GSC300

Auto Start Engine Controller

Installation and User Manual for the GSC300 Auto Start Engine Controller

Full Version

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September 2009

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SPECIFICATIONS FOR THE GSC300

Operating Voltage:	7 to 30 VDC continuous Zero volts operation for 100mS (assumes supply was 12 VDC before initiating starting)
Operating Temperature:	-40^{0}C to +85^{0}C (LCD Display operates from to -16^{0}C to 70^{0}C)
Physical Dimensions:	4.5” (H) x 5.5” (W) x 1.25” (D)
Actual Unit Weight:	0.458 lbs
Enclosure:	High Impact Resistant, Injection Molded Plastic Enclosure

Front Panel Indications

-High intensity LED’s with regulated brightness

LCD Display:

-Ultra-bright, Backlight LCD display with optimum viewing angle of 0 - 25^0 from perpendicular

-Display Size (mm) 8 (W) x 32 (H) x 12.8 (D) x (2 line x 8 character display)

Adjustments

Warm-up:	0-200 Seconds (After Oil Bypass Feature)
Cool-Down:	0 - 812 Seconds
Crank Disconnect:	12 to 140 Hz
Overspeed:	40 - 200 Hz
Crank Rest:	4 - 32 Seconds
Delay on Start:	0 - 59 Seconds
Crank Tries:	1 to 10
Oil Bypass:	10 - 55 Seconds
Low Battery Indication:	7 - 35 VDC

Timer adjustments

Glow Plug/Preheat:	0 - 255 Seconds
Energize To Stop (ETS):	Energizes for 15 Seconds on failures, or energizes until 5 Seconds after engine speed goes to zero upon removing power from Start/Stop terminal or removing the unit from manual mode using the front panel buttons.

Inputs

Speed Sensing:

-Generator Output Speed Sensing

-Maximum Input Voltage:	300VAC RMS
-Minimum Input Voltage:	0.7VAC RMS Generator Output Sensing

-60Hz Rejection Filter Included

-Loss of Speed Signal Included

Sender/Failure Inputs:

Oil Pressure
Coolant Temperature
Fuel Level / Auxiliary Input

-Accepts standard industry low impedance (0-500 ohm) sender inputs (VDO, Stewart-Warner, Datcon, Murphy, etc.)

-Custom senders can be accommodated for in PC programming

-Programmable for either switch or sender configuration

-Adjustable failure set-points

Protection

-Three on-board replaceable 40A fuses protect Fuel, Crank, and Timer Outputs

-Reverse polarity protected

-Short circuit & overload protection on annunciation outputs

-Inputs are electrostatic discharge protected

-Maximum power supply surge before damage: 1500V for 250us

Outputs:

-All outputs switched to +battery (sourcing)

-Fuel, Crank, and Timer Outputs: 40A each, using standard 40A automotive relays

-Annunciation Outputs: 300mA individually, 350mA combined

Connections

-Removable terminal block for annunciation outputs and low power connections

-0.25" spade terminals for high current and Main power inputs

Programming

-Windows based software interface utilizing the parallel port of your PC

-Option of programming through 3-button interface (limited parameter adjustment) on the front panel or the PC Interface that has full parameter programming ability.

-Needs no power to program using the PC Interface – uses power from parallel port of PC

-Specifications May Change Without Notification

GSC300 Product Number Identification

The GSC300 series catalog order number provides information pertaining to a specific model. The Product Number Identification Table (see Table 1) provides details on the breakdown of the model number.

TABLE1: IDENTIFICATION TABLE

Position 1-6	Position 8	Position 10-11	Position 13-14
Series	Speed Range	DC Voltage	Labeling
GSC300=GSC300	L=Low H=High (consult factory)	12=12VDC 24=24VDC	LS=Standard LX=Customized

Example: The product number GSC300-L-12-LS would be described as follows:

A GSC300 series automatic engine controller configured for a 12 VDC system.
The controller is factory configured for low speed range (generator speed range) which includes standard labeling.

A GSC300 serial number would be displayed as:

GSC300-L-12-LS-00000

WIRING INSTALLATION GUIDELINES

Danger: Never work on the engine while its power is on. This controller does not generate a warning signal prior to automatic engine start. Warning signs should be placed on engine equipment indicating this important safety measure.

INSTRUCTIONS

Following these instructions will help avoid common installation problems during wiring and setup.

- Battery must be disconnected before any wiring connections are made.
- Wire length from the engine to the controller should not exceed 6 meters (20 feet).

Wiring size and type should be as specified below. **Use stranded wire,** since solid wire has a tendency to crack, break and loosen over time.

TYPES AND SIZES

Terminal	Wire Size (AWG)	Current max.	Function
1	12	40A	Fuel Output Terminal
2	12	40A	Auto(Battery +) Terminal Connection
3	12	40A	Auto(Battery +) Terminal Connection
4	12	40A	Crank Output Terminal
5	12	40A	Ground Terminal Connection
6	12	40A	Ground Terminal Connection
7	12	40A	Preheat/ETS Terminal
8	12	40A	Preheat/ETS Terminal
9	18	100mA	Speed Signal Connection
10	18	100mA	Speed Signal Connection
11	18	300mA	Overcrank (failure to start) Output
12	18	300mA	Overspeed Output
13	18	300mA	High Temp Output
14	18	300mA	Low Oil Output
15	18	300mA	Low Battery Output
16	18	300mA	Engine Run Output
17	18	100mA	Not in Auto Output
18	18	300mA	General Failure Output
19	18	7mA	Start/Stop Input
20	18	7mA	Oil Pressure Sender/Switch Input
21	18	7mA	Temperature Sender/Switch Input
22	18	7mA	Fuel Level/Auxiliary Sender/Switch Input

WIRING GUIDELINES

1. DO NOT use wire smaller than 18 AWG as smaller wire has a tendency to crack and break over time.

2. IMPORTANT: The connections supplying DC power to the GSC300 panel should preferably run directly from the battery posts with no splices or other connections. Avoid using chassis (aluminum or iron engine parts), as return conductor for battery negative voltage. Copper wiring is recommended. Failure to follow the above may result in erratic operation due to large voltage drops across wiring connections. A small fuse should be placed at the battery terminal to provide 12 volts to the Remote Start Contacts to ensure that a short along this line will not cause any damage.

3. DO NOT exceed the maximum rated current and voltage on each of the controller outputs. DO NOT exceed 40A each for the Fuel Output, Crank Output or Preheat Output. DO NOT exceed 300mA individually, or 350mA combined, for the General Fault Output or Annunciation Outputs.

4. 40Amp relays are rated for resistive ratings. When driving such loads as starter solenoids you must ensure proper de-rating of the relays. Consult factory for further details.

5. Engine Sensor type MUST be selected and programmed properly to GSC300 (switch or sender type). Failure to do so may result in the controller not shutting down on true engine failure (Low oil pressure or high engine temperature).

6. When installing engine sensors (oil pressure, engine temperature, fuel level) **ensure the switches are connected to ground circuit through the engine sensor.** Damage will occur to controller unit if the sensor input terminals (Terminal #'s 20, 21 and 22) are connected to +Battery.

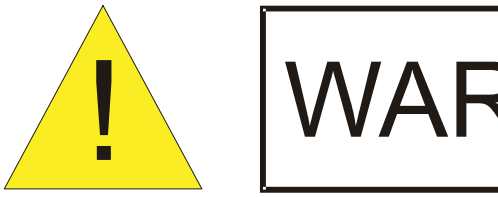
7. **When using engine sensors that are the resistive type the proper manufacturer of the sender MUST be selected during programming.** Failure to select the correct manufacturer type will cause inaccurate readings as well as failure to protect the engine during a fault condition.

