Programming Manual

8500B Series

Programmable DC Electronic Loads

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Common Commands

This chapter describes IEEE-488 common commands provided by the B&K 8500B series electronic load.

1.1 *CLS - Clear Status

This command clears the registers:
_ Standard Event Register
_ Operation Event Register
_ Questionable Event Register
_ Error Queue
Command syntax
*CLS

Parameters None

1.2 *ESE <NRf> - Event Enable

This command programs the Standard Event Status Enable register bits. The programming determines which events of the Standard Event Status Event register (see *ESR?) are allowed to set the ESB (Event Summary Bit) of the Status Byte register. A "1" in the bit position enables the corresponding event. All of the enabled events of the Standard Event Status Event Register are logically ORed to cause the Event Summary Bit (ESB) of the Status Byte Register to be set. See chapter “Programming the Status Registers” for descriptions of the Standard Event Status registers.
The query reads the Standard Event Status Enable register.

Command Syntax *ESE <NRf>

Parameters 0 to 255

Powe-on Value
see *PSC

Example *ESE 129

Query Syntax *ESE?

Query Response <NR1> - 0 to 255

Related Commands *ESR? *PSC *STB?

1.3 *ESR?

This query reads the Standard Event Status Event register. Reading the register clears it. The bit configuration of this register is the same as the Standard Event Status Enable register (see *ESE). See chapter "Programming the Status Registers" for a detailed explanation of this register.

Query Syntax *ESR?

Parameters None

Query Response <NR1> (register value)

Related Commands *CLS *ESE *ESE? *OPC

1.4 *IDN?

This query requests the electronic load to identify itself. It returns the data in four fields separated by commos.

Query Syntax *IDN?

Parameters None

Query Response B&K Precision, BK8510B, 803326011737720001, 1.45
n

1.5 *OPC

This command causes the interface to set the OPC bit (bit 0) of the Standard Event Status register when the electronic load has completed all pending operations. (See *ESE for the bit configuration of the Standard Event Status registers.) Pending operations are complete when:

- All commands sent before *OPC have been executed. This includes overlapped commands. Most commands are sequential and are completed before the next command is executed. Overlapped commands are executed in parallel with other commands. Commands that affect trigger actions are overlapped with subsequent commands sent to the electronic load. The *OPC commandprovides notification that all overlapped commands have been completed.
- All triggered actions are completed and the trigger system returns to the Idle state.

*OPC does not prevent processing of subsequent commands but Bit 0 will not be set until all pending operations are completed. The query causes the interface to place an ASCII "1" in the Output Queue when all pending operations are completed.

Command Syntax *OPC

Parameters None

Query Syntax *OPC?

Query Response <NR1>

Related Commands *TRIG *WAI

1.6 *PSC

This command is used to control whether the electronic load will generate a service request when power on again.
1 OR ON: When the load power on, status byte enable register, operater event enable register, query event enable register and standard event enable register will be cleared.

0 OR OFF: The value of status byte enable register, operater event enable register, query event enable register and standard event enable register will be stored in the none-volatile storage, which will be recalled when power on.

Command Syntax *PSC <bool>

Parameters 0- 1- ON- OFF

Query Syntax *PSC?

Query Response 0- 1

1.7 *RCL

This command restores the electronic load to a state that was previously stored in memory with a *SAV command to the specified location. All states are recalled with the following exceptions:
CAL:STATe is set to OFF
The trigger system is set to the Idle state by an implied ABORt command (this cancels any uncompleted trigger actions)
NOTE: The device state stored in location 0 is automatically recalled at power turn-on.

Command Syntax *RCL <NRf>

Parameters 0 to 9

Example *RCL 3

Related Commands *PSC *RST *SAV

1.8 *RST

This command reset the electronic load to the factory-defined states.

Command Syntax *RST

Parameters None

1.9 *SAV

This command stores the present state of the electronic load to a specified location in memory. Up to 100 states can be stored. If a particular state is desired at power-on, it should be stored in location 0. It then will be recalled at power-on if the power-on state is set to RCL0. Use *RCL to retrieve instrument states.

Command Syntax *SAV <NRf>

Parameters 0 - 99

Example *SAV 3

Related Commands *PSC *RST *RCL

1.10 *SRE

This command sets the condition of the Service Request Enable Register. This register determines which bits from the Status Byte Register (see *STB for its bit configuration) are allowed to set the Master Status Summary (MSS) bit and the Request for Service (RQS) summary bit. A 1 in any Service Request Enable Register bit position enables the corresponding Status Byte Register bit and all such enabled bits then are logically ORed to cause Bit 6 of the Status Byte Register to be set.

When the controller conducts a serial poll in response to SRQ, the RQS bit is cleared, but the MSS bit is not. When *SRE is cleared (by programming it with 0), the electronic load cannot generate an SRQ to the controller. The query returns the current state of *SRE.

Command Syntax *SRE <NRf>

Parameters 0 to 255

Default Value see *PSC

Example *SRE 128

Query Syntax *SRE?

Query Response <NR1> (register binary value) 0-255

Related Commands *ESE *ESR *PSC

1.11 *STB?

This query reads the Status Byte register, which contains the status summary bits and the Output Queue MAV bit. Reading the Status Byte register does not clear it. The input summary bits are cleared when the appropriate event registers are read (see chapter "Programming the Status Registers" for more information). A serial poll also returns the value of the Status Byte register, except that bit 6 returns Request for Service (RQS) instead of Master Status Summary (MSS). A serial poll clears RQS, but not MSS. When MSS is set, it indicates that the electronic load has one or more reasons for requesting service.

Query Syntax *STB?

Parameters None

Query Response <NR1> (register value)

Related Commands *SRE *ESR *ESE

1.12 *TST?

This command causes the electronic load to do a self-test and report any error.

Command Syntax TST?

Parameters None

Query Response <NR1> 0 indicates the electronic load has passed selftest. Non-zero indicates an error code(see appendix C)

SCPI Status Register

SCPI protocol supports the following four groups of status registers:

- Questionable
- Event
- Operation
- Status Byte

2.1 Questionable Status Register Group

Questionable status register group includes three 16-bit registers: status register, event register and enable register. When the corresponding status register bit is changed, the corresponding bit in the event register is set. If the corresponding bit in the enable register bit is set, it will be generated once Event (status byte register QUES is set). After executing an event register read operation, the event register will be automatically cleared. The status register is defined as follows:

Bit	Signal	Description
Bit0	VF	Either an over-voltage or a reverse voltage has occurred This bit reflects the active state of the FLT pin on the back of the unit. The bit remains set until the condition is removed and PROT:CLE is programmed.
Bit1	OC	An over-current condition has occurred.
Bit3	OP	An overpower condition has occurred.
Bit4	OT	An over-temperature condition has occurred.
Bit8	SV	Remote measurement terminal is not connected.
Bit11	UNR	The input is unregulated, when the input is regulated the bit is cleared.
Bit13	OV	An over voltage condition has occurred. Both this bit and VF bit0 are set and the loads are turned off. Both bits remain set until the condition is removed and PROT:CLE is programmed.

2.2 Standard Event Status Register Group

The standard event register group consists of two 16-bit registers: the event register and the enable register. When an event occurs, and if the corresponding bit in the enable register is set, an event occurs (the ESB in the Status Byte register is set). After executing an event register read operation, the event register will be automatically cleared. The event register is defined as follows:

Bit	Signal	Description
Bit0	OPC	The load has completed all pending operations. *OPC must be programmed for this bit to be set when pending operations are complete.
Bit2	QYE	The output queue was read with no data present or the data was lost. Errors in the range of 499 through 400 can set this bit.
Bit3	DDE	Device-Dependent Error. Memory was lost or self test failed. Errors in the range of 399 through 300 can set this bit.
Bit4	EXE	A command parameter was outside its legal range, inconsistent with the load's operation, or prevented from executing because of an operating condition. Errors in the range of 299 through 200 can set this bit.
Bit5	CME	A syntax or semantic error has occurred or the load received a <get> within a program message. Errors in the range of 199 through 100 can set this bit.
Bit7	PON	The unit has been turned off and then on since this bit was last read.

