Electronic DC Load

ELS Series
Power max. 80 kW
Cooled by air or liquid

Constant I- Mode, U- Mode,
P- Mode, or G- Mode,
All Modes I, U, P and G- Mode
ext. programmable
Nominal value indication and offline setting of all Modes
Auto change to true values
19" rack cabinet

Options a.o.:
Installed IEEE488.2 (GPIB) / RS232* / USB*
interface with Lab-View Driver (Series INT2E)
Installed USB Interface with driver software
External CAN Open Interface (on request)
*selectable RS232 or USB

Input:

Input voltage	230 V_{AC} ±10%, 50 - 60 Hz
Load voltage	max. 800 V
Load current	max. 2000 A
Power	max. 80 kW (100 kW consult factory)

Regulation:

Set point accuracy	≤ 0,1 % I_{max}, U_{max}
(Voltage range ± 20 %)	≤ 1% G_{max}, P_{max}
Rise time (10 – 90%	50 – 100 µs typical
nominal value change)	at I-Mode
Temperature coefficient	≤ 0,1 % /K I_{max}
(after 15 min. working time, const. ambient temp. and const. input voltage)	within 8 hours)

Protection:

Overload protection	power limit P_{max} + 5 %
Overvoltage protection	power shutdown U_{Lmax} + 5 %
Thermal protection	power shutdown, manual reset
Overcurrent	current limit I_{max} + 20%
Safety for load circuit and reverse polarity protection	fuse and wattless current diode

Environmental Conditions:

Air-cooled:	
Operating temperature	0 ° C – +35°C
Cooling	int. fans, temperature controlled
Liquid-cooled:	
Humidity	max. 70 %, non condensing
Operating temperature	+15°C – +35°C
Cooling	cooling liquid, temperature controlled gesteuert
Coolant pressure	3 bar ≤ P ≤ 6 bar
Coolant temperature	+12°C ≤ ϑ ≤ +20°C

Safety:

Safety standard	EN 61010-1
Isolation	
AC input - load input:	U_L ≤ 350 V: 2,3 kV_{eff} U_L > 350 V – 800 V: 3,7 kV_{eff}
AC input - ground:	1,35 kV_{eff}
Load input - ground:	U_L ≤ 150 V: 500 V_{eff} U_L > 150 – 300 V: 820 V_{eff} U_L > 300 – 600 V: 1,35 kV_{eff} U_L > 600 – 800 V: 2,2 kV_{eff}

EMC:

Input EMI filter	EN61000-6-3
Input immunity	EN61000-6-1

Operation and Control::

Manual adjust::	
Adjustment	current, voltage, power and conductance (see table): each 2 levels (max., min.) each over 2 channels adjustable I- and G-Mode coarse/fine selectable
Pulse-generator I, U, P, G	100 Hz or 1 kHz switch-selected, waveform: square-wave 1 : 1
Programming	ext. voltage (reference -U_L) 0 – 10 V ≙ 0 – I_{max} 0 – 10 V ≙ 0 – U_{max} 0 – 10 V ≙ 0 – P_{max} 0 – 10 V ≙ 0 – G_{max} any waveform, frequency range 0 – 10 kHz (-3 dB)
Parallel operation	max. 4 same Load-Modules with a Control -Unit
Monitor Signals	current-, voltage-, power- and conductance-monitor, signal undervoltage, sum alarm signals for overcurrent, temp. limit, overload or overvoltage
Indication	overcurrent, temp. limit, overload, over- and undervoltage each 1 LED
Instruments	LED digital for voltage, current/conductance and power 3½-dig., accuracy 0,2% ± 1d

Connectors:

Input	Euro - plug with switch, rear side
Load	Terminal area, rear side (inside)
Ext. programming	25 pol. Sub D female plug
Coolant	R 1 IG

Physical Specifications::

Dimensions w x h x d	ELS 38 HE: 600 x 1900 x 950 mm
Weight	without Modules ca. 200 kg

Units for Laboratory and Test

Load Units air cooled:

Power (W)	Load voltage (V)	Load current (A)	Load current in the operating range from 0,1 V to 2,5 V (A)	(A)	Conductance max. (S)	Model Number
3000	2,5 - 60	0,01 - 100	4	100	40	ELM3000/60/100
3000	2,5 - 60	0,01 - 250	10	250	100	ELM3000/60/250
3000	2,5 - 60	0,01 - 500	20	500	200	ELM3000/60/500
3000	2,5 - 160	0,01 - 100	4	100	40	ELM3000/160/100
3000	2,5 - 160	0,01 - 250	10	250	100	ELM3000/160/250
3000	2,5 - 160	0,01 - 500	20	500	200	ELM3000/160/500
3000	2,5 - 400	0,01 - 100	4	100	40	ELM3000/400/100
3000	2,5 - 400	0,01 - 250	10	250	100	ELM3000/400/250
3000	5 - 400	0,01 - 500	20	500*	100	ELM3000/400/500
6000	2,5 - 60	0,01 - 200	8	200	80	ELM6000/60/200
6000	2,5 - 60	0,01 - 500	20	500	200	ELM6000/60/500
6000	2,5 - 60	0,01 - 1000	40	1000	400	ELM6000/60/1000
6000	2,5 - 160	0,01 - 200	8	200	80	ELM6000/160/200
6000	2,5 - 160	0,01 - 500	20	500	200	ELM6000/160/500
6000	2,5 - 160	0,01 - 1000	40	1000	400	ELM6000/160/1000
6000	2,5 - 400	0,01 - 200	8	200	80	ELM6000/400/200
6000	2,5 - 400	0,01 - 500	20	500	200	ELM6000/400/500
6000	5 - 400	0,01 - 1000	40	1000*	200	ELM6000/400/1000

*up to 5 V

Options:

Autorange current-/voltage-const.
Single Case 6 U for ELM 10 kW and 20 kW (1 U = 44,45 mm)
Isolation amplifier with Interface 4 ÷ 20 mA, Input Signal
Isolation amplifier with Interface 4 ÷ 20 mA, Output Signal
Automatic system configuration (only liquid cooled units)
Installed IEEE 488.2 Interface Euro-Card INT2E (fit in the Control Unit ELC)
USB Interface
CAN Interface

Load Units liquid cooled:

Power (W)	Load voltage (V)	Load current (A)	Load current in the operating range from 0,1 V to 2,5 V (A)	(A)	Conductance max. (S)	Model Number
10000	2,5 - 60	0,01 - 200	8	200	80	ELM10000/60/200
10000	2,5 - 60	0,01 - 500	20	500	200	ELM10000/60/500
10000	2,5 - 60	0,01 - 1000	40	1000	400	ELM10000/60/1000
10000	2,5 - 160	0,01 - 100	4	100	40	ELM10000/160/100
10000	2,5 - 160	0,01 - 200	8	200	80	ELM10000/160/200
10000	2,5 - 160	0,01 - 500	20	500	200	ELM10000/160/500
10000	2,5 - 160	0,01 - 1000	40	1000	400	ELM10000/160/1000
10000	2,5 - 400	0,01 - 100	4	100	40	ELM10000/400/100
10000	2,5 - 400	0,01 - 200	8	200	80	ELM10000/400/200
10000	2,5 - 800	0,01 - 100	4	100	40	ELM10000/800/100
10000	2,5 - 800	0,01 - 200	8	200	80	ELM10000/800/200
20000	2,5 - 60	0,01 - 400	16	400	160	ELM20000/60/400
20000	2,5 - 60	0,01 - 1000	40	1000	400	ELM20000/60/1000
20000	2,5 - 160	0,01 - 200	8	200	80	ELM20000/160/200
20000	2,5 - 160	0,01 - 400	16	400	160	ELM20000/160/400
20000	2,5 - 160	0,01 - 1000	40	1000	400	ELM20000/160/1000
20000	2,5 - 400	0,01 - 100	4	100	40	ELM20000/400/100
20000	2,5 - 400	0,01 - 200	8	200	80	ELM20000/400/200
20000	2,5 - 400	0,01 - 400	16	400	160	ELM20000/400/400
20000	2,5 - 800	0,01 - 100	4	100	40	ELM20000/800/100
20000	2,5 - 800	0,01 - 200	8	200	80	ELM20000/800/200
20000	2,5 - 800	0,01 - 400	16	400	160	ELM20000/800/400

Control Unit:

Description	Model Number
Control Unit for max. 4 Load Modules	ELC

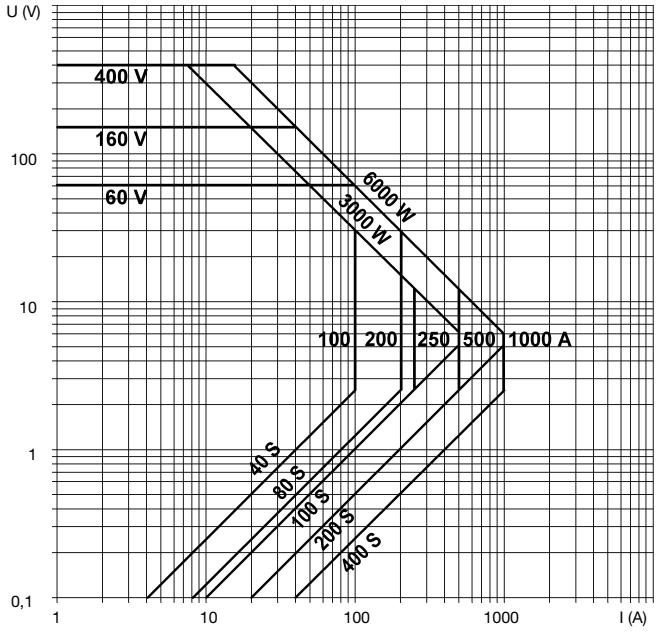
19" rack:

Description	Model Number
19" rack air cooled (prepared for 3 to 5 Load Modules and 1 Control Unit)	19" rack air
19" rack liquid cooled (prepared for 5 Load Modules and 1 Control Unit)	19" rack liquid

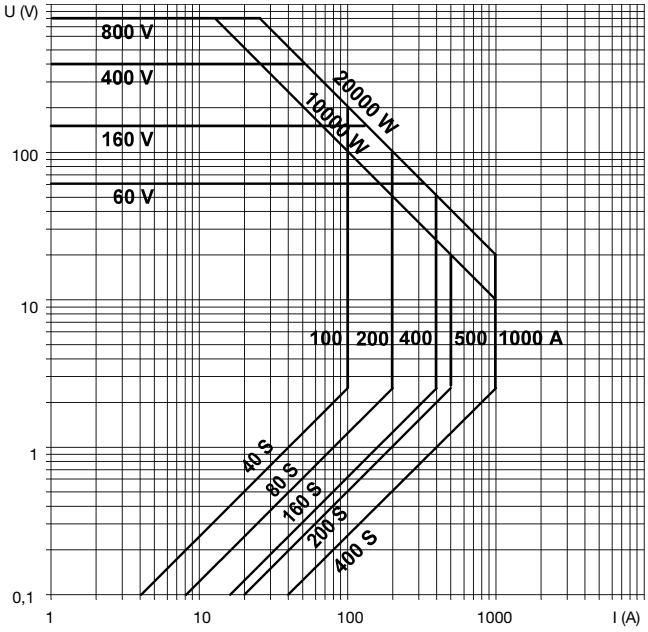
The Load System includes one Control Unit and up to 5 same Load Units, and a 19" rack!
The System can be delivered completely assembled in a 19"rack or as separate units in single cases.

Elektronisches DC Lastsystem

Operating range air cooled units:

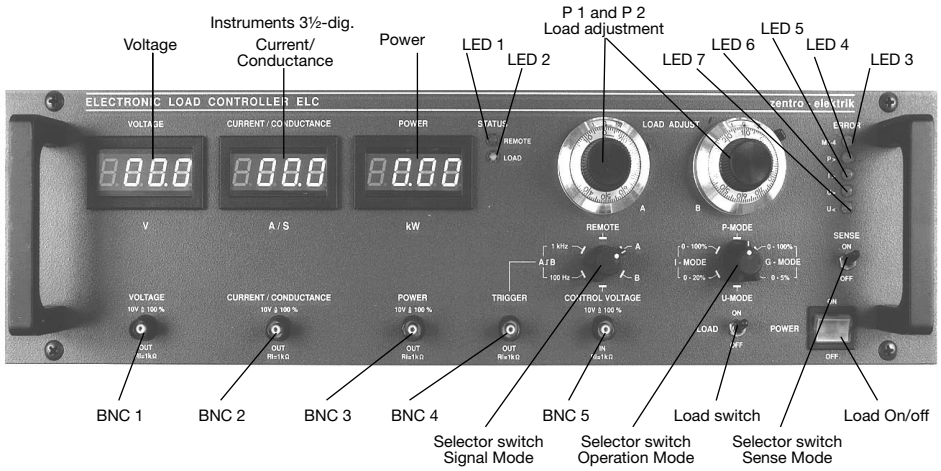


Operating range liquid cooled units:



Control Unit:

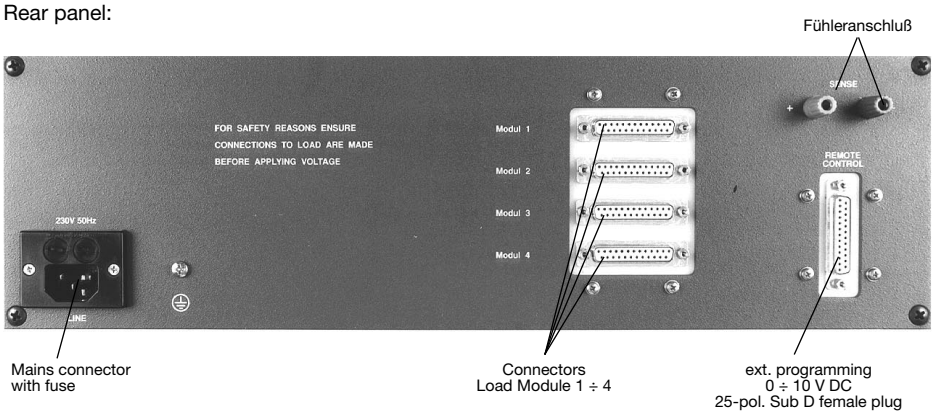
Front panel:



Signals:
BNC 1: Outp. true value Load voltage
BNC 2: Outp. true value Load current/ -conductancet
BNC 3: Outp. true value Load power
BNC 4: Outp. trigger
BNC 5: Inp. control voltage

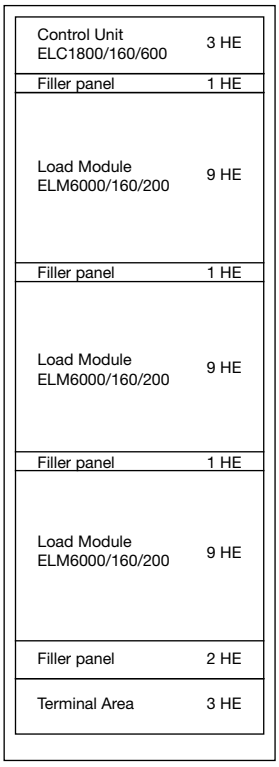
Indication:
LED 1: Remote on/off
LED 2: Load on
LED 3: Temperature limit
LED 4: Max. power
LED 5: Max. load current
LED 6: Max. load voltage
LED 7: Min. load voltage

Rear panel:



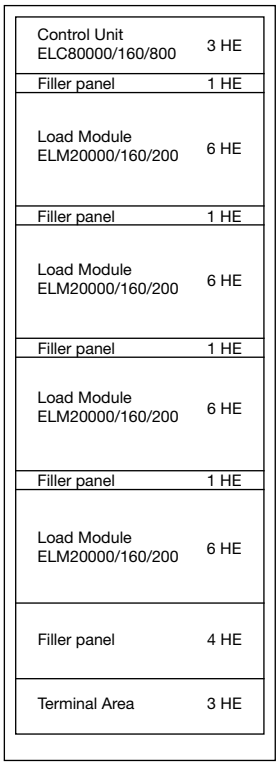
Examples of component parts for 19" rack:

Air cooled units:

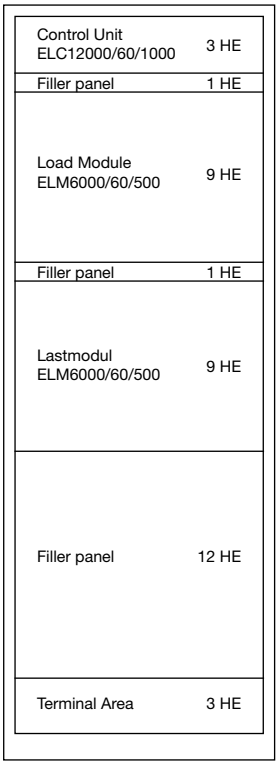


Fully equipped: Type
e.g.: ELS18 000/160/600

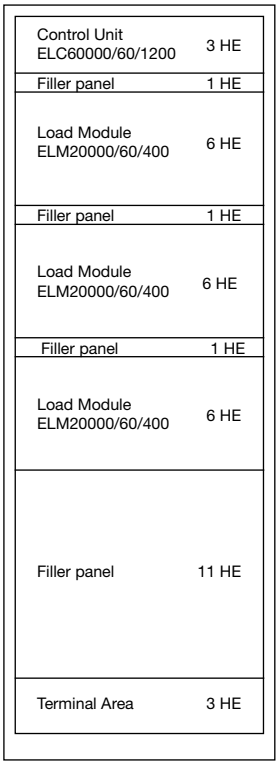
Liquid cooled units:



Fully equipped: Type
e.g.: ELS80 000/160/800



Partially equipped: Type
e.g.: ELS12 000/60/1000



Partially equipped: Type
e.g.: ELS60 000/60/1200

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