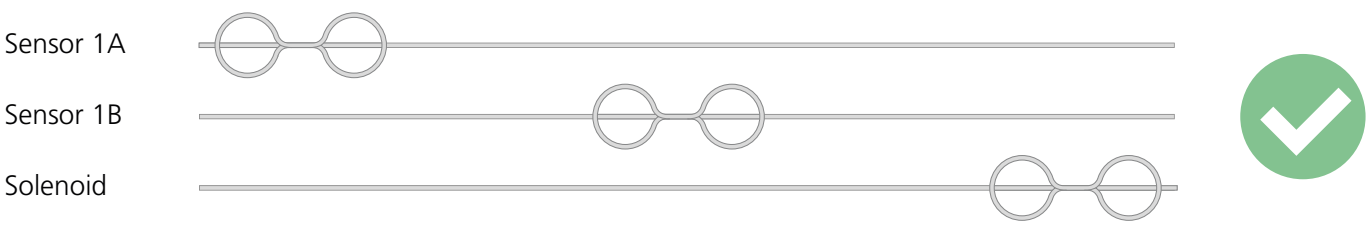
Excess length which will not form a complete loop may be left to hang in partial loops having a cable bend radius of 50 mm minimum.

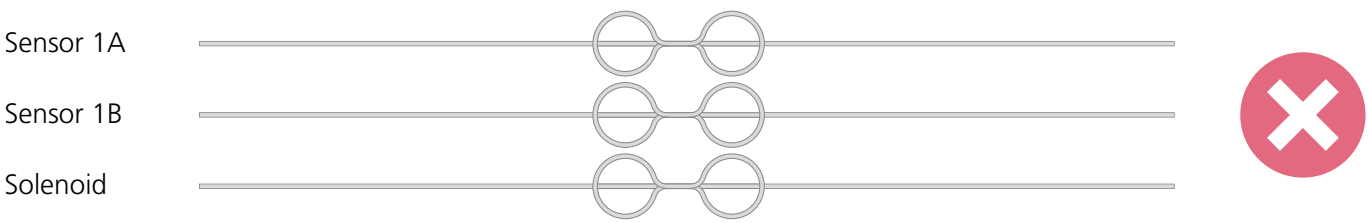
Cable lengths greater than 1 metre to be coiled and then flattened in the centre ‘B’, producing a ‘dog bone’ shape.

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.

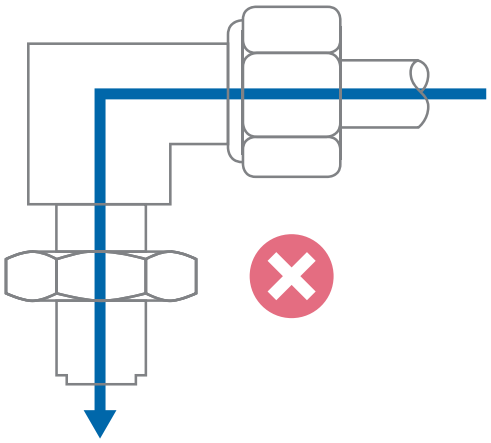


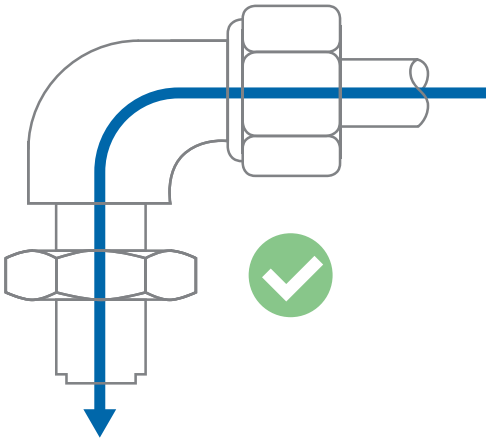


Piping recommendations

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





Wherever possible the use of elbow fittings should be avoided, if necessary, use swept type (rounded) elbow fittings as the preferred option.

The inner diameter of the fittings must match to the inside pipe diameter of the connected line.

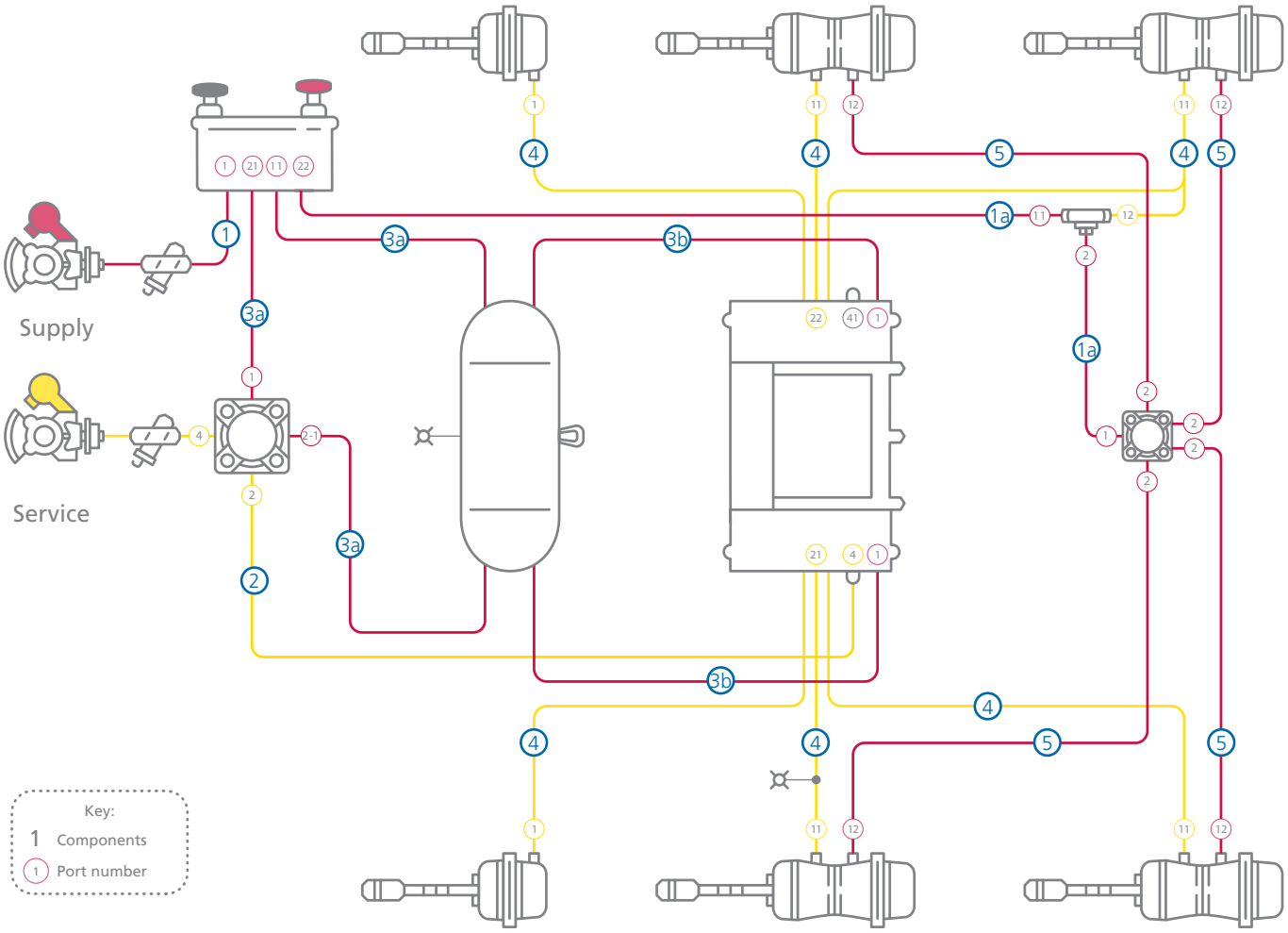
On metric (parallel thread) pipe fittings, a backing washer and O-ring should be used.

Note:

When installing the ABS 4.0, no pipe sealant or thread seal tape (PTFE) should be used.

No warranty claims will be accepted for faults caused by pipe sealants or thread seal tape (PTFE).

Piping recommendations

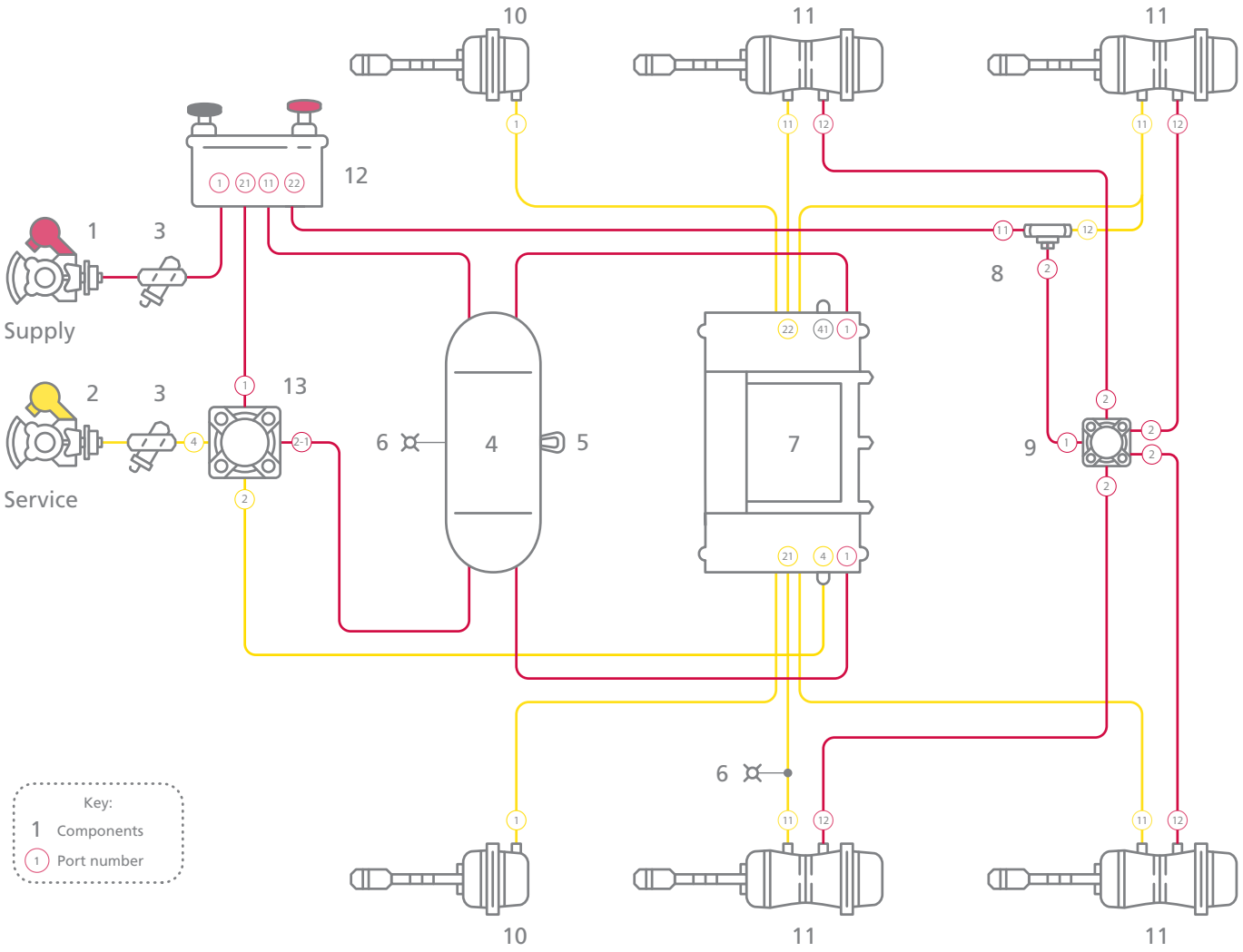


Note: ABS 4.0 should be supplied with clean / dry air.

Item	Pipe description	Material	Pipe size	Remark
1	Supply	Nylon	8 x 1mm or 10 x 1.25mm	Depends on PTC size installed to ports of Park / Shunt valve
1a	Spring brake supply	Nylon	8 x 1mm or 10 x 1.25mm	
2	Service demand	Nylon	8 x 1mm	
3a	Reservoir supply	Nylon	8 x 1mm or 10 x 1.25mm	Depends on PTC size installed to ports of Park / Shunt valve
3b	Reservoir delivery	Nylon	2 x 15 x 1.5mm	Short as possible 4.0m max.
4	Service brake delivery	Nylon or Rubber hose	12 x 1.5mm	Pipe to be as short as possible.
5	Spring brake delivery	Nylon or Rubber hose	8 x 1mm	Pipe to be as short as possible.

Piping layout - Brake

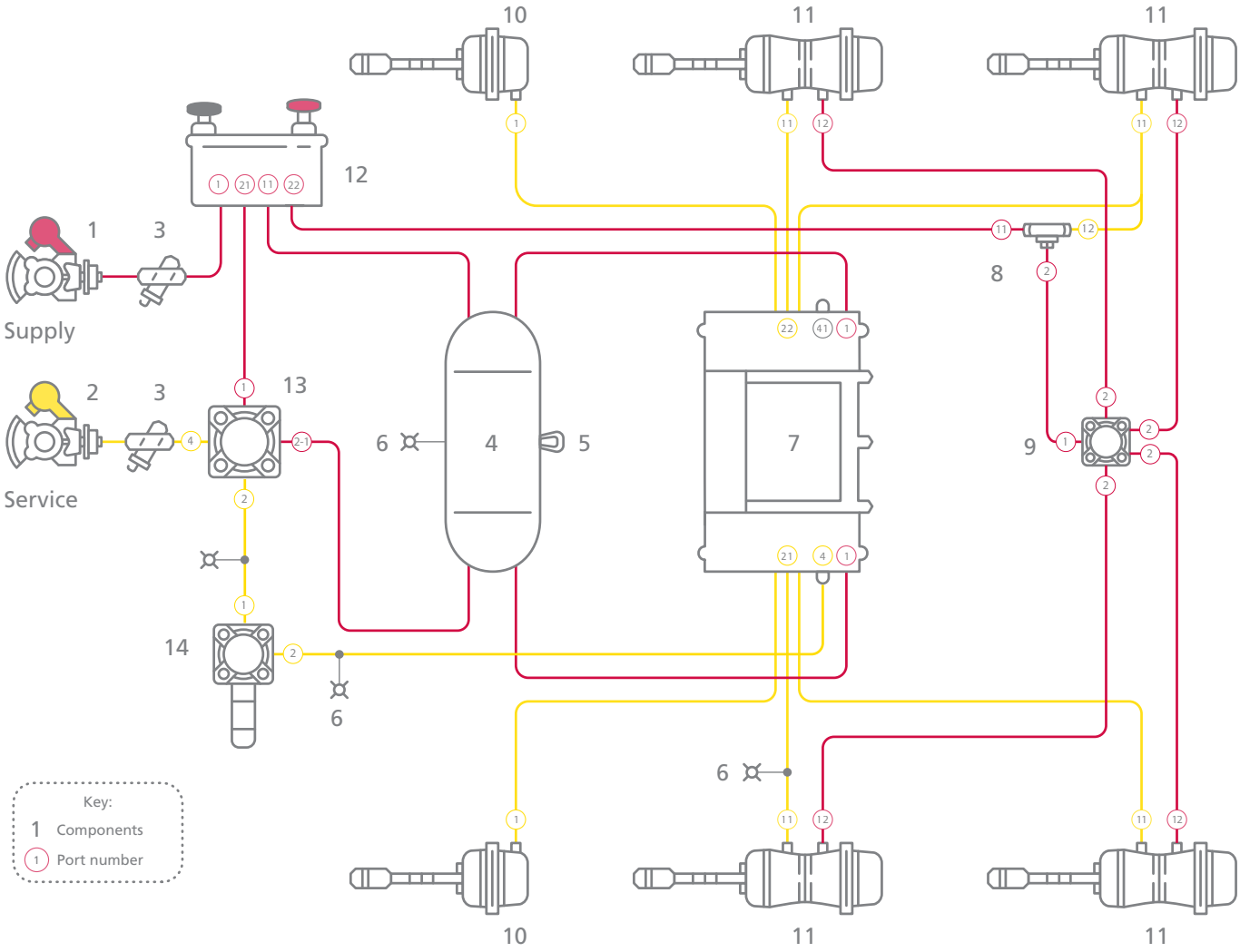
2M side by side, with Park & Shunt (352 044 001)



Note: ABS 4.0 should be supplied with clean / dry air.

