# OPERATOR'S MANUAL

DieHard®

## 12V Battery Charger & Engine Starter


**Model No.**
**28 71222**

**⚠CAUTION**

**Read and follow all Safety Rules and Operating Instructions before Every Use of this Product.**

**SAVE THESE INSTRUCTIONS.**

**Sears Brands Management Corporation, Hoffman Estates, IL 60179 U.S.A.**

0099001078-03

**DIEHARD THREE-YEAR FULL WARRANTY**

When operated and maintained according to all supplied instructions, if this DieHard product fails due to a defect in material or workmanship within 3 years from the date of purchase, return it to any DieHard outlet in the United States for free replacement.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Sears Brands Management Corporation, Hoffman Estates, IL 60179

**FOR CUSTOMER ASSISTANCE OR REPLACEMENT PARTS,**
**CALL TOLL-FREE FROM 7 AM TO 5 PM CT**
**MONDAY THROUGH FRIDAY: 1-800-732-7764**

**IMPORTANT: READ AND SAVE THIS SAFETY AND INSTRUCTION MANUAL.**

**SAVE THESE INSTRUCTIONS –** This manual will show you how to use your charger safely and effectively. Please read, understand and follow these instructions and precautions carefully, as this manual contains important safety and operating instructions. The safety messages used throughout this manual contain a signal word.

The signal word indicates the level of the hazard in a situation.

**⚠DANGER** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury to the operator or bystanders.

**⚠WARNING** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to the operator or bystanders.

**⚠CAUTION** Indicates a potentially hazardous situation which, if not avoided, could result in moderate or minor injury to the operator or bystanders.

**IMPORTANT** Indicates a potentially hazardous situation which, if not avoided, could result in damage to the equipment or vehicle or property damage.

**⚠WARNING**

Pursuant to California Proposition 65, this product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

**1. IMPORTANT SAFETY INSTRUCTIONS – SAVE THESE INSTRUCTIONS.**
This manual contains important safety and operating instructions.


**RISK OF ELECTRIC SHOCK OR FIRE.**

**1.1** Keep out of reach of children.

**1.2** Do not expose the charger to rain or snow.

**1.3** Use only recommended attachments. Use of an attachment not recommended or sold by the battery charger manufacturer may result in a risk of fire, electric shock or injury to persons or damage to property.

**1.4** To reduce the risk of damage to the electric plug or cord, pull by the plug rather than the cord when disconnecting the charger.

**1.5** An extension cord should not be used unless absolutely necessary. Use of an improper extension cord could result in a risk of fire and electric shock. If an extension cord must be used, make sure:

- That the pins on the plug of the extension cord are the same number, size and shape as those of the plug on the charger.
- That the extension cord is properly wired and in good electrical condition.
- That the wire size is large enough for the AC ampere rating of the charger as specified in section 8.

**1.6** To reduce the risk of electric shock, unplug the charger from the outlet before attempting any maintenance or cleaning. Simply turning off the controls will not reduce this risk.

**1.7** Do not operate the charger with a damaged cord or plug; have the cord or plug replaced immediately by a qualified service person.

**1.8** Do not operate the charger if it has received a sharp blow, been dropped or otherwise damaged in any way; take it to a qualified service person.

**1.9** Do not disassemble the charger; take it to a qualified service person when service or repair is required. Incorrect reassembly may result in a risk of fire or electric shock.


**RISK OF EXPLOSIVE GASES.**

**1.10** WORKING IN THE VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION. FOR THIS REASON, IT IS OF UTMOST IMPORTANCE THAT YOU FOLLOW ALL INSTRUCTIONS IN THIS MANUAL EACH TIME YOU USE THE CHARGER.

**1.11** To reduce the risk of a battery explosion, follow all instructions in this manual and those published by the battery manufacturer and the manufacturer of any equipment you intend to use in the vicinity of the battery. Review the cautionary markings on these products and on the engine.

**1.12** This charger employs parts, such as switches and circuit breakers, that tend to produce arcs and sparks. If used in a garage, locate this charger 18 inches or more above floor level.

