










# Overview Electronic DC Loads - Mechanics, Power, etc.

Höcherl & Hackl GmbH, Industriestr. 13, 94357 Konzell - Germany

This document shows the mechanical differences between PL, PLA, PLI, ZS, ERI, PMLA and PMLI.  
Refer to user manuals for detailed analysis.

Rev. 6  
30.07.2020

	Single Channel							Multi Channel	
									
Manufacturer	H&H	H&H	H&H	H&H	H&H	H&H	H&H	H&H	H&H
Series	PL (discontinued)	PLA	PLI Production Series A	PLI Production Series B	ZS (discontinued)	ERI Production series A	ERI Production Series B	PMLA Master	PMLI Master (discontinued)
<b>Power range</b>									
Maximum power	1,500 W	1,200 W	28,800 W	28,800 W	28,800 W	10,800 W	10,800 W	1,800 W	1,800 W
Multi-range devices	-	-	-	-	x only 500 W devices	-	-	-	-
<b>User interface</b>									
Graphical user interface	-	-	x	x	-	x	x	x	0
<b>Mains</b>									
1/N/PE AC 230 V, 2/N/PE AC 400/230 V, 3/N/PE AC 400/230 V	-	-	-	-	-	x	x	-	-
115/230 V selectable	x	-	x	x	x	-	-	x	x
115 ... 230 V wide voltage range	-	x	-	-	-	-	-	-	-
12 V DC supply	-	o	o only PLI14XX	o only PLI14XX	-	-	-	-	-
<b>Others</b>									
Temperature measurement	-	-	-	-	o <sup>1)</sup>	x	x	-	-
Interface changing or adding possible by customer	-	-	-	-	x	-	-	-	-
Interface changing or adding possible by H&H	x	x	x	x	x	x	x	x	x
19" integration with additional option	o	o	o 2 and 3 U	o 2 and 3 U	-	-	-	-	-
19" integration without additional option	-	-	x ≥5 U	x ≥5 U	x	x	x	x <sup>2)</sup>	x <sup>2)</sup>

x standard, o optional, - not available, i.p. in preparation

1) temperature dependent voltage signal; options ZS01, ZS13/ZS15 necessary










2) parts supplied as standard

# Overview Electronic DC Loads - IO-Port

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This document shows the I/O port differences between PL, PLA, PLI, ZS, ERI, PMLA and PMLI.  
Refer to user manuals for detailed analysis.

Rev. 6  
30.07.2020

	Single Channel							Multi Channel	
									
Manufacturer	H&H	H&H	H&H	H&H	H&H	H&H	H&H	H&H	H&H
Series	<b>PL</b> <i>(discontinued)</i>	<b>PLA</b>	<b>PLI</b> <i>Production Series A</i>	<b>PLI</b> <i>Production Series B</i>	<b>ZS</b> <i>(discontinued)</i>	<b>ERI</b> <i>Production series A</i>	<b>ERI</b> <i>Production series B</i>	<b>PMLA</b> Master	<b>PMLI</b> Master <i>(discontinued)</i>
<b>Port type</b>									
Standard	x	x	x	x	x	-	-	x	x
Galvanically isolated	-	-	o	o	o	o	o	-	-
<b>Analog control</b>									
Constant current control	x	x	x	x	x	o	o	x	x
Constant voltage control	-	x	x	x	x	o	o	x	-
Constant power control	-	-	-	-	x	-	-	-	-
Constant resistance control	-	-	-	-	-	-	-	-	-
Overcurrent protection control	-	-	x	x	o	o	o	-	-
Undervoltage protection control	-	-	x	x	o	o	o	-	-
<b>Digital control</b>									
Remote shut-down (emergency off)	-	-	x	x	x	o	o	-	-
Input activation state	x	x	x	x	x	o	o	x	-
<b>Operating mode selection</b>									
Trigger input	o <sup>1)</sup>	-	x	x	x	o	o	-	-
Readable logic input	-	-	x	x	o <sup>2)</sup>	o	o	-	-
Ext. control activation input	-	x	x	x	x	o	o	-	-
<b>Digital outputs</b>									
Input activation state	-	x	x	x	x	o	o	x	-
Status overload	x	x	x	x	x	o	o	-	-
Status voltage protection	-	-	-	-	x	-	-	-	-
Programmable logic output	-	-	x	x	o	o	o	-	-
Trigger output	x <sup>3)</sup>	-	x	x	x <sup>3)</sup>	o	o	-	-
<b>Analog monitor signals</b>									
Voltage monitor signal	x	x	x	x	x	o	o	x	x
Current monitor signal	x	x	x	x	x	o	o	x	x
Power monitor signal	-	-	-	-	x	-	-	-	-
<b>Sense</b>									
Sense at I/O port	x <sup>4)</sup>	x <sup>4)</sup>	-	-	-	-	-	x	x

