Secondary Distribution Switchgear Type 8DJ10 up to 24 kV, SF₆-Insulated

Medium-Voltage Switchgear

Catalog HA 45.11 2003

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SIEMENS

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Further Information

See Catalog HA 40.1



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Application, Requirements

Features

8DJ10 secondary distribution switchgear is a factory-assembled, type-tested, metal-enclosed switchgear for indoor installation.

Typical uses

8DJ10 secondary distribution switchgear is used for power distribution in substations – even under severe environmental conditions, such as:

- Industrial environments
- Damp, sandy or dusty areas
- Simple outdoor substations

Main uses

- Compact substations
- Compact transformer substations, e.g. for wind power stations
- Garage and vault substations
- Underground and underfloor substations
- Substations by pavements, e. g. in systems with extremely small construction widths, in particular the basic versions of schemes 10 and 71 in conurbations
- Substations with control aisle

Technical features

- Secondary distribution switchgear design with up to 6 feeders
- Maintenance-free
- Climate-independent
- Three-pole primary enclosure, metal-enclosed
- Insulating gas SF₆
- Gas-tight, welded switchgear vessel made of stainless steel, with welded-in bushings for electrical connections and mechanical components
- Three-position switch-disconnector with load-break and make-proof earthing function
- Cable connection for bushings with outside cone
- Connection with cable plugs
- In ring-main feeders with bolted contact (M16)
- In transformer feeders with plug-in contact
- <u>Option:</u> Connection with conventional sealing ends
- For thermoplastic-insulated cables via elbow adapter AKE 20/630 (make Siemens)
- For paper-insulated mass-impregnated cables via commercially available adapter systems
- Easy installation

Personal safety

- Safe-to-touch and hermetically sealed primary enclosure
- HV HRC fuses and cable sealing ends are only accessible when feeders are earthed
- Operation is only possible when the enclosure is closed
- Logical mechanical interlocking
- Capacitive voltage detection system for verification of safe isolation from supply
- Feeder earthing by means of make-proof earthing switches

Operating safety

- Hermetically sealed primary enclosure independent of environmental effects (dirt, moisture & small animals) – sealed for life:
- Welded switchgear vessel
- Welded-in bushings and operating mechanism
- Maintenance-free operating mechanism parts (IEC 60 694/ VDE 0670, Part 1000)
- Switch operating mechanisms accessible outside the switchgear vessel
- Switchgear interlocking with logical mechanical interlocking

Cost-efficiency

Extremely low "life-cycle costs" throughout the entire product service life as a result of:

- Maintenance-free concept
- Climatic independence
- Minimum space requirement
- Maximum availability

Standards *

IEC Standard	VDE Standard
IEC 60 694	VDE 0670 Part 1000
IEC 60 298	VDE 0670 Part 6
IEC 62 271-100	VDE 0670 P.101 to 106
IEC 62 271-102	VDE 0670 Part 2
IEC 62 265-1	VDE 0670 Part 301
IEC 62 271-105	VDE 0670 Part 303
IEC 61 243-5	VDE 0682 Part 415
IEC 60 282	VDE 0670 Part 4
IEC 60 529	VDE 0470 Part 1
IEC 60 071	VDE 0111
IEC 60 044-1	VDE 0414 Part 1
IEC 60 044-2	VDE 0414 Part 2

* Standards see also Catalog HA 40.1

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Designs, typical use

Our product range comprises switchgear consisting of

- Ring-main feeders
- Transformer feeders with HV HRC fuse assemblies

The switchgear is available in two overall heights:

- 1360 mm (with low subframe)
- 1650 mm (with high subframe)

These overall heights cover all areas of application, from compact substations to switchgear rooms with control aisle

Basic design

- Transformer cable connection above
- With logical mechanical interlocks
- With ready-for-service indicator
- With a capacitive voltage detection system at the ring-main feeders

Options

- Capacitive voltage detection system at the transformer feeders
- Motor operating mechanisms for the three-position switchdisconnectors of the ringmain and transformer feeders
- Auxiliary switch for threeposition switch-disconnector and make-proof earthing switch
- Short-circuit indicator with built-in housing for ring-main feeders
- Surge arresters for ring-main feeders
- Shunt releases for transformer feeders
- Secondary equipment for remote operation or remote indication, e.g. with localremote switch in the case of motor operating mechanisms or "trip signal" in the case of transformer feeders
- Locking devices
- Closing lock-out
- Mounted cable clamps at the ring-main feeders
- Further options on request



