

Remote Control



LD 200N/M/M-S1

Load Dump Generator

This document describes the remote control commands for

LD 200N

LD 200M

LD 200M-S1



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Interfaces

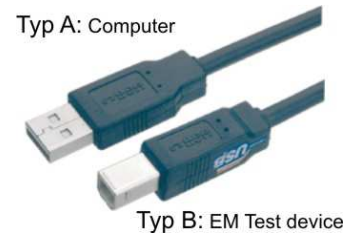
All following interfaces are standard features of the LD 200 Series.

• **USB Interface**

Device
 Computer - LD200N

Interface
 USB A / B

Communication via COM Port
 Baudrate 1200 – 19200 Baud (8-databit, 1 start/stop bit)



• **Parallel IEEE 488 interface, addresses 1 - 30 selectable**

- Command: (SH1, AH1, T4, L2, SR1, RL2, PP1, DC0, DT0, C0, E1)
- Connector and pin layout as per to IEEE - 488 - 1975
- 24-pin Amphenol connector
- 8 ground pins

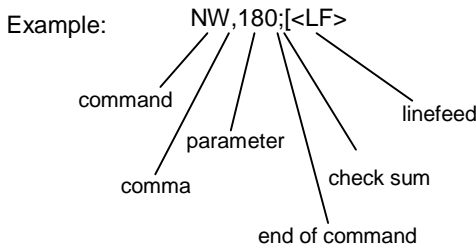
• **Equipment interface**

The parallel equipment interface controls the external coupling networks.

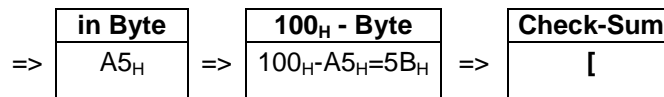
General information

The commands must be closed by an <LF>. Just before the <LF> the check sum of the complete string must be transmitted.

Calculating : check sum = 100_H - (sum of all ASCII codes in one byte)



Sign	ASCII Hex
N	4E _H
W	57 _H
,	2C _H
1	31 _H
8	38 _H
0	30 _H
;	3B _H
SUM	1A5 _H



Remark:

- Sum of all ASCII codes in one byte.
- Only the last 2 Digits of the sum of all ASCII codes in HEX will be considered.
- The messages coming back from the LD are sent without check sum. At the end of the message there is also an <LF>.
- The checksum values 00H and 0AH are not valid. If the Checksum value is equal to 00H then add * and D6H. If the Checksum value is equal to 0AH then add * and E0H.

The list below shows all commands available in each block

All Blocks	Block 0	Block 1	Block 2	Block 3
LC	LC	AA AS AT AR AW LC LN LH LD LY LP NU ND NW NR NT		

Error messages generated in block

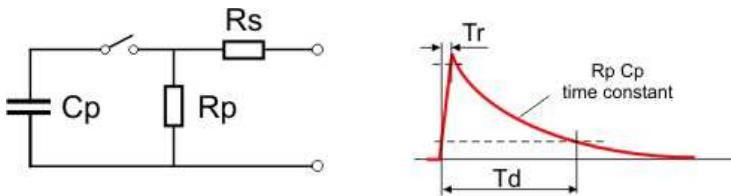
All Blocks	Block 0	Block 1	Block 2	Block 3
RR10 RR15	RR10 RR15	RR00 RR01 RR02 RR04 RR05 RR06 RR07 RR08 RR10 RR11 RR13 RR14 RR15 RR20 RR21 RR22		

