



Swiss technology
International product

MB金属封闭式直流开关柜
MB Metal-enclosed DC Switchgear

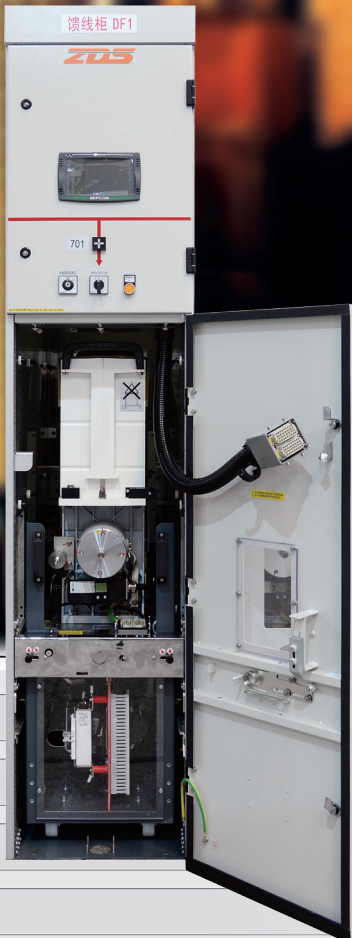
镇江大全赛雪龙牵引电气有限公司
Zhenjiang Daqo Secheron Traction Power Co.,Ltd.

城轨交通直流牵引供电技术的领先者
Leading DC Traction Power Supply for Mass Transit Projects

Swiss Technology International Product

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Leading DC Traction Power Supply for Mass Transit Projects



主要用户 References

长春轻轨环线一期工程
 Changchun Urban Railway Phase 1 Project
 天津津滨快速轨道交通工程
 Tianjin Urban Railway Line Jinbin Project
 武汉轻轨一期工程
 Wuhan Tramway Phase 1 Project
 南京地铁一期工程
 Nanjing Metro Phase 1 Project
 北京地铁八通线工程
 Beijing Metro Line Batong Project

重庆轻轨较新线一期工程
 Chongqing Tramway Line jiaoxin Phase 1 Project
 天津地铁一号线工程
 Tianjin Metro Line 1 Project
 广州地铁四号线工程
 Guangzhou Metro Line 4 Project
 上海地铁八号线工程
 Shanghai Metro Line 8 Project
 天津有轨电车试验线工程
 Tianjin Trolleybus test line Project

公司简介

Company Introduction

瑞士赛雪龙牵引电气有限公司（以下简称瑞士赛雪龙）成立于1879年，专门从事直流牵引系统及其元器件的设计、研发、生产、销售及服务，在开发轨道交通产品和系统方面有逾100多年的历史。如今，瑞士赛雪龙已成为直流牵引供电技术的领先者，直流快速断路器等主要元器件的市场份额位居前列，其产品服务于全世界的城轨交通用户。

大全集团有限公司（以下简称大全），中国电气工业领军企业，于1998年携手瑞士赛雪龙，在中国生产制造具有最新国际水平的直流开关设备，已服务于中国轨道交通行业20多年。

鉴于双方良好的合作和信任，以及对中国市场的信心，两家公司进一步走到了一起，于2007年1月成立了镇江大全赛雪龙牵引电气有限公司（以下简称大全赛雪龙）。合资公司在原有的KMB和MB直流开关柜的基础上，继续引进瑞士赛雪龙SIK箱式牵引整流变电站、SAPD静调电源柜、DSS直流隔离开关柜、SCMS杂散电流监测系统、ZELPD接地漏电保护装置、VES多工位供电接地系统、OMLA直流开关设备智能运维管理系统等其它产品，满足不同用户日益多元化的需求。至2021年底，大全赛雪龙已为国内40多个城市120多条地铁或轻轨提供了直流开关柜产品和服务，深得广大用户好评。

随着合资公司的成立，公司有能力和中国的客户提供更优质的解决方案，为中国正日益快速发展的轨道交通事业提供优质产品和高效服务。

Secheron S.A (hereinafter called Secheron), established in 1879, headquartered in Switzerland, is specialized in design, research, production, sales and service of components and systems of DC traction power. Secheron has been developing components and systems for rail transit for over 100 years. Today, Secheron has become the leader of DC traction power market. The core products as DC circuit-breaker have large market share and are applied in rail transit projects all over the world.

