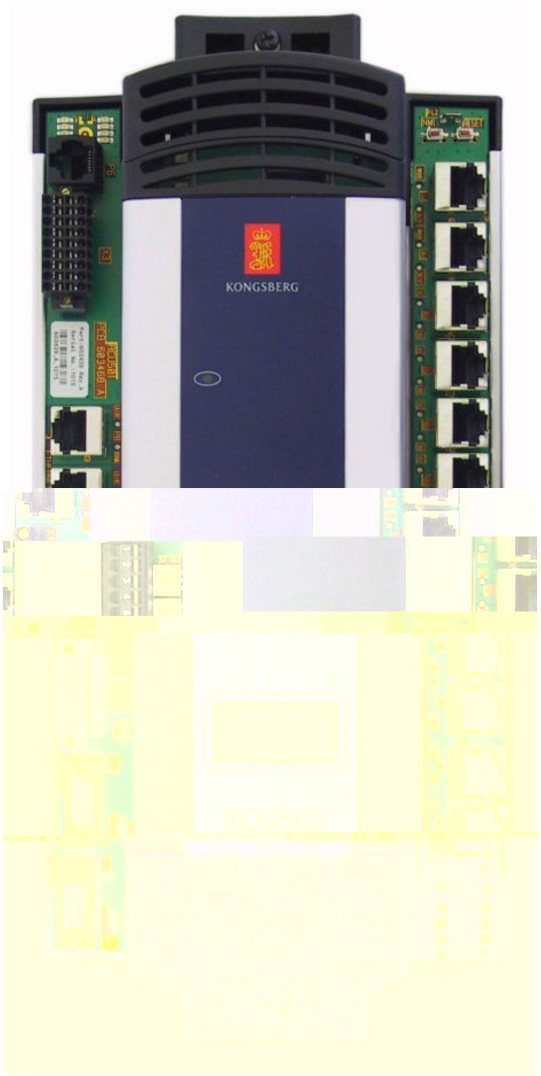
KONGSBERG

RCU502

Hardware Module Description

Kongsberg Maritime Part no.330924



358190/B

Document history

.		.
.		. , . . , . . , . . . , ...

Note

The information contained in this document remains the sole property of Kongsberg Maritime AS. No part of this document may be copied or reproduced in any form or by any means, and the information contained within it is not to be communicated to a third party, without the prior written consent of Kongsberg Maritime AS.
Kongsberg Maritime AS endeavours to ensure that all information in this document is correct and fairly stated, but does not accept liability for any errors or omissions.

Warning

The equipment to which this manual applies must only be used for the purpose for which it was designed. Improper use or maintenance may cause damage to the equipment and/or injury to personnel. The user must be familiar with the contents of the appropriate manuals before attempting to operate or work on the equipment.
Kongsberg Maritime disclaims any responsibility for damage or injury caused by improper installation, use or maintenance of the equipment.

Comments

,

.

- . .

. .

Table of contents

1 MODULE OVERVIEW 9
2 MODULE FUNCTION 11
3 TECHNICAL SPECIFICATIONS 22
4 MODULE PIN AND CONNECTOR DESCRIPTION 25

. ( )
. ( )
. ( )
. ( )
. ( )
. (, ,)
. ( )
. / ( )
. ( )
5 MODULE INSTALLATION 35
6 MODULE REPLACEMENT 36
. .....
. .....
. . ..
. . ..

Glossary

ADC

BITE -

CAN

CPLD

CPU

DI

DLL

DO

DSP

ECC

EMC

ESD

FPGA

GND

HF

HW

I^{2c}

IE

IEEE

I/O /

IRQ

KM

LAN

LED

Link Channel

-

MAC

MB

MH_z

MTBF

NMI -

PCI

/

PE

PLD

Process Net
- / -

PROFIBUS

PROFIBUS DP
.
/ , ,
. .
, .

RAM

RBUS /

RBUS interface -

RBUS Power

RCU502

RedNet
- / -

RHUB200–5

RIO /

RIO200 /

RIO420 /

RFI

RMP /

ROM

RS232
.

RS422 , ,
.

RS485 , ,
.

RSER200–4

SBC

SRAM

SDRAM

TN-S-DC

UART /

WD

/

1 Module overview

1.1 Document user

, -

.

1.2 Module functions and features

.

™

.

-

-

- -

- -

-

, (- / -)

(- / -)

, (- / -)

- -

/

/ -

( )

(.)

- ( ) -

1.3 Safety information

. .

’ ’

- . -

-

( ) - (

).

