

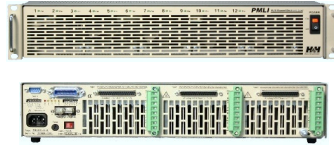
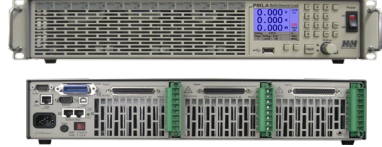
Multi-Channel Electronic Loads

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Use the user manuals to analyze the detailed differences between PMLI and PMLA series.

		
Manufacturer	H&H	H&H
Series	PMLI	PMLA
Continuous power max./device	1800 W	1800 W
Continuous power max./channel	600 W	600 W
Power classes	150 W, 300 W, 450 W, 600 W	150 W, 300 W, 450 W, 600 W
Voltage classes	40 V, 60 V, 120 V, 240 V	40 V, 60 V, 120 V, 240 V
No of different modules total	16	28
Op. modes	C, V, R, P	C, V, R, P
Min. input voltage Vmin for Imax	1.4 V	1 V
Input capacity	ca. 1 µF/150 W	ca. 1 µF/150 W
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	software control, accuracy depends on voltage and current measuring accuracy and current setting accuracy
		hardware control 0.1 % of setting 0.1 % of range
	Resolution	12 bits
Current setting		
	Accuracy	0.25 % of setting 0.15 % of range
		0.1 % of setting 0.1 % of range
	Resolution	12 bits
Resistance setting		
	Accuracy	software control, accuracy depends on voltage and current measuring accuracy and current setting accuracy
		software control 1.4 % of setting 0.3 % of current range
	Resolution	12 bits
Power setting		
	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
Protections		
Hardware protections and warnings	OPP, OTP	OCP, OPP, OTP, UV, RV, OV
Variable regulating protections	V, I	V, I
Measurement		
	Display	no
		4 digits
	ADC resolution	12 bits
		16 bits
Dynamic function		
Current rise and fall time (10 ... 90 % Imax)	300 µs	300 µs
Number of dynamic settings (PCYCLE)	2 currents with 2 dwell times	100 list points with ramp and dwell times (LIST)
Time resolution	2 ms	1 ms
Watchdog function	yes	yes
X/Y characteristic	no	no
Discharge function	no	yes
MPP tracking	no	no
Data acquisition to USB	no	no
Save/recall settings	no	10 memories
Trigger system	yes, only for setting values, trg source only bus	yes, for setting values and input state, trg source only bus
Group addressing	yes	yes
Name assignment for channels and groups	no	yes
Permissible potentials of load inputs I/O port	±100 V (DC or AC) to PE standard, not isolated	±100 V (DC or AC) to PE standard, not isolated

Analog control	0 ... 10 V	0 ... 10 V
Ext. setting control	0 ... 10V for 0 ... I _{max} ext. controlled current is added to internally programmed current of corresponding channel	0 ... 10V for 0 ... I _{max} 0 ... 10V for 0 ... V _{max}
Setting sampling rate, resolution	analog/real time	analog/real time
Protections control	no	no
Monitor signals	I, V	I, V
Monitor sampling rate	analog/real time	analog/real time
Sense	yes	yes
Digital control signals (inputs)	none	load on-off
Digital outputs	none	none
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 Master		
	USB standard	USB standard
	RS-232 standard	RS-232 standard
		CAN optional
		Ethernet standard
	GPIB standard	GPIB optional
SCPI syntax	yes	yes
LabVIEW drivers	yes, NI certified	yes, NI certified
Software tools	yes	yes
Firmware update	via RS-232 interface and flashing tool	via USB MSD (front)
User interface		
Display	no	Graphical User Interface
Keyboard	no	Silicon keypad incl. numeric keyboard
Rotary encoder	no	yes, with Enter function
Sense measurement	yes	yes
Master-Slave operation	no	analog
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 55011 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 twice for free	H&H calibration service twice for free