Daqo Group Co. Ltd.(hereinafter called Daqo), one of the leaders in china electrical industry, started cooperation with Secheron in 1998, has been manufacturing DC switchgear equipment with the latest international level quality, and providing service for China rail transit industry for more than 20 years.

The two companies jointly established a joint venture company named Zhenjiang Daqo Secheron Traction Power Co., Ltd. (hereinafter called ZDS) in January 2007. In addition to DC switchgear type KMB and MB, ZDS introduced prefabricated traction rectifier substation type SIK, static adjustable power device type SAPD, DC disconnecter switchgear type DSS, SCMS stray current monitoring system, ZELPD earth leakage protective device, VES Multi position power grounding system, OMLA DC switchgear equipment intelligent operation and maintenance management system and other products to meet the diversified demand of customers. By the end of 2021, ZDS has provided DC switchgear products and services for more than 120 metro or light rails in over 40 cities in China, which is well received by customers.

As the establishment of ZDS, we have enough capability to provide more excellent solutions to customers and to provide high quality products and top-ranking service for China mass transit industry which develops quickly.



北京地铁一/二号线改造工程
Beijing Metro Line 1&2 Retrofit Project
北京地铁十号线工程
Beijing Metro Line 10 Project
杭州地铁一号线工程
Hangzhou Metro Line 1 Project
深圳地铁五号线工程
Shenzhen Metro Line 5 Project
西安地铁一/二号线工程
Xi'an Metro Line 1&2 Project

广州地铁广佛线工程
Guangzhou Metro Line Guangfo Project
成都地铁一/二号线工程
Chengdu Metro Line 1&2 Project
苏州地铁一号线工程
Suzhou Metro Line 1 Project
武汉地铁二/四号线工程
Wuhan Metro Line 2&4 Project
宁波地铁一号线工程
Ningbo Metro Line 1 Project

哈尔滨地铁2号线一期工程
Haerbin Metro Line 2 Phase 1 Project
厦门地铁3号线工程
Xiamen Metro Line 3 Project
福州地铁2号线工程
Fuzhou Metro Line 2 Project
贵阳地铁2号线一期工程
Guiyang Metro Line 2 Phase 1 Project
兰州地铁1号线一期工程
Lanzhou Metro Line 1 Phase 1 Project

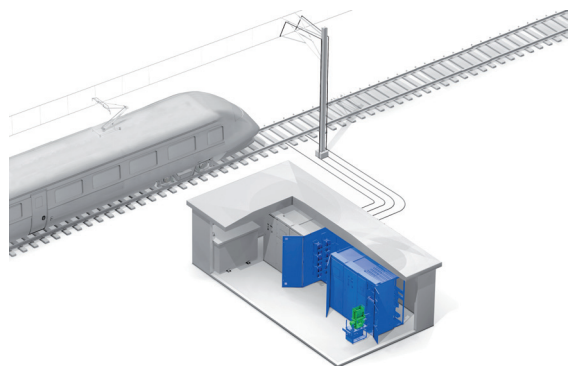
MB金属封闭式直流开关柜

MB Metal-enclosed DC Switchgear



概述

城市轨道交通直流牵引网络要求安全的供电系统和可靠的控制系统。MB直流金属封闭式开关柜是基于先进的技术并依托于赛雪龙多年在直流牵引领域的经验优势而发展的柜型。直流开关柜作为控制和保护设备服务于供电系统,由进线柜(也称正极柜)、馈线柜以及负极柜等柜型组成。



进线柜

进线柜在直流牵引变电所中又称正极柜,作为整流器柜正极和直流馈线母线之间隔离之用。柜内主要由电动隔离开关或直流快速断路器、分流器、避雷器、保护与控制单元等组成。

馈线柜

馈线柜安装于正极母线和接触网上网点之间,其内配置正极母线、直流快速断路器及相关控制、保护设备。

馈线柜装设手车式直流快速断路器,手车能方便地拉出或推入。手车具有“运行”、“试验”、“移开”三个明显位置。

馈线柜为金属封闭移开式,可以前后开门双面维护。柜体包括后隔室、手车室和低压室三部分。

负极柜

负极柜作为整流器柜负极和回流轨之间隔离之用,柜内装有手动或电动隔离开关。开关柜前部和后部均设可锁住的金属门。

负极柜内可以根据需要设多套低阻抗框架泄露保护装置,防止直流设备内部绝缘损坏闪络时造成人身危险,同时对某些特殊的故障进行保护。

使用条件

海拔高度: 不超过2000米(特殊要求另外商定)

