PL Electronic Loads

Höcherl & Hackl GmbH

- 12 models up to 400 V / 150 A
- Power 500 W - 1000 W - 1500 W
- short-time overload capacity
- Dynamic functions
- Full electronic protection
- Analog interface PLC compatible
- Battery discharge function
- Manual control and for use in test systems
- RS232 and GPIB interface with extensive software tools

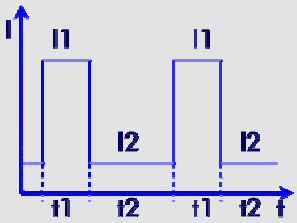
Functions

Operating Modes:

The PL series provides all necessary functions needed for daily use.
The device provides the operating modes Constant Current and Constant Resistance in both the static as well as in dynamic operation.
In combination with the RS232 or the GPIB interface, firmware-controlled Constant Power mode is also possible. The manual setting of the load values is provided by two separate 10-turn potentiometers. The load setting can be changed between the values A and B by the use of the push-buttons.

Dynamic Operation

The built-in modulator controls the switching between the two load levels A and B. For every load level there is an adjustable switching time from 0.5ms .... 500ms available. This provides the greatest possible range in duty cycle. The switching between the two load levels can also be controlled by the analog I/O connector using a pulse from 3V to 30V.



Installed Protection

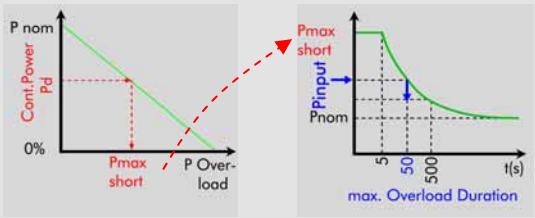
The following protection systems are installed to protect the device from either a faulty test object, or misuse.

- Current Limiting
- Power Limiting
- Over-temperature Protection
- Over-voltage Protection
- Reverse-polarity Protection
- Protection of the GND line in the Analog I/O Connector

In the event that one of the input levels is exceeded the display will start to blink.

Overload Capability

The model range covers three power ratings of 500W, 1000W and 1500W. Depending on the temperature of the power stage, this device can higher power for short-time. The level of the overload depends on the temperature of the power stage. This may allow to use the load even for more powerful applications.



Analog I/O Connector

The standard Analog I/O Connector provides a 0...10V measurement level for:

- Input Voltage
- Load Current
- Power
- Nominal Current
- Master-Slave-Control

The load current can be controlled by either a 0-to-5V or a 0-to-10V signal.
The following logic input/output can be read through the Analog I/O Connector:

- Status "Overload" for the overload display
- Trigger output in dynamic operation mode
- Trigger input for external control of dynamic load
- Switching input for battery testing
- Control input for external load control
- Sense connection (60V and 120V models only)

Data Interfaces and SW-Tools

Interfaces

As interfaces the choice of either the cost-saving RS232 or the combined GPIB/RS232 are available.
The interface allows the control of all the various functions including the dynamic control of the device, for example programmable rise and fall times of the device.
Various measurement functions are also available. All interfaces are galvanically isolated from the load input to prevent ground loop problems. Programming is in SCPI language.

RS232 Interface (Option PL01)

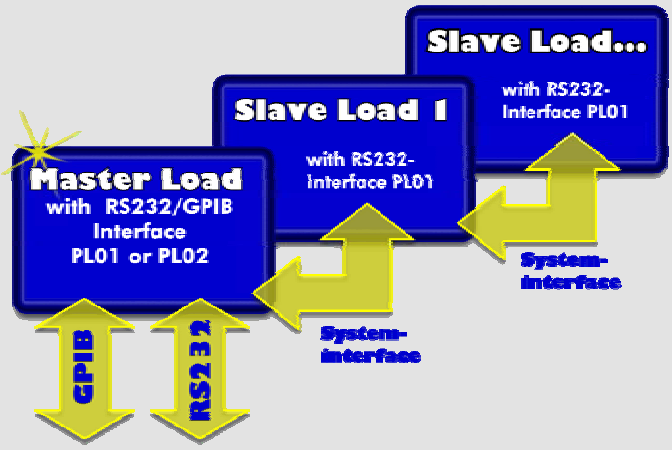
The RS232 interface is the cheapest method of device control by the PC. It includes the system bus interface to build up multichannelled load systems.

