SG035 | 4.5L | 35 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary

GENERAC | INDUSTRIAL POWER

DEMAND RESPONSE READY

Standby Power Rating
35 kW, 44 kVA, 60 Hz

Demand Response Rating
35 kW, 44 kVA, 60 Hz

Prime Power Rating
32 kW, 39 kVA, 60 Hz

ISO 9001:2008

USA ENGINEERED & BUILT* *Assembled in the USA using domestic and foreign parts

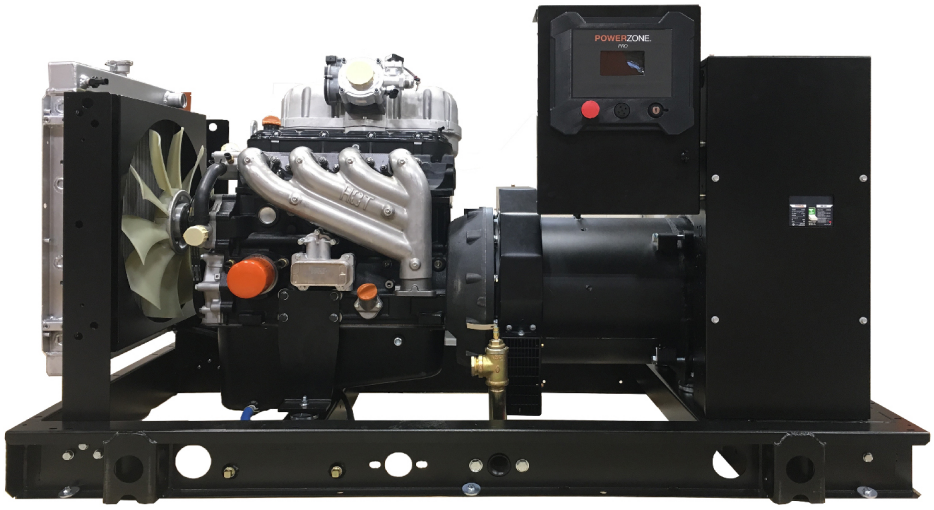


Image used for illustration purposes only

Codes and Standards

Not all codes and standards apply to all configurations. Contact factory for details.

UL2200, UL6200, UL1236, UL489

CSA C22.2

BS5514 and DIN 6271

SAE J1349

NFPA 37, 70, 99, 110

NEC700, 701, 702, 708

ISO 3046, 7637, 8528, 9001

NEMA ICS10, MG1, 250, ICS6, AB1

ANSI C62.41

IBC 2009, CBC 2010, IBC 2012, ASCE 7-05, ASCE 7-10, ICC-ES AC-156 (2012)

Powering Ahead

Generac ensures superior quality by designing and manufacturing most of its generator components, such as alternators, enclosures, control systems and communications software. Generac also makes its own spark-ignited engines, and you'll find them on every Generac gaseous-fueled generator. We engineer and manufacture them from the block up — all at our facilities throughout Wisconsin. Applying natural gas and LP-fueled engines to generators requires advanced engineering expertise to ensure reliability, durability and necessary performance. By designing specifically for these dry, hotter-burning fuels, the engines last longer and require less maintenance. Building our own engines also means we control every step of the supply chain and delivery process, so you benefit from single-source responsibility.

Plus, Generac Industrial Power's distribution network provides all parts and service so you don't have to deal with third-party suppliers. It all leads to a positive owner experience and higher confidence level. Generac spark-ignited engines give you more options in commercial and industrial generator applications as well as extended run time from utility-supplied natural gas.

SG035 | 4.5L | 35 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary

GENERAC | INDUSTRIAL POWER

STANDARD FEATURES

DEMAND RESPONSE READY

ENGINE SYSTEM

- Oil Drain Extension
- Air Cleaner
- Level 1 Fan and Belt Guards (Open Set Only)
- Stainless Steel Flexible Exhaust Connection
- Factory Filled Oil and Coolant
- Critical Silencer
- Oil Temperature Sender with Alarm
- Air Filter Restriction Indicator

Fuel System

- Fuel Line - NPT Connection
- Primary and Secondary Fuel Shutoff

Cooling System

- Closed Coolant Recovery System
- UV/Ozone Resistant Hoses
- Factory-Installed Radiator
- 50/50 Ethylene Glycol Antifreeze
- Radiator Drain Extension

Electrical System

- Battery Charging Alternator
- Battery Cables
- Battery Tray
- Rubber-Booted Engine Electrical Connections
- Solenoid Activated Starter Motor

ALTERNATOR SYSTEM

- UL2200 GENprotect™
- Class H Insulation Material
- 2/3 Pitch
- Skewed Stator
- Brushless Excitation
- Sealed Bearing
- Full Load Capacity Alternator

GENERATOR SET

- Internal Genset Vibration Isolation
- Separation of Circuits - High/Low Voltage
- Separation of Circuits - Multiple Breakers
- Wrapped Exhaust Piping
- Standard Factory Testing
- 2 Year Limited Warranty (Standby and Demand Response Rated Units)
- 1 Year Limited Warranty (Prime Rated Units)

ENCLOSURE (If Selected)

- Rust-Proof Fasteners with Nylon Washers to Protect Finish
- High Performance Sound-Absorbing Material (Sound Attenuated Enclosures)
- Gasketed Doors
- Upward Facing Discharge Hoods (Radiator and Exhaust)
- Stainless Steel Lift Off Door Hinges
- Stainless Steel Lockable Handles
- RhinoCoat™ - Textured Polyester Powder Coat Paint

CONTROL SYSTEM

Power Zone® Pro Controller

- NFPA 110 Level 1 Compliant
- Engine Protective Functions
- Alternator Protective Functions
- Digital Engine Governor Control
- Digital Voltage Regulator
- Multiple Programmable Inputs and Outputs
- Remote Display Capability
- Remote Communication via Modbus® RTU, Modbus TCP/IP, and Ethernet 10/100
- Alarm and Event Logging with Real Time Stamping
- Expandable Analog and Digital Inputs and Outputs
- Remote Wireless Software Update Capable
- Wi-Fi®, Bluetooth®, BMS, and Remote Telemetry
- Built-In Programmable Logic Eliminates the Need for External Controllers Under Most Conditions
- Programmable I/O Channel Properties
- Built-In Diagnostics

Alarms and Warnings

- High/Low Oil Pressure
- High/Low Coolant Level
- High/Low Coolant Temperature
- Sender/Sensor Failure
- High/Low Oil Temperature
- Over Total kW
- Over/Under Speed
- Over/Under Voltage
- Over/Under Frequency
- Over Current
- High/Low Battery Voltage
- Battery Charger Current
- Phase to Phase and Phase to Neutral Short Circuits (I^2T Algorithm)

4.3 Inch Color Touch Screen Display

- Resistive Color Touch Screen
- Easily Identifiable Icons
- Multi-Lingual
- On Screen Editable Parameters
- Key Function Monitoring
- Three Phase Voltage, Amperage, kW, kVA, and kVAr
- Selectable Line to Line or Line to Neutral Measurements
- Frequency
- Engine Speed
- Engine Coolant Temperature
- Engine Oil Pressure
- Engine Oil Temperature
- Battery Voltage
- Hourmeter
- Warning and Alarm Indication
- Diagnostics
- Maintenance Events/Information

SG035 | 4.5L | 35 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary

CONFIGURABLE OPTIONS

DEMAND RESPONSE READY

ENGINE SYSTEM

- Engine Coolant Heater
- Level 1 Fan and Belt Guards (Enclosed Units Only)
- Baseframe Cover/Rodent Guard
- Radiator Duct Adapter (Open Set Only)

FUEL SYSTEM

- Stainless Steel Flexible Fuel Lines

ELECTRICAL SYSTEM

- 10A UL Listed Battery Charger
- Battery Warmer

ALTERNATOR SYSTEM

- Alternator Upsizing
- Anti-Condensation Heater
- Tropical Coating

CIRCUIT BREAKER OPTIONS

- Main Line Circuit Breaker
- 2nd Main Line Circuit Breaker
- 3rd Main Line Circuit Breaker
- Shunt Trip and Auxiliary Contact
- Electronic Trip Breakers

GENERATOR SET

- Extended Factory Testing (3-Phase Only)
- 8 Position Load Center
- Spring Vibration Isolators
- Pad Vibration Isolators

ENCLOSURE

- Weather Protected Enclosure
- Level 1 Sound Attenuated
- Level 2 Sound Attenuated
- Level 2 Sound Attenuated with Motorized Dampers
- Steel Enclosure
- Aluminum Enclosure
- Up to 200 MPH Wind Load Rating (Contact Factory for Availability)
- AC/DC Enclosure Lighting Kit
- Enclosure Heaters (with Motorized Dampers Only)

CONTROL SYSTEM

- NFPA 110 Compliant 21-Light Remote Annunciator
- Remote Relay Assembly (8 or 16)
- Remote E-Stop (Break Glass-Type, Surface Mount)
- Remote E-Stop (Red Mushroom-Type, Surface Mount)
- Remote E-Stop (Red Mushroom-Type, Flush Mount)
- 10A Engine Run Relay
- Ground Fault Indication and Protection Functions
- 120V GFCI and 240V Outlets
- 100 dB Alarm Horn

WARRANTY (Standby Gensets Only)

- 2 Year Extended Limited Warranty
- 5 Year Limited Warranty
- 5 Year Extended Limited Warranty
- 7 Year Extended Limited Warranty
- 10 Year Extended Limited Warranty

ENGINEERED OPTIONS

CONTROL SYSTEM

- Spare Inputs (x4) / Outputs (x4)
- Battery Disconnect Switch

GENERATOR SET

- Special Testing
- Battery Box

SG035 | 4.5L | 35 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary

GENERAC | INDUSTRIAL POWER

APPLICATION AND ENGINEERING DATA

DEMAND RESPONSE READY

ENGINE SPECIFICATIONS

General

Make	Generac
Cylinder #	4
Type	In-Line
Displacement - in^3 (L)	275.0 (4.5)
Bore - in (mm)	4.5 (114.3)
Stroke - in (mm)	4.25 (107.95)
Compression Ratio	9.94:1
Intake Air Method	Naturally Aspirated
Number of Main Bearings	5
Connecting Rods	Forged Steel, Fractured Split, Bushingless
Cylinder Head	Cast Iron
Cylinder Liners	Cast Iron
Ignition	Coil Near Plug Solid State Inductive
Piston Type	Cast Aluminum Flat Top
Crankshaft Type	Forged Steel
Lifter Type	Hydraulic
Intake Valve Material	Stainless Steel
Exhaust Valve Material	Stainless Steel
Hardened Valve Seats	High Steel Iron Alloy

Engine Governing

Governor	Electronic
Frequency Regulation (Steady State)	±0.25%

Lubrication System

Oil Pump Type	Gear Driving
Oil Filter Type	Full-Flow Spin-On Cartridge
Crankcase Capacity - qt (L)	21 (20)

Cooling System

Cooling System Type	Pressurized Closed
Fan Type	Pusher
Fan Speed - RPM	2,100
Fan Diameter - in (mm)	20 (508)

Fuel System

Fuel Type	Natural Gas, Propane
Fuel Injection	Electronic
Fuel Shut Off	Generac
NG Operating Fuel Pressure - in H_2O (kPa)	5 - 14 (1.2 - 3.5)
LP Operating Fuel Pressure - in H_2O (kPa)	7 - 14 (1.7 - 3.5)

Engine Electrical System

System Voltage	12 VDC
Battery Charger Alternator	35 A
Battery Size	See Battery Index 0161970SBY
Battery Voltage	12 VDC
Ground Polarity	Negative

ALTERNATOR SPECIFICATIONS

Standard Model	K0035124Y21
Poles	4
Field Type	Revolving
Insulation Class - Rotor	H
Insulation Class - Stator	H
Total Harmonic Distortion	<5% (3-Phase Only)
Telephone Interference Factor (TIF)	<50
Standard Excitation	Synchronous Brushless
Bearings	Sealed Ball
Coupling	Direct via Flexible Disc
Prototype Short Circuit Test	Yes
Voltage Regulator Type	Full Digital
Number of Sensed Phases	All
Regulation Accuracy (Steady State)	±0.25%

SG035 | 4.5L | 35 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary

GENERAC | INDUSTRIAL POWER

OPERATING DATA

DEMAND RESPONSE READY

POWER RATINGS

	Standby		Prime	
Single-Phase 120/240 VAC @1.0pf	35 kW/35 kVA	Amps: 146	32 kW/32 kVA	Amps: 131
Three-Phase 120/208 VAC @0.8pf	35 kW/44 kVA	Amps: 122	32 kW/39 kVA	Amps: 109
Three-Phase 120/240 VAC @0.8pf	35 kW/44 kVA	Amps: 105	32 kW/39 kVA	Amps: 95
Three-Phase 277/480 VAC @0.8pf	35 kW/44 kVA	Amps: 53	32 kW/39 kVA	Amps: 47
Three-Phase 346/600 VAC @0.8pf	35 kW/44 kVA	Amps: 42	32 kW/39 kVA	Amps: 38

MOTOR STARTING CAPABILITIES (skVA)

skVA vs. Voltage Dip

277/480 VAC	30%	208/240 VAC	30%
K0035124Y21	61	K0035124Y21	46
K0060124Y21	124	K0060124Y21	95

FUEL CONSUMPTION RATES*

Natural Gas – scfh (m^3/hr)

Percent Load	Standby	Prime
25%	184 (5.2)	174 (4.9)
50%	273 (7.7)	248 (7.0)
75%	361 (10.2)	343 (9.7)
100%	446 (12.6)	427 (12.1)

LP Vapor – scfh (m^3/hr)

Percent Load	Standby	Prime
25%	98 (2.8)	94 (2.7)
50%	129 (3.7)	120 (3.4)
75%	159 (4.5)	155 (4.4)
100%	191 (5.4)	184 (5.2)

* Fuel supply installation must accommodate fuel consumption rates at 100% load.

COOLING

		Standby	Prime
Air Flow (Fan Air Flow Across Radiator) - Open Set	scfm (m^3/min)	3,511 (99.4)	
Coolant Flow	gpm (Lpm)	37.7 (142.7)	
Coolant System Capacity	gal (L)	3 (11.4)	
Max. Operating Ambient Temperature	°F (°C)	122 (50)	
Maximum Operating Ambient Temperature (Before Derate)		See Bulletin No. 0199270SSD	
Maximum Additional Radiator Backpressure	in H_2O (kPa)	0.5 (0.12)	

COMBUSTION AIR REQUIREMENTS

	Standby	Prime
Flow at Rated Power - scfm (m^3/min)	74 (2.1)	66.3 (1.9)

ENGINE

		Standby	Prime
Rated Engine Speed	RPM	1,800	1,800
Horsepower at Rated kW**	hp	54	49
Piston Speed	ft/min (m/min)	1,275 (389)	1,275 (389)
BMEP	psi (kPa)	88 (606)	80 (554)

EXHAUST

		Standby	Prime
Exhaust Flow (Rated Output)	scfm (m^3/min)	214.2 (6.1)	201.5 (5.7)
Maximum Allowable Backpressure (Post Silencer)	inHg (kPa)	0.75 (2.54)	0.75 (2.54)
Exhaust Temperature (Rated Output)	°F (°C)	1,342 (728)	1,330 (721)

** Refer to "Emissions Data Sheet" for maximum bHP for EPA and SCAQMD permitting purposes.

Deration – Operational characteristics consider maximum ambient conditions. Derate factors may apply under atypical site conditions.
Please contact a Generac Power Systems Industrial Dealer for additional details. All performance ratings in accordance with ISO3046, BS5514, ISO8528, and DIN6271 standards.
Standby - See Bulletin 0187500SSB
Demand Response - See Bulletin 10000018250
Prime - See Bulletin 0187510SSB

SG035 | 4.5L | 35 kW

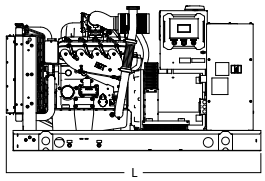
INDUSTRIAL SPARK-IGNITED GENERATOR SET

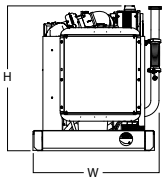
EPA Certified Stationary

GENERAC | INDUSTRIAL POWER

DIMENSIONS AND WEIGHTS*

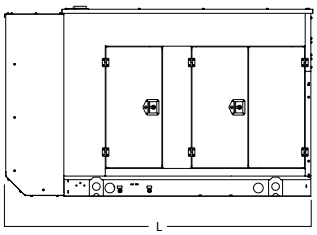
DEMAND RESPONSE READY

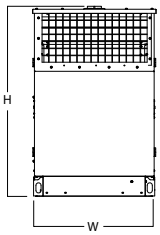




OPEN SET

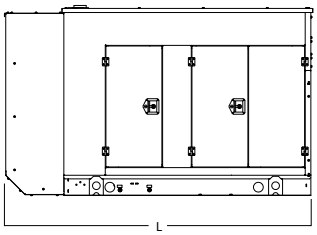
L x W x H - in (mm)	78.1 (1,981) x 37.3 (946) x 44.4 (1,128)
Weight - lbs (kg)	1,675 - 1,748 (760 - 793)

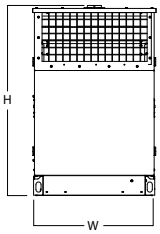




WEATHER PROTECTED ENCLOSURE

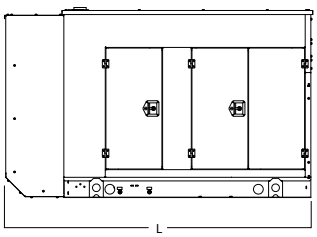
L x W x H - in (mm)	94.8 (2,409) x 38.0 (965) x 57.5 (1,461)
Weight - lbs (kg)	Steel: 2,160 - 2,233 (980 - 1,013) Aluminum: 1,894 - 1,965 (859 - 891)

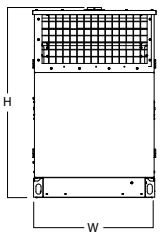




LEVEL 1 SOUND ATTENUATED ENCLOSURE

L x W x H - in (mm)	94.8 (2,409) x 38.0 (965) x 57.5 (1,461)
Weight - lbs (kg)	Steel: 2,258 - 2,329 (1,024 - 1,056) Aluminum: 1,987 - 2,061 (901 - 935)





LEVEL 2 SOUND ATTENUATED ENCLOSURE

L x W x H - in (mm)	94.8 (2,409) x 38.0 (965) x 57.5 (1,461)
Weight - lbs (kg)	Steel: 2,341 - 2,414 (1,062 - 1,095) Aluminum: 2,071 - 2,144 (939 - 972)

* All measurements are approximate and for estimation purposes only.

YOUR FACTORY RECOGNIZED GENERAC INDUSTRIAL DEALER

Specification characteristics may change without notice. Please contact a Generac Power Systems Industrial Dealer for detailed installation drawings.

SPEC SHEET

Generac Power Systems, Inc. | P.O. Box 8 | Waukesha, WI 53189
P: (262) 544-4811

Part No. A0000310331
Rev. B 06/03/20

TX Series Transfer Switch

TXC-100

Automatic Transfer Switch Controller

- Automatic Transfer Switch Controller
- Up to 480 VAC, 50/60 Hz
- Single and Three Phase
- cETLus Recognized Component
- Tested to UL 1008

Image used for illustration purposes only

Codes and Standards

Not all codes and standards apply to all configurations. Contact factory for details.

cETLus Recognized per UL 1008

NFPA 37, 70, 99, 110

NEC 700, 701, 702, 708

Description

Generac's TXC-100 microprocessor based controller provides customers with the flexibility to program a comprehensive group of set points to match the application needs. The controller has 2 programmable inputs and 1 programmable output as standard and is available with an optional expansion board for up to 4 programmable inputs and outputs. The LCD displays real time and historical information with time-stamped events. The integrated plant exerciser can be configured in off, daily, day of week, biweekly, and monthly intervals with user selectable run time. Standard features of the controller include three phase sensing on both sources, phase unbalance, phase reversal, emergency inhibit, and communications.

TX Series Transfer Switch

TXC-100

Automatic Transfer Switch Controller

STANDARD FEATURES

GENERAL

- Graphical LCD-Based Display for Programming, System Diagnostics and Help Menu Display Mimic Diagram with Source Available and Connected LED Indicator
- Time-Stamped Event History Log
- Programmable Exerciser - Daily, Weekly, Bi-Weekly, Monthly
- Methods of Transfer Include: Open with Inphase Transition Only, Time Delay in Neutral Transition, or Inphase with a Default to Time Delay in Neutral Transfer
- Modbus® RTU Communications
- Operating Temperature -4 ° to 158 °F (-20 ° to 70 °C)
- Voltage Agnostic*
- Integrated Anti-condensation Heater Control
- Auxiliary Output Includes: 2WS, SB4T, Fault, and a Programmable Relay Output
- Auxiliary Input Includes: Permissive and Loadshed Inputs (24 VDC)
- Expandable Input/Output Board Module Includes: 4 Relay Outputs and 4 Optically Isolated Inputs
- Front Programmable Control Reduces PPE Needs and Arc Flash Hazard
- Built in Battery Backup - Increases Switch Reliability and Reduces Switch Transition Time to Alternate Source
- Rechargeable Lithium-ion Battery Backup Able to Power the Controller for up to 60 Minutes in the Event of No Source Availability
- Accessible USB Port for Easy Data Downloads, Firmware Updates without Requiring PPE, Reducing the Risk of Arc Flash
- All Amp Nodes Offered with Delayed Transition
- General Alarm Indication
- Heater Programmable through Control for Desired Temperature and Humidity Settings
- Front Accessible Customer Connections and Battery without Arc Flash Exposure
- Auxiliary Generator Battery Backup for Controller

VOLTAGE AND FREQUENCY SENSING

- Three Phase Under and Over Voltage Sensing on Normal and Emergency Sources
- Under and Over Frequency Sensing on Normal and Emergency
- Selectable Settings: Single or Three Phase Voltage
- Sensing on Normal, Emergency and Load 50 or 60 Hz
- Phase Sequence Sensing for Phase Sensitive Loads

PROGRAMMABLE I/O PARAMETERS

Outputs:

- Source 1 – Two Wire Start
- Source 2 – Two Wire Start
- Engine Exercising
- Engine Warmup
- Signal Before Transfer (Elevator Contact)
- General Alarm
- Source 1 Good
- Source 2 Good

Inputs:

- Permissive (Emergency Inhibit)
- Remote Engine Fast Test
- Remote Engine Normal Test
- ATS Timer
- Initiate Demand Response

* 480 V Delta Must be Specified at Time of Ordering for Transformer Kit to be Included

AVAILABLE OPTIONS

- Chicago Code Kit
- 3R Padlockable Cover for Controller (Standard on 3R Enclosure)
- Emergency Inhibit
- Selectable Retransfer
- Manual Generator Retransfer
- Type 1 to 3R Conversion Kit
- Heater Option for Temperature and Humidity Control (Standard on 3R Enclosure)
- Input/Output (I/O) Module
- Current Measurements**
- Power in kW**
- Power Factor**

** When Equipped with Current Transformers

Generac Power Systems, Inc. | P.O. Box 8 | Waukesha, WI 53189
P: (262) 544-4811

Part No. A0000354456
Rev. A 06/18/2020

POWER ZONE® CONTROL PLATFORM
Power Zone® Pro Controller and Connectivity Server

Features - Power Zone® Pro Controller

The Generac Power Zone® Digital Control Platform is a fully integrated and multipurpose family of controllers for Generac's generator systems.

Standard Single Unit Control Features*
- Engine Protective Functions
- Alternator Protective Functions
- Digital Engine Governor Control
- Digital Voltage Regulator
- 4.3" Color Touch Screen
- Multi-Lingual
- Multiple Programmable Inputs and Outputs
- Remote Display Capability
- Remote Communication via Modbus® RTU, Modbus TCP/IP, Ethernet 10/100, SNMP
- Alarm and Event Logging with Real Time Stamping
- Expandable Analog and Digital Inputs and Outputs
- Wireless Software Update via Remote Computer
- Wi-Fi, Bluetooth, BMS and Remote Telemetry
- E-mail Notifications for Alarm Conditions and Log Data**

Standard System Control Features
- Built-In PLC Logic Eliminates the Need for External Controllers Under Most Conditions
- Programmable I/O Channel Properties
- Built-In Diagnostics

Qualification Testing
- Life Test in Environmental Chamber
- Temperature Rating -40° C to +60° C
- Vibration Tested and Protected

Voltage Regulation (Single or Three Phase Module Options)
- Digital Control
- Single Phase or Three Phase RMS Sensing with Loss of Sensing Protection†
- Variable V/F Slope Settings and Adjustable Gains
- Negative Power Limit
- Soft Start Ramping
- Components Encapsulated for Total Protection
- Fault Protection (I^2T Function and GFI)‡

PLC (Built-In Programmable Logic Controller)
- Configurable Through Software Tool
- Customer Configurable for Non-Standard Options
- Up to 8 Simultaneously Running PLC Programs or in Sequence

Communication Ports
- 1 - RS485 - Connectivity Server
- 1 - RS485 - Remote Annunciator Panel/Remote Relay Panel
- 2 - CANBus - Power Zone® Accessories

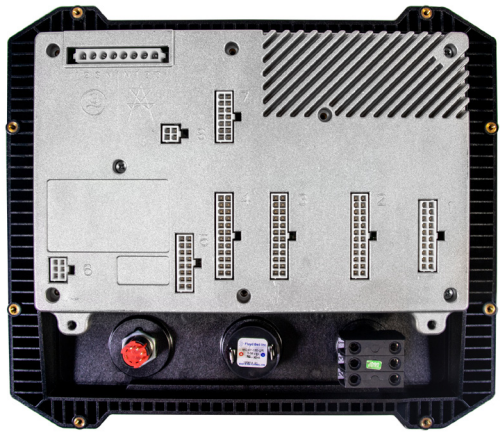
* For SG and SD Models
** Requires Use of a Network Accessible Authenticated or Open SMTP Server

† With Select Voltage Regulators
‡ Configurable Option

Part No. A0000068515
Rev. C 07/06/20

POWER ZONE® CONTROL PLATFORM
Power Zone® Pro Controller and Connectivity Server

Features - Power Zone® Pro Controller (Continued)



Display (Touch Screen)
- LCD 4.3" Color Touch Screen
- Easy Identifiable Icons
- Multi-Lingual
- IP65 Rated
- On Screen Editable Parameters
- Key Function Monitoring
  - Three Phase Voltage, Amperage, kW, kVa, and kVAr
  - Selectable Line to Line or Line to Neutral Measurements
  - Frequency
  - RPM
  - Engine Coolant Temperature
  - Engine Oil Pressure
  - Engine Oil Temperature
  - Battery Voltage
  - Warning and Alarm Indication
  - Diagnostics
  - Maintenance Events/Information
  - Hourmeter

Codes and Standards
- UL 6200
- UL 2200
- CSA STD C22.2 No. 14
- IEC/EN 61010-1
- NFPA 110 (Software Programmable for Level 1 or 2)[§]

Connections[§§]
- 21 - Digital Outputs (Open Drain, 35VDC, 1.7A)
  - 7 Fast PWM Capable
  - 1 High Current
- 15 - Digital Inputs Maximum
  - 7 Fast PWM Capable
- 12 - General Purpose Analog Inputs
- 2 - Special Purpose Analog Inputs
- 2 - Analog Outputs (0-10 VDC)
- 1 - E-Stop Relay Output
- 3 - Current Sense Inputs
- 8 - High Voltage Sense Inputs (Three Phase + Neutral)
- 1 - Magnetic Pickup Input
- 1 - Coolant Sensor Input
- 2 - CANBus Channels
- 1 - External RS-485 Port
- 2 - Switchable 12VDC Power Outputs

Protections
- High/Low Oil Pressure
- High/Low Coolant Level
- High/Low Coolant Temperature
- Sender/Sensor Failure
- High/Low Oil Temperature
- Over/Under Speed
- Over/Under Voltage
- Over/Under Frequency
- Over Current
- Over Total kW
- High/Low Battery Voltage
- Battery Charger Current
- Phase to Phase and Phase to Neutral Short Circuits (I^2T Algorithm and GFI)

Control Panel and Touch Screen
- Auto/Off/Manual
  - Operation Through Key Switch
  - Indication Through Touch Screen
- Alarm Acknowledge Soft Key
- Audible Alarm and Silence
- Emergency Stop
- Not in Auto Indication Through Touch Screen

§ With Additional Optional Remote Annunciator
§§ Actual I/O May Vary Due to Configuration

Part No. A0000068515
Rev. C 07/06/20

POWER ZONE® CONTROL PLATFORM
Power Zone® Pro Controller and Connectivity Server

Features - Power Zone® Connectivity Server

The Power Zone® Connectivity Server is a user interface for the Power Zone® system that provides external communication via ethernet, Wi-Fi or Bluetooth to a connected device such as a computer, smart phone or tablet. This external communication allows the user to configure or monitor generator parameters, including building management system connections.