SCPI Commands PMLI vs. PMLA

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n. a. = not available

PMLI (discontinued)	PMLA	Remark
Common Commands		
*CLS	*CLS	
*ESE	*ESE	
*ESE?	*ESE?	
*ESR?	*ESR?	
*IDN?	*IDN?	
n. a.	*OPC	
n. a.	*OPC?	
n. a.	*OPT?	
n. a.	*RCL	
*RST	*RST	
n. a.	*SAV	
*SRE	*SRE	PMLI generates no service request, independent from the set register value.
*SRE?	*SRE?	
*STB?	*STB?	
*TRG	*TRG	PMLI's trigger system needs no initiation (INITiate) before being used.
n. a.	*TST?	
n. a.	*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 CHANnel		
n. a.	CHANnel:ADdResS	PMLI's channels address programming is done by SYSTem:PARAmeter command (parameter no. 1)
n. a.	CHANnel:ADdResS?	PMLI's address query is done by SYSTem:PARAmeter? query (parameter no. 1)
n. a.	CHANnel:CATalog?	
n. a.	CHANnel:COUnT?	
n. a.	CHANnel:FOCus	
n. a.	CHANnel:FOCus?	
n. a.	CHANnel:ID?	
CHANnel INSTRument	CHANnel[:SElect]	No simultaneous selection of all channels possible at PMLA. No simultaneous selection of channels within an address range possible at PMLA.
n. a.	CHANnel[:SElect]?	
CHANnel:GROup INSTRument:GROup	CHANnel:GROup	
n. a.	CHANnel:GROup:MEMBERS	
n. a.	CHANnel:GROup:NAME	
n. a.	CHANnel:NAME	
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?	
n. a.	CURRent:PROTection[:LEVel]	Overcurrent protection of PMLI is programmed by SYSTem:PARAmeter command (parameter no. 8).
n. a.	CURRent:PROTection[:LEVel]?	Overcurrent protection of PMLI is read by SYSTem:PARAmeter query (parameter no. 8).
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:DISChArge[:STATE]	
n. a.	FUNction:DISChArge:CHARge?	
n. a.	FUNction:DISChArge:ENERgy?	
n. a.	FUNction:DISChArge:STOP:CHARge	
n. a.	FUNction:DISChArge:STOP:CHARge?	
n. a.	FUNction:DISChArge:STOP:CURRent[:LEVel]	
n. a.	FUNction:DISChArge:STOP:CURRent[:LEVel]?	
n. a.	FUNction:DISChArge:STOP:ENERgy	
n. a.	FUNction:DISChArge:STOP:ENERgy?	
n. a.	FUNction:DISChArge:STOP:EVENT?	
n. a.	FUNction:DISChArge:STOP:TIME	
n. a.	FUNction:DISChArge:STOP:TIME?	
n. a.	FUNction:DISChArge:STOP:VOLTag[:LEVel]	
n. a.	FUNction:DISChArge:STOP:VOLTag[:LEVel]?	

n. a.	FUNCTION:DISCharge:TIME?	
Subsystem INPut		
INPut[:STATe]	INPut[:STATe]	
INPut[:STATe]?	INPut[:STATe]?	
n. a.	INPut[:STATe]:TRIGgered	
n. a.	INPut[:STATe]:TRIGgered?	
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:VOLTag[:LEVel]	
n. a.	LIST:VOLTag[:LEVel]?	
n. a.	LIST:VOLTag[:LEVel]:POInTs?	
Subsystem MEASure		
MEASure:CURRent[:DC]?	MEASure:CURRent?	
MEASure:POWer[:DC]?	MEASure:POWer?	
MEASure:RESistance[:DC]?	MEASure:RESistance?	
n. a.	MEASure:TEMPerature?	
MEASure:VOLTag[:DC]?	MEASure:VOLTag?	
Subsystem MODE		
MODE:CURRent	FUNCTION:MODE	
MODE:POWer	FUNCTION:MODE	
MODE:RESistance	FUNCTION:MODE	
MODE:VOLTag	FUNCTION:MODE	
MODE?	FUNCTION:MODE?	
Subsystem PCYClE		
PCYClE:CURRent	n. a.	
PCYClE:POWer	n. a.	
PCYClE:RESistance	n. a.	
PCYClE:VOLTag	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]?	
POWer[:LEVel]:TRIGgered	POWer[:LEVel]:TRIGgered	
POWer[:LEVel]:TRIGgered?	POWer[:LEVel]:TRIGgered?	
n. a.	POWer:PEAK?	
Subsystem RESistance		
RESistance[:LEVel][:IMMediate]	RESistance[:LEVel][:IMMediate]	
RESistance[:LEVel][:IMMediate]?	RESistance[:LEVel][:IMMediate]?	
RESistance[:LEVel]:TRIGgered	RESistance[:LEVel]:TRIGgered	
RESistance[:LEVel]:TRIGgered?	RESistance[:LEVel]:TRIGgered?	
Subsystem SERVICE		
n. a.	SERvice:CALibration[:STATe]	At PMLI series access to the parameters for adjustment is activated by SYSTem:PARAmeter command (parameter no. 0).
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:PRODUction[:STATe]	At PMLI series access to the production parameters is activated by SYSTem:PARAmeter command (parameter no. 0).
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 STATUS		
n. a.	STATus:CHANnel:OPERation:CONDition?	
n. a.	STATus:CHANnel:OPERation:ENABLE	
n. a.	STATus:CHANnel:OPERation:ENABLE?	
n. a.	STATus:CHANnel:OPERation[:EVENT]?	

