- **High Power AC and DC Power Source**  
  Programmable AC and DC power for frequency conversion and product test applications.

- **Expandable Power Levels**  
  Available output power of 30 and 45 KVA per unit and multi-unit configurations for power requirements up to 135 KVA.

- **Single and Three phase mode**  
  Phase mode programming on MX30-3Pi and MX45-3Pi allows switching between single and three phase output modes.

- **Arbitrary Waveform Generation**  
  User defined voltage waveform and distortion programming.

- **Multiple Voltage Ranges**  
  Available 150, 300 or 400 Volt ranges in AC mode and 200 or 400 Volt ranges in DC mode.

- **High RMS Current and Peak Current**  
  Maximum current of 200 A RMS (MX30) and 300 A RMS (MX45) per chassis and 3:1 Crest factor capability.

- **Remote Control**  
  IEEE-488 and RS232C Interfaces for automated test applications.

---

**Introduction**  
The MX Series consists of a number of high power AC and DC power systems that provide controlled AC and DC output for ATE and product test applications. Available in power levels from 30 kVA and 45 kVA to 135 kVA, this high power AC and DC test system covers a wide spectrum of AC and DC power applications at an affordable cost. Using state-of-the-art PWM switching techniques, the MX series combines compactness, robustness and functionality in a compact floor-standing chassis, no larger than a typical office copying machine. This higher power density has been accomplished without the need to resort to elaborate cooling schemes or special installation wiring. Roll the MX30 or MX45 unit to its designated location - casters included - and plug it in.

**Simple Operation**  
The MX Series can be operated completely from its menu driven front panel controller. A large backlit LCD display shows menus, setup data and read-back measurements and is angled to provide easy viewing. IEEE-488 and RS232C remote control interfaces and instrument drivers for popular ATE programming environments are available as well. This allows the MX Series to be easily integrated into an automated test system.

For advanced test applications, the programmable controller version offers full arbitrary waveform generation, time and frequency domain measurements and voltage and current waveform capture.

**Configurations**  
The MX30 delivers up to 30 kVA, the MX45 up to 45 kVA of single or three phase output in AC mode. In DC mode, 65% of the AC power level is available. On MX models with the programmable controller, an AC+DC mode is also supported.

For higher power requirements, MX90 and MX135 models are available. Multi-cabinet MX45 systems always operate in three phase output mode. Available reconfigurable MX90 and MX135 models (-MB designation) provide multiple controllers which allow separation of the high power system into two or three individual MX45 units for use in separate applications. This ability to reconfigure the system provides a great level of flexibility.
Product Evaluation and Test
Increasingly, manufacturers of high power equipment and appliances are required to fully evaluate and test their products over a wide range of input line conditions. The built-in output transient generation and read-back measurement capability of the MX Series offers the convenience of an easy to use and integrated test system.

Avionics
With an output frequency range to 819 Hz, the MX Series is well suited for aerospace applications. Precise frequency control and accurate load regulation are key requirements in these applications. The available IEEE-488 control interface and SCPI command language provide for easy integration into existing ATE systems. The MX Series can eliminate the need for several additional pieces of test equipment, saving cost and space. Instrument drivers for popular programming environments such as National Instruments LabView™ are available to speed up system integration.

Regulatory Testing
As governments are moving to enforce product quality standards, regulatory compliance testing is becoming a requirement for a growing number of manufacturers. The MX Series is designed to meet AC source requirements for use in Euronorm EN61000-3-11 flicker compliance testing.

Choice of voltage ranges
The MX30 and MX45 can be ordered with either a 150 V RMS Line to Neutral output voltage range or a 300 V RMS Line to Neutral range. This provides 3 phase output capability of 260 Vac or 520 Vac line to line respectively. If dual output ranges are required, the programmable range change option (-R) provides the ability to switch between both output ranges. Pi version models offer standard dual voltage ranges.

The DC output mode changes the 150 V AC range to a 200 V DC output range; the 300 V AC range becomes 400 V DC.

