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## INSTALLATION INSTRUCTIONS

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Original Issue Date: **12/04**
Model: **RDT/HDT Automatic Transfer Switches**
Market: **ATS**
Subject: **Programmable Exerciser GM38798-KA1, -KA2, -KP1, and -KP2**

## Introduction

Use the Programmable Exerciser Kit with Model RDT or HDT transfer switches. Use the programmable exerciser to schedule generator set exercise runs in addition to the weekly or biweekly exercise set through the ATS controls. The programmable exerciser can also be used for peak shaving by scheduling the system to transfer the load to the generator set at times when utility rates are high.

Figure 1 shows the programmable exerciser with its clear plastic dust cover.

Optional Accessory Board GM38796-KA1 or -KP1 is required for connection and operation of the programmable exerciser. The Programmable Exerciser mounts on a bracket inside the transfer switch enclosure.

Check the input and output ratings marked on the unit to make sure this product is suitable for your power supply and application.

The installation and wiring must comply with the National Electrical Code and applicable local codes.

The Programmable Exerciser is programmable for 24-hour or 7-day schedules. Follow the instructions in this document to install (if not factory-installed) and program the exerciser.



**Figure 1**   Programmable Exerciser

| Programmable Exerciser Specifications | |
|---|---|
| Output | 1 SPDT relay with dry contacts |
| Switch rating | 16A 277VAC resistive |
| Supply voltage | 208/240VAC, 50/60Hz ; 100 hour capacitor backup of memory and display |
| Power required | 4VA |
| Ambient temperature range | −28°C to 60°C (−20°F to 140°F) |
| Connection | 1/4 in. quick connects 10 – 24 AWG |
| Accuracy | ±4 minutes per year |
| Shortest switch time | 1 minute |

## Safety Precautions

Observe the following safety precautions while installing the kit.

**⚠ WARNING**
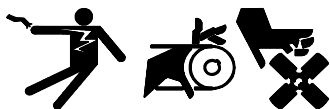
**Accidental starting.**
**Can cause severe injury or death.**

Disconnect the battery cables before working on the generator set. Remove the negative (−) lead first when disconnecting the battery. Reconnect the negative (−) lead last when reconnecting the battery.

**Disabling the generator set. Accidental starting can cause severe injury or death.** Before working on the generator set or connected equipment, disable the generator set as follows: (1) Move the generator set master switch to the OFF position. (2) Disconnect the power to the battery charger. (3) Remove the battery cables, negative (−) lead first. Reconnect the negative (−) lead last when reconnecting the battery. Follow these precautions to prevent starting of the generator set by an automatic transfer switch, remote start/stop switch, or engine start command from a remote computer.

**⚠ DANGER**

**Hazardous voltage.**
**Will cause severe injury or death.**

Disconnect all power sources before opening the enclosure.

**⚠ DANGER**

**Hazardous voltage.**
**Will cause severe injury or death.**

Only authorized personnel should open the enclosure.

**Short circuits. Hazardous voltage/current can cause severe injury or death.** Short circuits can cause bodily injury and/or equipment damage. Do not contact electrical connections with tools or jewelry while making adjustments or repairs. Remove all jewelry before servicing the equipment.

## Installation Procedure

For installed kits (GM38798-KA1 and -KA2), start with the ATS Setup section and then proceed to the programming instructions.

1. Disable the generator set to prevent accidental starting:

    a. Disconnect power to the battery charger, if equipped.

    b. Disconnect the generator set engine starting battery, negative (−) lead first.

2. Disconnect power to the transfer switch before opening the ATS enclosure.

### Mounting

Mount the programmable exerciser on the bracket provided with the kit as shown in Figure 3.

1. Install the mounting bracket as shown in Figure 3.

2. Insert the exerciser through the opening in the bracket. With a screwdriver, press down and turn the outer screws until the flanges are in position to fasten the unit in the bracket, then release.

3. Insert plugs into the unused holes. See Figure 2.

### Wiring

Wiring must comply with the National Electrical Code and applicable local codes.

**Note:** Check that the supply voltage matches the voltage marked on the unit. Wiring to incorrect voltage will void the warranty.

