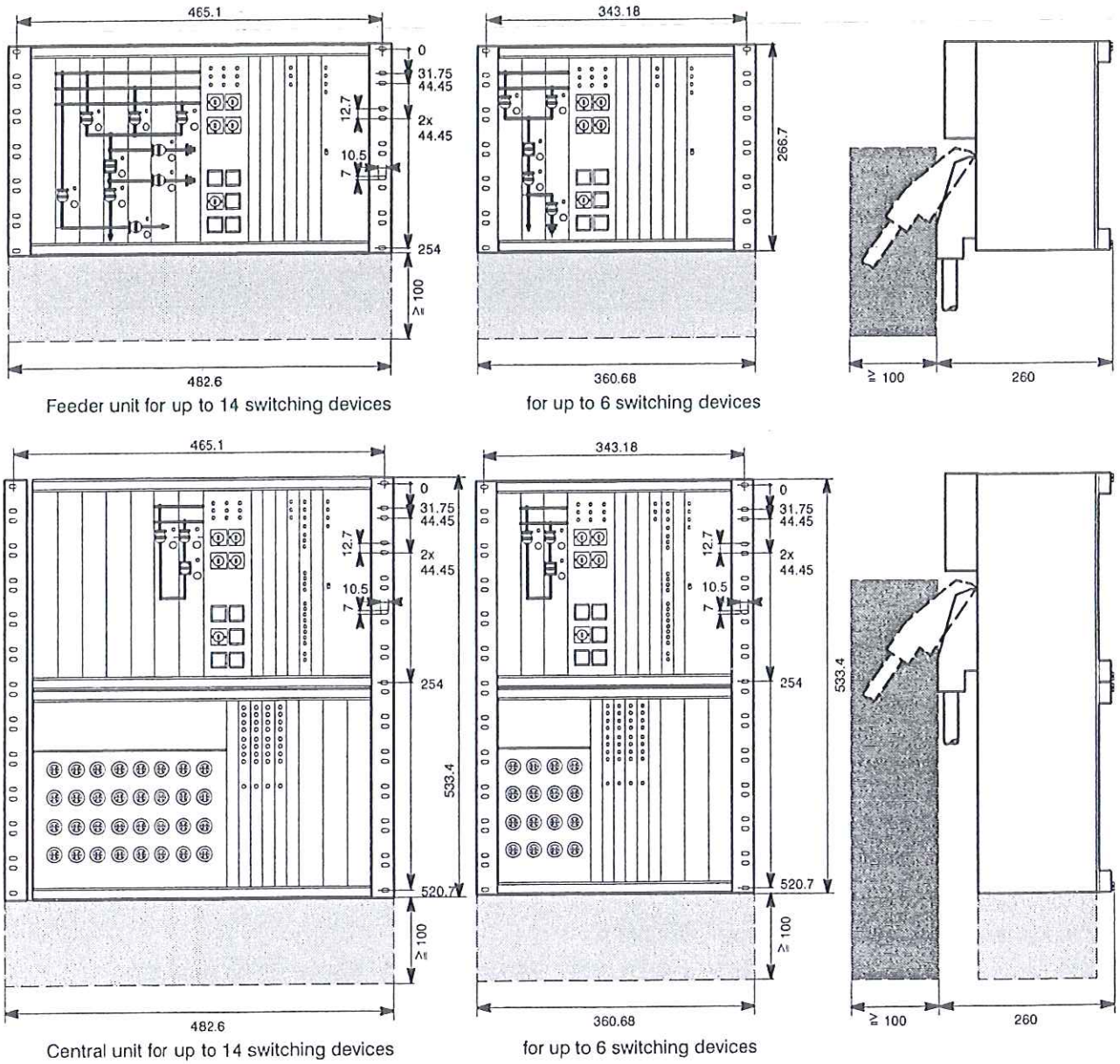
3 Design

3.1 Packaging system / dimensions

The microcomputer–controlled switchgear interlock units can be supplied in module racks (degree of protection IP20) in four sizes.

- feeder unit for up to 14 switching devices — double–tier 28 SPS * (19")
- feeder unit for up to 6 switching devices — double–tier 20 SPS
- central unit for up to 14 switching devices for connection to up to 32 feeder units — two double–tier 28 SPS (19")
- central unit for up to 6 switching devices for connection to up to 16 feeder units — two double–tier 20 SPS

