SquareWheel INDUSTRIES
2001 County Street
Laureldale, PA 19605
Phone 610.921.8561 ■ Fax 610.921.8571
www.trailertester.com

CHECKMATE 1200 &1200-A User's Guide

Equipment Register

Purchased from:
Date of purchase:
Serial Number:

Thank You…

For buying a ***CHECKMATE***. Using your ***CHECKMATE*** is so easy it's almost intuitive. Still, we encourage you to look through this User's Guide; it contains valuable tips and information that will tell you how to choose adapters, pick the right battery, or install a power supply so you don't even need a battery. Do you need to test ABS? It's all right here, and more, in this User's Guide.

Of course, if you still have questions, feel free contact us on the web at: www.trailertester.com.

www.trailertester.com
Phone 610-921-8561, Fax 610-921-8571

Contents

USING YOUR *CHECKMATE*
Instructions for basic light testing

Light testing with the *CHECKMATE 1200* is a straightforward operation. The six on/off switches on the ***CHECKMATE'S*** panel control the five lighting functions plus the auxiliary circuit.

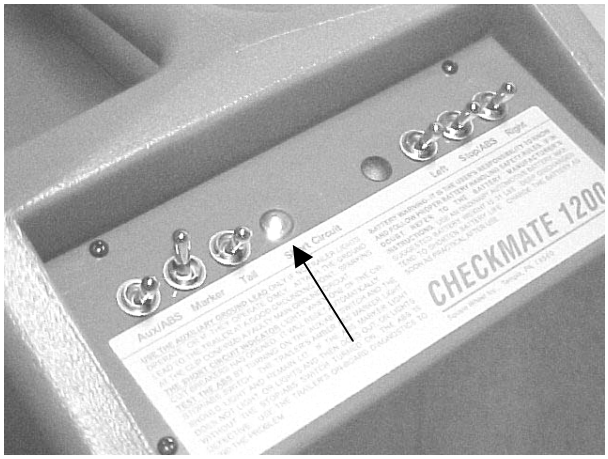
To get an accurate test of the trailer's lighting system you'll need to make two trips around the trailer.

1. Test the marker, tail, and one turn signal on your first walk around.

2. Next, turn these circuits off and test the stop lights and the other turn signal on your final walk around.

WAIT!
<u>Do not endeavor to test all the lighting functions at once</u>. You will not be able to determine that the turn signals are correctly wired- that left is left and right is right (a potential disaster out on the highway). It will be nearly impossible to tell if the tail light filaments are lit while the stoplights are on.

3. When you have finished your light checking task, remember to charge the battery so your ***CHECKMATE*** will be ready the next time you need it.



The Short Circuit Warning Lamp (SCWL) monitors the status of your ***CHECKMATE'S*** circuit breakers and lights up if either one trips open. If this happens, you'll want to identify the shorted circuit. Turn off all circuit switches and wait a few seconds until you hear a click, which will be the circuit breaker resetting. Flip the circuit switches on one at a time. The SCWL will again light when the offending circuit has been turned on.

Note if you're powering your *CHECKMATE* with the IOTA DLS-30 power supply: In order to protect itself from damage, the DLS-30 essentially shuts down in the face of a short circuit. Without power, your ***CHECMATE*** short circuit indicator can not work. To find a short if this happens:
1. If circuit "A" is completely dead, it may be shorted or it may be open. Turn on circuit "B". If circuit "B" lights up, the DLS-30 is putting out power; It sees no short, so circuit "A" must be open.
2. If neither circuit will light up, perhaps it's because the DLS-30 sees a short in circuit "A" and is not putting out power. Turn circuit "A" off. If "B" comes on now, there was a short in "A".

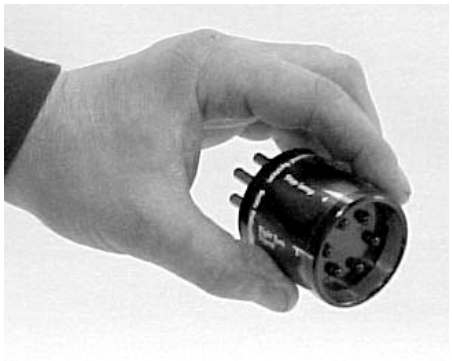
Your *CHECKMATE'S* 20 amp main circuit breaker has ample capacity to fully light most any trailer, but if the trailer has a multitude of extra lights or you're checking a lash-up of triples or turnpike doubles, it may be possible to overload it. Usually, SCWL will respond to a short circuit immediately, while an overload situation can take up to a minute to light the SCWL.