2 ring-main feeders 1 transformer feeder Scheme 10

Ring-main/transformer blocks



3 ring-main feeders 1 transformer feeder Scheme 71



4 ring-main feeders 2 transformer feeders Scheme 62



Technical Data, Shipping

Electrical data, temperature, filling pressure

Electrical data

Rated voltage U_r	7.2	12	15	17.5	24	
Rated insulation level: Rated short-duration power frequency withstand volt. U _d	kV	20	28	36	38	50
Rated lightning impulse withstand voltage $U_{\rm p}$	kV	60	75	95	95	125
Rated frequency f_r		50/60 H	Iz ——			
Rated normal current <i>I</i> _r for ring-main feeders		400 A d	or 630 A			
for transformer feeders depending on the HV HRC fuse link		200 A -				
Rated short-time withstand current I_k , 1 s	kA kA kA	- 20 25	- 20 25	- 20 25	16 20 25	16 20 -
Rated short-time withstand current I_k , 3 s (option)	kA	20	20	20	20	20
Rated peak withstand current $I_{\rm p}$	kA kA kA	- 50 63	- 50 63	- 50 63	40 50 63	40 50 -
Rated short-circuit making current I _{ma} for transformer feeders	kA	25	25	25	25	25
for ring-main feeders	kA kA kA	- 50 63	- 50 63	- 50 63	40 50 63	40 50 63

Temperature, filling pressure

Ambient temperature T	– 40 to	+70 °C		
Pressure values at 20 °C for the insulation: Rated filling pressure p_{m}	1500 h	Pa (absc	olute) —	
Minimum operating pressure p _{me}	1300 h	PA (abso	olute) —	

Switchgear installation, shipping data

Switchgear installation



5 Cable

6 Sheet-metal partition (not included in the scope of supply)

Shipping data

Scheme	Version	Switch-	Transpo	ort dimer	nsions	Vol-	Gross
No.	(abbrevi- ations)	gear height	Width	Height	Depth	ume	weight
		Ũ		Ũ	·		approx.
		mm	m	m	m	m ³	kg

Transport within Europe by rail, truck, container Packing with protective PE foil and timber floor

-							
10	2RK+1T	1360	1.10	1.56	1.10	1.89	300
		1650	1.10	1.85	1.10	2.24	330
71	3RK+1T	1360	1.45	1.56	1.10	2.49	380
		1650	1.45	1.85	1.10	2.95	430
62	4RK+2T	1360	1.80	1.56	1.10	3.09	580
		1650	1.80	1.85	1.10	3.66	660

Transport overseas by seafreight

Packing with protective PE foil and seaworthy crate							
10	2RK+1T	1360	1.10	2.0	1.15	2.53	350
		1650	1.10	2.0	1.15	2.53	380
71	3RK+1T	1360	1.45	2.0	1.15	3.34	460
		1650	1.45	2.0	1.15	3.34	510
62	4RK+2T	1360	1.80	2.0	1.15	4.14	680
		1650	1.80	2.0	1.15	4.14	760

1) Weight depending on the relevant equipment, e.g. motor operating mechanism

Abbreviations:

RK = Ring-main feeder

T = Transformer feeder

Product Range

Product range overview, schemes

Scheme	Overall	dimensio	ons	Net	
	Width	Depth	Height	weight 1)	
	mm	mm	mm	kg	
Block types, consisting of ring-main and transformer feeders					
Scheme 10 ଞ୍ୟ	2 ring-r	main feed	ders and		
	1 trans (Abbre	former fe viations 2	eeder 2RK+1T)		
	710	775	1360 1650	270 300	
Scheme 71	3 ring-r 1 trans (Abbre	main feed former fe	ders and eeder 3RK+1T)		
	1060	775	1360 1650	340 390	
Scheme 62	4 ring-r 2 trans (Abbre	main feed former fe viations 4	ders and eders IRK+2T)		
	1410	775	1360	500 580	

Weight depending on the relevant equipment, e.g. motor operating mechanism

Abbreviations:

