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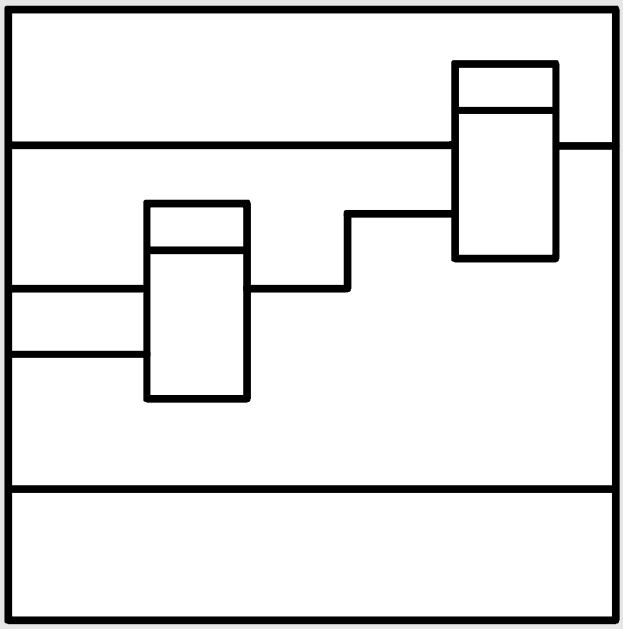
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SIMADYN D
Digital Control System

User Manual

Subrack SR6



Edition 05.95

DK-Nr. 213741

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User Manual, Subrack SR6

Edition		Edition status
1	Subrack SR6	05.95

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We have checked the contents of this Manual to ensure that they coincide with the described hardware and software. However, deviations cannot be completely ruled-out, so we cannot guarantee complete conformance. However, the information in this document is regularly checked and the necessary corrections included in subsequent editions. We are thankful for any recommendations or suggestions.

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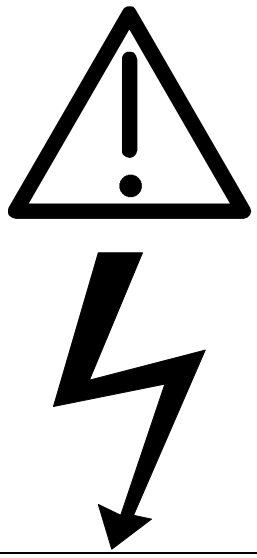
N O T E !

The information in this Manual does not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, please contact your local Siemens office.

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Warning information



W A R N I N G !

Electrical equipment has components which are at dangerous voltage levels.

If these instructions are not strictly adhered to, severe bodily injury and material damage can result.

Only appropriately qualified personnel may work on this equipment or in its vicinity.

This personnel must be completely knowledgeable about all the warnings and service measures according to this User Manual.

The successful and safe operation of this equipment is dependent on proper handling, installation, operation and maintenance.

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Definitions

* **QUALIFIED PERSONNEL**

For the purpose of this User Manual and product labels, a „Qualified person“ is someone who is familiar with the installation, mounting, start-up and operation of the equipment and the hazards involved. He or she must have the following qualifications:

1. Trained and authorized to energize, de-energize, clear, ground and tag circuits and equipment in accordance with established safety procedures.
2. Trained in the proper care and use of protective equipment in accordance with established safety procedures.
3. Trained in rendering first aid.

* **DANGER**

For the purpose of this User Manual and product labels, „Danger“ indicates death, severe personal injury and/or substantial property damage will result if proper precautions are not taken.

* **WARNING**

For the purpose of this User Manual and product labels, „Warning“ indicates death, severe personal injury or property damage can result if proper precautions are not taken.

* **CAUTION**

For the purpose of this User Manual and product labels, „Caution“ indicates that minor personal injury or material damage can result if proper precautions are not taken.

* **NOTE**

For the purpose of this User Manual, „Note“ indicates information about the product or the respective part of the User Manual which is essential to highlight.



C A U T I O N !

This board contains components which can be destroyed by electrostatic discharge. Prior to touching any electronics board, your body must be electrically discharged. This can be simply done by touching a conductive, grounded object immediately beforehand (e.g. bare metal cabinet components, socket protective conductor contact).



W A R N I N G !

Hazardous voltages are present in this electrical equipment during operation.

