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PRODUCT DOCUMENTATION



Fieldbus System
Quick Reference
User manual

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This manual has the Part-No.: 110 592

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Quick-reference manual

for the ferrocontrol Fieldbus system

1st edition, October 98
ID no.: 110 592 / English

Target group:

Service technicians, commissioning personnel, skilled workers familiar with the basic functions of automation equipment.

Range of application of this documentation:

This document should serve as a practical guide for the service technician on location when locating and remedying faults.

Complementary documentation:

You can find a current list of our documentation in the [appendix](#) of this manual.

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1 What you definitely need to know

1.1 Safety information

Instructions you must follow when doing repairs!



Must read!

1. **Interference and repairs carried out improperly can impair the integrated safety and protection functions of an automation system and can, in certain circumstances, cause risk to life and health of persons as well as damage to machinery and plant parts!**
2. **For this reason repairs to our automation systems may only be carried out by suitably qualified skilled workers!**
3. The qualified skilled worker is familiar with the risks and the appropriate safety measures to be taken when dealing with electrical currents.
4. The qualified skilled worker is familiar with the safety and protective measures common to all automation equipment - and in particular with the measures of the relevant machine (plant).
5. The qualified skilled worker can evaluate the damage and risks (caused by incorrect operation or by failure of a protective function) properly.
6. **Only use original spare parts specified by ferrocontrol**
Alterations and conversions to our components are not permitted. To do this you need our express permission.
7. **Please observe the valid accident prevention regulations!**
See VBG 4 and DIN VDE 015.
8. **After servicing or repairs:**
Before returning the machine to the production process, make absolutely certain that all integrated safety and protective devices are ready to function again. You are obliged to do this. See VBG 4.
9. **Please observe the safety conditions of the machine manufacturer!**

1 What you definitely need to know

1.2 Password information

Important input masks are protected by a password system against unauthorized access. Our password system permits a classification into a maximum of 9 access levels.

A password status is assigned to every access level. Status 9 has the highest priority. Status 9 gives you access to all levels, status 8 to the levels 1 to 8 and status 7 to the levels 1 to 7 and so on.

In agreement with the machine manufacturer, ferrocontrol allocates the input masks to a certain access level.

If you wish to obtain access entitlement to a particular level, as a user or service technician, you have to have the required status. You receive the status assignment by entering the appropriate password.

The assignment of passwords for the status 1 to 8 is carried out in the mask: Passwords / assigning (see [Quick overview 2.2](#))
Access to this mask is only possible with status 9!
The password for status 9 is assigned by ferrocontrol.

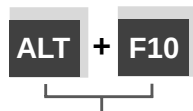


Notice!

If you wish to alter the configuration data or the controller parameters in the Service menu, you need the password for status 8.



Enter password:



Password entry takes place in the mask: Password / enter

You can call this entry mask from all menu levels using the key combination [ALT] + [F10].

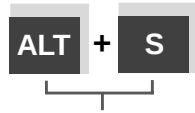
The entry mask appears on the screen.

Enter the appropriate password.

Confirm your entry with the key [F10].

If you have entered a valid password, the status assigned to you is displayed.
If the password is invalid, an appropriate message is displayed.

Switching languages:

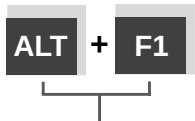


Using the key combination [ALT] + [S] you can switch between two national languages for the menu functions, e.g.:

German <-> English
German <-> French etc.

You can activate this function from every menu level. A prerequisite is, however, that a second language has been integrated for menu functions.

Direct access for test and diagnostic purposes (ATEST)



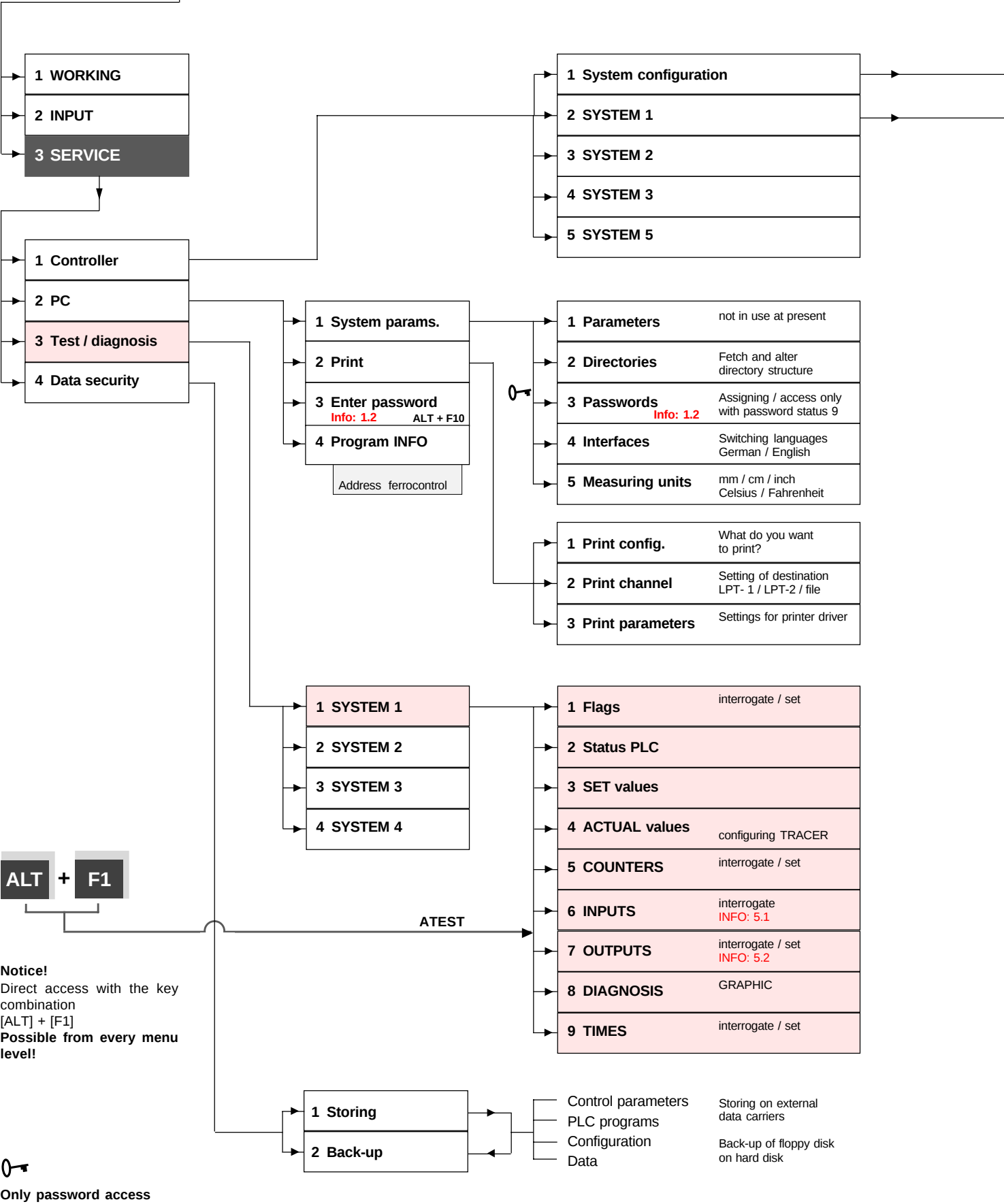
Direct access to the ATEST function is achieved by pressing the [ALT] + [F1] key combination. **This function enables you to inquire current actual values from the controller.**

**You can activate this function from every menu level!
With this function you cannot alter configuration data or parameter settings!**

2 Functional overview: Service menu

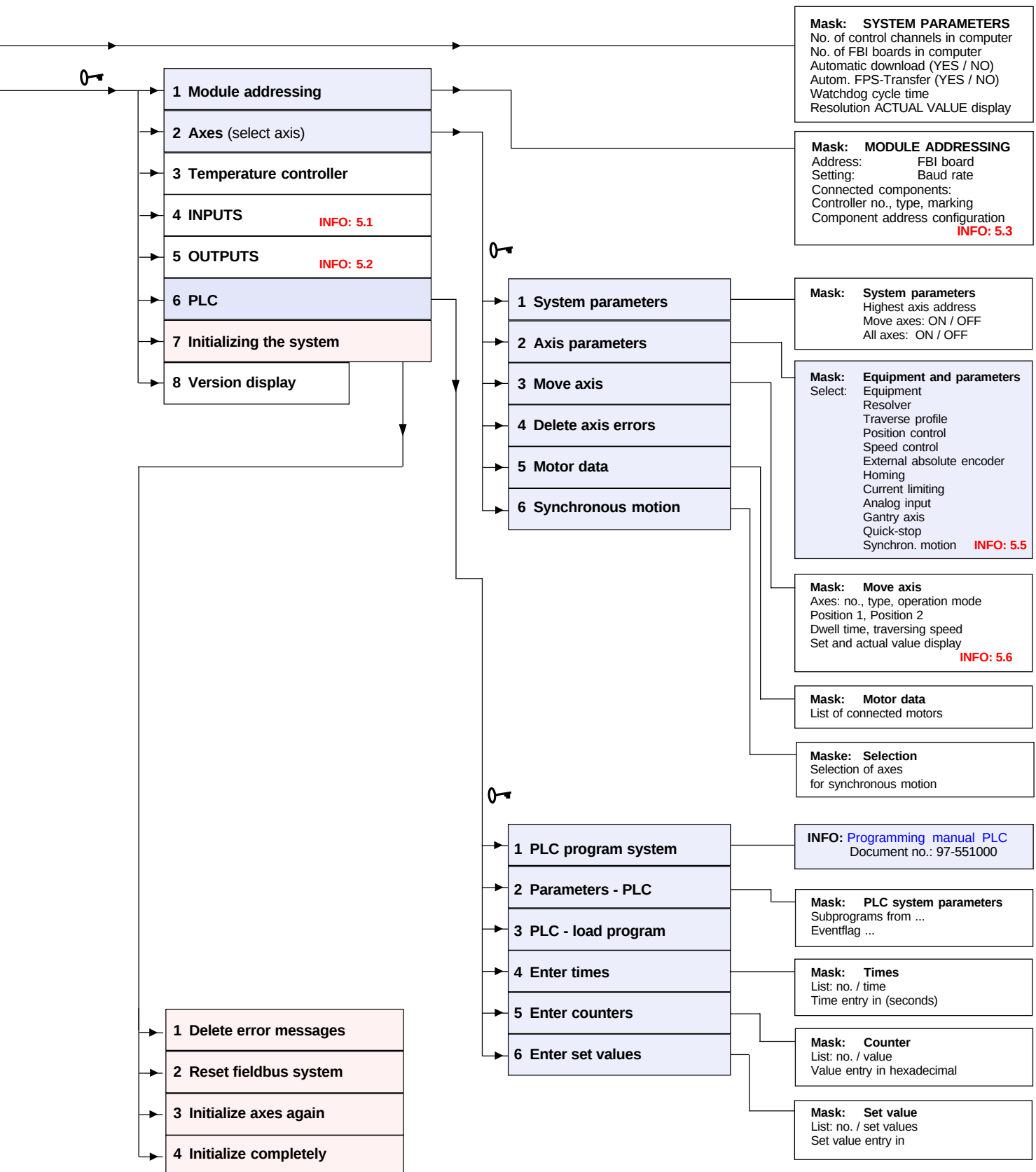
2.2 All functions at a glance

ferrocontrol - V 2.16



2 Functional overview: Service menu

2.2 All functions at a glance



2 Functional overview: Service menu

Space for your own notes

3 Where are system and error messages displayed?

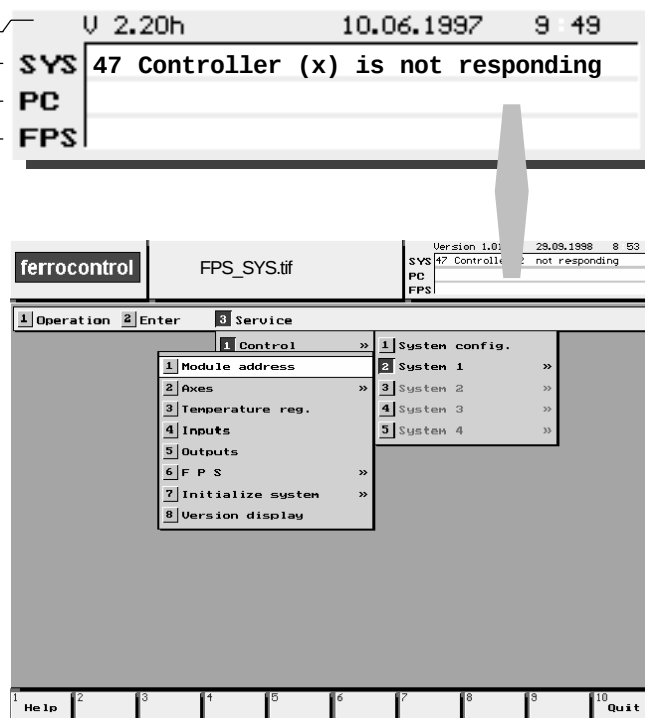
Message overview

The ferrocontrol automation system is equipped with a powerful information and message unit. This aid shows you the current operating status of the plant on the screen.

This effective diagnostic tool is especially useful in determining the cause of a malfunction.

On the following pages you will be shown how this aid can be used effectively.

This display field appears on every screen mask.



3.1 FPS

This line shows the messages from the Programmable Logic Control section. (PLC)

3.2 PC

This line shows the messages from the industrial PC section

3.3 SYS

This line shows the complete messages from the Fieldbus SYSTEM section, including DARC.

The meaning of these messages along with tips for trouble-shooting can be found in this manual in **Pos. 4.1**

3 Where are system and error messages displayed?

3.3.1 Messages from the axis controller

Screen mask: "Move axis"

Following error	0.000
Actual speed (rpm)	0
Actual torque	0
Act. posit. 2.encoder	0.000
Operational status axis	0000
Error status axis	0000
Hardware configuration	0000
Job counter axis	00
Error status MotCont	0000
Operational status MotCont	0000
Heat sink temperature	0
Resolver offset	0
Status 2. encoder	00
Position pos. flank	0.000
Position neg. flank	0.000
Motor controller vers.	0000
Boot EPROM vers.	0000
Encoder interface version	0000

Selection of
the relevant axis

C 8 4 2

lower byte (1st group)
upper byte (2nd group)

Example:

upper byte

C 8 = Interpolation active

lower byte

4 x = Axis is referenced

x 2 = Temperature monitoring

(x = any status)

Display: operating status - axis

In older software versions this entry is also called

Axis status or **Operating status 1**.

These labels are identical!

This display is shown in a hexadecimal numerical system.

The four-digit display is divided into two groups (lower and upper byte).

In 4.2.1 you can see in plain text which operating status
lies concealed behind the character combination displayed.

Access to this screen mask:

1. Press the key combination
[ALT] + [F1] -> ATEST
2. Select Position 4 -SET VALUES-
3. Select the required axis
4. Press the [F4] key for details

Further information about this
screen mask

See Pos. 5.6

Display: Error status - axis

In older software versions this entry is also called

Error profile generator or **Error status 1**.

These labels are identical!

This display is shown in a hexadecimal numerical system. In 4.2.2 the
plain text shows you which operating status lies concealed behind the
character combination displayed.

3 Where are system and error messages displayed?

3.3.2 Messages from the motor controller

Screen mask: "Move axis"

Following error	
Actual speed (rpm)	0
Actual torque	0
Act. posit. 2.encoder	0.000
Operational status axis	0000
Error status axis	0000
Hardware configuration	0000
Job counter axis	00
Error status MotCont	0000
Operational status MotCo.	0000
Heat sink temperature	0
Resolver offset	0
Status 2. encoder	00
Position pos. flank	0.000
Position neg. flank	0.000
Motor controller vers.	0000
Boot EPROM vers.	0000
Encoder interface version	0000

Selection of
the relevant axis

0 0 0 2
├── Bit - 0...3
├── Bit - 4...7
├── Bit - 8...11
└── Bit - 12...15

Example: 0002
5-volt voltage error

Example 0200
Stack error

Display: Operating status - motor controller

In older software versions this entry is called
Status motor controller or **Operating status 2**.
These labels are identical!

This display is shown in a hexadecimal numerical system. In 4.3.2 you can see in plain text which operating status lies concealed behind the character combination displayed.

Access to this screen mask:

1. Press the key combination
[ALT] + [F1] -> ATEST
2. Select position 4 -ACTUAL VALUES-
3. Select the required axis
4. Press the [F4] key for details

Display: Error status - motor controller

In older software versions this entry is called
Error motor controller or **error status 2**.
These labels are identical!

This display is shown in a hexadecimal numerical system. In 4.3.1 the plain text shows you which operating status lies concealed behind the character combination displayed.

Further information about
this screen mask:
See Pos. 5.6

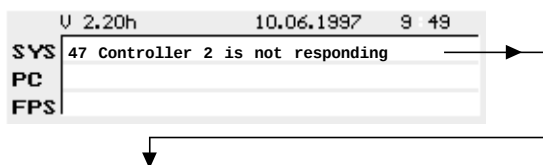
3 Where are system and error messages displayed?

Space for your own notes

4 What the system and error messages mean

4.1 System messages from the fieldbus system

Message no. 1 to 6



No.:	Message text / English	Tips for fault clearance	Additional information
1	No encoder value axis no.	The axis listed is not receiving any actual position value (encoder value). This axis is not started but is stopped immediately! Check the encoder signal for this axis! For fault clearance aid see also: 4.2.1 Operating status axis Message: D8xx; No encoder value Check encoder cables!	This message also appears in the mask: Move axis Operating status axis Display: D8xx The pin configuration of the encoder cables can be found in Chapter 7
2	Sluggish axis	Following error During positioning the given set value is constantly compared with the encoder signal (position ACTUAL value). If an inadmissible deviation occurs, the axis is stopped immediately. For fault remedy see also: 4.2.1 Operating status axis Message: D9xx Axis sluggish	This message also appears in the mask: Move axis Operating status axis Display: D9xx (Hex) Error status axis Display: 4000
4	Set value error axis no.:	Error in given set value / measuring unit Your current set value is not within the permitted limits for axis positioning. The axis won't start. Check your set value setting / measuring unit	This message also appears in the mask: Move axis Operating status axis Display: DCxx Error status axis Display: 0080
5	Axis no.: not initialized	There are no valid axis parameters for this axis. Remedy: Reset the fieldbus system! See also Pos. 2.2 Quick overview service menu: Initializing the system	
6	Profile error axis no.:	Message from the interpolator. The given contour can't be traversed with these parameters. Check your set speed value Entering the speed is performed in the user program	See also Position: 4.2.1 Operating status axis Display: DDxx (hex) 4.2.2 Error status axis Display: 0800 (hex) Mask: Move axis

4 What the system and error messages mean

4.1 System messages from the fieldbus system

Message no. 7 to 25

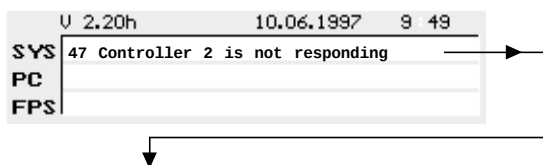
U 2.20h	10.06.1997	9 49
SYS	47 Controller 2 is not responding	
PC		
FPS		

No.:	Message text / English	Tips for fault clearance	Additional information
7	Argument error axis no.:	Incorrect interpolation data (e.g. radius = 0). The axis switches off immediately! The interpolation could not be performed because the speed at non-constant transitions was too high (negative circle radii). Remedy: 1. Check the interpolation data! 2. Exchange the interpolator board!	This message also appears in the mask: Move axis 4.2.2 Error status axis Display: 2000
8	System error FBIR axis no.:	Axis switches off immediately! Remedy: Exchange interpolator for DARC or FBIR	
9	Error current controller axis no.:	Message from DARC controller (Current control processor) Remedy on location: exchange DARC	
11	Quick-stop, positive axis no.:	The quick-stop (+) input is set at zero. (Limit switch in positive direction) -> clockwise rotation	See Pos. 6.20 Pin configuration Axis regulation controller (X 1) See also circuit diagram in the appendix (last page) Pos. 22 / KL. X1 / 2 Pos. 23 / KL. X1 / 3
12	Quick-stop, negative axis no.:	The quick-stop (-) input is set at zero. (Limit switch in negative direction) -> anticlockwise rotation	
13	Interpolation error group no.:	Interpolation error message. You will find information about the cause of the error in the status message of the relevant interpolation group.	
25	Axis no. inadmissible	Check the axis number entry Your entry exceeds the max. permissible value. Maximum 63 axes!	

4 What the system and error messages mean

4.1 System messages from the fieldbus system

Message no. 26 to 51



No.:	Message text / English	Tips for error clearance	Additional information
26	Error in axis parameter transmission	Configuration error, axis number possibly not entered.	
27	PLC start refused	PLC (Programmable Logic Control) has not been loaded. Possibly a file cannot be found when starting the PC program.	
28	Interpolation error controller	Erroneous transmission of the interpolation data from the PC to the FBIR board.	
34	PC; error not defined	Not defined	
47	Controller (x) is not responding	Proceed as follows: 1. Check the power supply to the controller. Check the fuse (F) on the controller board. If the green LED is on = OK. 2. Check the cable connection to the fieldbus system. If the red LED is not on = OK.	See Pos. 6.2 ... Fieldbus controller
48	Input does not exist	The input address does not exist in the system.	
49	Output does not exist	The output address does not exist in the system.	
50	Axis no.: does not exist	This axis does not exist in this configuration. The configuration data have not been loaded yet.	
51	No transmission enabling	Possible error causes: 1. Fieldbus not connected 2. Terminating resistor (terminator) is missing 3. No supply voltage at the fieldbus end 4. Fieldbus cable defective	Check supply voltage: See Pos. 6.1 ... Connector configuration Fieldbus cable: See Pos. 7.5

4 What the system and error messages mean

4.1 System messages from the fieldbus system

Message no. 52 to 58

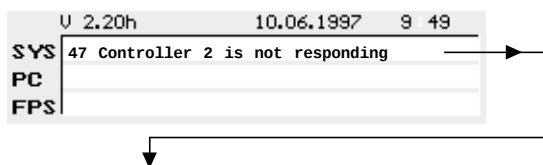
U 2.20h	10.06.1997	9 49
SYS	47 Controller 2 is not responding	
PC		
FPS		

No.:	Message text / English	Tips for error clearance	Additional information
52	Status error	Possible causes of error: 1. Fieldbus not connected 2. Terminator is missing 3. No power voltage at the fieldbus end 4. Fieldbus cable defective	Check supply voltage: See Pos. 6.2 ... etc. Connector configuration Fieldbus cables: See Pos. 7.5
54	Handshake error	Software versions controller - FBI do not match.	
55	Configuration error controller	Error on Parallel bus Possible causes of error: 1. The controller has not received any configuration data yet. 2. The voltage supply to the controller was briefly interrupted. 3. Error in the parallel connector	Info: Pos. 6.2 ... etc.
56	Controller not ready to receive	Check the configuration in the mask: Module addressing. Which DARC has not been entered? (Key F2 = Read configuration)	Mask: Module addressing See Pos. 5.3
57	No acknowledge controller	Check your configuration! Which controller has not been entered? No confirmation received for axis command. Error on the fieldbus, poss. incorrect software version.	
58	Fieldbus error on controller	Erroneous protocols, too many errors during data transfer! 1. Make sure that the cable lengths in the fieldbus system have not been exceeded. Max. cable length = See Pos. 8.1 and 8.2 2. Make sure that the fieldbus cables are not damaged. Pay special attention to earthing and screen cables. 3. Hardware error controller board Exchange the controller board.	Notice! EMC If earthing and screen cables are defective or improperly connected, it can lead to EMC irradiation (and thus to defective data transfer)! Info EMC: See Manual CNC-Fieldbus Section: Commissioning

4 What the system and error messages mean

4.1 System messages from the fieldbus system

Message no. 59 to 64



No.:	Message text / English	Tips for error clearance	Additional information
59	No interpolator	Your axis controller module does not have an interpolating function	
60	Timeout on controller	Erroneous data transfer on the fieldbus: 1. Check the cable and plug connectors. 2. Exchange the FBI board.	Connector configuratiuon fieldbus cable See Pos. 8.1 and 8.2
61	No digital controller	A special command for the digital axis controller was sent to another controller.	
62	Axis still has a job	The axis is still occupied and so no new job can be taken on at the moment. Notice! If necessary correct the positioning window in the parameter "Position control"	Info: Position control mask See Pos. 5.5.4 and manual DARC System Commissioning and Service Chapter 6.3.5.6
63	Incorrect interpolation group	This message appears: 1. if an incorrect interpolation group has been defined in the PLC. 2. if there is no interpolator.	
64	Watchdog elapsed	This message appears if the watchdog function has elapsed and the contact on the FBI board is open. Notice! Problems with the mains connection can also cause this message to be sent. If necessary exchange the FBI board.	Info: See Pos. 6.1

4 What the system and error messages mean

4.2 Messages from the axis controller

Mask: Select Move axis

The screenshot shows the ferrocontrol software interface. At the top, there's a header with 'ferrocontrol' and a file icon labeled 'Moveax_1.tif'. On the right, system information includes 'Version 1.01', '28.09.1998 14:12', and status for 'SYS' (47 Controller 2 not responding), 'PC', and 'FPS'. The main area is titled 'Move axis' and contains several sections:

- Axis:** 1.1 DARC axis
- X-Achse:**
- Operating mod:** Change Pos.1 <> Pos.2
- Position 1:** 1998.000 mm
- Position 2:** 2000.000 mm
- Dwell time:** 0.000 s
- Traversing speed:** 1 %
- Jogging speed:** 1 %
- Test amplitude:** 0
- Test pulse width:** 0

On the right side, there's a table of error and status values:

Following error	0.000
Actual speed (rpm)	0
Actual torque	0
Act. posit. 2.encoder	0.000
Operational status axis	0000
Error status axis	0000
Hardware configuration	0000
Job counter axis	00
Error status MotCont	0000
Operational status MotCont	0000
Heat sink temperature	0
Resolver offset	0
Status 2. encoder	00
Position pos. flank	0.000
Position neg. flank	0.000
Motor controller vers.	0000
Boot EPROM vers.	0000
Encoder interface version	0000

Below this table is a 'Status' section with a large empty box. At the bottom, there are two large displays: 'Set position value' showing '0.000' and 'Actual position' showing '0.000'. The very bottom has a row of 10 buttons: 1 Help, 2 Axis -1, 3 Axis +1, 4 Clear error, 5 Referen, 6 ON, 7 OFF, 8 << smaller, 9 >> greater, 10 OK.

Display: Operating status axis

In older software versions this entry is also called

Axis status or Operating status 1. These labels are identical!

This display is shown in a hexadecimal numerical system.

The four-digit display is divided into two groups (lower and upper byte).

Please note!

The four-digit display allows 2 to a maximum of 3 independent items of information to be displayed simultaneously

Example:

C 8 4 2
└───┬───┘ lower byte (1st group)
└───┬───┘ upper byte (2nd group)

The display C 8 4 2 contains the following information:

- | | | |
|---------|---|--|
| C 8 X X | = | 1. Interpolation active |
| X X 4 X | = | 2. Axis has been referenced |
| X X X 2 | = | 3. Temperature monitoring / excess temperature |

(X = any status)

4 What the system and error messages mean

4.2 Messages from the axis controller

4.2.1 Operating status axis

Error display	Description of error	Tips for error clearance	Additional information
xxx2	TM (Temperature Monitoring) responds after 20 seconds Temperature monitoring is carried out in the power output of the power supply. This message is sent if the temperature measured is > 100 °C.	Possible causes of error a) Dimensional error, power requirement of the axis drive is too high. b) Ambient temperature too high. c) Current flow too high, possible short circuit, fine fault, earth fault Also check the messages: 0004 Error status motor controller Short circuit, earth fault, excess current in the power circuit 0001 Error status axis Heat sink temperature too high	Manual DARC System Pos. 4-7.14
xxx4 xxx8	Axis is interpolating Axis stopped	Axis is interpolating Axis has been stopped (e.g. PLC).	
xx1x xx2x xx4x	Referencing is performed in this cycle Master referencing complete Axis referenced	Information about master referencing see ->	Manual DARC System Pos. 6-3.5.1
xx8x	Automatic resolver adjustment complete		
BBxx	Positioning is active		
C7xx	Gearing active This axis is being led by a master axis. You can find the allocation to a master axis in the mask: Equipment and parameters Selection: Equipment		
C8xx	Interpolation active		
C9xx	Test mode active		
CAxx	Automatic resolver adjustment active		
CBxx	Torque control is active		
CCxx	Position control is active	You can switch on or off position control Mask: Move axis Softkeys: ON / OFF	Pos. 5.6.2 Mask: Move axis
CDxx	Axis is in defined window		

4 What the system and error messages mean

4.2.1 Operating status axis

Error display	Description of error	Tips for error clearance	Additional information
CExx	Synchronous start has been prepared	only message	
CFxx	Position control inactive (disabled) (See also Message CCxx)	only message	
D1xx	Transmission error on DARC parallel bus		
D2xx	Temperature switch-off controller-		
D3xx	Temperature switch-off motor-		
D4xx	Motor controller error This message basically appears if an error message has been sent by the motor controller. You can find more detailed information about the state of the motor controller in: Error status - motor controller Operating status - motor controller	Notice! <i>In older software versions you will find the expression Error profile generator or Error status 1 instead of Error status axis. These messages are identical!</i>	
D5xx D6xx	Quick-stop positive Quick-stop negative		Pos. A.3 Circuit diagram in the appendix Pos. 6.20 X1 / Peripheral devices and holding brake
D7xx	Inadmissible nominal speed		
D8xx	No encoder value	Proceed as follows to remedy the cause: 1. Determine the encoder type in operation with this axis. You will find the allocation in the mask: Equipment and parameters Selection: Equipment a/ Resolver b/ Absolute position encoder DARC c/ Absolute position encoder Fieldbus SAE-IN d/ Incremental encoder DARC e/ Incremental encoder Fieldbus-INC 2. Proceed as follows depending on the encoder type: a/ Resolver Check the power connection between the DARC module and the resolver. Check that the plug-in connections are fixed firmly. -> Continued on next page...	Pos. 7.1 Pin configuration Resolver connection

4 What the system and error messages mean

4.2 Messages from the axis controller

4.2.1 Operating status axis

Error display	Description of error	Tips for error clearance	Additional information
D8xx	No encoder value /continued	If it is possible, take a second resolver signal and plug it into the "faulty" DARC input. If you now get an encoder signal, the cause of the error can be found in the resolver or in its line terminal. Check the line connection to the "faulty" resolver with a resistance meter (ohmmeter). b/ Absolute position encoder / DARC system Check the line connection between the DARC module and the absolute position en-coder. Make sure the plug-in connections are firmly fixed. If it is possible, take a second encoder signal (of the same type) and plug it into the "faulty" DARC input. If there now is an encoder signal, the error is to be found in the first encoder or its line terminal. Check the line connection to the "faulty" absolute position encoder with a resistance meter (ohmmeter). c/ Absolute position encoder Fieldbus system Check the following on the FB-SAE-IN module: 1. The operating voltage display LED 4 / green / $U_{OP} = 24\text{ V}$ 2. The fusible cutout = 1 A (time-lag) 3. Check LED 1, 2 and 3 for the encoder signal. If the line connection to the encoder = OK, the relevant LED glows a weak red. 4. Exchange the SAE-IN module d/ Incremental encoder / DARC system Check the line connection between the DARC module and the incremental en-coder. Check that the pin connections are properly fixed. If it is possible, take a second encoder signal (of the same type) and plug it into the "faulty" DARC input. If there now is an encoder signal, the error is to be found in the first encoder or its line terminal. Check the line connection to the "faulty" incremental encoder with a resistance meter (ohmmeter).	Pos. 7.2 Pin configuration Absolute position encoder DARC input Pos. 6.10 Card diagram FB-SAE-IN Pos. 7.3 Pin configuration Incremental encoder -> DARC input

4 What the system and error messages mean

4.2 Messages from the axis controller

4.2.1 Operating status axis

Error display	Description of error	Tips for error clearance	Additional information
D8xx	No encoder value /continued	e/ Incremental encoder / Fieldbus system Check: The operating voltage display on the FB-INC-1 module = LED 3 (green), $U_{Op} = 24\text{ V}$. The fuse for operating voltage = 1 A (time-lag). If possible, take a second encoder signal (of the same type) and plug it into the "faulty" input of the INC-1 module. If you now have an encoder signal, the cause of the error can be found in the first encoder or in its line terminal. Check the line connection to the "faulty" incremental encoder with a resistance meter (ohmmeter).	Pos. 6.11 Card diagram FB-INC-1 Modul Pos. 7.3 Pin configuration Incremental encoder -> fieldbus system
D9xx	Sluggish axis During positioning the given set value is constantly compared with the encoder signal (actual position value). If an inadmissible deviation occurs here, it leads to this error message.  Important notice This error message only appears if the monitoring function of the appropriate axis is switched on! Info: see preceding column Possible causes of this error are: 1. Incorrect commissioning Incorrect setting-up of the controller Axis regulator parameters not correctly adjusted. 2. Interface connection to actual value encoder not O.K. Ageing / wear and tear of gears / slip Bearing play/ friction Servo-motor running with too great a load Servo-motor running with too small a load	Proceed as follows to determine the cause: Move the axis by hand in Service mode 1. Select the Service mode 2. Select the mask: Move axis Assistance: See also Menu overview, Pos. 2.2 See also Mask display, Pos. 5.6.1	Switch ON or OFF monitoring function 1. Select mask: Equipment and parameters 2. Select: Position controller 3. Select position: Axis monitoring See also Pos. 5.5.4

4 What the system and error messages mean

4.2 Messages from the axis controller

4.2.1 Operating status axis

Error display	Description of error	Tips for error clearance	Additional information
DAxx	No axis parameters loaded		
DBxx	Axis not referenced		
DCxx	Set value limits exceeded Your set value input is outside the permissible limits for axis positioning.	Check your set value input	
DDxx	Axis profile error The stated contour can't be executed with these parameters This message also appears under Error status : 0800	See Error status axis: Message 0800 Notice! <i>In older software versions you will find the expression Error profile generator or also Error status 1 instead of the message line Error status axis. These messages are identical!</i>	
DExx	Internal error in the interpolator		
DFxx	Incorrect interpolation data		
E0xx	Error message from the supply controller (No enabling from the supply module)	Cause: D.c. link voltage not available! 1. Check the LED display: Uz on the DARC supply module. 2. Check the voltage supply L1 / L2 / L3 from the supply module Check the fuse!	Pos. 6.21 Diagram DARC supply module Pos. A.3 Circuit diagram in the appendix
E1xx	External enabling signal is missing	Check the (+ 24 volts) power supply for the enabling signal! Measuring point: DARC supply module Terminal X6 / No. 3	Pos. 6.21 Diagram DARC supply module

4 What the system and error messages mean

4.2 Messages from the axis controller

4.2.2 Error status: axis / Error profile generator / Error status 1

Screen mask:
Move axis

ferrocontrol

Version 1.01 28.09.1998 14:12

SYS 47 Controller 2 not responding

PC

FPS

U 1.54 / 09.09.98

Move axis

Axis 1.1 DARC axis

X-Achse

Operating mod Change Pos.1 <> Pos.2

Position 1 1998.000 mm

Position 2 2000.000 mm

Dwell time 0.000 s

Traversing speed 1 %

Jogging speed 1 %

Test amplitude 0

Test pulse width 0

Following error

Actual speed (rpm) 0.000

Actual torque 0

Act. posit. 2.encoder 0.000

Operational status axis 0000

Error status axis 0000

Hardware configuration 0000

Job counter axis 00

Error status MotCont 0000

Operational status MotCont 0000

Heat sink temperature 0

Resolver offset 0

Status 2. encoder 00

Position pos. flank 0.000

Position neg. flank 0.000

Motor controller vers. 0000

Boot EPROM vers. 0000

Encoder interface version 0000

Status

Set position value 0.000

Actual position 0.000

1 Help 2 Axis -1 3 Axis +1 4 Clear error 5 Referen 6 ON 7 OFF 8 << 9 >> 10 OK

Display: Error status - axis

In older software versions this entry is also called:

Error profile generator or Error status 1. These labels are identical!