环境温度: $-15\sim+40^{\circ}\text{C}$ (特殊要求另外商定)

相对湿度: 周围空气湿度在最高温度为 40°C 时不超过50%,在较低温度时允许有较大的相对湿度,如 $+20^{\circ}\text{C}$ 时为90%。应考虑由于温度变化可能会偶然产生的凝露的影响。

安装条件: 装置安装时与垂直面的倾斜度不超过 5° ,且整组柜排列平整。

安装场所: 装置应安装在无剧烈震动和冲击以及不足以使电器元件受到不应有冲击的场所;没有雨雪侵袭的地方。

General

DC traction networks require safe power distribution and reliable control systems. The MB panel contains proven technology components and is based on the Secheron traction DC protection experience. The DC switchgear serves as control and protection equipment for the power distribution, and consists of incoming cubicle (also called positive cubicle), feeder cubicle and negative cubicle etc.

Incoming Cubicle

The incoming cubicle, also called positive cubicle, is used between the positive pole of the rectifier and feeder DC distribution bus. The cubicle consists of DC disconnector or high speed circuit breaker (HSCB), shunt, arrester, measure and control unit.

Feeder Cubicle

Feeder cubicle shall be installed between the positive busbar and the point for connection of the Overhead Line(OHL). Inside it, positive busbar, HSCB and relevant control and protection components shall be provided.

The feeder cubicle is equipped with trolley type DC HSCB. The trolley can be easily pulled out or moved in. The trolley has three significant positions: Connected, Test and Disconnected.

Feeder cubicles are metal-enclosed withdrawable switchgear. It can be opened from the front or the rear of the cubicle with lockable doors, allowing easy maintenance. The cubicle consists of rear compartment, trolley compartment and low-voltage compartment.

Negative Cubicle

Negative cubicle is used between the negative pole of the rectifier and return rail of the network. The cubicle is equipped with motorized or manual disconnector. In front and rear of the cubicle, the metal door can be locked.

A set of several low-impedance frame leakage protection device can be installed in the negative cubicle to prevent personnel from injury due to the flashover of the DC equipment by the damage of its internal insulation. It is mainly used for ensuring personal safety and protection of the equipment against some special troubles.

Operation Conditions

Altitude: $\leq 2000\text{m}$ (Special request according to the negotiation between two parties)

Temperature: $-15\sim+40^{\circ}\text{C}$ (Special request according to the negotiation between two parties)

Relative humidity: Ambient air humidity shall not exceed 50% when the highest temperature is 40°C . But when the temperature is low, it allows considerable relative humidity, for example 90% at $+20^{\circ}\text{C}$;

Installation condition: During the installation of the equipment, the gradient shall not exceed 5 degree, and all of the switchgears shall be arranged orderly;

Installation site: The switchgear should be installed at the site without acutely strike or shake; in no case the equipment should be exposed to rain or bad weather conditions.

特征

- 高防护等级和高抗内燃弧性能的专业解决方案。
- 配直流快速断路器、分合闸回路及线路测试装置的轻型化平滑式推进机构的手车，检修维护方便。
- 带安全连锁的隔离开关或转换开关易于接近，方便柜前或柜后操作维护。
- 一体化的控制和保护系统，允许从牵引网络控制中心进行遥控和遥测。
- 新型的快速连接技术，确保柜间二次连线方便快捷。

Main Features

- Professional solution with high level of protection and high resistance to internal arcing.
- Simple smooth promoting institutions trolley with HSCB, breaker command and LTD, easy to maintenance.
- Disconnectors or reversing switches are accessible and suitable for operation from the cubicle front or rear side.
- Integrated protection and control system type SEPCOS, allowing both remote control and monitoring from the traction network control centre.
- New high-speed connecting technique make the wires between cubicles more convenient.

