



TRANSICOLD

Diesel Driven Generator Set

**Auto Restart Option for
69RG15- and 69UG15- Models**

**TECHNICAL
SUPPLEMENT**



TRANSCOLD

TECHNICAL SUPPLEMENT

DIESEL DRIVEN GENERATOR SET

Auto Restart Option for 69RG15- and 69UG15- Models

Carrier Refrigeration Operations
Carrier Transicold Division, Carrier Corporation, P.O. Box 4805, Syracuse, N.Y. 13221 U. S. A.

© Carrier Corporation 2006 • Printed in U. S. A. 1006



Carrier

A United Technologies Company

TABLE OF CONTENTS

SECTION	PAGE
SAFETY SUMMARY	ii
GENERAL SAFETY NOTICES	ii
FIRST AID	ii
OPERATING PRECAUTIONS	ii
MAINTENANCE PRECAUTIONS	ii
SPECIFIC WARNING AND CAUTION STATEMENTS	iii
DESCRIPTION	1-1
1.1 INTRODUCTION	1-1
1.2 AUTO RESTART OPERATION	1-1
1.3 AUTO RESTART SEQUENCING	1-2
1.3 AUTO RESTART SEQUENCING	1-3
OPERATION	2-1
2.1 AUTOMATIC START	2-1
TROUBLESHOOTING	3-1
3.1 Auto Restart Option	3-1
SCHEMATIC	4-1
4.1 INTRODUCTION	4-1
SERVICE REPLACEMENT PARTS	5-1
5.1 QUICK LIST	5-1
5.2 AUTO RESTART OPTION (PID RG0466 ONLY)	5-2
5.3 AUTO RESTART OPTION (PID RG0596 ONLY)	5-4
5.4 AUTO RESTART OPTION (PID RG1160 ONLY)	5-6

LIST OF ILLUSTRATIONS

NUMBER	DESCRIPTION	PAGE
Figure 4.2	Electrical Wiring Schematic (PID RG0466 only)	4-2
Figure 4.3	Electrical Wiring Schematic (PID RG0466 only)	4-3
Figure 4.4	Electrical Wiring Schematic (PID RG0466 only)	4-4
Figure 4.5	Electrical Wiring Schematic (PID RG1160 only)	4-5
Figure 4.6	Electrical Wiring Schematic (PID RG1160 only)	4-6
Figure 4.7	Electrical Wiring Schematic (PID RG1160 only)	4-7

SAFETY SUMMARY

GENERAL SAFETY NOTICES

THE FOLLOWING GENERAL SAFETY NOTICES SUPPLEMENT THE SPECIFIC WARNINGS AND CAUTIONS APPEARING ELSEWHERE IN THIS MANUAL. THEY ARE RECOMMENDED PRECAUTIONS THAT MUST BE UNDERSTOOD AND APPLIED DURING OPERATION AND MAINTENANCE OF THE EQUIPMENT COVERED HEREIN. THE GENERAL SAFETY NOTICES ARE PRESENTED IN THE FOLLOWING THREE SECTIONS LABELED: FIRST AID, OPERATING PRECAUTIONS AND MAINTENANCE PRECAUTIONS. A LISTING OF THE SPECIFIC WARNINGS AND CAUTIONS APPEARING ELSEWHERE IN THE MANUAL FOLLOWS THE GENERAL SAFETY NOTICES.

FIRST AID

AN INJURY, NO MATTER HOW SLIGHT, SHOULD NEVER GO UNATTENDED. ALWAYS OBTAIN FIRST AID OR MEDICAL ATTENTION IMMEDIATELY.

OPERATING PRECAUTIONS

ALWAYS WEAR SAFETY GLASSES.

KEEP HANDS, CLOTHING AND TOOLS CLEAR OF THE RADIATOR FAN AND ROTATING BELTS.

NO WORK SHOULD BE PERFORMED ON THE UNIT UNTIL ALL CIRCUIT BREAKERS AND START-STOP SWITCHES ARE TURNED OFF AND THE NEGATIVE BATTERY TERMINAL HAS BEEN DISCONNECTED..

ALWAYS WORK IN PAIRS. NEVER WORK ON THE EQUIPMENT ALONE.

IN CASE OF SEVERE VIBRATION OR UNUSUAL NOISE, STOP THE UNIT AND INVESTIGATE.

MAINTENANCE PRECAUTIONS

BE SURE POWER IS TURNED OFF AND THE NEGATIVE BATTERY CABLE IS DISCONNECTED BEFORE WORKING ON GENERATOR SET.

DO NOT BYPASS ANY ELECTRICAL SAFETY DEVICES, E.G. BRIDGING AN OVERLOAD, OR USING ANY SORT OF JUMPER WIRES. PROBLEMS WITH THE SYSTEM SHOULD BE DIAGNOSED, AND ANY NECESSARY REPAIRS PERFORMED, BY QUALIFIED SERVICE PERSONNEL.

IN CASE OF ELECTRICAL FIRE, OPEN CIRCUIT SWITCH AND EXTINGUISH WITH CO₂ (NEVER USE WATER).

SPECIFIC WARNING AND CAUTION STATEMENTS

TO HELP IDENTIFY THE LABEL HAZARDS ON THE UNIT AND EXPLAIN THE LEVEL OF AWARENESS EACH ONE CARRIES, AN EXPLANATION IS GIVEN WITH THE APPROPRIATE CONSEQUENCES:

DANGER - MEANS AN IMMEDIATE HAZARD WHICH WILL RESULT IN SEVERE PERSONAL INJURY OR DEATH.

WARNING - MEANS TO WARN AGAINST HAZARDS OR UNSAFE CONDITIONS WHICH COULD RESULT IN SEVERE PERSONAL INJURY OR DEATH.

CAUTION - MEANS TO WARN AGAINST POTENTIAL HAZARD OR UNSAFE PRACTICE WHICH COULD RESULT IN MINOR PERSONAL INJURY, PRODUCT OR PROPERTY DAMAGE.

THE STATEMENTS THAT FOLLOW ARE APPLICABLE TO THE GENERATOR SET AND APPEAR ELSEWHERE IN THIS MANUAL. THESE RECOMMENDED PRECAUTIONS MUST BE UNDERSTOOD AND APPLIED DURING OPERATION AND MAINTENANCE OF THE EQUIPMENT COVERED HEREIN.

WARNING

SAFETY GLASSES SHOULD BE WORN WHILE SERVICING OR OPERATING GENERATOR.

WARNING

HEARING PROTECTION SHOULD BE WORN IN HIGH NOISE ENVIRONMENTS.

WARNING

BEFORE SERVICING UNIT, MAKE SURE THE UNIT CIRCUIT BREAKER (CB-1) AND THE START-STOP SWITCH ARE IN THE OFF POSITION. ALSO DISCONNECT POWER PLUG AND CABLE.

WARNING

DO NOT WEAR LOOSE CLOTHING, JEWELRY OR NON-CONTAINED LONG HAIR THAT COULD GET CAUGHT ON MOVING PARTS WHILE OPERATING THE GENERATOR.

WARNING

UNITS EQUIPED WITH AN AUTO RESTART MODULE CAN START UNANNOUNCED.

WARNING

BEWARE OF V-BELTS AND BELT DRIVEN COMPONENTS AS THE UNIT MAY START AUTOMATICALLY. BEFORE SERVICING UNIT, MAKE SURE THE RUN - STOP SWITCH IS IN THE STOP POSITION. ALSO DISCONNECT THE NEGATIVE BATTERY CABLE.