Auxiliary ground lead
Normally you do not need to use the auxiliary ground lead, but if no trailer lights operate, or they operate dimly, or at inappropriate times (such as all the marker lights blinking when only a turn signal should be on), try grounding the trailer with the auxiliary ground lead. If this clears the problem, a ground circuit defect is indicated.

MAKING OTHER TESTS
Testing light cords, etc…

Testing Rear-Mounted 7-Pole Lighting Sockets
Never conduct your primary lighting system check from the rear-mounted plug! You are not testing the floor cable or the nose plug this way, and these are two common trouble spots. And **never** power the trailer from both ends at once, such as powering the rear plug with your ***CHECKMATE*** while a tractor is plugged into the trailer at the front (even if everything is turned off in the tractor). Not only will any test results obtained **this** way be invalid, but you could damage your ***CHECKMATE*** **or the tractor electrical systems!**

If the trailer has a rear-mounted lighting socket, you'll want to check its operation. Use an adapter or a good light cord to connect a Tractor Plug Output Tester (TPO Tester, such as our # 01950) to the rear socket. Then, with your ***CHECKMATE*** powering the trailer from the **front**, read the test results from the TPO Tester.



If you don't have a TPO Tester, make your usual lighting system test from the trailer's front socket. Check the rear socket by repeating the lighting system test, but this time use your ***CHECKMATE*** to power the trailer from the rear socket. Don't forget, **your main lighting system test must always be done from the front socket!**

Testing Light Cords
To test light cords you'll need an adapter (such as our # 01030 or equivalent) to connect your ***CHECKMATE***'7-way plug to the light cord in question. Insert a TPO Tester into the other end of the light cord. Observe the lights on the TPO Tester as you operate your ***CHECKMATE*** circuit switches.

If all of the TPO Tester's LED's light when only one circuit switch is turned on, The light cord's ground circuit is open.

Testing Electric Brakes
Your *CHECKMATE* can be used to test the operation of electric brakes, but only on an on/off basis. You can use an adapter wired so that the electric brakes apply each time you turn on the Stop Light switch, or you can use any other unused circuit. Do not use either of the turn signal circuits, you might overload the flasher.

Flasher Unit
Your *CHECKMATE* is equipped with a high quality heavy-duty flasher. It offers the advantages of reliability and a constant flashing rate with up to 10 bulbs on line. Your ***CHECKMATE'S*** flasher circuits have special circuitry to make them compatible with the latest generation low-current-draw LED tail lights. The flasher will even operate into an open circuit, making it possible to use a test light to troubleshoot a dead turn-signal circuit starting from the back of the trailer.

TIP: Once in service, your *CHECKMATE* will surely confront short circuits from time to time. Eventually, this can make the flasher contacts stick in the "on" mode; the turn signals will light up but not flash. Normally, simply tapping lightly on the lower-center portion of the front panel can unstick the flasher. Don't be too quick to replace the flasher. Flashers that have been repeatedly short-stuck can usually go on to give good service.

TESTING ABS SYSTEMS
Instructions for basic ABS testing

Modern trailer ABS systems contain an on-board computer with self-testing and diagnostic capabilities. Some systems test each time the Auxiliary pin of the 7-pole plug is powered, while others perform a little self-test each time the stoplight circuit is powered. An amber "ABS fault" marker light is located on the left frame rail, usually near the rear of the trailer where it can be seen by the driver through his mirror. It is used to signal the results of this test.

Using your *CHECKMATE* to test these systems is simply a matter of powering up the ABS so that the system can **test itself**, and observing the result of that test.

Before beginning your ABS test, it is **essential** that you have a fully charged battery or a power supply capable of providing smooth, conditioned power to your ***CHECKMATE*** (such as our No.01963 30-Amp power Supply). Do not attempt to power this test by using a typical shop battery charger all by itself. The current from shop chargers often has a ragged wave form that might not be recognized by the ABS computer, and may cause erroneous fault indications. You may, however, test a trailer's ABS while a charger is charging your ***CHECKMATE*** 's battery; because the battery will act to smooth and condition the charger's output, much like a capacitor does.

