

# MOOG

## N123-136 Series

### Snap Trac DC Level Detector

#### SPECIFICATIONS

##### Inputs:

Three individual inputs on terminals 1, 3 and 4.

- Input impedance can be determined by assuming pin 2 of A1A is grounded.
- Input trip levels (at terminals 3 or 4) can be set from  $\pm 0.05$  to  $\pm 1.0$  VDC with approximately 5% turn-off hysteresis.
- Input signals to  $\pm 100$  volts (will not harm circuit).

Differential input can be provided between terminals 3 and 4.

- Remove R3; remove D1 and D2
- Make R2 = R4 and R1 = R8 using resistors of  $10K\Omega$  to  $100K\Omega$ .

##### Outputs:

Relay K1 and transistor Q1 ON for inputs above + switching level.  
Relay K2 and transistor Q2 ON for inputs below - switching level.

The N123-136 DC Level Detector provides on/off switching outputs that are tripped at setable levels of the DC input (usually one + level and one -).

LED's provide visual indication of switching. Typical applications include set-point detection, null detection and "bang-bang" servocontrol.

Contact ratings < 5 amp resistive at 24 VDC or < 2 amp resistive at 115 VAC.

Transistor rating is 100 mA at 24 VDC.

- ⚠ For + and - switching from one input, connect terminal 9 to terminal 10 and use K1 or K2 contacts.

##### Drift:

(referred to input at terminal 3 or 4)  
<  $\pm 0.15$  mV/°C from 0°C to 50°C.

##### Transient Response:

Relay response:

- Fast-on/fast-off = 10 ms/15 ms
- Slow-on/fast-off = 100 ms/15 ms
- Slow-on/slow-off = 100 ms/105 ms

Transistor response:

- Fast-on/fast-off = 0.3 ms/0.3 ms
- Slow-on/slow-off = 90 ms/90 ms

Other slow times by selection of C4&C5.

##### Power Required:

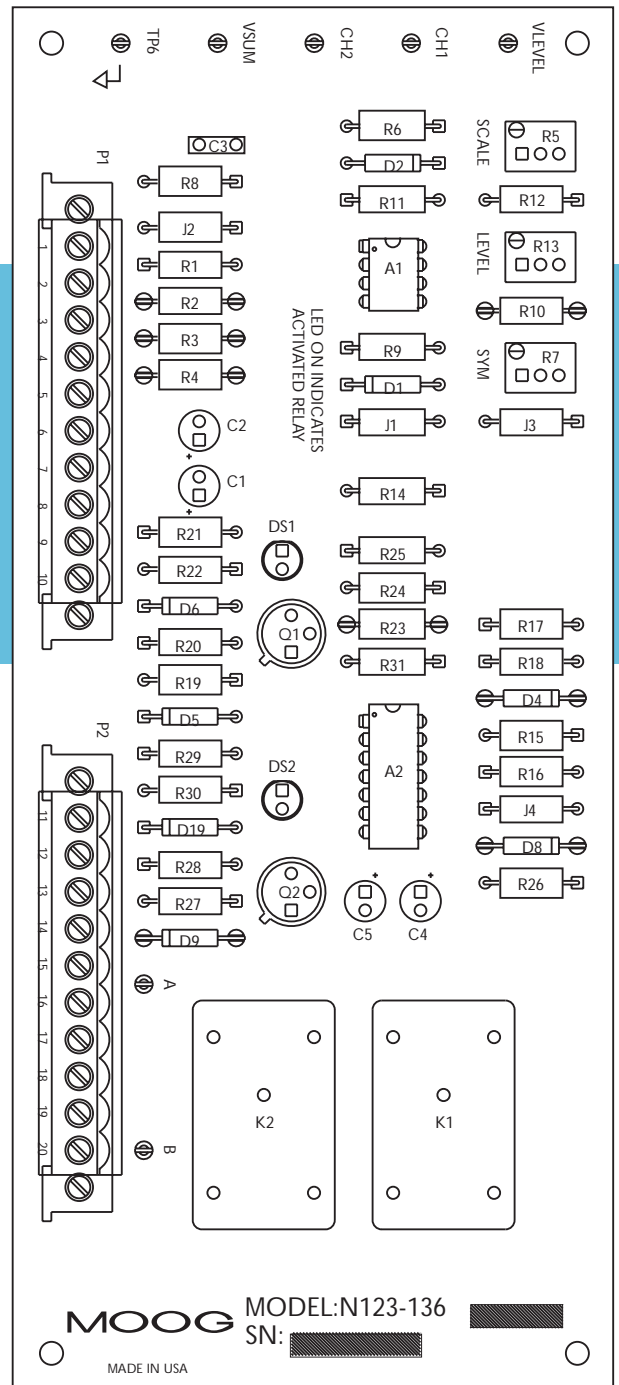
$\pm 15$  VDC at  $\pm 14$  mADC, regulated, 3-wire

( $\pm E$ ) at terminals 5, 6, and 7 and;

+14 VDC to +22 VDC, unregulated, 3-wire

(+V) at terminal 13.