Communications
- 1 - Ethernet Port
- 1 - RS485 Port for Input to Main Controller
- 1 - Type A USB Port
- 1 - Micro B USB Port
- Wi-Fi (2.4 Ghz)
- Bluetooth

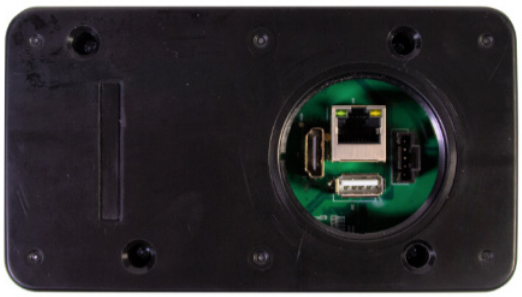
Power Supply Requirements
- Voltage: 11-13 VDC (12 VDC Nominal)
- Usage: 1.1A (Maximum During Power Up)
- Cable: 2 Wires

Environmental
- Temperature Rating -20°C to +60°C
- UL Type 1 Enclosure
- 5% to 90% Non-condensing Humidity

Codes and Standards
- UL 6200
- UL 2200
- CSA STD 222 No. 14
- C-ETL-US
- IEC/EN 61010-1
- FCC

Optional Accessory
- Extension Cabling for External Mounting

Features◊
- Auto/Off/Manual Indication
- Not in Auto Indication
- Alarm Acknowledge Button
- Easily Identifiable Icons
- Multi-Lingual
- IP65 Rated
- On Screen Editable Parameters
- USB Port for Easy Log Data Downloads and Firmware Updates
- Key Function Monitoring
  - Three Phase Voltage, Amperage, kW, kVA, and kVAr
  - Selectable Line to Line or Line to Neutral Voltage Measurements
  - Voltage Frequency
  - Engine Speed
  - Engine Coolant Temperature
  - Engine Oil Pressure
  - Engine Oil Temperature
  - Battery Voltage
  - Warning and Alarm Indication
  - Diagnostics
  - Maintenance Events and Information
  - Engine Hour Meter



◊ When Viewing on a Connected Computer, Smart Phone, Tablet, or Other Smart Device

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P: (262) 544-4811

Part No. A0000068515
Rev. C 07/06/20

ALTERNATOR DATA SHEET
K0035124Y21

General Characteristics

Voltages (V)	208/240 and 480	Number of Leads	12
Frequency (Hz)	60	Winding Type	Reconnectable
Phases	3	Air Flow (CFM)	599
Speed (RPM)	1,800	Total Harmonic Distortion (%)	<5
Excitation System	PMG/Brushless	Largest Single Harmonic Value (%)	<3.5
Insulation Class	H	Telephone Interference Factor (TIF)	<50
Winding Pitch	2/3	Reference Part Number	0J1374D01R, 0L4166E01R

Ratings @ 0.8 pf based on 40˚C ambient

Voltage (V)	80˚C Rise		105˚C Rise		120˚C Rise		150˚C Rise	
	kW	kVA	kW	kVA	kW	kVA	kW	kVA
208/240	28	35	31	39	35	44	38	47
480	28	35	31	39	35	44	38	47

Base Data at 480V, 44 kVA, 1,800 RPM, 60 Hz, 3Ø

Description	Value
Stator Resistance, Line to Line, High Wye Connection (Ω)	0.2147
Rotor Resistance (Ω)	0.9450
Exciter Stator Resistance - PMG/Brushless (Ω)	4.740/5.6000
Exciter Rotor Resistance - PMG/Brushless (Ω)	0.4565/0.4120
Excitation Winding Resistance - PMG/Brushless (Ω)	2.2478/0.5719
Xd, Direct Axis Synchronous Reactance (p.u.)	2.57
X2, Negative Sequence Reactance (p.u.)	0.31
X0, Zero Sequence Reactance (p.u.)	0.05
X'd, Direct Axis Transient Reactance (p.u.)	0.26
X"d, Direct Axis Subtransient Reactance (p.u.)	0.21
Xq, Quadrature Axis Synchronous Reactance (p.u.)	1.12
T'd, Direct Axis Transient Short Circuit Time Constant (s)	0.05

Description	Value
T"d, Direct Axis Subtransient Short Circuit Time Constant (s)	0.008
T'do, Direct Axis Transient Open Circuit Time Constant (s)	0.765
Ta, Short Circuit Time Constant of Armature Winding (s)	0.018
Phase Sequence CCW-NDE	T1, T2, T3
Voltage Balance, L-L or L-N (%)	2.5
Deviation Factor (%)	7
High Wye Connection, Sustained 3Ø Short Circuit Current (%) - PMG Only	300
X/R	7
Short Circuit Ratio	0.51
Heat Rejection (BTU/hr) - 100% Rated Load, 480V, 0.8pf, 120ºC Temperature Rise	27,469

Reference: Mil-STD-705B
All ratings are nominal

ALTERNATOR DATA SHEET
K0035124Y21

skVA

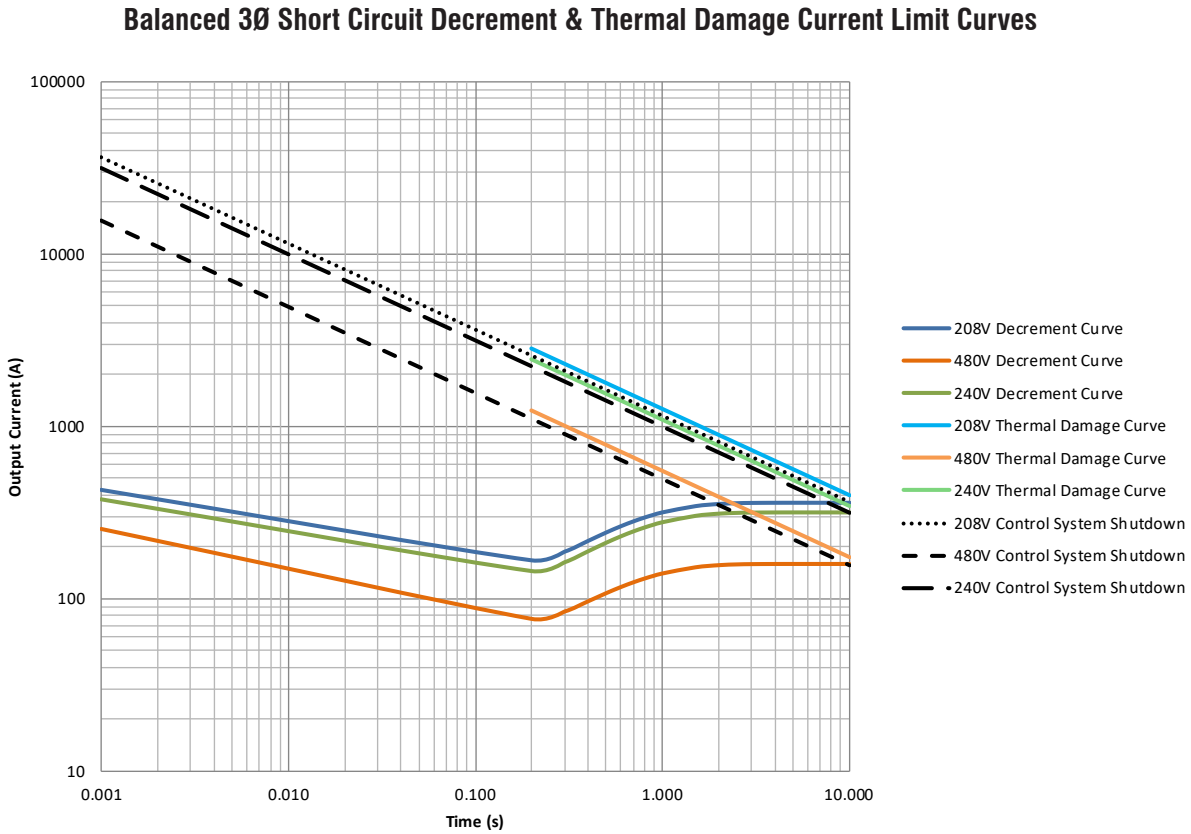
	10%	15%	20%	25%	30%	35%
480 V @ 0.3PF	14	22	31	41	55	67
480 V @ 0.6PF	17	25	36	46	61	75
208/240 V @ 0.3PF	11	16	24	31	41	51
208/240 V @ 0.6PF	13	19	28	36	46	57

Efficiencies

	480 @ 0.8 PF	480 @ 1.0 PF	208/240 @ 0.8PF	208/240 @ 1.0 PF
20% Rated Power*	75.8	78.1	77.9	79.8
40% Rated Power*	82.4	85.6	82.4	86.0
60% Rated Power*	83.2	87.6	82.3	87.1
80% Rated Power*	82.5	87.9	80.7	86.6
100% Rated Power*	81.3	87.5	78.9	85.7

*Rated Power value is rating kW at 120°C Winding Temperature Rise and 0.8pf

LOG LOG Decrement Curve



GENprotect ™
Seamless Protection for Industrial Power Generators

GENprotect Operation

The design choice of an onsite power system using a Generac Industrial Power Generator assures your emergency power source is protected from unexpected power distribution faults. Typically, a generator will include some type of over-current device, such as a circuit breaker, or be protected by inherent design with the controller protecting the alternator through a protection algorithm. Generac's GENprotect generator protection system monitors the system current output and protects the alternator with extended security against fault scenarios that could occur within the site's downstream distribution system.

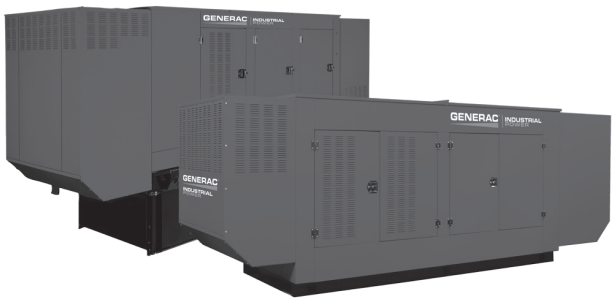
It is a common misconception that the alternator's main circuit breaker protects the alternator from a short circuit event. The main output breaker protects the cabling and provides a convenient disconnect. The characteristic trip curve for the industry standard thermal magnetic breaker (MCCB, molded case thermal magnetic or solid state) does not coordinate with the thermal damage limitation for an on-site generator. If circuit breakers are used for generator protection, a solid-state circuit breaker with full adjustments (Long Time, Short Time and Instantaneous, LSI) is required to coordinate the breaker protection curve within the generator thermal damage curve. Historically, this limitation was often accepted in system design since failures of the main generator feeder are extremely rare. Most short circuit events happen at a branch circuit, equipment level, where the fault is easily cleared by the smaller down stream breakers.

Given the mission critical nature of today's back-up power applications, it is more desirable to protect the system against even relatively rare failure modes. As generator controllers have become more powerful it is feasible for manufactures to supply coordinated short circuit protection integral to the generator control system, negating the need for a main-line circuit breaker.

Generac's GENprotect alternator protection algorithm monitors the generator output. If this monitoring senses short circuit current in excess of rated amps, GENprotect steps in to provide a controlled and safe approach to breaker coordination and alternator protection. GENprotect first limits the alternator short circuit current level to 300%. By limiting the available fault current, GENprotect extends the time the alternator can maintain fault current resulting in consistent breaker coordination. Without this functionality a line to neutral fault may be at 800% of rated current and need to be cleared within 1.4 seconds. The second function GENprotect performs is I2T thermal protection for the alternator. Since a short circuit event can heat the alternator so rapidly, it is not possible to protect the alternator by monitoring temperature. Instead GENprotect calculates the heat energy of the fault current. When this energy reaches the limits of NEMA MG1, GENprotect trips the generator off-line. This configuration ensures the alternator is protected and the power system is ensured 10 seconds of 300% fault current for breaker coordination.

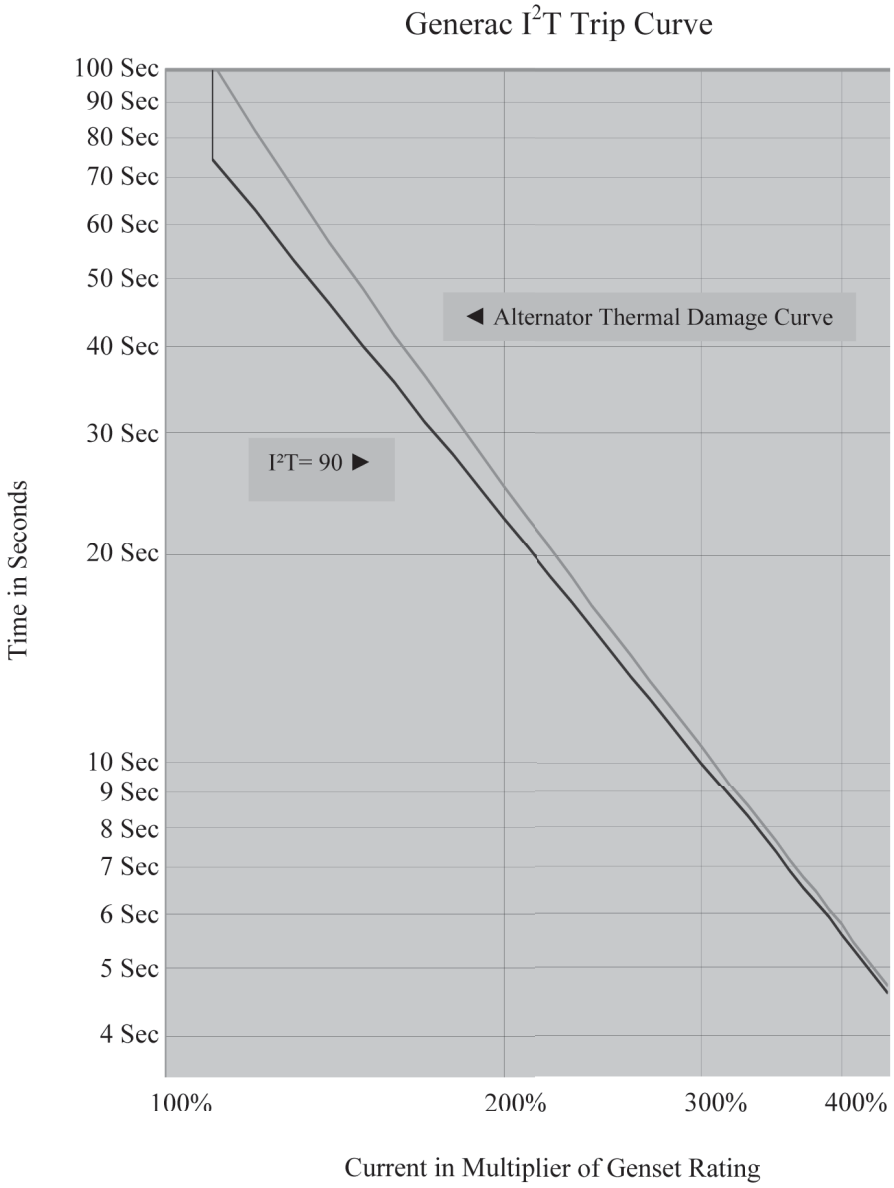
DESCRIPTION

- GENprotect is an alternator protection algorithm approved by UL.
- Protects alternator from damage due to shorts and electrical faults.
- Provides breaker coordination and alternator protection.
- Allows for use of multiple circuit breaker choices, including "no" breaker.



Doc. No 0187980SBY
Rev. D 06/13/19

GENprotect ™
Seamless Protection for Industrial Power Generators



The above Figure shows the Generac GENprotect thermal protection curve for use in protection and coordination studies. The alternator Thermal Damage Curve is shown just to the right of the GENprotect protection curve. If the alternator load is greater than the thermal damage protection curve for the alternator, the generator set will trip off-line. For example, an overload current of 110% for 75 seconds causes an overload alarm and will trip the generator off-line, shutting down the engine. GENprotect will provide generator protection over a full range of time and current, from instantaneous faults to overloads lasting several minutes. An advantage of GENprotect over a MCCB is that GENprotect allows for downstream breakers to clear faults without tripping the generator off-line, providing selective coordination with the first level of downstream breakers.

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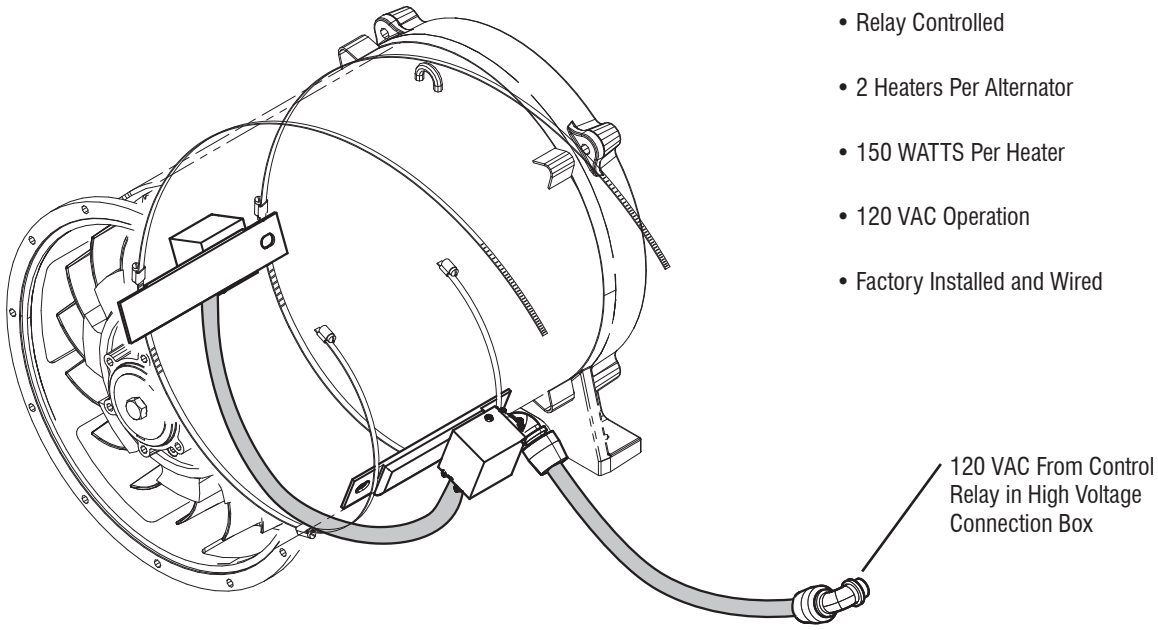
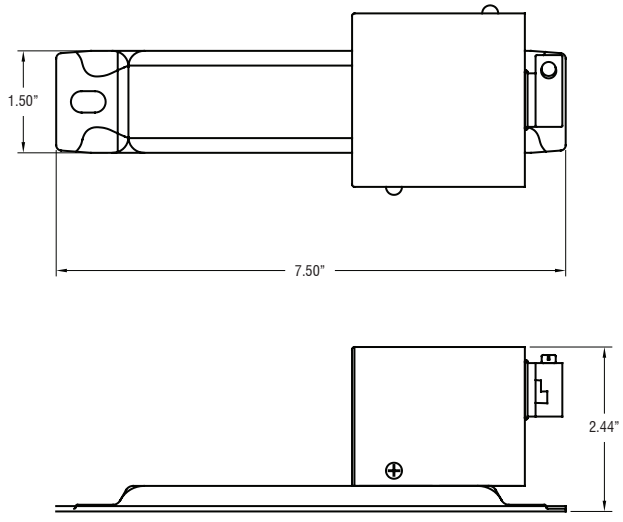
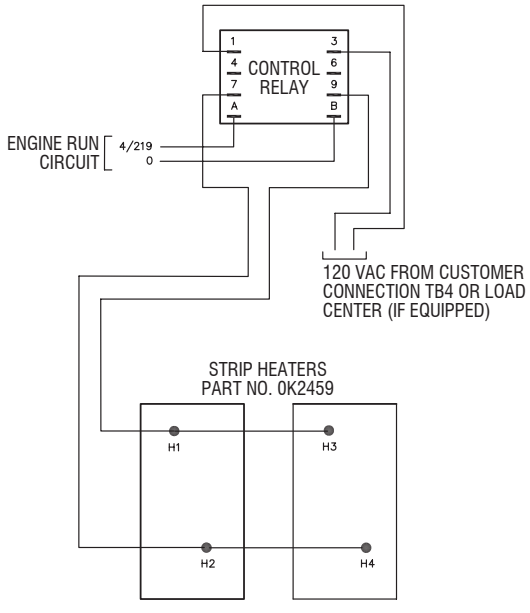
ALTERNATOR STRIP HEATER 120 VAC



Typical Heater Location on Alternator

- Relay Controlled
- 2 Heaters Per Alternator
- 150 WATTS Per Heater
- 120 VAC Operation
- Factory Installed and Wired





WIRING DIAGRAM

Part No. 0603480SSD
Rev. E 06/14/19

INDUSTRIAL GENSET - BATTERY INDEX

• Warranty by Exide Corp. • Exide e-mail: tbgna@exide.com • 800-782-7848 National Hot line

INDUSTRIAL SPARK-IGNITED GENSETS - AVAILABLE BATTERIES

			GENERAC PART #					
Engine	System Voltage	Battery Quantity	058208 (Group 24F)	077483 (Group 26)	058665 (Group 27F)	061119 (Group 31)	061104 (Group 8D)	BT0015A02 (Group 8D)
G2.4	12	1		X				
G4.5	12	1			X	X		
G9.0	12	1			X	X		
G14.2	24	2					X	
G21.9	24	2					X	
G25.8	24	2					X	
G33.9	24	4					X	
G49.0	24	4					X	X

INDUSTRIAL DIESEL GENSETS - AVAILABLE BATTERIES

			GENERAC PART #			
Engine	System Voltage	Battery Quantity	058665 (Group 27F)	061119 (Group 31)	061104/BT0015A00 (Group 8D)	BT0015A02 (Group 8D)
D2.2 Perkins	12	1	X	X		
D2.4 Generac	12	1	X	X		
D3.4 Generac	12	1	X	X		
D4.5 FPT	12	1		X		
D6.7 FPT 100, 130kW	12	1 or 2†		X		
D6.7 FPT 150, 175kW	12	2†		X		
D8.7 FPT	24	2		X		
D10.3 FPT	24	2		X	X	
D12.9 FPT	24	2		X	X	
D12.5 Perkins	24	2			X	
D15.2 Perkins	24	2			X	
D16.0 Volvo	24	2		X	X	
D18.1 Perkins	24	2			X	
D33.9 MHI	24	2			X	X
D37.1 MHI	24	4			X	X
D49.0 MHI	24	4			X	X
D65.4 MHI	24	4			X	X

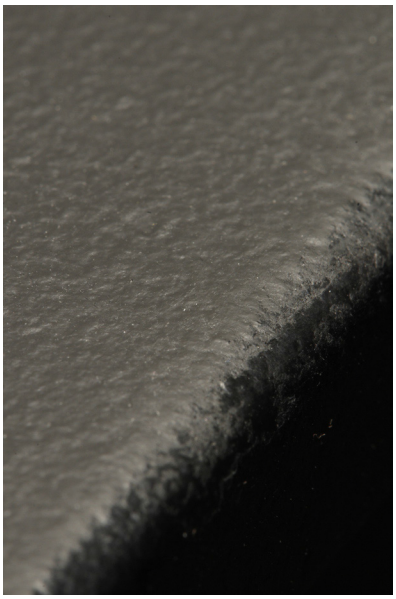
			DIMENSIONS (in) NOMINAL		
Part Number	Group Number*	Nominal CCA @ 0° F	L	W	H
058208	24F	525	6.75	10.63	9.00
077483	26	525	6.75	8.25	7.75
058665	27F	700	6.75	12.50	9.00
061119	31	925	6.75	13.00	9.40
061104/ BT0015A00	8D	1,155	11.00	20.80	10.00
BT0015A02	8D	1,300	11.00	20.80	10.00

All batteries are 12V, 6 cell construction, lead calcium type.
For 24V systems, batteries are wired in series.

X Battery available with electrolyte and installed in genset.
† Single or dual-paralleled battery options are available on 100 and 130kW. Single-battery option not available on 150 and 175kW.
* BCI Group Size reference.

Part No. 0161970SBY
Rev. L 8/24/20

RhinoCoat™



Generac's RhinoCoat™ finish system provides superior durability as a standard for all Generac Industrial enclosures, tanks and frames.*

Testing Standards

Generac's RhinoCoat™ finished surfaces are subjected to numerous tests. These include:

- ASTM D - 1186 - 87.....2.5+ MIL Paint Thickness
- ASTM D - 3363 - 92a.....Adequate Material Hardness
- ASTM D 522 - B.....Resistant to Cracking
- ASTM D 3359 - B.....Exceptional Adhesion
- ASTM B117 D 1654.....Resistant to Salt Water Corrosion
- ASTM D1735 D 1654.....Resistant to Humidity
- ASTM 2794 93 (2004).....Exceptional Impact Resistance
- SAEJ1690 - UV Specifications.....UV Protection

In addition to the testing standards above, Generac adds the following test requirements more specific to generator applications:

- Resistant to Typical Oils
- Resistant to Typical Fuels
- Resistant to Typical Antifreeze
- Resistant to Distilled Water

Primary Codes and Standards

*RhinoCoat™ powder coat paint is durable and corrosion resistant however it is not a rust preventative. Generac pretreats all powder coated parts to assist with resistance to corrosion.

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Part No. 0180230SBY
Rev. F 11/16/19

125 A LOAD CENTER

DESCRIPTION

The 125 AMP Load Center is a unit-mounted distribution panel utilized for optional equipment on all Generac generators utilizing H-100, PM-GC, or PM-PC control systems. This main lug load center includes all of the circuit breakers required for the coolant heater, battery charger, and other factory-installed AC loads within the generator set. The load center also serves as a convenient connection point for the customer's utility feed for AC loads. All breakers are labeled for specific load circuits.

SPECIFICATIONS

- Siemens Part Numbers:
  - NEMA 1: E0816ML1125SCU (Applies to Open Gensets)
  - NEMA 3R: W0816ML1125CU (Applies to Enclosed Gensets)
- 125 AMP Main Lugs EQ Load Center
- 100,000A IR
- 1Ø, Copper Bus
- UL Listed
- Siemens QP Type Circuit Breakers
- Maximum of 8 Single Pole Breakers
- Maximum of 4 Two Pole 240 V Breakers
- Mounted on Genset Frame Near Control Panel/Display Unit*

DIMENSIONS (IN)

	H	W	D
NEMA 1	14.75	12.375	3.87
NEMA 3R	14.75	12.128	4.25

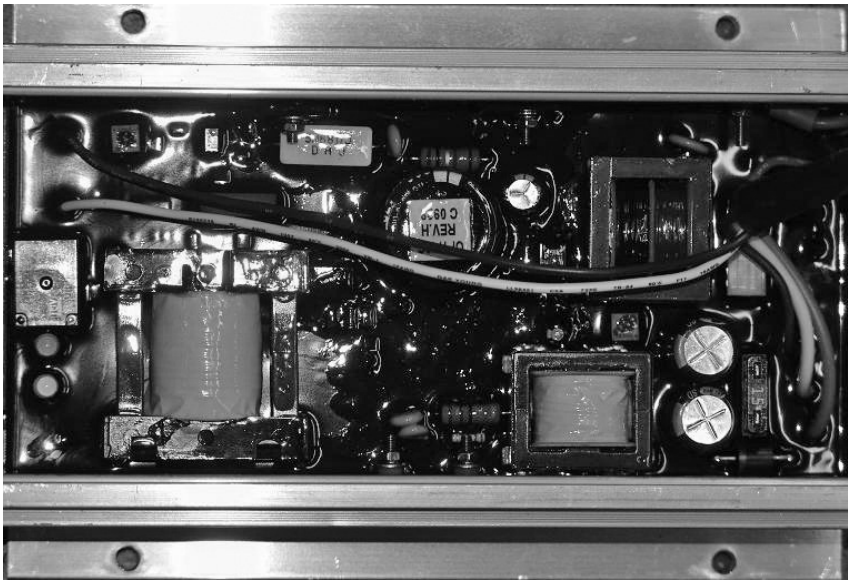
*Please refer to applicable generator set installation drawing for load center location details.

Part No. 0183630SSD
Rev. F 03/18/20

EATON CIRCUIT BREAKER DATA
Standard (80% Rated) Thermal-Magnetic

AMPS	VOLTS	ACCESSORIES	EATON PART NUMBER	SERIES	FRAME	GENERAC PART NUMBER
15	600	No Accessories	FG3015	C	F-Frame	0H9294TA00
		Shunt Trip and Aux. Contacts	FG3015A12S03			0H9294TAB0
20		No Accessories	FG3020			0H9295TA00
		Shunt Trip and Aux. Contacts	FG3020A12S03			0H9295TAB0
25		No Accessories	FG3025			0J0248TA00
		Shunt Trip and Aux. Contacts	FG3025A12S03			0J0248TAB0
30		No Accessories	FG3030			0H9296TA00
		Shunt Trip and Aux. Contacts	FG3030A12S03			0H9296TAB0
35		No Accessories	FG3035			0H9297TA00
		Shunt Trip and Aux. Contacts	FG3035A12S03			0H9297TAB0
40		No Accessories	FG3040			0H9298TA00
		Shunt Trip and Aux. Contacts	FG3040A12S03			0H9298TAB0
45		No Accessories	FG3045			0H9299TA00
		Shunt Trip and Aux. Contacts	FG3045A12S03			0H9299TAB0
50		No Accessories	FG3050			0H9300TA00
		Shunt Trip and Aux. Contacts	FG3050A12S03			0H9300TAB0
60		No Accessories	FG3060			0H9301TA00
		Shunt Trip and Aux. Contacts	FG3060A12S03			0H9301TAB0
70		No Accessories	FG3070			0H9302TA00
		Shunt Trip and Aux. Contacts	FG3070A12S03			0H9302TAB0
80		No Accessories	FG3080			0J0841TA00
		Shunt Trip and Aux. Contacts	FG3080A12S03			0J0841TAB0
90		No Accessories	FG3090			0J0837TA00
		Shunt Trip and Aux. Contacts	FG3090A12S03			0J0837TAB0
100		No Accessories	FG30100			0H9314TA00
		Shunt Trip and Aux. Contacts	FG3100A12S03			0H9314TAB0
125		No Accessories	FG30125			0J0231TA00
		Shunt Trip and Aux. Contacts	FG3125A12S03			0J0231TAB0
150		No Accessories	FG30150			0H9315TA00
		Shunt Trip and Aux. Contacts	FG3150A12S03			0H9315TAB0
175		No Accessories	FG30175			0H9316TA00
		Shunt Trip and Aux. Contacts	FG3175A12S03			0H9316TAB0
200		No Accessories	FG30200			0J0232TA00
		Shunt Trip and Aux. Contacts	FG3200A12S03			0J0232TAB0
225		No Accessories	FG3225			0H9317TA00
		Shunt Trip and Aux. Contacts	FG3225A12S03			0H9317TAB0
250		No Accessories	JG3250		J-Frame	0H9318TA00
		Shunt Trip and Aux. Contacts	JG3250A12S43			0H9318TAB0
300		No Accessories	KG3300		K-Frame	0H9319TA00
		Shunt Trip and Aux. Contacts	KG3300A12S43			0H9319TAB0

BATTERY CHARGER
2.5 amp and 10 amp



Battery charger shown from inside of control panel enclosure.
Connections are made via an attached harness.

The Generac 2.5 amp 12 volt and 10 amp 12/24 volt battery chargers are designed to work with Generac Industrial Controls to provide the ultimate in automatic battery voltage maintenance.

The 2.5 amp charger is self-regulating and produces instantaneous output current adjustments to keep the battery charged to an optimum level. Battery voltage is read on the control panel digital display.

The 10 amp charger has automatic float and equalize control. It precisely monitors the battery's voltage and automatically activates the correct charging mode. The charge rate is limited and controlled to efficiently and safely maintain ideal battery levels under varying conditions.

The equalize system uses a control circuit to limit charging current to 10 amps. When battery voltage drops below a preset level, charging current increases to 5 amps and then to the 10 amp charge rate if needed. When the battery reaches maximum charge, the charger switches to float mode to supply just enough current to maintain the battery at or above 13/26 volts. Battery voltage and charging current are read at the control panel digital display.

Specifications	2.5A	10A
Nominal Input	120 VAC	120 VAC
Operating AC Line Voltage Range	108 to 132 VAC	108 to 132 VAC
Input AC Line Frequency	50/60 Hz	50/60 Hz
Battery Fuse	N/A	15 A
Nominal Charge Rate	2.5 A	10 A
Equalize Voltage	N/A	13.8/27.6 V
Float Voltage	13.4 V	13.0/26.0 V
Current @ Equalize to Float Transition	N/A	5 A
Battery Under-voltage shutdown	N/A	11/22 V
LED Indicators	No	Yes
AC Line Voltage	N/A	Green LED
Battery Connected and Charging	N/A	Yellow LED
Battery Current Drain	30 mA	30 mA
AC Line Connection	Connector Plug	Connector Plug
Battery Connection	Connector Plug	Connector Plug
Control Connection		AC Power Fail Form Relay Form C 2 A Rating
CUL Recognized	Yes	Yes
NFPA 110 Compliant	No	Yes
AGM Compatible	No	Yes
UL1236	No	Yes
CSA 22.2 No. 107	No	Yes

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Part No.0191900SBY
Rev. E 08/12/19

EATON CIRCUIT BREAKER DATA LUG INFORMATION

Eaton Series C Circuit Breaker Lugs

			Standard Lug	
Amps	Series	Frame	Eaton Part #	Wire (QTY) Size
15-70	C	G	-	(1) #10-1/0
15-100	C	F	3T100FB	(1) #14-1/0
125-200	C	F	3TA225FD	(1) #4-4/0
225	C	F	3TA225FDK	(1) #6-300MCM
250	C	J	TA250KB	(1) #4-350MCM
300	C	K	TA350K	(1) 250-500MCM
350-400	C	K	3TA400K	(2) 3/0-250MCM
450-500	C	L	TA602LD	(2) 3/0-350MCM
600	C	L	3TA603LDK	(2) 400-500MCM
700-800	C	M	TA800MA2	(3) 3/0-400MCM
900-1,000	C	N	T1200NB3	(4) 3/0-400MCM
1,200	C	N	TA1201NB1	(3) 500-750MCM

Eaton Series G Circuit Breaker Lugs

			Standard Lug	
Amps	Series	Frame	Eaton Part #	Wire (Qty) Size
50-250	G	JG	TA250FJ	(1) #8-350MCM
300-600	G	LG	3TA632LK	(2) #2-500MCM
900-1,200	G	NG	TA1201NB1	(3) 500-750MCM
1,400-1,600	G	RG	T1600RD	(4) 1-600MCM
2,000	G	RG	Lugs Not Included	
2,500	G	RG	Lugs Not Included	

COOLANT HEATER OPTION
1500 WATT, 120VAC

SPECIFICATIONS:

VOLTAGE: 120VAC

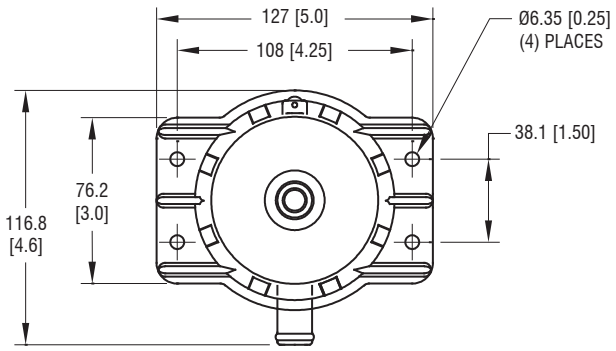
HEAT POWER: 1500W

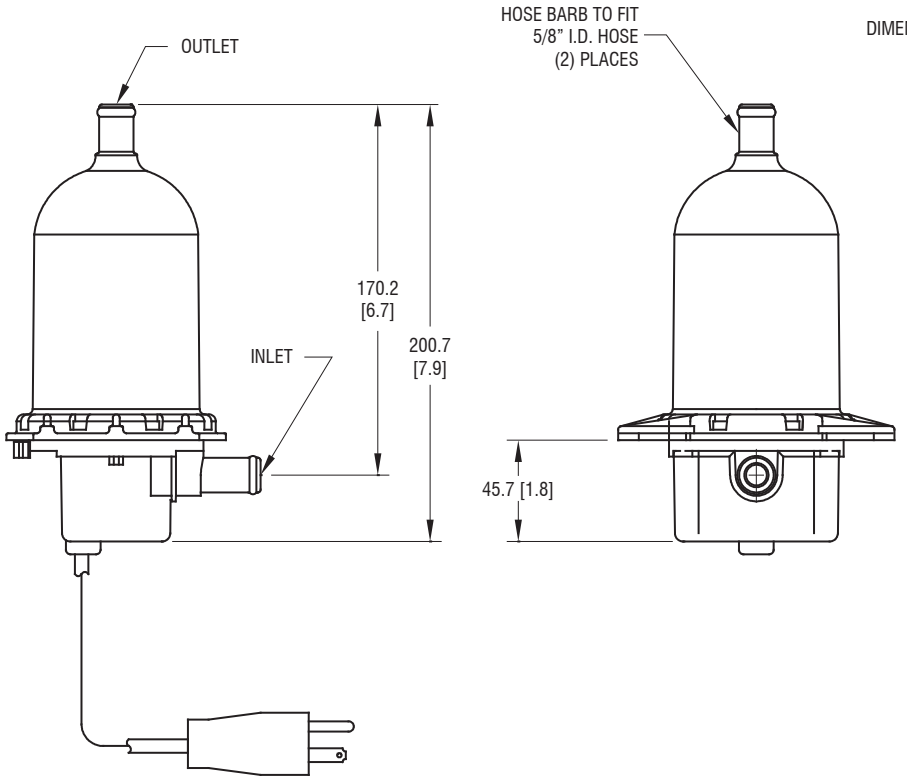
FIXED THERMOSTAT: 60°-80°F

HEATING ELEMENT: INCOLOY 800

MAXIMUM PRESSURE: 90 PSI (620 kPa)

PLUG NEMA STD: 5-15P





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Part No. 084918Q
05/13/15

ELECTRONIC GOVERNOR
Spark-Ignited Engines

Generac's electronic isochronous governor systems are standard on all Spark-Ignited gensets utilizing Generac's Digital Control Platforms.

