

# WTB-871120 /10/20/30 UNIVERSAL RELAY SERIES DESCRIPTION, OPERATION, AND INSTALLATION

## 1.0 GENERAL

1.01 The INS-871120 section provides description, installation and application information for the WTB-871120 Universal Relay Series.

1.02 This update changes information content and applications for the entire WTB-871120 series.

## 2.0 PRODUCT DESCRIPTION

### A. GENERAL INFORMATION

**2.01** The WTB-871120-10/20/30 Universal Relay series, provide an inexpensive source for supplying a single set of isolated (Dry), Form C, (Normally Open, Normally Closed, and Common) relay contacts. They feature constant current coil circuitry. This allows a single unit to operate over a wide range of available drive voltages while presenting a constant current load of approximately 22 ma to the driving source.

The HS or (High Sensitivity) versions of the 871120 series present a constant current load of approximately 9ma. The operating voltage range of the HS versions is limited to voltages above 24 volts.

These units will function on virtually all voltages present in the, Sound, Security, and Telecommunications Industries. The units allow a simple source of inexpensive contact generation for many applications. All units and contacts are design rated for use with Class II voltages only.

### B. DESCRIPTION OF WTB-871120 DESIGNATIONS AND BASIC APPLICATIONS

**2.02** The **WTB-871120-10** is a universal AC/DC type configuration for use in applications with voltages ranging from 12 VDC to 30 VDC or from 10 VAC to 24 VAC. The unit has a slow release option, which causes an approximate 100ms operate delay and a 350ms release delay. Without the slow release option the unit will operate and release in approximately 5ms. (Refer to Application Note WTB-871120 for more detailed information.)

**2.03** The **WTB-871120-10HS** is a higher sensitivity, lower current, version of the WTB-871120-10. Like the standard unit the HS version is used in applications requiring a universal AC/DC type relay working with drive voltages ranging from 24 VDC to 56 VDC or from 18 VAC to 36 VAC. The unit has a slow release option, which causes an approximate 100ms operate delay and a 350ms-release delay. Without the slow release option the unit will operate and release in approximately 5ms. The HS version is generally used in 1A2 type DC Matrix ring configurations or for any DC Relay application of 24 volts to 56 volts.

(Refer to Application Note WTB-871120 for more detailed information.)

**2.04** The **WTB-871120-20** is configured as an AC relay with DC blocking. It is useful for special signaling applications where an AC voltage is superimposed or biased on a DC source. The WTB-871120-20 offers the same constant coil current circuitry. The AC current is limited to approximately 22 ma and is constant over a frequency range of 20hz - 60hz. The unit is intended to respond to AC voltages from 12 VAC to 24 VAC while blocking any DC component. (Refer to Application Note WTB-871120 for more detailed information.)



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WTB 871120 SERIES UNIVERSAL RELAYS REV 10/2003

**2.05** The **WTB-871120-20HS** is a higher sensitivity, lower current, version of the WTB-871120-20. Like the standard unit the HS version is configured as an AC relay with DC blocking. It is useful for special signaling applications where an AC voltage is superimposed or biased on a DC source. The WTB-871120-20HS offers the same constant coil current circuitry. The unit presents a constant load of 8 ma across its entire operational range, and will work over a frequency range of 20hz - 60hz. The unit is intended to respond to AC voltages from 24 VAC to 60 VAC while blocking any DC component.

The unit can be used to respond to intermittent AC signalling voltages as high as 150 VAC. Any voltage in excess of 50 VAC must be intermittent duty 25% on to 75% off. The unit is not intended for continuous use with any AC drive voltage above 50 VAC. The unit can also be optioned for removal of the flutter filter allowing contact modulation at the applied AC frequency. (Refer to Application Note WTB-871120 for more detailed information.)

**2.06** The **WTB-871120-30** is configured as a polarity sensitive DC latching relay for operation with drive voltages of 12 to 48 VDC. The unit is triggered by a (+) pulse of at least 100us. The relay latches and will release upon removal of supply voltage. This unit is normally used for Zone Paging configurations utilizing a conventional Tone Decode Intercom unit. The unit can also be used for remote indicator memory or FAX in applications. (Refer to Application Note WTB-871120 for more detailed information)

## C. PHYSICAL DESCRIPTION

**2.07** The WTB-871120-10/20 and HS versions are small printed circuit board assemblies measuring 1.75"L X 1.35"W X .45"H. The units have five (5) telephone industry standard, spade lug receptacle terminals for interface connections. Five (5) 10" spade tip, color coded, wires are supplied with the units.