This display is represented in a hexadecimal numerical system.

Error display	Description of error	Tips for error clearance	Additional information
0001	Heat sink temperature too high	Power output (in the power supply) too hot.	
0002	Motor temperature too high Axis is switched off after 30 seconds due to too high motor temperature. (Bimetallic contact -> motor)	Bimetallic contact, see Circuit diagram in the appendix (last page) Position 18. See also axis regulation controller diagram Pos. 6.20 (Terminal X1-1).	Pos. 6.20
0004	Error motor controller Causes the axis to be switched off immediately! This message also appears under Error status axis: 0800	You can find a detailed error description under Error status motor controller Notice! In older software versions you will find the expression Error profile generator or also Error status 1 instead of Error status axis . These messages are identical!	

4 What the system and error messages mean

4.2 Messages from the axis controller

4.2.2 Error status: axis / Error profile generator / Error status 1

Error display	Description of error	Tips for error clearance	Additional information
0008 0010	Quick-stop, negative Quick-stop, positive Causes immediate halt Can only be moved on in enabled direction.	See circuit diagram in the appendix (last page)	Pos. 6.20 DARC. X1 (Terminal 2 and 3)
0020	No parameters exist in axis module Effect: axis cannot be switched on.		
0040	Axis not referenced Thus only jogging, referencing and gearing are possible.		
0080	Set value error Axis switches off immediately.		
0200	Data error on the Parallel bus		
0400	No enabling from supply module		
0800	Profile error Axis switches off immediately. The stated contour can't be executed with these parameters.	Cause: 1. The speed selected for this profile is not possible. Check your speed setting. 2. Incorrect interpolation data. Exchange the axis controller card.	
1000	Internal error Axis switches off immediately.	Remedy: Exchange axis regulation controller.	Pos. 6.20
2000	Argument error Axis switches off immediately. Error in the interpolator.	Remedy: Exchange card with interpolator.	
4000	Following error (sluggish axis) Axis switches off immediately if the preset following error value has been exceeded.  Important notice This error message only appears if following error monitoring for this axis is turned on. Info: see preceding column.	See also Operating status - axis Message: D9xx Sluggish axis	Switch on and off following error monitoring: See Pos. 4.2.1 Operating status - axis Error message Sluggish axis
8000	Encoder error Axis switches off immediately. If an error "external encoder" occurs, only jogging is possible! See also Operating status - axis: D8xx No encoder value		

4 What the system and error messages mean

4.3 Messages from the motor controller

4.3.1 Error status motor controller

Screen mask:
Move axis

Display:
Error status
motor controller

This display is shown in
a hexadecimal numerical
system

Error display	Description of error	Tips for error clearance	Additional information
0001	Run-time / interrupt error If the program structure is disturbed, the axis is switched off.		
0002	5 Volt voltage error This causes immediate switch-off if the 5 volts operating voltage is not within the nominal range.	On location: exchange motor controller	
0004	Short circuit / earth contact / overcurrent in the power circuit Causes immediate switch-off to protect the power outputs.	If this error message occurs very frequently, the cause can also be an incorrect parameter input (gain-current controller). In this case reduce the gain by 10 %. 1. Select the mask: Equipment and parameters (see 2.2). 2. Press the key combination [Contr.] + [F4] (motor data). This mask appears: Motor / controller combination 3. Reduce the parameter: Current regulator: gain	
0008	Resolver error The axis module does not switch on if e.g. the resolver feedback is missing. The resolver feedback is checked after every first-time axis enabling (after reset).	Check: Cable and plug connections	Pos. 7.1 Pin configuration Resolver cable

4 What the system and error messages mean

4.3 Messages from the motor controller

4.3.1 Error status motor controller

Error display	Description of error	Tips for error clearance	Additional information
0010	Heat sink temperature in the controller exceeded	1. Axis drive dimensioning correct? 2. Switching cabinet ventilation OK? Fan filter dirty? 3. Ambient temperature too high?	
0020	Motor temperature exceeded Bimetallic contact in the motor has triggered.	x-1 terminal (motor temperature)	Pos. A.3 / Circuit diagram in the appendix: (18)
0080	Current measuring adjustment error Causes immediate switch-off.	Diagnostic aid for ferrocontrol testing station	
0100	IGBT - Output switch-off Causes immediate switch-off.	IGBT excess current, e.g. due to incorrect motor parameters Remedy on location: Exchange motor controller module	
0200	Stack error Causes immediate switch-off.	Stack overflow in the motor controller Remedy on location: Exchange motor controller module	
0400	The permissible speed deviation has been exceeded Causes immediate switch-off.	Correct the preset value for the permitted speed deviation. In the axis parameters select the mask: Equipment and parameters . Press the key combination [Ctrl] + [F4] = Motor data. This mask appears on the screen: Motor controller combination . Set the parameter: Switch-off threshold - speed monitoring to the value = 0.	
0800	Run-time error in the speed controller		
1000	RAM test error After every reset the communication RAM in the axis module is checked. If the result is negative, the axis controller cannot be switched on.	Remedy on location: Exchange motor controller module	
2000	Error in digital transformer -> resolver After every reset the digital converter in the resolver is checked. If the result is negative, the axis controller cannot be switched on.		
4000	Bit checking error in the resolver After every reset the microcontroller databus is checked by the resolver in the axis module. If the result is negative, the axis controller cannot be switched on.	The digital transformer can be found on the motor controller module Remedy on location: Exchange motor controller module	
8000	Synchronous error Causes immediate switch-off. Signal transmission error on the internal Parallel bus.	Check the plug-in connector (X30) on the top side of the DARC.	Pos. 6.20 Pos. 6.21 DARC diagram

4 What the system and error messages mean

4.3 Messages from the motor controller

4.3.2 Operating status motor controller / *Status Motor controller / Operating status 2*

Screen mask:
Move axis

ferrocontrol | 1 | Moveax_1.tif | Version 1.01 28.09.1998 14:12
SYS 47 Controller 2 not responding
PC
FPS

Move axis U 1.54 / 09.09.98

Axis 1.1 DARC axis
X-Achse

Operating mod Change Pos.1 <> Pos.2
Position 1 1998.000 mm
Position 2 2000.000 mm
Dwell time 0.000 s

Traversing speed 1 %
Jogging speed 1 %

Test amplitude 0
Test pulse width 0

Following error	0.000
Actual speed (rpm)	0
Actual torque	0
Act. posit. 2.encoder	0.000
Operational status axis	0000
Error status axis	0000
Hardware configuration	0000
Job counter axis	00
Error status MotCont	0000
Operational status MotCont	0000
Heat sink temperature	0
Resolver offset	0
Status 2. encoder	00
Position pos. flank	0.000
Position neg. flank	0.000
Motor controller vers.	0000
Boot EPROM vers.	0000
Encoder interface version	0000

Status

Set position value **0.000** Actual position **0.000**

1 Help 2 Axis -1 3 Axis +1 4 Clear error 5 Referen 6 ON 7 OFF 8 << smaller 9 >> greater 10 OK

Display: Operating status - motor controller

In older software versions this entry is called

Status motor controller or **Operating status 2**.

These labels are identical!

This display is shown in a hexadecimal numerical system

4 What the system and error messages mean

4.3 Messages from the motor controller

4.3.2 Operating status motor controller

Error display	Description of error	Tips for error clearance	Additional information
▶ 0000	Output is switched off (disabled) See also Message 0040 = Output is switched on.		
0001	In the last position control cycle a negative measuring edge was detected.	You can find more information in the DARC system manual Pos. 4.4.15 Control in- and outputs	DARC System Manual Pos. 4.4.15
0002	In the last position control cycle a positive measuring edge was detected.		
0008	Level at measuring input Diagnostic aid for ferrocontrol testing station		
0010	Warning! Heat sink temperature exceeded	Power supply temperature too high	
0020	Warning! Motor temperature exceeded	Check motor bimetallic contact	See circuit diagram in the appendix: A.3
0040	Output is switched on (enabled) See also message 0000 = Output is switched off		
0080	Only for ferrocontrol testing station Causes immediate switch-off		
0100	Peak current limiting is active (only status message)		
0200	Nominal current limiting is active (only status message)		
1000	Enable-PIN input is set	Contact X6 (Terminal 3) is set. DARC power supply See Pos. 6.21	DARC system manual Pos. 4.4.15
2000	Only for ferrocontrol testing station		
8000	Automatic resolver adjustment (only status message)	Enable software in the communication RAM is set.	

4 What the system and error messages mean

Space for your own notes

Access to this mask:

See under 2.2
Overview service menu

ferrocontrol

1

inputs_1.tif

Version 1.01 18.08.1998 12 25
 SYS 47 Controller 2 not responding
 PC
 FPS

Inputs
Bank 0

00h	0 1 2 3 4 5 6 7	8 9 A B C D E F	10h	0 1 2 3 4 5 6 7	8 9 A B C D E F
20h	0 1 2 3 4 5 6 7	8 9 A B C D E F	30h	0 1 2 3 4 5 6 7	8 9 A B C D E F
40h	0 1 2 3 4 5 6 7	8 9 A B C D E F	50h	0 1 2 3 4 5 6 7	8 9 A B C D E F
60h	0 1 2 3 4 5 6 7	8 9 A B C D E F	70h	0 1 2 3 4 5 6 7	8 9 A B C D E F
80h	0 1 2 3 4 5 6 7	8 9 A B C D E F	90h	0 1 2 3 4 5 6 7	8 9 A B C D E F
A0h	0 1 2 3 4 5 6 7	8 9 A B C D E F	B0h	0 1 2 3 4 5 6 7	8 9 A B C D E F
C0h	0 1 2 3 4 5 6 7	8 9 A B C D E F	D0h	0 1 2 3 4 5 6 7	8 9 A B C D E F
E0h	0 1 2 3 4 5 6 7	8 9 A B C D E F	F0h	0 1 2 3 4 5 6 7	8 9 A B C D E F

1

He 1p

2

3

4

5

TEXT

6

Bank - 1

7

Bank + 1

8

9

10

OK

Text
 Filed application-related commentary (allocation in plain text) for this input

Status display - input
 Green = logical ON
 Grey = logical OFF

Hardware:

Input module / 16 inputs / binary
see Pos. 6.4

5 Screen masks

5.2 Binary outputs

Access to this mask:
See under 2.2
Overview service menu

ferrocontrol

1

outputs_1.tif

Version 1.01 18.09.1998 12:26
SYS 47 Controller 1 not responding
PC
FPS

Outputs

Bank 0

00h	0 1 2 3 4 5 6 7	8 9 A B C D E F	10h	0 1 2 3 4 5 6 7	8 9 A B C D E F
20h	0 1 2 3 4 5 6 7	8 9 A B C D E F	30h	0 1 2 3 4 5 6 7	8 9 A B C D E F
40h	0 1 2 3 4 5 6 7	8 9 A B C D E F	50h	0 1 2 3 4 5 6 7	8 9 A B C D E F
60h	0 1 2 3 4 5 6 7	8 9 A B C D E F	70h	0 1 2 3 4 5 6 7	8 9 A B C D E F
80h	0 1 2 3 4 5 6 7	8 9 A B C D E F	90h	0 1 2 3 4 5 6 7	8 9 A B C D E F
A0h	0 1 2 3 4 5 6 7	8 9 A B C D E F	80h	0 1 2 3 4 5 6 7	8 9 A B C D E F
C0h	0 1 2 3 4 5 6 7	8 9 A B C D E F	D0h	0 1 2 3 4 5 6 7	8 9 A B C D E F
E0h	0 1 2 3 4 5 6 7	8 9 A B C D E F	F0h	0 1 2 3 4 5 6 7	8 9 A B C D E F

1 He lp

2 SET

3 TOGGLE

4 RESET

5 TEXT

6 Bank - 1

7 Bank + 1

8

9

10 OK

Status display - output
Red = logical ON
Grey = logical OFF

Text
Filed application-relevant commentary
(allocation in plain text) for this output.

Reset
Reset output

TOGGLE
When the key is pressed the switching status changes: SET-RESET

SET
Here you can switch (set) a certain output to active for **test and diagnostic purposes**. Select the desired output with the cursor and press the **key F2** to SET.

Voltage output driver: + 24 Volt / 1 A.

Hardware:
Output module / 16 outputs / binary
see Pos. 6.5

Access to this mask:

See under 2.2
Overview service menu

ferrocontrol Modad_1.tif

Version 1.01 18.09.1998 12 27
SYS 47 Controller 1 not responding
PC
FPS

Module address

FBI board 1 Segment \$DA00 Version 04.39
Fieldbus baud rate 500 kbit/s

Controller No. Type

Controller No.	Type	Name	Mark	Adresses
1	DARC IP			
2	DARC IP			
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				

DARC with INTERPOLATOR UMDR 62.21

Components	Mark	Adresses
16 Outputs	OUT 16	1 2 3 4
DARC axis		0 0 0 0
DARC axis		1 0 0 0
DARC axis		9 0 0 0
DARC axis		11 0 0 0
DARC axis		16 0 0 0
DARC axis		2 0 0 0
DARC axis		5 0 0 0
		0 0 0 0
		0 0 0 0
		0 0 0 0

1 Help 2 Read config. 3 Reset error 4 Load all 5 6 7 8 Select 9 10 OK



Attention!
Do not activate the function "LOAD ALL" (Key F4) rashly then ...

Select

Here you can enter your configuration data manually.

Load all

The displayed configuration data are taken over as valid. The previously valid data record (on the hard disk) is overwritten!!

Reset - error

Resets the error display.

Read configuration (key F2)

A) Key not yet pressed:

The device configuration displayed is based on a filed data record (hard disk)

B) Press key:

The **current operating status** is read again and updated on the screen. A possible functionally disturbed bus participant (controller) will no longer be listed in the updated display!

Proceed as follows when looking for the malfunction:

1. Before you press [F2] make a note of the device configuration displayed.
2. Press [F2]. Compare the **updated display** with your notes.
3. A defective bus participant **does not appear** in the current display.

5 Screen masks

5.4 Select axis

Access to this
mask:

See under [2.2](#)
Overview service menu

ferrocontrol selax_1.tif Version 1.01 18.09.1998 12 29
SYS 47 Controller 2 not responding
PC
FPS

Select axis

Axis		Axis type	Axis name	Gantry axes
1.1	☒	DARC axis	X-Achse	
1.3	☒	Direction axis	X-Achse	
1.9	☒	DARC axis	X-Achse	
2.1	☒	Servo axis	Y-Achse	
2.2	☐	DARC axis	Y-Achse	
3.1	☐	DARC axis	Z-Achse	
4.1	☐	Servo axis	Kommentartext aus FPS-Ac	
5.1	☒	DARC axis	Kommentartext aus FPS-Ac	
9.1	☒	DARC axis		
16.1	☒	DARC axis		
18.1	☐	UMDR master axis		
	☐			
	☐			
	☐			
	☐			

Input :

1 Help 2 Increment search 3 4 5 6 Abort 7 8 9 10 OK

Select axis

If you want to alter the configuration of a particular axis,
you receive access via this mask.

Use the cursor to select the desired mask.

5.5 Axis equipment and parameters

5.5.1 Select: Equipment

Access to this
mask:

See under [2.2](#)
Overview service menu

The screenshot shows the 'ferrocontrol' software interface. At the top, there's a status bar with 'Version 1.01', '18.09.1998', '12:30', and 'SYS 47 Controller 2 not responding'. Below this, the 'Equipment and parameters' screen is displayed. On the left, a 'Select' menu is open, showing options like 'Equipment', 'Resolver', 'Motion profile', 'Position control', 'Speed control', '2. encoder: absolute value', 'Referencing', 'Current limitation', 'Analog input', 'Gantry axis', 'Quick-stop', and 'Synchronous motion'. The 'Equipment' option is selected. The main area shows 'X-Achse' with 'Last change: 18.09.1998 / 12:12' and 'Fieldbus controller: DARC IP'. The 'Equipment' section shows 'Axis controller' and 'Motor' fields. The 'Actual position' is 0.000. The bottom bar has buttons: 1 Help, 2 Axis -1, 3 Axis +1, 4 Clear error, 5 Load axis, 6 Check record, 7, 8, 9, 10 OK.

Select: Equipment

Allocation between the axis regulation controller and a motor type is made in this mask.

Notice!

Configuration parameters for determining the control characteristics for the individual motor types are filed by ferrocontrol. These configuration data are adopted and applied by the axis regulation controller.

You can find more information in the ferrocontrol manual:

DARC System - Commissioning and Service / [Chapter 6.3.5](#)

Brake holding time:

The brake holding time is the time between the brake contact opening and the switch-off moment of the motor current. It must correspond to the switch-off delay time of the brake release coil. This ensures that hanging axes do not sag.

Enter **0 ms** without a holding brake, and with a holding brake enter **50 ms** as the application time of standard holding brakes is about 50 ms.

5 Screen masks

5.5 Axis equipment and parameters

5.5.2 Select: Resolver

Access to this
mask:

See under [2.2](#)
Overview service menu

The screenshot shows the 'ferrocontrol' software interface. At the top, there's a status bar with 'Version 1.01', '18.09.1998', and '12:31'. Below this, a table shows 'SYS 47 Controller 2 not responding', 'PC', and 'FPS'. The main window is titled 'Equipment and parameters' and 'Version 2.46 / 09.09.98'. It has a left sidebar with a menu: 'Equipment', 'Resolver' (highlighted with an arrow), 'Motion profile', 'Position control', 'Speed control', '2. encoder: absolute value', 'Referencing', 'Current limitation', 'Analog input', 'Gantry axis', 'Quick-stop', and 'Synchronous motion'. The main area is divided into 'X-Achse' and 'Resolver' sections. The 'X-Achse' section shows 'Last changer: 18.09.1998 / 12:12' and 'Fieldbus controller: DARC IP'. The 'Resolver' section shows 'Distance/motor revolution: 16.00000 mm', 'Counting direction: neg.', 'Encoder offset: 0.000 mm', 'Modulo axis: NO', 'Minimum modulo value: 0.000', and 'Maximum modulo value: 0.000'. At the bottom, there's a bar with buttons: '1 Help', '2 Axis -1', '3 Axis +1', '4 Clear error', '5 Load axis', '6 Check record', '7', '8', '9', and '10 OK'. The 'Actual position' is displayed as '0.000'.

Select: Resolver

The selection of the resolver settings is made in this mask

Notice!

You can find more information in the ferrocontrol manual:

DARC System - Commissioning and Service / [Chapter 6.3.5.4](#)

Encoder offset:

In this input field you are able to set a new absolute value (desired actual value).

Proceed as follows:

1. Place the cursor on the field: **Encoder offset**.
2. Press the **Enter key**.
This mask appears: **Input absolute value**
3. Enter your desired value.

When the [F10] key is pressed, the value entered is adopted and stored as the new absolute actual value.

Access to this mask:
See under [2.2](#)
Overview service menu

ferrocontrol

1 Epmot_1.tif

Version 1.01 18.09.1998 12 32
 SYS 47 Controller 2 not responding
 PC
 FPS

Version 2.46 / 09.09.98

Equipment and parameters

Axis 1.1 Axis active

Type DARC axis

Encode 2. encoder: absolute v

Select

- Equipment
- Resolver
- Motion profile
- Position control
- Speed control
- 2. encoder: absolute value
- Referencing
- Current limitation
- Analog input
- Gantry axis
- Quick-stop
- Synchronous motion

Actual position

0.000

X-Achse

Last change:
18.09.1998 / 12:12

Fieldbus controller: DARC IP
 Encoder mod.: DARC
 Output mod.:

Motion profile

Minimum nominal position	0.000 mm
Maximum nominal position	1000.000 mm
Motion profile	linear
Starting-up time	340 ms
Braking time	600 ms
Maximum speed	800.000 mm/s
Limited speed	0.000 mm/s
User window	10.000 mm
Loop value	3.000 mm
Override pot. active	NO
Short distance jolt limiting	NO
Return outside limits	NO

1 Help

2 Axis -1

3 Axis + 1

4 Clear error

5 Load axis

6 Check record

7

8

9

10 OK

Select: Motion profile

Notice!

You can find more information in the ferrocontrol manual:
DARC System - Commissioning and Service / [Chapter 6.3.5.5](#)

5 Screen masks

5.5 Axis equipment and parameters

5.5.4 Select: Position control

Access to this
mask:

See under [2.2](#)
Overview service menu

The screenshot displays the 'ferrocontrol' software interface. At the top, there's a header bar with 'ferrocontrol' on the left, a file icon labeled 'Eposc_1.tif' in the center, and system information on the right: 'Version 1.01 18.09.1998 12 32', 'SYS 47 Controller 2 not responding', 'PC', and 'FPS'. Below the header, the main window is titled 'Equipment and parameters' with a sub-header 'Version 2.46 / 09.09.98'. On the left side of this window, there's a 'Select' menu with options: 'Equipment', 'Resolver', 'Motion profile', 'Position control' (highlighted with a black arrow), 'Speed control', '2. encoder: absolute value', 'Referencing', 'Current limitation', 'Analog input', 'Gantry axis', 'Quick-stop', and 'Synchronous motion'. Below the 'Select' menu, there's a field for 'Actual position' showing '0.000'. On the right side of the main window, there's a section for 'X-Achse' with parameters: 'Last changer: 18.09.1998 / 12:12', 'Fieldbus controller: DARC IP', 'Encoder mod.: DARC', and 'Output mod.:'. Below this, there's a 'Position control' section with various parameters and their values: 'Servo-gain factor' (1.200 n/min mm), 'Without following error' (NO), 'Distance correction' (NO), 'Distance correction value' (300.000), 'Completed message' (Meas. val.), 'Positioning window' (0.000 mm), 'Axis monitoring' (ON), 'Deactivate when maximum following error is exceeded' (YES), 'Error reaction' (Quick-stop), 'Maximum following error' (4.000 mm), 'Pos. control after crawling' (NO), and 'IPL resonance filter' (OFF). At the bottom of the interface, there's a row of 10 numbered buttons: 1 Help, 2 Axis -1, 3 Axis +1, 4 Clear error, 5 Load axis, 6 Check record, 7, 8, 9, and 10 OK.

Select: Position control

Notice!

You can find more information in the ferrocontrol manual:

DARC System - Commissioning and Service / [Chapter 6.3.5.6](#)

Access to this
mask:

See under [2.2](#)
Overview service menu

ferrocontrol Epspec_1.tif

Version 1.01 18.09.1998 12:33
SYS 47 Controller 2 not responding
PC
FPS

Equipment and parameters

Axis 1.1 Axis active
Type DARC axis
Encode 2. encoder: absolute v

Select

- Equipment
- Resolver
- Motion profile
- Position control
- Speed control**
- 2. encoder: absolute value
- Referencing
- Current limitation
- Analog input
- Gantry axis
- Quick-stop
- Synchronous motion

Actual position
0.000

Speed control

X-Achse

Last change: 18.09.1998 / 12:12
Fieldbus controller: DARC IP
Encoder mod.: DARC
Output mod.:

Maximum speed **3000** 1/min
Proportional gain **10000**
Integral factor **1300**
Differential factor **0**

1 Help 2 Axis -1 3 Axis + 1 4 Clear error 5 Load axis 6 Check record 7 8 9 10 OK

Select: Speed control

Notice!

You can find more information in the ferrocontrol manual:

DARC System - Commissioning and Service / [Chapter 6.3.5.7](#)

5 Screen masks

5.5 Axis equipment and parameters

5.5.6 Select: External absolute position encoder

Access to this
mask:

See under [2.2](#)
Overview service menu

The screenshot displays the 'ferrocontrol' software interface. At the top, a status bar shows 'Version 1.01', '18.09.1998', and '12:35'. Below this, a table lists system components: 'SYS' (47 Controller 2 not responding), 'PC', and 'FPS'. The main window is titled 'Equipment and parameters' and features a sidebar menu with options: 'Equipment', 'Resolver', 'Motion profile', 'Position control', 'Speed control', '2. encoder: absolute value' (highlighted with an arrow), 'Referencing', 'Current limitation', 'Analog input', 'Gantry axis', 'Quick-stop', and 'Synchronous motion'. The main area is divided into two sections. The left section, 'X-Achse', shows 'Last change: 18.09.1998 / 12:12' and 'Fieldbus controller: DARC IP'. The right section, '2. encoder: absolute value', displays parameters: 'Encoder resolution' (4096x 1), 'Distance/encoder revolution' (421.426 mm), 'Counting direction' (neg.), 'Encoder offset' (0.000 mm), 'Zero offset' (200.000 mm), and 'Position control from 2. enc' (NO). At the bottom, a 'Select' menu is visible with options: '1 Help', '2 Axis -1', '3 Axis +1', '4 Clear error', '5 Load axis', '6 Check record', '7', '8 Select', '9', and '10 OK'. The 'Actual position' is shown as '0.000'.

ferrocontrol		2enc_1.tif		Version 1.01 18.09.1998 12:35	
SYS	47 Controller 2 not responding	PC		FPS	

Equipment and parameters		Version 2.46 / 09.09.98	
Axis	1.1	Axis active	
Type	DARC axis		
Encode	2. encoder: absolute v		
Select			
Equipment			
Resolver			
Motion profile			
Position control			
Speed control			
2. encoder: absolute value			
Referencing			
Current limitation			
Analog input			
Gantry axis			
Quick-stop			
Synchronous motion			
Actual position			
0.000			

X-Achse	
Last change:	Fieldbus controller: DARC IP
18.09.1998 / 12:12	Encoder mod.: DARC
Output mod.:	

2. encoder: absolute value	
Encoder resolution	4096x 1
Distance/encoder revolution	421.426 mm
Counting direction	neg.
Encoder offset	0.000 mm
Zero offset	200.000 mm
Position control from 2. enc	NO

Select									
1	2	3	4	5	6	7	8	9	10
Help	Axis -1	Axis +1	Clear error	Load axis	Check record		Select		OK

Select: External absolute position encoder

Notice!

You can find more information in the ferrocontrol manual:

DARC System - Commissioning and Service / [Chapter 6.3.5.8](#)

5.5 Axis equipment and parameters

5.5.7 Select: Referencing

Access to this mask:

See under [2.2](#)
Overview service menu

ferrocontrol | Epref_1.tif | Version 1.01 18.09.1998 12 36
SYS 47 Controller 2 not responding
PC
FPS

Equipment and parameters | Version 2.46 / 09.09.98

Axis 1.1 | Axis active
Type DARC axis
Encode 2. encoder: absolute v

Select

- Equipment
- Resolver
- Motion profile
- Position control
- Speed control
- 2. encoder: absolute value
- Referencing**
- Current limitation
- Analog input
- Gantry axis
- Quick-stop
- Synchronous motion

Actual position: 0.000

Referencing

Necessary: YES
Only for referencing: YES
Referencing speed: 0.000 mm/s
Referencing direction: neg.

1 Help 2 Axis -1 3 Axis +1 4 Clear error 5 Load axis 6 Check record 7 8 9 10 OK

Select: Referencing

Notice!

You can find more information in the ferrocontrol manual:

DARC System - Commissioning and Service / [Chapter 6.3.5.9](#)

5 Screen masks

5.5 Axis equipment and parameters

5.5.8 Select: Current limitation

Access to this
mask:

See under [2.2](#)
Overview service menu

The screenshot displays the 'ferrocontrol' software interface. At the top, a status bar shows 'Version 1.01', '18.09.1998', and '12:37'. Below this, a table lists system parameters: 'SYS' (47 Controller 2 not responding), 'PC', and 'FPS'. The main window is titled 'Equipment and parameters' and contains a 'Select' menu on the left. The 'Select' menu lists various options: Equipment, Resolver, Motion profile, Position control, Speed control, 2. encoder: absolute value, Referencing, Current limitation (highlighted with a black arrow), Analog input, Gantry axis, Quick-stop, and Synchronous motion. To the right of the 'Select' menu, the 'Current limitation' screen is displayed, showing 'Peak current limit' at 100 % and 'Nominal current limit' at 50 %. Below the 'Select' menu, the 'Actual position' is shown as 0.000. At the bottom, a row of buttons is visible: 1 Help, 2 Axis -1, 3 Axis +1, 4 Clear error, 5 Load axis, 6 Check record, 7, 8, 9, and 10 OK.

ferrocontrol		Epcurr_1.tif		Version 1.01 18.09.1998 12:37	
SYS	47 Controller 2 not responding	PC		FPS	

Equipment and parameters		Version 2.46 / 09.09.98	
Axis	1.1	Axis active	
Type	DARC axis		
Encode	2. encoder: absolute v		
Select			
Equipment			
Resolver			
Motion profile			
Position control			
Speed control			
2. encoder: absolute value			
Referencing			
Current limitation			
Analog input			
Gantry axis			
Quick-stop			
Synchronous motion			
Actual position			
0.000			

1	2	3	4	5	6	7	8	9	10
Help	Axis -1	Axis +1	Clear error	Load axis	Check record				OK

Select: Current limitation

Notice!

You can find more information in the ferrocontrol manual:

DARC System - Commissioning and Service / [Chapter 6.3.5.10](#)

Access to this
mask:

See under [2.2](#)
Overview service menu

ferrocontrol | Anin_1.tif | Version 1.01 18.09.1998 12:38
SYS 47 Controller 2 not responding
PC
FPS

Equipment and parameters | Version 2.46 / 09.09.98

Axis 1.1 | Axis active
Type DARC axis
Encode 2. encoder: absolute v

Select

- Equipment
- Resolver
- Motion profile
- Position control
- Speed control
- 2. encoder: absolute value
- Referencing
- Current limitation
- Analog input**
- Gantry axis
- Quick-stop
- Synchronous motion

Actual position
0.000

Analog input

Address of the analog input 0
Offset for analog input 5.000
Pos. speed limit 6000 Incr.
Neg. speed limit 0 Incr.