技术参数

柜体型号 Type	MB 05			MB 08	
额定工作电流 Rated service current	2600A	4000A	6000A	2600A	4000A
额定工作电压 Rated service voltage	900V/1800V			3600V	
额定工频耐压 (50Hz/1min) Rated power-frequency withstand voltage	5.5 kV/8.3 kV			14 kV	
额定绝缘电压 Rated insulating voltage	1800V/3000V			4800V	
额定短路电流 Rated short-circuit current I_{Nss}/\hat{I}_{Nss} (kA)	TNc 100 ms (900V)	80/113	125/178	125/178	
	TNc 31.5 ms (1800V)	63/90	80/113	80/113	
	TNc 31.5 ms (3600V)				40/57
环境温度 Temperature	-15+40°C (特殊要求另外商定) (Special request according to the negotiation between two parties)				
防护等级 Protection degree	IP20/IP30或IP41				
外形尺寸(WXD _X H) Overall dimension	500或800×1500×2200 mm				
重量 Weight	500 kg	550 kg	650 kg	550 kg	700 kg
符合标准 Conformity to standards	IEC61992 / EN50123 / GB/T 25890				

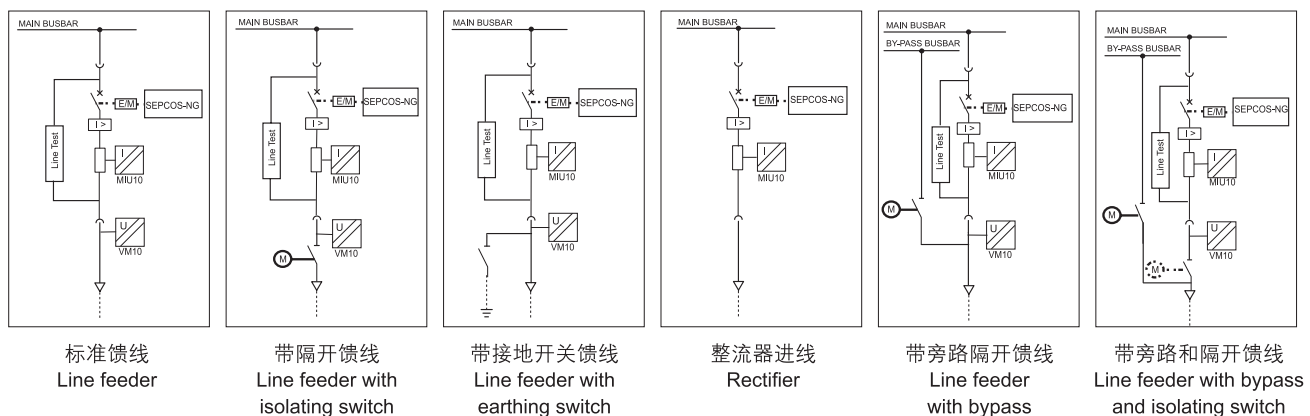
Technical Data

应用

典型柜配置：整流器和馈线断路器柜

Applications

Typical cubicle configurations: rectifier and feeder circuit breaker cubicles



结构

MB直流金属封闭式开关柜由一系列标准化单元组成。在这些标准化单元中装有操作设备和控制、测量、保护元件，以及母排、电源和辅助连接。这些单元又被分成许多能够以多种方式组合的基本小室，从而为系统工程师提供了尽可能多的设计灵活性。

