COMMON SDI-12 COMMANDS AND THEIR MEANINGS

The first character of all commands and responses is a device address "a". The last character of a command is the "!" character. The "!" can only be used in a command as the last character. For additional information on the SDI-12 protocol and the commands, please go to www.sdi-12.org.

a! Acknowledge Active

This command is used to ensure that a sensor is responding to a data recorder or another SDI-12 device. It asks a sensor to acknowledge its presence on the SDI-12 bus.

al! Send Identification

This command is used to query sensors for their SDI-12 compatibility level, model number, and firmware version number.

?! Address Query

When a question mark is used as the address character with the acknowledge active command (a!), the sensor will respond as if it is being addressed on the SDI-12 bus. Users should understand that if more than one sensor is connected to the bus, they will all respond, causing a bus contention.

aAb! Change Address

This command changes the address of a sensor. If the sensor supports software changeable addresses, it must support the change address command. After this command has been issued and responded to, the sensor is not required to respond to another command for one second. This gives the sensor time to write the new address to non-volatile memory. a is the current sensor address and b is the new address.

aM! Start Measurement

This command tells the sensor to take a measurement. The sensor does not, however, return the measurement to the data recorder after this command. It returns the time until one or more measurements will be ready and the number of measurements that it will make. The send data (D0!) command must be issued to get the measurement(s).
aC!  Start Concurrent Measurement

This command tells the sensor to take a concurrent measurement. A concurrent measurement is one that occurs while other SDI-12 sensors on the bus are also taking measurements. The send data (D0!) command must be issued to collect the measurements(s).

aD0!...aD09!  Send Data

This command is used to get groups of data from the sensor. D0! is issued after an M, MC, C, CC, or V command. The sensor responds by sending the data. If the response to a D command is valid, but no data are returned, the sensor has aborted the measurement. To obtain data the recorder must issue another M, C, or V command.

aR0!... aR9!  Continuous Measurements

Sensors -- such as shaft encoders -- that are able to continuously monitor the parameter to be measured do not require a start measurement command (M!, M1! . . . M9!). They can be read directly with the R commands (R0! ... R9!).

(D1! . . . D9!)  Return of Multiple Measurements (Parameters)

The commands D1 . . . D9 are used with sensors that return multiple measurements. The purpose of the D commands is for the sensor to return as many measurements as possible in response to each command.

(aM1! . . . aM9!)  Additional Measurement Commands

Additional M commands provide a means to request different types of measurements from a sensor or to instruct a sensor to do a calibration or a control function.

(aC1! . . . aC9!) Additional Concurrent Measurement Commands

Additional C commands provide a means to request different types of measurements from a sensor or to instruct a sensor to do a calibration or a control function.

(aV!)  Start Verification

This command tells the sensor to return verification in response to a subsequent D command. A verification sequence may include ROM signatures, CRCs, RAM test results, or the results of other diagnostics in the sensor.
Requesting a Cyclic Redundancy Check (CRC)

To enhance the error detection capability in SDI-12 data collection systems, a variation of the Start Measurement Commands (M!, M1! ... M9!), Start Concurrent Measurement Commands (C!, C1! ... C9!), and Continuous Measurement Commands (aR0! ... aR9!) request that the data be returned with a 16 bit Cyclic Redundancy Check (CRC) appended to it.

Extended Commands

Sensors are required only to respond to the basic SDI-12 command set. Sensors, however, usually require calibration or other setup commands. Extended commands provide the means for such functions. An extended command is a command for a specific make of sensor to tell that sensor to do a specific task. Extended commands are defined and documented by the manufacturer of each sensor.