1. To test the system, position your ***CHECKMATE*** off to the left front corner of the trailer so you can operate the unit and still have a clear view of the ABS fault light.

2. Turn your *CHECKMATE'S* Auxiliary circuit switch ON. Depending on the system, the ABS might test at this time. If it does, the ABS marker light should light up and remain lit up for three to five seconds, then go out, and you might hear the modulating valves 'chuffing'.

3. If nothing happens, turn on the Stop Light circuit switch. The system should now test (minus the 'chuffing').

If the ABS fault light fails to light up, or if it blinks, or if it stays lit all the time, a problem likely exists in the trailer's ABS.

Obviously, the trailer is stationary for this test, but note how this differs from real-world operation; that is, when the trailer is *actually moving.* In that condition, each time the brakes are applied, the ABS fault light should light for about one second and then go out.

If an ABS fault is found, the trailer's ABS has an extensive built-in self-diagnostic feature that can guide you straight to the problem. Since there are several different systems in use, using this feature is beyond the scope of this user's guide; you should consult the factory documentation for model-specific information.

ABS technology is evolving rapidly. New systems and procedures are arriving almost daily, so we can't guarantee that the above information will be correct in the future or in every case. Even though testing and diagnosing ABS systems is a remarkably "user friendly" operation, the complexities of today's vehicles make it essential that you **know the correct testing protocol for the type of ABS system you are servicing.**

SELECTING ADAPTERS
Information about available adapters

The following adapters and accessories are available from Square Wheel Industries, Inc. If you already have adapters on hand, you can use them successfully as long as they are in good, serviceable condition and have ground circuits. If your old adapter does not have a ground circuit you will have to deploy the auxiliary ground lead every time you use it.

Adapter application chart

To test ↓	You'll need ↓ (P/N)
Output of a tractor's SAE 7-pole lighting plug	01950
SAE 7-pole light cords- test continuity	01030 & 01950
Semi-Trailers equipped with the old-style SAE 6-way SOCKET	01018
Utility and construction trailers etc. equipped with a CABLE and SAE 6-pole PLUG	01019
Rear-mounted SAE 7-pole sockets (such as those found on the back of pup trailers)	01027 & 01950
Recreational vehicles equipped with a CABLE and a round, 7-blade PLUG	01023
Light-duty recreational vehicles equipped with ribbon cable and a 4-pole flat plug	01023 & 01022 (or 01017)
All applications. Plugs into your *SCANNER* 7-pole plug, you supply and install whatever kind of plug is needed on the other end. Most cost-effective adapter solution.	01017

01018
01019

01027

01030

01017

SELECTING THE POWER SOURCE
Some options for powering your ***CHECKMATE***

How do you intend to use your *CHECKMATE*? Do you need complete portability so you can use your tester anywhere? If so, you don't want to be tethered to a line cord. Maybe you're going to use your tester in one place, as at the end of a trailer assembly operation. In that case you won't want to be bothered with battery charging. The chart below shows three testing situations and suggests ways to power your ***CHECKMATE.***

Example	Powering Suggestions
Service Truck (exclusively)	Battery alone. Tester has no charger inside to add to carry weight, and is completely portable. Can be used in any weather. Your ***CHECKMATE*** battery can be charged from your service truck's electrical system while you drive. Important: Read "Connecting Your Charger" on page 11 before you do this.
Multi-use- Service Truck & Shop Floor	Battery plus a 6-amp charger. Unit can be fully portable or run on120 volts when it's available. When running on120 volts, the tester's duty cycle is about 50%, which is plenty for most applications. Because the charger is installed, the unit is not weatherproof, but the charger can be easily removed if you must work in wet environments.
Trailer Assembly Operation	30 Amp Power Supply mounted in remote location and connected to tester via 12 volt power cable. Since the tethering cable carries only 12 volts, this system offers safety advantages should the cable become cut or damaged. The tester can be used in any weather so long as the charger is mounted in a dry location. **Or** 30-Amp Power Supply mounted inside tester. Can be used anywhere a 120 volt source is available. 100% duty cycle, no battery requirement. Not weatherproof.

