WINMARTS25

Windows Software for the Model RTC25 Device Tester from

MARKENRICH CORPORATION

Introduction

The RTC25 is a half-size ISA card, which along with WINMARTS25, tests relays. One card can handle up to four double-throw contacts. Two cards may be used to test eight double-throw contacts. Devices can be split among the available contacts to test more than one at a time.

WINMARTS25 provides a **quick test** menu for individual parametric test execution as well as a **sequenced test** menu for automatic testing of multiple parameters. Automatic data logging, printout, and pass/fail indications are included.

A simple password function protects sequenced test files from unauthorized change. The password entry is selected from the file menu option. To change the password, edit the file "Password" (do not include non-printing characters; the file must be plain text). If no file called "Password" is found, the software uses a default password called "KEYING."

SECTION 1

Installation and Requirements

WINMARTS25 software is supplied on a set of diskettes or CD that will install on your hard drive. Insert disk 1 in the appropriate drive and select **Run** from the Windows Start icon. Select **Setup.exe** from the drive the disk is in, and click OK. Follow the instructions and read the dialogs presented.

After the successful completion of the package, run the **BDE Administrator** program before running **WINMARTS25** for the first time. BDE configures an "alias" database name, and defines a pathway for it to find the database files. When first installed, the database files are placed in the default installation directory, and the alias pathway can be set to this directory. If desired, the database files can be copied to another directory (or drive, network, etc.) and the alias configured for that new path.

After opening **BDE Administrator**, select Object from the menu and then New. The database driver you want to use is **STANDARD**. After selecting this, it will appear in the Database tab on the left. Highlight it and rename it WINMARTS25. In the Definition tab on the right, the default driver should be Paradox and Path will be blank. Type in the path desired (C:\Program Files\Markenrich Corporation\WINMARTS25 will be the default install directory unless you changed it during installation).

There are some files that must be in the alias directory specified above, and must be copied there if the program is to run properly (they'll already be in the default directory). They are:
RTC25TDEF.DBF
RTC25TDEF.MDX
RTC25CONDS.DBF
RTC25CONDS.MDX
RTC25DATA.DBF

WINMARTS25 supports the model RTC25 relay tester, the RTA8, and optionally a programmable contact load power supply. The power supplies (for the high-current CVD test) supported are models 6038A and 6012B from Agilent Technologies (HP).

Your computer must have the following:
Pentium or later processor
Windows 98/2000
64 meg RAM

Hard drive (at least 10 Meg free)
3.5 in floppy drive or CD rom drive

Additional hardware required:
80 Volt DC power supply (such as the RTA7)
Test fixture and interface cable for RUT (such as the RTA5)

Optional Hardware:
Agilent 6038A power supply
Markenrich RTA8 high-current CVD adapter

Operation

Devices to be tested are categorized by Relay Type and Device Part Number. Since many relays share common characteristics such as coil voltage, contact arrangement and current rating, a generic Relay Type can be selected for many Part Numbers. This file specifies the common attributes for a group of relay parts. Another file stores device specific information such as parametric test limits, test sequences, timing attributes, etc.

The Device Part Number is selected from the opening menu. The Relay Type is selected or defined from the Quick Test option of the main menu. You do not need to define a Relay Type, as the default values can be used, but it can make the definition of the Device Part Number easier.

When programming a Relay Type, try to specify only the common characteristics of a group that you may have to supply separate part numbers for. For example, a relay family may have common timing attributes, common contact arrangement and load characteristics, but different coil voltages. The Relay Type file would specify the contact code, coil dwell and contact settling time, and latch/non-latch characteristic. The Part Number would include coil voltage, test sequence and limits.

