
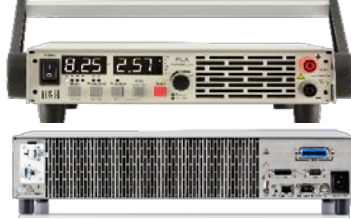


Low Power Electronic Loads

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

Rev. 02
21.09.2018

Use the user manuals to analyze the detailed differences between the PL and PLA series.

		
Manufacturer	H&H	H&H
Series	PL (discontinued)	PLA
Continuous power max.	1500 W	1200 W
Voltage classes	60 V, 120 V, 240 V, 400 V	60 V, 120 V, 300 V, 800 V
Op. modes	CC, CR (CP with optional data interface)	CC, CV, CR, CP
Min. input voltage Vmin for Imax	1.4 V	1.2 V
Input capacity	ca. 2 µF/500 W	max. 3 µF
Operating temperature	5 ... 40 °C	5 ... 40 °C
Power derating	-1.2 %/°C for Ta > 21 °C	-1.2 %/°C for Ta > 21 °C
Voltage setting		
Accuracy	--	0.1 % of setting 0.05 % of range
Resolution	--	12 bits
Current setting (local)		
Accuracy	1 % of setting 0.05 % of range	0.2 % of setting 0.05 % of range
Current (remote)		
Accuracy	0.4 % of setting 0.05 % of range	0.2 % of setting 0.05 % of range
Resolution	12 bits	12 bits
Resistance setting (remote)		
Accuracy (at 5 ... 100 % of voltage range)	5 % 0.5 % of current range	1.4 % of setting 0.3 % of current range
Resolution	12 bits	12 bits
Power setting (local)		
Accuracy	--	0.7 % of setting (V and I > 10 % of range) 2 % of setting (V or I 5 ... 10 % of range)
Power setting (remote)		
Accuracy	software control, accuracy depends on voltage and current measuring accuracy and current setting accuracy	0.7 % of setting (V and I > 10 % of range) 2 % of setting (V or I 5 ... 10 % of range)
Resolution	12 bits	12 bits
Protections		
Hardware protections and warnings	OCP, OPP, OTP UV warning	OCP, OPP, OTP UV, RV, OV warning
Variable regulating protections	V	V or I
Measurement/display		
Display	3 digits LED	4 digits LED
Voltage measurement accuracy	0.2 % of meas. value 0.05 % of range ±1 digit	0.1% of meas. value 0.05 % of range
Current measurement accuracy	0.4 % of meas. value 0.05 % of range ±1 digit	0.2 % of meas. value 0.05 % of range
Resistance measurement accuracy	--	calculated of voltage and current measurement

Power measurement accuracy	--	calculated of voltage and current measurement
Remote measurement		
Voltage measurement accuracy	0.2 % of meas. value 0.06 % of range ±1 digit	0.1% of meas. value 0.05 % of range
Current measurement accuracy	0.5 % of meas. value 0.12 % of range	0.2 % of meas. value 0.05 % of range
ADC resolution	12 bits	16 bits
Dynamic function		
Current rise and fall time (10 ... 90 % I _{max})	30 ... 60 µs	35 ... 55 µs
Number of dynamic settings	2 current/resistance values with 2 dwell times	100 list points with ramp and dwell times (LIST)
Time resolution	0.2 ms	1 ms
MPP Tracking	no	yes
Watchdog function	no	yes
X/Y characteristic	no	yes
Save/recall settings	no	10 memories
Trigger system	yes, only for setting values, trg source bus or external	yes, for setting values and input state, trg source only bus
Permissible potentials of load inputs		
	±125 V (DC or AC) to PE	±125 V (DC or AC) to PE
I/O port		
	standard, not isolated	standard, not isolated
Analog control	0 ... 5 V or 0 ... 10 V	0 ... 10 V
Ext. setting control	0 ... I _{max} 0 ... V _{max} 0 ... P _{max}	0 ... I _{max} 0 ... V _{max}
Monitor signals	I, V	I, V
Monitor sampling rate	analog/real time	analog/real time
Sense	only 60 V and 120 V models	yes
Digital control signals (inputs)	load on-off trigger input discharge voltage control input	load on-off control input for external control activation
Digital outputs	overload trigger output during dynamic operation	load on-off overload
Permissible potential of GNDs at I/O port	max. ±2 V (DC or AC) to Input -	max. ±2 V (DC or AC) to Input -
Data interfaces		
		USB optional
	RS-232 optional	RS-232 optional
		CAN optional
	external Ethernet optional	Ethernet optional
	GPIB optional	GPIB optional
SCPI syntax	yes	yes
LabVIEW drivers	yes	yes, NI certified
Software tools	yes	yes
Firmware update	by EPROM change	via USB MSD (front)
Master-Slave operation		
	no	yes
Safety compliance		
	DIN EN 61010-1 DIN EN 61010-2-030	DIN EN 61010-1 DIN EN 61010-2-030
EMC compliance		
	DIN EN 61326-1 DIN EN 61000-3-2 DIN EN 61000-3-3	DIN EN 61326-1 DIN EN 55011 DIN EN 61000-3-2 DIN EN 61000-3-3
Calibration		
	H&H calibration service	H&H calibration service twice for free

