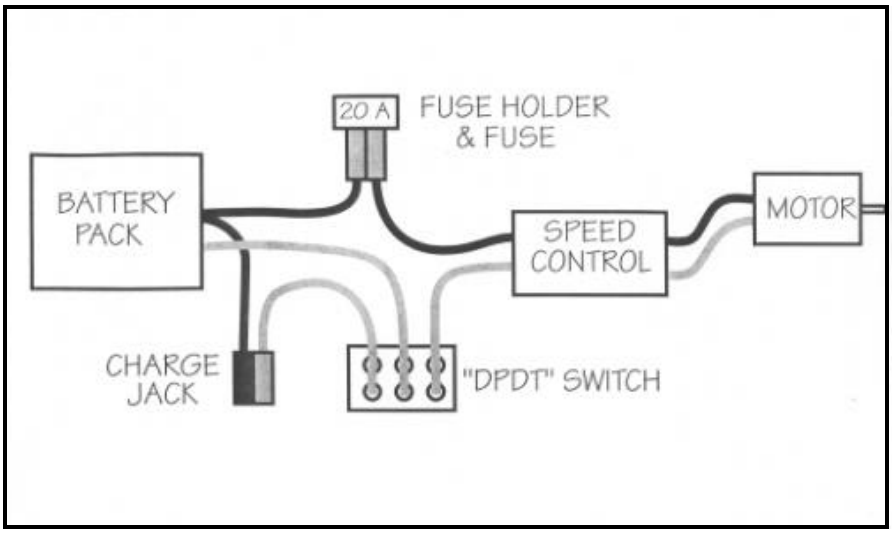
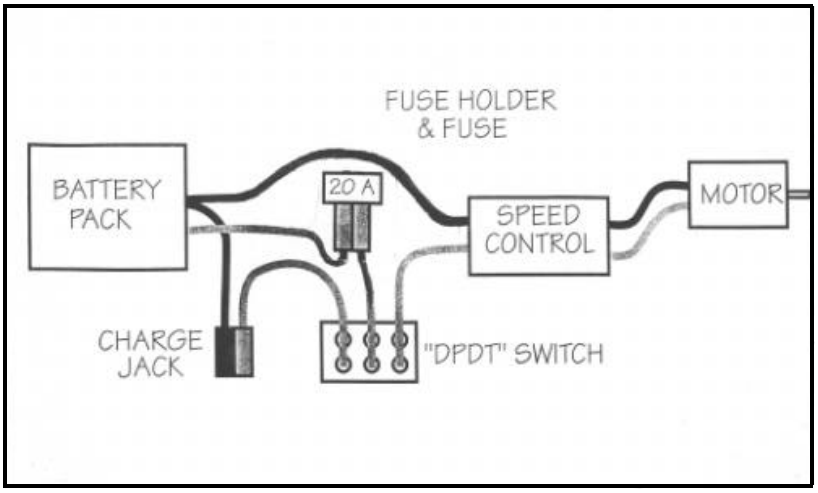


The diagram above appeared in the October 1994 issue of *Flying Models*, p. 69 See if you can figure out why our club member, Jack Lemon, recommends the diagram below.



BATTERY FACTS
provided by TME
Tejera Microsystems Engineering, Inc.

This information is believed to be as true and accurate as humanly possible, feel free to copy and distribute.

MYTH: Batteries form a "memory" that, if not eliminated by cycling, can cause you to CRASH your model.
FACT: The dreaded "memory" was first described by GE (now GATES) in their Nickel Cadmium Battery Applications Engineering Handbook and describes a temporary "voltage depression" caused by continuous but safe overcharge. This voltage loss amounts to a maximum of .15 volts per cell. Discharging the battery in order to observe this memory actually eliminates it. Shallow discharges would define the point that the "voltage depression" was eliminated from. Further discharge from that point in time would still have the voltage depression thus it "seemed" to remember the shallow discharges.

First, lets say that in R/C radio applications we cannot "feel" the effects of this 12% max loss in voltage. Your transmitter range would decrease perhaps 12% less and your servos would run with 12% less power. You cannot "feel" this anymore than you can detect the voltage difference from your first flight of the day to your 10th. If your battery application involves power tools, or RC car racing, electric shaver or even a camcorder you might detect this voltage (i.e. Power) loss. However, this voltage depression may "fool" a cycler into showing a lower capacity for the cell since most cyclers stop timing below a certain voltage. This would tend to exaggerate the "memory" effect and falsely link it to lost running time.

