



IMP-900/950 DATA ACQUISITION SYSTEM

FEATURES:

- Direct Sensor Inputs
- Control Outputs
- 2 Mbytes of Battery-Backed SRAM
- Phone/Dedicated Line or Radio Telemetry
- Optional Built-in Keyboard and Display
- Built-in Surge Protection
- MODBUS interface

The IMP-900/950 is a versatile digital data acquisition system suitable for environmental monitoring applications requiring only a limited number of inputs. It can function as a stand-alone station or be operated via a computer singly or in a network. The IMP-950 contains a built-in keyboard and data display, the IMP-900 does not.

Direct sensor interface including the supply of excitation voltages is possible with the IMP-900/950. The input signals will then be processed as required. Data is stored in the 2 Mbyte battery-backed SRAM internal memory, and/or a removable solid-state storage module, or a remote computer for later processing. The solid-state storage module can be used to transport and download a new operating program.

User programming is easily accomplished with a PC-compatible computer and the logger support software. An optional, portable keyboard/display unit (CCR1000KD) or the built-in keyboard/display of the IMP-950 can also be used to program the system and view data. A comprehensive on-board instruction set is included which can be programmed to perform calculations on any desired channel including interactions between channels. A custom operating program is factory supplied and can be modified by the user.

The basic IMP-900/950 consists of either data logger mounted in a 16 x 14 x 6 inch, NEMA-4X enclosure with 2 Mbytes of internal memory capable of storing up to 1,000,000 final data points. The G1 option provides an enclosure size of 18 x 16 x 8 inches and the G2 option is 24 x 24 x 8 inches. A rack mountable version of the IMP-900/950 is also available which uses only 5-1/4 x 19 inches of panel space.

The IMP-900/950 requires a 12-volt DC power source such as the 8AH battery backup power supply (P/N 101139). When battery backup is not required, our P/N 100519 power supply is provided.

A large selection of communications, storage, measurement and control peripherals are available. Please contact Climatronics for a system quotation based on your specific requirements.



SPECIFICATIONS

Electrical specifications are valid over a -25° to +50°C range unless otherwise specified; non-condensing environment required. To maintain electrical specifications, yearly calibrations are recommended.

PROGRAM EXECUTION RATE

10 ms to 30 min. @ 10 ms increments

ANALOG INPUTS

NUMBER OF CHANNELS: 3 differential or 6 single-ended, individually configured. Channel expansion provided by CAM16/32 Relay Multiplexers and CAM25T Thermocouple Multiplexers.

RANGES, RESOLUTION and TYPICAL INPUT NOISE: Basic resolution (Basic Res) is the A/D resolution of a single conversion. Resolution of DF measurements with input reversal is half the Basic Res. Noise values are for DF measurements with input reversal; noise is greater with SE measurements.

Input Range (mV)	Basic Res (mV)	250 ms Int. (mV RMS)	50/60 Hz Int. (µV RMS)
±5000	1330	385	192
±2500	667	192	95.9
±250	66.7	19.2	19.2
±25	6.7	2.3	1.9
±7.5	2	0.62	0.58
±2.5	0.67	0.34	0.19

ACCURACY¹:

±(0.06% of reading + offset), 0 to 40°C
±(0.12% of reading + offset), -25° to 50°C
±(0.18% of reading + offset), -55° to 85°C (-XT only)

¹ The sensor and the measurement noise are not included and the offsets are the following:

Offset for DF w/input reversal = 1.5 Basic Res + 1.0 µV
Offset for DF w/o input reversal = 3 Basic Res + 2.0 µV
Offset for SE = 3 Basic Res + 3.0 µV

MINIMUM TIME BETWEEN VOLTAGE

MEASUREMENTS: Includes the measurement time and conversion to engineering units. For voltage measurements, the imp-900 integrates the input signal for 0.25 ms or a full 16.66 ms or 20 ms line cycle for 50/60 Hz noise rejection. Differential measurements with input reversal incorporate two integrations with reversed input polarities to reduce thermal offset and common mode errors and therefore take twice as long.

250 µs Analog Integration: ~1 ms single ended
1/60 Hz Analog Integration: ~20 ms Single ended
1/50 Hz Analog Integration: ~25 ms single ended

INPUT NOISE VOLTAGE (for ±2.5 mV range):

Fast differential: 0.82 µV rms
Slow differential: 0.25 µV rms
Differential with 60 Hz rejection: 0.18 µV RMS

COMMON MODE RANGE: ±5.0 V

DC COMMON MODE REJECTION: >100 dB

NORMAL MODE REJECTION: 70 dB @ 60 Hz when using 60 Hz rejection

INPUT CURRENT: ±1 nA typical, ±6 nA max. @ 50°C, ±90 nA max. @ 85°C

INPUT RESISTANCE: 20 Gohms typical

ACCURACY OF BUILT-IN REFERENCE JUNCTION

THERMISTOR (for thermocouple measurements):
±0.3°C, -25° to 50°C
±0.8°C, -55° to 85°C (-XT only)

ANALOG OUTPUTS

DESCRIPTION: 2 switched voltage, active only during measurement, one at a time.

RANGE AND RESOLUTION: Voltage outputs programmable between ±2.5 V with 0.67 mV resolution.

ACCURACY: ±(0.06% of setting + 0.8mV) 0° to 40°C
±(0.12% of setting + 0.8mV) -25° to 50°C
±(0.06% of setting + 0.8mV) -55° to 85°C

CURRENT SOURCING/SINKING: ±25 mA

RESISTANCE MEASUREMENTS

MEASUREMENT TYPES: The IMP-900 series provides ratio metric bridge measurements of 4- and 6-wire full bridge, and 2-, 3-, and 4-wire half bridges. Precise dual polarity excitation using any of the switched outputs eliminates dc errors.

