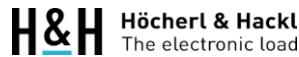




Electronic AC Loads ZSAC vs. ACL

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



Rev. 2

This document shows functional and SCPI command differences between ZSAC and ACL electronic AC loads. Refer to user manuals for detailed analysis.

		
Manufacturer	H&H	H&H
Series	ZSAC	ACL
Frequency range	DC, 50 ... 800 Hz	DC, 40 ... 1000 Hz
Single-phase/3-phase	only single-phase loads	single-phase (ACLS) and 3-phase (ACLT) loads
Synchronization in AC mode	Input, line	Input, line, extern
User interface	7-segment displays, buttons, potentiometers	4.3" touchscreen, input button, rotary setting encoder
Operation by mouse	n.a.	yes
Continuous power max.	21,000 W	21,000 W with ACLS 8,400 W per phase with ACLT
Voltage classes	260 VAC, 440 VAC 370 VDC, 620 VDC	280 VAC, 500 VAC 400 VDC, 700 VDC
Current ranges	1	1
Basic operating modes	CC, CR	CC, CV, CR, CP
Combined operating modes	n.a.	CR+CC, CP+CC, CV+CC by overcurrent protection
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	n.a.	DC: ±0.5 % of setting ±0.1 % of range AC: ±1 % of setting ±0.2 % of range
Current setting		
Accuracy	DC, 50 Hz: ±0.5 % of setting ±0.3 % of range 400 Hz: ±1 % of setting ±0.6 % of range	DC: ±0.2 % of setting ±0.15 % of range 40 ... 400 Hz: ±0.5 % of setting ±0.3 % of range > 400 Hz: ±0.75 % of setting ±0.5 % of range
Resolution	16 bits	14 bits
Total harmonic distortion	DC, 50 Hz: 1 % at maximum current 400 Hz: 5 % at maximum current	40 ... 400 Hz: <1 % at 10 ... 100 % of current range > 400 Hz: <2 % at 10 ... 100 % of current range
Resistance setting (local)		
Accuracy	DC, 50 Hz: ±1.9 % of setting ±0.5 % of current range 400 Hz: ±3.4 % of setting ±1 % of current range	at 5 ... 100 % Vmax: DC, 40 ... 400 Hz: ±1.5 % of setting ±0.3 % of current range > 400 Hz: ±3.5 % of setting ±0.5 % of current range
Resistance setting (remote)		
Accuracy	DC, 50 Hz: ±1.5 % of setting ±0.5 % of current range 400 Hz: ±3 % of setting ±1 % of current range	at 5 ... 100 % Vmax: DC, 40 ... 400 Hz: ±1.5 % of setting ±0.3 % of current range > 400 Hz: ±3.5 % of setting ±0.5 % of current range
Resolution	16 bits	14 bits
Power setting (local and remote)		
Accuracy	n.a.	V and I > 30 % of range: DC, 40 ... 400 Hz: ±1 % of setting ±0.25 % of range > 400 Hz: ±1.5 % of setting ±0.3 % of range V or I < 30 % of range: DC, 40 ... 400 Hz: ±3 % of setting ±0.5 % of range > 400 Hz: ±5 % of setting ±1.5 % of range
Protections		
Hardware protections and warnings	OCP, OPP, OTP protection OV, UV warning	OCP, OPP, OTP protection OV, UV warning
Variable undervoltage protection	n.a.	n.a.
Variable overcurrent protection	n.a.	yes, up to 4 x Imax due to crest factor
Waveforms		
Sine with crest factor	CF 1 ... 10	CF 1 ... 4
Peak current	Imax · √2	Imax · 4
Sine with harmonics	Harmonics up to 15th order, only odd	Harmonics up to 25th order, even and odd
Arbitrary waveform	512 points	360 points
Phase cut	0 ... 180° for positive half wave 0 ... 180° for negative half wave	0 ... 180° similar for both half waves
Phase shift	-90 ... 90°, in combination with crest factor or phase cut	0 ... 180°, in combination with crest factor or phase cut
Automatic amplitude correction	n.a.	yes, with crest factor and harmonics
Local measurement/display		
Display	4 digits LED voltage 4 digits LED current	graphical user interface, enhanced menu navigation
Voltage measurement accuracy	DC, 50 Hz: ±0.3 % of meas. ±0.1 % of range ±1 digit 400 Hz: ±0.6 % of meas. ±0.2 % of range ±1 digit	DC: ±0.2 % of meas. ±0.05 % of range ±1 digit AC: ±0.3 % of meas. ±0.1 % of range ±1 digit 14 bits
Current measurement accuracy	DC, 50 Hz: ±0.5 % of meas. ±0.3 % of range ±1 digit 400 Hz: ±1 % of meas. ±0.6 % of range ±1 digit	DC: ±0.2 % of meas. ±0.1 % of range ±1 digit AC: ±0.5 % of meas. ±0.3 % of range ±1 digit 14 bits
Resistance measurement accuracy	n.a.	calculated of voltage and current measurement
Power measurement accuracy	n.a.	calculated of voltage and current measurement
Remote measurement via data interface		

