SAIA-Burgess Electronics

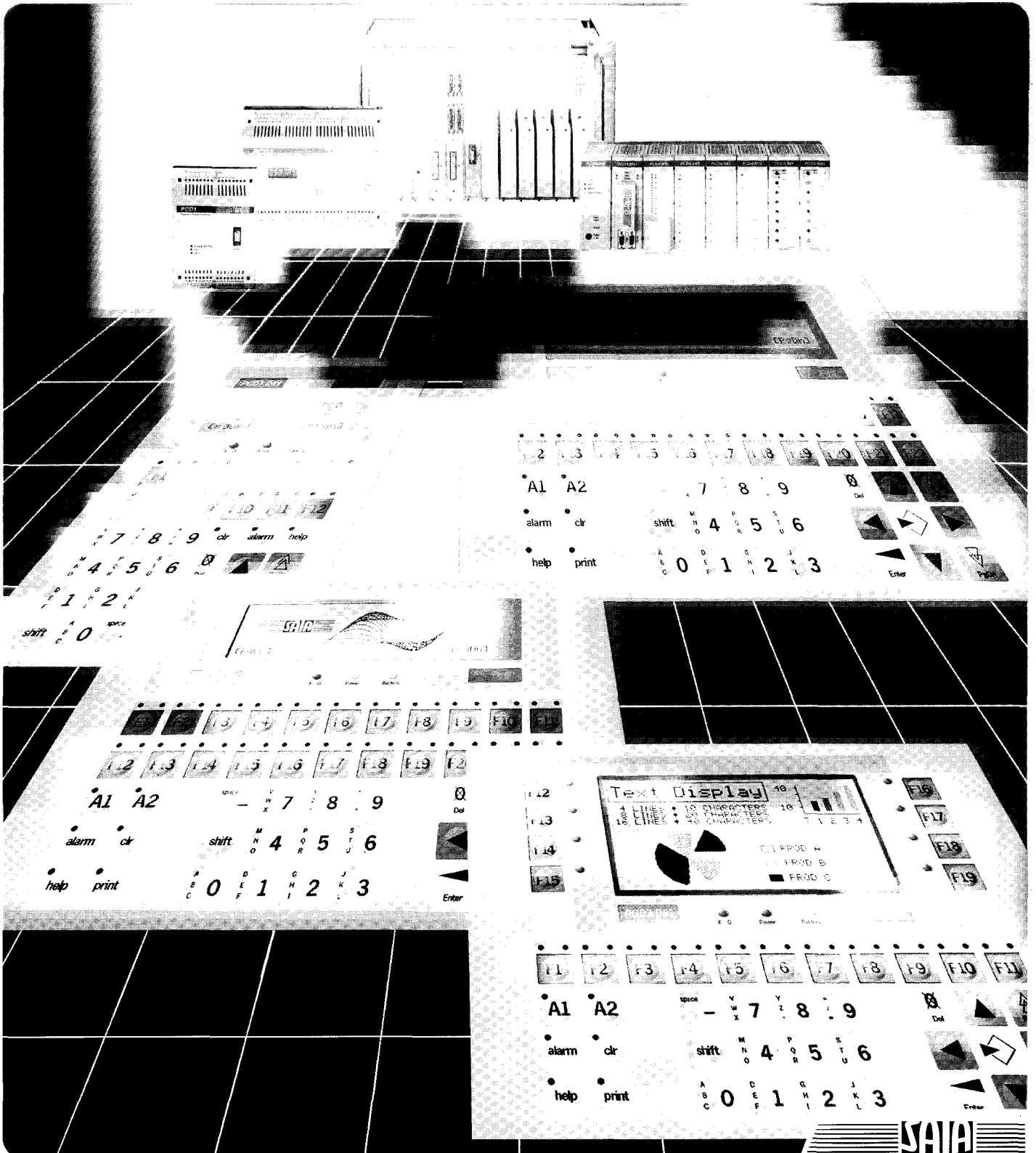**SWITCHES · MOTORS · CONTROLLERS**

SAIA® PCD
Process Control Devices

PCD7.D8
Intelligent industrial-terminals
Hardware Manual

SAIA® Process Control Devices

Hardware Manual

PCD7.D8..
Intelligent industrial terminals

Contents

C E MARK

The products PCD7.D810, D820, D825, D830, D835, D850 and D855 are in conformity with the following standards:

Electromagnetic compatibility (EMC):
- emissions EN 50081-2 (1993)
- immunity EN 50082-2 (1995)

and thus are in line with:

Council Directives
89/336/EEC 92/31/EEC 93/68/EEC

⚠ **Please note:**

A number of detailed manuals are available to aid installation and operation of the SAIA PCD. These are for use by technically qualified staff, who may also have successfully completed one of our "workshops".

To obtain the best performance from your SAIA PCD, closely follow the guidelines for assembly, wiring, programming and commissioning given in these manuals. In this way, you will also become one of the many enthusiastic SAIA PCD users.

If you have any technical suggestions or recommendations for improvements to the manuals, please let us know. A form is provided on the last page of this manual for your comments.

Summary

PCD1/2 series	PCD4 series	PCD6 series
Hardware PCD1 PCD2	Hardware PCD4	Hardware PCD6
	PCD4.H1.. *)	
	PCD4.H2.. *)	
	PCD4.H3.. *)	
	PCD4.H4..	

*) Adapter module 4'717'4828'0 allows H modules to be used with the PCD6.

General Manuals

- User's Guide
- Reference Guide (PG3)
- PCD8.P1..
- PCD7.D2.. PCD7. D160/170 **PCD7.D8..**
- - S-Bus
  - PROFIBUS
  - Remote I/O
- Installation Components for RS 485-Networks
- - PG4
  - Modem
- FUPLA/ KOPLA function families

Reliability and safety of electronic controllers

SAIA-Burgess Electronics Ltd. is a company which devotes the greatest care to the design, development and manufacture of its products:

- state-of-the-art technology
- compliance with standards
- ISO 9001 certification
- international approvals: e.g. Germanischer Lloyd, Det Norske Veritas, CE mark ...
- choice of high-quality componentry
- quality control checks at various stages of production
- in-circuit tests
- run-in (burn-in at 85°C for 48h)

Despite every care, the excellent quality which results from this does have its limits. It is therefore necessary, for example, to reckon with the natural failure of components. For this reason SAIA-Burgess Electronics Ltd. provides a guarantee according to the "General terms and conditions of supply".

The plant engineer must in turn also contribute his share to the reliable operation of an installation. He is therefore responsible for ensuring that controller use conforms to the technical data and that no excessive stresses are placed on it, e.g. with regard to temperature ranges, overvoltages and noise fields or mechanical stresses.

In addition, the plant engineer is also responsible for ensuring that a faulty product in no case leads to personal injury or even death, nor to the damage or destruction of property. The relevant safety regulations should always be observed. Dangerous faults must be recognized by additional measures and any consequences prevented. For example, outputs which are important for safety should lead back to inputs and be monitored from software. Consistent use should be made of the diagnostic elements of the PCD, such as the watchdog, exception organization blocks (XOB) and test or diagnostic instructions.

If all these points are taken into consideration, the SAIA PCD will provide you with a modern, safe programmable controller to control, regulate and monitor your installation with reliability for many years.

(D8-00-E.DOC) 26/754E1

1. Introduction and overview

The industrial terminals PCD7.D8xx (called D8) are used to display and input data, to show status messages (for instance, dynamic texts) or alarm messages in machines or plant controlled by a PCD.

The D8 is a versatile and economic solution because it communicates directly with the PCD using the programming connector without requiring any additional hardware. The D8 is programmed using programming software that enables the data to be transferred to the unit's memory.

With the characters offered innumerable applications are possible: the generous display area allows the operator to keep a check simultaneously on a large quantity of data (the upper limit varies according to the model). In addition it can deal with up to 1024 alarm or machine status messages.

The D8 can store up to a maximum of 1024 alarms (in a buffered RAM), together with the date and time they occurred or passed so they can be subsequently printed out when required, enabling a statistical diagnosis of the faults concerned.

Type overview

Type	
PCD7.D810	Terminal with 4 x 20 characters
PCD7.D820	Terminal with 4 x 40 characters
PCD7.D825	as D820 but with parallel port to printer
PCD7.D830	Terminal with 8 x 40 characters or graphics
PCD7.D835	as D830 but with parallel port to printer
PCD7.D850	Terminal with graphic display 240 x 128 pixels
PCD7.D855	as D850 but with parallel port to printer
PCD8.D80E	Configurator to edit texts and programs

	Text memory modules (Flash EPROM)
PCD7.R801	text memory 64Kbytes
PCD7.R802	text memory 128Kbytes
PCD7.R803	text memory 256Kbytes
PCD7.R804	text memory 512Kbytes
	Additional data memory modules (RAM)
PCD7.R810	data memory 32Kbytes
PCD7.R812	data memory 128Kbytes
4'507'4815'0	lithium back-up battery

Table of max. variables per page

Terminal PCD7.	Variables per page
D810	8
D820/D825	16
D830/D835	32
D850/D855	48

2. Front and rear of the D8

2.1 Front and rear D810
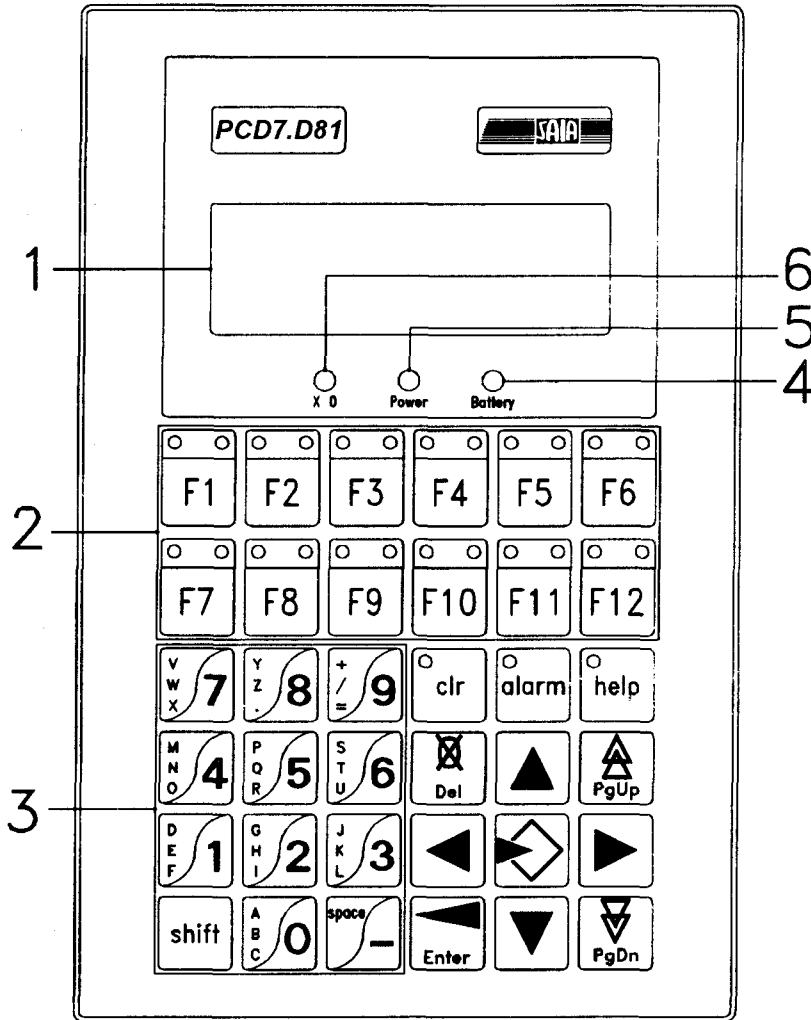
1	Display 4 x 20 characters	▼ PgDn	Key moves one page backwards or rotates alarm buffer
2	12 F keys with two LEDs	◇	Key for entering input phase
3	Number keys	◀ ▶ ▲ ▼	Keys for moving cursor between fields
4	Battery LED: on when battery level is low	⊠ Del	Key cancels data
5	Power LED: on when power on	alarm	Key displays alarm messages
6	X 0 LED: flashes when communication error occurs	help	Key displays alarm submessages
◀ Enter	Key confirms setting	clr	Key acknowledges alarms
▲ PgUp	Key moves one page foreward or rotates alarm buffer		
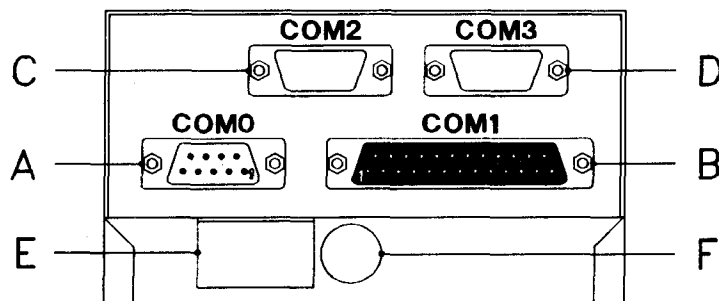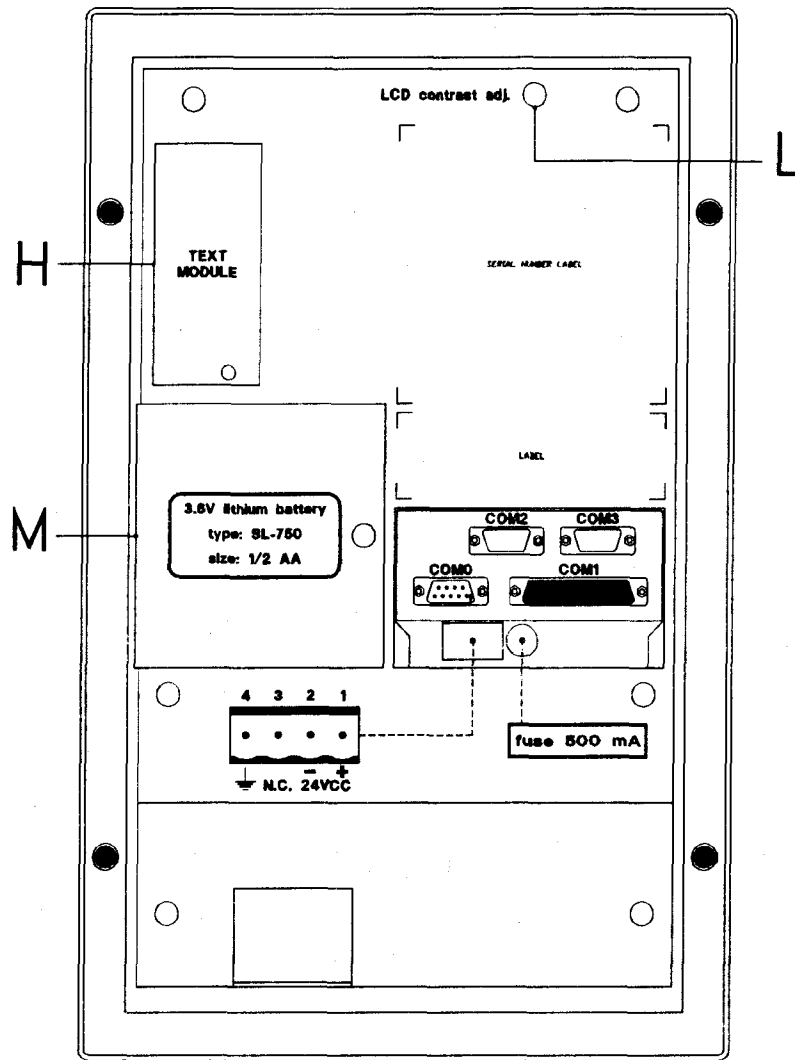
A	Port COM0: Serial port for communicating with PC
B	Port COM1: Serial port for communicating with PCD
C	Port COM2: Serial port for communicating in network (optional)
D	Port COM3: Serial port for communicating in network (optional)
E	Power supply connector
F	Fuse holder, 500mA fuse
H	Text memory module
L	Trimmer for display contrast adjustment
M	Battery housing

2.2　Front D820 and D825
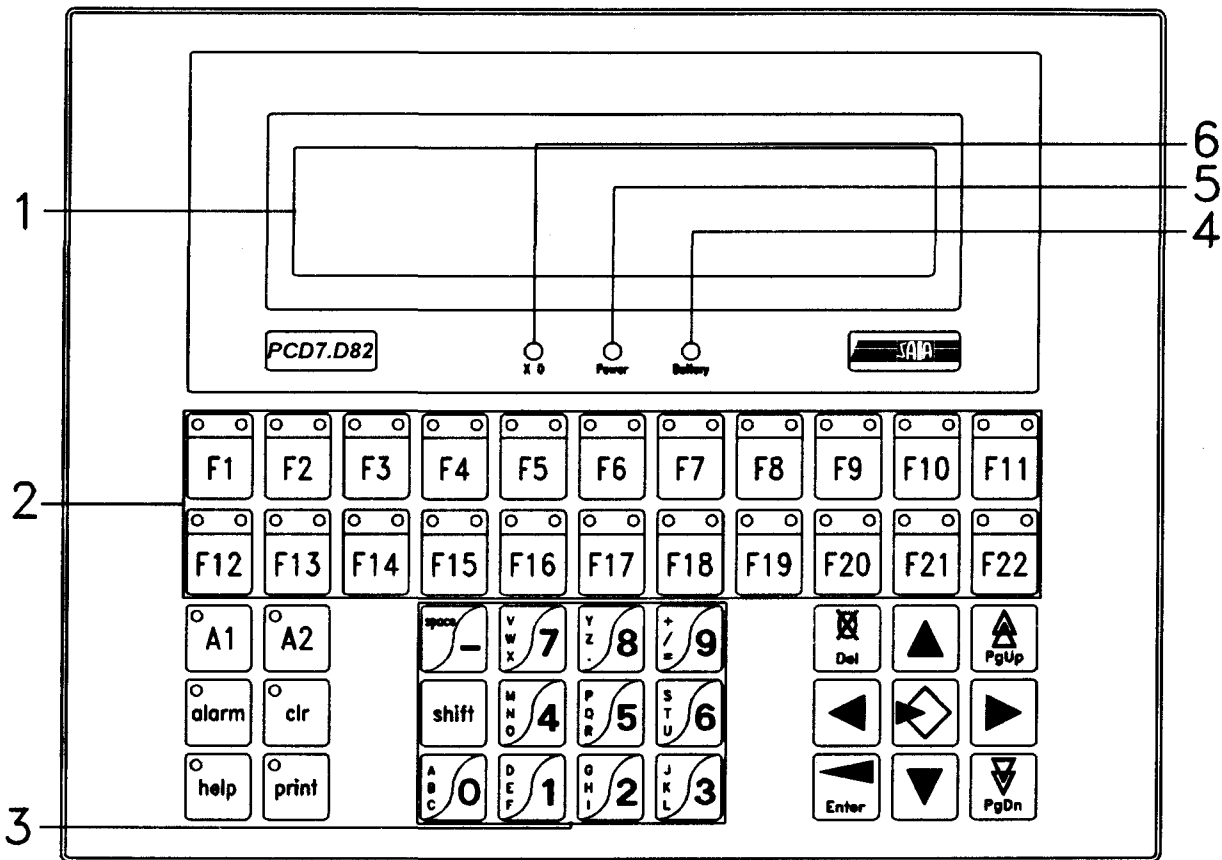
1	Display 4 x 40 characters	print	Key prints page being displayed
2	22 F keys with two LEDs	help	Key displays alarm submessages
3	Number keys	Enter	Key confirms setting
4	Battery LED: on when battery level is low	PgUp	Key moves one page foreward or rotates alarm buffer
5	Power LED: on when power on	PgDn	Key moves one page backwards or rotates alarm buffer
6	X 0 LED: flashes when communication error occurs.		Key for entering input phase
A1 A2	Keys not in use	◀ ▶ ▲ ▼	Keys for moving cursor between fields
clr	Key aknowledges alarms	Del	Key cancels data
alarm	Key displays alarm messages		