WARNING

BEWARE OF HOT EXHAUST COMPONENTS.

WARNING

DO NOT USE GASOLINE TO CLEAN AIR CLEANER PARTS.

WARNING

HIGH VOLTAGE (DIELECTRIC) TESTING MUST NOT BE PERFORMED TO THE MACHINE WITHOUT FIRST OBSERVING NEMA RULES. THE INSULATION OF THIS GENERATOR WINDING MAY BE SAFELY CHECKED BY USING A MEGGER. A HIGH MEGGER READING INDICATES GOOD INSULATION.

WARNING

DO NOT DIRECT WATER OR STEAM INTO THE GENERATOR OPENINGS. DO NOT ALLOW ANY SOAP AND WATER SOLUTIONS TO ENTER THE GENERATOR.

WARNING

THE ROTOR SHOULD NOT BE PULLED OUT FROM THE ALTERNATOR MORE THAN 0.75 INCHES. DAMAGE TO THE BEARING AND WINDINGS MAY RESULT.

WARNING

ELECTRICAL POWER IS GENERATED BY A LIMA 15 KW, A-C GENERATOR. THE GENERATOR PROVIDES A CONSTANT 460 OR 230 VAC, 3 PHASE, 60 HERTZ ELECTRICAL SUPPLY.

SECTION 1

DESCRIPTION

1.1 INTRODUCTION

THIS TECHNICAL SUPPLEMENT COVERS THE AUTO RESTART OPTION FOR 69UG15- AND 69RG15- UNITS. IT CONTAINS OPERATING DATA, TROUBLESHOOTING INSTRUCTIONS AND REPLACEMENT COMPONENT INFORMATION FOR CARRIER TRANSICOLD'S CLIP-ON AND UNDERMOUNT GENERATOR SET AUTO RESTART OPTION. THE AUTO-RESTART OPTION IS A SOLID STATE, AUTOMATIC START/RE-START CONTROLLER POWERED BY THE GENERATOR SETS 12 VOLT BATTERY.

WARNING

BEWARE OF V-BELTS AND BELT DRIVEN COMPONENTS AS THE UNIT MAY START AUTOMATICALLY. BEFORE SERVICING UNIT, MAKE SURE THE IGNITION SWITCH (IGN) IS IN THE STOP POSITION. ALSO DISCONNECT THE NEGATIVE BATTERY CABLE.

SEPARATLY BOUND MANUALS COVERING THE UNDERMOUNT AND CLIP-ON GENERATOR SETS ARE ALSO SUPPLIED, SEE CHART BELOW.

MANUAL / FORM NUMBER	EQUIPMENT COVERED	MANUAL DESCRIPTION
T-266	69UG15- MODELS	OPERATION AND SERVICE
T-266PL	69UG15- MODELS	SERVICE PARTS LIST
T-272	69RG15- MODELS	OPERATION AND SERVICE
T-272PL	69RG15- MODELS	SERVICE PARTS LIST

1.2 AUTO RESTART OPERATION

AUTO START/RESTART IS PROVIDED TO SIMPLIFY STARTING AND PROVIDE AN AUTOMATIC RESTART FEATURE THAT WILL AUTOMATICALLY ATTEMPT TO RESTART THE UNIT IN CASE OF SHUTDOWN.

FOUR LED'S INDICATE SHUTDOWN FROM OVERCRANK, OVERSPEED, LOW OIL PRESSURE AND HIGH WATER TEMPERATURE. A FIFTH LED IS USED TO INDICATE WHEN THE UNIT IS RUNNING.

THE MODULE CONTAINS THE FOLLOWING PRESET VALUES:

OVERSPEED:	2100 RPM	OVERSPEED IS THE POINT AT WHICH THE UNIT WILL SIGNAL FOR SHUTDOWN IF THE ENGINE SPEED BECOMES TO HIGH AN RPM.
CRANK DISCONNECT:	700 RPM	CRANK DISCONNECT IS THE POINT AT WHICH THE AUTO RESTART MODULE SENSES THE ENGINE HAS STARTED AND WILL DISENGAGE THE STARTER.
SHUTDOWN LOCKOUT DELAY:	15 SECONDS	THE OIL PRESSURE AND WATER TEMPERATURE INPUTS ARE IGNORED DURING THIS 15 SECOND DELAY (DURING STARTUP)
GLOW PLUG DELAY:	40 SECONDS	THE GLOW PLUG DELAY IS USED TO ENERGIZE THE GLOW PLUG CIRCUIT. THE GLOW PLUG DELAY BEGINS TIMING AFTER THE AUTO RESTART MODULE SIGNAL IS RECEIVED. DURING THE ENTIRE DELAY, THE GLOW PLUG CIRCUIT IS ENERGIZED AND AN AUDIBLE ALARM WILL SOUND. WHEN THE DELAY EXPIRES THE UNIT WILL CRANK.
CRANK ATTEMPTS:	A SERIES OF SIX ATTEMPTS WITH THREE ATTEMPTS IN EACH SERIES. (TOTAL OF 18 ATTEMPTS)	

1.3 AUTO RESTART SEQUENCING

SERIES ATTEMPT NUMBER	GLOW PLUGS ENERGIZED IN SECONDS	FUEL SOLENOID ENGAGED	ENGINE CRANK DURATION (SECONDS)	ENGINE REST DURATION (SECONDS)	ENGINE STATUS
1	40	X	5	10 *	<p>IF THE ENGINE STARTS:</p> <ul style="list-style-type: none"> a. GLOW PLUGS DE-ENERGIZED. b. CRANK OUTPUT WILL DE-ENERGIZE. c. RUN SEQUENCE BEGINS <p>IF THE ENGINE FAILS TO START:</p> <ul style="list-style-type: none"> a. GLOW PLUGS DE-ENERGIZED. b. FUEL SOLENOID WILL DE-ENERGIZED. c. CRANK OUTPUT WILL DE-ENERGIZE. d. OVERCRANK LED WILL FLASH ONE TIME, WAIT TWO SECONDS AND REPEAT. e. UNIT WILL REST 30 MINUTES AND PROCEED TO THE NEXT SERIES.
2	40	X	5	10 *	<p>IF THE ENGINE STARTS:</p> <ul style="list-style-type: none"> a. GLOW PLUGS DE-ENERGIZED. b. CRANK OUTPUT WILL DE-ENERGIZE. c. RUN SEQUENCE BEGINS <p>IF THE ENGINE FAILS TO START:</p> <ul style="list-style-type: none"> a. GLOW PLUGS DE-ENERGIZED. b. FUEL SOLENOID WILL DE-ENERGIZED. c. CRANK OUTPUT WILL DE-ENERGIZE. d. OVERCRANK LED WILL FLASH TWO TIMES, WAIT TWO SECONDS AND REPEAT. e. UNIT WILL REST 30 MINUTES AND PROCEED TO THE NEXT SERIES.
3	40	X	5	10 *	<p>IF THE ENGINE STARTS:</p> <ul style="list-style-type: none"> a. GLOW PLUGS DE-ENERGIZED. b. CRANK OUTPUT WILL DE-ENERGIZE. c. RUN SEQUENCE BEGINS <p>IF THE ENGINE FAILS TO START:</p> <ul style="list-style-type: none"> a. GLOW PLUGS DE-ENERGIZED. b. FUEL SOLENOID WILL DE-ENERGIZED. c. CRANK OUTPUT WILL DE-ENERGIZE. d. OVERCRANK LED WILL FLASH THREE TIMES, WAIT TWO SECONDS AND REPEAT. e. UNIT WILL REST 5 HOURS AND PROCEED TO THE NEXT SERIES.