x standard, o optional, - not available, i.p. in preparation

1) data interface necessary

2) ZS07 option necessary

3) only for setting A or setting B










4) only for 60 V and 120 V devices

# Overview Electronic DC Loads - Functions and Operation

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Rev. 6  
30.07.2020

	Single Channel							Multi Channel	
									
Manufacturer	H&H	H&H	H&H	H&H	H&H	H&H	H&H	H&H	H&H
Series	<b>PL</b> <i>(discontinued)</i>	<b>PLA</b>	<b>PLI</b> <i>Production Series A</i>	<b>PLI</b> <i>Production Series B</i>	<b>ZS</b> <i>(discontinued)</i>	<b>ERI</b> <i>Production Series A</i>	<b>ERI</b> <i>Production Series B</i>	<b>PMLA</b> Master	<b>PMLI</b> Master <i>(discontinued)</i>
<b>User interface</b>									
Graphical user interface	-	-	x	x	-	x	x	x	-
Keyboard	-	-	x	x	-	x	x	x	-
Analog setting potentiometer	x	-	-	-	x	-	-	-	-
Digital rotary encoder	-	x	x	x	-	x	x	x	-
<b>Display</b>									
Graphical color LCD	-	-	x	x	-	x	x	x	-
Graphical monochrome LCD	-	-	-	-	-	-	-	-	-
Alphanumeric LCD	-	-	-	-	-	-	-	-	-
LED 7 segments	x	x	-	-	x	-	-	-	-
<b>Data interfaces</b>									
RS-232	o	o	x	x	o	x	x	x	x
Ethernet	-	x	x	x	o	x	x	x	o
USB	-	o	x	x	o	x	x	x	-
CAN	-	o	x	x	-	x	x	o	-
GPIO	o	o	o	o	o	o	o	o	x
USB flash drive	-	x	x	x	-	x	x	x	-
<b>Operating modes</b>									
Constant Current	x	x	x	x	x	x	x	x	x
Constant Resistance	x	x	x	x	x	x	x	x	x
Constant Voltage	-	x	x	x	x	x	x	x	x
Constant Power	-	x	x	x	x	x	x	x	x
<b>Variable protections</b>									
Undervoltage protection	x	x <sup>1)</sup>	x	x	x	x	x	x <sup>1)</sup>	x
Overcurrent protection	-	x <sup>1)</sup>	x	x	x	x	x	x <sup>1)</sup>	x <sup>2)</sup>
<b>Regulation speed</b>									
Variable regulation time constant (fast/medium/slow)	-	x	x	x	x	x	x	x	x
By parameters	-	CP, CR mode	CP mode	CP mode	-	CP mode	CP mode	CP, CR mode	-
<b>Functions and operation</b>									
Master-Slave operation in system connection	-	x	-	x	-	-	x	-	-
Battery capacity determination	-	-	x	x	o <sup>3)4)</sup>	x	x	i.p.	-
Discharge function	-	-	x	x	-	x	x	i.p.	-
Internal resistance measurement	-	-	x	x	-	-	x	-	-
MPP tracking	-	x	x	x	o <sup>3)</sup>	-	x	-	-
X/Y characteristics	-	x	-	-	-	-	-	-	-
Watchdog function	-	x	x	x	o <sup>3)</sup>	x	x	x	-
Simulation of exponential inrush currents	-	-	-	-	o <sup>3)</sup>	-	-	-	-
<b>Setting memories</b>									
No. of setting memories	-	10	2	9	-	2	9	10	-
Last settings at power off	-	-	1	1	-	1	1	-	-
<b>LIST/waveform function</b>									
No. of setting points	o <sup>3)</sup> 256	100 <sup>4)</sup>	300 <sup>4)</sup>	300 <sup>4)</sup>	o <sup>3)</sup> 50	300 <sup>4)</sup>	300 <sup>4)</sup>	100	-

