

RCB 200N1

TRANSIENT IMMUNITY TEST GENERATOR MEETING FORD EMC-CS-2009.1



FOR TESTS ACCORDING TO ...

- › Ford EMC-CS-2009.1
- › EMC-CS-2010JLR V1.1 (2011-01)

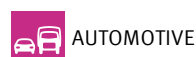
RCB 200N1 - GENERATION OF RELAY SWITCHING TRANSIENTS

As per FORD EMC-CS-2009.1 a part of the test pulses is not generated using a transient pulse generator similar to the ones defined as per ISO 7637 but being based on a circuitry including a Potter & Brumfield 12VAC relay and specifically defined components such as inductors, capacitors, resistors and switches with the aim of simulating "real-world transients". The EM TEST RCB 200N1 transient generator meets the requirements set out by the FORD EMC-CS-2009.1 standard document. It is built using the components outlined in Figure F-1 to generate pulses such as CI 220 A1, A2-1, A2-2, C-1 and C-2, CI 260 F and RI 130 A2-1 and A2-2 for which the RCB 200N1 is built into a metal housing. For RI 130 testing the RCB 200N1 offers BNC-type coaxial outputs to connect the specified test fixture needed for this particular test.

HIGHLIGHTS

- › **Approved by Ford acc. to EMC-CS-2009.1 requirements**
- › **Pulses CI 220: A1, A2-1, A2-2, C-1 and C-2**
- › **Pulse CI 260: F**
- › **Pulses RI 130: A2-1, A2-2 using a coupling test fixture**

APPLICATION AREAS



TECHNICAL DETAILS

BENEFITS

MICRO-PROCESSOR CONTROLLED RCB 200N1 ENSURES EASY OPERATION

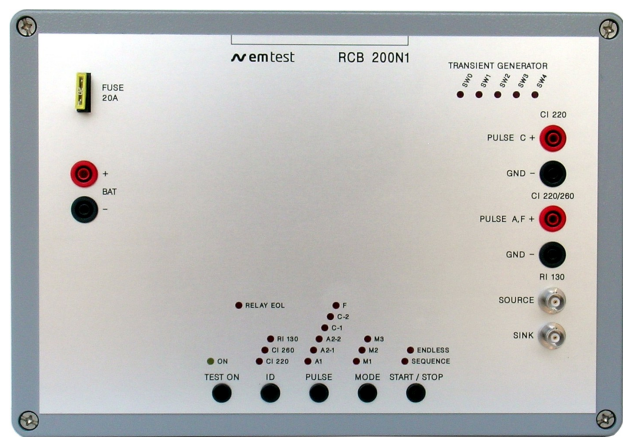
While including 8 different pulses and three different modes to sequence these pulses the operation is as easy it can be. A micro-controller sets the switches based on the selected ID (CI 220, CI 260 and RI 130), pulse (CI 220: A1, A2-1, A2-2, C-1 and C-2, CI 260: F or RI 130: A2-1 and A2-2) and mode (M1, M2 and M3) of application. LEDs are indicating the selected pulse and test mode as well as the status of the relays (SW0 to SW4) as requested by the standard.

The test modes Mode 2 and Mode 3 are defined based on a pseudo-random timing sequence for the application of the pulses. This is automatically done by the built-in micro-controller. Tests can be run in sequences or endlessly.

The Potter&Brumfield relay is required to be replaced after using it for approx. 100hours testing due to degradation of the performance. A built-in counter is active in the background counting the operation time of the relay. The EOL LED indicates the current EOL status.

To meet the requirements for RI 130 testing the RCB 200N1 is built into a metal box with the relay inside still easily accessible for replacement.

To trigger the pulses the unit has means to connect an external trigger source while it will automatically be triggered internally when no external trigger source is connected.

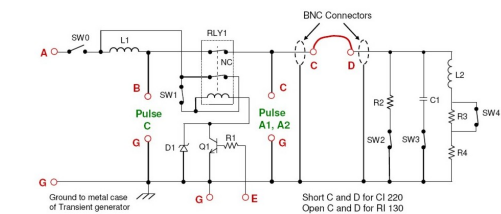


DESIGN OF THE RCB 200N1

RCB 200N1 - STRICTLY DESIGNED AS PER EMC-CS-2009.1

Ford strictly specifies the circuitry and components to be used for a compliant transient generator. The design of EM TESTs RCB 200N1 strictly respects these requirements.

