

Watchdog Timer Modules

Standard I/O

WDT5D Series

WDT12D
WDT15D
WDT24D

Overview

WDT5D Series Watchdog Timer Modules use patented *Digital* timing technology to monitor control system integrity. Packaging provides direct plug-in compatibility with Industry Standard I/O racks and sockets. Fixed timeouts are available ranging from 31 milliseconds to more than 1 hour using crystal-based timing accuracy (see *timing table*).

Loss of Control caused by CPU latch-up, control system faults, as well as communications problems and power failures can be detected. A versatile DRY contact output de-energized upon "Loss of Control" which can be used for ALARM, SHUTDOWN or RESET.

WDT5D Series Watchdog Timer Modules monitor activity from the control system by detecting on/off transitions with an edge-triggered input. During normal operation, the internal timer is reset by control line activity and the DRY contact output remains energized. When control is lost, the timer times out and de-energizes the output contact, indicating "Loss of Control".

Available in 5V, 12V, 15V & 24V Logic Voltages.

I/O Compatibility

0.6" Standard I/O
Classic I/O types
70 types



DIGITAL

Product Features

- ▶ System Fail-Safe*
- ▶ Precise 1% Digital Timing
- ▶ Versatile DRY Contact Output
- ▶ Fits Standard I/O Racks
- ▶ Blue I/O Case
- ▶ High Reliability
- ▶ Captive #4-40 Screw
- ▶ Operating Temp -20°C to +60°C
- ▶ 3 Year Factory Warranty**
- ▶ Fully Encapsulated

Recommended Operating Parameters

SYMBOL	PARAMETER	LIMITS			UNIT	CONDITION
		MIN	TYP	MAX		
Vcc	Supply Voltage (WDT5D) (WDT12D) (WDT15D) (WDT24D)	2.95 9.50 12.00 20.00		5.25 14.00 18.00 28.00	Vdc	Pins 3 & 5
Icc	Supply Current		12	18	mAdc	
TA	Ambient Temp.	-20		+60	°C	Operating
fmax	RESET (WDI) Toggle Frequency	1/timeout		1	MHz	
Tin	RESET (WDI) Period	1		T	µSec	Edge to Edge
T	Standard Timeout	1.98	2	2.02	Sec	
VIL	Input Logic Voltage Low		1.0	0.8	V	WDT5D
VIH	Input Logic Voltage High	3.0	2.4		V	WDT5D
Ri	Insulation Resistance	10 ¹⁰			OHMS	@ 20°C

- * Output relay de-energizes for all fault conditions.
- ** Refer to warranty section for limited warranty details.

Notes:

1. No Logic High Input Current is required. Unit may driven from Open-Collector logic.
2. Available by special order, units may be factory configured with an internal Pull-Down resistor ("PD" option) for use in sourcing logic applications, such as PLC's. Consult factory. See also PLC Compatible Watchdog Timers and Supervisory Modules, such as the P8-Series or P8D-Series for PLC applications, in this catalog.

Application Note to RESET Operating Systems requiring extended boot time: WDT5D Series may be configured with Extended Time-out (-Txxx), Fail-Closed (-C) and one-second reset (-R1).

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*Absolute Maximum Ratings

Supply Voltage (between pins 3 & 5).... See Vcc Max.
 RESET (WDI) Input (pins 4 & 5)..... ± 40V
 Contact Ratings (pins 1 & 2)..... See Output Contact Ratings
 Ambient Operating Temperature -20 to +60°C

***NOTE:** STRESSES ABOVE THOSE LISTED UNDER ABSOLUTE MAXIMUM RATINGS MAY CAUSE PERMANENT DEVICE DAMAGE. OPERATION AT THESE RATINGS FOR EXTENDED PERIODS MAY AFFECT RELIABILITY.

Output Contact Ratings

PARAMETER	STANDARD [FAIL-OPEN]	-C Option [FAIL-CLOSED]	-5A (Note 2) [FAIL-OPEN]	UNITS
Switching Voltage	175/250	140/200	250/30	ac/dc Volts
Switching Current	1	0.5	5	Amps
Carry Current	2	1	5	Amps
VA Rating	20	10	1250	VA
Initial Contact Resistance	0.15	0.15	0.03	Ohms

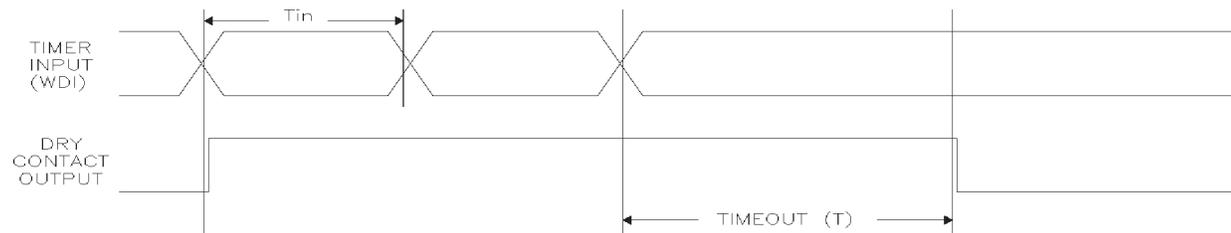
Notes:

1. All inductive loads must be suppressed to eliminate "inductive-kick" using an appropriate method. (i.e. - MOV, diode, RC snubber, etc.) For application assistance, please contact Brentek International Technical Support. 1-800-BRENTEK.
2. "-5A" Option is available for standard applications in 12V, 15V and 24V models only. Consult factory for 5V applications.

