



Vario Compact ABS

2nd generation

Part 2: Installation instructions



3rd edition

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6 Braking system diagrams**1-axis**

ZA 2S2M	Standard ECU	841 601 100 0	28
ZA 2S2M	Separate ECU	841 601 101 0	29
SA 2S2M	Standard ECU	841 700 991 0	30
SA 2S2M	Separate ECU	841 700 993 0	31
SA 2S2M	Standard ECU	841 700 994 0	32

2-axis

ZA 2S2M	Separate ECU	841 601 114 0	33
ZA 2S2M	Separate ECU	841 601 116 0	34
ZA 2S2M	Premium ECU	841 601 177 0	35
ZA 4S2M	Premium ECU	841 601 110 0	36
ZA 4S3M	Separate ECU	841 601 112 0	37
ZA 4S3M	Premium ECU	841 601 113 0	38
ZA 4S3M	Premium ECU	841 601 118 0	39
DA 4S3M	Premium ECU	841 601 121 0	40
DA 4S3M	Separate ECU	841 601 123 0	41
DA 4S3M	Premium ECU	841 601 124 0	42
SA 4S2M	Premium ECU	841 700 981 0	43
SA 4S2M	Premium ECU	841 701 120 0	44
SA 4S3M	Premium ECU	841 700 983 0	45

3-axis

DA 4S3M	Premium ECU	841 601 130 0	46
DA 4S3M	Premium ECU	841 601 131 0	47
SA 2S2M	Premium ECU	841 701 060 0	48
SA 2S2M	Premium ECU	841 701 062 0	49
SA 2S2M 12 V	Premium ECU	841 701 151 0	50
SA 4S3M	Premium ECU	841 700 971 0	51
SA 4S2M	Premium ECU	841 700 973 0	52

4-axis

DA 4S3M	Premium ECU	841 601 140 0	53
DA 4S3M	Premium ECU	841 601 141 0	54
DA 4S3M 12 V	Premium ECU	841 601 143 0	55
SA 4S3M	Premium ECU	841 701 002 0	56

5-axis

SA 4S3M	Premium ECU	841 701 080 0	57
SA 4S3M 12 V	Premium ECU	841 701 081 0	58

1.1 General information

This publication is meant for commercial vehicle workshop personnel with knowledge of automotive electronics. It provides assistance in the installation and commissioning of a VCS II trailer ABS system.

Further detailed information about this system can also be found in the publication "VCS II system description" under the WABCO number 815 010 008 3.

VCS II is a vehicle safety system. Installation, retrofitting, repairs and modification of the system settings may only be performed by trained and qualified specialist personnel.

WABCO offers the training required for installation and commissioning of the VCS II system both directly on-site at our premises and on the Internet at <http://wbt.wabco.info>.

Before you perform any work on the vehicle (installation, repairs, parts replacement, diagnosis, etc.) you must ensure the following:

- Always follow the specifications and instructions of the vehicle manufacturer.
- Always comply with the company and national accident prevention/health and safety regulations.
- Wear suitable protective clothing as the situation requires.
- The workplace has to be dry and sufficiently lit and ventilated.
- The gearbox of the towing vehicle, if present, must be in the "neutral" position and the hand brake must be activated.
- Secure the vehicle against rolling away using brake wedges.
- Attach a clearly marked note on the steering wheel of the towing vehicle, stating that work is being performed on the vehicle and that the brake must not be applied.

formed on the vehicle and that the brake must not be applied.

1.2 Diagnosis and commissioning of the VCS II

The diagnosis is carried out using a PC or notebook connected to the vehicle electronics. WABCO diagnostic software must be installed on the notebook.

You can find out the current status on the Internet (www.wabco-auto.com) via the "Download" menu.

All available language versions of the WABCO diagnostic programme are shown on the diagnostic software subscription pages.

The diagnostic memory and current measuring data can be obtained through the diagnostic programme. Errors are described when malfunctions occur.

Commissioning of the VCS II system is also performed via this diagnostic programme. The programme guides users through the menu. After successful commissioning, the ABS system is ready for operation.

Note: The connection between the diagnostic connection socket (with blue protection cover) on the trailer and the diagnostic PC requires a diagnostic interface allowing for use of both the serial interface and the USB version.

VCS II allows for straightforward fault indication in the towing vehicle via a warning lamp on the instrument panel and, if present, via a green warning lamp on the exterior of the towing vehicle.

The system is available in 2S/2M, 4S/2M and 4S/3M configurations with integrated or separate ECU.

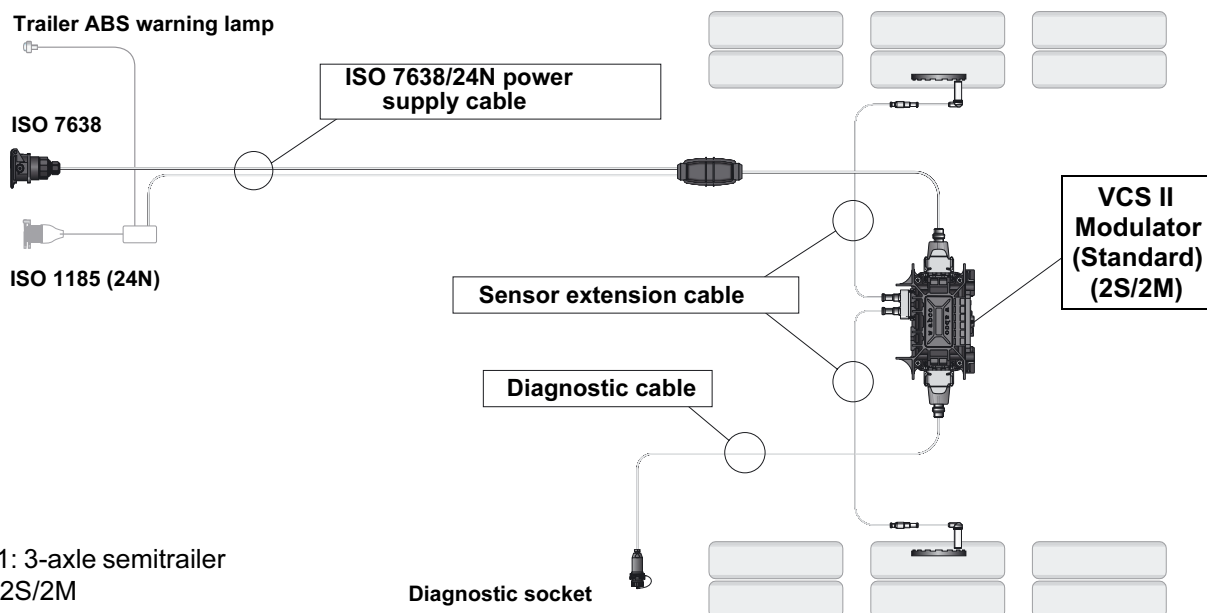


Fig. 1: 3-axle semitrailer with 2S/2M

2.1 Sensor allocation

ABS configurations for semitrailer vehicles, central-axletrailers and drawbar trailers

Lifting axles

2S/2M system: Lifting axles are not allowed to have sensors fitted

All other systems: Lifting axles may be fitted with ABS sensors e and f.

Steering axles

Forced steering axles can be treated like beam axles. WABCO prescribes ABS configurations 4S/3M or 2S/2M+SLV for vehicles with self-steering axles.

If 2S/2M or 4S/2M ABS systems are to be used in vehicles with self-steering axles, tests performed during the type test must establish that there are no abnormal axle vibrations or course deviations. It is not possible to investigate all axles on the market to check how they respond when ABS is triggered.


* These types of vehicle (see p. 6 and p. 7) are not listed in the "Type approval report no. EB 140.0" and require separate acceptance.


Modulator versions


ABS solenoid modulator valves are not permitted with 2S/2M and 4S/2M systems in 3-axle semitrailers and central-axle trailers.

Installation recommendation for unit types:

← = Driving direction

 = ABS modulator main axle (B/C)

 = ABS modulator valve A

 = Double cut-off valve (SLV)

Tested ABS modulators:

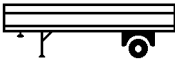
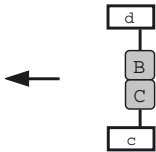

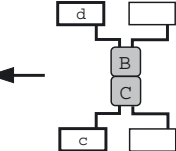
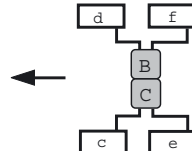
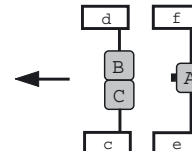

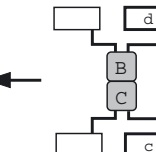
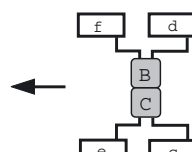
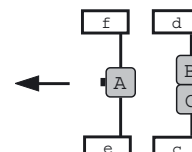

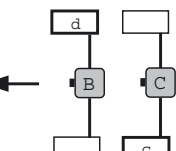

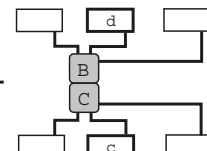
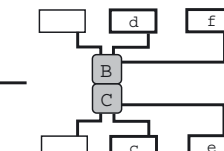
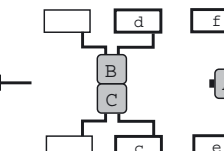

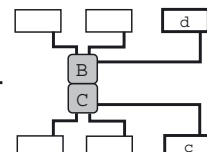
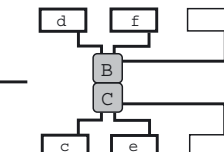
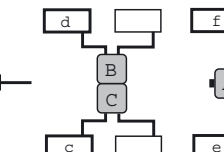

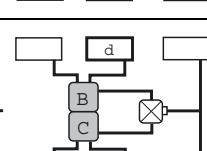
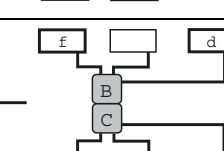
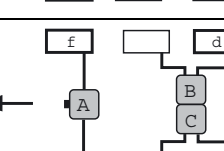

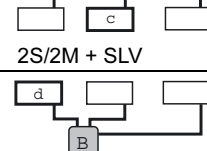
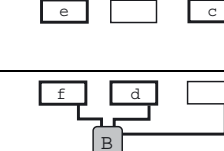
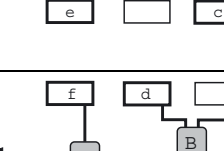