2.3 Operation Status Register Group

The operational status register group consists of three 16-bit registers: status register, event register, and enable register. When the status register corresponding bit is changed, the corresponding event register bit will be set. If the corresponding bit in the enable register bit is set, it will be generated once Event (status byte register OPER is set). After executing an event register read operation, the event register will be automatically cleared. The status register is defined as follows:

Bit	Signal	Description
Bit0	CAL	The electronic load is calculated a new calibration constant.
Bit5	WTG	The electronic load is waiting for a trigger.

2.4 Status Byte Register Group

The status byte register group consists of two 8-bit registers: event register and enable register. If the corresponding bit in the enable register bit is set, it will be generated once Event (status byte register RQS is set). The status byte register will be automatically cleared when an event register read is executed. The status register is defined as follows:

Bit	Signal	Description
Bit3	QUES	Indicates if an enabled questionable event has occurred.
Bit4	MAV	Indicates if the Output Queue contains data.
Bit5	ESB	Indicates if an enabled standard event has occurred.
Bit6	RQS	During a serial poll, RQS is returned and cleared.
Bit7	OPER	Indicates if an operation event has occurred.

Status Commands

Those commands configure the status registers of the electronic load.

3.1 SSTATus:QUEStionable[:EVENt]?

This query returns the value of event register. Event register is read only register, it keeps all events sent to it. Read the quest event register will clear it.

Query Syntax STATus:QUEStionable[:EVENt]?

Parameters None

Example STAT:QUES:EVEN?

Query Response <NR1>

Related Commands *CLS

3.2 STATus:QUEStionable:CONDition?

This command can read the parameter from quest condition register. It is a read only register, keep the real-time(not locked) query status of the load.

Query Syntax STATus:QUEStionable:CONDition?

Parameters None

Example STAT:QUES:COND?

Returned

Parameters <NR1>

Related Commands STAT:OPER:COND?

3.3 STATus:QUEStionable:ENABle <NRf+>

This command is used to set the value of the enable register.

Command Syntax STATus:QUEStionable:ENABle <NRf+>

Parameters 0 to 32767

Example STAT:QUES:ENAB 32

Query Syntax STATus:QUEStionable:ENABle?

Query Response <NR1>

3.4 STATus:OPERation[:EVENt]?

This command query the query operation event register values. The event register is read-only register, which holds (latches) all value passed by the NTR and, or PTR filter. Read channel operation event register will clear it.

Query Syntax STATus:OPERation[:EVENt]?

Parameters None

Example STAT:OPER:EVEN?

Query Response <NR1>

Related Commands ***CLS**

3.5 STATus:OPERation:CONDition?

This query returns the value of operation condition register. That is a read-only register that holds the real-time (unlatched) operational status of the electronic load.

Query Syntax STATus:OPERation:CONDition?

Parameters None

Example STAT:OPER:COND?

Query Response <NR1>

Related Commands STAT:QUES:COND?

3.6 STATus:OPERation:ENABle <NRf+>

The command is used to set the value of operations enable register. This register is a mask for enabling specific bits from the Operation Event register to set the operation summary bit (OPER) of the Status Byte register. The operation summary bit is the logical OR of all enabled Operation Event register bits.

Command Syntax STATus:OPERation:ENABle <NRf+>

Parameters 0 to 65535

Default Value 0

Example STAT:OPER:ENAB 32

Query Syntax STATus:OPERation:ENABle?

Query Response <NR1>

Related Commands STAT:OPER?

Default Value 0

Measure Commands

This signal measure command is used to get the read back value. You can use this command to control the measurement process.

4.1 MEASure[:SCALar]:VOLTage[:DC]?

This command is used to query the average voltage of the electronic load.

Command Syntax MEASure[:SCALar]:VOLTage[:DC]?

Parameters None

Example MEAS:VOLT?

Query Response <NR2>

4.2 MEASure[:SCALar]:VOLTage:MAXimum?

This command is used to query the peak voltage of the electronic load.

Command Syntax MEASure[:SCALar]:VOLTage:MAXimum?

Parameters None

Example MEAS:VOLT:MAX?

Query Response <NR2>

4.3 MEASure[:SCALar]:VOLTage:MINimum?

This command is used to query the minimum voltage of the electronic load.
MEASure[:SCALar]:VOLTage:MINimum?
MEAS:VOLT:MIN?
<NR2>

4.4 MEASure[:SCALar]:VOLTage:PTPeak?

This command is used to query the voltage peak-to-peak value.

Command Syntax MEASure[:SCALar]:VOLTage:PTPeak?

Parameters None

Example MEAS:VOLT:PTP?

Query Response <NR2>

4.5 MEASure[:SCALar]:CURRent[:DC]?

This command is used to query the current average of the electronic load.

Command Syntax MEASure [:SCALar]:CURRent[:DC]?

Parameters None

Example MEAS:CURR?

Query Response <NR2>

4.6 MEASure[:SCALar]:CURRent:MAXimum?

This command is used to query the peak current of the electronic load.
MEASure[:SCALar]:CURRent:MAXimum?
MEAS:CURR:MAX?
<NR2>

4.7 MEASure[:SCALar]:CURRent:MINimum?

This command is used to query the minimum current of the electronic load.

Command Syntax MEASure[:SCALar]:CURRent:MINimum?

Parameters None

Example MEAS:CURR:MIN?

Query Response <NR2>

4.8 MEASure[:SCALar]:CURRent:PTPeak?

This command is used to query the current peak-to-peak value.

Command Syntax MEASure[:SCALar]:CURRent:PTPeak?

Parameters None

Example MEAS:CURR:PTP?

Query Response <NR2>

4.9 MEASure[:SCALar]:POWer[:DC]?

This command is used to query the power average.
MEASure [:SCALar]:POWer[:DC]?
MEAS:POWer?
<NR2>

4.10 MEAS[:SCALar]:RESistance[:DC]?

This command is used to query the equivalent impedance.

Command Syntax MEAS[:SCALar]:RESistance[:DC]?

Parameters None

Example MEAS: RESistance?

Query Response <NR2>

CR-LED Commands

This chapter describes the LED analog function related commands. The user needs to set three parameters: **Vo**, **Io**, and **Rd Coeff.**. Where **Io** is the rated output current of the LED power supply under test; **Vo** is the forward working voltage of the LED when the forward working current is **Io**, and it can be obtained from the VI curve in the LED specification. The real load is the series connection of n LEDs, then **Vo** should be set to n times of the single-section parameter, or it can be set to any value within the LED power supply output voltage range; **Rd Coeff.** is the ratio of the series equivalent resistance (Rd) to the total equivalent resistance (Vo/Io) of the LED load, that is, Rd Coeff.= Rd/(Vo/Io). In series applications, the **Rd Coeff.** is only related to the selected LED's VI curve, regardless of the number of series nodes.

5.1 LED:VOLTage

This command is used to set **LED Vo**.

Command Syntax LED:VOLTage <Nrf+>

Parameters 0.001 MAX

Example LED:VOLT 18

Query Syntax LED:VOLT?

Returned Parameters <NR2>

5.2 LED:CURRent

This command is used to set **LED Io**.

