Hoffman Controls
Recalibration Instructions

901-D and 901-DP Series
Multiple Input Logic

General

The 901-D Series Multiple Input Logic and 901-DP Pneumatic Input Logic are factory calibrated. When the 901-D and 901-DP are utilized with the standard factory calibration their output will provide a 24V AC proportional time base over the various spans as noted in Table 1.

If field calibration is required to accommodate input spans other than those described below, see I, II or III for various inputs for calibration instructions.

The 901-D and 901-DP Logics can be programmed for either reverse acting or direct acting:

Reverse Acting (RA) – as the temperature (measured variable) decreases, an increase in output (on time) of 24V AC occurs. (Normally used in a heating function.)

Direct Acting (DA) – as temperature (measurable variable) increases, an increase in output (on time) of 24V-AC occurs. (Normally used in a cooling function.)

The 901-D and 901-DP are factory programmed in the reverse acting mode with a factory standard 5 second time base. Time bases other than 5 seconds must be special ordered. The programming tab located at P17 on the board can be field positioned for either reverse acting or direct acting.

Logic

The 901-D and 901-DP Logics proportional input signal provides a 5 second time base interval (time "On" plus time "Off" of 24V AC output) for controlling SCR proportional and/or sequencing stages of electric heat. The proportional input signal will reset the time "On" to time "Off" periods of each 5 second interval as the signal error increases or decreases from set point. An increasing "on time" output is proportional to an increasing input signal error (reverse acting) until the "on time" is continuous over the entire time base interval.

Each Logic is capable of driving up to twenty one SCR triac circuits and/or a Sequencer with up to ten stages. When 900, 902, or 903 Series SCRs and 901 Sequencers are used in combination, the proportional input modulates and sequences over the same span. This type control is referred to as a Vernier System. Calibration is the same for both SCR triac (power switch) circuits and sequencers.

Input vs. Output Signal Values
5 Sec. Time Base Interval = 60 Cycles x 5 Sec. = 300 Cycles

Input Signal	Output Signal
Above Set Point	Off
Set Point	Off
50% of Span	150 "On" and 150 "Off" cycles
Full Span	300 Cycles, Full On
Above Span	300 Cycles, Full On

Field calibration of the Logic will allow the user to effect a

Factory Calibration Table 1

Logic Model	Thermostat Manufacturer	Thermostat/Input Signal Range	Factory Standard Calibration Zero @	Span @
901-D	Hoffman — 906-13W, 13AW, 13ADRW, 13DRW	10K @ 77°F	Set Point (Heating)	-2°F
901-D	Hoffman — 906-19DDRW	770 mV @ 77°F	Set Point (Heating)	-7°F
901-D	Other	0 – 135 Ohms	10 Ohms	130 Ohms
901-D	Other	2 – 20 VDC	2 VDC	10 VDC
901-D	Other	2 – 20 mA	2 mA	10 mA
901-DP	Other	0 – 15 psi	9 psi	13 psi

Note: 901-D Logics provide a 20V-DC power supply. All 906 Series Thermostats are calibrated to temperature.

specific "zero" (start), and the span (proportional band) will provide the range to effect 100% output. Although the zero and span potentiometers are factory calibrated, they may be field adjusted. An LED "on time" light on the Logic board serves as a visual indicator of the time base interval function. Monitoring the 24V-AC output terminals 3-and 4 with a voltmeter will verify operation of the proportional output.

Pre-Calibration Instructions

Before Field Calibration Always:

1. Check wiring for proper installation per wiring diagram.
   - 900/901/906 Series Wiring Diagrams
   - 902/903 Series Product Data
   - 906 Series Electronic Thermostat Product Data
2. Apply 24V AC power to logic for 5 minutes before making any field calibration adjustments.
3. Even though an "on time" LED light is provided, monitoring the Logics 24V AC output terminals 3 and 4 with a voltmeter is recommended. (LED "On" will coincide with 24V AC output.)
4. The total time of one "On" period and one "Off" period equals one time base interval (5 seconds).

