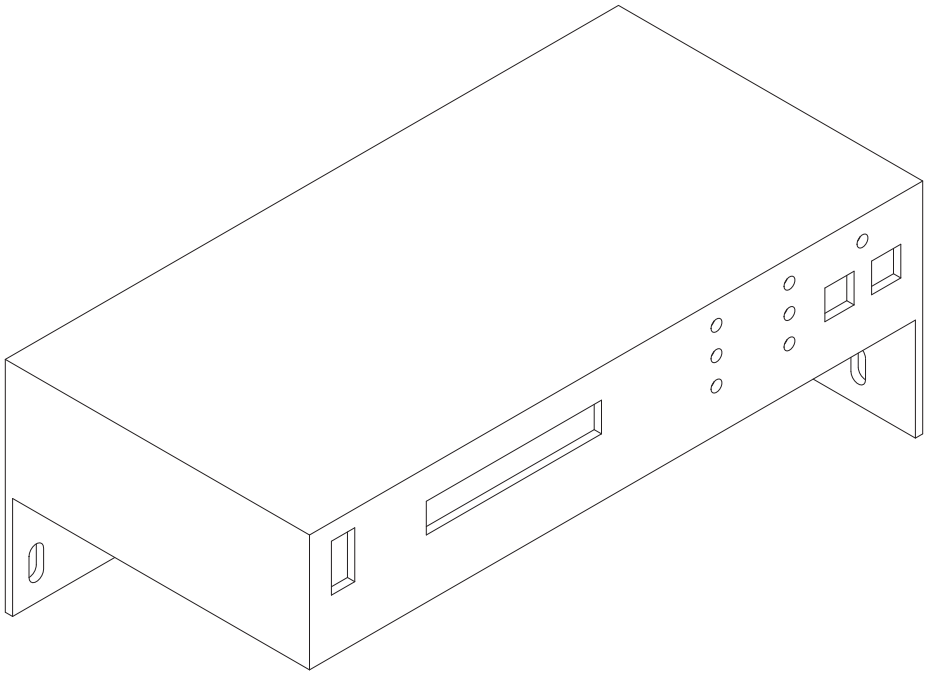
INSTALLATION/OPERATION INSTRUCTIONS

Subject: Auto-Light Controller
Models Affected: Light Towers GLT416 & GLT418

The following instructions will guide you through the installatijon and operation of the Auto-Light Controller on a light tower.



INTRODUCTION

This manual provides information and procedures to safely install and operate this accessory. For your own safety and protection from physical injury, carefully read, understand, and observe the safety, installation and operating instructions described in this manual. *The information contained in this manual was based on machines in production at the time of publication. GODWIN PUMPS OF AMERICA reserves the right to change any portion of this information without notice.*

DO NOT MODIFY or use this equipment for any application other than which it was designed for.

⚠ WARNING

GODWIN PUMPS OF AMERICA recommends that a trained and licensed electrician perform all electrical wiring and testing functions. Any wiring should be in compliance with the United States National Electric Code (NEC), state and local codes and Occupational Safety and Health Association (OSHA) guidelines. Failure to follow proper installation requirements may result in equipment or property damage, personal injury or death.

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SERVICE KIT, AUTO LIGHT OPTION: SK034GP

PARTS INCLUDED IN KIT:	PART NUMBER
(1) Controller, Light Tower	HUSH-23819
(1) Relay, 30A 12VDC	HUSH-65536
(1) Diode, Bridge Rectifier	HUSH-19511
(1) Screw, 10-32 x .5 pan head phil SS	HUSH-60398
(3) Screw, 10-32 x .75 pan head phil	HUSH-60062
(4) Nut, 10-32 hex nylock	HUSH-60061
(1) Strain relief - .75 Romex w/nut	HUSH-14219
(2) Bracket, manual holder	HUSH-11131B
(1) Bracket, manual holder	HUSH-11222
(2) Screw, 10-32 x 1.00 pan head phil	HUSH-60397
(2) Nut, 10-32 hex nylock	HUSH-60415
(4) Washer, flat #10 x .06thk SS	HUSH-60067
(4) Washer, flat .250 USS	HUSH-60243
(1) Screw, .250-20 x 1.5 hex head	HUSH-60414
(4) Nut, .312-18 hex	HUSH-60285
(2) Nut, .250-20 hex ser flange	HUSH-60161
(1) Terminal, F spade piggyback .250 14-16AWG	HUSH-65002
(1) Terminal, ring 14-16AWG #10 screw	HUSH-65006
(1) Decal, Auto Light Operation Instructions	HUSH-10019

