

Momentary Voltage Dip Multiple Power Compensator (MPC)



At TMEIC, we provide high-reliability power quality solutions. Sometimes, even the most reliable power delivery system can experience faults, momentary voltage dips, and power outages. TMEIC offers a unique voltage dip multiple power compensator for medium voltage industrial applications.

The MPC is a bidirectional converter that uses an energy storage element (such as a battery or capacitor) and a high speed switch (HSS) to eliminate voltage dips experienced by a facility. The MPC is an optional standby energy source.







1 msec power source transfer

MPC product range of Rated Voltage/Capacity				Rated Capacity (kVA)					
Switch type	Switching time	Maximum Efficiency	Rated Voltage	2000	4000	6000	8000	10000	12000
				Mechanical Switch	4msec	99%	~6600V ~3300V	[Bar chart showing capacity ranges for Mechanical Switch]	
Semiconductor Switch	1msec	99.5%	~6600V ~3300V	[Bar chart showing capacity ranges for Semiconductor Switch]					

* Contact TMEIC for other voltage levels

Design Feature	Customer Benefit
High Speed transfer	Power source change-over of less than 1/4-cycle (4.2 msec) at the time of blackout eliminates service dis-continuity ensuring 100% power availability.
High efficiency	With proven efficiency of 99%, the MPC far exceeds the efficiency of UPS systems by at least 7%, reducing the total cost of ownership (TCO).
Converter redundancy (option)	By using the module-type converter and making redundancy configuration by taking advantage of parallel operation, momentary voltage dip compensation can be performed even if one unit is out of service or faulted.
Multi-MVA power ratings	Single bank configurations of up to 12 MVA and even higher with paralleling can provide momentary power for entire plants in the semiconductor, mining, automotive, food and beverage and other demanding industries.
Long term power supply under blackout	By using a battery system and isolating the facility from line-side power, the MPC can be used not just for voltage dip compensations, but also as a UPS system. Conventional voltage dip compensation methods such as statcoms and static VAR compensators do not provide this functionality.

MPC energy storage options			MPC High-Speed Switch options		
	Battery (long term supply from 10 sec to a few minutes)	Electric double-layer capacitor (short term from 1 sec to a few seconds)		Mechanical-type high speed switch (4 msec transfer)	Semiconductor-type high speed switch (1 msec transfer)

Multiple Power Compensator Technical Overview

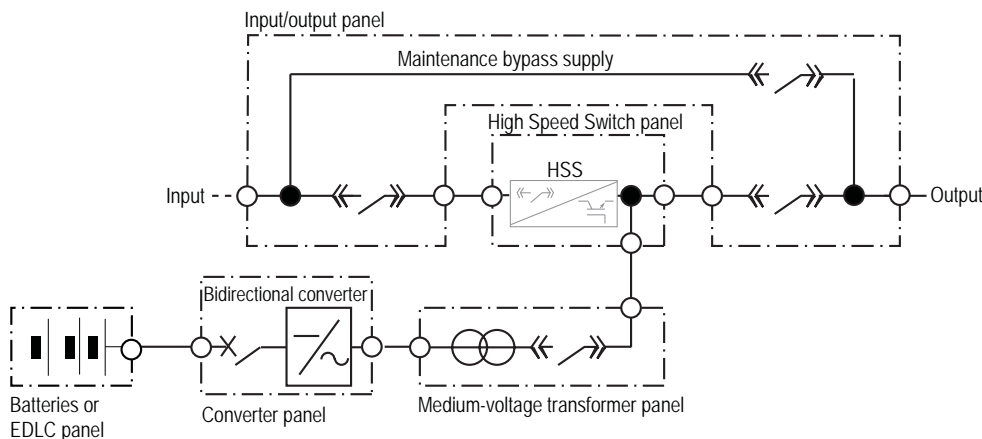
Transfer Time	
At blackout or momentary voltage dip*1	1 msec (semiconductor-type switch) 4 msec (mechanical-type switch)
At recovery	No interruption

