

THE SHAWNEE 334 COUNTS INPUT PULSES AT SPEEDS UP TO 5,000 PER SECOND, WITH 100% REPEAT ACCURACY ANYWHERE IN ITS ACTIVE RANGE OF 1 TO 9999 COUNTS. AN EXTREMELY VERSATILE COUNTER, IT CAN BE USED WITH A VARIETY OF START AND PULSE SIGNALS — POSITIVE OR NEGATIVE DC VOLTAGE INPUTS OR ISOLATED CONTACT CLOSURES; IT COUNTS ON *MAKE* OR *BREAK*, WITH BOUNCE IMMUNITY FOR EITHER LOW OR HIGH-BOUNCE CONTACT CLOSURE INPUTS; AND OPERATES EITHER AS A REPEAT CYCLE PULSE GENERATOR OR IN SINGLE CYCLE INTERVAL OR DELAYED CONTROL.

## PRODUCT HIGHLIGHTS

### 100% ACCURATE AND BOUNCE-PROOF

The repeat accuracy of the Shawnee 334 is 100% at all rated speeds, even in the presence of contact bounce. The 334 has two selectable levels of bounce suppression: a normal level which eliminates false counts at speeds up to 500 per second with reed switch inputs, and 5000 per second with DC voltage pulses; and a high level, for speeds up to 80 per second with high-bounce contact closures (relays, precision switches, etc.)

### CONTROL VERSATILITY

The 334 operates either as a repeat cycle pulse generator or in single-cycle interval or delayed mode: you choose the kind of control action you want by installing jumpers on the terminal block. It also provides a choice of control output: a standard plug-in SPDT relay or an optional SPST solid-state switch module . . . plus an independent and separate DC output signal at Terminal 6.

### NOISE IMMUNITY

The 334 does not have to be shielded: its transformer power supply, full-wave bridges, buffered logic and other design characteristics render it immune to the electrical noise that is sometimes encountered in industrial environments thus eliminating false *starts* and *reset* due to voltage spikes.

### SOLID-STATE RELIABILITY

Because it has no moving parts in its logic circuitry, the solid-state 334 has a practically unlimited life expectancy. Its standard plug-in load relay is rated for 100,000,000 mechanical operations, and its optional solid-state switch module has a virtually infinite life expectancy.

### PLUG-IN AND DUST-TIGHT

All 334 counters feature true plug-in design and are dust-tight from the front of panel. An optional transparent rubber boot makes the face of the counter fully dust and water-tight.

SERIES  
**atc** 334 SHAWNEE  
HIGH SPEED  
IC DIGITAL PREDETERMINING COUNTER



### CYCLE PROGRESS INDICATION

While the non-indicating Model 334B does not provide true cycle progress indication, its *legend light* signals when there is power to the counter, and its *pilot light* signals when the counter is running.

### EASY TO SET AT ALL TIMES

The Shawnee counter is easily and accurately set even with work gloves on. Push any of its four toggle levers in any sequence until the number you want appears above it. You can decrease as well as increase each number by pushing the levers *up* or *down*. You can change the setting at any time, even during a cycle.

### APPROVALS

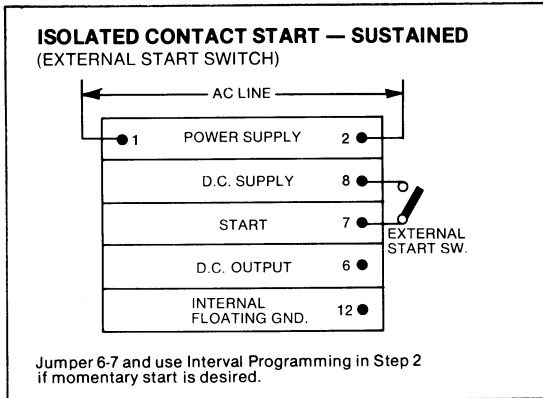
CSA. U.L. Recognized

**TYPICAL APPLICATIONS** The Shawnee 334 has a readily accessible 16-point terminal which allows its use with a variety of *start* circuits and *input* pulses and to *program* it for the desired *load* action. To wire the 334 so as to suit a particular application is a relatively simple matter that is easily accomplished by selecting one of the examples in each of the following four steps. Combine the four examples for your wiring diagram.