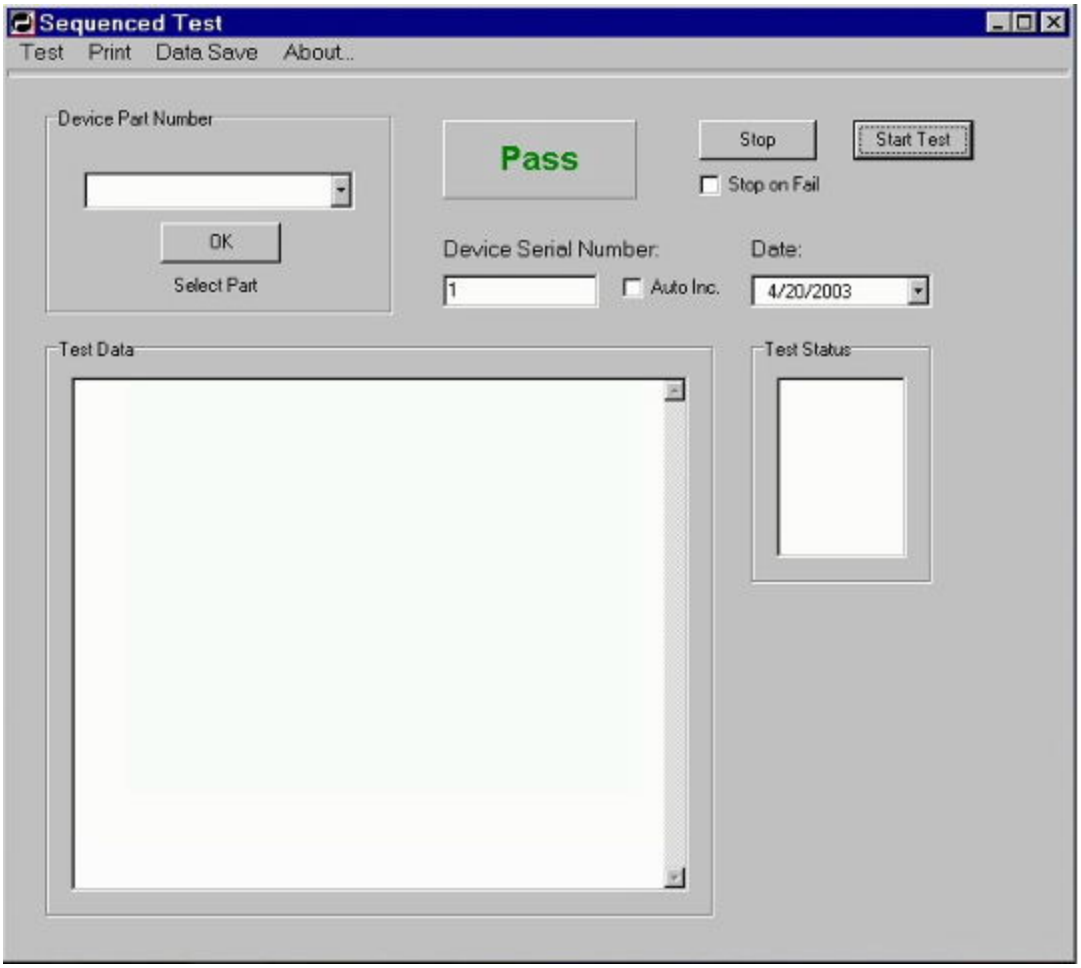

Figure 1.

When you start the program, the screen in Figure 1 is presented. This allows you to select a part from the Part Number pull-down control, or create a new part number (if a password has been entered). With the password entered, the Device Tests window is unlocked, and you can begin to define a sequence of tests and data limits.

The Device Part Number can include any of the test conditions defined in the Part Type. In fact, any conditions re-defined in the Part Number override the Part Type setting.

Simple Testing

From the main screen, select Quick Test from the menu, and the screen in Figure 2 will be presented.

The lower left panel has a group of buttons that activate a particular test. When pressed, the test is immediately performed using the test conditions in the panel above it. New conditions may be entered as needed and the test button pressed will activate the test with the new condition. Test data taken will appear in the panel to the right of the buttons. Although the data cannot be saved or printed, it may be copied and pasted.