Non-observance of the safety instructions can result in severe personal injury or property damage.

It is especially important that the warning information in all of the relevant Operating Instructions are strictly observed.

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1. Ordering Information

- Subrack with power supply	(MLFB)	6DD 1682-0BB0
- Power supply SP7	(MLFB)	6DD 1683-0BB0
- Slot cover SR81 1EP	(MLFB)	6DD 1682-0AJ1
- Slot cover SR82 2EP	(MLFB)	6DD 1682-0AJ2
- Slot cover SR83 3EP	(MLFB)	6DD 1682-0AJ3
- Daisy chain Jumper	GWE classification no. 502492	

2. Function Description

The SR6 housing is designed for mounting SIMADYN D boards and the power supply SP7. The mounting system ES 902 C is utilized and has the board format of 233.4 x 220 mm according to IEC 297.
The subrack has 6 slots, each separated by 1 1/3 SPS, the back plane wiring is implemented via multi layer circuit boards. All slots are designated with a labeling strip.
The power supply SP7 (6DD1683-0BB0) is utilized for the system power supply. It is designed as a plug-in module into the right hand section of the SR6 subrack and is supplied as a component of the SR6. The subrack and the power supply are designed for non-ventilated air cooling (see also chapter power supply).

3. Bus System

3.1. Bus Board

The back plane circuit board makes a continuous local bus (L bus) available for all the slots. It supplies a 20 bit address/16 bit data bus, control signals and the power supply for the SIMADYN D boards.
The connection of the back plane circuit board to the power supply is implemented via a plug connector (X200 on the bus board).
The bus board system ground is connected to the subrack (see appendix) via the H07V-K 2,5mm cable (connection to the X225 from the bus board)

3.2. Bus Arbitration

A bus cycle is divided into two phases:
During the request phase, each processor module, requiring to transmit data via the bus, generates a request via the common open collector line. The distribution phase is started when at least one request has been made.
The bus allocation is implemented according to the principal of daisy chain priority, i.e. in the sequence of the slot numbers.
The bus priority is immediately switched to the next processor module when the bus access has been completed or the bus request has not been made by the current bus master. The distribution cycle is completed when the request from the processor with the highest slot number has been processed.

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New requests can only be made when the common open collector line has become inactive.
This arbitration process then insures that each processor module is processed once within a distribution cycle. The maximum wait time for a processor with the highest slot number can total up to three bus accesses (P3 missed the request phase, P1-2 become active and immediately request the next cycle). A bus access is normally approximately 1 ms long (without continuous request or LOCK).

The complete arbitration will only function when the daisy chain line is correctly looped from the first to the last processor of a bus section. Two connector pins (X1...X5, the slot 6 contains no connector (X201...X206).
They must always be jumpered when no SIMADYN D board is mounted on the corresponding socket connector.
The jumper plugs must be removed when a SIMADYN D processor board is mounted on the corresponding socket connector.
The subrack is supplied with a complete set of connector pins.

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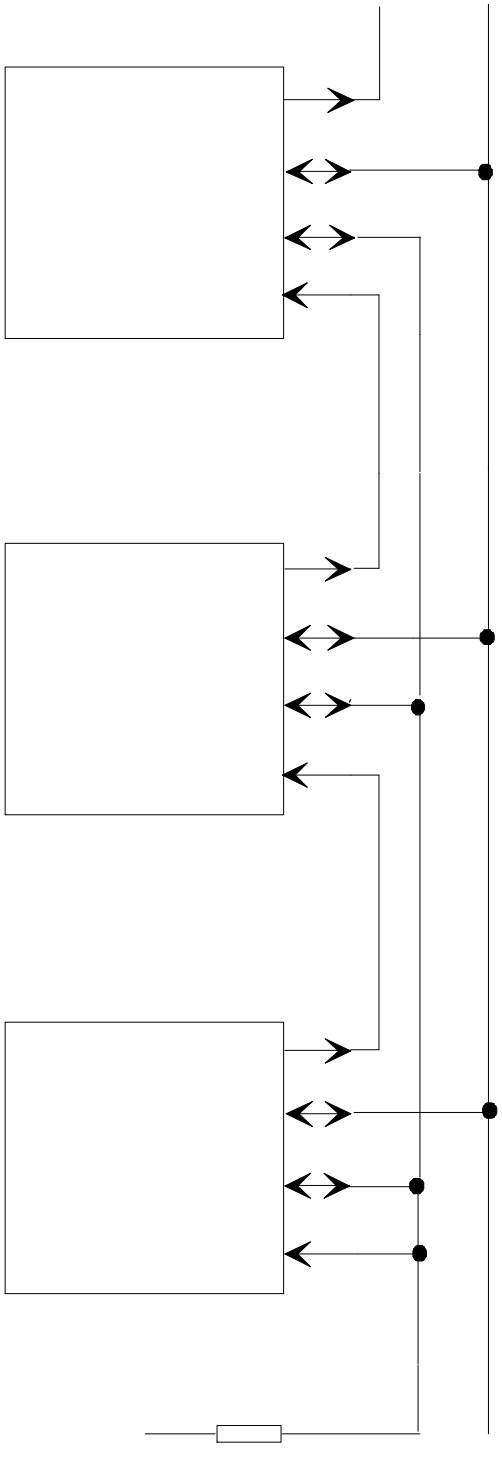


