Computerized Relay Test System

CVRT-S16

VASAVI

Pioneer In Test Automation

Brief Introduction :

Vasavi is specialized in manufacturing of Automatic Test equipments (PC based systems), that are suitable for manufacturers, R&D organizations, Quality Control & etc., for past 35 years.

Computerized Relay Test System is a custom designed for Railway Signaling Relays to cover most of the static and dynamic parameters (ELECTRICAL) defined by Indian railway standards. Computerized Relay Test System can test all the defined parameters at one go and give PASS / FAIL indication. These results can be stored in a database for further analysts. Test procedure can be pre-programmed and stored in a User Friendly Menu driven software and can be used as and when required. It can be easily used by a Semiskilled or unskilled person for testing of relays. Computerized Relay Test System has to be controlled through an serial port by an external PC with Windows 98 / XP Operating system.

Test Parameters :

1) Coil Resistance at Room Temperature
2) Coil Current at Room Temperature
3) Pick-up (Operate) Voltage / Current
4) Drop away (Release) Voltage / Current
5) Coil Power
6) Percentage Drop away (Release)
7) Contact Sequence Test (F.F.B to L.F.B / F.B.B to L.B.B)
8) Contact Resistance (All Contacts)
9) Pick-up (Operate) Time @ Rated & %Rated
10) Drop away (Release) Time@ Rated & %Rated
11) Pick-up (Operate) Front Contact Bounce Time
12) Drop away (Release) Back Contact Bounce Time
13) Difference : Operate time - Release Time
14) Pick-up (Operate) Transfer Time
15) Drop away (Release) Transfer Time (NO & NC Relays)

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Specification :

Coil Resistance	Maximum	10K Ohm
	Resolution	0.1 Ohm
	Accuracy	50 Ohm ~ 500 Ohm : ± 0.5% ± 1dig Other : ± 1% ± 1dig
Coil Current	Maximum	300mA
	Resolution	0.01mA
	Accuracy	50 mA ~ 200 mA : ± 0.5% ± 1dig Other : ± 1% ± 1dig
Pick-up (Operate) Voltage / Current	Definition	Minimum Voltage / Current at which relay Operates.
	Maximum Voltage	48V
	Incremental Steps	0.1V up to 24V & 0.2V for above 24V
	Voltage Measurement Resolution	0.05V
	Voltage Accuracy	± 0.5% ± 1dgt
	Maximum Current	300mA
	Resolution	0.01mA
	Accuracy	50 mA ~ 200 mA : ± 0.5% ± 1dig Other : ± 1% ± 1dig
Drop Away (Release) Voltage / Current	Definition	
	Specification	Same as Pick-up (Operate) Voltage / Current
Power Consumption	Definition	Voltage X Current , Measured at rated voltage
	Accuracy	± 0.5% ± 1dgt
Percentage Release Voltage / Current	Definition	Ratio of Drop Away Voltage / Current & Pick-up Voltage / Current
Contact Sequence Test (FFB to LFB & FBB to LBB)	Definition	Voltage / Current difference between First (Front/Back) brake to Last (Fron/Back) break
	Specification	Same as Pick-up Voltage / Current
Contact Resistance	Definition	Measured by applying 100mA on contact and measures Voltage drop across contact
	Resolution	0.1mOhm
	Maximum	500mOhm
	Accuracy	± 0.5% ± 0.1 mOhm
Pick-up (Operate) Time @ Rated	Definition	Time taken from applied rated voltage / current to change of contacts
	Resolution	0.01mS for < 50mS relays & 0.1mS for > 50mS relays
	Accuracy	± 0.05mS for < 50mS relays & ±0.2mS for > 50mS relays
Drop away (Release) Time @ Rated	Definition	Time taken from removal of rated voltage / current to change of contact state.
	Resolution	0.01mS for < 50mS relays & 0.1mS for > 50mS relays
	Accuracy	± 0.05mS for < 50mS relays & ±0.2mS for > 50mS relays