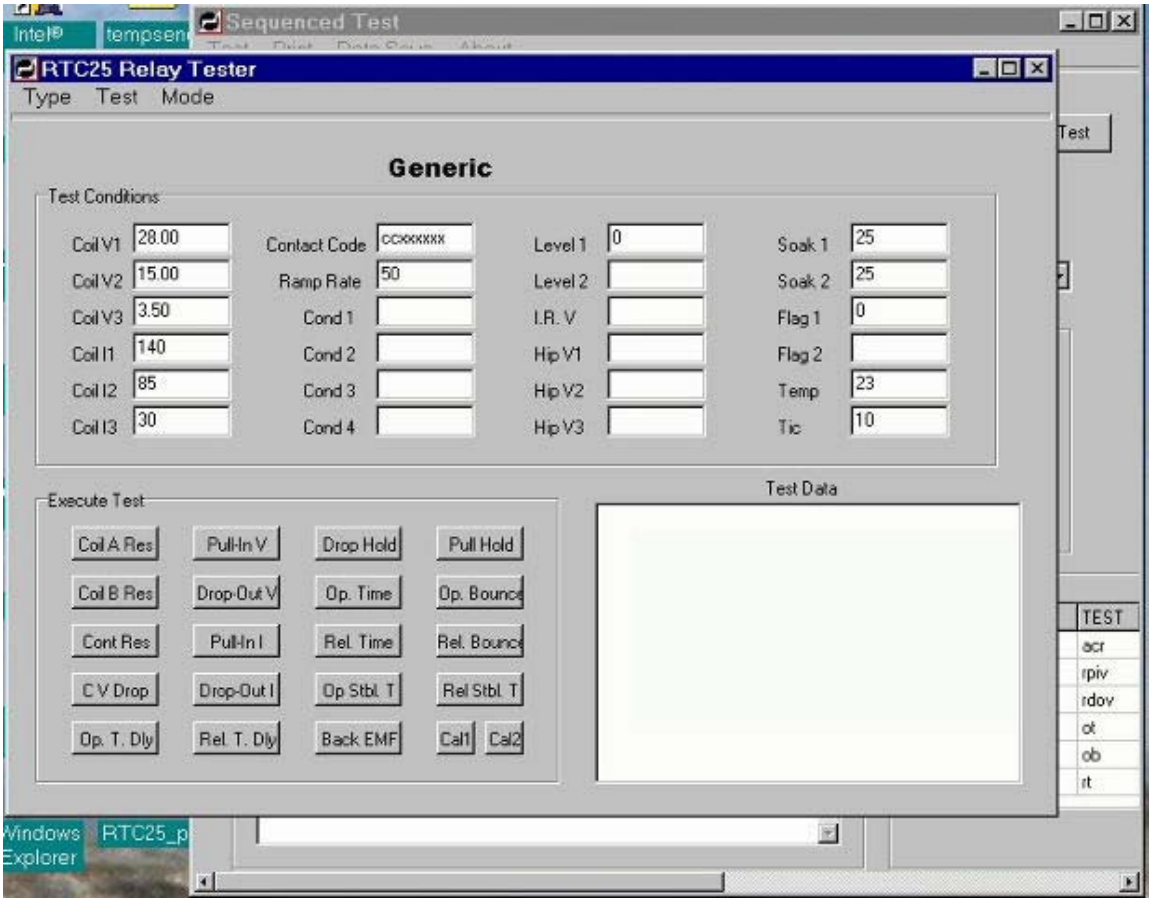

Figure 2.

Sequenced Testing

Selecting Test and Sequence from the pull-down menu (or simply clicking on any area of the Sequenced Test screen behind) will display the original screen from which you can add new part numbers and initiate a series of tests in sequence. After the password has been entered, two panels, Device Part Number and Device Tests, let you define a part test sequence. The Part Number data can be entered by clicking the "+" button and typing it in the appropriate column. Enter the test nmenonic, upper and lower limits, and optionally a sequence number.