Voltage measurement accuracy	DC, 50 Hz: $\pm 0.5\%$ of meas. $\pm 0.5\%$ of range 400 Hz: $\pm 1\%$ of meas. $\pm 0.1\%$ of range 18 bits	DC: $\pm 0.2\%$ of meas. $\pm 0.05\%$ of range AC: $\pm 0.3\%$ of meas. $\pm 0.1\%$ of range 14 bits
Current measurement accuracy	DC, 50 Hz: $\pm 0.5\%$ of meas. $\pm 0.05\%$ of range 400 Hz: $\pm 1\%$ of meas. $\pm 0.1\%$ of range 18 bits	DC: $\pm 0.2\%$ of meas. $\pm 0.1\%$ of range AC: $\pm 0.5\%$ of meas. $\pm 0.3\%$ of range 14 bits
Resistance measurement accuracy	n.a.	calculated of voltage and current measurement
Power measurement accuracy	n.a.	calculated of voltage and current measurement
Dynamic function (LIST)		
Number of dynamic settings	50 list points with corresponding ramp and dwell times (LIST)	300 list points with corresponding ramp and dwell times (LIST)
Time resolution	200 μ s	200 μ s
Number of measurement points	n.a.	40,000
Number of iterations	1 ... 65535, infinite	1 ... 999,999, infinite
Maximum dwell and ramp time	2,000 s	1,000 s
Maximum sample time	n.a.	1,000 s
Voltage measurement accuracy	n.a.	DC: $\pm 0.2\%$ of meas. $\pm 0.05\%$ of range AC: $\pm 0.3\%$ of meas. $\pm 0.1\%$ of range 14 bits
Current measurement accuracy	n.a.	DC: $\pm 0.2\%$ of meas. $\pm 0.1\%$ of range AC: $\pm 0.5\%$ of meas. $\pm 0.3\%$ of range 14 bits
Rectangle function	by LIST function	by LIST by Rectangle function with amplitude and offset (in local operation only)
Watchdog function	yes, WD reset by any valid data interface command	yes, WD reset periodically by control software
Save/recall settings	n.a.	9 memories + 1 for power-off settings
Data logging to USB MSD	n.a.	yes, sample rate 0.5 ... 30 s with 0.1 s resolution
Trigger system	yes (sources: extern, bus)	yes (sources: extern, bus)
Triggered input	n.a.	yes
Triggered levels	yes	yes
Triggered LIST	yes	yes
Triggered DAQ	n.a.	yes
Keylock function	n.a.	yes
Preset function (factory settings)	n.a.	yes
Save and recall device settings	n.a.	yes, 10 setting memories (1 for last power-off)
User-defined power-on settings	n.a.	yes, 10 setting memories
Measurement values (numeric)	Vrms, Irms	Vrms, Irms, R, P, S, Q, f, CF, PF, T
Characteristics display	n.a.	V(t), I(t), P(t) diagram
Waveform display	n.a.	V and I in one diagram
Help system	n.a.	yes, German or English selectable
Screenshot function	n.a.	yes
Manual on board	n.a.	yes, with update and download function via USB
I/O port		
Analog control	0 ... 5 V or 0 ... 10 V	0 ... 5 V or 0 ... 10 V
Analog control sampling rate	analog/real time	analog/real time
Ext. setting control	0 ... I _{max}	0 ... I _{max}
Monitor signals	I, V, P	I, V
Monitor sampling rate	analog/real time	analog/real time
Digital control signals (inputs)	load input on-off emergency off (remote shut-down) control input for ext. control activation trigger input waveform selection setting A-B	load input on-off remote shut-down control input for ext. control activation trigger input input mode (AC, DC) synchronization source (input, line, extern) synchronization input
Digital outputs	input status status overload trigger output during dynamic operation (setting A-B)	status overload load input activation state trigger output programmable logic output
Digital outputs' voltage levels	5 V / 24 V (selectable)	5 V / 24 V (selectable)
I/O port: Permissible voltages		
GND - Input LO	max. 500 V (DC or AC)	max. 600 V AC / 800 V DC
GND - PE	max. 125 V (DC or AC)	max. 100 V AC / 100 V DC
Permissible potentials of Input		
Input LO - PE	max. 300 V (DC or AC)	max. 500 V AC / 700 V DC
Input HI - PE	max. 300 V (DC or AC)	max. 500 V AC / 700 V DC
Input terminals	touch-protected sunk binding post SBUS4-32 or SBUS6-125	SBUS4-32 or Phoenix PH2/7.62-BU16, one per phase
Sense terminals	touch-protected sunk binding post SBUS4-32	Phoenix PH2/7.62-BU16, one per phase
Data interfaces		
USB	optional	standard
RS-232	optional	standard
CAN	n.a.	standard
Ethernet	optional	standard
GPiB	optional	optional
SCPI syntax	yes	yes
LabVIEW drivers	yes, NI certified	under construction
Software tools	yes	under construction
Firmware update	by flashing tool via RS-232	via USB MSD (front)
Analog Master-Slave operation	yes	yes
Master-Slave operation in system connection	n.a.	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 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
Front panel color	RAL 7032	RAL 7035
Calibration	Free H&H calibration service for new device, another free calibration within warranty period	Free H&H calibration service for new device, another free calibration within warranty period