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CONTROLLER SPECIFICATIONS

Temperature
- Operation from -50° C to 60° C
- Storage from -60° C to 71° C

Power Supply
- 9-35VDC

Ingress Protection Rating
- IP66

Inputs
- Power Supply Positive (Red/White)
- Power Supply Negative (Black)
- Fail (Green) ***OPTION***
- Auxiliary Shutdown (Grey) ***OPTION***
- Low Fuel Shutdown (White/Purple) ***OPTION***
- Remote Start (Orange) ***OPTION***
- AC voltage H (Red)
- AC voltage N (White)

Outputs
- Control in Auto (Black/Yellow)
- Fuel (Purple)
- Crank (Yellow)
- Preheat (Blue)
- Start Warning (Pink) ***OPTION***
- Ready to Load (Brown) ***OPTION***

Speed Measurement
- Obtained from generator frequency

Timers
- Start Warning – 20sec
- Preheat – 20sec
- Crank – 20sec
- Crank Pause – 20sec
- RPM=0 during crank – 5sec
- Stability – 25sec
- Ready to Load (warm up) – 20sec
- Crank attempts – 5sec
- Cool down – 60sec

MOUNTING THE AUTO LIGHT CONTROLLER ON TO THE EXISTING CONTROL BOX

Note: Disconnect the negative (-) cable from the battery before starting any work on unit.

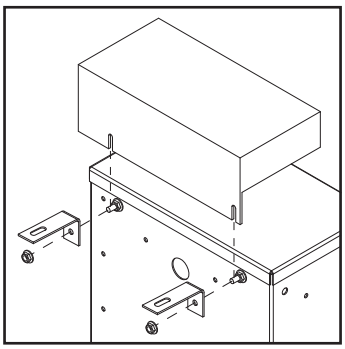


FIGURE 1

1. Remove the three screws at the top of the control panel to allow the panel to open.

2. Remove the manual holder and bracket from the top of the control box. Discard bracket and hardware, set aside manual holder.

3. Place the auto light controller on the top of the control box. Align the slots on the back panel of the controller on top of two existing screws on the rear of the control box, just below the top edge. SEE FIGURE 1.

4. Install two black brackets (included in kit) to the back of the control box for relocation of the manual holder. SEE FIGURE 1.

5. Secure controller and brackets to the control box by installing two flange nuts (included). SEE FIGURE 1.

6. On the right side of the auto light controller there is a ¼" slot. Using a ¼" drill bit, drill through the existing control box. SEE FIGURE 2. ***Note:*** *Check for wires inside the box so the drill bit does not damage any wires.*

7. Secure the side of the controller using a 10-32 x .75" screw and nylock nut included in the kit. SEE FIGURE 2.

8. Using the included hardware; 10-32 x 1" screw (2), #10 washer (4), .25" washer (4), nylock nut (2), install the new manual holder bracket onto the two black brackets installed in step 4. ***Note:*** *Make sure the open end of the manual holder bracket is facing the right side of the control box.* SEE FIGURE 3.

9. Remove hole plug on the bottom left side of the existing control box and install the strain relief (included). SEE FIGURE 4. ***Note:*** *Depending on model and year of light tower, a 7/8" hole may need to be drilled in bottom of unit to allow the routing of wires.*

10. Route wires from the auto light controller through this hole, into the control box.

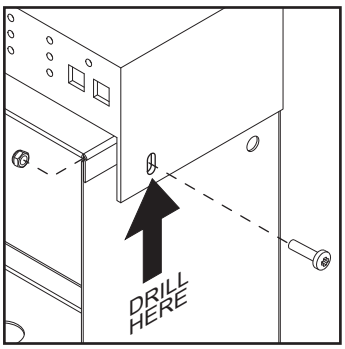


FIGURE 2

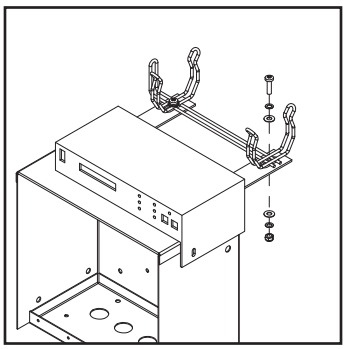


FIGURE 3

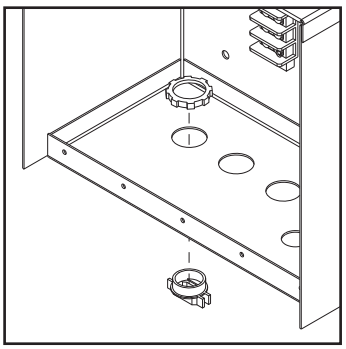


FIGURE 4

INSTALLING THE AC RELAY AND WIRING INTO THE EXISTING CONTROL BOX (SEE AC WIRING DIAGRAM ON PAGE 14)

1. On the right hand side of the control box, measure 2-5/8" in from the front of the control box and down 3-1/8" from the top of the control box and mark. Center punch where both measurements meet. From that mark, measure towards the back of the control box 1-7/8". Mark and center punch. Using a ¼" drill bit, drill both holes. SEE FIGURE 5.