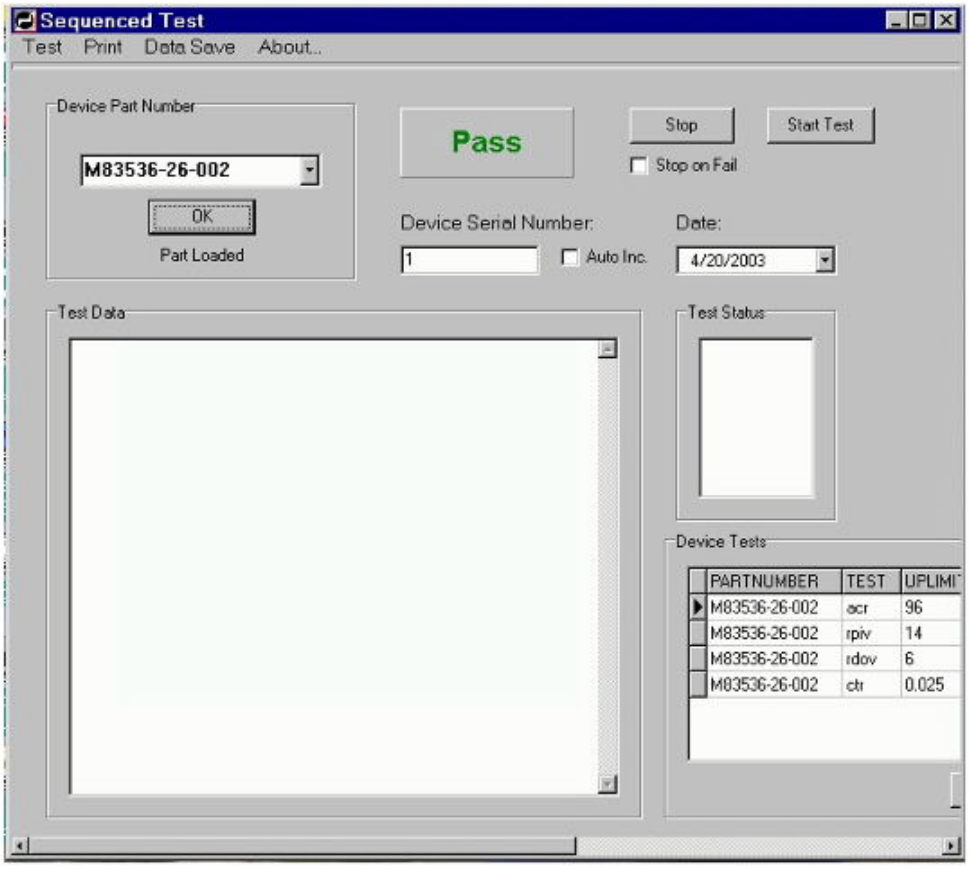

Figure 3.

Test conditions may be changed by editing the TEMPCONDS field in the Device Tests frame (use the scroll bar at the bottom of the window to see all of it). These new conditions become part of the device Part Number information. It is important to remember that a re-defined condition remains until defined again.
To navigate between the main screen and the Sequence Test screen, select Test and Sequence from the top menu. To go back, select Quick Test from the Test pull-down tab.
Alternately, click on one window and then the other to go back and forth.

From the Sequenced Test screen, you may select various print and data save options under the Print and Data Save pull-down tabs. The default is no printing and no saving, so be sure to select one of the options as required. It is also a good idea to check to make sure the desired date has been set in the Date box. To change the date, click on the small drop-down arrow; a calendar will appear.

Data Format

WINMARTS25 stores test data in a database file called RTC25DATA.DBF. The native file format is Paradox (Borland), and may be viewed with Corel or other database browser. The file structure and field names are shown below for your reference (there are 16 DATA fields).