Note that GE (GATES) is the only manufacturer that has published its findings on "their" batteries. Other manufacturers claim that their technology does not provide this phenomena. In trickle charging batteries with our Auto-Trickle Adapter for over a year and a half we have NOT observed this phenomena at ALL. (Note this represents a test involving only 9 battery packs.)
MYTH: You can leave your batteries on at the overnight charge rate C/10 indefinitely. You don't need a special trickle charger.
FACT: We're not picking on GE (GATES) but they are the only manufacturer that claims that you can charge continuously at "up to" the C/10 rate (overnight) and no lower than the C/50 rate. Sanyo recommends C/20 to C/50 and Panasonic recommends C/30 to C/50 for sustained trickle charging

over the full recommended operating temperature.

Here again your application is what should make you decide. If it's a cordless shaver or a cordless drill. so what if the batteries burn out after the 90 day warranty. We think RC applications deserve a more conservative approach than a shaver. Therefore we designed our AUTO-TRICKLE ADAPTER to trickle at the C/40 rate. A conservative compromise sufficient for all battery manufacturers charging at a wide variety of temperatures.

Remember, if your cells have sustained a heavy overcharge, the pressure inside may have caused the cell to vent. If you notice a loss of electrolyte (white powder) you have already damaged your cells from the excess pressure and temperatures caused by overcharging. Some modelers have reported burning out packs in as little as a week of overcharging at the C/10 overnight rate.

The bottom line is that YOU decide the risk YOU take! We therefore follow the battery manufacturers guidelines. They are conservative but we believe its worth it!

Some simple Do's and Don't's for NiCd battery care.

DO

...charge your batteries for a full 14 - 16 hours (whether you think you need to or not) just before you fly OR..

...charge your batteries for a full 14 - 16 hours when you get home and then put them on a trickle charger. TME's Auto-Trickle Adapter allows you to convert all your existing chargers to safe automatic trickle chargers. keeping your batteries always ready to go.

...test your batteries (Test them by using a battery cycler several times a season. Over time they will get weaker. Throw them away (or put them in a non flying object) after a significant drop in capacity (discharge time) is seen. Say a 20 - 35 % drop. Testing (cycling) will even eliminate any "voltage depression" or "memory" that may have formed.

... replace your NiCd batteries every 2 to 3 years or sooner if your testing shows a problem. Battery failure "statistics" is the only reason for this conservative approach.

...isolate your batteries from shock and vibration. (Wrap them in latex foam rubber.)

Tx & Rx Batteries Cont.

...physically inspect your batteries (Look for dings in the metal cases. Replace individual cells or better yet replace the whole pack if dents are discovered.)

...check all electrical connections (Keep an eye out for frayed. worn, corroded. or pinched wires and look for loose and dirty connectors.)

...check your receiver power switch for loose contacts. It doesn't usually hurt your batteries but it CAN hurt your plane. (If you replace a switch it's best to get a double pole type and double up your contacts for best reliability.)

... monitor your receiver battery voltage as often as possible. Ideally before each and every flight. (If your meter does not provide a load, just turn on the receiver and move all the control surfaces, it's the best load there is. . . the actual load! Don't fly if you read 4.6 volts or lower in your (4 cell) receiver pack. If you have our engine running you can catch the effects of: vibration, or a poor charge. a weak cell, frayed wires, stalled servo, power hungry gyro or a partial short before they take down your model.) TME's The Guardian Angel and the NEW Little Angel will do this for you automatically with a gentle Audible reminder.

...keep an eye on your transmitter's meter. (If its broken. get it fixed!)

DON'T

...listen to R/C car hobbyists when they talk about NiCd's. (Their goals for NiCd performance are very different from our goals for TX and Receiver batteries in planes and helicopters. The things they do would make Mr. SANYO drop dead instantly!)

...subject your NiCd's to prolonged extreme temperatures. (Inside a hot automobile or garage in the summer heat can deteriorate your cells over time.)

...discharge battery PACKS to zero volts. (If you keep forgetting to turn off your receiver or transmitter you will end up damaging your pack. Weaker cells will reverse charge and eventually become shorted cells. Note that individual cells may be discharged to zero volts without harm.)