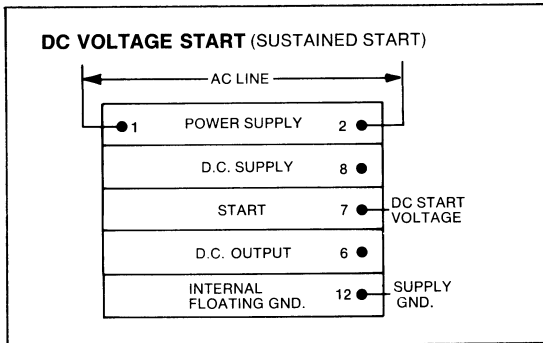
## STEP 1—START CIRCUITS

The 334 accommodates three types of *start* signals. To wire the counter properly to your *start* signal, first determine which of the three types applies, then consult the appropriate wiring diagram. Note that AC line connections are *always* made to Terminals 1 and 2.

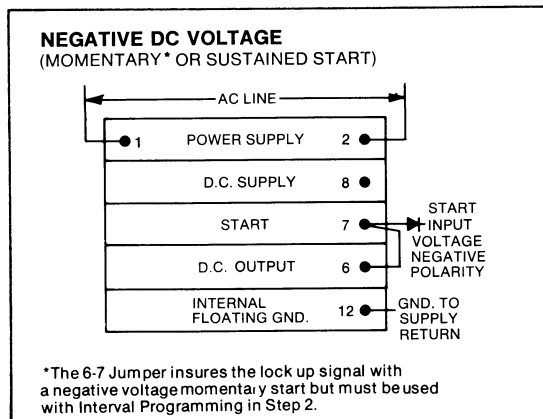
- A. ISOLATED CONTACT (sustained *start* signal.) The external dry *start* switch must be closed throughout the count cycle. The 334 is ready to count whenever the switch is closed; it resets when the switch is opened.



- B. DC VOLTAGE (sustained *start* signal.) The *start* voltage must be *on* throughout the count cycle. The 334 is ready to count whenever the voltage reaches + 4.5 or -3V DC; it resets when the voltage drops to + 1 or -1V DC.



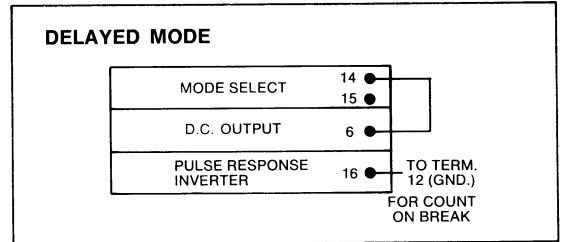
- C. NEGATIVE DC VOLTAGE (momentary\* or sustained *start* signal.) The *start* signal may be momentary or sustained. The 334 is ready to count whenever the *start* voltage reaches -3V DC. It resets at the end of the cycle, when the *start* voltage is momentary; or as soon after count-out as the *start* voltage drops between -1 and 0V DC, when the *start* signal is sustained.



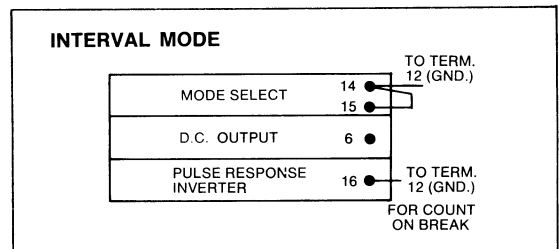
## STEP 2—PROGRAMMING

The 334 can be used for delayed or interval control or as a repeat-cycle pulse generator. Here again, decide which mode you want, then consult the appropriate wiring diagram. Note that the 334 counts on the *break* of a contact or decrease of a voltage signal when an external jumper is installed between Terminals 12 and 16, as shown in the diagrams in this step. It can also be programmed to count on *make* simply by leaving the jumper *off*.

