



SHACKNEWS

HIGHVELD AMATEUR RADIO CLUB

MARCH 2011

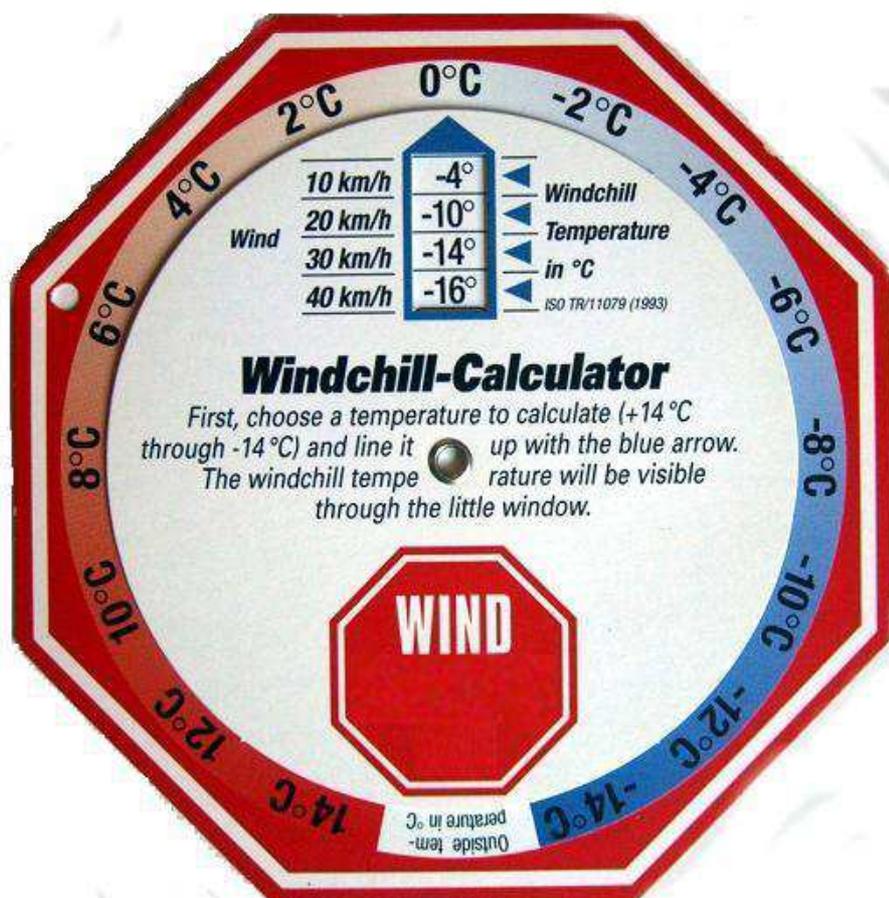
COMMUNICATION IS THE NAME OF THE GAME

Meeting There was no meeting during March. Please visit the new club website and participate. After all it is for you. The practical antenna day will take place on Sunday 10 April at the QTH of Rex, ZS6REX. The address is the farm "Cartwheels", 22 Kliprivier road (R550) Eikenhof, very close to the Lido hotel. GPS coordinates - 26deg 20' 7.47" South, 27deg 59' 53.19 East, according to Google Earth. This could be a long session so braai fires will be made available. This day will be open to all amateurs.

SSC Meeting A successful meeting was held at the QTH of Berridge and Sandra with 16 attending according to the register. The weather was not to wonderful with rain during the afternoon so everyone was inside. Thanks to all those who brought along extra goodies to eat. The next get together should take place on 18 June 2011. Venue to be announced later.

