



SERVICE BULLETIN No.1064

Circulate to listed addressees

COACH MODEL	: T2100 Series and C2045
BULLETIN TYPE	: Service Information
MANUAL & SECTION	: Maintenance Manual: Chapter 10 – HVAC System Spare Parts Manual: Section 7723 – Air conditioning
PARTS BOOK REVISION	: No
DATE	: May 28th, 2002
SUBJECT	: HVAC compressor control diagnostic feature
TERMS & CONDITIONS	: No claims will be accepted with reference to this Bulletin.

APPLICATION:

The product change subject of this Bulletin has been cut into production as from following units:

Model	Engine	VIN plug	VIN box
T2145	Cummins	43437	44218+44235 →
	Detroit Diesel	43799	44547+44561 →
C2045	Cummins	45001	45173+45222 →
	Detroit Diesel	45501	45647+45686 →
S2145	Not specified	42201	42226

DESCRIPTION:

A diagnostic feature has been introduced on T2100 and C2000 coaches. It comes either as a plug (see Figure 1) or as a direct readout box (see Figure 2). Location is in the engine compartment, next to the control box. Both plug and direct readout box allow service technicians to check the operation of the compressor capacity control and protection systems, without interfering with the wiring.

Service personnel: please read, initial and circulate.

Service Manager	Parts Manager	Warranty Administrator	Workshop Foreman	Service Technician

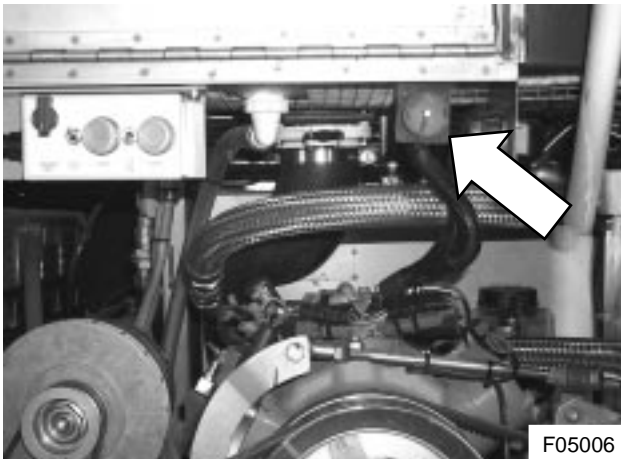


Figure 1: Location of HVAC compressor diagnostic plug in engine compartment

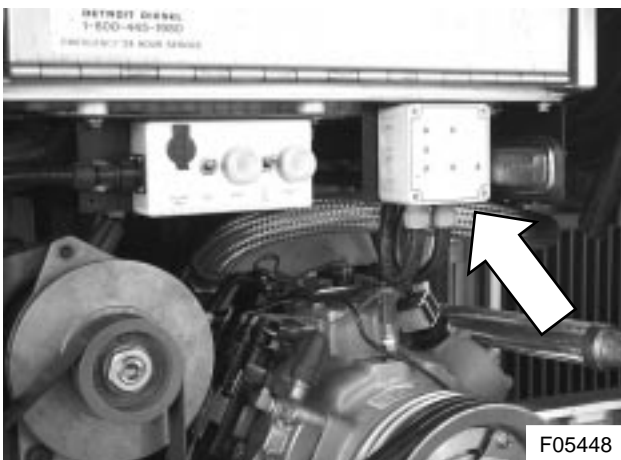


Figure 2: Location of HVAC compressor diagnostic direct readout box in engine compartment

PROCEDURE: To use the HVAC compressor control diagnostic feature

1. General:

- This procedure should be executed by an experienced HVAC technician
- For more information refer to the Electrical Wiring Diagram Booklet that comes with the coach.

2. Special tools, equipment or services:

- The diagnostic procedure for the diagnostic plug requires the use of a multimeter or a circuit tester, and a manifold gauge set.

3. Preparations:

- Park the coach on a level surface and apply the parking brake.
- Put a “DO NOT OPERATE” tag on the instrument panel.
- Read the entire procedure before beginning to work.
- To check and diagnose the HVAC compressor capacity control and protection circuits properly, it is important to know exactly what mode the HVAC system is operating in. It is

therefore recommended that the tests be made by a knowledgeable HVAC technician and that the manifold gauge set is being used in conjunction with the test plug/diagnostic box.

