

# RCB 200N1

## TRANSIENT IMMUNITY TEST GENERATOR MEETING FORD FMC1278 AND EMC-CS-2009.1



### FOR TESTS ACCORDING TO ...

- › Ford EMC-CS-2009.1
- › Ford FMC1278
- › Jaguar EMC-CS-2010JLR V1.1 (2011-01)
- › Jaguar JLR-EMC-CS V1.0 Amd 4

### RCB 200N1 - GENERATION OF RELAY SWITCHING TRANSIENTS

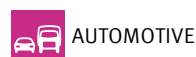
As per FORD FMC1278 and EMC-CS-2009.1 a part of the test pulses is not generated using a transient pulse generator similar to the ones defined as per ISO 7637 but being based on a circuitry including a Potter & Brumfield 12VAC relay and specifically defined components such as inductors, capacitors, resistors 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 FMC1278 and 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 FMC1278 and 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**

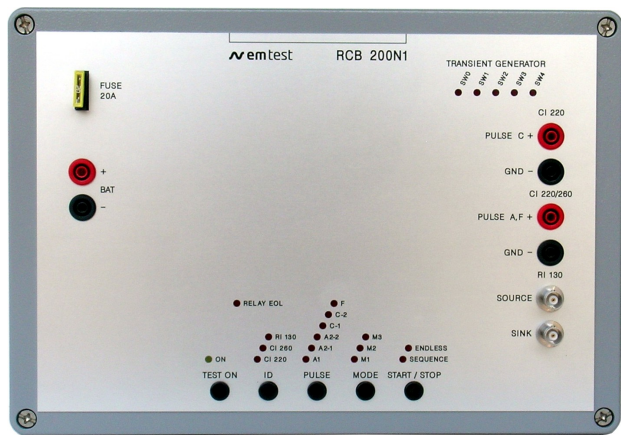
While including 8 different pulses and three different modes to sequence these pulses the operation is as easy it can be. A micro-controller sets the switches based on the selected ID (CI 220, CI 260 and RI 130), pulse (CI 220: A1, A2-1, A2-2, C-1 and C-2, CI 260: F or RI 130: A2-1 and A2-2) and mode (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.

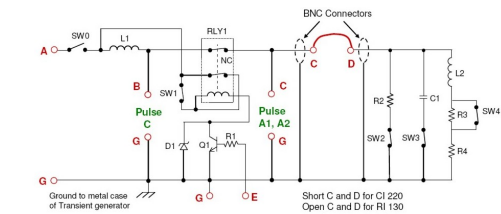


**DESIGN OF THE RCB 200N1**

**RCB 200N1 - STRICTLY DESIGNED AS PER FMC1278 AND 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 (Osborn Transformer Part Number 32416)*
R2: 220 ohms ± 5%, 2W	D1: Zener Diode, 39 V, 5W (1N5366A)
R3: 33 ohms ± 5%, 10W	Q1: NPN transistor (TIP-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-14A1S-12)*
L1: 5 mH inductor (Osborn Transformer Part Number 8745) *	

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

## TECHNICAL DETAILS

## TRANSIENT PULSE GENERATOR AS PER FORD FMC1278, 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 ± 5%, 2W
Resistor R3	33 ohms ± 5%, 10W
Resistor R4	6 ohms ± 5%, 50W
Capacitor C1	100 nF capacitor, 400V
Inductor L1	5 uH 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 FMC1278 and 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



## CONTACT EM TEST DIRECTLY

### Switzerland

EM TEST (Switzerland) GmbH › Sternenhofstraße 15 › 4153 Reinach › Switzerland  
 Phone +41 (0)61/7179191 › Fax +41 (0)61/7179199  
 Internet: [www.emtest.ch](http://www.emtest.ch) › E-mail: [sales.emtest@ametek.com](mailto:sales.emtest@ametek.com)

### Germany

AMETEK CTS Germany GmbH › Lünener Straße 211 › 59174 Kamen › Deutschland  
 Phone +49 (0)2307/26070-0 › Fax +49 (0)2307/17050  
 Internet: [www.emtest.com](http://www.emtest.com) › E-mail: [info.cts@ametek.de](mailto:info.cts@ametek.de)

### France

EM TEST FRANCE › Le Trident - Parc des Collines › Immeuble B1 - Etage 3 › 36, rue Paul Cézanne › 68200 Mulhouse › France  
 Phone +33 (0)389 31 23 50 › Fax +33 (0)389 31 23 55  
 Internet: [www.emtest.fr](http://www.emtest.fr) › E-mail: [info@emtest.fr](mailto:info@emtest.fr)

### Poland

EM TEST Polska › ul. Ogrodowa 31/35, 00-893 Warszawa › Polska  
 Phone +48 (0)518 64 35 12  
 Internet: [www.emtest.com/pl](http://www.emtest.com/pl) › E-mail: [infopolska.emtest@ametek.com](mailto:infopolska.emtest@ametek.com)

### USA / Canada

AMETEK Compliance Test Solutions › 52 Mayfield Ave. › Edison › NJ 08837  
 Phone +1 (732) 417-0501  
 Internet: [www.emtest.com](http://www.emtest.com) › E-mail: [sales.emtest@ametek.com](mailto:sales.emtest@ametek.com)

### P.R. China

E & S Test Technology Limited › Rm 913, Leftbank › No. 68 Bei Si Huan Xi Lu › Haidian District › Beijing 100080 › P.R. China  
 Phone +86 (0)10 82 67 60 27 › Fax +86 (0)10 82 67 62 38  
 Internet: [www.emtest.com](http://www.emtest.com) › E-mail: [info@emtest.com.cn](mailto:info@emtest.com.cn)

### Republic of Korea

EM TEST Korea Limited › #405 › WooYeon Plaza › #986-8 › YoungDeok-dong › Giheung-gu › Yongin-si › Gyeonggi-do › Korea  
 Phone +82 (31) 216 8616 › Fax +82 (31) 216 8616  
 Internet: [www.emtest.co.kr](http://www.emtest.co.kr) › E-mail: [sales@emtest.co.kr](mailto:sales@emtest.co.kr)

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.