1.3 AUTO RESTART SEQUENCING

SERIES ATTEMPT NUMBER	GLOW PLUGS ENERGIZED IN SECONDS	FUEL SOLENOID ENGAGED	ENGINE CRANK DURATION (SECONDS)	ENGINE REST DURATION (SECONDS)	ENGINE STATUS
4	40	X	5	10 *	<p>IF THE ENGINE STARTS:</p> <ul style="list-style-type: none"> a. GLOW PLUGS DE-ENERGIZED. b. CRANK OUTPUT WILL DE-ENERGIZE. c. RUN SEQUENCE BEGINS <p>IF THE ENGINE FAILS TO START:</p> <ul style="list-style-type: none"> a. GLOW PLUGS DE-ENERGIZED. b. FUEL SOLENOID WILL DE-ENERGIZED. c. CRANK OUTPUT WILL DE-ENERGIZE. d. OVERCRANK LED WILL FLASH FOUR TIMES, WAIT TWO SECONDS AND REPEAT. e. UNIT WILL REST 5 HOURS AND PROCEED TO THE NEXT SERIES.
5	40	X	5	10 *	<p>IF THE ENGINE STARTS:</p> <ul style="list-style-type: none"> a. GLOW PLUGS DE-ENERGIZED. b. CRANK OUTPUT WILL DE-ENERGIZE. c. RUN SEQUENCE BEGINS <p>IF THE ENGINE FAILS TO START:</p> <ul style="list-style-type: none"> a. GLOW PLUGS DE-ENERGIZED. b. FUEL SOLENOID WILL DE-ENERGIZED. c. CRANK OUTPUT WILL DE-ENERGIZE. d. OVERCRANK LED WILL FLASH FIVE TIMES, WAIT TWO SECONDS AND REPEAT. e. UNIT WILL REST 5 HOURS AND PROCEED TO THE NEXT SERIES.
6	40	X	5	10 *	<p>IF THE ENGINE STARTS:</p> <ul style="list-style-type: none"> a. GLOW PLUGS DE-ENERGIZED. b. CRANK OUTPUT WILL DE-ENERGIZE. c. RUN SEQUENCE BEGINS <p>IF THE ENGINE FAILS TO START:</p> <ul style="list-style-type: none"> a. GLOW PLUGS DE-ENERGIZED. b. FUEL SOLENOID WILL DE-ENERGIZED. c. CRANK OUTPUT WILL DE-ENERGIZE. d. OVERCRANK LED WILL ILLUMINATE SOLID AND LOCK OUT FUTURE CRANK ATTEMPTS. e. TO RESET, TURN UNIT POWER SWITCH OFF AND BACK ON.

* – ENGINE CRANK AND REST IS REPEATED THREE TIMES EACH SERIES UNLESS THE ENGINE STARTS.

SECTION 2 OPERATION

2.1 AUTOMATIC START

WARNING

SAFETY GLASSES SHOULD BE WORN WHILE SERVICING OR OPERATING GENERATOR.

WARNING

HEARING PROTECTION SHOULD BE WORN IN HIGH NOISE ENVIRONMENTS.

WARNING

DO NOT WEAR LOOSE CLOTHING, JEWELRY OR NON-CONTAINED LONG HAIR THAT COULD GET CAUGHT ON MOVING PARTS WHILE OPERATING THE GENERATOR.

WARNING

UNITS EQUIPED WITH AN AUTO RESTART MODULE CAN START UNANNOUNCED.

WARNING

BEWARE OF V-BELTS AND BELT DRIVEN COMPONENTS AS THE UNIT MAY START AUTOMATICALLY. BEFORE SERVICING UNIT, MAKE SURE THE IGNITION SWITCH (IGN) IS IN THE STOP POSITION. ALSO DISCONNECT THE NEGATIVE BATTERY CABLE.

WARNING

ELECTRICAL POWER IS GENERATED BY A LIMA 15 KW, A-C GENERATOR. THE GENERATOR PROVIDES A CONSTANT 460 OR 230 VAC, 3 PHASE, 60 HERTZ ELECTRICAL SUPPLY.

a. STARTING INSTRUCTIONS

1. PLACE IGNITION SWITCH (IGN) IN THE RUN POSITION.
2. THE AUTO RESTART MODULE WILL ENERGIZE THE GLOW PLUGS AND THE SAFETY BUZZER WILL SOUND. AFTER ALL OF THE MODULE'S CONDITIONS ARE MET, AS DESCRIBED IN SECTION 1.3, THE UNIT WILL ATTEMPT TO START.

b. STOPPING INSTRUCTIONS

1. PLACE IGNITION SWITCH (IGN) IN THE STOP POSITION.

SECTION 3

TROUBLESHOOTING

3.1 AUTO RESTART OPTION

CONDITION	POSSIBLE CAUSE
3.1.1 WHEN THE IGNITION SWITCH IS PLACED IN THE RUN POSITION, NOTHING HAPPENS.	<ul style="list-style-type: none"> c. WAIT 60 SECONDS. THERE IS A 40 SECOND TIME DELAY FOR GLOW PLUG WARMING. d. CHECK FOR 12 VOLTS ACROSS THE IGNITION SWITCH. e. IF NO, RESET CIRCUIT BREAKERS AND TRACE ALL WIRE CONNECTIONS BACK TO THE BATTERY. f. IF YES, CHECK FOR 12 VOLTS AT PIN #4 OF THE CONNECTOR PLUG. g. IF NO, REPLACE IGNITION SWITCH. h. IF YES, CHECK WIRING AND AUDIBLE ALARM AND REPLACE AS REQUIRED. i. IF NO PROBLEM IS FOUND WITH THE WIRING OR ALARM, REPLACE AUTO-RESTART MODULE.
3.1.2 AUDIBLE PRESTART ALARM SOUNDS, BUT ENGINE DOES NOT CRANK.	<ul style="list-style-type: none"> a. CHECK FOR 12 VOLTS AT PIN #2 OF CONNECTOR. b. IF YES, CHECK STARTER SOLENOID AND REPLACE IF NECESSARY. c. IF STARTER SOLENOID FUNCTIONS PROPERLY REPLACE AUTO RESTART MODULE.
3.1.3 STARTER ENGAGES AND IMMEDIATLY DISENGAGES.	<ul style="list-style-type: none"> a. PLACE IGNITION SWITCH IN THE OFF POSITION. b. CHECK BATTERY CABLES FOR LOOSE OR BAD CONNECTIONS. c. CHECK AND RECHARGE BATTERY. d. REPLACE BATTERY WITH THE PROPER SIZE AND AMP HOUR RATING.
3.1.4 ENGINE CRANKS, BUT WILL NOT START.	<ul style="list-style-type: none"> a. PLACE IGNITION SWITCH IN THE OFF POSITION. b. CHECK THE FUEL SUPPLY AND ADD FUEL IF NECESSARY. (NOTE: IT MAY BE NECESSARY TO RE-PRIME THE INJECTOR PUMP BEFORE ATTEMPTING TO RESTART) c. CHECK THE FUEL SOLENOID AND IT'S CONNECTIONS, REPLACE IF NECESSARY. d. CHECK THE GLOW PLUG RELAY AND CONNECTIONS, REPLACE IF NECESSARY. e. REPLACE AUTO RESTART MODULE. <p>NOTE: ALSO SEE APPROPRIATE GENSET OPERATION AND SERVICE MANUAL FOR NORMAL TROUBLESHOOTING IN WHICH THE AUTO RESTART MODULE IS NOT AFFECTED.</p>