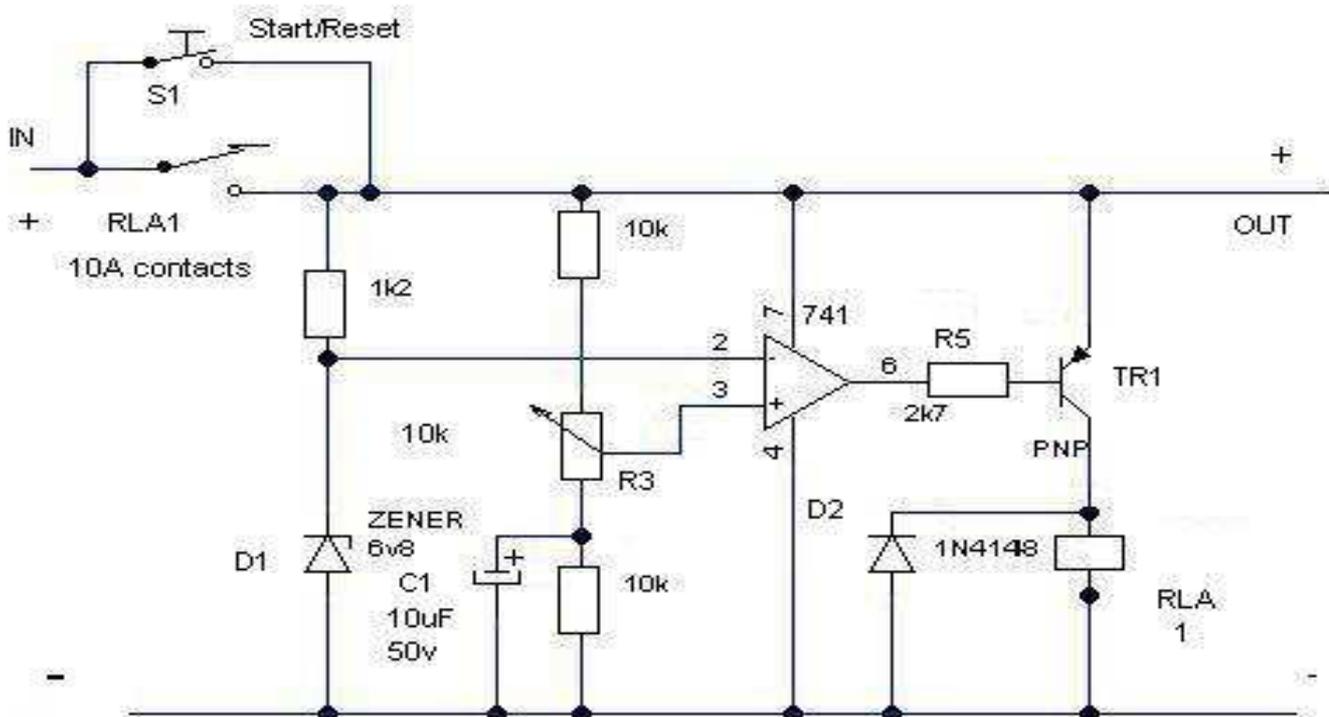
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A windchill calculator



I guess one could make one from the info on the last page (P4)

An over voltage and overload trip circuit for your



The unit described is intended for inclusion into an existing p.s.u. and not only provides over voltage protection for your rig but also offers protection of the p.s.u. in the event of a short-circuit overload. Built on a p.c.b. roughly 50 x 25mm, it is easily housed and requires only three connections to be made to the p s u, plus the reset push-button.

The lead to the existing output terminal of the p.s.u. is disconnected and taken to the p.c.b. In addition a "push-to-make" normally-open switch is connected across these points and may be located at some convenient place on the p.s.u. front panel.

The diagram shows the circuit of the overload device from which it will be seen that at switch-on, the p.s.u. output voltage appears at "+". Pressing the reset button (S1) applies this voltage to the trip circuit and output. The voltage at pin 2 of the op. amp is stabilized at 6.8V whilst that at pin 3 is set by means of R3 to about 6.5V. Under these conditions the op amp is driven into negative saturation. The output at pin 6 is at or near earth potential and the transistor TR1 is driven on. The relay is energized and the contacts closed, holding the p.s.u. output on when S1 is released. Should anything now occur to cause the p.s.u. output voltage to rise to the extent that the voltage at pin 3 exceeds the Zener voltage, the op. amp will be driven into positive saturation and the voltage at pin 6 will rise to near supply potential, cutting off Tr1. The relay will now open, isolating the output.

Should a short circuit occur on the output side, the voltage supply to the p.s.u. will collapse *ipso facto* and the relay again will open, isolating the p.s.u. from the damaging overload.

With the p.s.u. switched on the delivering its normal output, rotate the preset R3 slowly until the relay trips. Measure the voltage at pin 3, Back off R3 until this voltage is reduced by 0.3V. The circuit will, not now trip until the output voltage rises above 13.8V by about half a volt, i.e. to about 14.3V. This is a "safe" margin as most 13.8V equipment can be run safely up to about 15V without danger.

The function of the 10pF electrolytic is to prevent any occasional "spikes" from tripping the relay. Resistor R5 is a base-current limiting resistor. The resistance of the coil of the relay is about 4000. Diode D2 protects TR1 (used a BC258 in my unit) from the back e .m. f from the relay coil.

(There are other devices available, the "crowbar" type that blows a fuse being one but one described above works for me. Ed.)

Transmission Line - Myths and Basic Truths & FAQ's

(Found on the WWW)

Myth 1 - I don't need a balun, because my antenna (or dipole) is resonant.

Basic Truth 1 - A balun is recommended in connecting coax lines to balanced lines or balanced antennas - otherwise there will be an RF conduction path on the outside surface of the coax shield.

Myth 2 - The SWR should be 1:1 because the antenna is resonant.

Basic Truth 2 - There is no antenna that is inherently matched to any particular transmission line. The resistive or real component of the antenna's impedance is a function of its physical dimensions, its orientation with respect to surroundings and its frequency.

Myth 3 - A heavy gauge wire or strap connected to an earth rod is a "ground".

