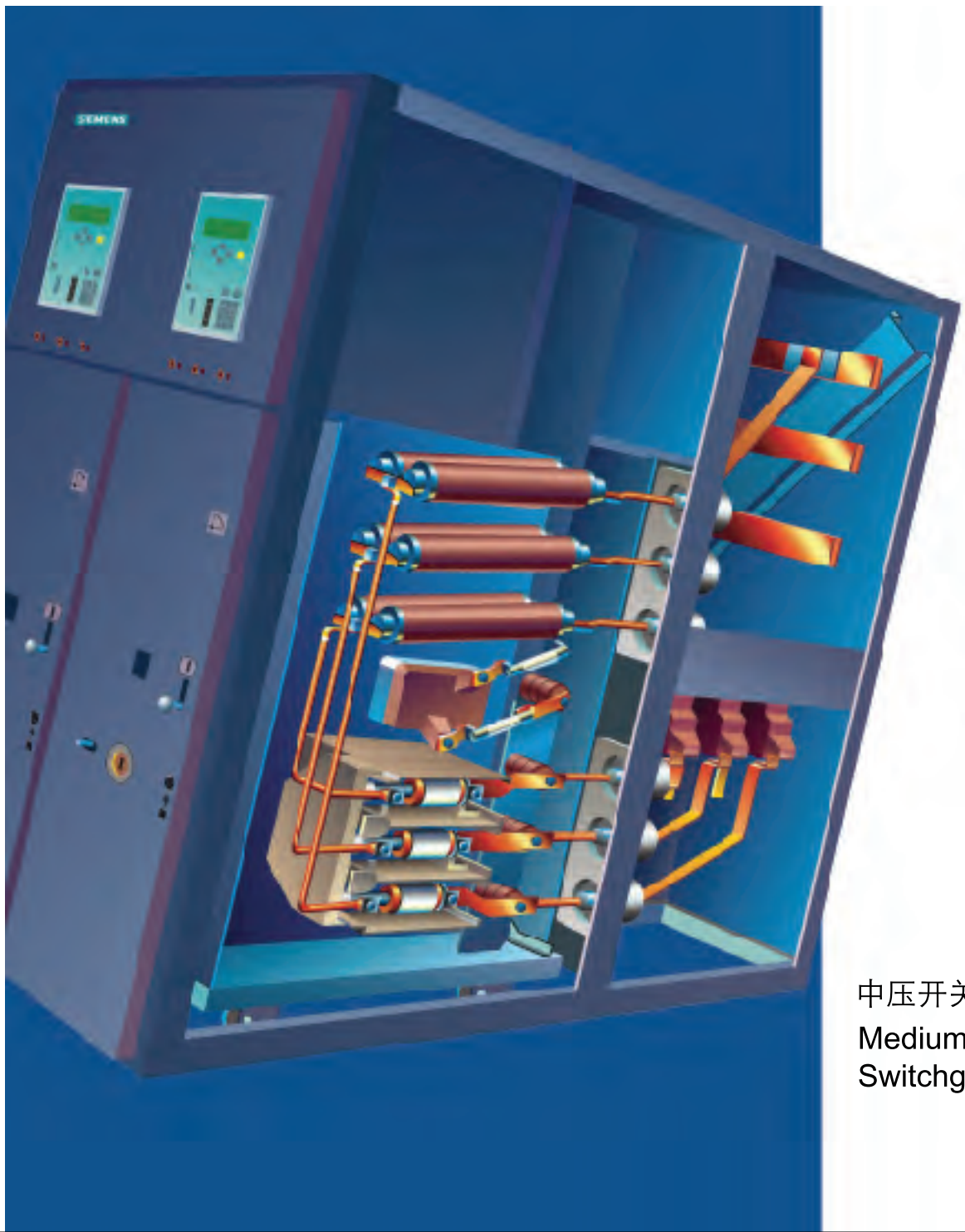
SIEMENS

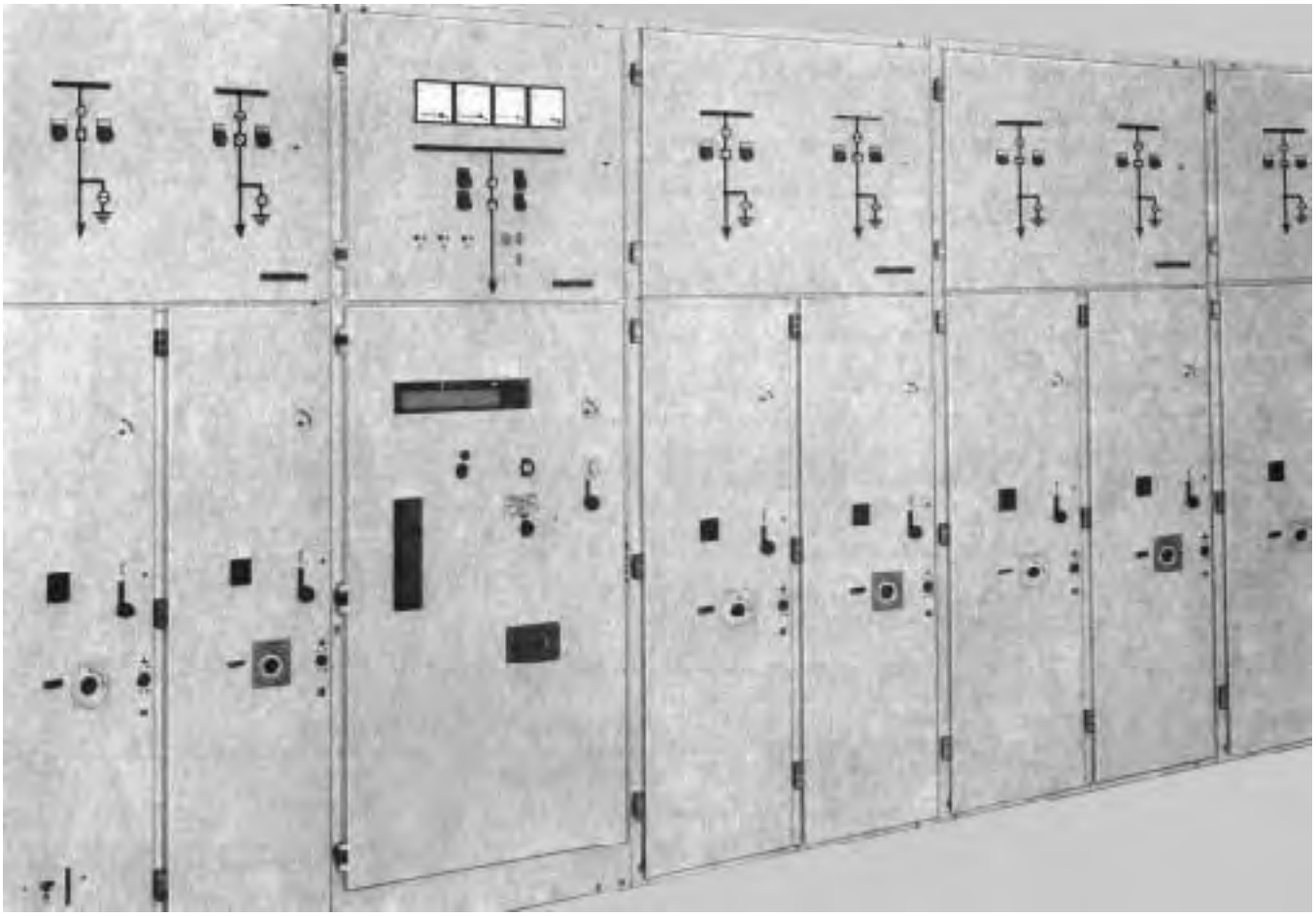
8BK30型
可移开式金属封闭／铠装真空接触器柜 (F-C回路)
额定电压 3.6~12kV
8BK30
With Draw-out Vacuum Contactors
Switchgear up to 12kV



中压开关装置
Medium-Voltage
Switchgear

使用说明
Application

典型用途 **Typical uses**



8BK30/8BK20 型开关柜, 7.2kV在使用中的实例　　8BK30/8BK20 switchboard,7.2kV

装有手车式真空接触器的 8BK30型开关柜是一类金属封闭/铠装,在工厂中完成组装,并通过型式试验考核的开关装置, 其特点为:

– 符合中国和国际的标准。
– 可直接与装有可移开式真空断路器的 8BK20型开关柜连接。
– 充分确保运行人员的安全和设备可靠运行。

The 8BK30 switchgear with draw-out vacuum contactors is a metal-enclosed, metal-clad, factory-assembled and type-tested medium-voltage switchgear.
– It complies with both national and international standards.
– It can be directly assembled with 8BK20 switchgear with draw-out circuit-breakers.
– It ensures a high level of operator safety, operational reliability and availability.

装有手车式真空接触器的 8BK30型开关柜尤其适合于需要频繁合、分操作的场合使用,例如:

– 高压电动机
– 变压器
– 电容器组

它的最高电压为 3.6kV 到 7.2kV(工频耐受电压根据中国标准)和12kV(工频耐受电压根据IEC标准)。
额定热稳定电流最大可达50kA
额定馈电电流最大可达400A
额定母线电流最大可达4000A。

The 8BK30 switchgear with draw-out vacuum contactors is ideally suited for the normal switching duty of loads requiring frequent operation such as
– high-voltage motors
– transformers
– capacitors
at rated voltages of 3.6kV to 7.2kV(power frequency withstard voltage according to Chinese standard,) and 12kV (power frequency withstand voltage according to IEC).
rated short-time currents up to 50 kA,
rated currents of feeders up to 400 A and
rated currents of the busbar up to 4000 A.

这种类型的开关装置可用于:

– 工厂
– 冶炼厂
– 发电厂
– 变电站,开关站

Such switchgear can consequently be used in
– industrial plants
– refineries
– power stations
– substations and switching stations.

