

Remote Control



ESD 30N / dito

ESD Simulator

IEC 61000-4-2 / EN 61000-4-2

Manual to

- dito (Version ≥ 2.10)
- ESD 30N (Version ≥ 1.20)

This document describes the remote control commands for the dito and ESD 30N.



Interfaces

All following interfaces are standard features of the ESD simulator.

- **Optical Serial RS 232 interface with 4800 - 19200 Baud (8-databit, 1 start/stop bit)**

General information

- **ESD 30N** communication: Commands are terminated with a LineFeed (<LF> or rather '\n') character.
- **Dito** communication: Commands are terminated with the last semicolon (;).

Configuration and system commands

Parameter description

Name	Description	Min - Max	Step	Unit	Parameters
Name	name	Actual product name			
Firmware version	version	Actual version			
Type	type	See below			
C value discharge module	C	No module	1	pF	0
		Not determined			1
		50 - 500			50 - 500
R value discharge module		No module	1	Ω	0
	R	Not determined			1
		10 - 10000			10 - 10000
High voltage relay	relay	No relay relay			0 1
Battery charge	bat	0 - 7	1		0-7
Min Voltage	Umin	1 - 50000	1	V	1 - 50000
Max Voltage Contact	UmaxC	1 - 50000	1	V	1 - 50000
Max Voltage Air	UmaxA	1 - 50000	1	V	1 - 50000
Voltage step	Ustep	1 - 1000	1	V	1 - 1000
Device number	devno	See below			
Date	date	See below			
Time	time	See below			

Battery parameter

Value	Description
0	No battery charge
1	Control unit works / No High voltage
2/3	Change
4/5	Half charged
6/7	Full charged

Type parameter

Type contains different information's and is bit-coded:

Bit	Description
0	Program Calibration
1	Language English
2	Language German
3	2 kV
4	4 kV
5	8 kV
6	16 kV
7	30 kV

devno parameter

The unit number corresponds to the unit number assigned by production, which is fit by a sticker in the equipment.

dito-month-year-number (z. Bsp. ditoB00123)

Name	Value
month	month (1,2,3,4,5,6,7,8,9,A,B,C)
year	Year in two digits
number	Current Number (1-999)

date parameter

The date is defined like the MSDOS Time format. The date is packed in a 16-Bit word and is as follows defined:

Bits	Value
0-4	Date (1-31)
5-8	Month (1 = January, 2 = February,)
9-15	Year Offset from 1980

Year Offset from 1980							Month				Date				
1	1	1	1	1	1	9	8	7	6	5	4	3	2	1	0
5	4	3	2	1	0										

E - Commands**Command **

Type	Syntax	Description
Query	EM?;	Checks the connection of the ESD simulator
Feedback	EM,name,version,type;	Answer from ESD simulator

Command <EL>

Type	Syntax	Description
Instruction	EL;	Go in Local-Mode

Command <ES>

Type	Syntax	Description
Instruction	ES,time,date;	Set system time (without Check)
Query	ES?;	Require system time
Feedback	ES,time,date;	Answer from ESD simulator

Command <EV>

Type	Syntax	Description
Query	EV?;	Require voltage
Feedback	EV,Umin,UmaxC,UmaxA,Ustep;	Answer from ESD simulator

Command <EO>

Type	Syntax	Description
Query	EO?;	Require Status
Feedback	EO,C,R,relais,bat;	Answer from ESD simulator

Command <EG>

Type	Syntax	Description
Instruction	EG,devno;	Set device number (factory setup)
Query	EG?;	Require device number
Feedback	EG,devno;	Answer from ESD simulator

Command <ED>

Type	Syntax	Description
Instruction	ED;	Set in Download-Mode

Calibration

Parameter description

Name	Description	Min - Max	Step	Unit	Parameters
Calibration voltage	Uk	0 – 50'000	1	V	0 - 50000
Duty Cycle	duty	0.04 – 20.00	0.04	%	1 - 500
Polarity	pol	Positive Negative			1 0
Offset	offset	- Umin - + Umin	Ustep / 10	V	0 - 2*Umin
Gain	gain	- 10.0 - + 10.0	0.1	%	0 - 200
Calibration range	range	Range High Range Med. Range Low			0 1 2
Status User-calibration	onoff	On Off			1 0

K - Commands

Command <KN> only factory setup

Type	Syntax	Description
Instruction	KN,duty,pol;	Set calibrations duty-cycle
Query	KN?;	Require calibrations duty-cycle
Feedback	KN,duty,pol;	Answer from ESD simulator

Command <KV> only factory setup

Type	Syntax	Description
Instruction	KV,range;	Set calibration voltage range
Query	KV?;	Require calibration voltage
Feedback	KV,range,Uk;	Answer from ESD simulator

