

Advant Controller 31
Intelligent Decentralized
Automation System

Networking

**Advant Controller 31 –
Tailor-made network**

**Communication module
07 KP 90 R0303 8.1**

**Communication module
07 MK 92 R1161 8.2**

**Communication processor
07 KP 93 R1161 8.3**

PDnet 8.4

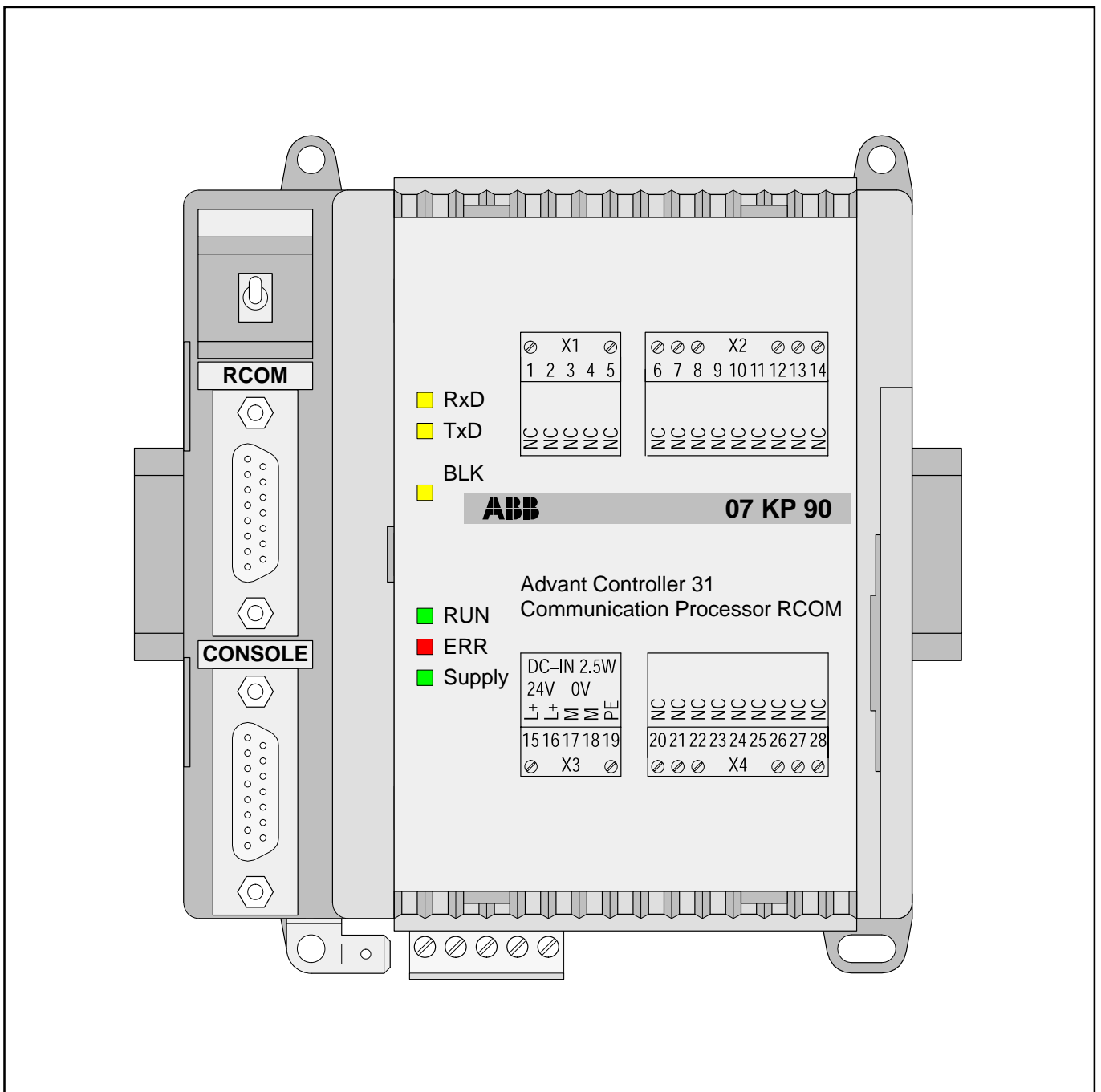
ARCNET-SST 8.5

**Communication processor
07 KP 95 R0101 8.6**

AS-i gateway 8.7

8.8

Communication module
07 KP 90 R303



1 Communication module 07 KP 90 R303

Communication via RCOM protocol

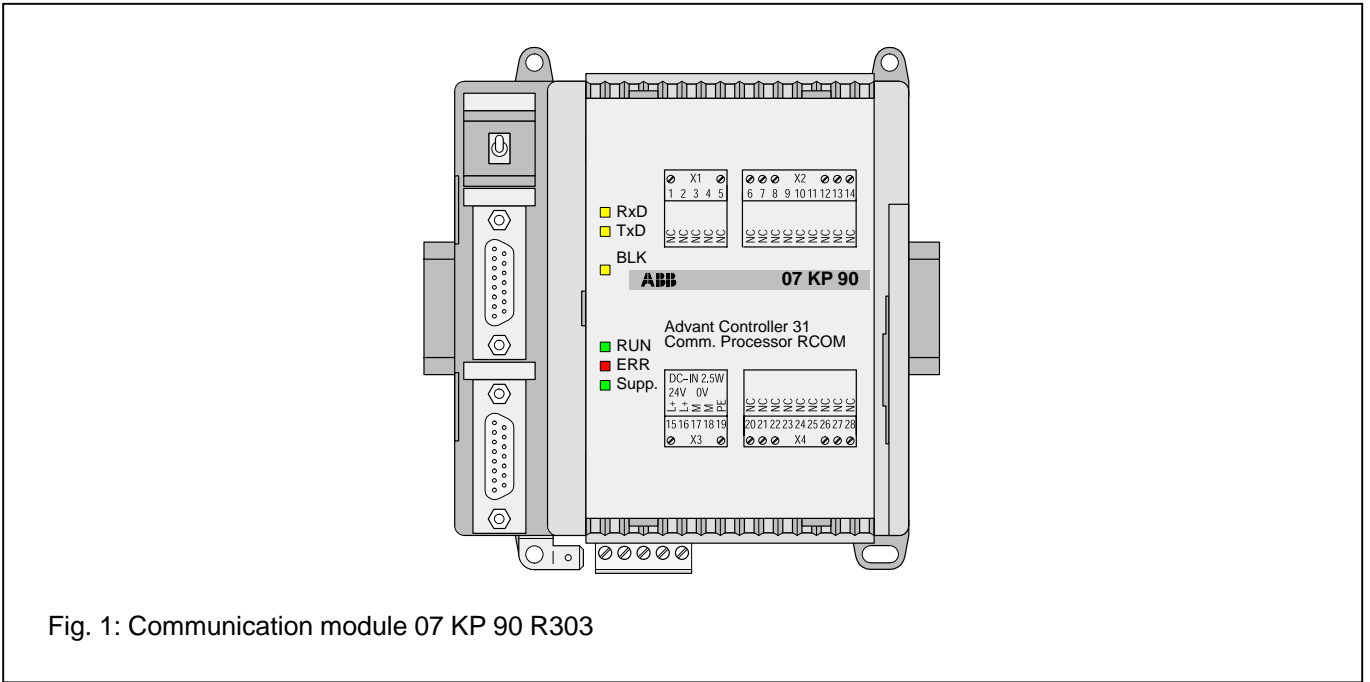


Fig. 1: Communication module 07 KP 90 R303

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1.1 Brief description

The 07 KP 90 R303 RCOM communication module can be connected as an expansion unit to basic units such as 07 KR 91 R353, 07 KT 92, 07 KT 93, 07 KT 94 of the decentralized automation system Advant Controller 31.

The 07 KP 90 R303 communication module permits communication via the RCOM protocol. Using this protocol it permits data exchange

- between ABB MasterPiece 200 control systems, ABB Procontic T200 systems and Advant Controller 31 systems or
- between Advant Controller 31 systems amongst themselves.

One advantage is that RCOM (**R**emote **C**OMmunication) permits large distances to be spanned.

Communication can be performed via various transmission media, such as:

- leased or private dedicated lines
- existing cable paths,
- telephone lines (dial-up connections).

Adaptation to the required transmission path can be performed by selection of various modems (e.g. VF or current loop modems, telephone modems, multidrop modems).

An RCOM network always consists of the master and one or more slaves, with the following data transmission options:

- master transmits data to a slave,
- master reads data from a slave,
- event-driven transmission: a slave can store process events with a time stamp and transfer them to the master on request (event polling).

1.2 Features

- The RCOM 07 KP 90 R303 communication module can be planned as RCOM master or slave.
- A network may have up to 254 RCOM slaves (max. 8 slaves if using MasterPiece 200, max. 30 slaves in case of dial-up mode).

- The RCOM protocol is compatible with MP200/1 with DSCA 180A. All RCOM services are available (cold start, warm start, normalization, clock synchronization, write data, read data, event polling).
- The RCOM interface for connection of the modem complies with EIA RS-232. It can also be used as an EIA RS-485 interface.
- An additional operator interface (CONSOLE) complying with EIA RS-232 is provided as a commissioning aid (indication of the communication sequence, planning telephone numbers etc.)
- Software clock; time can be used in the PLC program.
- Differences between RCOM and RCOM+, see volume 3, chapter 2.6.

All other features of RCOM which are not mentioned in the chapter "Differences" apply correspondingly for RCOM+.

- The connection element RCOM+ can be used with the communication module **07 KP 90 from index b up**.

1.3 Planning with the 907 KP 90 R202 software package

The communication sequence is planned with connection elements contained in the 907 KP 90 R202 documentation and software package (see also Ordering information). This package also contains the manual for the RCOM 07 KP 90 R303 communication module and planning examples.

1.4 Structure of the front panel elements

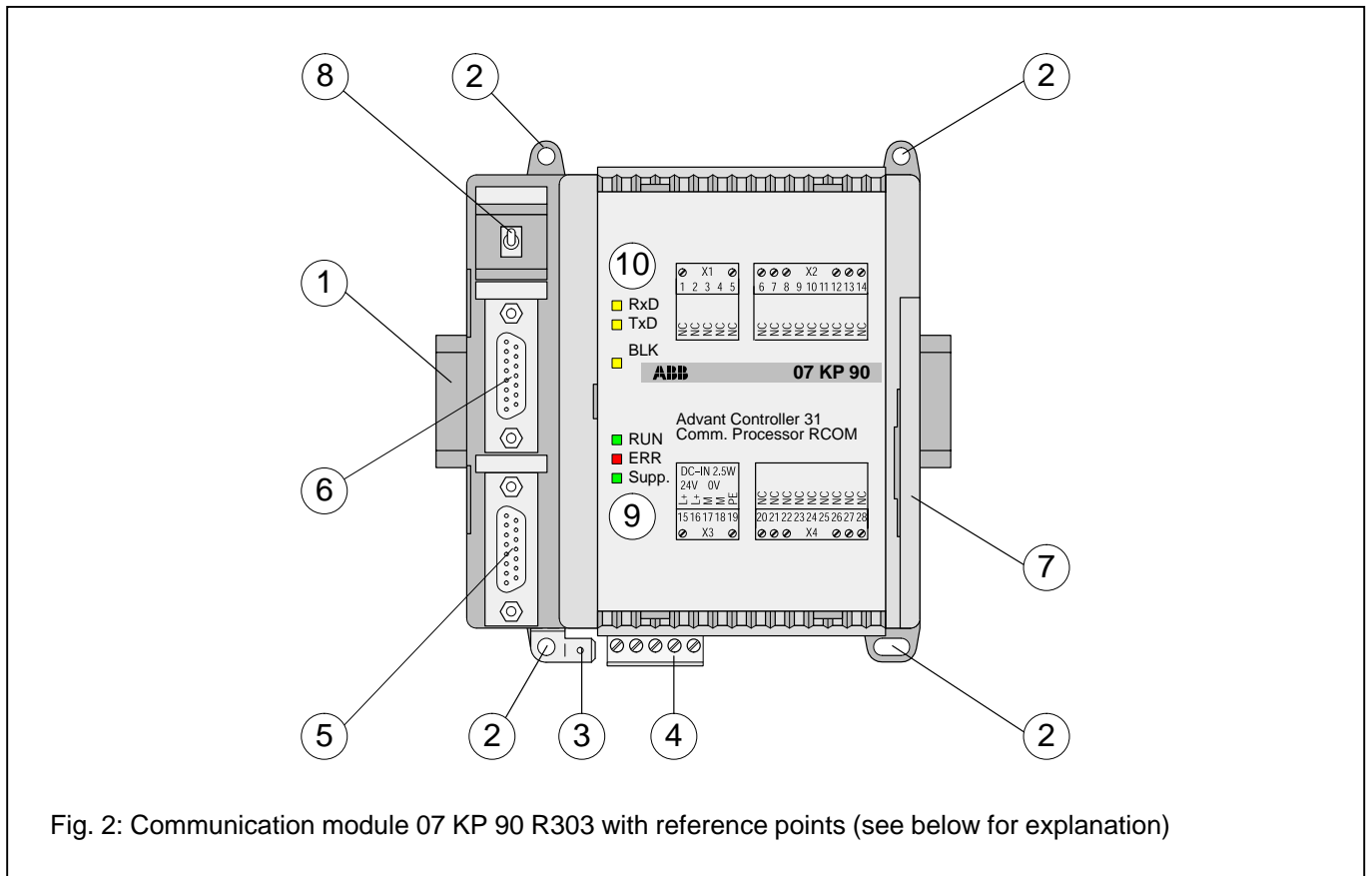


Fig. 2: Communication module 07 KP 90 R303 with reference points (see below for explanation)

1 Mounting the unit on a DIN rail

2 Mounting the unit with screws

3 6.3 mm Faston earthing terminal

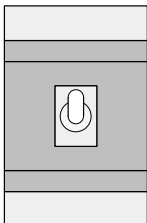
4 24 V DC supply voltage

5 Serial interface CONSOLE

6 Serial interface RCOM

7 Networking interface to the Advant Controller 31 central unit

8 Switch



The switch has no function.

9 LED indicators see below

10 LED indicators see below

⑩	yellow	<input type="checkbox"/> RxD	07 KP 90 is receiving an RCOM telegram
	yellow	<input type="checkbox"/> TxD	07 KP 90 is transmitting data via the RCOM interface
	yellow	<input type="checkbox"/> BLK	Transmission of user data blocked as the result of communication error
	green	<input type="checkbox"/> RUN	07 KP 90 R303 is ready for RCOM communication (running)
	red	<input type="checkbox"/> ERR	RCOM communication error
	green	<input type="checkbox"/> Supply	Supply voltage present
⑨			

Refer to Section 1.6 Diagnosis for further information

1.5 Electrical connection

1.5.1 Application example for connecting the inputs and outputs

The following illustration shows an application example with the 07 KT 93 which utilizes various possibilities for connecting inputs and outputs. Attention must be paid to the following in detail:

- The earthing measures
- Connection of the communication module 07 KP 90 R303
- Looping through the supply voltage (24 V DC) from the 07 KT 93 to the 07 KP 90 R303
- Earthing the switch cabinet mains socket
- Handling serial interfaces

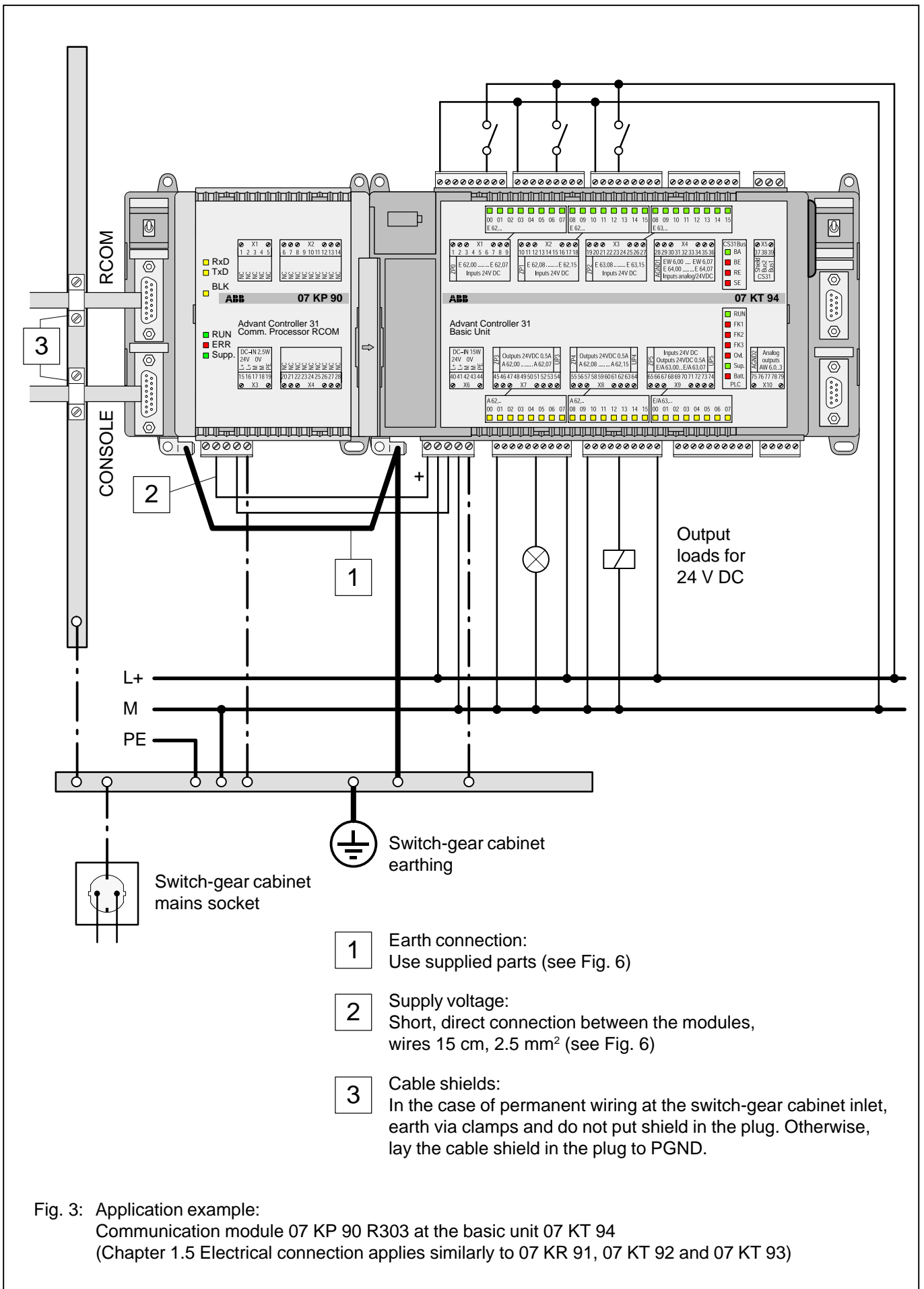


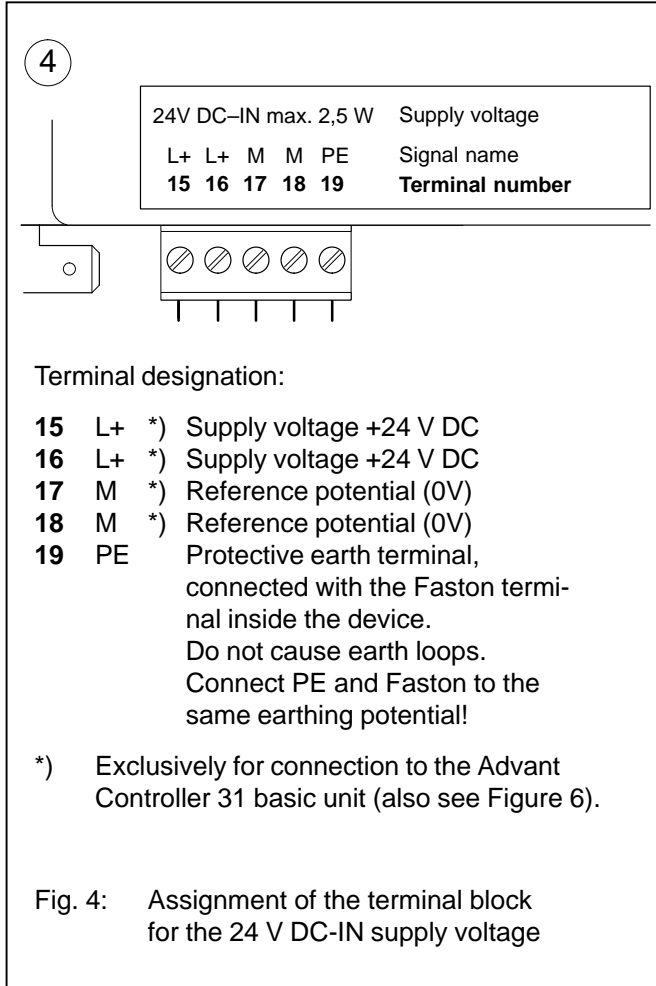
Fig. 3: Application example:
Communication module 07 KP 90 R303 at the basic unit 07 KT 94
(Chapter 1.5 Electrical connection applies similarly to 07 KR 91, 07 KT 92 and 07 KT 93)

1.5.2 Connecting the 24 V DC supply voltage

The supply voltage is fed in via a 5-pole detachable terminal block.

Important:

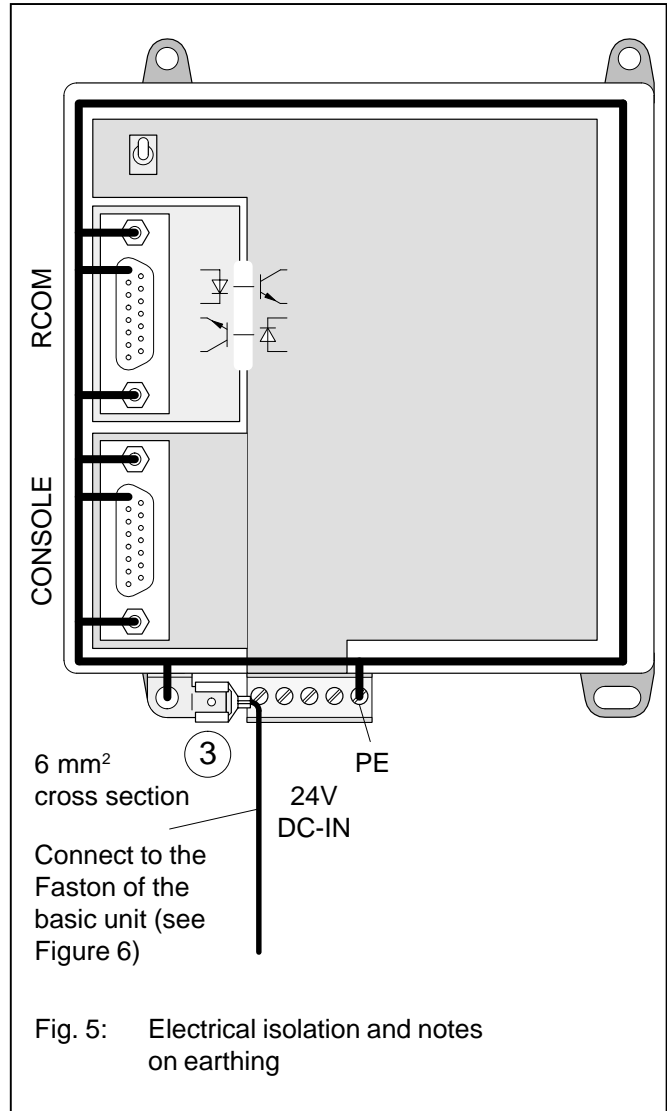
Plug and unplug terminal block only with power is off!



1.5.3 Electrical isolation and notes on earthing

The following illustration shows which circuit parts of the unit are electrically isolated from each other and which internal connections exist. Here, both the clearances and creepage distances and also the test voltages used correspond to DIN/VDE 0160.

The unit is connected via the 6.3 mm Faston terminal (bottom left) to the functional earth (switch cabinet earth) via a wire with a cross section of 6 mm² (also see Figure 6).



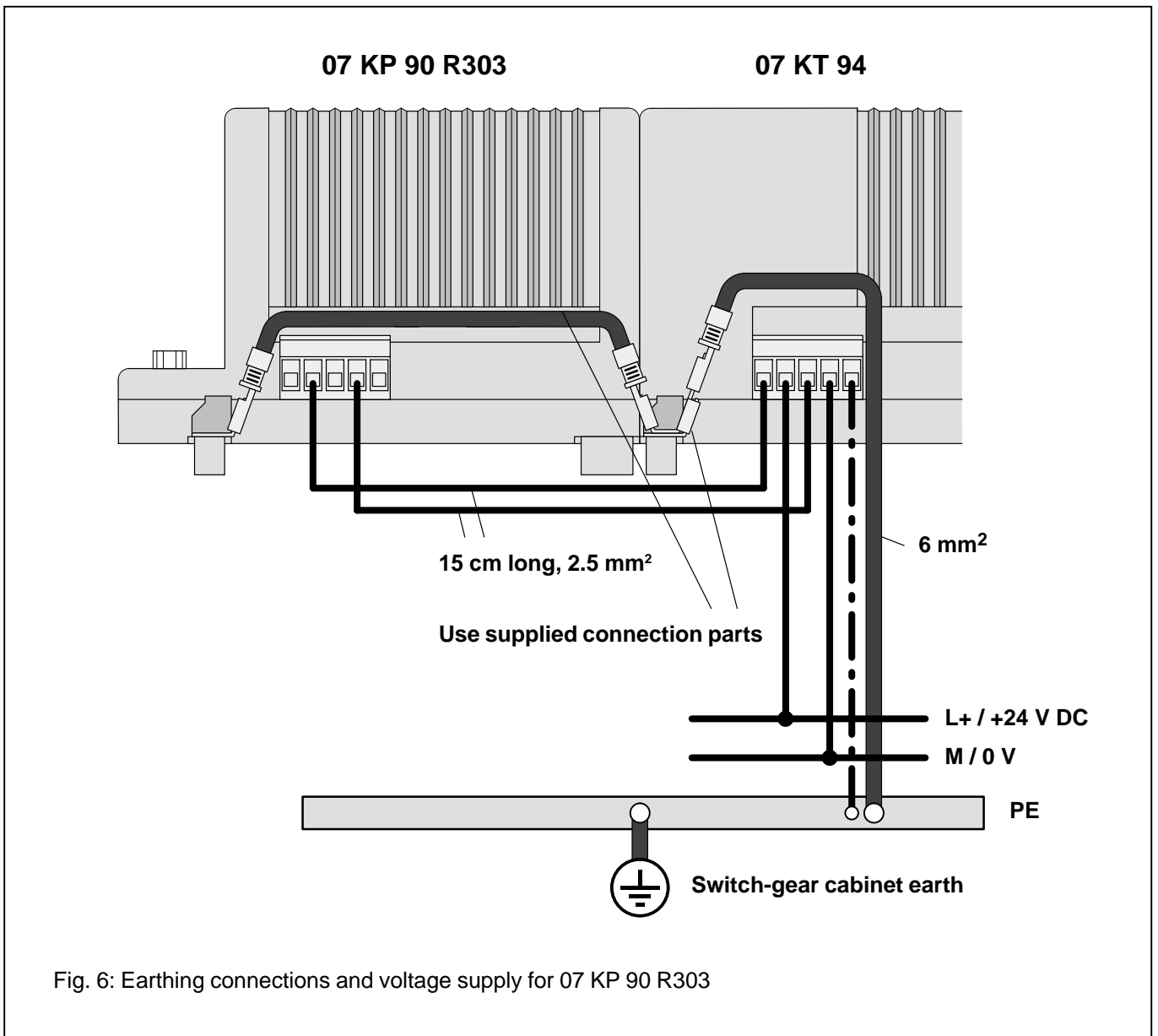


Fig. 6: Earthing connections and voltage supply for 07 KP 90 R303

1.5.4 Serial interfaces

Serial interface CONSOLE

A terminal (e.g. an IBM-PC with 907 PC 33 in Terminal mode) can be connected to the CONSOLE interface for commissioning. The CONSOLE interface can be used to

- configure the telephone directory or configure data (only in the case of dial-up modems),

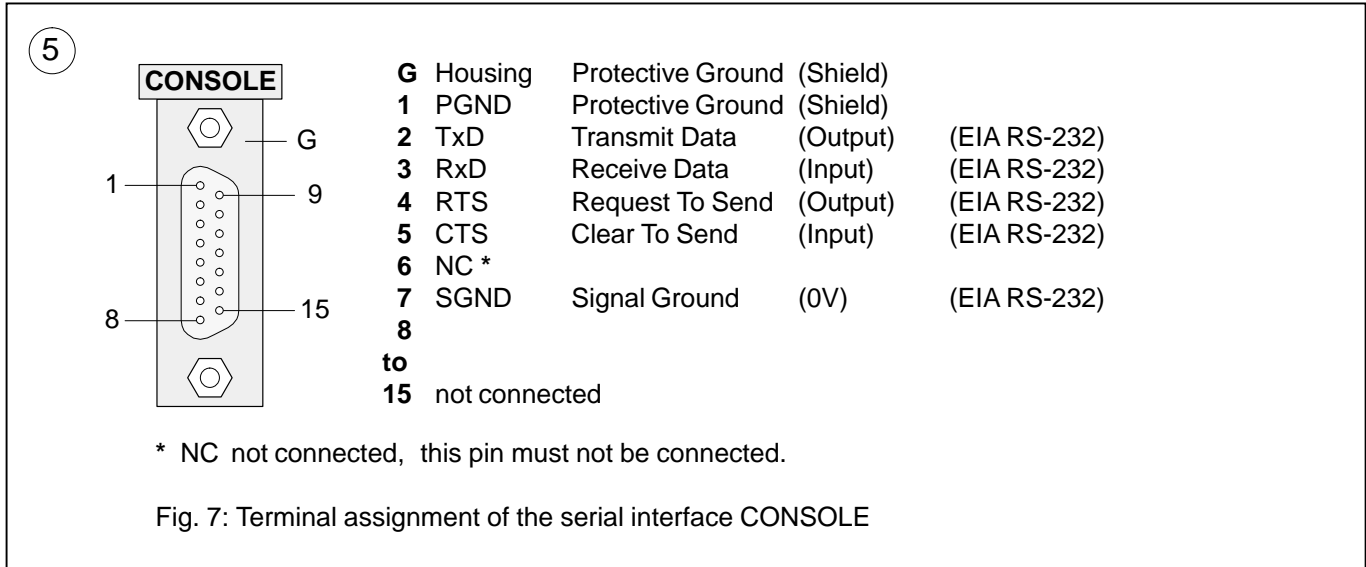
- follow the communication sequence (faultfinding during commissioning). This function can be deactivated after commissioning.