n. a.	STATUS:CHANNEL:PRESet	
n. a.	STATUS:CHANNEL:QUESTionable:CONDition?	
n. a.	STATUS:CHANNEL:QUESTionable:ENABle	
n. a.	STATUS:CHANNEL:QUESTionable:ENABle?	
n. a.	STATUS:CHANNEL:QUESTionable[:EVENT]?	
STATUS:OPERation:CONDition?	STATUS:OPERation:CONDition?	
STATUS:OPERation:ENABle	n. a.	
STATUS:OPERation:ENABle?	n. a.	
STATUS:OPERation[:EVENT]?	STATUS:OPERation[:EVENT]?	
STATUS:PRESet	STATUS:PRESet	
STATUS:QUESTionable:CONDition?	STATUS:QUESTionable:CONDition?	
STATUS:QUESTionable:ENABle	n. a.	
STATUS:QUESTionable:ENABle?	n. a.	
STATUS:QUESTionable[:EVENT]?	STATUS:QUESTionable[:EVENT]?	
Subsystem SYSTEM		
n. a.	SYSTEM:COMMunicate:CAN:ADDRes	
n. a.	SYSTEM:COMMunicate:CAN:ADDRes?	
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:ADDRes	
n. a.	SYSTEM:COMMunicate:GPiB:ADDRes?	
n. a.	SYSTEM:COMMunicate:LAN:DHCP[:STATe]	
n. a.	SYSTEM:COMMunicate:LAN:DHCP[:STATe]?	
n. a.	SYSTEM:COMMunicate:LAN:DNS[:ADDRes]	
n. a.	SYSTEM:COMMunicate:LAN:DNS[:ADDRes]?	
n. a.	SYSTEM:COMMunicate:LAN:GATeway[:ADDRes]	
n. a.	SYSTEM:COMMunicate:LAN:GATeway[:ADDRes]?	
n. a.	SYSTEM:COMMunicate:LAN:HOSTName?	
n. a.	SYSTEM:COMMunicate:LAN:IP[:ADDRes]	
n. a.	SYSTEM:COMMunicate:LAN:IP[:ADDRes]?	
n. a.	SYSTEM:COMMunicate:LAN:MAC[:ADDRes]?	
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]?	
SYSTEM:FAN	SYSTEM:COOLing[:MODE]	
SYSTEM:FAN?	SYSTEM:COOLing[:MODE]?	
n. a.	SYSTEM:HELP:HEADers?	
n. a.	SYSTEM:KLOCK	
n. a.	SYSTEM:KLOCK?	
n. a.	SYSTEM:LOCAL	
SYSTEM:PARAmeter	SERvice[:PARAmeter]:VALue	
SYSTEM:PARAmeter?	SERvice[:PARAmeter]:VALue?	
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:SPEEd	FUNCTion:SPEEd	
SYSTEM:SPEEd?	FUNCTion:SPEEd?	
SYSTEM:STRing	SERvice[:PARAmeter]:STRing	
SYSTEM:STRing?	SERvice[:PARAmeter]:STRing?	
SYSTEM:VERsion?	SYSTEM:VERsion?	
Subsystem TRIGger		
n. a.	INITiate[:IMMediate]	
n. a.	INITiate:CONTinuous	
n. a.	INITiate:CONTinuous?	
Subsystem VOLTage		
VOLTage[:LEVel][:IMMediate]	VOLTage[:LEVel][:IMMediate]	
VOLTage[:LEVel][:IMMediate]?	VOLTage[:LEVel][:IMMediate]?	
VOLTage[:LEVel]:TRIGgered	VOLTage[:LEVel]:TRIGgered	
VOLTage[:LEVel]:TRIGgered?	VOLTage[:LEVel]:TRIGgered?	
n. a.	VOLTage:PROTection[:LEVel]	At PMLI series the undervoltage protection is set by SYSTEM:PARAmeter command (parameter no. 9).
n. a.	VOLTage:PROTection[:LEVel]?	At PMLI series the undervoltage protection value is read by SYSTEM:PARAmeter? query (parameter no. 9).