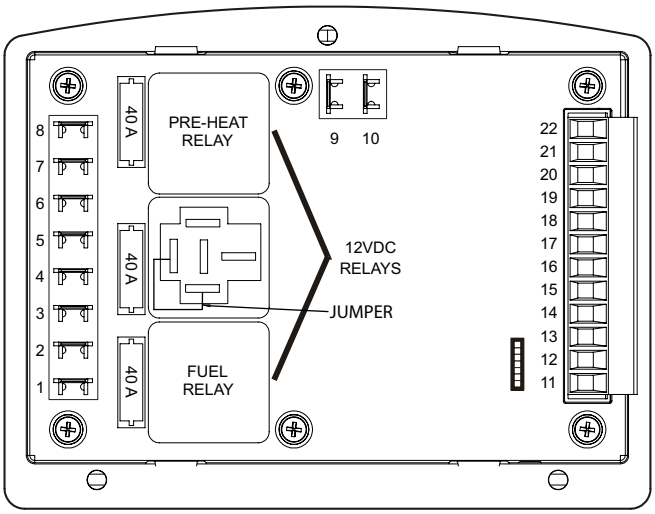
8. To verify the operation of engine controller outputs, measure voltage (i.e. meter in volts) when outputs should be ON.

9. To verify the operation of the Preheat Output, measure the resistance between the Preheat terminals when the Preheat Output is ON, it should read a closed circuit (i.e. zero ohms). When the output is OFF there should be an open circuit between the terminals (very high resistance).

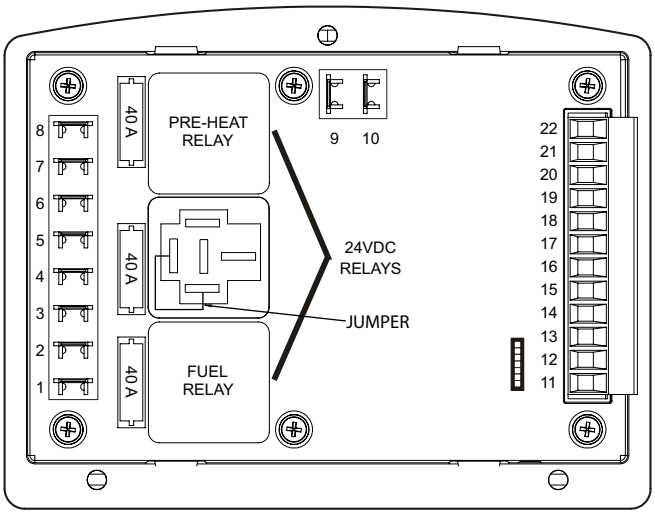
10. Speed sensing input terminals (Terminal #'s 9 and 10) do not have polarity sensitivity therefore the AC generator output leads can be connected in any polarity configuration to the controller speed sensing terminals. **Do not exceed 300VAC on speed sensing input terminals.**

GSC300 12/24VDC SYSTEM OPERATION





12VDC RELAYS MUST BE INSTALLED FOR 12VDC SYSTEM OPERATION



24VDC RELAYS MUST BE INSTALLED FOR 24VDC SYSTEM OPERATION

The GSC300 controller is designed to operate in either 12 or 24VDC system voltages. When operating in 12VDC systems the Fuel and Preheat/ETS relays need to be the 12VDC relay type. When operating in 24VDC systems these relays need to be the 24VDC relay type. Contact the factory if relays are required. 24 VDC will require reprogramming.

Approved relays for 12 or 24VDC system operation are as follows:

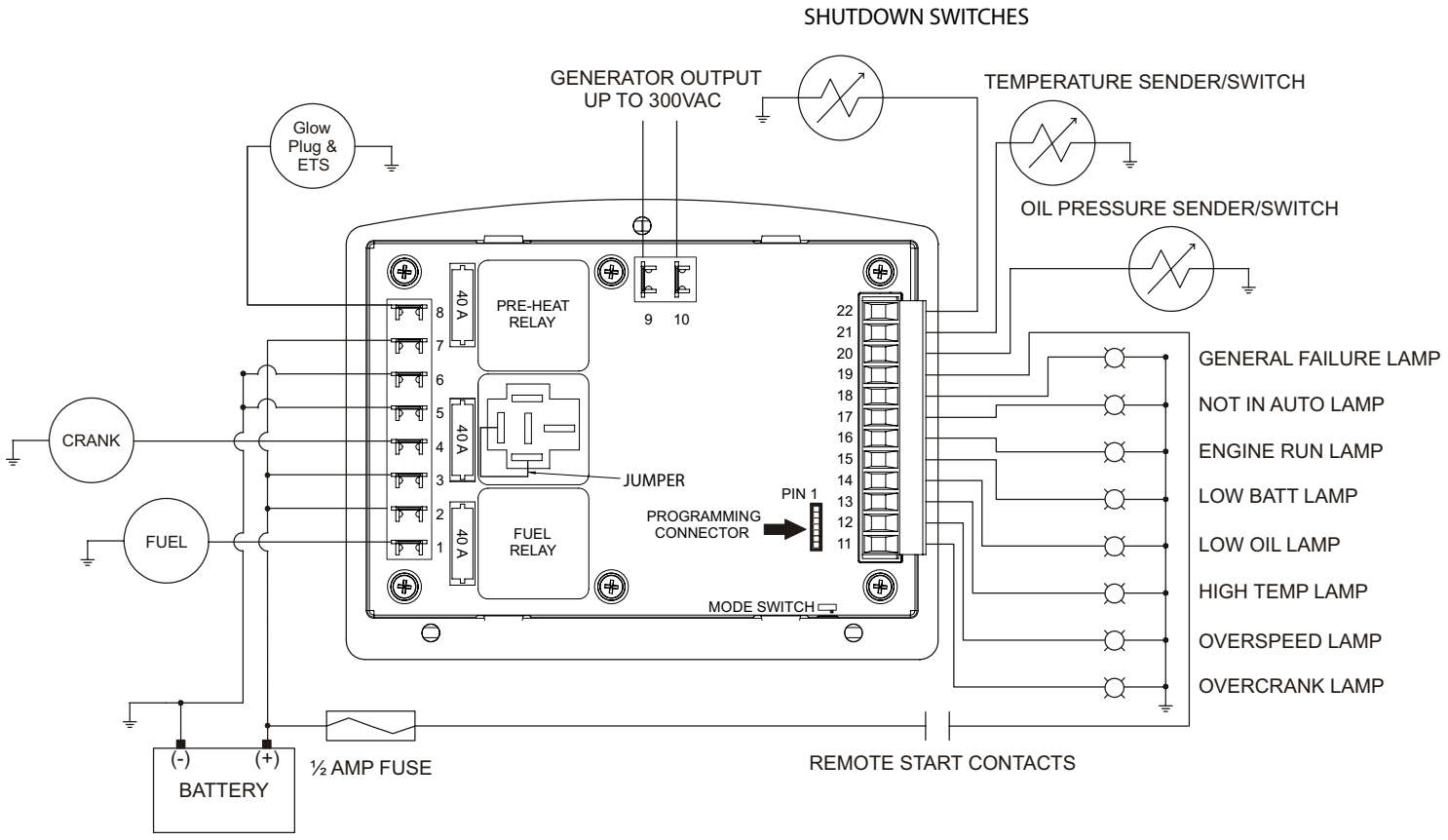
- Northern Lights P/N 22-42047 for 12VDC operation
- Northern Lights P/N 22-40085 for 24VDC operation

