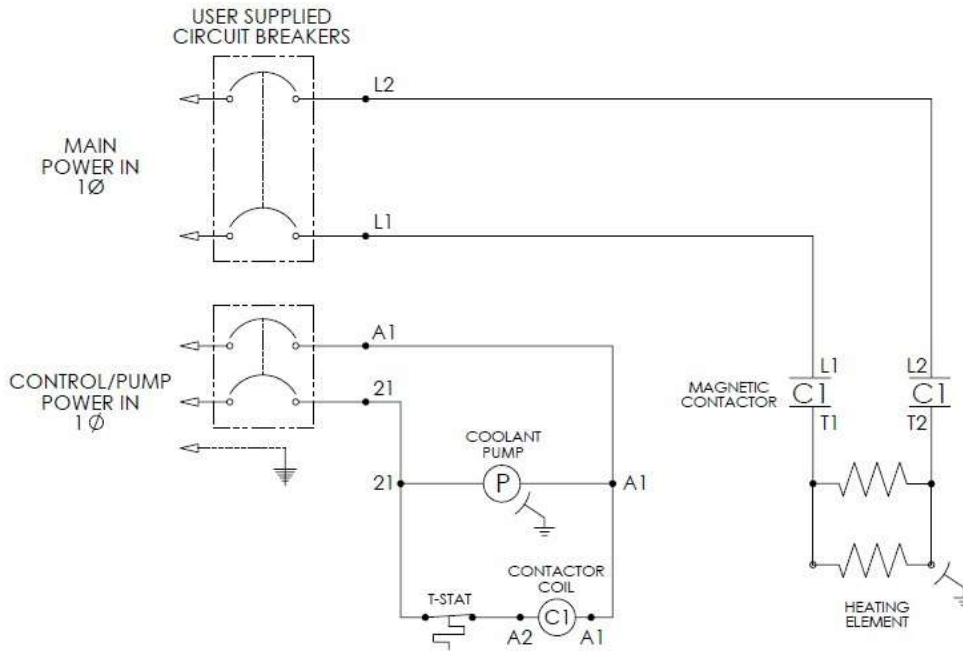
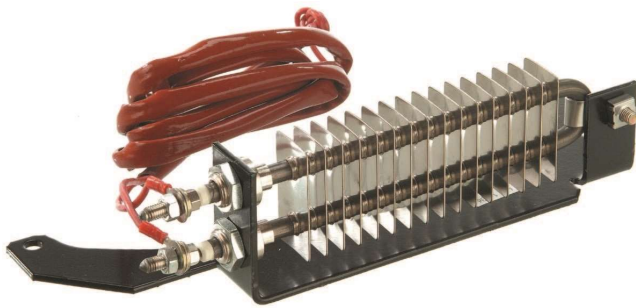


Wiring Diagram



Materials and specifications are subject to change without notice. The International System of Units (SI) is used in this publication.
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Generator Space Heater

for 1400 Frame*

*excluding 3512C

Picture shown may not reflect actual configuration

GENERAL DESCRIPTION

Humidity is a natural enemy of generators and all electrical equipment.

Space heaters are designed to protect generator windings from abnormally high humidity conditions when the generator is idle. The heater maintains the air around the windings at a suitable temperature to prevent winding corrosion due to condensation.

Generator space heaters use electrical resistance and are located within the generator stator housing.

Space heaters are particularly recommended for generator sets located in a low ambient and/or high humidity environment. As a further benefit, space heaters provide an excellent method of drying out a generator after long transit or storage.

Because space heaters are required only during non-operative periods, they require availability of a power source separate from the generator set itself.

When the generator set is not running the heater automatically connects to the AC supply through a power relay mounted in the control panel. Upon receiving a start signal the AC supply is automatically disconnected by the power relay and automatically reconnected when the start signal is removed.

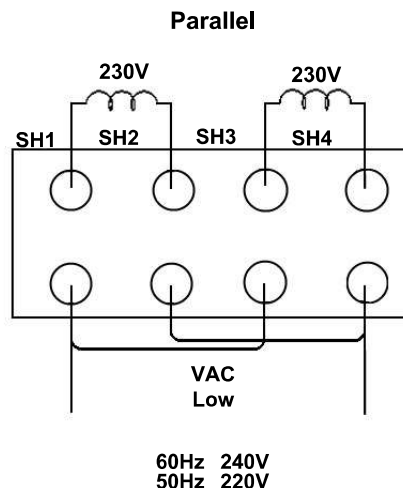
The 1400 frame space heater uses two heating elements.

Heating elements available in two voltages: 127V and 230V.

