

**DGC-2000
DIGITAL GENSET
CONTROLLER**

Basler Electric's Digital Genset Controller (DGC-2000) offers an integrated alternative for genset control and monitoring. Control includes engine starting and shutdown as well as system monitoring and remote annunciation. DGC allows for user inputs and programming that provide a reliable, customizable genset controller. This unique design has features not found in any competitive models. It permanently displays four engine parameters and four generator parameters. It also allows the user to scroll through 22 additional metering parameters.

FEATURES

- Microprocessor based design
- Permanently displays 8 parameters
- Displays 30 system parameters (scroll)
- Controls engine starting and shutdown
- PC settable via the serial link
- Large LCD display with backlighting
- Display in English or Metric values
- CSA certified, File #LR23131-138
- UL recognized, File #E97035
- Programmable engine cranking
- Programmable alarm setpoints
- Programmable pre-alarm setpoints
- NFPA 110 Level 1 compatible
- Modbus™ protocol used for communications
- Meets ANSI/IEEE C37.90.1-1989 Surge Withstand Capability
- Meets ANSI/IEEE C37.90.1-1989 for Fast Transient
- RS-485 communications for Remote Display Unit (RDP-110) to meet NFPA-110

WINDOWS® SOFTWARE

Interface for setting and communicating with Basler products
 Request BESTCOMS™-DGC2000-16 (Windows® 3.1)
 Request BESTCOMS™-DGC2000-32 (Windows® 95/NT)

ADDITIONAL INFORMATION

INSTRUCTION MANUAL
 Request Publication 9305500990

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FRONT PANEL DISPLAY & OUTLINE DRAWINGS pages 6 & 7
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DESCRIPTION

DGC-2000 Digital Genset Controllers use microprocessor based technology to provide integrated engine-generator set control, protection, and metering in a single package. Microprocessor based technology allows for exact measurement, setpoint adjustment, and timing functions. The DGC-2000 allows for quick and simple operation from the front panel or through serial link communications. Communications uses the Modbus™ protocol or optional custom Basler Electric software. Because of the low sensing burden in the DGC-2000, neither dedicated potential transformers nor current transformers are required. A wide temperature range LCD display with backlighting allows the display to be viewed under any ambient light condition. This combination of features in the DGC-2000 yields significant savings in installation and setup costs. The DGC-2000 is capable of RS-485 communications with an RDP-110, Remote Display Unit, to meet the remote annunciation requirements of NFPA-110.

SPECIFICATIONS

INPUTS

DC Power Input (Battery):

- 12 or 24 Vdc nominal systems (8-32 Vdc)
(both Negative Ground systems)
- Battery dip ride-through to 3 Volts for 0.75 seconds
- Power dissipated is 16 Watts.

Generator/Bus voltage input:

- 10-576 Vac continuous, 50/60Hz @ <1 VA

Generator line current: 1 or 5 Amp input @ <1 VA

Oil pressure sender: 0 to 100 PSI or 0 to 690kPa (32-240Ω)

Coolant temperature: 100°F to 300°F or 37°C to 149°C
(62.6 to 637.5Ω)

Speed input: Magnetic pickup 3V peak minimum
to 35V peak into a 10KΩ (250-10KHz) impedance

Charging alternator: 2-50V peak, 60-800Hz

Fuel level: 0-100% (240-33Ω)

Contact Sensing Inputs: Emergency Stop, Air Damper,
Automatic Transfer Switch, Battery Charger Failure,
and Low Coolant Level

OUTPUTS

Contact ratings: 10A @ 24Vdc make, break, and carry
(Master start, Aux. start, fuel solenoid,
engine run)
2A @ 24Vdc make, break, and carry
(Alarms, pre-alarms)

