

HAWKINS MANUFACTURING
REPAIR AND SERVICE DEPARTMENT

TROUBLESHOOTING GUIDELINES

POWER 4

No indicator lights showing.

The first and most obvious action is to check that the charger is plugged into the power source and that it is correctly connected to a battery. Check for physical damage of the housing and external wiring. A non-operational charger with no physical damage should be returned to the factory as a candidate for a warrantee claim. Physical damage will always invalidate the warrantee against assembly faults and, if a repair is sought, the charger should be sent back to Hawkins.

The charger has an internal safety cutout that will allow the charger to cool down if the electrical load overheats the unit. Under these conditions the yellow light will be off during the cooling period. It should however come back on after about 10 minutes.

Yellow light on but no green

The yellow light indicates current flowing into the battery while the green indicates a voltage that corresponds with 14 volts or at least 80% of the expected full charge. If the battery on charge seems to have taken too long to reach the green condition, the most usual cause is a cell in the battery that can no longer take a charge. Test the charger on a battery of known quality before blaming the charger.

Yellow and green on but no energy in the battery

A neglected battery that has been left in a discharged condition will have lost most of its internal acid to lead sulphate and will prove difficult to charge. It will have a high internal resistance that, under some circumstances, can cause the green light to light although little charge has gone into the battery. If this condition is encountered, the battery might respond if left on charge for a few days. If the green light goes out during this period, regard this as a good sign and continue charging. If the battery finally accepts the charge, the green should come back on within 12 hours and the battery may be in a working state. Deep discharge of a battery combined with time left in this condition always damages a battery to some extent and a recovery cannot be guaranteed.

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POWER 6

No indicator lights showing.

The first and most obvious action is to check that the charger is plugged into the power source and that it is correctly connected to a battery. Check for physical damage of the housing and external wiring. A non-operational charger with no physical damage should be returned to the factory as a candidate for a warrantee claim. Physical damage will always invalidate the warrantee against assembly faults and, if a repair is sought, the charger should be sent back to Hawkins.

The charger has an internal safety cutout that will allow the charger to cool down if the electrical load overheats the unit. Under these conditions the yellow light will be off during the cooling period. It should however come back on after about 10 minutes.

Yellow light on but no green

The yellow light indicates current flowing into the battery while the green indicates a voltage that corresponds with 14 volts or at least 80% of the expected full charge. If the battery on charge seems to have taken too long to reach the green condition, the most usual cause is a cell in the battery that can no longer take a charge. Test the charger on a battery of known quality before blaming the charger.

Yellow and green on but no energy in the battery

A neglected battery that has been left in a discharged condition will have lost most of its internal acid to lead sulphate and will prove difficult to charge. It will have a high internal resistance that, under some circumstances, can cause the green light to light although little charge has gone into the battery. If this condition is encountered, the battery might respond if left on charge for a few days. If the green light goes out during this period, regard this as a good sign and continue charging. If the battery finally accepts the charge, the green should come back on within 12 hours and the battery may be in a working state. Deep discharge of a battery combined with time left in this condition always damages a battery to some extent and a recovery cannot be guaranteed.

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TROUBLESHOOTING GUIDELINES

POWER 8

No indicator lights showing.

The first and most obvious action is to check that the charger is plugged into the power source and that it is correctly connected to a battery. Check for physical damage of the housing and external wiring. A non-operational charger with no physical damage should be returned to the factory as a candidate for a warranty claim. Physical damage will always invalidate the warranty against assembly faults and, if a repair is sought, the charger should be sent back to Hawkins.

The charger has an internal safety cutout that will allow the charger to cool down if the electrical load overheats the unit. Under these conditions the yellow light will be off during the cooling period. It should however come back on after about 10 minutes.

Yellow light on but no green

The yellow light indicates current flowing into the battery while the green indicates a voltage that corresponds with 14 volts or at least 80% of the expected full charge. If the battery on charge seems to have taken too long to reach the green condition, the most usual cause is a cell in the battery that can no longer take a charge. Test the charger on a battery of known quality before blaming the charger.