GPIB + RS232 Interface (Option PL02)

Combines both an GPIB and RS232 interface.

Configuration of Multichannelled Systems

For control of further devices by the GPIB or the RS232 interface of the first device, you can connect the following devices using the system bus connector (in Option PL01 in every other device).



In spite of the common interface, the devices are galvanically separated from each other and may be driven with potential differences up to 125V.

Technical Data in Remote Control:

Resolution of Input:	12 Bit
Resolution of V, I Measurement :	13 Bit, reading rate 300ms
Dynamic Load Cycling:	6ms ... 130s, 2ms resol.
Rise and fall times:	0ms ... 20s, 2ms resolution
Programmable Load Curve:	255 steps + 255 times each 5ms ... 100s

Software Tools

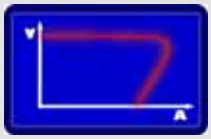
A program library on CD ROM is included in the delivery with interface option containing the following applications:

- Load control using a PC
- Programming of load profiles
- Recording of current limiting profiles
- Continuous operation with store function for voltage and current
- Battery testing with recording of the discharge curves
- LabVIEW-driver

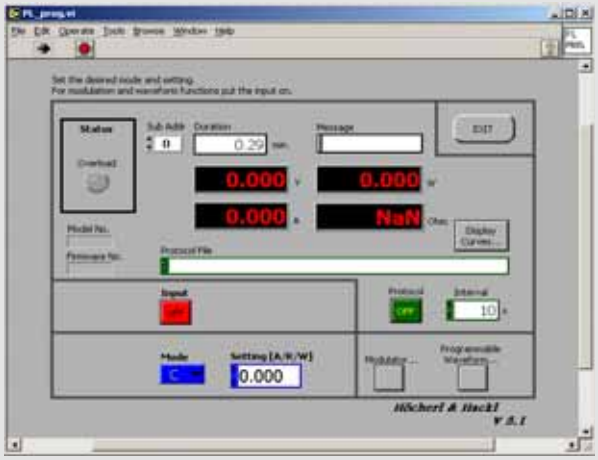
Battery Test


Programmable Waveforms


Dynamic Loading


Recording Characteristics

This Program Library is continuously updated and expanded. Updates can be downloaded from our homepage:
http://www.hoecherl-hackl.com



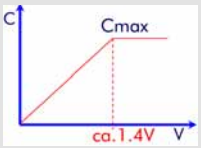
LabVIEW®

Type Overview - Technical Data

Model (Order No.)	Cont. Power	Peak Power [1]	Voltage	Current	Resistance [2]	Dimensions	Terminals [3]
PL506	500 W	900 W	60 V	50 A	0.1 Ω ... ∞	½19", 2HU	FK 8
PL506 SC5 *	300 W	300 W	60 V	5 A	1 Ω ... ∞	½19", 2HU	PK 4
PL512	500 W	900 W	120 V	20 A	0.2 Ω ... ∞	½19", 2HU	PK 4
PL524	500 W	900 W	240 V	10 A	0.5 Ω ... ∞	½19" ,2HU	SB 4
PL540	500 W	600 W	400 V	8 A	1.5 Ω ... ∞	½19", 2HU	SB 4
PL1006	1000 W	1800 W	60 V	100 A	0.05 Ω ... ∞	19", 2HU	FK 8
PL1006 SC10 *	600 W	600 W	60 V	10 A	0.5 Ω ... ∞	19", 2HU	PK 4
PL1012	1000 W	1800 W	120 V	50 A	0.1 Ω ... ∞	19", 2HU	FK 8
PL1024	1000 W	1800 W	240 V	20 A	0.3 Ω ... ∞	19", 2HU	SB 4
PL1040	1000 W	1200 W	400 V	16 A	1 Ω ... ∞	19", 2HU	SB 4
PL1506	1500 W	2700 W	60 V	150 A	0.04 Ω ... ∞	19", 2HU	FK 8
PL1506 SC15 *	900 W	900 W	60 V	15 A	0.4 Ω ... ∞	19", 2HU	PK 4
PL1512	1500 W	2700 W	120 V	80 A	0.06 Ω ... ∞	19", 2HU	FK 8
PL1524	1500 W	2700 W	240 V	30 A	0.2 Ω ... ∞	19", 2HU	SB 4
PL1540	1500 W	1800 W	400 V	25 A	0.5 Ω ... ∞	19", 2HU	SB 4