Dwell time min./max.	0 <sup>3)</sup> 5 ms - 20,000 s	1 ms / 100 s	200 µs / 800,000 s	200 µs / 1,000 s	200 µs / 2,000 s	200 µs / 800,000 s	200 µs / 1,000 s	1 ms / 100 s	-
Ramp time min./max.	-	1 ms / 100 s	0 s / 800,000 s	0 s / 1,000 s	0 s / 2,000 s	0 s / 800,000 s	0 s / 1,000 s	1 ms / 100 s	-
Resolution	5 ms	1 ms	200 µs	200 µs	50 µs	200 µs	200 µs	1 ms	-
Start by trigger	-	-	x	x	x	x	x	-	-
Start by variable trigger voltage	-	-	x	x	-	x	x	-	-
<b>Modulation</b>									
2 load levels (programmable)	x	x	x	x	x	x	x	x	x
<b>Measuring function via data interface</b>									
Current, voltage, power	0 <sup>3)</sup>	x	x	x	0 <sup>3)</sup>	x	x	x	x
Resistance, power stage temperature	-	x	x	x	-	x	x	x	-
<b>Data logging</b>									
to USB MSD	-	-	x	x	-	x	x	-	-
Sampling rate	-	-	0.5, 1, 5, 10 s	0.5 ... 30 s, resolution 0.1 s	-	0.5, 1, 5, 10 s	0.5 ... 30 s, resolution 0.1 s	-	-
<b>Data acquisition</b>									
Data acquisition memory	-	x	x	x	x	x	x	x	-
LIST/waveform synchronous	-	-	x	x	x	x	x	-	-
No. of sampling points	-	100	8,000	40,000	2,000	8000	40,000	100	-
Sampling rate min. / max.	-	1 ms / 100 s	200 µs / 800,000 s	200 µs / 1,000 s	200 µs / 2000 s	200 µs / 800,000 s	200 µs / 1,000 s	1 ms / 100 s	-
Resolution	-	1 ms	200 µs	200 µs	200 µs	200 µs	200 µs	1 ms / 100 s	-
Start by trigger	-	-	x	x	x	x	x	-	-
Start by trigger voltage	-	-	x	x	-	x	x	-	-
Start by trigger current	-	-	-	x	-	-	x	-	-
<b>Data transfer</b>									
Data transfer to USB MSD	-	-	x	x	-	x	x	-	-
Data transfer from USB MSD	-	-	x	x	-	x	x	-	-
<b>Trigger</b>									
External via I/O port	0	-	x	x	x	0	0	-	-
Via user interface	-	-	x	x	-	x	x	-	-
Via data interface	0	-	x	x	x	x	x	x	-
Variable trigger voltage	-	-	x	x	-	x	x	-	-
<b>Drivers, tools</b>									
LabVIEW driver	x	x	x	x	x	x	x	x	x
LXI	-	-	-	-	-	-	-	-	-
CANopen	-	-	-	-	-	-	-	-	-
Software tools (LabVIEW)	x	x	x	x	x	x	x	x	x
<b>Firmware update, calibration</b>									
Firmware update by	EPROM change	USB flash drive	USB flash drive	USB flash drive	RS-232 interface + flashing software	USB flash drive	USB flash drive	USB flash drive	RS-232 interface + flashing software
Calibration free of charge <sup>5)</sup>	x	x	x	x	x	x	x	x	x

x standard, o optional, - not available, i.p. in preparation

1) either overcurrent protection or undervoltage protection

2) variable by parameters

3) data interface necessary

4) locally 99 possible at PLA, 20 possible at PLI production series A and ERI production series A, 300 possible at PLI production series B and ERI production series B

5) free calibration once upon delivery and a second time when registered within warranty period