CAUTION: Observe safe shop practices at all times.

4. **Diagnostic plug configuration:**

The plug terminal numbers have been marked on the plug body (see Figure 3).

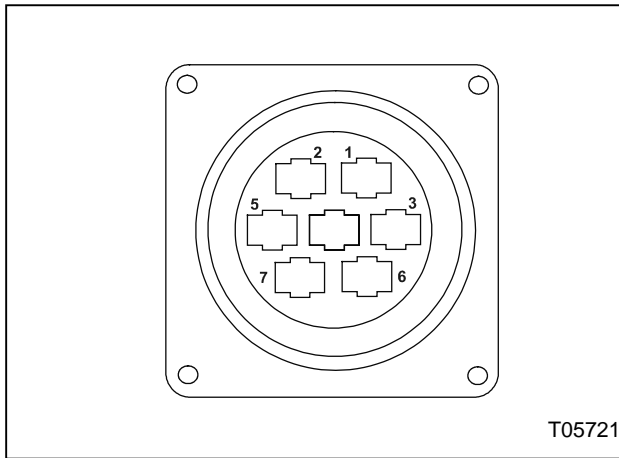


Figure 3: Plug terminal numbers (also refer to text)

- #1 Compressor clutch, unloader 1, unloader 2**
- #2 Unloader 1**
- #3 Compressor clutch**
- #4 Compressor clutch (not marked)**
- #5 Unloader 2**
- #6 Ground**
- #7 Not used**

Terminal #1 is connected to, compressor clutch Y1M and unloader 1 and 2 lines Y4A and Y5A, ahead of the pressure switches.

Terminal #2 is connected to the unloader 1 (Y4A) line, behind the pressure switches.

Terminal #3 is connected to the compressor clutch line Y1M, between the high and the low-pressure switches.

Terminal #4 is connected to compressor clutch line Y1M, behind the high an the low-pressure switches.

Terminal #5 is connected to unloader 2 (Y5A), behind the pressure switches.

Terminal #6 is connected to ground.

***NOTE:** The wiring diagrams attached to this Bulletin show the diagnostic plug hook-up for T2100 and C2000 coaches. Refer to the chart below for diagram references. For service purposes refer to the Electrical Wiring Diagram Booklet that accompanies the coach.*

Model	Carrier diagram #	VH diagram #
T2145	65.50.20.055-03-3	10637477
C2045	65.50.20.075-04-3	10709672

5. **Diagnostic plug use:**

Checks can be made with a multimeter (see Figure 4) or with a circuit tester (see Figure 5). With the HVAC system activated, insert one probe into terminal 6 (ground) and the other probe into the terminal of the line that is going to be checked.



Figure 4: Testing with a multimeter



Figure 5: Testing with a circuit tester

Test using terminal #1

Use this terminal to determine, whether the compressor clutch and the unloaders are activated by the HVAC switchboard. Make sure the operating conditions necessitate the activation.

Voltage is present. The system is activated by the HVAC switchboard. Depending on the operating conditions of the HVAC system, compressor clutch Y1M and unloaders 1 and 2 may be active. Testing may be continued.

No voltage is present. The system is not activated. The control system and/or the wiring is faulty, or the operating conditions of the HVAC system do not require activation of the compressor. Make sure voltage is present at terminal #1 before continuing testing.

Test using terminal #2

Use this terminal to determine, whether pressure switches B15N or B16N are closed and unloader 1 is activated.

Voltage is present. Pressure switch B15N or B16N is closed and unloader Y4A should be activated. If this is not the case, check unloader Y4A. Make sure the operating conditions of the HVAC system require activation of the unloader.

No voltage is present. Both pressure switches B15N and B16N are open. Unloader 1 (Y4A) is not activated.

Test using terminal #3

Use this terminal to check the operation of high-pressure switch B10F.

Voltage is present. High-pressure switch B10F is closed. This is the normal operating mode.

No voltage is present. High-pressure switch B10F is open. Check why this safety device has been activated. Make sure that high-pressure switch B10F is operating properly.