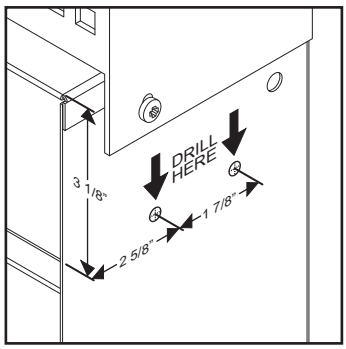


FIGURE 5

2. Install the AC relay inside the control box with two 10-32 x .75" screws and nylock nuts (included in kit). SEE FIGURE 6.

3. The relay has three wires attached to it when shipped from the factory. At the top of the relay on the left side there is a red 10 gage wire and on the top right side there is a 10 gage black wire. Halfway down the left side there is a black 14 gage wire.

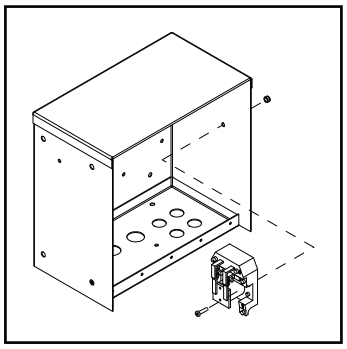


FIGURE 6

4. Connect the **14 awg black wire** from the relay coil to the ground bar inside the control box. SEE FIGURE 13, Item A.

5. Connect the **brown wire** from the auto light controller to the small screw on the right side of the relay (this is the positive coil feed from controller). SEE FIGURE 13, Item B.

6. Remove the red wire from position #10 of terminal block 1 and attach it to the left side Common (C) terminal at the bottom left side of the relay. SEE FIGURE 13, Item C.

7. Remove the black wire from position #8 of terminal block 1 and attach it to the right side Common (C) terminal at the bottom right side of the relay. SEE FIGURE 7, Item D.

8. Attach the (top) **red wire** from the Normally Closed (NC) terminal of the relay to position #10 of terminal block 1. SEE FIGURE 13, Item E.

9. Attach the (top) **black wire** from the Normally Closed (NC) terminal of the relay to position #8 on terminal block 1. SEE FIGURE 13, Item F.

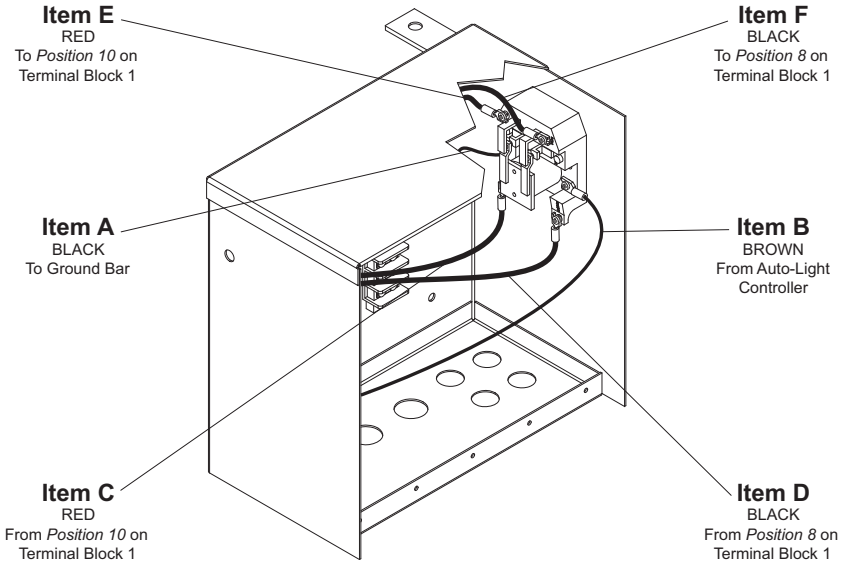


FIGURE 7

10. Locate the top of the main circuit breaker on the control panel. ***Note:*** *Depending on the model and year of the light tower, the main breaker may have spade type terminals or screw type terminals.* Remove the red wire from the breaker and attach the **red wire** from the auto light controller:
    a. **For units with spade terminals:** Remove the plastic cap from the end of the **red wire** from the auto light controller and crimp the included piggyback connector to the stripped end. Connect the red wire from the top of the main breaker onto the piggyback connector, then connect back to the main breaker. SEE FIGURE 8.
    b. **For units with screw terminals:** Remove and set aside the screw holding the red wire to the top of the main breaker. Remove the plastic cap from the end of the **red wire** from the auto light controller and crimp the included ring terminal to the stripped end. Reinstall screw and connect both red wires back to the main breaker. SEE FIGURE 9.