RK = Ring-main feeder T = Transformer feeder

Equipment features of panels

Equipment	 Basic equipme Additional equi further addition on request Not applicable Not available 	nt ipment (option), nal equipment
	Ring-main feeders panels RK	Transformer feeders panels T
Manual operating mechanism for three-position switch-disconnector: – As spring-operated mechanism – As spring-operat./stored-energy mech.	•	-
Motor operating mechanism for three-position switch-disconnector	0	0
Interlock of cable compartment cover for ring-main feeders	•	х
Interlock of HV HRC fuse compartment and transformer cable connection compartment	Х	•
Cable bracket ²) in ring-main feeders, cable routing downwards	•	х
Cable connection in transformer feeder (cable fixing by customer, supplied without cable bracket) for cable routing		
 To the rear (standard) for cable elbow plugs or Upwards 	х	•
for straight cable plugs or – To the right for cable elbow plugs	× ×	or o or o ³)
Low-voltage terminals in the operating mechanism (option for secondary equipment)	•	•
Shunt release	-	0
Auxiliary switch (1 NO + 1 NC for "CLOSED/EARTHED" and 1 NO for "OPEN") for three-position switch-disconnector and make-proof earthing switch	0	0
Locking device for three-position switch-disconnector	0	0
Short-circuit or earth-fault indicator (wiring at the indicator)	0	-
Closing lock-out for three-position switch-disconnector	0	-
Double cable connection for – Overall switchgear height 1360 mm – Overall switchgear height 1650 mm	0 0	x x
Surge arrester for – Overall switchgear height 1360 mm – Overall switchgear height 1650 mm	0 ⁴) 0	x x
Mounted cable clamps	0	Х
 2) For overall switchgear height 1360 mm: Cable bracket below the feeder <u>Abbreviations:</u> RK = Ring-main feeder T = Transformer feeder 	 3) For scheme 62 for the right-ha 4) Only possible 105 mm dee cable compa and 300 mm dee cable compa 	2 only possible and feeder for apper artment cover apper artment cover

Design

Panel design (example)





Standard

Cable connection for cable elbow plugs with plug-in contact, cable routing to the rear



Option

Cable connection for straight cable plugs with plug-in contact, cable routing <u>upwards</u>



Option (only for schemes 10 and 71) Cable connection for cable elbow plugs with plug-in contact, cable routing <u>to the right</u>

Design options for the transformer cable connection, see table on page 9 (cable fixing always by customer)



Cable connection with bolted contact (M16) optionally for:

- Cable T-plugs or cable elbow plugs
 Elbow adapter AKE 20/630 (make Siemens) for conventional cable sealing ends
- 11 HV HRC fuse assembly, cover removed
- **12** Interlock for HV HRC fuse assembly
- 13 Mimic diagram for transformer feeder
- 14 Rating and type plate
- 15 Mimic diagram for ring-main feeder
- **16** Arrangement of cable connections
- 17 Cable elbow plug with plug-in contact
- 18 Bushing as interface type "A" for cable plugs with plug-in contact
- **19** Connecting bar to cable connection
- 20 Three-position switch-disconnector
- **21** Switchgear vessel filled with SF_6 gas
- 22 Cable connection compartment
- 23 Straight cable plug with plug-in contact
- 24 Cover of the HV HRC fuse compartment and of the transformer cable connection compartment
- 25 Spring-operated/stored-energy mechanism
- 26 Cable connection compartment cover
- 27 M12 earthing connection
- 28 Pressure relief device
- **29** Cable bracket in ring-main feeder
- **30** Spring-operated mechanism
- **31** Bushing as interface type "C" for cable plugs with bolted contact (M16)
- **32** Elbow adapter AKE 20/630 for conventional cable sealing end (bolted contact M16)
- **33** Cover in transformer feeder for cable routing to the right

Components

Three-position switch-disconnector, operating mechanisms

Three-position switch-disconnector

The proven three-position switch-disconnector is used as switching device.

Functions

- Load-break function
- Earthing function with shortcircuit making capacity
- Switch positions CLOSED – OPEN – EARTHED

Operating mechanisms

The three-position switchdisconnector is operated from the switchgear front via

Detachable lever mechanism

- Spring-operated mechanism
 With "spring-operated CLOSED" and
- "spring-operated OPEN" for use in ring-main feeders
- Spring-operated/storedenergy mechanism
 With "spring-operated CLOSED" and "spring-operated OPEN" for use in transformer feeders
- With an additional energy store device for the function "stored-energy OPEN" after being tripped by the HV HRC fuse (striker pin tripping) or by the shunt release