TERMINAL DESCRIPTION

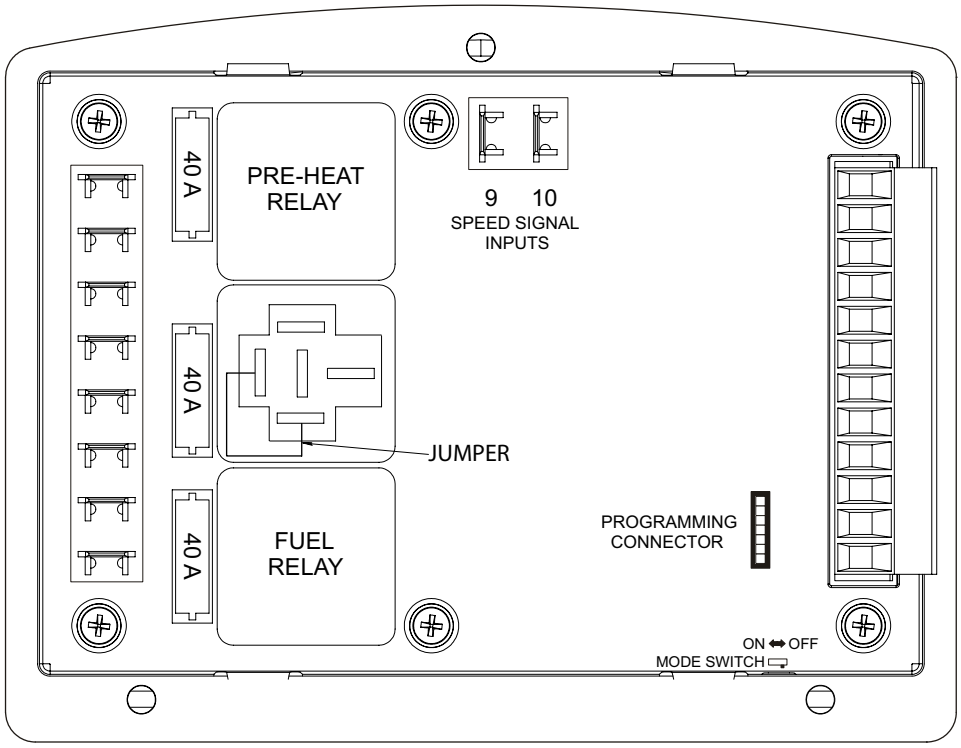
Term #	Description
1	Fuel Output provides 40A maximum. Fuel Output closes to +12/24VDC when start signal is received, and opens when either an engine failure occurs or when Cool Down period has ended.
2 , 3	Auto Terminals. Main +Battery power connection to controller. These terminals are internally connected together on GSC300 controller.
4	Crank Output provides 40A maximum. Crank Output closes to +12/24VDC during cranking, and opens when the engine has started, or during Crank Rest.
5 , 6	Main Battery Ground connection for the controller module. A good ground connection, **directly from the battery**, is required for proper operation. These terminals are internally connected together on GSC300 controller.
7 , 8	Preheat/ETS Output provides a set of dry contacts between terminals #7 and #8. When this output is energized terminals #7 and #8 are connected together. When output is OFF terminals #7 and #8 have no connection.
9 , 10	Speed 1. Speed Signal Input for Crank Disconnect, Engine Run, and Overspeed sensing. 300VAC max input voltage. Speed sensing input terminals (T#9, 10) do not have polarity sensitivity therefore the AC generator output leads can be connected in any polarity configuration. **Do not exceed 300VAC on speed sensing input terminals.**
11	Overcrank Annunciation Output closes to +12/24VDC on Overcrank Failure. 300mA max.
12	Overspeed Annunciation Output closes to +12/24VDC on Overspeed Failure. 300mA max.
13	High Temp Output closes to +12/24VDC upon High Temp Failure. 300mA max.
14	Low Oil Output closes to +12/24VDC upon Low Oil Failure. 300mA max.
15	Low Battery Output closes to +12/24VDC on Low Battery Condition. 300mA max.
16	Engine Run Output closes to +12/24VDC on Engine Run Condition. 300mA max.
17	Not In Auto Output closes to +12/24VDC when unit is not in auto. 300mA max.
18	General Failure Output closes to +12/24VDC on a General Failure. 300mA max.
19	Start Stop Input. Apply +12/24VDC to this terminal while unit is in Auto Mode to start engine. Remove +12/24VDC to stop engine or enter Cool-Down mode.
20	Low Oil Pressure sensor input. This sensor can be the resistive type (Sender) or can be the switch type. The proper type of sensor must be selected during GSC300 controller programming. The sender or switch must be connected to ground for proper operation. If +Battery is connected to input terminal this can result in damaged to GSC300 controller. When using a sender, the proper sender manufacturer must be selected as each sender manufacturer's characteristics are different; the sender failure set-point must also be selected. When using a switch NO or NC much be selected from the programming menu. NO refers to the state of the contacts during normal engine operation, therefore NO refers to normally open at normal engine run and close to ground on low oil pressure failure.
21	High Engine Temperature sensor input. This sensor can be the resistive type (Sender) or can be the switch type. The proper type of sensor must be selected during GSC300 controller programming. The sender or switch must be connected to ground for proper operation. If +Battery is connected to input terminal this can result in damaged to GSC300 controller. When using a sender, the proper sender manufacturer must be selected as each sender manufacturer's characteristics are different; the sender failure set-point must also be selected. When using a switch the switch must be the NO type on normal engine run and close to ground on failure.
22	Fuel Level sensor or Auxiliary failure input. This sensor can be the resistive type (Sender) or can be the switch type. The proper type of sensor must be selected during GSC300 controller programming. The sender or switch must be connected to ground for proper operation. If +Battery is connected to input terminal this can result in damaged to GSC300 controller. When using a sender, the proper sender manufacturer must be selected as each sender manufacturer's characteristics are different. When using a switch the switch must be the NO type on normal engine run and close to ground on failure.

Wiring Connections for the GSC300

(Refer to schematics No. B-9696 and B-9691 on pages 24 and 25.)



Back Panel Layout



1. General Failure Conditions
2. Not In Auto
3. Low Battery Voltage Alarm
4. Oil Pressure Input
5. Coolant Temperature Input
6. Fuel Level/Auxiliary Input
7. Speed Signal Sensing
8. Adjustable Input Programming

1: GENERAL FAILURE CONDITIONS: The following conditions can cause the GSC300 controller to shutdown the engine-generator system unexpectedly:

Auxiliary Failure ("XTR_FAIL")	Extra failure is indicated by a flashing RED Low oil pressure LED
Low Oil Pressure	Low Oil pressure is indicated by a steady on RED Low oil pressure LED
High Coolant Temperature	High coolant temperature is indicated by a steady on RED High water temp LED
Overcrank	Overcrank failure is indicated by a steady on RED Overcrank LED
Overspeed	Overspeed failure is indicated by a steady on RED Overspeed LED
Loss of Speed ("SPDLOSS")	Loss of speed signal is indicated by a flashing RED Overspeed LED

The General Failure output annunciation is triggered during any of the above failure conditions and is rated 300mA Max.

2: NOT IN AUTO: When the controller is in the OFF Mode, the NOT IN AUTO LED will illuminate and the NOT IN AUTO Output will be triggered. During this OFF mode Automatic engine starting is disabled. The LCD display will read "OFF", and the backlight on the LCD display will be off.

NOTE: + Battery must be permanently connected to the main power terminal for the NOT IN AUTO feature.

3: LOW BATTERY VOLTAGE ALARM: When the battery voltage drops below the user defined set point which can be programmed between 7 and 35VDC, the engine controller displays a Low Battery Condition. The Low battery warning Led will be illuminated at any time during OFF, AUTO and Manual run modes. The LCD display will indicate the message: "LOW_BATT". The LOW battery warning will be disabled during failure conditions.

4: LOW OIL INPUT: The Low Oil Input can be wired to a resistive sender or from a NO or NC type switch. NO / NC refers to the state of the contacts during normal engine operation (engine oil pressure ok). When utilizing a resistive sender the display units are fixed in PSI by the PC programming interface, and a failure set-point must be selected from the programming menu.

Note: *The oil input failure is disabled during the Oil Bypass time.*

5: HIGH TEMPERATURE INPUT: The high temperature input can be wired to a resistive sender or from a NO type switch. For proper operation while using a switch, the switch must be the NO type which closes to ground upon failure. When utilizing a resistive sender the display units are fixed in Fahrenheit by the PC programming interface, and a failure set-point must be selected from the programming menu.

Note: *The engine temperature failure is disabled during the Oil Bypass time.*

6: FUEL LEVEL/AUXILIARY INPUT: The Fuel level/Aux input can be wired to a resistive sender or from a NO type switch. For proper operation while using a switch, the switch must be the NO type which closes to ground upon failure. If this input is used as a sender, no failure will be indicated. The sender option is solely for Fuel Level/Auxiliary Level Display on the LCD. Northern Lights, Inc. uses this input to connect the engine shutdown switches as a backup to the primary shutdown inputs.

