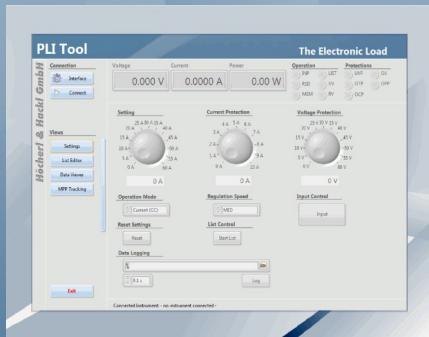




## Electronic Load PLI



Now with CP mode and MPPT functionality

# Electronic Loads, PLI Series

Interface overview	
RS-232	X
USB	X
LAN	X
GPIB	O
CAN	X
Analog	X
Analog isolated	O

X Standard   O Option   /not available

- Ethernet + USB + RS-232 + CAN + Analog I/O Port as standard**
- CC - CV - CR - CP - CCV - CVC Mode + optional MPPT**
- Dynamic loads with synchronized DAQ function**
- SCPI programming with measurement function**
- USB stick as measurement data memory**

- Protections for current and voltage**
- Depending on model, temporary overload capacity**
- High power density up to 3,200 W in 3HU**
- Full electronic protection**
- Silent fan cooling**
- Digital input and programmable control output**

**Description**  
The Electronic Loads of PLI series provide a comfortable operation by a graphical user interface.  
  
The highlight of the PLI series is the extensive variety of standard interfaces.  
  
Apart from Ethernet, USB, RS-232 and Analog I/O Port there is a standard CAN interface.  
  
GPIB can be installed as an option (PLI02).  
  
Programming is done in SCPI syntax.

## Data Interfaces

The following interfaces are included as standard:

- Ethernet
- USB
- RS-232
- CAN
- Analog I/O Port

## LabVIEW®

LabVIEW driver is approved by National Instruments.

**Functions**  
The units provide constant current, constant voltage, constant resistance and constant power mode. Optionally MPPT<sup>1)</sup> function for solar panel test can be activated. In addition, protections for current and voltage can be set in any mode. Dynamic operation can be configured by up to 300 list point settings. A data acquisition function allows to store measurement data on an external USB flash drive.  
  
Optionally (Option PLI20) the MPPT Function can be enabled.

## Analog I/O Port

The standard Analog I/O Port provides the following functions:

- Load setting C and V
- Analog setting of C and V protections
- Load on-off
- Voltage monitor output
- Current monitor output
- Trigger input
- Trigger output
- Digital input and programmable output

## Loading capacity

The model range covers three power classes with 600 W, 1,400 W, 2,100 W and 3,200 W continuous power rating.

In addition the models up to 300 V have an overload capability. The height and duration of the possible overload depends on the temperature of the power stage. The unit indicates the currently possible overload. Therefore the units can be used even for considerably more powerful applications for short time.

## Galvanically isolated Analog I/O Port (Option PLI06)

For the galvanic isolation between the Analog I/O Port and the load terminals the PLI06 option can be installed.

Using this board prevents ground loops and allows loading of bipolar voltages with two loads and common analog control.

## Protections

- Current limitation
- Power limitation
- Over-temperature protection
- Over-voltage protection
- Reverse polarity protection up to rated current
- Under-voltage indicator
- Protection of the GND lines at the Analog I/O Port

## Tools

The delivery includes comfortable tools for PC control.

<sup>1)</sup> MPPT: Maximum Power Point Tracking

## Factory Calibration Certificate (Option FCC-PLIxx)

A Factory Calibration Certificate (FCC) can be supplied with the devices. The FCC meets the requirements according to DIN EN ISO 9000ff. This calibration certificate documents the traceability to national standards to illustrate the physical device in accordance with the international System of Units (SI). The recommended calibration interval is 1 year.