For applications requiring more than 300 V L-N (or 520 V L-L), the -HV1 output transformer option provides an additional 400 V L-N and 693 V L-L output range for use in AC mode only.

Multi-Box Configurations
For high power applications, two or three MX45 chassis can be combined to provide 90 to 135 kVA of three phase power. MX90 and MX135 systems are always configured for three phase operation.

High Crest Factor
With a crest factor of up to 3:1, the MX Series AC source can drive difficult nonlinear loads with ease. Since many modern products use switching power supplies, they have a tendency to pull high repetitive peak currents. The MX30-3Pi can deliver up to 200 Amps of repetitive peak current (150 V AC range) per phase to handle three phase loads, and the MX45-3Pi can deliver up to 300 Amps. 600 Amps (MX30) and 900 Amps (MX45) is available in single phase mode.

Remote Control
IEEE-488 and RS232C remote control interfaces allow programming of all instrument functions from an external computer. The popular SCPI command protocol is used for programming.

Application Software
Windows® application software¹ is provided free of charge with the programmable controller version [Pi] or the standard controller with the “-P” option. This software provides easy access to the power source’s capabilities without the need to develop any custom code. The following functions are available through this GUI program:

- Steady state output control (all parameters)
- Create, run, save, reload and print transient programs
- Generate and save harmonic waveforms. [Pi only]
- Generate and save arbitrary waveforms. [Pi only]
- Measure and log standard measurements
- Capture and display output voltage and current waveforms. [Pi only]
- Measure, display, print and log harmonic voltage and current measurements. [Pi only]
- Display IEEE-488 or RS232C bus traffic to and from the AC Source to help you develop your own test programs.

¹ Requires PC running Windows Win98™ or Win 2000™. Recommended Pentium 400 MHz or better.
Harmonic Waveform Generation

Using the latest DSP technology, the MX Series programmable controller is capable of generating harmonic waveforms to test for harmonics susceptibility. The Windows Graphical User Interface program can be used to define harmonic waveforms by specifying amplitude and phase for up to 50 harmonics. The waveform data points are generated and downloaded by the GUI to the AC source through the IEEE-488 or RS232C bus. Up to 200 waveforms can be stored in nonvolatile memory and given a user defined name for easy recall.

All MX-Pi Series configurations offer three phase waveform generation, allowing independent phase anomalies to be programmed. It also allows simulation of unbalanced harmonic line conditions.

Arbitrary Waveform Generation

Using the provided GUI program or custom software, the user also has the ability to define arbitrary AC waveforms. The arbitrary waveform method of data entry provides an alternative method of specifying AC anomalies by providing specific waveform data points. The GUI program provides a catalog of custom waveforms and also allows real-world waveforms captured on a digital oscilloscope to be downloaded to one of the many AC source’s waveform memories. Arbitrary waveform capability is a flexible way of simulating the effect of real-world AC power line conditions on a unit under test in both engineering and production environments.

MX Series - AC and DC Transient Generation

The MX Series controller has a powerful AC and DC transient generation system that allows complex sequences of voltage, frequency and waveshapes to be generated. This further enhances the MX’s capability to simulate AC line conditions or DC disturbances. When combined with the multiphase arbitrary waveform capabilities, the AC and DC output possibilities are truly exceptional. Transient generation is controlled independently yet time synchronized on all three phases. Accurate phase angle control and synchronized transient list execution provide unparalleled accuracy in positioning AC output events.

Transient programming is easily accomplished from the front panel where clearly laid out menu’s guide the user through the transient definition process.

The front panel provides a convenient listing of the programmed transient sequence and allows for transient execution Start, Stop, Abort and Resume operations. User defined transient sequences can be saved to non-volatile memory for instant recall and execution at a later time. The included Graphical User Interface program supports transient definitions using a spreadsheet-like data entry grid. A library of frequently used transient programs can be created on disk using this GUI program.
The MX Series is much more than a programmable AC, DC or AC+DC power source. It also incorporates an advanced digital signal processor based data acquisition system that continuously monitors all AC source and load parameters. This data acquisition system forms the basis for all measurement and analysis functions. These functions are accessible from the front panel and the remote control interface.

