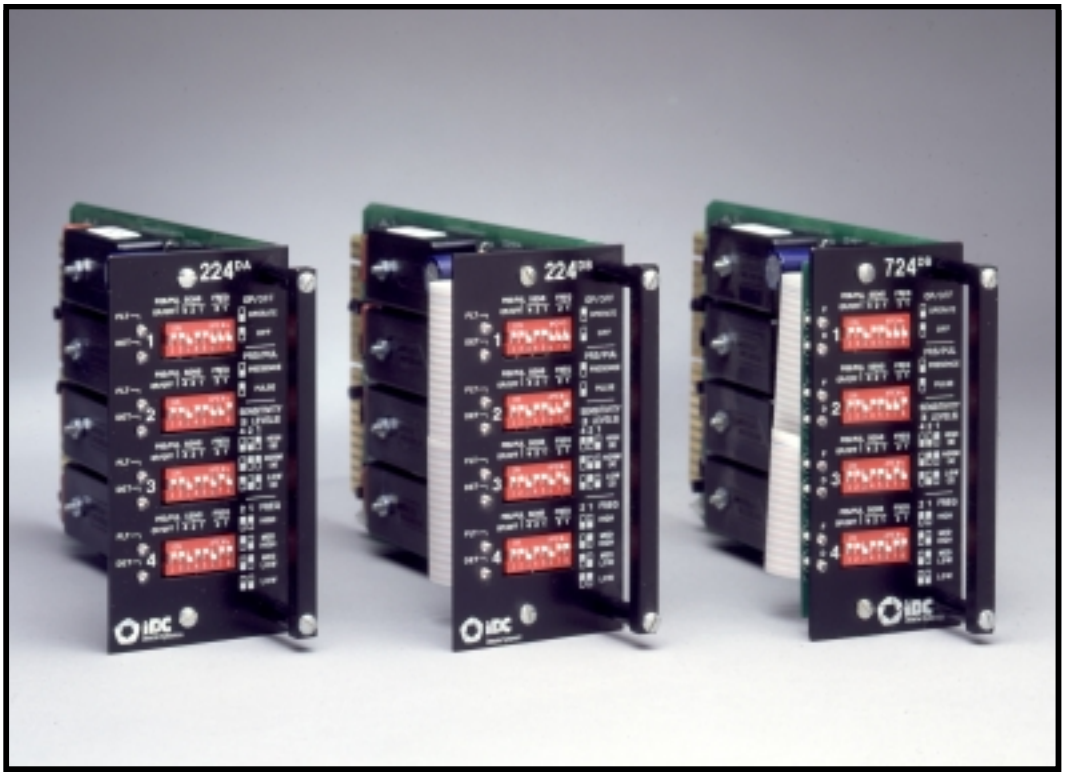
# U.S. Traffic Corporation

*Manufacturers & System Engineers*

# Models
# 224DA
# 224DB*
# 724DA
# 724DB*

## Four Channel Digital Loop Detector

*** (with Failsafe Output)**




**Features & Benefits**

- **FAULT indicator and DETECT indicator for each channel.**
- **TS 2 type output on "DB" models.**
- **Advanced digital microprocessor design.**
- **Each loop is sequentially scanned to minimize crosstalk and reduce power consumption.**
- **Front panel capability for selection of four loop frequencies, eight sensitivity levels, and two operating modes (pulse or presence).**
- **Four solid state outputs.**
- **Programming of the detector is accomplished by DIP switches for sensitivity, frequency, and mode selections.**
- **Two front panel light emitting diodes (LED) provided for each channel.**
- **Each loop circuit is continuously monitored to detect intermittents and other faults.**
- **The Winky-Blink™ loop monitor remembers and indicates intermittent and failed loops.**
- **Meets all applicable NEMA specs and the California/New York 20 Joules lightning test.**

IDC Detector Systems ®

TRAFFIC CONTROL SYSTEMS SECTION NEMA MEMBER

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**Self-Tuning:** Operational within one second after application of power or after a reset command. 30 seconds of operation is required before full presence time is possible.

**Environmental and Drift Tracking:** Fully self-compensating for environmental changes and component drift over full temperature range and entire loop inductance range.

