Manual

For Operation

UCS 200N

The ultra-compact simulator

UCS200N - designed as a modular system - is the most intelligent solution offering exactly what you need for full-compliant immunity tests against transients. The distinct operation features, convenient DUT connection facilities, a clearly arranged menu structure and display philosophy as well as the free-programmable pulse mode called ***Freestyle*** make testing easy, reliable and safe. Extendable by a variety of test accessories the UCS200N is a universal equipment for abroad range of recommendations even for high current applications up to 200A

- ISO 7637
- SAE J1113
- Manufacturer spec as per GM, Ford, Chrysler, Mercedes, BMW,VW, PSA, Renault, Fiat .....

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Contents

1. Model Overview

1.1. UCS models of the UCS200 series

Each UCS200Nxxx includes modules for the following pulses:

Pulse 3a/3b up to 1000V peak voltage, wave shape 5/100ns
Pulse 1, 2 as per ISO 7637, SAE J1113, GM3097,Ford ES-XW7T,ChryslerPF9326, DC10614,MBN10284,MBN,BMW,VW,Renault,PSA etc

For the different current ranges the UCS 200 series offers the following devices:

UCS 200N50	Coupling network 60V/50A	19"/3HU
UCS 200N100	Coupling network 60V/100A	19"/6HU
UCS 200N150	Coupling network 60V/150A	19"/6HU
UCS 200N200	Coupling network 60V/200A	19"/6HU

2. Standards covered by UCS 200N

A fully equipped UCS 200N covers the following standards

- ISO 7637-2:2004	**Pulse 1, 1a, 2, 3a, 3b**
- all relevant manufacturer spec	
- SAE J1113	**Pulse 1. 1a, 1b, 2, 3a, 3b**
- SAE J 1455	**Pulse Mutual and Inductive**
- JASO D001	**Pulse A2, B2 and D2**
- Nissan NDS 28400 NDS07	**Pulse B2, C8, C50 and C300**

3. Operating Functions

3.1. Front view

1 Display
2 Function keys "F1..F7"
3 "Test On"
4 Knob (Inc / Dec)
5 Cursor keys "←" and "→"
6 Exit
7 Escape
8 Oscilloscope trigger
9 HV pulse output 50 ohm
10 Earth plug for verification
11 LED: Indication battery switch
12 LED: Pulses available at + output
13 LED: Burst 3a/3b pulses
14 DUT test supply

1. Display
All functions and parameters are displayed (8 lines with max. 40 characters).

2. Function keys "F1 .. F7"
Parameters and functions, displayed in the lowest line, can be selected with the related function key.

3. Test On
By pressing the key "Test On" the test procedure is initiated with the preselected parameters. The red LED indicates the trigger of a burst event.

4. Knob (Inc / Dec)
The knob increments or decrements test parameters with a numeric value or selects from a list of parameters.

5. Cursor keys
Parameters and functions can be changed on-line. The selection of these parameters is realized with the cursor moving to the left or to the right.

6. Exit
Pressing of the Exit function will cause a reset of the firmware. This is only possible if no test routine is running.

7. ESC
When pressing the ESC button the user moves back one page in the menu.

8. BNC - CRO Trigger
At the BNC output the generator trigger can be checked, e.g. the burst duration, the burst repetition rate and the spike frequency (+15 V rectangular). This output signal can also be used to trigger external measuring devices (e.g. an oscilloscope)

9. HV pulse output 50 ohm
External coupling devices such as the capacitive coupling clamp are connected to the coaxial 50 ohm output. Also the pulse parameters, on open circuit and 50Ω load condition (pulses 3a/3b), must be verified at this coaxial output.

10. Earth plug for verification
This earth plug can be used during pulse verification special for pulse 3a/3b verification.

1 Display
2 "Test On"
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10 Earth plug for verification
11 LED: Indication battery switch
12 LED: Pulses available at + output
13 LED: Burst 3a/3b pulses
14 DUT test supply

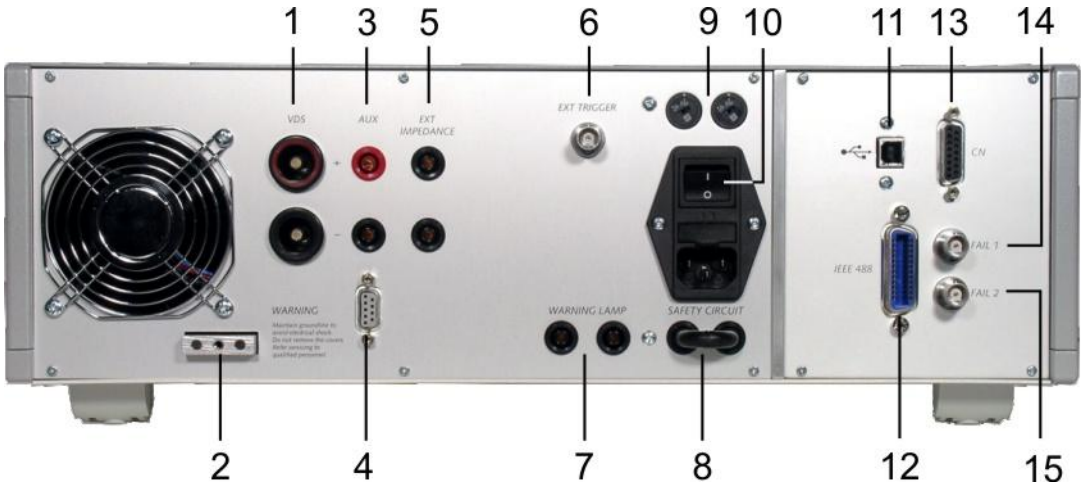
11. Indication Battery Switch
The red LED shows whether the battery switch is off or on. For negative pulses the battery switch is switched OFF / ON during pulse generation.

12. Red LED indication:
+ output, Micropulses, Burst 3a/3b pulses, External pulses,
The LEDs show the type of pulse and the output at which they are available.

13. Red LED indication:
The LEDs show the output on coaxial output for pulses 3a and 3b. This is the connection point for the external coupling devices .

14. DUT test supply
The coupling / decoupling network is part of the generator. The DUT is powered via the safety laboratory plugs at the front panel of the simulator. The nominal battery supply is 60V/50A. Higher currents, up to 200A, are available on special request.

3.2. Rear view



1 DUT test supply input
2 Reference earth connection
3 AUX Pulse input from ext. LD
4 Control input for ext. LD
5 Ext Impedance
6 External trigger
7 Warning lamp
8 Safety circuit
9 Mains selector 115V / 230V
10 Power on switch / Fuse
11 USB interface
12 Parallel interface GPIB / IEEE 488
13 Remote control connector CN
14 Fail input Fail 1
15 Fail input Fail 2

1 DUT test supply input
The power supply for the DUT is connected to the safety laboratory connectors + and -. The front panel output is decoupled by the internal coupling/ decoupling network.

2 Reference ground connection
The generator has to be connected to the reference ground plane of the test set up.

3 Pulse input for one external generator
The UCS 200N includes a central coupling matrix. The pulse output of an external **Load Dump LD200** or **MPG 200 S20** generator can be connected to this input. The Load Dump pulses then will be available at the central DUT output at the front panel of the UCS 200N

4 Control input for one external generator
The UCS 200N includes a central coupling matrix. The control output of the external generator can be connected to this input. The external generator is able to control the UCS200 coupling network.

5 External impedance
At this input an external resistor can be added to achieve impedance additional to those the generator includes. Select the “External Rs” mode in the setup menu. The internal resistor automatically is set to 10Ω And the external resistor is added.

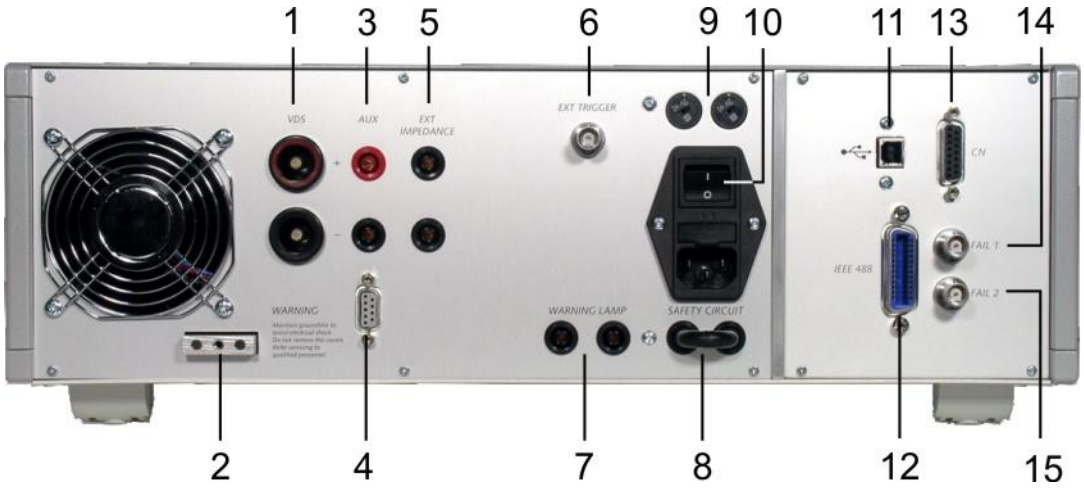
6 External trigger
One single event, burst, surge, voltage dip or ESD can be released. Trigger level 5-15V positive going.

7 Warning lamp control
This relays contact (230V / 6A) can control warning lamps which may be installed in the test set-up (Test On).

8 Safety circuit
To connect an external security circuit.

9 Mains selector
Selection of 115V / 230V

10 Power on switch
The switch is part of the mains filter. Mains fuses are part of the filter. (230V / 1A and 115V / 2A)



1 DUT test supply input
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10 Power on switch / Fuse
11 USB interface
12 Parallel interface GPIB / IEEE 488
13 Remote control connector CN
14 Fail input Fail 1
15 Fail input Fail 2

11 USB interface.

12 Parallel interface GPIB / IEEE 488, IEEE 488 interface with IEEE connector.

13 Remote control connector CN
External coupling devices are controlled via this remote control connector.

14 Fail detection FAIL 1 (TEST STOP)
The BNC input FAIL 1 can be used for DUT monitoring. In case of a low going signal (to chassis ground) the UCS 200N will stop pulse generation and the actual running test routine is paused. The test routine than can be stopped completely or can be continued from break point. A message of FAIL 1 is indicated in the LCD display.

15 Fail detection FAIL 2 (TEST PAUSE)
The BNC input FAIL 2 can be used for DUT monitoring In case of a low going signal (to chassis ground) the UCS 200N will stop pulse generation and the actual running test routine is paused as long as the low level signal is available at the FAIL 2 input. The test routine continues automatically as soon as the low level signal goes to high level. A message of FAIL 2 is indicated in the LCD display as well as in the iso.control software.

4. Operation

The simulator is operated by an easy menu control system. Seven function keys are available to select parameters and functions. All functions are indicated on the display; max. 8 lines and 40 characters.

The selected parameter is blinking and can be changed by turning the knob (incr./decr.).

←→ : The digit to be changed can be selected with the cursor (←→).

- Setted values are direct indicated on the screen.
- Status on the bottom lines shows the desired status after pressing the function key.

ESC : ESC will take you back to the previous level in the menu and set the displayed values. The latest settings are stored automatically and will be recalled when the menu is selected again.

EXIT : The firmware will reset to the main screen.

EM TEST

UCS 200N

Automotive Transient Generator

Micro Pulses 1, 2, 6
Burst Pulses 3a, 3b
Freestyle

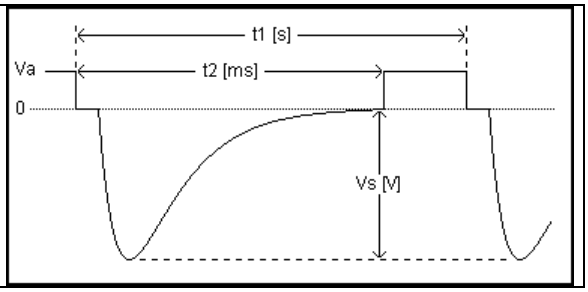
V 1.04a16 SWN : 031016

The serial number and the version number SWN are used for traceability reasons. These numbers are listed in the test reports and calibration certificates.

These numbers also are listed within the test reports generated by the iso.control software

The following short terms will be used within the next pages:

Vs	Test level
Pul	Type of pulse to be generated
+/-	Polarity of the generated pulse
Ri	Internal source resistance
rep (t1)	Repetition rate of the generated pulses
to (t2)	Off time of the battery supply voltage
tri	Trigger mode; AUTO, MAN or EXT
n	Number of pulses to be generated



General parameter restrictions:

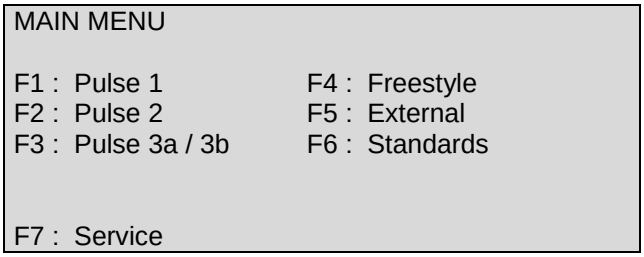
Repetition time t1 The minimum repetition time t1 is limited by the power capability of the charging rectifier.
The pulse repetition time t1 depends on the charging voltage with the following restrictions:

20V – 150V	0.2s
155V – 400V	0.5s
405V – 600V	1.0s

MAN / EXT Trigger The repetition time is limited by the setting of the repetition time t1

4.1. Main Menu

Other pulses different to ISO 7637 and the standards listed under 9.4 can be generated in Quick Start menu by changing the related parameters or by using the Freestyle programming mode.