**Conventional Measurements [All controllers]**

Common AC and DC measurement parameters are automatically provided by the data acquisition system. These values are displayed in numeric form on the front panel LCD display. The following measurements are available: Frequency, $V_{\text{rms}}$, $I_{\text{rms}}$, $I_{\text{pk}}$, Crest Factor, Real Power (Watts), Apparent Power (VA) and Power Factor.

**Harmonic Analysis [Pi controller]**

The MX Series provides detailed amplitude and phase information on up to 50 harmonics of the fundamental voltage and current (up to 6.7 kHz in three phase mode) for either one or three phases. Harmonic content can be displayed in both tabular and graphical formats on the front panel LCD for immediate feedback to the operator. Alternatively, the included GUI program can be used to display, print and save harmonic measurement data. Total harmonic distortion of both voltage and current is calculated from the harmonic data.

**Waveform Acquisition [Pi controller]**

The measurement system is based on real-time digitization of the voltage and current waveforms using a 4K deep sample buffer. This time domain information provides detailed information on both voltage and current waveshapes. Waveform acquisitions can be triggered at a specific phase angle or from a transient program to allow precise positioning of the captured waveform with respect to the AC source output.

The front panel LCD displays captured waveforms with cursor readouts. The included GUI program also allows acquired waveform data to be displayed, printed and saved to disk.
Specifications - applicable to MX30/45 Standard and Pi versions except where noted.

Operating Modes
- **Standard:** AC and DC
- **Pi version:** AC, DC and AC+DC

AC Mode Output

**Frequency**
- Range: 16.00 - 819.0 Hz
- LF option: 16.00 - 500.0 Hz (supplemental specifications apply above 500 Hz.)
- Resolution: 0.01 Hz < 81.91 Hz, 0.1 Hz > 82.0 Hz

**Phase outputs**
- MX30/45-1: 1
- MX30/45-3: 3 (A, B, C)
- MX30-3Pi: 1 or 3 switchable.
- MX45-3Pi: 1 or 3 switchable.
- Neutral: Floating
- Coupling: DC (except for -HV option)

Total Power
- MX30-1/3: 30 kVA
- MX45-1/3: 45 kVA
- MX90: 90 kVA
- MX135: 135 kVA

Load Power Factor
- 0 to unity at full output current.

AC Mode Voltage

**Voltage Ranges [1 only on std]**

<table>
<thead>
<tr>
<th>Range:</th>
<th>V Low</th>
<th>V High</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>0-150 V</td>
<td>0-300 V</td>
</tr>
<tr>
<td>AC+DC</td>
<td>0-150 V</td>
<td>0-300 V</td>
</tr>
</tbody>
</table>

Load Regulation
- < 0.25 % FS DC to 100 Hz
- < 0.5 % FS 100 Hz to 819 Hz

Line Regulation
- < 0.1% FS or 10 % line change

External Sense
- Voltage drop compensation

Output Noise
- (20 kHz to 1 MHz)
- < 2 Vrms Low V range
- < 3 Vrms High V range

Harmonic Distortion (Linear load)
- Less than 1% from 16 - 66 Hz
- Less than 2% above 66 Hz
- Less than 3% above 500 Hz

DC Offset
- < 20 mV

External Amplitude Modulation
- Depth: 0 - 10 %
- Frequency: DC - 2 KHz

Isolation Voltage
- 300 V RMS output to chassis

Peak Repetitive AC Current
- 3 x RMS value

Programming Accuracy
- Voltage (rms): ± 0.3 VRMS
- Frequency: ± 0.01 % of programmed value.
- Current Limit: - 0 % to + 5 % of programmed value + 1A.
- Phase: < 0.5° + 0.2°/ 100 Hz with balanced load

Programming Resolution
- Voltage (rms): 100 mV
- Frequency:
- Current: 0.01 Hz from 16 - 81.91 Hz, 0.1 Hz from 82.0 - 819 Hz
- Current Limit: 0.1 A, 3 phase mode.
- 1.0 A, 1 phase mode.
- Phase: 0.1°