## 2. PERSONAL PRECAUTIONS


**RISK OF EXPLOSIVE GASES.**

**2.1** NEVER smoke or allow a spark or flame in the vicinity of a battery or engine.

**2.2** Remove personal metal items such as rings, bracelets, necklaces and watches when working with a lead-acid battery. A lead-acid battery can produce a short-circuit current high enough to weld a ring or the like to metal, causing a severe burn.

**2.3** Be extra cautious, to reduce the risk of dropping a metal tool onto the battery. It might spark or short-circuit the battery or other electrical part that may cause an explosion.

**2.4** Use this charger for charging LEAD-ACID batteries only. It is not intended to supply power to a low voltage electrical system other than in a starter-motor application. Do not use this battery charger for charging dry-cell batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage to property.

**2.5** NEVER charge a frozen battery.

**2.6** Consider having someone nearby to come to your aid when you work near a lead-acid battery.

**2.7** Have plenty of fresh water and soap nearby in case battery acid contacts your skin, clothing or eyes.

**2.8** Wear complete eye and body protection, including safety goggles and protective clothing. Avoid touching your eyes while working near the battery.

**2.9** If battery acid contacts your skin or clothing, immediately wash the area with soap and water. If acid enters your eye, immediately flood the eye with cold running water for at least 10 minutes and get medical attention right away.

**2.10** If battery acid is accidentally swallowed, drink milk, the whites of eggs or water. DO NOT induce vomiting. Seek medical attention immediately.

## 3. PREPARING TO CHARGE



**RISK OF CONTACT WITH BATTERY ACID. BATTERY ACID IS A HIGHLY CORROSIVE SULFURIC ACID.**

**3.1** If it is necessary to remove the battery from the vehicle to charge it, always remove the grounded terminal first. Make sure all of the accessories in the vehicle are off, to prevent arcing.

**3.2** Be sure the area around the battery is well ventilated while the battery is being charged.

**3.3** Clean the battery terminals before charging the battery. During cleaning, keep airborne corrosion from coming into contact with your eyes, nose and mouth. Use baking soda and water to neutralize the battery acid and help eliminate airborne corrosion. Do not touch your eyes, nose or mouth.

**3.4** Add distilled water to each cell until the battery acid reaches the level specified by the battery manufacturer. Do not overfill. For a battery without removable cell caps, such as valve regulated lead-acid batteries (VRLA), carefully follow the manufacturer's recharging instructions.

**3.5** Read, understand and follow all instructions for the charger, battery, vehicle and any equipment used near the battery and charger. Study all of the battery manufacturer's specific precautions while charging and recommended rates of charge.

**3.6** Determine the voltage of the battery by referring to the vehicle owner's manual and make sure that the output voltage is correct for your battery.

**3.7** Make sure that the charger cable clips make tight connections.

## 4. CHARGER LOCATION


**RISK OF EXPLOSION AND CONTACT WITH BATTERY ACID.**

**4.1** Locate the charger as far away from the battery as the DC cables permit.

**4.2** Never place the charger directly above the battery being charged; gases from the battery will corrode and damage the charger.

**4.3** Do not set the battery on top of the charger.

**4.4** Never allow battery acid to drip onto the charger when reading the electrolyte specific gravity or filling the battery.

**4.5** Do not operate the charger in a closed-in area or restrict the ventilation in any way.

## 5. DC CONNECTION PRECAUTIONS

**5.1** Connect and disconnect the DC output clips only after removing the AC plug from the electrical outlet. Never allow the clips to touch each other.

**5.2** Attach the clips to the battery and chassis, as indicated in sections 6 and 7.

## 6. FOLLOW THESE STEPS WHEN BATTERY IS INSTALLED IN VEHICLE


**A SPARK NEAR THE BATTERY MAY CAUSE A BATTERY EXPLOSION. TO REDUCE THE RISK OF A SPARK NEAR THE BATTERY:**

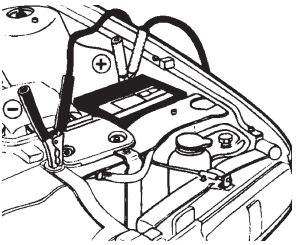
**6.1** Position the AC and DC cables to reduce the risk of damage by the hood, door and moving or hot engine parts. **NOTE:** If it is necessary to close the hood during the charging process, ensure that the hood does not touch the metal part of the battery clips or cut the insulation of the cables.

