

MODULAR
ABS SERIES

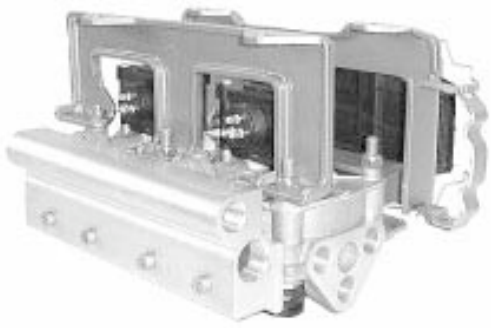
MODULAR 1 UPGRADE
MODULAR 1 PLUS
MODULAR 2



INSTALLATION INSTRUCTIONS

Haldex
Brake Systems

000 700 062



MODULAR

DOCUMENT REGISTRATION

Included on this page of the Installation Instructions is a postcard which enables you to register ownership of the document.

Please fill in the details requested, including your postcode , in block capitals using a non eraseable ink and return the card to us. This will enable us to ensure that any necessary Installation Instructions revisions which are issued by Haldex Brake Products Ltd will be forwarded to you automatically.

If you do not return the information to us we regret that we will be unable to ensure that your Installation Instruction is kept up to date.

If you should have any queries regarding this document or its contents please contact our Technical Service Office on 01325 310 110 or Fax us on 01325 311 834

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MODULAR

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MODULAR

NOTES ON THE USE OF THIS MANUAL

Preceding the Modular main index sheet, this manual should contain the document registration form and an amendment record sheet. Both of these documents are intended to assist your Company and Haldex Brake Products Ltd in maintaining this manual in an up to date condition.
Please follow the instructions included on each sheet to ensure that we are able to give both yourself and your company the best product information support whenever the need may arise.

For ease of reference each section of this manual deals with the individual systems of MODULAR trailer ABS .

This manual has been designed to assist personnel in satisfactorily installing
MODULAR 1 UPGRADE,
MODULAR 1 PLUS and
MODULAR 2 ABS
on semi-trailers.
The intention has been to illustrate the various areas of installation. It is expected that this manual will be in possession of the appropriate person throughout their 'training' and 'experience' and that the manual will be used as:

a) A teaching aid following supervision of a **HALDEX ENGINEER.**

b) A reminder of the correct procedure of **MODULAR ABS** installation.

For any other deviation consult **Haldex Brake Products Ltd. Technical Services.**

- Use appropriate spare-parts documentation when obtaining spare parts.
- Use only genuine Haldex parts in repairs.
- Haldex Brake Systems reserve the right to make changes in the interests of technical progress.
- No legal rights can be derived from the contents of the manual.
- Duplication, translation and reprinting are prohibited without permission from Haldex Brake Systems.

MODULAR

Haldex Brake Systems

AMENDMENT RECORD SHEET

From time to time it may be necessary for Haldex Brake Products Ltd to issue updates to the Installation Instructions.

If you have registered your ownership of the Installation Instructions using the enclosed documentation you will automatically receive section updates the receipt of which may be recorded on this page as they are entered into this manual.

AMENDMENT NUMBER	SECTIONS AFFECTED	DATE ENTERED
1	Released	01.98.
2	1, 2, 3, 4	12.99.
3	Page - 16, 44, 48	08.00.
4		
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MODULAR

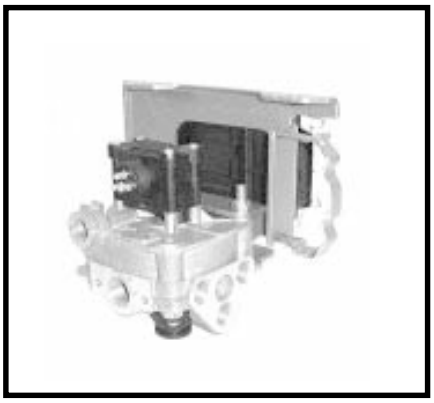
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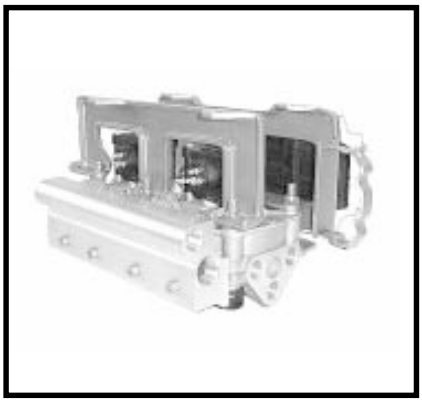
GENERAL COMPONENTS GUIDE



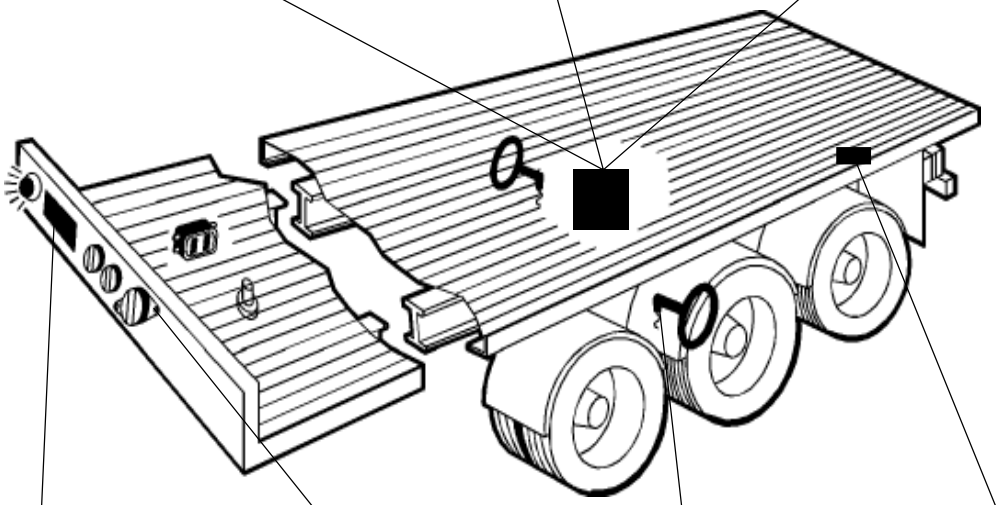
MODULAR 1 UPGRADE
ECU and Modulator assembly



MODULAR 1 PLUS
ECU and Modulator assembly



MODULAR 2
ECU and Modulator assembly





The Warning lamp and The Driver's information plate



ISO 7638 Connector assembly



The Sensor and Exciter



INFO CENTRE

Fig 1

SEMI - TRAILER CONFIGURATIONS

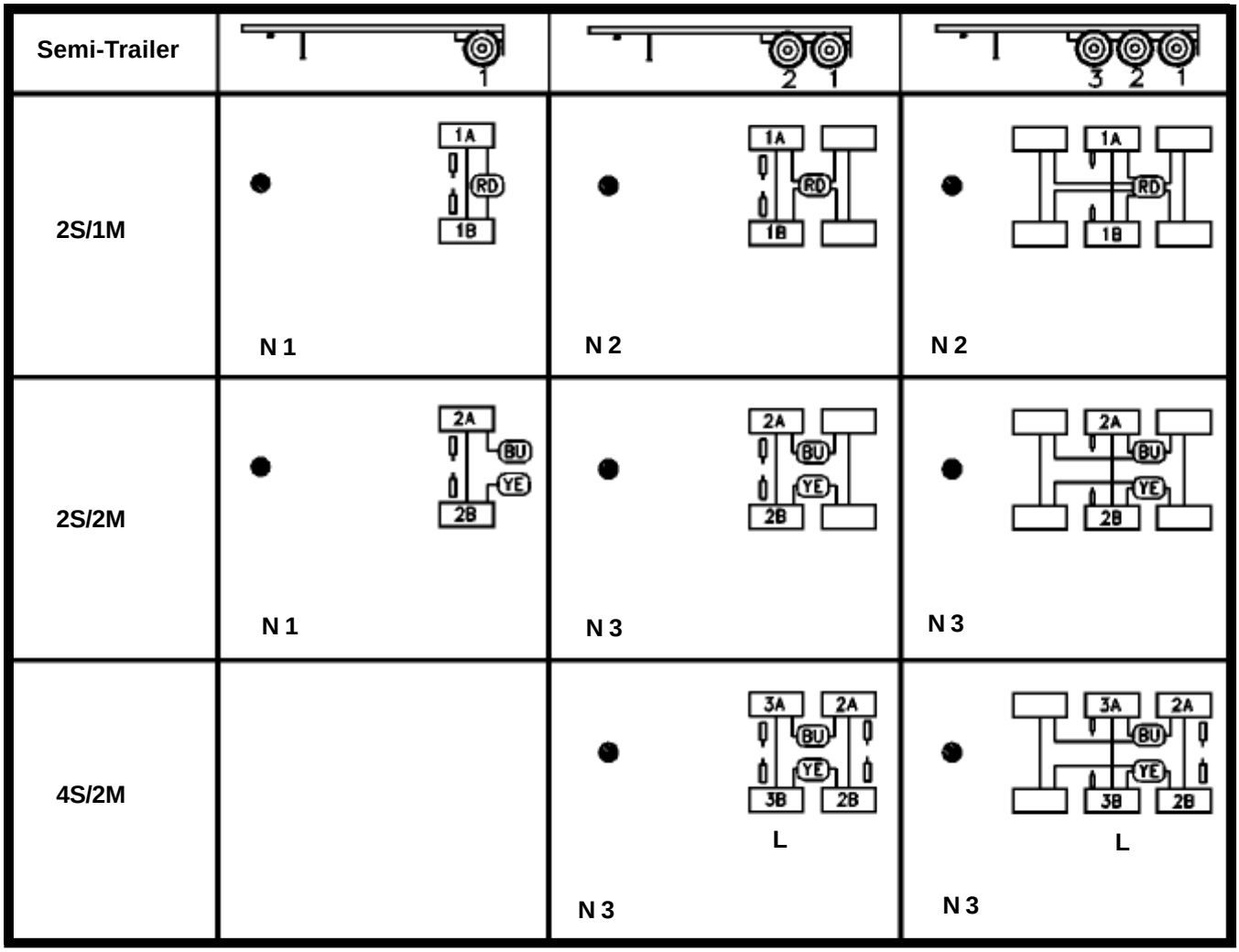


Fig 2

Details viewed from above.

N 1 = 2 Port Modulator valve assembly (preferred)
N 2 = 6 Port Modulator valve assembly
N 3 = 3 Port Modulator valve assembly
L= Axle which may be a lift axle.

CENTRE AXLE TRAILER CONFIGURATIONS

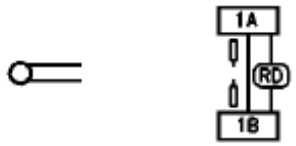
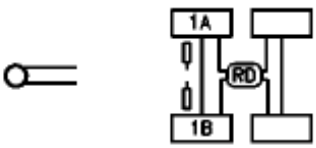
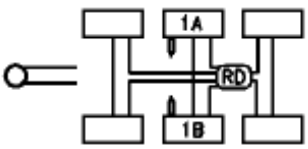
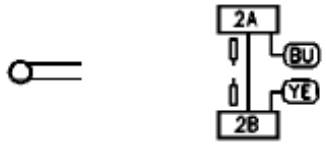
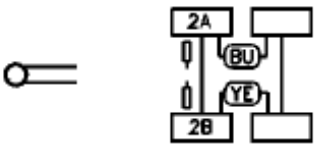
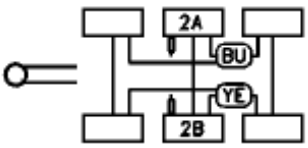
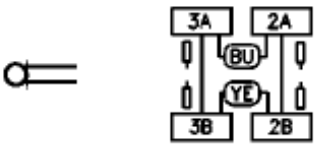
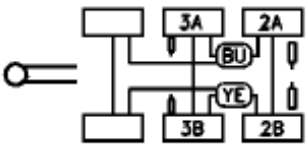
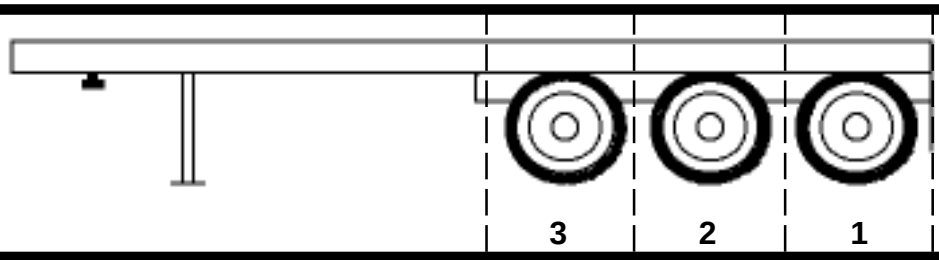
Centre Axle Trailer	1	2 1	3 2 1
2S/1M	 N 1	 N 2	 N 2
2S/2M	 N 1	 N 3	 N 3
4S/2M		 L N 3	 L N 3

Fig 3

Details viewed from above.

N 1 = 2 Port Modulator valve assembly (preferred)
N 2 = 6 Port Modulator valve assembly
N 3 = 3 Port Modulator valve assembly
L= Axle which may be a lift axle.

ACTUATION RECOMMENDATIONS



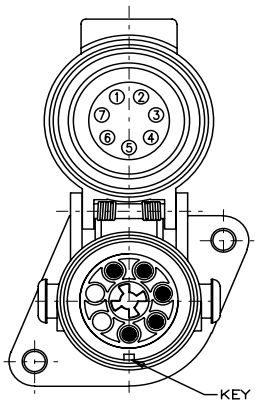
Suspension Type	Number of Axles	Sensed Axle	Actuation Size	Lever Length Variation			Comments
				Axle 3	Axle 2	Axle 1	
Non Re-active Mechanical	2	2	Equal		0	0	2S/1M+2S/2M
Non Re-active Mechanical	2	2 & 1	Equal		0	0	4S/2M
Non Re-active Mechanical	3	2	Equal	-A	0	0	2S/1M+2S/2M
Non Re-active Mechanical	3	2 & 1	Equal	-A	0	0	4S/2M
Air	2	2	Equal		0	0	2S/1M+2S/2M Preferred
Air	2	2 &1	Equal		0	0	4S/2M Preferred
Air	2	2	Equal		+B	0	2S/1M+2S/2M Alternative
Air	2	2 & 1	Equal		+B	0	4S/2M Alternative
Air	3	2	Equal	-A	0	0	2S/1M+2S/2M Preferred
Air	3	2 & 1	Equal	-A	0	0	4S/2M Preferred
Air	3	2	Equal	0	+B	0	2S/1M+2S/2M Alternative
Air	3	2 & 1	Equal	0	+B	0	4S/2M Alternative
Rubber	2	2	Equal		+A	0	2S/1M+2S/2M
Balance Beam	2	2	Equal		+A	0	4S/2M
Rubber	2	2 & 1	Equal		+A	0	2S/1M+2S/2M
Balance Beam	2	2 & 1	Equal		+A	0	4S/2M

Fig 4

The input torque to a brake can be varied by changing the brake chamber size or lever length.
This chart shows examples where the brake chamber size remains constant and variations in lever length control the brake input torque.
A = Variation in lever length of 25 to 30mm
B = Varaition in lever length of 12 to 15mm

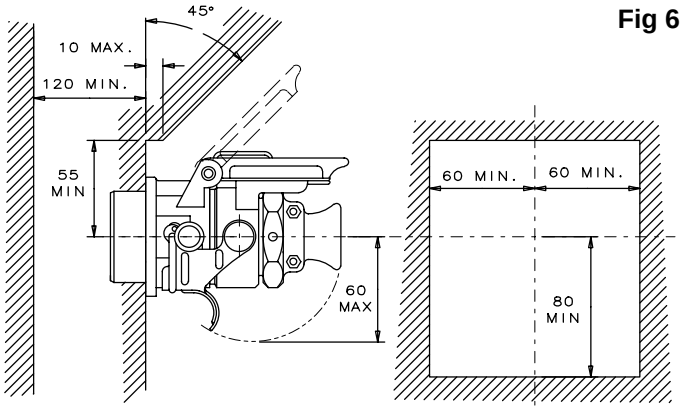
ISO 7638 SOCKET ASSEMBLY - 24V

Fig 5



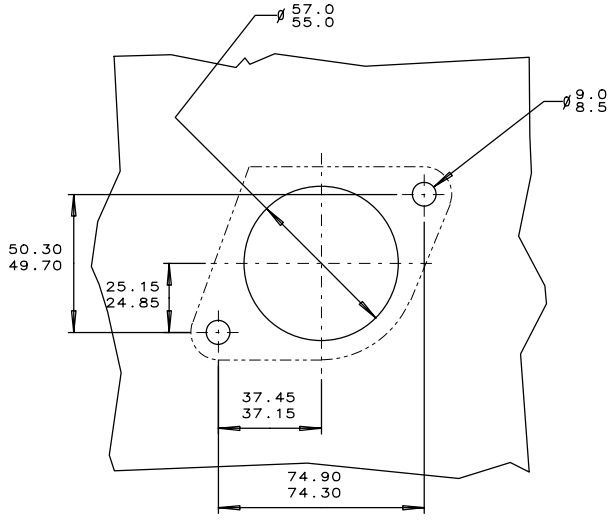
Pin detail and identification key location

Fig 6



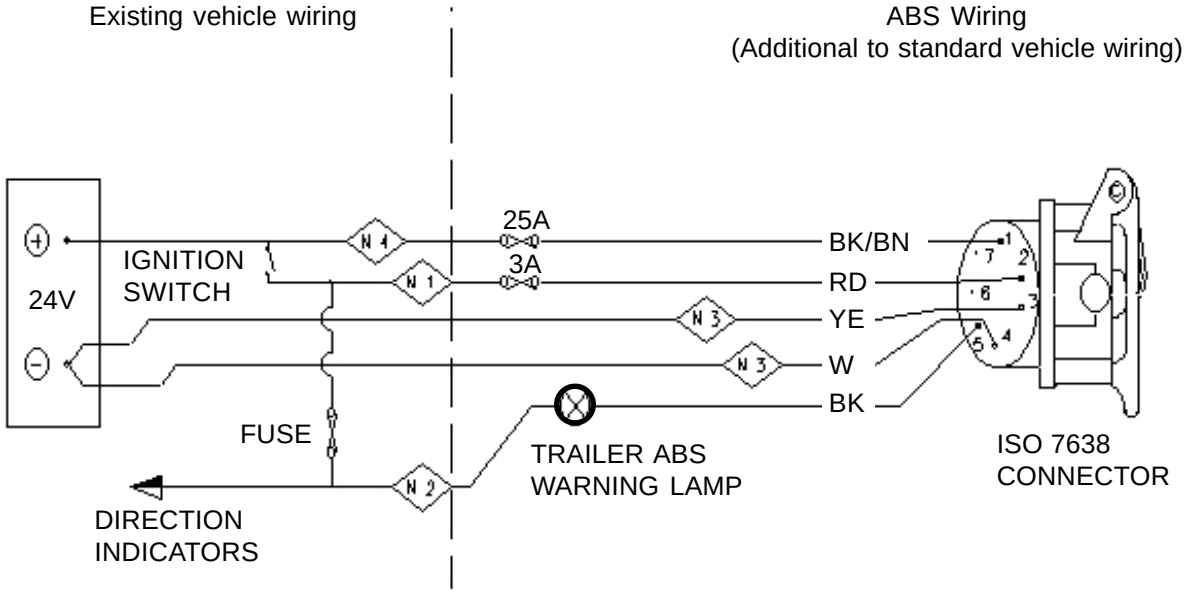
Clearance dimensions

Fig 7



Socket mounting dimensions

GENERAL TRUCK WIRING DIAGRAM FOR ISO 7638



N1 This wire is to be connected to the unfused ignition switched battery positive supply.

N2 This wire is to be connected to the fused ignition switched battery positive supply (same point as the direction indicators).

N3 This wire is to be connected using seperate ring tongue connectors to the main battery negative pick up point.

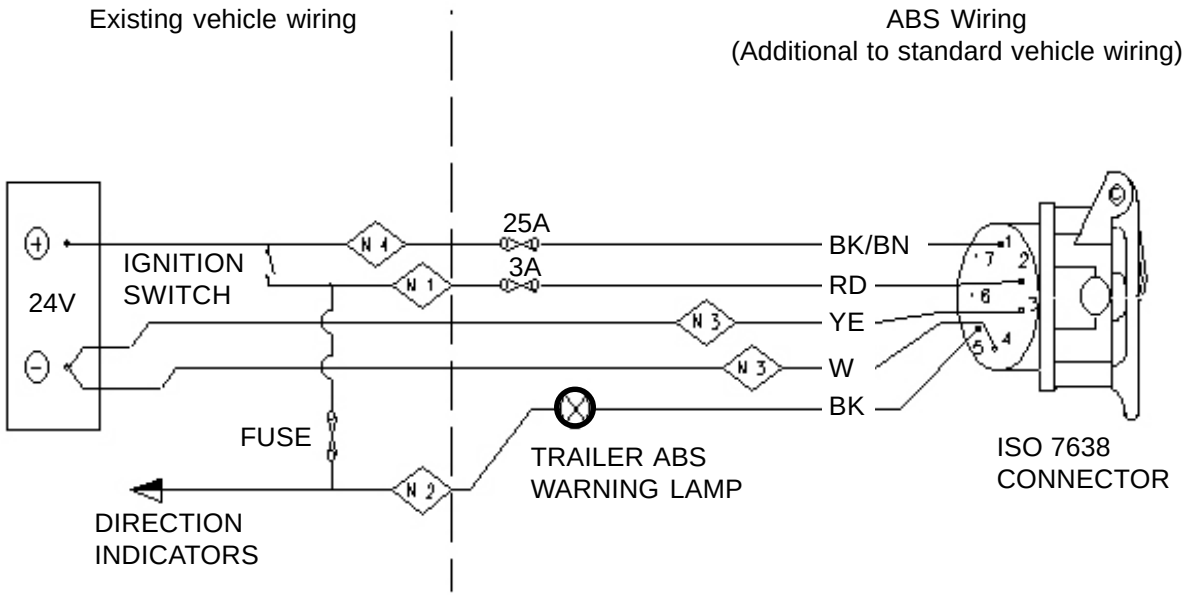
N4 This wire is to be connected to an unfused battery positive supply which has a continous current rating of at least 15A. The supply will be switched by a relay internal to the control

Fig 8

ISO 7638 Pin No.		Description	Colour	Cable size
1	25A	Unfused BAT+	BK/BN	6.0mm²
2	3A	Ignition switched B+	RD	1.5mm²
3		BAT -	YE	1.5mm²
4		BAT -	W	6.0mm²
5		Lamp (Direction indicators)	BK	1.5mm²

Key
BK = Black BN = Brown RD = Red YE = Yellow W = White

GENERAL TRUCK WIRING DIAGRAM FOR ISO 7638



N1 This wire is to be connected to the unfused ignition switched battery positive supply.

N2 This wire is to be connected to the fused ignition switched battery positive supply (same point as the direction indicators).

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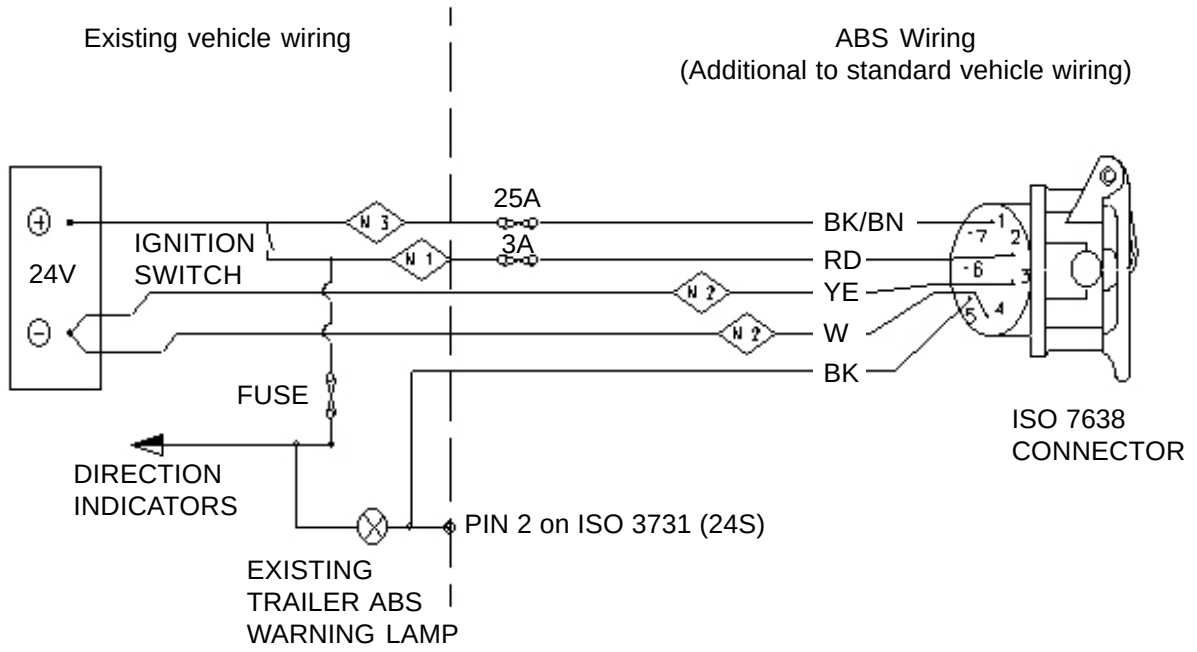
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2	3A	Ignition switched B+	RD	1.5mm²
3		BAT -	YE	1.5mm²
4		BAT -	W	6.0mm²
5		Lamp (Direction indicators)	BK	1.5mm²

Key
BK = Black BN = Brown RD = Red YE = Yellow W = White

GENERAL TRUCK WIRING DIAGRAM FOR ISO 7638 USING EXISTING VEHICLE TRAILER ABS WARNING LAMP



N1 This wire is to be connected to the unfused ignition switched battery positive supply.

N2 This wire is to be connected using seperate ring tongue connectors to the main battery negative pick up point.

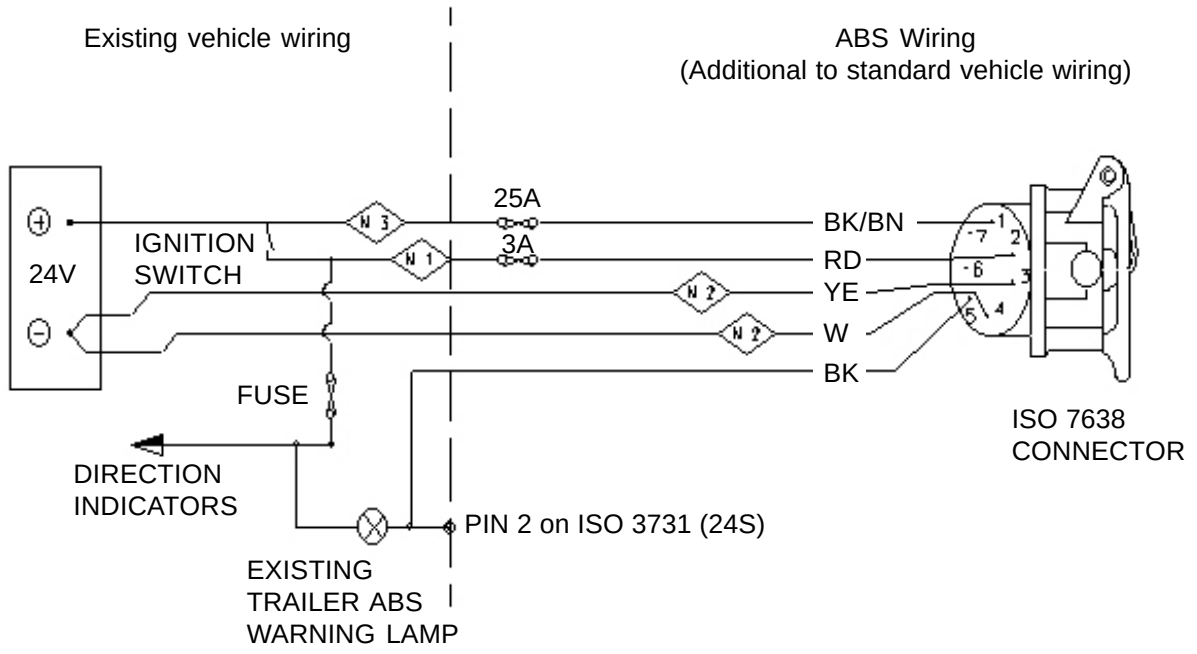
N3 This wire is to be connected to an unfused battery positive supply which has a continous current rating of at least 15A. The supply will be switched by a relay internal to the control

Fig 9

ISO 7638 Pin No.		Description	Colour	Cable size
1	25A	Unfused BAT+	BK/BN	6.0mm²
2	3A	Ignition switched B+	RD	1.5mm²
3		BAT -	YE	1.5mm²
4		BAT -	W	6.0mm²
5		Lamp (Direction indicators)	BK	1.5mm²

Key
BK = Black BN = Brown RD = Red YE = Yellow W = White

GENERAL TRUCK WIRING DIAGRAM FOR ISO 7638 USING EXISTING VEHICLE TRAILER ABS WARNING LAMP



N1 This wire is to be connected to the unfused ignition switched battery positive supply.

N2 This wire is to be connected using seperate ring tongue connectors to the main battery negative pick up point.

N3 This wire is to be connected to an unfused battery positive supply which has a continous current rating of at least 15A. The supply will be switched by a relay internal to the control

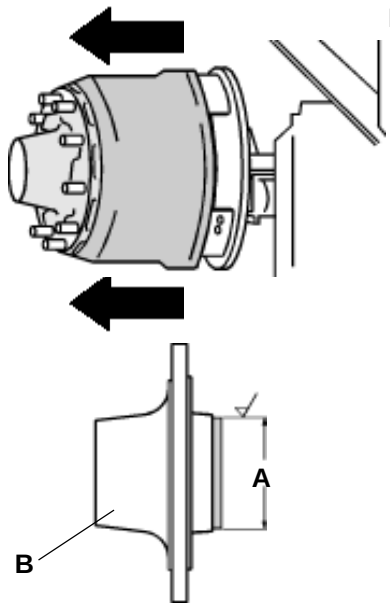
Fig 9

ISO 7638 Pin No.		Description	Colour	Cable size
1	25A	Unfused BAT+	BK/BN	6.0mm²
2	3A	Ignition switched B+	RD	1.5mm²
3		BAT -	YE	1.5mm²
4		BAT -	W	6.0mm²
5		Lamp (Direction indicators)	BK	1.5mm²

Key
BK = Black BN = Brown RD = Red YE = Yellow W = White

AXLE INSTALLATION

Fig 10



STRIPPING OF AXLE

See individual axle maufacturers information.
Remove hub and drum assembly. Refer to idividual ABS axle layout for details of
machine location area **'A'** on hub **'B'**.

Fig 11



EXCITER (Solid type)

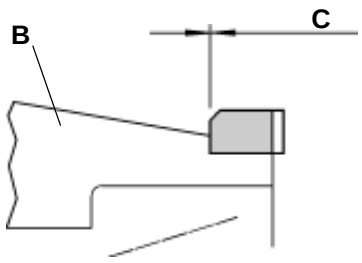
Available in two sizes to suit differing diameters of wheel. Establish correct exciter teeth in relation to tyre size refer to GS0006.
100 Tooth Exciter - Dynamic effective rolling radius (rdyn) = 442 to 645mm
80 Tooth Exciter - Dynamic effective rolling radius (rdyn) = 357 to 522mm

Fig 12



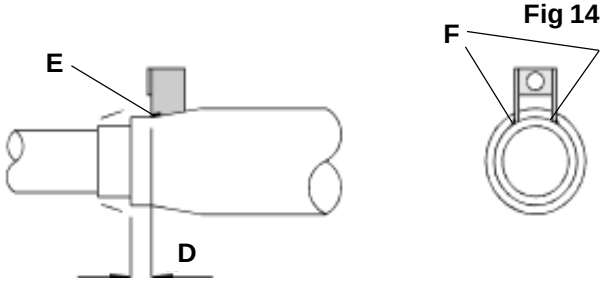
Heat exciter uniformly to required temperature.

Fig 13



Fit to hub and ensure that it is fully seated on the location area machined on the hub '**B**'. Dimension '**C**' to be zero to equal gap
0 to 360 degrees.

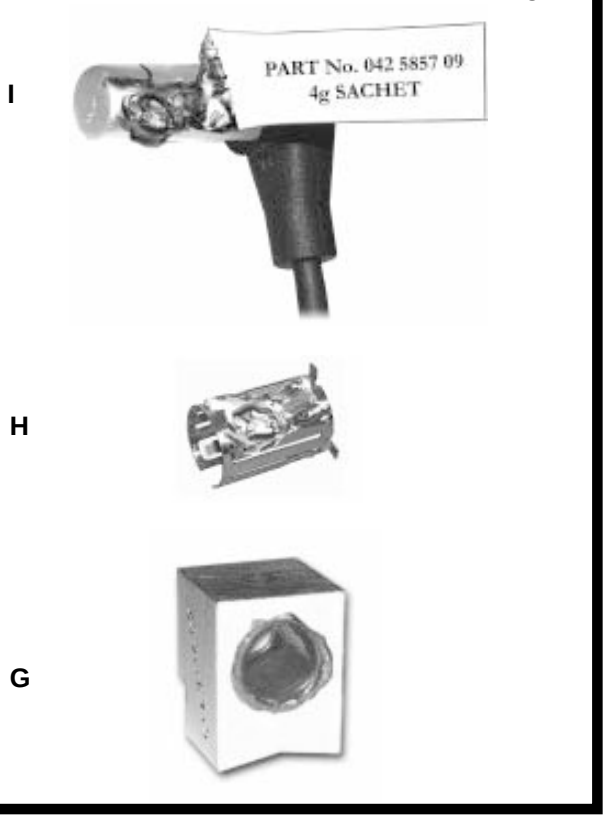
Fig 14



SENSOR

Position sensor bracket as detailed on the ABS axle layout, reference dimension '**D**'.
Tack weld bracket first '**E**'. Recheck for position and squareness and complete weld '**F**'.

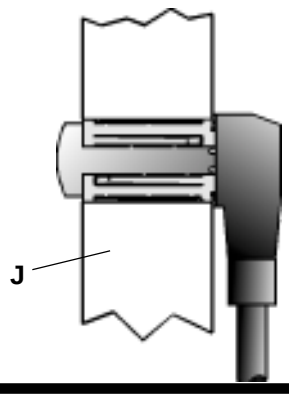
Fig 15



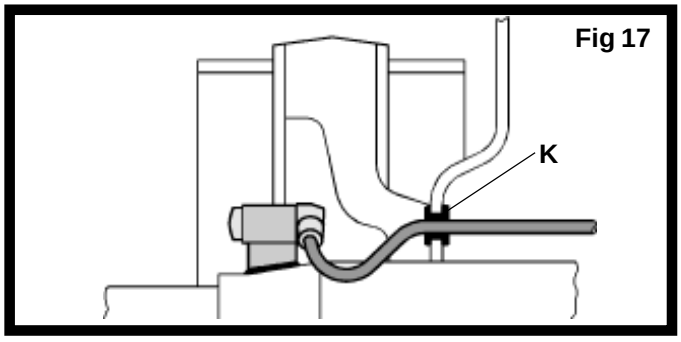
With grease provided liberally coat sensor '**I**' steel casing and bore of bracket '**G**'. Push the retaining clip '**H**' fully home into the sensor bracket housing and insert sensor through the retaining clip pushing it firmly into place until the sensor abuts against the back face of the bracket housing '**J**'.