2 Module function

, , -

- .

™

.

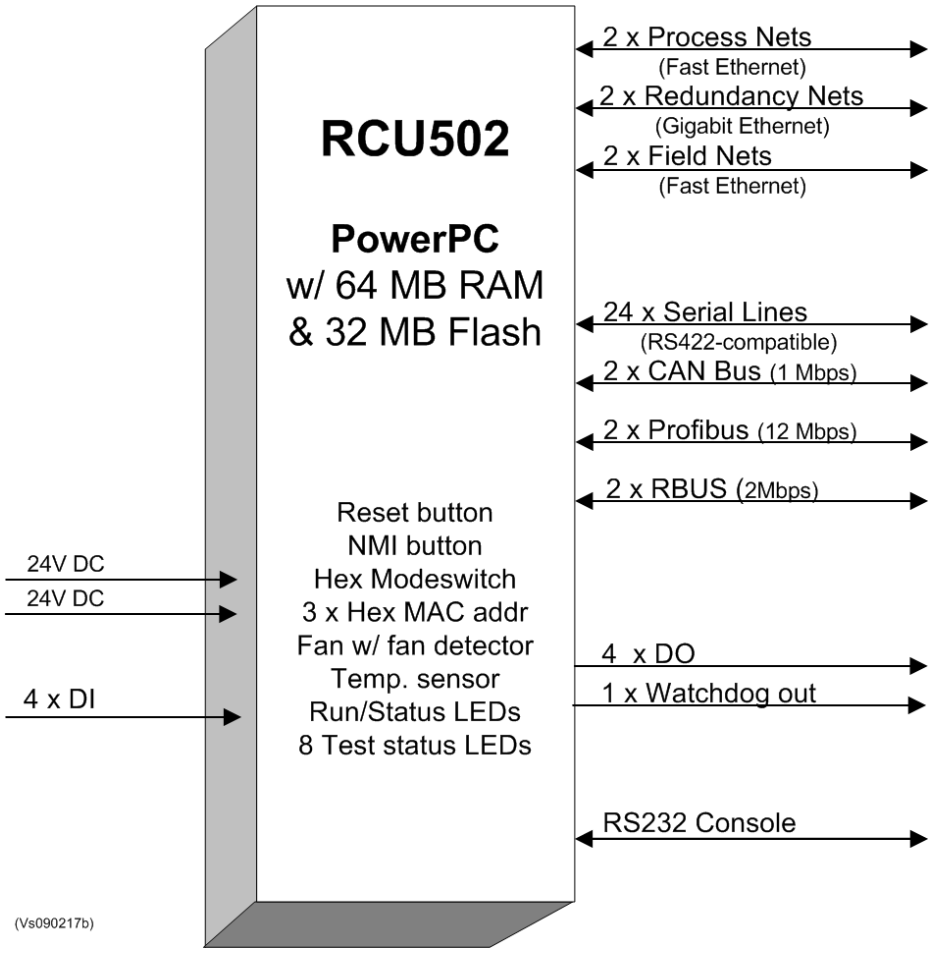
.

,

. ,

, .

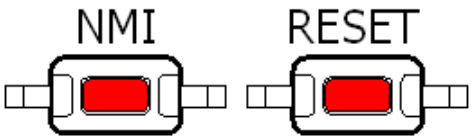
Figure 1 RCU502 interface block diagram



/

2.1 Controls, indicators and system connector

Figure 2 NMI and RESET buttons layout



(Vs090015a)

2.1.1 NMI push-button

2.1.2 RESET push-button

2.1.3 RCU condition monitoring

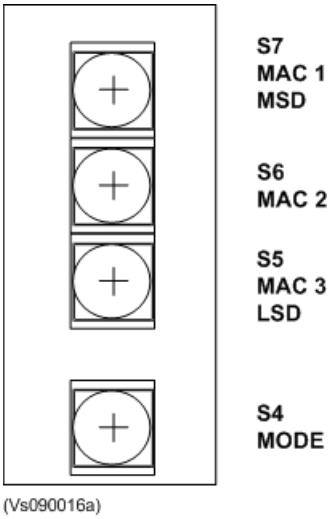
2.1.3.1 RCU502 system alarms

2.1.4 Address switches (MAC 1, MAC 2, MAC 3)

( ), ( ), ( )

.

Figure 3 Address switches and Mode switch



.

2.1.4.1 Example of address setting

, ,

.

/

2.1.5 MODE switch

( ) ( ),

.

.

.