[1] The possible peak power depends on the temperature of the power stages. and on the previous continuous power. (See diagram at page 2)
[2] ∞ is included in the accuracy range for the resistance mode.
[3] SB 4: 4 mm safety connector
PK 4: binding post with 4mm connector
FK 8: copper bus bar with M8 bolt
[4] units with reduced setting range
1HU = 1 Height Unit = 44.45 mm

Input:
Input Voltage: See type overview
minimum: min. 1.4 V for max. current, linear derating of current down to 0V



Current: See type overview for adjustment range
Accuracy: ±0.4% of input value, ±0.05% of input range
Rise and fall time: 75µs (10% ...90% Inom)

Resistance: See type overview for ranges
Accuracy: ±5% of input value ±0.5% of the input range in current at 5% to 100% of the voltage range

Display:
Current and Voltage: 3½ digit LED, max. display 1999, Digits displayed dependent on range Combined with overload indication (blinking display)

Power:
Continuous power: See type overview (at T_A = 21°C,)
Derating: -1.2%/°C
Short-time power: See type overview and diagrams

Pre-Setting:
Current operation: Direct display of the load current
Resistance operation: Display of expected load current for the applied voltage

Overload protection: Over-voltage (max. 120% of nominal voltage), overcurrent, overpower, overtemperature, cross-connection up to nominal current, transientprotect. Display by blinking of the current and/or voltage display, under-voltage display (too low input voltage for the set load level)

Dynamic Function: Two adjustable load levels (in C and R operation), with two adjustable times each 1ms ... 500ms (2Hz ... 1kHz)
Accuracy: ±10 % ±0.2ms
External triggering of the load levels possible

Analog I/O Interface: Standard
Analog control input: 0 ... 5V / 0 ... 10V for current setting 0 ... Imax
Accuracy: 10V: ±0.5%, ±20mV, 5V: ±1.5%, ±20mV
Input Impedance: 10kΩ / 20kΩ (at 5V / 10V)
Permissible low potential: ±2V respective to negative load input

Analog measurement output:
Voltage: 0 ... 10V for 0 ... Umax, accuracy: ±0.2%, ±20mV
Current: 0 ... 10V for 0 ... Imax, accuracy: ±0.3%, ±20mV
Power: 0 ... 10V, accuracy: ±5%, ±30mV
Master: 0 ... 10V for 0 ... Inom, for master-slave control
Reference: 10.5V ± 4%, for external use

Control input: (Level 3V ... 30V)
Load switching off - on
Battery testing off - on
Trigger input for dynamic load level switching

Status Outputs: Overload
(open collector 30V) Trigger output in dynamic loading

Connectors:
Load input: See type overview
Sense: up to 120V: provided at the analog I/O connector over 240V: not provided

Battery testing: Adjustable discharge voltage (The load is reduced to 0A when reaching the discharge voltage), C/V operation, R/V operation

Parallel control: Up to 5 devices in master-slave operation

Cooling: 2 speed air cooling, off - half - full

Dimensions:	PL5XX:	PL10XX	PL15XX
W x D x H:	222x88x390mm	444x88x390mm	444x88x390mm
Weight:	6kg	12kg	16kg
Noise level:	55dBA	59dBA	60dBA

Supply:	~115/230V 10% switchable, 45 ... 440Hz		
Power consumption:	PL5XX	PL10XX	PL15XX
	max. 30VA	max. 50VA	max. 60VA

Electrical safety: DIN EN 61010: 2002-08, DIN EN 61326-1: 2006-10
EMC, CE mark: DIN EN 61000-3-2: 2006-10, DIN EN 61000-3-3:2006-06

Options:

Interfaces:
Option PL01: RS232-Interface + Systembus
Option PL02: GPIB+ RS232-Interface + Systembus

Resolution:
Setting: 12 Bit
Measurement function V: 13 Bit, accuracy ±0.2%, ±5LSB,
Measurement function I: 13 Bit, accuracy ±0.5%, ±10LSB, reading rate ca. 300ms

Warranty: 2 years

19"- Rack kit:	For model	Order number
	1 Pc. PL5XX	ES PL05-1
	2 Pc. PL5XX	ES PL05-2
	PL10XX or PL15XX	ES PL2