

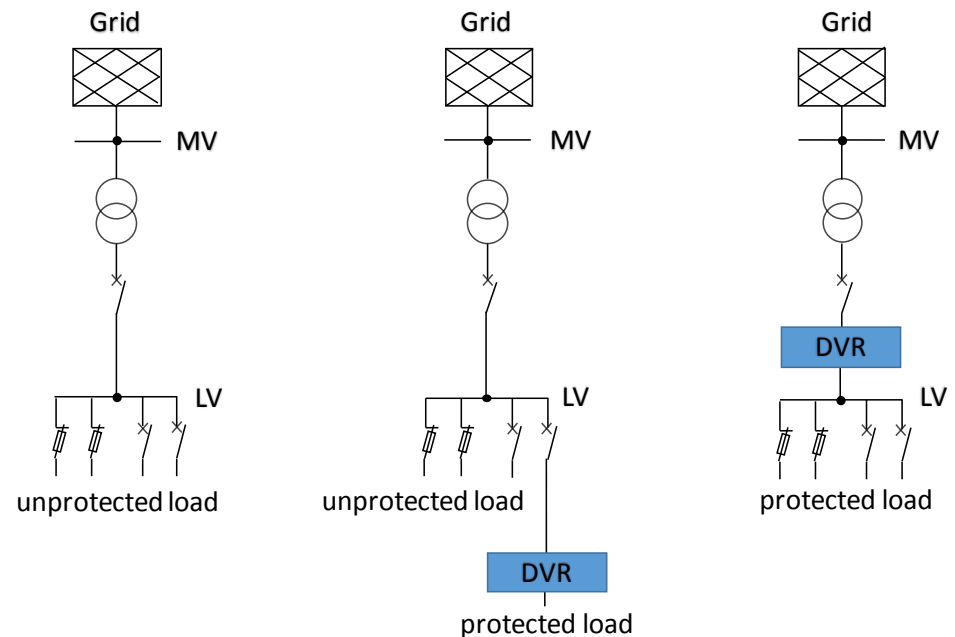
# 动态电压恢复器(DVR)

## DVR 电网侧保护

DVR会安装在供电变压器和负载之间，用于保护生产的连续性。加装DVR后，系统的短路容量几乎不变，系统中熔断器和断路器的选型也不受影响。

DVR采用模块化设计，便于扩展，因此可以用于对单台设备的保护，也可以用于对整个供电系统进行保护。

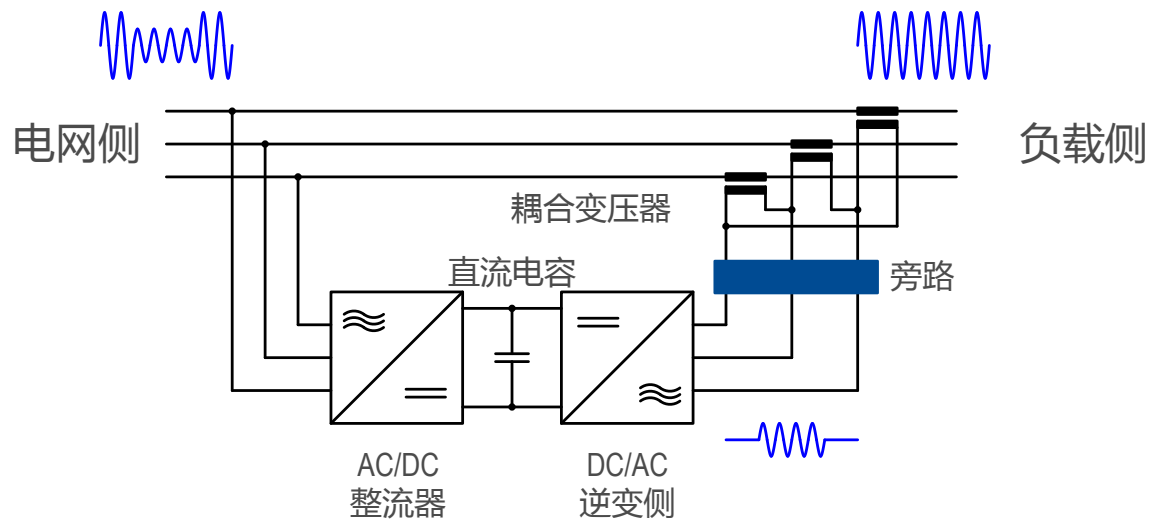
- | 实时电压校正(< 1 毫秒)
- | 短路容量几乎不变
- | 有效校正的暂降电压幅度至40%
- | 效率 > 98 %
- | 可以扩展容量
- | 可以保护过电压
- | 空间占用较小
- | 投资和运维的费用较小