* 1 SPS = 15.24 mm



Feeder unit for up to 14 switching devices

for up to 6 switching devices

Central unit for up to 14 switching devices

for up to 6 switching devices

terminal space for cable connectors and data transmission cables

clearance for cable connectors

Fig. 3.1 Feeder and central unit for up to 14 and up to 6 switching devices

3.2 Location of the modules in the module rack

3.2.1 Feeder unit

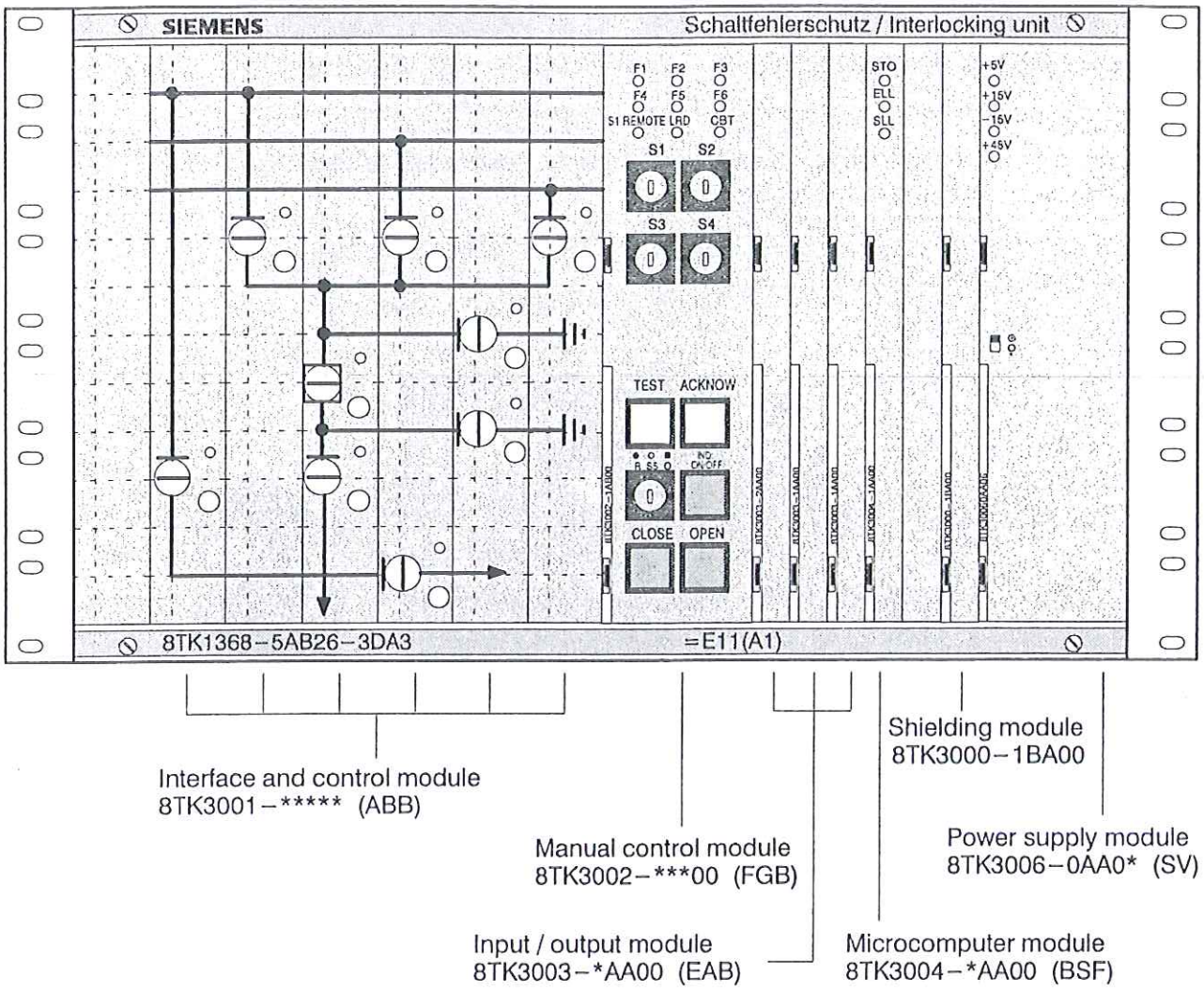


Fig. 3.2 28 SPS feeder unit

The double-tier module rack of the feeder units equipped with a backplane PCB and additional wire wrap wiring is equipped with the following basic modules:

- interface and control module (ABB) for control of one or two switching devices
- manual control module (FGB)
- input / output module (EAB) for connecting to five switchgear control circuits
- microcomputer module (BSF)
- 30 W power supply module for feeder unit (SV30)

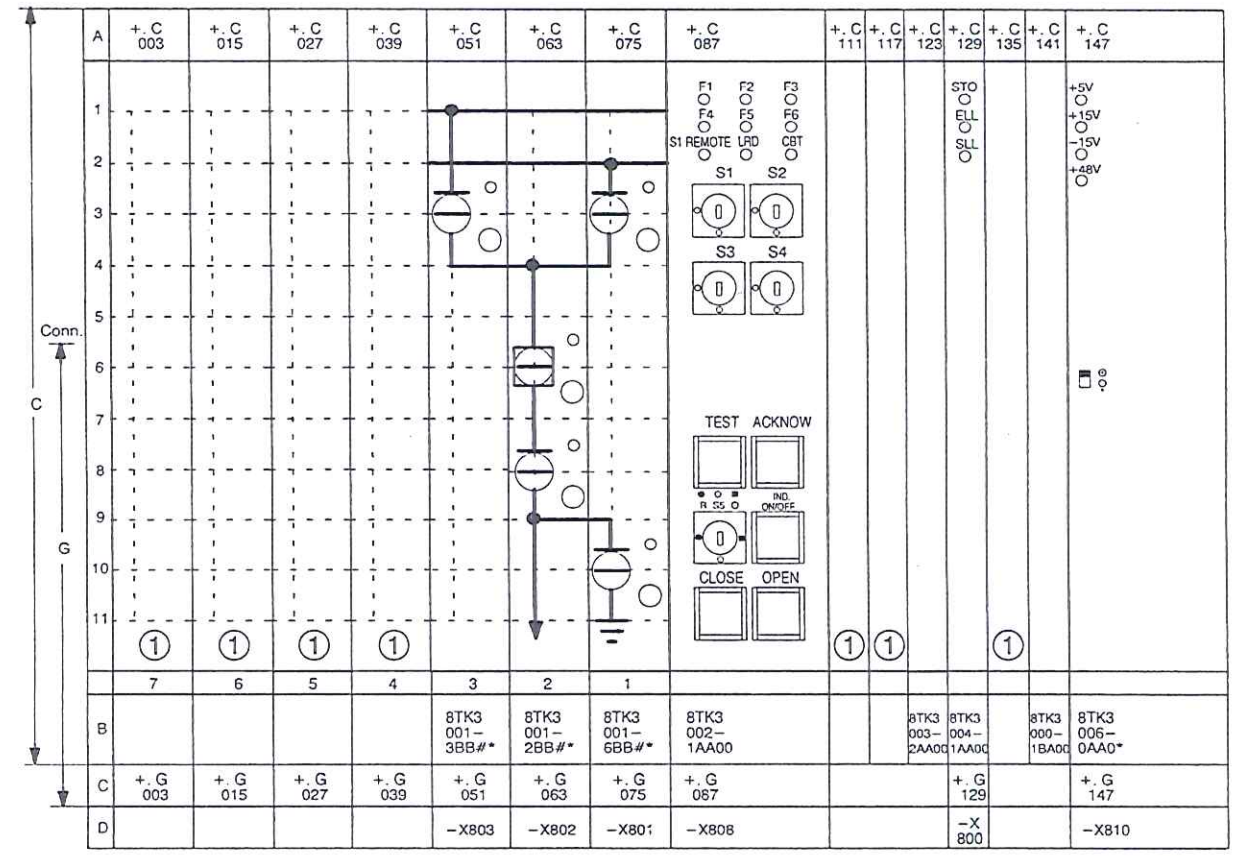
Fig. 3.3 shows a feeder unit with a mounting width of 28 SPS for a bay with five switching devices.

Empty slots are covered with dummy modules.

Fig. 3.4 shows the version with a mounting width of 20 SPS for the same bay.

On both versions, the numbering of the slots starts with +...C003.

