EV+ Controller

SPECIFICATIONS

INPUT

Low-Level Spans from 10 to 100 mV for emf, thermocouple, Rayotube® or RTD inputs. Standard thermocouple, Rayotube and RTD ranges are on interchangeable plug-in modules. Linearization and reference-junction compensation are provided where applicable. With a 0-100 mV range, a controller can also accept the input from an 8888 Linearizer-Plus with a Rayotube or Spectray® heat-radiation detector, and be scaled for direct readout in F or C.

High-Level Spans of 0-4 and 1-5 V, and 0-16 and 4-20 mA, available for transmitter inputs; linearization is provided for thermocouple and RTD transmitter inputs. High-level spans with linear ranges can also be scaled by the user for direct readout in engineering units.

Input Impedance 1 megohm minimum.

Thermocouple Failsafe Upscale or downscale (field-convertible).

Noise Suppression Although digital equipment is especially sensitive to electrical noise, good wiring practice will normally assure satisfactory Electromax VPLUS operation. In very noisy environnments, however, suppression of noise at the source is required, and an optional Noise Suppression Kit is available.

OUTPUT CAPACITY

6011 C.A.T. 4-20 mA into 0-600 ohms; field-convertible to 0-20 mA into 0-600 ohms, or 0-5 or 1-5 mA into 0-2400 ohms.

6012 D.A.T. Isolated SPDT Form C contact rated at 5 A on 120 V or 1 A on 240 V, 50/60 Hz, resistive load. "OUTPUT" legend on front panel is illuminated during "on" time of cycle.

6013 D.A.T. Solid-state output from triac, 100 mA to 10 A, 120 V or 240 V, 50/60 Hz. "OUTPUT" legend on front panel is illuminated during "on" time of cycle. (If Suffix F is 43, Triac output will be 50 mA to 1A, 120 V, 50/60 Hz.)

6014 P.A.T. Solid-state output through two triacs rated at 50 mA to 1.0 A, 120 V or 240 V, 50/60 Hz. On automatic control, "-" or "+" touch-switch on front panel is illuminated when "decrease" or "increase" triac is energized.

NUMERICAL DISPLAY

Process Variable/Set Point Four digits plus decimal point, in left-hand front-panel display; 7-segment LEDs, covering 100% of range. Resolution, 1° F or C, or 1 count. Pressing "PROCESS VARIABLE/SET POINT" touch-switch selects display; red LED adjacent to "SET POINT" legend indicates when latter display is selected. (A red LED with the legend "REMOTE", adjacent to the touch-switch, lights when controller operates with remote set point.) Pressing "SET PT DECR" or "SET PT INCR" touch-switches below display raises or lowers local set point. The rate of change of set point is logarithmic, to facilitate making both small and large changes.

Output/Deviation Four digits plus decimal point in right-hand display; 7-segment LEDs, covering 0-100% of range (output) or ±100% of range or ±9999 degrees (deviation). Resolution, 1% for output, 1° F or C or 0.1% for deviation. Pressing "OUTPUT/DEVIATION" touch-switch selects display; red LED adjacent to "DEVIATION" legend indicates when the latter display is selected.

Displays are also used, in conjunction with touch-switches, to present values of functions during programming and calibration procedures.

AUTO/MANUAL TRANSFER

Local Bumpless/balanceless transfer from automatic to manual control, and vice versa, through touch-switches on front panel. Red LED behind Auto/Manual switch lights in the manual mode; adjacent "-" and "+" switches can then decrease or increase control output, at a logarithmic range of change.

Remote Remote transfer option permits switching controller from automatic to manual and back, with a manual output equivalent to (1) the last automatic-control output level, or (2) a Preset Output value programmed at the front panel. This option also permits (from the remote location) increasing or decreasing the manual output, switching to a remote set point for automatic control, switching to either reverse- or direct-acting control, or locking out panel-switch changes for security.

TUNING ADJUSTMENTS

Programmed by touch-switches at the pront panel; include:

Proportional Band 0.5 to 999.9% of input span; resolution, 0.1%.

Manual Reset For proportional-only control operation; OFF and 0 to 100% of output span; resolution, 1%.

Automatic Reset OFF and 0.01 to 99.99 repeats/minute, with a resolution of 0.01 repeat/minute, or (switch selectable) 0.005 to 9.999 repeats/minute with a resolution of 0.001 repeat/minute; configuration code selectable.

EV+ Controller Specifications

Rate OFF and 0.02 to 5.00 minutes; resolution, 0.01 minute.

Lag Time OFF and 1.00 to 30.00 seconds; resolution, 0.01 second.

Approach Two independent adjustments, for increasing and decreasing process variable: 0 to 100% of deviation; resolution, 0.1%.

Impulse Rate (D.A.T.) 1.0 to 20.0 cycles/minute; resolution, 0.1 cycle/minute.

Drive-Unit Sensitivity (P.A.T.) 80 to 100% of output; resolution, 0.1%.

Response Time *For Self-Tuning Option Only:* 0.1 to 99.99 minutes; resolution, 0.01 minute.

Set Point Upset *For Self-Tuning Option Only:* Percent of full scale PV input, 1.0 to 50.0%; resolution 0.1%.

Dual Tuning Parameters Proportional Band, reset, rate; secondary parameter spans same as primary.