Command <KU> only factory setup

Type	Syntax	Description
Instruction	KU;	Duty-Cycle one Step up
Feedback	KU,duty;	Answer from ESD simulator

Command <KD> only factory setup

Type	Syntax	Description
Instruction	KD;	Duty-Cycle one Step down
Feedback	KD,duty;	Answer from ESD simulator

Command <KW> only factory setup

Type	Syntax	Description
Instruction	KW,range,pol,offset,gain;	Set factory calibration Cal-Date automatically set according RTC
Query	KW?,range,pol;	Require actual factory calibration
Feedback	KW,offset,gain;	Answer from ESD simulator

Command <KO>

Type	Syntax	Description
Instruction	KO,onoff;	Set status of User-calibration
Query	KO?;	Require user calibration status
Feedback	KO,onoff;	Answer from ESD simulator

Command <KS>

Type	Syntax	Description
Instruction	KS,pol,offset,gain;	Set user-calibration
Query	KS?,pol;	Require actual user calibration
Feedback	KS,offset,gain;	Answer from ESD simulator

Automatic test

Parameter description

Name	Description	Min – Max	Step	Unit	Parameters
Test commands	command	Start Stop Pulse Pause			0 1 2 3
Test status	Status	No Init Stop Pause Run			0 1 2 3
Message	Amess	Ready Pulsed * Test end			0 1 2
Voltage	U	Umin - Umax	Ustep	V	Umin - Umax
Discharge mode	Mode	AD CD			0 1
Repetition	Rep	0.05 – 20.00	0.05	s	5 – 2000
Polarity	Pol	Positive negative			1 0
Events	Events	1 – 30'000 endless	1		1 – 30000 0
Counter	Counts	0 – 999'999	1		0 – 999999
Trigger	Trig	Manuel Auto			0 1
Error	aerror	NoModul WrongModul NoRelais LowAccu NoVoltage NoPulse Pre Disch.			1 2 3 4 5 6 7

* With rep < 0.50 s and Auto-Trigger only all 10. Pulses the feedback message AM,1; (pulsed) will be sent.

More information to the parameter test instructions <command>:

Description	Command
Start	Start the automatic test
Stop	Stop the automatic test
Pulse	- one pulse with trigger mode „manual“ - start the steady discharges with trigger mode „auto“ - continue after pause
Pause	Automatic test interrupted

More information to the parameter test status <status>:

Description	Feedback
No Init	No test data transferred
Stop	Automatic test not started
Pause (HV_on)	Automatic test in pause state
Run	Automatic test runs

More information to the parameter test message <amess>:

Description	Message
Ready	Ready, the generator is ready to release an impulse (with trigger mode „manual“).
Pulsed	Pulse was released
Test end	Test was terminated

More information to the parameter error message <aerror>:

Description	Message
Wrong Module	Wrong discharge module
No Module	No discharge module
No Relay	No appropriate discharge relay
Low Accu	Battery voltage to low for high voltage
No Voltage	Voltage not reached or not correct
No Pulse	No pulse detected
Pre Discharge	Pre-discharge (air discharge occurred before the selected test voltage was reached)

A - Commands

Command <AA>

Type	Syntax	Description
Instruction	AA,command;	Instruction of the automatic test. First the parameters with the AN instruction must be sent.
Query	AA?;	Require automatic test status
Feedback	AA,status;	Answer from ESD simulator

Command <AN> (only dito)

Type	Syntax	Description
Instruction	AN,U,pol,mode,trig,events,rep;	Set the current settings of the automatic test
Query	AN?;	Require current settings
Feedback	AN,U,pol,mode,trig,events,rep;	Answer from ESD simulator

Command <AN> (only ESD 30N)

Type	Syntax	Description
Instruction	AN,U,pol,mode,trig,events,rep,bo,bo ts,botd;	Set the current settings of the automatic test
Query	AN?;	Require current settings
Feedback	AN,U,pol,mode,trig,events,rep,bo,bo ts,botd;	Answer from ESD simulator

Command <AU>

Type	Syntax	Description
Instruction	AU,U;	The AU command sends a new voltage level. This handling can be realized on-line during a running test.

Command <AP>

Type	Syntax	Description
Instruction	AP,pol;	The AP command changes polarity. This handling can be realized on-line during a running test.