Diagramm 1

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3.3. Bus Termination

The bus lines must be correctly terminated in order to achieve defined voltage levels on the bus lines. The bus termination resistances required for this are available on the system boards MM11, MM21 und SR17. They become active when the memory link is installed.

The boards

PT20	6DD1606-1AC0
PT20G	6DD1606-2AC0

can be operated without bus termination. They can however not access peripheral boards without bus termination.

4. Power Supply

4.1. Layout

The power supply is designed as a slot module for the SIMADYN D subrack system ES 902 C. The dimensions L x W x D are 220 x 233.4 x 45.72mm. The subrack is designed for non-ventilated air cooling. The slot module is fixed by screw mounting. The power line connections, LED's test jacks and the battery connection can be accessed on the front panel.

The power supply is located at the right hand slot of the SR6 subrack. The aluminum side wall towards the boards is a screen for insulation and radio noise emissions. The heat losses are therefore extracted from the side away from the boards.

The front panel corresponds to the usual SIMADYN D design. The front panel also contains a power line cable grip (see also MB).

4.2. Design

4.2.1. Front Panel Elements and Funktions

Front view of the SP7 (see also MB).

- Indicate the fault free operational readiness via an LED (green) on the front panel.

- Indicate an internal fault of the power supply by means of an LED (red) on the fronz panel (internal power supply fault when an under voltage monitor of the output voltages U_{a1}, U_{a2}, U_{a3} or the input voltage U_e is activated).

- Reset push button on the front panel of the power supply; activates a power supply switch off/switch on routine.

Press	-->	Activate switch off routine
Release	-->	Automatic restart

The reset push button is safeguarded against unintentional activation (reset mounted, simple activation (i.e. by means of a ball point pen)).

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- Test jacks on the front panel for checking the output voltages U_{a1}, U_{a2}, U_{a3}, (via protection impedances as short circuit protection).
- The battery connection is implemented via the front panel: Phoenix terminal MSTB 2.5/3-ST.

- The power line connection is carried out via a 4 pin Phoenix terminal MSTB 2.5/4-T. The line fuse is 2 pin and internally mounted on the printed circuit board (and an additional fuse SI 3).

Type and Designation:	T800mA : SI 1, T800mA : SI2 und	T50mA : SI 3.
Values:	Input current (for U_e =230V) :	I_N = 600mA
	Melting integral :	$I^2*t = 0,5A^2*s$
	Inrush peak current :	Is = 25A

4.2.2. Monitoring Functions

The input voltage and all output voltages are monitored for under voltage.

- Start of the switch off sequence:

Below range of	U_e (230VAC) < 170 ...175V
	U_{a1} (5V) < 4,7 ... 4,85V (t>100-200 us)

Subsequent to the power supply being switched off by the input voltage monitoring equipment, for falling below range, an automatic restart is implemented after resolving the cause of the fault (input voltage rises up to 190V). The down time period is undefined!
No automatic restart occurs after the power supply is switched off by the monitoring equipment of the output voltage 5V. The power up occurs, after resolution of the cause of the fault, by switching the supply voltage off and on.
The switch off sequence can no longer be implemented when a short circuit occurs at the output!