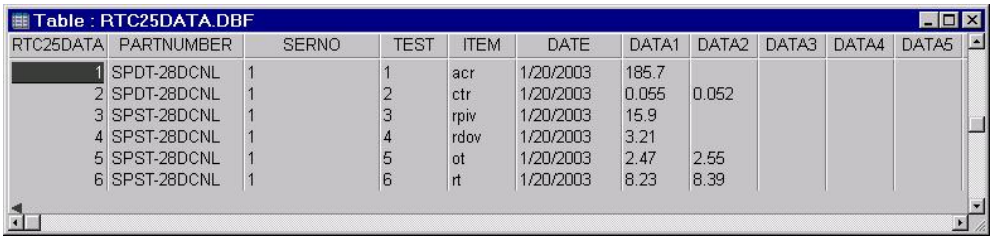

Table : RTC25DATA.DBF

RTC25DATA	PARTNUMBER	SERNO	TEST	ITEM	DATE	DATA1	DATA2	DATA3	DATA4	DATA5
1	SPDT-28DCNL	1	1	acr	1/20/2003	185.7				
2	SPDT-28DCNL	1	2	ctr	1/20/2003	0.055	0.052			
3	SPST-28DCNL	1	3	rpiv	1/20/2003	15.9				
4	SPST-28DCNL	1	4	rdov	1/20/2003	3.21				
5	SPST-28DCNL	1	5	ot	1/20/2003	2.47	2.55			
6	SPST-28DCNL	1	6	rt	1/20/2003	8.23	8.39			

SECTION TWO

Test Nmenonic Definitions

Please refer to the Section Three of this manual for complete definitions.

RTC25 Test Conditions

a. **COILV1** - Coil voltage 1. Nominal device operating voltage.
b. **COILV2** - Coil voltage 2. Must operate or must hold coil voltage.
c. **COILV3** - Coil voltage 3. Must not operate or must release coil voltage.
d. **COILI1** - Coil current 1.
e. **COILI2** - Coil current 2.
f. **COILI3** - Coil current 3.
g. **CODE** - Device contact code.
h. **RATE** - Coil voltage ramp rate. RATE=1000/volts-per-second.
i. **COND1** - reserved for future expansion.
j. **COND2** - reserved for future expansion.
k. **COND3** - reserved for future expansion.
l. **COND4** - Test Repeat. Tests will repeat this number of times when enabled by FLAG1. The result is an average or maximum value depending on FLAG1.
m. **LEVEL1** - Contact Stabilization Time (OCST/RCST) sense level in millivolts.
n. **LEVEL2** - reserved for future expansion.
o. **IRV** - Insulation Resistance Test voltage (with RTA11 adapter).
p. **HIPV1** - Dielectric Withstanding test voltage 1 (with RTA11 adapter).
q. **HIPV2** - Dielectric Withstanding test voltage 2(with RTA11 adapter).
r. **HIPV3** - Dielectric Withstanding test voltage3 (with RTA11 adapter).

s. **SOAK1** - Coil soak and contact stabilizing delay time.
t. **SOAK2** - Contact Voltage Drop test soak time.
u. **FLAG1** - Conditional test flags. Bits 3 through 7 are unused but reserved.
bit 0 = Latching relay enable.
bit 1 = Test repeat enable.
bit 2 = Repeat test max./average (1 = max. value)
v. **FLAG2** - reserved for future expansion.
w. **TEMP** - Ambient RUT temperature.
x. **TIC** - Calibration watchdog timer.

RTC25 Device Tests

ACR - Coil A resistance
BCR - Coil B resistance
RPIV - Pull-In voltage, ramp method
RDOV - Drop-Out voltage, ramp method
CVD - Contact Voltage Drop (with RTA7 or RTA11 adapter)
CTR - Contact resistance (using the internal current source)
OT - Operate Time
RT - Release Time
OB - Operate contact bounce
RB - Release contact bounce
BBC - Contact break bounce
OCST - Operate contact stabilization time
RCST - Release contact stabilization time
EMF - Max. coil turn-off reverse transient
CC - Coil current (at COILV1)
SPIV - Pull-in voltage, step method
SDOV - Drop-out voltage, step method
RPII - Pull-In current, ramp method
RDOI - Drop-Out current, ramp method
SPII - Pull-In current, step method
SDOI - Drop-Out current, step method
RPHV - Pull-In hold voltage, ramp method
RDHV - Drop-Out hold voltage, ramp method
OTD - Operate time delay
RTD - Release time delay
HCVD - High current CVD test (with RTA7 or RTA11 adapter)
FORM - Contact form switching test
SOCK - RUT socket check
CAL1 - Calibration mode 1
CAL2 - Calibration mode 2

SECTION 3

Test Descriptions

Coil Resistance (ACR/BCR): The coil resistance is measured at a maximum of 10 milliamps. A constant current is applied to the coil and the voltage is measured after a delay to allow for current stabilization.