Serial interface RCOM

The RCOM network is connected to this interface. It is connected via a modem with standard interface.

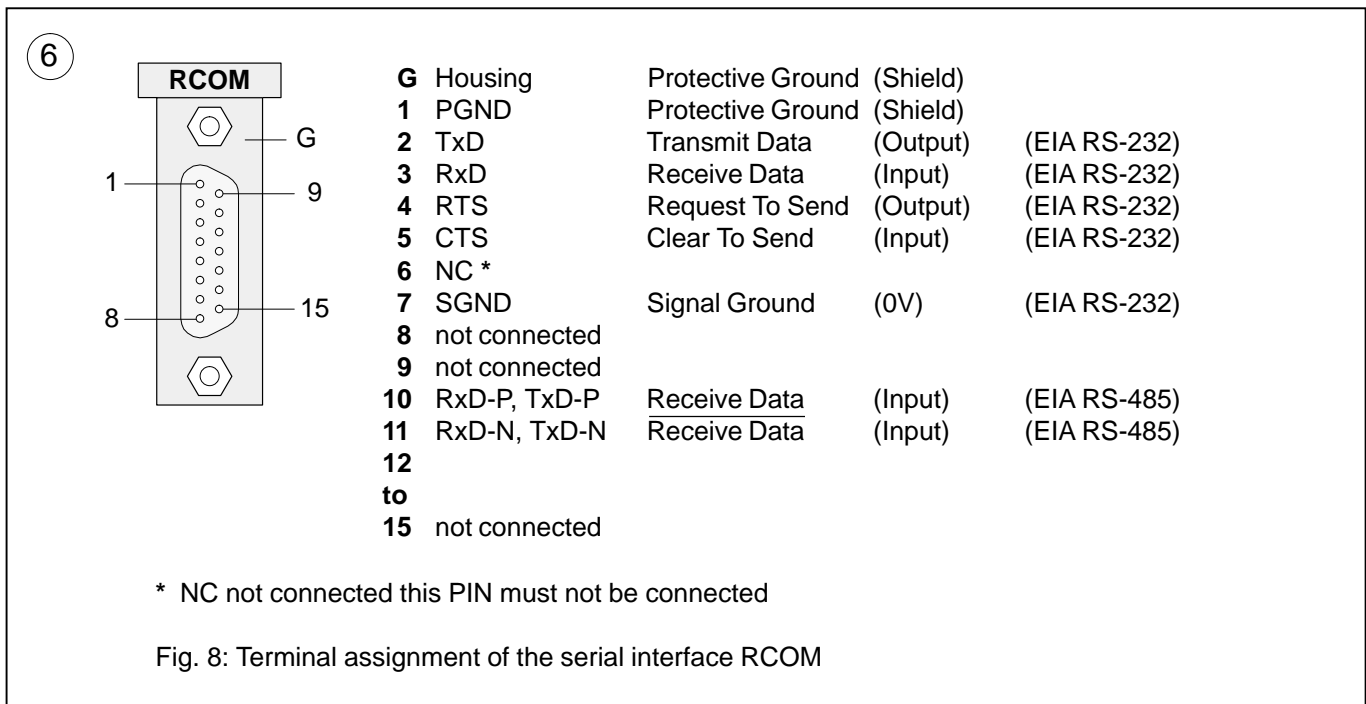
Serial interface CONSOLE: Terminal assignment

Interface standard: EIA RS-232



Serial interface RCOM: Terminal assignment

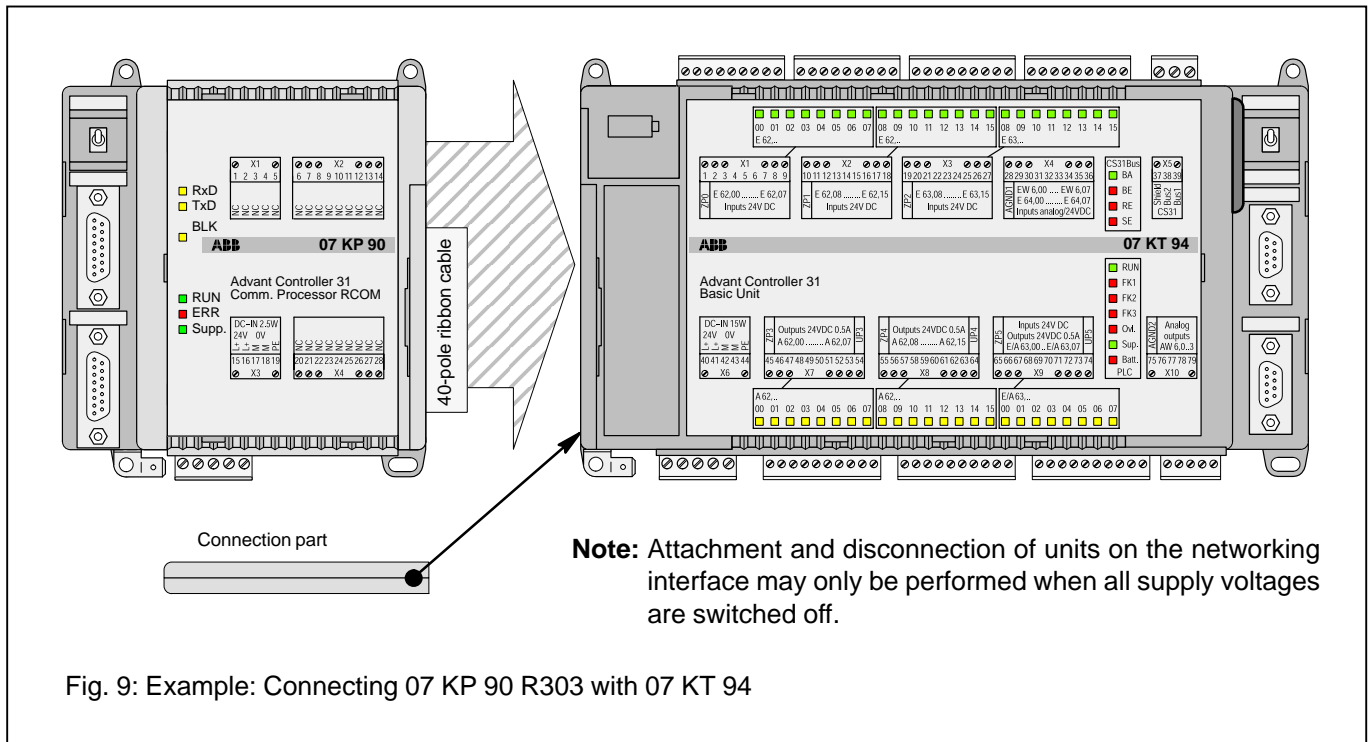
Interface standard: EIA RS-232 or EIA RS-485



1.5.5 Networking interface 7

The networking interface, a special parallel interface, allows the 07 KP 90 R303 communication module to be connected to AC31 basic units (such as 07 KR 91 R353, 07 KT 92, 07 KT 93, 07 KT 94). The housing of the com-

munication module is connected to the housing of the AC31 basic unit by a snap-fit connection. The electrical connection is via a 40-pole ribbon cable with socket connector, soldered onto the 07 KP 90 R303 side.



Mounting the expansion housing

1. Detach the cover on basic unit 07 KT 94 from the networking interface.
2. Plug the socket strip of the 40-pole ribbon cable secured to the 07 KP 90 R303 onto the networking connector of the 07 KT 94.
3. Place both units on a level surface and slide them together so that they engage.
4. Slide in the connection part to fix the housing in position.

Note: Mounting of the 07 KP 90 R303 to 07 KR 91 / 07 KT 92 / 07 KT 93 takes place in a similar way.

1.6 Diagnosis

LED displays for RCOM system messages

⑨ yellow
yellow
yellow

<input type="checkbox"/>	RxD
<input type="checkbox"/>	TxD
<input type="checkbox"/>	BLK

RxD: 07 KP 90 is receiving an RCOM telegram.
TxD: 07 KP 90 is transmitting data via the RCOM interface.
BLK: Transmission of user data blocked as the result of communication error. After normalization LED 'BLK' goes out again.

Fig. 10: LED displays for RCOM system messages

LED displays for RUN, ERR and Supply

⑩ green
red
green

<input type="checkbox"/>	RUN
<input type="checkbox"/>	ERR
<input type="checkbox"/>	Supply

RUN: 07 KP 90 is ready for RCOM communication (is running).
ERR: A RCOM communication error has occurred. In the case of recoverable errors, the LED goes out again after a short time. In the case of fatal errors, the LED remains ON continuously. The 'RUN' LED also goes out.
Supply: Supply voltage is present.

Fig. 11: LED displays for RUN, ERR and Supply

Operating states, error displays

RUN gn	RxD ye	TxD ye	BLK ye	Supply gn	ERR rd	Meaning	Remedy
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Supply voltage not present.	<ul style="list-style-type: none"> Switch on supply voltage. Check supply voltage.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	☆	<input type="checkbox"/>	Supply voltage present. 07 KP 90 not ready for communication <ul style="list-style-type: none"> during device reset or after fatal error. 	<ul style="list-style-type: none"> Switch supply voltage of 07 KP 90 R303 and 07 KT 94 off and on again.
☆	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	☆	<input type="checkbox"/>	07 KP 90 R303 is ready for communication.	--
☆	☆	<input type="checkbox"/>	<input type="checkbox"/>	☆	<input type="checkbox"/>	07 KP 90 R303 is receiving a data telegram.	--
☆	<input type="checkbox"/>	☆	<input type="checkbox"/>	☆	<input type="checkbox"/>	07 KP 90 R303 is transmitting a data telegram.	--
☆	X	X	<input type="checkbox"/>	☆	<input type="checkbox"/>	RCOM operation	--
☆	X	X	☆	☆	<input type="checkbox"/>	Transmission of user data not possible owing to the communication sequence.	<ul style="list-style-type: none"> Normalization
☆	X	X	<input type="checkbox"/>	☆	☆	RCOM communication error.	<ul style="list-style-type: none"> The ERR LED goes out again automatically in the case of recoverable errors.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	☆	☆	Fatal RCOM communication error.	<ul style="list-style-type: none"> Switch the supply voltage of 07 KP 90 and 07 KT 94 off and then on again.
X	☆	☆	☆	X	☆	Hardware error, (RAM, EPROM, DP-RAM)	<ul style="list-style-type: none"> Switch the supply voltage of 07 KP 90 and 07 KT 94 off and then on again.

= LED off, ☆ = LED on, ✦ = LED flashes, X = LED on or off, ye = yellow, gn = green, rd = red

Fig. 12: Signalling operating states and error display

1.7 Technical data

In general, the details in section 1 "System data and system structure" of volume 2 of the system description "Advant Controller 31" apply as technical data. Supplementary and deviating data is listed below.

1.7.1 General data

Number of serial interfaces	2
Number of parallel interfaces	1 networking interface for connecting to the Advant Controller 31 basic unit
Operating and error displays	6 LEDs: RUN, ERR, Supply, RxD, TxD, BLK
Conductor cross section for the removable terminal blocks	max. 2.5 mm ²

1.7.2 Power supply for 07 KP 90 R303

Rated supply voltage	24 V DC
Power dissipation	typ. 2.5 W
max. current consumption	
with rated voltage	210 mA
with a supply voltage of 30 V	170 mA
Protection against reversed terminal connection	yes

1.7.3 Serial interfaces RCOM and CONSOLE

Interface standard	EIA RS-232 or EIA RS-485 (RCOM only)
Electrical isolation	yes, RCOM interface with respect to the rest of the unit (see also Fig. 5)
Potential differences	So that no earthing potential differences arise between the 07 KP 90 R303 and the peripheral units connected to RCOM and CONSOLE, the latter are supplied from the switch-gear cabinet mains socket (also see earthing connections in Figure 5).
Transmission speed (Baud rate)	
RCOM	300...19200 Baud
CONSOLE	9600 Baud
Terminal assignment and description of the interfaces RCOM, CONSOLE	see page 8 onwards

1.7.4 LED displays

LEDs for operating and error displays:

– Supply voltage present (Supply)	1 green LED
– Fatal or serious error occurred (ERR)	1 red LED
– Ready for RCOM communication (running), (RUN)	1 green LED
– Interface signals RxD, TxD	2 yellow LEDs
– Protocol status BLK	1 yellow LED

1.7.5 Mechanical data

Mounting on DIN rail

in accordance with DIN EN 50022–35, 15 mm deep. The DIN rail is located in the middle between the upper and the lower edges of the module.

Fastening by screws

using 4 M4 screws.

Width x height x depth

140 x 120 x 85 mm

Wiring method

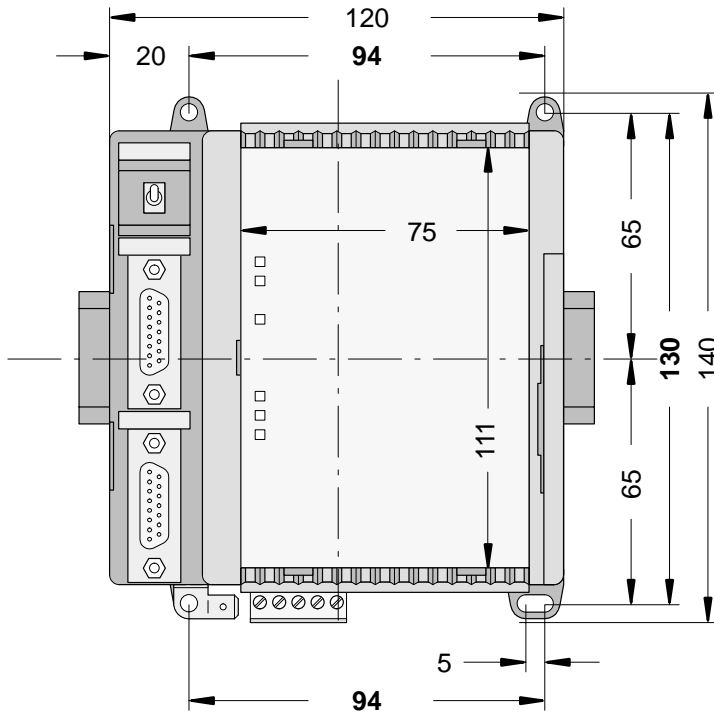
by removable terminal blocks with screw-type terminals, max. 2.5 mm²

Weight

450 g

Dimensions for mounting

see the following drawing



All dimensions in mm.

The device is 85 mm deep. The interface connectors RCOM and CONSOLE are set deeper so that the mounting depth required does not become any larger even with detachable interface cables. If, however, a DIN rail is used, the mounting depth is increased by the overall depth of the rail.

Fig. 13: Dimensions of the Communications module 07 KP 90 R303, front view, **the dimensions for assembly bore holes are printed in bold**

1.7.6 Mounting hints

Mounting position

vertical, terminals above and below

Cooling

The natural convection cooling must not be hindered by cable ducts or other material mounted in the switch-gear cabinet.

1.7.7 Ordering data

Communication module 07 KP 90 R303

Order No. GJR5 2510 00 R0303

Scope of delivery

Communication module 07 KP 90 R303
1 5-pole terminal block (5.08 mm grid)
Cable including terminals for making the
earth connection
Earthing instructions enclosed

Further literature

System description Advant Controller 31, English

Order No. FPTN 4400 04 R0201

System description ABB Procontic T200, English

Order No. GATS 1314 99 R2001

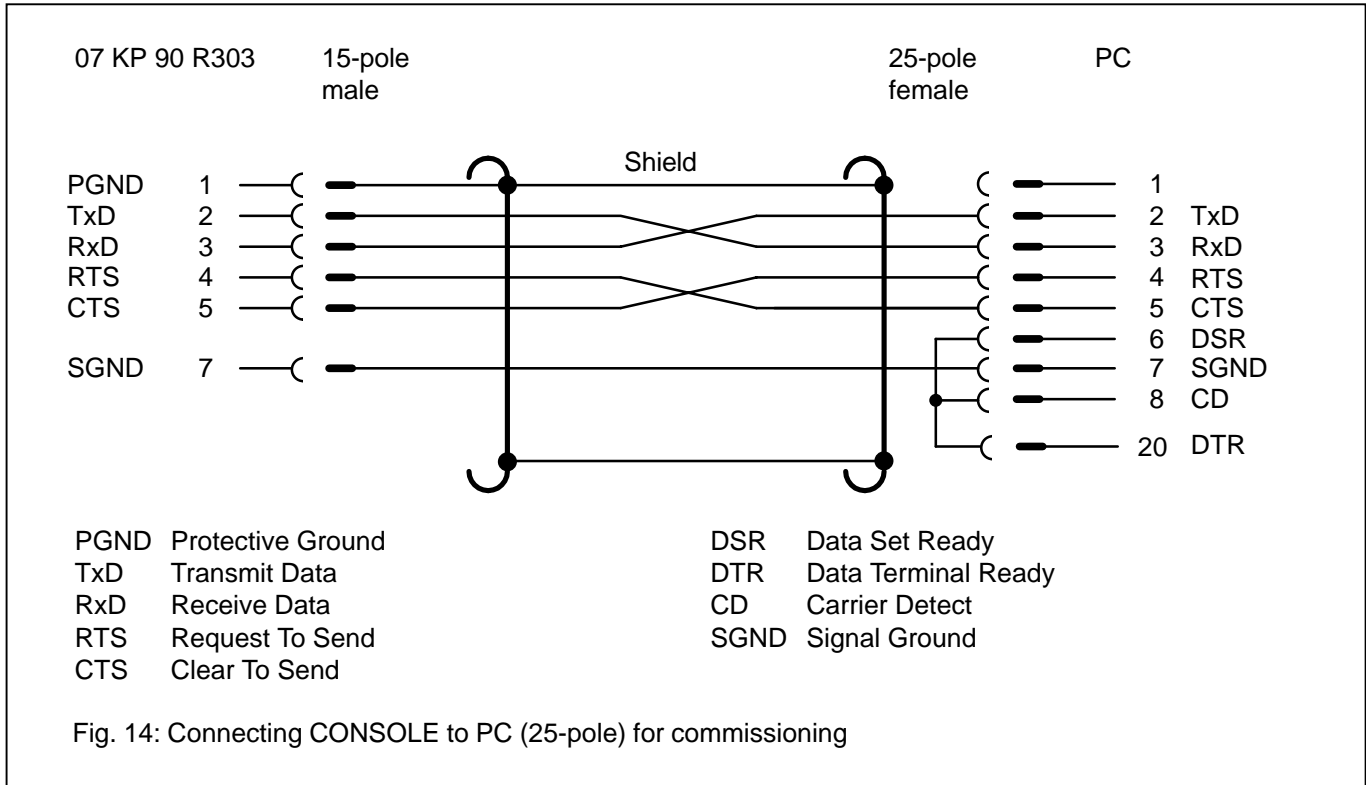
Software

907 KP 90 R202, English documentation,
CE library and example programs,

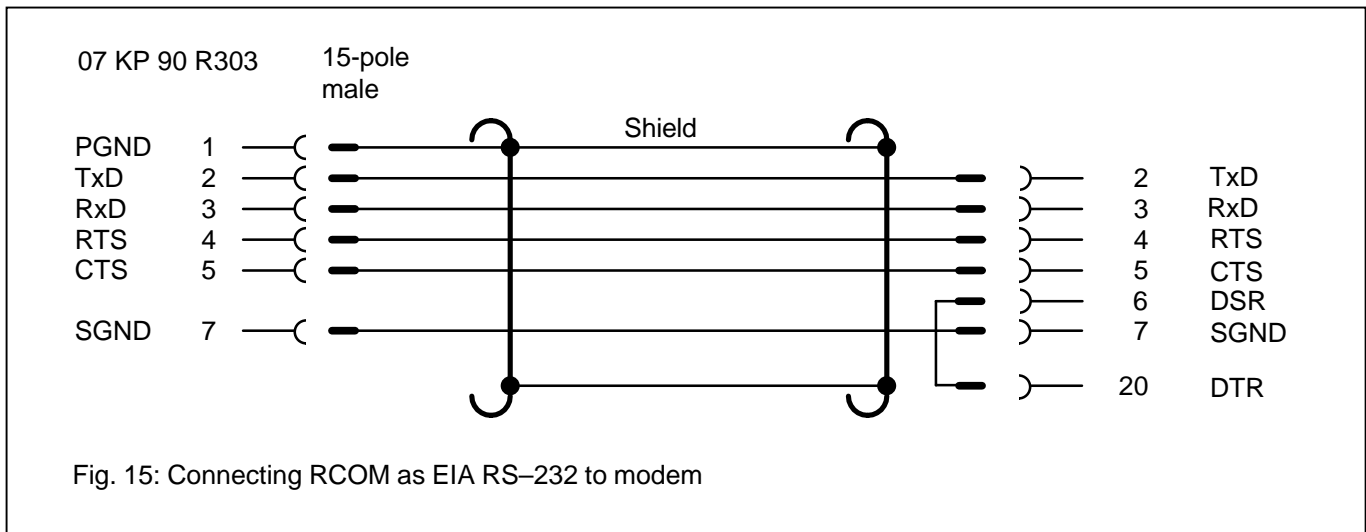
Order No. GJP5 2051 00 R0202 b

1.8 System cables and adaptors

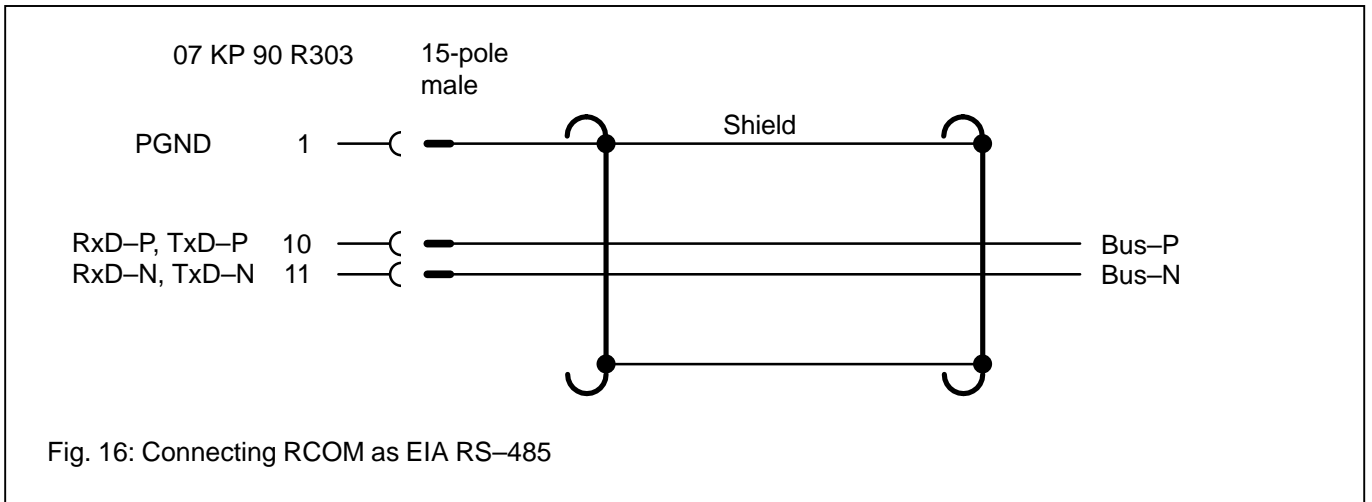
1.8.1 CONSOLE to PC (25-pole) for commissioning



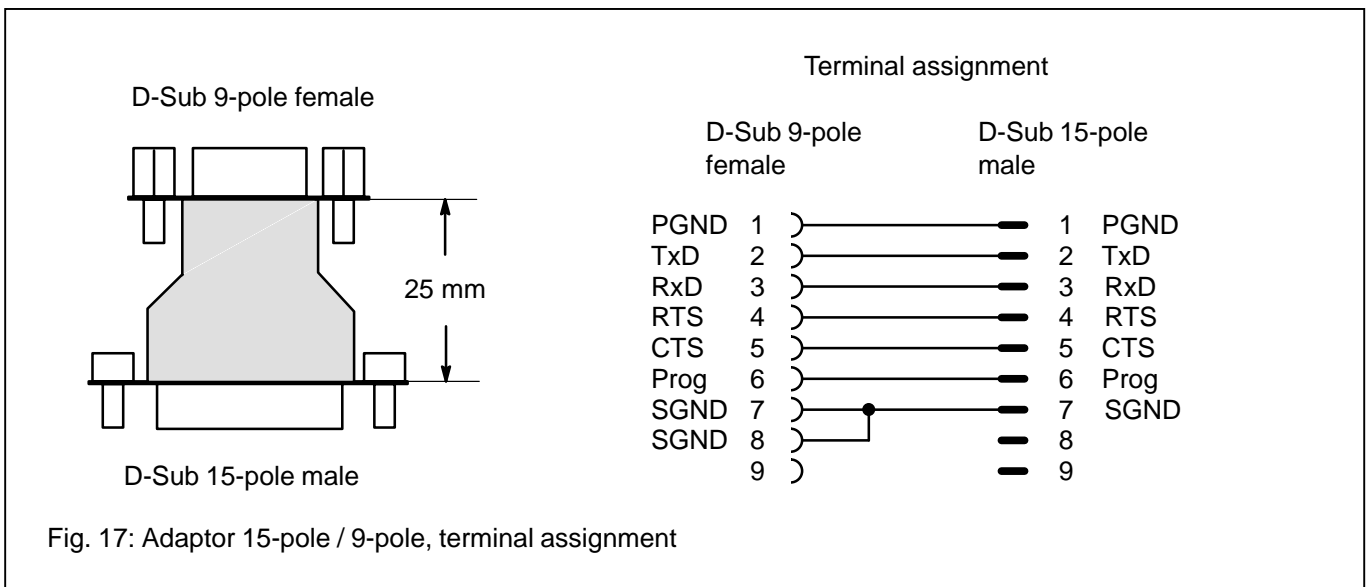
1.8.2 RCOM as EIA RS-232 to modem



1.8.3 RCOM as EIA RS-485



1.8.4 Adaptor 15-pole / 9-pole





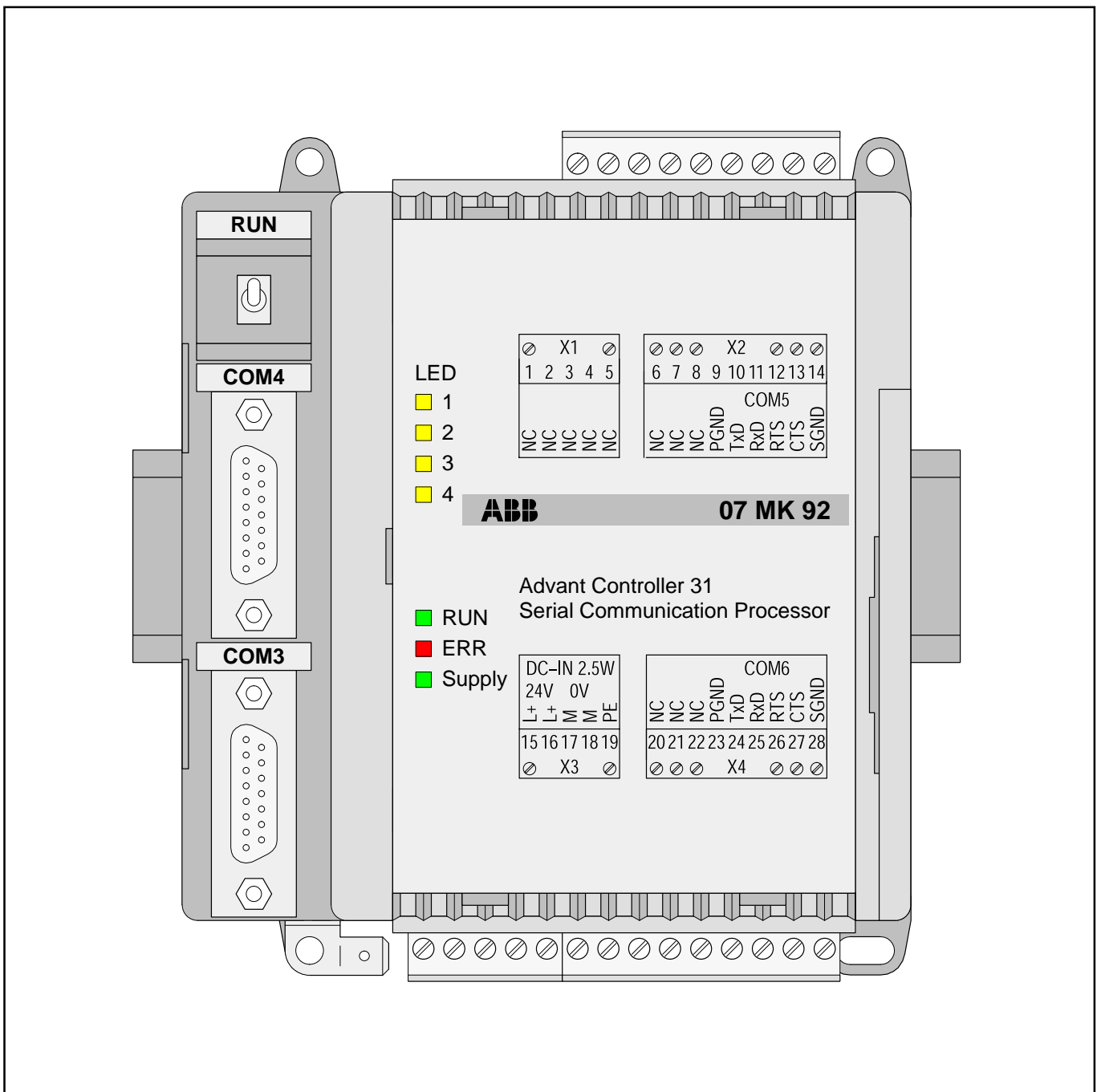
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Communication module
07 MK 92 R1161



1 Communication module 07 MK 92 R1161

Connecting external units

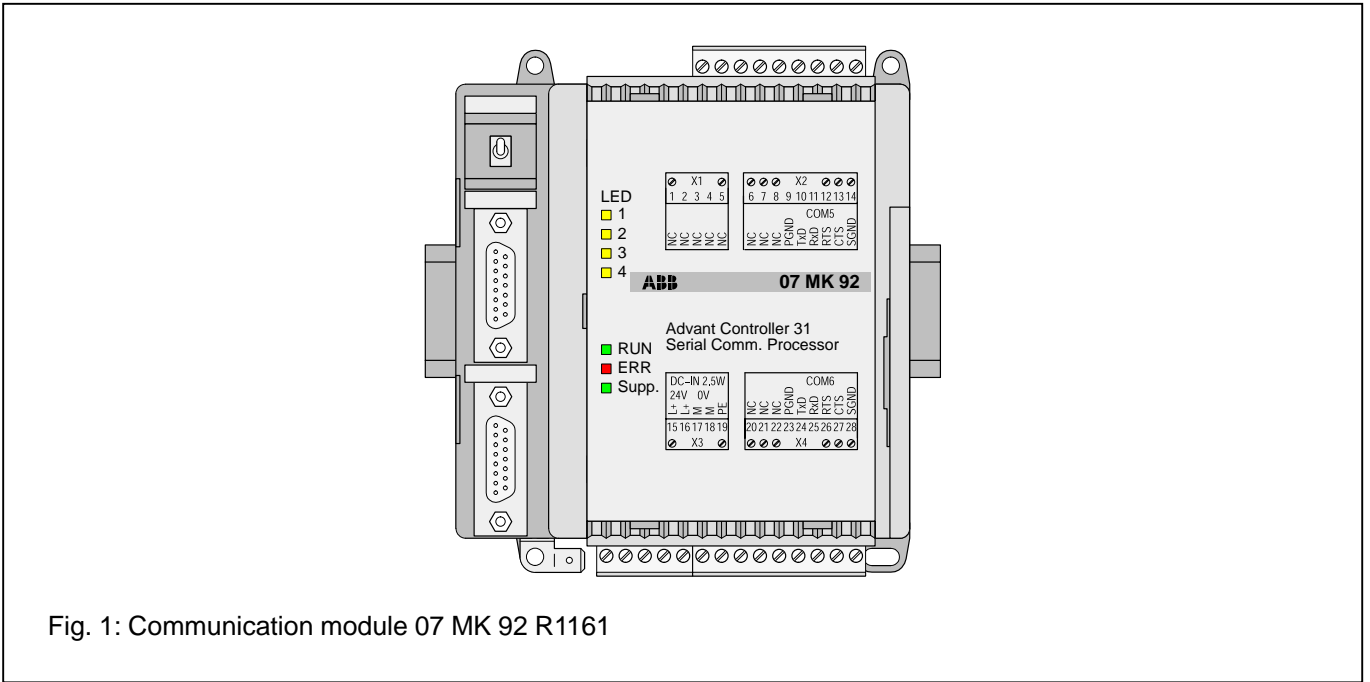


Fig. 1: Communication module 07 MK 92 R1161

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1.1 Brief description

The 07 MK 92 R1161 communication module is a freely programmable interface module with 4 serial interfaces.