操作方法,手车部分的几个位置
Operations, draw-out section positions

根据开关装置的结构设计,8BK30 型开关柜及其手车部分具有以下特征:

在高压室门关闭的情况下进行操作

为高度确保运行人员的安全,需特别强调所有操作都必须在门关闭的情况下进行:

- 无论在断开位置或工作位置时,真空接触器的合、分操作。
- 把8BK30型开关柜的手车从工作位置移开到断开位置,形成一个很长的电气隔离的距离。
- 用带电显示指示器插入设在低压室门上的与电流互感器或支柱绝缘子内电容分压器相连的插座,来判断馈线的带电或不带电状况。
- 接地开关的手动合、分操作。

手车部分的几个位置

手车部位的几个位置都是按照DIN VDE 0670 和IEC 298 的要求来设计的。

8BK30 型开关柜的手车部分在下列几个位置中移动:

工作位置:

在该位置,真空接触器把母线与馈线电缆连接起来,此时,低压插头接入回路(插入插座)。

断开和试验位置:

在该位置,8BK30 开关柜的隔离距离符合 DIN VDE 0670, 第 6 部分和 IEC 298 的要求,活门是由高压室门上的手柄来控制的。当高压室门打开时,活门自动关闭;高压室门关闭,则活门自动打开。

断开位置:

低压插头接入回路或不接入回路(插入插座或拔出插座)

试验位置:

低压插头接入回路。此时,真空接触器可以试验操作(也可遥控),另外,也可对合、分以及指示器和电气联锁等功能进行试验。

As a result of their design and construction,8BK30 switchgear and its draw-out parts have the following character features:

Operations performed with the door closed

To ensure a high degree of operator safety, special emphasis was placed on an arrangement which ensures that all operations can be performed with the door closed.

- Closing and opening the vacuum contactor both in the disconnected and in the service positions.
- Establishing the isolating distance with the 8BK30 by transferring the draw-out section from the service position to the disconnected position.
- Indication of the live or dead state of the outgoing circuit by means of capacitive coupling in the current transformers or post-insulators with plug-in indicators at the front of the panels.
- Manual closing and opening of the circuit (make-proof earthing switch).

Draw-out section positions

The positions are defined in DIN VDE 0670 and IEC 298.

The draw-out section of 8BK30 switchgear can be transferred to

the following positions:

Service position:

In this position, the vacuum contactor establishes a connection between the busbars and the outgoing cable. The low-voltage plug connector is in circuit.

Disconnected and test position:

In this position the isolating distance in the 8BK30 metal-clad panels meets the requirements of DIN VDE 0670,Part 6 and IEC 298.The shutters are regulated by the handle of the high-voltage compartment door in such a way that the shutters are colsed with the high-voltage compartment door open and open with the high-voltage compartment door closed. In this way segregation is verified with the high-voltage compartment door open.

Disconnected position:

The low-voltage plug connector can be in circuit or withdrawn.

Test position:

The low-voltage plug connector is in circuit.

With the low-voltage plug connector in circuit, the vacuum contactor can be test-operated (also from a remote point) and functions such as the Open-Closed indicator and electrical interlocks etc. can be tested.

8BK30 柜门打开,手车部分退出,活门关闭
8BK30 with the door open, the draw-out section racked out and the shutters closed

8BK30 柜门关闭,手车部分退出,活门打开
8BK30 with the door open, the draw-out section racked out and the shutters open.

特征介绍
Fectures

联锁功能，手车部分的驱动方法 Interlocks, racking out or racking in the draw-out section

联锁

只有满足有关联锁条件，才能进行下列操作。

把手车部分从断开位置推进到工作位置:
- 低压插头插入
- 高压室门关闭
- 真空接触器在“分”的位置
- 接地开关在“分”的位置

把手车部分从工作位置退出到断开位置:
- 真空接触器在“分”的位置

操作真空接触器:
- 手车部分在被锁定后

操作接地开关:
- 手车部分在断开位置并被锁定

打开高压室门:
- 手车部分在断开位置并被锁定

以上这些联锁条件符合甚至超过 DIN VDE 0670,第 6 部分和 IEC 298 所规定的要求。

手车、高压室门和接地开关之间的联锁是钥匙联锁。

这表明只有在联锁条件满足的情况下，操作杆才能插入。否则，插孔被活门盖住，这样可以避免联锁机构在不符合条件时误操作而过力损坏。

移动手车部分必须在T型手柄转动到自由移动位置后，这时，手车底部的插销被拔出，则手车不再被锁定。与此同时，T型手柄转动了控制凸轮，切断了真空接触器的合闸回路。因此保证了在移动手车的过程中，无法误合真空接触器。

手车部分的驱动方法

切断短路电流的功能由高压高遮断容量限流熔断器来承担，所以真空接触器一直与限流熔断器串联。

在柜内，手车部分的滚珠轴承在固定于底板的滑轨上移动，当手车退出柜体后，安装在车底的轮子自动伸出，这时则成为一辆小车。当推入柜体时，轮子缩入车底，手车依靠滚珠轴承移动。

使用这种设计，在拉出或推入手车部分时，只需一个人，而不需工具或其它任何辅助设备。

拉出或推入手车部分的操作
Racking in or racking out the draw-out section

Interlocks

The following operations can only take place when thestated interlock conditions are fulfilled:

Transferring the draw-out section from the disconnected position to the service position
- Low-voltage plug inserted
- High-voltage compartment door closed
- Vacuum contactor in the OPEN position
- (Make-proof) earthing switch in the OPEN position

Transferring the draw-out section from the service position to the disconnected position
- Vacuum contactor in the OPEN position

Operating the vacuum contactor
- Draw-out section in the interlocked final position

Operating the (make-proof) earthing switch
- Draw-out section in the interlocked disconnected position

Opening the high-voltage compartment door
- Draw-out section in the interlocked disconnected position

These meet the required interlocking conditions in DIN VDE0670 Part 6 and IEC 298 or even exceed them.
The interlocks between draw-out section, high-voltage compartment door and (make-proof) earthing switch are designed as key interlocks.
This means that operating levers can only be inserted when the interlocking conditions are fulfilled. In this way, undue stress on the interlock mechanisms is avoided.
Transfer of the draw-out section when the vacuum contactor is unlatched and switched on is prevented by means of an electrical positive release.When the vacuum contactor is latched the positive release is mechanically controlled.

Simple racking out or racking in the draw-out section

As the short-circuit protection is absolutely essential the high-voltage contactors are always driven by series-connected H.V. HRC fuse links.
The draw-out section runs on ball bearings inside the panel across a rail fixed in position by means of a floor plate. When racking out, the draw-out section slides from the rail onto automatically folding out wheels and thus becomes a trolley when removed from the panel.
This sequence of motions takes place in reverse order in the same way when the draw-out section is racked in.
Using this technology the draw-out section can either be withdrawn from the panel or racked in by just one person without tools or any other auxiliary devices.

电气性能，尺寸 Electrical data,dimensions

电气性能 Electrical data

最高电压 Rated voltage and insulation			3.6KV[1)]	7.2KV[1)]	12KV[1)]
额定工频耐受电压 Rated power frequency withstand voltage		kV	24	32	28
额定雷电冲击耐受电压 Rated lightning impulse withstand voltage		kV	40	60	60
母线最大热稳定电流 Rated short-time current of the busbar, max.		kA	50/3s, 40/4s	50/3s, 40/4s	50/3s, 40/4s
馈线热稳定电流 （无高遮断容量限流熔断器作用时） Rated short-time current of the feeder (without current limitation through HV HRC fuses)		kA/1s	8	8	8
高遮断容量限流熔断器的预期短路开断电流 Cut-off current I_D of HV HRC fuese		kA	≤50	≤50	≤50
额定最大母线峰值电流 Rated peak withstand current of the busbar, max.		kA	125	125	125
额定最大母线值电流 Rated current of the feeder, max.		kA	4000	4000	4000
额定馈线电流 Rated current of the busbar, max.		A	400	400	400
最大额定开断功率	Rated breaking-power, max				
电动机	Motor	kW	1600	3200	6500
变压器	Transformer	kVA	1600	3200	3200
电容器组	Capacitor	kVAr	1600	3500	5000
电容器组的最大开断电流 Capacitor breaking capacity		A	250	250	250
最大允许涌流 Max. permissible inrush current		kA	10	10	10
最大操作频率 Frequency of operation		操作次数/小时 Op. cycles/h	1200	1200	1200
机械寿命 Mechanical life		操作次数 Op. cycles	3×10^6	3×10^6	1×10^6
机电寿命 Electrical endurance		操作次数 Op. cycles	1×10^6	1×10^6	1×10^6
合闸功率 AC/DC Making capacity AC/DC		W	650	650	650
保质功率 Holding power		W	90	90	90

尺寸 Dimensions

宽度 Width				
每个回路 per panel	mm	400	400	400
每个柜体（2个回路） per switchgear(2 panels)	mm	800	800	800
高度 Height	mm	2050	2050	2050
深度[3)] Depth	mm	1650	1650	1650

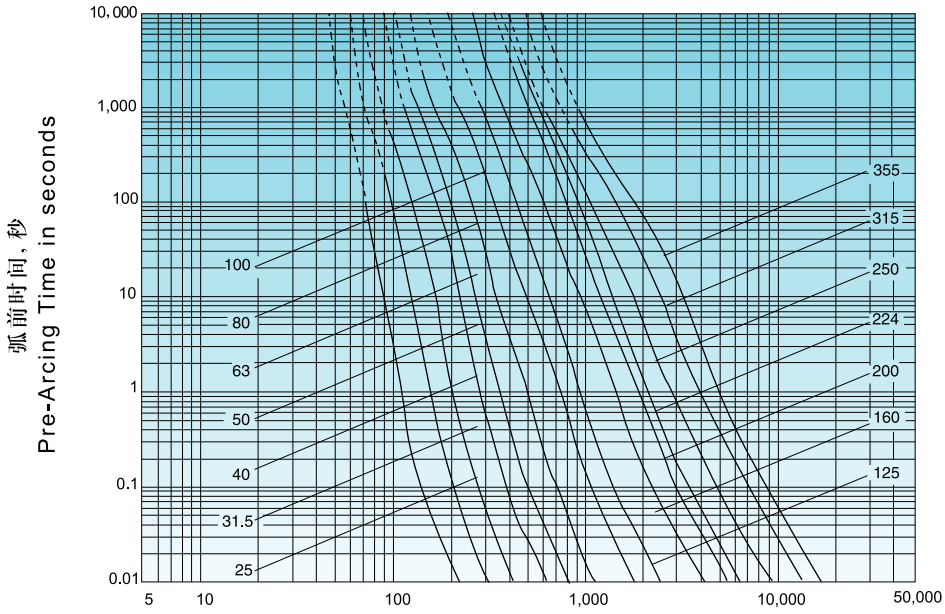
1) 工频耐压根据中国标准 1） Power frequency withstand voltage according to Chinese Standard
2) 工频耐压根据IEC标准 2） Power frequency withstand voltage according to IEC.
3) 如与柜深为1775 毫米的8BK20 真空开关柜拼柜，8BK30真空接触器柜可加辅柜，以保持尺寸与8BK20柜一致。
3) When switchgear 8BK30 are aligned together with those 8BK20, whose depth is 1775mm, 8BK30 will be equipped with additional panels, in order to keep the same dimension

