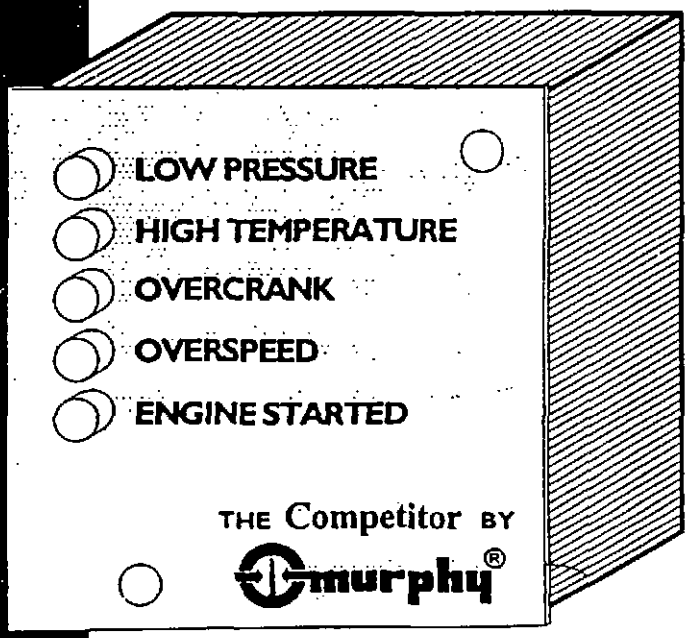
ASM-92152N
Effective 03-92

ASM150 AUTO START MODULE

murphy®

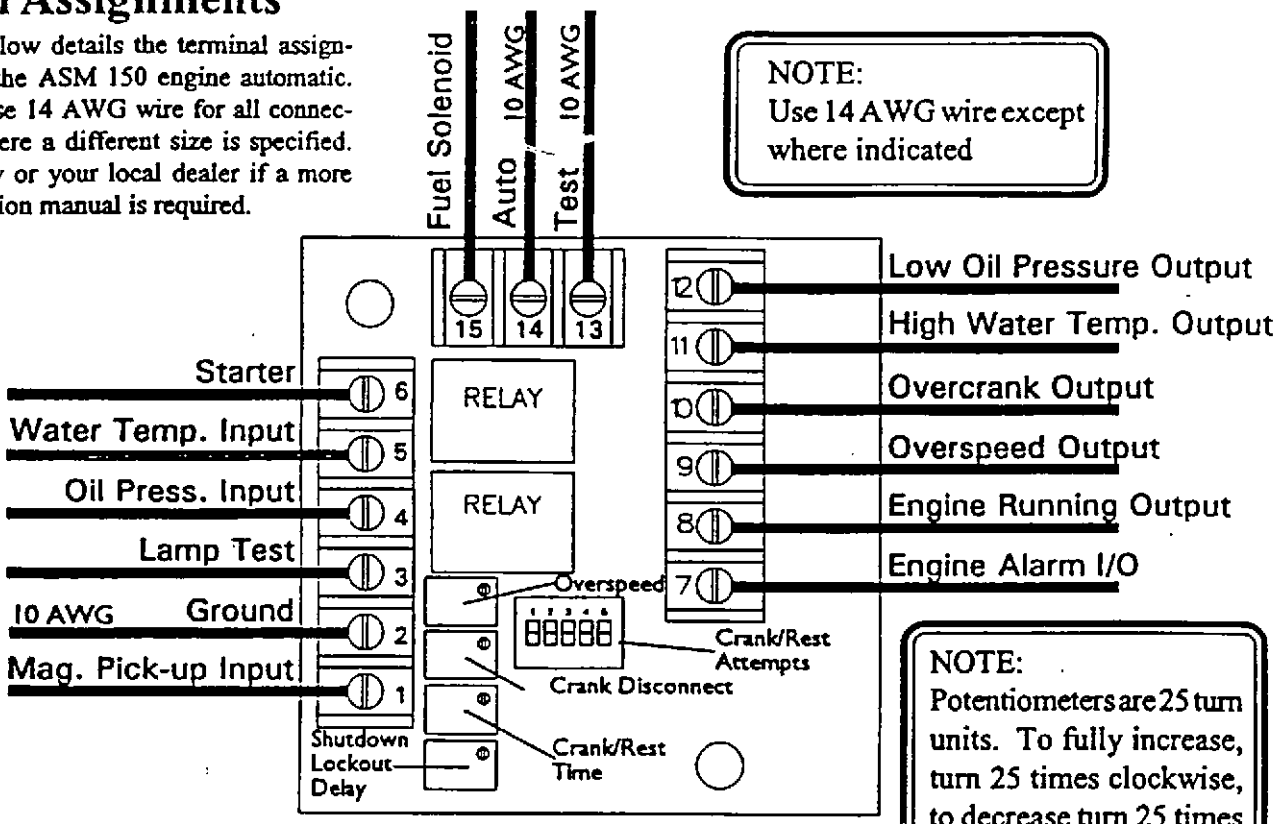
Instruction Manual For the *ASM 150* Automatic Start Module For Engines