POWER SUPPLIES AND BATTERY CHARGERS
Some ideas about powering your *CHECKMATE*

For your convenience, Square Wheel Industries offers the 6 Amp **Deltran *Battery Tender*** and the 30 amp **IOTA DLS-30** power supply. There are other chargers and power supplies on the market that are similar and provide equally satisfactory service.

⌦ **The Deltran unit is small and light** and can be installed right inside your tester's carrier **along with** a battery for a versatile 120 volt plug-in or battery-powered stand-alone tester.

⌦ **The IOTA power supply is larger** and more expensive, but does not require a battery. It requires access to 120 volts, and is capable of a100% duty cycle. This charger protects itself by shutting down instantly if it sees short circuit (it turns back on instantly when the short circuit is removed). Therefore, your ***CHECKMATE'S*** Short Circuit Warning Light feature can not work when using this charger. See page 1 for an alternate procedure for finding short circuits if you're using the IOTA DLS-30 instead of a battery.

⌦ **Either of these units** can be mounted right inside your ***CHECKMATE*** carrier, but neither is weatherproof.

Power Source	Advantages	Disadvantages
OPTION 1 Battery Alone	1. Complete portability- can be used anywhere 2. Least expensive power option initially 3. Can be used in any weather	1. Battery must be charged regularly 2. Might prove to be most expensive in the long run 3. Can be cumbersome if you're using a big battery
OPTION 2 Deltran 6-Amp Battery Tender installed along with a BCI size (group) U1 battery.	1. Complete portability when needed. You're not tethered to a line cord. 2. Convenient plug-in-and-forget-it charging. Can be plugged in on a 24-7 basis without over charging.	1. When plugged in, duty cycle for tester is typically about 50% (ample for most applications) 2. Not weatherproof unless you remove the Battery Tender
OPTION 3 IOTA 30 Amp Power Supply alone	1. No battery to buy or maintain 2. Always ready to work 3. Duty cycle is 100% 4. Lightest carry weight 5. Least expensive in the long run.	1. Must have 120 volt supply available 2. Not weatherproof 3. Most expensive initially

If you've chosen a powering option that requires a battery, your next step is to select the type of battery. The next section offers some suggestions for selecting the right battery for your application.

SELECTING THE BATTERY
Picking the best battery for your application

Your *CHECKMATE* is not fussy about the battery you install. You have the ability to select the battery with those specific attributes that are most important to **your** intended usage.

☑ **Type—** Unless you have special battery needs, we suggest you install an ***inexpensive*** 12 volt automotive battery. Don't bother with a long warranty or a high CCA rating; they are meaningless in this application. Deep-cycle and gel-cell batteries are best when your battery must go for long periods without charging, but they're heavy and expensive. Avoid these unless you really need the capacity they offer.

☑ **Physical Size—** The maximum recommended battery size is the BCI group 24 (except group 24 Marine; the terminals are too high). Group 24 batteries are 10"long x 7"wide x 9"High (over terminals). If you're installing the optional ***BATTERY TENDER*** charger/maintainer, the group "U1" size battery is recommended. It is small and leaves ample room for the charger inside the carrier.

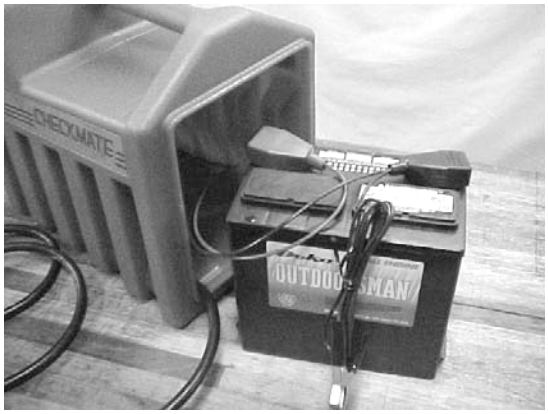
☑ **Reserve Capacity—** Reserve capacity is a measure of your battery's ability to release power over a period of time, and is the only value you need to consider.

This "rule of thumb" is useful when specifying reserve capacity:
When testing typical van trailers with standard incandescent lighting equipment, **the number of minutes of useful life per charge is roughly equal to *twice* the battery's reserve capacity.** For example, a battery with a reserve capacity of 45 will yield approximately 90 minutes of test time before charging is required. The new LED lighting equipment now being installed on trailers draws far less current. If you are checking a high percentage of LED equipment, expect considerably longer usage between charges.