The communication module allows external units to be connected to the Advant Controller 31 system via a serial interface.

The communications protocols and transmission types can be freely defined by the user.

Programming is performed on a PC with the programming and test software 907 MK 92.

The communication module is connected to AC31 basic units via the networking interface, e.g. 07 KR 91 R353, 07 KT 92 (index i onwards) 07 KT 93 or 07 KT 94.

The most important features of the communication module are:

- 4 serial interfaces:
 - 2 of them are serial interfaces, optionally configurable in accordance with EIA RS-232 or EIA RS-422 or EIA RS-485 (COM3, COM4)
 - 2 of them are interfaces in accordance with EIA RS-232 (COM5, COM6)
- Freely programmable with a comprehensive function library
- Communication with AC31 basic unit via connection elements
- Configurable LEDs for diagnosis
- Programming and testing on a PC via COM3
- Saving applications in a Flash EPROM

Processing of the serial interfaces and the networking interface is provided for in an applications program.

Programming is in the standard language "C".

The exchange of data between the serial communication module and the AC31 basic unit is realized by connection elements in the basic unit.

1.2 Structure of the front panel elements

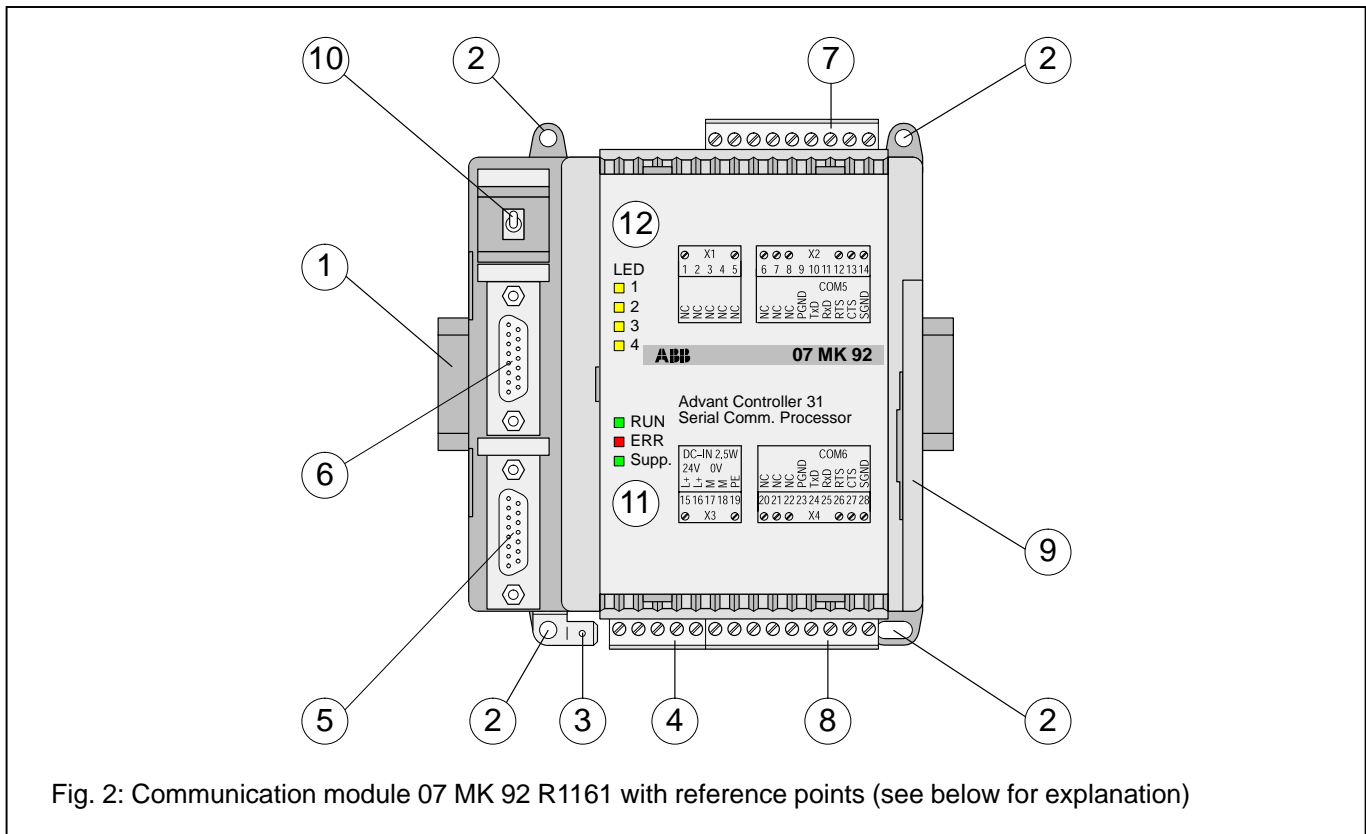
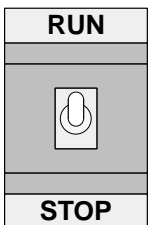


Fig. 2: Communication module 07 MK 92 R1161 with reference points (see below for explanation)

- 1 Mounting the unit on a DIN rail
- 2 Mounting the unit with screws
- 3 6.3 mm Faston earthing terminal
- 4 24 V DC supply voltage
- 5 Configurable serial interface COM3
- 6 Configurable serial interface COM4
- 7 Serial interface COM5
- 8 Serial interface COM6
- 9 Networking interface for the Advant Controller 31 basic unit
- 10 Switch for RUN/STOP operation



The RUN/STOP switch controls the processing of the user application.

STOP → RUN

If the switch is switched from STOP to RUN, the user application is loaded into the main memory and processing of the application program is started.

The status of the application program is indicated by the LED RUN: The LED RUN lights up while the program is being processed. If an error occurred during loading (e.g. program not present), the LED RUN remains OFF.

RUN → STOP

If the switch is switched from RUN to STOP, the program processing is aborted. The LED RUN goes out.

11 LED displays for system messages

12 LED displays freely configurable

12

yellow
yellow
yellow
yellow

- LED1
- LED2
- LED3
- LED4

11

green
red
green

- RUN
- ERR
- Supply

Application program is running
Fatal or serious error
Supply voltage present

Refer to Section 1.4 Diagnosis for further information

1.3 Electrical connection

1.3.1 Application example for connecting the inputs and outputs

The following illustration shows an application example with the 07 KT 94 which utilizes various possibilities for connecting inputs and outputs. Attention must be paid to the following in detail:

- The earthing measures
- Connection of the 07 MK 92 communication module
- Looping through the supply voltage (24 V DC) from the 07 KT 94 to the 07 MK 92
- Earthing the switch-gear cabinet mains socket
- Handling serial interfaces

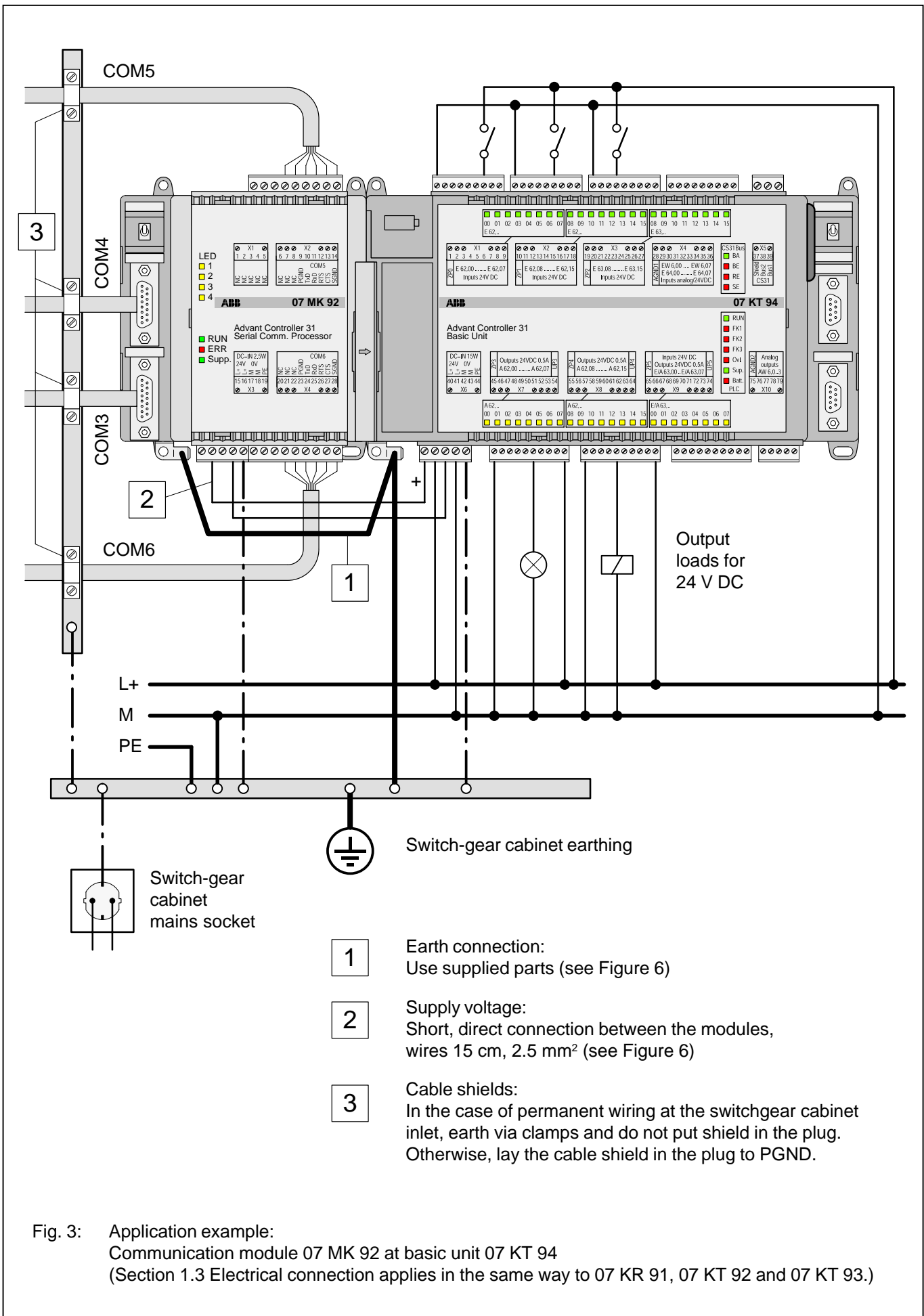


Fig. 3: Application example:
 Communication module 07 MK 92 at basic unit 07 KT 94
 (Section 1.3 Electrical connection applies in the same way to 07 KR 91, 07 KT 92 and 07 KT 93.)

1.3.2 Connecting the 24 V DC supply voltage

The supply voltage is fed in via a 5-pole detachable terminal block.

Important:

Plug and unplug terminal block only with power off!

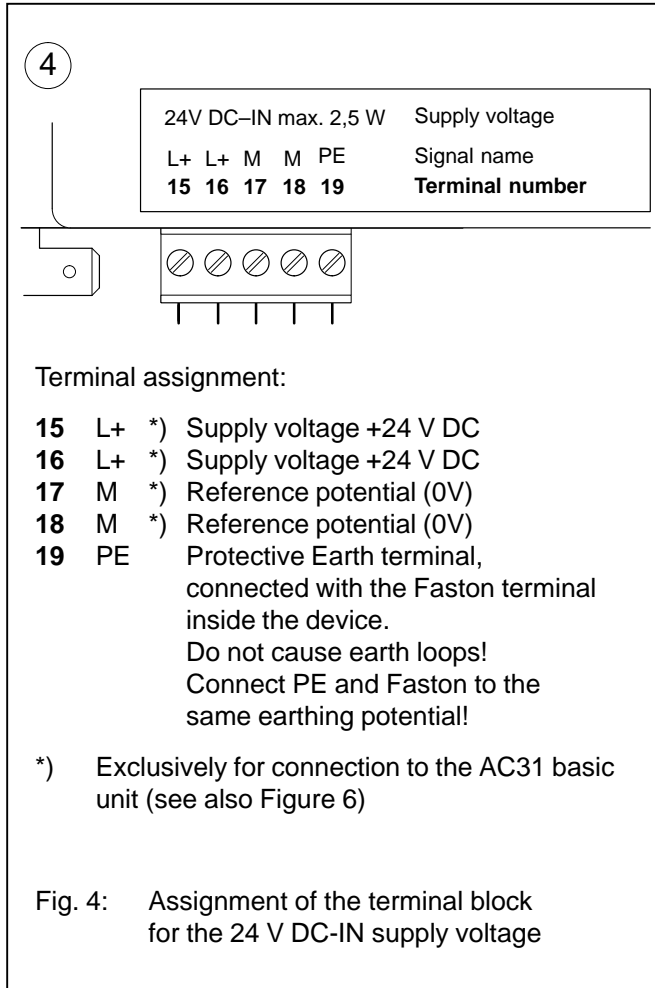


Fig. 4: Assignment of the terminal block for the 24 V DC-IN supply voltage

1.3.3 Electrical isolation and notes on earthing

The following illustration shows which circuit parts of the unit are electrically isolated from each other and which internal connections exist. Here, both the clearances and creepage distances and also the test voltages used correspond to DIN/VDE 0160.

The unit is connected via the 6.3 mm Faston terminal (bottom left) to the functional earth (switch-gear cabinet earth) via a wire with a cross section of 6 mm² (also see Fig. 6).

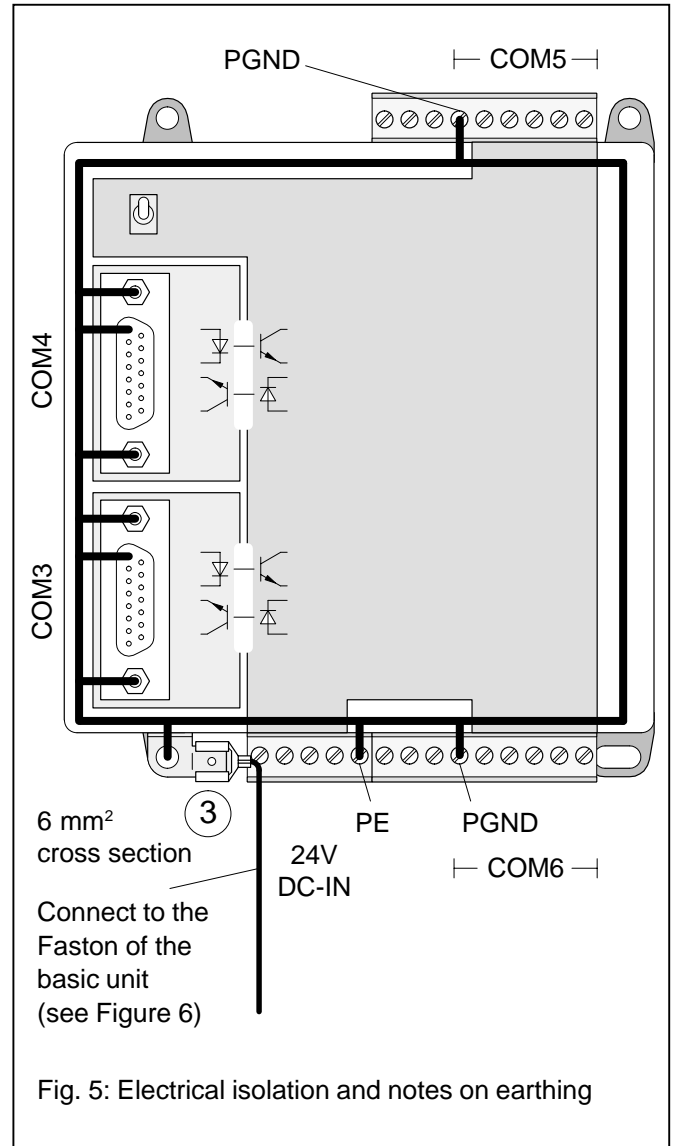


Fig. 5: Electrical isolation and notes on earthing

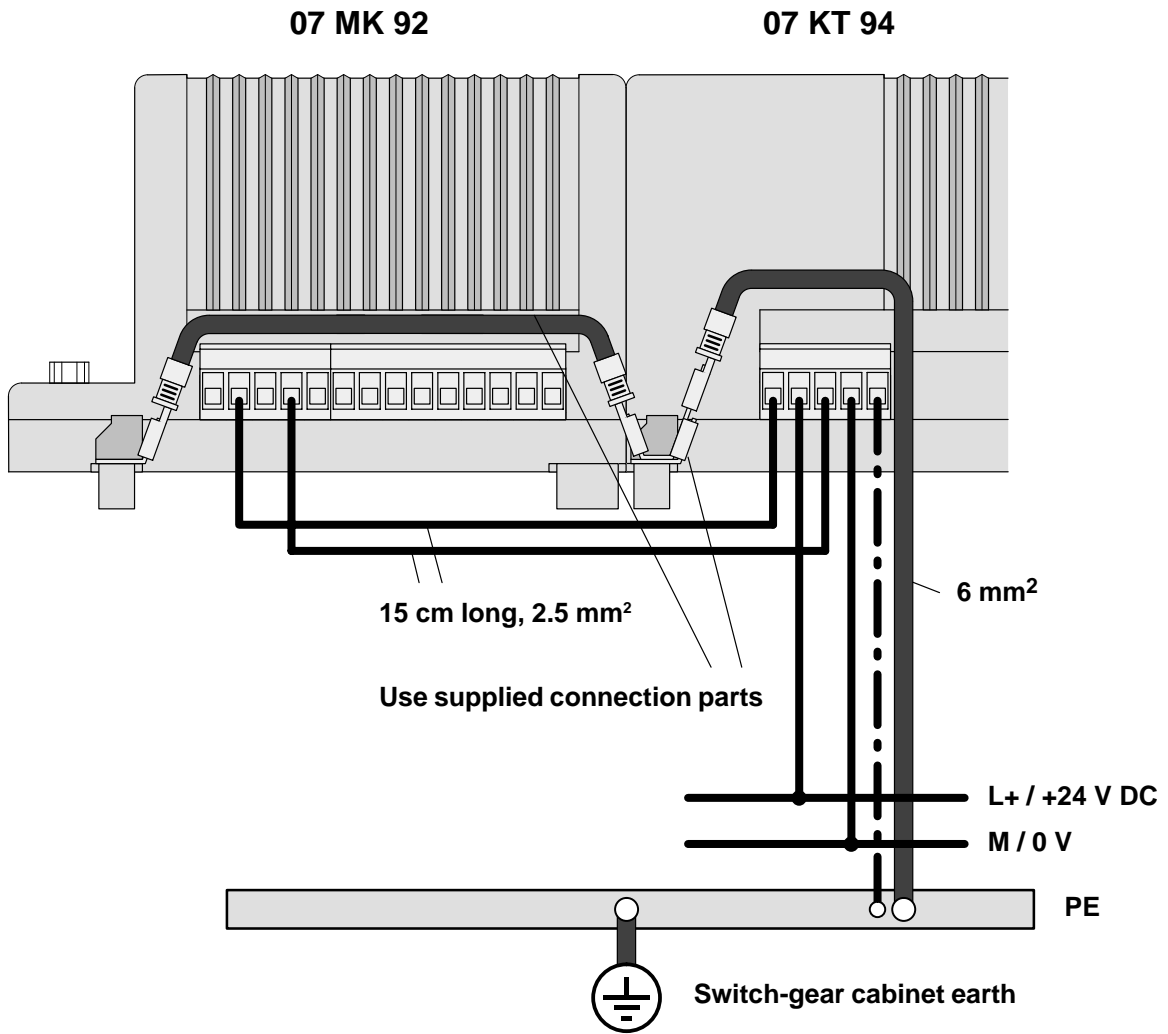


Fig. 6: Earthing connections and voltage supply for 07 MK 92

1.3.4 Serial interfaces

Use

External units can be connected to the AC31 system via the serial interfaces. The interfaces are independent of each other. They can be managed via freely definable protocols.

Scope of functions

The four serial interfaces can be configured independently of each other in the following scope of functions:

- Data format 7 or 8 bits
- Even, odd or no parity
- Discrete baud rates
from 300 Bd to 19200 Bd for COM3 and COM 4 and
from 300 Bd to 9600 Bd for COM5 and COM6
- Automatic processing of the SW handshake (XON/XOFF)
- Automatic processing of the HW handshake (RTS/CTS)
- Error detection
(parity, framing, overrun, break)

Serial interfaces COM3, COM4

Interface standard

- EIA RS-232 or
- EIA RS-422 or
- EIA RS-485

Both interfaces can be run independently of each other in one of the interface standards each. Selection is by choosing the corresponding interface signals.

Modes

- Programming and test mode
- Application mode

COM3 can be used as a programming and test interface. This mode is set at pin 6 of the interface connector by the signal status.

Electrical isolation

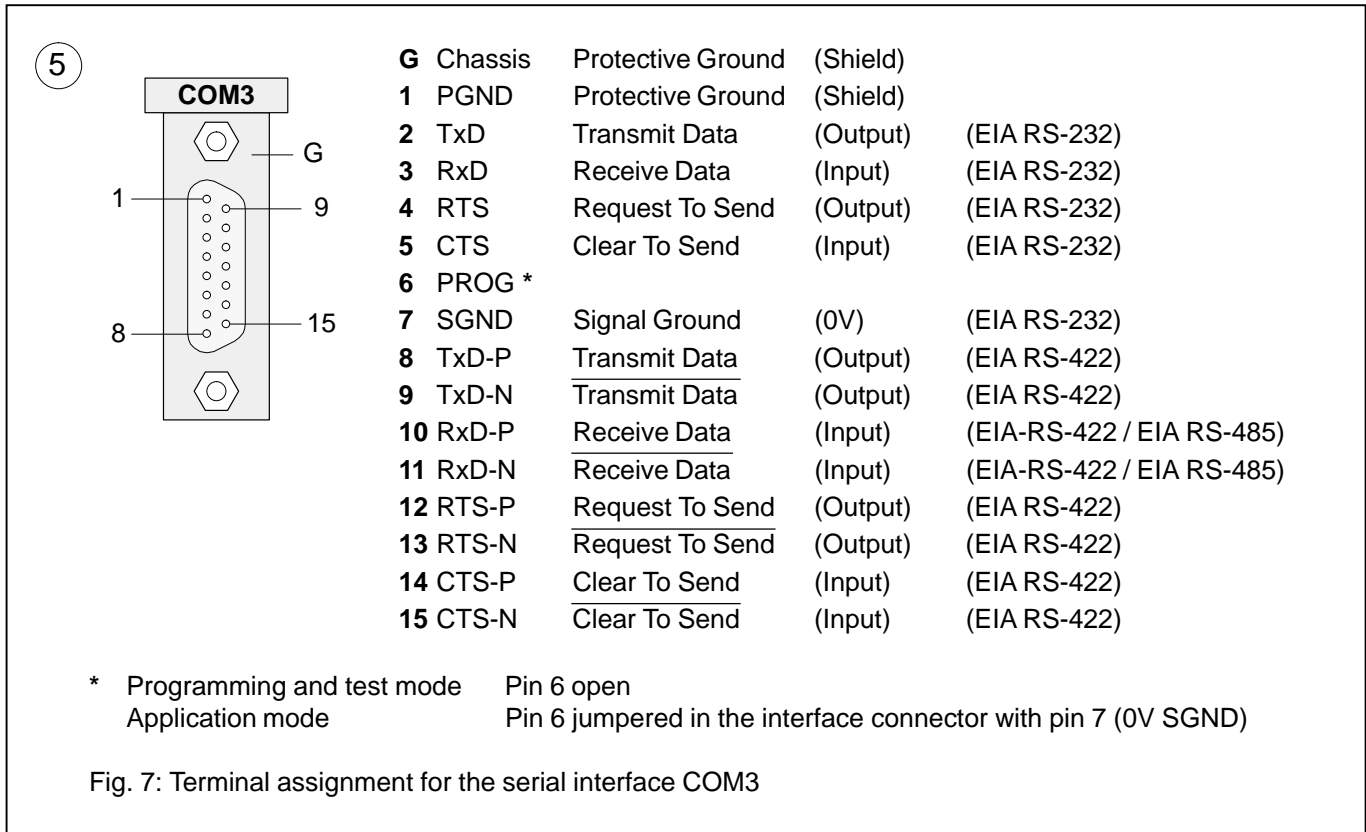
Both interfaces are electrically isolated.

Connection

Connection is via a 15-pole D-SUB connector (female).

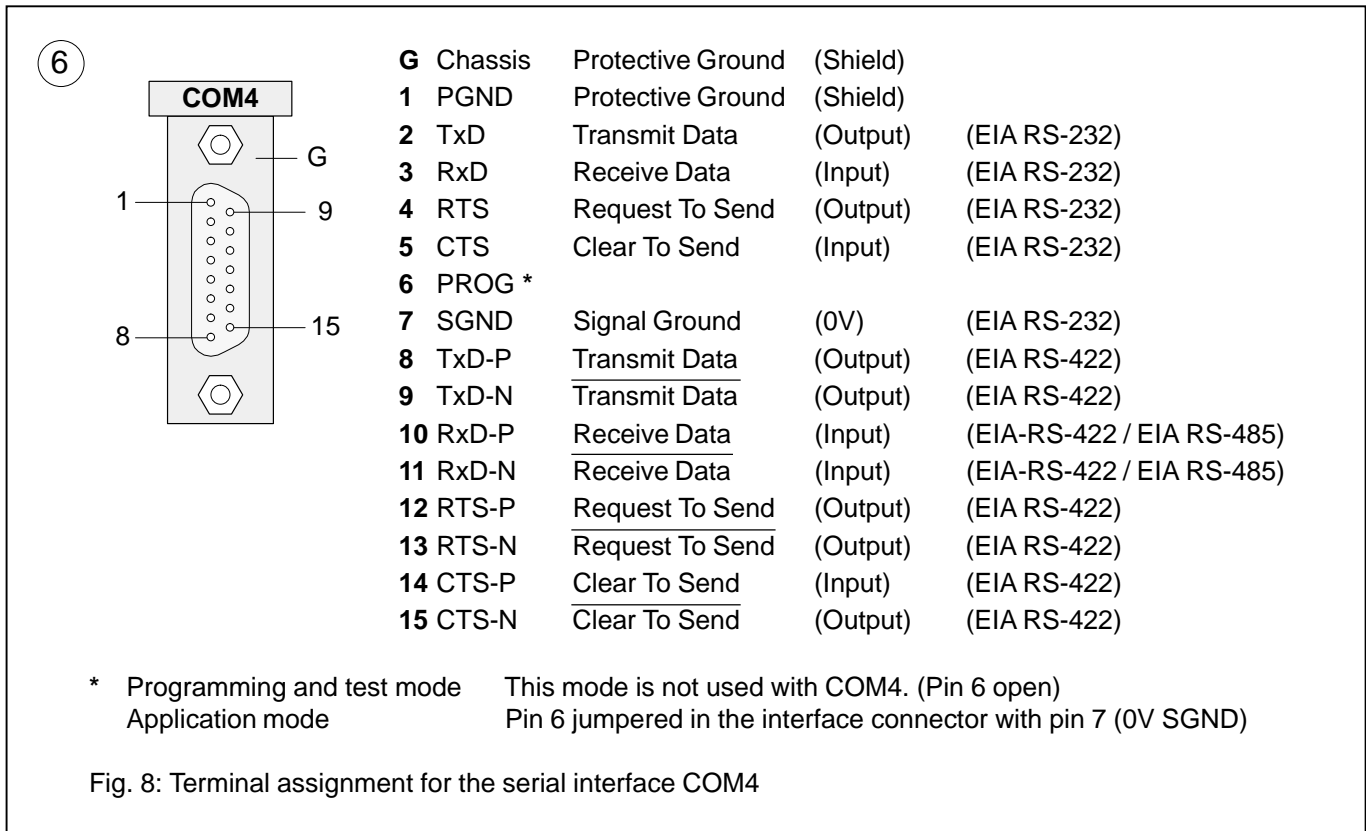
Serial interface COM3: Terminal assignment

Interface standard: EIA RS-232, EIA RS-422, EIA RS-485



Serial interface COM4: Terminal assignment

Interface standard: EIA RS-232, EIA RS-422, EIA RS-485



Serial interfaces COM5, COM6

Interface standard

EIA RS-232

Mode

Application mode

Electrical isolation

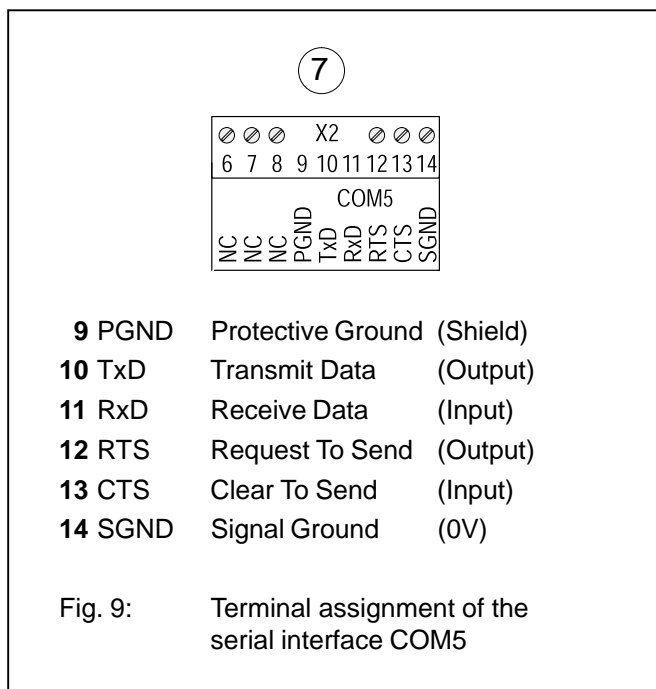
Both interfaces are not electrically isolated.