# 动态电压恢复器(DVR)

## DVR 功能原理

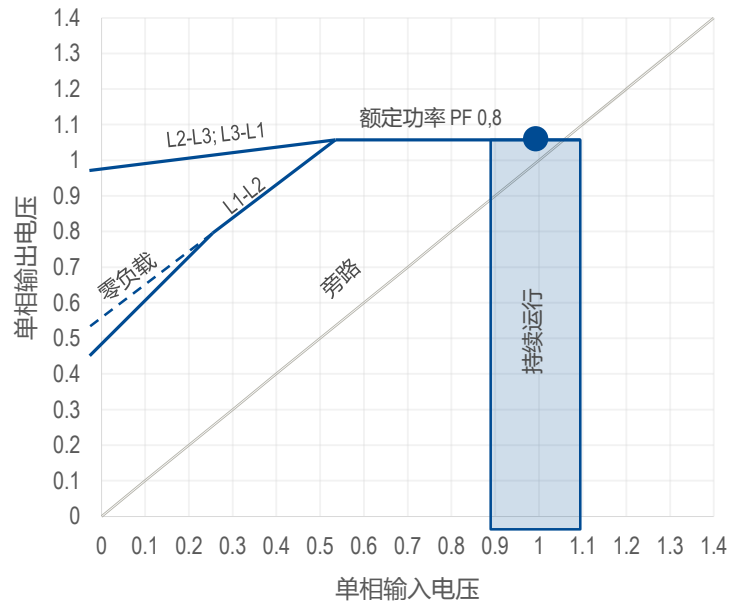
- | DVR配备了在线控制装置，可以让系统电压持续保持在设定值上
- | 只要DVR检测到实际电压和目标电压有偏差，电压校正就会在140微秒内启动
- | 电压校正的全响应时间在半个周波之内
- | 对3相电压跌落至40%或过电压至20%的情况，DVR都可以进行电压校正



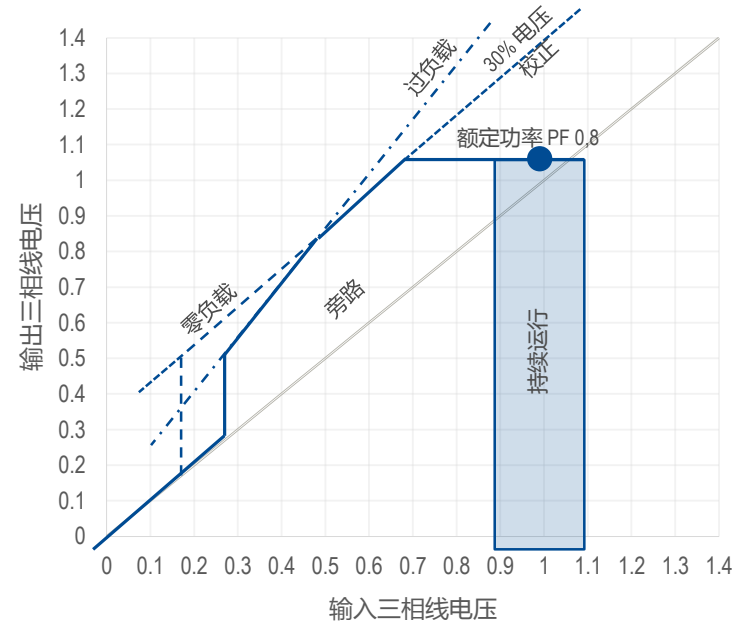
# 动态电压恢复器(DVR)