☑ **Weight—**for easy hand carrying, a maximum battery weight of about 30 lbs is suggested.

☑ **Terminals—**post, lug, or stud terminals are acceptable. Avoid side terminals; they might make battery installation difficult.

INSTALLING THE BATTERY
Instructions for installing your battery



1. Install a battery that is clean, charged, and in good condition. Position the battery lengthwise at the rear of the carrier so that the positive(+) terminal will enter the carrier first.

2. If needed, use the battery terminals provided to connect the leads. No part of the connection should extend out over the edge of the battery, and the battery leads should head toward each other. Observe correct polarity- red is positive (+), black is negative (-).

3. Cover the terminals with the insulating covers provided on the battery leads.

4. Slide the battery into the carrier and push it forward as far as it will go.

5. Some small batteries (group U1 for example) fit sideways inside the carrier, although very snugly. Often these batteries have a lug on each end of the battery case. To install or remove this type of battery from the carrier, you must first lift the battery slightly to allow these lugs to clear the ribs in the carrier's side. Other small batteries (group 22NF for example), are too big to fit sideways, so use spacers to center the battery and keep it from moving side-to-side.

Styrofoam blocks make the best spacers, but nail-free wooden blocks will also work satisfactorily.

We do not recommend using grease or sprays to control corrosion on the terminals because these usually become too messy.

CONNECTING YOUR CHARGER
Some tips and ideas about connecting your charger

WARNING! It is the user's responsibility to know and follow proper battery handling safety rules! Always follow the battery manufacturer's recommended handling and servicing procedures. Failure to do so can result in property damage, serious bodily injury or death.

If you have installed the Deltran *BATTERY TENDER,* charging the battery is simply a matter of plugging the charger in. You can leave the ***BATTERY TENDER*** plugged in on a 24-7 basis, it won't overcharge your battery, but it is **not weather proof**. If you must use your ***CHECKMATE*** outdoors during inclement weather, remove the charger before going outside.

You can also charge your ***CHECKMATE*** battery through the 7-way cable. "Hard wire" a charger's output leads directly to a SAE 7-pole socket mounted at a convenient location. Wire the charger's positive lead to the auxiliary circuit pin (the center pin) of the socket and the negative lead to the ground pin (the fat pin). To charge the battery, simply plug your Tester's trailer plug into this socket and turn ON the AUX circuit switch. Charging current will flow thru the unit and charge your battery through your ***CHECKMATE*** circuitry.

This simple charging station provides the plug-in convenience of a built-in charger, but without a 120-volt charger on board, your ***CHECKMATE*** will still be weatherproof.

If you're charging your *CHECKMATE* battery from your service truck's electrical system, charge it through the 7-way cable. You may find your ***CHECKMATE*** 20 Amp circuit breaker trips each time you start the truck's engine, because your ***CHECKMATE*** battery is trying to start the truck when the key is turned. This is considered normal and not a problem.

For safety, run a separate 10 gage wire from your truck's positive battery terminal and install a 30 amp SAE Type 1 automatic resetting circuit breaker in that line. Hook the breaker up so its ACC terminal connects to your truck battery's positive (+) terminal, and its BAT terminal connects to the positive (+) terminal of your ***CHECKMATE*** battery.

If you're using a large battery you can, of course, simply slide the battery out of the carrier to connect your charger.

Regardless of which charging method you use, make sure the battery is well ventilated at all times. Always keep your tester's open end away from walls or other obstructions that would prevent air from circulating into the carrier and around the battery.

CHARGING THE BATTERY

General information about charging your battery

WARNING!

It is the user's responsibility to know and follow proper battery handling safety rules! Always follow the battery manufacturer's recommended handling and servicing procedures. Failure to do so can result in property damage and/or serious bodily injury or death.

Nothing will destroy a good battery faster than overcharging. As a rule when charging most batteries, voltage should be limited to about 14 volts at no more than 12 amps for maximum battery life. Check your charger output to make sure it can limit itself to these levels.

On the other hand, storing a partially discharged battery will shorten its life. Charge the battery as soon as practical after use.

We suggest a 6 to 10 amp charger, preferably with a "storage" or "float" mode be dedicated to charging your tester's battery.