- Isochronous Speed Regulation
- ±0.25% Steady State Regulation
- Factory Installed and Adjusted
- Fully Adjustable
- Quiet-Test™ Low-Speed Exercise Capability
- Fast Response
- High Reliability
- Environmentally Sealed
- RoHS Compliant

ACTUATOR

Die cast enclosure housing the throttle plate and the gear-driven rotary actuator with the interior components sealed against dust, dirt and moisture. The gear drive is directly connected to the throttle plate for fast and precise control. Safety spring-return to a closed position upon loss of power.

Design	Generac
Type	Electronically Actuated Throttle Valve
Operating Voltage	12VDC
Response Time	<100 ms
Operating Temperature Range	-40˚F to 212˚F
Output	Rotary (internal - no linkage)

CONTROLLER

The governor driver module is located in the generator control panel. A sealed unit with waterproof connections and a feedback circuit from the actuator for throttle plate position. Generac software controls speed governing, and is fully adjustable.

The Generac electronic governor system applies to all spark-ignited gensets with Generac's Digital Control Platforms.

Part No. A0000384073
Rev. A 10/08/19

TX611 Series Transfer Switch

100 – 400 Amps

Contactor Type · Open and Delayed Transition

- Automatic Transfer Switch
- 100 – 400 A, up to 480 VAC, 50/60 Hz
- Single or Three Phase
- 2, 3 or 4 Poles
- NEMA 1 or 3R
- Open and Inphase or Open with Delayed Transition
- ETL/cETL Listed to UL 1008
- 3 Cycle Rated for Easy Upstream Breaker Coordination

Image used for illustration purposes only

Codes and Standards

Not all codes and standards apply to all configurations. Contact factory for details.

ETL/cETL Listed to UL 1008

NFPA 37, 70, 99, 110

NEC 700, 701, 702, 708

Description

Generac's contactor type transfer switches are double-throw robust switch construction with inherent interlocks to ensure safe positive transfer between power sources. The contacts are silver composite for long life, resisting pitting or burning. The switches are rated for full load transfers in mission critical, emergency, legally required, and optional power systems.

The microprocessor based controller provides the customers with the flexibility to program a comprehensive group of set points to match the application needs. The controller has 2 programmable inputs and 1 programmable output as standard and is available with optional expansion boards for up to 4 programmable inputs and outputs. The LCD displays real time and historical information with time-stamped events. The integrated plant exerciser can be configured in off, daily, day of week, biweekly, and monthly intervals with user selectable run time. Standard features of the controller include three phase sensing on both sources, phase unbalance, phase reversal, load shed, emergency inhibit, and communications.

TX611 Series Transfer Switch

100 – 400 Amps

Contactor Type · Open and Delayed Transition

STANDARD FEATURES

GENERAL

- Small Footprint, Results in Easy Mounting and Installation for Reduced Time and Costs
- Cable Entry is Top or Bottom
- Double-Throw, Stored Energy Transfer Mechanism
- Can be Electrically Isolated while Energized
- Graphical LCD-Based Display for Programming, System Diagnostics and Help Menu Display Mimic
- Diagram with Source Available and Connected LED Indicator
- Time-Stamped Event History Log
- Programmable Exerciser - Daily, Weekly, Bi-Weekly, Monthly
- Method of Transfer: Open with Inphase Transition
- Mechanically Interlocked to Prevent Connection of Both Sources
- Modbus® RTU
- TXC 100 Controller
- Operating Temperature -4 ° to 158 °F (-20 ° to 70 °C)
- Removable Top and Bottom Plates for Ease of Entry
- Voltage Agnostic*
- High Withstand and Closing Ratings
- Heater Kit Standard on All 3R Enclosures
- Auxiliary Output Includes: Two Wire Start, Signal Before Transfer, Fault, and a Programmable Relay Output
- Auxiliary Input Includes: Permissive Inputs (24 VDC)
- General Alarm Indication
- 2 Year Standard Warranty

VOLTAGE AND FREQUENCY SENSING

- Three Phase Under and Over Voltage Sensing on Normal and Emergency Sources
- Under and Over Frequency Sensing on Normal and Emergency
- Selectable Settings: Single or Three Phase Voltage
- Sensing on Normal, Emergency and Load 50 or 60 Hz
- Phase Sequence Sensing for Phase Sensitive Loads

CONTROLS

- Front Programmable Control Reduces PPE Needs and Arc Flash Hazard
- Built in Battery Backup - Increases Switch Reliability and Reduces Switch Transition Time to Alternate Source
- Battery Backup Able to Power the Controller for up to 60 Minutes in the Event of No Source Availability
- Generator Battery Backup for Controller
- Accessible USB Port for Easy Data Downloads, Firmware Updates without Requiring PPE, Reducing the Risk of Arc Flash
- All Amp Nodes Offered with Delayed Transition
- Heater Programmable through Control for Desired Temperature and Humidity Settings
- Front Accessible Customer Connections

* 480 V Delta Must be Specified at Time of Ordering for Transformer Kit to be Included

AVAILABLE OPTIONS

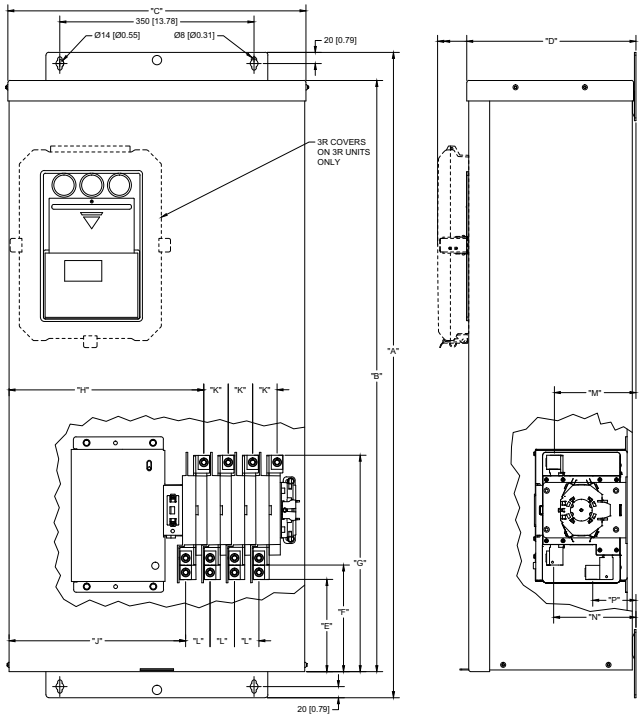
- Chicago Code Kit
- 3R Padlockable Cover for Controller (Standard on 3R Enclosure)
- Emergency Inhibit
- Selectable Retransfer
- Manual Generator Retransfer
- Type 1 to 3R Conversion Kit
- Heater Option for Temperature and Humidity Control (Standard on 3R)
- Time Delay in Neutral Transition (TDN), or Inphase with a Default to Time Delay in Neutral Transfer
- Expandable Input/Output Board Module Includes: 4 Relay Outputs and 4 Optically Isolated Inputs
- 2 Year Extended Limited Warranty
- 5 Year Basic Limited Warranty
- 5 Year Extended Limited Warranty
- 7 Year Extended Limited Warranty
- 10 Year Extended Limited Warranty

TX611 Series Transfer Switch

100 – 400 Amps

Contactor Type · Open and Delayed Transition

UNIT DIMENSIONS*



Contactor Type, Open and Delayed Transition, 100 – 400 A

Description	in (mm)														Cu/Al					lbs (kg)
	A (Height)	B (Height)	C (Width)	D (Depth)	E (Dim)	F (Dim)	G (Dim)	H (Dim)	J (Dim)	K (Dim)	L (Dim)	M (Dim)	N (Dim)	P (Dim)	Normal 75 °C Wire	Standby Source 75 °C Wire	Load 75 °C Wire	Neutral Connection	Ground Connection	Weight
100A NON SER NEMA 1	35.6 (903)	31.7 (806)	21.4 (544)	12.0 (305)	9.3 (236)	10.3 (262)	18.1 (460)	3.7 (93)	5.1 (129)	1.5 (38)	1.7 (44)	5.8 (148)	5.8 (148)	4.8 (122)	(1) 2/0 - 14	(1) 2/0 - 14	(1) 2/0 - 14	(5) 2/0 - 14	(2) 1/0 - 14	105.8 (48)
100A NON SER NEMA 3R	35.6 (903)	31.7 (806)	21.4 (544)	14.1 (358)	9.3 (236)	10.3 (262)	18.1 (460)	3.7 (93)	5.1 (129)	1.5 (38)	1.7 (44)	5.8 (148)	5.8 (148)	4.8 (122)	(1) 2/0 - 14	(1) 2/0 - 14	(1) 2/0 - 14	(5) 2/0 - 14	(2) 1/0 - 14	110.2 (50)
150A NON SER NEMA 1	35.6 (903)	31.7 (806)	21.4 (544)	12.0 (305)	9.3 (236)	10.3 (262)	18.1 (460)	3.7 (93)	5.1 (129)	1.5 (38)	1.7 (44)	5.8 (148)	5.8 (148)	4.8 (122)	(1) 250 - 6	(1) 250 - 6	(1) 250 - 6	(4) 350 - 6	(2) 250 - 6	116.8 (53)
150A NON SER NEMA 3R	35.6 (903)	31.7 (806)	21.4 (544)	14.1 (358)	9.3 (236)	10.3 (262)	18.1 (460)	3.7 (93)	5.1 (129)	1.5 (38)	1.7 (44)	5.8 (148)	5.8 (148)	4.8 (122)	(1) 250 - 6	(1) 250 - 6	(1) 250 - 6	(4) 350 - 6	(2) 250 - 6	121.3 (55)
200A NON SER NEMA 1	35.6 (903)	31.7 (806)	21.4 (544)	12.0 (305)	9.3 (236)	10.3 (262)	18.1 (460)	3.7 (93)	5.1 (129)	1.5 (38)	1.7 (44)	5.8 (148)	5.8 (148)	4.8 (122)	(1) 250 - 6	(1) 250 - 6	(1) 250 - 6	(4) 350 - 6	(2) 250 - 6	116.8 (53)
200A NON SER NEMA 3R	35.6 (903)	31.7 (806)	21.4 (544)	14.1 (358)	9.3 (236)	10.3 (262)	18.1 (460)	3.7 (93)	5.1 (129)	1.5 (38)	1.7 (44)	5.8 (148)	5.8 (148)	4.8 (122)	(1) 250 - 6	(1) 250 - 6	(1) 250 - 6	(4) 350 - 6	(2) 250 - 6	121.3 (55)
300A NON SER NEMA 1	51.4 (1,305)	47.5 (1,206)	24.4 (621)	12.0 (305)	9.8 (249)	11.6 (295)	20.4 (519)	4.6 (116)	6.3 (161)	2.3 (59)	2.3 (59)	6.5 (166)	6.5 (166)	3.3 (84)	(1) 600 - 4 or (2) 250 - 1/0	(1) 600 - 4 or (2) 250 - 1/0	(1) 600 - 4 or (2) 250 - 1/0	(5) 600 MCM - 4 or (10) 250 MCM - 1/0	(2) 250 - 6	174.2 (79)
300A NON SER NEMA 3R	51.4 (1,305)	47.5 (1,206)	24.4 (621)	14.1 (358)	9.8 (249)	11.6 (295)	20.4 (519)	4.6 (116)	6.3 (161)	2.3 (59)	2.3 (59)	6.5 (166)	6.5 (166)	3.3 (84)	(1) 600 - 4 or (2) 250 - 1/0	(1) 600 - 4 or (2) 250 - 1/0	(1) 600 - 4 or (2) 250 - 1/0	(5) 600 MCM - 4 or (10) 250 MCM - 1/0	(2) 250 - 6	178.6 (81)
400A NON SER NEMA 1	51.4 (1,305)	47.5 (1,206)	24.4 (621)	12.0 (305)	9.8 (249)	11.6 (295)	20.4 (519)	4.6 (116)	6.3 (161)	2.3 (59)	2.3 (59)	6.5 (166)	6.5 (166)	3.3 (84)	(1) 600 - 4 or (2) 250 - 1/0	(1) 600 - 4 or (2) 250 - 1/0	(1) 600 - 4 or (2) 250 - 1/0	(5) 600 MCM - 4 or (10) 250 MCM - 1/0	(2) 250 - 6	174.2 (79)
400A NON SER NEMA 3R	51.4 (1,305)	47.5 (1,206)	24.4 (621)	14.1 (358)	9.8 (249)	11.6 (295)	20.4 (519)	4.6 (116)	6.3 (161)	2.3 (59)	2.3 (59)	6.5 (166)	6.5 (166)	3.3 (84)	(1) 600 - 4 or (2) 250 - 1/0	(1) 600 - 4 or (2) 250 - 1/0	(1) 600 - 4 or (2) 250 - 1/0	(5) 600 MCM - 4 or (10) 250 MCM - 1/0	(2) 250 - 6	178.6 (81)

UL 1008 Withstand and Closing Ratings

Ampere Rating	Specific Breaker (kA)	3-Cycle Rating (kA)	Fuse Rating (Class J)
100	35	22	200 kA
150	42	22	200 kA
200	42	22	200 kA
300	65	35	200 kA
400	65	35	200 kA

* All measurements are approximate and for estimation purposes only. Specification characteristics may change without notice. Please contact a Generac Power Systems Industrial Dealer for detailed installation drawings.

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Part No. A0000528440
Rev. B 06/18/2020

GAS SUPPLY CHECK LIST

- **Gas Service Meter and Serving Utility**
  - Available on site and reliable
  - Rated for the combined loading of the facility and the generator (total BTU)
  - Maintains generator minimum pressure requirements while under maximum loading
- **Step Down Pressure Regulators**
  - Selected for the pressure and flow needs of the generator
  - Direct acting type with good dynamic response (no significant time lags in regulation)
  - Selected for minimum no-load to full load pressure droop (< 1-2" w.c desired)
  - Located near the generator (allows the long piping runs to be at higher pressure)
  - Located at least 10' away from generator connection (avoids regulator oscillations)
  - Dedicated to a single generator (increases system reliability)
- **Piping**
  - Sized large enough to minimize pressure drops to acceptable levels under full gas flow
  - Minimize the number of elbows to avoid unwanted pressure drops
  - Ensure entire gas supply system maintains acceptable generator pressure under full gas flow conditions
  - Should be connected to generator with a flexible connection
  - Should include a drip leg (sediment trap)
- **LP**
  - LP tank's boil off rate (BTU capacity) needs to support rated BTU at minimum ambient
  - LP liquid withdrawal systems should be considered: cold ambients, small tanks, large generators
  - LP liquid systems require pressure rated piping and vaporization outside a building
- **Generac Design Resources**
  - "Installation Guidelines for Stationary Industrial Generators" manual 046622 (detailed information)
  - "Power Design Pro" software -- mechanical design tab (gas piping pressure drop calculator)
- **National Codes and Standards**
  - NFPA 37 "Installation and use of Stationary Combustion Engines"
  - NFPA 54 "National Fuel Gas Code"
  - NFPA 58 "LP Gas Code"

Part No. 10000002132
Rev. C 11/15/19

GENERAC®
INDUSTRIAL POWER

DESIGN GUIDELINES

Natural Gas Supply System
Design Guide for Generac
Industrial Spark Ignited Generators

GENERAC®
INDUSTRIAL POWER

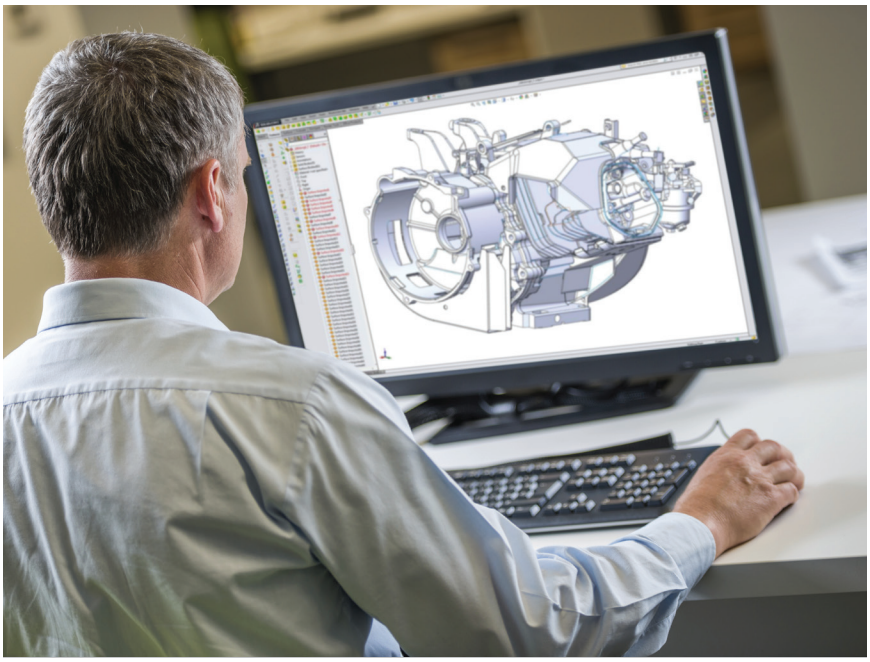
DESIGN GUIDE

Natural Gas Supply System Design Guide for Generac Industrial Spark Ignited Generators

INTRODUCTION

This design guidance document is to be provided to the consulting engineer during the project design phase and again at the time of submittal to the engineer and mechanical contractor for all Generac Industrial natural gas and propane fueled generator sets.

The following pages provide information and design best practices that have been demonstrated to minimize gas pressure instability and flow deficiency problems in the field. These design guidelines are to be used in combination with applicable national standards,[1] local fuel gas piping codes, and Generac's Installation Guidelines for Stationary Industrial Generators (Document #046622).



1. DESIGN OBJECTIVES

1.1. Provide the generator with a stable gas supply pressure over varying gas flow demand conditions. Maximum gas flow for all Generac generators are listed on the unit nameplate and generator data sheets.[2]

1.2. The pressure difference measured at the generator fuel pressure test port should typically be less than 2" water column (w.c.) from no-load running to full-load running condition.

1.3. The gas pressure must remain above the minimum specified for the generator set at all times, under all operating conditions. Failure to maintain adequate gas pressure and flow will result in operational problems such as extended crank cycles, inability to carry full load, and unstable engine speed.

1.4. Maintain a pressure and flow margin to allow for seasonal pressure variation on the upstream gas system. The emergency system must be before the facility shutoff.

1.5. Other facility loads must be factored in while sizing the Generator fuel system. It is recommended that the generator should have a dedicated fuel supply, which is not shared with any other appliances (furnace, water heaters, ranges, etc.) and the Generator fuel supply line shall be installed away from a high heat source so that the fuel temperature must remain at an acceptable operating rage.

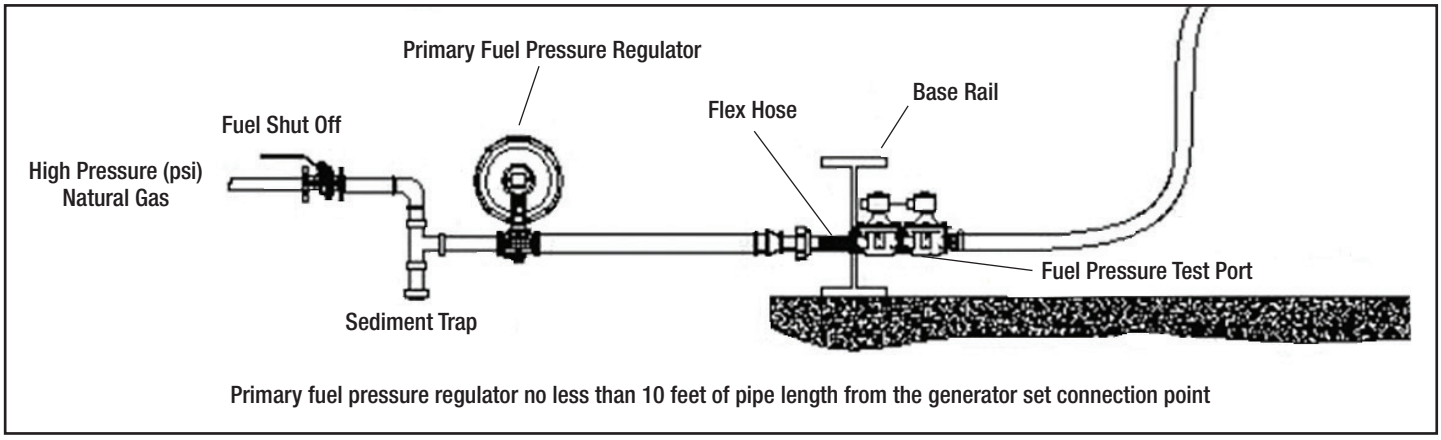


Figure 1: Typical natural gas supply regulator and piping configuration.

2. REGULATOR PERFORMANCE ATTRIBUTES[3]

2.1. Regulator Body Size: The inlet and outlet ports on a regulator are typically a single metal casting. The “body size” refers to the nominal diameter of the inlet and outlet pipe threads (or flange).

The regulator body size should never be larger than the pipe size, but it may be smaller provided the required flow can be obtained through the smaller regulator body size.

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2.2. Pressure differential: The maximum flow rate of a service regulator is constrained by the gas pressure differential across the inlet and outlet port. When selecting a regulator for a specific gas flow requirement, it must correspond to the expected nominal upstream and downstream gas pressures. Consult manufacturers' published flow rate tables at various inlet and outlet pressure values to select an appropriate regulator *(See the example in Table 1).*

2.3. Flow and droop: Select a direct acting regulator that will deliver approximately 1.5 times the maximum gas flow required by the generator with 1" – 2" water column (w.c.) pressure droop at the expected nominal upstream and downstream gas pressures. Direct acting regulators provide the quick response required for controlling fast changing gas flow demands encountered in engine-generator applications.

For example, a Generac SG500 generator, configured for 7" – 11" w.c. nominal gas pressure, requires 6,000 CFH of gas at full load. The selected regulator must be rated to flow approximately 9,000 CFH (1.5 X 6000 CFH = 9000 CFH). Given an upstream gas pressure of 2 psi, a 1½" Model 122–12 regulator with a blue spring would be the first choice. However, assume there is a substantial risk of seasonal pressure variation where the upstream gas pressure may fall closer to 1 psi, a larger 2" Model 122–12 regulator with a blue spring will still provide the required flow at the lower upstream pressure.

INLET PRESSURE	Set Point 5" w.c.	Set Point 7" w.c.	Set Point 11" w.c.	Set Point 18" w.c.	Set Point 28" w.c.	Set Point 2 w.c.	REGULATOR SIZE AND MODEL
	Red Spring 1" w.c. DROOP	Blue Spring 1" w.c. DROOP	Green Spring 2" w.c. DROOP	Orange Spring 2" w.c. DROOP	Orange Spring 3" w.c. DROOP	Black Spring 1/4" PSI DROOP	
8" w.c.	4000	3000	-	-	-	-	
14" w.c.	4900	4500	3700	-	-	-	
1 psi	6600	6500	6000	5750	-	-	
2 psi	10500	10000	9800	9000	9500	-	1 ½" Model 122-12
3 psi	12000	12000	11100	10000	10500	8900	
5 psi	14500	14500	13900	12000	12700	10000	
10 psi	16000	16000	15000	13500	14000	12700	
15 psi	18000	18000	19000	19000	20000	18000	
8" w.c.	5000	4000	-	-	-	-	
14" w.c.	8800	8000	6600	-	-	-	
1 psi	12200	12000	11500	10700	-	-	
2 psi	18200	18000	17300	16500	16900	-	2 ½" Model 122-12
3 psi	25000	25000	24000	22300	23000	18000	
5 psi	32000	32000	30000	28100	29000	27400	
10 psi	38000	38000	35000	32200	33000	30000	
15 psi	38000	38000	40000	39000	40000	36000	

Table 1: Typical regulator flow capacity table. Note how the same model regulator will flow larger volumes of gas with a higher inlet pressure while maintaining a set downstream pressure. Courtesy of Sensus.

Gas pressure regulators are feedback control systems driven by the pressure differential across the diaphragm and the case spring. When gas flow on the low-pressure side of the regulator causes a pressure drop, spring force in the regulator case pushes on the diaphragm and opens the valve to increase gas flow to maintain the set pressure. The dynamic pressure maintained by the regulator decreases slightly as gas flow rate increases *(Figure 2).* This phenomenon is known as pressure droop or, more simply, “droop”. Regulator manufacturers design products to minimize pressure droop while still maintaining regulator stability for a given gas flow rate.

Regulators tend to exhibit the best stability and response time when they operate near the middle of their proportional band. Selecting a regulator with a published maximum gas flow of approximately 1.5 times the full-load gas flow required by the generator avoids operation very close to the fully open or fully closed position, minimizing the probability of unstable operation. A regulator that is too large, capable of flowing several times the maximum gas flow required by the generator, will operate very close to its fully closed position which may also result in unstable operation.

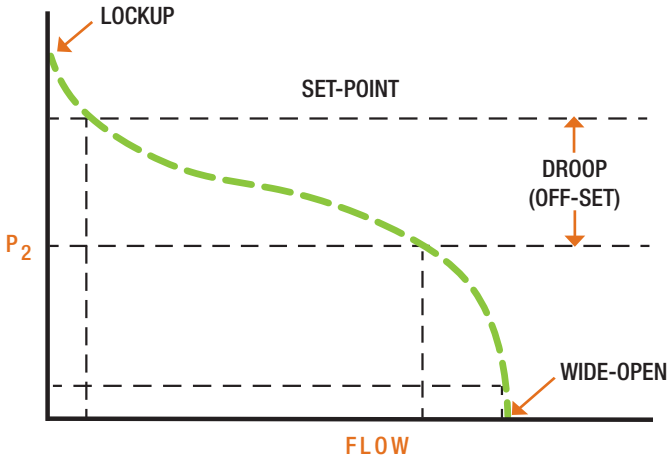

Figure 2: Pressure droop characteristic of a typical direct-operated regulator. Courtesy of Emerson-Fisher Natural Gas Application Guide.

2.4. Spring Rate, Accuracy, and Response Time:[4] The regulator spring provides the force required to open the regulator valve and maintain the desired operating pressure. There may be more than one spring covering a desired operating pressure. Spring selection plays a role in regulator accuracy and response time.

In general, using the lightest spring rate *(a blue spring from the prior example referencing Figure 2)* that achieves the desired operating pressure will provide the best accuracy, minimizing pressure droop across the range of expected gas flow rates. However, a response that is “too fast” can introduce oscillation and instability. If instability is experienced during operation, moving to the next higher spring *(a green spring from the prior example referencing Table 1)* that includes the desired operating pressure is one potential method to mitigate oscillations.

2.5. Orifice size: For regulators where various orifice sizes are available, select the smallest orifice that will provide approximately 1.5 times the maximum gas flow required by the generator. Selecting an orifice that is significantly larger than necessary will result in the valve operating very close to the seat (nearly closed) and may result in pressure instability, increased seal wear, or audible noise from the regulator.

2.6. Lockup or hard shutoff: A regulator with a lockup or hard shutoff feature must be used. Lockup is the pressure above the regulator setpoint that is required to shut the regulator off tight so no gas flows. Typically, the lockup pressure is 1"-3" W.C. above the dynamic pressure setpoint measured when a small volume of gas is flowing *(i.e. no-load running condition on the generator)*. The lockup feature prevents the low-pressure side of the regulator from

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creeping up to the regulator line side pressure during long periods of zero gas flow when the generator is not running. If excessive gas pressure is allowed to build up on the low-pressure side of the regulator, the generator solenoid valves may be unable to open against the excessive pressure and the engine will not start.

2.7. Internal vs. external pressure registration:

Internally registered regulators are recommended because they generally have fewer operational problems in the field.

The diaphragm case of a regulator must have a connection to the low-pressure side in order to function. Internally registered regulators have a passage built into the body casting which provides a path for low-pressure gas to act against the diaphragm and spring force. Externally registered regulators lack this internal connection path but instead have an additional pipe fitting on the regulator case where a smaller diameter pipe is field-fabricated to a downstream location on the low-pressure side of the main gas piping system. Because all the pipe fabrication is done in the field, variation in the main gas piping system and the remote pressure registration line can cause unpredictable performance that is difficult to troubleshoot.

Externally registered regulators can be used, but the engineer and installation contractor must be aware of the dynamic effects introduced by variables such as; flow turbulence, length and diameter of the sensing line, location of the sensing point in the low pressure piping system, increases and decreases in pipe diameter.

If an externally registered regulator is used, locate the remote sensing point 8 to 10 pipe diameters downstream of the regulator in the largest diameter pipe section. The start of 8 to 10 pipe diameters is

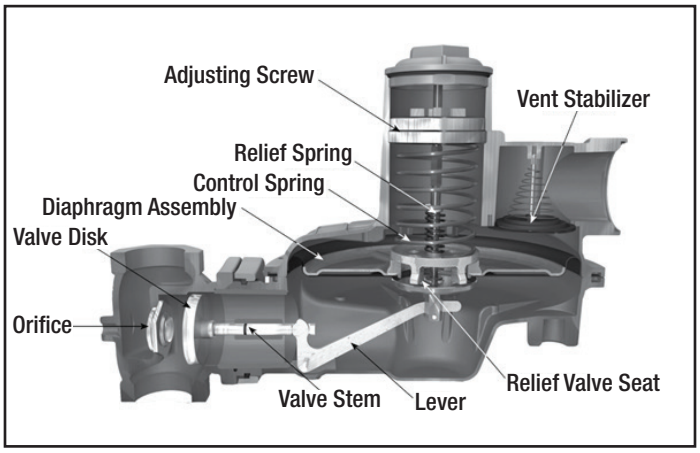


Figure 3: Major components of a direct-acting lever-type regulator, internally registered. *(Courtesy Emerson Fisher).*

after the transition to the largest diameter pipe or any other throttling devices, component and/or fittings that will disrupt flow and create turbulence. The sensing line should be taken off the top of the main line to keep it free of debris and condensate. If possible, it should horizontally slope back to the main so that any condensate will drain back into the main rather than accumulate in the regulator's diaphragm case. Minimize the fittings used in running the sensing line. An externally registered regulator will respond to the pressure changes sensed at the remote tap rather than within the regulator body. It is advisable to install a pressure gauge at the sensing line tap on the main as this will be the control point of the regulator.

2.8. Recommended gas regulators:

The list of regulators below is not an exhaustive list of all suitable regulators that are available in the market, nor is it a list of "Generac Approved" regulators. The list is intended to help design engineers and mechanical contractors identify a range of products that have demonstrated their suitability for engine-generator service in past projects. Consult your Generac Distributor or gas regulator supplier for additional information.

- Sensus[5]
- Emerson Fisher
- Itron

3. FLOW CHARACTERISTICS OF GAS PIPING SYSTEMS:

3.1. Elbows and Tees: Minimize the number of elbows and tee fittings that increase pressure drop and flow turbulence in the system. Where more than three elbows and/or tees are required, use of swept radius elbows (typical for welded pipe sections) will help reduce pressure loss.