Quick Reference Instruction Sheet For The Murphy ASM 150 Auto Start Module

Terminal Assignments

The drawing below details the terminal assignments used on the ASM 150 engine automatic. Remember to use 14 AWG wire for all connections except where a different size is specified. Contact Murphy or your local dealer if a more detailed instruction manual is required.



NOTE:
Use 14 AWG wire except where indicated

NOTE:
Potentiometers are 25 turn units. To fully increase, turn 25 times clockwise, to decrease turn 25 times counter-clockwise.

Basic Operating Instructions

After wiring to your unit, referring to the terminal assignment diagram above, you must adjust the setpoints for optimal operation. The factory presets are as follows: OVERSPEED - 3750 Hz, CRANK DISCONNECT - 600 Hz, CRANK/REST - 10 Seconds, SHUTDOWN LOCKOUT DELAY - 25 Seconds, CRANKING ATTEMPTS - 5 cranks. To increase the settings on the potentiometers, turn them clockwise, counterclockwise to decrease. In order to set your CRANK DISCONNECT speed, you must adjust the potentiometer so that the ASM 150 will release the starter just as the engine begins to run. When setting the OVERSPEED, run the engine up to its maximum speed and turn the pot counterclockwise until the engine shuts down. Now turn the pot two turns clockwise so the setting will be slightly higher than your maximum operating speed. The SHUTDOWN LOCKOUT DELAY is adjustable between 0 and 25 seconds and locks out the Pressure and Temperature faults when the engine is first started. If the engine False Starts, the ASM 150 will RE-CRANK the engine. When setting the cranking attempts, refer to the chart below.

NOTE: The values in the chart below are true only with SW4 in the **OFF** position. If SW4 is in the **ON** position, there will be only one Cranking Attempt. The length of this attempt is calculated by multiplying the number of cranks (plus one) by the crank/rest time.

Setting The Dip Switch

The chart below shows which combination of switches you must flip in order to get the desired number of cranking attempts.

SW1	OFF	OFF	ON	ON	OFF	OFF	ON	ON
SW2	OFF	ON	OFF	ON	OFF	ON	OFF	ON
SW3	OFF	OFF	OFF	OFF	ON	ON	ON	ON
ATTEMPTS	1	2	3	4	5	6	7	8

INSTALLATION GUIDE FOR THE *ASM 150* MURPHYMATIC® MICRO-CONTROLLER

INTRODUCTION

The *ASM 150* is designed to give you years of dependable service and to provide the flexibility available only through microprocessor technology. The first step to insure maximum performance is careful attention during installation. The following guide will help you avoid common installation problems. Follow these suggestions and the drawings supplied with your controller explicitly. Help is available from our engineering department, if necessary: Call Murphy direct at (805) 272-4700.