Calibration Instructions

Direct or Reverse Acting Options

1. ***Important:*** 901-D & 901-DP Logics are furnished factory **programmed in the Reverse Acting Mode**.
2. Verify setting for either Reverse or Direct Acting Mode of operation by locating P17 near the center of the board.
3. **Note:** A factory installed jumper tab will be on the center pin and right pin (RA).
4. Program mode options as follows:

Reverse Acting **Direct Acting**

I. 901-D Logic with 906 Series Thermostats, Reverse Acting

906 Series Thermostat Options

	Set Point	Range
13W,13AW,13ADRW,13DRW	Visible	65 – 85
19DDRW	Visible	30 – 160

NOTE

The 906 Series Electronic Thermostats are factory temperature calibrated and do not require field calibration. Do not break seal or remove set point dial from potentiometer shaft.

1. Install and/or verify wiring is in accordance with the Precalibration Instructions.
2. Turn the ZERO (R82) pot 20 full turns CW.
   Turn the SPAN (R81) pot 20 full turns CCW.
3. ZERO Adjust:
   a. Turn the thermostat to the prevailing measured ambient, as sensed by the thermostat or remote sensor. (Calibration accuracy will be determined by the accurate measurement of the temperature.)
   b. Turn the *ZERO* pot slowly CCW until the AC voltmeter indicates zero voltage at the 24V AC output terminals 3 and 4. (LED should be Off.)
4. SPAN Adjust:
   a. Turn the thermostat set point up the °F scale to the desired span (proportional band). (Calibration accuracy will be determined by the accurate movement of set point adjustment.)
   b. Turn the span pot slowly CW until the 24V AC stays On. (LED On continuously.) (Voltage stops pulsing and remains On continuously.)
5. When monitoring 24V AC output pulses (LED light), allow more than 5 seconds before re-adjusting pots.
6. Interaction between ZERO and SPAN pots requires, repeating steps 3, 4 and 5 (above), at least three times to assure accurate calibration.

CAUTION

Performance of 900, 902/903 Series Power Switch(es), Logics and Sequencers are directly related to the response time of the thermostat selected. Thermostats with slow response (large time constants) should not be used.

II.906-D Logic with 0-–-135 Ohms, 2-–-20V-DC or 2-–-20mA inputs, Reverse Acting

1. Install or verify field wiring in accordance with Precalibration Instructions.
2. Turn the ZERO pot (R82) 20 full turns CW.
   Turn the SPAN pot (R81) 20 full turns CCW.
3. ZERO Adjust:
   a. Furnish the input signal in ohms, VDC, or mA at the required signal value selected for set point.
   b. Turn the *ZERO* pot slowly CCW until the AC voltmeter indicates zero voltage at the 24V AC output terminals 3 and 4. (LED should be Off.)
4. SPAN Adjust:
   a. Furnish the input signal in ohms, VDC, or mA as required for full span.
   b. Turn the span pot slowly CW until the 24V AC stays On (LED On continuously). (Voltage stops pulsing and remains On continuously.)
5. When monitoring 24V AC pulses, (LED light), allow more than 5 seconds before re-adjusting.
6. Interaction between zero and span pots requires repeating instruction steps 3, 4, and 5 (above), at least three times to assure accurate settings.

III. 901-DP Pneumatic Signal Input (0-–-15 psi), Reverse Acting

1. Install or verify field wiring in accordance with Precalibration Instructions.
2. Turn the ZERO (R82) pot 20 full turns CW.
   Turn the SPAN (R81) pot 20 full turns CCW.
3. ZERO Adjust:
   a. Adjust the input pressure to the desired starting point.
   b. Turn the ZERO pot slowly CCW until the AC voltmeter indicates zero voltage at the 24V AC output terminals 3 and 4. (LED should be Off.)
4. SPAN Adjust:
   a. Adjust the input pressure signal to the higher pressure as required for full heating for the desired proportional band.
   b. Adjust the SPAN pot slowly CW until the voltmeter stays On continuously (voltage stops pulsing and LED stays On continuously).
5. When monitoring 24V AC pulses (LED light), allow more than 5 seconds. before re-adjusting.
6. Interaction between zero and span pots requires repeating instruction steps 3, 4, and 5 (above), at least three times to assure accurate setting.