Test using terminal #4

Use this terminal to check the operation of low-pressure switch B11F.

Voltage is present. High-pressure switch B10F **and** low-pressure switch B11F are closed. This is the normal operating mode. Compressor clutch Y1M should be activated. If this is not the case, check the compressor clutch.

No voltage is present. High-pressure switch B10F or low-pressure switch B11F is open. If voltage was present at terminal #3, the power cut is caused by low-pressure switch B11F. Check why this safety device has been activated. Make sure that low-pressure switch B11F is operating properly.

Test using terminal #5

Use this terminal to check the operation of low-pressure switch B17N.

Voltage is present. Low-pressure switch B17N is closed and unloader 2 (Y5A) should be activated. If this is not the case, check the operation of the unloader. Make sure the operating conditions of the HVAC system require activation of the unloader.

No voltage is present. Pressure switch B17N is open and unloader 2 (Y5A) is not activated.

6. Direct readout box configuration:

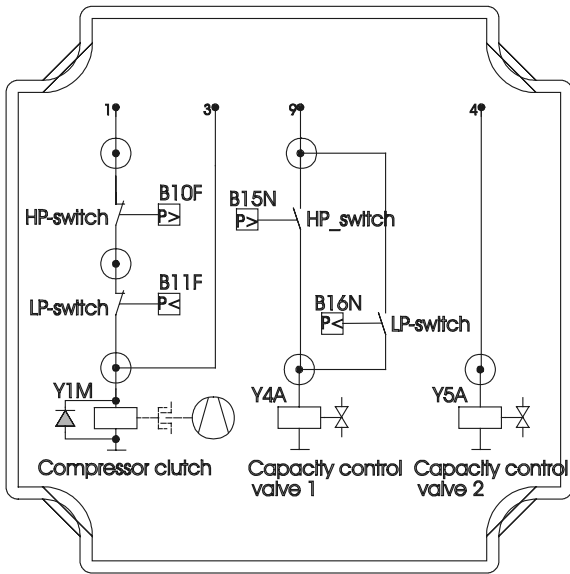
The direct readout diagnostic box is a further development of the diagnostic plug. The use of a circuit tester or a multimeter is no longer required.

On the box cover is a decal showing the section of the electric wiring diagram the box is connected to (see Figure 6).

NOTE: *The wiring diagrams attached to this Bulletin show the direct readout diagnostic box hook-up for T2100 and C2000 coaches. Refer to the chart below for diagram numbers. For service purposes always refer to the Electrical Wiring Diagram Booklet that accompanies the coach.*

Model	Carrier diagram #	VH diagram #
T2145	65.50.20.055-03-3	10733657
C2045	65.50.20.075-05-3	10734460

Positioned on the diagram, at 6 points of measurement, are green LEDs. These show what part of the circuit is active/inactive by lighting up or going out according to the mode of operation of the HVAC system. The hook-up for the box is similar to the one of the plug.



T05894

Figure 6: Wiring diagram section on direct readout diagnostic box (LEDs shown as circles with dot)

7. Diagnostic box use:

The charts below show the operation of the different subsystems, which keep HVAC compressor operation within safe limits.

System protection				Plug terminal							LED display		
Cooling 1 signal (Uk)	HP protection switch (B10F)	LP protection switch (B11F)	Compressor clutch	1	2	3	4	5	6	7	A	B	C
On	Closed	Closed	On	-	-	1	1	*	Gnd	*	On	On	On
Off	Open	Open	Off	-	-	0	0	*	Gnd	*	Off	Off	Off
On	Open	Closed	Off	-	-	0	0	*	Gnd	*	On	Off	On
On	Closed	Open	Off	-	-	1	0	*	Gnd	*	On	On	Off

Symbols and abbreviations:

- * : not used
- : N/A
- 0 : 24V not present between terminal and ground (Gnd)
- 1 : 24V present between terminal and ground (Gnd)