CAUTION

The *ASM 150* is a pilot duty device. The outputs are designed for control only. Any load connected to the panel which draws current in excess of 5 amperes MUST be piloted at the load.

1. Wire type and size are shown on the Field Wiring drawing located at the end of the manual. Follow the suggested wire sizes (14 AWG in most cases) and use **stranded** wire, if at all possible. Solid wire transmits vibration directly to the terminal block screws and causes them to loosen with time. Also, solid wire is more likely to crystallize and break when it is subjected to movement.

2. **The wires supplying the DC control power to the panel should be run directly from the battery posts to the panel with no other connections or splices**. The Field Wiring drawing should show the recommended wire size of 10 AWG for these connections.

3. If a standby battery charger is installed, it must be wired directly to the battery, **not** to the battery connections on the *ASM 150*. Wiring the battery charger output to the panel could cause electronic "noise" produced by the charger to be coupled into the microprocessor. If the "noise" is severe, erratic operation could occur.

4. Electrical codes prohibit the running of low voltage DC (battery) control wiring in the same conduit as high voltage AC wiring for safety reasons. It is particularly important to separate the AC and DC when making connections to your *ASM 150*. To prevent the coupling of AC signals into the control circuits, run separate conduits - **never** run AC and DC handling wiring together.

5. The control relays are designed for 12/24 VDC system only. **Never** connect HIGH VOLTAGE circuits directly to the *ASM 150*.

6. We recommend that shielded wiring be used for connecting the magnetic pickup to the panel to prevent signal loss and the possible coupling of electrical interference into the relatively sensitive, speed sensing circuit. The shield should only be grounded on one end.

7. It is important that you place transient suppression diodes across inductive loads such as solenoid valves, relays and operators. This will increase contact life and eliminate another source of electrical interference.

OPERATION DIRECTIONS FOR THE *ASM 150* CONTROLLER

OPERATION SEQUENCE WITH PANEL IN "AUTO"

When the *ASM 150* receives an automatic start signal from the remote start contacts, it cranks the engine until CRANK DISCONNECT speed is reached. At this time, the SHUTDOWN LOCKOUT time delay will begin timing, the engine will be brought to full operating speed and the ENGINE RUNNING light will be lit. It will continue to run until it is no longer needed or a malfunction occurs. The SHUTDOWN LOCKOUT DELAY serves a dual purpose. It causes the *ASM 150* to disregard the signals to the OIL PRESSURE and WATER TEMPERATURE terminals at engine start-up. It is also a delay which, if the engine false starts before the delay expires, causes the engine to RE-CRANK after a fixed delay to let the engine stop moving before engaging the starter.

If the engine fails to start after the user adjustable number of crank and rest attempts, the *ASM 150* will annunciate an OVERCRANK condition on the LED's and lockout the engine from any further start attempts. The OVERCRANK condition can be reset by moving the selector switch into the "OFF" position and back into the "AUTO" position.

If the engine speed exceeds the OVERSPEED setpoint (user adjustable), the *ASM 150* will shutdown the engine and annunciate OVERSPEED as the cause of shutdown on the LED's and lockout the engine from any further start attempts. The OVERSPEED condition can be reset by moving the selector switch into the "OFF" position and back into the "AUTO" position.

If a low oil pressure condition occurs while the engine is running, the *ASM 150* will shutdown the engine and annunciate "LOW PRESSURE" on the LED's and lockout the engine from any further start attempts. Please note that the SHUTDOWN LOCKOUT DELAY must have expired to get a shutdown on low oil pressure. This is also reset by moving the selector switch into the "OFF" position and back into the "AUTO" position.

If a high engine temperature condition occurs while the engine is running and after the SHUTDOWN LOCKOUT DELAY has expired, the *ASM 150* will shutdown the engine and annunciate "HIGH TEMPERATURE" on the LED's and lockout the engine from any further start attempts. This is also reset by moving the selector switch into the "OFF" position and back into the "AUTO" position.