- A. DELAYED MODE. The SPDT relay provides one delayed closing and one delayed opening circuit, and the 334 generates a DC signal at Terminal 6 at the end of the cycle.



- B. INTERVAL MODE. The SPDT relay provides one interval opening and one interval closing circuit, and the 334 provides a -24V DC signal at Terminal 6 during the cycle.



- C. REPEAT CYCLE PULSE GENERATOR. In this mode, the 334 generates an output of 80 ms ( $\pm 20$  ms) at the end of the count cycle; the length of the output pulse can be adjusted as follows:

To *shorten* the pulse, install a fixed or variable resistor between Terminals 12 and 14, sizing it according to this formula:

$$\frac{2.2t - 26.4}{80-t} = R$$

Where:  $t$  = time in ms ( $\pm 25\%$ )

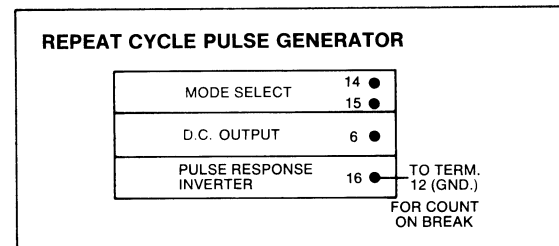
$R$  = resistance in megohms

To *lengthen* the pulse, install a capacitor between Terminals 12 and 14 (if a polarized capacitor, install + to 12, - to 14) and size it according to the formula:

$$\frac{T - 0.08}{1.6} = C$$

Where:  $T$  = time in sec ( $\pm 25\%$ )

$C$  = capacitance in microfarads.

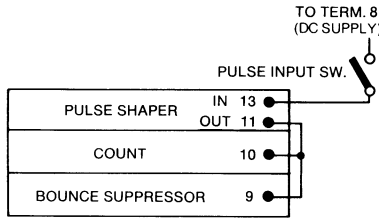


## STEP 3—PULSE INPUTS

The 334 can count from low or high-speed contacts or, by virtue of its built-in pulse shaper, from DC voltage pulses of positive or negative polarity. Choose the wiring diagram that suits your application.

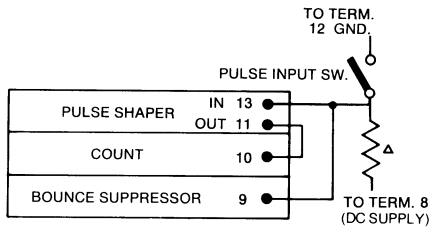
A. **LOW-SPEED CONTACTS.** The 334 counts input pulses from precision switches, relays, limit switches, etc., at speeds up to 80/sec.

### LOW SPEED CONTACTS



B. **HIGH-SPEED CONTACTS.** Input pulses from low-bounce contacts, reed switches, etc., can be counted at speeds up to 500/sec. In this circuit *only*, the 334 counts on the *break* of the pulse switch as received; to count on *make*, install a jumper between Terminals 12 and 16; this is the *reverse* of the situation that applies to all other 334 circuits.

### HIGH SPEED CONTACTS

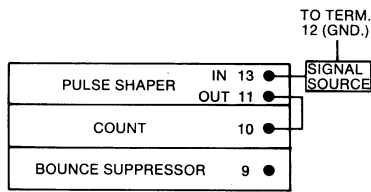


NOTE: With this circuit, to count on break, **remove** 12-16 jumper, shown in Step 2.