7: SPEED SIGNAL SENSITIVITY: The controller will accept to a maximum of 300VAC, 60Hz from direct generator output for speed sensing. The following values are minimal recommended voltages for speed signal sensing:
20Hz - .075V (75mV)
60HZ - .6V (600mV)

8: HOUR METER: The controller displays a log of total accumulated generator running hours. Generator Run times will be displayed on the controllers display screen. The display represents both hours and minutes in the form 123456:7. The last digit on the hour meter will represent the time in 1/10 of an hour. Please note that although the hour meter displays time in hours and minutes, it will record up to the nearest second. If the generator was operated for a 3 minute period and then stopped the running time is stored in permanent memory and then adding to the next running period. The same would be true if the controller were to enter a failure mode as the controller would permanently store the remaining time for the next running cycle.

LED LAYOUT

Front View of GSC300

LED INDICATIONS

FRONT PANEL LED INDICATIONS

LED Appearance	Condition/Failure
Not in Auto LED is ON.	Unit is in OFF state, and automatic starting is disabled
No LED's ON	"OFF", no +12/24VDC to main power terminal.
Steady Low Oil LED	Low Oil Pressure Failure
Flashing Low Oil LED	Auxiliary Input Failure
Steady High Temperature LED	Over Temperature Failure
Steady Overcrank LED	Engine-generator failed to start after the specified number of cranking attempts.
Steady Overspeed LED	Speed Signal present above Overspeed setting
Flashing Overspeed LED	The speed signal was Zero while running. The engine has stalled (overload or lack of fuel), or the speed signal has been lost.
Steady Engine Running LED	Engine Controller is in running mode of operation.
Flashing Engine Running LED	Crank Rest period. Cranking will resume soon.

Programming The GSC300 Settings

Using the Front Panel Interface:

The following table shows the LED's that correspond to the various settings of the various parameters. To enter the controller into Program Mode, you need to turn the small switch at the bottom edge of the controller to the program position (See Diagram on Pg 12). This Mode Switch can be set using a ballpoint pen or small tool to allow the controller to be put into Program Mode. The first three LED's (3, 2 & 1) correspond to which **Parameter** is being adjusted, and the next three (6, 5 & 4) LED's show the **Value** for that particular **Parameter**.

LED 1 = Low oil pressure
LED 2 = High water temp
LED 3 = Overcrank
LED 4 = Overspeed
LED 5 = Engine Running
LED 6 = Low engine battery
LED7 = Preheat/ETS
LED8 = NOT IN AUTO (starting disabled)

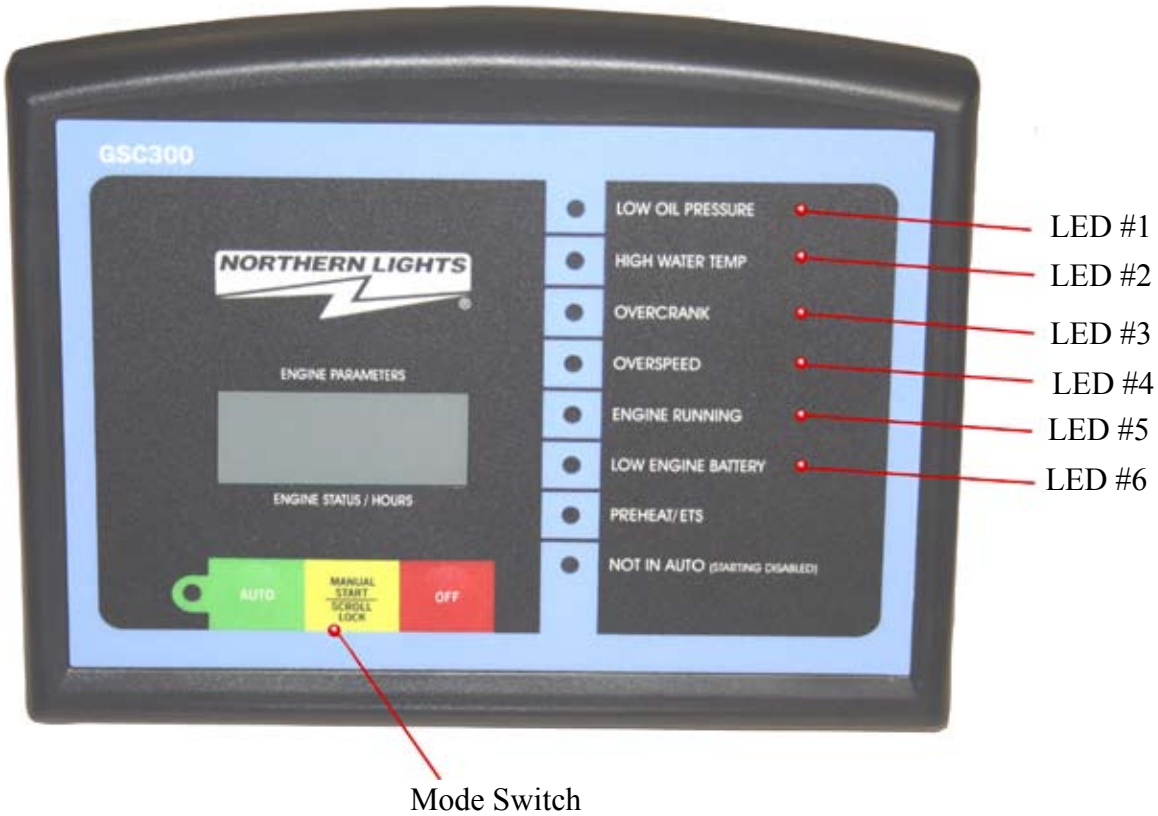
The picture on the next page shows the LED numbering and the location of the Mode Switch.

The highlighted circle in the table refers to the LED being illuminated.

Parameter	LED's 3, 2 & 1 ▼	▼ LED's 6, 5 & 4 ▼							
		○○○	○○●	○●○	○●●	●○○	●○●	●●○	●●●
Crank Tries	○○○	1	2	3	4	5	6	7	8
Crank Time	○○●	5	10	15	20	25	30	35	40
Rest Time	○●○	0	5	10	15	20	25	30	35
Preheat Time	○●●	0	5	10	15	20	25	30	35
Cool-Down	●○○	0	32	64	96	128	160	192	224
Preheat/ETS/ Warm-Up	●○●	Preheat	ETS	Warm-Up	N/A	N/A	N/A	N/A	N/A
Warm-Up	●●○	0	28	56	84	112	140	168	196

To scroll through the parameters simply press the Auto button on the front panel of the GSC300. **To scroll through the range of values for that parameter simply press the Manual Start button. To program the value into the controller's memory, press the OFF button.** In this manner the settings of the controller can be adjusted by simply using the three buttons on the front panel of the controller. **Be sure to press the OFF button when you have selected the parameter value wanted.**