View of the module side



A	Slot for module
B	Order numbers
C	Slot for connector
D	Equipment ID connector
①	Dummy module
③	Retrofitted if required

*	Please mark	Rated auxiliary voltage motor circuit
–		–
2		48 V DC
3		60 V DC
4		110 V DC
5		125 V DC
6		220 V DC
7		250 V DC

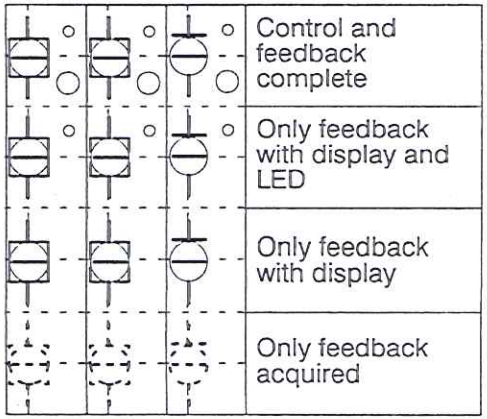
#	Please mark	Remote control voltage
1		24 V DC
2		48 V DC
3		60 V DC
4		110 V DC
5		125 V DC
6		220 V DC
7		250 V DC

Fig. 3.3 Slot assignment of the 28 SPS feeder unit

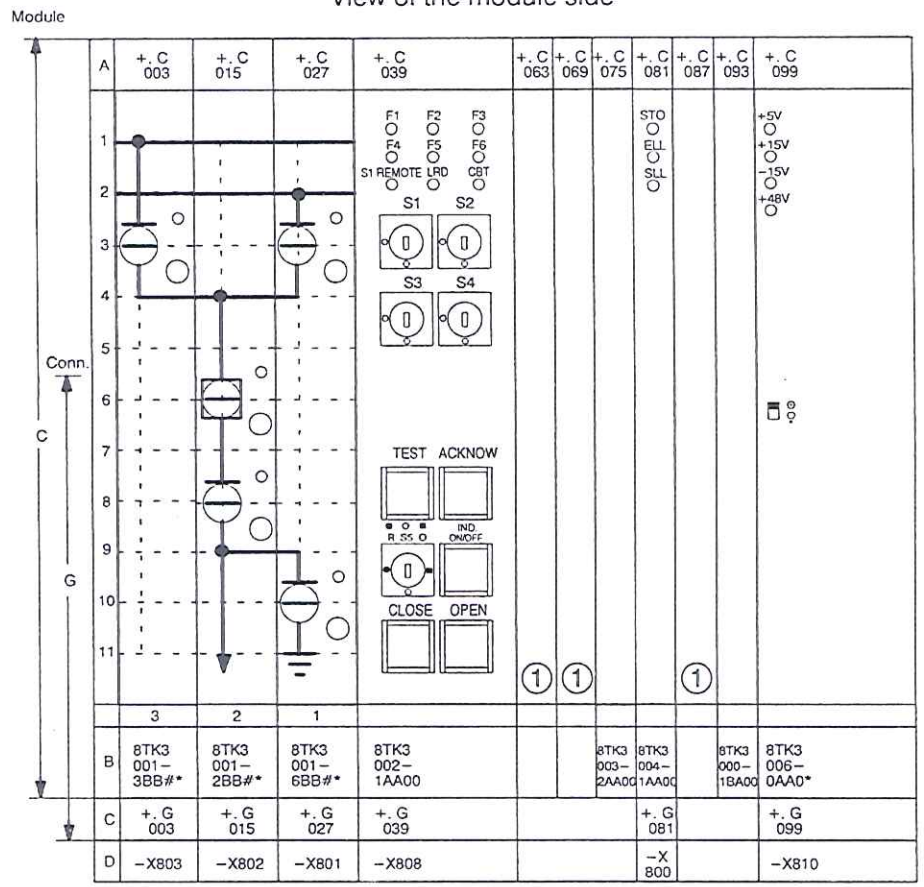
Example 8TK1262−0AA26−3DA3 (bay)

Slot	Module	Order number	Short code
003 015 027 039	Dummy module	8TK3000−2LA00	–
051	Interface and control module	8TK3001−3BB#*	ABB
063		8TK3001−2BB#*	
075		8TK3001−6BB#*	
087	Manual control module	8TK3002−1AA00	FGB
111 117	Dummy module		①
123	Input / output module	8TK3003−2AA00	EAB
129	Microcomputer module	8TK3004−1AA00	BSF
135	Dummy module		①
141	Shielding module	8TK3000−1BA00	
147	Power supply module	8TK3006−0AA0*	SV30

Symbols for circuit−breakers, switches and disconnectors



View of the module side



A	Slot for module
B	Order numbers
C	Slot for connector
D	Equipment ID connector
①	Dummy module
③	Retrofitted if required

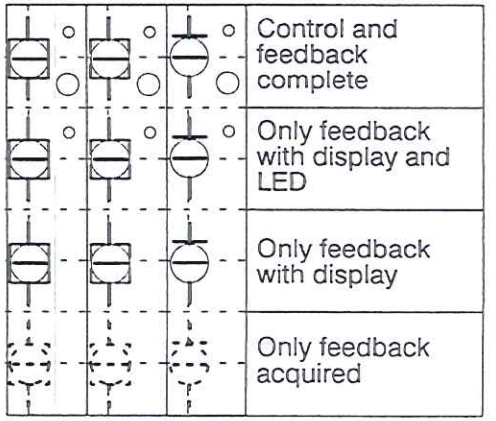
*	Please mark	Rated auxiliary voltage motor circuit
–		–
2		48 V DC
3		60 V DC
4		110 V DC
5		125 V DC
6		220 V DC
7		250 V DC

#	Please mark	Remote control voltage
1		24 V DC
2		48 V DC
3		60 V DC
4		110 V DC
5		125 V DC
6		220 V DC
7		250 V DC

Fig. 3.4 Slot assignment of the 20 SPS feeder unit
Example 8TK1262−0AA06−3DA3 (bay)

Slot	Module	Order number	Short code
003	Interface and control module	8TK3001−3BB#*	ABB
015		8TK3001−2BB#*	
027		8TK3001−6BB#*	
039	Manual control module	8TK3002−1AA00	FGB
063 069	Dummy module		①
075	Input / output module	8TK3003−2AA00	EAB
081	Microcomputer module	8TK3004−1AA00	BSF
087	Dummy module		①
093	Shielding module	8TK3000−1BA00	
099	Power supply module	8TK3006−0AA0*	SV30