1 Help 2 Axis -1 3 Axis +1 4 Clear error 5 Load axis 6 Check record 7 8 9 10 OK

Select: Analog input

Notice!

You can find more information in the ferrocontrol manual:

DARC System - Commissioning and Service / [Chapter 6.3.5.11](#)

5 Screen masks

5.5 Axis equipment and parameters

5.5.10 Select: Gantry axis

Access to this
mask:

See under [2.2](#)
Overview service menu

The screenshot displays the 'ferrocontrol' software interface. At the top, a status bar shows 'Version 1.01', '18.09.1998', and '12:39'. Below this, a table lists system parameters: 'SYS' (47 Controller 2 not responding), 'PC', and 'FPS'. The main window is titled 'Equipment and parameters' and contains several sections. On the left, a 'Select' menu lists various options: Equipment, Resolver, Motion profile, Position control, Speed control, 2. encoder: absolute value, Referencing, Current limitation, Analog input, Gantry axis (highlighted with a black arrow), Quick-stop, and Synchronous motion. Below the 'Select' menu, the 'Actual position' is displayed as '0.000'. On the right, the 'X-Achse' section shows 'Last changer: 18.09.1998 / 12:12' and 'Fieldbus controller: DARC IP'. The 'Gantry axis' section contains fields for 'Gantry axis' (set to './.'), 'Master axis' (set to '0'), and 'Allowed offset in act.vals' (set to '0.000 mm'). At the bottom, a row of buttons includes '1 Help', '2 Axis -1', '3 Axis +1', '4 Clear error', '5 Load axis', '6 Check record', '7', '8', '9', and '10 OK'.

Select: Gantry axis

Notice!

You can find more information in the ferrocontrol manual:

DARC System - Commissioning and Service / [Chapter 6.3.5.12](#)

Access to this
mask:

See under [2.2](#)
Overview service menu

The screenshot shows the 'ferrocontrol' software interface. At the top, there's a header with 'ferrocontrol' and a file icon labeled 'Epqust_1.tif'. To the right, a status bar shows 'Version 1.01', '18.09.1998', '12:40', and system information: 'SYS 47 Controller 2 not responding', 'PC', and 'FPS'. The main window is titled 'Equipment and parameters' and has a sub-header 'Version 2.46 / 09.09.98'. On the left, a 'Select' menu lists various options: Equipment, Resolver, Motion profile, Position control, Speed control, 2. encoder: absolute value, Referencing, Current limitation, Analog input, Gantry axis, Quick-stop (highlighted with a black arrow), and Synchronous motion. Below this menu, the 'Actual position' is displayed as '0.000'. The main area on the right is titled 'Quick-stop' and contains three fields: 'Quick-stop reaction' set to 'Quick-stop', 'Slow down at' set to 'Current limit', and 'Quick-stop ramp' set to '10000 ms'. At the bottom, a status bar contains 10 numbered buttons: 1 Help, 2 Axis -1, 3 Axis +1, 4 Clear error, 5 Load axis, 6 Check record, 7, 8, 9, and 10 OK.

Select: Quick-stop

Notice!

You can find more information in the ferrocontrol manual:

DARC System - Commissioning and Service / [Chapter 6.3.5.13](#)

5 Screen masks

5.5 Axis equipment and parameters

5.5.12 Select: Synchronous motion

Access to this
mask:

See under [2.2](#)
Overview service menu

The screenshot displays the 'ferrocontrol' software interface. At the top, a status bar shows 'Version 1.01', '18.09.1998', and '12:41'. Below this, a menu bar includes 'SYS', 'PC', and 'FPS'. The main window is titled 'Equipment and parameters' and 'Version 2.46 / 09.09.98'. It features a 'Select' menu on the left with options: Equipment, Resolver, Motion profile, Position control, Speed control, 2. encoder: absolute value, Referencing, Current limitation, Analog input, Gantry axis, Quick-stop, and Synchronous motion. The 'Synchronous motion' option is highlighted. The 'Actual position' field shows '0.000'. The 'X-Achse' section displays parameters: Last changer (18.09.1998 / 12:12), Fieldbus controller (DARC IP), Encoder mod. (DARC), and Output mod. (). The 'Synchronous motion' section displays: Window position (0.000 mm), (reserved) (100.000), (reserved) (100), (reserved) (0.000), Distance to rendezvous (0.000 mm), End position monitoring (OFF), End position (0.000 mm), and Synchronous motion factor (1.00000000). A bottom toolbar contains buttons: 1 Help, 2 Axis -1, 3 Axis +1, 4 Clear error, 5 Load axis, 6 Check record, 7, 8, 9, and 10 OK.

Axis	1.1	Axis active
Type	DARC axis	
Encode	2. encoder: absolute v	

Select

- Equipment
- Resolver
- Motion profile
- Position control
- Speed control
- 2. encoder: absolute value
- Referencing
- Current limitation
- Analog input
- Gantry axis
- Quick-stop
- Synchronous motion

Actual position

0.000

X-Achse

Last changer: 18.09.1998 / 12:12

Fieldbus controller: DARC IP

Encoder mod.: DARC

Output mod.:

Synchronous motion

Window position 0.000 mm

(reserved) 100.000

(reserved) 100

(reserved) 0.000

Distance to rendezvous 0.000 mm

End position monitoring OFF

End position 0.000 mm

Synchronous motion factor 1.00000000

1 Help 2 Axis -1 3 Axis +1 4 Clear error 5 Load axis 6 Check record 7 8 9 10 OK

Select: Synchronous motion

Notice!

You can find more information in the ferrocontrol manual:

DARC System - Commissioning and Service / [Chapter 6.3.5.14](#)

Access to this mask:

See under 2.2
Overview service menu

ferrocontrol

1 Moveax_1.tif

Version 1.01 28.09.1998 14:12
 SYS 47 Controller 2 not responding
 PC
 FPS

Move axis

Axis 1.1 DARC axis

X-Achse

Operating mod Change Pos.1 <> Pos.2

Position 1 1998.000 mm

Position 2 2000.000 mm

Dwell time 0.000 s

Traversing speed 1 %

Jogging speed 1 %

Test amplitude 0

Test pulse width 0

Following error 0.000

Actual speed (rpm) 0

Actual torque 0

Act. posit. 2.encoder 0.000

Operational status axis 0000

Error status axis 0000

Hardware configuration 0000

Job counter axis 00

Error status MotCont 0000

Operational status MotCont 0000

Heat sink temperature 0

Resolver offset 0

Status 2. encoder 00

Position pos. flank 0.000

Position neg. flank 0.000

Motor controller vers. 0000

Boot EPROM vers. 0000

Encoder interface version 0000

Status

Set position value

0.000

Actual position

0.000

1 Help

2 Axis -1

3 Axis +1

4 Clear error

5 Referen

6 ON

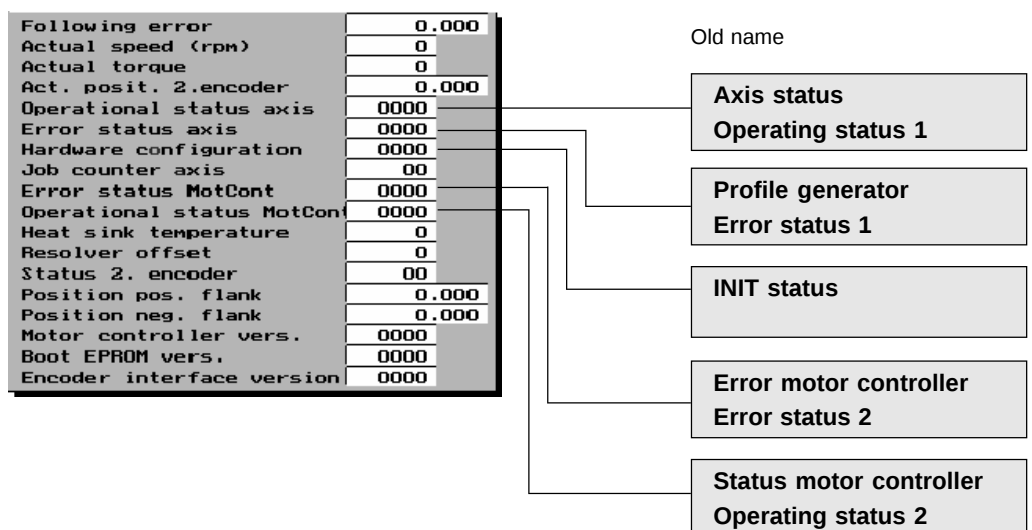
7 OFF

8 << smaller

9 >> greater

10 OK

In older software versions you will come across variant names for the following data fields:



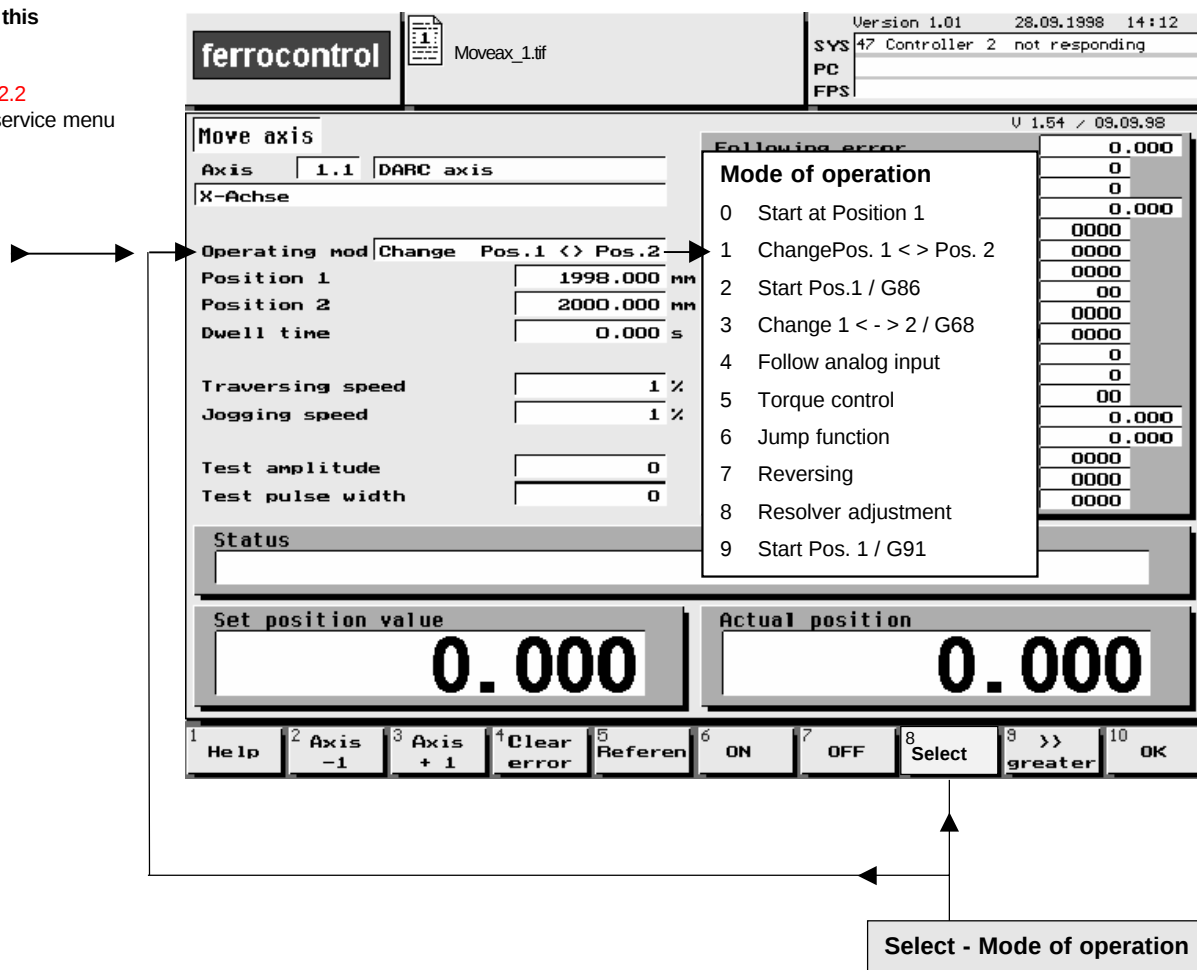
5 Screen masks

5.6 Move axis

5.6.1 Select: Mode of operation

Access to this
mask:

See under [2.2](#)
Overview service menu



Select: Mode of operation

Start auf Position 1

If the **START** key is pressed, the axis moves at the preset traversing speed to the set value in the input window of Position 1.

Change Pos 1 <> Pos 2

If the **START** key is pressed, the axis moves at the preset traversing speed between the set values in the input window of Position 1 and Position 2.

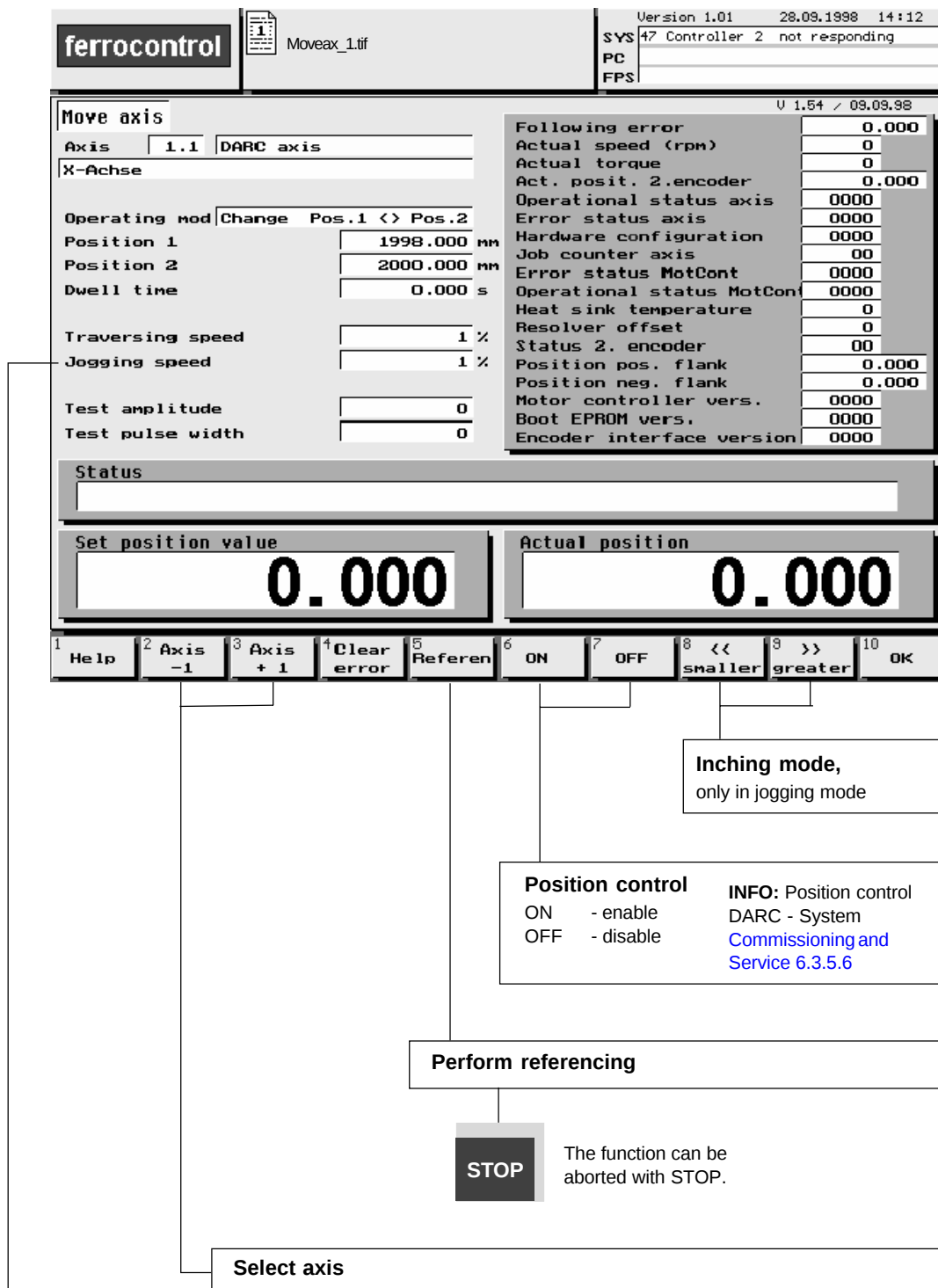
Resolver adjustment

See ferrocontrol manual:

DARC System - Commissioning and Service / [Chapter 6.4.7](#)

Access to this mask:

See under [2.2](#)
Overview service menu

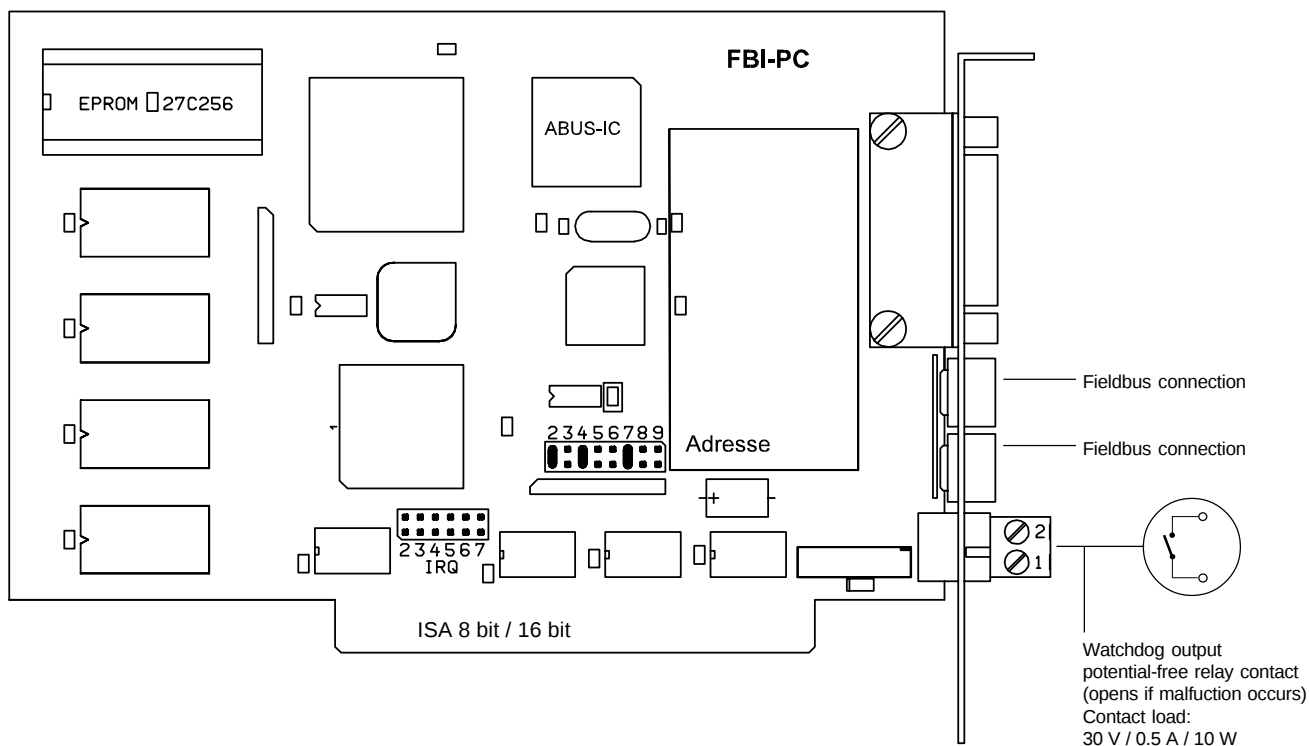


5 Screen masks

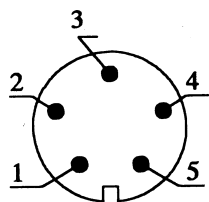
Space for your own notes

6 Functional modules in the Fieldbus system

6.1 FBI-PC, Fieldbus interface card for IBM computers



CNC-Fieldbus connection



- 1 Rt + / terminator
Differential signal - positive
- 2 Fieldbus signal
Differential signal - negative
- 3 Screening
- 4 Fieldbus signal
Differential signal - positive
- 5 Rt - / terminator
Differential signal - negative

Addressing:

Possible segment addresses in PC: C000 h - EF00 h
Settable via jumper field: address

Address	Jumper:	9	8	7	6	5	4	3	2	
0C000 h	=	0	0	X	X	X	X	X	X	X = Jumper plugged in 0 = Jumper open
0C100 h	=	0	0	X	X	X	X	X	0	
0C200 h	=	0	0	X	X	X	X	0	X	
0C300 h	=	0	0	X	X	X	X	0	0	Jumper 8 and 9 remain open!
0C400 h	=	0	0	X	X	X	0	X	X	
... ..										
FD00 h	=	0	0	0	0	0	0	X	0	
FE00 h	=	0	0	0	0	0	0	0	X	
FF00 h	=	0	0	0	0	0	0	0	0	
DA00 h	=	0	0	X	0	0	X	0	X	/ Factory setting

Select Interrupt (IRQ) :

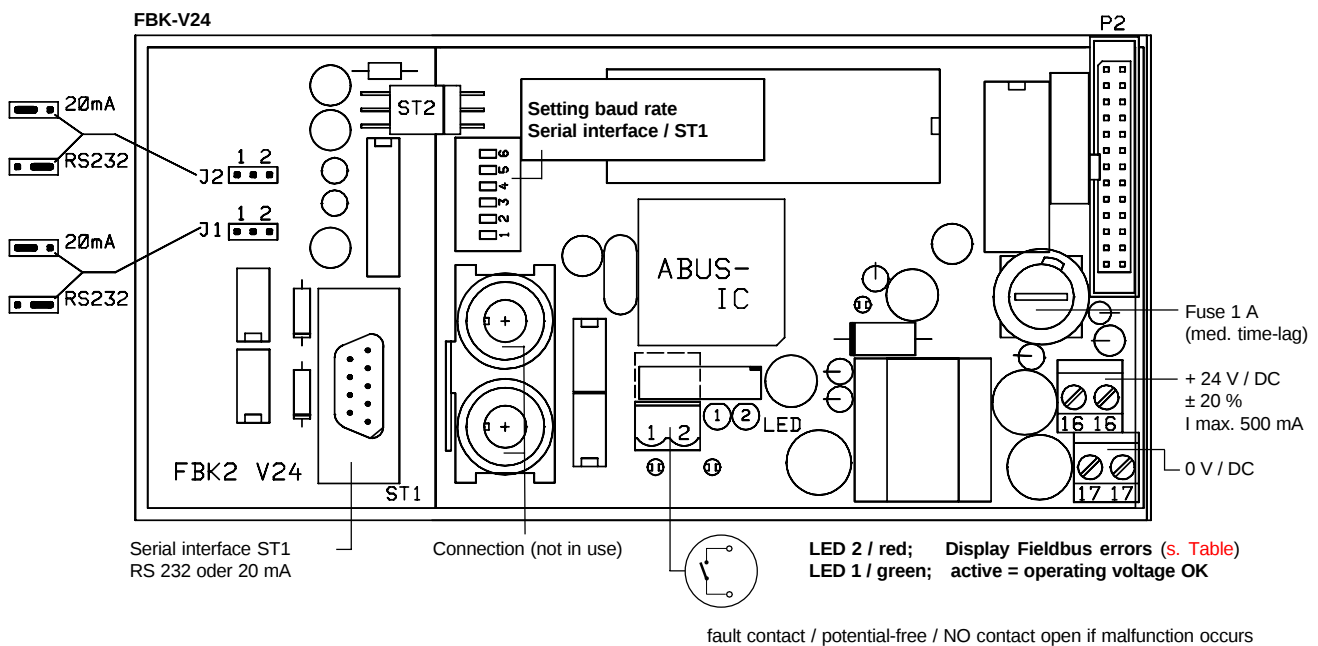
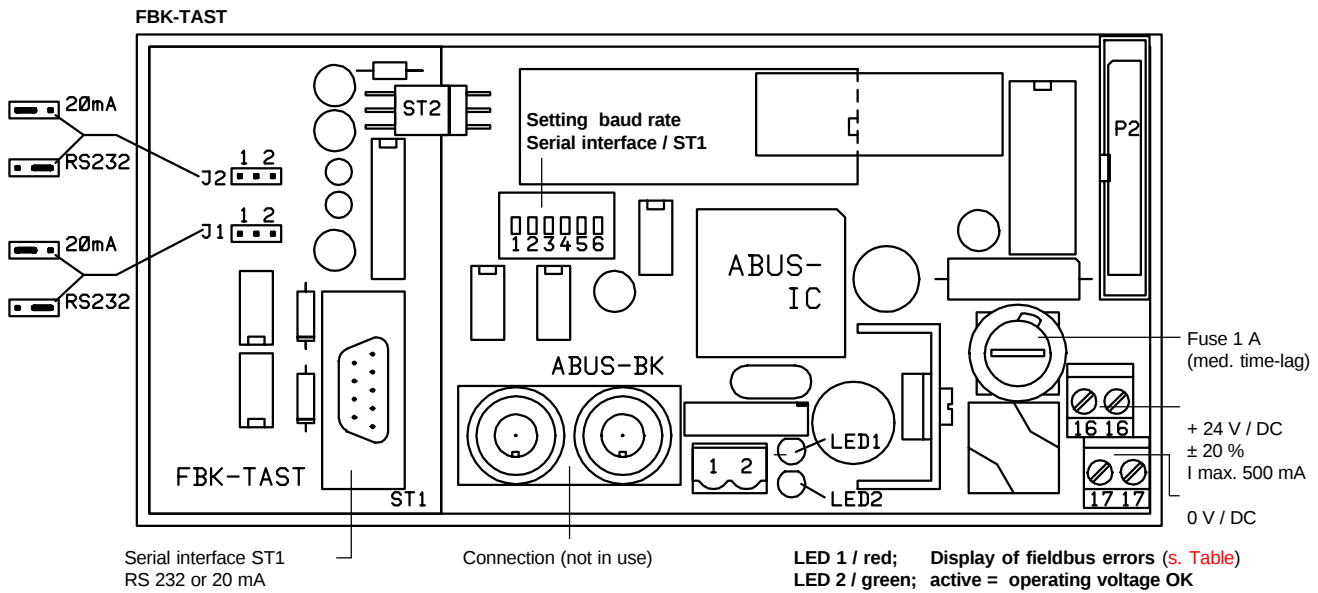
Settable via jumper field: IRQ

IRQ	Jumper:	2	3	4	5	6	7	
IRQ-2	=	X	0	0	0	0	0	X = Jumper plugged in 0 = Jumper open
IRQ-3	=	0	X	0	0	0	0	
IRQ-4	=	0	0	X	0	0	0	
IRQ-5	=	0	0	0	X	0	0	
IRQ-6	=	0	0	0	0	X	0	
IRQ-7	=	0	0	0	0	0	X	

Only max. one jumper may
be plugged in!

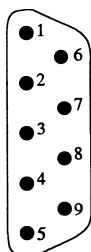
6 Functional modules in the Fieldbus system

6.2 FBK / Fieldbus nodes



Pin configuration ST1 (9-pole)
RS 232/20 mA

- 1 RX-
- 2 RXD
- 3 TXD
- 4 TX-
- 5 0 V / Screening
- 6 RX+
- 7 not in use
- 8 not in use
- 9 TX+



Setting baud rate
Serial interface ST1

on	1	2	3	4	5	6	
off							19 200 Baud
on							
off							9 600 Baud
on							
off							4 800 Baud
on							
off							2 400 Baud
on							
off							1 200 Baud

6 Functional modules in the Fieldbus system

6.2 Fieldbus nodes Technical data

What the LED display means: Fieldbus errors

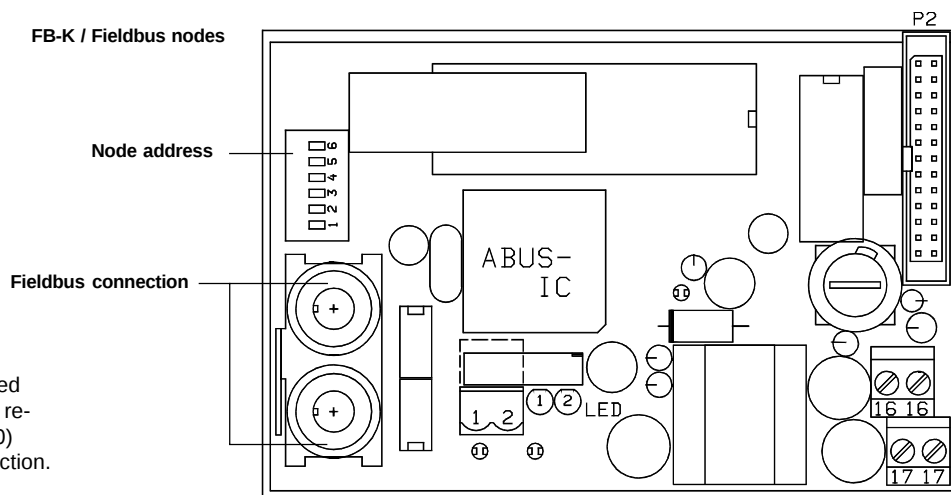
Display:	possible causes of error:
off	- No error
on with short pauses	- Short circuit on the fieldbus - Driver board not available or faulty
regular blinking	- Operating system on the fieldbus interface card in the PC not started yet. - No connection via fieldbus cable - No terminating resistor connectors
4 x blinking	- Configuration does not match the connected modules. - Parallel bus cable not connected or faulty. - Parallel bus cable too long (malfunctions)

Addressing:

Setting the node addresses via DIP switches / address 0 - 63

Address	DIP switch no.	
	1 2 3 4 5 6	
0	0 0 0 0 0 0	X = DIP switch closed
1	X 0 0 0 0 0	0 = DIP switch open
2	0 X 0 0 0 0	
3	X X 0 0 0 0	
4	0 0 X 0 0 0	
5	X 0 X 0 0 0	
6	0 X X 0 0 0	
7	X X X 0 0 0	
...		
60	0 0 X X X X	
61	X 0 X X X X	
62	0 X X X X X	
63	X X X X X X	

FB-K / Fieldbus nodes



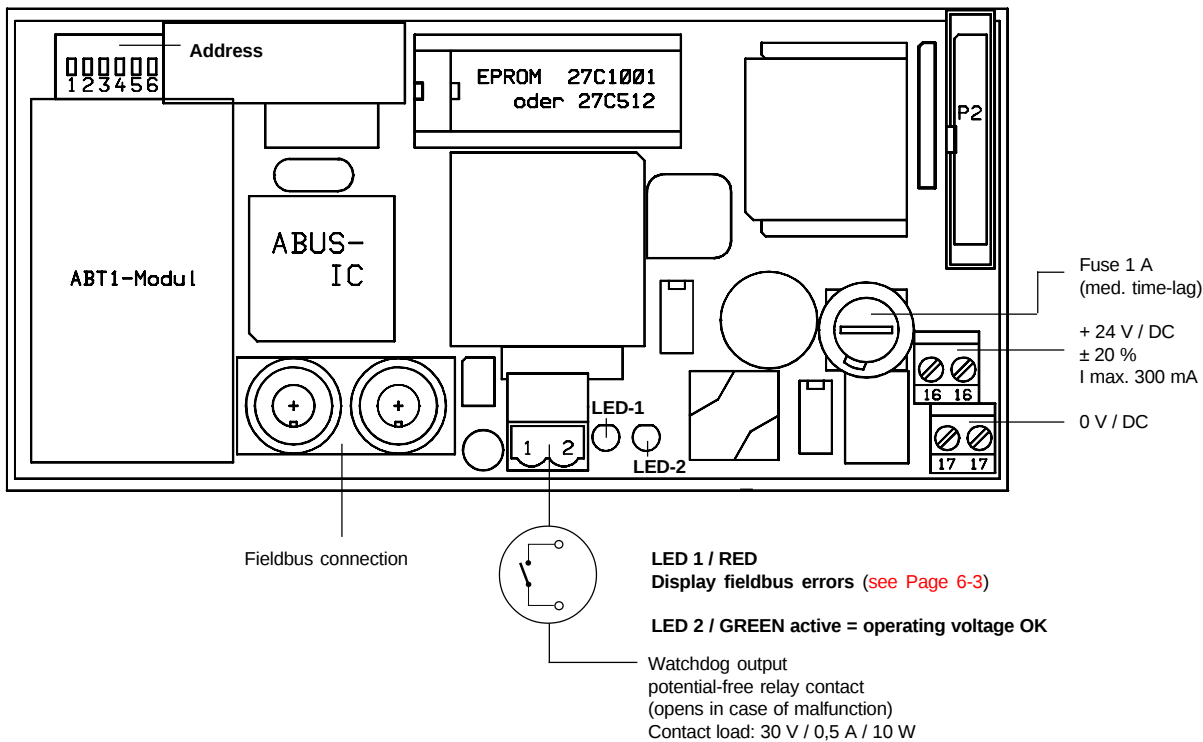
Please note!