With a grease based corrosion inhibitor, Recommended type - Molykote Cu 7439 Plus (Dow Corning) or from the 4g sachet,Haldex part number - 042 5857 09, liberally coat sensor '**I**' steel casing, retainig clip **'H'** and bore of bracket/housing '**G**'.

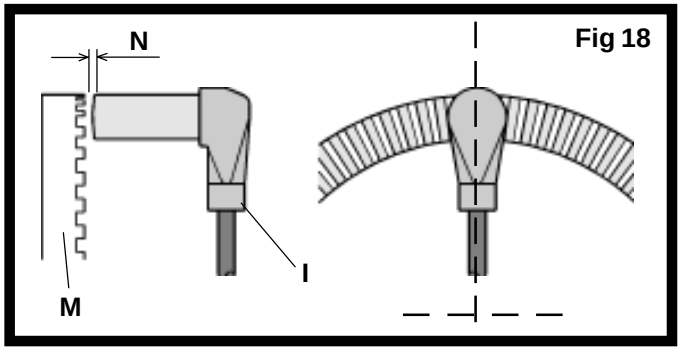
Fig 16



Push the retaining clip '**H**' fully home into the sensor bracket housing and insert sensor through the retaining clip pushing it firmly into place until the sensor abuts the back face of the bracket/housing '**J**'.



Lay out the sensor cable route. Ensure sensor cable is not under tension and not fouling brake shoe. Avoid any sharp edges and moving parts. The cable exit from the brake torque plate or dirt shield should be via a grommet '**K**'.



Reassemble hub assembly.
Sensor must be central over the exciter teeth. The gap between exciter '**M**' and sensor '**I**' must not exceed **N** = 0.5mm.
Maximum run out 0.2mm true indicator reading.

Before fitment of HUB CAP/ COVER check sensor output.

CHASSIS INSTALLATION - **MODULAR 1 UPGRADE** (2S/1M) shown for clarity

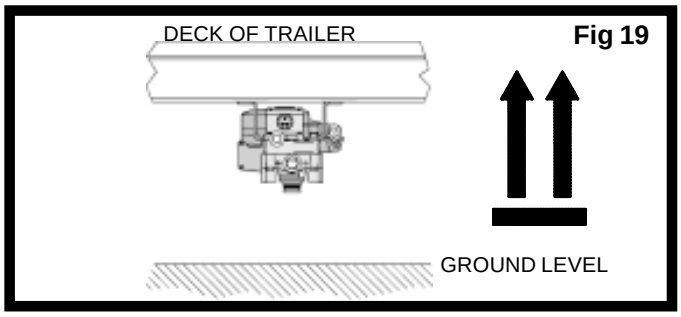
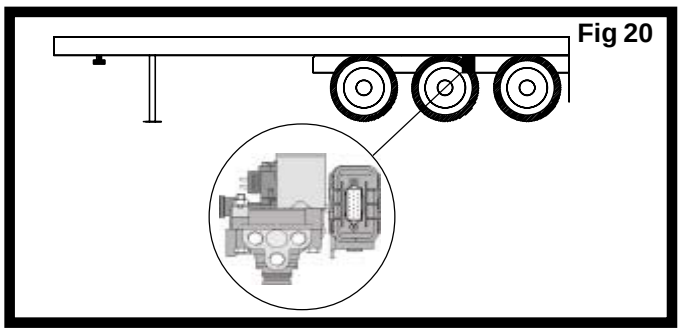


Fig 19

POSITION OF MODULAR ASSEMBLY
Assembly must be mounted vertically.


Fig 20

The **preferred** assembly orientation should be positioned so that the **ECU faces towards the rear** of the semi-trailer.

Note:
This is particularly important on 2M systems in order that the diagnostic codes for modulators and sensor are correct.

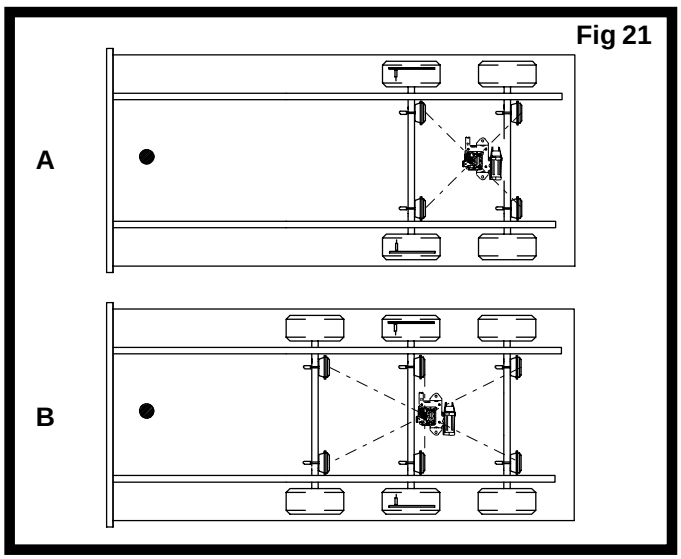


Fig 21

Mount Modulator Valve/s centrally to the brake chambers.
A. Tandem axle.
B. Tri-Axle.

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

Check earth continuity (resistance) between ECU/ Modulator bracket and vehicle chassis.

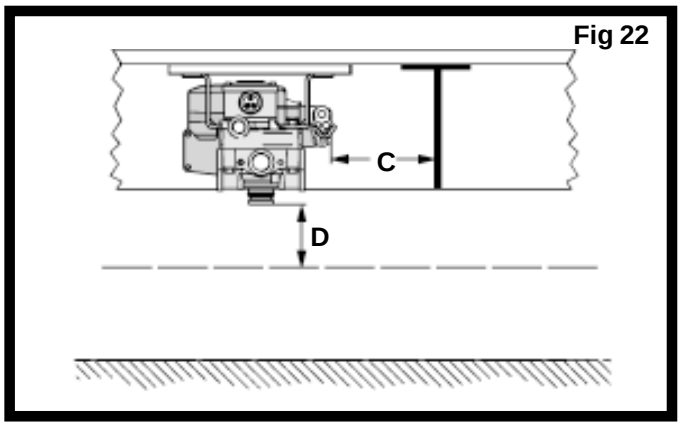
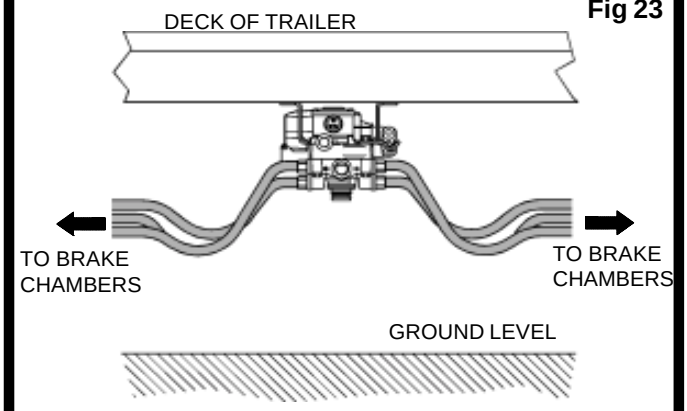


Fig 22

Care should be taken to provide reasonable excess to the ECU for replacement of loom or ECU.

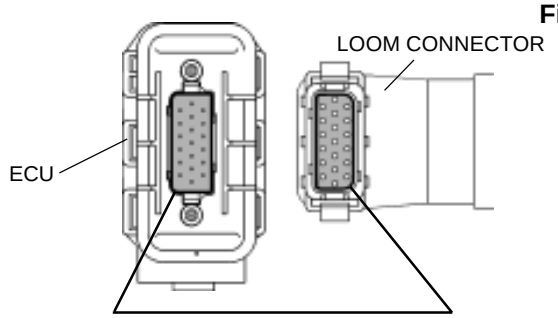
C = 200mm Minimum.
D = 1. Assembly to be above axle centre line.
2. Adequate space should be provided for future fitment of a exhaust silencer

Fig 23



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

Fig 24



ELECTRIC WIRING

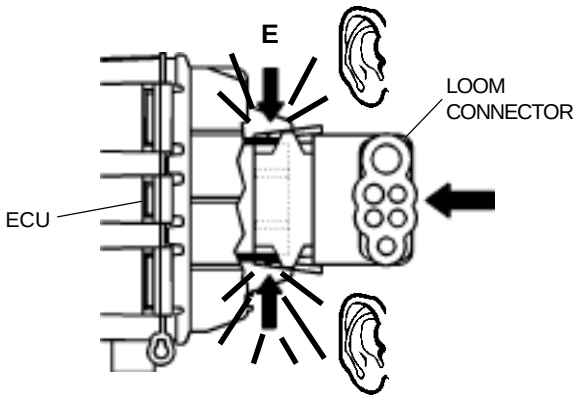
Remove from ECU and modulator protective rubber covers. **Fit** appropriate connector to ECU and modulator.

ECU Connector

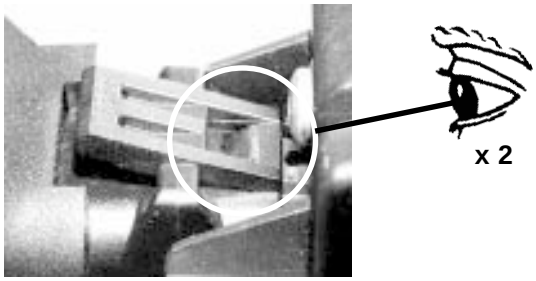
Identify shape of ECU plug and loom connector socket.

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

Fig 25

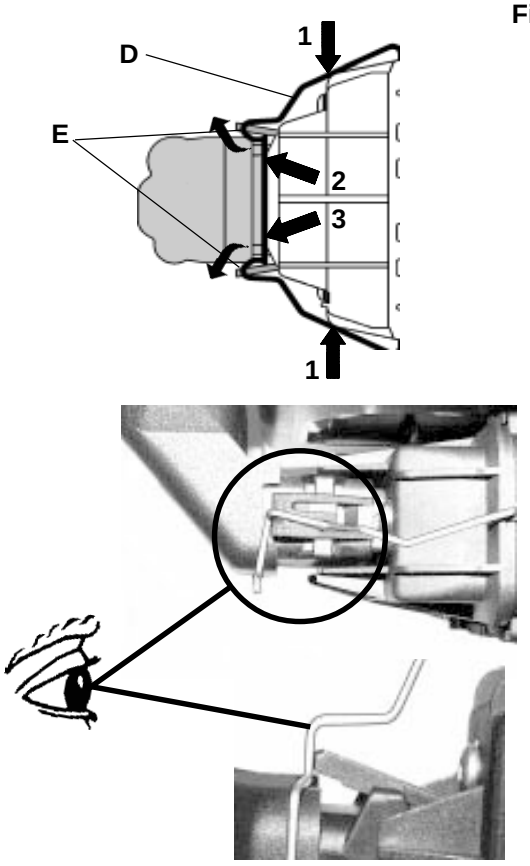


Mate together and click into position via two clips **'E'**.



Make sure both clips **'E'** are fully engaged.

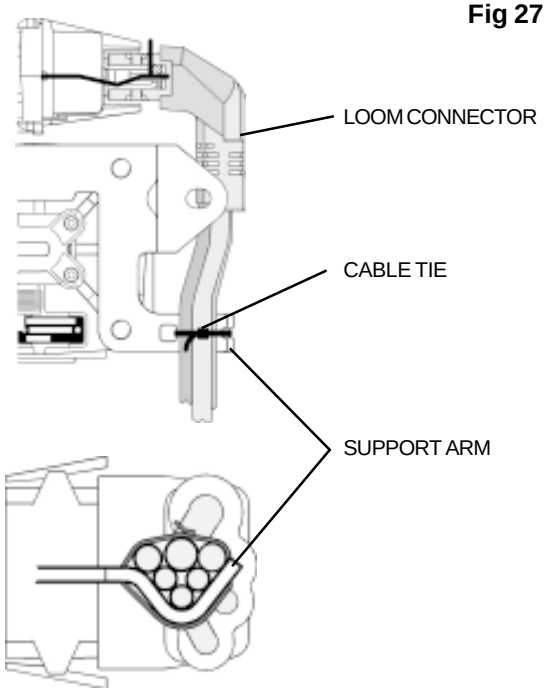
Fig 26



For MODULAR 1 UPGRADE

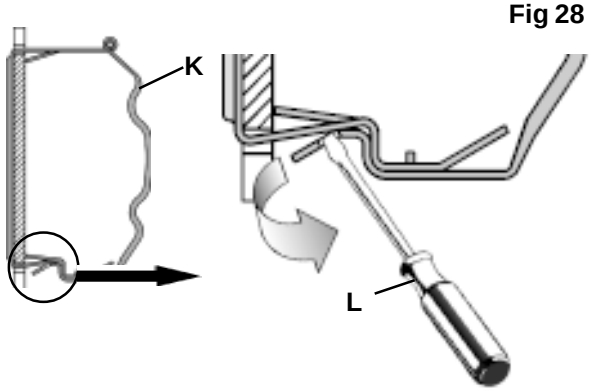
Position bail latch **'D'** over connector clips **'E'**.
Apply force at positions **'1'** in order to compress the bail latch. Whilst in a compressed state apply force at position **'2'** and hook over the eye of the bail latch onto the connector clip.
Apply force at position **'3'** and repeat procedure.

Fig 27



Position cables from loom connector socket in support arm of mounting braket.
Secure with a cable tie.

Fig 28

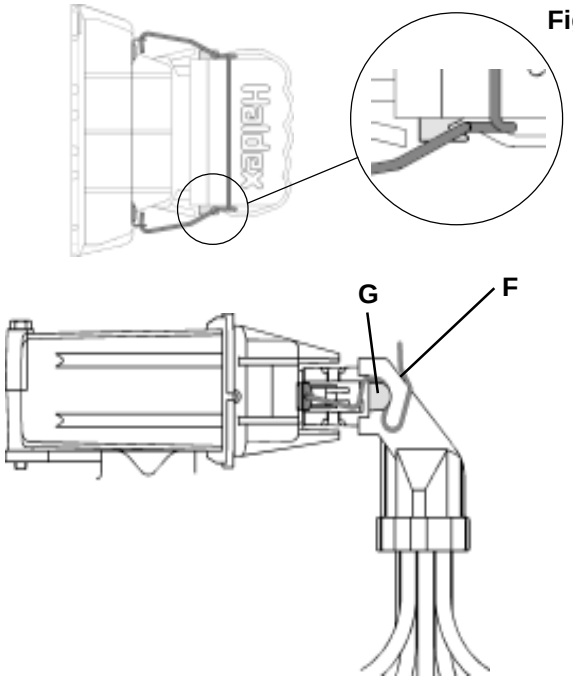


For MODULAR 1 PLUS and MODULAR2

Open mounting bracket clip **'K'** by using a tool **'L'.**
Position loom socket in clip **'K'**

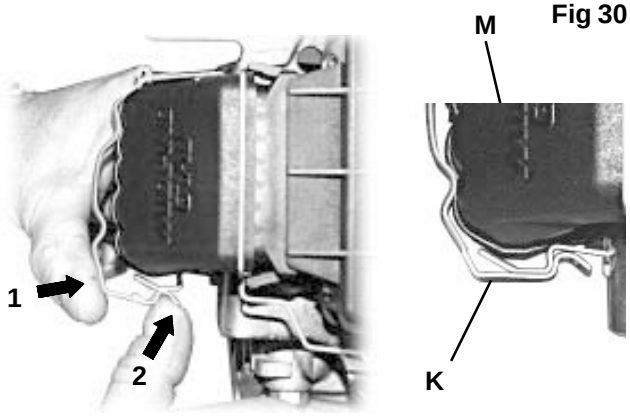
Connect socket to ECU as in Fig 24 and Fig 25.

Fig 29



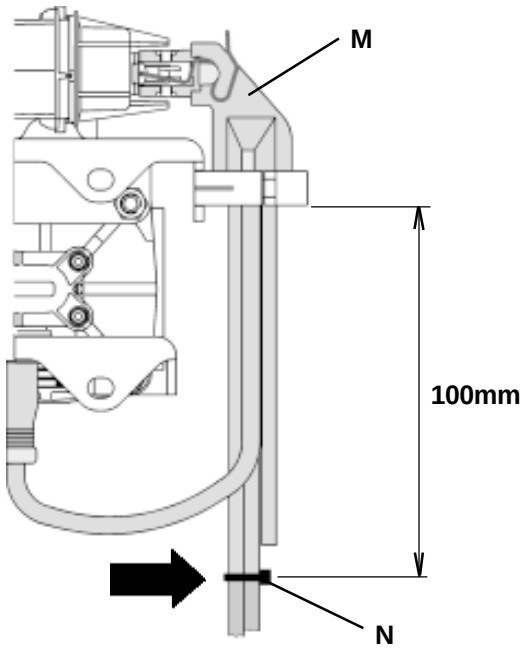
Position bail latch **'F'** over connector lugs **'G'** .

Fig 30



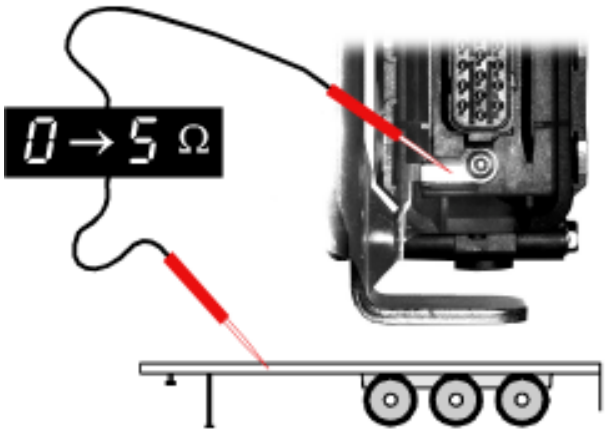
Close mounting bracket clip **'K'** by appling force at **'1'** to compress spring lever and while in this position apply force at **'2',** clamping the socket **'M'**.

Fig 31

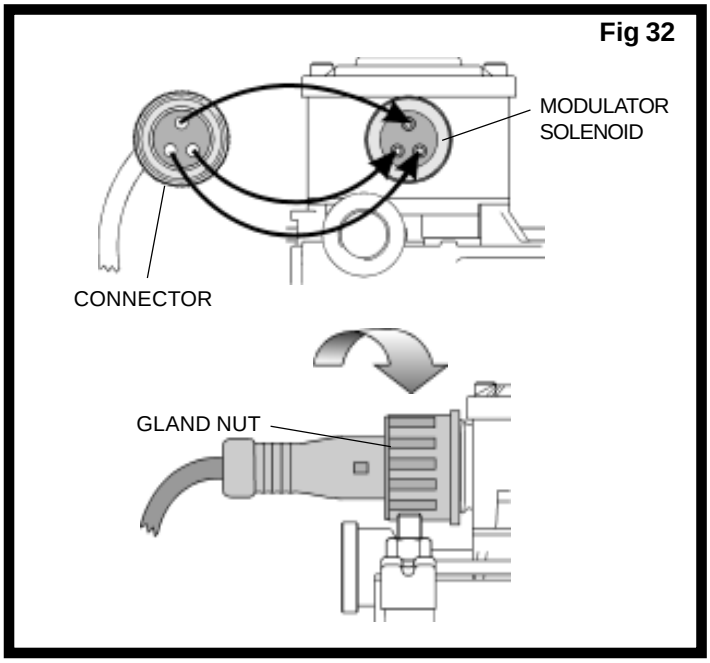


Cables from the socket **'M'** to be secured to an appropriate fixing at point **'N'** and secured by a cable tie.
Cable from the socket 'M' should remain horizontal for 100mm before being directed towards a chassis securing point.

Fig 31_1



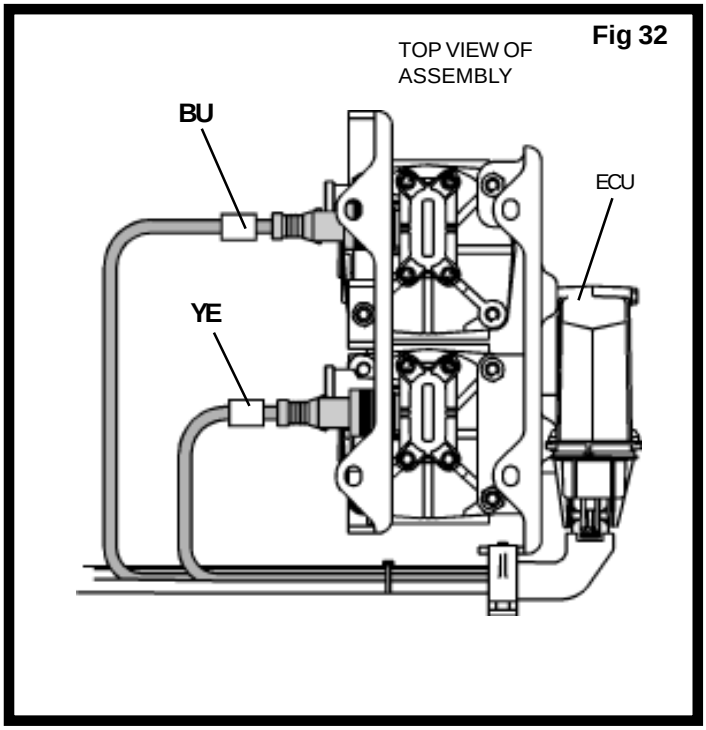
Check earth continuity between ECU/Modulator/ Bracket and vehicle chassis.



Modulator Connector

Identify orientation of sockets in modulator connector and push fully connector onto modulator solenoid pins.

Tighten gland nut to torque 1.5Nm (1 lbft) maximum.

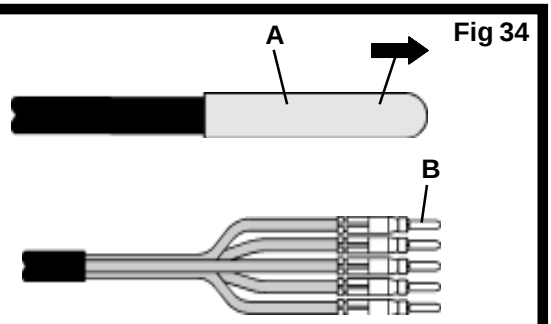


For MODULAR 2

Identify (blue marker-**BU**) and (yellow marker-**YE**) cables on loom assembly and connect to the appropriate Modulator.

Tighten gland nut to torque 1.5Nm (1 lbft) maximum.

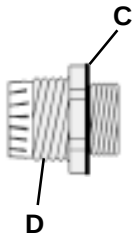
Fig 34



Power Cables Connector

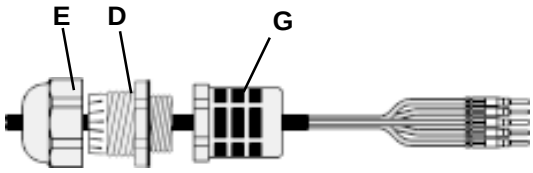
Remove coloured protective cover **'A'** from end of cable to expose crimped pins '**B'**.

Fig 35



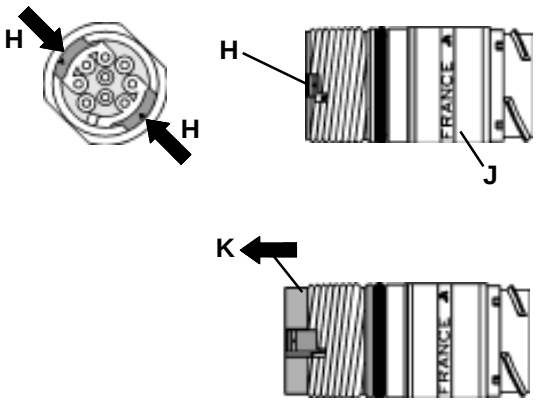
Position gasket **'C'** or O-ring onto backface of cable gland assembly **'D'**. **Ensure it is flat** and undistorted.

Fig 36



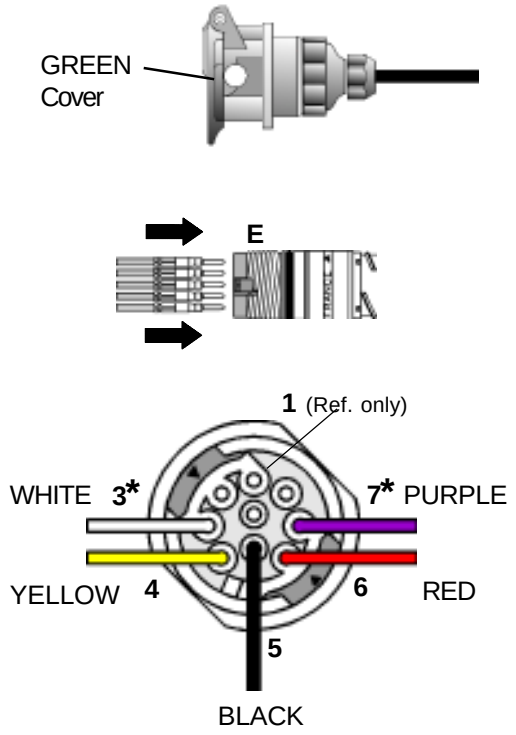
Slide the 5 pins through the cable gland nut **'E'** cable gland **'D'** and backshell **'G'** on cable.

Fig 37



On receptacle (9-way housing) **'J'** with your thumb and index finger squeeze the red retainer plate flaps **'H'** and pull outwards **'K'** : The plate is then in an unlocked position.

Fig 38

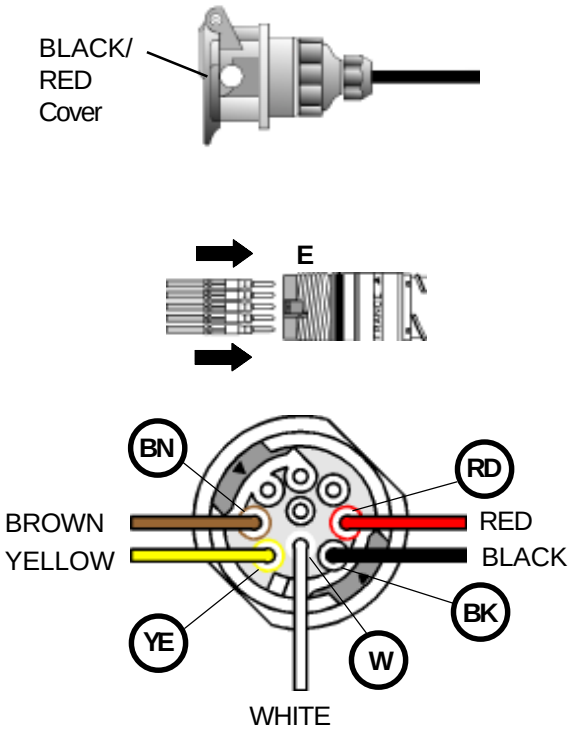


ISO 7638 - Fused

Fully insert the crimp pins into the appropriate receptacle cavities. Slightly rotate pins whilst pushing fully home.

Numbers relate to positions on the red retaining plate as viewed from inserting side. Numbers marked ***, ARE NOT MARKED** on red retainer plate

Fig 39



ISO 7638 - Un-Fused

Fully insert the crimp pins into the appropriate receptacle cavities. Slightly rotate pins whilst pushing fully home.

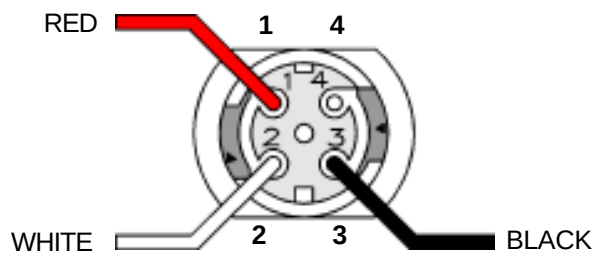
Circled colours marked on the red retaining plate relate to wire inserting positions. Viewed from inserting side.

Marking on plate

BN = Brown
YE = Yellow
W = White
BK = Black
RD = Red

Other Connector Details

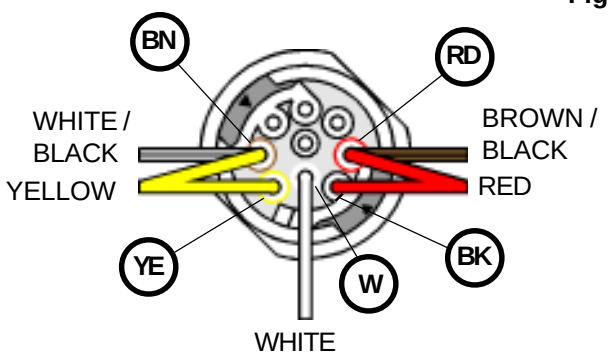
Fig 40



ISO 1185 (24N)

Numbers relate to positions on the red retaining plate as viewed from inserting side.

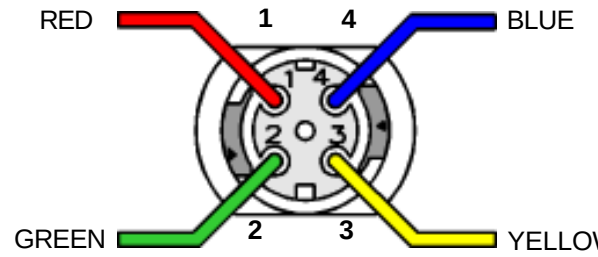
Fig 41



ISO 3731 (24S)

Circled colours marked on the red retaining plate relate to wire inserting positions.
Viewed from inserting side.
Marking on plate
BN = Brown
YE = Yellow
W = White
BK = Black
RD = Red
Installation Instruction Ref. 000 700 180

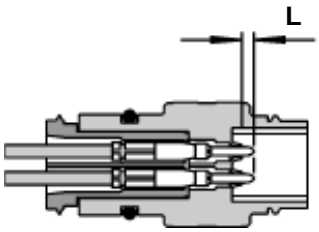
Fig 42



DIAGNOSTIC

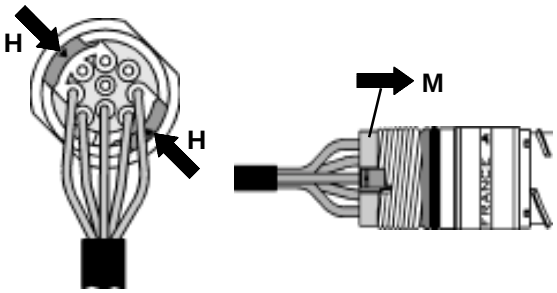
Numbers relate to positions on the red retaining plate as viewed from inserting side.

Fig 43



Ensure all wires are inserted fully as indicated by pin protrusion **'L'** (approxitmately 2mm). This is critical to the locking of the red retaining plate.

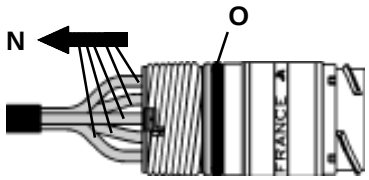
Fig 44



Squeeze the retainer plate flaps **'H'** and push inward **'M'** : the plate is then locked and retains the pins.

If plate fails to move, push each wire forward and repeat.

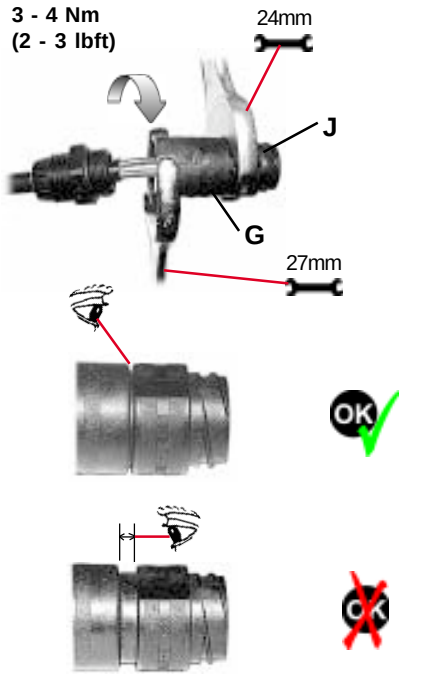
Fig 45



Ensure O-ring **'O'** is correctly located in groove in receptacle housing.

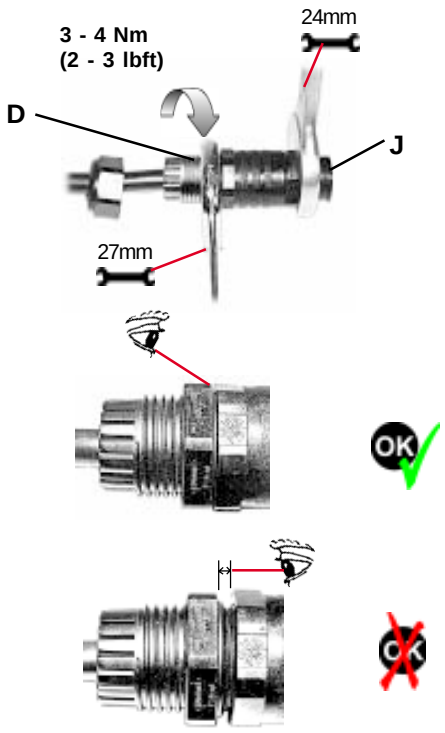
Apply a pull test to the **each wire** '**N**'. Wires must not pull out.

Fig 46

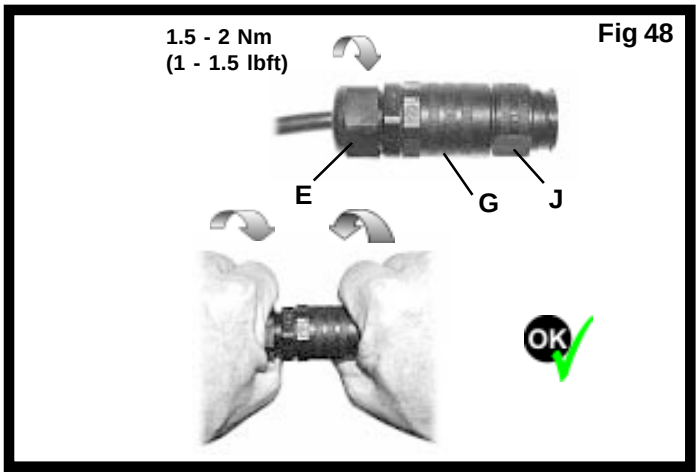


Hold receptacle **'J'** and screw in place backshell **'G'** until it stops against receptacle shoulder.

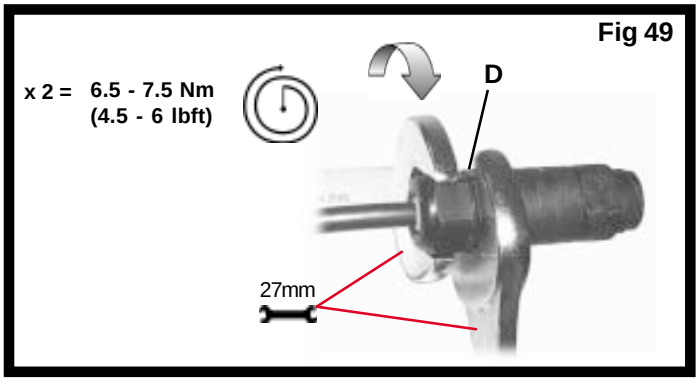
Fig 47



Hold receptacle **'J'** and screw in place cable gland **'D'**. Ensure gasket **'C',** if fitted, is evenly compressed and not distorted.