AC Measurements

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
<th>Accuracy’ (±)</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>16 - 100 Hz</td>
<td>0.01% + 0.01 Hz</td>
<td>0.01 Hz</td>
</tr>
<tr>
<td>RMS Voltage</td>
<td>0 - 400 V</td>
<td>0.05 V + 0.02%</td>
<td>10 mV</td>
</tr>
<tr>
<td>RMS Current</td>
<td>0 - 160 A</td>
<td>0.15 A + 0.02%</td>
<td>10 mA</td>
</tr>
<tr>
<td>Peak Current</td>
<td>0 - 400 A</td>
<td>0.15 A + 0.02%</td>
<td>10 mA</td>
</tr>
<tr>
<td>Crest Factor</td>
<td>0.00 - 6.00</td>
<td>0.05</td>
<td>0.01</td>
</tr>
<tr>
<td>Real Power</td>
<td>0 - 15 kW</td>
<td>30 W + 0.1%</td>
<td>10 W</td>
</tr>
<tr>
<td>Apparent Power</td>
<td>0 - 15 kVA</td>
<td>30 VA + 0.1%</td>
<td>10 VA</td>
</tr>
<tr>
<td>Power Factor</td>
<td>0.00 - 1.00</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Phase</td>
<td>0.0 - 360.0°</td>
<td>2.0°</td>
<td>0.1°</td>
</tr>
</tbody>
</table>

DC Measurements

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
<th>Accuracy’ (±)</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Voltage</td>
<td>0 - 400 V</td>
<td>0.5 V</td>
<td>10 mV</td>
</tr>
<tr>
<td>DC Current</td>
<td>0 - 160 A</td>
<td>0.5 A</td>
<td>10 mA</td>
</tr>
<tr>
<td>Power</td>
<td>0 - 15 kW</td>
<td>0.15 kW</td>
<td>10 W</td>
</tr>
</tbody>
</table>

* Measurement system bandwidth = DC to 6.7 kHz. Accuracy specifications are valid above 100 counts. Current and Power Accuracy and Range specifications are times three for MX90, MX135 or MX30/45-3Pi in single phase mode. PF accuracy applies for PF > 0.5 and VA > 50 % of range.

Measurements - Harmonics [Pi controller only]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
<th>Accuracy’ (±)</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>Fundamental Harmonics</td>
<td>0.03% + 0.03 Hz</td>
<td>0.01 Hz</td>
</tr>
<tr>
<td>Harmonics</td>
<td>32.00 Hz - 6.7 kHz</td>
<td>0.01 Hz</td>
<td></td>
</tr>
<tr>
<td>Phase</td>
<td>0.0 - 360.0°</td>
<td>2° typ.</td>
<td>0.5°</td>
</tr>
<tr>
<td>Voltage</td>
<td>Fundamental Harmonics</td>
<td>750 mV</td>
<td>10 mV</td>
</tr>
<tr>
<td>Harmonics 2 - 50</td>
<td>0.3% + 750 mV+0.3%/1 kHz</td>
<td>10 mV</td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td>Fundamental Harmonics</td>
<td>0.5 A</td>
<td>100 mA</td>
</tr>
<tr>
<td>Harmonics 2 - 50</td>
<td>0.3% + 150 mA +0.3%/1 kHz</td>
<td>100 mA</td>
<td></td>
</tr>
</tbody>
</table>

* Accuracy specifications are valid above 100 counts. Accuracy specifications are for three phase mode. Harmonics frequency range for MX30/45-3Pi in single phase mode is 32 Hz - 19.5 kHz.

Note 1: Specifications are warranted over an ambient temperature range of 25°± 5° C. Unless otherwise noted, specifications are per phase for a sinewave with a resistive load and apply after a 30 minute warm-up period. For three phase configurations, all specifications are for L-N. Phase angle specifications are valid under balanced load conditions only.
**Specifications - Continued**

**DC Mode Output**
Maximum DC power at full scale of DC voltage range.
MX30-3Pi: 6.5 kW per output, 3 outputs. 20 kW in 1 channel mode.
MX45-3Pi: 10 kW per output, 3 outputs. 30 kW in 1 channel mode.