OPERATION SEQUENCE WITH PANEL IN "TEST"

When the selector switch is thrown to the "TEST" position, an automatic start signal is simulated. Therefore, the controller will operate the same as it does in "AUTO." However, it will continue to run as long as there are no signals from monitored conditions or until the selector switch is moved to the "AUTO" or "OFF" positions. Keep in mind, it will still shutdown the engine if a monitored condition occurs such as low oil pressure or high temperature.

MAKING ADJUSTMENTS TO THE *ASM 150*

On the back of the *ASM 150*, you will find four (4) potentiometers and a dip switch. These are used to make the adjustments necessary for the *ASM 150* to work optimally in your application. The potentiometers are for CRANK DISCONNECT, OVERSPEED, CRANK/REST TIME, and SHUTDOWN LOCKOUT DELAY. The dip switch is for adjusting the OVERCRANK feature. Refer to

SHUTDOWN LOCKOUT DELAY must be set so the engine oil pressure and coolant temperature can reach normal operating ranges. When starting a cold engine, it takes a few seconds for the oil pressure to build up which would cause the unit to shutdown the engine unnecessarily. This is also true with coolant temperature when starting a hot engine. This delay is adjustable between 1 and 25 seconds and begins timing as soon as CRANK DISCONNECT occurs. To increase the setting, turn the pot clockwise; to decrease the setting, turn the pot counterclockwise.

CRANK/REST TIME

The CRANK/REST TIME refers to the length of time the *ASM 150* will crank the engine and then rest the starter between cranks. This time is adjustable between 4 and 25 seconds. To increase the setting, turn the pot clockwise; to decrease the setting, turn the pot counterclockwise.

OVERCRANK

The *ASM 150* allows you to crank the engine once and signal OVERCRANK if it fails to start or you can configure it to crank the engine several times before it signals OVERCRANK. See the chart for the dip switch settings for the number of cranking attempts you would like to have for your specific application.

If you would like only one crank, flip SW4 to ON. Remember, that by switching SW4 ON, the *ASM 150* will only crank one time. Now, flip SW1 through SW3 to the number you would like to multiply the CRANK/REST TIME by and then add to the CRANK/REST TIME. The formula for calculating your single crank time is below:

Single Crank Time = (Crank/Rest Time X Dip Switch Attempts) + Crank/Rest Time

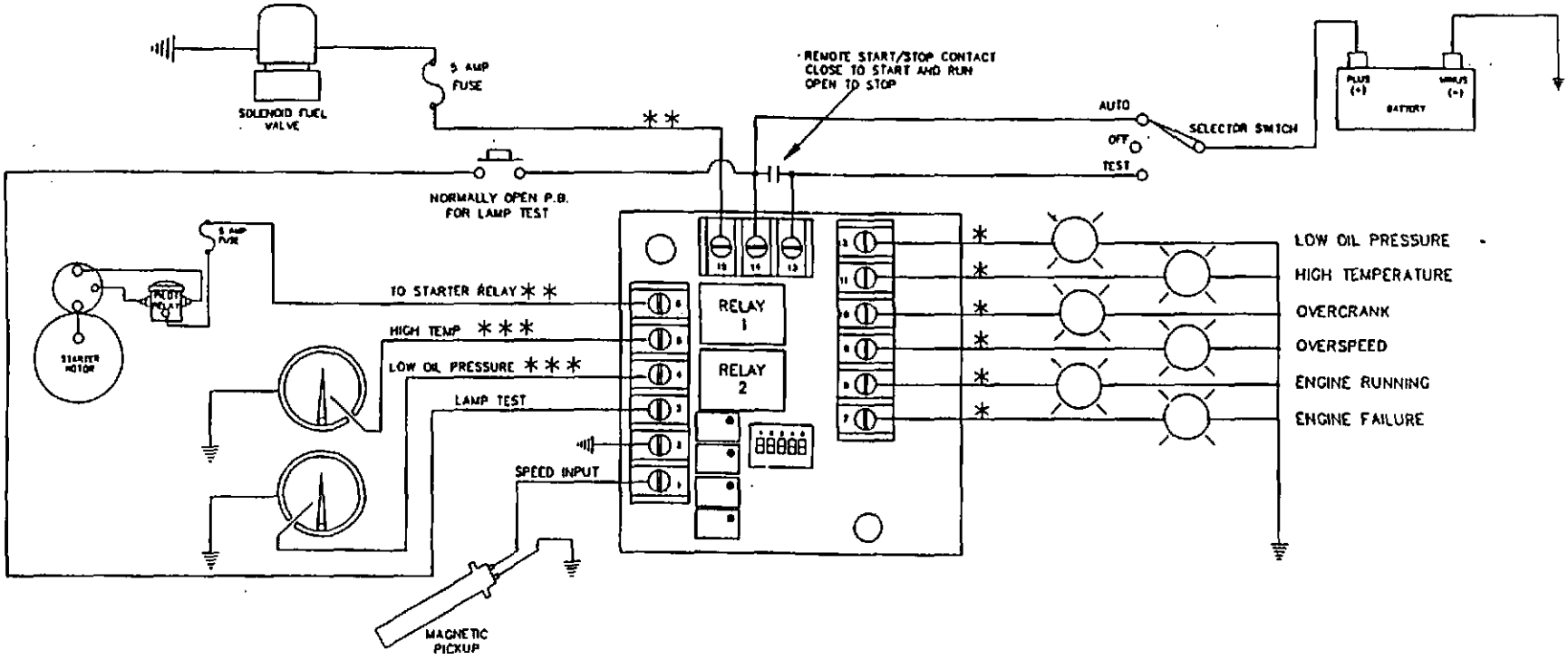
For example, if SW1 through SW3 were all OFF and the CRANK/REST TIME is set to 10 seconds, then the single crank would be 20 seconds because (10 X 1) + 10 = 20. If SW1 through SW3 were all ON and the CRANK/REST TIME is set to 10 seconds, then the single crank would be 90 seconds because (10 X 8) +10 = 90.

You can also achieve a single crank by setting SW1 through SW4 to OFF. However, this single crank can only range between 4 and 25 seconds depending on the setting of the CRANK/REST TIME pot.

If the engine false starts and the *ASM 150* RE-CRANK's the engine, it will count this as a cranking attempt. This way, if the engine false starts the same number of times as your cranking attempts, then the unit will show OVERCRANK.

Please note: SW5 does is not used for any function on the *ASM 150*.