F1 Pulse 1

Pushing the function key F1 opens the test menu which supports the so called test pulse 1. The basic pulse for this is defined in ISO 7637-2:2004. The menu F1 supports various different and modified type pulse 1 tests. In Quickstart mode all parameters can be adjusted during the running test.

F2 Pulse 2

Pushing the function key F2 opens the test menu which supports the so called test pulse 2. The basic pulse for this is defined in ISO 7637-2:2004. The menu F2 supports various different and modified type pulse 2 tests. All parameters can be adjusted during the running test.

F3 Pulse 3a / 3b

Pushing the function key F3 opens the test menu which supports the so called test pulse 3a and 3b. The basic pulse for this is defined in ISO 7637-2.3. The menu F3 supports different preprogrammed test level for pulse 3a and 3b tests. All parameters can be adjusted during the running test.
The UCS 200N Sx have no pulses 3a/3b.

F4 Freestyle

The Freestyle menu makes it possible to program the rise time and the pulse duration of the generated transients over a broad range. This enables to easy adapt the generators output pulses to new requirements.
It also allows the user to program his own specific test pulses, e.g. to test beyond the existing requirements.
This mode is used for pulses in the µs and ms range for rise time and pulse duration. It can not be used for programming parameters in the ns range.
The special models of UCS 200N Sx have no freestyle function.

Remark : The pulses in Freestyle are not defined standard pulses

F5 External

The operator can connect external devices (like Load Dump, MPG 200 S20...) at the rear of the UCS 200N. The pulses are then available at the central output of the UCS 200N. By selecting F5: External the operator enables the internal coupling matrix to be used via the front panel of the external generator.
Coupling to 50Ω output the LED does not light on.

F6 Standards

In this menu the UCS 200N supports the following standard pulses:

JASO	Pulses A2, B2, D2
NISSAN	Pulses B2, C8, C50, C300
SAE	Pulse mutual, pulse inductive
ISO	Pulse 6 ISO 7637-1:1990

F7 Service

Set-up menu of the generator.

4.2. Service

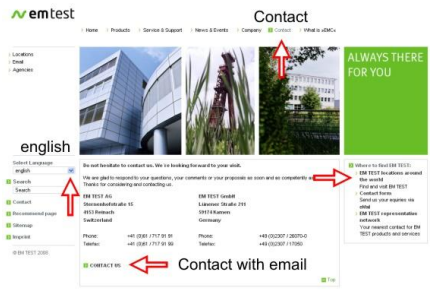
```
SERVICE

F1 :  Addresses
F2 :  Selftest
F3 :  Setup
F4 :  Set default values
```

F1 F2 F3 F4 F5 F6 F7

F1 Addresses

The addresses of the EM TEST AG and the EM TEST GmbH are shown. The addresses of all EM TEST sales agencies are listed on the web site of EM Test under :

www.emtest.com



F2 Selftest

Together with the user the firmware can test some parts of the equipment. The software will clearly explain the self-test procedure.

F3 Setup

The software will clearly explain the set-up procedure.

F4 Set default values

Set the following standard parameters to the factory settings:
ISO 7637-2-3:2004, NISSAN NDS, Jaso D001, SAE J1455

4.3. Setup

```
SETUP
F1 : Change language / Sprache ändern
F2 : LCD backlighting
F3 : Interfaces
F4 : Keyboard-Beeper
F5 : Power-on counter
```

F1 F2 F3 F4 F5 F6 F7

F1 Change language

The user can chose between two languages, German and English.

F2 LCD backlighting

With the use of F2 the backlighting can be switched On or Off. Additionally the Auto Off function can be programmed to switch off the backlighting after a specified time the generator has not been in operation (1 - 30min).

F3 Interfaces

This menu will help the user to define the status of the integrated serial and parallel interfaces, e.g. the baud rate of the RS 232 or the address of the IEEE interface.

F4 Keyboard-Beeper

F1 is the selector for the beeper ON/OFF mode.
The beeper is always on when a test routine is finished. To indicate that a running test is finished the beeper sounds 3 times.

F5 Power-on counter

Pressing of F5 will show the total power-on time and testing time of the test equipment.

4.4. Tests pulse1, pulse 2

The pulse 1 and pulse 2, have the same menu structure. The following sections shows the common menu-items.

4.4.1. **Quickstart** (pulse 1, pulse 2)

The pulses 1, 2, 3a / 3b offers a Quickstart menu. Easy and very fast operation of all standard functions of the equipment. The latest simulator settings are stored automatically and will be recalled when Quick Start is next selected.

QUICK START				
V =	100 V	pul =		2
+/- =	-	Ri =		10 Ohm
t1 =	1.0 s	t2 =		8.0ms
tri =	Auto	cpl =		Supply
n =	10000			
START	CHANGE			

F1 **F2** **F3** **F4** **F5** **F6** **F7**

Press ***CHANGE*** and the test parameters can be changed.

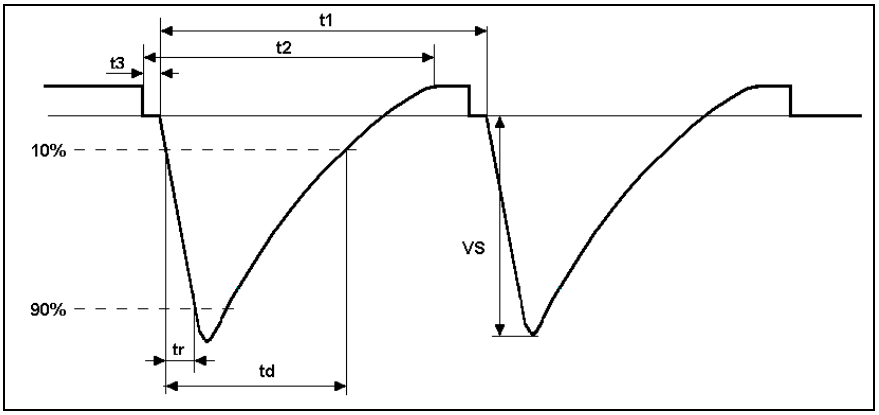
Select the desired parameter with the related function key and change the value by turning the front panel knob. The cursor allows the user to define the digit to be changed (fast or slow change).

Press ***START*** and the test starts immediately with the displayed test parameters.

The operator now can navigate with the ***Cursor*** from parameter to parameter. The blinking parameter can be changed by turning the front panel knob.

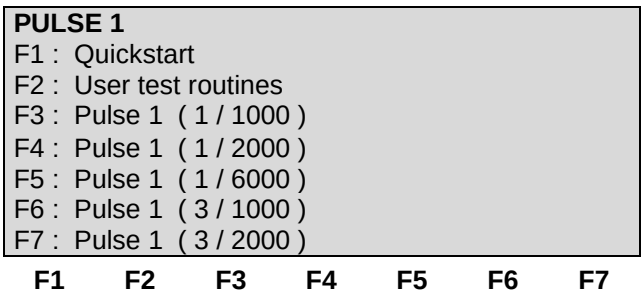
Press ***ESC*** will bring the user back to the previous menu level.

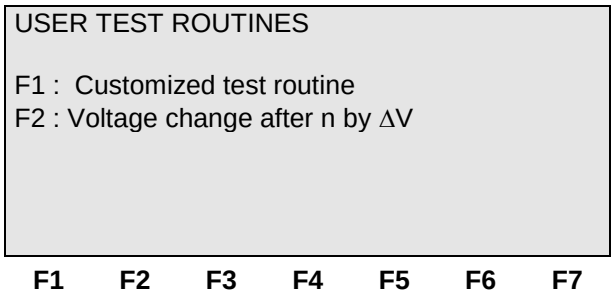
All function keys except F2 (manual trigger) can ***Stop*** the test routine.

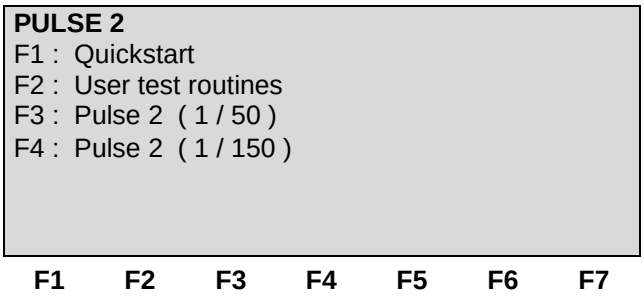


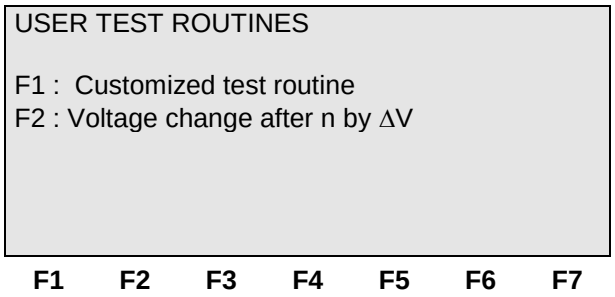
4.4.2. User Test Routines (pulse 1, pulse 2)

The user can program, save and recall his own specific test routines. The next pages shows the selection of the functions.





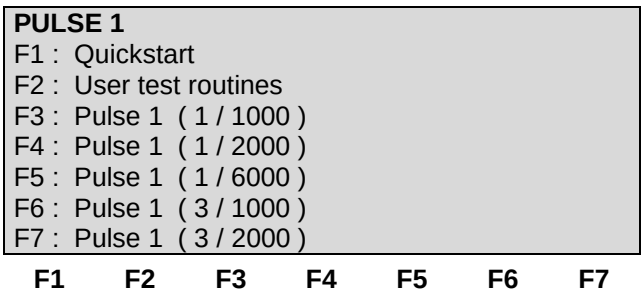


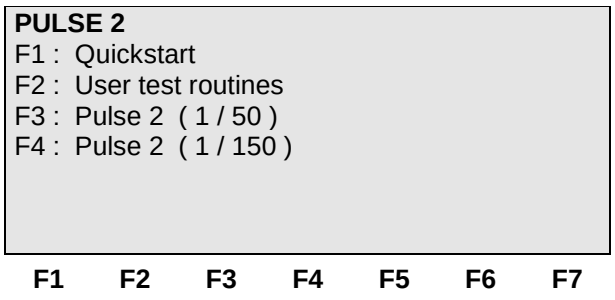


4.4.3. Standard Test Routines (pulse 1, pulse 2)

The operating software of the UCS 200N includes several preprogrammed Standard Test Routines which can be easily called up by pushing the related function key. All test parameters are set as specified in the standard, so that the operator can start the test procedure immediately.

For **Pulse 1** and **Pulse 2** the basic standard is the ISO 7637-2:2004.





Pulse 1 test routine includes the following pulses:

- 1/1000µs with Ri = 20Ω as per SAE J1113
- 1/2000µs with Ri = 10Ω as per ISO 7637
- 1/6000µs with Ri = 30Ω as per MBN 10284
- 3/1000µs with Ri = 50Ω as per ISO 7637
- 3/2000µs with Ri = 4Ω as per MBN 22100

Pulse 2 test routine includes the following pulses:

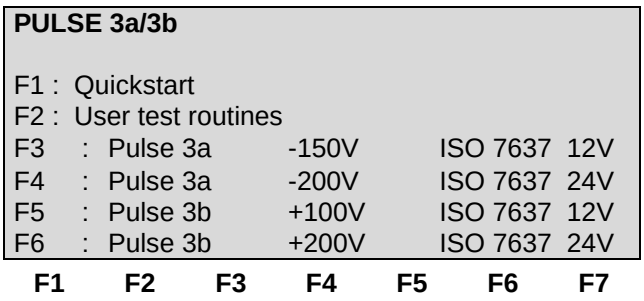
- 1/50µs with Ri = 2Ω as per ISO 7637
- 1/150µs with Ri = 30Ω as per MBN 10284

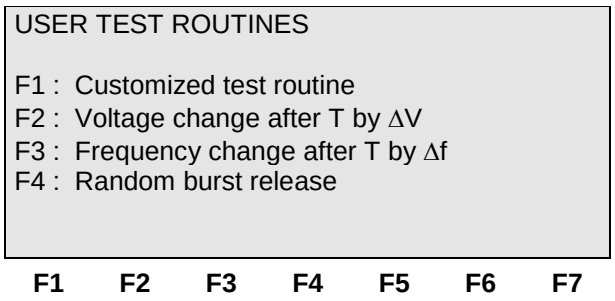
All other pulse 1 and pulse 2 variations in other manufacturer specifications can be covered by selecting a different internal resistor Ri or by using the ***Freestyle*** programming mode (see paragraph 10.5)

4.5. EFT Burst pulse 3a/3b as per ISO 7637-2:2004

4.5.1. Operation

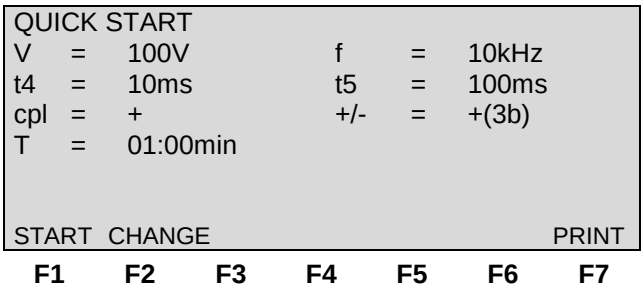
The Burst menu offers different test routines for burst testing.