## DVR 特性曲线

电压曲线  
单相电压跌落



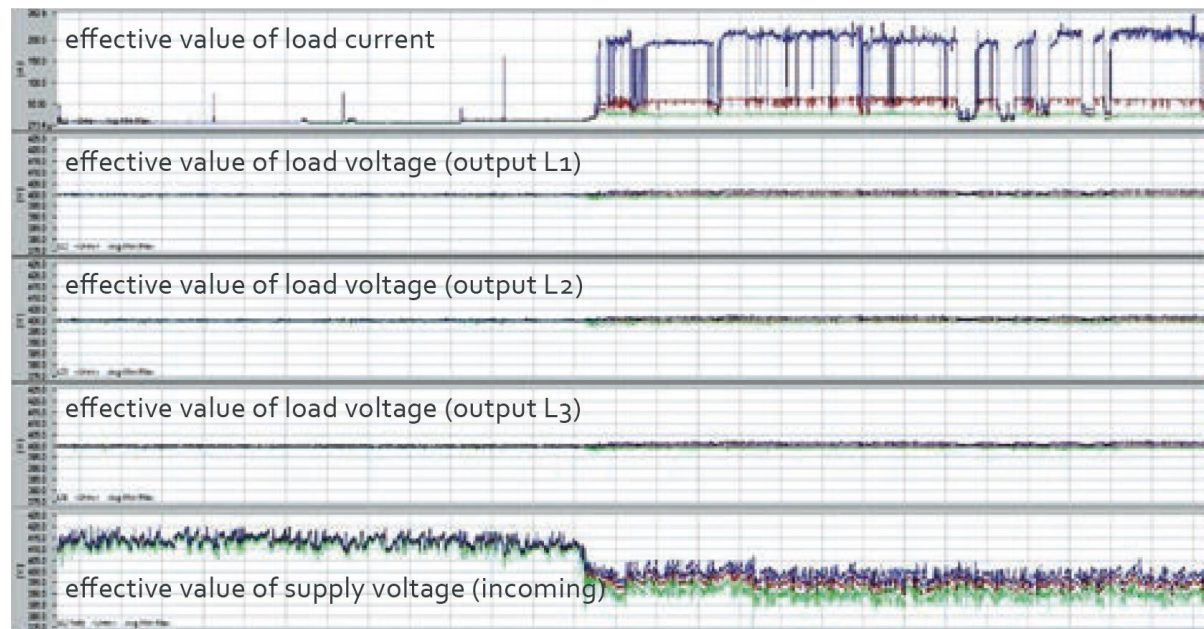
电压曲线  
三相电压跌落



# 动态电压恢复器(DVR)

## DVR 实测结果

- | DVR在三相电压跌落情况下应用的效果
- | 通过实际应用的案例可以看出DVR的应用效果
- | 在带载的情况下，DVR的实际电压输出值域目标电压值的误差大约是0.625%

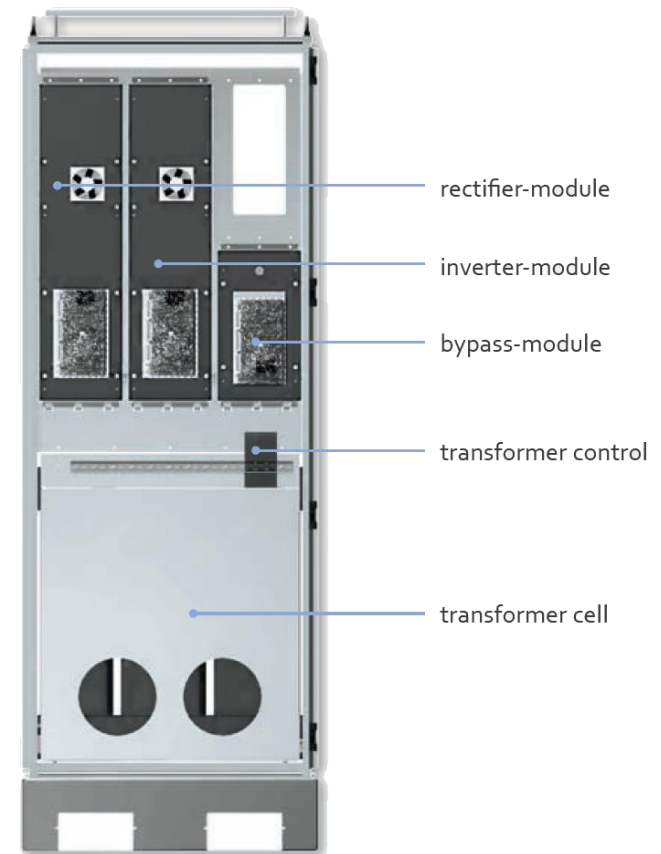


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# 动态电压恢复器(DVR)