If only one fieldbus cable is connected to the fieldbus node, the terminating resistor connector (Art. no. 70-042 500) must be plugged into the free connection.

6 Functional modules in the Fieldbus system

6.3 FBUR / FBRR

Fieldbus universal controller / Fieldbus directional controller



FBUR:

With this version a maximum of 3 servo-drive or controlled fixed-speed axes can be traversed. (See Label EPROM)

FBRR:

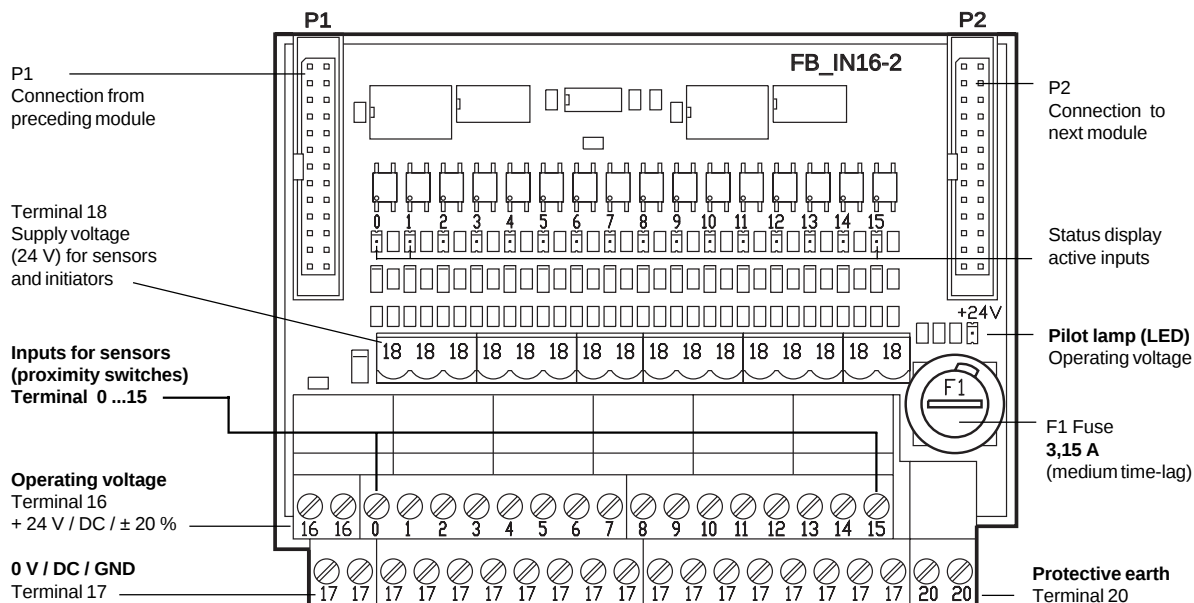
With this version a maximum of 6 controlled fixed-speed axes can be traversed. (See Label EPROM)

Addressing:					
Setting the node address via DIP switches / address 0 - 63					
Address	DIP switch no.				
	1	2	3	4	5 6
0	0	0	0	0	0 0
1	X	0	0	0	0 0
2	0	X	0	0	0 0
3	X	X	0	0	0 0
4	0	0	X	0	0 0
5	X	0	X	0	0 0
6	0	X	X	0	0 0
7	X	X	X	0	0 0
...					
60	0	0	X	X	X X
61	X	0	X	X	X X
62	0	X	X	X	X X
63	X	X	X	X	X X

X = DIP switch closed
0 = DIP switch open

6 Functional modules in the Fieldbus system

6.4 FB-IN 16-2 Input module with 16 inputs (binary)



Technical data

Inputs:

All inputs metallically separated

Maximum input voltage 30 V DC

Current consumption per input c. 18 mA / 24 V

Input level:

High level > 19 V

Low level < 3 V

Time until input signal valid 100 μ s

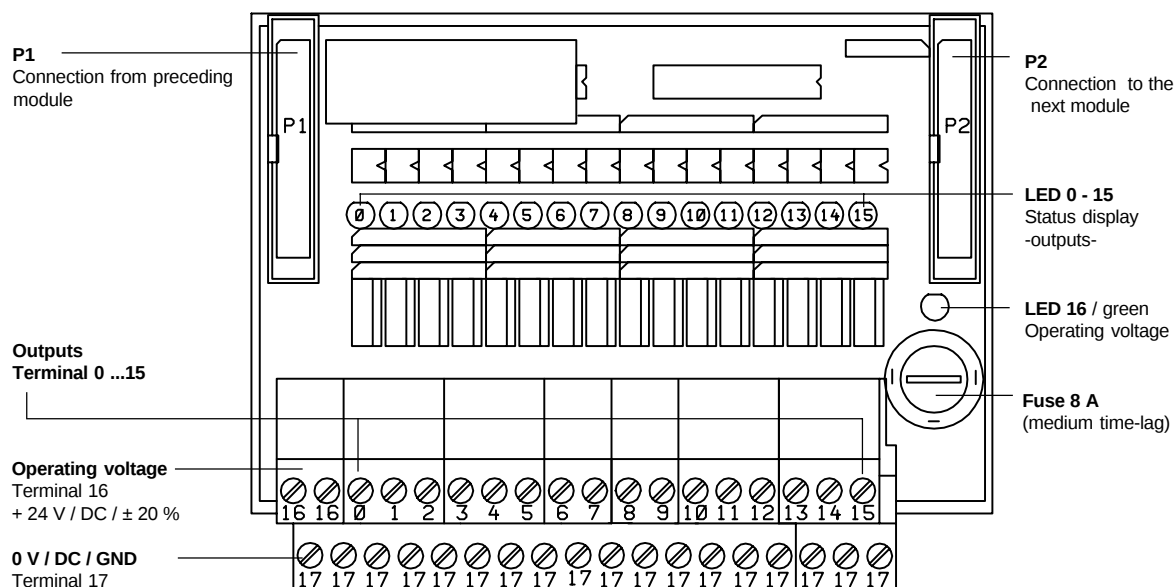
**If the input voltage is between 3 and 19 volts,
the value read is not defined.**

AC voltage may not be connected!

6 Functional modules in the Fieldbus system

6.5 FBOUT-16

Output module with 16 outputs (binary)



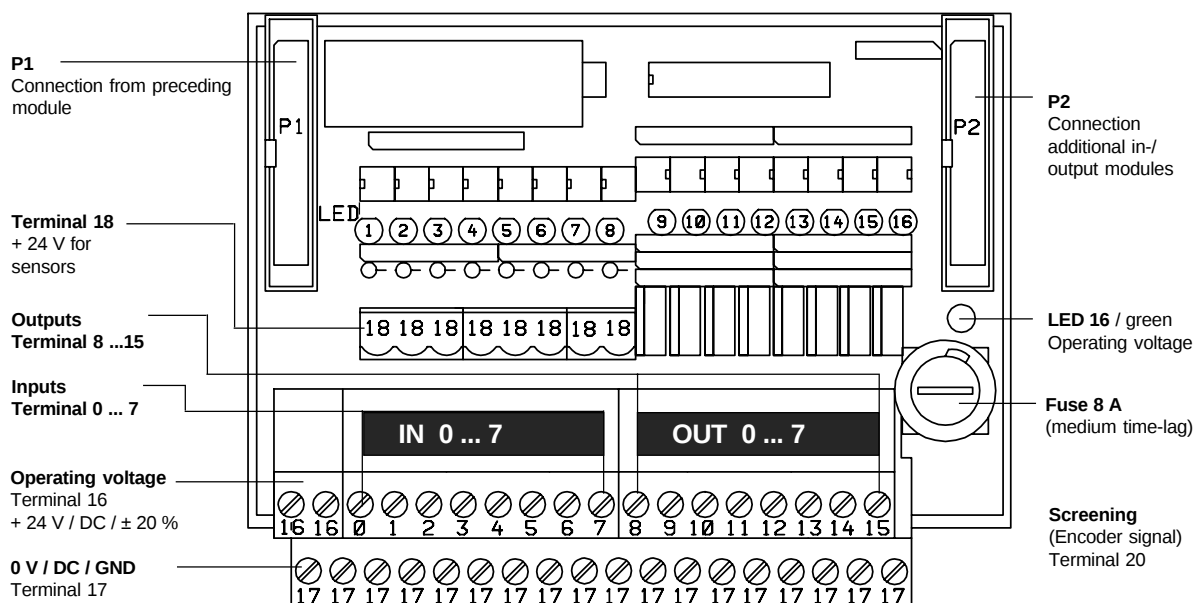
Notice!

Every output is fitted with protection against short circuit and excess temperature. After a short circuit the control of the appropriate output must be reset. Only then is the output ready for operation again.

Technical data

Outputs:

Maximum switching voltage:	30 V DC
Minimum switching voltage:	19 V DC
Constant load per output:	1 A
Total constant load of board:	8 A
Peak load per output:	3 A / 10 sec. / 45° C ambient temperature



Description

The FB-IOT8 is a combined input/output module. The module has 8 inputs and 8 outputs at its disposal. All in- and outputs are metallurgically separated by optical isolators.

The outputs are short-circuit proof and protected against excess temperature.

After remedying a short circuit the output can only work normally again once the control has been reset.

The LEDs 1 ... 8

signal the status of the inputs.

The LEDs 9 ... 16

signal the status of the outputs.

ON = in-/outputs active

Technical data

Outputs:

Maximum switching voltage:	30 V DC
Minimum switching voltage:	19 V DC
Constant load per output:	1 A
Total constant load of card:	8 A
Peak load per output:	3 A / 10 sec. / 45° C ambient temperature

Input level:

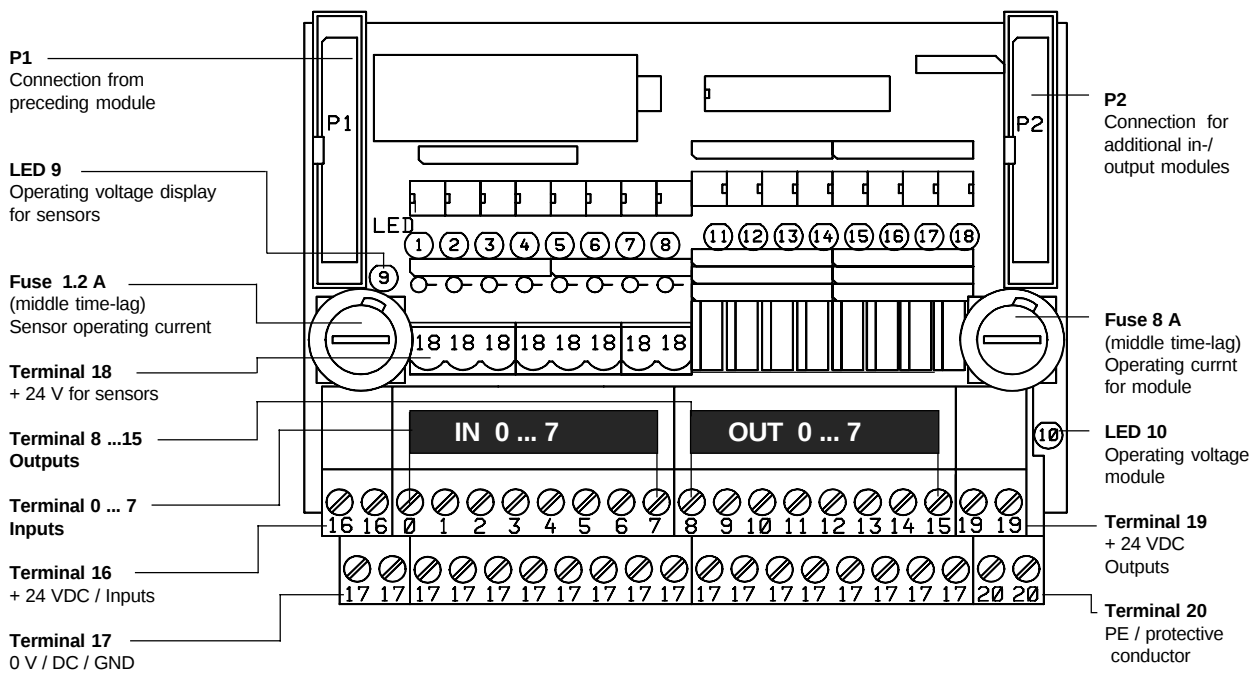
High level	> 19 V
Low level	< 3 V
Time until input signal is valid	100 µs

**If the input voltage is between 3 and 19 volts, the value read is not defined.
AC voltage may not be connected!**

6 Functional modules in the Fieldbus system

6.7 FB-INOUT

Combi module / 8 inputs and 8 outputs (binary)



Description

The FB-INOUT is a combined input/output module. The module has 8 inputs and 8 outputs at its disposal. All in- and outputs are metallically separated by optical isolators.

The outputs are short-circuit proof and protected against excess temperature.

After remedying a short circuit the output can only work normally again once the control has been reset.

The LEDs 1 ... 8

signal the status of the inputs.

The LEDs 9 ... 16

signal the status of the outputs.

ON = in-/outputs active

Technical data

Outputs:

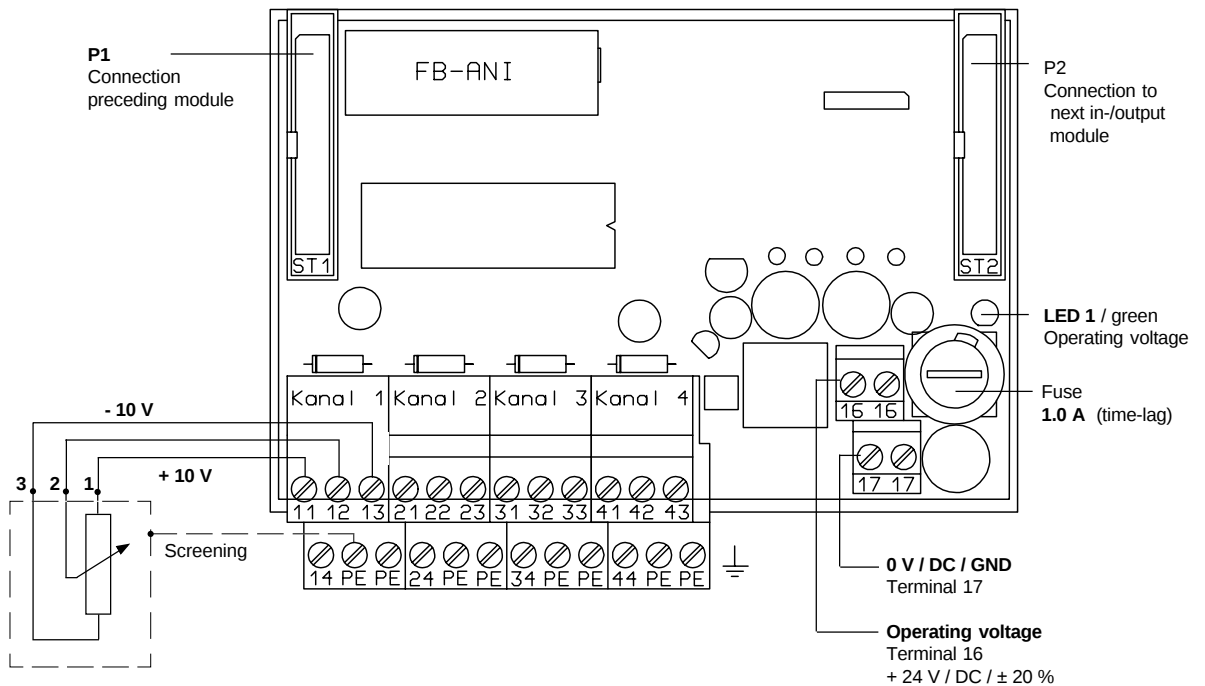
Maximum switching voltage:	30 V DC
Minimum switching voltage:	19 V DC
Constant load per output:	1 A
Total constant load of card	8 A
Peak load per output:	3 A / 10 sec. / 45° C ambient temperature

Input level:

High level	> 19 V
Low level	< 3 V
Time until input signal is valid	100 µs

**If the input voltage is between 3 and 19 volts, the value read is not defined.
AC voltage may not be connected!**

6.8 FB-ANI Module for 4 analog inputs



Input 1

Ter. 11	+ 10 V / Output
Ter. 12	Analog input 1 / - 10 V ... + 10 V
Ter. 13	- 10 V / output
Ter. 14	0 V / earth for input 1
Ter. PE	Screening for input 1

Input 2

Ter. 21	+ 10 V / output
Ter. 22	Analog input 2 / - 10 V ... + 10 V
Ter. 23	- 10 V / output
Ter. 24	0 V / Earth for input 2
Ter. PE	Screening for input 2

Input 3

...

Input 4

...

Technical data

Analog inputs:

4 channels

Input voltage range:

(- 10 V) to (+ 10 V)

Input resistance:

20 KOhm

Analog converter:

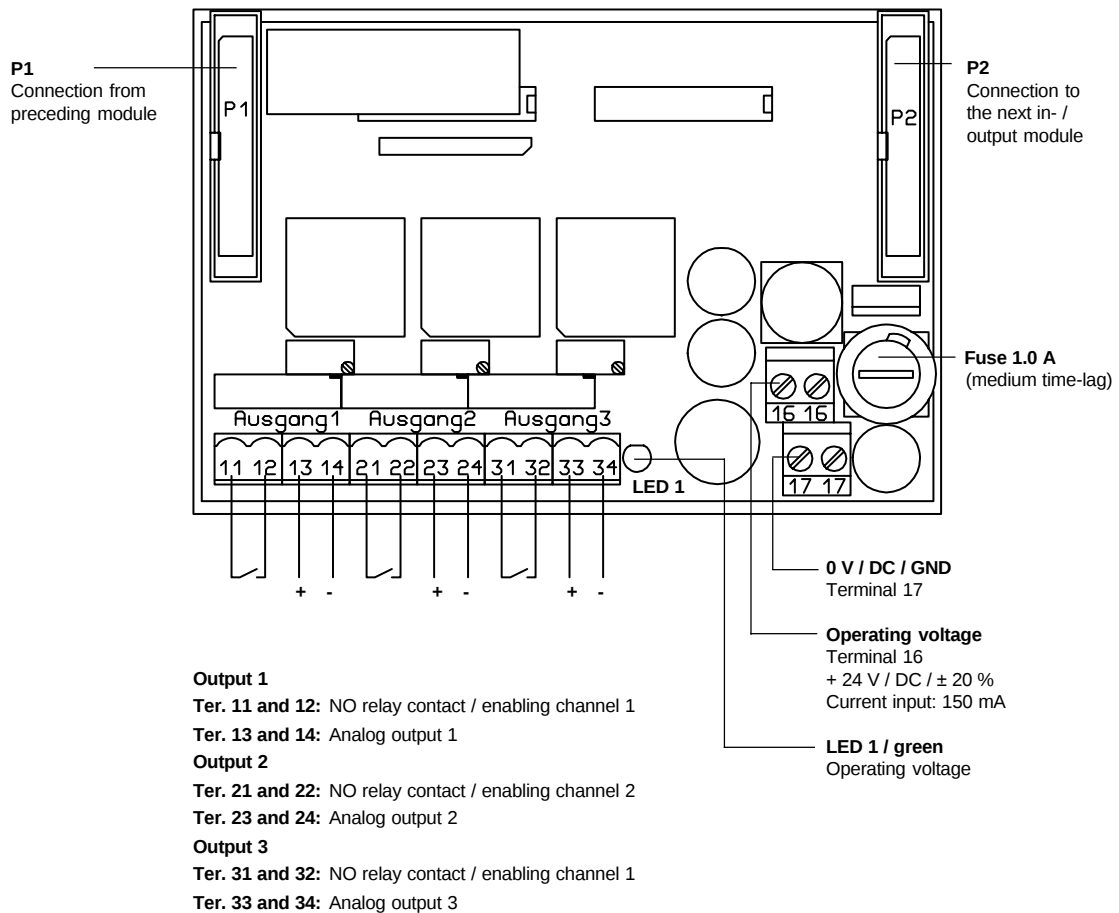
12 bit resolution / 4096 values = c. 5 mV

The inputs are protected against overvoltage!

6 Functional modules in the Fieldbus system

6.9 FB-ANO

Module for 3 analog outputs



Technical data

The analog output module FB-ANO has 3 analog outputs at its disposal for controlling servo-controllers. The set values determined by the axis controller are output as analog voltages (-10 V to +10 V).

In addition, one potential-free relay contact (controller enabling) is available for every channel.

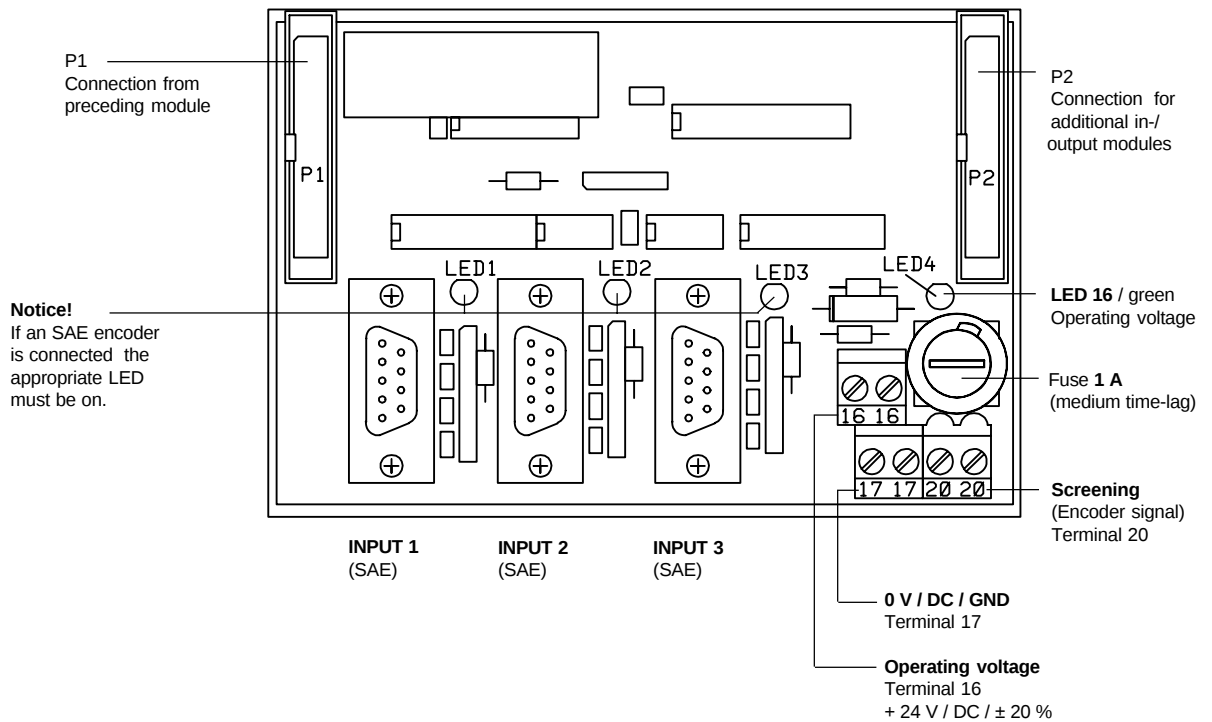
Analog outputs

Output voltage range:	(- 10 V) to (+ 10 V)
D/A converter:	12 bit resolution / 4096 values = c. 5 mV
Output current:	5 mA
Short-circuit current:	40 mA

Relay contact

Switching power:	max. 10 Watt
Switching voltage:	max. 30 V
Switching current:	max. 0.5 A

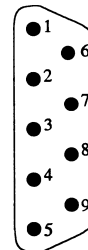
Module for serial absolute encoders (SSI interface)



Description

The FB-SAE module is responsible for reading a maximum of 3 serial absolute encoders with SSI interface simultaneously.

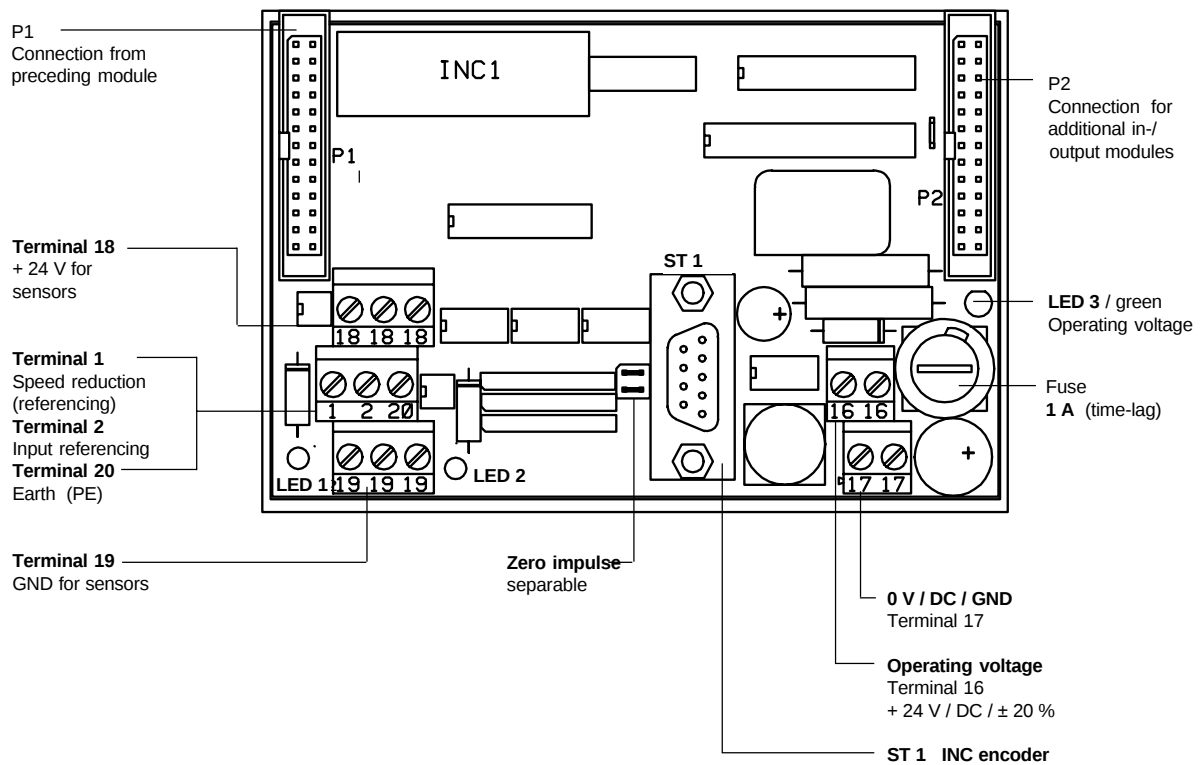
- 1 Data input -
- 2 Data input +
- 3 Screening
- 4 Clock output -
- 5 Clock output +
- 6 + 24 V - Operating voltage for encoder
- 7 + 24 V - Operating voltage for encoder
- 8 0 V / GND
- 9 0 V / GND



6 Functional modules in the Fieldbus system

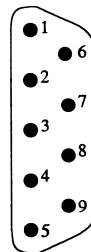
6.11 FB-INC-1

Module for reading an incremental encoder



ST 1: Incremental encoder

- 1 UA 2 / K2
- 2 UA 1 / K1
- 3 UA 0 / K0
- 4 0 V / GND
- 5 Screening
- 6 UA 2 / K2 / negative
- 7 UA 1 / K1 / negative
- 8 UA 0 / K0 / negative
- 9 + 5 V



LED 1 (green) signals: Speed reduction for referencing switched on.
LED 2 (green) signals: Referencing = active

Jumper zero impulse

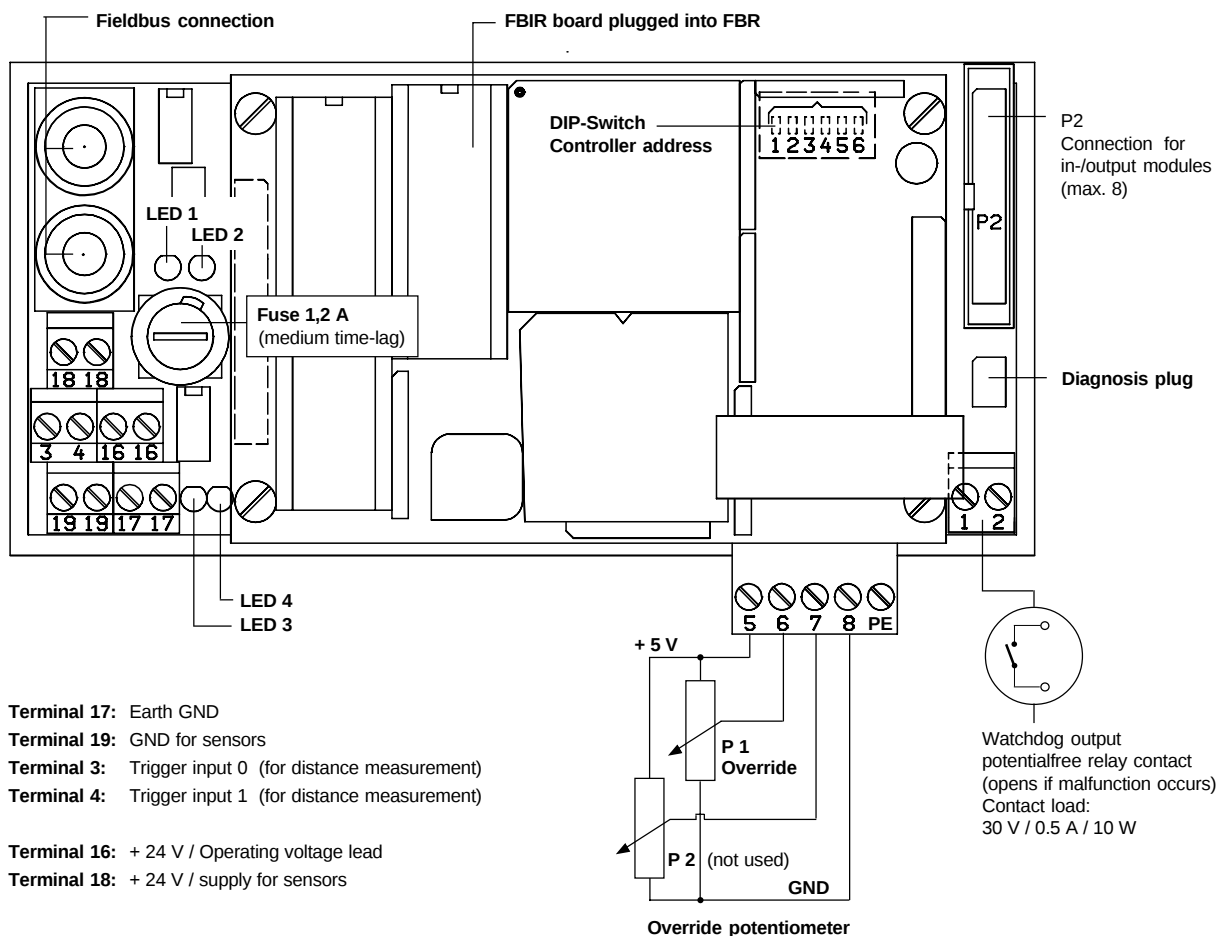
The zero impulse of the encoder can be interrupted by the two jumpers.

Both jumpers must always be opened or closed!

Both jumpers open: The counter is reset for every negative edge of the referencing input.

6 Functional modules in the Fieldbus system

6.12 FBIR / Interpolator for the CNC-Fieldbus system Module for connecting max. 6 controlled servo-axes



LED 1 (red) Display fieldbus errors (see [page 6-15](#))
LED 2 (green) Operating voltage
LED 3 Trigger input 0 / Terminal 3
LED 4 Trigger input 1 / Terminal 4

Addressing:

Setting of node address via DIP switch / address 0 - 63

AddressDIP switch no.