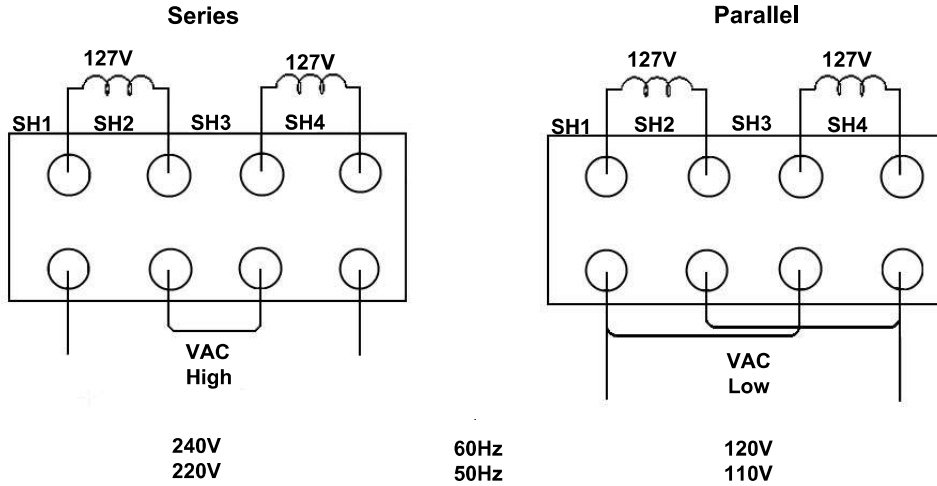
Heater elements electrical data:

- Voltage - 230V, Power - 500W.
- Voltage - 127V, Power - 500W.

230V Space Heater Connection Diagram



127V Space Heater Connection Diagram



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Picture shown may not reflect actual configuration

Molded Case and Insulated Case Circuit Breakers:

C27-C175 North America built packages (50/60Hz)

L-Frame

400A (UL)

P-Frame

800-1200A (UL)

R-Frame

1600-3000A (UL)

NS-Frame

1600-3200A (IEC)

NW-Frame

1200-5000A (UL), 1600-5000A (IEC)

Features

- Moisture and fungus protection
- Clear indication of breaker status
- Reinforced insulation
- Shunt trip
- Auxiliary contacts
- Load side extension bars
- Maintenance-free operation
- Exceptional characteristics under short-circuit conditions
- Adjustable trip settings

NS-Frame

- Federal Specification W-C-375B/GEN
- NEMA AB1
- UTE, VDE, BS, CEI, UNE

Conformity with International Standards

Circuit Breakers have been designed to comply with the international standard IEC 60947-2 as well as these other major standards:

L-Frame

UL 489

CSA 22.2 No 5

Federal Specification W-C-375B/GEN

NEMA AB1

NMX J-266

CCC

CE Marking

P-Frame & R-Frame

UL 489

IEC Standard 60947-2

CSA 22.2 No 5-02

Federal Specification W-C-375B/GEN

NEMA AB1

NMX J-266

UTE, VDE, BS, CEI, UNE

NW-Frame

UL 489

NEMA AB1

CSA 22.2 No. 5096

NMX J-266-ANCE

ANSI C37.13, C37.16, C37.17, C37.50

UL 1066 (cULus Listed)

NEMA SG3

Standard Features

Standards

- UL-CSA
 - L-Frame
 - P-Frame
 - R-Frame
 - NW-Frame
- IEC
 - NS-Frame

Shunt trip

- The shunt trip provides a means of tripping the circuit breaker electronically
- Shunt trip ratings
- Voltage: 24VDC
- Coil Burden (Holding/Inrush): 4.5/200 VA
- Power Consumption: 4.5 VA

Auxiliary contacts

The auxiliary contacts provide a means of remote circuit breaker position indication and consists of (1) Form C Contact (1 Normally open and 1 Normally closed contact) with the following current ratings:
6A @ 240-480 VAC, 50/60Hz

Trip units

All circuit breakers come equipped with True RMS Current Sensing.

The trip units for each of the circuit breaker ratings sample the current waveform to provide true RMS protection through the 15th harmonic. This true RMS sensing gives accurate values for the magnitude of a nonsinusoidal waveform. Therefore, the heating effects of harmonically distorted waveforms are accurately evaluated. The trip system comes equipped with a set of current transformers (CT's) to sense current, a trip unit to evaluate the current, and a tripping solenoid to trip the circuit breaker.

Additionally, each trip unit comes equipped with Active Thermal Imaging which is active 20 minutes before and after tripping.