ENVIRONMENTAL SPECIFICATIONS

Isolation: Qualified to IEC255-5

Surge Withstand Capability: Meets ANSI/IEEE
C37.90.1-1989

Fast Transient: Meets ANSI/IEEE C37.90.1-1989

RFI: 5 Watt transceiver from 144 to 440 MHz

Vibration: 10 to 500 Hz @ 2 Gs

Shock: 15 Gs in each of three mutually perpendicular axes

Ambient operating temperature: -40°C to +70°C

Salt Fog Testing: Per ASTM 117B-1989 for 100 hours

Weight: 5.75 lbs (2.61 kilograms)

MONITORING

ENGINE

Oil pressure	Hours to next service
Coolant temperature	Total run time
Fuel level	Air Box damper position
Battery voltage	Engine RPM

ENGINE

Oil pressure:

Input from sender

Display range is 3 to 100 PSI or 21 to 690kPa

Accuracy is ±0.5% or ±1PSI, whichever is greater
@ 25°C (With Stewart Warner sender 411K)

Coolant temperature:

Input from sender

Display range is 100°F to 300°F or 37°C to 149°C

Accuracy is ±0.5% or ±1°, whichever is greater @
25°C ambient (With Stewart Warner sender 334P)

Battery voltage:

Input from battery is 0 to 36 Vdc

Display range is 3 to 36 Vdc

Accuracy is ±0.5% of indication or ±0.1 volts,
whichever is greater @ 25°C

Engine run-time:

Display range is 0 to 99,999 hours

Accuracy is ±0.5% of reading or ±1 hours,
whichever is greater @ 25°C

Fuel Level Sensing:

Input from Sender

Display range is 0-100%

Accuracy is ±0.5% or indicator or 1% @25°C

GENERATOR

Voltage (three phases and three phases to neutral)

Total kW load

Current (three phases)

kVA (three phases)

kVA total

SPECIFICATIONS, continued

MONITORING, continued

GENERATOR, continued

kW (three phases)
kWH
Power factor
Frequency

BUS

Voltage
Frequency

Generator/Bus voltage:

0 to 600 Vac RMS
Display range is 0 to 15,000V
Accuracy is $\pm 0.5\%$ of reading or $\pm 1\text{VRMS}$,
whichever is greater (with phase selection
switch and panel indication) @25°C

Frequency generator or bus:

Derived from voltage inputs
Display range is 20 to 75 Hz
Accuracy is $\pm 0.25\%$ of reading or $\pm 0.1\text{Hz}$,
whichever is greater @25°C

Line current input (CT):

0 to 5 Aac or 0 to 1 Aac RMS
Display range is 0 to 5000 Aac
Accuracy is $\pm 0.5\%$ of reading or $\pm 1\text{ARMS}$,
whichever is greater (with phase selection
switch and panel indication) @ 25°C

KVA: Calculated from voltage and current inputs
Display range is 0-9999kVA
Accuracy is $\pm 0.5\%$ of indication or $\pm 0.1\text{kVA}$,
whichever is greater @ 25°C

kW: Calculated from voltage and current inputs
Display range is 25 to 9999kW
Accuracy is $\pm 0.5\%$ of reading or $\pm 0.1\text{kW}$,
whichever is greater @ 25°C

Power Factor:

Calculated from voltage and current inputs
Display range is +1.0 to -1.0, both leading and
lagging
Accuracy is $\pm 0.01\text{PF}$ of reading @ 25°C

kWh: Display range 0-999,999,999kWH
Accuracy is $\pm 0.5\%$ of reading or $\pm 1\text{kWH}$,
whichever is greater @ 25°C

ALARMS (SHUTDOWNS)

Low oil pressure	Overspeed
High coolant temperature	Overcrank
Sender failures	Low Coolant Level

PRE-ALARMS

Low oil pressure	High coolant temperature
Low fuel	Low coolant temperature
Battery overvoltage	Battery undervoltage
Weak battery	Engine kW overload
Maintenance interval timer	