3.2. Reducing bushings (swages): Pipe reducing bushings are the transition from a larger to smaller pipe diameter or vice versa. Gas flow velocity is slower in a larger diameter pipe compared to a smaller diameter pipe moving the same volume of gas. If a remote sensing regulator is used, it is important to understand the dynamic pressure effects caused by the gas flow velocities in different sized pipe sections and design accordingly.[6]

In some installations where it is impractical to run approximately 10 feet of pipe, swaging up to a larger diameter pipe is a practical method to increase the gas volume between the service regulator and the generator fuel system. For installations where this method is used, an internally registered regulator is strongly recommended.

3.3. Flexible fuel lines: Flexible fuel lines are intended to isolate the rigid gas piping system from vibrations on the generator set and must be installed as straight as possible. They are not intended to correct misaligned pipe sections or to serve as an elbow.

3.4. Regulator vent lines: Regulator vents must open downward and be screened to prevent insects and water from entering the regulator case. Regulator vent lines should be kept as short as possible to reduce the possibility of affecting the regulator response time.

4. DESIGN REQUIREMENTS:

4.1. Use Generac's Power Design Pro[7] gas pipe sizing module to determine the minimum recommended pipe size for the selected generator's gas flow given the anticipated length of the pipe run between the service regulator and the generator fuel inlet, including all elbows. Select the option to design for <0.5" water column pressure drop. Refer to the Table 1 for more detail.

4.2. The flexible fuel line shall be installed at the generator fuel inlet located on the frame rail and must exit the generator perpendicular to the frame rail. No pipe fittings (elbows or swages) are permitted between the flexible fuel line and the generator fuel inlet port.

4.3. The flexible fuel line must be as straight as possible. It is designed to isolate the rigid gas piping system from vibrations on the generator set. It is not intended to correct misaligned pipe sections or to serve as an elbow.

4.4. Given the combined effects of pipe friction loss and regulator droop, gas pressure should typically not drop more than 2" w.c. from no-load running to full-load running. Under no circumstances shall the gas pressure measured at the test port on the inside frame rail of the generator set drop below the minimum rated gas pressure listed on the generator nameplate.

4.5. Full-port ball valves, the same diameter as the pipe which they are connected to, are to be used for all shut-offs.

4.6. For multiple generator set installations (Generac MPS), each generator set must have its own regulator installed. Do not share a single large regulator across multiple generator sets.

CONTINUED |

Table 2: Natural Gas Fuel Pipe Sizing

	PIPE SIZE (inches)								
KW	1.00"	1.25"	1.5"	2"	2.5"	3"	4"	5"	6"
25	10	95	220	739					
30		60	147	565					
40		25	75	315	790				
50			50	220	560				
60			25	145	390	1185			
70			5	75	225	710			
80				65	195	630			
100				40	140	460			
130					50	215			
150					30	150			
200					15	95	475		
250						62	315	1020	
300						35	255	850	
350						10	145	535	
400							107	452	
500							42	245	650
625								120	395
750								112	380

TABLE VALUES ARE MAXIMUM PIPE RUN IN (feet)

NOTE: Pipe sizing is based on 0.5" H_2O pressure drop for Naural Gas. Also sizing includes nominal number of elbows and tees. Please verify adequate service and meter sizing.

5. RECOMMENDED DESIGN BEST PRACTICES:

5.1. Provide approximately 10 feet of pipe between the regulator and generator gas inlet. This does not have to be a single straight run. The pipe volume decouples the dynamic response of the generator throttle control system and the service regulator, reducing the probability of oscillation and unstable operation.

5.2. Avoid installing elbows or pipe swages immediately upstream or downstream of a regulator, unless specifically allowed by the regulator manufacturer. This will increase the turbulence of the gas flow, having a negative impact on pressure regulation accuracy and stability. Regulator manufacturers typically recommend 10 pipe diameters of straight pipe run upstream and downstream of a regulator. For example, on a regulator with 2" diameter pipe fittings, 20" of straight pipe should be fitted upstream and downstream of the regulator. When field conditions prohibit meeting both constraints, place the elbow on the high-pressure side of the regulator. The straight run on the low-pressure side is more critical for proper regulator operation.

5.3. Avoid installing pipe swages immediately before or after an elbow. The combined flow turbulence of the swage and elbow in close proximity can cause unexpectedly large pressure drops at high flow rates.

5.4. Minimize the number of 90-degree elbows. If more than three elbows are needed downstream of the regulator to accommodate the design, swept radius elbows are recommended to minimize pressure drop.

5.5. Use of an internally registered regulator is strongly recommended. Regulators with external pressure registration lines add an additional variable into the system that can be difficult to troubleshoot should the gas pressure become unstable under high-flow conditions.

5.6. For more stable gas flow with longer gas piping, the high pressure side may be raised as high as code allows and regulate it down to generator operating pressure at the generator. (This is the same design concept used in the electrical industry; "high voltage for long distances, transformation at the loads"). This may also help reduce cost as pipe diameters can be smaller, saving material and installation costs.

6. INSTALLATION AND COMMISSIONING RECOMMENDATIONS:

6.1. Refer to Generac's Installation Guidelines for Stationary Industrial Generators (Document #046622) for additional installation details.

6.2. Pig all gas pipes after installation to remove pipe dope, weld slag and other contaminants that could damage the regulator valve seat and cause pressure creep.

6.3. Install a dirt trap and/or screen before the gas regulator.

6.4. Set the regulator pressure with the generator running at no-load. Measurements are taken at the generator fuel pressure test port on the inside of the frame rail. For units configured for 7"-11" w.c. operating pressure, set the regulator to 11" w.c. no-load running. For units configured for 11-14" w.c. operating pressure, set the regulator to 14" w.c. no-load running. Pressure droop at full-load running will be a combination of regulator droop and pipe friction loss. Proper design will limit the no-load to full-load running pressure drop to no more than 2" w.c. and at no time can the gas pressure fall below the minimum pressure listed on the generator nameplate. Expect the lockup static pressure typically to be higher than the no-load running dynamic pressure.

7. METHODS FOR CORRECTING UNDESIRABLE PERFORMANCE:

7.1. Pressure surging and cycling: Should the regulator experience "hunting" or other unstable operating behavior, an extended vent line may be creating resonant condition on the atmospheric side of the regulator diaphragm. If this is suspected, temporarily disconnect the vent line or remove the cap from the regulator spring case and observe if the unstable behavior stops. Shortening the length or increasing the diameter of the vent line will often correct an instability caused by vent line resonance.

The pipe volume between the service regulator and the generator may be insufficient to decouple the control action of the regulator and the generator's throttle control system. Increase the pipe volume between the regulator and the generator.

Change the response time of the regulator. In some cases, a small adjustment of the regulator spring (up or down 1 w.c.) will be enough to restore stability to the system. If available for the selected regulator, using the next higher spring is another inexpensive and easy to implement option. This will slow the regulator response and can reduce or eliminate the instability. Keep in mind that changing to a higher spring rate will also increase pressure droop and reduce the regulator's maximum flow capacity which limits the applicability of this corrective measure.

CONTINUED |

7.2. Low gas pressure under high load: There are several potential causes of low gas pressure under high load.

Pipe runs with excessive friction loss caused by a pipe diameter that is too small for the required gas flow and pipe length and/or a large number of elbows. The only corrective action for this is to increase the pipe diameter between the regulator and the generator or to raise the pressure of the high pressure gas. Avoid this problem by using a gas pipe sizing tool during the design phase.

Insufficient regulator capacity. Confirm the upstream gas main and regulator flow capabilities for a given upstream gas pressure. If the upstream gas pressure is lower than originally anticipated, investigate the possibility adjusting the utility regulator (if present). If increasing upstream gas pressure is not possible, a larger orifice and/or different spring combination may be available for the existing regulator to increase flow and reduce pressure droop. If the previous steps fail to correct the situation, a larger regulator will be required. Avoid this problem by thoroughly reviewing the regulator manufacturer's flowrate tables prior to ordering.

7.3. Excessive transient pressure drop during generator crank cycle or block load application: If the transient pressure drop during a generator crank cycle or block load application is large enough to impact performance, speeding up the regulator response will reduce the transient pressure drop. Avoid this problem by using a direct-acting regulator that is suitable for engine-generator applications. If available for the selected regulator, using a lighter spring will increase the regulator response speed and reduce transient pressure dip. Finally, if a remotely registered regulator is used, increase the pipe diameter of the remote sensing line.

7.4. Pressure creep: Ensure the selected regulator has a lockup or hard-shutoff feature. Pressure creep is almost always caused by contaminants in the pipe system upstream of the regulator. The contaminants either get caught on the regulator valve disk or cause physical damage to the valve disk, making it impossible to achieve a hard shutoff. Avoid this problem by pigging all pipe components prior to installing the regulator and ensure a dirt trap is installed upstream of the regulator.

7.5. Failure to start, run smoothly, or accept 100% load: Barring a mechanical failure on the generator, failure to make 10-second start, run smoothly, or carry full load is almost always caused by an underlying gas supply problem.

8. PROPANE VAPOR AND LIQUID:

8.1. Propane vapor system: This type of system uses the vapors formed above the liquid fuel in the supply tank. The maximum tank liquid capacity is 80% and a minimum of approximately 20% of the tank capacity is required to boil off liquid into the vapor state. Gas pressure and volume requirements for an LPG system at the connection point of the generator are listed on the unit specification sheet. The piping system connecting the outlet of the first stage regulator to the connection point on the second stage regulator must be properly sized to provide the fuel volume required by the unit at 100% load.

The piping system between the outlet of the second stage regulator and the generator connection point must be sized to provide the fuel volume required by the generator at 100% load while also staying within the pressure range noted on the unit specification sheet.

8.2. Tank vaporization rate: In addition to sizing the gas piping system in a similar manner to natural gas, LP-vapor systems must also size the propane storage tanks to ensure a sufficient volume of gas will boil off

CONTINUED |

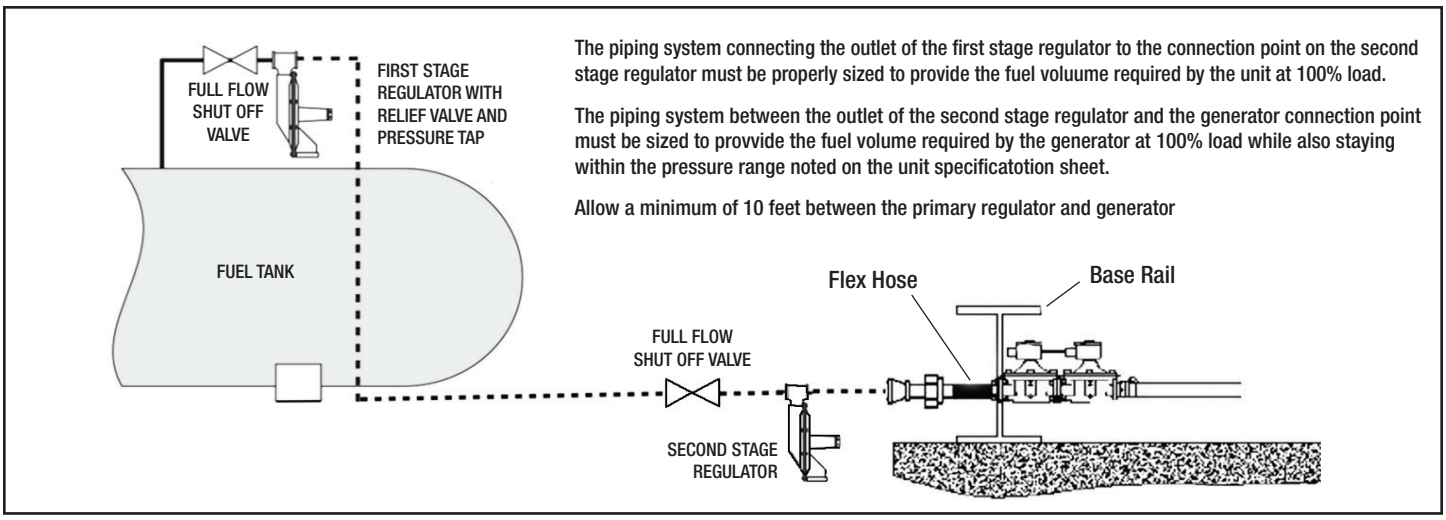


Figure 4: Typical LP vapor withdrawal system.

under a range of environmental conditions and various liquid levels in the tank. Liquid propane absorbs ambient heat from the surrounding environment to boil off liquid into a gas. Low liquid levels in a tank coupled with cold ambient temperatures can result in a condition where the tank boil off rate is insufficient to meet the demands of the generator.

The local propane supplier is often a good resource to help with tank sizing. The Emerson-Fisher LP-Gas Serviceman's Handbook is another valuable resource for sizing propane systems and includes tank vaporization tables.[8] In many cases, the tank volume must be larger (sometimes much larger) than the gas required to achieve a desired runtime. Where practical, buried tanks can improve the vaporization rate by protecting the tank from extremely low ambient air temperatures.

8.3. Liquid propane system: This system delivers propane in a liquid state (LPL) to the connection point on the generator set. Liquid propane systems are used where it is impractical to achieve the required boil off rate from the available fuel tank volume. For the engine to use the LPL fuel, the liquid must be vaporized prior to being delivered to the fuel mixer (carburetor). LPL will vaporize at a temperature of

Max. Intermittent Withdrawal Rate (BTU/HR) Without Tank Frosting* If Lowest Outdoor Temperature (Average for 24-Hours) Reaches . . .

	TANK SIZE (Gallons)			
TEMPERATURE	150	250	500	1,000
40°F	214,900	288,100	478,800	852,800
30°F	187,900	251,800	418,600	745,600
20°F	161,800	216,800	360,400	641,900
10°F	148,000	198,400	329,700	587,200
0°F	134,700	180,600	300,100	534,500
-10°F	132,400	177,400	294,800	525,400
-20°F	108,800	145,800	242,300	431,600
-30°F	107,100	143,500	238,600	425,000

* Tank frosting acts as an insulator, reducing the vaporization rate.

Table 3: Above ground AMSE Tank vaporization rate, LP-Gas Serviceman's Handbook.

(-44°F/-42.2°C). The generator set LPL fuel system delivery pressure operates over the range of 58-180 psi (400-1242 kPa), depending on the ambient temperature and liquid level in the storage tank. LPL enters the vaporizer and passes into a "flash" chamber. The pressure drop in this chamber vaporizes the liquid to a gas and is regulated to negative 11"-14" w.c. (2.9-3.5 kPa). Heated engine coolant from the jacket water heater is used to heat the flash chamber of the vaporizer and to prevent the vaporizer from icing.

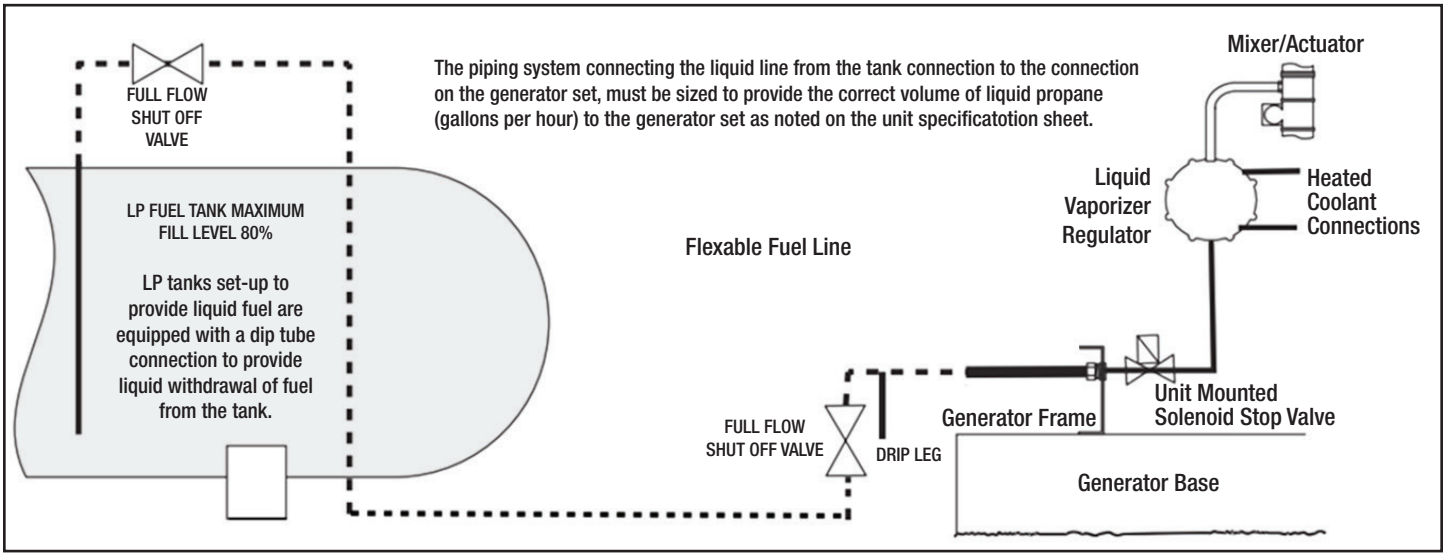


Figure 5: Typical LP liquid withdrawal system.

8.4. Dual fuel, natural gas primary and propane secondary: Some applications use a dual fuel system where the primary source may not be available during a power outage. Dual fuel systems use natural gas as the primary fuel and LPG or LPL withdrawal as the secondary fuel. For dual fuel units, the specific fuel pressure, volume, and pipe sizing requirements for each fuel type must be observed.

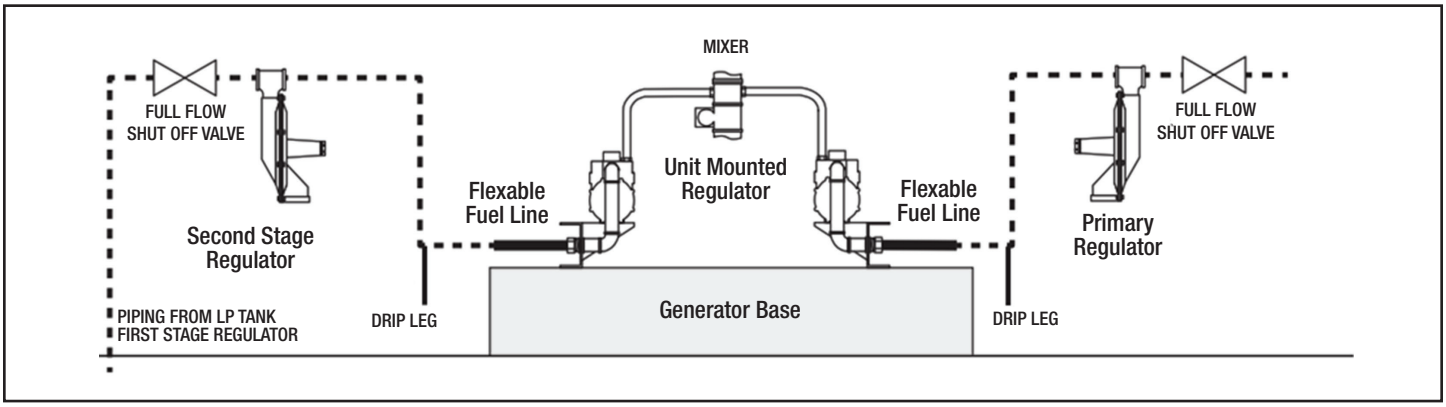


Figure 6: Typical dual-fuel system.

9. ADDITIONAL RESOURCES:

[1] NFPA 37 “Installation and use of Stationary Combustion Engines”
NFPA 54 “National Fuel Gas Code”
NFPA 58 “LP Gas Code”
Free access to view NFPA code documents can be found at:
https://www.nfpa.org/Codes-and-Standards/All-Codes-and-Standards/Free-access.

[2] Data sheets for Generac Industrial gas generator sets:
https://www.generac.com/Industrial/products/gaseous-generators.

[3] A more thorough description of the operational principles and performance attributes of gas regulators can be found in Emerson-Fisher’s Natural Gas Application Guide at:
http://www.emerson.com/en-us/automation/valves-actuators-regulators/regulators.

[4] Causes and Cures of Regulator Instability, Class #6010. William H Earney, Fisher Controls International Inc. 1995.
https://www.scribd.com/document/197653841/Causes-and-Cures-of-Regulator-Instability

[5] Sensus product data sheets: https://sensus.com/products/?utility=gas

[6] The Bernoulli Effect will cause a difference in gas pressure only when gas is flowing. When a remote sensing regulator is used, and the remote sensing point is located in a pipe section that is a larger diameter than the generator fuel inlet, under high-flow conditions it can result in an additional 1”-2” w.c. of pressure difference that cannot be eliminated. https://en.wikipedia.org/wiki/Bernoulli%27s_principle

[7] Power Design Pro is Generac’s web-based generator sizing tool that includes modules for gas supply pipe sizing and exhaust pipe sizing. It can be accessed and used free of charge at:
https://pdp.powerdesignpro.com.

[8] LP-Gas Serviceman’s Handbook, Emerson Fisher.
http://www.squibbtaylor.com/uploaded/lp10servicemaninst.pdf.

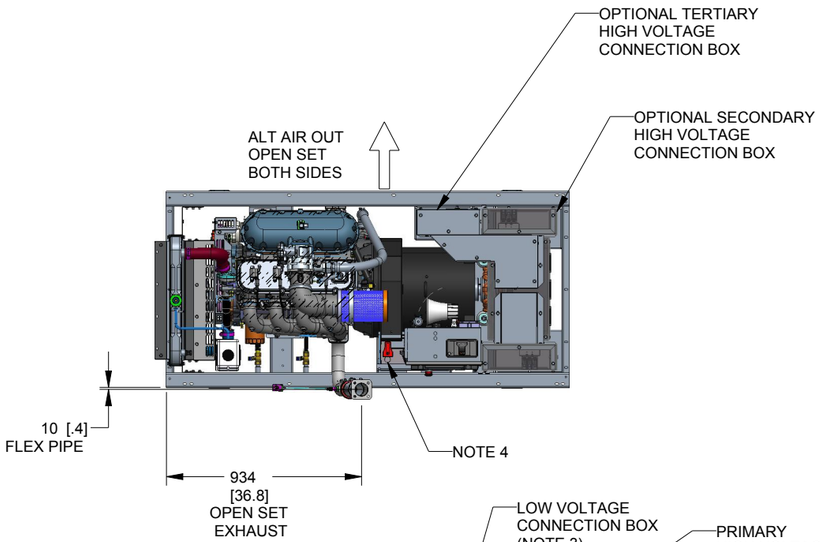
Generac Power Systems, Inc.
S45 W29290 Hwy. 59, Waukesha, WI 53189 | 1-888-GENERAC (1-888-436-3722) | 10000046207 03/2020

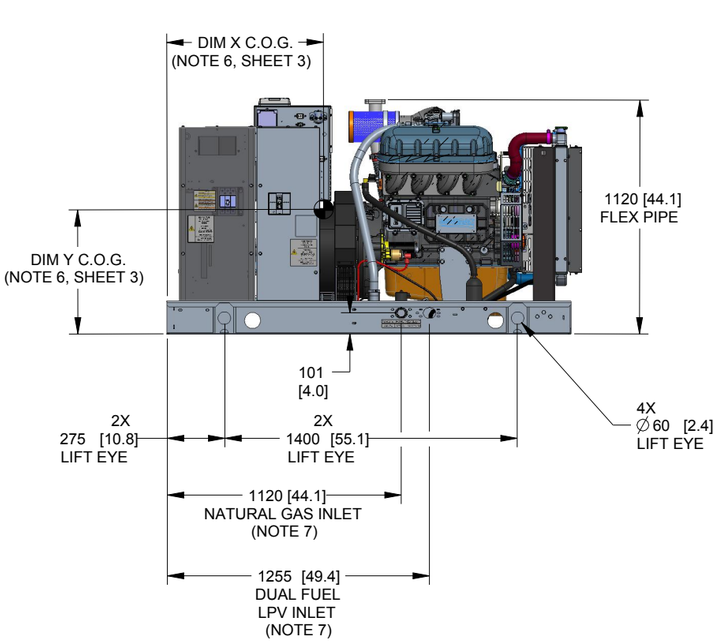
GENERAC.COM

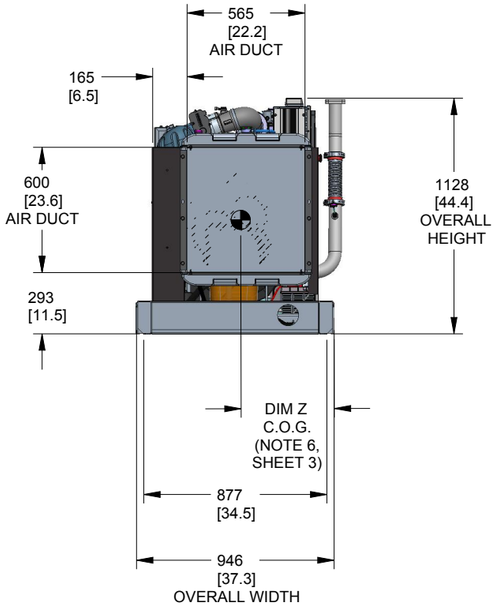
Notes:
1. CONTROL PANEL, (BATTERY CHARGER INSIDE).
2. 120V, 20A GFCI & 250V, 15A OUTLET (OPTIONAL).
3. CONNECTION POINTS FOR CONTROL WIRES PROVIDED IN THE LOW VOLTAGE CONNECTION BOX (USE LOW VOLTAGE STUB-UP AREA).
4. BATTERY (12 VOLT NEGATIVE GROUND SYSTEM).
5. MAIN LINE CIRCUIT BREAKER (MLCB), AC LOAD LEADS. (DIMENSIONS MAY VARY DUE TO UNIT CONFIGURATION)
6. CENTER OF GRAVITY AND WEIGHT MAY CHANGE DUE TO UNIT OPTIONS. FOR WEIGHT AND CENTER OF GRAVITY DATA SEE SHEET 3
7. ENGINE SERVICE CONNECTIONS:
   INLET NATURAL GAS = 1-1/4" NPT FEMALE COUPLING
   INLET DIESEL = N/A
   RETURN DIESEL = N/A
   OIL DRAIN = 1/2" NPT COUPLING
   RADIATOR DRAIN = 1/2 NPT COUPLING,
   FLEX PIPE OUTLET = 2.5" ID - WELD ON FLANGE PROVIDED
   EXHAUST OUTLET = N/A

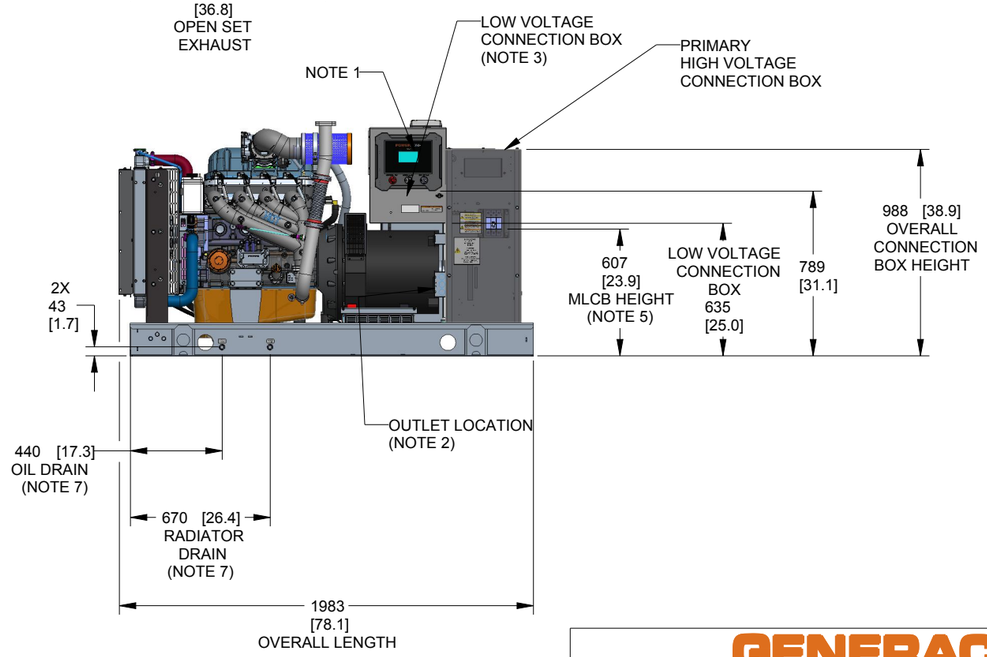
***** SEE GENERATOR SIZING GUIDE FOR FUEL PIPE SIZING TO SUIT APPLICATION *****

8. AUXILARY AC CONNECTION FOR UNIT OPTIONS ARE LOCATED IN HIGH VOLTAGE CONNECTION BOX, UNLESS AN OPTIONAL LOAD CENTER IS INSTALLED.
9. EXHAUST PIPES MAY BE ROTATED TO ALLOW MUFFLER TO POINT OUT TO THE RIGHT OR LEFT SIDE OF GENERATOR. (MAY NOT APPLY TO ALL UNITS)
10. GENERATOR SET MUST BE INSTALLED SUCH THAT FRESH COOLING AIR IS AVAILABLE AND DISCHARGE AIR FROM THE RADIATOR IS NOT RECIRCULATED.
11. BOTTOM OF GENERATOR SET MUST BE ENCLOSED TO PREVENT PEST INTRUSION AND RECIRCULATION OF DISCHARGE AIR AND/OR IMPROPER COOLING AIR FLOW.
12. EXHAUST SYSTEM MAXIMUM BACK PRESSUE = 10" H20 (ADDITIONAL).
13. INSTALL EXHAUST BLANKETS ALONG THIS LINE.
14. CONNECT THE OPEN SET EXHAUST PER NFPA 37
15. BLANKETS SHOULD NOT COVER OXYGEN SENSOR.
16. OXYGEN SENSOR (IF EQUIPPED) MUST BE MOUNTED BETWEEN ENGINE OUTLET AND CATALYST INLET IN PORT PROVIDED.
17. CATALYST MUST BE MOUNTED IN DESCRIBED POSITION. FAILING TO FOLLOW THESE INSTRUCTIONS WHEN INSTALLING A CERTIFIED ENGINE IN A PIECE OF STATIONARY EQUIPMENT VIOLATES FEDERAL LAW 40CFR 1068.105(b), SUBJECT TO FINES OR PENALTIES AS DESCRIBED IN THE CLEAN AIR ACT.
18. BOLTS OR STUDS USED TO MOUNT UNIT TO PAD SHALL BE 5/8 - 11 GRADE 5.









DRAWING CREATED FROM PRO/ENGINEER 3D FILE. ECO MODIFICATION TO BE APPLIED TO SOLID MODEL ONLY.