Parameter of the remote commands

Name	Description	Min - Max	Step	Unit	Parameters
Voltage	U	20 – 200	0.1	V	200 – 2000
	US	20 – 200	0.1	V	200 – 2000
	UE	20 – 200	0.1	V	200 – 2000
	UI	0 – 180	0.1	V	0 – 1800
		The min/max values can deviate depending on selected pulses			
Pulse	Pul	ISO 5 40			0
		ISO 5 50			1
		ISO 5 100			2
		ISO 5 150			3
		ISO 5 200			4
		ISO 5 250			5
		ISO 5 300			6
		ISO 5 350			7
		ISO 5 400			8
		JASO A1			9
		JASO B1			10
		JASO D1			11
		SAE 5 12V			12
		SAE 5 24V			13
		Chrysler			14
		Ford AB		(with LD only)	15
		Ford AC			16
		Nissan A1			17
		Nissan A2			18
		Nissan B1			19
		MBN 5a 12V			20
		MBN 5a 24V			21
		MBN 5a 42V			22
		Scania 480			23
		Scania 300			24
		Freestyle		(with LY and LP only)	27
		Ford Load Dump 12V		(with LD only)	28
		Ford Load Dump 24V			29
		Polarity	Pol	+ , -	
Source Impedance	Rs	0.1 – 38	0.1	Ω	1 – 380
		Extern (+10 Ω internal)			0
		min: 0.5 Ω up to 100V then 1.0 Ω (exceptions are possible in standard pulses) Freestyle: if Td > 400ms 1 Ω (>100V: 2 Ω) and if Td > 800ms 2 Ω (>100V: 4 Ω)			
Load Impedance	RL	ext., 2, 0.7, 0.5		Ω	0, 1, 2, 3
Repetition	Rep	3 – 999	1	s	3 – 999
		The LD limits the repetition rate according to the maximum equipment energy.			
Time off	To	1 – 999	1	s	1 – 999
Trigger	Tri	Auto, Man			0 , 1

Rise time	Tr	1 10-90 100-900 1000-10000	0 10 100 1000	us	1 10-90 100-900 1000-10000
Pulse duration	Td	10-1200	10	ms	10-1200
Pulse no	N	1 – 99,999 endless	1		1 - 99,999 100,001
Load tail time	Rp	0.1 – 38	0.1	Ω	1 - 380
Capacity pulse	Cp	1 – 110	1	mF	1 - 110
Clipping voltage	Clp	15 - 99.5	0.1	V	150 - 995

Load dump pulse



Parameter of the remote commands

Technical Comments:

The firmware is internally organized in 2 blocks.

Block 0: initialization

Block 1: main block with all remote functions

To access the desired program the correct block has to be set via remote commands (BS command).

To start the remote mode it is not necessary to switch to a default block.

L commands (Initialization)

Command	Syntax	Description
LC	LC;	<p>LC checks the connection of the interface. Additionally it will be checked whether an external coupling network is connected. The LD sends back: LD200xy,CN,SWN,FW-VER,CLASS,STAGEOFEXP;</p> <ul style="list-style-type: none"> - Instead of CN a number is indicated (0 - 3) <ul style="list-style-type: none"> 0 -> no CNA 1 -> External CNA 200 2 -> Internal CNA/Switch 3 -> Internal CAN/Switch & External CNA200 - Instead of SWN the software no. of the equipment is sent: e.g.: 000016 - Instead of FW-VER the firmware version of the device is sent: e.g.: V1.03a01 - Instead of CLASS a 0 is send. This Parameter is reserved for the future. - Instead of STAGEOFEXP a Unsigned 32bit number is send. This Number shows the stage of expansion. e.g.: 0335544319

B commands (Initialization)

Command	Syntax	Description
BS	BS,1; BS,2; BS,0;	<p>The BS command sets a new block: Block 0: base block => no remote function available Block 2: main block with all remote functions</p> <p>The answer is BS,x; where x is the number of the actual block</p>
BW	BW;	<p>The BW command asks the actual block. The answer is BW,x; where x is the number of the actual block.</p>

Note: After a B command no further command should be sent before the answer is received. Otherwise there is no guarantee for the proper function of the LD200.