2.3   Front D830 and D835
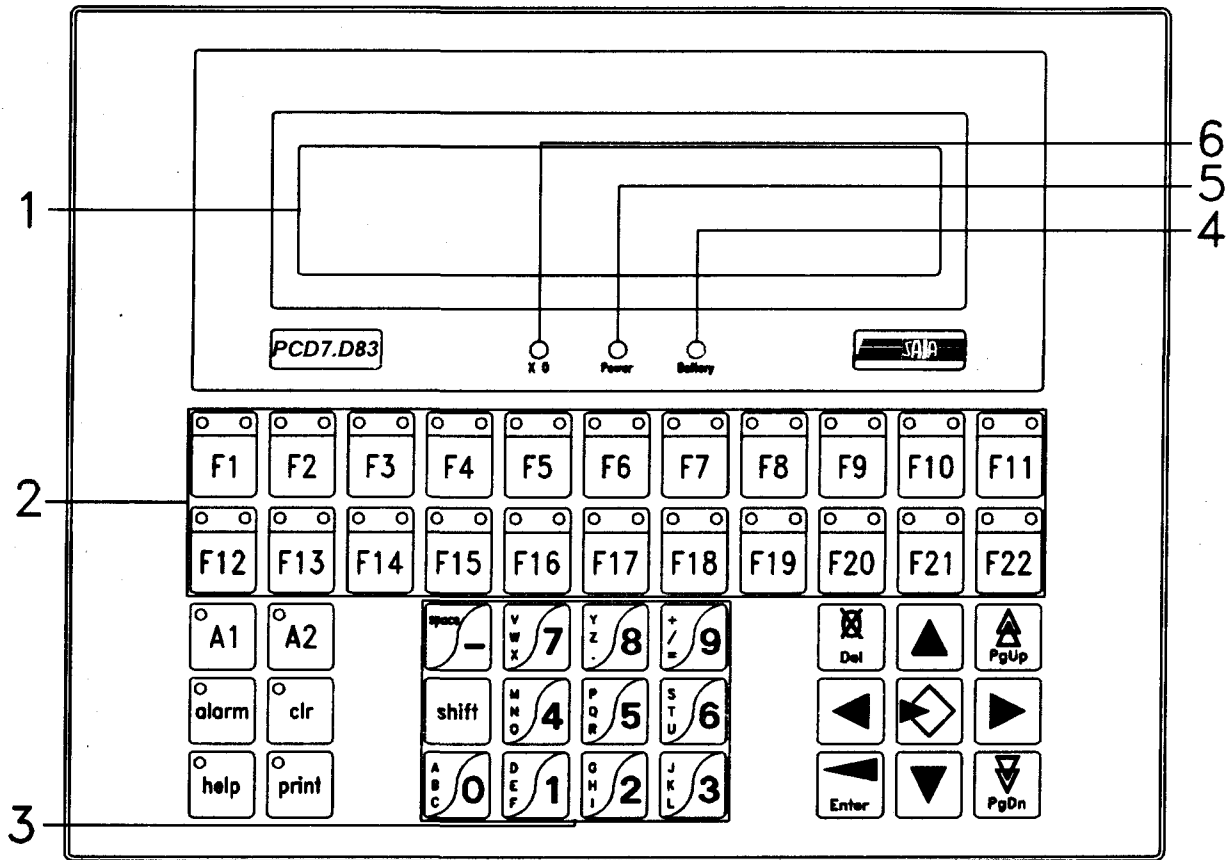
1	Graphic display 240 x 64 pixels	print	Key prints page being displayed
2	22 F keys with two LEDs	help	Key displays alarm submessages
3	Number keys	Enter	Key confirms setting
4	Battery LED: on when battery level is low	PgUp	Key moves one page foreward or rotates alarm buffer
5	Power LED: on when power on	PgDn	Key moves one page backwards or rotates alarm buffer
6	X 0 LED: flashes when communication error occurs	◇	Key for entering input phase
A1 A2	Keys not in use	◄ ► ▲ ▼	Keys for moving cursor between fields
clr	Key aknowledges alarms	Del	Key cancels data
alarm	Key displays alarm messages		

2.4   Front D850 and D855
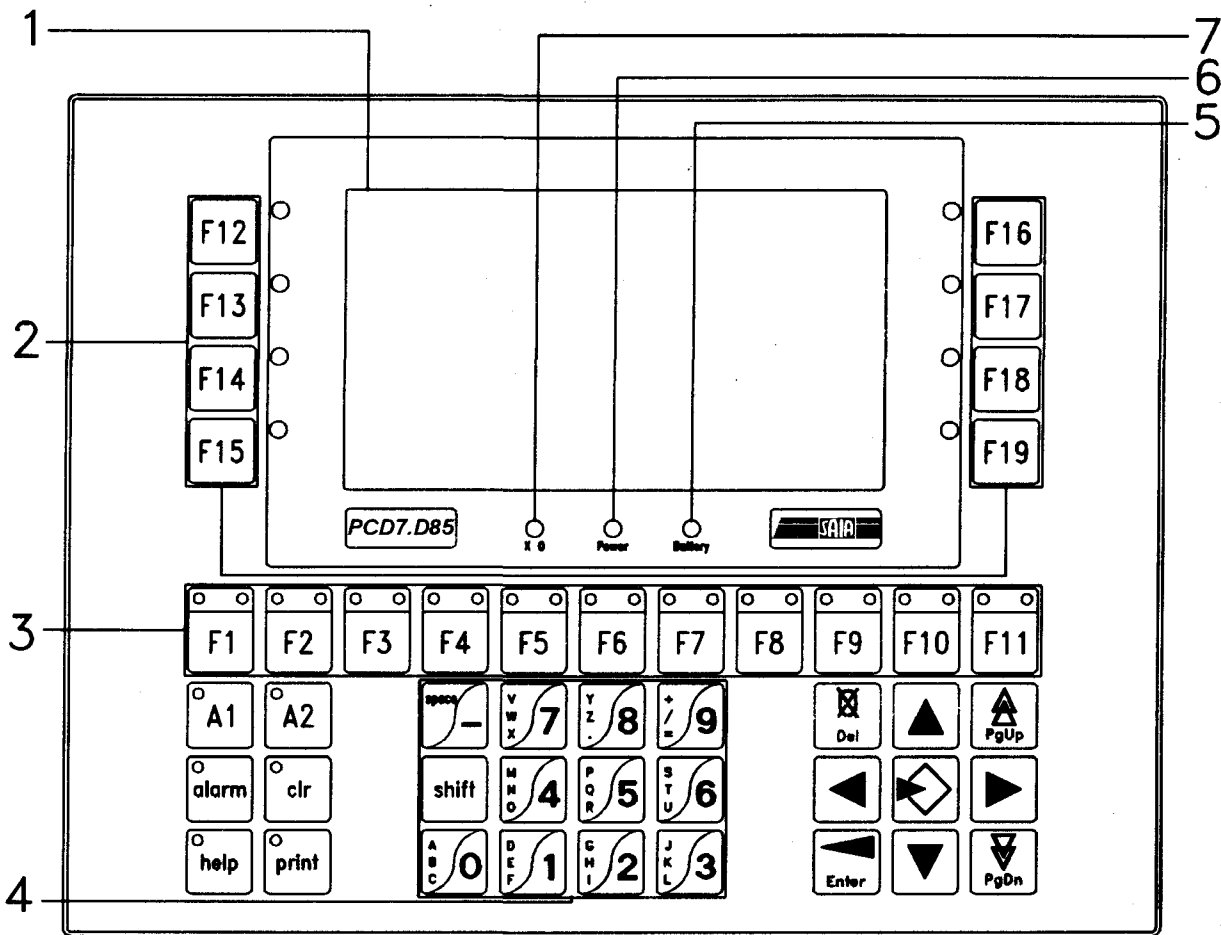
1	Graphic display 240 x 128 pixels	alarm	Key displays alarm messages
2	8 F keys with one LED	print	Key prints page being displayed
3	11 F keys with two LEDs	help	Key displays alarm submessages
4	Number keys	Enter	Key confirms setting
5	Battery LED: on when battery level is low	PgUp	Key moves one page foreward or rotates alarm buffer
6	Power LED: on when power on	PgDn	Key moves one page backwards or rotates alarm buffer
7	X 0 LED: flashes when communication error occurs		Key for entering input phase
A1 A2	Keys not in use	◄ ► ▲ ▼	Keys for moving cursor between fields
clr	Key aknowledges alarms	Del	Key cancels data

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## 2.5   Rear of D820/825, D830/835 and D850/855
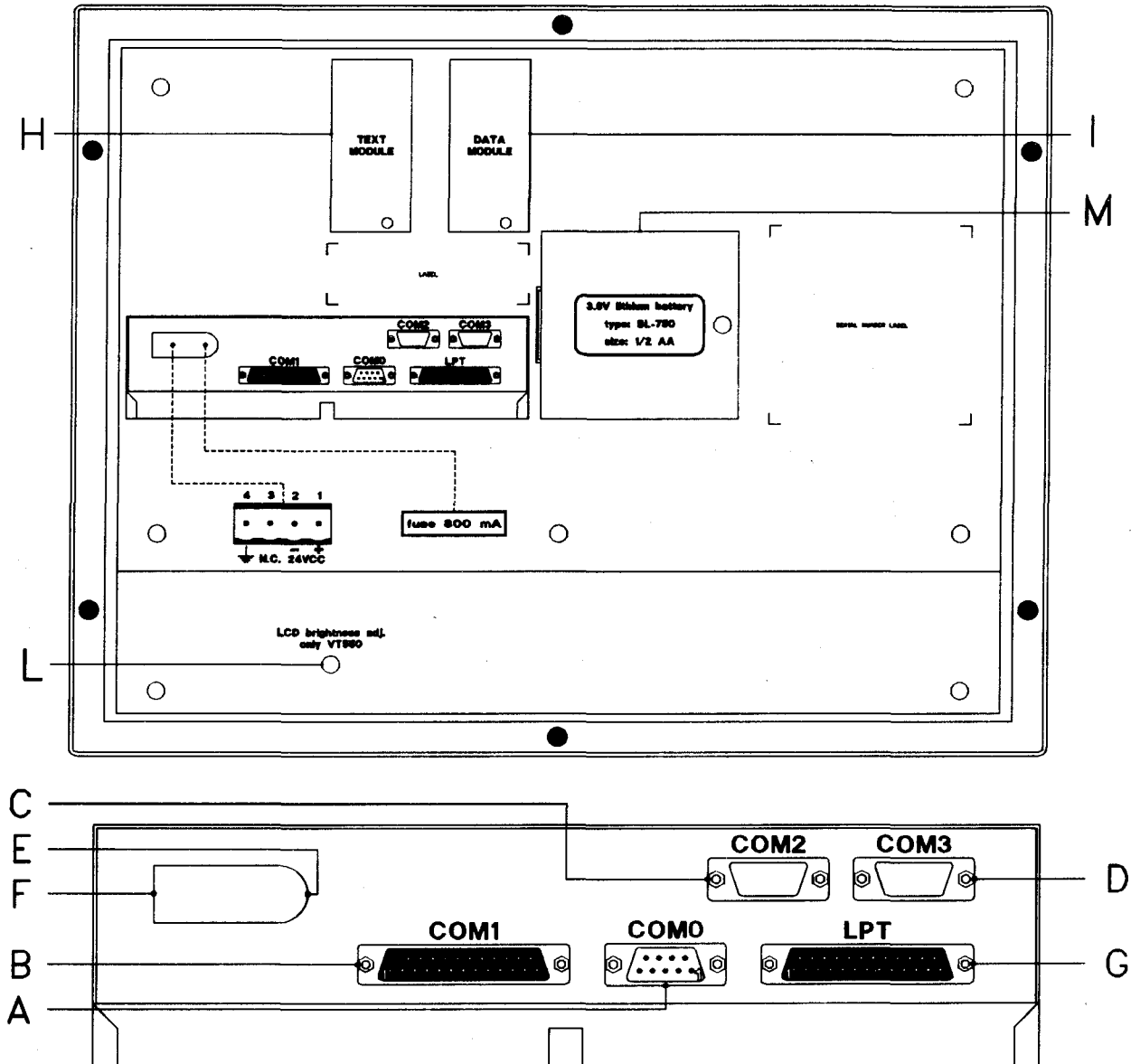
A	Port COM0: Serial port for communicating with PC
B	Port COM1: Serial port for communicating with PCD
C	Port COM2: Serial port for communicating in network (optional)
D	Port COM3: Serial port for communicating in network (optional)
E	Fuse holder, 800mA fuse
F	Power supply connector
G	LPT port: Parallel port LPT for printer output (optional)
H	Text memory module
I	Data memory module (optional)
L	Trimmer for brightness adjusting (only D850/855)
M	Battery housing

3. Dimensions and panel cut-outs

D810
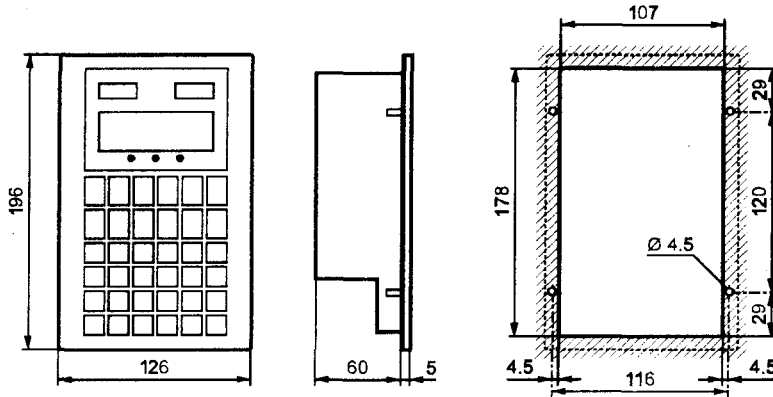
D820/825 and D830/835
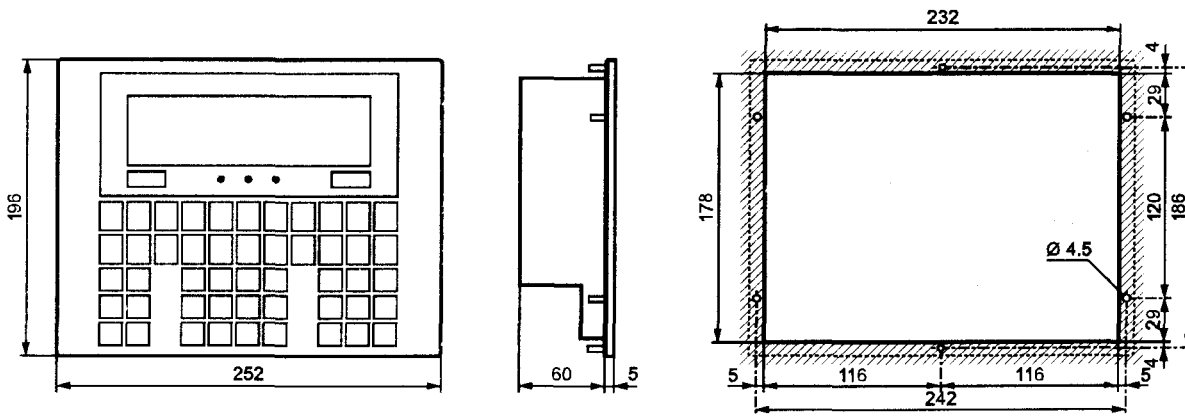
D850/855
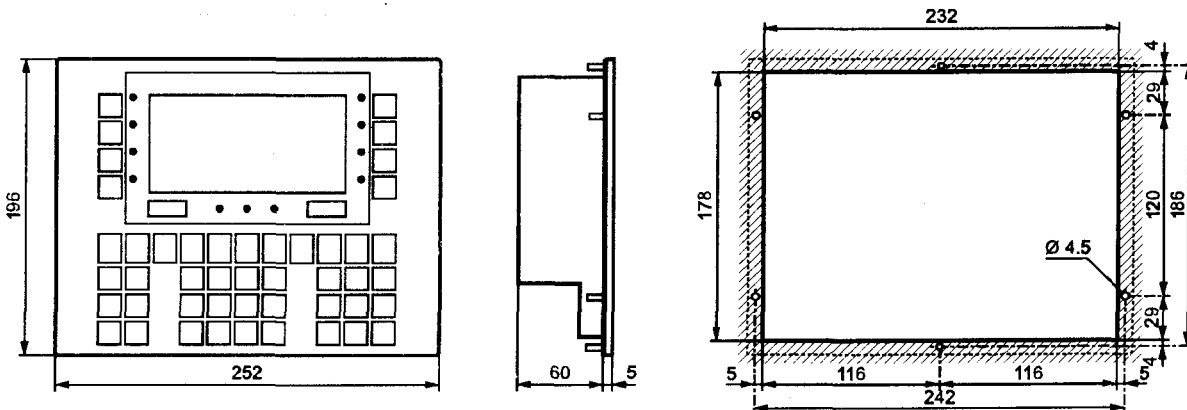
4. Power supply

4.1 Connections and grounding

To supply power to the D8 use a 24VDC ± 20 %, 0.5A power supply unit.
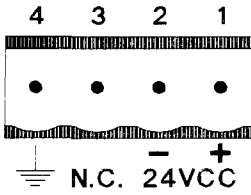
Power supply 4 pins connector	
1	+L Input for 24VDC power supply
2	− Input for 0V power supply
3	N.C.
4	PE Protective ground

IMPORTANT
- Correct earthing is vital.
- Check the connection using the diagrams below.
- The terminal D8 and the controller PCD must have the same ground potential of the supply (0V). Otherwise D8 components could be damaged.

Power supply with 0V (–) to PE
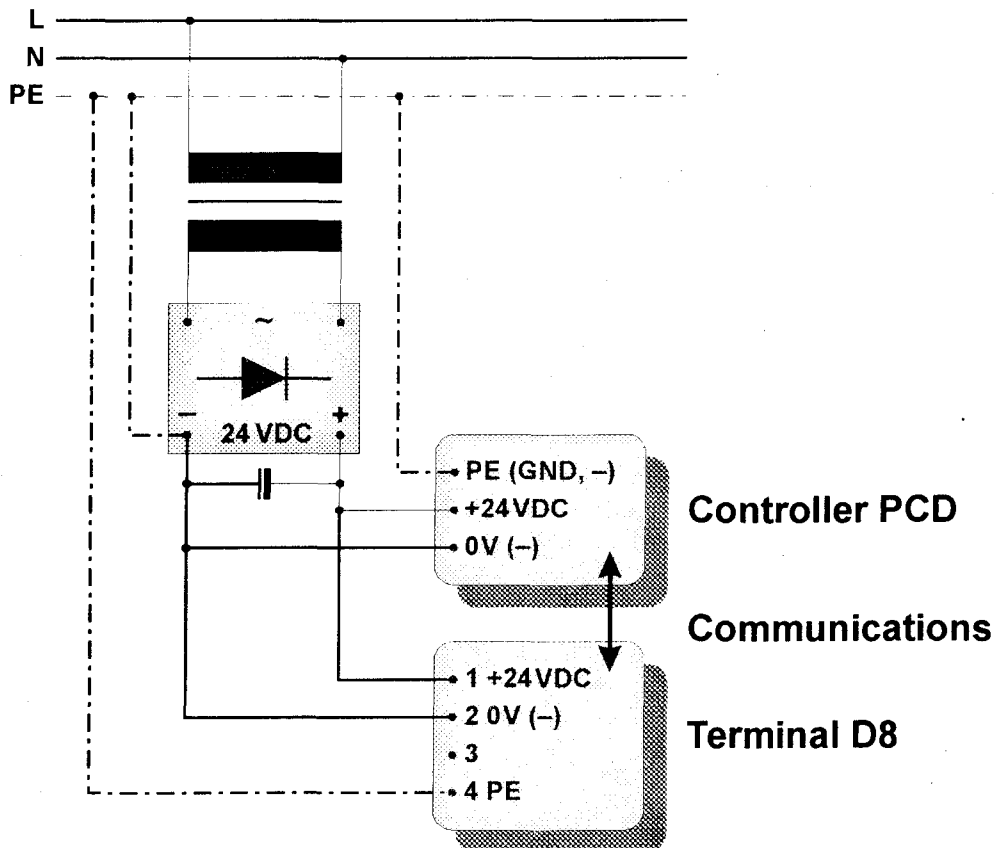
Dangerous connections
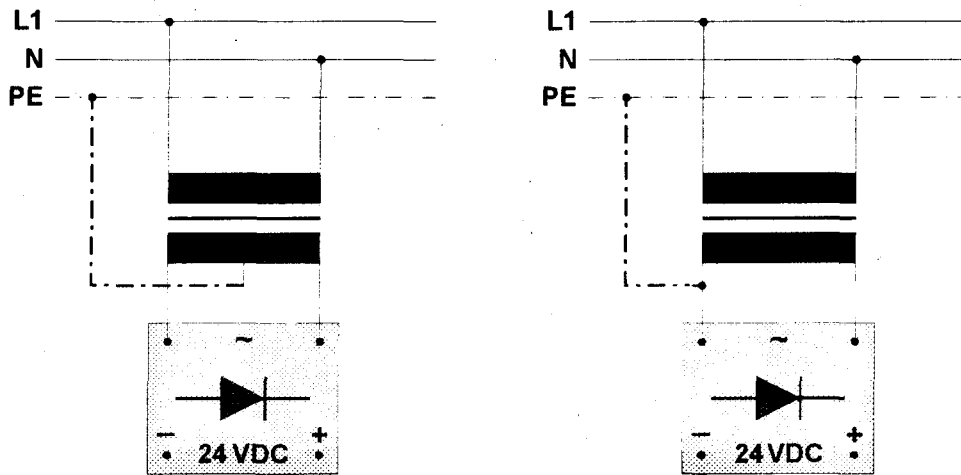
⚠ **WARNING**

These two configurations will seriously damage D8 components.