RATIO ACCURACY¹: Assuming excitation voltage of at least 1000 mV, not including bridge resistor error.

±(0.04% of reading + offset) V_{ex}
¹ The sensor and the measurement noise are not included and the offsets are the following:

Offset for DF w/input reversal = 1.5 Basic Res + 1.0 µV
Offset for DF w/o input reversal = 3 Basic Res + 2.0 µV
Offset for SE = 3 Basic Res + 3.0 µV

PERIOD AVERAGING MEASUREMENTS

The average period for a single cycle is determined by measuring the duration of a specified number of cycles. The period resolution is 192 ns divided by the specified number of cycles to be measured; the period accuracy is ±(0.01% of reading + resolution). Any of the 6 SE inputs can be used for period averaging. Signal limiting are typically required for the SE channel.

INPUT FREQUENCY RANGE:

Input Range (mV)	Input Signal (Min) ² Peak to Peak	Input Signal (Max) ² Peak to Peak	Pulse Width (Min)	Frequency (Max) ³
±2500 mV	500 mV	10 V	2.5 µs	200 kHz
±250 mV	10 mV	2 V	10 µs	50 kHz
±25 mV	5 mV	2 V	62 µs	8 kHz
±2.5 mV	2 mV	2 V	100 µs	5 kHz

²-The signal is centered at the data logger ground.
³-The maximum frequency = 1/(Twice Minimum Pulse Width) for 50 % duty cycle signals.

PULSE COUNTERS

NUMBER OF PULSE COUNTER CHANNELS: 2 24-bit; software selectable as switch closure, high frequency pulse, and low level AC.

MAXIMUM COUNTS PER SCAN: 16.7 x 10⁶

SWITCH CLOSURE MODE

Minimum Switch Closed Time: 5 ms
Minimum Switch Open Time: 6 ms
Maximum Bounce Time: 1 ms open without being counted

HIGH FREQUENCY PULSE MODE

Maximum Input Frequency: 250 kHz
Voltage Thresholds: Count upon transition from below 0.9 V to above 2.2 V after input filter with 1.2 µs time constant.
Maximum Input Voltage: ±20 V

LOW LEVEL AC MODE: Internal ac coupling removes dc offsets up to ±0.5 V

Input Hysteresis: 16 mV @ 1 Hz
Maximum AC Input Voltage: ±20 V
Minimum AC Input Voltage:

(Sine wave mV RMS)	Range (Hz)
20	1.0 to 20
200	0.5 to 200
2000	0.3 to 10,000
5000	0.3 to 20,000

DIGITAL I/O PORTS

DESCRIPTION: 4 ports selectable, under program control, as binary inputs or control outputs. They also provide edge timing, subroutine interrupts/wake up, switch closure pulse counting, high frequency pulse counting, asynchronous communications (UART), SDI-12 communications, and SDM communications.

HIGH FREQUENCY MAX: 400 kHz

SWITCH CLOSURE FREQUENCY MAX: 150 kHz

OUTPUT VOLTAGES (no load): high 5.0V ±0.1V; low < 0.1V

OUTPUT RESISTANCE: 330 ohms

INPUT STATE: high 3.8 to 5.3 V; low -0.3 to 1.2 V

INPUT RESISTANCE: 100 kohms

INPUT HYSTERESIS: 1.4 V

SWITCHED 12 V

One independent 12 V unregulated source switched on and off under program control. Thermal fuse hold current = 900 mA @ 20°C, 650 mA @ 50°C and 360 mA @ 85±C

SDI-12 INTERFACE STANDARD

The control ports may be configured for SDI-12 asynchronous communication. Up to ten SDI-12 sensors are supported per port. It meets SDI-12 Standard version 1.3 for data logger mode.

CE COMPLIANCE

STANDARD (S) TO WHICH CONFORMITY IS

DECLARED:
IEC 61326:2002

CPU AND INTERFACE

PROCESSOR: Hitachi H8S 2322 (16 bit CPU with 32 bit internal core)

MEMORY: 2 Mbytes of flash for operating system; 2 Mbytes of battery-backed SRAM for CPU usage, program storage and data storage..

OPTIONAL REMOVABLE KEYBOARD DISPLAY: 8 line x 21 character LCD and 16-digit keyboard

SERIAL INTERFACES: COM1 (CS I/O, used to interface with IMP data logger peripherals), COM2 (Standard RS-232 communication port)

BAUD RATES: Selectable from 300 bps to 115.2 kbps. ASCII protocol is one start bit, one stop bit, eight data bits, and no parity.

CLOCK ACCURACY: ±3 minute per year (-30° to 85°C) ±15 minute per year (-55° to 85°C, extended temperature range)

SYSTEM POWER REQUIREMENTS

VOLTAGE: 9.6 to 16 Vdc

Sleep Mode: ~0.6 mA

1 Hz Scan (8 diff. meas., 60 Hz rej., 2 pulse meas.)

w/RS-232 communications : 19 mA

w/RS-232 communications : 4.2 mA

1 Hz Scan (8 diff. meas., 250 Hz µs integ., 2 pulse meas.)

w/RS-232 communications : 16.7 mA

w/RS-232 communications : 1.0 mA

100 Hz Scan (4 diff. meas., 250 Hz µs integ.)

w/RS-232 communications : 27.6 mA

w/RS-232 communications : 16.2 mA

EXTERNAL BATTERIES: 12 Vdc nominal; reverse polarity protected

PHYSICAL SPECIFICATIONS

SIZE: 9.5" x 4.1" x 2.0" (24.1x 10.4 x 5.1 cm)

Additional clearance required for serial cable and sensor leads.

WEIGHT: 1.5 lbs (0.7Kg)

WARRANTY

Three years against defects in materials and workmanship.



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