Connection

Connection is via removable screw-type terminal blocks.

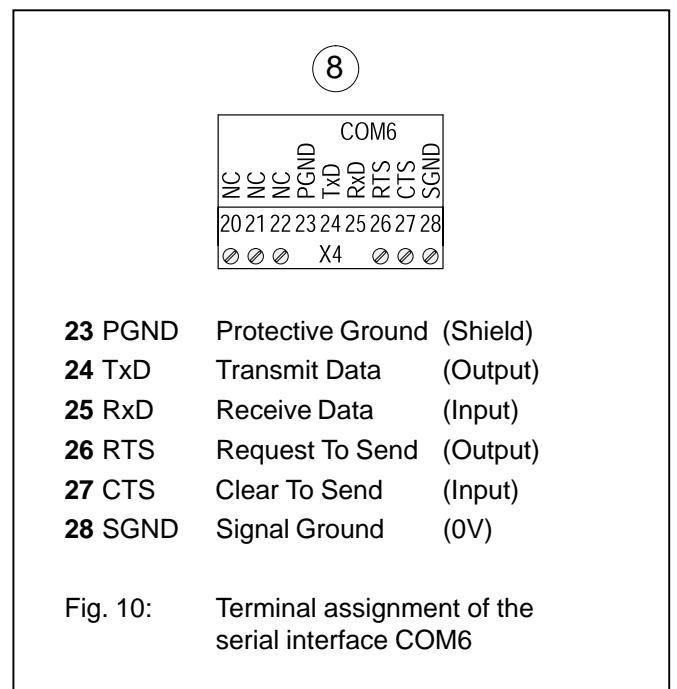
Serial interface COM5: Terminal assignment

Interface standard: EIA RS-232



Serial interface COM6: Terminal assignment

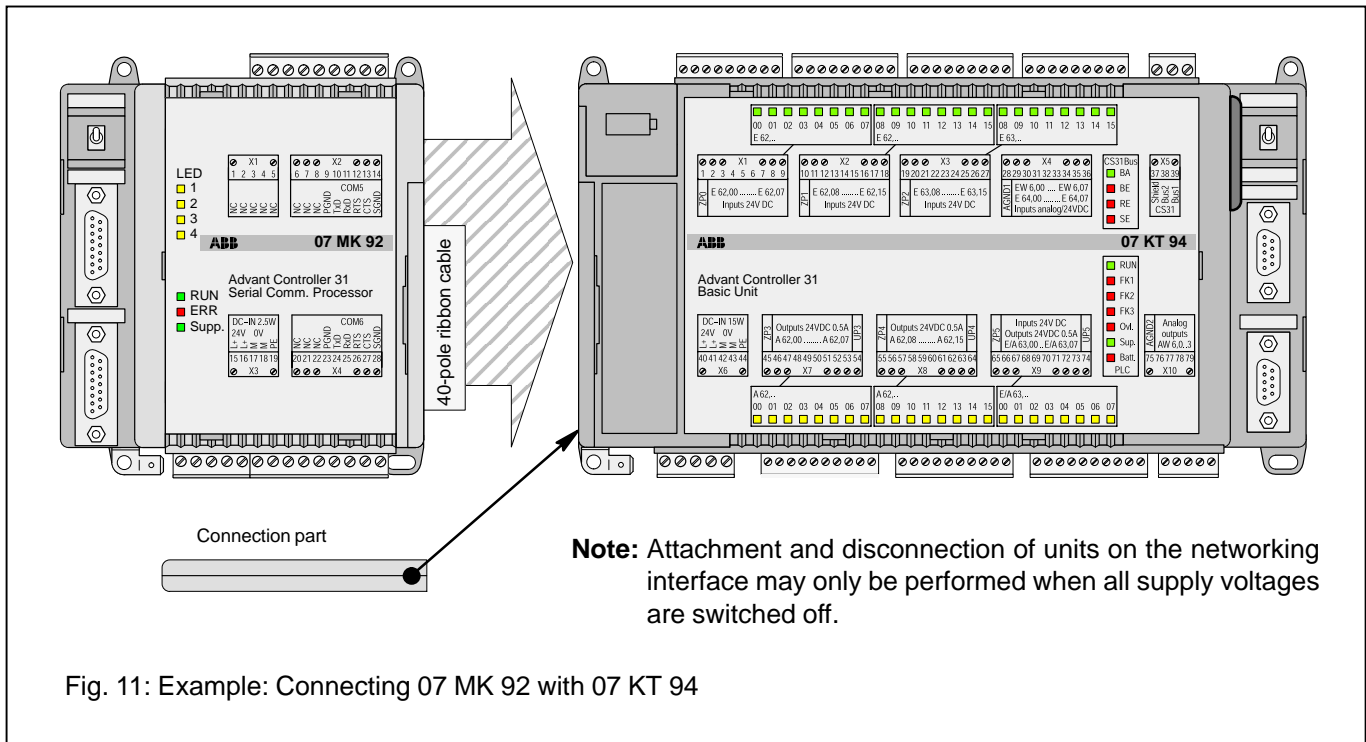
Interface standard: EIA RS-232



1.3.5 Networking interface ⑨

The networking interface, a special parallel interface, allows the 07 MK 92 communication module to be connected to AC31 basic units (such as 07 KR 91 R353, 07 KT 92, 07 KT 93, 07 KT 94). The housing of the communication

module is connected to the housing of the AC31 basic unit by a snap-fit connection. The electrical connection is via a 40-pole ribbon cable with socket connector, soldered onto the 07 MK 92 side.



Mounting the expansion housing

1. Detach the cover on unit 07 KT 94 from the networking interface.
2. Plug the socket strip of the 40-pole ribbon cable secured to the 07 MK 92 onto the networking connector of the 07 KT 94.
3. Place both units on a level surface and slide them together so that they engage.
4. Slide in the connection part to fix the housing in position.

Note: Mounting of the 07 MK 92 to 07 KR 91 / 07 KT 92 / 07 KT 93 takes place in the same way.

1.4 Diagnosis

LED displays for system messages RUN, ERR, Supply

11

green

red

green

RUN

ERR

Supply

The green LED "RUN" lights up when the user application is being processed.

The red LED "ERR" lights up when a fatal error (RAM error, DP-RAM error, EPROM error, Flash EPROM error) or a serious error is present.

The green LED "Supply" indicates the presence of the supply voltage.

Fig. 12: LED displays for system messages RUN, ERR, Supply

LED displays, freely configurable

The yellow LEDs "LED1...LED4" are configurable. They can be controlled by the application program.

12

yellow

yellow

yellow

yellow

LED1

LED2

LED3

LED4

Fig. 13: LED displays, freely configurable

Operating states, error display

RUN ERR Supply gn rd gn	Meaning	Remedy
■ ■ ■	Supply voltage not present.	<ul style="list-style-type: none"> ● Switch on supply voltage. ● Check supply voltage.
■ ■ ★	Supply voltage present. 07 MK 92 is ready to process the user application. – Load user application with 907 MK 92. – Start processing of application: Switch RUN/STOP switch to RUN.	
★ ■ ★	The user application is running.	
X ★ ★	A serious error is present which caused the user application to abort automatically.	<ul style="list-style-type: none"> ● Read out error and remedy if this is possible.
★ ★ ★	Initialization procedure. Voltage ON.	
<p>■ = LED off, ★ = LED on, X = LED on or off, gn = green, rd = red</p>		

Fig. 14: Signalling operating states and error display

1.5 Programming and test software 907 MK 92

The communication module is programmed with the programming and test software 907 MK 92. This software can be run on an IBM-compatible PC. The PC is connected with the COM3 interface of the communication module.

In addition to the programming and test software, the package 907 MK 92 contains documentation of the communication module 07 MK 92, the CE library and configuration examples.

1.6 Technical data

In general, the details in section 1 "System data and system structure" of volume 2 of the system description "Advant Controller 31" apply as technical data. Supplementary and deviating data is listed below.

1.6.1 General data

Number of serial interfaces	4
Number of parallel interfaces	1 networking interface for connecting to the Advant Controller 31 basic unit
Built-in application software memory	Flash EPROM 128 kbytes
Diagnosis	4 configurable LEDs: LED1...4 (controlled by the application program)
Operating and error displays	3 LEDs: RUN, ERR, Supply
Conductor cross section for the removable terminals	max. 2.5 mm ²

1.6.2 Supply voltage for 07 MK 92 R1161

Rated supply voltage	24 V DC
Power dissipation	typ. 2.5 W
Max. current consumption with rated voltage with supply voltage 30 V	210 mA 170 mA
Protection against reversed terminal connection	yes (only when units with electrically isolated interfaces are connected to COM5/COM6)

1.6.3 Connection of serial interfaces COM3, COM4

Interface standard	EIA RS-232 or EIA RS-422 or EIA RS-485
Programming with 907 MK 92	via IBM-PC (or compatible)
Man-machine communication	yes, e.g. with an operating station
Electrical isolation	yes, interfaces with respect to each other and with respect to the rest of the unit (also see Figure 5)
Potential differences	So that no earthing potential differences arise between the 07 MK 92 and the peripheral units connected to COM3 and COM4, the latter are supplied from the switch-gear cabinet mains socket (also see earthing connections in Figure 5).
Terminal assignment and description of the interfaces COM3, COM4	see page 7 onwards

1.6.4 Connection of serial interfaces COM5, COM6

Interface standard	EIA RS-232
Man-machine communication	yes, e.g. with an operating station
Electrical isolation	none
Potential differences	see COM3, COM4
Terminal assignment and description of the interfaces COM5, COM6	see page 9 onwards

1.6.8 Ordering data

Communication module 07 MK 92 R1161

Order No. GJR5 2533 00 R1161

Scope of delivery

Communication module 07 MK 92 R1161
2 9-pole terminal blocks (5.08 mm grid)
1 5-pole terminal block (5.08 mm grid)
Cable including terminals for making the
earth connection

Further literature

System description Advant Controller 31, English

Order No. 1SAC 1316 99 R 0201

Software

Programming and test software 907 MK 92

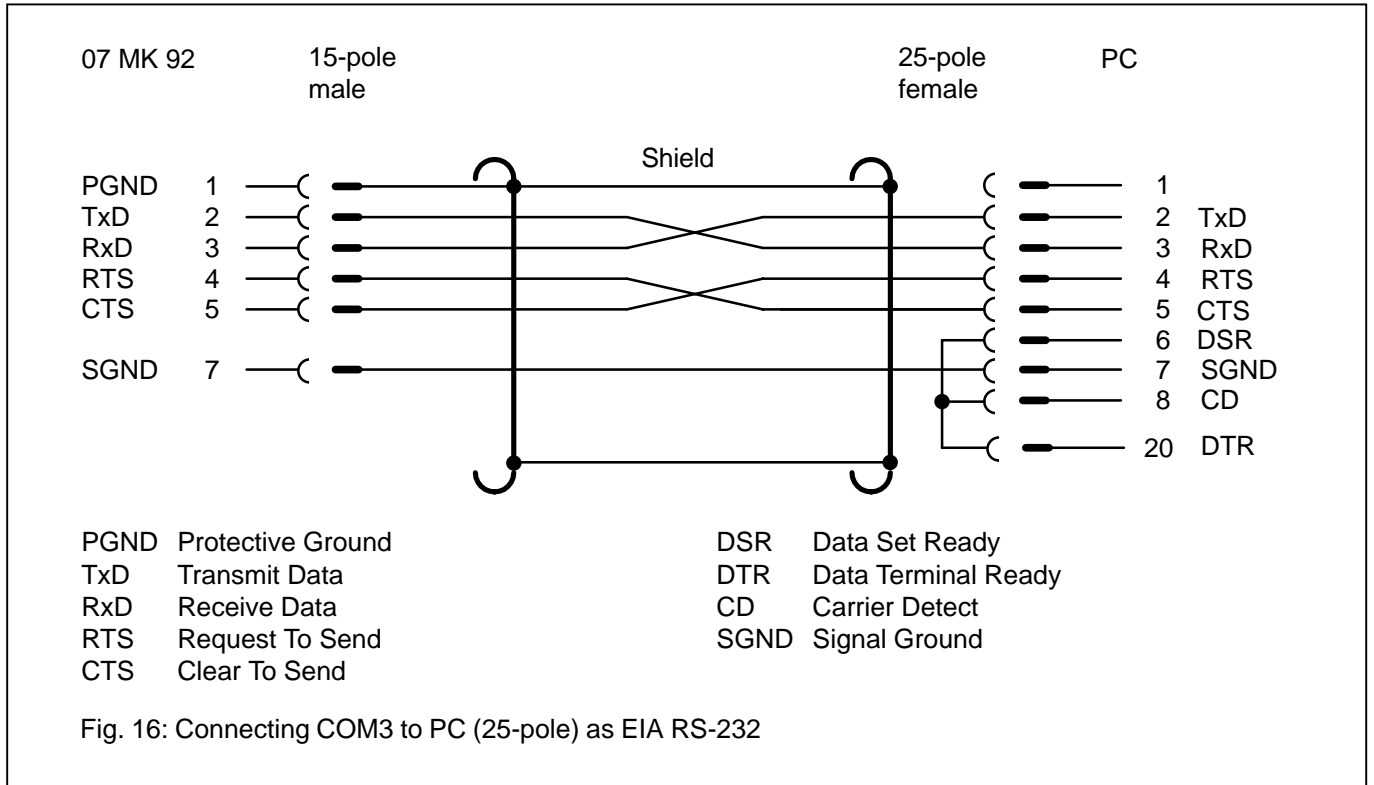
Order No. GJP5 2074 00 R0102

907 MK 92 consists of:

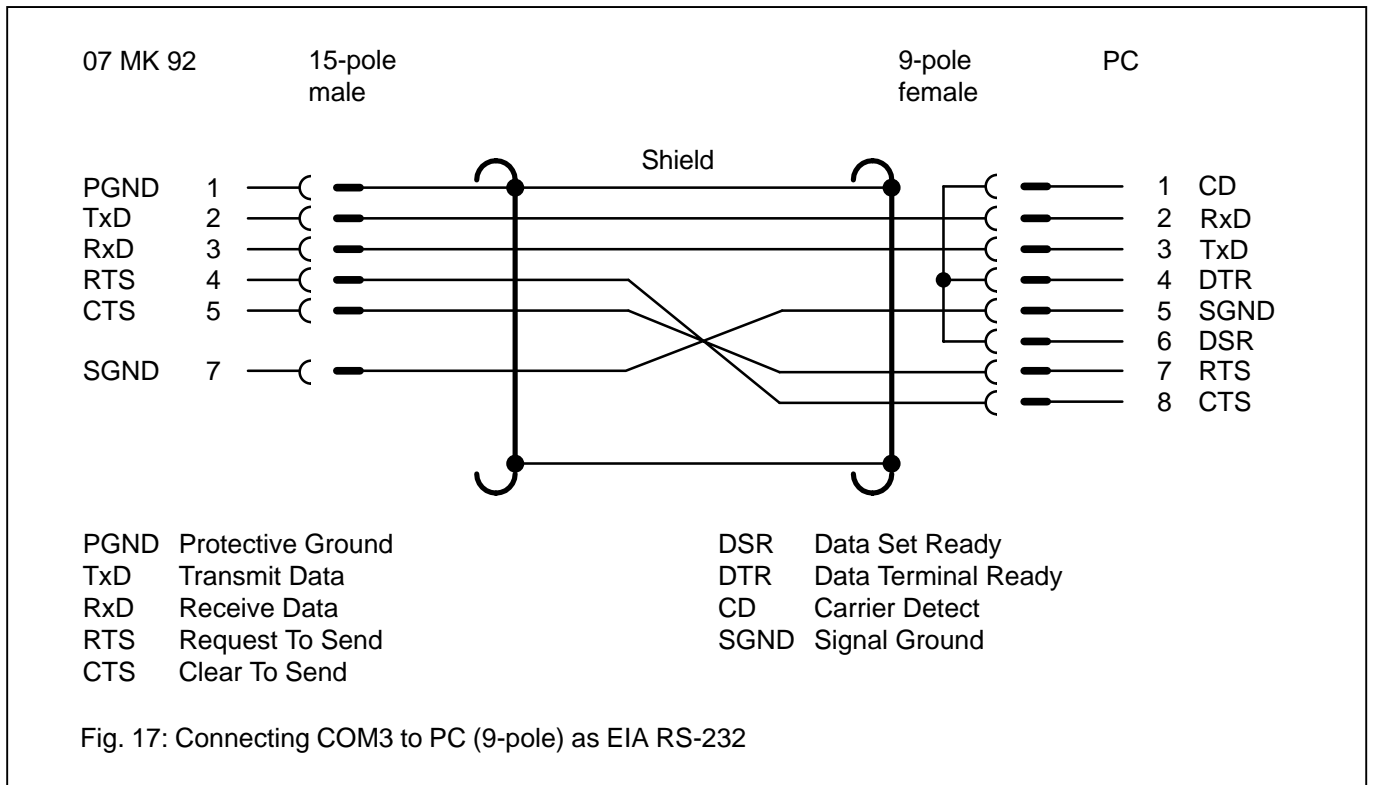
- Documentation
- Software
 - Basic functions for 07 MK 92 R1161
 - Paradigm Locate V 3.21

1.7 System cables

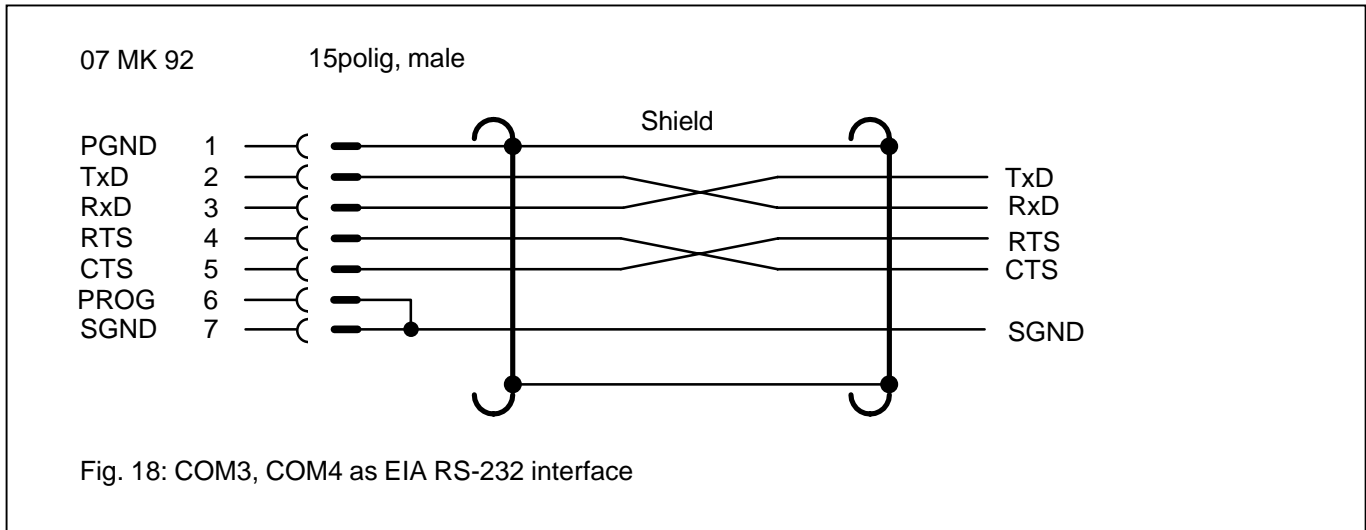
1.7.1 COM3 to PC (25-pole) for programming und test software 907 MK 92



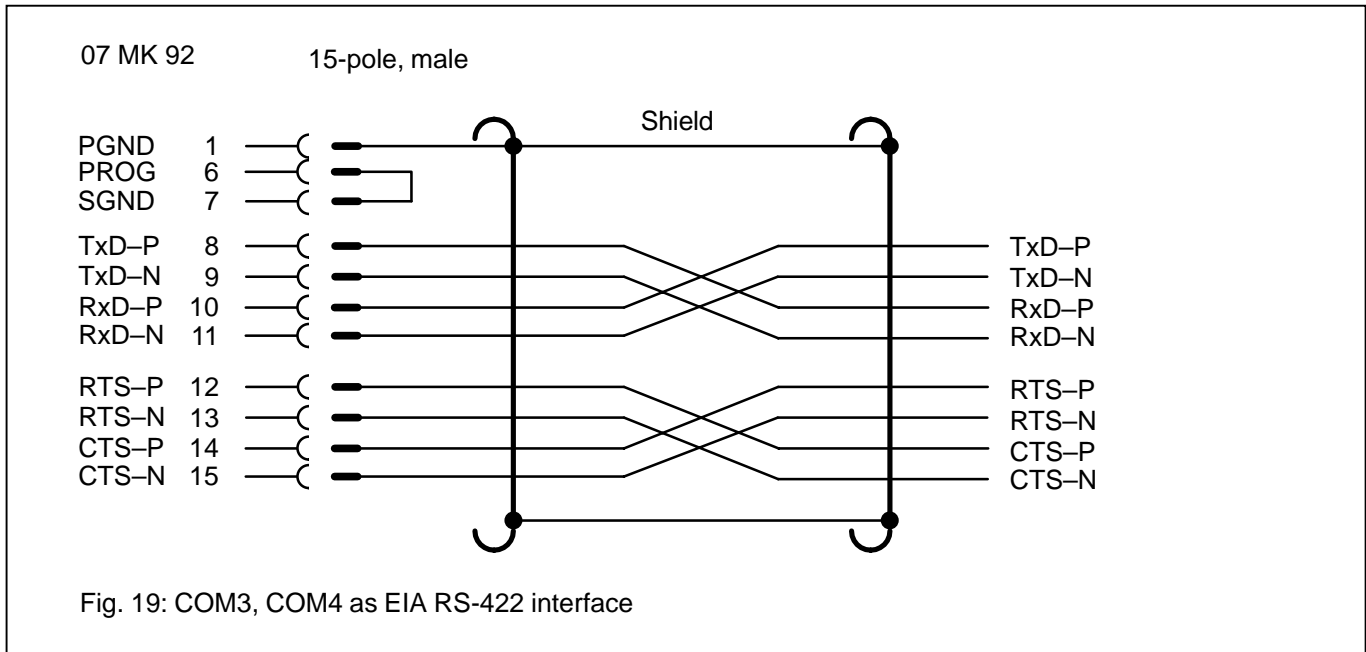
1.7.2 COM3 to PC (9-pole) for programming and test software 907 MK 92



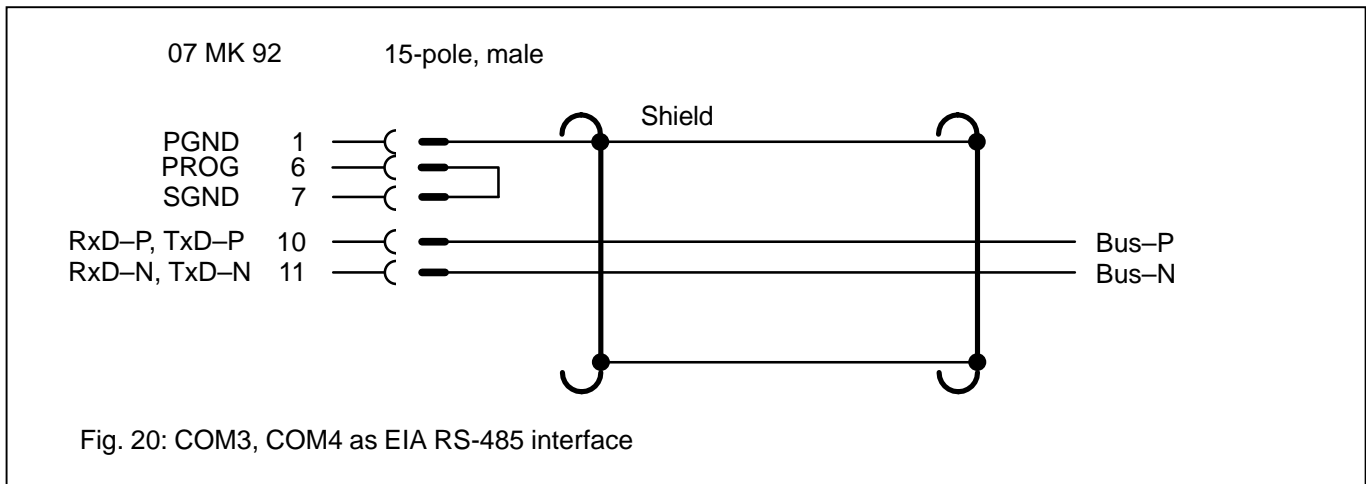
1.7.3 COM3, COM4 as EIA RS-232 interface



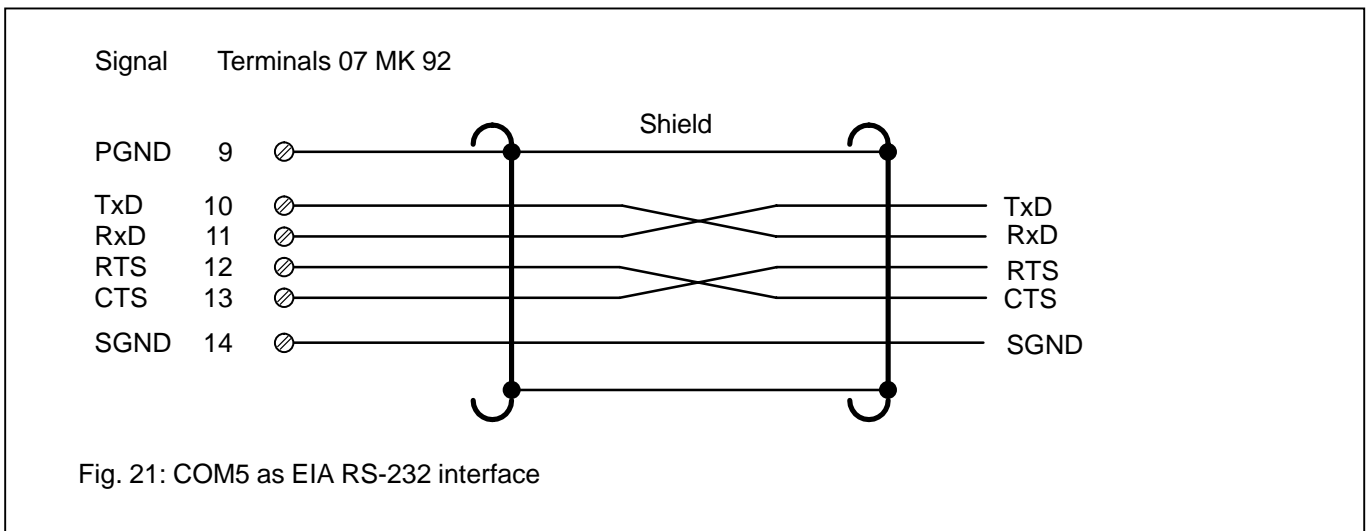
1.7.4 COM3, COM4 as EIA RS-422 interface



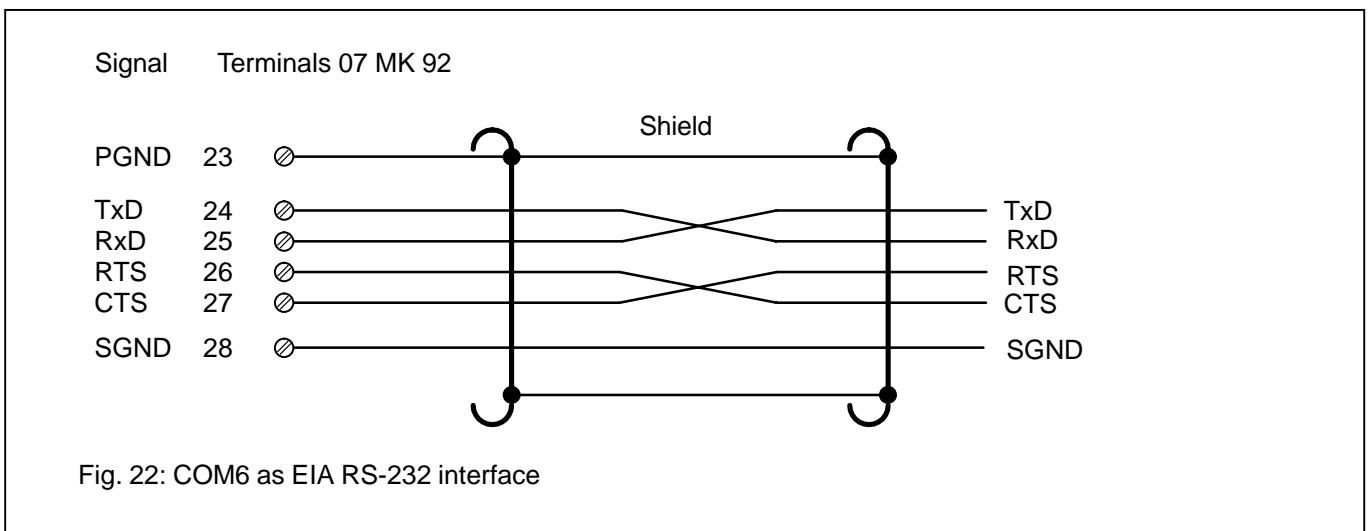
1.7.5 COM3, COM4 as EIA RS-485 interface