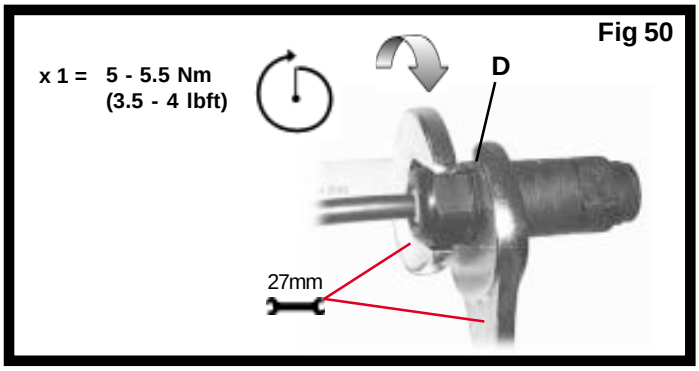


Hold receptacle **'J'**, backshell **'G'** together, hand screw in place the gland nut **'E'.**



For ISO7638 Fused and Un-Fused connector

To securely tighten, hold cable gland **'D'**, further screw in place the gland nut **'E'.**



For ISO1185, ISO3731 and Diagnostic

To securely tighten, hold cable gland **'D'**, further screw in place the gland nut **'E'.**

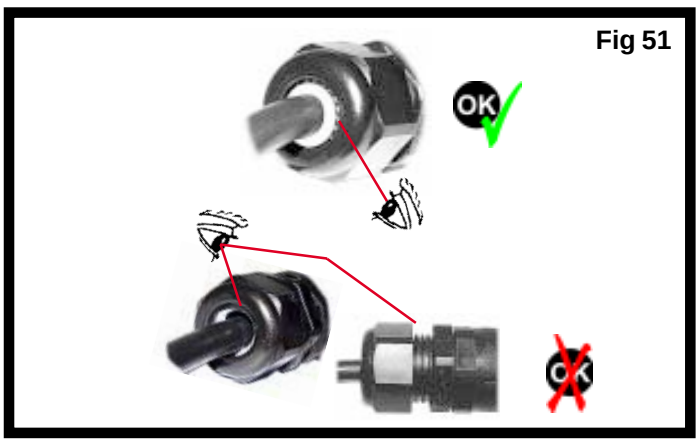
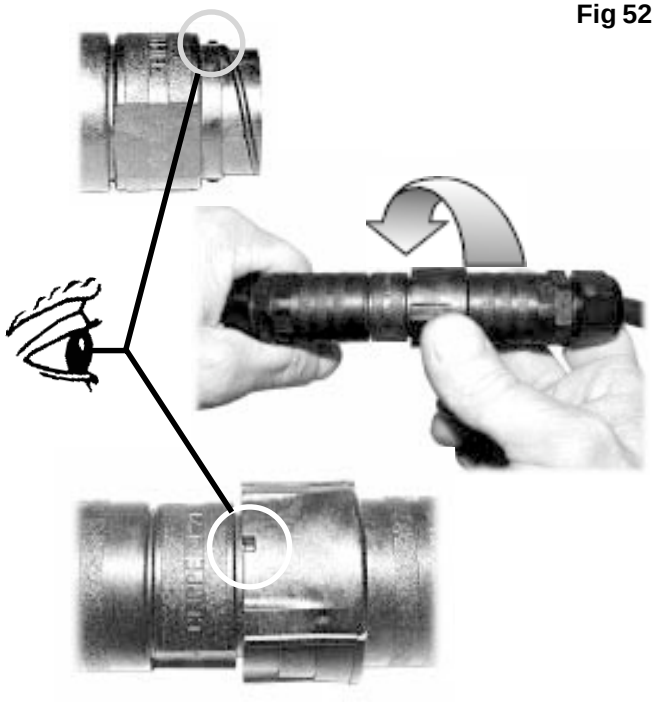


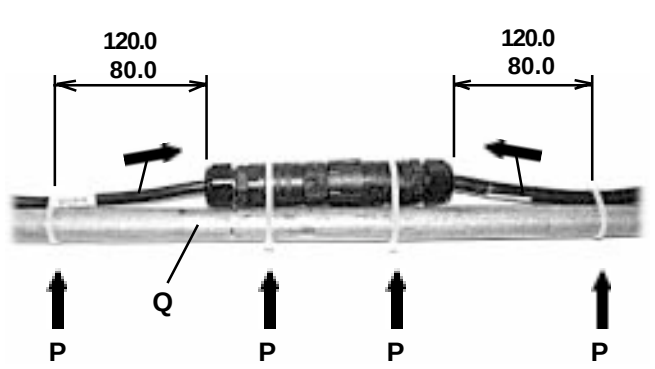
Fig 52



ALL Power Cables Connector

Identify orientation of keys on 9-way and 4-way socket and keyway on plug and connect together. Tighten gland nut on socket and ensure locking tab **'O'** is located.

Fig 53



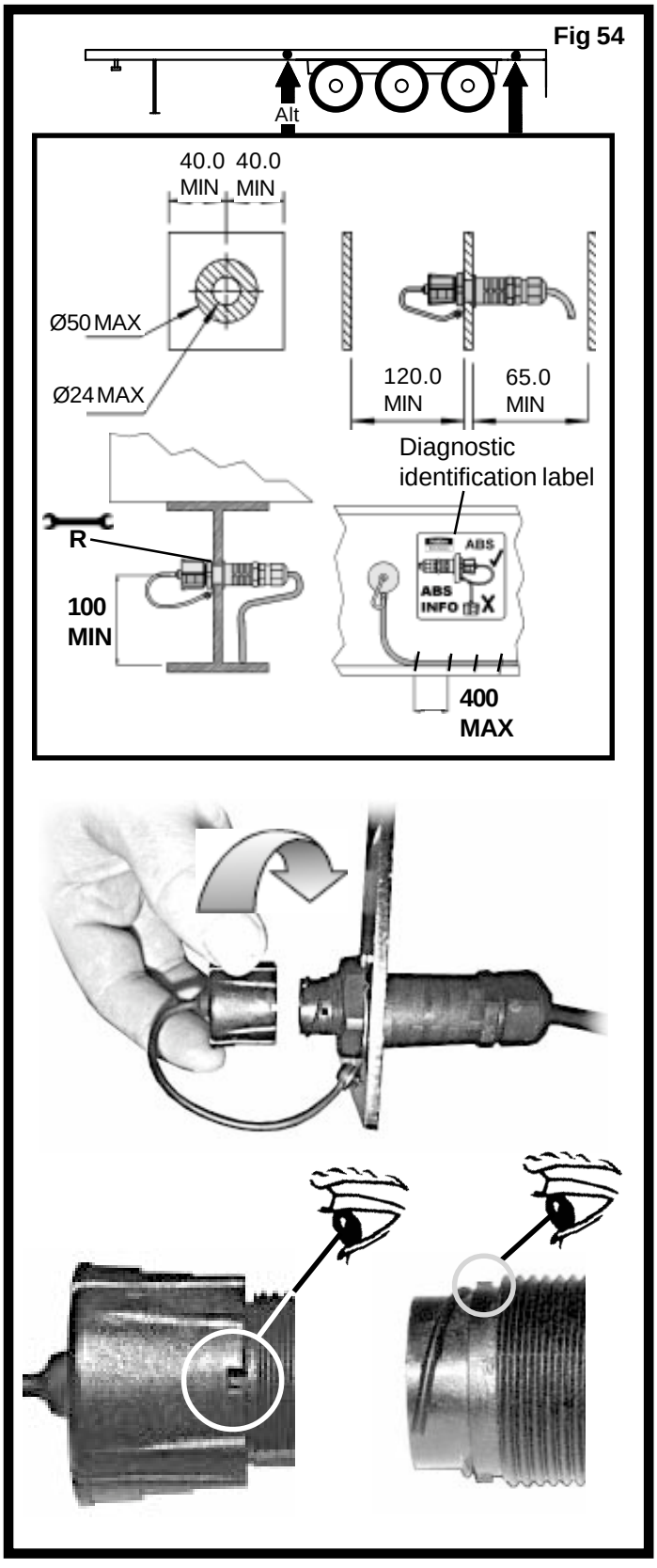
Secure connection by cable ties **'P'** within 50mm of each end on an appropriate mounting feature in its area **'Q'**, Example: nylon pipe.

Do **NOT** overtighten tie wraps.
Do **NOT USE tie wraps within 80mm of connector gland nut.**

All cables to run **UP TO** connection.

Alternative Installtion





Diagnostic Connector

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 member 4m cable length from ECU.
The position **MUST** be in a accessible area, after the rear axle or alternatively before the front axle but **NOT** in the direct spray of the wheels.
The connector must be mounted horizontally.
Tighten nut **'R'** to a torque of 3-4Nm (2-3 lbft).

Diagnostic identification label in to be mounted where it is visible and near the diagnostic connector.

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

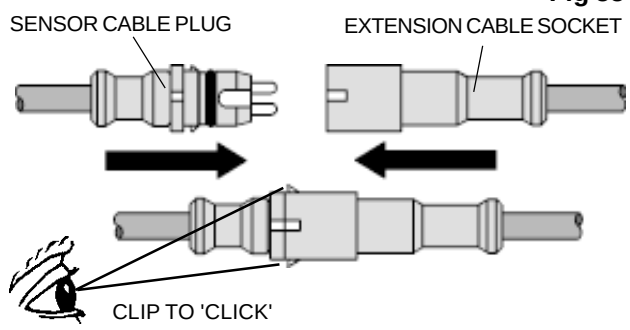
Note:

For Installation of **INFO CENTRE** refer to Instructions **000 700 067** Leaflet.

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

If used permanently with an Info Centre the connection may be secured as Fig 53.

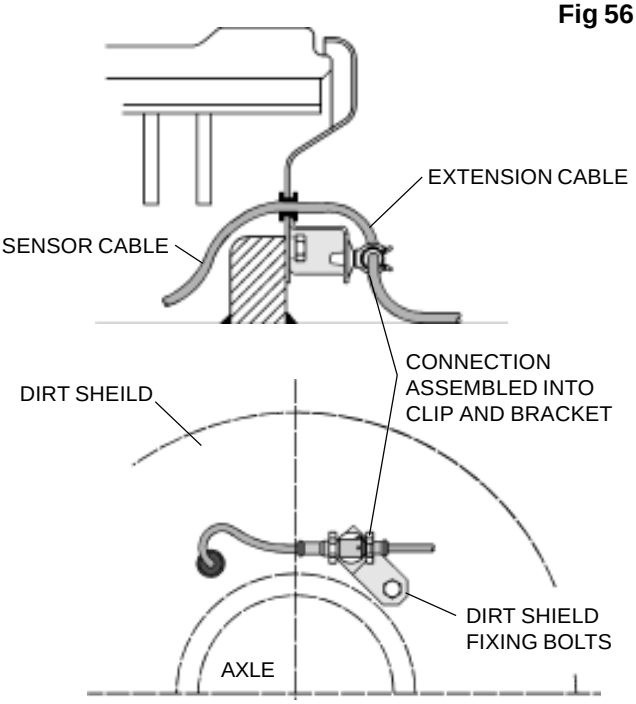
Fig 55



Sensor Connection

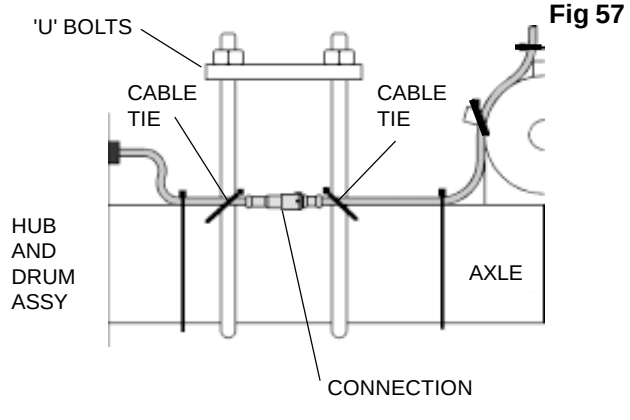
Sensor extension cable socket must be pushed fully into sensor cable plug till they clip into place to prevent falling out with axle vibration.

Fig 56

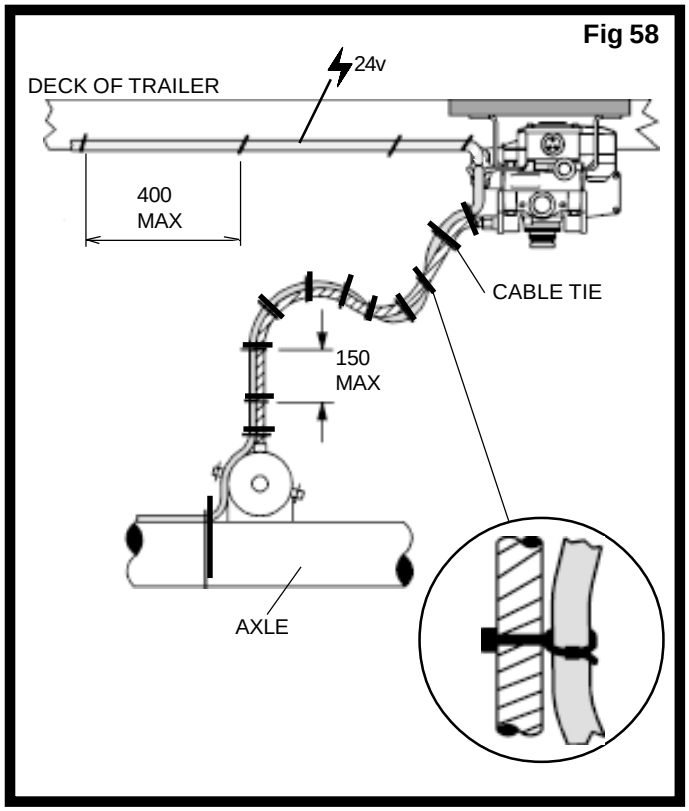


Where possible use a clip and bracket to secure sensor cable connection.

Fig 57



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

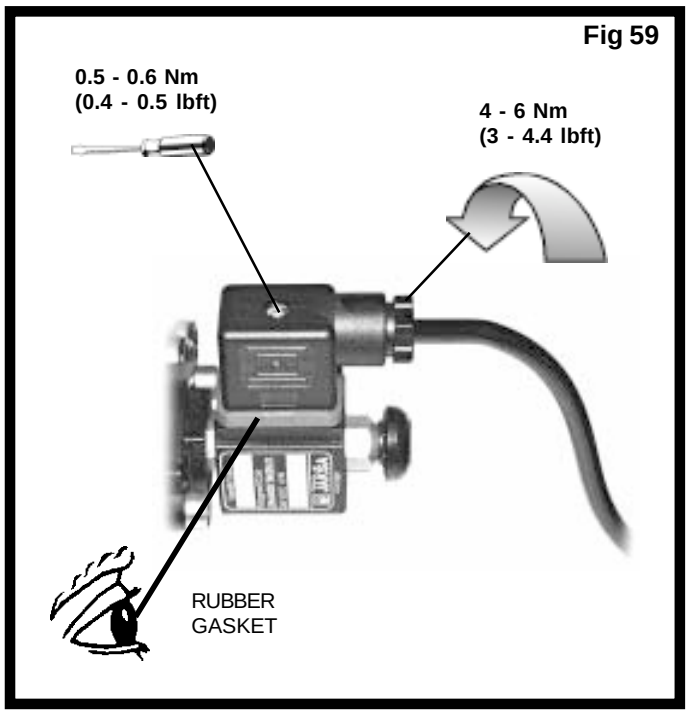


Sensor cable route should follow the centre line or outer radius of pipe or hose.
Tie wraps not to be overtightened because on brake application rubber hose expands, i.e. tie could damage the hose and sensor cable.

Do NOT run sensor leads in spiral wrapping on hoses.

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

Note: All cables should run **'UP TO'** loom connector and ECU.

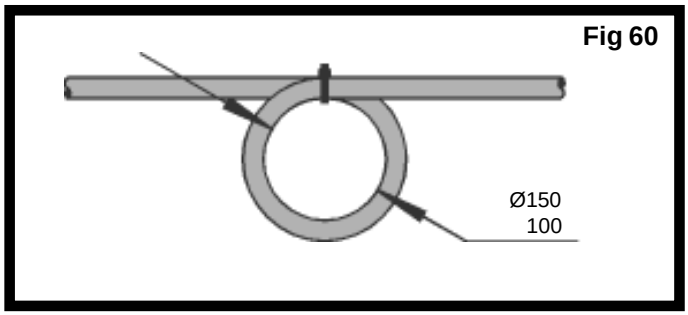


COLAS Connection
Cable should be secured down the chassis rail on piping and should be secured not less than 400mm intervals.

Note: All cables should run **'UP TO'** connector.

ANTI-VIBRATION SUPPORT

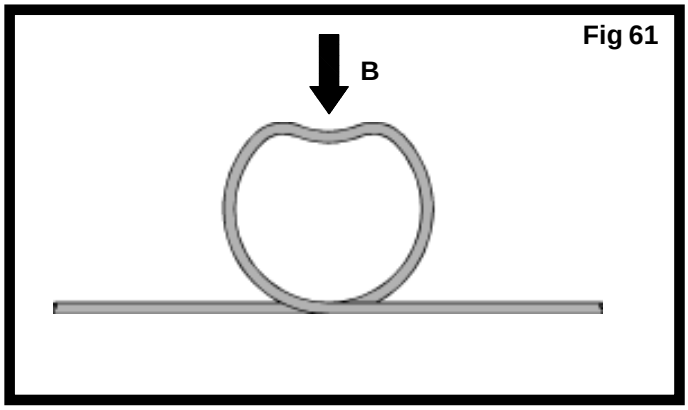
Excess cable must not be allowed to hang free, but must be attached to the chassis to prevent damage due to vibration and abrasion



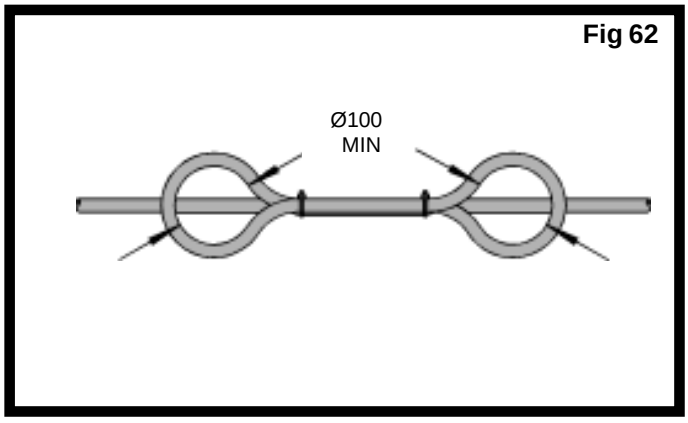
EXCESS CABLE

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

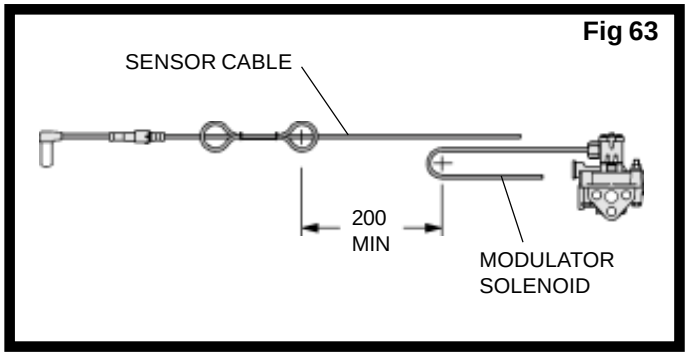
Excess length which will not form a complete loop may be left to hang in partial loops having a cable bend radius of 50mm minimum.



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

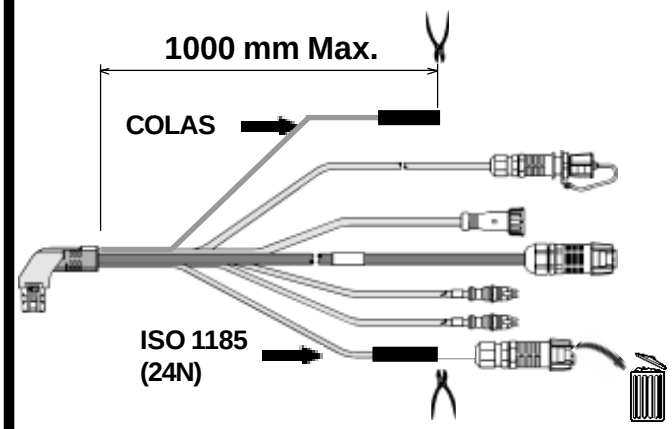


The resulting loops at the end must have a minimum bend radius of 50mm. Cable ties are to be used to fix the cable in the flattened loop shape.



Excess coiled up cable of sensor to be seperated from modulator solenoid cabel.

Fig 64



TERMINATION OF CABLES

Un-used or excess cable can be shortened in length but must be terminated in the form of a sealed joint.

Permissable cables to modify are:

1. COLAS (Reset to ride) cable
2. ISO1185 (24N) Power cable

Fig 65

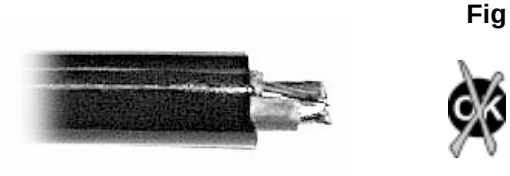


Cable preperation:

1. COLAS - 2 core cable. Cut one wire 15mm difference to the other wire.
This will prevent a short circuit occuring.

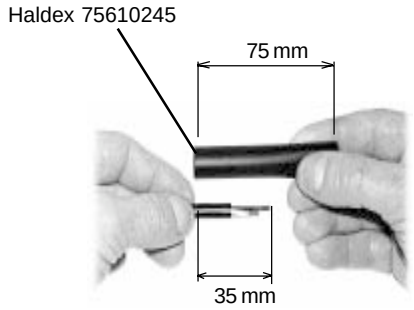
2. ISO1185 (24N) - 3 core cable. gain accsesto the cable by dismateling the 4-way connector. Cut back the individual wires in a staggered maner.

Fig 66



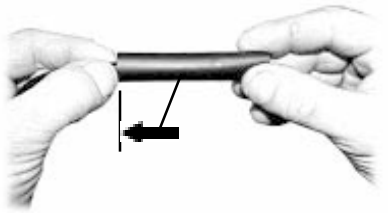
DO NOT cut wires the same length or cut flush with the outer insulation, so that it is possible for the individual wires to join and coause a short circuit fault.

Fig 67



Cut heat shrink sleeve (Haldex 75610245) to a minimum length of 75mm.

Fig 68



Insert heat shrink sleeve onto cable so that the total length of the heat shrink covers half the length of the cable.

Fig 69



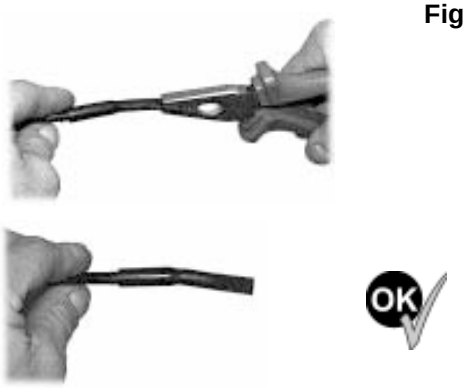
Apply heat with a suitable hot air gun, such as Hellerman No. GHL 1550.

Fig 70



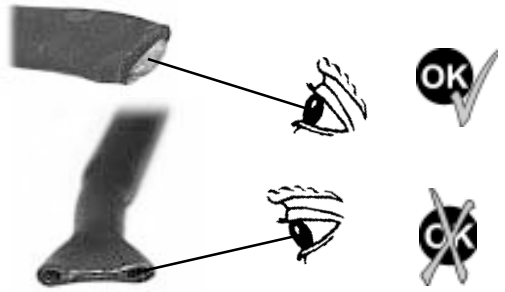
Make sure the heat shrink sleeve sealant melts and is visible on the cable. A watertight joint is formed when the sealant solidifies on cooling.

Fig 71



While shrink sleeve is still warm, gently squeeze the end of the sleeve.

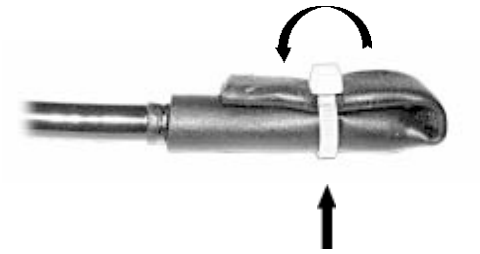
Fig 72



Make sure a amount of sealant is visible from the end of the sleeve. A watertight joint is formed when the sealant solidifies on cooling.

DO NOT over squeeze and create air gaps.

Fig 73



Before fully cooled, fold back sleeve on itself and secure with a cable tie.

GENERAL CHASSIS COMPONENTS

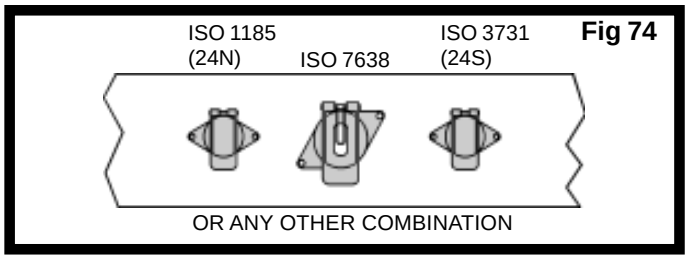


Fig 74

ISO 7638 Connector
Should be positioned / grouped with other electrical connections.

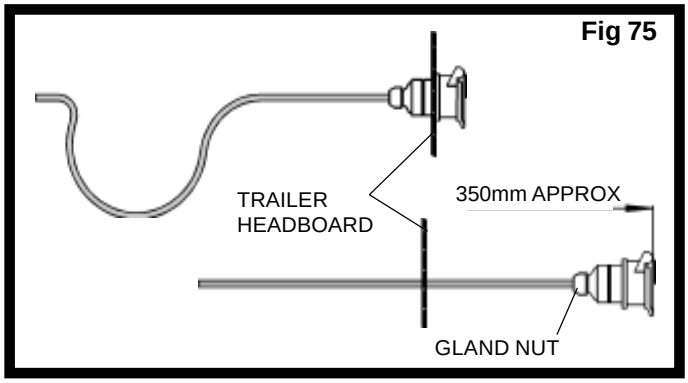


Fig 75

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

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

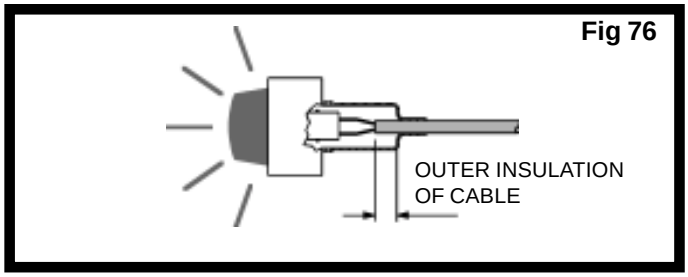


Fig 76

Warning Lamp
When wiring of warning lamp the cable outer insulation must enter the rubber boot of the lamp.

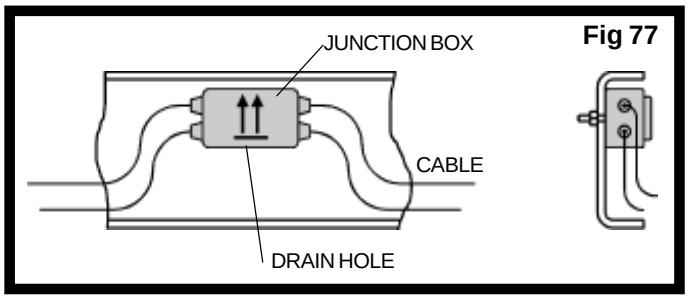


Fig 77

Junction Box
Should be mounted on a flat surface.
Mounting holes to be drilled 6.25mm diameter to avoid stress at the box from in correct location.
Ensure cable runs 'UP' to the junction box.

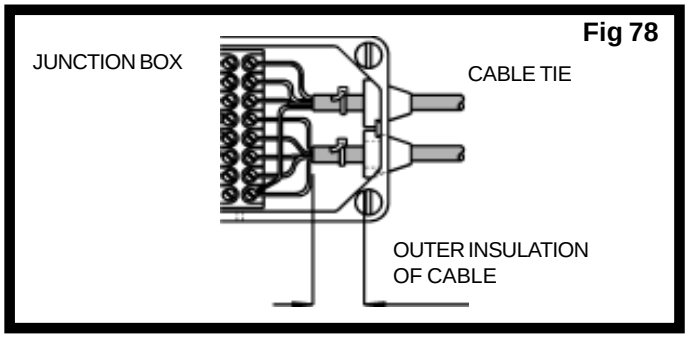
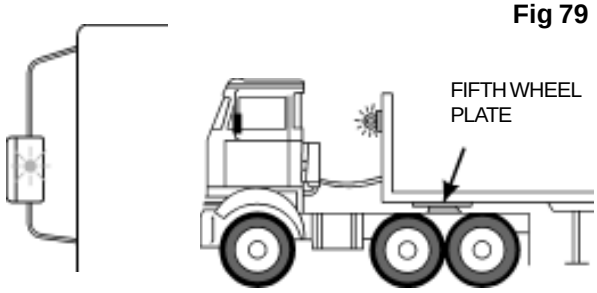


Fig 78

Ensure outer insulation of the cable enters inside junction box.

Fig 79

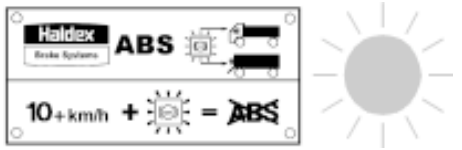


This must be positioned where it can be seen from the drivers rear view mirror.

The warning lamp and wiring should be mounted above the fifth wheel plate.

It must not protrude beyond the vehicle width.

Fig 80

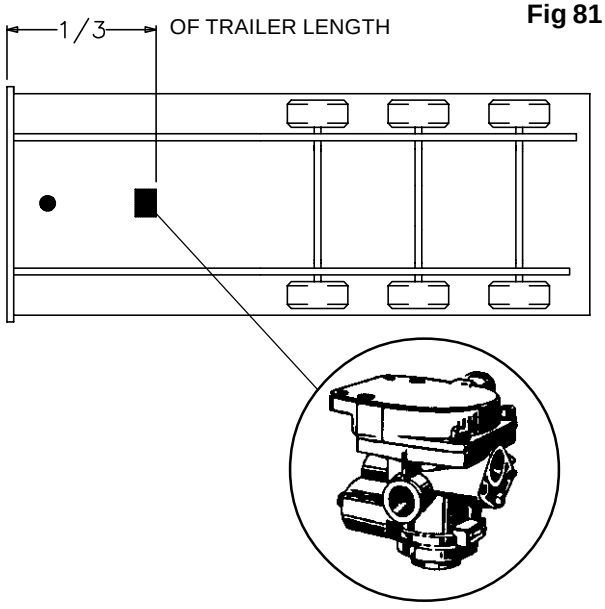


ABS LABEL

ABS WARNING LAMP

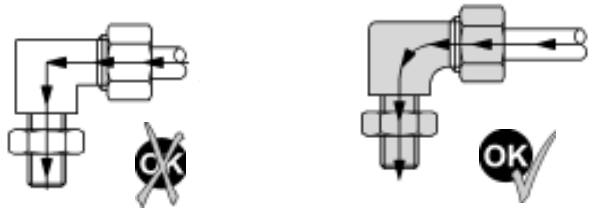
Instruction Label
Should be mounted adjacent to the green warning lamp.

Fig 81



POSITION OF ADDITIONAL VALVES
Ideal position of RELAY EMERGENCY VALVE

Fig 82



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

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

On metric (parallel thread) pipe fitting a backing washer and 'O' ring should be used. The use of tape and/or sealing liquid is not necessary.

FINAL PRODUCTION TEST PROCEDURE FOR 24V TRAILER INSTALLATIONS

Reference : GS 0105 (Issue 5) - Section 2

Scope

These tests verify that the wiring to the ABS electronic control unit (ECU) and piping to the ABS modulator has been satisfactory completed.

Equipment Required

(Item 4 below is only required if the installation to be tested is not fitted with an Info Centre)

1 A supply switch box with a 24 volt supply (see Figure 84).
A smooth d.c. supply must be used. An a.c. supply will damage the ECU while a d.c. supply whose voltage varies by more than 4 volts, from the nominal 24V, will degrade system performance.

2 A trolley jack and wheel chocks.

3 Workshop compressed air supply (regulated to a maximum of 8 bar, minimum of 6 bar).

4 A Diagnostic Display Unit (DDU) (Haldex part No. 905 027 001) and an ECU to DDU 2 metre cable assembly (Haldex part No. 003 8467 09).

Main Procedure

1 Lower any raised lift axles.

2 Connect and switch on the workshop compressed air supply to the trailer red and yellow lines.

3 Record the information requested below concerning the installation to be tested. This information may be obtained either from the installation drawing or by direct inspection of the trailer (preferred method).
For all Modular installations. The location of each of the wheels to which a sensor is fitted.
For Modular 1 Plus and Modular 2 installations only. Whether the installation includes suspension control.
For Modular 2 installations only. The physical position and connection to the brake chambers of each of the ABS modulators (BLUE and YELLOW) on the trailer, so that in later testing the order in which they exhaust air can be identified.

4 Set all of the switches on the supply switch box to OFF and check that the ammeter link has been fitted.

5 If necessary locate the DDU output socket on the trailer and connect this socket to the DDU using the 2m cable assembly.

6 If the trailer is not fitted with or the ECU is not powered by an ISO1185 (24N) connector go to item 9.

7 **ISO1185 (24N) connector test**

a) Plug the ISO1185 (24N) connector into the trailer.

b) Set the ISOII85 (24N) switch on the supply switch box to ON.

c) Carry out the Modular Configuration test described at the end of this procedure.

d) Set the supply switch box circuit breaker switch to ON. The following will occur sequentially,

i) The trailer mounted warning lamp will illuminate.

ii) On Modular 2 installations, a **single** short burst of air will be exhausted from **each** of the ABS modulators in the sequence BLUE, YELLOW.
or On Modular 1 Upgrade or Plus installations, a **single** short burst of air will be exhausted from the ABS modulator.

iii) The trailer mounted warning light will switch off for between 0.5 and 1 second and then come on again permanently.

e) If necessary set the circuit breaker switch to OFF and repeat d) above to confirm valve, lamp and DDU sequences.

8 If the trailer is not fitted with an ISO3731 (24S) connector go to item 11.

9 **ISO3731 (24S) connector test**

a) Set the circuit breaker switch and all other switches on the switch box to OFF and unplug the ISO1185 (24N) connector. Plug in the ISO3731 (24S) connector.

b) Set the warning light switch on the supply switch box to ON. Set the circuit breaker switch on the supply switch box to ON. The lamp on the switch box will come on permanently (wait for at least 2 seconds to check that lamp does not flash).
Set the circuit breaker switch on the supply switch box to OFF. Note that the trailer mounted warning lamp will remain off throughout this ISO3731 test.

c) Set the ISO3731 B+P switch on the supply switch box to ON. If the ISO1185 (24N) connector test (point 7) was not required, carry out the Modular Configuration test as described at the end of this procedure.

d) Set the supply switch box circuit breaker switch to ON. The following will occur sequentially,

NOTE: If the trailers wired for 3 power option as drawing 911 304 001 the trailer warning light will also come on during this test.

i) The supply switch box warning light will illuminate.

ii) On Modular 2 installations, a **single** short burst of air will be exhausted from **each** of the ABS modulators in the sequence BLUE, YELLOW.
or On Modular 1 Upgrade or Plus installations, a **single** short burst of air will be exhausted from the ABS modulator.

iii) The supply switch box warning light will switch off for between 0.5 and 1 second and then come on again permanently.

