Dear DRTS 64/66 user !

   If you have been using DRTS with high burden relays you have most probably encountered this Warning Message up until now.
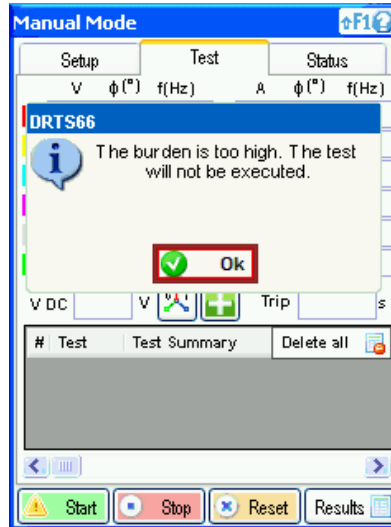

Figure 1 When the relay you are testing is a "bit too much" for DRTS

   We at ISA decided to do something about it and we did. In the next few easy steps we are going to describe what is the novelty in the new Firmware 1.24 that will let you pilot the loads that are as twice as high, or that will allow you to double current that you used to generate thru a certain load.

The novelty the new FW 1.24 brings

When you Upgrade your test set to version 1.24 your Local Control will look like the one you see on Figure 2

Figure 2 Local Screen after upgrading to FW 1.24

The new thing is the Auxiliary Settings button. This button already existed in FW 1.23 when ISA introduced the new feature used to control the V DC, but now in 1.24 this option has grew and now aside from V DC option, it has also the Burden Settings, as you can see in Figure 3.
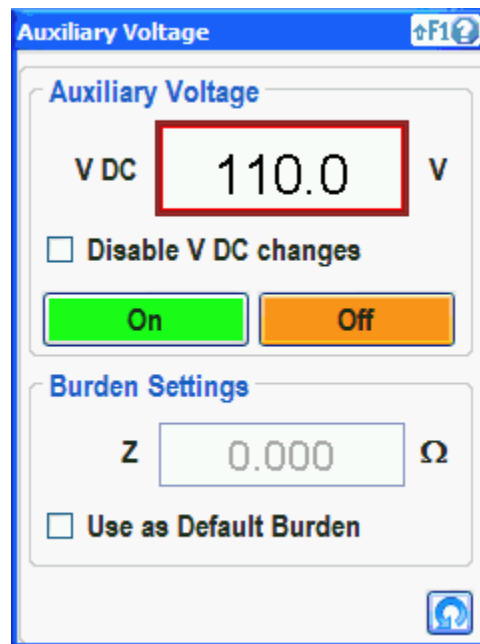
Figure 3 The options offered when you choose Auxiliary Settings button

How to use the Burden Settings option is going to be described in this short manual.

How to use Burden Settings

If you remember some of the specifications of DRTS 66, you'll remember that power on current output is 430 VA at 32 A. It is also said that if you parallel two current outputs, you can reach 860 VA. This Burden Setting option helps you reach 860 VA.

Let us do some math – if max current is 32 A and if with that current the supplied power is 430 VA, that means that the voltage driving those 32 A is V=P/I which gives us the driving voltage of 13.43 V (RMS value).

Another important thing to know is that DRTS 64 and 66 have two current amplifier cards. The first one is responsible of generating I1, I2 and I3, and the second current amplifier card generates currents I4, I5 and I6. Each one of these two cards can give us 13.43 V of driving voltage, but if we connect these two cards in series, we can get double the driving voltage, and accordingly, we can double the power.

So to conclude - if we connect two current outputs in series like observed in Figure 4, we have doubled THE POWER (860 VA @ 32 A), but the maximum current stays the same at 32 A.
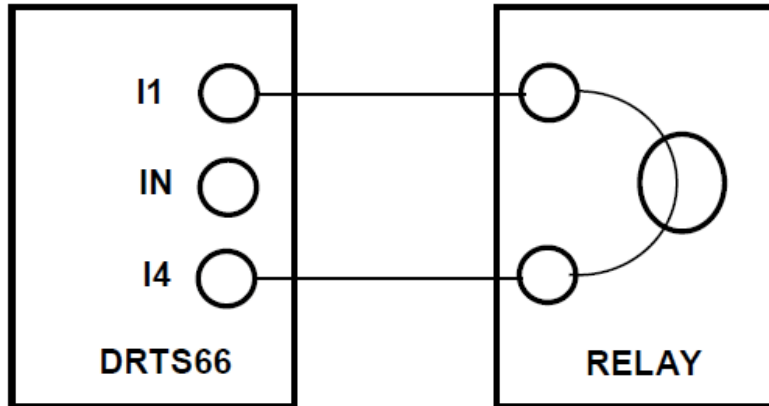
Figure 4 Series connection between two current amplifiers that doubles the power

Now Let's get Practical

So how to use this new feature? First of all, what you need aside the high burden relay you are testing and the DRTS 66 is a multimeter. Any multimeter which measures AC voltage will do. You will use this multimeter to measure the driving voltage on current outputs. It might sound a bit counterintuitive at first, but you'll see it has sense.