SCPI Commands ZSAC vs. ACL

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- For identical commands/queries, the following notes must be considered:
- The setting values after resetting the system may differ.
 - The actual, numeric settings when passing parameters MIN or MAX may differ.
 - The format of transferred parameters can differ.
 - The format of returned values and strings may differ.
 - The assignment of status registers can differ.
 - The control behavior with regard to speed and accuracy may differ.
 - The scope of commands can differ.

Use the user manuals to analyze the detailed differences between the ZSAC and ACL series commands/queries.
n. a. = not available

	ZSAC	ACL	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	ZSAC loads do not produce SRQ, independent from the set register value.
	*SRE?	*SRE?	
	*STB?	*STB?	
	*TRG	*TRG	
	*TST?	*TST?	
	*WAI	*WAI	
Device-dependent Commands			
Subsystem ACQuisition			
	n. a.	ACQuisition[:STATe]	
	n. a.	ACQuisition[:STATe]?	
	n. a.	ACQuisition[:STATe]:TRIGgered	
	n. a.	ACQuisition[:STATe]:TRIGgered?	
	n. a.	ACQuisition:STIMe	
	n. a.	ACQuisition:STIMe?	
Subsystem CHANnel			
	n. a.	CHANnel:CATalog?	
	n. a.	CHANnel:COUNT?	
	n. a.	CHANnel:COUPle	
	n. a.	CHANnel:COUPle?	
	n. a.	CHANnel:ID?	
	CHANnel INSTRument	CHANnel[:SElect]	
	n. a.	CHANnel[:SElect]?	
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.	
	n. a.	CURRent:PROTection[:LEVel]	
	n. a.	CURRent:PROTection[:LEVel]?	
	CURRent:RANGe?	n. a.	
Subsystem DATA			
	n. a.	DATA:DELeTe	
	DATA:POINts?	DATA:POINts?	
	TRACe:POINts?		
	DATA:REMove?	DATA:REMove?	
	TRACe:REMove?		
Subsystem DELay			
	DELay	n. a.	
Subsystem FORMat			
	n. a.	FORMat[:DATA]	
	n. a.	FORMat[:DATA]?	
	n. a.	FORMat:SREGister	
	n. a.	FORMat:SREGister?	
Subsystem GTL			
	GTL	SYSTem:LOCal	
Subsystem INPut			
	INPut[:STATe]	INPut[:STATe]	
	OUTPut[:STATe]		
	INPut[:STATe]?	INPut[:STATe]?	
	OUTPut[:STATe]?		
	n. a.	INPut[:STATe]:TRIGgered	
	n. a.	INPut[:STATe]:TRIGgered?	
	n. a.	INPut:MODE?	
Subsystem LIST			
	n. a.	LIST:ACQuisition[:ENABle]	
	n. a.	LIST:ACQuisition[:ENABle]?	
	LIST:COUNT	LIST:COUNT	
	n. a.	LIST:COUNT?	
	LIST:CURRent[:LEVel]	LIST:CURRent[:LEVel]	