**Voltage Ranges:**

<table>
<thead>
<tr>
<th>Range:</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 - 200 V</td>
<td>0 - 400 V</td>
</tr>
</tbody>
</table>

**Output Accuracy:**
± 1 Vdc

**Load & Line Regulation:**
see AC mode

**Ripple:**
< 2 Vrms Lo Range
< 3 Vrms Hi Range

**Max. DC Current @ FS V per output:**

<table>
<thead>
<tr>
<th>Model</th>
<th>V Low</th>
<th>V High</th>
</tr>
</thead>
<tbody>
<tr>
<td>MX30-1</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>MX30-3</td>
<td>33.3</td>
<td>16.6</td>
</tr>
<tr>
<td>MX30-3Pi</td>
<td>33.3</td>
<td>16.6</td>
</tr>
<tr>
<td>1 o/p mode:</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>MX45-1</td>
<td>150</td>
<td>75</td>
</tr>
<tr>
<td>MX45-3</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>MX45-3Pi</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>1 o/p mode:</td>
<td>150</td>
<td>75</td>
</tr>
<tr>
<td>MX90-3/Pi</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>MX135-3/Pi</td>
<td>150</td>
<td>75</td>
</tr>
</tbody>
</table>

**Current Limit:**
Programmable from 0 A to max. current for selected range.

**AC+DC Mode Output [Pi]**

**Power:**
Maximum current and power in AC+DC mode is same as DC mode.

**General Specifications**

**Protection**

**Over Load:**
Constant Current or Constant Voltage mode

**Over Temperature:**
Automatic shutdown

**Storage**
**Non Volatile Memory storage:**
8 instrument setups, 200 user defined waveforms [Pi only]

**Waveforms**

**Waveform Types:**
Std: Sine
Pi: Sine, Square, Clipped sine, User defined

**User defined waveform storage [Pi version]:**
Four groups of 50 user defined arbitrary waveforms of 1024 points for a total of 200. One group can be active at a time.

**Transient Programming**

**Transient List Parameters:**
Voltage, Frequency, Time or Cycles, Slew rate, Waveform shape, Repeat

**Transient lists storage:**
up to 32 transient steps per list

**Time resolution / range:**
1 ms / 1 ms - 90000 s

**Maximum slew rate:**
200 µs for 10% to 90% of full scale change into resistive load

**Waveform Acquisition [Pi]**

**Channels:** Voltage and Current

**Memory Depth:** 4096 smpls/phs.

**Maximum Sample Rate:**
MX30-3Pi and MX45-3Pi: 13.02 ks/s in 3 phase mode, 39.0625 ks/s in 1 phase mode
All other models: 13.02 ks/s.

**Triggering:**
Auto, Phase, Transient.

**Trigger Delay:**
Pre-trigger 0 - 104 ms 1ø
0 - 312 ms 3ø
Post-trigger 0 - 1000 msec. (at max. sample rates)

**Display:**
Front panel Graphics Display with cursors.

**Bus Interface:**
Full bus access to waveform acquisition system.

**Output Relay**
Push button controlled or bus controlled output relay

**Output impedance**
Programmable Z available on MX30-3Pi and MX45-3Pi in 3 phase mode only. Specifications apply at 50 Hz fundamental.

**Resistive:** 1 - 200 mOhm
**Inductive:** 15 - 200 uH

**Remote Control**
[Pi only or Std with -P option]

**IEEE-488 Interface:**
IEEE-488 (GPIB) talker listener.
Subset: AH1, C0, DC1, DT1, L3, PP0, RL2, SH1, SR1, T6
IEEE-488.2 SCPI Syntax

**RS232C Interface:**
9 pin D-shell connector
Supplied with RS232C cable.

**Specifications - Continued**

**Constant Power AC Mode - Available Max. AC Current on MX45**

![Graph showing constant power AC mode current range](image)
System Interface

Inputs:
- Remote shutdown
- External Sync
- Clock/Lock (option on Pi)

Outputs:
- Function Strobe / Trigger out
- Clock/Lock (option on Pi)

AC Input

Voltage:
Must be specified at time of order. All inputs are L-L, 3Ø, 3 wire + Gnd.