Symbols for circuit−breakers, switches and disconnectors



3.2.2 Central unit

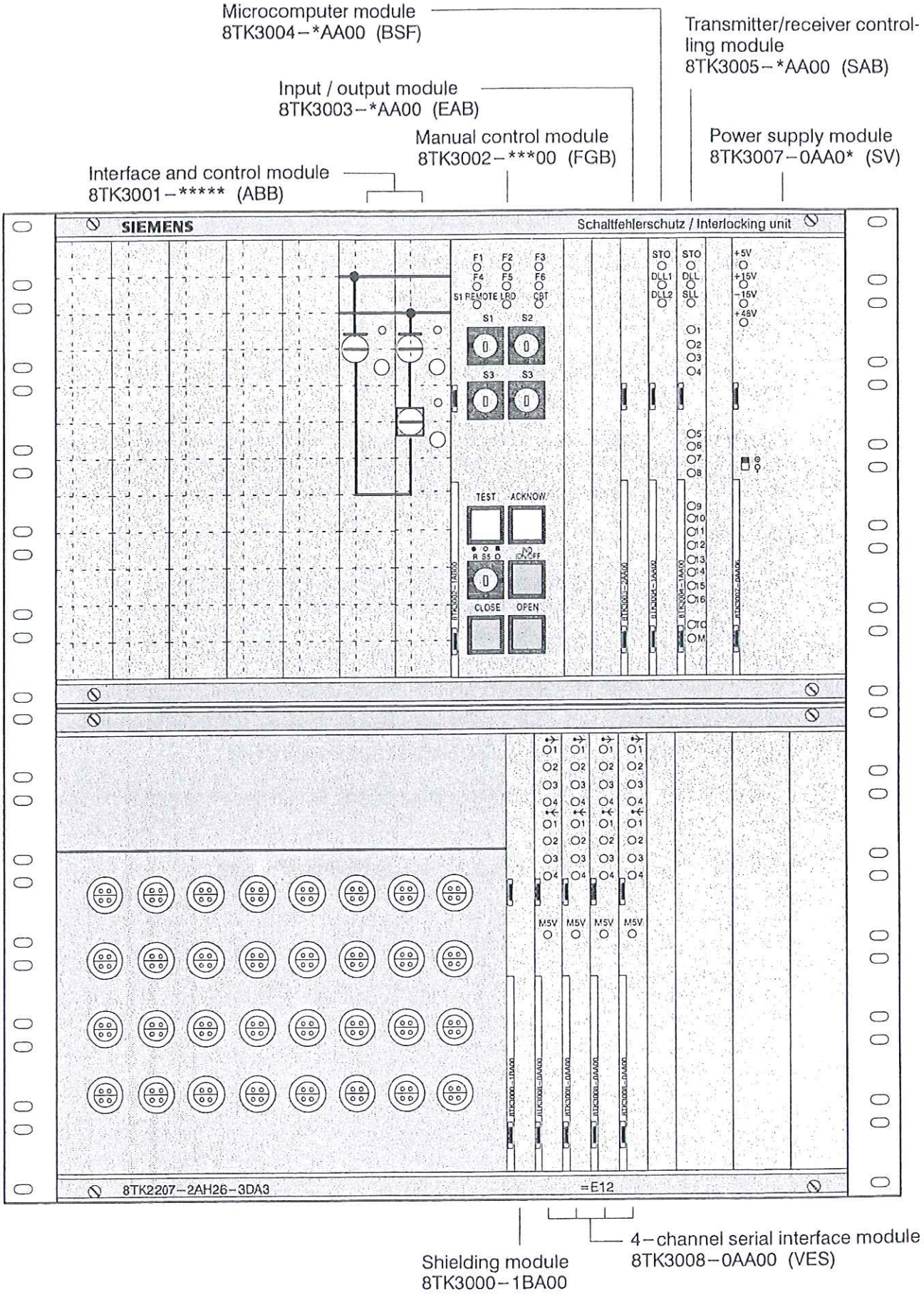


Fig. 3.5 Central unit 28 SPS

The two double–tier module racks of the central units equipped with two backplane PCBs and additional wire wrap wiring are always equipped with the following basic modules in the upper parts of the module rack (Figs. 3.6 and 3.8):

- interface and control module (ABB) for control of one or two switching devices
- manual control module (FGB)
- input / output module (EAB) for connecting five switchgear control circuits
- microcomputer module (BSF)
- transmitter/receiver controlling module (SAB) for 16 feeders
- 75 W power supply module for the central unit (SV75)

The lower part of the module rack (Figs. 3.7 and 3.9) contains:

- 4–channel serial interface module (VES) for four feeders
- shielding module
- central connector panel for connection of up to 32 data transmission cables from the feeder units

Four plug–in connections of the feeders (A1 to D1 through A8 to D8) are assigned to the 4–channel serial interface modules (slot +...C105 to +...C147). The test sockets 1 to 4 for the transmit and receive directions on the 4–channel serial interface modules are assigned to the slot rows A to D on the connector panel.

Examples (see Fig. 3.7):

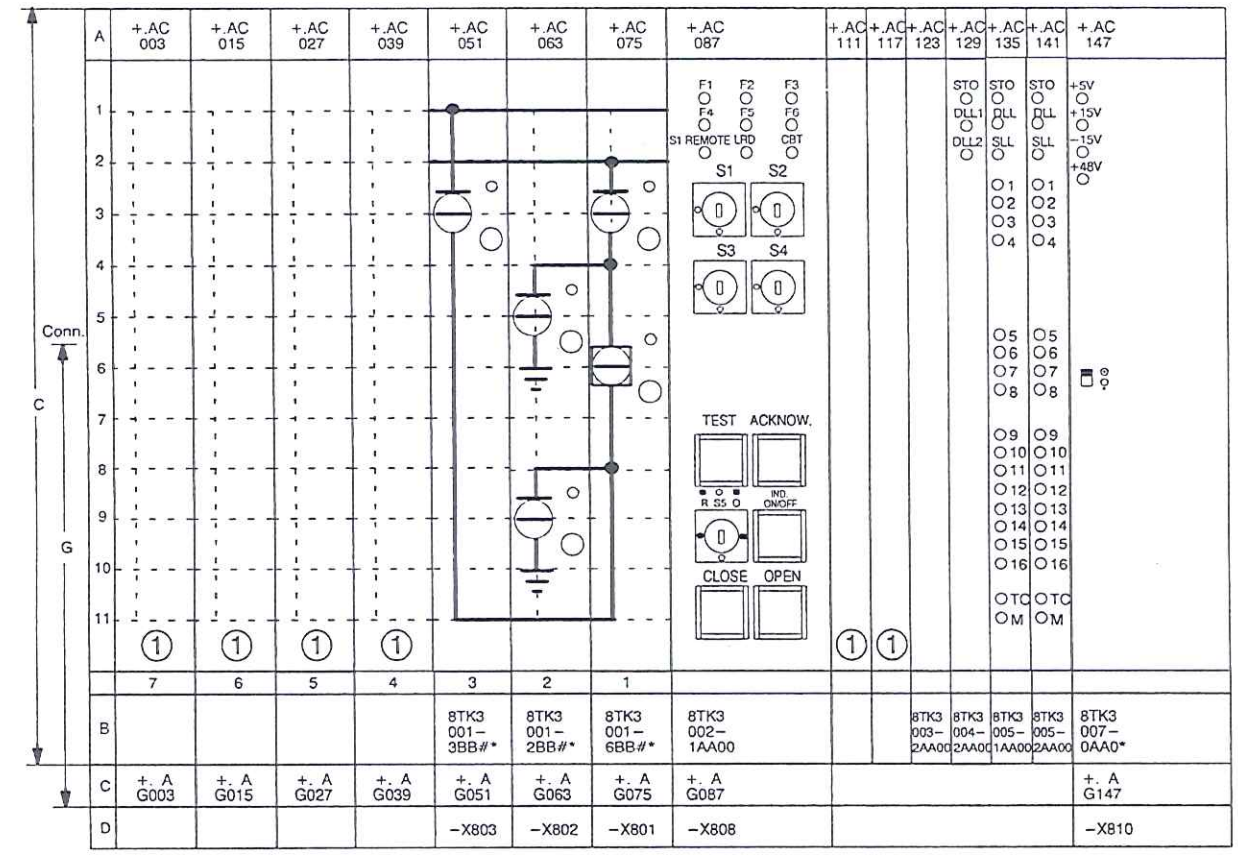
Module in slot + BC 105:	transmitter socket 1 against GND and receiver socket 1 against GND on slot A1 (connector X811).
Module in slot + BC 147:	sender socket 4 against GND and receiver socket 4 against GND on slot D8 (connector X884).

