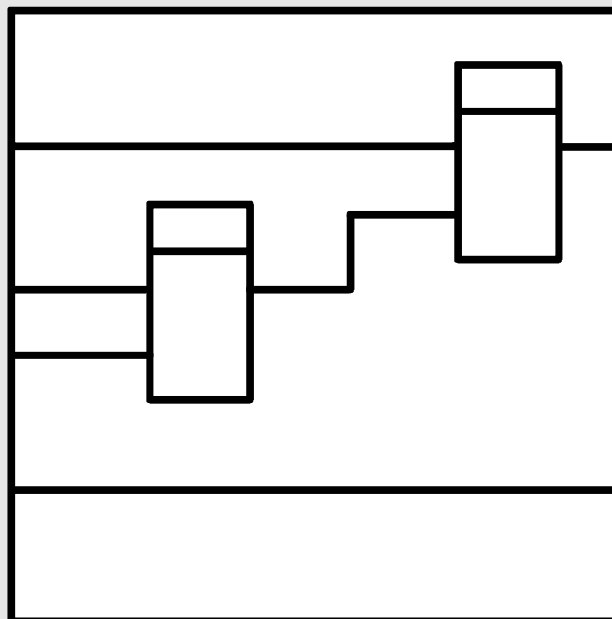# SIMADYN D
Digital Control System

communication board CS11

User Manual, communication board CS11

Edition		Edition status
1	communication board CS11	03.91
2	communication board CS11	05.95

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.
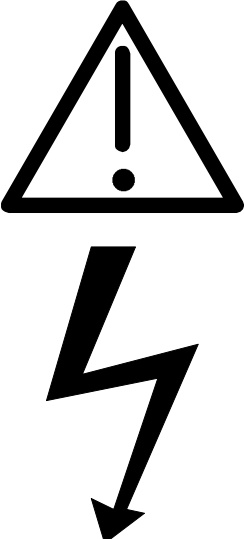
Contents

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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.

Further, the contents of this Manual shall not become a part of or modify any prior or existing agreement, committment or relationship. The sales contract contains the entire obligation of Siemens. The warranty contained in the contract between the parties is the sole warranty of Siemens. Any statements contained herein do not create new warranties nor modify the existing warranty.

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Warning information

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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.

1. Function Description

The communication board CS11 is the new version of the CS1 board. The board is designed, in connection with the communication board CS21, to link from two to four board racks SR1 or SR5 of the Simadyn D system. Therefore a fast parallel link is possible via the C-bus. The data transfer can therefore only be carried out by processor boards with a C-bus connection (PM12, PM13, PM16).

The CS11 board contains 16 Kbyte of memory (dual port RAM). The data from all the linked racks are written to or read from this memory.

A daisy chain arbitration is enforced between the communication boards CS11 and CS21 in order to prevent accessing to the dual port RAM by more than one rack. A software generated permanent requ est signal may be implemented to transmit several data blocks consistently. No other processor board is permitted access to the dual port RAM while this signal is set.

The rack containing the CS11 board is designated the master in the system. The basic clock rate, the time clock interrupt and the external interrupt are transferred to the CS21 board. Therefore the slave racks can be synchronized by the master rack.

The memory area of the dual port RAM lies within the special peripheral area (40000H - 6FFFFH). The start address is defined by the compiler. Accessing the chip select logic and the memory is carried out via a programmable address decoder (PAD).

The connection between the boards CS11 and CS21 is made via a 50 pin cable. The control signals, addresses and data are transferred via differential drivers and receivers in order to improve security against signal corruption.

2. Board Design

- Connections for local bus (connector X2) and the communication bus (connector X1)
  (only monitoring signals and the clock via the local bus)
- two 50 pin SUB D jack terminals (X5, X6) for the connection to the CS21 and the SE42
- 16 Kbyte RAM
  Battery - back-up by power supply
- board ID
- Software programmed address definition
- transfer the basic clock rate, time clock interrupt, external interrupt to the CS21
- permanent requ est for data block consistency
- up to three CS21 boards can be connected to CS11 via a terminal block SE42
- cable length of 100m between two coupled racks. A 2.5m cable length is permitted between a
  CS11 board and the terminal block when three or four racks are coupled via terminal blocks.

3. Application notes

3.1. General

The communication board CS11 can only be installed in the large racks SR1 or SR5, since the data communication between the processor board and the dual port RAM can only be implemented via the communication bus. The corresponding function modules can only be configured on the PM12, PM13 and PM16.