Options

- Motor operating mechanism for switch-disconnector
- Locking devices
- Auxiliary switch for threeposition switch-disconnector and make-proof earthing switch
- Shunt release for transformer feeders
- Closing lock-out for ring-main feeders
- Design according to VDEW recommendation – Association of German Utilities – VDEW e.V.
- On request: Rotary operating mechanism



Three-position switch-disconnector

Three-position switch-disconnector

Rear view of the switchgear vessel of a ring-main/transformer block, scheme 10

- 1 Three-position switch-disconnector in the transformer feeder
- 2 Three-position switch-disconnector in the ring-main feeders
- 3 Pressure relief device

Control board

(standard) Example

scheme 10

for detachable lever mechanisms

for the detachable lever mechanism

Ring-main/transformer block,

5 Detachable lever mechanism

6 Detachable lever mechanism for the load-break function

for the earthing function

4 Locking device (option)

Operating mechanisms







- 7 Detachable lever mechanism for the ring-main feeder
- 8 Detachable lever mechanism for the transformer feeder



On request: Control board for rotary operation

for rotary operating mechanisms Example

Ring-main feeder

- **9** Symbols for the actuating direction of the rotary operating mechanism
- **10** Locking device for the rotary operating mechanism
- 11 Rotary operating mechanism

Components

HV HRC fuse assembly, secondary equipment

HV HRC fuse assembly

The HV HRC fuse boxes are provided with single-phase insulation and are located above the transformer feeder outside the switchgear vessel.

Standards

HV HRC fuse links with striker pin in "medium" version according to

- IEC 60 282 *
- VDE 0670 Parts 4 and 402
- DIN 43 625 main dimensions

Features

- Access to the HV HRC fuse compartment and replacement of HV HRC fuses is only possible if the transformer feeder has been isolated and earthed
- The requirements of the HV alternating current switch fuse combination * are fulfilled
- Selection of HV HRC fuses for transformers
- Thermostatic protection system protects the switchgear against the effects of an incorrectly inserted fuse link
- Thermal striker tripping when using an appropriate HV HRC fuse link, e.g. make Siemens, type 3GD1
- HV HRC fuses are easy to replace

Secondary equipment

(option) Examples:

- Auxiliary contacts
- Motor operating mechanisms
- Shunt releases

<u>Wiring</u>

Auxiliary contacts, motor operating mechanisms or shunt releases are wired to a terminal strip, itself located next to the operating mechanism assembly of the relevant feeder.

Wiring is led in by the customer from the side or rear and connected to the terminal strip allotted to the operating mechanism assembly.

* Standards see Catalog HA 40.1

HV HRC fuse compartment



HV HRC fuse compartment with cable compartment cover removed

Phase L1: HV HRC fuse box with HV HRC fuse slide removed Phase L2: HV HRC fuse box closed Phase L3: Replacement of HV HRC fuses

Secondary equipment (option)



Auxiliary contacts, motor operating mechanism and shunt release

Operating mechanism components at the spring-operated/stored-energy mechanism of a transformer feeder:

- 1 Motor operating mechanism
- 2 Auxiliary contacts
- 3 Terminal strip
- 4 Shunt release



Cable connection

- Bushings according to EN 50 181/DIN EN 50 181¹) with outside cone
- Access to the cable connection compartment only if the feeder has been isolated and earthed

Ring-main connection

- With bolted contact (M16) as interface type "C" according to EN 50 181/DIN EN 50 181
- Cable connection at one level
- For thermoplastic-insulated cables
- For paper-insulated massimpregnated cables with adapter systems
- For conventional cable sealing ends via elbow adapters AKE 20/630 (make Siemens)
- For cable T-plugs or cable elbow plugs with bolted contact
- For connection cross-sections up to 300 mm² (standard)
- Cable routing downwards, cable connection at front
- For rated normal currents of 400 A or 630 A

Options

- Suitable for the connection of surge arresters
- Short-circuit/earth-fault indicator
- Mounted cable clamps
- Double cable connection with corresponding cable plugs

Transformer cable connection

- With plug-in contact as interface type "A" according to EN 50 181/DIN EN 50 181
- For thermoplastic-insulated cables
- For cable elbow plugs (standard) or straight cable plugs with plug-in contact
- For connection cross-sections up to 120 mm²
- For rated normal currents of 200 A

<u>Option</u>

• Cable routing upwards or to the right

Cable connection (examples)



Cable connection compartment, as delivered (front view)