10 If the trailer is not fitted with an ISO 7638 connector go to item 12.

11 **ISO7638 connector test**

a) Set the circuit breaker switch and all other switches on the supply switch box to OFF and unplug the ISO3731 (24S) and/or the ISO1185 (24N) connector. Plug in the ISO7638 connector. Note that the trailer mounted warning lamp will remain off througout this ISO7638 test.

b) Set the warning light switch on the supply switch box to ON. Set the circuit breaker switch on the supply switch box to ON. The lamp on the switch box will come on permanently (wait for at least 2 seconds to check lamp does not flash). Set the circuit breaker switch on the supply box to OFF.

c) Set the ISO7638 B+P switch on the supply switch box to ON. If the ISO1185 (24N) and the ISO3731 (24S) connector tests (point 7 and 9) were not required, carry out the Modular Configuration test as described at the end of this procedure.

d) Set the supply switch box circuit breaker switch to ON. The following will occur sequentially,

i) The supply switch box warning light will illuminate.

ii) On Modular 2 installations, a **single** short burst of air will be exhausted from **each** of the ABS modulators in the sequence BLUE, YELLOW.
or Modular 1 Upgrade or Plus installations, a **single** short burst air will be exhausted from the ABS modulator.

iii) The supply switch box warning light will switch off for between 0.5 and 1second and then come on again permanently.

e) If necessary set the circuit breaker switch to OFF and repeat d) above to confirm valve, lamp and DDU sequences.

12 Reconnect the ISO1185 B+I/ISO3731 B+P/ISO7638 B+P plugs to the trailer. (if fitted).

Ensure that the ISO1185 B+I/ISO3731 B+P/ISO7638 B+P and warning light switches are ON.

Set the supply switch box circuit breaker switch to ON.
The following will occur sequentially,

i) The switch box and trailer mounted warning lamp will illuminate.

ii) On Modular 2 installations, a **single** short burst of air will be exhausted from **each** of the ABS modulators in the sequence BLUE, YELLOW.

or On Modular 1 Upgrade or Plus installations, a **single** short burst of air will be exhausted from the ABS modulator.

iii) The switch box and trailer mounted warning light will switch off for between 0.5 and 1 second and then come on again permanently.

13 **Sensor Test**

The following is carried out with the ECU powered up.
For each of the two wheels to which a wheel speed sensor is fitted

a) Jack up the wheel and chock remaining wheels.

b) Disconnect the workshop compressed air supply to the trailer yellow line.

c) Spin the wheel at approximately one revolution every two seconds.

d) The bar on the DDU corresponding to the wheel being spun will be displayed (see Figure 83).

e) Reconnect the workshop compressed air supply to the trailer yellow line.

f) Lower jacked up wheel.

14 **No stored diagnostic codes check**

a) Press (and keep depressed) button on the top face of the DDU.

b) The DDU will display two horizontal lines for several seconds and then if no diagnostic codes are stored 00. Release switch. If any code other than 00 was displayed carry out the procedure for clearing diagnostic fault codes described after the Configuration test.

15 Switch off all of the supply switch box switches and then disconnect the switch box from the trailer.

16 Disconnect the workshop compressed air supply from the trailer.
Disconnect the DDU cable from the trailer mounted connector and ensure that the dust cover for the connector is refitted.

END OF TEST PROCEDURE

CONFIGURATION TEST

1 Set the operating switch to ON and observe the DDU . The DDU will display 88 then a code in the range C0 - C2 for approximately 2 seconds followed by 07. If the installation includes optional retarder and/or suspension control an additional A code or codes will appear between the C code and 07.

The group C code displayed is dependent on the number of modulators and sensors fitted to the trailer (see main procedure item 3 - page 34).

- C0 Modular 1 Upgarde and Modular 1 Plus
- C1 Modular 2 fitted with two wheel speed sensors
- C2 Modular 2 fitted with four wheel speed sensors

The A codes for the optional additional control features are given below.

- A1 Manual raise/lower suspension control valve
- A2 Retarder control

2 Set the circuit breaker switch to OFF.

3 Connect the workshop compressed air supply to both the Red and Yellow lines. If there is any audible loss from the system repair the fault before continuing.

RETURN TO MAIN PROCEDURE AT ITEM 7d), 9d) OR 11d) - page 35 and 36.

MODULAR PRODUCT FAMILIES DIAGNOSTIC CODE CLEARANCE PROCEDURE

1 Press (and keep depressed) the button on the top face of the DDU.
2 The DDU will display two horizontal bars for several seconds and then a diagnostic code. Release switch.
3 Repeat items 1 and 2 until the code displayed is CA. Press the button again while DDU is still displaying CA (if it has already reverted to another code start procedure again).
4 The DDU will rapidly scan through its complete numeric range and then display 00. Release switch.
5 Press (and keep depressed) the button switch on the top face of the DDU.
6 The DDU will display two horizontal bars for several seconds and then 00. Release switch. If any other code is displayed repeat this whole procedure.

RETURN TO ITEM 13 OF THE MODULAR TEST PROCEDURE

Note **This procedures will not clear a 1 or 2 series diagnostic code (11, 14, 22, 26 etc.) until the trailer has been towed (or some other method used to rotate all sensed wheels simultaneously) at a speed sufficient to cause the warning lamp to switch off.**

Figure 83 - Sensor location chart (Alternativley Refer to Page 3 and 4)

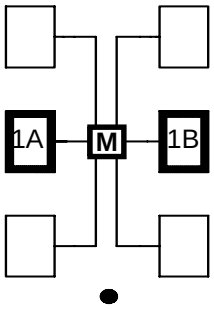
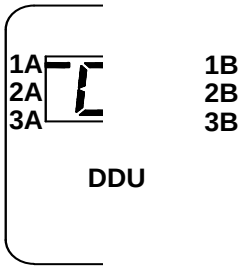
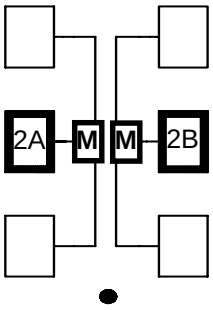
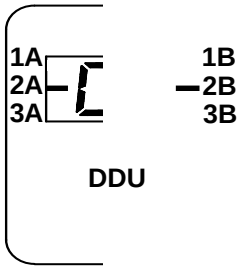
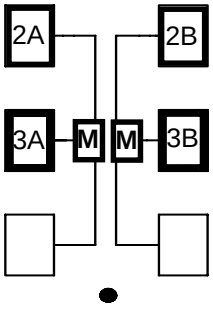
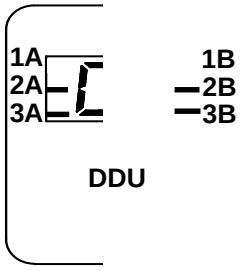
SYSTEM	AXLE SENSED	DIAGNOSTIC DISPLAY UNIT INDICATION
2S / 1M		
2S / 2M		
4S / 2M		

Figure 84 - Circuit diagram of supply switch test box

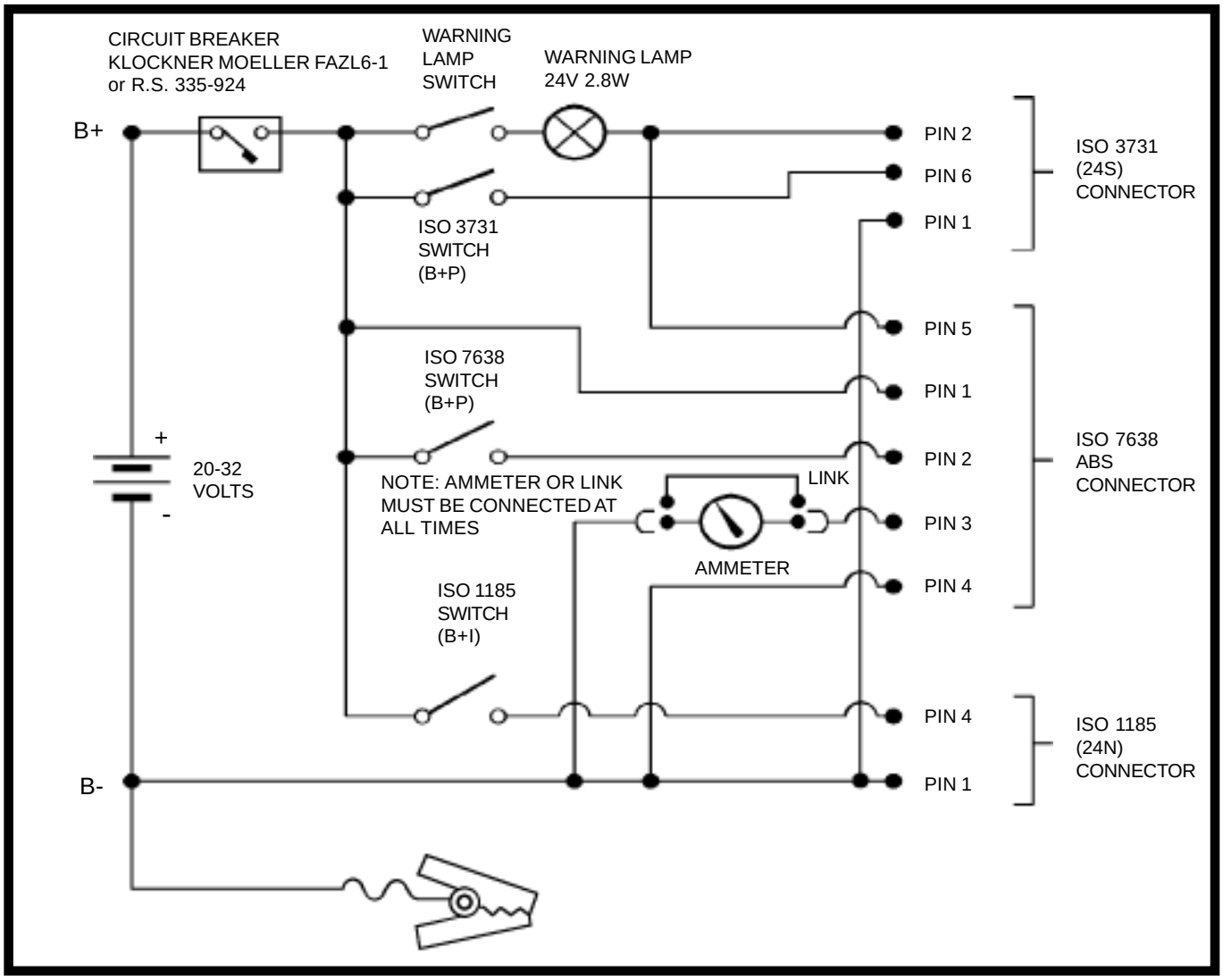
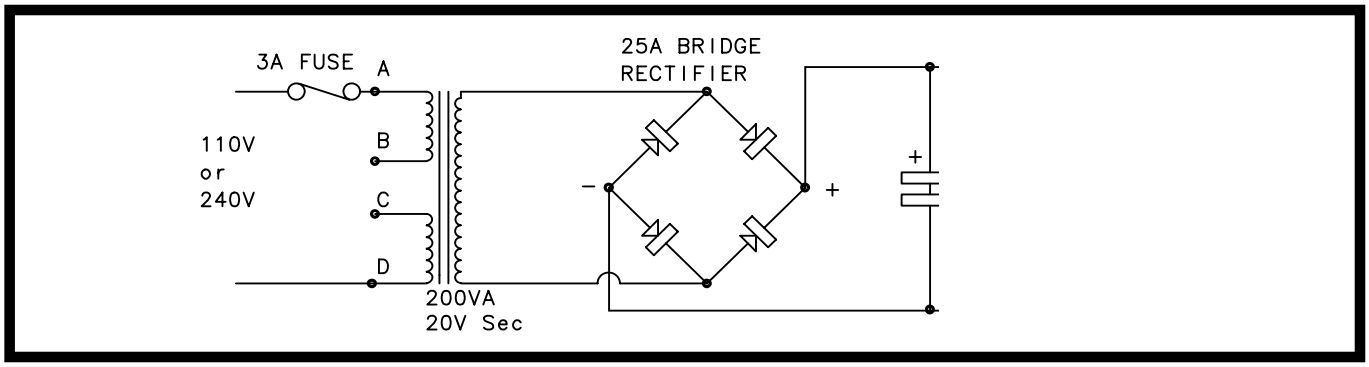


Figure 85 - Mains power supply circuit



Connect A to C and B to D for 110V operation.
Connect B to C 240V operation.

ABS TEST PROCEDURE - SUMMARY

Apply foot brake and Switch on ignition :

STEP **1** **WATCH RED** and **GREEN WARNING LAMP**.

STEP **2** Listen for order of **BLOW DOWN.**

STEP **3** **REFER TO DIAGNOSTIC DISPLAY UNIT** or **INFO Centre CODE,**

Release foot brake **SPIN EACH SENSED WHEEL IN TURN** and refer to :-

DIAGNOSTIC DISPLAY UNIT INDICATION
or
INFO Centre INDICATION.

CHECK MEMORY CODES OF THE ECU ARE CLEAR. Refer to SERVICE MANUAL.

Drawing references :-

Semi Trailer MODULAR 1 UPGRADE -	2S/1M System (Fig. 86)
Semi Trailer MODULAR 1 PLUS -	2S/1M System (Fig. 86)
Semi Trailer MODULAR 2 -	2S/2M System (Fig. 87)
Semi Trailer MODULAR 2 -	4S/2M System (Fig. 88)

MODULAR 1 Upgrade and MODULAR 1 PLUS - 2S/1M

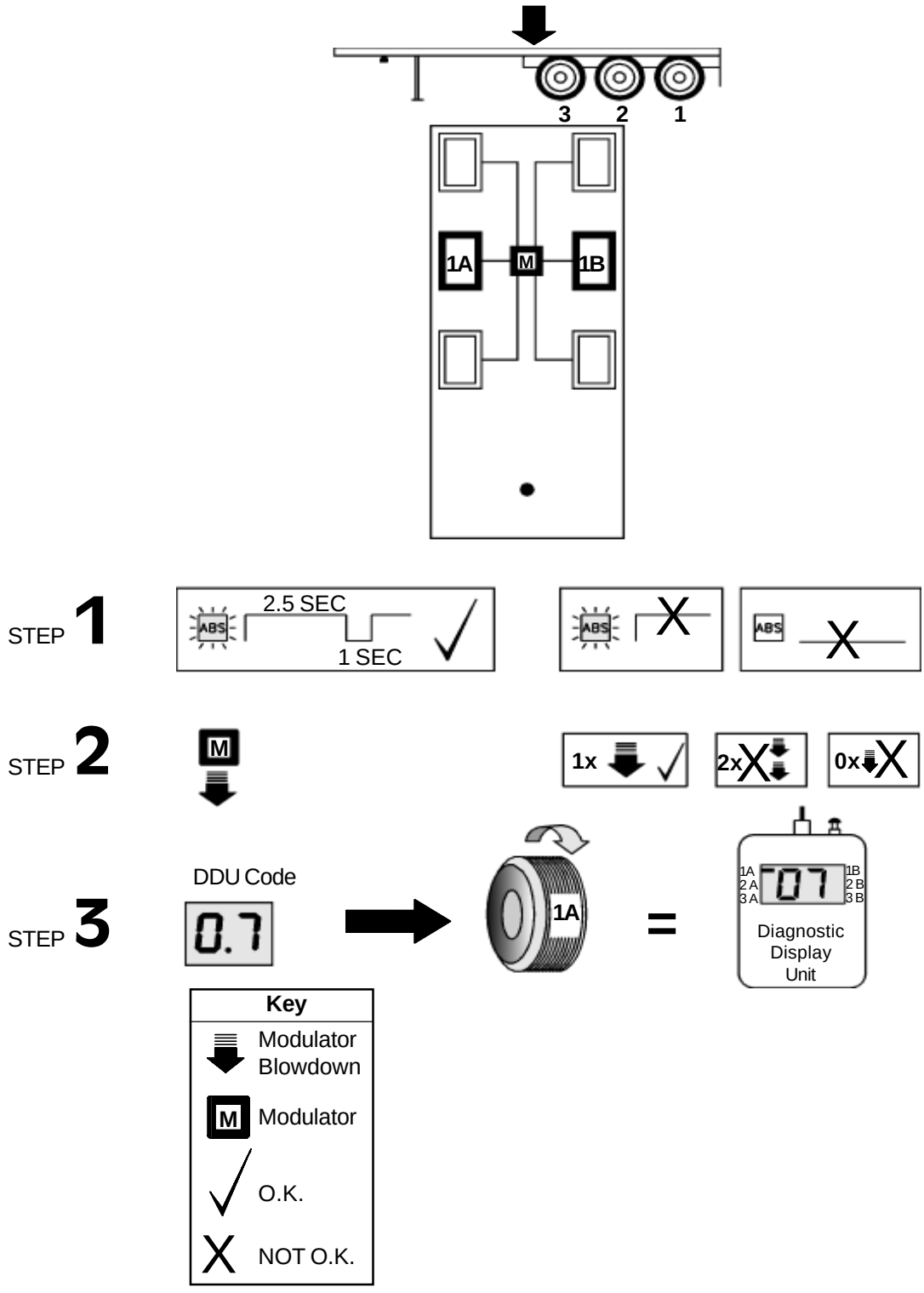


Fig 86

MODULAR 2 - 2S/2M

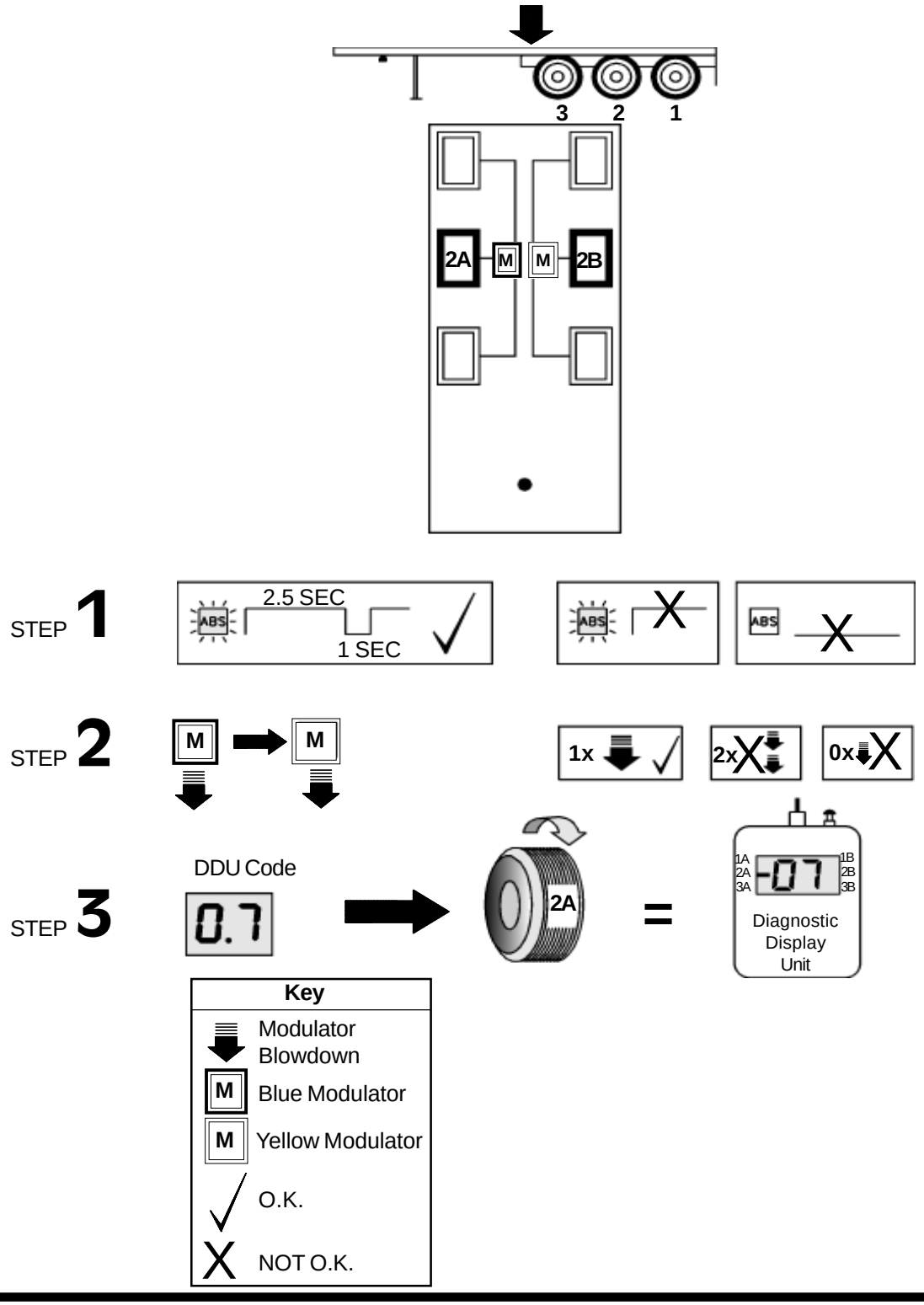


Fig 87

MODULAR 2 - 4S/2M

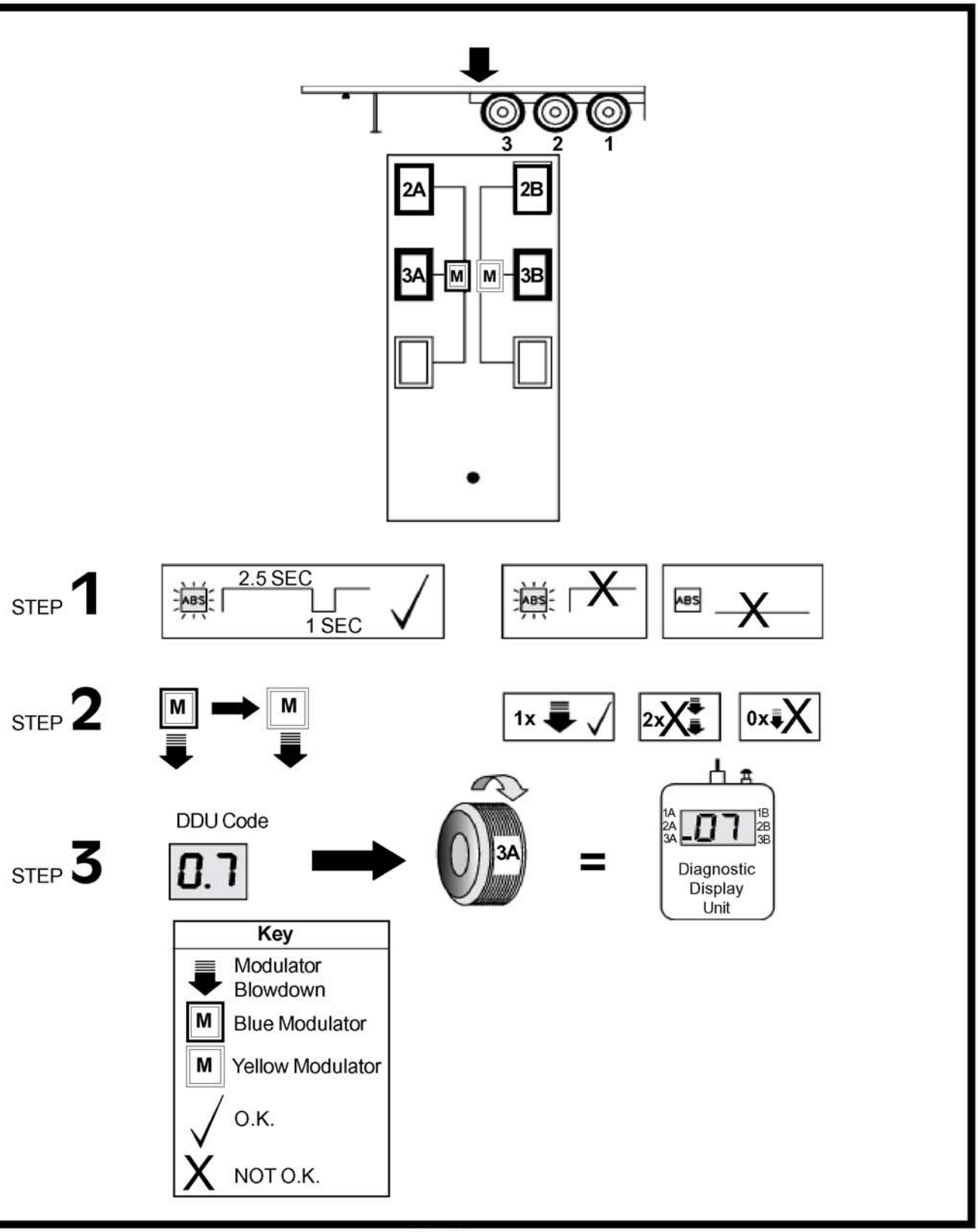


Fig 88

DIAGNOSTIC CODES - DDU

If a diagnostic code not listed below is displayed check for intermittent sensor and wiring faults.
Refer to Service Manual for detailed diagnostic testing procedures.

BLANK DISPLAY	No supply on ignition switched line. ***Possible causes:*** Fuse blown. DDU or cable fault. Open circuit B -
SENSOR BAR	Bar displayed = Sensor output O.K. Bar not displayed = Sensor output too low
00	System is O.K. vehicle is moving
01	1A Sensor/wiring open or short circuit
02	1B Sensor/wiring open or short circuit
03	2A Sensor/wiring open or short circuit
04	2B Sensor/wiring open or short circuit
05	3A Sensor/wiring open or short circuit
06	3B Sensor/wiring open or short circuit
07	System is O.K. vehicle is stationary
08	Retarder / Wiring open circuit
09	Retarder / Wiring short circuit
OC	Reset to ride / Wiring open circuit
OA	Reset to ride / Wiring short circuit
OE	Warning lamp circuit fault
	LOW SENSOR OUTPUT GROUP
11	1A Sensor system fault
12	1B Sensor system fault
13	2A Sensor system fault
14	2B Sensor system fault
15	3A Sensor system fault
16	3B Sensor system fault ***Possible causes:*** Sensor worn, maladjusted sensor, wiring open or short circuit.
20	Incorrect exciter type. ***Possible causes:*** Exciter tooth count diffrent each side of axle.
	INTERMITTENT LOW SENSOR OUTPUT GROUP
21	1A Sensor system fault
22	1B Sensor system fault
23	2A Sensor system fault
24	2B Sensor system fault
25	3A Sensor system fault
26	3B Sensor system fault ***Possible causes:*** Loose sensor, connection, bracket or exciter. Damaged exciter. Maladjusted sensor or worn sensor cable insulation.

CODE DISPLAYED

37	Lamp signalled by external device
	ONE WHEEL WITH SLOW RECOVERY GROUP
40	Sensor wiring crossed across an axle
41	Slow recovery of one wheel of red channel
42	Slow recovery of one wheel of blue channel
43	Slow recovery of one wheel of yellow channel
	Possible causes:
	Slow brake release, foundation brake mechanical faults, dry bearings, broken spring, restricted piping
	Check for kinks and blockages etc.
	Incorrect piping, Wiring
	Modulator fault
	OPEN CIRCUIT MODULATOR SOLENOID OR SOLENOID WIRING GROUP
61	Hold solenoid circuit fault, red channel
62	Hold solenoid circuit fault, blue channel
63	Hold solenoid circuit fault, yellow channel
67	Dump solenoid circuit fault, red channel
68	Dump solenoid circuit fault, blue channel
69	Dump solenoid circuit fault, yellow channel
	SHORT CIRCUIT ACROSS MODULATOR SOLENOID OR SOLENOID WIRING GROUP
71	Hold solenoid circuit fault, red channel
72	Hold solenoid circuit fault, blue channel
73	Hold solenoid circuit fault, yellow channel
77	Dump solenoid circuit fault, red channel
78	Dump solenoid circuit fault, blue channel
79	Dump solenoid circuit fault, yellow channel
	MODULATOR SOLENOID WIRING OR SOLENOID SHORT TO B+ GROUP
80	Poor insulation in the modulator solenoid or wiring fault
81	Hold solenoid circuit fault, red channel.
82	Hold solenoid circuit fault, blue channel
83	Hold solenoid circuit fault, yellow channel
87	Dump solenoid circuit fault, red channel
88	Dump solenoid circuit fault, blue channel
89	Dump solenoid circuit fault, yellow channel
	SUPPLY VOLTAGE GROUP
90	Supply voltage at ECU less than 18v when a solenoid is energised
91	Faulty supply from ISO 7638 Pin 1 or fuse blown
92	Supply voltage at the ECU greater than 32v
93	Internal ECU fault

CODE DISPLAYED

99	Internal ECU fault

SYSTEM FUNCTION GROUP

A1	Reset to ride height (COLAS)
A2	Retarder

CONFIGURATION CODES

Figures in brackets indicate sensing is disabled when the axle is lifted.

	Function	Axle Lifted	Sensors Used	Modulators Used
C0	2S/1M		1A, 1B	Red
C1	2S/2M		2A, 2B	Blue, Yellow
C2	4S/2M		2A, 2B, 3A, 3B	Blue, Yellow
C3	4S/2M	2 or 3	2A, 2B, (3A), (3B)	Blue, Yellow

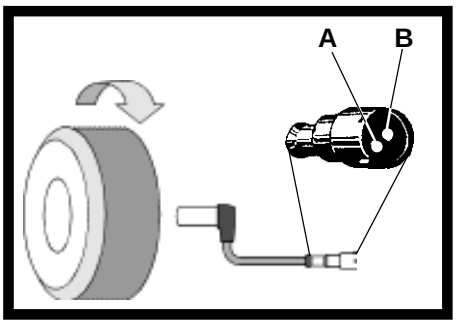
SUNDRY ADDITIONAL CODES

CA	Erase stored fault
CC	Clear Configuration
CF	Sensors and Solenoid not connected
LO	Open circuit wiring to the DDU connector either between ECU and connector or in the DDU fly lead.

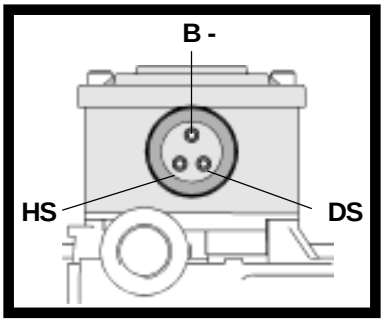
Note: If a code is displayed and after following recommended procedure, as detailed in the Service Manual, no fault is found, the ABS ECU should be replaced.

MULTIMETER READINGS

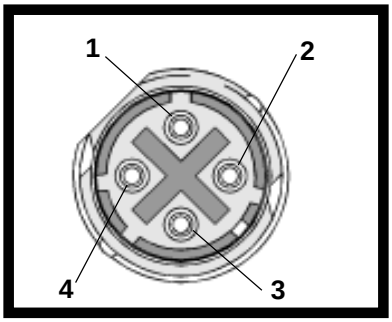
CHECKING POSITION	MEASURE BETWEEN	CORRECT VALUE	REMARKS	Fig
Sensor output	A B	0.2V AC Min.	Sensor 1A, 1B, 2A, 2B or 3A,3B Sensor disconnected from ECU. Wheel rotated at 1 rev/2 sec.	**89**
Sensor resistance	A B	>1.0 <2.4 kohm	Sensor 1A, 1B, 2A, 2B or 3A,3B Sensor disconnected from ECU.	**89**
Modulator Solenoid resistance	B - DS	>12 <20 ohm	Modulator cable disconnected . from solenoid.	**90**
Modulator Solenoid resistance	B - HS	>12 <20 ohm	Modulator cable disconnected . from solenoid.	**90**
Supply from ISO 7638	1 4	>18 <32V	Ignition on. Approx battery voltage	**91**
Supply from ISO 1185 (24N)	1 4	>18 <32V	Brake applied, Ignition on Approx battery voltage	**91**
Earth continuity	ECU/Modulator Bracket and Vehicle chassis	<5 ohms		**92_1**
COLAS Solenoid resistance	+ -	>79 <96 ohms	Cable disconnected	**92**