Command Syntax LED:CURRent <Nrf+>

Parameters 0 MAX

Example LED:CURR 0.35

Query Syntax LED:CURR?

Query Response <NR2>

5.3 LED:RCOeff

This command is used to set **LED Rd Coeff.**.

Command Syntax LED:RCOeff <Nrf+>

Parameters 0.001 1

Example LED:RCO 0.2

Query Syntax LED:RCO?

Query Response <NR2>

5.4

OCP Testing Commands

5.5 OCP[:STATe] <bool>

This command is used to set the OCP test status.

Command Syntax OCP[:STATe] <bool>

Parameters 0- 1- OFF- ON

Example OCP:ON

Query Syntax OCP[:STATe]?

Query Response 0- 1

5.6 OCP:ISTart <NRf+>

This command is used to set the start current of the OCP test.

Command Syntax OCP:ISTart <NRf+>

Parameters MIN MAX

Unit
A

Example OCP:IST 3

Query Syntax OCP:ISTart?

Query Response <NR2>

5.7 OCP:IEND <NRf+>

This command is used to set the OCP cut-off current.

Command Syntax OCP:IEND <NRf+>

Parameters MIN MAX

Unit
A

Example OCP:IEND 6

Query Syntax OCP:IEND?

Query Response <NR2>

5.8 OCP:STEP

This command is used to set the current step of OCP test.

Command Syntax OCP:STEP<NR1>

Parameters 1 1000

Example OCP:STEP 500

Query Syntax OCP:STEP?

Query Response <NR2>

5.9 OCP:DWELI <NRf+>

This command is used to set the single-step dwell time of OCP test.

Command Syntax OCP:DWELI <NRf+>

Parameters 0.00001 0.99999

Unit
S

Example OCP:DWEL 0.01 or OCP:DWEL 10ms

Query Syntax OCP:DWELI?

Query Response <NR2>

5.10 OCP:VTRig <NRf+>

This command is used to set the OCP trigger level.

Command Syntax OCP:VTRig <NRf+>

Parameters MIN MAX

Unit
V

Example OCP:VTR 11.8

Query Syntax OCP:VTRig?

Query Response <NR2>

5.11 OCP:RESult[:OCP]?

This command is used to query the current value of OCP.

Command Syntax OCP:RESult[:OCP]?

Returned Parameters <NRf+>
Unit
A

Example OCP:RES?

Query Response 4.68

5.12 OCP:RESult:PMAX?

This command is used to query the PMAX value.

Command Syntax OCP:RESult:PMAX?

Query Response <NR2>,<NR2>,<NR2>

Unit
W V A

Example OCP:RES:PMAX?

Query Response 55.34 11.8 4.69

This example shows that the maximum output power of PMAX is 55.34W, at this moment the voltage is 11.8V, the current is 4.69A.

Peak Testing Commands

These commands are used to read the maximum/minimum value after startup test. Peak value recording is automatically cleared when the Peak test is started.

6.1 PEAK[:STATe] <bool>

This command is used to set the peak test status.

Command Syntax PEAK[:STATe] <bool>

Example Peak:ON

6.2 PEAK CLEar

This command is used to clear the peak record.

Command Syntax PEAK CLEar

Example Peak CLE

6.3 PEAK:VOLTage:MAXimum?

This command is used to query the maximum voltage.

Command Syntax PEAK:VOLTage:MAXimum?

Example PEAK:VOLT:MAX?

Query Response <NR2>

6.4 PEAK:VOLTage:MINimum?

This command is used to query the minimum voltage.

Command Syntax PEAK:VOLTage:MINimum?

Example PEAK:VOLT:MIN?

Query Response <NR2>

6.5 PEAK:CURRent:MAXimum?

This command is used to query the maximum current.

Command Syntax PEAK:CURRent:MAXimum?

Example PEAK: CURR:MAX?

Query Response <NR2>

6.6 PEAK:CURRent:MINimum?

This command is used to query the minimum current.

Command Syntax PEAK: CURRent:MINimum?

Example PEAK:CURR:MIN?

Query Response <NR2>

Input Settings

These commands control the input of the electronic load. The INPut, CURRent, RESistance and VOLTage commands program the actual input current, resistance, and voltage.

7.1 [SOURce:]INPut <bool>

This command is used to set the input status.

Command Syntax [SOURce:]INPut <bool>

Parameters 0 - 1 - OFF - ON

*RST Value OFF

Example INP 1

Query Syntax INPut[:STATe]?

Query Response 0 - 1

7.2 [SOURce:]INPut:SHORt <bool>

This command is used to set the status of short circuit function.

Command Syntax [SOURce:]INPut:SHORt <bool>

Parameters 0 - 1 - OFF - ON

*RST Value OFF

Example INP:SHOR 1

Query Syntax INPut:SHORt?

Query Response 0 - 1

Related Commands INP

7.3 [SOURce:]FUNCtion <function> [SOURce:]MODE <function>

These two commands are equivalent and are used to select the input mode of the load.

Command Syntax [SOURce:]FUNCtion <function>

[SOURce:]MODE <function>

Parameters CURRent - VOLTage - POWer - RESistance- DYNamic - LED - IMPedance

- CURRent: Constant Current Mode
- VOLTage: Constant Voltage Mode
- POWer: Constant Power Mode
- RESistance: Constant Resistance Mode
- DYNamic: Dynamic Operation Mode
- LED: LED Mode
- IMPedance: Constant Impedance Mode

*RST Value
CURRent

Example MODE RES

Query Syntax [SOURce:]FUNCtion?

[SOURce:]MODE?

Query Response <CRD>

7.4 [SOURce:]VOLTage:RANGe <NRf+>

This command sets the voltage range of the electronic load module. When you program a range value, the load automatically selects the range that corresponds to the value that you program. If the value falls in a region where ranges overlap, the load selects the range with the highest resolution.

Command Syntax [SOURce:]VOLTage:RANGe <NRf+>

Parameters MIN MAX - MINimum - MAXimum

Unit
V
*RST Value

MAXimum(high range)

Example SOUR:VOLT:RANG MIN

Query Syntax [SOURce:]VOLTage:RANGe?

Query Response <NR2>

7.5 [SOURce:]VOLTage:RANGe:AUTO[:STATe]

This command is used to set the auto-range state of the voltage meter of the load module.

Command Syntax [SOURce:]VOLTage:RANGe:AUTO[:STATe] <bool>

Parameters 0 - 1 - ON - OFF

Query Response 1

Example VOLT:RANG:AUTO 1

Query Syntax [SOURce:]VOLTage:RANGe:AUTO[:STATe]?

Query Response <NR1>

7.6 [SOURce:]VOLTage:[LEVel:]ON <NRf+>

This command sets the voltage of sink current on.

Command Syntax [SOURce:]VOLTage[:LEVel]:ON <NRf+>

Parameters None

Unit
V
*RST Value
1

Example VOLT:ON 3

Query Syntax [SOURce:]VOLTage[:LEVel]:ON?

Query Response <NR2

7.7 [SOURce:]Voltage:[LEVel:]OFF <NRf+>

This command is used to set the load start unloading voltage value.

Command Syntax [SOURce:]VOLTage[:LEVel]:OFF <NRf+>

Parameters MIN MAX - MINimum - MAXimum

Unit
V
*RST Value
0.5

Example VOLT:OFF 2

Query Syntax [SOURce:]VOLTage[:LEVel]:OFF?

Query Response <NR2>

7.8 [SOURce:]VOLTage[:LEVel][:IMMediate][:AMPLitude] <NRf+>

This command is used to set the voltage setting in CV mode.