Yellow and green on but no energy in the battery

A neglected battery that has been left in a discharged condition will have lost most of its internal acid to lead sulphate and will prove difficult to charge. It will have a high internal resistance that, under some circumstances, can cause the green light to light although little charge has gone into the battery. If this condition is encountered, the battery might respond if left on charge for a few days. If the green light goes out during this period, regard this as a good sign and continue charging. If the battery finally accepts the charge, the green should come back on within 12 hours and the battery may be in a working state. Deep discharge of a battery combined with time left in this condition always damages a battery to some extent and a recovery cannot be guaranteed.

SMART 6

No indicator lights showing.

The first and most obvious action is to check that the charger is plugged into the power source and that it is correctly connected to a battery. Check for physical damage of the housing and external wiring. A non-operational charger with no physical damage should be returned to the factory as a candidate for a warrantee claim. Physical damage will always invalidate the warrantee against assembly faults and, if a repair is sought, the charger should be sent back to Hawkins.

The charger has an internal safety cutout that will allow the charger to cool down if the electrical load overheats the unit. Under these conditions all lights will be off during the cooling period. The system should however come back on after about 10 minutes.

Red indicator on but no yellow or green

Mains power supply to the unit should light the red indicator. With power on, the yellow should light if the battery has been correctly connected. This unit has polarity protection to prevent damage to the control board in the event of a reverse connection. If connected incorrectly the charger *will not switch on*, will not show the yellow light nor will it suffer damage in any way. It will also *not switch on* if it cannot detect sufficient voltage from the battery in order to make this judgment. Severely discharged batteries present this problem to automatic chargers and before declaring fault with the charger, it should be correctly connected to a battery with a minimum of 8 volts across its terminals. A jump feed from a charged battery to a very flat battery can usually restore the minimum voltage in a few seconds.

If the yellow light fails to show on a battery in good condition and the charger passes all of the physical checks, it is probably a candidate for a warrantee claim and this is best achieved at the factory or an established repair station, where replacement components can be installed.

Red and Yellow lights on but no Green

The green light indicates that the voltage of the battery has reached about 14.5 volts and that the charger is in a resting state. When the green is on, the yellow is off, no current is flowing and the battery voltage is characteristically dropping back to 13 volts at which point the charger switches back on. This brings the yellow on and the green off. A cycling pattern of on and off completes the charge with the off periods getting longer and longer.

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A battery reaching the end of its life will make the task of reaching the switch off point impossible and the first indication of this to the user is an abnormally long charging period. A test using a known quality of battery should be used to confirm the situation.

The fix for this charger fault would be a replacement electronic board and if the repair is a warrantee claim the board should be inspected for lightning damage.

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POWER 10 (6/10G)

No indication of charge

The first and most obvious action is to check that the charger is plugged into the power source and that it is correctly connected to a battery. Check for physical damage of the housing and external wiring. A non-operational charger with no physical damage should be returned to the factory as a candidate for a warrantee claim. Physical damage will always invalidate the warrantee against assembly faults and, if a repair is sought, the charger should be sent back to a Hawkins service agent.

Check the mains fuse located in the mains inlet socket, if it is blown then replace it with a 10-amp fuse. Make sure that the overload breaker has its pin set in. Check the 15 amp cable fuse located under the charger that protects the rectifier against an error in connection to the battery. If the overload circuit breaker or either of the fuses continues to indicate a fault then the charger needs attention from a Hawkins service agent.

The failure of the meter to indicate a current may be the fault of the meter but in the absence of test equipment it is difficult to diagnose this problem. Dirty or badly corroded clamps may result in a loss of continuity between the charger and battery, which will result in no current flow and thus no indication on the meter.

Low output indicated on meter

This charger is a typical taper charger that allows the current to fall back as the battery voltage rises. A low output (1/3 of rated current) can be a sign that the battery is charged or nearly charged.

A severely discharged battery will be unable to conduct a current that will show on the meter and will either fail to charge from this condition or an unusually long time will elapse before a normal current indicates the start of a charge cycle.