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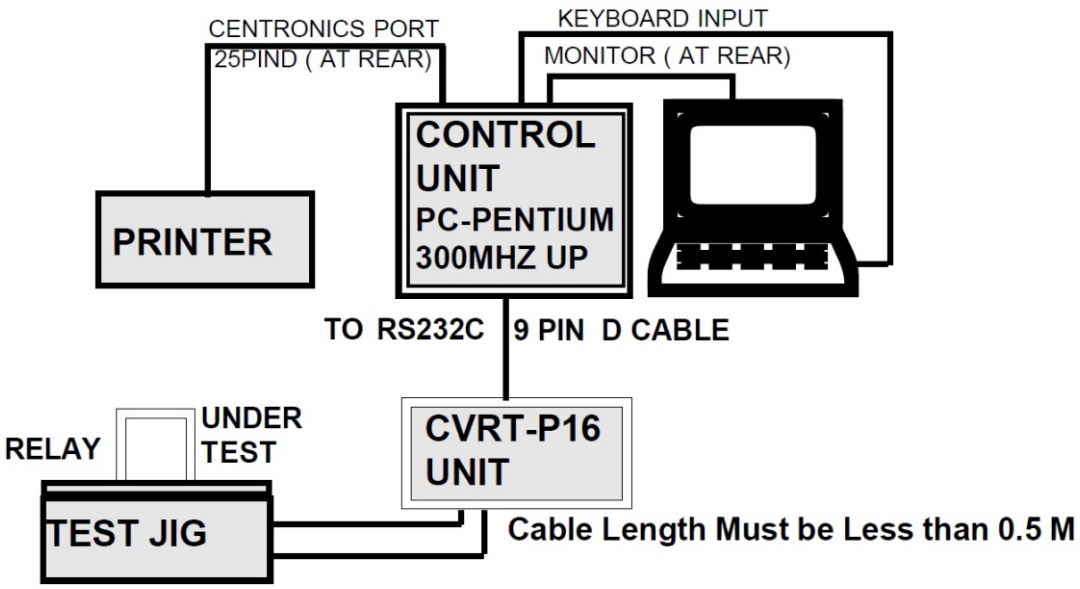
Specification :

Bounce Time Front Contact	Definition	Duration of bounce in each front contact
	Specification	Same as Pick-up (Operate) Time
Bounce Time Back Contact	Definition	Duration of bounce in each Back contact
	Specification	Same as Pick-up (Operate) Time
Operate Transfer Time for NO NC Relays	Definition	Time between F.B.B to L.F.M
	Specification	Same as Pick-up (Operate) Time
Release Transfer Time	Definition	Time between F.F.B to L.B.M
	Specifications	Same as Pick-up (Operate) Time

System Connections :



Computer Software :

The system will test the defined parameters automatically at one stroke

- Compare the individual measured parameters with the limits
- Display the values
- Indicate whether Pass or Fail
- Build the database of results for printout or future analysis.

The system consists of main instrument and a control PC (PC is not included). The relay to be tested is inserted in a jig which is connected to the instrument through cables. One single jig is enough for all types of signaling Q-Type relays. The active contacts and test conditions are set in the program.

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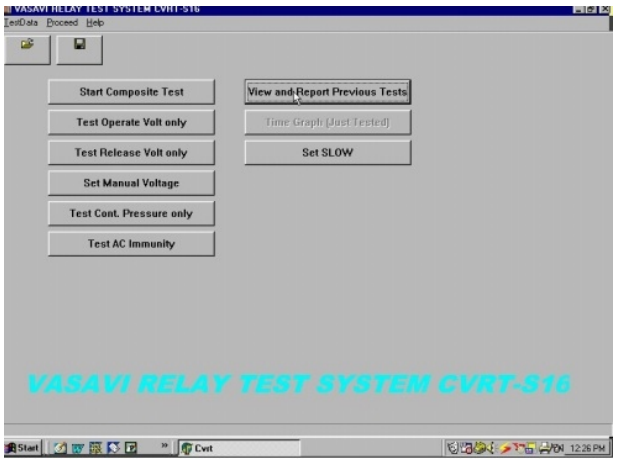
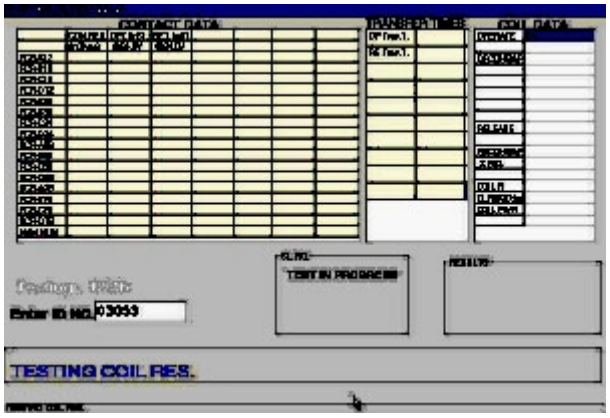
Main Menu :

Let us see how to test a relay. Presume that the test program is already made. We will see later on how to make the test program. In the main menu click on “Test Data” and open or open document type button. See a list of files. Click on the test file, say “12F4b”. The test file is loaded. Click on “start composite” button. Try to establish communication with the test instrument. See the progress in the status bar. Once the control is established see “Get serial no & batch no” window. Enter the room temperature, required to calculate the coil resistance correction factor for 20 C. You have a separate option in the menu while preparing test program for 20 C correction. Enter start serial number of the relay. The system will increment serial number for each relay. Conclude this window by clicking on “Start test”.