Command Syntax [SOURce:]VOLTage[:LEVel][:IMMediate][:AMPLitude] <NRf+>

Parameters MIN MAX- MINimum- MAXimum

Unit
V
*RST Value
MAXimum

Example VOLT 5

Query Syntax [SOURce:]VOLTage[:LEVel][:IMMediate][:AMPLitude]?

Query Response <NR2>

7.9 [SOURce:]CURRent:RANGe <NRf+>

This command sets the current range of the electronic load module. When you program a range value, the load automatically selects the range that corresponds to the value that you program. If the value falls in a region where ranges overlap, the load selects the range with the highest resolution.

Command Syntax [SOURce:]CURRent:RANGe <NRf+>

Parameters MIN MAX - MINimum - MAXimum

Unit
A
*RST Value
MAXimum (high range)

Example CURR:RANGE MIN

Query Syntax [SOURce:]CURRent:RANGe?

Query Response <NR2>

7.10 [SOURce:]CURRent:SLEW[:BOTH] <NRf+>

This command sets the slew rate for all programmed changes in the input current level of the electronic load. This command programs both positive and negative going slew rates.

Command Syntax [SOURce:]CURRent:SLEW[:BOTH] <NRf+>

Parameters MIN MAX - MAXimum - MINimum

Unit
A /uS
*RST Value
MAXimum

Example CURR:SLEW 3

Related Commands [SOURce:]CURRent:SLEW?

Query Response <NR2>

7.11 [SOURce:]CURRent:SLEW:RISE <NRf+>

This command sets the slew rate of the current for positive going transitions.

Command Syntax [SOURce:]CURRent:SLEW:RISE <NRf+>

Parameters MIN MAX - MAXimum - MINimum

Unit
A/uS
*RST Value
MAXimum

Example CURR:SLEW RISE 3

Query Syntax [SOURce:]CURRent:SLEW:RISE?

Query Response <NR2

7.12 [SOURce:]CURRent:SLEW:FALL <NRf+>

This command sets the slew rate of the current for negative going transitions.

Command Syntax [SOURce:]CURRent:SLEW:FALL <NRf+>

Parameters MIN MAX - MAXimum - MINimum

Unit
A/uS
*RST Value
MAXimum

Example CURR:SLEW FALL 3

Query Syntax [SOURce:]CURRent:SLEW:FALL?

Query Response <NR2>

7.13 [SOURce:]CURRent:PROTection[:LEVel] <NRf+>

This command sets the current protection level. If the input current exceeds the current protection level for the time specified by CURR:PROT:DEL, the input is turned off.
NOTE: Use CURR:PROT:DEL to prevent momentary current limit conditions caused by programmed changes from tripping the overcurrent protection.

Command Syntax [SOURce:]CURRent:PROTection[:LEVel] <NRf+>

Parameters MIN MAX - MINimum - MAXimum

Unit
A

*RST Value
MAXimum

Example CURR:PROT 3

Query Syntax [SOURce:]CURRent:PROTection[:LEVel]?

Query Response NR2

7.14 [SOURce:]CURRent[:LEVel][:IMMediate][:AMPLitude] <NRf+>

This command is used to set the current setting in CC mode.

Command Syntax [SOURce:]CURRent[:LEVel][:IMMediate][:AMPLitude] <NRf+>

Parameters MIN MAX- MINimum- MAXimum

Unit
A
*RST Value
MINimum

Example CURR 5

Query Syntax [SOURce:]CURRent[:LEVel][:IMMediate][:AMPLitude]?

Query Response <NR2>

7.15 [SOURce:]POWer:PROTection[:LEVel] <NRf+>

This command sets the power protection level. If the input power exceeds the power protection level for the time specified by POW:PROT:DEL, the input is turned off.
NOTE: Use POW:PROT:DEL to prevent momentary power limit conditions caused by programmed changes from tripping the over power protection.

Command Syntax [SOURce:]POWer:PROTection[:LEVel] <NRf+>

Parameters MIN MAX - MINimum - MAXimum

Unit
W
*RST Value
MAXimum(high range)

Example POW:PROT 100

Query Syntax [SOURce:]POWer:PROTection[:LEVel]?

Query Response <NR2>

7.16 [SOURce:]POWer[:LEVel][:IMMediate][:AMPLitude] <NRf+>

This command is used to set the power setting in CP mode.

Command Syntax [SOURce:]POWer[:LEVel][:IMMediate][:AMPLitude] <NRf+>

Parameters MIN MAX- MINimum- MAXimum

Unit
W
*RST Value
MINimum

Example POW 10

Query Syntax [SOURce:]POWer[:LEVel][:IMMediate][:AMPLitude]?

Query Response <NR2>

7.17 [SOURce:]RESistance[:LEVel][:IMMediate][:AMPLitude] <NRf+>

This command is used to set the resistance setting in CR mode.

Command Syntax [SOURce:]RESistance[:LEVel][:IMMediate][:AMPLitude] <NRf+>

Parameters MIN MAX- MINimum- MAXimum

Unit
ohm
*RST Value
MAXimum

Example RES 5

Query Syntax [SOURce:]RESistance[:LEVel][:IMMediate][:AMPLitude]?

Query Response <NR2>

7.18 [SOURce:]RESistance[:LEVel][:IMMediate][:AMPLitude]?

This command is used to query the resistance setting in CR mode.

Command Syntax [SOURce:]RESistance[:LEVel][:IMMediate][:AMPLitude]?

Parameters None

Unit
ohm
*RST Value
MAXimum

7.19 [SOURce:]DYNamic:HIGH[:LEVel] <NRf+>

This command is used to set the high-level load current in dynamic mode.

Command Syntax [SOURce:]DYNamic:HIGH[:LEVel] <NRf+>

Parameters MIN MAX- MINimum- MAXimum

Unit
A
*RST Value
0

Example DYN:HIGH 10

Query Syntax [SOURce:]DYNamic:HIGH[:LEVel]?

Query Response <NR2>

7.20 [SOURce:]DYNamic:HIGH:DWELl <NRf+>

This command is used to set the duration of high-level load current in dynamic mode.

Command Syntax [SOURce:]DYNamic:HIGH:DWELl <NRf+>

Parameters MIN MAX- MINimum- MAXimum

Unit
S
*RST Value
MIN

Example DYN:HIGH:DWELl 0.01

Query Syntax [SOURce:]DYNamic:HIGH:DWELl?

Query Response <NR2>

7.21 [SOURce:]DYNamic:LOW[:LEVel] <NRf+>

This command is used to set the low-level load current in dynamic mode.

Command Syntax [SOURce:]DYNamic:LOW[:LEVel] <NRf+>

Parameters MIN MAX- MINimum- MAXimum

Unit
A
*RST Value
MIN

Example DYN:LOW 1

Query Syntax [SOURce:]DYNamic:LOW[:LEVel]?

Query Response <NR2>

7.22 [SOURce:]DYNamic:LOW:DWELl <NRf+>

This command is used to set the duration of low-level load current in dynamic mode.

Command Syntax [SOURce:]DYNamic:LOW:DWELl <NRf+>

Parameters MIN MAX- MINimum- MAXimum

Unit
S
*RST Value
MIN

Example DYN:LOW:DWEL 1

Query Syntax [SOURce:]DYNamic:LOW:DWELl?

Query Response <NR2>

*RST Value
0.00002

7.23 [SOURce:]DYNamic:SLEW <NRf+>

This command is used to set the current slope in dynamic mode.

Command Syntax [SOURce:]DYNamic:SLEW <NRf+>

Parameters MIN MAX- MINimum- MAXimum

Unit
A/uS
*RST Value
MAX

Example DYN:SLEW 3

Query Syntax [SOURce:]DYNamic:SLEW?