技术数据
Technical Data

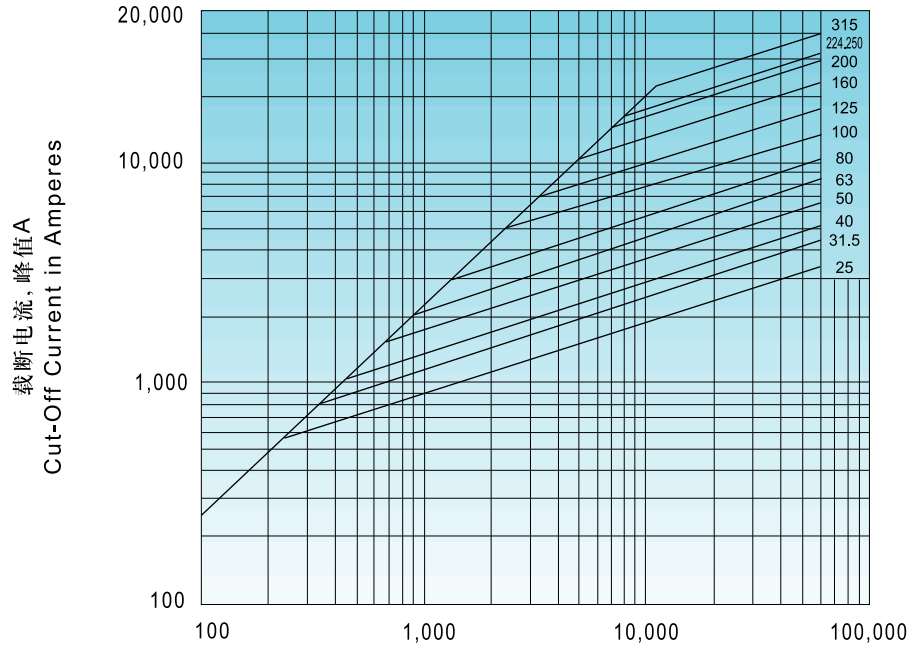
高遮断容量限流熔断器的特性与选择方法 **Characteristics and selections of HV HRC Fuses**

8BK30 真空接触器柜使用 WKN 系列高遮断容量限流熔断器作为短路后备保护，它符合 DIN43，IEC282-1，BS2692 的要求，其安–秒特性曲线和预期开断电流曲线见下图。

8BK30 vaccum contactor switchgear use WKN HV HRC fuses as short-circuit back-up protection. It complies with DIN43, IEC282-1 , BS2692. Time-current characteristics and pre-cut-off characteristics curves areas as follows:



预期开断电流的对称分量有效值，A
图1　WKN 型熔断器的安一秒曲线
RMS symmetrical prospective current in Amperes
Fig.1 WKN Time-current characteristics



预期开断电流对称分量有效值A
图2　WKN 型熔断器的限流特性
RMS symmetrical prospective current in Amperes
Fig.2 WKN Cut- Off characteristics

保护电动机限流熔断器选择方法 Selection of HV HRC Fuses for motor protection

按公式确定直接起动电动机时的计算电流 $Iy = \frac{NIn}{K}$,

式中

N ——启动电流与额定电流之比，通常 N=6

I_n ——电动机额定电流

K ——熔断器系数如表1

各种负载的启动时间见表2

Caculated current for direct start $Iy = \frac{NIn}{K}$,

Within the formula:

N — Ratio of starting current to rated current, normally N=6

I_n — Rated current of motor

K — Fuse coefficient (see table 1)

Starting period of different loads(see table2)

举例计算如下:

一台 6kV,1000kW的感应电动机，采用直接起动，每小时起动为4次。电动机的功率因数和效率均为 0.9。

电动机额定电流 In = 1000/(6×0. 9×0. 9×√3)=119A

Iy = NIn /k = 6 ×119× (1 /1. 9) = 1357 A

查对应起动时间 6秒时，Iy= 1357A 对应的熔断器安一秒特性曲线，得出应选择熔断器的额定电流为200A。

如再考虑环境温度及三相封闭柜体运行熔断器需降容使用，因此:

a）三相封闭系统需降容10%

b）环境温度高出标准1℃需降容1%

对于保护变压器和电容器时熔断器额定电流的计算方法可见西安熔断器厂或其他工厂的有关样本。

Example:

An induction motor with ratings 6kV, 1000kW, and 0.9 for its power factor and efficiency, direct started, and its operation freqency is 4 times per hour.

Rated current of motor In=1000/(6×0.9×0.9×√3) =119A

Iy= NIn /k= 6× 119 × (1 / 1.9) = 1357A

Checking the Time-current characteristics curve of fuses, when starting time is 6s, then we should choose 200A as the rated current of fuses.

The fuse must be used under the capacity. If surrounding temperature and three-phase sealed panel be concerned, so:

a）Three-phase sealed system must reduce 10% capacity.

b） Reducing 1% capacity,when ambient temperature increases 1℃

Checking Xi'an Fuse Factory (or other manufacturers) catalogs about caculating methods of rated current of fuses as transformer and capacitor protections.

表1 (Table1)

每小时启动数 Starting times per hour	2	4	6	8
K系数 K	1 /1.7	1 /1.9	1 /2.1	1 /2.3

表2 (Table2)

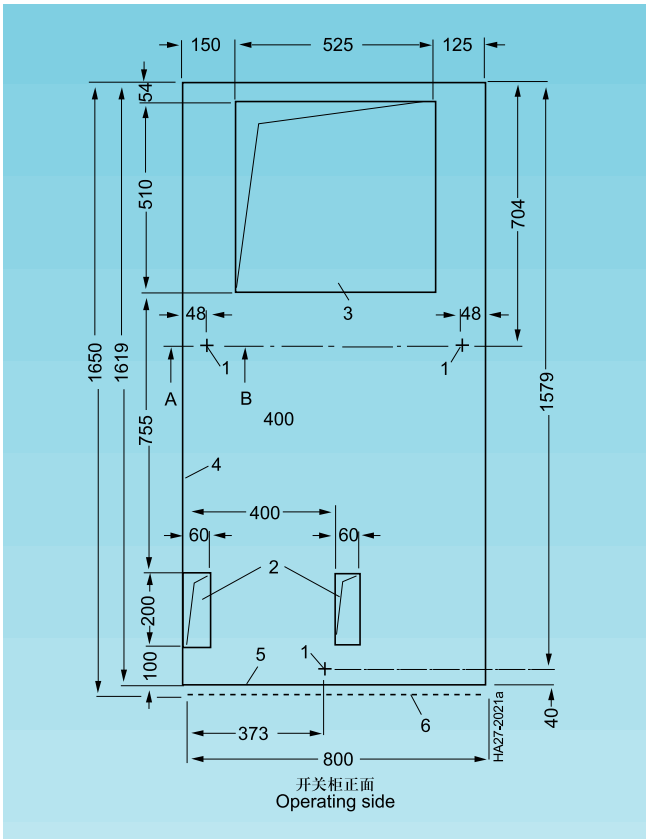
电机类型 Type of Motor	泵电机 Pump motor	磨粉电机 Grinding motor	风机 Fan
启动时间 Starting period	6秒 6 s	10~15秒 10~15 s	60秒 60 s

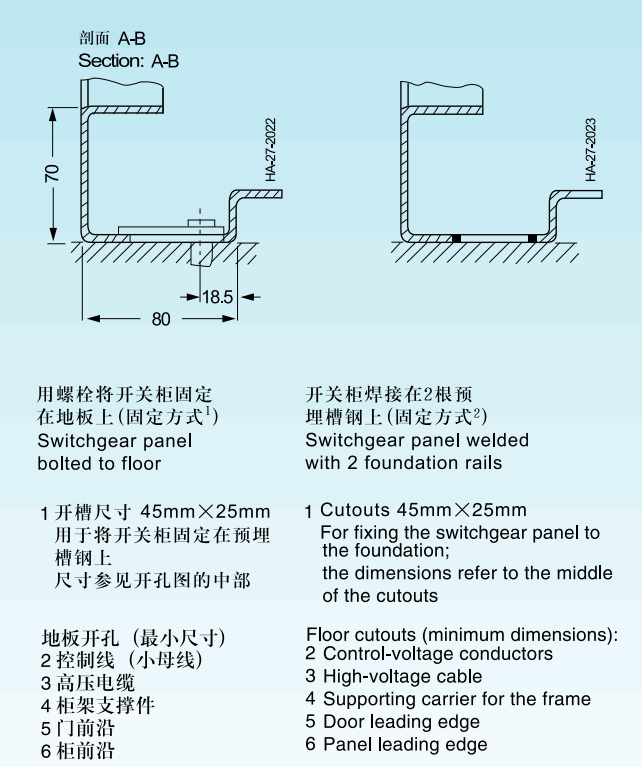
技术数据
Technical Data

安装说明 **Installation details**

柜体的地板开槽及固定点

Floor cutouts and fixing points for a frame with 2 individual panels





用螺栓将开关柜固定在地板上(固定方式[1])
Switchgear panel bolted to floor

1 开槽尺寸 45mm×25mm
用于将开关柜固定在预埋槽钢上
尺寸参见开孔图的中部

开关柜焊接在2根预埋槽钢上(固定方式[2])
Switchgear panel welded with 2 foundation rails

1 Cutouts 45mm×25mm
For fixing the switchgear panel to the foundation;
the dimensions refer to the middle of the cutouts

地板开孔（最小尺寸）
2 控制线（小母线）
3 高压电缆
4 柜架支撑件
5 门前沿
6 柜前沿

Floor cutouts (minimum dimensions):
2 Control-voltage conductors
3 High-voltage cable
4 Supporting carrier for the frame
5 Door leading edge
6 Panel leading edge

将柜体固定在设计的位置上

安装方式及相关基础图的详细说明参见使用手册。

8BK30开关柜安装方法如下:
安装地面必须是水泥地板，在第一排开关柜的位置上，布置两条基础轨道，为保证符合规定的固定位置和开槽尺寸，应使用图示的样板，将轨道埋入未完工的地板中。开关柜可以用螺栓固定或焊接在该轨道上。
如果没有条件制做基础轨道，也可把开关柜直接放在坚硬的地板上，然后用膨胀螺栓固定。

Fixing the panels in positions

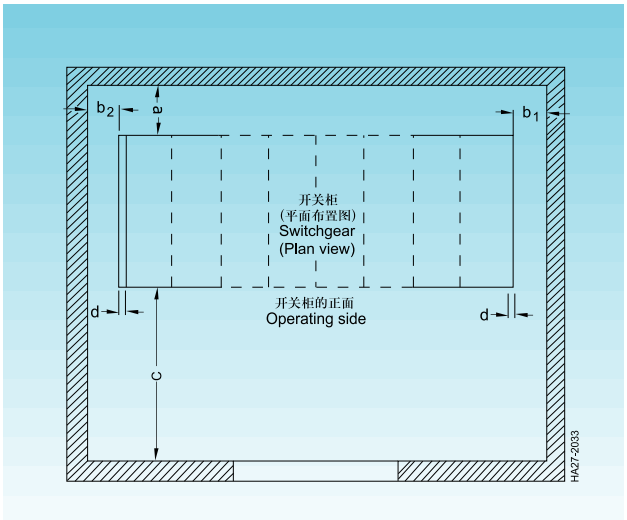
Details about types of installation and corresponding foundations are shown in the operating instructions.