Model (order number)	Conti- nuous power	Short-time power <sup>1)</sup>	Volta- ge	Cur- rent	Rise/fall time <sup>2)</sup>	Resistance	Housing <sup>3)</sup>	Noise max. <sup>4)</sup>	Load connection <sup>5)</sup>	
									front	back
<b>PLI606</b>	600 W	1,200 W	60 V	60 A	50 µs	0.033 ... 10.8 Ω	½19", 2 HU	55 dB(A)	PK 4-60	FK 8
<b>PLI606 C10</b>	600 W	600 W	60 V	10 A	30 µs	0.2 ... 64.5 Ω	½19", 2 HU	55 dB(A)	PK 4-30	PK 4-30
<b>PLI612</b>	600 W	1,200 W	120 V	20 A	50 µs	0.100 ... 64.5 Ω	½19", 2 HU	55 dB(A)	PK 4-30	PK 4-30
<b>PLI630</b>	600 W	900 W	300 V	16 A	40 µs	0.125 ... 202 Ω	½19", 2 HU	55 dB(A)	PK 4-30	PK 4-30
<b>PLI660</b>	600 W	600 W	600 V	8 A	40 µs	0.25 ... 807 Ω	½19", 2 HU	55 dB(A)	PK 4-30	PK 4-30
<b>PLI680</b>	600 W	600 W	800 V	6 A	40 µs	0.33 ... 1 430 Ω	½19", 2 HU	55 dB(A)	PK 4-30	PK 4-30
<b>PLI1406</b>	1,400 W	2,800 W	60 V	120 A	50 µs	0.017 ... 5.37 Ω	19", 2 HU	56 dB(A)	-	FK 8
<b>PLI1406 C20</b>	1,200 W	1,200 W	60 V	20 A	30 µs	0.1 ... 32.2 Ω	19", 2 HU	56 dB(A)	-	PK 4-30
<b>PLI1412</b>	1,400 W	2,800 W	120 V	40 A	50 µs	0.05 ... 32.3 Ω	19", 2 HU	56 dB(A)	-	PK 4-60
<b>PLI1430</b>	1,400 W	2,100 W	300 V	32 A	40 µs	0.063 ... 101 Ω	19", 2 HU	56 dB(A)	-	PK 4-60
<b>PLI1460</b>	1,400 W	1,400 W	600 V	16 A	40 µs	0.125 ... 403 Ω	19", 2 HU	56 dB(A)	-	PK 4-30
<b>PLI1480</b>	1,400 W	1,400 W	800 V	12 A	40 µs	0.167 ... 717 Ω	19", 2 HU	56 dB(A)	-	PK 4-30
<b>PLI2106</b>	2,100 W	4,200 W	60 V	180 A	50 µs	0.011 ... 3.58 Ω	19", 2 HU	60 dB(A)	-	FK 8
<b>PLI2106 C30</b>	1,800 W	1,800 W	60 V	30 A	30 µs	0.066 ... 21.5 Ω	19", 2 HU	60 dB(A)	-	PK 4-30
<b>PLI2112</b>	2,100 W	4,200 W	120 V	60 A	50 µs	0.033 ... 21.5 Ω	19", 2 HU	60 dB(A)	-	PK 4-60
<b>PLI2130</b>	2,100 W	3,150 W	300 V	48 A	40 µs	0.042 ... 67.2 Ω	19", 2 HU	60 dB(A)	-	PK 4-60
<b>PLI2160</b>	2,100 W	2,100 W	600 V	24 A	40 µs	0.083 ... 269 Ω	19", 2 HU	60 dB(A)	-	PK 4-30
<b>PLI2180</b>	2,100 W	2,100 W	800 V	18 A	40 µs	0.111 ... 478 Ω	19", 2 HU	60 dB(A)	-	PK 4-30
<b>PLI3206</b>	3,200 W	6,400 W	60 V	300 A	60 µs	0.007 ... 2.15 Ω	19", 3 HU	70 dB(A)	-	FK 25
<b>PLI3212</b>	3,200 W	6,400 W	120 V	150 A	60 µs	0.013 ... 8.60 Ω	19", 3 HU	70 dB(A)	-	FK 25
<b>PLI3230</b>	3,200 W	4,800 W	300 V	60 A	60 µs	0.033 ... 53.7 Ω	19", 3 HU	70 dB(A)	-	PK 4-60
<b>PLI3260</b>	3,200 W	3,200 W	600 V	40 A	60 µs	0.05 ... 161 Ω	19", 3 HU	70 dB(A)	-	PK 4-60
<b>PLI3280</b>	3,200 W	3,200 W	800 V	30 A	60 µs	0.067 ... 286 Ω	19", 3 HU	70 dB(A)	-	PK 4-30

1) The possible short-time power depends on the temperature of the output stage, i.e. on the previous load.

2) Rise and fall times are defined from 10 ... 90 % and 90 ... 10 % of the maximum current in "fast" setting. (Const. current mode, tolerance +/- 20 %). Risetimes in the settings "medium": 500µs, "slow": 5ms

3) 1 HU = 1 height unit = 44.45 mm  
4) Measured on the front from distance of 1m

5) PK 4-30: Pole terminal touch-protected for 4 mm laboratory jack + stripped wires, max. 30 A.  
PK 4-60: Pole terminal touch-protected

for 4 mm laboratory jacks + stripped wires, max. 60 A.