MODE HEX switch setting	Function
0	. . .
1	.
2	.
5	. . .
D	. . . ( )
F	(() .)

Note

The switch has to be set to 0 (zero) for normal operation (default setting).

2.1.6 LED indicators

2.1.6.1 Run status LED

. - **run error** .

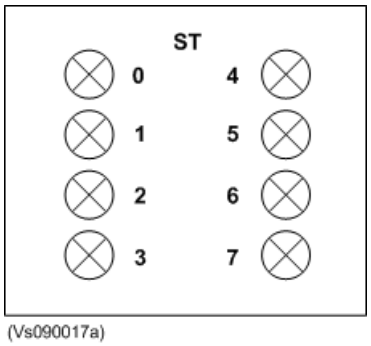
Table 1 LED indicator information

LED name	Colour	Function
		Run (. . .
		Error

2.1.6.2 Eight test status LEDs

. . , . , . - .

Figure 4 Test status LEDs layout



- (,).

Table 2 Start-up LED status pattern

Phase	ST3–ST0	Task running

Table 2 Start-up LED status pattern (cont'd.)

Phase	ST3–ST0	Task running

2.1.7 RS232 console connector (P6)

.

-

- , (

) .

Note

***Safety**: There are restrictions with respect to use of this functionality in safety systems. The safety will be de-guarded in debugging mode.*

2.2 Power supply

( )

. ( )

.

,

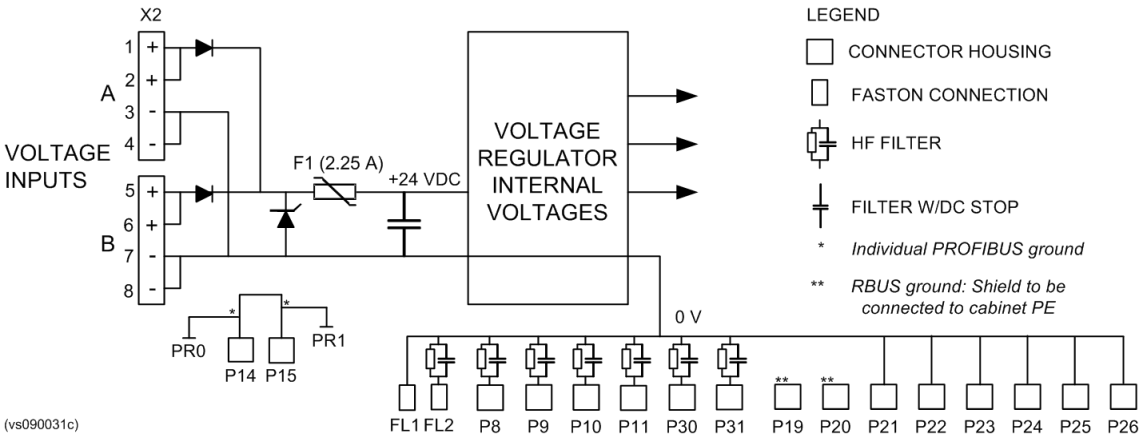
. ,

.

.

.

Figure 5 Power supply principles



2.3 Process Net interfaces

, , .

. - / - .

( ).

2.4 FieldNet interfaces

, ( ) ( )

. . .

. . .

Note

***Safety**: For IEC 61508 functions only qualified I/O drivers shall be used.*

2.5 RedNet interfaces

( )

( ) .

.

.

/

Figure 6 Dual RCU redundancy

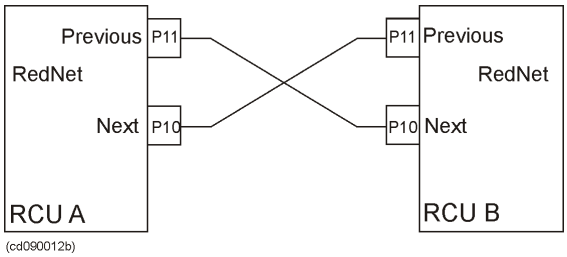
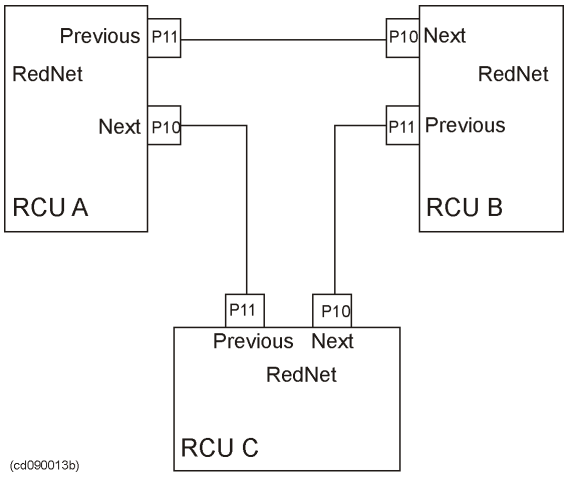


Figure 7 Triple RCU redundancy



2.6 Serial line interfaces

( ).