4.5.2. Quick Start

Easy and very fast operation of all standard functions of the equipment. The latest simulator settings are stored automatically and will be recalled when Quick Start is next selected.



Press ***CHANGE*** and the test parameters parameter can be changed.

Select the desired parameter with the related function key and change the value by turning the front panel knob. The cursor allows the user to define the digit to be changed (fast or slow change).

Press ***START*** and the test starts immediately with the displayed test parameters.

The operator now can navigate with the ***Cursor*** from parameter to parameter. The blinking parameter can be changed by turning the front panel knob.

Press ***ESC*** will bring the user back to the previous menu level.

All function keys except F2 (manual trigger) can ***Stop*** the test routine.

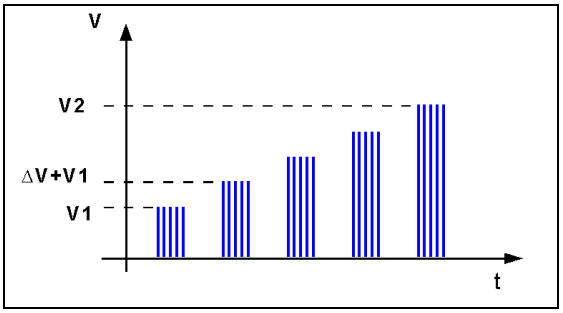
4.5.3. User Test Routines

The user can program, save and recall his own specific test routines. The next pages shows the selection of the functions. After selection the last used test parameters will be indicated on the display.

Customized test routines

The software controls user test routines according to the specification of the user. All limitations are the same as defined under Quick Start.

Voltage change after T by ΔV The test voltage is increased from V1 to V2 by steps of ΔV after the defined test time T. All limitations are the same as defined under Quick Start. The limitation of the max. generated number of spikes is related to the higher voltage of V1 or V2.



Frequency change after T by Δf

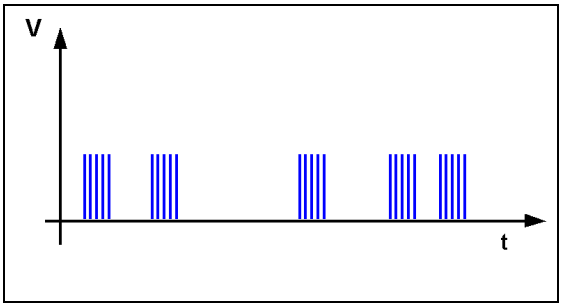
The spike frequency is changed from f1 to f2 by steps of **Δf** after a defined test time. All limitations are the same as defined under Quick Start. The limitation of the max. generated number of spikes is related to the higher voltage of V1 or V2.

tr	>=	100 ms
f1	<=	f2
td	>=	5.0 ms
td	>=	5 / f1
tr -td	>=	50 ms

Note: The maximum values for frequency, burst duration td and voltage are in dependence of each other and therefore limited by the generator performance. The practical limits of the UCS200M are 20kHz for f2 and 50ms for the burst duration td. The limits of the generator model UCS 200N4 are approx. 10 times higher.

Random burst release

No repetition rate is selected. The single burst will be triggered by statistics in the limits of 20 to 2000ms as time between two Bursts. All limitations are the same as defined under Quick Start.



4.5.4. Test Routine as per ISO 7637

The display shows a list of test levels as per the standards ISO 7637.

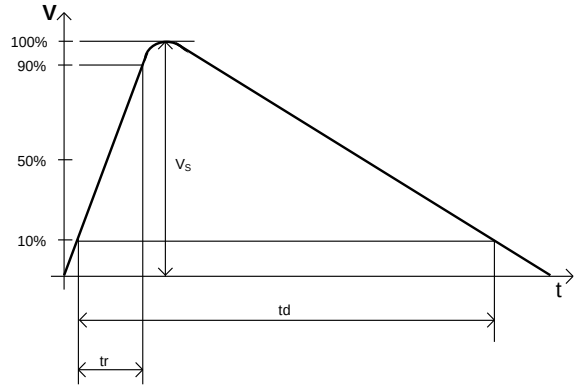
STANDARD TEST ROUTINES			
F3	: Pulse 3a	-150V	ISO 7637 / 12V
F4	: Pulse 3a	-200V	ISO 7637 / 24V
F5	: Pulse 3b	+100V	ISO 7637 / 12V
F6	: Pulse 3b	+200V	ISO 7637 / 24V

F1 F2 F3 F4 F5 F6 F7

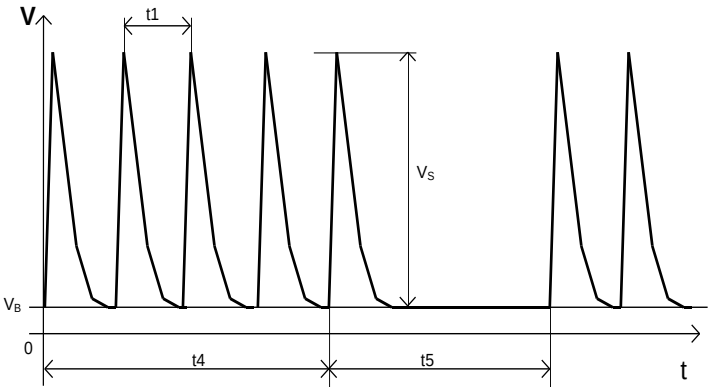
Select the recommended test level by pressing the function key Fx and start the test immediately.

4.6. Burst generation

As per ISO 7637 the test pulses 3a and 3b are defined as follows:



Definition of a single pulse



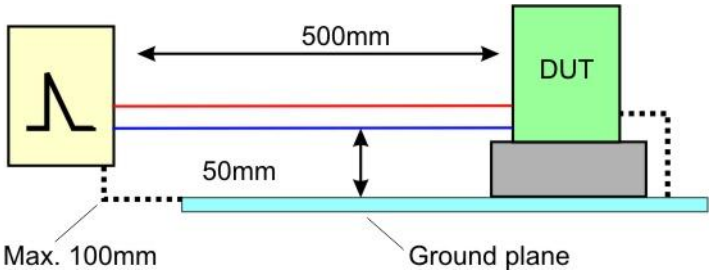
Definition of the burst

	ISO 7637 3a		ISO 7637 3b	
Parameter	**12V System**	**24V System**	**12V System**	**24V System**
VS	0V - -150V	0V - -200V	0V - +100V	0V -+ 200V
Ri	50Ω	50Ω	50Ω	50Ω
td	0.1µs	0.1µs	0.1µs	0.1µs
tr	5ns	5ns	5ns	5ns
t1	100µs	100µs	100µs	100µs
t4	10ms	10ms	10ms	10ms
t5	90ms	90ms	90ms	90ms

Discharge switch:
The discharge switch is a highly reproducible semiconductor switch. Spike frequencies up to 200kHz are by a factor of 20 higher than recommended in the actual standards. This means of course that also the pulse energy would be 20 times higher.

4.6.1. Test Set-up

IMPORTANT



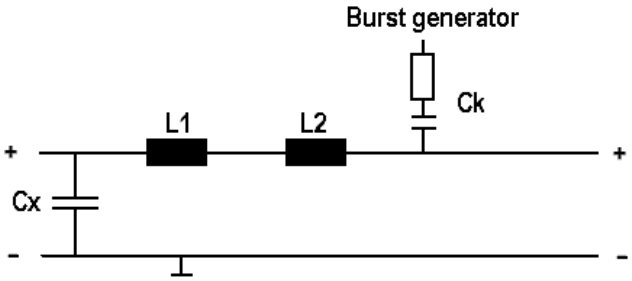
- The test generator and the coupling network should be connected directly to the reference ground plane.
- For the pulses 3a/3b the connection generator – groundplane shall not be longer than 100mm. The connection shall be suitable for high frequencies.
- The DUT shall be isolated from the reference ground plane by 0.1m. This is also recommended for all connected lines. The DUT should only be grounded if it is also recommended for the real installation in a vehicle.
- Whenever possible the test set-up and the cabling should always be the same.
- The diodes or zeners are optional only for pulse 5b (suppressed)
- The load resistor Rv is optional. This resistor is used to match the generator to the low impedance battery supply system. So far, as known, this is only used within the Ford ES-XW7T specification where Rv = 0.7Ω

During the test the measuring circuit shall be removed from the test setup

4.6.2. Coupling decoupling network

The decoupling part of the coupling network has to:

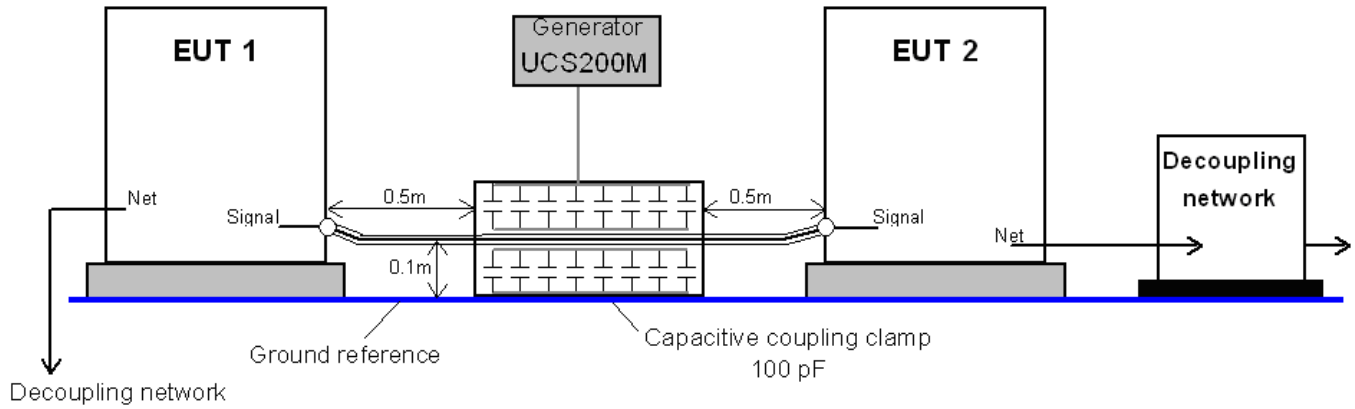
- to decouple the pulses from the battery or the power supply
- protect other systems that are connected to the same power supply and realize a high impedance of the power supply, e.g. battery supply.



Coupling / decoupling network for the UCS 200M (3a / 3b)

4.6.3. Tests with the capacitive coupling clamp ACC

- The coupling on signal lines is realized with the capacitive coupling clamp.
- The coupling clamp has to be terminated with a 50 ohm resistor.
- The clamp should be placed in a distance of 0.5m to the equipment under test. When using shorter distances, the DUT may be influenced by radiation.
- If the DUT is built up by two different units, the test should be conducted on each single unit with the required distance.



Coupling to signal lines or lines where no galvanic contact is possible (e.g. shielded lines)

4.7. Freestyle

The Freestyle menu makes it possible to program the rise time and the pulse duration of the generated transients over a broad range. This enables to easy adapt the generators output pulses to new requirements.
It also allows the user to program his own specific test pulses, e.g. to test beyond the existing requirements.
This mode is used for pulses in the µs and ms range for rise time and pulse duration. It can not be used for programming parameters in the ns range.

Warning: The pulses in the Freestyle menu don't correspond to a defined standard!

The accuracy of the voltage, td and tr are depending on the pulse setting and the load. A “typical” pulse in open circuit is the reference for the linearisation. Pulses with other parameters are more or less accurate.
The exact pulse parameter must be checked by an oscilloscope. If there are differences, the user must modify the setting till the measured pulse is correct.