The 8BK30 switchgear can be installed as follows:
On solid floor (unfinished floor + screed). For this purpose, two foundation rails per row of switchgear are grouted flush with the screed. For the position of the fixing cutouts and therefore of the foundation rails, see under "Floor cutouts". The panels can be welded or bolted to the rails.

Only if foundation rails can no longer be made, is the switchgear placed directly on the solid floor The panels are then fixed by masonry bolts.

安装说明 Installation details

平面布置的设计
Planning the layout



尺寸 Dimension	最小尺寸 Minimum dimensions for	
	自由竖立 电缆后接线时 Free-standing arrangement Connection from rear	面对面布置 电缆后接线时 Connection from rear
a	500	500
b_1	50	50
b_2	100	100
c	1100	1300
d	33	33

开关室的高度
Height of switchgear room

开关室的高度不得小于2800mm
The height of the switchgear room should not be less than 2800mm.

3

地板承重
Floor loading

每个开关柜(双回路)的平均净重约为700kg。(占地面积1.36m^2)
The average net weight of an 8BK30 switchgear (two panels) is approximately 700kg (floor area1.36 m^2).

技术数据
Technical Data

运输方法 **Shipping details**

8BK30 型开关柜最多以 3 个 开关柜作为一个运输单元。
在装箱前必须决定运输单元的大小，为此应考虑下列因素：
– 运输方式
– 运输条件
如果客户不及时提供这些信息，工厂将慎重地决定运输单元的大小。否则，如果运输单元不适合现场的条件，需要在现场重新拆卸（例如将三台一组的运输单元拆散）将使费用增加，并可能导致再组装时出现错误。
运输单元用螺栓紧固在一起，母排在现场连接。

Transport units

The 8BK30 switchgear panels are dispatched in transport units up to 6 panels.

The size of the transport units should be determined, prior to assembly, to suit;
– the means of transport
– the transporting conditions at site.

If the customer does not submit this information in good time, the factory will determine the size at its discretion.

Subsequent dismantling of transport units at site will in crease costs and may result in incorrect reassembly of the panels.

The transport units are bolted together and the busbars are connected on site.

装箱
Packing

包装方式 Type of packing	目的地 Destination	
	国内 公路或铁路运输 Inside China Shipment by road or rail	出口 海运 Other countries Shipment by sea
用聚乙烯膜盖住放在平板上的开关柜 Open pallet with polyethylene sheet covering the panels	有 Yes	无 No
放入干燥剂后，用聚乙烯膜将开关柜及平板封装，然后放入密封的木箱 Sealed crates, with upper and lower polyethylene sheets welded together, with desiccant bags and sealed wooden floor	无 No	有 Yes

3

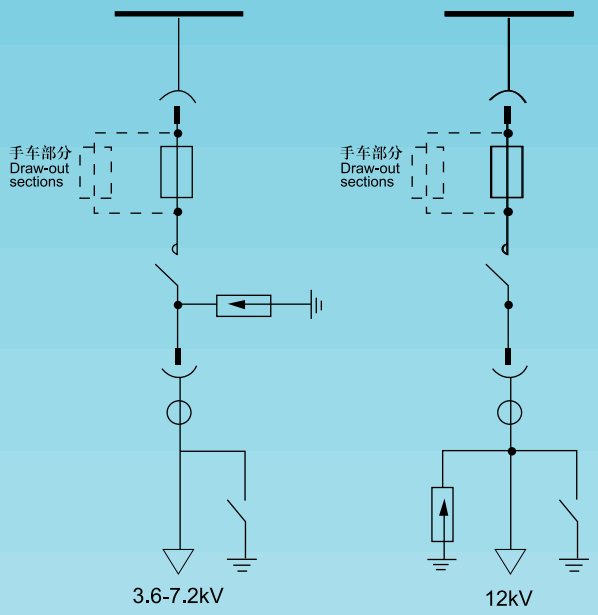
运输单元尺寸及重量
Transport dimensions and weights

额定电压 kV	运输单元（开关柜数） Transport units (No. of panels)	国内 China					出口 Overseas countries				
		宽度 Width (Spacing) m	深度 Depth m	高度 Height m	体积 Volume m^3	毛重 Gross weight kg	宽度 Width (Spacing) m	深度 Depth m	高度 Height m	体积 Volume m^3	毛重 Gross weight kg
3.6 to 12	2 回路 2 panels	1.06	1.90	2.25	4.53	770	1.06	1.90	2.41	4.85	1050
	4 回路 4 panels	1.90	1.90	2.25	8.12	1540	1.90	1.90	2.41	8.65	1880
	6 回路 6 panels	2.66	1.90	2.25	11.37	2300	2.66	1.90	2.41	12.15	2730

开关柜的主要回路 **Circuit options**

馈电回路
Outgoing feeder panels

用虚线表示的模块是可供选择的元件。
The modules shown in broken lines can be fitted optionally, i.e. they can be totally or partially left out.

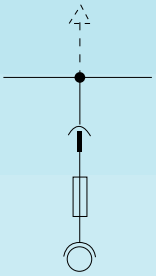


馈电柜
Outgoing feeder panel

测量回路
Metering panel

用虚线表示的模块是可供选择的元件

The modules shown in broken lines can be fitted optionally, i. e. they can be totally or partially left out.



带测量柜的手车
Metering panel with metering section

特殊控制回路

对于高压电动机的特殊控制回路，8BK30开关柜可以满足它们的要求，从而达到减小起动电流，改变旋转方向及变速的作用。

特殊控制回路：

- 电动机的可逆运转
- 操作主接触器实现电动机的可逆动转
- 欠压起动
- Dahlander换极起动回路
- Dahlander换极起动，可正、反运转的回路
- 星-三角起动
- 星-三角起动，可正、反运转的回路
- 换极电动机控制回路

Special circuits

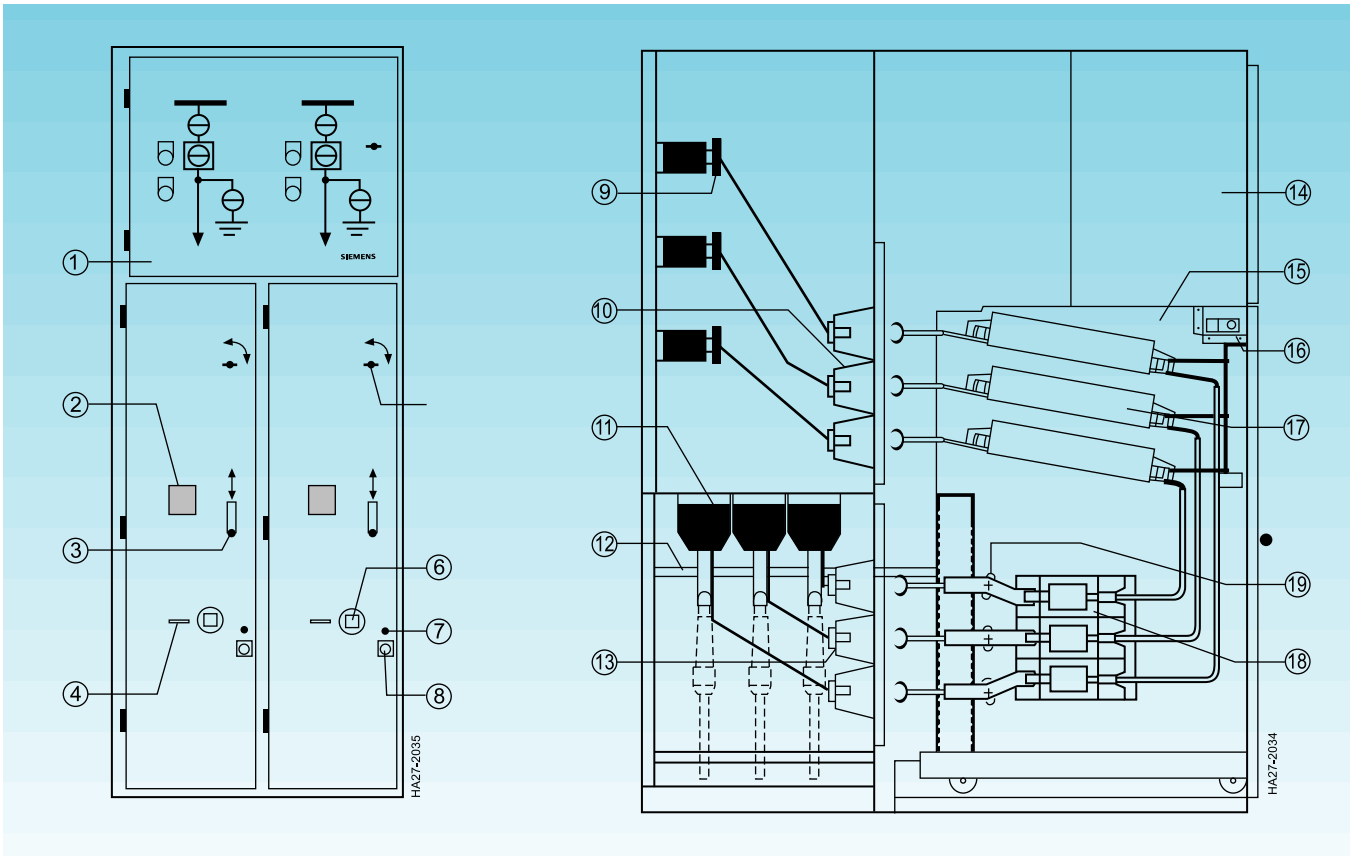
For high-voltage motors various special circuits for 8BK30 switchgear can be implemented to achieve a reduction in the starting current,the reversal of the direction of rotation and speed switching