This power is available from Model N121-132A Snap Trac Servocontroller.

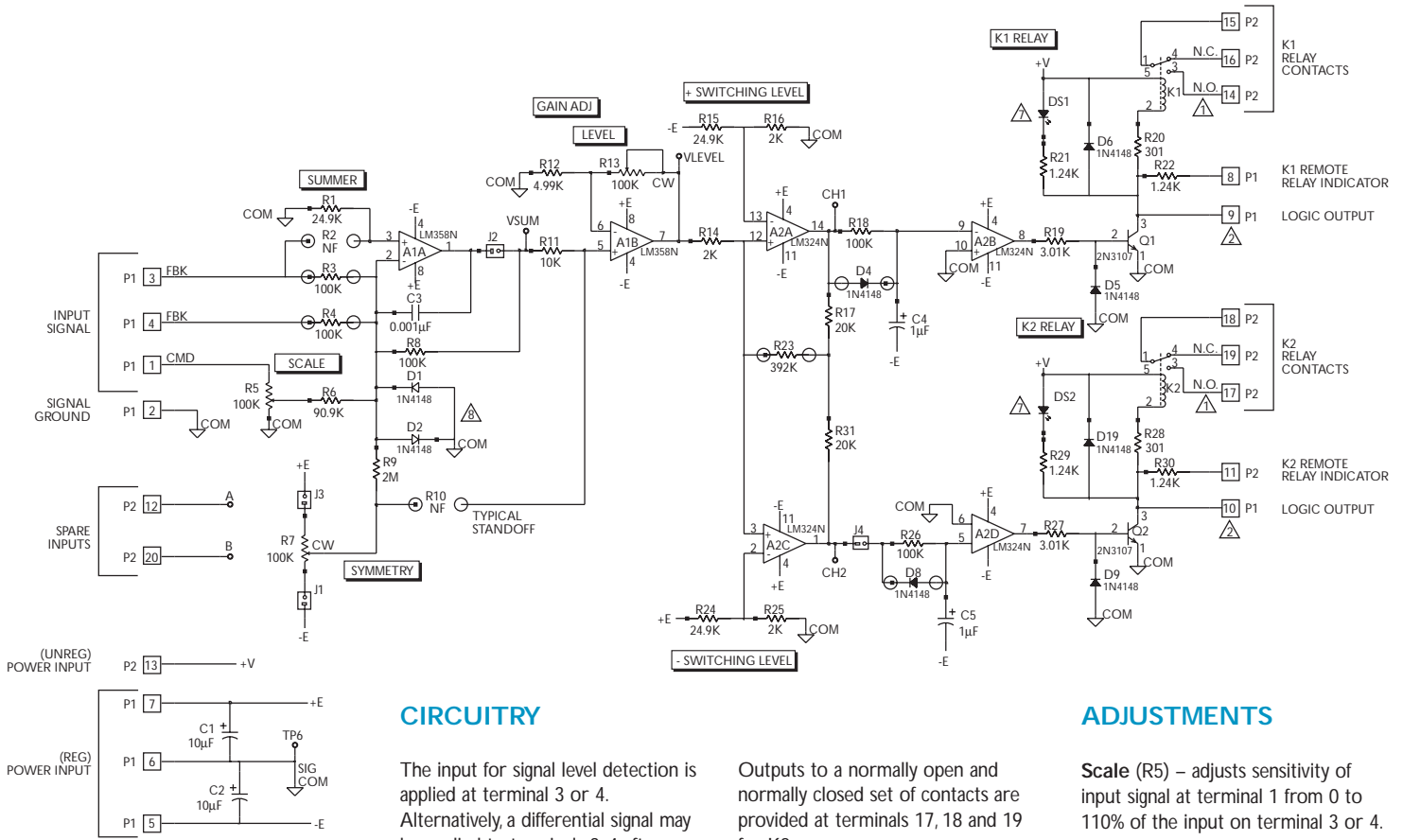


#### DIMENSIONS

3.25 in x 7.50 in long

Maximum Component Height: 1.27 in

# N123-136 DC LEVEL DETECTOR SCHEMATIC



## CIRCUITRY

The input for signal level detection is applied at terminal 3 or 4. Alternatively, a differential signal may be applied to terminals 3, 4 after making suitable resistor changes.