Deltran's 6 Amp *BATTERY TENDER* charger/maintainer is just such a charger and is our primary recommendation. The ***BATTERY TENDER*** is rated at 6 amps, and its microprocessor controlled float mode will never allow your battery to be overcharged, even if left plugged in on a 24-7 basis. The microprocessor protects the charger from damage due to overload, short circuits, or reversed polarity. The ***BATTERY TENDER*** is small enough and light enough (only 21 ounces) to be mounted in your ***CHECKMATE*** carrier along with your battery. We suggest you use the BCI size (group) U1 battery with this charger, but it is possible to use a bigger battery if your application requires it. (Our part number 01960)

Square Wheel Industries, Inc.'s Five-Year Warranty
What could *Possibly* go wrong?

Warranty Policy: Each *CHECKMATE* Trailer Lighting System Tester is warranted by Square Wheel Industries, Inc. to be free from defects in materials and workmanship for a period of five years from the date of purchase by the original customer. The warranty will not apply where the unit has been abused, misused, subject to accident, or if the defect is caused by alterations made to the unit without approval from the manufacturer.

This warranty covers 100% of parts and labor. Square Wheel Industries, Inc. will, at its option, repair or replace any unit or part thereof which, in its opinion, has failed under the terms of this warranty. Replacement units may be a different model than the unit being returned for service providing the replacement unit is functionally equal to or better than the unit that was returned. Replacement units may be either new or reconditioned. Replacement of parts or the complete unit does not extend the original warranty period. The customer shall return the unit to Square Wheel "freight prepaid". Square Wheel Industries, Inc. will pay for shipping the repaired unit back to the customer.

When you unpack your *CHECKMATE*, you may notice some scuffing or minor scratches on the carrier. Your ***CHECKMATE*** carrier is molded from low-density polyethylene. This material is very tough and able to withstand extreme conditions, but prone to acquiring small surface imperfections. In fact, scuffing often occurs as the carrier is withdrawn from the manufacturing mold, and during the trimming, shipping, and assembly process. These cosmetic imperfections in no way affect the strength or integrity of the carrier.

There is no finer material for your *CHECKMATE* carrier. Its use ensures a virtual lifetime of rough-and-tumble service.

Service and spare parts
If you must return your *CHECKMATE* for service…

It is very important that you include a note explaining what's wrong, and please include the name and phone number of someone with firsthand knowledge of the problem.

For service or further information call or fax:

SquareWheel INDUSTRIES
www.trailertester.com
Phone 610-921-8561
Fax 610-921-8571

Supplemental Information for # 01015 Ammeter Modification and/or RV-7 Blade Socket Substitution Model- 1200A Order # 01015

This unit may be a modification of the standard CHECKMATE 1200, with the addition of an Ammeter, and relocation of the control panel decal.

If the CHECKMATE has also been modified with an RV 7-Blade socket (replacing the SAE 7-Pole plug), a new panel label has been applied to reflect the change to the RV protocol.

In addition to the information provided in the standard User's Guide, the following also applies:

1. **The Ammeter measures the total current being drawn** by any lights, brakes, or accessories turned on in the trailer (To make troubleshooting dead circuits easier, CHECKMATEs have internal loads wired into the flashing circuits to enable them to flash even when they are not externally loaded. Since this load is not attributable to the trailer, the Ammeter does not measure this load).

2. **The red indicator lamp lights up when either of the circuit breakers trips open**. This lamp lost its label in the course of the ammeter modification.

3. **Overloads, such as short circuits, that cause the ammeter to be "pegged"** in either direction will not harm the Ammeter, provided they are limited in duration to 5 to 10 seconds. This is plenty of time for the circuit breakers to react and remove the overload.

If your CHECKMATE has an RV 7-Blade plug and the RV panel decal, the following also applies:

1. **The "Batt Circuit" ("Mark" circuit on SAE panels) is the trailer's break-away battery charging circuit.** To test this circuit, disconnect the trailers positive battery lead and, using a test light, check for current coming from the CHECKMATE at the trailer's disconnected positive lead. **Leave this switch turned off at all other times.**

2. **When testing electric brakes (the "Stop" circuit on SAE Panels),** make sure all other circuits are turned off so the ammeter will measure only the current draw attributable to the brakes.