TIMERS

Engine cooldown: 0 to 60 minutes
Engine maintenance: 0 to 5000 hours
Pre-Alarm time delays:
 Battery undervoltage: 1-10 seconds
 Weak battery: 1-10 seconds
Alarm time delays:
 Overspeed: 0-500ms
 Sender failure: 0-10 seconds
Arming delays after crank disconnect:
 Low oil pressure: 5-15 seconds
 High coolant temperature: 50-150 seconds
Pre-crank delay: 0-30 seconds
Coolant temperature arming time delay upon start-up:
 60 seconds

CRANKING PARAMETERS

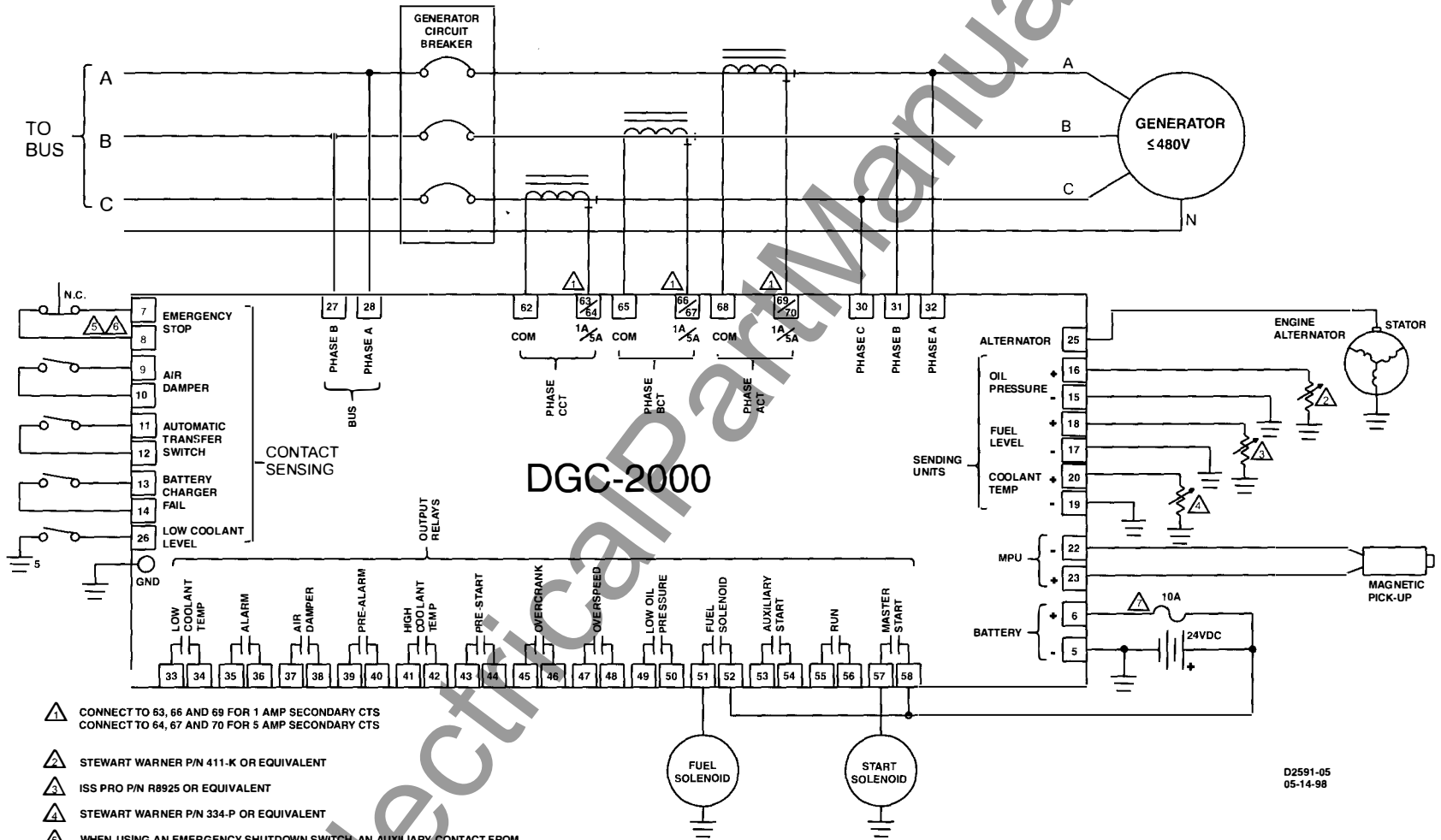
Selectable continuous or cycle cranking
Selectable number of crank cycles: 1-7 (limited to 3,
15-second crank periods for NFPA 110)
Adjustable crank/rest period: 5-15 seconds (if 5 seconds
is selected, the crank and rest periods will both be 5
for a total of 10 seconds)
Adjustable continuous crank time: 5-60 seconds (limited
to 45 seconds for NFPA 110)
Crank disconnect limit: 10-50% of rated speed
Precrank contact status after crank disconnect: Closed
or open
Three selectable sources for crank disconnect signal:
 Magnetic pickup, Charging alternator, generator