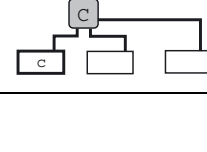
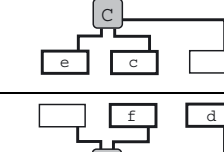
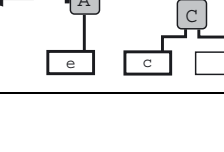


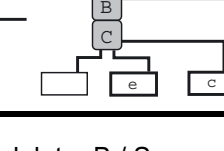

- ABS double relay valve (integrated)
- Separate ABS relay valves (not integrated)
- ABS solenoid modulator valves (not integrated)

Allocation of control channels:


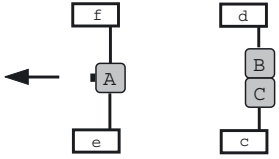
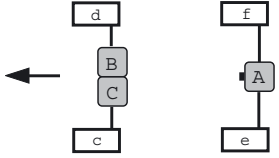
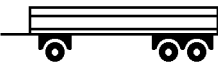
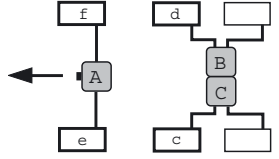
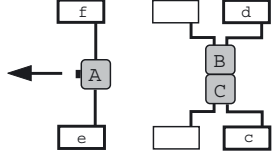

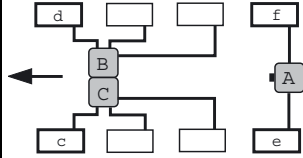

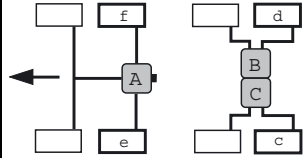
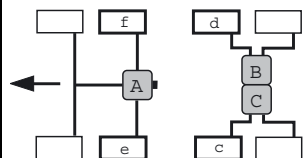
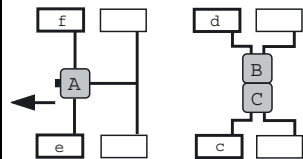
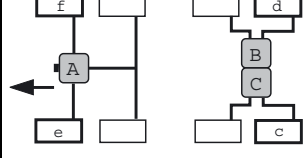
(Acc. to WABCO cabling diagram 841 801 930 0 to 841 801 933 0)


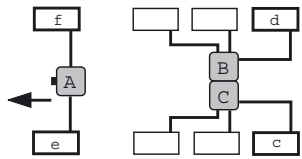
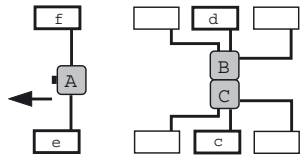
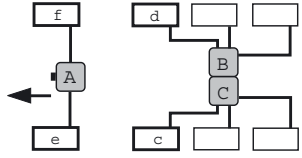

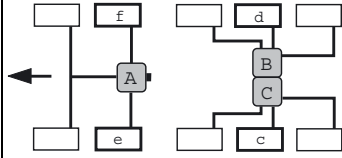
Modulator	Sensors	<div> <div></div> WITH SENSORS (DIRECTLY CONTROLLED) <div></div> WITHOUT SENSORS (INDIRECTLY CONTROLLED) </div>	
		SYSTEM AXLE	CONTROL LOGIC:
B / C	c , d	Main axle (not lifting)	IR / MSR
A	e , f	Steering axle (lifting)	MAR
B / C	e , f	Auxiliary axle (lifting)	MSR
B / C	d , f	Main axle (not lifting)	IR

STANDARD VERSION
400 500 070 0

VEHICLE TYPE		2S / 2M ¹⁾	4S / 2M	4S / 3M
CENTRAL-AXLE TRAILER + SEMITRAILER				
				
	+			
				
				
		2S/2M + DAR		
				
	+			
				
				
				
				
				




1) For the Standard version 400 500 070 0, the allocation is "Modulator B / Sensor f and Modulator C / Sensor d".

	VEHICLE TYPE	2S / 2M	4S / 2M	4S / 3M
DRAWBAR TRAILER				
				
				
				
SEMITRAILER+ DRAWBAR TRAILER				
				
				
				
				

	VEHICLE TYPE	2S / 2M	4S / 2M	4S / 3M
DRAWBAR TRAILER				
				
				
SEMITRAILER				

* These types of vehicle are not listed in the "Type approval report no. EB 140.0" and require separate acceptance.

2.2 Overview of the VCS II generation

	Separate ECU 4S/3M	STANDARD 2S/2M	PREMIUM 4S/2M (3M)	PREMIUM 4S/2M (3M) painted	PREMIUM 4S/2M (3M) 12 V
					
WABCO part number					
System	400 010 203 0				
Tabular drawing		400 500 090 0			
Complete device		400 500 070 0	400 500 081 0	400 500 082 0	400 500 083 0
Separate ECU	446 108 085 0				
Installation diagram	841 801 932 0	841 801 930 0	841 801 933 0	841 801 933 0	841 801 935 0
corresponds to VCS I	446 108 030 0	400 500 045 0	400 500 035 0	400 500 063 0	400 500 050 0
Functions					
Power supply					
ISO 7638-1	24 V	24 V	24 V	24 V	12 V
ISO 1185 (24N)		X	X	X	
ISO 1724 (12N)					X
Possible systems					
2S/2M	X	X	X	X	X
4S/2M	X		X	X	X
4S/3M	X		X	X	X
Modulators					
External ABS-RV ¹⁾	X		X	X	X
ABS-MRV ²⁾	X				
Paint ³⁾				X	
GenericIOs & special functions					
GIO D1 / D2 / A1	X / - / -	X / X / -	X / X / X	X / X / X	X / X / X
Communication					
ISO 11992 interface (CAN)	X		X	X	
Diagnosis at:	Supply plug	Diagnostic plug	Diagnostic plug	Diagnostic plug	Diagnostic plug
Various					
ECAS / ELM interface ⁴⁾		X	X	X	X
Preferred vehicle use	O3 vehicles and special-purpose vehicles	Semitrailers	Semitrailers/draw-bar trailers (incl. with electr. air suspension)	Semitrailers & draw-bar trailers in Scandinavia	Semitrailers & draw-bar trailers in Australia and Israel

¹⁾ (X): External relay valve for 4S/3M - configuration required

²⁾ Change of parameter settings required (EV+AV control)!

³⁾ Modulator painted black

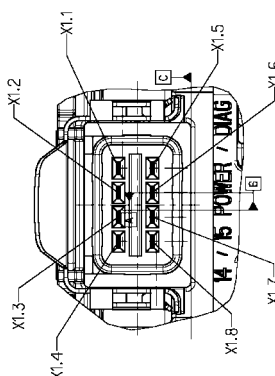
⁴⁾ Can be activated via GenericIO

WABCO

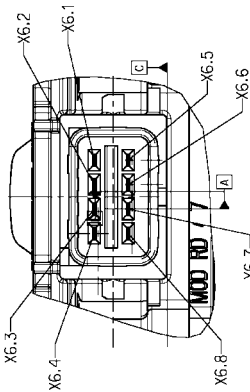
X1	POWER SUPPLY TERMINATION (N. VERBODEN) - (N. VERBODEN) RACCOMANDO D'ALIMENTAZIONE CONNESSIONE D'ALIMENTAZIONE				X6			
	400 500 070 0	400 500 081 0	400 500 092 0	400 500 093 0	400 500 070 0	400 500 081 0	400 500 092 0	400 500 093 0
1.1	DC POWER SUPPLY EQUI DC SPANNINGSVOERSRINGEN EQUI DC ALIMENTAZIONE ELETTRICA EQUI DC ALIMENTAZIONE ELETTRICA EQUI	DC POWER SUPPLY EQUI DC SPANNINGSVOERSRINGEN EQUI DC ALIMENTAZIONE ELETTRICA EQUI DC ALIMENTAZIONE ELETTRICA EQUI	DC POWER SUPPLY EQUI DC SPANNINGSVOERSRINGEN EQUI DC ALIMENTAZIONE ELETTRICA EQUI DC ALIMENTAZIONE ELETTRICA EQUI	DC POWER SUPPLY EQUI DC SPANNINGSVOERSRINGEN EQUI DC ALIMENTAZIONE ELETTRICA EQUI DC ALIMENTAZIONE ELETTRICA EQUI	X6.1: GENERIC IO D1 X6.2: GENERIC IO D2	GENERIC IO D1 GENERIC IO D2	GENERIC IO D1 GENERIC IO D2	GENERIC IO D1 GENERIC IO D2
1.2	ISO 1105 (24V)	ISO 1105 (24V)	ISO 1105 (24V)	ISO 1105 (24V)				
1.3	DC POWER SUPPLY VALVES DC SPANNINGSVOERSRINGEN VENTILE DC ALIMENTAZIONE ELETTRICA PER VALVOLE DC ALIMENTAZIONE ELETTRICA PER VALVOLE	DC POWER SUPPLY VALVES DC SPANNINGSVOERSRINGEN VENTILE DC ALIMENTAZIONE ELETTRICA PER VALVOLE DC ALIMENTAZIONE ELETTRICA PER VALVOLE	DC POWER SUPPLY VALVES DC SPANNINGSVOERSRINGEN VENTILE DC ALIMENTAZIONE ELETTRICA PER VALVOLE DC ALIMENTAZIONE ELETTRICA PER VALVOLE	DC POWER SUPPLY VALVES DC SPANNINGSVOERSRINGEN VENTILE DC ALIMENTAZIONE ELETTRICA PER VALVOLE DC ALIMENTAZIONE ELETTRICA PER VALVOLE	X6.3: N.C.	GENERIC IO A1	GENERIC IO A1	GENERIC IO A1
1.4	END	END	END	END	DIAGNOSTIC POWER SUPPLY DIAGNOSTIC SPANNINGSVOERSRINGEN DIAGNOSTIC ALIMENTAZIONE ELETTRICA DIAGNOSI DIAGNOSTIC ALIMENTAZIONE ELETTRICA DIAGNOSI	DIAGNOSTIC POWER SUPPLY DIAGNOSTIC SPANNINGSVOERSRINGEN DIAGNOSTIC ALIMENTAZIONE ELETTRICA DIAGNOSI DIAGNOSTIC ALIMENTAZIONE ELETTRICA DIAGNOSI	DIAGNOSTIC POWER SUPPLY DIAGNOSTIC SPANNINGSVOERSRINGEN DIAGNOSTIC ALIMENTAZIONE ELETTRICA DIAGNOSI DIAGNOSTIC ALIMENTAZIONE ELETTRICA DIAGNOSI	DIAGNOSTIC POWER SUPPLY DIAGNOSTIC SPANNINGSVOERSRINGEN DIAGNOSTIC ALIMENTAZIONE ELETTRICA DIAGNOSI DIAGNOSTIC ALIMENTAZIONE ELETTRICA DIAGNOSI
1.5	N.C.	CAN LOW (ISO 1992) 24V	CAN LOW (ISO 1992) 24V	CAN LOW (ISO 1992) 2V	END	END	END	END
1.6	N.C.	CAN HIGH (ISO 1992) 24V	CAN HIGH (ISO 1992) 24V	CAN HIGH (ISO 1992) 2V	X6.6: N.C.	L-MODULATOR AV (INLET VALVE) (SCOPARE D'ECCHIPPAMENTI) (VALVOLE DI SCARICO)	L-MODULATOR AV (INLET VALVE) (SCOPARE D'ECCHIPPAMENTI) (VALVOLE DI SCARICO)	L-MODULATOR AV (INLET VALVE) (SCOPARE D'ECCHIPPAMENTI) (VALVOLE DI SCARICO)
1.7	WARNING LAMP WARN LAMPE LAMPES D'AVERTISSEMENT LUCE SP1A	WARNING LAMP WARN LAMPE LAMPES D'AVERTISSEMENT LUCE SP1A	WARNING LAMP WARN LAMPE LAMPES D'AVERTISSEMENT LUCE SP1A	WARNING LAMP WARN LAMPE LAMPES D'AVERTISSEMENT LUCE SP1A	X6.7: N.C.	L-MODULATOR EV (INLET VALVE) (SCOPARE D'ECCHIPPAMENTI) (VALVOLE D'IMMISSIONE)	L-MODULATOR EV (INLET VALVE) (SCOPARE D'ECCHIPPAMENTI) (VALVOLE D'IMMISSIONE)	L-MODULATOR EV (INLET VALVE) (SCOPARE D'ECCHIPPAMENTI) (VALVOLE D'IMMISSIONE)
1.8	END	END	END	END	X6.8: DIAGNOSTIC LINE K DIAGNOSTIC LÉITUNG K (ISO 14230) LINES K DIAGNOSTIC LINES K DIAGNOSTIC	DIAGNOSTIC LINE K DIAGNOSTIC LÉITUNG K (ISO 14230) LINES K DIAGNOSTIC LINES K DIAGNOSTIC	DIAGNOSTIC LINE K DIAGNOSTIC LÉITUNG K (ISO 14230) LINES K DIAGNOSTIC LINES K DIAGNOSTIC	DIAGNOSTIC LINE K DIAGNOSTIC LÉITUNG K (ISO 14230) LINES K DIAGNOSTIC LINES K DIAGNOSTIC