When this level detector is used as a set point detector or “bang-bang” servoamplifier, the feedback signal should be applied to terminal 3 or 4 with the command applied to terminal 1. Summation of the inputs is provided by amplifier A1A with gain adjustment from amplifier A1B.

Amplifiers A2A and A2C are biased so that their outputs are saturated positive and negative, respectively, for zero signal inputs. These biases are approximately -1.1 VDC at pin 13 and ±1.1 VDC at pin 2 of A2C. Therefore, A2A will switch negative when pin 7 of A1B goes more negative than -1.1 VDC. Likewise, A2C will switch positive when pin 7 of A1B goes more positive than 1.1 VDC. Switching of A2A negative turns on relay K1 through driving transistor Q1. Switching of A2C positive turns on relay K2.

Outputs to a normally open and normally closed set of contacts are provided at terminals 17, 18 and 19 for K2.

LED's DS1 and DS2 are turned on when their respective relays, K1 and K2 are energized. Terminals 8 and 11 can be used for remote placement of relay indicators.

Components D4-C4 and D8-C5 provide time delay in the on/off switching of relays K1 and K2, respectively.

- slow on, fast off
- slow on, slow off
- fast on, slow off
- fast on, fast off

Logic compatible outputs from Q1 and Q2 can be used for passive pull-downs in a remote logic circuit. Remove D6, D10, R20, R21, R22, R28, R29 and R30. Use terminals 9 and 10 for logic outputs.

## ADJUSTMENTS

**Scale (R5)** – adjusts sensitivity of input signal at terminal 1 from 0 to 110% of the input on terminal 3 or 4.

**Level (R13)** – provides 21:1 range of trip level setting.

**Symmetry (R7)** – adjusts symmetry between + and - trip levels.

**MOUNTING:**  
Mount using Curtiss type TR-3 plastic track (Moog P/N 65419-1)

## FEATURES

- VSUM – Test point
- VLEVEL – Test point (gain)
- CH1 – Test point
- CH2 – Test point
- TP6 – Test point (common)
- J1 to J4 – 0Ω Jumpers (factory installed)