Item	Description	Notes
1	Supply coupling	Red - Combined coupling & filter available
2	Service coupling	Yellow - Combined coupling & filter available
3	Pipe filter	
4	Air reservoir - brake	
5	Drain valve	
6	Test point	
7	2M Master ABS	ABS 4.0 assembly
8	Double check valve	
9	Quick Release Valve	
10	Single diaphragm brake chamber	
11	Spring brake chamber	
12	Park & Shunt	352 044001
13	Relay Emergency Valve	

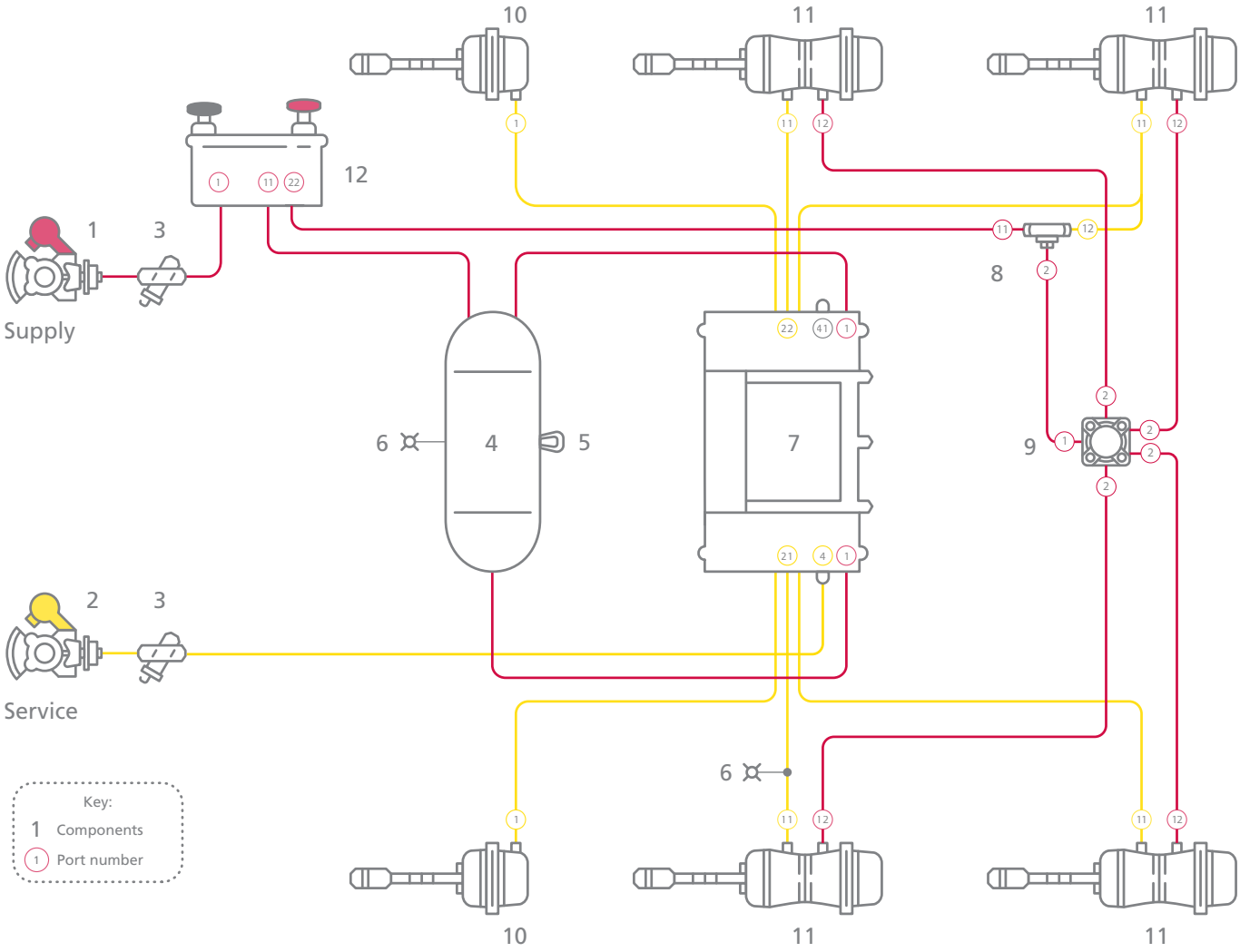
2M side by side, with Park & Shunt (352 044 001) and Load Sensing Valve



Note: ABS 4.0 should be supplied with clean / dry air.

Item	Description	Notes
1	Supply coupling	Red - Combined coupling & filter available
2	Service coupling	Yellow - Combined coupling & filter available
3	Pipe filter	
4	Air reservoir - brake	
5	Drain valve	
6	Test point	
7	2M Master ABS	ABS 4.0 assembly
8	Double check valve	
9	Quick Release Valve	
10	Single diaphragm brake chamber	
11	Spring brake chamber	
12	Park & Shunt	352 044 001
13	Relay Emergency Valve	
14	Load Sensing Valve	

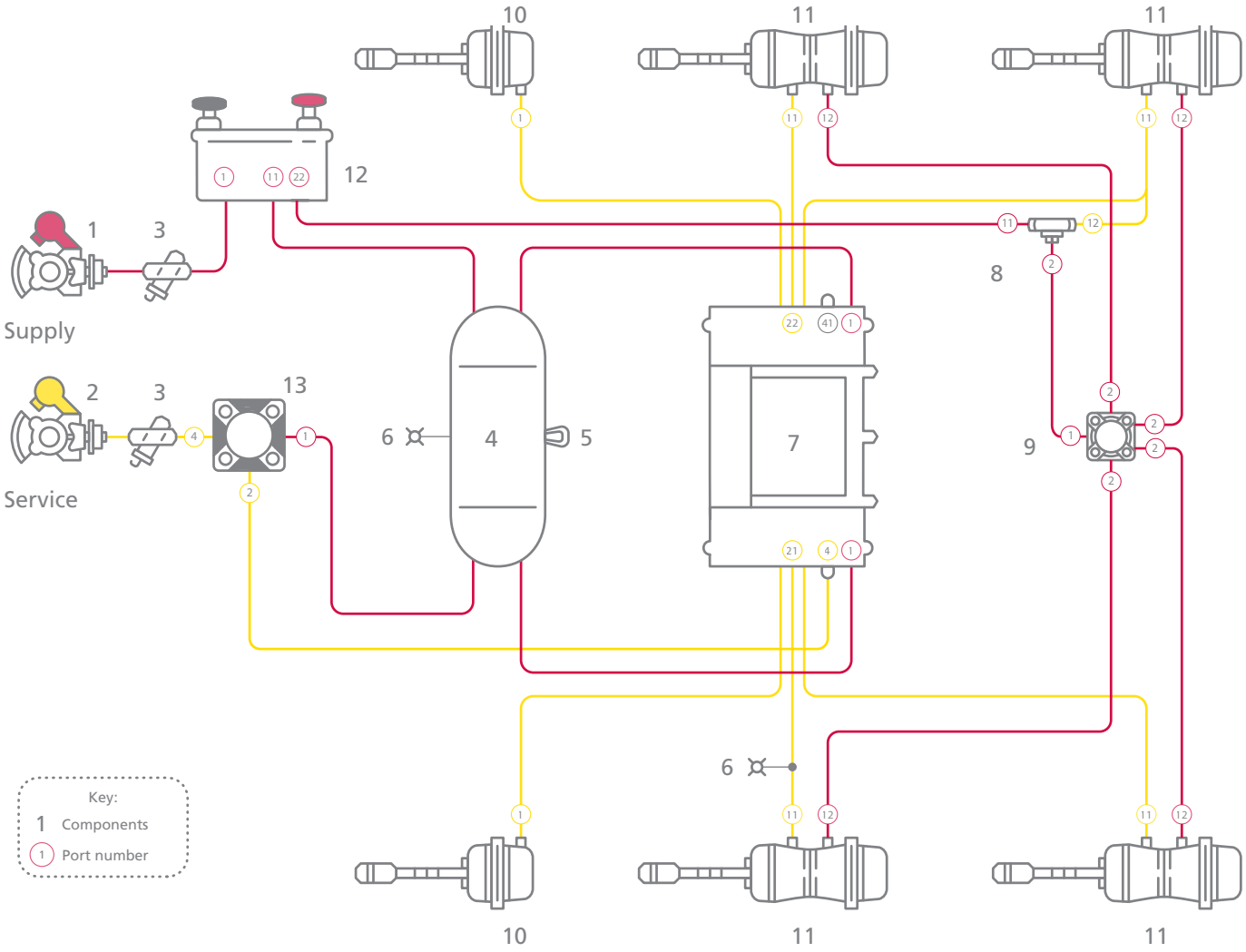
2M side by side, with Park & Shunt (352 046 001)



Note: ABS 4.0 should be supplied with clean / dry air.

Item	Description	Notes
1	Supply coupling	Red - Combined coupling & filter available
2	Service coupling	Yellow - Combined coupling & filter available
3	Pipe filter	
4	Air reservoir - brake	
5	Drain valve	
6	Test point	
7	2M Master ABS	ABS 4.0 assembly
8	Double check valve	
9	Quick Release Valve	
10	Single diaphragm brake chamber	
11	Spring brake chamber	
12	Park & Shunt	352 046 001

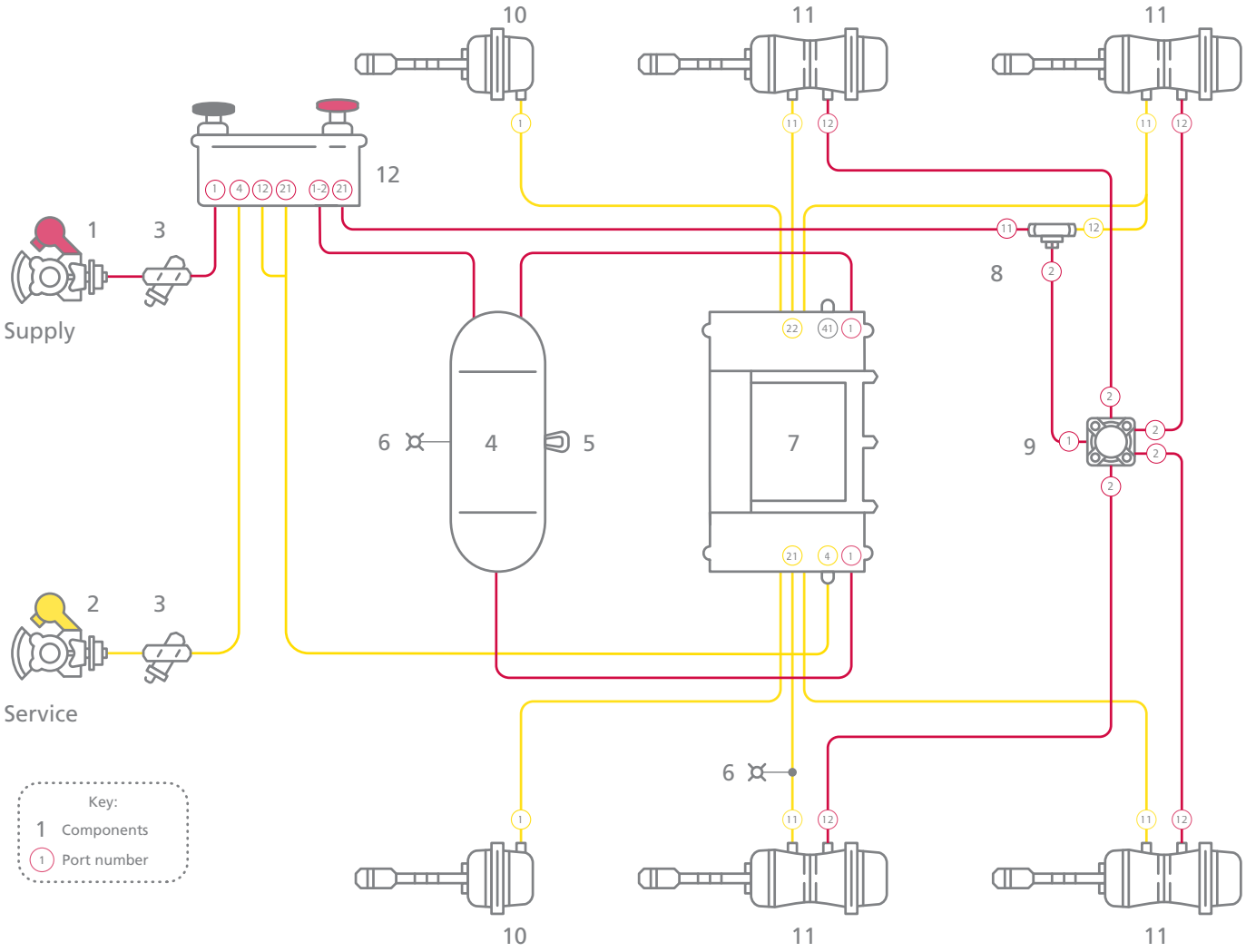
2M side by side, with Park & Shunt (352 046 001) and Relay valve



Note: ABS 4.0 should be supplied with clean / dry air.

Item	Description	Notes
1	Supply coupling	Red - Combined coupling & filter available
2	Service coupling	Yellow - Combined coupling & filter available
3	Pipe filter	
4	Air reservoir - brake	
5	Drain valve	
6	Test point	
7	2M Master ABS	ABS 4.0 assembly
8	Double check valve	
9	Quick Release Valve	
10	Single diaphragm brake chamber	
11	Spring brake chamber	
12	Park & Shunt	352 046 001
13	Relay Valve	

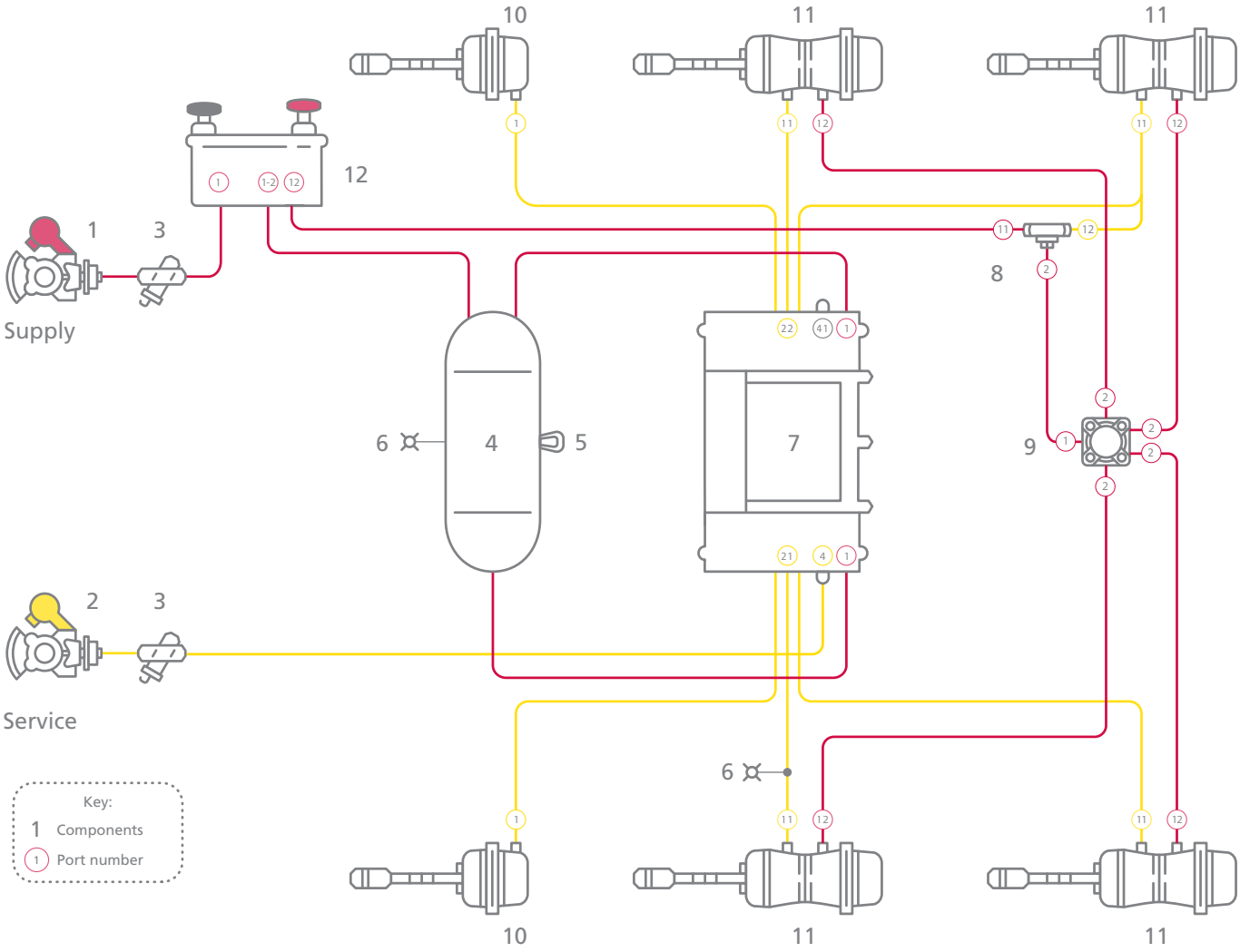
2M side by side, with TrCM+ (352 067 xxx)



Note: ABS 4.0 should be supplied with clean / dry air.