DIMENSIONS ARE IN MILLIMETERS [INCHES]

INSTALLATION DRAWING

ELECTRONICALLY APPROVED
INSIDE WINDCHILL

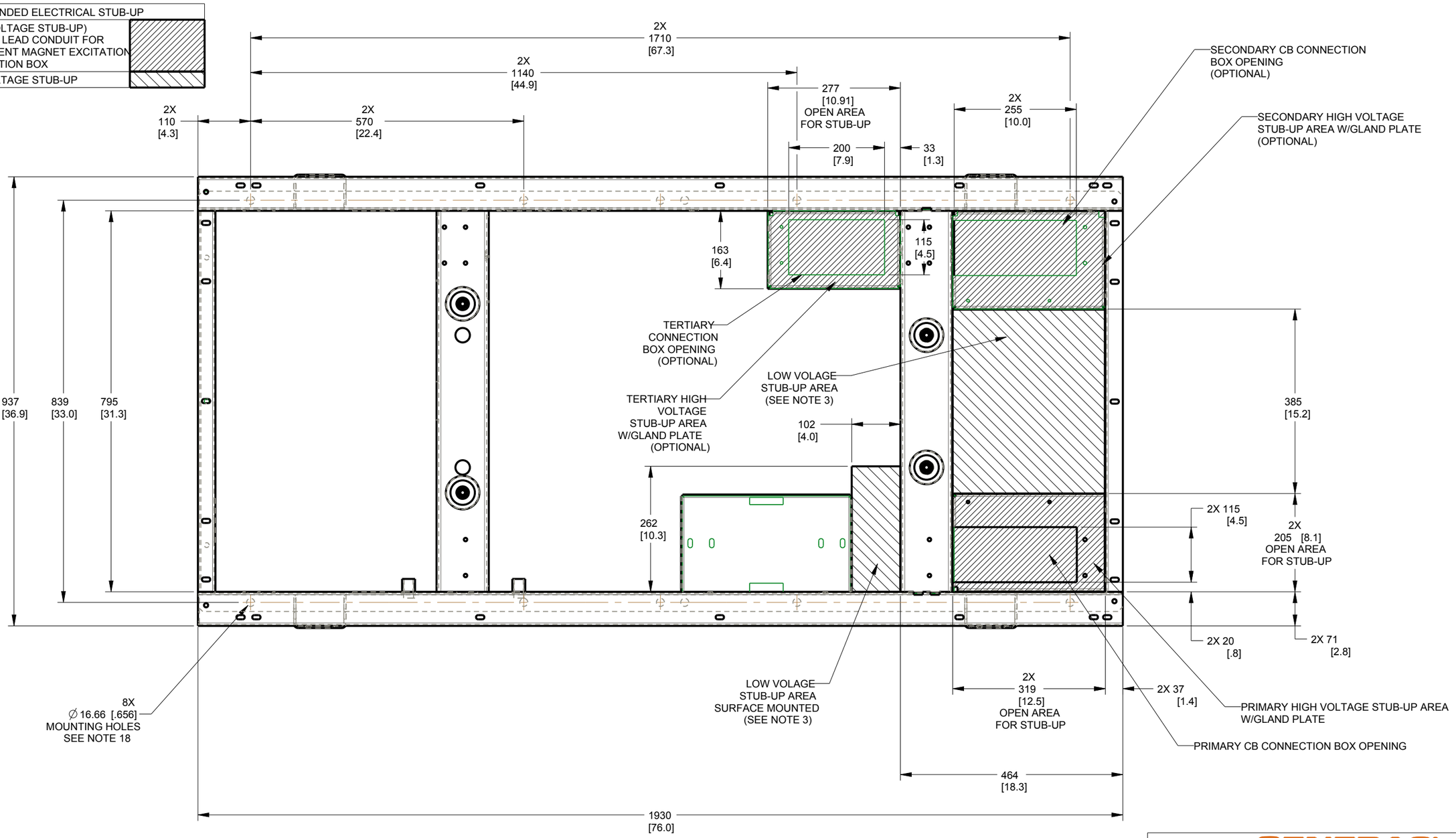
GENERAC

TITLE
OPEN SET
G4.5L 60Hz
SG35, SG40, SG45, SG50

ISSUE DATE:

SIZE	CAGE NO	DWG NO	REV
B	N/A	A0000292914	C
SCALE 0.035	WT-KG	SHEET 1 of 3	

RECOMENDED ELECTRICAL STUB-UP
(HIGH VOLTAGE STUB-UP) AC LOAD LEAD CONDUIT FOR PERMANENT MAGNET EXCITATION CONNECTION BOX
LOW VOLTAGE STUB-UP



DRAWING CREATED FROM PRO/ENGINEER 3D FILE. ECO MODIFICATION TO BE APPLIED TO SOLID MODEL ONLY.

DIMENSIONS ARE IN MILLIMETERS [INCHES]

INSTALLATION DRAWING

ELECTRONICALLY APPROVED INSIDE WINDCHILL

GENERAC

TITLE

STUB-UP
G4.5L 60Hz
SG35, SG40, SG45, SG50

ISSUE DATE:

SIZE	CAGE NO	DWG NO	REV
B	N/A	A0000292914	C

SCALE	0.120	WT-KG	SHEET	2 of 3

OPEN SET

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG35, SG40, SG45, SG50	220V, 240V,Ø	759.8 kg [1675 lbs.]	1038 [40.9]	551 [21.7]	444 [17.5]
SG35, SG40, SG45, SG50	600V	763.4 kg [1683 lbs.]	1038 [40.9]	551 [21.7]	
SG35, SG40, SG45, SG50	208V, 240V, 400V, 480V	765.2 kg [1687 lbs.]	1038 [40.9]	551 [21.7]	
SG35, SG40, SG45, SG50	220V, 240V,Ø UPSIZE	787.4 kg [1736 lbs.]	1014 [40]	546 [21.5]	
SG35, SG40, SG45, SG50	600V UPSIZE	791.1 kg [1744 lbs.]	1012 [39.8]	545 [21.5]	
SG35, SG40, SG45, SG50	208V, 240V, 400V, 480V UPSIZE	792.9 kg [1748 lbs.]	1011 [39.8]	545 [21.5]	

STD ENCLOSURE, STEEL

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG35, SG40, SG45, SG50	220V, 240V,Ø	979.8 kg [2160 lbs.]	1069 [42.1]	614 [24.2]	448 [17.6]
SG35, SG40, SG45, SG50	600V	983.4 kg [2168 lbs.]	1069 [42.1]	614 [24.2]	
SG35, SG40, SG45, SG50	208V, 240V, 400V, 480V	985.2 kg [2172 lbs.]	1068 [42]	614 [24.2]	
SG35, SG40, SG45, SG50	220V, 240V,Ø UPSIZE	1007.4 kg [2221 lbs.]	1054 [41.5]	608 [23.9]	
SG35, SG40, SG45, SG50	600V UPSIZE	1011.1 kg [2229 lbs.]	1053 [41.5]	607 [23.9]	
SG35, SG40, SG45, SG50	208V, 240V, 400V, 480V UPSIZE	1012.9 kg [2233 lbs.]	1052 [41.4]	607 [23.9]	

STD ENCLOSURE, ALUMINUM

WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
859.1 kg [1894 lbs.]	1051 [41.4]	601 [23.7]	447 [17.6]
861.8 kg [1900 lbs.]	1051 [41.4]	601 [23.7]	
863.6 kg [1904 lbs.]	1051 [41.4]	600 [23.6]	
886.8 kg [1955 lbs.]	1035 [40.7]	595 [23.4]	
889.5 kg [1961 lbs.]	1034 [40.7]	595 [23.4]	
891.3 kg [1965 lbs.]	1034 [40.7]	594 [23.4]	

L1A ENCLOSURE, STEEL

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG35, SG40, SG45, SG50	220V, 240V,Ø	1024.2 kg [2258 lbs.]	1071 [42.2]	616 [24.3]	449 [17.7]
SG35, SG40, SG45, SG50	600V	1026.9 kg [2264 lbs.]	1070 [42.1]	616 [24.3]	
SG35, SG40, SG45, SG50	208V, 240V, 400V, 480V	1028.7 kg [2268 lbs.]	1070 [42.1]	616 [24.3]	
SG35, SG40, SG45, SG50	220V, 240V,Ø UPSIZE	1051.9 kg [2319 lbs.]	1058 [41.7]	611 [24.1]	
SG35, SG40, SG45, SG50	600V UPSIZE	1054.6 kg [2325 lbs.]	1057 [41.6]	611 [24.1]	
SG35, SG40, SG45, SG50	208V, 240V, 400V, 480V UPSIZE	1056.4 kg [2329 lbs.]	1057 [41.6]	610 [24]	

L1A ENCLOSURE, ALUMINUM

WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
901.3 kg [1987 lbs.]	1056 [41.6]	604 [23.8]	447 [17.6]
904.1 kg [1995 lbs.]	1056 [41.6]	604 [23.8]	
906.7 kg [1999 lbs.]	1056 [41.6]	604 [23.8]	
929 kg [2048 lbs.]	1042 [41]	599 [23.6]	
932.6 kg [2056 lbs.]	1041 [41]	599 [23.6]	
934.9 kg [2061 lbs.]	1041 [41]	598 [23.5]	

L2A ENCLOSURE, STEEL

MODEL	VOLTAGE	WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
SG35, SG40, SG45, SG50	220V, 240V,Ø	1061.9 kg [2341 lbs.]	1076 [42.4]	626 [24.6]	452 [17.8]
SG35, SG40, SG45, SG50	600V	1065.5 kg [2349 lbs.]	1076 [42.4]	626 [24.6]	
SG35, SG40, SG45, SG50	208V, 240V, 400V, 480V	1067.3 kg [2353 lbs.]	1076 [42.4]	626 [24.6]	
SG35, SG40, SG45, SG50	220V, 240V,Ø UPSIZE	1089.5 kg [2402 lbs.]	1064 [41.9]	621 [24.4]	
SG35, SG40, SG45, SG50	600V UPSIZE	1093.2 kg [2410 lbs.]	1063 [41.9]	620 [24.4]	
SG35, SG40, SG45, SG50	208V, 240V, 400V, 480V UPSIZE	1095.4 kg [2415 lbs.]	1063 [41.9]	620 [24.4]	

L2A ENCLOSURE, ALUMINUM

WEIGHT	CENTER OF GRAVITY DIM X	CENTER OF GRAVITY DIM Y	CENTER OF GRAVITY DIM Z
939.4 kg [2071 lbs.]	1063 [41.9]	612 [24.1]	450 [17.7]
943 kg [2079 lbs.]	1063 [41.9]	612 [24.1]	
944.8 kg [2083 lbs.]	1063 [41.9]	612 [24.1]	
966.6 kg [2131 lbs.]	1049 [41.3]	607 [23.9]	
970.7 kg [2140 lbs.]	1049 [41.3]	606 [23.9]	
972.5 kg [2144 lbs.]	1048 [41.3]	606 [23.9]	

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DIMENSIONS ARE IN MILLIMETERS [INCHES]

INSTALLATION DRAWING

ELECTRONICALLY APPROVED
INSIDE WINDCHILL

GENERAC

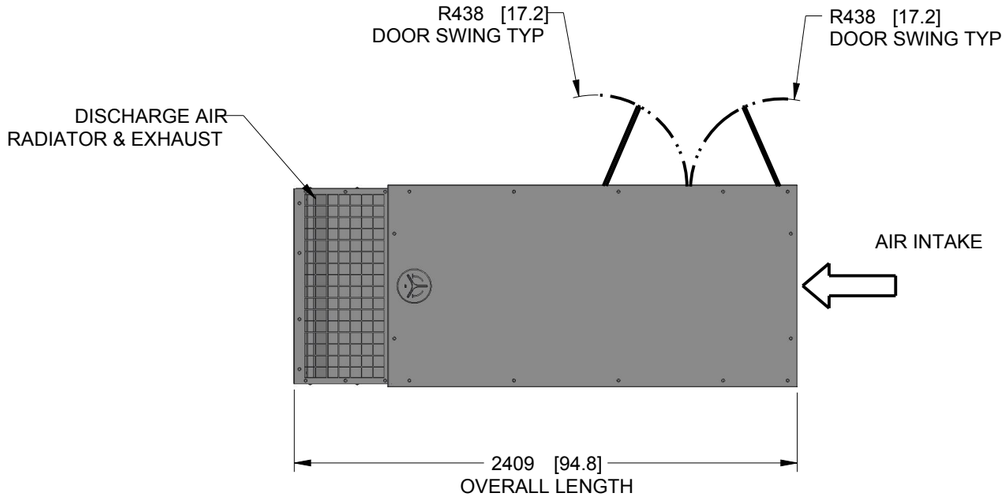
TITLE
OPEN SET
G4.5L 60Hz
SG35, SG40, SG45, SG50

ISSUE DATE:

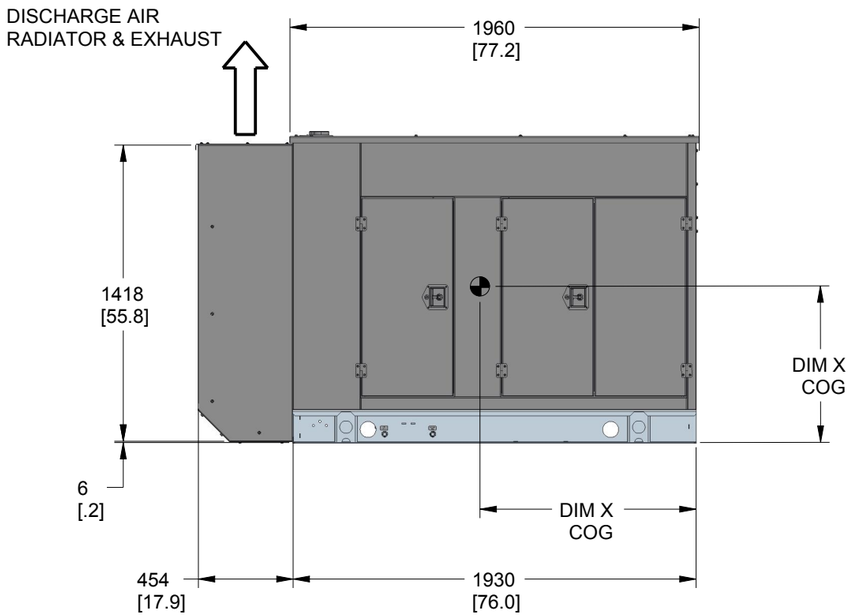
SIZE	CAGE NO	DWG NO	REV
B	N/A	A0000292914	C

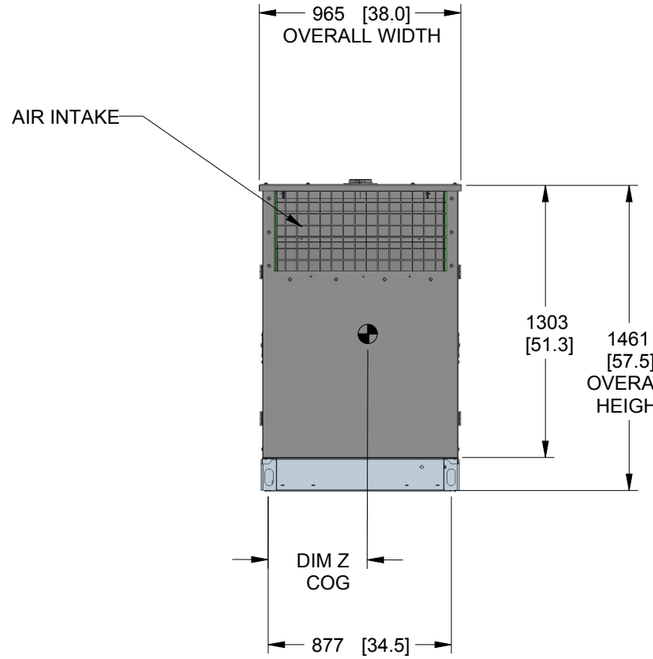
SCALE 0.035 | WT-KG | SHEET 3 of 3

SH	REV	WINDCHILL VERSION	
1/1	C	C.1	



FOR ALL STUB-UP, WEIGHT AND COG DETAILS, SEE
CORRESPONDING OPEN SET DRAWING PER UNIT CONFIGURATION.





DRAWING CREATED FROM PRO/ENGINEER
3D FILE. ECO MODIFICATION TO BE
APPLIED TO SOLID MODEL ONLY.

DIMENSIONS ARE IN MILLIMETERS [INCHES]

INSTALLATION DRAWING

ELECTRONICALLY APPROVED
INSIDE WINDCHILL

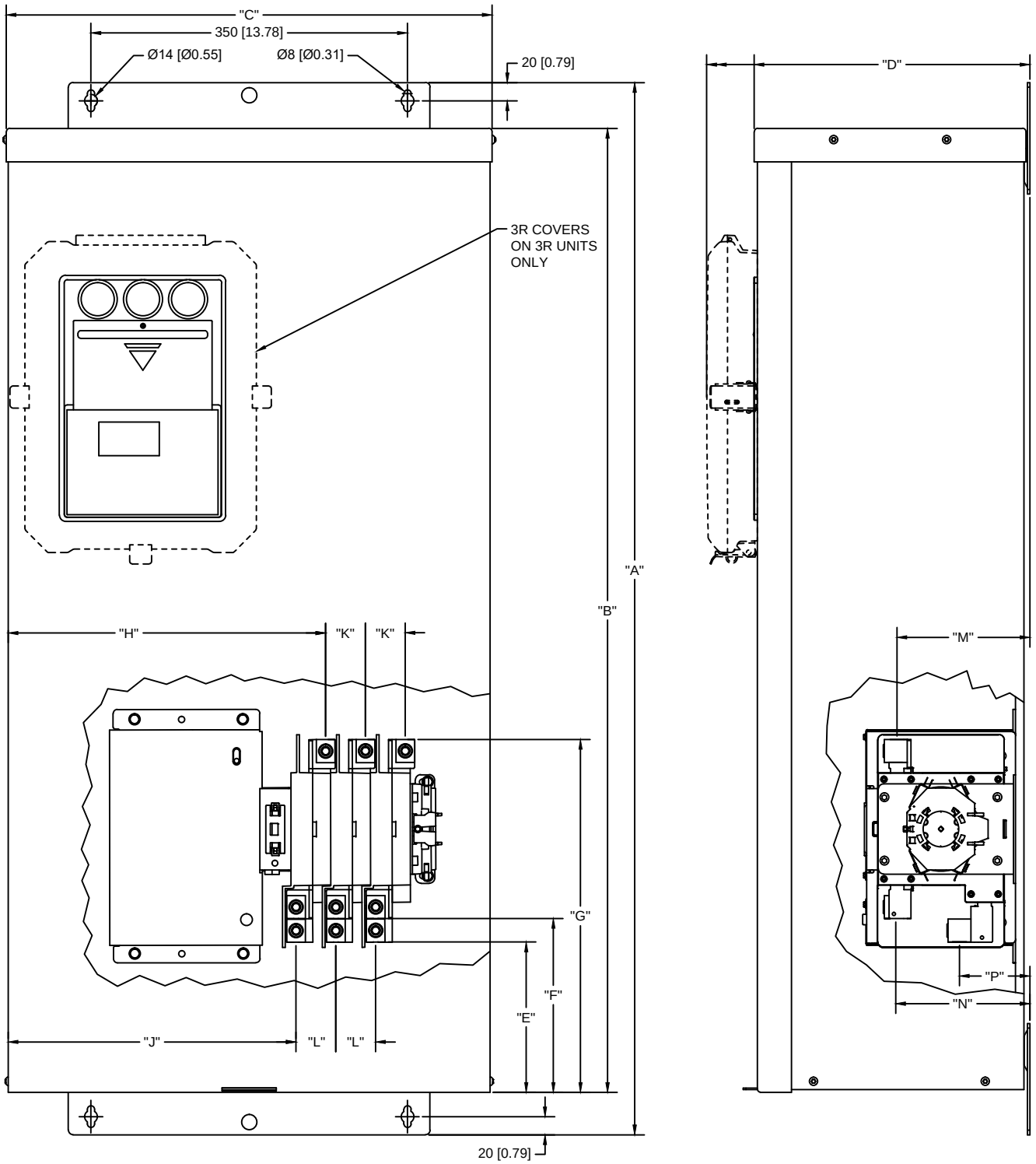
GENERAC

TITLE
INSTALL A-GRP ENCLOSED
G4.5L 50&60Hz

ISSUE DATE:

SIZE	CAGE NO	DWG NO	REV
B	N/A	A0000335178	C

SCALE	0.035	WT-KG	N/A	SHEET	1 of 1



ALL DIMENSION ARE: mm [inches]

DESCRIPTION	HEIGHT "A"	HEIGHT "B"	WIDTH "C"	DEPTH "D"	DIM "E"	DIM "F"	DIM "G"	DIM "H"	DIM "J"	DIM "K"	DIM "L"	DIM "M"	DIM "N"	DIM "P"	WEIGHT
100A NON SER NEMA 1	903	806	538	305	226	252	471	348	315	44	44	149	149	79	48kg
	[35.55]	[31.71]	[21.16]	[12.00]	[8.89]	[9.91]	[18.54]	[13.70]	[12.40]	[1.73]	[1.73]	[5.88]	[5.88]	[3.11]	105.6lbs
100A NON SER NEMA 3R	903	806	538	355	226	252	471	348	315	44	44	149	149	79	50kg
	[35.55]	[31.71]	[21.16]	[13.99]	[8.89]	[9.91]	[18.54]	[13.70]	[12.40]	[1.73]	[1.73]	[5.88]	[5.88]	[3.11]	110.0lbs
150A NON SER NEMA 1	903	806	538	305	237	263	460	348	315	44	44	153	153	83	53kg
	[35.55]	[31.71]	[21.16]	[12.00]	[9.31]	[10.34]	[18.12]	[13.70]	[12.40]	[1.73]	[1.73]	[6.04]	[6.04]	[3.26]	116.6lbs
150A NON SER NEMA 3R	903	806	538	355	237	263	460	348	315	44	44	153	153	83	55kg
	[35.55]	[31.71]	[21.16]	[13.99]	[9.31]	[10.34]	[18.12]	[13.70]	[12.40]	[1.73]	[1.73]	[6.04]	[6.04]	[3.26]	121.0lbs
200A NON SER NEMA 1	903	806	538	305	237	263	460	348	315	44	44	153	153	83	53kg
	[35.55]	[31.71]	[21.16]	[12.00]	[9.31]	[10.34]	[18.12]	[13.70]	[12.40]	[1.73]	[1.73]	[6.04]	[6.04]	[3.26]	116.6lbs
200A NON SER NEMA 3R	903	806	538	355	237	263	460	348	315	44	44	153	153	83	55kg
	[35.55]	[31.71]	[21.16]	[13.99]	[9.31]	[10.34]	[18.12]	[13.70]	[12.40]	[1.73]	[1.73]	[6.04]	[6.04]	[3.26]	121.0lbs

REVISION: B
REVISION DATE: 02/04/2020

ID TX SWITCH NON SERVICE ENTRANCE 3-POLE 100A-200A
A0000561085
NOT TO SCALE

FUEL SPECIFICATION
Liquid Petroleum Gas (LPG) - Odorized Commerical Propane (HD-5)

Commercial propane is a hydrocarbon product for use where high volatility is required. It is suitable for certain low severity internal combustion engine applications. At Generac, generators and other equipment using combustion engines are tested using LPG, typically available in USA and Canada, with chemical and physical properties listed below. The variations from this fuel standard can lead to lower power output, pre-ignition, detonation and corrosion.

Chemical Data

Chemical Name: Propane
Chemical Family: Liquid Petroleum Gas (Paraffinic Hydrocarbon)
Molecular Formula: C_3H_8
Allowable Contents of (by Volume):
- Minimum of 90% Propane
- Maximum of 5% Propylene
- Maximum of 2.5% Butane and Heavier
- Remainder - Other Gases (Methane, ect.)

Energy Density: 46.4 MJ/kg

Physical Properties

Description	Unit	Test Method	Results
Molar Mass	g/mol (lb/mol)	ASTM D2597	44.1(0.09722)
Density (Gas) @ STP	kg/m³ (lb/gal)	ASTM D1657	1.83 (0.0153)
Density (Liquid @ Boiling Point)	kg/m³ (lb/gal)	ASTM D1657	581.2 (4.85)
Boiling Point @ 1 atm (14.7 psia)	°C (°F)	ASTM D2887	-41.2 (-42.1)
Vapor Pressure @ 37.8°C (100°F)	kPa (psig)	ASTM D1267	1,434 (208)
Expansion Ratio @ 1 atm (14.7 psia)	-------	ASTM D1267	1 to 270
Solubility in Water	-------	-------	Slight
Appearance*	-------	-------	Colorless
Odor*	ppmv	ASTM D5305	5 or More

***Odorant Warning:** When LPG is first made it is colorless and odorless. An odorant is added to aid in the detection of leaks. One common odorant is Ethyl Mercaptan, CAS No. 75-08-01. Odorant has a foul smell. The ability of people to detect odors varies widely. In addition, certain chemical reactions with material in the propane system, or fugitive propane gas from underground leaks passing through certain soils can reduce the odor level. No odorant will be 100% effective in all circumstances. If odorant appears to be weak, notify propane supplier immediately.

Composition/Information of Ingredients

Ingredient Name/Cas Number	Percentage	OSHA PEL
Propane/74-98-6	90-100	1,000 ppm
Ethane/74-84-0	0-7.5	
Propylene/115-07-1	0-5	
Butanes/Various	0-2.5	800 ppm
Ethyl Mercaptan/75-08-1	16.25 ppm	0.5 ppm

Part No. A0000641396
Rev. A 4/8/2020

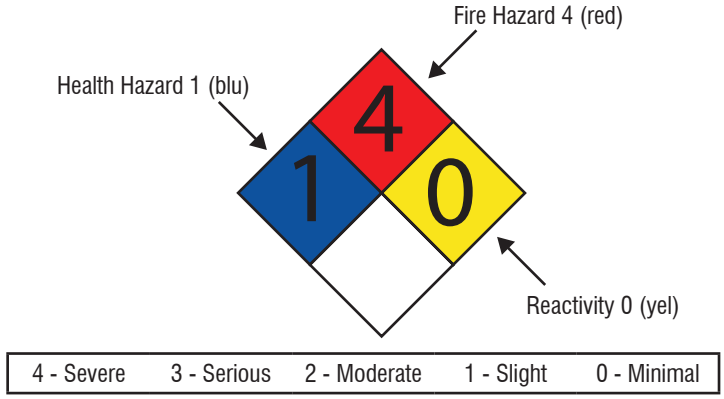
FUEL SPECIFICATION
Liquid Petroleum Gas (LPG) - Odorized Commerical Propane (HD-5)

Hazards Information

Emergency Overview

DANGER! Flammable liquefied gas under pressure. Keep away from heat, sparks, heat and all other ignition sources. Vapor replaces oxygen available for breathing and may cause suffocation in confined spaces. Use only with adequate ventilation. Odor may not provide adequate warning of potentially hazardous concentrations. Vapor is heavier than air. Liquid can cause freeze burn similar to frostbite. Do not get liquid in eyes, on skin, or on clothing. Avoid breathing of vapor. Keep container valve closed when not in use.

NFPA 704 Hazard Identification System



Regulatory Information

The following information concerns selected regulatory requirements potentially apply to this product. Not all such requirements are identified. Users of this product are responsible for their own regulatory compliance on a federal, state, county and local level.

U.S. Federal Regulations

EPA:

CERCLA – 40 CFR Parts 117 and 302
SARA – Section 302/304
– Section 311/312

OSHA: 29 CRF 1910.119

NFPA 58 *Liquefied Petroleum Code* and OSHA 29 CRF 1910.110 require that all persons employed in handling LP-gases be trained in proper handling and operating procedures, which the employer shall document. Contact your propane supplier to arrange for the required training. Allow only trained and qualified persons to install and service propane containers and systems.

Other Information

Special Precautions: Use piping and equipment adequately designed to withstand pressures to be encountered.

References

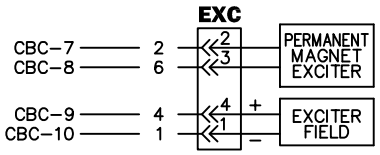
CAS Chemical Abstracts Services
LPS Liquefied Petroleum Gas
OSHA Occupational Safety and Health Administration
EPA Environmental Protection Agency
CERCLA Comprehensive Environmental Response, Compensation and Liability Act of 1980
SARA Superfund Amendment and Reauthorization Act
ASTM D1835 – 11
Farrellgas MSDS – Propane

Generac Power Systems, Inc. | P.O. Box 8 | Waukesha, WI 53187
P: (262) 544-4811
Part No. A0000641396
Rev. A 4/8/2020

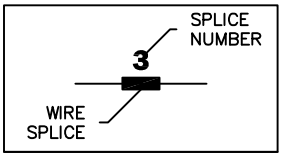
LEGEND

AFPS – AIR FILTER PRESSURE SENSOR	DPR – DRIVER POWER RELAY	OS – OXYGEN SENSOR
AH1 – ALARM HORN	ECM – ENGINE CONTROL MODULE	OTS – OIL TEMPERATURE SENDER
ALT – DC CHARGE ALTERNATOR	EMC – ELECTRONIC MIXER CONTROL VALVE	PWR – POWER ZONE POWER CONNECTOR
AVR – AUTOMATIC VOLTAGE REGULATOR	ES1 – EMERGENCY STOP SWITCH	PZC – MAIN POWER ZONE CONNECTOR
BCC – BATTERY CHARGER CONNECTOR	ETC – ELECTRONIC THROTTLE CONTROL VALVE	PZCS – POWER ZONE CONNECTIVITY SERVER
BCH – BATTERY CHARGER	EXC – EXCITER	R1 – RESISTOR
BPC – BATTERY CHARGER POWER CONNECTOR	FB_ – FUSE BLOCK	RB_ – RELAY BOARD
BS – POWERZONE BASE STATION	FPS – FUEL PRESSURE SENSOR	RB_A – RELAY BOARD CONNECTOR
BS_ – BASE STATION CONNECTOR	FS_ – FUEL SOLENOID	SC – START CONTACTOR
BSG – BASE STATION CHASSIS GROUND	FSP – FUEL SOLENOID PLUG	SM – STARTER MOTOR
CAMS – CAMSHAFT POSITION SENSOR	FSR – FUEL SOLENOID RECEPTACLE	ST – SHUNT TRIP
CB – CIRCUIT BREAKER PME	GFCI – GROUND FAULT CURRENT INTERRUPT	SW1 – OFF/AUTO/MANUAL SWITCH
CBC – (MLCB) CIRCUIT BREAKER CONNECTOR	GND – GROUND BAR CONNECTION	SWC – OPERATOR SWITCH CONNECTOR
CRKS – CRANKSHAFT POSITION SENSOR	IC_ – IGNITION COIL	TB_ – TERMINAL BLOCK
CT_ – CURRENT TRANSFORMER	IR – IGNITION RELAY	TMAP – MANIFOLD TEMPERATURE & PRESSURE
CTC – CURRENT TRANSFORMER CONNECTOR	LFP – LOW FUEL PRESSURE SWITCH/SENSOR	TPS – MIXER POSITION SENSOR
CAC – CHARGE AIR COOLER BYPASS	MLCB – MAIN LINE CIRCUIT BREAKER	VSC – VOLTAGE SENSING CONNECTOR
DB – DIODE BRIDGE	NEU – NEUTRAL BUS	WLS – COOLANT LEVEL SENDER
DGND – CONTROL PANEL DOOR GROUND	OPS – OIL PRESSURE SENDER	WTS – COOLANT TEMPERATURE SENDER