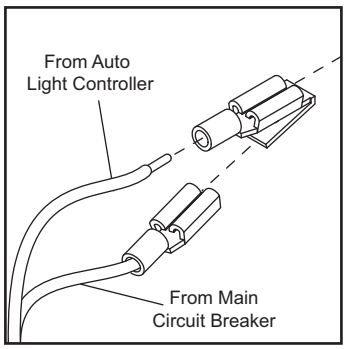


FIGURE 8

11. Connect the **white wire** from the auto light controller (gen neutral) to position #4 on the left side of terminal block 1. (This terminal block will already have a green wire on #1, a white wire on # 2 and a white wire on # 3.) ***Note:*** *This will allow the auto light controller to open the relay before cranking the engine, preventing the unit from starting under load.*

12. Once the relay has been mounted inside the control box, close the door to verify there is no contact between the door, its components and the newly installed AC relay.

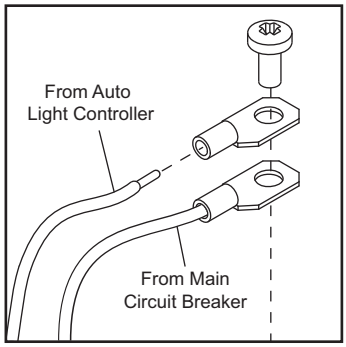


FIGURE 9

MOUNTING THE BRIDGE RECTIFIER

1. On the rear right side of the control box, measure up from the bottom of the control box 2 1/8", make a mark on the rear control box panel. SEE FIGURE 10.

2. On the back of the control box, measure from the right side 4", towards the center of the box. Make a mark on the rear control box panel. SEE FIGURE 10.

3. Where the two lines cross drill a ¼" hole. SEE FIGURE 10. ***Note:*** *Check for wires inside the box so the drill bit does not damage any wires.*

4. Run a 10-32 x .5" screw (included) from the back of the control box into the box and mount the Bridge Rectifier on the inside of the control box so the negative terminal is on the right. Secure with nylock nut included. SEE FIGURE 11.

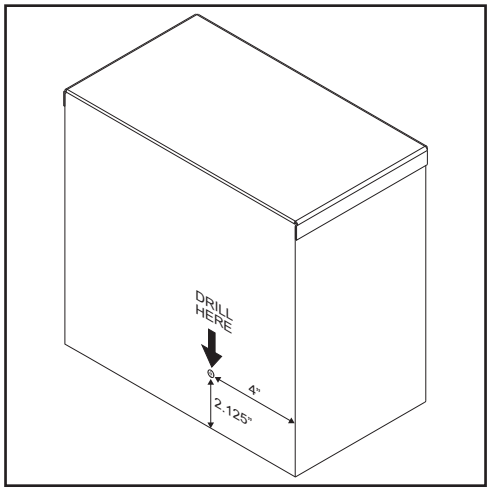


FIGURE 10

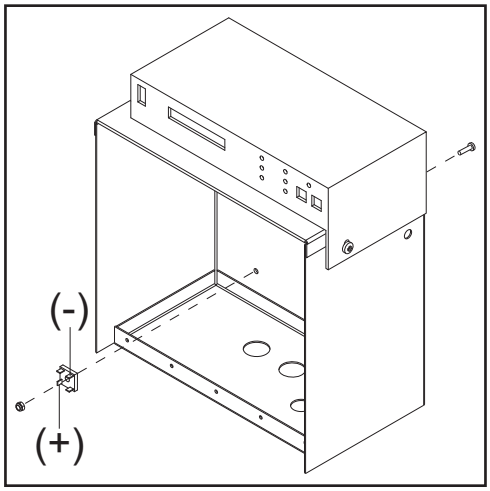


FIGURE 11

INSTALLING THE DC CONTROLS AND WIRING TO THE EXISTING CONTROL BOX (SEE DC WIRING DIAGRAM ON PAGE 15)

Note: *Disconnect the negative (-) cable from the battery before any wiring is done.*

1. Connect the **red/white wire** (auto light controller main positive power) to the #10 position (top) of terminal block 2. Run the included **12 awg red wire** from opposite side of #10 to the B position of the starter switch.

2. Connect **black wire** (auto light controller main negative power) to the #9 position of terminal block 2. Run the included **12 awg black wire** from the opposite side of #9 position to the main ground bar.

3. Connect the **purple wire** from the auto light controller (fuel solenoid) to the BR terminal of the starter switch. ***Note:*** *Depending on the model and year of the light tower, the red wire connected to the time delay relay could either be on the BR terminal or the ACC terminal. Be sure to connect the purple wire from the auto light controller to the terminal with the wires.*

4. Connect the **blue wire** (engine preheat) to the R1 terminal of the starter switch.

5. Connect **yellow wire** from the auto light controller to the negative (–) of the Bridge Rectifier (piggyback connector, **green/yellow**).