Numbering of LED's and Location of Mode Switch

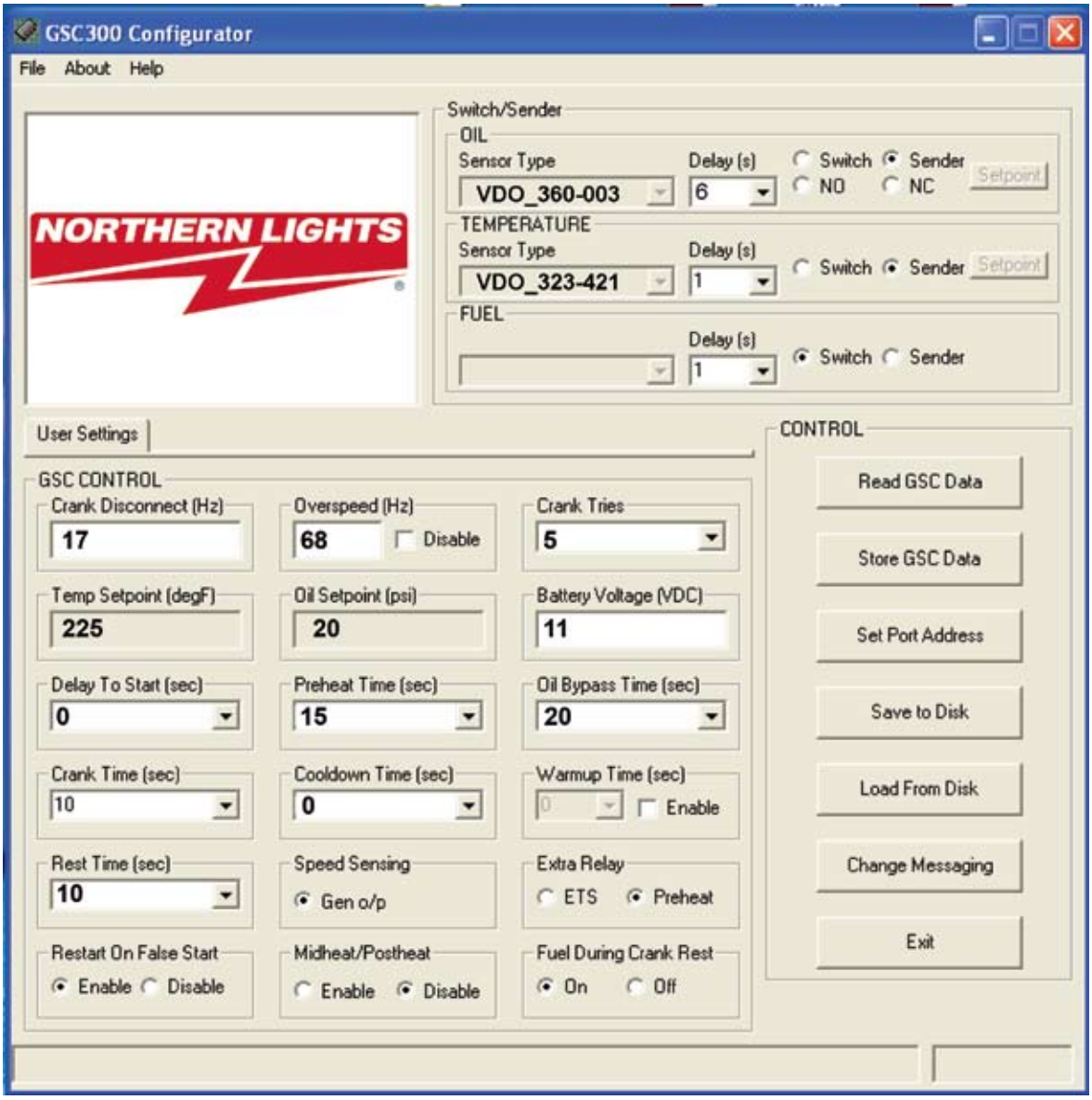


Programming Using the PC Interface

The GSC300 can also be programmed using the PC interface. Detailed instructions on the PC interface are included with the GSC300 Configurator software. A sample interface screen is illustrated on the following page.

Sample Screen From PC Interface

NOTE: Factory default settings are outlined in the photo below.



TROUBLESHOOTING GUIDELINES

TROUBLE	POSSIBLE CAUSE	SUGGESTED ACTION
Unit does not operate when powered to test mode	Power leads to unit are reversed	Confirm correct wiring for ground and +bat, and re-attempt testing.
	Bad ground connection from engine to controller unit.	Run wire directly from battery - to the ground terminal #11on controller unit.
Engine starts and immediately goes into Overspeed shutdown	Improper Overspeed setting	Verify the Overspeed setting with PC configuration software. Confirm that engine's governor is properly calibrated for its intended use.
Engine does not crank	Battery is low or terminals are dirty	Clean terminals and re-charge battery
	Crank circuitry wiring improperly connected	Refer to engine control wiring section and check crank connections
	Bad ground connection from engine to controller	Run wire directly from battery - to the ground terminal #5 & 6, on controller unit.
	Crank relay damaged. Or on board fuse is blown	Check wiring, in line fuse and slave relay. Replace fuse, relay and re-test controller.
Engine cranks but does not start	Out of fuel	Check fuel level, add fuel if necessary
	Ignition control wiring not installed properly	Refer to engine control wiring section and check ignition connections
	Fuel relay and or fuse damaged	Check fuel relay and fuse, replace if damaged or blown.
Engine starts but shuts down after "*Oil Bypass*™ period" due to low oil/high temp/Aux input	Oil/Temp/Auxiliary input wiring improperly connected.	Check wiring for proper connections.
	Incorrect programming of sensor inputs.	Check programming of oil pressure, engine temperature and aux input. Ensure that the sensor type is properly programmed to controller unit (Sender / Switch type)
Flashing Overspeed LED	Speed signal improperly connected, missing, or damaged.	Check speed signal wiring; replace damaged speed signal source.
	Crank output damaged, not working, or fuse blown on starter output	Check wiring and replace relay of fuse where necessary.
	Starter or starter solenoid damaged	Replace/repair damaged starter or starter solenoid.
Steady Oil LED immediately on start-up, without engine actually cranking or starting.	False speed signal being detected by controller. This problem can sometimes occur in installations where there is AC power from inverters near generator output lines connected to the speed signal cable.	Install a small step down transformer between the speed sensing wires and the generator output.
		If the neutral from the generator output is not grounded, attach it to ground
Display Parameter for Temperature, Oil or Fuel displayed as >>> or <<<	Parameter is >>> ABOVE or <<< BELOW specified manufacturer sender range.	If further accuracy is required it may be necessary to install sender with proper range specifications.
Warm-Up Feature appears longer then time setting.	Warm-Up Feature time setting does not begin until the Oil Bypass Time has expired.	Re-adjust Oil Bypass and/or Warm-Up timing.
Engine cranks immediately when battery is started up.	GSC300 was in autostart when battery was disconnected.	Make sure GSC300 is shut off prior to battery being disconnected.
	GSC300 was in autostart and battery was dead when charger was hooked up.	Press off when hooking up charger.
Battery Discharged. (Low battery voltage alarm.)	GSC300 has a 45 ma load in standby mode.	Use a battery disconnect switch, install a larger battery, or install a battery charger/ maintainer.

TECHNICAL NOTES ON FREQUENTLY ASKED QUESTIONS

1. Controller Memory Clear Time

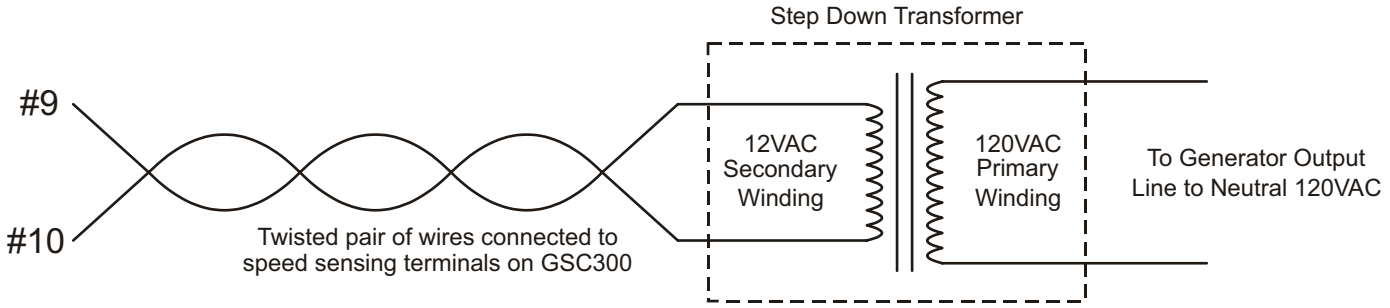
The GSC300 needs 10 seconds for its memory to clear. When the power to the controller is turned off and then back on again without waiting 10 seconds to clear the memory, a loss of speed will may be indicated by the GSC300 (if controller is in AUTO mode and start signal is activated) because the controller remains in run mode and senses that the generator has stopped. This would be indicated by a Flashing Overspeed LED. By leaving the GSC300 main power OFF for 10 seconds before main power is re-applied this allows the clearing the memory and it will function as intended.