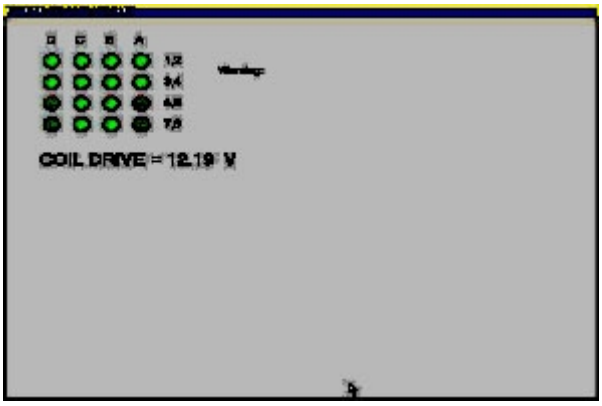
Test Results Display :

See a set of tables meant for displaying the tested results. See edit box for entering relay ID number. This edit box will be shown if selected in the options list. See test progress message in blue color. At this stage you will insert the relay in the jig and click on “START TEST” button.



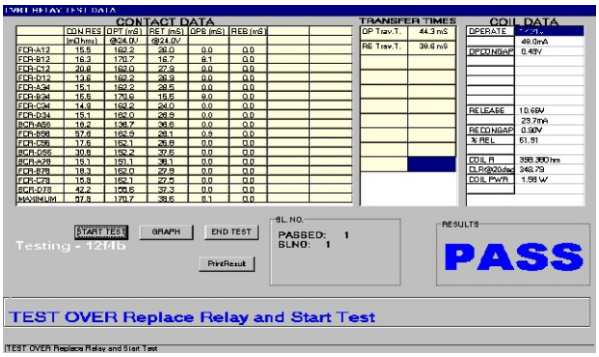
Contact Status Indicators :

When the system starts testing you can see a window with green LED’s. This window is displaying status of the contacts while coil drive voltage is automatically decreased. Now the system is testing release or Drop out voltage. After completing Release Voltage you will see another similar window for testing operate or pick up voltage. The increase or decrease of voltage takes place till the operate or release voltage is attained. The system will monitor all the active contacts. Now the system tests operate and release time which you cannot visualize as the process is very fast. **Thus the system will test all the parameters of the relay defined in the test program.**



PASS / FAIL Indications :

After completing the tests the tested values are displayed in the table. See contact resistance, operate time and release times for each contact and the maximum values at the bottom. If all are within the limits you will see “PASS” otherwise “FAIL”. Now you have to replace the relay with another one and click on START TEST. The process repeats.



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Contact Timing Graph :

Now let us see the contact timing graph. Click on the button “Time graph”. You will see operate time graph. By clicking on a button “Press for Release Time“ you will see the Release Time graph. You will be able to magnify the graph and see the individual contact behavior and bounce time very clearly. This information is very essential for R & D and analysis. Come back to the main menu by closing graph window.

Create Test Procedure :

Contact Selection :

The system can test maximum of 16 contacts. Each in the menu corresponds to a set of pin numbers in the connector. So you have to select the contacts which are active. You see two columns of selections namely **Contact BCR/NC**: which means break contact or Normally open contact or back contact .**Contact MCR/NO**: which means make contact or Normally open contact or Front contact. Click on the contact no in the NC or NO items. The selection you see in the display is for 12F4B relay. 12 front and 4 back contacts.
Relay Drive Measure is to select from voltage drive voltage measure or voltage drive current measure or current drive current measure.
Rated volt milliampere entry box: Type the rated voltage of the relay to be tested ,say 24volts.

Measurement Options :

Under Measurement options you can include tests of your interest by clicking on the test. When you select an option by clicking, you will see one or two entry boxes opening up opposite to the test item. These boxes are meant to enter the limits and test conditions. You will also see some of the test items are grayed. When you select one item, some other items become active. These are meant for connecting parameters. For example when you select operate time, the operate bounce gets active. It is obvious that you can test operate bounce only when you test operate time.