### NOTES:

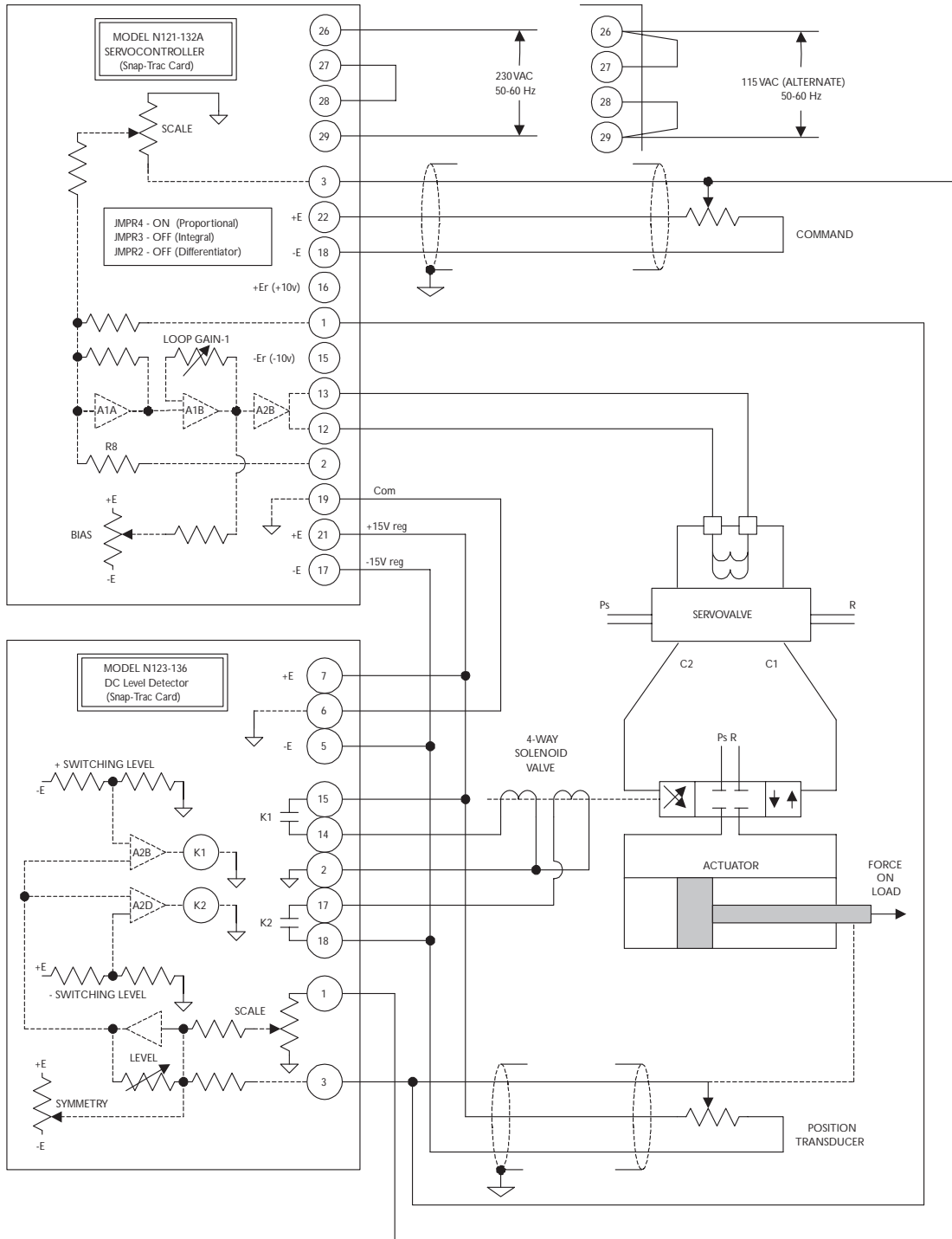
1. N.C. – NORMALLY CLOSED CONTACT  
N.O. – NORMALLY OPEN CONTACT
2. SEE OUTPUT SPECIFICATIONS
3. NF – NOT FURNISHED
4. ■ – PIN 1 (SQUARE PIN)
5. ⊖ – INDICATES COMPONENT STANDOFF
6. CW – CLOCKWISE
7. ILLUMINATED LED'S FOR K1 AND K2 INDICATES RELAY IS ACTIVATED OR ENERGIZED.
8. DIODES D1 AND D2 PROTECT STAGE A1A FROM INADVERTENT OVER-SIGNAL CONDITIONS. WHEN A1A IS USED AS A DIFFERENTIAL AMPLIFIER (R3 REMOVED, SUITABLE RESISTOR R2 INSERTED), DIODES D1 AND D2 SHOULD BE REMOVED.

## K1/K2 RELAY OPERATION

Apply +15 VDC to P2-13 and +10VDC to P1-4. Adjust SCALE pot (R5) full CCW and LEVEL pot (R13) full CCW. Monitor voltage at VLEVEL - Test Point. Adjust voltage source at P1-4. LED 'DS2' will light-up and K2 energizes when voltage at VLEVEL is > +1.1VDC (more positive). Adjust voltage source at P1-4. LED 'DS1' will light-up and K1 energizes when VLEVEL is > -1.1VDC (more negative).

## POSITION SERVO CONTROL WITH RAPID TRAVERSE

Model N123-136 DC Level Detector may be used in a Position Servo application with Rapid Traverse. A 4-way solenoid valve is used, along with the Level Detector, to obtain the high flow of a large valve while maintaining the precise positioning of a lower flow servovalve. Model N121-132A Servocontroller card is used as a proportional servoamplifier driving a low-flow servovalve to obtain 'accurate' positioning of the actuator. When point-to-point commands become sufficiently large (adjustable by level pots), N123-136 activates the appropriate relay (K1 or K2). This energizes a 4-way solenoid valve which provides high-flow to the actuator. The response time of the solenoid valve must respond quickly to be compatible with the system dynamic requirements.



# **MOOG**

**Industrial Controls Division**

Moog Inc., East Aurora, NY 14052-0018

Telephone: 716/655-3000

Fax: 716/655-1803

Toll Free: 1-800-272-MOOG