1.7.6 COM5 as EIA RS-232 interface



1.7.7 COM6 as EIA RS-232 interface



1.8 Memory areas in 07 MK 92

Used EPROM area	FFFFF (128 kB EPROM) FE000
Free EPROM area	FDFFF E0000
Not used	DFFFF C0000
Flash EPROM	BFFFF (128 kB) A0000
Not used	9FFFF 99000
LEDs	98FFF 98000
Not used	97FFF 90800
Dual Port RAM	907FF (2 kB) 90000
Not used	8FFFF 80000
Free RAM area	7FFFF (512 kB RAM) 00B00
Used RAM area	00AFF 00000

1.9 LED control

Addressing:	Segment:	9800	
	Offset:	0	LED1
		1	LED2
		2	LED3
		3	LED4
		4	LED RUN
(Flash programming voltage		5	EEPROM - Vpp)
		6	LED ERR

1.10 Allocation of the ports

Port P2PIN	Bit 5	RUN / STOP (1 = STOP, 0 = RUN)
Port P2PIN	Bit 6	Status of pin 6 at COM3
Port P2PIN	Bit 7	Status of pin 6 at COM4
Port P1LTCH	Bit 5	Control of RTS COM3
Port P1LTCH	Bit 7	RS-485 change-over COM3
Port P1LTCH	Bit 3	Control of RTS COM4
Port P1LTCH	Bit 6	RS-485 change-over COM4

The addresses of the ports are listed in the file MK92HW.H

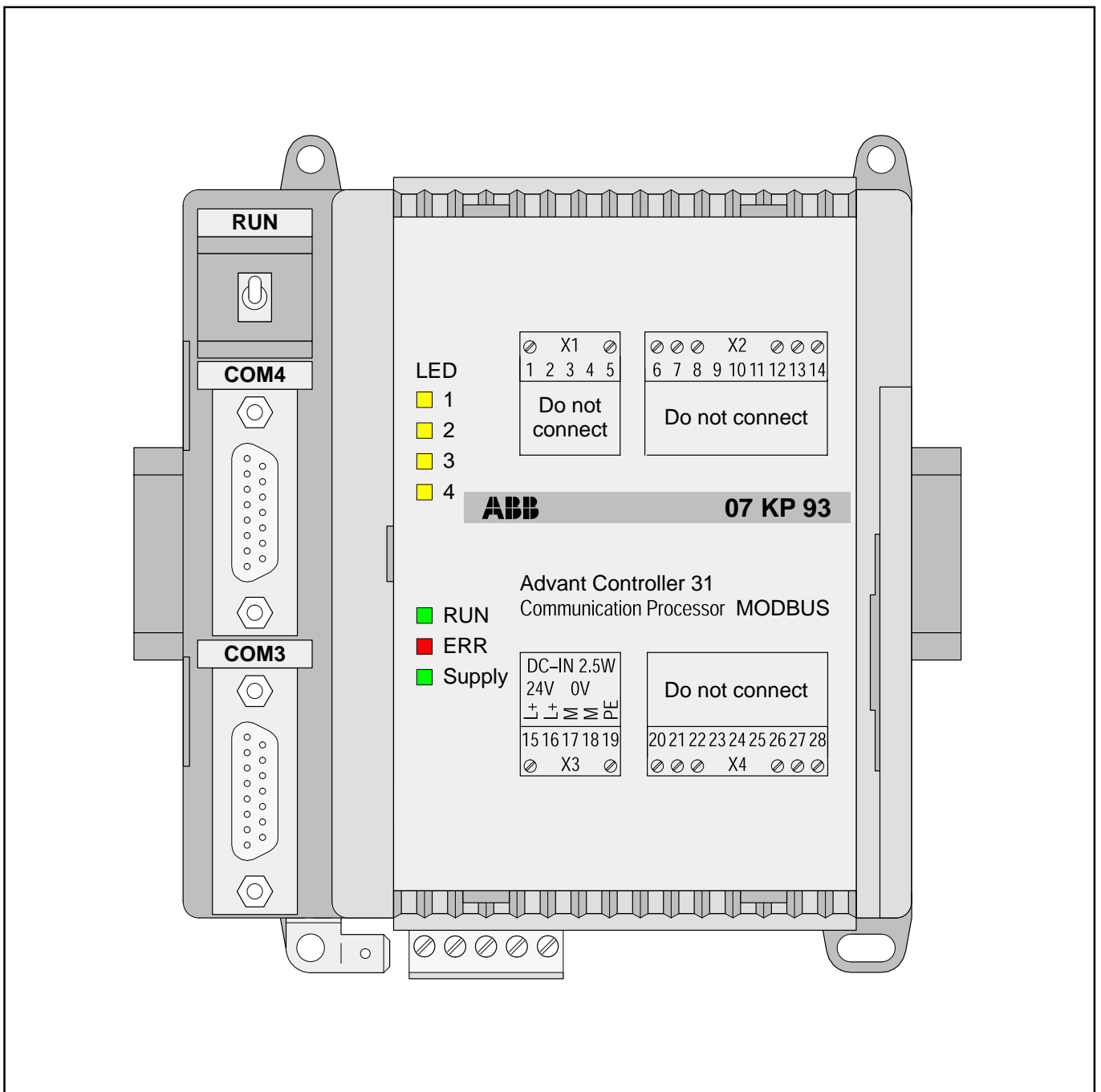


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1 Communication processor 07 KP 93 R1161

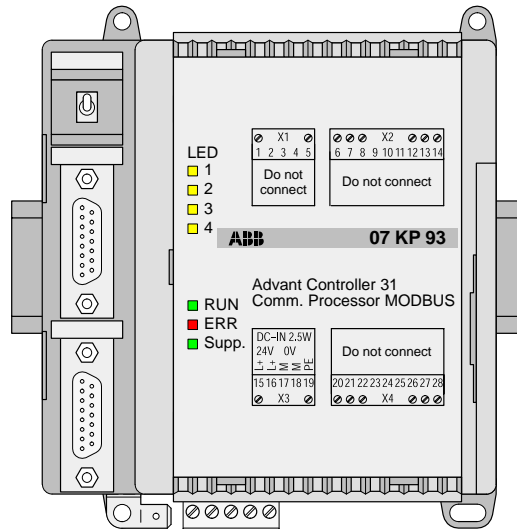


Fig. 1: Communication processor 07 KP 93 R1161

Contents

1.1	Brief description	1
1.2	Structure of the front panel elements	2
1.3	Electrical connection	2
1.3.1	Application example	3
1.3.2	Connecting the supply voltage	4
1.3.3	Electrical isolation and earthing instructions	4
1.3.4	Serial interfaces	6
1.3.5	Networking interface	7
1.4	Diagnosis	8
1.5	Technical data	9
1.6	System cables	12
1.7	MODBUS RTU	13
1.8	MODBUS protocol	16
1.9	Function blocks	18

1.1 Brief description

The 07 KP 93 communication processor is an interface module with 2 serial MODBUS RTU interfaces.

The communication processor allows external units to be connected to the Advant Controller 31 system using the MODBUS RTU protocol.

The most important features of the communication processor are:

- 2 serial interfaces:
usable in accordance with EIA RS-232 or EIA RS-485 (COM3, COM4)

Possible operating modes:

COM3	COM4	
Master	Slave	(Master-master does not work)
Slave	Master	
Slave	Slave	

- Communication with AC 31 basic units is performed with 2 function blocks / connection elements (see also programming software 907 KP 93).

Contact person

If you have any questions concerning the use of MODBUS, please ask our helpline:

ABB Schalt- und Steuerungstechnik GmbH
SST/MPE
Eppelheimer Straße 82
D-69123 Heidelberg

Telephon: +49 6221 777-444
Telefax: +49 6221 777-361
EMail: desst.helpline@de.abb.com
Internet: http://www.abb-sst.de

1.2 Structure of the front panel

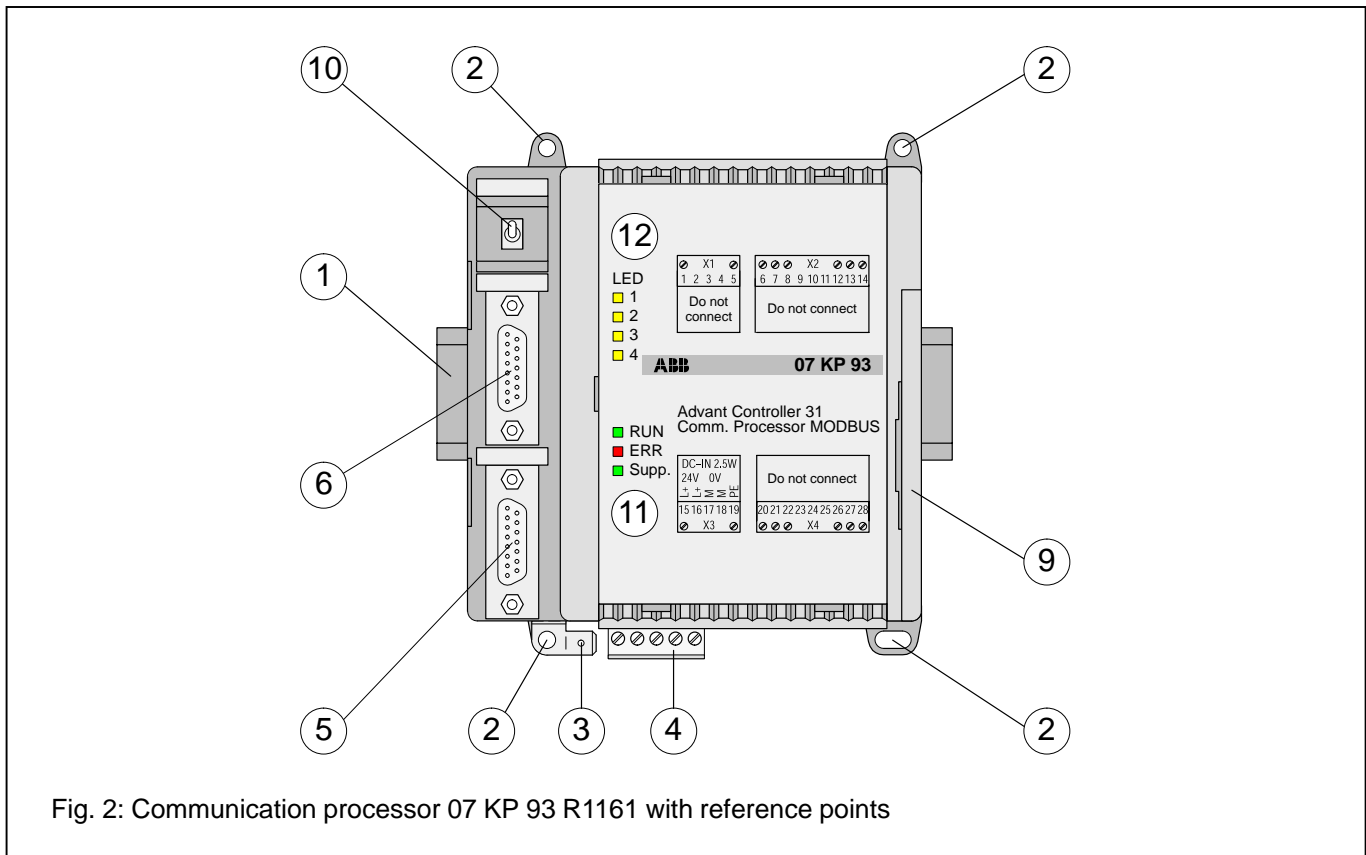


Fig. 2: Communication processor 07 KP 93 R1161 with reference points

1 Mounting the unit on a DIN rail

2 Mounting the unit with screws

3 6.3 mm Faston earthing terminal

4 24 V DC supply voltage

5 Serial interface COM3

6 Serial interface COM4

9 Networking interface for the Advant Controller 31 basic unit

10 Switch not used

11 LED displays for system messages

Refer to chapter 1.4 Diagnosis for further information

12 LED displays for system messages

Refer to chapter 1.4 Diagnosis for further information

12

yellow

yellow

yellow

yellow

11

green

red

green

LED1

LED2

LED3

LED4

RUN

ERR

Supply

1.3 Electrical connection

1.3.1 Application example

The following illustration shows an application example with the 07 KT 94 basic unit.

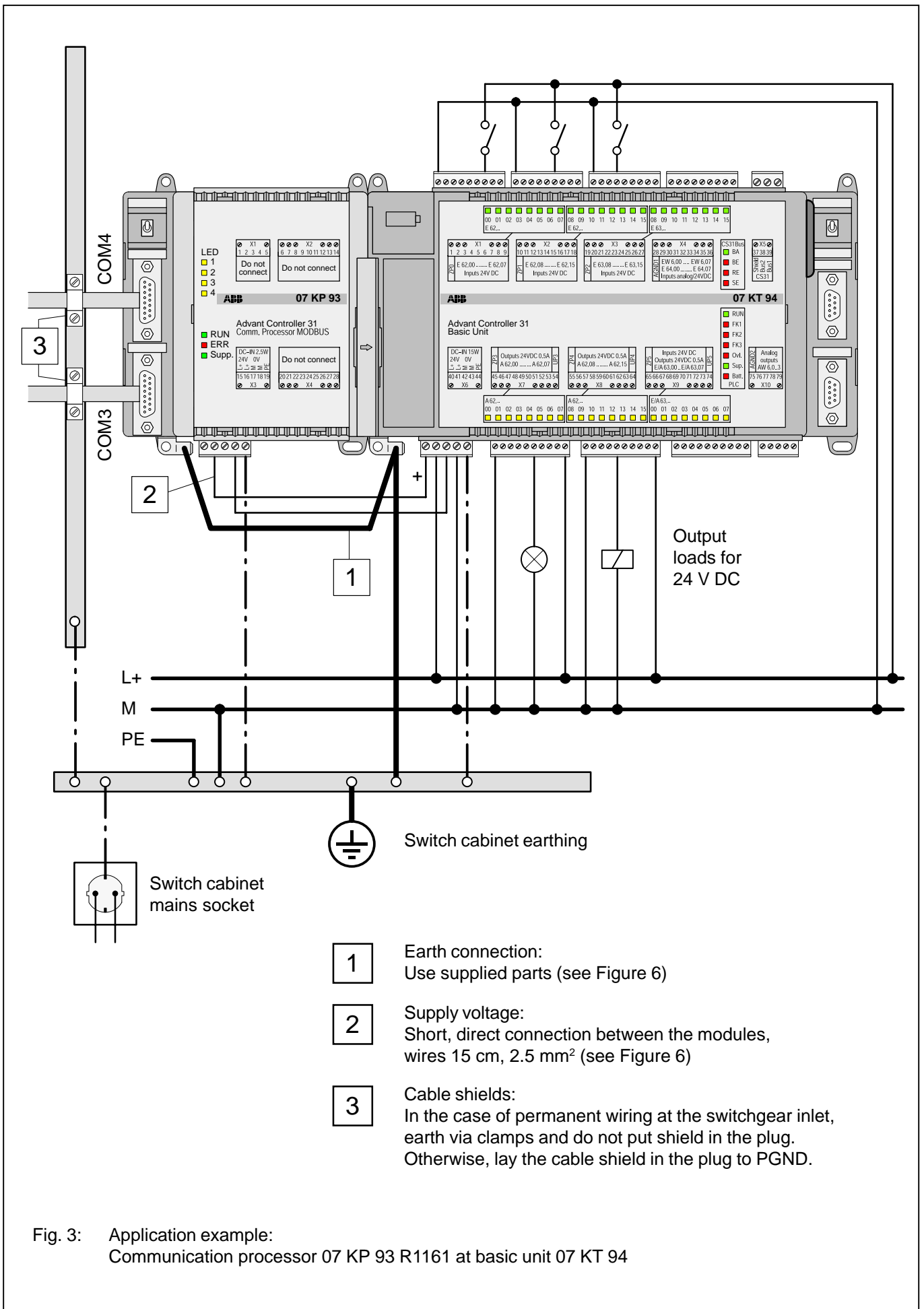


Fig. 3: Application example:
Communication processor 07 KP 93 R1161 at basic unit 07 KT 94

1.3.2 Connecting the 24 V DC supply voltage

The supply voltage is fed in via a 5-pole detachable terminal block.

Important:

Plug and unplug terminal block only with power is off!

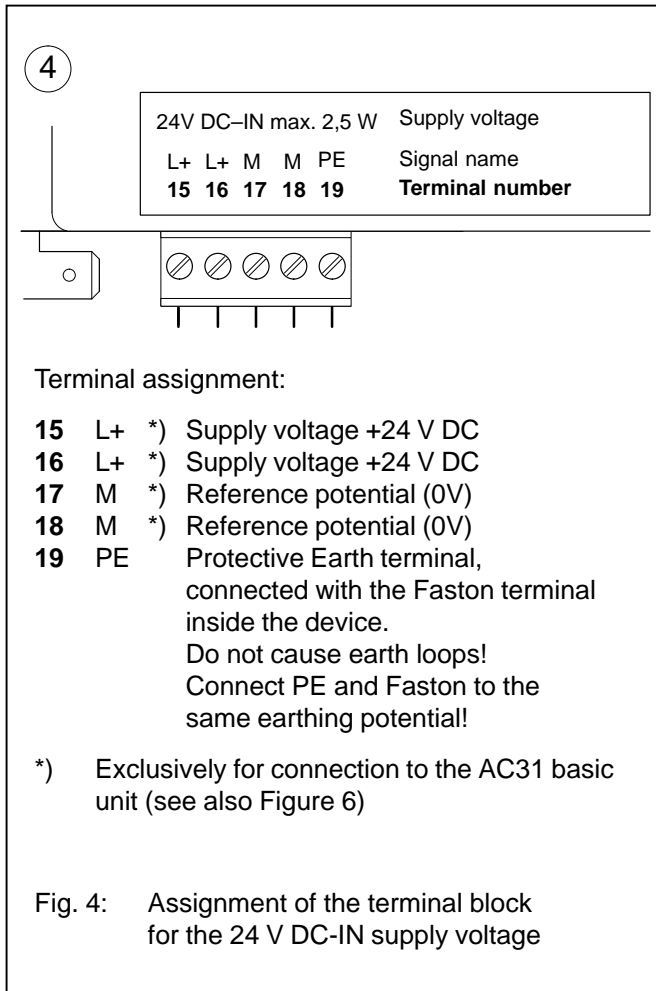


Fig. 4: Assignment of the terminal block for the 24 V DC-IN supply voltage

1.3.3 Electrical isolation and notes on earthing

The Protective Earth is connected to the 6.3 mm Faston terminal via a wire with a cross section of 6 mm² (maximum length 25 cm).

The signals of the interfaces COM3 and COM4 are electrically isolated from each other and also from the internal electronics of the unit.

The following illustration shows which parts of the unit are connected to PE/PGND.

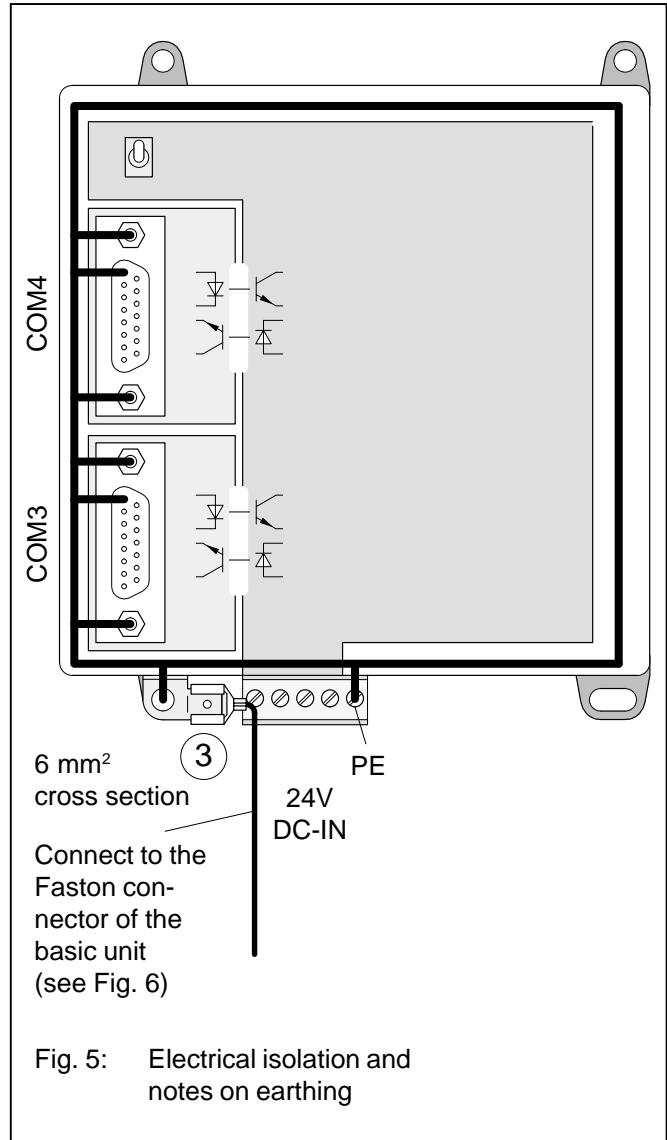
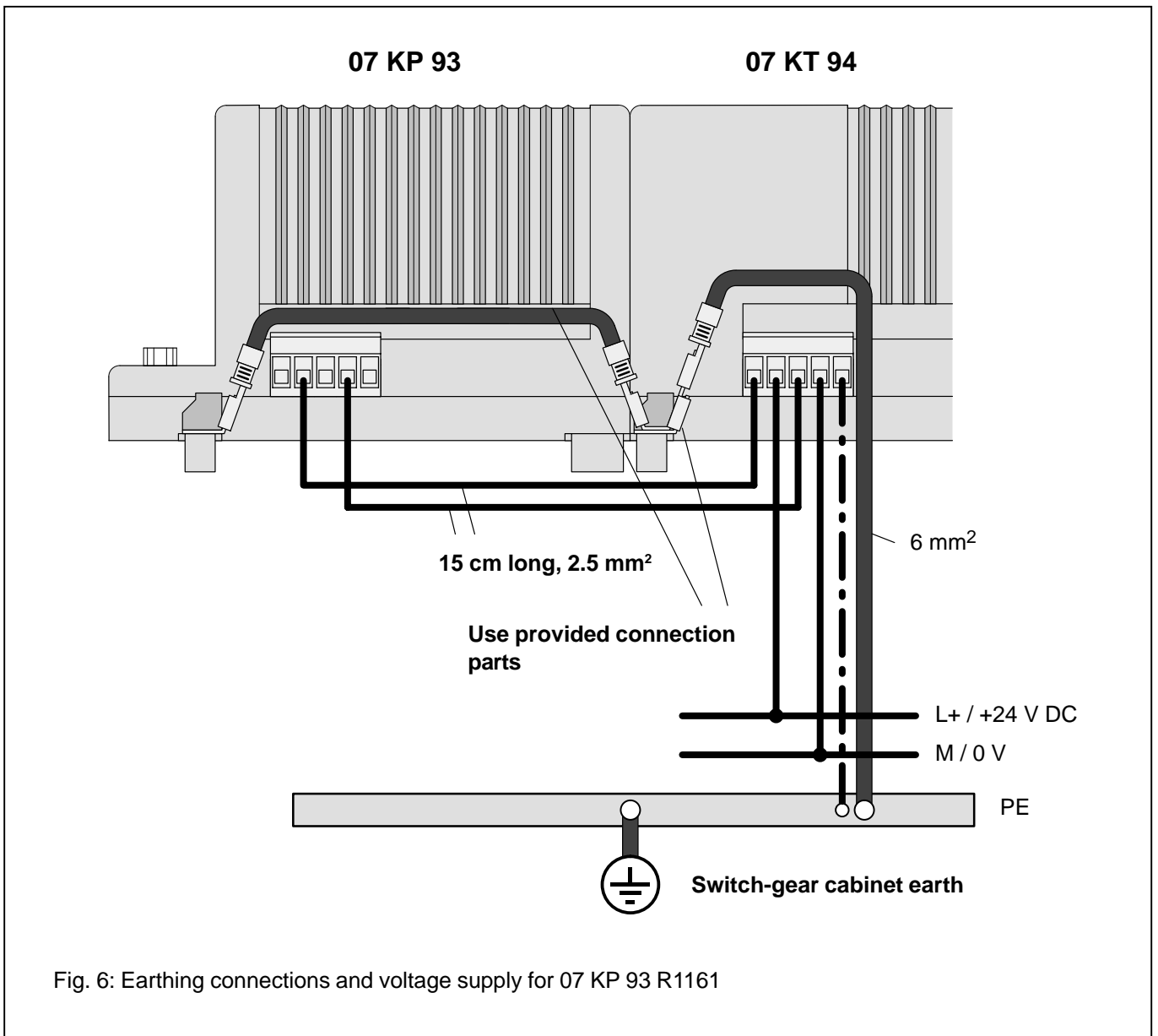
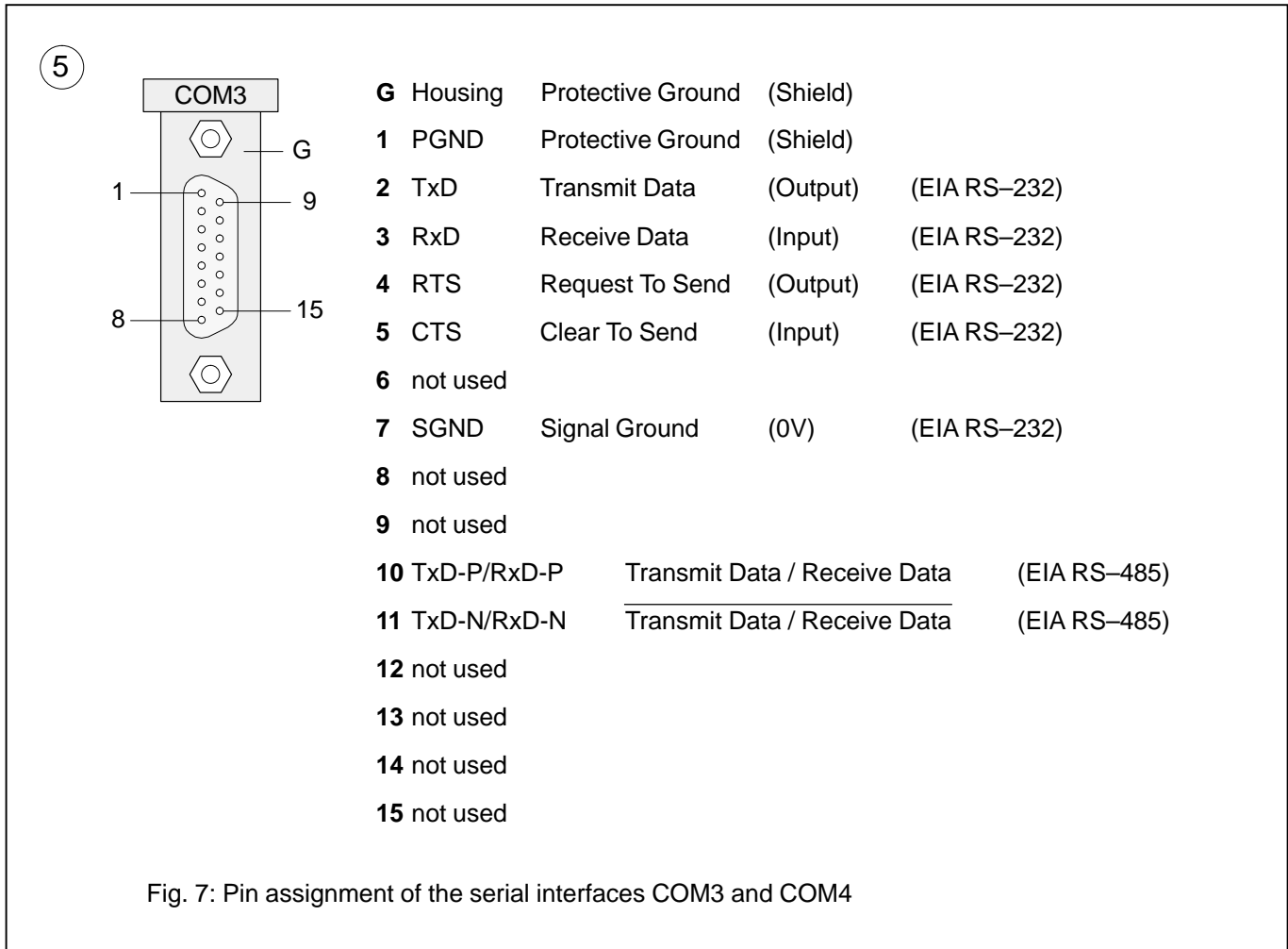


Fig. 5: Electrical isolation and notes on earthing



1.3.4 Serial interfaces COM3 and COM4: Pin assignment

Interface standard: EIA RS-232, EIA RS-422, EIA RS-485



1.3.5 Networking interface 9

The communication processor can be connected to AC31 basic units of the 90 series which have a networking interface. The housing of the communication processor is

connected to the housing of the AC31 basic unit by a snap-fit connection. The electrical connection is via a 40-pole ribbon cable with socket connector, soldered onto the 07 KP 93 side.

