



# Horlick Company, Inc.

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## 60SH Model Motor-Generator Set 50-60 Hz Frequency Converter



### Features

*Precise 60 Hz output frequency  
Common frame design  
Low audible noise  
Easy to operate  
Exceptional MTBF  
Minimal maintenance required*

### Description

Horlick 60SH Model motor-generator sets consist of a 10-pole, synchronous motor and a 12-pole, synchronous generator mounted on a common shaft. These units run at 600 RPM and deliver an output frequency of precisely 60 Hz from no-load to full-load. 60SH Model motor-generator sets are rated for continuous duty and they provide a clean source of 60 Hz power isolated from switching transients, voltage fluctuations and power line noise. They have high overload capability and are most commonly utilized in military applications where a rugged and reliable 50-60 Hz frequency converter is required. Alternatively, they are also utilized in overseas manufacturing facilities to provide a source of precise 60 Hz power for large-scale operations. They are dependable in harsh environments and are ideally suited for applications where continuous run time is a necessity.

Horlick 60SH Model motor-generator sets are designed to be installed inside where a 75-80 dBA noise level is acceptable. As an option, 60SH Model motor-generator sets can be mounted in a weather-resistant enclosure, a sound-reduced enclosure, a cargo container or a trailer. Each 50SH Model motor-generator set is equipped with a standard control system that is either wall-mounted or free standing. The components in the control system perform the functions necessary to operate, monitor and protect the system



### Specifications

#### Motor

- Brushless synchronous, 600 RPM, 10-pole
- Continuous duty, Class F insulation, open drip-proof
- Selection of 50 Hz, 3-phase input voltages to include: 208V, 220V, 380V or 416V

#### Generator

- Brushless synchronous, 600 RPM, 12-pole
- Continuous duty, Class F insulation, open drip-proof
- Selection of 60 Hz output voltages to include: 120/208V or 277/480V, 3-phase
- Rated at 0.8 power factor to insure proper handling of inductive loads

#### Mechanical Construction

- Motor and generator mounted on common shaft
- Reinforced steel frame
- Precision machined and dynamically balanced rotor

#### Standard Control Systems

Each motor-generator set is equipped with a separate wall-mounted or floor-standing control panel. The standard package includes the following components:

#### Motor Controls

- Motor starter with adjustable overload
- Start-Stop push buttons with terminal strip for remote start/stop
- Control power transformer with fusing
- Variable transformer for power factor control, with protective relay for motor out-of-step and field failure protection
- Analog meter package to include ammeter and run time meter
- Pilot lights to indicate "Motor Run" and "50 Hz Line Energized"

#### Generator Controls

- Analog meter package to include voltmeter, ammeter and frequency meter
- Voltmeter and ammeter phase selector switches (3-phase systems)
- Voltage regulator,  $\pm 1\%$  regulation accuracy, with automatic buildup and rheostat for control of regulated voltage
- Output circuit breaker, molded case, to protect generator against short circuit or prolonged overload
- Pilot light to indicate "60 Hz Load On"
- Over voltage protection package to include output circuit breaker shunt trip

### Performance Characteristics

- **Voltage regulation:**  $\pm 1\%$  from no-load to full-load at rated power factor
- **Voltage steady state stability:**  $\pm 0.5\%$  from no-load to full-load at rated power factor
- **Voltage adjustment range:**  $\pm 10\%$  in stepless increments of nominal output voltage
- **Frequency regulation:** Precise 60 Hz output from no-load to full-load
- **Voltage transient:** When a full-load at rated power factor is applied or released, the resultant instantaneous droop or overshoot will not exceed 30% of preset value
- **Voltage recovery time:** After a full-load is applied or released, the output voltage will return to the regulation band within 500 milliseconds
- **Harmonic distortion:** Less than 3% max. total distortion factor and less than 2.5% max. single-phase when measured line-to-line
- **Ambient operating conditions:** Temperature at 40°C, relative humidity at 95%
- **Duty cycle:** Motor-generator set and controls are rated for continuous duty

### Motor-Generator Options

- Weather-resistant, NEMA 3R enclosure
- Oversized generator to support motor-starting transients
- Thermal bearing and winding protection
- Input disconnect or circuit breaker
- Input phase protection relay
- Generator reconnection switch to allow selection of multiple output voltages
- Digital meter package
- Remote meter package with start/stop controls

60SH Model Three Phase Output Ratings						
Model	Generator Rating at 0.8 PF		Output Current at 120/208V	Output Current at 277/480V	Motor Rating	Motor Starting Method
60SH-203	25 KVA	20 KW	69 A	30 A	30 HP	Wye-delta
60SH-253	31.3 KVA	25 KW	87 A	45 A	40 HP	Wye-delta
60SH-303	37.5 KVA	30 KW	104 A	57 A	50 HP	Wye-delta
60SH-403	50 KVA	40 KW	139 A	60 A	60 HP	Wye-delta
60SH-503	62.5 KVA	50 KW	174 A	75 A	75 HP	Wye-delta
60SH-603	75 KVA	60 KW	208 A	90 A	100 HP	Wye-delta
60SH-753	93.8 KVA	75 KW	261 A	113 A	125 HP	Wye-delta
60SH-1003	125 KVA	100 KW	347 A	151 A	150 HP	Wye-delta
60SH-1253	156 KVA	125 KW	434 A	188 A	200 HP	Wye-delta
60SH-1503	188 KVA	150 KW	521 A	226 A	250 HP	Wye-delta
60SH-1753	219 KVA	175 KW	608 A	263 A	300 HP	Wye-delta
60SH-2003	250 KVA	200 KW	695 A	301 A	300 HP	Wye-delta
60SH-2503	313 KVA	250 KW	868 A	376 A	400 HP	Wye-delta
60SH-3003	375 KVA	300 KW	1042 A	452 A	500 HP	Wye-delta
60SH-3503	438 KVA	350 KW	1216 A	527 A	550 HP	Wye-delta
60SH-4003	500 KVA	400 KW	1390 A	602 A	600 HP	Wye-delta
60SH-4503	563 KVA	450 KW	1563 A	677 A	700 HP	Wye-delta
60SH-5003	625 KVA	500 KW	1737 A	753 A	750 HP	Wye-delta
60SH-5503	688 KVA	550 KW	1911 A	828 A	850 HP	Wye-delta
60SH-6003	750 KVA	600 KW	2084 A	903 A	1000 HP	Wye-delta
60SH-6503	813 KVA	650 KW	2258 A	978 A	1000 HP	Wye-delta
60SH-7003	875 KVA	700 KW	2432 A	1054 A	1100 HP	Wye-delta
60SH-7503	938 KVA	750 KW	2605 A	1129 A	1250 HP	Wye-delta
60SH-8003	1000 KVA	800 KW	2779 A	1204 A	1250 HP	Wye-delta
60SH-9003	1125 KVA	900 KW	3126 A	1355 A	1350 HP	Wye-delta
60SH-10003	1250 KVA	1000 KW	3474 A	1505 A	1500 HP	Wye-delta