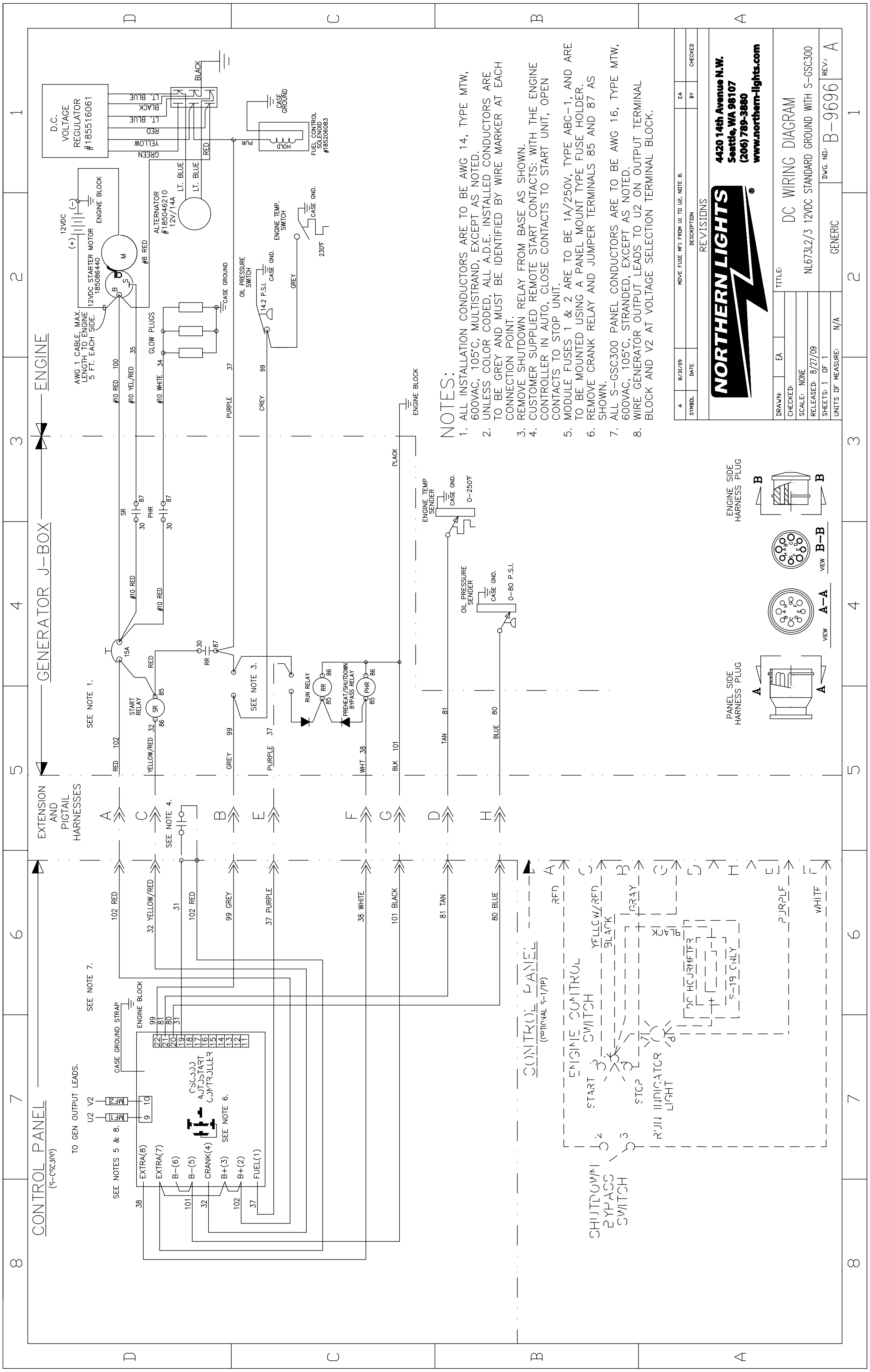
2. Step Down Transformer Use On Speed Sensing Cable With Inverter Systems

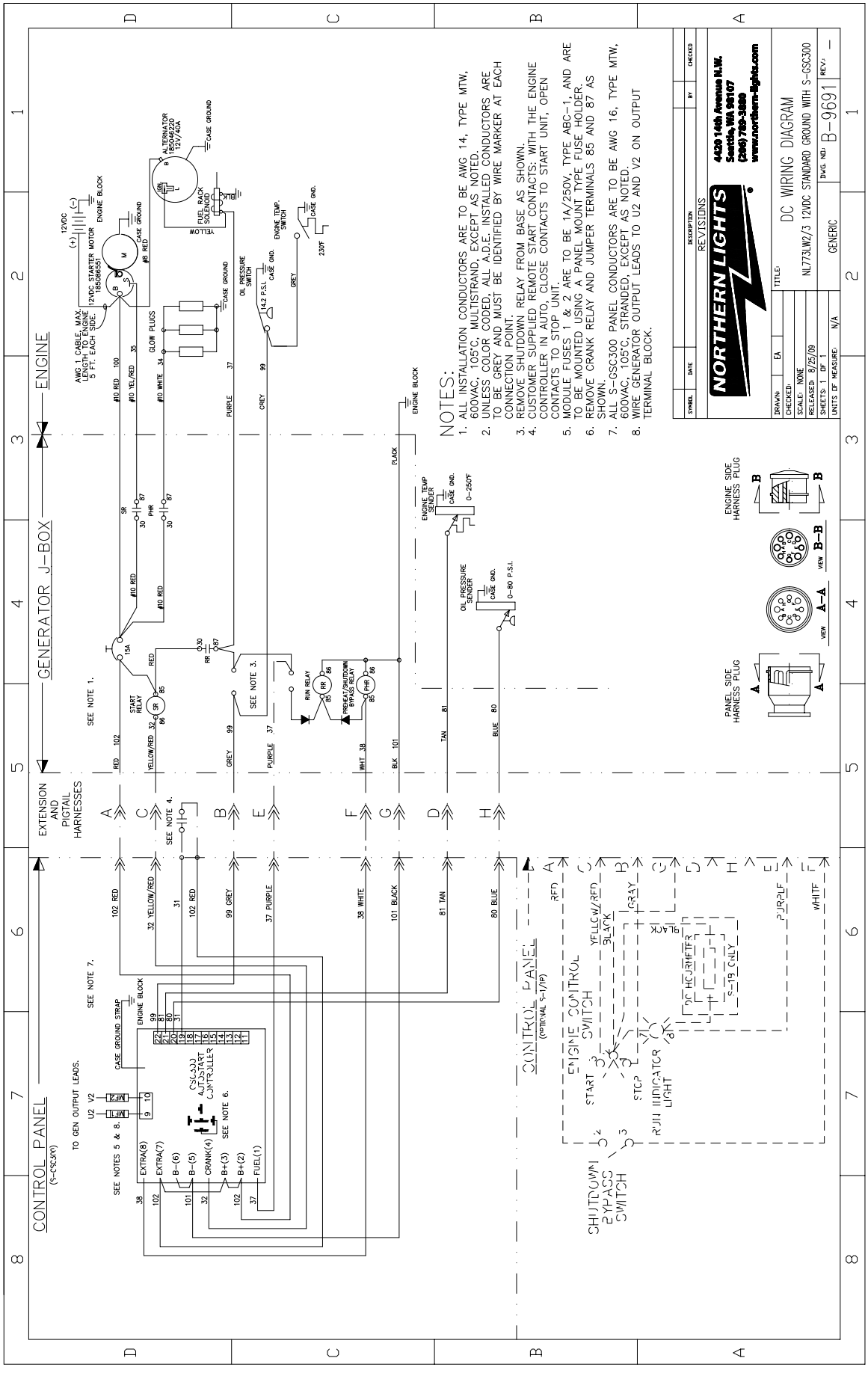
In some applications engine controllers are used on generators where there is no utility connection and inverters are used to provide AC power instead of a utility. Inverters can produce harmonics that can cause small AC signals to appear on wires that are near any power lines being fed by the inverter. If the generator output wires are located close to a line being powered by an inverter, a small AC signal can appear on the generator output lines when the inverter is on. This signal can cause the engine controller to react as if the generator is running if the speed sensing wires are connected to the generator output lines. This small AC signal can cause the controller to appear to have a Low Oil Failure when the remote start contacts are closed or the controller is put in the manual/test mode. The controller may think the generator is already running and immediately check to make sure there is oil pressure. Since the engine really hasn't started yet, there is no oil pressure and the controller sees a low oil fault. This is seen as the Oil LED turning on steady even before the engine starts to engage the starter.