3.2. Start-up Response

The rack containing the CS11 board can be switched on alone (without the CS21 connection) for the purpose of board commissioning. The initialization module will start the board with the communication modules for the rack link and display the processor number on the front panel. The communication modules are set to a wait state and are not processed until the rack containing the CS21 board is also powered up and initialized.

The following is required to put the board into operation:

- Power up all racks in the system simultaneously,

    - or power up the rack containing the CS11 before the rack containing the CS21

3.3. Design of the Rack Link

It is possible to implement parallel rack links with up to four racks. One CS11, up to three CS21 boards and the terminal block SE42 are required therefore.

A link between two racks is implemented as follows: The CS11 board is installed beside the PMxx processor board in the master rack. The CS21 board is installed beside the PMxx board in the slave rack (figure 1). The connection between the boards is made via two 50 pin cables (SC36.1), connected as follows:

    CS11/X5 - CS21/X5
    CS11/X6 - CS21/X6

The maximum cable length permitted between both boards is 100m.

The terminal block SE42 (Order {MLFB} : 6DD1681-0EC0) is required when three or four racks are to connected via a parallel rack link. The star connected cables from the CS11 and CS21 run together at this point (figure 2). Each CS11 and CS21 board has a 50 pin cable connected to it. The exact connection plan is contained in the HW description of the SE42 terminal block (HW documentation 28.30.41). This configuration requires the terminal block to be located in the cubicle containing the CS11 rack. The maximum permitted cable length between the terminal block and the CS11 is 2.5m, between the terminal block and the CS21 is 15m.

Several CS11 and CS21 boards may be simultaneously configured in one rack (the available memory area permits up to 12 special IO boards to be configured in one rack). This is necessary when more than two racks are to be linked over a longer distance (>15m). If a CS11 and a CS21 board are to be initialized in one rack, then the boards are to be allocated such that the CS11 is initialized before the CS21 board. The C bus memory coupling board (MM11) must be installed in the rack containing the CS21 board, with the link to the CS11 in rack 1, since valu es regarding address corrections are contained in this memory coupling (figure 3).

3.4. Connection Cables

The GWE works has the following custom cables for the link between two racks:

Cable   SC36.1   50-pin   / 2,5m   MLFB: 6DD1684-0DG1

The connection cable 6DD1684-0DG1 is required as follows:

- twice   for two   racks
- six   times for three racks with the terminal block SE42
- eight times for four racks with the terminal block SE42

The cables are to be manufactured as follows when other lengths are required:

A parts kit may be obtained from GWE containing the pin connectors. The order no. = 6DD1680-0AE0 and is required two times for each cable. The kit contains pin connectors (Cut and contact techniqu e), latch, plug casing as well as all the required mechanical parts. The cable must be ordered directly from the manufacturer.

The cable must have the following characteristics for a high security against signal corruption:

- shielded
- twisted pair (conductor pairs)

(i.e. SCOTCHFLEX MTP-round cable, order no. 3784-25P-540A from 3M)

The appendix contains a scale drawing (3GE 465 684.9000.09 MB) which shows the most important data for manufacturing the cable.

The cable shield is pushed over the plug casing slide latch and is connected to the front panel. The grips on the front panel must be screwed to the rack to ensure a good ground connection and also to ensure perfect operation (even during the board commissioning). The linked racks must be connected with a shorting cable (zero voltage differential) of 6mm2 cross-section whose length is as short as possible (fix to the rack's grounding screws). This cable should be manufactured to the correct length when the system has been completely installed.

4. Technical Specification

INSULATION GROUP	A to VDE 0110 paragraph 13, group 2
	at 5 VDC
AMBIENT TEMPERATURE	0 to 50 deg. C with forced ventilation
STORAGE TEMPERATURE	-40 to +70 deg. C
HUMIDITY CLASS	F to DIN 40040
ALTITUDE RATING	S to DIN 40040
MECHANICAL STRESS	Installation in fixed non vibration resistant devices
PACKAGING SYSTEM	ES 902 C
DIMENSIONS	233.4 x 220 mm
BOARD WIDTH	1 1/3 SEP = 1 Slot = 20.14 mm
WEIGHT	0.45 kg
CURRENT CONSUMPTION	
OPERATION	5 VDC 1.35 A
POWER FAILURE	max. 1 uA, VBatt = 3,4V