▲ Recommended Value = 33K ½W 10%

C. **DC VOLTAGE PULSES.** In this circuit, the 334 counts when the voltage decreases from above +4.5V to below +1V, or from above -3V to below -1V, with a jumper installed between Terminals 12 and 16 as shown in Section 2; to reverse the action, simply remove the jumper.

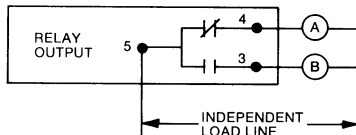
### COUNT DC VOLTAGE PULSES



## STEP 4—LOAD ACTION

The load action of the 334 depends on the choice of *start* circuit and *programming* mode.

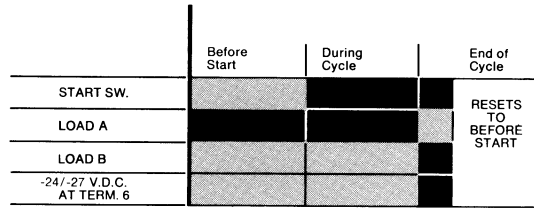
Loads are always wired to the 334 in the following manner:



If the 334 is equipped with the optional SPST solid-state switch module, its contacts are always available at Terminals 3 and 5, and its load action is the same as for Load B in the drawings right.

A. **DELAYED MODE.** The load action in this mode is always the same regardless of the kind of *start* circuit selected in Step 1; but the *start* signal must remain *on* during the entire count cycle, as the counter resets when the *start* signal is removed.

### DELAYED MODE

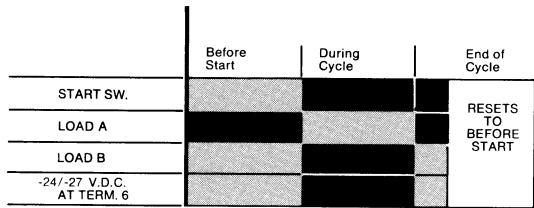


RED — Circuit Closed

GRAY — Circuit Open

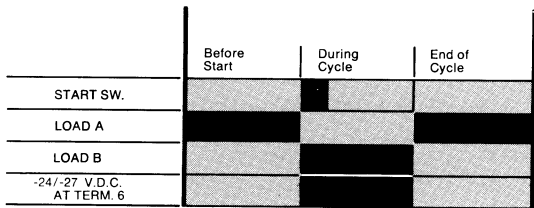
B. **INTERVAL MODE WITH SUSTAINED START.** In this mode also, the counter resets when the *start* signal is removed.

### INTERVAL—SUSTAINED START



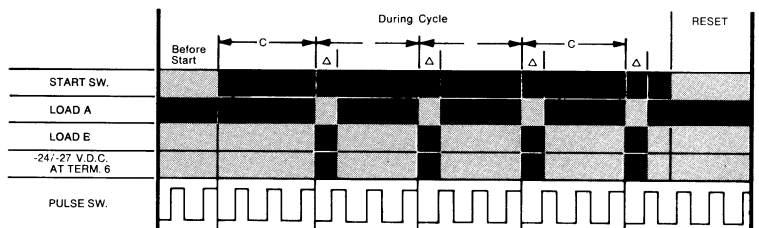
C. **INTERVAL MODE WITH MOMENTARY START.** Because of the 334's electronic latch capability, it can provide interval control with a momentary negative DC voltage *start* signal, in which event the 334 resets at the end of cycle. But the counter will also operate with a sustained *start* signal, in which case it resets when the *start* signal goes off, as described above.

### INTERVAL—MOMENTARY OR SUSTAINED START



D. **REPEAT CYCLE PULSE GENERATOR.** When this mode is selected, the *start* signal must remain *on* continuously. The 334 generates an output pulse at the end of each count cycle, then resets and repeats automatically. At least 500  $\mu$ s is required for resetting, between the last count of one cycle and the first count of the next. Count pulses can be of unequal length — long and short as shown in the diagram — provided that they meet the minimum requirements listed in the SPECIFICATIONS.