Figs. 3.6 and 3.7 show a master with a mounting width of 28 SPS for a bus-tie bay with five switching devices for connection to 32 feeder units. Empty slots are covered with a dummy module.

Figs. 3.8 and 3.9 show the version with a mounting width of 20 SPS for the same bus-tie bay for connection to 16 feeder units.

On both versions the numbering of the slots begins with +...C003 from left to right.

View of the module side



A	Slot for module
B	Order numbers
C	Slot for connector
D	Equipment ID connector
①	Dummy module
③	Retrofitted if required

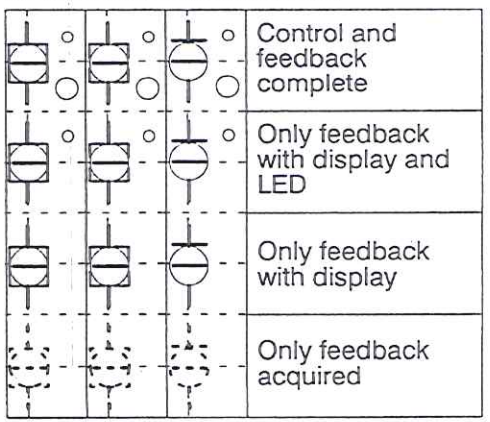
*	Please mark	Rated auxiliary voltage motor circuit
–		–
2		48 V DC
3		60 V DC
4		110 V DC
5		125 V DC
6		220 V DC
7		250 V DC

#	Please mark	Remote control voltage
1		24 V DC
2		48 V DC
3		60 V DC
4		110 V DC
5		125 V DC
6		220 V DC
7		250 V DC

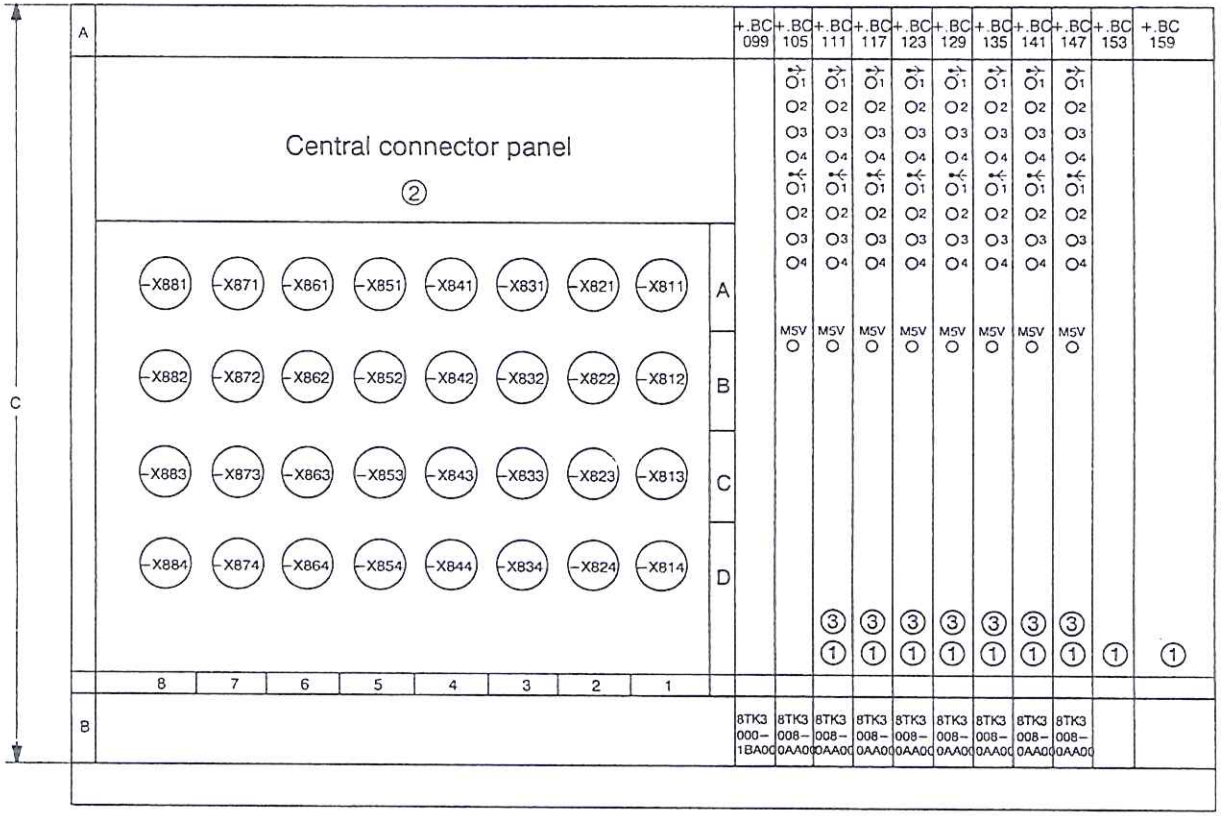
Fig. 3.6 Slot assignment for the 28 SPS central unit
Example 8TK2207−2AH26−3DA3 (bus-tie bay)