4.2   Terminal battery

| M | Battery housing |
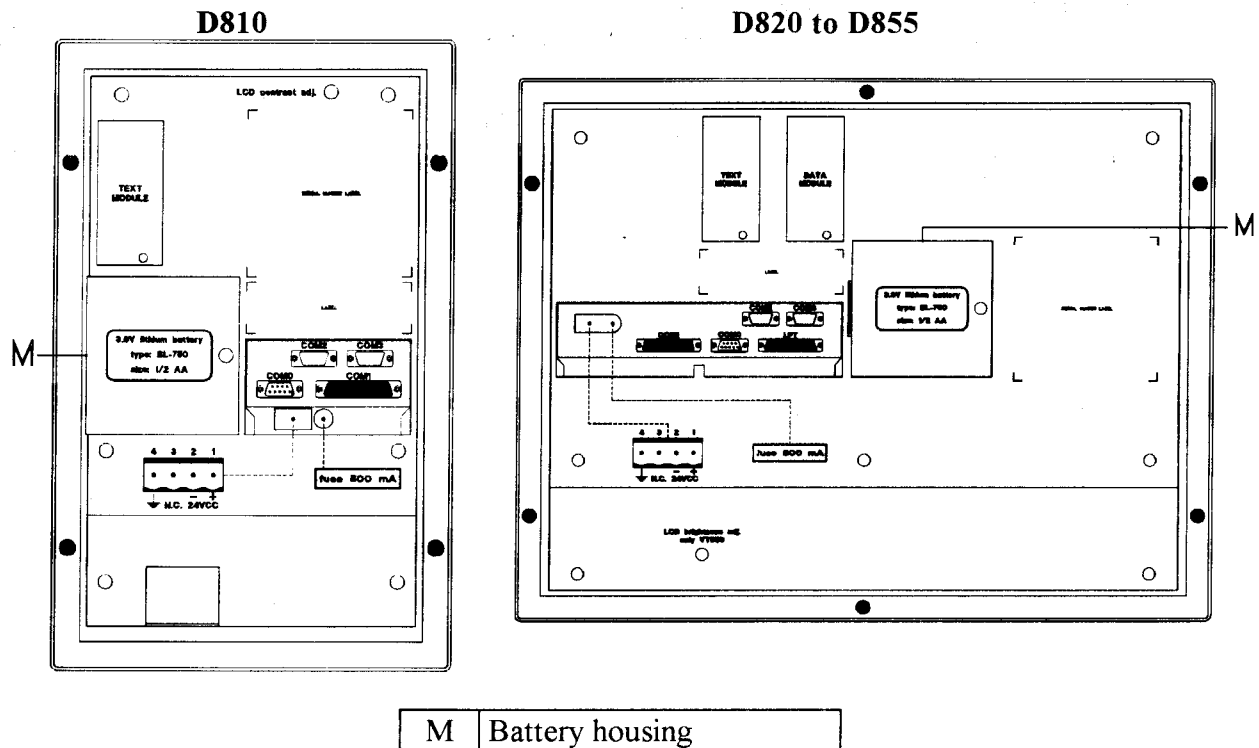
The battery protects the content of RAM (work recipes) and powers the internal clock
(12 microamps at a temperature of 25 °C) in the absence of power supply. At the moment of
purchase there is no battery in the D8, thus inserting it is a matter for the client.

Battery to be used

Size	Catalogue code
Lithium 3.6V ½ AA	4'507'4815'0

We recommend substituting the batteries every 12 months.

- When the battery LED (situated on the D8 keypad) lights up it means that the battery should
be substituted. The content of the data memory will be lost if the battery is not renewed.
Apart from this, the D8 communicates via the appropriate bit in the D8-PCD data exchange
area that the batteries are flat.

- The batteries must be changed with the D8 off. The data in the buffered memory are not lost
in this phase for at least 15 minutes.

How to install the battery in your D8:

- Make sure the power supply is disconnected.
- Remove the tab behind the battery housing (M) in the D8.
- Insert the new battery.
- Replace the tab behind the battery housing (M) in the D8.
- Reconnect the power supply.

5. Text and data memories

D810   **D820/25, D830/35, D850/55**
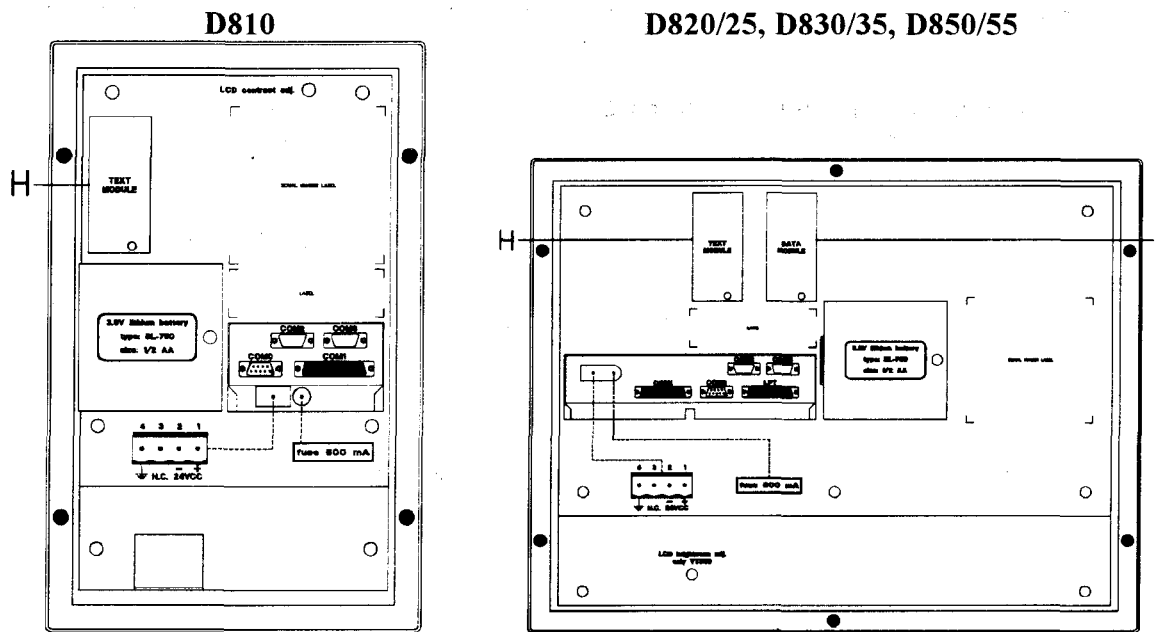
H	FLASH EPROM	Text memory module
I	RAM	Data memory module

If the memory installed in the terminal is not sufficient for your project, the size can be increased by using appropriate expansions. As shown schematically on the rear of the panel the D8 has two distinct types of memory, each intended to perform a particular task:

- **FLASH EPROM** memory used as text memory.
  It is essential that the text memory be installed. At the moment of purchase there is no text memory module in the D8, thus inserting it is a matter for the client.

- **RAM** used as data memory; the basic data memory present on the D8 terminals are:
  - 8Kbytes for D810
  - 32Kbytes for D820/25, D830/35 and D850/855
  In the case of D820/25/30/35/50/55 the capacity of the memory can be increased by applying a supplementary memory module. E.g. if an additional board of 32Kbytes is installed, the data memory available will be 64Kbytes, as the base memory must be added to the supplementary memory.

Table of memory modules

Type of memory	Size	Catalogue code
text memory (FLASH-EPROM)	64Kbytes	PCD7.R801
	128Kbytes	PCD7.R802
	256Kbytes	PCD7.R803
	512Kbytes	PCD7.R804
additional data memory (RAM)	32Kbytes	PCD7.R810
	128Kbytes	PCD7.R812

IMPORTANT
Disconnect the power supplies before operate on the D8

How to install or change the memory in your D8:

- Make sure the power supply is disconnected.
- Remove the rear cover of the D8.
- Using the illustration on the cover, locate on the D8 the memory to be installed or substituted.
- Remove memory board in question (if present).
- Insert the new memory board.
- Replace the cover.

Now the power supply can be reconnected and D8 programming operations can start again.

6.   Brightness and contrast adjustment

D810	**D850/855**

L	Trimmer for display contrast adjustment

L	Trimmer for brightness adjustment (only for D850/855)
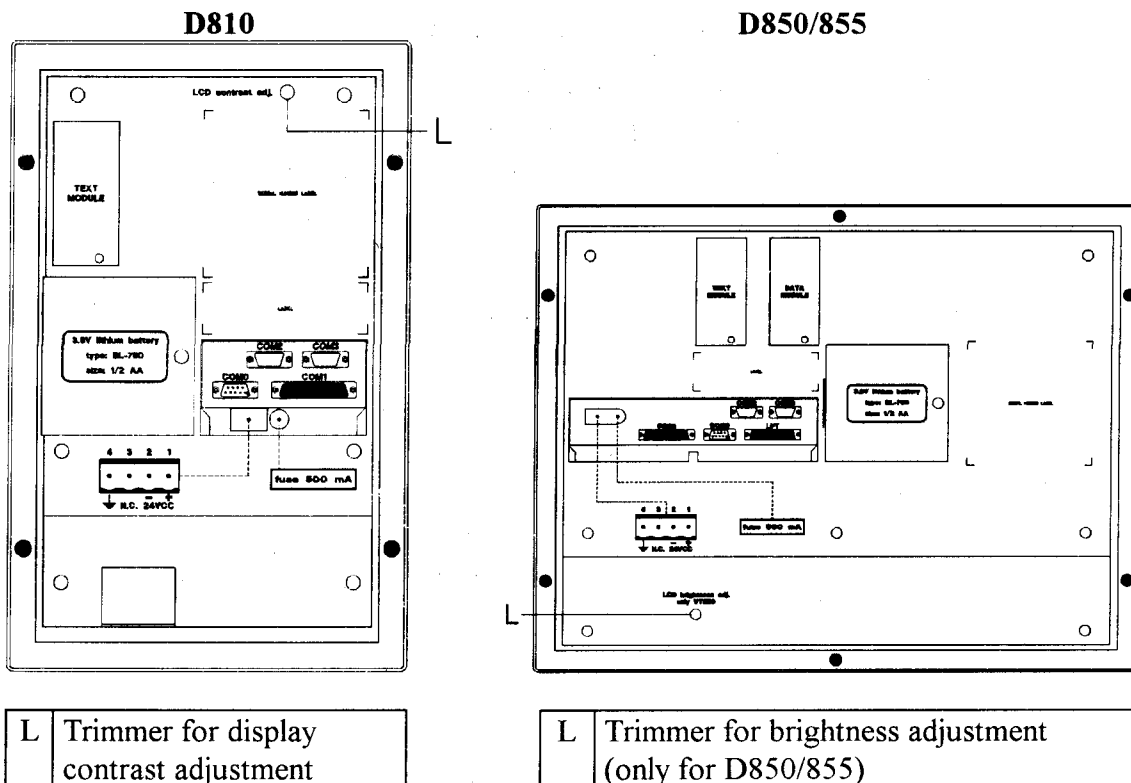
The display **contrast** can be re-adjusted using the [shift] + [▲] or [shift] + [▼].
If you want to set the contrast at medium, press [shift] + [Del].
Once the contrast has been re-adjusted as desired, press [shift] + [Enter] to confirm the changes made.

In the case of D810, **contrast** can only be adjusted by means of the trimmer (L) via the special hole marked "LCD contrast adj." situated on the rear cover.

In the case of D850/855, the **brightness** can also be adjusted by means of the trimmer (L) via the hole on the rear cover at the same level as the connectors and marked "LCD brightness adj. only VT550".

7.   Service page

The service page of the D8 is a page containing all the information relating to the D8. When you press [shift] + [◄], the D8 emits a beep and enters the service page.

This page displays the characteristics of the D8, that is, the version of hardware, the size of RAM data memory and the size of flash text memory present in the D8.

This page (only with D830/35 and D850/55, while in the case of other D8s you have to move to the next page using [▼]), contains the data relating to the hours, minutes, the day, month and year, to the project selected and to the printer being used.

Using [◄] or [►], the information can be polled; items of information can be changed by hand using [▲] or [▼].

When the various changes have been completed, by pressing [◄] or by using [shift] + [◄], you can confirm the changes effected and exit from the service page.

Service page D810 (1)

```
D810    Ver 01.01.N
RAM data   : ### Kb ─1
FLASH user: ### Kb ─2
Status: ######### ─3
```

Service page D810 (2)

```
D810    Ver 01.01.N
◄► select : ##### ─4
▲▼ modify : #### ─5
Status: ######### ─3
```

Service page D820/25 (1)

```
   D820/25  Ver 01.01.N
RAM data memory      : ### Kb ─1
FLASH user memory    : ### Kb ─2
Status : ################## ─3
```

Service page D820/25 (2)

```
   D820/25  Ver 01.01.N
◄► select parameter : ###### ─4
▲▼ modify parameter : ##### ─5
Status : ################## ─3
```

Service page D830/35

```
     D830/35  Ver 01.01.N

RAM data memory      : ### Kb ─1
FLASH user memory    : ### Kb ─2
◄► select parameter  : ###### ─4
▲▼ modify parameter  : ##### ─5
Status : ################# ─3
```

Service page D850/55

```
     D850/55  Ver 01.01.N

RAM data memory    : ### Kb ─1
FLASH user memory  : ### Kb ─2



◄► select parameter : ###### ─4
▲▼ modify parameter : ##### ─5



Status : ################ ─3
```

1	Size of RAM present in D8
2	Size of FLASH-EPROM present in D8
3	Current status of D8
4	Field for selecting the parameter to be modified
5	Field for modifying the parameter selected

7.1   Selecting the active project

If more than one project has been transmitted to the D8, you can select the project you want to use.

Activating the project you want:

- Enter service page using [shift] + [◄].
- In the case of D810 and D820/25 models press [▼ PgDn].
- Go to field "Project" using [◄] or [►].
- Select the project you want to use using [▲] or [▼].
- Confirm choice effected and exit from service page by using [◄ Enter] or by using [shift] + [◄].

7.2   Selecting the printer

The D8 is able to control a serial or (in the case only of D825, D835 and D855 equipped with a parallel port LPT) a parallel printer. While in the phase of constructing the project, you can choose the type of printer to be used. Each D8 can control a serial printer using the COM0 port.

Beside a serial printer, D825, D835 and D855 can also control a parallel printer provided they are equipped with a parallel port LPT (optional). In any case, the D8 can only control one type of printer – it means that both types of printer cannot be used simultaneously.

The type of printer to be used can be modified by the D8 as well as by the project.

To change the printer using the D8:

- Enter service page using [shift] + [◄].
- In the case of D810 and D820/25 models press [▼ PgDn].
- Go to field "PRINTER" using [◄] or [►].
- Using [▲] or [▼] select the type of printer you want to use from the three options available:
  - "FROM PROJECT" means that the D8 will use the printer identified in the project.
  - "SERIAL" means that the D8 will use the serial printer (COM0).
  - "PARALLEL" means that the D8 will use the parallel printer (LPT).
- Confirm choices effected and exit from service page by using [◄ Enter] or by using [shift] + [◄].

7.3 Inputting the network parameters (in preparation)

If you intend to use more than one D8 connected to a single PCD, you will need to define the network parameters. The parameters to be defined for more than one D8 to communicate with a single PCD are:

- Address to assign to D8
    - 0 to indicate to the D8 that it is a master D8
    - Number 1 to number 31 to indicate to the D8 that it is a slave D8 whose address is equal to the number assigned

- Only for the master D8
    - Number of slave D8s connected, maximum 31.

Operations necessary for inputting network parameters:

- Enter service page using [shift] + [◄].
- In the case of D810 and D820/25 models press [▼PgDn].
- Go to field "ADDRESS" using [◄] or [►].
- Select the address to be assigned to the D8 using [▲] or [▼].
- Go to field "MAX STATION" (or field STATIONS in the case of D810), using [◄] or [►].
- Select the number of slave D8s connected to the master using [▲] or [▼].
- Exit from service page by using [◄Enter] or by using [shift] + [◄].

8. Status page

The status page of the D8 is a page containing all the information relating to the various kinds of error to which the D8 is subject.

To access the status page press [shift] + [▶]. The D8 will emit a beep and enter this page.

The status page contains the type of driver transmitted to the D8 and sixteen dots. Each dot is assigned to a bit and consequently to an error message.

The message related to each dot can be displayed by moving with the help of [◀] or [▶].

If there are errors in the D8, this page will display instead of a dot or dots one or more asterisks corresponding to these errors. Using [◀] or [▶] you will be able to see the nature of the error and therefore take measures to eliminate it.

Exit from this page by pressing [shift] + [▶].

Status page D810

```
################ ──── 1
15......8 7......0
........ ........ ──── 2
«################» ── 3
```

Status page D820/825

```
Protocol Type :    ################ ──── 1
                   15......8 7......0
Status :           ........ ........ ── 2
Description :      «################» ── 3
```

Status page D830/835

```
       D830/835  Ver 01.01.N

Protocol Type :    ################ ──── 1
                   15......8 7......0
Status :           ........ ........ ── 2
Description :      «################» ── 3
```

Status page D850/855

```
       D850/855  Ver 01.01.N

Protocol Type :    ################ ──── 1

                   15......8 7......0
Status :           ........ ........ ──── 2

Description :      «################» ── 3
```

1	Type of driver
2	Status of error bits
3	Error message relative to the bit selected

The possible error messages and solutions are as follows:

Bit	Meaning	Solution
0	The data requested belongs to a non-existent list.	Recompile and transfer the project and the driver.
2	The data requested in display has not yet been read by the D8.	Recompile and transfer the project and the driver.
3	An operation has been carried out on an item of data belonging to a list that has not yet been interpreted, or that has been interpreted and subsequently disabled.	Recompile and transfer the project and the driver.
4	The operation requested has been carried out on an item of data not present in the PCD.	Check whether the PCD elements are all accessible.
6	The PCD has been asked to carry out a function before finishing the previous one.	Recompile and transfer the project and the driver.
7	Errors have been detected in the data exchange between the D8 and the PC.	Recompile and transfer the project and the driver.
8	Communication between D8 and PCD interrupted.	Check the cable connection between D8 and PCD.

9. Terminal communication ports
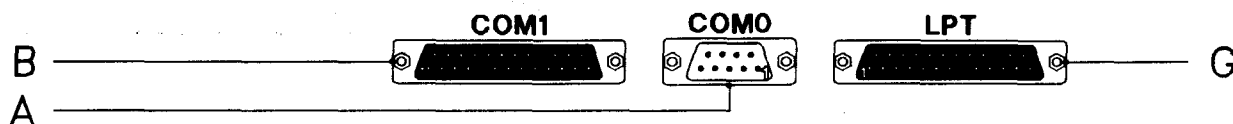
A	Port COM0: Serial port for communicating with PC
B	Port COM1: Serial port for communicating with PCD
G	LPT port: Parallel port LPT for printer output (optional)

COM1 (B) 25 pole female	
Pin	**Description**
1	N.C.
2	Tx RS232 OUT
3	Rx RS232 IN
4	RTS RS232 OUT
5	CTS RS232 IN
6	N.C.
7	Signal GND
8	N.C.
9	*Tx C.L. + OUT
10	Tx Rx485 – IN/OUT
11	*Tx C.L. – OUT
12	Tx RS422 – OUT
13	Rx RS422 + IN
14	IKT OUT
15	IKR OUT
16	+ 5 VDC
17	N.C.
18	*Rx C.L. + IN
19	N.C.
20	N.C.
21	N.C.
22	Tx Rx485 +IN/OUT
23	Tx RS422 +OUT
24	Rx RS422 – IN
25	*Rx C.L. – IN

* C.L. = Current loop.