1. Verify that power has been disconnected as described above.

2. Use the leads supplied with the kit to connect the exerciser according to the wiring diagram in Figure 4.
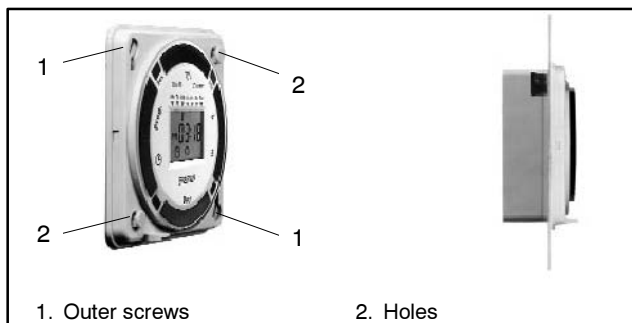


1. Outer screws                    2. Holes
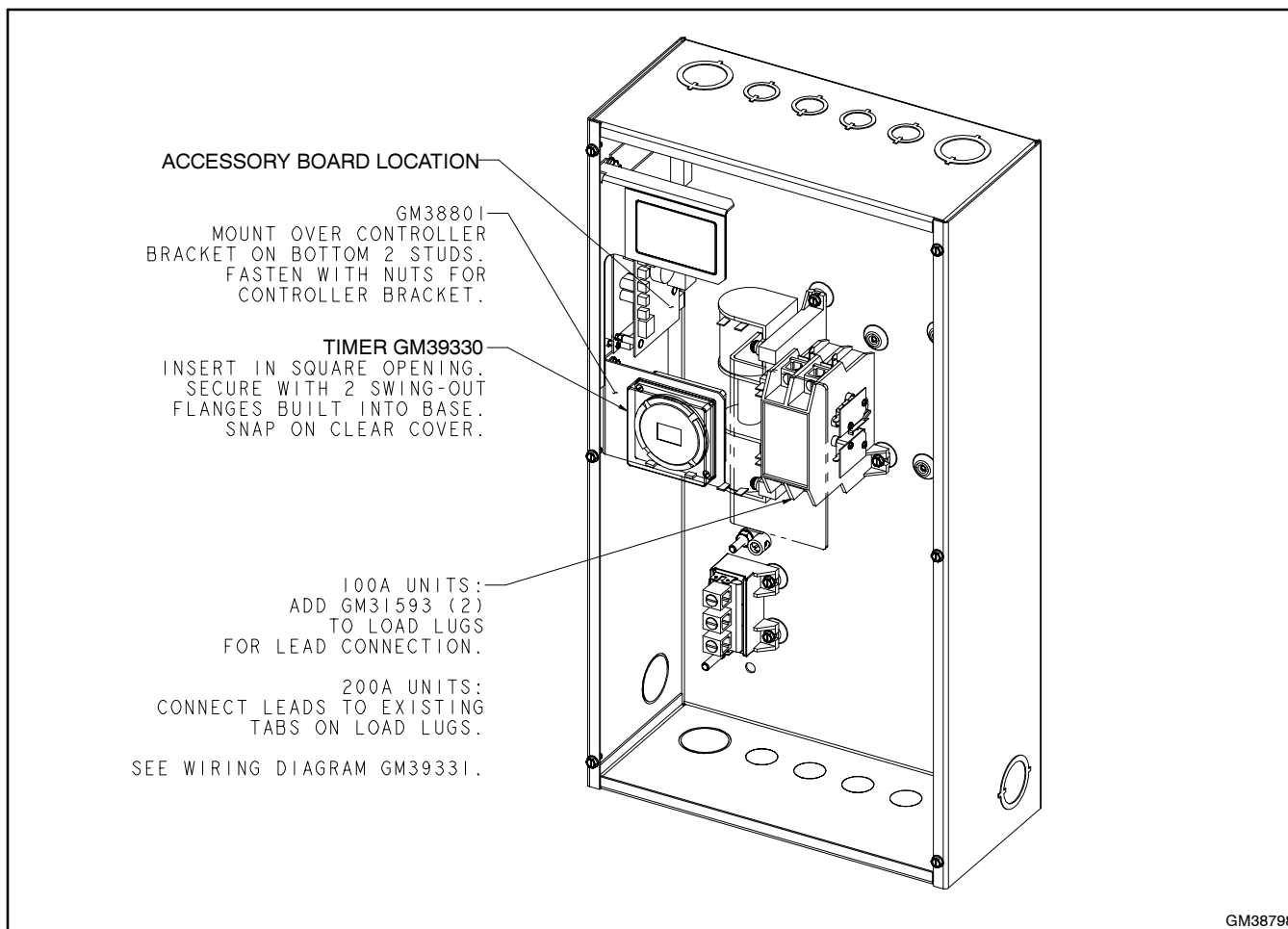
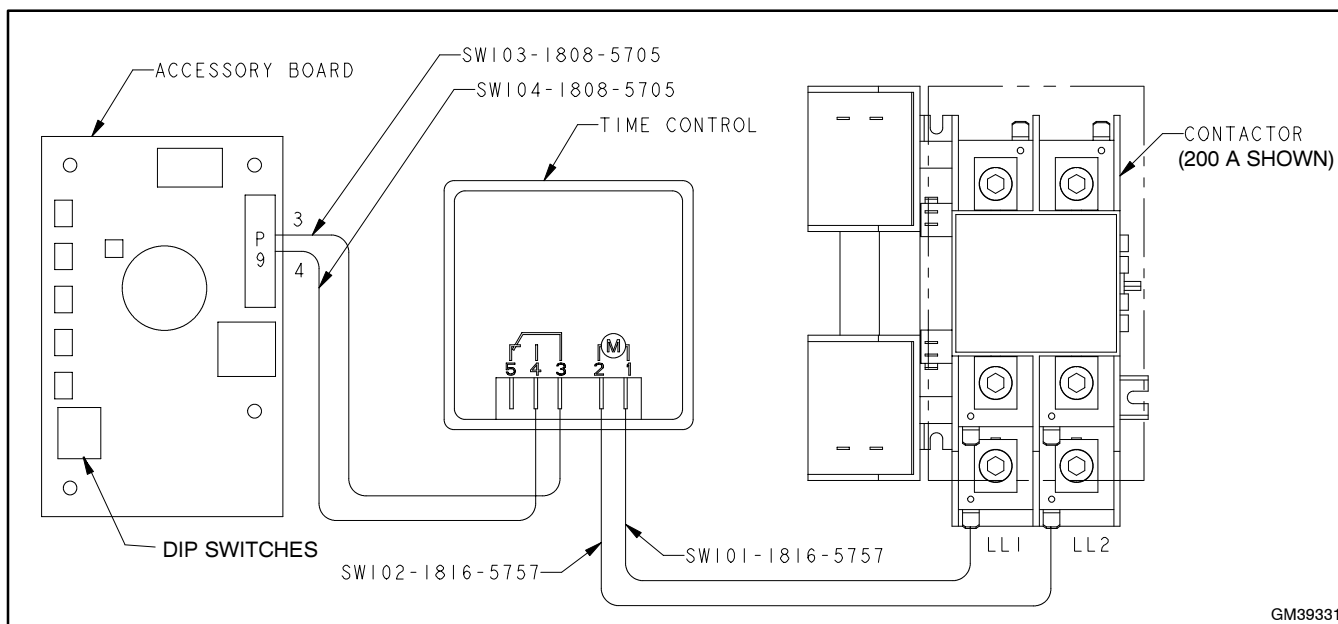**Figure 2**   Mounting Flanges