Y
2:1
TURNED BY
DREHT UM 90°
TOURNE DE

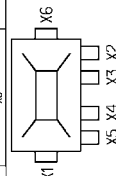
VUE SANS BOÎTE DE RACCORDEMENT
VISTA SENZA INCOLLEGAMENTO



VIEW SHOWN WITHOUT ELECTRICAL ASSEMBLY
ANSICHT DARGESTELLT OHNE ELEKTRISCHE BAUGRUPPE 894 607 390 2
VUE SANS ENSEMBLE ELECTRIQUE
VISTA SENZA GRUPPO ELETTRICO



PORT ANSOLUSS OFFIZIO	FUNCTION FUNKTION FUNZIONE
1	
2,1	400 500 070 0
2,2	400 500 081 0
2,3	400 500 082 0
2,4	400 500 083 0
3	SUPPLY OF ENERGY, ENERGIEZUFÜHRUNG VORRAT, ALIMENTAZIONE ALIMENTAZIONE
4	DELIVERY OF ENERGY, ENERGIEZUFÜHRUNG, UTILISATION, MANO D'OPERA
5	EXHAUST PORT, ANSCHLUSS ATMOSPHERE, CONNECTION D'ÉCHAPPEMENT, CONNESSIONE SORRICO
6	CONTROL PORT, STEUERANSCHLUSS, OFFICE DE COMMANDE, OFFIZIO DI COMANDO
X2	PIN ASSIGNMENT ACCORDING TO INSTALLATION INSTRUCTION;
X3	ANSHLUSSELEGTUNG NACH INSTALLATIONSGEBRAUCHT.
X4	ASSEGNAZIONE PIN SECONDO ISTRUZIONE DI INSTALLAZIONE;
	ATBIB/2006 DI CAVI SECONDO ISTRUZIONE DI MONTAGGIO.
	(SEE SHEET 1)
	(SIEHE BLATT 1)
	(VEDI FOLIO 1)
	(VERGLEICHEN SIE FOLIO 1)



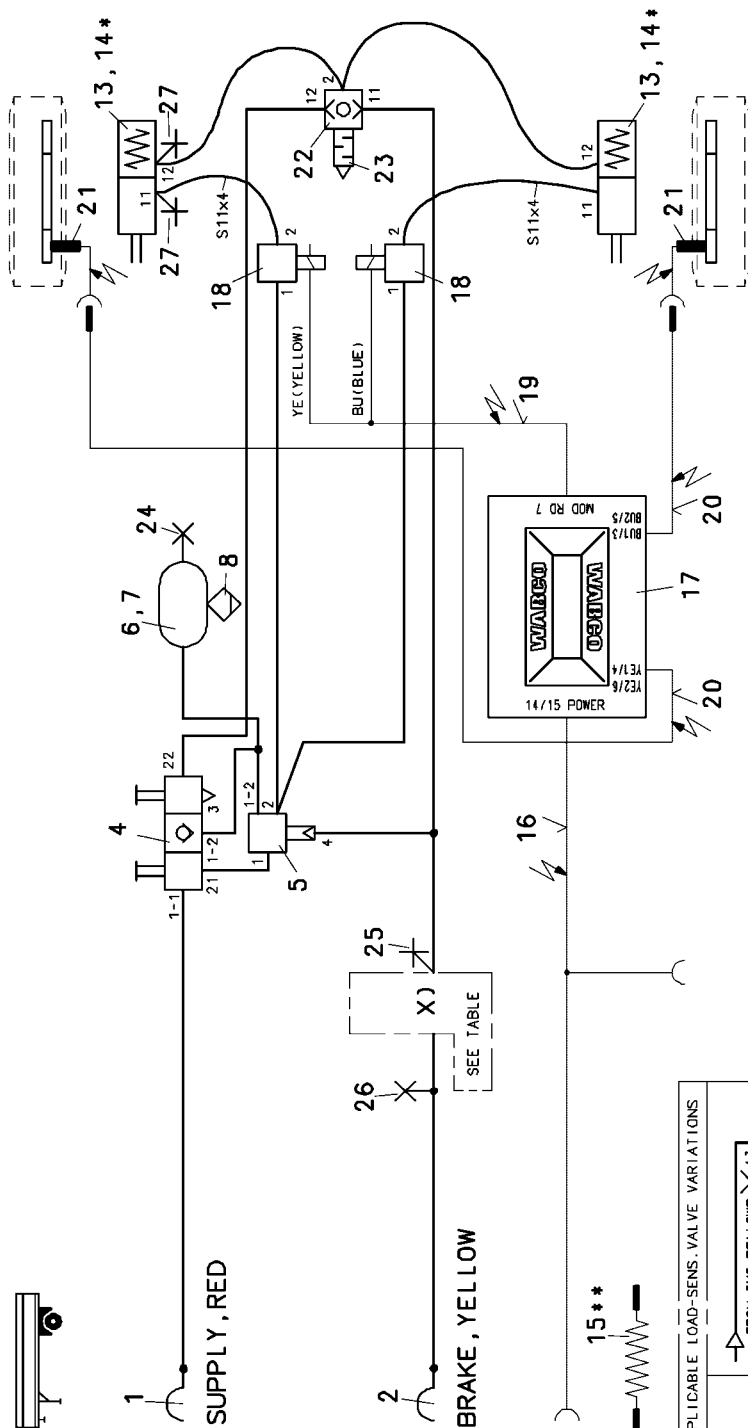
①
FURTHER TECHNICAL DATA SEE SPECIFICATIONS.
WEITERE TECHNISCHE DATEN SIEHE SPEZIFIKATIONEN.
POUR AUTRES DONNÉES TECHNIQUES VOIR SPECIFICATION.
PER ULTERIORI DATI TECNICI VEDERE SPECIFICA:

BLACK PAINT COAT
SCHWARZE LACKSCHICHT
COUCHE DE VERNIS NOIR
STRATO DI VERNICE NERO

SURFACE PROTECTION:
OBERFLÄCHENSCHUTZ:
PROTECTION DE SURFACE
PROTEZIONE SUPERFICI:

[illegible]