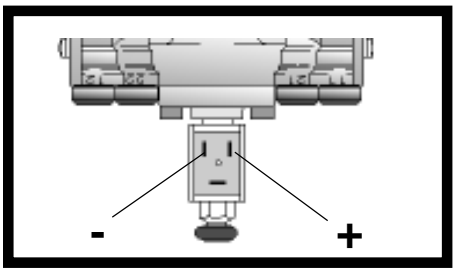
Sensor Connector - **Fig 89**



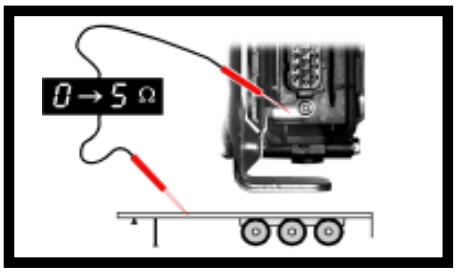
Solenoid Connector - **Fig 90**



Diagnostic Connector - **Fig 91**



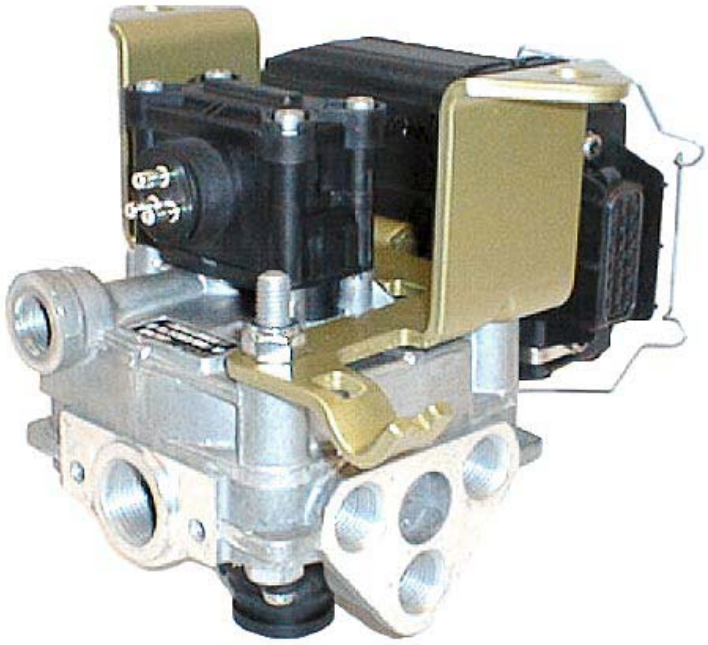
COLAS Connector - **Fig 92**



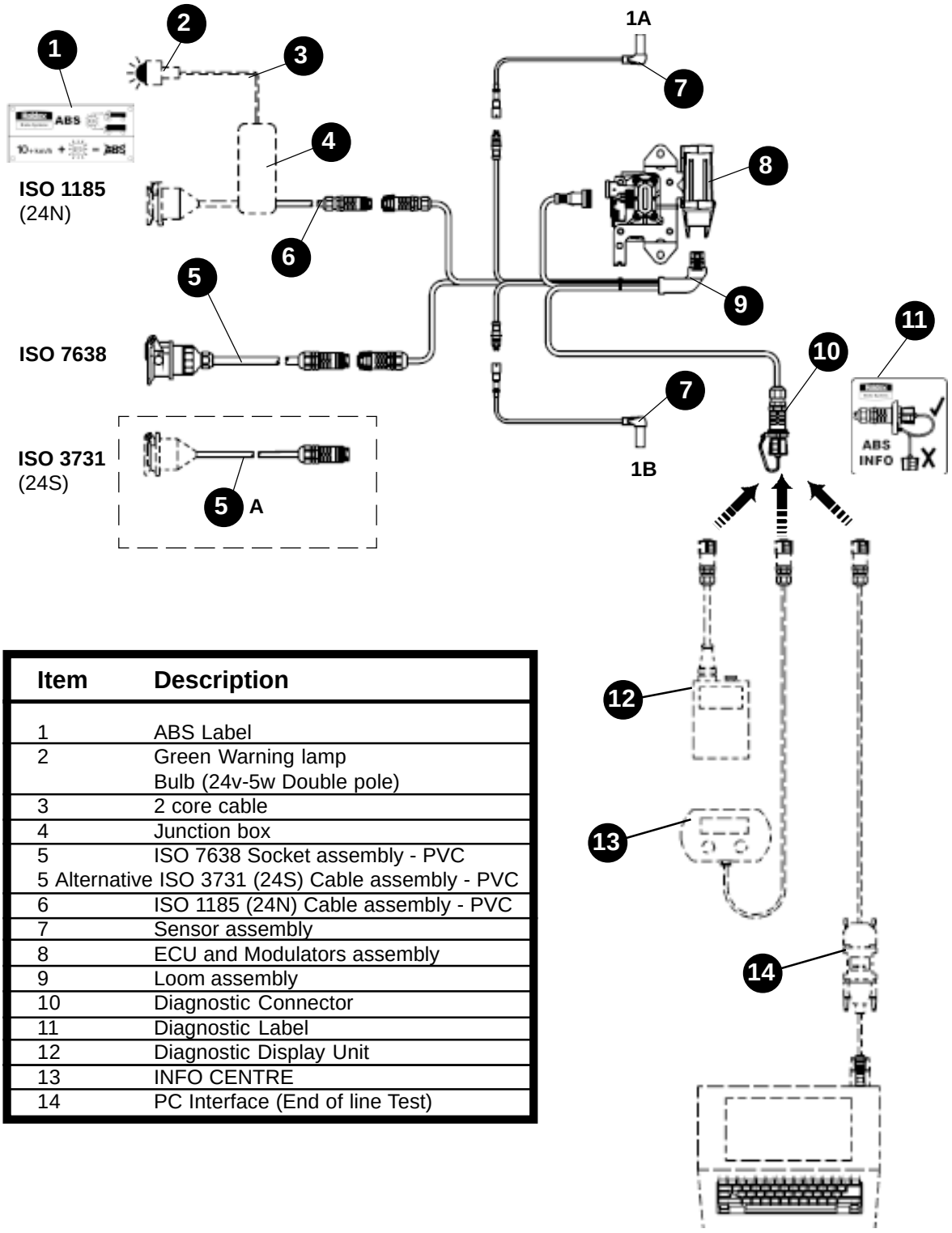
COLAS Connector - **Fig 92_1**

SECTION 2

MODULAR 1 UPGRADE
2S/1M ABS



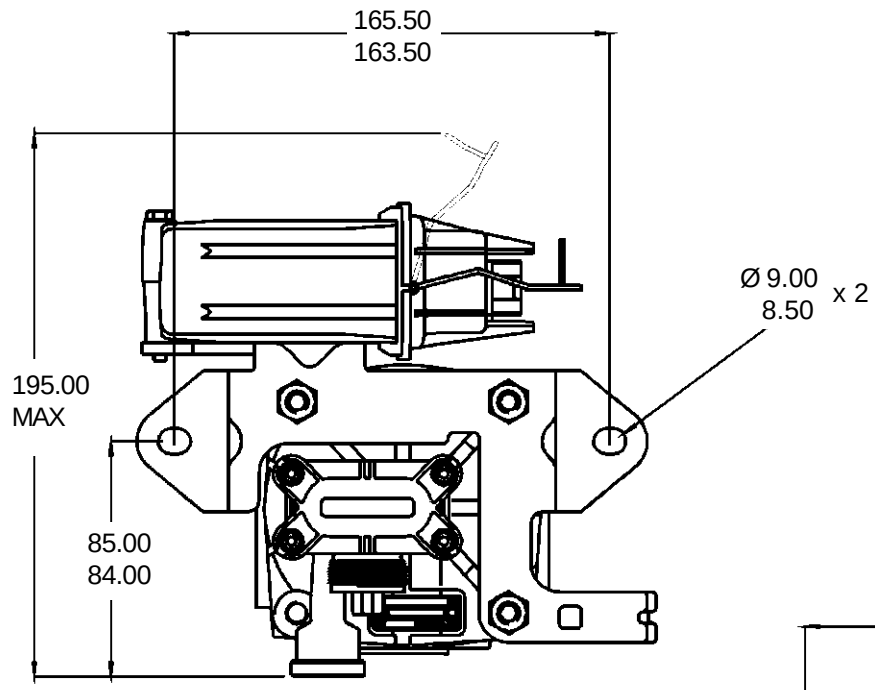
MODULAR 1 UPGRADE - ABS CHASSIS COMPONENTS 2S/1M

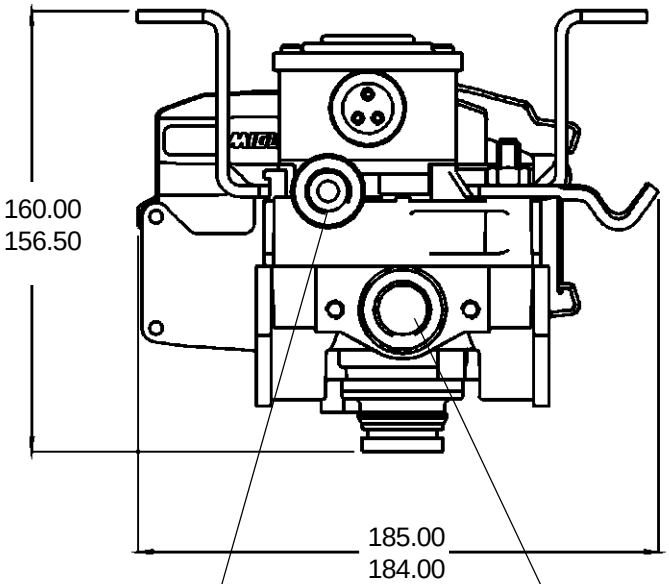


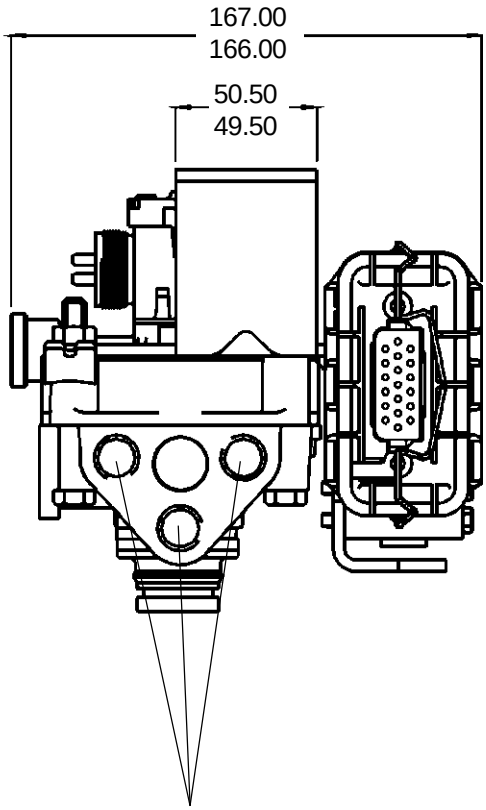
Item	Description
1	ABS Label
2	Green Warning lamp Bulb (24v-5w Double pole)
3	2 core cable
4	Junction box
5	ISO 7638 Socket assembly - PVC
5 Alternative	ISO 3731 (24S) Cable assembly - PVC
6	ISO 1185 (24N) Cable assembly - PVC
7	Sensor assembly
8	ECU and Modulators assembly
9	Loom assembly
10	Diagnostic Connector
11	Diagnostic Label
12	Diagnostic Display Unit
13	INFO CENTRE
14	PC Interface (End of line Test)

Fig 93

MODULAR 1 UPGRADE INTEGRATED ASSEMBLY







Control port (4)
M16 x 1.5

Reservoir port (1)
M22 x 1.5

Delivery port (2)
M16 x 1.5 x 6

Mass of Assembly = 2Kgs

Fig 94

PIPE RECOMMENDATIONS Applicable to MODULAR 1 UPGRADE

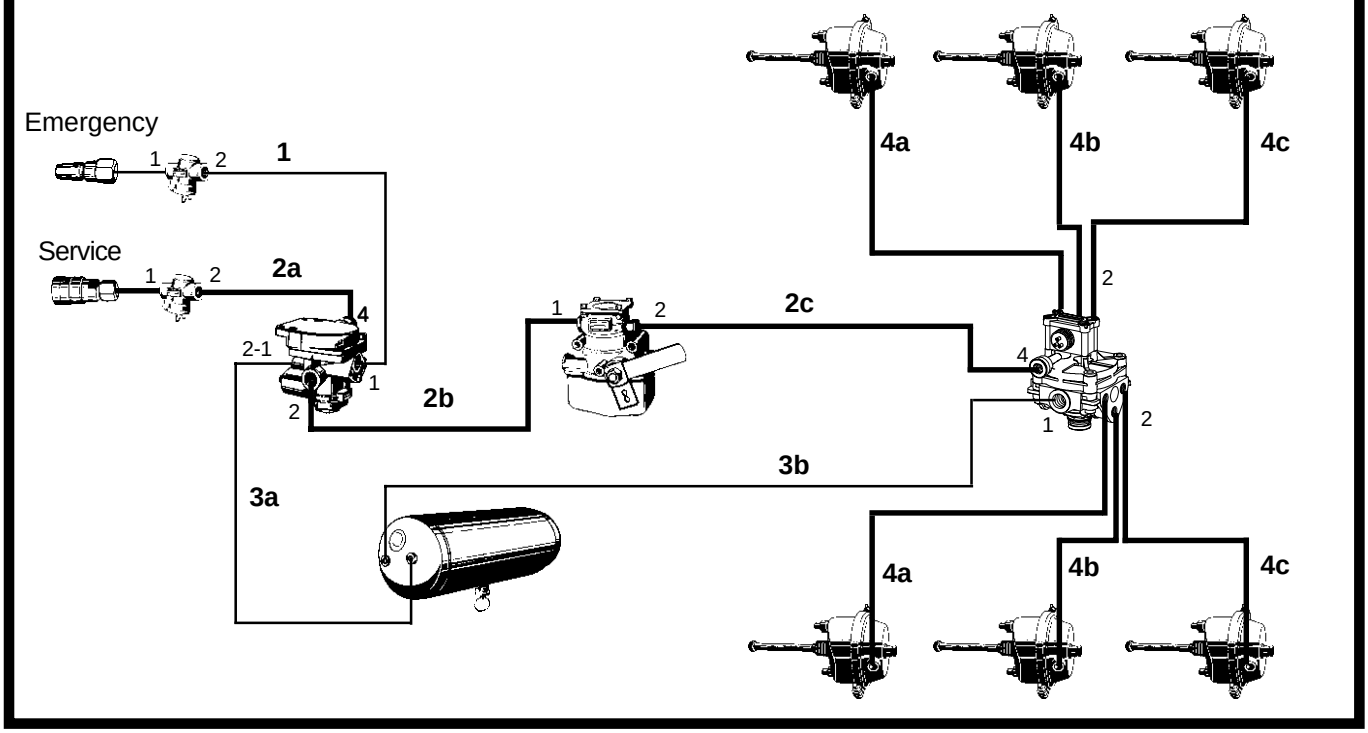


Fig 95

Item	Description	Material	Size	Remark
1	Emergency pipe	Nylon	8 X 1 10 X 1 / 1.25 12 X 1.5	
2a	Service pipe	Nylon	8 X 1 Pref 10 x 1 Alt 10 x 1.25 Alt	2a To be 1/3 of total trailer length
2b	Service pipe	Nylon	12 x 1.5 Pref 10 x 1 Alt 10 x 1.25 Alt	2b to be one size greater than 2a and 2c
2c	Service pipe	Nylon	8 x 1 Pref 10 x 1 Alt	
3a	Reservoir pipe	Nylon	12 x 1.5 Pref 15 x 1.5 Alt	
3b		Nylon	15 x 1.5 18 x 2	Short as possible 1.0m Max. Short as possible 4.0m Max.
4a 4b 4c	Brake delivery pipe	Nylon or Rubber hose I.D.	12 x 1.5 or 11.0 I.D. 13.0	4a and 4c to be similar in length, 4b to be as short as possible.

Pref = Preferred Alt = Alternative All pipe and rubber hose to comply to recognised international standards. Nylon pipe to DIN 73378, Rubber hose to SAE 1402. The above pipe sizes are defined as guide lines only.
Actual sizes need to be opitomised for a given trailer to meet system response time requirements.

PIPING LAYOUT

MODULAR 1UPGRADE
3 axle Semi-Trailer - 2 line air brake system - S/D Brake Chambers

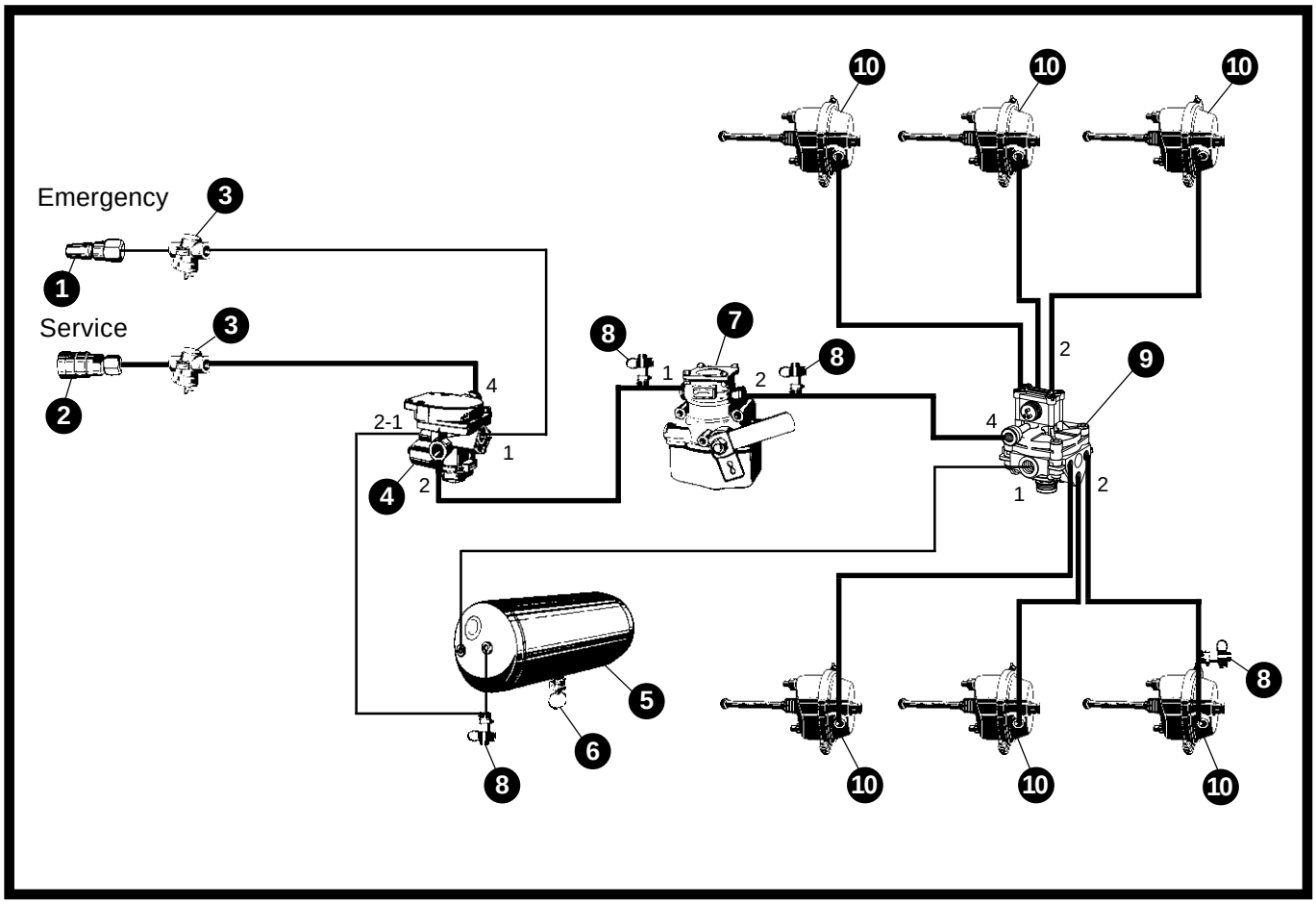


Fig 96

Item	Description
1	Emergency Coupling
2	Service Coupling
3	Pipe Filter
4	Relay Emergency Valve
5	Air Reservoir (30L/Axle - Single Diaphgram B.C.)
6	Drain valve
7	Load Sensing valve - mechanical
8	Test point
9	ABS Modulator
10	Brake Chamber

PIPING LAYOUT

MODULAR 1UPGRADE

3 axle Semi-Trailer - 2 line air brake system - Spring Brake Chambers - (Air Suspension)

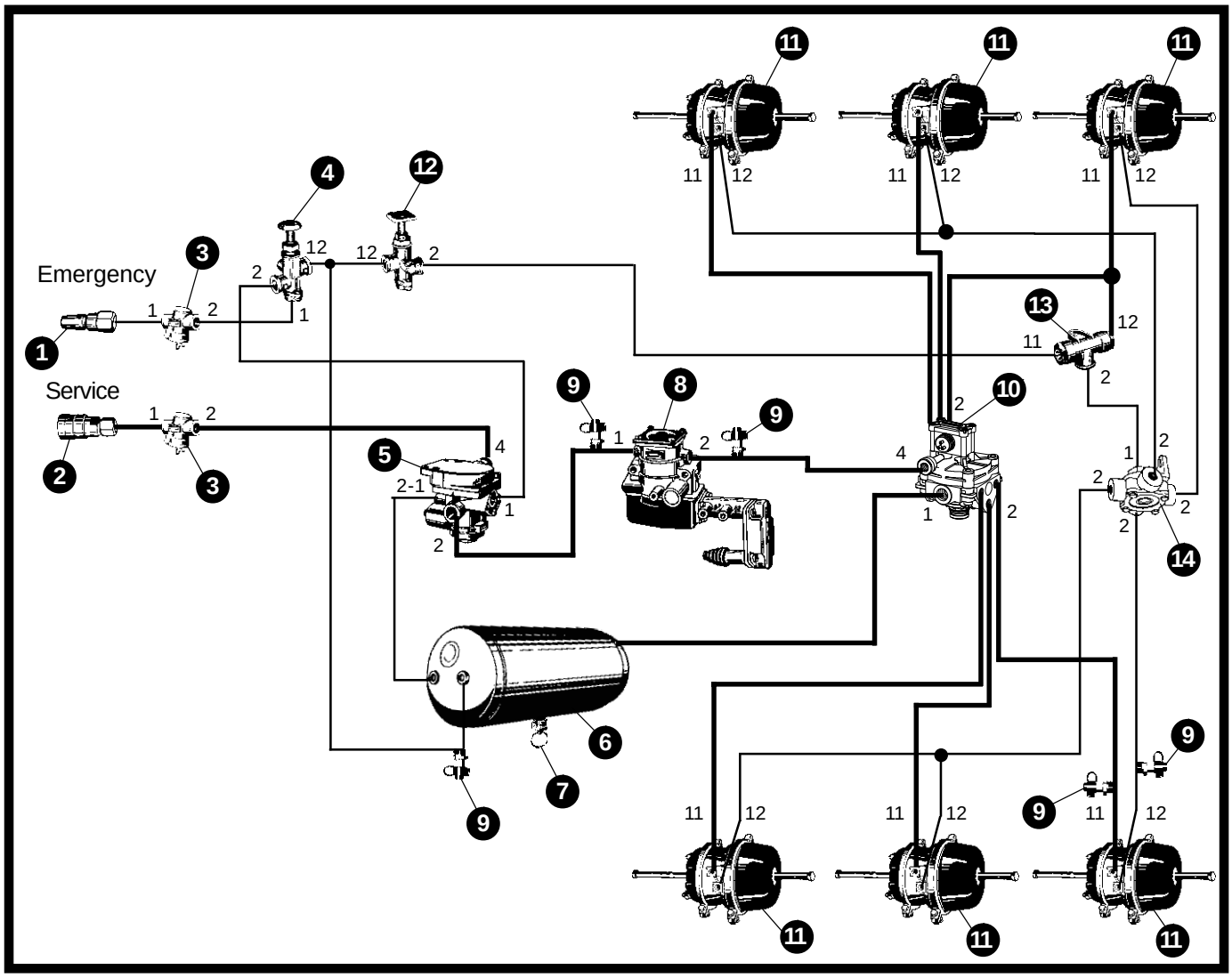


Fig 97

Item	Description
1	Emergency Coupling
2	Service Coupling
3	Pipe Filter
4	Shunt valve
5	Relay Emergency Valve
6	Air Reservoir (40L/Axle - Spring Brake Chamber)
7	Drain valve
8	Load Sensing valve - pneumatic
9	Test point
10	ABS Modulator
11	Spring Brake Chamber
12	Park Valve
13	Double Check Valve
14	Quick Release Valve

PIPING LAYOUT

MODULAR 1UPGRADE

3 axle Semi-Trailer - 2 line air brake system - Spring Brake Chambers - (Air Suspension)

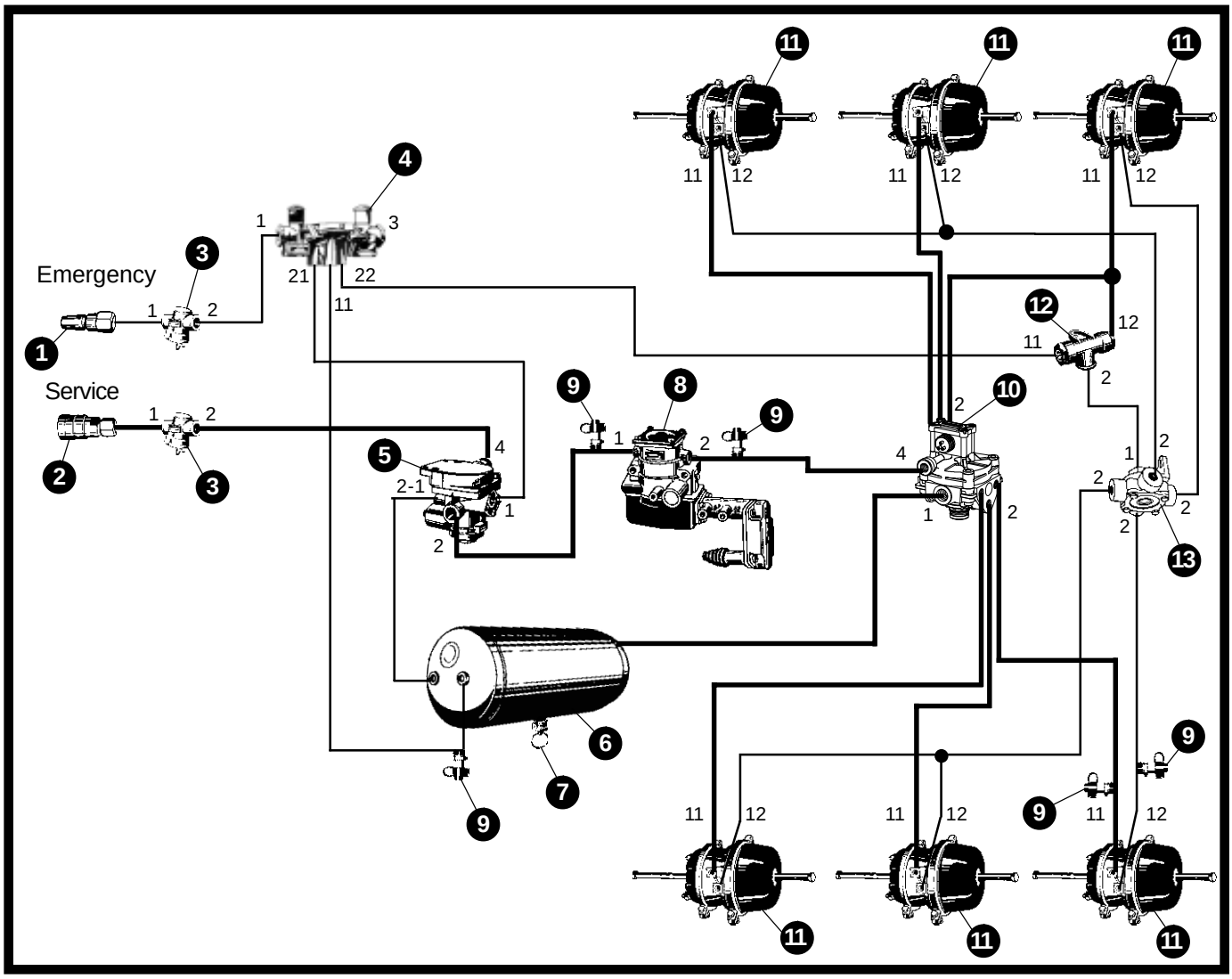
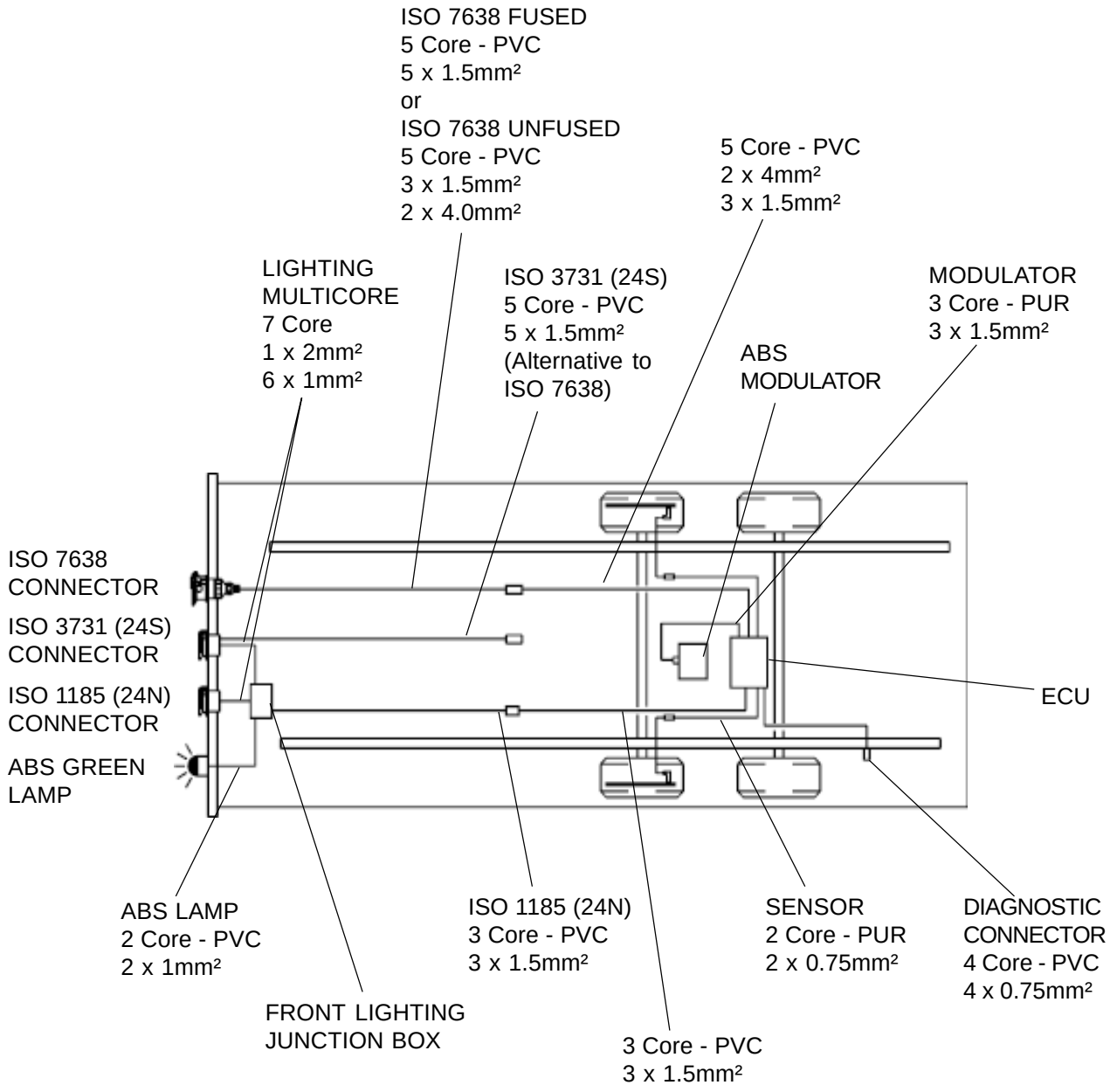


Fig 98

Item	Description
1	Emergency Coupling
2	Service Coupling
3	Pipe Filter
4	Combined Park and Shunt valve
5	Relay Emergency Valve
6	Air Reservoir (40L/Axle - Spring Brake Chamber)
7	Drain valve
8	Load Sensing valve - pneumatic
9	Test point
10	ABS Modulator
11	Spring Brake Chamber
12	Double Check Valve
13	Quick Release Valve

WIRING SCHEMATIC - MODULAR 1 UPGRADE



Maximum length of cable between ISO 1185 (24N) connector (or alternative wiring for ISO 3731 (24S)) and front junction box to be 1m.

Fig 99

WIRING DIAGRAM - **MODULAR 1 UPGRADE 2S/1M** with ISO 7638 (Fused) and ISO 1185 (24N) Power Supply

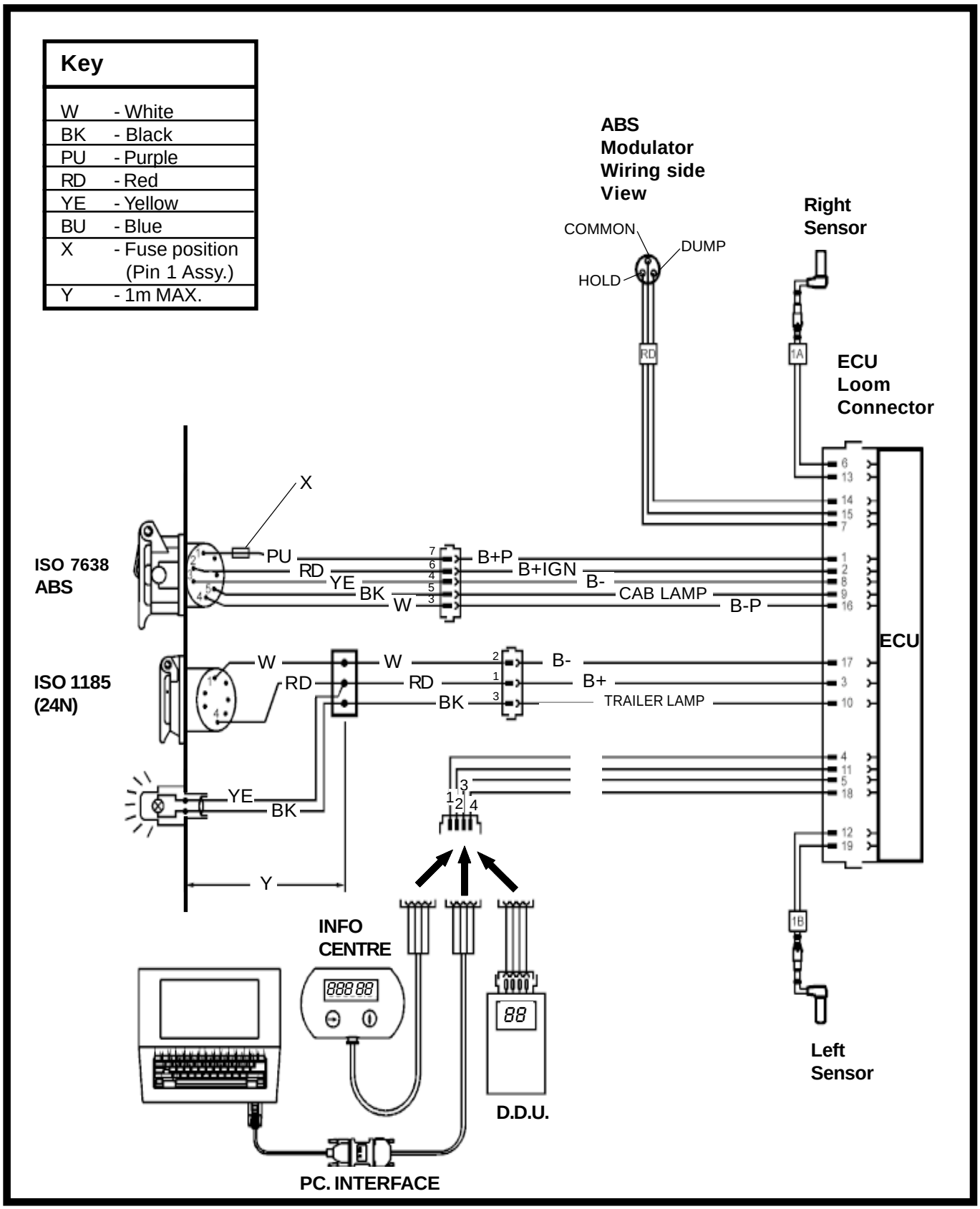


Fig 100

WIRING DIAGRAM - **MODULAR 1 UPGRADE 2S/1M** with ISO 7638 (UnFused) and ISO 1185 (24N) Power Supply

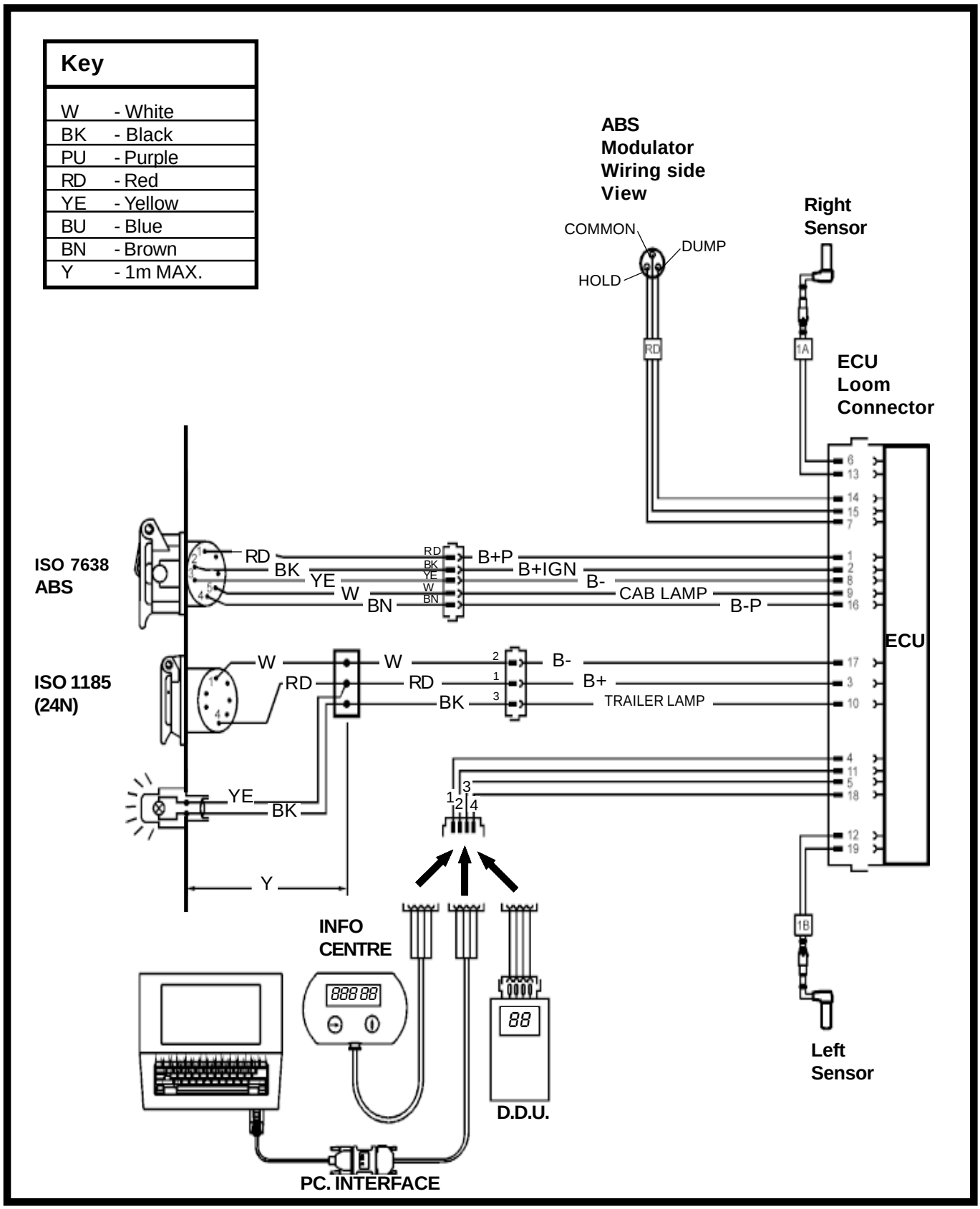


Fig 101

WIRING DIAGRAM

MODULAR 1 UPGRADE 2S/1M

ISO3731 (24S) and ISO 1185 (24N)