- .

. ,

.

( ).

.

.

.

Note

***Safety**: For IEC 61508 functions only qualified I/O drivers shall be used.*

2.7 RBUS interfaces

( ) . / . . .

2.8 CAN interfaces

( ), . .

Note

***Safety**: For IEC 61508 functions only qualified I/O drivers shall be used.*

2.9 PROFIBUS DP interfaces

( ), . , .

Note

***Safety**: For IEC 61508 functions only qualified I/O drivers shall be used.*

2.10 Onboard I/O channels and Watchdog

, - . . **0** . . .

Note

***Safety**: The onboard I/O signals shall neither be used in IEC 61508 systems for SIL functions nor for SIL monitoring functions.*

/

2.11 Self diagnostics

-

.

2.11.1 Watchdog control

( ) .

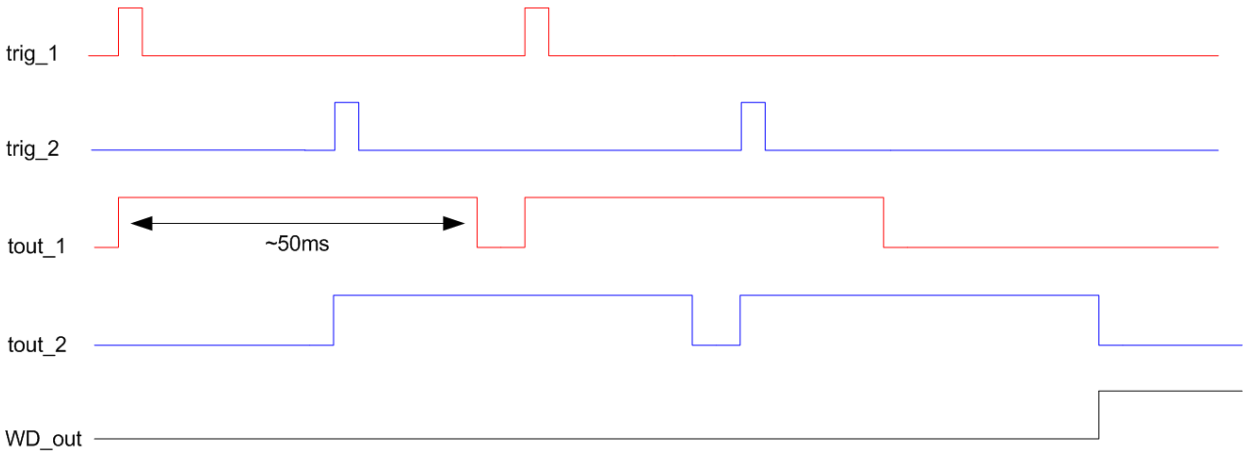
-

- . (*trig_1* *Trig_2*)

( ) . - (*WD_out*

) ' - ' .

Figure 8 Watchdog timer



2.12 Module grounding

( ).

- - -

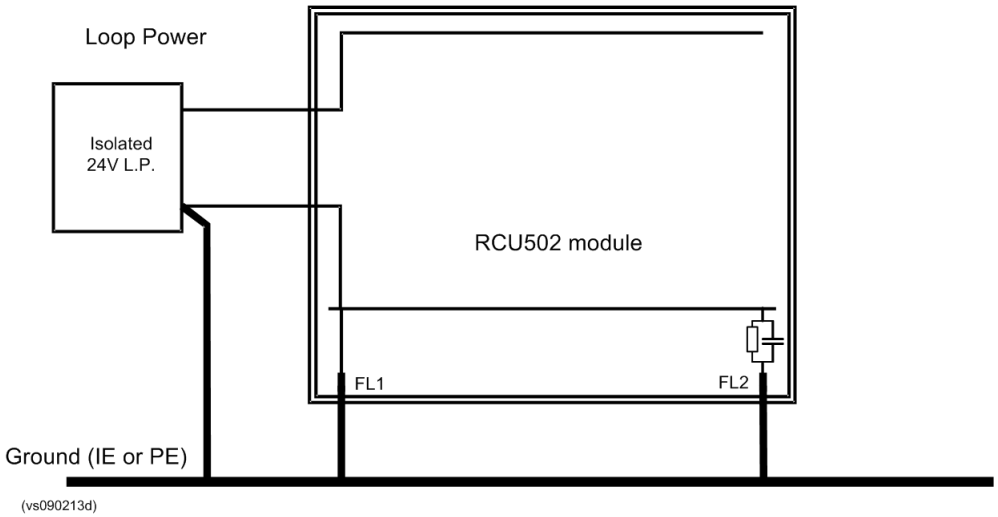
.