Special circuits:

- Reversing operation
- Reversing operation with main contactor
- Reduced-voltage starting
- Dahlander pole-changing circuit
- Dahlander pole-changing circuit with 2 directions of rotation
- Star-delta starting
- Star-delta starting with 2 directions of rotation
- Pole-changing motor

结构说明
Construction

操作与安装 **Operation and installation**



一个开关柜中两个回路的正视图
Front view of two feeders

1) 低压室门
2) 观察窗口
3) 门手柄
4) T 型手柄插孔联锁推杆
5) 高压室门锁
6) 驱动手车的 T 型手柄插孔
7) 接地开关操作手柄插孔
8) 接地开关位置指示器
9) 母排
10) 上触头罩(连接母排)
11) 电流互感器
12) 接地开关
13) 下触头罩(连接电流互感器)
14) 低压室
15) 手车部分
16) 低压插头 / 插座
17) 高压高遮断容量限流熔断器
18) 真空接触器
19) 避雷器或过电压限制器

侧视图
Side view

1) Door of low-voltage compartment
2) Inspection window
3) Door handle
4) Interlock deactivator of actuation openings
5) Door lock
6) Opening for the transfer of the draw-out section
7) Opening for the actuation of the earthing switch
8) Position indicator of the earthing switch
9) Busbar
10) Penetration type bushings
leading to the busbar compartment
11) Current transformer
12) Earthing switch
13) Penetration type bushings
leading to the cable connection compartment
14) Low-voltage compartment
15) Draw-out section
16) Low-voltage connection
17) HV HRC fuses
18) Vacuum contactor
19) Surge arrester/Limiter

结构说明
Construction

开关柜的宽度，框架，隔板
Panel width, frame, partitions

开关柜的宽度

8BK30 开关柜由两个独立回路组成，每回路宽 400mm。在一个常规的 800mm 柜宽的柜体中，可放入两个单独的回路。

框架

框架采用折弯的钢板部件、螺栓和精密的直角定位钢件固定的拼装结构。在电缆室底部，还设有底板。开关室的底板上装有导轨以便移动手车部分。
高压室和低压室门、两侧钢板都经过喷粉处理 (RAL7032 灰色)；其他钢件，包括柜体的后部则采用热镀锌处理。

隔板

金属隔板把 8BK30 柜体分成：
- 母线室，可以是横向贯穿式，也可在每两个柜之间用隔板隔开。
- 电缆连接室
- 高压室

隔板可防触电，并可防灰尘和防止小虫的侵入。
提起或压下高压室门上的手柄，可移开高压室与母线室、电缆连接室之间的两块金属活门，以便打开或关闭触头罩。

当退出手车后，如想观察定触头的状态，可用一个专门的工具将活门打开。作为选择，活门也可附有挂锁作为检修时的辅助措施。高压室中的上隔板（通向母线）和下隔板（通向电缆连接室）可以分别卸下。这样，母线室可与电缆连接室完全贯通，便于现场安装工作。

8BK30 开关柜侧视图
Side view of 8BK30 switchgear

Panel width

Each 8BK30 switchgear consists of two individual panels which have a panel width of 400 mm.
On a common 800 mm wide frame two individual panels are arranged.

Frame

The frame is a bolted assembly of folded and torsionally rigid steel sections. Stamped corner pieces are used as connecting elements.
All steel plates and partitions are bolted to these sections.
A floor plate for the termination compartment is also available.
A rail is mounted on the floor plate of the draw-out compartment for the transfer of the draw-out section.
The front (high-voltage and low-voltage compartments) and the side-panels are powder-coated (RAL 7032, finely textured);
all other sheet-steel parts, including the rear of the panels are hot-dip galvanized.

Partitions

The metal partitions divide 8BK30 cubicle into
- busbar compartment, normally continuous but optionally partitioned every 2 panels
- termination compartment
- draw-out compartment.

The partitions are safe from touch and the compartments thus formed are dust-proof and vermin-proof.

Two metal shutters are shifted to the side by raising or depressing the door handle on the high-voltage compartment door and accordingly close or open the penetration type bushings between the draw-out busbar and cable connection compartments.
The metal shutters can be opened when the draw-out section is withdrawn by means of a shutter defeater, for example for a visual inspection of the mating contacts. As an option the shutters are capable of being locked with a padlock. The upper partition (access to the busbar) and the lower partition (access to the termination compartment) can be unscrewed independently of one another.
This makes it possible to work in the busbar compartment with the termination compartment fully partitioned of, and vice versa.

结构说明
Construction

压力释放板，柜内隔板，高压室门
Pressure relief, inter-cubicle partitions, high-voltage compartment door

压力释放板

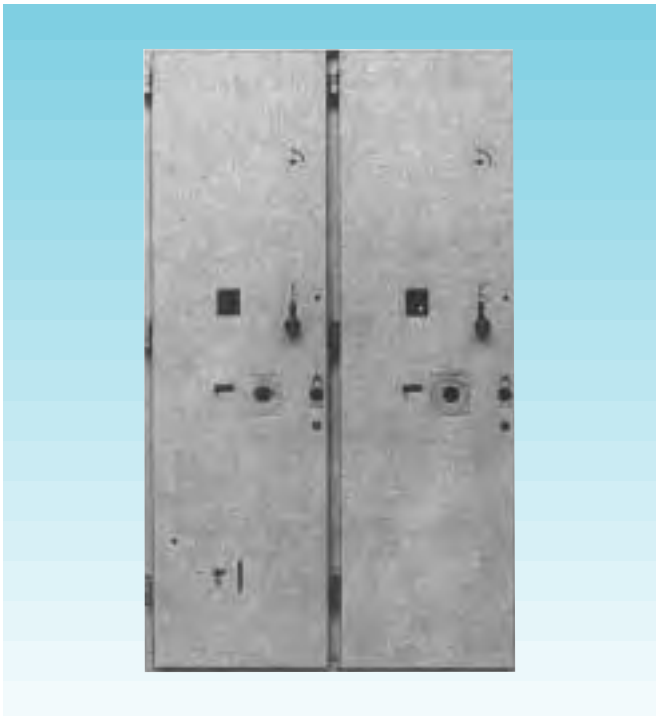
在电弧故障（极少发生）中，压力会增加。这时压力可以通过高压室和母线室上方的压力释放板释放；但压力释放板不会从外部打开。在任何电弧故障中电缆连接室的压力释放装置是不需要的，因为回路中串接的高压高遮断容量限流熔断器限制了故障电弧的燃弧时间及其幅值。

柜内隔板

柜内隔板由热镀锌钢板制成。高压室、低压室、电缆连接室与相邻各室隔离。母线室两侧的隔板可供选择，既可以是贯穿的，也可设置有供母排通过的穿墙套管的隔板。

高压室门

高压室门（铰链的门左边，门可打开165°）由一套联锁装置和门锁锁住，具有防止内部电弧故障时产生的压力和强度。高压室门中的操作孔、T型手柄插孔都由盖板或活门遮盖。通过观察窗口可以观察手车部分的位置（工作位置或断开位置），还可观察熔断器通断状态指示器。



高压室门
High-voltage compartment doors

Pressure relief

The pressure which would develop in the unlikely event of an arcing fault is released upwards from the draw-out and busbar compartments by pressure relief flaps, which cannot be opened from outside.
Pressure relief of the cable connection compartment is not requires as any arcing fault would be limited by the line-side HV HRC fuses with respect both to its duration and its current intensity.

Inter-cubicle partitions

The inter-cubicle partitions are made of hot-dip galvanized sheet steel. The high-voltage and termination compartments are separated from those of the adjacent cubicles.

At the busbars, there are openings in the partitions so that the busbar compartment extends through all the cubicles of a board section. Busbar barriers, providing full segregation between two respective cubicles of a section are available as an option.

High-voltage compartment door

The left-hinged door of the high-voltage compartment (165° opening angle) is closed in a pressureresistant manner by means of a locking device (double-bit key, DIN 43 668) and three blocking pins. All actuation openings on the high-voltage compartment door are covered either by means of flaps or shutters. An inspection window allows the draw-out section to be inspected whether it is in the disconnected or service position and allows the fuse monitor of the H.V. HRC fuses to be inspected.

低压室，低压线路的连接方式，母线室
Low-voltage compartment, low-voltage connector, busbar compartment

低压室，低压线路的连接方式

低压室和高压室之间是用具有足够强度的接地钢板隔开的。两个回路的低压室共用一扇门。作为选择，在低压室门上可设置一个观察窗口。在低压室内安装两套独立的继电保护系统，用以控制各自的高压回路。

低压室的内部尺寸
高　680mm
宽　680mm
深　450mm

低压室门也可做成两扇分开的门。（2x400mm)。
如继电保护有很多的附加装置，还可以在柜顶加装一个高度为400mm的辅助低压室。

使用软导线和64芯低压插头、插座连接手车部分和固定部分。软连线沿着隔板布置。

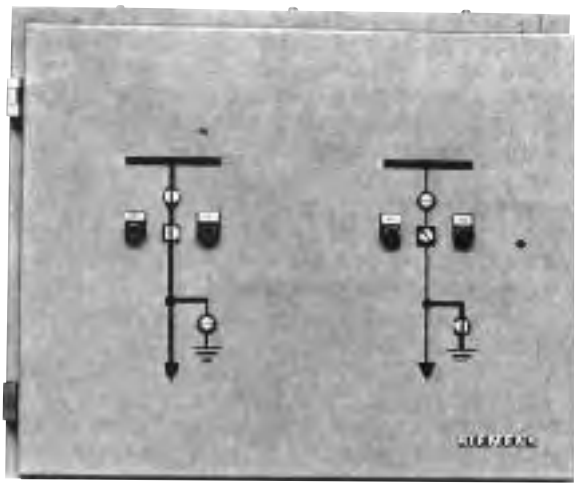
母线室

母线

扁平铜排用螺栓固定在环氧树脂浇铸绝缘子上。与手车部分动触头配合的定触头由隔板上的触头罩内伸出，并固定在环氧树脂浇铸绝缘子上。

顶端的电缆连接

在需要从母线室直接供电的情况下，可在开关柜的顶部安装一个电缆接头盒，这时每相导体最多允许2根密封电缆头从顶端直接与母线连接。



低压室的正视图
Low-voltage compartment,front view

Low-voltage compartment , Low-voltage connector

The low-voltage compartment is partitioned off from the high-voltage compartment by pressure resistant earthed metal and, inculding the door, stretches across two cubicles respectively. As an option an inspection window can be fitted into the door . Both protective relays in individual housings and solid state relays can be installed in the low-voltage compartment.