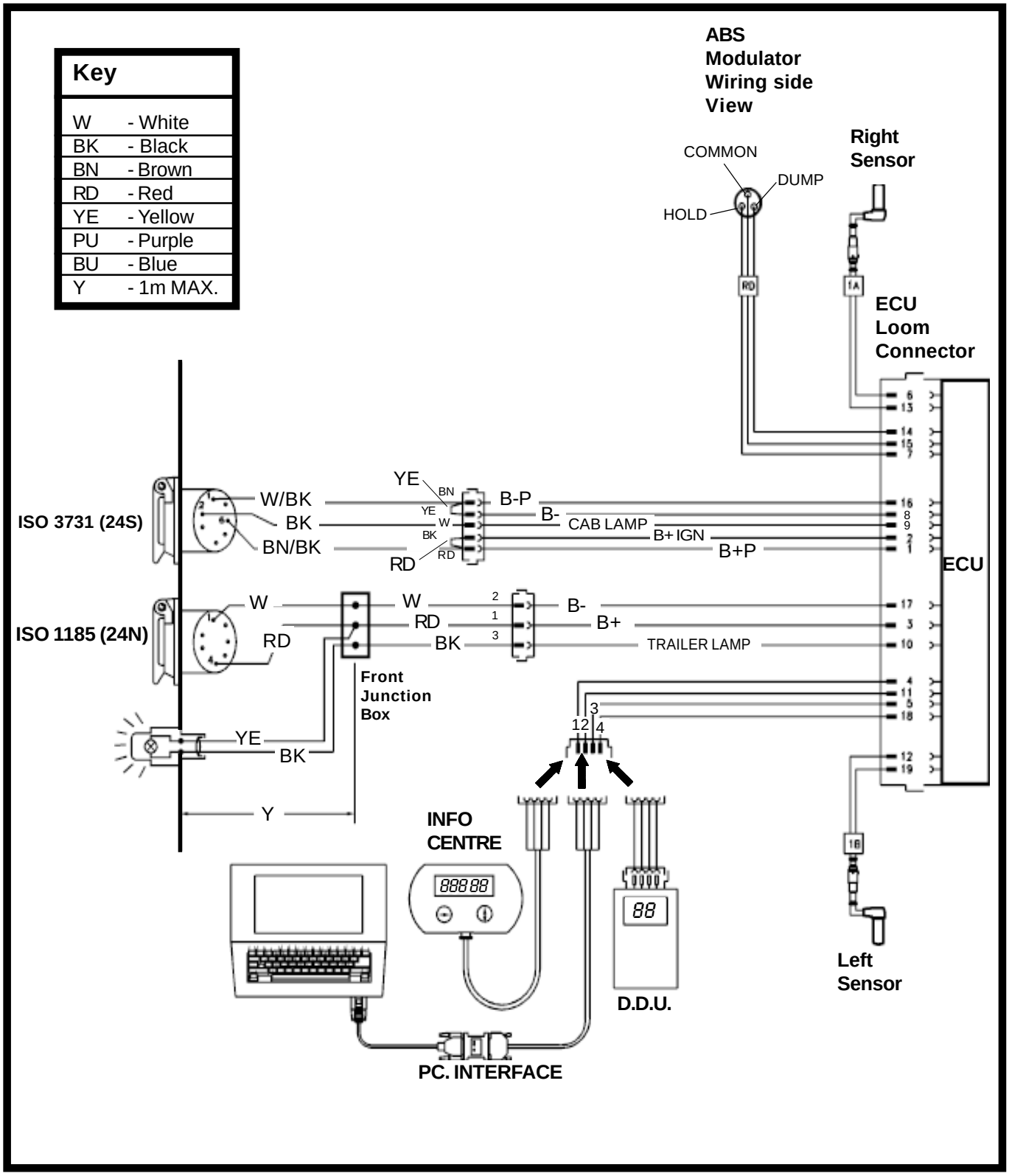
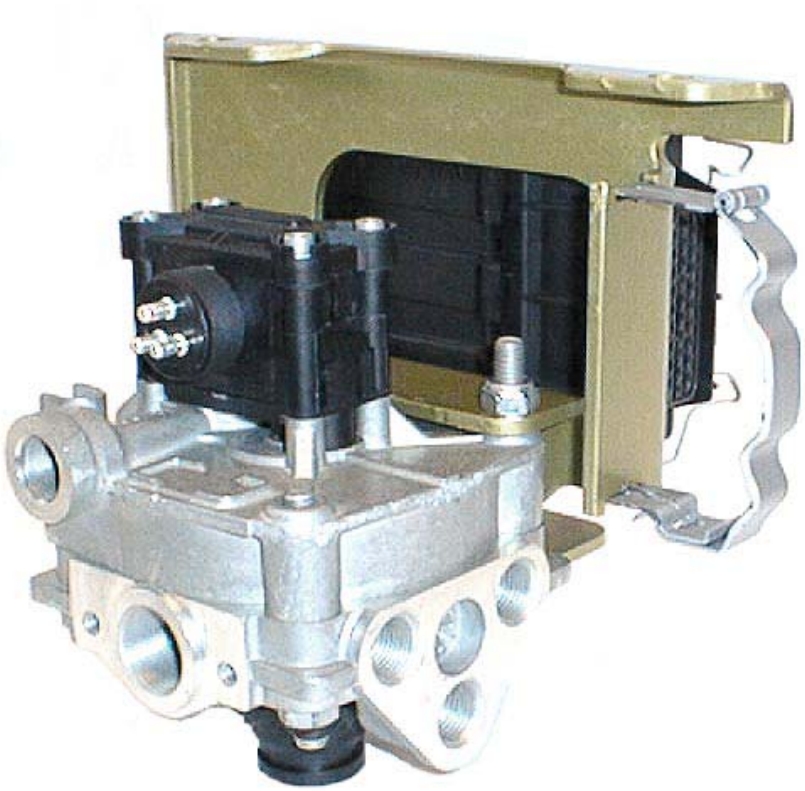


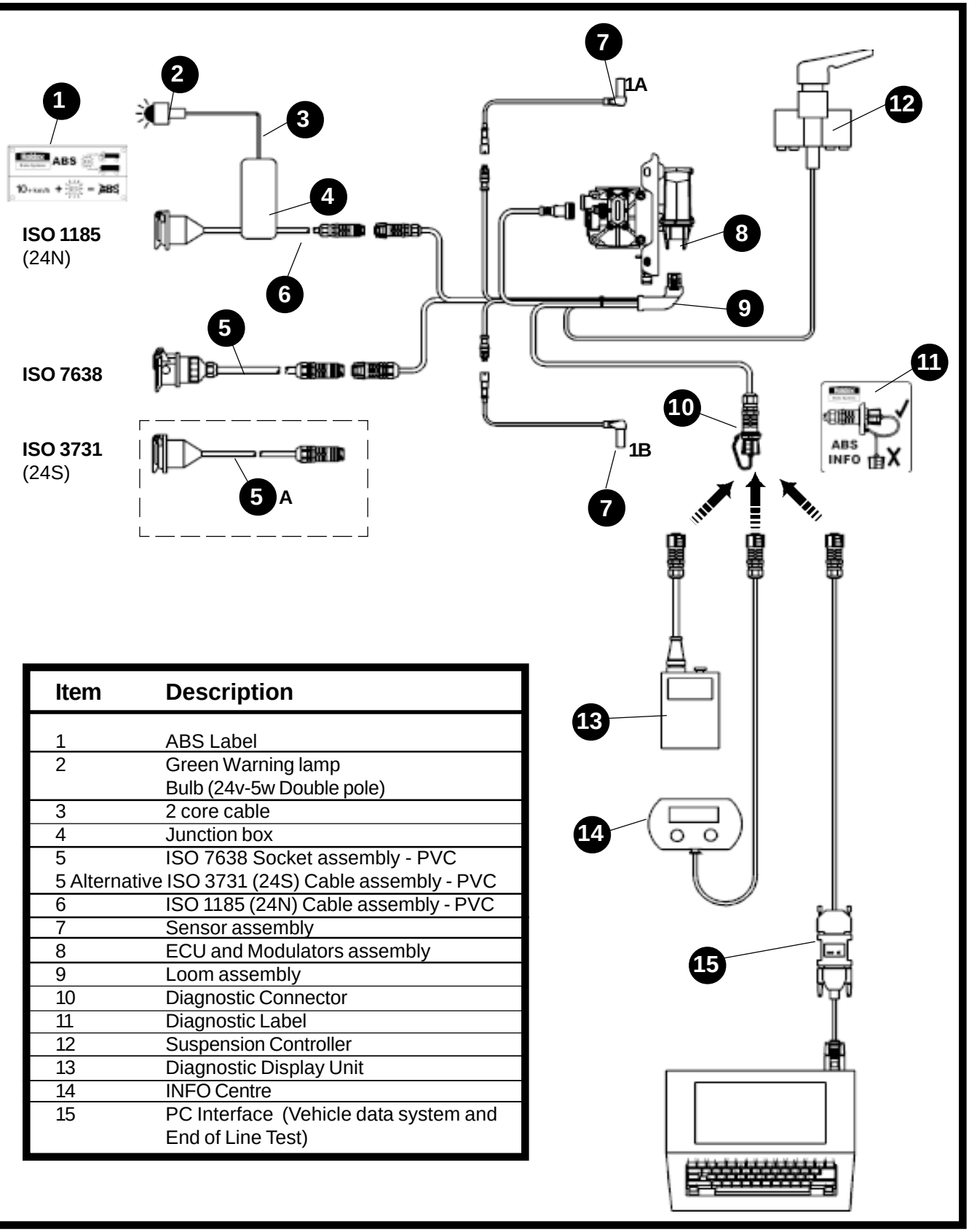
Fig 102

SECTION 3

MODULAR 1 PLUS
2S/1M ABS



MODULAR 1 PLUS - ABS CHASSIS COMPONENTS 2S/1M



Item	Description
1	ABS Label
2	Green Warning lamp Bulb (24v-5w Double pole)
3	2 core cable
4	Junction box
5	ISO 7638 Socket assembly - PVC
5 Alternative	ISO 3731 (24S) Cable assembly - PVC
6	ISO 1185 (24N) Cable assembly - PVC
7	Sensor assembly
8	ECU and Modulators assembly
9	Loom assembly
10	Diagnostic Connector
11	Diagnostic Label
12	Suspension Controller
13	Diagnostic Display Unit
14	INFO Centre
15	PC Interface (Vehicle data system and End of Line Test)

Fig 103

MODULAR 1 PLUS INTEGRATED ASSEMBLY

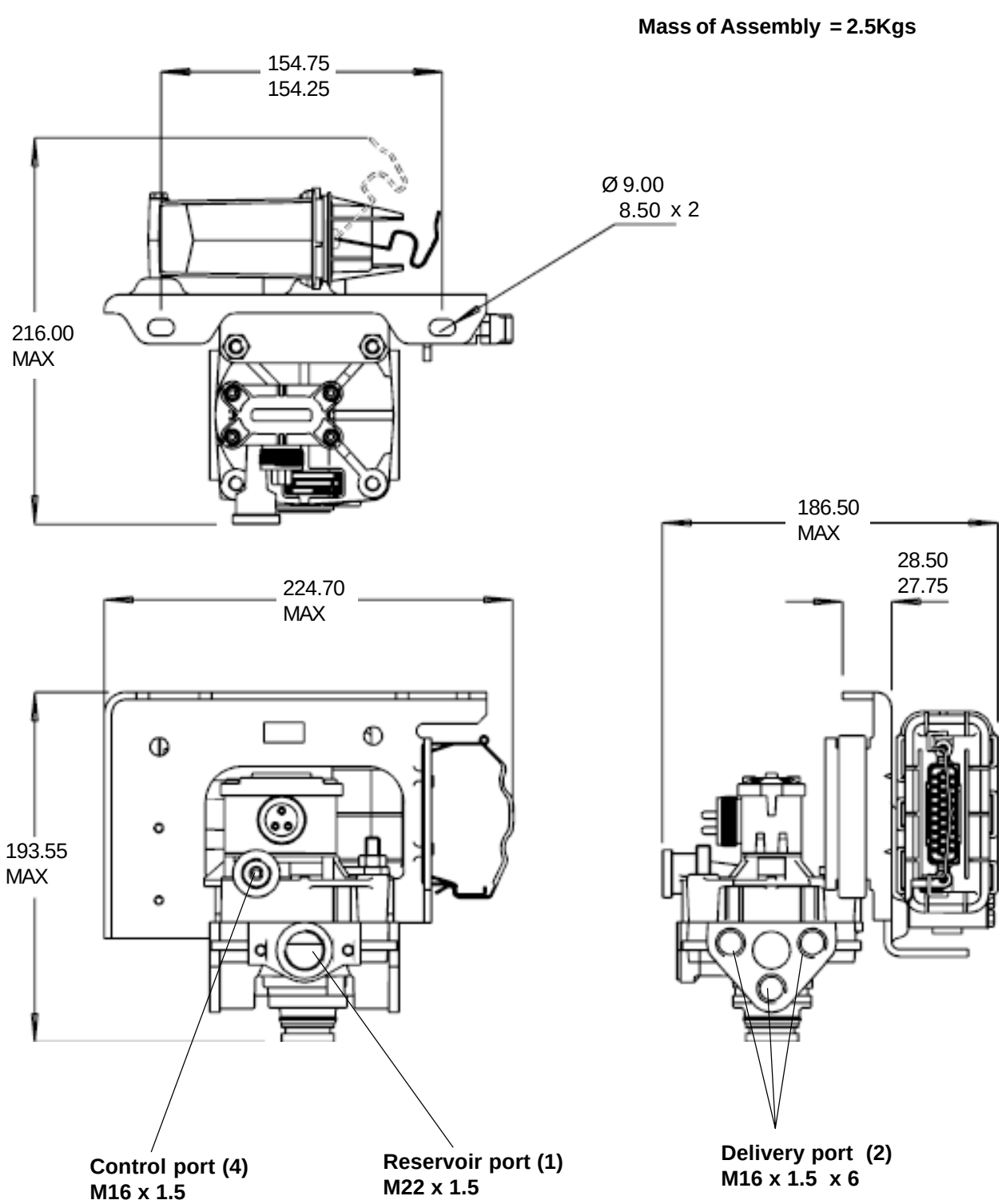


Fig 104

PIPE RECOMMENDATIONS Applicable to MODULAR 1 PLUS

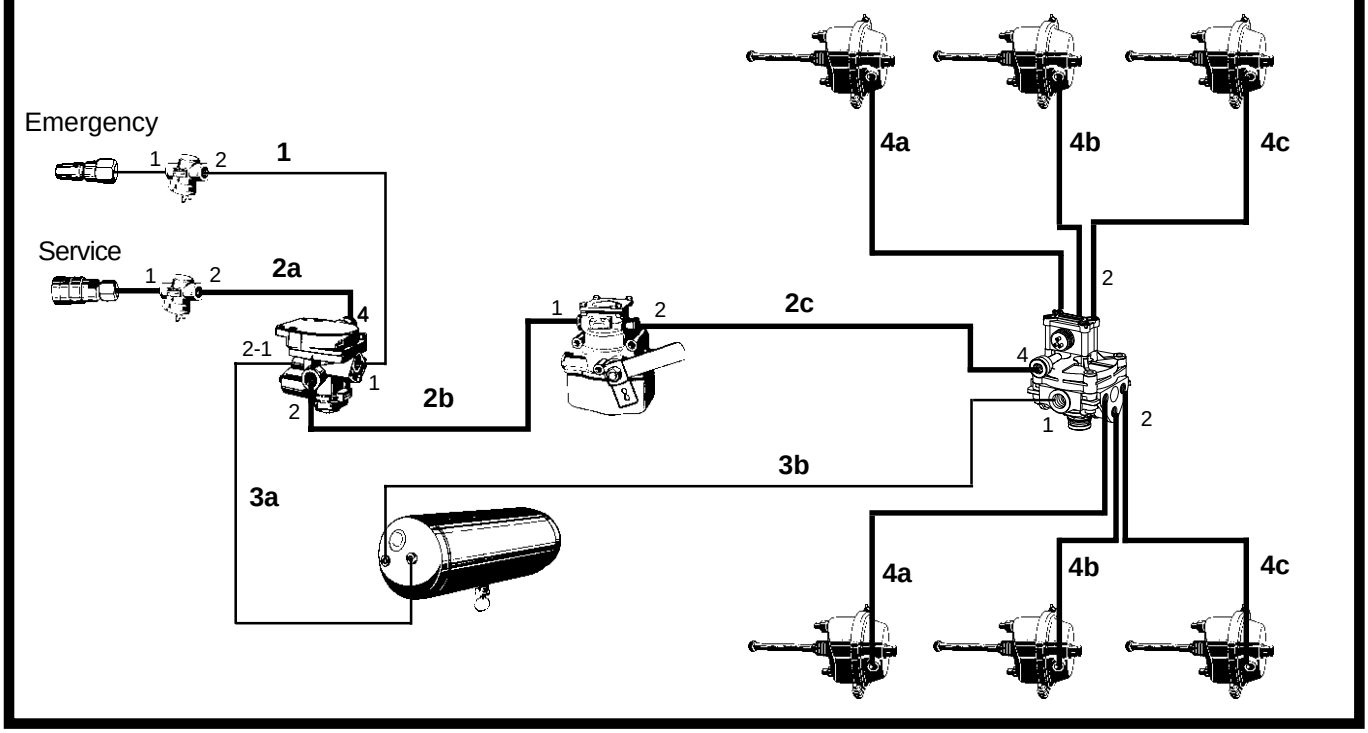


Fig 105

Item	Description	Material	Size	Remark
1	Emergency pipe	Nylon	8 X 1 10 X 1 / 1.25 12 X 1.5	
2a	Service pipe	Nylon	8 X 1 Pref 10 x 1 Alt 10 x 1.25 Alt	2a To be 1/3 of total trailer length
2b	Service pipe	Nylon	12 x 1.5 Pref 10 x 1 Alt 10 x 1.25 Alt	2b to be one size greater than 2a and 2c
2c	Service pipe	Nylon	8 x 1 Pref 10 x 1 Alt 10 x 1.25	
3a	Reservoir pipe	Nylon	12 x 1.5 Pref 15 x 1.5 Alt	
3b		Nylon	15 x 1.5 18 x 2	Short as possible 1.0m Max. Short as possible 4.0m Max.
4a 4b 4c	Brake delivery pipe	Nylon or Rubber hose I.D.	12 x 1.5 or 11.0 I.D. 13.0	4a and 4c to be similar in length, 4b to be as short as possible.

Pref = Preferred Alt = Alternative All pipe and rubber hose to comply to recognised international standards. Nylon pipe to DIN 73378, Rubber hose to SAE 1402. The above pipe sizes are defined as guide lines only.
Actual sizes need to be opitomised for a given trailer to meet system response time requirements.

PIPING LAYOUT

MODULAR 1 PLUS
3 axle Semi-Trailer - 2 line air brake system - S/D Brake Chambers

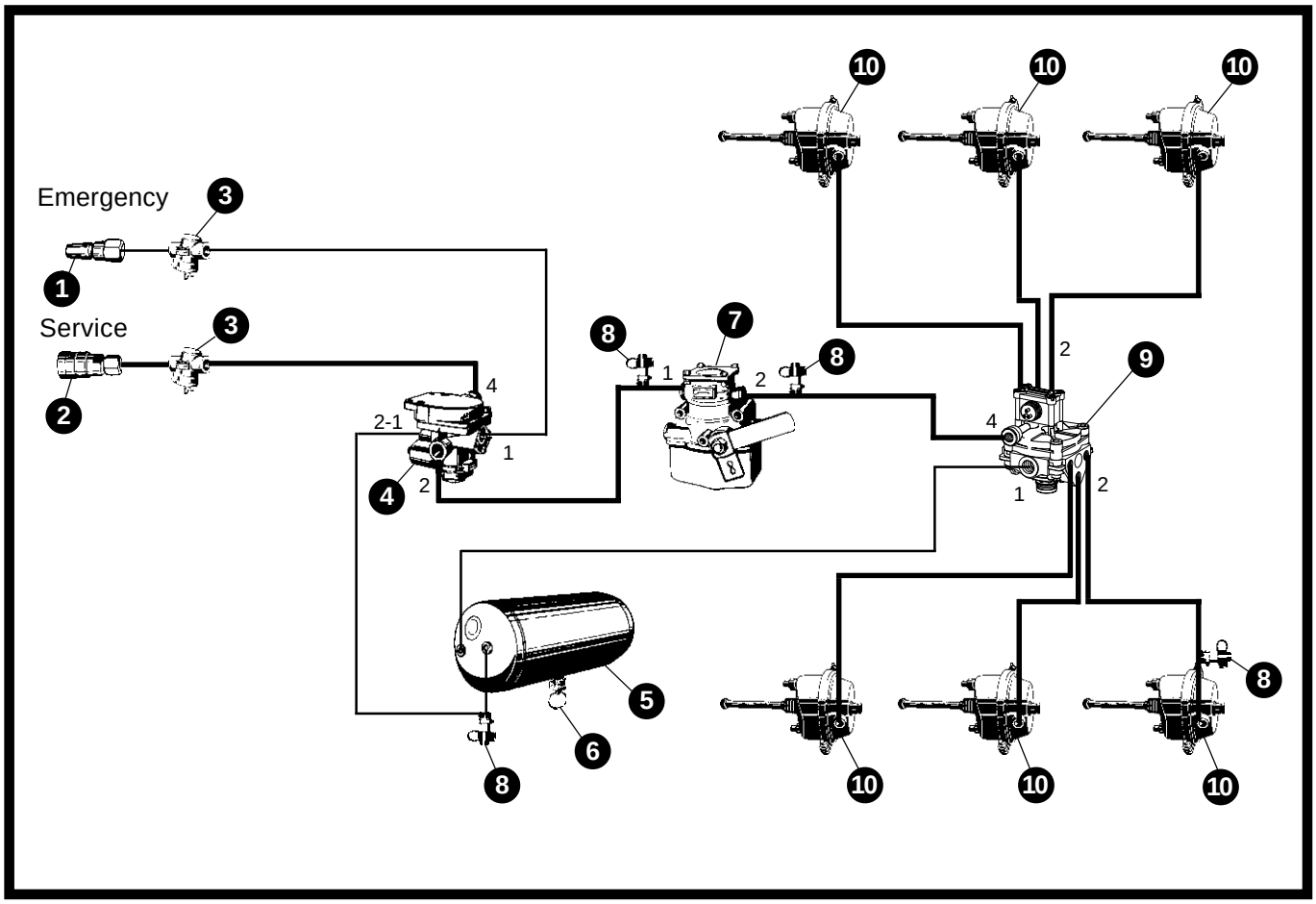


Fig 106

Item	Description
1	Emergency Coupling
2	Service Coupling
3	Pipe Filter
4	Relay Emergency Valve
5	Air Reservoir (30L/Axle - Single Diaphgram B.C.)
6	Drain valve
7	Load Sensing valve - mechanical
8	Test point
9	ABS Modulator
10	Brake Chamber

PIPING LAYOUT

MODULAR 1 PLUS

3 axle Semi-Trailer - 2 line air brake system - Spring Brake Chambers - (Air Suspension)

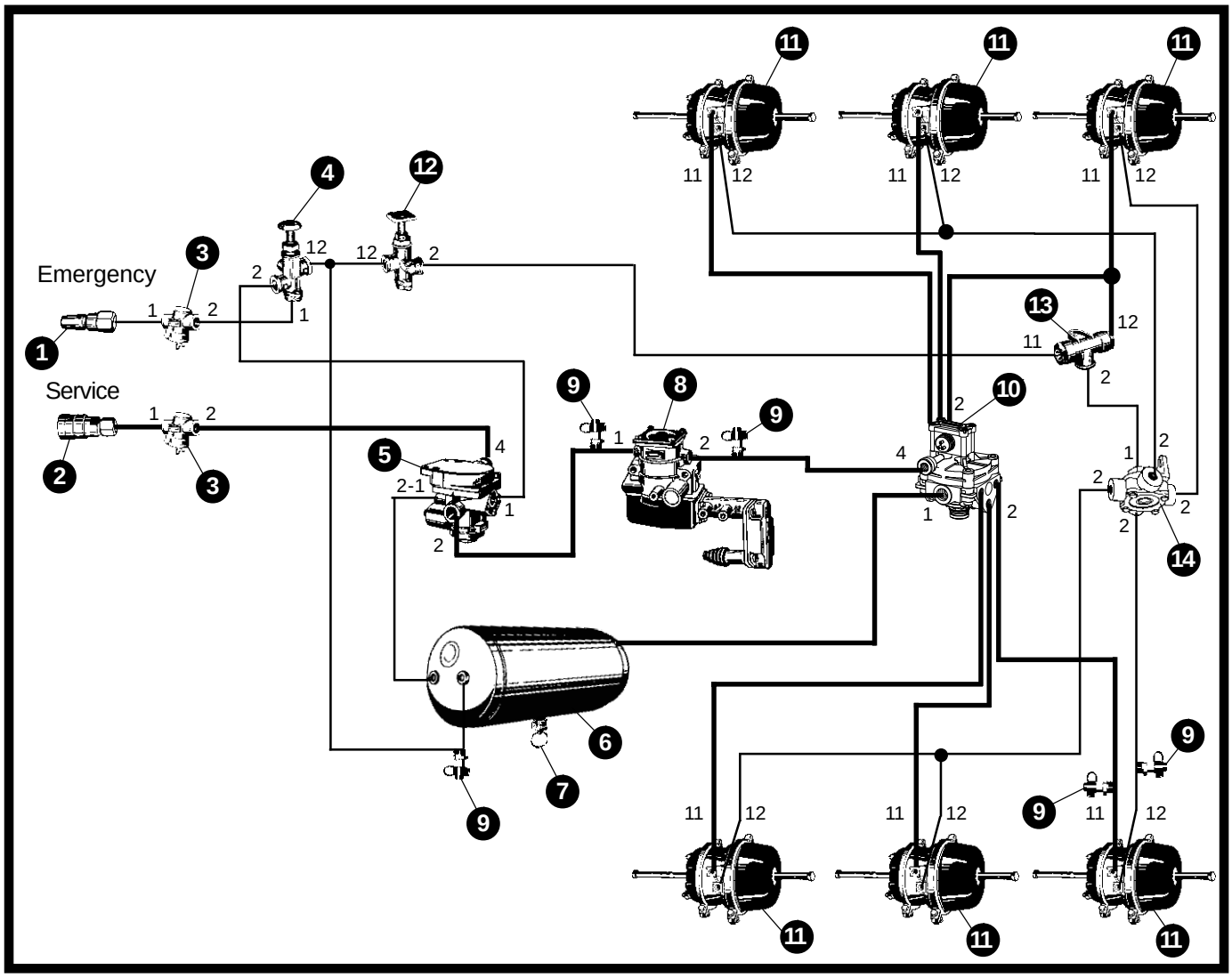


Fig 107

Item	Description
1	Emergency Coupling
2	Service Coupling
3	Pipe Filter
4	Shunt valve
5	Relay Emergency Valve
6	Air Reservoir (40L/Axle - Spring Brake Chamber)
7	Drain valve
8	Load Sensing valve - pneumatic
9	Test point
10	ABS Modulator
11	Spring Brake Chamber
12	Park Valve
13	Double Check Valve
14	Quick Release Valve

PIPING LAYOUT

MODULAR 1 PLUS

3 axle Semi-Trailer - 2 line air brake system - Spring Brake Chambers - (Air Suspension)

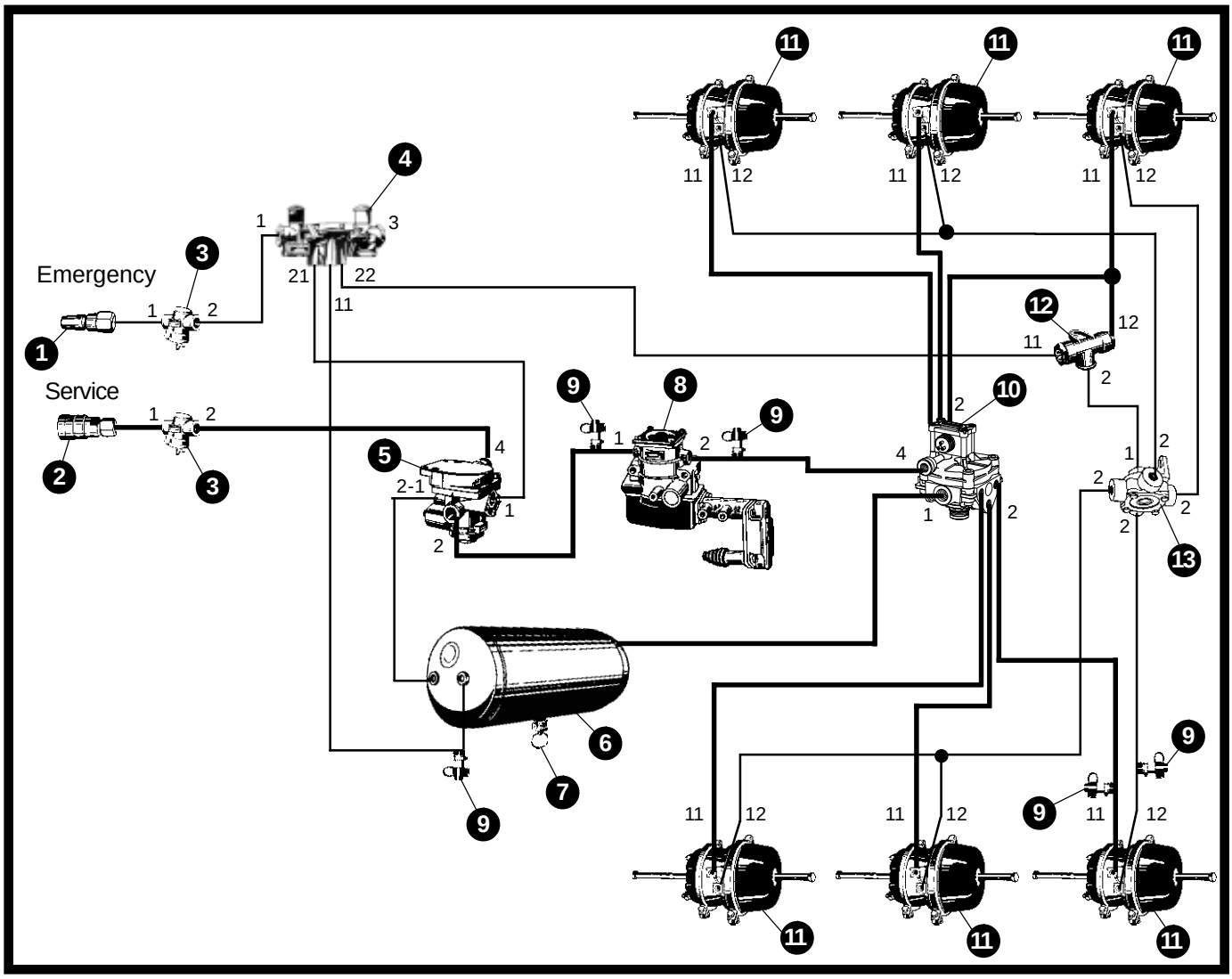
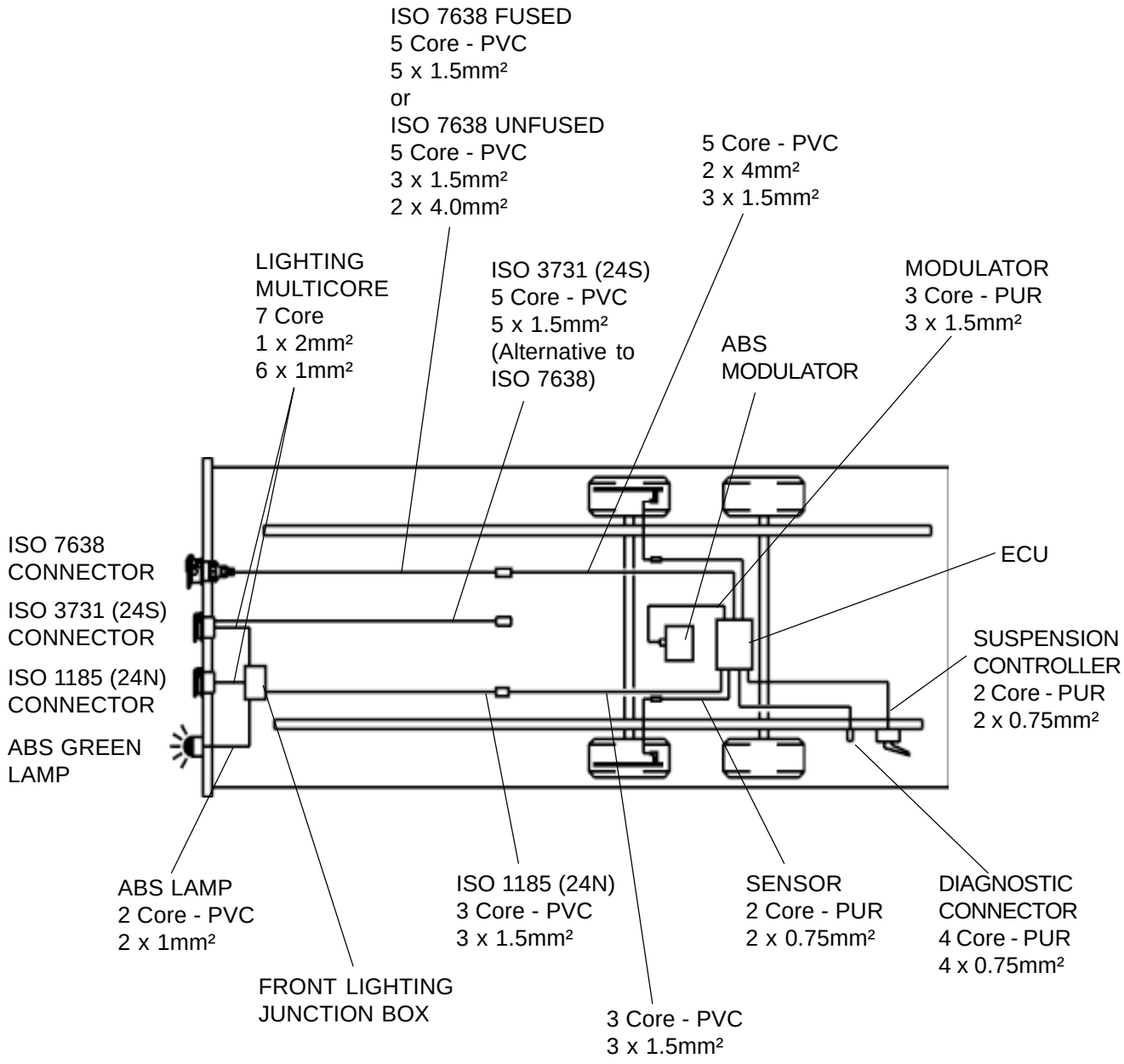


Fig 108

Item	Description
1	Emergency Coupling
2	Service Coupling
3	Pipe Filter
4	Combined Park and Shunt valve
5	Relay Emergency Valve
6	Air Reservoir (40L/Axle - Spring Brake Chamber)
7	Drain valve
8	Load Sensing valve - pneumatic
9	Test point
10	ABS Modulator
11	Spring Brake Chamber
12	Double Check Valve
13	Quick Release Valve

WIRING SCHEMATIC - MODULAR 1 PLUS



Maximum length of cable between ISO 1185 (24N) connector (or alternative wiring for ISO 3731 (24S)) and front junction box to be 1m.