**Loop Inductance Range:** 50-2,000 microhenries with Q factor of 5 or greater.

**Loop Feeder Length:** Up to 5,000 feet (1500 m) maximum with proper feeder cable and appropriate loops.

**Loop Input:** Transformer isolated.

**Grounded Loop Operation:** The loop isolation transformer allows operation with poor quality loops, including a single point short to ground.

**External Reset:** Switch closure between D.C. Common (pin A) and the reset line (pin C) for 15 microseconds or longer will reset detector channels.

**Manual Reset:** Channels of the detector may be manually reset by removing power momentarily. An individual channel may be manually reset by momentarily changing the sensitivity setting, by momentarily changing the PRS/PUL switch, or by momentarily moving the OP/AMP switch to OFF and back to ON.

**Lightning Protection:** The detector can tolerate, without damage, a 10 microfarad capacitor charged to 2,000 volts discharged directly into the loop input terminals, or a 10 microfarad capacitor charged to 2,000 volts discharged between either loop terminal and earth ground.

**Intermittent Loop Monitor:** If the total inductance of the detector input network exceeds the specified inductance range or takes a step change of more than 25% from the operation inductance, the detector will generate a continuous call and the front panel Detect and Fault LEDs will both be on steady. The continuous call output will remain until the faulty loop condition is corrected. If the faulty loop self-heals, the Detect LED and the detector output will resume normal operation and the Fault LED will begin repeating bursts of three blinks, the Winky-Blink™ mode. The Fault indicator will continue in the Winky-Blink™ mode until the detector is manually reset or a power interruption occurs, a feature that helps identify intermittent loop problems not present during troubleshooting.

**Loop Frequency:** Four selectable frequencies (normally in the range of 15 - 84 kilohertz) are provided for each channel.

**Sequential Scanning:** The four loops are alternately turned on and off to minimize crosstalk.

**Failsafe Output (224DB/724DB):** Each channel output generates a continuous call output to the controller when power to the detector is removed.

**Sensitivity:** Vehicle detection results from a sufficient negative change in loop inductance (-ΔL/L).

| EIGHT SELECTABLE SENSITIVITY SETTINGS | | | |
|---|---|---|---|
| **Sensitivity** | **-ΔL/L** | **Sensitivity** | **-ΔL/L** |
| Level 7 | 0.01% | Level 3 | 0.16% |
| Level 6 | 0.02% | Level 2 | 0.32% |
| Level 5 | 0.04% | Level 1 | 0.64% |
| Level 4 | 0.08% | Level 0 | 1.28% |

**Channel Off State:** When the front panel OP/OFF DIP switch is set to off, the output is off and the channel is disabled and reset.

**Detect Indicator Operation:** High intensity red light emitting diode (LED) indicates output status of each detector channel.

- CALL OUTPUT: On steady (presence mode) or on for 125 milliseconds (pulse mode) while vehicle is being detected.
- FAILED or OUT-OF-RANGE LOOP CONDITION: Steady on while fault exists. If fault self-heals or is cleared without a reset, the indicator displays the call output again.

**Fault Indicator Operation:** High intensity red light emitting diode (LED) indicates status of each detector channel loop input.

- NORMAL: No indication.
- FAILED or OUT-OF-RANGE LOOP CONDITION (existing fault): On steady. Note that the Detect indicator is also on steady.
- FAILED or OUT-OF-RANGE LOOP CONDITION (fault memory): If fault self-heals or is cleared without a reset, the indicator emits the Winky-Blink™ signal of three 50 ms blinks, 50 ms apart, which repeats once per second. (NOTE: If loop frequency is manually changed, the fail indication may appear. Reset the channel if this occurs.)