Capacity control system							Plug terminal							LED display		
Cooling 1 signal (Uk)	HP control switch (B15N)	LP control switch (B16N)	Un-loader 1 (Y4A)	Cooling 2 signal (ULR)	Un-loader 2 (Y5A)	Com-pres. capacity	1	2	3	4	5	6	7	D	E	F
Off	Open	Open	Loaded	Off	Loaded	Off	0	0	-	-	*	Gnd	*	Off	Off	Off
On	Closed	Open	Unloaded	Off	Unloaded	33%	1	1	-	-	*	Gnd	*	On	On	On
On	Open	Closed	Unloaded	Off	Unloaded	33%	1	1	-	-	*	Gnd	*	On	On	On
On	Open	Open	Loaded	Off	Unloaded	66%	1	0	-	-	*	Gnd	*	On	Off	On
On	Closed	Open	Unloaded	On	Loaded	66%	1	1	-	-	*	Gnd	*	On	On	Off
On	Open	Closed	Unloaded	On	Loaded	66%	1	1	-	-	*	Gnd	*	On	On	Off
On	Open	Open	Loaded	On	Loaded	100%	1	0	-	-	*	Gnd	*	On	Off	Off

Symbols and abbreviations:

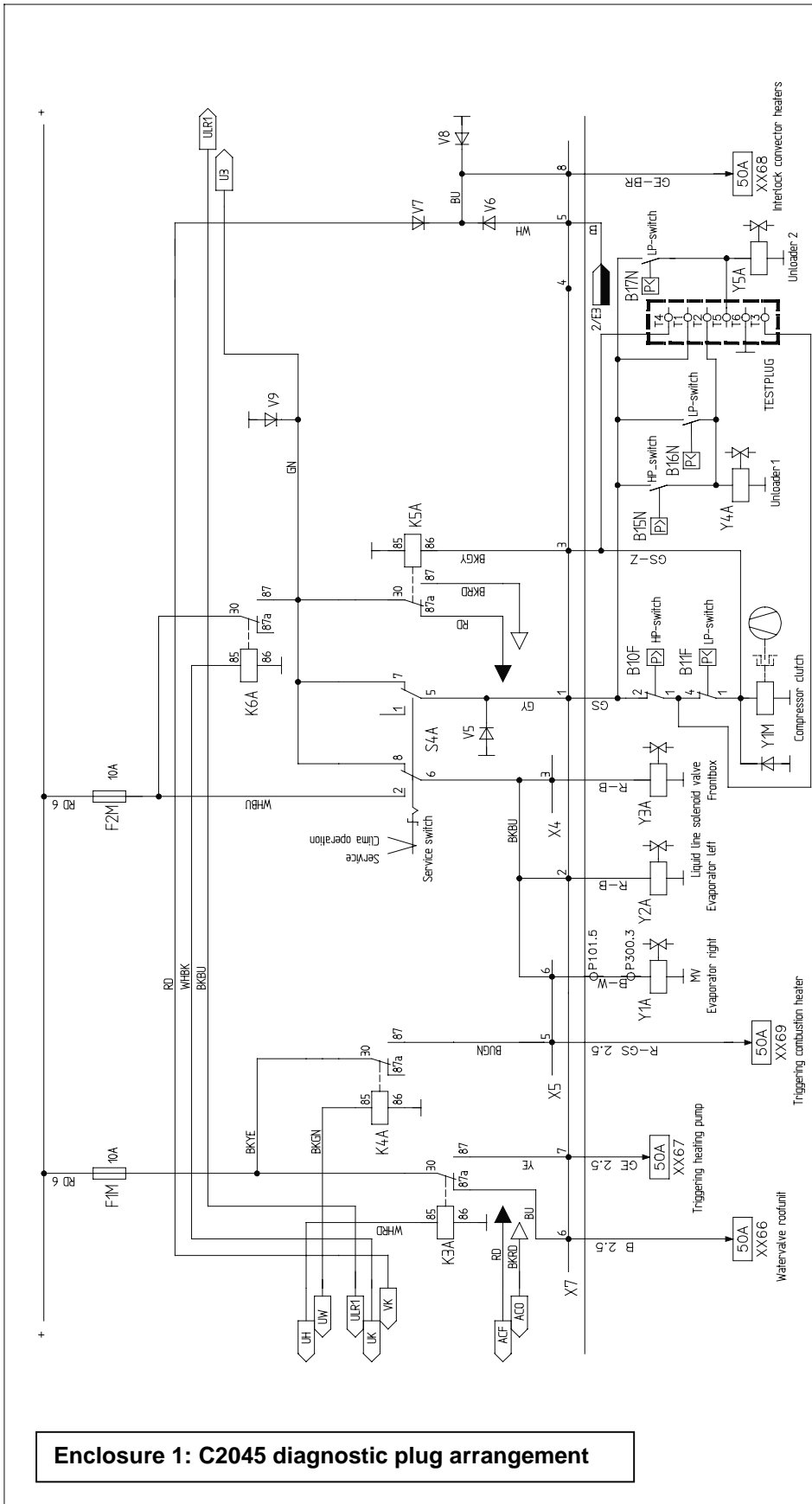
- * : not used
- : N/A
- 0 : 24V not present between terminal and ground (Gnd)
- 1 : 24V present between terminal and ground (Gnd)