**6.2** Stay clear of fan blades, belts, pulleys and other parts that can cause injury.

**6.3** Check the polarity of the battery posts. The POSITIVE (POS, P, +) battery post usually has a larger diameter than the NEGATIVE (NEG, N, -) post.

**6.4** Determine which post of the battery is grounded (connected) to the chassis (vehicle frame). If the negative post is grounded to the chassis (as in most vehicles), see step 6.5. If the positive post is grounded to the chassis, see step 6.6.

**6.5** For a negative-grounded vehicle, connect the POSITIVE (RED) clip from the battery charger to the POSITIVE (POS, P, +) ungrounded post of the battery. Connect the NEGATIVE (BLACK) clip to the vehicle frame or engine block at a distance away from the battery. Do not connect the clip to the carburetor, fuel lines or sheet-metal body parts. Connect to a heavy gauge metal part of the vehicle frame or engine block.



NEGATIVE GROUNDED SYSTEM

**6.6** For a positive-grounded vehicle, connect the NEGATIVE (BLACK) clip from the battery charger to the NEGATIVE (NEG, N, -) ungrounded post of the battery. Connect the POSITIVE (RED) clip to the vehicle frame or engine block at a distance away from the battery. Do not connect the clip to the carburetor, fuel lines or sheet-metal body parts. Connect to a heavy gauge metal part of the vehicle frame or engine block.

**6.7** Connect charger AC supply cord to electrical outlet.

**6.8** When disconnecting the charger, disconnect the AC cord, remove the clip from the vehicle chassis and then remove the clip from the battery terminal.

**6.9** See CALCULATING CHARGE TIME for length of charge information.

## 7. FOLLOW THESE STEPS WHEN BATTERY IS OUTSIDE VEHICLE

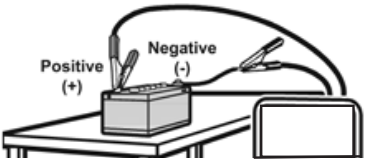

**A SPARK NEAR THE BATTERY MAY CAUSE A BATTERY EXPLOSION. TO REDUCE THE RISK OF A SPARK NEAR THE BATTERY:**

**7.1** Check the polarity of the battery posts. The POSITIVE (POS, P, +) battery post usually has a larger diameter than the NEGATIVE (NEG, N, -) post.

**7.2** Attach at least a 24-inch (61 cm) long 6-gauge (AWG) insulated battery cable to the NEGATIVE (NEG, N, -) battery post.

**7.3** Connect the POSITIVE (RED) charger clip to the POSITIVE (POS, P, +) post of the battery.

**7.4** Position yourself and the free end of the cable you previously attached to the NEGATIVE (NEG, N, -) battery post as far away from the battery as possible – then connect the NEGATIVE (BLACK) charger clip to the free end of the cable.




**7.5** Do not face the battery when making the final connection.

**7.6** Connect charger AC supply cord to electrical outlet.

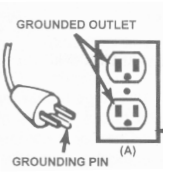
**7.7** When disconnecting the charger, always do so in the reverse order of the connecting procedure and break the first connection while as far away from the battery as practical.

**7.8** A marine (boat) battery must be removed and charged on shore. To charge it onboard requires equipment specially designed for marine use.

## 8. GROUNDING AND AC POWER CORD CONNECTIONS


**RISK OF ELECTRIC SHOCK OR FIRE.**

**8.1** This battery charger is for use on a nominal 120-volt circuit and has a grounded plug that looks like the plug illustrated. The charger must be grounded to reduce the risk of electric shock. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances. The plug pins must fit the receptacle (outlet). Do not use with an ungrounded system.




**8.2** **DANGER** Never alter the AC cord or plug provided – if it does not fit the outlet, have a proper grounded outlet installed by a qualified electrician. An improper connection can result in a risk of an electric shock or electrocution. **NOTE:** Pursuant to Canadian Regulations, use of an adapter plug is not allowed in Canada. Use of an adapter plug in the United States is not recommended and should not be used.