SCPI Commands PL vs. PLA

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

Rev. 02
21.09.2018

n. a. = not available

	PL (discontinued)	PLA	Remark
Common Commands			
	*CLS	*CLS	
	*ESE	*ESE	
	*ESE?	*ESE?	
	*ESR?	*ESR?	
	*IDN?	*IDN?	
	*OPC	*OPC	
	*OPC?	*OPC?	
	n. a.	*OPT?	
	n. a.	*RCL	
	*RST	*RST	
	n. a.	*SAV	
	*SRE	*SRE	PL series loads do not produce a Service Request, independent from the set register value.
	*SRE?	*SRE?	
	*STB?	*STB?	
	*TRG	n. a.	
	*TST?	*TST?	
	*WAI	*WAI	
Device-dependent Commands			
Subsystem ACQuisition			
	n. a.	ACQuisition[:STATe]	
	n. a.	ACQuisition[:STATe]?	
	n. a.	ACQuisition:CONTInuous	
	n. a.	ACQuisition:CONTInuous?	
	n. a.	ACQuisition:STIME	
	n. a.	ACQuisition:STIME?	
Subsystem CALibration			
	CALibration?	n. a.	
Subsystem CHANnel			
	CHANnel[:NSElect[:SElect] INSTrument[:NSElect[:SElect]	n. a.	
	CHANnel? INSTrument?	n. a.	
	CHANnel:STATe INSTrument:STATe	n. a.	
Subsystem CURRent			
	CURRent[:LEVel][:IMMediate]	CURRent[:LEVel][:IMMediate]	
	CURRent[:LEVel][:IMMediate]?	CURRent[:LEVel][:IMMediate]?	
	CURRent[:LEVel]:TRIGgered	CURRent[:LEVel]:TRIGgered	
	CURRent[:LEVel]:TRIGgered?	CURRent[:LEVel]:TRIGgered?	
	CURRent:MODE	n. a.	
	CURRent:MODE?	n. a.	
	CURRent:PROTection[:LEVel]	CURRent:PROTection[:LEVel]	
	n. a.	CURRent:PROTection[:LEVel]?	
	CURRent:PROTection:TRIPped?	n. a.	
	CURRent:RANGe	n. a.	
	CURRent:RANGe?	n. a.	
	CURRent:RANGe:AUTO	n. a.	
Subsystem CURVe			
	n. a.	CURVe:STATe	
	n. a.	CURVe:STATe?	
	n. a.	CURVe:CURRent[:LEVel]	
	n. a.	CURVe:CURRent[:LEVel]?	
	n. a.	CURVe:CURRent[:LEVel]:POINts?	
	n. a.	CURVe:VOLTag[:LEVel]	
	n. a.	CURVe:VOLTag[:LEVel]?	
	n. a.	CURVe:VOLTag[:LEVel]:POINts?	
Subsystem DATA			
	n. a.	DATA:POINts?	
	n. a.	DATA:REMOve?	
Subsystem FORMat			