Cable plugs with bolted contact (M16)

Cable connections in ring-main feeder

1 Prepared for cable plugs with bolted contact (M16)

- 2 <u>Phase L1:</u> Make: Euromold, type K400 LB as cable elbow plug
- 3 <u>Phase L2:</u> Make: Euromold, type K400 TB as cable T-plug
- 4 <u>Phase L3:</u> Make: Euromold, type AGT 20/630 as cable T-plug

Option: Mounted cable clamps



Cable elbow plug with cable routing to the rear

Cable connections in transformer feeder

- 5 Prepared for cable plugs with plug-in contact
- 6 <u>Phase L1:</u> Make: Euromold, type K158 LR
- 7 <u>Phase L2:</u> Make: nkt cables, type EASW 20/250

8 <u>Phase L3:</u> Make: Cooper, type DE 250-R-C

Cable routing to the rear, cable fixing by customer

with plug-in contact as interface type "A"							
Arrangement of connections	Cable routing	Cable plug version					
Above, beside	To the rear (standard)	Cable elbow plug with					

Transformer cable connection for cable plugs

Abc the	Above, beside the HV HRC	To the rear (standard)	Cable elbow plug with plug-in contact for all schemes
	fuse assembly	To the right (option)	Cable elbow plug with plug-in contact – For schemes 10 and 71 – For scheme 62: only possible for the right transformer feeder
		Upwards (option)	Straight cable plug with plug-in contact for all schemes

1) Standard EN 50 181/DIN EN 50 181: "Plug-in bushings above 1 kV up to 36 kV and from 250 A to

1.25 kA for equipment other than liquid-filled transformers."

as delivered

(side view)

Cable plugs, cable sealing ends and cable clamps are not included in the scope of supply.

Dimensions

Switchgear, floor openings (dimensions in red) and fixing points





Scheme 10





For missing dimensions see scheme 10 Floor openings and fixing points

Scheme 71





For missing dimensions see scheme 10 Floor openings and fixing points

Scheme 62

- 1 Wall distance
- 2 Fixing points
- 3 Position of the incoming cables in the ring-main feeder
- Position of the incoming cables to the rear in the transformer feeder (standard) 4
- **5** Floor opening for high-voltage cables
- 6 Fixing frame (base) of the switchgear
- Depending on the type of cable plug
- Dimensions depending on the overall switchgear heights 1360 and 1650 mm
- * * * Dimensions depending on the overall switchgear heights 1360 and 1650 mm, slight deviations are possible due to the various makes of cable elbow plugs
 - △ Dimension for bushing as interface type "C" with bolted contact (M16)

The cables and cable plugs shown here are not included in the scope of supply.







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Dimensions

Cable connection fittings in ring-main feeders

Examples for an overall height of 1650 mm







Standard cable compartment cover

Single cable connection

- 1 Elbow adapter, make: Siemens, type AKE 20/630 with conventional cable sealing end, make: Corning Cables, type IAE 20
- 2 Cable T-plug, make: Euromold, type (K) 400 TB/TBS



Standard cable compartment cover

Cable connection with surge arresters

- 3 Cable plug, make: Tyco Electronics Raychem, type RICS 5139
- 4 Surge arrester ¹), types up to RDA21 or RDA24
- 5 Cable plug, make: nkt cables, type CB 24-630
- 6 Surge arrester, make: nkt cables, type CSA 24-5
- 7 Cable plug, make: Euromold, type (K) 400 TB/TBS
- 8 Surge arrester, e.g. make: Euromold, type 156 SA-...



Double cable connection

- 9 Cable T-plug, make: nkt cables, type CB 24-630 and CC 24-630
- 10 Cable T-plug, make: ABB Energiekabel, 2 x type SET (12/24) with coupling insert KU 23.2



- * Max. mounting space for cable and/or surge arrester
- * Depth of floor opening Δ Dimension for bushing
- with bolted contact (M16)
- 1) Make:
- Tyco Electronics Raychem

Dimension a

- 610 mm up to type RDA21635 mm for type RDA24

105 mm deeper cable compartment cover

575

~190

-560

715*

852

880

Notes

If not stated otherwise on the individual pages of this catalog, we reserve the right to include modifications, especially regarding the stated values, dimensions and weights.

Drawings are not binding.

All product designations used are trademarks or product names of Siemens AG or other suppliers.

If not stated otherwise, all dimensions in this catalog are given in mm.

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