Typical Customer Wiring Schematic

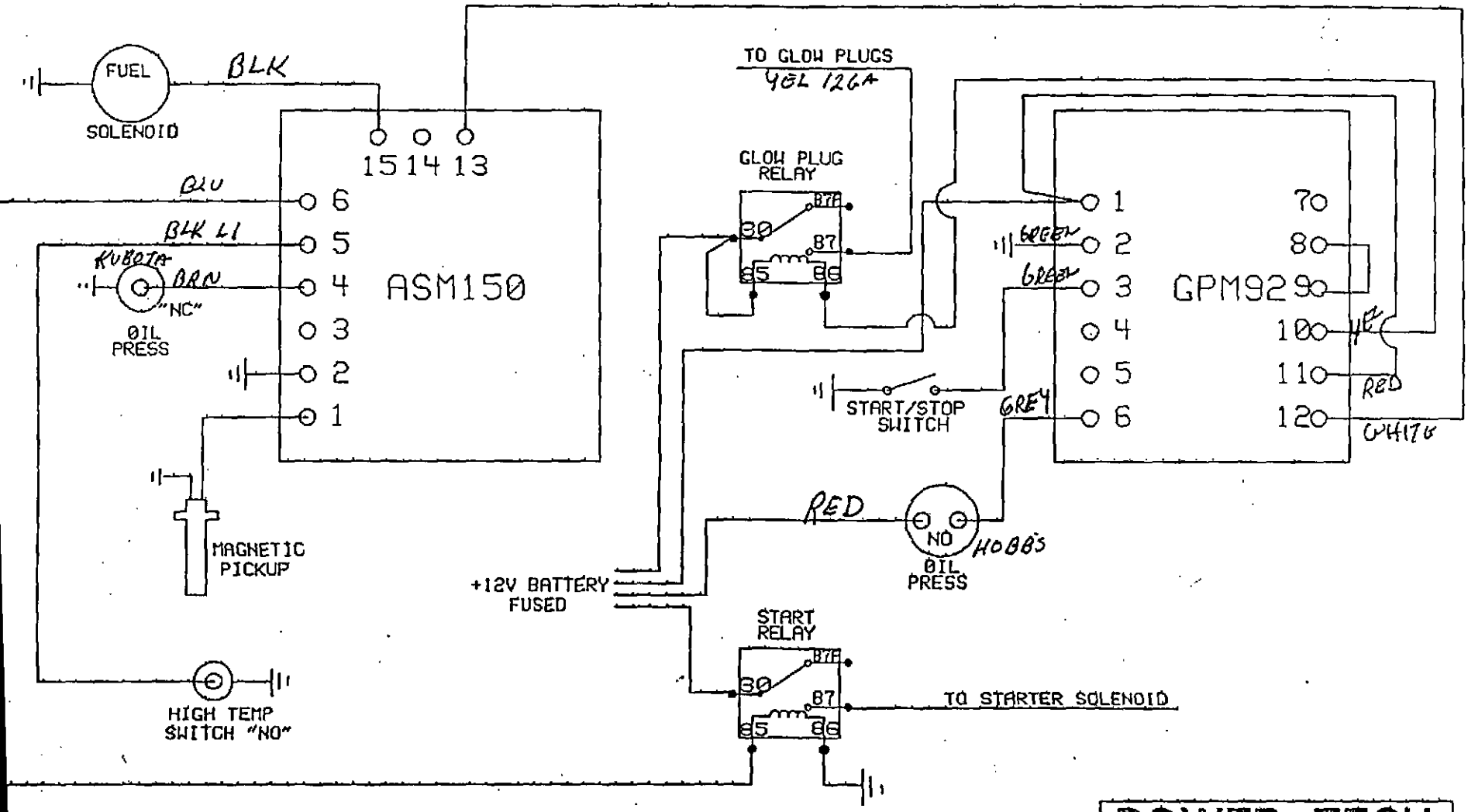


*** tHESE INPUTS MAY BE WIRED TO ACCEPT POSITIVE AND NEGATIVE INPUTS
** LOAD NOT TO EXCEED 5A.
* REMOTE LIGHTS (IF USED). NOT TO EXCEED

REMEMBER TO PLACE DIODES ACROSS INDUCTIVE LOADS

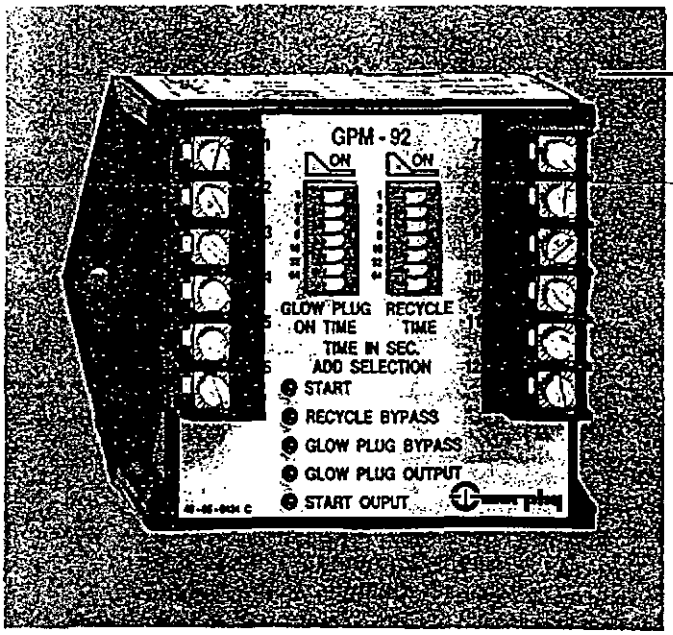
murphy switch of California, Inc.
P.O. BOX 900788
PALMDALE, CA 93590
PHONE: (805) 272-4700