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PRO 15 (Model 12/10G)

No indication of charge

The first and most obvious action is to check that the charger is plugged into the power source and that it is correctly connected to a battery. Check for physical damage of the housing and external wiring. A non-operational charger with no physical damage should be returned to the factory as a candidate for a warrantee claim. Physical damage will always invalidate the warrantee against assembly faults and, if a repair is sought, the charger should be sent back to a Hawkins service agent.

Check the mains fuse located in the mains inlet socket, if it is blown then replace it with a 10-amp fuse. Make sure that the overload breaker has its pin set in. Check the 30 amp cable fuse located on the front panel the charger that protects the rectifier against an error in connection to the battery. If the overload circuit breaker or either of the fuses continues to indicate a fault, first check that the correct voltage setting is being used i.e. 6 volt, 12 volt or 24 volt and if the problem persists then the charger needs attention from a Hawkins service agent.

The failure of the meter to indicate a current may be the fault of the meter, the rotary switches or the rectifier but in the absence of test equipment it is difficult to diagnose these problems. Dirty or badly corroded clamps may result in a loss of continuity between the charger and battery, which will result in no current flow and thus no indication on the meter.

Low output indicated on meter

This charger is a typical taper charger that allows the current to fall back as the battery voltage rises. A low output (1/3 of rated current) can be a sign that the battery is charged or nearly charged. This charger has a selector switch that should be adjusted once or twice during a full recharge to provide a current within the range indicated.

A severely discharged battery will be unable to conduct a current that will show on the meter and will either fail to charge from this condition or an unusually long time will elapse before a normal current indicates the start of a charge cycle.

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PRO 16 (Model 18/10G)

No indication of charge

The first and most obvious action is to check that the charger is plugged into the power source and that it is correctly connected to a battery. Check for physical damage of the housing and external wiring. A non-operational charger with no physical damage should be returned to the factory as a candidate for a warrantee claim. Physical damage will always invalidate the warrantee against assembly faults and, if a repair is sought, the charger should be sent back to a Hawkins service agent.

Check the mains fuse located in the mains inlet socket, if it is blown then replace it with a 10-amp fuse. Make sure that the overload breaker has its pin set in. Check the 30 amp cable fuse located on the front panel the charger that protects the rectifier against an error in connection to the battery. If the overload circuit breaker or either of the fuses continues to indicate a fault, first check that the correct voltage setting is being used i.e. 12 volt, 24 volt or 36 volt and if the problem persists then the charger needs attention from a Hawkins service agent.

The failure of the meter to indicate a current may be the fault of the meter, the rotary switches or the rectifier but in the absence of test equipment it is difficult to diagnose these problems. Dirty or badly corroded clamps may result in a loss of continuity between the charger and battery, which will result in no current flow and thus no indication on the meter.

Low output indicated on meter

This charger is a typical taper charger that allows the current to fall back as the battery voltage rises. A low output (1/3 of rated current) can be a sign that the battery is charged or nearly charged. This charger has a selector switch that should be adjusted once or twice during a full recharge to provide a current within the range indicated.

A severely discharged battery will be unable to conduct a current that will show on the meter and will either fail to charge from this condition or an unusually long time will elapse before a normal current indicates the start of a charge cycle.

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PRO 30 (Model 12/20G)

No indication of charge

The first and most obvious action is to check that the charger is plugged into the power source and that it is correctly connected to a battery. Check for physical damage of the housing and external wiring. A non-operational charger with no physical damage should be returned to the factory as a candidate for a warranty claim. Physical damage will always invalidate the warranty against assembly faults and, if a repair is sought, the charger should be sent back to a Hawkins service agent.

Make sure that the overload breaker has its pin set in. Check the 40 amp cable fuse located on the front panel the charger that protects the rectifier against an error in connection to the battery. If the overload circuit breaker or the fuse continues to indicate a fault, first check that the correct voltage setting is being used i.e. 6 volt, 12 volt or 24 volt and if the problem persists then the charger needs attention from a Hawkins service agent.

The failure of the meter to indicate a current may be the fault of the meter, the rotary switches or the rectifier but in the absence of test equipment it is difficult to diagnose these problems. Dirty or badly corroded clamps may result in a loss of continuity between the charger and battery, which will result in no current flow and thus no indication on the meter.

