

# Three $\emptyset$ In/Out FREQUENCY CONVERTERS

## Industrial/Commercial “NFC” Series

FREQUENCY CONVERTERS: 50, 60, or 400Hz Input Frequency / 50, 60, or 400Hz User Defined Output Frequency

The Always “On”™ NFC Series Frequency Converters are manufactured to provide clean, regulated and controlled power at the customer specified voltage and frequency. Based on the Always “On”™ NX Series, the NFC Series provides clean, isolated, reliable and consistent power to all critical loads at the expected levels required.

The NFC Series Frequency Converters are dual conversion, on-line, three phase, intelligent systems for centralized frequency conversion, power protection and distribution. The “dual conversion” means AC utility is converted into DC power which, in turn, charges the batteries and supplies the inverter, which inverts the DC power back into highly regulated and isolated AC power supplied at a user defined frequency (50, 60, or 400Hz). This continuous on-line Frequency Converter is available in models from 10kVA up to 250kVA. This dual conversion prevents power aberrations from affecting the connected loads.

The NFC Series Frequency Converters provide reliable and robust protection and frequency conversion, allowing for reliable and protected power to be available for all specific and critical loads.

### Features and Benefits

**Frequency Conversion:** This permits the user to configure a system with any input voltage (208, 480 or 600) and input frequency (50, 60, or 400Hz) with any output voltage (208/120, 480/277 or 600/347) and output frequency (50, 60 or 400Hz), independent of the input configuration.

**Full Galvanic Isolation:** Full Galvanic Isolation provides a completely isolated and referenced output. This isolation protection provides a proven solution to problems created by induced voltages affecting the critical loads. Since the output circuit to the load is completely isolated and no noise induced on the neutral can permeate to the loads, systems operate in a more reliable fashion. Also, this type of protection increases the life span of equipment by eliminating noise, which breaks down components.

**Modular Design:** Each major component (inverter, rectifier and static switch) on the NFC Series Frequency Converters are installed on slide-out modules. This allows for quick repair (mean time to repair of >30 minutes) and easy field upgradability.

**High efficiency:** Thanks to IGBT technology, the NFC Series Frequency Converters provide high efficiency (up to 94.5%). This, combined with IPR0, results in the most cost-efficient and reliable UPS solution in the industry.

**Fully digital:** DSP (Digital Signal Processor), flash memory and SVM strategy are the technology corner stones of the new age of power quality and reliability.

**Extremely flexible:** The NFC Series Frequency Converters offer tailor-made power protection to comply with your individual installation requirements. Options include a passive filter, a 12-pulse rectifier and a Smart Panel (SP). In addition, a comprehensive software suite can be added for mission control and data protection.

**Optional Battery Banks:** Always “On”™ has also allowed for the option of back-up time to be added to the system to eliminate the need of purchasing a UPS system and a frequency converter. This runtime package will allow for UPS-like operation at a user defined frequency (50, 60, or 400Hz).



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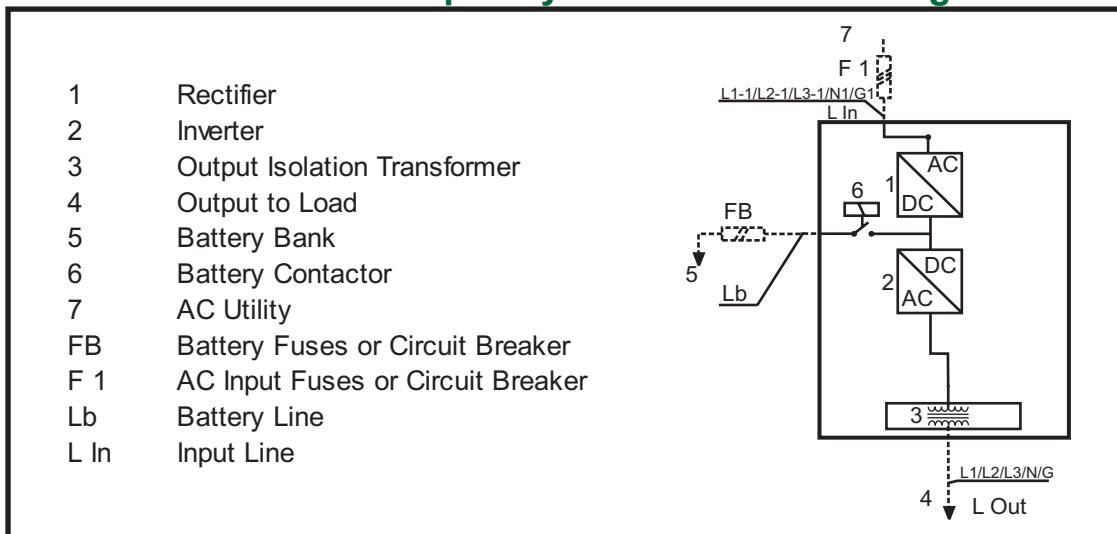
10kVA - 250kVA