REV.	TITLE	
	CUSTOMER WIRING FOR THE ASM 150 ENGINE AUTOMATIC	
DRAWN RJM	DATE 9/11/91	SCALE NONE	DRAWING NO. S150WIRE.DWG



POWER TECH	
AUTO START	
DATE 1/20/95	SCALE
DR BY JF	WIRDIAAS
POWER TECHNOLOGY SOUTHEAST INC. LEESBURG, FLORIDA 34748	

Glow Plug Control Module



Model GPM-92

- Automates Manual Glow Plug Preheat and Recycling Control in Diesel Engines
- Compatible with Most Murphy Automatic Start/Stop Controllers
- Two Field-Adjustable Time Delays:
  - Timer for Preheating Glow Plugs Before Initiating Start Sequence
  - Recycle Timer-When Engine Fails to Start on First Attempt
- Preheat Bypass Circuit for Warm Weather
- LED's to Assist with Sequence of Operations

Description

The GPM-92 is a solid-state delay module for automating the glow plug preheating and recycling process in diesel engines with automatic start controls.

The start signal is connected to the GPM-92 allowing the glow plugs to be preheated before the starter is engaged.

The GPM-92 is designed to operate from either a maintained close to run, open to stop signal or a momentary close to run, momentary close to stop type circuit. The auto start controller must be configured to operate from a maintained close to run signal.

The module includes two adjustable time delays, one for glow plug preheating time and the other to allow the auto start module to crank the engine and start it.

If the engine fails to start before the recycle time delay expires, the GPM-92 recycles for the full time set on the glow plug delay timer. It then signals the auto start controller to initiate a new cranking cycle until the engine starts.

One bypass circuit overrides glow plug preheat time with a glow plug ready signal and controls the length of the glow plug heating cycle.

A second bypass circuit is provided to turn off the glow plugs when the engine starts.

The preheat is locked out, and the start signal is locked into the auto start controller until a stop signal is received. This circuit can also be used with an external summer/winter switch to bypass the preheat system during warm weather when preheating is not required.

The GPM-92 requires an external relay to handle the high current to the glow plugs.

Application

The GPM-92 is intended for use on all diesel engines that require glow plug or flame type preheat and are equipped with automatic start-stop controls. The GPM-92 is ideal for Murphy Automatic Start Controllers which do not include glow plug control provisions or other cold weather starting aids.

Features

- Solid State Control Module
- Easy DIP Switch Programming
- 5 LED Signal Indicators for:
  - Start *(GPM-92 receives start signal.)*
  - Recycle Bypass *(Recycle bypass input received/engine running.)*
  - Glow Plug Bypass *(Bypass input circuit has closed.)*
  - Glow Plug Output *(Relay energized for heating glow plug.)*
  - Start Output *(Preheat cycle completed.)*
- Quick Connect Terminal Blocks
- Compact Design

Specifications

Power Requirements:

Voltage: *8-30 VDC.*

Current: *30 mA maximum @ 30 VDC.*

Input Polarity: *negative ground.*

Signal Inputs:

Start: *Single pole, single throw (SPST) maintained, close to negative to run, open to stop or 2 SPST momentary, close to negative to start and close to negative to stop.*

Glow Plug Time Delay Bypass: *SPST maintained, close to positive to bypass.*

Recycle Time Delay Bypass: *SPST maintained, close to negative to bypass or SPST maintained, close to positive to bypass.*

Output:

Glow Plug Relay: *Transistor, sinks to negative, 1 A @ 30 VDC.*

Start: *Dry relay contact, 2 A @ 30 VDC.*

NOTE: A customer-supplied relay for glow plugs is required.