Command <AE>

Type	Syntax	Description
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Query	AE?;	Require actual event counter
Feedback	AE,counts;	Answer from ESD simulator
		This instruction is available only in break/stop state

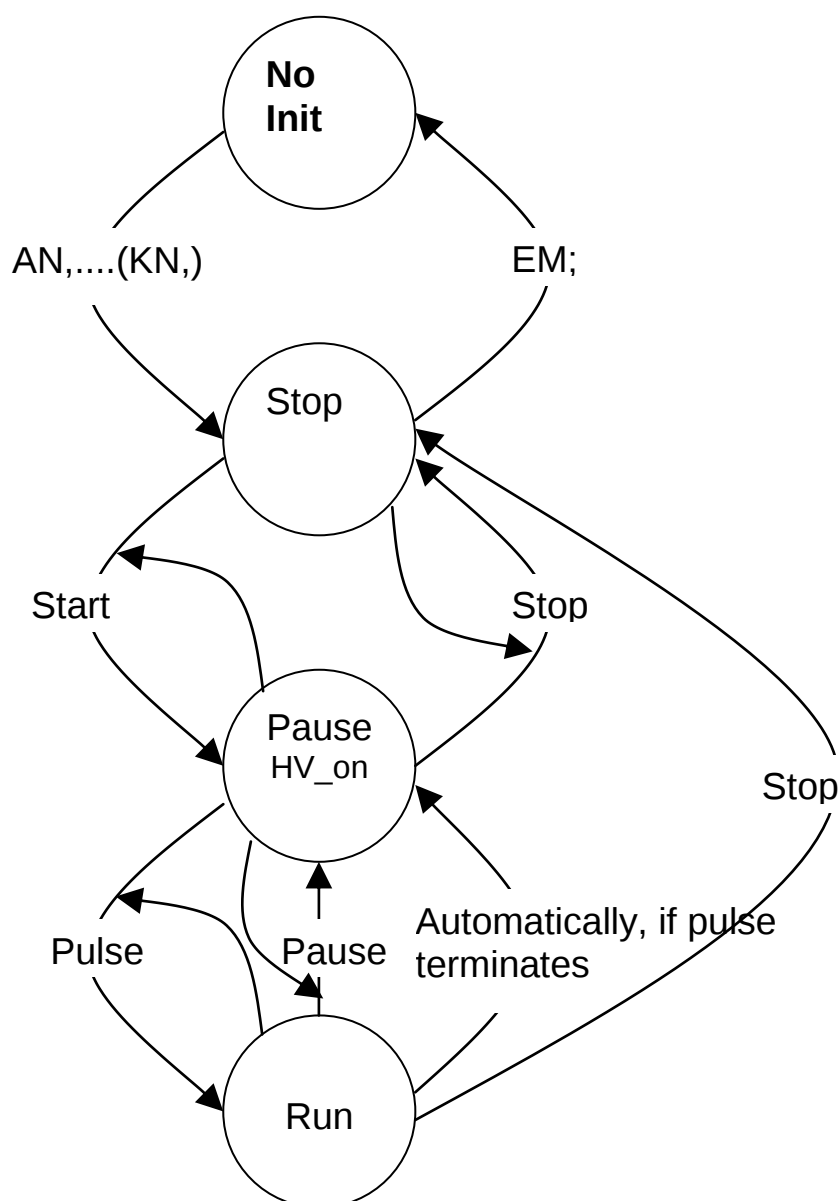
Command <AM>

Type	Syntax	Description
Message	AM,amess;	Message for automatic test

Command <AF>

Type	Syntax	Description
Message	AF,aerror;	Error message for automatic test

Schematic representation of the possible instructions and conditions



Test routines

Parameter description

Name	Description	Min - Max	Step	Unit	Parameters
Test routine	Nstore	1 – 8			1 – 8
Test routine name	name	max 15 Character			
Test level	level1, level2 level3, level4	Umin - Umax 0	Ustep	V	Umin - Umax Not defined
Polarity	pol	Negative Positive Toggle			0 1 2
Discharge mode	mode	AD CD			0 1
Trigger	trig	Single Auto Cont			0 1 2
Events	events	1 – 30'000	1		1 – 30000
Repetition	rep	0.5 – 20.0	0.5	s	50 – 2000
Test point	points	1 – 30	1		1 – 30
Result report number	RepNr	1 – 20	1		1 – 20
Info Block	InfoBlk	Info Nr 1–10 Info Nr. 11–20			0 1
Number of information	AnzInfos	1 – 20	1		1 – 20
C-Value discharge module	C	unknown 50 – 500	1	pF	1 50 – 500
R-Value discharge module	R	unknown 10 – 10'000	1	Ω	1 10 – 10000
Bleed Off	bo	Disabled Enabled			0 1
Bleed Off Start (ts)	bots	0.1 – 9.0	0.1	s	1 – 90
Bleed Off Time (td)	botd	0.1 – 99.9	0.1	s	1 – 999
Iteration	itera	see below			
Time	time	see under configuration and system			
Date	date	see under configuration and system			
Information	infox	see below			

The Bleed Off is only available on CD mode and AD with single trigger (see “User Manual, Bleeding Function”)!

The following parameters can be changed by the user before program start. All other values are changeable only over the software.