	n. a.	FORMat[:DATA]	
	n. a.	FORMat[:DATA]?	
	n. a.	FORMat:SREGister	
	n. a.	FORMat:SREGister?	
Subsystem FUNCTION			
	n. a.	FUNction:PROTection[:STATe]	
	n. a.	FUNction:PROTection[:STATe]?	
	n. a.	FUNction:PROTection:MODE	
	n. a.	FUNction:PROTection:MODE?	
	n. a.	FUNction:MODE	
	n. a.	FUNction:MPPT[:STATe]	
	n. a.	FUNction:MPPT[:STATe]?	
	n. a.	FUNction:MPPT:ENERgy?	
	n. a.	FUNction:MPPT:MPP?	
	n. a.	FUNction:MPPT:SWEEp:[IMMediate]	
	n. a.	FUNction:MPPT:SWEEp:DATA:POINts?	
	n. a.	FUNction:MPPT:SWEEp:DATA?	
	n. a.	FUNction:MPPT:SWEEp:DIRection	
	n. a.	FUNction:MPPT:SWEEp:DIRection?	
	n. a.	FUNction:MPPT:SWEEp:PERiod	
	n. a.	FUNction:MPPT:SWEEp:PERiod?	
	n. a.	FUNction:MPPT:SWEEp:TIME	
	n. a.	FUNction:MPPT:SWEEp:TIME?	
	n. a.	FUNction:SPEEd	
	n. a.	FUNction:SPEEd?	
Subsystem GTL			
	GTL	SYSTem:LOCal	
Subsystem INPUT			
	INPut[:STATe]	INPut[:STATe]	
	INPut[:STATe]?	INPut[:STATe]?	
	n. a.	INPut[:STATe]:WDOG[:STATe]	
	n. a.	INPut[:STATe]:WDOG[:STATe]?	
	n. a.	INPut[:STATe]:WDOG:DELay	
	n. a.	INPut[:STATe]:WDOG:DELay?	
	n. a.	INPut[:STATe]:WDOG:RESet	
Subsystem LIST			
	n. a.	LIST[:STATe]	
	n. a.	LIST[:STATe]?	
	n. a.	LIST:COUNt	
	n. a.	LIST:COUNt?	
	n. a.	LIST:CURRent[:LEVeL]	
	n. a.	LIST:CURRent[:LEVeL]?	
	n. a.	LIST:CURRent[:LEVeL]:POINts?	
	n. a.	LIST:DWELL	
	n. a.	LIST:DWELL?	
	n. a.	LIST:DWELL:POINts?	
	n. a.	LIST:MODE	
	n. a.	LIST:MODE?	
	n. a.	LIST:POWer[:LEVeL]	
	n. a.	LIST:POWer[:LEVeL]?	
	n. a.	LIST:POWer[:LEVeL]:POINts?	
	n. a.	LIST:RESistance[:LEVeL]	
	n. a.	LIST:RESistance[:LEVeL]?	
	n. a.	LIST:RESistance[:LEVeL]:POINts?	
	n. a.	LIST:RTIME	
	n. a.	LIST:RTIME?	
	n. a.	LIST:RTIME:POINts?	
	n. a.	LIST:VOLTagE[:LEVeL]	
	n. a.	LIST:VOLTagE[:LEVeL]?	
	n. a.	LIST:VOLTagE[:LEVeL]:POINts?	
Subsystem MEASURE			
	MEASure:CURRent[:DC]?	MEASure:CURRent?	
	MEASure:POWer[:DC]?	MEASure:POWer?	
	n. a.	MEASure:RESistance?	
	n. a.	MEASure:TEMPerature?	
	MEASure:VOLTagE[:DC]?	MEASure:VOLTagE?	
Subsystem MODE			
	MODE:CURRent[:DC] FUNction:CURRent[:DC]	FUNction:MODE	
	MODE:POWer[:DC] FUNction:POWer[:DC]	FUNction:MODE	
	MODE:RESistance[:DC] FUNction:RESistance[:DC]	FUNction:MODE	
	MODE?	FUNction:MODE?	
	MODE? FUNction?	FUNction:MODE?	