**8.3** Recommended minimum AWG size for extension cord:

- 100 feet (30.5 meters) long or less – use a 14 gauge (2.08 $mm^2$) extension cord.
- Over 100 feet (30.5 meters) long – use a 10 gauge (5.26 $mm^2$) extension cord.

## 9. ASSEMBLY INSTRUCTIONS

Remove all cord wraps and uncoil the cables prior to using the battery charger.

## 10. FEATURES /CONTROL PANEL


1. Ammeter
2. Battery Type Selector Switch
3. Charge Rate Selector Switch
4. Battery Clips
5. Full Charge LED

**Setting the controls**
All of the controls for your charger are located on the front of the charger. Read these instructions to properly set the charger controls.

**Ammeter**
The Ammeter indicates the amount of current, measured in amps, that is being drawn by the battery. As a battery takes on a charge, it draws less current from the charger. Correspondingly, the meter will show less current being drawn by the battery. When the current stops decreasing, the battery is charged.

The 2 amp charge rate may indicate some activity on the meter, although the meter does not have the resolution to display this low rate. For the 2 amp charge rate, a triangle has been provided. Its accuracy has been calibrated for use with small batteries.

- **Percent of Charge**
  The percent of charge is based on the current drawn by the battery. For this reason, accuracy will vary with the size and battery type.

**LED Indicators**

- **On Steady –** Battery is fully charged and the charger is in Maintain Mode.
- **Fast Blink (4x per second) –** Charger is ready to crank the engine in Engine Start Mode.
- **Slow Blink (1x per second) –** Charger is in Engine Start Cool Down Mode.
- **Two Blinks (followed by pause) –** Charger is in Abort Mode.

**Battery Type Switch**
Use this switch to set the type of battery to be charged – Standard or AGM. Both settings are for regular and deep-cycle batteries. If you are not sure which type of battery you have, select the AGM setting.

**Charge Rate Selector Switch:**
Use the Charge Rate Selector switch to select the charge rate setting you require.

## 11. OPERATING INSTRUCTIONS

**⚠WARNING** This battery charger must be properly assembled in accordance with the assembly instructions before it is used.

**NOTE:** The charger does not have an ON/OFF switch. The ON and OFF commands are controlled by plugging the 71222 into a 120V AC electrical wall outlet only after the battery connections have been made.

**Charging**

1. Make sure to place the charger on a dry, non-flammable surface, such as metal or concrete.
2. Ensure that all of the charger components are in place and in good working condition, including the plastic boots on the battery clips.
3. Connect the battery, following the precautions listed in sections 6 and 7.
4. Select the appropriate settings for your battery.
5. Connect the AC power, following the precautions listed in section 8.
6. To disconnect the charger, reverse the above procedures.

**Automatic Operation**
When an automatic charge is performed, the charger switches to a maintain mode automatically after the battery is charged.

**Aborted Charge**
If charging cannot be completed normally, charging will abort. When charging aborts, the charger's output is shut off and the LED will blink (two blinks followed by a pause). All charger function switches become non-functional. To reset after an aborted charge, unplug the charger from the AC outlet, wait a few moments and plug it back in.

**Completion of Charge**
Charge completion is indicated by the LED. When lit steadily, the charger has switched to the Maintain Mode of operation.

**Maintain Mode (Float-Mode Monitoring)**
When the LED is lit, the charger has started Maintain Mode. In this mode, the charger keeps the battery fully charged by delivering a small current when necessary.

**NOTE:** If the charger has to provide its maximum Maintain Mode current for a continuous 12 hour period, it will go into Abort Mode (see Aborted Charge section). This is usually caused by a drain on the battery or a bad battery. Make sure there are no loads on the battery. If there are, remove them. If there are none, have the battery checked or replaced.

**Maintaining a Battery (2 amp charge rate)**
The charger maintenance setting will keep 12 volt batteries at full charge. The setting can also be used to charge smaller batteries. However, if you use the setting to charge a large battery, such as a marine deep-cycle battery, battery capacity may be lost. The battery would then be unable to hold a charge and become useless. Avoid using the maintenance setting to charge a large battery.

**NOTE:** The maintain mode technology utilized in DieHard chargers allows you to safely charge and maintain a healthy battery for extended periods of time. However, problems with the battery, electrical problems in the vehicle, improper connections or other unanticipated conditions could cause excessive current draws. As such, occasionally monitoring your battery and the charging process is recommended.

