Command Set Specification

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This document describes the RS232 command set.

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Remote Commands

All commands are in ASCII format and end with a single carriage return <CR>. The meter has four modes of operation; local mode, remote mode, calibration mode, and continuous mode. Specific commands are only available certain meter modes. Below are the list of commands, their functions and the mode they are available in. Following the list of commands each command is documented in detail.

The meter communicates in RS232 using the following specifications.

Characters	8
Parity	N
Stop Bits	1
Baud Rate	9600

The meter can also utilize an optional Ethernet to Meter converter which allows the meter to connect to the computer using a available Ethernet connection on the computer. A driver is then installed on the computer allowing the meter to appear as a virtual serial port on the computer. This allows the same program code written to communicate to the meter to operate with both a serial port or a Ethernet port on the computer.

We do not recommend connecting the meter to the network of your office building. Controlling the IP address of the meter and bandwidth of the network backbone can present challenges to this approach. If you do need to connect the computer communicating with the meter to a office network, we recommend a second dedicated network card be installed in the computer to connect to the meter(s).

Standard Command List					
Command	**Command Message**	**Function**	**Local Mode**	**Remote Mode**	**Continuous Mode**
Continuous Reading Off	COFF	This causes the meter to exit continuous reading mode.	No	Yes	Yes
Continuous Reading On	CON	This causes the meter to enter continuous reading mode.	No	Yes	No
Flush	FS	Flush Reading FIFO buffer	No	Yes	No
Local	LM	Switches the meter into Local mode.	No	Yes	No
Set Range	SR#	Switches the meter to the range requested.	No	Yes	No
State	ST	Requests the State of the meter.	Yes	Yes	No
Read Battery	RB	Reads the Voltage level of the battery and indicates status.	Yes	Yes	No
Remote	RM	Switches the meter into Remote mode.	Yes	No	No
Reset Meter	RST	Resets the meter to power up state.	Yes	Yes	Yes
Read Value	RV	Reads the present value of the meter.	No	Yes	No
Version	VR	This command reports all version information from the meter.	No	Yes	No

PROPRIETARY INFORMATION

Detail Documentation Notes :

In the following description any text in bracketed as follows <> is a single ASCII coded character. The value inside the <> symbols is either the direct code value in decimal or the code identifier from the list below.

    Example <13> is a Carriage Return

Code List Used

    <CR> or <13>   is a Carriage Return
    <LF> or <10>   is a Line Feed

All commands are followed by a <CR> character to indicate the completion of the command. All returned responses are followed by a <CR> character as well.

Commands with multiple returning parameters, the parameters are separated by | character.

The following commands are in alphabetical order.

Command	Continuous Reading Off
Command Message	COFF<CR>
Function	This cause the meter to exit continuous reading mode.
Mode Availability	Continuous Mode Only

Description

   Once in continuous reading mode, this command removes the unit continuous readout.

Example

      Send :   COFF <CR>
      Return : 0<CR>   ; Indicates Command Ok

            or

            1<CR>   ; Indicates Unknown Command

            or

            2<CR>   ; Indicates Command Not Allowed in present Mode

Command	Continuous Reading On
Command Message	CON<CR>
Function	This cause the meter to enter continuous reading mode.
Mode Availability	Remote Mode Only

Description

Once in remote mode, this command sets the unit continuous readout. If this mode every meter reading measured is transmitted to the remote computer. The remote computer must collect the data from the buffered input port or overruns will occur. Once in this command the meter will only accept two commands (COFF or RM) to exit continuous mode. COFF exits the mode and RM exist the mode and resets the meter.