Basic Truth 3 - Any conductor connected to an earth rod, or any other solid connection to the earth or a buried conductor, can act like an antenna all by itself. In fact, such wires can be better antennas than "grounds". The impedance of a wire or strap changes as a function of frequency and the length of the wire or strap to the point where it is earthed. If the length approaches one quarter wavelength or an odd multiple thereof, the impedance will be extremely high. Therefore, so-called ground wires can often be very poor grounds indeed. If the ground wire is getting too long to be a good ground, it may improve things to make it a half wave long, in which case it begins to act like a good ground again. However, the RF current flowing in such a ground wire may be equal to the RF current in the antenna proper. It depends on the type of antenna - whether it's balanced or unbalanced against ground. An end fed antenna system is actually comprised of a part that you normally think of as the antenna itself and also a part that you think of as the ground wire. The "ground" wires in house wiring are earthed at, or close to, the service entrance panel, but from there out to the extremities of each branch you have a veritable Christmas tree of antenna branches. Each such branch is effectively an antenna resonant at some frequency. The ends of those branches can be very hot with RF voltage if they happen to be a quarter wave at or near your frequency of operation.

FAQ 1 - Why does the SWR seem to be different with different lengths of coax?

This is usually a symptom of RF flowing on the outside surface of the coax. There doesn't seem to be any general agreement as to why an SWR meter would be sensitive to RF on the shield, but there does seem to be a correlation. (See "Baluns and RF on the Coax Shield" below)

FAQ 2 - What is characteristic Impedance?:

The characteristic impedance of a transmission line, Z_0 , is the impedance with which it must be terminated at the load end in order to be flat - i.e., not have any standing waves (SWR = 1:1). If a transmission line is not terminated in its characteristic impedance, there will be a reflection of energy at that mismatch which will in turn be responsible for a buildup of standing waves.

FAQ 3 - What are Baluns and RF on the Coax Shield ?

A centre-fed antenna with open ends, of which the half-wave dipole is an example, is inherently a balanced radiator. If the antenna is fed at the centre through a coaxial line, this balance is upset because one side of the radiator is connected to the shield while the other is connected to the inner conductor. On the side connected to the shield, a current can flow down over the outside of the coaxial line. these "antenna currents" flowing on the outside of the line will be responsible for radiation.

A Balun is one of the ways in which antenna currents on the outside of the coax can be reduced or eliminated.

FAQ 4 - What is antenna Impedance ?

While it is true that a resonant dipole has an impedance very close to $50 + j 0$ (50 ohms resistive), antennas in general can have quite a range of impedance. In fact, the radiation resistance of the resonant dipole is very dependant upon the height over ground. The radiation resistance over realistic earth will vary from 45 to 100 ohms. There are probably more antennas being used off resonance or at harmonics of the resonant frequency than there are being operated at resonance. For example, the G5RV is almost never operated at its resonant frequency, which would be between 4 and 5 MHz.

Folded Dipoles can have impedances of several hundred ohms at resonance, depending on wire diameter and spacing.

Verticals can have impedances at resonance from about 35 ohms and up, depending upon ground impedance.

Windchill factor

1. Find out the temperature T in degrees Celsius and the wind speed W in kilometres per hour.
2. You can use the official formula to compute the windchill equivalent ($13.12 + 0.6215 T - 11.37 W^{0.16} + 0.3965 T W^{0.16}$) or you can work it out in your head as follows and get an answer that is accurate to the nearest degree.
3. First work out the 'wind factor' F. At 5 km/h, it's 52%. At 10 km/h, it rises 5% to 57%. At 15 km/h, it rises 4% to 61%. At 20 km/h, it rises 3% to 64%. At 25 km/h, it rises 2% to 66%. Beyond that, it's cold, so give yourself three bonus percentage points plus another point for every 5 km/h over 25. That makes the wind factor 70% at 30 km/h, 71% at 35 km/h, 72% at 40 km/h and so on.
4. Take the number of degrees above -21 and multiply by 5/8 to get some warmth. If it's positive, be thankful. Take the number of degrees below 28 and multiply by the wind factor to get the cold. Subtract the cold from the warmth and you get the windchill equivalent.
5. *Example:* The thermometer reads -18 and the wind is blowing at 20 km/h, giving a wind factor of 64%. The warmth is 5/8 of three degrees, let's say two degrees. The cold is 64% of 46 degrees, let's say thirty degrees. That gives a wind chill equivalent of -28. The official formula gives -28.02: close enough!
6. If the windchill is -25, you can get frostbitten after 'prolonged exposure'. If it's -35, it takes ten minutes. If it's -60, it only takes two minutes.

(Seeing that we moving into winter, horrible thought, here is something to try out. Have not tried it myself - Ed.)

CLUB INFORMATION

Postal address PO Box 19937 Sunward Park 1470

Website <http://www.zs6hvb.za.net>

Back issues of Shacknews available on the club website

e-mail zs6hvb@zs6hvb.za.net

Repeater 145.1875 MHz input - 145.7875 MHz output

Linked to 70 cm - 438.850 Mhz (Sunday bulletins)

Bulletins Sunday morning - 145.7875 MHz & 7062 KHz @ 08h45.
Relay - 80M - 3662KHz

Monthly meeting venue

Germiston Methodist Church
Room at back of the offices
Lady Duncan Rd
Germiston

3rd Saturday of the month at 14:30

Committee

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Club bank details

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