Page 3

STANDARD TEST ROUTINE				FREESTYLE
V = 100 V		pul	=	Free
tr = 1us		td	=	5000us
+/- = -		Rs	=	75 Ohm
t1 = 1.0 s		t2	=	8.0ms
tri = Auto		cpl	=	Supply
n = 10000				
START CHANGE				

F1 F2 F3 F4 F5 F6 F7

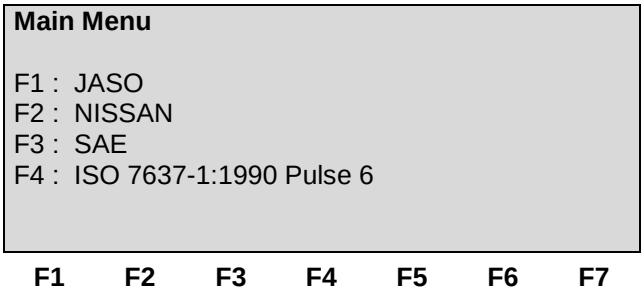
The pulse parameters can be programmed within following range:

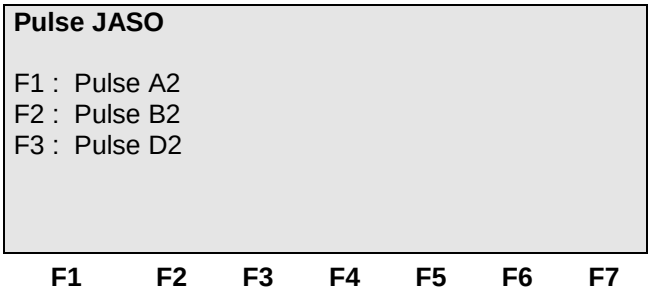
Peak Voltage V	20V – 600V
Rise time tr (10% - 90%)	1µs - 10µs
Pulse duration td (10% - 10%)	50µs – 10’000µs
Polarity	Positive / negative
Internal resistor Rs	2Ω, 4Ω, 10Ω, 20Ω, 30Ω, 50Ω, 75Ω,80Ω, 90Ω, 200Ω, 450Ω Remark : For internal overload protection UCS 200N limits the output voltage for Rs = 2Ω Vmax = 150V Rs = 4Ω Vmax = 330V
External resistor Rs	At the rear of the UCS 200N any resistor can be connected to realize other values then listed above. An internal 10Ω resistor is in series with the external resistance. (10Ω resistor is an internal overload protection) **Ri = 10Ω internal + external value**

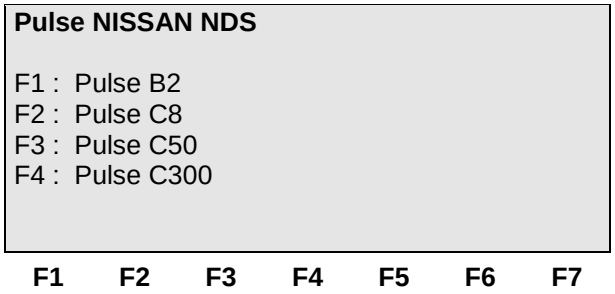
4.8. Standards

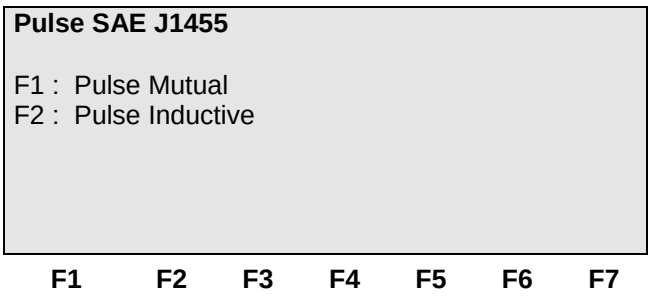
The **Standards** menu is based on the following standards:

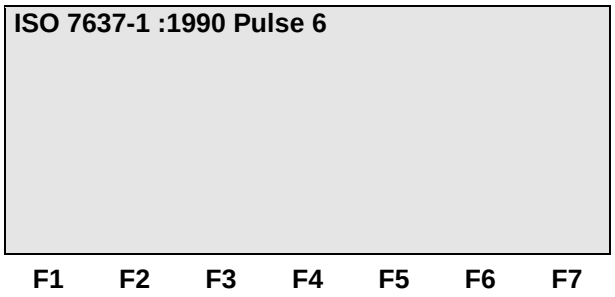
- JASO D001
- NISSAN 28400 NDS07
- SAE J1455
- ISO 7637-1:1990 Pulse 6





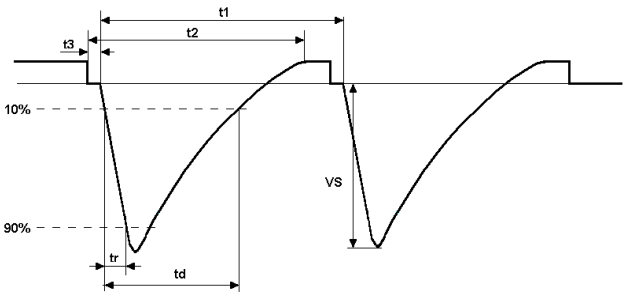


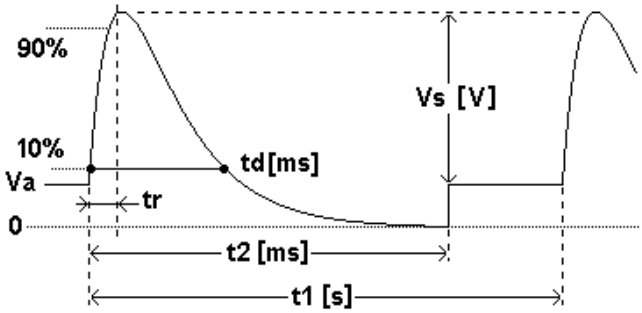




5. Micro pulse generation

Discharge switch:
The discharge switch is a highly reproducible semiconductor switch.

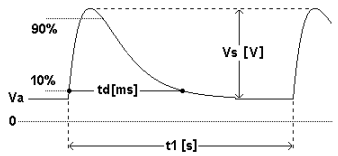




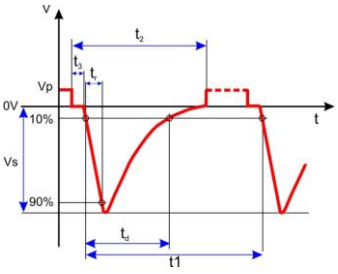
5.1. Pulses as per ISO 7637

Testpulse 1	**12V System**	**24V System**
Vs Voltage	0 .. -100V	0 .. –600V
Ri Impedance	10Ω	50Ω
td Duration	2 ms	1 ms
tr Risetime	1µs	3µs
t1 (Rep) Repetition rate	0,5 - 5s	0,5 – 5s
t2 Switch off time	200 ms	200 ms
t3 (smallest possible time)	< 100µs	<100µs

Testpulse 2a	**12V System**	**24V System**
Vs Voltage	0 .. 50V	0 .. 50V
Ri Impedance	2Ω	2Ω
td Duration	50µs	50µs
tr Risetime	1µs	1µs
t1 (Rep) Repetition rate	0,2 - 5s	0,2 - 5s
t2 Switch off time	0 ms	0 ms



Testpulse 6	**12V System**	**24V System**
Vs Voltage	0 .. -300V	0 .. –300V
Ri Impedance	30Ω	30Ω
td Duration	300µs	300µs
tr Risetime	60µs	60µs
t1 (Rep) Repetition rate	15s	15s
t2 Switch off time	1s	1s
t3 (smallest possible time)	< 100µs	<100µs



5.2. Pulses as per SAE J 1113

	12V System Passenger Car and Light-Duty Trucks	12V System Heavy-Duty Trucks	24V System
Testpulse	**Pulse 1a**	**Pulse 1b**	**Pulse 1c**
Vs Voltage	-25 .. -100V	-150 .. -600V	-300 .. -600V
Ri Impedance	10Ω	20Ω	50Ω
td Duration	2 ms	1 ms	1 ms
tr Risetime	1µs +0/ -50%	1µs +0/ -50%	3µs +0/ -50%
t1 (Rep) Repetition rate	0,5 - 5s	0,5 - 5s	0,5 - 5s
t2 Switch off time	200 ms	200 ms	200 ms
t3 (smallest possible time)	< 100ms	<100ms	<100ms

5.2.1. Pulses as per SAE J 1455

	Inductive	Mutual
Test voltage	20 - 600V 5V step	20 - 300V 5V step
Internal resistor	20Ω	50Ω
Pulse width	1000µs	15µs
Risetime tr	1µs	1µs
Repetition rate t1 (Rep)	1.0s - 99.0s	1.0s - 99.0s
Battery off time t2	0.0ms - 10000ms	0.0ms - 10000ms

5.3. Pulses as per Nissan NDS 28400 NDS07

	Pulse B2	Pulse C8	Pulse C50	Pulse C300
Voltage	-300V	±300V	±300V	-300V
Capacitor	C = 33µF	C = 1µF	C = 33µF	C = 33µF
Pulse duration τ(36,8%)	τ = 2.5us	τ = 2.0ms	τ = 2.5us	
Internal resistor R1	100Ω	500Ω	1.2Ω	100Ω
Internal resistor R2	75Ω	450Ω	200Ω	75Ω
Polarity	Negative	pos, neg	Negative	pos, neg
t1	30s	30s	30s	
t2	--	200ms	--	
t3	--	< 100µs	--	

5.4. Pulses as per JASO D 001

	Pulse A2	Pulse B2	Pulse D2
Voltage	0...110V	0...-260V	0..170V
Capacitor	C = 4.7µ	C = 33µF	C = 2.2µ
Pulse duration τ(36,8%)	τ = 2.5us	τ = 2.0ms	τ = 2.5us
Internal resistor R1	0.6Ω	60Ω	1.2Ω
Internal resistor R2	0.4Ω	80Ω	0.9Ω
Polarity	Positive	Negative	Positive
t1	30s	30s	30s
t2	--	200ms	--
t3	--	< 100µs	--

Comments to the JASO Pulse verification

1. JASO does not only specify the discharge τ_R value of 2.5µs but also the related RC components,
   - for D2 2.2µF & 1.2Ω
   - for A2 4.7µF & 0.6Ω

   ➔ Therefore the UCS 200N include the required components.
2. JASO also specifies a very short pulse duration of 2.5µs for A2 and D2 which is the result of the above mentioned RC networks. Because the rise time constant (1µs) is in the same range as the discharge time constant τ_R both parameters are influenced by each other. That means the discharge time constant is already influenced by the rise time constant.

   ➔ Therefore it is no more possible to make a pure graphical evaluation of the τ_R parameter as usually made by the 100% to 36.7% wave shape level. The graphical evaluated τ_R value seems much longer due to the influence of the rise time constant
3. The real τ_R can be easily calculated by the following method:
   - Measure the time at which the decay has reached 70% of the peak voltage
   - Measure the time at which the decay has reached 30% of the peak voltage

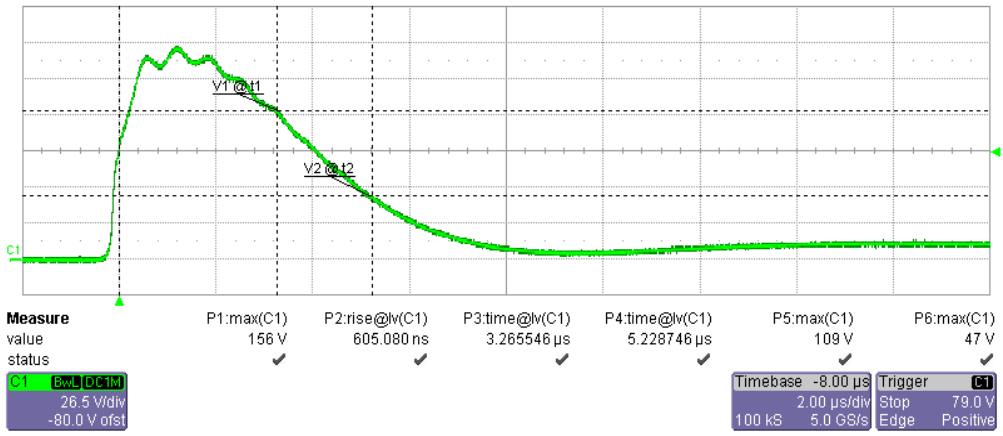
   These 2 points are far enough away from the 100% point of the wave and therefore far enough away from the influence of the risetime constant).