| GENERAL DATA   |                   |   |  |             |             |             |             |              |                    |              |              |              |             |  |
|--|-------------------|---|--|-------------|-------------|-------------|-------------|--------------|--------------------|--------------|--------------|--------------|-------------|--|
| Topology   |                   | True On-Line, Dual Conversion   |  |             |             |             |             |              |                    |              |              |              |             |  |
| Nominal output at PF=0.8                               |                   | kVA   | 10   | 15          | 20          | 30          | 40          | 50           | 60                 | 80           | 100          | 160          | 250         |  |
| Overall efficiency                                     | 100% load, 0.9 PF | %   | 91   | 91          | 91          | 91          | 91.5        | 92           | 92                 | 92.5         | 92.5         | 93           | 93          |  |
|  | 50% load, 0.9 PF  | %   | 89   | 89          | 89          | 89          | 89          | 91           | 91                 | 91           | 91           | 92           | 92          |  |
| True galvanic isolation from input to output           |                   | Yes   |  |             |             |             |             |              |                    |              |              |              |             |  |
| Heat rejection at 100% load, 0.9PF and charged battery |                   | BTU/hr (kW)   | 3,070 (0.9)                                  | 3,510 (1.0) | 4,440 (1.3) | 6,480 (1.9) | 8,870 (2.6) | 10,200 (3.0) | 11,900 (3.5)       | 15,700 (4.6) | 18,400 (5.4) | 29,700 (8.7) | 44,360 (13) |  |
| Audible noise level (at 1 m)                           |                   | dB (A)  | < 65 at 1m maximum                           |             |             |             |             |              | < 67 at 1m maximum |              |              |              |             |  |
| Operating temperature range                            | UPS               | 0°C to 40°C (32°F to 104°F)   |  |             |             |             |             |              |                    |              |              |              |             |  |
|  | Battery           | Optimum 20°C to 25°C (68°F to 77°F) Higher temperatures reduce battery life expectancy  |  |             |             |             |             |              |                    |              |              |              |             |  |
| Storage temperature range                              | UPS               | -15°C to +50°C (5°F to 122°F)   |  |             |             |             |             |              |                    |              |              |              |             |  |
|  | Battery           | 0°C to 40°C (32°F to 104°F)   |  |             |             |             |             |              |                    |              |              |              |             |  |
|  | (VRLA)            | Storage time is 6 months at 25°C (77°F) Higher temperatures reduce battery storage time |  |             |             |             |             |              |                    |              |              |              |             |  |
| Relative Humidity                                      |                   | 0% to 90%, non-condensing   |  |             |             |             |             |              |                    |              |              |              |             |  |
| Maximum Altitude                                       |                   | Without Derating  | <1,500m (5,000ft.) No derating               |             |             |             |             |              |                    |              |              |              |             |  |
| Enclosure  | Type              | Indoor (NEMA 1) [Optional drip shield available] [other configurations available]       |  |             |             |             |             |              |                    |              |              |              |             |  |
|  | Safety            | Internal dead front construction  |  |             |             |             |             |              |                    |              |              |              |             |  |
|  | Cooling           | Forced air (bottom to top)  |  |             |             |             |             |              |                    |              |              |              |             |  |
|  | Colour            | Manufacturer colour (ivory)   |  |             |             |             |             |              |                    |              |              |              |             |  |
| Installation   |                   | Rigging   | Suitable for handling by forklift            |             |             |             |             |              |                    |              |              |              |             |  |
|  |                   | Mounting  | Casters and Floor mounting brackets          |             |             |             |             |              |                    |              |              |              |             |  |
|  |                   | Installation and maintenance access   | Front access required for normal maintenance |             |             |             |             |              |                    |              |              |              |             |  |
|  |                   | Conduit access  | Bottom entry standard [Optional top entry]   |             |             |             |             |              |                    |              |              |              |             |  |
| Standards  |                   | UL 1778, IEC 62040, FCC Class A, EN50091-1, -2  |  |             |             |             |             |              |                    |              |              |              |             |  |
| Electrostatic discharge immunity                       |                   | 4kV contact / 8kV air discharge   |  |             |             |             |             |              |                    |              |              |              |             |  |
| Configuration  | Standard          | Stand-alone   |  |             |             |             |             |              |                    |              |              |              |             |  |
|  | Optional          | IPRO - up to 8 units may be paralleled for redundancy or capacity                       |  |             |             |             |             |              |                    |              |              |              |             |  |

Specifications are subject to change without notice to reflect upgrades and improvement in technology.



## “NFC” Series Frequency Converter Block Diagram



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