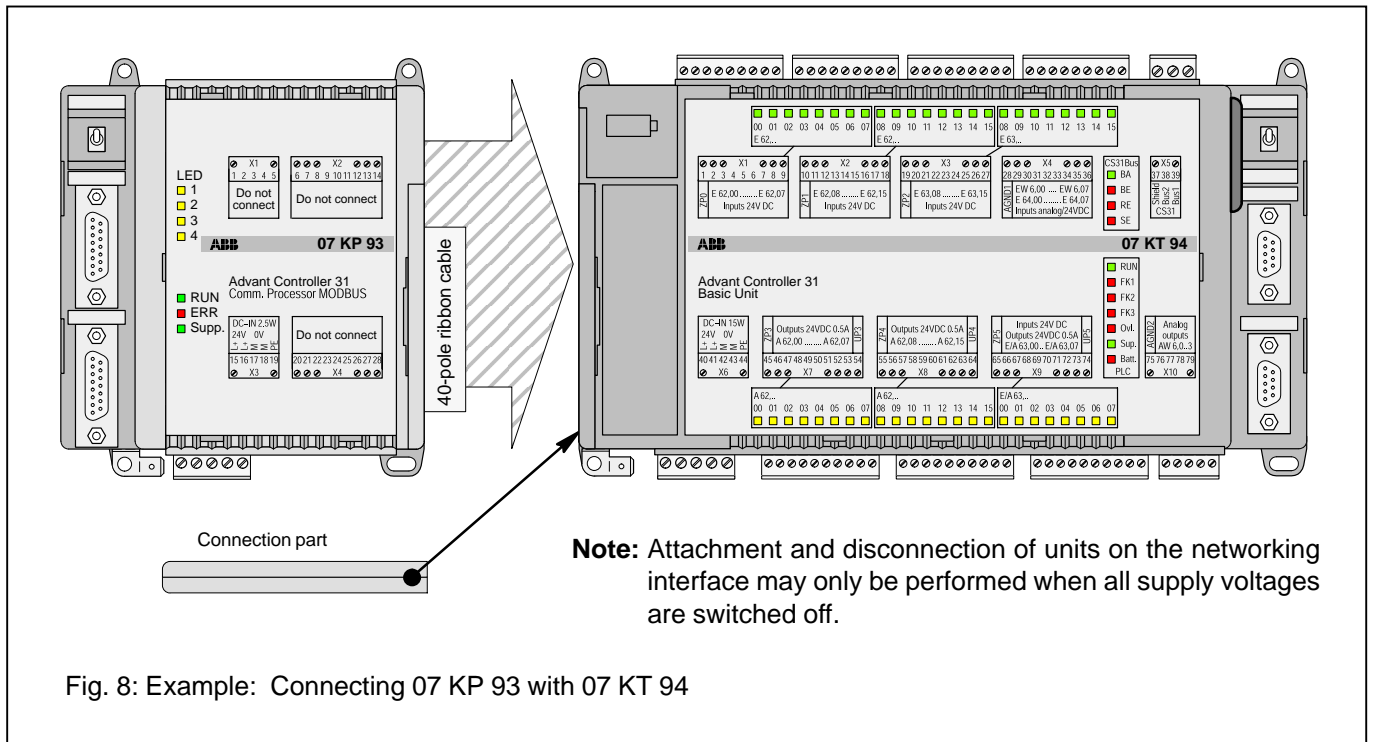


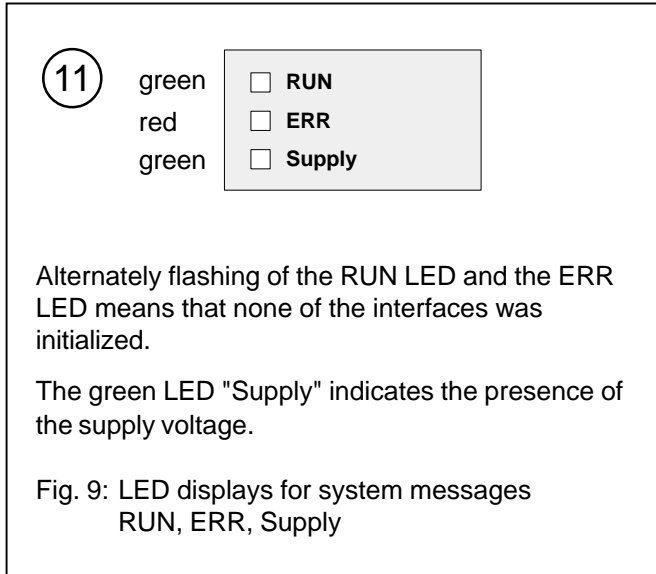
Fig. 8: Example: Connecting 07 KP 93 with 07 KT 94

Mounting the expansion housing

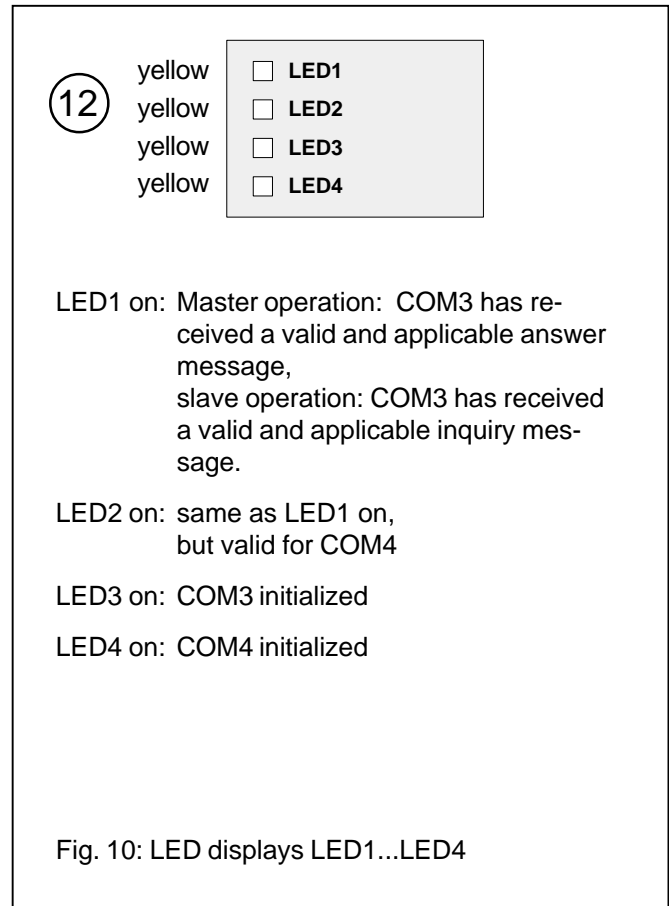
1. Detach the cover on unit 07 KT 94 from the networking interface.
2. Plug the socket strip of the 40-pole ribbon cable secured to the 07 KP 93 onto the networking connector of the 07 KT 94.
3. Place both units on a level surface and slide them together so that they engage.
4. Slide in the connection part to fix the housing in position.

1.4 Diagnosis

LED displays for system messages RUN, ERR, Supply



LED displays LED1...LED4



1.5 Technical data

In general, the details in section 1 "System data and system structure" of volume 2 of the system description "Advant Controller 31" apply as technical data. Supplementary and deviating data is listed below.

1.5.1 General data

Number of serial interfaces	2
Number of parallel interfaces	1 networking interface for connecting to the Advant Controller 31 basic unit
Diagnosis	4 LEDs: LED1...LED4
Operating and error displays	3 LEDs: RUN, ERR, Supply
Conductor cross section for the removable terminal blocks	max. 2.5 mm ²

1.5.2 Supply voltage for 07 KP 93 R1161

Rated supply voltage	24 V DC
Power dissipation	typ. 2.5 W (max. 5W)
Max. current consumption with rated voltage	210 mA
with supply voltage 30 V	170 mA
Protection against reversed terminal connection	yes

1.5.3 Connection serial interface COM3, COM4

Interface standard	EIA RS-232 or EIA RS-485
Electrical isolation	yes, interfaces with respect to each other and with respect to the rest of the unit (also see Figure 5)
Terminal assignment and description of the interfaces COM3, COM4	see page 6

1.5.4 LED displays

– Supply	1 green LED
– ERR	1 red LED
– RUN	1 green LED
– LED1...LED4	4 yellow LEDs

description see chapter 1.4 Diagnosis

1.5.5 Mechanical data

Mounting on DIN rail

in accordance with DIN EN 50022–35, 15 mm deep. The DIN rail is located in the middle between the upper and the lower edges of the module.

Fastening by screws

using 4 M4 screws.

Width x height x depth

140 x 120 x 85 mm

Wiring method

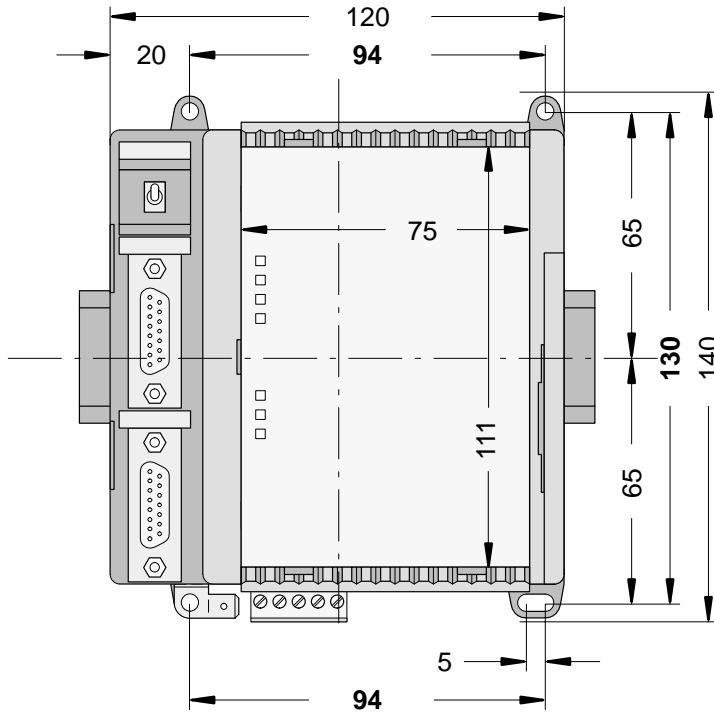
by removeable terminal blocks with screw-type terminals, max. 2.5 mm²

Weight

450 g

Dimensions for mounting

see the following drawing



All dimensions in mm.

The device is 85 mm deep. The interface connectors COM3 and COM4 are set deeper so that the mounting depth required does not become any larger even with detachable interface cables. If, however, a DIN rail is used, the mounting depth is increased by the overall depth of the rail.

Fig. 11: Dimensions of the communication processor module 07 KP 93, front view, **the dimensions for assembly bore holes are printed in bold**

1.5.6 Mounting hints

Mounting position

vertical, terminals above and below

Cooling

The natural convection cooling must not hindered by cable ducts or other material mounted in the switch-gear cabinet.

1.5.7 Ordering data

Communication processor

07 KP 93 R1161 Order No. GJR5 2532 00 R1161

Scope of delivery

Communication processor 07 KP 93 R1161
1 5-pole terminal block (5.08 mm grid),
cable including terminals for making the
earth connection

Further literature

System description Advant Controller 31, English

Order No. 1SAC 1316 99 R0201

System description ABB Procontic T200

Order No. GATS 1314 99 R2001

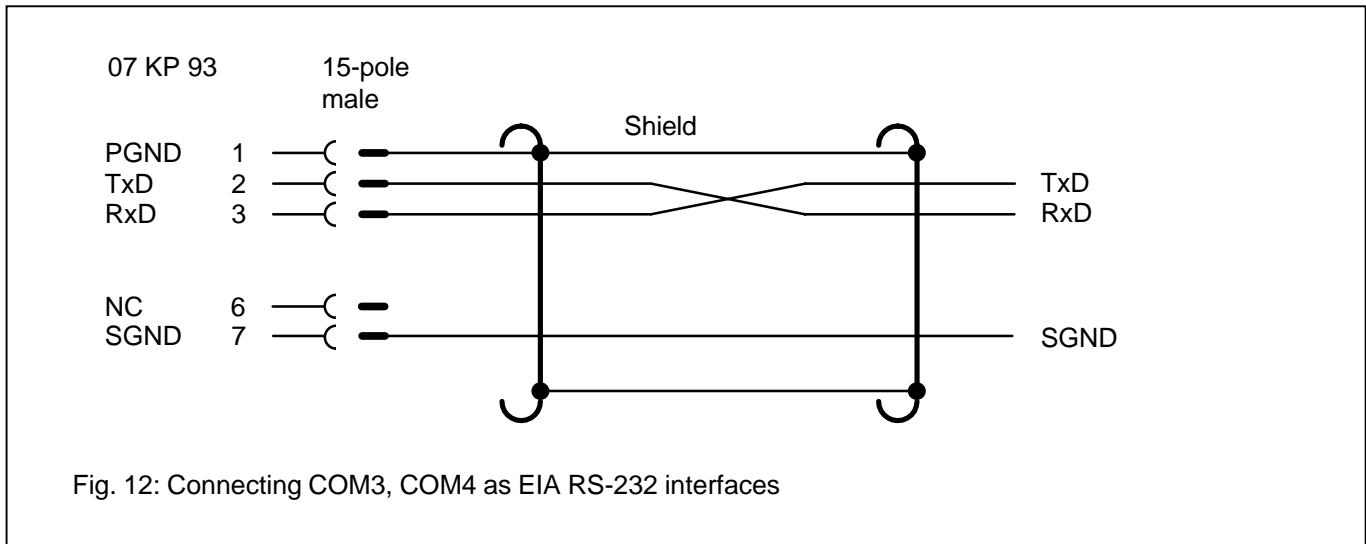
Software

Software 907 KP 93

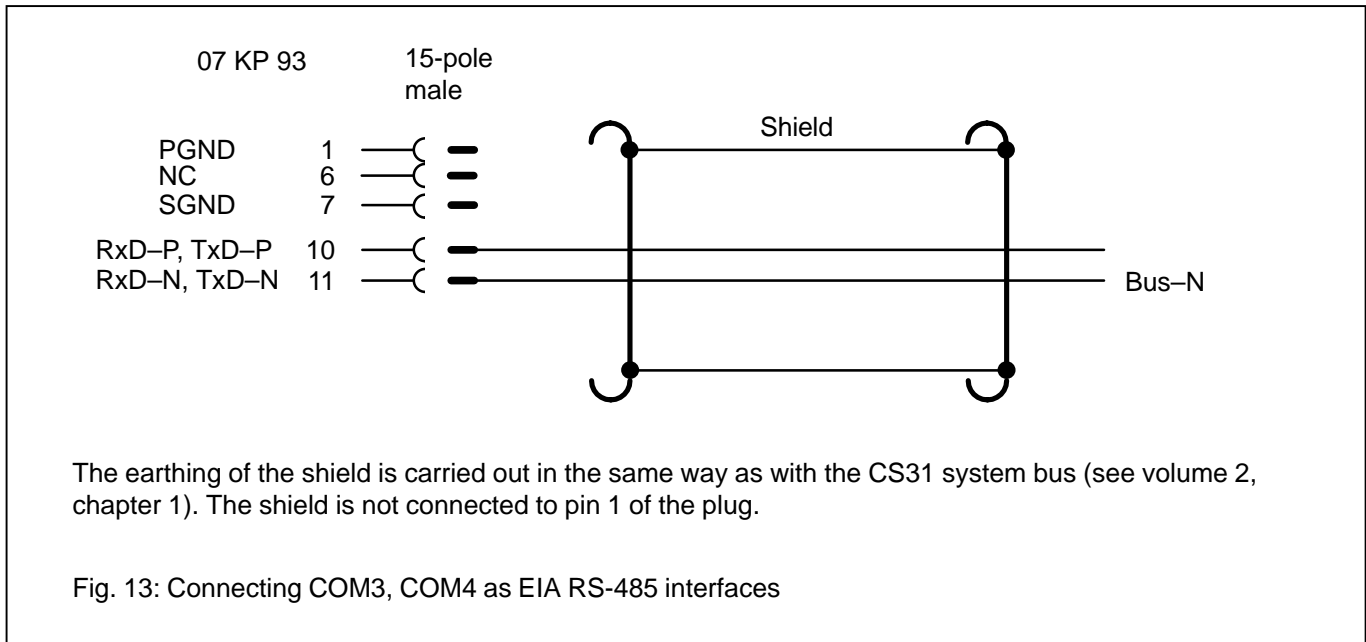
Order No. GJP5 2072 00 R0102

1.6 System cables

1.6.1 COM3, COM4 as EIA RS-232 interfaces



1.6.2 COM3, COM4 as EIA RS-485 interfaces



1.7 MODBUS-RTU

Overview

Brief description, field of application

MODBUS-RTU is an international widely known standard. The main application is the coupling in the local area for:

- Automation systems and PLCs,

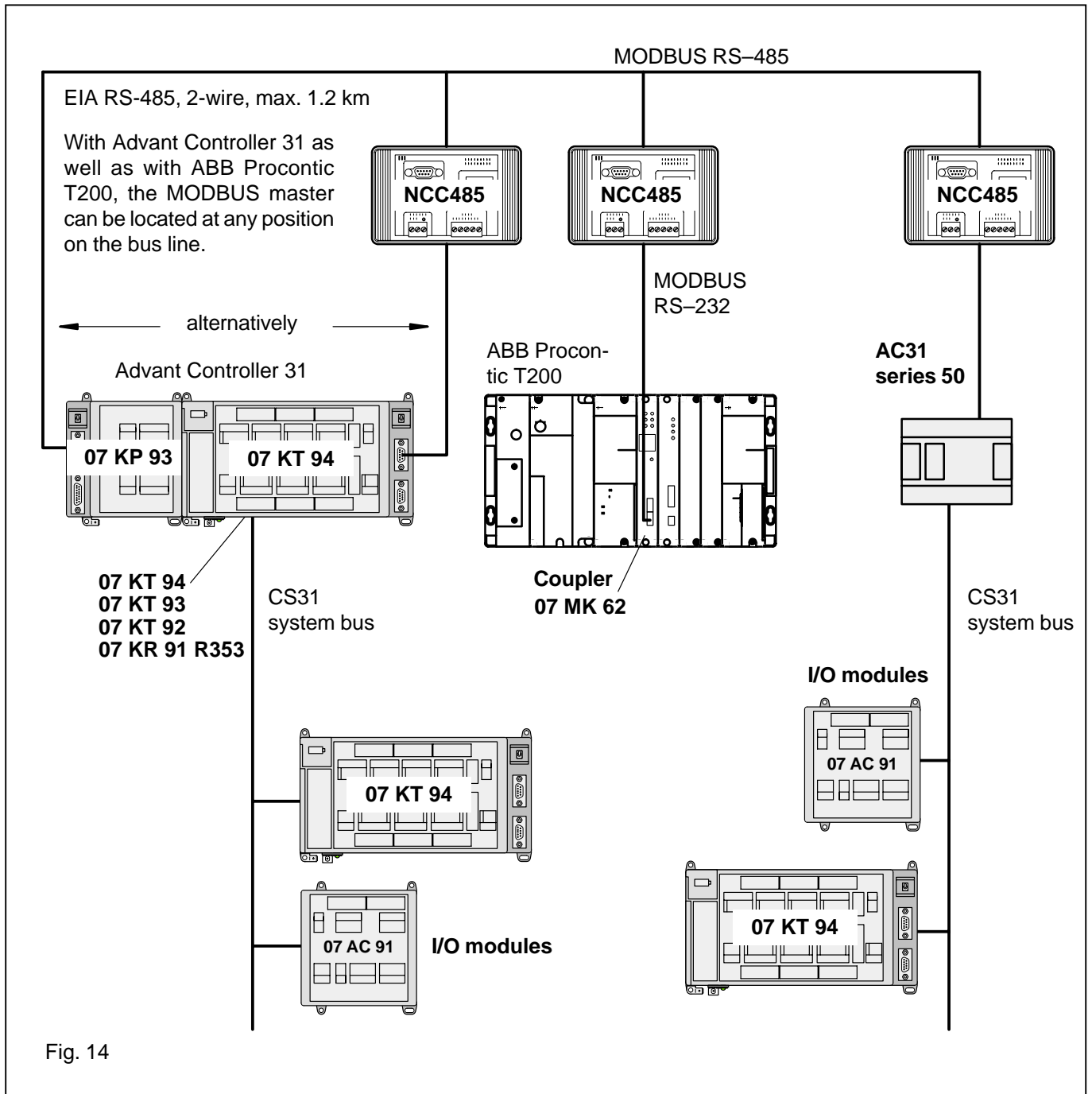
- Operating terminals
- PC operating stations / master terminals

Short data

- Number of user stations with EIA RS-485: 32
- Distance with EIA RS-485: max. 1.2 km
- Connection of dedicated-line modems is possible

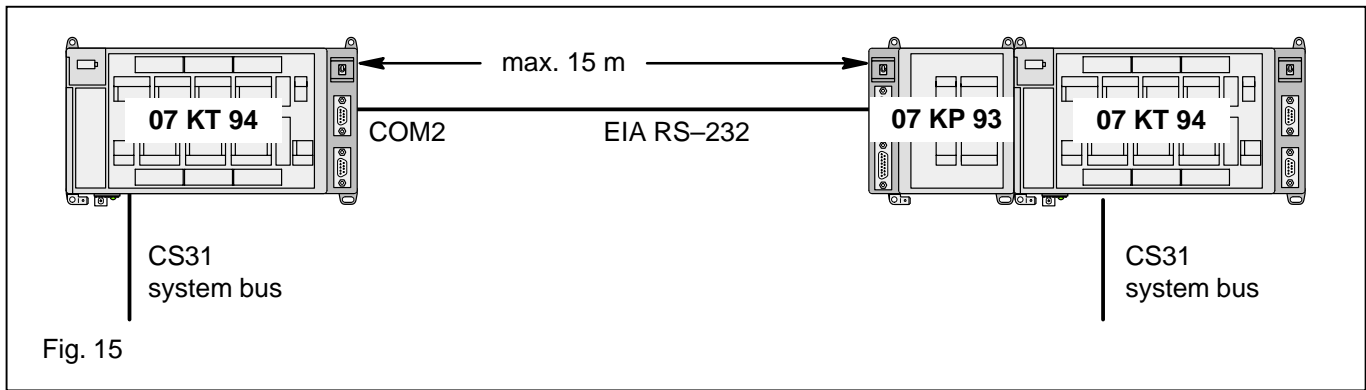
Networking alternatives

Multi-point line up to 1.2 km

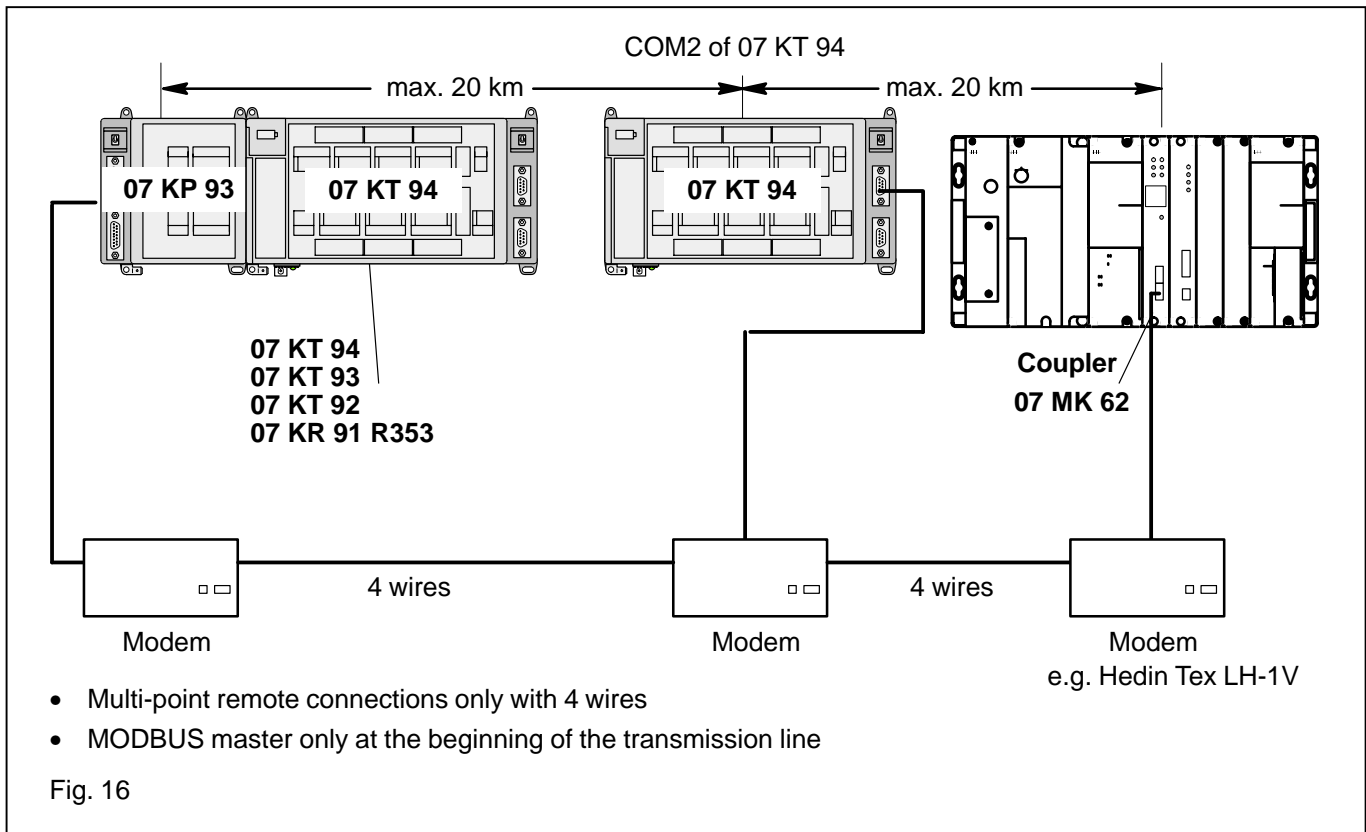


Installation example

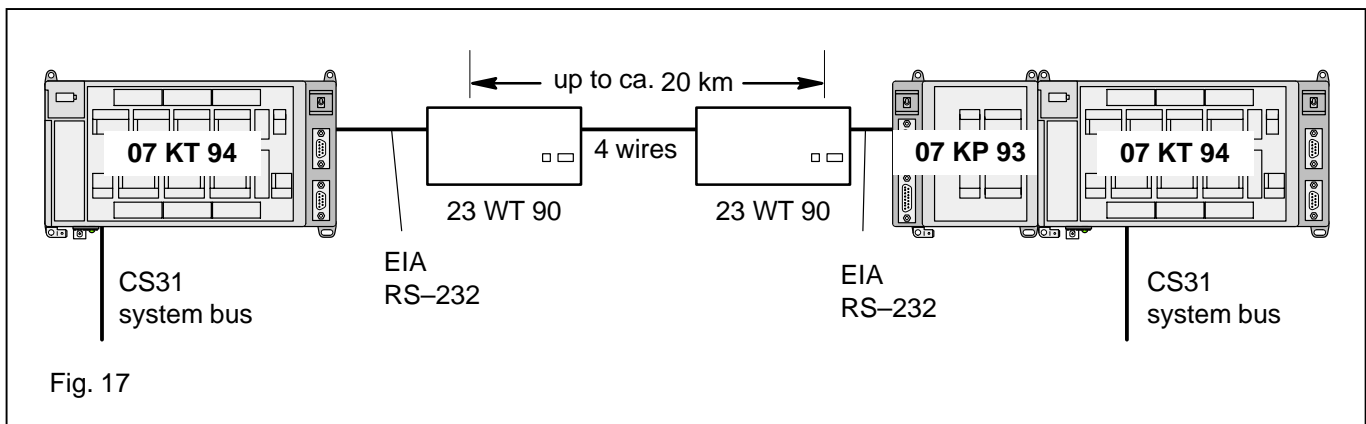
Point-to-point without converter



Multi-point line

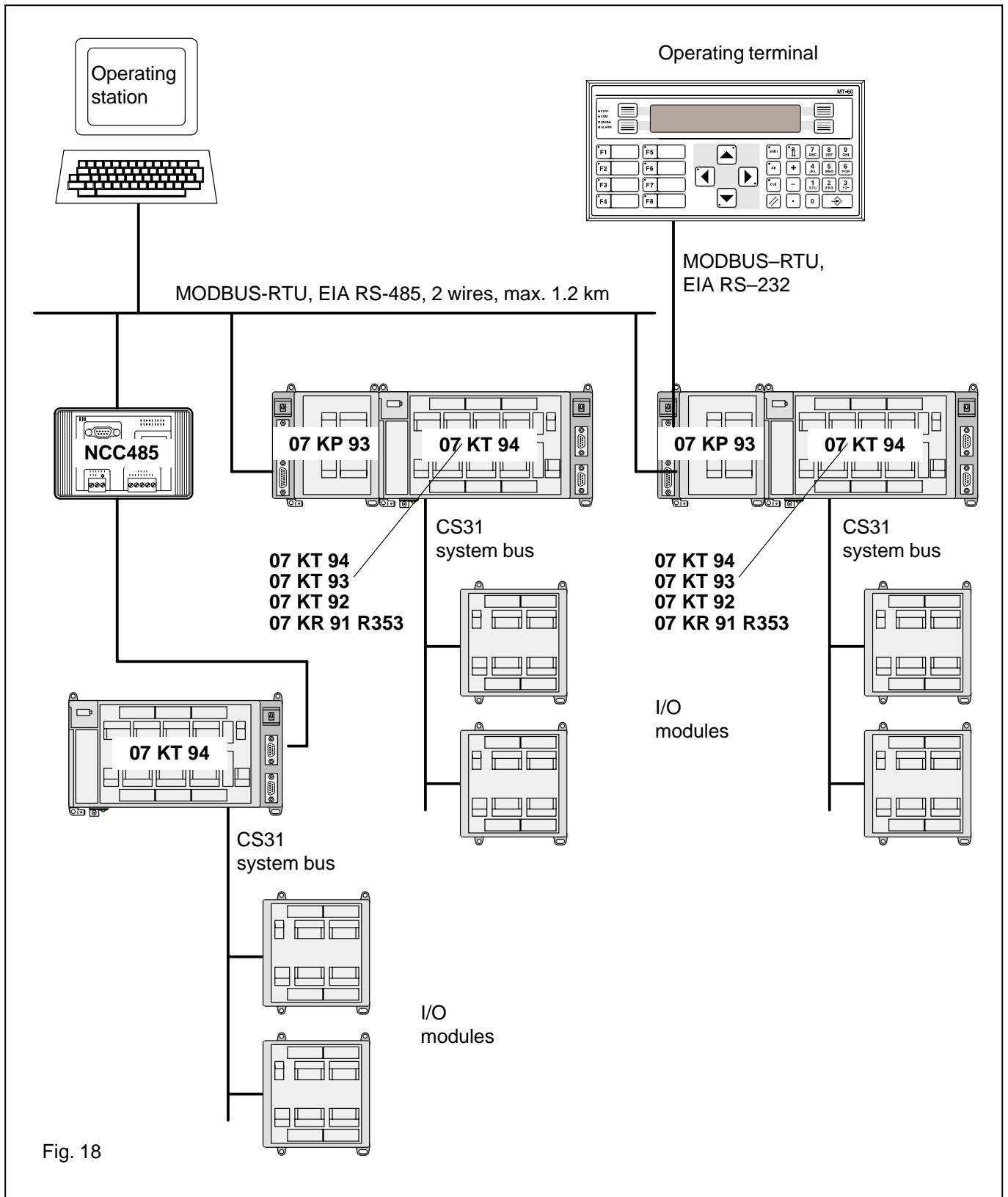


Point-to-point, max. 1200 bits/s, 4 wires



Separate connection of an operating terminal and an operating station via MODBUS

Use is made of the fact that the coupler 07 KP 93 R1161 has 2 MODBUS interfaces when used as slave (only as slave)