Query Response <NR2>

7.24 [SOURce:]DYNamic:SLEW:RISE <NRf+>

This command is used to set the current rising slope in dynamic mode.

Command Syntax [SOURce:]DYNamic:SLEW:RISE <NRf+>

Parameters MIN MAX- MINimum- MAXimum

Unit
A/uS
*RST Value
MAX

Example DYN:SLEW:RISE 3

Query Syntax [SOURce:]DYNamic:SLEW:RISE?

Query Response <NR2>

7.25 [SOURce:]DYNamic:SLEW:FALL <NRf+>

This command is used to set the current falling slope in dynamic mode.

Command Syntax [SOURce:]DYNamic:SLEW:FALL <NRf+>

Parameters MIN MAX- MINimum- MAXimum

Unit
A/uS
*RST Value
MAX

Example DYN:SLEW:FALL 3

Query Syntax [SOURce:]DYNamic:SLEW:FALL?

Query Response <NR2>

7.26 [SOURce:]DYNamic:MODE <mode>

This command is used to set the working mode in dynamic mode.

Command Syntax [SOURce:]DYNamic:MODE <mode>

Parameters CONTinuous- PULSe- TOGGLe

*RST Value
CONTinuous

Example DYN:MODE PULS

Query Syntax [SOURce:]DYNamic:MODE?

Query Response <CRD>

Essential Commands

8.1 SYSTem:ERRor?

This command return the next error number, followed by a remote programming error message string.
Sequence is a FIFO buffer FIFO (first-in, first-out), when the error occurres, the error is stored in the cache. When it is read out, it is deleted from the sequence. After reading all the errors, the query Returned "0, No Error". If the error accumulates too much that is more than the cache can bear, the last error of the sequence will be "-350, Too Many Errors".

Query Syntax SYSTem:ERRor?

Parameters None

Query Response <NR1>, <SRD>

Example SYSTem:ERRor[:NEXT]?

8.2 SYSTem:VERSion?

This query returns the SCPI revision of the load used. The format is YYYY.V, where YYYY is the year and V is the revision number for that year.

Query Syntax SYSTem:VERSion?

Parameters None

Query Response <NR1>, <SRD>

Example SYSTem:VERS?

8.3 SYSTem:SENSe[:STATe] <bool>

This command is used to control the remote compensation function on and off.

Command Syntax SYSTem:SENSe[:STATe] <bool>

Parameters 0- 1- OFF- ON

Example SYST:SENS ON

Query Syntax SYSTem:SENSe[:STATe]?

Query Response 0-1

*RST Value = OFF

8.4 SYSTem:LOCal

The command sets the load to local mode when in RS232 mode. Can use the buttons on front panel to operate.

Command Syntax SYSTem:LOCal

Parameters None

Example SYST:LOC

8.5 SYSTem:REMote

The command sets the load to remote mode when in RS232 mode. All the buttons except for the LOCAL and Shift buttons will lose function. In the remote state, press LOCAL key return to local mode.

Command Syntax SYSTem:REMote

Parameters None

Example SYST:REM

8.6 SYSTem:RWLock

This command can set the load to remote mode, all the button on front panel will lose function including LOCAL button. Use SYSTem:LOCal return to local mode.

Command Syntax SYSTem:RWLock

Parameters None

Example SYST:RWL

Related Commands SYST:REM SYST:LOC

Voltage Rise/Fall Time Test

9.1 TIME:VOLTage:LOW <Voltage>

This command is used to set the start rising voltage value of the load when measuring the rise time of voltage output.

Command Syntax TIME:VOLTage:LOW <Voltage>

Parameters 0 through MAX- MINimum- MAXimum- DEFault

Unit
V

Query Response MINimum

Query Syntax TIME:VOLTage:LOW?

9.2 TIME:VOLTage:HIGH <Voltage>

This command is used to set the starting drop voltage value of the load when measuring the fall time of voltage output.

Command Syntax TIME:VOLTage:HIGH <Voltage>

Parameters 0 through MAX- MINimum- MAXimum- DEFault

Voltage Rise/Fall Time Test
Unit
V

Query Response MAXimum

Query Syntax TIME:VOLTage:HIGH?

9.3 TIME:VOLTage:UP?

This command is used to read the voltage rise time.

Command Syntax TIME:VOLTage:UP?

Parameters None

Query Response <NRf>

9.4 TIME:VOLTage:DOWN?

This command is used to read the voltage fall time.

Command Syntax TIME:VOLTage:DOWN?

Parameters None

Query Response <NRf>

Timing Test Commands

10.1 TIMing[:STATe]

This command is used to start or stop the Timing test.
After sending the TIM 1 command, the front panel of the instrument begins to display the timing of the test. Unit: S;
After sending the TIM 0 command, the front panel timing function disappears.

Command Syntax TIMing[:STATe] <bool>

Parameters 0- 1- OFF- ON

Example TIM ON

Query Syntax TIMing[:STATe]?

Query Response 0- 1

10.2 TIMing:LOAD:SETTing

This command is used to determine whether to change the load setting during the Timing test.

Command Syntax TIMing:LOAD:SETTing <bool>

Parameters 0- 1- OFF- ON

When it is set to ON, after the test is started, the load is changed according to the setting of TIMing:LOAD, and after the test is ended, the load input is turned off; if it is set to OFF, the test is started/stopped without changing the load setting.

Example TIM:LOAD:SETT OFF

Query Syntax TIMing:LOAD:MODE?

Query Response <mode>

10.3 TIMing:LOAD:MODE

This command is used to set the load mode during Timing test.

Command Syntax TIMing:LOAD:MODE <mode>

Parameters CURR- VOLT- POW- RES

Example TIM:LOAD:MODE CURR

Query Syntax TIMing:LOAD:MODE?

Query Response <mode>

Related Commands If is executed, the setting of this command does not take effect.

10.4 TIM:LOAD:SETT OFF

10.5 TIMing:LOAD:VALue

This command is used to set the load parameters for the Timing test.

Command Syntax TIMing:LOAD:VALue <Nrf+>

Parameters A / V / W / , depending on **TIMing:LOAD:MODE**

Example TIM:LOAD:VAL 1

Query Syntax TIMing:LOAD:VALue?

Query Response <NR2>

Related Commands If **TIM:LOAD:SETT OFF** is executed, the setting of this command does not take effect.

10.6 TIMing:TSTart:SOURce

This command sets the trigger source for starting the test.

Command Syntax TIMing:TSTart:SOURce <source>

Parameters VOLT- CURR- EXT

Example TIM:TST:SOUR VOLT

Query Syntax TIMing:TSTart:SOURce?

Query Response <source>

10.7 TIMing:TSTart:EDGE

This command is used to set the trigger edge of the start test.

Command Syntax TIMing:TSTart:EDGE <edge>

Parameters RISE- FALL

Example TIM:TST:EDGE RISE

Query Syntax TIMing:TSTart:EDGE?

Query Response <edge>

10.8 TIMing:TSTart:LEVel

This command is used to set the trigger level for the start test.

Command Syntax TIMing:TSTart:LEVel <Nrf+>

Parameters Depends on the start trigger source, which is the setting of the **Timing:TSTart:SOURce** command.

Example TIM:TST:LEV 1

Query Syntax TIMing:TSTart:LEVel?

Query Response <NR2>

10.9 TIMing:TEND:SOURce

This command sets the trigger source for ending the test.

Command Syntax TIMing:TEND:SOURce <source>

Parameters VOLT- CURR- EXT

Example TIM:TEND:SOUR VOLT

Query Syntax TIMing:TEND:SOURce?