- Trigger
- Events
- Repetition
- Test points

Closer data to the parameter < itera >: The iteration sequence of the parameters can be changed:

0

Voltage	Test Point	Polarity	Events

1

Test Point	Voltage	Polarity	Events

2

Test Point	Polarity	Voltage	Events

Closer data to the parameter < infox >:

The information is packed in a 16-Bit word and is as follows defined:

Bits	Description
0-7	Current test block counter (1- 255)
8	Reserve
9	Reserve
10	Reserve
11	Test canceled
12	Test block jumped (Next)
13	Test block repeated (Redo)
14	Fail 1 occurred (Fail 1)
15	Fail 2 occurred (Fail 2)

N - Commands

Command <NP> (only dito)

Type	Syntax	Description
Instruction	NP,nstore,name,level1,level2,level3,level4,mode,pol,itera,trig,events,rep,points;	Set parameter of test routine
Query	NP?,nstore;	Require test routine parameter
Feedback	NP,name,level1,level2,level3,level4,mode,pol,itera,trig,events,rep,points;	Answer from ESD simulator

Command <NP> (only ESD 30N)

Type	Syntax	Description
Instruction	NP,nstore,name,level1,level2,level3,level4,mode,pol,itera,trig,events,rep,points,bo,bots,botd;	Set parameter of test routine
Query	NP?,nstore;	Require test routine parameter
Feedback	NP,name,level1,level2,level3,level4,mode,pol,itera,trig,events,rep,points,bo,bots,botd;	Answer from ESD simulator

Command <NQ> (only dito)

Type	Syntax	Description
Query	NQ?,RepNr;	Require result report (Read)
Feedback	NQ,name,level1,level2,level3,level4,mode,pol,itera,trig,events,rep,points,time,date,C,R,AnzInfos;	Answer from ESD simulator

Command <NQ> (only ESD 30N)

Type	Syntax	Description
Query	NQ?,RepNr;	Require result report (Read)
Feedback	NQ,name,level1,level2,level3,level4,mode,pol,itera,trig,events,rep,points,time,date,C,R,AnzInfos,bo,bots,botd;	Answer from ESD simulator

Command <NC>

Typ	Syntax	Description
Instruction	NC,RepNr;	Clear test result report Only one test result report can be deleted at each case

Command <NI>

Typ	Syntax	Description
Query	NI?,RepNr,InfoBlk;	Require the 10 Info of test result report
Feedback	NI,infox1,infox2,...,infox0;	Answer from ESD simulator

General error messages

Command <QF>

Typ	Syntax	Description
Message	QF,error;	Error message

Description of the parameters

Name	Description	Min - Max	Step	Unit	Parameters
Error	error	Command Limit Total Limit Unit Parameter Prog			0 1 2 3 4 5

Closer data to the parameter error message < error >:

Description	Message
Command	With the transferred string an error was determined. Too few or too many parameters were transferred or the instruction is not allowed.
Limit	One or several of the transferred values were limited.
Total Limit	Unrecoverable limitation error, instruction deleted
Unit	Error in received unit
Parameter	Wrong Parameter, instruction ignored
Prog	Error after switching in Download mode

The bleeding function (only ESD 30N)

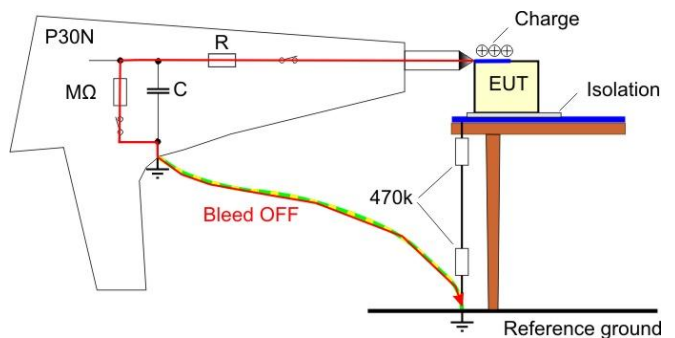
Ungrounded equipment, or ungrounded parts of equipment, cannot discharge itself. If the charge is not removed before the next ESD pulse is applied, it is possible that the EUT is stressed up to twice the intended test voltage. With a bleed off function an isolated metal part can be discharged to a reasonable voltage level where the next ESD pulse goes to a uncharged target.

The P30N internal relays will close and short the circuit. The charge on the EUT will discharge via the ESD30N simulator.

The bleed function works only if the charged part on the EUT is tangible with the discharge tip.

Mode with Bleed off

Air discharge : Single
Contact discharge: Single, Auto, Cont



Bleed off timing

ts : Time during the ESD pulse application

td : Bleed off time

tr : Repetition time

Time between 2 pulses = $ts + td + tr$