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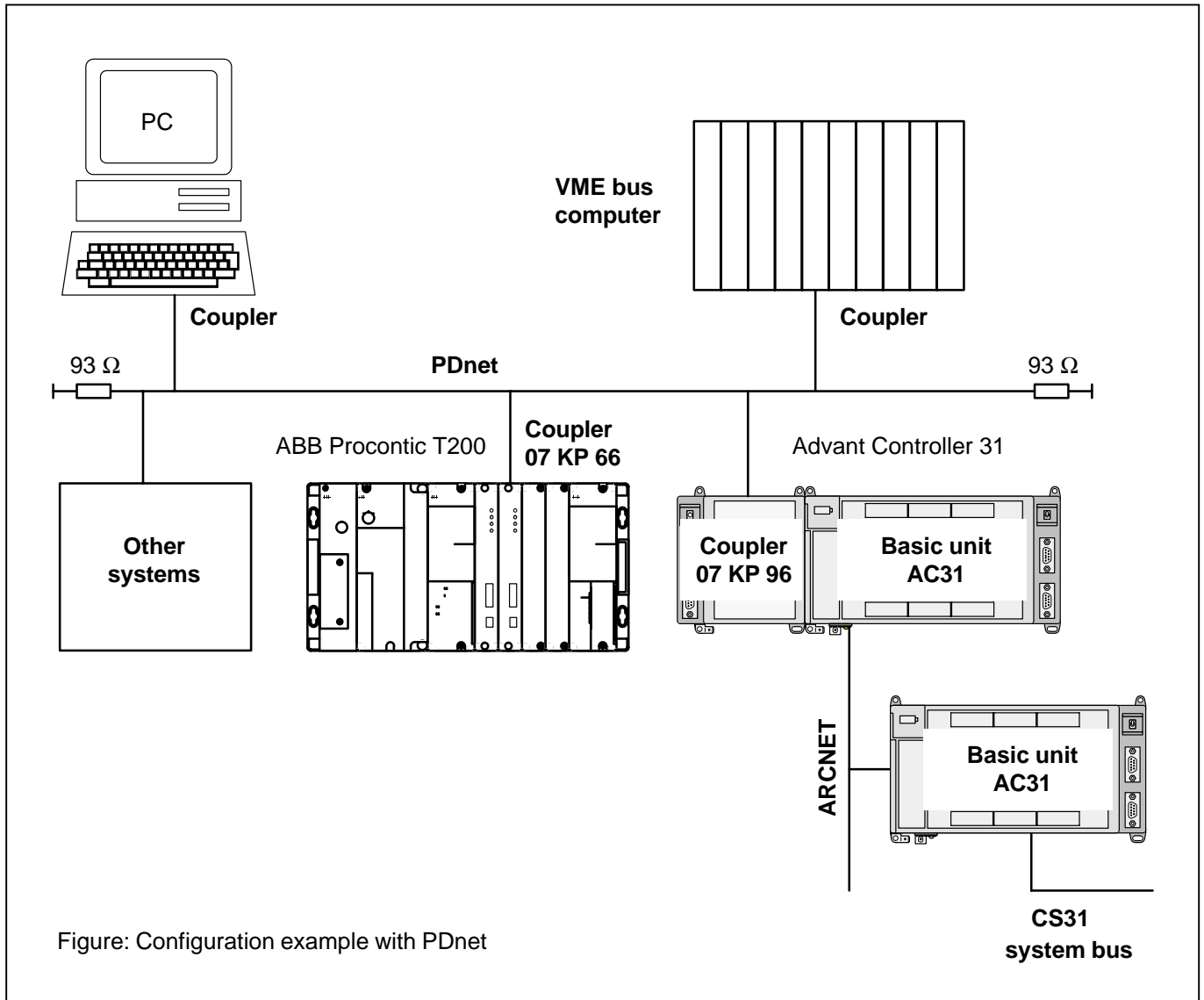
ABB Schalt- und Steuerungstechnik GmbH
Eppelheimer Straße 82 Postfach 10 50 09
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Higher-level fast networking with PDnet for Advant Controller 31 and ABB Procontic T200

Used couplers 07 KP 66 (T200) and 07 KP 96 (AC31)



Brief description, field of application

PDnet is a higher-level fast networking (LAN = Local Area Network) of

- T200 and AC31 with one another
- T200 and AC31 with other systems
- T200 and AC31 with PCs

The powerful software planning aid NetPro with comfortable desktop allows you to easily create connections even to other systems.

The connection to PDnet is carried out via a separate coupler. Concerning the AC31 basic units 07 KT 92, 07 KT 93 and 07 KT 94, the advantage is that the ARCNET-SST networking can be employed at the same time.

PDnet is based on ARCNET. Complex networking (line or star configuration etc., single or with redundancy) can be built using coaxial cable or optical fibre.

Short data

- Very short access times due to high data rate of 2.5 Mbit/s.
- Bus length up to ca. 300 m, using repeaters/couplers for star configuration up to ca. 6 km.
- Token master, without repeater up to ca. 10 participants, with repeaters and couplers in star configuration up to 255 participants.

Hardware

- Coupler for T200 07 KP 66
- Coupler for AC31 07 KP 96
- Coupler for PC 07 CM 96
- Various coupler for other systems

Software

- Configuration software NetPro
- Diagnosis software NetDiag
- Software package
(configuration + diagnosis) NetPD

Documentation

The corresponding documentation is provided with the hardware and software products.

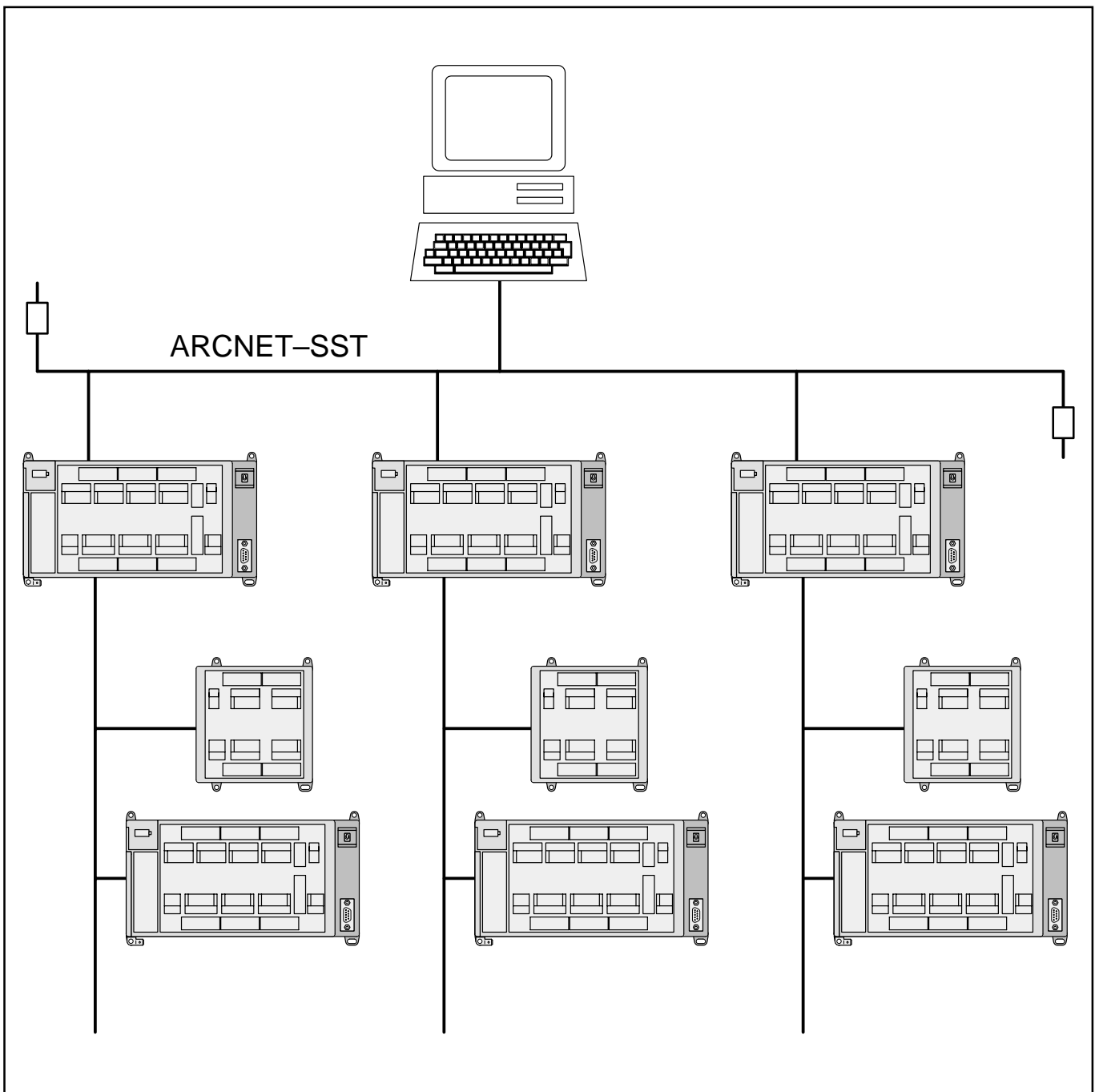
Our Helpline address

For information concerning the networking with PDnet please contact our Helpline as follows:

ABB Schalt- und Steuerungstechnik GmbH
SST/MPE
Eppelheimer Straße 82
D-69123 Heidelberg

Telephone: +49 6221 777-444
Telefax: +49 6221 777-361

Networking with
ARCNET-SST



1 ARCNET-SST

Overview

Brief description, field of application

The ARCNET-SST serves – in accordance with the decentralized intelligence – as a fast networking between AC31 basic units.

Input and output modules as well as additional preprocessors (AC31 basic units, converters etc.) can be connected to these networked basic units.

The coupler is integrated in the AC31 basic unit 07 KT 94 R161. The communication interface is not used, it can for instance be used for the connection of an RCOM coupler 07 KP 90 for long-distance transmission or for a PDnet coupler 07 KP 96.

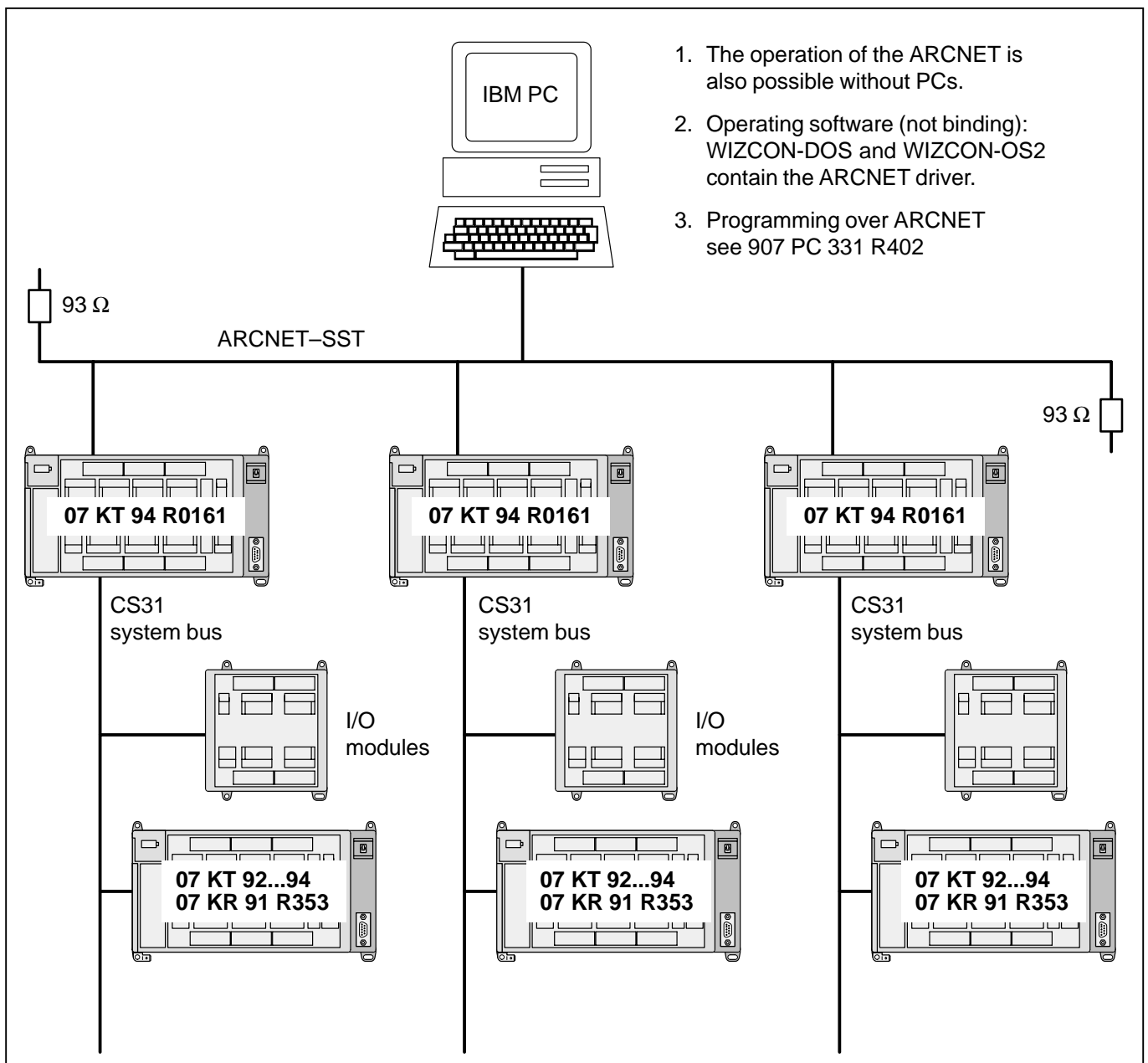
The configuration is easy and the amount of program is small.

Short data

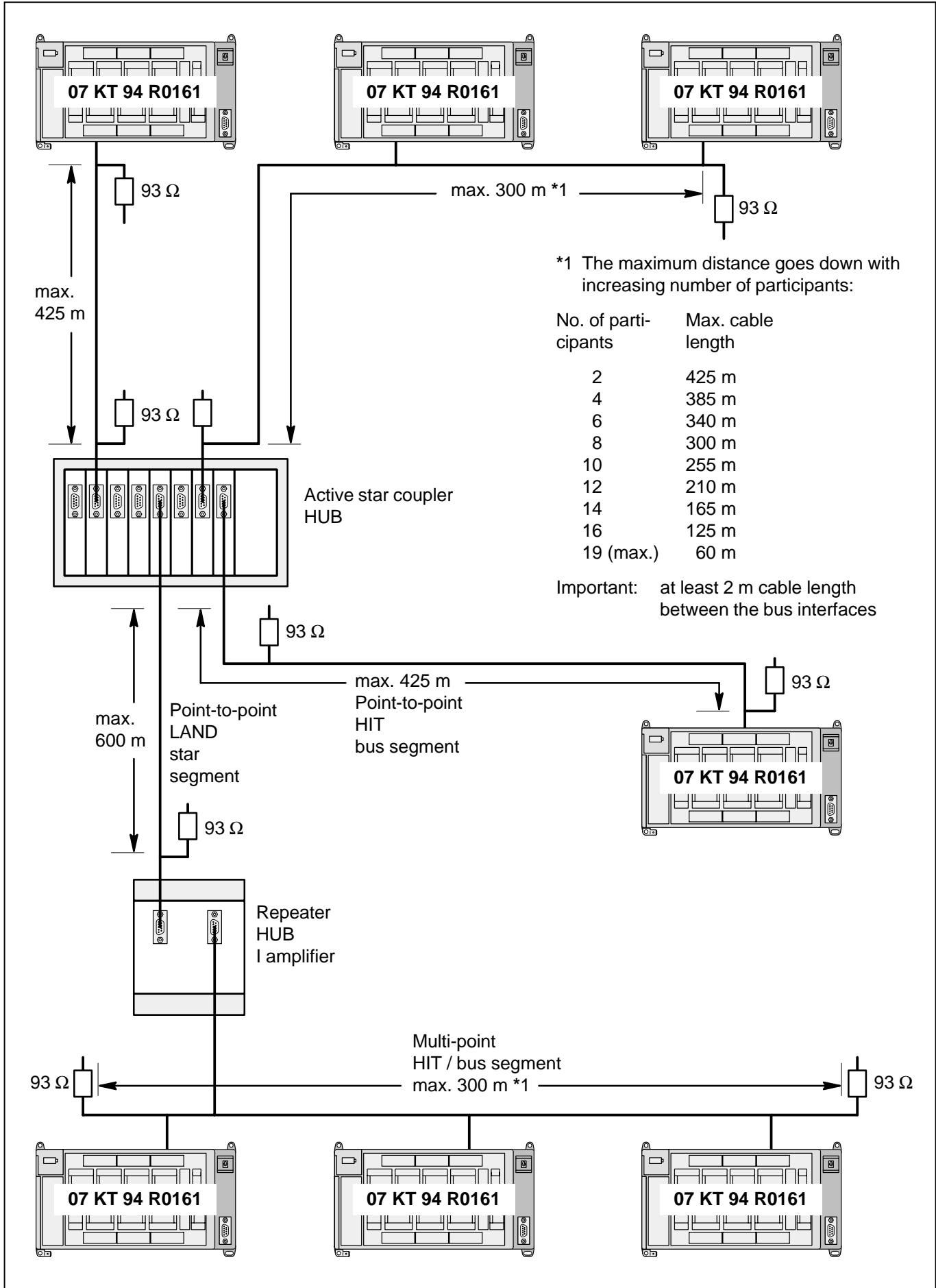
- Very short access times due to high data rate of 2.5 Mbit/s.
- Bus length of 300 m, using repeaters / couplers for star configuration up to ca. 6 km.
- Token master, without repeater up to 9 participants, with repeaters and couplers in star configuration up to 255 participants.
- Programming over the ARCNET bus see 907 PC 331 R402

Networking configurations

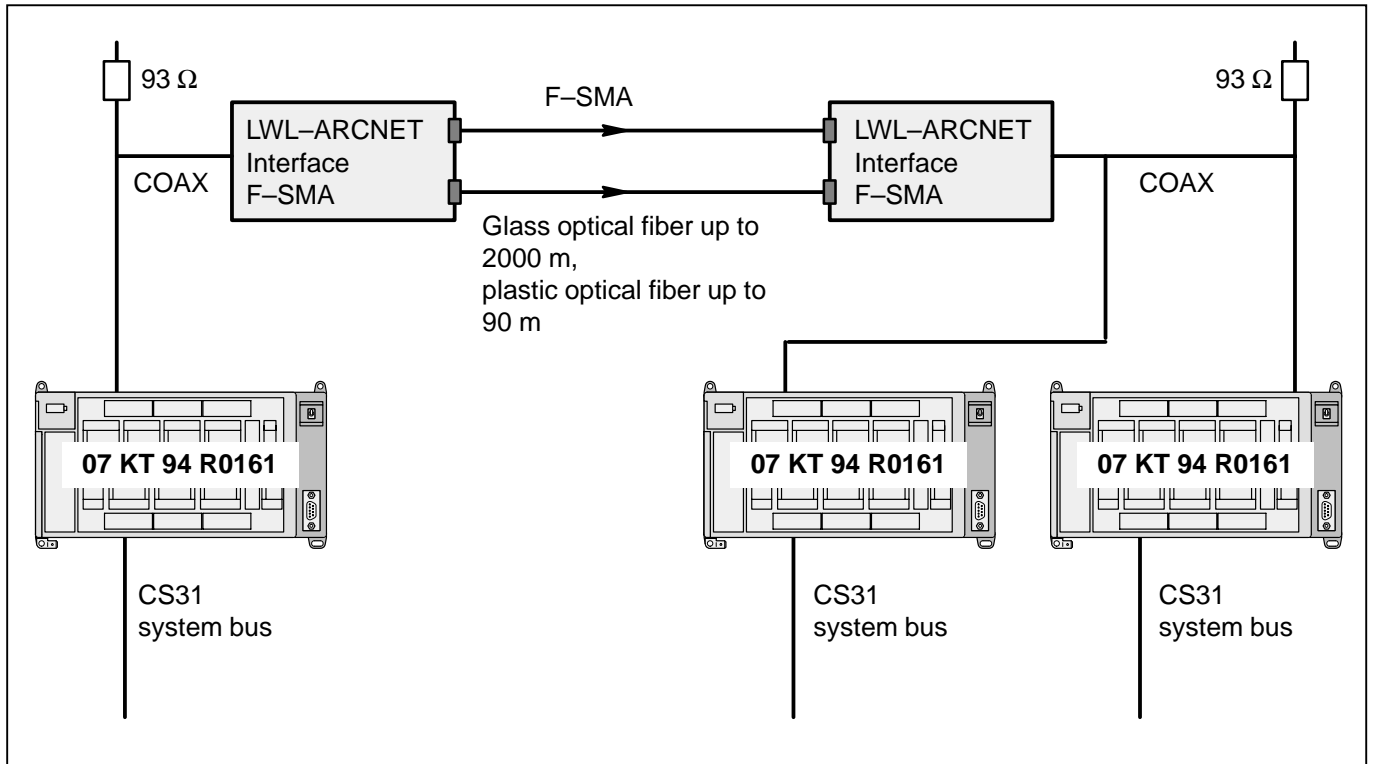
Multi-point line



Multi-point line, long distances, star



Conversion from COAX to optical fiber



Supplier for optical fiber parts:

Harting Elektronik GmbH
D-32339 Espelkamp
Telephone: +49 5772/47-263
Telefax: +49 5772/47-461

Optical fiber to ARCNET-Interface:
Order No. 20 40 002 3711

F-SMA plug 50/125:
Order No. 20 10 125 1212

F-SMA plug 50/125 glass:
Order No. 20 20 050 1022

Other cables, e.g. for laying underground (on request)
up to ca. 5.32/m

For questions concerning the optical fiber technique
please contact

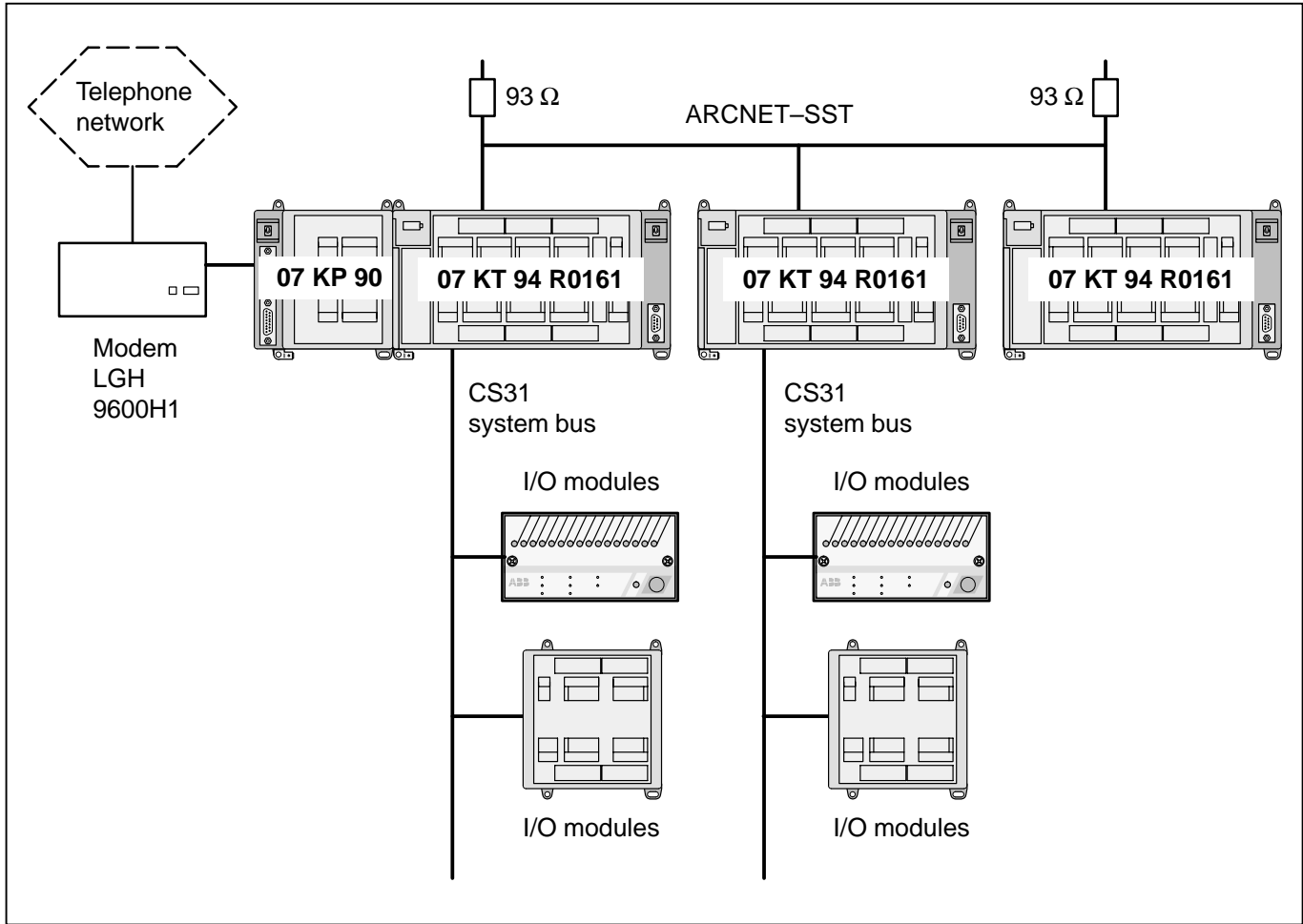
Fa. Harting (Telephone: +49 5772/47-225).

Laying and connecting optical fiber requires high-skilled
personnel. Company with experience in installing optical
fibers:

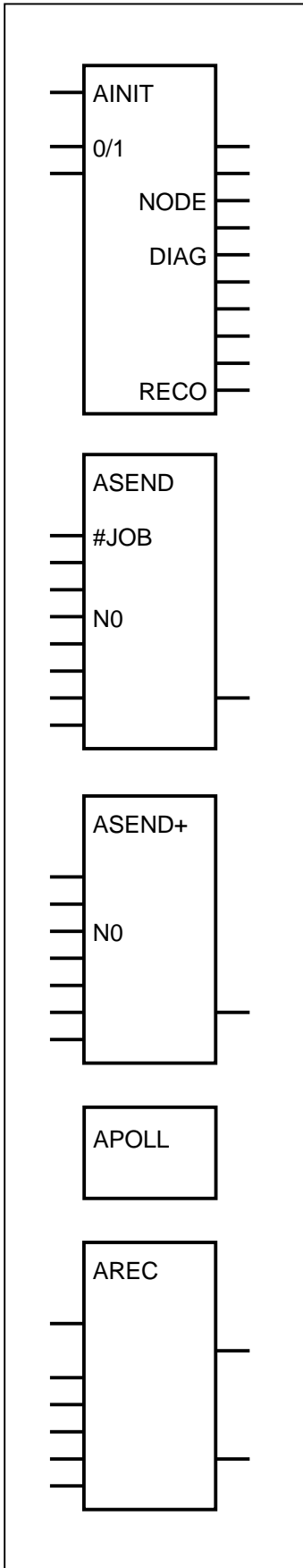
Magronic in München (Munich)
Telephone: +49 89/3838-650

Stations with an additional coupler

Connection of 3 substations to the telephone network



ARCNET NODE 1



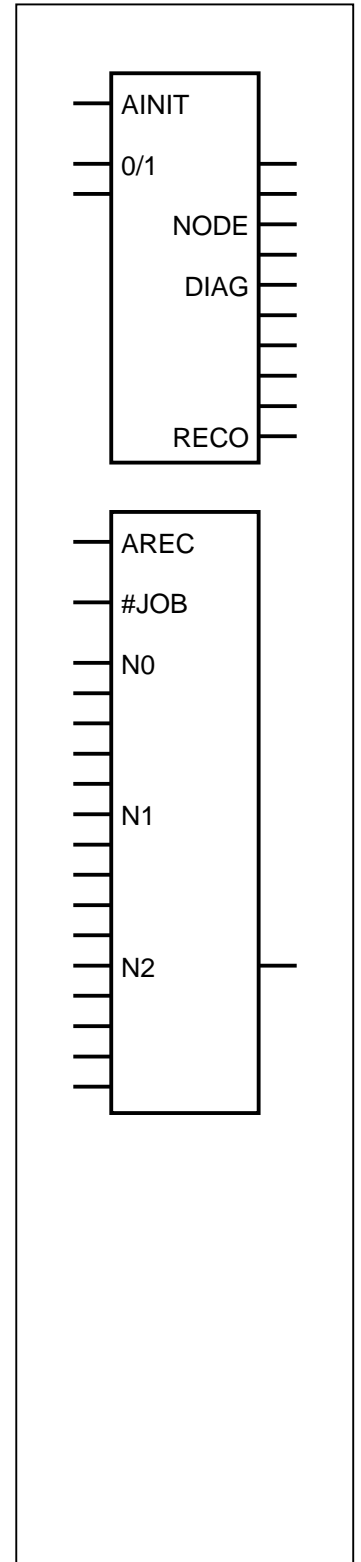
AINIT once per station.
 The NODE No. (address of the participant) is set on a DIL switch and output here.
 Powerful diagnosis.
 Shows, that the bus configures anew after a failure of a participant.

ASEND once, for the first sending telegram
 #JOB = Total number of configured jobs in ASEND and all following ASEND+.
 NO = NODE No. of the receiver(s).

Directly following an ASEND+ each for every further telegram at the same NODE and for further NODES.

APOLL at least once within the program.
 Starts sending procedure immediately.

ARCNET NODE 2



AREC once per NODE.
 For further telegrams duplication of the inputs.
 #JOB = Number of telegrams to be received.
 NO = NODE of the transmitter (can be duplicated).