First step is determining what is the burden you want to pilot (or in other words, what is the impedance of the relay you are testing). Unfortunately you cannot just use your multimeter to measure the Relays impedance because the multimeter would measure only the resistive component of the Relay's burden, but what we are looking for is a complete impedance.

So what you need to do is to first connect your Relay. Like this to I1 – Relay – IN (basically performing the standard single phase connection). Then take your multimeter and connect one connector to I1 and the other to IN (just like Relay)
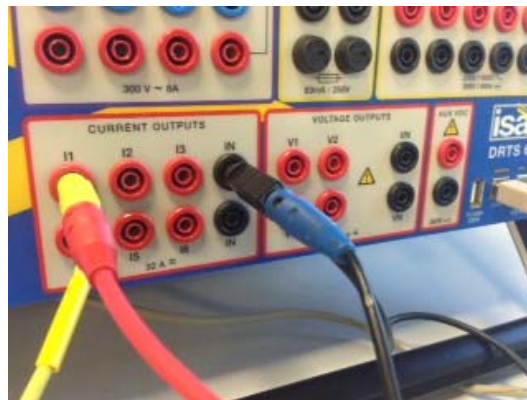

Figure 5 Connecting the Relay and Multimeter

In Figure 5 you can see the connection. Yellow and black connectors belong to a Relay, and red and blue are the multimeter's connectors meant to measure the driving voltage.

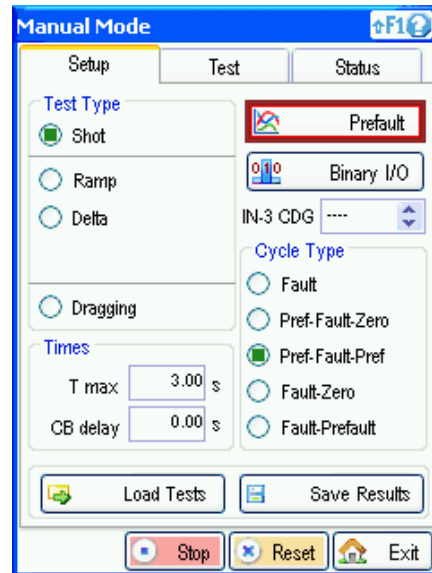Now go to Manual Mode in Local control and Prefault like on Figure 6

Figure 6 Choose Prefault in Manual Mode

When in Prefault set the current on I1. The value depends on the Relay but try for example with 5 A. If the generation fails due to the high burden of Relay, then simply reduce until you reach the value of current DRTS 66 can drive thru the Relay. In my case I first tried with 5 A, but I got "Overload on Current I1".

Here I need to explain two things and make a small digression. In Prefault you can generate max of 10 A. Second thing is that even if the Burden is too high in Prefault, you will not see the alarm "Burden too high message", but "Overload" message. This is due to the fact that in Prefault, the DRTS 66 does not measure the impedance, so it cannot give you an alarm if the Impedance is too high. Instead it gives you the "Overload" message.

But let us get back to the Prefault. After failing with 5 A, I reduced and tried with 4 A and it worked. You can see how I set the Prefault in:

Figure 7 How I set the Prefault that managed to drive the current thru the Relay

Sometimes you might need to go as low as 1 A or even less, it all depends on the Relay you are testing, but when eventually you manage to get the current going thru your Relay, you need to read the value on your multimeter. To remind you, you are measuring the AC voltage in the range up to cca 35 V.
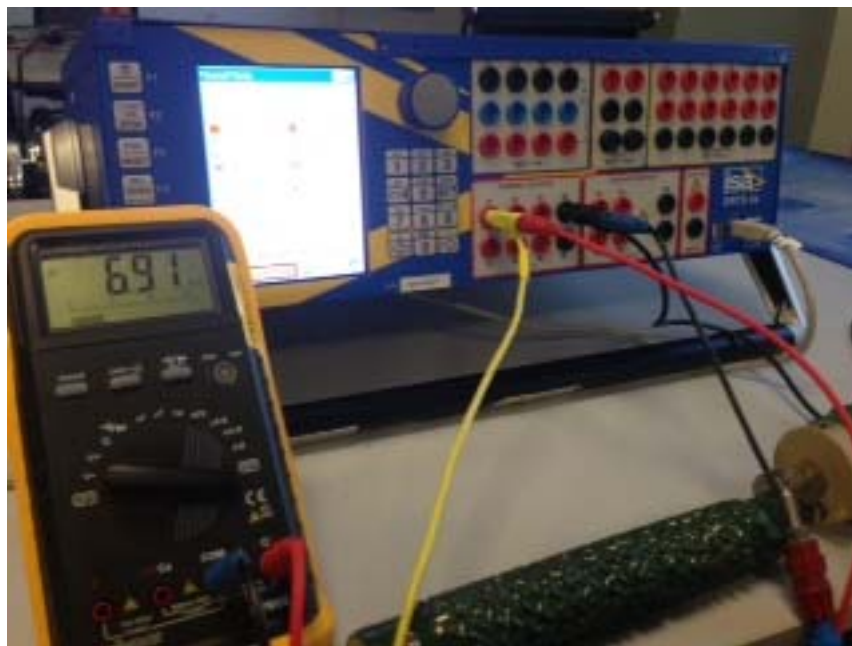

Figure 8 measuring the driving voltage on I1 - IN

In my case that was 6.91 V. What we need to do now is to take this figure and also the current you are generating, in my case 4 A and using the Ohms law, calculate the Relay's impedance. So Z = V/I which in my case gives me the impedance of 1.73 Ohm.

 The next step is dividing this number with two – in my case 0.86 Ohm. Why division you ask? Because in the next step you are going to divide this burden between the two Current Amplifiers.

The next step – Burden Settings

What you need to do now is this – exit the Manual Mode in Local control and go to Auxiliary Settings. One there, enable the "Use as default burden" and insert the value you have just calculated, like I did it in Figure 9.
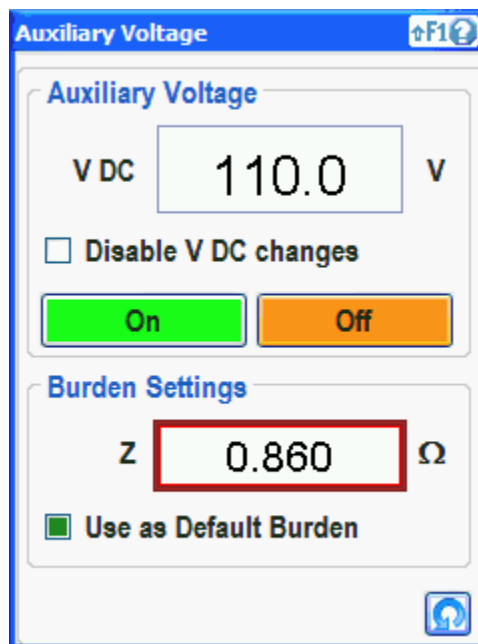

Figure 9 Setting the Default Burden

Basically what you are doing in this step is that you are telling the DRTS this "you do not need to calculate the burden, I am telling you that this is the burden you are seeing". By doing so, you are preventing the DRTS to measure the burden, you are bypassing the measurement. This helps because DRTS has a lot of power, but if it sees a burden higher than an internally defined burden threshold, he will not even try to generate the current, even though he often is capable of doing so.

After this is done, exit the Auxiliary Settings and return to Manual Mode.