➔ Calculate the real $\tau_{R\ by}$ using the following formula:

$V1 = V_0 \times e^{-t1/\tau}$

$V2 = V_0 \times e^{-t2/\tau}$ ➔ Divide V1 / V2 and you will get the final formula ➔ **$\tau = (t2-t1) / \ln V1/V2$**

Note: JASO requires both, to match the τ_R requirement and to use the related RC components. Therefore it is not possible simply to match the waveform so that the user can detect 2.5µs as time constant between 100% and 36.7% manually out of the measured waveform. This would need to change the internal RC components accordingly so that these values would no more be in the JASO spec (e. g. 2.2µF & 1.2Ω)



V1 = 109 V
V2 = 47 V
t1 = 3.265 us
t2 = 5.229 us

t2 – t1 =1.964

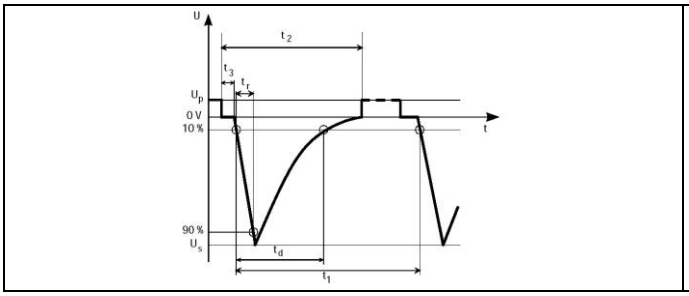
ln V1/V2 = 0.841

τ_R = 2.335

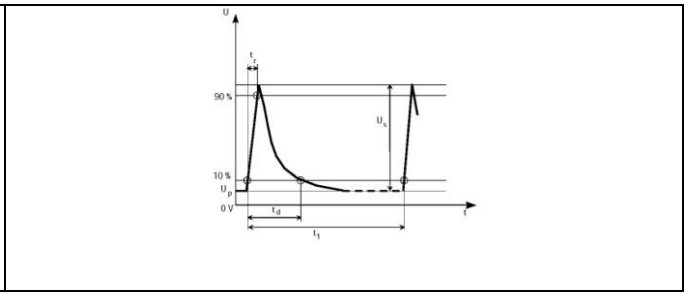
5.5. Pulses as per MBN 10 284 part 2 : August 2001

Testpulse 1	**12V System**	**24V System**	**42V System** Scenario 1	**42V b System** Scenario 2
Voltage Vs	-100V	-300V	-100V	-300V
Internal resistor Ri	10Ω	10Ω	30Ω	90Ω
Duration td	2 ms	2 ms	6 ms	2 ms
Rise time tr	1µs	1µs	1µs	1µs
Repetition rate t1 (Rep)	5s	5s	5s	5s
Switch off time t2	200 ms	200 ms	200 ms	200 ms
t3 (smallest possible time)	< 100µs	<100µs	<100µs	<100µs
Testpulses	5000	5000	5000	5000

Testpulse 2	**12V System**	**24V System**	**42V a System** Scenario 1	**42V b System** Scenario 2
Voltage Vs	100V	150V	100V	300V
Internal resistor Ri	10Ω	10Ω	30Ω	90Ω
Duration td	0,05 ms	0,05 ms	0,15 ms	0,05 ms
Rise time tr	1µs	1µs	1µs	1µs
Repetition rate t1 (Rep)	5s	5s	5s	5s
Switch off time t2	200 ms	200 ms	200 ms	200 ms
Testpulses	5000	5000	5000	5000



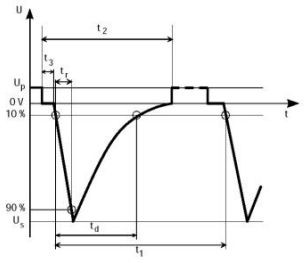
Testpulse 1



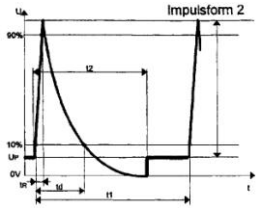
Testpulse 2

5.5.1. Pulses as per NBM 22100 –2 : August 1999

Testpulse 1	**12V System**	**24V System**	**Impulseform**
Voltage Vs	-150V	-300V	
Internal resistor Ri	4Ω	4Ω	
Duration td	2 ms	2 ms	
Rise time tr	1µs	3µs	
Repetition rate t1 (Rep)	0.2s	0.2s	
Switch off time t2	200 ms	200 ms	
t3 (smallest possible time)	< 100µs	<100µs	
Testpulses	50'000	50'000	



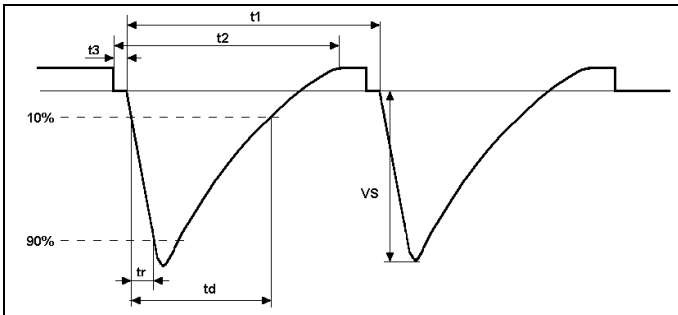
Testpulse 2	**12V System**	**24V System**	**Impulseform**
Voltage Vs	100V	150V	
Internal resistor Ri	4Ω	4Ω	
Duration td	50µs	50µs	
Rise time tr	1µs	1µs	
Repetition rate t1 (Rep)	0.5s	0.5s	
Switch off time t2	200 ms	200 ms	
Testpulses	5'000	5'000	



5.6. Special pulses as per VW, Mercedes, Ford, Opel

Pulse 1b as per VW

	12V supply	24V supply
Test voltage	0 .. -50V	0 .. -50V
Internal resistor	10Ω	20Ω
Pulse width td	0.05 ms	0.05 ms
Risetime tr	1µs	1µs
Repetition t1 (Rep)	0,2 s	0,2 s
Switch off time t2	for approx. td	for approx. td

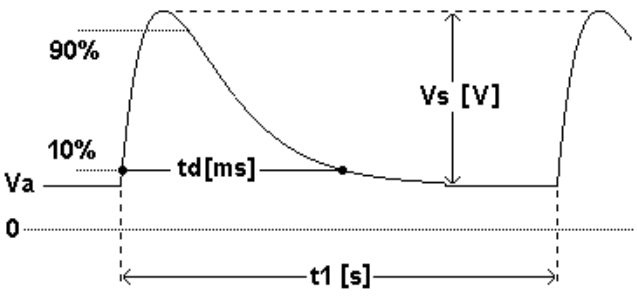


To generate this test pulse please select in Quick Start pulse 2 as per ISO 7637. Additionally the following setting are recommended:

- Polarity negative
- Battery off time to (t2) to 0.05ms
- Repetition rate rep=0.2s
- Internal resistor Ri=10Ω (20Ω for 24V battery supply)

Test pulse 2 as per VW

	12V supply
Test voltage	0 - 50V
Internal resistor	10Ω
Pulse width td	0,05 ms
Risetime tr	1µs
Repetition t1 (Rep)	0,2s



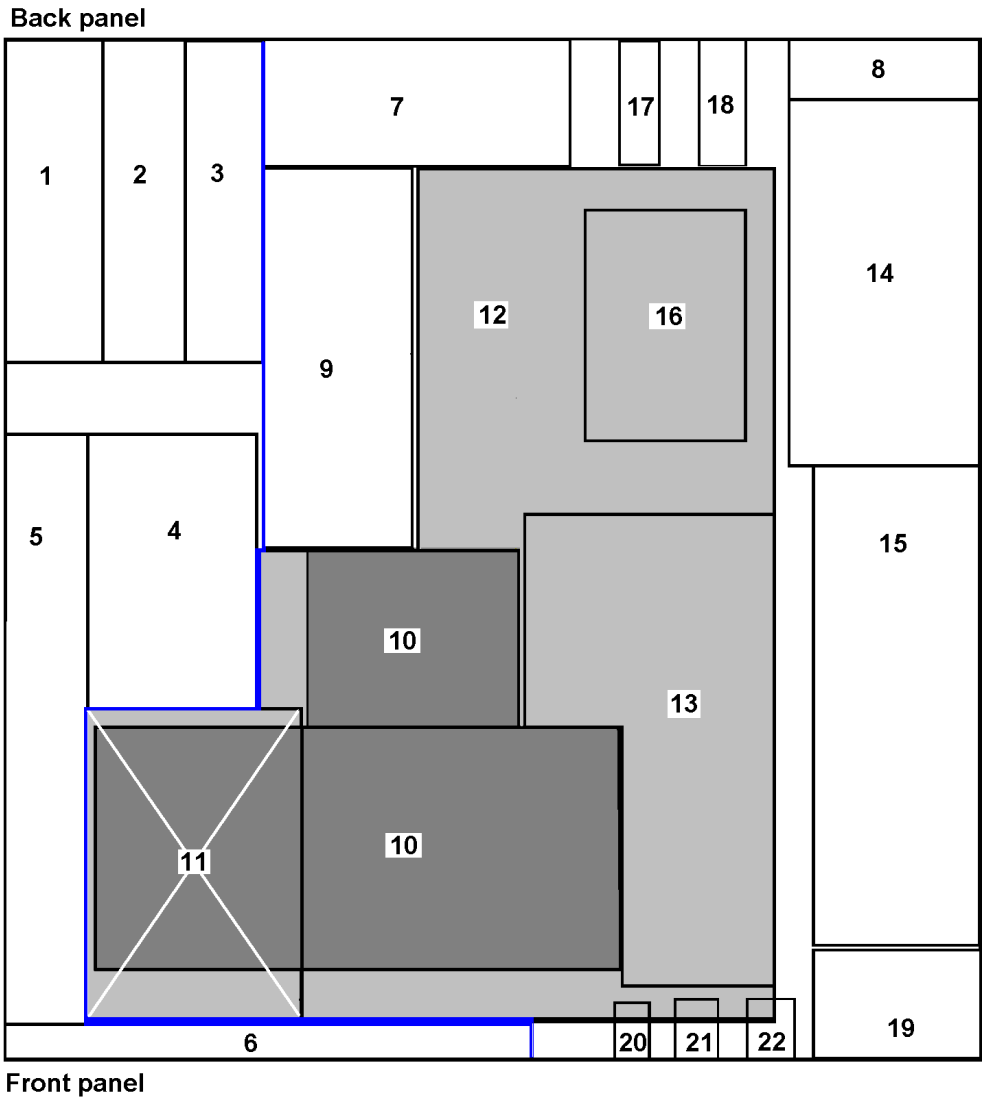
To generate this test pulse please select in Quick Start pulse 2 as per ISO 7637. Additionally the following setting are recommended:

- Battery off time to (t2) to 0.0ms
- Repetition rate rep=0.2s
- Internal resistor Ri=10Ω (20Ω for 24V battery supply)

The following test pulses can also be covered by the MPG (examples):

- Ford ES-XW7T	**Pulse 1a**	The specification is basically the same as per ISO 7637(pulse 2) , except Ri = 4Ω and a negative polarity shall be selected.
- Opel	**Pulse 1a**	The specification is basically the same (wiper pulse) as per ISO 7637(pulse 2) , except Ri = 2Ω and a negative polarity shall be selected.

6. Test Equipment UCS 200N



Control unit

1	Power supply board	5	Filter board / connecting board
2	Interface board	6	Keyboard / LCD- display
3	Controller board	7	General power supply input, filter
4	Power supply transformer	8	Ventilation

High voltage unit

9	High voltage power supply	13	Coupling board
10	Storage capacitor	14	DC Switch
11	Relays driver board	15	Burst board
12	Micropulses board		

Coupling/decoupling unit

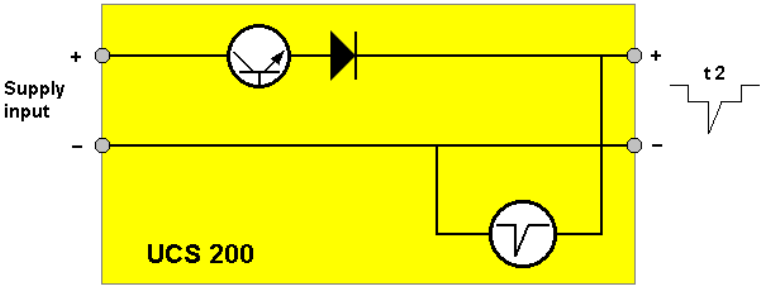
16	Decoupling chokes	20	CRO Trigger
17	External input	21	50 Ohm Output
18	DC Input	22	LEDs
19	+ Coupling		

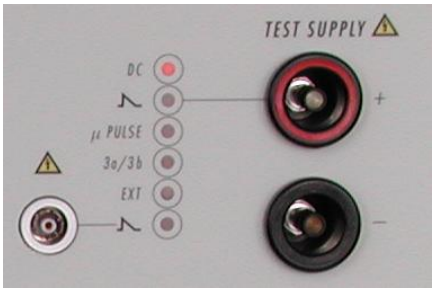
6.1. Battery switch

- The battery switch is located on the right part of the equipment and can switch off the battery supply for the DUT. The time off can be selected. The dc power is switched off during pulse generation of e.g. pulse 1. See the figure and the table on the previous page.

- When the UCS 200N is powered the battery switch is set into operation. Without being triggered the switch is closed and the DUT is powered. The red LED on the front panel of the equipment indicates the switching condition.

- The switching off procedure is automatically selected when negative pulses are generated. The range for switching off time is at 0ms and 0.1ms - 9.9s. The maximum value is limited by the repetition rate. The synchronisation, switching off and pulse generation, is realized in the control unit.





- For positive pulse generation the operator can select whether the battery supply is switched off or not. The range for switching off time is from 0.1ms to 9.9s. The maximum value is limited by the repetition rate. If no switching off is required the pulses are superimposed to the + line.
- The switching off procedure is mandatory for negative pulse generation. Due to decoupling, the low impedance battery is disconnected and the whole energy is surged to the DUT. For positive pulses the battery is additionally decoupled by a diode. For negative pulses 0ms also can be selected. The operator shall be aware that most of the pulsed energy will be absorbed by the low impedance battery. The 0ms setting shall therefore not been selected for normal test procedures.

- The resolution of the OFF TIME setting is as follows:

Range	Step [ms]
0 to 1ms	0.01
1 to 10ms	0.1
10 to 100ms	1
100 to 1000ms	10
1000 to 10000ms	100

- The switch can carry a nominal current of 50A and has a voltage capability of 800V.

- The switch includes a short-circuit protection control unit. The switch is a solid state device.

- The switch is a solid state device.