5. Pin Allocation of the CS11

	X6 (female)	X5 (female)
	X6 (female)	X5 (female)
1	GRANT21	----
2	GRANT32	----
3	REQ21	----
4	REQ32	DATWRH2
5	2RDY1	ENAS1
6	DBD41	DATRD2
7	DBD52	ABD131
8	DBD61	DT/*RD2
9	DBD32	ABD112
10	DBD12	ABD92
11	DBD121	ABD82
12	DBD152	ABD72
13	DBD141	ABD62
14	DBD81	ABD42
15	DBD92	ABD12
16	DBD101	ABD22
17	CIR11	CIR31
18	GRANT31	----
19	GRANT42	----
20	REQ31	DATWRH1
21	REQ42	DATWRL2
22	DBD42	DATRD1
23	DBD72	DENB2
24	DBD62	DT/*RD1
25	DBD01	ABD112
26	DBD11	ABD91
27	DBD21	ABD102
28	DBD151	ABD71
29	DBD132	ABD52
30	DBD82	ABD41
31	DBD112	ABD32
32	DBD102	ABD21
33	CLKCY1	CIR02
34	GRANT22	----
35	GRANT41	----
36	REQ22	----
37	REQ41	DATWRL1
38	2RDY2	ENAS2
39	DBD71	DENB1

	X6	X5
40	DBD51	ABD131
41	DBD02	ABD121
42	DBD31	ABD111
43	DBD22	ABD101
44	DBD122	ABD81
45	DBD131	ABD51
46	DBD142	ABD61
47	DBD111	ABD31
48	DBD9	ABD11
49	CLKCY2	CIR01
50	CIR12	CIR32

6. STRUC L-Mask of the CS11 in the Master program

```
101 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
102
103       :CS11           "coupling module-DPR CS11, C-bus"
104   X5  1M = 0          "connector X5,X6"
105 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
106
```

7. Appendices

7.1. Block Diagram
Block Diagram   3GE 465 660 9003.00 SU

7.2. Scale Drawing and pin connector table
Scale Drawing with view of front panel
Table of the connector pins   3GE 465 660 9003.00 MB

7.3. Layout Plan
Layout plan   3GE 465 660 9003.00 AO

7.4. Scale drawing for cables
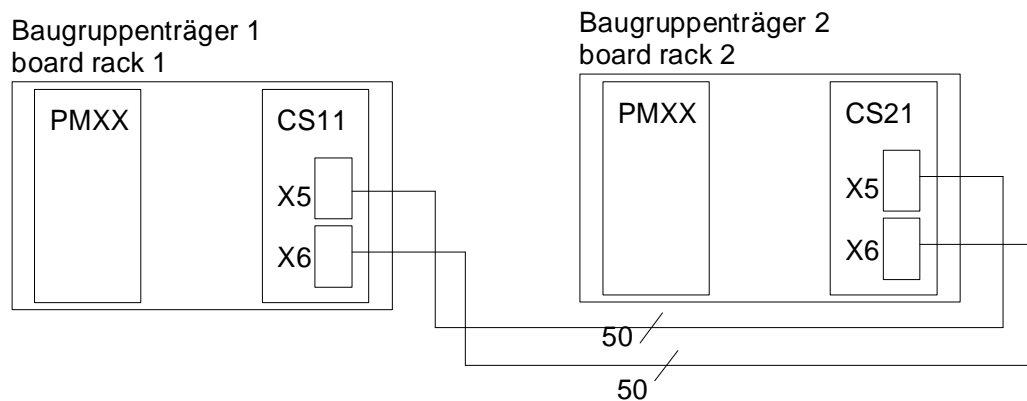Scale drawing for cables   3GE 465 685 9000.09 MB-76