3.3 Standard version 2S/2M with mixed supply (24N) without CAN



OPTIONAL

* NOT APPLICABLE FOR DISC-BRAKES

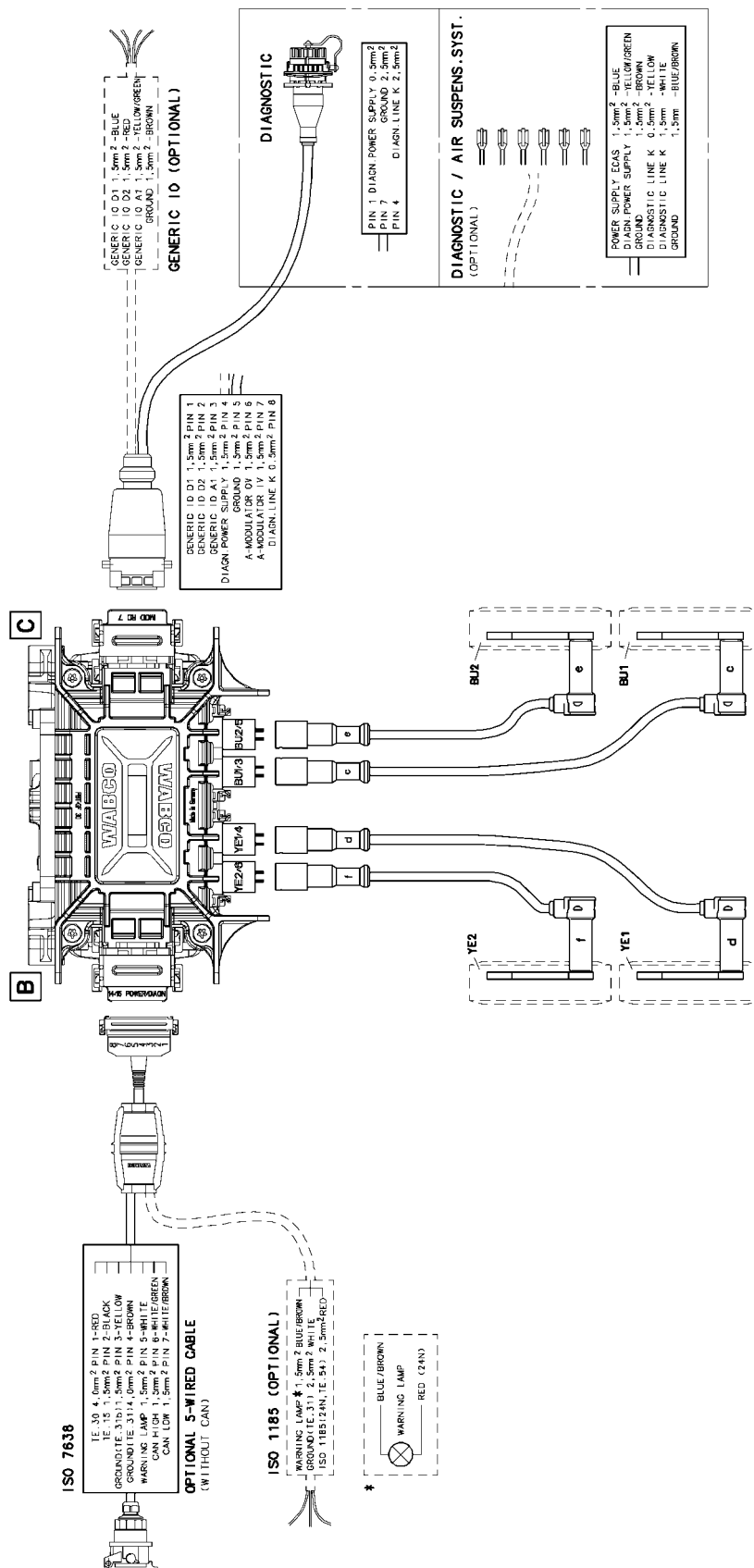
WIRING DIAGRAM: SEE 841 801 930 0
OR/AND 841 801 932 0

AIM IS:

IDENTIC DEAD VOLUMINA OF ALL BRAKE ACTUATORS PLUS CORRESPONDING BRAKE HOSES BASED ON AN ABS-RELAY VALVE

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Premium version 4S/2M with mixed supply (24N) and CAN

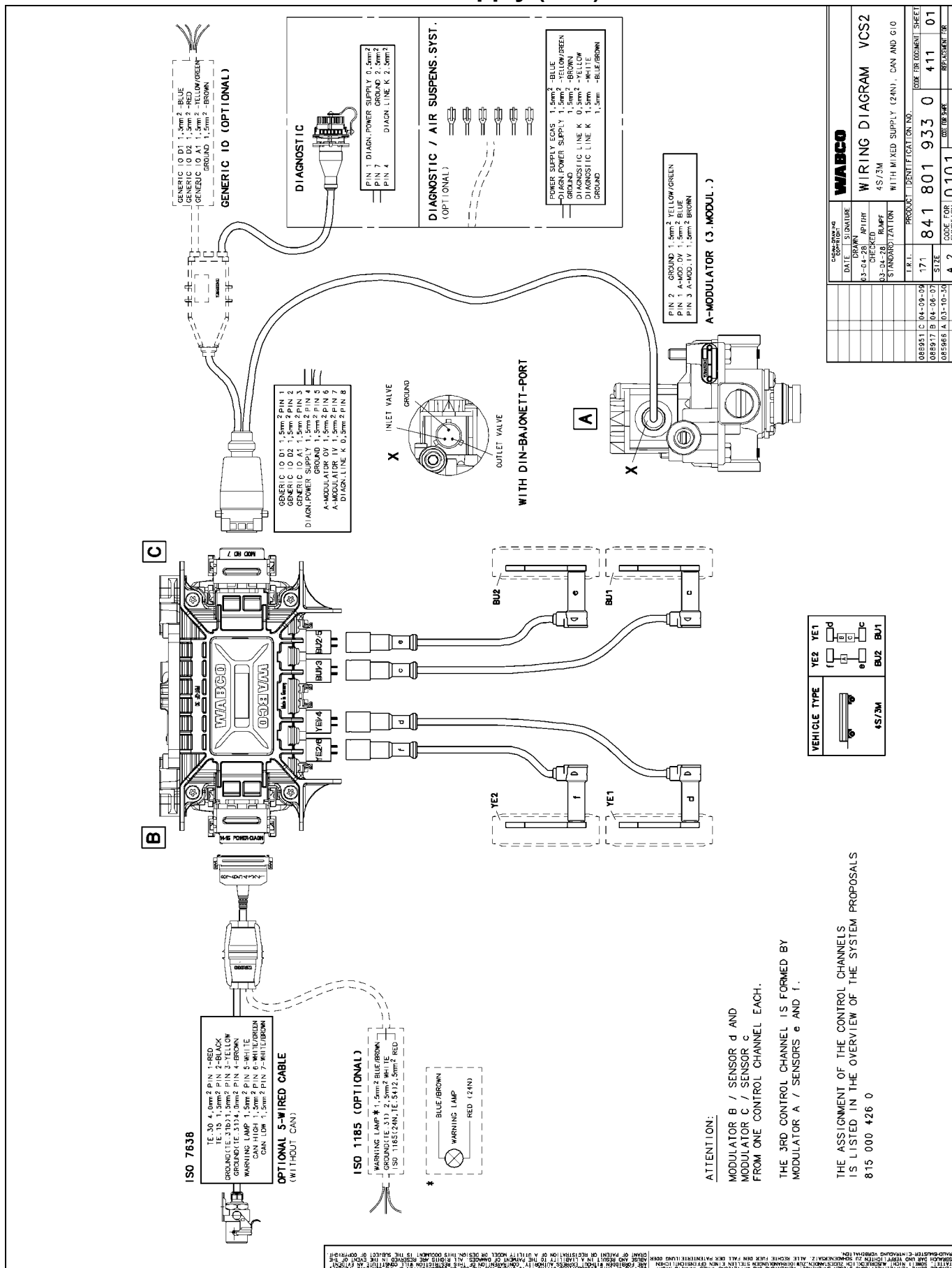


ATTENTION:

1. MODULATOR AND SENSORS OF ONE VEHICLE SIDE FROM ONE CONTROL CHANNEL.
(MODULATOR B / SENSORS d and f)
(MODULATOR C / SENSORS c and e)
2. THE ASSIGNMENT OF THE CONTROL CHANNELS IS LISTED IN THE OVERVIEW OF THE SYSTEM PROPOSALS
815 000 426 0

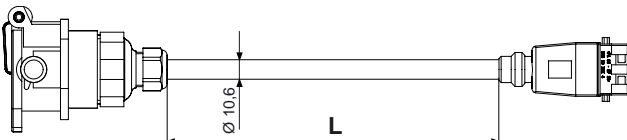
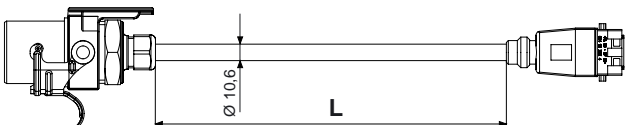
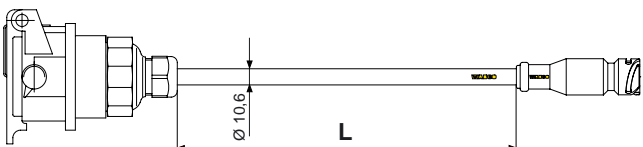
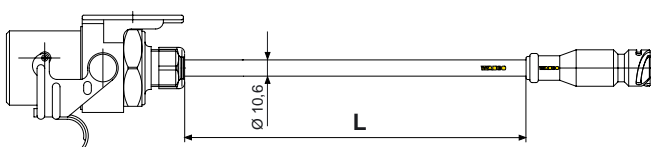
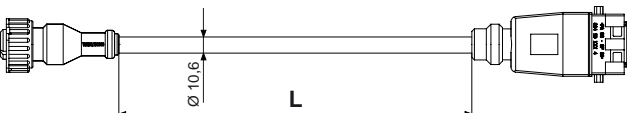
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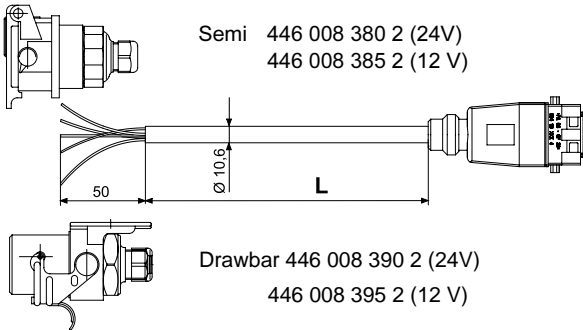
Premium version 4S/3M with mixed supply (24N) CAN and GIO