1 2 3 4 5 6

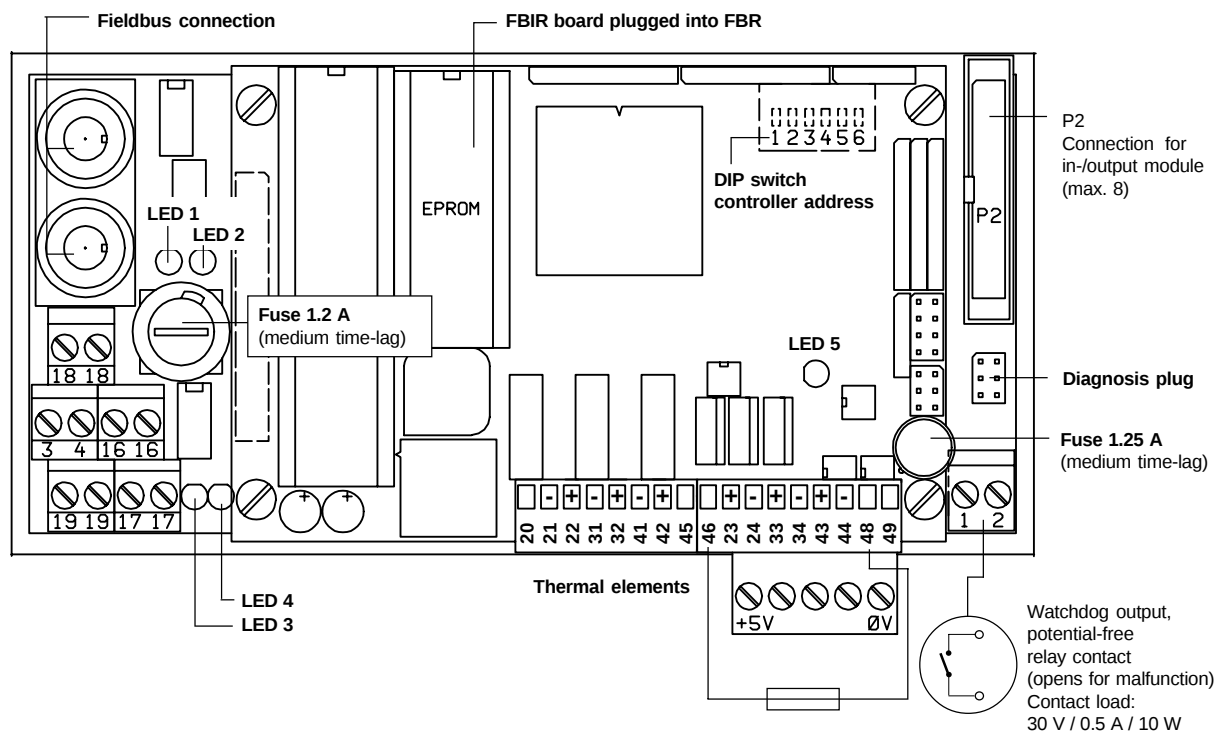
0	0	0	0	0	0	0
1	X	0	0	0	0	0
2	0	X	0	0	0	0
3	X	X	0	0	0	0
4	0	0	X	0	0	0
5	X	0	X	0	0	0
6	0	X	X	0	0	0
7	X	X	X	0	0	0
...						
60	0	0	X	X	X	X
61	X	0	X	X	X	X
62	0	X	X	X	X	X
63	X	X	X	X	X	X

X = DIP switch closed
 0 = DIP switch open

6 Functional modules in the Fieldbus system

6.13 FBTRG

CNC-Fieldbus interface with 3 temperature control systems



Technical data

3 control systems for FeCuNi - Thermal elements

Effective range:	0 to 409.6° C
Correcting variable outputs:	24V / DC / 500 mA
Signal resolution:	12 Bit / 0.1°C / 10 mV for each °C

Card power consumption **max. 600 mA**

Terminal configuration

Terminal 3:	+ 24 V	Input temperature increase
Terminal 4:	+ 24 V	Input temperature decrease
Terminal 16:	+ 24 V	Operating voltage module
Terminal 17:	GND	Operating voltage
Terminal 18:	+ 24 V	Operating voltage pick-off for sensors
Terminal 19:	GND	For sensors

Connection FeCuNi - Thermal elements:

Terminal 20	PE bar connection / PE
Terminal 21 / 22	Thermal element 1 Terminal 21 (-)
Terminal 31 / 32	Thermal element 2 Terminal 31 (-)
Terminal 41 / 42	Thermal element 3 Terminal 41 (-)

Terminal 45	Input controller enabling
Terminal 46	+ 24 V for controller enabling

Terminal 23 / 24	Corr. variable Th-1 Terminal 23 (+)
Terminal 33 / 34	Corr. variable Th-2 Terminal 33 (+)
Terminal 43 / 44	Corr. variable Th-3 Terminal 43 (+)

Terminal 48	+ 24 V / Operating voltage pick-off for controller enabling
Terminal 49	GND

LED 1 (red)
Display fieldbus errors
(see [page 6-15](#))

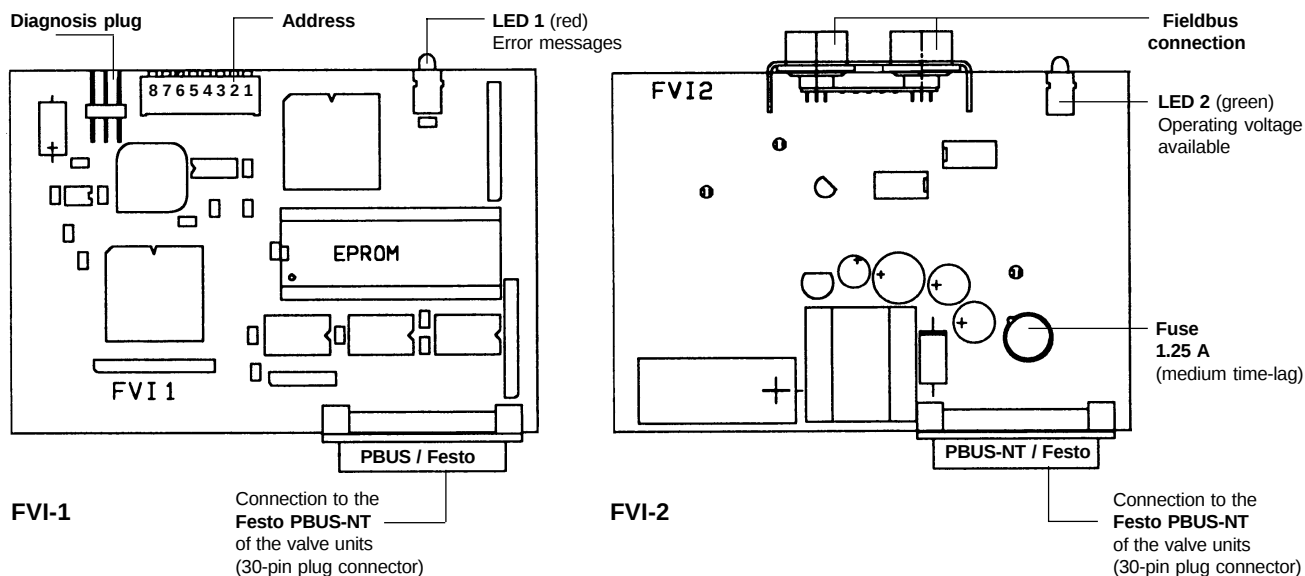
LED 2 (green)
Operating voltage

LED 3
Enable,
temperature increase
Terminal 3

LED 4
Enable,
temperature decrease
Terminal 4

LED 5
Operating voltage
for controller enabling

Activation of Festo valve units with fieldbus connection



Addressing:

Setting the node address via DIP switch / address 0 - 63

Address	DIP switch no.					
	1	2	3	4	5	6
0	0	0	0	0	0	0
1	X	0	0	0	0	0
2	0	X	0	0	0	0
3	X	X	0	0	0	0
4	0	0	X	0	0	0
5	X	0	X	0	0	0
6	0	X	X	0	0	0
7	X	X	X	0	0	0
...						
60	0	0	X	X	X	X
61	X	0	X	X	X	X

X = DIP switch closed
0 = DIP switch open

Notice!
DIP switch 7 and DIP switch 8 are always set to 0!

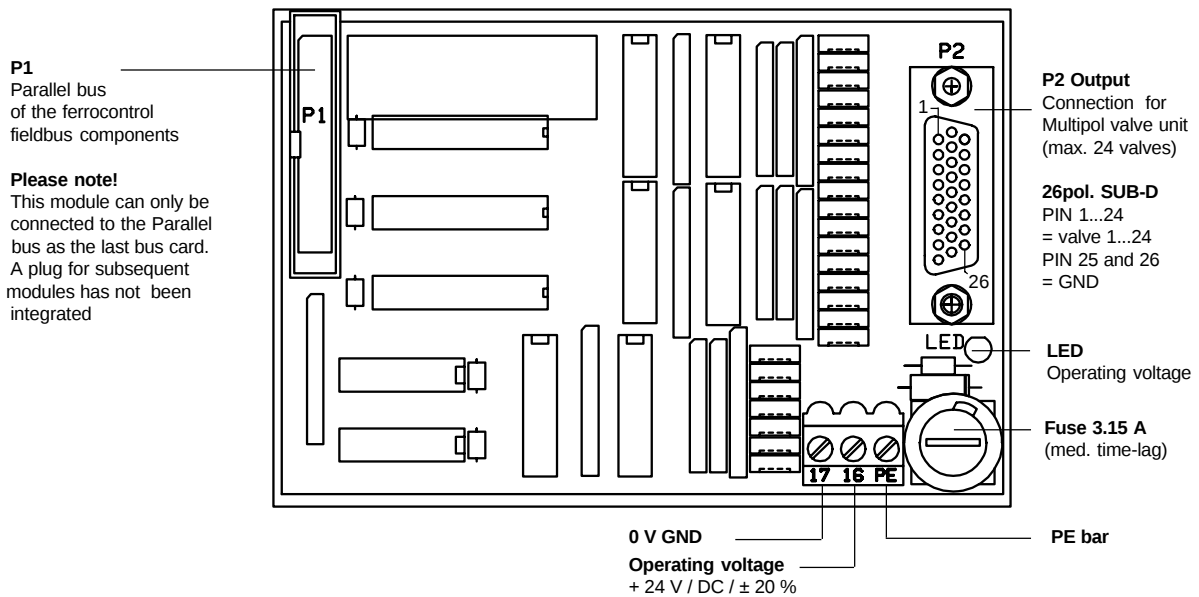
What the fieldbus error display means (LED 1 red)

Display:	Possible causes of error:
Off	- No error
Steady flashing	- Operating system on the fieldbus interface card in the PC has not been started yet. - No connection via fieldbus cable - No terminator
flashes 4 x	- Configuration does not match the connected modules. - Parallel bus not connected or faulty. - Parallel bus cable too long (malfunctions)
flashes 7 x	- Error in initializing valve units type 03.
flashes 9 x	- Error in initializing valve units type 02.

6 Functional modules in the Fieldbus system

6.15 MPLI

Interface for connecting the Festo Multipol valve unit



Description

This module makes 24 switching outputs available.

These outputs are reserved especially as drivers for the Festo valve units.

These outputs do not have any internal protection against short circuit, excess temperature, overvoltage or switching peaks.

Special feature

In the fieldbus configuration this module is registered **twice with the ID number 6** (as FB-OUT 16). This module has two logical addresses in the fieldbus configuration. Exception: the module is in operation as the last parallel bus participant.

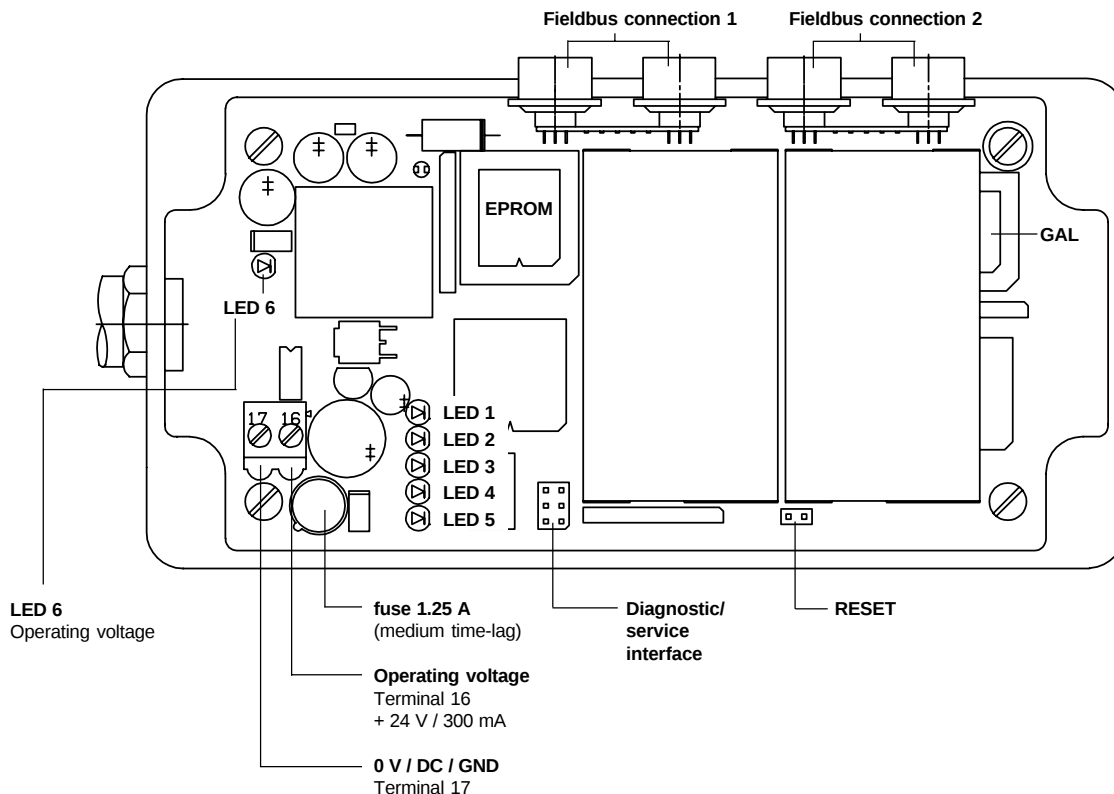
Please note!

If all 24 outputs are in operation, this module may only be connected to the Parallel bus as the 7th participant at the highest!

Technical data:

Max. switching voltage	30 V / DC
Min. switching voltage:	5 V / DC
Constant load per output:	120 mA
Peak load per output:	200 mA / 10 sec / 45° C ambient temperature
Total constant load of module:	2.4 A

The total constant load of 2.4 A may not be exceeded!
20 Outputs at 120 mA each = 2.4 A.



Description

With the repeater it is possible to realize a tree-shaped fieldbus topology. (see figure on the [next page](#)). The purpose of the fieldbus repeater is to branch and enlarge the maximum permitted cable lengths.

Max. cable lengths (for each fieldbus phase)

Baud rate:	
500 Kbit/sec.	70 Meter
250 Kbit/sec.	170 Meter
125 Kbit/sec.	350 Meter
62,5 Kbit/sec.	650 Meter

LED 1 ... 5

LED 1 is on
LED 2 is on

Error status display

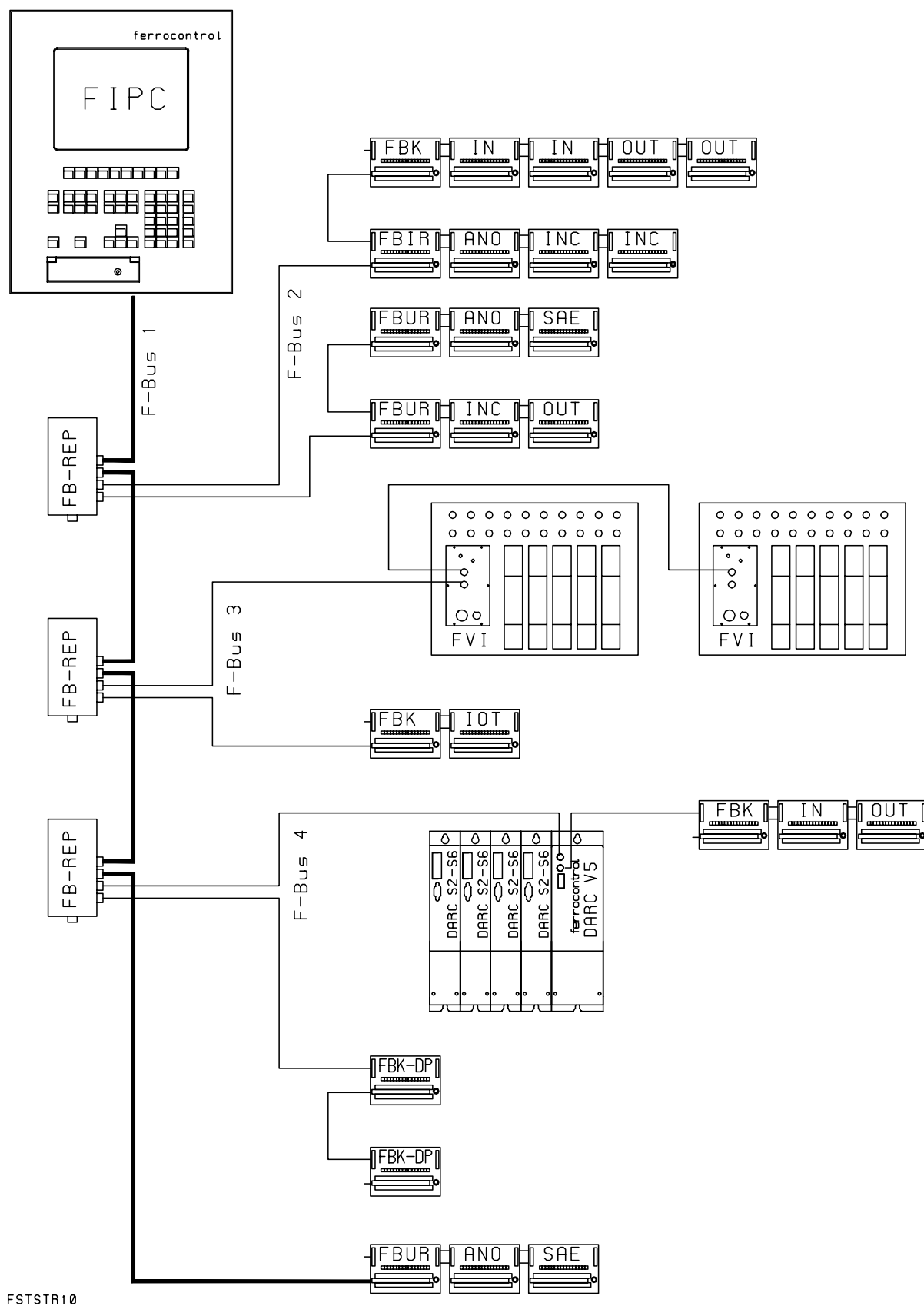
Error on fieldbus connection 1
Error on fieldbus connection 2

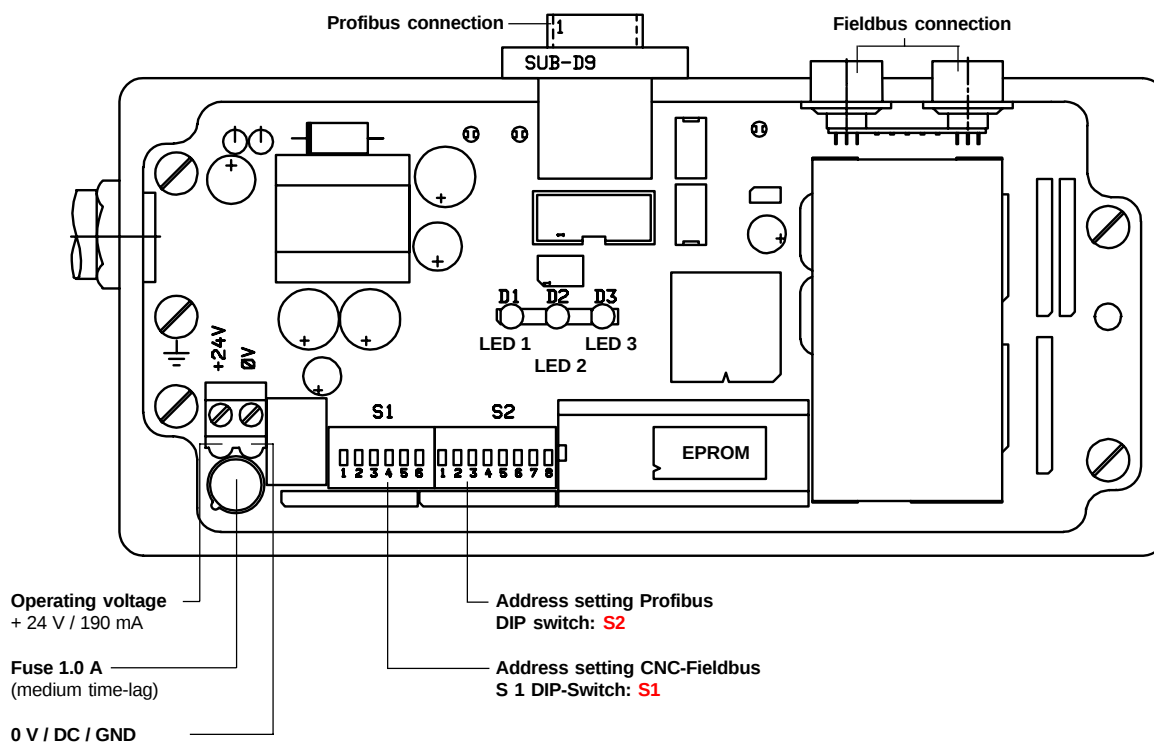
The following table is valid only if LED 1 or LED 2 is on:

LED 3	LED 4	LED 5	
off	off	off	— Short circuit in the fieldbus cables after 5 V
off	off	on	— More than 32 telegrams with transmission error
off	on	off	— More than 32 telegrams with transmission error
off	on	on	— Short circuit in the fieldbus cables after 0 V
on	off	on	— ABUS not synchronized

6 Functional modules in the Fieldbus system

6.17 Diagram: Fieldbus system Bus topology with repeater





LED 1 / green

LED 2 / red

LED 3 / red

Operating voltage available

Error diagnosis / CNC-Fieldbus

see Table **card FVI** = LED 1 (red)

Error diagnosis / is on if a profibus error occurs

Description

The fieldbus bridge FBK_DP allows the exchange of information between the CNC-Fieldbus and the Profibus (Process-Field-Bus).

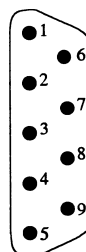
The configuration of this module is carried out via the Profibus-Master.

The address allocation for the CNC-Fieldbus is carried out via DIP switch S1.

The address allocation for the CNC-Fieldbus is carried out via DIP switch S2.

Pin configuration Profibus connection cable

- 1 NC / not connected
- 2 NC / not connected
- 3 RS 485 -B**
- 4 RTS (TTL level)
- 5 GND (metallically separated)
- 6 + 5 V (metallically separated)
- 7 NC / not connected
- 8 RS 485 -A**
- 9 NC / not connected



6 Functional modules in the Fieldbus system

6.18 FBK-DP

Fieldbus bridge: continued

Setting the address via DIP switches

DIP switch S1

Addresses in the CNC-Fieldbus system / settable address range: 0 - 63

Address	DIP switch no.						
	1	2	3	4	5	6	
0	0	0	0	0	0	0	X = DIP switch closed 0 = DIP switch open
1	X	0	0	0	0	0	
2	0	X	0	0	0	0	
3	X	X	0	0	0	0	
4	0	0	X	0	0	0	
5	X	0	X	0	0	0	
6	0	X	X	0	0	0	
7	X	X	X	0	0	0	
...							
60	0	0	X	X	X	X	
61	X	0	X	X	X	X	

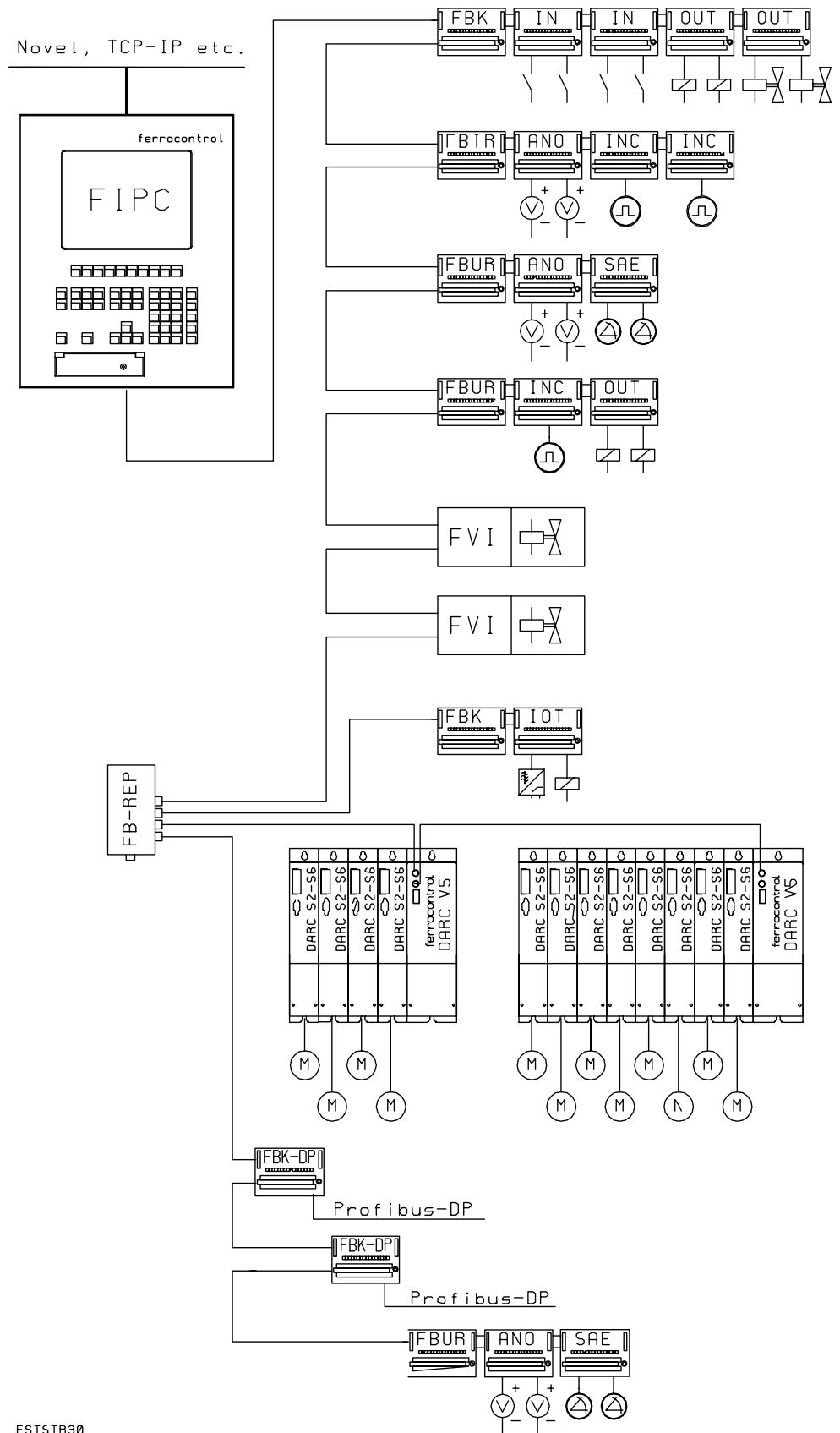
DIP switch S2

Addresses in the Profibus system / settable address range: 0 - 127

Address	DIP switch no.								
	1	2	3	4	5	6	7	8	
0	0	0	0	0	0	0	0	0	X = DIP switch closed 0 = DIP switch open
1	X	0	0	0	0	0	0	0	
2	0	X	0	0	0	0	0	0	
3	X	X	0	0	0	0	0	0	
4	0	0	X	0	0	0	0	0	
5	X	0	X	0	0	0	0	0	
6	0	X	X	0	0	0	0	0	
7	X	X	X	0	0	0	0	0	
...									
124	0	0	X	X	X	X	X	0	Notice! DIP switch 8 is always set to 0!
125	0	X	X	X	X	X	X	0	
126	X	0	X	X	X	X	X	0	
127	X	X	X	X	X	X	X	0	

6 Functional modules in the Fieldbus system

6.19 Bus topology with a bridge to the Profibus



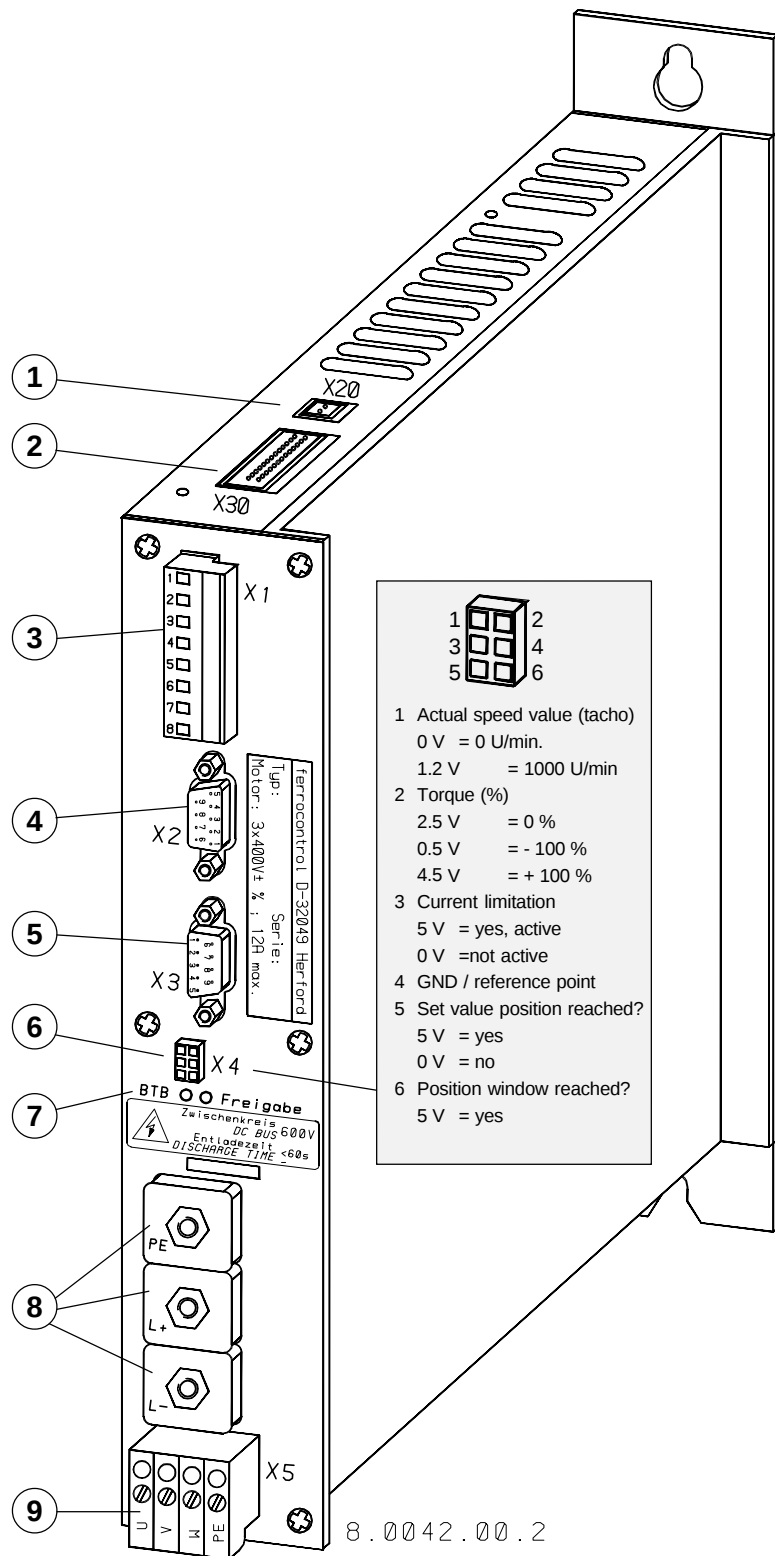
FSTSTR30

6 Functional modules in the Fieldbus system

6.20 Connection configuration: DARC axis regulation controller

- 1 **X 20**
24 V power supply
- 2 **X 30**
Parallel bus
- 3 **X 1**
Peripheral devices and holding brake
 - 1 Temperature contact - motor
 - 2 Quick-stop - right
 - 3 Quick-stop - left
 - 4 Input - reference switch
 - 5 Input - trigger
 - 6 0 V - potential (24 V)
 - 7 + 24 V / line entry
 - 8 Holding brake - motor
Protective circuit see [Appendix A.3](#)
- 4 **X 2**
Input resolver
Input protective circuit
see [Appendix A.3](#)
- 5 **X 3**
Input - OPTIONAL
for absolute position encoders
or incremental encoders
- 6 **X 4**
Test and diagnosis measuring point
- 7 **BTB: Operational display**
LED = ON
Axis reg. controller ready for operation
LED = OFF
Axis reg. controller not ready for operation