- Indicate power supply faulty with control signal *RDYIN = LOW ,

when	U_{a2} (+15V) < 13,0 ... 14,0V	and
	U_{a3} (-15V) > -14,0 ...-13,0V	falls below range.

4.3. Technical Data

1. Input voltages:

AC supply according to SN 2655 Section 8, DIN IEC 38 specifications

	U_e: 230V
Static upper limit:	U_e * 1,1 (=253V)
Static lower limit:	U_e * 0,85 (=195,5V)
Frequency:	50/60 Hz ± 2,5Hz

Non periodical over voltages according to DIN VDE160, A5.3.1.1.2

U based on peak value :	U_e * 1,3 (460V)
Period :	1,3 ms
Recovery time at least:	0,1 s

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Events per hour:	10 maximum

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Transient voltage dips according to DIN VDE 0160, A5.3.1.1.3

U based on effective value:	U_e * 1 (230V)
Period :	5 ms
Recovery time at least:	0,1 s
Events per hour:	10 maximum
V_{cc} :	+5V

2. Output Voltages/Current : U_{a1}: +5,1V ± 0,1V

Ripple :	$50mV_{SS}$
I_{a1} :	1,5 bis 7 A
Base load :	1,5A, the defined values are valid above the base load.
	U_{a2}: +15V ± 0,300V
Ripple :	$150mV_{SS}$
I_{a2} :	0 bis 0,7 A
Base load :	$0,05*I_{a2}$ rated
	U_{a3}: -15V ± 0,300V
Ripple :	$150mV_{SS}$
I_{a3} :	0 bis 0,6 A
Base load :	$0,05*I_{a3}$ rated

3. Over Voltage Protection : for U_{a1} (Surpressor Diode)

4. Current Limiting : I_{a1max} = approx. $1,2*I_{a1}$ rated
I_{a2max} = approx . $1,2*I_{a2}$ rated
I_{a3max} = approx . $1,2*I_{a3}$ rated

5. Control Accuracy : Conform with the values in section 1,2

6. Transient Recovery Time for U_{a1}: < 80ms after U_e=U_e rated
<1ms after load step (0,5 -->1)*I_{a1} rated

7. Residual Ripple: < 50 mV_{SS} for U_{a1}
< 150 mV_{SS} for U_{a2},U_{a3}

Measurement Conditions: Probe 1:1, 10% base load, measurement band width 30 MHz

8. Commutation Peaks : < 5% of U_a rated

9. External Switch -On/Off : Via line switch

10. Input Protection : Fuse

11. Safety Regulations: Safe isolation according to VDE 0160

12. Insulation Voltage : 3750 V AC

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Test Voltage :	3750 V AC

13. Radio Interference Suppression Level : Limit value class B according to VDE 0871

14. Temperature Coefficient :	Comply with values in Section 1.2 within Section 15
15. Working Temperature Range :	0 deg. C ± 55 deg. C , non-ventilated air cooling
16. Storage Temperature Range :	-25 deg.C - + 85 deg.C
17. Ventilation :	Internal, non-ventilated
18. Humidity Class :	F according to DIN 40040
19. Protection Class :	According to VDE 0106 / IEC536
20. Contamination Grade :	2 according to VDE 0110
21. Air and Leakage Path :	According to VDE 0110
22. Connection Technology :	See chapter 6 of this specification
23. Shock/Vibration Loading :	Stationary installation: severity 12 according to SN29010 Transport: severity 22 according to SN29010
24. Protection Class :	IP00
25. Elevation Class :	S according to DIN 40050
26. Discharge Current :	1mA according to VDE 0160

4.4. Battery Buffering of the RAM Memory

The SR6 subrack does not contain its own battery for retaining the RAM memory data when the power supply fails. A battery can be connected via the plug connector X2. The voltage fed into X2/pin 1 must lie between 3.0 V and 4.5 V. When lithium batteries are utilized, a protection component must be connected into the current path in order to prevent an impermissibly high charging current when faults occur (danger of explosion). A resistor in series of 39 Ohm is recommended. The battery is loaded with a maximum of 100 mA.

Possibly available monitoring of the battery voltage (U< 3.0 V) can be reported to the system via X2/pin 2. Connect the 5V level at X2/pin 2 (*BATAL) to X2/pin 1 (M) with a low resistance. The current occurring at the jumpered connections X2/pin 2 and X2/pin 1 is a maximum of 0.5 mA
(R_i = 10 KOhm).