## DVR 设置

- | DVR是按照传统的开关柜来进行设计的，所有的元器件都安装在柜内
- | DVR所需的耦合变压器安装在柜内底部(300KVA)或者安装在独立的柜体内(600KVA – 1800KVA)
- | DVR中的功率单元模块位于柜体的上部(300KVA)或者安装在独立的柜体内(600KVA – 1800KVA)
- | 功率单元包括整流器、逆变器和旁路模块



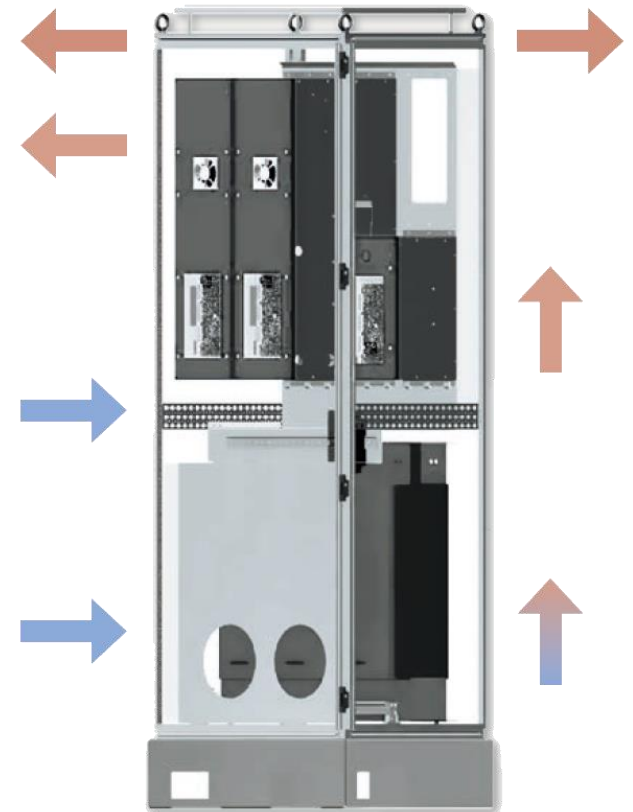
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# 动态电压恢复器(DVR)

## DVR 冷却系统

- | DVR配置了精密的通风系统用于将工作时产生热量及时散出
- | 柜体底部两组强力的风扇给变压器提供了足够的冷却风
- | 冷却风会从柜体后面的墙和功率单元模块后面的隔离装置之间流入，从柜体的出风口流出
- | 每个功率单元模块都有自己的冷却风扇用于自身的热量的散出
- | 柜体内的热量会从柜体背部和柜体上部的通风装置散出



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# 动态电压恢复器(DVR)

## DVR 300 kVA

- | 额定电压 400 V / 480 V / 220 V
- | 工作电压范围：+/- 10 %  $U_n$
- | 三相电压跌落校正范围：40%  $U_n$  for 30 s
- | 单相电压跌落校正范围：60%  $U_n$  for 30 s
- | 过电压校正范围：20 %  $U_n$  for 30 s
- | 短路耐受能力（旁路）：40 kA for 10 ms
- | 尺寸规格：800 x 600 x 2282 mm
- | 重量：900 kg
- | 损耗：< 5 kW
- | 冷却风量：1000 m<sup>3</sup>/h



# 动态电压恢复器(DVR)

## DVR 600 kVA

- | 额定电压 400 V / 480 V / 220 V
- | 工作电压范围：+/- 10 %  $U_n$
- | 三相电压跌落校正范围：40%  $U_n$  for 30 s
- | 单相电压跌落校正范围：60%  $U_n$  for 30 s
- | 过电压校正范围：20 %  $U_n$  for 30 s
- | 短路耐受能力（旁路）：40 kA for 10 ms
- | 尺寸规格：800 x 600 x 2282 mm  
800 x 1200 x 2282 mm (b2b)
- | 重量：1800 kg
- | 损耗：< 10 kW
- | 冷却风量：2000 m<sup>3</sup>/h