Fig 109

WIRING DIAGRAM - **MODULAR 1 PLUS 2S/1M** with ISO 7638 (Fused) and ISO 1185 (24N) Power Supply

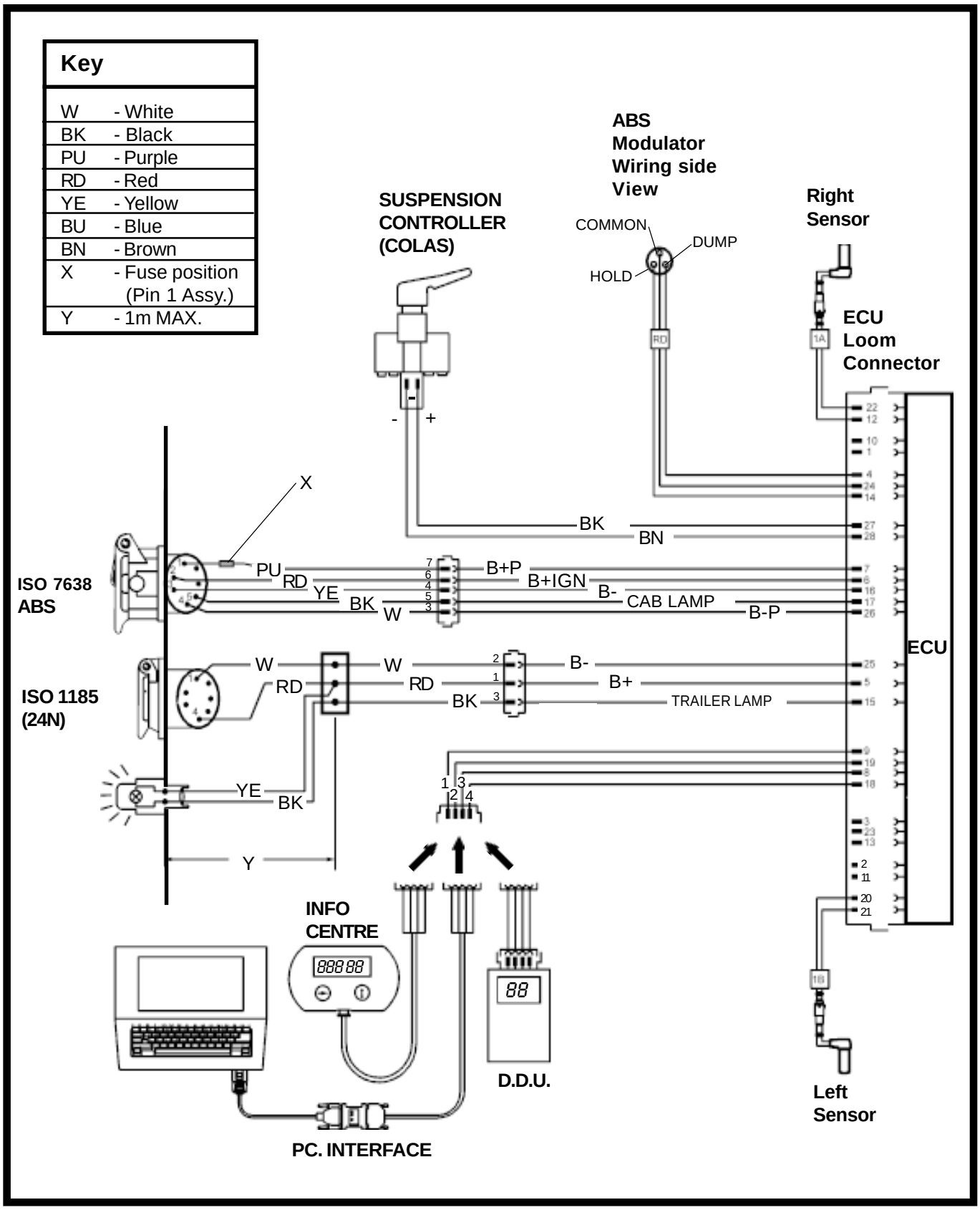


Fig 110

WIRING DIAGRAM - **MODULAR 1 PLUS 2S/1M** with ISO 7638 (UnFused) and ISO 1185 (24N) Power Supply

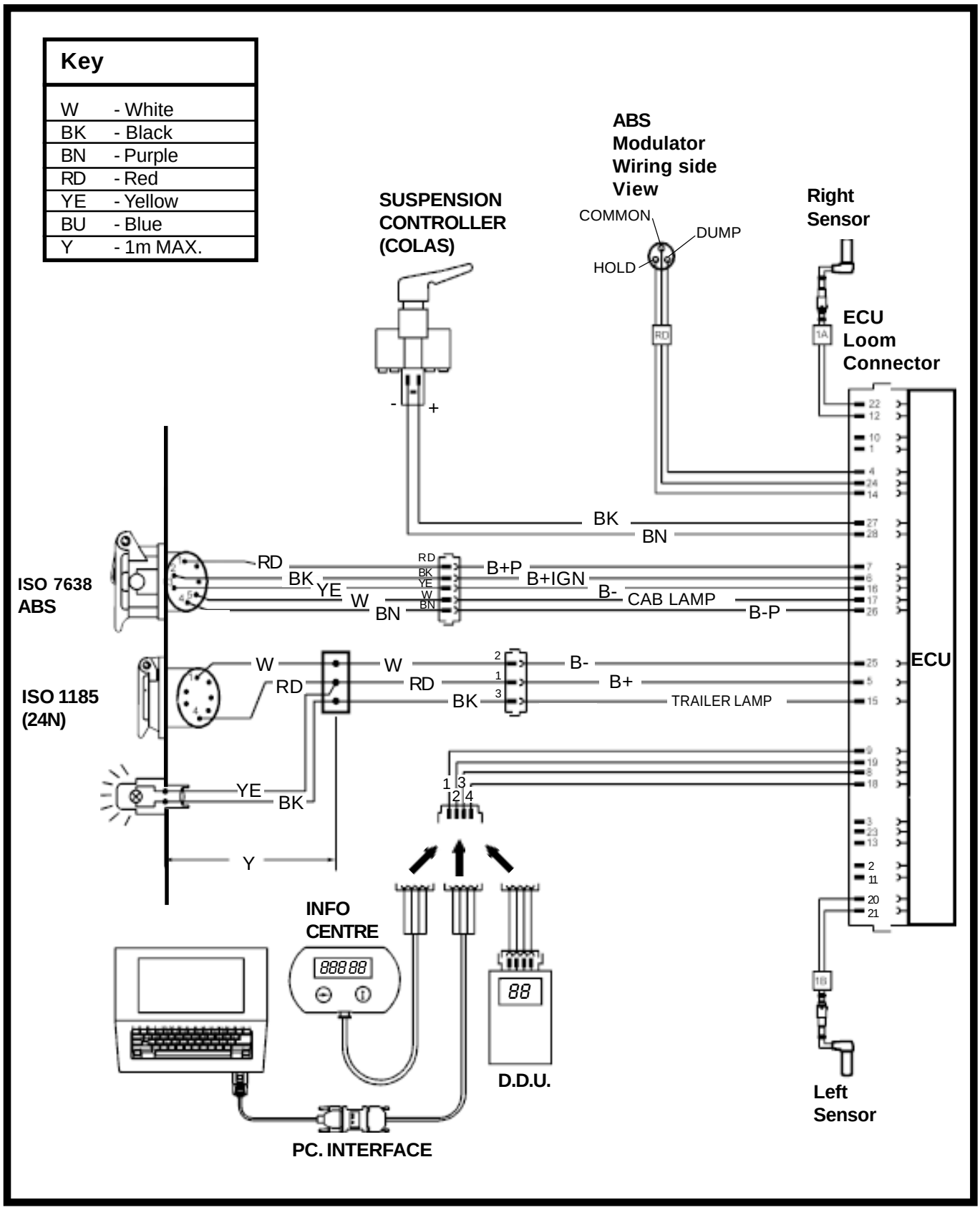


Fig 111

WIRING DIAGRAM - **MODULAR 1 PLUS 2S/1M** with ISO 3731 (24S) and ISO 1185 (24N) Power Supply

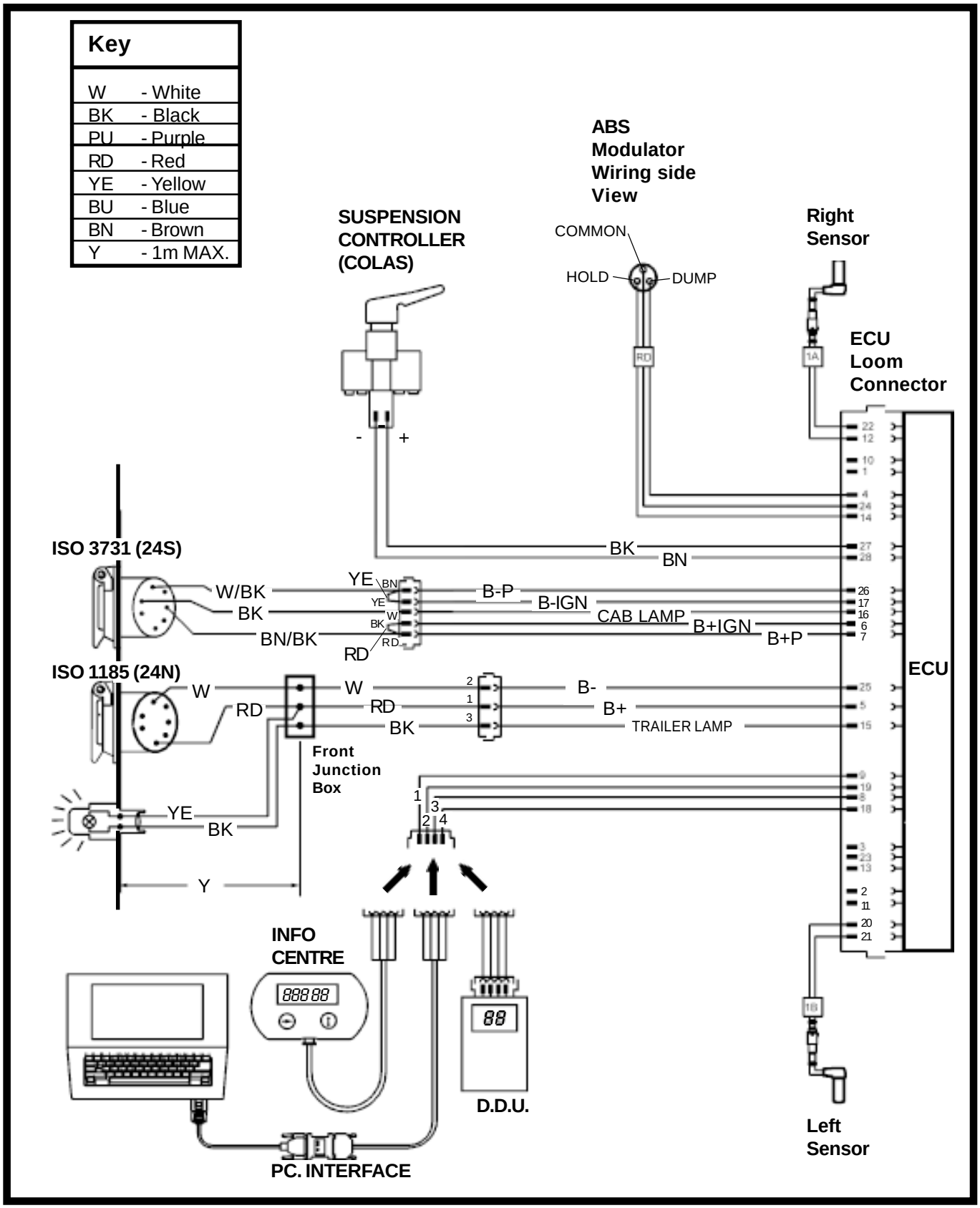
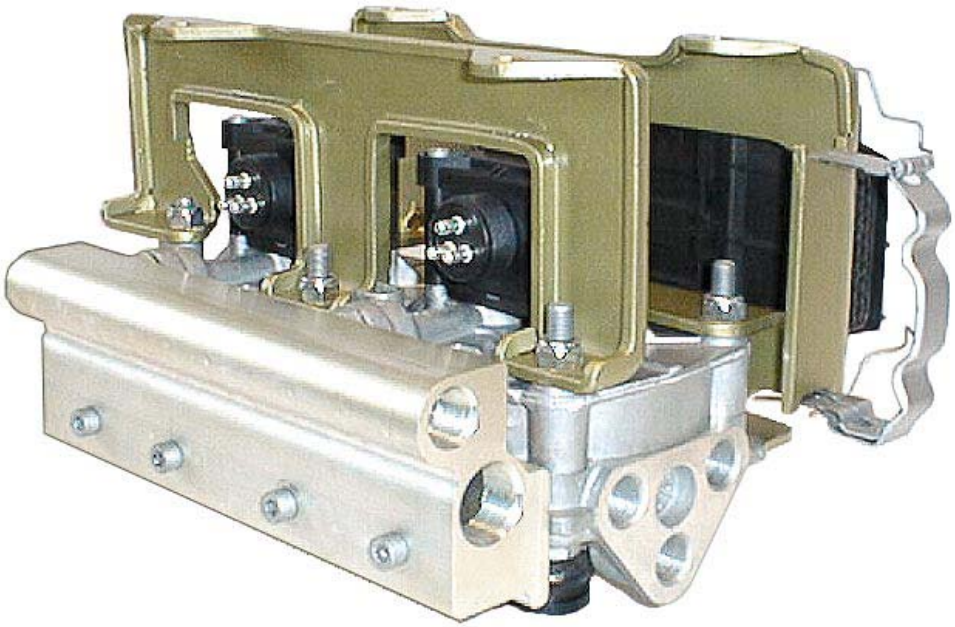


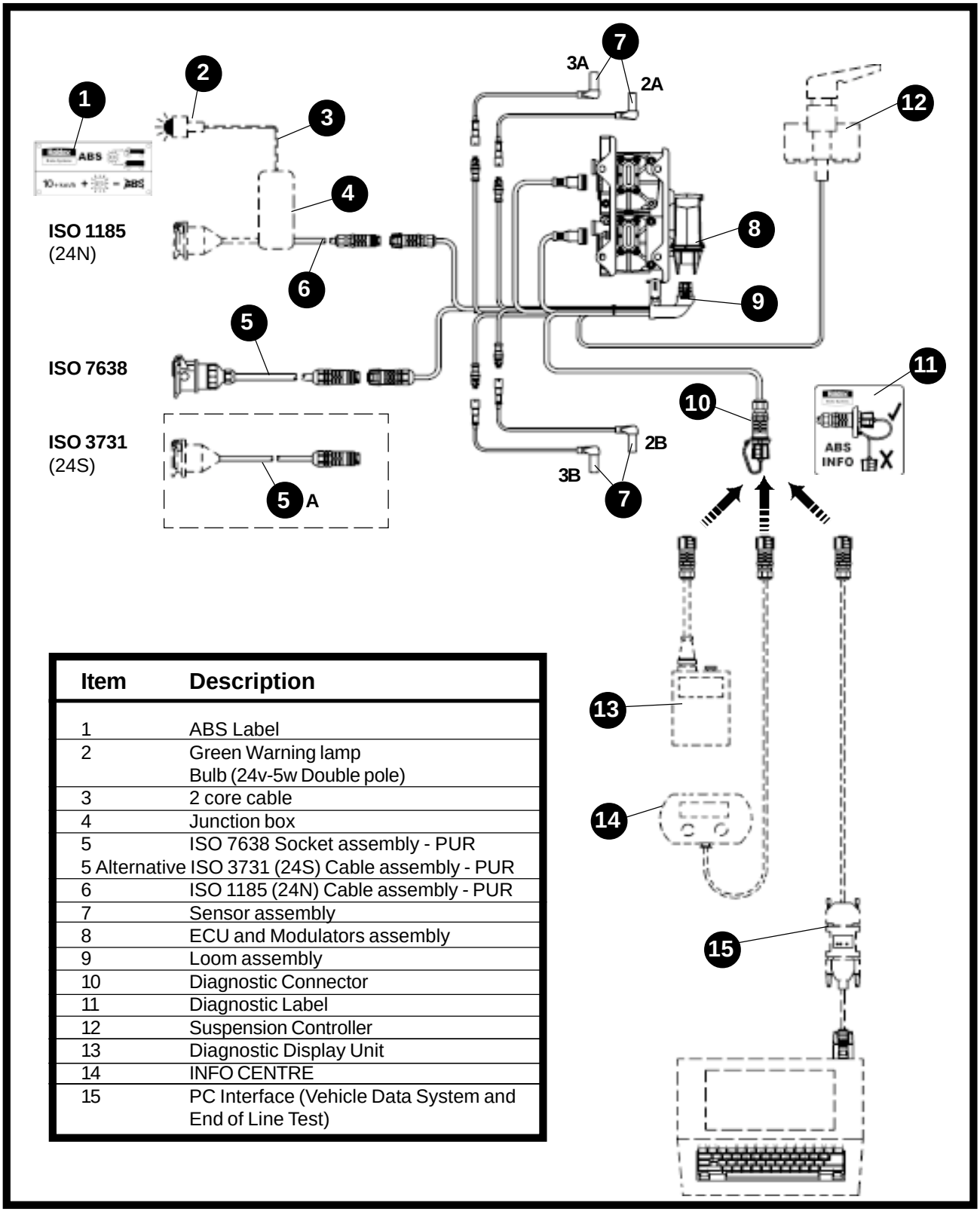
Fig 112

SECTION 4

MODULAR 2
2S/2M - 4S/2M ABS



MODULAR 2 - ABS CHASSIS COMPONENTS 2S/2M - (4S/2M As Shown)



Item	Description
1	ABS Label
2	Green Warning lamp Bulb (24v-5w Double pole)
3	2 core cable
4	Junction box
5	ISO 7638 Socket assembly - PUR
5 Alternative	ISO 3731 (24S) Cable assembly - PUR
6	ISO 1185 (24N) Cable assembly - PUR
7	Sensor assembly
8	ECU and Modulators assembly
9	Loom assembly
10	Diagnostic Connector
11	Diagnostic Label
12	Suspension Controller
13	Diagnostic Display Unit
14	INFO CENTRE
15	PC Interface (Vehicle Data System and End of Line Test)

Fig 112

MODULAR 2 INTEGRATED ASSEMBLY 2S-4S/2M Without Manifold

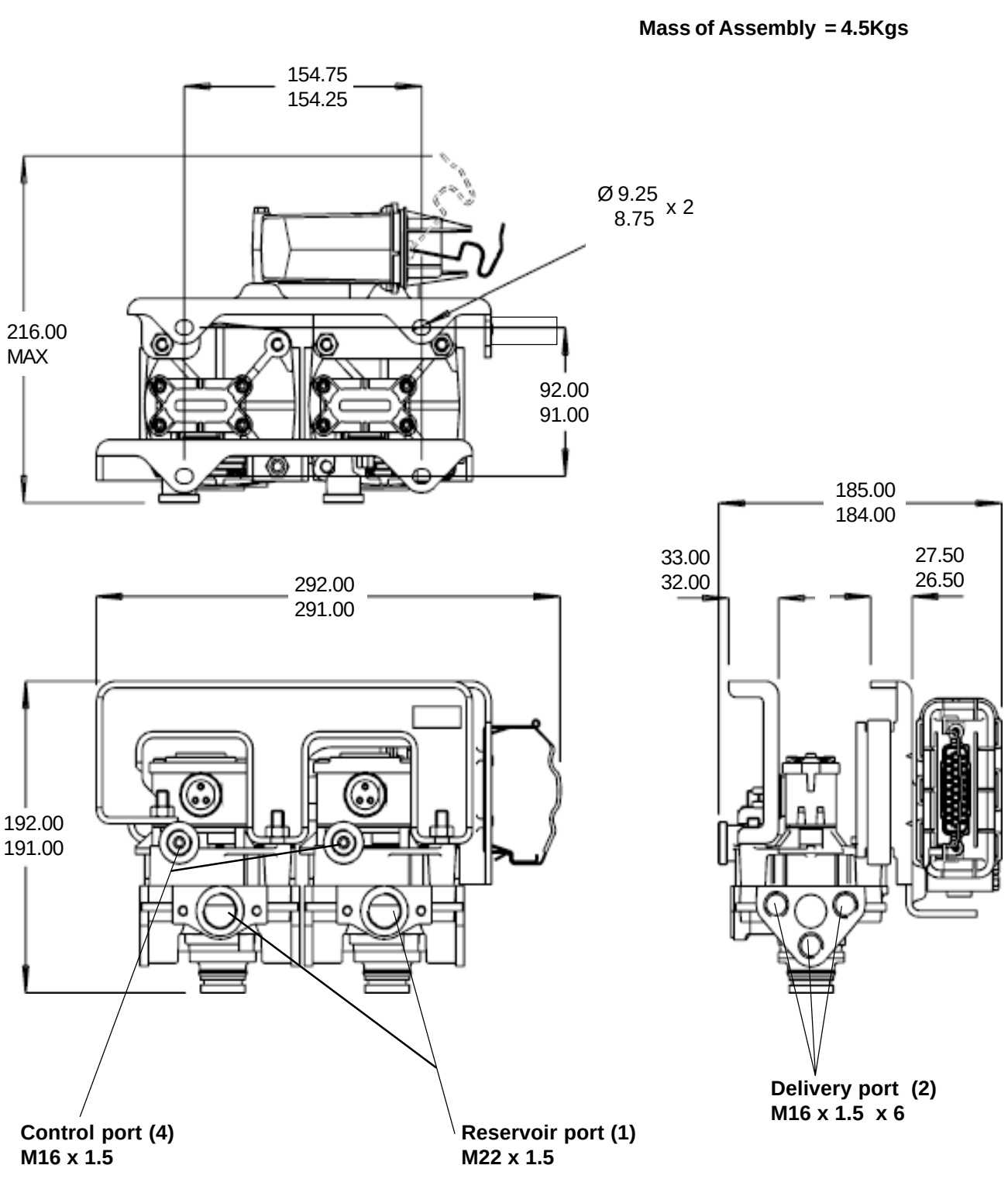


Fig 114

MODULAR 2 INTEGRATED ASSEMBLY 2S-4S/2M With Manifold

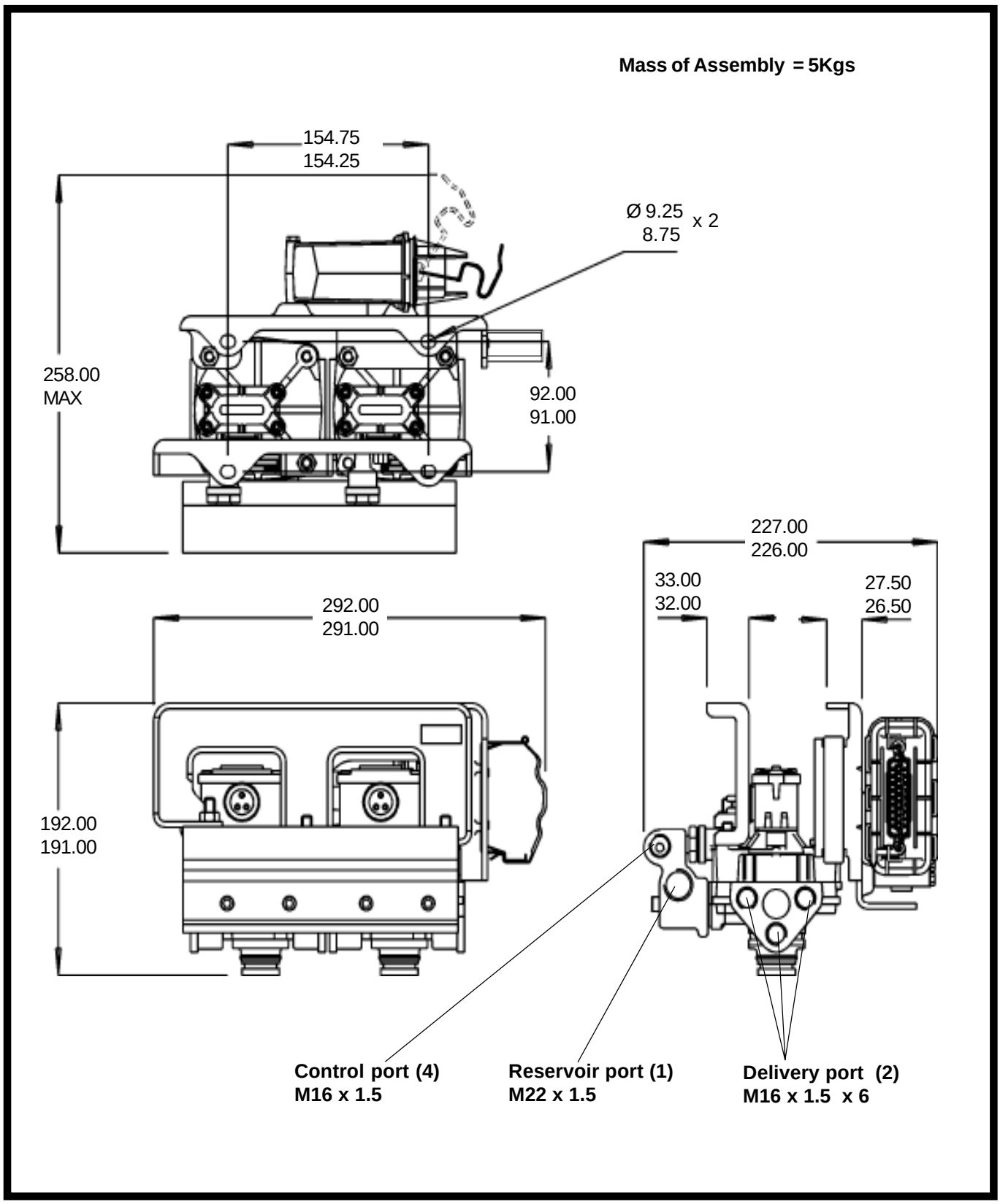


Fig 115

PIPE RECOMMENDATIONS

Applicable to MODULAR 2 without manifold.

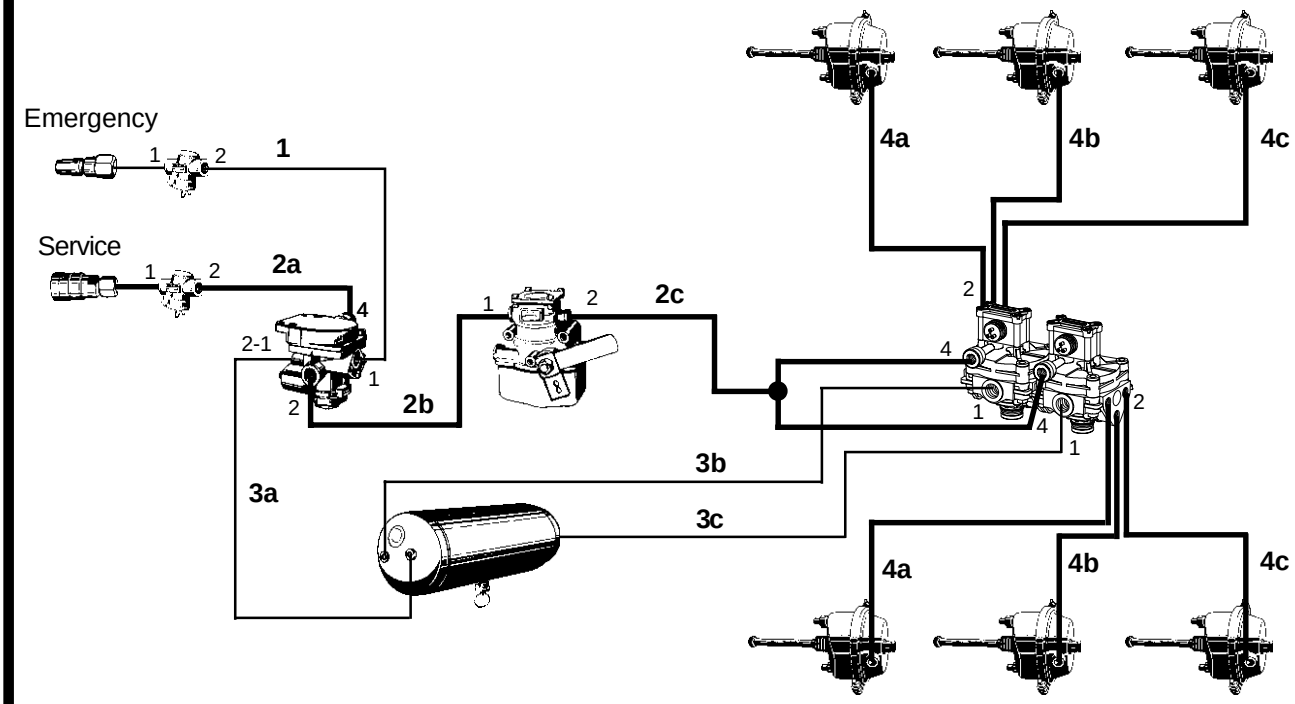


Fig 116

Item	Description	Material	Size	Remark
1	Emergency pipe	Nylon	8 X 1 10 X 1 / 1.25 12 X 1.5	
2a	Service pipe	Nylon	8 X 1 Pref 10 x 1 Alt 10 x 1.25 Alt	2a To be 1/3 of total trailer length
2b	Service pipe	Nylon	12 x 1.5 Pref 10 x 1 Alt 10 x 1.25 Alt	2b to be one size greater than 2a and 2c
2c	Service pipe	Nylon	8 x 1 Pref 10 x 1 Alt 10 x 1.25	
3a	Reservoir pipe	Nylon	12 x 1.5 Pref 15 x 1.5 Alt	
3b and 3c		Nylon	15 x 1.5 18 x 2	Short as possible 1.0m Max. Short as possible 4.0m Max.
4a 4b 4c	Brake delivery pipe	Nylon or Rubber hose I.D.	12 x 1.5 or 11.0 I.D. 13.0	4a and 4c to be similar in length, 4b to be as short as possible.

Pref = Preferred Alt = Alternative All pipe and rubber hose to comply to recognised international standards. Nylon pipe to DIN 73378, Rubber hose to SAE 1402. The above sizes are defined as guide lines only.
Actual sizes need to be optimised for a given trailer to meet response time requirements.