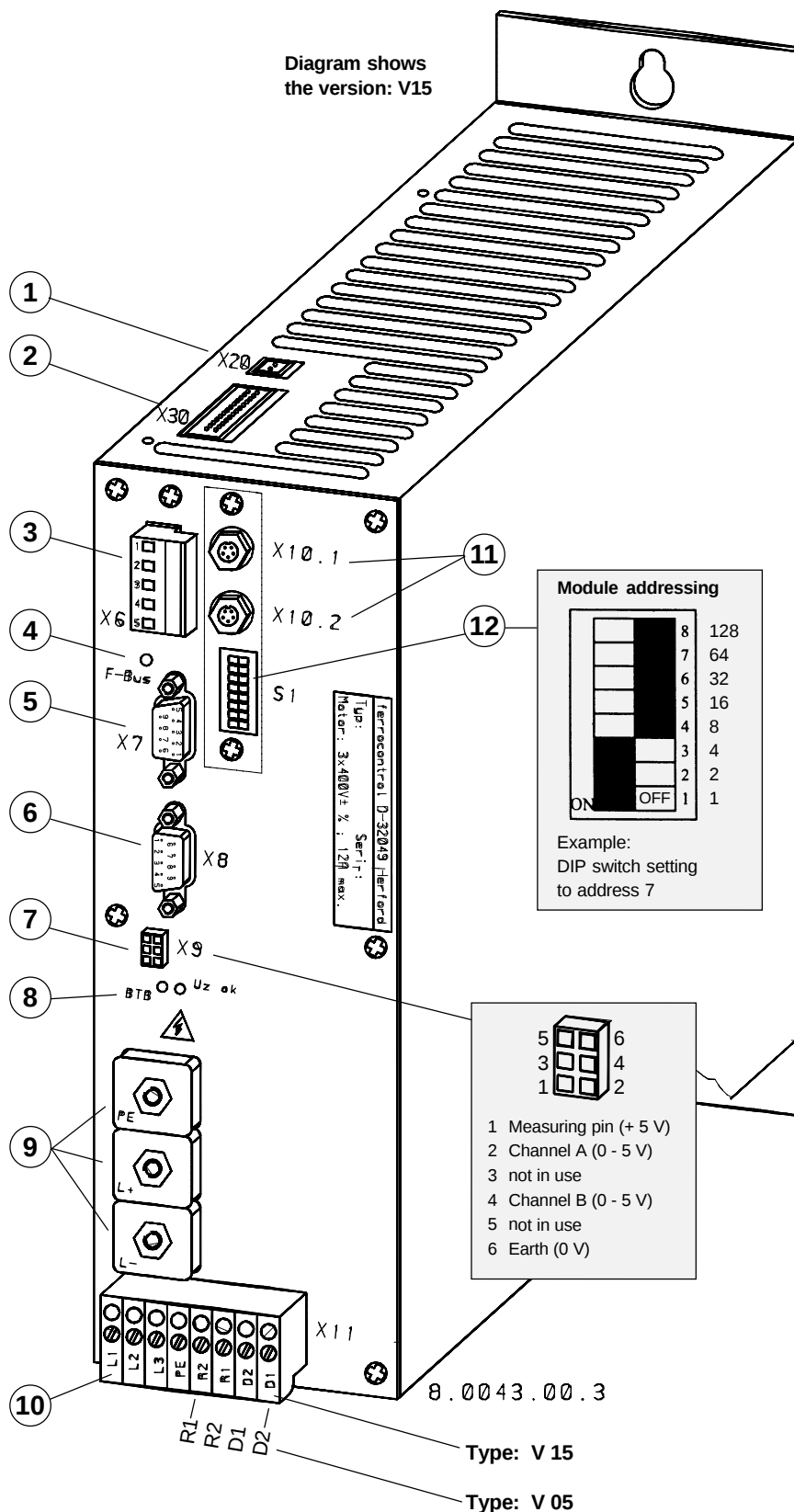
Enabling: Operational display
LED = ON
Pulse-controlled inverter = ON
Axis enabled
LED = OFF / axis disabled
- 8 **D.c. link**
PE / L+ / L-
Connection diagram see [Appendix A.3](#)
- 9 **X 5**
Motor connection
Connection diagram see [Appendix A.3](#)



6 Functional modules in the Fieldbus system

6.21 Connection configuration: DARC supply module

- 1 **X 20**
24 V power supply / DC
1 + 24 V
2 0 V
- 2 **X 30**
Parallel bus
- 3 **X 6**
Control in- and outputs
1 + 24 V / input
2 Ready for operation (BTB)
BTB output
3 External enabling signal (+ 24 V)
4 Trigger signal (+ 24 V)
5 0 V / earth
Protective circuit see [Appendix A.3](#)
- 4 **Fieldbus LED**
Info about LED display
see [next page](#)
- 5 **X 7**
Service-interface
RS-232
Override potentiometer
- 6 **X 8 / OPTIONAL**
Input for absolute position encoder
or incremental encoder
- 7 **X 9 Measuring points**
Only for ferrocontrol service
- 8 **BTB; operational display**
LED - ON = ready for operation
LED - OFF = not ready
Uz; operational display
LED - ON =
D.c. link voltage im
set range
LED - OFF =
Over- or undervoltage
- 9 **D.c. link**
PE / L+ / L-
Connection diagram see [Appendix A.3](#)
- 10 **X 11**
Power connection
R1 - R2 = Braking resistance
D1 - D2 = D.c. link choke
Connection diagram see [Appendix A.3](#)
- 11 **X 10.1 / X 10.2**
CNC - Fieldbus connection
- 12 **S1- Module address**
DIP switch for setting
the module address



6 Functional modules in the Fieldbus system

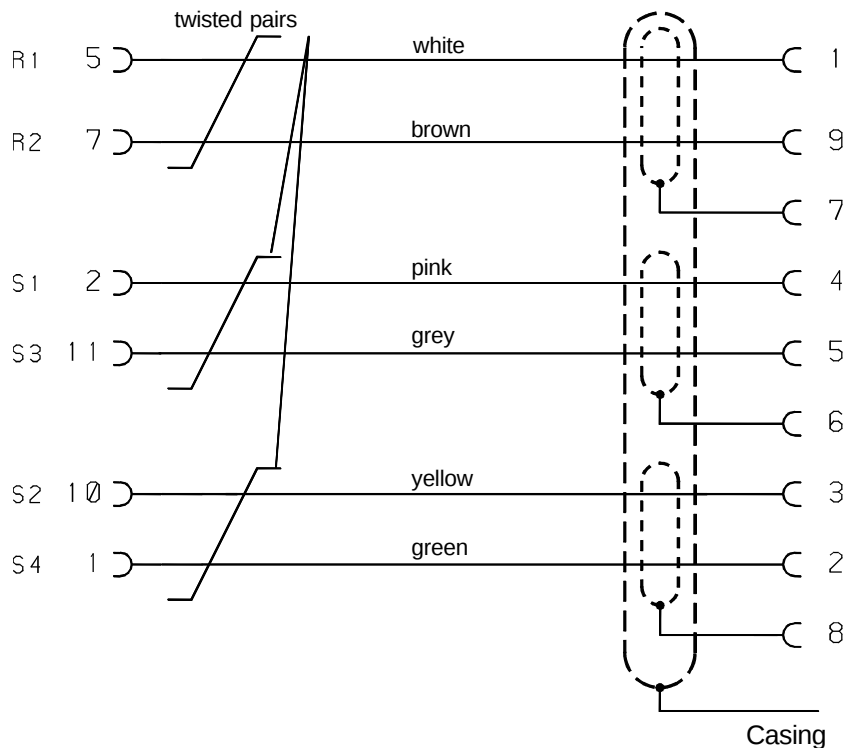
6.21 DARC supply module

Operating display F-Bus (LED)

Operational display: Fieldbus LED	Status	Cause / Meaning
	ON	The operating software is being transferred to the axis regulation controller. If the LED doesn't go out, possibly a download error.
	OFF	No error, everything OK.
	ON (with short pauses)	a) Fieldbus transfer error b) Short circuit in the fieldbus c) Terminating resistor connector is missing
	Steady flashing	Fieldbus system not started yet. no connection via fieldbus cable
	4 x flashing, 1 x pause	Error in the parallel bus connector

7 Pin configuration

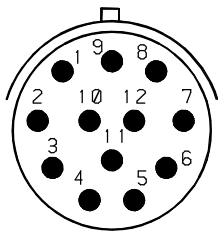
7.1 Encoder signal resolver - DARC input



Resolver

DARC input

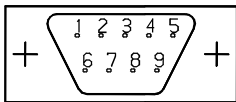
View = solder side



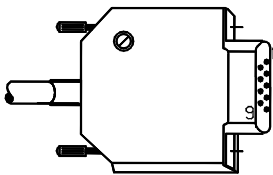
Jack insert 12-pin
Type: IN92



View = crimp side



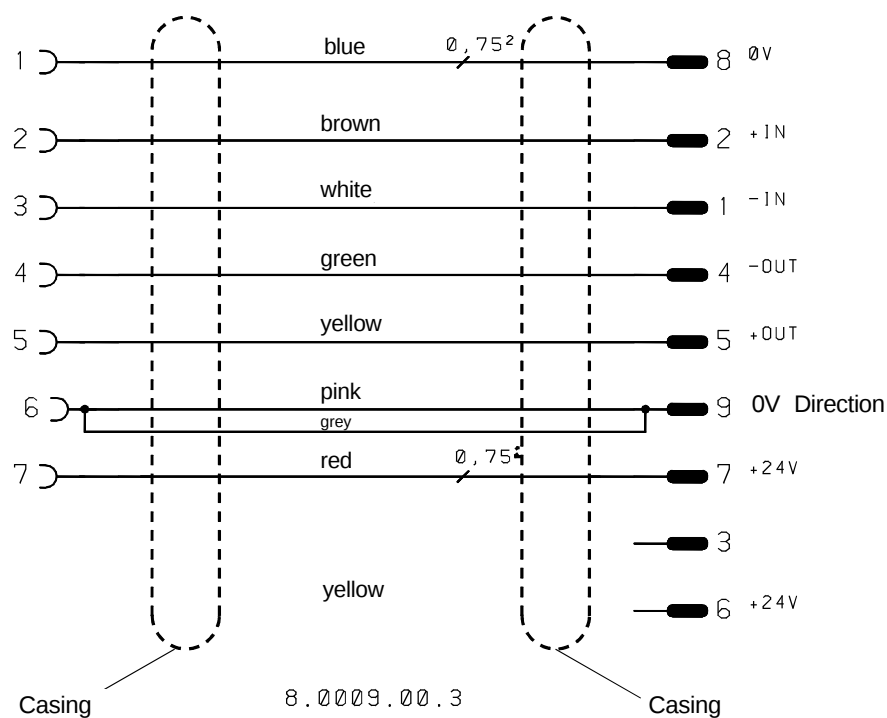
Jack insert sub-D 9-pin



Metallic casing
Screws = UNC thread

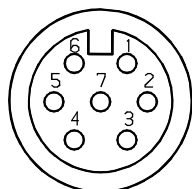
7 Pin configuration

7.2 Absolute position encoder - DARC input

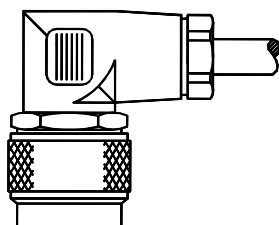


Absolute position encoder

View = solder side

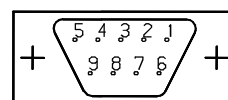


Jack contact unit
7-pin

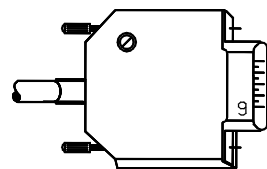


DARC input

View = solder side



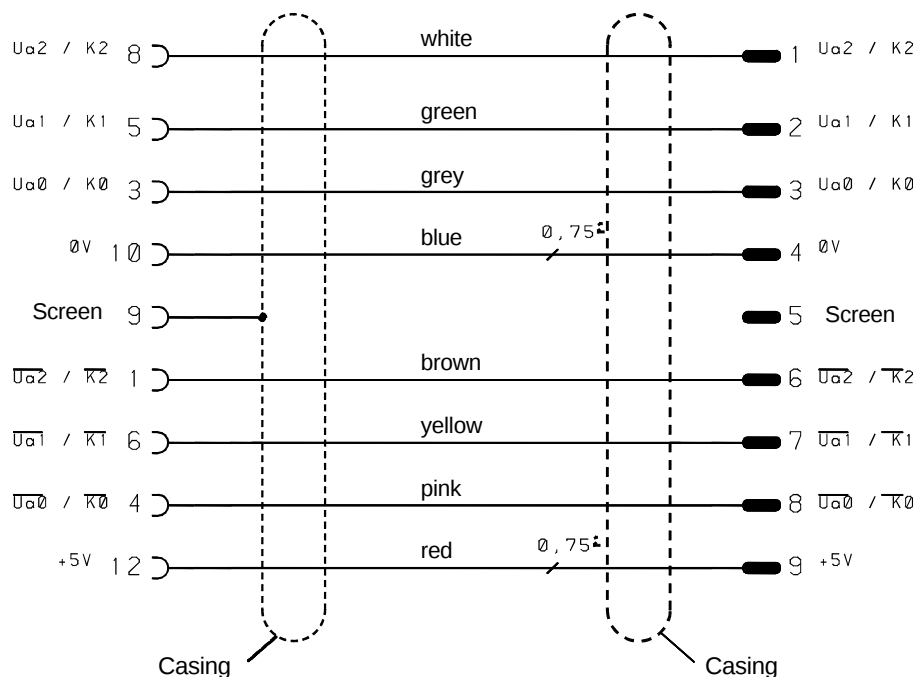
Pin contact unit
sub-D 9-pin



Metallic casing
Screws = UNC thread

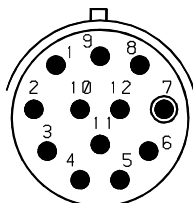
7 Pin configuration

7.3 Incremental encoder -> DARC input Incremental encoder -> FB-INC



Incremental encoder

View = solder side

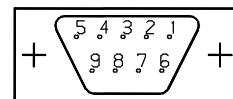


Jack contact unit 12-pin
Type: IN 101

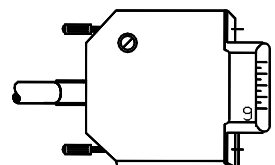


DARC input and FB - INC

View = solder side



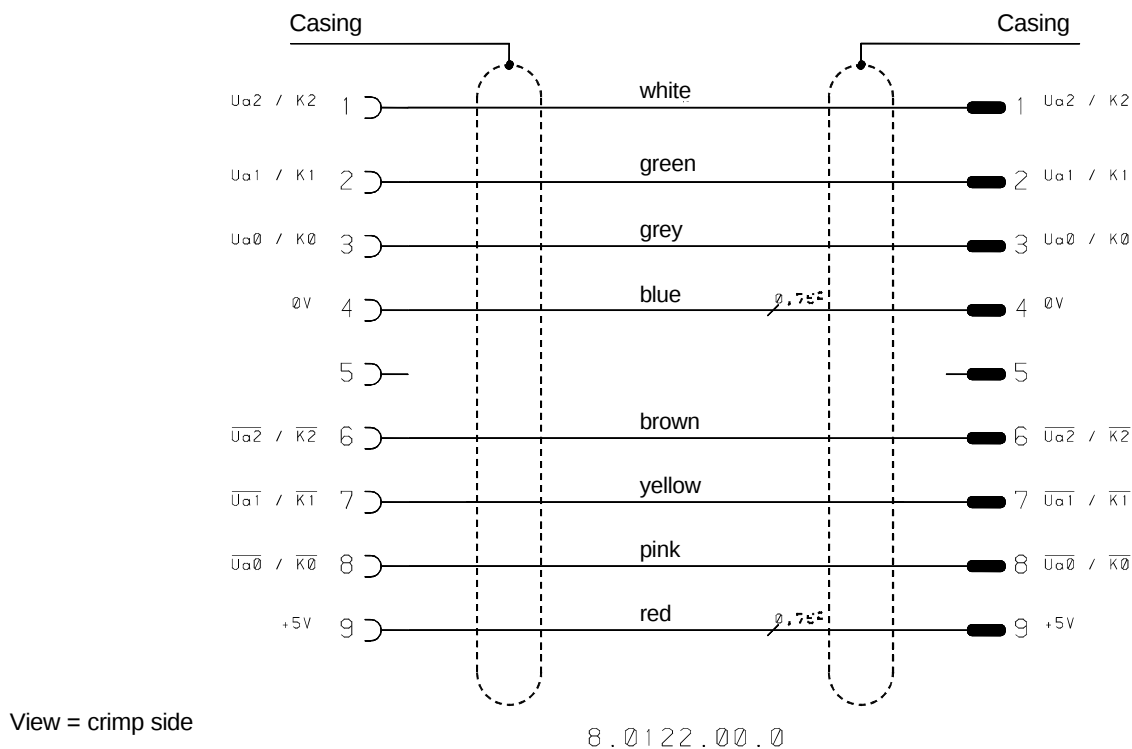
Pin contact unit
sub-D 9-pin



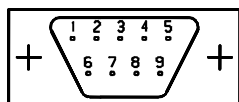
Metallic casing
Screws = UNC thread

7 Pin configuration

7.4 Incremental encoder distribution board -> DARC supply module

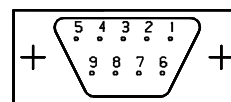


View = crimp side

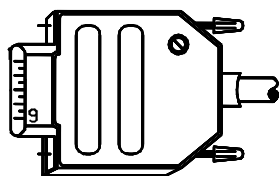


Sub-D 9-pin socket

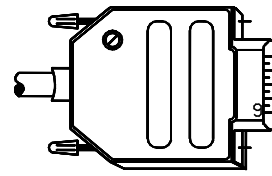
View = solder side



Male connector



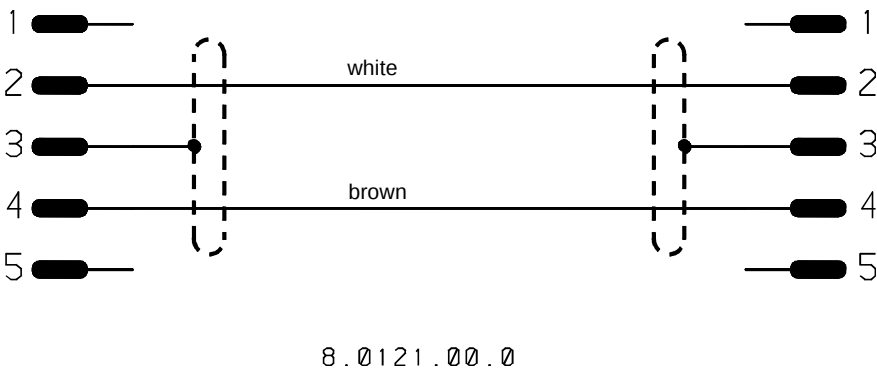
Metallic casing
Screws = UNC thread



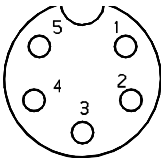
Metallic casing
Screws = UNC thread

7 Pin configuration

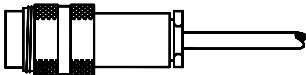
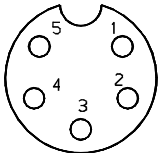
7.5 Fieldbus cable ferrocontrol - CNC Fieldbus



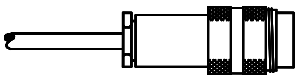
View of solder side



View of solder side



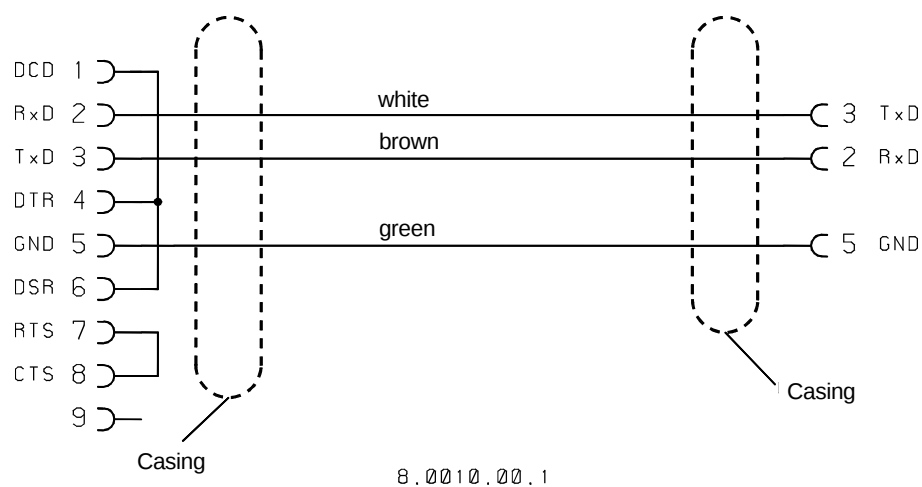
Male connector 5-pin



Pin contact unit
sub-D 9-pin

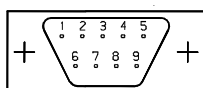
7 Pin configuration

7.6 RS-232 interface cable / PC -> DARC supply module

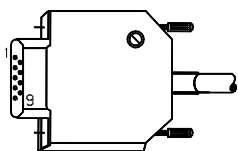


PC

View = crimp side



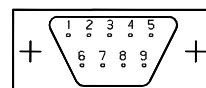
Sub-D 9-pin socket



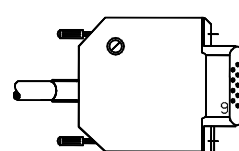
Metallic casing
Screws = UNC thread

DARC supply module

View = crimp side



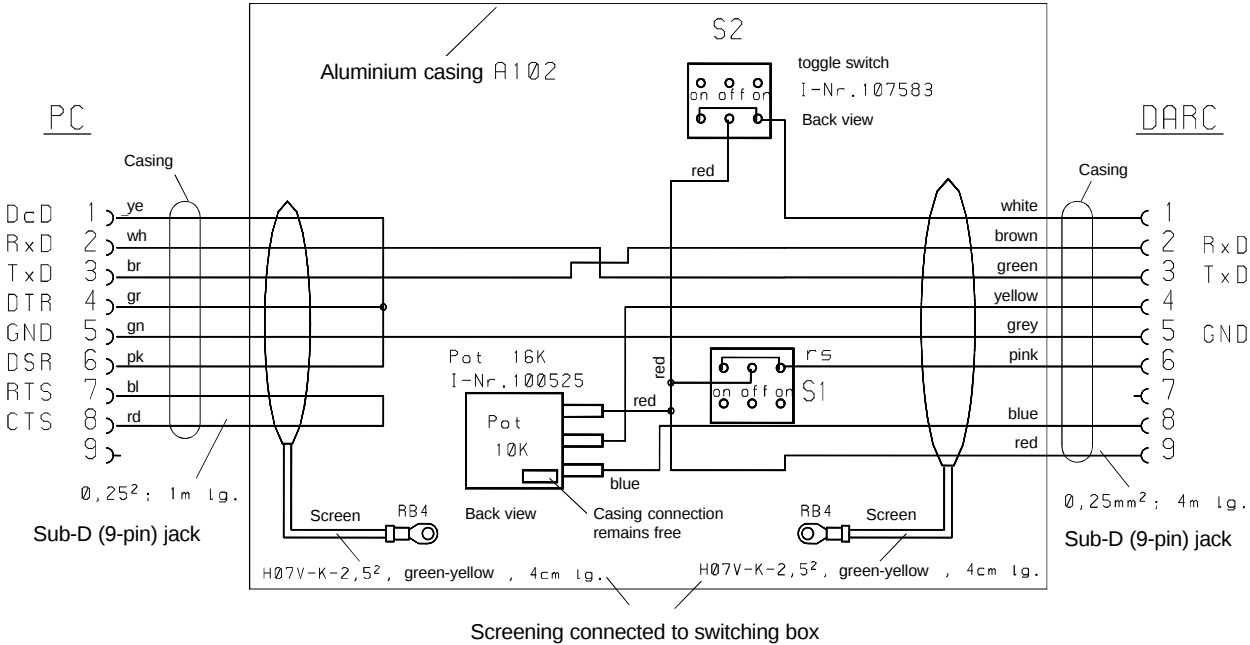
Sub-D 9-pin socket



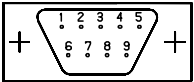
Metallic casing
Screws = UNC thread

7 Pin configuration

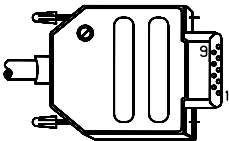
7.7 Connection: Override potentiometer
Service cable: V24 for DARC supply module



View = crimp side

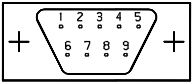


Sub-D 9-pin socket

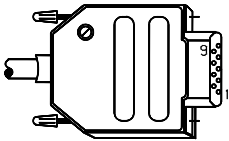


Metallic casing
Screws = UNC thread

View = crimp side



Sub-D 9-pin socket



Metallic casing
Screws = UNC thread

7 Pin configuration

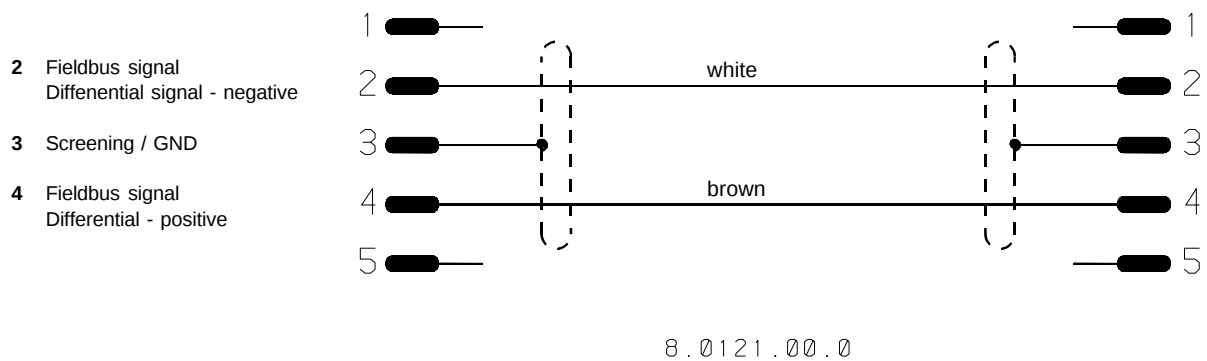
Space for your own notes

8 Cable lengths and transmission rate in the CNC-Fieldbus

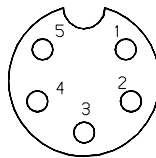
8.1 Max. cable lengths

Baud rate:	Cable length (for each fieldbus phase)
500 Kbit/sec.	70 metres
250 Kbit/sec.	170 metres
125 Kbit/sec.	350 metres
62.5 Kbit/sec.	650 metres

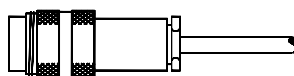
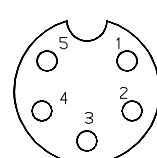
By using an amplifier (repeater) you can increase the cable lengths!



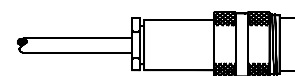
View of solder side



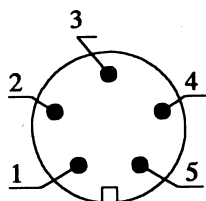
View of solder side



Male connector 5-pin



Male connector 5-pin



Pinconfiguration: CNC-Fieldbus connection

- 1 Rt + / terminator
Differential signal - positive
- 2 Fieldbus signal
Differential signal - negative
- 3 Screening
- 4 Fieldbus signal
Differential signal - positive
- 5 Rt - / terminator
Differential signal - negative

8 Cable lengths and transmission rate in the CNC-Fieldbus

8.2 Determining the length of the installed cables via the d.c. link resistance



Warning!

Only carry out this measurement when the power current (+ 24 V) is switched off!

If the error message

"58 fieldbus error in controller"

occurs very frequently in your system or transmission errors occur very often, you should definitely check the reliability performance of the fieldbus cables.

Frequent causes of malfunction are e.g.:

Line interruptions or short circuits on mobile (incorporated) cable routes, whereby the error can only appear briefly (according to the cable position)

"Cold junction", e.g. at plug-in connectors

Transmission rate too high for the appropriate cable length (see [Table 8.1](#)).

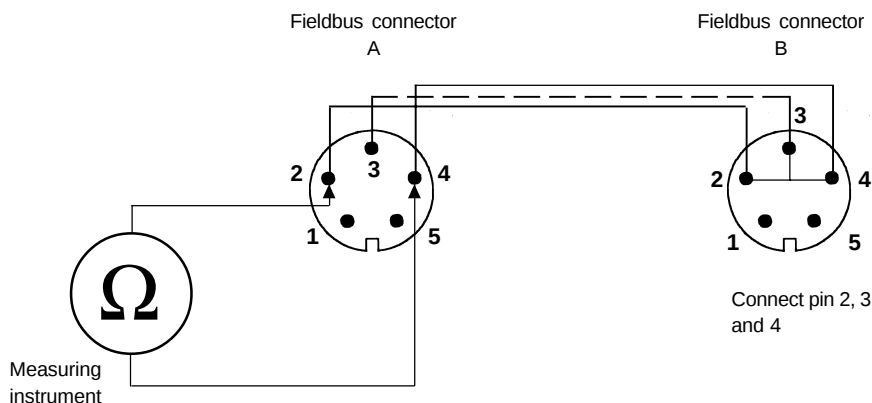
In many cases determining the d.c. link resistance to a restriction of the cause of the fault.

The following figures refer to the fieldbus with the ferrocontrol article no.: 70-041 000. The specific d.c. link resistance of this cable is 0.077 ohms/metre.

Cable length	D.c. link resistance
70 metres	c. 11 ohms / pin 2 - 4
170 metres	c. 26 ohms / pin 2 - 4
350 metres	c. 54 ohms / pin 2 - 4

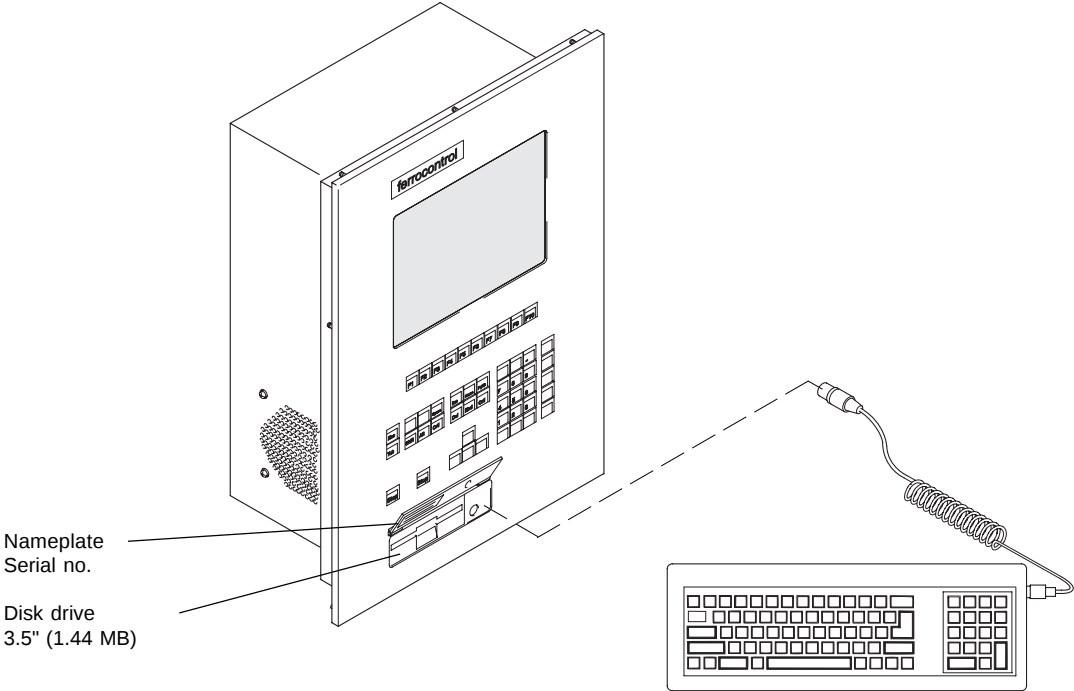
These figures refer to the return journey. Between pin 2 and 3 or pin 4 and 3 check the connections to the screen conductor.

This measurement can be made between the two ends of the complete fieldbus phase.