The WTB-871120-30 is a small printed circuit board assembly measuring 1.75"L X 1.35"W X .45"H. The unit has six (6) telephone industry standard, spade lug receptacle terminals for interface connections. The additional terminal being the trigger input. Six (6) 10" spade tip, color coded, wires are supplied with the unit.

## D. ELECTRICAL SPECIFICATIONS

### **2.09** CONTACTS: RATINGS APPLY TO ALL UNITS

\* One set Form C (Normally Open, Normally Closed, Common)  
rated at 1 Amp Resistive @ 28VDC

\* 25W Average Audio Switching on Standard 25v Audio Page Lines

\* External Arc Suppression and derating is required for reactive loads. (Refer to Application Note AN-871120)

\* **Contacts are intended for Class II voltage operation only.**

Higher voltage and current for operation of Klaxons or 120VAC lamps can be provided by utilizing a Solid State AC switch such as the Grayhill 70S2-04-B-06-S and a Class II power supply in conjunction with the units Form C contacts.  
(Refer to Application Note AN-871120)

## 2.10 WTB-871120-10 UNIVERSAL RELAY STANDARD CONFIGURATION

- \* Input Voltage Range 12VDC to 30VDC / 10VAC to 24VAC
- \* Non-Polarity Sensitive
- \* Maximum Coil Current 25ma
- \* Must Operate Current 15ma
- \* Must Drop Loop Current 4ma
- \* Response Time: (Slow release option"OUT") 5 ms Operate / 5ms Release  
(Slow release option "IN") 150ms Operate / 350ms Rele

## 2.11 WTB-871120-10HS HIGH SENSITIVITY RELAY CONFIGURATION

- \* Input Voltage Range 24VDC to 56VDC / 24VAC to 48VAC
- \* Non-Polarity Sensitive
- \* Maximum Coil Current 9 ma
- \* Must Operate Current 8 ma
- \* Must Drop Loop Current 2 ma
- \* Response Time: (Slow release option"OUT") 5 ms Operate / 5ms Release  
(Slow release option "IN") 150ms Operate / 350ms Release

## 2.12 WTB-8711220-20 AC RELAY STANDARD CONFIGURATION

- \* Input Voltage Range 12 VAC TO 24 VAC
- \* Maximum Coil Current 25ma
- \* Must Operate Current 15ma
- \* Must Drop Current 3ma
- \* Response Time: (Slow release option"OUT") 5 ms Operate / 5ms Release  
(Slow release option "IN") 150ms Operate / 350ms Release
- \* 20 hz to 60 hz Frequency Response Range

## 2.13 WTB-8711220-20HS HIGH SENSITIVITY AC RELAY CONFIGURATION

- \* Input Voltage Range 24 VAC TO 48 VAC
- \* Intermittent Signal Voltage rating of 130VAC
- \* Maximum Coil Current 9ma @ 130VAC
- \* Must Operate Current 8ma
- \* Must Drop Current 2ma
- \* Response Time:(Slow release option"OUT") 5 ms Operate / 5ms Release  
(Slow release option "IN") 150ms Operate / 350ms Release
- \* 20 hz to 60 hz Frequency Response Range

### \* INTERMITTENT MODE OPERATION:

2 SECONDS ON MAXIMUM---25% DUTY CYCLE MAXIMUM (1 SEC ON/ 3 SECONDS OFF)

**CAUTION: A 100% DUTY CYCLE (CONSTANT ON) AT THE RATED INTERMITTENT VOLTAGE MAY RESULT IN POSSIBLE DAMAGE OR DEVICE FAILURE.**

- \* Intermittent signal voltage **130 VAC MAXIMUM RATING**

- \* Internal non replaceable fusing 125ma

## **2.14 WTB-871120-30 LATCHING RELAY/ 12VDC TO 30VDC @ 25MA**

- \* Input Voltage Range 12 VDC to 30 VDC
- \* (+) Trigger Input 100 ms minimum
- \* Maximum Coil Current 25ma
- \* Must Operate Current 15ma
- \* Must Drop Loop Current 4ma
- \* Response Time: 50ms Operate / Unit remains latched until supply voltage is removed.

## **2.15 WTB-871120-30HS HIGH SENSITIVITY LATCHING RELAY/ 24VDC TO 56VDC @ 9 MA**

- \* Input Voltage Range 24 VDC to 56 VDC
- \* (+) Trigger Input 100 ms minimum
- \* Maximum Coil Current 9 ma
- \* Must Operate Current 8 ma
- \* Must Drop Loop Current 2 ma
- \* Response Time: 50ms Operate / Unit remains latched until supply voltage is removed.