Output Power	
# of phases/wires	3 Phase / 3 Wires
Rated voltage	6,600V or 3,300V ±5% or less
Rated frequency	50/60 Hz ±5%
Rated load power factor	0.8 lag
Load factor range	0.7 lag~1.0
Voltage THD*3	3% or less (at 100% linear load)
Voltage unbalanced rate*4	±5% or less (at load unbalance rate of ≤ 30%)
Transient recovery	50 msec or less

Input Power	
AC Input	
Number of phases/wires	3 Phase / 3 Wires
Rated Voltage	6,600V or 3,300V ±10%
Rated frequency	50/60 Hz ±5%
DC Input	
Voltage range	500~745V

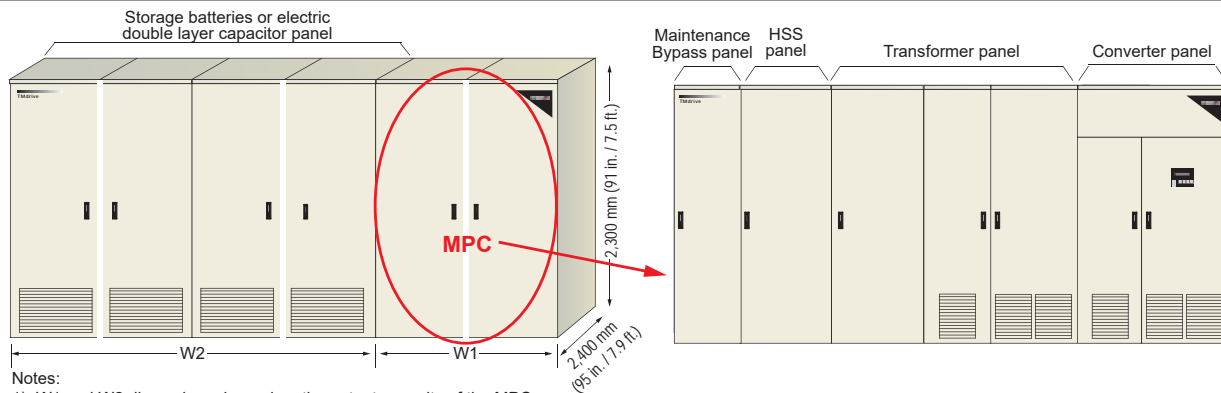
Environmental	
Cooling	Forced air
Operating temperature*2	0°~40°C, (average 25°C for energy storage device)
Relative humidity	30~90% (non condensing)
Altitude	1000m or less
Location	Indoor (free from corrosive gas and dust)

MPC Electrical one-line Illustration (Typical)



- Bidirectional converter functions**
- Charging the energy storage device
 - Converting the energy from the energy storage device into an alternating current.
- HSS functions:**
- Opens the circuit at a high speed
 - MPC 2000 uses a mechanical switch
 - MPC 1000/3000 uses a semiconductor switch

MPC General Arrangement (Typical)



- Notes:
- 1) W1 and W2 dimensions depend on the output capacity of the MPC
 - 2) Additional clearance space required: Top: 400mm (18 in.), Back: 1400mm (51 in.), Front: 2000mm (79 in.)

- Notes:
- *1 The transfer time at voltage dip indicates the time from the detection of a voltage dip until the transfer to power supply from converter.
 - *2 The compensation time and life of the energy storage device differ according to the operating temperature. The standard selection condition is 25°C (77°F).
 - *3 $THD = \frac{\sqrt{\sum (\text{Root mean square value of each harmonic})^2}}{\text{Root mean square value of fundamental harmonics}}$
 - *4 Voltage unbalanced rate = $\frac{\text{Output line-to-line voltage} - \text{Output voltage arithmetic mean value}}{\text{Output voltage arithmetic mean value}}$ Load unbalanced rate = $\frac{\text{Maximum load current} - \text{Minimum load current}}{\text{Load current arithmetic mean value}}$

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