Dual Tuning Parameter Hysteresis Off 0.1-5% input span; resolution, 0.1%.

Application Package dependent parameters:

Split-Range, Deadband — ±5.0% output; resolution, 0.1%.
Split-Range #2 D.A.T. Impulse Rate — Same as #1.
Input Weighing Factors; OFF, ±0-10.0; resolution, 0.1%.

Low Flow Cutoff 0-20% span; resolution, 0.1%.

REFERENCE-VOLTAGE OUTPUT

Provided for use on a drive-unit feedback slidewire (P.A.T. control) or a remote set-point or bias potentiometer: 5 V dc nominal, for a 100- to 1000-ohm slidewire.

PERFORMANCE SPECIFICATIONS

Accuracy Factory-calibrated to ±0.25% of input span, for all ranges.

Can be field calibrated for thermocouple ranges at reference conditions to:

±1°F or C for base-metal Type J, K or T, or Nicrosil-Nisil; or
±2°F or C for noble-metal Type B, R or S, W5RE/W26RE or Ni-Ni, 18% Moly.

Type E is ±1°F above -350°F, degrades nonlinearly to ±3°F at -450°F.

The calibration procedure is described in Appendix C.

Temperature Stability 6 uV per degree C maximum, including reference-junction compensation. *A detailed specification referring to individual thermocouple types is provided in the Operator's Manual.*

Common-Mode Rejection At reference conditions: 120 dB at 60 Hz for low-level input; 80 dB at 60 Hz for high-level input. 100 dB at 60 Hz for isolated input option.

Normal-Mode (Transverse) Rejection 50 dB at 60 Hz, for low- or high-level process variable input; 40 dB at 60 Hz, for auxiliary high-level input (remote set point).

Radio-Frequency Interference (RFI) Less than 0.5% of set-point or output span at a distance of 1 m (3.1 ft) from a transmitter (4 W at 27 MHz, 5 W at 154 MHz, 5 W at 461 MHz).

OPERATING SPECIFICATIONS

Reference Conditions Temperature: 25°C (77°F). Relative humidity: 40%. Supply voltage: 120 V, 50/60 Hz (or 240 V, 50/60 Hz). Power required: 22 VA. Source resistance: 10 ohms.

Rated Conditions Temperature: 4 to 55°C (40 to 131°F). Relative humidity: 90% at 40°C, noncondensing. Vibration: 5 to 15 Hz 1 mm displacement. 15 to 150 Hz at 0.5 g. Shock: Up to 1 g for 30 msec. Supply voltage: 120 V ± 10%, 50/60 Hz (or 240 V ±10%, 50/60 Hz). Source resistance, 2000 ohms, max.

Extreme Conditions Temperature: 0 to 60 C (32 to 140°F). Relative humidity: 50% at 60°C, noncondensing. Vibration: 5 to 15 Hz 1 mm displacement. 15 to 150 Hz at 0.5 g. Shock: Up to 5 g for 30 msec.

Storage Ratings Temperature: -10 to 70°C (14 to 160°F). Vibration: 5 to 15 Hz 1 mm displacement. 15 to 150 Hz at 0.5 g. Shock: Up to 10 g for 30 msec.

ALARMS

Two independently-set dual alarms are provided as a standard feature: HI/HI and LO/LO operation for either the process-variable or the deviation value, or HI/LO operation for each value. (Assignment of alarms is switch-selectable.) LED-illuminated legends—"ALM 1" and "ALM 2"—indicate when each alarm has been tripped. Range of alarm setting (programmed by touch-switch) is 0 to 100% of process-variable span, or 0 to ±100% of deviation span. Resolution is 1°F or C, or 0.1%; hysteresis, 0.25% of span, (0.1% of span in units mfg. after October 1984).

As an option, two SPDT Form C relays (Part Number 036766), energized on alarm trip in either direction, can be provided to actuate external devices; contact rating, 5 A at 120 V or 1 A at 240 V, 50/60 Hz.

TERMINAL CONNECTIONS

Connection of field wiring is made to #6 screw barrier terminals on a board inside the rear cover of controller. A cable within the case joins the dedicated terminal board to the slide-out controller chassis with a removable plug-in connector.

For isolated discrete digital inputs for remote operation, an optional connector can be provided at the rear of the case. For serial digital communication, an optional RS422/485 Interface can be provided at the rear.

EV+ Controller Specifications

CONSTRUCTION

Front Panel Comprises a monoplanar, dust-tight, nonglare switch panel, with opaque black background; transparent "windows" are provided for illuminated displays, labelled gray areas to iderntify touch-switches. Programming parameters ("F1 PROP BAND", etc.) are listed on panel, in program sequence. Hinged drop-down cover conceals programming switches when not in use; duplicate list of parameters (on inner surface of cover) permits notation of selected settings.

Chassis Slide-out steel chassis can be removed from the front without disconnecting field wiring.

Case Cast-aluminum case is designed for mounting from front of panel, with self-contained mounting hardware. Front bezel dimensions (DIN): 144 mm (w) x 144 mm (h) (5.7" x 5.7"); case, 136 mm (w) x 136 mm (h) (5.35" x 5.35"), and 305 mm (12") deep, behind bezel. Panel cutout requirements 138 x 138 mm (5.43" x 5.43").

Terminal Board Cover Finned cast aluminum; also functions as heat-sink for triac outputs up to 10 A.