COM0 (A) 9 pole male	
Pin	**Description**
1	DCD IN
2	RX IN
3	TX OUT
4	DTR OUT
5	Signal GND
6	DSR IN
7	RTS OUT
8	CTS IN
9	RI IN

LPT (G) 25 pole female	
Pin	**Description**
1	Strobe
2	PRN Data 0
3	PRN Data 1
4	PRN Data 2
5	PRN Data 3
6	PRN Data 4
7	PRN Data 5
8	PRN Data 6
9	PRN Data 7
10	N.C.
11	PRN Busy
12	N.C.
13	N.C.
14	N.C.
15	N.C.
16	N.C.
17	N.C.
18	Signal GND
19	Signal GND
20	Signal GND
21	Signal GND
22	Signal GND
23	Signal GND
24	Signal GND
25	Signal GND

10. Connection cables

10.1 D8 (COM0) ⇔ PC: 9 pin connection cable

Cable RS 232: D8↔Personal Computer

to terminal		to Personal Computer
PCD7.D8xx		(IBM compatible)

9-pole D-type connector (female)	max. 15 m	9-pole D-type connector (female)

RxD 2		3 TxD
TxD 3		2 RxD
SGND 5		5 SGND
RTS 7		7 RTS
CTS 8		8 CTS
		6 DSR
		4 DTR
Shield / housing		Shield / housing
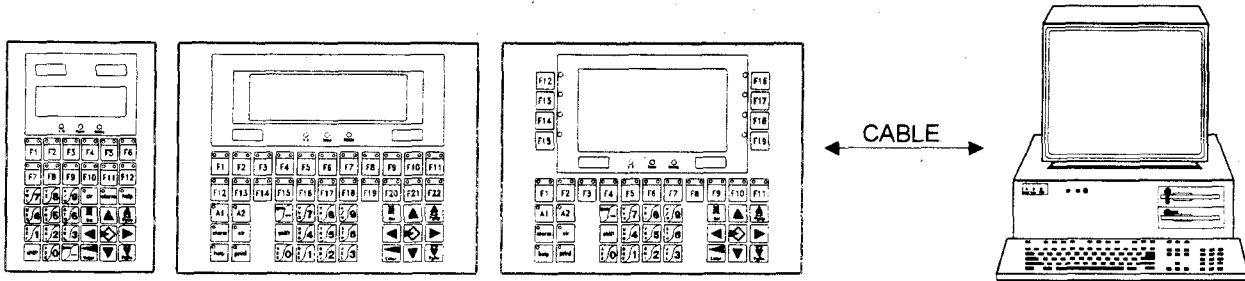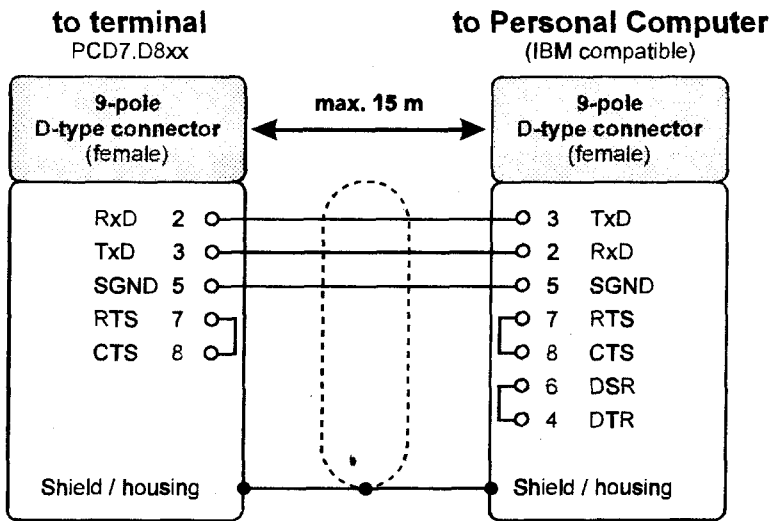
Diagram A1

Cable RS 232: D8↔Personal Computer

to terminal		to Personal Computer
PCD7.D8xx		(IBM compatible)

9-pole D-type connector (female)	max. 15 m	25-pole D-type connector (female)

RxD 2		2 TxD
TxD 3		3 RxD
SGND 5		7 SGND
RTS 7		4 RTS
CTS 8		5 CTS
		6 DSR
		20 DTR
Shield / housing		Shield / housing
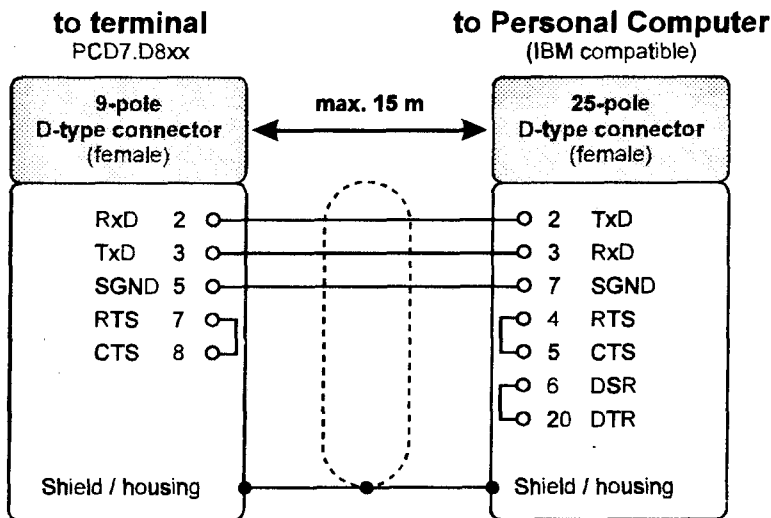
Diagram A2

10.2 D8 (COM1) ⇔ PCD: 25 pin connection cable

Pay special attention to the choice and layout of connection cables, especially the cable for the serial connection between the D8 and PCD:

Specifications of serial connection cable:	
Direct current resistance	max. 151 Ω/km
Capacity coupling	max. 29 pF/m
Shielding	>80 % or total

Always:
- Find the shortest route
- Lay disturbed cables separately

⚠ **WARNING**

Disconnect the power supply before connecting or disconnecting the communication cables.

Cable RS 232: D8↔PGU socket (port 0)
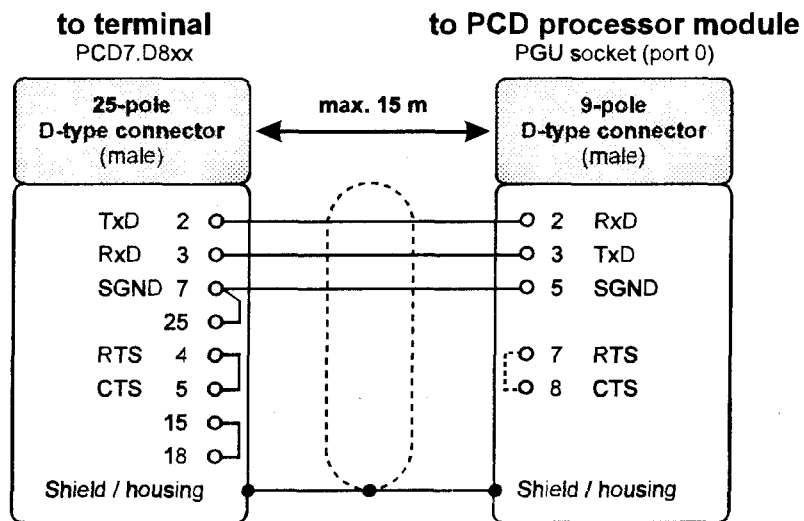
Diagram B1

Cable RS 232: D8↔PCD interface (port 1, 2 or 3)
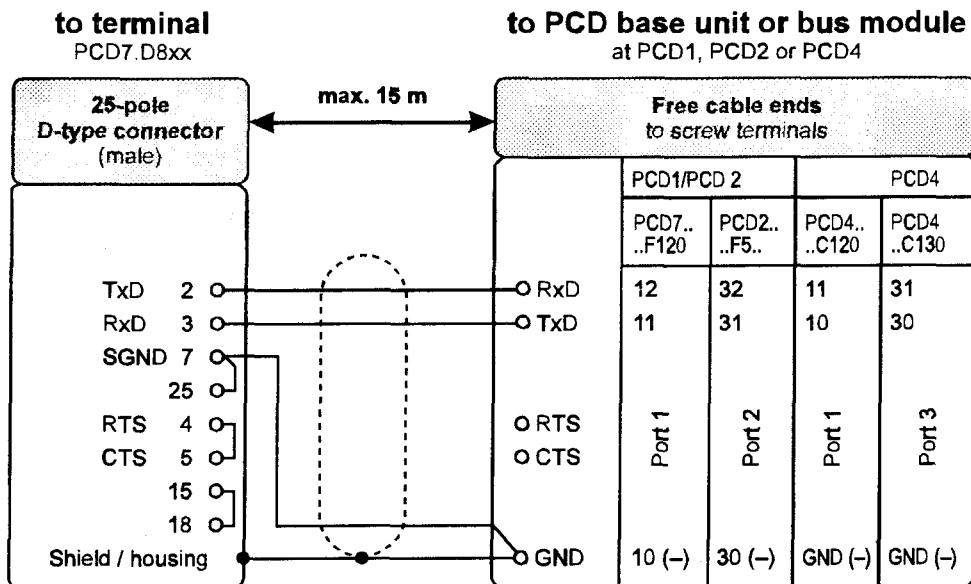
Diagram B2

Cable RS 422: D8↔PCD interface (port 1, 2 or 3)

to terminal
PCD7.D8xx

to PCD base unit or bus module
at PCD1, PCD2 or PCD4

25-pole D-type connector (male)		Free cable ends to screw terminals			
			PCD1/PCD2		PCD4
			PCD7.. ..F110 ..F150	PCD2.. ..F520 ..F530	PCD4.. ..C130
Tx – 12	Rx		13	38	X1
Tx + 23	/Rx		14	39	X3
Rx – 24	Tx		11	36	X0
Rx + 13	/Tx		12	37	X2
RTS 4	RTS				
CTS 5	/RTS				
15	CTS				
18	/CTS				
SGND 7					
25	PGND		10/15	35 (–)	GND (–)
			Port 1	Port 3	Port 1/2

(X = Port no.)
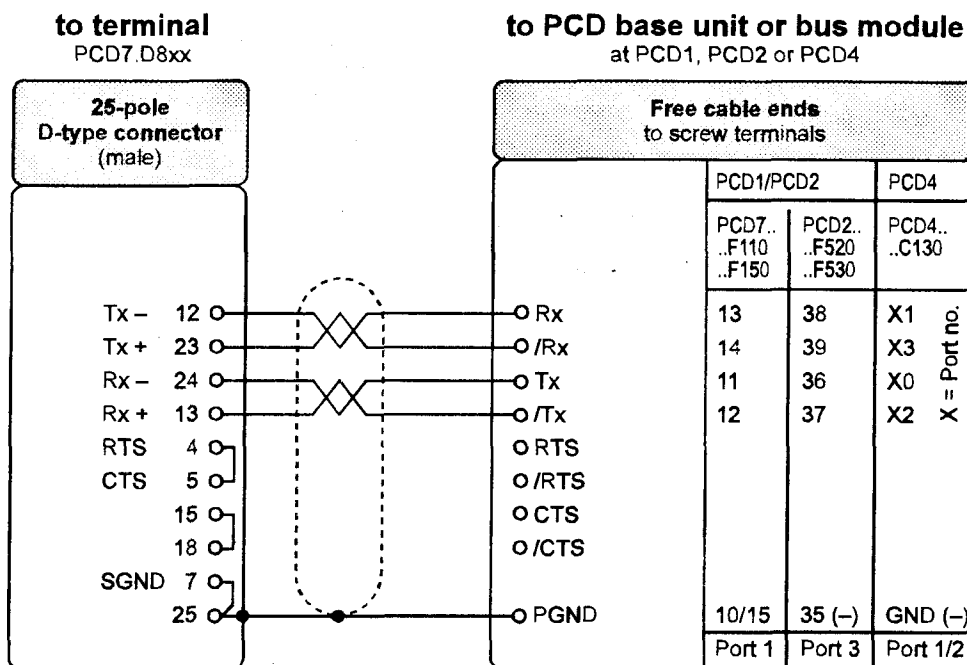
Diagram C1

For PCD1 and PCD2 it is recommanded to place jumper J1 to position "CLOSED" to define the 5V level and activate the termination resistor 150 Ω. For the PCD4 bus module ..C130 please see the PCD4 manual 26/734.

Cable RS 485: D8↔PCD interface (port 1 or 3)

to terminal
PCD7.D8xx

to PCD base unit or bus module
at PCD1, PCD2 or PCD4

25-pole D-type connector (male)		Free cable ends to screw terminals			
			PCD1/PCD2		PCD4
			PCD7.. ..F110 ..F150	PCD2.. ..F520 ..F530	PCD4.. ..C130
Tx Rx – 10	Rx - Tx		11	36	10
Tx Rx + 22	/Rx - /Tx		12	37	12
RTS 4	GND		10 (–)	35 (–)	GND (–)
CTS 5			Port 1	Port 3	Port 1
15					
18					
7					
25					
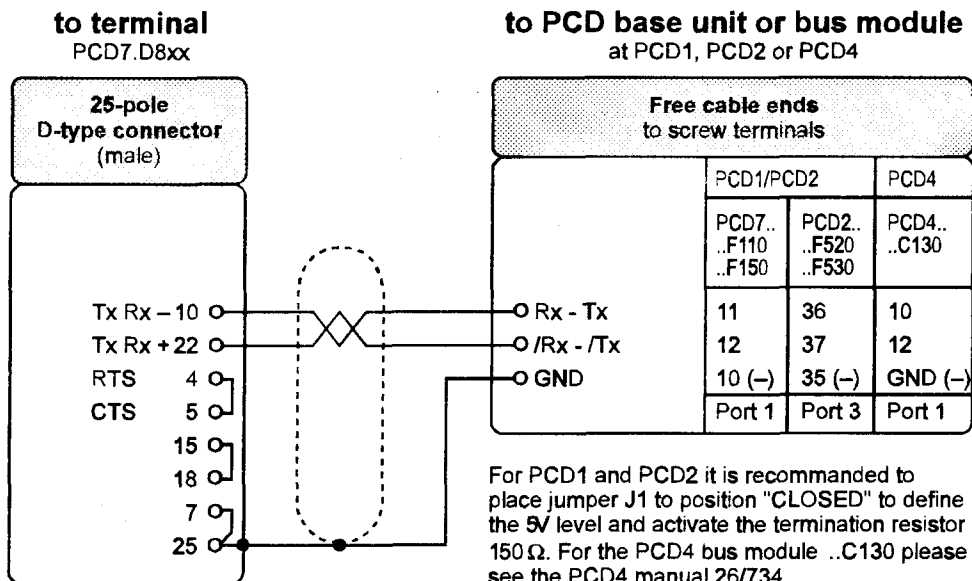
Diagram C2

For PCD1 and PCD2 it is recommanded to place jumper J1 to position "CLOSED" to define the 5V level and activate the termination resistor 150 Ω. For the PCD4 bus module ..C130 please see the PCD4 manual 26/734.

Cable CL 20 mA: D8↔PCD interface (port 1, 2 or 3)

to terminal
PCD7.D8xx

to PCD base unit or bus module
at PCD1, PCD2 or PCD4

Diagram D1

		PCD1/PCD2	PCD4
		PCD7.F130	..C110/..C120
Source ±⊕⊕⊣		12	X1
RxD +	14	14	X3
	9	17	X5
SGND	11	19	X7
Source ±⊕⊕⊣		11	X0
	15	13	X2
	18	16	X4
	25	18	X6
	7		
RTS	4		
CTS	5		
Shield / housing			

25-pole D-type connector (male) — Active

Free cable ends to screw terminals — Passive

X = Port no.
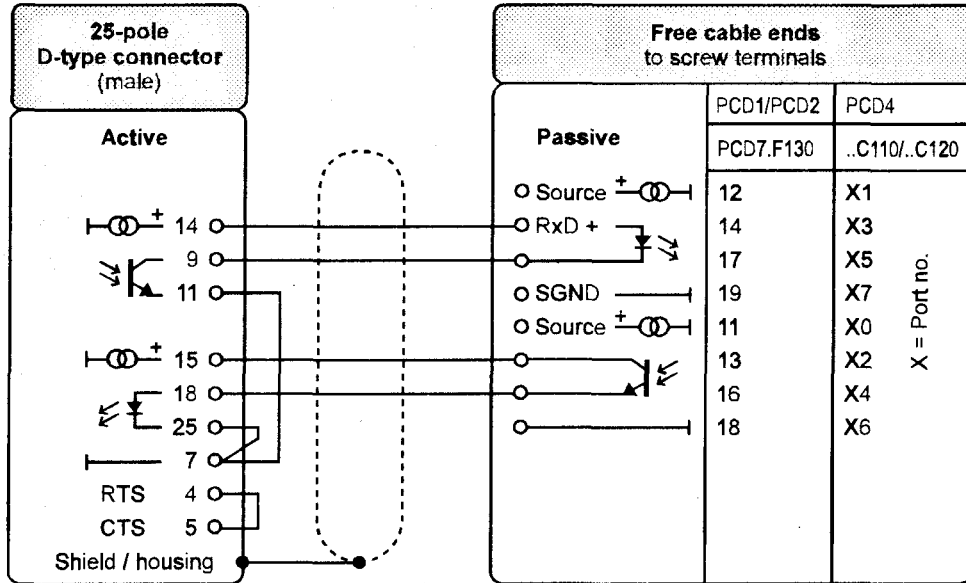
11. Loading the driver or the project in a D8

11.1 General programming operations

- Make certain that the D8 is OFF.
- Check that the serial connection between the PC and D8 is in place: connect the serial cable between the COM0 of the terminal and a serial port of the PC.
- Switch ON the PC and the D8
- Select "Connection with D8" from main menu of project management program (PCD8.D80E); don't worry about the D8 operational mode, the correct one will be activated during the transfer of the project from PC.

During the programming operation, the D8 continuously informs on the progress of the transfer, at the end of which the D8 emits a "beep" and starts to display and manage the transferred project.