SERIAL COMMUNICATIONS INPUT

This serial communications link connects via optically
isolated circuitry to the microprocessor. Enhanced
access to device functions, remote starting/stopping,
and real time, remote metering capabilities are available
through this port. Password protection is provided for
security. The DGC-2000 emulates a subset of the
Modicon 984 programmable controller. Basler Electric
custom software provides easy access to these
functions. The DGC-2000 comes complete with
Windows® 3.1 and Windows® 95 compatible software.

FRONT PANEL ALARM HORN

An alarm horn is provided on the DGC for audible fault
indication. This horn is rated at 80db at a distance of two
feet (0.6 meters).



- ⚠ CONNECT TO 53, 66 AND 69 FOR 1 AMP SECONDARY CTS
CONNECT TO 64, 67 AND 70 FOR 5 AMP SECONDARY CTS
- ⚠ STEWART WARNER P/N 411-K OR EQUIVALENT
- ⚠ ISS PRO P/N R8925 OR EQUIVALENT
- ⚠ STEWART WARNER P/N 334-P OR EQUIVALENT
- ⚠ WHEN USING AN EMERGENCY SHUTDOWN SWITCH, AN AUXILIARY CONTACT FROM THE EMERGENCY SHUTDOWN SWITCH MUST BE USED TO TRIP THE AIR DAMPER SOLENOID
- ⚠ IF AN EMERGENCY SHUTDOWN SWITCH IS NOT USED, JUMPER TERMINALS 7 AND 8.
- ⚠ THIS FUSE IS MANDATORY TO PREVENT DAMAGE DUE TO REVERSE BATTERY POLARITY.

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Figure 1 - DGC-2000 Direct Connected Three-Phase Line-to-Line Sensing

DGC-2000 CONNECTIONS

Compression type terminal strips make wiring the DGC-2000 a simple task. These connections accept one #10 or two #14 AWG wires. These operations are made even easier by user-friendly labeling of the terminal strips. Figure 2 shows the DGC-2000 rear panel terminal connections. Once wired, these terminals can be snapped off as a unit and facilitate replacement in the unlikely event of a DGC failure.