6. Connect the **yellow wire** on the positive (+) of the Bridge Rectifier to the C terminal of the starter switch.

7. Remove the green wire from the N/C position of the auxiliary contact at the back of the main breaker. Pull the wire back through the harness to the point at which it will meet the **green/yellow** wire from the Bridge Rectifier. The wire will be tapped into at this point. Before cutting the green wire to splice in the **green/yellow**, make sure the green wire can be connected back on the N/C auxiliary contact.

8. See DC diagram. Cut the green wire and splice in the **green/yellow** wire from the Bridge Rectifier. Reconnect the green wire to the N/C position on the auxiliary contact at the back of the main breaker.

Note: *The remaining wires from the auto light controller (grey, white/violet, orange, pink, green and black/yellow) are capped off for optional equipment use.*

OPERATING THE AUTO LIGHT CONTROLLER

The Auto-Light light tower controller is a microprocessor-based automatic light tower controller. When attached to a light tower, this controller easily controls the light tower functions from preheating, cranking, warm-up, energizing and de-energizing the lights, cool down, and shutdown. *(Note: Of those light tower functions only the "Preheat" function is independently programmable).* Seven LED's indicate the status of the light tower and a 14 character display screen allows for easy programming, as well as displaying controller status.

PROGRAMMING

1. Turn AUTO TIMER ENABLE/OFF switch to the AUTO TIMER ENABLE position, the SCREEN DISPLAY will toggle between current day of week and time of day, Next Start Day and Time, and Days Programmed to Run.

TO PROGRAM THE RUN TIME

1. To program run times for days of the week, press and hold the **CHANGE** and **ENTER** buttons simultaneously for 5 seconds and until the display reads **"Programming"** then release buttons.

2. The controller will display **"Change Mon? No"** the **"No"** will be flashing. If Mondays programmed start and run time needs to be changed, press the **CHANGE** button until the display reads **"Change Mon? Yes"**, then press the **ENTER** button. If Mondays program does not need to be changed press the **ENTER** button when the display reads **"Change Mon? No"**. If the **ENTER** button is pressed when the display reads **"Change Mon? No"**, the controller will jump to the next day of the week, in this case **"Change Tue? No"**. This quickly allows the operator to only change one day of the week if need be, or all days in a quick and orderly fashion. If the **ENTER** button is pressed when the display reads **"Change Mon Yes?"** The controller will jump to Mondays start and run time programming.

3. The display will now read **"Mon On"** with the **"On"** flashing. This is asking the operator if the light tower should be ran on Monday. If the light tower is to be run on Monday, press the **ENTER** button when the display reads **"Mon On"**. If the light tower is not to be ran on Monday press the **CHANGE** button until the display reads **"Mon Off"** and press the **ENTER** button. If the **ENTER** button is pressed when the display reads **"Mon Off"** the controller will jump to Tuesdays programming. If the **ENTER** button is pressed when the display reads **"Mon On"** the controller will jump to Mondays start time programming.

4. The display will now read the current programmed start time for Monday, for example, **"Mon On 1:00"**, with the **"1:00"** flashing. To change the programmed start time from "1:00" press the **CHANGE** button, to accept the setting, press the **ENTER** button. For example, if the light tower is to be programmed to start at 5:30 press the **CHANGE** button until the display reads **"Mon On 5:30"** then press the **ENTER** button.

5. The display will now read the current set start time for Monday with **"am"** or **"pm"** flashing. In the example above, the display would read **"Monday On: 5:30am"** with the **"a"** flashing. To change the start times from am to pm press the **CHANGE** button. Accept the appropriate setting by pressing the **ENTER** button. If the light tower is to be programmed for the optional remote start input, press the **ENTER** button when the display reads **"Mon On:Remote"**. This means the light tower will start when the remote input is activated. The light tower will run from a minimum of one hour when programmed for a remote start no matter what the remote start input does after the light tower is started. After the **ENTER** button is pressed, the controller will jump to run duration programming.

6. The display will now read the number of run hours programmed for Monday. For example, if the controller was programmed to run for ten hours on Monday, the display would read **"Run For: 10hrs"**. To change the programmed run time press the **CHANGE** button until the appropriate number of run hours for Monday are displayed then press the **ENTER** button. If the controller is to run until a remote start signal is removed, press the **ENTER** button when the display reads **"Run For:Remote"**. This means that the light tower will start at the programmed start time and run until the remote start input is removed. If the remote start signal is not present at the time of start, the signal must be turned on then off before the light tower will turn off. After the **ENTER** button is pressed, accepting the duration for run time on Monday, the controller will jump to Tuesdays programming.