**Using the 50 Amp Engine Start feature**
Your battery charger can be used to jumpstart your car if the battery is low. Follow these instructions on how to use the ENGINE START feature.

**⚠WARNING** Follow all safety instructions and precautions for charging your battery. Wear complete eye protection and clothing protection. Charge your battery in a well-ventilated area.

**IMPORTANT** Using the ENGINE START feature WITHOUT a battery installed in the vehicle could cause damage to the vehicle's electrical system. **NOTE:** If you have charged the battery and it still will not start your car, do not use the engine start feature, or it could damage the vehicle's electrical system.

**IMPORTANT** Do not leave the charger in Engine Start Mode for longer than 9 minutes at a time, or you will damage the charger.

1. With the charger unplugged from the AC outlet, connect the charger to the battery following the instructions given in section 6: FOLLOW THESE STEPS WHEN BATTERY IS INSTALLED IN VEHICLE.
2. Plug the charger AC power cord into the AC outlet.
3. With the charger plugged in and connected to the battery of the vehicle, set the charge rate selector switch to the engine start position.
4. Crank the engine until it starts or 10 seconds pass. If the engine does not start, wait 3 minutes before cranking again. This allows the charger and battery to cool down.

**NOTE:** During extremely cold weather, or if the battery is under 2 volts, charge the battery for 5 minutes before cranking the engine.

5. If the engine fails to start, charge the battery for 5 more minutes before attempting to crank the engine again.
6. After the engine starts, unplug the AC power cord before disconnecting the battery clips from the vehicle.
7. Clean and store the charger in a dry location.

**NOTE**: If the engine does turn over but never starts, there is not a problem with the starting system; there is a problem somewhere else with the vehicle. STOP cranking the engine until the other problem has been diagnosed and corrected.

**Engine Starting Notes**
During the starting sequence listed above, the charger is set to one of three states.

**Wait for cranking –** The charger waits until the engine is actually being cranked before delivering sufficient charge (up to 50 amps) for engine start. While waiting, the charger delivers a charge of up to 10 amps, and will go into Abort Mode if the engine is not cranked within 15 minutes.

**Cranking –** When cranking is detected, the charger will automatically deliver up to its maximum output as required by the starting system for as long as 10 seconds of cranking.

**Cool Down** – After cranking, the charger enters a mandatory 3 minute (180 second) cool down state. During the cool down period, the charger delivers a charge of up to 10 amps and the LED will blink slowly (1x per second). After 3 minutes, the LED will start blinking fast (4x per second), indicating that another crank cycle can be started.

## 12. CALCULATING CHARGE TIME

Use the following table to more accurately determine the time it will take to bring a battery to full charge. First, identify where your battery fits into the chart.

CCA = Cold Cranking Amps

RC = Reserve Capacity

Ah = Amp hour

NR means that the charger setting is NOT RECOMMENDED.

Find your battery's rating on the chart below, and note the charge time given for each charger setting. The times given are for batteries with a 50% charge prior to recharging. Add more time for severely discharged batteries.

| BATTERY SIZE/RATING | | | CHARGE RATE/CHARGING TIME | |
|---|---|---|---|---|
| | | | 2 AMP | 10 AMP |
| SMALL BATTERIES | Motorcycle, garden tractor, etc. | 6 - 12 Ah | 2 - 4 hrs | NR |
| | | 12 - 32 Ah | 4 - 10 hrs | NR |
| CARS/ TRUCKS | 200 - 315 CCA | 40 - 60 RC | 11 ¼ - 14 ½ hrs | 2¼ - 3 hrs |
| | 315 - 550 CCA | 60 - 85 RC | NR | 3 - 3¾ hrs |
| | 550 - 1000 CCA | 80 - 190 RC | NR | 3¾ - 7 hrs |
| MARINE/DEEP-CYCLE | | 80 RC | NR | 3½ hrs |
| | | 140 RC | NR | 5½ hrs |
| | | 160 RC | NR | 6 hrs |
| | | 180 RC | NR | 6½ hrs |

## 13. MAINTENANCE INSTRUCTIONS

**13.1** After use and before performing maintenance, unplug and disconnect the battery charger (see sections 6, 7 and 8).