### REPEAT CYCLE PULSE GENERATOR



C = COUNT CYCLE = DIAL SETTING  
 $\Delta$  = TIMED PULSE OUTPUT

## OPERATION

The Shawnee 334 operates on a digital logic circuit with three main elements: *input circuits* which allow it to count various types of DC pulses; a *read-only-memory (ROM)* whose output is set by the counter's digital setting number wheels; and a *comparator* that continuously examines the outputs of the input circuit and ROM.

When the *start (ready/reset)* signal is **on**, the input circuit begins to count incoming pulses, feeding the total count continuously to the comparator. When input circuit output exactly equals ROM output, the 334 counts out. At that instant, the input circuit automatically turns itself **off** even if the *start* signal remains **on**; it is therefore not necessary to turn off the pulses externally.

At the same instant, the 334 provides one of three load control actions depending on how it is wired (see Typical Applications).

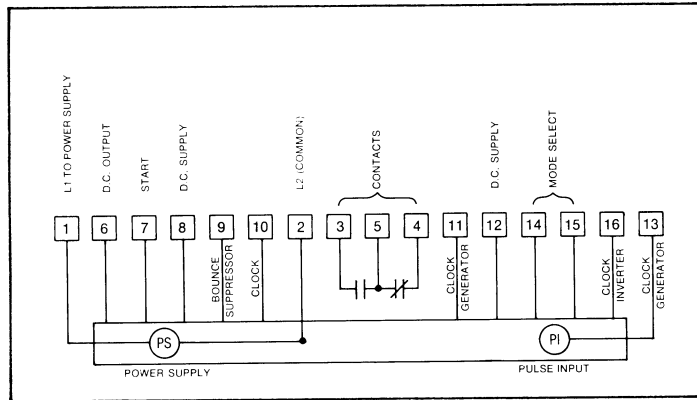
When the 334 is wired for interval operation, the counter's output device (either the standard SPDT relay or the optional SPST switch module) is energized from the start to the end of the count cycle; so is the DC output at terminal 6.

When the 334 is wired for delayed control, the output device is energized at the end of the cycle and remains **on** until the counter is reset; so is the DC output.

When the 334 is wired as a repeat cycle pulse generator, the output device and the DC signal are both **off** until the end of the count cycle, at which time they are both **on** for about 80 ms. From the instant that the output pulse comes on, the 334 stops counting for 500  $\mu$ s while it resets; it automatically begins a new cycle and starts counting pulses again immediately after reset.

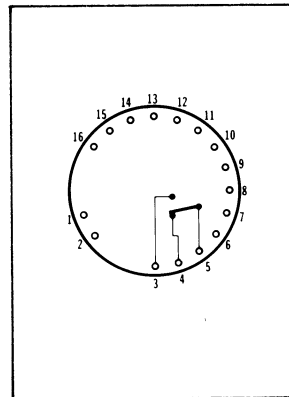
The duration of the pulse generated by the 334 can be easily lengthened or shortened by wiring a capacitor or resistor across terminals 12 and 14 (see Typical Applications).

## WIRING

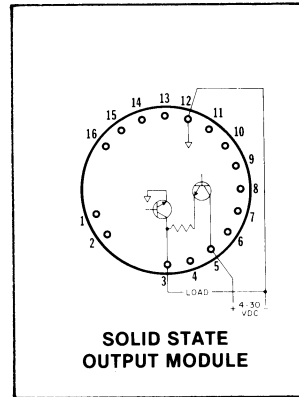


Concerning Safety...ATC makes every effort to build a safe product. We try to state specifications accurately. But every product made will eventually fail, so design our products into equipment so that they fail safely.

## TERMINAL WIRING



## TERMINAL WIRING



# SPECIFICATIONS

## MODEL

**334B** non-indicating  
(no cycle progress indication)  
Counts on *make* or *break*  
(field-convertible)  
Operates in **on delay** mode only.