ALTERNATOR EXCITATION



NOTE: ALL WIRES 18 AWG 300V UL LISTED UNLESS SHOWN OTHERWISE

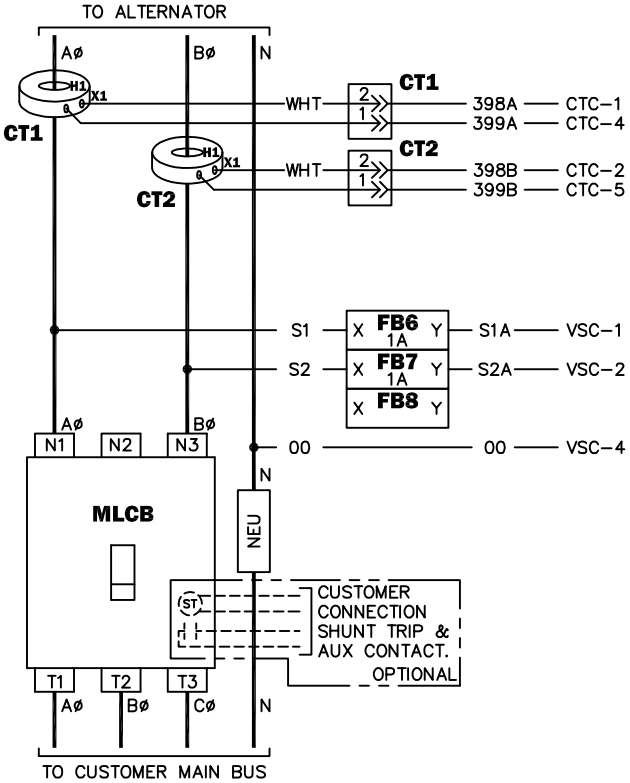


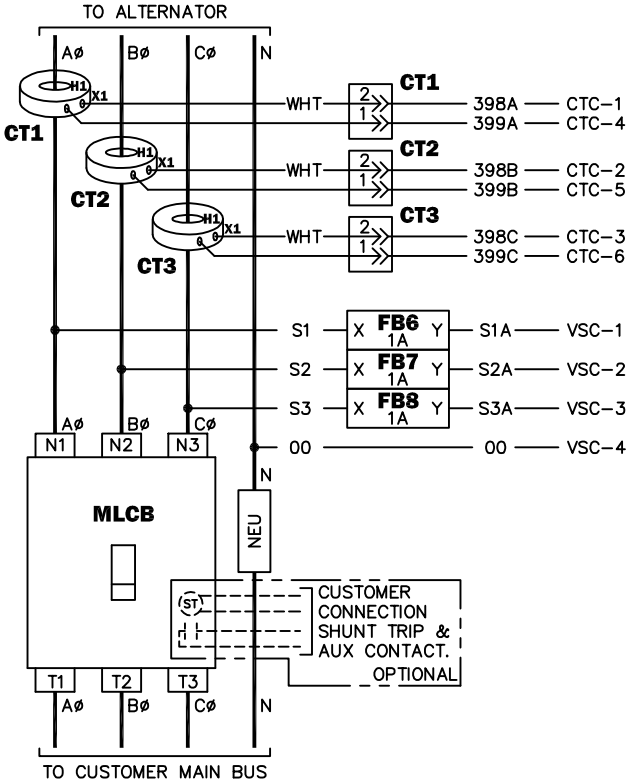
COMPONENTS LOCATED IN HIGH VOLTAGE CUSTOMER CONNECTION MODULE

CONNECTIONS FOR 1Ø UNIT

NOTE: ALL WIRES IN THIS SECTION ARE 600V RATED

CONNECTIONS FOR 3Ø UNIT

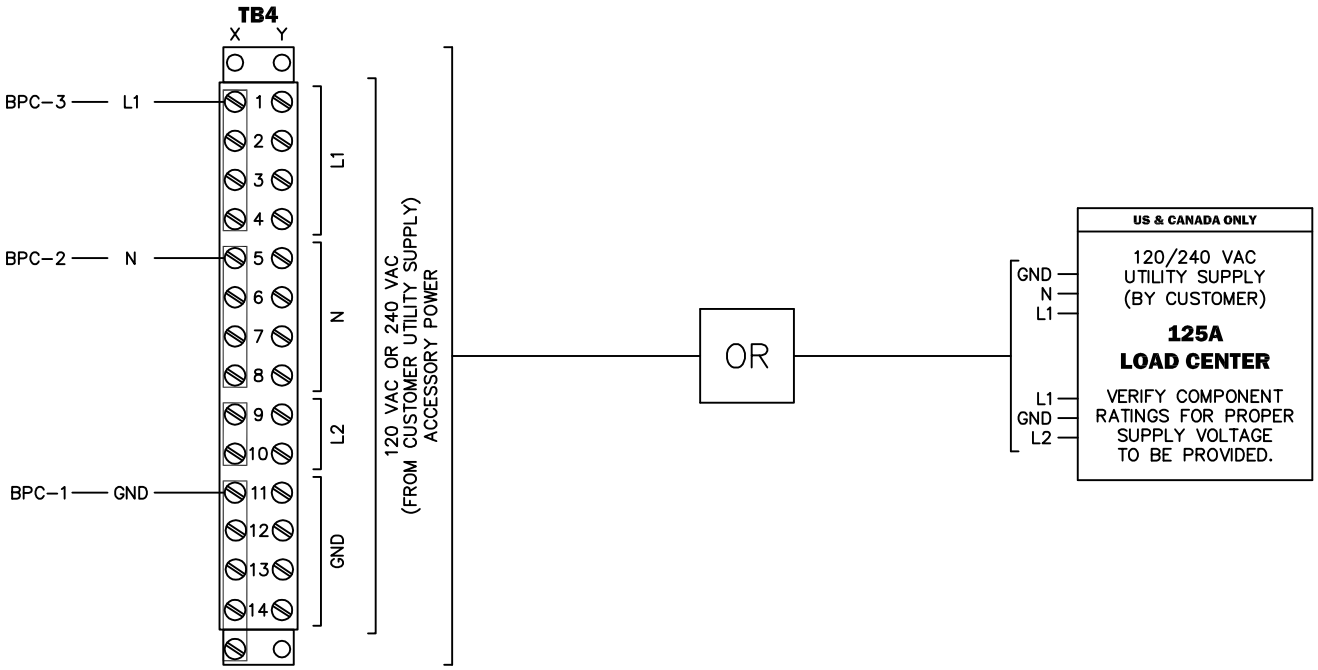




PAGE 1 OF 12

COMPONENTS LOCATED IN HIGH VOLTAGE CUSTOMER CONNECTION MODULE

NOTE: ALL WIRES ON THIS PAGE ARE 600V RATED

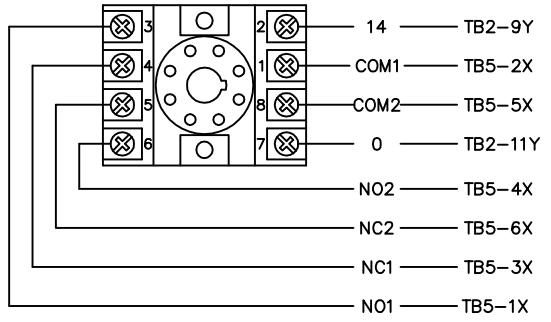


NOTE:
FOR FIELD WIRING TO CUSTOMER CONNECTIONS (TERMINAL STRIP)
MAXIMUM WIRE SIZE: #10 AWG
RECOMMENDED TIGHTENING TORQUE: 14 LB-IN

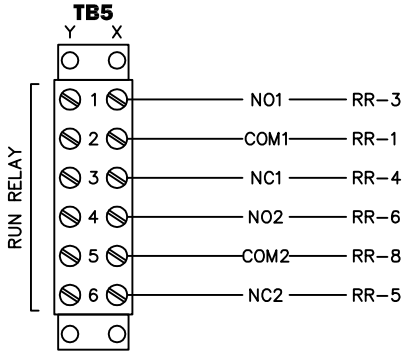
COMPONENTS LOCATED IN HIGH VOLTAGE CUSTOMER CONNECTION MODULE

NOTE: ALL WIRES ON THIS PAGE ARE 600V RATED

RUN RELAY

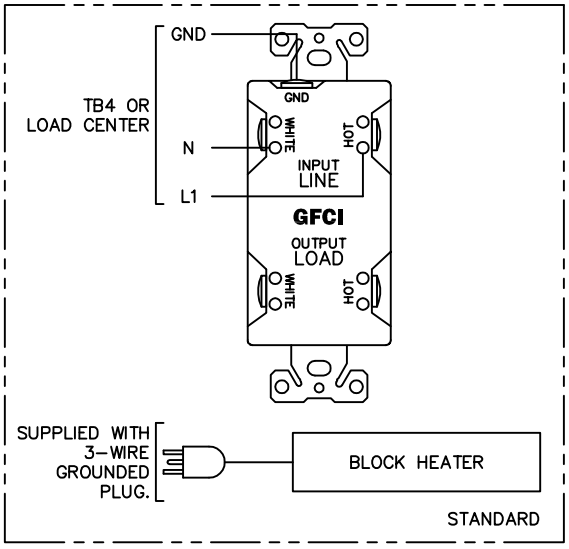


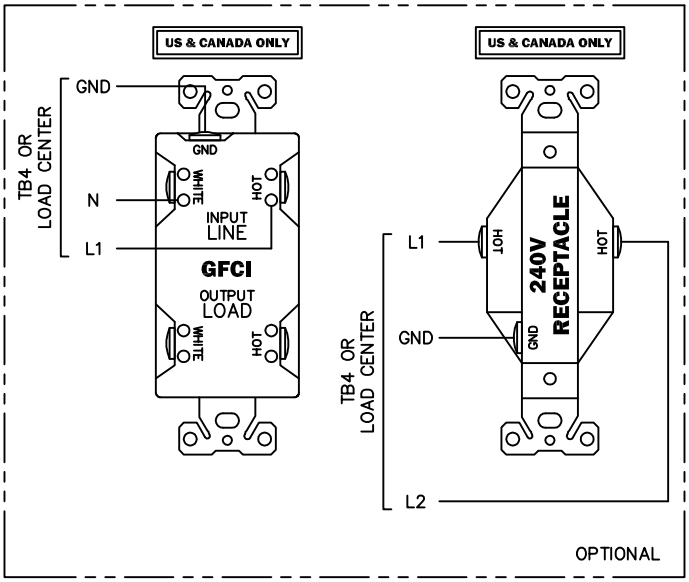
TB5



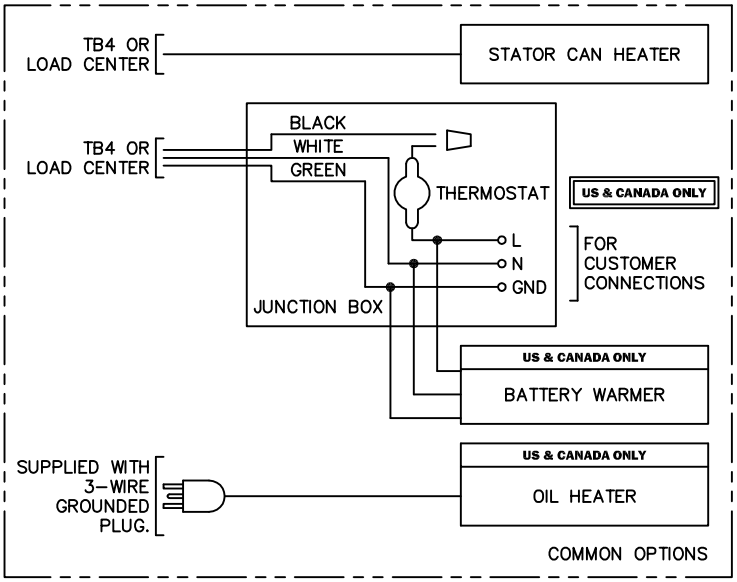
NOTE:
FOR FIELD WIRING TO CUSTOMER CONNECTIONS (TERMINAL STRIPS AND RELAY BOARD)
MAXIMUM WIRE SIZE: #14 AWG
RECOMMENDED TIGHTENING TORQUE: 12 LB–IN

OPTIONAL





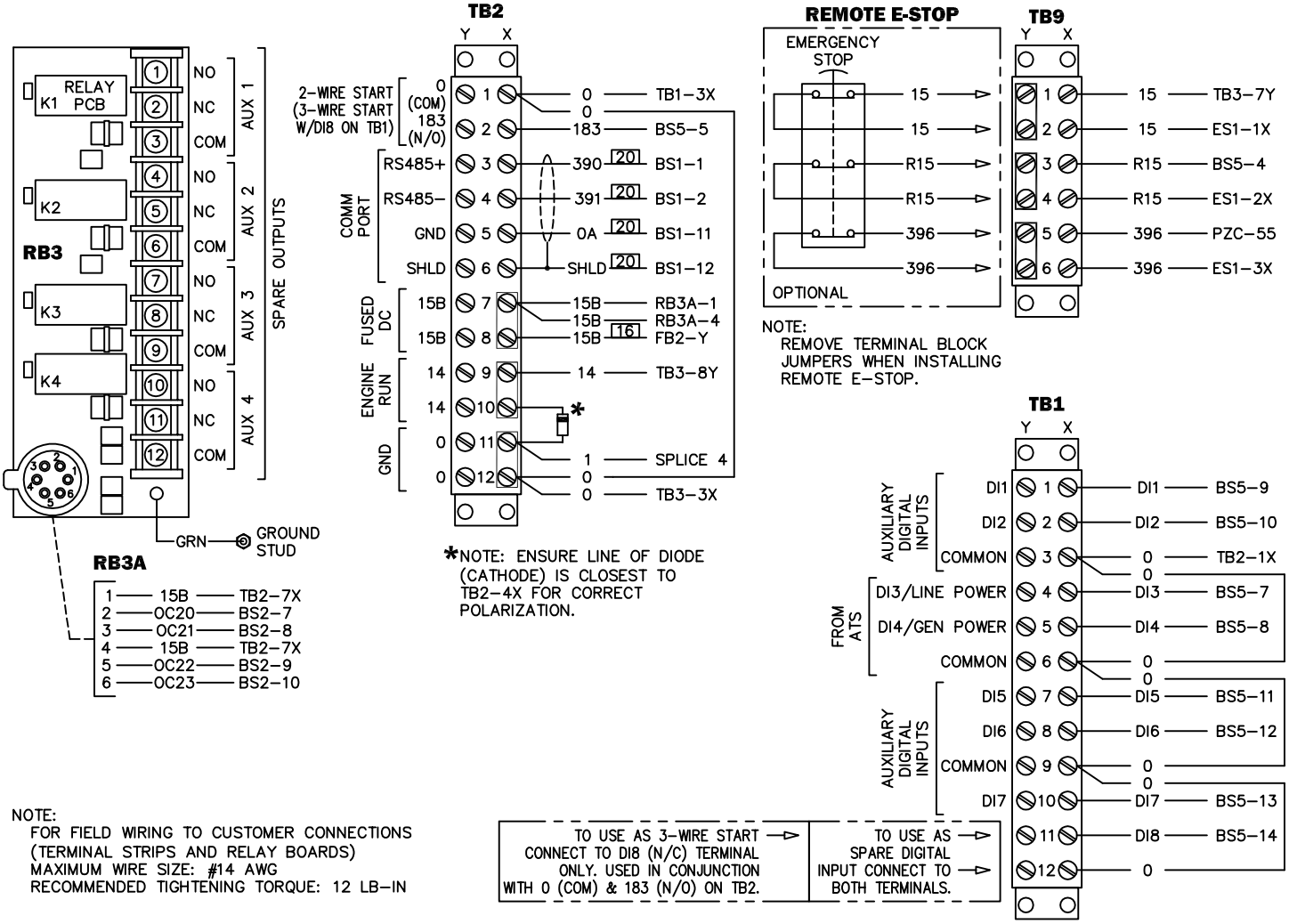
OPTIONAL



COMMON OPTIONS

PAGE 3 OF 12

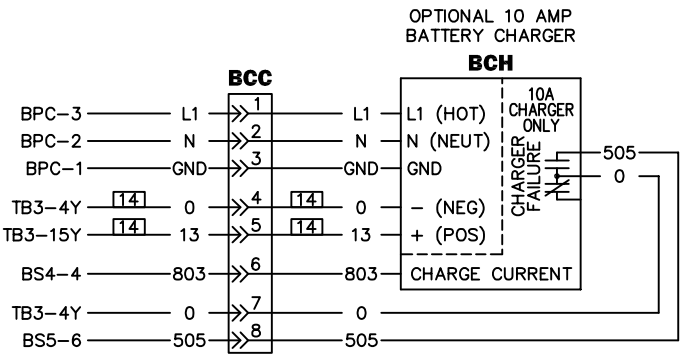
COMPONENTS LOCATED ON LOW VOLTAGE CUSTOMER CONNECTION PANEL



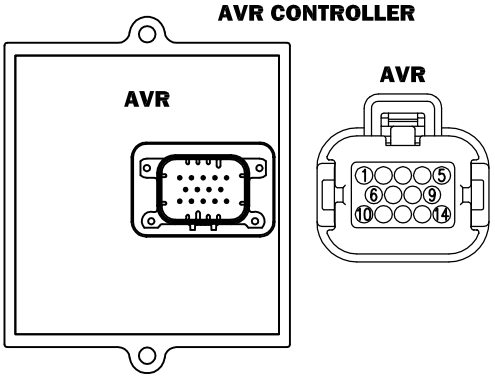
NOTE:
FOR FIELD WIRING TO CUSTOMER CONNECTIONS (TERMINAL STRIPS AND RELAY BOARDS)
MAXIMUM WIRE SIZE: #14 AWG
RECOMMENDED TIGHTENING TORQUE: 12 LB-IN

COMPONENTS LOCATED IN CONTROL PANEL

BATTERY CHARGER

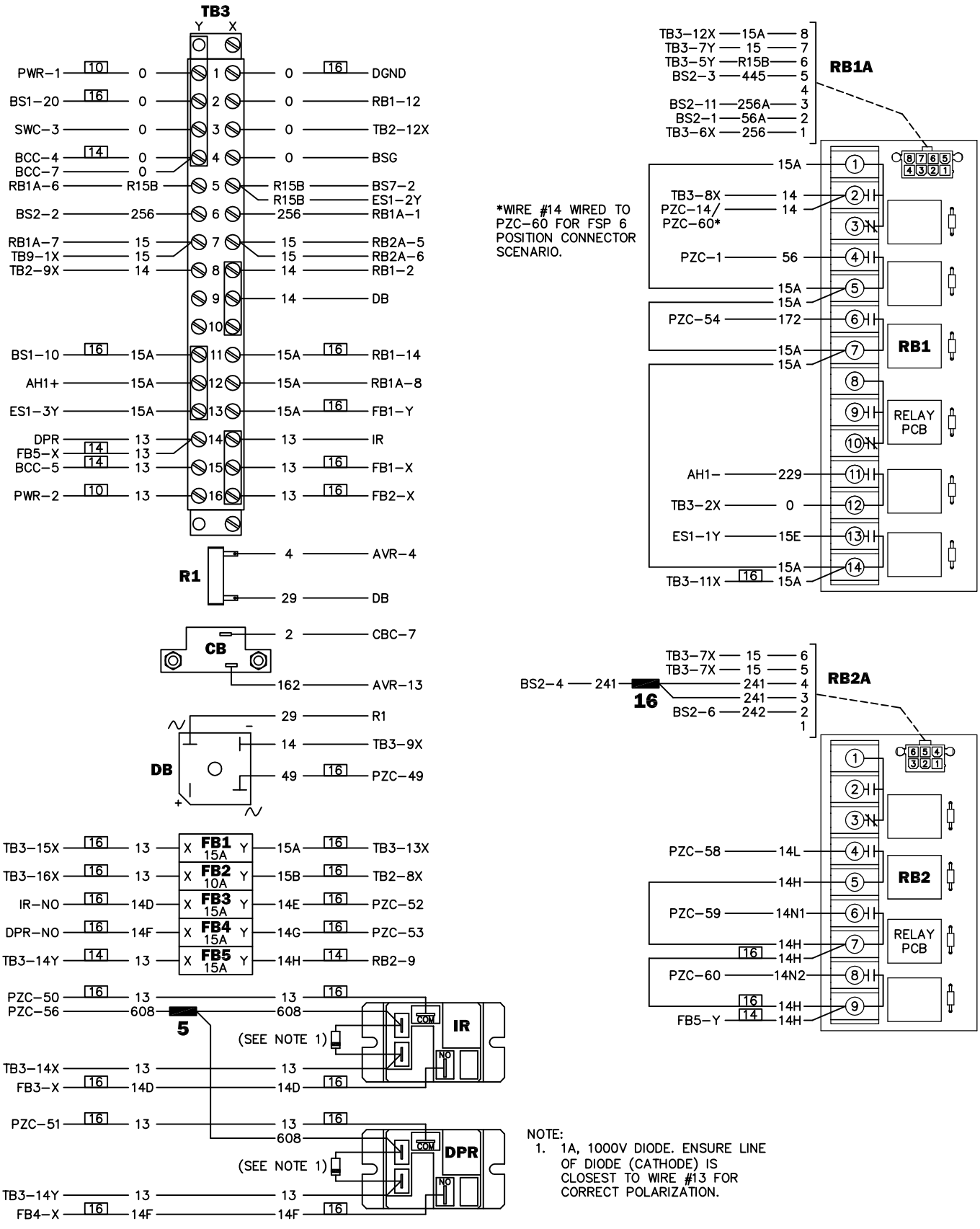


AVR CONTROLLER



PIN	WIRE	FROM
1	1	SPLICE 4
2	194	BS7-11
3	6	CBC-8
4	4	R1
5	4	CBC-9
6	403	BS2-20
7	404	BS2-19
8	–	–
9	–	–
10	406	BS5-15
11	405	BS7-4
12	–	–
13	162	CB
14	–	–

COMPONENTS LOCATED IN CONTROL PANEL



PAGE 5 OF 12

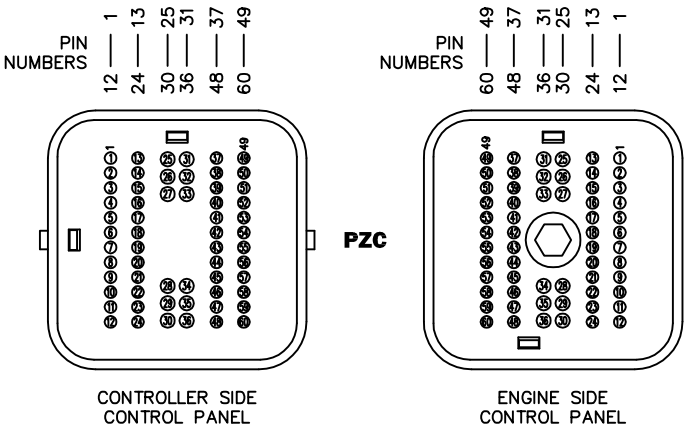
COMPONENTS LOCATED ON CONTROL PANEL BACK WALL

PIN	WIRE	FROM	TO
1	56	RB1–4	SC
2	–	–	–
3	–	–	–
4	–	–	–
5	–	–	–
6	601	BS5–3	FSP–1
7	573	BS3–12	WLS–A
8	573A	BS3–11	WLS–B
9	–	–	–
10	–	–	–
11	–	–	–
12	–	–	–

PIN	WIRE	FROM	TO
13	–	–	–
14	14	RB1–2	SPLICE 3
15	–	–	–
16	–	–	–
17	–	–	–
18	–	–	–
19	–	–	–
20	–	–	–
21	–	–	–
22	–	–	–
23	–	–	–
24	–	–	–

PIN	WIRE	FROM	TO
25	–	–	–
26	–	–	–
27	–	–	–

PIN	WIRE	FROM	TO
28	–	–	–
29	–	–	–
30	–	–	–



PIN	WIRE	FROM	TO
31	–	–	–
32	–	–	–
33	–	–	–

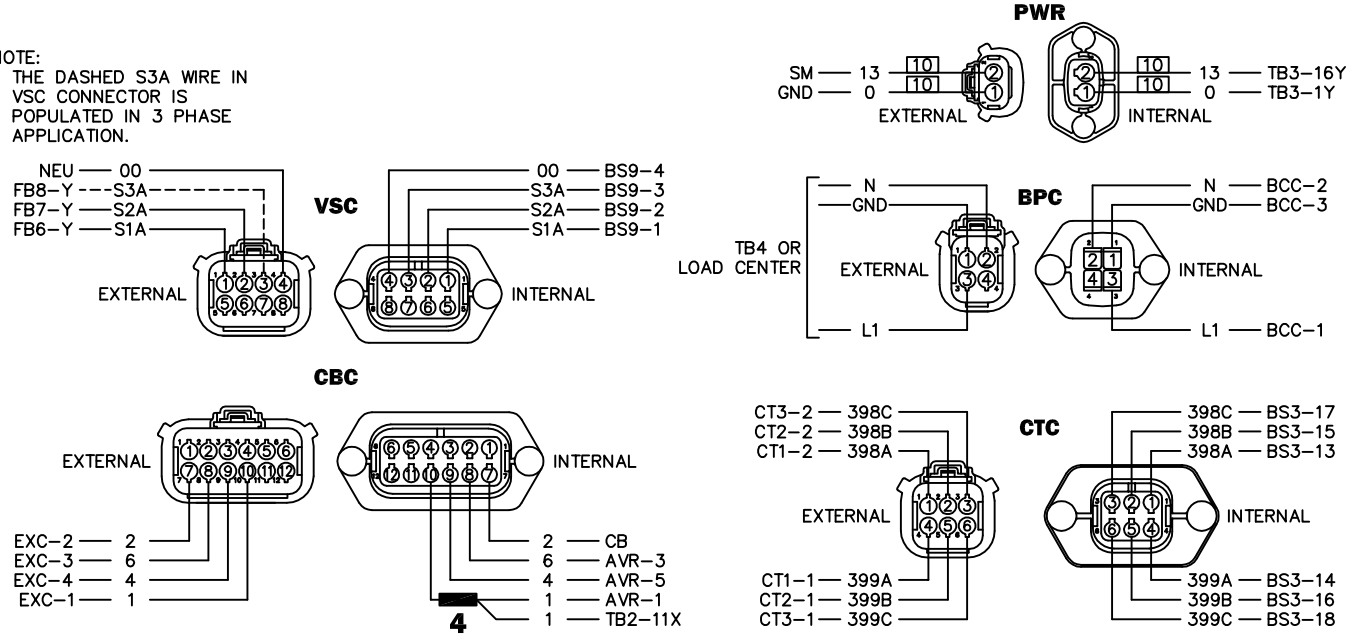
PIN	WIRE	FROM	TO
34	–	–	–
35	–	–	–
36	–	–	–

PIN	WIRE	FROM	TO
37	–	–	–
38	–	–	–
39	–	–	–
40	797S	BS4–1	FSP–2
41	797R	BS4–13	FSP–3
42	797V	BS4–9	FSP–4
43	743A	BS8–3	ECM–2C
44	744A	BS8–4	ECM–2B
45	SHLD	BS8–2	ECM (CUT)
46	–	–	–
47	–	–	–
48	–	–	–

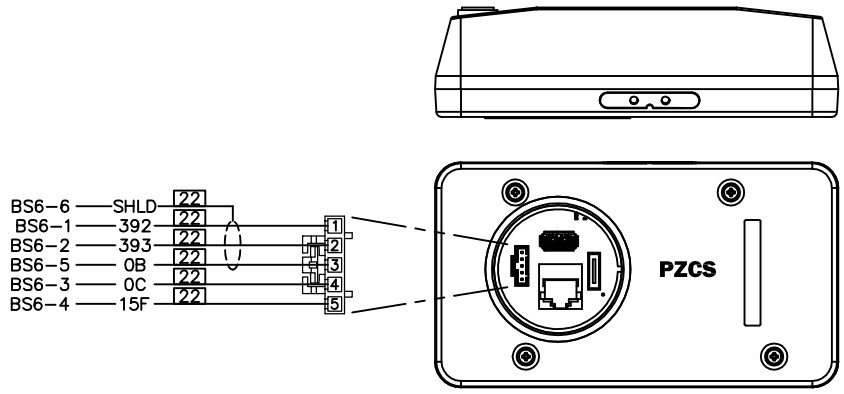
PIN	WIRE	FROM	TO	
49	49	DB	ALT	
50	13	IR–COM	SPLICE 1	
51	13	DPR–COM	SPLICE 1	
52	14E	FB3–Y	SPLICE 6	
53	14G	FB4–Y	SPLICE 13	
54	172	RB1–6	ECM–2O	
55	396	TB9–5X	ECM–3J	
56	608	SPLICE 5	ECM–1H	
57	609	BS2–13	ECM–3K	
58	14L	RB2–4	FSP–8	*
59	14N1	RB2–6	FSP–9	*
60	14N2	RB2–8	FSP–10	*

*SEE ALTERNATIVE WIRING TO FSP FOR 6 POSITION CONNECTOR ON PAGE 7.

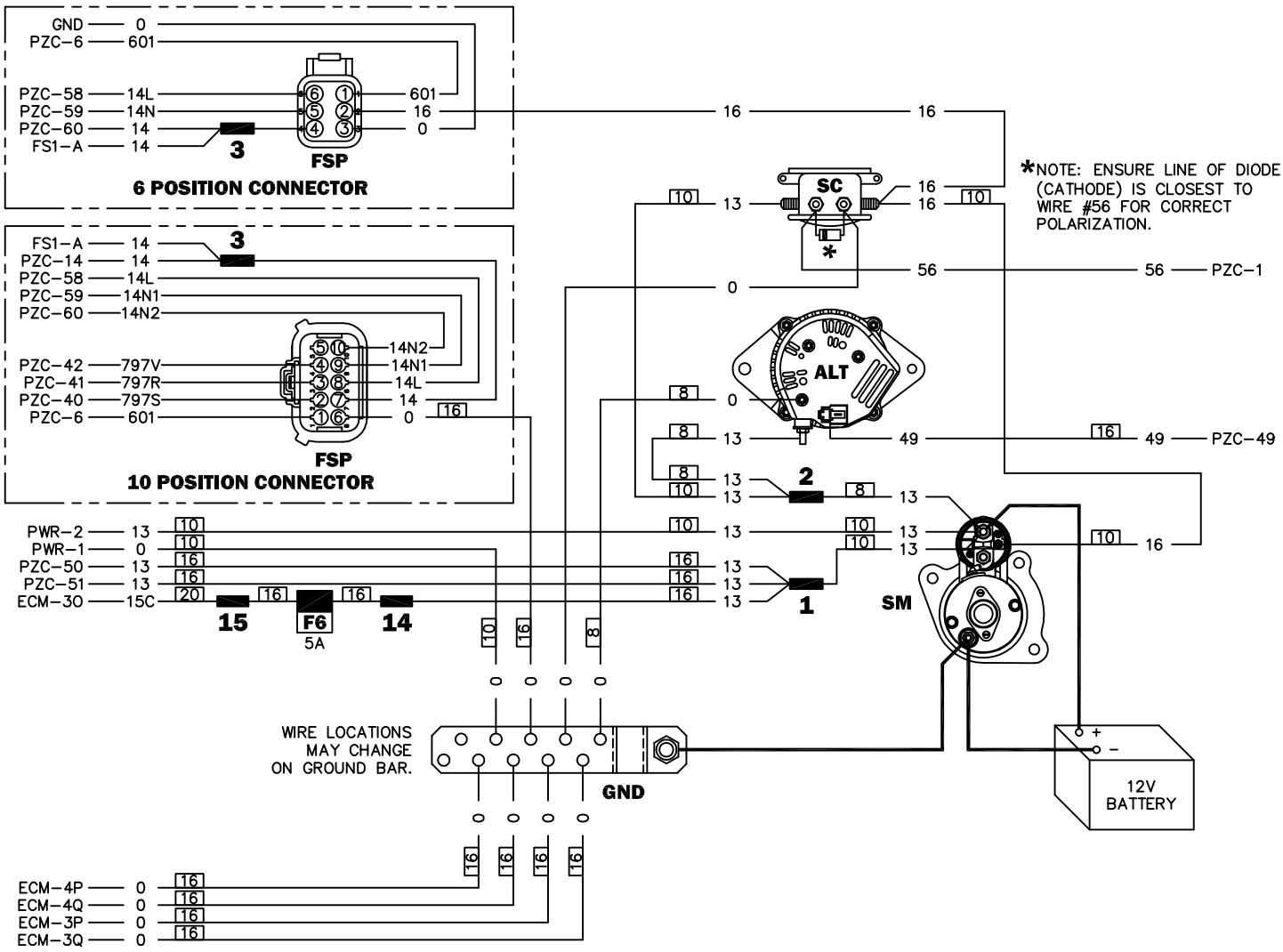
NOTE:
THE DASHED S3A WIRE IN VSC CONNECTOR IS POPULATED IN 3 PHASE APPLICATION.