Item	Description	Notes
1	Supply coupling	Red - Combined coupling & filter available
2	Service coupling	Yellow - Combined coupling & filter available
3	Pipe filter	
4	Air reservoir - brake	
5	Drain valve	
6	Test point	
7	2M Master ABS	ABS 4.0 assembly
8	Double check valve	
9	Quick Release Valve	
10	Single diaphragm brake chamber	
11	Spring brake chamber	
12	Park & Shunt	352 067 xxx

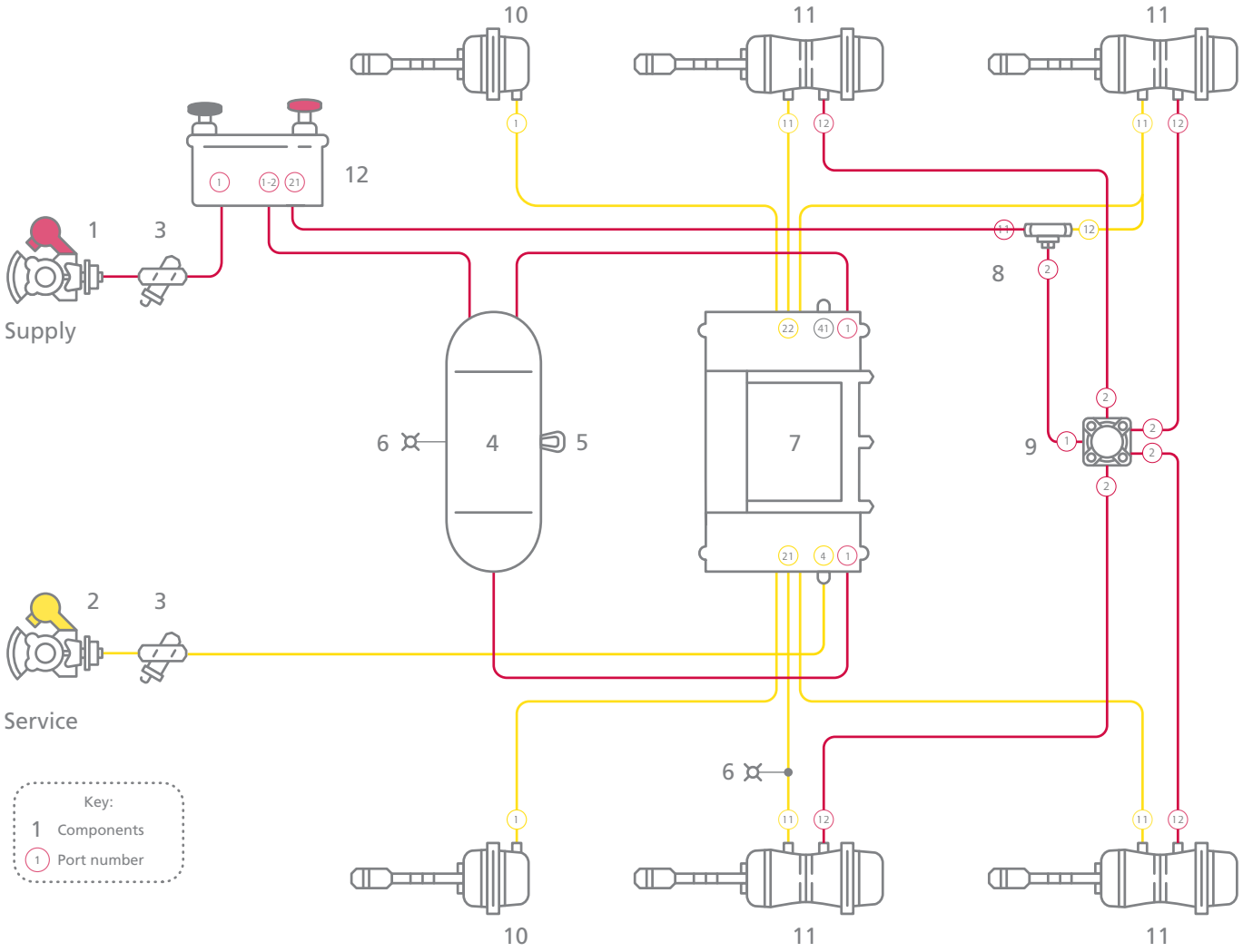
2M side by side, with TEM (352 075 xxx)



Note: ABS 4.0 should be supplied with clean / dry air.

Item	Description	Notes
1	Supply coupling	Red - Combined coupling & filter available
2	Service coupling	Yellow - Combined coupling & filter available
3	Pipe filter	
4	Air reservoir - brake	
5	Drain valve	
6	Test point	
7	2M Master ABS	ABS 4.0 assembly
8	Double check valve	
9	Quick Release Valve	
10	Single diaphragm brake chamber	
11	Spring brake chamber	
12	Park & Shunt	352 075 xxx

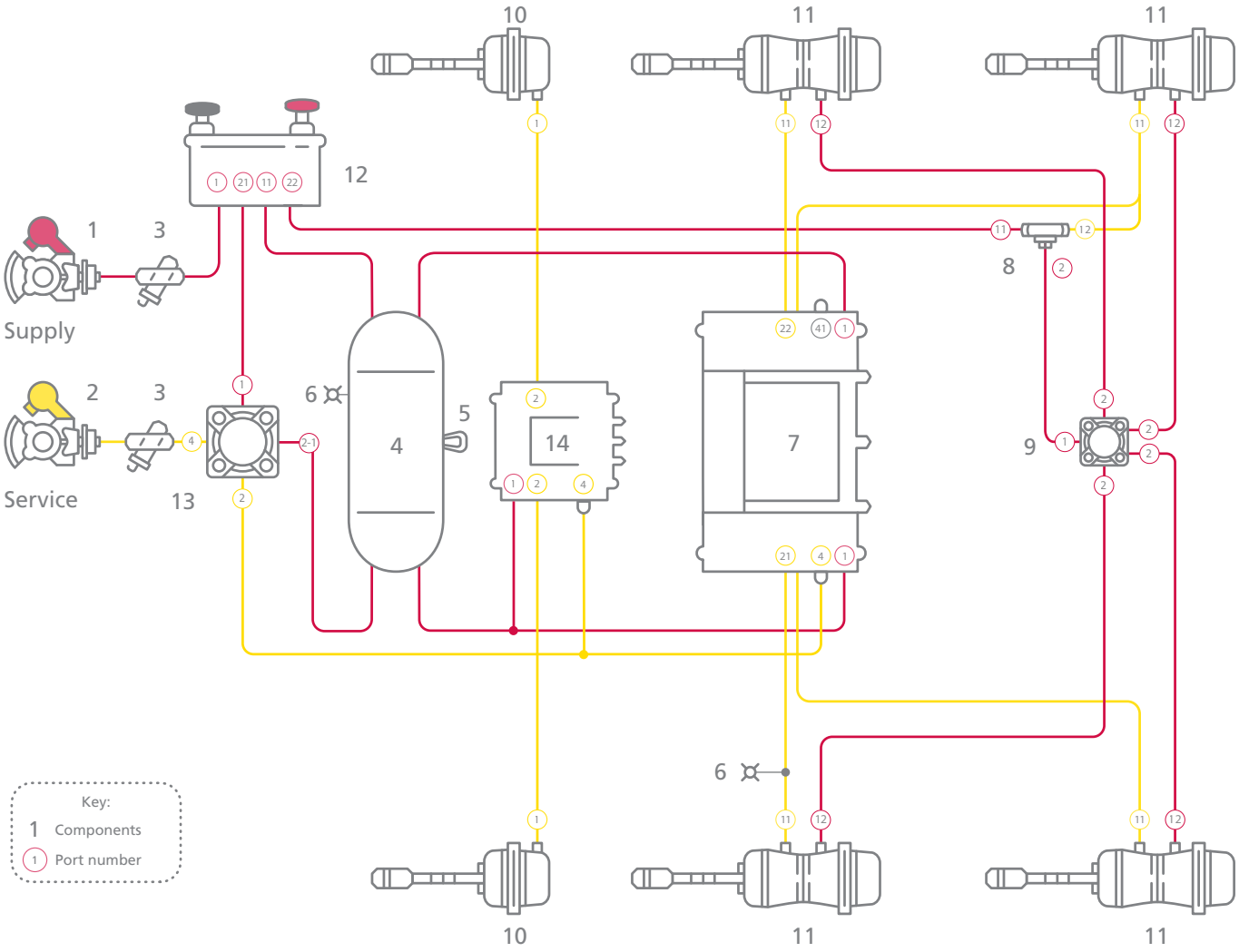
2M side by side, with TEM+ (352 091 xxx or 352 092 xxx))



Note: ABS 4.0 should be supplied with clean / dry air.

Item	Description	Notes
1	Supply coupling	Red - Combined coupling & filter available
2	Service coupling	Yellow - Combined coupling & filter available
3	Pipe filter	
4	Air reservoir - brake	
5	Drain valve	
6	Test point	
7	2M Master ABS	ABS 4.0 assembly
8	Double check valve	
9	Quick Release Valve	
10	Single diaphragm brake chamber	
11	Spring brake chamber	
12	Park & Shunt	352 091 xxx or 352 092 xxx

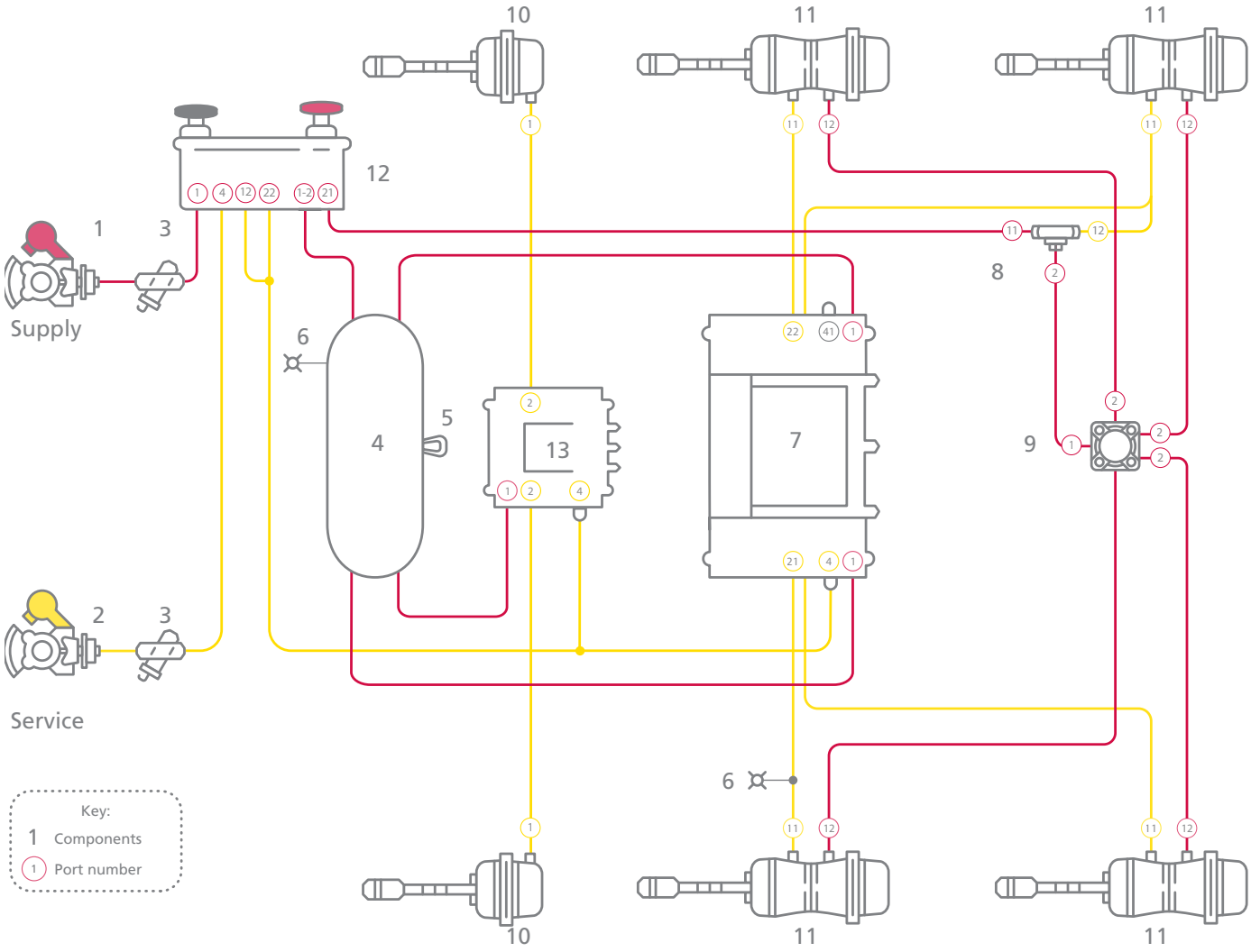
3M Full trailer, 3 axle, with Park & Shunt (352 044 001)



Note: ABS 4.0 should be supplied with clean / dry air.

Item	Description	Notes
1	Supply coupling	Red - Combined coupling & filter available
2	Service coupling	Yellow - Combined coupling & filter available
3	Pipe filter	
4	Air reservoir - brake	
5	Drain valve	
6	Test point	
7	2M Master ABS	ABS 4.0 assembly
8	Double check valve	
9	Quick Release Valve	
10	Single diaphragm brake chamber	
11	Spring brake chamber	
12	Park & Shunt	352 044 001
13	Relay Emergency Valve	
14	1M Slave ABS	ABS 4.0 Slave

3M Full trailer, 3 axle, with TrCM+ (352 067 xxx)

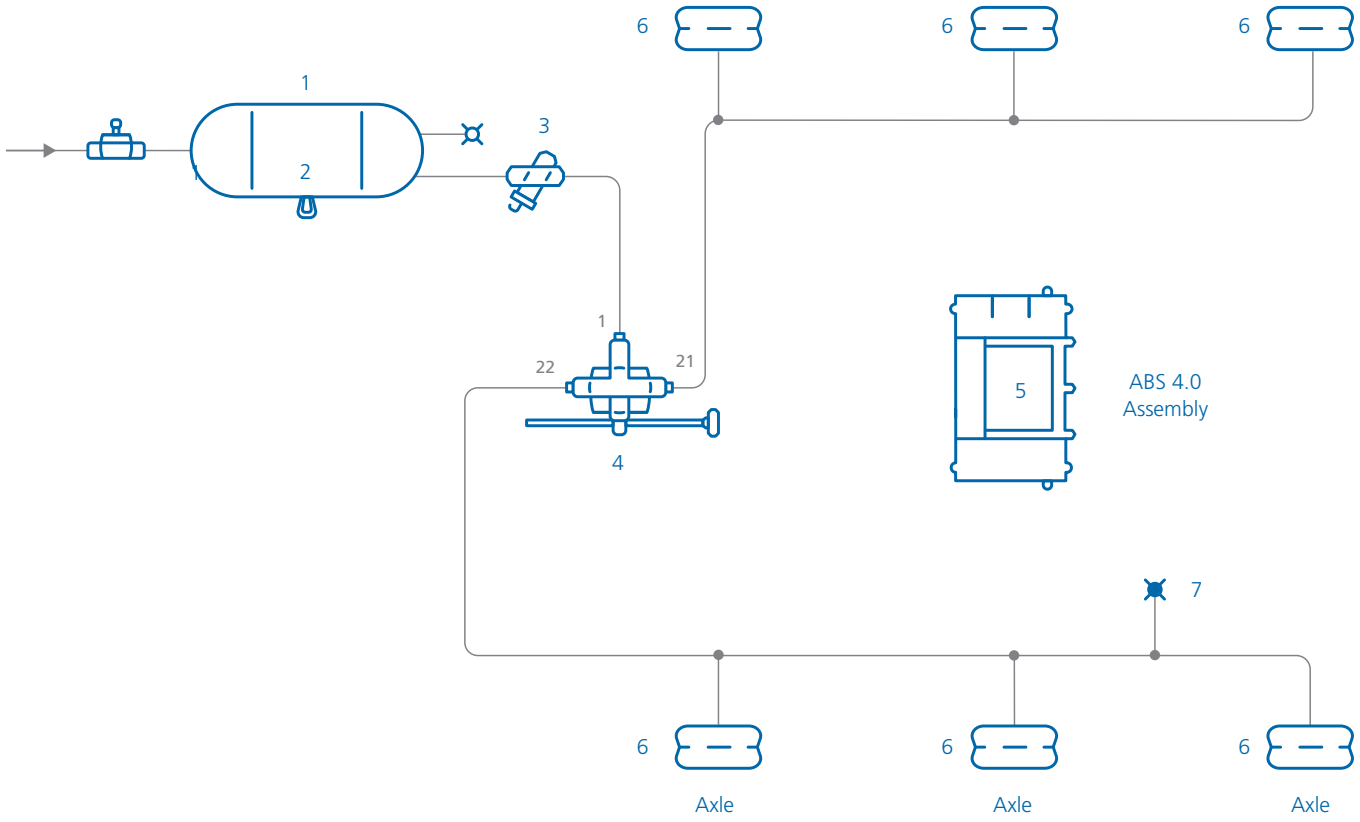


Note: ABS 4.0 should be supplied with clean / dry air.