11.2 Operations on PC for loading the SAIA driver

```
        ╭─────────────────╮
        │      START       ▌
        ╰─────────┬───────▌
                  ▼
  ┌───────────────────────────┐
  │          Select           │
  │   CONNECTION WITH D8      │
  │      from main menu       │
  └─────────────┬─────────────┘
                ▼
  ┌───────────────────────────┐
  │ PC displays menu with headings: │
  │  "TX PROJECT", "SERVICE"  │
  │ and "CHANGE RECIPE DATA"  │
  └─────────────┬─────────────┘
                ▼
  ┌───────────────────────────┐
  │     Select "SERVICE"      │
  └─────────────┬─────────────┘
                ▼
  ┌───────────────────────────┐
  │  PC shows mask for selecting │
  │     "service" operations  │
  └─────────────┬─────────────┘
                ▼
  ┌───────────────────────────┐
  │     Select "TX DRIVER"    │
  └─────────────┬─────────────┘
                ▼
  ┌───────────────────────────┐
  │ PC shows mask for selecting the │
  │   driver to be sent to the D8  │
  └─────────────┬─────────────┘
                ▼
  ┌───────────────────────────┐
  │  Select appropriate driver │
  │        from list          │
  └─────────────┬─────────────┘
                ▼
  ┌───────────────────────────┐
  │ PC transfers driver selected, then │
  │           shows           │
  │ "END OF OPERATIONS" mask. │
  └─────────────┬─────────────┘
                ▼
        ╭─────────────────╮
        │       END        ▌
        ╰─────────────────▌
```
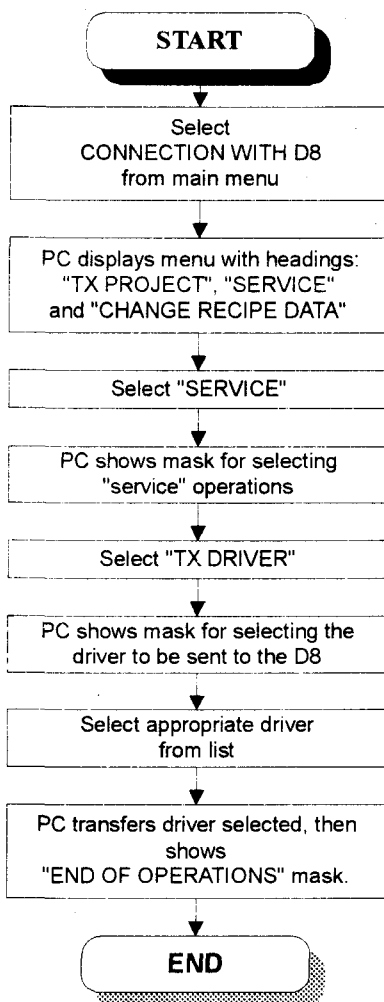
11.3 Operations on PC for loading the project

```
        ┌─────────────────┐
        │     START       │
        └─────────────────┘
                 │
   ┌─────────────▼─────────────┐
   │          Select           │
   │    CONNECTION WITH D8     │
   │      from main menu       │
   └─────────────┬─────────────┘
   ┌─────────────▼─────────────┐
   │ PC displays menu with headings. │
   │  "TX PROJECT", "SERVICES" │
   │  and "CHANGE RECIPE DATA" │
   └─────────────┬─────────────┘
   ┌─────────────▼─────────────┐
   │    Select "TX PROJECT"    │
   └─────────────┬─────────────┘
   ┌─────────────▼─────────────┐
   │ PC shows mask for selecting │
   │ the projects to be sent to the D8 │
   │ with the list of those selected │
   └─────────────┬─────────────┘
        ┌────────▼────────┐   No
        │ At least one project ├──────► PROCESS 1
        │ appears in list?     │
        └────────┬────────┘
              Yes│
        ┌────────▼────────┐   Yes
        │ Do you want to add   ├──────► PROCESS 1
        │ another project to the list of │
        │ projects to be sent? │
        └────────┬────────┘
               No│
        ┌────────▼────────┐   Yes
        │ Do you want to delete ├──────► PROCESS 2
        │ a project from the list │
        │ of projects to be sent? │
        └────────┬────────┘
               No│
   ┌─────────────▼─────────────┐
   │       Select "OK"         │
   └─────────────┬─────────────┘
   ┌─────────────▼─────────────┐
   │  PC compiles the projects │
   │    selected (if necessary) │
   └─────────────┬─────────────┘
   ┌─────────────▼─────────────┐
   │  PC requests confirmation │
   │   before commanding the   │
   │   D8 to enter service page │
   └─────────────┬─────────────┘
   ┌─────────────▼─────────────┐
   │       Select "OK"         │
   └─────────────┬─────────────┘
   ┌─────────────▼─────────────┐
   │  The PC shows the mask for │
   │   selecting the parameters │
   │     for the serial port:  │
   │    1) COM1 - COM2         │
   │    2) Transmission speed  │
   └─────────────┬─────────────┘
   ┌─────────────▼─────────────┐
   │ Select the desired parameters │
   └─────────────┬─────────────┘
   ┌─────────────▼─────────────┐
   │ Press "OK" D8 enters service page │
   │  and project transfer begins │
   └─────────────┬─────────────┘
   ┌─────────────▼─────────────┐
   │ PC transfers project or projects. │
   └─────────────┬─────────────┘
        ┌────────▼────────┐
        │       END       │
        └─────────────────┘
```

```
        ┌─────────────────┐
        │ START PROCESS 1 │
        └────────┬────────┘
   ┌─────────────▼─────────────┐
   │       Select "ADD"        │
   └─────────────┬─────────────┘
   ┌─────────────▼─────────────┐
   │  The PC shows the mask for │
   │ selecting the project to be added │
   └─────────────┬─────────────┘
   ┌─────────────▼─────────────┐
   │    Select the new project │
   └─────────────┬─────────────┘
   ┌─────────────▼─────────────┐
   │  The PC adds the new project to │
   │ the list and returns to main mask │
   └─────────────┬─────────────┘
        ┌────────▼────────┐
        │  END PROCESS 1  │
        └─────────────────┘
```

```
        ┌─────────────────┐
        │ START PROCESS 2 │
        └────────┬────────┘
   ┌─────────────▼─────────────┐
   │  Select the project you want │
   │    to delete from the list │
   └─────────────┬─────────────┘
   ┌─────────────▼─────────────┐
   │       Press "DELETE"      │
   └─────────────┬─────────────┘
   ┌─────────────▼─────────────┐
   │ The PC deletes the project from │
   │ the list and allows new selections │
   │       to be made          │
   └─────────────┬─────────────┘
        ┌────────▼────────┐
        │  END PROCESS 2  │
        └─────────────────┘
```

12. Error messages (during operation)

The D8 may display on its screen while in operation certain operation error messages or program error messages. The messages are as follows:

NUMBER	TYPE OF ERROR	DESCRIPTION
ERROR 1	Too much data in page: X	Means that the maximum number of data per page has been exceeded in the page in question.
ERROR 2	Page not found: X	Means that the page X has been called up, but does not exist in the user program.
ERROR 3	Starting page not defined	Means that no sequence declaration has been made in the program; there is therefore no definition of the starting page.
ERROR 4	Data not found: X	Means that the datum X is not present in the database.
ERROR 5	Recipe data not found: X.	Means that the datum X is not present in the database of recipe data.
ERROR 6	Bad command in page: X	Means that a command on page X has not been recognised.
ERROR 7	Object not found	Means that the object to be displayed does not exist in the page.
ERROR 8	Report not found	Means that the report to be printed does not exists.
ERROR 9	Wrong D8 in project	Means that the FLASH-EPROM module installed in the D8 contains a project made for a different model of D8.
ERROR 10	Wrong PLC in project	Means that the project which has been transmitted to the D8 was made for a different PLC with a different driver.

Useful advice for overcoming these errors:

- ERROR 1: Erase some date on the page X.
- ERRORS 2, 3, 4, 5, 6, 7 and 8: Check the project again, there could be errors there. In these cases it is advisable to use the "Full compilation" in the transmission to D8 phase.
- ERROR 9: The FLASH-EPROM must be replaced or erased and reloaded with the correct project.
- ERROR 10: Load the correct driver for your PCD or change the project driver.

If you want to transfer a driver or a project when errors 9 or 10 appear on the screen, you have to wait until the D8 enters the service page (wait about 17 seconds from the appearance of the error message) and transfer the new driver or the new project. To find out how to transfer the driver or the project, see the sections "Loading the SAIA driver in a D8" and "Loading the project in a D8".

13. Data exchange area

Word no.	Type	Contents of register	
+ 0	W	Clock hours in BCD (00...23)	
+ 1	W	Clock minutes in BCD (00...59)	
+ 2	W	Clock seconds in BCD (00...59)	
+ 3	W	Day of month in BCD (01...31)	
+ 4	W	Month BCD (01...12)	
+ 5	W	Year in BCD (00...99)	
+ 6	W	Day of week BCD (0=Mon, 06=Sun)	
+ 7	W	Sequence currently displayed	
+ 8	W	Page currently displayed	
+ 9	R	Num. word alarms	
+ 10	W	ASCII value of last key pressed	
+ 11	R	Offset 1st word alarms from visual.	Offset last word alarms from visual.
+ 12	R	Offset 1st word alarms from printer.	Offset last word alarms from printer.
+ 13	W	Decode. bit Groups, Keys, Special keys	
+ 14	W	Decode. bit clr, alarm, help	
+ 15	W	Decode. bit - number keys, +, -	
+ 16	W	Decode. bit - Letter keys, space	
+ 17	W	Decode. bit - Keys F1...F15	
+ 18	W	Decode. bit - Keys F16...F22	
+ 19	R	Steady LEDs A1, A2, clr, alarm, help	
+ 20	R	Steady red LEDs keys F1...F15	
+ 21	R	Steady red LEDs keys F16...F22	
+ 22	R	Steady green LEDs keys F1...F15	
+ 23	R	Steady green LEDs keys F16...F22	
+ 24	R	Flashing LEDs A1, A2, clr, alarm, help	
+ 25	R	Flashing red LEDs keys F1...F15	
+ 26	R	Flashing red LEDs keys F16...F22	
+ 27	R	Flashing green LEDs keys F1...F15	
+ 28	R	Flashing green LEDs keys F16...F22	
+ 29	R	Forcing page in sequence	
+ 30	R	Forcing sequence	
+ 31	R	Forcing page (inhibit sequence)	
+ 32	W	Writing Data exchange bit	
+ 33	R	Reading data exchange bit	
+ 34	W	State of inputs F1...F15	
+ 35	W	State of inputs F16...F22	
+ 36	W	Synchronised recipe transfer	
+ 37	R	Synchronised recipe transfer	
+ 38	W	Number recipes remaining	
+ 39	W	Number recipes already written	
+ 40	R	Dummy read	
+ 41	W	Dummy write	

Word no.	Type	Contents of register
+ 42	R	Recipe code requested by PCD part 1
+ 43	R	Recipe code requested by PCD part 2
+ 44	R	Recipe code requested by PCD part 3
+ 45	R	Recipe code requested by PCD part 4
+ 46	R	Recipe code requested by PCD part 5
+ 47	R	Recipe code requested by PCD part 6
+ 48	R	Recipe code requested by PCD part 7
+ 49	R	Recipe code requested by PCD part 8
+ 50	R	Commands for data recipe from PCD to D8
+ 51	W	Commands for data recipe from D8 to PCD
+ 52	W	Printing page number
+ 53	W	Number of alarms printing page
+ 54	R	Printing page
+ 55	R	Commands to printer from PCD to D8
+ 56	W	Answer from printer from D8 to PCD
+ 57	R	Printing report
+ 58	R	Timer assigned to synchro-symbols
+ 59	W	Progressive number of data being modified
+ 60	W	Number alarms selected

Type	Description
R	Read
W	Write

13.1 Key decoding

Bit	Word 13: Bit decodification key group and special keys
0	Any key
1	
2	Letter keys, Space
3	◀ ◈ ▽ ▲ ◀ ▶ ▲ ▼ ⊠
4	A1 A2 clr alarm help
5	F1...F22 keys
6	shift
7	Any key
8	◀ Enter
9	◈
10	▽ PgDn
11	▲ PgUp
12	▶
13	◀
14	▼
15	▲

Bit	Word 14: Bit decodification, clr, alarm, and help keys
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	A1
11	A2
12	print
13	clr
14	alarm
15	help

Bit	Word 15: Bit decodification number keys keys "+" and "–"
0	Key 0
1	Key 1
2	Key 2
3	Key 3
4	Key 4
5	Key 5
6	Key 6
7	Key 7
8	Key 8
9	Key 9
10	
11	
12	
13	
14	
15	

Bit	Word 16: Bit decodification Letter Keys and Space Key
0	A/B/C Key
1	D/E/F Key
2	G/H/I Key
3	J/K/L Key
4	M/N/O Key
5	P/Q/R Key
6	S/T/U Key
7	V/W/X Key
8	Y/Z Key
9	
10	
11	
12	
13	SPACE Key
14	+/–/= Key
15	

Bit	Word 17: Bit decodification F1...F15 KEYS
0	
1	Key F1
2	Key F2
3	Key F3
4	Key F4
5	Key F5
6	Key F6
7	Key F7
8	Key F8
9	Key F9
10	Key F10
11	Key F11
12	Key F12
13	Key F13
14	Key F14
15	Key F15

Bit	Word 18: Bit decodification F16...F22 KEYS
0	Key F16
1	Key F17
2	Key F18
3	Key F19
4	Key F20
5	Key F21
6	Key F22
7	
8	
9	
10	
11	
12	
13	
14	
15	

13.2 Exchange bits for LEDs

Bit	Word 19: Steady LEDs clr, alarm, help
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	A1
11	A2
12	print
13	clr
14	alarm
15	help

Bit	Word 24: Flashing LEDs clr, alarm, help
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	A1
11	A2
12	print
13	clr
14	alarm
15	help

Bit	Word 20: Steady red LEDs keys F1...F15	Bit	Word 21: Steady red LEDs keys F16...F22
0		0	Red LED Key F16
1	Red LED Key F1	1	Red LED Key F17
2	Red LED Key F2	2	Red LED Key F18
3	Red LED Key F3	3	Red LED Key F19
4	Red LED Key F4	4	Red LED Key F20
5	Red LED Key F5	5	Red LED Key F21
6	Red LED Key F6	6	Red LED Key F22
7	Red LED Key F7	7	
8	Red LED Key F8	8	
9	Red LED Key F9	9	
10	Red LED Key F10	10	
11	Red LED Key F11	11	
12	Red LED Key F12	12	
13	Red LED Key F13	13	
14	Red LED Key F14	14	
15	Red LED Key F15	15	

Bit	Word 22: Steady green LEDs keys F1...F15	Bit	Word 23: Steady green LEDs keys F16...F22
0		0	Green LED Key F16
1	Green LED Key F1	1	Green LED Key F17
2	Green LED Key F2	2	Green LED Key F18
3	Green LED Key F3	3	Green LED Key F19
4	Green LED Key F4	4	Green LED Key F20
5	Green LED Key F5	5	Green LED Key F21
6	Green LED Key F6	6	Green LED Key F22
7	Green LED Key F7	7	
8	Green LED Key F8	8	
9	Green LED Key F9	9	
10	Green LED Key F10	10	
11	Green LED Key F11	11	
12	Green LED Key F12	12	
13	Green LED Key F13	13	
14	Green LED Key F14	14	
15	Green LED Key F15	15	

Bit	Word 25: Flashing red LEDs keys F1...F15
0	
1	Red LED Key F1
2	Red LED Key F2
3	Red LED Key F3
4	Red LED Key F4
5	Red LED Key F5
6	Red LED Key F6
7	Red LED Key F7
8	Red LED Key F8
9	Red LED Key F9
10	Red LED Key F10
11	Red LED Key F11
12	Red LED Key F12
13	Red LED Key F13
14	Red LED Key F14
15	Red LED Key F15

Bit	Word 26: Flashing red LEDs keys F16...F22
0	Red LED Key F16
1	Red LED Key F17
2	Red LED Key F18
3	Red LED Key F19
4	Red LED Key F20
5	Red LED Key F21
6	Red LED Key F22
7	
8	
9	
10	
11	
12	
13	
14	
15	

Bit	Word 27: Flashing green LEDs keys F1...F15
0	
1	Green LED Key F1
2	Green LED Key F2
3	Green LED Key F3
4	Green LED Key F4
5	Green LED Key F5
6	Green LED Key F6
7	Green LED Key F7
8	Green LED Key F8
9	Green LED Key F9
10	Green LED Key F10
11	Green LED Key F11
12	Green LED Key F12
13	Green LED Key F13
14	Green LED Key F14
15	Green LED Key F15

Bit	Word 28: Flashing green LEDs keys F16...F22
0	Green LED Key F16
1	Green LED Key F17
2	Green LED Key F18
3	Green LED Key F19
4	Green LED Key F20
5	Green LED Key F21
6	Green LED Key F22
7	
8	
9	
10	
11	
12	
13	
14	
15	

13.3 Status bits

Bit	Word 32: Writing data exchange bits D8 ⇔ PCD
0	Values:
1	**000** Normal; **001** Input; **010** Alarm; **011** Error; **100** Help alarm
2	**101** Display status; **110** Recipe Direct
3	Presence of alarm messages
4	Writing completed (ENTER)
5	
6	Battery state (1 = charged, 0 = discharged)
7	Start communication
8	Printing buffer for alarms full
9	Printing buffer for alarms printed
10	Printing buffer for alarms deleted
11	Hard Copy finished
12	Print buffer for alarms empty.
13	
14	Watch Dog (always set to 1 from panel)
15	Real Time (=1 when a key is held down)

Bit	Word 33: Reading exchange data bits PCD ⇔ D8
0	BEEP (1 = on)
1	Disable BEEP when keys pressed
2	Enable BEEP when INPUT changes state
3	Enable BEEP in presence of alarms
4	Confirm data writing completed
5	Automatic rotation of the alarms
6	Priority to alarms on page.
7	Confirm start communication
8	Lamp LCD 1 = off (only D850/55) *
9	Print alarm buffer
10	Delete print buffer of alarms
11	Execute Hard Copy
12	
13	
14	
15	

* It is better if the bulb (of "CCFL" type) is switched off to prolong its life (10,000 hours), because after this period it looses 20% of its brightness.

13.4 Exchange bits for inputs (F-keys)

Bit	Word 34: Input status F1...F15
0	
1	Input Key F1
2	Input Key F2
3	Input Key F3
4	Input Key F4
5	Input Key F5
6	Input Key F6
7	Input Key F7
8	Input Key F8
9	Input Key F9
10	Input Key F10
11	Input Key F11
12	Input Key F12
13	Input Key F13
14	Input Key F14
15	Input Key F15

Bit	Word 35: Input status F16...F22
0	Input Key F16
1	Input Key F17
2	Input Key F18
3	Input Key F19
4	Input Key F20
5	Input Key F21
6	Input Key F22
7	
8	
9	
10	
11	
12	
13	
14	
15	

13.5 Exchange bits for data memory

Bit	Word 36: Exchange bits data out Synchronised recipe transfer
0	Start recipe transfer
1	
2	
3	
4	End recipe transfer
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Bit	Word 37: Exchange bits data in Synchronized recipe transfer
0	Start recipe transfer
1	End recipe transfer
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Bit	Word 50: Exchange bits data in Synchronised recipe transfer
0	
1	
2	
3	
4	Recipe requested
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Bit	Word 51: Exchange bits data out Synchronised recipe transfer
0	Timeout on peripheral
1	
2	
3	
4	Recipe code not present
5	No PCD data present
6	
7	
8	
9	
10	
11	
12	
13	
14	End of previous command
15	No command from PCD

13.6 Exchange bits for printer

Bit	Word 55: Reading data exchange bits Commands to printer PCD ⇒ D8	Bit	Word 56: Writing exchange data bits Answer from printer D8 ⇒ PCD
0	Printer setup bit 0 (*)	0	Printer time-out
1	Printer setup bit 1 (*)	1	Page doesn't exist
2		2	Page printing over
3		3	Report doesn't exist
4		4	Report printing over
5		5	Page being printed
6		6	Report being printed
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13	Form feed command	13	Confirms form feed command
14	Zeros number of sheets for alarms	14	Confirms zeroing of number of sheets for alarms
15	Zeros number of sheets for page	15	Confirms zeroing of number of sheets for page

(*) Printer bits

Bit 0	Bit 1	
0	0	Default by config.
0	1	Serial
1	0	Parallel
1	1	Default by config.