PIPING LAYOUT

MODULAR 2 without Manifold

3 axle Semi-Trailer - 2 line air brake system - Spring Brake Chambers - (Air Suspension)

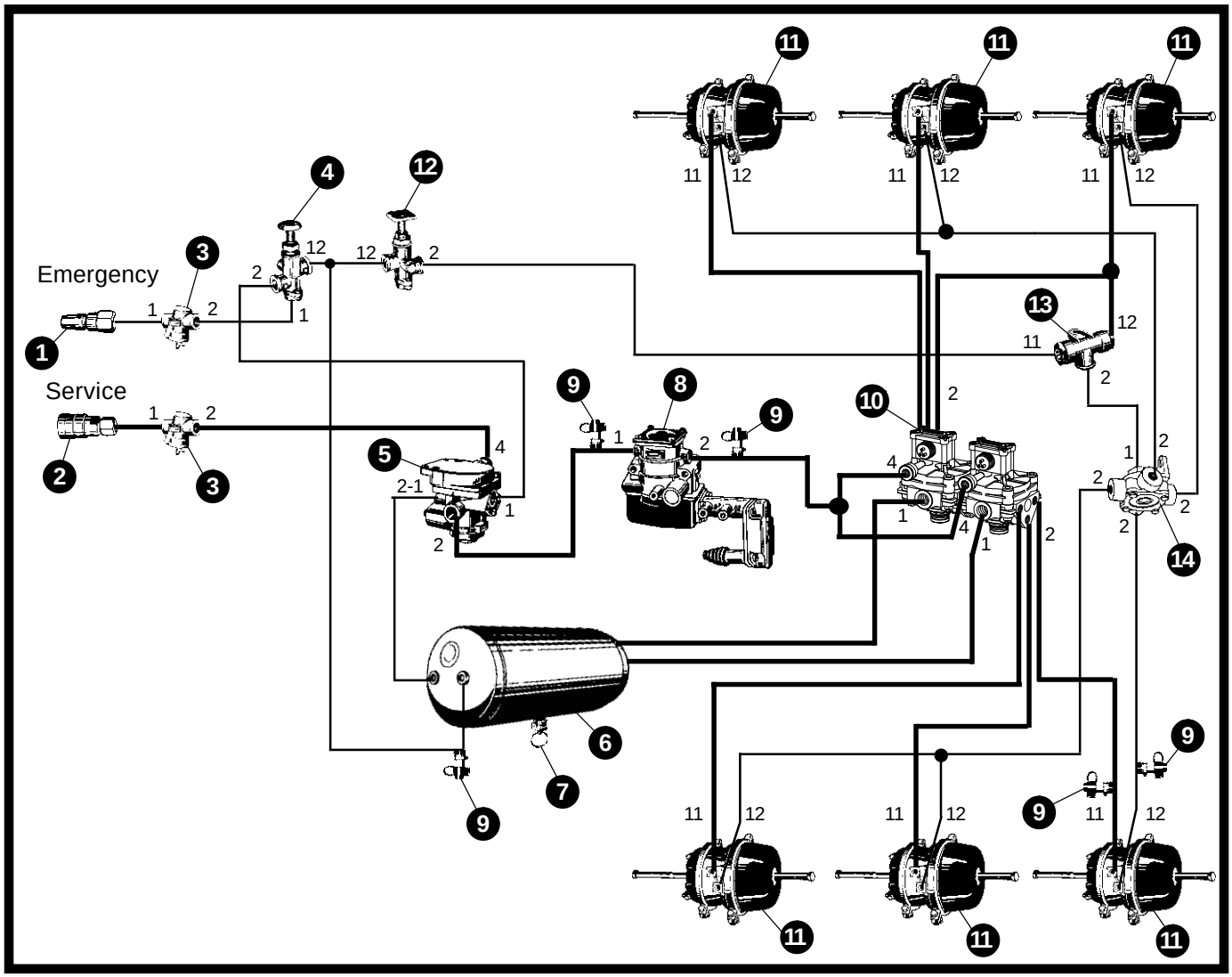


Fig 117

Item	Description
1	Emergency Coupling
2	Service Coupling
3	Pipe Filter
4	Shunt valve
5	Relay Emergency Valve
6	Air Reservoir (40L/Axle - Spring Brake Chamber)
7	Drain valve
8	Load Sensing valve - pneumatic
9	Test point
10	ABS Modulator (w/o Manifold)
11	Spring Brake Chamber
12	Park Valve
13	Double Check Valve
14	Quick Release Valve

PIPING LAYOUT

MODULAR 2 without Manifold
3 axle Semi-Trailer - 2 line air brake system - Spring Brake Chambers - (Air Suspension)

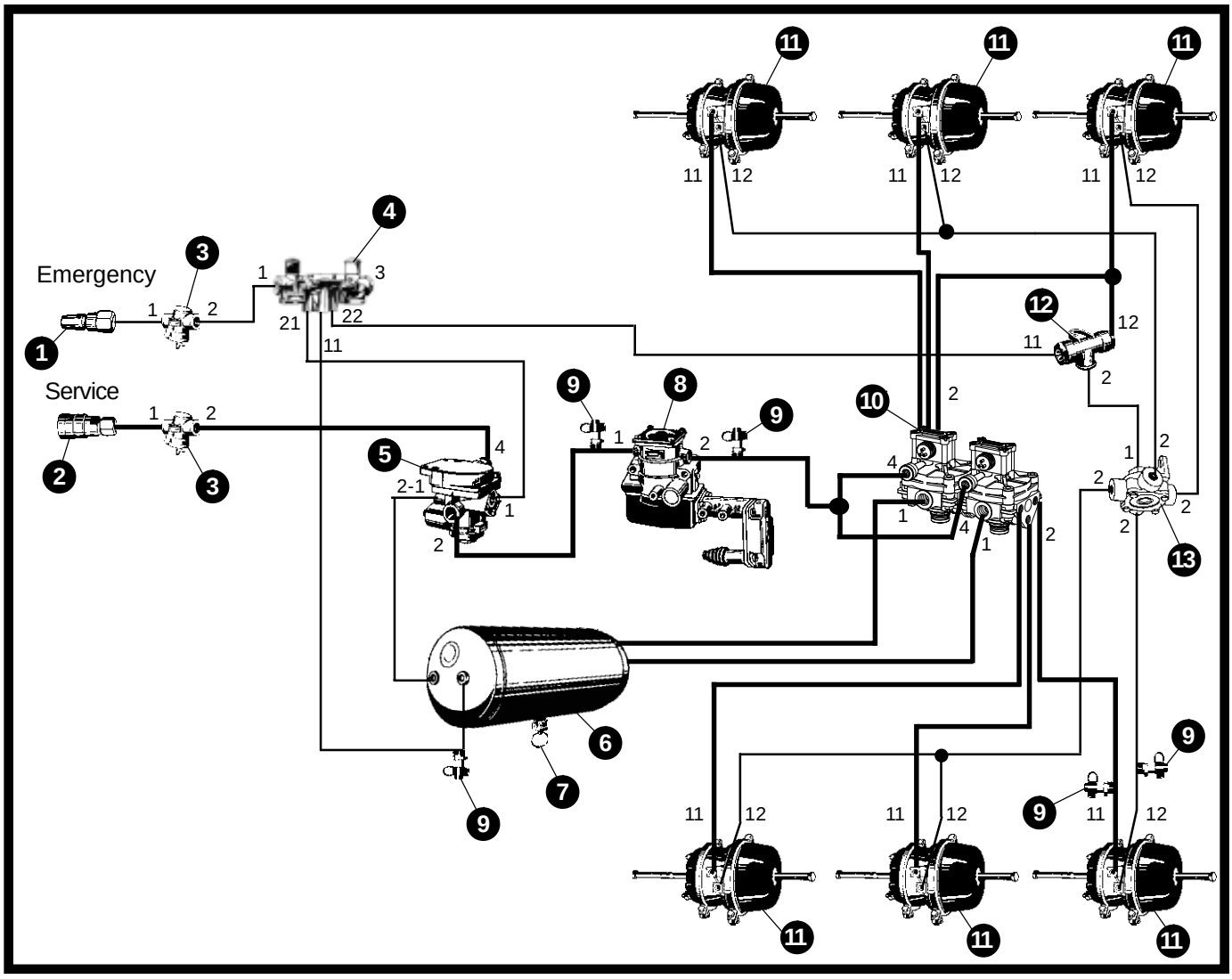
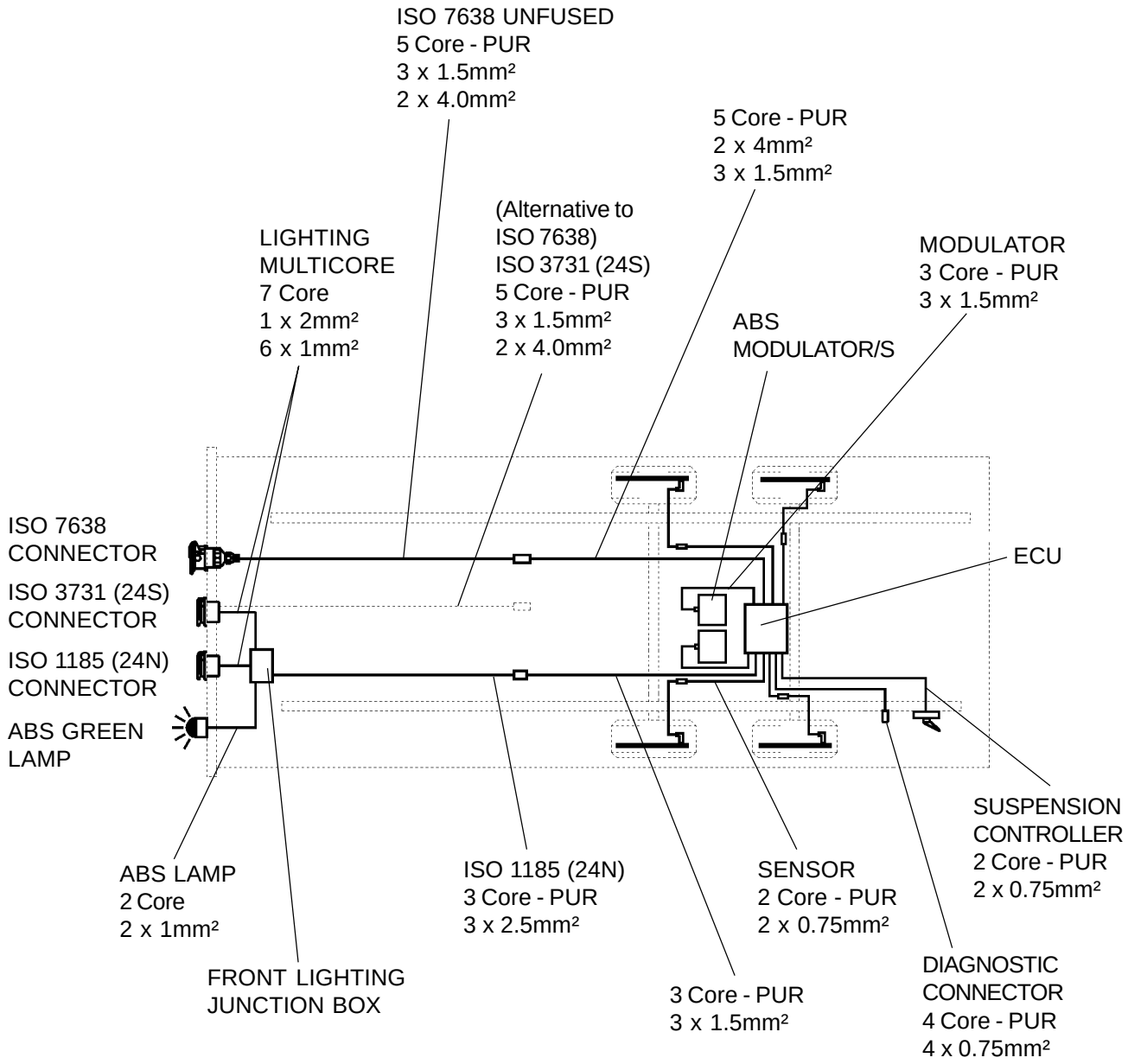


Fig 118

Item	Description
1	Emergency Coupling
2	Service Coupling
3	Pipe Filter
4	Combined Park and Shunt valve
5	Relay Emergency Valve
6	Air Reservoir (40L/Axle - Spring Brake Chamber)
7	Drain valve
8	Load Sensing valve - pneumatic
9	Test point
10	ABS Modulator (w/o Manifold)
11	Spring Brake Chamber
12	Double Check Valve
13	Quick Release Valve

WIRING SCHEMATIC - MODULAR 2



Maximum length of cable between ISO 1185 (24N) connector (or alternative wiring for ISO 3731 (24S)) and front junction box to be 1m.

Fig 119

WIRING DIAGRAM - **MODULAR 2 2S/2M** with ISO 7638 (Fused) and ISO 1185 (24N) Power Supply

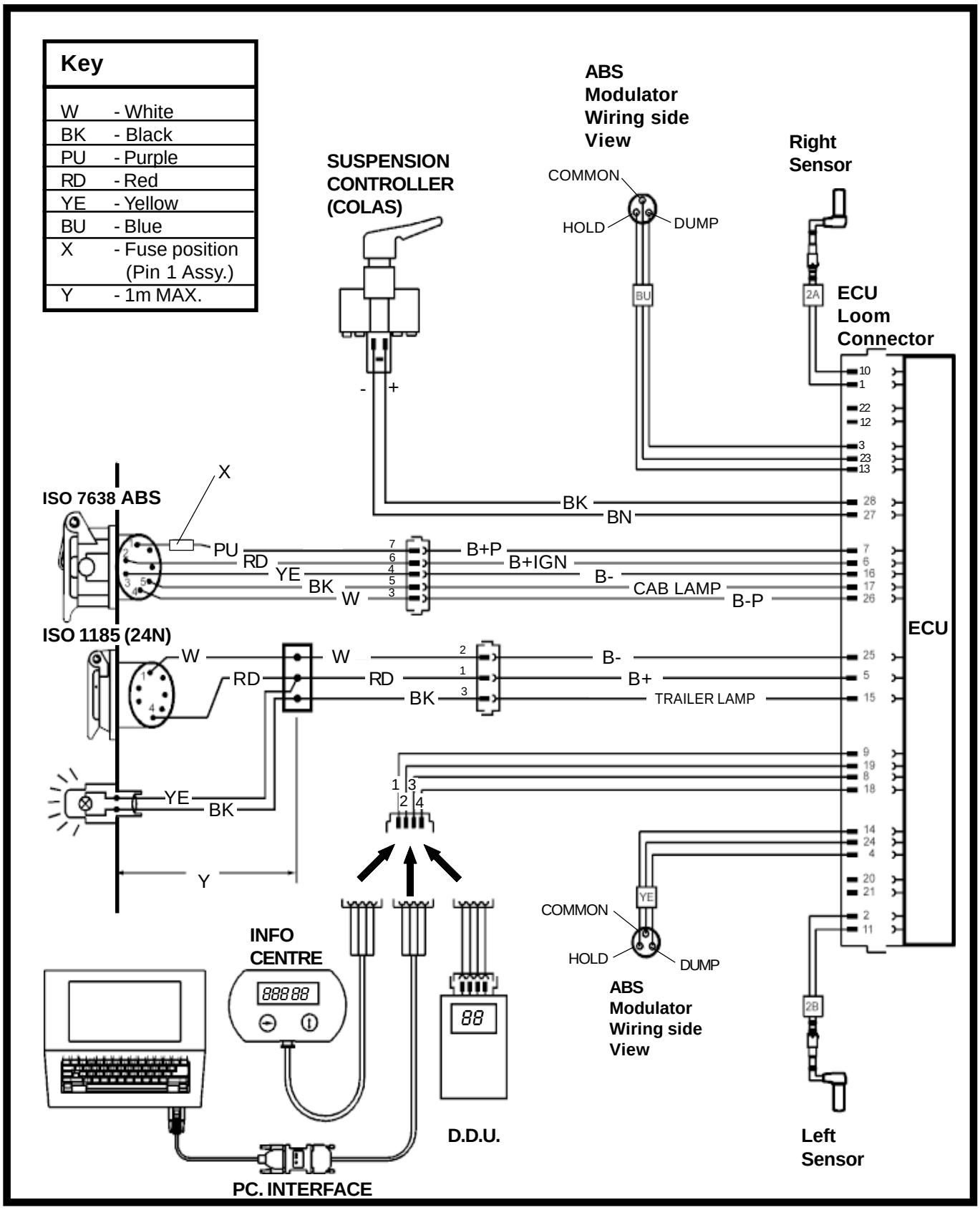


Fig 120

WIRING DIAGRAM - **MODULAR 2 2S/2M** with ISO 7638 (UnFused) and ISO 1185 (24N) Power Supply

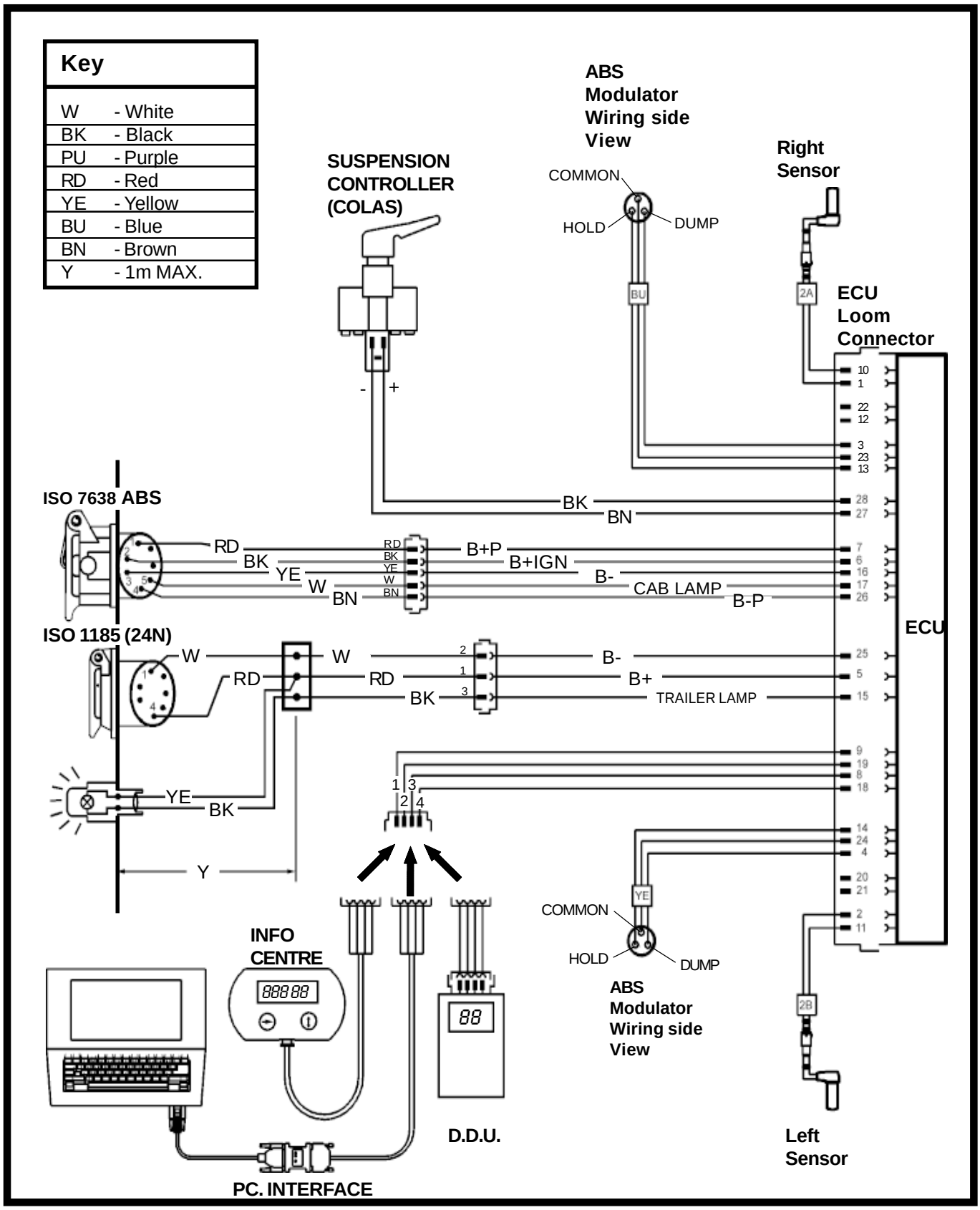


Fig 121

WIRING DIAGRAM - **MODULAR 2 2S/2M** with ISO 3731 (24S) and ISO 1185 (24N) Power Supply

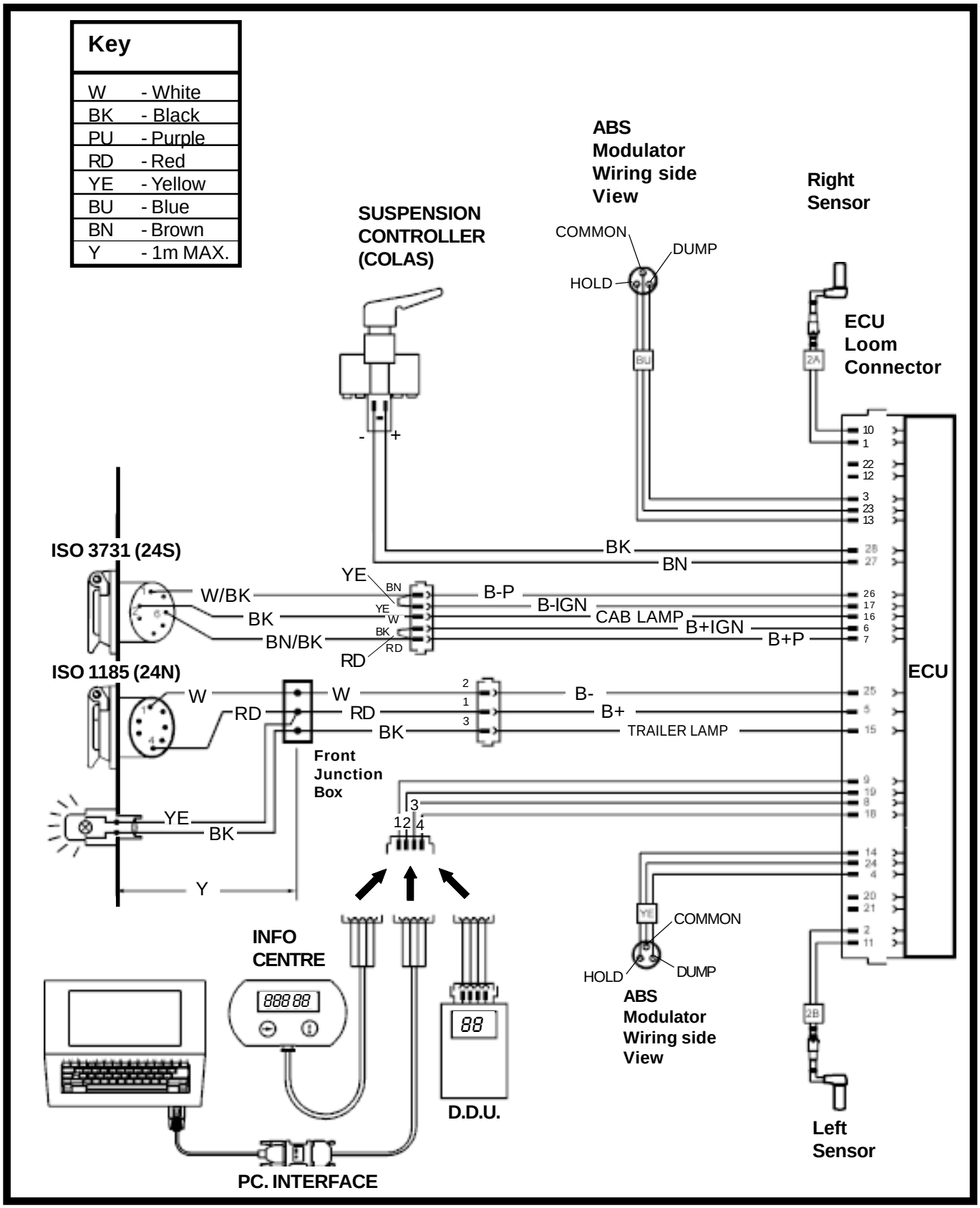


Fig 122

WIRING DIAGRAM - **MODULAR 2 4S/2M** with ISO 7638 (Fused) and ISO 1185 (24N) Power Supply

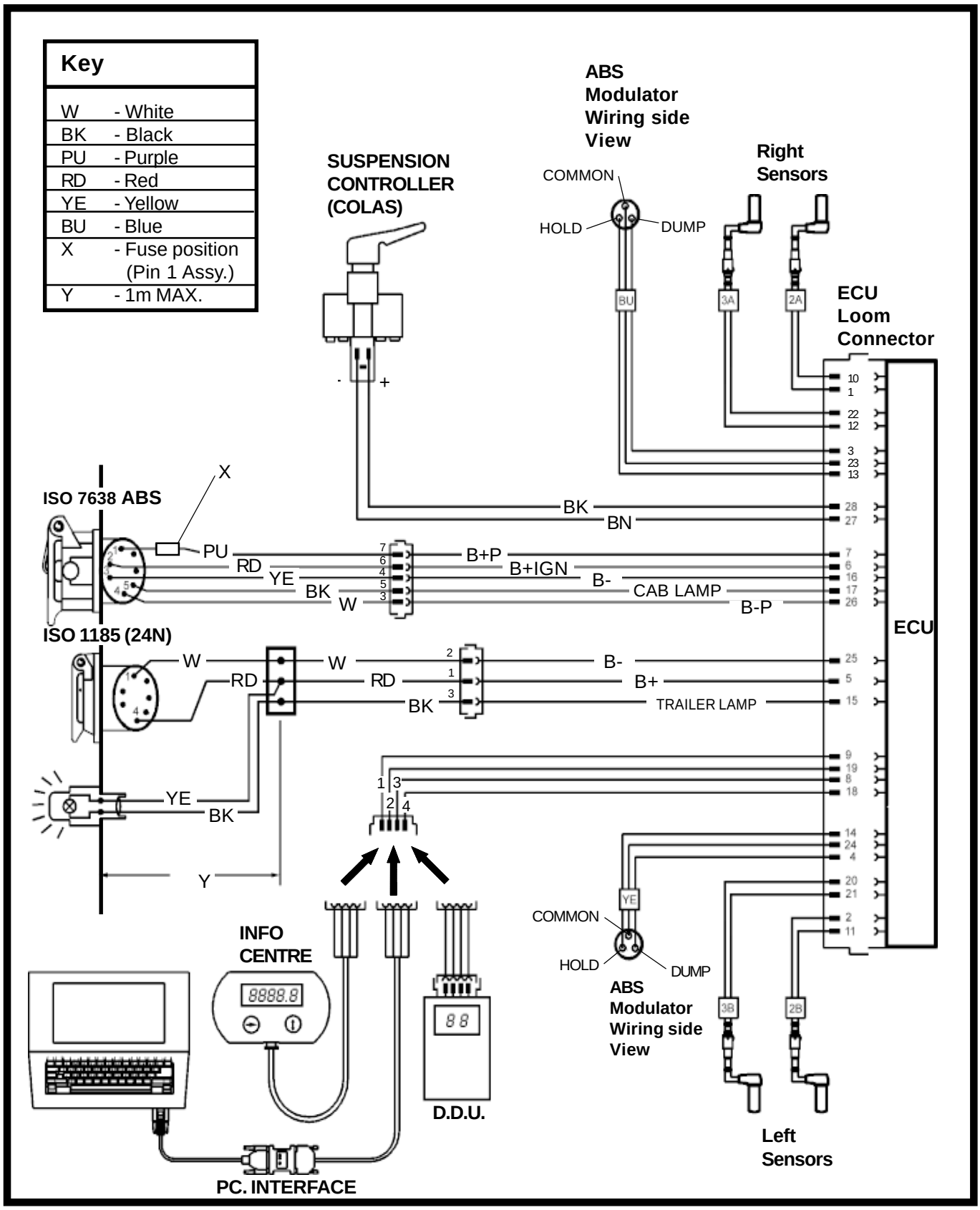


Fig 123

WIRING DIAGRAM - **MODULAR 2 4S/2M** with ISO 7638 (UnFused) and ISO 1185 (24N) Power Supply

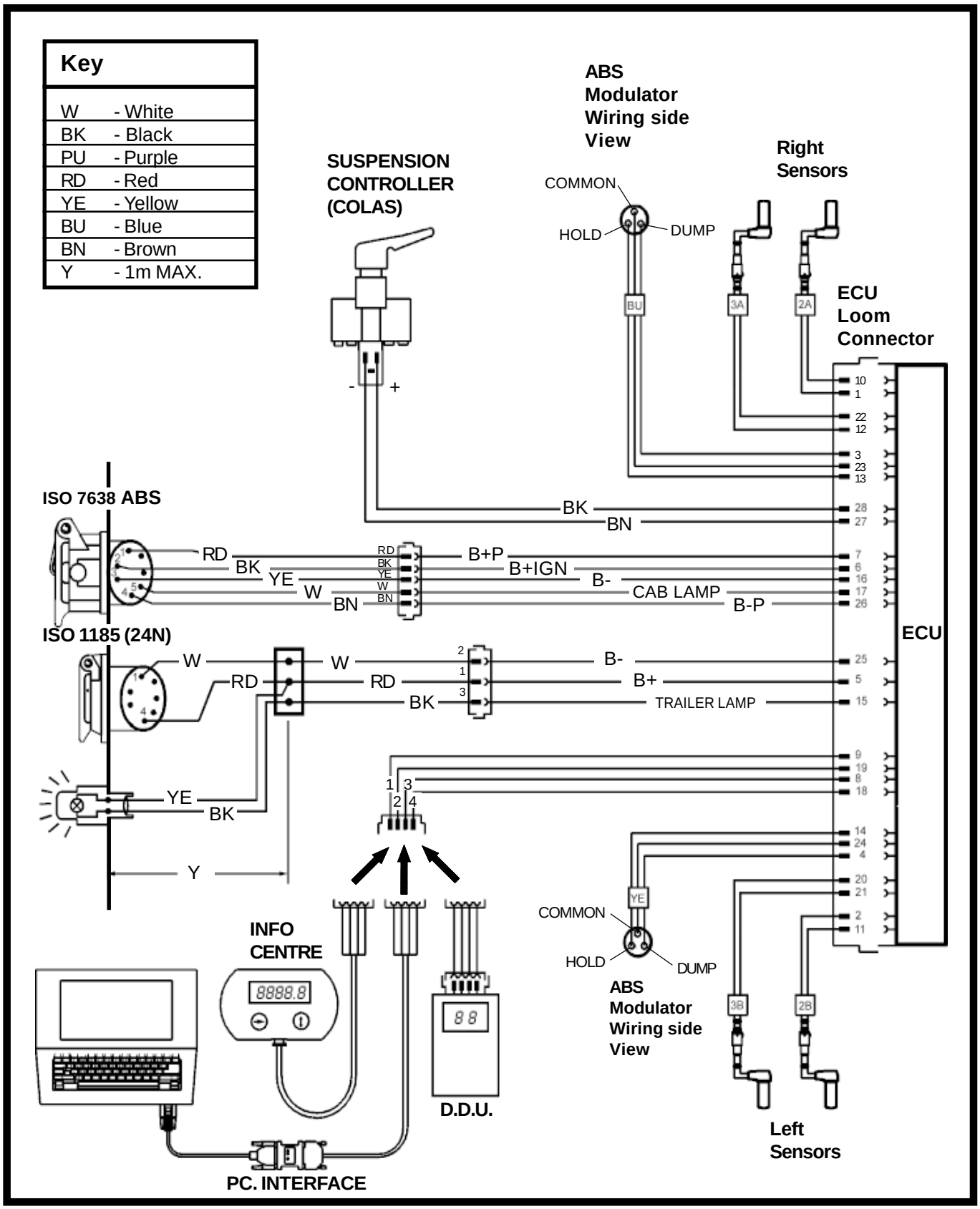


Fig 124

WIRING DIAGRAM - **MODULAR 2 4S/2M** with ISO 3731 (24S) and ISO 1185 (24N) Power Supply

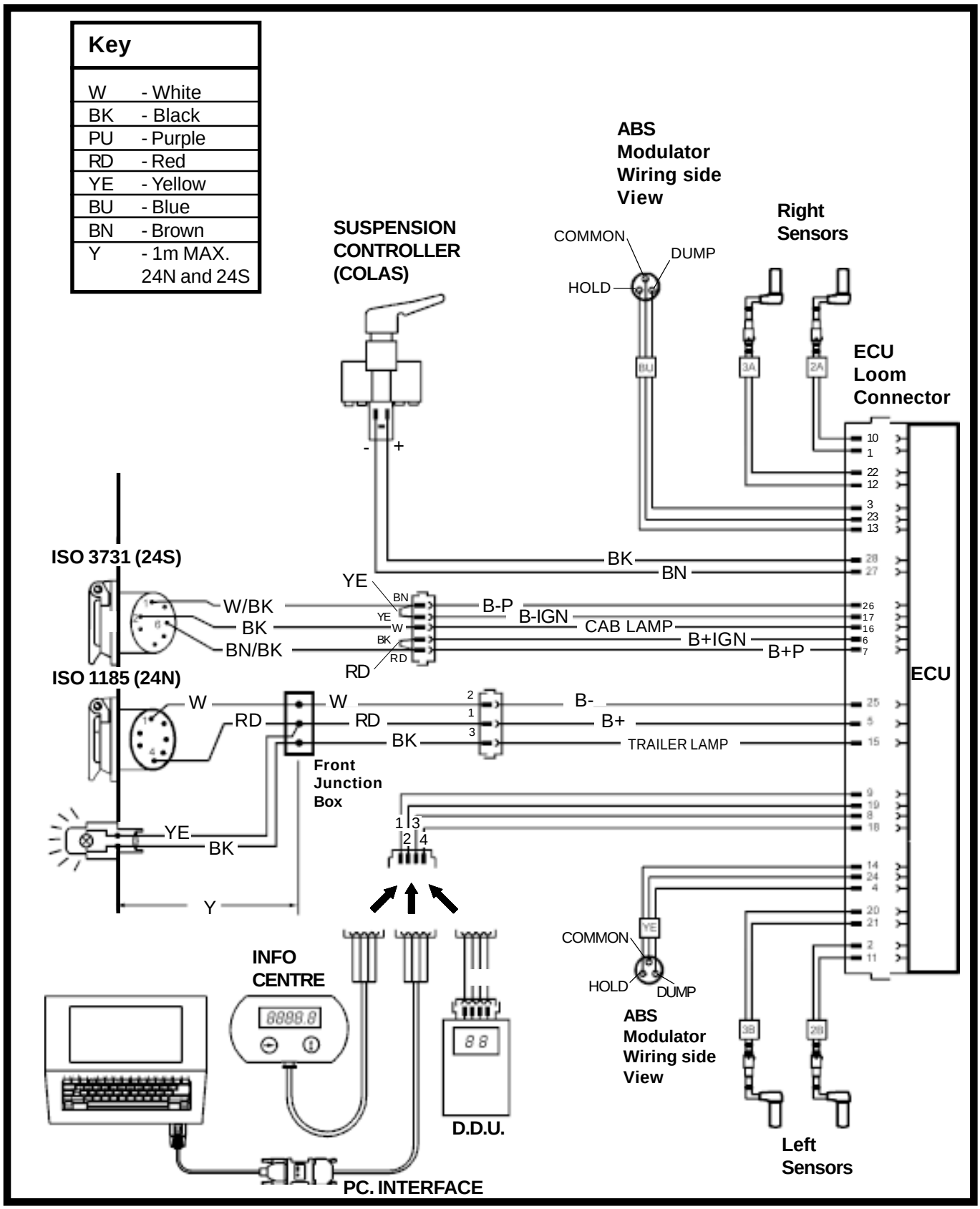


Fig 125

SECTION 5

GENERAL

WIRING DIAGRAM

MODULAR 1M and 2M Systems
ISO 3731 (24S), ISO 1185 (24N), and ISO 7638 Power supply

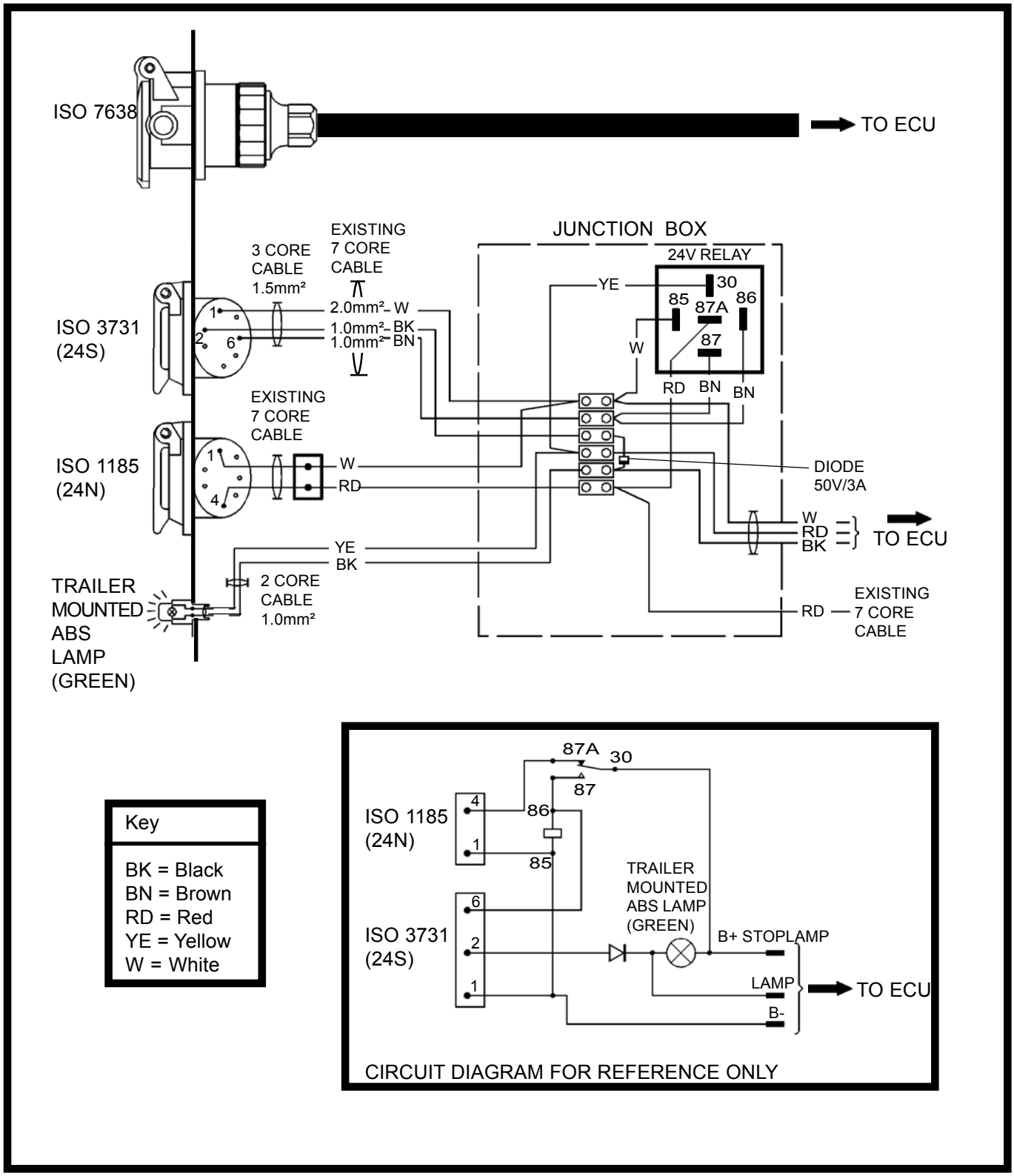


Fig 126

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