Slot	Module	Order number	Short code
003 015 027 039	Dummy module	8TK3000−2LA00	–
051	Interface and control module	8TK3001−3BB#*	ABB
063		8TK3001−2BB#*	
075		8TK3001−6BB#*	
087	Manual control module	8TK3002−1AA00	FGB
111 117	Dummy module		①
123	Input / output module	8TK3003−2AA00	EAB
129	Microcomputer module	8TK3004−2AA00	BSF
135	Transmitter/ receiver cntrl. module	8TK3005−1AA00	SAB
141		8TK3005−2AA00	
147	Power supply module	8TK3007−0AA0*	SV75

Symbols for circuit−breakers, switches and disconnectors



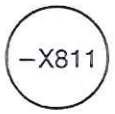
View of the module side



A	Slot for module
B	Order number
①	Dummy modules
②	Connector feeder assignment see overview/switchyard overview
③	Retrofitted if required

Slot	Module	Order number	Short code
099	Shielding module	8TK3000–1BA00	–
105 111 117 123 129 135 141 147	4–channel serial interface module	8TK3008–0AA00	VES
153 159	Dummy module		①

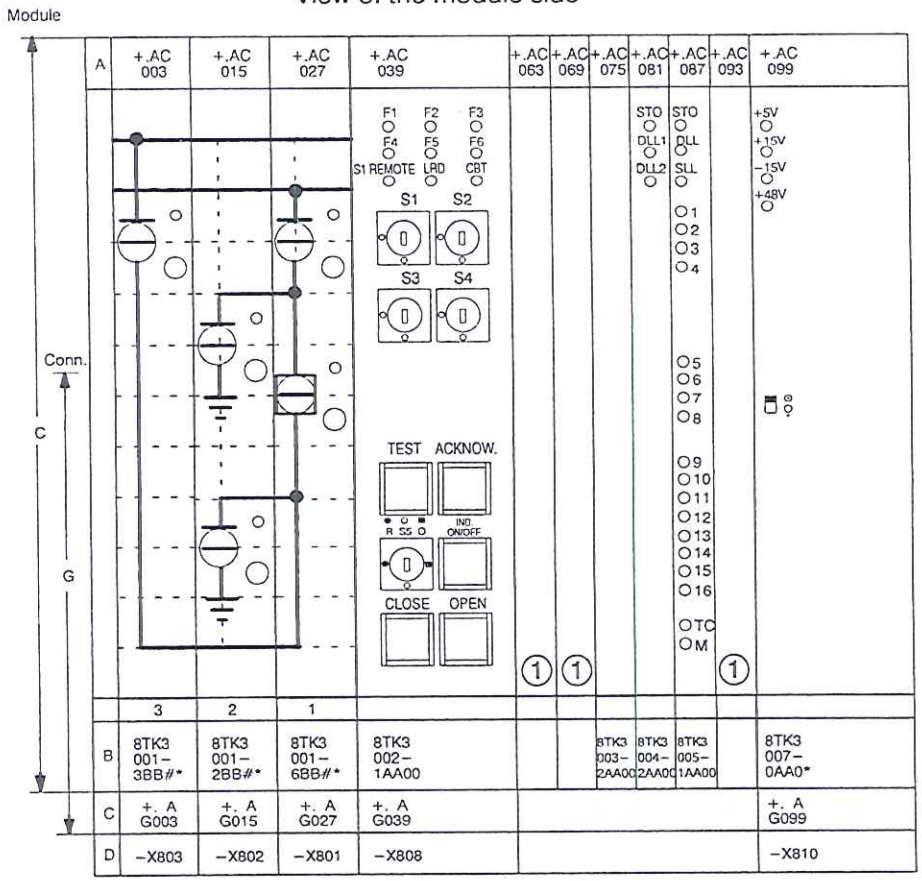
Explanation



Equipment ID of the connector

Fig. 3.7 Slot assignment of the 28 SPS central unit

View of the module side



A	Slot for module
B	Order numbers
C	Slot for connector
D	Equipment ID connector
①	Dummy module
③	Retrofitted if required

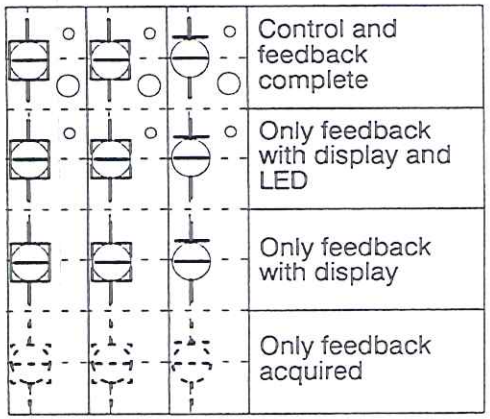
*	Please mark	Rated auxiliary voltage motor circuit
–		–
2		48 V DC
3		60 V DC
4		110 V DC
5		125 V DC
6		220 V DC
7		250 V DC

#	Please mark	Remote control voltage
1		24 V DC
2		48 V DC
3		60 V DC
4		110 V DC
5		125 V DC
6		220 V DC
7		250 V DC

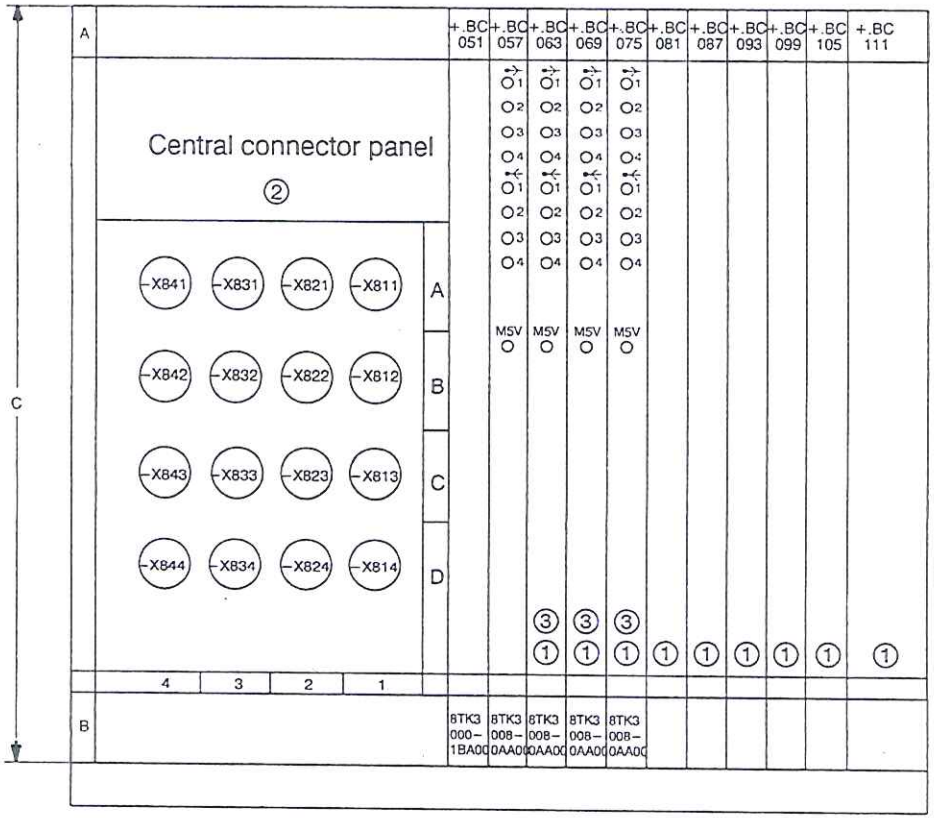
Fig. 3.8 Slot assigment for the 20 SPS central unit
Example 8TK2207–2AD06–3DA3 (bus-tie bay)