Figure F-1: Transient Generator Circuit for RI 130 and CI 220



| Key | |
|---|--|
| R1: 51 ohms, 25W | L2: 100 mH inductor (Osborne Transformer Part Number 32416)* |
| R2: 220 ohms ± 5% , 2W | D1: Zener Diode, 39 V, 5W (1N5366A) |
| R3: 33 ohms ± 5% , 10W | Q1: NPN transistor (TTP-41) |
| R4: 6 ohms ± 5% , 50W | SW0 – SW4: Single Throw Switch (10 contact rating) |
| C1: 100 nF ceramic capacitor, 400V | RLY1: 12 volt AC Relay** Use normally closed (NC) contacts (Potter & Brumfield KUP-14A15-12)* |
| L1: 5 mH inductor (Osborne Transformer Part Number 8745) * | |

* Critical Component, no substitutions permitted without written authorization from the EMC EMC department.
** See Table F-1 for relay specifications

TECHNICAL DETAILS

TRANSIENT PULSE GENERATOR AS PER FORD EMC-CS-2009.1

TECHNICAL DATA

| | |
|---------------|--|
| RCB 200N1 | Circuitry as per Annex F, Figure F-1 with the following components: |
| Resistor R1 | 51 ohms, 25W |
| Resistor R2 | 220 ohms \pm 5%, 2W |
| Resistor R3 | 33 ohms \pm 5%, 10W |
| Resistor R4 | 6 ohms \pm 5%, 50W |
| Capacitor C1 | 100 nF capacitor, 400V |
| Inductor L1 | 5 μ H inductor (Osborne transformer part no. 8745) |
| Inductor L2 | 100 mH inductor (Osborne transformer part no. 32416) |
| Diode D1 | Zener diode, 39V, 5W |
| Transistor Q1 | NPN transistor |
| SW0 - SW4 | Single Throw Switch |
| RLY1 | 12 volt AC relay, NC contact used (Potter&Brumfield KUP-14A15-12) |

OPERATION

| | |
|------------|--|
| TEST ON | Activates the DUT supply for CI 220 and CI 260 test pulses; no function for RI 130 as this is performed without DC voltage |
| ID | To select the test |
| Pulse | To select the pulses of the preset test |
| Mode | To select the mode of generating the pulses |
| Start/Stop | To start/stop the test |

INPUTS/OUTPUTS

| | |
|---------|---|
| Input | 4mm safety lab connectors for DC supply (e.g. battery or VDS 200x) |
| Trigger | External trigger input (BNC) |
| Outputs | 4mm safety lab connectors for CI 220 and CI 260 testing; 50 ohm BNC connectors for RI 130 testing |
| LEDs | Indication of the - TEST ON status - Test (ID) - Pulse - Mode - Sequence or endless - Switching status (SW0 - SW4) - Relay EOL (end of life reached) |

TEST ROUTINES

| | |
|--------------------|---|
| as per EMC-CS-2009 | CI 220: A1, Modes M1, M2 CI 220: A2-1, Modes M1, M2, M3 CI 220: A2-2, Modes M2, M3 CI 220: C-1, Modes M2, M3 CI 220: C-2, Modes M2 and M3 |
| | CI 260: F |
| | RI 130: A2-1, Modes M2 and M3 RI 130: A2-2, Modes M2 and M3 using the Test fixture recommended by Ford |

GENERAL DATA

| | |
|--------------------|--|
| Dimensions, Weight | 330mm x 230mm x 115mm; approx 7.5kg |
| Fuse | 20A for DUT supply current |
| Protection | Electronically protected against overvoltage and reversed polarity |

OPTIONS

| | |
|--------------|---|
| Test fixture | for wire-to-wire coupled immunity, RI 130 test requirements |
| R-Rel | Set of replacement relays |

COMPETENCE WHEREVER YOU ARE



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Information about scope of delivery, visual design and technical data correspond with the state of development at time of release. Subject to change without further notice.