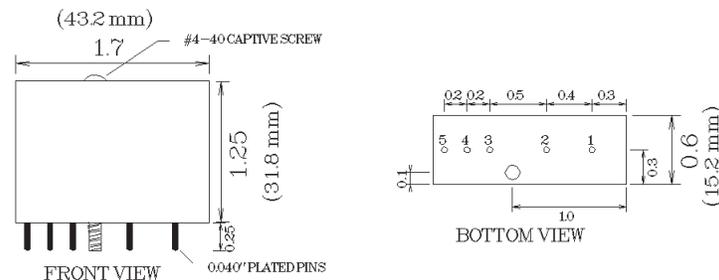
Operation

The WDT5D Watchdog Timer Module is reset on positive and negative going edges of the WDI input (pin 4). Timeout will occur only when the WDI input does not detect a transition within the fixed timeout period. While the WDT5D is reset, K1 remains energized maintaining a closed DRY contact output (pins 1 & 2) on standard types (FAIL-OPEN). The "-C" option provides a FAIL-CLOSED output. Loss of control (WDI input latched high, low or open) or loss of power is indicated by the DRY Contact output, providing a very high level of control system integrity.

Timing Diagram - (Refer to option-specific Timing Diagrams for "-R" and "-R1" options.)



Dimensions



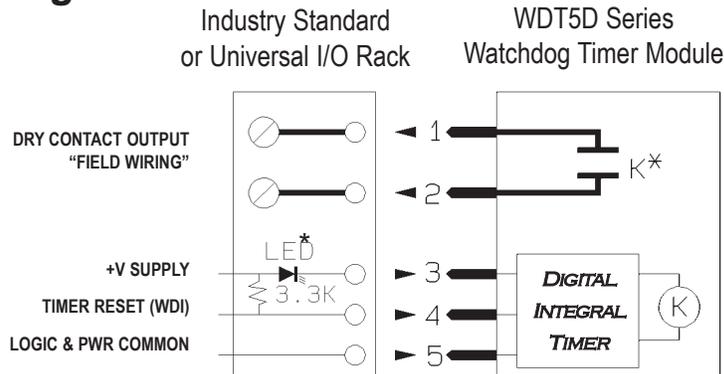
Units are in inches unless noted otherwise.

Watchdog Timer Modules

WDT5D Series

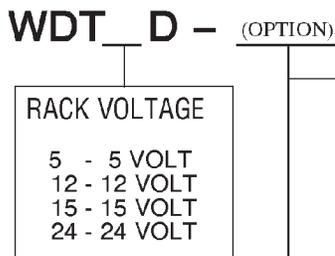
WDT12D
WDT15D
WDT24D

Connection Diagram



*Note: In some I/O sockets, LED may be dimly lit in the de-energized state.

Part Numbering



*Standard time-out options.

OPTION	TIMEOUT	ACCURACY	OPTION	TIMEOUT	ACCURACY
-T0.031	31 mSEC	+/- 2 mSEC	-T16	16.0 SEC	+/- 1%
-T0.062	62 mSEC	+/- 2 mSEC	-T32	32.0 SEC	+/- 1%
-T0.12	125 mSEC	+/- 2 mSEC	-T64	64.0 SEC	+/- 1%
-T0.25	0.25 SEC	+/- 1%	-T128	2 MIN, 8 SEC	+/- 1%
-T0.5	0.5 SEC	+/- 1%	-T256	4 MIN, 16 SEC	+/- 1%
-T1.0	1.0 SEC	+/- 1%	-T512	8 MIN, 32 SEC	+/- 1%
STANDARD	2.0 SEC	+/- 1%	-T1024	17 MIN, 4 SEC	+/- 1%
-T4.0	4.0 SEC	+/- 1%	-T2048	34 MIN, 8 SEC	+/- 1%
-T8.0	8.0 SEC	+/- 1%	-T4096	68 MIN, 16 SEC	+/- 1%

*Consult factory for time-outs not listed.