	n. a.	LIST:CURRent[:LEVel]?	
	n. a.	LIST:CURRent[:LEVel]:POINts?	
		LIST:CURRent:RTIME	LIST:RTIME
		LIST:CURRent:DWELl	LIST:DWELl
		LIST:CURRent:STRamp	LIST:STIME:RTIME
		LIST:CURRent:STDWell	LIST:STIME: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:RTIME	
	n. a.	LIST:DWELl	
	n. a.	LIST:STIME:RTIME	
	n. a.	LIST:STIME:DWELl	
		LIST:RESistance[:LEVel]	LIST:RESistance[:LEVel]
	n. a.	LIST:RESistance[:LEVel]?	
	n. a.	LIST:RESistance[:LEVel]:POINts?	
		LIST:RESistance:RTIME	LIST:RTIME
		LIST:RESistance:DWELl	LIST:DWELl
		LIST:RESistance:STRamp	LIST:STIME:RTIME
		LIST:RESistance:STDWell	LIST:STIME:DWELl
	n. a.	LIST:RTIME?	
	n. a.	LIST:RTIME:POINts?	
		LIST:STATe	LIST[:STATe]
		LIST:STATe?	LIST[:STATe]?
	n. a.	LIST[:STATe]:TRIGgered	
	n. a.	LIST[:STATe]:TRIGgered?	
	n. a.	LIST:STIME:DWELl?	
	n. a.	LIST:STIME:DWELl:POINts?	
	n. a.	LIST:STIME:RTIME?	
	n. a.	LIST:STIME:RTIME:POINts?	
	n. a.	LIST:VOLTag[:LEVel]	
	n. a.	LIST:VOLTag[:LEVel]?	
	n. a.	LIST:VOLTag[:LEVel]:POINts?	
	n. a.	LIST:RTIME	
	n. a.	LIST:DWELl	
	n. a.	LIST:STIME:RTIME	
	n. a.	LIST:STIME:DWELl	
Subsystem MEASure			
	MEASure:CURRent[:DC]?	MEASure:CURRent?	
	n. a.	MEASure:CURRent:CFActor?	
	MEASure:EXTErnal[:DC]?	n. a.	
	n. a.	MEASure:FREQuency?	
	MEASure:POWer[:DC]?	MEASure:POWer?	
	n. a.	MEASure:POWer[:ACTive]?	
	n. a.	MEASure:POWer:APParent?	
	n. a.	MEASure:POWer:PFACtor?	
	n. a.	MEASure:POWer:REAActive?	
	MEASure:RESistance[:DC]?	MEASure:RESistance?	
	n. a.	MEASure:TEMPerature?	
	MEASure:VOLTag[:DC]?	MEASure:VOLTag?	
	n. a.	MEASure:VOLTag:CFActor?	
Subsystem MODE			
	MODE:CURRent[:DC] FUNction:CURRent[:DC]	FUNction:MODE	
	MODE:RESistance[:DC] FUNction:RESistance[:DC]	FUNction:MODE	
	MODE?	FUNction:MODE?	
	n. a.	FUNction:MODE:TRIGgered	
	n. a.	FUNction:MODE:TRIGgered?	
Subsystem PORT			
	n. a.	PORT:IO:MSIGnal	
	n. a.	PORT:IO:MSIGnal?	
	n. a.	PORT:IO:OPIN	
	n. a.	PORT:IO:OPIN?	
Subsystem POWer			
	n. a.	POWer[:LEVel][:IMMediate]	
	n. a.	POWer[:LEVel][:IMMediate]?	
	n. a.	POWer[:LEVel]:TRIGgered	
	n. a.	POWer[:LEVel]:TRIGgered?	
Subsystem PROGram			
	PROGram[:SELected]:BEGin	n. a.	
	PROGram[:SELected]:DELete[:SELected]	n. a.	
	PROGram[:SELected]:DELete:ALL	n. a.	
	PROGram[:SELected]:END	n. a.	
	PROGram[:SELected]:NAME	n. a.	
	PROGram[:SELected]:STATe	n. a.	
	PROGram[:SELected]:STATe?	n. a.	
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?	
	RESistance:MODE	n. a.	
	RESistance:MODE?	n. a.	
	RESistance:RANGe?	n. a.	
Subsystem SETup			
	SETup?	n. a.	
Subsystem SFUNction			