MB直流金属封闭式开关柜设计紧凑，带有独立的高、低压小室。

开关柜由下述三个主要部分组成：

- 高压母线室
- 低压控制室
- 直流快速断路器手车

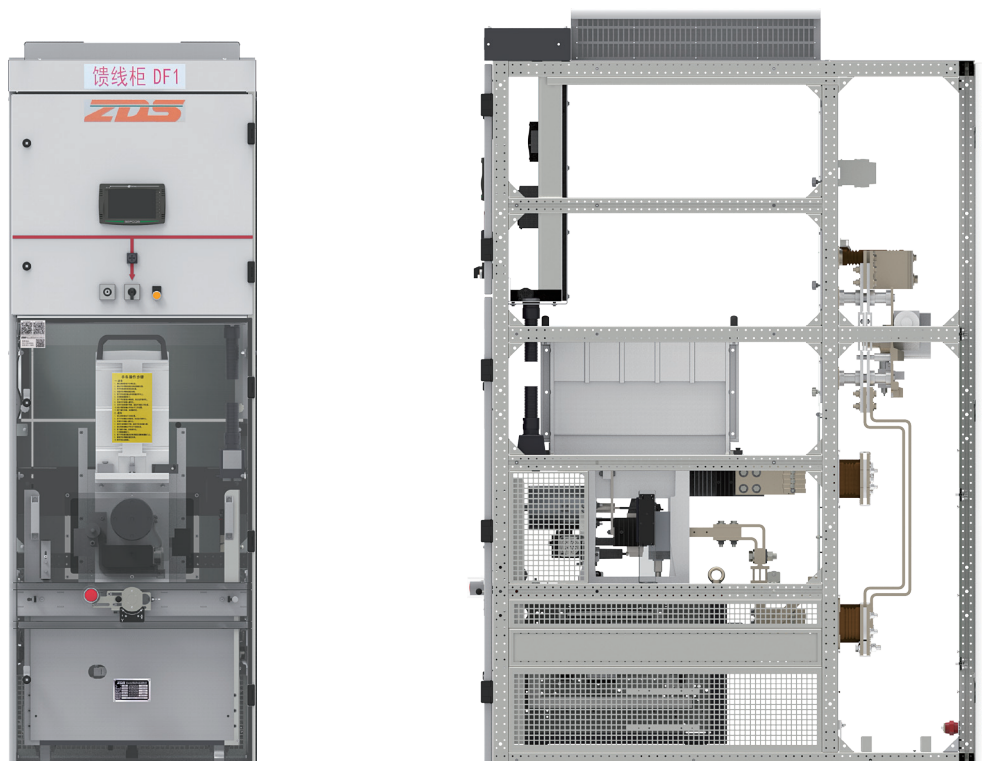
Construction

The metal-enclosed DC switchgear type MB consists of a series of standardised units, in which the operating equipment and the control, measurement and protection devices are mounted, along with the power and auxiliary connections. The units are subdivided into elementary cells that can be combined in various ways so as to offer the systems engineer the greatest possible implementation flexibility.

The metal-enclosed DC switchgear type MB is compact designed with insulated high voltage compartment and low voltage compartment.

The cubicle is made of the following three main parts:

- High voltage busbar compartment
- Low-voltage control compartment
- High-speed circuit breaker trolley.



后柜高压室

高压室位于后柜，包括主母线、连接电缆以及隔离开关（需要时）。

Rear High Voltage Compartment

The high voltage compartment is at the rear of the cubicle. It contains the main busbar, cable connection and disconnector switch where applicable.

低压室

保护和控制系统位于开关柜前部。低压室包括一些低压元件，确保通过SEPCOS或其它保护和继电器实现保护功能。

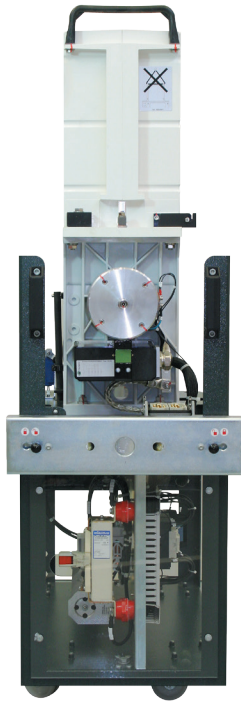
Low-voltage Compartment

The protection and control system is located on the front of the cubicle. This low voltage compartment contains low voltage components, and ensures the protection through the SEPCOS protection and control relay (or SEPCOS-PRO).

直流快速断路器手车

直流快速断路器(赛雪龙型号UR)安装在可移动的四轮小车上,该小车可以方便地推进或退出开关柜。手车上装设有电流测量装置和线路测试装置等功能单元。断路器命令通过航空插头与二次回路相连,断路器通过断路器触头触指与主回路相连。

所有同规格型号的手车可以百之百进行互换,且便于移动和进出。



High Speed Circuit Breaker Trolley

The high speed circuit breaker (secheron type UR) is mounted on a removable four-wheeled trolley which can be easily drawn in or out of the cubicle. The trolley contains also the current measuring and the line test device functions. The breaker command is connected to the auxiliary circuits through a connector and the breaker is connected to the high-voltage compartment through power finger connectors. All trolley are exchanged by one of the same type and easy to move.



数字化信息

支持二维码扫码获取设备数字化维护信息。

Digital Information

QR code scanning is available to obtain digital device maintenance information.