**Output Conditions Table:**

| TABLE 1 - 224DA/724DA OUTPUT TRANSISTOR CONDITIONS | | | | | |
|---|---|---|---|---|---|
| | **Detector Power OK** | | | | **Detector Power Out** |
| | **Loop Normal** | | **Loop Failed** | | |
| Output | Car | No Car | Car | No Car | |
| Presence | On | Off | On | On | Off |
| Pulse | Mom. On | Off | On | On | Off |

| TABLE 2 - 224DB/724DB OUTPUT TRANSISTOR CONDITIONS | | | | | |
|---|---|---|---|---|---|
| | **Detector Power OK** | | | | **Detector Power Out** |
| | **Loop Normal** | | **Loop Failed** | | |
| Output | Car | No Car | Car | No Car | |
| Presence | On | Off | On | On | On |
| Pulse | Mom. On | Off | On | On | On |
| On state depends on output being connected to an input of a powered-up NEMA controller. | | | | | |

# Specifications

**Response Time:**

| SENSITIVITY | RESPONSE TIME | | SENSITIVITY | RESPONSE TIME | |
|---|---|---|---|---|---|
| | Min. | Max. | | Min. | Max. |
| Level 0 | 10 ms | 50 ms | Level 4 | 10 ms | 50 ms |
| Level 1 | 10 ms | 50 ms | Level 5 | 10 ms | 50 ms |
| Level 2 | 10 ms | 50 ms | Level 6 | 10 ms | 50 ms |
| Level 3 | 10 ms | 50 ms | Level 7 | 10 ms | 50 ms |

**Modes:**

- PRES: Presence mode with a hold time of four minutes minimum (regardless of vehicle size) and typically 60 to 90 minutes for a car.
- PULSE: In the pulse mode, each vehicle generates a pulse output of 125 ± 25 milliseconds. Should a vehicle remain over the loop for two seconds or longer, the detector will tune out the vehicle such that the remainder of the loop zone detects subsequent vehicles after two seconds. When the vehicle leaves the loop, the detector resumes full sensitivity within 0.75 seconds.

**Output Circuit Ratings:**

- **224DA/724DA**: Optically coupled transistors; 36 VDC maximum collector to emitter; 50 milliamps maximum collector current. The transistor saturation level is 1.2 VDC maximum. The output transistor is protected with a 36 volt transorb connected across the emitter and collector.
- **224DB/724DB:** Darlington transistor optically isolated from each channel output; 36 VDC maximum collector to emitter; 50 milliamps maximum collector current. The transistor saturation level is 1.2 VDC maximum. The output transistor is protected with a 36 volt transorb connected across the emitter and collector.

**Operating Power:** 16 VDC to 30 VDC, 80 milliamps max

**Operating Temperature:** -40°F to 180°F (-40°C to +82°C)

**Connector:** 2 x 22-pin edge card connector with 0.156 inch contact centers. Key slots are located between B and C, M and N.

**Size:** Edge card connector is centered on the 4.5" (114 mm) edge.

- Model 224DA/DB: 4.5" H x 6.87" x 2.25" (114 x 174 x 57 mm)
- Model 724DA/DB: 4.5" H x 6.87" x 2.00" (114 x 174 x 51 mm)

**Weight:**

- 224DA/DB: 10 oz (283 grams)
- 724DA/DB: 9 oz (255 grams)

**Pin Assignments:**

| 224DA/DB, 724DA/DB - PIN ASSIGNMENTS | | | |
|---|---|---|---|
| **Pin** | **Function** | **Pin** | **Function** |
| A | Power/Logic Common | M | Reserved |
| 1 | Reserved | N | Reserved |
| B | +24 VDC Power | 13 & P | Loop Input, Ch. 3 |
| 2 | Reserved | 14 & R | Loop Input, Ch. 3 |
| C | Reset | S | Output, Ch. 3 (+) |
| 4 & D | Loop Input, Ch. 1 | T | Output, Ch. 3 (-) |
| 5 & E | Loop Input, Ch. 1 | 17 & U | Loop Input, Ch. 4 |
| F | Output, Ch. 1 (+) | 18 & V | Loop Input, Ch. 4 |
| H | Output, Ch. 1 (-) | W | Output, Ch. 2 (+) |
| 8 & J | Loop Input, Ch. 2 | X | Output, Ch. 2 (-) |
| 9 & K | Loop Input, Ch. 2 | Y | Output, Ch. 4 (+) |
| L | Chassis Ground | Z | Output, Ch. 4 (-) |
| Key slot located between B & C, M & N. | | | |

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