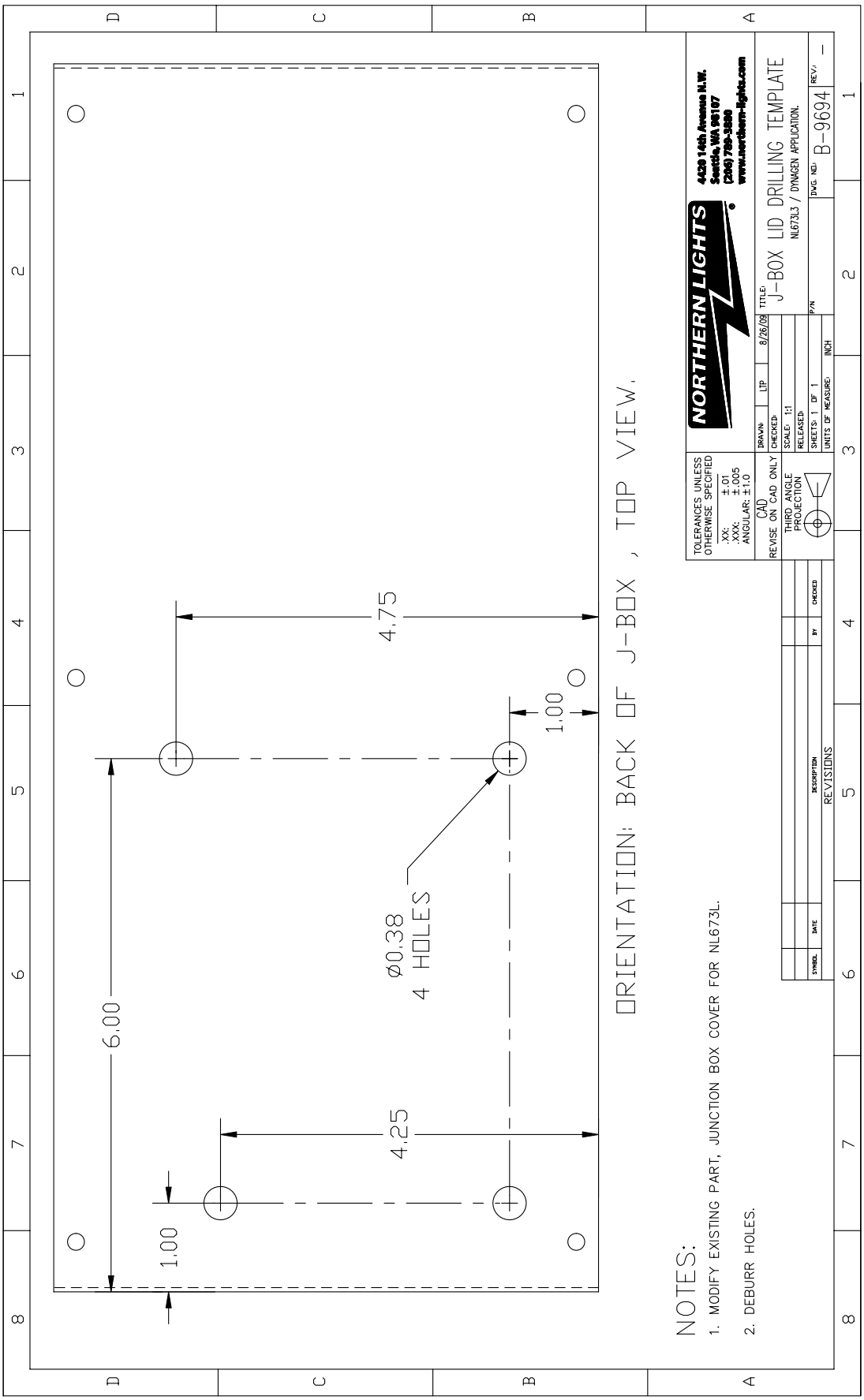
Without this false speed signal the controller will not look for oil pressure until the engine has started to run and the crank disengages if oil verification is disabled. Simply installing a small transformer between the generator output and the speed sensing terminals on the controller can eliminate this false speed signal. This transformer should be rated for 120 or 240 volts on the input or primary coil (depending on the generator output voltage you are using for speed sensing), and have an output voltage of around 12VAC on the secondary of the transformer. The two wires from the secondary of the transformer are connected to the two wires of the speed sensing terminals on the GSC300 controller. The step-down transformer acts to reduce the false speed signal on the line to a level that the engine controller will not recognize as the engine running. A common size transformer that would serve this purpose would be 24VA.

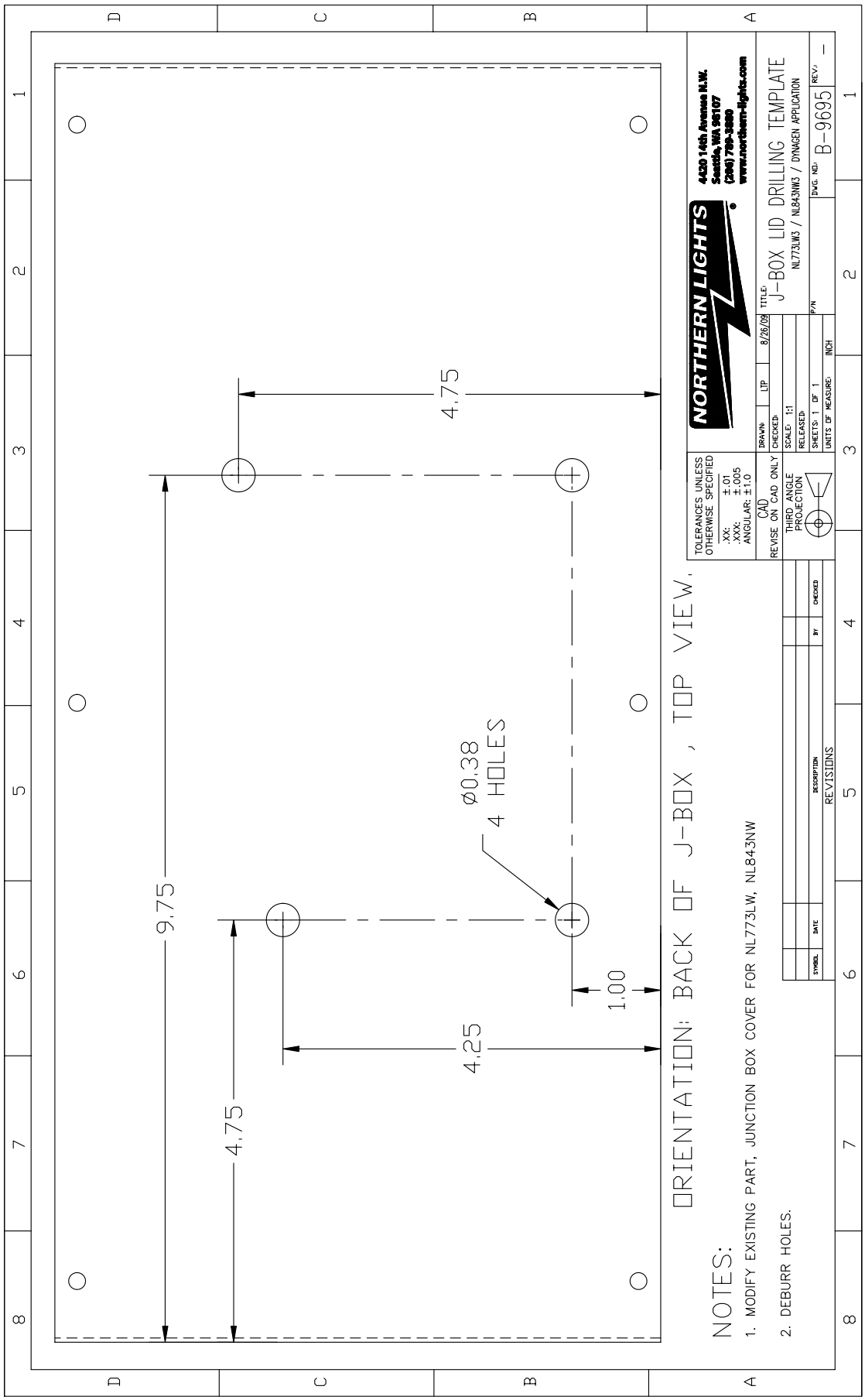
Step Down Transformer Connections on Speed Sensing Cable