**Figure 3** Mounting



**Figure 4** Wiring Diagram

## ATS Setup

Set DIP switch #2 on the Accessory Board to select loaded or unloaded programmed exercise runs. See Figure 3 and Figure 4 for the location of the DIP switches on the accessory board.

● Set DIP switch #2 to the OFF position to run the generator set without transferring the load. See Figure 5, or

● Set DIP switch #2 to the ON position to start the generator set and transfer the load during programmed exercise runs. For peak shave applications, set the DIP switch to the ON position.

DIP switch #2 does not affect the exercise period that is set by pressing the Exercise button on the ATS controller.

| DIP Switch | | OFF (open) | ON (closed) |
|---|---|---|---|
| 2 | Loaded Exercise | Unloaded | Loaded |

**Figure 5**  Accessory Board DIP Switch Setting

## Operating Instructions
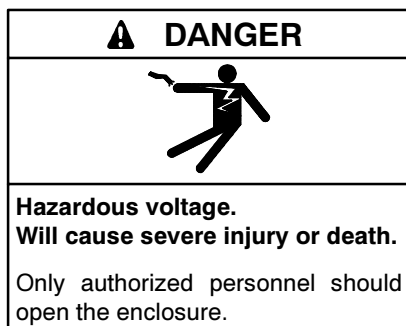


⚠ **DANGER**

**Hazardous voltage.**
**Will cause severe injury or death.**

Only authorized personnel should open the enclosure.