7. Follow the same sequence programming each day of the week to the required settings. After Sundays run time has been set, the controller will reboot, exiting the programming mode and saving all parameters. If at anytime the controller is turned off during programming the settings will not be saved.

TO PROGRAM CURRENT DAY AND TIME

1. To change current day of week and time of day, press and hold the **CHANGE** and **ENTER** buttons simultaneously for seven seconds and until the display reads “Set TimeOf Day” then release buttons.

2. The current set week day will be flashing, to change the day, press the **CHANGE** button, to accept the setting, press the **ENTER** button.

3. After the **ENTER** button is pressed the current programmed time of day will be flashing, to change the hour press the **CHANGE** button, to accept the hour setting, press the **ENTER** button, continue the same process until the hours and minutes and AM or PM are set.

4. After pressing the **ENTER** button setting time of day to AM or PM, the control will save settings and exit current day and time programming.

TO RESET PROGRAM BACK TO DEFAULTS

1. To change all programming back to defaults with the exception of the current day of week and time of day, press and hold the **CHANGE** and **ENTER** buttons simultaneously for ten seconds and until the display reads **“ResetToDefault”** then release buttons.

2. The display will now read **“Reset All? No”** with the **“No”** flashing. To reset settings back to defaults press the **CHANGE** button until the display reads **“Reset All? Yes”**, then press the **ENTER** button. After the **ENTER** button is pressed resetting controller programming back to default settings, the control will jump back to Mondays programming. If default settings are not to be set press the **ENTER** button when the display is reading **“Reset All? No”** then press the **ENTER** button.

STARTING OPERATION

1. Turn **AUTO TIMER ENABLE/OFF** switch to the **AUTO TIMER ENABLE** position, the SCREEN DISPLAY will toggle between current day of week and time of day, Next Start Day and Time, and Days Programmed to Run. ***Note: Make sure the main circuit breaker and individual light breakers are left in the “ON” position for the unit to start up and light up automatically.***

2. The light tower will start when the start command is given by either a remote start input or a timer start, depending on the programming of the controller.

3. When the Start sequence is enabled, the controller checks to see if the light tower engine is already running. If the engine **is not** running the start sequence is continued. If the engine **is** running, the controller will only pick up the fuel relay, allowing the key switch to be turned to the OFF position, letting the controller take control over the light tower operations. ***Note: If the key switch is left in the RUN position when the controller is running the light tower or is switched from OFF to RUN, the switch will override the controller, causing the engine to remain running after the timer cycle is complete.***

4. If the start sequence is initiated the “Start Warning Output” circuit is energized first. This output is an option and can be used to run a light or horn to warn personnel close by that the light tower is about to start. This output stays energized for 20 seconds.

5. The Engine Preheat relay runs in parallel with the start warning, depending on the preheat time delay. Example: if the engine preheat is set for 20 seconds, the engine preheat relay and start warning relays will activate and deactivate at the same time. If the engine preheat is set for 10 seconds, the start warning will activate 10 seconds prior to the preheat relay activating. When the preheat relay is activated the preheat LED on the controller will be illuminated. Engine Preheat default time is 20 seconds.
To change the Engine Pre-heat time delay, press and hold the Change and Enter buttons simultaneously until the display reads “Preheat”. Relaese the Change and Enter buttons and thethe current time delay setting will be flashed on the display. The time delay setting is adjustable from 0 to 45 seconds by presing the **Change** button on the controller. When the new time delay setting is reached press the **Enter** button.

6. After the Preheat time has expired, the preheat LED and relay will turn off. The Crank LED and relay, the Fuel LED and relay, and the Load Energized LED and relay will be energized.

7. The crank relay will crank the engine, the fuel relay will energize the fuel hold solenoid, and the Load relay will open (disconnect) the power circuit to the light and auxiliary outlets, allowing the light tower to be started under no load conditions.

8. Once cranking, the engine will continue to crank up to 15 seconds as long as the engine rpm does not reach 450 rpm (15 Hz). If rpm = 0 for the first five seconds of the crank attempt, the unit will turn off the crank relay and LED and enter the “Crank Pause” for 15 seconds.

9. If the engine exceeds 450 rpm, the crank relay and LED are turned off, but the fuel relay remains energized. Once the engine starts and speeds up to 1800 rpm, a timer will begin to countdown the “Stability Time” for 25 seconds. Once this timer has elapsed the “Running” LED will be turned on.

10. If the engine does not start in 15 seconds, the controller will allow the starter to cool by entering the “Crank Pause” for 15 seconds before turning the crank relay / LED and the fuel relay back on. If the engine fails to reach 450 rpm, the controller will to start the engine a total of 5 times. If the engine never reaches 450 rpm in the 5 attempts, the fuel relay will be shut off along with the crank relay and LED. The fault LED will then be illuminated. The engine will be locked out at this time; to reset the controller the AUTO TIMER ENABLE/OFF switch must be turned OFF to reset the controller and then switched back on.