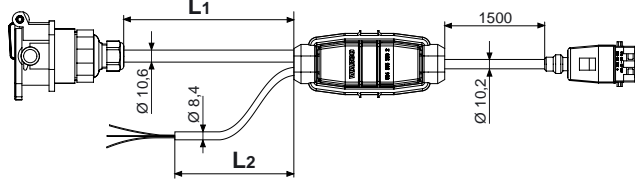
4.1 Power supply cable

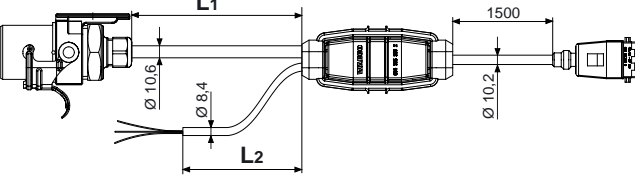
5-wire power supply cable

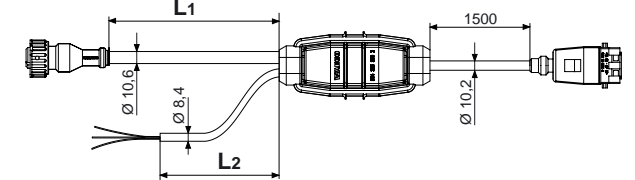
For semitrailers (24V)		Application for: Standard and Premium ECU		
	Order number	L in m	Cable end type	
	449 125 060 0	6	Socket ISO 7638	Plug VCS II electronic control unit "POWER"
	449 125 100 0	10		
	449 125 120 0	12		
	449 125 140 0	14		
	449 125 180 0	18		
For drawbar trailers (24V)		Application for: Standard and Premium ECU		
	Order number	L in m	Cable end type	
	449 225 060 0	6	Plug ISO 7638	Plug VCS II electronic control unit "POWER"
	449 225 100 0	10		
	449 225 120 0	12		
	449 225 140 0	14		
For semitrailers with connection [combined with 449 375 ... 0 or 449 374 ... 0 (24N)]		Application for: Standard and Premium ECU		
	Order number	L in m	Cable end type	
	449 132 005 0	0.5	Socket ISO 7638	Coupling 5-wire, mating compo- nent for 449 375 ... 0 and 449 374 ... 0
	449 132 060 0	6		
	449 132 080 0	8		
	449 132 100 0	10		
	449 132 120 0	12		
	449 132 150 0	15		
For drawbar trailers with connection [combined with 449 375 ... 0 or 449 374 ... 0 (24N)]		Application for: Standard and Premium ECU		
	Order number	L in m	Cable end type	
	449 242 100 0	10	Plug ISO 7638	Coupling 5-wire, mating compo- nent for 449 375 ... 0 and 449 374 ... 0
Power supply cable with connection [combined with 449 132 ... 0 or 449 242 ... 0 (24V)]		Application for: Standard and Premium ECU		
	Order number	L in m	Cable end type	
	449 375 003 0	0.3	Coupling 5-wire, mating compo- nent for 449 132 ... 0 and 449 242 ... 0	Plug VCS II electronic control unit "POWER"
	449 375 030 0	3		
	449 375 060 0	6		
	449 375 100 0	10		
	449 375 120 0	12		

Power supply cable for trailer		Application for: Standard and Premium ECU		
		Order number	L in m	Cable end type
 <p>Semi 446 008 380 2 (24V) 446 008 385 2 (12 V)</p> <p>Drawbar 446 008 390 2 (24V) 446 008 395 2 (12 V)</p>		449 345 120 0	12	3 x 1.5 mm ² 2 x 4 mm ² Plug VCS II electronic control unit "POWER"
		449 345 150 0	15	

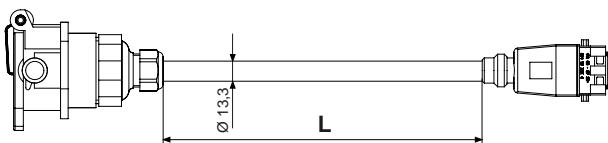
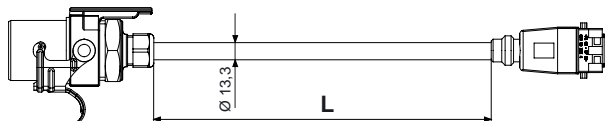
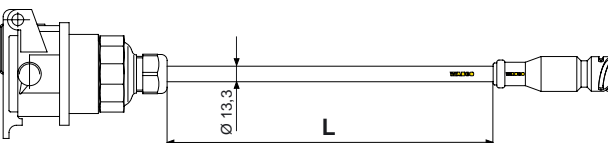
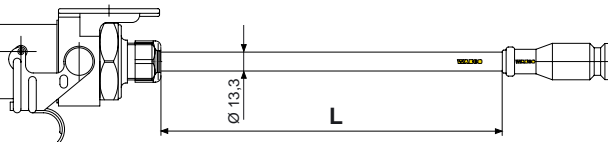
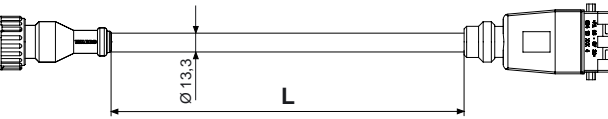
5-wire Y-power supply cable

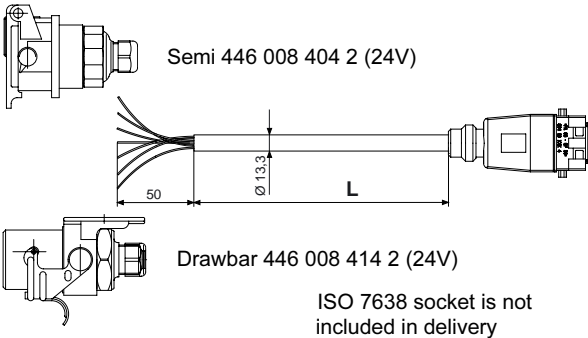
For semitrailers (24V) and 24N		Application for: Standard and Premium ECU			
		Order number	L1 in m	L2 in m	Cable end type
		449 124 333 0	6	12	Socket ISO 7638 and ISO 1185 (24N) 1 x 1.5 mm ² 2 x 2.5 mm ² Plug VCS II electronic control unit "POWER"
		449 124 337 0	12	12	

For drawbar trailers (24V) and 24N		Application for: Standard and Premium ECU			
		Order number	L1 in m	L2 in m	Cable end type
		449 224 337 0	12	12	Plug ISO 7638 and ISO 1185 (24N) 1 x 1.5 mm ² 2 x 2.5 mm ² Plug VCS II electronic control unit "POWER"

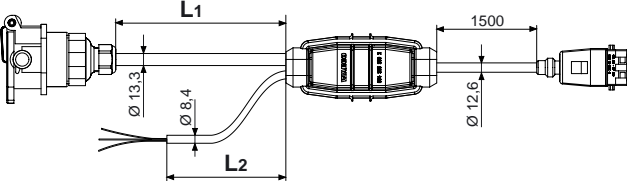
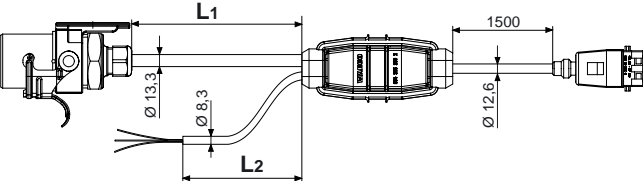
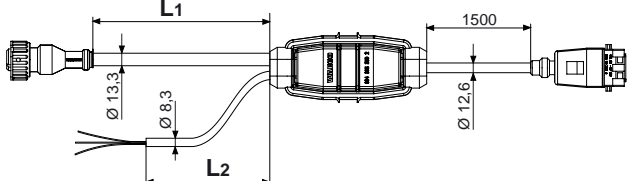
Y-power supply cable with connection [combined with 449 132 ... 0 or 449 242 ... 0 and 24N]		Application for: Standard and Premium ECU			
		Order number	L in m	L2 in m	Cable end type
		449 374 281 0	0.25	8	Coupling 5- wire, and ISO 1185 (24N) 1 x 1.5 mm ² 2 x 2.5 mm ² Plug VCS II electronic control unit "POWER"
		449 374 323 0	1	12	
		449 374 328 0	3	12	
		449 374 333 0	6	12	

7-wire power supply cable

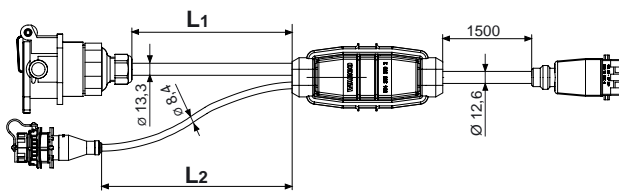
For semitrailers (24V)		Application for: Premium ECU		
	Order number	L in m	Cable end type	
	449 126 060 0	6	Socket ISO 7638	Plug VCS II electronic control unit "POWER"
	449 126 100 0	10		
	449 126 120 0	12		
	449 126 140 0	14		
For drawbar trailers (24V)		Application for: Premium ECU		
	Order number	L in m	Cable end type	
	449 226 060 0	6	Plug ISO 7638	Plug VCS II electronic control unit "POWER"
	449 226 100 0	10		
	449 226 120 0	12		
	449 226 140 0	14		
For semitrailers with connection [combined with 449 385 ... 0, 449 384 ... 0 (24N) or 449 386 ... 0]		Application for: Premium ECU		
	Order number	L in m	Cable end type	
	449 133 003 0	0,3	Socket ISO 7638	Coupling 7-wire, mating compo- nent for 449 384 ... 0, 449 385 ... 0 or
	449 133 030 0	3		
	449 133 120 0	12		
	449 133 150 0	15		
For drawbar trailers with connection [combined with 449 385 ... 0, 449 384 ... 0 (24N) or 449 386 ... 0]		Application for: Premium ECU		
	Order number	L in m	Cable end type	
	449 233 030 0	3	Plug ISO 7638	Coupling 7-wire, mating compo- nent for 449 384 ... 0, 449 385 ... 0 or
	449 233 100 0	10		
	449 233 140 0	14		
	449 233 180 0	18		
Power supply cable with connection [combined with 449 133 ... 0 or 449 233 ... 0 (24V)]		Application for: Premium ECU		
	Order number	L in m	Cable end type	
	449 385 003 0	0.3	Coupling 7- wire, mating component for 449 133 ... 0 and 449 233 ... 0	Plug VCS II electronic control unit "POWER"
	449 385 030 0	3		
	449 385 060 0	6		
	449 385 100 0	10		

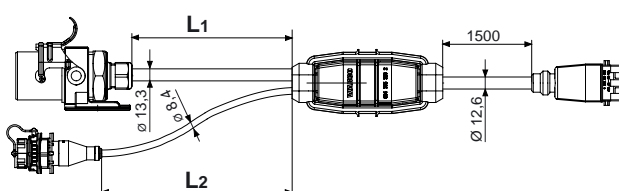
For semitrailers or drawbar trailers		Application for: Premium ECU		
	Order number	L in m	Cable end type	
	449 320 120 0	12	5 x 1.5 mm ² 2 x 4 mm ²	Plug VCS II electronic control unit "POWER"
	449 320 150 0	15		