**Short circuits. Hazardous voltage/current can cause severe injury or death.** Short circuits can cause bodily injury and/or equipment damage. Do not contact electrical connections with tools or jewelry while making adjustments or repairs. Remove all jewelry before servicing the equipment.

The programmable exerciser must have power connected in order to set the time and program the unit.

1. Install the transfer switch enclosure door(s).

2. Reconnect power to the transfer switch.

3. Reconnect the generator set engine starting battery, negative (–) lead last.

4. Reconnect power to the battery charger, if equipped.

5. Remove the transfer switch enclosure door(s) to access the programmable exerciser. Do not contact electrical connections when programming the exerciser.

## Key Description

See Figure 1 for key locations and Figure 6 for descriptions of the keys.

| Key | Description |
|---|---|
| 🕐 | Setting the Time/Automatic Run Mode Prog. |
| Prog. | Program Mode |
| Res.* | Reset: Clears all programs and time Select ON or OFF in Prog. Mode, Manual Override in Run Mode |
| ✋ | Select ON or OFF in Prog. Mode, Manual Override in Run Mode |
| ±1h* | Manual Daylight Change Key |
| h | Setting the Hour (12:– – AM) |
| m | Setting the Minute (12:01 AM) |
| Day | Set Day(s) for time and programs |
| * Recessed keys; use a pen point to press. | |

**Figure 6**  Key Description

## LCD Display Elements

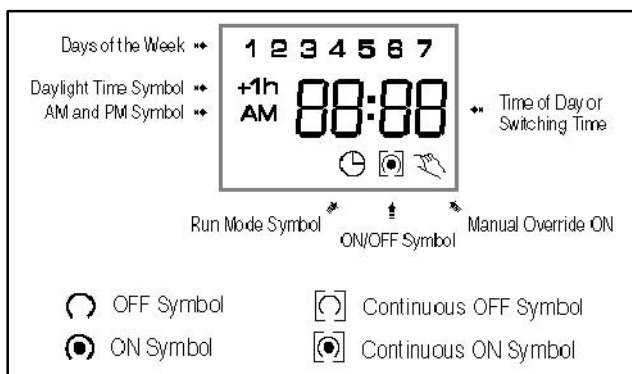The LCD incorporates a number of different elements to display various data and information. See Figure 7.



**Figure 7**  LCD Display

## Selecting AM/PM or Military Time

**Note:** Before proceeding with setting the time and programming the unit, press the reset key to clear all data from the memory.

After pressing reset, the display may show AM (right). The numbered day symbols will be flashing on and off. If the display does not show AM, it is in military time mode

(00:00 to 23:59). To change to AM/PM mode, press and hold the **h** key and press the **±1h** key once. AM will appear in display. If display is in AM mode and military mode is desired, press and hold the **h** key, press the **±1h** key once.
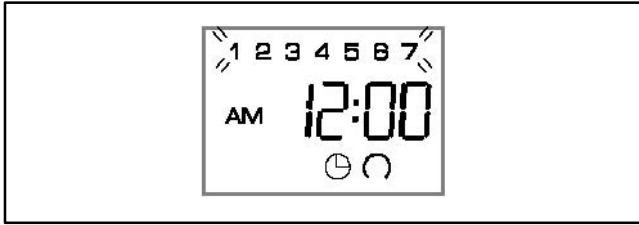


**Figure 8** Time Display

## Setting the Time

**Note:** If the **h** and **m** keys are held down longer than 2 seconds, the numbers will advance rapidly.

Press and hold the ⊕ key during the following: (If daylight savings time is in effect, press **±1h** first).

1. Press **h** to advance to the current hour (while holding down the ⊕ key).

2. Press **m** to advance to the current minute (while holding down the ⊕ key).

3. Press **Day** repeatedly to advance to current day (while holding down the ⊕ key).

## Manual Daylight Time Changeover

Each year, in the Spring, press **±1h** to advance the time an hour. In the Fall, press **±1h** to set back an hour.

# Programs

The Programmable Exerciser will accept up to 20 programs. A program consists of:

● An ON or OFF command

● Time of day (hour and minute)

● Single day or multiple days

Each exercise period requires two programs: one ON command to start the generator set, and a separate OFF command to stop the generator set.

**Note:** Do not program an ON command without also programming an OFF command.

A programmed OFF command will not transfer the load or shut down the generator set if the utility (normal) power is not available.