Low output indicated on meter

This charger is a typical taper charger that allows the current to fall back as the battery voltage rises. A low output (1/3 of rated current) can be a sign that the battery is charged or nearly charged. This charger has a selector switch that should be adjusted once or twice during a full recharge to provide a current within the range indicated.

A severely discharged battery will be unable to conduct a current that will show on the meter and will either fail to charge from this condition or an unusually long time will elapse before a normal current indicates the start of a charge cycle.

PRO 224

No indication of charge

The first and most obvious action is to check that the charger is plugged into the power source and that it is correctly connected to a battery. Check for physical damage of the housing and external wiring. A non-operational charger with no physical damage should be returned to the factory as a candidate for a warrantee claim. Physical damage will always invalidate the warrantee against assembly faults and, if a repair is sought, the charger should be sent back to a Hawkins service agent.

The failure of the meter to indicate a current may be the fault of the meter, the switch or the rectifier but in the absence of test equipment it is difficult to diagnose these problems. Dirty or badly corroded clamps may result in a loss of continuity between the charger and battery, which will result in no current flow and thus no indication on the meter.

Low output indicated on meter

This charger is a typical taper charger that allows the current to fall back as the battery voltage rises. A low output (1/3 of rated current) can be a sign that the battery is charged or nearly charged. This charger has a selector switch that should be adjusted once or twice during a full recharge to provide a current within the range indicated.

A severely discharged battery will be unable to conduct a current that will show on the meter and will either fail to charge from this condition or an unusually long time will elapse before a normal current indicates the start of a charge cycle.

Engine Starting

The recommended method used to start an engine of a vehicle with a flat battery is to spend a few minutes boosting the battery *before* attempting a start to ensure that the engine can receive the full benefit of the start current. The high /low charge switch on the charger should be in the high position for a start.

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PRO 324

No indication of charge

The first and most obvious action is to check that the charger is plugged into the power source and that it is correctly connected to a battery. Check for physical damage of the housing and external wiring. A non-operational charger with no physical damage should be returned to the factory as a candidate for a warrantee claim. Physical damage will always invalidate the warrantee against assembly faults and, if a repair is sought, the charger should be sent back to a Hawkins service agent.

The failure of the meter to indicate a current may be the fault of the meter, the switch or the rectifier but in the absence of test equipment it is difficult to diagnose these problems. Dirty or badly corroded clamps may result in a loss of continuity between the charger and battery, which will result in no current flow and thus no indication on the meter.

Low output indicated on meter

This charger is a typical taper charger that allows the current to fall back as the battery voltage rises. A low output (1/3 of rated current) can be a sign that the battery is charged or nearly charged. This charger has a selector switch that should be adjusted once or twice during a full recharge to provide a current within the range indicated.

A severely discharged battery will be unable to conduct a current that will show on the meter and will either fail to charge from this condition or an unusually long time will elapse before a normal current indicates the start of a charge cycle.

Engine Starting

The recommended method used to start an engine of a vehicle with a flat battery is to spend a few minutes boosting the battery *before* attempting a start to ensure that the engine can receive the full benefit of the start current. The high /low charge switch on the charger should be in the high position for a start..

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PRO 512 (6/60G) and PRO 524 (6/60GX) Trouble shooting

1. The first and most obvious check would be to check that the charger has not sustained any physical damage. This can be achieved by a visual inspection of the charger housing. This sort of damage could lead to failure or damage to the internal components and therefore must be sent back to a Hawkins Service centre for further analysis.
2. By virtue of their size, these chargers have a significant momentary current inrush when the mains is connected or interrupted and this can trip a mains circuit breaker if it is undersized for the application. A distribution board circuit breaker of at least 25 amps rating is required to avoid nuisance tripping. An extension lead between the charger and a wall plug will reduce this occurrence.
3. The chargers incorporate a polarity protection device that will prevent the charger from operating with the leads incorrectly connected, by deliberately tripping the main breaker on the charger.
4. The advice with regard to engine starting, provided in the operating instructions is important and many problems are solved by taking the time to put some energy back into a dead battery before hitting the starter. The best start is achieved with the current switch set to the highest of the current settings before pushing the start button. When the starter is providing current for starting, it is running in overload and will heat up many of its internal components within 15 seconds. A cooling rest of 5 minutes between starts is important for the life of the charger. Some of these units now incorporate a thermal cutout and will switch off the start circuit if the charger gets too hot.
5. The timer is provided to limit the charging time of a high rate charge that may be employed to recover a flat battery. If the timer is suspect, the isolating switch may be used to charge without using the timer.
6. The charge rate can be adjusted with the rotary switch and if a current close to the limit is chosen, it is possible for the overload to be tripped by a small increase in current after the start of the charge. Reset the overload and choose a lower current until the charge rate stabilises.