- 208 ± 10% V\textsubscript{AC}
- 230 ± 10% V\textsubscript{AC}
- 400 ± 10% V\textsubscript{AC}
- 480 ± 10% V\textsubscript{AC}

Current (MX30):

<table>
<thead>
<tr>
<th>V (L-L)</th>
<th>St State</th>
<th>Inrush</th>
</tr>
</thead>
<tbody>
<tr>
<td>208</td>
<td>116 A\textsubscript{RMS}</td>
<td>230 Apk</td>
</tr>
<tr>
<td>230</td>
<td>105 A\textsubscript{RMS}</td>
<td>220 Apk</td>
</tr>
<tr>
<td>400</td>
<td>60 A\textsubscript{RMS}</td>
<td>132 Apk</td>
</tr>
<tr>
<td>480</td>
<td>50 A\textsubscript{RMS}</td>
<td>110 Apk</td>
</tr>
</tbody>
</table>

Distortion: < 8 % at full power < 20 % below 35 % of power

Current (MX45):

<table>
<thead>
<tr>
<th>V (L-L)</th>
<th>St State</th>
<th>Inrush</th>
</tr>
</thead>
<tbody>
<tr>
<td>208</td>
<td>175 A\textsubscript{RMS}</td>
<td>230 Apk</td>
</tr>
<tr>
<td>230</td>
<td>157 A\textsubscript{RMS}</td>
<td>220 Apk</td>
</tr>
<tr>
<td>400</td>
<td>90 A\textsubscript{RMS}</td>
<td>132 Apk</td>
</tr>
<tr>
<td>480</td>
<td>75 A\textsubscript{RMS}</td>
<td>110 Apk</td>
</tr>
</tbody>
</table>

Distortion: < 8 % at full power < 20 % below 35 % of power

Line Frequency: 47 - 63 Hz
Efficiency: 85 % typical
Power Factor: 0.95 typical
Hold-up Time: At least 10 ms

AC Service

Input: Front access, cables routed through rear panel, exit in back.
Output: Front access, cables routed through rear panel, exit in back.

Regulatory:
- IEC61010, EN50081-2, EN50082-2, CE EMC and Safety Mark requirements

EMI:
- CISPR 11, Group1, Class A

Connectors
- AC Input terminal block behind front cover
- AC output terminal block behind front cover
- IEEE-488 (GPIB) connector, rear panel
- 9 pin D-Shell RS232C connector*, rear panel
- Remote voltage sense terminal block, rear panel
- System Interface Connector, DB-37, rear panel

(*RS232 DB9 to DB9 cable supplied)

Physical

Dimensions per MX30/MX45 unit
- Height: 50.0" (1270 mm)
- Width: 28.75° (731 mm)
- Depth: 34.5° (876 mm)

Weight
- MX30/MX45 Chassis:
  - Net: 1150 lbs / 522 Kg
  - Shipping: 1231 lbs / 560 Kg
- Amp Module:
  - Net: 63 lbs / 29 Kg

Chassis:
- Casters and forklift openings.

Vibration and Shock:
- Designed to meet NSTA project 1A transportation levels. Units are shipped in wooden crate with forklift slots.

Air Intake/Exhaust:
- Forced air cooling, front air intake, rear exhaust.

Operating Humidity:
- 0 to 95 % RAH, non condensing.