6.2. The coupling network

Via coupling network the pulses are injected to the lines of a vehicle battery supply system, according ISO 7637 as well as SAE J1113.
The coupling mode, capacitive coupling to the + line or via capacitive coupling clamp to signal lines, is selected via the front panel keyboard of the UCS 200N or by ISO.control software.

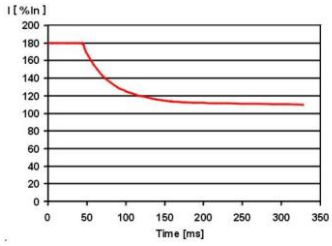
The following options are available:

	UCS 200N50	UCS 200N100	UCS 200N150	UCS 200N200
DC supply	max. 60V	max. 60V	Max. 60V	max. 60V
current	50A	100A	150A	200A
Inrush current	100A 500ms	150A 500ms		

Behavior of the inrush current

The behavior of the inrush current is similar to the curve in figure on the right.

The curve shows approximately the switch off time for the overcurrent duration.



Behavior of the inrush current

Installation:

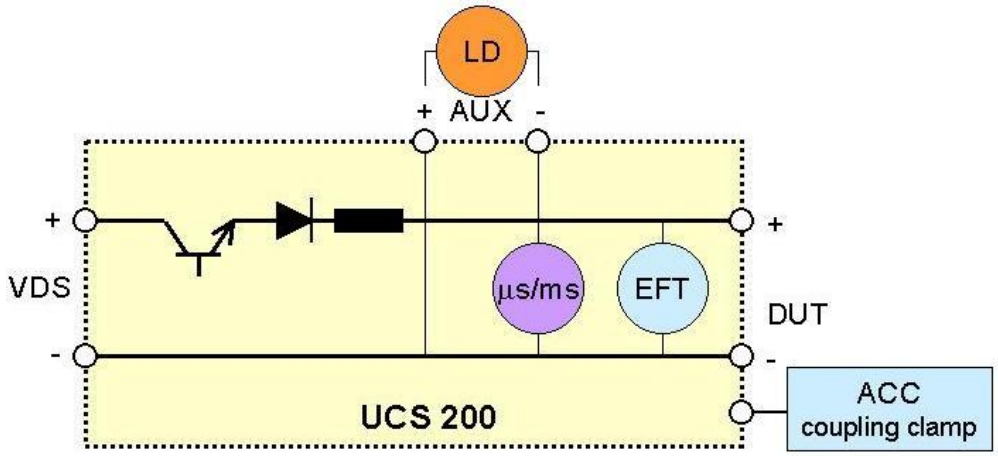
The following connection between external generators and coupling network has to be made:

Pulse output				CN input at the rear side of UCS		
LD	+/-	(rear part)	→	CN	+/-	(rear part)
MPG 200 S20	+/-	(rear part)	→	CN	+/-	(rear part)

Control signals to UCS 200N :

Device	Control signals
from LD/MPG	polarity, trigger battery switch, interlock, pulse onto the + potential

6.2.1. UCS 200N Coupling network general diagram



Input:

Pulse	Pulse Simulator Type
DC power supply +/- and pulse	VDS or external
Pulse 1, 1a, 2, 6 (ISO)	Internal from UCS 200N module
Pulse B2, C8, C50, C 300 (Nissan)	Internal from UCS 200N module
Pulse A2, B2 and D2 (Jaso)	Internal from UCS 200N module
Pulse 3a, 3b	Internal from UCS 200N module
Pulse 5, 7 (ISO, Ford, Chrysler)	External LD 200N
Pulse A1, A2 and B1 (Nissan)	External LD 200N
Pulse A1, B1 and D1 (Jaso)	External LD 200N
Pulse 1b (GOST)	External MPG 200 S20

Output:

+/- power supply lines for the DUT or DUT according ISO 7637 part 1
Coaxial output for connecting a capacitive coupling clamp according ISO 7637 part 3

Control functions

All functions of the coupling network are controlled via the keyboard of the pulse generators.
All test pulses are available at the central output of the UCS 200N.

Additionally the coupling network may also be controlled fully automatic via iso.control. All coupling modes and test pulses are then controlled by the computer.

Before starting a test procedure the button TEST ON shall be pressed and the related LED is alighted.

Please take care that, within a fully automatic test setup which is supported by the iso.control software, all units of the setup must be switched on. This is necessary to support all necessary communication between the instruments.

7. Technical data

7.1. EFT / Burst pulse 3a/3b as per ISO 7637-2:2004

7.1.1. Pulse specification

Open circuit	U = 25V – 1000V	± 10 %
at 50 ohm	U = 13V – 500V	± 10 %
Rise time (10%-90%)	5ns	± 30%
Pulse duration (10%-10%)	100ns	(+100 / -0)ns
Source impedance	Zq = 50 Ω	± 20%
Polarity	Pulse 3a negative and pulse 3b positive	

7.1.2. Settings

Voltage Setting	25V – 1000V in 5V steps
Burst duration	t4 = 0.1ms - 999.9ms
Burst repetition rate	t5 = 0 ms - 9,999ms / man t5 ≤ 9,999ms ⇒ Auto Trigger t5 > 9,999ms ⇒ Man Trigger
Spike frequency	f = 0.1kHz - 200kHz t1 = 5µs - 10ms
Test time	T = 0:01min - 999:59min T > 999:59min = ∞
Trigger	Automatic repetition of bursts Manual trigger of one single burst External trigger of one single burst

7.1.3. Output

Direct	via HV coaxial connector 50 Ω
Coupling network	to +
DUT supply DC	60V / 50A / 100A / 200A
CRO Trigger	+5V rectangular trigger signal

7.2. Micro pulses 1 & 2 as per ISO 7637-2:2004

7.2.1. Pulse specification and settings

No load	U = 20V - 600V ±10%
Voltage settings	20V - 600V in 5V steps
Pulses	pulses 1, 1a and 2 as per ISO 7637-2:2004
Source impedance selectable	2Ω, 4Ω, 10Ω, 20Ω, 30Ω, 50Ω,, 90Ω and as option EXTERN (Rs = 10Ω +Rs_{ext}.)
Polarity	positive / negative

***FREESTYLE* mode**	**Free programmable pulse parameters**
Peak Voltage V	20V – 600V
Rise time tr (10% - 90%)	1µs - 10µs
Pulse duration td (10% - 10%)	50µs – 10'000µs
Polarity	positive / negative
Internal resistor Rs	2 - 450Ω At the rear of the UCS 200N any resistor can be connected to realize other values then listed above
Operation	
Front panel	Via function keys
iso.control software	Via user software

ISO 7637 pulses

Pulse 1 (12V battery supply)

Rise time	1µs +0% // -50%
Pulse width	2ms ±10%
Source impedance	10Ω ±10%

Pulse 1a

Rise time	3µs +0% // -50%
Pulse width	1ms ±10%
Source impedance	50Ω±10%

Pulse 2 (12V/24V)

Rise time	1µs +0% // -50%
Pulse width	0.05ms ±10%
Source impedance	2Ω ±10%

Pulse 6 (12V/24V)

Rise time	60µs +0% // -50%
Pulse width	300µs ±10%
Source impedance	30Ω ±10%

SAE J1113 Pulses

SAE pulse 1a

Rise time	60µs +0% // -50%
Pulse width 10%-10%	300µs ±10%
Source impedance	30Ω ±10%

SAE pulse 1b

Rise time	1µs +0/ -50%
Pulse width 10%-10%	1 ms ±20%
Source impedance	20Ω ±20%

SAE pulse 1c

Rise time	3µs +0/ -50%
Pulse width 10%-10%	1 ms ±20%
Source impedance	50Ω ±20%

As options

SAE pulses as per SAE J 1455

SAE Mutual

Rise time	1µs ±20%
Pulse width 37%-37%	15µs ±20%
Source impedance	50Ω ±10%

SAE Inductive

Rise time	1µs ±20%
Pulse width 37%-37%	1000µs ±20%
Source impedance	20Ω±10%

Nissan pulses as per 28400 NDS07

Pulse B2

Open circuit voltage	– 300V ± 10% max. 400V
Capacitor	C = 33µF
R1	100Ω ± 10%
R2	75Ω ± 10%
Polarity	Negative

Pulse C8

Open circuit voltage	±300V ± 10% max. 400V
Capacitor	C = 1µF
R1	500Ω ± 10%
R2	450Ω ± 10%
Polarity	Positive and negative

Pulse C50

Open circuit voltage	±300V ± 10% max. 400V
Capacitor	C = 33µF
R1	30Ω ± 10%
R2	200Ω ± 10%
Polarity	Positive and negative

Pulse C300

Open circuit voltage	- 300V ± 10% max. 400V
Capacitor	C = 33µF
R1	100Ω ± 10%
R2	75Ω ± 10%
Polarity	Negative

JASO pulses as per JASO D 001

Pulse A2 (12V) JASO

Capacitor	C = 4.7µF
Pulse duration τ	τ(36,8%) = 2.5us ±30%
R1	0.6Ω ±10%
R2	0.4 Ω ±10%
Polarity	Positive

Pulse B2(12V) JASO

Capacitor	C = 33µF
Pulse duration τ	τ(36,8%) = 2.0ms ±20%
R1	60Ω ±10%
R2	80 Ω ±10%
Polarity	Negative

Pulse D2(12V) JASO

Capacitor	C = 2.2µF
Pulse duration τ	τ(36,8%) = 2.5us ±30%
R1	1.2Ω ±10%
R2	0.9 Ω ±10%
Polarity	Positive

Examples of manufacturer requirements:

MBN 10284 pulses

Pulse 1 (12V supply)

Rise time	1µs +0% // -50%
Pulse duration	2 ms ±10%
Source impedance	10Ω ±10%

Pulse 1 (24V supply)

Rise time	1µs +0% // -50%
Pulse duration	2 ms ±10%
Source impedance	10Ω ±10%

Pulse 1 Scenario 1 **(42V supply)**

Rise time	1µs +0% // -50%
Pulse duration	6 ms ±10%
Source impedance	30Ω ±10%

Pulse 1 Scenario 2 **(42V supply)**

Rise time	1µs +0% // -50%
Pulse duration	2 ms ±10%
Source impedance	90Ω ±10%

Pulse 2 (12V supply)

Rise time	1µs +0% // -50%
Pulse duration	0,05 ms ±10%
Source impedance	10Ω ±10%

Pulse 2 (24V supply)

Rise time	1µs +0% // -50%
Pulse duration	0,05 ms ±10%
Source impedance	10Ω ±10%

Pulse 2 Scenario 1 **(42V supply)**

Rise time	1µs +0% // -50%
Pulse duration	0,15 ms ±10%
Source impedance	30Ω ±10%

Pulse 2 Scenario 2 **(42V supply)**

Rise time	1µs +0% // -50%
Pulse duration	0,05 ms ±10%
Source impedance	90Ω ±10%

7.2.2. Trigger

Automatic	Auto release with preselected parameters
Repetition rate	0.2s - 99.0s (1.0s SAE pulses)
Manual	Manual release of a single event
Extern	External release by external trigger
Battery switch	Switch off time selectable t2 = 0 - 10'000ms

7.2.3. Input / Output

+/- output	safety laboratory plugs for max. 60V/50A / 100A / 200A
Coupling	Coupling to + line (capacitive coupling)
Decoupling	by diode and battery switch

7.3. Coupling Network

DC supply voltage	max. 60V

Options	**UCS 200N50**	**UCS 200N100**	**UCS 200N150**	**UCS 200N200**
DC current	50A	100A	150A	200A
Inrush current 500ms	100A	150A	--	--
Weight	25kg	29.2kg	35.35kg	approx. 35kg
Dimension UCS & CN	19” 3HU	19” 6HU	19” 9HU	19” 9HU
				

Input	
DC power supply +/- and pulse	VDS 200Nx or external dc supply
Pulse 5, 7 (ISO, Ford, Chrysler)	LD 200N generator
Pulse A1, A2 and B1 (Nissan)	
Pulse A1, B1 and D1 (Jaso)	
Pulse GOST 28751-90	MPG 200 S20 generator
Control	Control cable from external generator (Load Dump / MPG)
Output	
DUT supply	60V/50A; higher current as options and on special request
Coaxial output	To connect external coupling devices as capacitive coupling clamp
Option	CNA extension to connect up to max 4 external Load Dump /MPG generators

7.4. General

Power mains supply	230V/115V, 50/60Hz, less than 75W
Fuse	2 A slow blow 230V 4 A slow blow 230V
Safety	
Safety circuit	External interlock capability
Warning lamp	voltage free contact max. 250V 5A
Design	per IEC 1010, EN 61010
Interfaces	
USB interface	
Parallel IEEE	Address 1-31

=> Not relevant data for the standards can be changed by the manufacturer <=

8. Maintenance

8.1. General

The generator is absolutely maintenance-free by using a solid state semiconductor switch to generate transients.

8.2. Test set-up

When setting up the test national and international regulations regarding human safety have to be guaranteed.

