



IMP-865 DATA ACQUISITION SYSTEM

FEATURES:

- Direct Sensor Inputs
- Control Outputs
- Internal/External Solid-State Storage
- Phone/Dedicated Line or Radio Telemetry
- Low Power
- Built-in Surge Protection

The IMP-865 is a versatile digital data acquisition system suitable for environmental monitoring applications. It can function as a stand-alone station or be operated via a computer singly or in a network.

Direct sensor interface including the supply of excitation voltages is possible with the IMP-865. The input signals will then be processed as required. Data will either be stored in internal memory, 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 of the IMP-865 is easily accomplished via an IBM PC-compatible computer with support software or an optional, portable keyboard/display unit. 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-865 (P/N 102654-G0-H0) consists of a P/N 102655 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. The H1 option adds 2 Mbyte of internal memory. A rack mountable version of the IMP-865 is also available (P/N 102658-G0-H0) which uses only 5-1/4 x 19 inches of panel space.

The IMP-865 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 100520-G0-H1 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: 8 differential or 16 single-ended, individually configured. Channel expansion provided by CAM416 Relay Multiplexers and CAM25T Thermocouple Multiplexers.

ACCURACY: $\pm 0.2\%$ of FSR (-25° to 50°C); $\pm 0.1\%$ of FSR (0° to 40°C);
e.g., $\pm 0.1\%$ FSR = ± 5.0 mV for ± 2500 mV range

RANGE AND RESOLUTION

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 |

Offset for DF measurement w/input reversal = Basic Res/2 + 0.5 μ V
Offset for DF measurement w/o input reversal = Basic Res + 1.0 μ V
Offset for SE measurement = Basic Res + 2 μ V
Offset for SE measurement = Basic Res + 2 μ V

MINIMUM TIME BETWEEN VOLTAGE

MEASUREMENTS: Includes the measurement time and conversion to engineering units. For voltage measurements, the imp-865 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 μ s 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 μ V rms
Slow differential: 0.25 μ V rms
Differential with 60 Hz rejection: 0.18 μ V 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

ANALOG OUTPUTS

DESCRIPTION: 3 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: ± 5 mV; ± 2.5 mV (0° to 40°C);

CURRENT SOURCING: 25 mA

CURRENT SINKING: 25 mA

FREQUENCY SWEEP FUNCTION: The switched outputs provide a programmable swept frequency, 0 to 2.5 V square wave for exciting vibrating wire transducers.

RESISTANCE MEASUREMENTS

MEASUREMENT TYPES: The IMP-865 provides ratiometric 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.

ACCURACY: $\pm 0.02\%$ of FSR plus bridge resistor error.

PERIOD AVERAGING MEASUREMENTS

DEFINITION: The average period for a single cycle is determined by measuring the duration of a specified number of cycles. Any of the 16 single-ended analog input channels can be used. Signal attenuation and AC coupling are typically required.

INPUT FREQUENCY RANGE & SPECIFICATION:

| 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 ms | 200 kHz |
| ± 250 mV | 10 mV | 2 V | 10 ms | 50 kHz |
| ± 25 mV | 5 mV | 2 V | 62 ms | 8 kHz |
| ± 2.5 mV | 2 mV | 2 V | 100 ms | 5 kHz |

²-Maximum signal must be centered at data logger ground.

³-Maximum frequency equals 1/(Twice Minimum Pulse Width) for 50 % duty cycle signals.

ACCURACY: $\pm 0.01\%$ of reading + resolution

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: 16.7×10^6

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 μ s time constant.
Maximum Input Voltage: ± 20 V

LOW LEVEL AC MODE

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: 8 ports selectable, under program control, as binary inputs or control outputs. C1-C8 also have multiple function capability, which include edge timing, subroutine interrupts/wake up, switch closure pulse counting, high frequency pulse counting, asynchronous communication port (UART), SDI-12 communication port, and SDM communication port.

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

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

SDI-12 INTERFACE STANDARD

DESCRIPTION: Control Ports 1, 3, 5, and 7 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.

IMP-865 TCR THERMOCOUPLE REFERENCE

POLYNOMIAL LINEARIZATION ERROR: Typically $< \pm 0.5^\circ$ C (-35° to +50°C), $< \pm 0.1^\circ$ C (-24° to +45°C).

INTERCHANGEABILITY ERROR: Typically $< \pm 0.2^\circ$ C (0° to +60°C) increasing to $\pm 0.4^\circ$ C (at -35°C).

CE COMPLIANCE

STANDARD (S) TO WHICH CONFORMITY IS DECLARED:
BS EN61326:2002

CPU AND INTERFACE

PROCESSOR: Hitachi H8S 2322

PROGRAM STORAGE: Up to 16 Kbytes for active program.

DATA STORAGE: 1 Mbytes SRAM standard (approximately 1,000,000 data values). Additional 2 Mbytes SRAM available as an option.

OPTIONAL KEYBOARD DISPLAY: 8-digit LCD (0.5" digits)

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

PARALLEL INTERFACE: 40-pin interface for attaching data storage or communication peripherals such as the CFM100 module

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: ~ 0.5 mA
1 Hz Sample Rate (one fast SE measurement): ~ 0.6 mA
100 Hz Sample Rate (one fast SE measurement): ~ 7.0 mA
100 Hz Sample Rate (one fast SE measurement ~ 20.0 mA w/RS-232 communication):

BATTERIES: Any 12 V battery can be connected as a primary power source. Several power supply options are available.

The Model CR2430 lithium battery for clock and SRAM backup has a capacity of 270 MAhr.

PHYSICAL SPECIFICATIONS

SIZE: 8.5" x 3.9" x 0.85" - Measurement & Control Module; 9.4" x 4.0" x 2.4" - with Wiring Panel. Additional clearance required for serial cable and sensor leads.

WEIGHT: 2 lbs

WARRANTY

Three years against defects in materials and workmanship.



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