7.5. Figures

Figure 1: Layout of a parallel link between two racks

Baugruppenträger 1
board rack 1

Baugruppenträger 2
board rack 2

PMXX   CS11

X5

X6

PMXX   CS21

X5

X6

SE42

X1   X2   X7

X3   X4   X8

X5   X6   ☐ • • • ☐
              S1   S5

Baugruppenträger 3
board rack 3

PMXX   CS21

X5

X6
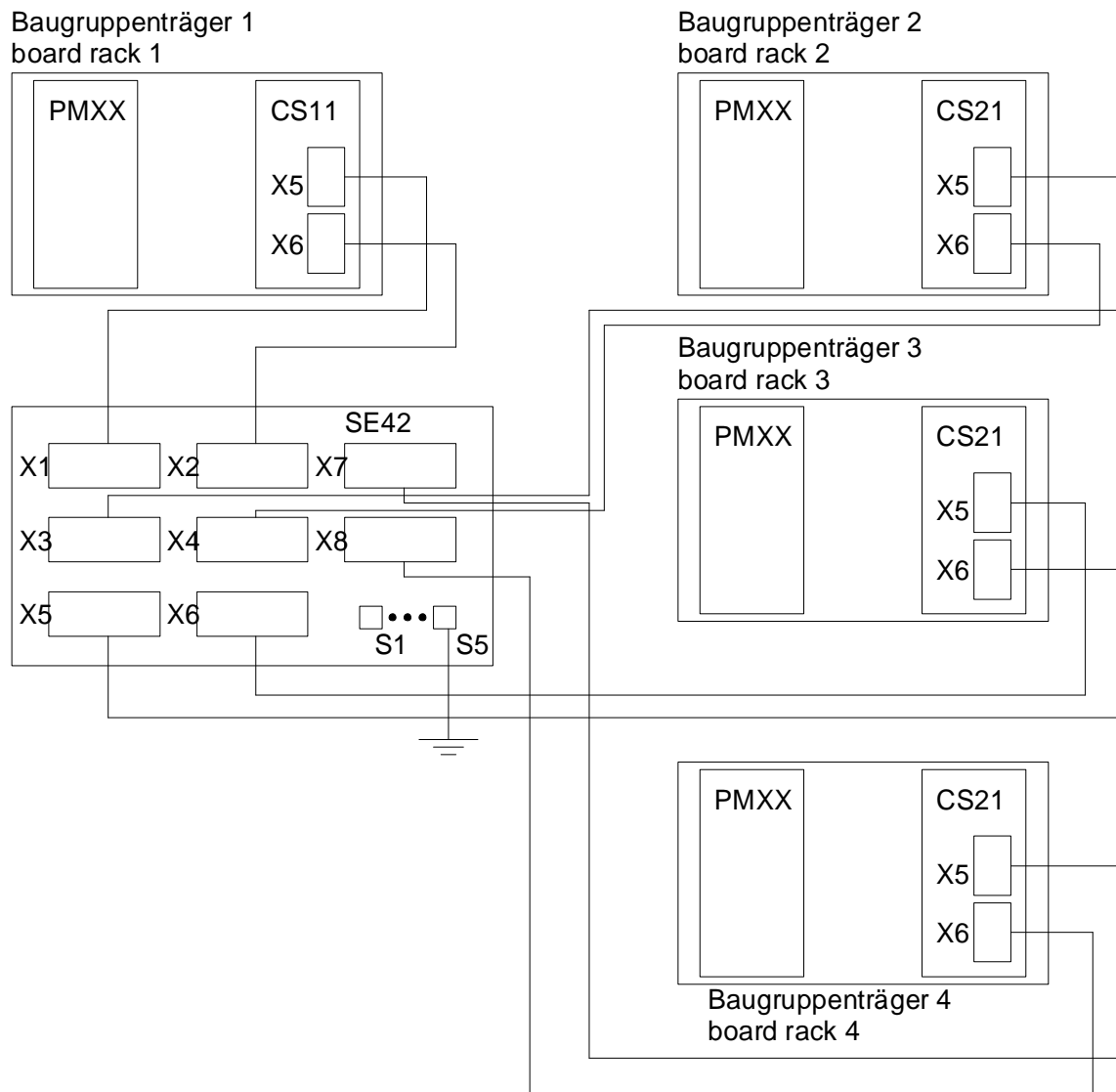
PMXX   CS21

X5

X6

Baugruppenträger 4
board rack 4

Figure 2: Layout of a parallel link between four racks via SE42