Changing the connection

Now you need to disconnect the IN and place it in I4 as seen on Figure 10. Thus you are about to double the _power_
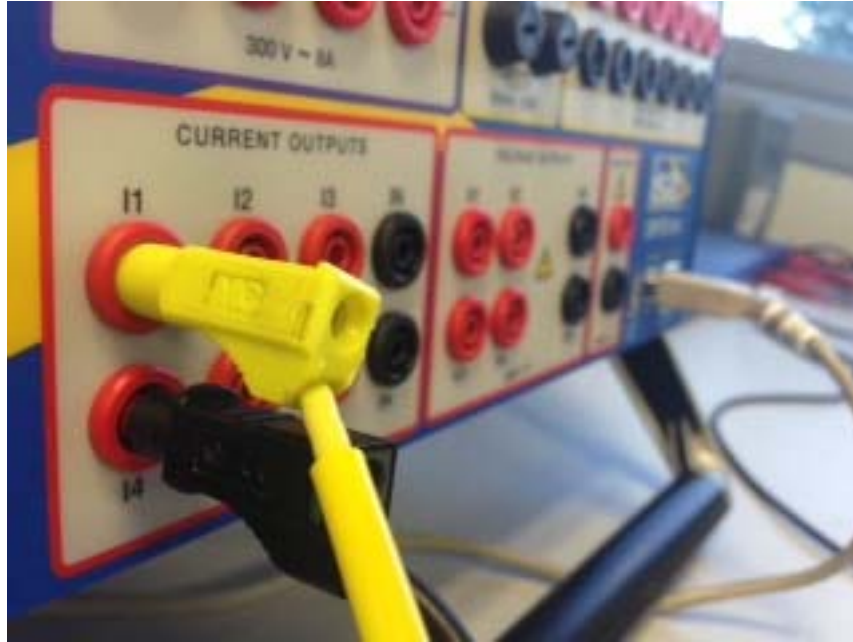

Figure 10 Doubling the power

So what you did now, you performed the connection described in Figure 4. There is one more thing to do and you are all set.

Now in Manual Mode go to Test Tab and set I1 and I4. Important thing is to set both values the same – in my case I first tried again with 4 A. And even more important – THE ANGLES HAVE TO BE SHIFTED 180°. So in this case I1 will be 4 A with 0° and I4 will again 4 A with an angle of 180°, like in Figure 11
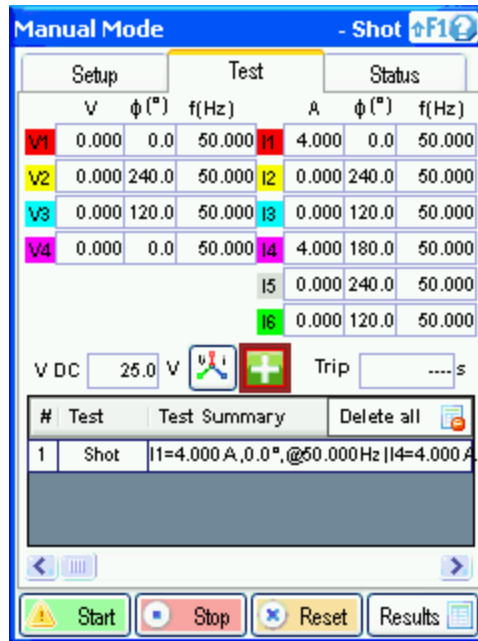
Figure 11 Setting the current I1 and I4 Amplitude and Angle. The currents have to be shifted 180 degrees

If I wanted to do the test 3phase these would be the values

I2 = 4 A 240°

I5 = 4 A 60°

I3 = 4 A 120°

I6 = 4 A 300°

How do I see if the new connection scheme and Burden settings are ok?

It is simple, now try to generate the higher (than the value that in Prefault caused Overload) value of current, but remember that the angle has got to be always 180 between two current phases in series. I went very high and tried 16 A as you can see in Figure 12
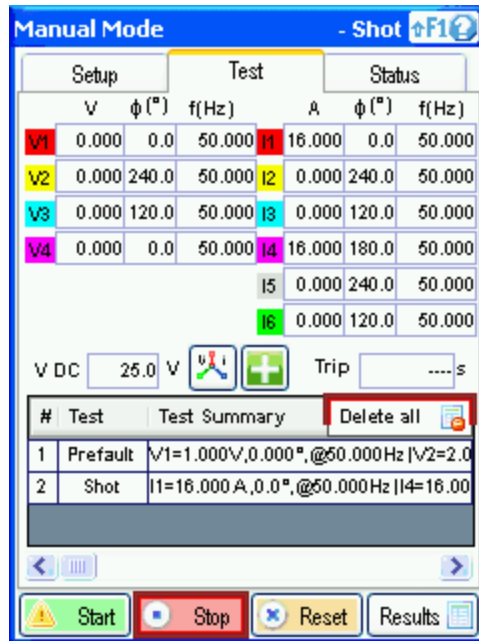
Figure 12 checking the newly found power

While the multimeter measured the voltage you can see in Figure 13.

Figure 13 The driving voltage with I1 and I4 in series

Now, you do not need to measure the voltage anymore, but I wanted to see how high I can go.

To conclude, I will say that in this example I showed you how to get higher current using the same load (1.73 Ohm), but you can stay with the same current and use twice as high load.

Happy Testing

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