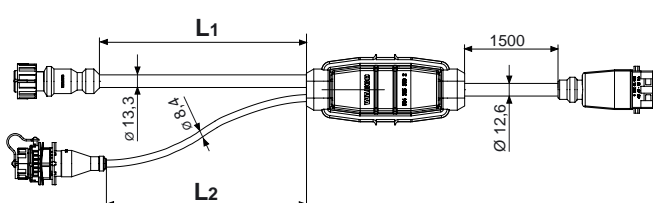
7-wire Y-power supply cable

For semitrailers (24V) and 24N		Application for: Premium ECU			
	Order number	L1 in m	L2 in m	Cable end type	
	449 134 337 0	12	12	Socket ISO 7638 and ISO 1185 (24N) 1x 1.5 mm ² 2x 2.5 mm ²	Plug VCS II electronic control unit "POWER"
For drawbar trailers (24V) and 24N		Application for: Premium ECU			
	Order number	L1 in m	L2 in m	Cable end type	
	449 234 337 0	12	12	Plug ISO 7638 and ISO 1185 (24N) 1x 1.5 mm ² 2x 2.5 mm ²	Plug VCS II electronic control unit "POWER"
Y-power supply cable with connection [combined with 449 133 ... 0 or 449 233 ... 0 (24V) and 24N]		Application for: Premium ECU			
	Order number	L in m	L2 in m	Cable end type	
	449 384 323 0	1	12	Coupling 7-wire, mating compo- nent for 449 133 ... 0 and 449 233 ... 0 and ISO 1185 (24N) 1x 1.5 mm ² 2x 2.5 mm ²	Plug VCS II electronic control unit "POWER"
	449 384 333 0	6	12		

7-wire Y-power supply cable + diagnosis

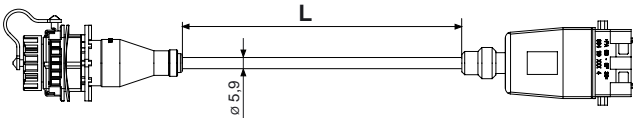
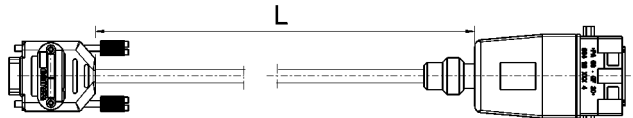
For semitrailers (24V)		Application for: Separate ECU			
	Order number	L1 in m	L2 in m	Cable end type	
	449 144 057 0	12	1	Socket ISO 7638 and Diagnostic- socket	Plug VCS II elec- tronic control unit "POWER"
	449 144 157 0	12	3		

For drawbar trailers (24V)		Application for: Separate ECU			
	Order number	L1 in m	L2 in m	Cable end type	
	449 244 048 0	3	1	Plug ISO 7638 and diagnostic- socket	Plug VCS II elec- tronic control unit "POWER"
	449 244 155 0	8	3		
	449 244 157 0	12	3		

Y-power supply cable with connection [combined with 449 133 ... 0 or 449 233 ... 0 (24V)]		Application for: Separate ECU			
	Order number	L in m	L2 in m	Cable end type	
	449 386 143 0	1	3	Coupling 7-wire, mating compo- nent for 449 133 ... 0 and 449 233 ... 0	Plug VCS II elec- tronic control unit "POWER"
	449 386 148 0	3	3		

4.2 Connecting cable

Diagnostic cable

For diagnosis		Application for: Standard and Premium ECU			
	Order number	L1 in m	Cable end type		
	449 615 010 0	1	Diagnostic socket	Plug VCS II electronic control unit "MOD RD"	
	449 615 030 0	3			
	449 615 060 0	6			
	449 615 080 0	8			
For direct diagnostic connection from ECU to the diagnostic interface		Application for: Standard and Premium ECU			
	Order number	L1 in m	Cable end type		
	446 300 455 0	6	ECU	Diagnostic interface	

Y-diagnostic cable

For diagnosis and socket for A-modulator

Application for: Standard and Premium ECU

	Order number	L1 in m	L2 in m	Cable end type	
	449 616 148 0	3	3	Diagnostic socket and Bayonet socket DIN 72585 B1-3.1-Sn/K1	Plug VCS II electronic control unit "MOD RD"
	449 616 153 0	6	3		
	449 616 156 0	10	3		
	449 616 157 0	12	3		
	449 616 158 0	15	3		
	449 616 235 0	8	5		
	449 616 248 0	3	6		
	449 616 253 0	6	6		
	449 616 293 0	6	8		

For diagnosis and GIO interface

Application for: Standard and Premium ECU

	Order number	L1 in m	L2 in m	Cable end type	
	449 617 013 0	6	0.25	Diagnostic socket and 4 x 1.5 mm ²	Plug VCS II electronic control unit "MOD RD"
	449 617 157 0	12	3		
	449 617 253 0	6	6		
	449 617 257 0	12	6		

For diagnosis and RTR function

Application for: Standard and Premium ECU

	Order number	L1 in m	L2 in m	Cable end type	
	449 623 253 0	6	6		
	449 623 316 0	10	10		

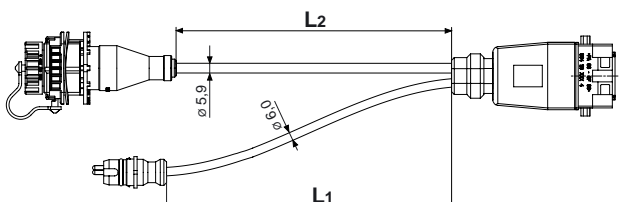
Triple cable for diagnosis, GIO interface and socket for A-modulator

Application for: Premium ECU

	Order number	L1 in m	L2 in m	Cable end type	
	449 618 003 0	1	0.25	4 x 1.5 mm ² and Diagnostic socket and bayonet socket DIN 72585 B1-3.1-Sn/K1	Plug VCS II electronic control unit "MOD RD"
	449 618 153 0	6	3		
	449 618 157 0	12	3		
	449 618 255 0	8	6		

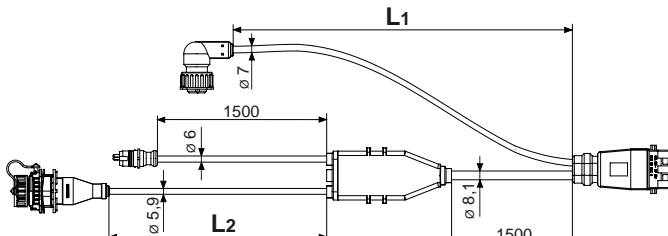
**Diagnosis and GIO interface
For brake pad wear indication**

Application for: Standard and Premium ECU

	Order number	L1 in m	L2 in m	Cable end type	
	449 619 148 0	3	3	Diagnostic socket and plug	Plug VCS II electronic control unit "MOD RD"

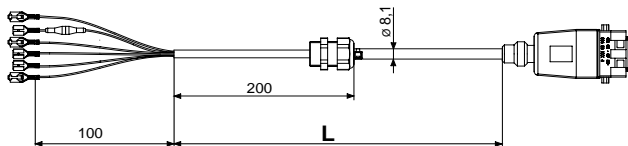
Triple cable
**For diagnosis and GIO interface
and socket for A-modulator**

Application for: Premium ECU

	Order number	L1 in m	L2 in m	Cable end type	
	449 620 156 0	10	3	Bayonet socket DIN 72585 B1-3.1-Sn/K1 and plug and diagnostic-socket	Plug VCS II electronic control unit "MOD RD"

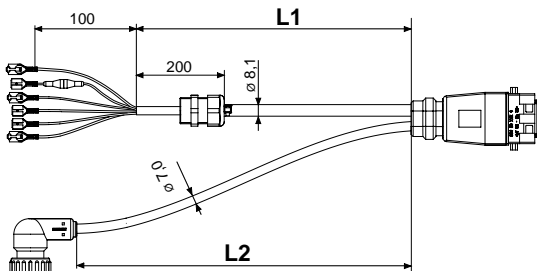
Cable for the ECAS connection
For ECAS incl. a diagnostic interface

Application for: Standard and Premium ECU

	Order number	L in m	Cable end type	
	449 336 030 0	3	PG 11 4 x 1.5 mm ² 2 x 0.5 mm ² 6 push-on contacts	Plug VCS II electronic control unit "MOD RD"

Y-cable for the ECAS connection
**For ECAS incl. a diagnostic interface
and socket for A-modulator**

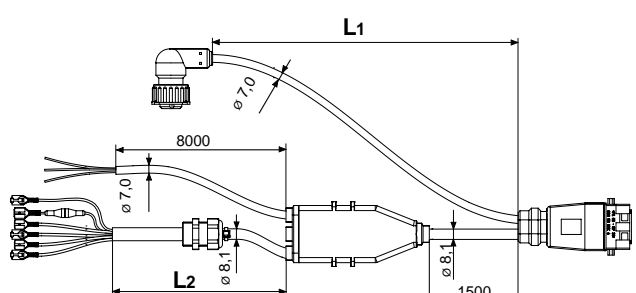
Application for: Premium ECU

	Order number	L1 in m	L2 in m	Cable end type	
	449 337 328 0	3	12	PG 11 5 x 1.5 mm ² 1 x 0.5 mm ² 6 push-on contacts and bayonet socket DIN 72585 B1-3.1-Sn/K1	Plug VCS II electronic control unit "MOD RD"

Triple cable for the ECAS connection

For ECAS incl. a diagnostic interface and GIO interface and socket for A-modulator

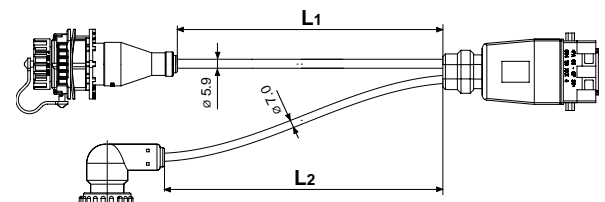
Application for: Premium ECU

	Order number	L1 in m	L2 in m	Cable end type	
	449 339 297 0	12	8	Bayonet socket DIN 72585 B1-3.1-Sn/K1 and 3 x 1.5 mm ² and PG 11 5x 1.5 mm ² 1 x 0.5 mm ² 6 push-on con- tacts	Plug VCS II elec- tronic control unit "MOD RD"

Y-cable for the ELM connection

For ELM incl. a diagnostic interface

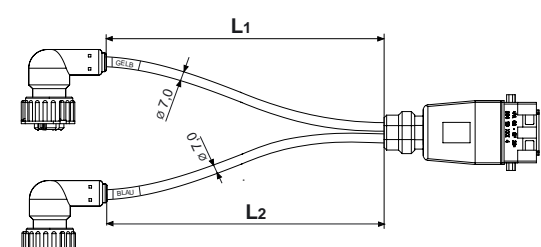
Application for: Standard and Premium ECU

	Order number	L1 in m	L2 in m	Cable end type	
	449 340 153 0	6	3	Diagnostic socket and ELM socket	Plug VCS II elec- tronic control unit "MOD RD"