CONDITION	POSSIBLE CAUSE
3.1.5 THE ENGINE STARTS, BUT THE STARTER DOES NOT DISENGAGE AND CONTINUES TO CRANK THE ENGINE.	a. PLACE IGNITION SWITCH IN THE OFF POSITION. b. CHECK THE SPEED SENSOR WIRING AND CONNECTIONS. c. CHECK THE SPEED SENSOR AIR GAP. (1/4 TO 1/2 A TURN AWAY FROM THE FLYWHEEL GEAR TEETH) d. REPLACE SPEED SENSOR. e. REPLACE AUTO RESTART MODULE.
3.1.6 ENGINE STARTS, BUT SHUTS DOWN ON LOW OIL PRESSURE.	a. REFER TO THE APPROPRIATE GENSET OPERATION AND SERVICE MANUAL FOR PROPER OIL PRESSURE. b. CHECK ENGINE OIL FOR PROPER LEVEL. c. CHECK THE WIRING TO THE OIL PRESSURE SAFETY SWITCH FOR LOOSE OR BROKEN CONNECTIONS. REPLACE IF NECESSARY. d. CHECK OIL PRESSURE SWITCH. REPLACE IF NECESSARY.
3.1.7 THE ENGINE STARTS, BUT SHUTS DOWN ON HIGH WATER TEMPERATURE.	a. CHECK COOLANT FOR PROPER LEVEL. b. CHECK THE WIRING TO THE HIGH WATER TEMPERATURE SWITCH FOR LOOSE OR BROKEN CONNECTIONS. REPLACE IF NECESSARY. NOTE: ALSO SEE APPROPRIATE GENSET OPERATION AND SERVICE MANUAL FOR ADDITIONAL COOLANT SYSTEM INFORMATION.
3.1.8 THE ENGINE STARTS, BUT SHUTS DOWN FROM OVERSPEED.	a. CHECK AND RESET ENGINE TO THE PROPER OPERATING SPEED. REFER TO THE APPROPRIATE GENSET OPERATION AND SERVICE MANUAL FOR PROPER OPERATING SPEED.

SECTION 4 SCHEMATIC

4.1 INTRODUCTION

THIS SECTION CONTAINS ELECTRICAL WIRING SCHEMATICS COVERING THE GENERATOR SET AUTO RESTART OPTION. THE FOLLOWING GENERAL SAFETY NOTICES SUPPLEMENT THE SPECIFIC WARNINGS AND CAUTIONS APPEARING ELSEWHERE IN THIS MANUAL. THEY ARE RECOMMENDED PRECAUTIONS THAT MUST BE UNDERSTOOD AND APPLIED DURING OPERATION AND MAINTENANCE OF THE EQUIPMENT COVERED HEREIN.

WARNING

SAFETY GLASSES SHOULD BE WORN WHILE SERVICING OR OPERATING GENERATOR.

WARNING

HEARING PROTECTION SHOULD BE WORN IN HIGH NOISE ENVIRONMENTS.

WARNING

BEFORE SERVICING UNIT, MAKE SURE THE UNIT CIRCUIT BREAKER (CB-1) AND THE IGNITION SWITCH (IGN) ARE IN THE OFF POSITION. ALSO DISCONNECT POWER PLUG AND CABLE.

WARNING

UNITS EQUIPED WITH AN AUTO RESTART MODULE CAN START UNANNOUNCED.

WARNING

BEWARE OF V-BELTS AND BELT DRIVEN COMPONENTS AS THE UNIT MAY START AUTOMATICALLY. BEFORE SERVICING UNIT, MAKE SURE THE IGNITION SWITCH (IGN) IS IN THE STOP POSITION. ALSO DISCONNECT THE NEGATIVE BATTERY CABLE.

WARNING

BEWARE OF HOT EXHAUST COMPONENTS.

WARNING



HIGH VOLTAGE (DIELECTRIC) TESTING MUST NOT BE PERFORMED TO THE MACHINE WITHOUT FIRST OBSERVING NEMA RULES. THE INSULATION OF THIS GENERATOR WINDING MAY BE SAFELY CHECKED BY USING A MEGGER. A HIGH MEGGER READING INDICATES GOOD INSULATION.

WARNING

ELECTRICAL POWER IS GENERATED BY A LIMA 15 KW, A-C GENERATOR. THE GENERATOR PROVIDES A CONSTANT 460 OR 230 VAC, 3 PHASE, 60 HERTZ ELECTRICAL SUPPLY.

WARNING

MAKE SURE THE POWER PLUG(S) ARE CLEAN AND DRY BEFORE CONNECTING TO ANY POWER RECEPTACLE.

LINE	SYMBOL	LEGEND
2,5,6,10,11,14		ENGINE GROUND
21		CHASSIS GROUND
1	A -	AMMETER
14	BC -	BATTERY CHARGER
1	BAT -	BATTERY
3,5,16	CB -	CIRCUIT BREAKER
5	CM -	CONTROL MODULE
4,6,13,14	D -	DIODE
8	ESA -	ENGINE START ALARM
7	ESL -	ENGINE START LIGHT
8	ESS -	ENGINE SPEED SENSOR
9	FH -	FUEL HEATER
3	FS -	FUEL SOLENOID
3	FSA -	FUEL SOLENOID HOLD
3	FSB -	FUEL SOLENOID PULL
16	G -	GENERATOR
2	GP -	GLOW PLUG
3	GR -	GLOW PLUG RELAY
6	HWT -	HIGH WATER TEMP. SWITCH
4	IGN -	IGNITION SWITCH
5	LOP -	LOW OIL PRESS. SWITCH
10	OPG -	OIL PRESSURE GAUGE
10	OPS -	OIL PRESSURE SENDER
16	R1 -	RECEPTACLE
4,8	S -	SAFETY RELAY
2	SM -	STARTER MOTOR
2	SS -	STARTER SOLENOID
12	TT -	TIME METER
11	WTG -	WATER TEMP. GAUGE
11	WTS -	WATER TEMP. SENDER

**FIGURE 4.2 ELECTRICAL WIRING SCHEMATIC - DRAWING NUMBER 62-10386-00 REV -
APPLIES TO FIGURE 4.3 AND 4.4
(PID RG0466 ONLY)**