Glow Plug Timer: *Adjustable from 1-127 seconds; 7-element binary DIP switch.*

Recycle Timer: *Adjustable from 1-127 seconds; 7-element binary DIP switch.*

Temperature Range: -4 to 185°F (-20 to 85°C).

Case: ABS Plastic Housing

Shipping Weight: 0.488 lb. (0.221 kg).

Shipping Dimensions: 4-3/4 x 4-3/4 x 3-1/8 in. (121 x 121 x 79 mm).

Model ASM 150
Automatic Start Module
Quick Reference Instruction Sheet

ASM150-I.PM5
REVISION D: 3-94

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GENERAL INFORMATION

WARNING

BEFORE BEGINNING INSTALLATION OF THIS MURPHY PRODUCT

- ✔ Disconnect all electrical power to the machine.
- ✔ Make sure the machine cannot operate during installation.
- ✔ Follow all safety warnings of the machine manufacturer.
- ✔ Read and follow all installation instructions.

Installation Accessories

Hardware, tools, and optional equipment needed to install the model ASM 150.

- Tools as needed for the system mounting, such as drill and screw driver.
- 10 and 14 ga. wire for hook up:
- Set of wire terminating tools.
- Wire termination; such as spade terminals.

DESCRIPTION

The ASM 150 Auto Start Module is a compact engine controller. It's main use is for automatic engine start of generators and other simple automatic start applications.

BASIC OPERATING INSTRUCTIONS

After wiring to your unit, referring to the terminal assignment diagram, you must adjust the setpoints for optimal operation. The factory presets are as follows: OVERSPEED - 3750 Hz, CRANK DISCONNECT - 600 Hz, CRANK/REST - 10 Seconds, SHUTDOWN LOCKOUT DELAY - 25 Seconds, CRANKING ATTEMPTS - 5 cranks. To fully increase a pot setting, turn it clockwise 25 turns. To fully decrease a pot setting, turn it counterclockwise 25 turns.

In order to set your CRANK DISCONNECT speed, you must adjust the potentiometer so that the ASM 150 will release the starter just as the engine begins to run. When setting the OVERSPEED, run the engine up to its maximum speed and turn the pot counterclockwise until the engine shuts down. Now turn the pot two turns clockwise so the setting will be slightly higher than your maximum operating speed. Remember to turn the pots slowly when making adjustments. The LOCKOUT DELAY is adjustable between 0 and 25 seconds and locks out the Pressure and Temperature shutdowns when the engine is first started. If the engine False Starts, the ASM 150 will RE-CRANK the engine.

SETTING THE DIP SWITCH (CRANK ATTEMPTS)

The following chart shows which combination of switches you must flip in order to get the desired number of cranking attempts. Please note, Switch 5 is not used for any function and the values in the chart below are true only with SW4 in the OFF position. If SW4 is in the ON position, there will be only one Crank Attempt. The length of this attempt is calculated by multiplying the number of cranks (plus one) by the crank/rest time.

Crank Attempts	Switch 1	Switch 2	Switch 3
1	OFF	OFF	OFF
2	OFF	ON	OFF
3	ON	OFF	OFF
4	ON	ON	OFF
5	OFF	OFF	ON
6	OFF	ON	ON
7	ON	OFF	ON
8	ON	ON	ON

WIRING TO ASM 150

When wiring to the ASM 150, use 14 AWG wire except to 13, 14, and 2. These are the power handling connections and larger wires help to carry the necessary power to the unit during an engine start. Demand on the batteries is highest during cranking and can lead to system resets if the unit loses voltage during cranking.

When hooking the battery plus and ground wires to the unit, run them directly from the battery to the ASM 150. This will help reduce electrical noise coupling and avoid voltage losses from other devices. Refer to the back side of this document for a typical wiring diagram.

Also, use shielded cable for connecting the magnetic pickup to the ASM 150. Ground only one end of the shield. It is usually most convenient to ground it at the engine.