Customer cable connections

Connections include bus for installation flexibility.

Optional Features

Electrically-operated Circuit Breakers

Circuit breakers that are electrically-operated come with a two-step stored energy mechanism and come standard with a motor assembly. Motor assemblies provide on and off control from remote locations.

These assemblies contain a spring-charging motor, a shunt trip, and shunt close.

Motor Assembly Voltage Rating: 24-30VDC

Undervoltage trip

Undervoltage trip option trips the circuit breaker when the voltage drops to a value between 35% and 70% of the control voltage.

An attempt to close the circuit breaker when the UV is not energized produces no movement in the main contacts.

Closing is allowed when the supply voltage of the UV trip reaches 85% of the rated voltage.

- Voltage Rating: 24-30VAC/VDC
- Operating Threshold:
 - Opening: 0.35 to 0.7Vn
 - Closing: 0.85 Vn
- Power Consumption: 4.5VA
- Circuit Breaker Response Time at Vn: 50ms +/- 10

Circuit Breakers Table

Cat® Part Number	Frame and Rating (Amps)	IEC/UL	No. Poles	Operation	Trip Unit	Circuit Breaker Characteristics	Options	Instantaneous Override (kA RMS) +/- 10%
4213235	400A L-Frame MCCB	UL	3P	MO	3.3S LSI	Table 10	1 Aux Contact, Shunt Trip	–
4213237	400A L-Frame MCCB	UL	3P	MO	6.3A LSIG	Table 10	1 Aux Contact, Shunt Trip	–
4213239	400A L-Frame MCCB	UL	4P	MO	6.3A LSIG	Table 11	1 Aux Contact, Shunt Trip	–
2449744	800A NS-Frame MCCB	IEC	4P	MO	5.0A LSI	Table 2	1 Aux Contact, Shunt Trip	–
2449794	800A P-Frame MCCB	UL	3P	EO	5.0A LSI	Table 1	1 Aux Contact, Shunt Trip	24
2449802	800A P-Frame MCCB	UL	3P	EO	6.0A LSIG	Table 1	1 Aux Contact, Shunt Trip	–
2449984	800A P-Frame MCCB	UL	3P	EO	5.0P LSI-P	Table 1	1 Aux Contact, Shunt Trip, Modbus	24
5858066	800A P-Frame MCCB	UL	3P	EO	5.0P LSI-P	Table 1	1 Aux Contact, Shunt Trip, Modbus	24
2449742	1200A P-Frame MCCB	UL	3P	EO	5.0A LSI	Table 1	1 Aux Contact, Shunt Trip	24
2449746	1200A P-Frame MCCB	UL	3P	EO	6.0A LSIG	Table 1	1 Aux Contact, Shunt Trip	24
2449766	1200A P-Frame MCCB	UL	3P	EO	6.0H LSIG-H	Table 1	1 Aux Contact, Shunt Trip, Modbus	24
2449770	1200A P-Frame MCCB	UL	3P	EO	6.0P LSIG-P	Table 1	1 Aux Contact, Shunt Trip, Modbus	24

Circuit Breakers Table (Continued)

Cat® Part Number	Frame and Rating (Amps)	IEC/UL	No. Poles	Operation	Trip Unit	Circuit Breaker Characteristics	Options	Instantaneous Override (kA RMS) +/- 10%
2449988	1200A P-Frame MCCB	UL	3P	EO	5.0P LSI-P	Table 1	1 Aux Contact, Shunt Trip, Modbus	24
3834673	1200A NW-Frame ICCB	UL	3P	EO	5.0A LSI	Table 7	4 Aux Contacts, Shunt Trip, UV	40
3834674	1200A NW-Frame ICCB	UL	3P	EO	6.0A LSI-G	Table 7	4 Aux Contacts, Shunt Trip, UV	40
5858050	1200AP-Frame MCCB	UL	3P	EO	6.0P LSI-G-P	Table 1	1 Aux Contact, Shunt Trip, Modbus	24
5858067	1200A P-Frame MCCB	UL	3P	EO	5.0P LSI-P	Table 1	1 Aux Contact, Shunt Trip, Modbus	24
2449764	1250A NS-Frame MCCB	IEC	4P	EO	5.0A LSI	Table 3	1 Aux Contact, Shunt Trip	-
2449765	1250A NS-Frame MCCB	IEC	4P	EO	6.0A LSI-G	Table 3	1 Aux Contact, Shunt Trip	-
2449767	1250A NS-Frame MCCB	IEC	4P	EO	6.0P LSI-G-P	Table 3	1 Aux Contact, Shunt Trip, Modbus	-
2449772	1600A NS1600 MCCB	IEC	3P	EO	5.0A LSI	Table 3	1 Aux Contact, Shunt Trip	-
2449773	1600A NS1600 MCCB	IEC	3P	EO	6.0A LSI-G	Table 3	1 Aux Contact, Shunt Trip	-
2449775	1600A NS1600 MCCB	IEC	3P	EO	6.0P LSI-G-P	Table 3	1 Aux Contact, Shunt Trip, Modbus	-
2449776	1600A NS1600 MCCB	IEC	3P	MO	5.0A LSI	Table 4	1 Aux Contact, Shunt Trip	-