12VDC CONTROL CIRCUIT

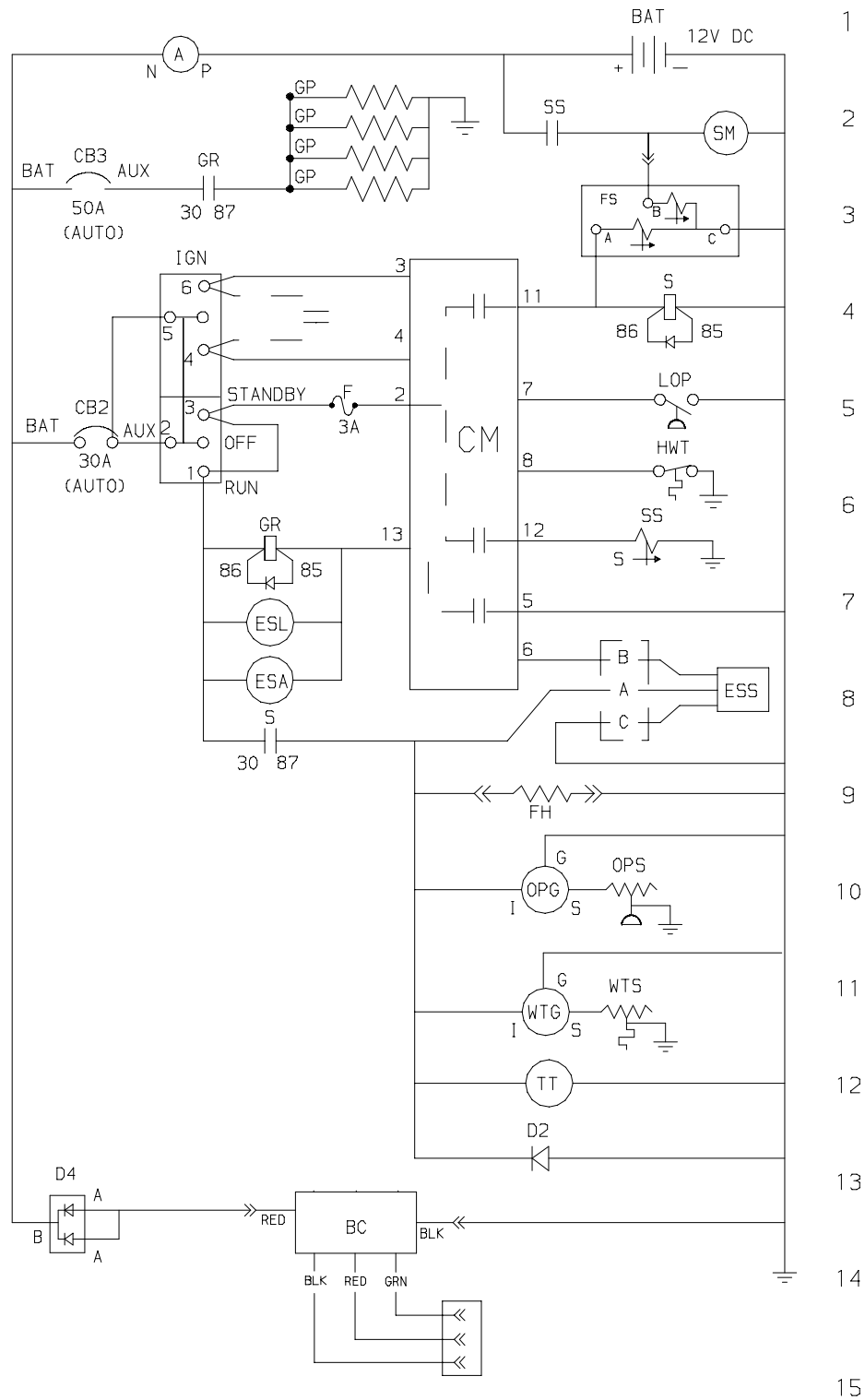
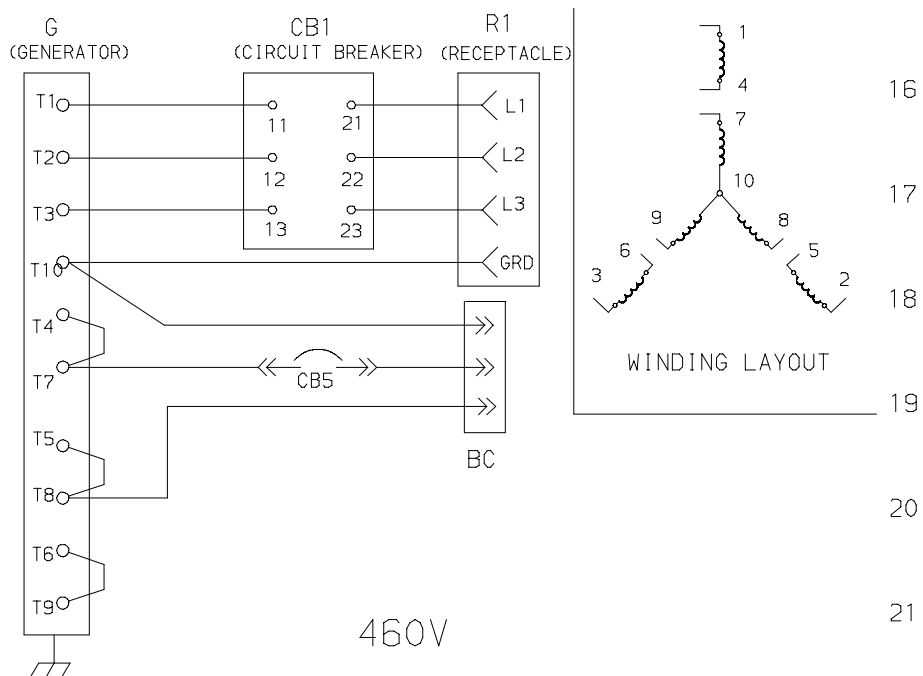




FIGURE 4.3 ELECTRICAL WIRING SCHEMATIC - DRAWING NUMBER 62-10386-00 REV - (PID RG0466 ONLY)

