CR10 Instruction Set Options

OS10-0.1, -1.1, -2.1, and Library Special PROMs

The customer selects one of three OS10 PROM options (at no charge) or a Library Special. PROM (firmware) options are generally specified at time of CR10 purchase and the selected PROM is installed at the factory. However, if measurement needs change, an alternate PROM can be purchased and installed at the factory or by the user. Differences between PROMs are summarized below:

OS10-0.1

The PROM used by over 90% of our customers. It contains the standard instructions that support measurement, processing, and control functions commonly used in agricultural, meteorological, and industrial applications. The OS10-0.1 instruction set is listed on page 6 of the CR10 brochure. If a PROM is not specified at the time of CR10 purchase, this PROM is supplied.

OS10-1.1, OS10-2.1 - Specialized PROMs for Hydrology

OS10-1.1 includes instructions for the SDI-12 protocol (Recorder and Sensor functions), as well as processing for the Paroscientific pressure transducer, and bulk load. OS10-0.1 excludes Burst measurement.

OS10-1.2 includes instructions for the SDI-12 protocol (Recorder function only), an enhanced measurement algorithm for Instrumentation Northwest's 9104E sensor, and a *4 Parameter Entry Table. The OS10-1.2 PROM excludes Burst measurement, Model 207 Temp/RH measurement, automatic calibration, vapor pressure calculations, and histogram instructions.

OS10 PROM Summary Table

Instructions	OS10-0.1 (default)	OS10-1.1	OS10-2.1	
23 Burst Measurement	X			
29 INW 9104E			X	
64 Paroscientific			X	
65 Bulk load			X	
105 SDI-12 Recorder		X		X
106 SDI-12 Sensor			X	
*4 Parameter Entry Table				X

OS10 Instruction Descriptions

INSTRUCTION 23 - Burst Measurement
Increases the CR10 sample rate; one channel is sampled at a maximum rate of 750 Hz (once every 1.333 ms). The number of samples taken is limited by available memory. Instruction 23 makes voltage measurements on a series of single-ended or differential channels, with or without excitation.

INSTRUCTION 29 - Instrumentation Northwest's PS9104E
Applies Instrumentation Northwest's Enhanced Measurement Process (EMP) to the PS9104E pressure transducer. Outputs water temperature and temperature-compensated pressure values.

INSTRUCTION 64 - Paroscientific Processing
Simplifies the programming and calibration of a Paroscientific pressure transducer with frequency outputs for both temperature and pressure.

INSTRUCTION 65 - Bulk Load
Loads eight fixed values (constants) into consecutive input locations.

INSTRUCTION 105 - SDI-12 Recorder
Communicates with up to ten sensors using the SDI-12 interface standard. The SDI-12 communication protocol was developed for microprocessor-based hydrologic and environmental sensors. Each SDI-12 sensor, set to a unique address between 0 and 9, responds with measurement data as commanded by the datalogger.

INSTRUCTION 106 - SDI-12 Sensor
Enables the CR10 to act as an SDI-12 sensor by supplying data to another device that issues SDI-12 commands.

***4 Parameter Entry Table**
Allows simple entry of site-specific IDs and sensor calibrations without entering the program edit mode.

Library Special PROMs

OS10 PROMs meet the needs of most CR10 applications. Where some additional capability is required, Library Special PROMs are available at an additional charge. Some features of OS10 must be removed to make room for the special instructions. Library Special modules include:

- The capability to save and load programs from cassette tape.
- Serial communications through control ports (300 or 1200 baud). May be used with some intelligent sensors.
- Fast Fourier Transform - The FFT is used to obtain the frequencies, relative magnitudes, and phases of various frequency components in a time varying signal. Instruction 60 performs a Fast Fourier Transform on a set of data contained in sequential Input Storage locations.
- Rainflow Histogram - An algorithm used in estimating cumulative fatigue damage. Strain measurements are processed to provide a two dimensional histogram. One dimension is the amplitude of the stress/strain cycles; the number of cycles within each user-defined amplitude range are counted. The other dimension (optional) is mean value of the strain cycle.

Consult Campbell Scientific for further information regarding Library Special PROMs.

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