11. If the engine reaches 450 rpm or greater and then stalls, the controller will again enter the crank pause for 15 seconds and then try to start again. This counts as a crank attempt but not a failure. After the “Stability Timer” has elapsed, the “Ready to Load” timer begins; this timer is 25 seconds. After this time expires the “Ready to Load” relay is turned off (energizing the load on the normally closed contacts of the relay) and the “Loaded” LED is illuminated. If the controller reaches the “Loaded” state and engine speed decreases to 0 RPM, this will be considered a failure. The fuel relay will de-energize, and the fault LED will be turned on. There will be no more crank attempts.

12. Once the controller has successfully started the light tower, it will begin counting down the remaining run time.

Note: After the installation is completed, the key is no longer required to operate the unit in the “Auto” mode and may be removed for security purposes.
The main breaker and the individual light breakers should be left in th e”On” position, for the unit to start-up and light up automatically.

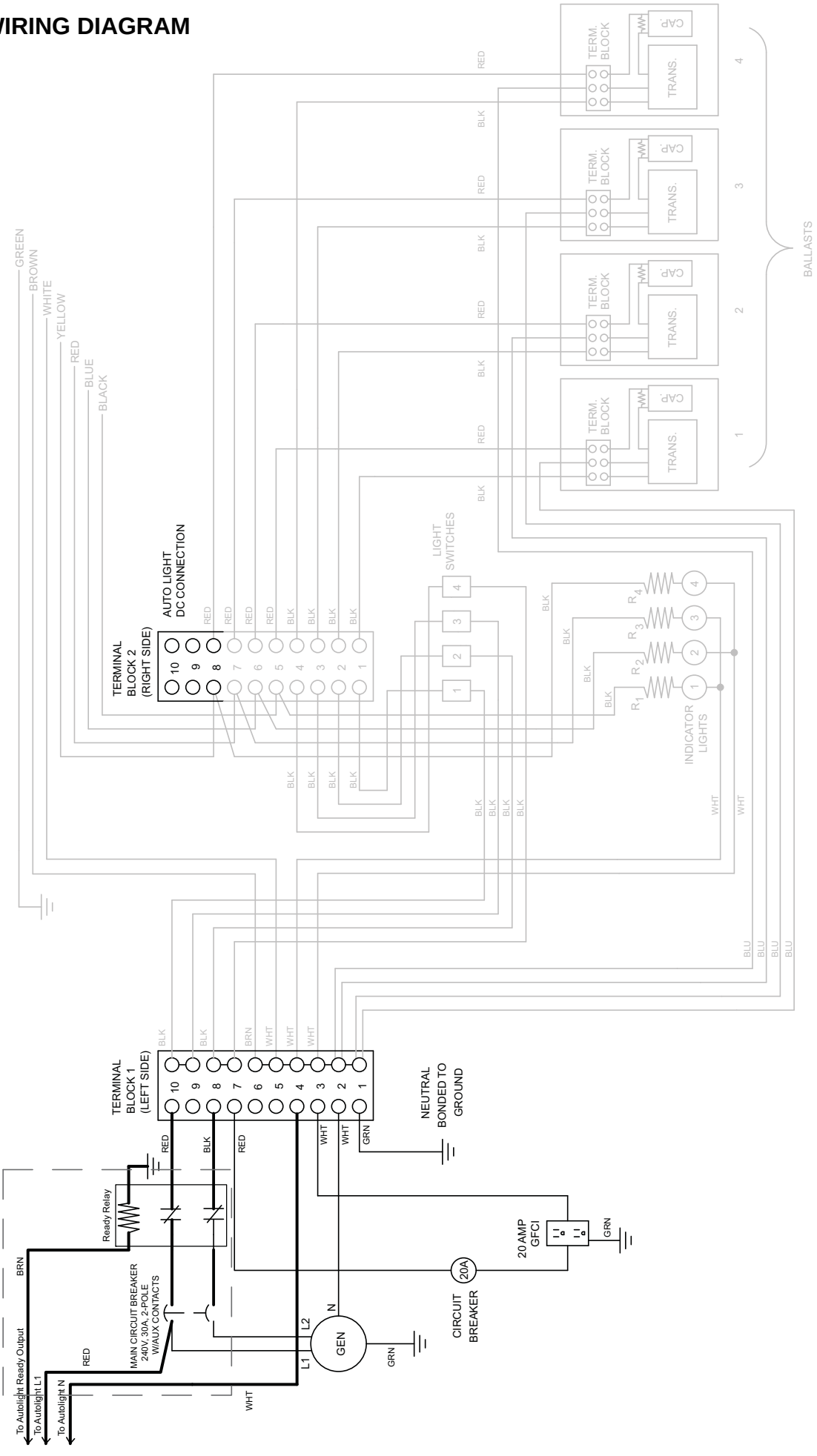
STOP OPERATION

1. Once a stop command has been initiated, from the removal of the “Remote Start” signal, timer expiration, or the optional low fuel shutdown, the controller will turn the “Ready to Load” relay on (turning off the lights) and the “Loaded” LED off.