Calibration Instructions for Direct Acting Applications

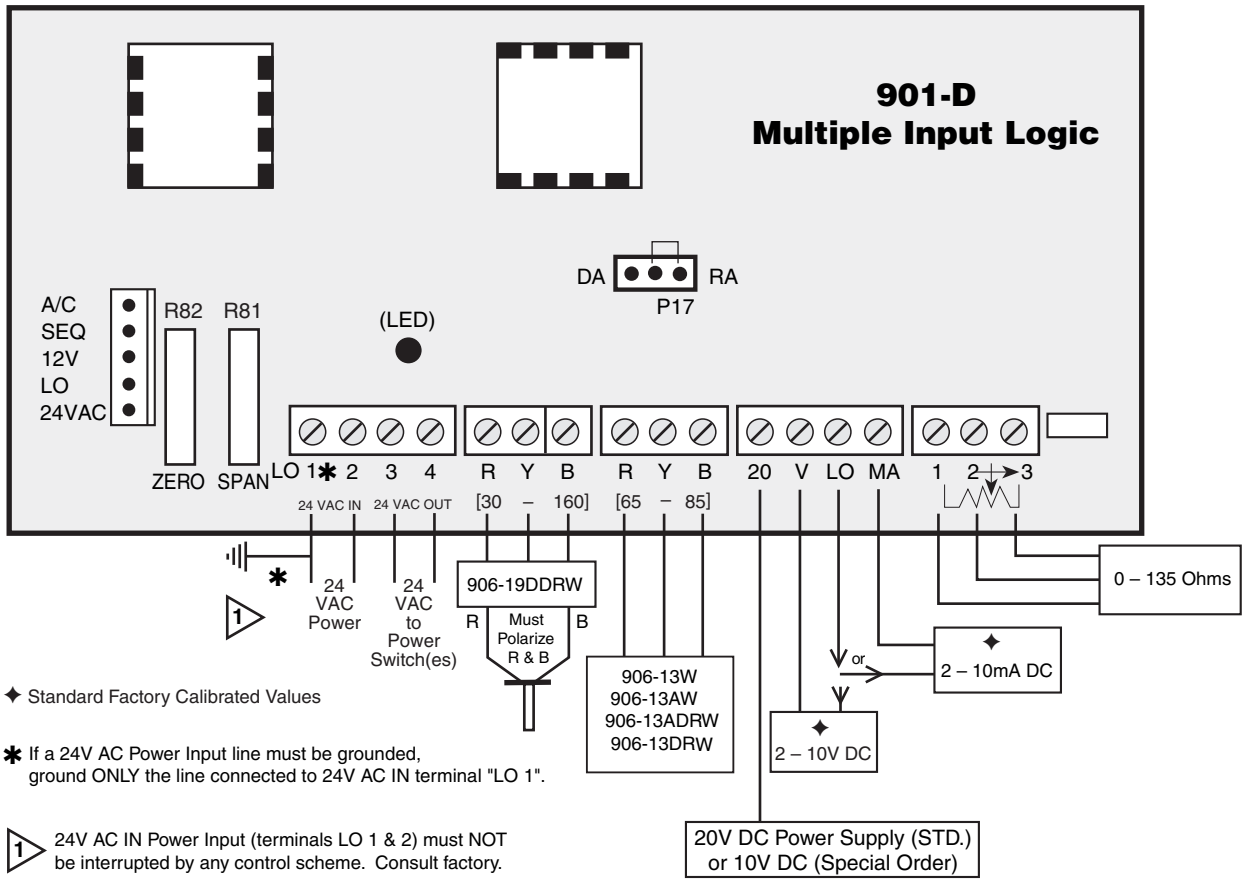
For All Inputs – Direct Acting, Volts DC, mA & Ohms

Important: Locate the Jumper Tab for Direct Acting and verify correct position. (See Tab position as depicted in number 4 under "Direct or Reverse Acting Options" on page 2.)