Slot	Module	Order number	Short code
003	Interface and control module	8TK3001–3BB#*	ABB
015		8TK3001–2BB#*	
027		8TK3001–6BB#*	
039	Manual control module	8TK3002–1AA00	FGB
063 069	Dummy module		①
075	Input / output module	8TK3003–2AA00	EAB
081	Microcomptuer module	8TK3004–2AA00	BSF
087	Transmitter/ receiver cntrl. module	8TK3005–1AA00	SAB
093	Dummy module		①
099	Power supply module	8TK3007–0AA0*	SV75

Symbols for circuit–breakers, switches and disconnectors



View of the module side



Slot	Module	Order number	Short code
051	Shielding module	8TK3000–1BA00	–
057 063 069 075	4–channel serial interface module	8TK3008–0AA00	VES
081 087 093 099 105	Dummy module		①
111	Dummy module		①

A	Slot for module
B	Order number
①	Dummy modules
②	Connector feeder assignment see overview/switchyard overview
③	Retrofitted if required

Explanation

-X811 Equipment ID of the connector

Fig. 3.9 Slot assignment of the 20 SPS central unit

3.3 Assignment of the modules depending on the degree of expansion

3.3.1 Assignment of the modules depending on the number of switching devices connected to the feeder unit and to the central unit:

Number of switching devices	1) ABB 1/2	2) ABB 1/1	3) FGB	4) EAB	5) BSF	6) SV30/SV75	
1	1		1	1	1	1	20 SPS
2		1	1	1	1	1	
3	1	1	1	1	1	1	
4		2	1	1	1	1	
5	1	2	1	1	1	1	
6		3	1	2	1	1	
7	1	3	1	2	1	1	28 SPS
8		4	1	2	1	1	
9	1	4	1	2	1	1	
10		5	1	2	1	1	
11	1	5	1	3	1	1	
12		6	1	3	1	1	
13	1	6	1	3	1	1	
14		7	1	3	1	1	

3.3.2 Assignment of modules and connection units depending on the number of feeder units connected to the central unit:

Number of feeder units	7) SAB	8) VES	9) Plug connection unit for feeder units	
1–4	1	1	1	20 SPS
5–8	1	2	2	
9–12	1	3	3	
13–16	1	4	4	
17–20	2	5	5	28 SPS
21–24	2	6	6	
25–28	2	7	7	
29–32	2	8	8	

1) interface and control module, equipped for one switching device
2) interface and control module, equipped for two switching devices
3) manual control module
4) input / output module
5) microcomputer module
6) 30 W power supply for feeder unit / 75 W for central unit
7) transmitter/receiver controlling module
8) 4–channel serial interface module
9) four connection sockets A–D each (see also Fig. 3.7 and Fig. 3.9)

3.4 Assignment of the switchgear interlock units to the bays

Fig. 3.10 shows a basic switchyard configuration with the 8TK microcomputer controlled switchgear interlocking system.

Data exchange between the units required to implement the interlocking conditions is performed via serial data transmission lines. All data transmission lines are connected to the central unit in a star-shaped topology. Because experience has shown that the greatest volume of information occurs in the bus-tie bay of a switchyard, the central unit is best assigned to the bus-tie bay. With the star-shaped topology, the shortest links between the feeder units and the central unit are achieved if the central unit is positioned in the center of the switchyard. It might therefore be better to assign the central unit functions to another feeder.