Item	Description	Notes
1	Supply coupling	Red - Combined coupling & filter available
2	Service coupling	Yellow - Combined coupling & filter available
3	Pipe filter	
4	Air reservoir - brake	
5	Drain valve	
6	Test point	
7	2M Master ABS	ABS 4.0 assembly
8	Double check valve	
9	Quick Release Valve	
10	Single diaphragm brake chamber	
11	Spring brake chamber	
12	Park & Shunt	352 067 xxx
13	1M Slave ABS	ABS 4.0 Slave

Piping layout - Suspension

Three axle, dual circuit suspension with levelling valve

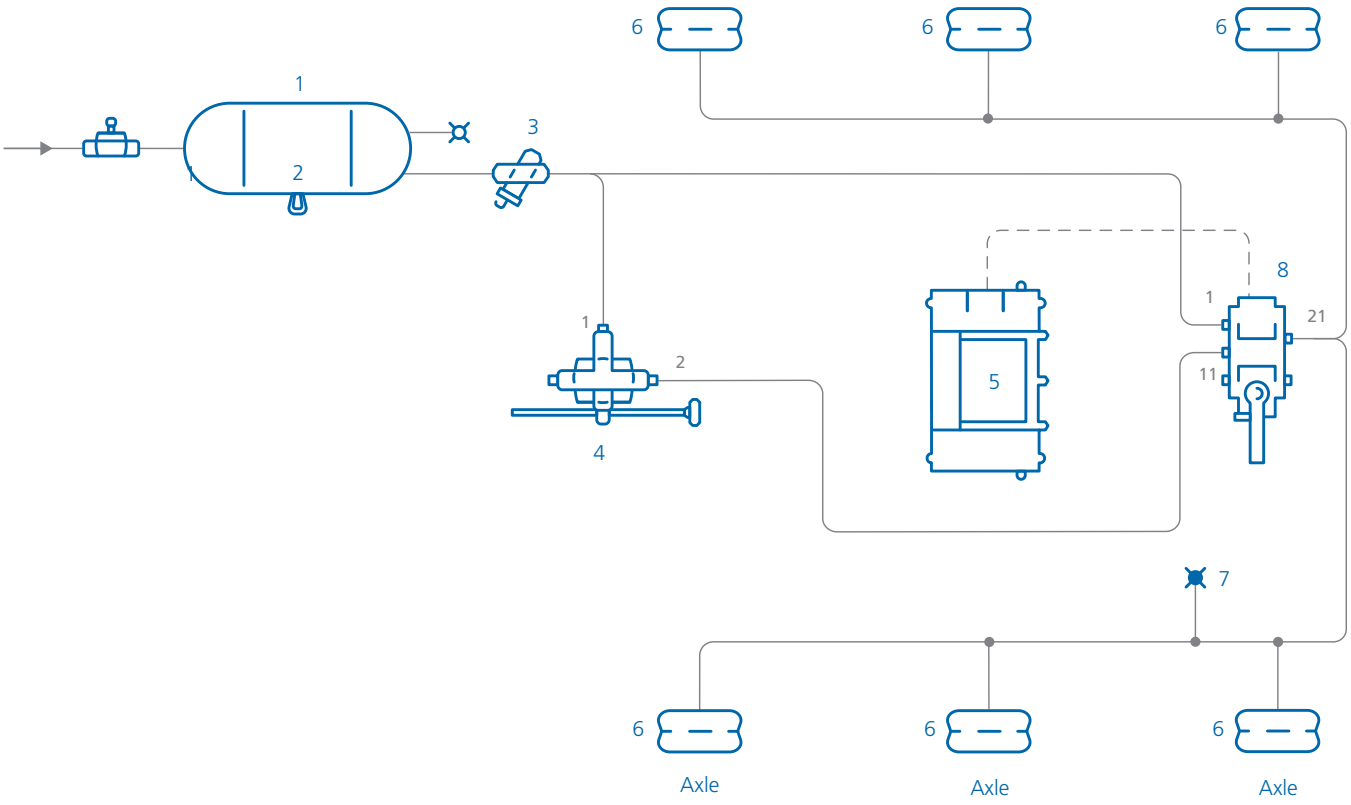


Key:
1 Components
4 Port number

Note: ABS 4.0 should be supplied with clean / dry air.

Item	Description
1	Air reservoir
2	Drain valve (manual)
3	Line filter
4	Levelling valve (without height limitation)
5	ABS 4.0 assembly
6	Air suspension bellows
7	Test connection (ISO 3583)

Three axle, single circuit suspension with levelling valve and COLAS

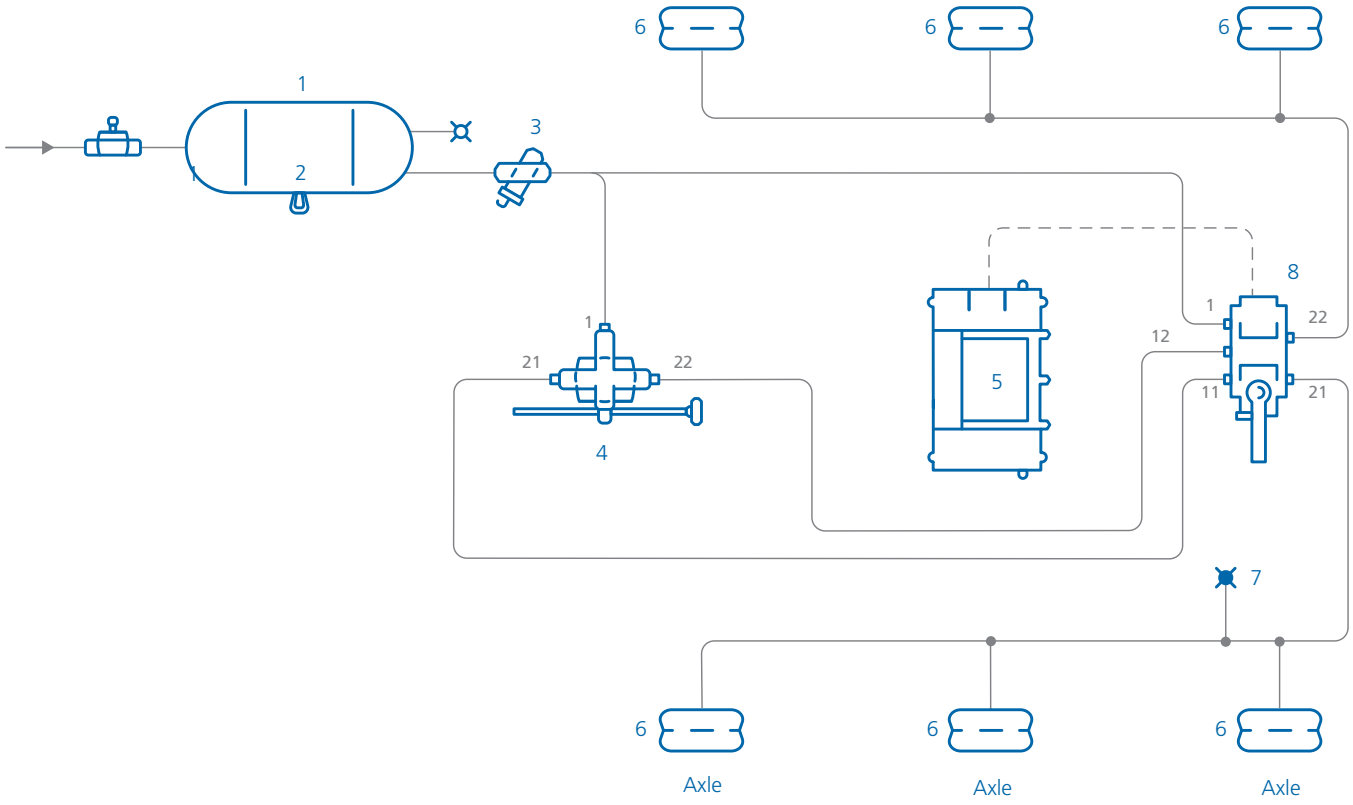


Key:
1 Components
4 Port number

Note: ABS 4.0 should be supplied with clean / dry air.

Item	Description
1	Air reservoir
2	Drain valve (manual)
3	Line filter
4	Levelling valve (without height limitation)
5	ABS 4.0 assembly
6	Air suspension bellows
7	Test connection (ISO 3583)
8	COLAS

Three axle, dual circuit suspension with levelling valve and COLAS



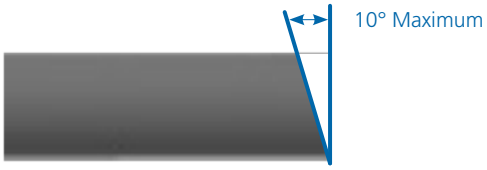
Key:
1 Components
4 Port number

Note: ABS 4.0 should be supplied with clean / dry air.

Item	Description
1	Air reservoir
2	Drain valve (manual)
3	Line filter
4	Levelling valve (without height limitation)
5	ABS 4.0 assembly
6	Air suspension bellows
7	Test connection (ISO 3583)
8	COLAS

PTC Connectors

PTC tube insertion instructions



The tube has to be cut with a tube cutter by 90°. A maximum deviation of 10° is allowed. The tube end must be free of marks, burrs, stickers etc.

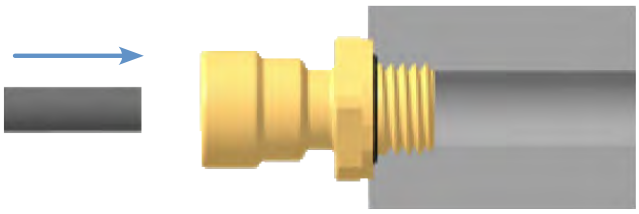
Assembly of tube push-in is performed manually by hand without the need of special tooling. The tube push-in is performed in one easy and simple push-in operation.

Details during tube push-in sequence:

1. Passing the environmental seal o-ring

2. Passing the grip ring

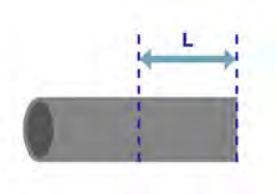
3. Passing the main seal o-ring and reaching the mechanical stop at the bottom of the coupling



› Pull back the tube by hand to secure the assembly. Customer decision depending on the criticality level of the application.

› The maximum required tube push-in forces are shown in the below table.

A marking for visual control of the push-in length is optional.



The push-in length is mentioned in the below table. In cases where the tube is not pushed in correctly, and only passing the grip ring, a measurable controlled leakage will occur and an audible whistle can be heard to locate. Depending on the dimension of the tube it can be re-pushed under pressure, to secure a 100% assembly.

Tube size	Push-in length	Max. push-in force
8 x 1	20.5 mm	90 N
10 x 1, 10 x 1.25, 10 x 1.5	24 mm	100 N
12 x 1.5	25 mm	110 N
15 x 1.5	27 mm	125 N

PTC tube removal instructions

Please read the following instructions for your personal safety and the safe use of the couplings as a part of the brake system to avoid loss of brake function.

Only original Raufoss ABC release tools shall be used when releasing tubes from Raufoss ABC couplings. Use of other methods, tools or equipment than those stated in this manual is considered misuse of the products and will void any product warranty. Haldex does not take responsibility for any subsequent failures as a result of misuse or misapplication of the products.

When using the Raufoss ABC system, the exchange of valves, air reservoirs, air bellows etc. can be performed without any problem.

Before starting to work on the couplings:

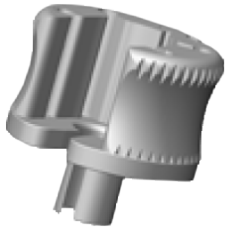
- Remove air pressure completely out of the pneumatic system, to be able to release the tubing / couplings.
- Remove cable ties close to ABC coupling. The tube / ABC coupling block must be accessible, and the tube to be as straight as possible.
- Clean
  a. The push-in area around the tube
  b. The tube push-in section of the coupling.
  c. Make sure that no dirt or contamination will be pushed into the tube, the coupling or the valve port

Standard release tool



Standard release tool	
Part no.	**Tube size (mm)**
	6 x 1
032 966 080	8 x 1
	10 x 1, 10 x 1.25, 10 x 1.5
032 966 127	12 x 1.5
	15 x 1.5
032 966 160	16 x 2

Professional release tool

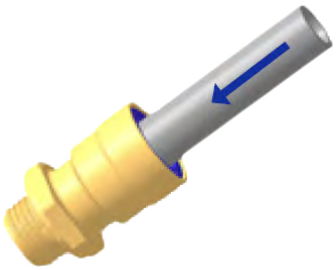


Professional release tool	
Part no.	**Tube size (mm)**
HF00102	6 x 1
HF00103	8 x 1
HF00104	10 x 1, 10 x 1.25, 10 x 1.5
HF00105	12 x 1.5
HF00106	15 x 1.5
HF00107	16 x 2

Only use original Raufoss ABC release tools. Never push any other parts or equipment into the Raufoss ABC coupling.

Check that the release tool is not damaged or blunt. If so, then replace it.

1. Push the tube to the bottom of the coupling to move the grip ring out of locking position.



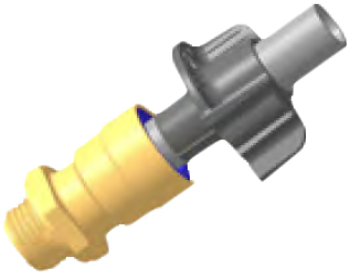
2. Apply release tool onto tube.



3. Ensure tight contact between release tool and tube.

4. Push the release tool into the coupling. Avoid using excessive force or rotation, while sliding the release tool down the tube. Make sure the flange of the release tool stops against the top of the coupling.

Silicone spray can be used to ease the injection of release tool.

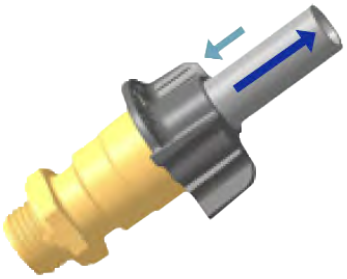


5. While pushing the release tool towards the coupling; pull the tube out. Rotating (a few degrees) the tube may ease the release.

6. Remove the release tool.

7. Ensure that the tube end is clean and undamaged. If not, cut the tube end.

8. Visually inspect the tube push-In section of the coupling for any contamination. Ensure no contamination is coming into the air flow, or on the O-ring seals of the coupling. Haldex does not take any responsibility for consequences of such contamination or damages caused by contamination.



9. Push-in the clean tube.

10. Perform a leakage test.

PTC Leakage

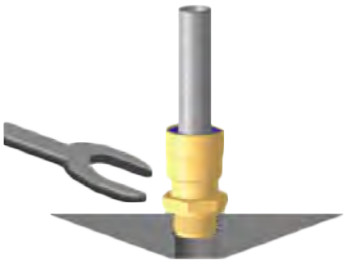
› Check the cleanliness of the coupling and tube

› Exchange the coupling (brass PTC screw type only)

Brass PTC screw type coupling and tube removal instructions

Only applies to the brass PTC screw type couplings:

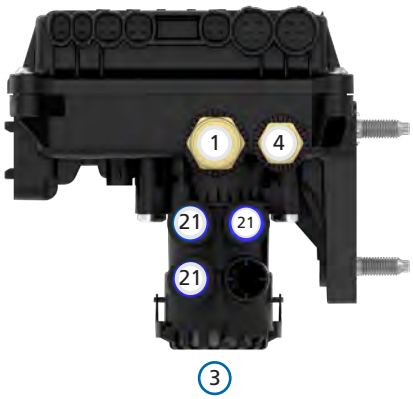
- In cases where ABC release tool is not available, the connection can be released together with the tube
- Please unscrew with a standard wrench. The push-in coupling is turning on the tube
- Ensure that the brass PTC screwed coupling torques are not exceeded when replacing the coupling (see table below)

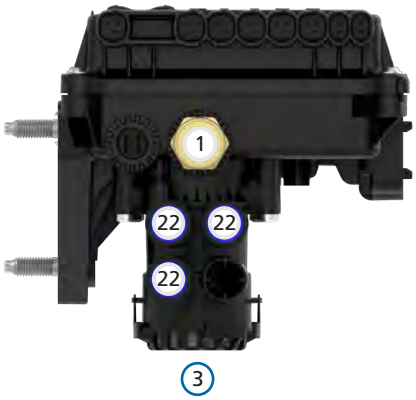


Note:

1. If necessary, only remove the brass PTC couplings from the Haldex ABS housing.
2. Do not attempt to remove any of the molded PTC couplings from the Haldex ABS housing.