Lithium- Battery	3,6V	5,0Ah	GWE-Classification No.: 247 239

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5. Installation Regulations

5.1. Interference Protection

The SIMADYN D ground is fixed to the housing and therefore lies at ground line potential.

- All SIMADYN D housings must be connected to the cubicle ground with the shortest possible 6 mm^2 cable. Voltage equalization via the “PE“ connection of the power supply is not sufficient.

- Screened cables must have their screen directly connected to the ground or a screen rail. The screen must run up to the terminal module or board.

- All switch gear cubicles actively participating on meshed SIMADYN D drives must be connected together with a single potential equalizing cable with a cross section of at least 16 mm^2.

- Empty slots must be covered with SIMADYN D slot cover panels (SR81,SR82,SR83).

- All boards must be fixed with screws.

- No unsuppressed circuit breakers may be used in a switch gear cubicle with SIMADYN D.

- If unsuppressed circuit breakers are utilized in a cubicle next to the SIMADYN D cubicle, then the cubicles must be separated by side wall panels.

- The protective cable connection is implemented on the rack and the power supply. Both components (rack and power supply) must be connected to ground cable potential. This can be implemented for the rack by fixing with serrated edge washers. Disconnect the connection cables of the power supply before removing the power supply.

5.2. Non- Ventilated Cooling

The SIMADYN D rack SR6 is designed for non-ventilated cooling. In order to ensure the effectivness of the internal fan cooling, sufficient exhaust possibilities must be exist at the rack and in the cubicle for the rack exhaust air.

That signifies that the rack cannot be operated in an enclosed cubicle and that racks exhaust air is not constricted by other units or components. The same applies for the racks intake air. The ventilation slits in the cubicle must not be covered with a filter.

If the rack is operated in an enclosed cubicle, then it must be forced air ventilated.

A minimum distance above or below the rack of 60 mm must be adhered to when mounting units or other components. Therefore two racks mounted above one another require a distance between both racks of 120 mm, whereby the upper rack must be protected from the exhaust air of the lower rack by a deflection plate.

The rack may only be operated with processor boards from supply dates after 03.89 (lower power losses from the C-MOS components).

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6. Connector Assignments

6.1. Connector Assignments of the Power Supply

6.1.1. Line Supply 230 V AC

Connector Type: 4 pin male connector
MSTB 2,5/4-ST/5,08
Phönix Company

	X1
L	1
N	2
NC	3
PE	4

6.1.2. Battery Connection

Connector Type: 3 pin male connector
MSTB 2,5/3-ST/5,08
Phönix Company

	X2
0V	1
*BATSEN	2
V_{cc}	3

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6.1.3. Base Connector Supply

A 96 pin blade connector is utilized as the base connector (X200)

Pin	a	b	c
1	+15V	+15V	+15V
2	NC	-15V	-15V
3	Vcc	NC	*DSAVE
4	NC	*BATAL	NC
5	*RDYIN	*DSAD	*RESET
6	5 V	5 V	5 V
7	5 V	5 V	5 V
8	5 V	5 V	5 V
9	5 V	5 V	5 V
10	5 V	5 V	5 V
11	5 V	5 V	5 V
12	0 V	0 V	0 V
13	0 V	0 V	0 V
14	0 V	0 V	0 V
15	0 V	0 V	0 V
16	0 V	0 V	0 V
17	0 V	0 V	0 V
18	NC	NC	NC
19	NC	NC	NC
20	NC	NC	NC
21	NC	NC	NC
22	NC	NC	NC
23	NC	NC	NC
24	NC	NC	NC
25	NC	NC	NC
26	NC	NC	NC
27	NC	NC	NC
28	NC	NC	NC
29	NC	NC	NC
30	NC	NC	NC
31	NC	NC	NC
32	NC	NC	NC

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6.2. Signal Assigments on the Back Plane Bus

X201 to X206 : 96 pin socket connector DIN 41612 format C (L-Bus)