CONTROL PANEL
EXTENSION AND PIGTAIL HARNESSES
GENERATOR J-BOX
ENGINE
CONTROL PANEL
NOTES:
1. ALL INSTALLATION CONDUCTORS ARE TO BE AWG 14, TYPE MTW, 600VAC, 105°C, MULTISTRAND, EXCEPT AS NOTED.
2. UNLESS COLOR CODED, ALL A.D.E. INSTALLED CONDUCTORS ARE TO BE GREY AND MUST BE IDENTIFIED BY WIRE MARKER AT EACH CONNECTION POINT.
3. REMOVE SHUTDOWN RELAY FROM BASE AS SHOWN.
4. CUSTOMER SUPPLIED REMOTE START CONTACTS: WITH THE ENGINE CONTROLLER IN AUTO, CLOSE CONTACTS TO START UNIT, OPEN CONTACTS TO STOP UNIT.
5. MODULE FUSES 1 & 2 ARE TO BE 1A/250V, TYPE ABC-1, AND ARE TO BE MOUNTED USING A PANEL MOUNT TYPE FUSE HOLDER.
6. REMOVE CRANK RELAY AND JUMPER TERMINALS 85 AND 87 AS SHOWN.
7. ALL S-GSC300 PANEL CONDUCTORS ARE TO BE AWG 16, TYPE MTW, 600VAC, 105°C, STRANDED, EXCEPT AS NOTED.
8. WIRE GENERATOR OUTPUT LEADS TO U2 ON OUTPUT TERMINAL BLOCK AND V2 AT VOLTAGE SELECTION TERMINAL BLOCK.
REVISIONS
NORTHERN LIGHTS
4420 14th Avenue N.W.
Seattle, WA 98107
(206) 789-3880
www.northern-lights.com
DC WIRING DIAGRAM
NL673L2/3 12VDC STANDARD GROUND WITH S-GSC300
GENERIC
DWG. NO. B-9696
REV. A


CONTROL PANEL
(S-GSC300)
GENERATOR J-BOX
ENGINE
EXTENSION AND PIGTAIL HARNESSES
SEE NOTE 1.
SEE NOTE 3.
SEE NOTE 4.
SEE NOTE 7.
SEE NOTES 5 & 8.
SEE NOTE 6.
TO GEN OUTPUT LEADS.
U2 V2
CASE GROUND STRAP
ENGINE BLOCK
GSC300 AUTOSTART CONTROLLER
EXTRA(8)
EXTRA(7)
B-(6)
B-(5)
CRANK(4)
B+(3)
B+(2)
FUEL(1)
12VDC STARTER MOTOR 185086551
12VDC (+) (-)
ALTERNATOR 185046220 15V/40A
FUEL RACK SOLENOID
OIL PRESSURE SWITCH
42 P.S.I.
ENGINE TEMP. SWITCH
230°F
GLOW PLUGS
START RELAY
RUN RELAY
PREHEAT/SHUTDOWN BYPASS RELAY
ENGINE TEMP SENDER
0-250°F
OIL PRESSURE SENDER
0-80 P.S.I.
CASE GND.
CASE GROUND
#10 RED
#10 YEL/RED
#10 WHITE
#8 RED
YELLOW
GREY
PURPLE
BLACK
BLUE
TAN
BLK
WHT
RED
YELLOW/RED
GREY
PURPLE
WHT
BLK
TAN
BLUE
102 RED
32 YELLOW/RED
31
102 RED
99 GREY
37 PURPLE
38 WHITE
101 BLACK
81 TAN
80 BLUE
CONTROL PANEL
(OPTIONAL S-1/PP)
ENGINE CONTROL START SWITCH
SHUTDOWN BYPASS SWITCH
RUN INDICATOR LIGHT
DC HOURMETER
S-1PP ONLY
YELLOW/RED
BLACK
GRAY
PURPLE
WHITE
PANEL SIDE HARNESS PLUG
ENGINE SIDE HARNESS PLUG
VIEW A-A
VIEW B-B
NOTES:
1. ALL INSTALLATION CONDUCTORS ARE TO BE AWG 14, TYPE MTW, 600VAC, 105°C, MULTISTRAND, EXCEPT AS NOTED.
2. UNLESS COLOR CODED, ALL A.D.E. INSTALLED CONDUCTORS ARE TO BE GREY AND MUST BE IDENTIFIED BY WIRE MARKER AT EACH CONNECTION POINT.
3. REMOVE SHUTDOWN RELAY FROM BASE AS SHOWN.
4. CUSTOMER SUPPLIED REMOTE START CONTACTS: WITH THE ENGINE CONTROLLER IN AUTO, CLOSE CONTACTS TO START UNIT, OPEN CONTACTS TO STOP UNIT.
5. MODULE FUSES 1 & 2 ARE TO BE 1A/250V, TYPE ABC-1, AND ARE TO BE MOUNTED USING A PANEL MOUNT TYPE FUSE HOLDER.
6. REMOVE CRANK RELAY AND JUMPER TERMINALS 85 AND 87 AS SHOWN.
7. ALL S-GSC300 PANEL CONDUCTORS ARE TO BE AWG 16, TYPE MTW, 600VAC, 105°C, STRANDED, EXCEPT AS NOTED.
8. WIRE GENERATOR OUTPUT LEADS TO U2 AND V2 ON OUTPUT TERMINAL BLOCK.
SYMBOL
DATE
DESCRIPTION
BY
CHECKED
REVISIONS
NORTHERN LIGHTS
4420 14th Avenue N.W.
Seattle, WA 98107
(206) 789-3636
www.northern-lights.com
DRAWN: EA
CHECKED:
SCALE: NONE
RELEASED: 8/25/09
SHEETS: 1 OF 1
UNITS OF MEASURE: N/A
TITLE: DC WIRING DIAGRAM
NL773LW2/3 12VDC STANDARD GROUND WITH S-GSC300
GENERIC
DWG. NO. B-9691
REV: -


NOTES:
1. MODIFY EXISTING PART, JUNCTION BOX COVER FOR NL673L.
2. DEBURR HOLES.
ORIENTATION: BACK OF J-BOX , TOP VIEW.
4.75
6.00
4.25
1.00
1.00
Ø0.38
4 HOLES
NORTHERN LIGHTS
4428 14th Avenue N.W.
Seattle, WA 98107
(206) 789-3888
www.northern-lights.com
TITLE: J-BOX LID DRILLING TEMPLATE
NL673L3 / DYNAGEN APPLICATION.
DWG. NO: B-9694
REV: -
TOLERANCES UNLESS OTHERWISE SPECIFIED
.XX: ± .01
.XXX: ± .005
ANGULAR: ± 1.0
REVISE ON CAD ONLY
DRAWN: LTP 8/26/09
CHECKED:
SCALE: 1:1
RELEASED:
SHEETS: 1 OF 1
UNITS OF MEASURE: INCH
P/N
THIRD ANGLE PROJECTION
REVISIONS
SYMBOL DATE DESCRIPTION BY CHECKED


4.75
9.75
4.75
Ø0.38
4 HOLES
1.00
4.25
ORIENTATION: BACK OF J-BOX , TOP VIEW.
NOTES:
1. MODIFY EXISTING PART, JUNCTION BOX COVER FOR NL773LW, NL843NW
2. DEBURR HOLES.
NORTHERN LIGHTS
4420 14th Avenue N.W.
Seattle, WA 98107
(206) 789-5800
www.northern-lights.com
TITLE: J-BOX LID DRILLING TEMPLATE
NL773LW3 / NL843NW3 / DYNAGEN APPLICATION
DWG. NO: B-9695
REV: -
TOLERANCES UNLESS OTHERWISE SPECIFIED
.XX: ± .01
.XXX: ± .005
ANGULAR: ±1.0
CAD
REVISE ON CAD ONLY
DRAWN: LTP 8/26/09
CHECKED:
SCALE: 1:1
RELEASED:
SHEETS: 1 OF 1
UNITS OF MEASURE: INCH
P/N
THIRD ANGLE PROJECTION
SYMBOL DATE DESCRIPTION BY CHECKED
REVISIONS

4420 14th Ave. NW
Seattle, WA 98107-4616, USA

Tel: (206) 789-3880 • Toll Free 1-800-762-0165

Fax: (206) 782-5455 • www.northern-lights.com

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