14. Specifications

PCD7.	D810	D820/825	D830/835	D850/855

Display

Type	LCD backlit with LED			LCD backlit with CCFL
Display format	Text		Graphic	
Lines x characters Resolution [pixel] Visible area [mm]	4 x 20 70.4 x 20,8	4 x 40 140.5 x 23.2	8 x 40 240 x 64 127.2 x 33.9	16 x 40 240 x 128 123 x 68
Character matrix in text mode [pixel]	5 x 7		6 x 8 / 12 x 16 / 24 x 32	
Character size [mm]	2.95 x 4.75	2.8 x 4.9	3.2 x 4.2 6.5 x 8.5 12.7 x 17	3 x 4 6 x 8 12 x 16
Display adjustment	Potentiomet.	Software		
Character fonts	ASCII, Katakana		ASCII, Katakana, programmable	

Keyboard

Customisable function keys	12	22		19
Function key LEDs	24	44		30
Numeric/ operative keys	24	27		27
Numeric/ operative LEDs	3	6		6

Features

No. of operative / report pages	2024			
Variables per page	8	16	32	48
Data format	Decimal, Hexadecimal, Binary, BCD, ASCII			
Dynamic Text	1024			
Alarms / Sub-alarm messages	1024 / 1024			
No. of projects	99			
Recipes management	Yes			
Password	Yes			
Real-Time clock	Yes (battery optional)			

Memories

Text (Flash EPROM)	64-256 Kbytes	64-512Kbytes		
Recipe data (RAM)	8Kbytes	32Kbytes (standard) -128Kbytes (option)		

Interfaces

Serial ports for PCD link	RS232/422/485/TTY 20mA			
Serial ports for printer or PC	RS232			
Parallel port		Yes (types D825, D835, D855)		

PCD7.	D810	D820/825	D830/835	D850/855

Networks

PROFIBUS-DP	Yes (optional)
INTERBUS-S	Yes (optional)
D8-Bus (in preparation)	Master (optional) / Slave

Programming software

	PCD8.D80E in 4 languages

Technical Data

Power supply	24 VDC ± 20%		
Power consumption (24 VDC)	9 W	12 W	9 W
Protection level	IP65 (Front)		
Working temperature	0...50 °C	0...40 °C	
Storage / transport temperature	–20...+60 °C		
Humidity (non-condensing)	85 %	90 %	85 %
Weight	0.8 kg	1.2 kg	

Dimensions

External (W x H x D mm)	126 x 196 x 65	252 x 196 x 65
Cut-out size (W x H mm)	107 x 178	232 x 178

Immunity	Nature of disturbance	In accordance with standards
Interference	Electrostatic discharge Contact Trough air	IEC 801-2 4 kV 8 kV
	Radio frequency irradiation	IEC 801-3 / IEC 801-6 10 V/m
	Rapid transients Power supply Serial I/O	IEC 801-4 2 kV 1 kV
Radio interference	Emissions	EN 55011 Level of radio interference B
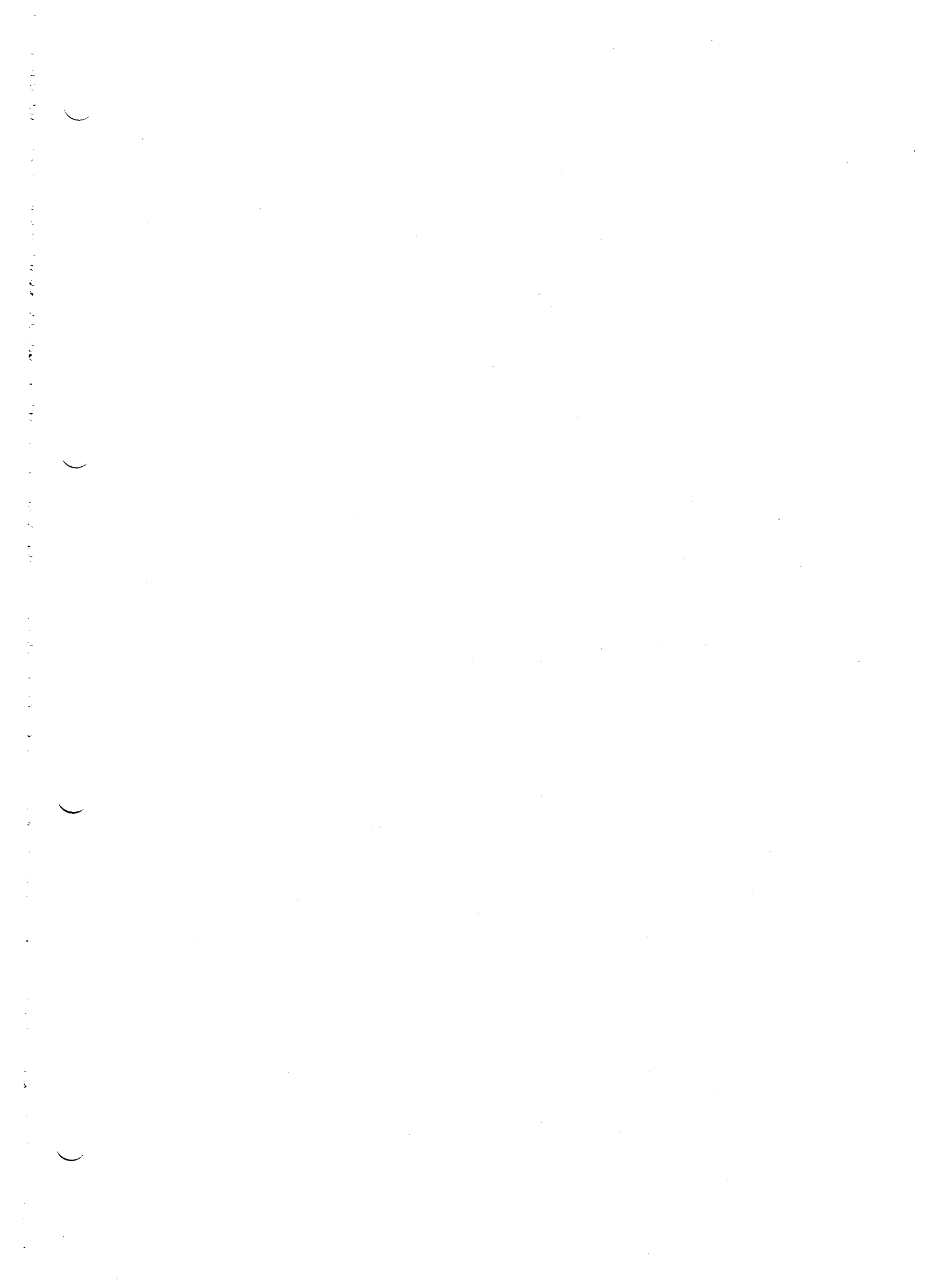
A   General information on electromagnetic compatibility

Electronic devices are being increasingly used in automated systems. programmable controllers (like the PCD) belong to this category, as do Man-machine-interface systems (eg the Video Terminal), control systems (eg diagnostic panels), interface elements (eg interface boards) and activators (like inverters). Together with this type of electronic apparatus, you find installed classical electro-mechanical devices like counters, electro-valves, motors etc.

Electrical disturbances caused by the operation of these devices can compromise the smooth functioning and the length of the working life of the electronic devices present on the same switchboard or the same plant. To get the best out of both the electrical and the electronic devices it is necessary to reduce electrical disturbance.

Laying cables. Remember to lay measurement, monitoring and communication cables so that they are kept apart from power cables. Power cables laid close and parallel to communication cables can cause coupling voltages that are strong enough to disturb or destroy electronic components.

Shielding of cables. It is essential to use suitably shielded cables for communication signal connections (total shielding is recommended). The shielding must be connected to the zero potential.

Earthing of shielding and electronic circuits. With many devices the "0V" is connected to the earth. The signal ground must be earthed but it is best to separate the ground of the shields and circuits from that of the power circuits. Note that the earth can only perform its function if the "Resistance of the earth circuit" is within the max. limits prescribed.

Switching of capacitive loads. The current peaks which occur when capacitive loads are switched on can damage or destroy control devices. Furthermore, the high-frequency component of the current peak can cause serious disturbance in electronic circuits caused by inductive coupling between the connection cables.

Switching of inductive loads. When and inductive load is switched off, the magnetic energy stored tends to oppose this, discharging a voltage peak down the line which can damage or destroy the control device. Furthermore, the high-frequency component of the voltage peak can cause disturbance caused by capacitive coupling between the connection cables.

The physical structure and characteristics of an inductive load make it impossible to carry out switching without disturbance unless suitable measures are taken. The disturbance can be at least partially suppressed by fitting a suitable disturbance-suppression module in parallel with the inductive load. The disturbance-suppression module must not constitute an additional load during the work phase. Electrical disturbance is propagated both through the connection cables and electromagnetic transmission. If the disturbance is propagated by cable or electromagnetic transmission, it is much more difficult to suppress at the inputs to the units in the danger zone than it is to suppress the disturbance at its source.

B Connection of D8 terminals to SAIA S-Bus

B1 D8 terminal with point-to-point connection to Master PCD

```
                        ┌─────────────────┐        S-Bus o
                        │   ┌─────────┐    │        Modus D
                        │   │         │    │
                        │   └─────────┘    │
                        │        D8        │
                        └────────┬─────────┘
                                 │ S-Bus Maste
                    Port A       │ S-Bus Slave
                        ┌────────┴─────────┐
                        │      Master      │
                        │       PCD        │
                        │                  │
                        └────────┬─────────┘
                    Port B       │ S-Bus Maste
  S-Bus ───────────────┬─────────┴─────────── ─ ─ ─ ─ ─┬──────────
          S-Bus Slave  │             S-Bus Slave       │ S-Bus Slave
      ┌────────────┐   ┌────────────┐            ┌────────────┐
      │            │   │            │            │            │
      │    PCD     │   │    PCD     │            │    PCD     │
      │            │   │            │            │            │
      └────────────┘   └────────────┘            └────────────┘
```
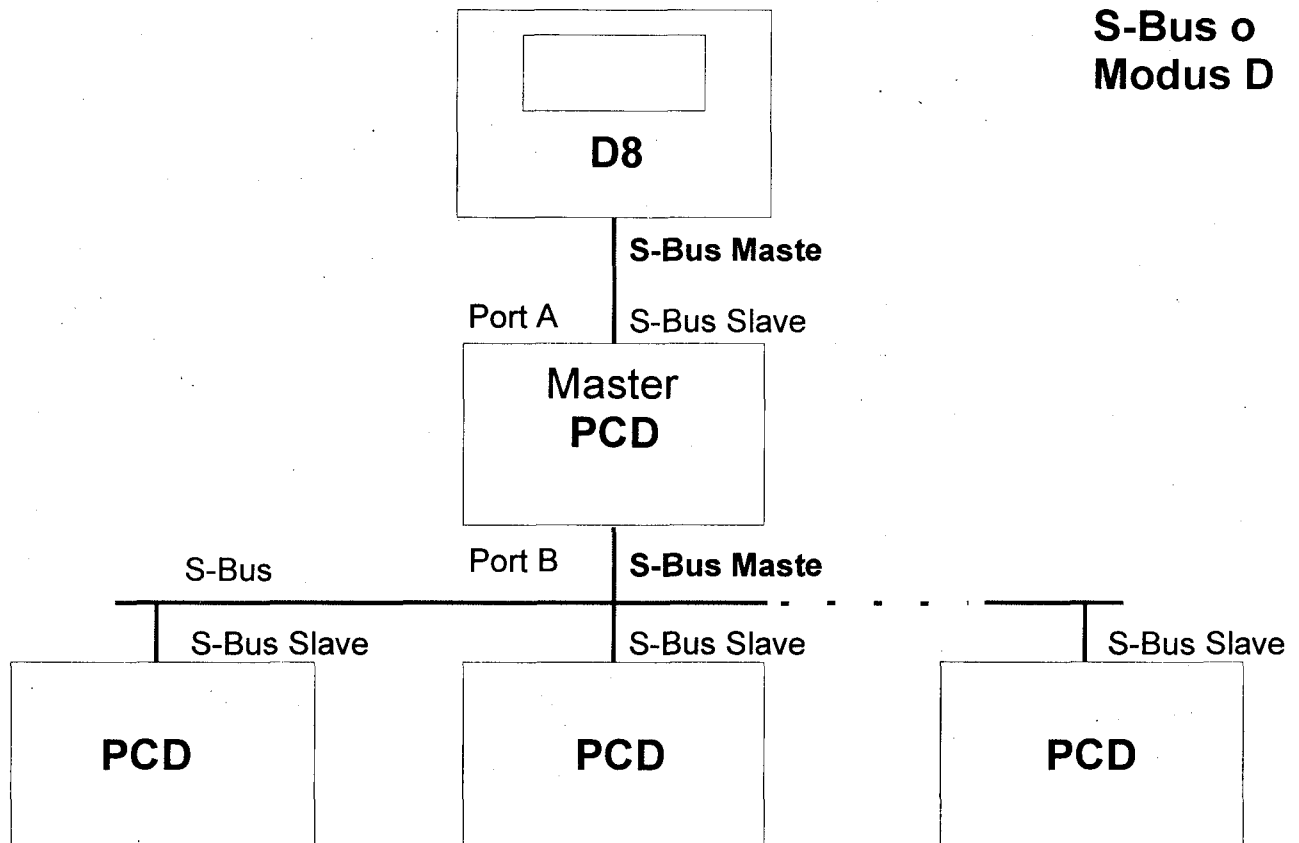
The D8 terminal communicates directly with the master PCD using the MD or S-Bus protocol.
This master PCD takes care of communication with slave PCDs.

B2 D8 terminals in gateway communication via master PCD
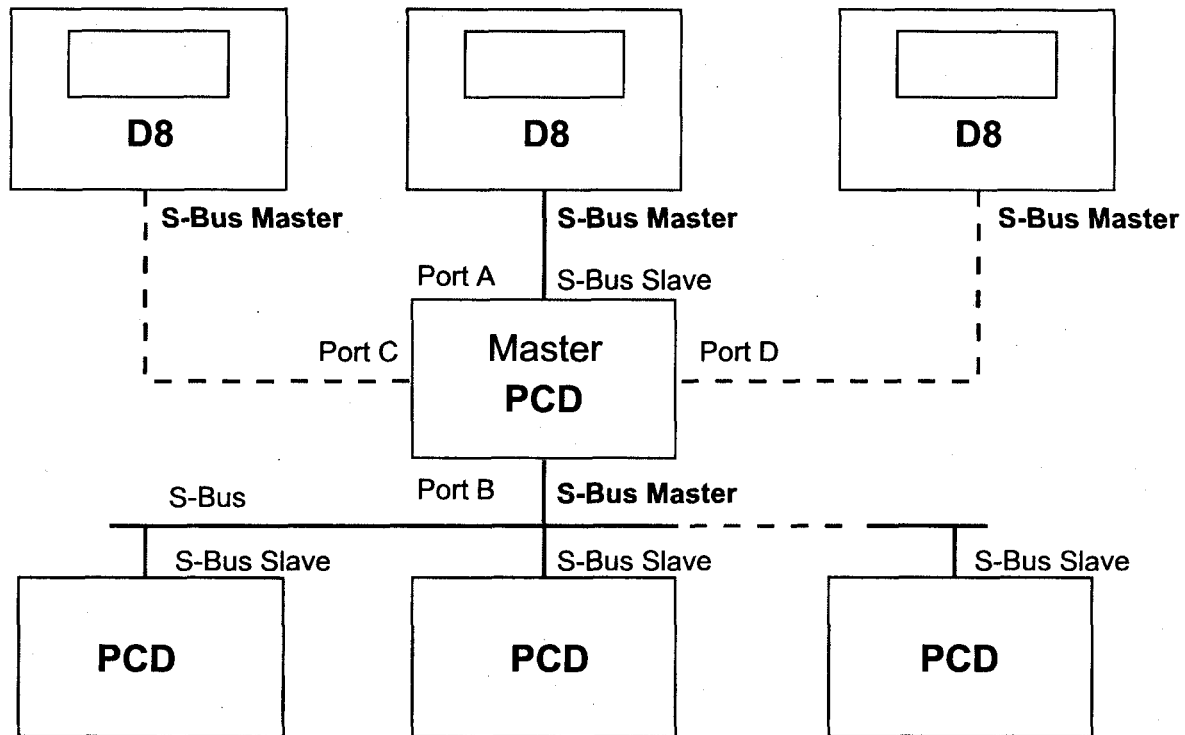
The master PCD is configured in gateway mode. The D8 terminals (max. three) can therefore access PCD slaves and the PCD master directly via communications ports A, C and D. Communication from the terminals to the master PCD and slaves takes place under the S-Bus protocol.

B3 Two S-Bus networks each with 1 master
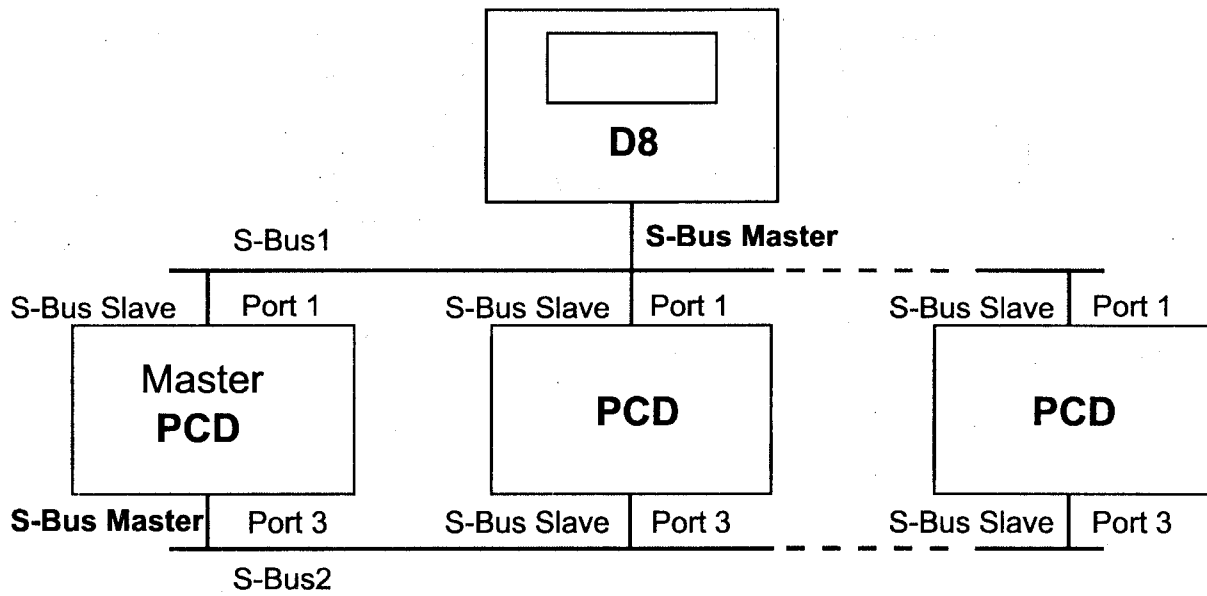
The D8 terminal has direct access to all PCDs via S-Bus "1" (using the S-Bus protocol). The master PCD manages all slave PCDs via S-Bus "2".

C   Quick guide to operating the D8 terminal

1. Preparation of the PC

 - Since the terminal editor runs under MS-DOS, there must be at least 580Kbytes (or 540Kbytes without Helps) of available space in the PC's RAM memory (i.e. remove resident programs if necessary).

 - Load the editor and SAIA driver from the disk to your PC.

2. Preparation of the terminal

 - The text memory (flash-EPROM) and the battery (if present) should be plugged into the back of the terminal, according to chapters 5 and 4.2.

 - Attach the connecting cable (according to the diagrams A1 or A2, chapter 10.1) to terminal and PC, switch on the supply of the terminal and load the SAIA driver (chapter 11.2).

3. Preparation of the SAIA PCD

 - For communication with the terminal, use RS232 interface no.1 on
    - ° PCD2 with PCD7.F120 module, or
    - ° PCD4 with PCD4.C120 bus module.

 - Use the connecting cable according to the diagram B2, chapter 10.2 (cable RS232: D8√PCD interface).

 - Assign interface no. 1 of the PCD as follows:

```
    XOB    16
    SASI   1
           10
    EXOB

    $SASI
    TEXT   10   "UART:9600,7,E,1;"   or   "UART:19200;"
                "MODE:SD0;"               "MODE:SS1;"
                "DIAG:F1000,R4000"        "DIAG:F1000,R4000"
    $ENDSASI



    COB    0

           0

    ECOB
```

 - Do a simple program in the PCD, e.g.:

    - ° Calling a text in the terminal with one variable.
    - ° Transmitting a function key to a PCD output.

 Additional information can be found in the software manual on the editor disk.

D Introductory examples for the PCD8.D80E configurator

D1 Structure of a project
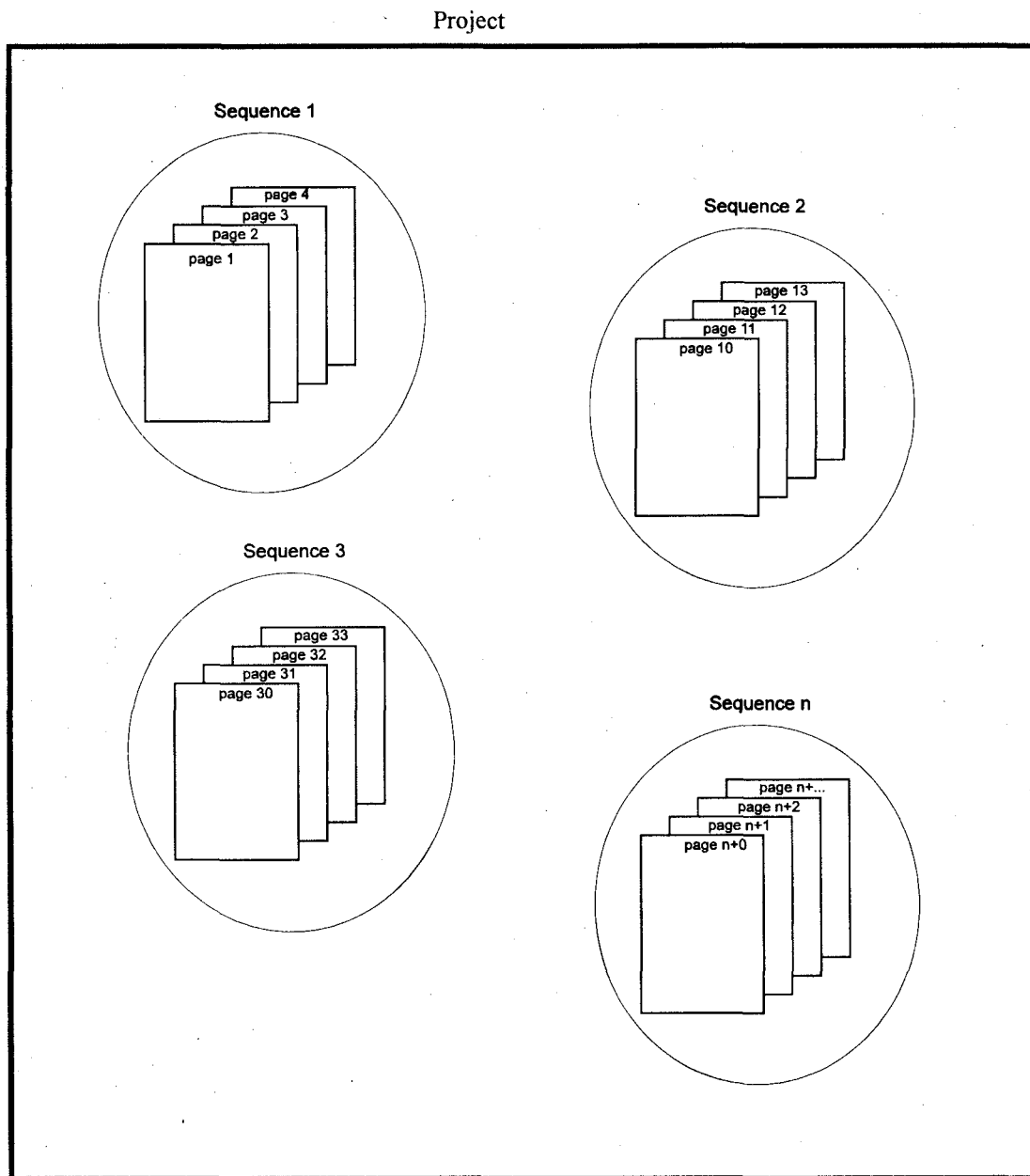
Project

Definition:

A project consists of one or more sequences, and each sequence can contain one or more pages. If a project contains several sequences, it is best to assign a function key to each one. This makes is easy to change from one sequence to another. Within a sequence, the "PgUp" and "PgDn" keys can be used for scrolling.