Procedure complete.

SERVICE INFORMATION:

Service Bulletins are issued to supplement or supersede information in the Van Hool manuals. Note Service Bulletin number, date and subject on the register at the end of the relevant chapter(s). File Service Bulletin separately for future reference.

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Enclosure 1: C2045 diagnostic plug arrangement

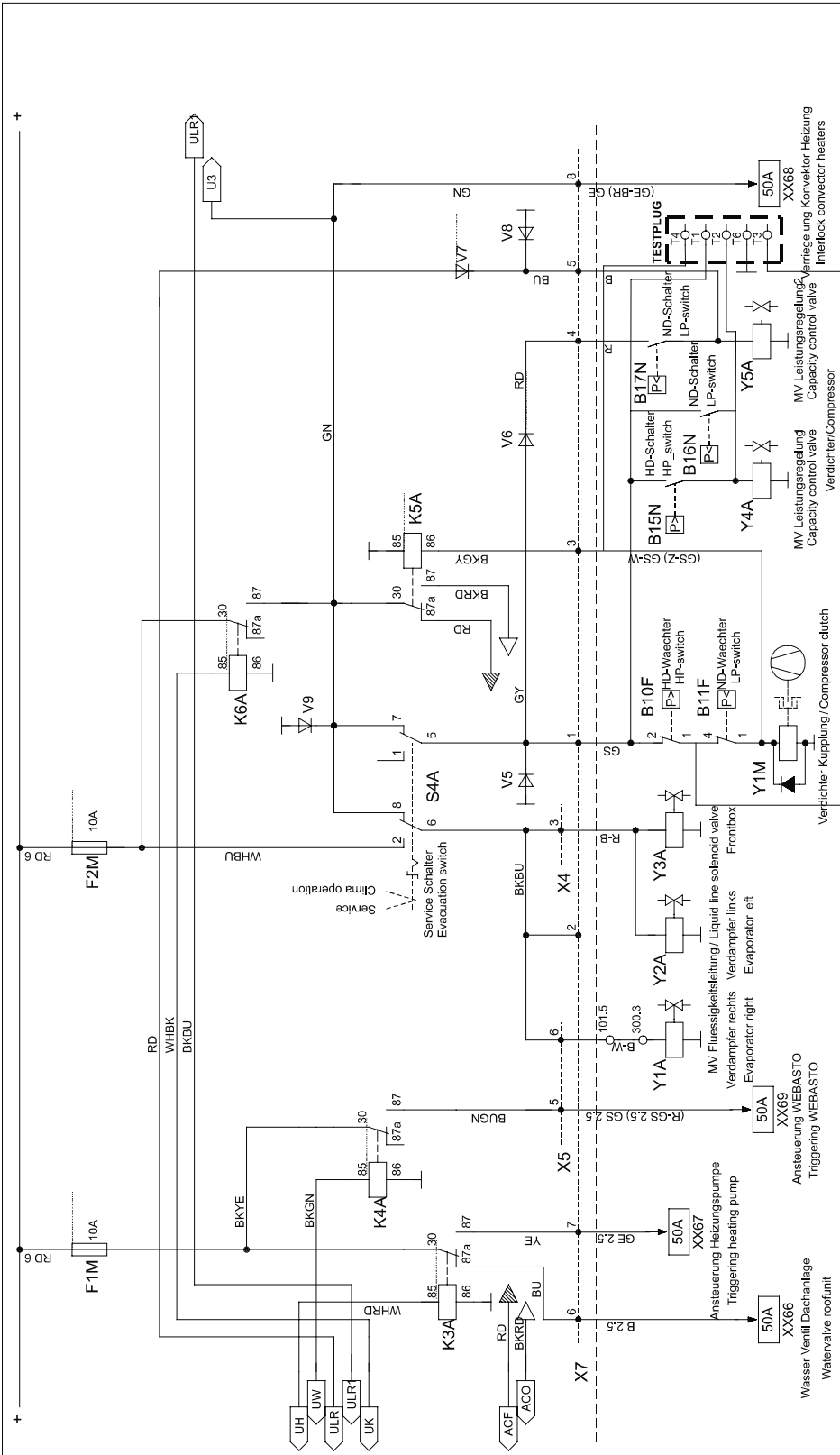
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C	B	A PW 12944		MILIZIENGEN	
VERSE	I S O SYMBOL	NAAM	DATUM	MATRIKAL	
	GET VISUM FV-JG	K.V.D.	02-03-2000	—	
SI-30T-K187-CFRXZ(1)		PSNR / TREFW		1/1	
60 50E3		FORM GS MS		10709672/3/	
—		VH NUMBER		—	
—		B 2500 LIER		—	