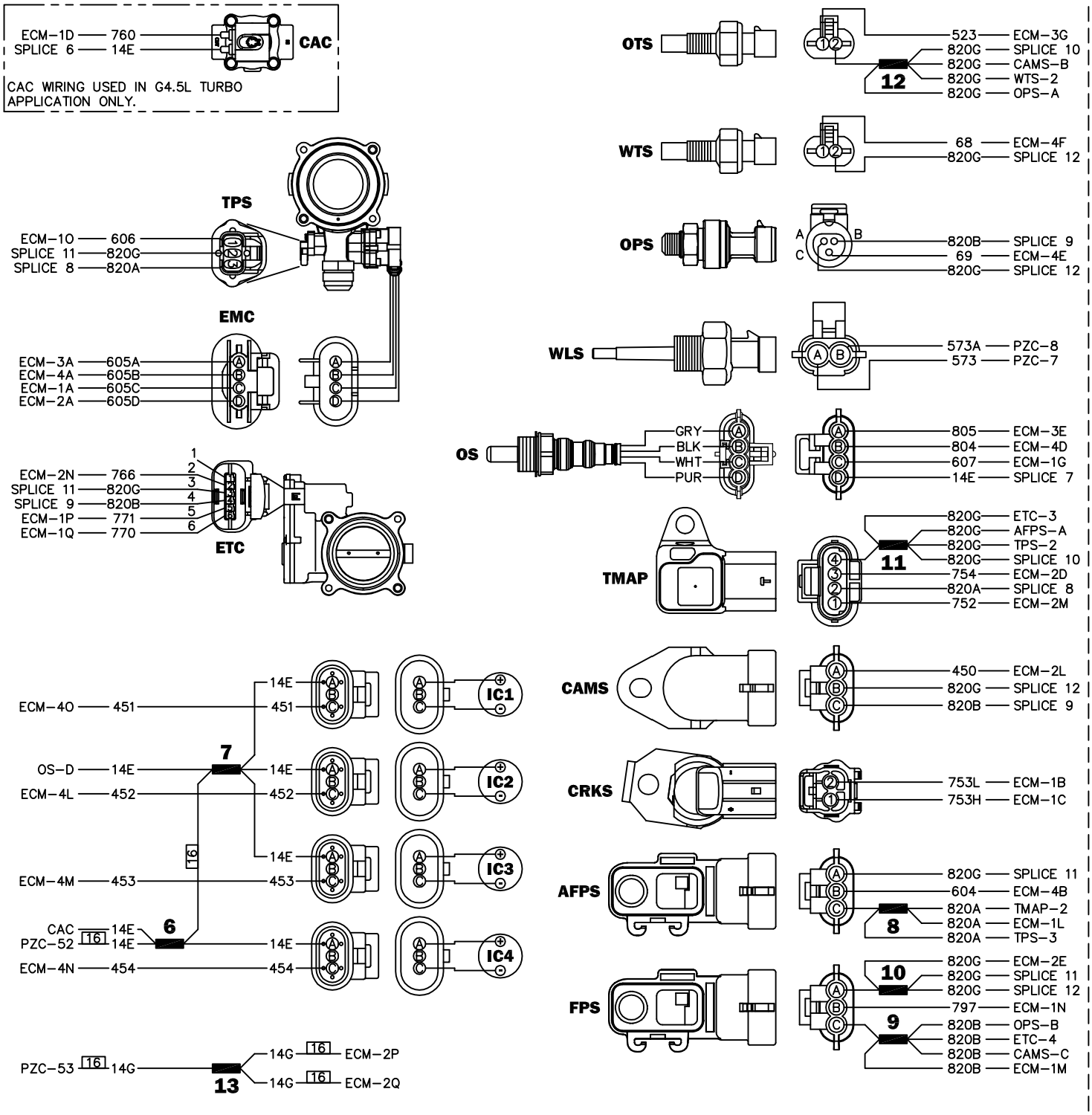
COMPONENTS LOCATED ON TOP OF CONTROL PANEL



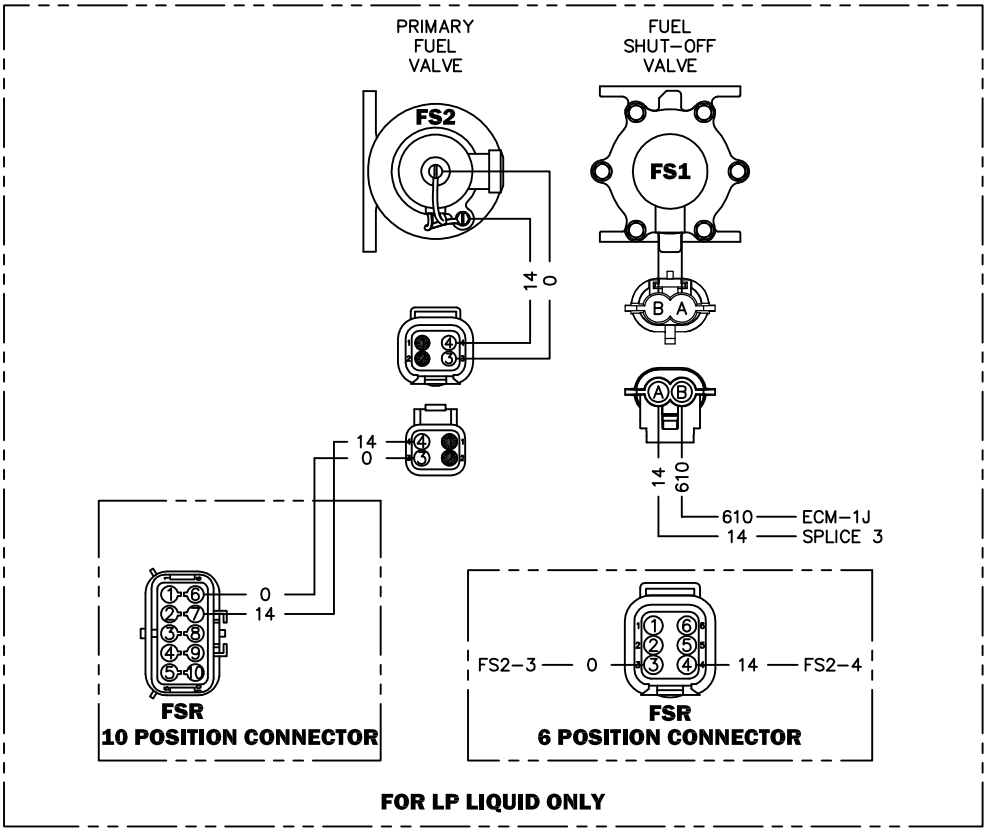
COMPONENTS LOCATED ON ENGINE



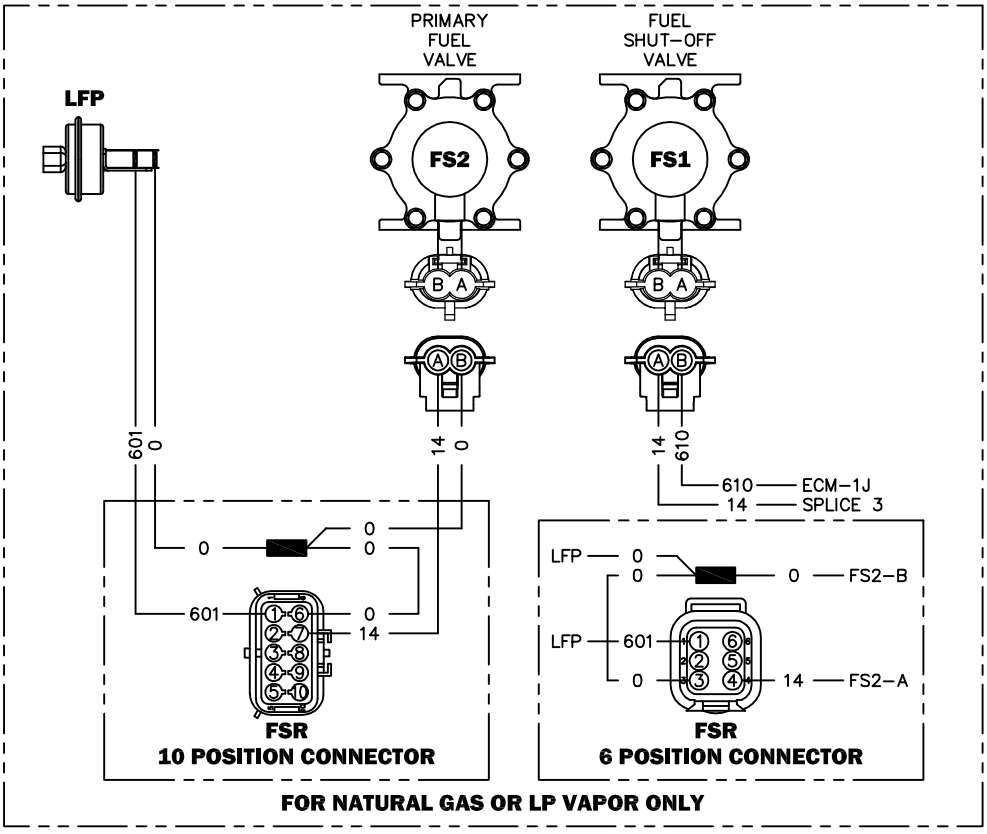
COMPONENTS LOCATED ON ENGINE



COMPONENTS LOCATED ON ENGINE



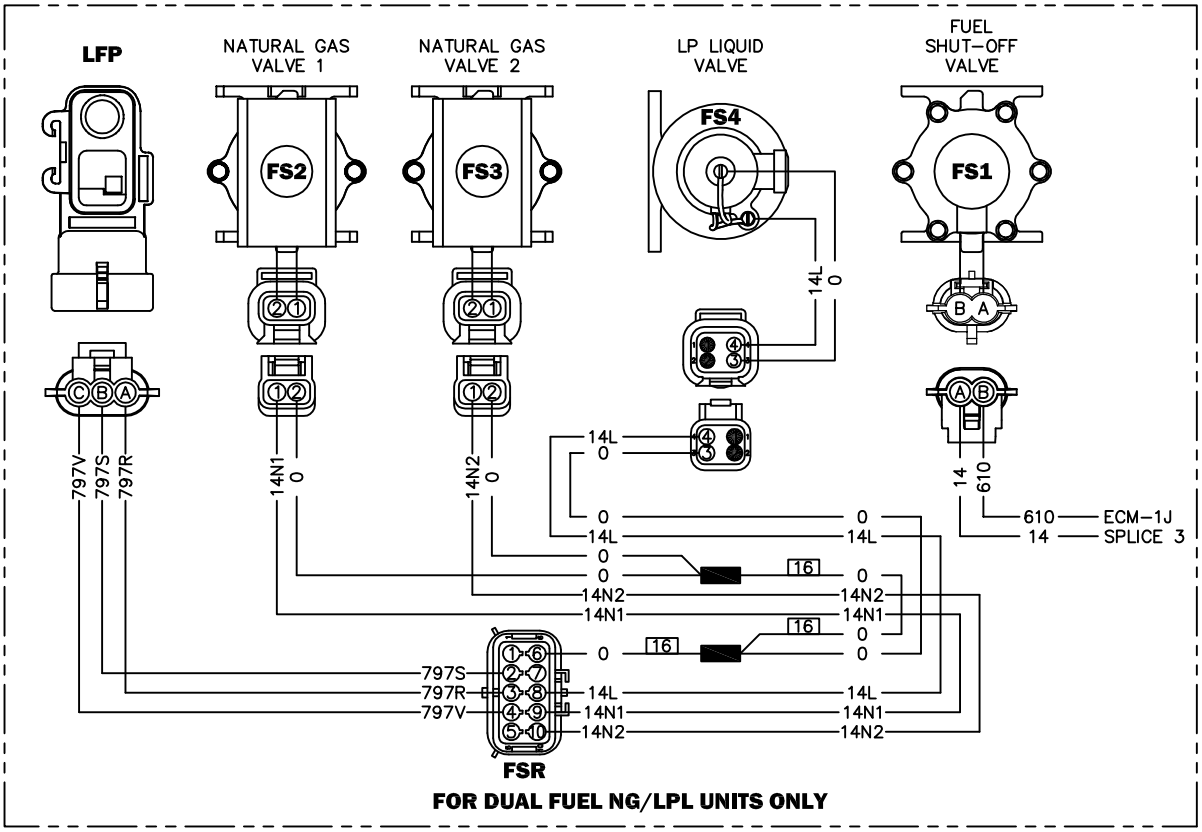
FOR LP LIQUID ONLY



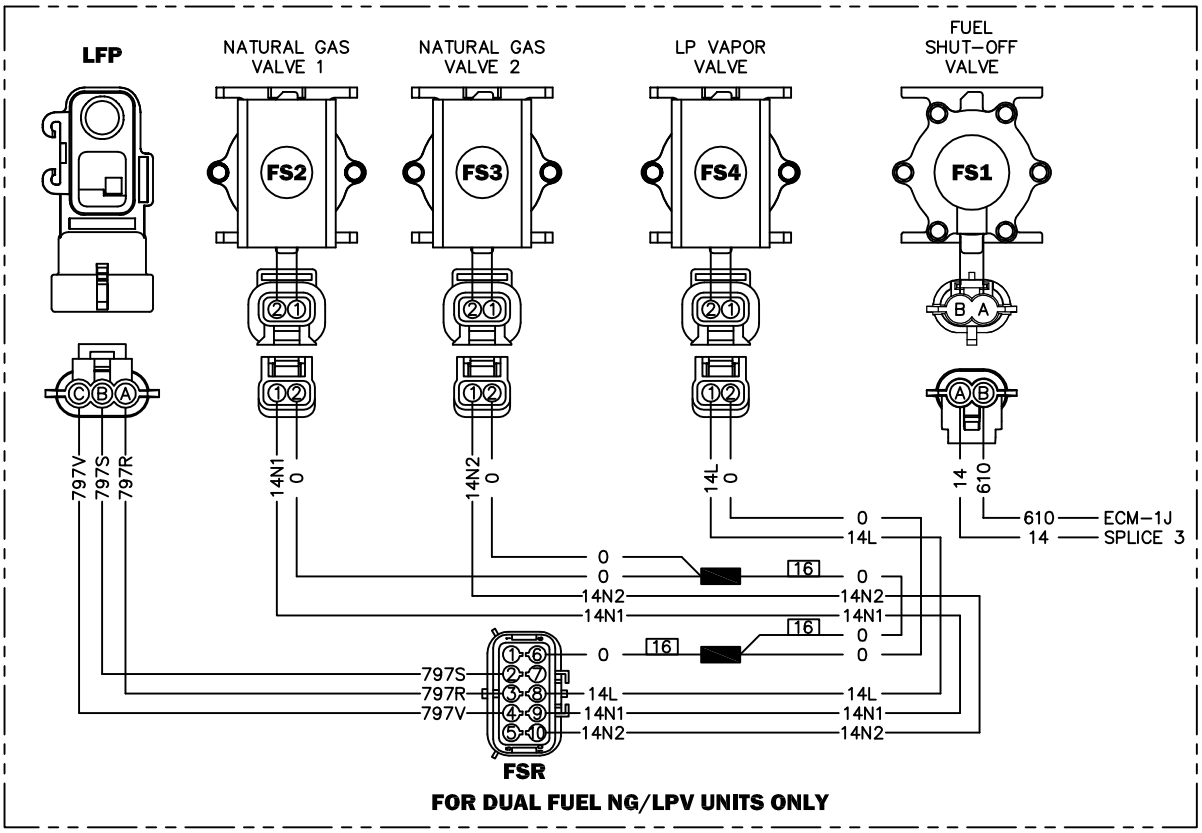
FOR NATURAL GAS OR LP VAPOR ONLY

PAGE 9 OF 12

COMPONENTS LOCATED ON ENGINE



FOR DUAL FUEL NG/LPL UNITS ONLY



FOR DUAL FUEL NG/LPV UNITS ONLY

WIRING - DIAGRAM

REVISION: CN-0038414-F

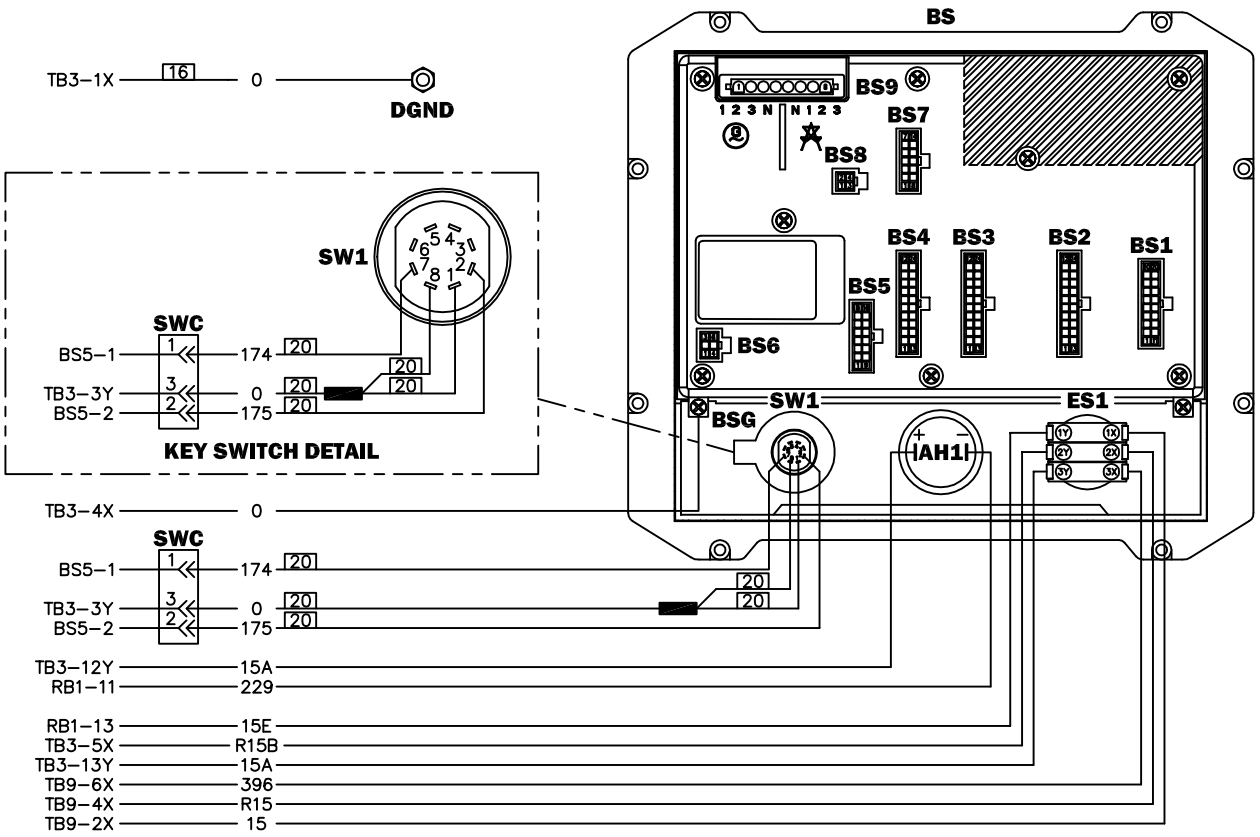
G4.5L G26 PZP

DATE: 6/24/20

PAGE 10 OF 12

DRAWING #: 10000046468

COMPONENTS LOCATED IN CONTROL PANEL



BS1

FROM	WIRE	PIN
TB3-11Y	15A	10
–	–	9
–	–	8
–	–	7
–	–	6
–	–	5
–	–	4
–	–	3
TB2-4X	391	2
TB2-3X	390	1

PIN: 10 20 / 1 11

PIN	WIRE	FROM
20	0	TB3-2Y
19	–	–
18	–	–
17	–	–
16	–	–
15	–	–
14	–	–
13	–	–
12	SHLD	TB2-6X
11	0A	TB2-5X

BS2

FROM	WIRE	PIN
–	–	12
RB1A-3	256A	11
RB3A-6	0C23	10
RB3A-5	0C22	9
RB3A-3	0C21	8
RB3A-2	0C20	7
RB2A-2	242	6
–	–	5
SPLICE 16	241	4
RB1A-5	445	3
TB3-6Y	256	2
RB1A-2	56A	1

PIN: 12 24 / 1 13

PIN	WIRE	FROM
24	–	–
23	–	–
22	–	–
21	–	–
20	403	AVR-6
19	404	AVR-7
18	–	–
17	–	–
16	–	–
15	–	–
14	–	–
13	609	PZC-57

BS3

FROM	WIRE	PIN
PZC-7	573	12
PZC-8	573A	11
–	–	10
–	–	9
–	–	8
–	–	7
–	–	6
–	–	5
–	–	4
–	–	3
–	–	2
–	–	1

PIN: 12 24 / 1 13

PIN	WIRE	FROM
24	–	–
23	–	–
22	–	–
21	–	–
20	–	–
19	–	–
18	399C	CTC-6
17	398C	CTC-3
16	399B	CTC-5
15	398B	CTC-2
14	399A	CTC-4
13	398A	CTC-1

BS4

FROM	WIRE	PIN
–	–	12
–	–	11
–	–	10
PZC-42	797V	9
–	–	8
–	–	7
–	–	6
–	–	5
BCC-6	803	4
–	–	3
–	–	2
PZC-40	797S	1

PIN: 12 24 / 1 13

PIN	WIRE	FROM
24	–	–
23	–	–
22	–	–
21	–	–
20	–	–
19	–	–
18	–	–
17	–	–
16	–	–
15	–	–
14	–	–
13	797R	PZC-41

BS5

FROM	WIRE	PIN
TB1-5X	DI4	8
TB1-4X	DI3	7
BCC-8	505	6
TB2-2X	183	5
TB9-3X	R15	4
PZC-6	601	3
SWC-2	175	2
SWC-1	174	1

PIN: 8 16 / 1 9

PIN	WIRE	FROM
16	–	–
15	406	AVR-10
14	DI8	TB1-11X
13	DI7	TB1-10X
12	DI6	TB1-8X
11	DI5	TB1-7X
10	DI2	TB1-2X
9	DI1	TB1-1X

BS6

FROM	WIRE	PIN
PZCS-4	0C	3
PZCS-2	393	2
PZCS-1	392	1

PIN: 3 6 / 1 4

PIN	WIRE	FROM
6	SHLD	PZCS (CUT)
5	0B	PZCS-3
4	15F	PZCS-5

BS7

FROM	WIRE	PIN
–	–	7
–	–	6
–	–	5
AVR-11	405	4
–	–	3
TB3-5X	R15B	2
–	–	1

PIN: 7 14 / 1 8

PIN	WIRE	FROM
14	–	–
13	–	–
12	–	–
11	194	AVR-2
10	–	–
9	–	–
8	–	–

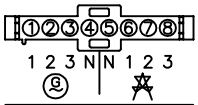
BS8

FROM	WIRE	PIN
PZC-45	SHLD	2
–	–	1

PIN: 2 4 / 1 3

PIN	WIRE	FROM
4	744A	PZC-44
3	743A	PZC-43

BS9



	PIN	WIRE	FROM
GEN 1	1	S1A	VSC-1
GEN 2	2	S2A	VSC-2
GEN 3	3	S3A	VSC-3
GEN N	4	00	VSC-4
UTIL N	5	–	–
UTIL 1	6	–	–
UTIL 2	7	–	–
UTIL 3	8	–	–

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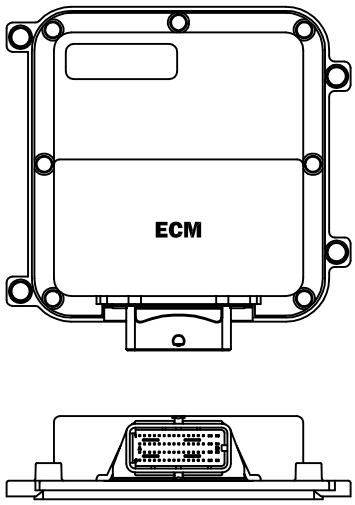
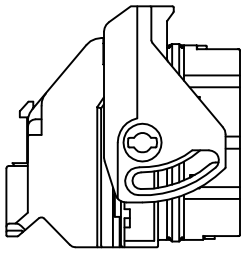
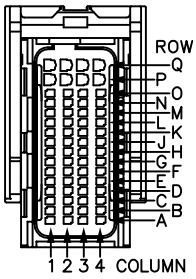
COMPONENTS LOCATED ON ENGINE
ELECTRONIC CONTROL MODULE





SIDE VIEW OF CONNECTOR W/COVER



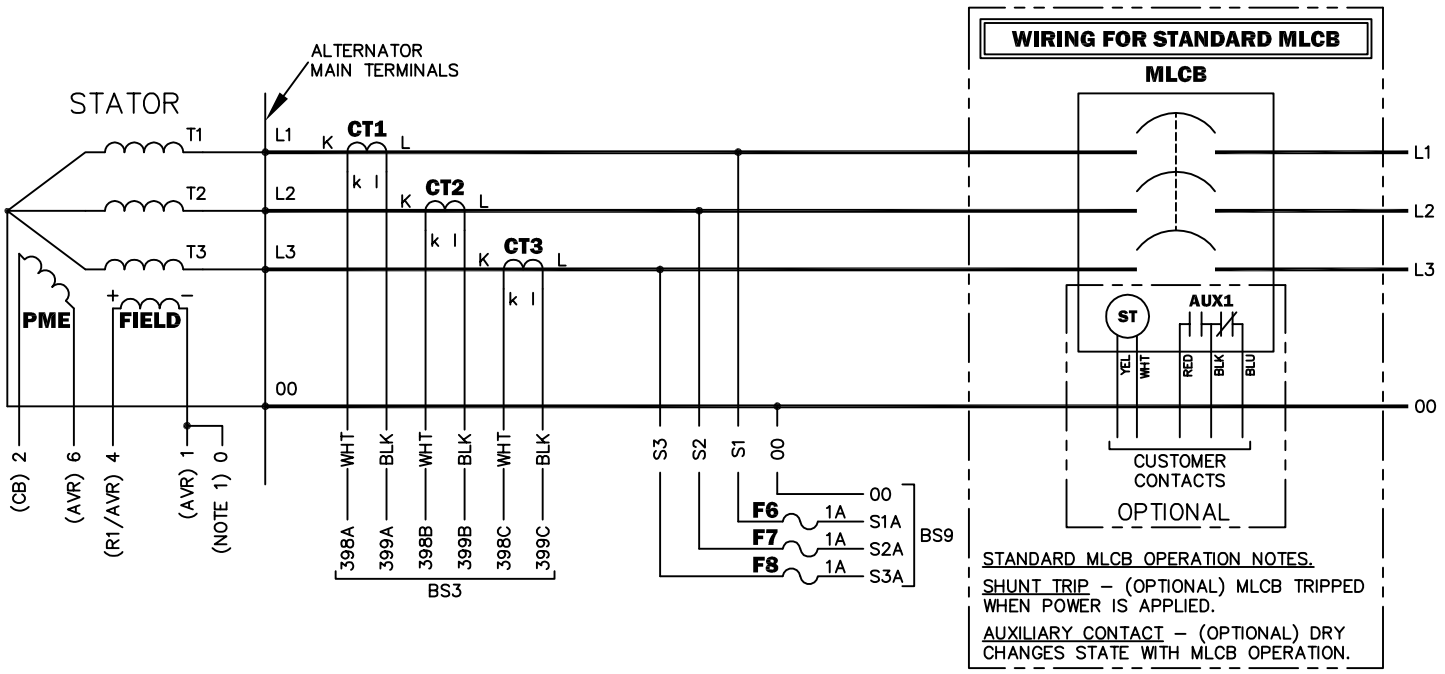
TOP VIEW OF CONNECTOR W/O COVER

PIN	WIRE	TO
1A	605C	EMC–C
1B	753L	CRKS–2
1C	753H	CRKS–1
1D	760	CAC
1E	–	–
1F	–	–
1G	607	OS–C
1H	608	PZC–56
1J	610	FS1–B
1K	–	–
1L	820A	SPLICE 8
1M	820B	SPLICE 9
1N	797	FPS–B
1O	606	TPS–1
1P	771	ETC–5
1Q	770	ETC–6

PIN	WIRE	TO
2A	605D	EMC–D
2B	744A	PZC–44
2C	743A	PZC–43
2D	754	TMAP–3
2E	820G	SPLICE 10
2F	–	–
2G	–	–
2H	–	–
2J	–	–
2K	–	–
2L	450	CAMS–A
2M	752	TMAP–1
2N	766	ETC–2
2O	172	PZC–54
2P	14G	SPLICE 13
2Q	14G	SPLICE 13

PIN	WIRE	TO
3A	605A	EMC–A
3B	–	–
3C	–	–
3D	–	–
3E	805	OS–A
3F	–	–
3G	523	OTS–1
3H	–	–
3J	396	PZC–55
3K	609	PZC–57
3L	–	–
3M	–	–
3N	–	–
3O	15C	SPLICE 15
3P	0	GND
3Q	0	GND

PIN	WIRE	TO
4A	605B	EMC–B
4B	604	AFPS–B
4C	–	–
4D	804	OS–B
4E	69	OPS–C
4F	68	WTS–1
4G	–	–
4H	–	–
4J	–	–
4K	–	–
4L	452	IC2–C
4M	453	IC3–C
4N	454	IC4–C
4O	451	IC1–C
4P	0	GND
4Q	0	GND



NOTES:

1) WIRE# 0 IS CHASSIS GROUND (BATTERY–) UNLESS NOTED OTHERWISE.
2) WIRE# 13 IS UNFUSED +12VDC (BATTERY+).
3) WIRE# 14 IS FUSED +12VDC POWER WHEN ENGINE IS CRANKING OR RUNNING.
4) WIRE# 15 IS FUSED +12VDC POWER WHEN E–STOP IS NOT ACTIVATED.
5) WIRE# 15A IS FUSED +12VDC POWER FOR GENERAL USE.
6) WIRE# 15B IS FUSED +12VDC POWER FOR THE CUSTOMER RELAYS AND FUSED DC CONNECTIONS.
7) WIRE# 15C IS FUSED +12VDC POWER FOR THE ECM.
8) WIRE# 15E IS FUSED +12VDC CONTROLLED BY BASE STATION PRIOR TO E–STOP.

LEGEND

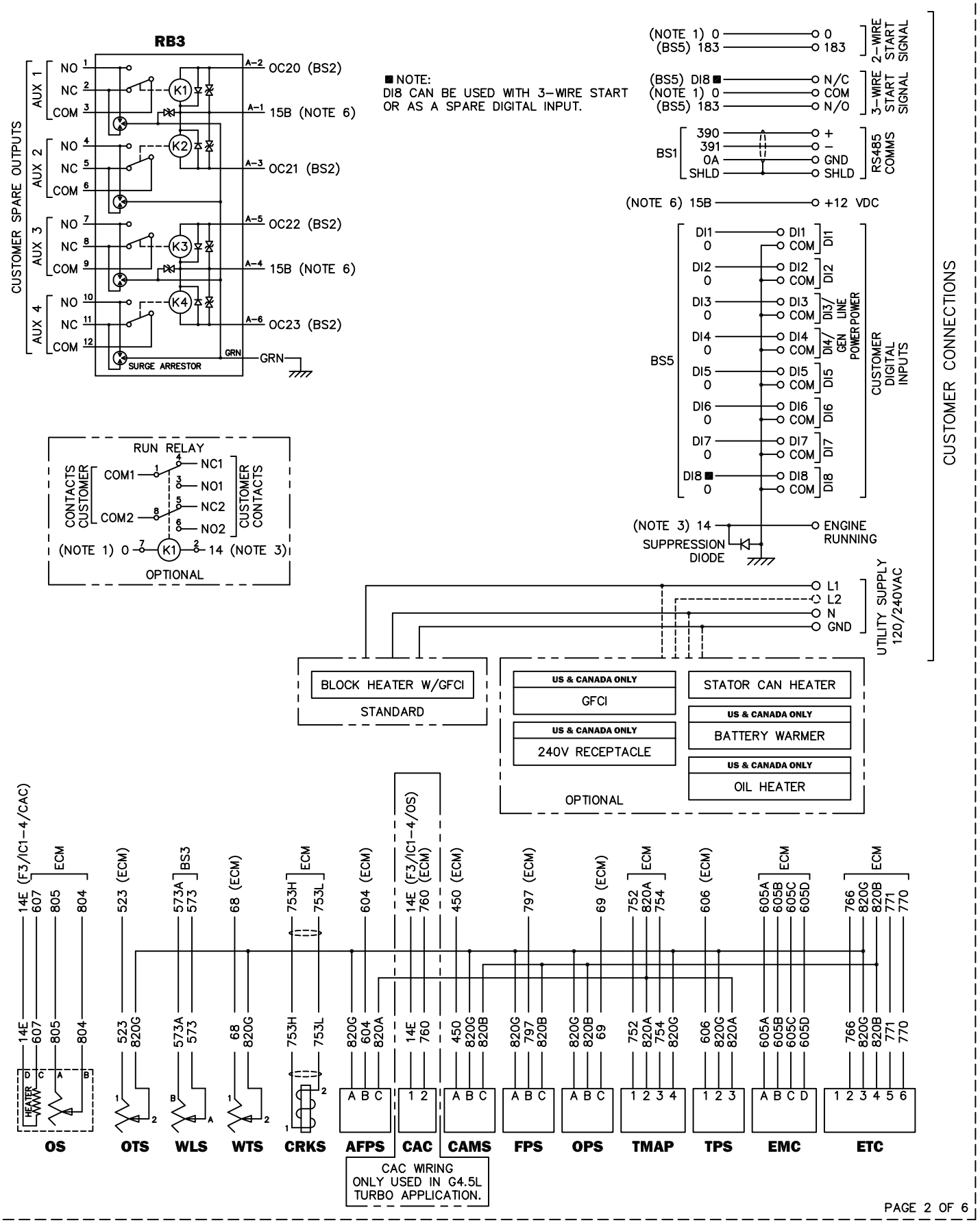
AFPS – AIR FILTER PRESSURE SENSOR
AH1 – ALARM HORN
ALT – DC CHARGE ALTERNATOR
AUX_ – AUXILIARY CONTACT
AVR – AUTOMATIC VOLTAGE REGULATOR
BAT – BATTERY
BCH – BATTERY CHARGER
BS – POWER ZONE BASE STATION
BS_ – BASE STATION CONNECTOR
CAC – CHARGE AIR COOLER BYPASS
CAMS – CAMSHAFT POSITION SENSOR
CB – CIRCUIT BREAKER
CRKS – CRANKCASE POSITION SENSOR
CT_ – CURRENT TRANSFORMER
DB – DIODE BRIDGE
DPR – DRIVER POWER RELAY
ECM – ENGINE CONTROL MODULE
EMC – ELECTRONIC MIXER CONTROL VALVE
ES1 – EMERGENCY STOP SWITCH
ETC – ELECTRONIC THROTTLE CONTROL VALVE
F_ – FUSE
FPS – FUEL PRESSURE SENSOR
FS_ – FUEL SOLENOID
GFCI – GROUND FAULT CURRENT INTERRUPT
IC_ – IGNITION COIL
IR – IGNITION RELAY
LFP – LOW FUEL PRESSURE SWITCH/SENSOR
MLCB – MAIN LINE CIRCUIT BREAKER
OPS – OIL PRESSURE SENSOR
OS – OXYGEN SENSOR
OTS – OIL TEMPERATURE SENDER
PME – PERMANENT MAGNET EXCITER
PZCS – POWER ZONE CONNECTIVITY SERVER
R1 – RESISTOR
RB_ – RELAY BOARD
SC – START CONTACTOR
SM – STARTER MOTOR
ST – SHUNT TRIP
SW1 – OFF/AUTO/MANUAL SWITCH
TMAP – MANIFOLD TEMP AND PRESSURE
TPS – MIXER POSITION SENSOR
WLS – COOLANT LEVEL SENDER
WTS – COOLANT TEMPERATURE SENDER