Subsystem PCYCLE			
	PCYCLE:CURRENT	n. a.	
	PCYCLE:RESISTANCE	n. a.	
	PCYCLE:TIME	n. a.	
	PCYCLE:MODE	n. a.	
	PCYCLE:MODE?	n. a.	
	PCYCLE:STATE	n. a.	
	PCYCLE:STATE?	n. a.	
Subsystem POWER			
	POWER[:LEVEL][:IMMEDIATE]	POWER[:LEVEL][:IMMEDIATE]	
	POWER[:LEVEL][:IMMEDIATE]?	POWER[:LEVEL][:IMMEDIATE]?	
	n. a.	POWER[:LEVEL]:TRIGGERED	
	n. a.	POWER[:LEVEL]:TRIGGERED?	
	n. a.	POWER:PEAK?	
	POWER:RANGE	n. a.	
	POWER:RANGE?	n. a.	
	POWER:RANGE:AUTO	n. a.	
Subsystem RESISTANCE			
	RESISTANCE[:LEVEL][:IMMEDIATE]	RESISTANCE[:LEVEL][:IMMEDIATE]	
	RESISTANCE[:LEVEL][:IMMEDIATE]?	RESISTANCE[:LEVEL][:IMMEDIATE]?	
	RESISTANCE[:LEVEL]:TRIGGERED	n. a.	
	RESISTANCE[:LEVEL]:TRIGGERED?	n. a.	
	RESISTANCE:MODE	n. a.	
	RESISTANCE:MODE?	n. a.	
	RESISTANCE:RANGE	n. a.	
	RESISTANCE:RANGE?	n. a.	
	RESISTANCE:RANGE:AUTO	n. a.	
Subsystem SERVICE			
	n. a.	SERVICE:CALIBRATION[:STATE]	
	n. a.	SERVICE:CALIBRATION[:STATE]?	
	n. a.	SERVICE:CALIBRATION:LEVEL:HIGH	
	n. a.	SERVICE:CALIBRATION:LEVEL:LOW	
	n. a.	SERVICE:CALIBRATION:MEASURE:HIGH	
	n. a.	SERVICE:CALIBRATION:MEASURE:LOW	
	n. a.	SERVICE:CALIBRATION:PROTECTION:HIGH	
	n. a.	SERVICE:CALIBRATION:PROTECTION:LOW	
	n. a.	SERVICE[:PARAMETER]:VALUE	
	n. a.	SERVICE[:PARAMETER]:VALUE?	
	n. a.	SERVICE[:PARAMETER]:STRING	
	n. a.	SERVICE[:PARAMETER]:STRING?	
	n. a.	SERVICE:PRODUCTION[:STATE]	
	n. a.	SERVICE:PRODUCTION[:STATE]?	
Subsystem SETTING			
	n. a.	SETTING:EXTERNAL:ENABLE	
	n. a.	SETTING:EXTERNAL:ENABLE?	
	n. a.	SETTING:EXTERNAL[:STATE]	
	n. a.	SETTING:EXTERNAL[:STATE]?	
Subsystem SETUP			
	SETUP:ADDRESS	n. a.	
	SETUP:DIGITS	n. a.	
	SETUP:SAVE	n. a.	
Subsystem STATUS			
	STATUS:OPERATION:CONDITION?	STATUS:OPERATION:CONDITION?	
	STATUS:OPERATION:ENABLE	STATUS:OPERATION:ENABLE	
	STATUS:OPERATION:ENABLE?	STATUS:OPERATION:ENABLE?	
	STATUS:OPERATION[:EVENT]?	STATUS:OPERATION[:EVENT]?	
	STATUS:PRESET	STATUS:PRESET	
	STATUS:QUESTIONABLE:CONDITION?	STATUS:QUESTIONABLE:CONDITION?	
	STATUS:QUESTIONABLE:ENABLE	STATUS:QUESTIONABLE:ENABLE	
	STATUS:QUESTIONABLE:ENABLE?	STATUS:QUESTIONABLE:ENABLE?	
	STATUS:QUESTIONABLE[:EVENT]?	STATUS:QUESTIONABLE[:EVENT]?	
Subsystem SYSTEM			
	n. a.	SYSTEM:COMMUNICATE:CAN:ADDRESS	
	n. a.	SYSTEM:COMMUNICATE:CAN:ADDRESS?	
	n. a.	SYSTEM:COMMUNICATE:CAN:BAUD	
	n. a.	SYSTEM:COMMUNICATE:CAN:BAUD?	
	n. a.	SYSTEM:COMMUNICATE:CAN:TERMINATION[:STATE]	
	n. a.	SYSTEM:COMMUNICATE:CAN:TERMINATION[:STATE]?	
	n. a.	SYSTEM:COMMUNICATE:GPIB:ADDRESS	
	n. a.	SYSTEM:COMMUNICATE:GPIB:ADDRESS?	
	n. a.	SYSTEM:COMMUNICATE:LAN:DHCP[:STATE]	
	n. a.	SYSTEM:COMMUNICATE:LAN:DHCP[:STATE]?	
	n. a.	SYSTEM:COMMUNICATE:LAN:DNS[:ADDRESS]	
	n. a.	SYSTEM:COMMUNICATE:LAN:DNS[:ADDRESS]?	
	n. a.	SYSTEM:COMMUNICATE:LAN:GATEWAY[:ADDRESS]	