Inner dimensions of the low-voltage compartment:
Height　680mm
Width　680mm
Depth　450mm

As an option the low-voltage compartment can also be delivered in a subdivided version(2x400mm)with 2 separate doors.

In the case of extensive auxiliary equipment,an additional 400 mm high low-voltage compartment can be positioned on the panels.

Flexible conductors and a 64-way low-voltage control circuit connector are used to connect the draw-out to the non-withdrawable section. The conductors are routed through the protective steel conduit.

When the low-voltage plug has been disconnected it can be inserted in a holder in the high-voltage compartment door.

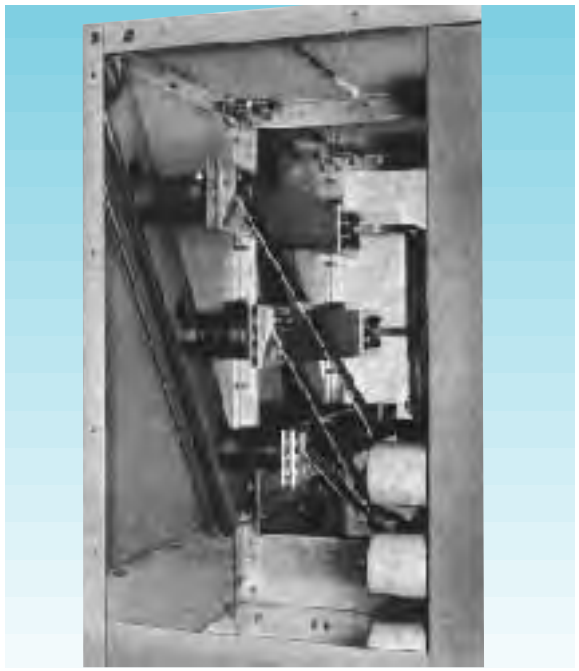
Busbar compartment

Busbars

The flat copper busbars are fastened on cast resin in insulators with bolted-on holders.The links with the mating contacts for the upper contact arms of the draw-out section are also held by these insulators and by the penetration type bushings of the partition.

Cable connection at the top

It is possible to connect a maximum of 2 cable sealing ends per conductor from the top directly to the continuous busbar.In this case a cable connection box is installed with each 2 panels.



母线室
Busbar compartment

结构说明
Construction

手车部分 **Draw-out section**

手车部分包括以下部件：
– 车体
– 开关装置和可选择的设备
– 动触头与触臂

车体

底盘与侧安装板用螺栓固定，并装有可自动伸出、缩进的轮子。
位于底盘中部的滚动轴承可以引导手车部分在柜体的底板上滑行。
另外手车部分还可通过在低压室下方的滚动轴承引导手车上方的安装板起到辅助支持的作用。
这套机构可使手车部分如第 5 页所述的那样方便地推入、退出，而不受开关室地板条件的影响。
安装在手车下部的联锁装置可以将手车部分锁定在断开位置或工作位置。
为了使手车部分解锁，可将 T 型手柄插入关闭的高压室门内的联锁机构，然后向右旋转90°。
用 T 型手柄可将解锁的手车部分推入或退出到断开（试验）位置。
将 T 型手柄向左转90°，则手车部分锁定在断开（试验）或工作位置。
T 型手柄只有在手车部分锁定的情况下，才可拿出。

开关装置和可选择的设备

– 3TL6 真空接触器的型号取决于最高工作电 压。
– 高压高遮断容量限流熔断器
根据设备的额定电流，每相最多可并联两根熔管。
– 7.2kV 避雷器或过电压限制器安装在手车上，12kV的避雷器或过电压限制器安装在电缆室内。
– 电压测量装置（PT 手车）

动触头与触臂

与梅花型镀银动触头相连的是圆形铜触臂，动触头与之配合的定触头之间的允许中心误差为 ± 8mm。

The draw-out section consists of the following components:
– Mounting plate with chassis
– Switching devices and equipment options
– Contact arms with isolating contacts

Mounting plate with chassis

The chassis is bolted onto the side mounting plate together with the wheels which automatically fold out and in. The rolling contact bearings located in the middle of the chassis underside guide the draw-out section on the rail of the floor plate. The draw-out section is given an additional side support by means of two rolling contact bearings on the underside of the low-voltage compartment between which the upper edge of the mounting plate runs.

This mechanism facilitates the simple racking in and out of the draw-out section as already described on page 5 and this is achieved largely independently of the switchroom floor quality.

The interlocking device fitted on the end of the mounting plate locks the draw-out section in its disconnected and service positions.

To release the draw-out section a T type spanner is inserted through the closed door of the high-voltage compartment into the interlocking device and turned by 90° to the right.
The released draw-out section can now be transferred to the corresponding final position by pulling out or pushing the T type spanner.

After turning the T type spanner by 90° to the left the service or disconnected position is reached and consequently the draw-out section is locked to the panel.
The T type spanner can only be removed if the draw-out section is locked.

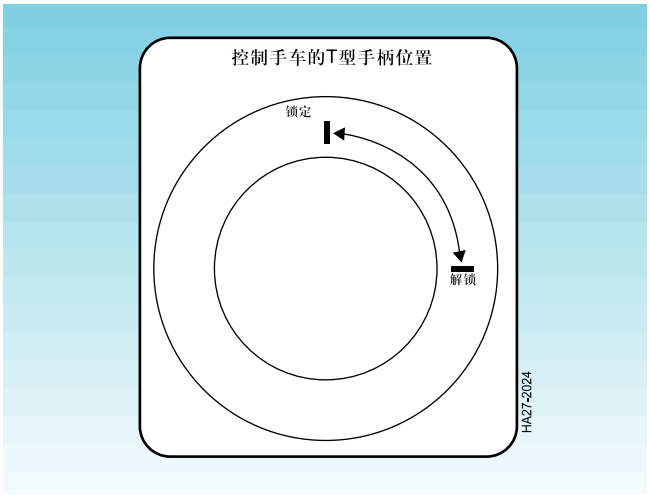
Swtching devices and equipment options

– Type 3TL6 vacuum contactor depending on the rated voltage
– HV HRC fuse holders with HV HRC fuse links
As an option 2 HV HRC fuses per phase can be connected in parallel.

– Surge arresters/limiters (mounted on the draw-out section, only up to 7.2 kV), at 12 kV, surge limiters/arresters are located in the cable connection compartment.
– Voltage measuring device.

Contact arms with isolating contacts

The contact arms at the end of which silver-plated tulip contacts are fixed consist of rounded copper. The design of the tulip contacts allows tolerances of ± 8mm to the mating contacts.



贴在高压室门上的标签，指示控制手车的 T 型手柄位置
Label on the high-voltage compartment door for the transfer of the draw-out section positions of the locking key

手车部分装有真空接触器、过电压限制器，并联的熔断器
Draw-out section equipped with vacuum contactor, surge limiters, and parallel fuses.

电缆连接室及可选的部件
Cable connection compartment, optional additions at the lower contacts

电缆连接室

伸入电缆连接室触头罩内的圆形定触头与电流互感器的端子之间用铜排连接。作为选择，电流互感器也可以全部或部分用支柱绝缘子替代。如果在柜中装有接地开关，则它可直接将出线电缆接地。

用一个高度能调整的电缆夹(C型安装槽)将电缆固定在该隔室的下方。从电缆接线孔到电缆夹支撑轨道之间的高度为350mm。电缆连接室的底部用一块活动的板封闭。

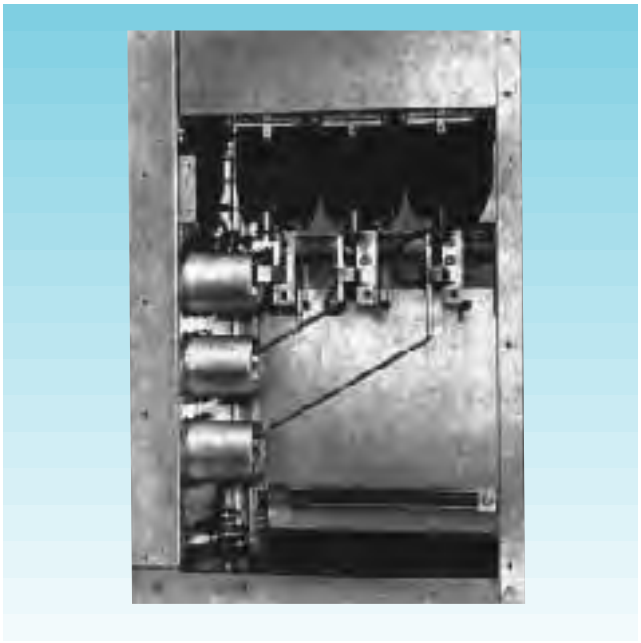
可选择的部件

在电缆连接室内可安装以下部件:

－电流互感器

－12kV时，安装避雷器或过电压限制器

－每相最多可接一根300mm^{2}或两根180mm^{2}单芯交联聚乙烯电缆头。



装有三个电流互感器和接地开关的电缆连接室
Cable connection compartment with three current transformers and made-proof earthing switch

Cable connection compartment

The penetration type bushings which project into the cable connection compartment are supported by the round mating contacts.The connections between mating contacts and the line terminal of the current transformer consist of copper rails.

As an option the current transformers can be totally or partially replaced by post insulators. If an earthing switch is built in, this directly earths the outgoing feeder cable.

The connected cables are supported in the lower region of the cable connection compartment by a height-abjustable cable clamp (C mounting channel.)

The available height for mounting sealing ends is 350mm between the hole in the connecting link and the cable clamp support rail.