Pull-In Voltage, Ramp Method (RPIV): A voltage ramp is applied to the RUT coil increasing at a speed determined by the condition RATE. COILV3 is initially applied for SOAK1 milliseconds, then increased until the RUT contacts transfer or until COILV1 is reached.

Drop-Out Voltage, Ramp Method (RDOV): A voltage ramp is applied to the RUT coil decreasing at a speed determined by the condition RATE. COILV1 is initially applied for SOAK1 milliseconds, stepped to COILV2, then decreased until the RUT contacts transfer or until COILV3 is reached.

Pull-In Current, Ramp Method (RPII): Analogous to RPIV except coil current is measured.

Drop-Out Current, Ramp Method (RDOI): Analogous to RDOV except coil current is measured.

Pull-In Voltage, Step Method (SPIV): COILV3 is applied for SOAK1 milliseconds and the device checked for non-transfer, then COILV2 is applied and the device checked for contact transfer. If either check fails, the failing value is reported and the test fails.

Drop-Out Voltage, Step Method (SDOV): COILV1 is applied for SOAK1 milliseconds, then stepped to COILV2 and a check for contact transfer is made. The coil is then stepped to COILV3 and a check for non-transfer is made. If either check fails, the failing value is reported and the test fails.

Pull-In Current, Step Method (SPIV): Analogous to SPIV except that coilcurrent is measured.

Drop-Out Current, Step Method (SDOI): Analogous to SDOV except that coil current is measured.

Pull-In Hold Voltage, Ramp Method (RPHV): Analogous to RPIV except that instead of looking for complete contact transfer, the test looks for any change in contact state.

Drop-Out Hold Voltage, Ramp Method (RDHV): Analogous to RDOV except that instead of looking for complete contact transfer, the test looks for any change in contact state.

Contact Voltage Drop (CVD): The selected contact load source is applied to the RUT N.C.

Contacts and the resulting voltage drop measured after SOAK2 milliseconds. The RUT is then energized and the measurement repeated on the N.O. Contacts

High Level Contact Voltage Drop (HCVD): Analogous to CVD except that it is intended to be used with the RTA8 high current adapter.

Contact Resistance (CTR): Analogous to CVD except the measurement is converted to Ohms (assuming the internal current source is used).

Coil Current (CC): COILV1 is applied to the RUT coil for SOAK1 milliseconds and the resulting current measured.

Operate Time (OT): COILV1 is applied to the RUT coil and the time to contact transfer is meaasured. This test does not include contact bounce.

Release Time (RT): COILV1 is applied for SOAK1 milliseconds and then turned off. The time to contact transfer is measured. This test does not include contact bounce.

Operate Bounce Time (OB): COILV1 is applied to the RUT coil and the instrument waits for N.O. Contact closure. The total contact bounce time is measured. Device operate time is not included.

Release Bounce Time (RB): COILV1 is applied to the RUT coil for SOAK1 milliseconds. The coil is de-energized and the instrument waits for N.C. Contact closure. The total contact bounce time is measured. Device release time is not included.

Contact Break Bounce (BBC): Analogous to OB except that the instrument monitors the N.C. Contacts during release.

Operate Contact Stabilization Time (OCST): Analogous to OB except that the contact voltage drop is monitored to drop below a programmed value (COND4). The time it takes the contact to stabilize to below this value from the onset of closure is the measured time.

Release Contact Stabilization Time (RCST): Analogous to RB. See OCST.

Coil Reverse Transient (EMF): The RUT coil is energized to COILV1 for SOAK1 milliseconds and then turned off. The resulting peak reverse voltage transient is detected and measured.