Query Response <source>

10.10 TIMing:TEND:EDGE

This command is used to set the trigger edge of the end test.

Command Syntax TIMing:TEND:EDGE <edge>

Parameters RISE- FALL

Example TIM:TEND:EDGE RISE

Query Syntax TIMing:TEND:EDGE?

Query Response <edge>

10.11 TIMing:TEND:LEVel

This command sets the trigger level for ending the test.

Command Syntax TIMing:TEND:LEVel <Nrf+>

Parameters Depends on the end trigger source, which is the setting of the **Timing:TEND:SOURce** command.

Example TIM:TEND:LEV 1

Query Syntax TIMing:TEND:LEVel?

Returned Parameters <NR2>

10.12 TIMing:RESult

This command is used to query Timing test results.

Command Syntax TIMing:RESult?

Unit
S

Example TIM:RES?

Query Response <NR2>

Frame Interface Command Introduction

11.1 Frame Format

Frame length is 26 bytes. Details as following:
AAH Address Command
4-25 bytes are information content
Parity code
Description
1 Start bit is AAHoccupies one byte.
2 Address range from 0 to 31, occupies one byte. 0XFF is boardcast address.
3 Each command occupies one byte. Following is the command details.

20H	Set the Remote control mode
21H	Set the input on/off state
22H	Set the max input voltage
23H	Read the max setup input voltage.
24H	Set max input current
25H	Read the max setup input current.
26H	Set max input power.
27H	Read the max setup input power.
28H	Set CC/CV/CW/CR operation mode of electronic load.
29H	Read the operation mode.
2AH	Set CC mode current value
2BH	Read CC mode current value
2CH	Set CV mode voltage value
2DH	Read CV mode voltage value
2EH	Set CW mode watt value
2FH	Read CW mode watt value
30H	Set CR mode resistance value
31H	Read CR mode resistance value
32H	Set CC mode transient current and timer parameter.
33H	Read CC mode transient parameter
34H	Set CV mode transient voltage and timer parameter.
35H	Read CV mode transient parameter
36H	Set CW mode transient watt and timer parameter
37H	Read CW mode transient parameter
38H	Set CR mode transient resistance and timer parameter
39H	Read CR mode transient parameter
3AH	Set the list operation mode (CC)
3BH	Read the list operation mode.
3CH	Set the list repeat mode (ONCE/REPEAT)
3DH	Read the list repeat mode.
3EH	Set list steps counts.
3FH	Read list steps counts
40H	Set one of the step's current and time values.
41H	Read one of the step's current and time values.
4CH	Save list file in appointed area.
4DH	Recall the list file from the appointed area.
50H	Set timer value of FOR LOAD ON
51H	Read timer value of FOR LOAD ON
52H	Disable/Enable timer of FOR LOAD ON
53H	Read timer state of FOR LOAD ON
54H	Set communication address
55H	Enable/Disable LOCAL control button.
56H	Enable/Disable remote sense mode.
57H	Read the state of remote sense mode.
58H	Set trigger source.
59H	Read trigger source.
5AH	Sending a trigger signal to trigging the electronic load.
5BH	Saving user's setting value in appointed memory area for recall.

NOTE If control output of electronic through PC, please setting electronic load to PC control state. Command is 20H. Make a calibration on input of electronic Load, Ensure the calibration protection mode is OFF state when setting calibration information.

If electronic load in calibration mode, user can't change the input and operation mode of electronic load.
4 4 to 25 are information contents.
5 26 is checksum code, is the sum of the former 25 bytes.

Frame Commands

12.1 20H Set control mode

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 20H
4 .byte	Operation mode 0 is front panel operation mode 1 is remote operation mode
5-25	Reserved
26	Checksum

NOTE: Front panel operation state is not in effect if electronic load is in calibration mode.

12.2 Set the input on/off state (21H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 21H
4	Input state 0 is OFF1is ON
5-25	Reserved
From26	Checksum

12.3 Set/Read max input voltag. (22H/23H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 22H/23H
4	The Lowest byte of max voltage value
5	The lower byte of max voltage value.
6	The higher byte of max voltage value.
7	The highest byte of max voltage value.
8-25	Reserved.
26	Checksum.

NOTE Represent a voltage upper limit value by 4 bytes of Hex. Low byte to High byte order. 1 represent 1mV.For Example : The voltage upper limit is 16.000V the hex code is 0X00003E80then the 4th byte is 0X805th byte is 0X3E6th byte is 0X007TH byte is 0X00.

12.4 Set/Read the max input current. (24H/25H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 24H/25H
4	The Lowest byte of max current value
5	The Lowest byte of max current value
6	The higher byte of max current value
7	The highest byte of max current value
8-25	Reserved
26 bye	Checksum

NOTE Represent an current value by 4 bytes of Hex .Low byte to High byte order.1 represent 0.1mA, If setting upper limit is 3.0000Athe hex code is 0X00007530then the 4th byte is 0X305th is 0X756th is 0X007th is 0X00

12.5 Set/Read max input power (26H/27H)

Byte	Description
1	AAh
2	Address (0-0XFE)
3	Command 26H/27H
4	The lowest byte of max power value.
5	The lower byte of max power value
6	The higher byte of max power value.
7	The highest byte of max power value.
8-25	Reserved
26	Checksum

NOTE Represent power value by 4 bytes of Hex. Lower bytes are in the Front location, higher bytes are in the later location. 1 represents 1mW. If setting upper value is 200.000Wthe hex code is 0X00030d40then the 4th byte is 0X405th is 0X0d6th is 0X037th is 0X00.

12.6 Select/Read operation mode (CC/CV/CW/CR) of electronic load. (28H/29H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 28H/29H
4	Mode 0 is CC mode, 1 is CV mode , 2 is CW mode , 3 is CR mode
5-25	Reserved
26	Checksum

12.7 Set/Read current value of CC mod. (2AH/2BH)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 2AH/2BH
4	The lowest byte of current value
5	The lower byte of current value.
6	The higher byte of current value.
7	The highest byte of current value.
From 8 To 25	Reserved
27	Checksum

NOTE: Represent current by 4 bytes of Hex. Low byte to High byte order. For example: current is 3.0000AHex code is 0X00007530NO. 4 bye is 0X30NO. 5 bye is 0X75NO. 6 bye is 0X00NO. 7 bye is 0X00

12.8 8. Set/Read voltage value of CV mode. 2CH/2DH

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 2CH/2DH
4	The lowest byte of voltage value.
5	The lower byte of voltage value.
6	The higher byte of voltage value.
7	The highest byte of voltage value.
8-25	Reserved
26	Checksum

NOTE: Represent voltage by 4 bytes of Hex. Low byte to High byte order. For example :voltage is 16.000VHex code is 0X00003EB04th byte 0XB0 5TH byte is 0X3E6th byte is 0X007th bytes 0X00

12.9 9. Set/Read watt value of CW mode 2EH/2FH

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 2EH/2FH
4	The lowest byte of max power value
5	The lower byte of max power value
6	The higher byte of max power value
7	The highest byte of max power value
8 to 25	Reserved
26	Checksum

NOTE: Represent power by 4 bytes of Hex. Low byte to High byte order. For example :power is 200.000WHex is 0X00030d404th byte is 0X40 5th byte is 0X0d6th byte is 0X037th byte is 0X00

12.10 10. Set/Read resistance value CR mode (30H/31H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 30H/31H
4	The lowest byte of resistance value.
5	The lower byte of resistance value.
6	The higher byte of resistance value.
7	The highest byte of resistance value.
8 to 25	Reserved
26	Checksum