The cable connection compartment can be closed off at the bottom by means of a dividable floor plate.

Optional parts:

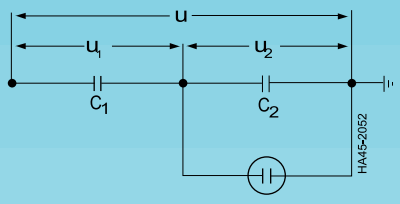
The following parts can be fitted in the cable connection compartment:

- CT's
- 12kV surge arresters/limiters.
- and cable sealing ends up to a maximum of 1x300mm^2 or 2 x185mm^2 single-core XLPE conductors per phase.

结构说明
Construction

验电方法 Checking for isolated condition

用于检查定触头是否带电的方法有两种，它们都符合DIN VDE 0105，第一部分的要求。
1.用 LRM 电压指示器检查每相的带电状况。
该指示器由一个容性电压分压器从高压侧输出信号。电容 C_1 可以由电流互感器或支柱绝缘子的分压电容构成。信号经由屏蔽电缆通到低压室门上对应于L_1、L_2、L_3的三个插座。电容 C_2 表示屏蔽电缆电容和指示器的电容。如设备带电，电容 C_2 输出一个信号电压。验电时，指示器可依次插入每相的插座。在任何工作状态下，这套系统对操作人员都是安全可靠的，不会发生漏电、触及人身。它的指示范围符合 DIN VDE 0681，第4 部分的规定。（VDE 关于电压指示器的规定）
2.根据 DIN VDE 0681 第4部分，在使用传统的电压检测器时，需将高压室门打开。然后将8BK30开关柜的手车部分退出，用一个特殊工具打开金属活门。



带电压指示的容性电压分压器
Capacitive voltage divider with votage indicator

Ther are two methods ,all of which comply with DIN VDE 0105 Part 1 ,in order to check that the mating contacts are disconnected:

1.Checking each pole with an voltage indicator.
The indicator is energized from the high-voltage parts across a capacitive voltage divider.
Capacitance C_1 may be formed by a divider capacitor in a current transformer or a cast-resin insulator .The connection to the panel front is made by screened leads terminated at pairs of jacks for L_1, L_2 and L_3 at the low-voltage compartment. Capacitance C_2 results from the lead capacitance and the capacitance of the voltage indicator.The latter flashes when high voltage is applied.The indicator is plugged into the jacks for each pole in tum.The system is shock-proof in any operating state.Its indicating range conforms to DIN VDE 0681.Part 4(VDE specifications for voltage detectors).

2.Using conventional voltage detectors to DIN VDE 0681. Part 4. with the high-voltage compartment door open. On 8BK30 switchgear the draw-out section must first be racked out and the metal shutters must then be opened with a shutter defeater.

结构说明
Construction

模块柜体结构 Modular construction

在许多情况下，开关站中的真空接触器柜需要由断路器柜供电。8BK30 型真空接触器柜可与8BK20型真空开关柜直接拼装，而不需任何附加措施。

In many cases feeder contactor panels are combined with feeding circuit-breaker panels in the one switchgear unit. 8BK30 vacuum contactor panels can be mounted directly on 8BK20 circuit-breaker panels without taking additional measures.

8BK30 真空接触器与8BK20 断路器柜(模块结构)

8BK30 vacuum contactor panels mounted on 8BK20 circuit-breaker panel in modular arrangement

5

技术标准与说明
Standards and Specifications

DIN VDE, PEHLA, IEC, ANSI, NBN, NFC, BS, SEN, N. E. N., GB, DL

技术标准及说明

8BK30开关柜符合以下标准及说明：
- IEC 出版物298和694
- DIN VDE 0670，第6部分及第1000部分
- ANSI C37.20c 1974 (基本条款)
- NBN 610
- NF C64 400
- BS 5227
- SEN 36 2103
- N.E.N.10298
- PEHLA Guideline No.4

按 EEC 会员国达成一致的协议认为，这些国家标准符合 IEC 298号出版物。
同时，8BK30开关柜还符合：
- DIN VDE 0670 第 601 部分; IEC 附录 AA 或 PEHLA 导则第 4 号。

在中国生产的产品还符合GB 11022,3906, 1207, 1208, 11032, 311.2-6。DL 404(绝缘部分)

工作场地的类型

8BK30开关柜的工作地点是根据 DIN VDE 0101规定的一般工作室和可以上锁的工作室。

绝缘

8BK30开关柜确保在各个电压等级的绝缘水平符合 DIN VDE 0670第1000部分或IEC 694 的规定。
额定绝缘水平（额定雷电冲击耐受电压，额定工频耐受电压）是按照标准状态（大气压1013hPa,温度20 C,和相对湿度11g/m³)制定的，即在DIN VDE 0111和 IEC 71规定的海平面处的标准大气条件。随着海拔高度的升高，空气密度变小，绝缘水平随之降低。从海平面每升高1000米，上述的额定绝缘水平下降9%，对此，VDE, IEC都认为是可以允许的。对于安装在更高的海拔高度时，标准中没有给出规定的绝缘数值，而是根据具体的协定来提出要求的。我们认为1000米以下的绝缘水平计算同样也适合于更高海拔高度的绝缘水平计算。所以高度修正系数a是基于1000米的绝缘水平基础上的，它从海平面到海拔1000米高度，下降了9%（相当于1/1.1）
在选择设备时，应按下述条件：

$$\text{选取的额定耐受电压}^{1)} \geqq \frac{\text{要求的额定耐受电压}^{1)}}{1.1 \times a}$$

例如：
海拔高度 ..... 3000 米
要求的额定冲击耐受电压 40kV
(IEC规定的3.6kV开关柜)
修正系数 a 0.73
选用的额定冲击耐受电压：

$$\frac{40\text{kV}}{1.1 \times 0.73} = 50\text{kV}$$

所以应选择7.2kV开关柜。

最高工作电压 Rated voltage	额定工频耐受电压（有效值） Rated power-frequency withstand voltage (rms)		额定雷电冲击耐受电压（峰值） Rated impulse withstand voltage(peak)	
	隔离断口 for isolating distances kV	相间及对地 between phases and to earth kV	断口 for isolating distance kV	相间及对地 between phases and to earth kV
3.6kV[2)]	26	24	43	40
7.2kV[2)]	36	32	66	60
12kV[3)]	32	28	70	60

Standards and specifications

The switchgear conforms to the following standards and specifications:
- IEC Publ.298 and 694
- DIN VDE 0670,Part 6 and Part 1000
- ANSI C37.20c 1974 (in the essential points)
- NBN 610
- NF C 64 400
- BS 5227
- SEN 36 2103
- N.E.N. 10298
- PEHLA Guideline No.4

1)额定雷电冲击耐受电压或额定工频耐受电压
2)额定工频耐受电压根据中国标准
3)额定工频耐受电压根据IEC标准

In accordance with the harmonization agreement reached by the EEC countries, their national standards conform to IEC Publication No.298.
8BK30 switchgear also complies with:
-DIN VDE 0670 Part 601;IEC Appendix AA or PEHLA Guideline No.4
8BK30 switchgear (made in China) also complies with GB11022, 3906,1207, 1208, 11032, 311.2-6 DL (Insulation parts).

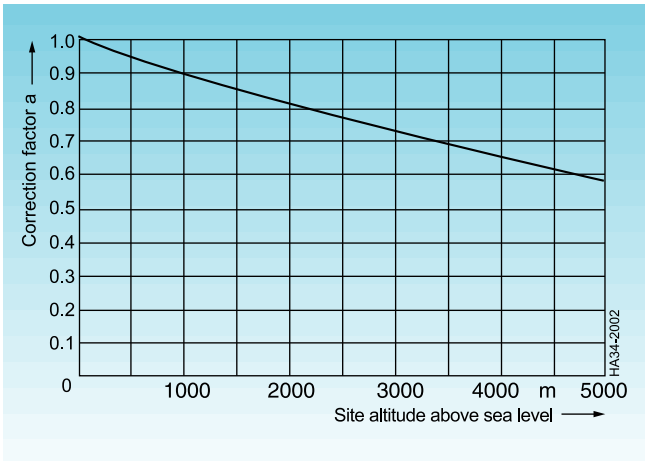
Type of service location

8BK30 switchgear is designed for service in normal service rooms and lockable electrical service rooms according to DIN VDE 0101.

Insulation

8BK30 switchgear guarantees insulation for the particular rated voltages according to DIN VDE 0670 Part 1000 or IEC 694,see table below.
The rated insulation levels (rated impulse withstand voltage,rated power-frequency withstand voltage) of our equipment and switchgear are referred to normal atmospheric conditions (1013 hPa,20℃, 11g/m³ humidity),at sea level.This is in accordance with DIN VDE 0111 and IEC Publication 71.The insulating property of air decreases with increasing altitude due to the reduction in the air density. According to IEC and DIN VDE this decrease can be disregarded up to a site altitude of 1000m, i.e.the existing decrease of 9% at this altitude is permissible.There are no guidelines for insulation rating at site altitudes of more than 1000 m;this is left to special agreements. We recommend the retention of the insulation rating. fieldproven up to 1000 m, even at higher altitudes.For this reason the altitude correction factor a is based on the insulation level at 1000 m which is approx.9% (corresponds to 1/1.1) less than at sea level. For the selection of equipment and switchgear the following is applicable:

$$\text{Rated withstand voltage to be selected}^{1)} \geqq \frac{\text{Required rated withstand voltage}^{1)}}{1.1 \cdot a}$$



Correction factor for the insulation level, dependent on the site altitude

Example:
Site altitude ..... 3000 m above s.l.
Required rated impulse withst. volt 40kV
(for 3.6kV switchgear according to IEC)
Correction factor a 0.73
(see Fig.)
Rated imp.withstand
voltage to be selected $\frac{40\text{kV}}{1.1 \cdot 0.73} = 50\text{kV}$

According to this it can be seen that switchgear for 7.2kV. should be chosen.