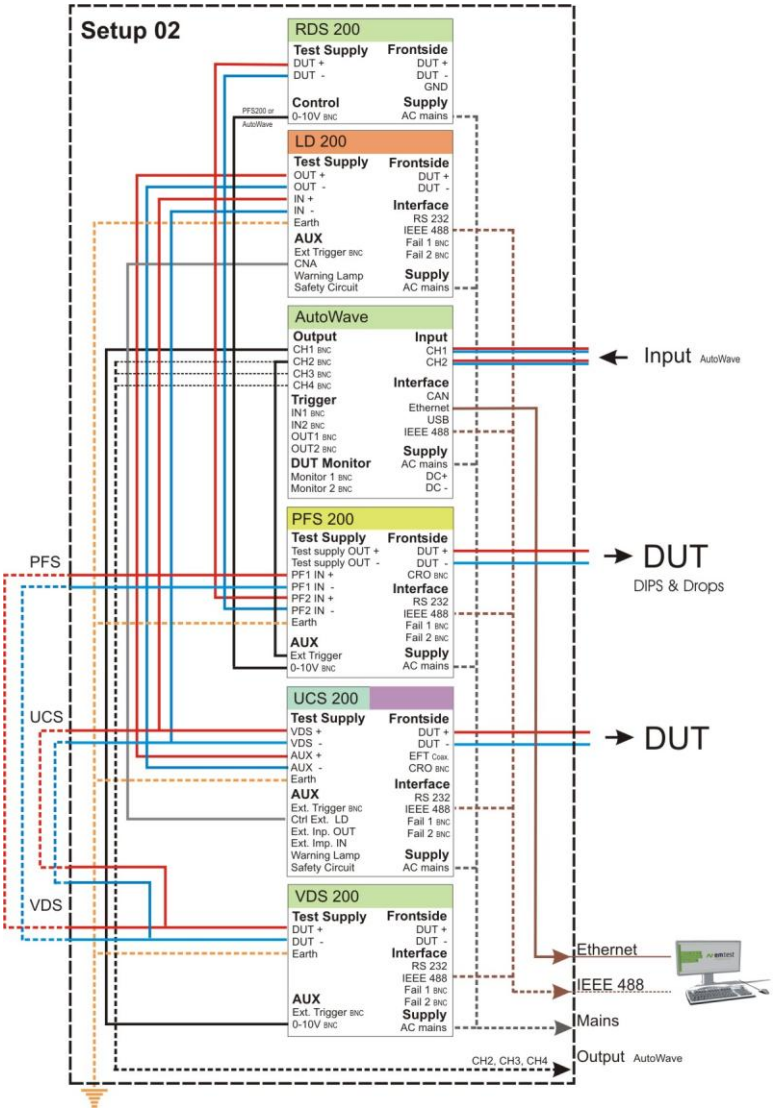
It is recommended to connect the simulator to the ground reference plane of the test set-up.

The generators of the series 200, UCS, LD, PFS and VDS can be linked together to a fully automotive test set-up.

The set-up communicates via the IEEE/GPIB bus and is controlled by iso.control software.

For setting up the system see the following figures:

Each generator can be operated individual as a single equipment.



Example wiring ISO System

8.3. Calibration and Verification

8.3.1. Factory calibration

Every EM TEST generator is entirely checked and calibrated as per international standard regulations before delivery. A calibration certificate is issued and delivered along with a list of the equipment used for the calibration proving the traceability of the measuring equipment. All auxiliary equipment and accessories are checked to our internal manufacturer guidelines.

The calibration certificate and the certificate of compliance (if available) show the date of calibration.

The EM Test equipment are calibrated in the factory and marked with a calibration mark. The used measuring instruments are traceable to the Swiss Federal Office of Metrology.
The calibration date is marked. The validity of the calibration is to the responsibility of the user's quality system. Neither the certificate of calibration nor the corresponding label mark any due date for re-calibration.

Example: Calibration mark

8.3.2. Guideline to determine the calibration period of EM Test instrumentation

Our International Service Departments and our QA Manager are frequently asked about the calibration interval of EM TEST equipment.

EM TEST doesn't know each customer's Quality Assurance Policy nor do we know how often the equipment is used and what kind of tests are performed during the life cycle of a test equipment. Only the customer knows all the details and therefore the customer needs to specify the calibration interval for his test equipment.

In reply to all these questions we like to approach this issue as follows :
EM TEST make use of a solid state semiconductor switch technique to generate high voltage transients. A precious advantage of this technique is the absolute lack of periodical maintenance effort. In consequence thereof a useful calibration period has to be defined based on two criteria :

- The first one is the customer's Quality Assurance Policy. Any existent internal regulation has to be applied at highest priority. In the absence of such internal regulation the utilization rate of the test equipment has to be taken into consideration.

- Based on the experience and observation collected over the years **EM TEST recommend a calibration interval of 1 year** for frequently used equipment. A 2-years calibration interval is considered sufficient for rarely used test generators in order to assure proper performance and compliance to the standard specifications.

8.3.3. Calibration of Accessories made by passive components only:

Passive components do not change their technical specification during storage. Consequently the measured values and the plots stay valid throughout the storage time. The date of shipment shall be considered as the date of calibration.

8.3.4. Periodically In-house verification

Please refer to the corresponding standard before carrying out a calibration or verification. The standard describes the procedure, the tolerances and the necessary auxiliary means. Suitable calibration adapters are needed. To compare the verification results, EM Test suggests to refer to the waveshape and values of the original calibration certificate.

All calibrations and verifications are always done without mains supply voltage connected to the coupling network input.


Danger

Before starting the calibration or verification

remove the EUT Mains Supply

from the generator and from the coupling network

9. Delivery Groups

9.1. Basic equipment

- Pulse generator type UCS 200N
- Mains cable
- Safety laboratory cable red/black
- Manual
- CD

Identical accessory parts are delivered only once if several devices are orderes. The delivered packing list is in each case valid for the delivery.

9.2. Accessories and options

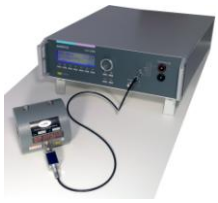
- **User software " iso.control "**
  - Test, analysis and documentation with
  - License version for testing according the most automotive standards
  - Report generator with export function to word-processing software

- **ACC**
  Automotive Coupling Clamp for couppling pulses 3a / 3b to I/O lines.
  Umax for pulses 3a/3b : 2kV

- KW 50 Ω matching resistor (1:100) type KW 50
- 1000Ω matching resistor (1:1000) type KW 1000
- Capacitive coupling clamp ACC as per ISO 7637


KW50 / 1000

Adapter kit for ISO 7637-3 testing



- ICC SET ISO 7637 includes
  - HV coax cable 1 m
  - Fischer to N Adapter to Bulk Current injection clamp
  - 50Ω HV coax cable 1 m
  - AD-N-SC N connector with short circuit
- CAISO
  Calibration adapter with resistors for pulse verification as per standard ISO 7637-2

Adaptor for high current plugs

- AD-ISO-100A Art # 105267

- AD-ISO-150A Art # 105264
- AD-ISO-200A Art # 105265

10. Appendix

10.1. Declaration of CE-Conformity

Manufacturer :	**EM TEST Switzerland GmbH**
Address:	Sternenhofstr. 15CH 4153 Reinach Switzerland

declares, that under is sole responsibility, the product's listed below, including all their options, are conformity with the applicable CE directives listed below using the relevant section of the following EC standards and other normative documents.

Product's name:	Ultra compact generator
Model Number(s)	UCS 200N50, UCS 200N10, UCS 200N150, UCS 200N200

Low Voltage Directive 2006/95/EC

Standard to which conformity is declared:

EN 61010-1 : 2006	Safety requirements for electrical equipment for measurement, control, and laboratory use.

EMC Directive 2004/108/EG

Standard(s) to which conformity is declared:

EN 61326 : 2006	Electrical equipment for measurement, control and laboratory use Class A
EN 61000-3-2 : 2007	Limits for Harmonic current emissions
EN 61000-3-3 : 2005	Limitation of voltage changes, voltage fluctuations and Flicker in public low-voltage supply systems.

	European representative	Manufacturer
	EM TEST GmbH Lünenerstr. 211 D 59174 Kamen Tel: +49 (0) 2307 / 26070-0 Fax: +49 (0)2307 / 17050	EM TEST Switzerland GmbH Sternenhofstr. 15 CH 4153 Reinach Tel: +41 61-7179191 Fax: +41 61-7179199
By	U. Flor General manager	A. Burger Design and Research
Place	Kamen, Germany	Reinach BL , Switzerland
Date	1. December 2011	1. December 2011

10.2. UCS 200N – internal Voltage drop

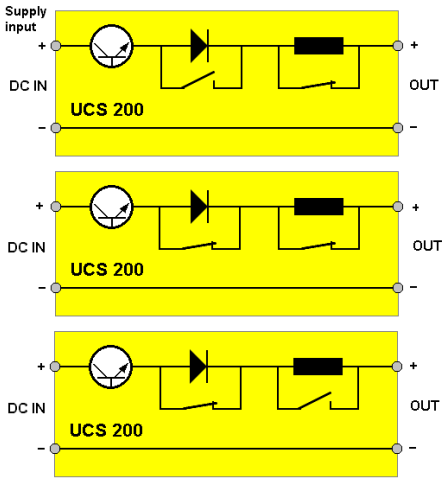
Depends on the pulse setting a different Voltage drop appears inside the UCS 200N. This voltage drop can be compensated by the battery supply (VDS 200) setting, The iso.control software compensate the voltage drop automatically. In the CNA setup for each case a voltage drop can be setted.