ABS 4.0 Premium example:





Port	Description	Type	Torque	Size
1	Reservoir port	PTC - brass, screwed	15 Nm	15 x 1.5 mm (with filter)
3	Exhaust port			
4	Control port	PTC - brass, screwed	10 Nm	8 x 1 mm
21/22	Delivery ports	PTC molded		12 x 1.5 mm
21	Test point port	PTC molded		8 x 1 mm

ECU Connectors

Cable connection

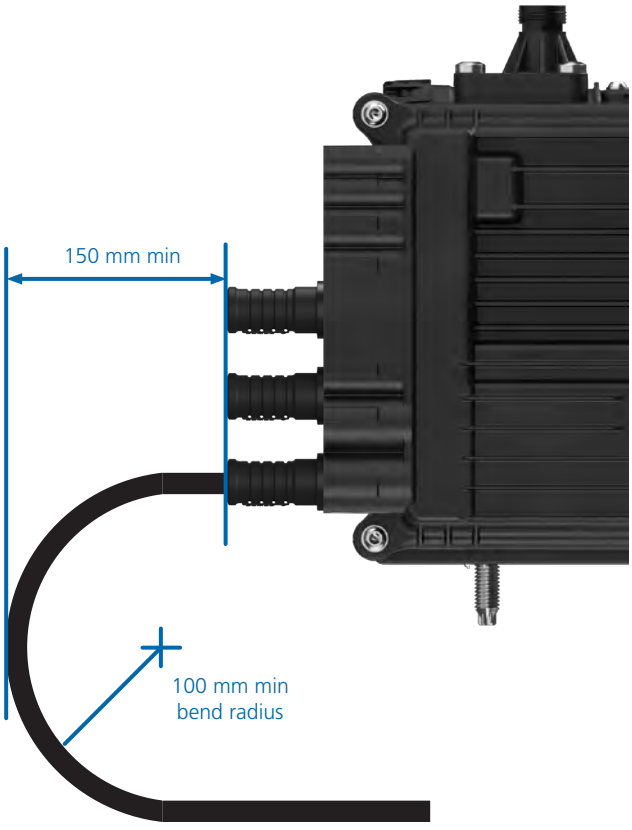
The route of all of the cables from the ECU connector should not start to bend so that the connectors are strained.

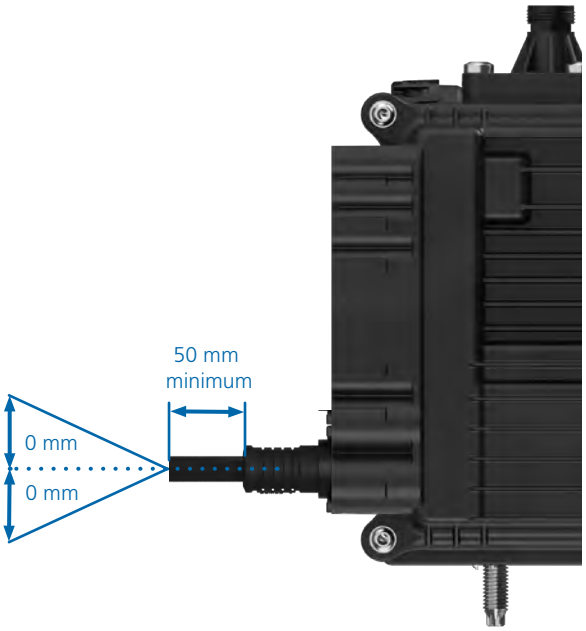
Ensure stated minimum distance is not exceeded.

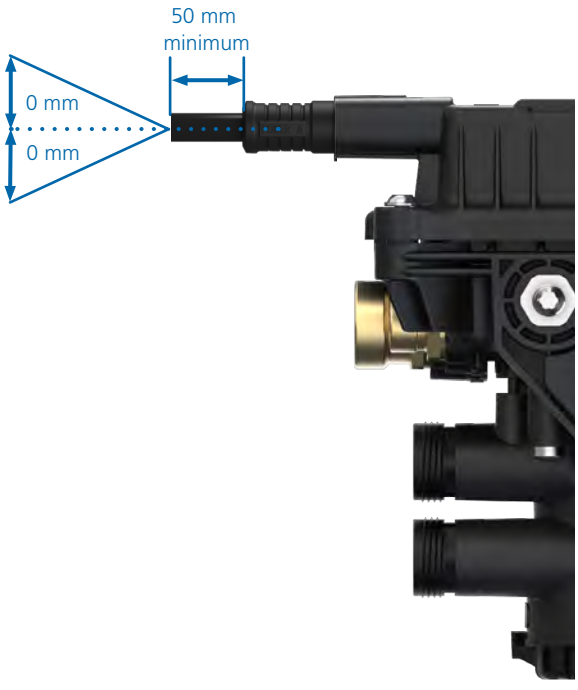
Allow distance of 150 mm (minimum) before bending of cable.

All cables should run ‘up to’ ECU connectors.

Cable runs must be positioned downwards from the ECU to ensure no water ingress





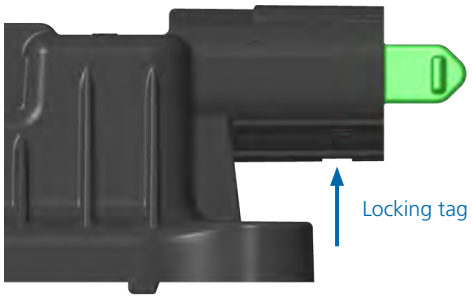


Blanking Plugs removal

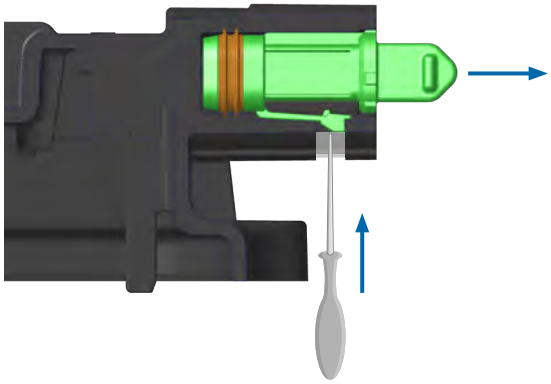
The ECU is supplied with green blanking plugs.

These require to be removed to allow fitment of additional sensors or permitted ancillary equipment.

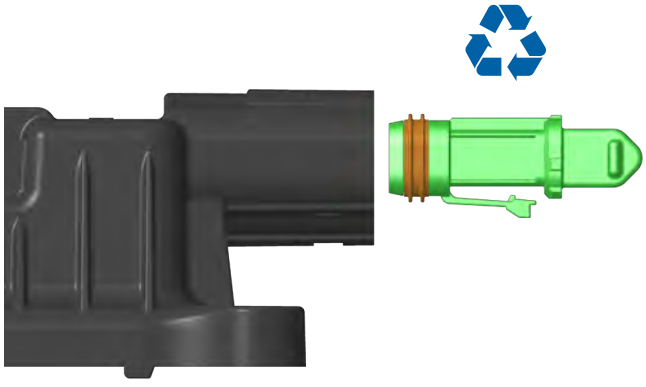
Locate the locking tag position.for the connector.



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



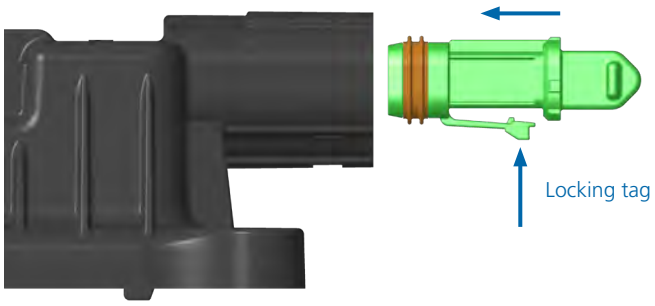
Environmentally dispose of the green blanking plug



Blanking Plugs insertion

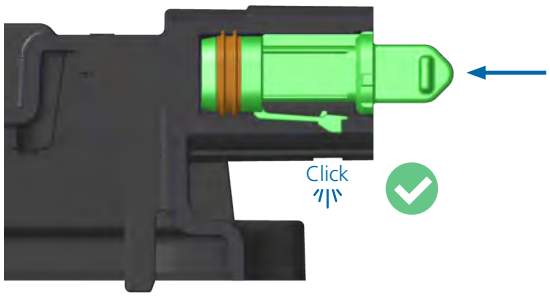
Ensure that both the green blanking plug and the ECU connector are clean and dry before assembly.

Rotate the green blanking plug, so that the locking tag is facing the bottom of the ABS 4.0



Push the plug into the connector

Keep pushing until a click is heard from the locking tag



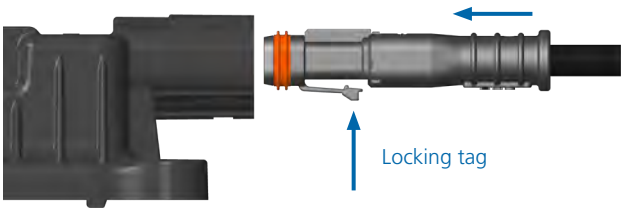
Blanking plug is now inserted correctly



Power / Auxiliary / Sensor connector insertion

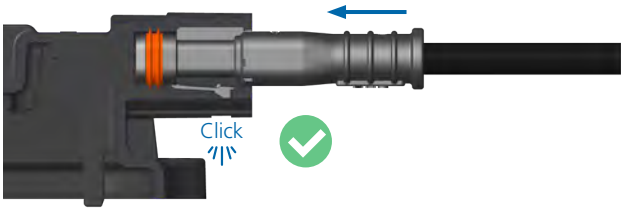
Ensure that both the cable connector and the ECU connector are clean and dry before assembly.

Rotate the cable connector, so that the locking tag is facing the bottom of the ABS 4.0



Push the cable connector into the ECU connector.

Keep pushing until a click is heard from the locking tag

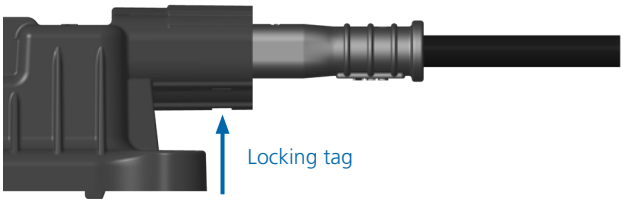


The cable connector is now fully inserted correctly.

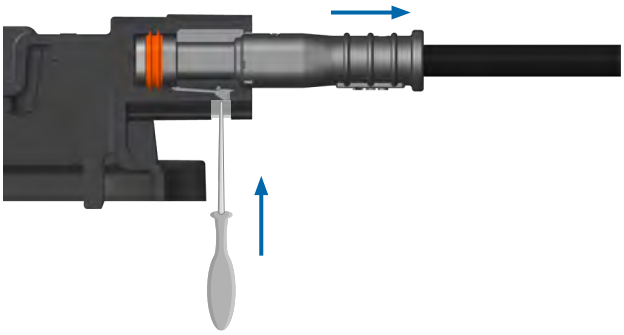


Power / Auxiliary / Sensor connector removal

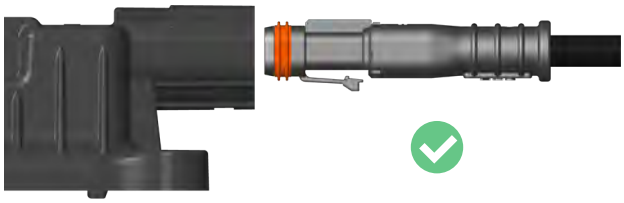
Locate the locking tag position.for the connector to be removed.



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



If necessary install a green blanking plug.



Any unused ECU connectors must have a green blanking plug fitted.

7-way blanking plug 003 9898 09

4-way blanking plug 003 9899 09

2-way blanking plug 003 9900 09



Auxiliary operation

Auxiliary operations are dependant on the installed ABS product.

ABS 4.0 has up to 3 usable auxiliary connectors (AUX 1-3), which can be configured using the DIAG++ software.

This amount of inputs and outputs are sufficient for most used standard trailer applications. In the case of malfunction (short circuit / open circuit) the ABS 4.0 system generates a DTC code and the service lamp will be triggered after start up.

ABS variant	AUX 1	AUX 2	AUX 3
Basic	✓	✗	✗
Premium	✓	✓	✓
Premium (roll-over control)	✓	✓	✓

AUX function assignment

Wire colour	AUX 1	AUX 2	AUX 3
Red	O/P DIG I/P	O/P DIG I/P	O/P DIG I/P
Black	B-	B-	B-
Yellow	O/P ANA I/P	O/P ANA I/P	O/P ANA I/P

Key:

O/P (AUX 1-3) – Switched supply voltage outputs on red channel (pin 1) and yellow channel (pin 3) with 1.2A maximum supply current for each channel.

Dig I/P (AUX 1-3) – Digital monitor input. Red channel (pin 1) can be used to monitor a state change input (B+ or B-)

Ana I/P (AUX 1-3) – Analogue input on yellow channel (pin 3) can be used to measure voltage input.

B- – System ground connection (pin 4)

AUX connections

Programming of AUX 1 to AUX 3 on ABS 4.0 is only possible using DIAG++ software.

The user can program two totally independent inputs or outputs on AUX 1 to AUX 3.

Each AUX has two wires that can be configured as an input or output.

The twin inputs or outputs of AUX 1 to AUX 3 are colour coded red and yellow within the DIAG++ software. These colours then match the twin colour identifiers on the cables.

AUX 1 to AUX 3



Auxiliary connection cables

To use the full auxiliary twin functionality of the AUX, the following cables can be used.

844 301 XXX

Bare ended cable for customers to fit their own connectors.



Gen3 Equivalent: 814 001 3XX

844 331 XXX

Auxiliary extension cable (for use with Y-Splitter)



Gen3 Equivalent: 814 032 XXX

844 341 001

F/F/F Splitter. Premium Aux, meaning each cable can be programmed individually in the ABS 4.0 software

Gen3 Equivalent: 814 039 001



844 342 001

M/F/F Splitter. Premium Aux, meaning each cable can be programmed individually in the ABS 4.0 software

Gen3 Equivalent: N/A



844 321 XXX

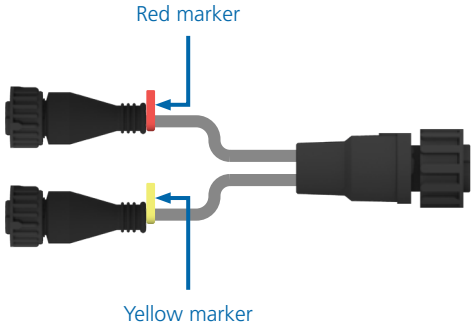
DIN 72585 Socket connection for COLAS® etc

Gen3 Equivalent: 814 012 2XX



814 027 001

Male to female to female (2x2x2 way)



364 655 XXX

Bare ended 24N cable (to ISO 12098)

Gen3 Equivalent: 814 002 2XX



Programming AUX using DIAG++

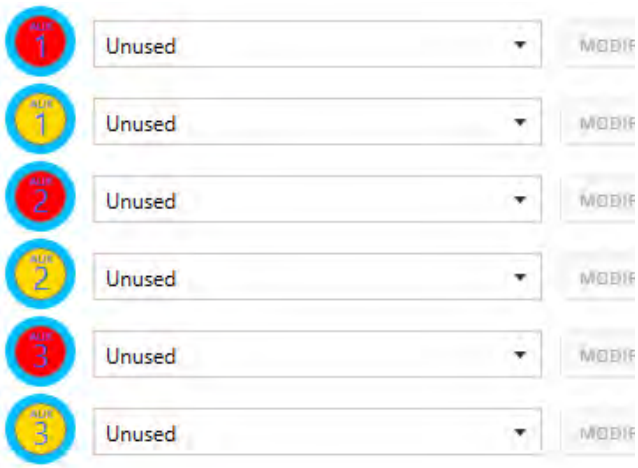
Programming of AUX 1 to AUX 3 on ABS 4.0 is only possible using DIAG++ software.

The 'AUX configuration' screen shows the various auxiliary connections that can be used.

AUX 1 Red & yellow

AUX 2 Red & yellow

AUX 3 Red & yellow



Clicking on the drop down arrow displays a list of options that can be selected on that auxiliary.