Ref. BASIS

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 10 710 001 —
 10 710 002 —
 10 710 003 —
 10 710 004 —

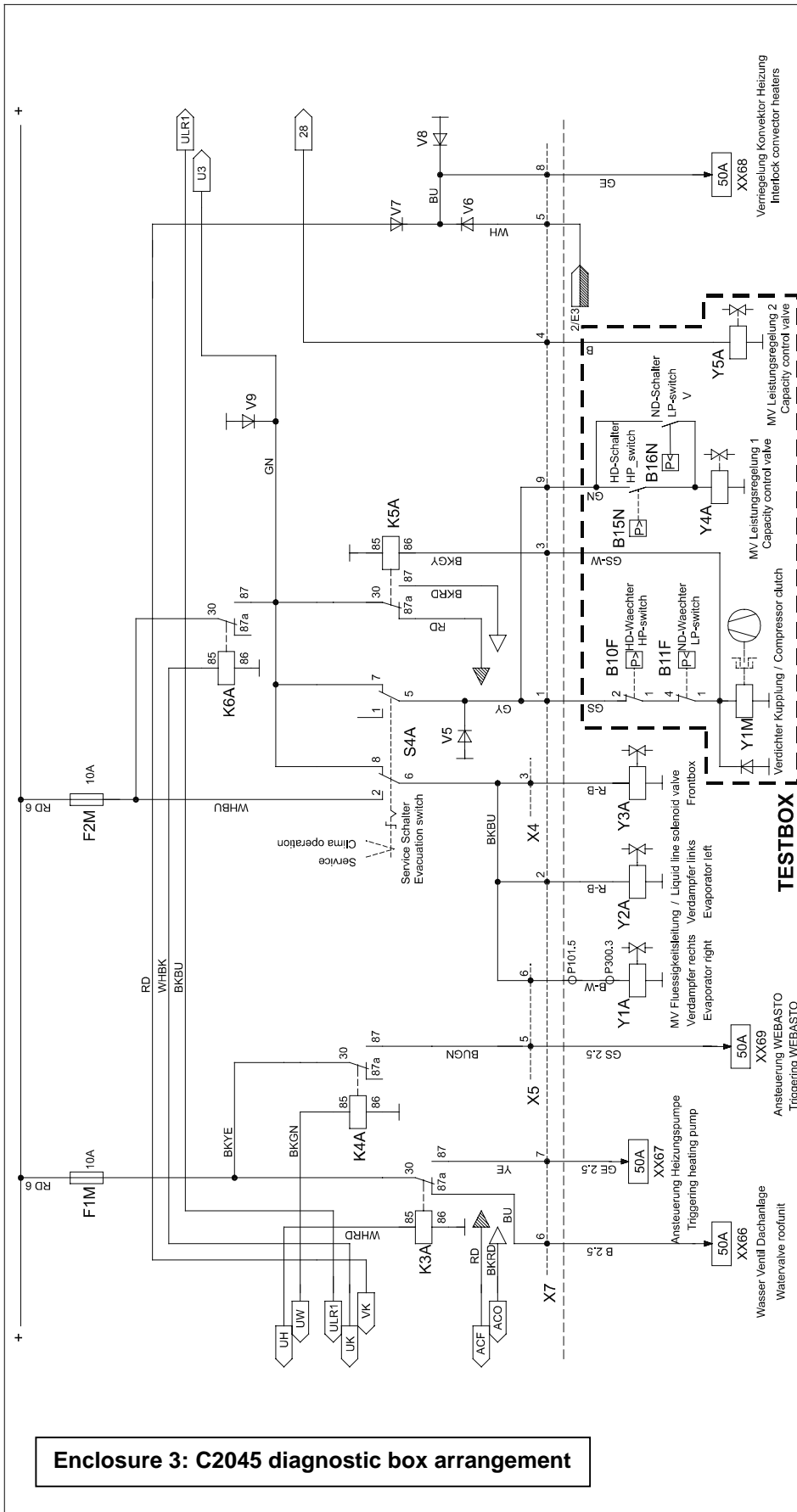
65.50.20.075-04-3
 01-12-1999

Enclosure 2: T2100 diagnostic plug arrangement



Gehr. T2100		PV 13312, NIEUWE DRAADKLEUREN		K.V.D.	F7-A/G	19-07-2000
C	TOEVOEGEN TESTPLUG			K.V.D.	F7-A/G	24-01-2000
B	TOEVOEGEN VRIJLOOPDIODE CONDENSORKOPPELING			K.V.D.	F7-A/G	21-05-99
A	TOEVOEGEN VRIJLOOPDIODE CONDENSORKOPPELING			GET	VISUM	DATUM
VERSIE	WILZINGEN			GET	VISUM	DATUM
ISO SYMBOOL	NAAM	DATUM	MATERIAL	LUSPESBINDER EN TOLERANTIES OP VOLGENS VAN HOOL NORMEN		
GET	K.V.D.	03-02-98	SCHAKEN	VOLGENS VAN HOOL NORMEN		
VISUM	F.V.-JG			PSNR / TREFFV		
SI27/28T-K186-CFR(1)		50E3		FORM GS MS		
		-		WH NUMBER		
		-		10637477 / 31		
		-		B 2500 LER		

	Ref. BASIS	10636911
	SET	10636905
		10636906
		10636907
		TRANSPORTKAELE GmbH D-71272 Remmingen 65.50.20.055-03-3 29-08-1997