Multiple on or off events may be programmed. For example, Program 1 may turn the generator set ON at 10:00 PM Mon.–Fri. Program 2 may turn the generator set OFF at 10:30 PM Mon.–Fri.

**Loaded/unloaded exercise:** The setting of DIP switch #2 on the Accessory Board determines whether the load is transferred to the generator set during the programmed exercise runs. See ATS Setup.

**Note:** An exercise period that is scheduled by pressing the Exercise button on the ATS controller is not affected by the programmable exerciser or the DIP switch setting.

When programming is complete, snap the clear plastic cover over the exerciser. Replace the transfer switch enclosure door(s).

## Programming 24 Hour or 7 Day Schedules

It is helpful to write out the program schedules before beginning. See Figure 10 on the last page.

The current time of day and day of week must be set before programming. See Setting the Time.

**Note:** If the days are flashing, it indicates the day of the week was not set when setting the time. The timer cannot be programmed unless the day of the week is entered.

The following example demonstrates how to program different on and off times. Typically, the generator set should be exercised once a week.

**EXAMPLE:**
Program 1: ON at 1:00 AM Monday thru Saturday
Program 2: OFF at 1:30 AM Monday thru Friday
Program 3: OFF at 2:00 AM Saturday
Three programs need to be entered.

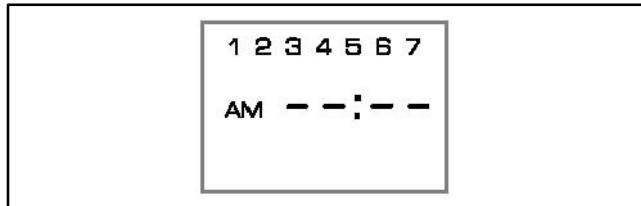Press the **Prog.** key only once. The display appears as shown in Figure 9.

```
  1 2 3 4 5 6 7

AM  — —:— —
```

**Figure 9**   Display after **Prog.** Key is Pressed

Program 1 (ON at 1:00 AM Monday thru Saturday):

| | |
|---|---|
| Press ✎ key once | ON symbol ◉ appears |
| Press **h** key | to 01AM |
| Press **m** key once | to 00 |
| Press **Day** key once | 1 2 3 4 5 6 is displayed |
| Press **Prog.** key to enter | |

Program 2 (OFF at 1:30 AM Monday thru Friday):

| | |
|---|---|
| Press ✎ key twice | OFF symbol ◠ appears |
| Press **h** key | to 01AM |
| Press **m** key | to 30 |
| Press **Day** key two times | 1 2 3 4 5 is displayed |
| Press **Prog.** key to enter | |

Program 3 (OFF at 2:00 AM Saturday):

| | |
|---|---|
| Press ✎ key twice | OFF symbol ◠ appears |
| Press **h** key | to 02AM |
| Press **m** key once | to 00 |
| Press **Day** key 9 times | until only 6 is displayed |
| Press **Prog.** key to enter | |
| Press ◷ key to enter | |

**Note:** If the programmed ON time is earlier in the day than the current time, press ✎ once to turn the timer on. The timer does not look back to determine if it should be on or off after programming.

**Note:** If 24 hour time control (same schedule every day of the week) is desired, ignore the the **Day** key.

**Note:** If an ON or OFF symbol is not entered, the ON symbol will flash, and the program will not be accepted.

## Day Key Selections

| Press Day Key | Display Shows | Days |
|---|---|---|
| 0 times | 1 2 3 4 5 6 7 | Every day |
| 1 time | 1 2 3 4 5 6 | Monday–Saturday |
| 2 times | 1 2 3 4 5 | Monday–Friday |
| 3 times | 6 7 | Saturday and Sunday |
| 4 times | 1 | Monday |
| 5 times | 2 | Tuesday |
| 6 times | 3 | Wednesday |
| 7 times | 4 | Thursday |
| 8 times | 5 | Friday |
| 9 times | 6 | Saturday |
| 10 times | 7 | Sunday |

## Reviewing Programs

To review the programs at any time, press **Prog.** key. Programs will appear in the order they were entered with repeated presses of the **Prog.** key. After all programs have been reviewed, the blank display will appear to allow entering another program. Another press of the **Prog.** key will display the number of free programs available, such as **Fr 16** if 4 programs have been entered.