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AutoPro 5 12v (or 24v)

No indicator lights showing.

The first and most obvious action is to check that the charger is plugged into the power source and that it is correctly connected to a battery. Check for physical damage of the housing and external wiring. A non-operational charger with no physical damage should be returned to the factory as a candidate for a warranty claim. Physical damage will always invalidate the warranty against assembly faults and, if a repair is sought, the charger should be sent back to Hawkins.

If the red (power on) light is not showing when power is supplied, check the mains fuse located in the mains inlet socket. If it is blown then replace it with a 10-amp fuse. Make sure that the overload breaker has not been tripped. If the overload circuit breaker or the mains fuse continues to trip or blow then the charger must be sent back to Hawkins for further analysis.

Red light on but no yellow or green

The output from this charger is automatically regulated firstly by current and then by voltage. It is polarity protected against incorrect connection and if incorrectly connected ***the charger will not switch on.*** The polarity protection requires a minimum voltage on the battery of 8 volts (or 16v) to function and batteries discharged below this voltage ***will not allow the charger to switch on.*** A charger that refuses to switch on should always be checked on a known healthy battery before being regarded as faulty. A jump feed from a charged battery to a very flat battery can usually restore the minimum voltage in a few seconds.

A fuse on the underside on the charger protects the battery cable against faults and should be checked. If blown, this could indicate a fault requiring expert attention.

If all of these causes for failure can be eliminated then the charger probably needs the services of a Hawkins repair agent.

Red light on, Yellow on and charging but no green

Current is indicated on the meter and, when connected to a serviceable battery, the charger should be indicating a constant value as defined in the specification. The orange light should be lit during the period of constant current and also during the following period under voltage control until the charger switches to the float voltage.

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The green light replaces the orange when the charge is complete and the controller switches to float. At this point the ammeter will be showing a small current.

The switch to float (green) is dependant on a minimum current drawn while the charger is in the constant voltage period and if additional current is drawn from the battery during charging, the charger will probably never switch to float.

A dying battery can have a cell that is no longer charging and this leaves the remaining cells to share the charger's full voltage between them. An overcharge and extensive gassing of the remaining cells follows without the charger switching to float. The warning sign is an abnormally long charge time and a significant warming of the battery. Any time a battery feels warm to the touch during charging it should be disconnected and allowed to cool before repeating the charge. If rapid heating of the battery happens a second time then the battery is probably at the end of its life.

SMART 15 12 & (24v)

1 No indicator lights showing.

The first and most obvious action is to check that the charger is plugged into the power source and that it is correctly connected to a battery. Check for physical damage of the housing and external wiring. A non-operational charger with no physical damage should be returned to the factory as a candidate for a warranty claim. Physical damage will always invalidate the warranty against assembly faults and, if a repair is sought, the charger should be sent back to Hawkins.

1. Red indicator on but no orange or green

Mains power supply to the unit should light the red indicator. With power on, the orange should light if the battery has been correctly connected. This unit has polarity protection to prevent damage to the control board in the event of a reverse connection. If connected incorrectly the **charger will not switch on**. It will also **not switch on** if it cannot detect sufficient voltage from the battery in order to make this judgment. Severely discharged batteries present this problem to automatic chargers and before declaring fault with the charger, it should be correctly connected to a battery with a minimum of 8 volts for a 12v charger and 16v for a 24v charger across its terminals. A jump feed from a charged battery to a very flat battery can usually restore the minimum voltage in a few seconds.