## RANGE

**334B**: 1 to 9999 counts, in a single range.

## PULSE INPUTS

ISOLATED CONTACT INPUT (Dry)  
MIN. OPEN RESISTANCE: 1 megohm  
MAX. CLOSED RESISTANCE:  
**334B** — 50K ohms,  
SWITCH REQUIREMENTS: 10mA, 30V.

## COUNT RATE AND BOUNCE IMMUNITY

With normal bounce immunity — for  
Reed Switches (Terminal 9 jumpered  
to 13):

MAX. COUNT RATE: 500/sec.  
MIN. CLOSED TIME: 100  $\mu$ s.  
MIN. OPEN TIME: 1 ms.  
MAX. OPEN TIME FOR ANY SINGLE  
BOUNCE: 0.3 ms.

With maximum bounce immunity — for  
Precision Switches (Terminal 9  
jumpered to 10 and 11):

MAX. COUNT RATE: 80/sec.  
MIN. CLOSED TIME: 30  $\mu$ s.  
MIN. OPEN TIME: 6 ms.  
MAX. OPEN TIME FOR ANY SINGLE  
BOUNCE: 2.5 ms.

## VOLTAGE INPUTS

VOLTAGE REQUIREMENTS:  
POSITIVE POLARITY: **On** at 4.5V min.  
**Off** at 1.0V max.  
NEGATIVE POLARITY: **On** at 3.0V min.  
**Off** at 1.0V max.

MAX. CONTINUOUS INPUT: 40V.

RIPPLE VOLTAGE:  
Must not go below min. req.

INPUT IMPEDANCE: 334B-15K ohms

MIN. ON TIME: 60  $\mu$ s.  
MIN. OFF TIME: 100  $\mu$ s.  
COUNT RATE: 5K Hz max.  
RISE AND FALL TIME REQ.: none.

## START (READY/RESET) SIGNAL

VOLTAGE REQUIREMENTS:  
POSITIVE POLARITY: *ready* at 4.5V min.  
*reset* at 1.0V max.  
NEGATIVE POLARITY: *ready* at 3.0V min.  
*reset* at 1.0V max.

MAX. CONTINUOUS INPUT: 40V.

RIPPLE VOLTAGE:

must not go below min. req.

INPUT IMPEDANCE: 334B-15K ohms  
READY-TO-COUNT TIME: 0.5 ms max (after  
application of voltage to Terminal 7.)

## RESET TIME

CIRCUIT RESET: 1 ms max.

RELAY DROP-OUT: 20 ms max.

START SWITCH REQUIREMENTS (isolated  
contact)

SWITCH RATING: 10mA, 30V.  
MIN. OPEN RESISTANCE: 1 megohm.  
MAX. CLOSED RESISTANCE: 20K ohms.

LATCHING MODE OPERATION (interval only)

MIN. DURATION START SIGNAL: 50  $\mu$ s.

MAX. DURATION START SIGNAL:  
continuous

RESET: when signal is removed after  
count-out.

## DELAYED MODE

RELAY OPERATE TIME (after coincidence):  
20 ms max.

RELAY RELEASE TIME: 20 ms max.

## INTERVAL MODE

RELAY OPERATE TIME: 15 ms max.

RELAY RELEASE TIME (after coincidence):  
25 ms max.

## AUTOMATIC RECYCLE MODE

PULSE ON TIME (with relay): 80 ms,  $\pm$  20 ms  
(may be shortened or lengthened by  
installing a resistor or capacitor,  
respectively, across Terminals 12 and 14;  
see Application section for details.)

RECYCLE TIME AT RESET: **334B** - 4 ms.