...leave your overnight chargers on for more than 2 or 3 days. (Signs of damage are a loss of electrolyte (white powder) caused by overheating and cell venting.)

...charge at high temperatures (over 90 degrees F) or high currents without heat or peak detection chargers.

We'll be glad to answer any questions.

(813)-968-9510 **Tejera Microsystems Engineering, Inc. - TME**

Innovative Products You Can Depend On

Helpful Henry

From The Ohio Radio Kontrol Society Newsletter, George Reverman, Editor, come these tips:

Check Your Tach. You can check the accuracy of your tachometer by aiming it at a fluorescent lightbulb. They oscillate at 3600 cycles per second which translates to 3600 RPM in the two blade mode and 2400 for three blades.

Pull Gears. To pull gears from electric motors, go to the bicycle repair shop and buy a chain repair tool.

A Blade for Monokote Which Lasts Forever. Monokote is very rough on blades. Try removing the blades from the Blue Handle Gillette razor. Glue it between two pieces of 3/32 balsa. These blades will outlast X-acto 10 to one. Suggest you don't shave with the blade first.

Iron Cleaner

Tom Miles of Colma, California has this tip for **keeping your covering iron clean:**

To clean a covering iron as glue and pigment accumulate, use waxed paper. Tear off about one foot, fold it in half, then fold it again into a square. Wipe the iron on the wax paper over the edge of the workbench. It will take several wipes. Then wipe the iron gently with a tissue.

The Klemm

from : Joe Wagner
135 Waugh Avenue
(P.O. Box 15)
New Wilmington, Pennsylvania 16142

A couple of years ago I was sent one of the Graupner Klemm L-25 kits plus all the Graupner-recommended accessories for it: motor, gearbox, speed control, prop, and battery pack. These freebies were furnished so that I could do a "Field and Bench" review of the kit for Model Airplane News.

That article never appeared in print -- because my review was far from complimentary. The best things I can say about the Klemm are (1) the box art is beautiful; and (2) the kit contains a LOT of surplus wood.

I can't find any fault with the Graupner motor, gearbox, speed control, etc., even though the first speed control they sent me smoked the first time I tried it. (The replacement functions flawlessly.)

But the airplane is something else. Its design's far too complex -- and for no reason that I can discern. This is not a true scale kit, so the only reason I can figure for the Klemm's incredible number of parts and their complicated assembly procedure is that the designer loves complexity above all else. For instance, there's not a single right-angled joint in the fin construction -- and its "spar" is a 2-piece, scarf-jointed hardwood/balsa assembly.

MAN's editors told me to build the kit as designed, in order to provide an honest assessment. But before I got a third of the way through the Klemm's construction I HAD to begin simplifying. I could see the weight piling up: the tailskid alone was supposed to be attached with two screws, nuts, and washers to a 2-piece plywood insert, and the "latch" for the removable upper deck weighed half an ounce.

But even with my simplifications, the Klemm ended up with a flying weight of 37 ounces. The gross wing area measures 300 square inches. However, I feel that the working area's more like 275, because of the wing's sharp taper plus its washed-out tip sections.

The finished Klemm barely balanced correctly, with the power battery pushed as far forward as it would go (half an inch ahead of the "design position") .

Every takeoff attempt (on smooth concrete) ended in a groundloop. The first hand launch attempt also failed (from lack of impetus), and the only way we could get the Klemm flying was with a desperate heave delivered from a full running start.

Once in the air, the Klemm proved only marginally controllable with the "design deflections" of its rudder and elevator. (The plans show aileron installations, but the model's construction was so obviously overweight that I decided to forego the ailerons.)

The next flight, with the control motion increased about 40%, turned out more successfully. However, it still needs a catapult-strength launch, and is not what I consider a pleasure to fly.

To sum up: the Klemm's a purty airplane, and makes a nice ornament to hang from the ceiling.

[I plan to remove the motor, R/C system, battery pack etc. from the Klemm and install them later in a scratch-built model of an American version of the Klemm: either the Keane "Ace" or the Aeromarine. This will be somewhat larger than the Graupner "design"; with perhaps 360 sq. in. of wing area -- and an all-up weight of 32 ounces.]