.

Note

This is the recommended ground alternative due to high noise immunity, over-voltage protection as well as EMC (ESD, RFI etc).

Figure 9 Module grounding in a TN-S-DC system according to IEC 60364



2.13 Safety functions

3 Technical specifications

Table 3 Technical specification

Power supply requirements	
-	+ (+ - +) . . . . . ( ) .
Central processor and memory specifcations:	
	™ / -
Watchdog specifcations	
-	. . ,
General Purpose I/O channel specifcations	
Digital output (DO) **Digital input (DI)** **I/O connectors**	- . - ( ) . - .
Network interface specifcations	
Process Net interface **FieldNet interface**	, . - / - , . , . - / - , .

Table 3 Technical specification (cont'd.)

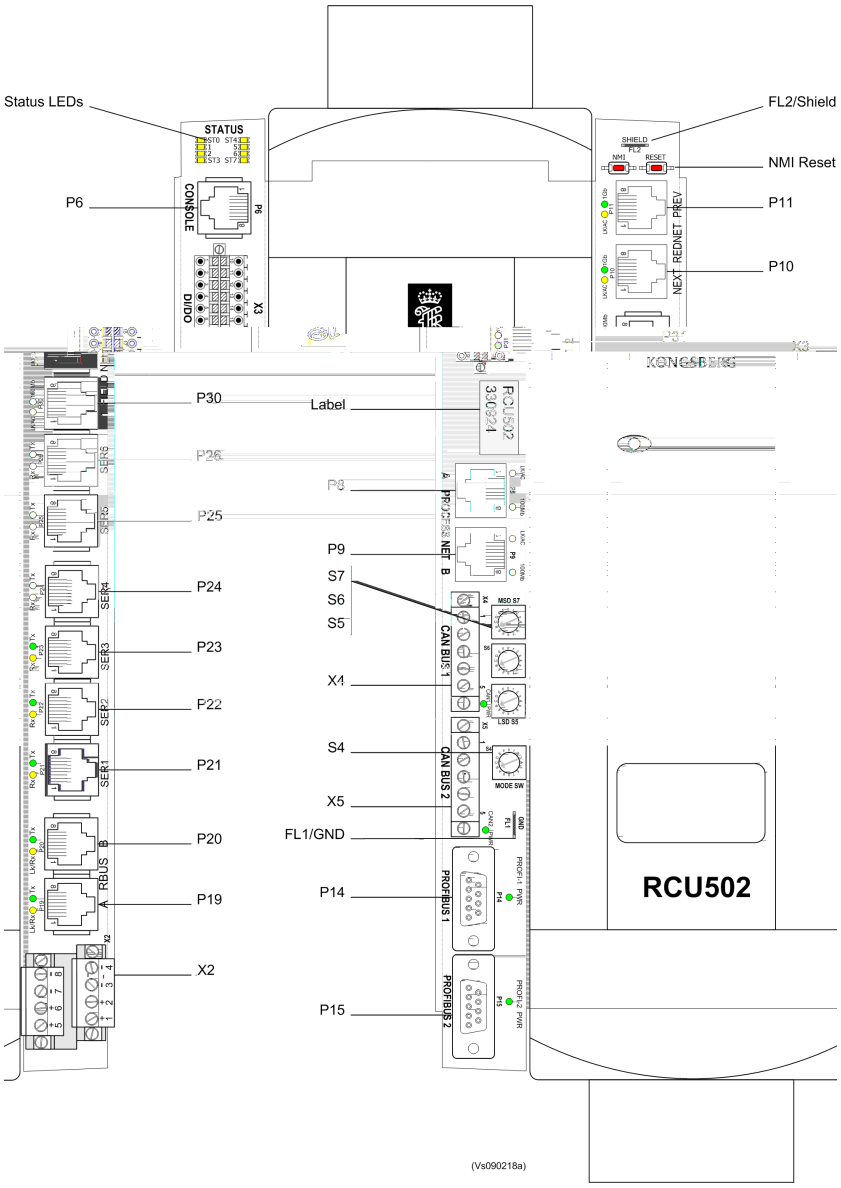
RedNet interface	, . - / - , .
Serial Line interface	
	. , , . /
Remote I/O interface specifcations	
RBUS	, , . (-) + - + . /
Copper wire topology	( ) - . / ( ) . .
Fibre optics topology (w/additional fbre media converter)	. / , - ( ), .
Fieldbus interface specifcations	
CAN interface	, / . - . . ( )
PROFIBUS DP interface	, , - , - .