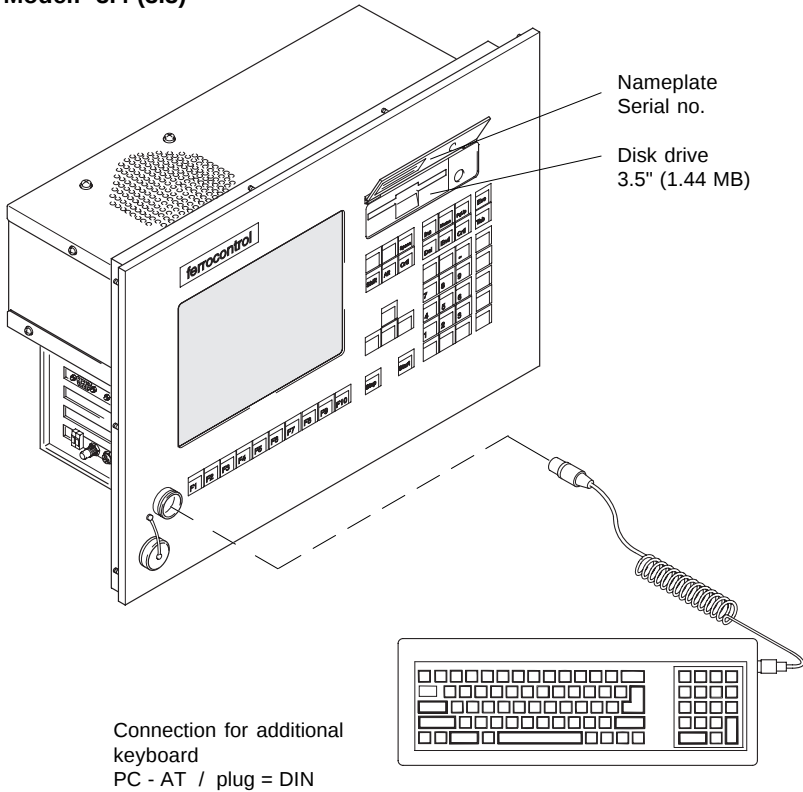


9.1 Model range 1.4 (3.4) and 1.3 (3.3)
9.1.1 Device view

Model: 1.4 (1.3)



Model: 3.4 (3.3)

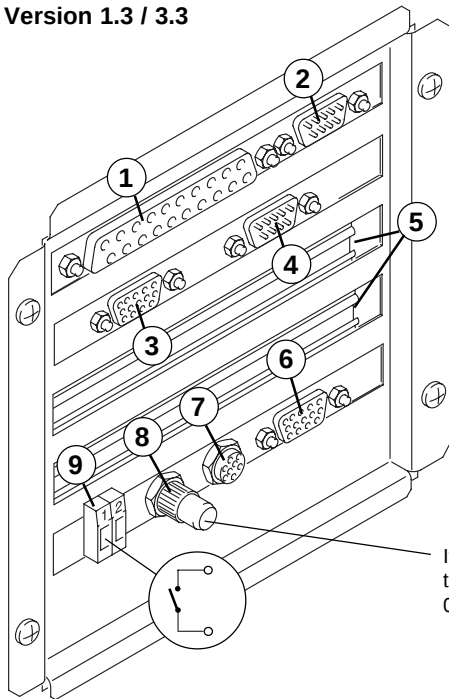


9 The industrial PC

9.1 Model range 1.4 (3.4) and 1.3 (3.3)

9.1.2 External pin configuration

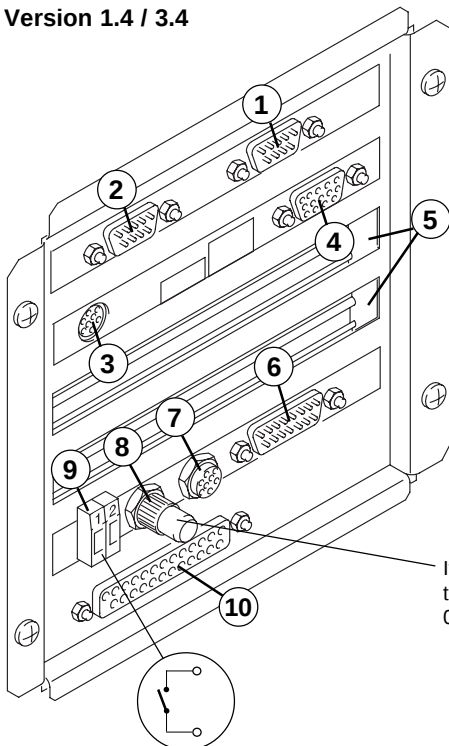
Version 1.3 / 3.3



If only one fieldbus channel is in use, a terminating resistor connector (Art. no. 70-042500) must be plugged into the free channel!

- 1 LPT 1**
Parallel interface for printer connection
- 2 Com 2 / RS 232**
Serial interface for e.g. modem
- 3 External monitor (VGA)**
- 4 Com 1 / RS 232**
for e.g. mouse
- 5 2 free plug-in stations** for additional functions
e.g. interface RS 485
- 6 OPTION / not in use**
- 7 Fieldbus connection / channel 1**
- 8 Fieldbus connection / channel 2**
(with terminating resistor connector)
- 9 Watchdog output**
potential-free contact,
max. contact load: 30 Volt/0.5 A/ 10 W

Version 1.4 / 3.4



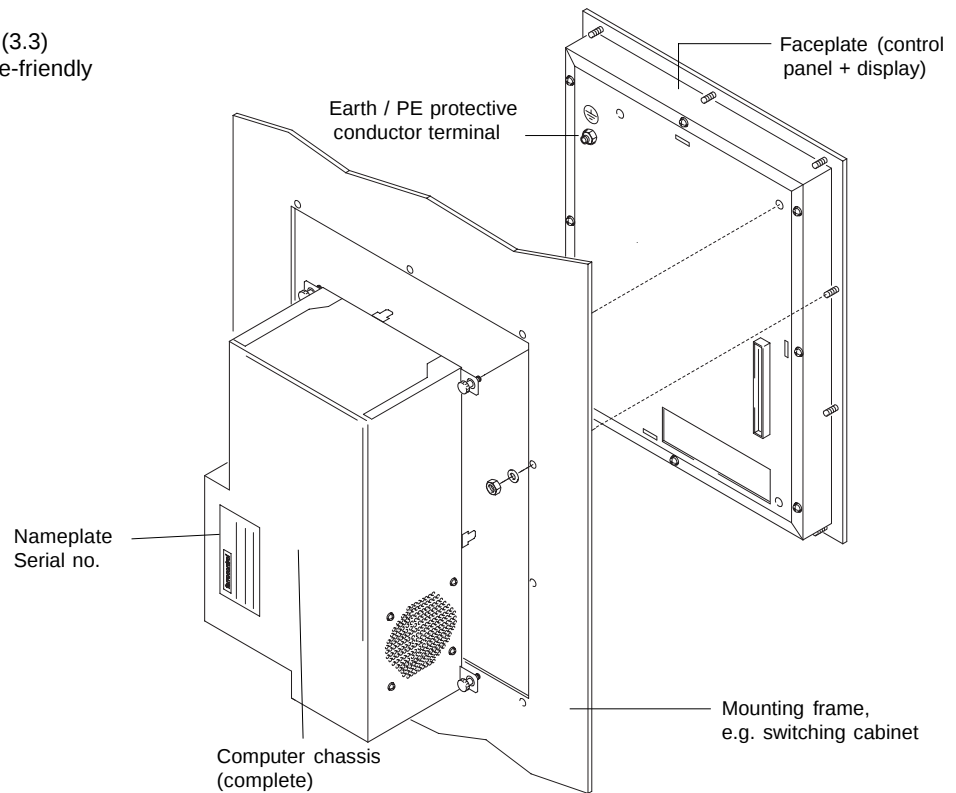
If only one fieldbus channel is in use, a terminating resistor connector (Art. no. 70-042500) must be plugged into the free channel!

- 1 COM 1 / RS 232**
Serial interface
- 2 COM 2 / RS 232**
Serial interface for e.g. modem
- 3 PS/2 Mouse**
- 4 External monitor (VGA)**
- 5 2 free plug-in stations** for additional functions
e.g. interface RS 485
- 6 OPTION / not in use**
- 7 Fieldbus connection / channel 1**
- 8 Fieldbus connection / channel 2**
(with terminating resistor connector)
- 9 Watchdog output**
potential-free contact,
max. contact load: 30 Volt/0.5 A/ 10 W
- 10 LPT 1**
Parallel interface for printer connection

9.1 Model range 1.4 (1.3) / 3.4 (3.3)

9.1.3 PC plug-in unit, installation and removal

The model range 1.4 (1.3) / 3.4 (3.3) is based on a particularly service-friendly concept.

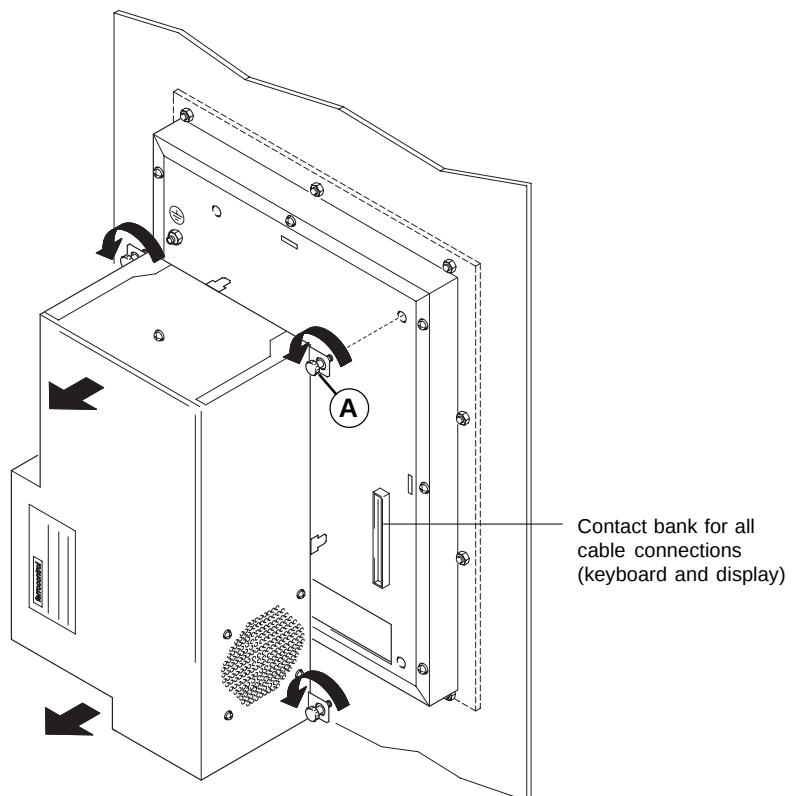


For servicing the computer chassis can be easily removed from the faceplate.

The faceplate does not have to be dismantled.

Dismantling the computer chassis:

1. Unscrew the 4 knurled screws (A)
2. Carefully remove the chassis from its locking element with both hands.



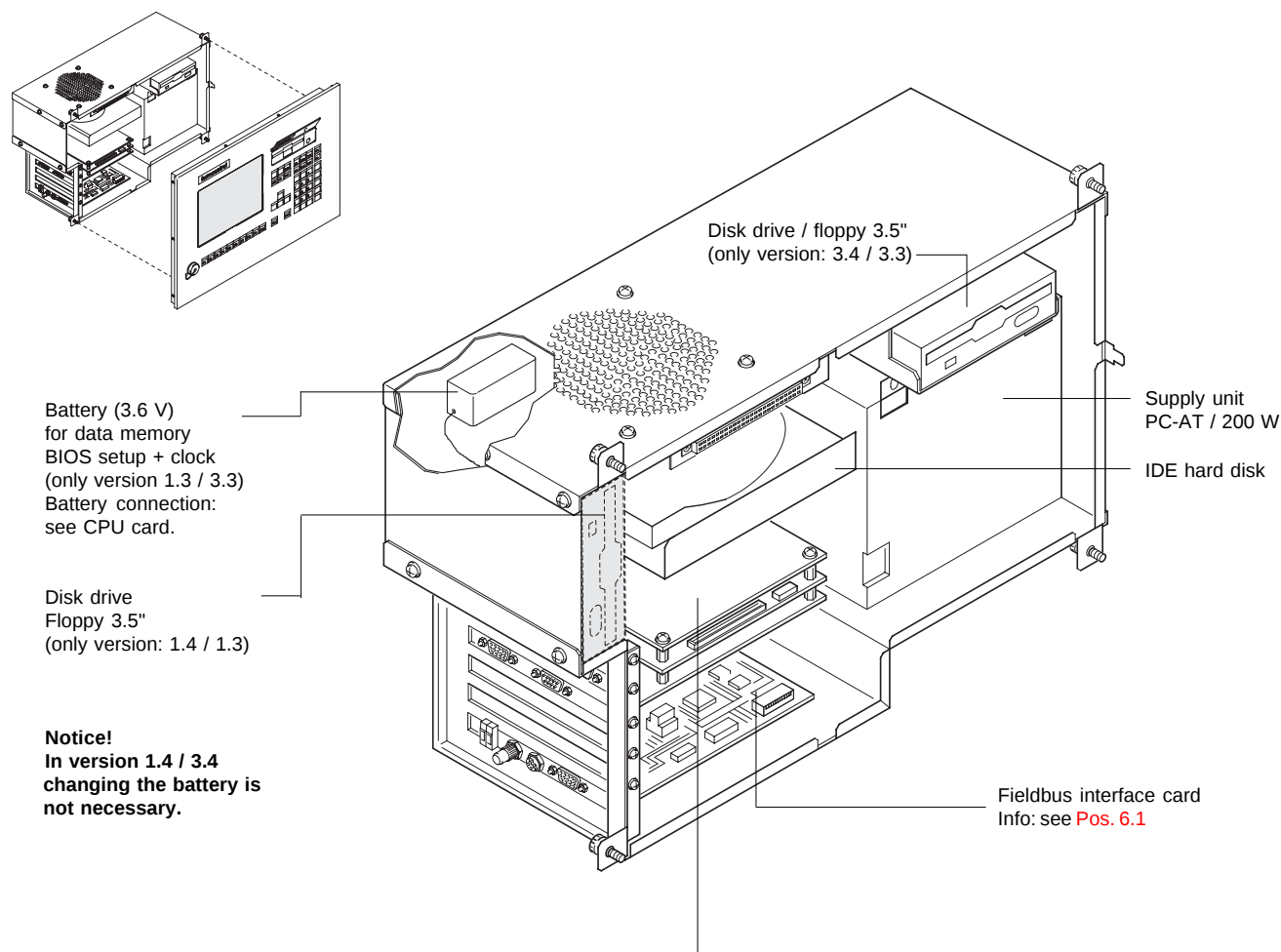
Notice!

In case of malfunctions in the input keyboard or in the display, the complete faceplate is exchanged!

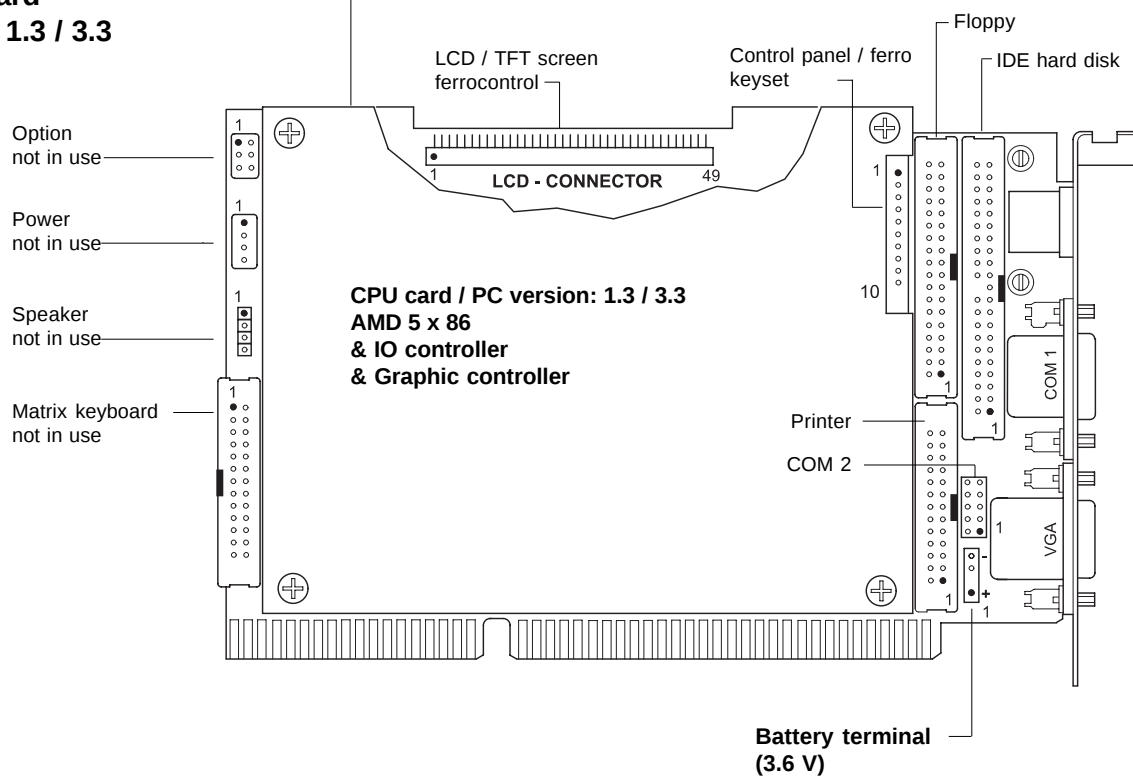
9 The industrial PC

9.1 Model range 1.4 (1.3) / 3.4 (3.3)

9.1.4 Interior view



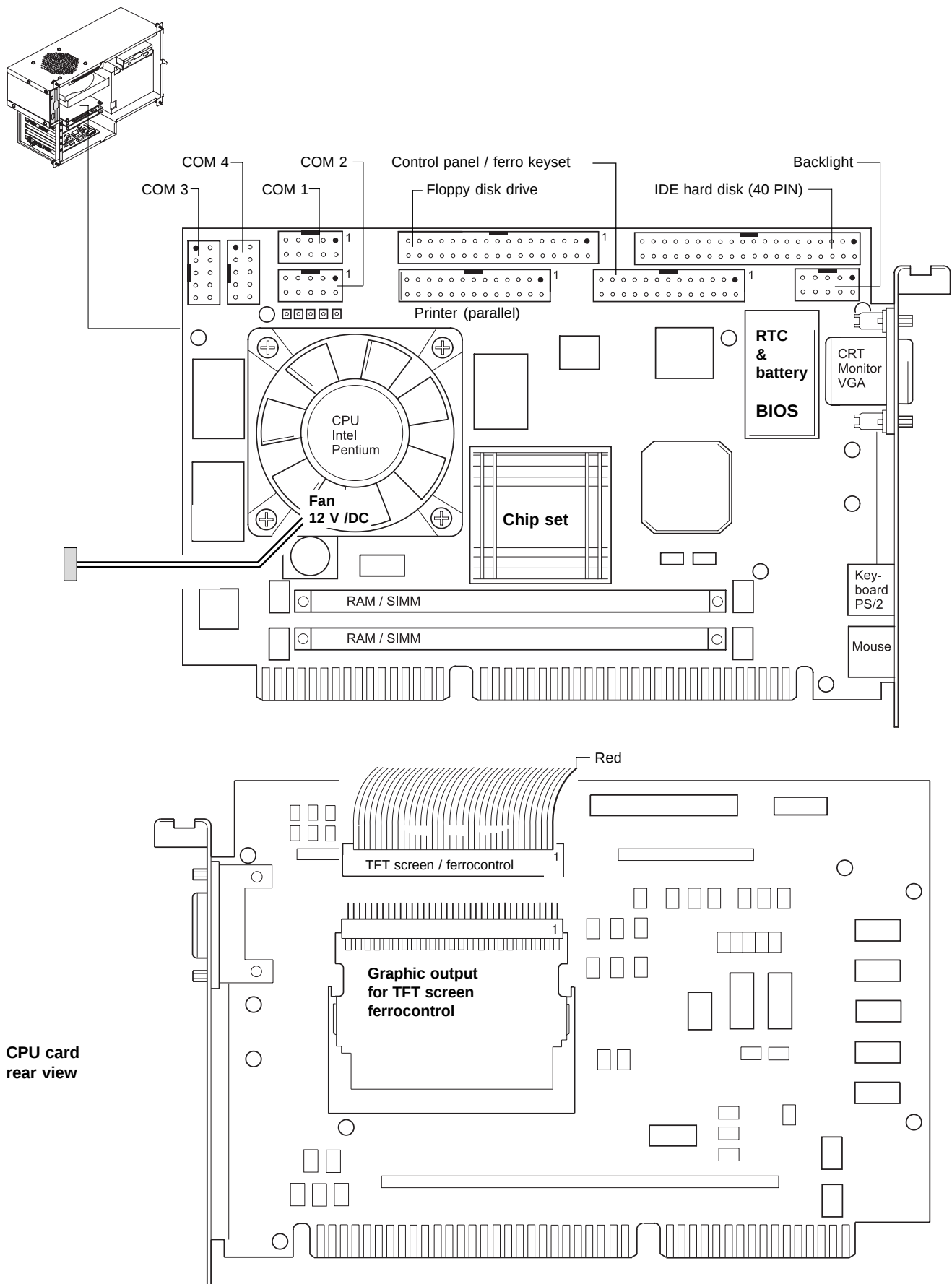
9.1.5 CPU card PC version: 1.3 / 3.3



9 The industrial PC

9.1 Model range 1.4 (1.3) / 3.4 (3.3)

9.1.6 CPU card / Intel-Pentium / PC version: 1.4 (3.4)



9 The industrial PC

9.2 Model range 1.2

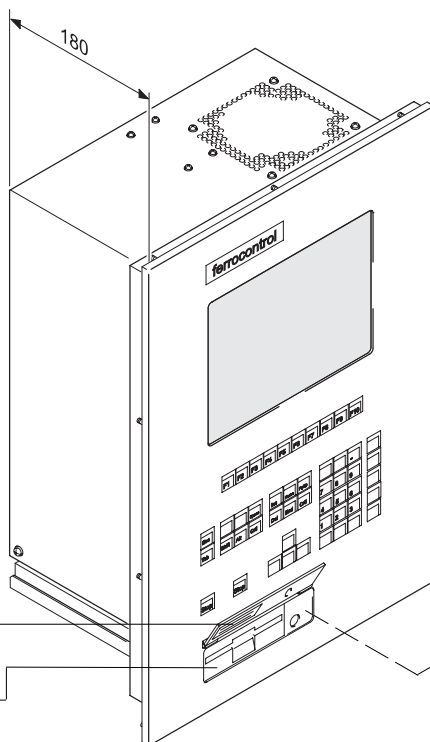
9.2.1 Device view

Model: 1.2
Front view

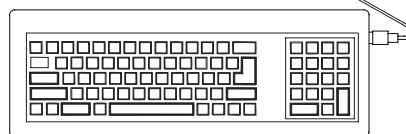
Mounting depth: 180 mm

Nameplate
Serial no.

Disk drive
3.5" (1.44 MB)



Connection for additional
keyboard
PC - AT / plug = DIN

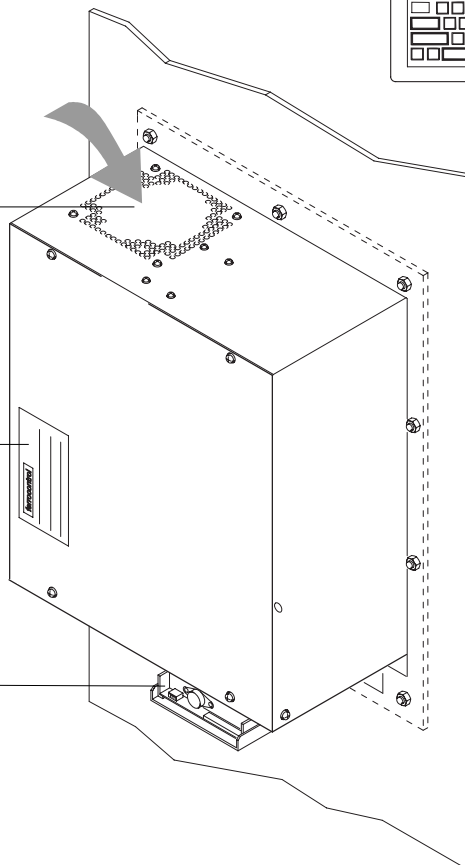


Model: 1.2
rear view

Fan

Nameplate
Serial no.

Disk drive
3.5" (1.44 MB)

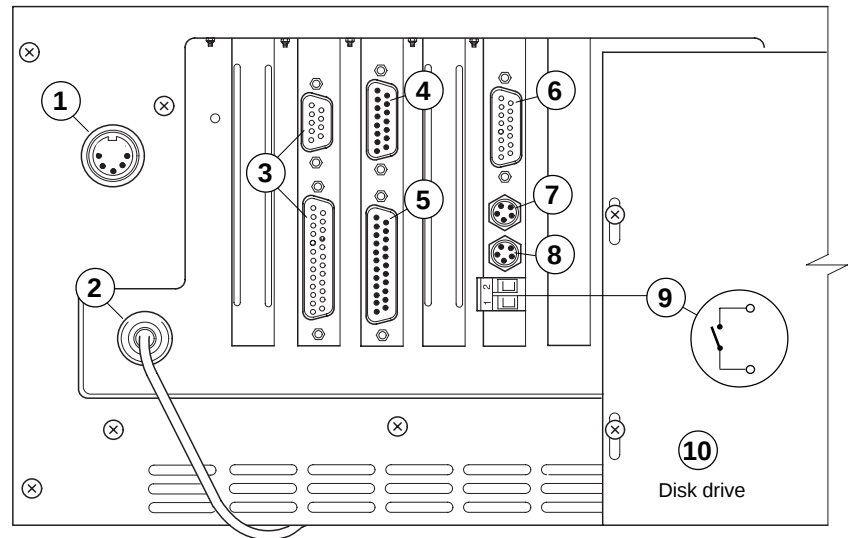


When making service en-
quiries or ordering spare
parts please state the full
type designation and serial
number.

9.2.2 External pin configuration

Device view from below:

- 1 **Keyboard connection (external)**
PC-AT / DIN plug
- 2 **Connection for internal keyboard**
DIN plug
- 3 **COM 2**
Serial interface / RS-232
Plug depending on version
SUB-D 25-pin or SUB-D 9-pin
Application:
e.g.: modem or printer (serial)
- 4 **COM 1**
Serial interface / RS-232
Plug depending on version
SUB-D 25-pin or SUB-D 9-pin
Application:
mouse or printer (serial)
- 5 **LPT1**
Parallel interface
Standard printer connection
- 6 **OPTION / not in use**
- 7 **Fieldbus connection / channel 1**
- 8 **Fieldbus connection / channel 2**
- 9 **Watchdog output**
potential-free contact

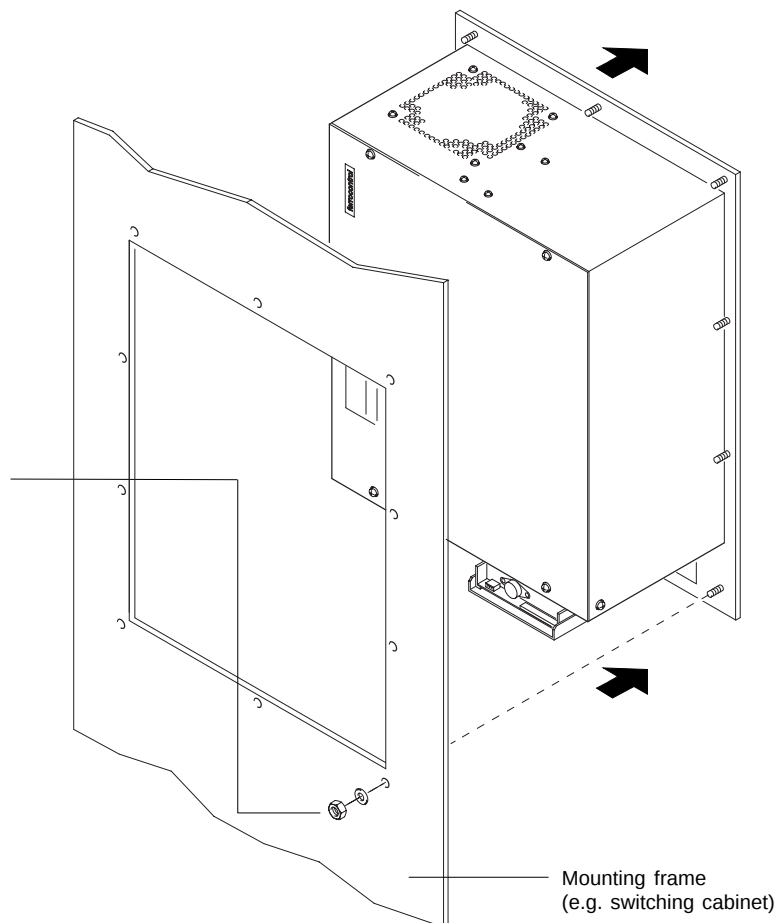


9.2.3 Industrial PC: removing

When repairing the industrial PC (version 1.2), the complete device must be removed from the mounting frame.

Proceed as follows:

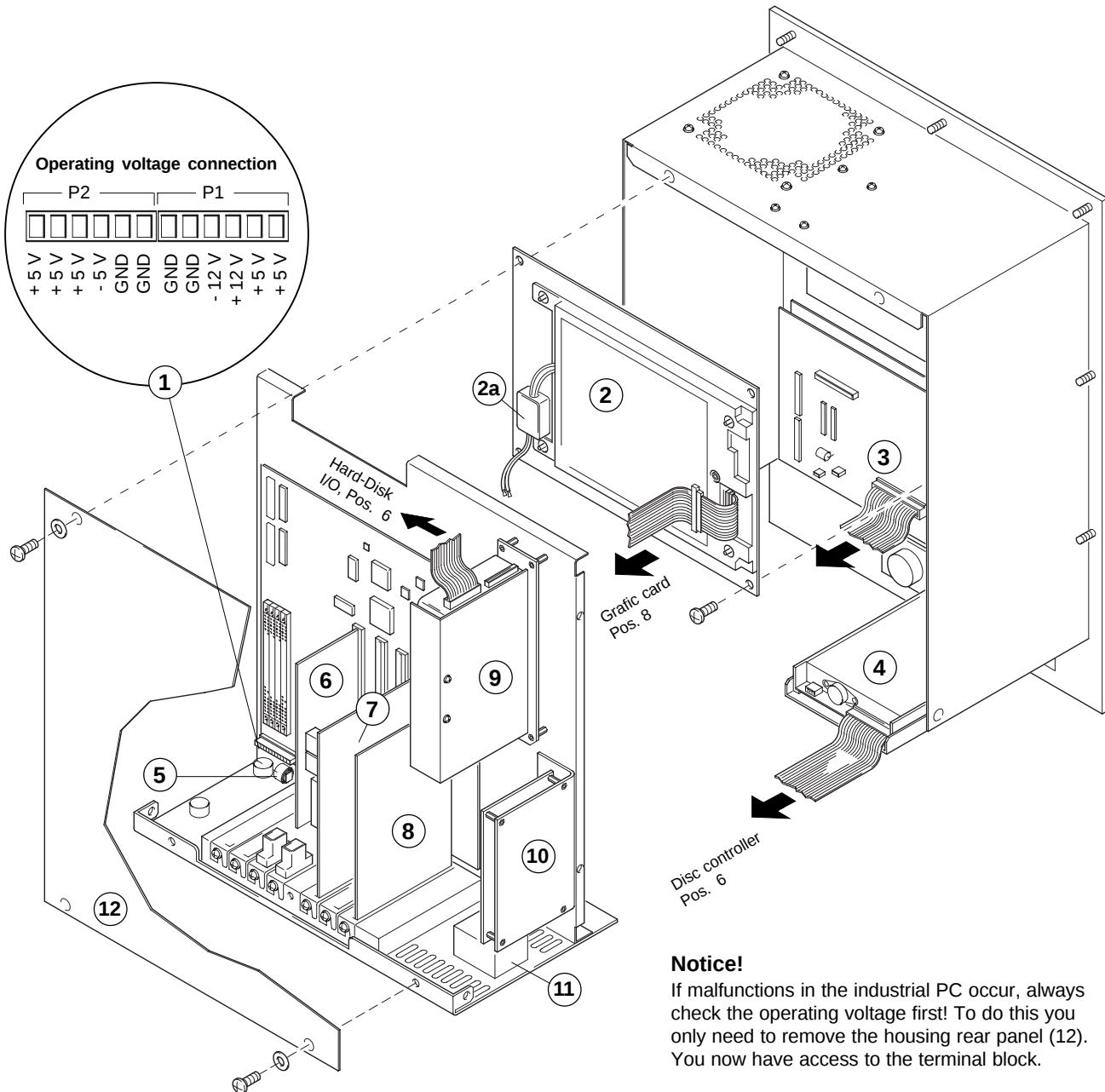
1. Switch the device off.
2. Disconnect all connecting cables:
 - mains power supply
 - interface cables
 - fieldbus connection
 - protective conductor terminal
3. Unscrew the 10 fixing screws.
4. Pull the device carefully out of the mounting frame to the front.



9 The industrial PC

9.2 Model range 1.2

9.2.4 Interior view



Notice!

If malfunctions in the industrial PC occur, always check the operating voltage first! To do this you only need to remove the housing rear panel (12). You now have access to the terminal block.