	n. a.	SYSTem:COMMunicate:LAN:GATeway[:ADDRESS]?	
	n. a.	SYSTem:COMMunicate:LAN:HOSTname?	
	n. a.	SYSTem:COMMunicate:LAN:IP[:ADDRESS]	
	n. a.	SYSTem:COMMunicate:LAN:IP[:ADDRESS]?	
	n. a.	SYSTem:COMMunicate:LAN:MAC[:ADDRESS]?	
	n. a.	SYSTem:COMMunicate:LAN:PORT	
	n. a.	SYSTem:COMMunicate:LAN:PORT?	
	n. a.	SYSTem:COMMunicate:LAN:SUBNet[:MASK]	
	n. a.	SYSTem:COMMunicate:LAN:SUBNet[:MASK]?	
	n. a.	SYSTem:COMMunicate:SERial:BAUD	
	n. a.	SYSTem:COMMunicate:SERial:BAUD?	
	n. a.	SYSTem:COMMunicate:SERial:BITS?	
	n. a.	SYSTem:COMMunicate:SERial:PARity	
	n. a.	SYSTem:COMMunicate:SERial:PARity?	
	n. a.	SYSTem:COMMunicate:SERial:SBITs	
	n. a.	SYSTem:COMMunicate:SERial:SBITs?	
	n. a.	SYSTem:COMMunicate:VCP:BAUD	
	n. a.	SYSTem:COMMunicate:VCP:BAUD?	
	n. a.	SYSTem:COMMunicate:VCP:BITS?	
	n. a.	SYSTem:COMMunicate:VCP:PARity	
	n. a.	SYSTem:COMMunicate:VCP:PARity?	
	n. a.	SYSTem:COMMunicate:VCP:SBITs	
	n. a.	SYSTem:COMMunicate:VCP:SBITs?	
	n. a.	SYSTem:DATE	
	n. a.	SYSTem:DATE?	
	n. a.	SYSTem:ERRor:ALL?	
	n. a.	SYSTem:ERRor:COUNT?	
		SYSTem:ERRor?	SYSTem:ERRor[:NEXT]?
	n. a.		SYSTem:COOLing[:MODE]
	n. a.		SYSTem:COOLing[:MODE]?
	n. a.		SYSTem:HELP:HEADers?
	n. a.		SYSTem:KLOCK
	n. a.		SYSTem:KLOCK?
	n. a.		SYSTem:LOCal
	n. a.		SYSTem:PRESet
		SYSTem:PROTection[:LEVel]	INPut:WDOG:DELay
		SYSTem:PROTection[:LEVel]?	INPut:WDOG:DELay?
	n. a.		INPut:WDOG:RESet
		SYSTem:PROTection:STATe	INPut:WDOG[:STATe]
		SYSTem:PROTection:STATe?	INPut:WDOG[:STATe]?
		SYSTem:PROTection:TRIPped?	n. a.
	n. a.		SYSTem:REMote
	n. a.		SYSTem:TIME
	n. a.		SYSTem:TIME?
		SYSTem:VERSion?	SYSTem:VERSion?
Subsystem TRANsient			
		TRANsient:XCURrent	n. a.
		TRANsient:XCURrent?	n. a.
		TRANsient:YCURrent	n. a.
		TRANsient:YCURrent?	n. a.
		TRANsient:XTIME	n. a.
		TRANsient:XTIME?	n. a.
		TRANsient:YTIME	n. a.
		TRANsient:YTIME?	n. a.
		TRANsient:RTIME	n. a.
		TRANsient:RTIME?	n. a.
		TRANsient:FTIME	n. a.
		TRANsient:FTIME?	n. a.
		TRANsient:MODE	n. a.
		TRANsient:MODE?	n. a.
		TRANsient:STATe	n. a.
		TRANsient:STATe?	n. a.
Subsystem TRIGger			
		TRIGger[:SEQuence]:SOURce	n. a.
		TRIGger[:SEQuence]:SOURce?	n. a.
Subsystem VOLTage			
	n. a.	VOLTage[:LEVel][:IMMediate]	
	n. a.	VOLTage[:LEVel][:IMMediate]?	
	n. a.	VOLTage[:LEVel]:TRIGgered	
	n. a.	VOLTage[:LEVel]:TRIGgered?	
	n. a.	VOLTage:PROTection[:LEVel]	
	n. a.	VOLTage:PROTection[:LEVel]?	
		VOLTage:RANGe?	n. a.