NOTE: Represent resistance value by 4 bytes of Hex. Low byte to High byte order. If resistance value is 200.000RHex code is 0X00030d404TH byte is 0X405TH byte is 0X0d6th byte is 0X037th byte is 0X00

12.11 Set/Read CC mode transient current and timer parameter. (32H/33H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 32H/33H
4-7	Setting value of current A (Low byte to High byte order.)
8-9.	Time value of timer A ((Lower bytes are in the front location, higher (1 represent 0.1mS)
10-13	Setting value of current B (Low byte to High byte order.)
14-15	Time value of timer B (Low byte to High byte order) (1 represent 0.1mS)
16	Transition operation mode (0 is CONTINUES, 1 is PULSE, 2 is TOGGLED)
17-25	Reserved
26	Checksum

12.12 Set/Read CV transient voltage and timer parameter. (34H/35H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 34H/35H
4-7.	Setting value of voltage A (Low byte to High byte order)
8-9th byte.	Time value of timer A (Low byte to High byte order) (1represent 0.1mS)
10-13	Setting value of voltage B (Low byte to High byte order)
14-15	Time value of timer B (Low byte to High byte order) (1represent 0.1mS)
16	Transient operation mode (0 is CONTINUES, 1 is PULSE, 2 is TOGGLED)
17-25	Reserved
26	Checksum

12.13 Set/Read CW transient watt and timer paramete. (36H/37H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 36H/37H
4-7	Setting value of power A (Low byte to High byte order)
8-9	Time value of timer A (Low byte to High byte order) (1 represent 0.1mS)
10-13	Setting value of power B (Low byte to High byte order)
14-15	Time value of timer B (Low byte to High byte order) (1 represent 0.1mS)
16	Transition operation mode (0 is CONTINUES, 1 is PULSE, 2 is TOGGLED)
17-25	Reserved
26	Checksum

12.14 Set/Read CR transient resistance and timer paramete. (38H/39H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 38H/39H
4-7	Setting value of resistance A (Low byte to High byte order)
8-9.	Time value of timer A (Low byte to High byte order) (1 represents 0.1mS)
10-13	Setting value of resistance B (Low byte to High byte order)
14-15	Time value of timer B (Low byte to High byte order) (1 represents 0.1mS)
16	Transition operation mode (0 is CONTINUES, 1 is PULSE, 2 is TOGGLED)
17 to 25	Reserved
26	Checksum

12.15 Set /Read the list operation mode (CC) 3AH/3BH

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 3AH/3BH
4	LIST operation mode 0 is CC mode
5-25 byte	Reserved
26	Checksum

12.16 Set/Read the list repeat mode. (3CH/3DH)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 3CH/3DH
4	LIST repeat operation mode (0 is ONCE, 1 is REPEAT, 65535 represents no limit)
5-25	Reserved
26	Checksum

12.17 Set/Read list step counts. (3EH/3FH)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 3EH/3FH
4-5	LIST steps count
6-25	Reserved
26	Checksum

12.18 Set/Read one of the step's current and time values. (40H/41H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 40H/41H
4-5	Appointed one step
6-9	Current value of current step (Low byte to High byte order)
10-11	Time value of current step (Low byte to High byte order) (1 represent 0.1mS)
12-25	Reserved
26	Checksum

12.19 Save/Recall list file in appointed area.. (4CH/4DH)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 4CH/4DH
4	Storing area (1-7)
5-25	Reserved
26	Checksum

12.20 Setting/Reading timer value of FOR LOAD ON (50H/51H

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 50H/51H
4	The lowest byte of time value in timer. (1 represent 1S)
5	The highest byte of time value in timer.
8-25	Reserved
26	Checksum

Time unit in Timer is S, 1S is represented by 1.

12.21 Disable/Enable timer of FOR LOAD ON (52H); Read timer state of FOR LOAD ON (

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 52H/53H
4	Timer state (0:OFF, 1:ON)
5-25	Reserved
26	Checksum

12.22 Set communication address (54H)

Byte	Description
1	AAh
2	Address (0-0XFE)
3	Command 54H
4	New communication address (0-31)
5-25	Reserved
26	Checksum

12.23 Enable/Disable LOCAL control mode. (55H)

Byte	Description
1	AAh
2	Address (0-31)
3	Command 55H
4	State of LOCAL button (0:disable, 1:enable)
5-25	Reserved
26	Checksum

12.24 Enable/Disable remote sense mode. (56H/57H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 56H/57H
4	Remote mode state (0:OFF, 1:ON)
5 to 25	Reserved
26	Checksum

12.25 Set/Read trigger source. (58H/59H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 58H/59H
4	Trigger mode (0:Manual, 1: External, 2:Bus, 3:Hold)
5-25	Reserved
26	Checksum

12.26 Send a trigger signal to trigging the electronic load. (5AH)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 5AH
4-25	Reserved
26	Checksum

12.27 Saving/Recall user's setting value in appointed memory area for recall.

(5BH/5CH)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 5BH/5CH
4	Storing area
5-25	Reserved
26	Checksum

12.28 Selecting/Reading FIXED/SHORT/TRAN/LIST/ BATTERY function mode. (5DH/5E

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 5DH/5EH
4	Work mode (0:FIXED, 1:SHORT, 2:TRANSITION, 3:LIST, 4: BATTERY)
5-25	Reserved
26	Checksum

12.29 Read input voltage, current, power and relative state. (5FH)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 5FH
4-7	Actual input voltage value (Low byte to High byte order)
8-11	Actual input current value (Low byte to High byte order)
12-15	Actual input power value (Low byte to High byte order)
16	Operation state register
17-18	Demand state register
19-25	Reserved
26	Checksum

12.30 Operation status register

12.31 Read status register

Byte	Description	
0	RV	Reverse voltage
1	OV	Over voltage
2	OC	Over current
3	OP	Over power
4	OT	Over temperature
5	SV	remote sense wires are disconnected
6	CC	Constant current
7	CV	Constant voltage
8	CW	Constant power
9	CR	Constant resistance
10	PASS	Pass autotest
11	FAULT	fail to pass autotest
12	COMPLET	Complete autotest

12.32 Read the information of E-Load (rated max current, max voltage, min voltage, max po

Byte	Description
1	AAh
2	Address 0-31, 0XFF)
3	Command 01H
4-7	Rated max current (Low byte to High byte order)
8-11	Rated max voltage (Low byte to High byte order)
12-15	Rated min voltage (Low byte to High byte order)
16-19	Rated max power (Low byte to High byte order)
20-23	Rated max resistance (Low byte to High byte order)
24-25	Rated min resistance (Low byte to High byte order)
26	Checksum

12.33 Set/Read hardware OPP value (02H/03H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 02H/03H
4-7	OPP value (Low byte to High byte order)
8-25	Reserved
26	Checksum

12.34 Set/Read OCP value. (80H/81H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 80H/81H
4-7	OCP value (Low byte to High byte order)
8-25	Reserved
26	Checksum

12.35 Set/Read OCP delay time. (82H/83H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 82H/83H
4	Delay time
5-25	Reserved
26	Checksum

12.36 Enable/Disable OCP function. (84H/85H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 84H/85H
4	Set OCP state (0:off 1:on)
5-25	System reverse
26	Checksum

12.37 Set/Read software OPP value. (86H/87H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 86H/87H
4-7	Software OPP value (Low byte to High byte order)
8-25	Reserved
26	Checksum

12.38 Set/Read software OPP delay time. (88H/89H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command (88H/89H
4	OPP delay time
5-25	Reserved
26	Checksum