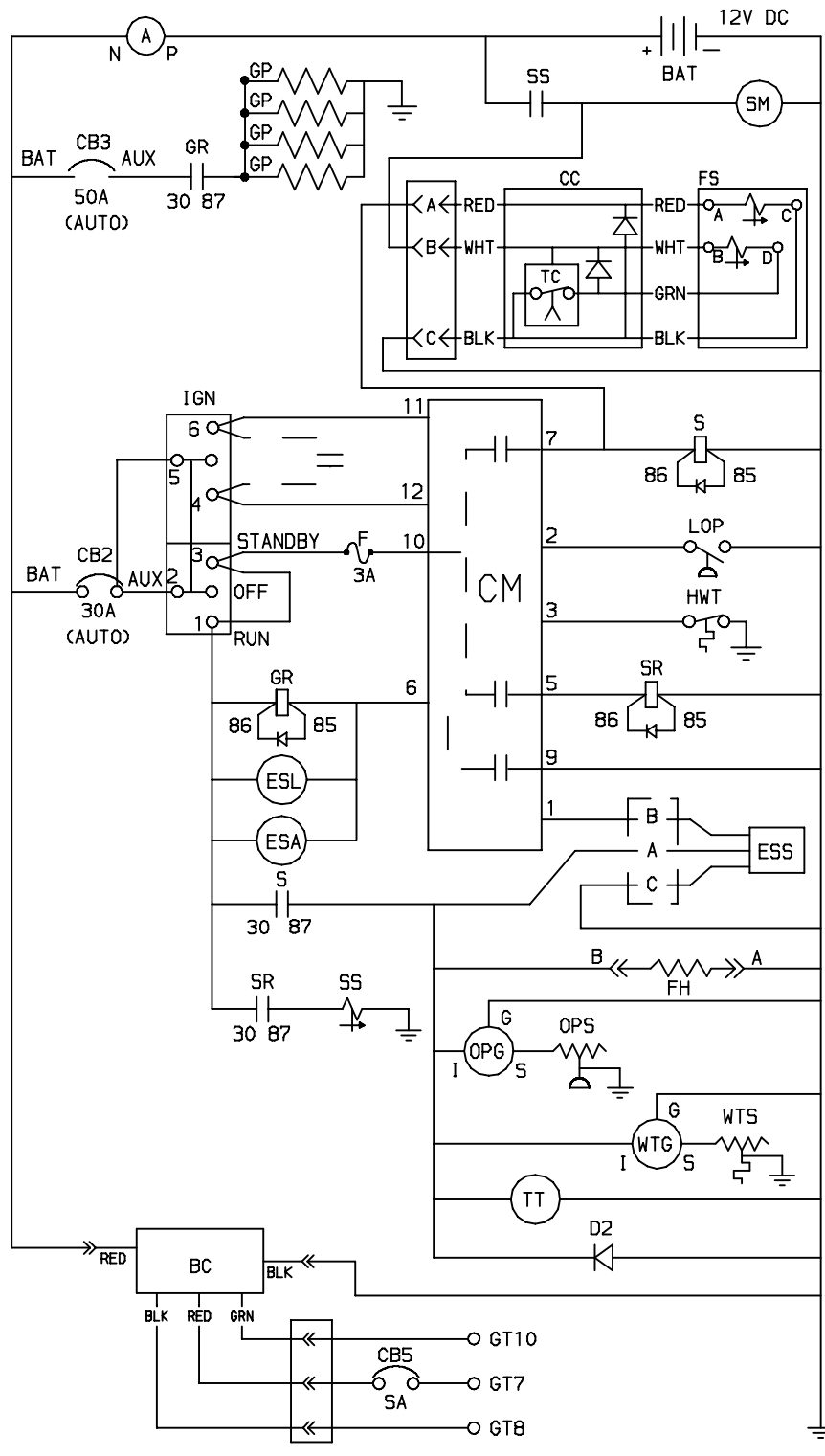


**FIGURE 4.4 ELECTRICAL WIRING SCHEMATIC - DRAWING NUMBER 62-10386-00 REV -
HIGH VOLATGE INFORMATION
(PID RG0466 ONLY)**

LINE	SYMBOL	LEGEND
2,7,11,15		ENGINE GROUND
21		CHASSIS GROUND
1	A -	AMMETER
14	BC -	BATTERY CHARGER
1	BAT -	BATTERY
3,7,16	CB -	CIRCUIT BREAKER
3	CC	COIL COMMANDER
7	CM -	CONTROL MODULE
13	D -	DIODE
9	ESA -	ENGINE START ALARM
9	ESL -	ENGINE START LIGHT
9	ESS -	ENGINE SPEED SENSOR
7	F -	FUSE
11	FH -	FUEL HEATER
3	FS -	FUEL SOLENOID
3	FSA -	FUEL SOLENOID HOLD
3	FSB -	FUEL SOLENOID PULL
16	G -	GENERATOR
2	GP -	GLOW PLUG
3	GR -	GLOW PLUG RELAY
7	HWT -	HIGH WATER TEMP. SWITCH
5	IGN -	IGNITION SWITCH
6	LOP -	LOW OIL PRESS. SWITCH
11	OPG -	OIL PRESSURE GAUGE
11	OPS -	OIL PRESSURE SENDER
16	R1 -	RECEPTACLE
5,10	S -	SAFETY RELAY
2	SM -	STARTER MOTOR
2	SS -	STARTER SOLENOID
13	TT -	TIME METER
12	WTG -	WATER TEMP. GAUGE
12	WTS -	WATER TEMP. SENDER

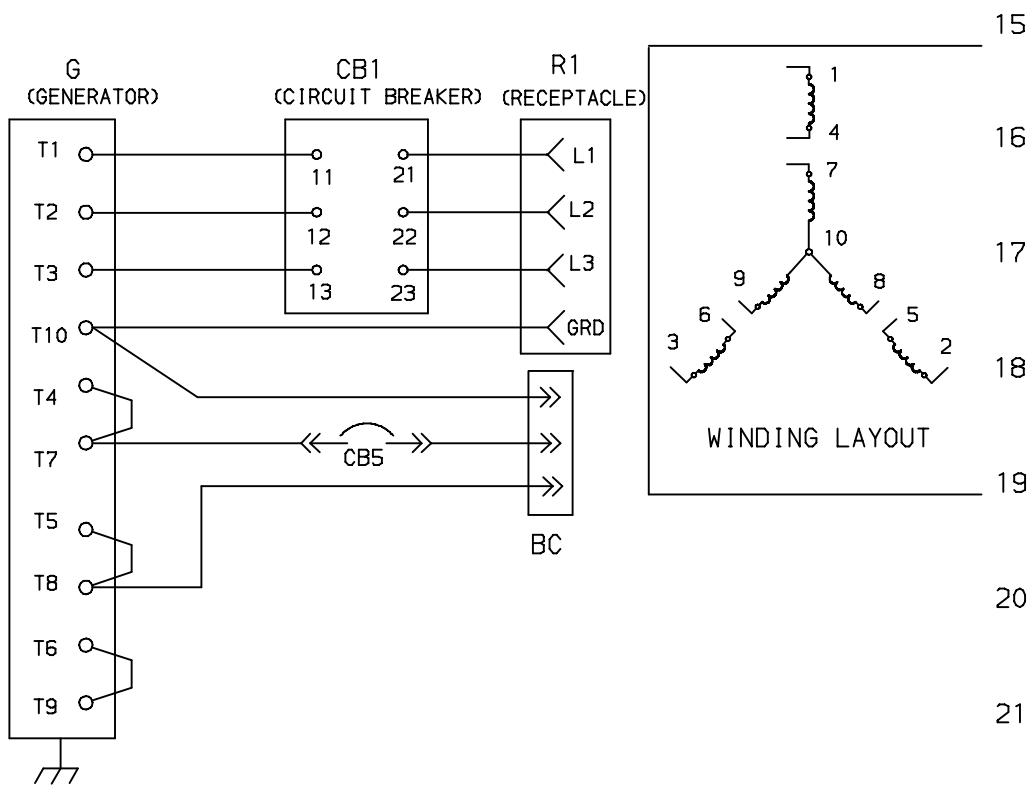
**FIGURE 4.5 ELECTRICAL WIRING SCHEMATIC - DRAWING NUMBER 62-11257-00 REV -
APPLIES TO FIGURE 4.6 AND 4.7
(PID RG1160 ONLY)**

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15



62-10411

460 Volt Circuit



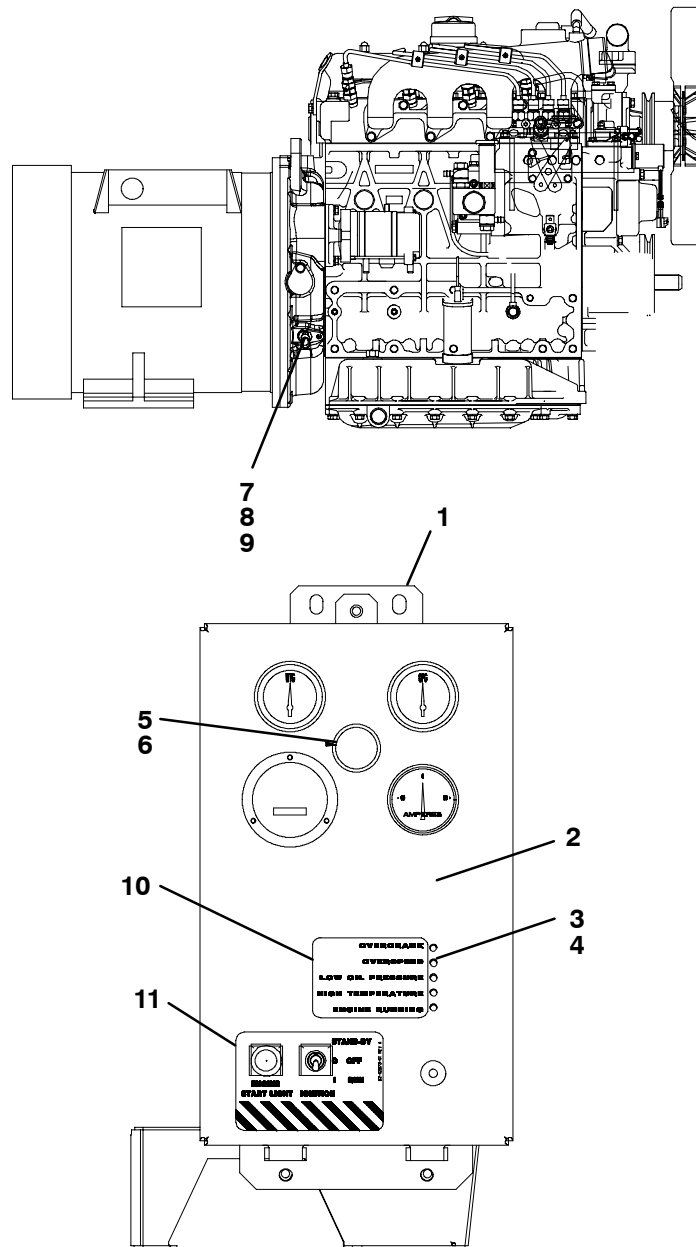
**FIGURE 4.7 ELECTRICAL WIRING SCHEMATIC - DRAWING NUMBER 62-11257-00 REV -
HIGH VOLTAGE INFORMATION
(PID RG1160 ONLY)**