Contact Form Check (FORM): The Rut coil is energized to COILV1 for SOAK milliseconds and then turned off. The instrument monitors the contact state and compares it with that programmed inCODE. If they are not the same, the test fails.

APENDIX

Relay Test Connector Pinout

DB-37 Pin Number	Signal Name	Signal Description
1	V+ IN	Coil power supply input (+)
2	BXTR	Transistor bias supply output
3	A+	Coil A drive output (+)
4	B+	Coil B drive output (+)
5	XEN*	HCA logic drive (NOTE 1)
6	INT	Contact load output (NOTE 2)
7	EXT	Contact load input (NOTE 2)
8	F-MC1	Moving contact 1 force
9	F-NO2	Normally open contact 2 force
10	F-NC2	Normally closed contact 2 force
11	F-MC3	Moving contact 3 force
12	F-NO4	Normally open contact 42 force
13	F-NC4	Normally closed contact 4 force
14	S-MC1	Moving contact 1 sense
15	S-NO2	Normally open contact 2 sense
16	S-NC2	Normally closed contact 2 sense
17	S-MC3	Moving contact 3 sense
18	S-NO4	Normally open contact 4 sense
19	S-NC4	Normally closed contact 4 sense
20	V- IN	Coil power supply return (-)
21	---	Not used
22	A-	Coil A drive common (-)
23	B-	Coil B drive common (-)
24	GND	Signal ground
25	GND	
26	F-NO1	Normally open contact 1 force
27	F-NC1	Normally closed contact 1 force
28	F-MC2	Moving contact 2 force
29	F-NO3	Normally open contact 3 force
30	F-NC3	Normally closed contact 3 force
31	F-MC4	Moving contact 4 force
32	S-NO1	Normally open contact 1 sense
33	S-NC1	Normally closed contact 1 sense
34	S-MC2	Moving contact 2 sense
35	S-NO3	Normally open contact 3 sense
36	S-NC3	Normally closed contact 3 sense
37	S-MC4	Moving contact 4 sense

Notes:

1) Used with RTA8 and external contact supply only.

2) Normally connected together internally.

RTC25 Calibration Adjustment Procedure

1) The RTC25 Relay Tester card must be installed in a suitable desktop computer ISA expansion slot in order to make the following adjustments. Make sure all trimpots and test points on the board are accessible.
2) Turn computer ON. Be sure that an external coil supply is connected to the RTC25 via a test interface such as the RTA5. Turn the supply ON.
3) Allow ten minutes for the RTC25 to stabilize before continuing. Run the WINMARTS software, select a device from the menu (or use the default settings), and set the TIC condition to an appropriate setting (30 to 100 seconds).

WARNING
Do not unplug the board while the power is on.

A.1 Connect DVM (-) to TP1. Connect DVM (+) to TP3.
A.2 Connect a 0.1Ω resistor directly across the DVM input using a dual-banana plug adapter.
A.3 Adjust trimpot P4 until the DVM reads 1.00mV ± 0.1mV. (see Note 1)
A.4 Remove the 0.1Ω resistor from the DVM.
A.5 Adjust trimpot P3 to read 30.0mV ± 1mV on the DVM. (see Note 2)

B.1 Execute the CAL1 test from the test menu.
B.2 Connect DVM (-) to TP1. Connect DVM (+) to TP2.
B.3 Adjust trimpot P1 to read 20.00V ± 0.1V on the DVM.
B.4 Wait for CAL1 test to end. Remove DVM test leads.

C.1 Set DVM to milliampere range and connect (-) lead to TP1.
C.2 Connect DVM (+) to TP2 through a 100Ω resistor.
C.3 Execute the CAL2 test.
C.4 Adjust trimpot P2 until the DVM reads 10.00mA ± 0.01 mA.
C.5 Wait for CAL2 test to end. Remove test leads from board.

Notes:

1) Adjust to 5.0mV when using software revision 2.0 or higher. This is the internal contact load adjustment (50mA)
2) Adjust to 50.0 mV when using Windows software revision 2.0 or higher. This is the maximum contact load voltage, open circuit.