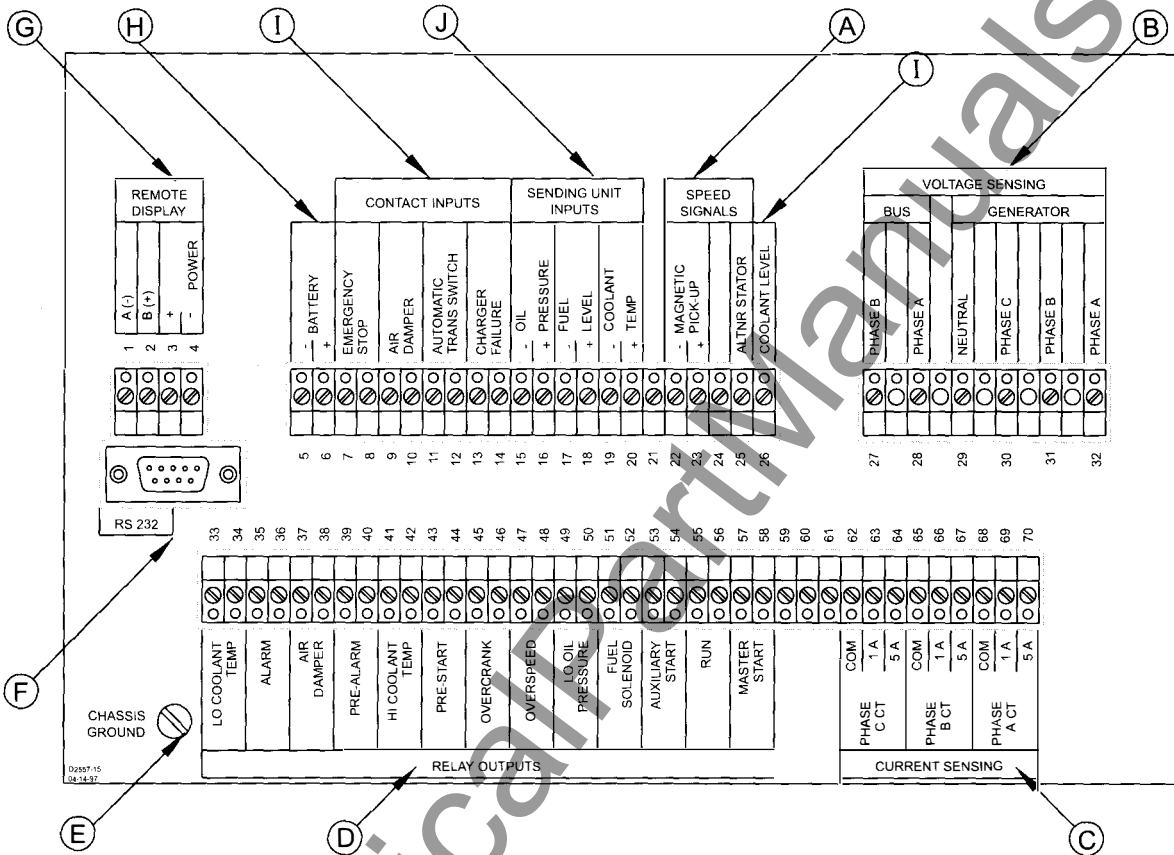
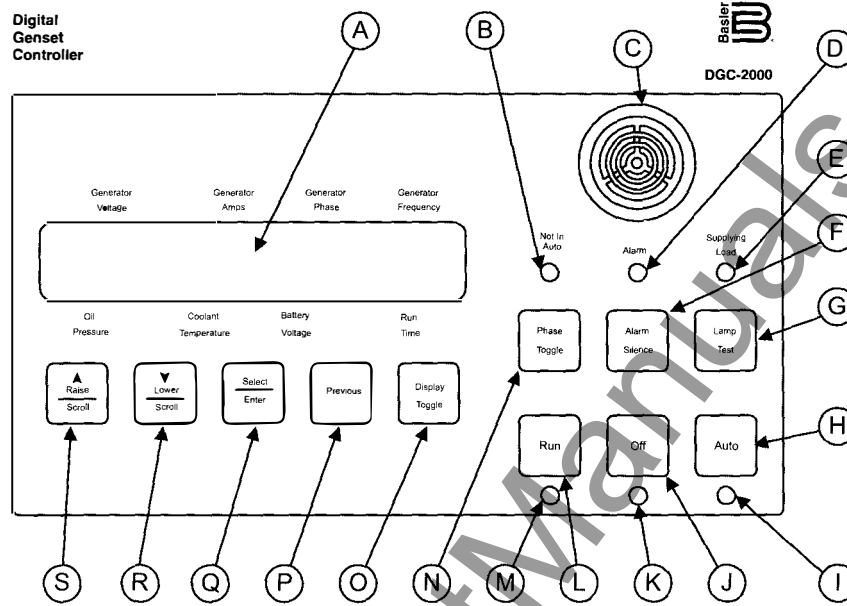