STANDARD FAIL OPEN

- C FAIL CLOSED
- 5A 5A FAIL OPEN*

TIME-OUT RESET OPTION(S)

-R RESET 50% DUTY
-R1 RESET ONE SECOND

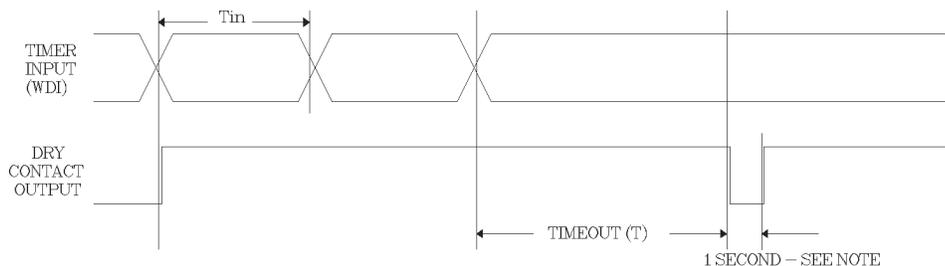
EXAMPLE(S):

WDT5D [STD MODEL -- FAIL OPEN, 2 SEC, 5V LOGIC]
WDT12D-C-T8.0 [FAIL CLOSED, 8 SEC, 12 VOLT LOGIC]

FOR STANDARD TYPES, LEAVE OPTION FIELD BLANK.

[*-5A option is available on 15 and 24V models only as a standard option. For 5V models with -5A option, consult factory.]

Timing Diagram - "R1" Option



The "-R1" option is designed to RESET computer controlled systems with long boot-up times, such as systems operating under Windows™. Upon time-out, the output changes for one second and resets the timer. This sequence repeats until a WDI input is detected (pin 4). This option is recommended to be used in conjunction with the -C option for FAIL-CLOSED operation. (-Txx option may be desired for specific timeout periods).

WDT5D Series

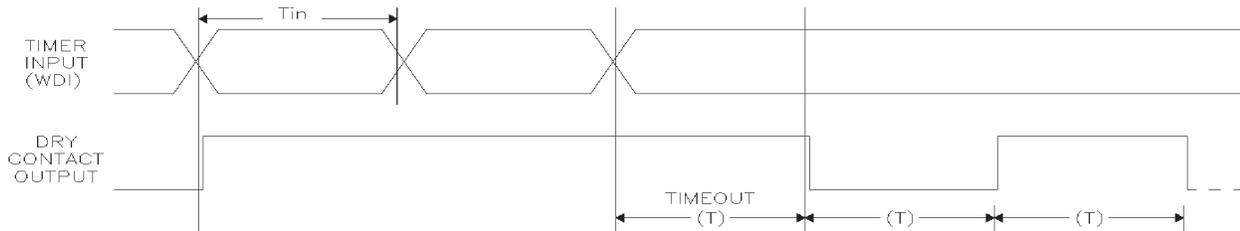
WDT12D

WDT15D

WDT24D

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Timing Diagram - "R" Option



The "-R" option adds an extra function by toggling the output contact on and off (50% duty cycle) after the initial timeout has occurred. The on and off time is equal to (T), the fixed timeout delay period. Any change-of-state detected on the WDI input will reset the integral timer and restore the contact.

Application Notes

1.6.1 Hardware Design

It is recommended to drive the Watchdog Timer input from the same decoded data that is controlling the system outputs. This will provide a very reliable "loss of control" detection. It is NOT recommended that the decoded address (Chip Enable or Strobe) lines are used as the WDI input signal, because these lines are likely to be random during a CPU latch-up condition. (See Figure F.)

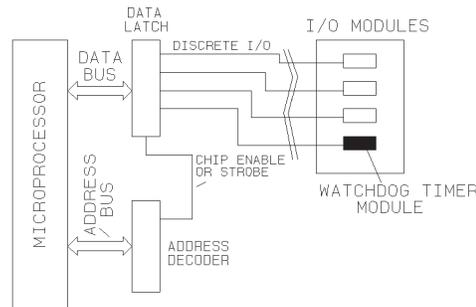


Figure F — Watchdog System Location

1.6.2 Software Design

Most control programs are structured with subroutines and interrupt calls. Others are simply one continuous loop. In either case, the most reliable place to service the Watchdog Timer line is from within the Main Loop. If the program is multitasking, then servicing the Watchdog line from within the primary main loop is recommended. It is NOT recommended to service the Watchdog line from within a subroutine, in the event the program may get lost within the subroutine and continue to service the Watchdog even in a "loss of control" condition. It is also recommended NOT to service the Watchdog line using a timer interrupt because it is likely that the program could latch-up and the timer will force the Watchdog line to be serviced at its expected interval, thus preventing the "loss of control" condition from being detected.

1.6.3 System Configuration - Important Notes

1. I/O Rack must be connected to logic signal ground.
2. Inductive loads should be suppressed when driven by a dry contact. (i.e. — MOV, Clamping Diode, etc.)
3. During normal system operation, the Watchdog output relay is normally energized and therefore the LED indicator will be lit.