**13.2** Use a dry cloth to wipe all battery corrosion and other dirt or oil from the battery clips, cords, and the charger case.

**13.3** Ensure that all of the charger components are in place and in good working condition, including the plastic boots on the battery clips.

**13.4** Servicing does not require opening the unit, as there are no user-serviceable parts.

**13.5** All other servicing should be performed by qualified service personnel.

## 14. MOVING AND STORAGE INSTRUCTIONS

**14.1** Store the charger unplugged, in an upright position. The cord will still conduct electricity until it is unplugged from the outlet.

**14.2** Store inside, in a cool, dry place.

**14.3** Do not store the clips on the handle, clipped together, on or around metal, or clipped to cables.

**14.4** If the charger is moved around the shop or transported to another location, take care to avoid/prevent damage to the cords, clips and charger. Failure to do so could result in personal injury or property damage.

## 15. TROUBLESHOOTING

| PROBLEM | POSSIBLE CAUSE | REASON/SOLUTION |
|---|---|---|
| The charger will not turn on. | Charger is not plugged in. | Plug the charger into an AC outlet. |
| | No power at the receptacle. | Check for open fuse or circuit breaker supplying AC outlet. |
| | Poor electrical connection. | Unplug the charger from the AC outlet, wait 10 seconds, then plug it back in. |
| No reading on the Ammeter. (Needle stays on the left.) | Clips are not making a good connection to the battery. | Check for poor connection to battery and frame. |
| | Connections are reversed. | Unplug the charger and reverse the clips. |
| | Short or bad cell on the battery. | Have the battery checked. |
| | 2 amp charge rate is being used. | Ammeter may show no activity at the 2A charge rate. |
| Ammeter reading stays high. | Battery is severely discharged. | Continue charging battery for two more hours. If problem continues, have the battery checked. |
| | Wrong battery voltage. | Verify that the output voltage of the charger matches the battery voltage. |
| Ammeter reads less than selected charge rate when charging a discharged battery. | Extension cord is too long or wire gauge is too small. | Use a shorter or heavier gauge extension cord. |
| | Weak cell or sulfated plate in battery. | Have the battery checked. |
| | Battery is only partially discharged. | Continue to charge the battery. |
| Battery clips do not spark when touched together. | The charger is equipped with an auto-start feature. It will not supply current to the battery clips until a battery is properly connected. The clips will not spark if touched together. | No problem; this is a normal condition. |
| Charger makes a noticeable buzz. | Transformer laminations vibrate. | No problem; this is a normal condition. |

| PROBLEM | POSSIBLE CAUSE | REASON/SOLUTION |
|---|---|---|
| Short or no start cycle when cranking engine. | Drawing more than 50 amps. | Crank time varies with the amount of current drawn. |
| | Failure to wait 3 minutes between cranks. | Wait 3 minutes of rest time before the next crank. |
| | Battery may be severely discharged. | Charge for 10 to 15 minutes at the 10A rate to help assist in cranking. |
| | The charger may be overheated. | The thermal protector may have tripped and needs a little longer to reset. |
| The measured current is much lower than what was selected. | The charger reached the maximum voltage and is reducing the current. | No problem; this is a normal condition. |

## 16. BEFORE RETURNING FOR REPAIRS

**16.1** When a charging problem arises, make certain that the battery is capable of accepting a normal charge. Double check all connections, the AC outlet for a full 120 volts, the charger clips for correct polarity and the quality of the connections from the cables to the clips and from the clips to the battery system. The clips must be clean.

**16.2** When a battery is very cold, partially charged or sulfated, it will not draw the full rated amperes from the charger. It is both dangerous and damaging to a battery to force higher amperage into it than it can effectively use in recharging.

**16.3** When an UNKNOWN OPERATING PROBLEM arises, please read this complete manual and call the customer service number for information. This will usually eliminate the need for return.

If the above solutions do not eliminate the problem,
or for information about troubleshooting or replacement parts,
call toll-free from anywhere in the U.S.A.
1-800-732-7764
7:00 am to 5:00 pm Central Time, Monday through Friday