SECTION 5
SERVICE REPLACEMENT PARTS

PART NO.	DESCRIPTION
5.1 QUICK LIST	

ITEM	PART NO.	DESCRIPTION	QTY
------	----------	-------------	-----

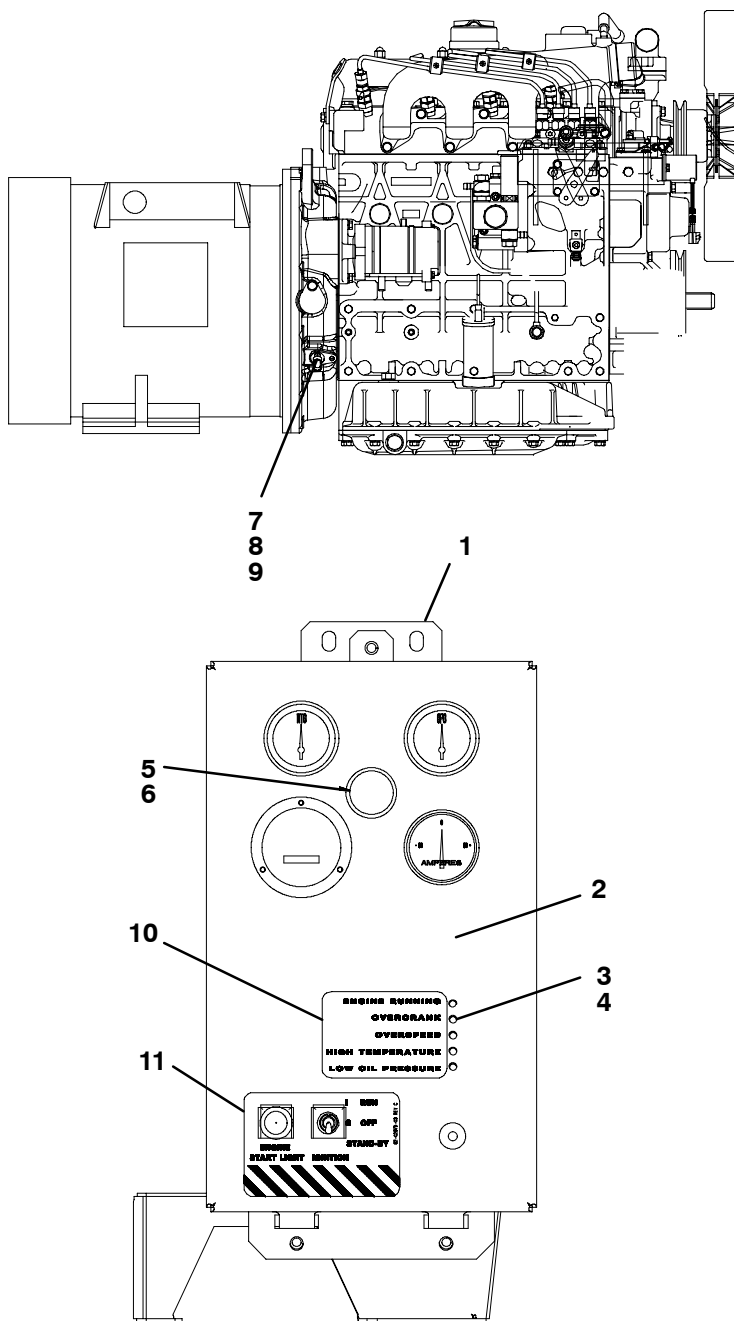
5.2 AUTO RESTART OPTION (PID RG0466 ONLY)



ITEM	PART NO.	DESCRIPTION	QTY
5.2	AUTO RESTART OPTION (PID RG0466 ONLY) - SEE NOTE		
-	79-	CONTROL BOX ASSEMBLY, AUTO RESTART - INCLUDES:	1
1	86-04231-01	CONTROL BOX	1
2	86-04165-03	COVER, CONTROL BOX	1
3	12-00477-02	MODULE, AUTO RESTART	1
4	42-00473-00	GASKET, AUTO RESTART	1
5	10-00375-01	INDICATOR (BUZZER)	1
6	42-00243-14	O RING	1
NS	22-01890-00	HARNESS, AUTO RESTART	1
7	12-00448-01	SENSOR, RPM	1
8	34-01152-16	SCREW, CAP HEX HEAD, M6 X 16 MM - SST	1
9	34-01151-06	WASHER, FLAT, M6 - SST	1
10	62-10387-00	LABEL, AUTO RESTART LED	1
11	62-02973-01	LABEL, SWITCH	1

NOTE: THIS INFORMATION IS ONLY FOR AUTO RESTART UNITS. PLEASE REFER TO THE APPROPRIATE UNIT MANUAL FOR STANDARD COMPONENT INFORMATION.

ITEM	PART NO.	DESCRIPTION	QTY
5.3 AUTO RESTART OPTION (PID RG0596 ONLY)			

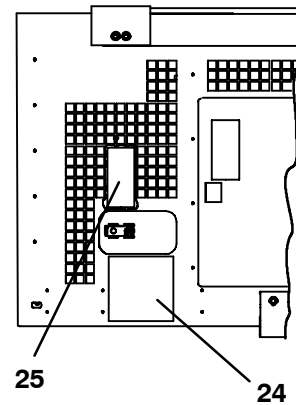
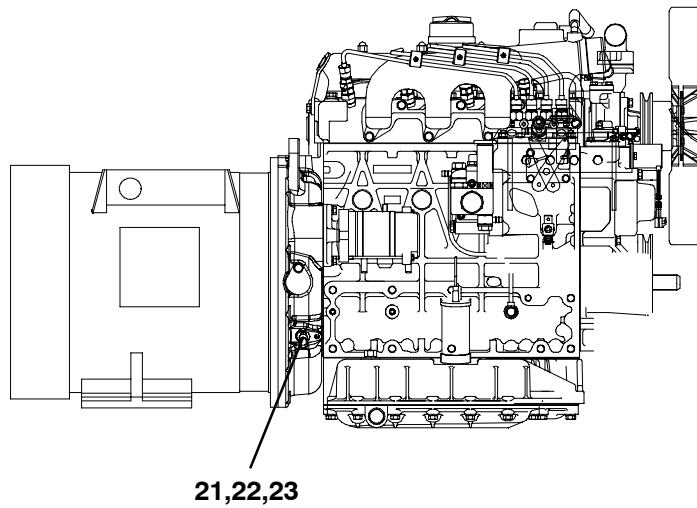