If the orange light fails to show on a battery in good condition and the charger passes all of the physical checks, it is probably a candidate for a warranty claim and this is best achieved by sending it to a Hawkins repair agent where replacement components can be installed.

Red and Orange lights on but no Green

The green light indicates that the voltage of the battery has reached about 14.5 (or 29) volts and that the charger is in a resting state. When the green is on, the orange is off, no current is flowing and the battery voltage is characteristically dropping back to 13 (or 26) volts at which point the charger switches back on. This brings the orange on and the green off. A cycling pattern of on and off completes the charge with the off periods getting longer and longer.

A battery reaching the end of its life will make the task of reaching the switch off point impossible and the first indication of this to the user is an abnormally long charging time without any encouraging green light. If however, a charger fault is

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suspected, then a test using a known quality of battery should be used to confirm the situation.

The fix for this charger fault would be a replacement electronic board and if the repair is a warrantee claim the board should be inspected for lightning damage.

2. Charger charges at approximately $\frac{1}{2}$ the rated current.

First remove the charger cover. Locate the load resistor at the right rear of the charger (Behind the control card). This component is bolted onto a heat sink. While the charger is charging at $\frac{1}{2}$ current for approximately 5 minutes, feel the temperature of this component. If this component is hot (± 50 deg C), the second stage relay has failed. The only solution is to change the control card.

If

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AutoPro 10 12v & (24v)

The first and most obvious action is to check that the charger is plugged into the power source and that it is correctly connected to a battery. Check for physical damage of the housing and external wiring. A non-operational charger with no physical damage should be returned to the factory as a candidate for a warrantee claim. Physical damage will always invalidate the warrantee against assembly faults and, if a repair is sought, the charger should be sent back to Hawkins.

If the red (power on) light is not showing when power is supplied, check the mains fuse located in the mains inlet socket. If it is blown then replace it with a 10-amp fuse. Make sure that the overload breaker has not been tripped. If the overload circuit breaker or the mains fuse continues to trip or blow then the charger must be sent back to Hawkins for further analysis.

The output from this charger is automatically regulated firstly by current and then by voltage. It is polarity protected against incorrect connection and the current regulation protects it against excessive load. The polarity protection requires a minimum voltage on the battery of 8 volts (16v) to function and batteries discharged below this voltage ***will not allow the charger to switch on.*** A charger that refuses to switch on should always be checked on a known healthy battery before being regarded as faulty. A jump feed from a charged battery to a very flat battery can usually restore the minimum voltage in a few seconds.

Current is indicated on the meter and, when connected to a serviceable battery, the charger should be indicating a constant value as defined in the specification. A fuse, located on the front face of the charger protects the output cable. If the meter is not indicating current and a correct connection to the battery has been established, check this fuse. The orange light should be lit during the period of constant current and the period under voltage control until the charger switches to the float voltage. The green light replaces the orange when the charge is complete and the controller switches to float. At this point the ammeter will be showing a small current.

The switch to float (green) is dependant on the current drawn while the charger is in the constant voltage period and if current is drawn from the battery during charging, the charger will probably never switch to float.

A dying battery can have a cell that is no longer charging and this leaves the remaining cells to share the charger's full voltage between them. An overcharge and extensive gassing of the remaining cells follows without the charger switching to float. The warning sign is an abnormally long charge time and a significant warming of the battery. Any time a battery feels warm to the touch during charging it should be disconnected and allowed to cool before repeating the charge. If rapid heating of the battery happens a second time then the battery is probably at the end of its life.

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AutoPro 50 12v & (24v)

The first and most obvious action is to check that the charger is plugged into the power source and that it is correctly connected to a battery. Check for physical damage of the housing and external wiring. A non-operational charger with no physical damage should be returned to the factory as a candidate for a warrantee claim. Physical damage will always invalidate the warrantee against assembly faults and, if a repair is sought, the charger should be sent back to Hawkins.