Transmission media

Bus cable

Cable RG 62 A/U:
e.g. Lapp Kabel, Stuttgart
Telephone: +49 711/7838-0

Plugs for bus cables

BNC plug 75 Ω: Order No. B-9005
BNC T-plug 75 Ω: Order No. B-9083
BNC termination 93 Ω: Order No. B-9093

Rufenach Vertriebs-GmbH
Telephone: +49 6221/8443-0
Telefax: +49 6221/8443-99

Repeater, active star coupler

Supplier:

APEX Automatisierungstechnik GmbH, Braunschweig
Telephone: +49 5307/1261

COAX repeater (2-port amplifier):
010214005/HKXKX

Active star coupler, consisting of:

Modular 8-port amplifier (basic unit with control circuit
and power supply):
010214001/modH8P

COAX-port plug-in unit for star configuration (LAND):
010214002/MHKXP

COAX-port plug-in unit for bus connection (HIT):
010214003/MHKXP

LWL converter, plugs

See page 3.

Advantages of the ARCNET bus

- High performance in combination with easy programming methods.
- Very fast networking of AC31 basic units in the field range.
- Guaranteed low access times (data rate 2.5 Mbit/s, token master).
- Reasonable project planning expenditure due to big telegram length.
- Programming over the CS31 system bus (in preparation).
- Basic unit 07 KT 94 R161 with integrated couplers. The communication interface remains free for other couplers or communication processors.
- Distance up to 430 m (line 300 m), using repeaters up to 6.5 km.
- Complex networking configurations (line, star, etc.) with repeaters and star couplers.
- Standardized, well-known bus in some branches.
- The networking with ABB Procontic T200 is carried out over PDnet. The planning utilities allow you to establish an effective and fast transmission.

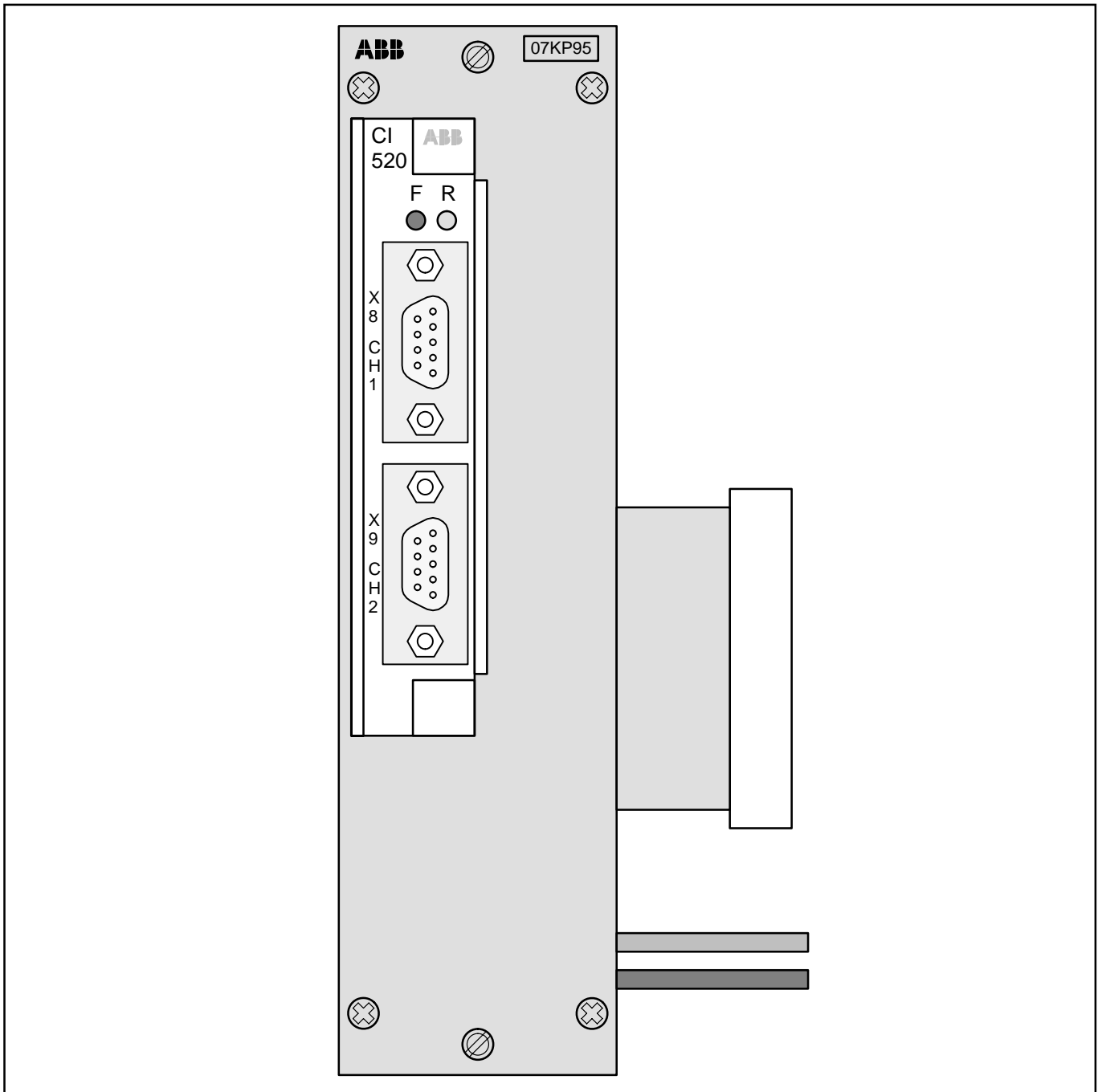


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1 Communication processor 07 KP 95 R101

Communication via the Advant Fieldbus 100

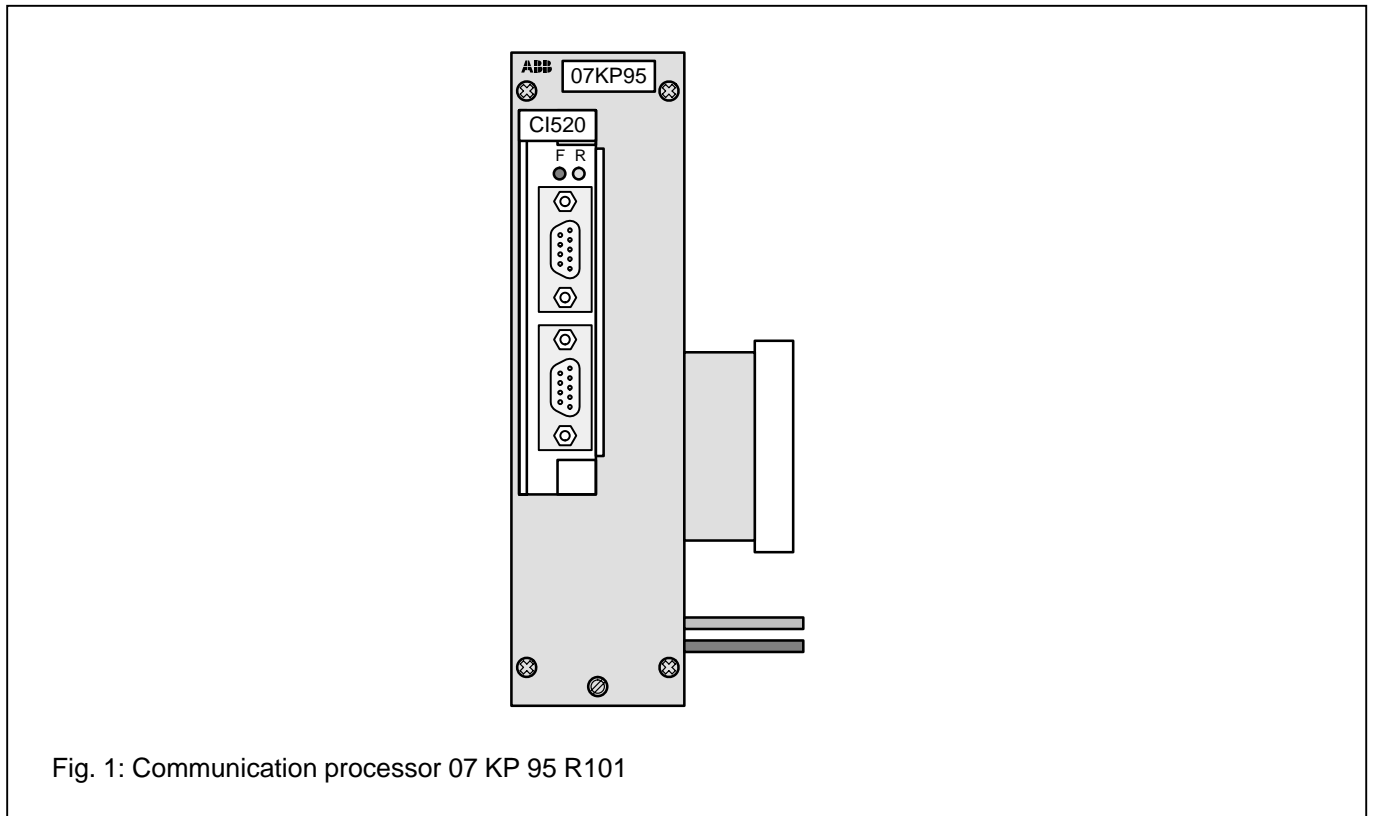


Fig. 1: Communication processor 07 KP 95 R101

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1.1 Brief description

The communication processor 07 KP 95 allows interfacing of AC31 to the AF100 (Advant Fieldbus 100). The communication processor 07 KP 95 **needs** additionally a communication interface **CI520** and an appropriate bus modem. The 07 KP 95 contains the carrier board for the CI520 (similar to the Submodule Carrier Board with the Advant Controller 450, but the 07 KP 95 has only one slot for **one** CI520).

The programming of the communication processor is carried out in the PLC program with a PC using the programming and test system 907 PC 331.

The programming software 907 KP 95 R102 provides all connection elements necessary for operating the communication processor 07 KP 95:

- AF100
- DSPIN
- DSPOUT
- DWREAL
- REALDW

1.2 Features of the unit 07 KP 95

The following functions are supported by the 07 KP 95:

- master or slave at the AF100 (function block AF100)
- single-channel or redundant configuration of the AF100 (selectable via the function block AF100)
- transmission of cyclic data using the function blocks DSPIN and DSPOUT (max. 475 DSPs with 8 DATs, max. 250 DSPIN and 249 DSPOUT)
- service data: station, type, version, status
- no event handling
- no time-sync
- no program-load

1.3 Survey of Advant Fieldbus (AF100), 07 KP 95 and Advant Controller 31

- The AF100 is a field bus, to which a maximum of 80 AF100 stations (nodes) can be connected. Each station can be a master or a slave. At least one master must be connected to an AF100, several masters are possible.
- The AF100 distinguishes between **process data**, which are transmitted cyclically (Cyclic Data Packages) and **messages** (diagnosis data, events), which are only transmitted if necessary.
- The AF100 can be configured in single-channel mode or redundant. In the redundant configuration, the data are always sent via both busses. The data, however, are only received from one bus. The switch-over to the bus, from which the data is received, is performed automatically by the hardware.
- The transmission medium for the AF100 can be a twisted pair, a coaxial cable or an optical fiber. For the

connection between the coupler and the AF100 bus, an appropriate modem must be selected.

- For the transmission of cyclic data on the Advant Controller side, the data base element DSP (Data Set Peripheral) is available. Each DSP can contain up to 8 data elements (DATs) of the types boolean, integer, long integer or real. In the data base element, the following is given: the number of DATs, the transmission interval, the direction (sending or receiving DSP), the identification and the station number.
- Analog to that, on the AC31 side there are the function blocks DSPIN (receiving DSP) and DSPOUT (sending DSP). As a maximum, a number of 475 DSPs with 8 DATs each can be configured. The max. number of function blocks is 250 DSPINs and 249 DSPOUTs.
- For initialization, the function block AF100 is available (station number, master/slave, AF100 bus single/redundant).

1.4 Structure of the front panel

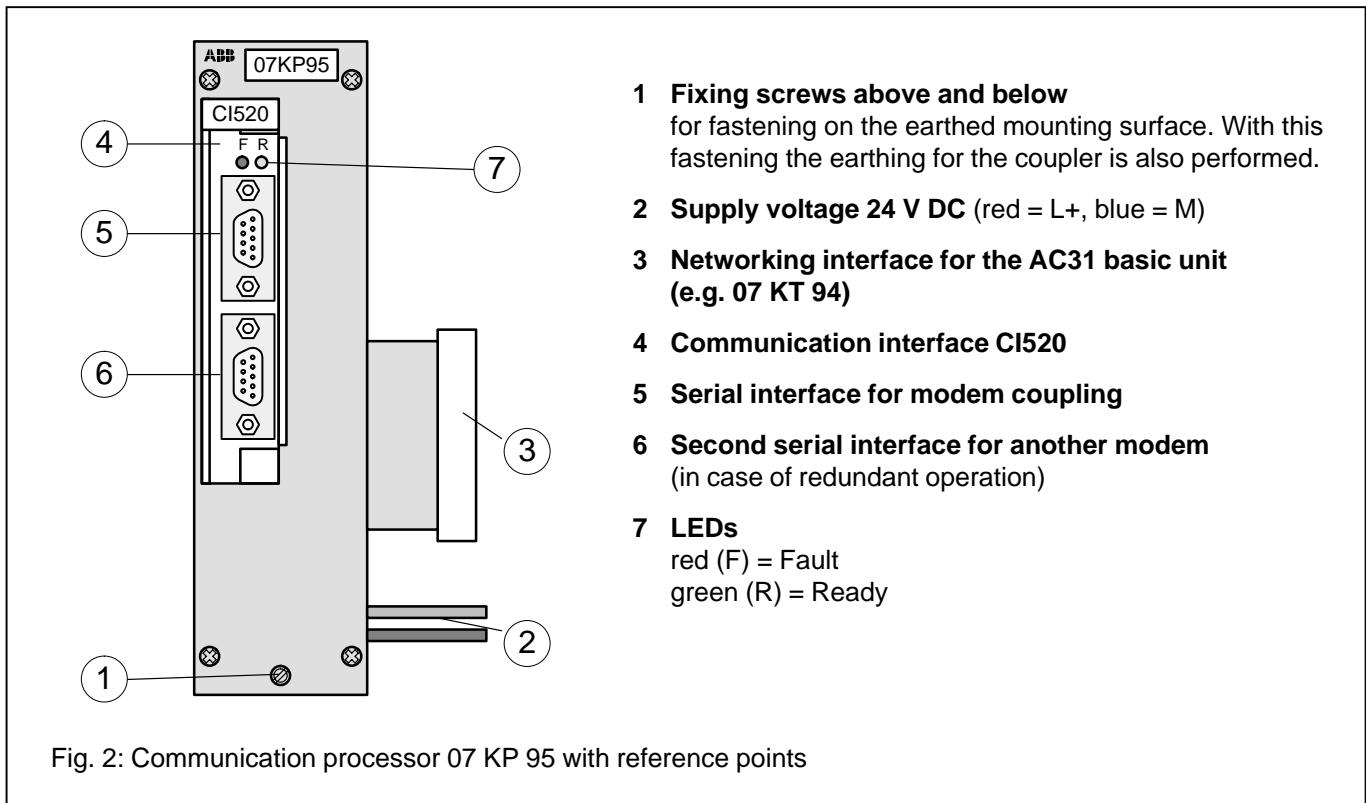


Fig. 2: Communication processor 07 KP 95 with reference points

1.5 Electrical connection

1.5.1 Application examples for AF100 coupling with modem, coupler 07 KP 95 and basic unit

The following figures show two application examples for single-channel and redundant configuration. Attention must be paid to the following in detail:

- The earthing measures
- The connection of the communication processor 07 KP 95 to the modem(s).
- Looping through the supply voltage (24 V DC) from the 07 KT 94 to the 07 KP 95 R101
- Earthing the switch cabinet mains sockets
- Using the AF100 bus with coaxial cable

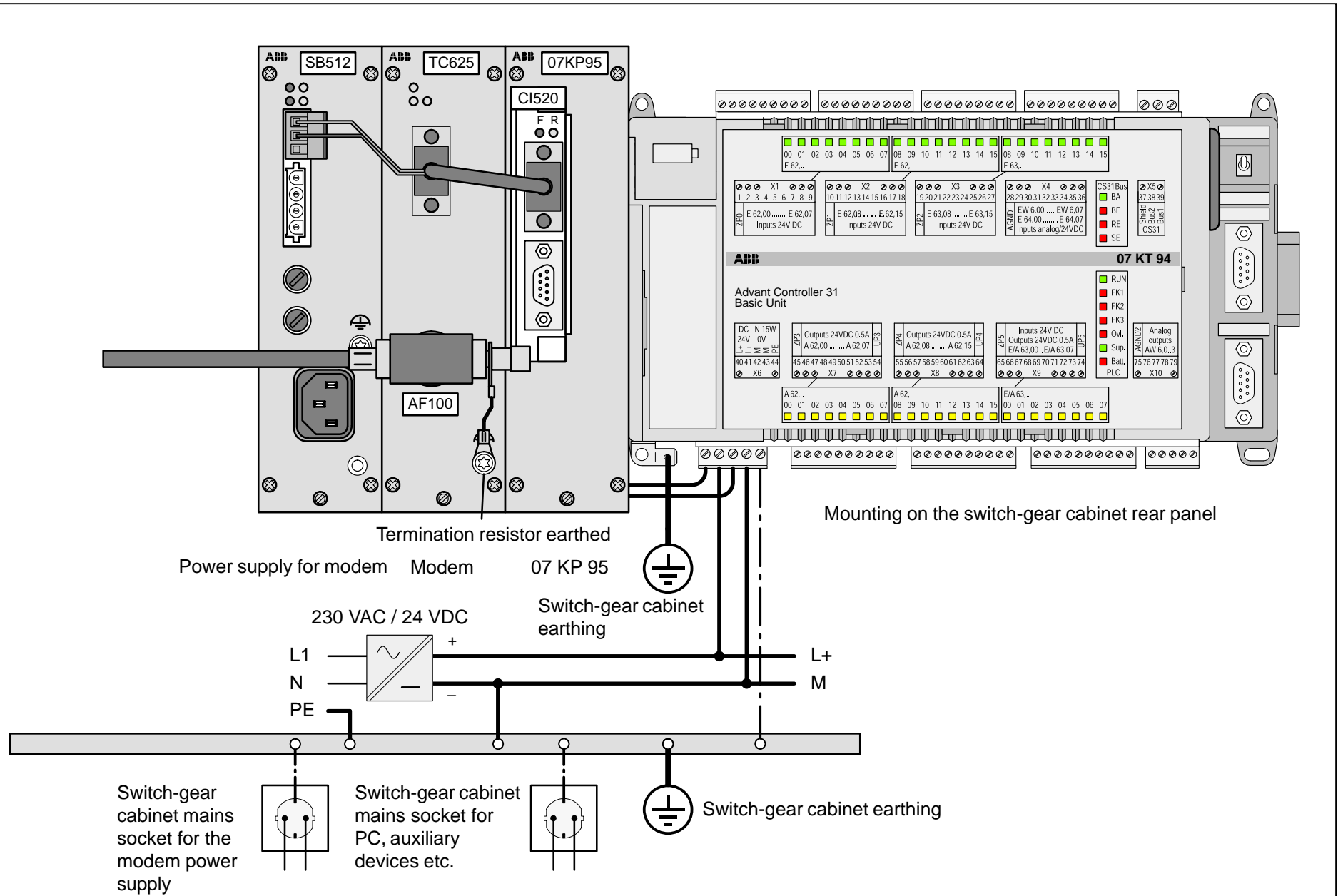


Fig. 3: Application example of an AF100 coupling with modem, coupler and basic unit (typical switch-gear cabinet configuration)

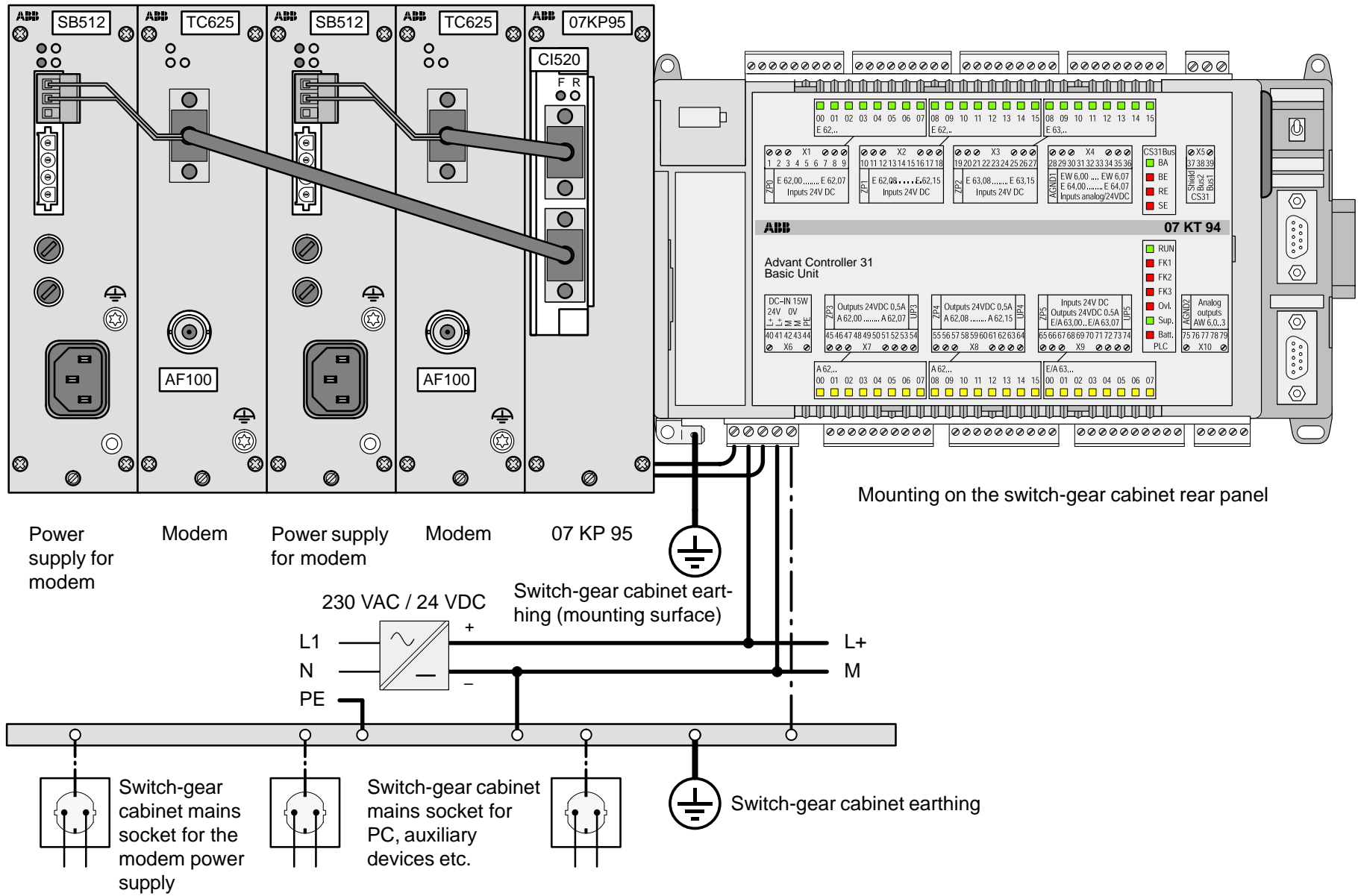


Fig. 4: Application example of an AF100 coupling with modems, coupler and basic unit, redundant configuration (typical switch-gear cabinet configuration)

1.5.2 Connection of the supply voltage 24 V DC

As shown in Fig. 3 and Fig. 4, the supply voltage for the 07 KP 95 is looped through from the AC31 basic unit (red wire = L+, blue wire = M).

1.5.3 Networking interface

The networking interface, a special parallel interface, allows the 07 KP 95 communication processor to be connected to AC31 basic units 07 KT 93 and 07 KT 94. The housing of the communication processor is connected to the housing of the ABB Procontic basic unit by a snap-fit connection. The electrical connection is via a 40-pole ribbon cable with socket connector, soldered onto the 07 KP 95 R101 side.

Note: Attachment and disconnection of units on the networking interface may only be performed when all supply voltages are switched off.

Mounting the communication processor at the networking interface

1. Detach the cover on the basic unit (e.g. 07 KT 94) from the networking interface.
2. Plug the socket strip of the 40-pole ribbon cable secured to the 07 KP 95 R101 onto the networking connector of the AC31 basic unit.
3. Slide both units together.
4. Slide the replacement cover provided with the 07 KP 95 unit with its cut-out onto the networking interface.

1.5.4 Measures for RFI (Radio Frequency Interference)

- Installation in a metallic switch-gear cabinet
- Mains filters

1.7 Technical data

In general, the details in Section 1 "System data and system structure" of volume 2 of the system description "Advant Controller 31" apply as technical data. Supplementary and deviating data is listed below.

1.7.1 General data

Number of parallel interfaces	1 networking interface for connecting to the AC31 basic unit 1 interface for communication interface CI520
Note:	The communication interface CI520 must be ordered separately and is not supplied together with the 07 KP 95

1.7.2 Supply voltage 07 KP 95 R101

Rated supply voltage	24 V DC
Power dissipation	typ. 6 W
Max. current consumption	
with rated voltage	250 mA
with supply voltage 30 V	200 mA
Protection against reversed terminal connection	yes

1.7.3 Mechanical data

Fastening on a mounting surface

by screws, distance 163 mm
height of mounting surface 180 mm

Width x height x depth

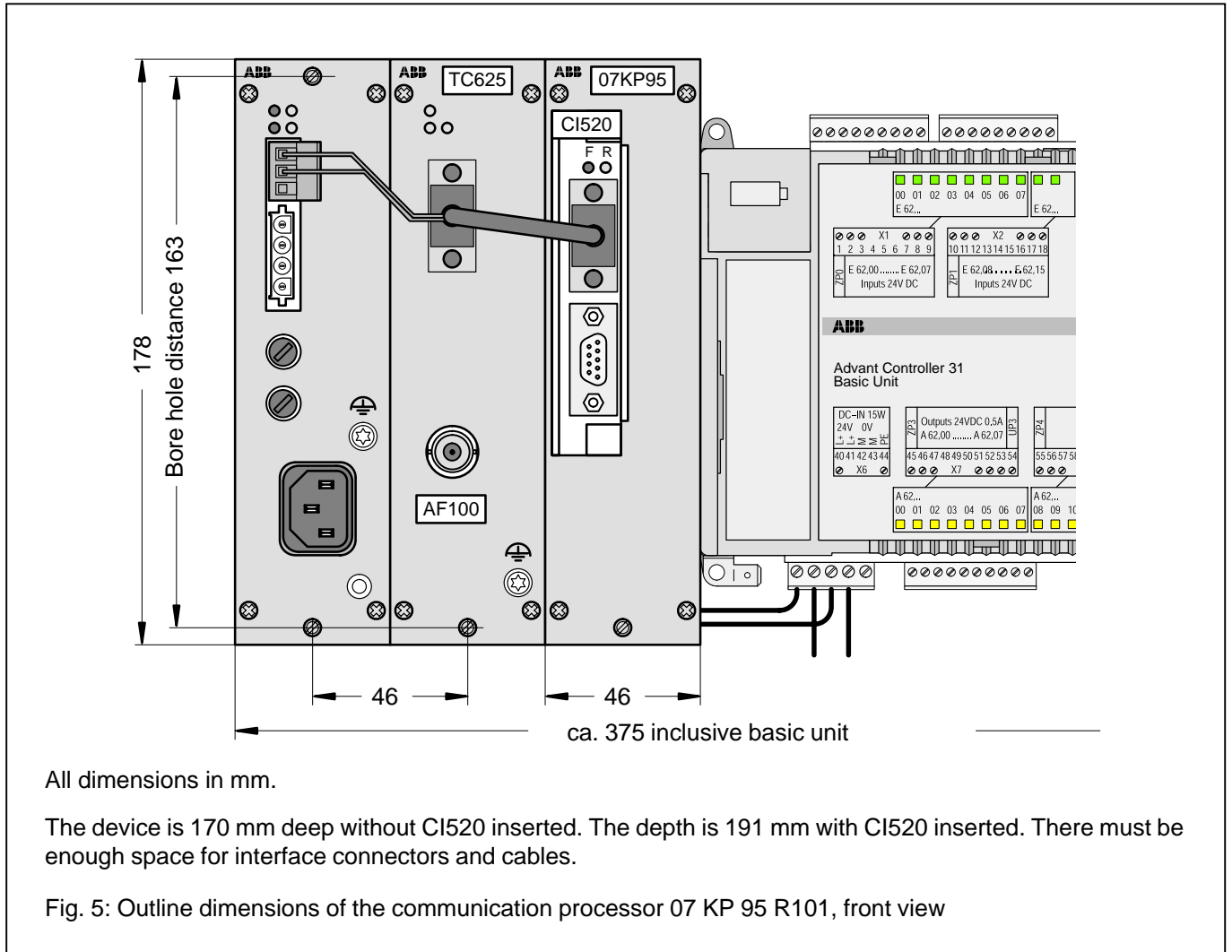
46 x 180 x 170 mm

Weight

1.2 kg

Dimensions for mounting

see the following drawing



1.7.4 Mounting hints

Mounting position

fastening on the switch-gear cabinet rear panel

Cooling

The natural air convection must not be hindered by cable ducts or other material mounted in the switch-gear cabinet.

1.8 Ordering data

Communication processor 07 KP 95 R101

Order No. GJR5 2520 00 R0101

Scope of delivery

Communication processor 07 KP 95 R0101
Earthing instructions
Replacement cover for the networking interface

Further literature

System description Advant Controller 31, English

1SAC 1316 99 R0201

Software

907 KP 95 R0102, Documentation, CE library

GJP5 2065 00 R0102 (German documentation)
GJP5 2066 00 R0102 (English documentation)

Additional components (see also Figures 3 and 4)

CI520 Communication interface

TC625 AF100 modem for coaxial cable (contains interface cable CI520 <--> TC625)

TC512 AF100 modem for twisted pair (contains interface cable CI520 <--> TC512)

SB512 Power supply unit for modem

These components can be ordered under the following address:

ABB Industrietechnik AG
Abteilung IND / OM
Dudenstraße 44–46
D-68167 Mannheim
Tel.: +49 621 381 1847 (Mr. Bräuler)

Additional literature

User's Guide Advant Fieldbus 100

Document 3BSE 000 506R0101 (English)

Installation Rules

Document 3BSE 009 178R0001 (English)



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AS-i Gateway 07 KA 90

The German operating manual 07 KA 90
Order No. 1SAC 1316 30 R0101
is available on request.