L commands (Setup)

Command	Syntax	Description
LN	LN,U,pul,pol,Rs,Rep,to,tri,n;	The LN command sends the parameters for Quick Start
LH	LH,US,UE,UI,pul,pol,Rs,Rep,to,tri,n;	The LH command sends the parameter for the ,Voltage Iteration' pulse.
LD	LD,U,pul,pol,Rs,Rep,tri,n,RL;	The LD command sends the parameter for the Ford pulse. → pul must be 15, 16, 28 or 29
LY (only for LD200N, LD200M-S1)	LY,Us,CIp,tr,td,Rs,Rep,tri,n;	The LY command sends the parameter for the ,Freestyle' waveform. The LD limits the repetition rate dynamic according to the selected voltage and duration: 10ms =< td <= 400ms -> Cp = td / 10 400ms < td <=1200ms -> Cp = td / 18 Rep(min) = (Us * (266 + Cp) / 1000) + 5 The Rep (min) value is always rounded up to a multiple of 5!
LY (only LD200M)	LY,U,tr,td,pol,Rs,Rep,to,tri,n;	The LYcommand sends the parameter for the ,Freestyle' waveform.
LP (only LD200N)	LP,Us,CIp,tr,Cp,Rp,Rs,Rep,tri,n;	The LP command sends the parameter for the ,FreestyleRC' waveform. The LD limits the repetition rate according to the selected voltage and capacity dynamic by: Rep(min) (Us * (266 + Cp) / 1000) + 5 The Rep (min) value is always rounded up to a multiple of 5!

A commands (Run)

Command	Syntax	Description
AA	AA;	The AA command starts the test procedure.
AT	AT;	The AT command triggers one single pulse, if the trigger mode has previously been set on the MAN mode.
AS	AS;	The AS command stops a running test.
AW	AW;	The AW command continues a stopped test (Pause).
AR	AR;	The AR command stops a running test and resets the equipment to the local mode (reset of the remote mode).

N commands (Change)

Command	Syntax	Description
NU	NU,U;	The NU command sends a new voltage level. The change is realized online.
ND	ND,td;	The ND command changes the pulse width.
NW	NW,Rs;	The NW command sends a new value for the source impedance. The change is realized on-line.
NR	NR,rep;	The NR command sends a new value for the repetition rate. The change is realized on-line.
NT	NT,tri;	The NT command sends a new trigger mode. The change is realized online.

Back Messages

Message	Description
RR,00;<LF>	The test procedure was stopped correctly.
RR,01;<LF>	One single pulse was triggered.
RR,02;<LF>	Ready, the simulator is ready to be discharged. MAN trigger mode.
RR,04;<LF>	Check clip voltage
RR,05;<LF>	Fail 1
RR,06;<LF>	Fail 2
RR,07;<LF>	Continue after Fail 2 RR,06;<LF>
RR,08;<LF>	Overtemperature
RR,10;<LF>	Error appears in a transmitted data string. Too much or too less parameters were transmitted.
RR,11;<LF>	Test Start is not possible. Test On key is not pushed in or the safety circuit is not closed.
RR,13;<LF>	No, or wrong CNA connected. The required coupling mode can not be selected.
RR,14;<LF>	Automatic limitation of transmitted data.
RR,15;<LF>	Check sum error.
RR,20;<LF>	Not correctable limitation error.
RR,21;<LF>	Cooling is active (only for pulse Ford)
RR,22;<LF>	Cooling finished (only for pulse Ford)

Examples

Function	Send	Receive
Start Up Block switch -> 0 Block switch -> 1	LC; BS,0; BS,1;	LD200N,0,000000, V 1.00a01,0, 0134217727; BS,0; BS,1;
Set pulse parameters for one pulse and start. Vs = 120 pul = 5 40 ms +/- = + Rs = 2.0 Ohm t1 = 30 s to = 0 s Tri = Auto n = 4	LN,1200,0,0,20,30,0,0,4; AA;	RR 01; RR 01; RR 01; RR 01; RR 00;
Set pulse parameters for a Freestyle pulse. Us = 100 V Clp = off tr = < 1 ms td = 300 ms Rs = 10 Ohm Rep = 45 s tri = Auto n = 13	LY,1000,0,1,300,10,45,0,4; AA;	RR 01; RR 01; RR 01; RR 01; RR 00;
Set pulse parameters for a FreestyleRC pulse Us = 174 V Clp = 65 V tr = 5 ms Cp = 37 mF Rp = 2.2 Ω Rs = 2 Ω Rep = 60 s tri = Auto n = 55	LP,870,350,60,37,22,20,60,0,5; AA;	RR,01; RR,01; RR,01; RR,01; RR,01; RR 00;