D2   Operation on the PC to create a new project

Left column flowchart:

(New project)

↓

Select project from main menu

↓

A new menu appears with New; Recall project; ...; End

↓

Select New

↓

A window appears on the screen, who calls " choice of new project"

↓

- Select your directory
- Give a name to your new project (see fig. 1)

↓

click on Ok

↓

A new window appears who calls "Selection of PCD7"

↓

Select your terminal type, then click Ok

↓

A new window appears who calls: "Choice of peripheral"

↓

Click on "No PLC"

↓

Click on "Saia"

↓

A new window appears who calls: "choice of PLC"

↓

Right column flowchart:

Click on :"S-Bus" or "SAIA serie PCD"

↓

The configurator turnback on window "choice of peripheral"

↓

Click on Ok

↓

The background changes and a window asks you which kind of graphic type you want

↓

Click your choice

↓

Click on Ok

↓

(You can start your projec)

(fig. 1)

Loading the SAIA-driver : see chapter 11.

Loading of a project   : see chapter 11.

D3 Hardware structure for introductory examples

```
            18
            15
            25
PCD7.D8..    7 ──────────── 10   PCD2
             3 ──────────── 11   Port1
             2 ──────────── 12
             4
             5
                                 Port0

CVCOM21102                              K111

        COM2              COM1
```
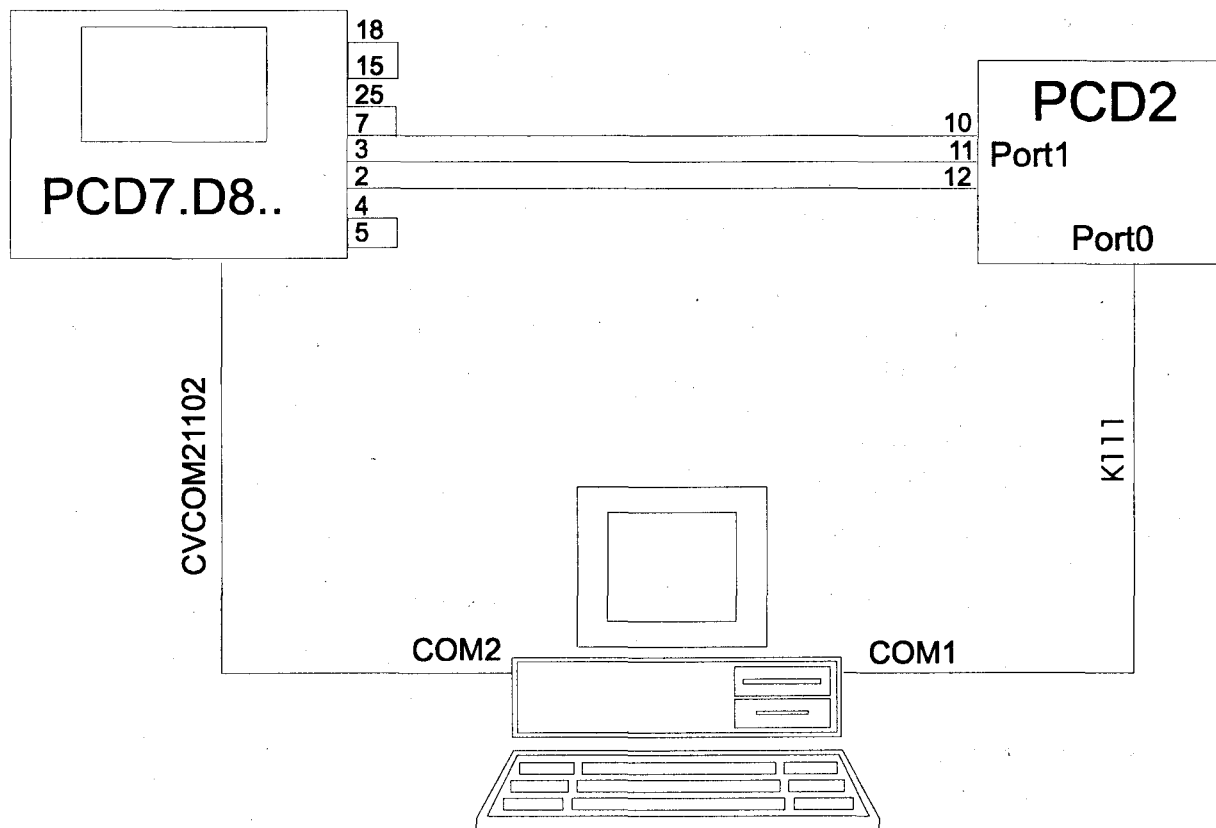
Regarding connections to the terminal, please consult chapters 9, 10 and 11 of this manual.

*) For examples with text output, the PCD7.D810 and D820 are sufficient. To process graphics also, the D830 or D850 models are required.

D4   Introductory examples

D4.1   Text display to terminal in "semigraphic" mode

To carry out the following, a new project must first be created (see chap. D3).

1.   Position the cursor on the green area of the screen, which corresponds to the terminal display.

2.   Write any text.

3.   You can then change the text type (size, attributes). This is done by using the mouse to mark
the relevant text. Then click on "Configure", "Display" and "Character". For graphical displays, you can select sizes "X1, X2 or X4". For attributes, "REVERSE" and "blinking" are provided.

4.   Save this page in a sequence:
   4.1   Click on "Sequences"

   4.2   Click on "Video"

   4.3   A new window opens, in which you can store the edited page of sequence 1.

   4.4   Click on "OK"

5   Assignment of "F1" to sequence 1
   5.1   Click on "Configure"

   5.2   then click on "Prog. F key"

   5.3   followed by "Function of F key"

   5.4   A new window is displayed

   5.5   Activate "Enabling"

   5.6   Click on "None" next to F1

   5.7   A small window opens entitled "F1"

   5.8   Click on "Sequence"

   5.9   A small window opens entitled "F1 sequence"

   5.10   Click on sequence 1: "1-1"

   5.11   Click on "OK".

Note: Function keys can be defined as either global or local. If a function key is defined as global, it can be used throughout the program, whereas if it has been defined as local, it can only be used in the same sequence in which it was defined.

Exit the D8 editor and load this project into the terminal (see chapter 11.3).

D4.2   Reading and writing variables into a PCD register

Restart the D8 editor.

1.   Position the cursor at your chosen location.

2.   Double-click on this position.

3.   Click on "Data"

4.   Position the various fields as you wish (see fig. 4.2.1).
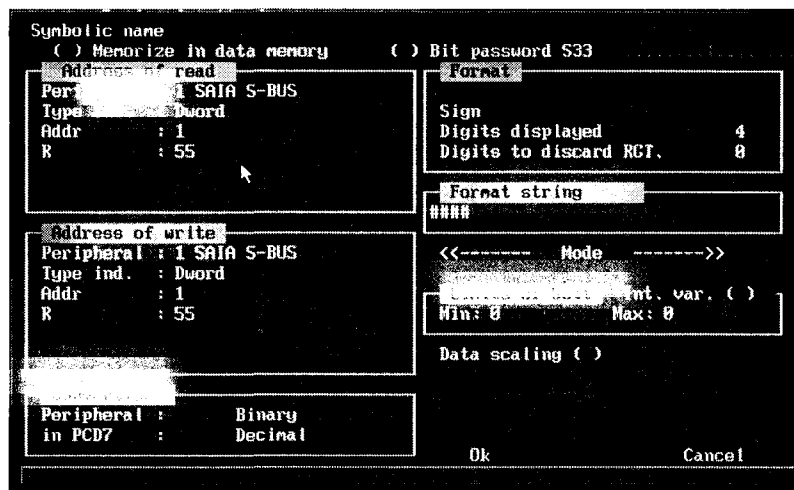
Fig 4.2.1

Remark : this example allows the terminal to read and write a value in the register R55 of a PCD.

D4.3   Creating a bar chart

1.   Position the cursor on the desired location.

2.   Double-click.

3.   Click on "Bar data"

4.   The cursor appears in the appropriate work field.

5.   Expand the area of the bar chart using the arrow keys until it has the desired shape.

6.   Press the "Enter" key.

7.   A new mask appears.

8.   Enter the desired values.

9.   Define the limits of the bar chart.

10.   Click on "OK".

D4.4   Entry of date and time

1.   Use the mouse to select the desired position on the display.

2.   Double-click.

3.   Select "Clock".

D4.5   Dynamic texts

1.   Use the mouse to select the desired position on the display.

2.   Double-click.

3.   Select "Dynamic text".

4.   A new mask appears.

5.   Enter the various options.

6.   In the "Dynamic text" field, find the 3 different ways of calling dynamic texts:

       - bits (up to 16 different texts)

       - BCD (up to 100 different texts)

       - binary (up to 256 different texts)

7.   Pressing F2 takes you on to the second page of the mask.

8.   Enter the various dynamic texts.

9.   Pressing F2 again displays the first part of the mask again.

10.   Click on "OK".

D4.6   Bit commands

This command enables a specific bit from a PCD register to be modified by using a function key. There are two types of command:

       - RT = real time (the bit is logically 1 for as long as the key is held down)

       - FF = flip-flop (the bit becomes logically 1 at the first key depression,

              returning to 0 at the second depression)

1.   Click on "Page".

2.   Click on "Prog. F key".

3.   Click on "Function of F key".

4.   Click on "Bit command"

5.   Click on "insert"

6.   Enter S-Bus addresses of PCD and register.

7.   Mark the bit to be processed.

8.   Click on "OK" (to mark an additional bit, start again from point 5).

9.   Click on "OK".

10.   Click on "None" next to the desired F-key.

11.   Click on "C.bit RT" or "C.bit FF".

12.   Select the appropriate bit.

13.   Click on "OK".

D4.7   Programming LEDs

Each function key is provided with 1 or 2 LEDs, which can be activated individually by the function keys themselves. Programming is as follows:

1.   For global validity

1.1   Click on "Configure"

1.2   Click on "Prog F key"

1.3   Click on "Prog leds of F keys"

1.4   A new mask appears

2.   For local validity

2.1   Click on "Page"

2.2   Click on "Prog F key"

2.3   Click on "Prog leds of F keys"

2.4   A new mask appears

After the mask appears on the screen, the procedure is the same for both alternatives. It is possible to activate or deactivate each green or red LED individually, either as continually lit or flashing.

To exit from the window "Configuration of Fkey " click on "OK".

D4.8   The "mechanism" of data exchange

Each D8 terminal has a register range which the PCD can use to control the terminal or obtain information from it.

Each of these registers can be assigned the following fields (see also chapter 13):

1. Register field for variables which are read continuously from the terminal in the PCD (free read field)

2. Register field for variables which are written continuously from the terminal into the PCD (free write field)

3. Register field for variables which are written from the terminal into the PCD as soon as a particular key is depressed (key write field)

4. Register field for variables which are written from the terminal into the PCD as soon as any signal change occurs of an "Input" (write field for "Inputs")

These communication fields can be defined anywhere in the register range of the PCD and may have any size wished.

The exchange of information can be activated or deactivated as desired by programming.

Procedure for configuring a data exchange field:

1.   Click on "Configure".

2.   Click on "Data exchange".

A new mask appears containing the " Variables of data exchange " window:

```
    0 W  HOUR           Watch hours in BCD format (00...23)
    1 W  MINUTES        Watch minutes in BCD format (00...59)
    2 W  SECONDS        Watch seconds in BCD format (00...59)
    3 W  DAY            Month day in BCD format (01...31)
    4 W  MONTH          Month in BCD format (01...12)
    5 W  YEAR           Year in BCD format (only last 2 digit  0...99)
    6 W  DAY                                                   6=Sunday)
    7 W  SEQ            VARIABLES OF DATA EXCHANGE
    8 W  PAG
    9 R  WAL
   10 W  KEY
   11 R  LIM  R  Addr: 1 R: 120   Enabd.: (J)               t, 8 low bi
   12 R  LIM  W  Addr: R:          Enabd.: ( )               t, 8 low bi
   13 W  KEY  WK Addr: R:          Enabd.: ( )
   14 W  KEY  WI Addr: R:          Enabd.: ( )
   15 W  KEY
   16 W  KEY                       End
   17 W  KEY               Key bit decod.: F11...F15 Keys
   18 W  KEYDEC6_F2     Key bit decod.: F16...F22 Keys
   19 R  LEDFIX1        Fixed light leds 1
   20 R  LEDFIX2        Fixed light leds 2
   21 R  LEDFIX3        Fixed light leds 3
   22 R  LEDFIX4        Fixed light leds 4
   23 R  LEDFIX5        Fixed light leds 5
```

Fig. 8.1

3.   Activate the "Enabd" field.

4.   Position the cursor on one of the lines R/W/WK/WI (R=read, W=write)

5.   Click on "Enter".

6.   Then click on "End".

7.   With the "F5" key, you can access back to the previous mask, where you can select the appropriate variables.

8.   Use the "PgUp/PgDn" keys to scroll pages. If the variable has been selected, press "Enter" to return to the "PCD7 <-> PLC" mask.

9.   A variable can also be deleted with the "F6" key.

10.   When all necessary variables have been defined, click on "OK" and then on "End".

<u>Note:</u> It is an absolute requirement that an even number of elements should always be selected by variables. The reason for this is that PCD registers have 32 bits, whereas D8 terminals use only 16 bits, i.e. they always store 2 elements in one register. In order to increase an odd number of elements to an even one, the configurator provides a "Dummy" variable. The dummy variable has no other function.

D4.9   Password

The configurator allows definition of up to 10 passwords. All passwords must consist of 6 digits (no other characters).

<u>Procedure:</u>
1.   Click on "Configure".
2.   Click on "Password".
3.   This displays the mask "Programming of Password".

```
        Password no 1  147258   (J) ENTER to confirm
        Password no 2            ( ) ENTER to confirm
        Password no 3            ( ) ENTER to confirm
        Password no 4            ( ) ENTER to confirm
        Password no 5            ( ) ENTER to confirm
        Password no 6            ( ) ENTER to confirm
        Password no 7            ( ) ENTER to confirm
        Password no 8            ( ) ENTER to confirm
        Password no 9            ( ) ENTER to confirm
        Password no10            ( ) ENTER to confirm

 ( ) Password modifiable in PCD7
 Using page no.
 Recallable using sequence no.
 Sequence recalled coming out with F1

 Modification of password in PCD7 using
 ( ) General Password          ( ) ENTER to confirm


                      Ok      Cancel
```

Fig 9.1

4.   Next to "Password no X", enter the appropriate 6-digit password.
5.   Unless you put a cross against "( ) Enter to confirm", the terminal user does not have to press the enter key after entering the 6 digits.
6.   If you do put a cross against "(X) Enter to confirm", the user must confirm validity with the "Enter" key.
7.   In the lower portion of the mask there is an option indicated for changing a password directly with the terminal by using a "General Password" (see page 97 of instruction).

D4.10 Alarms

The PCD7.D8.. terminal family supports alarm handling. For this, reference is made to one or more registers in the connected PCD.

1024 alarms (64 registers x 16 bits) are available for this purpose according to the following procedure:

1.   Click on "Alarms".
2.   Click on "Setting".
3.   The "SELECTING ALARMS" mask is displayed.
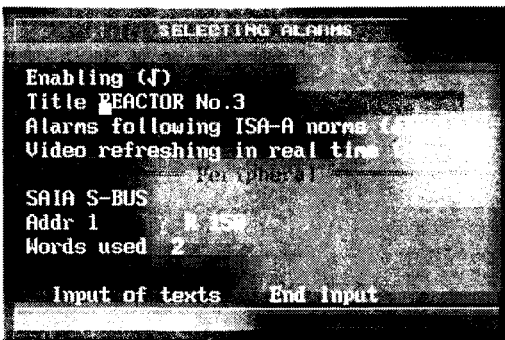
Fig 10.1

4.   A cross must be entered against the first line "Enabling (X)" in order to activate the alarm   function.
5.   A name for this alarm should then be entered near the word "Title".
6.   In the next line, you define whether this alarm should be handled according to the ISA standard or to ESA.

According to the **ESA** procedure, alarms are activated in real time. This means that, when the alarm button LED flashes, at least one alarm is present. As soon as the problem clears, the LED goes off again too, i.e. alarms are not stored.

According to the **ISA** standard, all alarms are stored chronologically in a buffer, i.e. the occurrence of an alarm, its acknowledgement and the cancellation of an alarm. This alarm protocol can either be viewed directly using the terminal, or it can be output to a connected printer.

7.   Afterwards, the S-Bus address of the PCD and a PCD register address should be typed in.
8.   Under "Words used", the number of PCD registers required should be indicated (min. 2, max. 64).
9.   Click on "Input of texts".

10.   The "Select alarm bit" mask is displayed.
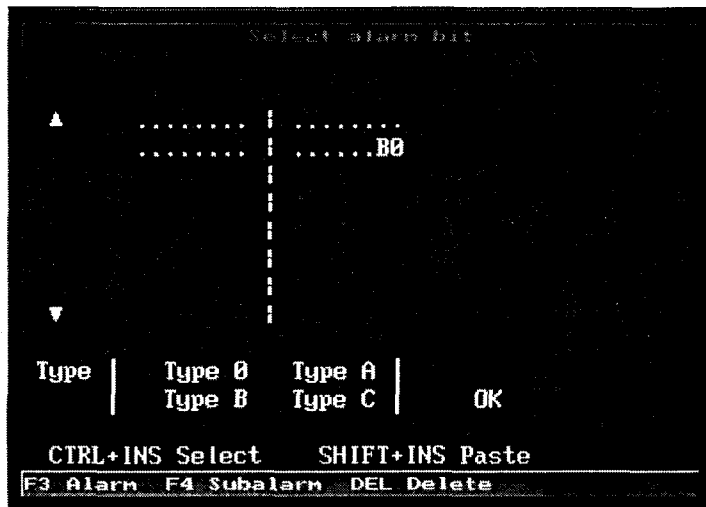
Fig 10.2

11.   Here each alarm is assigned a bit and an alarm type. Click on the appropriate bit and
       the relevant alarm type, according to the table below:

Alarm type	Function
0	Immediate display
A	Immediate display and immediate output to printer
B	Immediate display and storage in history file
C	Immediate display, output to printer and storage in history file

After you have defined the alarm type, you can then enter an alarm text of max 40 characters.
If these 40 characters are not enough, the D8 terminal offers you a total of 8 additional screen
pages for detailed notes on this alarm (see page 95 of description for details).

D4.11 Recipes

What is meant by recipe handling?

Example: With a mixer, you wish to blend the three colours: blue, red and yellow. To produce
olive green, X% blue must be mixed with Y% red and Z% yellow. For brown, other propor-
tions are needed, and different percentages again for violet. These proportions are directly
programmable by the terminal, placing no load on the PCD CPU.