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Test Options :

These options are meant to meet varying requirements of the users. For example take operate time. Some define, operate time includes bounce time but, some other say it will not. You are free to define as you like.

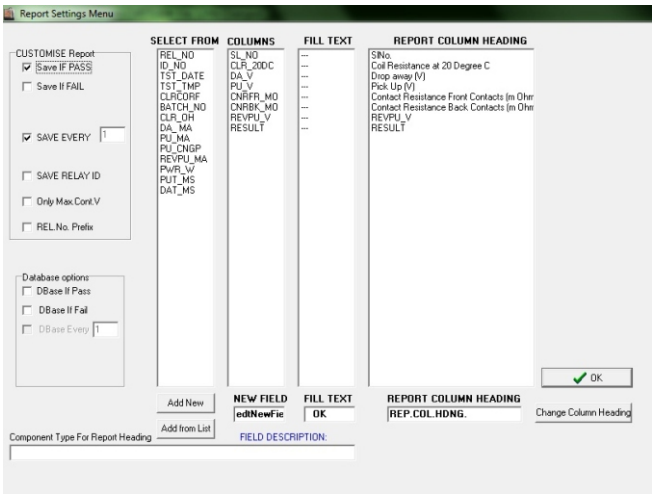
Error Indications :

Click on next to conclude the menu. If there is any typing error the system prompts you. Accordingly you see one such entry error. While typing the value limits. After correcting the mistake, Click on next again.

Report Printing :

When you conclude test settings menu the Report setting menu will open up .This menu is meant for customizing report and database. The system will maintain two database files per each test programs.

Database :



Report database is meant to take printout after each session of testing if selected. If you select any item under data base option the system will maintain another database file in addition to the report database.

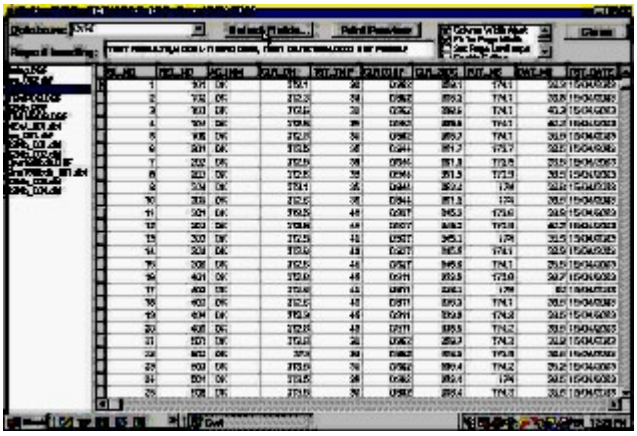
To customize database & reports you have three list boxes namely “SELECT, COLUM and FILL TEXT”. See several fields under SELECT list which are proposed by the system depending on the test and options you have selected. For example drop away volt and drop away milli-amp come under select ,only if you select Drop away test in the measurement options. When you click on the field name you will see the full form of the name at the bottom .If you double click on the name it will be shifted to COLUMNS list box.

You have an option to include fields which is not a part of the testing .Type the field name you want ,in the NEW FIELD entry box .Type the text you want to fill the field ,in the FILL TEXT entry BOX .Now, click on ADD NEW button. Immediately the text in new field will be transferred to columns fill text to fill text list box. To Delete the Fields from columns by double clicking on the name. Finally after concluding the field list click on OK. You will come back to the main menu .

Saving Test Procedure :

You have to save the test procedure in a file for future use. Click on Test Data and click on save. Type the file name you want for this test procedure. Say XYZ and click on save. When you want to start testing XYZ type of relays load this file and proceed testing.

View & Print Report :



All the test results will be transferred to a database files with connected file name. To take a printed report or to see the data click on the button named “View and Report” when you are in main menu. A new menu opens up with list box of database files and Table grid of the selected file. When you click on the file name you will see the corresponding data table. The data table will have the fields selected under report customization menu. Now if you want to see only a few of the fields and not interested in the other fields you can do so by clicking on select fields button. You will see a list box with the field list all highlighted with blue color. Click on the fields to remove. When you click on OK of the list box you will see only those fields which are high lighted when you press OK.

Now if you want to take a printed report click on print preview button. You will see the preview of the report selected. By clicking on the printer button the report will be printed on the printer connected to the system click on the quit to come back to table grid Windows. Some times you may need to correct the errors in the data like relay number. There is a small window of options. Click on the enable editing now you are free to go through the entire table and edit the field where ever required. You must be careful in editing the data because the data edited will be permanently recorded. When you click close button you will be back in the main menu.

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