With the charger correctly connected to the battery and the mains switched off, the charged indicator (green light) should be on as well as the battery voltage being indicated on the charger voltmeter. If this does not happen then check the 50 amp cable fuse located in the front panel of the charger.

When power is supplied the power on indicator (red light) should be on, followed by the charging indicator (orange) and a current indication on the ammeter. If the mains circuit breaker continues to trip when switched on the charger must be sent back to Hawkins Manufacturing for further analysis.

The output from this charger is automatically regulated firstly by current and then by voltage. It is polarity protected against incorrect connection and the current regulation protects it against excessive load. The polarity protection requires a minimum voltage on the battery of 8 volts (16v) to function and batteries discharged below this voltage **will not allow the charger to switch on**. A charger that refuses to switch on should always be checked on a known healthy battery before being regarded as faulty. A jump feed from a charged battery to a very flat battery can usually restore the minimum voltage in a few seconds.

Current is indicated on the meter and, when connected to a serviceable battery, the charger should be indicating a constant value as defined in the specification. A fuse, located on the front face of the charger protects the output cable. If the meter is not indicating current and a correct connection to the battery has been established, check this fuse. The orange light should be lit during the period of constant current and the period under voltage control until the charger switches to the float voltage. The green light replaces the orange when the charge is complete and the controller switches to float. At this point the ammeter will be showing a small current.

The switch to float (green) is dependant on the current drawn while the charger is in the constant voltage period and if current is drawn from the battery during charging, the charger will probably never switch to float.

A dying battery can have a cell that is no longer charging and this leaves the remaining cells to share the charger's full voltage between them. An overcharge and extensive gassing of the remaining cells follows without the charger switching to float. The warning sign is an abnormally long charge time and a significant warming

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of the battery. Any time a battery feels warm to the touch during charging it should be disconnected and allowed to cool before repeating the charge. If rapid heating of the battery happens a second time then the battery is probably at the end of its life.

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2400 Bulk Charger

The first and most obvious action is to check that the charger is plugged into a power source and that it is correctly set up for connection to a bank of batteries. Check for physical damage of the housing and external wiring. A non-operational charger with no physical damage should be returned to the factory as a candidate for a warranty claim. Physical damage will always invalidate the warranty against assembly faults and, if a repair is sought, the charger should be sent back to Hawkins.

It is important that the instructions for this charger be followed as the power available is high and the fuses provided are expensive to replace. With the charger correctly connected to at least one pair of batteries in series and with the mains switched off, the voltmeter should be indicating about 24 volts. If this does not happen then check the connections and the 120 amp cable fuse located in the front panel of the charger.

With the rotary control knob turned fully down for minimum current, switch on the mains breaker. Rotate the knob clockwise and the ammeter should confirm that current is flowing into the batteries. If no current is indicated then a fault is must be assumed.

In order to provide each of the intended 10 pairs of batteries with 10 amps each, the charger has the capacity to provide a total of 100 amps at the start of the charging cycle. The charger is rated to produce this current when the voltmeter is indicating 24 volts and anything significantly less would indicate a fault. It is recommended that the current is reduced appropriately if fewer batteries are connected. If half this number is connected then 50 amps should suffice. Using more power will not harm the charger but may harm some batteries. The higher current will also result in a premature switch-off if the automatic voltage control option is chosen.

A bank of 20 batteries, unless brand new, will always be very different in their states of charge or discharge and probably also in capacity. This will lead to immediate imbalances of current drawn within the charging pairs and those with the lowest combined voltage will initially take most of the current. An indication of this may be found in some hot interconnecting cables but, unless the batteries connected to these cables are faulty, the situation very soon rectifies itself and the current balances itself across all of the batteries. Towards the end of the charge, batteries that are dying and have lost capacity may be seen to be gassing more than most and these may need to be removed from the bank to allow the remaining good batteries to achieve a more complete charge.

The chosen switch-off voltage on the automatic control is 28.8 volts and it would be ideal if the current could be reduced to allow the batteries to absorb more energy while remaining at this voltage. The automatic device provided with this charger will pulse on and off around this voltage. Problems relating to incompletely charged batteries can often be solved by reducing the current at the end of the charge cycle.