Range	Format	Over Range Format	Wiring Error Format	Calib Error Format	Hardware Error Format	Units
No Range	0.000	0.000	0.000	0.000	0.000	
DIODE	X.XXX	+9.990	+9.880	+9.770	+9.660	Volts
20 Ohm	XX.XXX	+99.900	+98.800	+97.700	+96.600	Ohms
200 Ohm	XXX.XX	+999.00	+988.00	+977.00	+966.00	Ohms
2K Ohm	XXXX.X	+9990.0	+9880.0	+9770.0	+9660.0	Ohms
20K Ohm	XXXXX	+99900	+98800	+97700	+96600	Ohms
200K Ohm	XXXXXX	+999000	+988000	+977000	+966000	Ohms
2M Ohm	XXXXXXX	+9990000	+9880000	+9770000	+9660000	Ohms

Example

```
Send :   CON<CR>
Return : 0<CR>                              ; Indicates Command Ok
         4.600| OVER| ERROR|OK|OK <CR>      ; Reading 1 |
                                            ; Over Range State OVER or OK |
                                            ; Wiring Error State ERROR or OK |
                                            ; Calibration State OK or BAD |
                                            ; Hardware State OK or BAD<CR>
         4.601| OVER| ERROR|OK|OK <CR>      ; Reading 2
         4.600| OVER| ERROR|OK|OK <CR>      ; Reading 3
         4.599| OVER| ERROR|OK|OK <CR>      ; Reading 4
         ...                                ...

         or

         1<CR>                              ; Indicates Unknown Command

         or

         2<CR>                              ; Indicates Command Not Allowed in present Mode
```

Command	Flush Buffer
Command Message	FS<CR>
Function	This command flushes all data in the reading FIFO buffer.
Mode Availability	Remote Mode Only.

Description

This commands flushes all other commands in the input buffer of the meter.

Example

Send :   FS<CR>
Return : 0<CR>   ;Indicates Command Ok

         or

         1<CR>   ; Indicates Unknown Command

         or

         2<CR>   ; Indicates Command Not Allowed in present Mode

Command	Local
Command Message	LM<CR>
Function	Switches the meter into Local mode
Mode Availability	Remote Mode Only

Description

This command switches the system from remote mode into local mode. Local mode activates accepting input from the local buttons on the panel and allows local control of the meter.

Changing to this mode does not change the range of the meter or alter the internal data buffers. It does flush all buffered commands in the incoming communications buffer.

Example

Send :   LM<CR>
Return : 0<CR>   ;Indicates Command Ok

        or

        1<CR>   ; Indicates Unknown Command

        or

        2<CR>   ; Indicates Command Not Allowed in present Mode

Command	Read Battery
Command Message	RB<CR>
Function	This command reports the present battery voltage.
Mode Availability	Local Mode & Remote Mode.

Description

This commands reads the present battery input voltage in volts. It also returns the battery state (OK or LOW).

Example

    Send : RB<CR>
    Return : 0|4.600|OK<CR>   ; Command OK | Battery Voltage | Battery State OK or LOW

        or

        1<CR>   ; Indicates Unknown Command

        or

        2<CR>   ; Indicates Command Not Allowed in present Mode

Command	Remote
Command Message	RM<CR>
Function	Switches the meter into Remote mode
Mode Availability	Local Mode & Calibration Mode Only

Description

This command switches the system from local or calibration mode into remote mode. Remote mode disables the accepting input from the local buttons on the panel and allows remote control of the meter.

Changing to this mode does not change the range of the meter or alter the internal data buffers. It does flush all buffered commands in the incoming communications buffer.

Example

Send :   RM<CR>
Return : 0<CR>   ; Indicates Command Ok

        or

        1<CR>   ; Indicates Unknown Command

        or

        2<CR>   ; Indicates Command Not Allowed in present Mode

Command	Reset Meter
Command Message	RST<CR>
Function	This command resets the meter returning it to the start up state.
Mode Availability	All Modes Only.

Description

This commands resets the meter to its startup state. It return to no range, and zeros all buffers.

Example

    Send :   RST<CR>
    Return : 0<CR>   ; Indicates Command Ok

        or

        1<CR>   ; Indicates Unknown Command

        or

        2<CR>   ; Indicates Command Not Allowed in present Mode

Command	Read Value
Command Message	RV<CR>
Function	This command reads the present measurement value.
Mode Availability	Remote Mode Only.