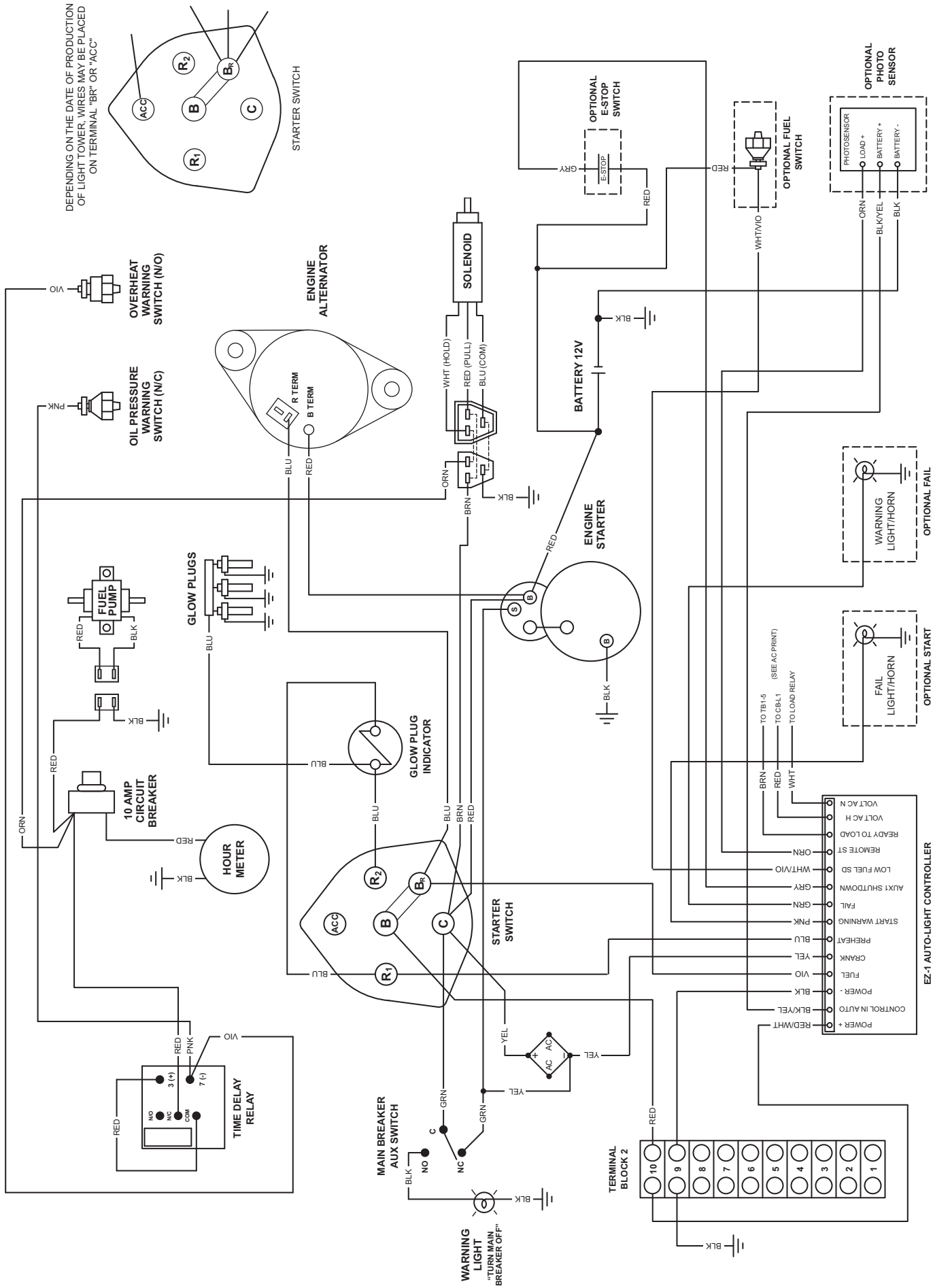
2. The light tower will continue to run for a one minute cool down interval. After that time the fuel relay will be de-energized and the running LED will be turned off.

3. The only time the engine will stop immediately is if the controller is taken from AUTO TIMER ENABLE to OFF, or if an optional auxiliary input is activated.

AC WIRING DIAGRAM



DC WIRING DIAGRAM



NOTES

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