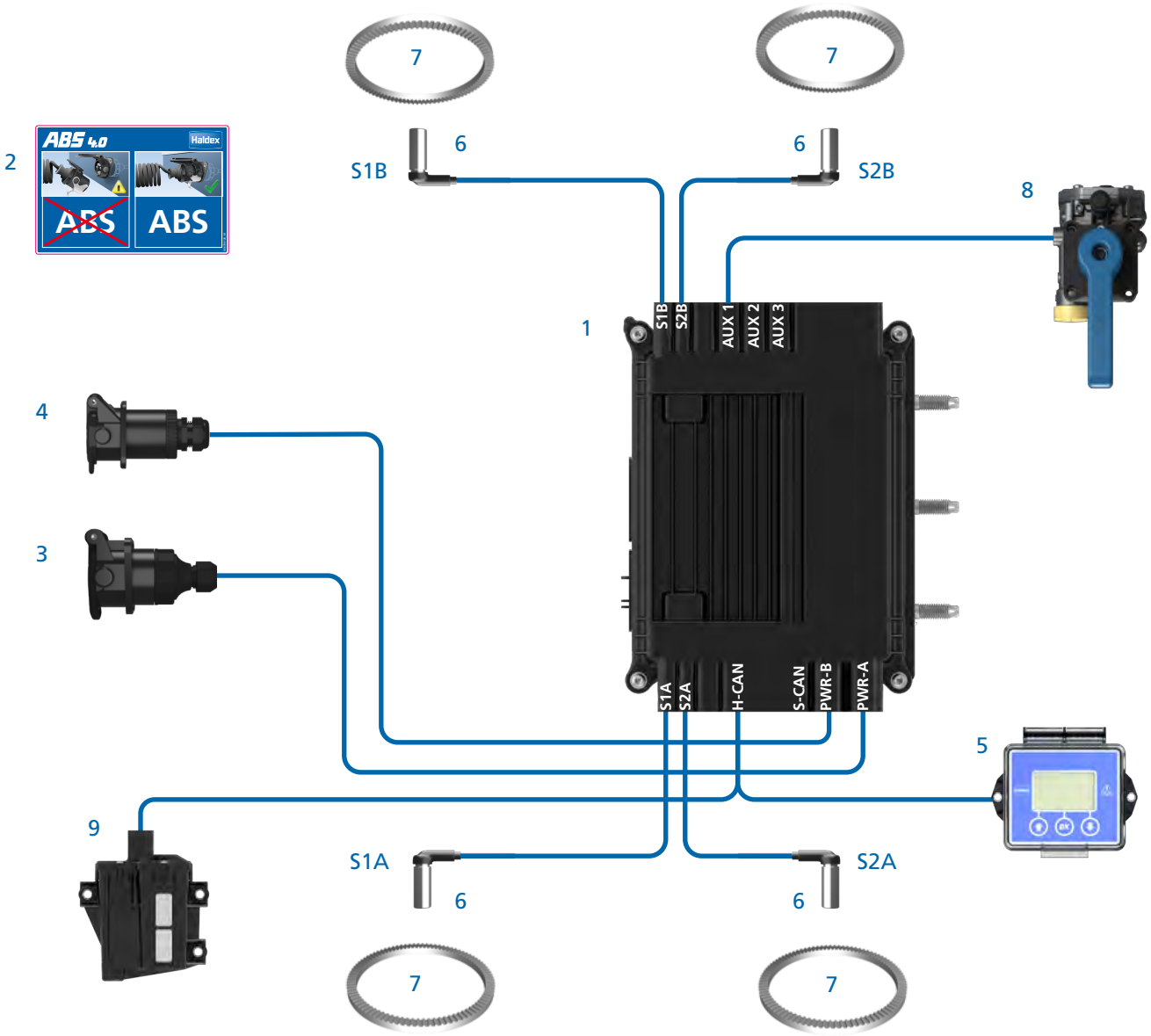
AUX configuration example

AUX 1 (Red AUX)	COLAS®
AUX 1 (Yellow AUX)	Aux Power
AUX 2 (Red AUX)	Unused
AUX 2 (Yellow AUX)	Unused
AUX 3 (Red AUX)	Unused
AUX 3 (Yellow AUX)	Unused



Basic 2M - ECU connections

Basic 2M ABS chassis components

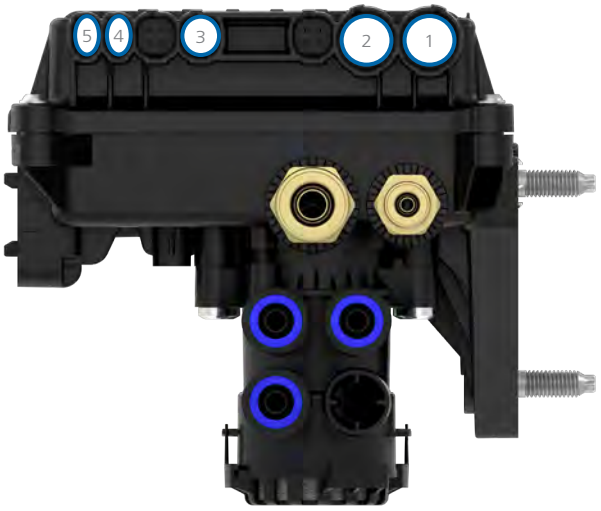


Item	Description	Notes
1	ABS 4.0 assembly	Basic version shown
2	ABS 4.0 label	
3	ISO 7638 7-pin socket assembly	
4	ISO 12098 / PWR-B	Optional safety back up cable
5	EB+ Info Centre	
6	Sensor assembly	
7	Exciter	
8	COLAS®+	Programmable via DIAG++ (Operators guide no. 006 300 056)
9	TPMS 2.0	Programmable via DIAG++ (Operators guide no. 006 300 056)

Basic 2M ABS connections

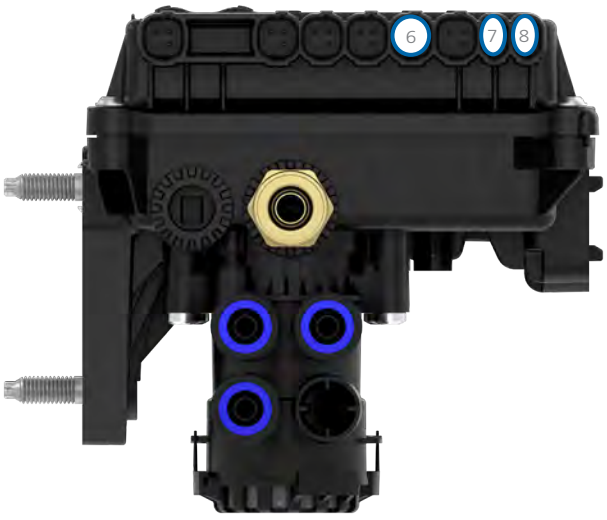
No.	Description
1	ISO 7638 PWR-A 7-Pin*
2	ISO 12098 / PWR-B
3	H-CAN
4	Sensor S2A
5	Sensor S1A *

* minimum requirement for a 2S / 2M system



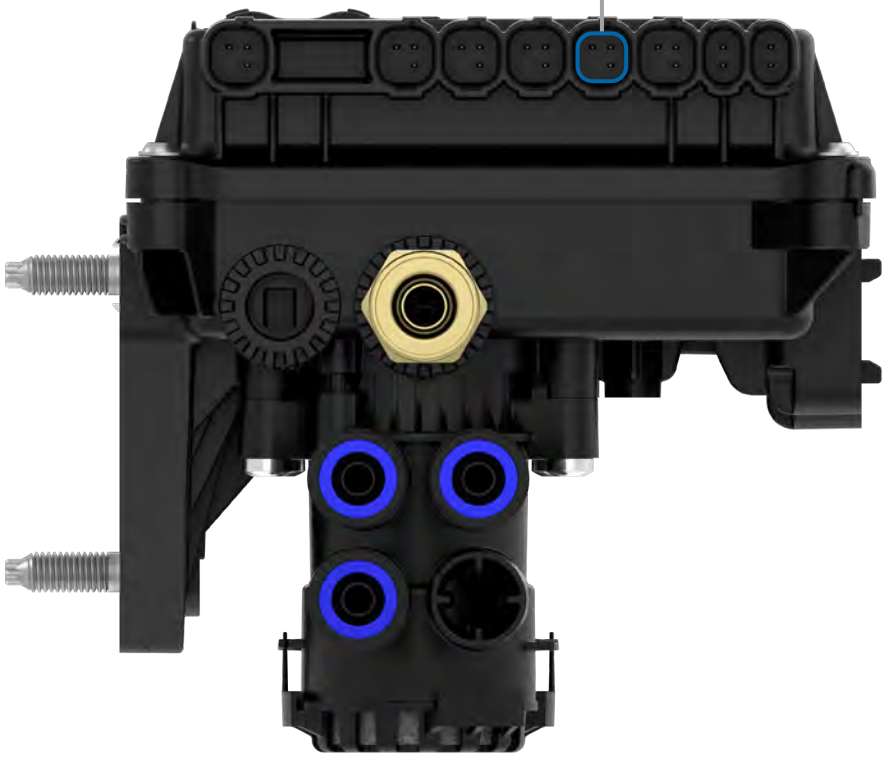
No.	Description
6	AUX 1
7	Sensor S2B
8	Sensor S1B *

* minimum requirement for a 2S / 2M system



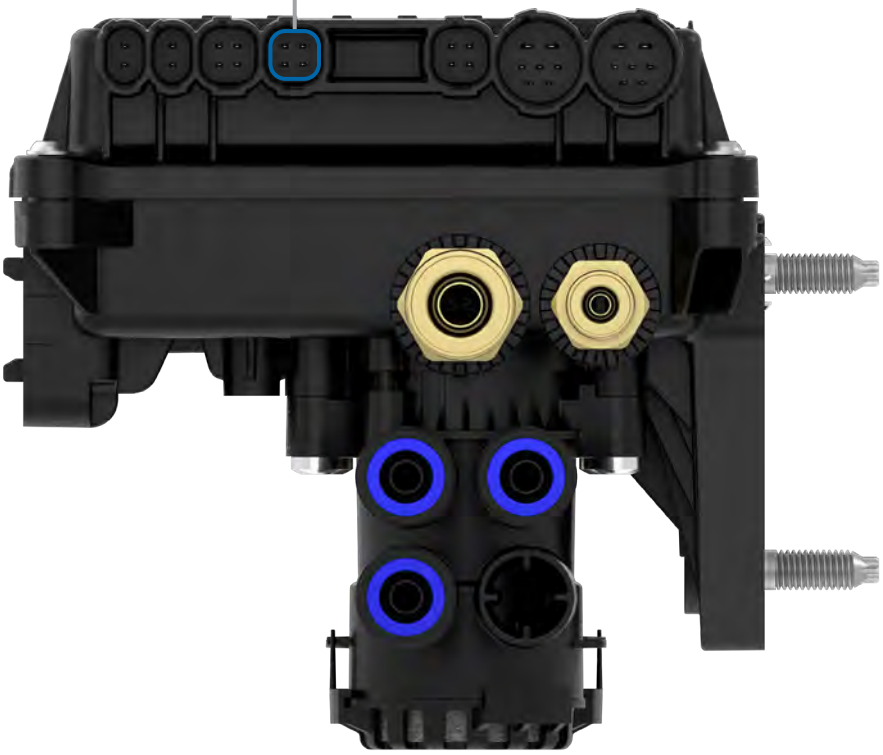
Basic ABS auxiliary operation

AUX 1
COLAS®+
Retarder
Trailer lamp
AUX power
Steer axle lock
Service lamp
Stability lamp
Speed lock
TPMS lamp



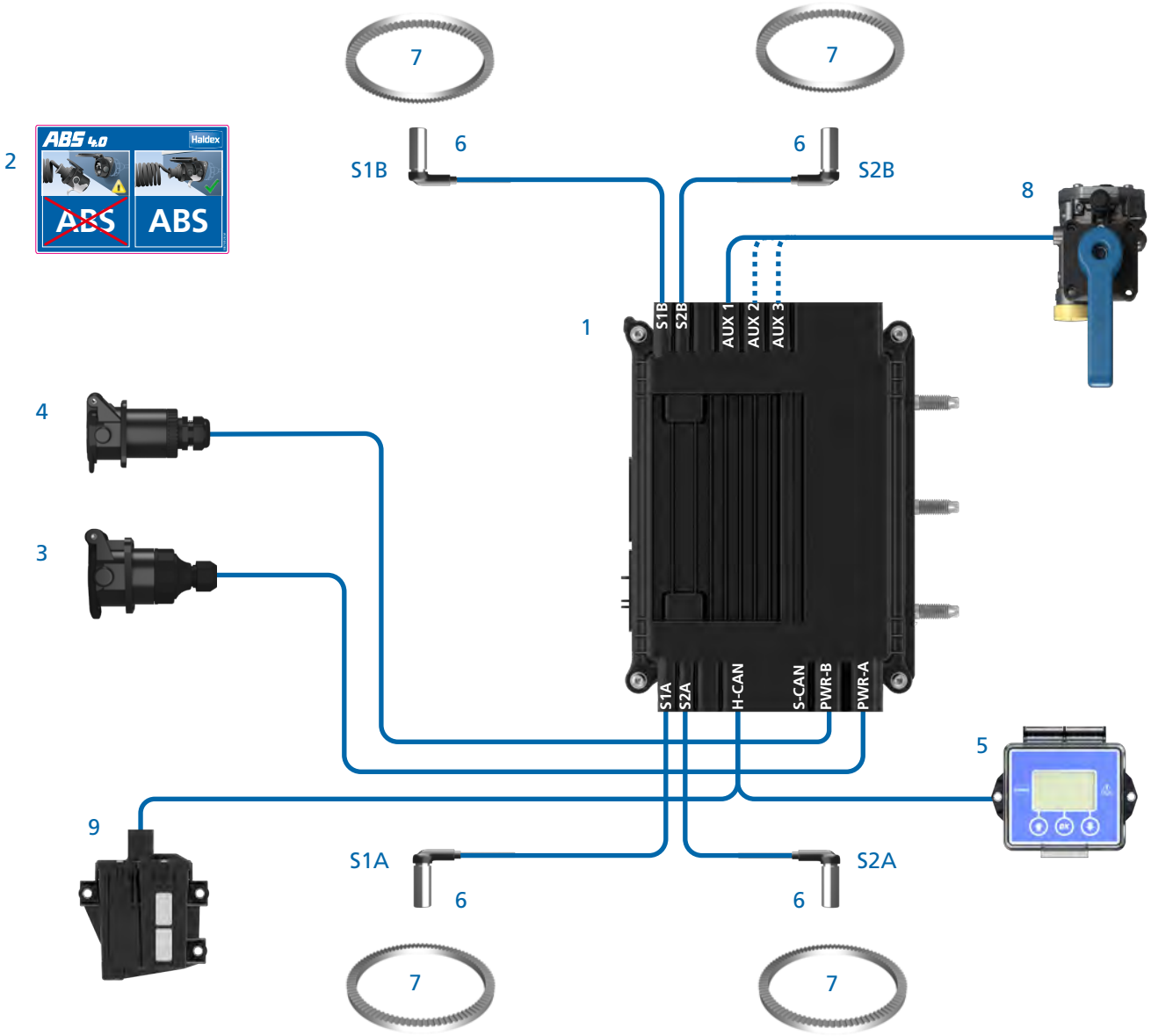
Basic ABS CAN operation

H-CAN
TPMS 2.0
EB+ Soft Docking
EB+ Info Centre
PC interface



Premium 2M - ECU connections

Premium 2M ABS chassis components

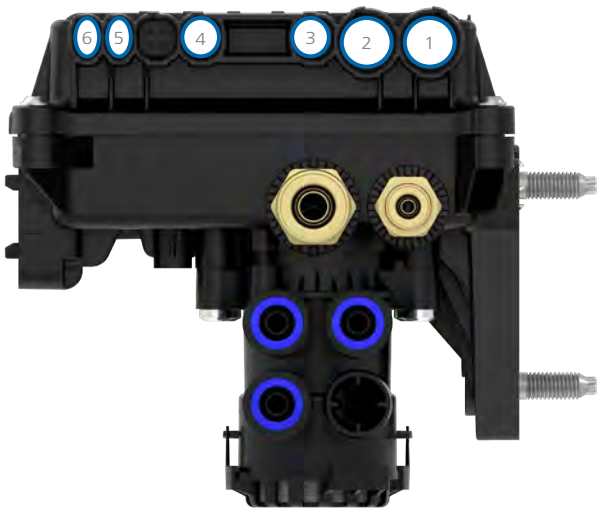


Item	Description	Notes
1	ABS 4.0 assembly	Premium version shown
2	ABS 4.0 label	
3	ISO 7638 7-pin socket assembly	
4	ISO 12098 / PWR-B	Optional safety back up cable
5	EB+ Info Centre	
6	Sensor assembly	
7	Exciter	
8	COLAS®+	Programmable via DIAG++ (Operators guide no. 006 300 056)
9	TPMS 2.0	Programmable via DIAG++ (Operators guide no. 006 300 056)

Premium 2M ABS connections

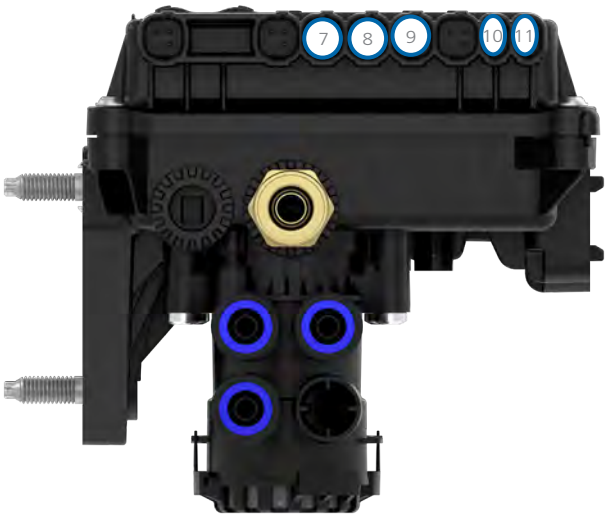
No.	Description
1	ISO 7638 PWR-A 7-Pin *
2	ISO 12098 / PWR-B
3	S-CAN
4	H-CAN
5	Sensor S2A
6	Sensor S1A *