Cable for modulator

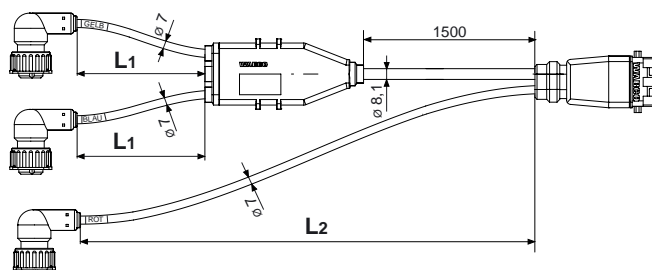
For B- and C-modulator

Application for: Separate ECU

	Order number	L1 in m	L2 in m	Cable end type	
	449 534 043 0	1	1	2 x bayonet socket DIN 72585 B1-3.1-Sn/K1	Plug VCS II elec- tronic control unit "MOD RD"
	449 534 148 0	3	3		
	449 534 253 0	6	6		

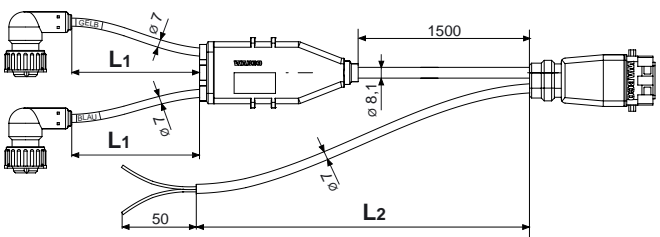
For A-, B- and C-modulator

Application for: Separate ECU

	Order number	L1 in m	L2 in m	Cable end type	
	449 544 190 0	4	4	3 x bayonet socket DIN 72585 B1-3.1-Sn/K1	Plug VCS II elec- tronic control unit "MOD RD"
	449 544 248 0	3	6		
	449 544 333 0	6	12		

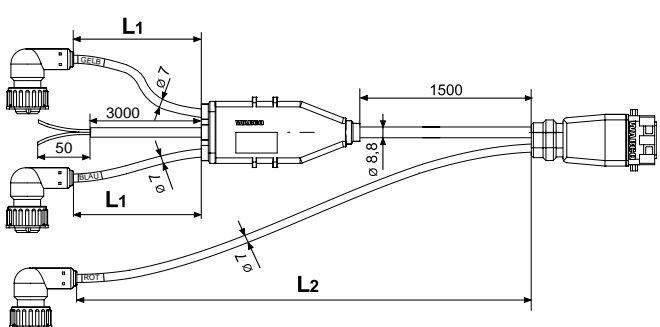
For B-, C-modulator and GIO interface

Application for: Separate ECU

	Order number	L1 in m	L2 in m	Cable end type	
	449 555 293 0	6	8	2 x bayonet socket DIN 72585 B1-3.1-Sn/K1 and 2 x 1.5 mm ²	Plug VCS II elec- tronic control unit "MOD RD"

For A-, B-, C-modulator and GIO interface

Application for: Separate ECU

	Order number	L1 in m	L2 in m	Cable end type	
	449 566 333 0	6	12	3 x bayonet socket DIN 72585 B1-3.1-Sn/K1 and 2 x 1.5 mm ²	Plug VCS II elec- tronic control unit "MOD RD"

5 Installation of the Vario Compact ABS 2nd generation

5.1 General information

The Vario Compact ABS 2nd generation (VCS II) is simple to install. Only a few hand movements are needed to activate the system.

The VCS II version 400 500 081 0 (Premium version) can be configured to up to maximum 4S/3M. **The condition as delivered is 2S/2M**, higher configurations (4S/2M or 4S/3M) are recognised automatically.

The VCS II version 400 500 070 0 (Standard version) is configured to 2S/2M and cannot be modified.

The VCS II version 446 108 085 0 (separate electronic control unit) can be configured to up to maximum 4S/3M. **The condition as delivered is 2S/2M**, higher configurations (4S/2M or 4S/3M) are recognised automatically.

5.2 Installation of the Premium version

1. Attach the system to the vehicle

The electronics/valve unit, consisting of the electronic control unit and the Boxer relay valve, should be installed near the central axle of semitrailers. For trailers, this unit may be optionally mounted in a position close to the rear or front axle. In any case, the cable lengths leading to the brake cylinders should be as short as possible. The device is screwed on via both flanges, right/left, of the Boxer relay valve. Use M8 screws with appropriate washers. The device **must** be installed in such a way that the exhaust faces downward.

2. Connect the pneumatic line of the ABS relay valve(s)

Attach the electronics/valve unit:

- Supply port 1 (M 26x1.5)
- Control port 4 (M 16x1.5)
- Up to six discharge ports 2 (three 2.1 and 2.2 for each side of vehicle, M 16x1.5)

For a 4S/3M configuration, attach the external relay valve:

- Supply port 1 (M 22x1.5)
- Control port 4 (M 16x1.5)
- Two discharge ports 2 (M 22x1.5)

3. Electrical cabling

For the electrical cabling, please use the circuit diagram 841 801 933 0 (4S/3M) or 841 801 931 0 (4S/2M).

3a. 2S/2M configuration

- Connect the diagnostic cable 449 615 000 0 (where appropriate, 449 617 000 0 or 449 619 000 0) with the modulator connector MOD RD (X6)
- Connect the sensor extension cables 449 712 000 0 with connectors BU1 and YE1.
- To avoid switching them, it is important that the respective modulators and wheel sensors are installed on the same side of the vehicle:
 - Wheel sensor BU1 corresponds to port 2.2 (modulator C)
 - Wheel sensor YE1 corresponds to port 2.1 (modulator B)
- Attach the power supply cable to the connector POWER/DIAG (X1) (for part no. see VCS II cabling overview).

3b. 4S/2M system

- Connect the diagnostic cable 449 615 000 0 (where appropriate, 449 617 000 0 or 449 619 000 0) with the modulator connector MOD RD (X6).
- Connect the sensor extension cables 449 712 000 0 with connectors BU1, YE1, BU2 and YE2.
- To avoid switching them, it is important that the respective modulators and wheel sensors are installed on the same side of the vehicle:
 - Wheel sensors BU1/BU2 correspond to port 2.2 (modulator C)
 - Wheel sensors YE1/YE2 correspond to port 2.1 (modulator B)
- Attach the power supply cable to the connector POWER/DIAG (X1) (for part no. see VCS II cabling overview).

3c. 4S/3M system

- Connect the modulator/diagnostic cable 449 616 000 0 (where appropriate, 449 618 000 0 or 449 620 000 0) with the modulator connector MOD RD (X6).
- Connect the sensor extension cables 449 712 000 0 with connectors BU1, YE1, BU2 and YE2.
- To avoid switching them, it is important that the respective modulators and wheel sensors are installed on the same side of the vehicle:

- Wheel sensor BU1 corresponds to port 2.2 of the Boxer relay valve (modulator C)
 - Wheel sensor YE1 corresponds to port 2.1 of the Boxer relay valve (modulator B)
 - Wheel sensors BU2/YE2 correspond to port 2 of the external relay valve (modulator A)
 - Attach the power supply cable to the connector POWER/DIAG (X1) (for part no. see VCS II cabling overview).
- 4. After the installation, switch the system on**
Supply the system with an operating voltage corresponding to product specification 400 500 081 0. Power can be supplied via the ISO7638 plug connection or optionally via ISO1185 (24N).
- 5. Start the PC diagnostic programme**
Connect the diagnostic PC using the diagnostic interface and the diagnostic cable 446 300 329 2.
- 6. Activate the commissioning sequence**
Start the diagnostic software, press the commissioning button and follow the instructions. **The commissioning procedure must always be performed** to verify the correct allocation of sensors and modulators! Brakes must be applied to the wheels at the start of the test!
- 7. End the installation**
After successful commissioning, the system is ready for operation.

5.3 Installation of the Standard version

- 1. Attach the system to the vehicle**
The electronics/valve unit, consisting of the electronic control unit and the Boxer relay valve, should be installed near the central axle of semitrailers. For trailers, this unit may be optionally mounted in a position close to the rear or front axle. In any case, the cable lengths leading to the brake cylinders should be as short as possible. The device is screwed on via both flanges, right/left, of the Boxer relay valve. Use M8 screws with appropriate washers. The device must be installed in such a way that the exhaust faces downward.
- 2. Connect the pneumatic lines of the electronics/valve unit**
Attach the electronics/valve unit:
- Supply port 1 (M 26x1.5)
 - Control port 4 (M 16x1.5)

- Up to six discharge ports 2 (three 2.1 and 2.2 for each side of vehicle, M 16x1.5).

3. Electrical cabling

For the electrical cabling, please use the circuit diagram 841 801 930 0.

3a. 2S/2M configuration (only possible configuration)

- Connect the diagnostic cable 449 615 000 0 (where appropriate, 449 617 000 0 or 449 619 000 0) with the modulator connector MOD RD (X6).
- Connect the sensor extension cables 449 712 000 0 with connectors YE1 and YE2.
- To avoid switching them, it is important that the respective modulators and wheel sensors are installed on the same side of the vehicle:
 - Wheel sensor YE1 corresponds to port 2.2 (modulator C)
 - Wheel sensor YE2 corresponds to port 2.1 (modulator B)
- Attach the power supply cable to the connector POWER/DIAG (X1) (for part no. see VCS II cabling overview, 5-wire only).

4. After the installation, switch the system on

Supply the system with an operating voltage corresponding to product specification 400 500 070 0. Power can be supplied via the ISO7638 plug connection or optionally via ISO1185 (24N).

5. Start the PC diagnostic programme

Connect the diagnostic PC using the diagnostic interface and the diagnostic cable 446 300 329 2.

6. Activate the commissioning sequence

Start the diagnostic software, press the commissioning button and follow the instructions. **The commissioning procedure must always be performed** to verify the correct allocation of sensors and modulators. Brakes must be applied to the wheels at the start of the test!

7. End the installation

After successful commissioning, the system is ready for operation.

5.4 Installation of the separate electronic control unit

1. Attach the system to the vehicle

The separate electronic control unit can be installed anywhere on the vehicle frame. Use the M6 thread on the back side of the electronic control unit. The

electronic control unit must be installed so that the sensor connections YE1, YE2, BU1 and BU2 point downward.

2. Connect the pneumatic line with the ABS valves

Connect the separate ABS valves (ABS relay valve 472 195 031 0, double ABS relay valve 472 195 041 0 or ABS solenoid modulator valves 472 195 018 0 are permitted) as with the VCS 1st generation.