# 动态电压恢复器(DVR)

## DVR 900 kVA

- | 额定电压 400 V / 480 V / 220 V
- | 工作电压范围：+/- 10 % Un
- | 三相电压跌落校正范围：40% Un for 30 s
- | 单相电压跌落校正范围：60% Un for 30 s
- | 过电压校正范围：20 % Un for 30 s
- | 短路耐受能力（旁路）：40 kA for 10 ms
- | 尺寸规格：2.000 x 800 x 2.282 mm  
800 x 1.800 x 2.282 mm (b2b)
- | 重量：2350 kg
- | 损耗：< 15 kW
- | 冷却风量：3000 m<sup>3</sup>/h





# 动态电压恢复器(DVR)

Technical data	GRIDCON? Dynamic Voltage Restorer			
Rated AC voltage	400V; +/- 10 % (other ratings on request)			
Rated frequency	50/60 Hz; +/- 5 %			
Correction range continous	+/- 10 % Un			
Correction range three phase dip	40 % for 30 s / correction of 60 % Un to 100 % Un (other ratings on request) 50 % for 15 s / correction of 50 % Un to 100 % Un (other ratings on request)			
Correction range single phase dip	60% for 30 s / correction of 40 % Un to 100 % Un (other ratings on request)			
Correction range overvoltage	20% for 30 s / correction of 120 % Un to 100 % Un (other ratings on request)			
Overload capability	150% In for 30 s			
Rated Power (of total load)	300 kVA	600 kVA	900 kVA	1800 kVA
Rated AC current	433 A	866 A	1299 A	2598 A
Dimensions (with base)	800 x 600 x 2282 mm	1600 x 600 x 2282 mm	2000 x 800 x 2282 mm	3200 x 800 x 2282 mm
Optional back to back assembly		800 x 1200 x 2282 mm	800 x 1800 x 2282 mm	1600 x 1400 x 2282 mm
Weight	900 kg	1800 kg	2350 kg	3700 kg
Short circuit capability (bypass)	40 kA (peak) for 10 ms	35 kA (peak) for 10 ms	85 kA (peak) for 10 ms	120 kA (peak) for 10 ms
Power loss	< 5 kW	< 10 kW	< 15 kW	< 30 kW
Air flow rate	1000 m <sup>3</sup> h	2000 m <sup>3</sup> h	3000 m <sup>3</sup> h	6000 m <sup>3</sup> h
Cable connection	3-phase + PE + N, a neutral conductor is necessary (grids: TN)			
System efficiency	> 98 %			
Switching frequency	7,2 kHz			



# 动态电压恢复器(DVR)

Technical data	GRIDCON? Dynamic Voltage Restorer
Control	Internal control-computer
System setup and display	Integrated touchpanel with graphic display Integrated SD-card for fault data logger
Reaction time	140 祜 (settling time < 10 ms)
Accuracy	< 1 % Un in continuous operation +/- 3 % Un during voltage dip
Communication interfaces	Ethernet (TCP/IP) Modbus TCP FTP-Server / Mail-Server
Cabinet	Rittal TS8 with perforated, vented double doors
Colouring	Standard: RAL 7035 light grey (other colors and designs on request)
Power connection	From the bottom
Cooling	Air cooling with speed-controlled fans Air inlet through doors; Air outlet through roof-top
IP protection degree	Standard: IP20D (other ratings on request)
Environmental conditions	Maximum ambient temperature without derating: 40°C Recommended ambient temperature for continuous operation: < 25°C Minimum operating temperature: 0°C, relative humidity: maximum 95% non condensing Transport / storage: -20°C .. 70°C
Pollution degree (IEC 60721-3-3)	Chemical environmental class 3C2; Solids environmental class 3S2
Altitude	<= 1000 m; 1,5 % derating each additional 100 m; Maximum altitude <= 2000 m
EMC class	EN 55011, class A1 (industrial environment)
Standards	EN 50178, EN 61000-6-4, EN 55011
Conformity	CE

THE POWER BEHIND POWER.

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