* minimum requirement for a 2S / 2M system



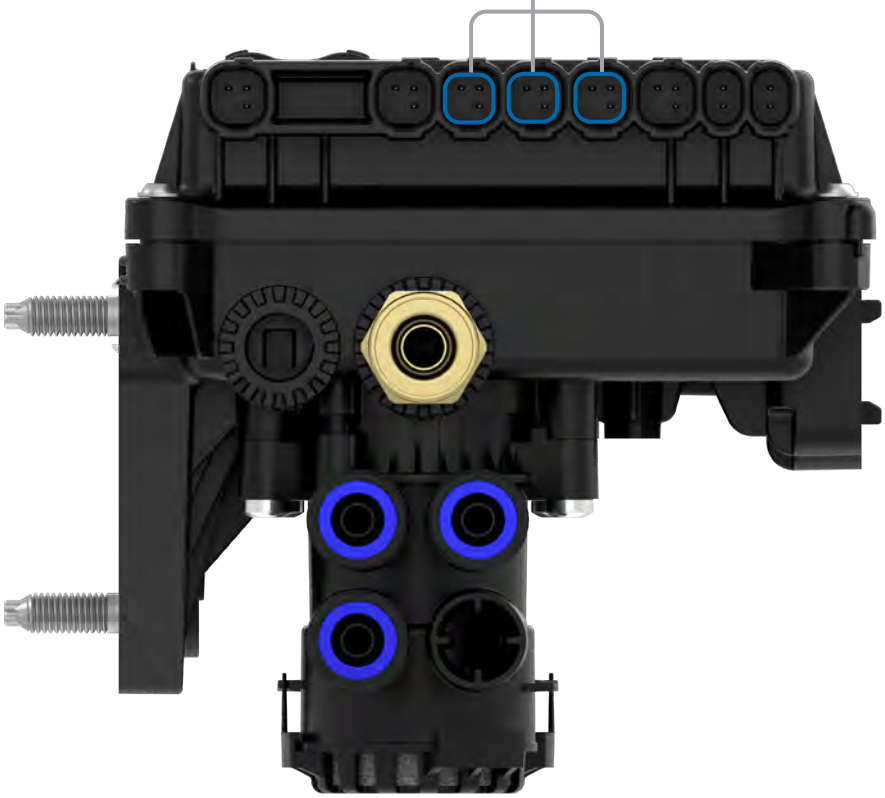
No.	Description
7	AUX 3
8	AUX 2
9	AUX 1
11	Sensor S2B
12	Sensor S1B *

* minimum requirement for a 2S / 2M system

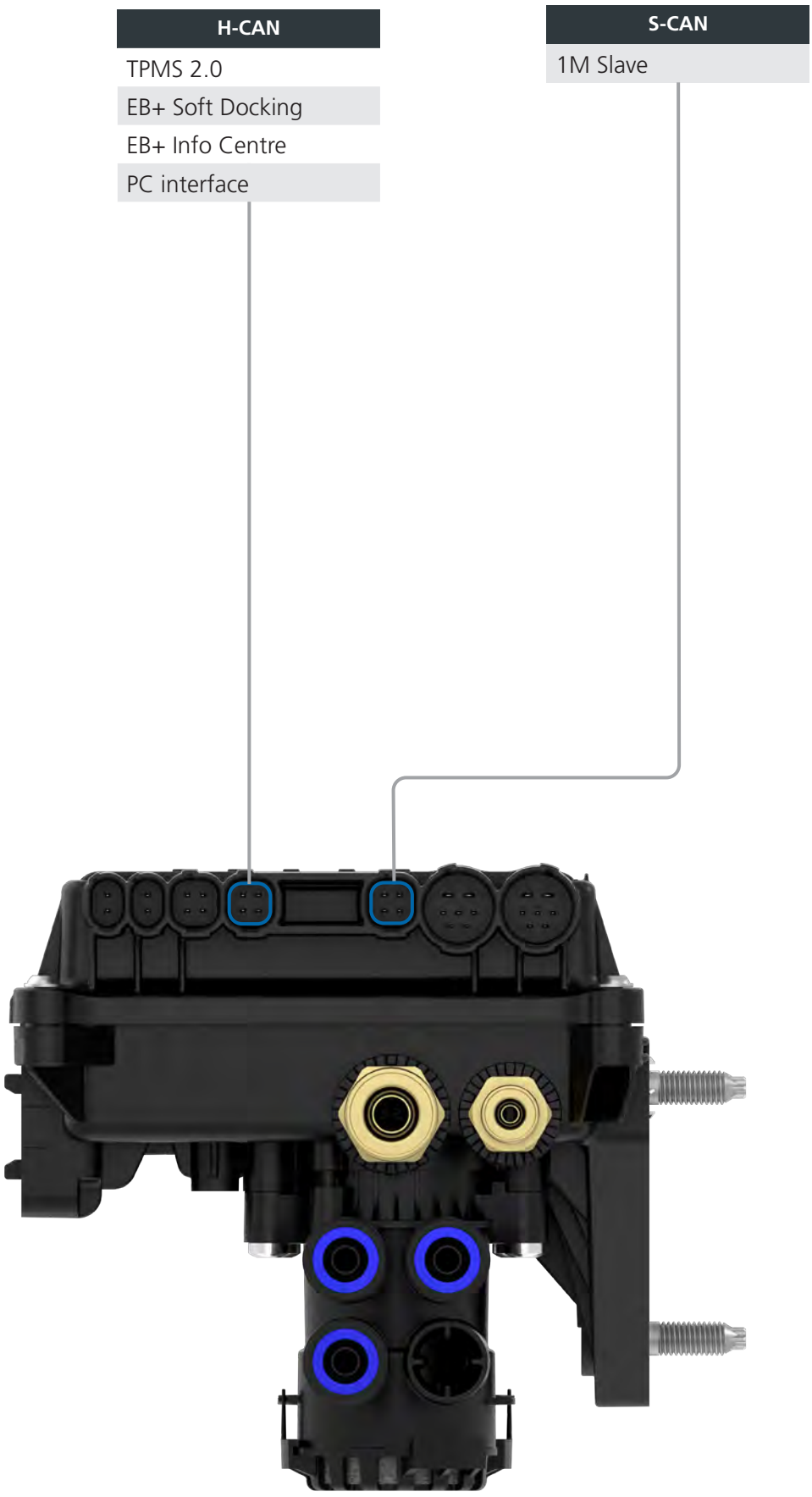


Premium ABS auxiliary operation

AUX 1 - 3
COLAS®+
Retarder
Trailer lamp
AUX power
Steer axle lock
Service lamp
Stability lamp
Speed lock
TPMS lamp

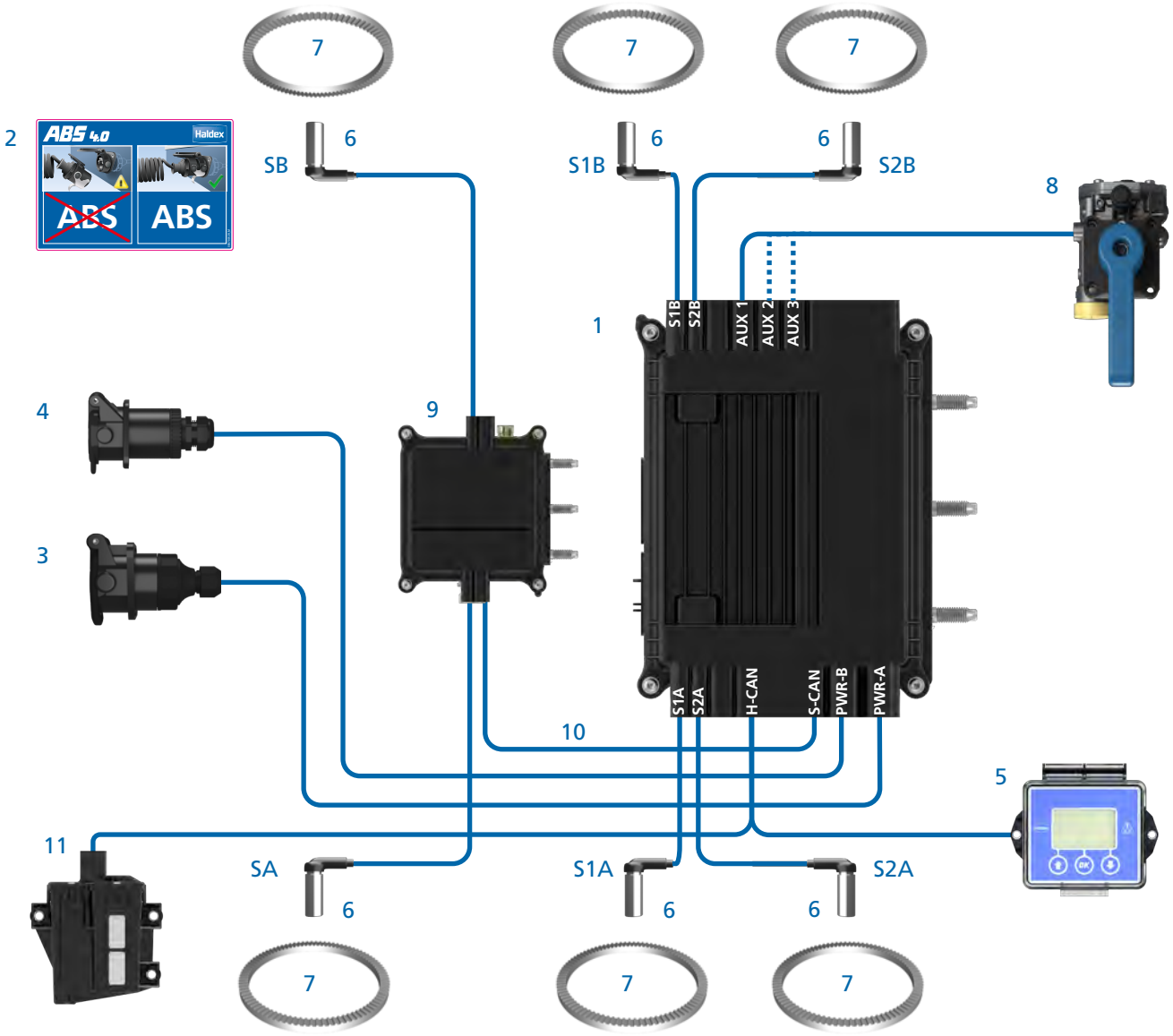


Premium ABS CAN operation



Slave 1M - ECU connections

Premium 3M ABS chassis components



Item	Description	Notes
1	ABS 4.0 assembly	ABS 4.0 2M Premium version
2	ABS 4.0 label	
3	ISO 7638 7-pin socket assembly	
4	ISO 12098 / PWR-B	Optional safety back up cable
5	EB+ Info Centre	
6	Sensor assembly	
7	Exciter	
8	COLAS®+	Programmable via DIAG++ (Operators guide no. 006 300 056)
9	ABS 4.0 1M Slave assembly	
10	3M link cable	
11	TPMS 2.0	Programmable via DIAG++ (Operators guide no. 006 300 056)