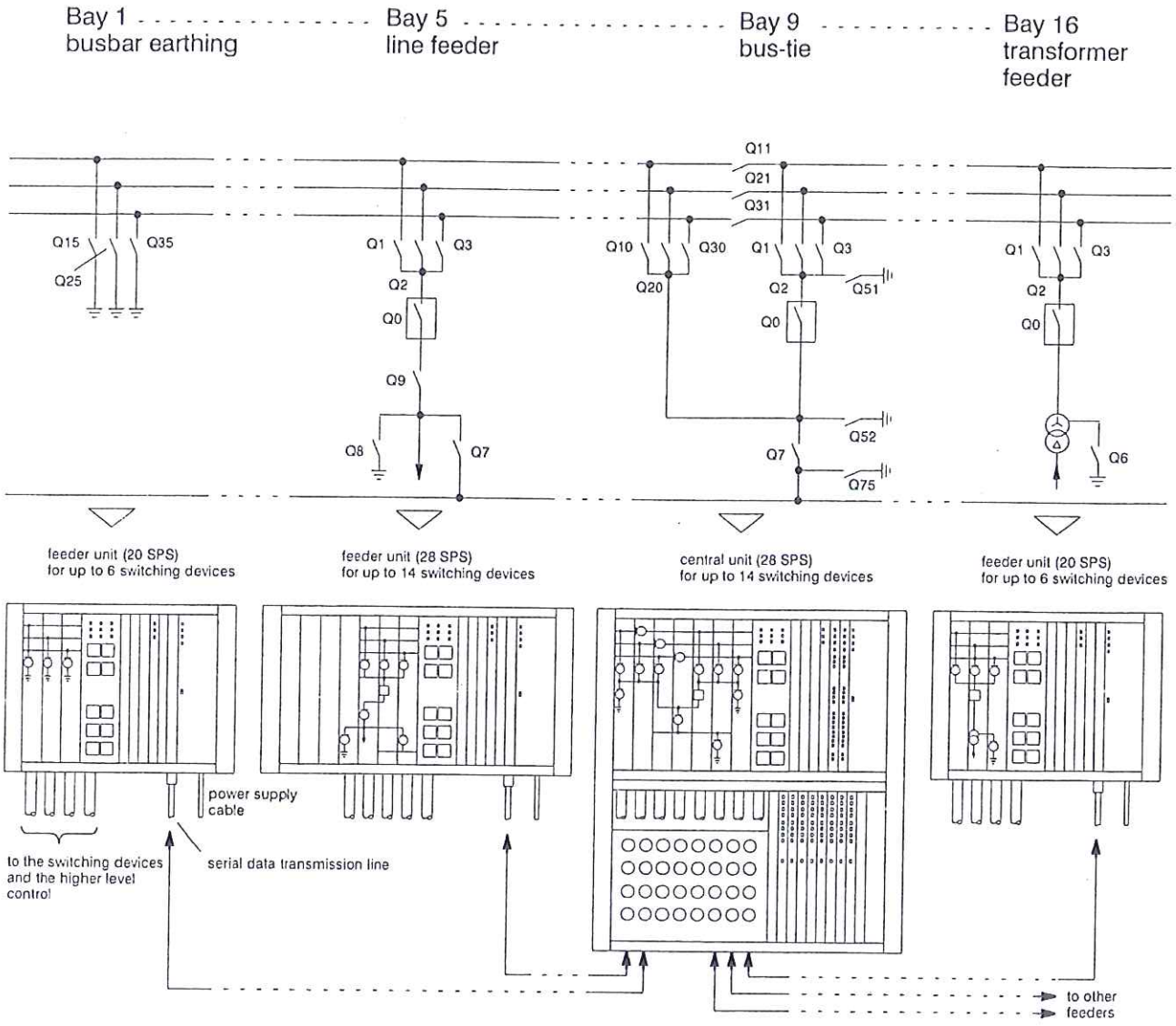
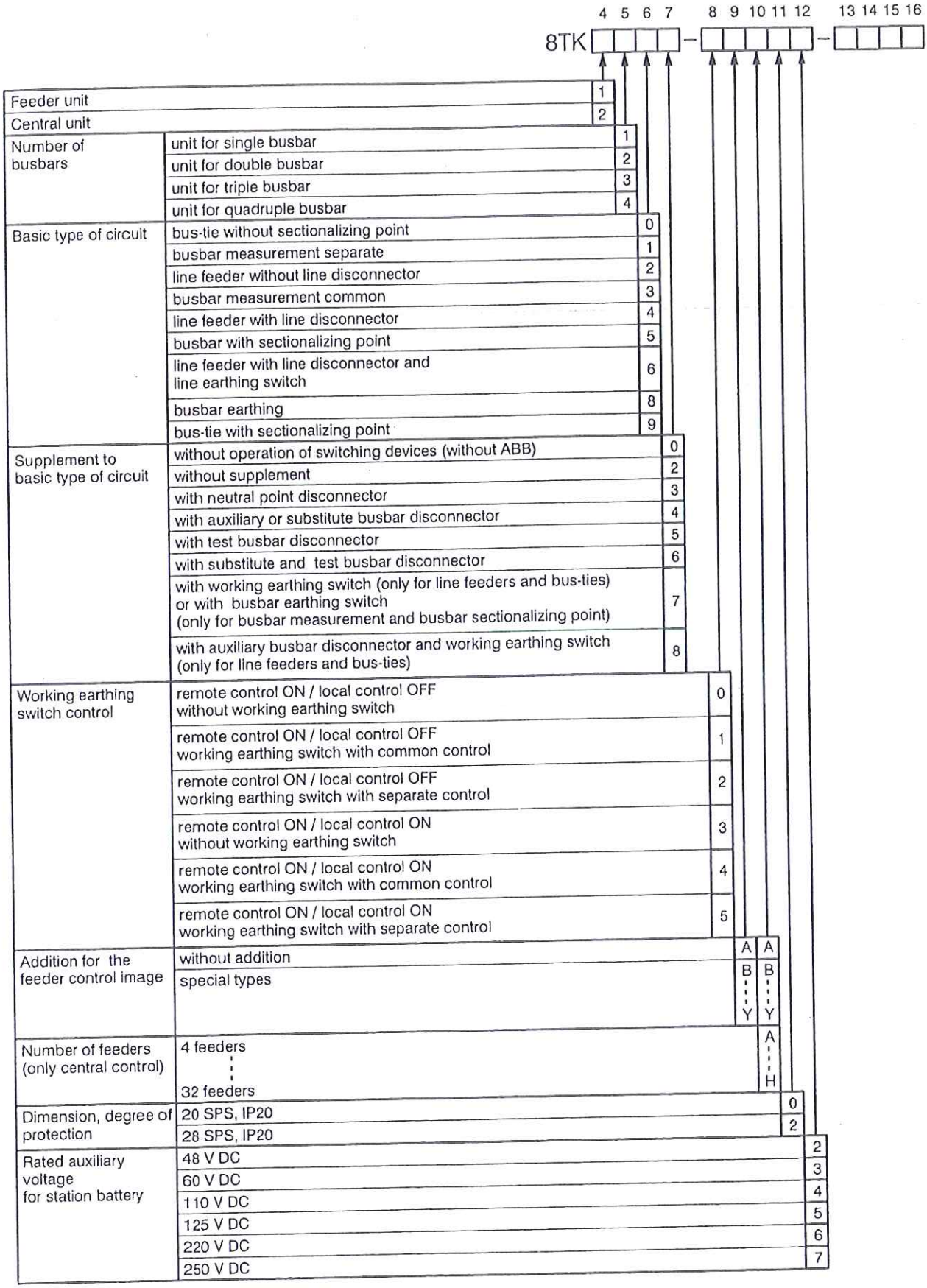
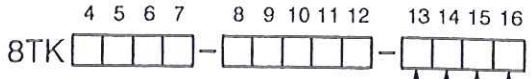


Fig. 3.10 Assignment of the switchgear interlock units to the bays

3.5 Ordering data

for the examples in Figs. 3.2, 3.4, 3.5, 3.8





Rated auxiliary voltage for remote control	24 V DC – 60 V DC [1]	0
	24 V DC	1
	48 V DC	2
	60 V DC	3
	110 V DC	4
	125 V DC	5
	220 V DC	6
	250 V DC	7
Operating time monitoring	disconnector 15 seconds (standard)	D
	disconnector 30 seconds (standard for high voltage SF6 equipment)	G
	circuit breaker 1 second (standard)	A
Command execution counter control command	counter control command reversal	0
	counter control command causes stop, second counter control command causes reversal	1
	forced command execution (counter control commands rejected)	3
	individual control unit, counter control command reversal	4
	individual control unit, counter cntrl. command causes stop, 2nd counter cntrl. command causes reversal	5
	individual control unit, forced command execution (counter control commands rejected)	7

[1] supplied until 9.93 (no longer supplied)