3. Electrical cabling

For the electrical cabling, please use the circuit diagram 841 801 932 0.

3a. 2S/2M configuration

- Connect the modulator cable 449 534 000 0 (Y-cable) with the modulator connector MOD RD (X6).
- Connect the sensor extension cables 449 712 000 0 with connectors BU1 and YE1.
- To avoid switching them, it is important that the respective modulators and wheel sensors are installed correctly:
 - Wheel sensor YE1 corresponds to modulator YE (B)
 - Wheel sensor BU1 corresponds to modulator BU (C)
- Attach the power supply/diagnostic cable to the connector POWER/DIAG (X1) (for part no. see VCS II cabling overview).

3b. 4S/2M system

- Connect the modulator cable 449 534 000 0 (Y-cable) with the modulator connector MOD RD (X6).
- Connect the sensor extension cables 449 712 000 0 with connectors BU1, BU2, YE1 and YE2
- To avoid switching them, it is absolutely essential that the respective modulators and wheel sensors are installed correctly:
 - Wheel sensors YE1/YE2 correspond to modulator YE (B)
 - Wheel sensors BU1/BU2 correspond to modulator BU (C)
- Attach the power supply/diagnostic cable to the connector POWER/DIAG (X1) (for part no. see VCS II cabling overview).

3c. 4S/3M system

- Connect the modulator cable 449 544 000 0 (triple cable) with the modulator connector MOD RD (X6).
- Connect the sensor extension cables 449 712 000 0 with connectors BU1, BU2, YE1 and YE2.
- To avoid switching them, it is absolutely essential that the respective modulators and wheel sensors are installed correctly:
 - Wheel sensors YE2/BU2 correspond to modulator RD (A)
 - Wheel sensor YE1 corresponds to modulator YE (B)
 - Wheel sensor BU1 corresponds to modulator BU (C)
- Attach the power supply/diagnostic cable to the connector POWER/DIAG (X1) (for part no. see VCS II cabling overview).

4. After the installation, switch the system on

Supply the system with an operating voltage corresponding to product specification 446 108 085 0. Power is supplied via the ISO7638 plug connection.

5. Start the PC diagnostic programme

Connect the diagnostic PC using the diagnostic interface and the diagnostic cable 446 300 329 2.

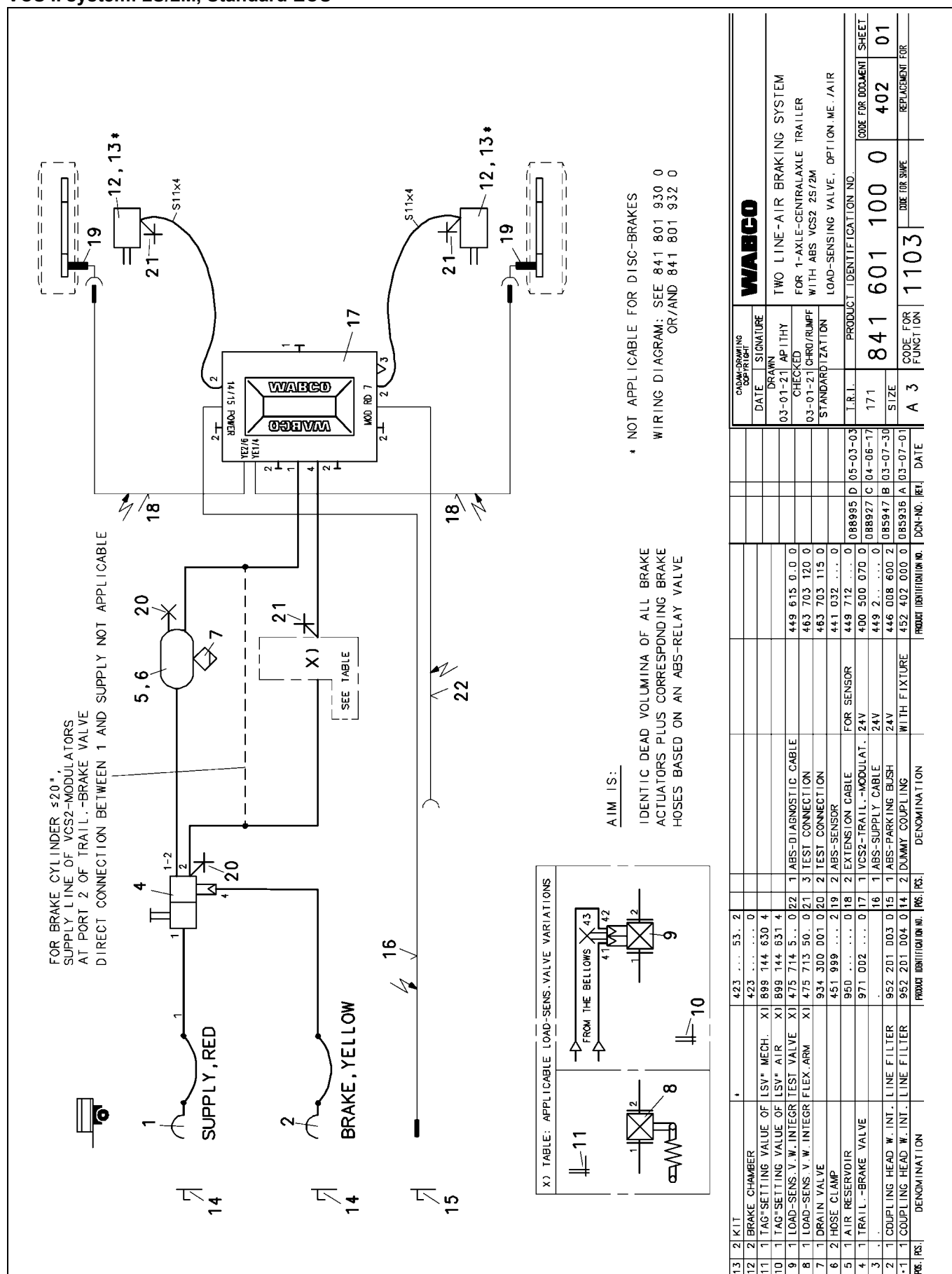
6. Activate the commissioning sequence

Start the diagnostic software, press the commissioning button and follow the instructions. **The commissioning procedure must always be performed** to verify the correct allocation of sensors and modulators! Brakes must be applied to the wheels at the start of the test!

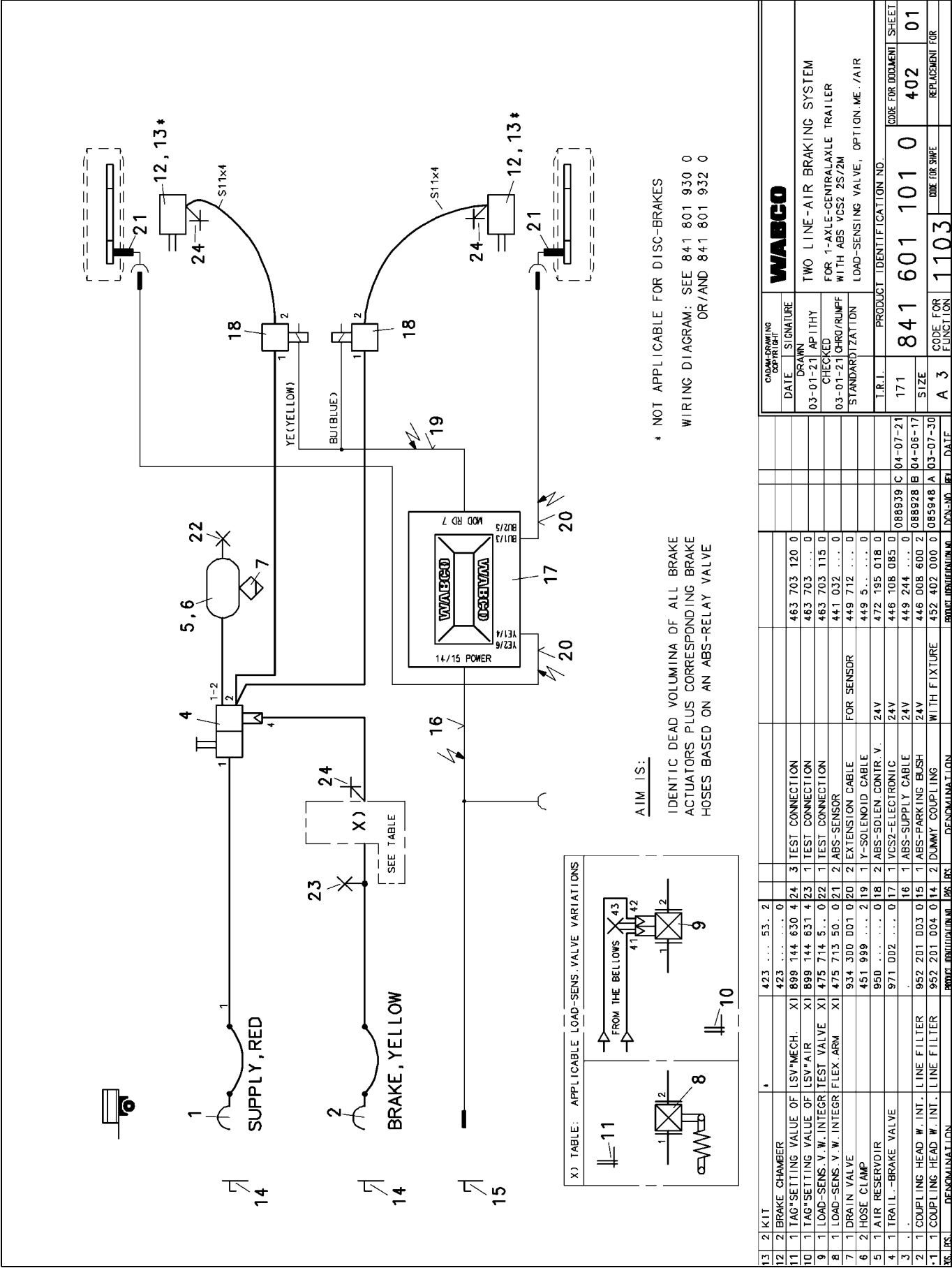
7. End the installation

After successful commissioning, the system is ready for operation.

VCS II system: 2S/2M, Standard ECU



VCS II system: 2S/2M, Separate ECU



VCS II system: 2S/2M, Standard ECU