## **3.0 OPERATION**

**3.01** Operation of WTB-871120-10/10HS UNIVERSAL RELAY: The relay is activated when an AC or DC voltage, in the unit's operational range, is placed on the input terminals. The input terminals are non polarity sensitive for DC. The relay when active will draw a constant average current through out its operational voltage range. Connection to the relay contacts on the standard circuit board is made via spade tipped wires to the board receptacles. Connection to the modular case unit is made via snap action terminal strips.

**3.02** Operation of WTB-871120-20/20HS UNIVERSAL AC RELAY: The unit is designed to respond only to AC voltage. The relay is activated when a conventional sinusoidal AC voltage, in the unit's operational voltage range, with a frequency of 20 to 60 hz, is placed on the input terminals. The relay when active will draw a constant average current through out its operational range.

The input terminals are non-polarity sensitive in relation to the blocked DC voltage when the unit is used on a DC biased signaling system.

If the factory filter jumper is cut the relay will be modulated (flutter) at twice the frequency rate of the applied AC voltage. This can be useful for audio tone modulation or lamp modulation to indicate signaling. Because the flutter is a mechanical action lower frequency AC signaling voltages work best. Field test shows that 30 hz is the upper limit for using this particular device feature for any type of visual or audible flutter indication.

The 871120-20HS unit can be used on AC signaling voltages up to 130 VAC maximum. The signaling voltage at this level must be intermittent, with a duty cycle not exceeding 25% or an on time exceeding 2 seconds maximum.

**3.03** Operation of the WTB-871120-30/30HS LATCHING RELAY: In normal operation the latching relay is powered by a switched DC source of 12 VDC to 30 VDC (24 VDC to 56 VDC for HS version). The unit is polarity sensitive. In addition to the (+) and (-) input terminals there is an additional

terminal for (+) trigger. When DC power is switched to the unit and a (+) trigger of at least 100 ms is gated, the unit will latch on. The trigger can be momentary or continuous, and has no effect once the unit is switched on. Removal of the DC drive voltage at the (+) or (-) terminal will reset the unit. DC voltage can then be restored and the unit is ready to latch again on the next trigger signal. In operation as a Zone Page control module, a conventional tone intercom audible supply can be optioned to provide a momentary trigger pulse on the selected digit decode. DC drive voltage is supplied via the page contact or lamp battery contact. This contact is only active if the intercom is accessed, and as such, provides a switched source of DC to the latching relay. Audio is routed through the latching relay's Form C contacts. The latching relay (Zone) will remain active until the intercom drops off, removing the DC drive and resetting the latching relay unit. Using one latching relay per zone, as many zones as are required can be activated. Paging and intercom functions can be mixed if the audio signaling utilizes a switched (GND +) approach.

## **INSTALLATION QUICK REFERENCE NOTES:**

### **4.0 INSTALLATION**

**4.01** Installation of the 871120-10/10HS is illustrated in Figure 4-1. Connection to the unit is made via spade lug terminals as shown in the diagram. The connection terminals are identical for the WTB-871120-10/10HS and the WTB-871120-20/20HS.

The WTB-871120-30/30HS series has one extra terminal for the trigger input as shown in Figure 4-3.

The alternate terminal designations for each WTB-871120 type are shown in the designated Figures 4-1 thru 4-3. The relay contact terminals are designated NO (Normally Open), NC (Normally Closed), and C (Common).

**4.02** Installation of the WTB-871120 series modular case is shown in Figure 4-4. The modular case provides a protective housing for the installation of the WTB-871120 series circuits. Connection to circuits housed in the modular case are made via two snap action type terminal strips as shown in Figure 4-4.

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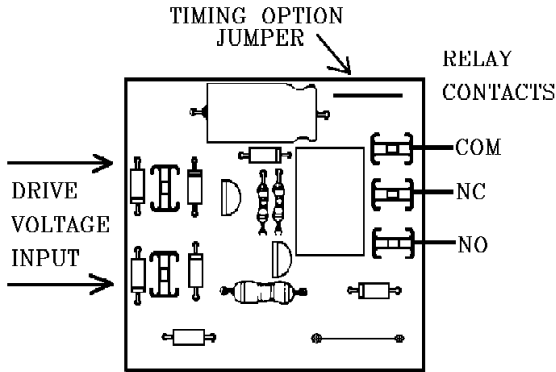
**CAUTION: NEVER USE THE RELAY CONTACTS ON THE WTB-871120 SERIES MODULES TO DIRECTLY SWITCH 120 VAC LINE VOLTAGE. ALWAYS USE A LOW VOLTAGE BUFFER CIRCUIT WHICH HAS BEEN RATED FOR THIS PURPOSE. FAILURE TO FOLLOW THIS PRECAUTION CAN EXPOSE INSTALLATION PERSONNEL TO HAZARDOUS VOLTAGE AND CURRENT POTENTIALS. THESE UNITS ARE INTENDED FOR CLASS 2 AND CURRENT LIMITED SIGNAL VOLTAGE OPERATION ONLY.**