	SFUNction:BATTeRY:ENABle	n. a.	
	SFUNction:BATTeRY:ENABle?	n. a.	
	SFUNction:BATTeRY:STATe?	n. a.	
	SFUNction:BATTeRY:TEVOLTage	n. a.	
	SFUNction:BATTeRY:TEVOLTage?	n. a.	
	SFUNction:AC:CRESt	WAVeform:SINE:CFACtor	
	n. a.	WAVeform:SINE:CFACtor?	
	SFUNction:AC:FSYNthesis	WAVeform:HARMonics[AMPLitude]	
	n. a.	WAVeform:HARMonics[AMPLitude]?	
	SFUNction:AC:PHControl	WAVeform:PCUT	
	n. a.	WAVeform:PCUT?	
	SFUNction:AC:PHShift	WAVeform:PSHift	
	n. a.	WAVeform:PSHift?	
	SFUNction:AC:WAVEform	WAVeform:ARBitrary[LEVel]	
	n. a.	WAVeform:ARBitrary[LEVel]?	
	n. a.	WAVeform:DATA?	
	n. a.	WAVeform:DATA:POINts?	
	n. a.	WAVeform:SYNChronize?	
	n. a.	WAVeform:TYPE	
	n. a.	WAVeform:TYPE?	
	SFUNction:AC:WAVEform:RECall	*RCL	
	SFUNction:AC:WAVEform:SAVE	*SAV	
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[MASt]	
	n. a.	SYSTem:COMMunicate:LAN:SUBNet[MASt]?	
	n. a.	SYSTem:COMMunicate:SERial:BAUD	
	n. a.	SYSTem:COMMunicate:SERial:BAUD?	
	n. a.	SYSTem:COMMunicate:SERial:BITs?	
	SYSTem:COMMunicate:SERial:CONTRol:RTS	n. a.	
	SYSTem:COMMunicate:SERial[RECeive]:PACE	n. a.	
	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.	SETTing:EXTernal:ENABle	
	n. a.	SETTing:EXTernal:ENABle?	
	SYSTem:CONTRol	SETTing:EXTernal[STATe]	
	SYSTem:CONTRol?	SETTing:EXTernal[STATe]?	
	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	n. a.	
	SYSTem:FUNCTion	INPut:MODE	
	n. a.	SYSTem:HELp:HEADers?	
	n. a.	SYSTem:KLOCK	
	n. a.	SYSTem:KLOCK?	
	SYSTem:LANGuage	n. a.	
	SYSTem:LANGuage?	n. a.	
	SYSTem:PARAmeter	SERVice:VALue	
	SYSTem:PARAmeter?	SERVice: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]	
	n. a.	INPut:WDOG[STATe]?	

	SYSTem:PROTectiOn:TRIPped?	n.v.	
	n. a.	SYSTem:REMOte	
	SYSTem:STRing	SERvice:STRing	
	n. a.	SERvice:STRing?	
	n. a.	SYSTem:TIME	
	n. a.	SYSTem:TIME?	
	SYSTem:VERSion?	SYSTem:VERSion?	
Subsystem TRIGger			
	n. a.	ABORT	
	n. a.	INITiate[:IMMediate]	
	n. a.	INITiate:CONTinuous	
	n. a.	INITiate:CONTinuous?	
	n. a.	TRIGger:IMMediate]	
	n. a.	TRIGger:DELay	
	n. a.	TRIGger:DELay?	
	n. a.	TRIGger:HOLDoff	
	n. a.	TRIGger:HOLDoff?	
	n. a.	TRIGger:SLOPe	
	n. a.	TRIGger:SLOPe?	
	TRIGger[:SEquence]:SOURce	TRIGger:SOURce	
	TRIGger[:SEquence]:SOURce?	TRIGger:SOURce?	
	TRIGger[:SEquence]:TIMER	n. a.	
	TRIGger[:SEquence]:TIMER?	n. a.	
Subsystem VOLTage			
	n. a.	VOLTage[:LEVel][:IMMediate]	
	n. a.	VOLTage[:LEVel][:IMMediate]?	
	n. a.	VOLTage[:LEVel]:TRIGgered	
	n. a.	VOLTage[:LEVel]:TRIGgered?	