1M Slave connections

No.	Description
1	S-CAN
2	Sensor A

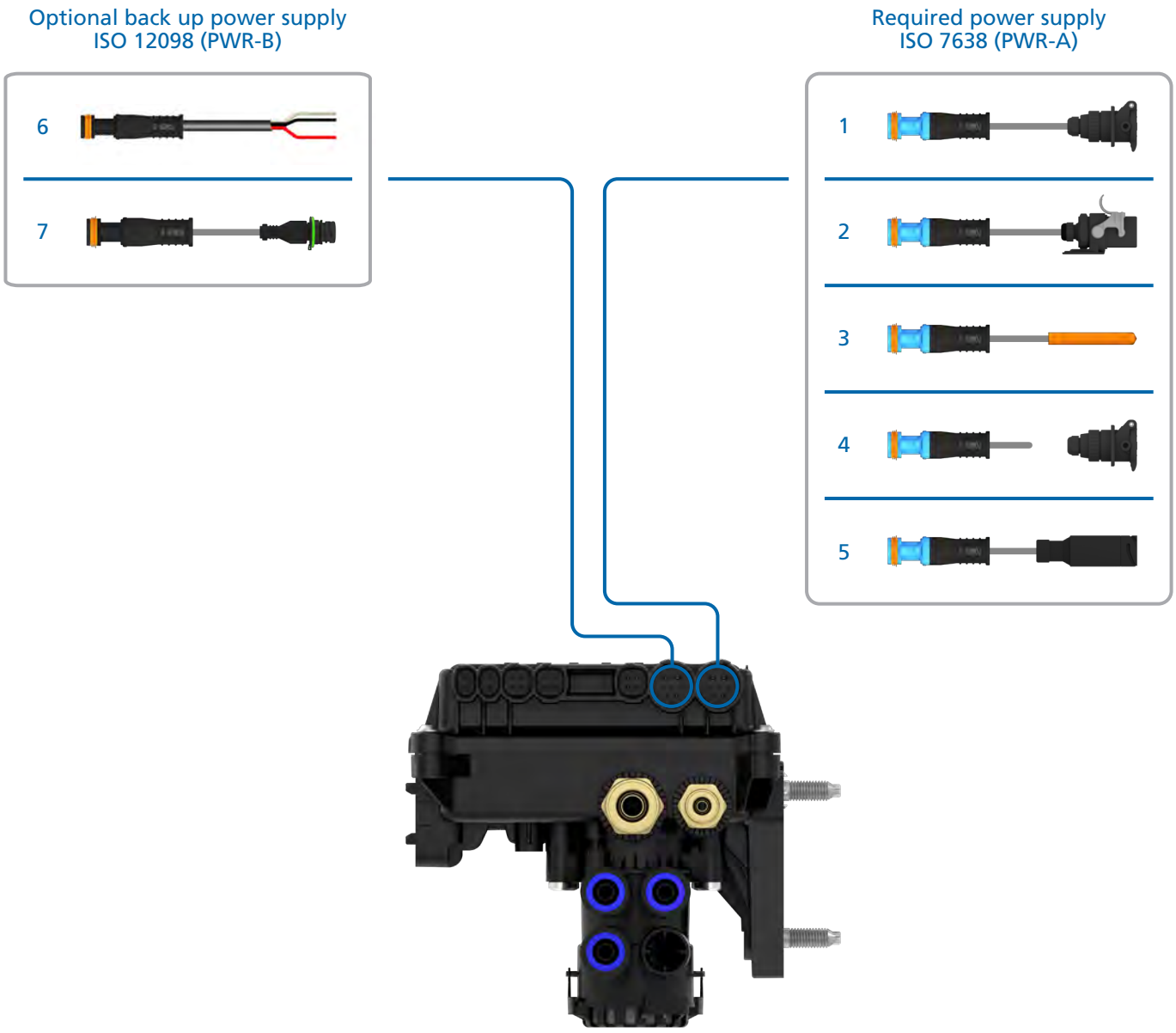


No.	Description
3	AUX
4	Sensor B



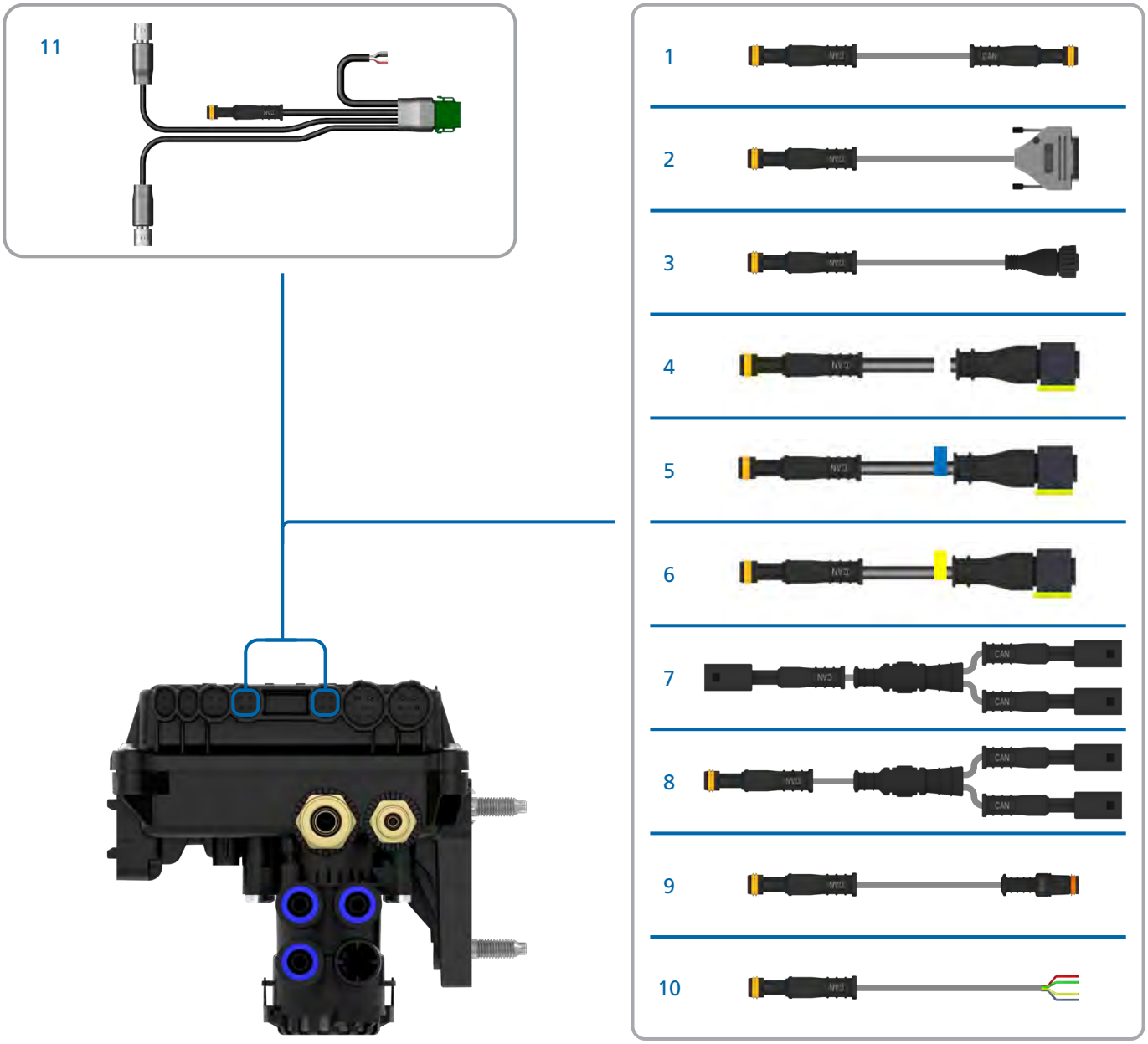
Cables

Power options



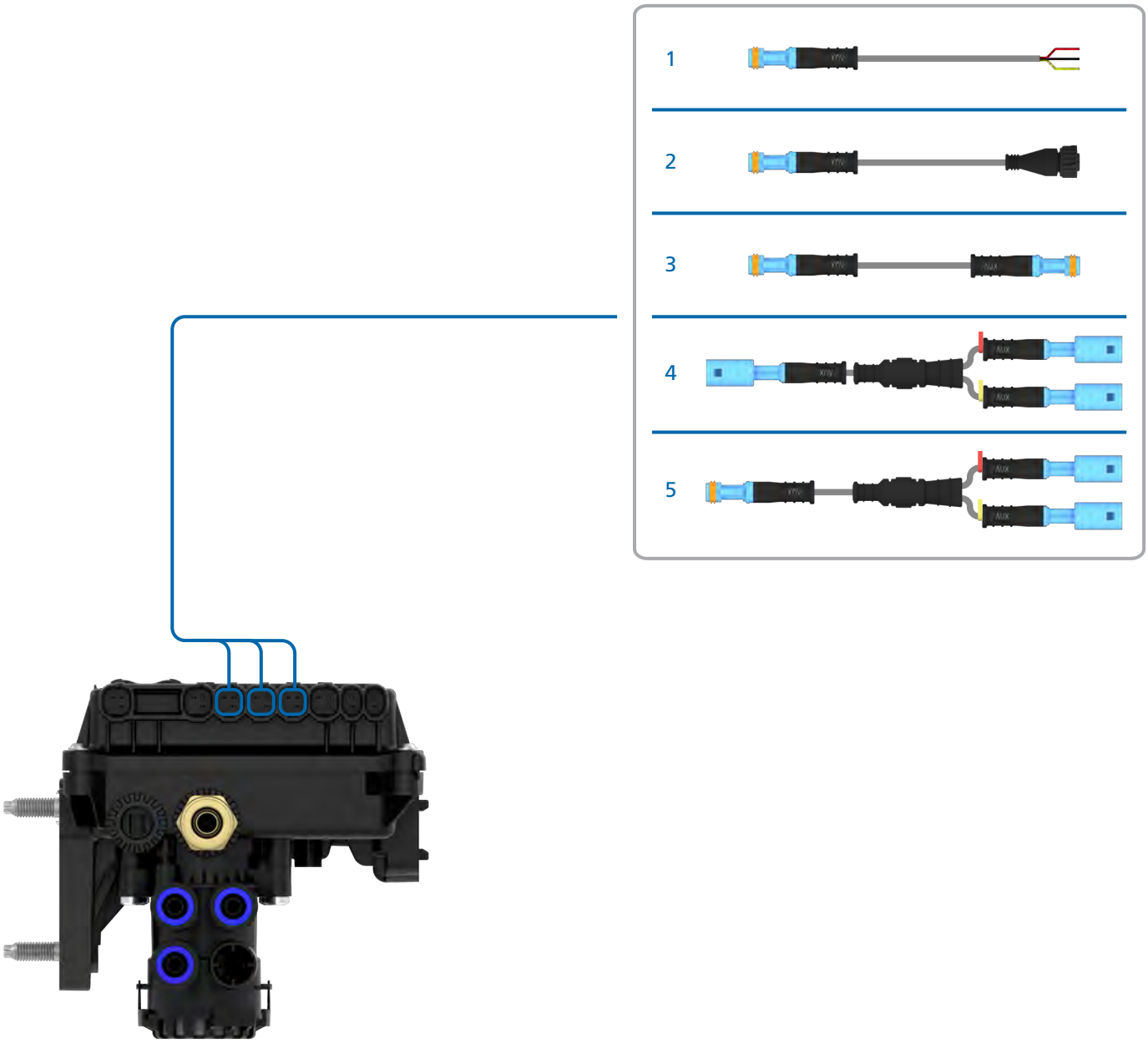
Item	Description	Part numbers
1	Power A to ISO7638 (Socket)	844 001 xxx
2	Power A to ISO7638 (Plug)	844 021 xxx
3	Power A to bare wires	844 101 xxx
4	Power A (ISO7638 kit)	844 003 xxx
5	Power A to 7-way DIN	844 111 xxx
6	Power to ISO 12098 (24N)	364 655 xxx
7	Power B to ISO 12098 (Male DIN)	844 211 xxx

CAN options



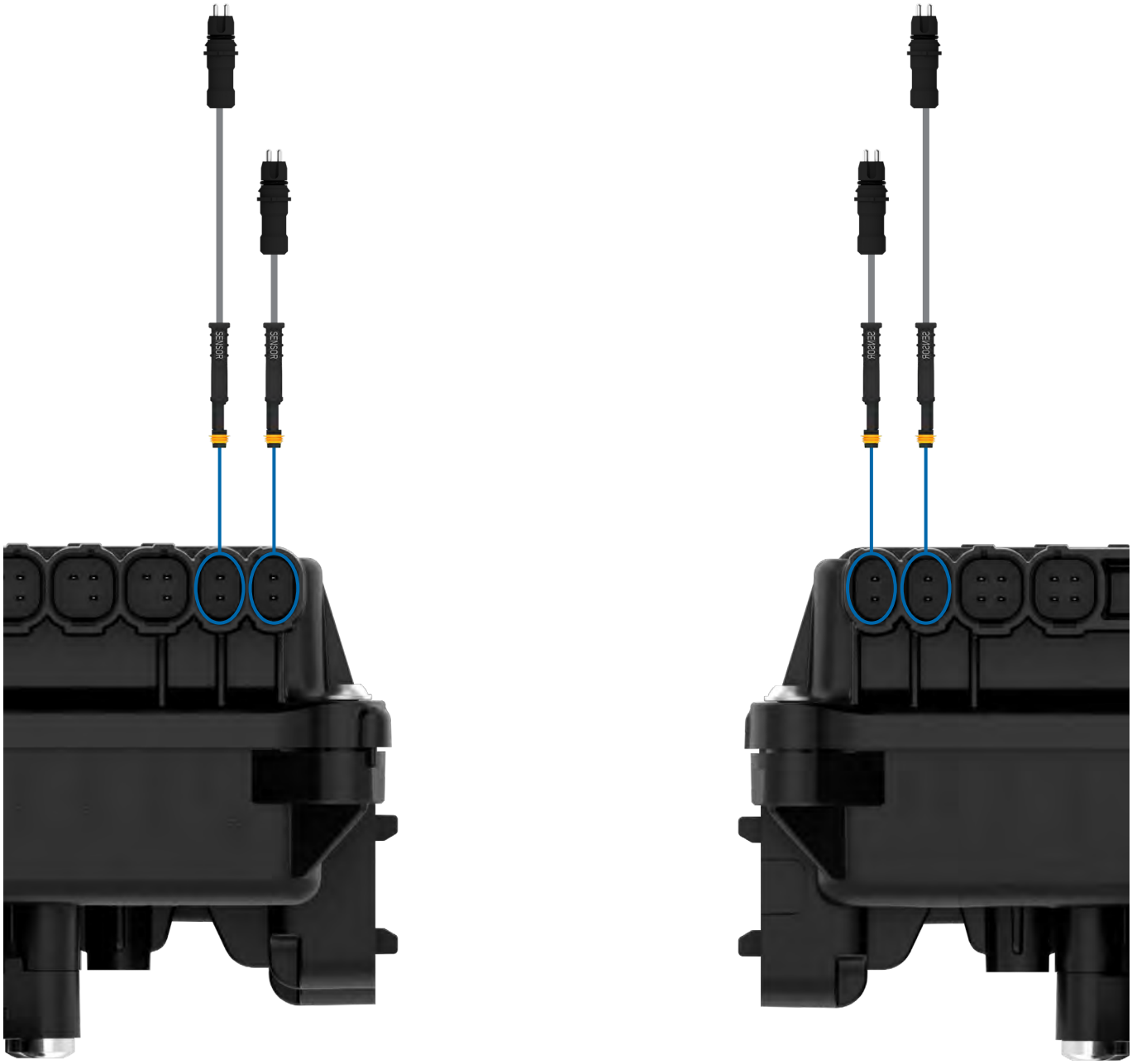
Item	Description	Part numbers
1	Slave / CAN extension	844 501 xxx
2	CAN to PC interface	844 511 xxx
3	CAN to Telematics	844 521 xxx
4	CAN to TPMS 2.0 (Terminated)	844 534 xxx
5	CAN to TPMS 2.0 (Unterminated)	844 536 xxx
6	CAN to TPMS 2.0 (Power)	844 537 xxx
7	CAN Y-Splitter (F/F/F)	844 541 xxx
8	CAN Y-Splitter (M/F/F)	844 542 xxx
9	CAN to EB+ Info Centre	844 551 xxx
10	CAN to bare wires	844 561 xxx
11	Outline marker and brake cable (open wires)	844 573 xxx

Auxiliary options (AUX 1-3)



Item	Description	Part numbers
1	Auxiliary to bare wires	844 301 xxx
2	Auxiliary DIN	844 321 xxx
3	Auxiliary to Y-Splitter	844 331 xxx
4	Auxiliary Y-Splitter 3x2x2 way (F/F/F)	844 341 xxx
5	Auxiliary Y-Splitter 3x2x2 way (M/F/F)	844 342 xxx

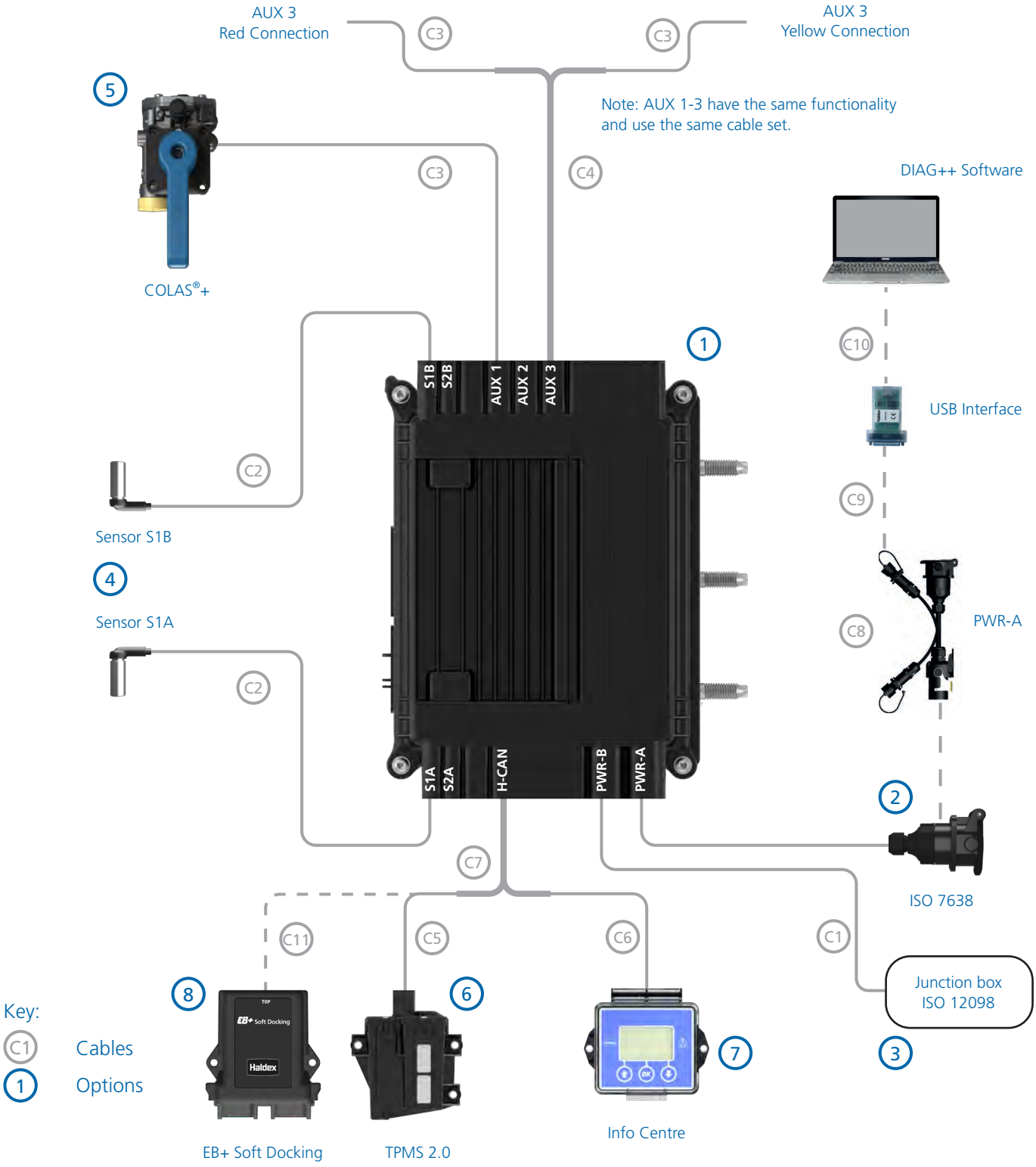
Sensor options



Item	Description	Part numbers
1	Sensor extension	844 401 xxx

Wiring Schematic

ABS 4.0 2M Premium, 2 sensors, 3 AUX



Options

Item	Option description	Part No.	Notes
1	ABS 4.0 assembly	364 635 101	Premium shown
2	ISO 7638 7-pin socket assembly	844 001 xxx	ISO 7638 7-pin socket to ABS 4.0
3	ISO 12098 junction box	N/A	Customer supplied junction box
4	Sensor	364 094 xxx	Right angled sensor
5	COLAS®+	338 061 201 338 071 101	Single circuit Dual circuit
6	TPMS 2.0	See TPMS Guide (006300062)	Programmable via DIAG++
7	Info Centre	815 041 001 815 046 001	ADR version
8	EB+ Soft Docking	See SD Guide (006300035)	Programmable via DIAG++

Connecting cables

Item	Option description	Part No.	Notes
C1	Power B to junction box	364 655 xxx	Junction box to ABS 4.0
C2	Sensor extension	844 401 xxx	Sensor assembly to ABS 4.0
C3	Auxiliary DIN	844 321 xxx	AUX connection to ABS 4.0
C4	Auxiliary Y-Splitter 3x2x2 way (M/F/F)	844 342 001	Y-Splitter to ABS 4.0 (Can be used in AUX 1-3)
C5	H-CAN to TPMS 2.0	844 534 xxx 844 536 xxx	H-CAN to TPMS 2.0 (Terminated) CAN to TPMS 2.0 (Unterminated)
C6	H-CAN to Info Centre	844 551 xxx	
C7	H-CAN Y- Splitter (M/F/F)	844 542 xxx	
C8	ISO 7638 diagnostic	815 018 001	
C9	PC interface	814 011 001	PC Interface to ISO 7638 diagnostic
C10	Dongle USB cable	042 7073 09	Remote PC to DIAG++ PC Interface
C11	CAN to EB+ Soft Docking	844 573 xxx	EB+ Soft Docking to ABS 4.0

Pipe lengths (Appendix 2)

ABS 4.0 Trailer anti-lock - Recommended tube sizes

Dimensions of connecting tubes between the pressure modulators and service brake actuators

Plastic tube: - Minimum inside diameter 9 mm

Rubber hose: - Minimum inside diameter 11 mm

The connecting tubes or hoses length shall be less than or equal to 5 metres. In all cases the prescribed brake system response time provisions shall be fulfilled.

Dimensions of connecting tubes between the air reservoir and the pressure modulators

Plastic tube: - Minimum inside diameter 12mm

In all cases the inside diameter and length of the connecting tube(s) shall ensure that the prescribed brake system response time provisions are fulfilled

Haldex develops and provides reliable and innovative solutions focused on brake and air suspension products to the global commercial vehicle industry.

Over 130 years of innovation have provided Haldex with competitive expertise in brake and air suspension systems for commercial vehicles. Haldex is a long-term partner to manufacturers of heavy trucks, trailers and buses, as well as to axle manufacturers.

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