**HIGHER VOLTAGE AND CURRENT FOR OPERATION OF KLAXONS OR 120 VAC LAMPS CAN BE PROVIDED BY UTILIZING A SOLID STATE RELAY SUCH AS THE GRAYHILL 7052-04-B-06-S AND A CLASS 2 POWER SUPPLY IN CONJUNCTION WITH THE WTB-871120 RELAY CONTACT OPERATION.**

**NOT FOR DIRECT CONNECTION TO THE PUBLIC SWITCHED TELEPHONE NETWORK. FOR USE BEHIND REGISTERED PBX OR SIMILAR EQUIPMENT ONLY.**

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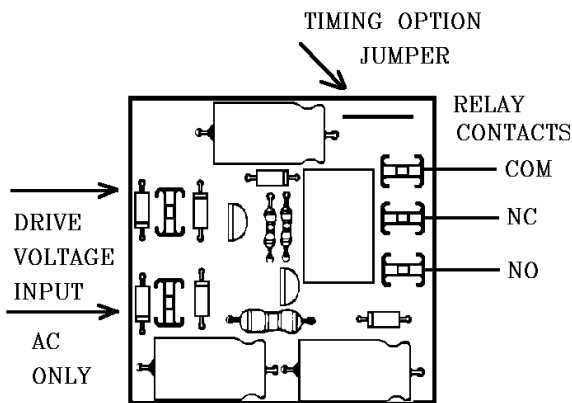
## INSTALLATION DIAGRAMS AND NOTES FOR THE WTB-871120 UNIVERSAL RELAY SERIES



**FIGURE 4-1**  
**WTB-871120-10/HS**

1.) **WTB-871120-10** IS A UNIVERSAL RELAY FOR AC OR DC DRIVE VOLTAGES. THE INPUT VOLTAGE RANGE OF THE 871120-10 IS: 12-24 VAC/ 12-30 VDC

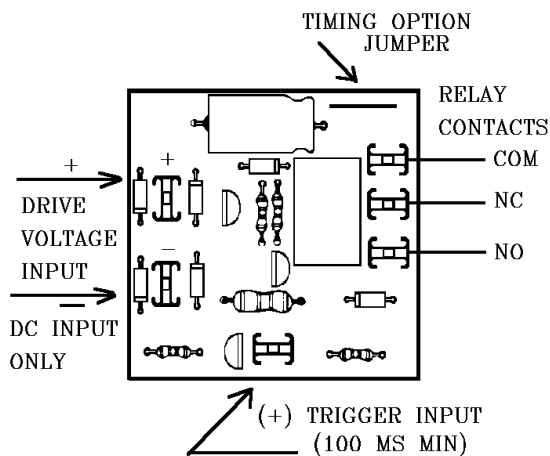
2.) **WTB-871120-10HS** IS THE HIGHER SENSITIVITY VERSION OF THE UNIVERSAL RELAY. IT DRAWS ONLY 9MA ACROSS THE ENTIRE SPECIFIED INPUT VOLTAGERANGE. THE INPUT VOLTAGE RANGE FOR THE WTB-871120-10HS IS: 18-48 VAC/ 24-56 VDC.



**FIGURE 4-2**  
**WTB-871120-20/20HS**

3.) **WTB-871120-20** IS AN AC ONLY RELAY. THE INPUT VOLTAGE RANGE OF THE WTB-871120-20 IS 12-24 VAC

4.) **WTB-871120-20HS** IS AN AC ONLY RELAY. THE INPUT VOLTAGE RANGE OF THE WTB-871120-20HS IS 18-48 VAC CONTINUOUS AND 18-130 VAC INTERMITTENT DUTY.