1 Operational voltage connection
for the motherboard

2 Display:
if malfunctions occur the complete unit is exchanged

2a Voltage transformer for display

3 Controller unit
for the internal keyboard

4 Disk drive
3.5" / 1.44 MByte

5 Accumulator 3.6 V / soldered in

6 I/O card
IDE hard disk controller
Controller for disk drive
RS 232: COM 1/Com 2
Parallel interface: LPT 1

7 Fieldbus interface card / FBI_PC

8 Graphic card
Connection for LCD / TFT screen
Connection VGA monitor (external)

9 Hard disk drive / IDE

10 Power supply unit module
+/- 5 Volt; +/- 12 Volt
see also **Pos. 1**
Operational voltage connection

11 Mains power supply

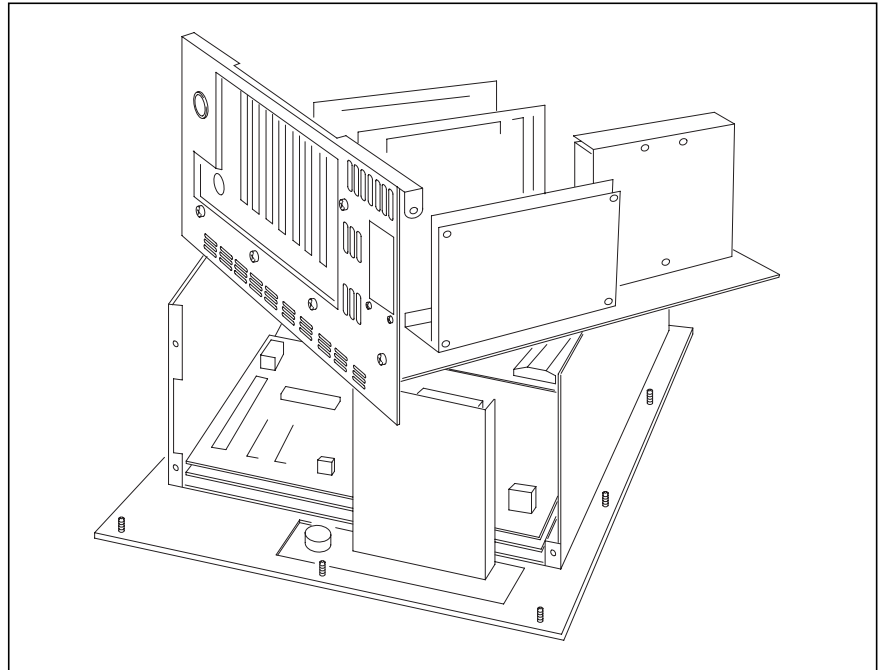
12 Housing rear panel
(can be removed separately)

9.2.5 Dismantling PC chassis

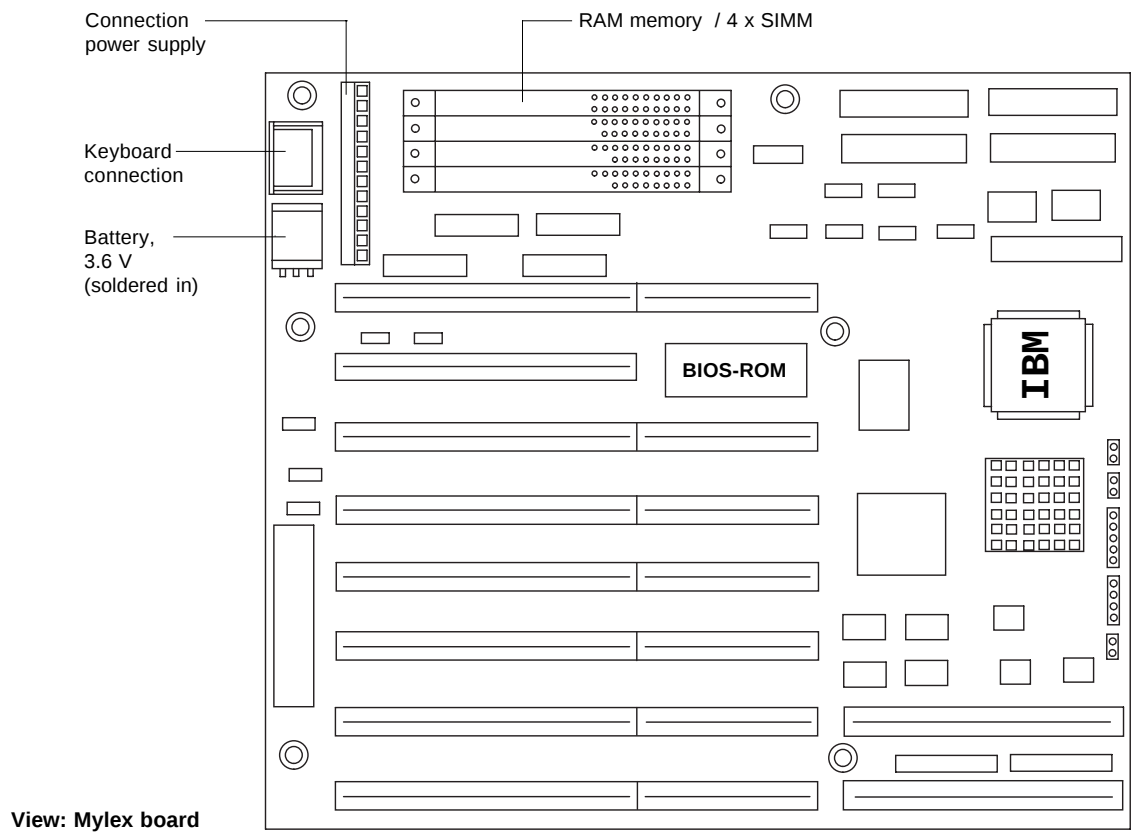
If you want to exchange components in the PC, proceed as follows:

1. Place the PC unit (with the front panel) carefully on a fixed base (table-top). In order to avoid scratches on the front of the device, use a piece of cardboard or a woollen blanket as a mat.

2. Carefully remove the PC chassis and place it on the device frame (as shown in the diagram opposite).



9.2.6 PC main board



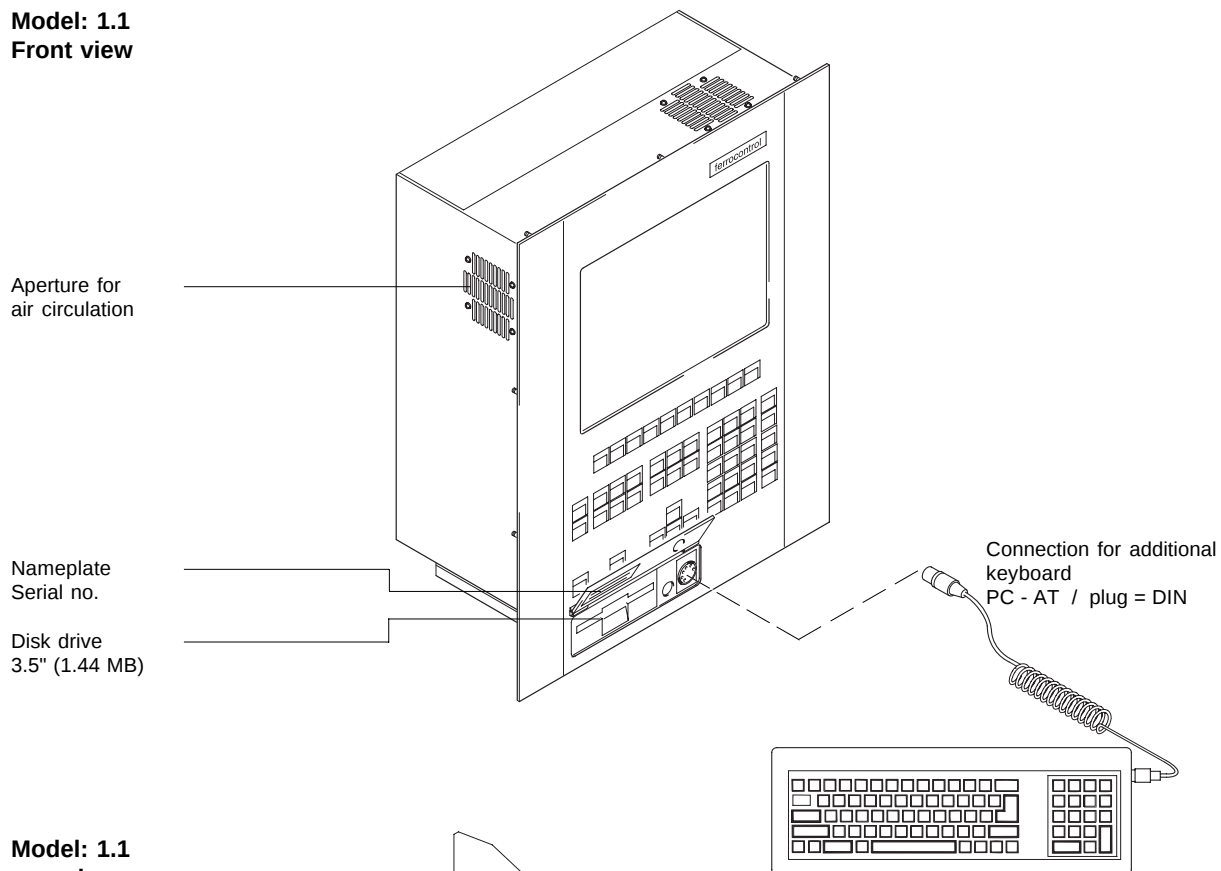
View: Mylex board

9 The industrial PC

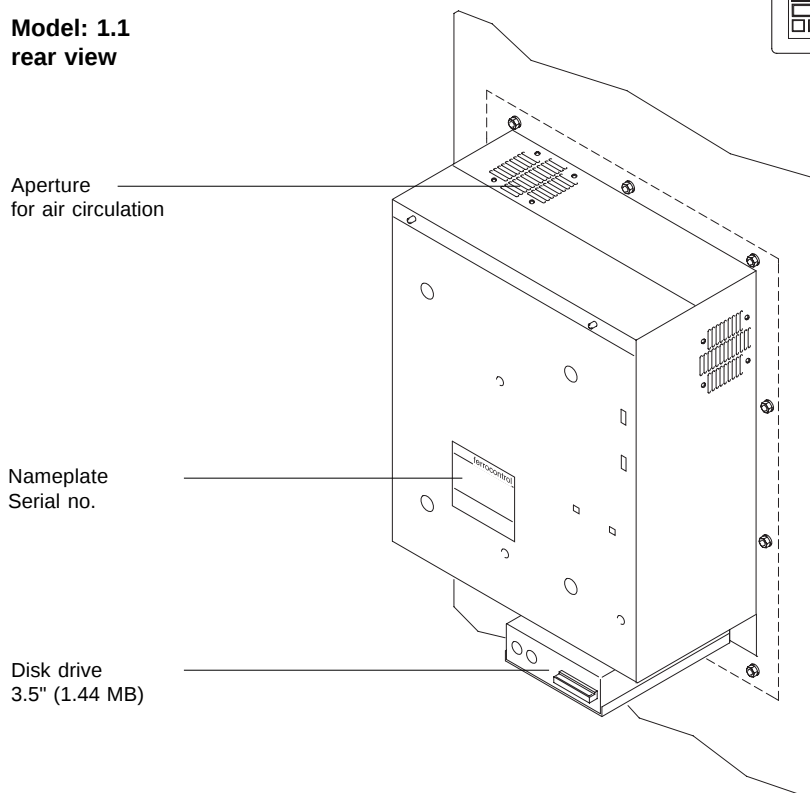
9.3 Model range 1.1

9.3.1 Device view

Model: 1.1
Front view



Model: 1.1
rear view

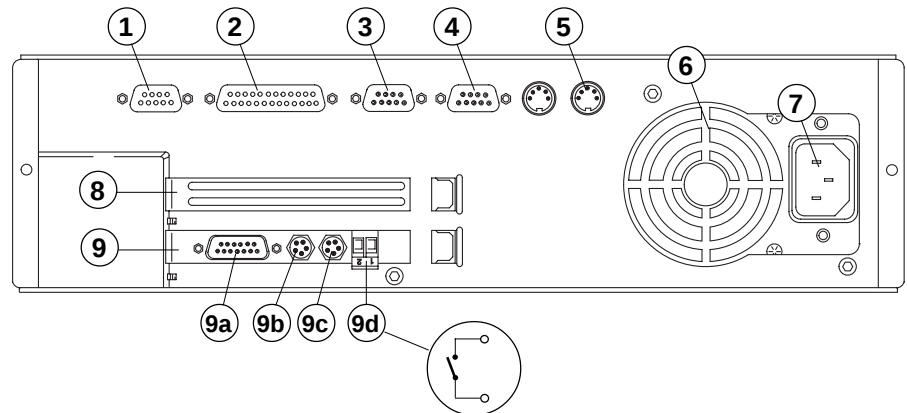


When making service enquiries or ordering spare parts please state the full type designation and serial number.

9.3.2 External pin configuration

Device view from below:

- 1 **VGA monitor** / external
- 2 **LPT1**
Parallel interface
Standard printer connection
- 3 **COM 2**
Serial interface RS-232
Plug: SUB-D 9-pin
Application:
modem or printer (serial)
- 4 **COM 1**
Serial interface RS-232
Plug SUB-D 9-pin
Application:
mouse or printer (serial)
- 5 **Connection for the internal keyboard**
Mini-DIN plug (6-pin)
- 6 **Fan**
- 7 **Mains power supply**
- 8 **Free plug-in station/ ISA-AT**
- 9 **Fieldbus controller**
- 9a **OPTION / not in use**
- 9b **Fieldbus connection** / channel 2
- 9c **Fieldbus connection**/ channel 1
- 9d **Watchdog output**
potential-free contact

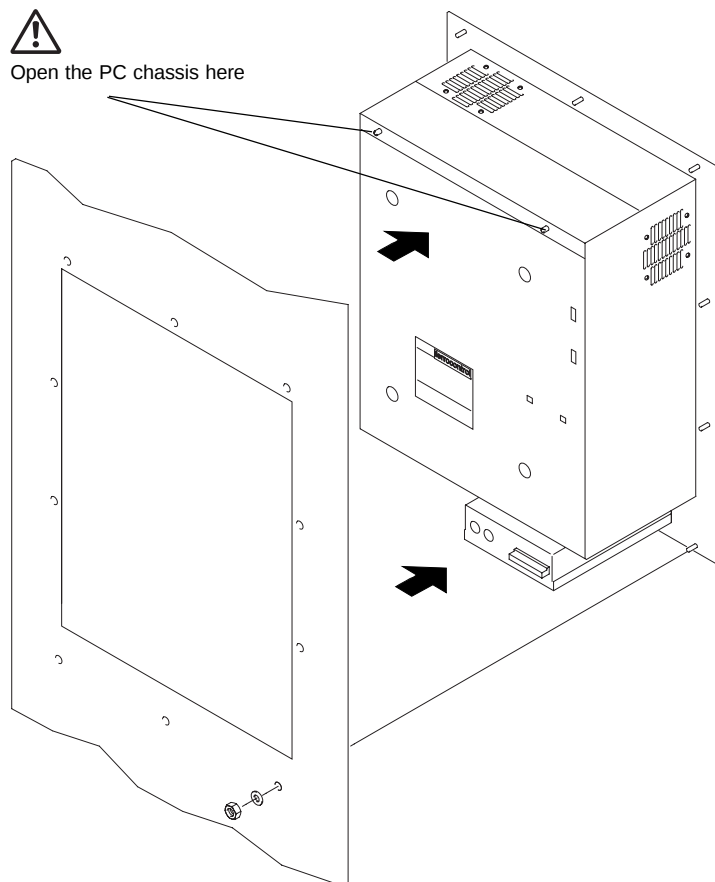


9.3.3 Industrial PC: removing

When repairing the industrial PC (version 1.2), the complete device must be removed from the mounting frame.

Proceed as follows:

1. Switch the device off.
2. Disconnect all connecting cables:
 - mains power supply
 - interface cables
 - fieldbus connection
 - protective conductor terminal
3. Unscrew the 10 fixing screws.
4. Pull the device carefully out of the mounting frame to the front.

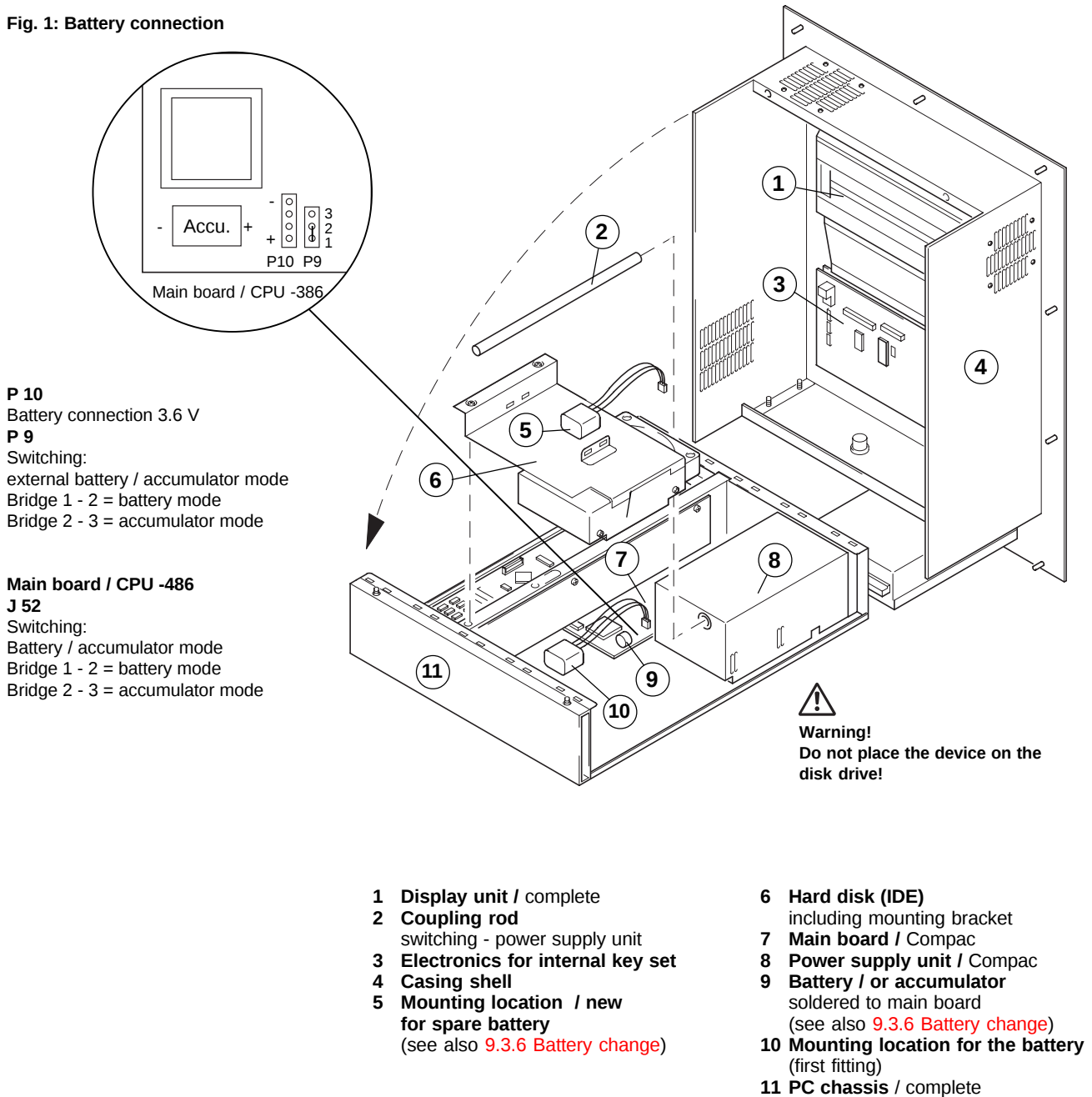


9 The industrial PC

9.3 Model range 1.1

9.3.4 Interior view

Fig. 1: Battery connection



9.3.5 Opening the device, dismantling the PC chassis:

If you want to exchange components in the PC, proceed as follows:

1. Place the whole PC unit on a suitable pad.
2. Unscrew the screws on the rear side of the PC chassis (11).
3. Carefully rotate the chassis out to the rear (see diagram).
Be careful of cable connections!

9.3.6 Battery change

Notice!

The PC version 1.1 was delivered with different main boards. Some of these boards are fitted with an NC accumulator (soldered in). If an error occurs the soldered-in accumulator can be switched off via a plug-in jumper (see Fig. 1). Switching to battery or accumulator mode. **The appropriate spare battery (3.6 V) is plugged in via a lead.**

When carrying out repairs (on location) never do any soldering on the main board! Consult our customer services!

Access to the battery is blocked by the hard disk mounting bracket.

When changing the battery proceed in the following way:

1. Remove the coupling rod from its locking element (**Pos. 2**).
2. Unscrew the **two** screws holding the hard disk mounting bracket (**Pos. 6**).
3. Before removing the hard disk, disconnect the two plug-in connectors for the data line and the power supply from the hard disk.
4. Remove the hard disk together with the mounting bracket. The main board is now accessible.

5. Before connecting the new battery:

Check ...

whether the main board is switched to battery or accumulator mode.

Correct, if necessary...

the plug-in jumper on the contact bank **P9** (only main board with 386-CPU) or the plug-in jumper **J 52** (only for the main board with 486-CPU).

Info: see [Fig. 1 / Battery connection](#).

6. Connect the battery connector to the contact bank (**P-10**) (**red = +**).
7. Fix the new battery (with a Velcro fastening) to the hard disk mounting bracket (**Pos. 5**).

After changing the battery, check:

- the entries in the BIOS-Setup (configuration - hard disk etc.)
- the system time

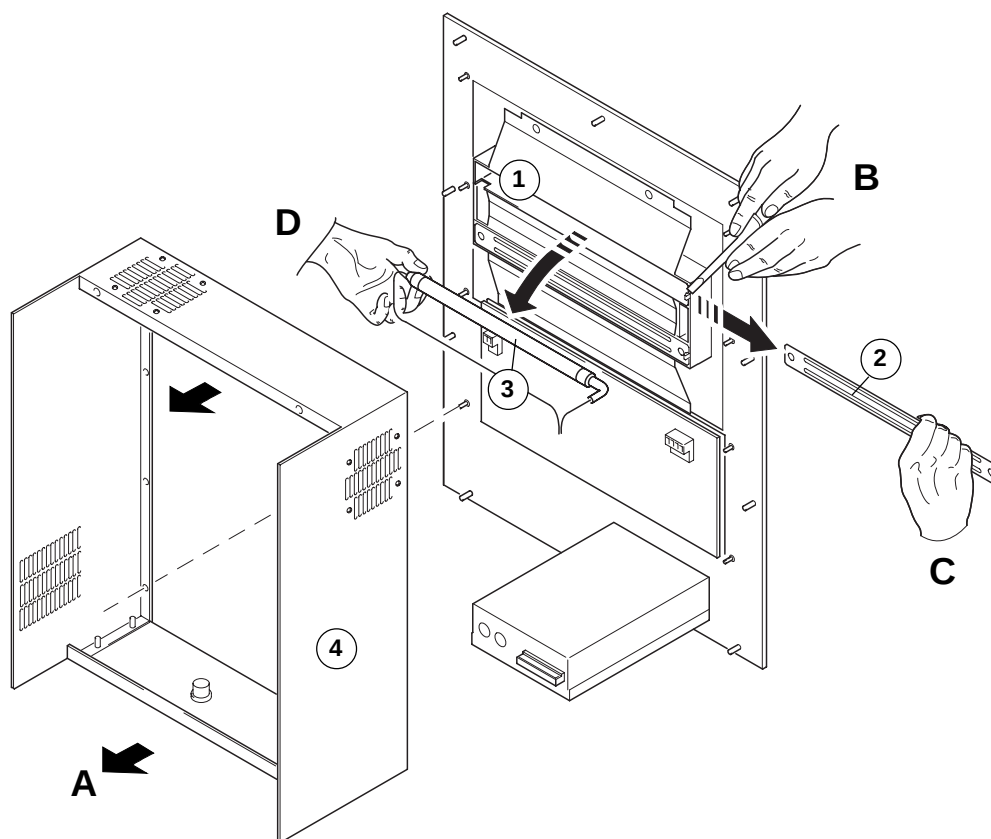


Only use lithium batteries with
3.6 V nominal voltage.

9 The industrial PC

9.3 Model range 1.1

9.3.7 Replacing bulbs in the display unit



- 1 Display unit / complete
- 2 Lead strips covering the fluorescent tube
- 3 Bulb / fluorescent tube
- 4 Casing shell

Proceed as follows:

- A Undo the screws of the casing shell.
Pull the casing shell a few centimetres to the front.
Be careful of the cable connections!
- B Open the locking element of the lead strip with a screwdriver (Pos. 2).
- C Pull the lead strip (Pos. 2) sideways out of its guides.
- D Carefully remove the bulb (fluorescent tube).
Carefully disconnect the electrical connection.

Insert the new bulb in reverse order.



When making service enquiries or ordering spare parts please state the full type designation and serial number.

A

Axis equipment a. parameters 5-5

Axis status

Operating status 1 5-17

B

Battery <--> accumulator mode

PC-Model 1.1 9-12

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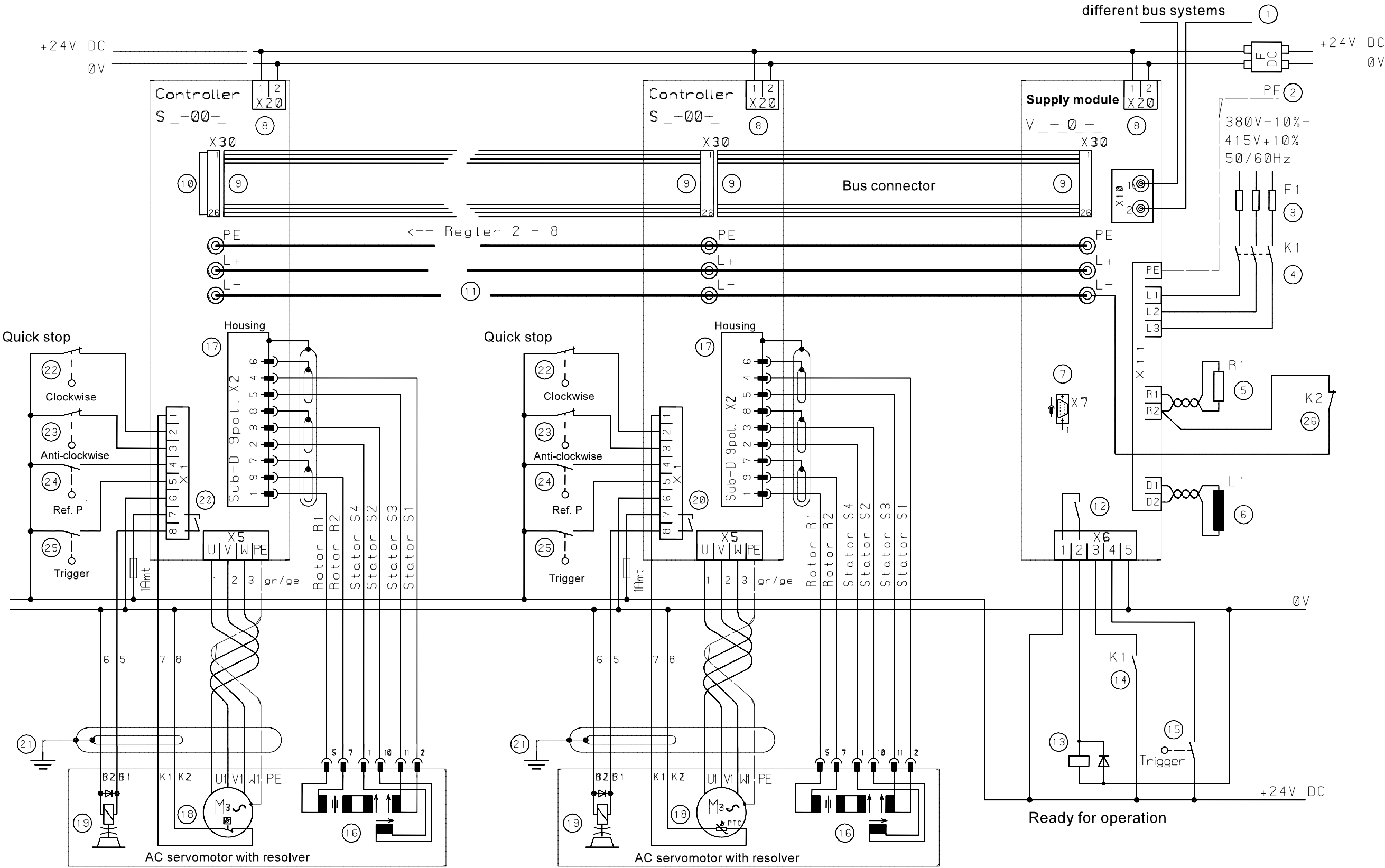
A.2 Overview of ferrocontrol documentation

Curr. no	Document no.	Description	Language	Status
1	96-050 500	CNC-Feldbus: Gerätebeschreibung	German	3/95
2	96-100 500	DARC Handbuch: Inbetriebnahme / Service	German	9/97
3	96-101 000	DARC Service Manual	English	9/97
4	96-102 000	RS-232-Schnittstellenbeschreibung / DARC Protokoll RS 232	German	
5	96-100 501	DARC Produktdokumentation	German	
6	96-401 000	DARC-System, Inbetriebnahme- Hardware	German	
7	96-510 000	ferrocontrol CNC-Feldbus / Teil: Gerätebeschreibung	German	
8	96-511 000	ferrocontrol CNC-Feldbus / Appliance Description	English	
9	96-520 500	ferrocontrol CNC-Feldbus / Teil: Inbetriebnahme/ Service	German	3/95
10	96-521 000	ferrocontrol CNC-Feldbus: Commissioning / Service	English	3/95
11	96-600 500	ferrocontrol Industrie-PC 1.2 (FIPC-1.2)	German	10/94
12	96-601 000	The ferrocontrol Industrial PC 1.2 (FIPC-1.2)	English	
13	96-700 500	Bedienfeld mit Anzeige TSED-RS485	German	
14	97-400 500	Einführung ferrocontrol-Bedienoberflächen	German	
15	97-400 600	Description of PC-Software (ferrocontrol User Interfaces)	English	
16	97-400 700	Introduction: InterfacesUtilisateur ferrocontrol	French	
17	97-500 500	Benutzer- u. Referenzhandbuch / Applikationsgenerator	German	
18	97-501 000	User and Reference Manual / Application Generator	English	
19	97-550 500	Programmierhandbuch FPS	German	
20	97-551 000	Programming Manual PLC	English	
21	97-880 500	Doppeldiagonalsäge mit DARC	German	
22	97-881 000	Tandem Diagonal Saw with DARC	English	
23		DARC mit Verbundachsen	German	
24	96-051 000	ferrocontrol MAS: Systemhandbuch-Hardware	German	
25	97-053 500	ferrocontrol MAS: Systemhandbuch-Software	German	
26	96-800 500	MAG-System: Inbetriebnahme/Service	German	
27	96-801 000	MAG-System: Gerätebeschreibung	German	
28	97-051 000	DARC-System: Software SeleCAN	German	
29	97-051 500	DARC-System: Software CANopen	German	
30	97-052 000	DARC-System: Software Profibus-DP	German	
31	97-052 500	DARC-System: Programmierung	German	
32	97-053 000	DARC-System: Inbetriebnahme DARCTOOL	German	
33	96-031 000	Quick-Referenzhandbuch für das ferrocontrol Feldbussystem (Hilfestellung zur Störungsbeseitigung)	German	8/98
34	96-032 000	Quick-reference Manual for the ferrocontrol Fieldbus System (Tips for Trouble-shooting)	English	9/98

A.3 Connection diagram: DARC system

① Fieldbus connection	Terminal 10
② PE terminal power supply	Terminal X 11
③ Mains supply / fusing	Terminal X 11
④ Mains contactor	Terminal X 11
⑤ Braking resistor	Terminal X 11
⑥ D.c. link filter choke	Terminal X 11
⑦ Service connector, 9-pin sub-D socket	Terminal X 7
⑧ 24 V / DC power supply for internal signal processing	Terminal X 20
⑨ Parallel bus connector	Terminal X 30
⑩ Terminating resistor connector, bus connector	Terminal X 30
⑪ D.C. link bridges	Terminal L+, L-, PE
⑫ Control in- and outputs	Terminal X 6
⑬ Auxiliary relay, power BTB (ready for operation)	Terminal X 6
⑭ Enabling	Terminal X 6
⑮ 24 V DC (trigger signal)	Terminal X 6
⑯ Resolver	Terminal X 2
⑰ Resolver connector, resolver cable	Terminal X 2
⑱ Servo-motor temperature monitoring	Terminal X 1 /1
⑲ Holding brake	Terminal X 1 /8
⑳ Peripheral devices and holding brake	Terminal X 1
㉑ Motor cable screening	Terminal X 1
㉒ Quick-stop switch - clockwise rotation	Terminal X 1 /2
㉓ Quick-stop switch - anticlockwise rotation	Terminal X 1 /3
㉔ Reference point switch	Terminal X 1 /4
㉕ Trigger switch	Terminal X 1 /5

A.3 Connection diagram: DARC system



Attention!
For brake release current > 1A use coupling- or contactor relay!
Connect a medium time-lag fuse = 1 A in series.

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