Enclosure 3: C2045 diagnostic box arrangement

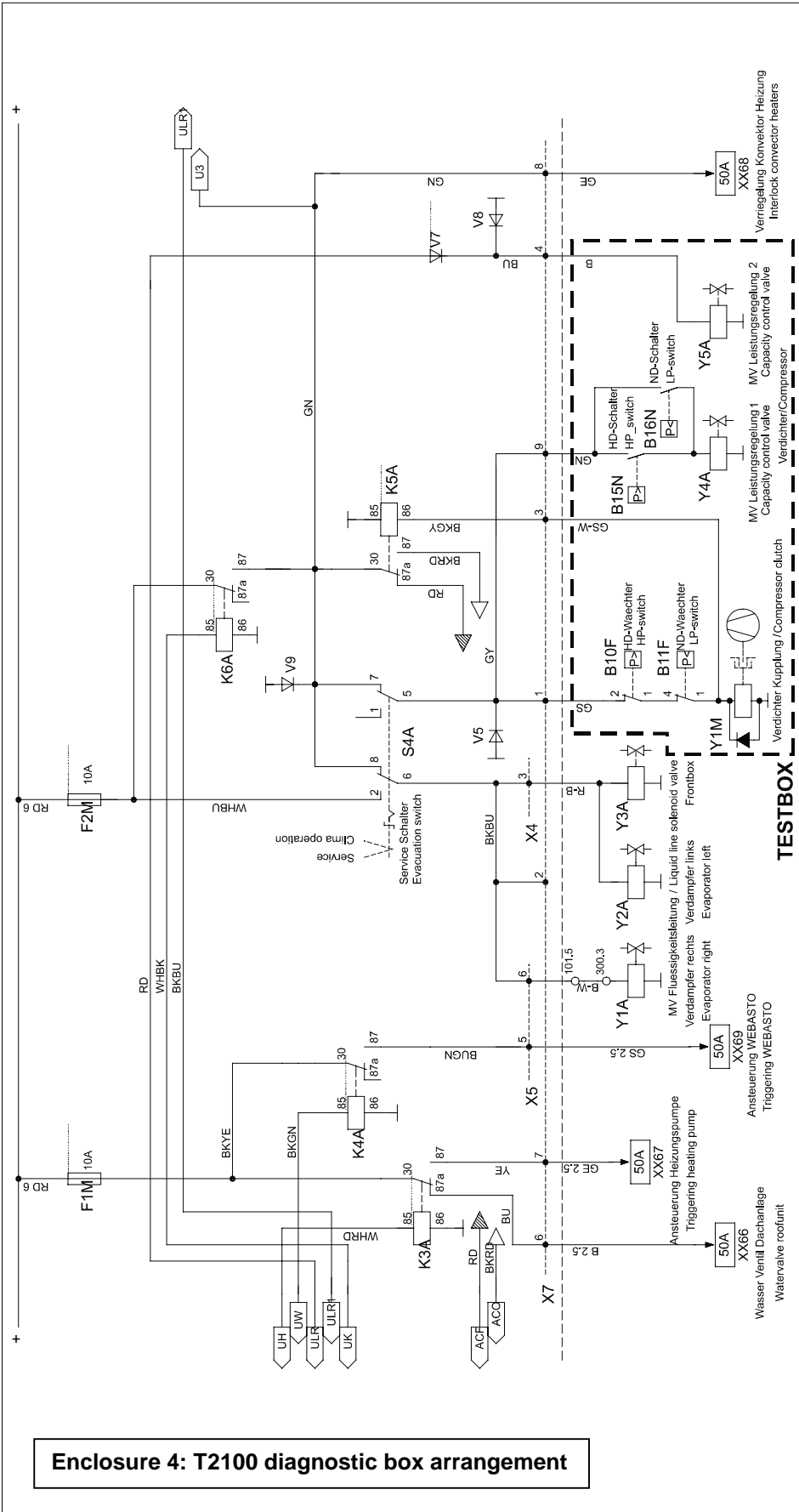
Gebr. COMMUTER COACH USA		VERBODEN TOEGANG TOT DEZE TOEGANGSDEUR	
C	B	WALZINGEN	DATUM
B	A	VERBODEN TOEGANG TOT DEZE TOEGANGSDEUR	22-1-2000
VERSIE	MAAM	IS 0 SYMBOOL	1/1
GET	K.V.D.	SCHALEN	PSNR/TREPW
VISUM	PLUG	PSNR/TREPW	60 50E3
SI-30T-K187-CFRXZ(1)		CODE	-
VH NUMBER		FORM	GS MS
10734460 / 3/		-	
B 2500 LER		-	
VERBODEN TOEGANG TOT DEZE TOEGANGSDEUR		VERBODEN TOEGANG TOT DEZE TOEGANGSDEUR	
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 10 770 002 - 10 710 007
 10 770 004 - 10 710 008

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 06-03-2000



Enclosure 4: T2100 diagnostic box arrangement

Geh. T2100		WIRZINGEN		GET	VISUM	DATUM
C	B	A				
VERSIE		MAAM		LUS/VERBODEN EN TOEGANGS VOOR VRIJE MATEN, INDIEN VOLGENS VAN HOOL NORMEN		
ISO SYMBOL		K.V.D.		MATERIAL		
VISUM		F.V.-J.G.		SCHALEN		
SI27/28T-K186-CFR(1)				PSNR / TRETY		
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				B 2500 LER		
				WH NUMBER		
				10733657 / 3/		
				GS MS		

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SÜTRAK

TRANSPORTKAeLTE GmbH
 D-71272 Renningen

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