Figure 2 - Connections

- A Connection points for the speed sensing inputs.
- B Connection points for voltage sensing inputs.
- C Connection points for current sensing inputs.
- D Connection points for relay output contacts.
- E Connection point for chassis ground.
- F RS-232 serial communication port.
- G Connection points for remote display RDP-110. Refer to Bulletin SNE for more details.
- H Connection points for operating power.
- I Connection points for contact sensing inputs.
- J Connection points for sending unit inputs.

DGC-2000 FRONT PANEL DISPLAY

Figure 3 shows the front panel human-machine interface (HMI) for a DGC-2000. Descriptions in Table 1 refer to callouts in Figure 3.



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Figure 3 - Front Panel

A	Two line by twenty character LCD provides the primary visual interface for metering, alarms, prealarms, and protective functions. Labels above and below the display are used in the normal mode. In the alternate display mode, labels appear on the LCD along with the displayed value.
B	Red LED turns ON when the device is not in the AUTO mode.
C	Audible alarm annunciates when the unit is not in AUTO and when alarms and prealarms occur.
D	Red LED turns ON continuously for all alarm conditions and flashes for prealarm conditions.
E	Green LED turns ON when the generator is supplying more than two percent of rated current.
F	Pushbutton used to silence the audible alarm.
G	Pushbutton used to exercise all segments of the LCD and to illuminate all LEDs.
H	Pushbutton used to place the device in AUTO mode.
I	Green LED turns ON when the device is in the AUTO mode.
J	Pushbutton used to place the unit in the OFF mode.
K	Red LED turns ON when the device is in the OFF mode.
L	Pushbutton used to place the device in the RUN mode.
M	Green LED turns ON when the device is in the RUN mode.
N	Pushbutton used to scroll through the displays available in the normal display mode.
O	Pushbutton used to scroll through the display modes.
P	Pushbutton used to scroll through previous menu levels.
Q	Pushbutton used to enter menu sublevels and select setpoints.
R	Pushbutton used to scroll backward through the menus and to decrement setpoints.
S	Pushbutton used to scroll forward through the menus and to increment setpoints.

Table 1 - DGC-2000 HMI (Controls and Indicators)