12.39 Set/Read the first measured point. (8AH/8BH)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 8AH/8BH
4-7	The first measured value (Low byte to High byte order)
8-25	Reserved
26	Checksum

12.40 Set/Read the second measured point. (8CH/8DH)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 8CH/8DH
4-7	The second measured value (Low byte to High byte order)
8-25	Reserved
26	Checksum

12.41 Set/Read Vd value in CR-LED mode. (8EH/8FH)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 8EH/8FH
4-7	Vd value (Low byte to High byte order)
8-25	Reserved
26	Checksum

12.42 Clear protection state. (90H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 90H
4-25	Reserved
26	Checksum

12.43 Enable/Disable voltage autorange function. (91H/92H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 91H/92H
4	Auto voltage range state (0:off 1:on)
5-25	Reserved
26	Checksum

12.44 Enabel/Disable CR-LED function. (93H/94H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 93H/94H
4	CR-LED mode (0: OFF 1:ON)
5-25	Reserved
26	Checksum

12.45 Send a trigger signal. (9DH)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 9DH Regardless of the current trigger souce it is, this command can provide a trigger signal
4-25	Reserved
26	Checksum

12.46 Read the information of load (on-load capacitance, on-load time...). (A0H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command A0H
4-7	On-load capacitance (Low byte to High byte order)
8-11	On-load time or rising/falling slope (Low byte to High byte order)
12-15	The rest time of timer (Low byte to High byte order)
16-25	Reserved
26	Checksum

12.47 Read the information of E-load (max/min input voltage/current). (A1H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command A1H
4-7	Max input voltage (Low byte to High byte order)
8-11	Min input voltage (Low byte to High byte order)
12-15	Max input current (Low byte to High byte order)
16-19	Min input current (Low byte to High byte order)
20-25	Reserved
26	Checksum

12.48 Read the max measured voltage in list mode. (A2H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command A2H
4-7	Max measured voltage (Low byte to High byte order) value resets after query
8-25	System reserve
26	Checksum

12.49 Read the min measured voltage in list mode. (A3H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command A3H
4-7	Min measured voltage (Low byte to High byte order) value resets after query
8-25	System reserve
26	Checksum

12.50 Read the max measured current in list mode. (A4H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command A4H
4-7	max measured current (Low byte to High byte order) value resets after query
8-25	System reserve
26	Checksum

12.51 Read the min measured current in list mode. (A5H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command A5H
4-7	min measured current (Low byte to High byte order) value resets after query
8-25	System reserve
26	Checksum

12.52 Read on-load capacitance. (A6H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command A6H
4-7	On-load capacitace (Low byte to High byte order) value resets after query
8-25	System reserve
26	Checksum

12.53 Set/Read current rising slope. (B0H/B1H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command B0/B1H
4-7	Current rising slope (Low byte to High byte order)
8-25	System reserve
26	Checksum

12.54 Set/Read current falling slope. (B2H/B3H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command B2H/B3H
4-7	Current falling slope (Low byte to High byte order)
8-25	System reserve
26	Checksum

12.55 Set/Read the voltage upper limit in CC mode. (B4H/B5H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command B4H/B5H
4-7	The voltage upper limit in CC mode (Low byte to High byte order)
8-25	System reserve
26	Checksum

12.56 Set/Read the voltage lower limit in CC mode. (B6H/B7H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command B6H/B7H
4-7	The voltage lower limit in CC mode (Low byte to High byte order)
8-25	System reserve
26	Checksum

12.57 Set/Read the current upper limit in CV mode. (B8H/B9H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command B8H/B9H
4-7	The current upper limit (Low byte to High byte order)
8-25	System reserve
26	Checksum

12.58 Set/Read the current lower limit in CV mode. (BAH/BBH)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command BAH/BBH
4-7	The current lower limit (Low byte to High byte order)
8-25	System reserve
26	Checksum

12.59 Set/Read the voltage upper limit in CW mode. (BCH/BDH)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command BCH/BDH
4-7	The voltage upper limit (Low byte to High byte order)
8-25	System reserve
26	Checksum

12.60 Set/Read the voltage lower limit in CW mode (BEH/BFH)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command BEH/BFH
4-7	The voltage lower limit (Low byte to High byte order)
8-25	System reserve
26	Checksum

12.61 Set/Read max input resistance setting of E-load. (C0H/C1H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command (C0H/C1H
4-7	max input resistance value (Low byte to High byte order)
8-25	System reserve
26	Checksum

12.62 Set/Read the voltage upper limit in CR mode. (C2H/C3H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command C2H/C3H
4-7	The voltage upper limit (Low byte to High byte order)
8-25	System reserve
26	Checksum

12.63 Set/Read the voltage lower limit in CR mode. (C4H/C5H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command C4H/C5H
4-7	The voltage lower limit (Low byte to High byte order)
8-25	System reserve
26	Checksum

12.64 Set/Read the current range in list mode. (C6H/C7H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command C6H/C7H
4-7	Current range (Low byte to High byte order)
8-25	System reserve
26	Checksum

12.65 Set/Read autotest steps. (D0H/D1H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command (D0H/D1H
4-5	Autotest steps (Low byte to High byte order), when one step is selected, then corresponding bit should be set to 1.
6-25	Reserved
26	Checksum

12.66 Set/Read Short steps. (D2H/D3H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command (D2H/D3H
4-5	Autotest short steps (Low byte to High byte order), if one step is set to short on mode, then this bit should be set to 1
6-25	Reserved
26	Checksum

12.67 Set/Read Pause steps. (D4H/D5H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command (D4H/D5H
4-5	Autotest Pause steps (Low byte to High byte order), if one step need to pause, then this bit should be set to 1
6-25	Reserved
26	Checksum

12.68 Set/Read single-step on-load time of autotest mode. (D6H/D7H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command D6H/D7H
4	Step number
5-7	Single step on-load time (Low byte to High byte order)
8-25	Reserved
26	Checksum

12.69 Set/Read delay time of single-step in autotest mode. (D8H/89H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command D8H/D9H
4	Step number
5-7	Single step delay time (Low byte to High byte order)
8-25	Reserved
26	Checksum

12.70 Set/Read single-step off-load time of autotest mode. (DAH/DBH)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command DAH/DBH
4	Step number
5-7	Single step off-load time (Low byte to High byte order)
8-25	Reserved
26	Checksum

12.71 Set/Read autotest stop condition. (DCH/DDH)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command DCH/DDH
4	Stop condition (0:complete, 1:failure)
5-25	Reserved
26	Checksum

12.72 Set/Read autotest chain file. (DEH/DFH)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command DEH/DFH
4	Chain file number (0 repersents chain no file)
5-25	Reserved
26	Checksum

12.73 Save/Recall autotest file. (DEH/DFH)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command E0H/E1H
4	File number (0 repersents do not save)
5-25	Reserved
26	Checksum

12.74 Set/Read Von mode. 0EH/0FH

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 0EH/0FH
4	Von mode (0:Living 1:Latch)
5-25	Reserved
26	Check sum

12.75 Set/Read Von value. (10H/11H)

Byte	Description
1	AAh
2	Address (0-31, 0XFF)
3	Command 10H/11H
4	Von value (Low byte to High byte order)
5-25	Reserved
26	Check sum

NOTE: Receiving one frame command and verify them
If verify sum is wrong, return the parameter 90H
If setting parameter is wrong or over brim, return parameter A0H.
If command is not enforce, return to parameter B0H
If command is invalid, return to parameter C0H
Otherwise, return to parameter 80H

NOTE: Receiving one frame command and verify them
If verify sum is correct, return the relative reading data
If verify sum is wrong, return the verify command (90H)

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