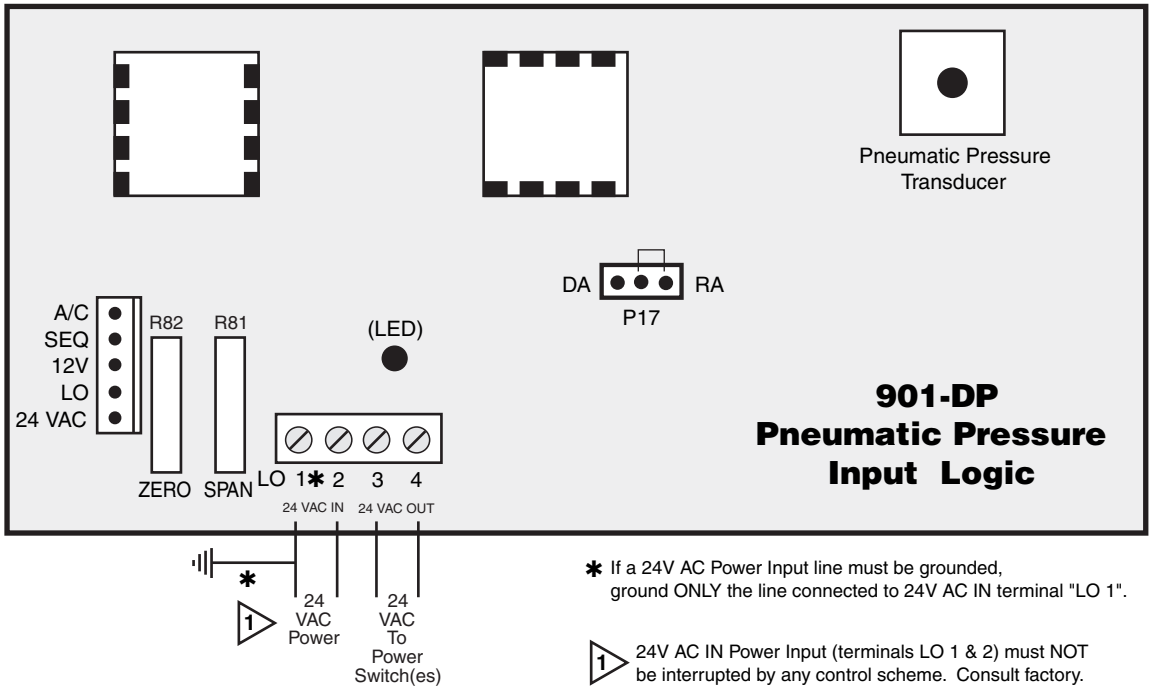
Follow same procedure as in Steps I, II, and III, except for the following CHANGE IN NOMENCLATURE:

When the 901-D is used in the Direct Acting Mode, the ZERO Adjust becomes the SPAN Adjust and the SPAN Adjust becomes the ZERO adjust.

1. Install or verify field wiring in accordance with Precalibration Instructions.
2. Turn the ZERO (R82) pot 20 full turns CW.
   Turn the SPAN (R81) pot 20 full turns CCW.
3. SPAN Adjust – using ZERO pot
   a. Adjust the signal input to the value required for full span (output). (Minimum input, i.e., 4mA DC.)
   b. Adjust ZERO pot (R82) CCW until the 24VAC OUT and LED stay ON continuously.
4. ZERO Adjust – using SPAN pot
   a. Adjust the signal input to the value required for set point (maximum input, i.e., 20mA DC).
   b. Adjust SPAN pot (R81) CW until the AC Voltmeter indicates zero voltage (24VAC OUT and LED stay OFF continuously).
5. When monitoring 24V AC pulses (LED light), allow more than 5 seconds before re-adjusting.
6. Interaction between zero and span pots requires repeating instruction steps 3, 4, and 5 (above), at least three times to assure accurate setting.



901-D Multiple Input Logic Wiring Diagram



901-DP Pneumatic Pressure Input Logic Wiring Diagram

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