Circuit Breakers Table (Continued)

Cat® Part Number	Frame and Rating (Amps)	IEC/UL	No. Poles	Operation	Trip Unit	Circuit Breaker Characteristics	Options	Instantaneous Override (kA RMS) +/- 10%
2449777	1600A NS1600 MCCB	IEC	3P	MO	6.0A LSI	Table 4	1 Aux Contact, Shunt Trip	–
2449779	1600A NS1600 MCCB	IEC	3P	MO	6.0P LSI	Table 4	1 Aux Contact, Shunt Trip, Modbus	–
2449784	1600A NS1600 MCCB	IEC	4P	EO	5.0A LSI	Table 3	1 Aux Contact, Shunt Trip	–
2449785	1600A NS1600 MCCB	IEC	4P	EO	6.0A LSI	Table 3	1 Aux Contact, Shunt Trip	–
2449787	1600A P-Frame MCCB	IEC	4P	EO	6.0P LSI	Table 3	1 Aux Contact, Shunt Trip, Modbus	–
2449788	1600A NS1600 MCCB	IEC	4P	MO	5.0A LSI	Table 4	1 Aux Contact, Shunt Trip	–
2449789	1600A NS1600 MCCB	IEC	4P	MO	6.0A LSI	Table 4	1 Aux Contact, Shunt Trip	–
2449791	1600AP-Frame MCCB	IEC	4P	MO	6.0P LSI	Table 4	1 Aux Contact, Shunt Trip	–
2449864	1600A R-Frame MCCB	UL	3P	MO	5.0A LSI	Table 6	1 Aux Contact, Shunt Trip	57
2449865	1600A R-Frame MCCB	UL	3P	MO	6.0A LSI	Table 6	1 Aux Contact, Shunt Trip	57
2449867	1600A R-Frame MCCB	UL	3P	MO	6.0P LSI	Table 6	1 Aux Contact, Shunt Trip, Modbus	57
2449870	1600A NW-Frame ICCB	UL	3P	EO	5.0A LSI	Table 7	4 Aux Contact, Shunt Trip	40

Circuit Breakers Table (Continued)

Cat® Part Number	Frame and Rating (Amps)	IEC/UL	No. Poles	Operation	Trip Unit	Circuit Breaker Characteristics	Options	Instantaneous Override (kA RMS) +/- 10%
2449871	1600A NW-Frame ICCB	UL	3P	EO	6.0A LSIG	Table 7	4 Aux Contact, Shunt Trip	40
2449872	1600A NW-Frame ICCB	UL	3P	EO	6.0H LSIG-H	Table 7	4 Aux Contact, Shunt Trip	40
2449873	1600A NW-Frame ICCB	UL	3P	EO	6.0P LSIG-P	Table 7	4 Aux Contact, Shunt Trip, Modbus	40
2449991	1600A R-Frame MCCB	UL	3P	MO	5.0P LSI-P	Table 6	1 Aux Contact, Shunt Trip, Modbus	57
2449996	1600A NW-Frame ICCB	UL	3P	EO	5.0P LSI-P	Table 7	4 Aux Contact, Shunt Trip, Modbus	40
3115765	1600A NW-Frame ICCB	UL	3P	EO	5.0A LSI	Table 7	4 Aux Contacts, Shunt Trip, UV	40
3115766	1600A NW-Frame ICCB	UL	3P	EO	6.0A LSIG	Table 7	4 Aux Contacts, Shunt Trip, UV	40
3407174	1600A R-Frame MCCB	UL	3P	MO	6.0A LSIG	Table 9	1 Aux Contact, Shunt Trip	48
3775313	1600A NW-Frame ICCB	IEC	3P	EO	5.0A LSI	Table 13	4 Aux Contacts, Shunt Trip, UV	40
3775314	1600A NW-Frame ICCB	IEC	3P	EO	6.0A LSIG	Table 13	4 Aux Contacts, Shunt Trip, UV	40
3853411	1600A R-Frame MCCB	UL	3P	MO	5.0A LSI	Table 9	1 Aux Contact, Shunt Trip	48
3853414	1600AR- Frame MCCB	UL	3P	MO	6.0P LSIG-P	Table 9	1 Aux Contact, Shunt Trip, Modbus	48