Description

This commands reads the present measurement value. The format of the value can be found in the range chart below.

Range	Format	Over Range Format	Wiring Error Format	Calib Error Format	Hardware Error Format	Units
No Range	0.000	0.000	0.000	0.000	0.000	
DIODE	X.XXX	+9.990	+9.880	+9.770	+9.660	Volts
20 Ohm	XX.XXX	+99.900	+98.800	+97.700	+96.600	Ohms
200 Ohm	XXX.XX	+999.00	+988.00	+977.00	+966.00	Ohms
2K Ohm	XXXX.X	+9990.0	+9880.0	+9770.0	+9660.0	Ohms
20K Ohm	XXXXX	+99900	+98800	+97700	+96600	Ohms
200K Ohm	XXXXXX	+999000	+988000	+977000	+966000	Ohms
2M Ohm	XXXXXXX	+9990000	+9880000	+9770000	+9660000	Ohms

Example

```
Send :   RV<CR>
Return : 0<CR>                                ; Indicates Command Ok
         1.2345| OVER| ERROR|OK|OK <CR>       ; Reading |
                                              ; Over Range State OVER or OK |
                                              ; Wiring Error State ERROR or OK |
                                              ; Calibration State OK or BAD |
                                              ; Hardware State OK or BAD<CR>

         or

         1<CR>                                ; Indicates Unknown Command

         or

         2<CR>                                ; Indicates Command Not Allowed in present Mode
```

Command	Set Range
Command Message	SR#<CR>
Function	Switches the meter to a range condition.
Mode Availability	Remote Mode Only

Description

In remote mode, this command sets the range the range index #.

In no range the excitation supply connection is set to ground so that no excitation exists at the squib connections. The meter will display "-----" as the readings in this mode, however it will continue to monitor the battery state.

Legal range values are as follows -

Values of #	Range
0	No Range
1	DIODE Range
2	20 Ohm
3	200 Ohm
4	2K Ohm
5	20K Ohm
6	200K Ohm
7	2M Ohm

Example

Send :   SR0<CR>
Return : 0<CR>   ; Indicates Command Ok

        or

        1<CR>   ; Indicates Unknown Command

        or

        2<CR>   ; Indicates Command Not Allowed in present Mode

Command	State
Command Message	ST<CR>
Function	Requests the state of the meter.
Mode Availability	Local Mode, Remote Mode & Calibration Mode Only

Description

This command returns the present mode and range of the meter.

Mode Code Return Values

Values of #	Range
RM	Remote Mode
LM	Local Mode
CM	Calibration Mode

Range Code Return Values

Values of #	Range
0	No Range
1	DIODE Range
2	20 Ohm
3	200 Ohm
4	2K Ohm
5	20K Ohm
6	200K Ohm
7	2M Ohm

Example

```
Send :   ST<CR>
Return : 0| RM| SR#<CR>              ; Indicates Command Ok|
                                     ; Mode RM, LM, or CM|
                                     ; Range #

         or

         1<CR>                       ; Indicates Unknown Command

         or

         2<CR>                       ; Indicates Command Not Allowed in present Mode
```

Command   Version
Command Message   VR<CR>
Function   This command reports all version information from the meter.
Mode Availability   Remote Mode Only.

Description

   This commands reads the model number, serial number, firmware version number and all the calibration date
   and values from the meter.

Example

      Send :   VR<CR>
      Return : 0|1234|101-SQB-RAK|1234|1.0.6|2010-12-12<CR>
                                              ; Indicates Command Ok|
                                              ; Cage Code|
                                              ; Model Number|
                                              ; Serial Number|
                                              ; Firmware Version|
                                              ; Calibration Date

            or

            1<CR>   ; Indicates Unknown Command

            or

            2<CR>   ; Indicates Command Not Allowed in present Mode