Pin	Row a	Row b	Row c
1	5 V	5 V	5 V
2	AUX 2	AB 20	AB 22
3	AUX 1	AB 21	AB 23
4	+15 V	+15 V	+15V
5	AUX 0	-15 V	-15 V
6	*LOCK	*CSPER	*CSINI
7	5 V ext	5 V ext	*RSERQ
8	Vcc	AB 12	AB 0
9	*BATAL	0 V	AB 1
10	*DSAD	AB 13	AB 2
11	*DSAVE	PLC 0	AB 3
12	AB 19	AB 14	AB 4
13	*OUTDS	PLC 1	AB 5
14	*RESET	AB 15	AB 6
15	*BHE	PLC 2	AB 7
16	*BRQ	AB 16	AB 8
17	*BGIN	PLC 3	AB 9
18	*BGOUT	AB 17	AB 10
19	*BCLR	PLC 4	AB 11
20	*IR0	AB 18	DB 0
21	*IR1	0 V	DB 1
22	*IR2	DB 11	DB 2
23	*IR3	0 V	DB 3
24	*RDYIN	DB 12	DB 4
25	*RDY	PRIVAT	DB 5
26	*WR	DB 13	DB 6
27	*RD	0 V	DB 7
28	CLKCY	DB 14	DB 8
29	*CLK.M	0 V	DB 9
30	*DEN	DB 15	DB 10
31	*HWE	RES	SBR
32	DT/*R	0 V	SBT

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7. STRUC L-Screen in the Master Program

```
        : SR6                           "Rack 6 slots,  L-Bus"
L01 4S = '.      .        .       .     ´"Label"
L05 4S = '.      .        .- - - - - - SP - - - - ´"Strips"
S01 8N = ?                              "Slot 1: board (,sub-module)"
S02 8N = 0
S03 8N = 0
S04 8N = 0
S05 8N = 0
S06 8N = 0
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

8. Appendices

8.1. Bus Board

Bus board drawing	3SE. 465 682.0011.00

8.2. Scale Drawing

Scale Drawing	3SE. 465 682.9011.00 MB

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9. ECB instructions

Components which can be destroyed by electrostatic discharge (ECB)

Generally, electronic boards should only be touched when absolutely necessary.

The human body must be electrically discharged before touching an electronic board. This can be simply done by touching a conductive, grounded object directly beforehand (e.g. bare metal cubicle components, socket outlet protective conductor contact.

Boards must not come into contact with highly-insulating materials - e.g. plastic foils, insulated desktops, articles of clothing manufactured from man-made fibers.

Boards must only be placed on conductive surfaces.

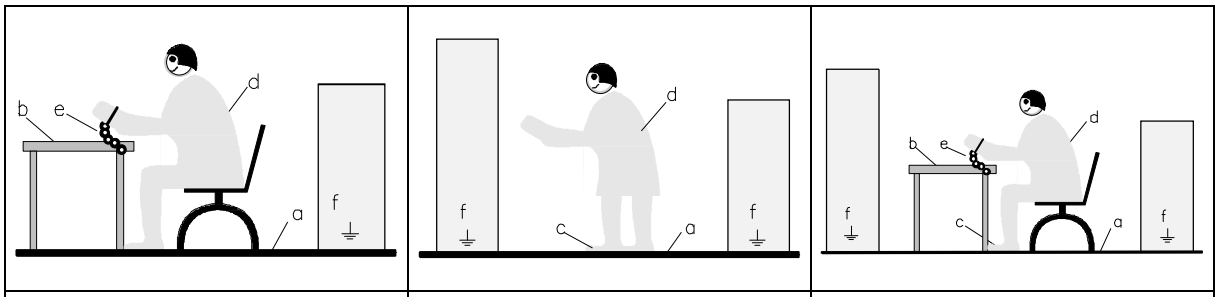
When soldering, the soldering iron tip must be grounded.

Boards and components should only be stored and transported in conductive packaging (e.g. metalized plastic boxes, metal containers).

If the packing material is not conductive, the boards must be wrapped with a conductive packing material, e.g. conductive foam rubber or household aluminum foil.

The necessary ECB protective measures are clearly shown in the following diagram.

a = Conductive floor surface
b = ECB table
c = ECB shoes
d = ECB overall
e = ECB chain
f = Cubicle ground connection

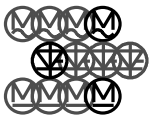


Seated	Standing	Standing/sitting

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