1) Rated impulse withstand voltage or Rated power-frequency withstand voltage
2) Rated power frequency withstand voltage accoording to Chinese standard
3) Rated power frequency withstand voltage according to IEC

DIN VDE,PEHLA,IEC,ANSI,NBN,NFC,BS,SEN,N.E.N.,GB,DL

载流容量

根据DIN VDE 0670第6部分或第1000部分，IEC298/694规定，载流容量参照以下环境温度：

24小时最高平均值	＋35 ℃
最高值	＋40 ℃

随着柜体周围环境的变化，开关柜和母线的载流容量也随之变化。在金属封闭的柜体中，因只有有限的通风，正常的载流容量将有所降低。

防电击及异物侵入

因为手车部分在断开位置与工作位置之间的移动都是在柜门关闭的情况下进行的，所以在工作位置和断开位置的防电击及异物侵入的可靠性非常高。柜体设计的标准防护等级是，IP4X/IP40，可选择的是IP41，IP50，IP51。根据DIN40050和IEC529，对于不同保护等级的解释：

等级号 No.	准则 Specifications	防护等级 Degree of protection
IP4X	DIN VDE 0670，第 6 部分和 IEC 298 DIN VDE 0670, Part 6, and IEC 298	防止直径或厚度大于1mm的线形或带状物伸入柜体，接触带电体，对防水保护无要求。 Protection against approach to live parts and contact with moving parts by wires of diameter or strips of thickness greater than 1 mm.No specification regarding protection against water.
IP40	DIN 40050和 IEC 529 DIN 40050 and IEC 529	防止直径或厚度大于1mm的线形或带状物体入柜体，接触带电体，无防水保护。 Protection against approach to live parts and contact with moving parts by wires of diameter or strips of thickness greater than 1 mm.No protection against water.
IP41	DIN 40050 和 IEC 529 DIN 40050 and IEC 529	防止直径或厚度大于1mm的线形或带状物体入柜体，接触带电体，有防水保护。 Protection against approach to live parts and contact with moving parts by wires of diameter or strips of thickness greater than 1 mm.and protection against dripping water.
IP50	DIN 40050 和 IEC 529 DIN 40050 and IEC 529	防有害的灰尘成积，无防水保护。 Protection against harmful dust deposits.No protection against water.
IP51	DIN 40050和 IEC 529 DIN 40050 and IEC 529	防有害的灰尘成积，防滴水保护。 Protection against harmful dust deposits.And protection against dripping water.

内部电弧故障的防护

根据DIN VDE 0670第6部分或IEC 298对于柜体内部电弧故障防护的试验，用户与制造厂商可以根据DIN VDE 0670第60部分，IEC 298附录AA或PEHLA导则第4条，达成协议。
在标准设计中，遵循标准1到3和6。
金属封闭开关柜的试验条件中包括内部电弧故障对人身安全的影响。
标准1：门和盖板安全可靠，在工作中不可打开。
标准2：可能造成危险的部件不会飞离。
标准3：在柜体的外部可以接近的部位，不应出现孔洞。
标准4：垂直布置的指示器不可燃烧。
标准5：水平布置的指示器不可燃烧。
标准6：可靠的接地连接。

Current-carrying capacity

According to DIN VDE 0670,Part 6 or Part 1000 and IEC 298/694, current-carrying capacities are referred to the following ambient temperatures:

Maximum value of the 24-hour-mean:	＋35℃
Maximum value:	＋40℃

The current-carrying capacity of the switchgear and busbars varies as a function of the ambient temperature outside the enclosure.

In metal-enclosed switchgear the current-carrying capacity of a switching device may be reduced to some extent by the limited ventilation.

Protection against electric shock and ingress of solid foreign bodies

Since the cubicle door need not be opened to transfer the draw-out section from the disconnected position to the service position and vice versa, the quality of protection against electric shock and ingress of solid foreign bodies is equally high in both positions.
The standard protective degree of the panel is IP4X/IP40, optionals are IP41, IP50, IP51.

Explanation of the various degrees of protection according to DIN VDE 0670 Part 6, IEC 298, DIN 40050 and IEC 529:

Resistance to internal arcing

In compliance with DIN VDE 0670, Part 6 or IEC 298 tests on switchgear for the verification of resistance to internal arcing can be carried out subject to agreement between user and manufacturer in accordance with DINVDE 0670, Part 601, IEC298 Appendix AA or PEHLA Guideline NO.4.
Criteria1 to 3 and 6 are also complied with in the standard-design.
The test conditions for metal-enclosed switchgear cover the effects of internal arcing on personnel safety.

Criterion 1:
Correctly secured doors, covers,etc.must not open.

Criterion 2:
Parts of the metal-enclosed switchgear which may cause a hazard to personnel must not fly off.

Criterion 3:
No holes may develop or be burned into the outer, freely accessible external parts.

Criterion 4:
Vertically arranged fabric indicators must not ignite.

Criterion 5:
Horizontally arranged fabric indicators must not ignite.

Criterion 6:
The earthing connections must remain effective.

技术标准与说明
Standards and Specifications

DIN VDE, PEHLA, IEC, ANSI,NBN, NFC, BS, SEN, N. E. N., GB, DL

气候和环境影响

气候和其它环境条件(通常的外部条件,化学污染地区,小动物)对开关柜产生的影响大小取决于开关室的设计情况。基于开关室的环境特点,开关柜可附加一些改进措施。根据上述标准可以确定以下三种气候类型。

气候类型

以下气候类型是根据IEC721 - 3 - 3号出版物和西门子标准SN29070第1部分定义的。

– 气候类型I1

建筑物的房间有着良好的隔热能力或其热容量高;通常只对温度进行控制,例如通常的起居室、办公室、商店、电话总机室、或精密产品储藏室。

– 气候类型I2

建筑物的房间有着较差的隔热能力或热容量低,对室内温度未加控制。即只偶然加热或降温几天的场所,例如无人看管的继电器室、增压站、马厩、机动车修理场、半成品车间、飞机库。

– 气候类型I3

建筑物房间没有隔热材料,或其热容量很低,从不加温或降温。
例如:电话、建筑的入口处、谷仓、无取暖设施的储藏室、棚、车库。

Climatic and environmental effects

The climate and other environmental conditions (normal foreign matter, chemically aggressive pollution,small animals) may effect switchgear to a greater or lesser degree, depending on the design of the switchgear room. Any additional features which the switchgear should possess will therefore depend on the actual indoor climate, for which three classes are defined in these standards.

Climate classes

The climate classes are based on IEC Publication 721-3-3 and Siemens standard SN 29 070, Part 1 and are defined as follows:

Climate class I1:

Rooms in building with good thermal insulation or high thermal capacity, heated or cooled, with temperature monitoring only, e. g. normal living rooms, offices, shops, telecommunications exchanges, storage rooms for sensitive products.

Climate class I2:

Rooms in buildings with poor thermal insulation or low thermal capacity, heated or cooled, without temperature monitoring; heating or cooling subject to failure over several days, e. g. unattended relay, booster or transformer stations, stables, motor vehicle repair shops, manufacturing rooms for unfinished products, hangars.

Climate class I3:

Rooms in buildings without thermal insulation and with low thermal capacity,neither heated nor cooled ,e .g. telephone booths,entrances of buildings,barns,lofts, unheated storerooms,sheds and garages.

DIN VDE,PEHLA,IEC,ANSI,NBN,NFC,BS,SEN,N.E.N.,GB,DL

开关室的条件 Conditions in switchgear rooms

开关室的数据 Data of switchgear rooms				8BK30开关柜可选项 Options for 8BK30 switchgear					
可直接安装开关柜的气候类型（根据 IEC 721-3-3 和 SN 29 070, 第1部分） Direct exposure of the switchgear (as in IEC 721-3-3 and SN 29 070,Part 1) to climate	环境温度 Ambient temperature 相对温度 Relative humidity	凝露 Condensation	通常的外部条件，化学污染地区，小动物 Normal foreign matter, chemically aggressive pollution,small animals	在电缆室和高压室的加热器 Heaters in termination + draw-out compartments	防护等级 Degree of protection	密封装置(附件) Set of Seals (accessories)	接触面的处理 Contact treatment 螺栓连接 Screwed joints	 滑动接触面 Moving contacts	除喷粉部分外，其它部分的表面处理 Surface treatment of all parts not powder-coated
气候类型 I1 Climate class I1	+5至+40℃ 5%至85% + 5to +40℃ 5%to85%	无 none	无 none	–	IP40/IP4X	–	–	–	–
气候类型 I2 Climate class I2	-5至+55℃ 10%至100% -5 to +55℃ 10%to100%	偶尔，大约一天两小时 occasionally, about once a month for 2 hours	无 none	–	IP40/IP4X	–	–	–	–
			黄沙，灰尘 Blown sand,dust		IP50				
			小动物 Small animals		IP50	o			
气候类型 I3 Climate class I3	-5至+70℃ 10%至100% -5 to +70℃ 10%to100%	经常性，大约每天两小时 frequently, about once a day for 2 hours	无 none	o	IP40/IP4X	–	–	–	–
			黄沙，灰尘 Blown sand,dust	o	IP50				
			滴水 Drip water 由天花板凝露引起(无害) caused by condensation on ceiling (not harmful)	o	IP40/IP4X				
			根据DIN 40 050 或 IEC 529 to DIN 40 050 or IEC 529	o	IP41				
			黄沙，灰尘，滴水 Bolwn sand, dust and drip water 由天花板凝露引起(无害) caused by condensation on ceiling (not harmful) 根据 DIN 40 050 或 IEC 529 to DIN 40 050 or IEC 529	o	IP50				
				o	IP51				
			小动物 Small animals	o	IP50	o			
气候类型 I3 Climate class I3	潮湿地区(在 SN 29 004气候图上标出的红色或红色阴影地区) In humid areas (red or red-hatched areas shown on climate chart SN 29 004)			附加改进措施: Additional modifications					o
有化学污染地区 Areas subject to emission of chemical pollution	对开关柜有害的的浓度: Concentrations harmful to switchgear:	ppm		–	IP40/IP4X	–	镀锡 tinning	–	o
	二氧化硫(SO_2) Sulphur dioxide(SO_2)	>4							
	硫化氢(H_2S) Hydrogen sulphide(H_2S)	>2					镀镍 nickel plating	镀镍 nickel plating	o
	盐酸(HCL) Hydrochloric acid(HCL)	>3					镀银 silver plating	–	o
	氨气(NH_3) Ammonia(NH_3)	>50					镀银 silver plating	–	o
	二氧化氮(NO_2) Nitric oxide(NO_2)	>5					镀镍 nickel plating	镀镍 nickel plating	o

“o” = 要求 required
“–” = 不要求 not required

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Order No.JS 006

上海西门子开关有限公司
订货号: JS 006
印刷日期: 2006年5月
印刷册数：2000本
SSLS-JS 006-B