镇江大全赛雪龙牵引电气有限公司



G00788/0105G02 馈线柜F01

扫描二维码查询设备信息



负极柜

负极柜采用手动隔离开关（或电动隔离开关），开关柜由高强度型材做框架，前部和后部设可锁住的金属门。在开关柜上部和后部均可设有一个低压元件室。另在柜内设多套低阻抗框架泄漏保护装置，防止直流设备内部绝缘损坏闪络时造成人身危险，同时对某些特殊的故障进行保护。

框架泄漏保护由一个电流元件和一个电压元件（可选）组成。电压元件可就地投入 / 切除，并可分别整定为报警和不少于 6 段电压保护，动作电压及动作时间可以整定。框架保护动作跳闸后，闭锁被跳开的断路器的合闸，只有当故障消失，复位框架保护后，断路器才能合闸。

框架泄漏保护装置能检测以下设备故障：

- 采用绝缘方式安装的开关设备框架与保护地之间出现的电流。
- 开关设备框架与牵引系统地之间的电位差。

当检测出设计故障时，将跳闸交流断路器与直流断路器。

Negative Cubicle

Negative cubicle is equipped with manual (or motorized) DC disconnect, and assembled with reinforced profile. The metal doors in the front and rear of the cubicle can be locked. Low voltage compartment is located in the upper part or rear of the cubicle. Several set of low-impedance frame leakage protection device shall be installed in the negative cubicle to prevent personnel from injury due to the flashover of the DC equipment by the damage of its internal insulation. It is mainly used for ensuring personal safety and protection of the equipment against some special troubles as well.

The frame leakage protection device consists of a current device and a voltage device(optional). The voltage device can be used or removed locally, and it can set no less than 6 settings of voltage protection or send out alarm signal according to the type of fault, which can be adjusted for the voltage and the time. When the frame protection device trips, the tripped HSCB is locked and can not be switched on; only when the fault is eliminated and the frame protection is reset, can the HSCB be switched on.

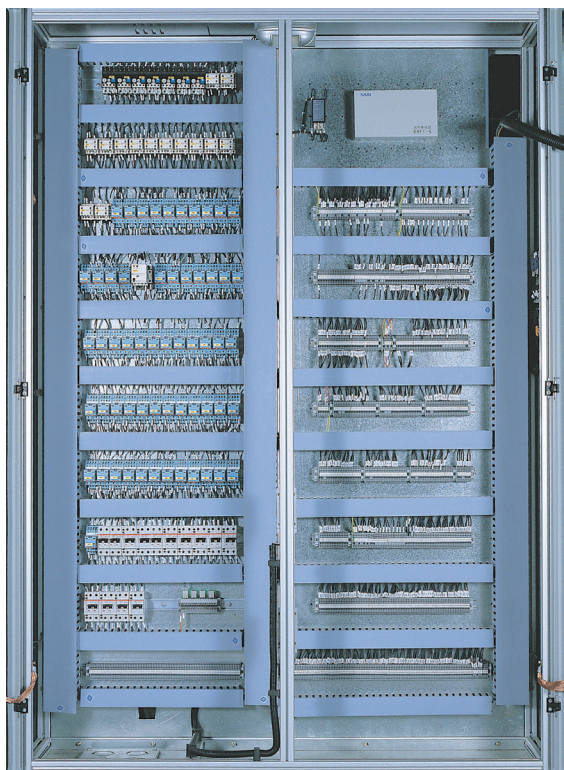
The following faults are tested by the frame leakage protection device.

- The current between the frame of the insulated cubicle and the protection earth.
- The voltage between the frame and traction systemic earth.

As the frame protection detects the fault, the AC breaker and the DC HSCB will be tripped.

端子柜

端子柜主要作为直流开关柜系统内部与外部连线接口界面，柜内配有标准的连接端子，其他相关联跳功能模块和控制继电器，这样直流开关柜系统输入和输出控制接点以及系统内部电源模块与外部有一个清晰的接口界面，极大地方便系统连接和维护。



Interface Cubicle

The interface cubicle takes the role of connection between inside and outside of the DC switchgear, which is configured with standard terminals, related intertripping functional units and control relays. An obvious interface is set up to link the input supply module with external system, and to make the connection and maintenance very convenient.

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