## LOAD RELAY

LIFE: 100,000,000 operations (no load.)  
CONTACT RATING: 5 A at 120V AC  
2 A at 240V AC  
0.1 A at 125V DC

## SOLID-STATE SWITCH MODULE (Optional)

Switches external DC voltage supply of  
positive polarity, 4 to 30V, 50 mA max.;  
factory-wired to Terminals 3 and 5 (detailed  
description of operation in Installation  
Instruction IN-334.)

## DC OUTPUT (Terminal 6)

VOLTAGE: **on** — **334B** -27V  $\pm$  10%;  
**off** — -1V or less

CURRENT: *with relay* — 5 mA max.  
*without relay* — 40 mA max.

IMPEDANCE: **on** — 10 ohms max.  
**off** — 10K ohms.

## DC POWER SUPPLY OUTPUT (Terminal 8)

VOLTAGE: **334B** -27V  $\pm$  10%

CURRENT: 40 mA max.

## POWER REQUIREMENTS:

**120V**: 95 to 132V, 50/60 Hz  
inrush — 0.4 A  
running — 0.04 A.

**240V**: 190 to 264V, 50/60 Hz  
inrush — 0.2 A  
running — 0.02 A.

## TEMPERATURE RATING

0 to 60°C (32°F to 140°F.)

## WEIGHT

NET: 1 lb., 14 oz.  
SHIPPING: 2 lbs., 8 oz.

## MOUNTING ACCESSORIES

STANDARD: Hardware is provided to mount  
counter so that it is dust-tight from front of panel.  
OPTIONAL: (See last pages of catalog for  
detailed description).

Surface mounting with front-facing terminals.  
Dust boot.

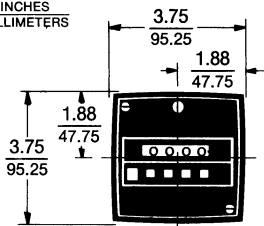
NEMA 12 molded case (1 counter) or NEMA 1  
steel case (2 counters).

**Before starting your design, read the safety statement in the front of the ATC catalog.**

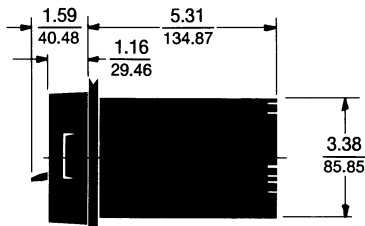
## DIMENSIONS

INCHES  
MILLIMETERS

INCHES  
MILLIMETERS

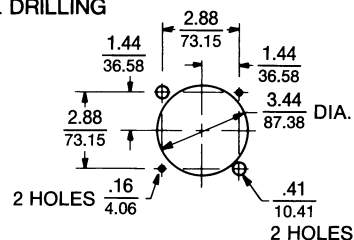


PANEL GASKET



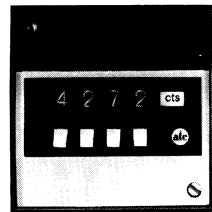
CUSTOMER'S PANEL UP TO 3/16" THK.

## PANEL DRILLING



# HIGH SPEED IC DIGITAL PREDETERMINING COUNTER

334B (without display)



ORDERING CODE	334B	350	Q	10	P	X
BASIC TYPE	_____					
RANGE	_____					
350	9999 Counts					
000	Special					
VOLTAGE AND FREQUENCY	_____					
Q	120 50/60					
R	240 50/60					
K	Special					
ARRANGEMENT	_____					
10	On-delay (resets on power interruption)					
00	Special					
FEATURES	_____					
P	Basic plug-in unit, with receptacle					
S	Surface mounted plug-in unit with front-facing terminals					
X	Standard unit					
J	With solid-state output module					
K	Special					

## ACCESSORIES

03252602800

Surface mounting brackets (without terminals) one pair required per counter

03252606200

Surface-mounting bracket and housing with front-facing terminals, less counter

03252605500

Boot Kit



**AUTOMATIC TIMING & CONTROLS  
COMPANY, INC.**