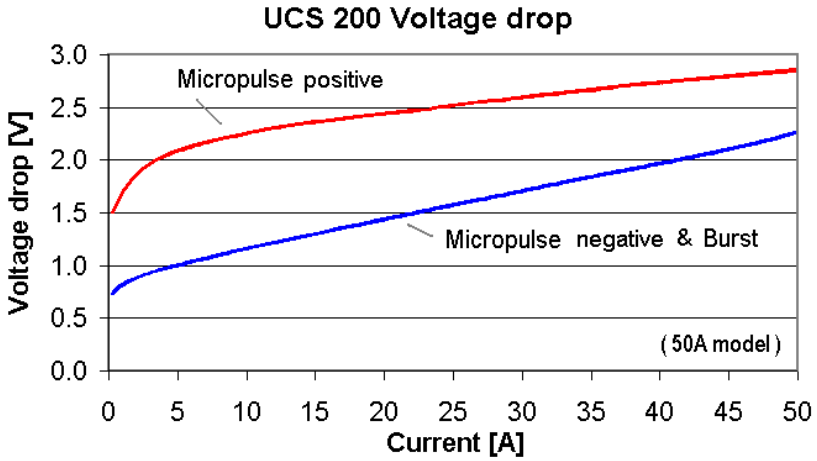
Internal UCS 200N connection diagram

Micropulses positive

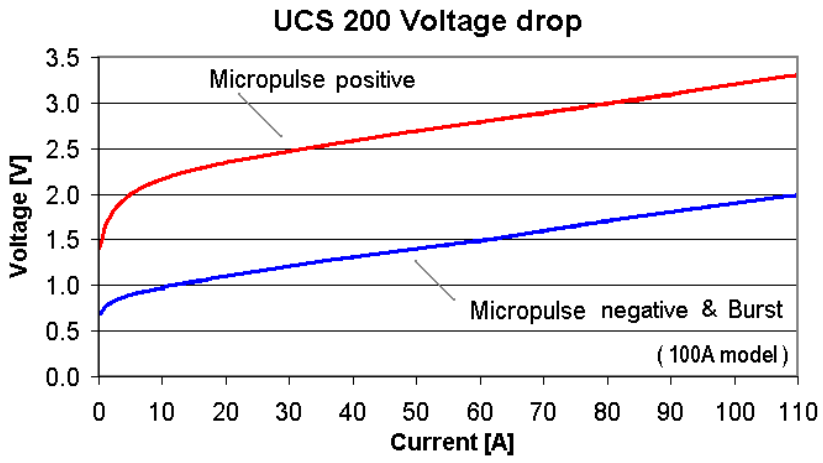
Micropulses negative

Burst pulse 3a & 3b



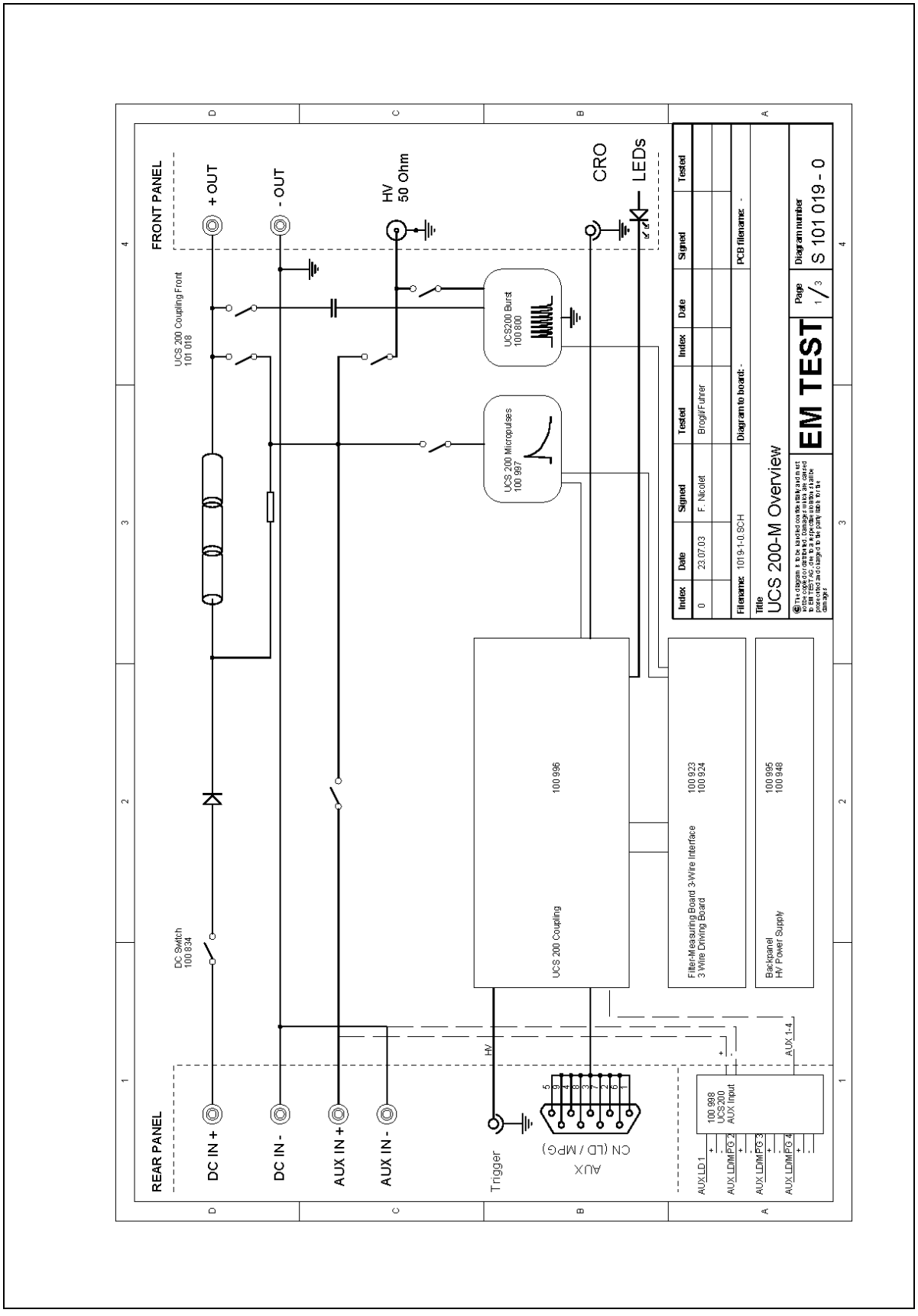


Voltage drop UCS 200N50 model.

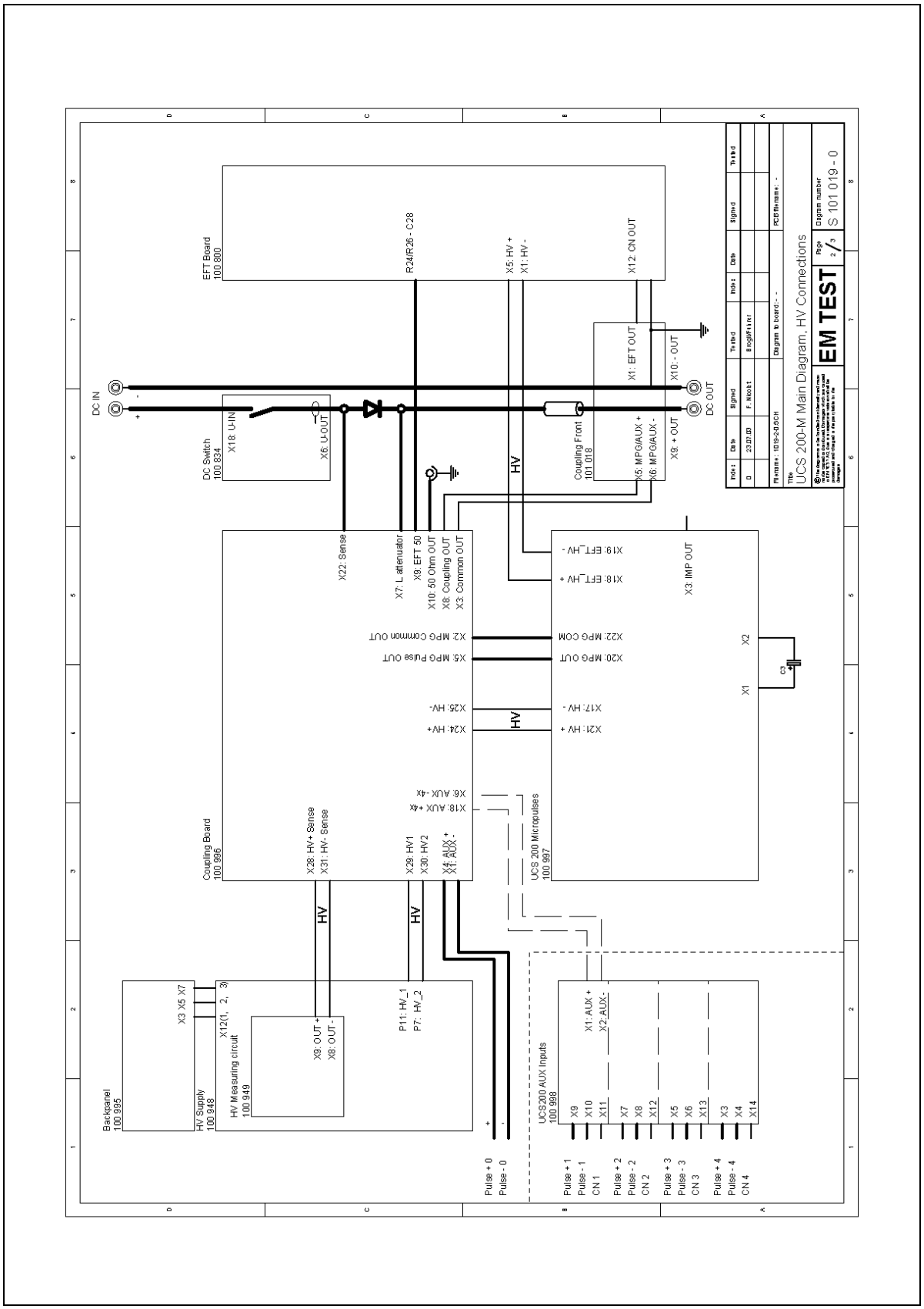


Voltage drop UCS 200N100 model.

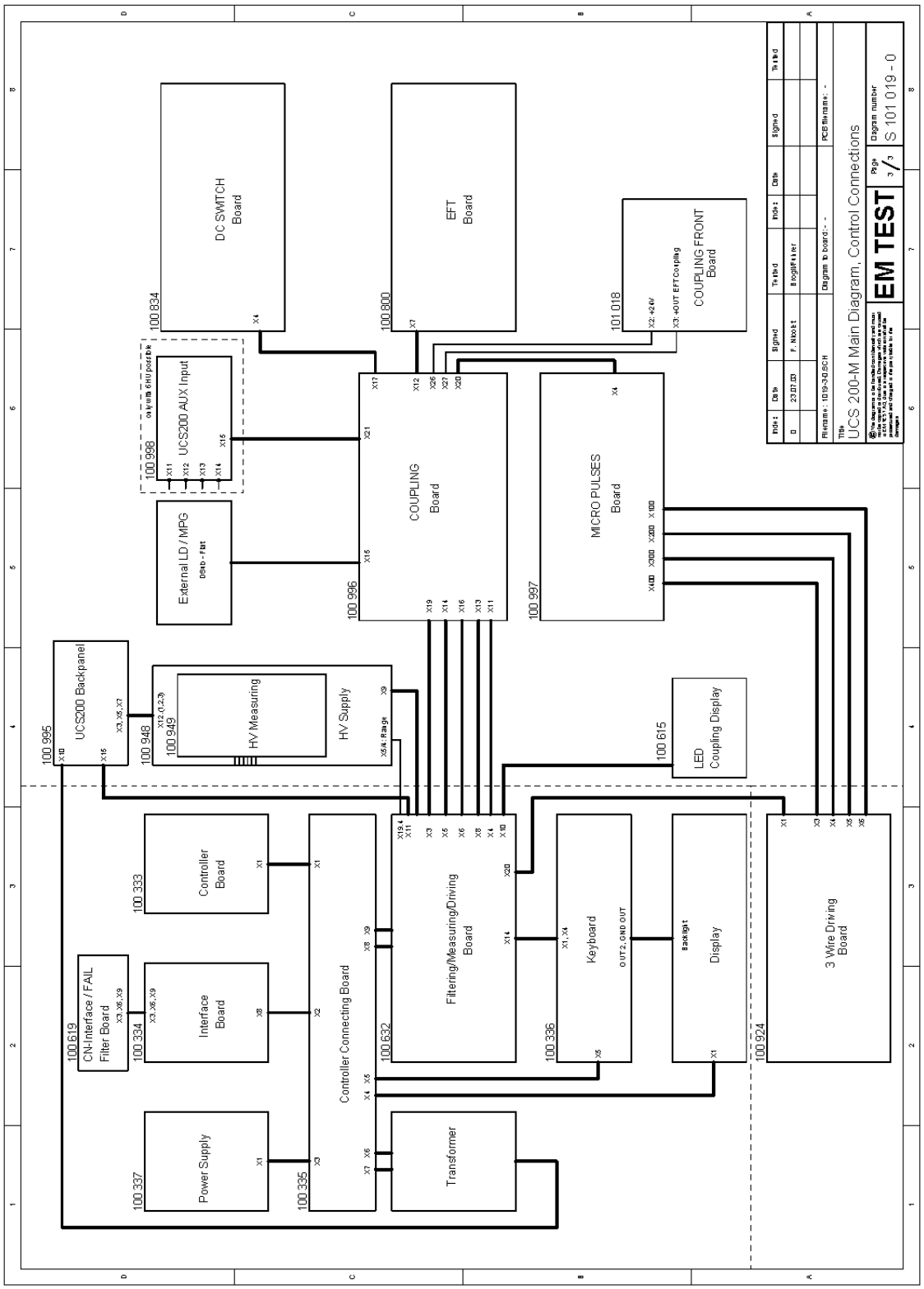
10.3. UCS 200N - General Diagram



10.4. Main diagram control connection



10.5. Main diagram high voltage connection



10.6. Setup for ICC testing as per ISO 7637-3

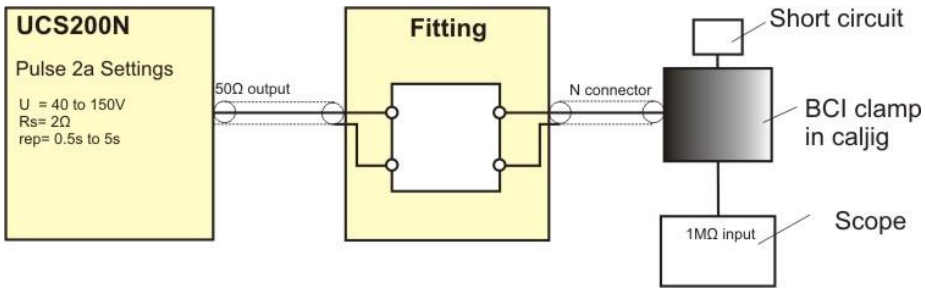
For testing as per ISO 7637-3 with the ICC clamp the standard recommends an output voltage of 3V to 10V. These low voltages can not be realized direct with the UCS 200 generator.
A solution for get an ICC pulse is to use a matching network with an attenuator.

The ICC method specifies the test level as the output voltage measured with the calibration test setup. The coupled pulse 2 in Quickstart mode shall fulfil the requirements of the table below.

Parameters	12V system	24V system	42V system
td in µs	7µs ± 30 %	7µs ± 30 %	7µs ± 30 %
tr in µs	≤1.2 µs	≤1.2 µs	≤1.2 µs

Requirements for the coupled pulse as per ISO 7637-3 chapter 4.6

ICC SET ISO 7637 for ICC calibration and testing



Polarity

The polarity will change when:

- Change the CalJig connectors
- Rotate the BCI 180°
- Change polarity at the UCS voltage.

Calibration test setup

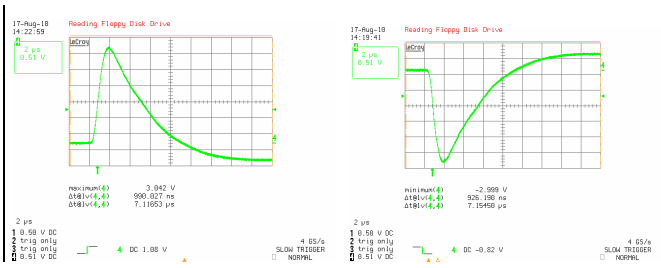
Attention

The **generator setting is according the standard**. Important is the verification pulse at the BCI output.
The **ICC SET ISO 7637** is equipped with typical values for the both BCI clamps FCC models **F-130A-1** and **F140**. An exact fitting needs the original used BCI clamp mandatory.

Example of pulse measurement on Caljig output

BCI = FCC F-130A-1

tr = 0.88us
td = 7.2us
U = 2.98 V



The user is responsible to use this methode for ICC testing.