**FIGURE 4-3**  
**WTB-871120-30**  
**ELECTRONIC LATCHING RELAY**

5.) **WTB-871120-30** IS AN ELECTRONIC LATCHING RELAY TRIGGERED BY A (+) INPUT OF 100MS OR LONGER. ONCE TRIGGERED THE UNIT WILL STAY IN ITS LATCHED MODE UNTIL THE INPUT DRIVE VOLTAGE IS MOMENTARILY INTERRUPTED. THE INPUT VOLTAGE RANGE OF THE WTB-871120-30 IS DC ONLY +12-30 VDC @ 25MA

6.) **WTB-871120-30HS** IS THE HIGHER SENSITIVITY VERSION. THE INPUT VOLTAGE RANGE OF THE WTB-871120-30HS IS + 24-56 VDC @ 9MA.

## **5.0 WARRANTY INFORMATION**

**5.01** The Creative Aspect, Inc. warrants that the circuits described in the above specification will be free from defects in material for a period of one (1) year from the date of shipment. Excessive mechanical or electrical abuse excluded. If during the period of one (1) year from the date of original purchase, this circuit assembly, or any part, should prove defective by reason of improper workmanship or materials, return it prepaid to The Creative Aspect, Inc. Purchaser must first obtain a RETURN MATERIAL AUTHORIZATION (RMA). The Creative Aspect, Inc. will repair or, at its option, replace the product without charge for parts or labor. (Replacement can be with similar equipment.)

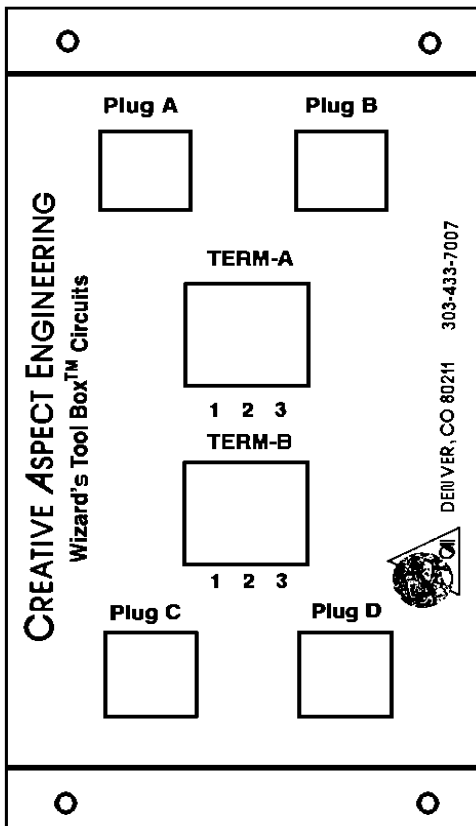
Should this circuit assembly prove defective in workmanship or materials, the consumers sole remedies shall be repair or replacement as here-in above provided. Under no circumstances shall The Creative Aspect, Inc. be liable for any loss or damage, direct, indirect, consequential, or incidental arising out of the use or inability to use this product. This limited warranty is in lieu of all other warranties, expressed or implied.

Certain terms and conditions of this warranty may not apply where local laws prevail.

## DISCONTINUED CONFIGURATION USE FOR REFERENCE ONLY

**2.08** The modular case housing for the circuits provides two (2) quick connect, three (3) position, snap action terminal strips for the inputs and relay contacts. The housing case dimensions are 2.74"W X 4.19"H X 1.57"D. The mounting plate is 2.56"W X 5.43"H. When ordering or describing, these units have an "MC" suffix to denote the modular case, i.e.; CAI-871120-10MC, CAI-871120-20MC, or CAI-871120-30MC. All connections to these units are made via snap connection terminals. **(See Figure 4.4)**

**4.03** Installation of the WTB-871120 is shown in Figure 4-4. The modular case has 4 mounting holes on the case backplane. There are 4ea #5 X 1/2" tapping screws supplied with the modular protective case for wall mounting.



**FIGURE 4-4**  
**WTB-871120 SERIES**  
**MODULAR CASE**

1.) THE WTB-911031 SERIES MODULAR CASE PROVIDES AN EASY MEANS OF HOUSING AND PROTECTING THE WTB-871120 SERIES CIRCUITS WHEN THEY ARE USED IN A STAND ALONE CONFIGURATION.

2.) CONFIGURATION STANDARDS FOR THE WTB-871120 SERIES ARE AS FOLLOWS:

**TERMINAL A**

- 1--DRIVE VOLTAGE (+)
- 2--DRIVE VOLTAGE (-)
- 3--TRIGGER INPUT (WTB-871120-30/30HS)

**TERMINAL B**

- 1--COMMON RELAY CONTACT
- 2--NORMALLY OPEN RELAY CONTACT
- 3--NORMALLY CLOSED RELAY CONTACT