SCHEMATIC - DIAGRAM

REVISION: CN-0038414-D
DATE: 7/6/20

G4.5L G26 PZP

DRAWING #: 10000046517



SCHEMATIC - DIAGRAM

REVISION: CN-0038414-D

DATE: 7/6/20

G4.5L G26 PZP

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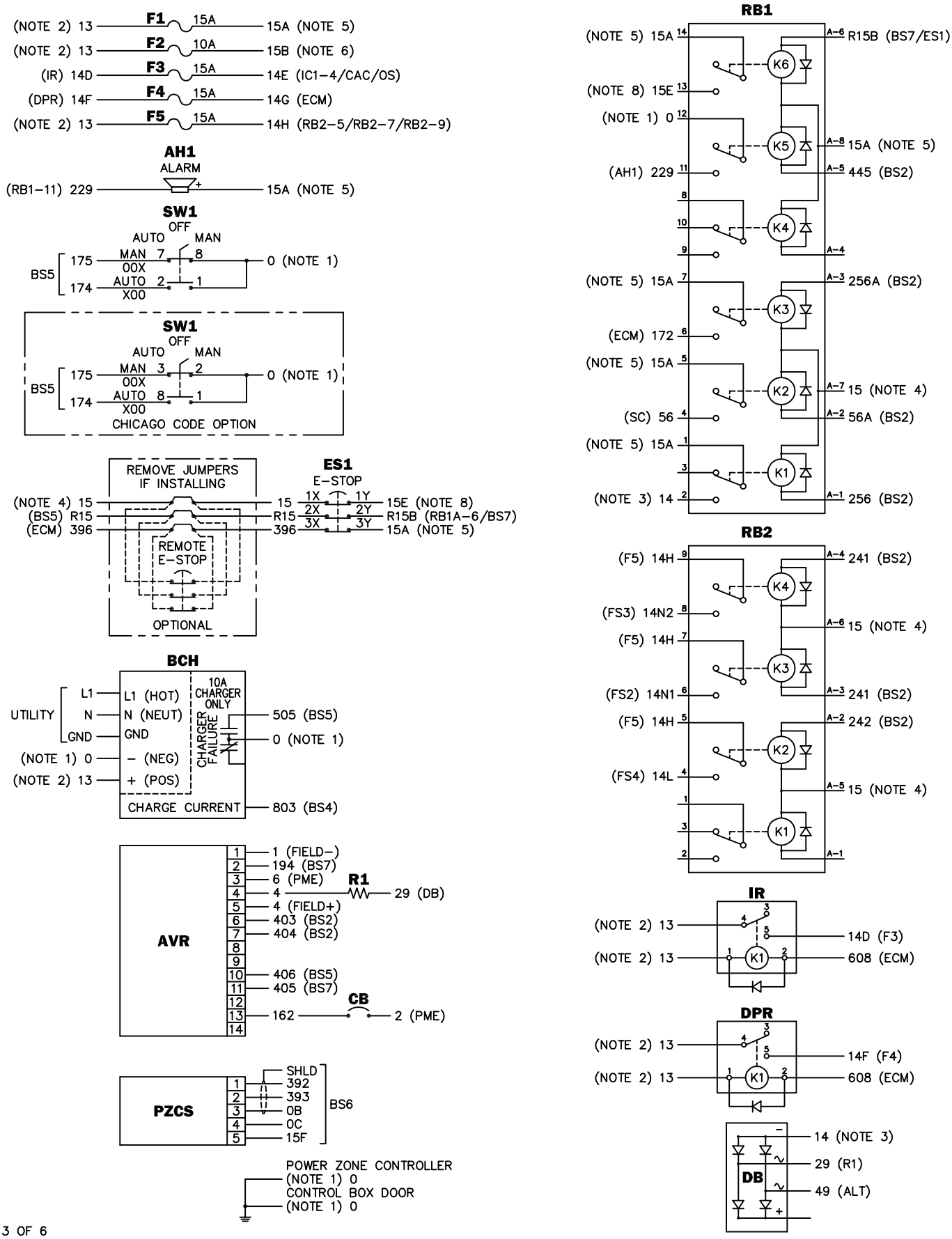

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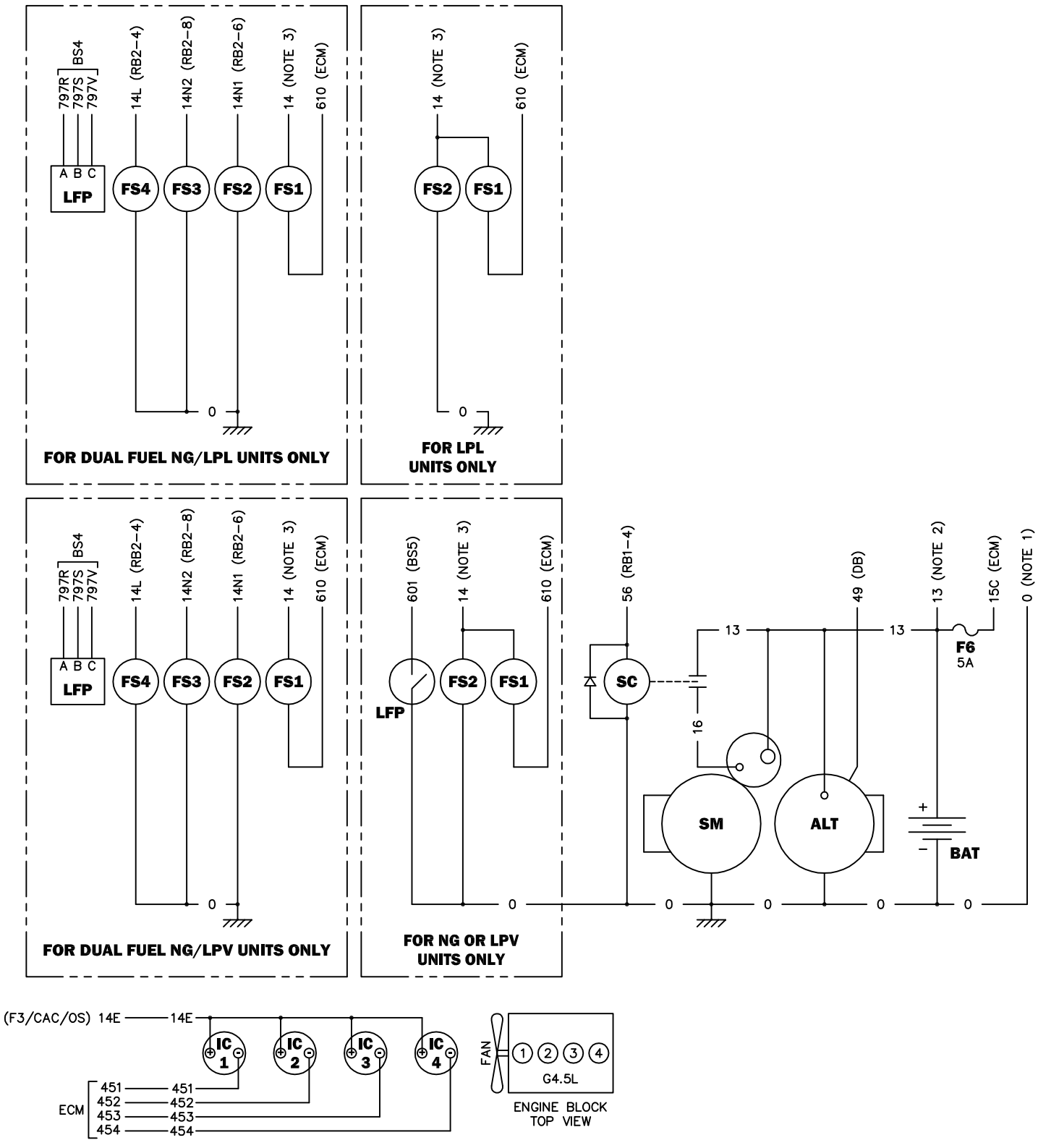
SCHEMATIC - DIAGRAM

REVISION: CN-0038414-D

G4.5L G26 PZP

DATE: 7/6/20

DRAWING #: 10000046517



SCHEMATIC - DIAGRAM

REVISION: CN-0038414-D

DATE: 7/6/20

G4.5L G26 PZP

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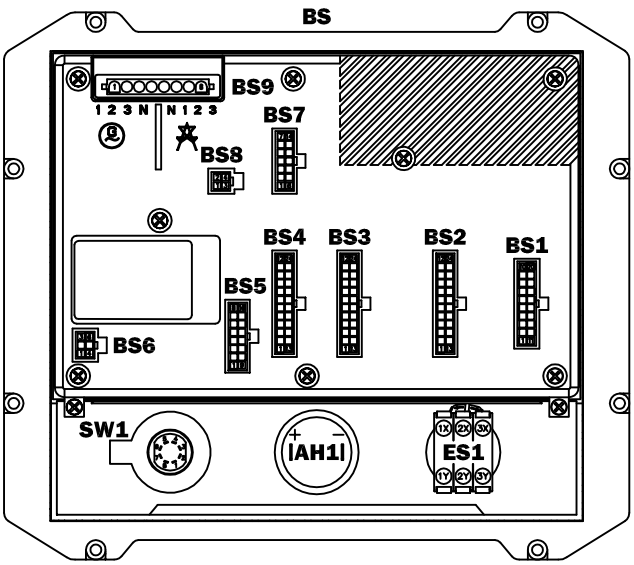

BS1

PIN	WIRE	TO	FUNCTION
1	390	CUST CONN	RS485+ (TRANSFER SWITCH)
2	391	CUST CONN	RS485- (TRANSFER SWITCH)
10	15A	F1	NOTE 5
11	0A	CUST CONN	RS485 GND (TRANSFER SWITCH)
12	SHLD	CUST CONN	RS485 DRAIN (TRANSFER SWITCH)
20	0	GND	NOTE 1

BS2

PIN	WIRE	TO	FUNCTION
1	56A	RB1A-2	START RELAY
2	256	RB1A-1	FUEL RELAY
3	445	RB1A-5	ALARM RELAY
4	241	RB2A-3/RB2A-4	NG SOLENOID RELAY (DUAL FUEL ONLY)
6	242	RB2A-2	LPV/LPL SOLENOID RELAY (DUAL FUEL ONLY)
7	0C20	RB3A-2	SPARE RELAY 1
8	0C21	RB3A-3	SPARE RELAY 2
9	0C22	RB3A-5	SPARE RELAY 3
10	0C23	RB3A-6	SPARE RELAY 4
11	256A	RB1A-3	ECM RUN RELAY
13	609	ECM-3K	FUEL SELECT
19	404	AVR-7	AVR GATE TRIGGER A
20	403	AVR-6	AVR GATE TRIGGER B

BS3

PIN	WIRE	TO	FUNCTION
11	573A	WLS-B	COOLANT LEVEL (-)
12	573	WLS-A	COOLANT LEVEL (+)
13	398A	CT1-2	GEN PHASE A CURRENT (+)
14	399A	CT1-1	GEN PHASE A CURRENT (-)
15	398B	CT2-2	GEN PHASE B CURRENT (+)
16	399B	CT2-1	GEN PHASE B CURRENT (-)
17	398C	CT3-2	GEN PHASE C CURRENT (+)
18	399C	CT3-1	GEN PHASE C CURRENT (-)

BS4

PIN	WIRE	TO	FUNCTION
1	797S	LFP-B	FUEL PRESSURE SENSOR SIGNAL
4	803	BCH	BATTERY CHARGER CURRENT
9	797V	LFP-C	FUEL PRESSURE SENSOR 5V SUPPLY
13	797R	LFP-A	FUEL PRESSURE SENSOR GROUND

BS5

PIN	WIRE	TO	FUNCTION
1	174	SW1	AUTO START
2	175	SW1	MANUAL START
3	601	LFP	LOW FUEL PRESSURE SWITCH
4	R15	ES1-2X	EMERGENCY STOP
5	183	CUST CONN	REMOTE START
6	505	BCH	BATTERY CHARGER FAIL
7	DI3	CUST CONN	AUXILIARY DI3/LINE POWER
8	DI4	CUST CONN	AUXILIARY DI4/GENERATOR POWER
9	DI1	CUST CONN	AUXILIARY DIGITAL INPUT 1
10	DI2	CUST CONN	AUXILIARY DIGITAL INPUT 2
11	DI5	CUST CONN	AUXILIARY DIGITAL INPUT 5
12	DI6	CUST CONN	AUXILIARY DIGITAL INPUT 6
13	DI7	CUST CONN	AUXILIARY DIGITAL INPUT 7
14	DI8	CUST CONN	AUXILIARY DIGITAL INPUT 8
15	406	AVR-10	AVR ZERO CROSSING INPUT

BS6

PIN	WIRE	TO	FUNCTION
1	392	PZCS-1	RS485+ (POWER ZONE CONNECTIVITY SERVER)
2	393	PZCS-2	RS485- (POWER ZONE CONNECTIVITY SERVER)
3	0C	PZCS-4	POWER ZONE CONNECTIVITY SERVER GROUND
4	15F	PZCS-5	POWER ZONE CONNECTIVITY SERVER +12VDC
5	0B	PZCS-3	RS485 GND (POWER ZONE CONNECTIVITY SERVER)
6	SHLD	PZCS (CUT)	RS485 DRAIN (POWER ZONE CONNECTIVITY SERVER)

BS7

PIN	WIRE	TO	FUNCTION
2	R15B	RB1A-6/ES1-2Y	OVERSPEED/WATCHDOG
4	405	AVR-11	AVR GROUND
11	194	AVR-2	AVR +12VDC

BS8

PIN	WIRE	TO	FUNCTION
2	SHLD	ECM (CUT)	CAN COMMS TO ECM (SHIELD)
3	743A	ECM-2C	CAN COMMS TO ECM (HIGH)
4	744A	ECM-2B	CAN COMMS TO ECM (LOW)

BS9

PIN	WIRE	TO	FUNCTION
1	S1A	FB6-Y	PHASE A VOLTAGE SENSING
2	S2A	FB7-Y	PHASE B VOLTAGE SENSING
3	S3A	FB8-Y	PHASE C VOLTAGE SENSING
4	00	NEUTRAL	NEUTRAL VOLTAGE SENSING

SCHEMATIC - DIAGRAM

REVISION: CN-0038414-D

G4.5L G26 PZP

DATE: 7/6/20

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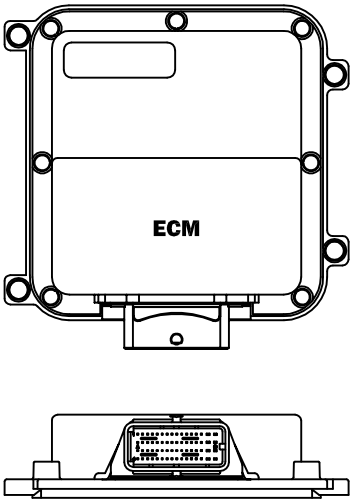
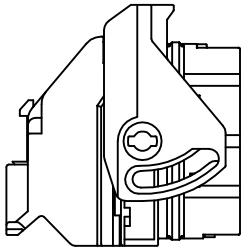
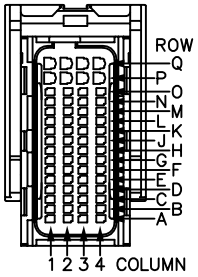
DRAWING #: 10000046517





SIDE VIEW OF CONNECTOR W/COVER



TOP VIEW OF CONNECTOR W/O COVER

ECM

PIN	WIRE	TO	FUNCTION
1A	605C	EMC–C	ELECTRONIC MIXER CONTROL VALVE B (+)
1B	753L	CRKS–2	CRANKSHAFT POSITION SENSOR (–)
1C	753H	CRKS–1	CRANKSHAFT POSITION SENSOR (+)
1D	760	CAC	CHARGE AIR COOLER BYPASS
1G	607	OS–C	OXYGEN HEATER
1H	608	IR/DPR	ECM POWER RELAY COIL
1J	610	FS1–B	FUEL SHUT OFF VALVE
1L	820A	AFPS/TMAP/TPS	SENDER POWER 1
1M	820B	CAMS/ETC/FPS/OPS	SENDER POWER 2
1N	797	FPS–B	FUEL PRESSURE SENSOR
1O	606	TPS–1	MIXER POSITION SENSOR
1P	771	ETC–5	ELECTRONIC THROTTLE CONTROL VALVE (–)
1Q	770	ETC–6	ELECTRONIC THROTTLE CONTROL VALVE (+)
2A	605D	EMC–D	ELECTRONIC MIXER CONTROL VALVE B (–)
2B	744A	BS8–4	CAN COMMS TO BASE STATION (LOW)
2C	743A	BS8–3	CAN COMMS TO BASE STATION (HIGH)
2D	754	TMAP–3	INTAKE AIR TEMPERATURE
2E	820G	AFPS/CAMS/ETC/FPS OPS/OTS/TMAP/TPS/WTS	SENDER GROUND
2L	450	CAMS–A	CAMSHAFT POSITION SENSOR
2M	752	TMAP–1	MANIFOLD AIR PRESSURE
2N	766	ETC–2	ELEC. THROTTLE CONTROL VALVE POSITION
2O	172	RB1–6	RUN SIGNAL
2P	14G	F4	DRIVER POWER
2Q	14G	F4	DRIVER POWER

ECM

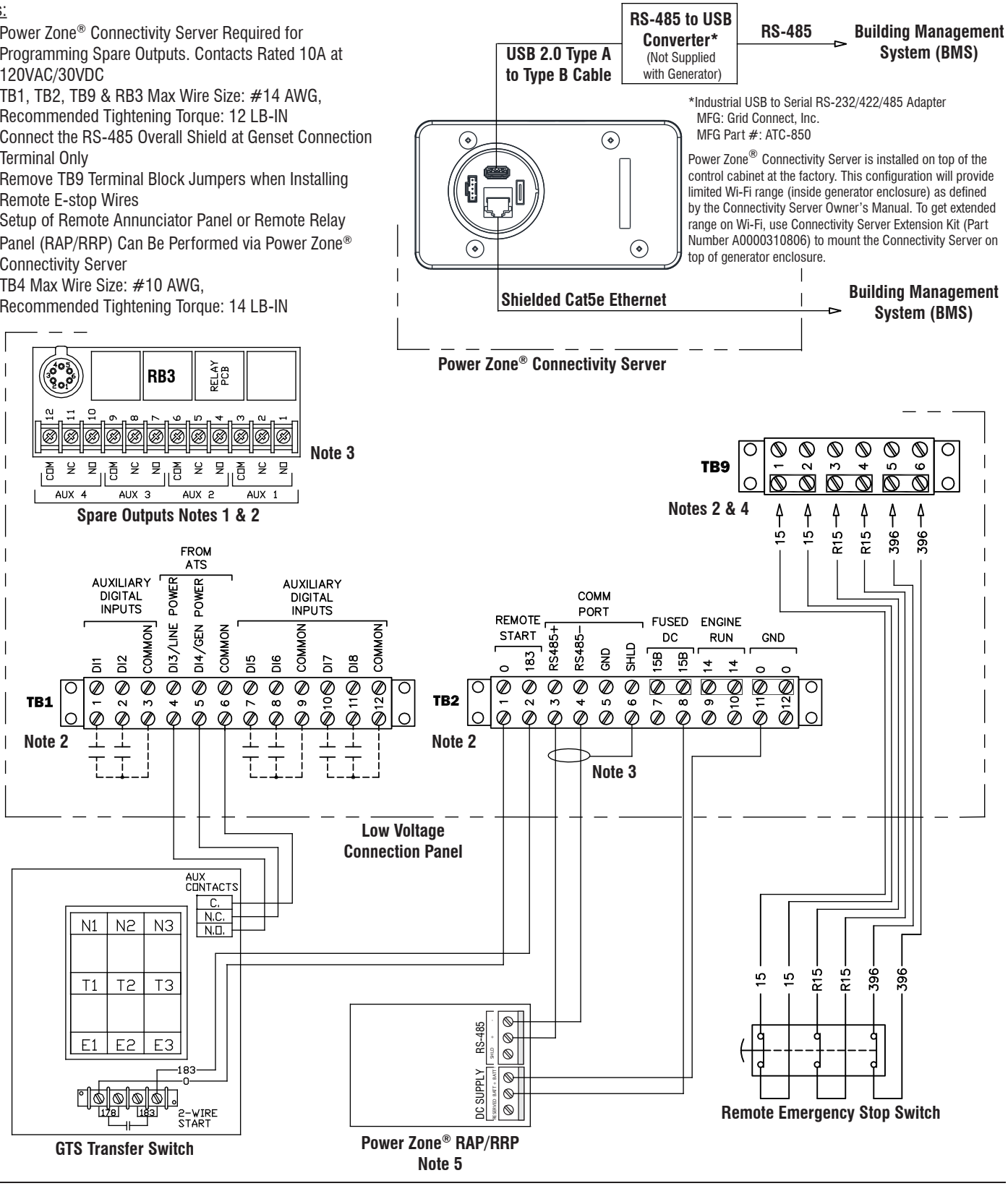
PIN	WIRE	TO	FUNCTION
3A	605A	EMC–A	ELECTRONIC MIXER CONTROL VALVE A (+)
3E	805	OS–A	OXYGEN SENSOR (–)
3G	523	OTS–1	OIL TEMPERATURE SENSOR
3J	396	ES1–3X	EMERGENCY STOP
3K	609	BS2–13	FUEL SELECT
3O	15C	F5	NOTE 7
3P	0	GND	NOTE 1
3Q	0	GND	NOTE 1
4A	605B	EMC–B	ELECTRONIC MIXER CONTROL VALVE A (–)
4B	604	AFPS–B	AIR FILTER PRESSURE SENSOR
4D	804	OS–B	OXYGEN SENSOR
4E	69	OPS–C	OIL PRESSURE SENSOR
4F	68	WTS–1	COOLANT TEMPERATURE SENSOR
4L	452	IC2–C	IGNITION COIL 2
4M	453	IC3–C	IGNITION COIL 3
4N	454	IC4–C	IGNITION COIL 4
4O	451	IC1–C	IGNITION COIL 1
4P	0	GND	NOTE 1
4Q	0	GND	NOTE 1

POWER ZONE® CONTROL PLATFORM

Power Zone® Pro Control Interconnections

Notes:

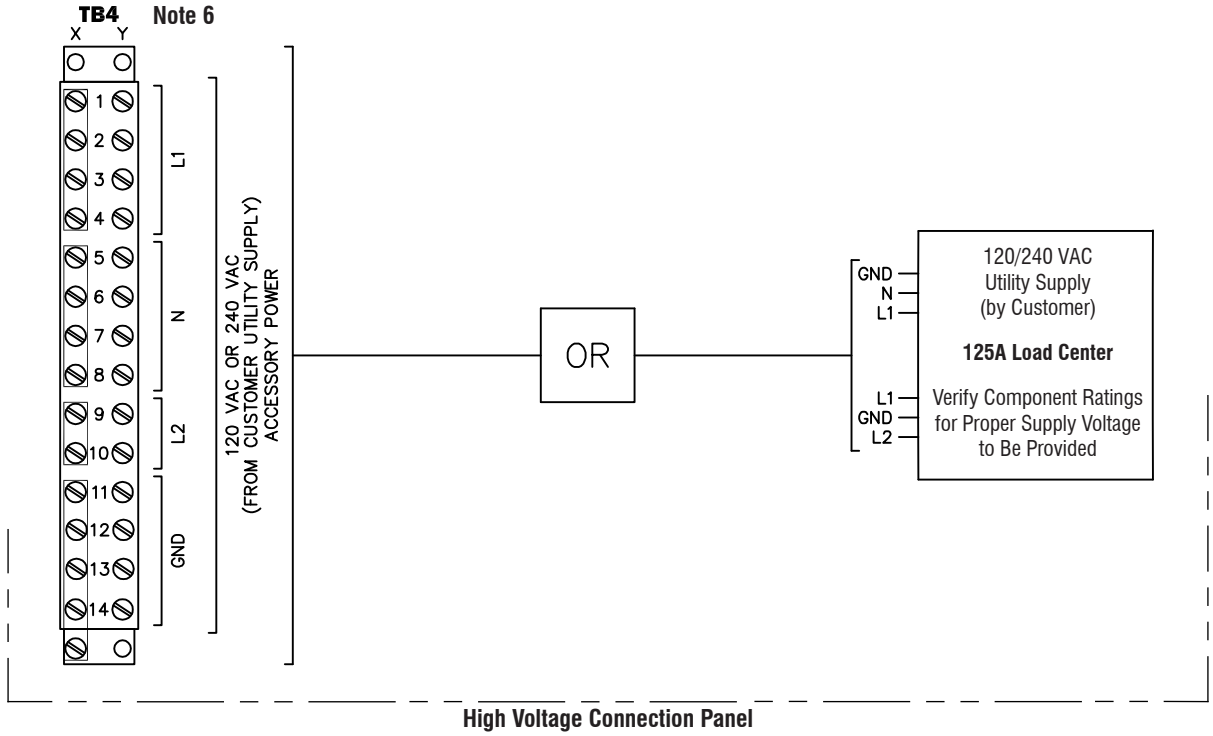
1. Power Zone® Connectivity Server Required for Programming Spare Outputs. Contacts Rated 10A at 120VAC/30VDC
2. TB1, TB2, TB9 & RB3 Max Wire Size: #14 AWG, Recommended Tightening Torque: 12 LB-IN
3. Connect the RS-485 Overall Shield at Genset Connection Terminal Only
4. Remove TB9 Terminal Block Jumpers when Installing Remote E-stop Wires
5. Setup of Remote Annunciator Panel or Remote Relay Panel (RAP/RRP) Can Be Performed via Power Zone® Connectivity Server
6. TB4 Max Wire Size: #10 AWG, Recommended Tightening Torque: 14 LB-IN



Part No. A0000419465
Rev. B 11/18/19

POWER ZONE® CONTROL PLATFORM

Power Zone® Pro Control Interconnections

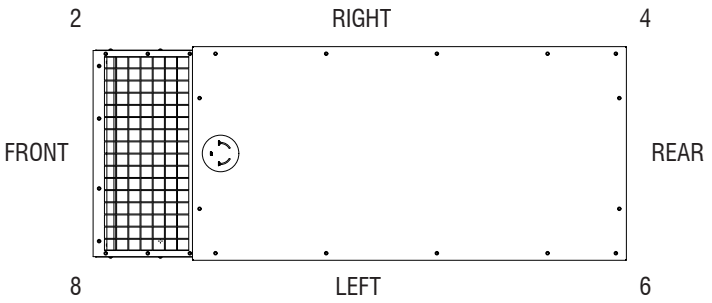


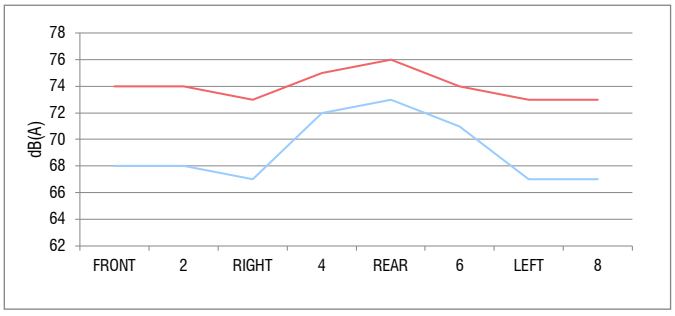
Part No. A0000419465
Rev. B 11/18/19

WEATHER PROTECTED ENCLOSURE
G4.5L SG035

	60Hz NO-LOAD, dB(A)								DISTANCE: 7 METERS	
MICROPHONE LOCATION	OCTAVE BAND CENTER FREQUENCY (Hz)									
	31.5	63	125	250	500	1,000	2,000	4,000	8,000	dB(A)
FRONT	32	56	52	56	61	66	61	58	47	**68**
2	32	56	51	56	61	64	63	56	48	**68**
RIGHT	32	57	52	60	60	62	60	56	46	**67**
4	33	61	53	60	61	67	67	63	54	**72**
REAR	40	64	56	62	62	69	69	64	56	**73**
6	31	61	54	60	60	67	65	62	54	**71**
LEFT	32	59	53	57	59	62	59	57	47	**67**
8	31	60	53	55	59	63	60	55	48	**67**
AVERAGE	**33**	**59**	**53**	**58**	**61**	**65**	**63**	**59**	**50**	**69**

	60Hz FULL-LOAD, dB(A)								DISTANCE: 7 METERS	
MICROPHONE LOCATION	OCTAVE BAND CENTER FREQUENCY (Hz)									
	31.5	63	125	250	500	1,000	2,000	4,000	8,000	dB(A)
FRONT	31	71	62	63	63	68	62	61	55	**74**
2	32	70	62	63	63	66	66	62	56	**74**
RIGHT	31	70	64	65	63	64	61	59	55	**73**
4	31	72	63	65	65	68	65	64	57	**75**
REAR	29	73	64	65	65	68	66	64	57	**76**
6	30	71	57	62	63	67	65	64	57	**74**
LEFT	33	70	65	61	63	64	61	59	54	**73**
8	35	70	63	62	64	66	65	62	56	**73**
AVERAGE	**32**	**71**	**63**	**63**	**64**	**67**	**64**	**62**	**56**	**74**





1. All positions at 23 feet (7 meters) from side faces of generator set.
2. Test conducted on a 100 foot diameter asphalt surface.
3. Sound pressure levels are subject to instrumentation, installation and testing conditions.
4. Sound levels are ±2 dB(A).

CERTIFICATE

This is to certify that

Generac Power Systems, Inc.

S45 W29290 Hwy. 59
Waukesha, WI 53189
United States of America

with the organizational units/sites as listed in the annex

has implemented and maintains a **Quality Management System**.

Scope:
Design, Manufacturing, and Distribution of Generators and Power Products.

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

ISO 9001 : 2015

Certificate registration no.	10012920 QM15
Date of original certification	2013-12-09
Date of certification	2018-07-16
Valid until	2021-07-15

DQS Inc.

Brad McGuire
Managing Director

Annex to certificate
Registration No. 10012920 QM15

Generac Power Systems, Inc.

S45 W29290 Hwy. 59
Waukesha, WI 53189
United States of America

Location	Scope
10012920 **Generac Power Systems, Inc.** **S45 W29290 Hwy. 59** **Waukesha, WI 53189** **United States of America**	Design, Manufacturing of Generator Components and Distribution of Service Parts.
10012922 **Generac Power Systems, Inc.** **211 Murphy Dr.** **Eagle, WI 53119** **United States of America**	Manufacturing and Distribution of Generators.
10012923 **Generac Power Systems, Inc.** **757 N. Newcomb St.** **Whitewater, WI 53190** **United States of America**	Manufacturing and Distribution of Generators and Manufacture of Generator components.
10012924 **Generac Power Systems, Inc.** **900 N. Parkway** **Jefferson, WI 53549** **United States of America**	Manufacturing of Generators and Power Products.
10013528 **Generac Power Systems** **3815 Oregon St.** **Oshkosh, WI 54902** **United States of America**	Manufacturing of Generators.

Remote Location	Scope
10014175 **Generac Power Systems, Inc.** **351 Collins Road** **Jefferson, WI 53549** **United States of America**	The remote location at Jefferson, WI performs the following primary functions: Parts and Components Receiving, Inventory, and Distribution to Generac Locations.

This annex (edition: 2018-07-16) is only valid in connection with the above-mentioned certificate.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2020 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Generac Power Systems, Inc.**
(U.S. Manufacturer or Importer)

Certificate Number: LGNXB04.52NN-001

Effective Date: 05/30/2019

Expiration Date: 12/31/2020

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 05/30/2019

Revision Date: N/A

Manufacturer: Generac Power Systems, Inc.
Engine Family: LGNXB04.52NN
Mobile/Stationary Certification Type: Stationary
Fuel : Natural Gas (CNG/LNG)
Emission Standards :
Part 90 Phase 1
NMHC + NOx (g/kW-hr) : 13.4
CO (g/kW-hr) : 519.0
HC + NOx (g/kW-hr) : 13.4
Emergency Use Only : Y

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 60, 1065, 1068, and 60 (stationary only and combined stationary and mobile) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new nonroad spark-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60. This certificate of conformity does not cover nonroad engines imported prior to the effective date of the certificate.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover large nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2020 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Generac Power Systems, Inc.**
(U.S. Manufacturer or Importer)

Certificate Number: LGNXB04.52NL-002

Effective Date: 06/19/2019

Expiration Date: 12/31/2020

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 06/19/2019

Revision Date: N/A

Manufacturer: Generac Power Systems, Inc.
Engine Family: LGNXB04.52NL
Mobile/Stationary Certification Type: Stationary
Fuel : LPG/Propane
Emission Standards :
Part 90 Phase 1
HC + NOx (g/kW-hr) : 13.4
CO (g/kW-hr) : 519.0
Emergency Use Only : Y

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 60, 1065, 1068, and 60 (stationary only and combined stationary and mobile) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new nonroad spark-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60. This certificate of conformity does not cover nonroad engines imported prior to the effective date of the certificate.

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This certificate does not cover large nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.