Temperature:
- Operating: 0 to 40° C (30° C max in CP mode)
- Storage: -20 to +85° C

MX30/MX45 Dimensions - single chassis
Standard controller versions with single voltage range:

<table>
<thead>
<tr>
<th>Model</th>
<th>AC Output Power</th>
<th>Phase Outputs</th>
<th>AC/DC Voltage Range</th>
<th>Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>MX30-1</td>
<td>30 kVA</td>
<td>1</td>
<td>150/200 or 300/400</td>
<td>Standard</td>
</tr>
<tr>
<td>MX30-3</td>
<td>30 kVA</td>
<td>3</td>
<td>150/200 or 300/400</td>
<td>Standard</td>
</tr>
<tr>
<td>MX45-1</td>
<td>45 kVA</td>
<td>1</td>
<td>150/200 or 300/400</td>
<td>Standard</td>
</tr>
<tr>
<td>MX45-3</td>
<td>45 kVA</td>
<td>3</td>
<td>150/200 or 300/400</td>
<td>Standard</td>
</tr>
<tr>
<td>MX90-3</td>
<td>90 kVA</td>
<td>3</td>
<td>150/200 or 300/400</td>
<td>Standard</td>
</tr>
<tr>
<td>MX135-3</td>
<td>135 kVA</td>
<td>3</td>
<td>150/200 or 300/400</td>
<td>Standard</td>
</tr>
</tbody>
</table>

Programmable controller versions with dual voltage ranges:

<table>
<thead>
<tr>
<th>Model</th>
<th>AC Output Power</th>
<th>Phase Outputs</th>
<th>AC/DC Voltage Range</th>
<th>Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>MX30-3Pi</td>
<td>30 kVA</td>
<td>1 &amp; 3</td>
<td>150/200 &amp; 300/400</td>
<td>Programmable</td>
</tr>
<tr>
<td>MX45-3Pi</td>
<td>45 kVA</td>
<td>1 &amp; 3</td>
<td>150/200 &amp; 300/400</td>
<td>Programmable</td>
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<td>MX90-3Pi</td>
<td>90 kVA</td>
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<td>150/200 &amp; 300/400</td>
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<tr>
<td>MX135-3Pi</td>
<td>135 kVA</td>
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<td>150/200 &amp; 300/400</td>
<td>Programmable</td>
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Reconfigurable Power Systems:

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<thead>
<tr>
<th>Model</th>
<th>AC Output Power</th>
<th>Phase Outputs</th>
<th>AC/DC Voltage Range</th>
<th>Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>MX90-3Pi-MB</td>
<td>90 kVA</td>
<td>3</td>
<td>150/200 &amp; 300/400</td>
<td>Dual MX45-3Pi</td>
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<tr>
<td>MX135-3Pi-MB</td>
<td>135 kVA</td>
<td>3</td>
<td>150/200 &amp; 300/400</td>
<td>Triple MX45-3Pi</td>
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<tr>
<th>Controller:</th>
<th>Std</th>
<th>Pi</th>
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<tbody>
<tr>
<td>AC mode</td>
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<td>x</td>
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<tr>
<td>DC mode</td>
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<td>x</td>
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<tr>
<td>AC+DC mode</td>
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<td>x</td>
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<tr>
<td>Dual V Range</td>
<td>Option</td>
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<tr>
<td>Transient programming</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Arbitrary waveforms</td>
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<tr>
<td>Measurements</td>
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<td>Harmonic measurements</td>
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<tr>
<td>Waveform acquisition</td>
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<tr>
<td>1 or 3 Phase mode</td>
<td>MX30/45-3Pi</td>
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<tr>
<td>IEEE / RS232</td>
<td>Option</td>
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</tr>
</tbody>
</table>

Pi Model Options [Cont.]

-143 IEC 1000-4-13 Harmonics and Interharmonics test firmware.
-704 Mil Std 704 A - F test firmware/software.
-ABD ABD0100.1.8 Test Option.
-HV Adds 400 V AC-only output range.
-LF Limits maximum frequency to 500 Hz.
-XV Adds other AC-only output range. Consult factory.
-LKM Clock/Lock Master
-LKS Clock/Lock Auxiliary
-WHM Watt-Hour Measurement option.

Accessories

OMNI-3-75 Impedance matching network for IEC61000-3-11 flicker tests.

Packaging and Shipment

All MX systems are packaged in reusable protective wooden crates for shipment.

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