Table 3 Technical specification (cont'd.)

Console interface specifcations	
	, , ,
Fan specifcations	
	,
Mechanical specifcations	
( )	. - / .
Environmental requirements	
	- + - + .
Life cycle predictions	
(% ,)	.
(-)	,
Safety IEC 61508	
	. . . .
Recycling	
Pb Lead-free	/ ( ). / ( ).

4 Module pin and connector description

Figure 10 Layout of RCU502



allocation P20 and P19 9 ab Tle

Function name	Signal	Pin no.
+		

Chann(el link allocation P26 to P21 4 connect

( ). ( )

.

( ) -

.

allocation P26 to P21 10 ab Tle

Function name	Signal	Pin no.
# ,		-
# ,		-
# ,		
, #		
, #		
# ,		
,		

...., , ,

/

.

.

Note

Each connector housing of P21 to P26 is connected to common ground (see Figure 5 on page 17).

4.9 X1 (Fan connection)

( ) -

.

Table 11 X1 pin allocation

Pin no.	Pin name	Function
	+	

4.10 X2 (Power connection)

( ) - .

(

).

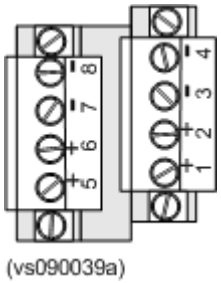
.

"

- " ( ).

.

Figure 14 X2 terminal layout



/

Table 12 X2 terminal allocation

Terminal number	Terminal name	Function
	+	,
		,
	+	,
		,

4.11 X3 (DI, DO, WD)

- - -

.

.

Figure 15 X3 terminal layout and allocation

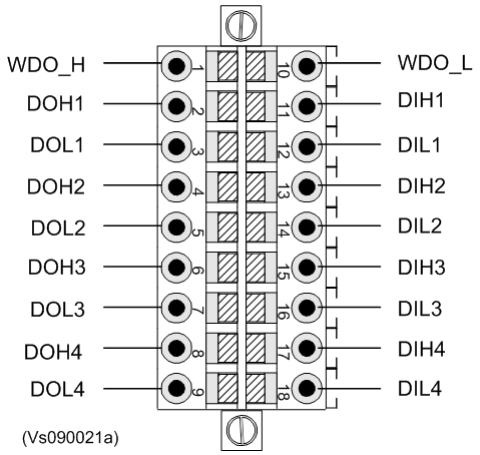


Table 13 X3 terminal allocation

Terminal number	Signal name	Function
		( )
		( )
		( )
		( )

Table 13 X3 terminal allocation (cont'd.)

Terminal number	Signal name	Function
		( )
		( )
		( )
		( )
		( )
		( )
		( )
		( )
		( )
		( )
		( )
		(( )
		( )
		( )

4.12 X4 and X5 pin allocation (CAN connection)

( ) ( ).

- .

.

.

Figure 16 X4 and X5 terminal layout

/

6 Module replacement

6.1 Module replacement procedure

1 - ( )
( ) .

2
- ( ).

Note

The connectors X2 to X5 can be split by firstly release the attachment screws and then split the header from the connector body using a thin bladed screwdriver.

3 .

4 ( ) .

5 .

6 .

7
.

8 **0**.

9 .

10
.

11 .

12 .

13
.

14 .

15 /
.

16 .

17 - .
.

18 ( )
.

6.2 Fan replacement

6.2.1 Spareparts

6.2.2 Replacement procedure

1 ( ).

2 .

3 ( ).

4
.

5 ( ).

Note

The new fan body shall have a gasket located on the top side to avoid a loose assembly.

Be aware of determining correct fan orientation. Blowing direction must be into the module. See arrow marks on the fan for your guidance.

6 .

7 . (
').

8 .

9 ( ) .

10
( ).

11 /
.

12 .