## Changing A Program

Select the program to be changed with the **Prog.** key. A new set of days may be selected with the **Day** key just as in initial programming. Hour and minute can be changed with the **h** and **m** keys. Press **Prog.** or ◷ key to store the new program.

## Deleting A Program

To delete only one or a few programs:

1. Press **Prog.** key until the desired program is displayed.

2. Press **m** key to **:59** and press once more to blank out.

3. Press **h** key to **11PM** and press once more to blank out.

4. Press ◷ key. Display will flash for several seconds and then enter the Run Mode.

**Note:** Using the reset key will delete ALL programs, the time of day, and day of the week.

# Manual Override

## Temporary Override

While in the Run Mode, pressing the ✎ key once will reverse the output; ON to OFF or OFF to ON. The ✎ symbol appears in the display to indicate a temporary override. At the next scheduled switching time, automatic control resumes, eliminating the override.

Pressing the override key will turn the generator set on at unprogrammed times. Be sure to press the override key again to turn the generator set off.

**Note:** If the override key is not pressed a second time to turn the unit off, the generator set will run until the next programmed OFF event.

## Continuous Override

While in the Run Mode:

- Pressing the ✎ key twice will turn the output to ON permanently. [⊙] symbol appears in display.

- Pressing the ✎ key three times will turn the output OFF permanently. [◠] symbol appears in display.

- To terminate a continuous override, press the ✎ key until ☉ appears in the display.

# Troubleshooting

**PROBLEM:** Days are flashing, pressing ✎ key turns output ON and OFF, and pressing any other key does nothing.

**SOLUTION:** *Time of Day* and *Day of Week* have not been set. See *Setting the Time.*

This is the condition after a reset. If the timer is found in this condition after it has been installed, programmed and operating for a while, it may indicate that electrical noise or voltage transients have disrupted the microprocessor causing a loss of program information. Contact the factory if the problem persists.

A second but unlikely cause of program loss is a power failure with the backup capacitor low or dead. Check by disconnecting power and monitoring how long the capacitor keeps the time of day in the display. Typically, the capacitor will maintain the time and programs for 4 days, but not more than 5 days.

**PROBLEM:** Time of day was set while holding the ☉ key down, but days are still flashing.

**SOLUTION:** Current day of week was not set while holding down the ☉ key. See *Setting the Time.*

**PROBLEM:** It is 10:00 AM and an ON program for 8:00 AM was entered, but the output is not ON. Display shows the ☉ and ◠ symbols.

**SOLUTION:** After programming, the timer does not look back to determine if it should be ON. Press the ✎ key (temporary override) to turn the output ON; ✎ ⊙ appears in display. The timer will assume automatic operation at the next programmed event.

**PROBLEM:** A program for 8:00 AM Monday thru Friday was entered, but it will not accept it and ⊙ is flashing.

**SOLUTION:** ON ⊙ or OFF ◠ was not entered as part of the program. ON or OFF must be selected.

| Prog | On/Off | h | m | Day(s) |
|------|--------|------|----|------------------------------------|
| 1 | On | 7 am | 20 | Mon., Tue., Wed., Thurs., Fri. |
| | | | | |
| | | | | |
| | | | | |
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**Figure 10** Programming Worksheet

# Parts Lists

**Exerciser, Programmable 100A**

| Kit: GM38798-KA1, -KP1 | | |
|------|-------------------------------|------------------|
| **Qty.** | **Description** | **Part Number** |
| 1 | Timer | GM39330 |
| 2 | Terminal, ATS Lug Sensing | GM31593 |
| 1 | Bracket, Timer Mounting | GM38801 |
| 1 | Diagram, Wiring | GM39331 |
| 1 | Lead | SW101–1816–5757 |
| 1 | Lead | SW102–1816–5757 |
| 1 | Lead | SW103–1808–5705 |
| 1 | Lead | SW104–1808–5705 |

**Exerciser, Programmable 200A**

| Kit: GM38798-KA2, -KP2 | | |
|------|-------------------------------|------------------|
| **Qty.** | **Description** | **Part Number** |
| 1 | Timer | GM39330 |
| 1 | Bracket, Timer Mounting | GM38801 |
| 1 | Diagram, Wiring | GM39331 |
| 1 | Lead | SW101–1816–5757 |
| 1 | Lead | SW102–1816–5757 |
| 1 | Lead | SW103–1808–5705 |
| 1 | Lead | SW104–1808–5705 |