DIMENSIONS

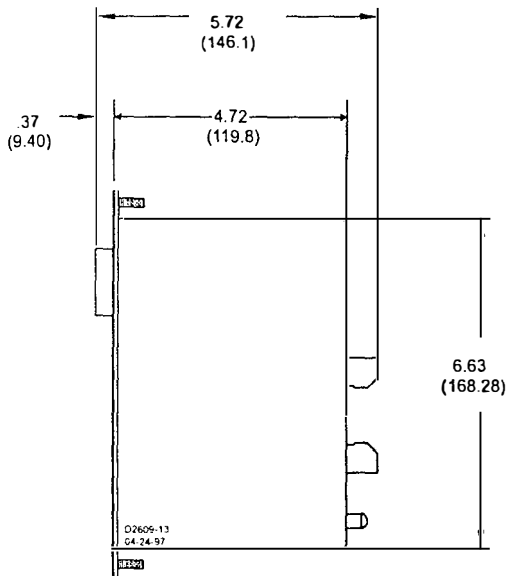


Figure 4 - Dimensions - Side View

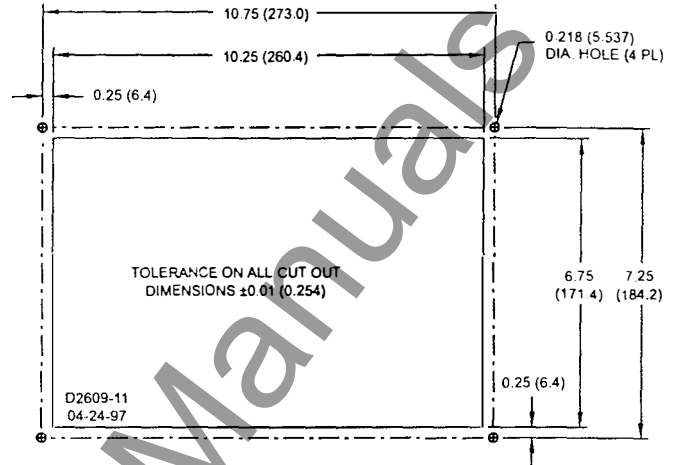


Figure 5 - Case Cutout Dimensions

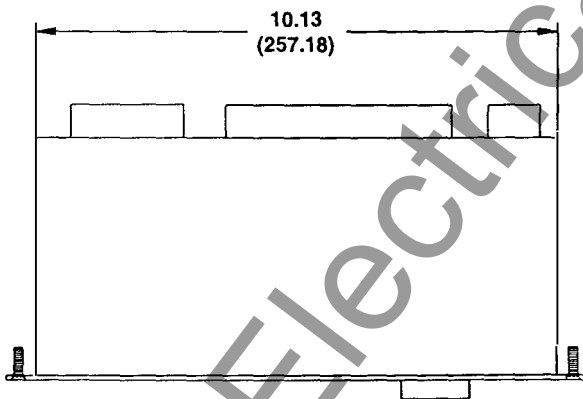


Figure 6 - Dimensions - Top View

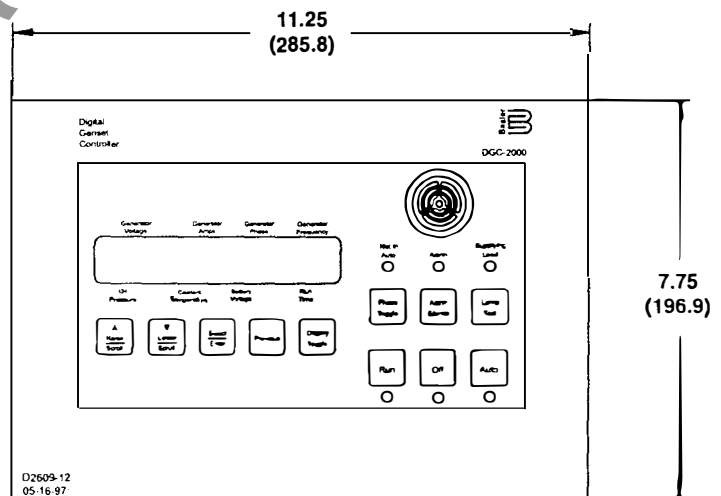


Figure 7 - Dimensions - Front View

- NOTES: 1. Dimensions in parentheses are in millimeters.
 2. All drawings and data subject to change without notice.

SAMPLE SPECIFICATION

The engine generator control system shall be a microprocessor based design that incorporates both engine control and monitoring of the engine and generator and displays these monitored quantities on a front panel LCD display. The device shall meet the requirements of NFPA 110 Level 1 and shall provide for remote annunciation. It shall provide the user the option of set-up and adjustment via a personal computer. The device shall be a Basler Electric Model DGC-2000; there is no equal.

OPTIONAL ACCESSORY EQUIPMENT

Remote display panel to meet NFPA-110, Basler Model RDP-110. This unit allows for remote indication (up to 4000 ft.) of 18 emergency generator set conditions via an RS-485 communications port. Requires only 4 wires to operate. Refer to Product Bulletin SNE for more details.

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