FK 8: Flat copper rail with M8 screw  
FK 25: Flat copper rail with M10 screw

## Technical Data PLI Series

PLI

Settings				
	of the setting value	of the corresponding range		
<b>Current</b>	±0.2 %	±0.05 %		
<b>Voltage</b>	±0.2 %	±0.05 %		
<b>Resistance</b> (at U and I 5 % to 100 % of the voltage range)	±1.4 %	±0.3 % of current range		
<b>Power</b> (at U and I 10-30% of the Range) (at U and I > 30% of the range)	±1,4% ±0,7%			
<b>Resolution</b>	14 bit			
Limitations				
<b>Current</b>	±1.4 %	±0.3 %		
<b>Voltage</b>	±1.4 %	±0.3 %		
Measurement / Display				
	of the measured value (actual value)	of the corresponding range		
<b>Voltage</b>	±0.2 %	±0.05 % ±1 digit		
<b>Current</b>	±0.2 %	±0.05 % ±1 digit		
<b>Resistance</b>	is calculated from current and voltage			
<b>Power</b>	is calculated from current and voltage			
<b>Resolution</b>	18 bit / 13 bit at DAQ function			
Dynamic Function				
<b>No. of load levels</b>	max. 300, with ramp time and dwell time setting			
	min.	max.		
<b>Dwell time</b>	100 µs	400,000 s		
<b>Resolution</b>	100 µs			
<b>Precision of the setting times</b>	+/-0.02%			
Data Acquisition				
To external USB flash drive				
<b>Measurement rate</b>	0.5 s, 1 s, 5 s, 10 s			
<b>Measurement data</b>	time stamp, voltage, current			
<b>File format</b>	.CSV format			
Into internal memory				
<b>Measurement rate</b>	100 µs ... 400,000 s, resolution 100 µs, synchronized with Dynamic Function			
<b>Measurement data</b>	time stamp, voltage, current			
<b>No. of points</b>	max. 8,000			
Input				
<b>Input resistance</b>	>50 kΩ when load input is off			
<b>Input capacity</b>	approx. 2 µF / 600 W			
<b>Parallel operation</b>	up to 5 units in Master-Slave mode (hardware-controlled)			
<b>Input voltage</b>	see type overview			
<b>Minimum voltage</b>	min. 1.4 V for max. current, including linear derating of current with respect to 0V			
<b>Permissible operating voltage</b>	negative load input - housing 125 V DC			
<b>Protective devices</b>	over-voltage up to 105 % of rated voltage over-current over-power over-temperature reverse polarity up to rated current under-voltage display (if the input voltage is too low for the set voltage)			
<b>Connections</b> Load input: Sense:	see type overview PK 4-30 (Pole terminal touch-protected for 4 mm laboratory jack + stripped wires)			
<b>Continuous power</b>	see type overview (where T <sub>A</sub> = 21 °C)			
<b>Derating</b>	-1.2 %/°C for T <sub>A</sub> > 21 °C			
<b>Overload capability</b>	see model overview			

Subject to technical modifications

Analog I/O Port					
<b>Analog control inputs 0 ... 10 V</b>					
	of the setting value	of the corresponding range			
<b>Current</b>	±0.2 %	±0.1 %			
<b>Voltage</b>	±0.2 %	±0.1 %			
<b>Current protection</b>	±1 %	±0.4 %			
<b>Voltage protection</b>	±1 %	±0.4 %			
Input resistance of analog inputs >10 kΩ GND max. ±2 V with respect to negative load input					
<b>Analog measurement outputs 0 ... 10 V</b>					
	of analog signal of	offset voltage			
<b>Voltage</b>	±0.2 %	±15 mV			
<b>Current</b>	±0.2 %	±15 mV			
Load capacity: minimal 2 kΩ					
<b>Control inputs and outputs</b>					
<b>Control outputs</b>	input on/off overload trigger output programmable output selectable, 3.3 V, 5 V, 12 V, or external programmable up to 30 V				
	Output level				
<b>Control inputs</b>	input on/off mode selection trigger input digital input 3 V to 30 V				
	Input level				
<b>Operating conditions</b>					
<b>Operating temperature</b>	5 °C ... 40 °C				
<b>Cooling</b>	3-stage air-cooling				
<b>Supply voltage</b>	115/230 V~ ±10 %, switchable 50 ... 60 Hz				
Power consumption	PLI6XX 35 VA	PLI14XX 55 VA	PLI21XX 75 VA	PLI32XX 150 VA	
<b>Dimensions</b> W x B x D <sup>1)</sup> (mm)	PLI6XX 222 x 88 x 555	PLI14XX — 444 x 88 x 520 —	PLI21XX 9 kg	PLI32XX 15 kg	444 x 133 x 540 22,5 kg
<b>Color</b>	Front panel, side panels top		RAL7032 (pebble grey) RAL7037 (stone grey)		
<b>Electrical safety</b>	DIN EN 61010				
<b>EMC, CE marking</b>	DIN EN 61326-1 DIN EN 61000-3-2 DIN EN 61000-3-3				
<b>Warranty</b>	2 years				
<b>Available options</b>					
<b>19" rack mounting kits</b>	<b>for models</b>	<b>order number</b>			
	1 PLI6XX	PLI10			
	2 PLI6XX	PLI11			
	PLI14XXX or PLI21XX	PLI12			
	PLI32XX	PLI13			
<b>MPPT Function</b>	PLI20				
<b>GPIB Interface</b>	PLI02				

1) This is the deepest device type of the series.

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