ITEM	PART NO.	DESCRIPTION	QTY
5.3 AUTO RESTART OPTION (PID RG0596 ONLY)			
-	79-	CONTROL BOX ASSEMBLY, AUTO RESTART - INCLUDES:	1
1	86-04231-01	CONTROL BOX	1
2	86-04165-06	COVER, CONTROL BOX	1
3	12-00477-02	MODULE, AUTO RESTART	1
4	42-00481-00	GASKET, AUTO RESTART	1
5	10-00375-01	INDICATOR, BUZZER	1
6	42-00243-14	O RING	1
NS	22-01937-00	HARNESS, AUTO RESTART	1
7	12-00448-01	SENSOR	1
8	34-01152-16	SCREW, CAP HEX HEAD, M6 X 16 MM - SST	1
9	34-01151-06	WASHER, FLAT, M6 - SST	1
10	62-10387-01	LABEL, AUTO RESTART LED	1
11	62-02973-03	LABEL, SWITCH	1

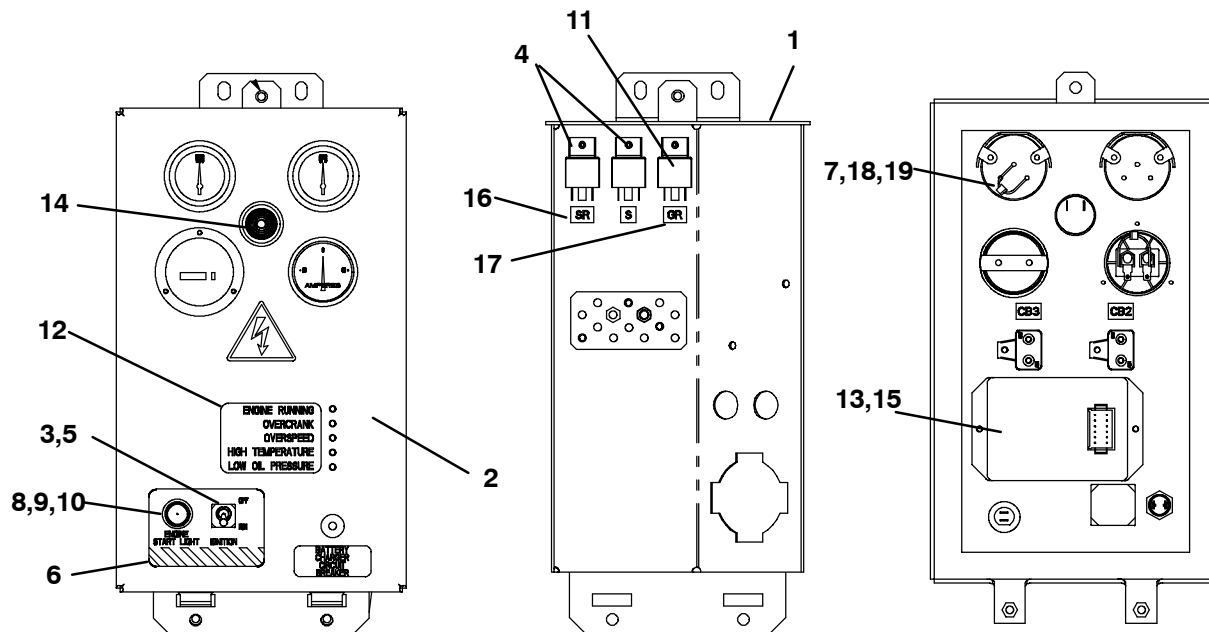
NOTE: THIS INFORMATION IS ONLY FOR AUTO RESTART UNITS. PLEASE REFER TO THE APPROPRIATE UNIT MANUAL FOR STANDARD COMPONENT INFORMATION.

ITEM	PART NO.	DESCRIPTION	QTY
------	----------	-------------	-----

5.4 AUTO RESTART OPTION (PID RG1160 ONLY)



LOCATED TO LEFT OF
CONTROL BOX. PORTION OF
GRILL REMOVED FOR CLARITY



ITEM 20 = HARNESS ASSEMBLY

ITEM	PART NO.	DESCRIPTION	QTY
5.4	AUTO RESTART OPTION (PID RG1160 ONLY) - SEE NOTE		
1	86-04655-01	CONTROL BOX	1
2	86-04662-01	COVER, CONTROL BOX	1
3	10-01129-05	SWITCH, TOGGLE	1
4	10-00286-02	RELAY (WITH DIODE)	1
5	69GC15-3542	BRACKET	1
6	62-02973-02	LABEL, SWITCH	1
7	22-01030-54	DIODE ASSEMBLY	1
8	22-00049-00	LAMP	1
9	22-00518-01	BASE, PILOT LIGHT	1
10	22-00519-01	JEWEL ASSEMBLY, PILOT LIGHT, RED	1
11	10-00328-00	RELAY, 70 AMP	1
12	62-10387-01	LABEL, AUTO RESTART LED	1
13	12-00477-02	MODULE, AUTO RESTART	1
14	10-00375-01	BUZZER, WARNING	1
15	42-00481-00	GASKET, AUTO RESTART	1
16	62-10530-02	LABEL "SR"	1
17	62-10530-03	LABEL "GR"	1
18	22-02200-06	WASHER, PLAIN #6	1
19	34-00667-07	NUT, SELF LOCK #6-32	1
20	22-01965-07	HARNESS, AUTO RESTART	1
21	12-00448-01	SENSOR, RPM	1
22	34-01152-16	SCREW, CAP HEX HEAD, M6 X 16 MM - SST	1
23	34-01151-06	WASHER, FLAT, M6 - SST	1
24	62-02717-06	LABEL, STOP/START	1
25	62-02146-00	LABEL, WARNING - AUTO START	1

NOTE: THIS INFORMATION IS ONLY FOR AUTO RESTART UNITS. PLEASE REFER TO THE APPROPRIATE UNIT MANUAL FOR STANDARD COMPONENT INFORMATION.

PART NUMBER INDEX

PART NO.	PAGE NO.	PART NO.	PAGE NO.	PART NO.	PAGE NO
10-00286-02	5-7	22-01965-07	5-7	62-02973-03	5-5
10-00328-00	5-7	22-02200-06	5-7	62-10387-00	5-3
10-00375-01	5-3, 5-5, 5-7	34-00667-07	5-7	62-10387-01	5-5, 5-7
10-01129-05	5-7	34-01151-06	5-3, 5-5, 5-7	62-10530-02	5-7
12-00448-01	5-3, 5-5, 5-7	34-01152-16	5-3, 5-5, 5-7	62-10530-03	5-7
12-00477-02	5-3, 5-5, 5-7	42-00243-14	5-3, 5-5	69GC15-3542	5-7
22-00049-00	5-7	42-00473-00	5-3	86-04165-03	5-3
22-00518-01	5-7	42-00481-00	5-5, 5-7	86-04165-06	5-5
22-00519-01	5-7	62-02146-00	5-7	86-04231-01	5-3, 5-5
22-01030-54	5-7	62-02717-06	5-7	86-04655-01	5-7
22-01890-00	5-3	62-02973-01	5-3	86-04662-01	5-7
22-01937-00	5-5	62-02973-02	5-7		