<u>Procedure:</u>

1. Prepare a text on your display similar to the one below (without ###).

```
            RECEPIE
            ‾‾‾‾‾‾‾
label     disp.         plc
BLUE    : ###  ------>  ### R200
RED     : ###  ------>  ### R202
YELLOW  : ###  ------>  ### R204

RECIPE CODE:COD.
COMMENT    :COMM

F10 SAVE
F11 DISP.>PLC
F12 MEM.>DISP
F13 CLR MEM
F14 LISTING
```

Fig 11.1 Terminal display

2. The variables ###, located under "disp." in the display (see fig. 11.1) can be provided with
   the desired information (register address, number of digits, etc.). The following mask, fig.
   11.2, is used for this purpose.

   In this mask, one reaches the appropriate variable by double-clicking on the appropriate
   position (e.g. next to BLUE). In the small window which is then displayed, click on
   "Data".

   As the following mask shows, for each variable it is now possible to enter the register ad-
   dress, number of digits, any limit values, etc..

```
Symbolic name
   (X) Memorize in data memory
   (X) Address in peripheral
Peripheral : 1 SAIA S-BUS
Type ind.  : Dword              Sign
Addr       : 1                  Digits displayed          3
R          : 200                Digits to discard RGT.     0


 Address of                     ##
Peripheral
Type ind.                       Modification enabled (X)

                                Limit        t   Int. var. ( )
                                Min: 0           Max: 0

 Con                            Data scaling ( )
Peripheral :      Binary
in PCD7    :      Decimal
                                  Ok              Cancel
< ENTER > Select/Deselect
```

Fig 11.2

   After all details have been entered, confirm with "OK".

3. For variables under "plc" (i.e. the PCD) the procedure follows that for "disp.". Entries in mask 11.3 must correspond to the entries in 11.2.

```
Symbolic name       ■
    ( ) Memorize in data memory        ( ) Bit password S33
  Address of read                       Format
Peripheral : 1 SAIA S-BUS
Type ind.  : Dword                    Sign
Addr       : 1                        Digits displayed          3
R          : 200                      Digits to discard RCT.     0

  Address
Peripher
Type ind                             <<-------    Mode    ------->>


                                     Data scaling ( )


       :ns
        ]       Binary
        :       Decimal
                                         Ok                   Cancel
Data no. 9/39
```
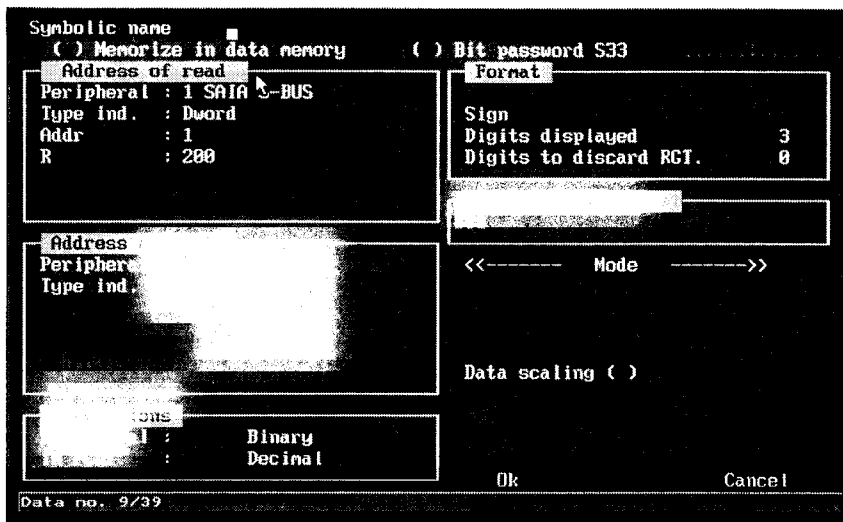
Fig 11.3   Mode   - read continue
                        - display enable

"RECIPE CODE" and "COMMENT" define and describe the various recipes entered in the terminal.

Procedure:

1. Position the cursor on the appropriate field (next to "RECIPE CODE") and activate it with a double-click.
2. Select "Data memory" and then "Recipe code".
3. A small window opens, into which you can enter the missing details.
4. Click on "OK".
5. Now position the cursor on the field (next to "COMMENT") and activate it with a double-
6. click.
7. Now select "Data memory", then "Recipe comment".
8. A small window opens, into which you can enter the missing details.
9. Click on "OK".

Procedure for configuring the selected function keys:

1. Click on "Page".
2. Click on "Prog F key".
3. Click on "Function of F key".
4. Click on "none" next to a function you have selected.
5. Another small window then appears:

```
  F-2
None
Command
Sequence
C.bit RT
C.bit FF
Macro
```
Fig 11.4

6. Click on "Command".
7. The relevant window opens:

```
                       F2:  Command
   Load from data memory
   Save in data memory
   Delete data memory code
   Transfer from data memory to PLC
   Transfer from temporary buffer to PLC
   Disable key
   Transfer PLC data -> temp. buffer -> data memory
   Transfer PLC data -> temp. buffer
   Video Buffer back to zero
   Transfer data memory -> temp. buffer -> PLC
```
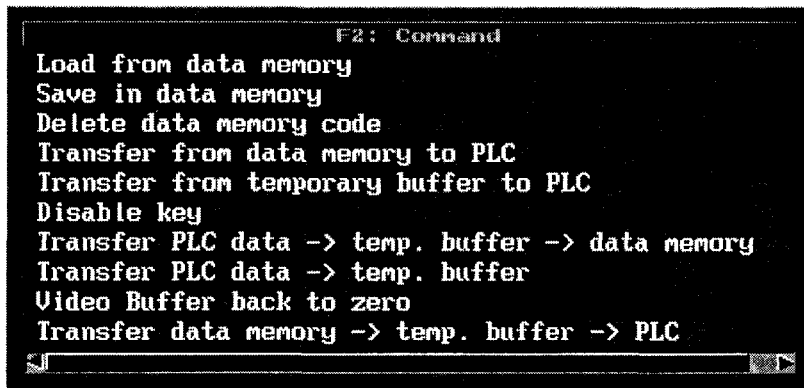
Fig 11.5

8. Click on the desired function.
9. Repeat points 4 to 8 for each additional command.
10.Click on "OK".

Procedure for recipe directory:

1. Double-click on the field which represents the display.
2. Click on "Data memory".
3. Click on "Recipe directory".
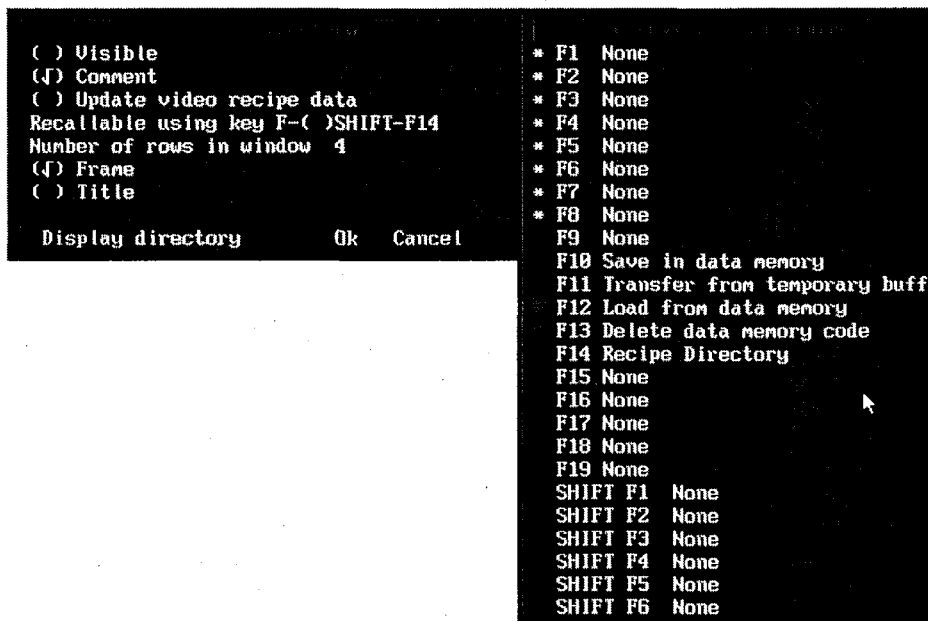4. Enter the various functions as shown in the example:

```
( ) Visible                    * F1   None
(J) Comment                    * F2   None
( ) Update video recipe data   * F3   None
Recallable using key F-( )SHIFT-F14  * F4   None
Number of rows in window  4    * F5   None
(J) Frame                      * F6   None
( ) Title                      * F7   None
                               * F8   None
  Display directory    Ok  Cancel  F9   None
                                 F10 Save in data memory
                                 F11 Transfer from temporary buff
                                 F12 Load from data memory
                                 F13 Delete data memory code
                                 F14 Recipe Directory
                                 F15 None
                                 F16 None
                                 F17 None
                                 F18 None
                                 F19 None
                                 SHIFT F1   None
                                 SHIFT F2   None
                                 SHIFT F3   None
                                 SHIFT F4   None
                                 SHIFT F5   None
                                 SHIFT F6   None
```

Fig 11.6

The above mask cannot be changed. It shows the resulting current allocation of function keys..
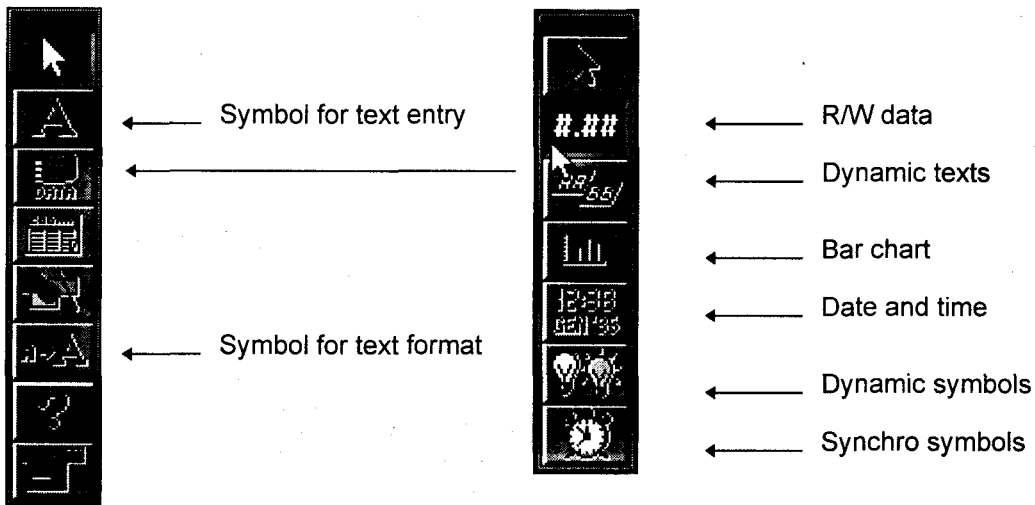
D4.12 Graphic mode entry

Graphic mode has the same flexibility as text mode, with the additional capability to enter drawings of any type, or bit maps. A mouse is, of course, necessary for graphic mode entry.

To select graphic mode, first click on "Page", then "new". In the new window, "Grafic page" can now be activated. Confirm with "OK".

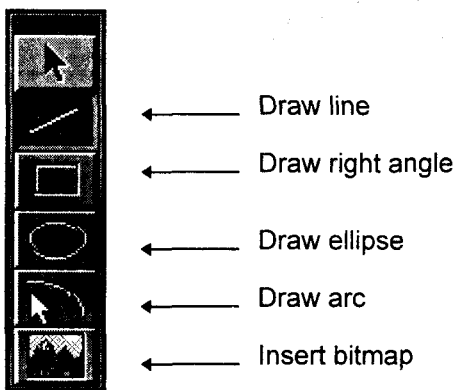The main toolbox appears on the screen next to the display simulation. A specific sub-toolbox can be selected with each field.

Main toolbox   Sub-toolbox

Symbol for text entry

Symbol for text format

R/W data

Dynamic texts

Bar chart

Date and time

Dynamic symbols

Synchro symbols

Box with drawing symbols

Draw line

Draw right angle

Draw ellipse

Draw arc

Insert bitmap

Dynamic symbols

To enter dynamic symbols, click on icon ▣ in the main toolbox and then on the icon with two lightbulbs ▣.
Only bitmap files can be used for dynamic symbols.
Before you enter a bitmap file, make sure that it will have enough room on the display provided.
The procedure is the same as for the entry of dynamic texts (see chapter D4.5).

"Synchro symbols" mode

The "Synchro symbols" function offers the possibility of animating up to 1024 pictures. Of course, the necessary memory must also be present in the terminal.

Procedure:

1. To enter synchro symbol, click on icon ▣ in the main toolbox and then on the icon with an alarm clock ▣
2. Place the point of the cursor arrow on the position in the display which coincides with the upper left corner of the picture to be entered.
3. Double-click. The following mask is then displayed:

Fig 12.1

4. Enter the number of symbols or pictures you require for your animation.
5. Enter the number of the timer (1 to 16) you would like to use.

6. Clicking on "Setup" displays the timer mask.

```
Setting of timers assigned to timer-linked dynamic symbols

Timer no. 1  ( ) Time based on int. var.      5 tenths of a second
Timer no. 2  ( ) Time based on int. var.      0 tenths of a second
Timer no. 3  ( ) Time based on int. var.      0 tenths of a second
Timer no. 4  ( ) Time based on int. var.      0 tenths of a second
Timer no. 5  ( ) Time based on int. var.      0 tenths of a second
Timer no. 6  ( ) Time based on int. var.      0 tenths of a second
Timer no. 7  ( ) Time based on int. var.      0 tenths of a second
Timer no. 8  ( ) Time based on int. var.      0 tenths of a second
Timer no. 9  ( ) Time based on int. var.      0 tenths of a second
Timer no.10  ( ) Time based on int. var.      0 tenths of a second
Timer no.11  ( ) Time based on int. var.      0 tenths of a second
Timer no.12  ( ) Time based on int. var.      0 tenths of a second
Timer no.13  ( ) Time based on int. var.      0 tenths of a second
Timer no.14  ( ) Time based on int. var.      0 tenths of a second
Timer no.15  ( ) Time based on int. var.      0 tenths of a second
Timer no.16  ( ) Time based on int. var.      0 tenths of a second

               Ok                       Cancel
```
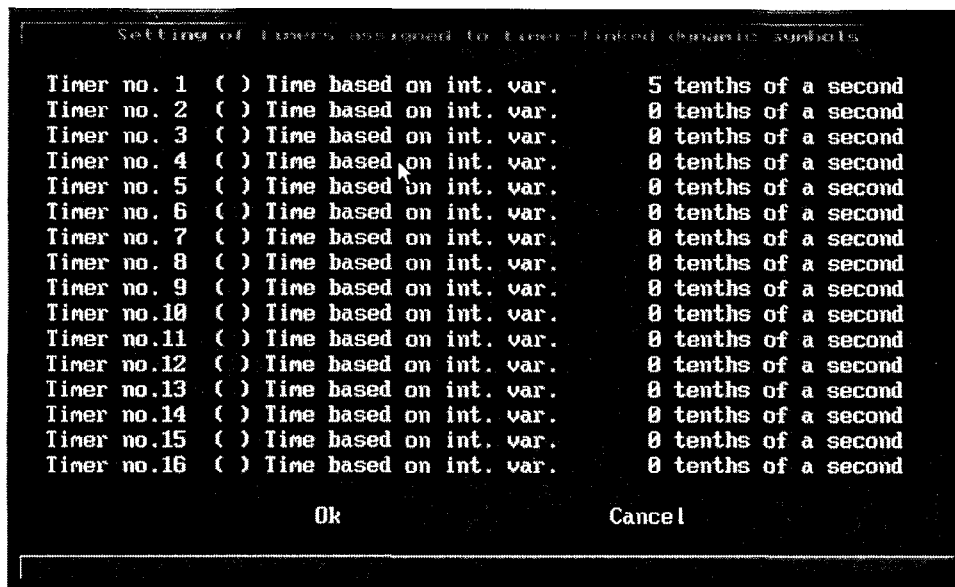
Fig 12.2

7. Enter the time base for the selected timer.
8. Return to the previous mask with "OK".
9. Next to "Initial symbol", enter the number of the first picture in a sequence of pictures (from "Bitmap fonts" mask in fig. 12.1).
10. Next to "Final symbol", enter the last number in the sequence of pictures.
11. Press F2 to go to the mask on the right (see fig 12.1)
12. The F5 key allows you to select the appropriate bitmap from a wide choice.
13. The selected bitmap can be displayed with the F4 key.
14. Repeat points 9 and 10 until all desired pictures have been selected.
15. Press F2 to return to the mask on the left.
16. Click on "OK".

The special variable no 58 in the data exchange range (page 36) activates one or more timers for the synchro symbols. Bit 0 of this register 58 corresponds to timer no. 1, bit 1 to timer no. 2, etc..
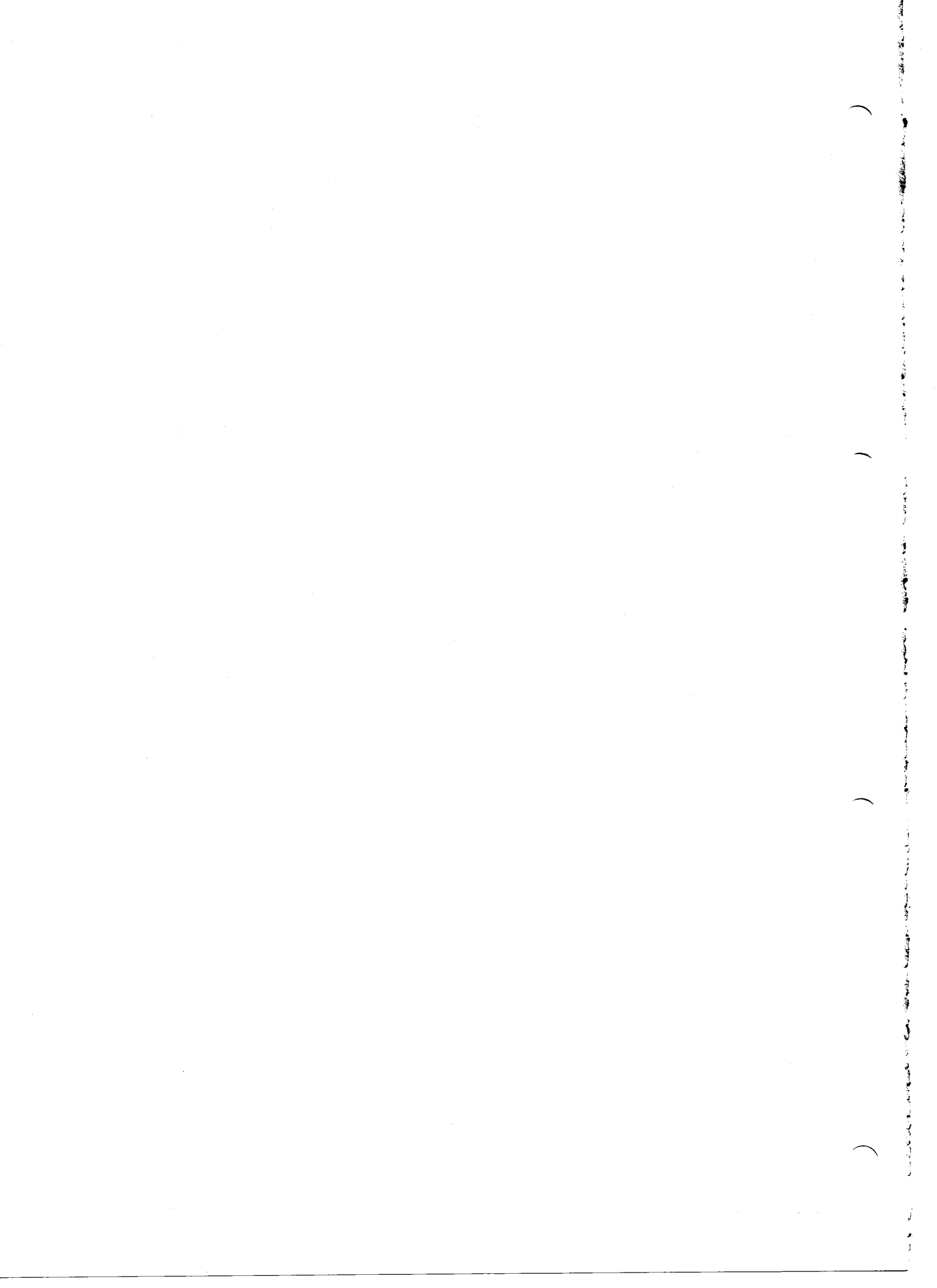
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Date	PCD7.D8.. Intelligent industrial terminals

If you have any suggestions concerning the SAIA® PCD, or have found any errors in this manual, brief details would be appreciated.

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