Circuit Breakers Table (Continued)

Cat® Part Number	Frame and Rating (Amps)	IEC/UL	No. Poles	Operation	Trip Unit	Circuit Breaker Characteristics	Options	Instantaneous Override (kA RMS) +/- 10%
4448345	1600A NS-Frame MCCB	IEC	3P	MO	5.0A LSI	Table 4	1 Aux Contact, Shunt Trip	–
4448346	1600A NS-Frame MCCB	IEC	3P	MO	6.0A LSI	Table 4	1 Aux Contact, Shunt Trip	–
4448353	1600A NS-Frame MCCB	IEC	3P	EO	5.0A LSI	Table 4	2 Aux Contact, UV	–
4448354	1600A NS-Frame MCCB	IEC	3P	EO	6.0A LSI	Table 4	2 Aux Contact, UV	–
4860754	1600A NS-Frame MCCB	IEC	3P	EO	5.0A LSI	Table 3	2 Aux Contact, Shunt Trip	–
4860755	1600A NS-Frame MCCB	IEC	3P	EO	6.0A LSI	Table 3	2 Aux Contact, Shunt Trip	–
5805751	1600A R-Frame MCCB	UL	3P	MO	5.0P LSI-P	Table 9	2 Aux Contacts, Comms, Shunt Trip	–
5858063	1600A R-Frame MCCB	UL	3P	MO	6.0P LSI-P	Table 6	1 Aux Contact, Shunt Trip, Modbus	57
5858068	1600A R-Frame MCCB	UL	3P	MO	5.0P LSI-P	Table 6	1 Aux Contact, Shunt Trip, Modbus	57
5858071	1600A R-Frame MCCB	UL	3P	MO	6.0P LSI-P	Table 9	1 Aux Contact, Shunt Trip, Modbus	48
2449792	2000A NS2000 MCCB	IEC	3P	MO	5.0A LSI	Table 4	1 Aux Contact, Shunt Trip	–
2449793	2000A NS2000 MCCB	IEC	3P	MO	6.0A LSI	Table 4	1 Aux Contact, Shunt Trip	–

Circuit Breakers Table (Continued)

Cat® Part Number	Frame and Rating (Amps)	IEC/UL	No. Poles	Operation	Trip Unit	Circuit Breaker Characteristics	Options	Instantaneous Override (kA RMS) +/- 10%
449795	2000A NS2000 MCCB	IEC	3P	MO	6.0P LSIG-P	Table 4	1 Aux Contact, Shunt Trip, Modbus	–
2449800	2000A NS2000 MCCB	IEC	4P	MO	5.0A LSI	Table 4	1 Aux Contact, Shunt Trip	–
2449803	2000A NS2000 MCCB	IEC	4P	MO	6.0P LSIG-P	Table 4	1 Aux Contact, Shunt Trip, Modbus	24
2449868	2000AR- Frame MCCB	UL	3P	MO	5.0A LSI	Table 6	1 Aux Contact, Shunt Trip	57
2449869	2000A R-Frame MCCB	UL	3P	MO	6.0A LSIG	Table 6	1 Aux Contact, Shunt Trip	57
2449874	2000A NW-Frame ICCB	IEC	3P	EO	5.0A LSI	Table 5	4 Aux Contact, Shunt Trip	40
2449875	2000A NW-Frame ICCB	IEC	3P	EO	6.0A LSIG	Table 5	4 Aux Contact, Shunt Trip	40
2449876	2000A NW-Frame ICCB	IEC	3P	EO	6.0P LSIG-P	Table 5	4 Aux Contact, Shunt Trip, Modbus	40
2449877	2000A NW-Frame ICCB	IEC	4P	EO	5.0A LSI	Table 5	4 Aux Contact, Shunt Trip	–
2449878	2000A NW-Frame ICCB	IEC	4P	EO	6.0A LSIG	Table 5	4 Aux Contact, Shunt Trip	–
2449879	2000A NW-Frame ICCB	IEC	4P	EO	6.0P LSIG-P	Table 5	4 Aux Contact, Shunt Trip, Modbus	–
2449880	2000A NW-Frame ICCB	UL	3P	EO	5.0A LSI	Table 7	4 Aux Contact, Shunt Trip	40