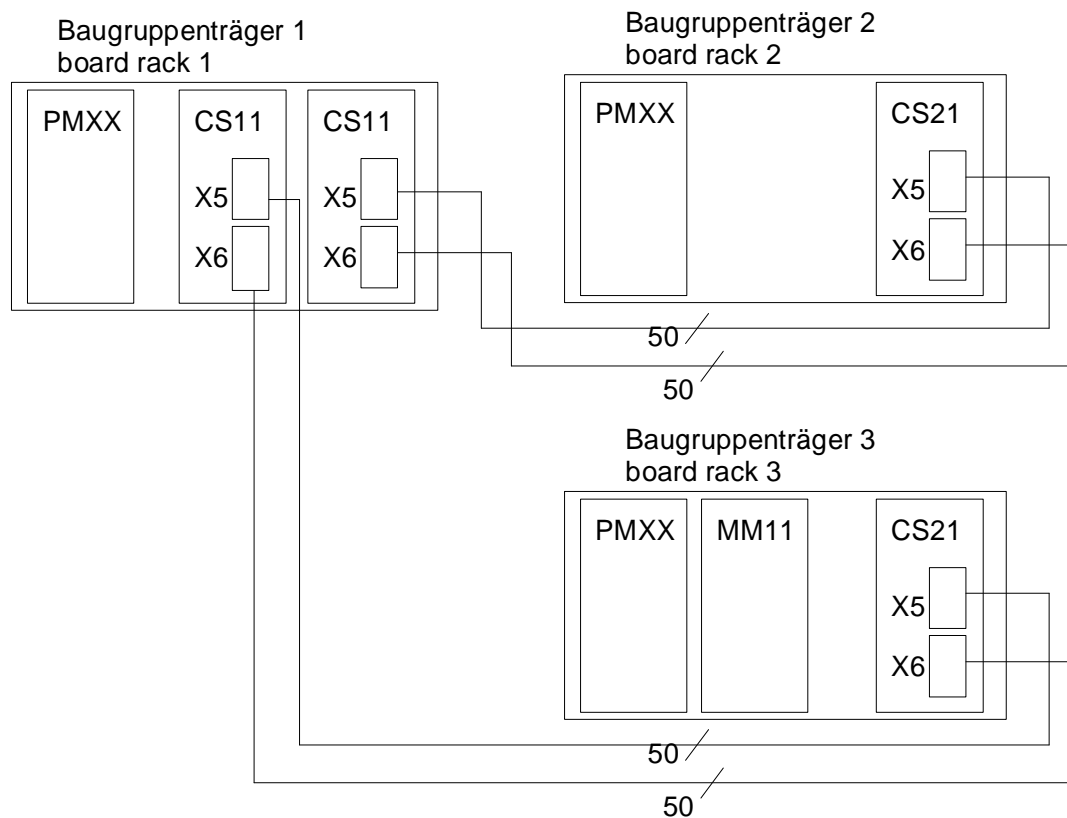
Figure 3: Layout of a parallel link between three racks with two CS11

8. Miscellaneous

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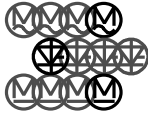
a = Conductive floor surface   d = ECB overall
b = ECB table   e = ECB chain
c = ECB shoes   f = Cubicle ground connection

| Seated | Standing | Standing/sitting |
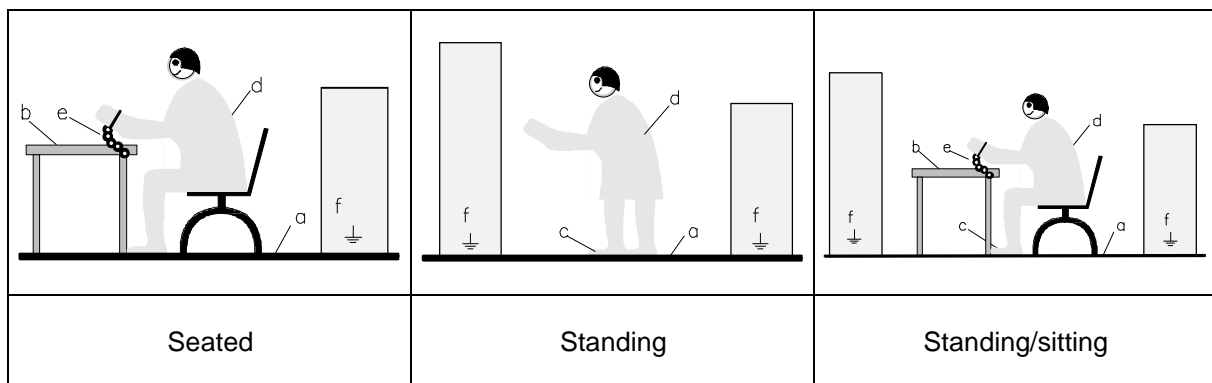
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